OpenCellular – Connect-1
Environmental Test Specification Document

Version 1.0

History.

SL.no	Date	Version	Author	Comments
1	February 9th, 2017	1.0	OpenCellular Team	First Release

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1. Purpose and Scope.

The purpose of this document is to capture the Connect-1 Environmental Test Specifications and Test Procedure. This intended to be used by R&D teams including testing team.

This document captures Connect-1 Environmental Test Specifications and detailed Test Procedure.

- Water Ingression IPX5
- Dust Ingression IP6X
- Rain & Blowing Rain
- Earthquake
- Salt Fog
- Operation Vibration
- Thermal
- HALT
- HASS

2. Abbreviation

ANT	Antenna
BOM	Bill of Material
BTS	Base Transceiver Station
ETSI	European Telecommunications Standards Institute
GBC	General Purpose Baseband and Computing
GPRS	General Packet Radio Service
GSM	Global System for Mobile
HW	Hardware
LED	Light Emitting Diode
LNA	Low Noise Amplifier
PA	Power Amplifier
PCB	Printed Circuit Board

3.4   Rain & Blowing Rain

3.4.1   Test Case: Effect of Blowing Rain

3.4.1.1 Description

I.   Purpose

The purpose of this test is to define unit tightness against Rain & Blowing Rain and to possible leaks of the unit.

II.   Impact of failure

If Rain test requirement is not met, there could be chance of water ingress in to the unit & system would not work as intended if water enter into the unit.

3.4.1.2 Test Equipment List

1. Rain & Blowing Rain test setup
2. Stop watch
3. Pin point colorimeter

3.4.1.3 Test Setup

i.   Unit Preparation

Before starting the test, Connect-1 unit is painted from inside by Pin Point colorimeter developer WDP-217 paint. This paint detects water leaks by colour change white to green.

Unit should be configured as per actual field condition (Exception case: Electronic PWB assemblies could be removed if required).
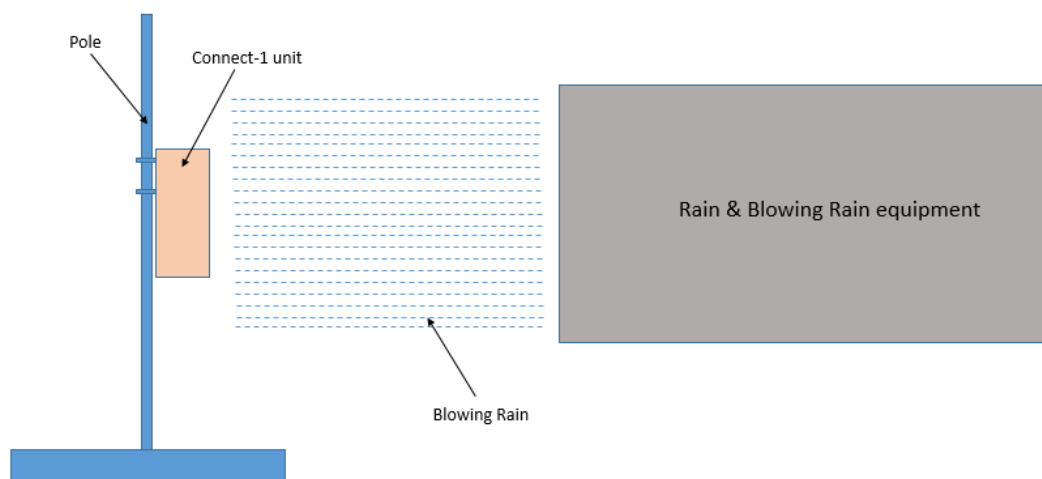

Figure 5. Rain Test Setup

ii. **Measurement Locations**

  A. Functionality of the unit should be checked during the test & after test

  B. Following are some of the parts and its locations which are checked after the test

   a. Connectors (can get loosened)

   b. Gaskets (can get damaged)

   c. Screws (can get unscrewed from the unit)

   d. Adhesive / Label (can get damaged)

   e. Components (can get de-soldered)

iii. **Equipment Settings**

   a. Non-operational working condition

iv. **Software settings**

  • Nil

3.4.1.4 Control & Measurements

1. Rain fall rate & Wind velocity are set as below
   a. Rain fall rate: 2.8 mm/min
   b. Wind velocity: 18 m/s

2. Water Flow rate & Wind velocity to be kept constant throughout the test & it should be monitored using flow rate measuring device attached to water outlet valve.

3. Position the wind source with respect to the test item so that it will cause the rain to beat directly, with variations up to 45° from the horizontal.

4. Measure the wind velocity at the position of the test item before placement of the test item in the facility

5. Rotate the unit so that each surface will be exposed for 30 minutes.

6. Total testing time will be for 2 hours.

7. Using stop watch for accurate time measurement.

3.4.1.5 Test Specification

1. The Test need to carry out as per the test standard MIL STD-810G Method 506.5 procedure

2. Unit should be configured as per actual field condition (Exception case: Electronic PWB assemblies could be removed as per the test conditions)

3. Unit mounting: Pole mounting condition

4. Pass / Fail criteria

  Pass : At the end of the test there shall not be any water detected in the IPX5 area.

  Fail : Water marks seen inside the IPX5 area

3.4.1.6 Test Procedure

1. Install the unit as per field installation (Pole mounting condition)

2. The simulated wind to be directed horizontally to blow through the water spray and drive it against the surfaces of the unit.

3. Ensure the rain is dispersed completely over the test item when accompanied by the prescribed wind.

4. Rotate the unit to expose each surface for 30mins, with total testing time of 2hrs.

5. After completion of test, without disturbing the unit place the unit inside thermal chamber and dry the unit for minimum of 2 hours at 50 degree before opening up the unit for observation.

6. Finally open the unit & visually inspect the unit for any water leak inside IPx5 area as give below
    - Connector joints
    - Gaskets
    - Screws
    - Adhesive / Label
    - Electronic circuit board
    - Cables

3.4.1.7 Reference

a. OC Connect 1 Environmental Test Specification document
b. 3D & 2D Design document
c. Product specification
d. Industry Standards
e. Datasheets for critical components