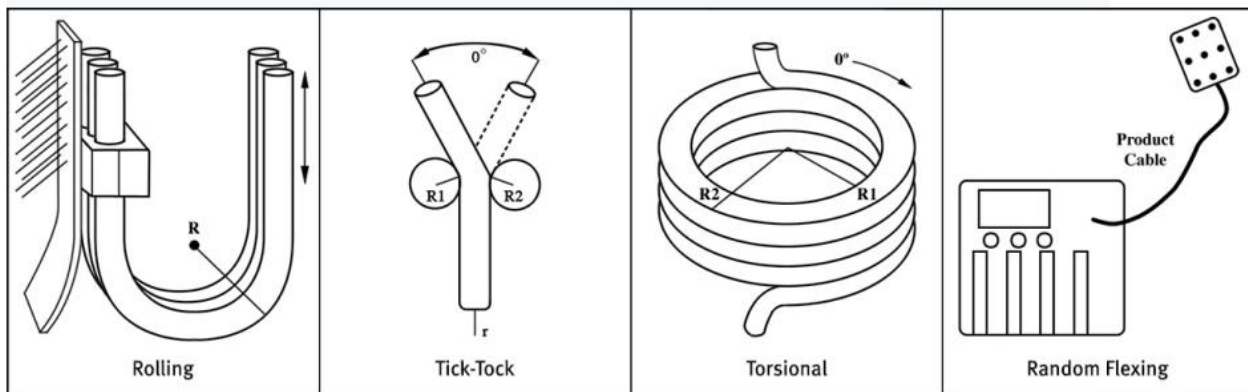# Bending (Tick-tock)Test for Microwave Ultra Flexible Cable Assembly

RF ONE UF series(stranded center conductor)

Introduction

There are four basic cable flexing modes in the operating environment: rolling flex, bending (Tick-Tock) flex, torsional flex and random flex, shown in below illustration.

*This illustration is from the source of Gore.

Bending or tick tock flex occurs when a cable is subjected to repetitive motion in the axis of the cable. For high flex applications, the industry usually adopts an accelerated life test involving a certain load with continuous flex at a fixed point.

1. Test Purpose

Bending (tick-tock) testing is performed to observe if our ultra-flexible test cable UF series (stranded center conductor) will degrade in its insertion loss & VSWR in the highly flex applications and also to determine the number of cycles the cable can be bent continuously at a fixed point (with a designated load) before the cable fails.

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2. DUT Product Information

Product Name	UF550 Ultra Flexible SMA Cable Assembly
P/N	UF550-SMAMSMAM-1M
Specification	Frequency Range: DC-18 GHz Length: 1 Meter VSWR: 1.3 max Insertion Loss:1.64 dB max
Qty	1 PC

3. Test Instrument and Tool

No.	Instrument	Model
1	Cable Bending Life Tester	DE21-001
2	Vector Network Analyzer	AV3672E(10MHz-67GHz)

4. Test Setup and Procedures

The test setup is based on standard IEC 60966-1. The DUT cable assembly is secured to the test apparatus shown in Diagram 1 and Pic 1.
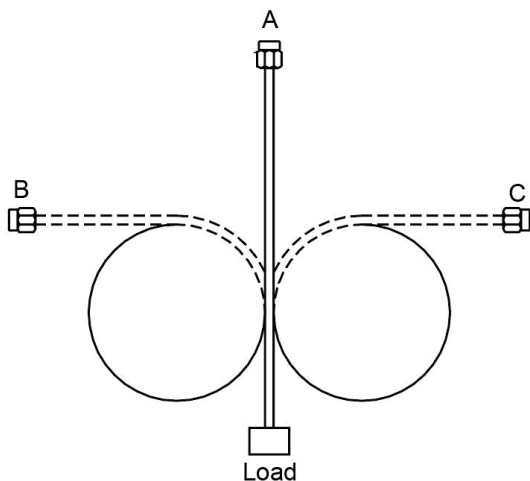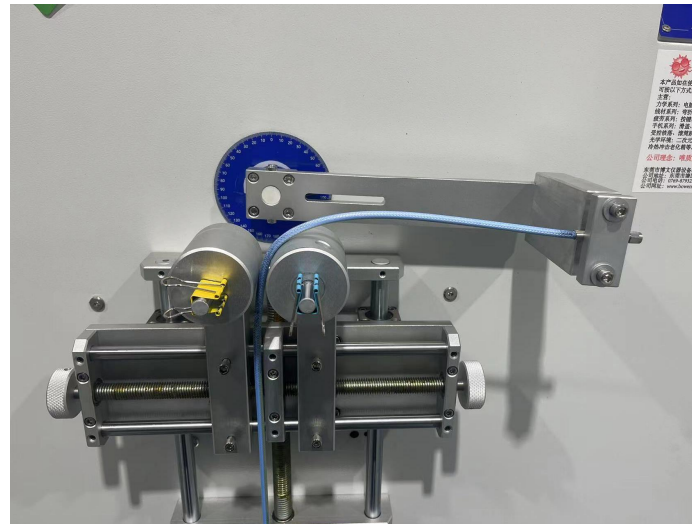

Diagram 1

Pic 1

1) During the entire test process, one connector end of the DUT is loaded with 100g weight perpendicularly.

2) The other end of the DUT is bent first in one direction with an angle of 90° to position B, then back to the central vertical position A, and then bent in the other direction with an angle of 90° to position C and finally back to the centre A again.The 4 times of bend makes one complete cycle.

3) The rate of flexing is 20 cycles per minute.

4) *The bending radius is only 26 mm(in order to simulate the extreme flex condition).

5) Measure and record the DUT cable's attenuation and VSWR every 100 cycles till the DUT cable performance is out of specs in a dynamic(test the DUT cable by shaking it) condition.
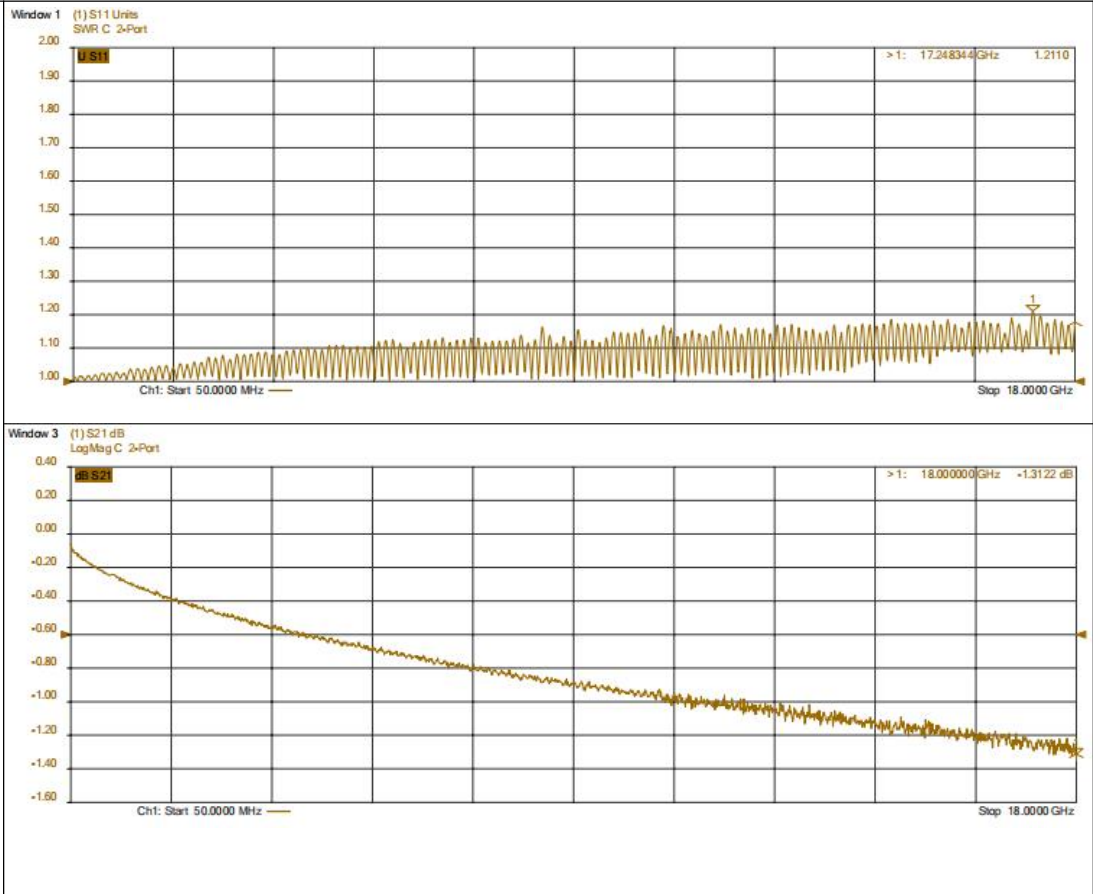
Increasing the bending radius can extend the flex life.
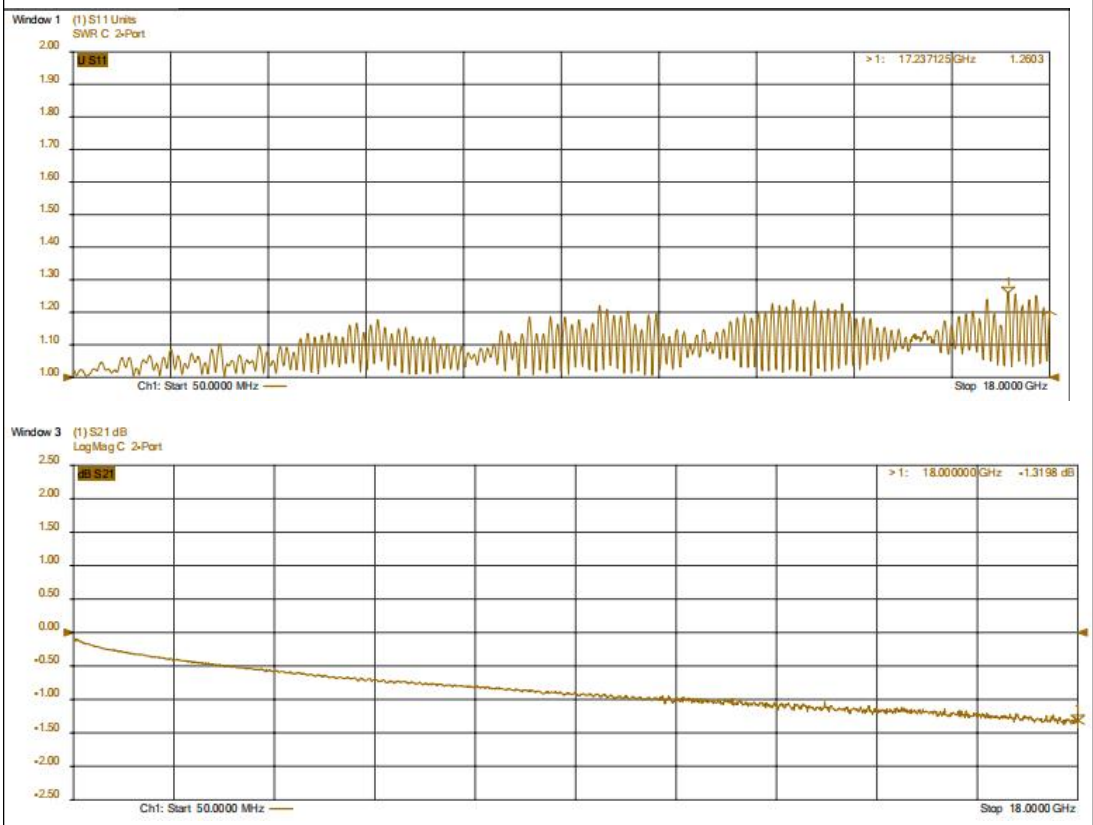
5. Test Results and Records

Records of DUT cable's VSWR and insertion loss from 100 cycles to 20000 cycles of bending test.
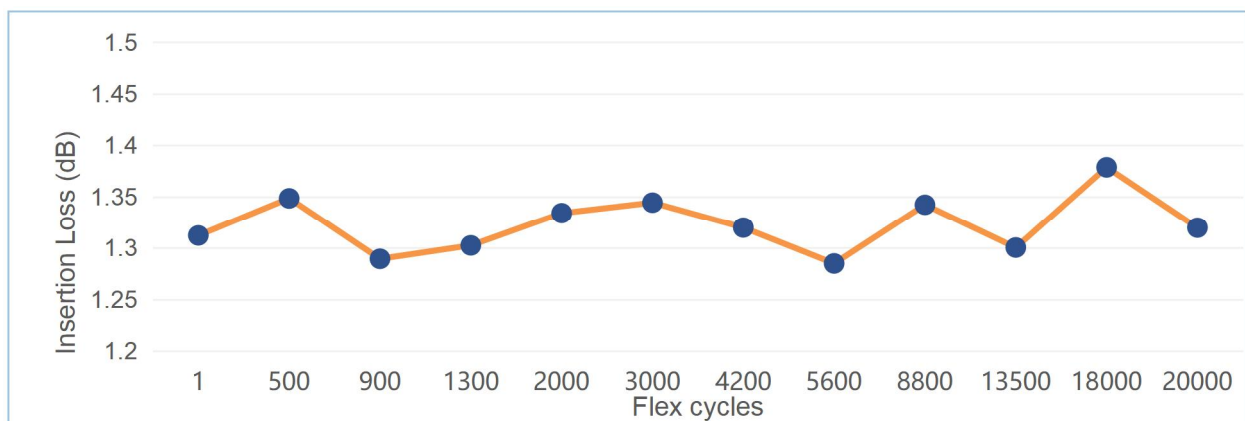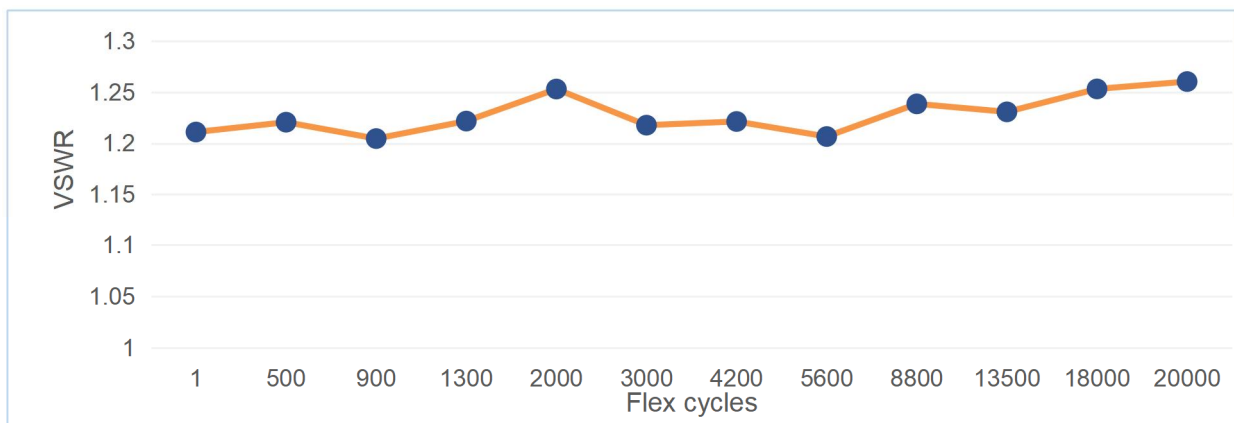
Before bend test

After 20000 cycles of bending test

6. Observations from the Test

The UF550 Ultra flexible cable assembly can endure min 20000 cycles of bending under these harsh conditions:

- Bend radius 26 mm
- Flex the DUT cable at a single point continuously
- Flex speed is 20 cycles per minute
- The flex test is performed with DUT loaded with 100g weight perpendicularly
- After the flex life test, the DUT cable shall be tested in a shaking condition, only negligible degradation in insertion loss and VSWR is allowed in such a dynamic test condition. Even the DUT cable test data is stable in static condition, but unstable in shaking condition, the cable is judged as Fail.