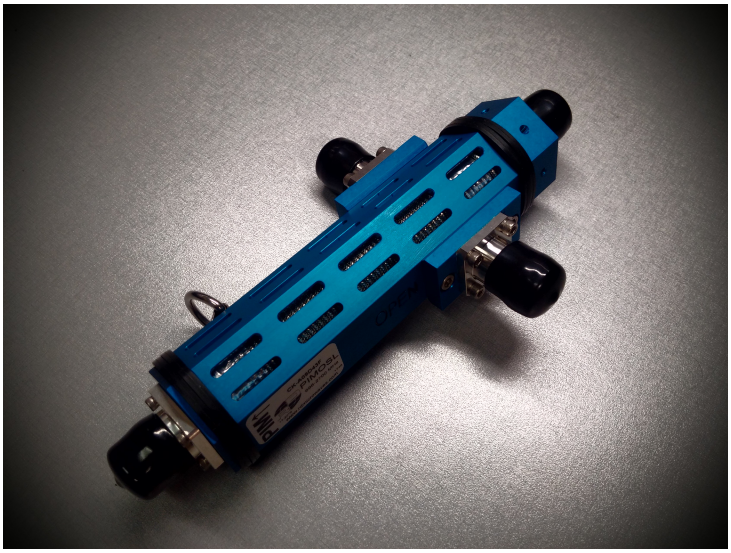
A Customer Story: Rapid DAS Test Procedure: Before And After R&D OSL-CK-A09

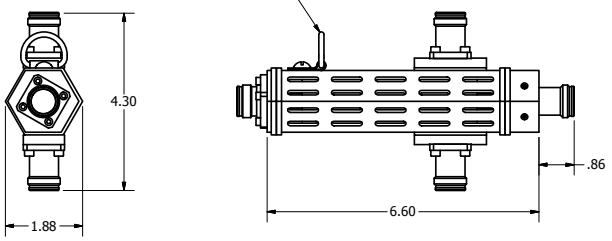
Traditional Sweep & PIM test procedures for a typical high-rise DAS project is usually a 4 step process. This document outlines the steps required (in Black) when using a traditional Open/Short/Load (OSL) Calibration-T, in conjunction with a typical Low PIM Load for Sweep & PIM Testing, compared to the Time Saving steps (in Red) using the New Hybrid Low PIM OSL. The process is the same for any number of antennas, but for the sake of this document we will only use an 8-antenna design. We will also assume that all terminations have been made and jumpers installed at the antenna locations. No troubleshooting steps will be covered as we will assume everything is connected correctly and functioning perfectly.

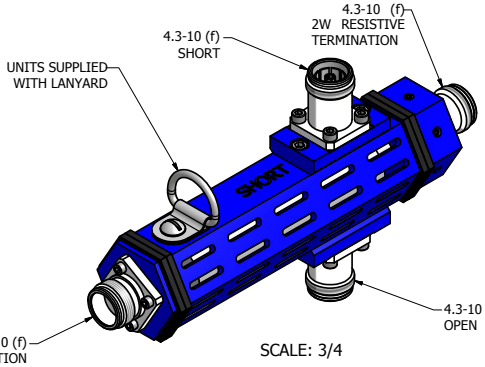
Every day before we physically get started we run through the same procedure of checking the equipment and cleaning all devices required for testing. We have a custom testing cart with all our loads and gear on it. Someone will usually take about an hour to power up all the test gear and calibrate it for the day. We also hand clean every load, OSL and PIM load. We do this by swabbing thoroughly with special q-tips (G-Tips, they are designed for firearm cleaning and do not break down like a typical q-tip swab. They are also shaped for reaching impossible edges and corners.) and follow up with blowing them out with clean compressed air. Our final step for cleaning involves taking a KIM wipe (for fiber cleaning, no lint!) and making sure everything is clean and dry.



Since we now only need 8 loads instead of 16 this cuts our time down to about a half an hour. We can now move to testing.

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	0	PRELIMINARY	01-23-2015	AK
	1	CREATED OUTLINE DRAWING	10/10/2017	DM
	2	UPDATED SPECS	10/31/2017	DM
	3	ADDED CONNECTOR NOTE	11/8/2017	DM





SPECIFICATION:

LOW PIM TERMINATION

FREQUENCY:	698-2700 MHz
RETURN LOSS:	22 dB TYPICAL
PIM: POWER:	160 dBc
CONNECTOR:	40W AVG.
FINISH:	4.3-10 (f) BLUE ANODIZED

SHORT
ED = 214.4 pS PHASE =180 ± 4 DEG. r = ± 0.1 dB

OPEN
ED=224.8 pS
PHASE 0 ± 4 DEG.
r = 0 ± 0.1 dB

2W RESISTIVE TERMINATION

FREQUENCY:	DC - 400-2700 MHz
IMPEDANCE:	50 OHMS
VSWR:	1.07:1 MAX
POWER:	2 WATTS @ 25°C

CONNECTORS:
OSL (OPEN, SHORT, LOAD) 4.3-10 FEMALE
PIM LOAD: 4.3-10 FEMALE
NOTE: ANY COMBINATION 7-16 DIN AND 4.3-10 ARE AVAILIBLE UPON REQUEST

HOLE TOLERANCE: X.XXX ±.003
LENGTH TOLERANCE: X.XXX ±.010 LENGTH
TOLERANCE: X.XX ±.030 THREADS
SPECIFICATION AFTER PLATING
PROPERTY OF R&D MICROWAVES LLC

DRAWN	mclaughlind	10/10/2017
CHECKED	TB	11/7/2017
QA	MdB	11/7/2017
MFG		
APPROVED		

R&D Microwaves LLC, USA

TITLE: CK-A09D43F, 4.3-10 (f) CALIBRATION KIT WITH LOW PIM TERMINATION

SIZE B | DWG NO CK-A09D43F-OLrev3 | REV 3

SCALE 1/2 | SHEET 1 OF 1

Preparation – 1.5 Hours

Time Savings - 0.5 hour

On a typical design, we will have a passive device in the riser closet that usually splits the floor into 2 branches. We connect our testing equipment to the input side of this device in the riser closet so we can see all connected devices for that floor only. Keep in mind that every antenna location requires a man to physically get up to it and perform the work required. A ladder is needed to move around the floor.

Step 1

Time required – 1 Hour

Time Savings – N/A

We will physically go to every antenna location and connect the SHORT to the ends of the jumpers. 2 tests will be performed once all the connections to all the antennas have been made. DTF and Insertion Loss tests are conducted and given the results come back favorable we then record the results and prepare for step 2.

Instead of the OSL we connect the Hybrid OSL short and conduct the tests.

Step 2

Time Required - 0.5, 1 Hour

Time Savings – N/A

We now need to go back to all antenna locations and switch the OSL over to the load. This requires walking the whole floor and moving a ladder to every location. We now perform 2 Return Loss tests, Highband and Lowband. If results are good, we will record and prepare for step 3.

We will switch over the SHORT to the Hybrid Load portion of CK-A09 and perform our tests.

Step 3

Time Savings - 5.1 Hour

Time Required - 0.5, 1 Hour

(Depending on floor size and tenant space)

We head back out to the antenna locations and swap out the load for the PIM load. Again, walking the floor and moving a ladder to every location. Once swapped out we will perform 2 PIM tests on the cable. One test for all technologies, usually LTE and AWS only. No issues and we can record the results and prepare for step 4.
Since we are already connected to the Hybrid Load portion of CK-A09 we do not have to walk the floor to swap out the testing loads. This is not only a time savings but also is one less mating to the connectors on the jumper.

Step 4

Time Required – 1, 2 Hours

Time Savings – N/A

We go back to every antenna location and disconnect all testing equipment and make the final connections of the jumper to the antenna. We will then perform our final system test through the antennas and finalize the floor. Total Time Savings 1+ Hour per floor

Everything said and done we are looking at least an hour of savings. Although it doesn't seem like much, it adds up and its allows us to possibly save on other tasks. For example, we can now have a man closing junction boxes or taking photos for the hour of savings instead of at the end.The CK-A09 is a high-quality precision piece of testing equipment that not only produces superior test results but also saves on manpower costs.

Total Time Savings 1+ Hour per floor