

The Teleste logo is displayed in a white box. It consists of the word "TELESTE" in a blue, italicized, sans-serif font.

Enabling  
digital  
evolution

# Loose Connectors – A Permanent Fix

## The Imperative To Improve Long-Term interconnectivity

Keith Mothersdale  
Technology Director P&I Division Teleste PLC

# Stop parties in your drop interconnect



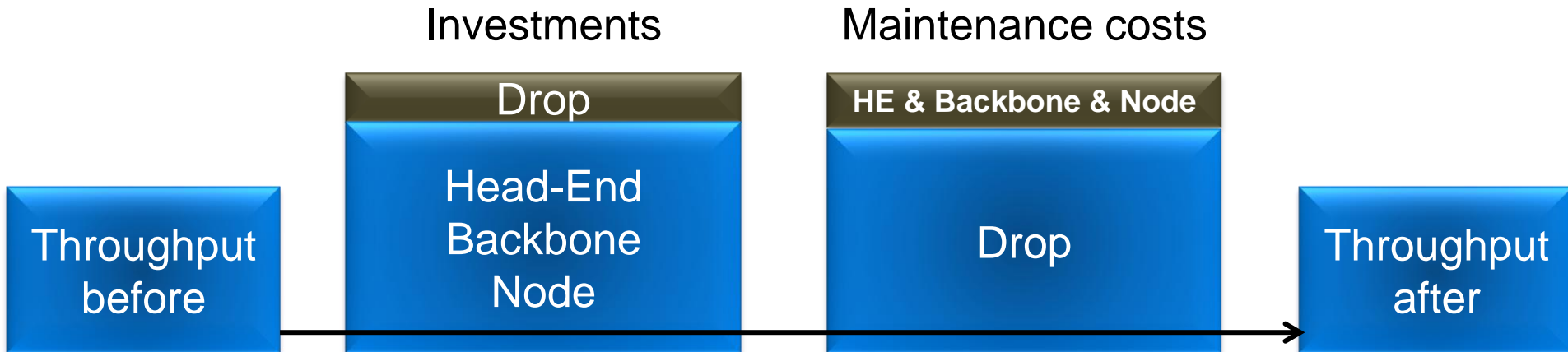
# Migrating from DOCSIS® 3.0 to 3.1 “The Challenge”

## FUTURE PROOFING THE RF INTERCONNECT

The **DROP = GATEWAY** to the broadband network

Total throughput = throughput of DROP \* throughput of other network parts

**Nothing times a lot of is still nothing**



# The little things in a Cable Network can make the **Biggest Improvements** To reliability and Performance!

What is key to success

- Network reliability & performance
- Quality of Service all the way in to the home
- Customer satisfaction



**Do we have this today?**

# How Can you keep a closed network (WORK IN PROGRESS)

- Constant network maintenance (Costly)
- Keeping connectors tight, clean and moisture free (Like painting the Golden Gate Bridge)
- All F connectors will come loose and lose their torque during their life
- Results in :-
  - Poor RFI shielding effectiveness, CPD, intermittent service.

**Is It Possible to have a reliable long-term F connection  
First Time/Everytime!**

**YES!**

# THE TESTING / THE PROOF

Test regime:

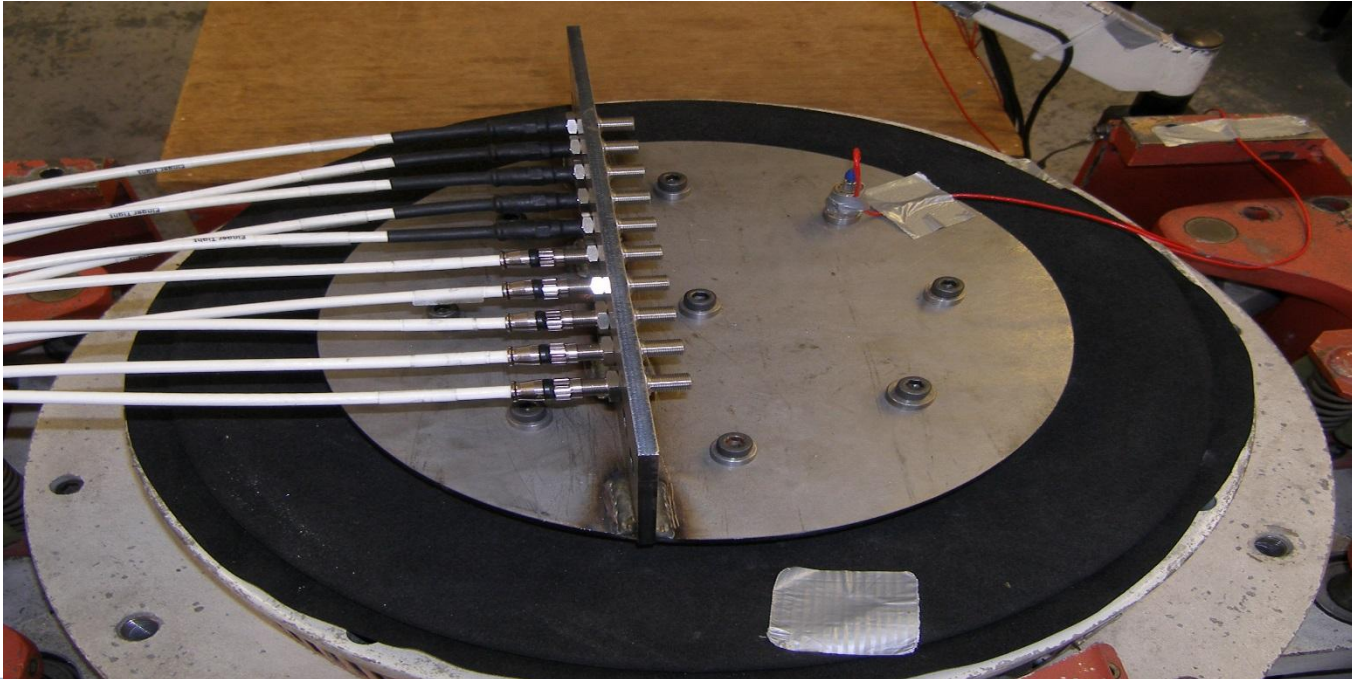
- 10 RF cable connections made to brass Nickel plated feedthrough connectors
- All connections finger tight
- 5 RF cable connectors secured and sealed using Airshrink
- 5 RF cable connectors left open just finger tight



# THE TESTING / THE PROOF

Test regime:


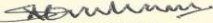

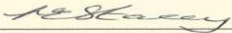
- Test Jig secured to Vibration equipment in certified test lab





# THE TESTING / THE PROOF

## Test regime: Test Lab Certification Certificate

<b>CERTIFICATE OF TEST</b>		
DATE OF ISSUE: <b>17 April 2015</b>	CERTIFICATE NUMBER: <b>U2851-1</b>	PAGE <b>1</b> OF <b>1</b> PAGES APPROVED SIGNATORY  S J Abraham Quality Manager
	Environmental Test Services Ltd, Ladbroke Close, Woodley, Berks, RG5 4DX <b>ENVIRONMENTAL TEST SERVICES</b> Tel: 0118 927 2220 Fax: 0118 927 2120 E-Mail: ets@etsonline.co.uk	
Registered in England No: 3110350		
<b>Customer:</b> Asheridge Communications Ltd Unit A, Chiltern Commerce Centre Asheridge Road Chesham Bucks HP5 2PY	<b>Order No:</b> PO45499	
<b>Description of Equipment Tested:</b> 10 off Co-Axial Cables RG59 – Cable Assemblies, fitted with 2 x F male Continuity Connectors* Serial No's: 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10* *(As advised by customer)		
	Supplied by Asheridge Communications Ltd	
<b>Tested to:</b>	<b>Vibration</b> (Sinusoidal) 10Hz to 55Hz, 0.03 inches displacement Linear sweep 10Hz to 55Hz to 10Hz in one minute Duration: 20 minutes in one axis only Test Tolerances: BS EN 60068-2-6:2008	
<b>Comments:</b>	The test items were received in good visual condition for testing on 17 April 2015. The tests were started and completed on 17 April 2015. The tests were performed in accordance with the Test Specification shown above. All 10 test items were mounted together on the vibration test facility. All test items were subjected to two 20 minute vibration tests at the request of the customer. The vibration test was performed using a test fixture supplied by the customer. Customer representatives were on site to perform all test item functionality checks and visual inspections during the vibration test. The post-test inspection and functionality testing of the test items was the customer's responsibility. The vibration test recordings were issued to the customer as certificate attachments (1 page). An additional attachment showing photographs of the test set-up was also issued (1 page). All test records for the work detailed above are filed at ETS under Route Card No: 2608.	
Prepared by:  H E Stacey		

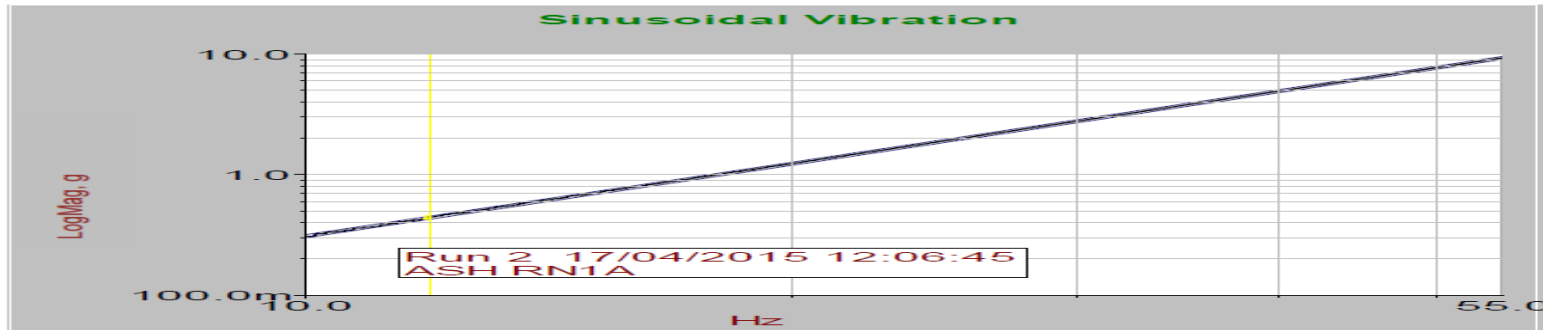
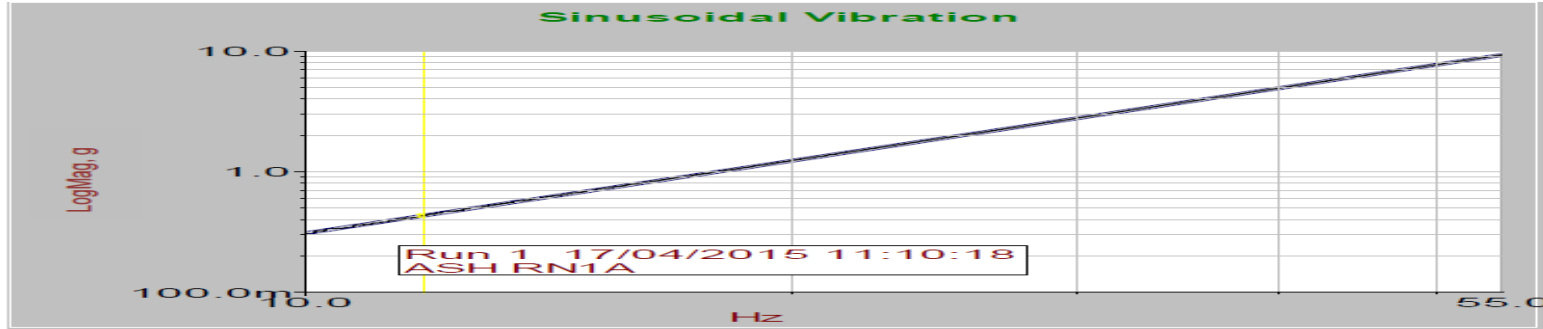
# THE TESTING / THE PROOF

Test regime: Test Lab Vibration Profile

RC2608

ENVIRONMENTAL TEST SERVICES LTD  
VIBRATION TEST RECORDINGS

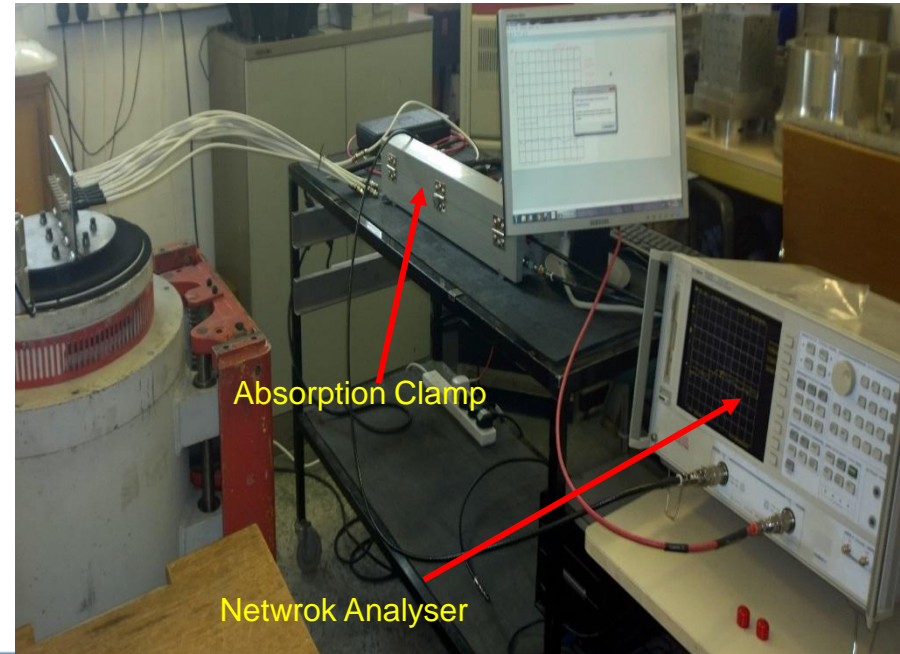
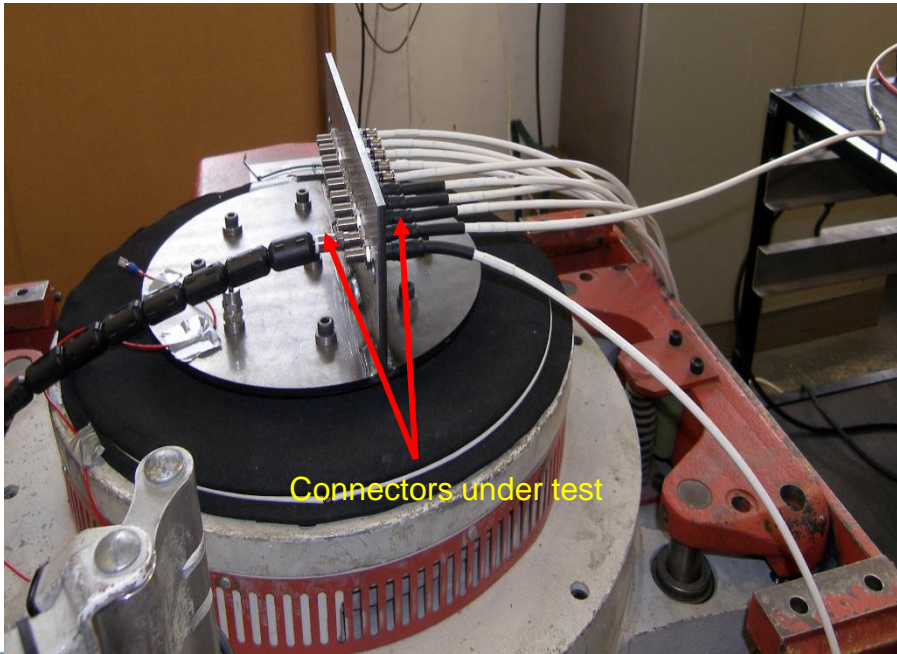
Page 1 of 1



# THE TESTING / THE PROOF

Test regime:

- RFI shielding effectiveness measurements taken on all connectors prior to vibration test using Absorption Clamp System.



# THE TESTING / THE PROOF

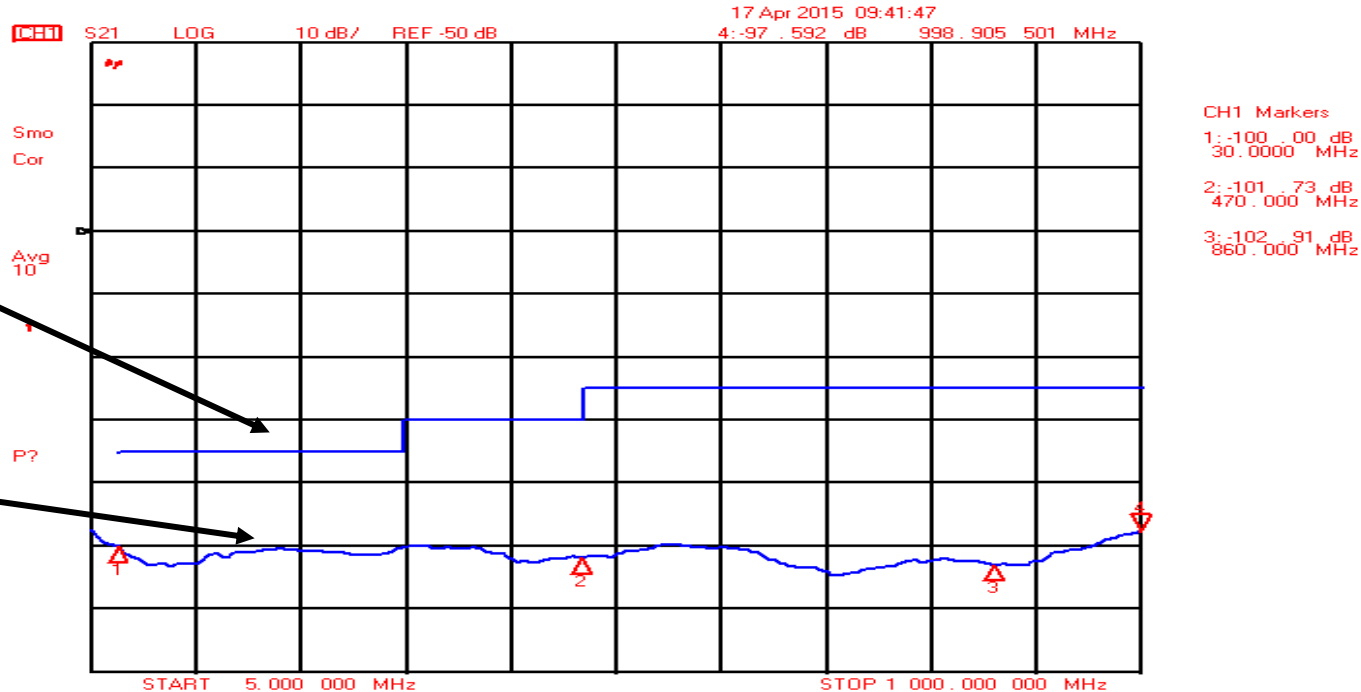
## VibrationTest regime summary:

- Vibration test done to Bellcore GR-1503-CORE Issue1 (section 4.6)
  - Harmonic Motion
    - Vertical amplitude = 0.03 inches
    - Frequency varying uniformly between 10Hz and 55Hz for twenty minutes
    - Entire frequency from 10Hz to 55Hz and back to 10Hz traversed in one minute.
  - Testing carried out by MEM Certified test centre to exact Bellcore specification
  - F male connectors RG6 compression type with continuity
  - Test cables TFC T6TSFx77-U Tri-shield. 1metre length end-to-end
  - Test jig and connectors allowed 1 hour to temperature stabilise to room temperature before finger tightening
  - Airshrink applied and left for 24 hours to cure.
  - F female to F Female adaptors Brass machined Nickel Plated

# THE TESTING / THE PROOF

Test regime:

RFI shielding effectiveness measurement pre vibration test. **(SYSTEM NOISE FLOOR)**



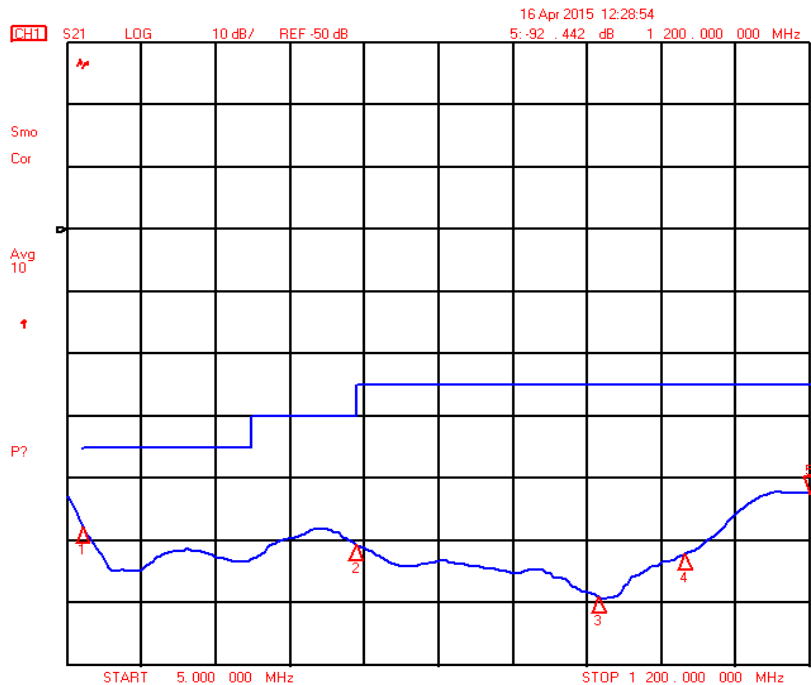
Cenelec Class A  
Limited Lines

Real-time RFI  
level -100dB  
system noise  
floor

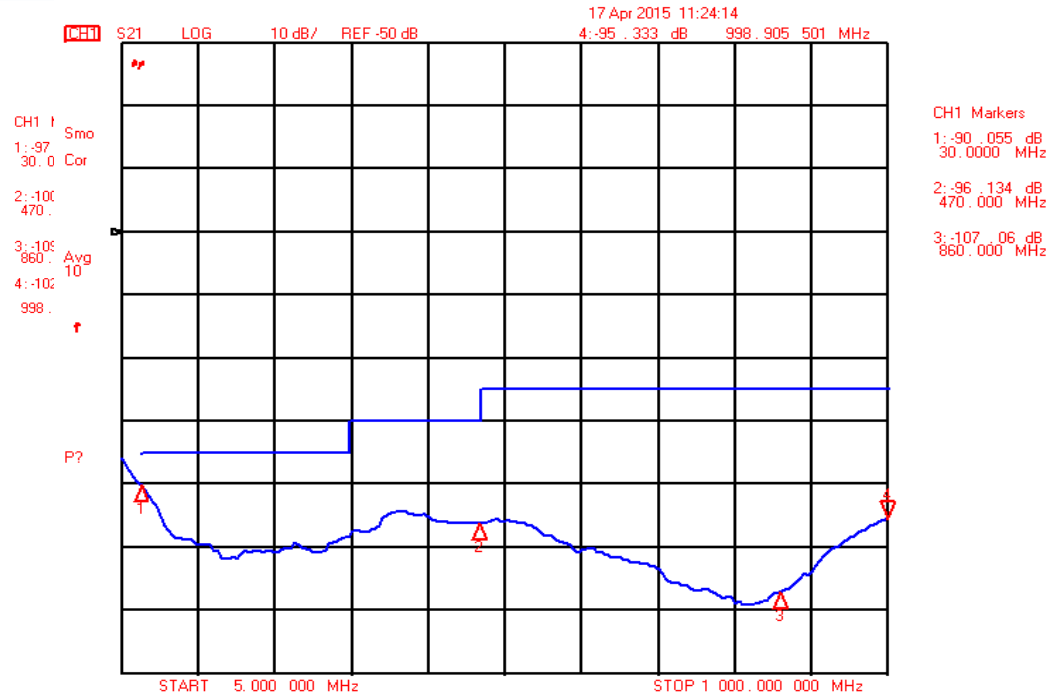
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 1 Air shrink applied Pre Vibration



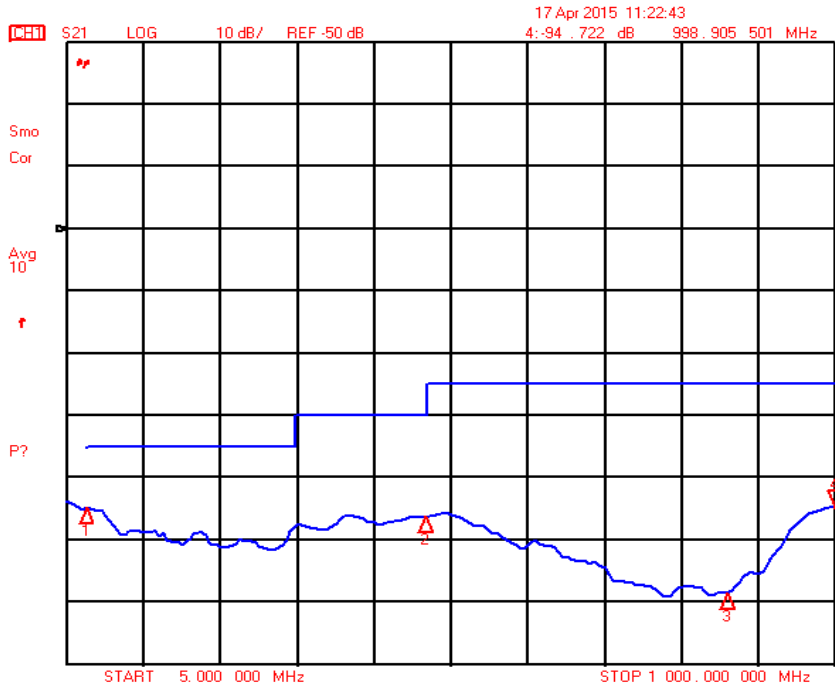
Connector 1 Air shrink applied Post Vibration



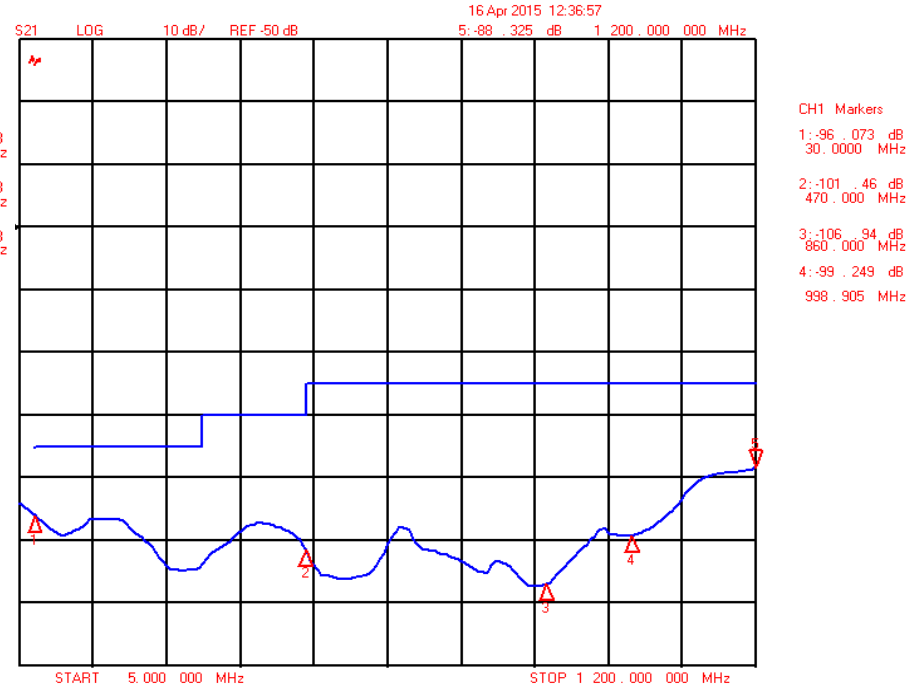
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 2 Air shrink applied Pre Vibration



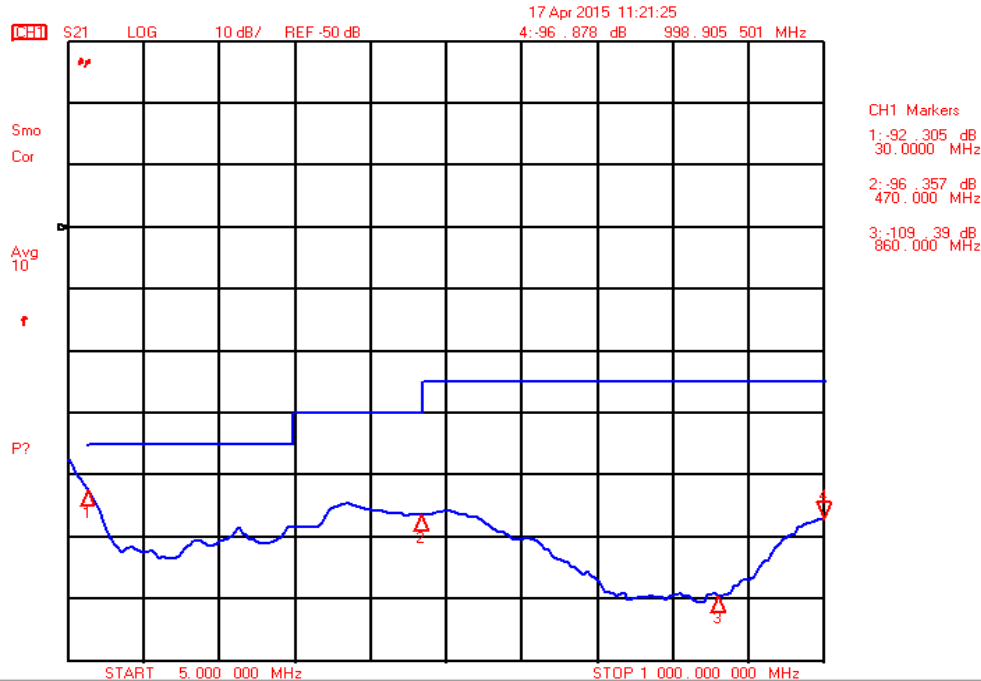
Connector 2 Air shrink applied Post Vibration



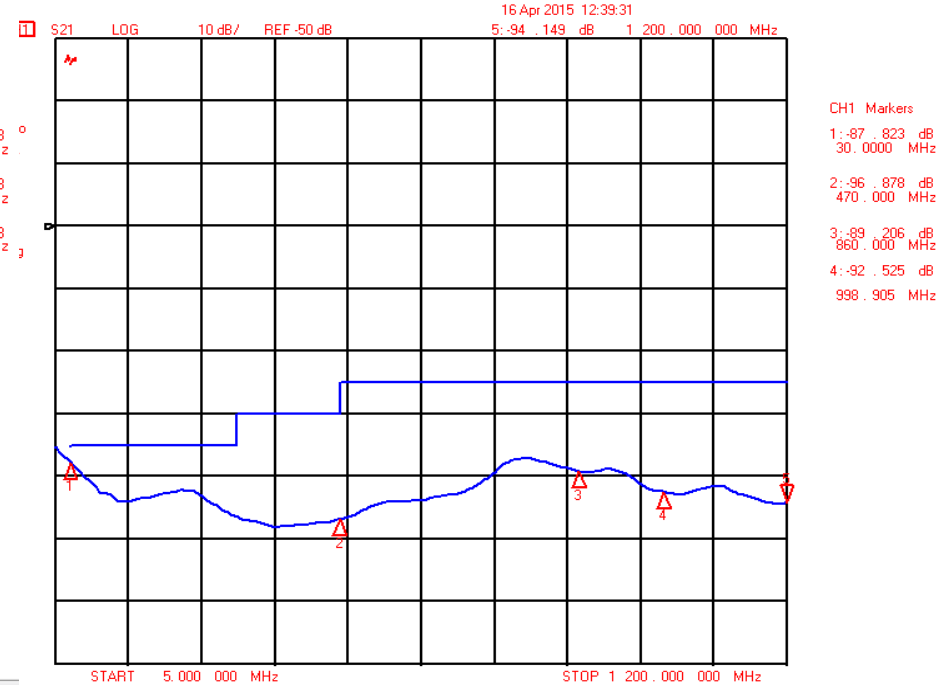
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 3 Air shrink applied Pre Vibration



Connector 3 Air shrink applied Post Vibration

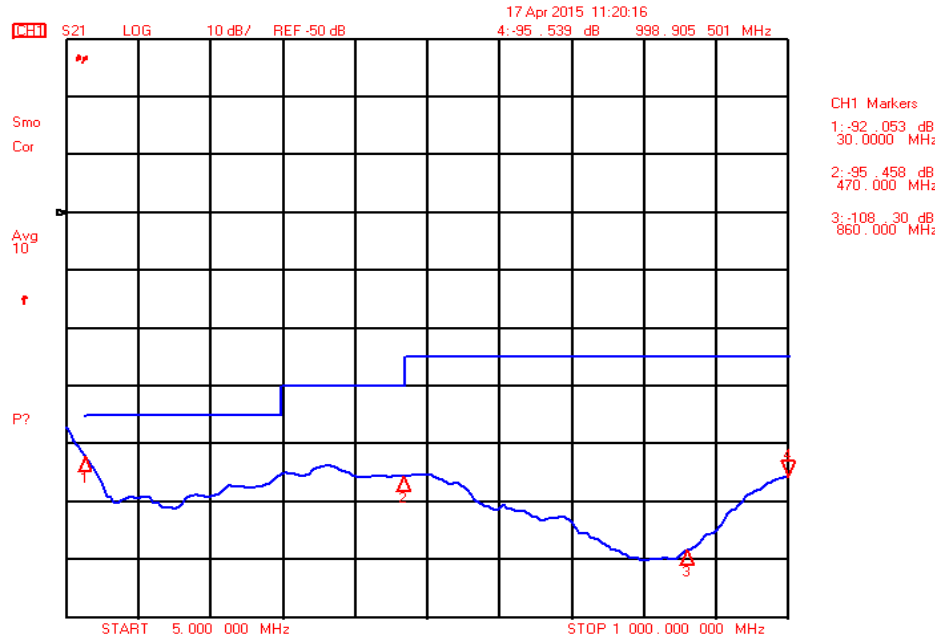




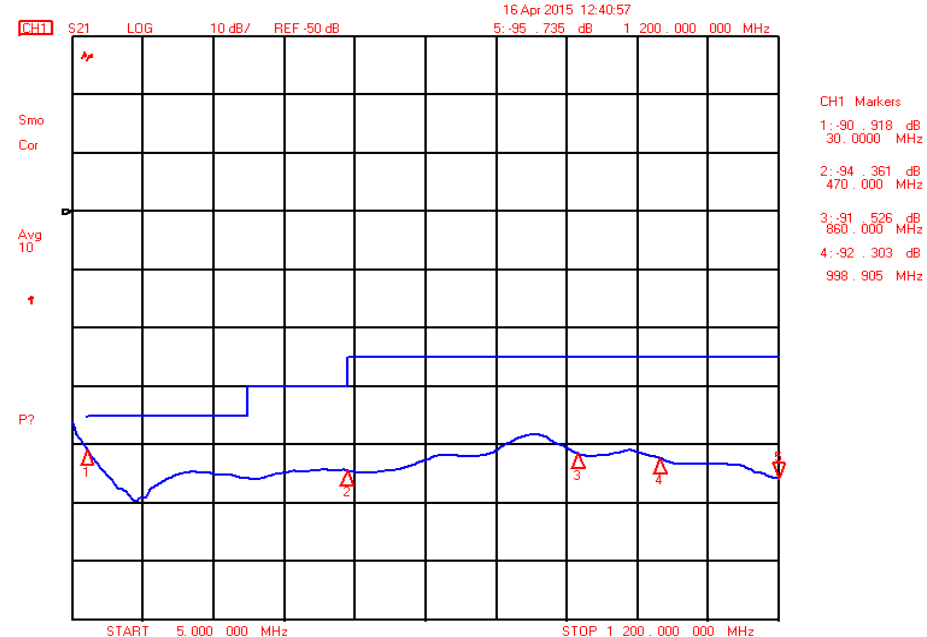
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 4 Air shrink applied Pre Vibration



Connector 4 Air shrink applied Post Vibration

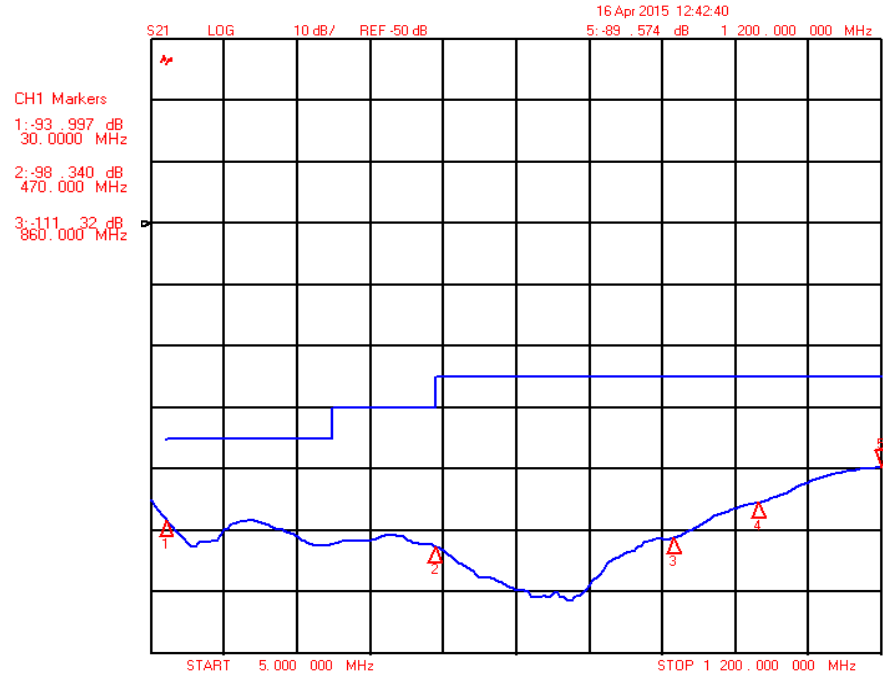
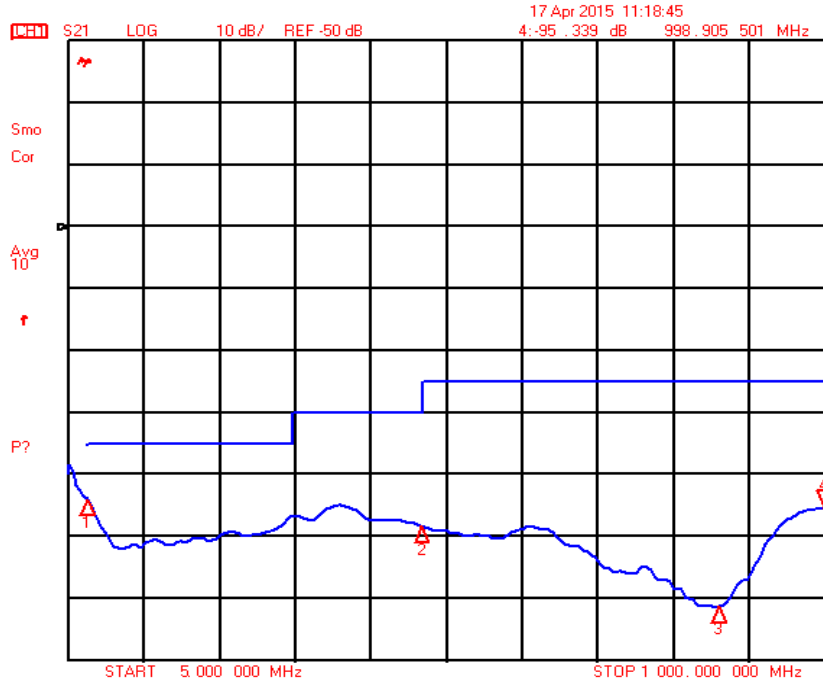


# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 5 Air shrink applied Pre Vibration

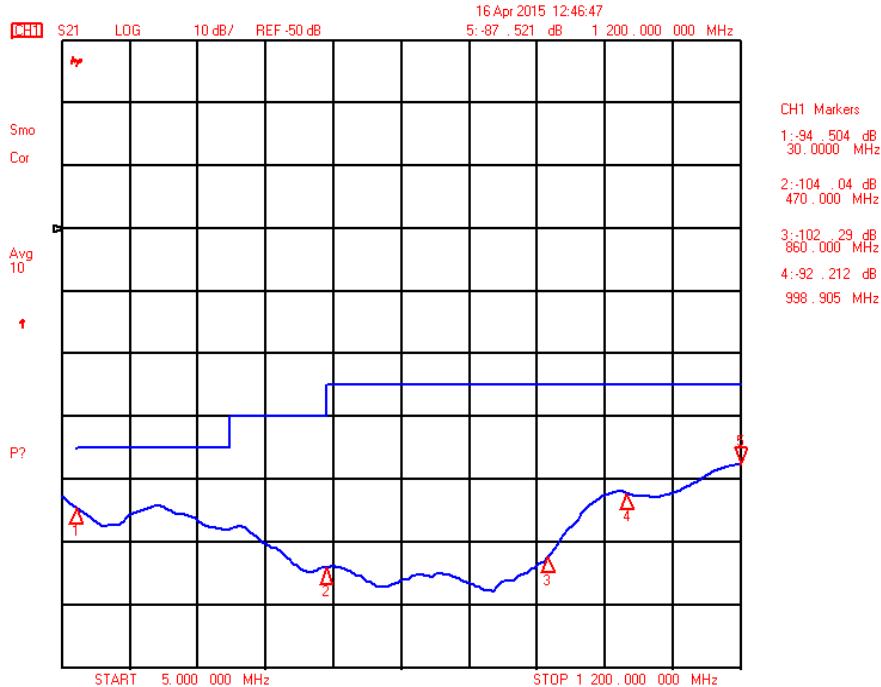
Connector 5 Air shrink applied Post Vibration



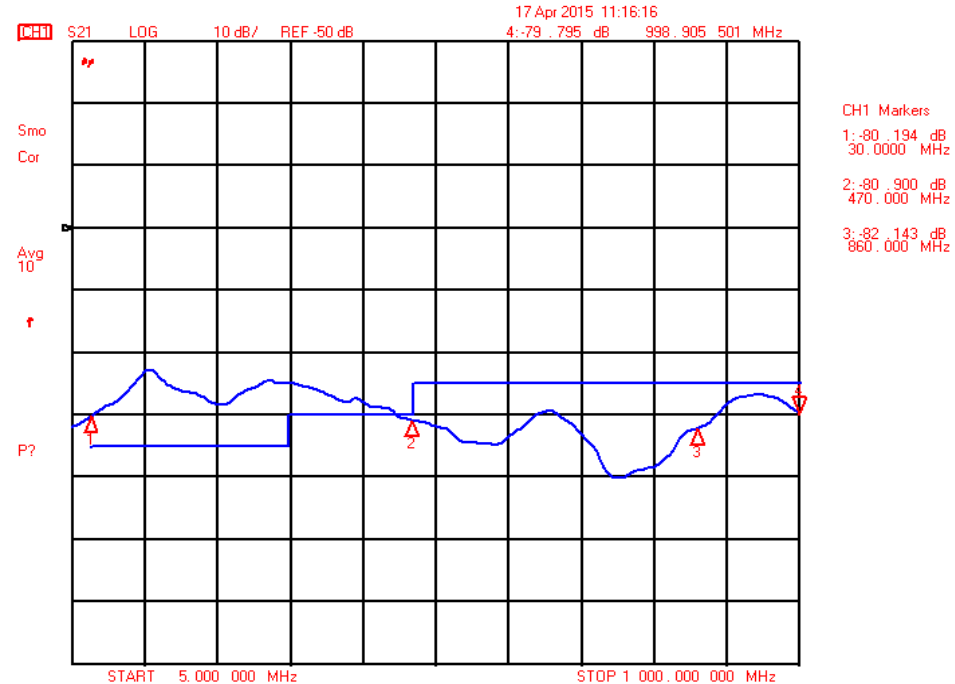
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

## Connector 6 No shrink Pre Vibration



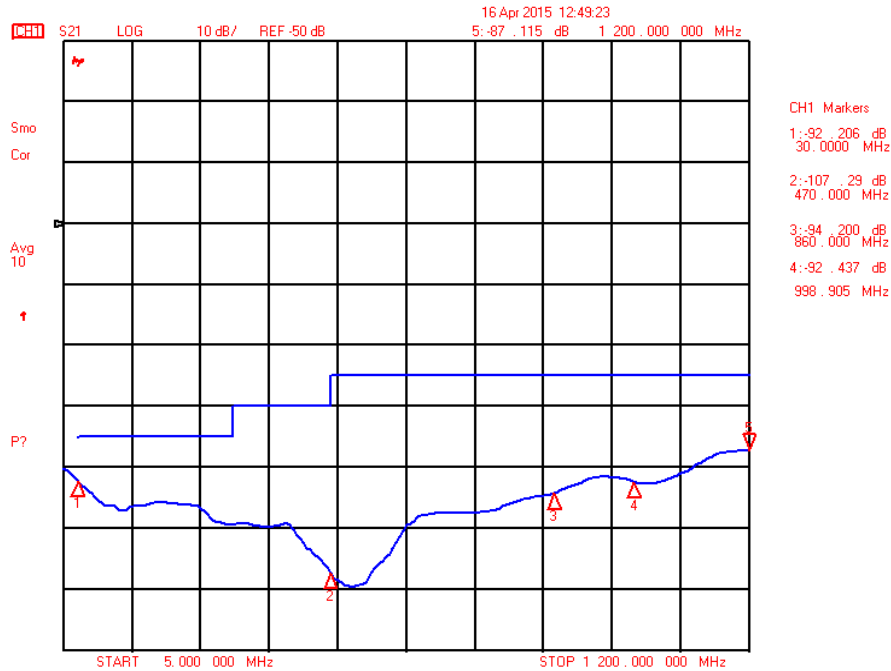
## Connector 6 No shrink Post Vibration



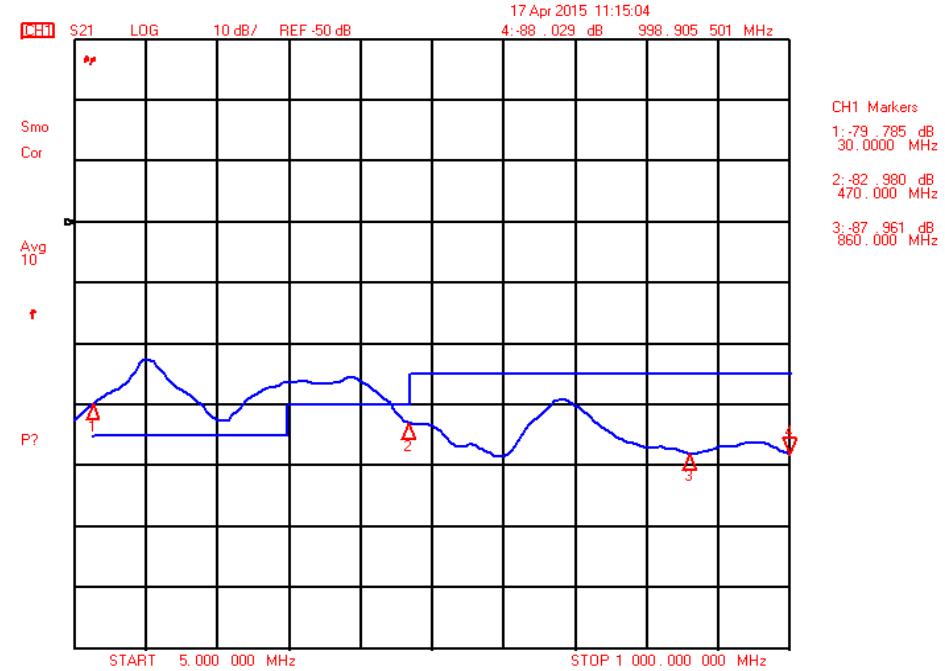
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

## Connector 7 No shrink Pre Vibration



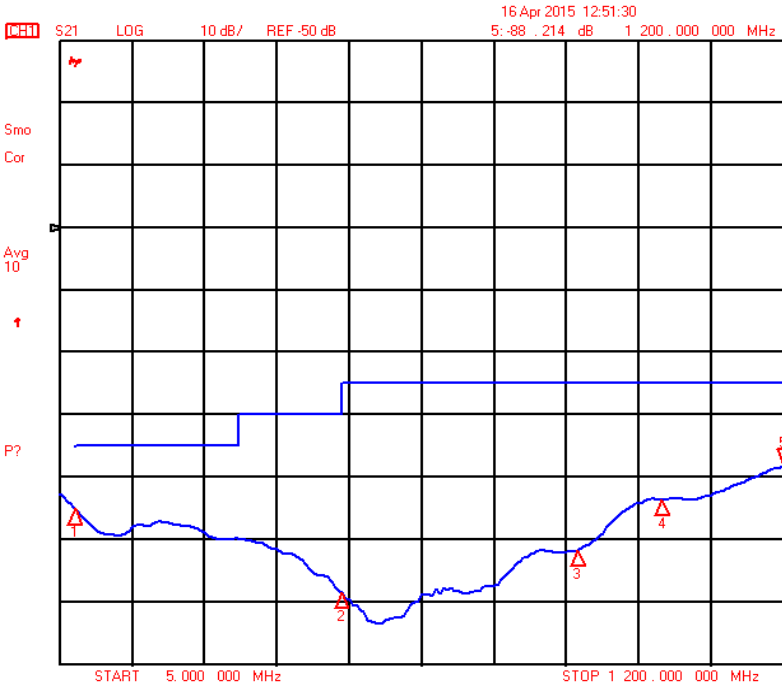
## Connector 7 No shrink Post Vibration



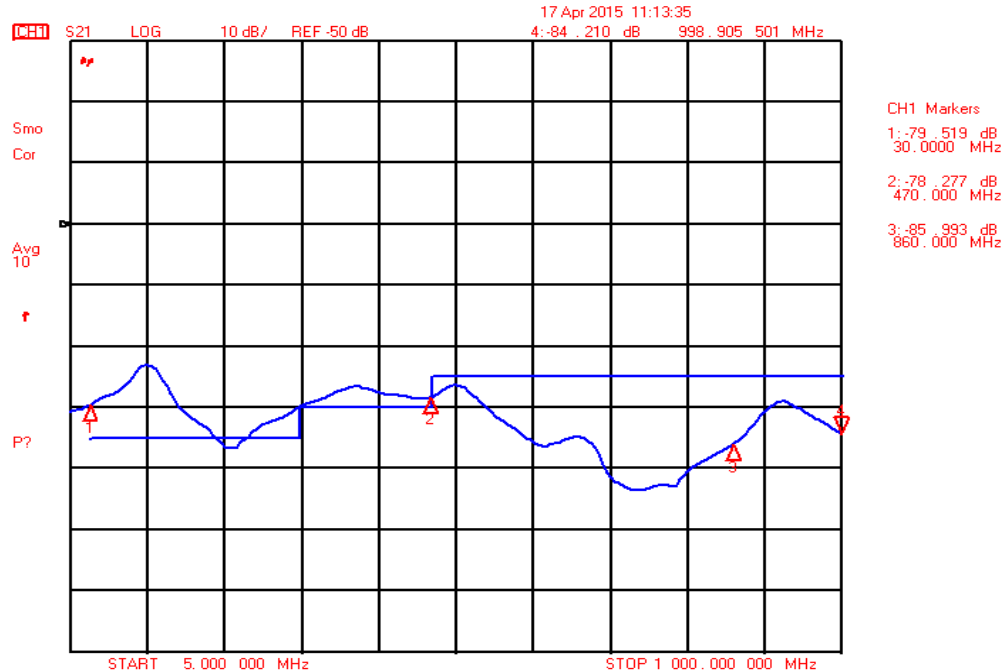
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

## Connector 8 No shrink Pre Vibration



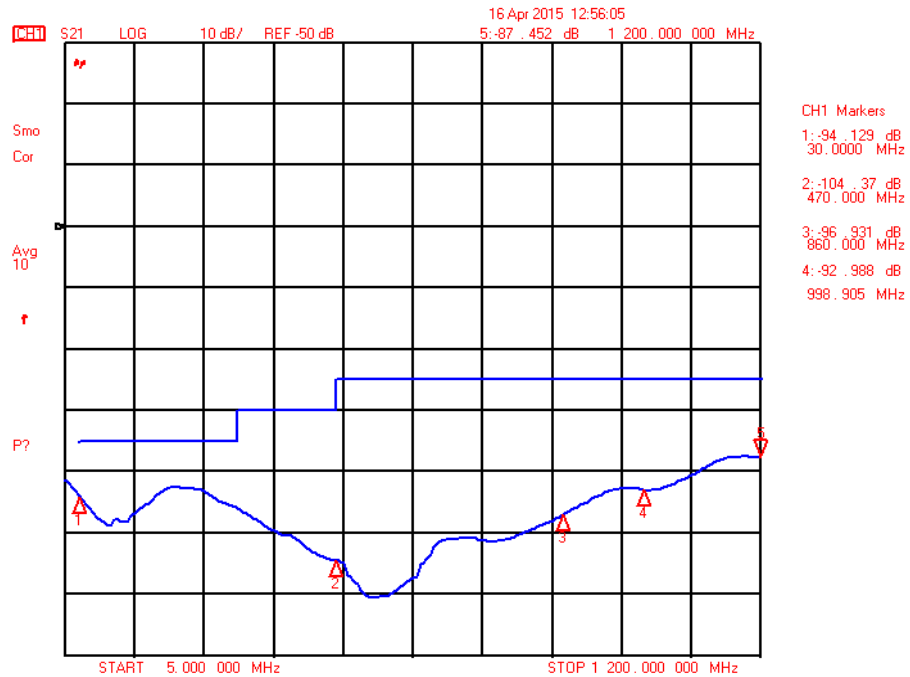
## Connector 8 No shrink Post Vibration



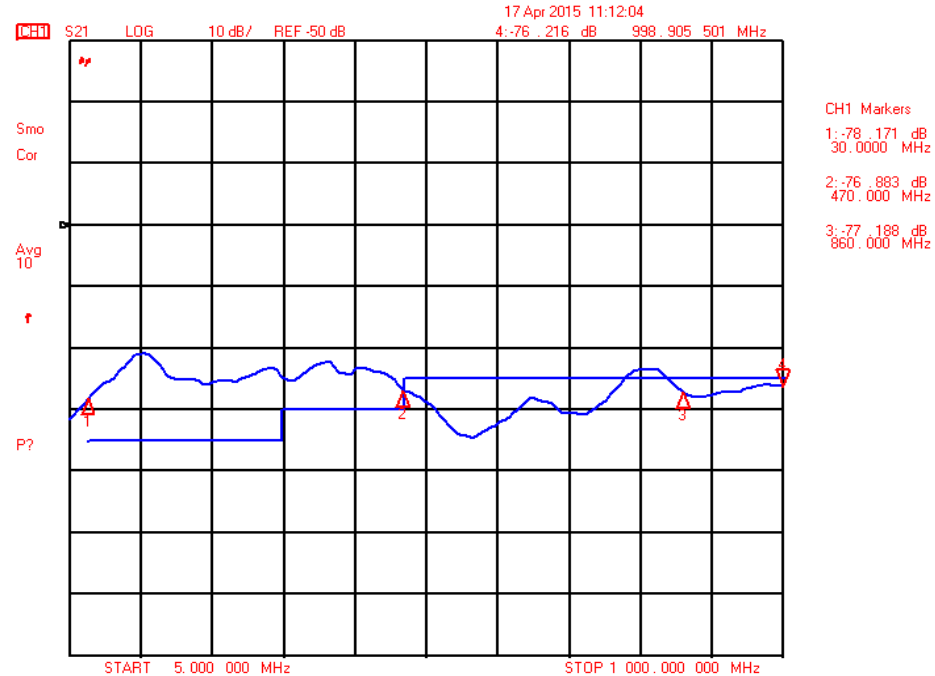
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

## Connector 9 No shrink Pre Vibration



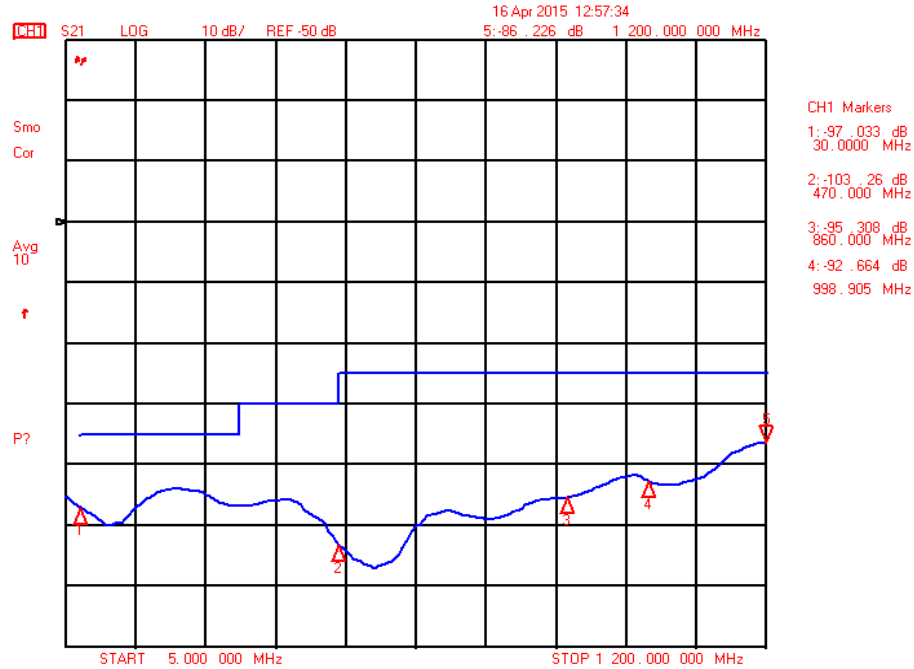
## Connector 9 No shrink Post Vibration



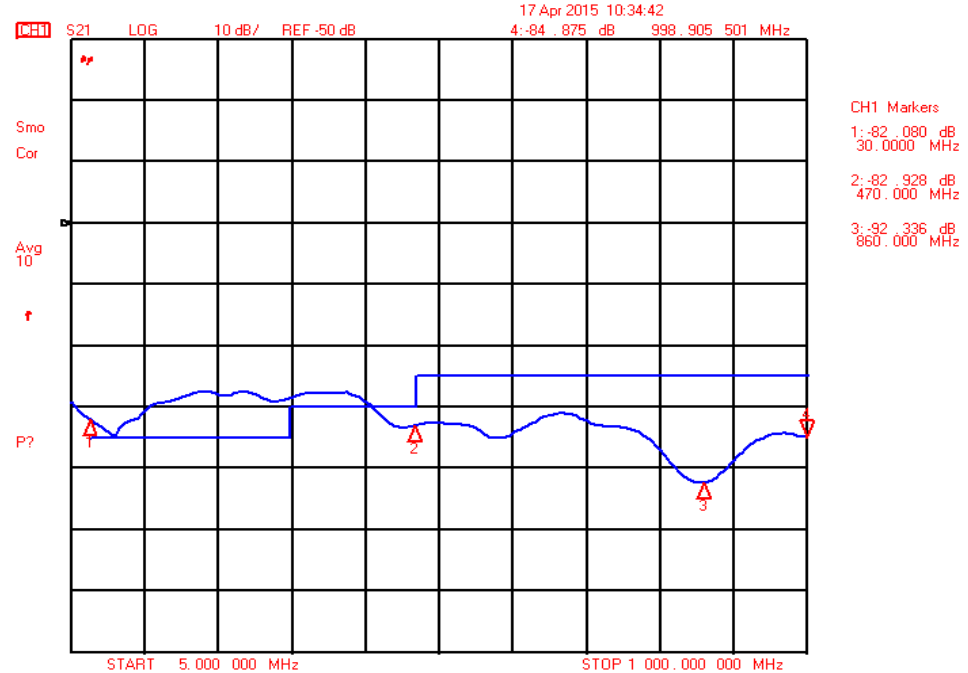
# THE TESTING / THE PROOF

Test regime: RFI shielding effectiveness measurement Pre and Post Vibration test

Connector 10 No shrink Pre Vibration



Connector 10 No shrink Post Vibration



# TEST SUMMARY





## Worst Case connector scenario after breaking original torque, taking finger tight as the reference, result summary as follows:

- Standard connector installations, as done today, the RFI shielding effectiveness would degrade by up to 40dB from fully tight to torque broken, and subject to environmental movement. This would for sure continue to degrade once moisture enters the connector threads and the metal-to-metal contact resistance further degrades. The connectors do not even meet the minimum Class A shielding and would add serious Ingress and also be subject to LTE 4G interference.
- Connectors fitted with Air-shrink protection would maintain adequate RFI shielding with worst case connector torque totally broken to finger tight levels even after subjected to long-term environmental extremes.
- Air-shrink means the cable installation does not rely on installer fully tightening the connector to ensure long-term signal integrity and installation reliability over time.
- Air-shrink will ensure the connectors remain sealed to all weather conditions, a must to avoid water ingress in to connector threads, which will lead to CPD and other issues

# THANKS!