

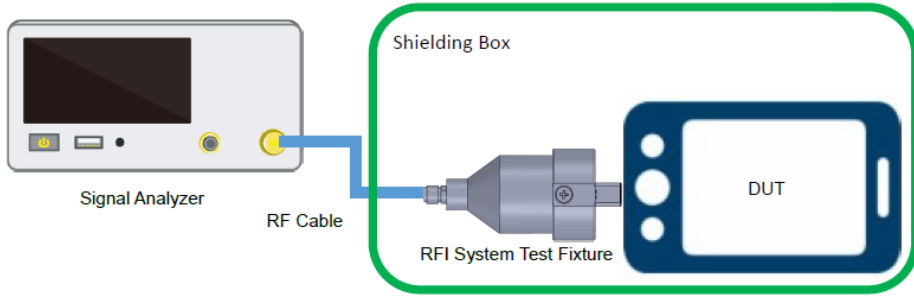
Mechanical Modify of RFI System Level

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RFI System Level Test Solution



USB RFI System Level Test Procedure

Rev-1.0
August 30, 2020

Equipment List

No	Equipment Name	Vendor	Part
1	Signal Analyzer	Anritsu/Rohde	M2230A /N9000B
2	RFI System Level Test Fixture	Luxshare-ICT	MEU-27P11-053
3	RF Cable 3m	Lsp105	CEL-150-24-HR100C-M14
4	RF Cable 0.5m	Lsp105	CEL-150-24-HR00C-M14
5	Shielding Box	Lsp105	EMR0004
6	Set Table	Luxshare-ICT	MET-38A17
7	3-in-1ba torque wrench	Luxshare-ICT	MEW-00A11

Please contact Jia.Liao@luxshare-ict.com for Luxshare and Lsp105 parts.

Signal Analyzer Test Configuration

It is highly recommended to have the built-in preamplifier function for the signal analyzer.

Anritsu M2230A

Keysight N9000B



- The compliance test limits the noise emission level from the type-C USB port for the interoperability between wireless devices (e.g. Wi-Fi, BT, WWAN) and USB.
- Applicable to only systems with a Type C connector that supports 5 Gbps and above.
 - USB 3.2 Hosts End Product (This includes embedded hosts)
 - USB 3.2 Hubs End Product
 - DRD (Dual-Rate Data)

DUT Type



Notebook



Monitor



Smart phone



Hubs end product



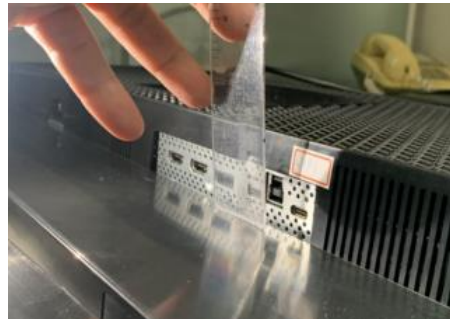
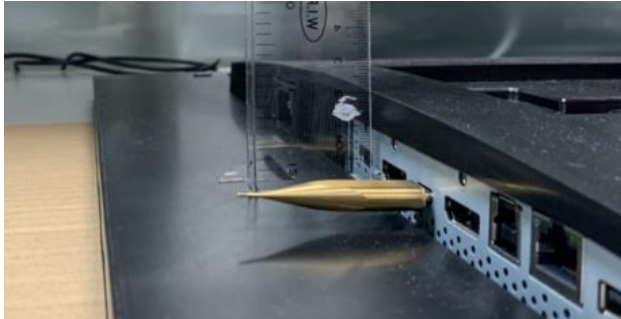
Test Issue: Mechanical Interference

- Current fixture design doesn't fit to all type-C port due to mechanical interference.



Test Fixture Dimension
Mechanical Interference

Concave Type Hubs (Monitor)



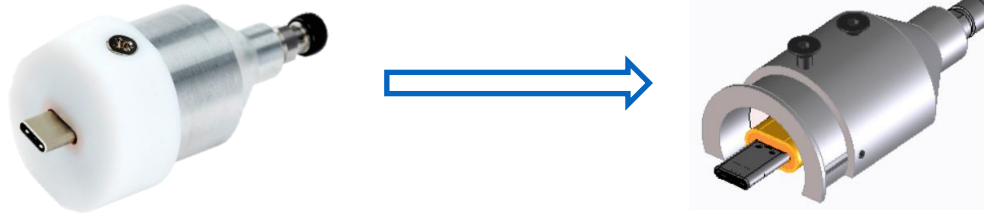
Mechanical Interference DUT (Hubs Type)



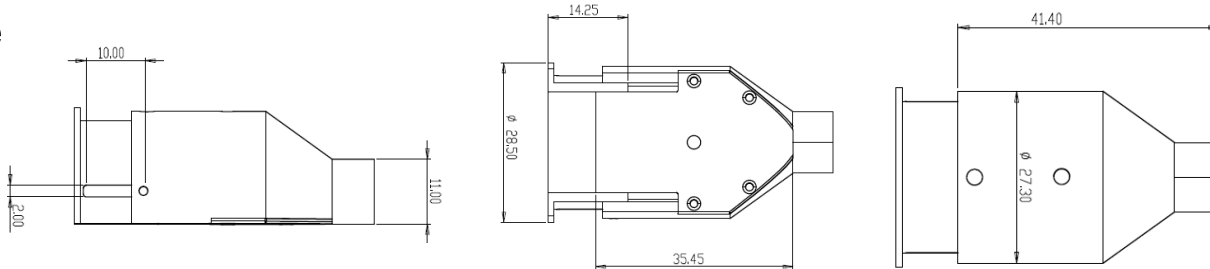
Mechanical Interference TVs
(Hubs Type)

Proposed Solutions

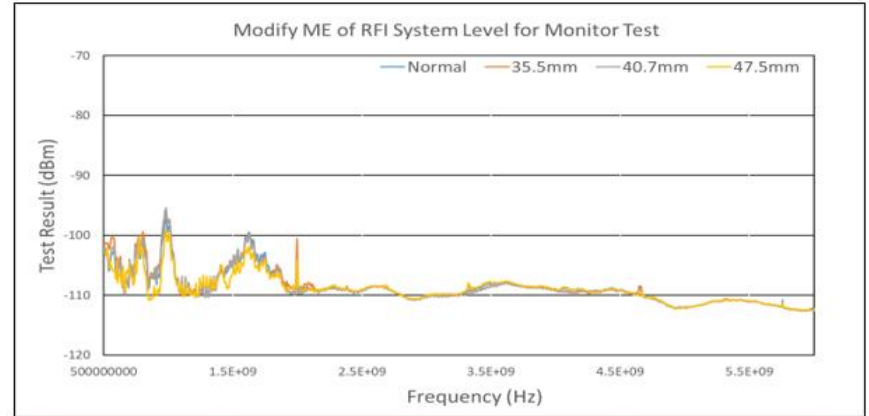
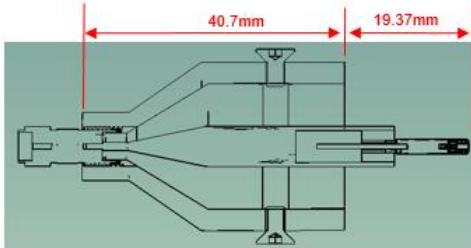
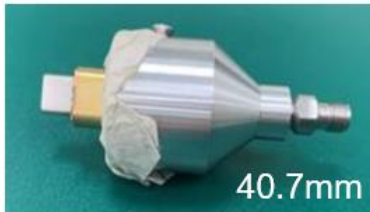
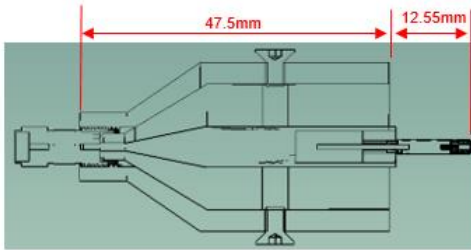
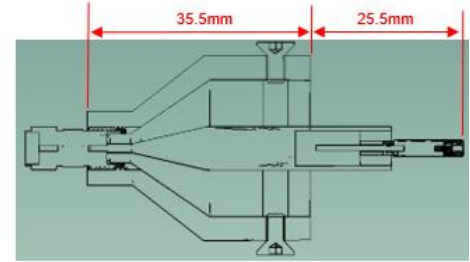
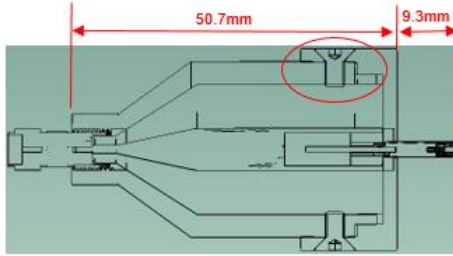
- Additional fixture designs optional for compliance test.
 - Recess the outer tube length
 - Cut bottom half outer tube.
- Compliance test results with current fixture and proposed optional fixture are compared:
 - Target to be within +/- 3dB



Final Type



Experiment: Reduce Test Fixture Cover Length

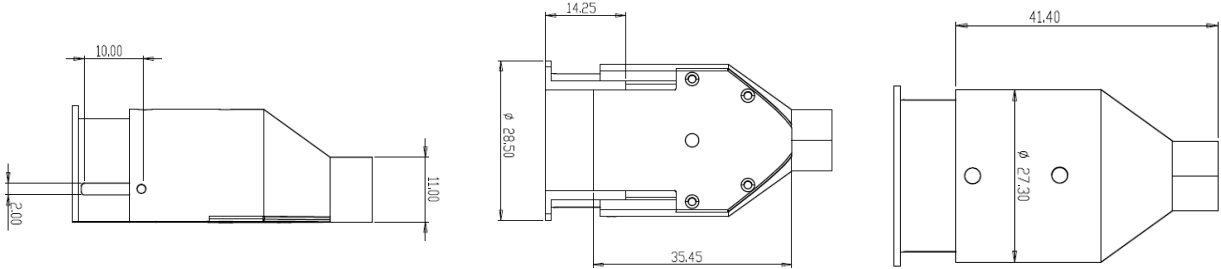


	33.5mm	40.7mm	47.5mm
Max. Δ	3.77 dB	2.14 dB	3.7 dB

Experiment: Reduce Test Fixture Cover Length and Cut Half Cover



Final Type



Fixture Samples and DUT

Fixture Samples

Original



Longer Cover



Shorter Cover



DUT

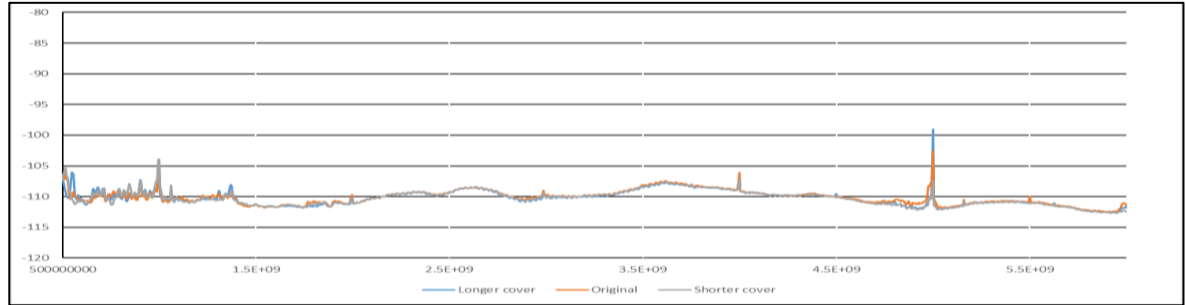


NB_1

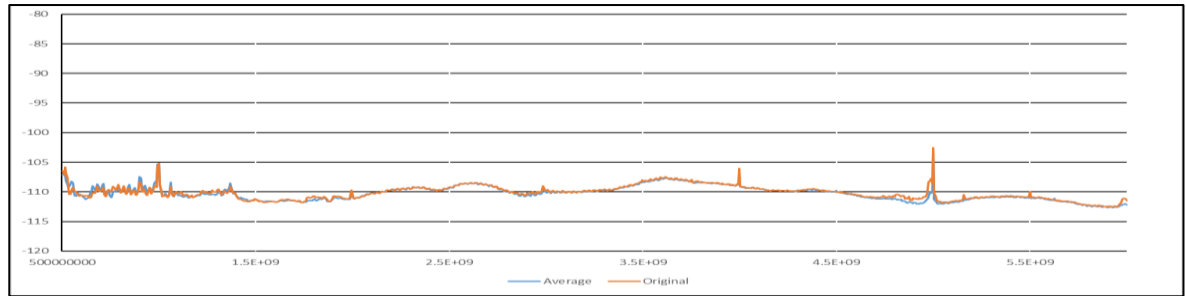


NB_2

Test Result_Fixture Comparison_NB1_Port 2_(1/3)



Original VS Longest Cover VS Shortest Cover

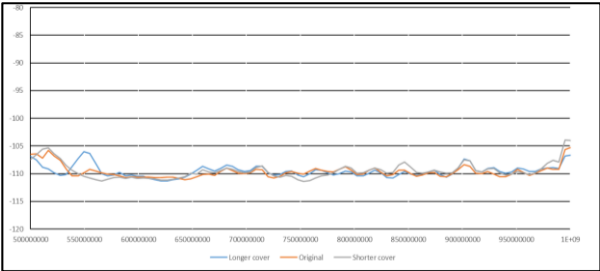


Original VS Average (Longest Cover and Shortest Cover)

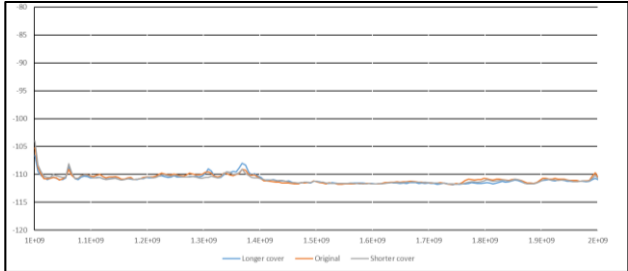
Max. Δ Comparison	
Original VS Longest Cover VS Shortest Cover	4.748dB @4.99GHz
Original VS Average (Longest Cover and Shortest Cover)	2.531 dB @4.97GH

Internal use - Confidential

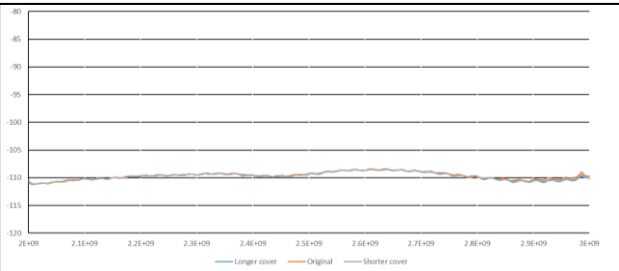
Test Result_Fixture Comparison_NB1_Port 2_(2/3)



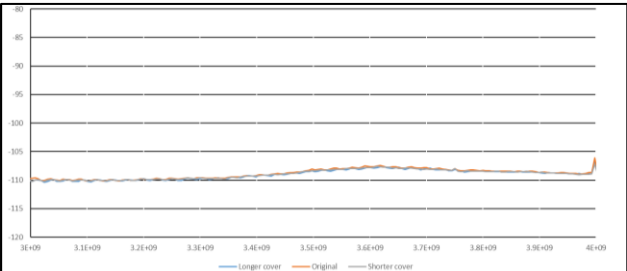
500 MHz to 1 GHz



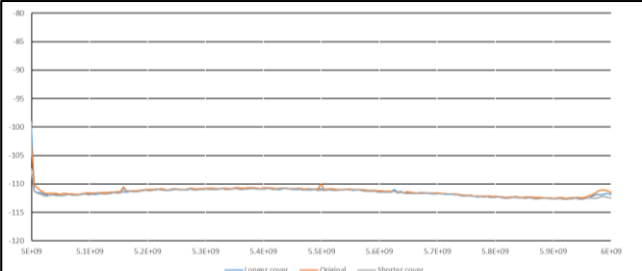
1 GHz to 2 GHz



2 GHz to 3 GHz

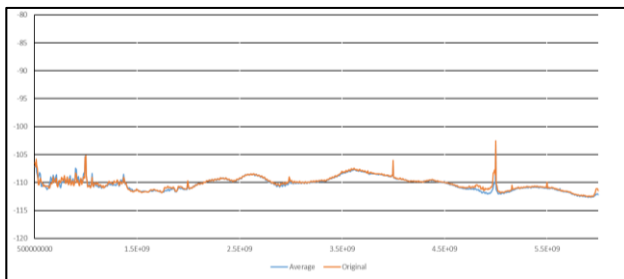


3 GHz to 4 GHz

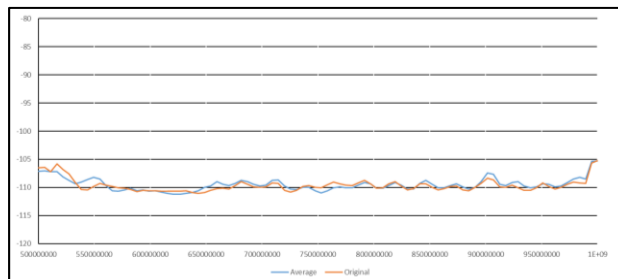


5 GHz to 6 GHz

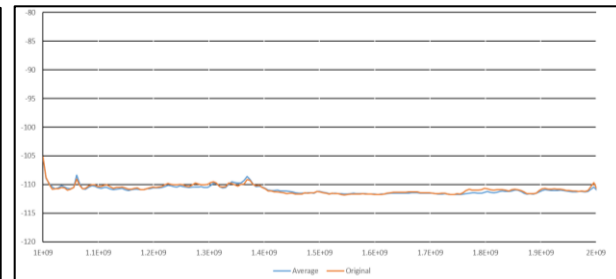
Test Result_Fixture Comparison_NB1_Port 2_(3/3)



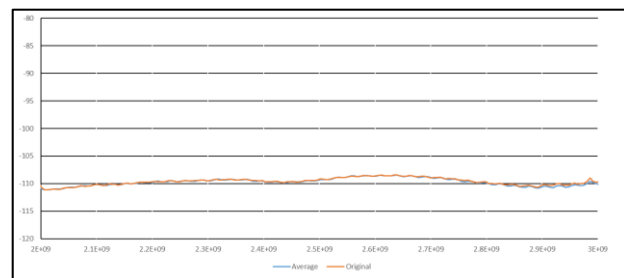
Full Range



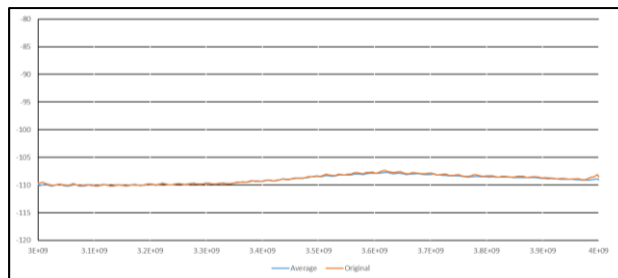
500 MHz to 1 GHz



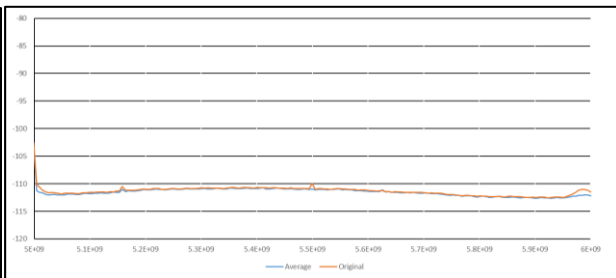
1 GHz to 2 GHz



2 GHz to 3 GHz



3 GHz to 4 GHz



5 GHz to 6 GHz

Summary

- An Alternative RFI system level compliance test proposed if the original fixture can't fit the DUT.
 - Two fixtures with 1) longer cover and 2) shorter cover
 - Averaged data should be collected from the two fixtures in order to reduce measurement mismatch comparing to from the original fixture.
- Propose that the compliance is met if either one of the original test or the alternative test is passed.

Original



Longer Cover



Shorter Cover





Thank you