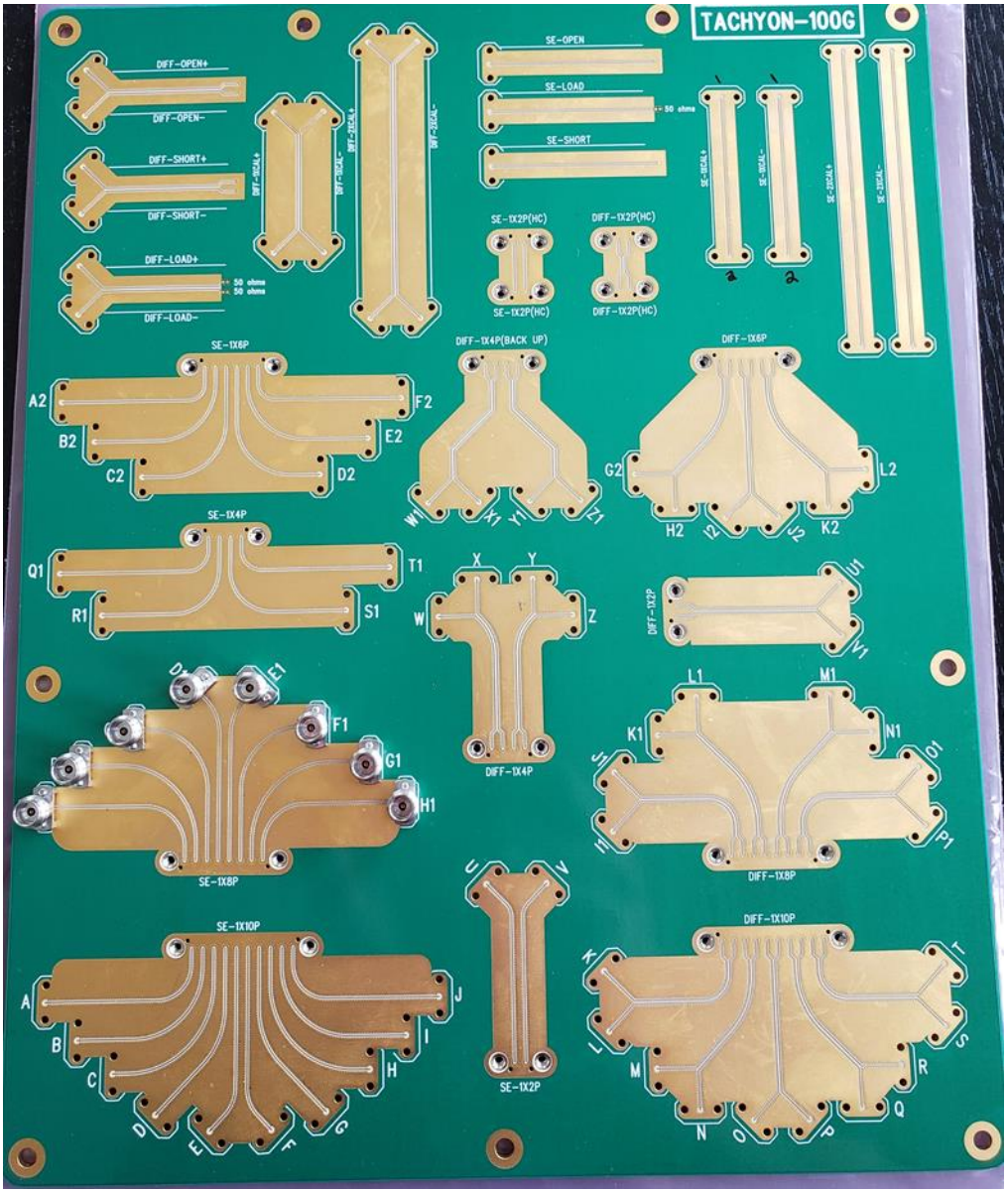
SIGNAL INTEGRITY REPORT

Test and Measurement Performance Report

Part Number TM7SSSH22S8MS028 (Core HC)
Distribution: Internal and External Use

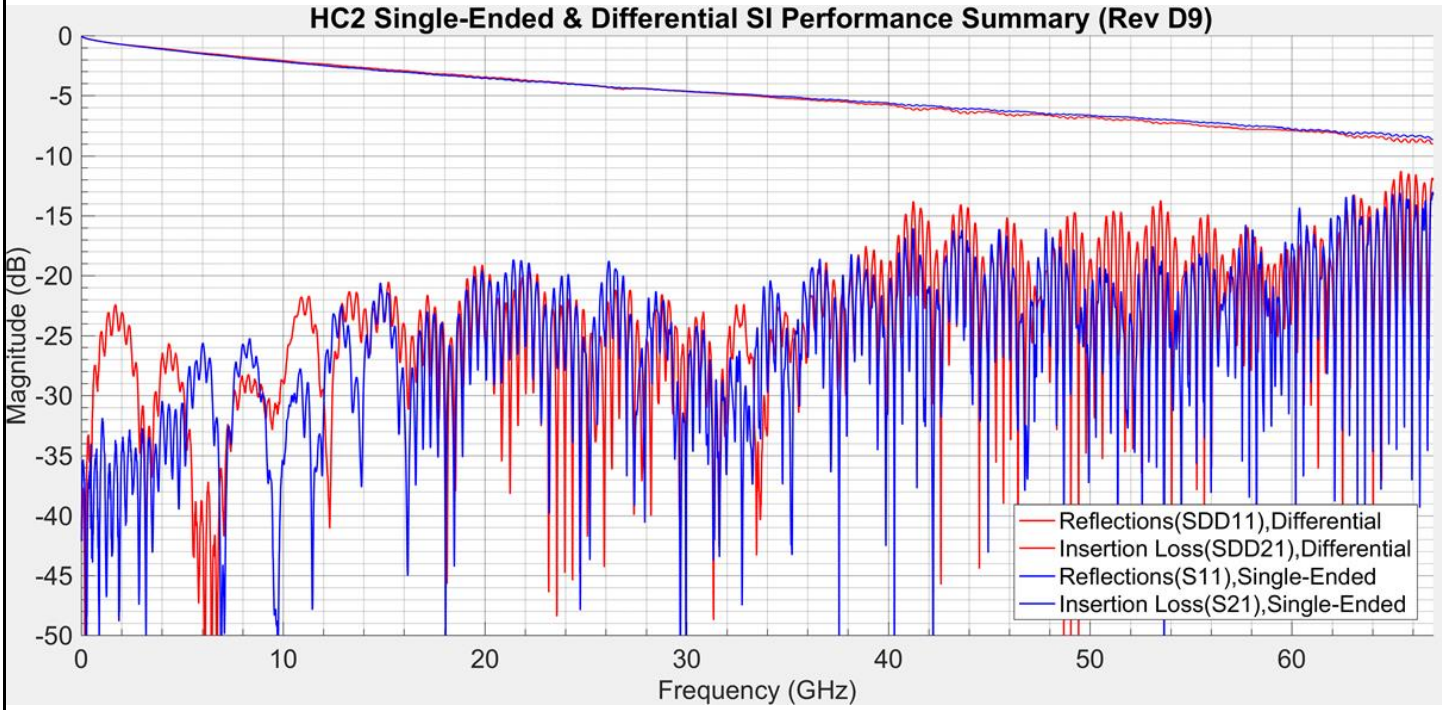


REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: **N/A** DATE: **05/ 26 / 2020**	**Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB)** **CARLISLE IT CONFIDENTIAL**	**1** of **22**

DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	**R.Stavoli**	**H.Tran**	**E.Soubh**

SIGNAL INTEGRITY REPORT

SI Performance Summary
(Attenuation & Reflections, Single-Ended, Differential)



Legend: Single-Ended, Differential

* For further details regarding the testing setup and configuration please see the rest of the report.

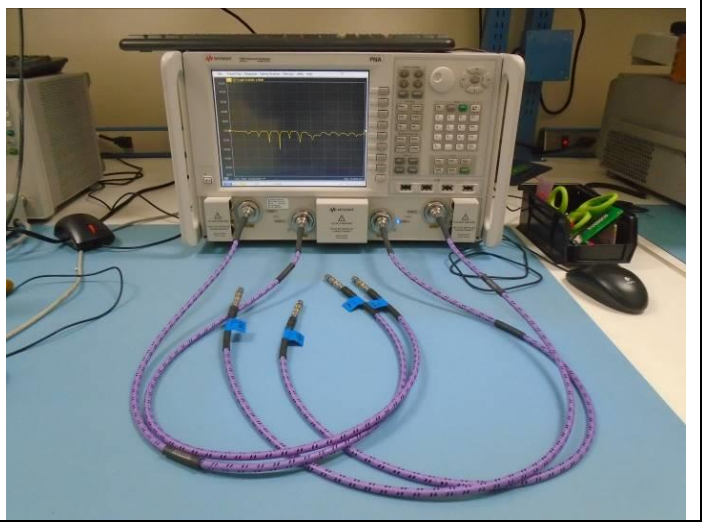
SIGNAL INTEGRITY REPORT

1.0 TEST SETUP AND DUT

Equipment, fixtures, and methods

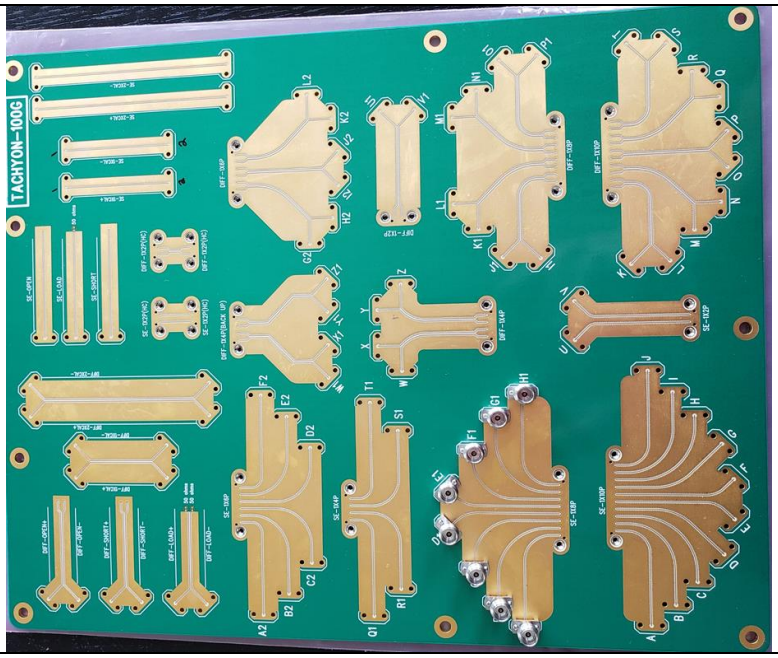
Test method: All data measured from test PCB shown below and a N5227A PNA Network Analyzer

- Calibration was performed up to the 1. 85mm SMA adapters using calibration kit: 85058B
- Data was swept from 10 MHz to 67GHz for 6700 points
- Data averaging was turned off.
- Data is not dembedded and includes the board traces and the Core HC cable assembly



Assembly Description

- T&M PN: TM7SSSH22S8MS028
- 2- Position LCP Connector Housing, two pieces at the interface
- **11-inch solid center conductor 092 coax cable**
- Carlisle DUT PCB: Core HC, CPW, Vertical Launch, **Rev D, #9**
- Port 1: 1.85mm Cable Connector (Core HC)
- Port 2: 1.85mm CPW Vertical Launch Precision Connector (on HC2, CPW PCB)



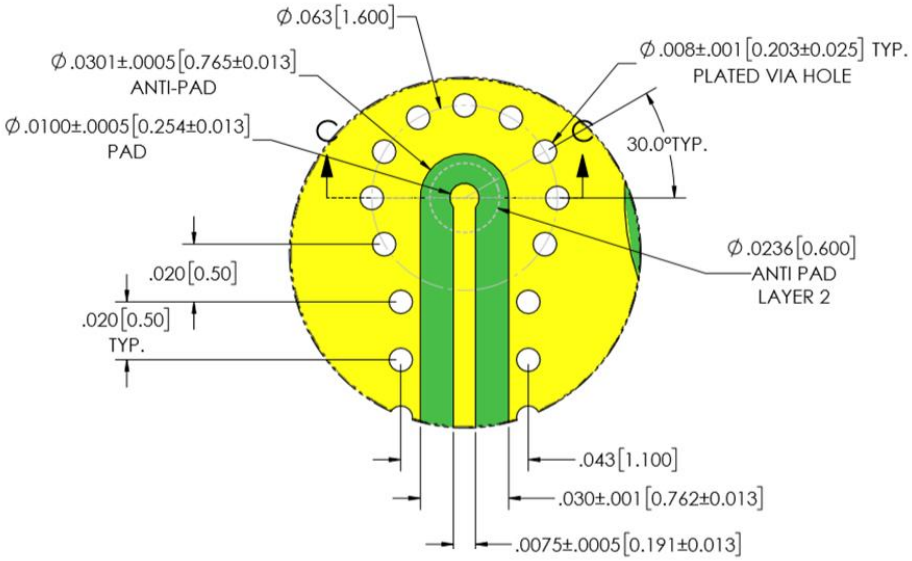
Testing Samples:

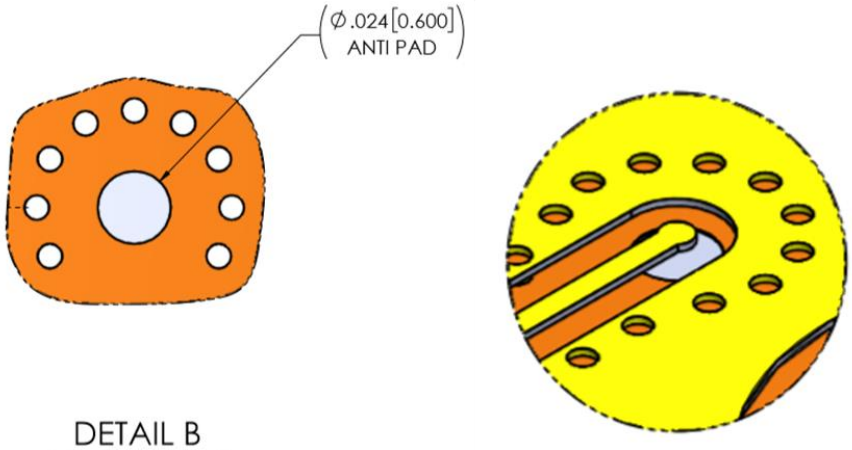
- 1 Samples
- 2 Channels

- 2 THRU Measurements w/ PCB (2 Channels x 1 samples) -> -Single-Ended
- 4 Crosstalk Meas. w/PCB (FEXT, NEXT) -> Single-Ended
- 1 THRU Meas. w/ PCB (1 Channels x 1 samples) -> -Differential
- 2 THRU Meas. w/RF Adaptor (2 Chan. x 1 samples) → Single-Ended

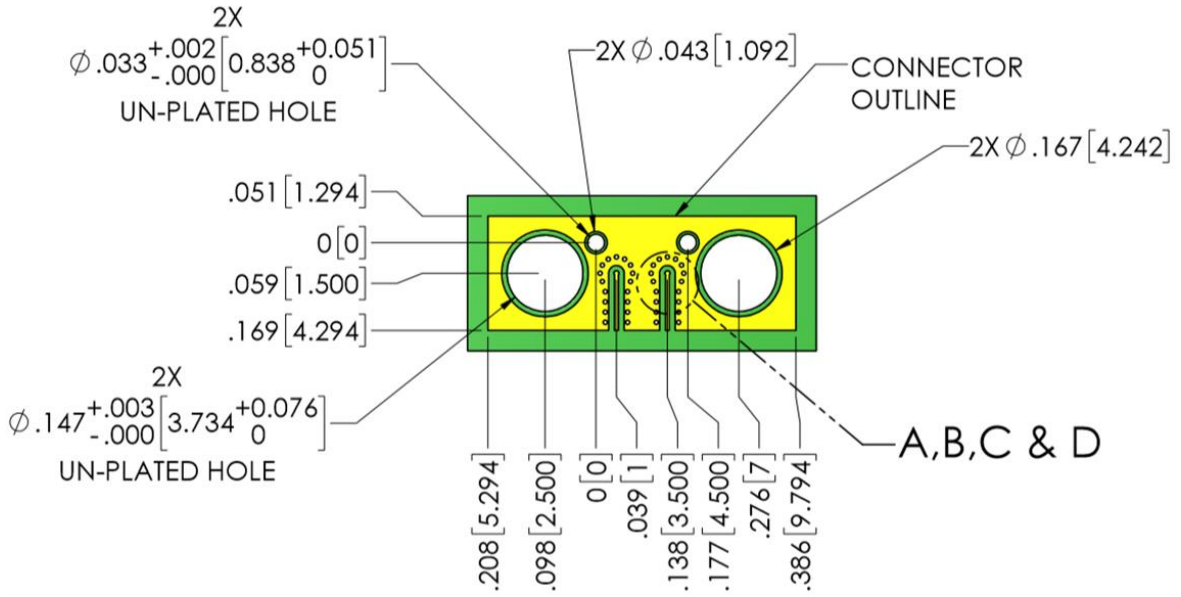
2.0 BOARD STACKUP & FOOTPRINT INFORMATION

- Carlisle Core HC 2.5mm CPW Test Board
  - Revision D, #9, Coplanar Waveguide, Vertical Launch
  - **Cable Assembly placed on 2-Position Single-Ended Footprint**
- Dielectric Material: Tachyon 100G (Dk.2.97, Df 0.0014 @ 20 GHz)
  - Thickness: 0.104mm / 4.11 mil
  -

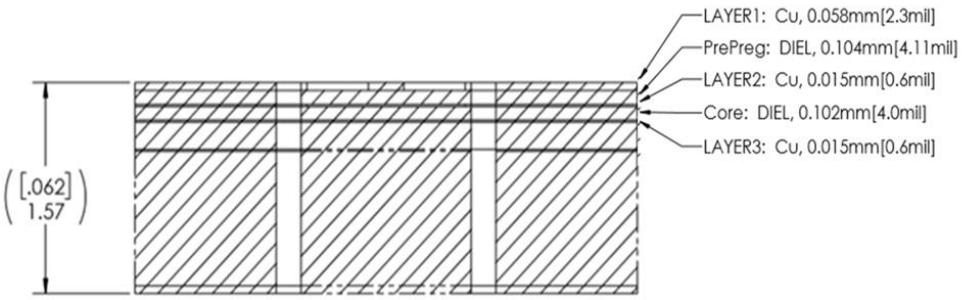




DETAIL B
SCALE 32 : 1
LAYER2



Core HC 2.5mm CPW Test Board Stackup (RevD0)



C) PCB FINISH

1. Surface Protective Plating

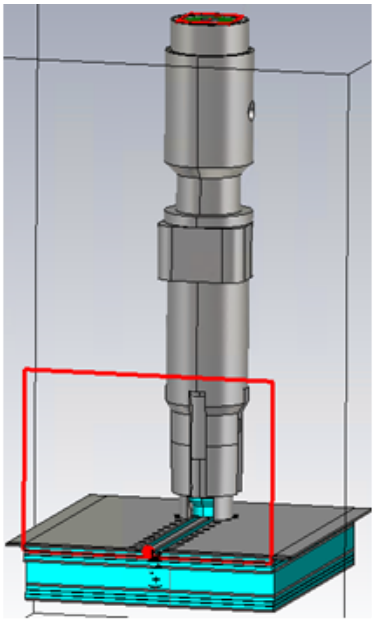
a. All exposed copper on the outer layers shall be plated with a protective surface finish.
b. All exposed pads, edge fingers and plated through holes shall be ENIG with thickness listed in Table 2.

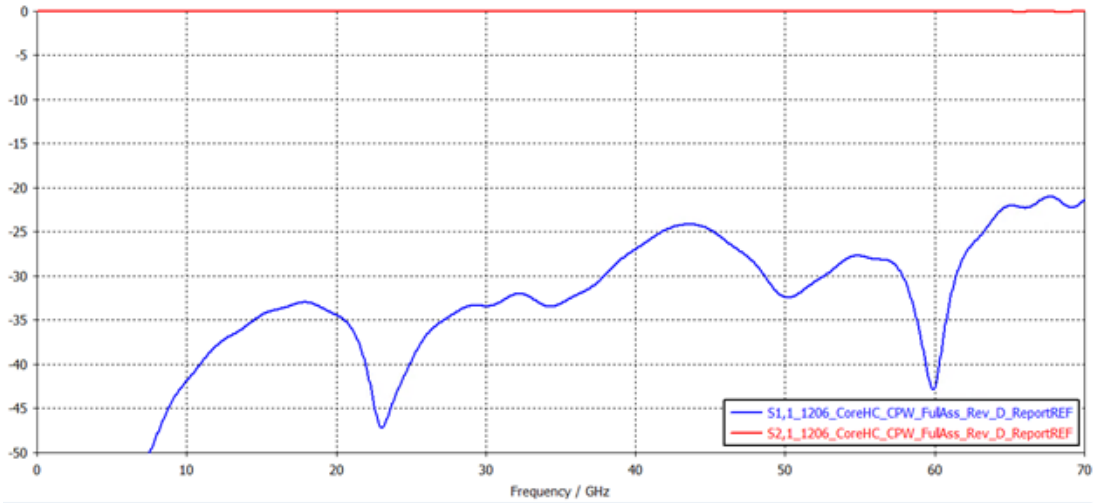
Table 2: Protective Plating Thickness

Nickel		Immersion Gold	
µm (microinch)		µm (microinch)	
Min.	Max.	Min.	Max.
2.5 (100)	13(512)	0.051 (2)	0.2032 (8)

SIGNAL INTEGRITY REPORT

Simulated Data (CST)
1 connector to PCB

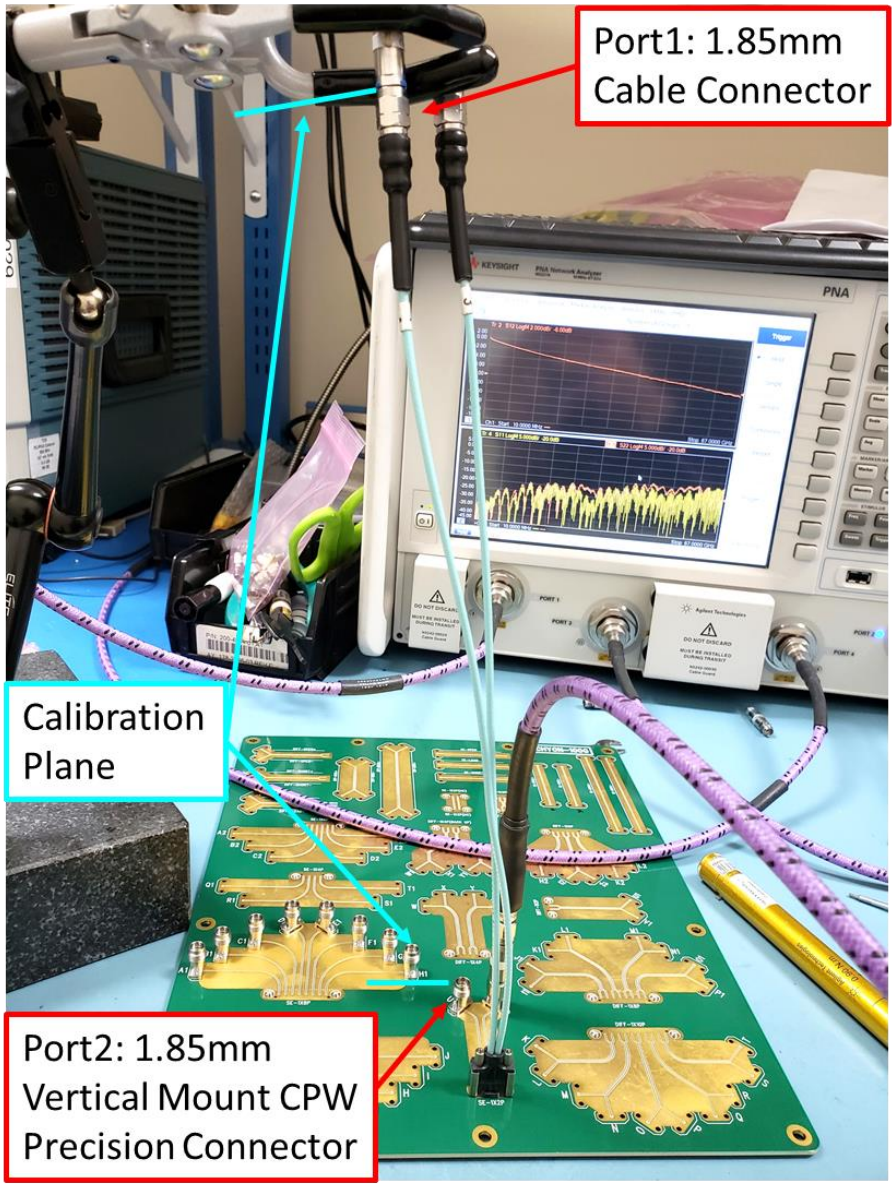


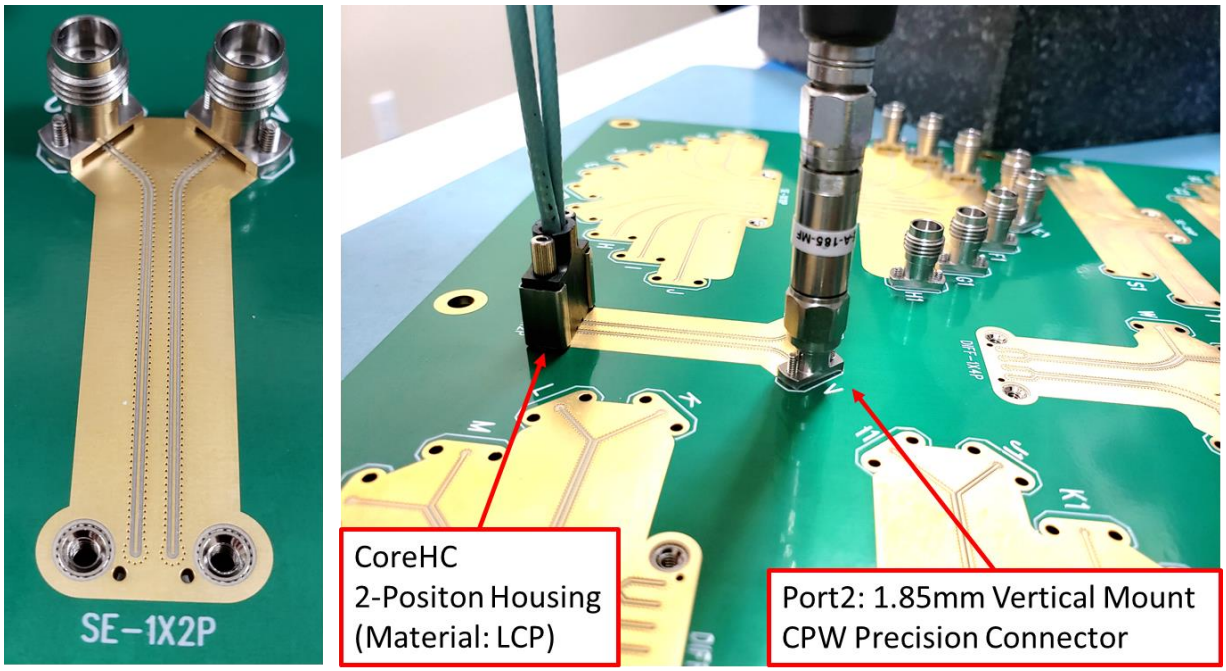


CoreHC_RevD_CPW_1206_032619_FullAss_SE_Rev_1.s2p	3/26/2019 4:26 PM	S2P File	147 KB
CoreHC_2p5mm_PCB_RevD_03262019_CPW_SE_Rev_1.stp	3/26/2019 4:35 PM	STP File	1,042 KB
CoreHC_2p5mm_InterconnectOnly+SolderConnections_03112019_Rev_1	3/11/2019 12:01 PM	STP File	1,415 KB

3.0 MEASUREMENT SET-UP, SINGLE-ENDED (HC2 CPW REVD BOARD)

Measurements are not dembedded and include the Core HC assembly (cable connector, cable, interconnect), PCB (transitions, traces) and 1.85mm CPW vertical mount precision connector.

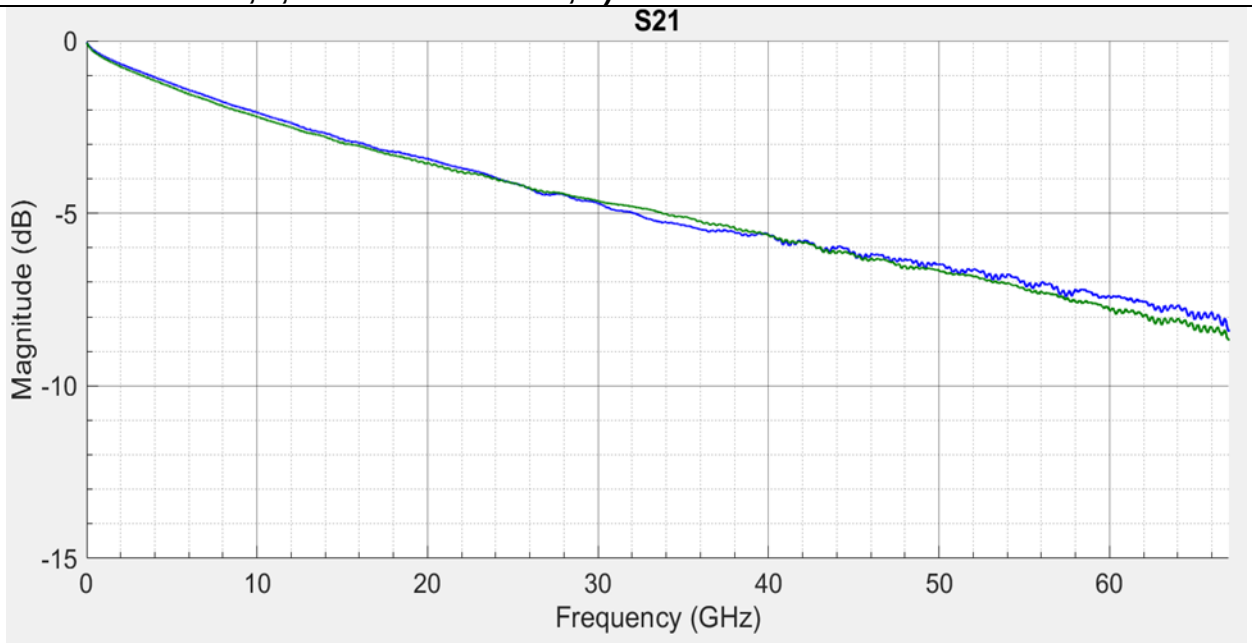




4.0 SIGNAL INTEGRITY RESULTS, SINGLE-ENDED (HC2 CPW REVD BOARD)

Insertion Loss (S21), Single-Ended

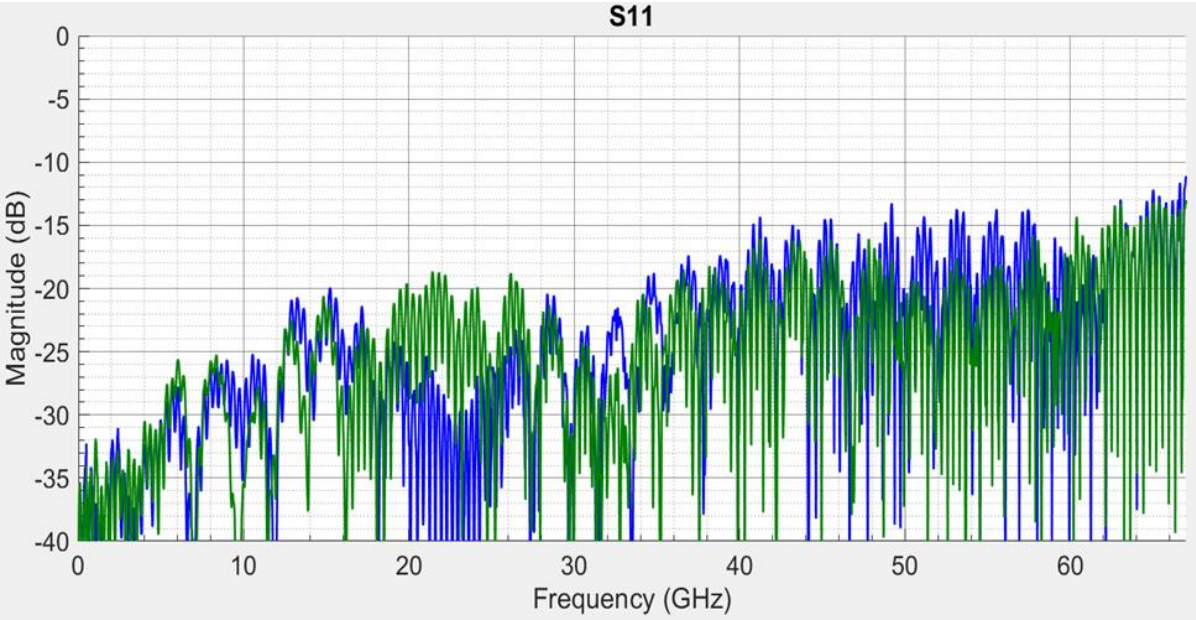
(CoreHC Channels: 3, 4, Board Locations: U, V)

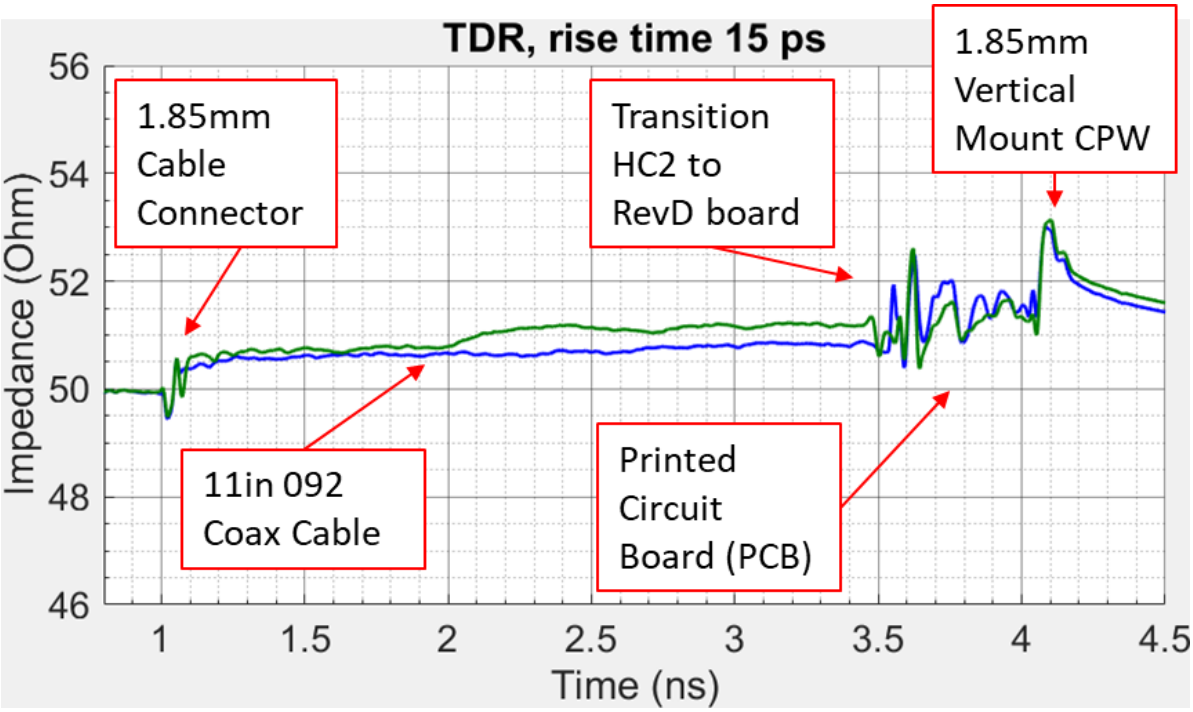


SIGNAL INTEGRITY REPORT

Return Loss (S11), Single-Ended

(CoreHC Channels: 3, 4, Board Locations: U, V)





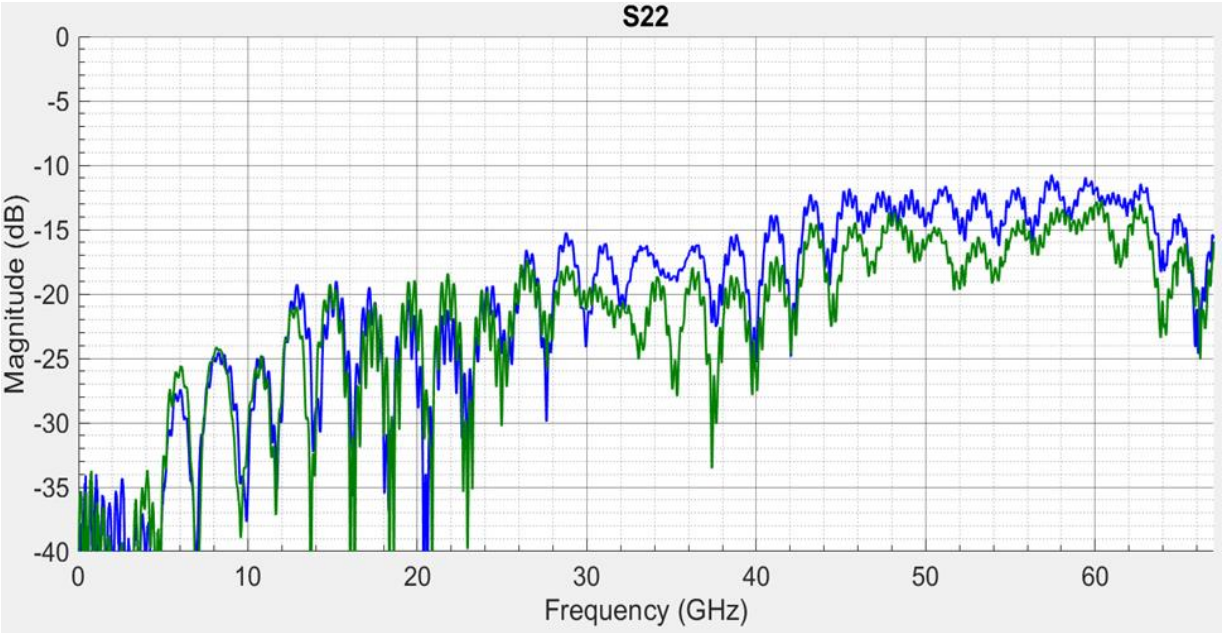
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: **N/A** DATE: **05/ 26 / 2020**	**Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB)** **CARLISLE IT CONFIDENTIAL**	**9** of **22**

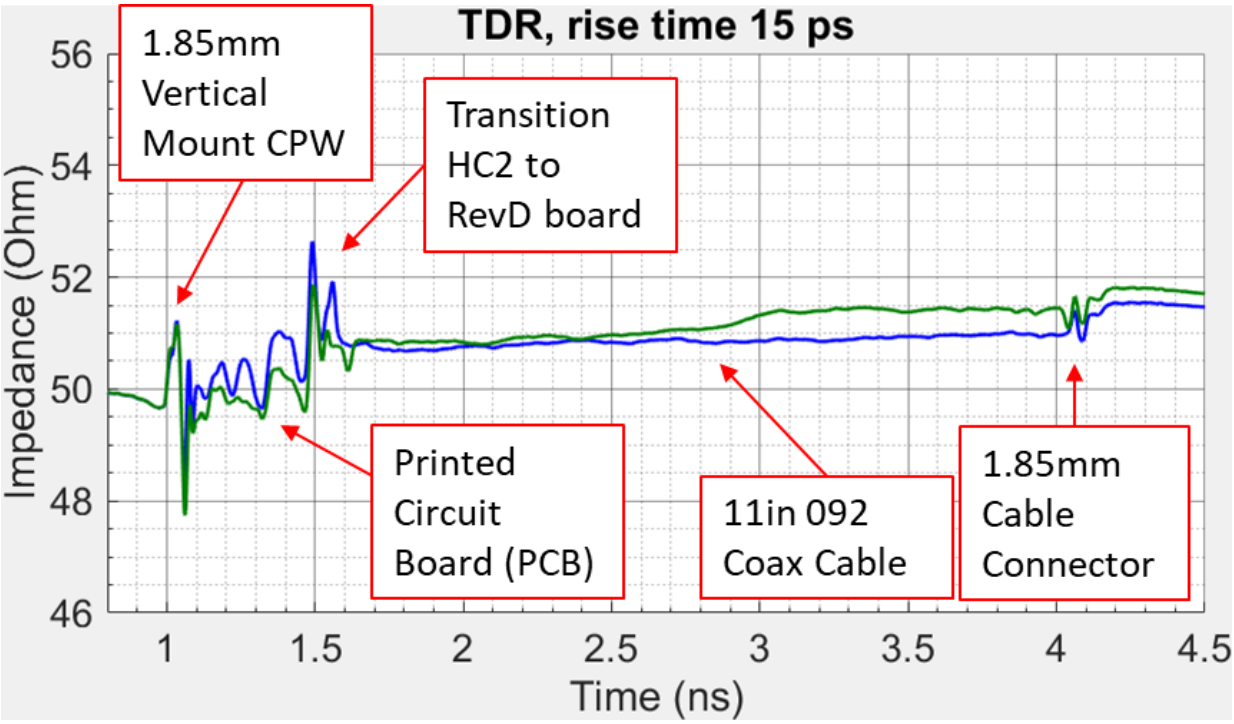
DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	**R.Stavoli**	**H.Tran**	**E.Soubh**

SIGNAL INTEGRITY REPORT

Return Loss (S22), Single-Ended

(CoreHC Channels: 3, 4, Board Locations: U, V)





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1	EC No: **N/A** DATE: **05/ 26 / 2020**	**Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB)** **CARLISLE IT CONFIDENTIAL**	**10** of **22**

DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
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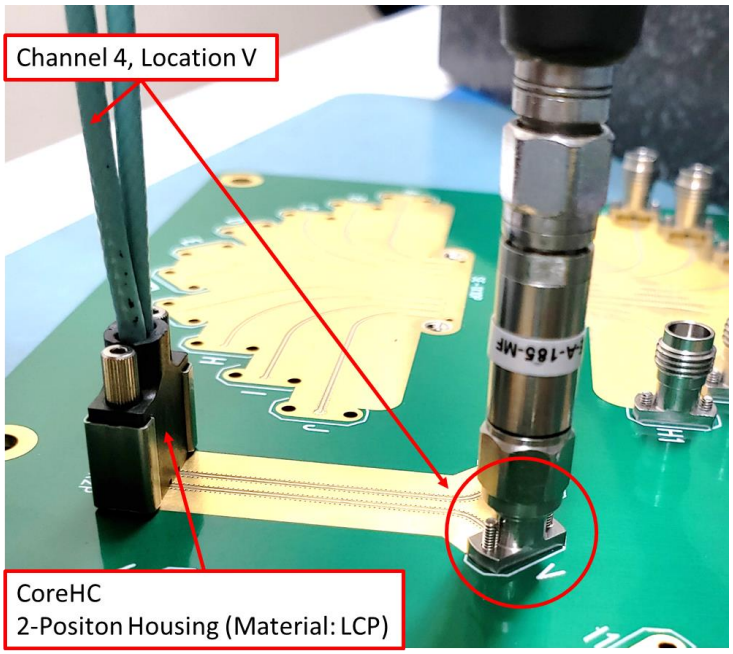
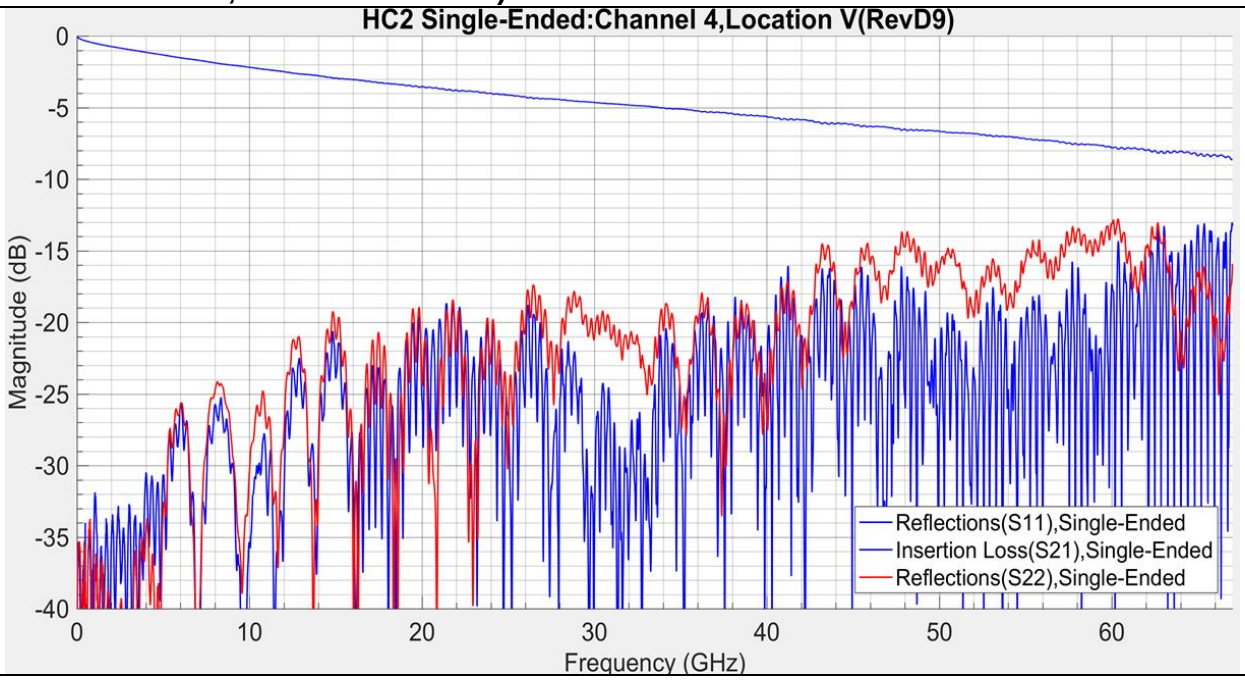
5.0 SIGNAL INTEGRITY RESULTS (HC2 CPW REVD BOARD), CHANNEL #4, LOCATION V



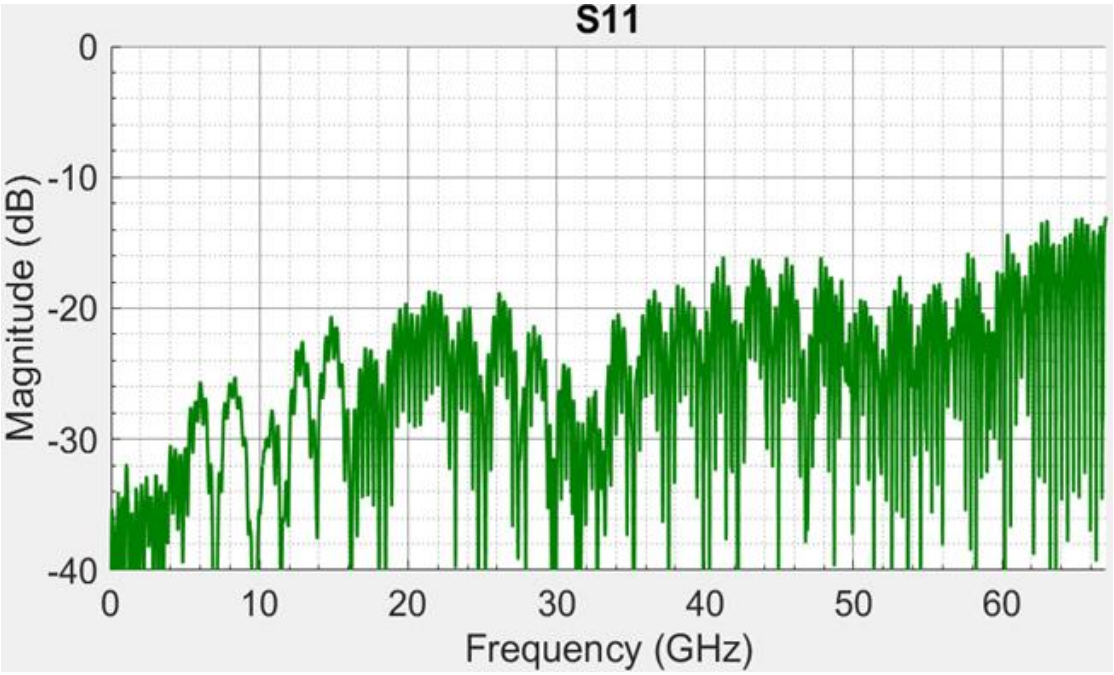
Insertion(S21) and Return (S11, S22) Loss, Single-Ended
(CoreHC Channel: 4, Board Location: V)

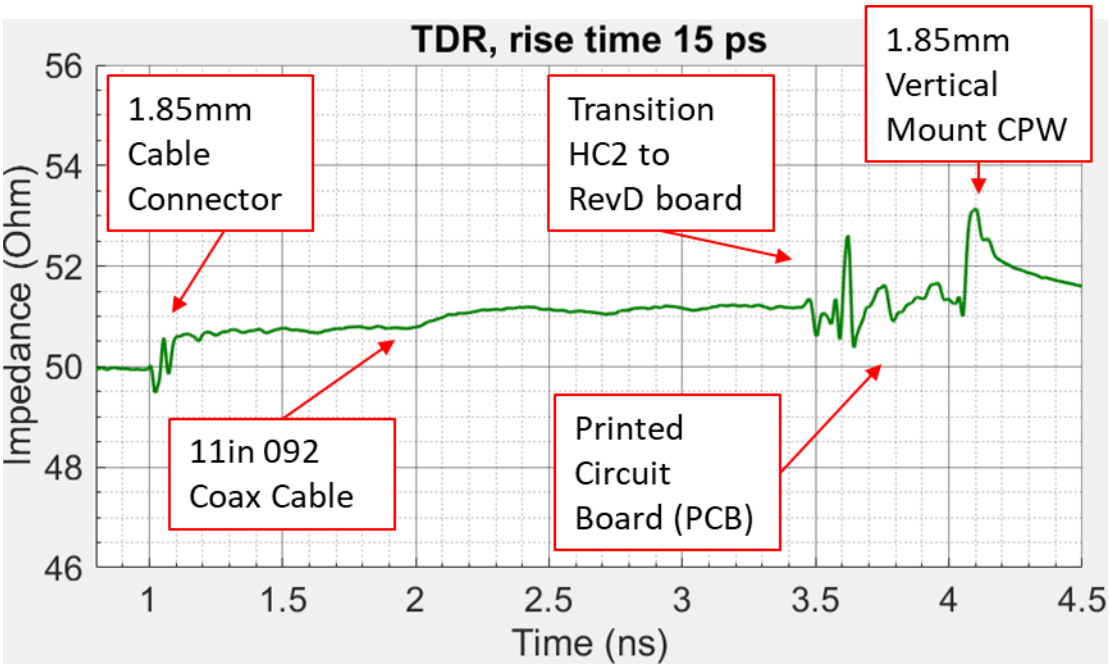


SIGNAL INTEGRITY REPORT

Return Loss (S11), Single-Ended

(CoreHC Channel: 4, Board Location: V)





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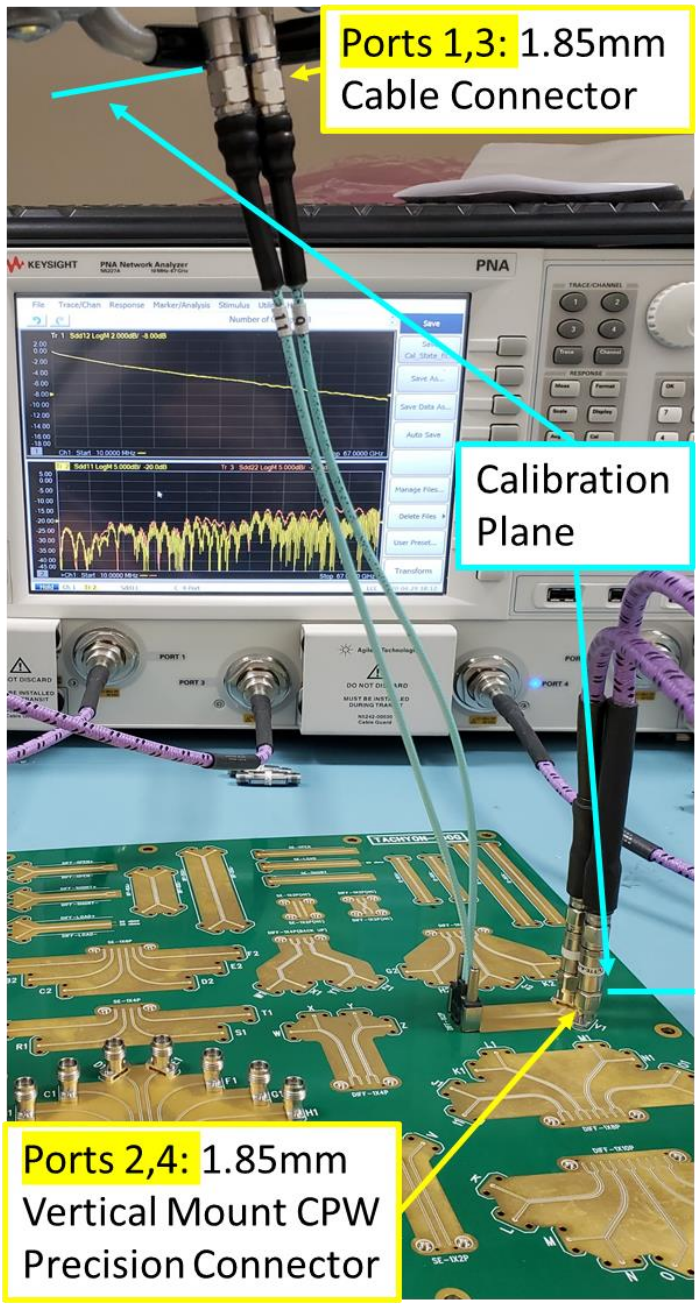
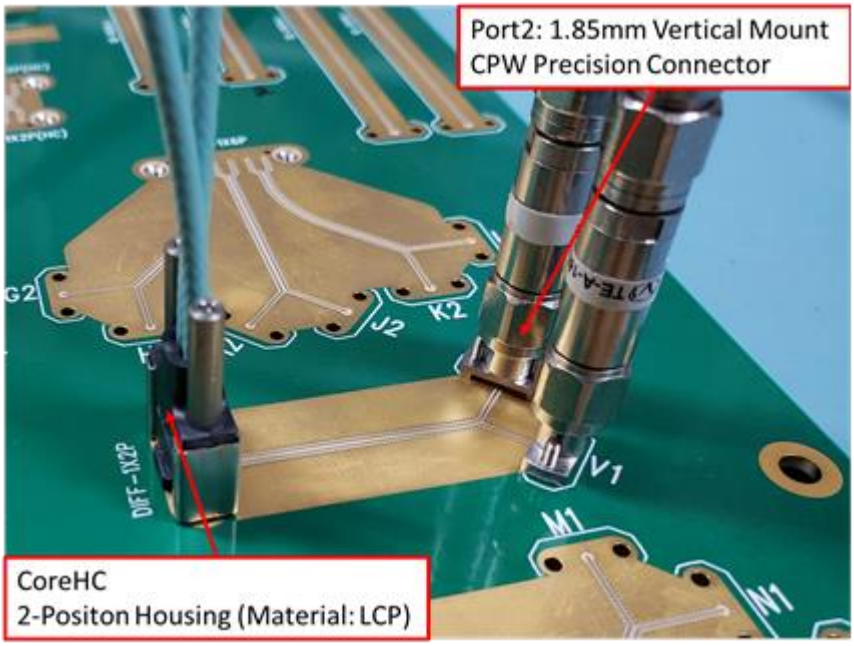
1	EC No: N/A DATE: 05/ 26 / 2020	Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB) CARLISLE IT CONFIDENTIAL	12 of 22

DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	R.Stavoli	H.Tran	E.Soubh

6.0 MEASUREMENT SET-UP, DIFFERENTIAL (HC2 CPW REVD BOARD)

Ports 1, 3: Core HC (1.85mm Cable Connector) → Device Under Test → Ports 2,4: Core HC RevD PCB (1.85mm CPW Vertical Mount Precision Connector)

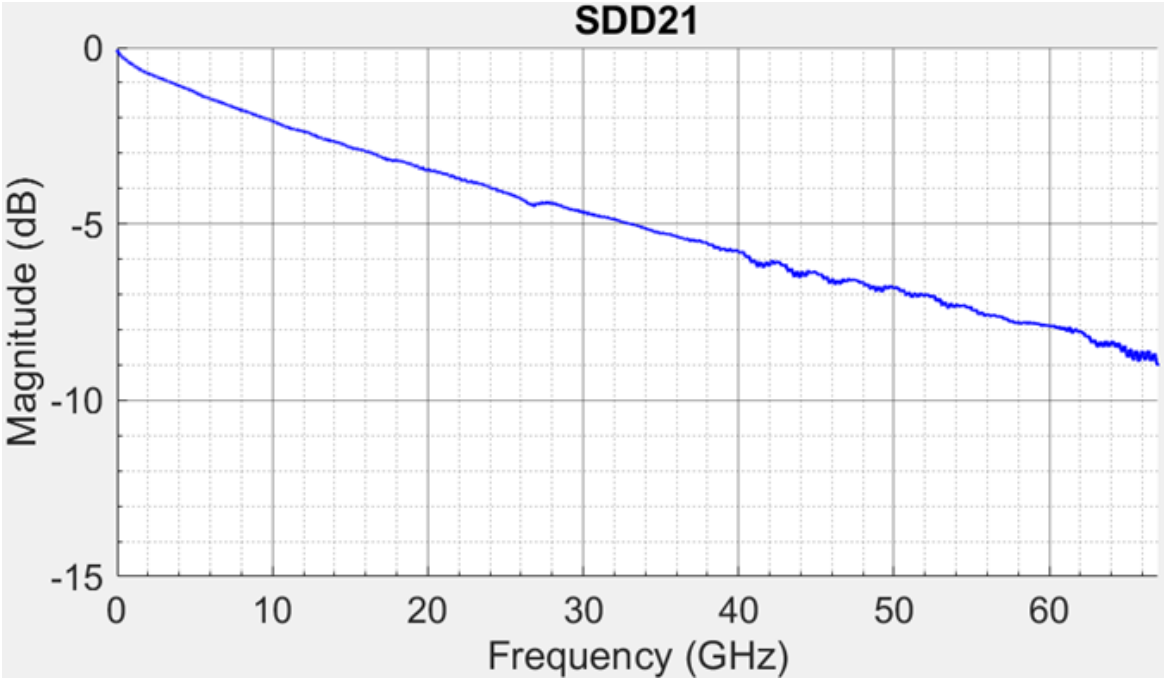




7.0 SIGNAL INTEGRITY RESULTS, DIFFERENTIAL (HC2 CPW REVD BOARD)

Insertion Loss (SDD21), Differential

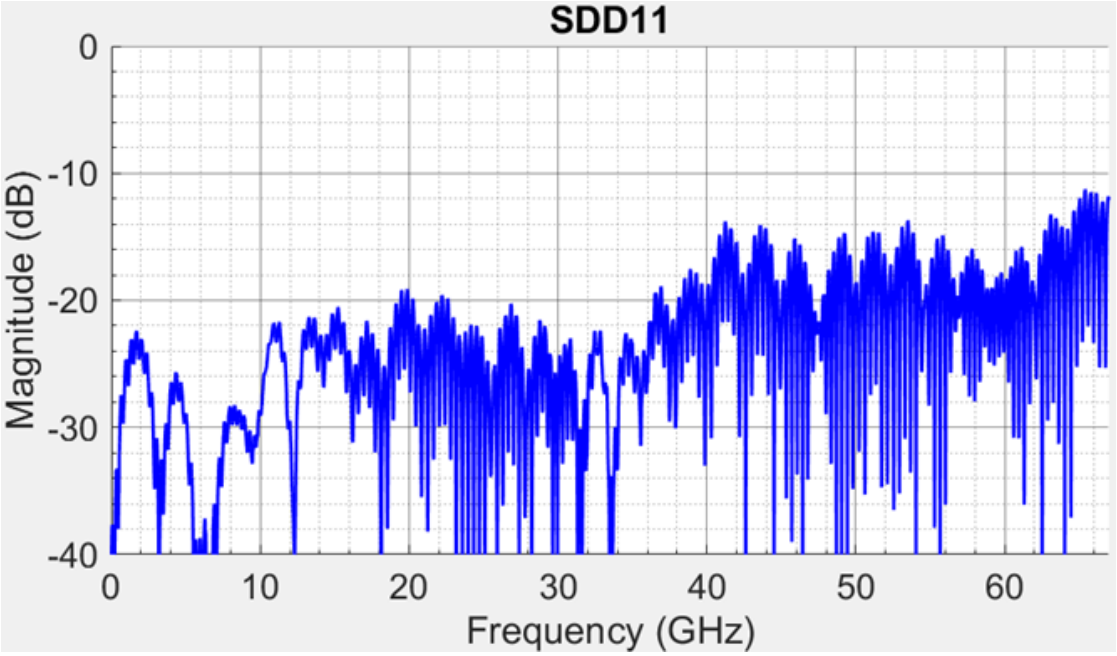
(CoreHC Channels: 3, 4, Board Locations: U1, V1)

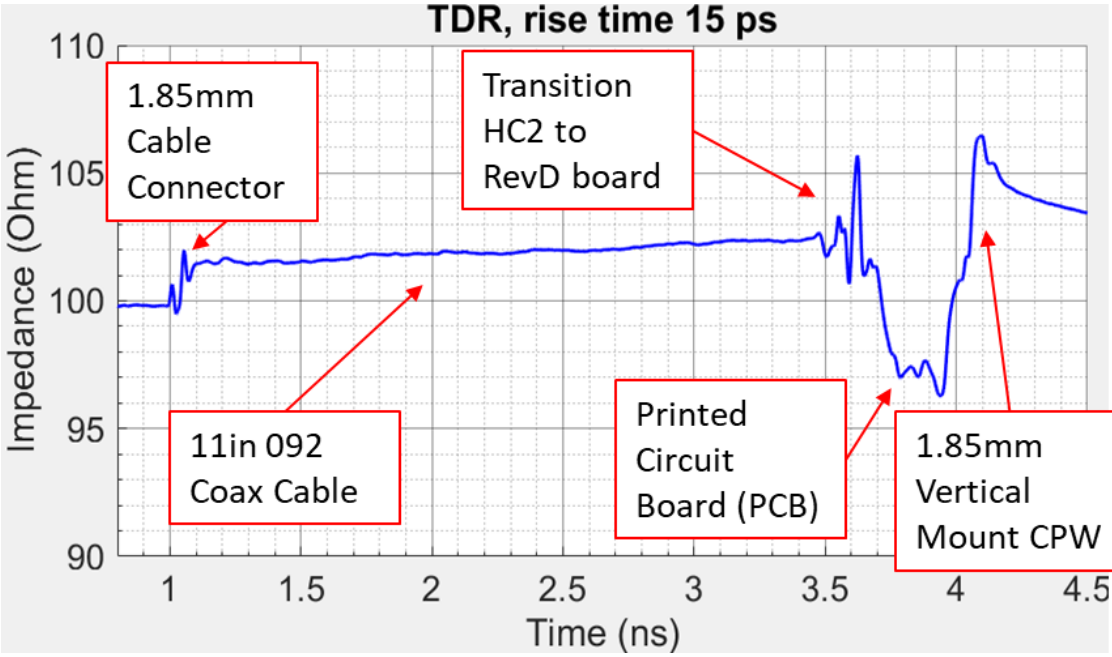


SIGNAL INTEGRITY REPORT

Return Loss (SDD11), Differential

(CoreHC Channels: 3, 4, Board Locations: U1, V1)





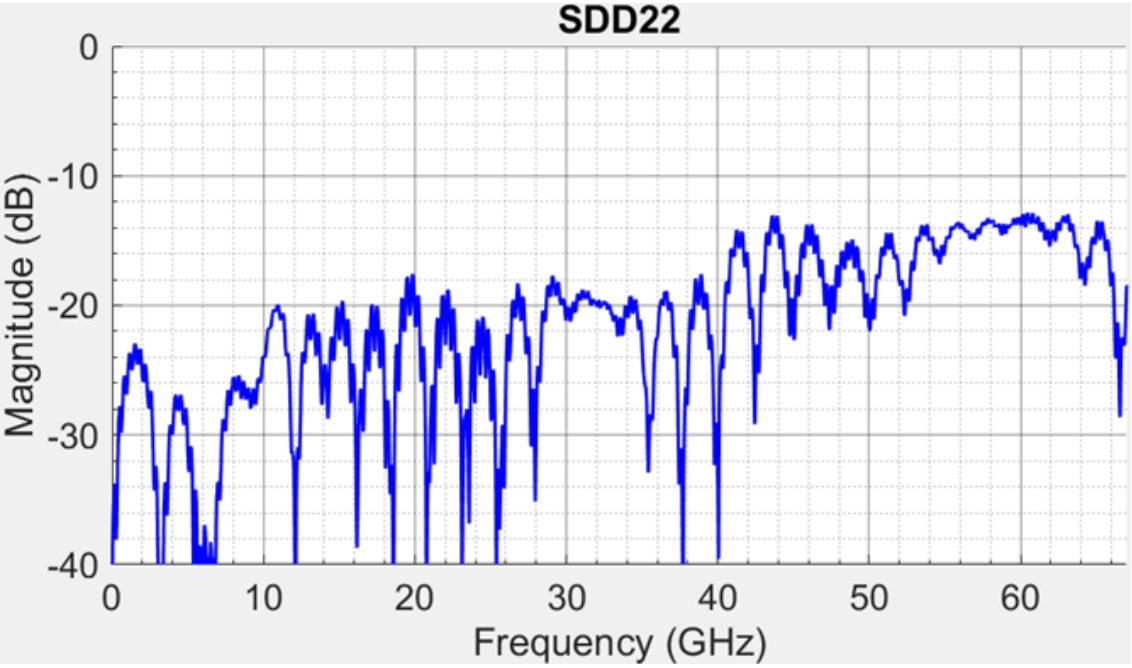
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: N/A DATE: 05/ 26 / 2020	Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB) CARLISLE IT CONFIDENTIAL	15 of 22

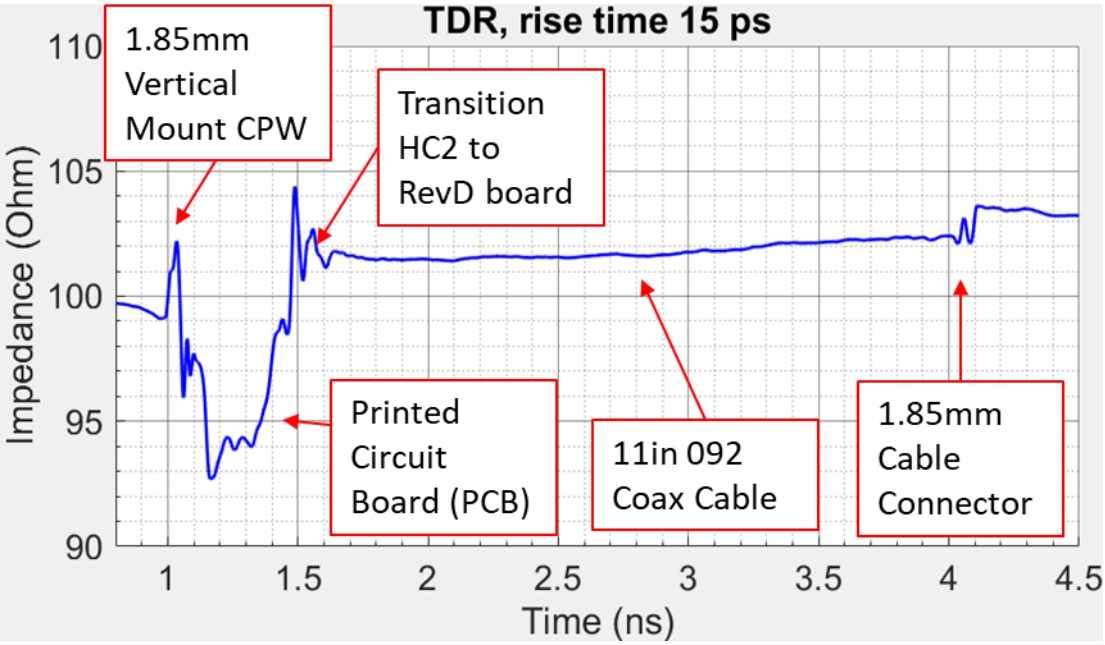
DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	R.Stavoli	H.Tran	E.Soubh

SIGNAL INTEGRITY REPORT

Return Loss (SDD22), Differential

(CoreHC Channels: 3, 4, Board Locations: U1, V1)

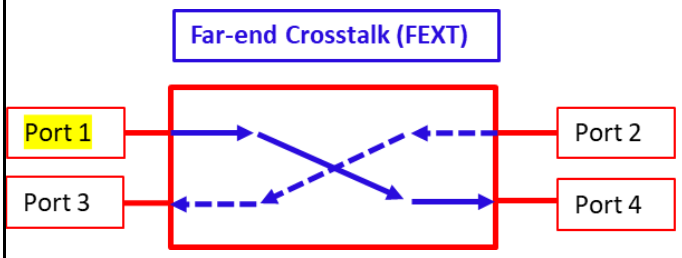


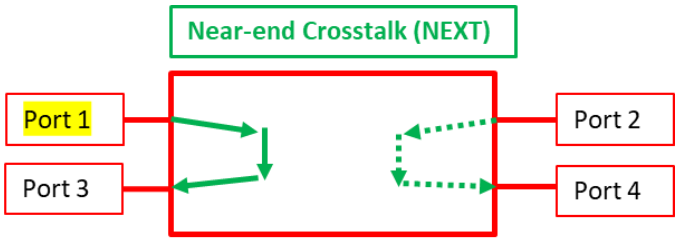


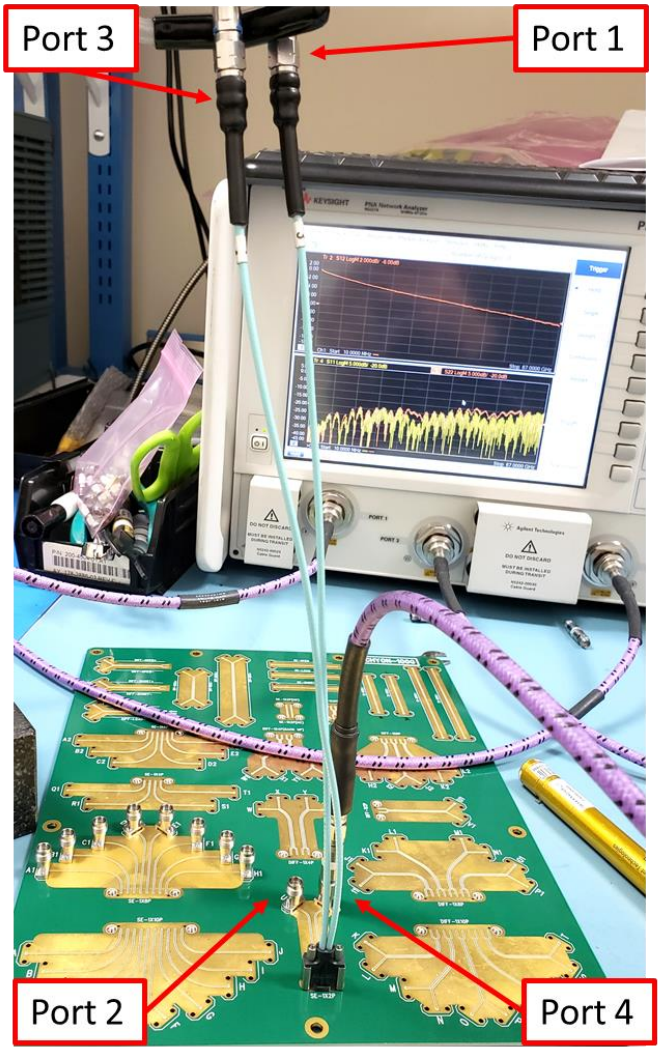
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: N/A DATE: 05/ 26 / 2020	Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB) CARLISLE IT CONFIDENTIAL	16 of 22

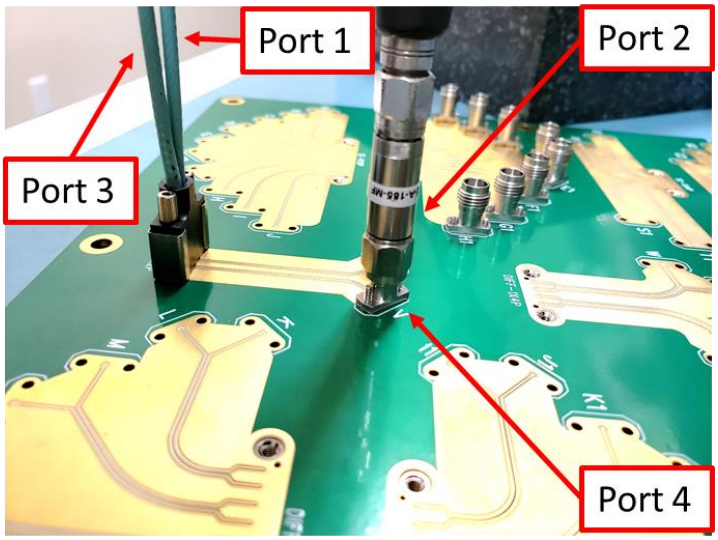
DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	R.Stavoli	H.Tran	E.Soubh

8.0 MEASUREMENT SET-UP, SINGLE-ENDED, CROSSTALK (HC2 CPW REVD)







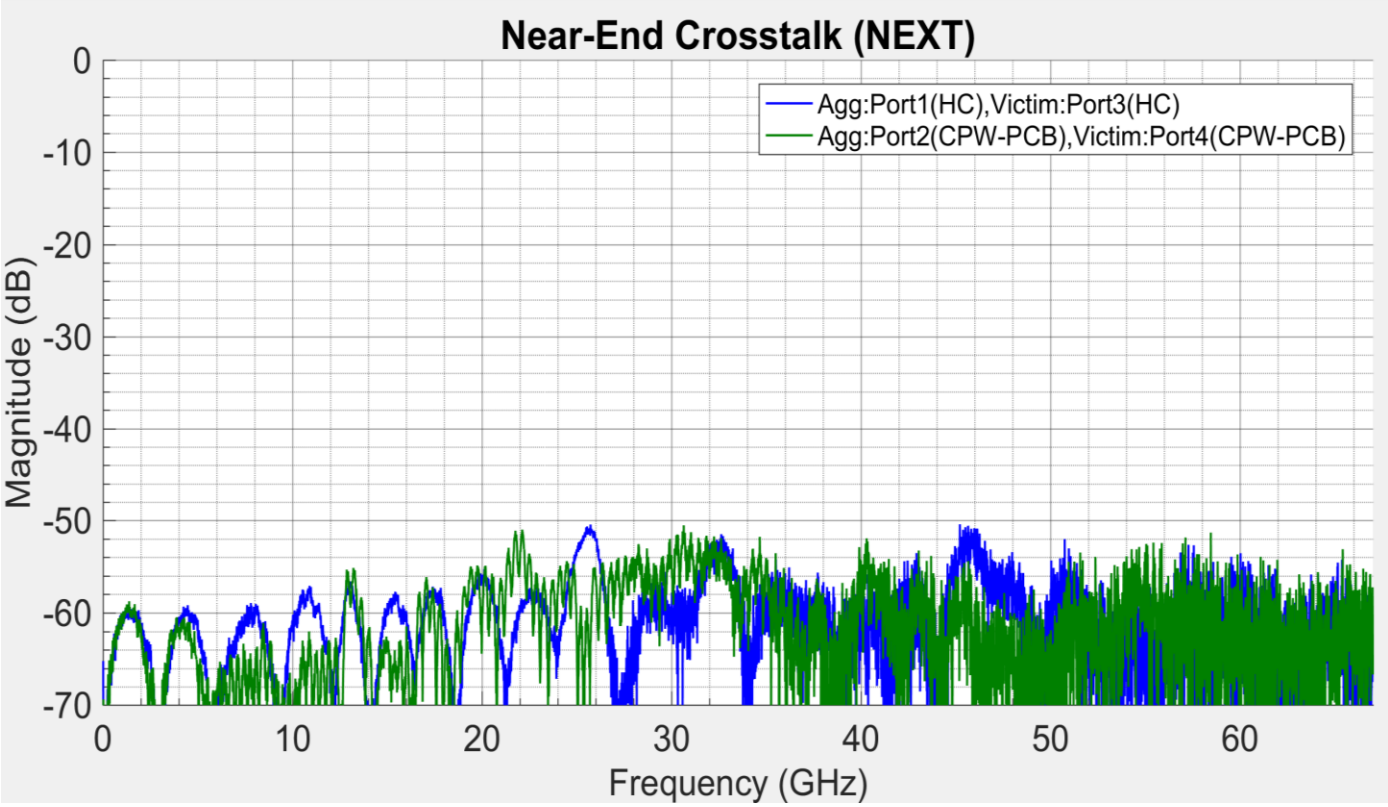


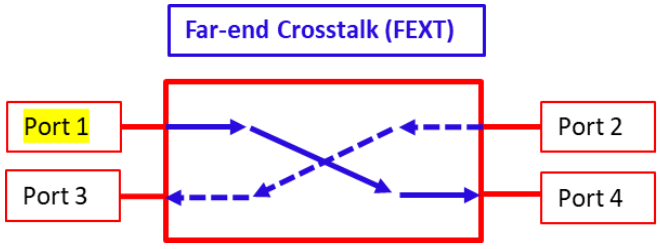
SIGNAL INTEGRITY REPORT

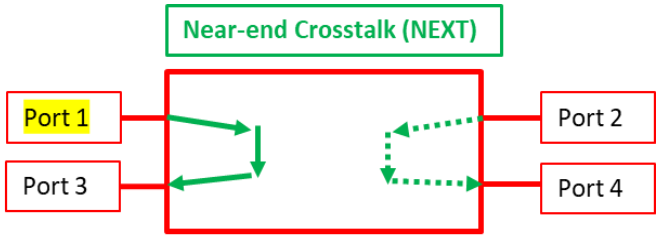
9.0 SIGNAL INTEGRITY RESULTS, SINGLE-ENDED, CROSSTALK (HC2 CPW REVD)

Near-End Crosstalk (S31, S42), Single-Ended

(CoreHC Channels: 3, 4, Board Locations: U, V)
Port1(HC) → Port3(HC) & Port 2(VMCPW/PCB)→ Port 4 (VMCPW/PCB)







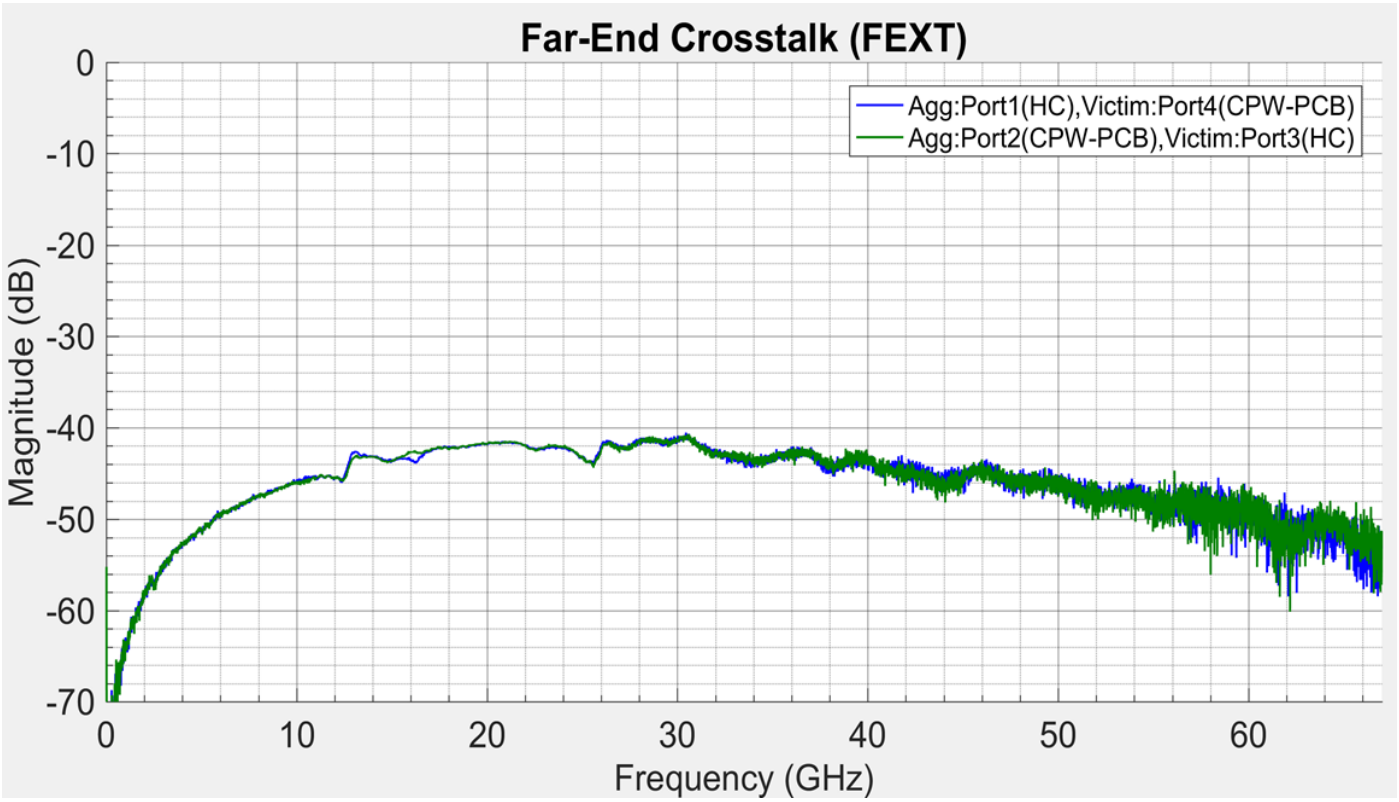
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: N/A DATE: 05/ 26 / 2020	Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB) CARLISLE IT CONFIDENTIAL	18 of 22

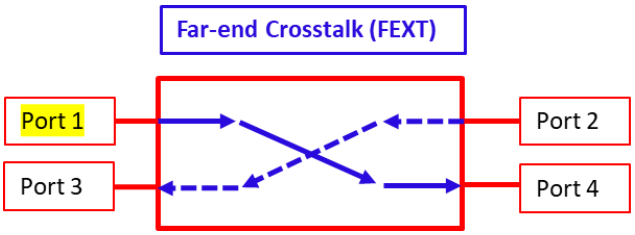
DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	R.Stavoli	H.Tran	E.Soubh

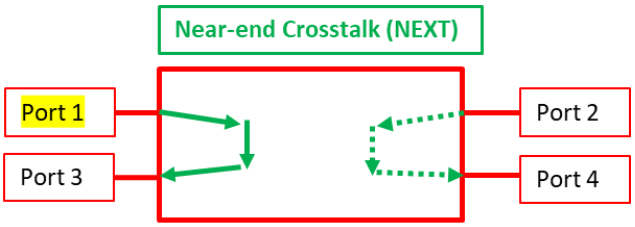
SIGNAL INTEGRITY REPORT

Far-End Crosstalk (S41, S32), Single-Ended

(CoreHC Channels: 3, 4, Board Locations: U, V)
Port1(HC) → Port 4 (VMCPW/PCB) & Port 2(VMCPW/PCB)→ Port3(HC)







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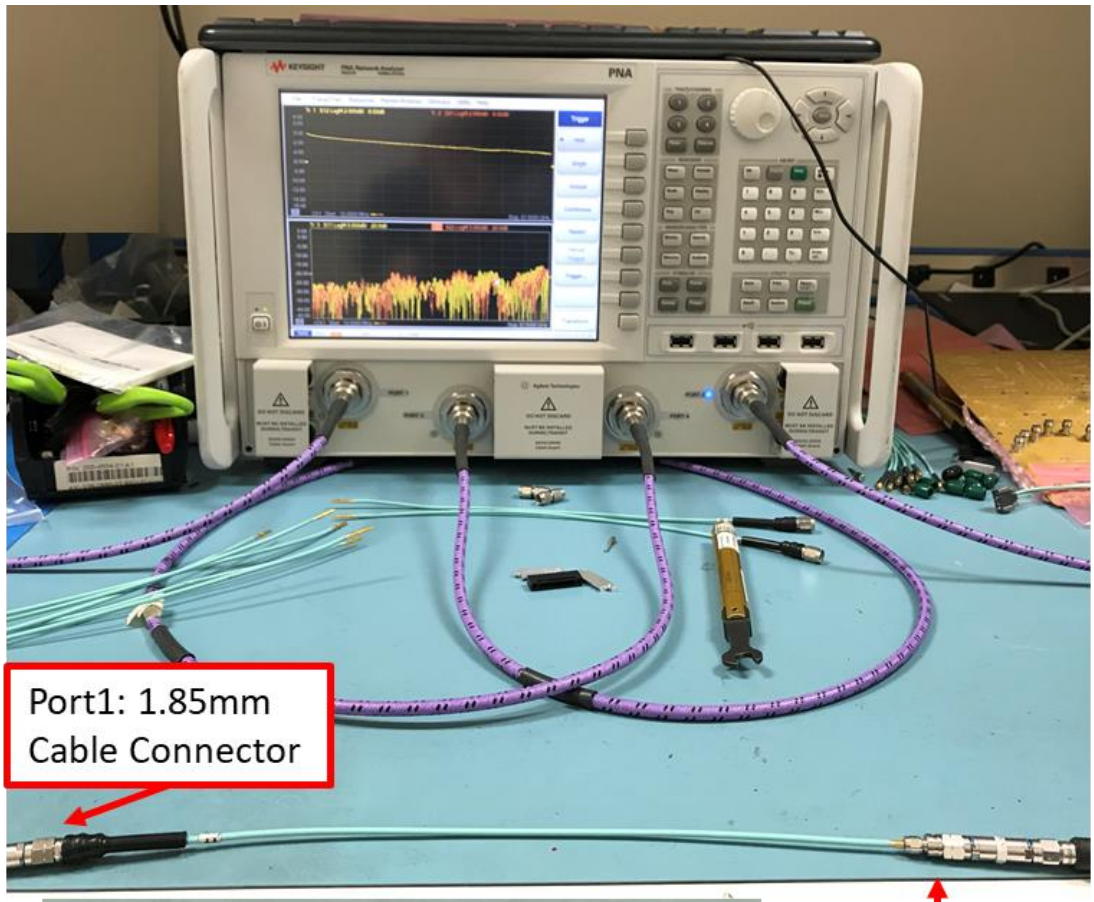
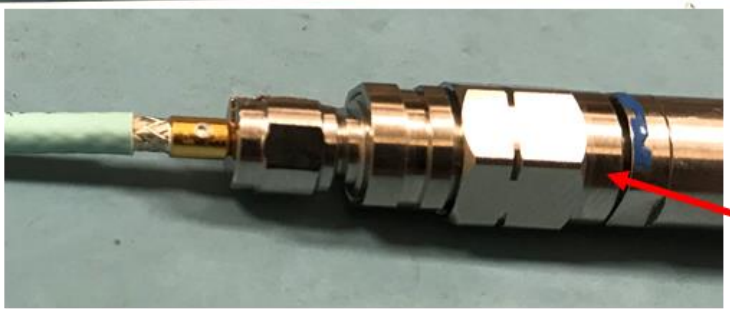
1	EC No: **N/A** DATE: **05/ 26 / 2020**	**Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB)** **CARLISLE IT CONFIDENTIAL**	**19** of **22**

DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	**R.Stavoli**	**H.Tran**	**E.Soubh**

10.0 MEASUREMENT SET-UP (HC2 1.85MM RF ADAPTOR #1)

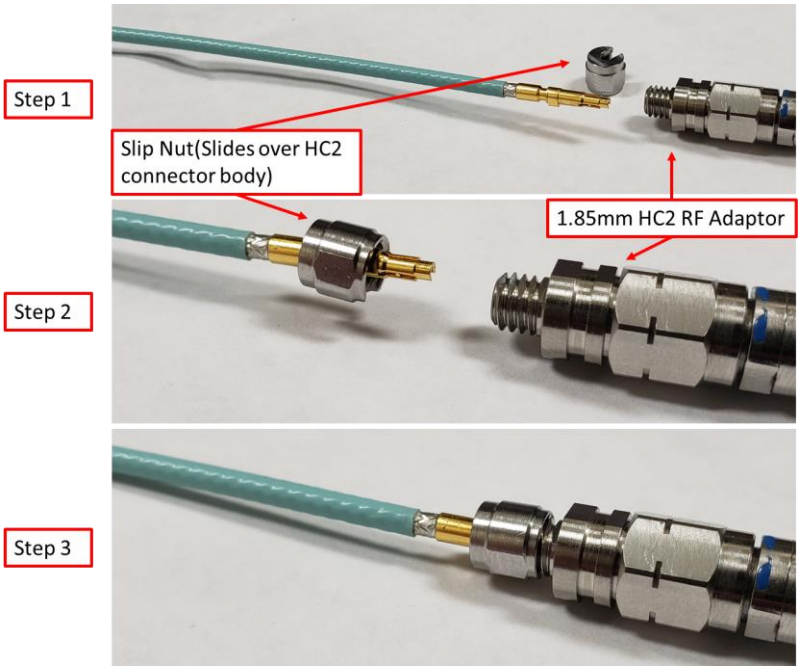
Port 1: Core HC
(1.85mm Cable Connector) → Device Under Test → Port 2: Core HC Interface
(1.85mm RF Core HC Adaptor #1)





SIGNAL INTEGRITY REPORT

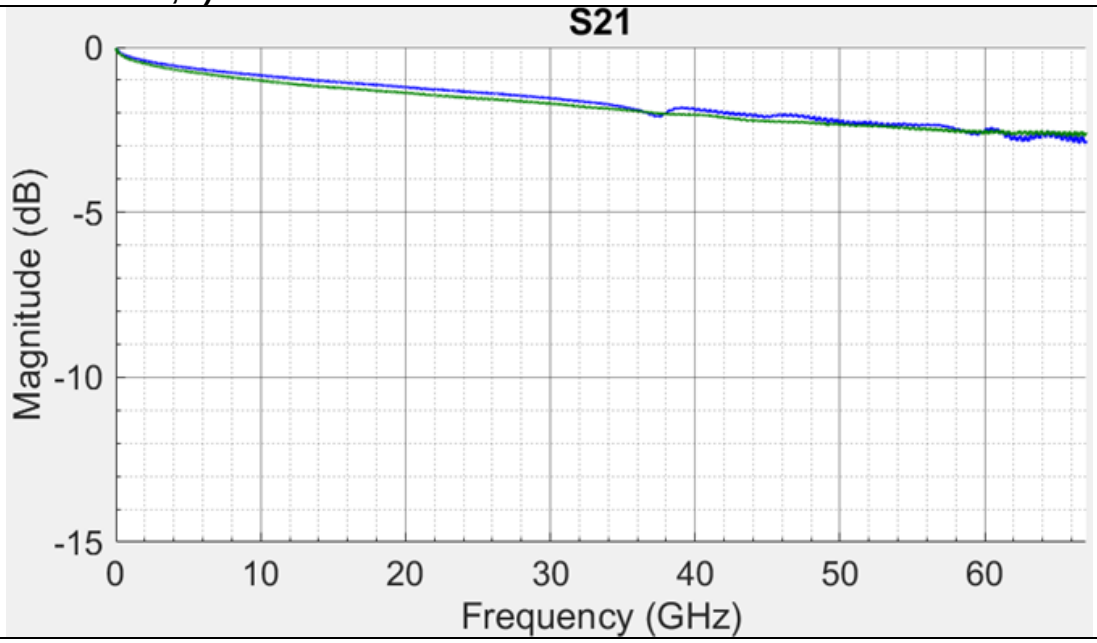
HC2 Adaptor Testing Procedure



11.0 SIGNAL INTEGRITY RESULTS (HC2 1.85MM RF ADAPTOR #1)

Insertion Loss (S21), Single-Ended

(CoreHC Channels: 3, 4)

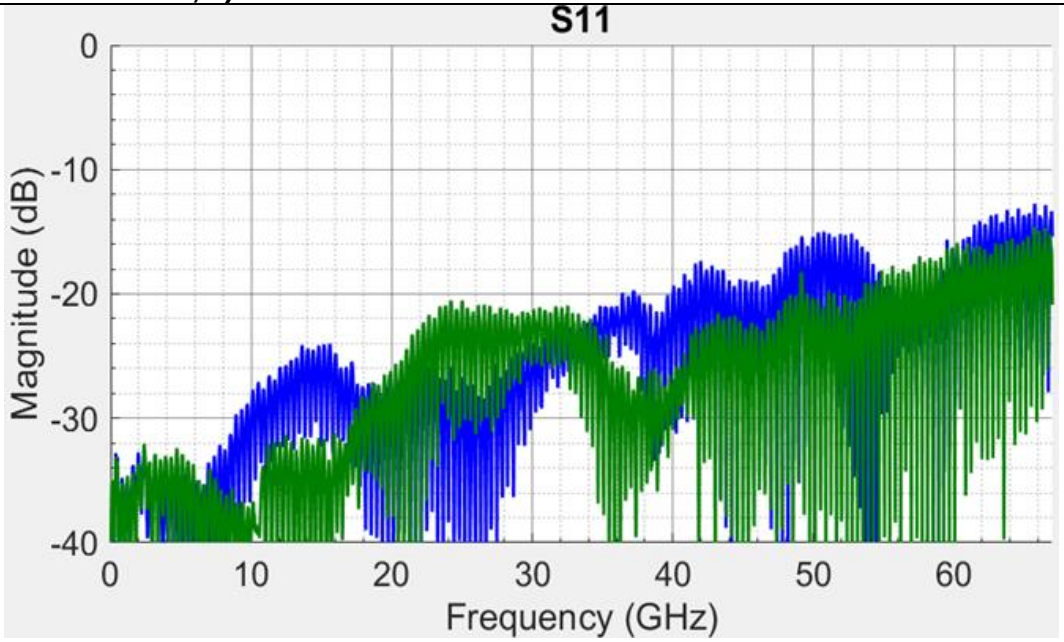


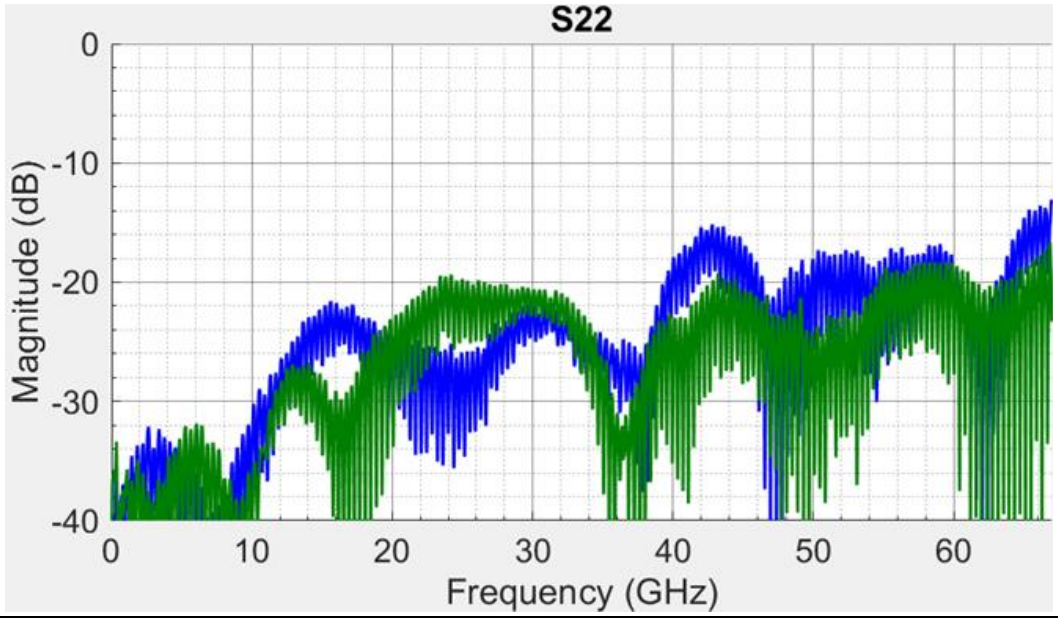
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
1	EC No: N/A DATE: 05/ 26 / 2020	Core HC 2.5mm CPW: Configuration 1X2P (HC2 to PCB) CARLISLE IT CONFIDENTIAL	21 of 22

DOCUMENT NUMBER:	SI ENGINEER:	DESIGN ENGINEER	ENGINEERING MANAGER
RSI-TM7SSSH22S8MS028	R.Stavoli	H.Tran	E.Soubh

Return Loss (S11, S22), Single-Ended

(CoreHC Channels: 3, 4)





12.0 APPENDIX, (SPARAMETERS SHOWN IN REPORT)

CoreHC Reference Cable Assembly_2-Position Measurements_051420 5/14/2020 4:18 PM Compressed (zipp... 3,135 KB