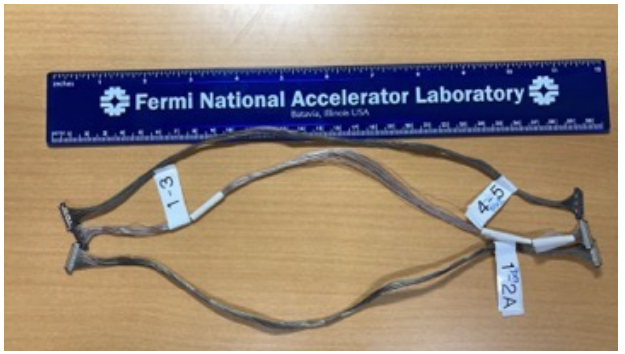
Micro-Coax Solution for Bus Extender

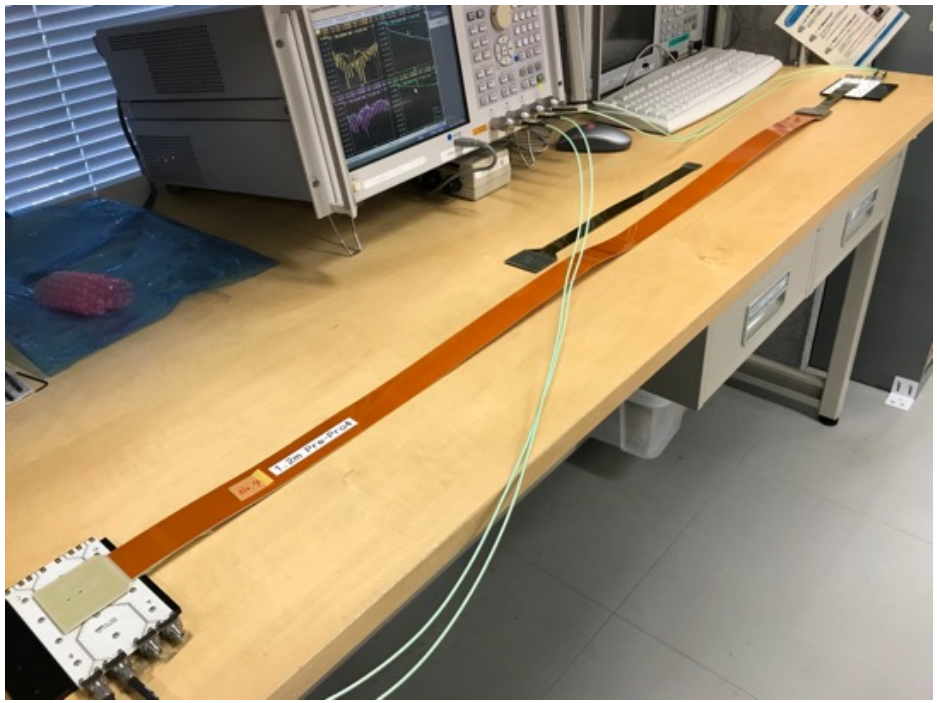
RIKEN/RBRC
Itaru Nakagawa

vs



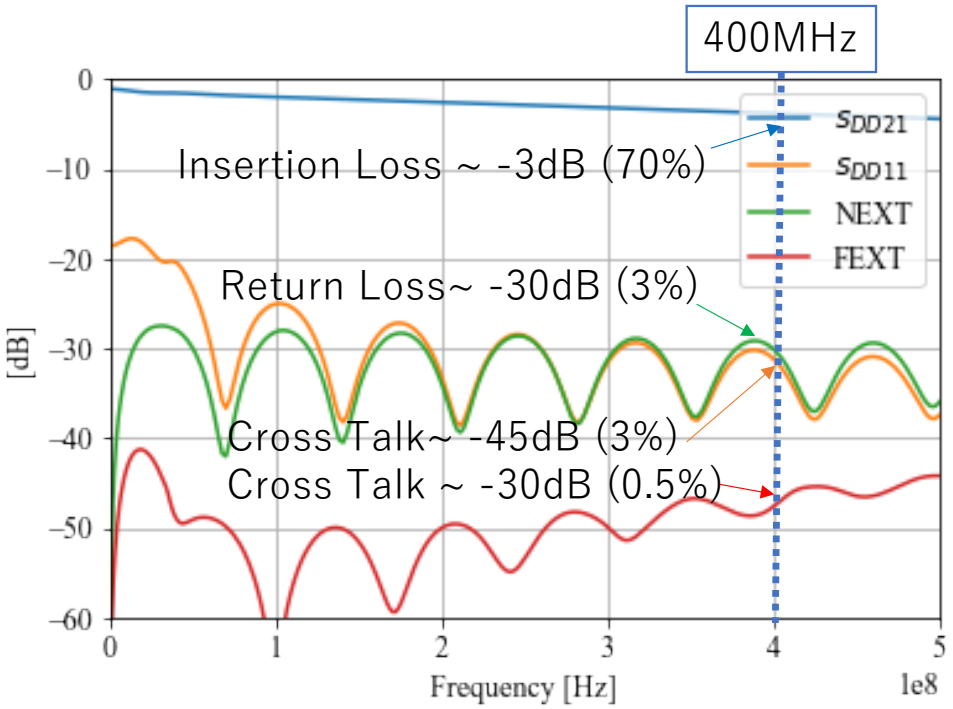
sParameter Measurements @ TIRI

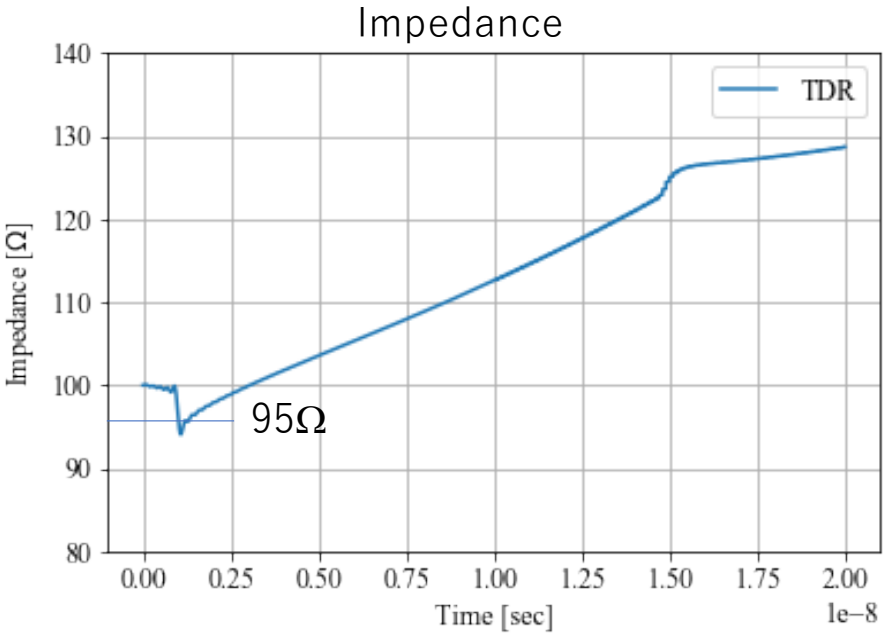
Bus Extender + Conversion Cable



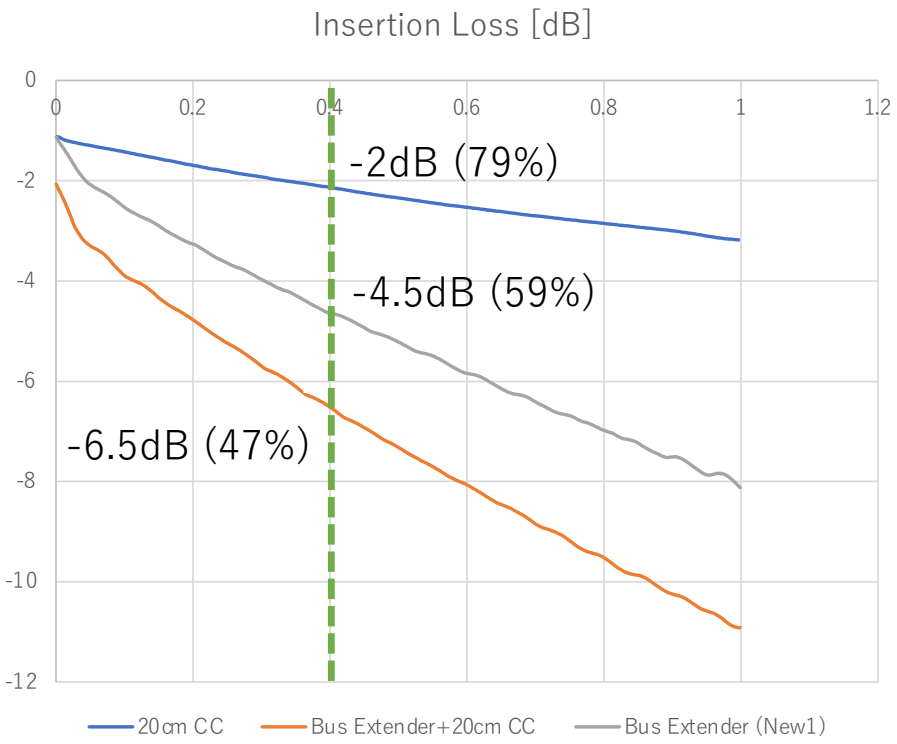
Measurement by Takashi Kondo (2021/8/4)

Bus Extender Property Summary



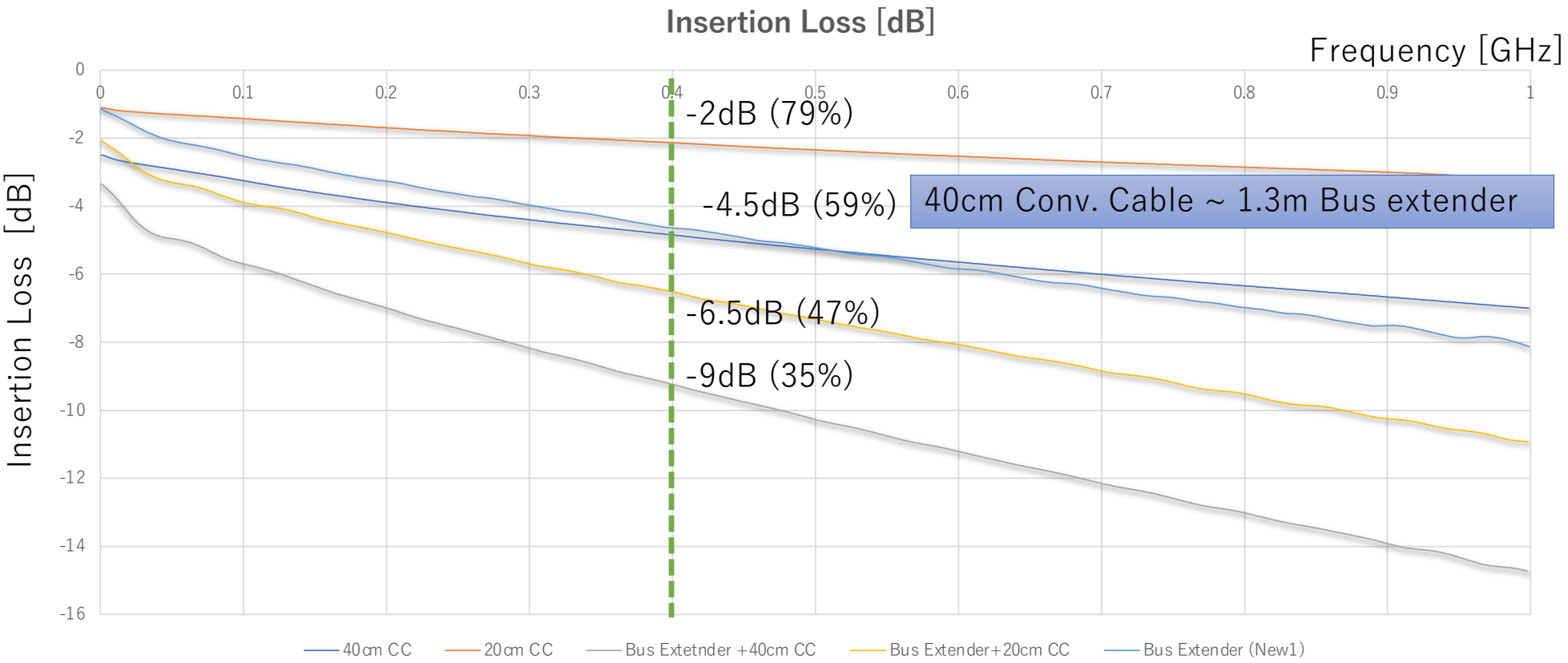


sParameters for BE, BE+Conv. Cable



20cm CC x Bus Extender = 0.79 x 0.59 = 0.47
Observed 47% is consistent with expectation
(no additional loss by the impedance mismatch)

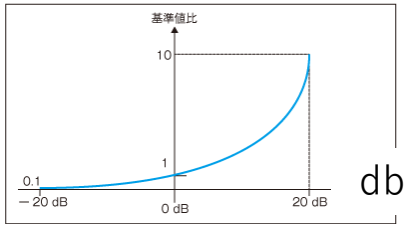
Insertion Loss and 40cm Conversion Cable



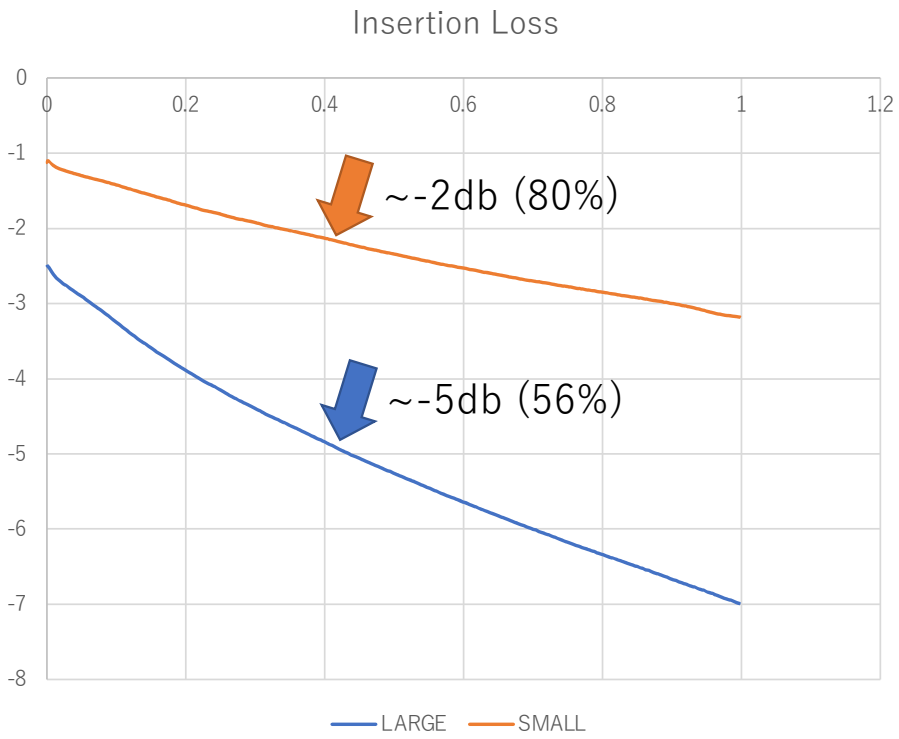
Bus Extender + 40cm Conversion Cable is nearly equal impact to Bus Extender + Bus Extender

Micro Coax Expected Performance

Insertion Loss @ 400MHz



FPC Conversion Cable



KEL XSL Coaxial Cable

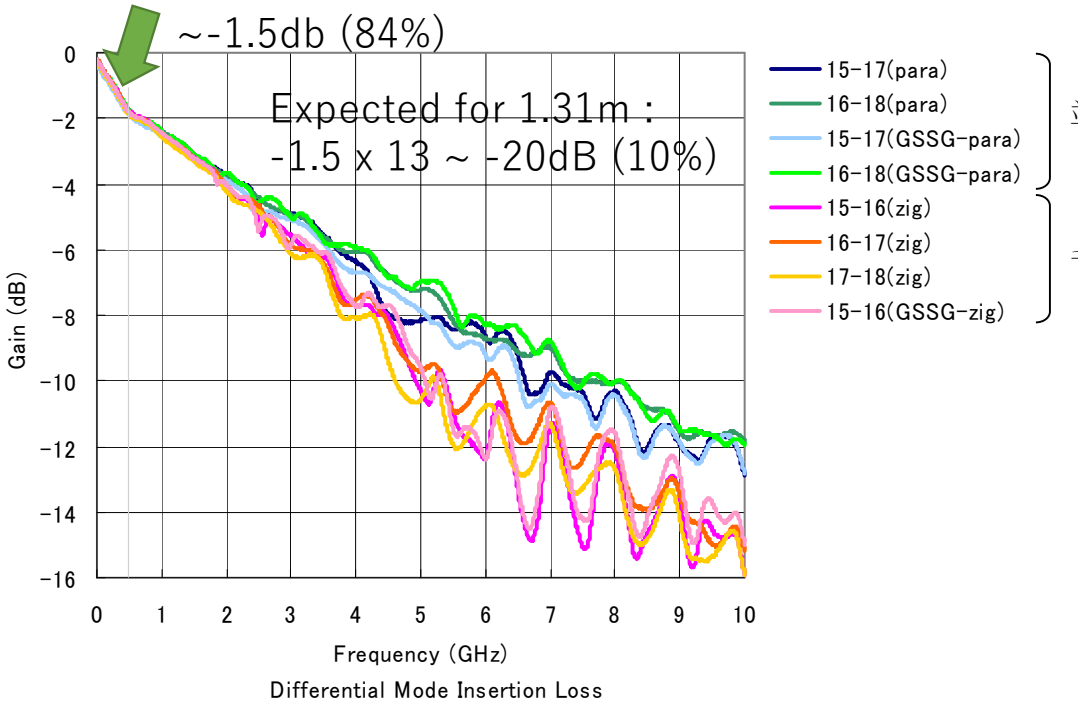
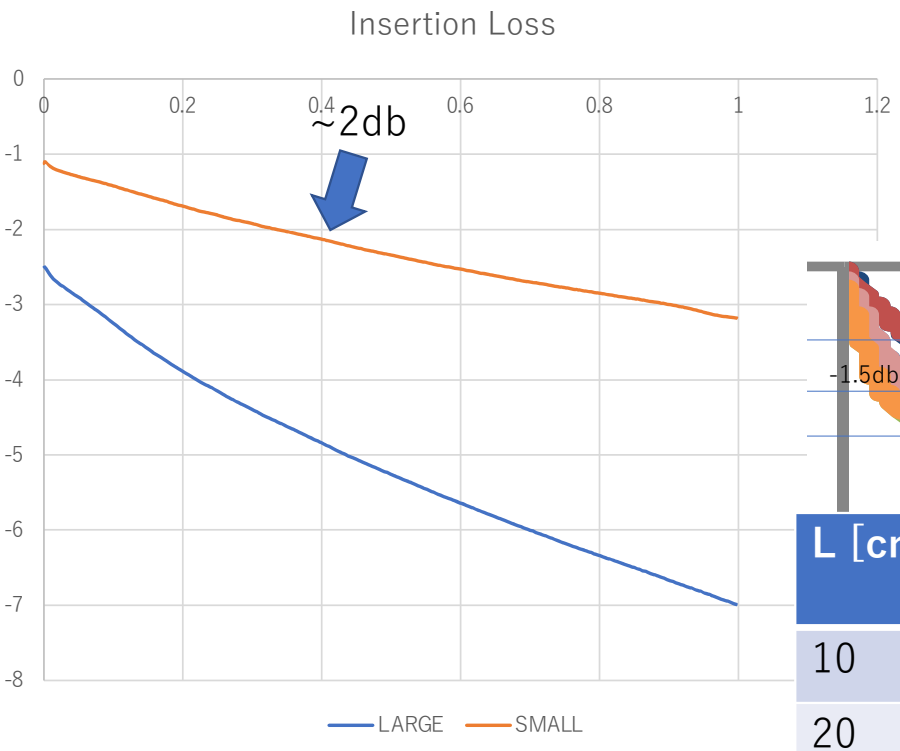


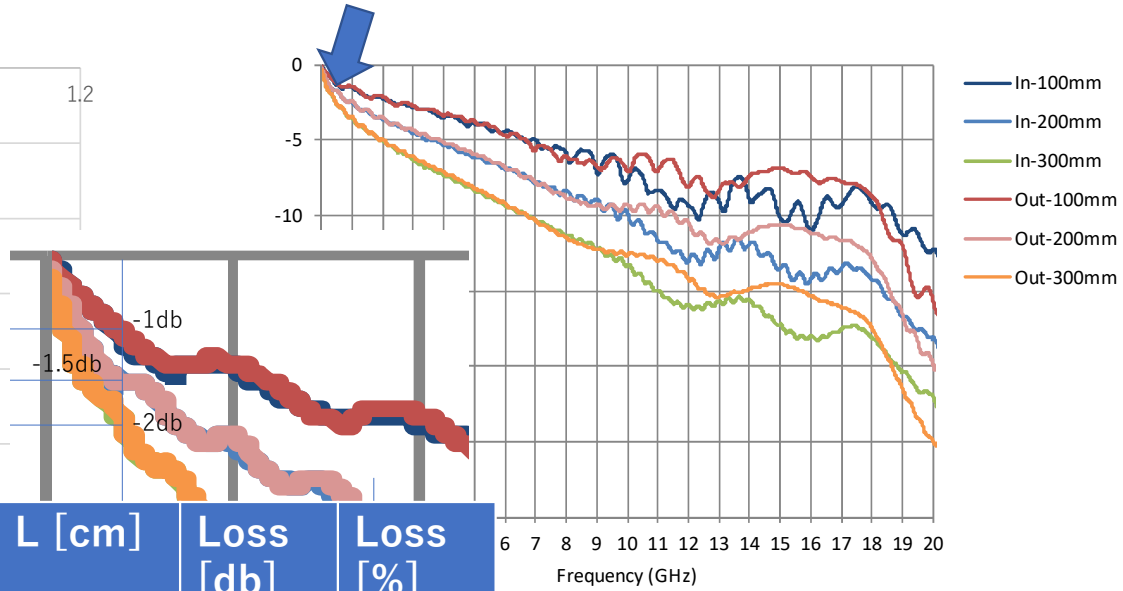
図 7.6　差動のインサーションロス

Insertion Loss

FPC Conversion Cable



KEL XSL Coaxial Cable



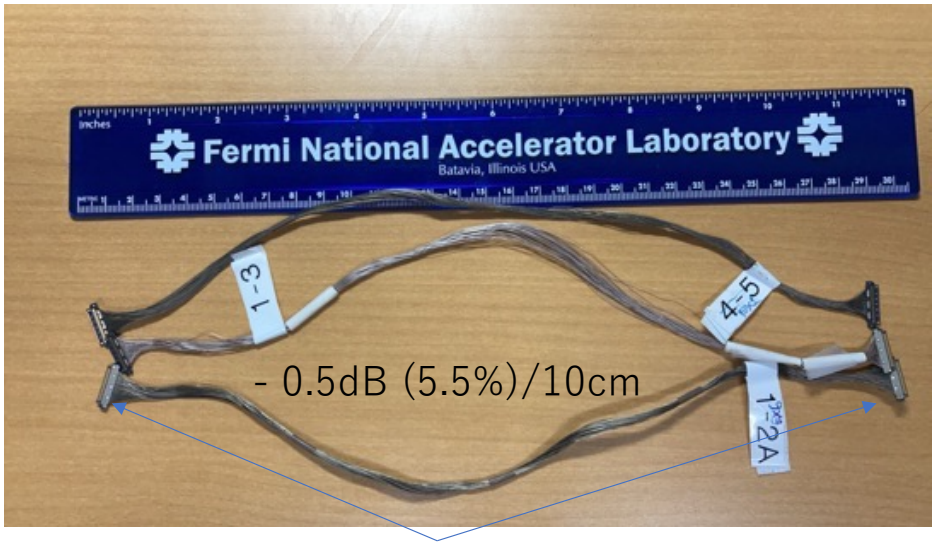
ifferential Mode Insertion Loss

図 6.1　差動インサーションロス

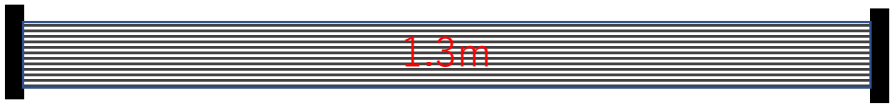
L [cm]	Loss [db]	Loss [%]
10	-1db	90
20	-1.5db	84
30	-2db	80

Trying to improve the precision now underway.

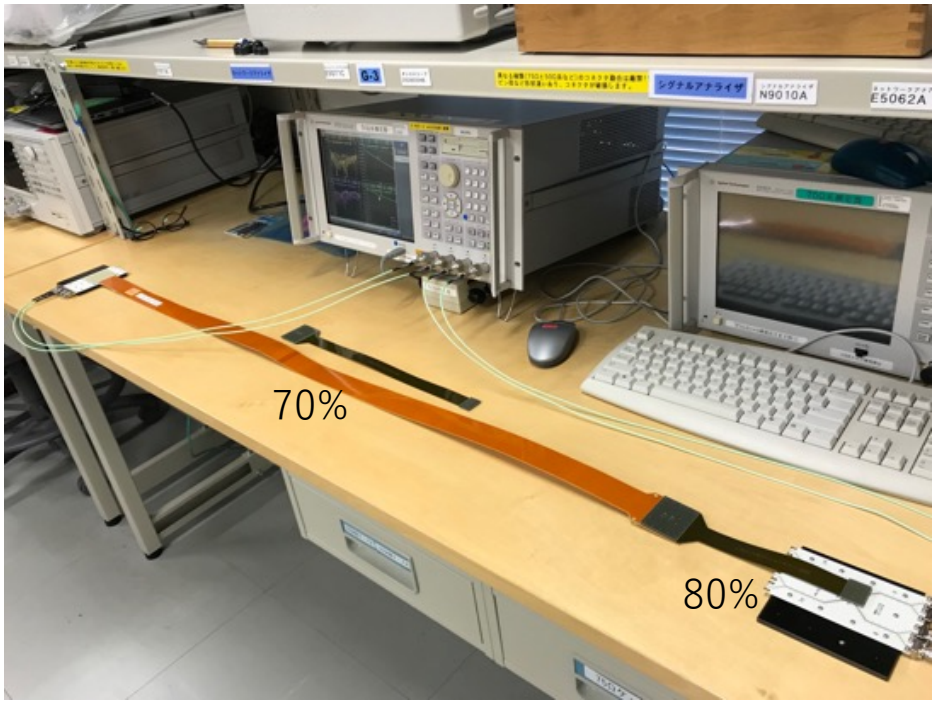
Insertion Loss Comparison



- 0.5dB (5.5%)@connector ends

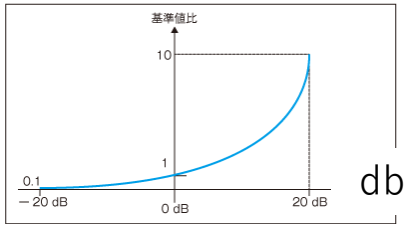


~7dB (44%)

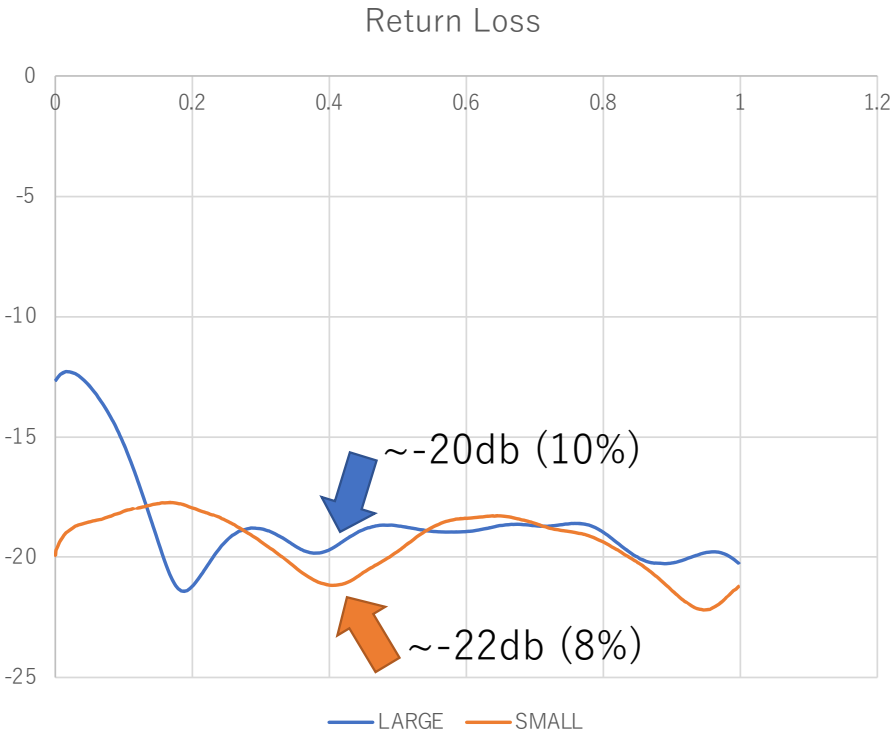


Measurement by Takashi Kondo (2021/8/4)

Return Loss @ 400MHz



FPC Conversion Cable



KEL XSL Coaxial Cable

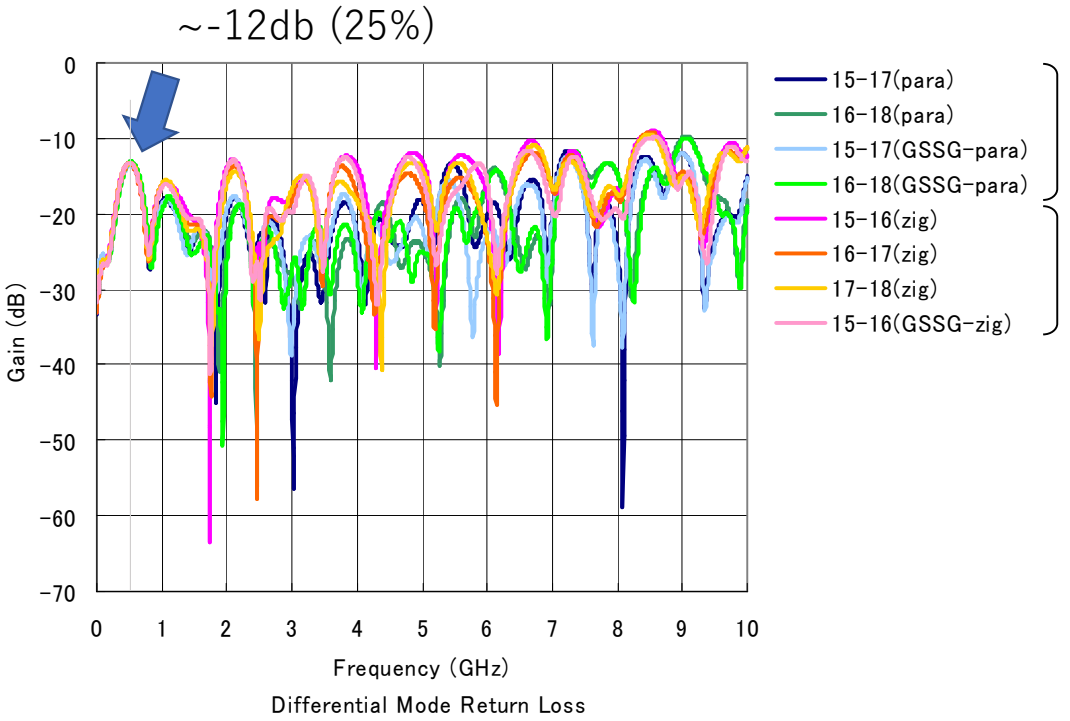


図 7.7　差動のリターンロス

Specification Comparison (Executive Summary)

High Frequency Signal Transmission Performance @400MHz

	BE	FPC		KEL XSL				
Length [cm]	**130**	20	40	10	130	10	20	30
AWG	**N/A**	N/A	N/A	46	46	44		
Impedance [Ω]	**50**	50	50	50	50	45 ± 3		
Diff Impedance [Ω]	**95**	110	110	93	93	83		
Insertion Loss [%]	**70**	80	56	84	47**	90	84	80
Return Loss [%]	**3**	10	20	25	25***		18	
Cross Talk [%]	**0.5/3**	<12*		1				
Eye Diagram		similar		similar				

**simple scale from 10cm data
*** assuming length independent

*20cm conversion cable with bus extender

Conclusion

There is no data available for the exactly same condition between FPC and μCoax cables.
Presumably 20cm FPC can be compared to XSL-AWG46-10cm and XSL-AWG44-20cm.
Resulting performances look similar within 20cm. To be executed actual measurement once prototype is made. **Extrapolated performance of 1.31m indicates it is worthy to try.**