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BETALaserMike, Inc.**DCM Test Report**

Cable Type : 4x2x24 x PE/LSZH/HFLTx	Factory Number : PHOENIX	Data File Name : DA043609.D3S
Cable I.D. : F/UTP#24X4P CABLE	Order Number : 12088 GR-67 191229953	Specification : FTP C5e-305M.S3S File
Temperature : 25.00 °C	Relative Humidity : 50 %	Test Date/Time : 12/15/2019 05:39:07 AM
Length : 305.00 m	Number of Pairs to Test : 4	Operator : L 191214WE303004/3
Starting Position : 17		Analyzer Type : ENA

Pass - Fail Test Certificate - 4 Pairs**High Frequency**

Test Type	Test Result
Input Impedance (Zin)(Ohms)(Terminated)	OK
Return Loss (RL)(dB)	OK
Insertion Loss (IL)(Curve Fit)(dB/100.0 m)@20C	OK
Near End Crosstalk Loss (NEXT)(dB)	OK
Power Sum NEXT(PSNEXT)(dB)	OK

Low Frequency

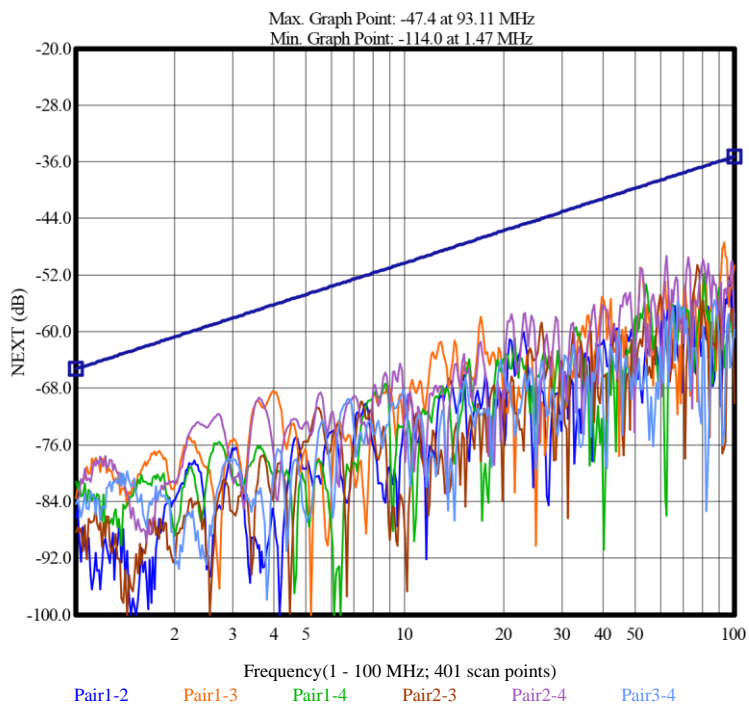
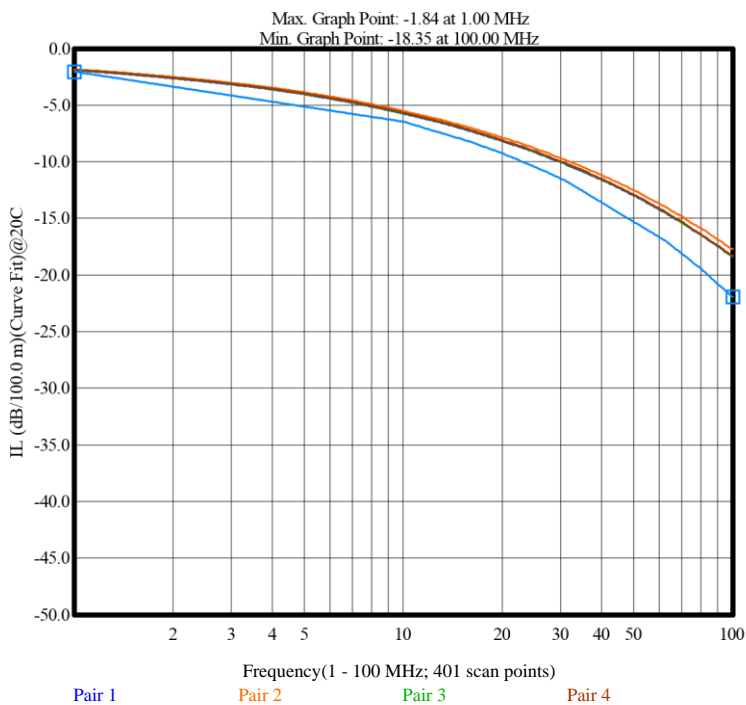
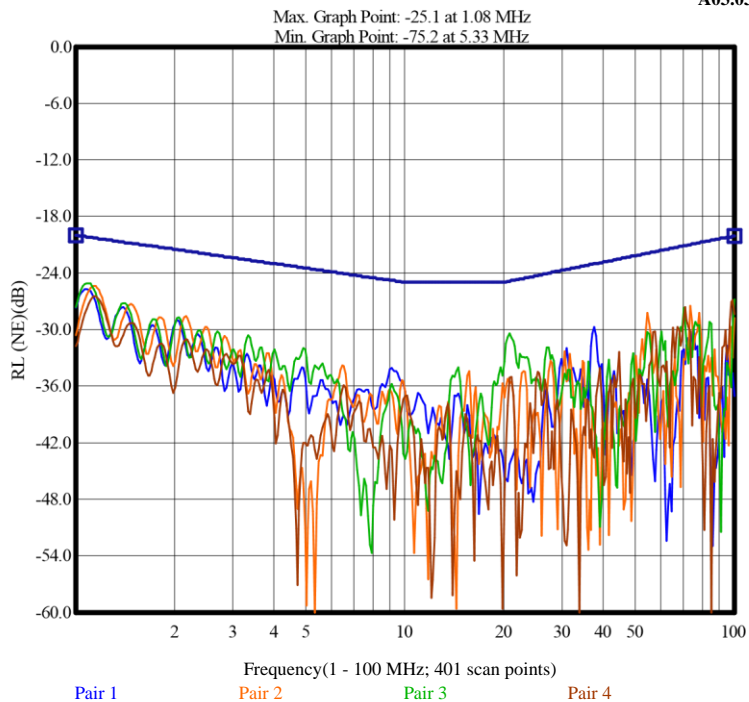
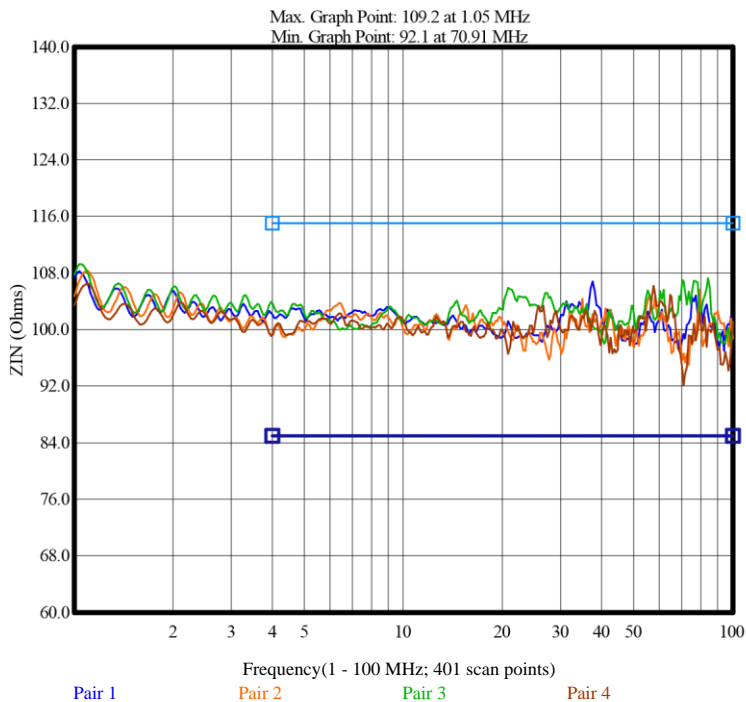
Test Type	Test Result
Conductor Resistance(Ohms/100.0 m)@20C	OK
Resistance Unbalance(%)	OK
Mutual Capacitance(nF/100.0 m)@1000Hz	OK
Cap. Unbalance to Ground(pF/100.0 m)@1000Hz	OK
Signature:	Approved: _____ Date: _____

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BETALaserMike, Inc.**DCM Test Report**

Cable Type : 4x2x24 x PE/LSZH/HFLTx	Factory Number : PHOENIX	Data File Name : DA043609.D3S
Cable I.D. : F/UTP#24X4P CABLE	Order Number : 12088 GR-67 191229953	Specification : FTP C5e-305M.S3S File
Temperature : 25.00 °C	Relative Humidity : 50 %	Test Date/Time : 12/15/2019 05:39:07 AM
Length : 305.00 m	Number of Pairs to Test : 4	Operator : L 191214WE303004/3
Starting Position : 17		Analyzer Type : ENA

Worst Case Summary**High Frequency**

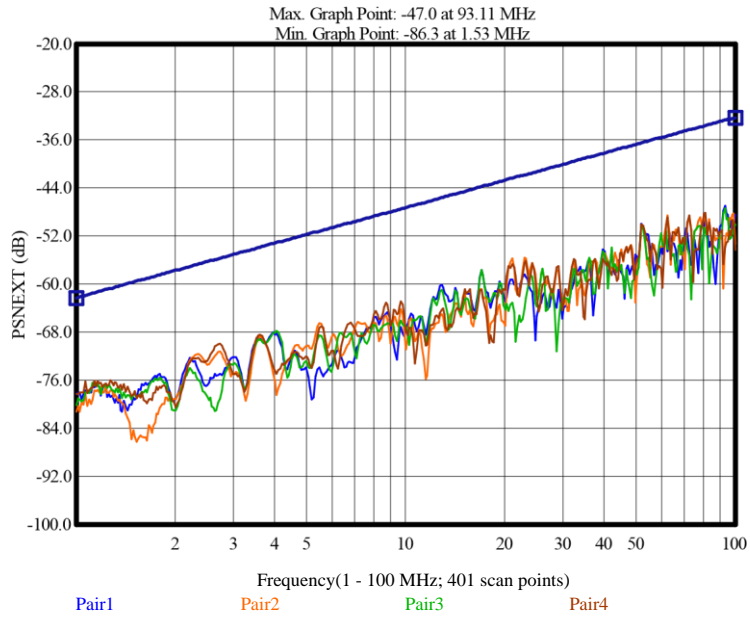
Test Type	Specification	Measured (Pair)	Margin	@ Frequency (MHz)	Test Result
Input Impedance (Zin)(Terminated)	85.0 (Min)	92.1 (Pair 4)	7.1	70.91	Passed
Input Impedance (Zin)(Terminated)	115.0 (Max)	107.2 (Pair 3)	7.8	84.25	Passed
Return Loss (RL)	20.2 (Min)	25.1 (Pair 3)	4.9	1.08	Passed
Insertion Loss (IL)(Curve Fit)@20C	2.04 (Max)	1.91 (Pair 1)	0.13	1.00	Passed
Near End Crosstalk Loss (NEXT)	38.3 (Min)	49.3 (Pairs 2-4)	11.0	62.40	Passed
Power Sum NEXT(PSNEXT)	42.4 (Min)	55.7 (Pair 2)	13.3	21.08	Passed



N/A = Not Applicable.
--- = Disable/Bypassed Pair.

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xxx = No entry.

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Worst Case Summary

Low Frequency

Statistical Parameter	Maximum		Minimum		Average Maximum		Standard Deviation		Result
	Spec Limit	Measured	Spec Limit	Measured	Spec Limit	Measured	Spec Limit	Measured	
Conductor Resistance(Ohms/100.0 m)@20C	9.38	8.19	xxx	7.78	xxx	7.98	xxx	0.167	Passed
Resistance Unbalance(%)	5.00	0.28	xxx	0.15	xxx	0.20	xxx	0.052	Passed
Mutual Capacitance(nF/100.0 m)@1000Hz	5.60	5.16	xxx	4.90	xxx	5.03	xxx	0.103	Passed
Cap. Unbalance to Ground(pF/100.0 m)@1000Hz	330.00	10.03	xxx	1.03	xxx	4.72	xxx	3.555	Passed

Detail: Resistance/Capacitance Measurement -Normalized

Test Types	Conductor Resistance Ra @20C	Conductor Resistance Rb @20C	Resistance Unbalance	Mutual Capacitance @1000 Hz	Capacitance Unbalance to Ground @1000 Hz	Test Result
Unit	Ohms/100.0 m	Ohms/100.0 m	%	nF/100.0 m	pF/100.0 m	
Max Spec	9.38	9.38	5.00	5.60	330.00	
Min Spec	xxx	xxx	xxx	xxx	xxx	
Pair 1 [17]	8.17	8.19	0.22	5.16	10.03	Passed
Pair 2 [18]	7.84	7.85	0.16	4.90	5.84	Passed
Pair 3 [19]	8.10	8.11	0.15	5.09	1.03	Passed
Pair 4 [20]	7.78	7.80	0.28	4.96	1.97	Passed

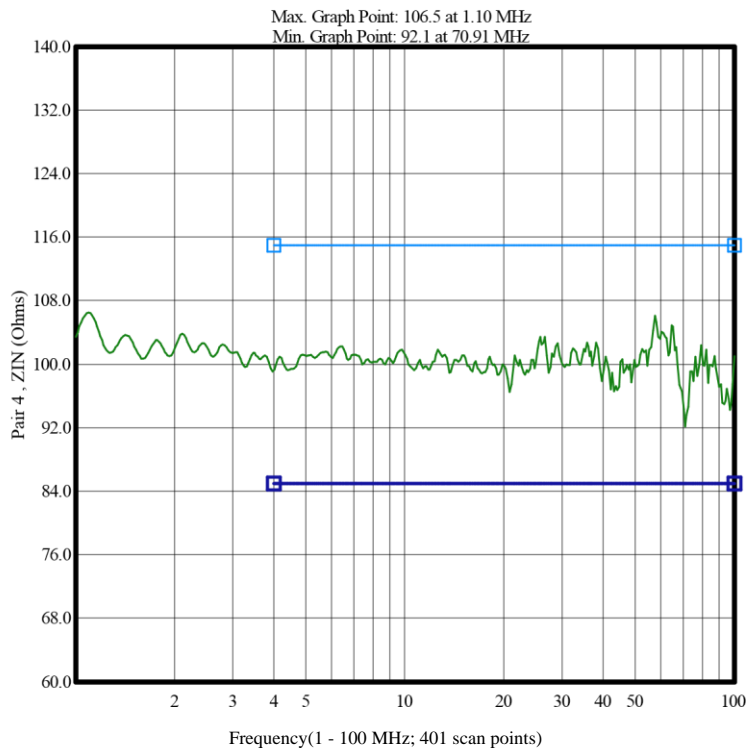
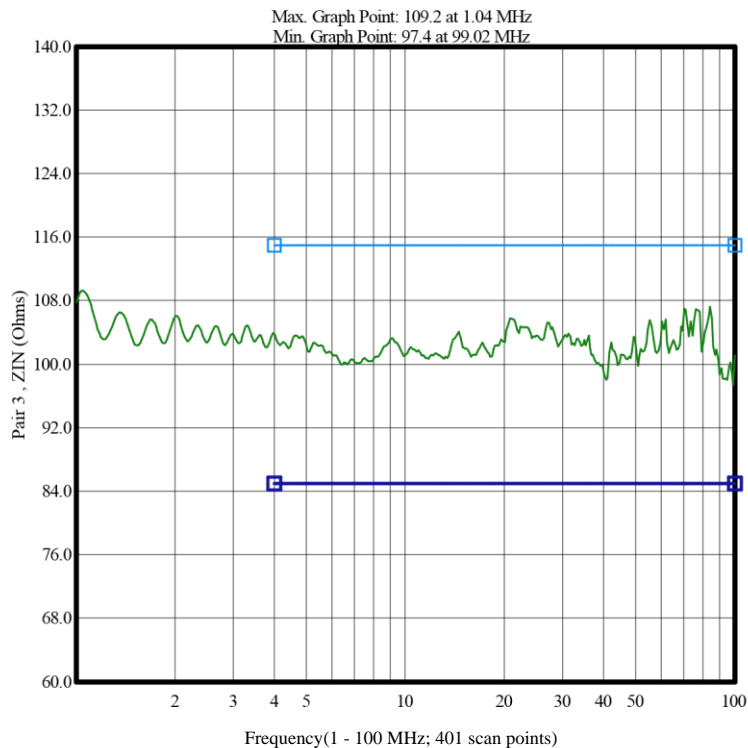
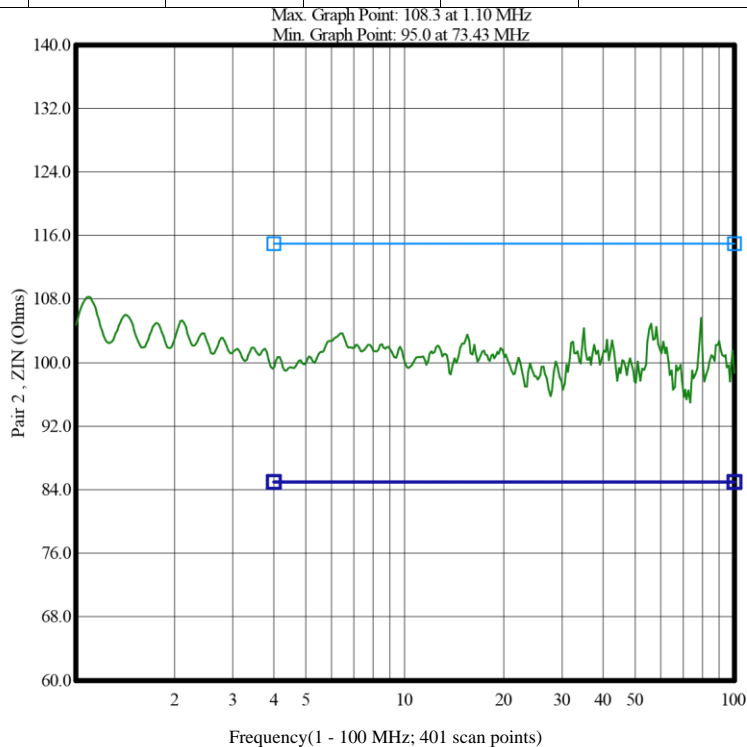
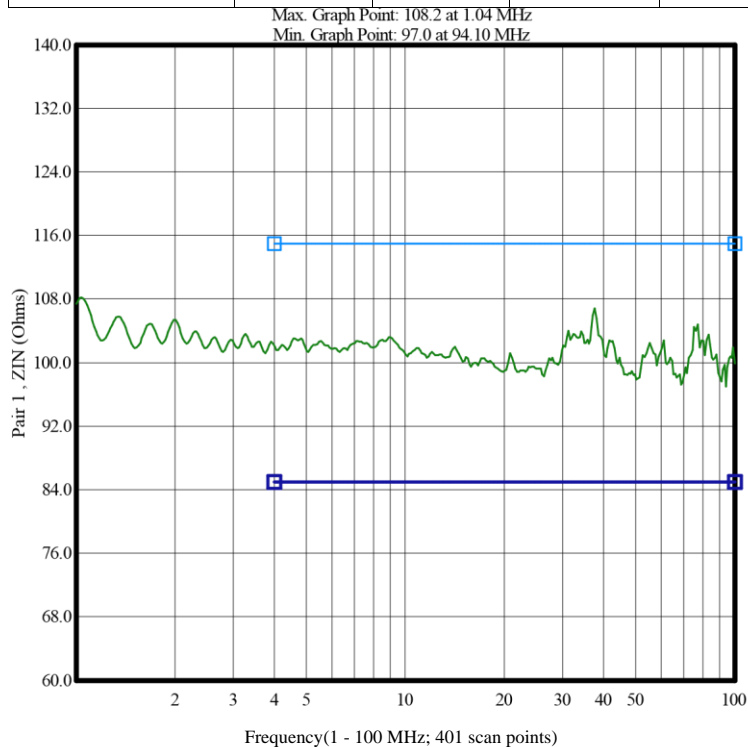
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Summary and Graphic: Input Impedance (Zin)(Terminated)

Pair	Specification		Measured(Ohms)		Margin (Ohms)		@ Frequency (MHz)		Test Result
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
Pair 1 [17]	85.0	115.0	97.0	106.8	12.0	8.2	94.10	37.58	Passed
Pair 2 [18]	85.0	115.0	95.0	105.6	10.0	9.4	73.43	79.33	Passed
Pair 3 [19]	85.0	115.0	97.4	107.2	12.4	7.8	99.02	84.25	Passed
Pair 4 [20]	85.0	115.0	92.1	106.1	7.1	8.9	70.91	57.44	Passed



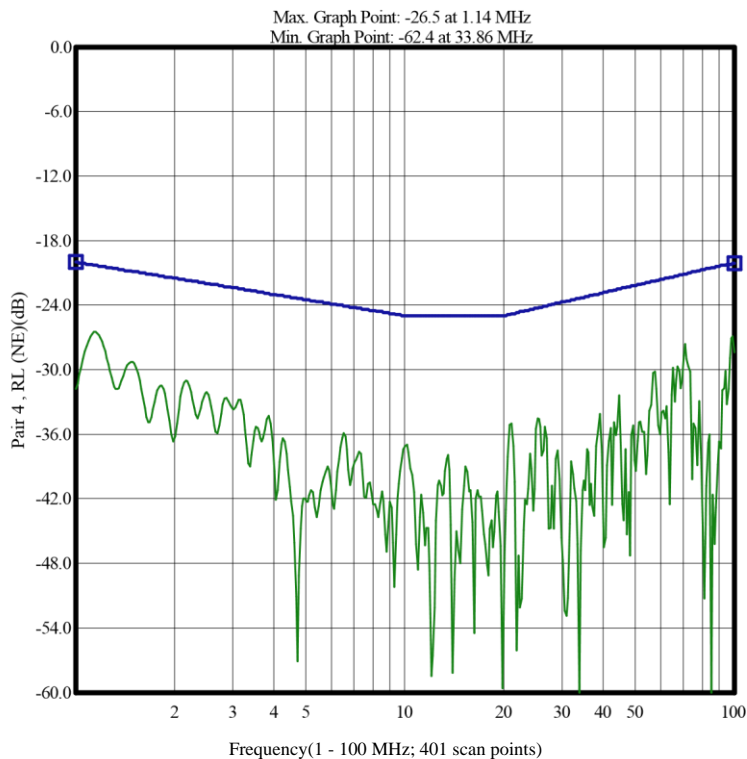
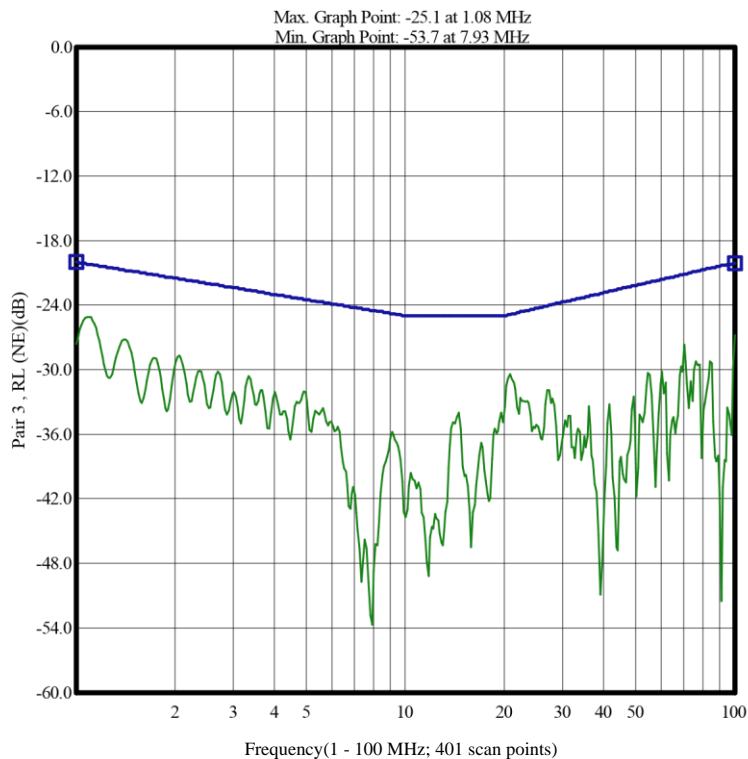
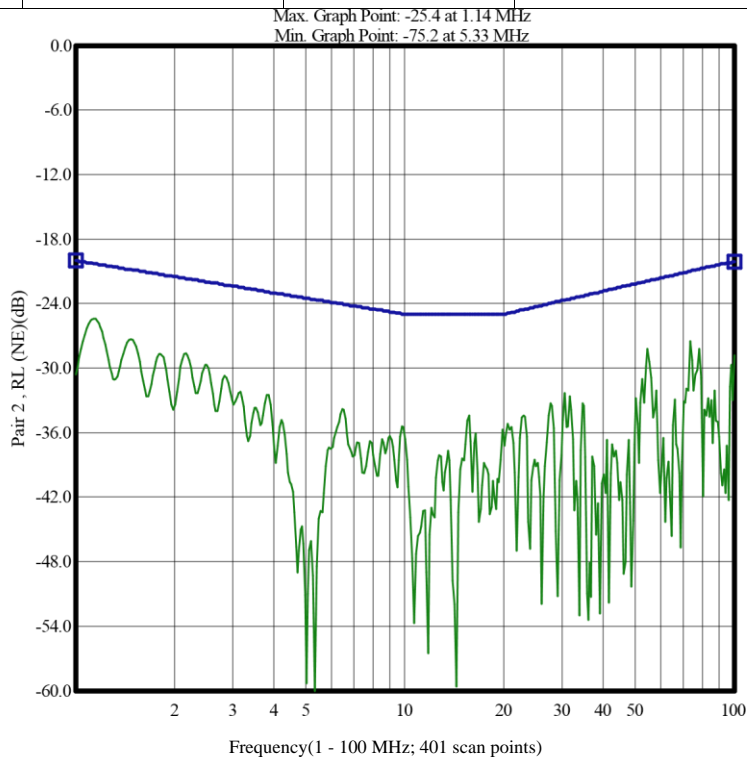
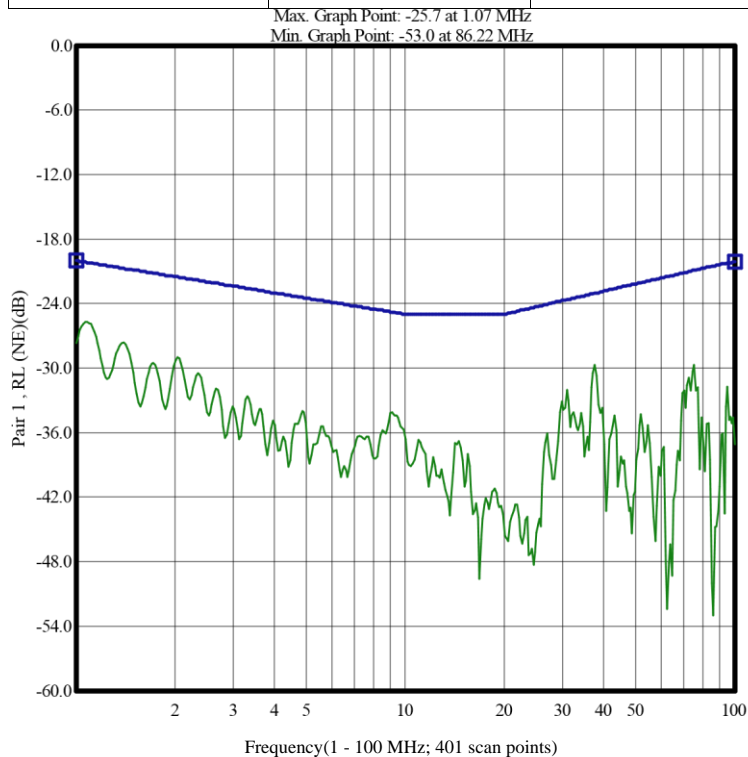
N/A = Not Applicable.
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Summary and Graphic: Return Loss (RL)

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 [17]	20.2	25.7	5.5	1.08	Passed
Pair 2 [18]	20.3	25.4	5.1	1.14	Passed
Pair 3 [19]	20.2	25.1	4.9	1.08	Passed
Pair 4 [20]	20.3	26.5	6.2	1.14	Passed



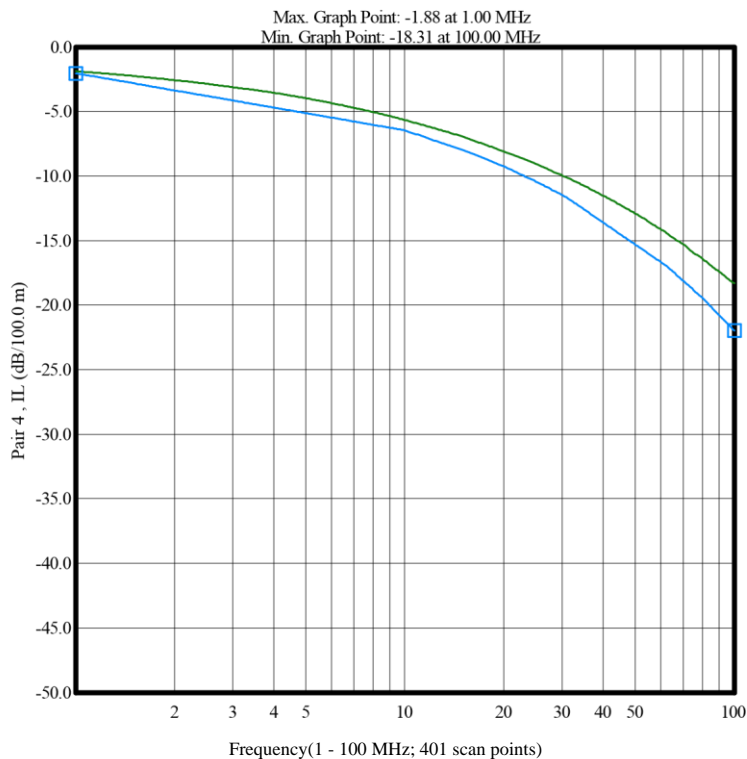
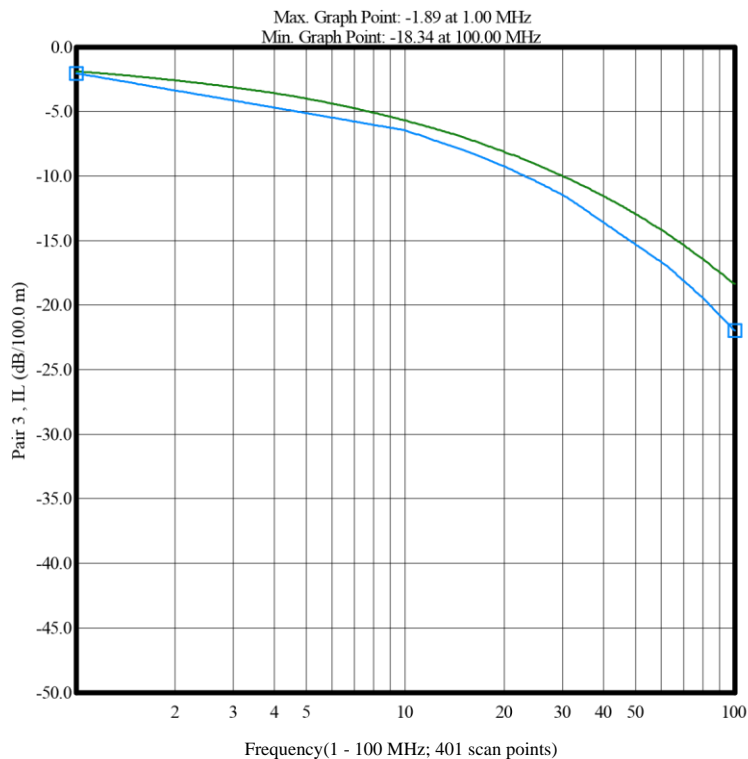
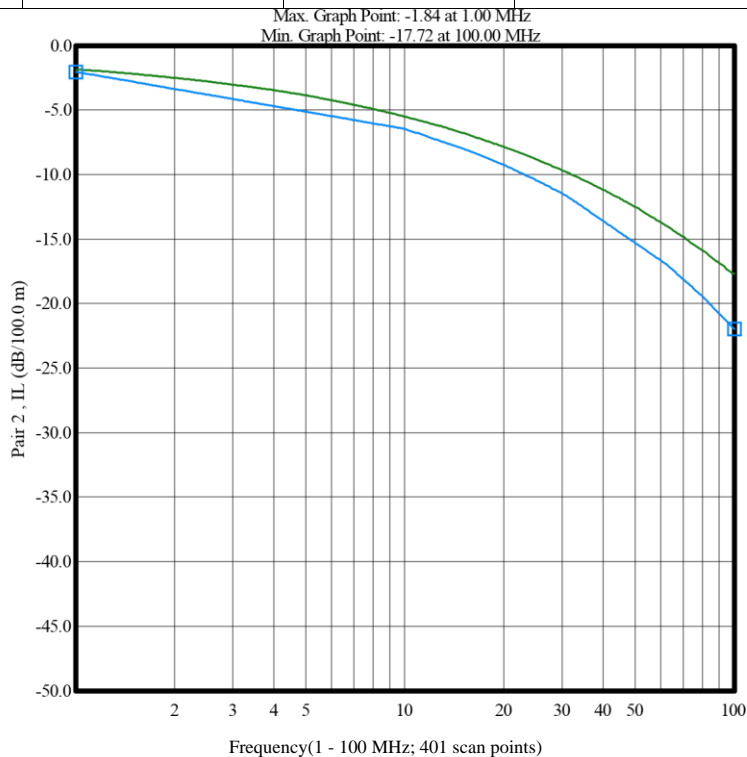
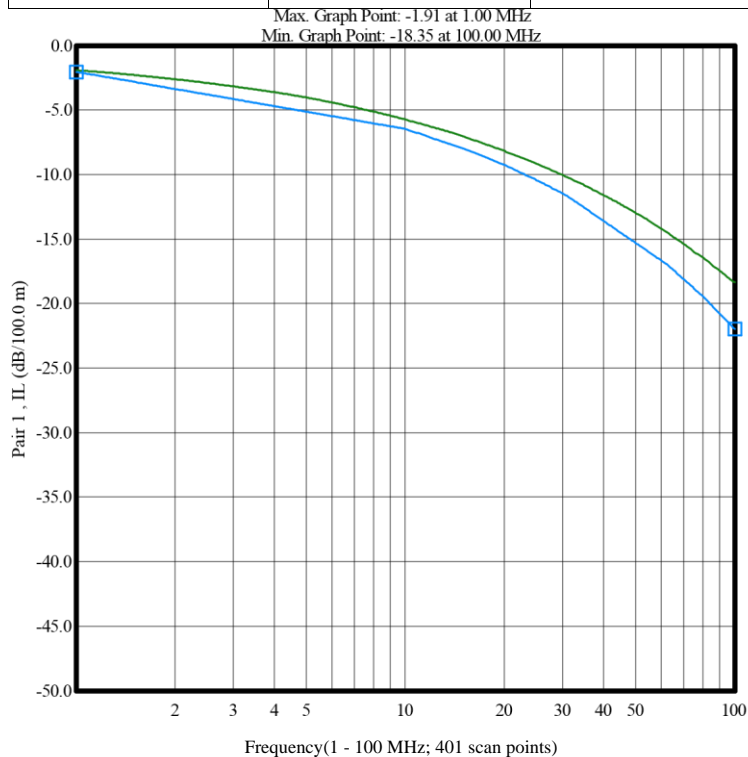
N/A = Not Applicable.
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Summary and Graphic: Insertion Loss (IL)(Curve Fit)@20C

Pair	Spec (Max)(dB/100.0 m)	Measured(dB/100.0 m)	Margin (dB/100.0 m)	@ Frequency (MHz)	Test Result
Pair 1 [17]	2.04	1.91	0.13	1.00	Passed
Pair 2 [18]	2.04	1.84	0.20	1.00	Passed
Pair 3 [19]	2.04	1.89	0.15	1.00	Passed
Pair 4 [20]	2.04	1.88	0.16	1.00	Passed



N/A = Not Applicable.
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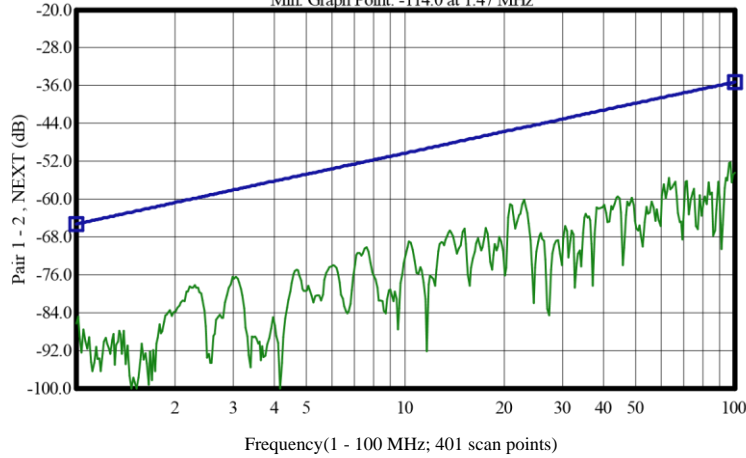
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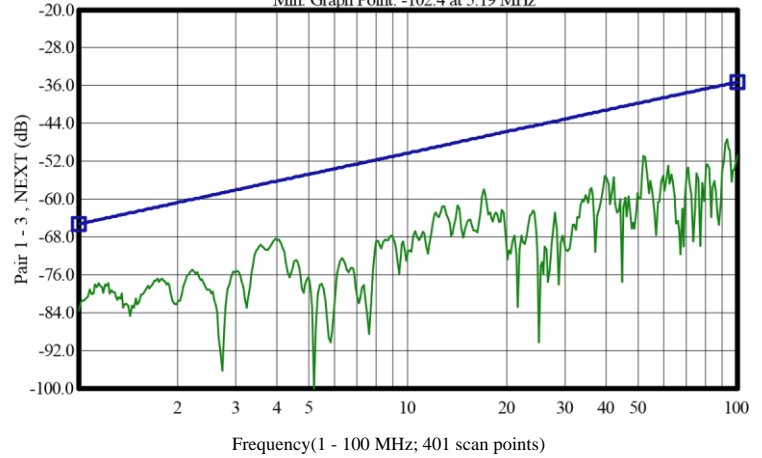
Summary and Graphic: Near End Crosstalk Loss (NEXT)

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 - 2	44.8	60.1	15.3	22.92	Passed
Pair 1 - 3	46.8	57.9	11.1	17.00	Passed
Pair 1 - 4	39.3	53.3	14.0	53.90	Passed
Pair 2 - 3	36.9	50.6	13.7	77.36	Passed
Pair 2 - 4	38.3	49.3	11.0	62.40	Passed
Pair 3 - 4	52.8	69.5	16.7	6.74	Passed

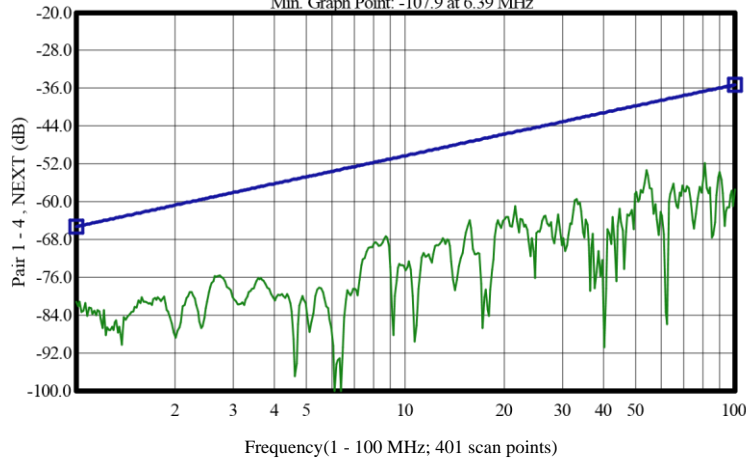
Max. Graph Point: -52.3 at 97.05 MHz
Min. Graph Point: -114.0 at 1.47 MHz



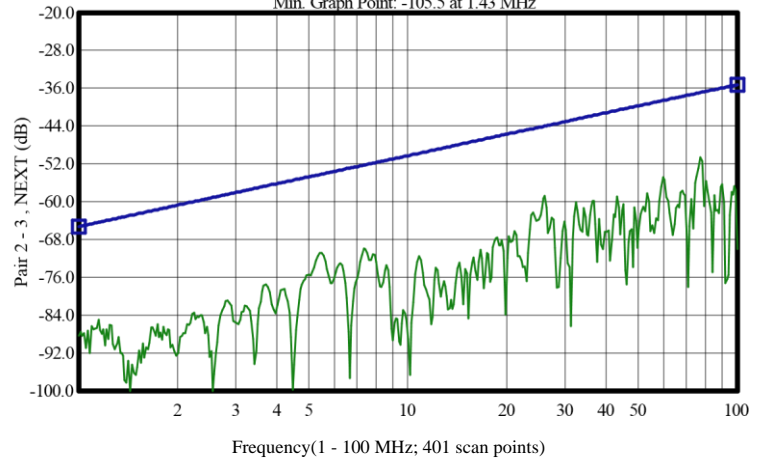
Max. Graph Point: -47.4 at 93.11 MHz
Min. Graph Point: -102.4 at 5.19 MHz



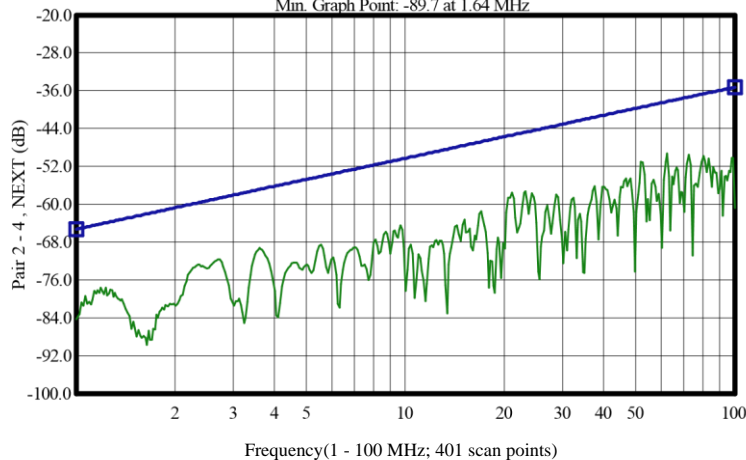
Max. Graph Point: -51.8 at 81.30 MHz
Min. Graph Point: -107.9 at 6.39 MHz



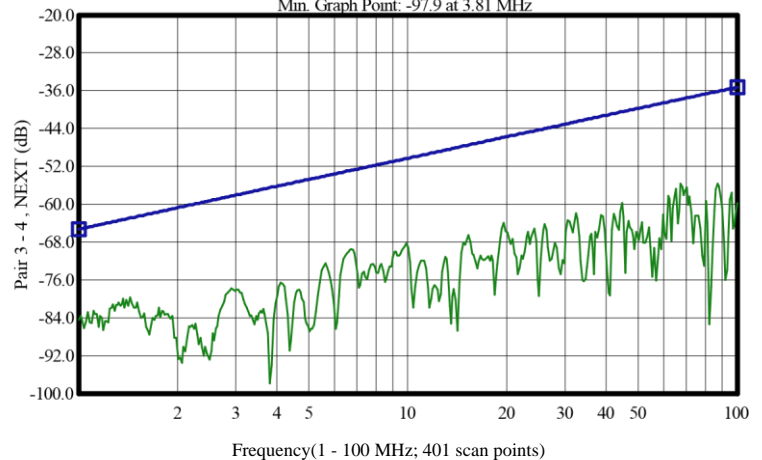
Max. Graph Point: -50.6 at 77.36 MHz
Min. Graph Point: -105.5 at 1.43 MHz



Max. Graph Point: -49.3 at 62.40 MHz
Min. Graph Point: -89.7 at 1.64 MHz



Max. Graph Point: -55.6 at 87.21 MHz
Min. Graph Point: -97.9 at 3.81 MHz



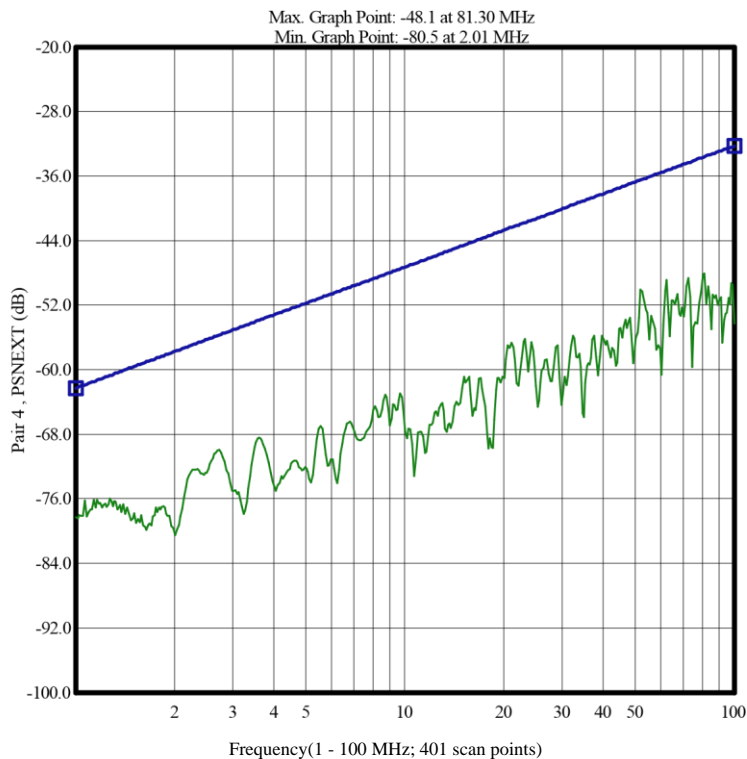
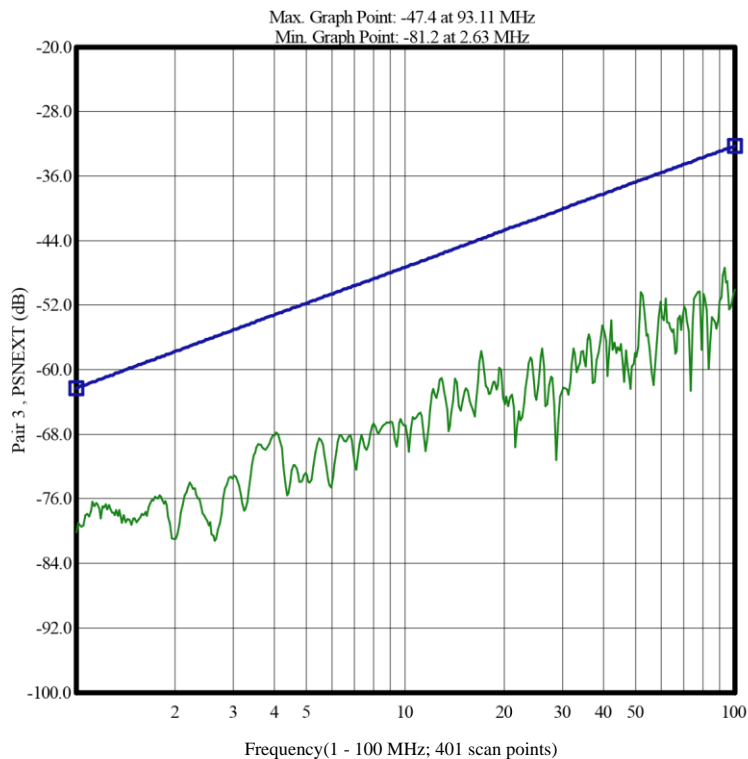
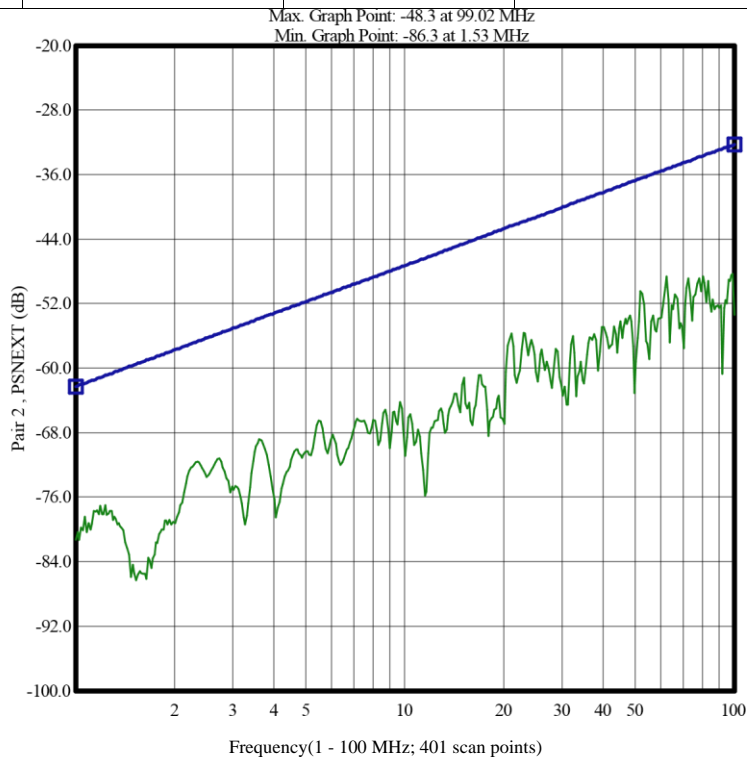
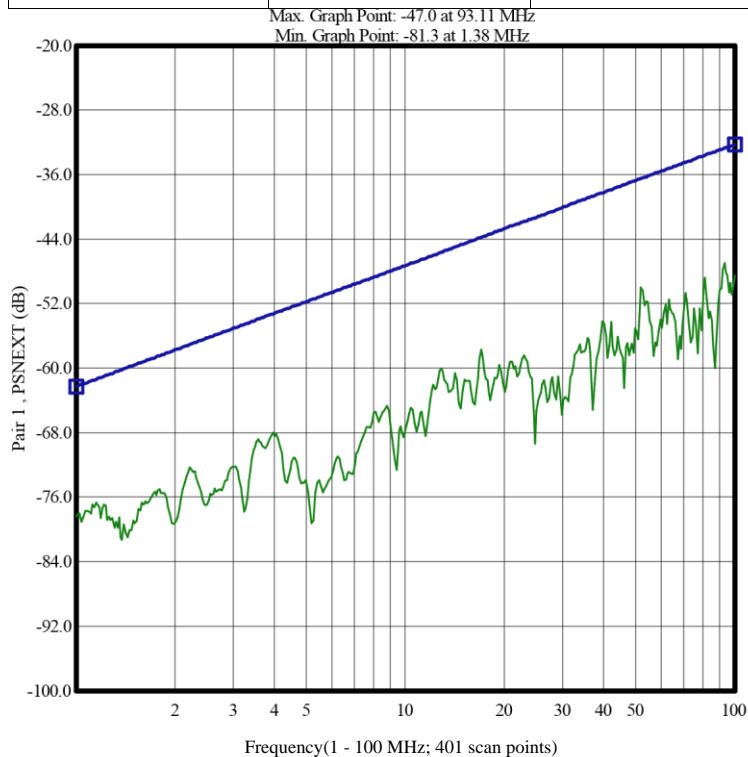
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Summary and Graphic: Power Sum NEXT(PSNEXT)

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 [17]	36.5	50.0	13.5	51.88	Passed
Pair 2 [18]	42.4	55.7	13.3	21.08	Passed
Pair 3 [19]	43.8	57.7	13.9	17.00	Passed
Pair 4 [20]	36.5	50.1	13.6	51.88	Passed



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Detail Discrete Frequencies ---Return Loss (RL)(dB)

Frequency	1.00	4.00	10.00	16.00	20.00	25.00	30.00	31.25	62.50	80.00
Min Spec	20.0	23.0	25.0	25.0	25.0	24.3	23.7	23.6	21.5	20.7
Pair 1 [17]	27.7	35.2	36.6	43.0	45.4	45.5	33.4	32.9	51.8	36.5
Pair 2 [18]	30.6	37.2	36.6	40.3	37.1	39.0	36.7	35.4	40.0	38.4
Pair 3 [19]	27.6	32.2	43.7	44.1	33.5	35.1	36.4	34.4	38.1	35.1
Pair 4 [20]	31.8	38.7	37.1	43.4	48.7	36.1	46.5	51.4	34.0	43.4

Continue:Return Loss (RL)(dB)

Frequency	100.00									
Min Spec	20.1									
Pair 1 [17]	37.1									
Pair 2 [18]	28.8									
Pair 3 [19]	26.8									
Pair 4 [20]	28.4									

Detail Discrete Frequencies ---Insertion Loss (IL)(dB/100.0 m)(Curve Fit)@20C

Frequency	1.00	10.00	16.00	20.00	25.00	30.00	31.25	62.50	80.00	100.00
Max Spec	2.04	6.46	8.24	9.26	10.42	11.47	11.72	16.99	19.43	21.97
Pair 1 [17]	1.91	5.75	7.29	8.19	9.14	10.04	10.24	14.50	16.44	18.35
Pair 2 [18]	1.84	5.52	7.01	7.87	8.81	9.67	9.87	13.99	15.86	17.72
Pair 3 [19]	1.89	5.71	7.24	8.14	9.11	9.99	10.19	14.48	16.43	18.34
Pair 4 [20]	1.88	5.67	7.20	8.10	9.05	9.96	10.15	14.41	16.40	18.31

Detail Discrete Frequencies ---Near End Crosstalk Loss (NEXT)(dB)

Frequency	1.00	4.00	10.00	16.00	20.00	25.00	30.00	31.25	62.50	80.00
Min Spec	65.3	56.2	50.3	47.2	45.7	44.3	43.1	42.8	38.3	36.7
Pair 1 - 2	86.3	86.3	71.8	73.0	75.6	71.4	71.5	71.5	58.0	61.6
Pair 1 - 3	83.6	68.6	71.0	66.6	72.3	88.4	70.2	68.8	56.6	55.5
Pair 1 - 4	81.2	80.7	74.6	68.8	63.7	67.6	68.6	67.4	82.4	55.7
Pair 2 - 3	88.4	82.2	89.1	74.0	73.0	63.9	65.0	84.5	62.8	57.4
Pair 2 - 4	84.3	77.8	78.4	69.6	69.3	63.5	69.6	66.0	50.0	50.2
Pair 3 - 4	84.4	79.6	69.1	71.8	65.9	79.0	69.5	64.5	60.1	63.7

Continue:Near End Crosstalk Loss (NEXT)(dB)

Frequency	100.00									
Min Spec	35.3									
Pair 1 - 2	54.4									
Pair 1 - 3	50.7									
Pair 1 - 4	57.4									
Pair 2 - 3	70.1									
Pair 2 - 4	60.8									
Pair 3 - 4	59.7									

Detail Discrete Frequencies ---Power Sum NEXT(PSNEXT)(dB)

Frequency	1.00	4.00	10.00	16.00	20.00	25.00	30.00	31.25	62.50	80.00
Min Spec	62.3	53.2	47.3	44.2	42.7	41.3	40.1	39.8	35.3	33.7
Pair 1 [17]	78.4	68.3	67.5	63.8	62.8	65.7	65.0	64.1	54.1	51.9

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Pair 2 [18]	81.3	76.0	70.9	66.9	66.8	60.3	62.7	64.5	49.0	49.2
Pair 3 [19]	80.2	68.1	66.9	64.8	64.2	63.6	62.5	63.0	54.1	52.8
Pair 4 [20]	78.3	74.3	67.7	65.0	61.0	61.7	63.8	61.0	49.5	48.9

Continue: Power Sum NEXT (PSNEXT) (dB)

Frequency	100.00									
Min Spec	32.3									
Pair 1 [17]	48.5									
Pair 2 [18]	53.4									
Pair 3 [19]	50.1									
Pair 4 [20]	54.3									

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