

### DCM Test Report

Cable Type : 4x2x23 x PE/LSZH	Factory Number : PHOENIX	Data File Name : DA072267.D3S
Cable I.D. : U/UTP#23X4P CABLE	Order Number : 5460 VI-15 210755001	Specification File : CAT 6A-305M.S3S
Temperature : 25.00 °C	Relative Humidity : 50 %	Test Date/Time : 07/03/2021 02:40:49 PM
Length : 305.00 m	Number of Pairs to Test : 4	Operator : L 210702SM016001/R1
Starting Position : 5		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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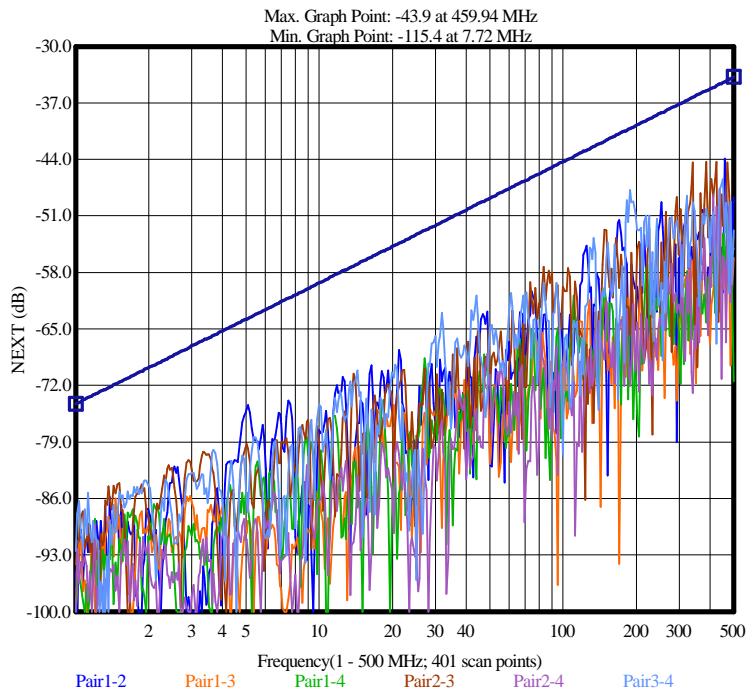
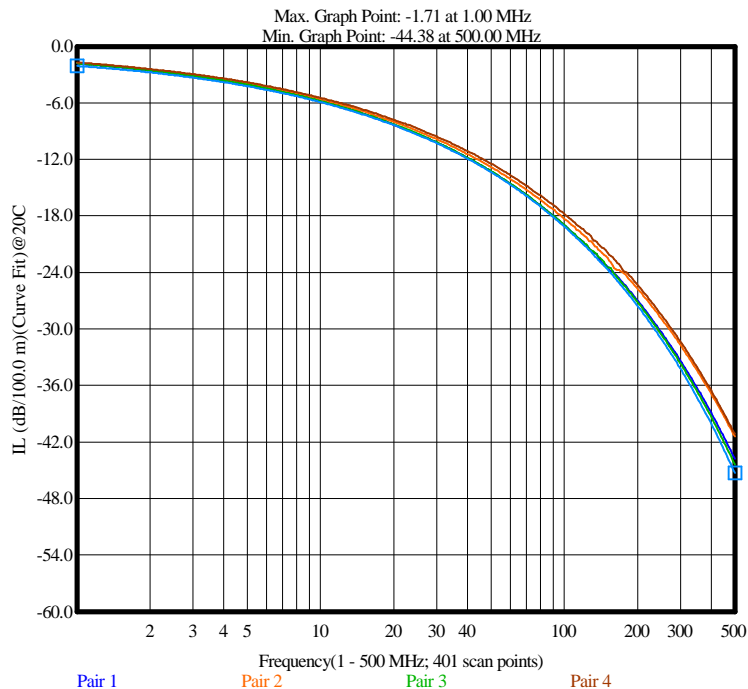
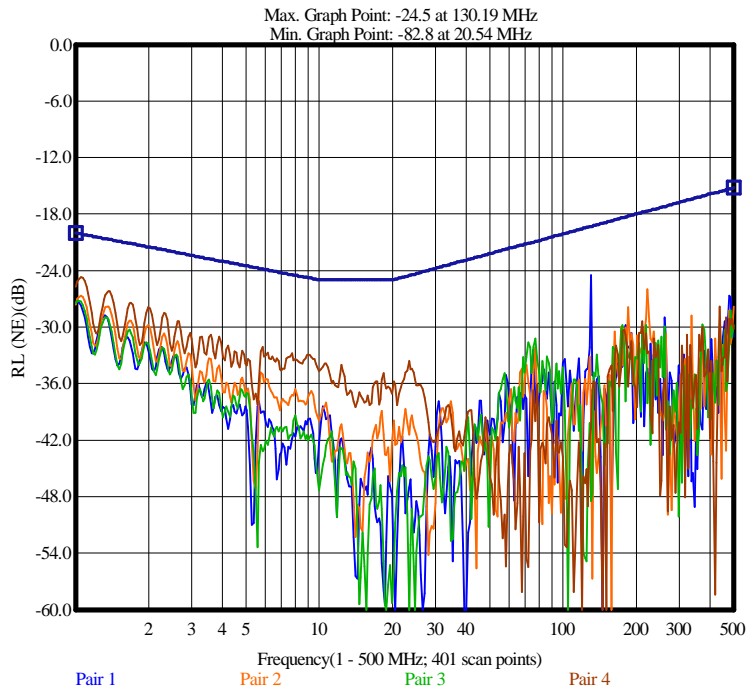
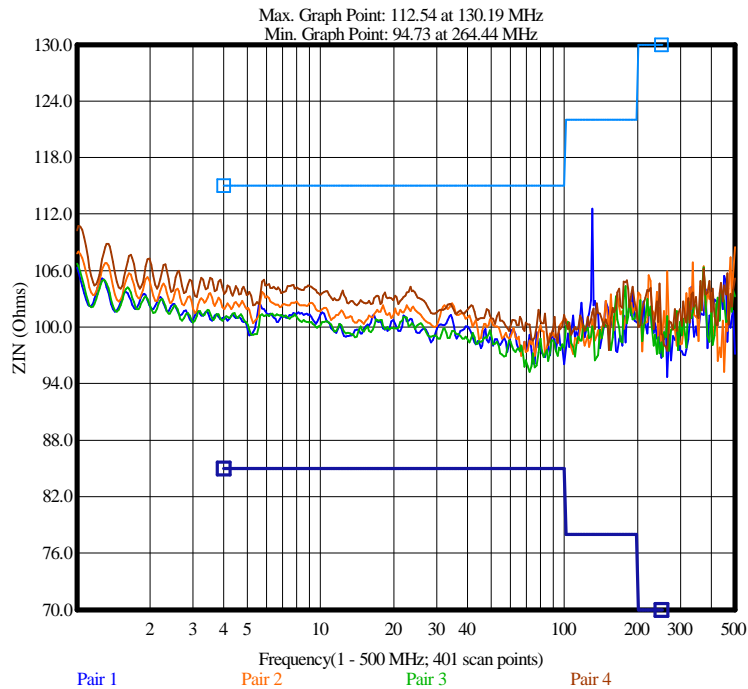
### DCM Test Report

Cable Type : 4x2x23 x PE/LSZH	Factory Number : PHOENIX	Data File Name : DA072267.D3S
Cable I.D. : U/UTP#23X4P CABLE	Order Number : 5460 VI-15 210755001	Specification File : CAT 6A-305M.S3S
Temperature : 25.00 °C	Relative Humidity : 50 %	Test Date/Time : 07/03/2021 02:40:49 PM
Length : 305.00 m	Number of Pairs to Test : 4	Operator : L 210702SM016001/R1
Starting Position : 5		Analyzer Type : ENA

### Worst Case Summary

#### High Frequency

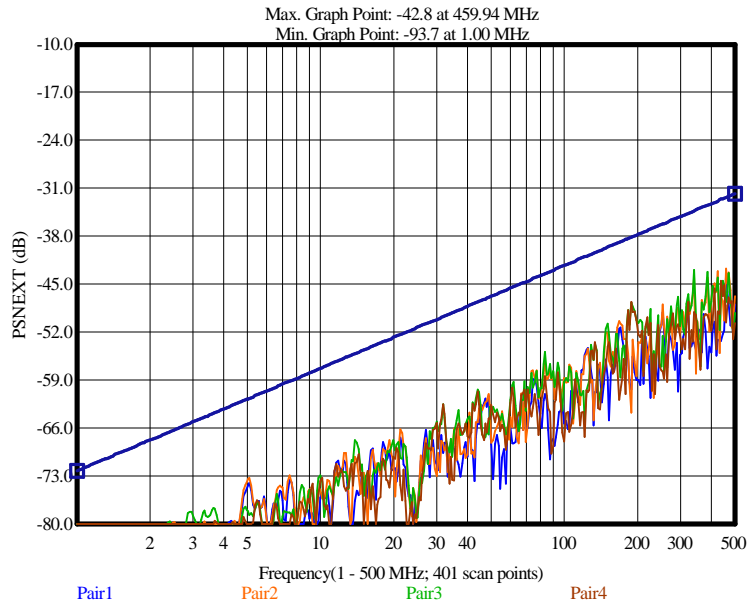
Test Type	Specification	Measured (Pair)	Margin	@ Frequency (MHz)	Test Result
Input Impedance (Zin)(Terminated)	85.00 (Min)	95.21 (Pair 3)	10.21	71.88	Passed
Input Impedance (Zin)(Terminated)	122.00 (Max)	112.54 (Pair 1)	9.46	130.19	Passed
Return Loss (RL)	20.2 (Min)	24.8 (Pair 4)	4.6	1.07	Passed
Insertion Loss (IL)(Curve Fit)@20C	8.19 (Max)	8.14 (Pair 1)	0.05	19.14	Passed
Near End Crosstalk Loss (NEXT)	40.2 (Min)	47.8 (Pairs 3-4)	7.6	187.88	Passed
Power Sum NEXT(PSNEXT)	34.3 (Min)	42.9 (Pair 3)	8.6	341.53	Passed



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

\* = Measured value out of spec.  
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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	7.67	xxx	7.38	xxx	7.50	xxx	0.113	Passed
Resistance Unbalance( % )	5.00	0.28	xxx	0.02	xxx	0.11	xxx	0.101	Passed
Mutual Capacitance(nF/100.0 m)@1000Hz	5.60	5.49	xxx	5.15	xxx	5.34	xxx	0.132	Passed
Cap. Unbalance to Ground(pF/100.0 m)@1000Hz	330.00	18.37	xxx	0.81	xxx	10.03	xxx	7.150	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 [5]	7.67	7.65	0.28	5.49	15.44	Passed
Pair 2 [6]	7.42	7.42	0.10	5.29	18.37	Passed
Pair 3 [7]	7.55	7.56	0.02	5.44	-0.81	Passed
Pair 4 [8]	7.38	7.38	0.04	5.15	5.49	Passed

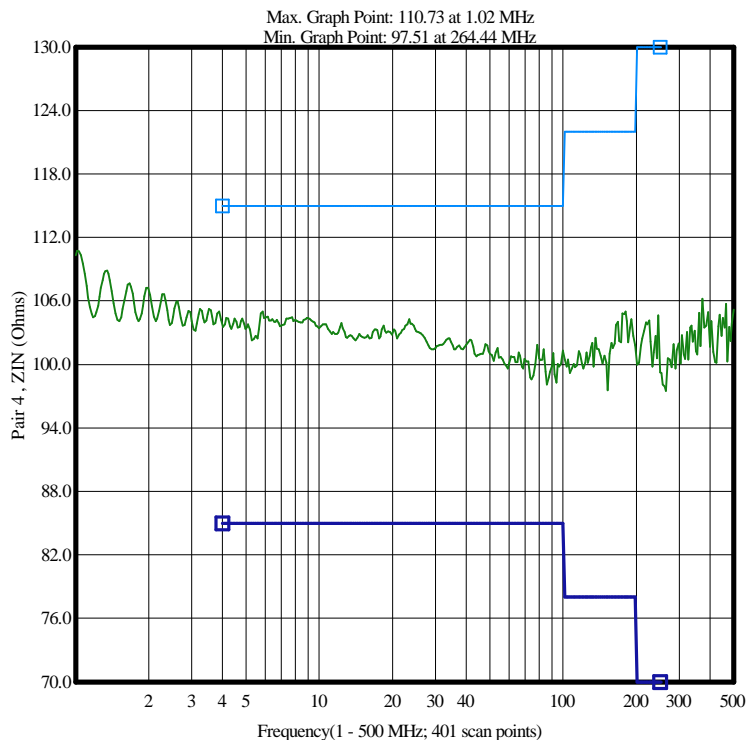
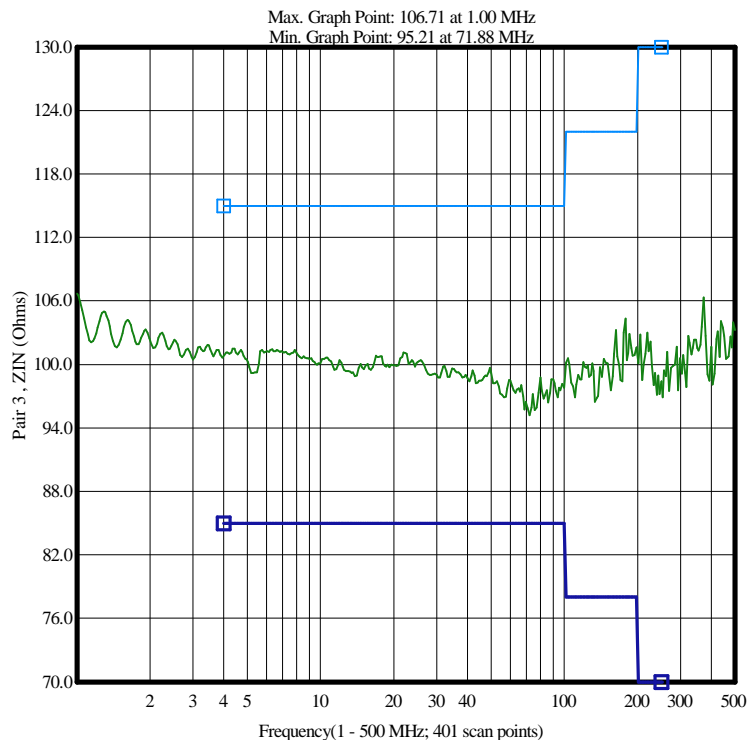
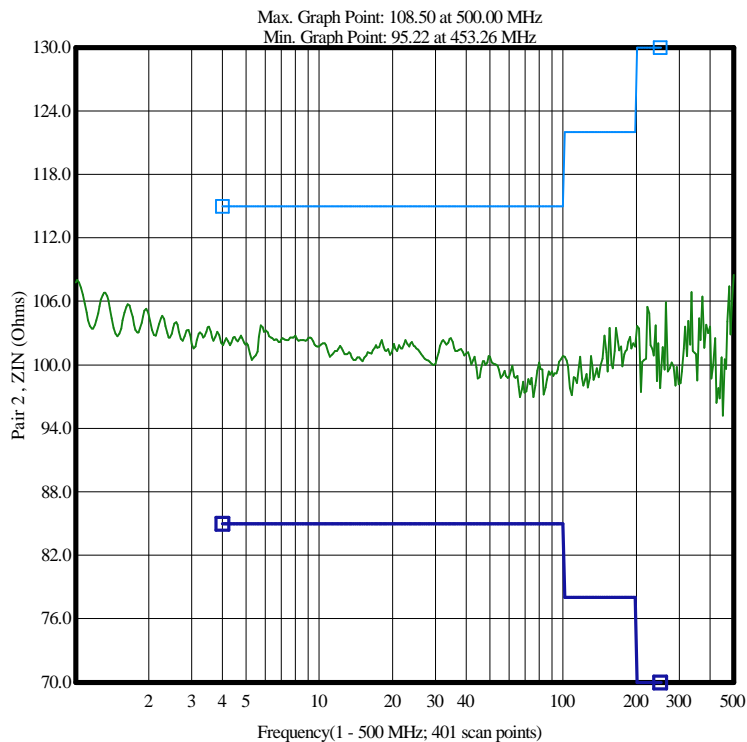
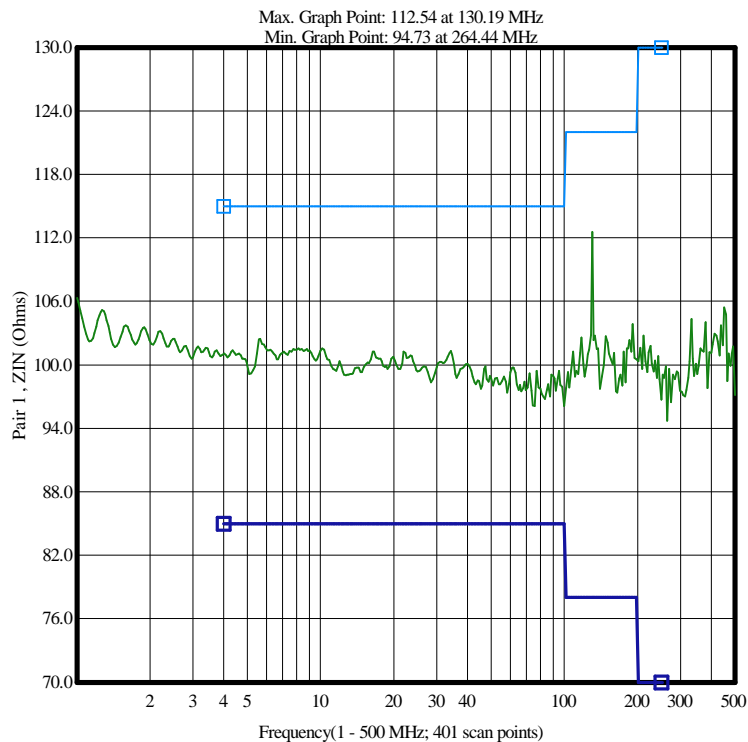
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### Summary and Graphic: Input Impedance (Zin)(Terminated)

Pair	Specification		Measured(Ohms)		Margin (Ohms)		@ Frequency (MHz)		Test Result
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
Pair 1 [5]	85.00	122.00	96.08	112.54	11.08	9.46	99.63	130.19	Passed
Pair 2 [6]	85.00	115.00	96.92	103.72	11.92	11.28	75.74	5.76	Passed
Pair 3 [7]	85.00	115.00	95.21	101.47	10.21	13.53	71.88	4.43	Passed
Pair 4 [8]	85.00	115.00	98.12	105.01	13.12	9.99	86.03	5.85	Passed



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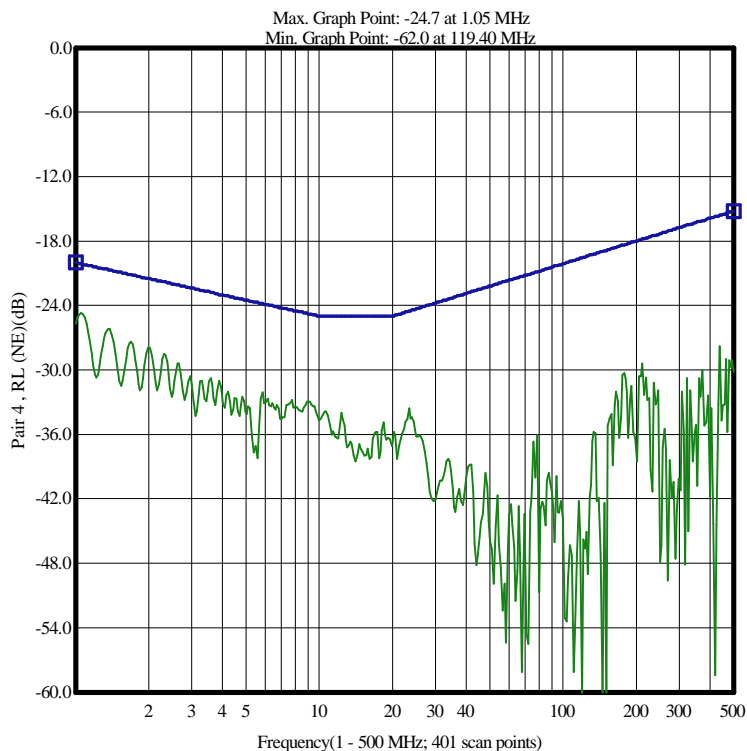
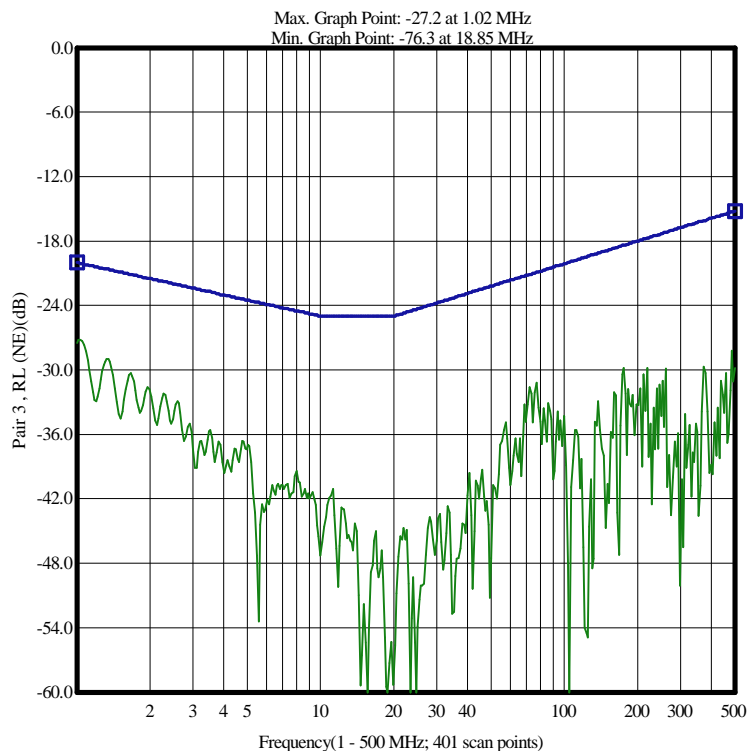
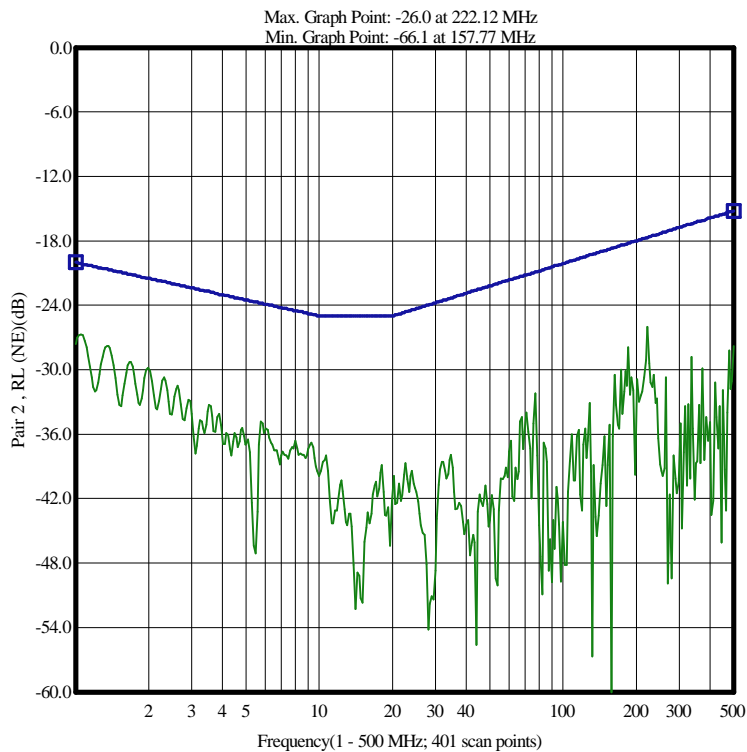
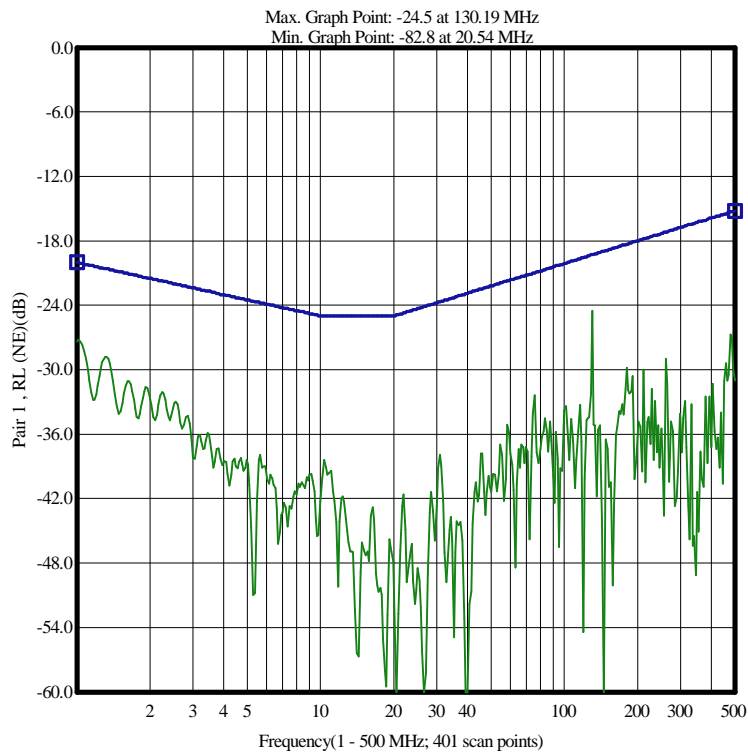
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### Summary and Graphic: Return Loss (RL)

(Cat 6A):  $RL \geq 20 + 5 * \log(f)$ ;  $25; 25 - 7 * \log(f/20)$

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 [5]	19.3	24.5	5.2	130.19	Passed
Pair 2 [6]	20.2	26.8	6.6	1.07	Passed
Pair 3 [7]	20.1	27.2	7.1	1.04	Passed
Pair 4 [8]	20.2	24.8	4.6	1.07	Passed



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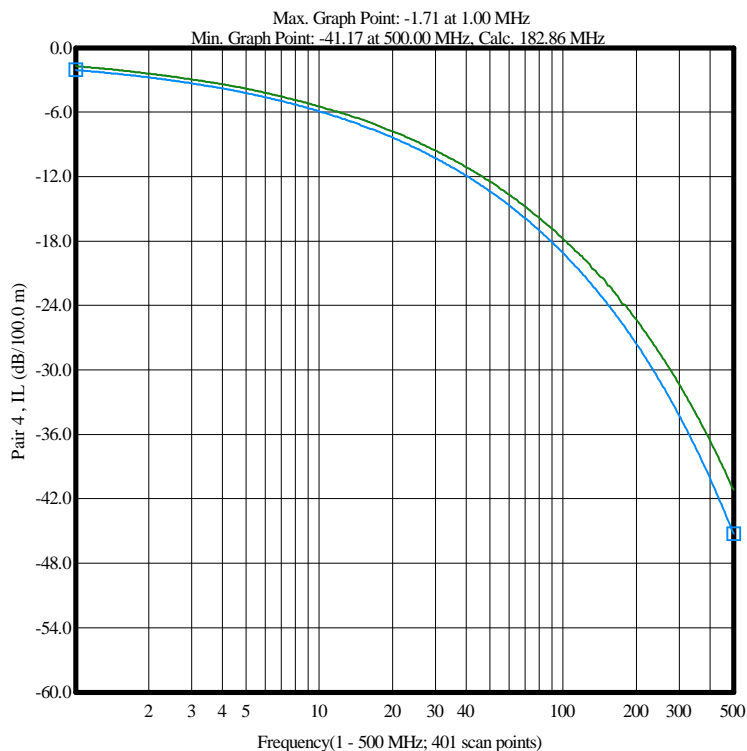
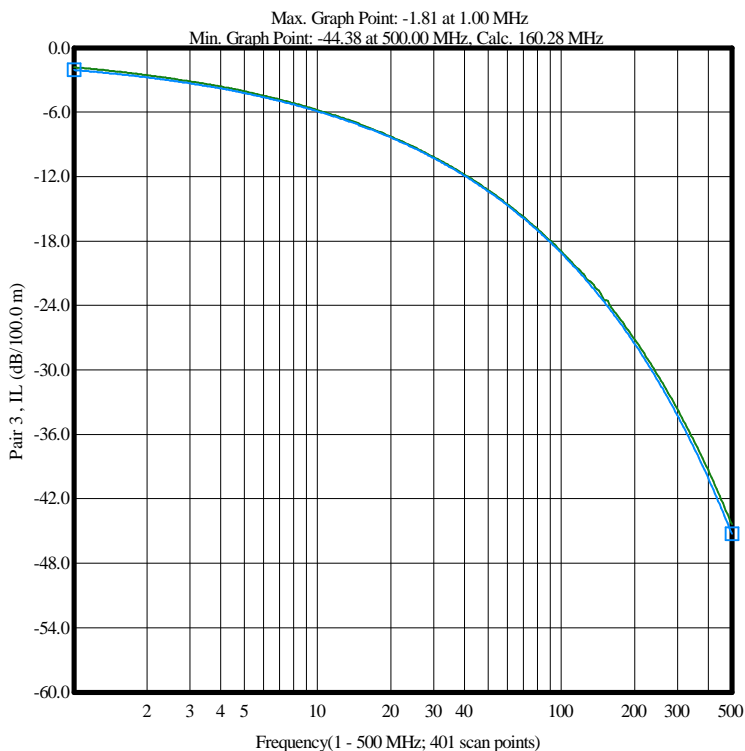
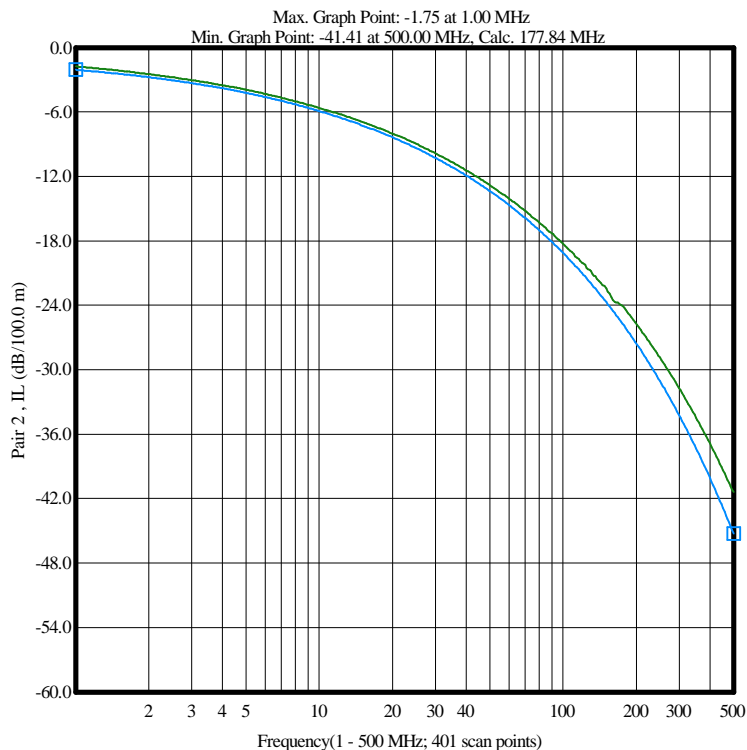
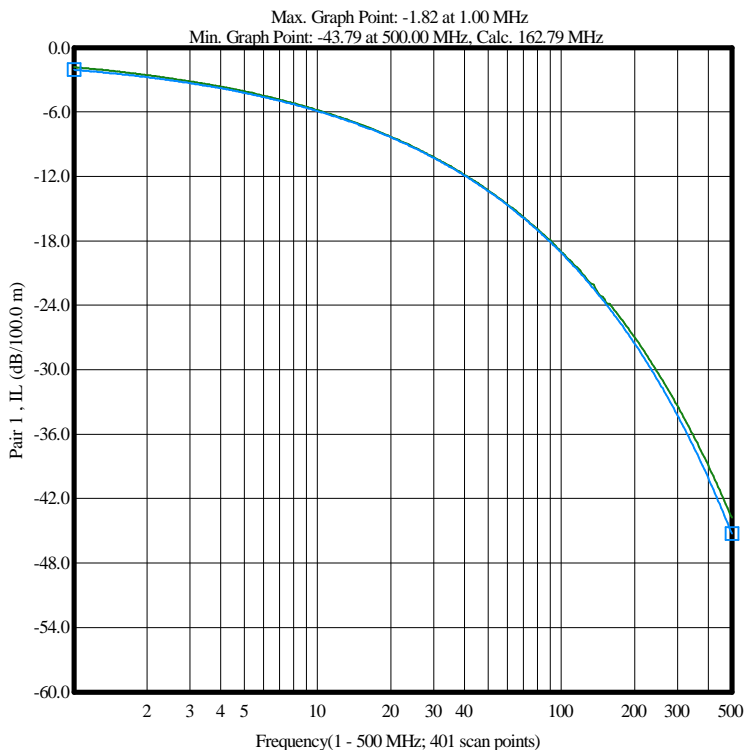
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### Summary and Graphic: Insertion Loss (IL)(Curve Fit)@20C

(Cat 6A):  $IL \leq 1.82 \sqrt{f} + 0.0091 * f + 0.25 / \sqrt{f}$  (Refer to manual)

Pair	Spec (Max)(dB/100.0 m)	Measured(dB/100.0 m)	Margin (dB/100.0 m)	@ Frequency (MHz)	Test Result
Pair 1 [5]	8.19	8.14	0.05	19.14	Passed
Pair 2 [6]	5.08	4.80	0.28	7.32	Passed
Pair 3 [7]	8.19	8.11	0.08	19.14	Passed
Pair 4 [8]	2.49	2.14	0.35	1.56	Passed



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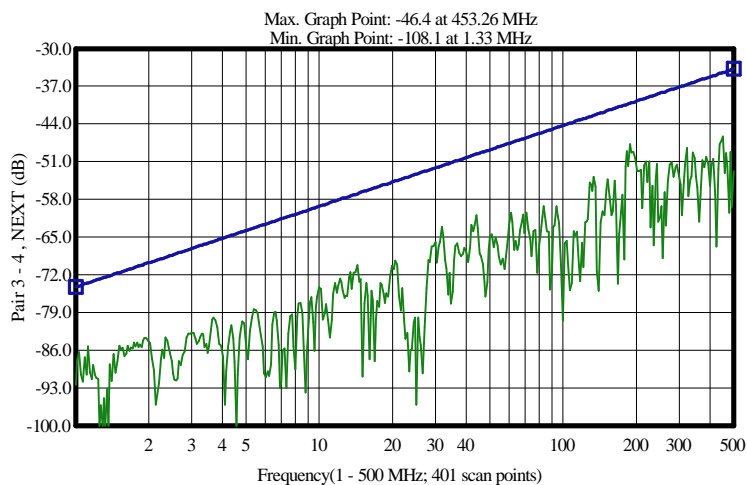
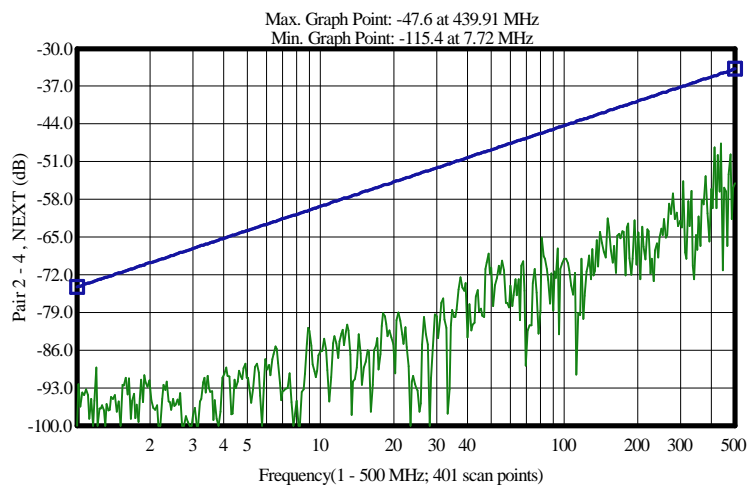
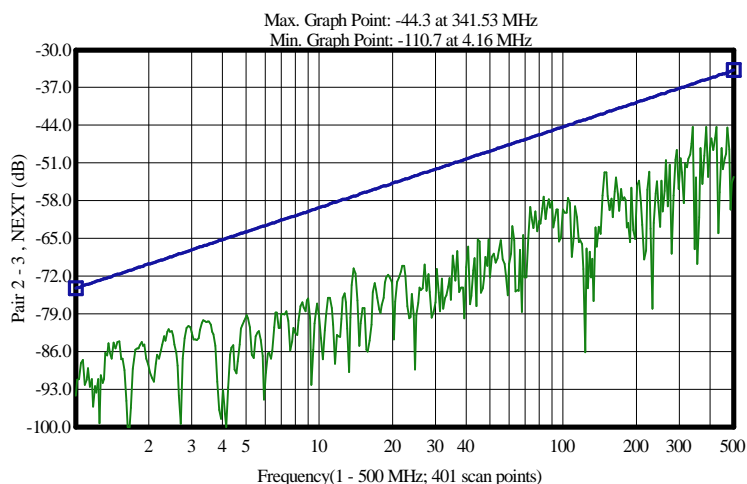
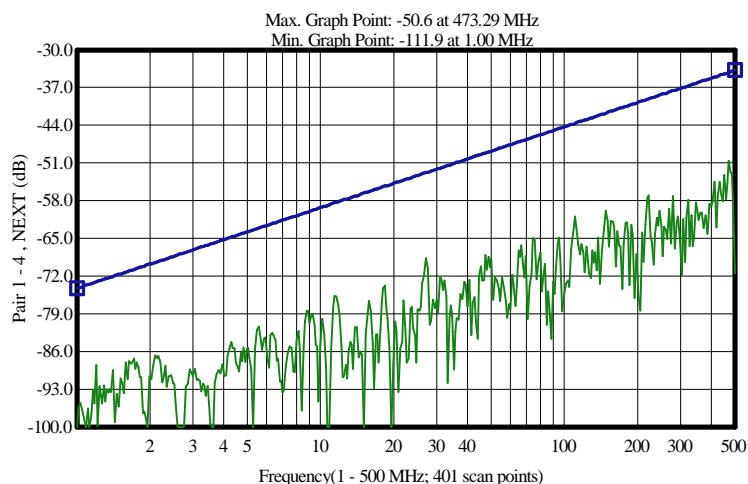
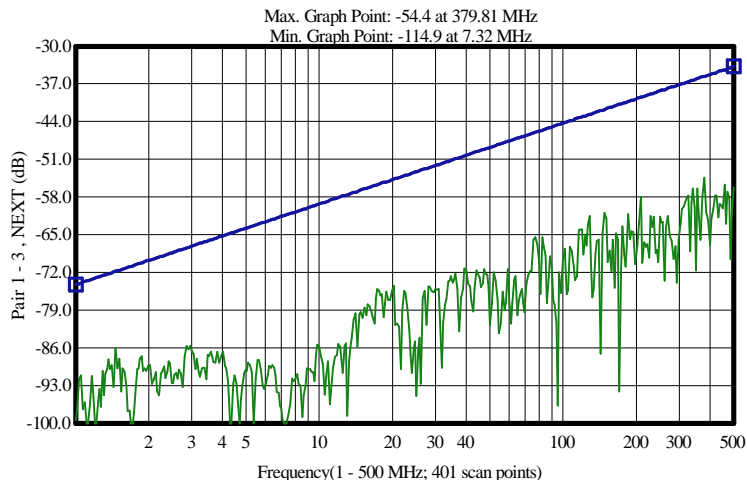
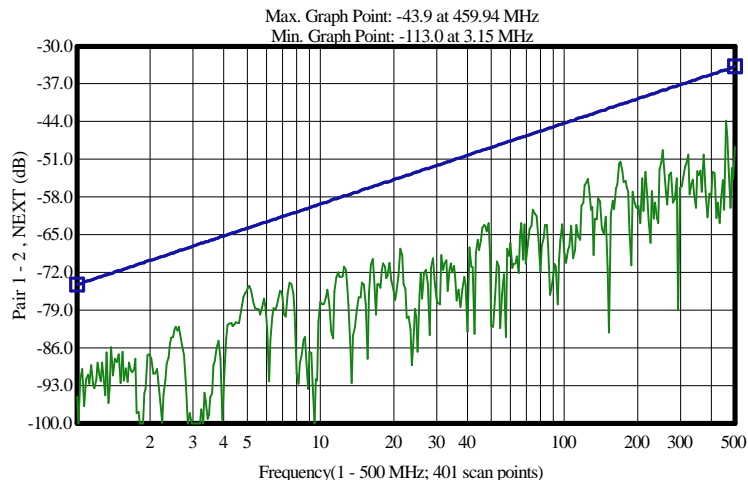
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### Summary and Graphic: Near End Crosstalk Loss (NEXT)

(Cat 6A): NEXT >= 44.3 - 15 \*log(f/100)

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 - 2	34.4	43.9	9.5	459.94	Passed
Pair 1 - 3	71.8	86.0	14.2	1.46	Passed
Pair 1 - 4	73.1	88.5	15.4	1.20	Passed
Pair 2 - 3	36.3	44.3	8.0	341.53	Passed
Pair 2 - 4	34.6	47.6	13.0	439.91	Passed
Pair 3 - 4	40.2	47.8	7.6	187.88	Passed



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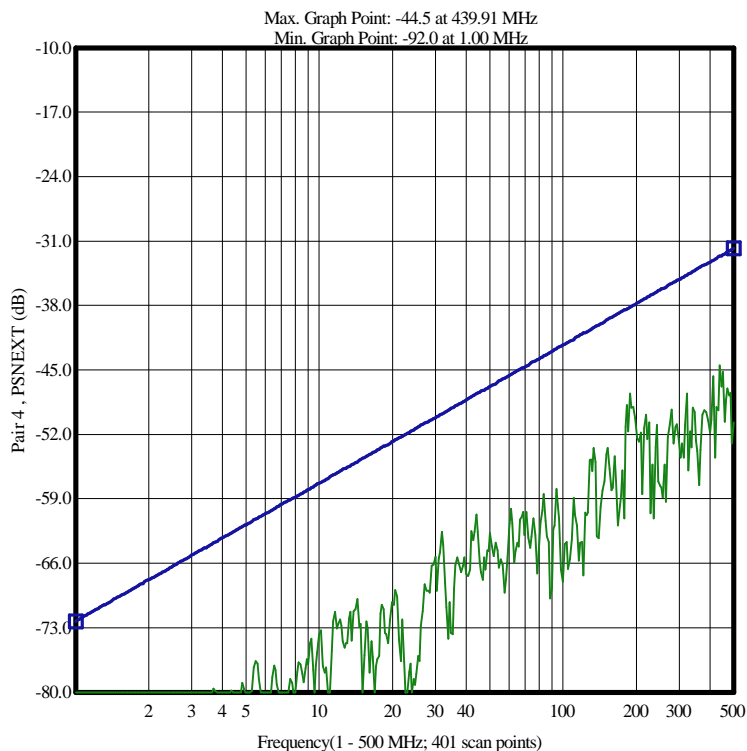
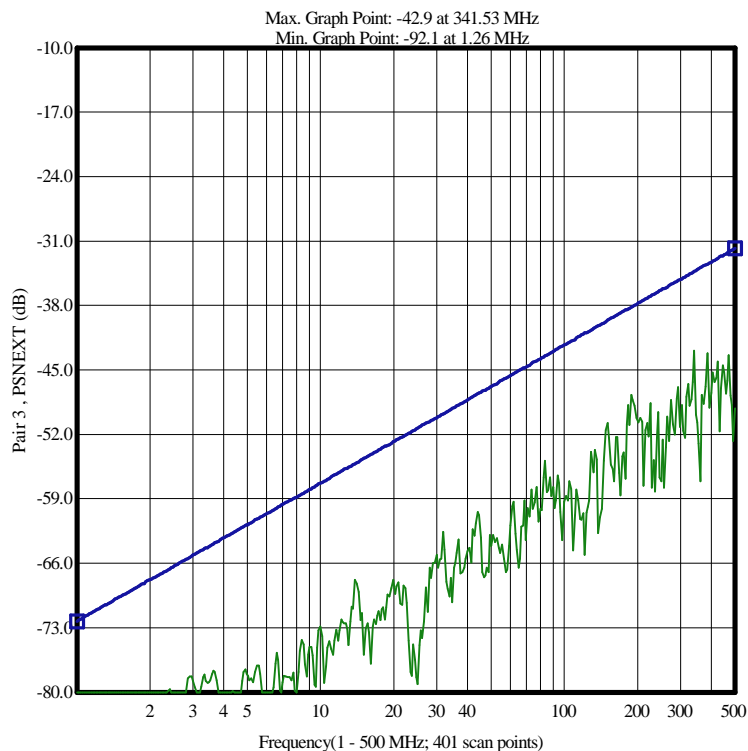
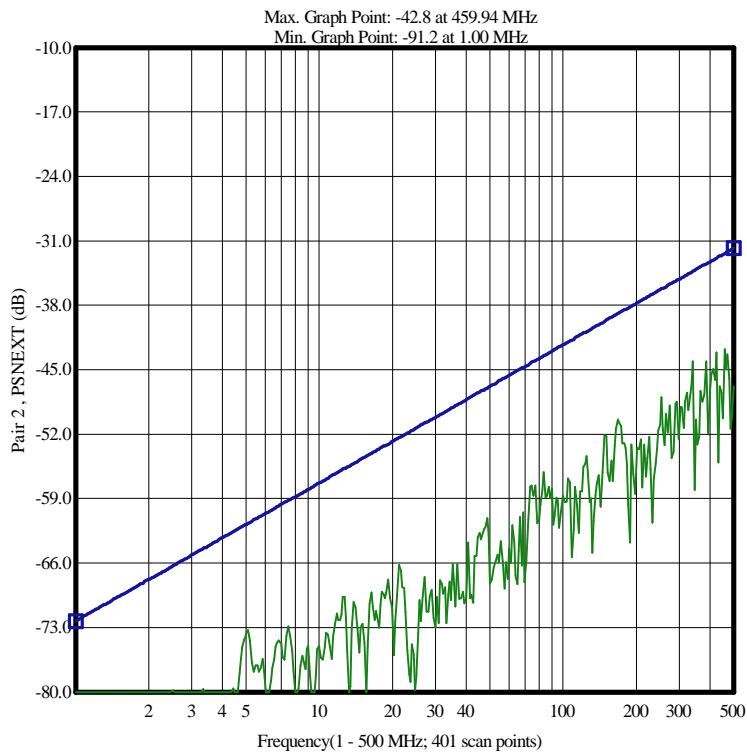
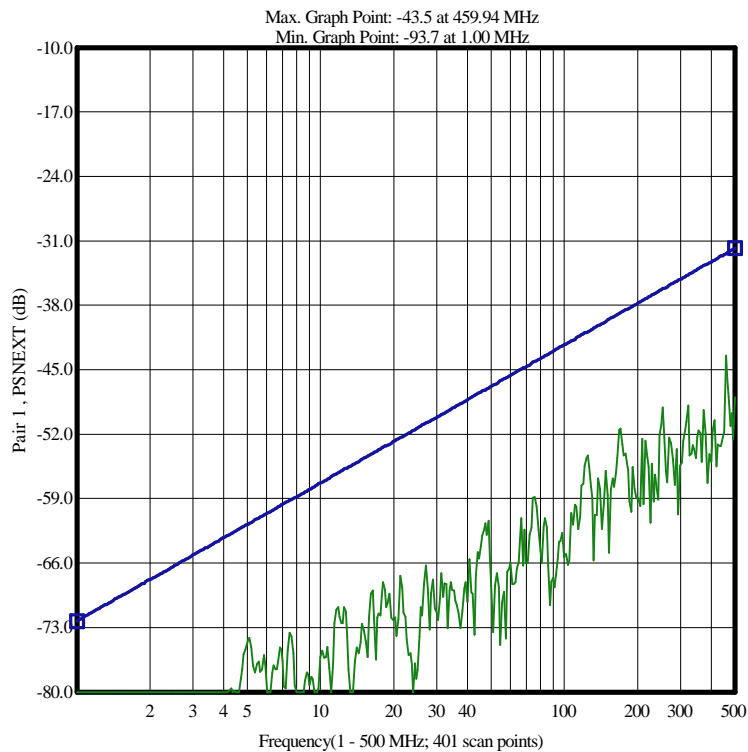
\*\*\* = Measured value is invalid.



### Summary and Graphic: Power Sum NEXT(PSNEXT)

(Cat 6A): PSNEXT >= 42.3 - 15 log(f/100)

Pair	Spec (Min)(dB)	Measured(dB)	Margin (dB)	@ Frequency (MHz)	Test Result
Pair 1 [5]	32.4	43.5	11.1	459.94	Passed
Pair 2 [6]	34.3	44.1	9.8	341.53	Passed
Pair 3 [7]	34.3	42.9	8.6	341.53	Passed
Pair 4 [8]	38.2	47.6	9.4	187.88	Passed



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**NEXT SWEEP - Worst Margin (dB) (Negative sign indicates a failure.)**

Dv/Rc	2	3	4
1	9.5	14.2	15.4
2	...	8.0	13.0
3	...	...	7.6

**NEXT SWEEP - Worst Frequency (MHz)**

Dv/Rc	2	3	4
1	460	1.46	1.20
2	...	342	440
3	...	...	188

**Detail Discrete Frequencies ---Input Impedance (Zin)(Ohms)(Terminated)**

Frequency	4.00	8.00	10.00	16.00	20.00	25.00	31.25	62.50	99.90	100.00
Max Spec	115.00	115.00	115.00	115.00	115.00	115.00	115.00	115.00	115.00	122.00
Min Spec	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	78.00
Pair 1 [5]	101.00	101.44	101.34	100.38	100.55	99.39	100.26	99.50	96.34	96.43
Pair 2 [6]	101.96	102.69	101.74	101.12	101.55	101.60	101.64	99.45	100.81	100.81
Pair 3 [7]	100.79	101.02	100.18	99.51	99.88	100.20	99.11	97.44	98.17	98.30
Pair 4 [8]	103.81	104.17	103.45	102.56	103.04	103.16	101.83	100.72	101.16	101.12

**Continue:Input Impedance (Zin)(Ohms)(Terminated)**

Frequency	125.00	155.00	199.90	200.00	250.00					
Max Spec	122.00	122.00	122.00	132.00	132.00					
Min Spec	78.00	78.00	78.00	68.00	68.00					
Pair 1 [5]	101.07	100.58	100.40	100.40	96.76					
Pair 2 [6]	98.98	103.06	102.91	102.97	97.85					
Pair 3 [7]	99.78	97.74	100.68	100.64	98.34					
Pair 4 [8]	101.00	100.62	100.69	100.64	99.23					

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

(Cat 6A):  $RL \geq 20 + 5 * \log(f)$ ; 25; 25 - 7 \*  $\log(f/20)$

Frequency	1.00	4.00	8.00	10.00	16.00	20.00	25.00	31.25	62.50	100.00
Min Spec	20.0	23.0	24.5	25.0	25.0	25.0	24.3	23.6	21.5	20.1
Pair 1 [5]	27.4	38.7	41.4	41.9	44.9	51.4	48.9	38.7	44.4	33.7
Pair 2 [6]	27.6	36.2	36.7	39.8	44.0	41.1	41.3	39.6	42.0	45.0
Pair 3 [7]	27.5	39.2	39.6	47.1	50.5	57.6	56.5	45.4	37.3	35.2
Pair 4 [8]	25.7	32.6	33.4	34.7	38.0	36.5	36.1	40.4	45.3	45.7

**Continue:Return Loss (RL)(dB)**

Frequency	200.00	250.00	300.00	350.00	400.00	500.00				
Min Spec	18.0	17.3	16.8	16.3	15.9	15.2				
Pair 1 [5]	36.0	35.6	35.5	43.3	37.1	31.0				
Pair 2 [6]	34.1	38.8	38.4	39.5	35.1	27.8				
Pair 3 [7]	33.3	34.2	46.3	35.6	38.8	29.8				
Pair 4 [8]	37.7	47.9	40.5	35.3	41.6	30.2				

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

(Cat 6A):  $IL \leq 1.82 \sqrt{f} + 0.0091 * f + 0.25 / \sqrt{f}$  (Refer to manual)

Frequency	1.00	4.00	8.00	10.00	16.00	20.00	25.00	31.25	62.50	100.00
Max Spec	2.08	3.80	5.31	5.93	7.49	8.38	9.38	10.50	14.99	19.14
Pair 1 [5]	1.82	3.65	5.21	5.84	7.40	8.32	9.30	10.43	14.89	19.04
Pair 2 [6]	1.75	3.51	5.02	5.64	7.14	8.03	8.97	10.07	14.36	18.32
Pair 3 [7]	1.81	3.62	5.18	5.81	7.38	8.29	9.27	10.40	14.85	18.97
Pair 4 [8]	1.71	3.41	4.88	5.48	6.94	7.81	8.73	9.78	13.96	17.80

**Continue:Insertion Loss (IL)(dB/100.0 m)(Curve Fit)@20C**

Frequency	125.00	155.00	200.00	250.00	300.00	350.00	400.00	500.00		
Max Spec	21.51	24.09	27.58	31.07	34.27	37.25	40.05	45.26		
Pair 1 [5]	21.31	23.88	27.01	30.35	33.40	36.23	38.89	43.79		
Pair 2 [6]	20.52	22.91	25.76	28.89	31.75	34.39	36.86	41.41		
Pair 3 [7]	21.27	23.57	27.17	30.58	33.70	36.60	39.33	44.38		
Pair 4 [8]	19.89	22.21	25.35	28.50	31.37	34.04	36.55	41.17		

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

(Cat 6A): NEXT >= 44.3 - 15 \*log(f/100)

Frequency	1.00	4.00	8.00	10.00	16.00	20.00	25.00	31.25	62.50	100.00
Min Spec	74.3	65.3	60.8	59.3	56.2	54.8	53.3	51.9	47.4	44.3
Pair 1 - 2	95.1	94.2	91.1	77.6	72.2	76.0	85.4	70.9	70.4	68.4
Pair 1 - 3	99.5	87.1	91.7	86.0	78.2	75.0	92.8	79.6	75.8	69.4
Pair 1 - 4	111.9	89.7	83.4	83.9	77.9	84.8	80.3	72.4	75.4	75.0
Pair 2 - 3	94.2	95.3	82.6	80.1	84.6	78.0	81.4	77.8	63.9	59.9
Pair 2 - 4	101.7	90.7	96.4	86.3	93.9	87.3	93.4	78.1	74.5	69.1
Pair 3 - 4	92.5	86.4	88.1	74.4	84.0	70.7	92.7	66.1	64.5	77.6

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

Frequency	200.00	250.00	300.00	400.00	500.00					
Min Spec	39.8	38.3	37.1	35.3	33.8					
Pair 1 - 2	59.8	51.6	56.2	57.5	48.7					
Pair 1 - 3	68.6	61.7	64.7	66.8	56.2					
Pair 1 - 4	72.7	62.9	67.9	59.1	71.5					
Pair 2 - 3	58.7	62.7	53.6	48.3	53.6					
Pair 2 - 4	66.3	63.5	62.5	56.2	55.0					
Pair 3 - 4	51.9	61.2	54.1	55.4	52.8					

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

(Cat 6A): PSNEXT >= 42.3 - 15 log(f/100)

Frequency	1.00	4.00	8.00	10.00	16.00	20.00	25.00	31.25	62.50	100.00
Min Spec	72.3	63.3	58.8	57.3	54.2	52.8	51.3	49.9	45.4	42.3
Pair 1 [5]	93.7	84.4	82.2	76.1	70.1	72.1	77.8	67.7	68.2	65.3
Pair 2 [6]	91.2	87.8	81.9	75.2	71.9	73.2	78.7	69.0	62.7	58.8
Pair 3 [7]	89.8	83.3	80.8	73.1	75.8	68.5	79.0	65.5	60.9	59.2
Pair 4 [8]	92.0	83.7	81.7	73.7	76.4	70.3	78.3	65.0	63.6	67.2

**Continue:Power Sum NEXT(PSNEXT)(dB)**

Frequency	200.00	250.00	300.00	400.00	500.00					
Min Spec	37.8	36.3	35.1	33.3	31.8					
Pair 1 [5]	59.0	50.9	55.3	54.9	48.0					
Pair 2 [6]	55.3	50.9	51.2	47.2	46.8					
Pair 3 [7]	50.5	57.0	50.3	47.4	49.2					
Pair 4 [8]	51.6	57.6	53.3	51.8	50.7					

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