

Laboratório de Ensaios

RELATÓRIO DE ENSAIO 10046-V01-01-R01

**CABO DE TRANSMISSÃO DE DADOS – SEM BLINDAGEM – CAT. 5E – 4 PARES –
CONDUTOR MULTIFILAR – PAR TRANÇADO DE 100 OHMS**

HISTÓRICO DAS REVISÕES

Revisão	Motivo	Período	Autor	Data
01	Emissão Inicial	21/07/10 a 28/07/10	jpgongora	28/07/10

APROVAÇÃO

**FITec – Responsável
Técnico**

Gabriel Quinteiro



Data

28/07/10

Autor(es)

José Henrique D. Gongora



Data

28/07/10

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1. OBJETIVO

Apresentar os resultados dos ensaios, realizados no Cabo de transmissão de dados Cabo UTP – sem blindagem – categoria 6 – condutor multifilar (flexível) – para uso interno – par trançado de 100 ohms (capacidade de 4 pares), de fabricação Microcenter Teleinformática Comercio e Representações Ltda, segundo o documento normativo ANSI TIA/EIA-568-B.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling Components.

2. INFORMAÇÕES GERAIS

2.1. Dados do Fabricante

Nome do Fabricante: YFC-Bon Eagle Electric Co., Ltd.
Endereço: No. 12-9, 130 Lane – Chung Shan E Road, Sec.2 - Hsinwu, Taoyuam, Taiwan, R.O.C
CEP: N.A.
Contato: Eduardo Corigliano
Telefone: +55 11 5606.8000

2.2. Dados do Solicitante

Nome do Solicitante: UL do Brasil Certificações.
Endereço: Rua Fidêncio Ramos, 195 – 2º andar – Vila Olímpia - São Paulo – S.P
CEP: 04551.010
Contato: João Abel
Telefone: +55 11 3049-8791

2.3. Dados do OCD

Nome do OCD: UL do Brasil Certificações.
Endereço: Rua Fidêncio Ramos, 195 – 2º andar – Vila Olímpia - São Paulo – S.P
CEP: 04551.010
Contato: João Abel
Telefone: +55 11 3049-8791

2.4. Local dos Testes

Nome do Laboratório: Laboratório de Ensaios de Certificação - FITLAB
Fundação para Inovações Tecnológicas - FITec
Contato: Alexandre Apolinário Garcia
Telefone: +55 19 2137-6943

2.5. Dados Comerciais

Número do Contrato: LPC 10053-01

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Os resultados apresentados referem-se exclusivamente às amostras ensaiadas nas condições relatadas.

3. DADOS DA AMOSTRA

3.1. Descrição

Cabo UTP – sem blindagem – categoria 6 – condutor multifilar (flexível) – para uso interno – par trançado de 100 ohms (capacidade de 4 pares).

Produto pertencente à Família 20, segundo a Tabela 6 – Página 118/277, dos Procedimentos de Ensaio Aplicáveis à Certificação de Produtos para Telecomunicações de Categoria I – Atualização de 06/07/2010.

3.2. Identificação

Tabela 1 – Identificação das Amostras

Informações das Amostras	Amostra 1
Código da Amostra	AMO-10046-V01
Modelo	MAXI UTP CAT 5e Condutor Multifilar 24 AWGx4 pares
Número de Série	Não se aplica
Versão SW	Não se aplica
Data do Recebimento	15/07/2010
Outras Informações	Gravação no cabo: Vide item 3.3.

3.3. Fotos



Foto 1: 10046-V01-01-R01_MICROCENTER_LAN_CAT5e_FLEX_GRAVAÇÃO

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4. CONDIÇÕES AMBIENTAIS

Tabela 2 – Temperatura (°C)

Temperatura Mínima	20,9
Temperatura Máxima	21,2

5. INSTRUMENTOS UTILIZADOS

Tabela 3 – Instrumentos Utilizados

Nome do Instrumento	Nº de série	Validade da Calibração
Network Analyzer HP8753ES	T029	02/12
Mini data logger 175-H2	20001854/207	08/10

6. SW UTILIZADOS

Tabela 4 – Produtos/Ferramentas SW Utilizados

Código do Item SW	Nome do SW	Versão	Fornecedor
SW01	A1 – LAN	V1.0 R23.01.2006	Josaphat Engenharia

7. ENSAIOS REALIZADOS

Tabela 5 – Ensaios Realizados

Documento Normativo: ANSI TIA/EIA-568-B.2 2001 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling Components																								
Instrução de Testes: ITT-06001-03-CABOS_LAN-UTP-STP-CAT-3-5e-6																								
Item da Norma	Ensaio	Método	Requisito	Resultado Obtido																				
4.5.3	Perda de retorno	ASTM D4566	Para todas as freqüências de 1MHz à 100MHz, a perda de retorno (return loss), para um comprimento de 100m, medido nos dois sentidos do cabo, deve satisfazer os valores determinados utilizando as equações especificadas na tabela “16” do documento normativo TIA/EIA-568-B.2.	<table border="1"> <thead> <tr> <th colspan="5">Pior caso</th> </tr> <tr> <th>Sentido da gravação</th> <th>Pa r</th> <th>Freq. (MHz)</th> <th>Especificado (dB)</th> <th>Perda de Retorno (dB)</th> </tr> </thead> <tbody> <tr> <td>Crescente</td> <td>4</td> <td>1,4</td> <td>20,7</td> <td>22,4</td> </tr> <tr> <td>Decrescente</td> <td>4</td> <td>1,4</td> <td>20,7</td> <td>22,5</td> </tr> </tbody> </table>	Pior caso					Sentido da gravação	Pa r	Freq. (MHz)	Especificado (dB)	Perda de Retorno (dB)	Crescente	4	1,4	20,7	22,4	Decrescente	4	1,4	20,7	22,5
Pior caso																								
Sentido da gravação	Pa r	Freq. (MHz)	Especificado (dB)	Perda de Retorno (dB)																				
Crescente	4	1,4	20,7	22,4																				
Decrescente	4	1,4	20,7	22,5																				
4.3.4.8	NEXT	ASTM D4566	Para todas as freqüências de 0,772MHz à 100MHz, a perda NEXT (Near-end crosstalk “NEXT” loss), para um comprimento de 100m ou maior, medido nos dois sentidos do cabo, deve satisfazer os valores determinados utilizando a equação “6” do documento normativo TIA/EIA-568-B.2.	<table border="1"> <thead> <tr> <th colspan="4">Pior caso</th> </tr> <tr> <th>Sentido da gravação</th> <th>Freq. (MHz)</th> <th>Especificado (dB)</th> <th>NEXT (dB)</th> </tr> </thead> <tbody> <tr> <td>Crescente</td> <td>76,2</td> <td>37,1</td> <td>46,0</td> </tr> <tr> <td>Decrescente</td> <td>85,1</td> <td>36,3</td> <td>43,3</td> </tr> </tbody> </table>	Pior caso				Sentido da gravação	Freq. (MHz)	Especificado (dB)	NEXT (dB)	Crescente	76,2	37,1	46,0	Decrescente	85,1	36,3	43,3				
Pior caso																								
Sentido da gravação	Freq. (MHz)	Especificado (dB)	NEXT (dB)																					
Crescente	76,2	37,1	46,0																					
Decrescente	85,1	36,3	43,3																					
4.3.4.9	PSNEXT	ASTM D4566	Para todas as freqüências de 0,772MHz à 100MHz, a perda PSNEXT (power sum near-end crosstalk “PSNEXT” loss), para um comprimento de 100m ou maior, medido nos dois sentidos do cabo, deve satisfazer os valores determinados utilizando a equação “8” do documento normativo TIA/EIA-568-B.2.	<table border="1"> <thead> <tr> <th colspan="5">Pior caso</th> </tr> <tr> <th>Sentido da gravação</th> <th>Par</th> <th>Freq. (MHz)</th> <th>Especificado (dB)</th> <th>PSNEXT (dB)</th> </tr> </thead> <tbody> <tr> <td>Crescente</td> <td>2</td> <td>76,1</td> <td>34,1</td> <td>45,1</td> </tr> <tr> <td>Decrescente</td> <td>3</td> <td>85,1</td> <td>33,3</td> <td>43,1</td> </tr> </tbody> </table>	Pior caso					Sentido da gravação	Par	Freq. (MHz)	Especificado (dB)	PSNEXT (dB)	Crescente	2	76,1	34,1	45,1	Decrescente	3	85,1	33,3	43,1
Pior caso																								
Sentido da gravação	Par	Freq. (MHz)	Especificado (dB)	PSNEXT (dB)																				
Crescente	2	76,1	34,1	45,1																				
Decrescente	3	85,1	33,3	43,1																				

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Item da Norma	Ensaio	Método	Requisito	Resultado Obtido				
4.3.4.12	Atraso de propagação	ASTM D4566	Para todas as frequências de 1MHz à 100MHz, o atraso de propagação (propagation delay) deve satisfazer os valores determinados utilizando a equação "12" do documento normativo TIA/EIA-568-B.2.	Pior caso				
				Par	Frequência (MHz)	Especificado (ns/100m)	Atraso de propagação (ns/100m)	
				1	180,0	537,5	485,7	

OBS.: A incerteza expandida relatada é baseada em uma incerteza padronizada combinada, multiplicada por um fator de abrangência k fornecendo um nível de confiança de aproximadamente 95%.

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7.1. Outras Informações

7.1.1. Para os ensaios elétricos e de transmissão, foi utilizado um comprimento de 100 metros da amostra, que permaneceu climatizada 24 horas antes e durante o ensaio na temperatura de $20 \pm 3^{\circ}\text{C}$.

7.1.2. Foram utilizados 801 pontos de leitura para a varredura de cada medida.

8. DOCUMENTOS ASSOCIADOS

8.1. Documentos de Referência

[1] ANSI TIA/EIA-568-B.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling Components;

9. LISTA DE COLABORADORES

Tabela 6 – Lista de colaboradores

Nome	Empresa	Fone	E-mail
José Henrique D. Gongora	Versus	+55 (19) 2137-6816	jgongora@fitec.org.br

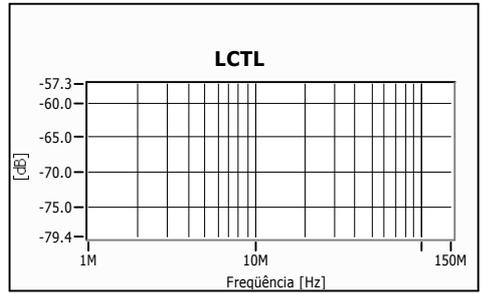
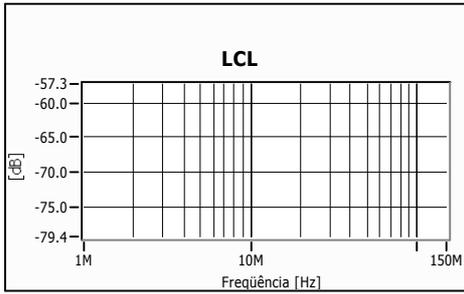
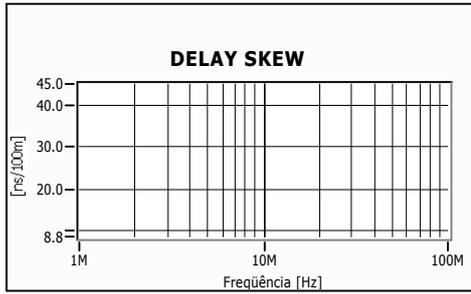
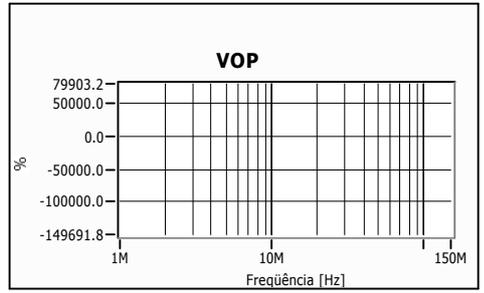
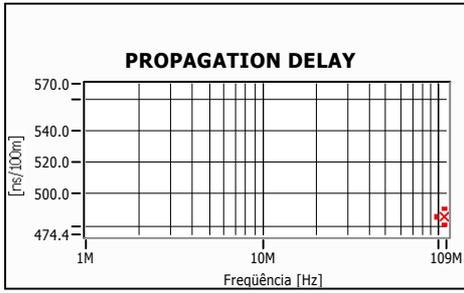
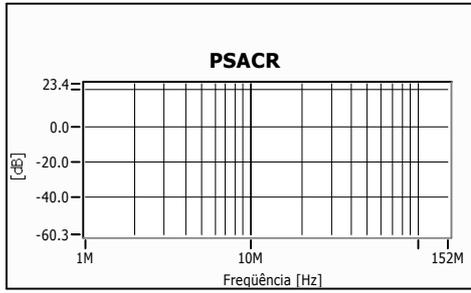
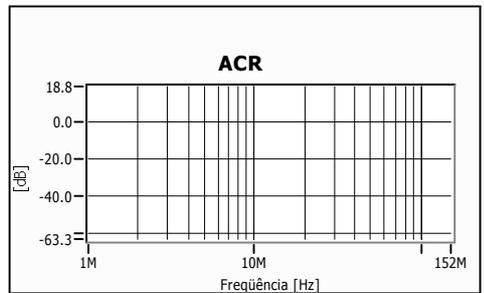
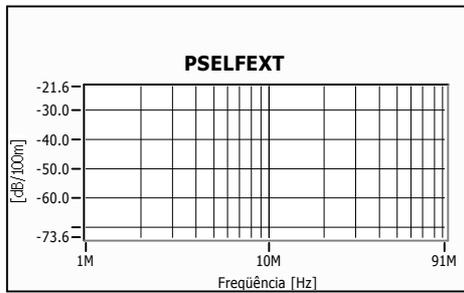
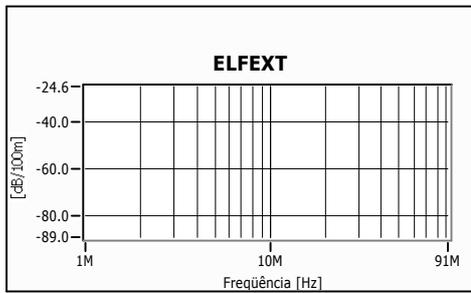
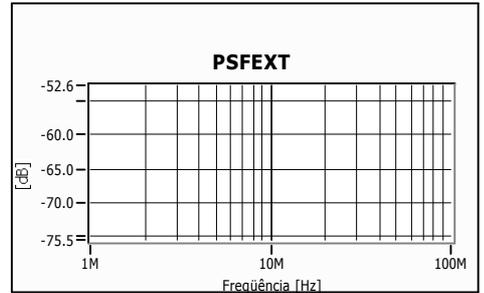
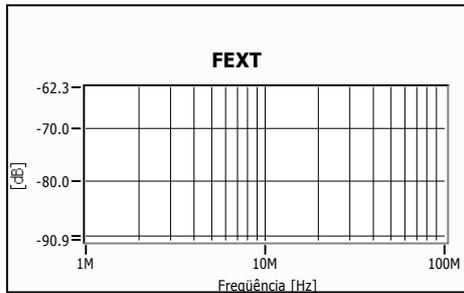
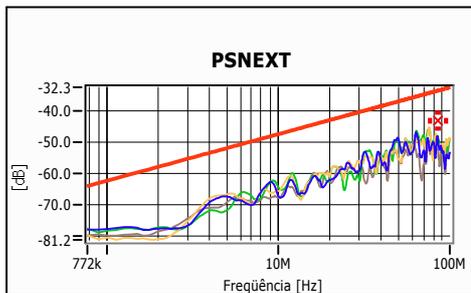
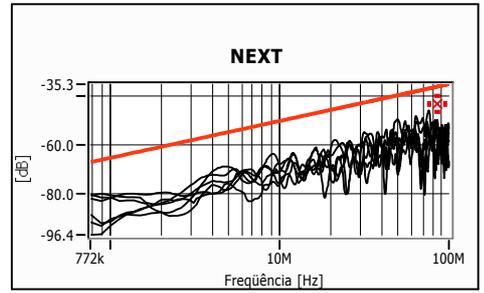
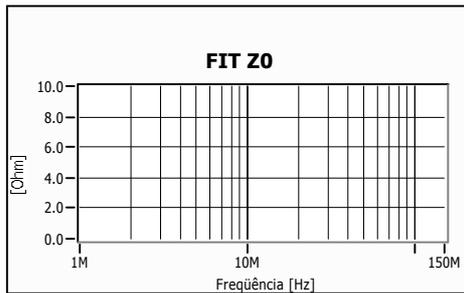
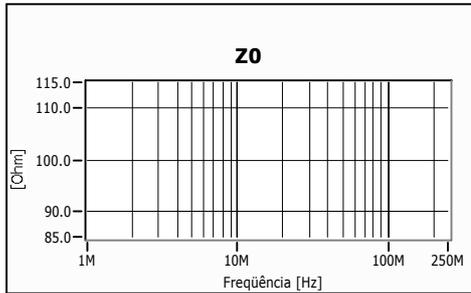
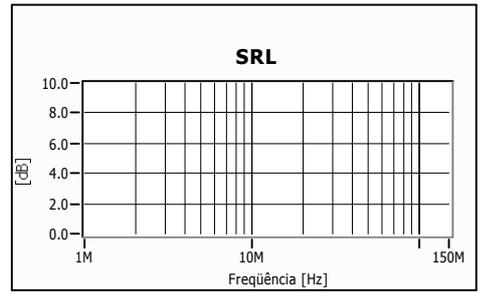
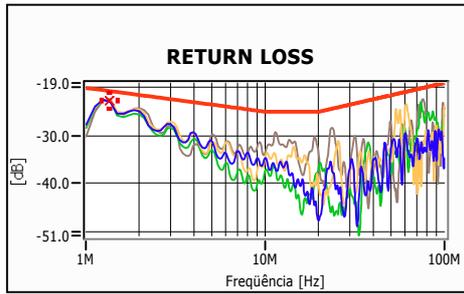
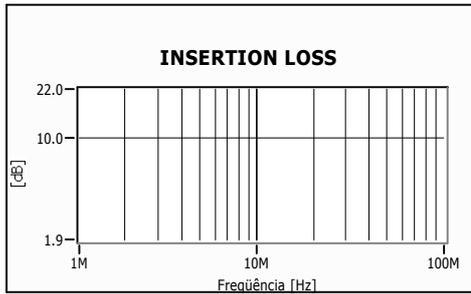
10. ANEXOS

Relatórios emitidos pelo equipamento automático de teste SISTEMA A1.

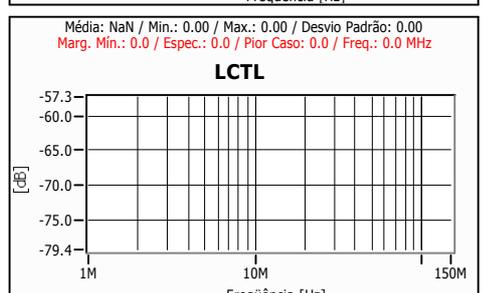
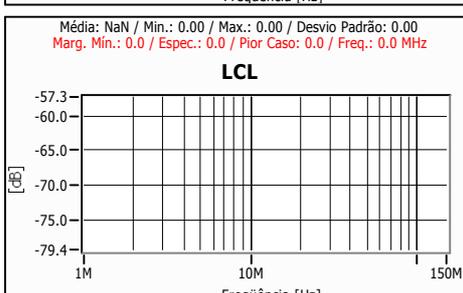
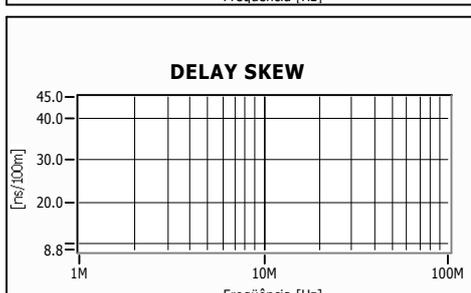
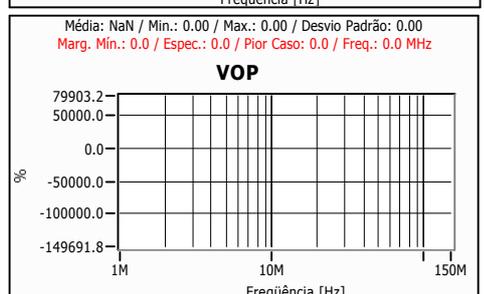
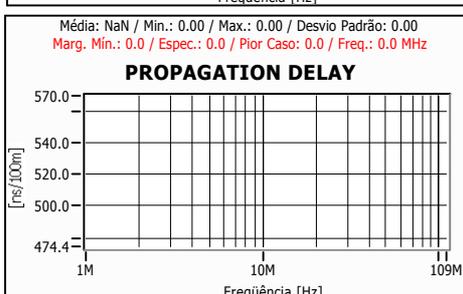
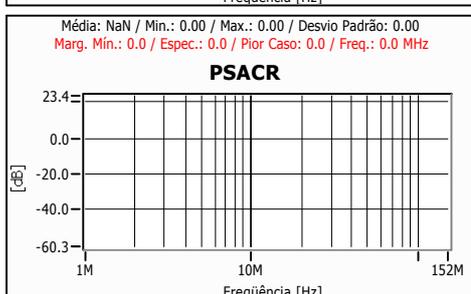
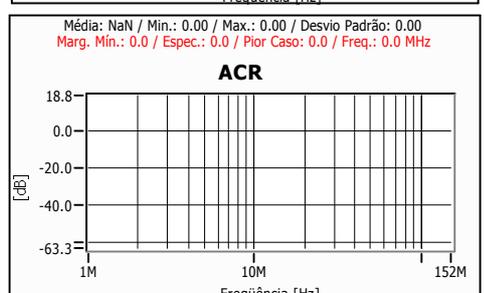
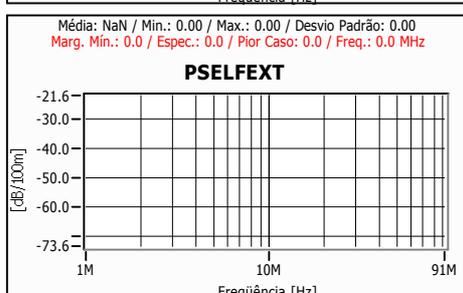
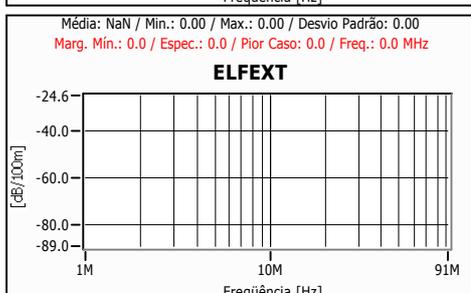
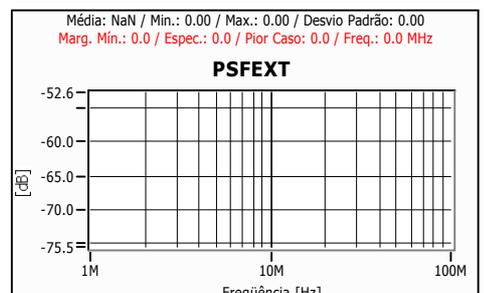
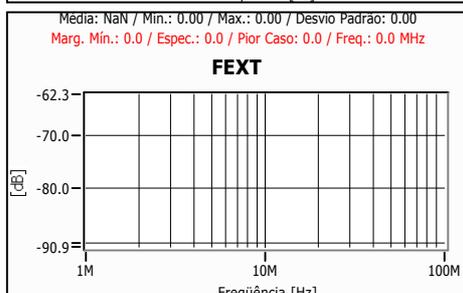
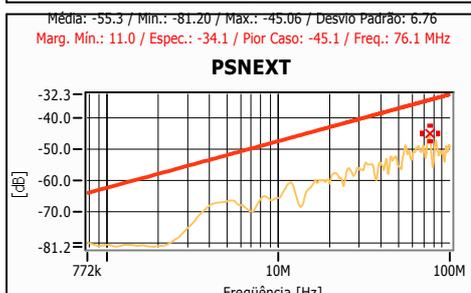
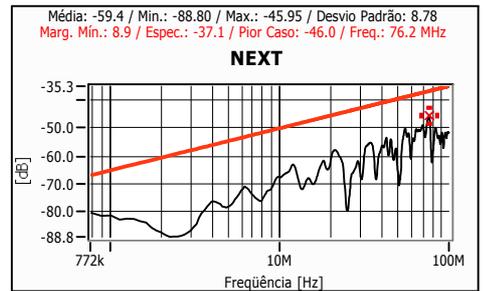
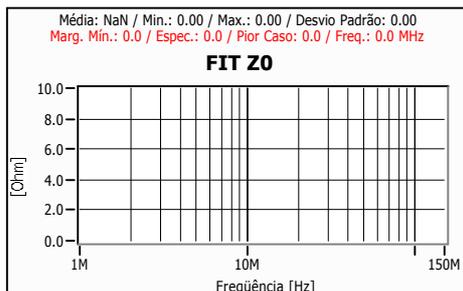
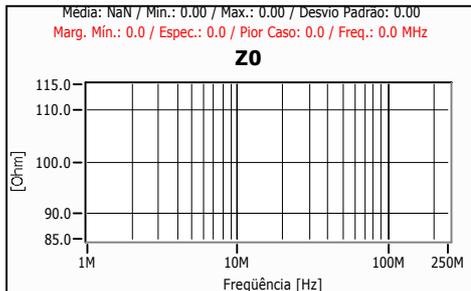
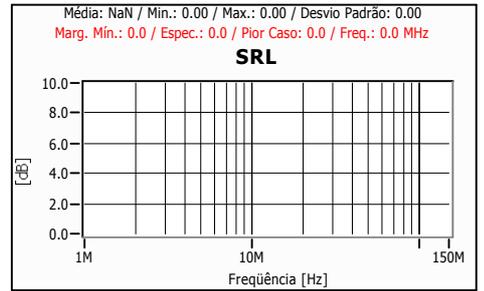
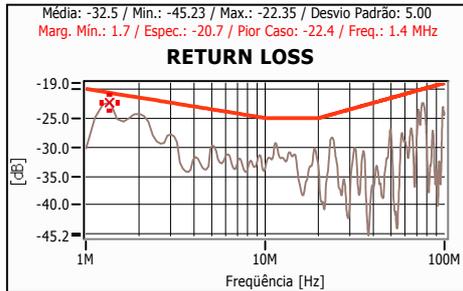
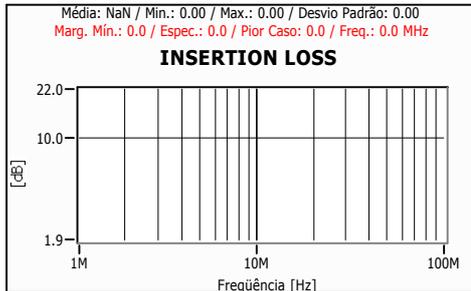
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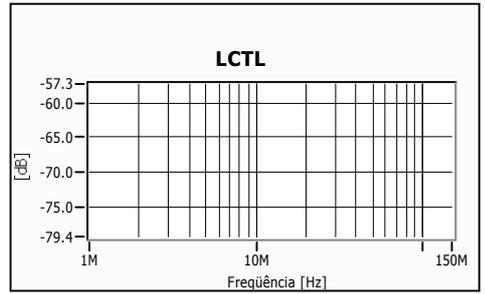
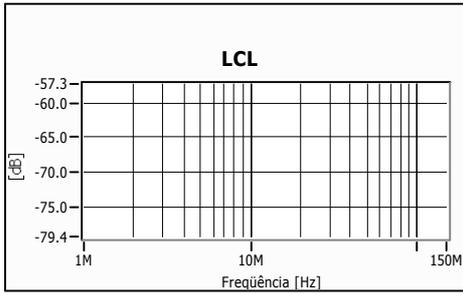
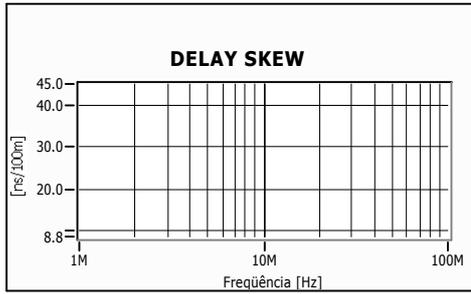
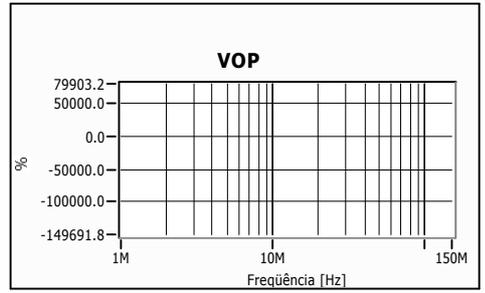
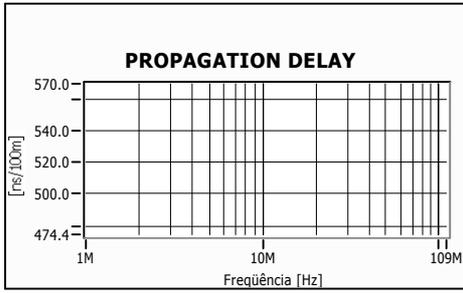
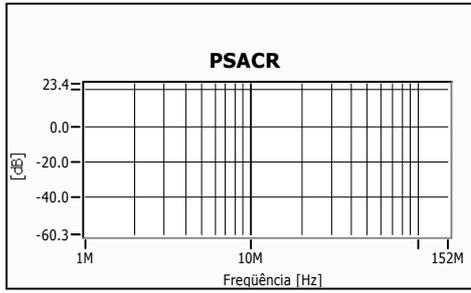
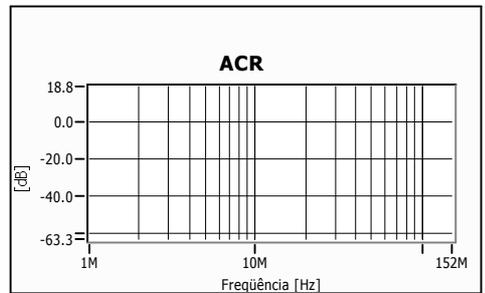
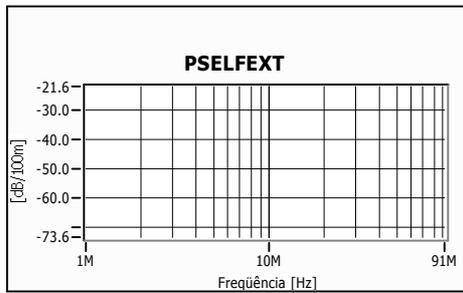
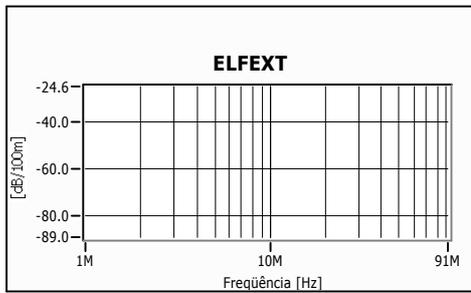
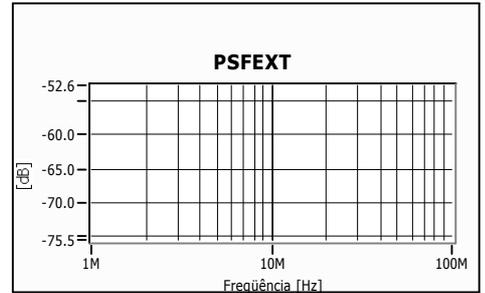
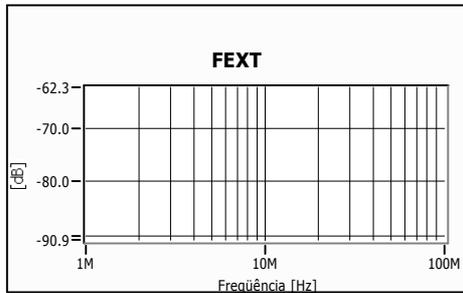
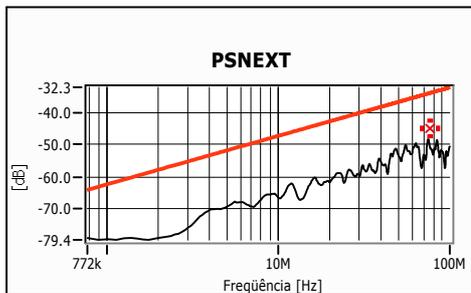
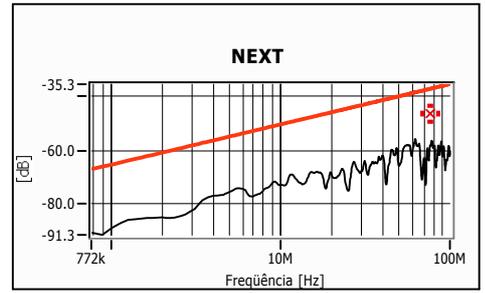
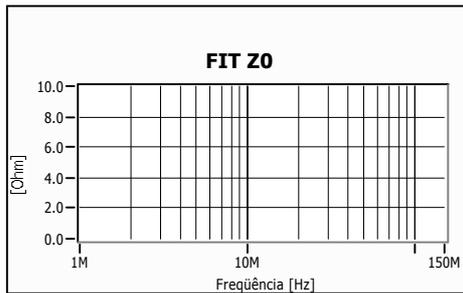
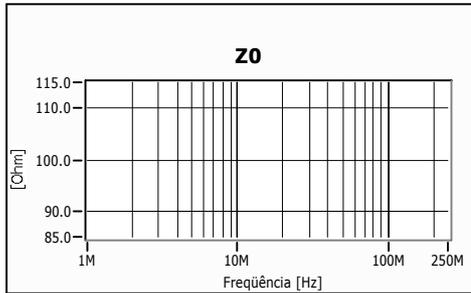
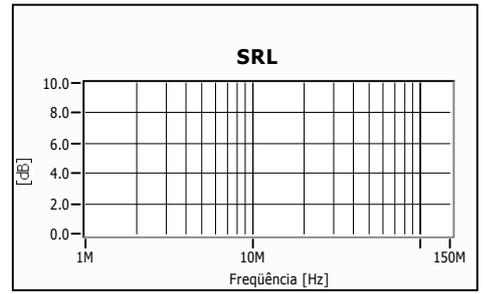
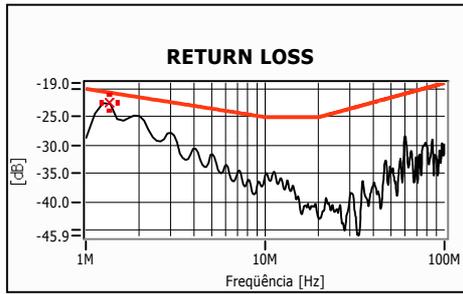
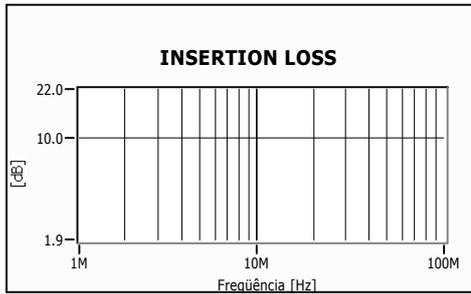
SUMÁRIO



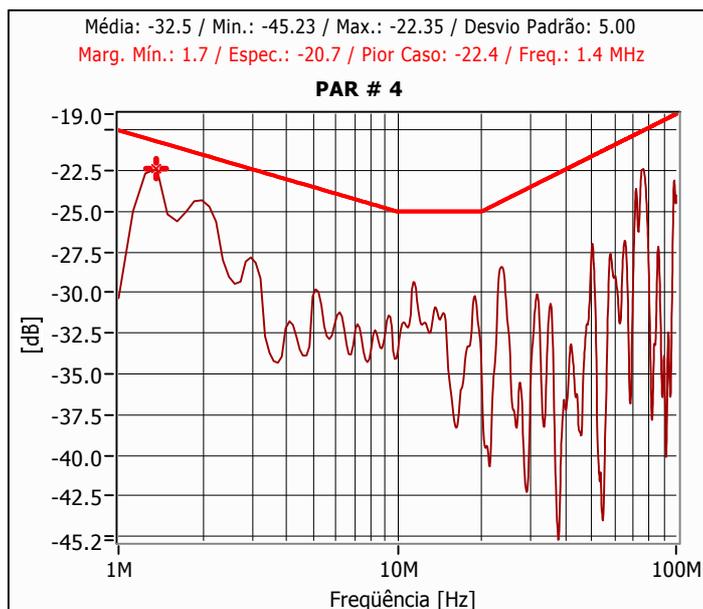
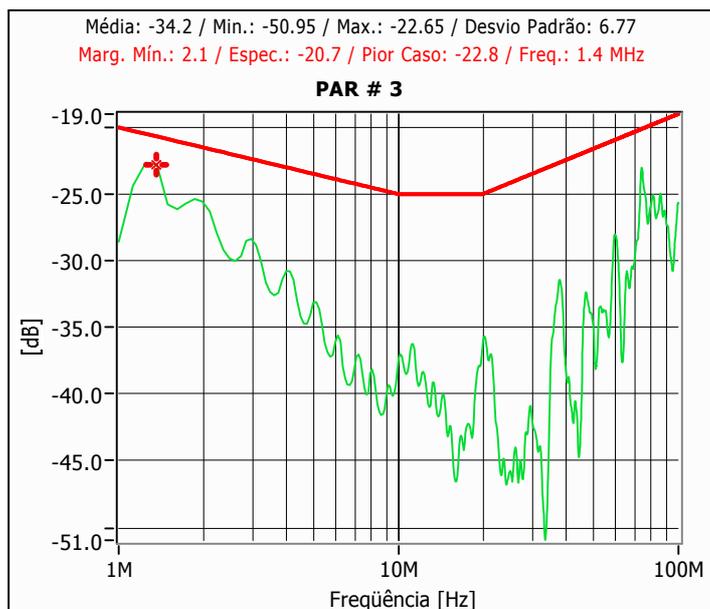
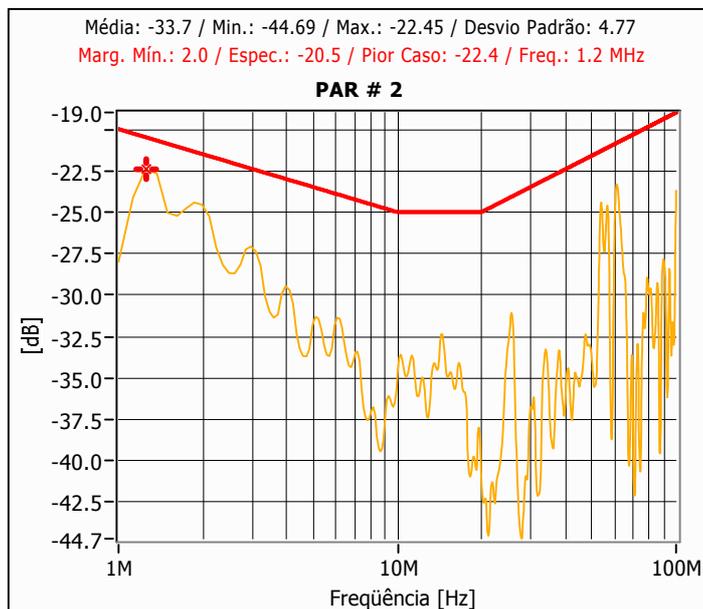
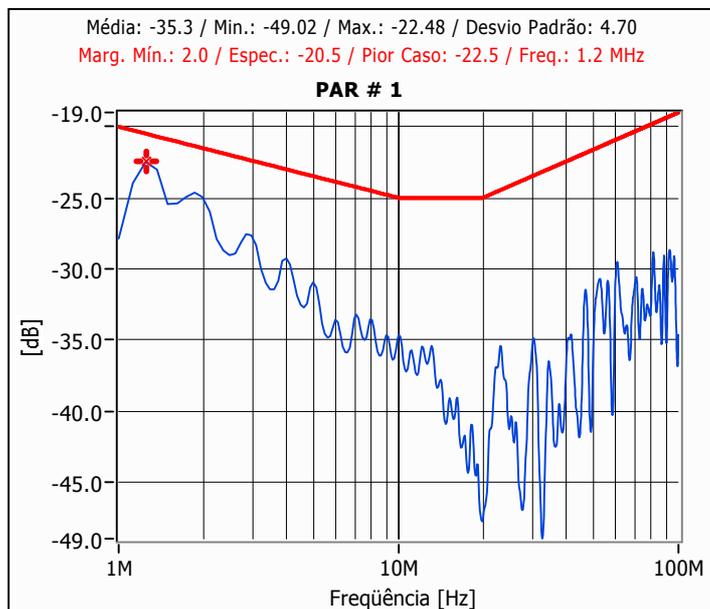
PIOR CASO



MÉDIAS

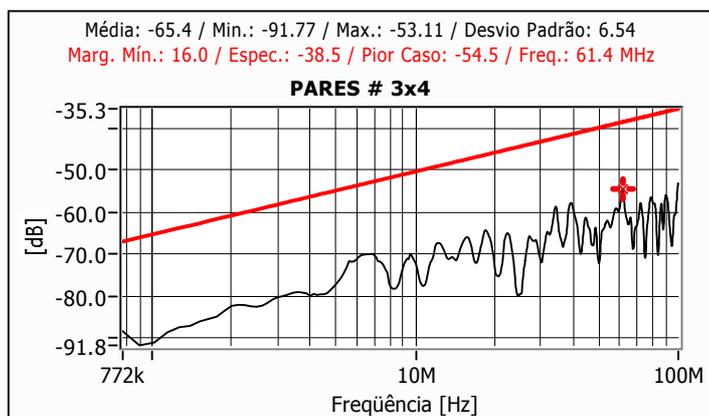
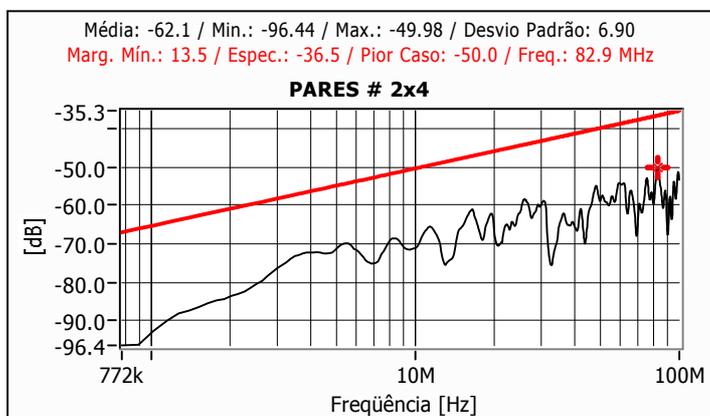
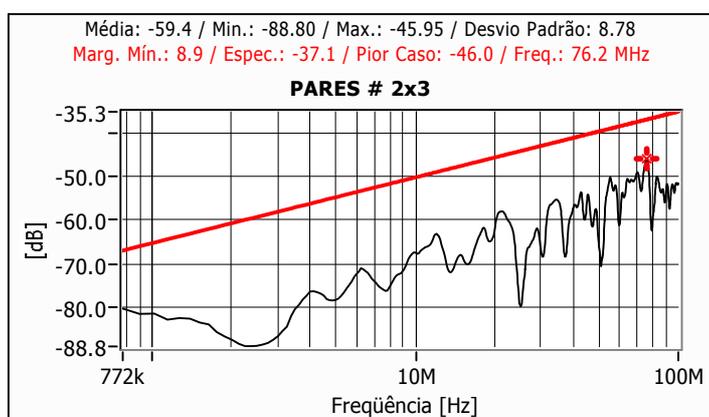
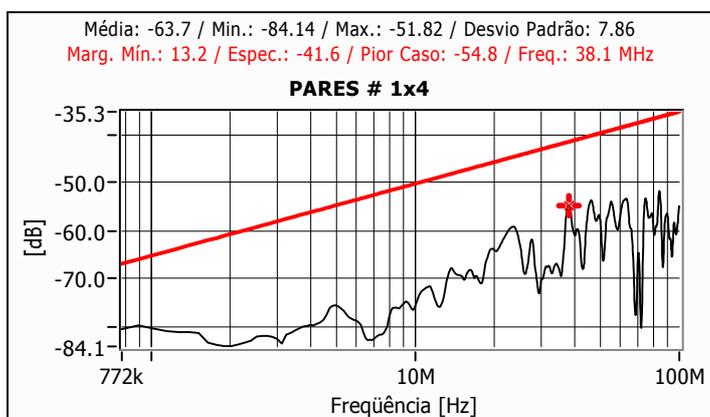
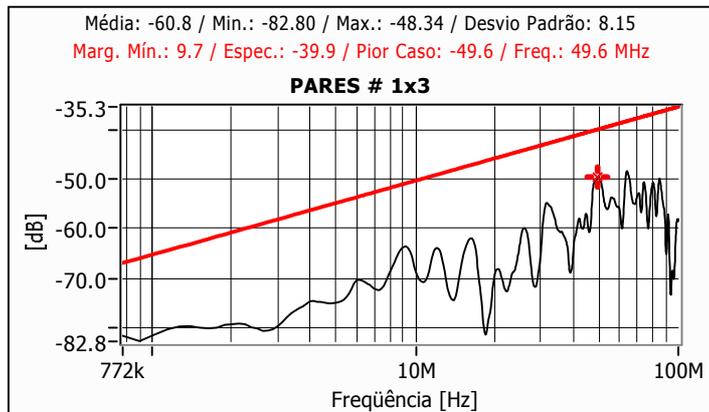
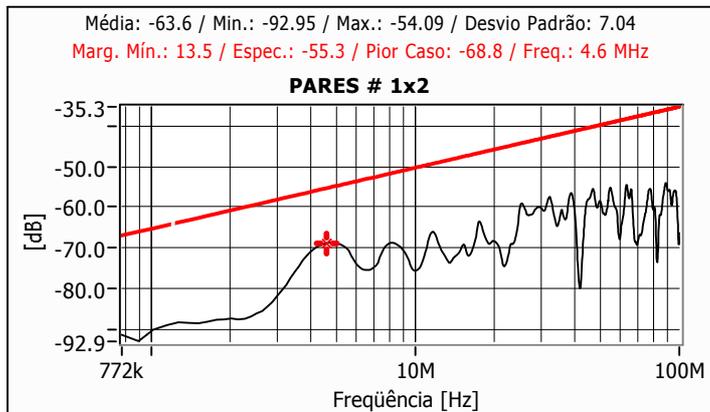


RETURN LOSS



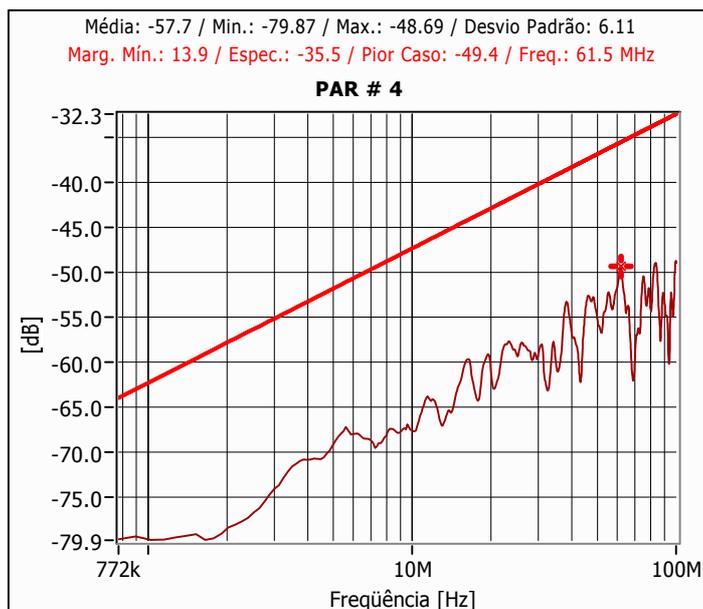
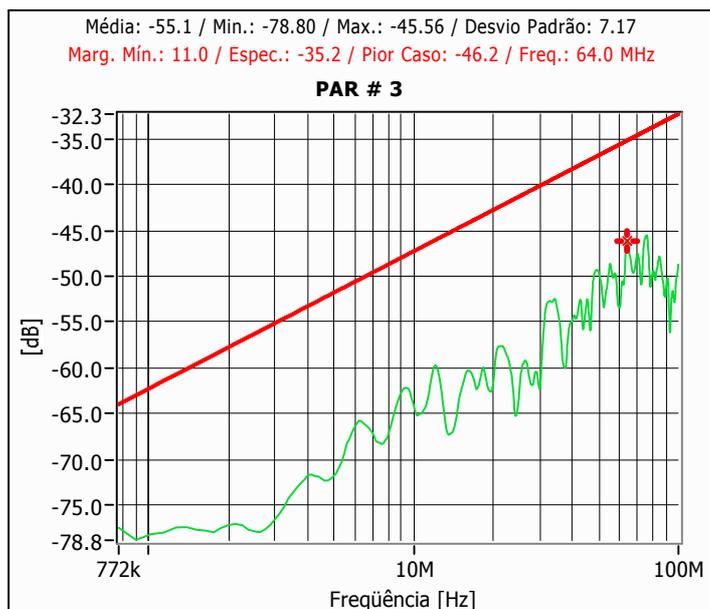
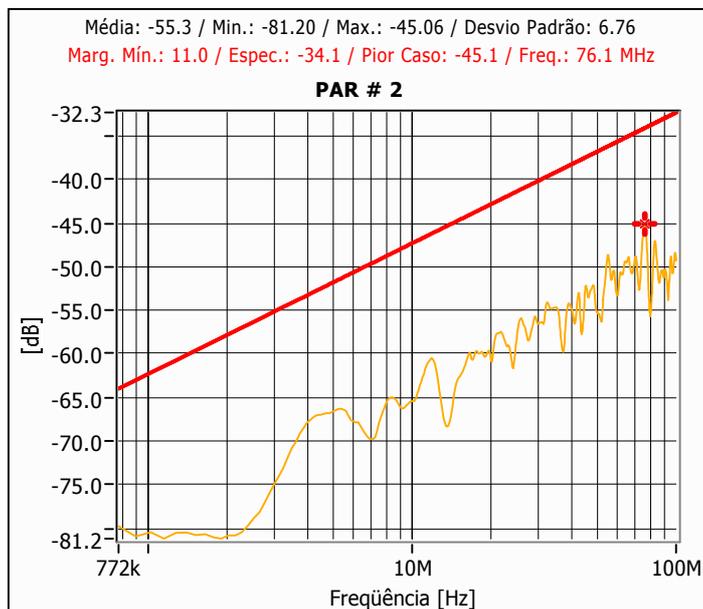
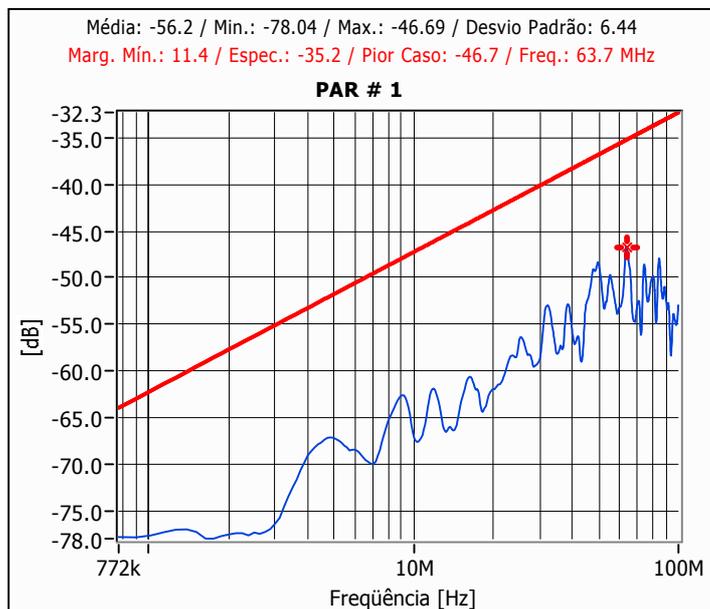
FREQ.	1	2	3	4	MIN.	MAX.	MÉDIA
1.00	27.87	27.99	28.57	30.34	27.87	30.34	28.81
4.00	29.28	29.47	30.75	32.19	29.28	32.19	30.58
8.00	33.61	37.00	38.16	33.46	33.46	38.16	36.04
10.00	34.65	34.42	37.29	33.59	33.59	37.29	35.23
16.00	40.08	35.66	46.57	37.91	35.66	46.57	42.14
20.00	47.64	41.55	36.02	34.95	34.95	47.64	42.99
25.00	41.08	32.88	45.80	32.23	32.23	45.80	41.34
31.25	36.85	38.12	43.46	30.87	30.87	43.46	39.39
62.50	32.98	24.75	36.24	31.73	24.75	36.24	33.00
100.00	34.66	23.71	25.69	24.01	23.71	34.66	29.76

NEXT



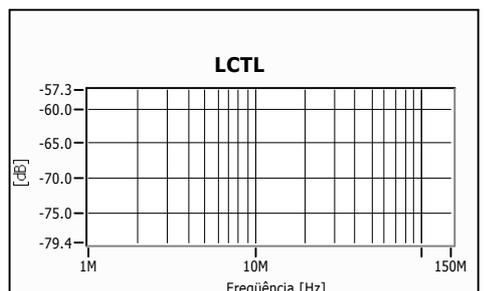
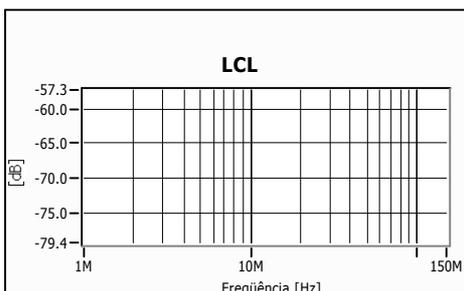
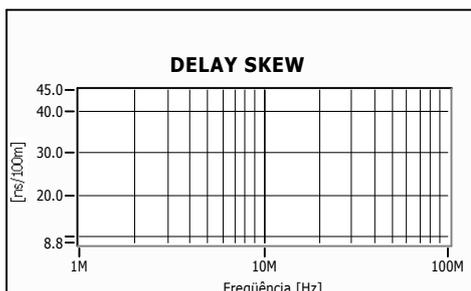
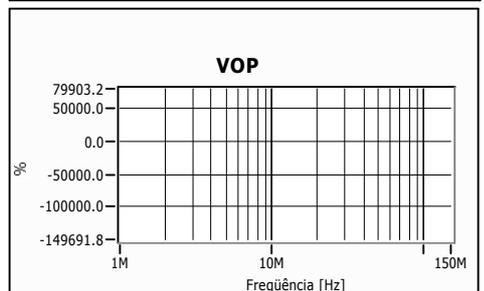
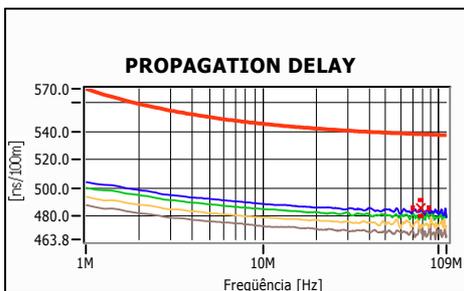
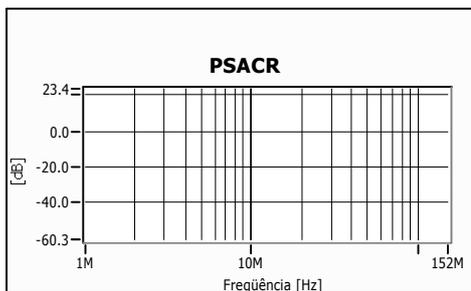
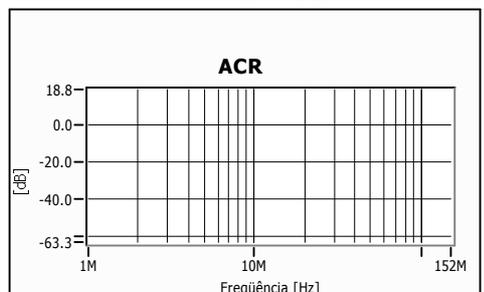
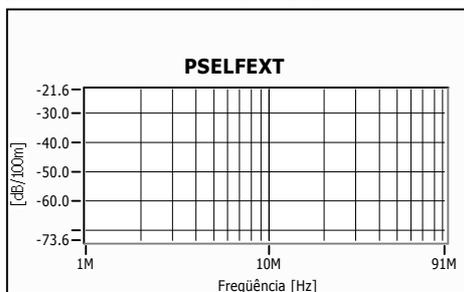
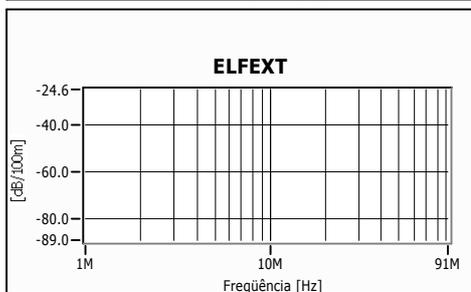
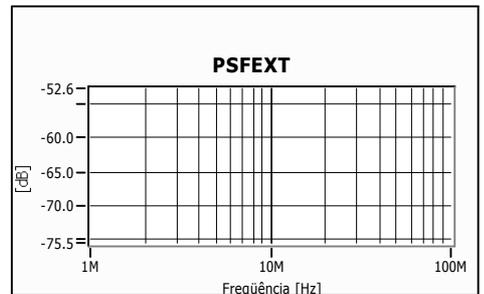
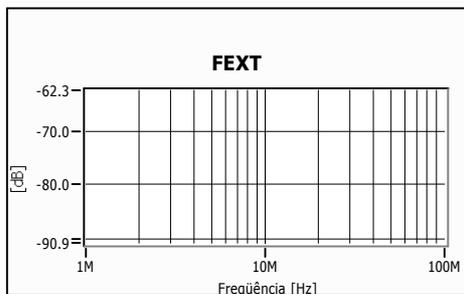
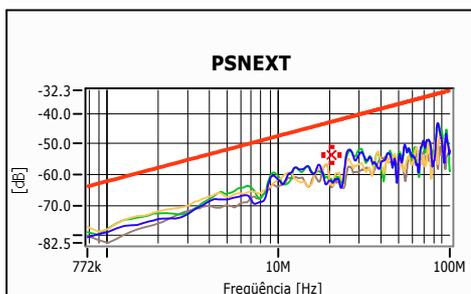
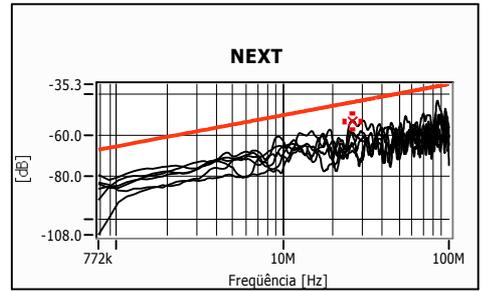
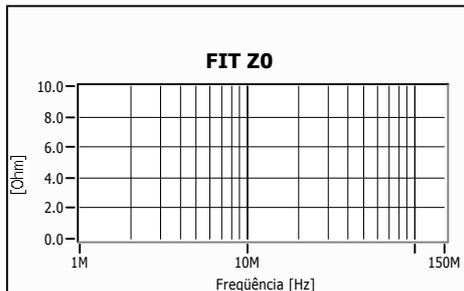
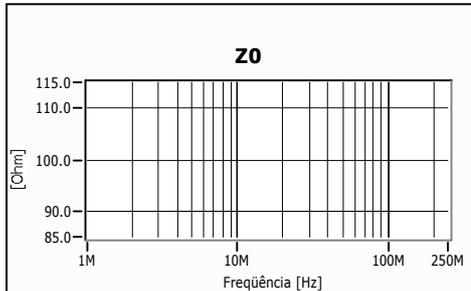
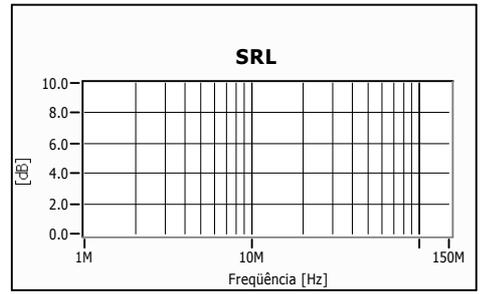
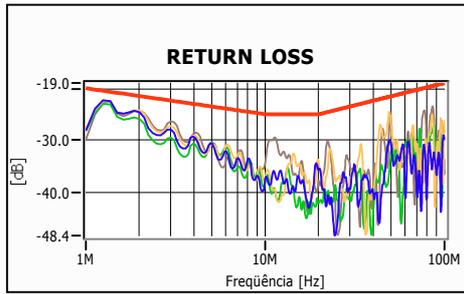
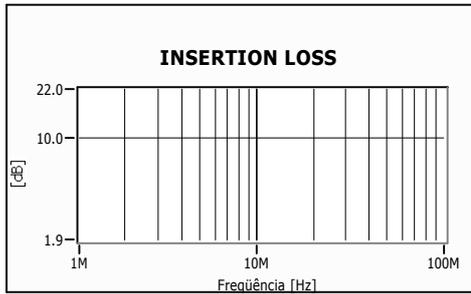
FREQ.	1x2	1x3	1x4	2x3	2x4	3x4	MIN.	MAX.	MÉDIA
0.77	91.31	81.66	80.55	80.19	96.44	88.29	80.19	96.44	90.54
1.00	90.10	81.51	80.47	81.30	92.66	91.04	80.47	92.66	88.78
4.00	71.02	74.69	79.69	76.32	72.19	79.97	71.02	79.97	76.90
8.00	68.92	69.11	78.19	75.37	69.42	77.08	68.92	78.19	74.68
10.00	75.57	67.86	76.19	67.42	71.05	71.57	67.42	76.19	72.88
16.00	71.90	62.24	68.27	70.00	61.84	66.24	61.84	71.90	68.20
20.00	68.44	69.90	64.15	63.02	67.80	71.99	63.02	71.99	68.57
25.00	59.94	63.60	63.05	79.03	61.79	79.59	59.94	79.59	74.72
31.25	60.01	55.30	67.53	64.36	60.53	66.71	55.30	67.53	64.14
62.50	56.47	53.22	53.56	54.73	55.99	58.24	53.22	58.24	55.72
100.00	66.41	58.07	54.97	51.66	53.21	53.11	51.66	66.41	59.92

PSNEXT

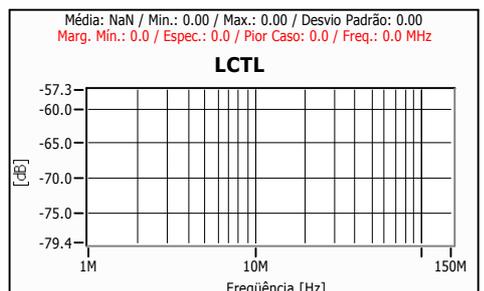
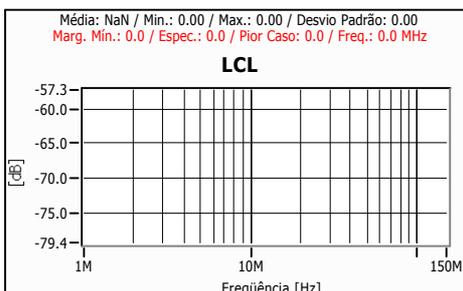
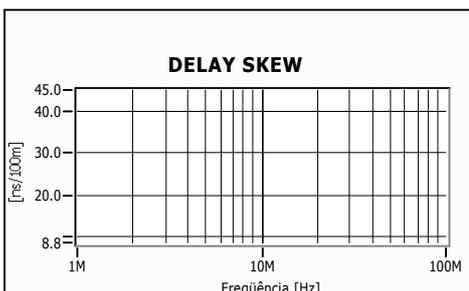
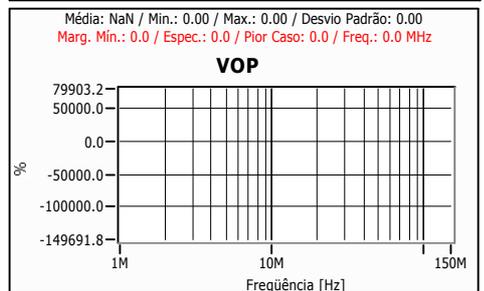
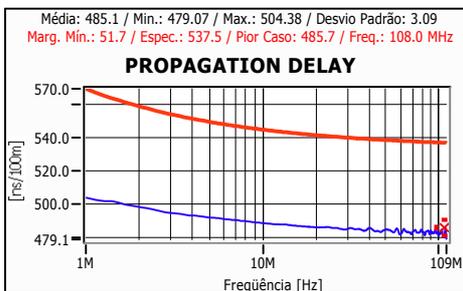
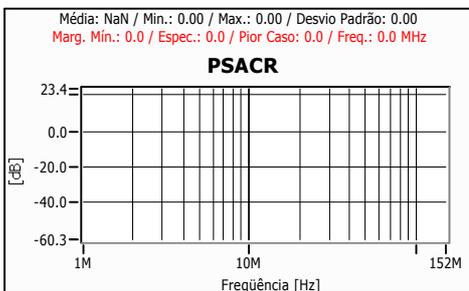
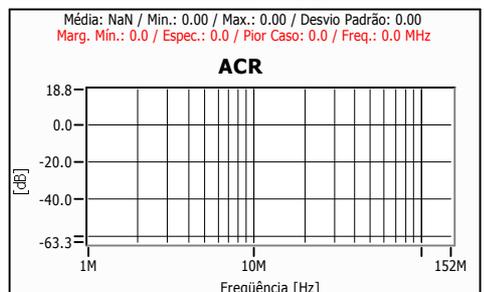
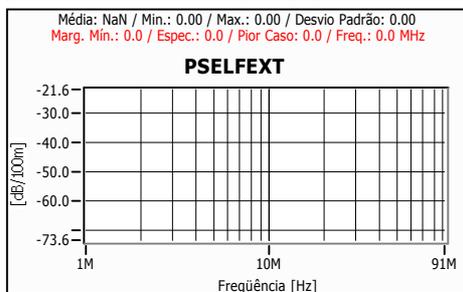
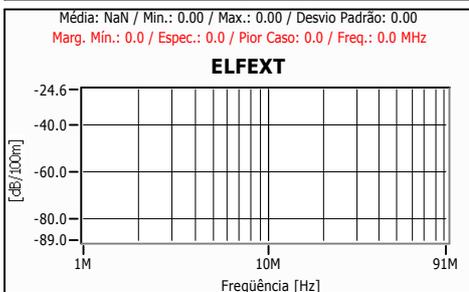
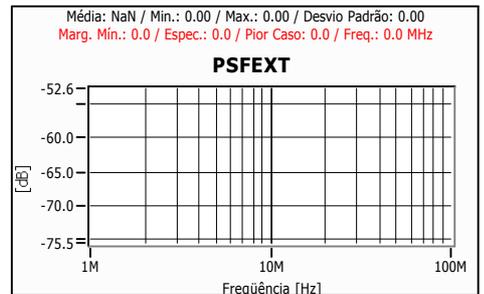
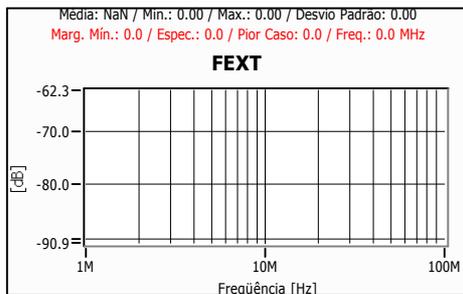
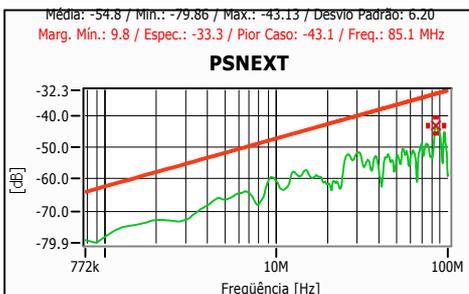
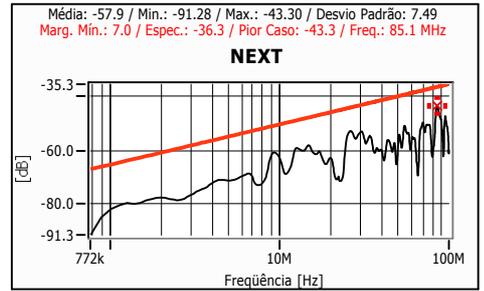
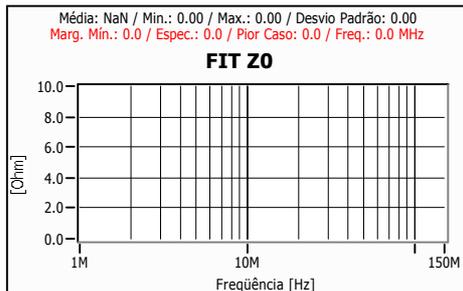
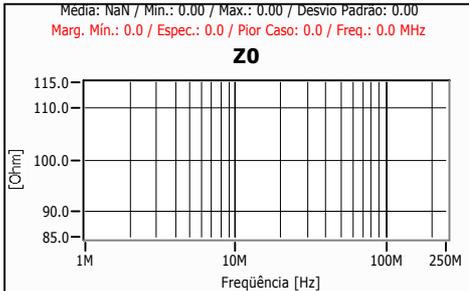
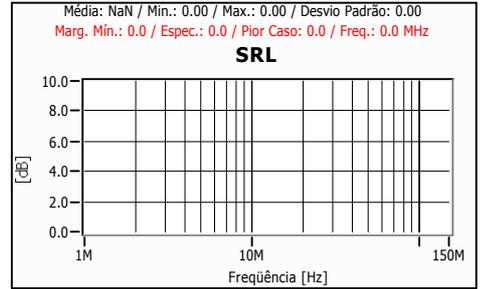
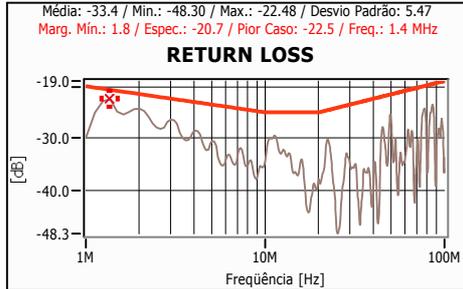
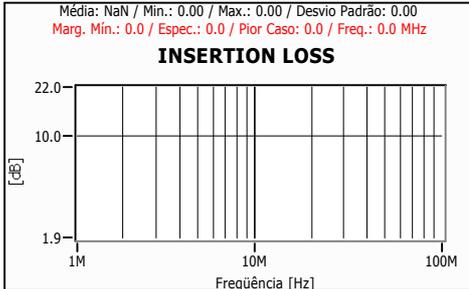


FREQ.	1	2	3	4	MIN.	MAX.	MÉDIA
0.77	77.86	79.77	77.48	79.78	77.48	79.78	78.85
1.00	77.69	80.49	78.16	79.87	77.69	80.49	79.21
4.00	69.08	67.89	71.72	70.91	67.89	71.72	70.15
8.00	65.75	65.66	67.66	68.27	65.66	68.27	66.99
10.00	66.67	65.42	63.83	67.64	63.83	67.64	66.11
16.00	60.92	60.87	60.30	59.83	59.83	60.92	60.50
20.00	62.01	60.92	61.77	62.12	60.92	62.12	61.73
25.00	57.11	57.72	63.38	59.32	57.11	63.38	60.15
31.25	53.84	56.48	54.52	58.94	53.84	58.94	56.42
62.50	49.42	50.90	50.17	50.74	49.42	50.90	50.34
100.00	53.03	49.27	48.77	48.91	48.77	53.03	50.40

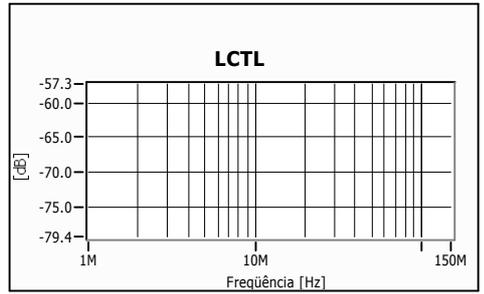
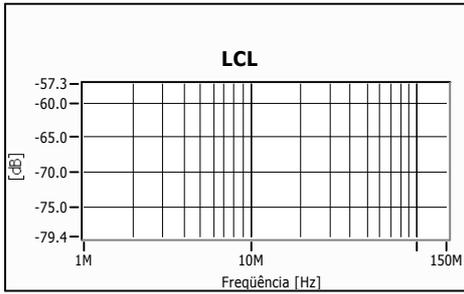
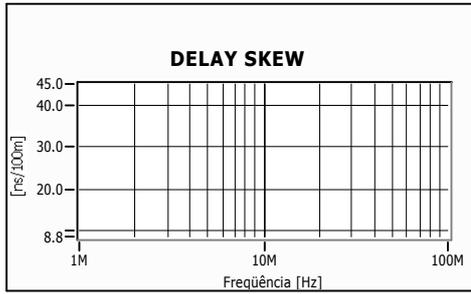
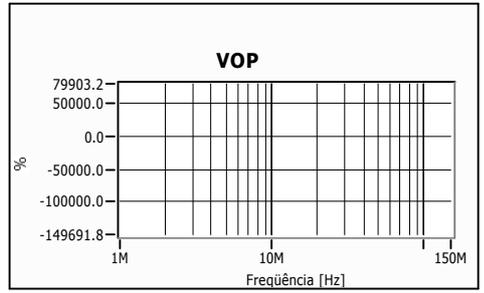
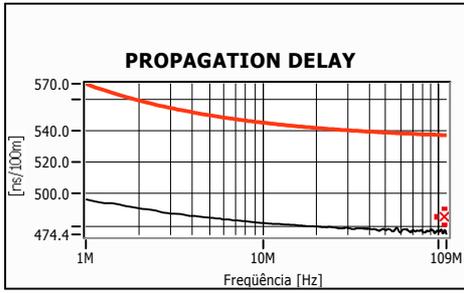
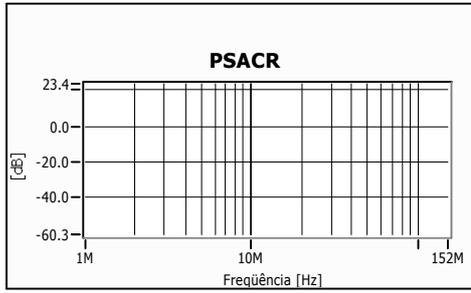
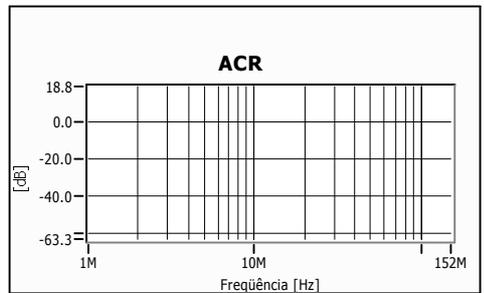
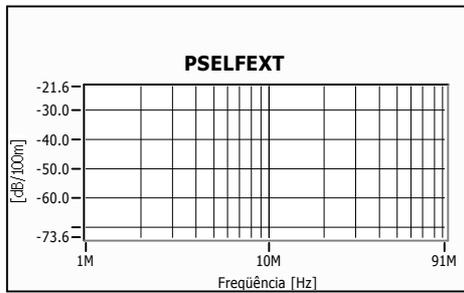
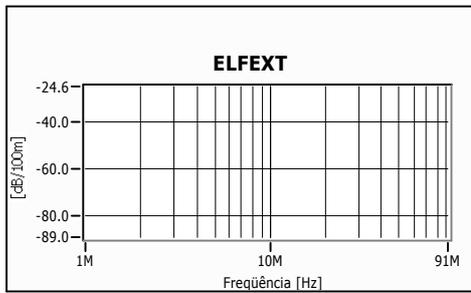
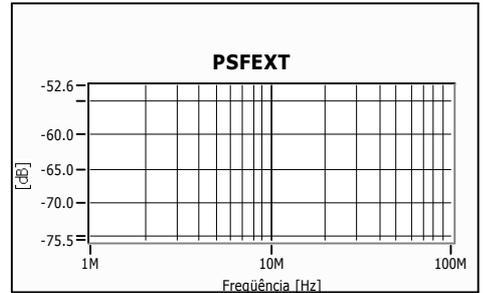
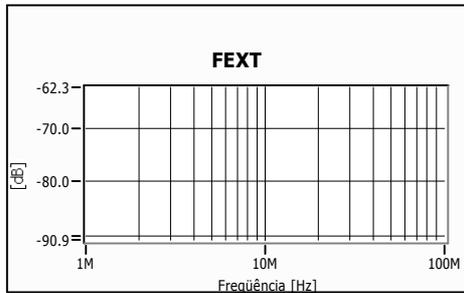
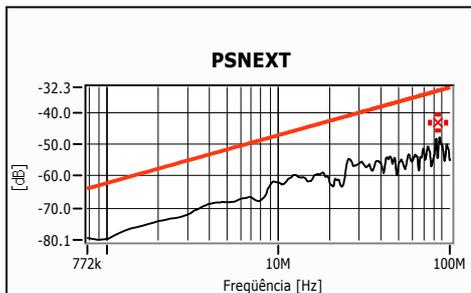
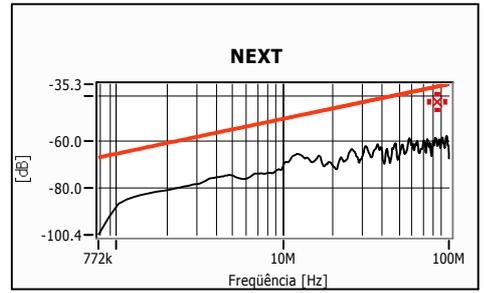
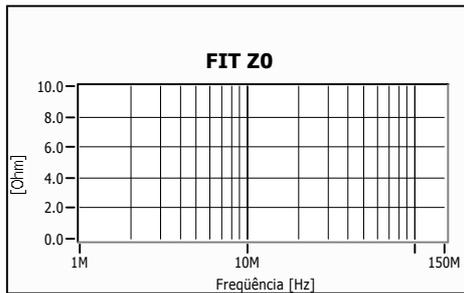
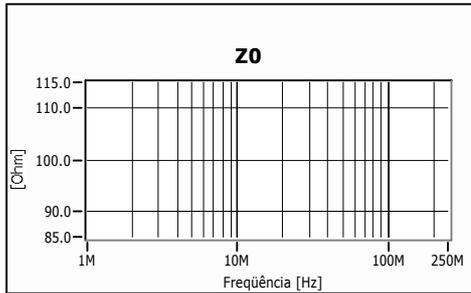
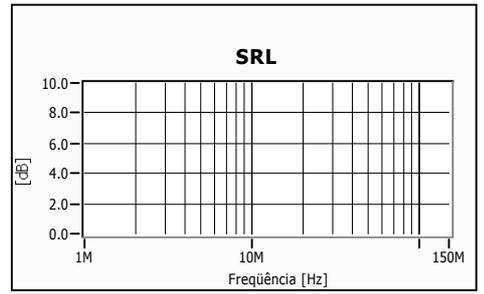
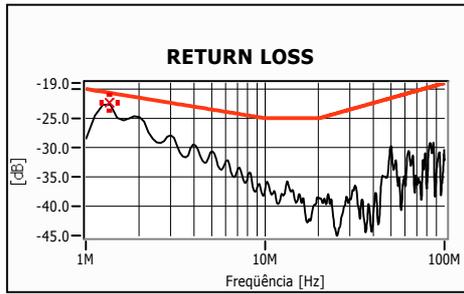
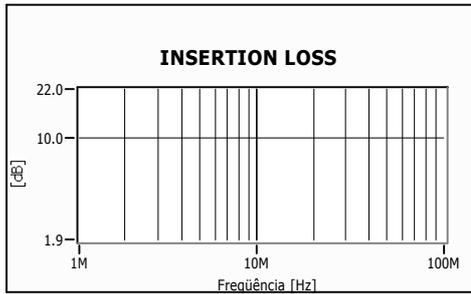
SUMÁRIO



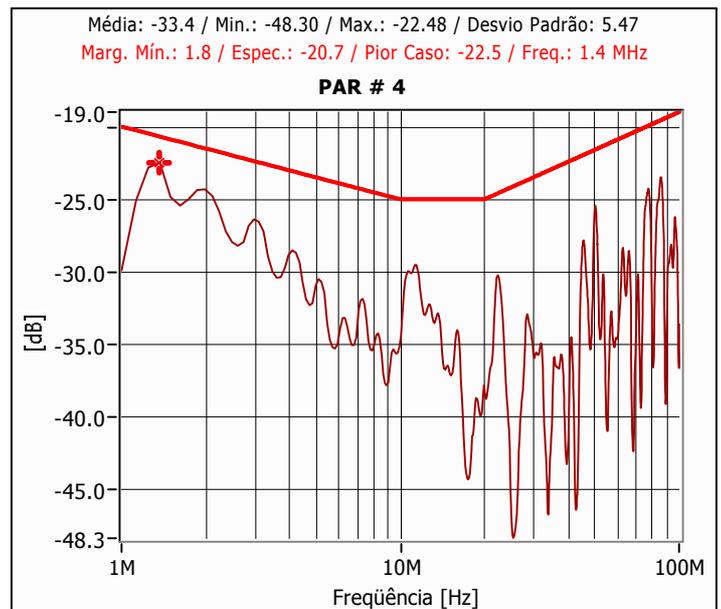
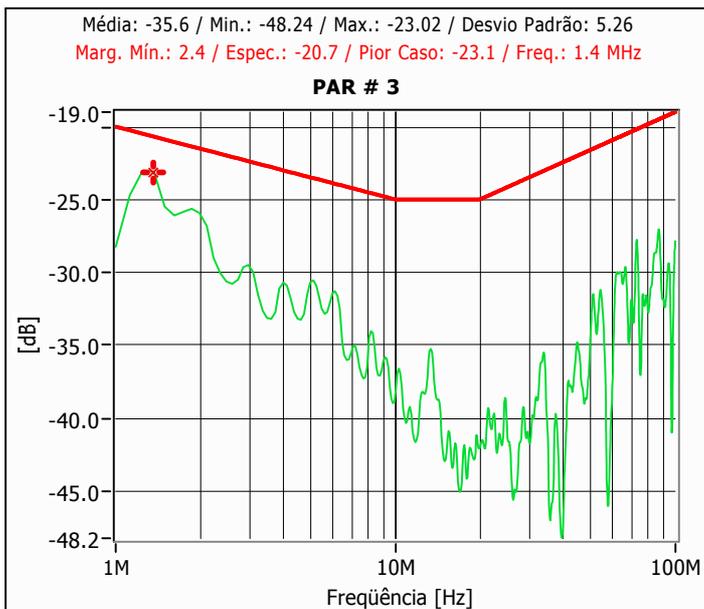
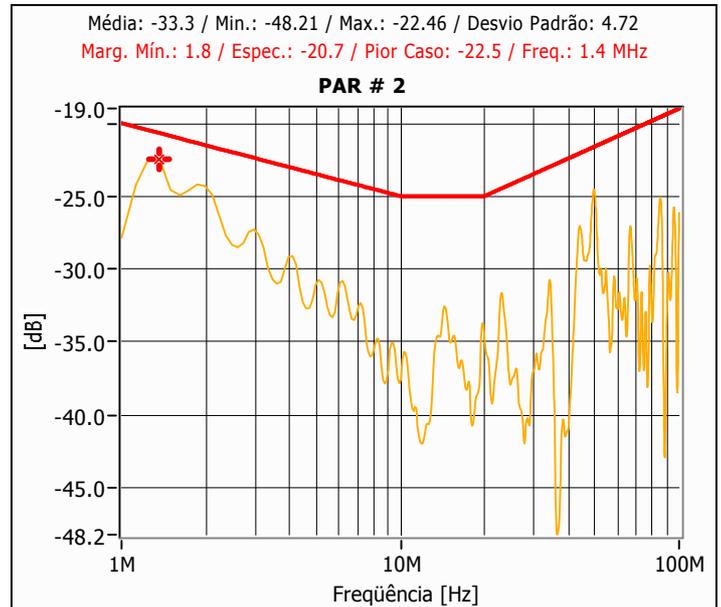
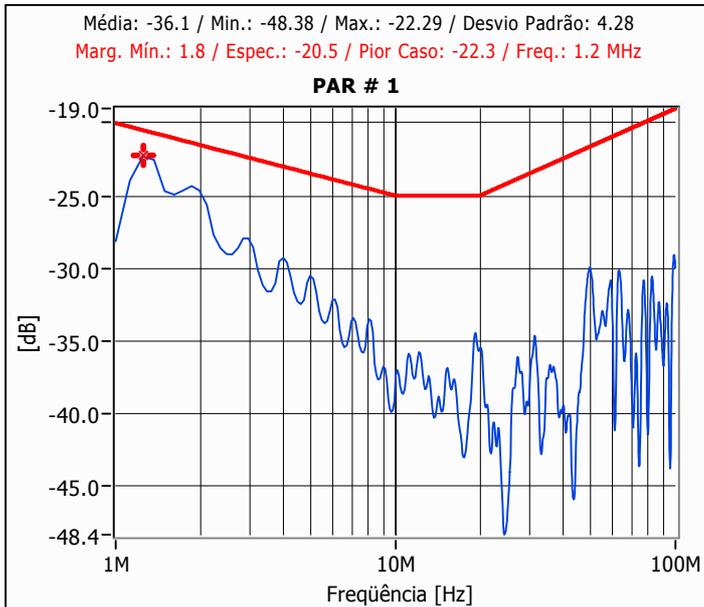
PIOR CASO



MÉDIAS

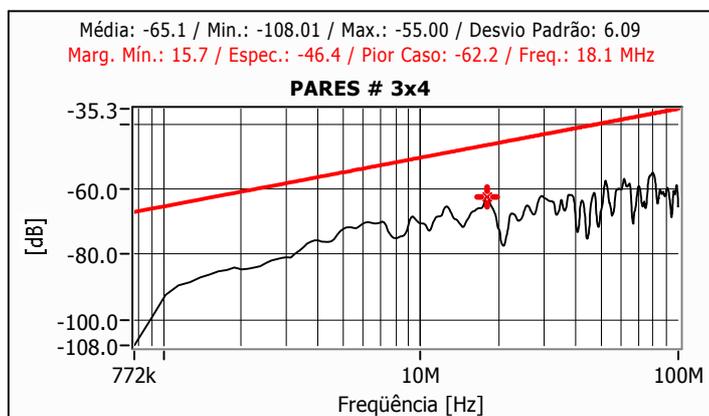
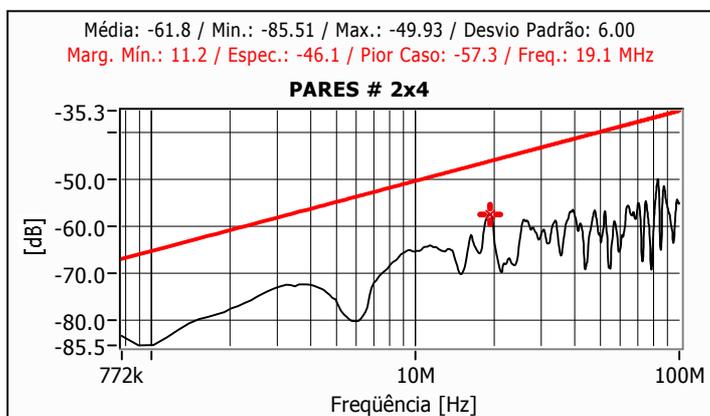
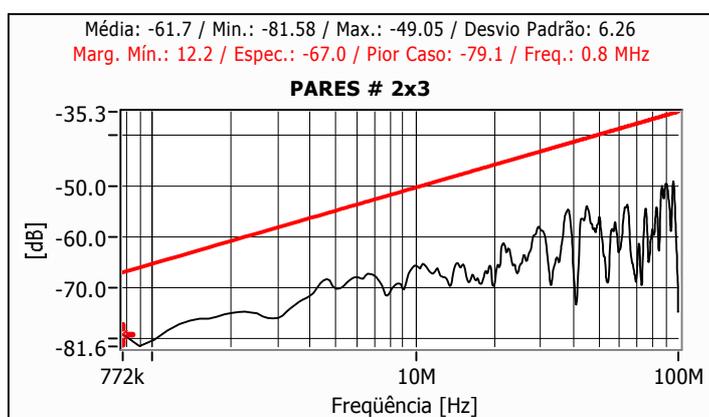
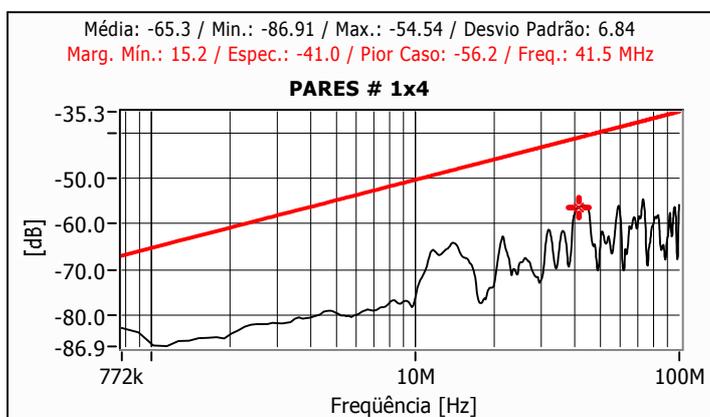
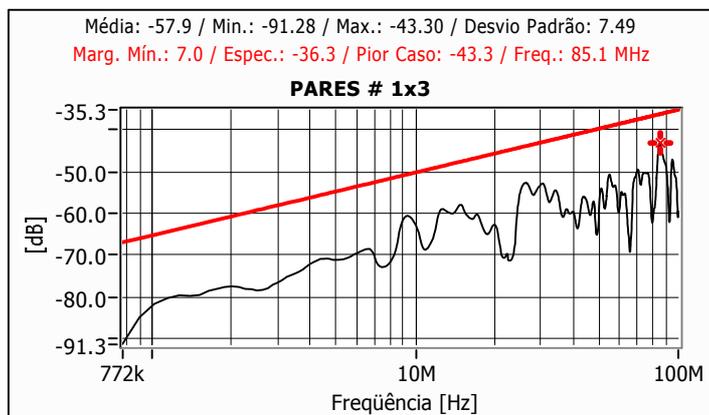
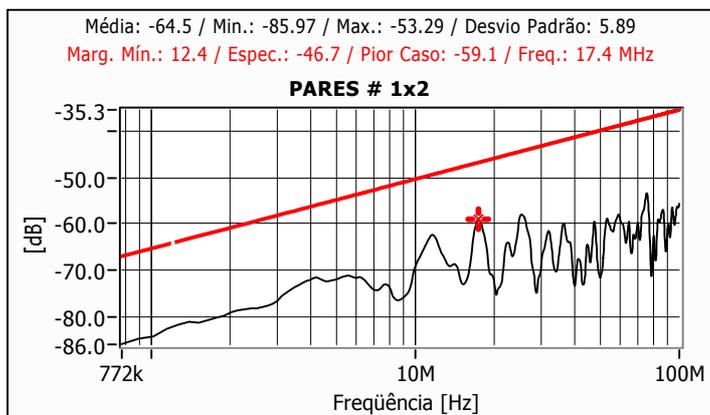


RETURN LOSS



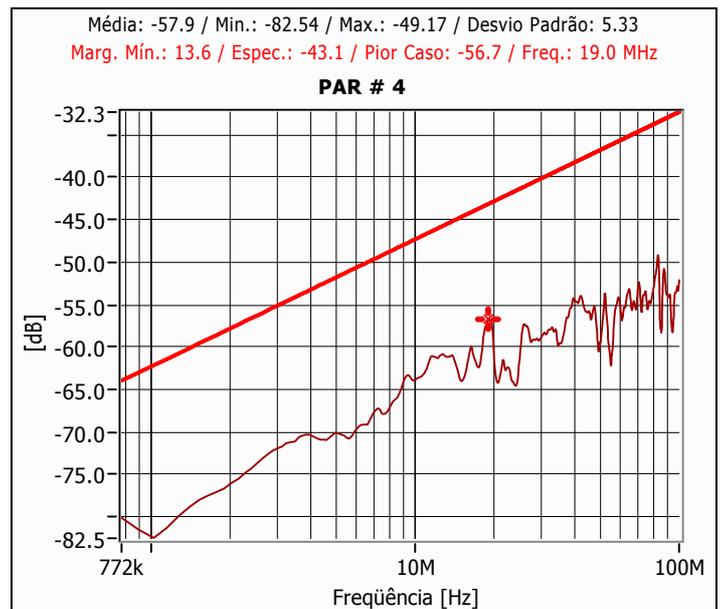
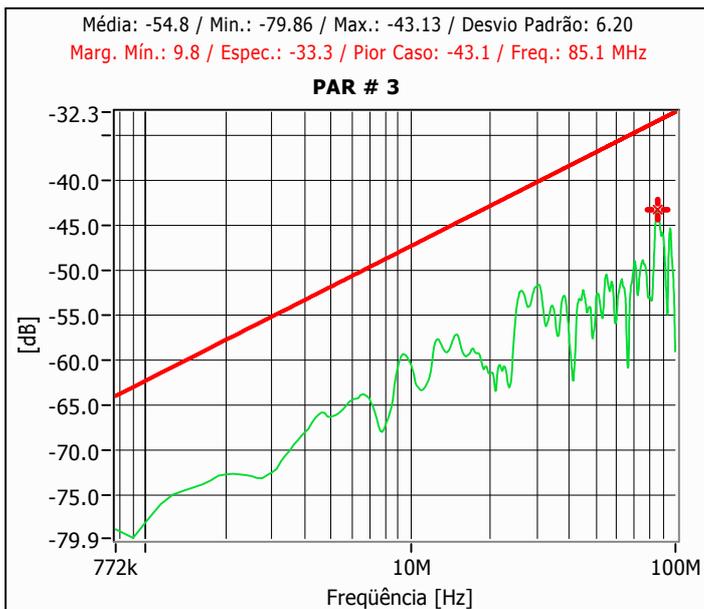
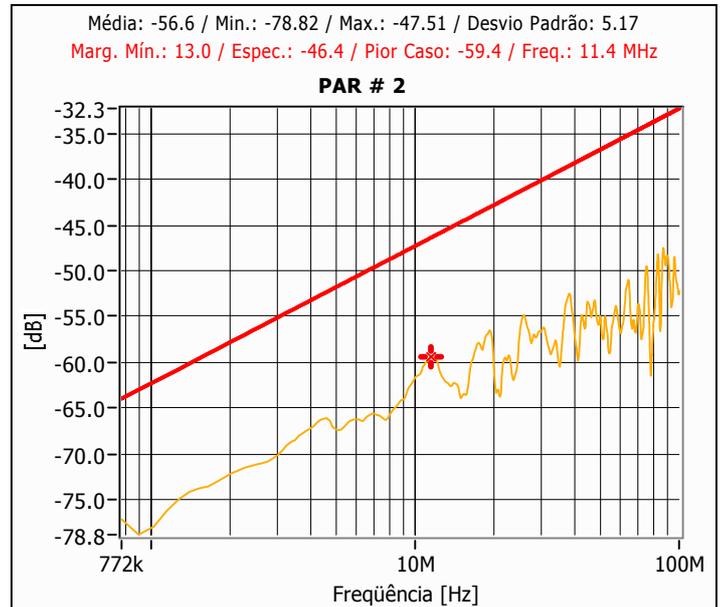
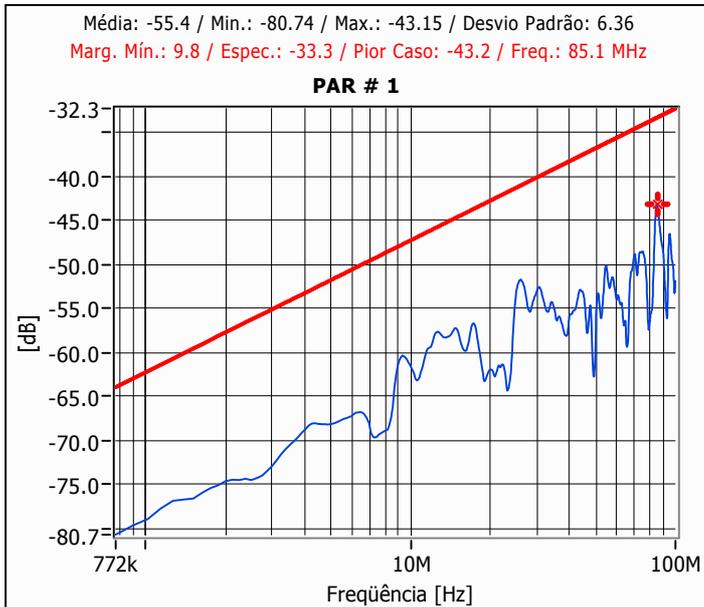
FREQ.	1	2	3	4	MIN.	MAX.	MÉDIA
1.00	28.15	27.86	28.23	29.88	27.86	29.88	28.61
4.00	29.28	29.14	30.70	28.80	28.80	30.70	29.54
8.00	33.51	35.40	34.50	34.99	33.51	35.40	34.66
10.00	37.36	37.56	38.13	34.42	34.42	38.13	37.08
16.00	38.15	36.30	43.43	34.00	34.00	43.43	39.46
20.00	35.53	34.89	42.00	38.18	34.89	42.00	38.62
25.00	47.43	37.73	40.66	46.85	37.73	47.43	44.82
31.25	35.23	36.68	40.07	35.70	35.23	40.07	37.38
62.50	30.53	33.51	30.09	28.69	28.69	33.51	31.08
100.00	29.94	26.17	27.88	33.59	26.17	33.59	30.31

NEXT



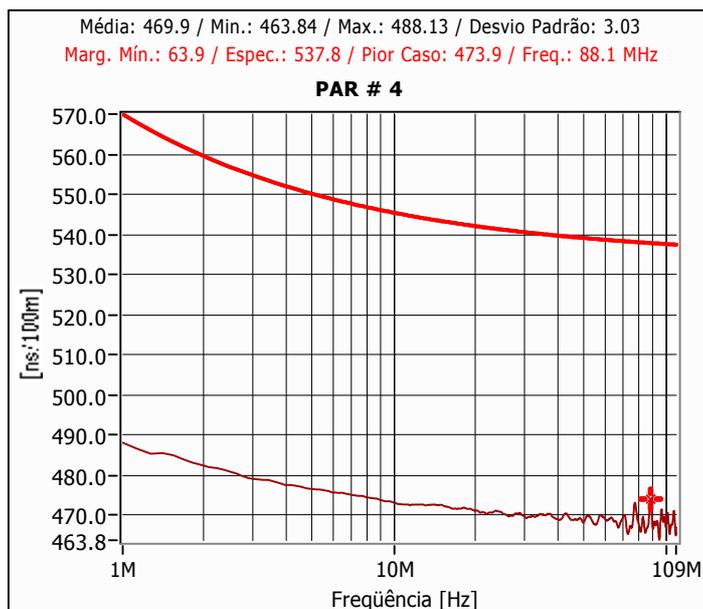
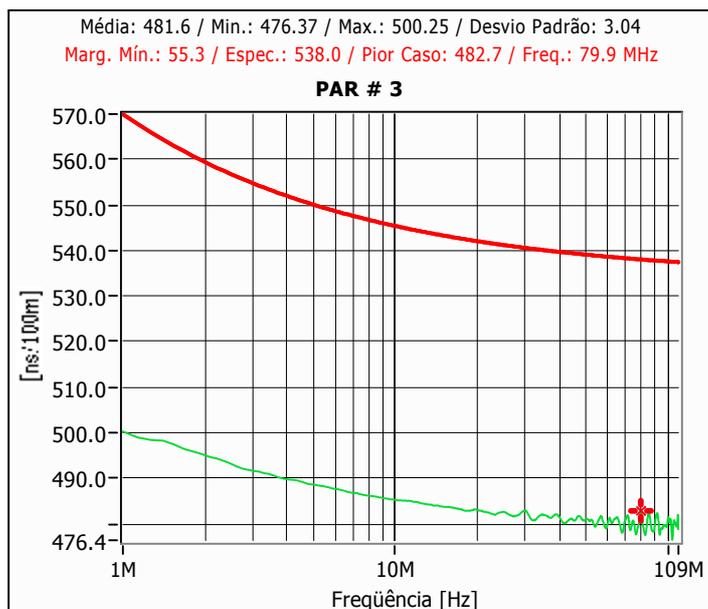
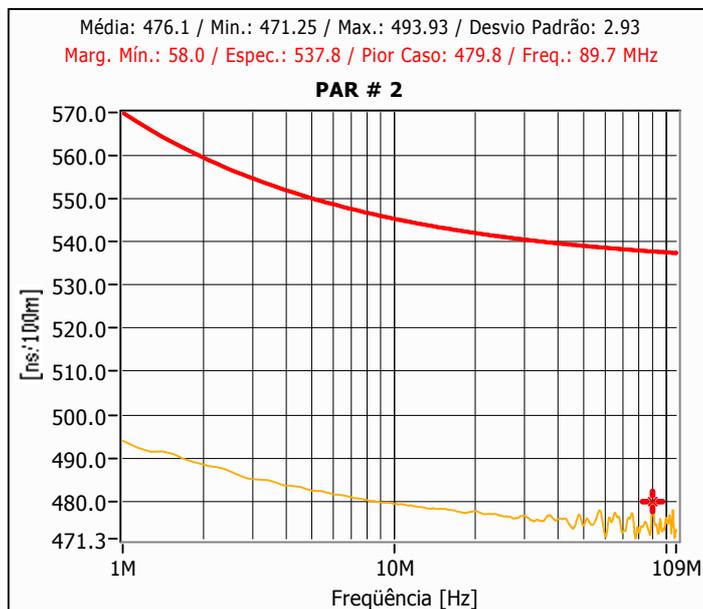
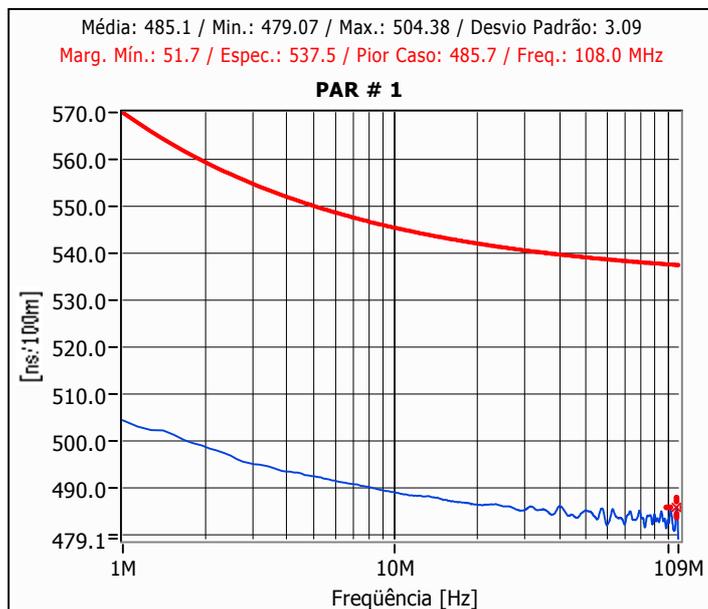
FREQ.	1x2	1x3	1x4	2x3	2x4	3x4	MIN.	MAX.	MÉDIA
0.77	85.97	91.28	82.88	79.14	83.42	108.01	79.14	108.01	100.38
1.00	84.29	81.68	86.76	80.27	85.38	92.43	80.27	92.43	87.12
4.00	72.06	72.15	80.60	71.62	72.50	75.74	71.62	80.60	75.59
8.00	73.43	72.00	77.45	71.18	68.59	75.01	68.59	77.45	73.85
10.00	69.67	62.29	77.07	65.73	65.37	70.48	62.29	77.07	71.26
16.00	69.99	61.01	68.31	68.96	63.30	66.80	61.01	69.99	67.38
20.00	73.17	62.74	72.81	69.54	63.68	71.96	62.74	73.17	70.59
25.00	58.36	55.72	68.52	65.84	62.60	68.13	55.72	68.52	65.30
31.25	63.60	54.14	63.89	60.24	62.64	63.50	54.14	63.89	62.27
62.50	63.53	55.36	65.55	54.64	59.15	58.31	54.64	65.55	61.23
100.00	55.67	59.60	55.84	74.75	54.99	65.25	54.99	74.75	67.69

PSNEXT



FREQ.	1	2	3	4	MIN.	MAX.	MÉDIA
0.77	80.74	77.15	78.88	80.13	77.15	80.74	79.43
1.00	78.99	77.95	77.76	82.54	77.76	82.54	79.78
4.00	68.80	67.27	68.05	70.38	67.27	70.38	68.78
8.00	68.98	65.85	67.67	67.26	65.85	68.98	67.58
10.00	61.44	61.77	60.24	63.99	60.24	63.99	62.08
16.00	59.83	61.58	59.48	60.84	59.48	61.58	60.51
20.00	61.99	62.30	61.51	62.64	61.51	62.64	62.13
25.00	53.68	56.44	55.09	60.73	53.68	60.73	57.37
31.25	53.28	57.15	52.80	58.54	52.80	58.54	56.12
62.50	54.40	52.93	51.07	55.27	51.07	55.27	53.69
100.00	51.93	52.29	58.45	52.17	51.93	58.45	54.73

PROPAGATION DELAY



FREQ.	1	2	3	4	MIN.	MAX.	MÉDIA
1.00	504.38	493.93	500.25	488.13	488.13	500.25	496.67
4.00	493.38	483.52	489.74	477.59	477.59	489.74	486.06
8.00	490.03	480.06	486.11	474.40	474.40	486.11	482.65
10.00	488.92	479.35	485.24	473.21	473.21	485.24	481.68
16.00	486.99	477.94	483.53	471.94	471.94	483.53	480.10
20.00	486.27	477.64	482.95	471.23	471.23	482.95	479.52
25.00	485.91	476.49	482.60	470.62	470.62	482.60	478.90
31.25	485.91	476.06	481.38	469.56	469.56	481.38	478.23
62.50	485.28	475.76	480.18	469.31	469.31	480.18	477.63
100.00	483.08	475.33	480.28	467.82	467.82	480.28	476.63