

TEST DATA

ON

500 MHz TO 2.0 GHz

LOW BAND DIRECTION FINDING MODULE

**WITH INTEGRATED
GAIN LEVELING AMPLIFIER, HARMONIC FILTER BANK,
DF/LEVELING ATTENUATOR AND PULSE MODULATOR**

**PMI MODEL No:
LBDFM-052-BD-DP**

**Serial Numbers: PM308093, PM308094, PM308095, PM308096 AND PM306035
CUBIC P/N 915350027**

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**TESTED BY
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0.5 To 2.0 GHz, LOW BAND DIRECTION FINDING MODULE

KEY FEATURES:

- 0.5 to 2.0 GHz
- +14 dBm GAIN
- 8 Bit TTL CONTROL
- 64 dB ATTENUATION RANGE



PMI MODEL No: **LBDFM-052-BD-DP**

SPECIFICATIONS:

- | | |
|--------------------------------------|---|
| ● FREQUENCY RANGE | ■ 500 TO 2000 MHz |
| ● RF POWER OUTPUT GAIN | ■ +14 dBm (with +5dBm Input and $P_{out} CP \leq 0.9dB$) |
| ● RF SPURIOUS OUTPUT | ■ -60 dBc Maximum |
| ● RF HARMONICS OUTPUT | ■ -60 dBc Maximum |
| ● NOISE FIGURE | ■ 8.5 dB Maximum |
| ● AMPLITUDE TAPER | ■ 8.0 dB Peak to Peak Maximum |
| ● FINE GRAIN FLATNESS | ■ 3.0 dB Peak to Peak Maximum |
| ● VSWR INPUT / OUTPUT | ■ 2.0:1 Maximum |
| ● PULSE MODULATOR CONTROL | ■ TTL "0" = LOW / "OFF", "1" = HIGH / "ON" |
| ● PULSE MODULATOR ISOLATION | ■ -60 dBc Minimum |
| ● PULSE MODULATOR Rise/Fall TIME | ■ 10 nS Maximum |
| ● PULSE MODULATOR DELAY TIME | ■ 50% TTL TO 50% RF (Defined but not specified) |
| ● PULSE MODULATOR DELAY SYMMETRY | ■ 10 nS Maximum |
| ● PULSE MODULATOR VIDEO GENERATION | ■ -60 dBm Maximum (500 to 2000 MHz) |
| ● ATTENUATOR RANGE | ■ 64 dB Mean |
| ● ATTENUATOR CONTROL BITS | ■ 8 Absolute |
| ● ATTENUATOR LSB | ■ 0.25 dB Nominal |
| ● TTL CONTROL (Positive True Binary) | ■ b0 = LSB |

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SPECIFICATIONS:

- TTL COMMANDS : 0 dB = 00h, 64 dB = FFh
- ATTENUATOR FLATNESS 0-20 dB : ±1.0 dB Maximum
- ATTENUATOR FLATNESS 20-40 dB : ±2.0 dB Maximum
- ATTENUATOR FLATNESS 40-60 dB : ±3.0 dB Maximum
- ATTENUATOR FLATNESS 60-64 dB : ±4.0 dB Maximum
- ATTENUATOR ACCURACY 0-20 dB : ±1.0 dB Maximum
- ATTENUATOR ACCURACY 20-40 dB : ±1.5 dB Maximum
- ATTENUATOR ACCURACY 40-60 dB : ±2.0 dB Maximum
- ATTENUATOR ACCURACY 60-64 dB : ±3.0 dB Maximum
- ATTENUATOR SWITCHING TIME : 700 nS Maximum
- ATTENUATOR REPEATABILITY : 0.125 dB Maximum (as measured at 1dB & 32dB)
- SWITCH FILTER BAND SWITCHING TIME : 700 nS Maximum
- +5 VDC CURRENT DRAW : 250 mA Maximum
- +15 VDC CURRENT DRAW : 700 mA Maximum
- -15 VDC CURRENT DRAW : 250 mA Maximum
- DC VOLTS RIPPLE PEAK TO PEAK : 250 mV from 40 kHz to 40 MHz

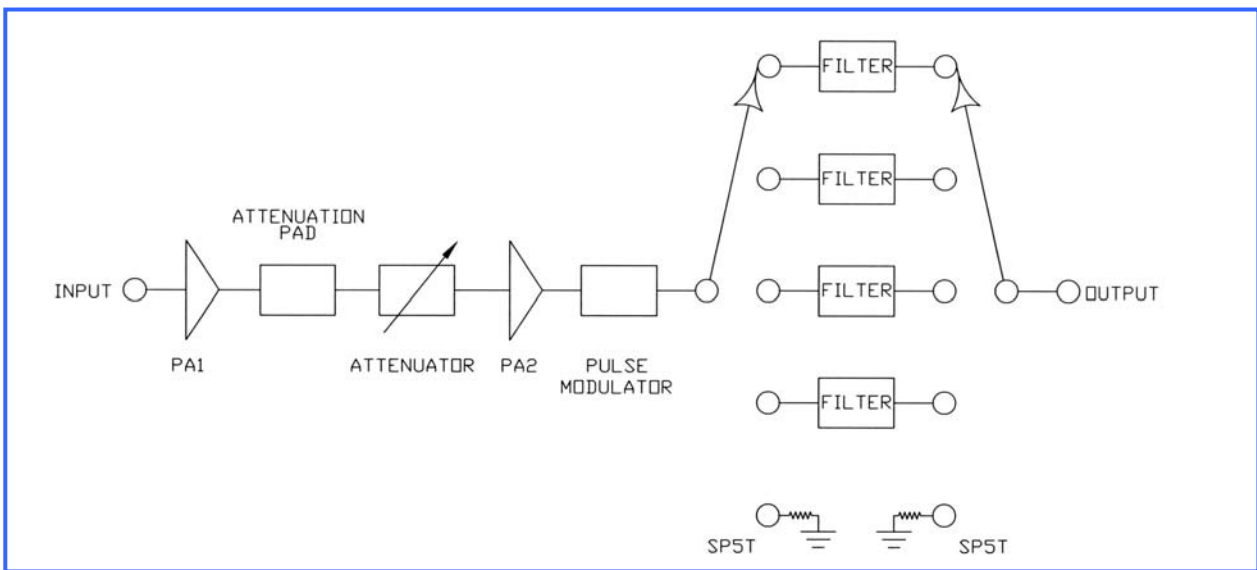
ENVIRONMENTAL RATINGS:

- TEMPERATURE : +20°C TO +40°C (Operating)
: -20°C TO +70°C (Storage)
- HUMIDITY : 20 TO 50% NON-CONDENSING (Operating)
: 0 TO 95% NON-CONDENSING (Storage)
- DROP TEST HEIGHT : 0 (Operating)
: 0 (Storage)
- VIBRATION : As Experienced by Rack Mounted Equipment (Operating)
: As Experienced by Commercial Land and Air Cargo (Storage)
- HEAT SINK : +25°C TO +35°C Mounting Surface Comprised of 2 oz. Copper Clad
Fiber or 0.062" (1.6 mm) Thick Aluminum Plate (Operating)
- AIR FLOW : 10 CFM, Minimum Continuous Forced Air (Operating)
- WARM-UP TIME : 10 Minutes with DC Power Applied, RF Off (Operating)



FUNCTIONAL BLOCK DIAGRAM

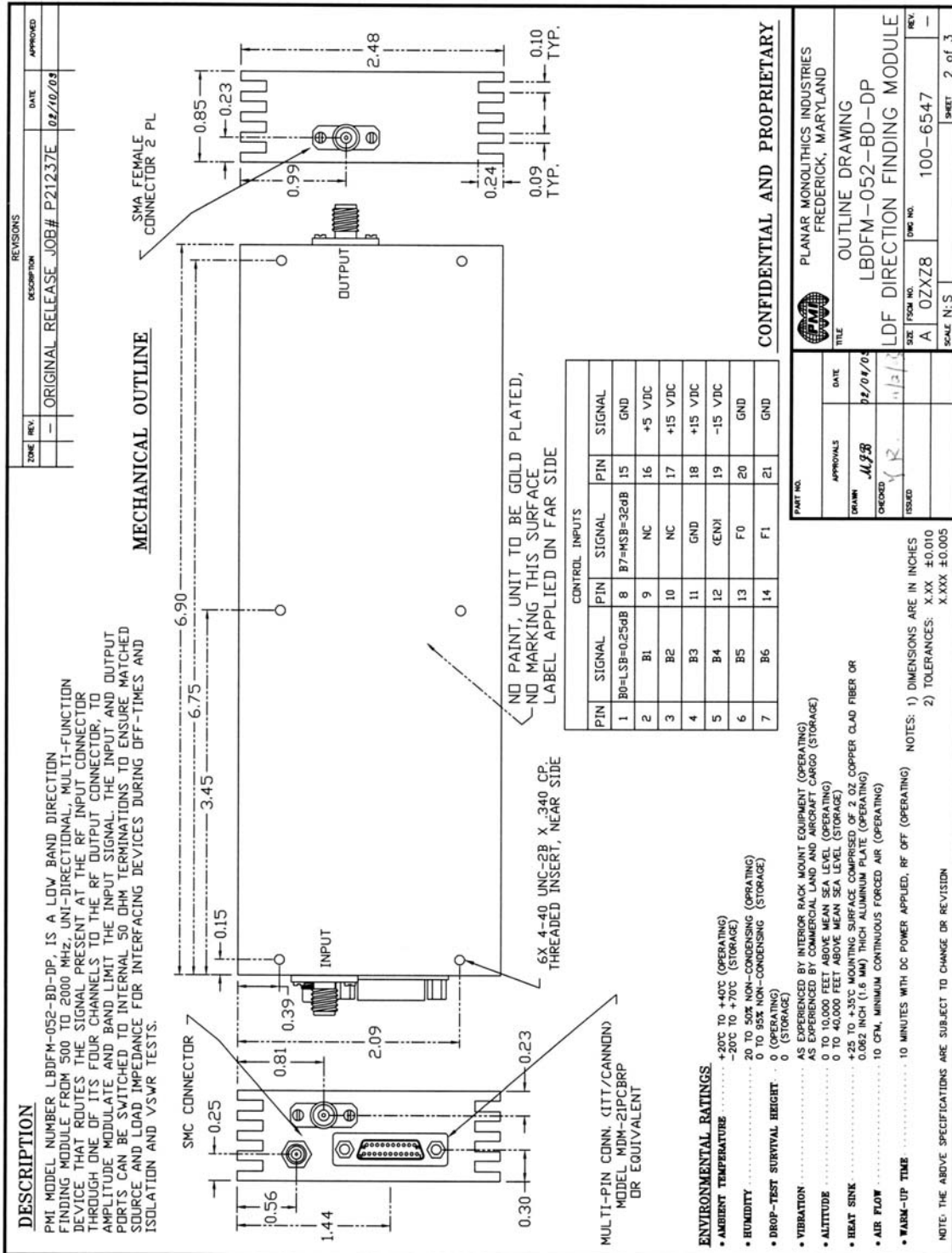
PMI MODEL NUMBER LBDFM-052-BD-DP, IS A LOW BAND DIRECTION FINDING MODULE THAT OPERATES FROM 500 TO 2000 MHz. IT IS A UNIDIRECTIONAL AND MULTI-FUNCTIONAL DEVICE THAT ROUTES THE SIGNAL THAT IS PRESENT AT THE RF INPUT THROUGH ONE OF ITS FOUR CHANNELS TO THE RF OUTPUT IN ORDER TO AMPLITUDE MODULATE AND BAND LIMIT THE INPUT SIGNAL. THE INPUT AND OUTPUT PORTS CAN BE SWITCHED TO INTERNAL 50 OHM TERMINATIONS TO ENSURE MATCHED SOURCE AND LOAD IMPEDANCE FOR INTERFACING DEVICES DURING OFF-TIMES AND ISOLATION AND VSWR TESTS.



CONTROL INPUTS					
PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	B0=LSB=0.25 dB	8	B7=MSB=32 dB	15	GND
2	B1	9	NC	16	+5 VDC
3	B2	10	NC	17	+15 VDC
4	B3	11	GND	18	+15 VDC
5	B4	12	(EN)!	19	-15 VDC
6	B5	13	F0	20	GND
7	B6	14	F1	21	GND



MECHANICAL OUTLINE





PRODUCT FEATURE

REVISIONS		DATE	APPROVED
1	ORIGINAL RELEASE	02/10/03	

ZONE	REV	DESCRIPTION

DESCRIPTION

PMI MODEL NUMBER LBDFM-052-BD-DP, IS A LOW BAND DIRECTION FINDING MODULE FROM 500 TO 2000 MHZ, UNI-DIRECTIONAL, MULTI-FUNCTION DEVICE THAT ROUTES THE SIGNAL PRESENT AT THE RF INPUT CONNECTOR THROUGH ONE OF ITS FOUR CHANNELS TO THE RF OUTPUT CONNECTOR, TO AMPLITUDE MODULATE AND BAND LIMIT THE INPUT SIGNAL. THE INPUT AND OUTPUT PORTS CAN BE SWITCHED TO INTERNAL 50 OHM TERMINATIONS TO ENSURE MATCHED SOURCE AND LOAD IMPEDANCE FOR INTERFACING DEVICES DURING OFF-TIMES AND ISOLATION AND VSWR TESTS.

SPECIFICATIONS

- FREQUENCY RANGE: 500 - 2000 MHZ
- RF INPUT SIGNAL LEVEL RANGE: +5 dBm TO +8 dBm TYPICAL +10 dBm MAXIMUM
- RF INPUT SPECTRAL PURITY: -60 dBc MAXIMUM INPUT HARMONIC LEVELS -10 dBc MAXIMUM
- RF OUTPUT: 70 dB MINIMUM
- SIGNAL-TO-NOISE RATIO: 70 dB MINIMUM
- RF OUTPUT POWER LEVEL AND GAIN COMPRESSION: POWER OUT = +14 dBm MINIMUM AT ALL FREQUENCIES WITH INPUT POWER = +5 dBm AND ATTENUATION SET AT MINIMUM, GAIN COMPRESSION 0.9 dB MAXIMUM UNDER THESE CONDITIONS
- RF OUTPUT SPECTRAL PURITY AND HARMONIC SIGNALS: -60 dBc MAXIMUM FOR SPURIOUS SIGNALS AND HARMONIC SIGNALS
- NOISE FIGURE: 8.5 dB MAXIMUM @ MINIMUM ATTENUATION
- MACRO-GAIN FLATNESS: AMPLITUDE TAPER: 8.0 dB MAXIMUM PEAK-TO-PEAK @ -5 dBm INPUT
- FINE-GRAIN GAIN FLATNESS: 3.0 dB MAXIMUM PEAK-TO-PEAK FOR ANY 40 MHZ BANDWIDTH @ -54dBm INPUT
- VSWR = 2.0:1: RF INPUT RF OUTPUT

PULSE MODULATOR SWITCH

- CONTROL: TTL LOGIC "0" = INSERTION LOSS "1" = ISOLATION 60 dBc MINIMUM
- ISOLATION: 10 nS MAXIMUM (10% RF TO 90% RF)
- SWITCHING SPEED RISE TIME: 10 nS MAXIMUM (90% RF TO 10% RF)
- FALL TIME: DELAY SYMMETRY BETWEEN ON/OFF TO BE 10 nS MAXIMUM
- DELAY SYMMETRY: DELAY SYMMETRY BETWEEN ON/OFF TO BE 10 nS MAXIMUM
- P-MOD VIDEO GENERATION: -60 dBm MAXIMUM @ PULSING TO TTL '0' FOR 25 nS AT A 2 MHZ RATE

ENVIRONMENTAL RATINGS

- AMBIENT TEMPERATURE: -40C TO +65C (OPERATING) -20C TO +70C (STORAGE)
- HUMIDITY: 0 TO 90% NON-CONDENSING (OPERATING) 0 TO 95% NON-CONDENSING (STORAGE)
- SHOCK: 1000G SURVIVAL BURST (OPERATING)
- VIBRATION: AS EXPERIENCED BY INTERIOR RACK MOUNT EQUIPMENT (OPERATING) AS EXPERIENCED BY COMMERCIAL LAND AND AIRCRAFT CARDS (STORAGE)
- ALTITUDE: 0 TO 40000 FEET ABOVE MEAN SEA LEVEL (STORAGE)
- HEAT SINK: +25 TO +30C MOUNTING SURFACE COMPRESSED OF 2 OZ ALUMINUM PLATE (OPERATING)
- AIR FLOW: 10 CFM MINIMUM CONTINUOUS FORCED AIR (OPERATING)
- WAKE-UP TIME: 10 MINUTES WITH DC POWER APPLIED, RF OFF (OPERATING)

NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION

DE/LEVEL ATTENUATOR

- ATTENUATION RANGE: 64 dB
- NUMBER OF BITS: 8
- LSB: 0.25 dB
- CONTROL: TTL, POSITIVE-TRUE
- RESOLUTION: 0.25 dB (LSB)
- COMMANDS: 0 dB = 00H, 64 dB = FFh
- SWITCHING TIME: 700 nS MAXIMUM TO ± 1 dB OF FINAL ATTENUATION VALUE
- REPEATABILITY: 0.125 dB MAXIMUM

ATTENUATION FLATNESS AND ACCURACY		
ATTENUATION (dB)	FLATNESS (MAX. ± dB)	ACCURACY (MAX. ± dB)
0 - 20	1.0	1.0
20 - 40	2.0	1.5
40 - 60	3.0	2.0
60 - 64	4.0	3.0

SWITCHED FILTERS

- SWITCHING SPEED: 700 nS MAXIMUM
- DC POWER INPUTS:
 - +5 VDC ±3% AT 250 MILLIAMPERES MAXIMUM
 - +15 VDC ± 5% AT 700 MILLIAMPERES MAXIMUM
 - 15 VDC ± 5% AT 250 MILLIAMPERES MAXIMUM
 - DCV RIPPLE: UP TO 250 MILLIVOLTS PEAK-TO-PEAK AT 40 KHZ TO 40 MHZ

BAND CONTROLS						
LOGIC	F1 PIN 13	F0 PIN 14	PASSBAND (MHZ)	Fc (MHZ)	LEVEL (dBc)	HIGH SIDE REJ LEVEL (dBc)
0	0	0	500 - 750	625	250	-40
0	0	1	650 - 1000	825	250	-40
0	1	0	900 - 1350	1125	250	-40
0	1	1	1250 - 2000	1625	250	-40
1	X	X	PARK	160 dB REJECTION ACROSS THE FULL BAND DF 500 - 2.500 MHZ		

CONTROL INPUTS		SIGNAL	
PIN	SIGNAL	PIN	SIGNAL
1	RD+LSB+25dB	8	RF+MSB+50dB
2	B1	9	NC
3	B2	10	NC
4	B3	11	NC
5	B4	12	NC
6	B5	13	FO
7	B6	14	F1
		15	GN
		16	+5 VDC
		17	+15 VDC
		18	+5 VDC
		19	-15 VDC
		20	GN
		21	GN

CONFIDENTIAL AND PROPRIETARY

PLANAR MONOLITHICS INDUSTRIES
 FREDERICK, MARYLAND

PRODUCT FEATURE
 LBDFM-052-BD-DP

LDF DIRECTION FINDING MODULE

DATE: 02/04/03

APPROVALS: Mfgg

CHECKED: V.R.

ISSUED: 11/2/03

SIZE FROM NO. A 02XZ8

SCALE N:S 100-6547

SHEET 1 of 3



RF POWER OUTPUT

On Serial No: PM306035

OUTPUT POWER WHEN INPUT POWER IS 5 dBm		
●	500 MHz	19.75 dBm
●	1.0 GHz	19.80 dBm
●	1.35 GHz	18.39 dBm
●	2.0 GHz	15.37 dBm



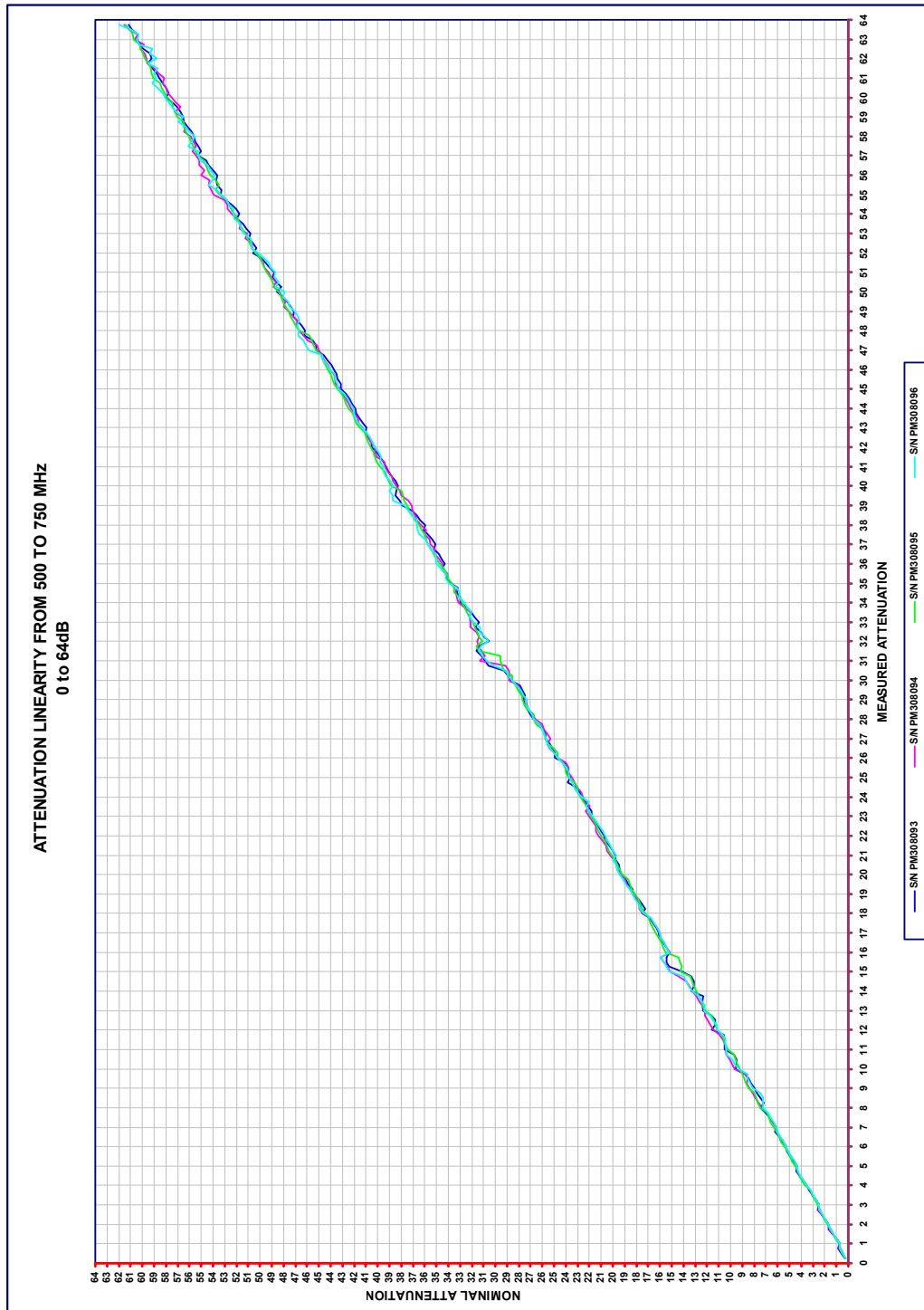
ATTENUATION LINEARITY

ON FOUR LOW BAND DIRECTION FINDING MODULES



ATTENUATION LINEARITY A COMPARISON OF FOUR UNITS FROM 0 TO 64dB

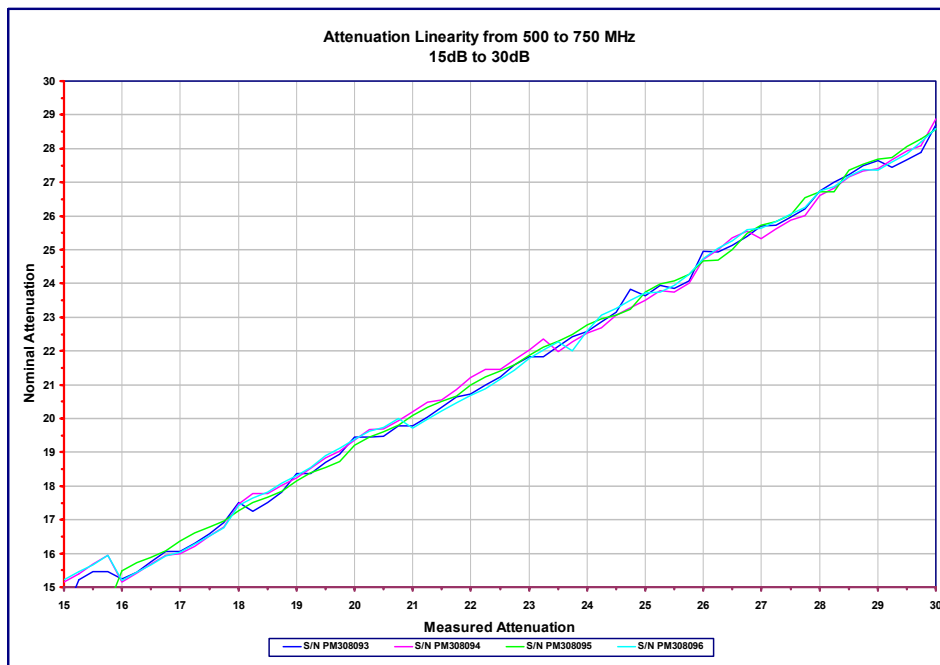
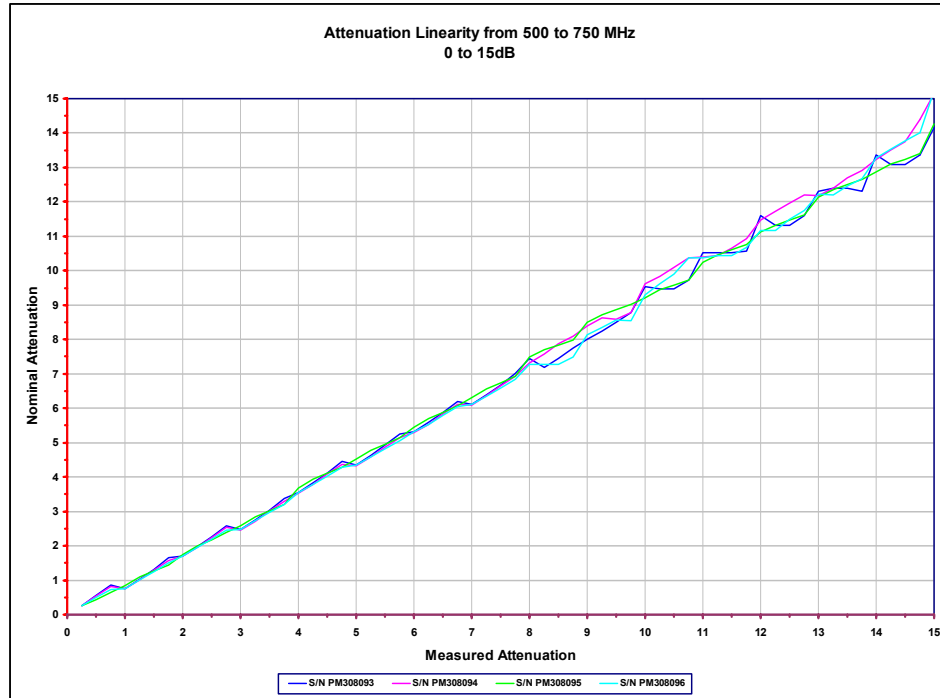
Serial Numbers: PM308093, PM308094, PM308095 and PM308096
ILLUSTRATING 1,000 DATA POINTS





ATTENUATION LINEARITY A COMPARISON OF FOUR UNITS AS MEASURED IN 15 dB INCREMENTS

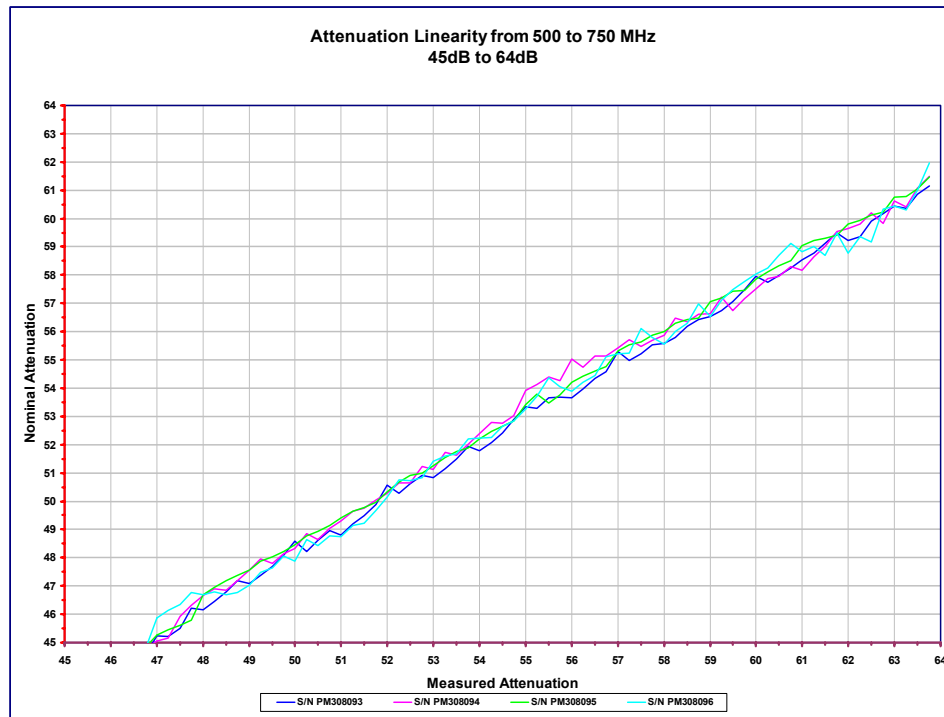
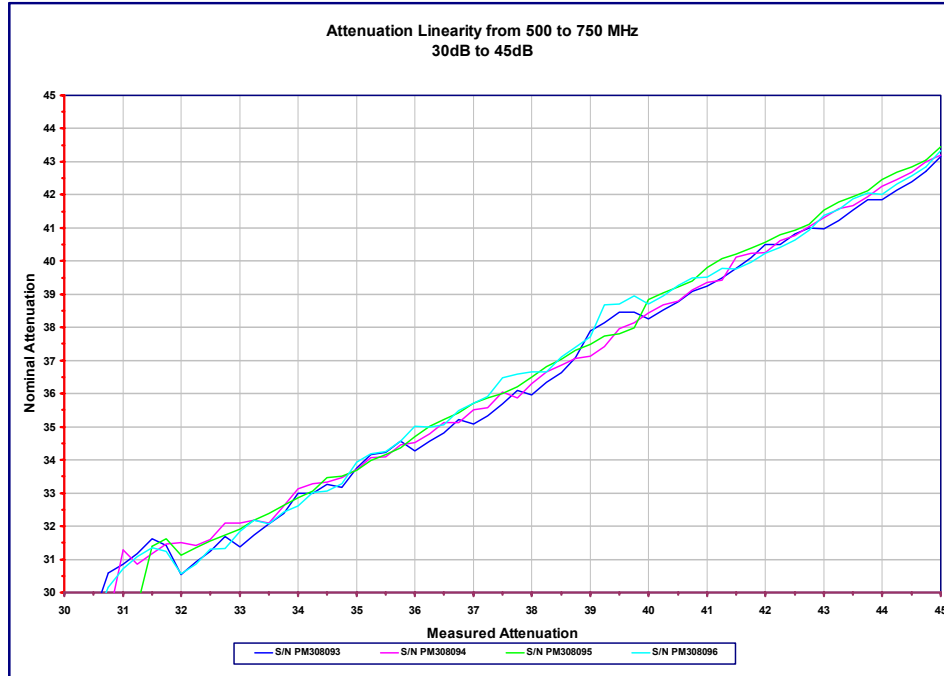
Serial Numbers: PM308093, PM308094, PM308095 and PM308096





ATTENUATION LINEARITY A COMPARISON OF FOUR UNITS AS MEASURED IN 15 dB INCREMENTS

Serial Numbers: PM308093, PM308094, PM308095 and PM308096





ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
0.25	0.26	0.25	0.26	0.25
0.50	0.55	0.53	0.44	0.49
0.75	0.87	0.81	0.64	0.73
1.00	0.76	0.75	0.83	0.76
1.25	1.04	1.01	1.09	1.01
1.50	1.32	1.29	1.26	1.24
1.75	1.65	1.58	1.45	1.50
2.00	1.70	1.69	1.75	1.70
2.25	1.97	1.95	2.01	1.96
2.50	2.25	2.23	2.18	2.19
2.75	2.58	2.53	2.38	2.45
3.00	2.47	2.46	2.59	2.48
3.25	2.75	2.72	2.84	2.73
3.50	3.04	3.01	3.02	2.96
3.75	3.37	3.29	3.21	3.21
4.00	3.56	3.54	3.67	3.56
4.25	3.83	3.79	3.94	3.78
4.50	4.12	4.08	4.11	4.03
4.75	4.45	4.37	4.29	4.28
5.00	4.35	4.32	4.52	4.34
5.25	4.62	4.58	4.78	4.58
5.50	4.92	4.86	4.95	4.82
5.75	5.25	5.15	5.14	5.06
6.00	5.31	5.29	5.45	5.31
6.25	5.59	5.54	5.71	5.53
6.50	5.88	5.83	5.88	5.78
6.75	6.20	6.12	6.07	6.04
7.00	6.12	6.08	6.31	6.11
7.25	6.39	6.36	6.56	6.34
7.50	6.68	6.64	6.73	6.58
7.75	7.01	6.92	6.92	6.84
8.00	7.45	7.32	7.49	7.27
8.25	7.19	7.58	7.70	7.28
8.50	7.44	7.87	7.84	7.27
8.75	7.74	8.10	7.99	7.49
9.00	8.00	8.39	8.51	8.13
9.25	8.24	8.64	8.72	8.34



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
9.50	8.50	8.58	8.87	8.57
9.75	8.79	8.79	9.02	8.54
10.00	9.54	9.61	9.22	9.29
10.25	9.46	9.84	9.44	9.62
10.50	9.46	10.10	9.58	9.89
10.75	9.73	10.37	9.73	10.37
11.00	10.52	10.39	10.25	10.37
11.25	10.52	10.43	10.46	10.44
11.50	10.52	10.66	10.61	10.44
11.75	10.56	10.93	10.76	10.68
12.00	11.59	11.47	11.13	11.17
12.25	11.33	11.72	11.33	11.17
12.50	11.32	11.97	11.47	11.49
12.75	11.60	12.21	11.63	11.74
13.00	12.32	12.19	12.14	12.23
13.25	12.39	12.39	12.36	12.20
13.50	12.40	12.69	12.50	12.45
13.75	12.31	12.91	12.66	12.67
14.00	13.36	13.23	12.88	13.27
14.25	13.09	13.51	13.10	13.53
14.50	13.09	13.76	13.23	13.77
14.75	13.37	14.40	13.40	14.00
15.00	14.15	15.15	14.26	15.23
15.25	15.22	15.39	14.12	15.46
15.50	15.47	15.68	14.27	15.67
15.75	15.47	15.94	14.42	15.94
16.00	15.24	15.15	15.48	15.20
16.25	15.45	15.41	15.73	15.45
16.50	15.74	15.68	15.89	15.65
16.75	16.06	15.95	16.08	15.93
17.00	16.06	16.00	16.36	16.04
17.25	16.31	16.22	16.61	16.27
17.50	16.59	16.52	16.78	16.53
17.75	16.91	16.79	16.95	16.77
18.00	17.51	17.46	17.26	17.43
18.25	17.25	17.77	17.51	17.65
18.50	17.52	17.77	17.66	17.82



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
18.75	17.83	18.01	17.84	18.09
19.00	18.37	18.24	18.14	18.31
19.25	18.37	18.53	18.39	18.54
19.50	18.70	18.84	18.55	18.90
19.75	18.94	19.02	18.72	19.11
20.00	19.46	19.36	19.21	19.39
20.25	19.46	19.67	19.45	19.63
20.50	19.48	19.70	19.61	19.73
20.75	19.77	19.94	19.81	19.99
21.00	19.77	20.19	20.08	19.72
21.25	20.04	20.49	20.34	19.97
21.50	20.32	20.56	20.50	20.21
21.75	20.64	20.86	20.66	20.46
22.00	20.73	21.21	21.00	20.68
22.25	20.99	21.45	21.24	20.88
22.50	21.24	21.46	21.40	21.17
22.75	21.58	21.73	21.58	21.44
23.00	21.83	22.02	21.88	21.78
23.25	21.83	22.36	22.12	22.02
23.50	22.13	21.98	22.28	22.26
23.75	22.42	22.26	22.48	22.01
24.00	22.58	22.53	22.77	22.61
24.25	22.86	22.69	22.96	23.07
24.50	23.15	23.06	23.07	23.27
24.75	23.83	23.29	23.24	23.50
25.00	23.63	23.51	23.74	23.72
25.25	23.94	23.79	23.99	23.75
25.50	23.85	23.74	24.08	23.94
25.75	24.08	24.01	24.27	24.28
26.00	24.95	24.72	24.68	24.74
26.25	24.94	25.01	24.69	25.04
26.50	25.13	25.35	24.99	25.27
26.75	25.39	25.55	25.49	25.60
27.00	25.71	25.32	25.73	25.63
27.25	25.72	25.62	25.83	25.84
27.50	25.98	25.88	26.04	26.05
27.75	26.21	26.01	26.55	26.25



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
28.00	26.74	26.60	26.72	26.74
28.25	27.01	26.82	26.72	26.88
28.50	27.22	27.16	27.35	27.17
28.75	27.50	27.34	27.54	27.38
29.00	27.65	27.41	27.69	27.35
29.25	27.44	27.66	27.73	27.60
29.50	27.67	27.93	28.06	27.85
29.75	27.88	28.08	28.29	28.20
30.00	28.69	28.87	28.57	28.58
30.25	28.95	28.80	28.59	28.89
30.50	29.27	28.86	29.27	29.07
30.75	30.59	29.17	29.45	30.16
31.00	30.85	31.29	29.58	30.73
31.25	31.18	30.85	29.58	31.08
31.50	31.63	31.16	31.39	31.36
31.75	31.42	31.46	31.61	31.24
32.00	30.53	31.50	31.13	30.57
32.25	30.93	31.41	31.35	30.85
32.50	31.24	31.59	31.56	31.30
32.75	31.69	32.09	31.73	31.32
33.00	31.38	32.09	31.91	31.84
33.25	31.74	32.19	32.19	32.18
33.50	32.07	32.09	32.38	32.07
33.75	32.39	32.60	32.63	32.43
34.00	32.98	33.13	32.85	32.61
34.25	32.99	33.29	33.05	33.02
34.50	33.25	33.33	33.46	33.05
34.75	33.16	33.47	33.51	33.29
35.00	33.75	33.71	33.68	33.93
35.25	34.16	34.08	33.98	34.19
35.50	34.23	34.09	34.15	34.24
35.75	34.56	34.46	34.36	34.56
36.00	34.27	34.52	34.70	35.02
36.25	34.57	34.80	35.01	35.00
36.50	34.81	35.13	35.22	35.06
36.75	35.22	35.13	35.42	35.49
37.00	35.09	35.51	35.72	35.72



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
37.25	35.34	35.58	35.88	35.92
37.50	35.70	36.05	36.01	36.48
37.75	36.09	35.88	36.21	36.60
38.00	35.96	36.29	36.49	36.66
38.25	36.35	36.65	36.81	36.65
38.50	36.64	36.85	37.03	37.10
38.75	37.09	37.06	37.32	37.39
39.00	37.89	37.12	37.48	37.72
39.25	38.14	37.43	37.73	38.68
39.50	38.46	37.95	37.81	38.71
39.75	38.45	38.15	37.98	38.96
40.00	38.25	38.43	38.83	38.71
40.25	38.52	38.68	39.05	38.95
40.50	38.76	38.79	39.22	39.27
40.75	39.08	39.12	39.39	39.48
41.00	39.25	39.36	39.81	39.51
41.25	39.50	39.43	40.07	39.78
41.50	39.79	40.11	40.22	39.75
41.75	40.09	40.24	40.40	39.97
42.00	40.51	40.25	40.57	40.24
42.25	40.50	40.62	40.79	40.42
42.50	40.82	40.78	40.94	40.64
42.75	40.99	41.05	41.12	40.94
43.00	40.98	41.31	41.53	41.37
43.25	41.22	41.58	41.79	41.57
43.50	41.53	41.67	41.95	41.88
43.75	41.85	41.94	42.13	42.06
44.00	41.86	42.25	42.47	42.02
44.25	42.15	42.45	42.69	42.33
44.50	42.40	42.69	42.85	42.57
44.75	42.71	43.00	43.04	42.84
45.00	43.15	43.19	43.45	43.33
45.25	43.15	43.53	43.69	43.41
45.50	43.42	43.61	43.84	43.62
45.75	43.47	43.69	44.03	43.65
46.00	43.67	44.04	44.24	44.07
46.25	43.94	44.24	44.44	44.27



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
46.50	44.25	44.58	44.62	44.64
46.75	44.55	44.75	44.82	44.74
47.00	45.25	45.04	45.26	45.86
47.25	45.21	45.17	45.46	46.13
47.50	45.51	45.93	45.61	46.34
47.75	46.22	46.32	45.79	46.78
48.00	46.16	46.66	46.69	46.68
48.25	46.45	46.91	46.96	46.79
48.50	46.80	46.85	47.19	46.70
48.75	47.18	47.18	47.38	46.78
49.00	47.08	47.56	47.55	47.04
49.25	47.38	47.95	47.87	47.48
49.50	47.69	47.81	48.04	47.65
49.75	48.09	48.14	48.23	48.07
50.00	48.59	48.33	48.45	47.88
50.25	48.22	48.86	48.78	48.65
50.50	48.61	48.63	48.92	48.44
50.75	48.96	49.04	49.15	48.78
51.00	48.79	49.31	49.42	48.74
51.25	49.19	49.65	49.65	49.13
51.50	49.49	49.74	49.77	49.22
51.75	49.87	50.04	49.96	49.67
52.00	50.57	50.29	50.34	50.14
52.25	50.28	50.65	50.67	50.75
52.50	50.62	50.64	50.91	50.73
52.75	50.92	51.23	50.99	50.82
53.00	50.82	51.12	51.26	51.42
53.25	51.14	51.73	51.54	51.61
53.50	51.49	51.63	51.75	51.68
53.75	51.95	52.02	51.90	52.21
54.00	51.78	52.39	52.21	52.23
54.25	52.07	52.78	52.47	52.26
54.50	52.42	52.75	52.64	52.65
54.75	52.88	53.02	52.84	52.83
55.00	53.35	53.91	53.43	53.27
55.25	53.28	54.13	53.78	53.71
55.50	53.66	54.39	53.48	54.36



ATTENUATION LINEARITY
COMPARING ALL FOUR UNITS IN 0.25 dB STEPS

ATTENUATION VALUE	S/N PM308093	S/N PM308094	S/N PM308095	S/N PM308096
55.75	53.68	54.26	53.77	54.06
56.00	53.66	55.03	54.22	53.88
56.25	53.98	54.75	54.43	54.20
56.50	54.35	55.13	54.61	54.45
56.75	54.57	55.13	54.77	55.12
57.00	55.29	55.43	55.31	55.21
57.25	54.98	55.72	55.54	55.25
57.50	55.21	55.47	55.63	56.12
57.75	55.54	55.68	55.86	55.80
58.00	55.57	55.87	56.01	55.55
58.25	55.78	56.49	56.30	56.00
58.50	56.19	56.34	56.43	56.29
58.75	56.43	56.61	56.49	56.97
59.00	56.53	56.63	57.07	56.53
59.25	56.73	57.23	57.19	57.12
59.50	57.06	56.73	57.42	57.48
59.75	57.47	57.17	57.45	57.78
60.00	57.97	57.51	57.85	58.03
60.25	57.75	57.87	58.12	58.24
60.50	57.99	57.96	58.33	58.69
60.75	58.24	58.29	58.51	59.11
61.00	58.53	58.16	59.04	58.84
61.25	58.78	58.65	59.22	59.02
61.50	59.12	59.01	59.29	58.69
61.75	59.48	59.55	59.42	59.49
62.00	59.22	59.64	59.81	58.77
62.25	59.35	59.80	59.93	59.35
62.50	59.91	60.19	60.13	59.16
62.75	60.17	59.84	60.23	60.33
63.00	60.44	60.63	60.76	60.44
63.25	60.37	60.41	60.78	60.31
63.50	60.87	61.08	61.04	60.98
63.75	61.14	61.50	61.46	61.98



ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

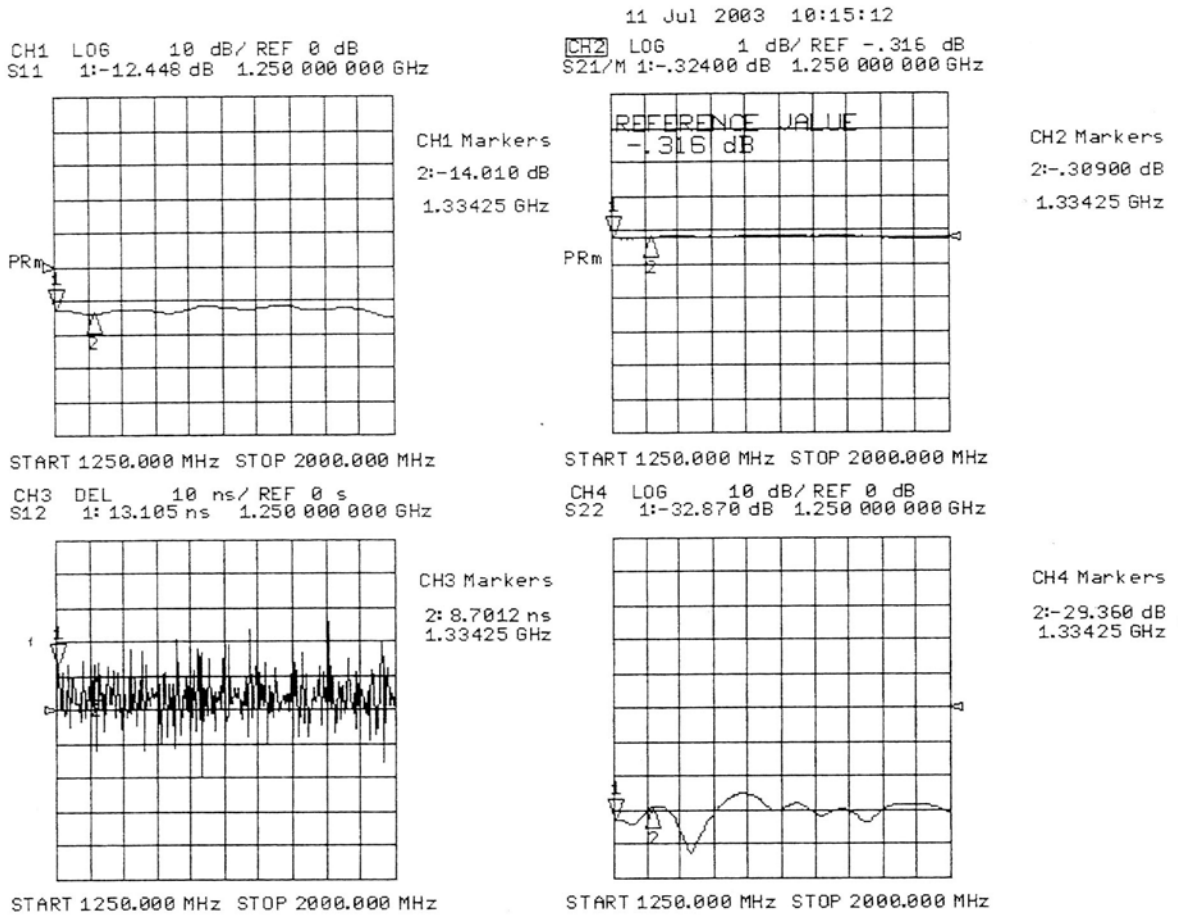
AS MEASURED FROM 0.25 dB to 64 dB
First Series: 0.25 dB (LSB) to 32.0 dB (MSB) in Bit Order
Second Series: 5.0 dB to 64.0 dB in 5 dB Steps



ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 0.25 dB (LSB)

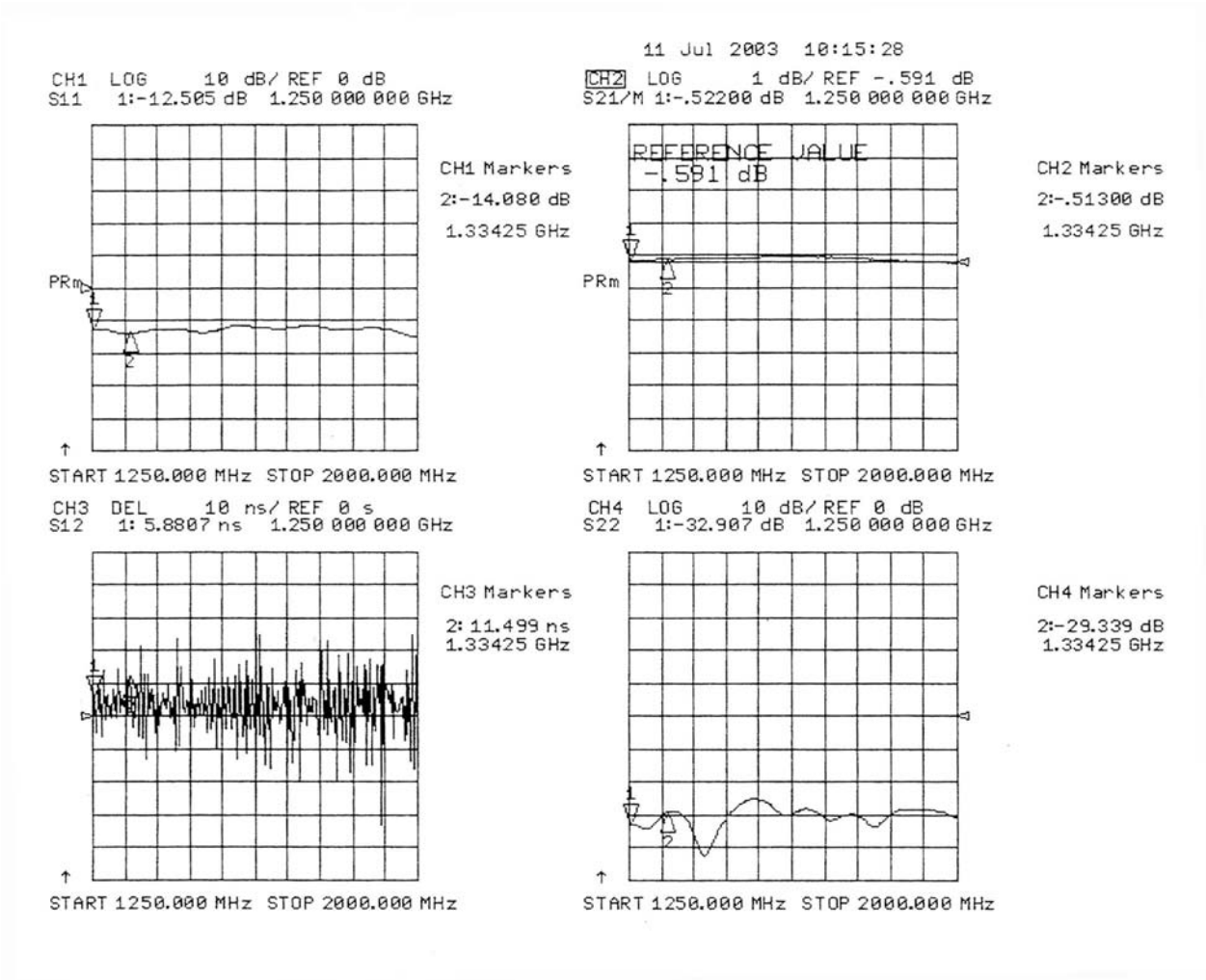




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 0.50 dB

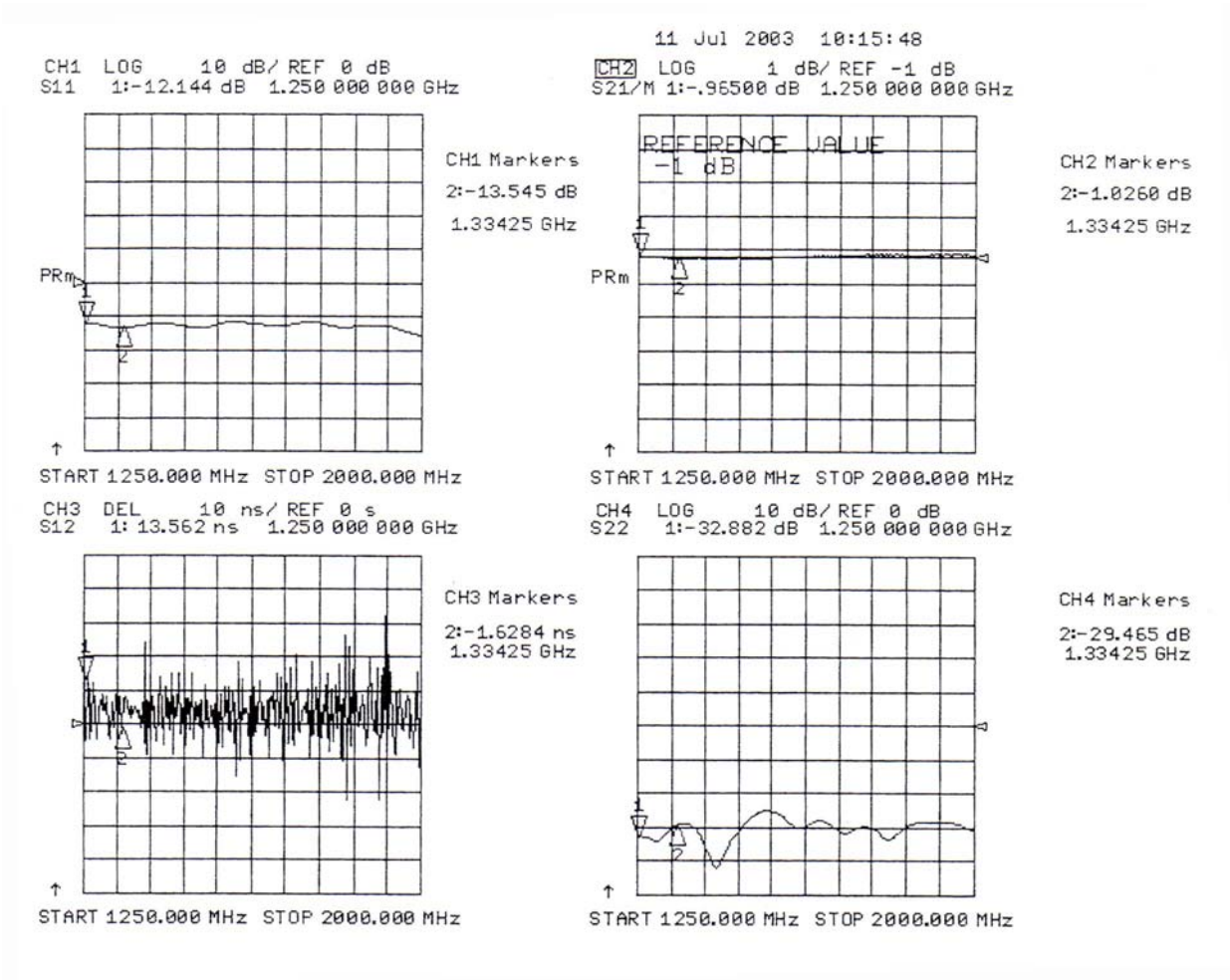




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 1.0 dB

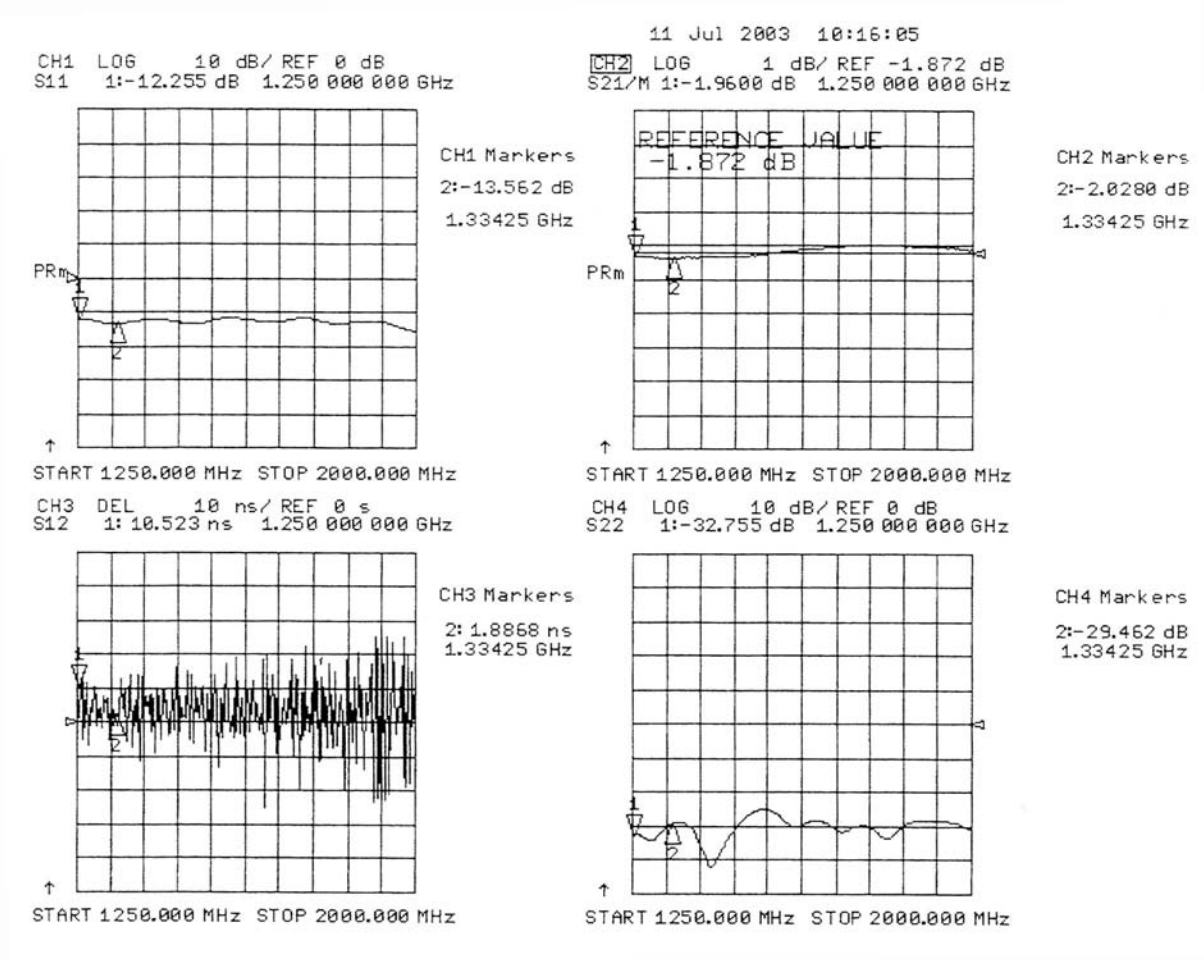




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 2.0 dB

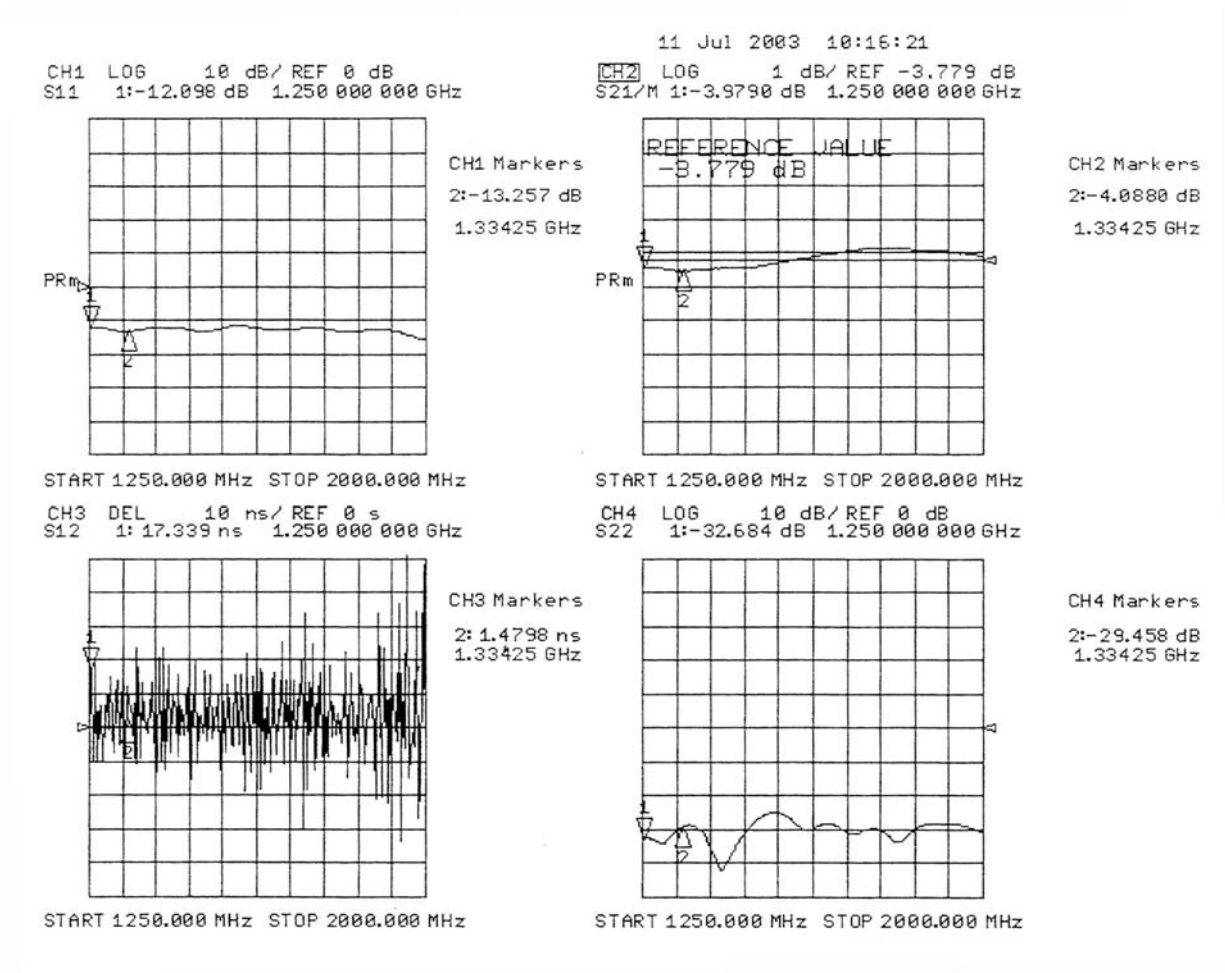




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 4.0 dB

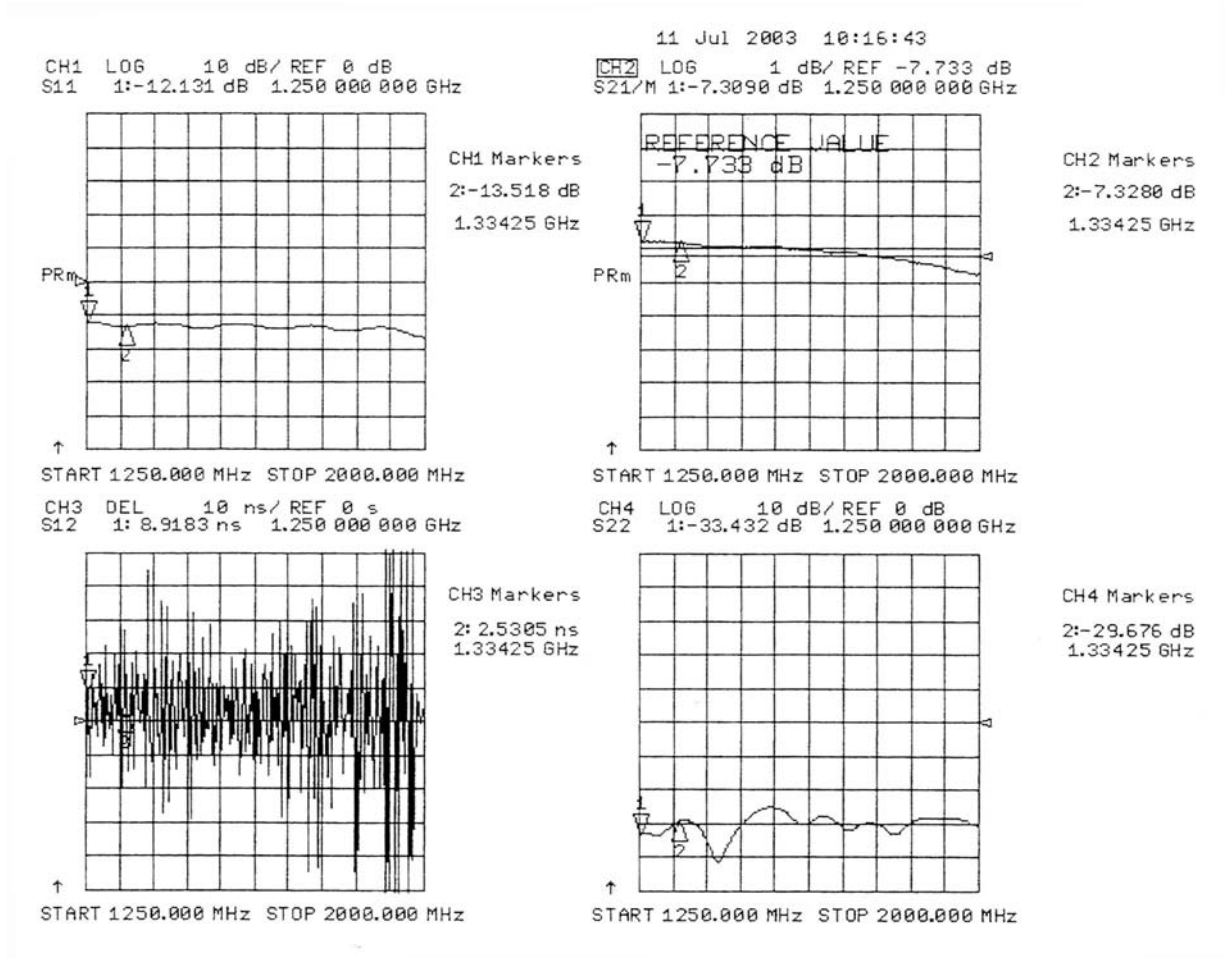




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 8.0 dB

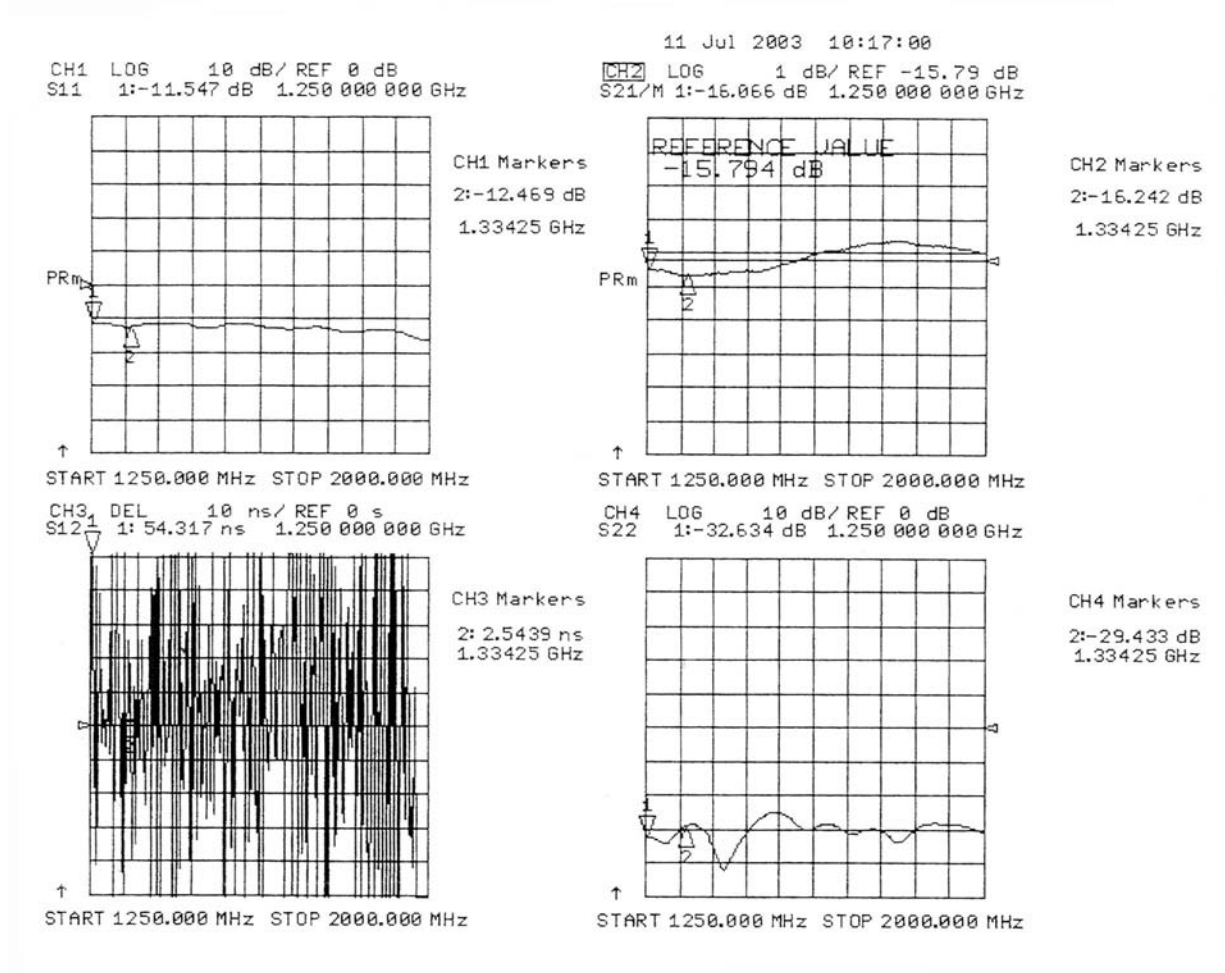




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 16.0 dB

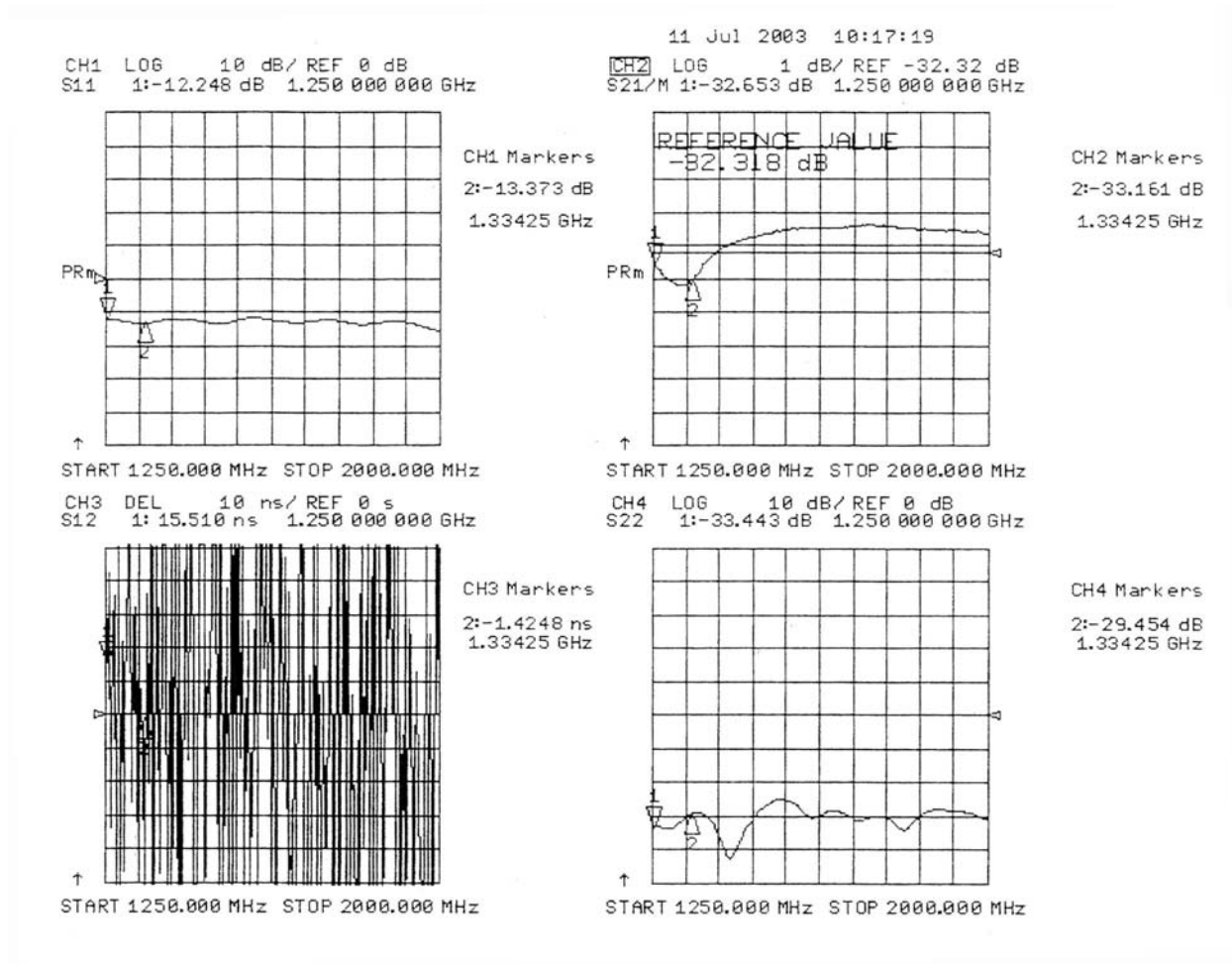




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 32.0 dB (MSB)

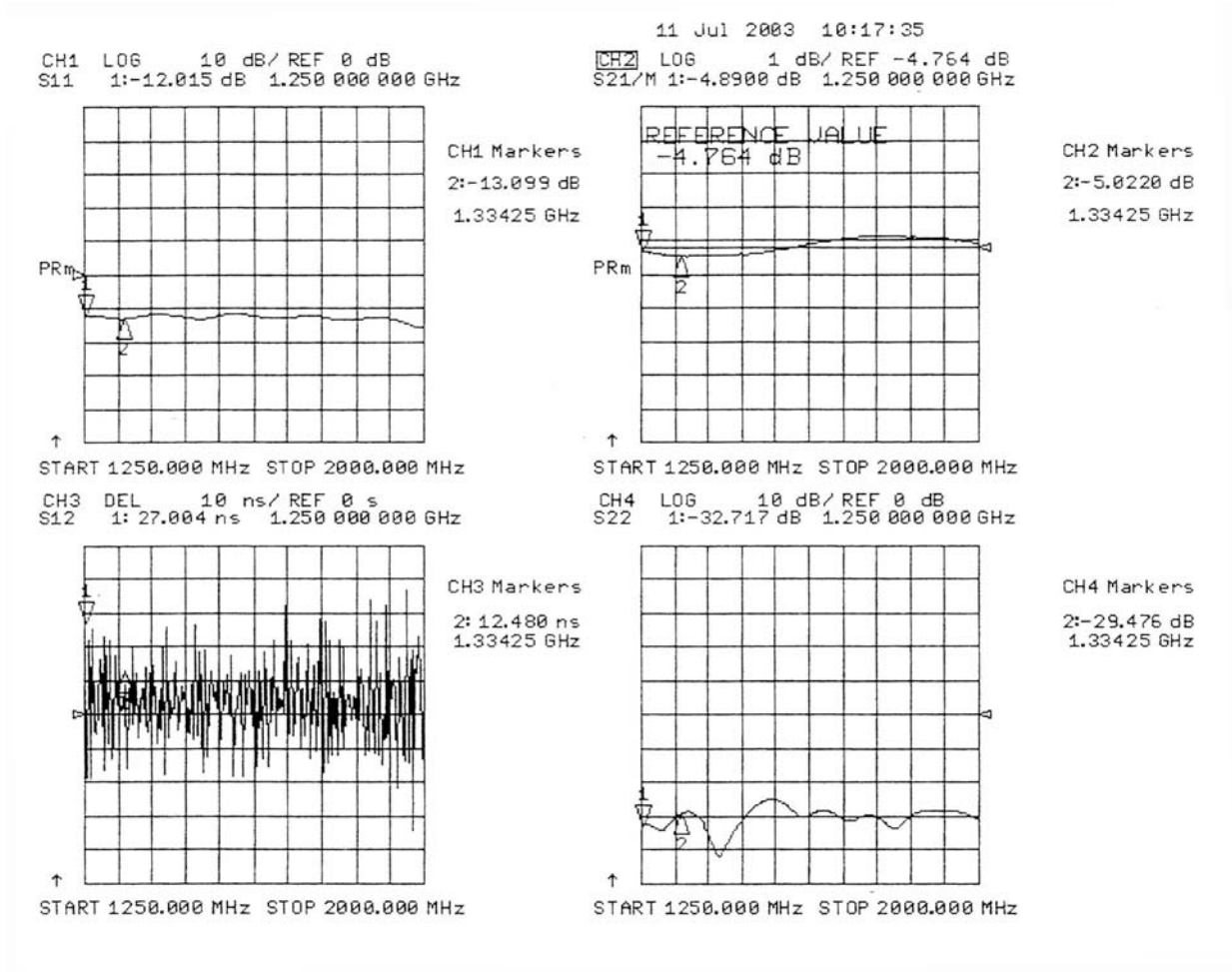




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 5.0 dB

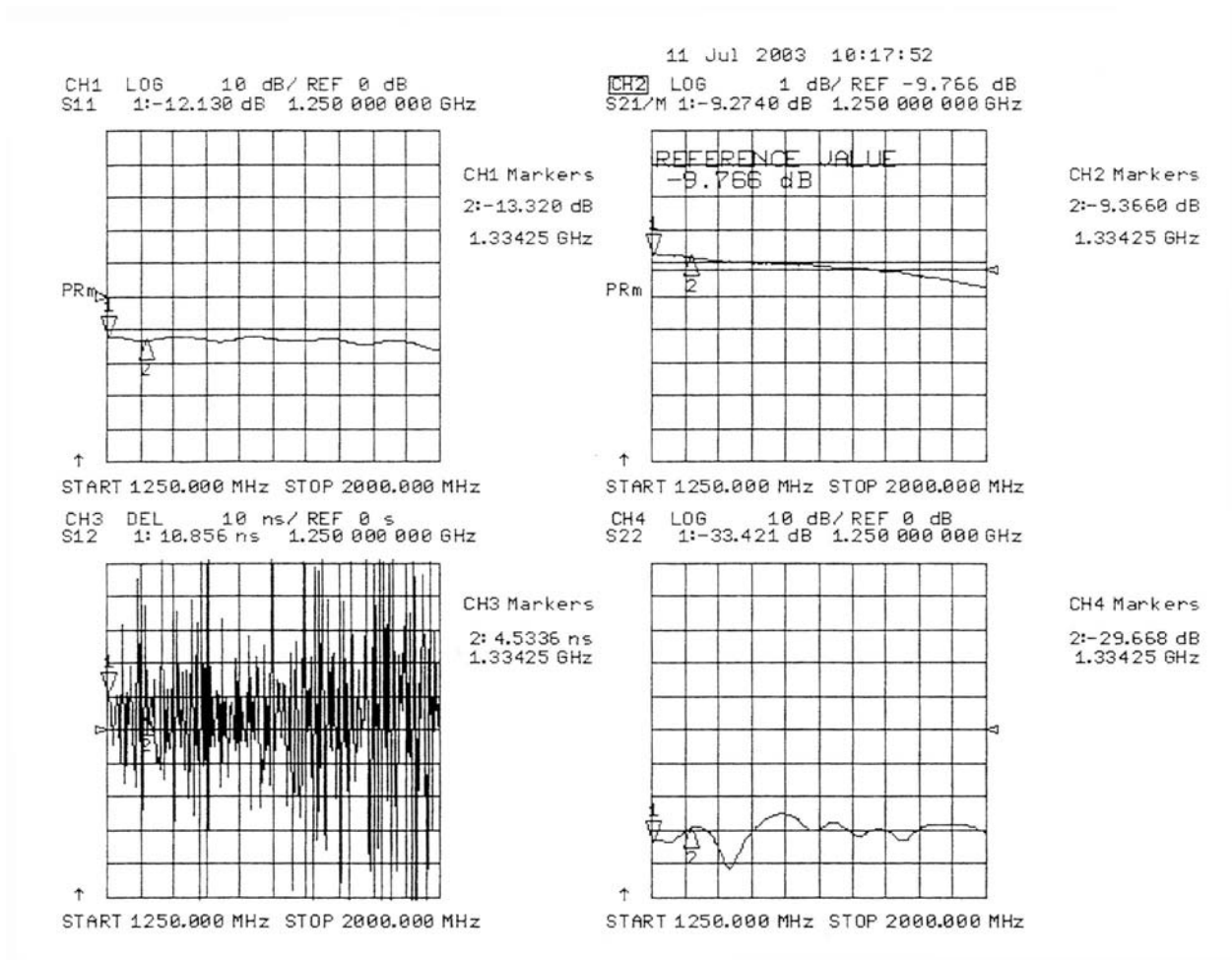




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 10.0 dB

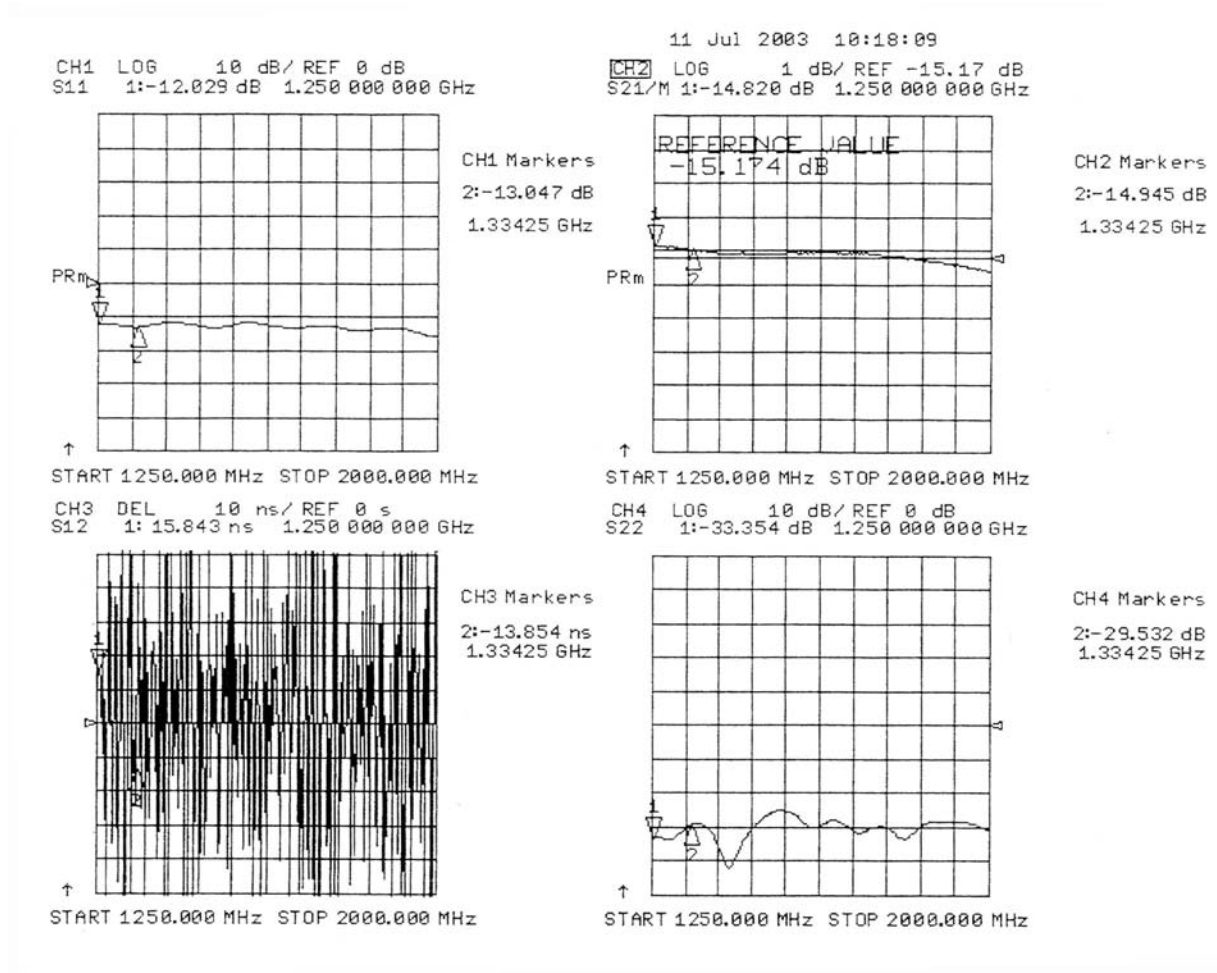




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 15.0 dB

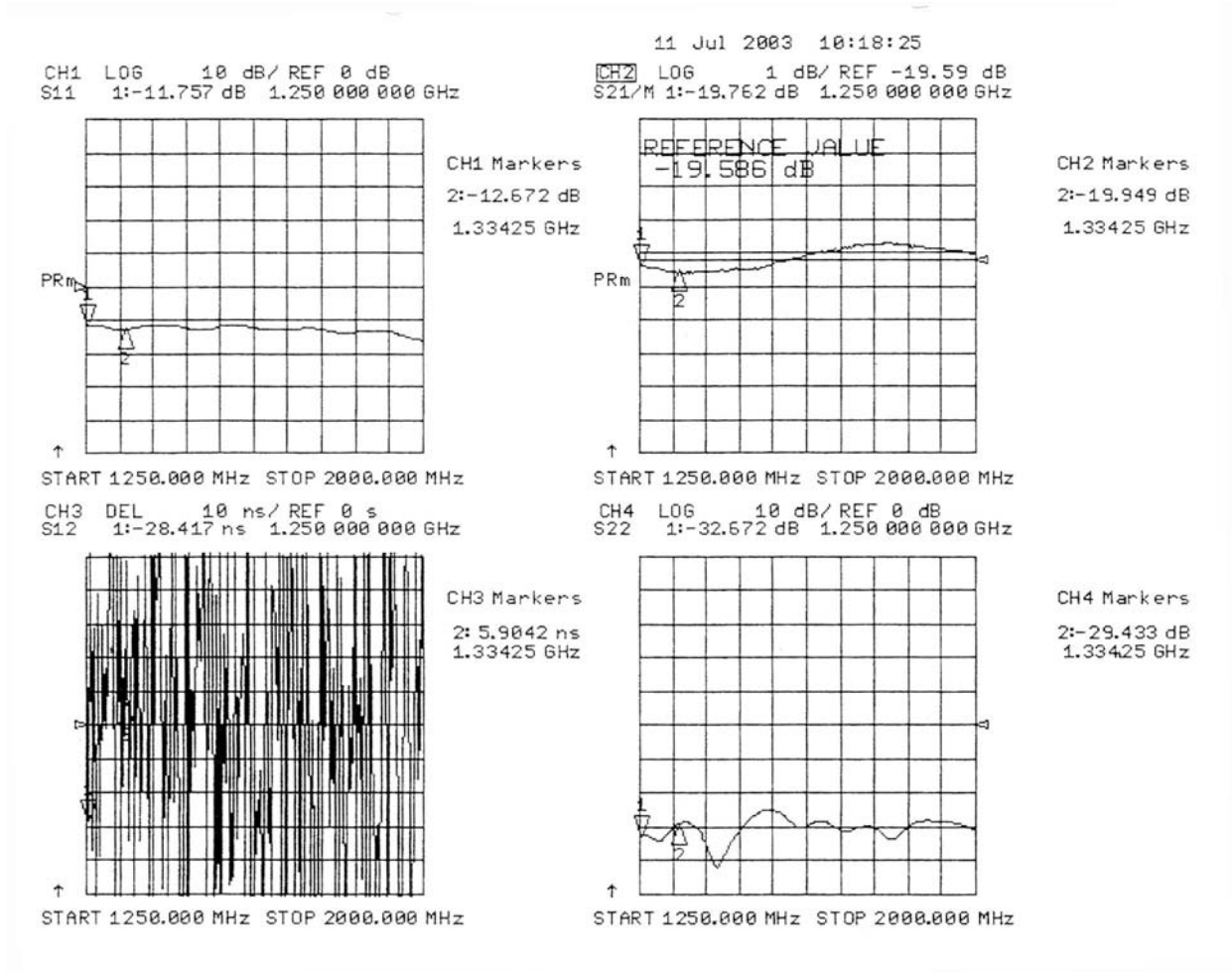




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 20.0 dB

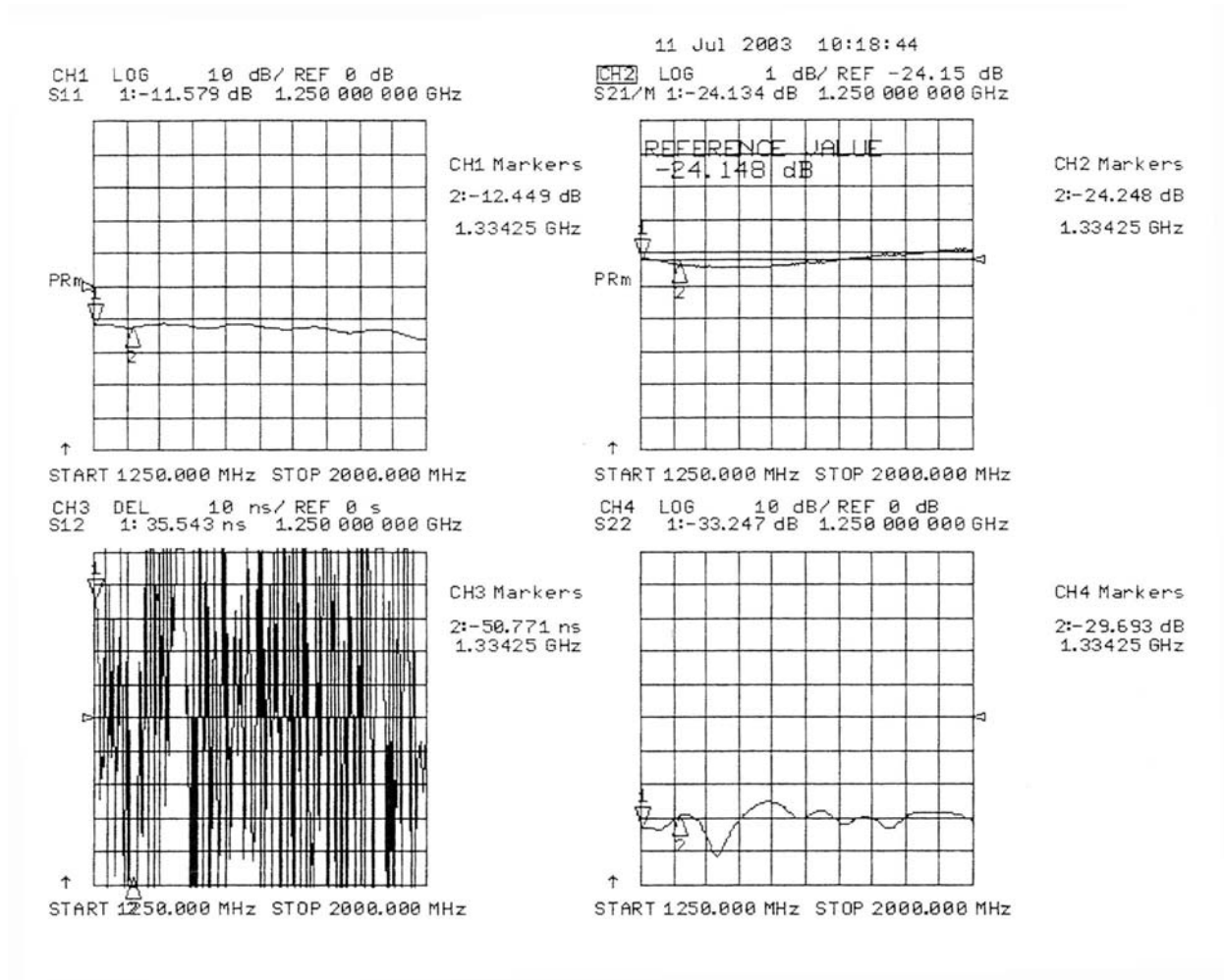




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 25.0 dB

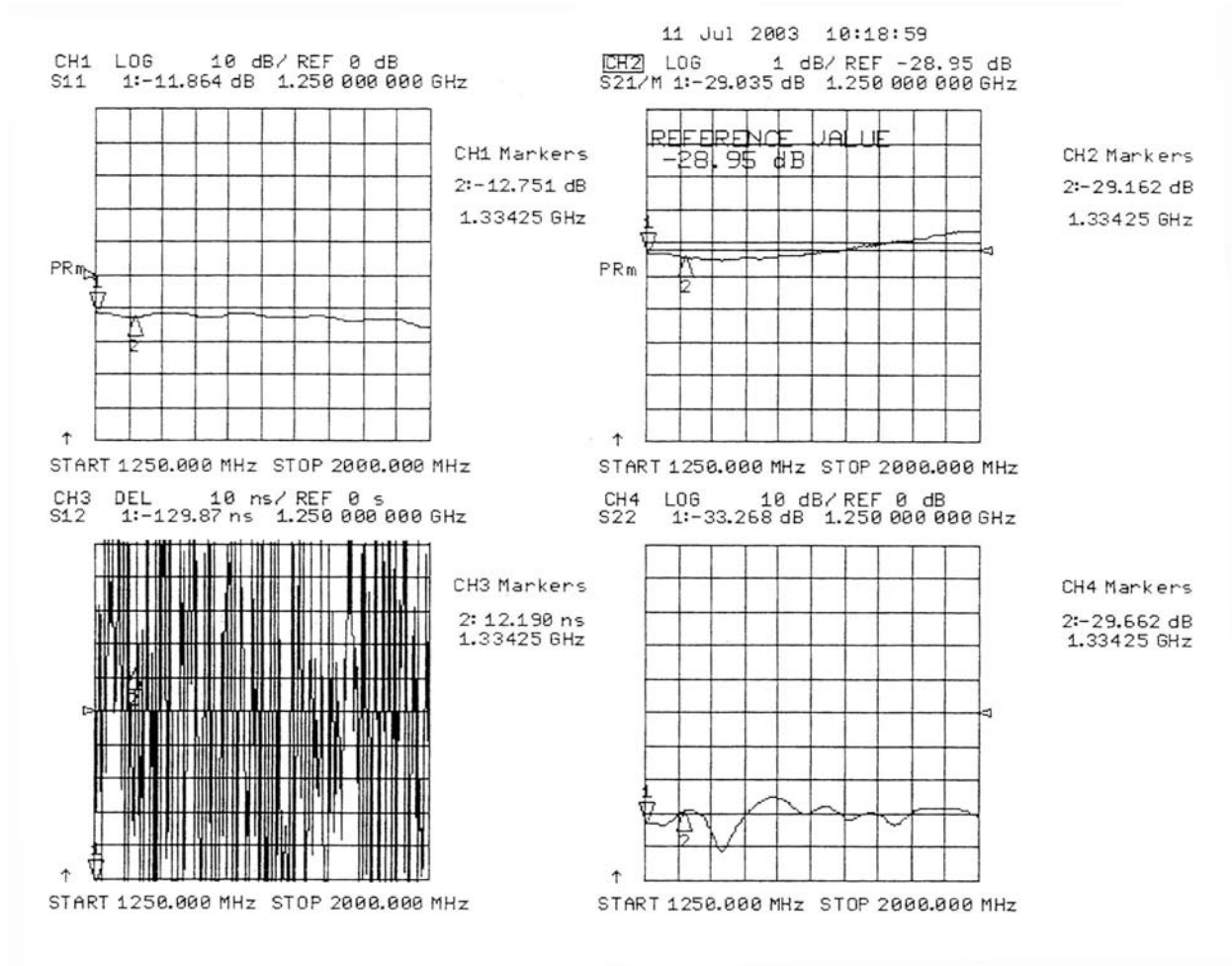




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 30.0 dB

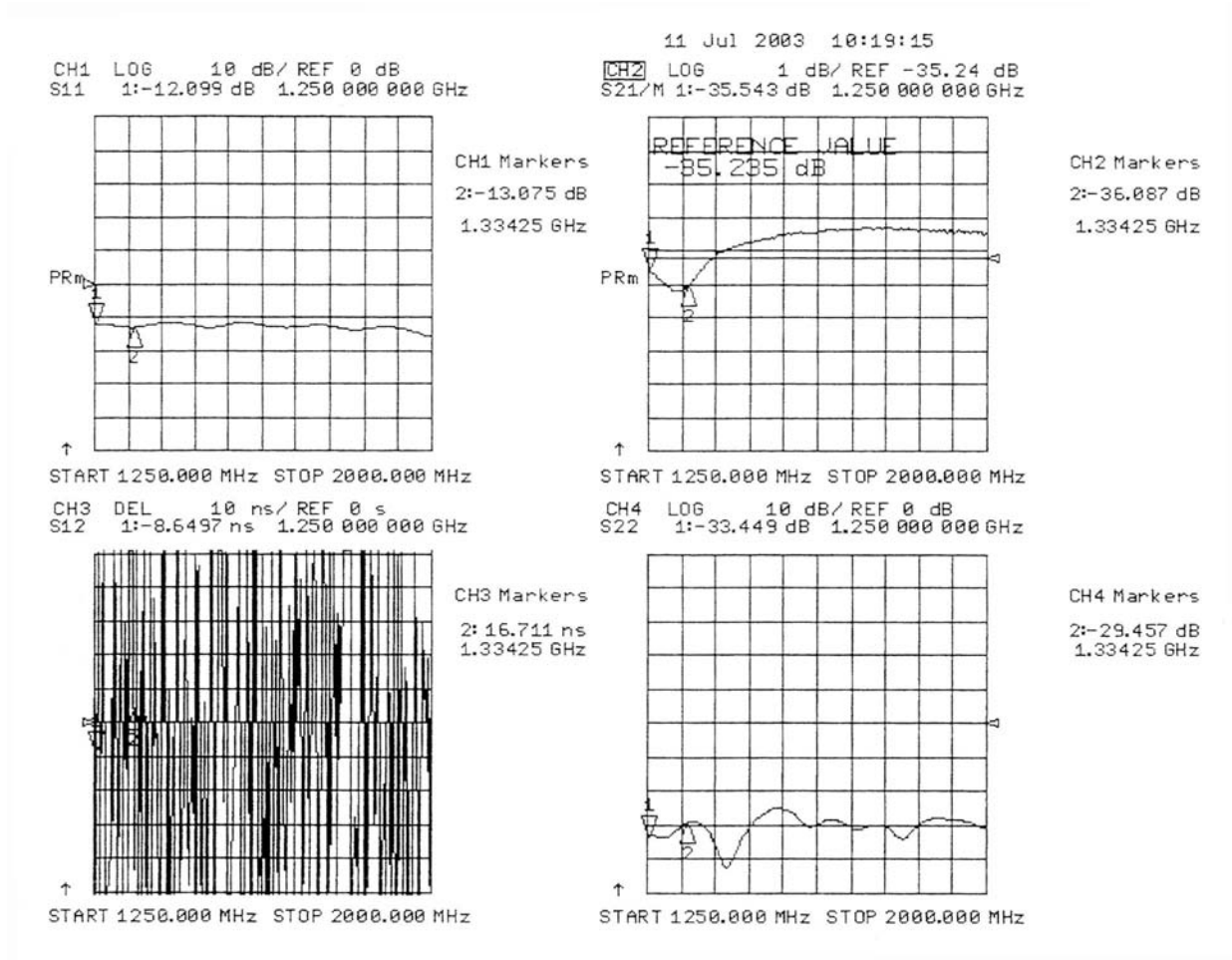




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 35.0 dB

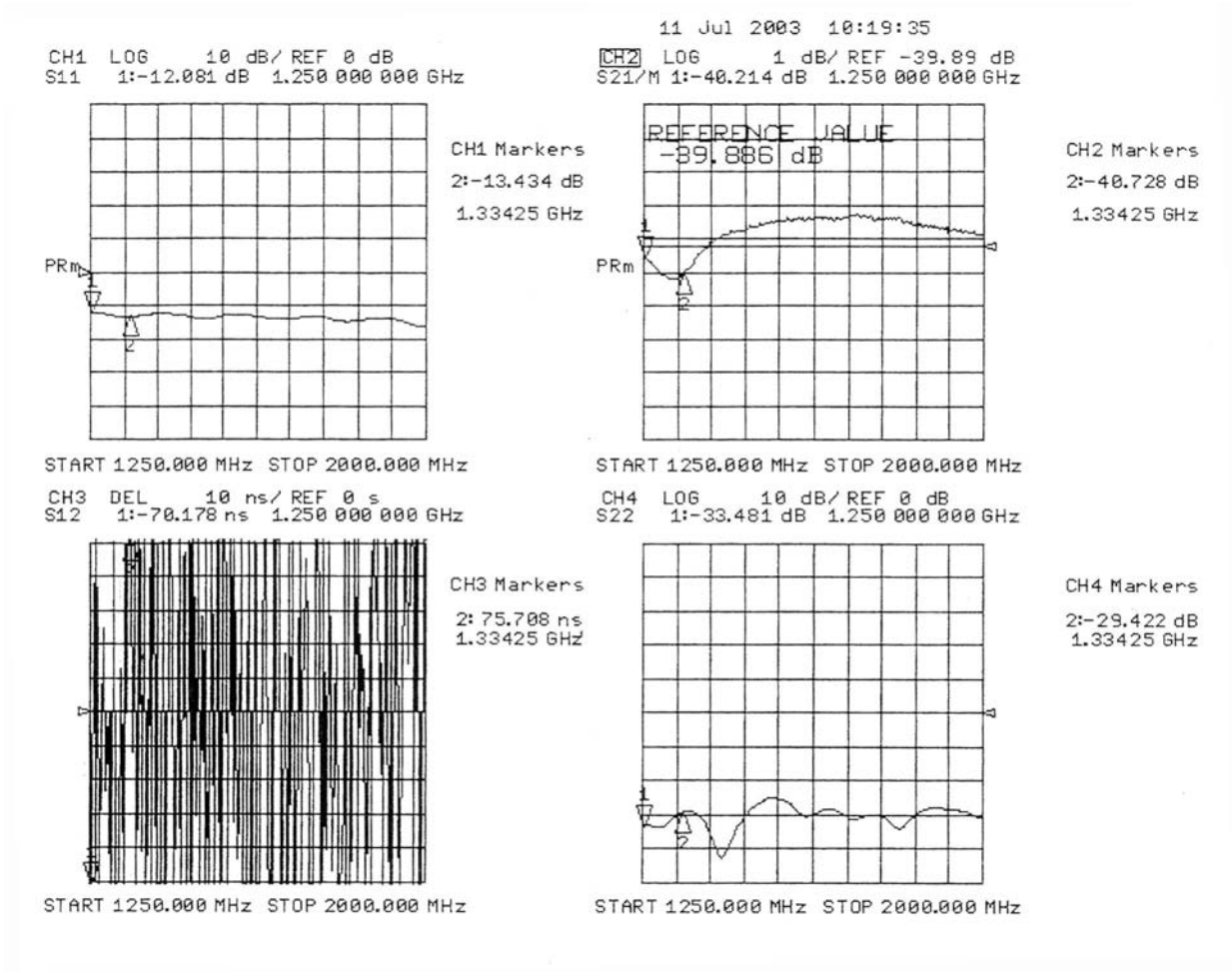




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 40.0 dB

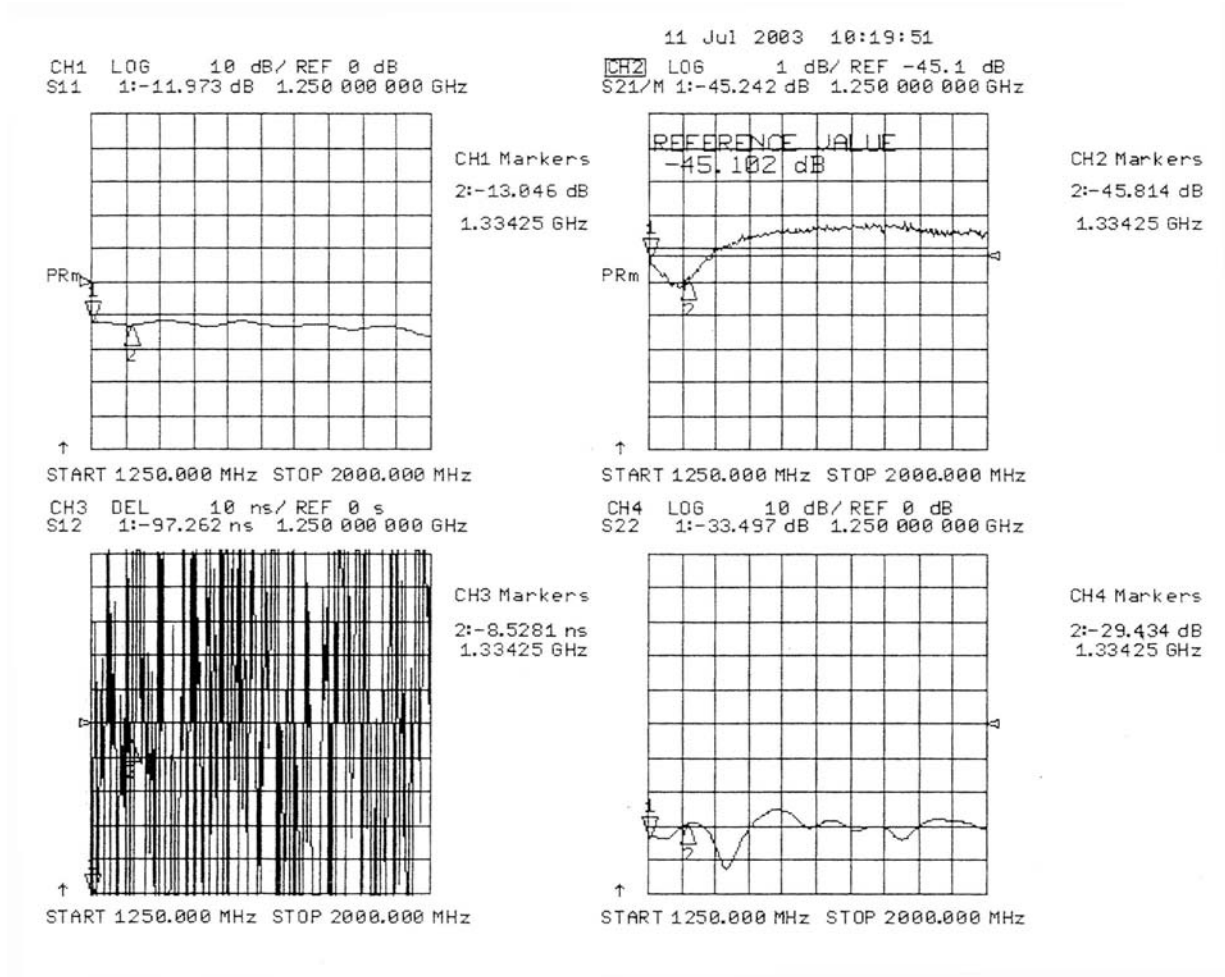




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 45.0 dB

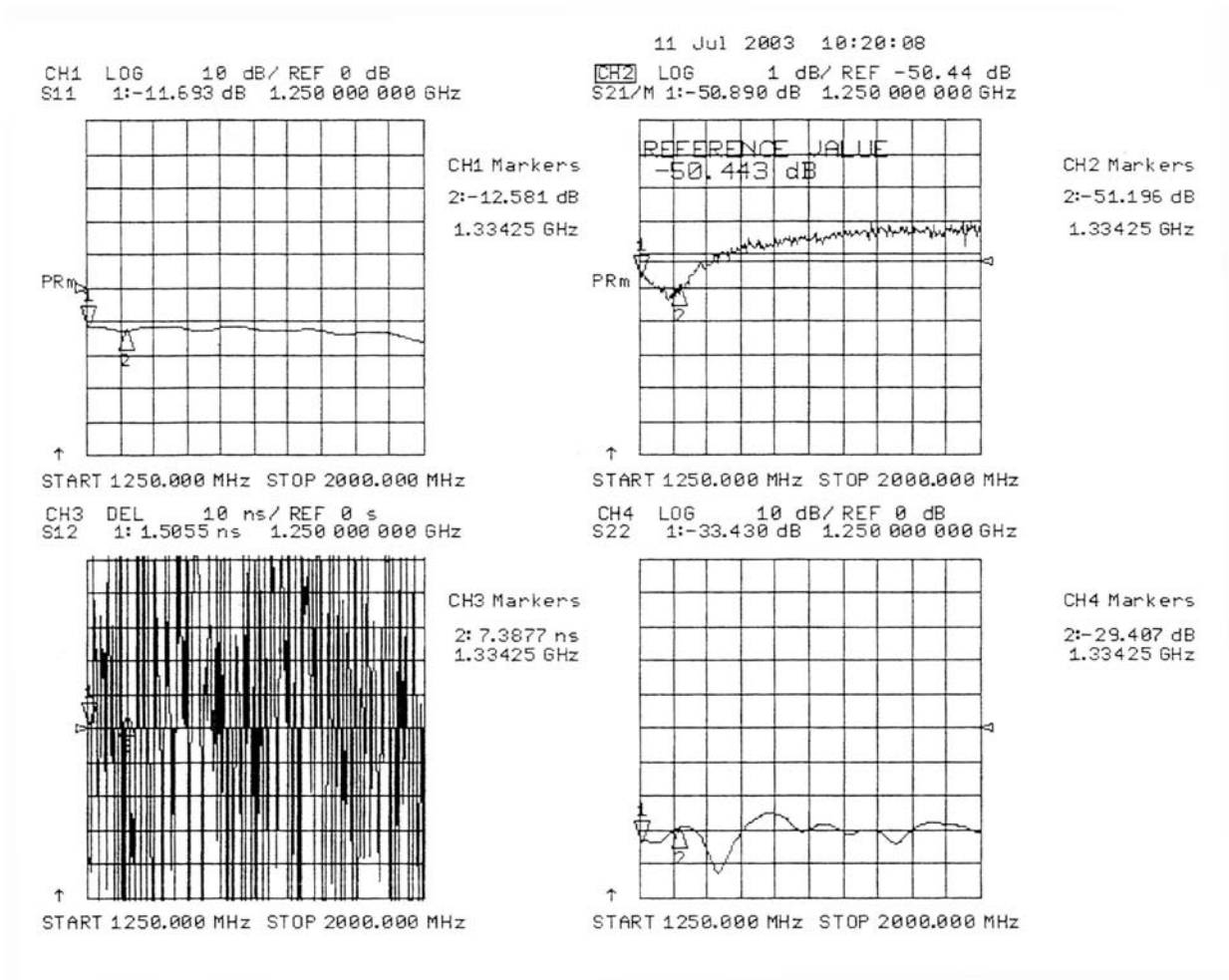




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 50.0 dB

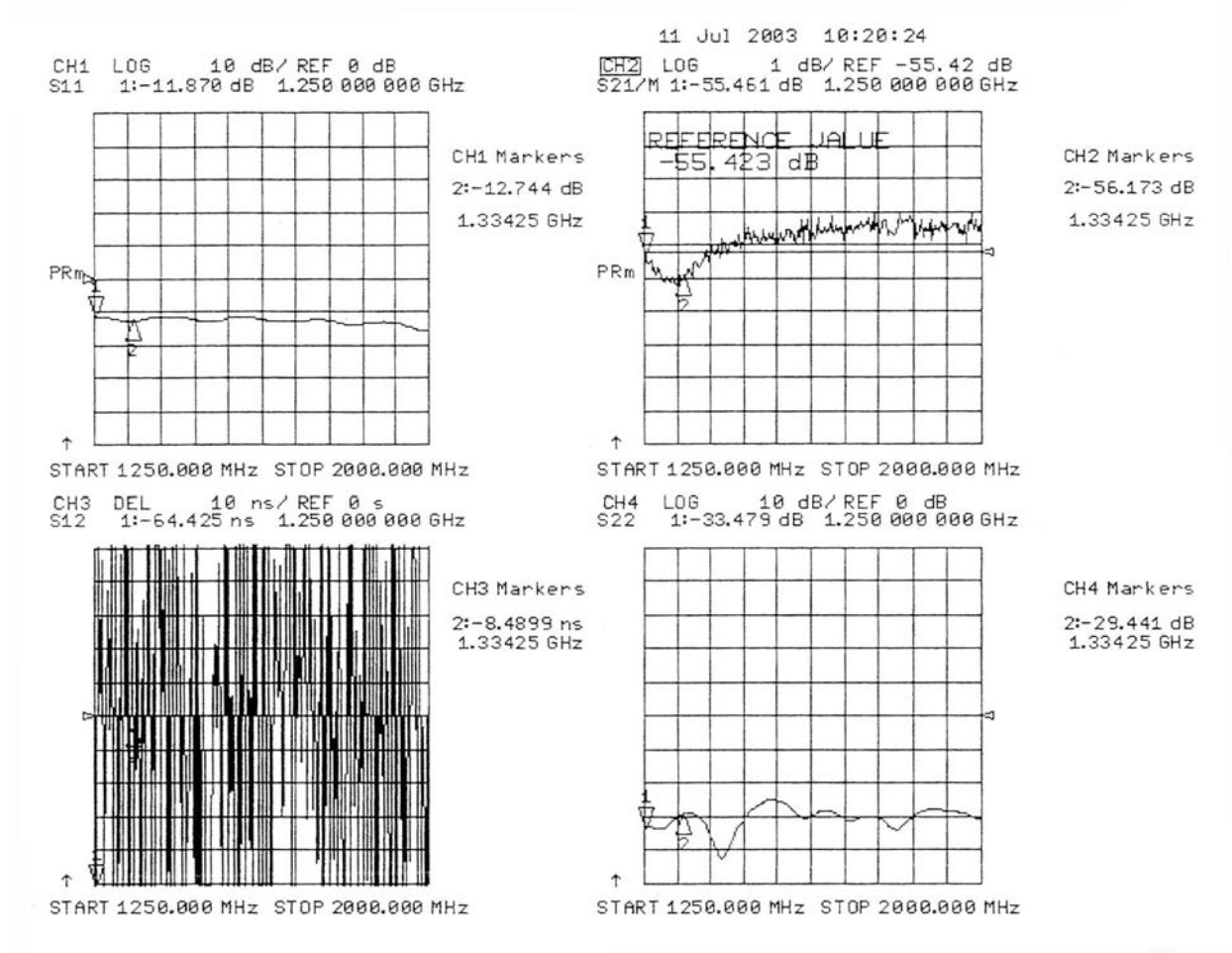




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 55.0 dB

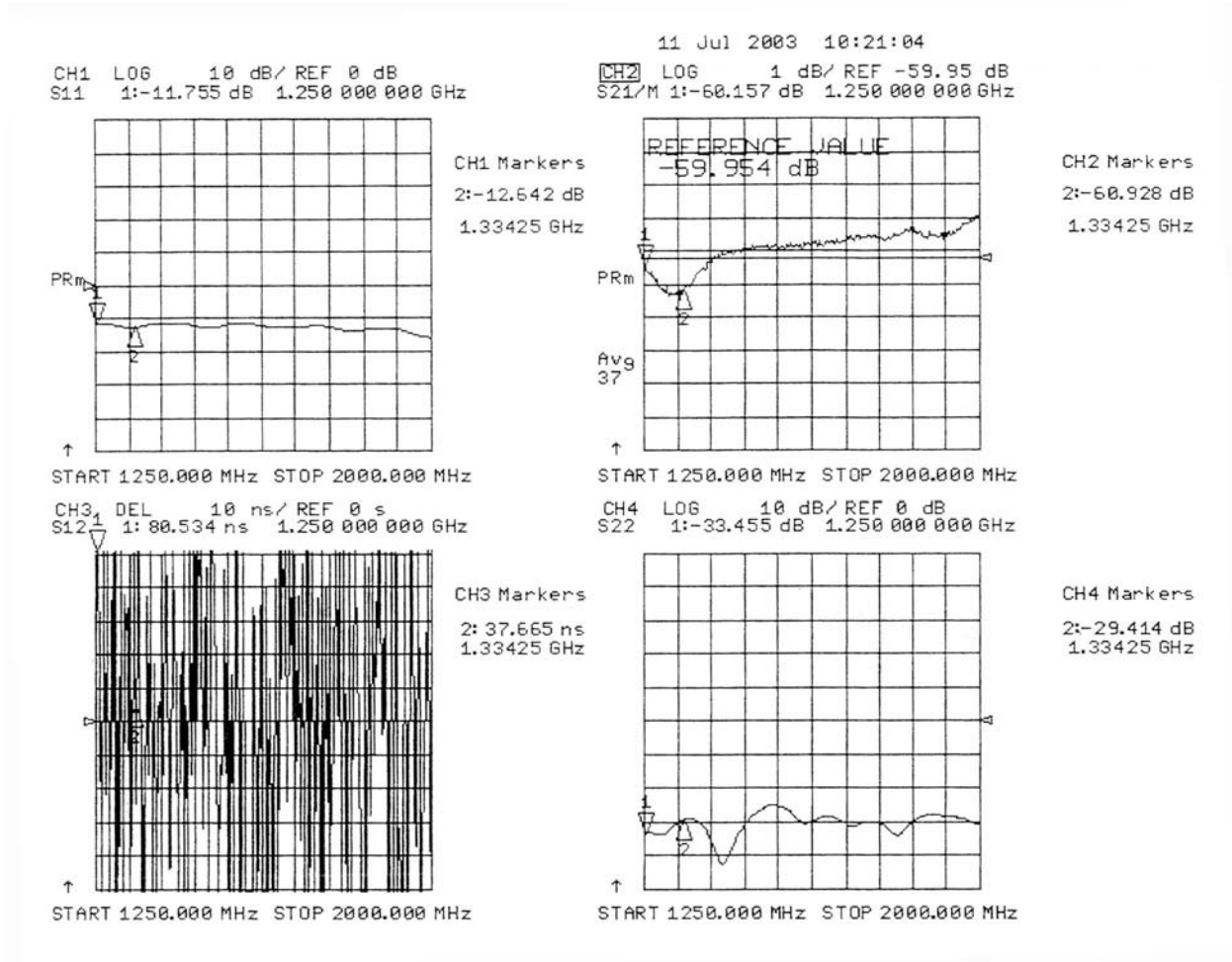




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 60.0 dB

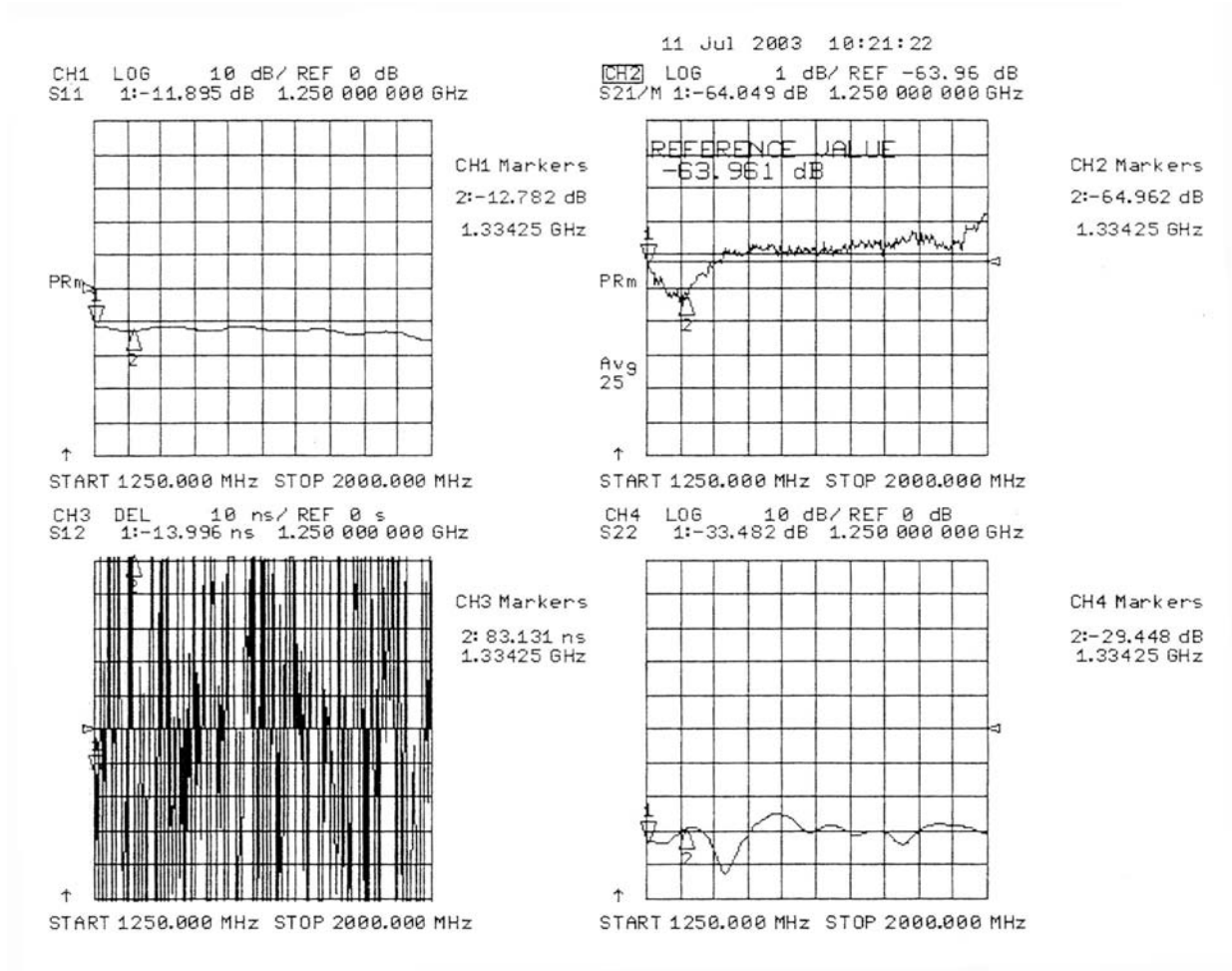




ATTENUATION ACCURACY AND FLATNESS @ 1.334 GHz & -5 dBm

On LBDFM Serial No: PM306035

Reference: 64.0 dB





SWITCHING SPEED

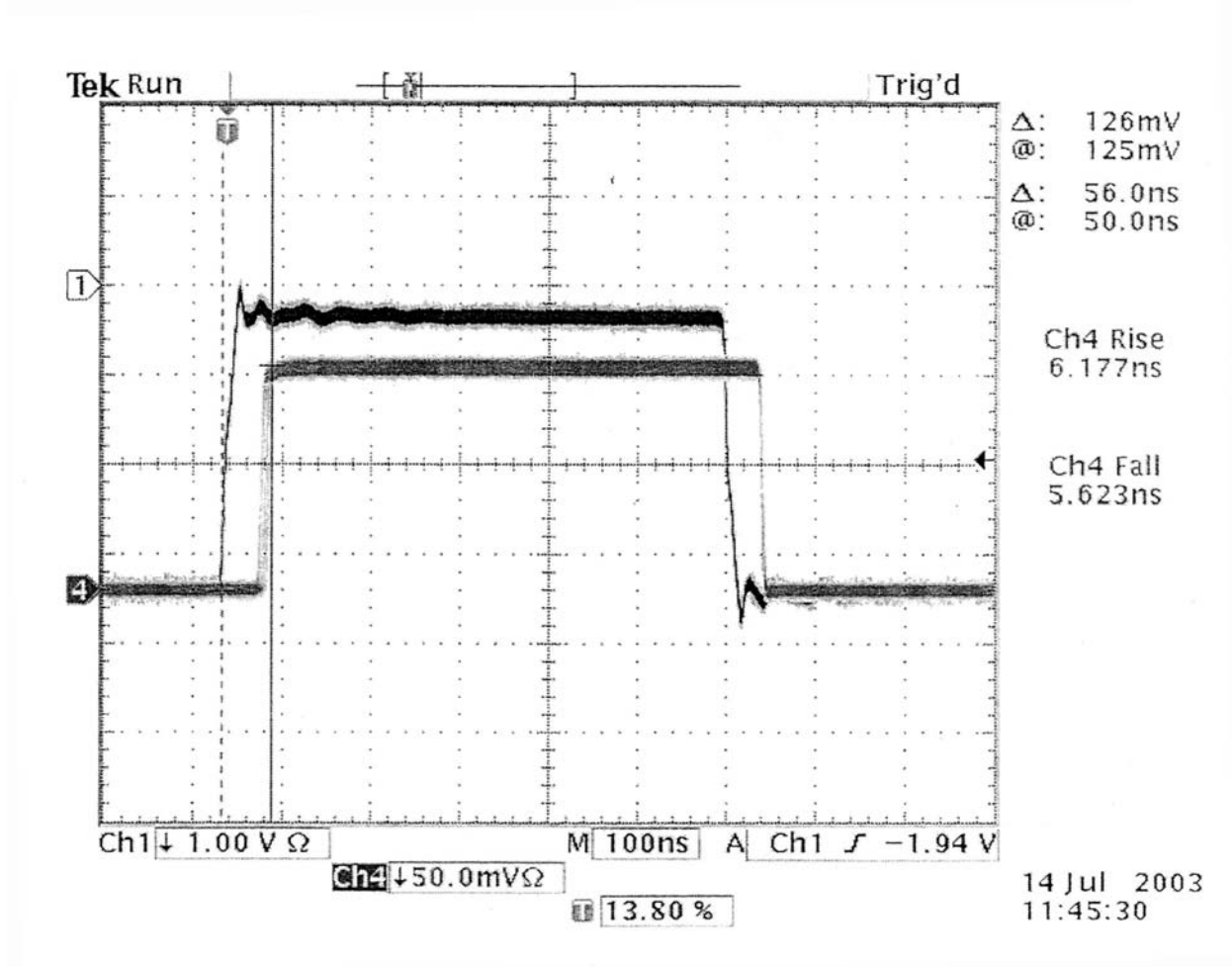
PULSE MODULATOR

SP5T SWITCH

ATTENUATOR

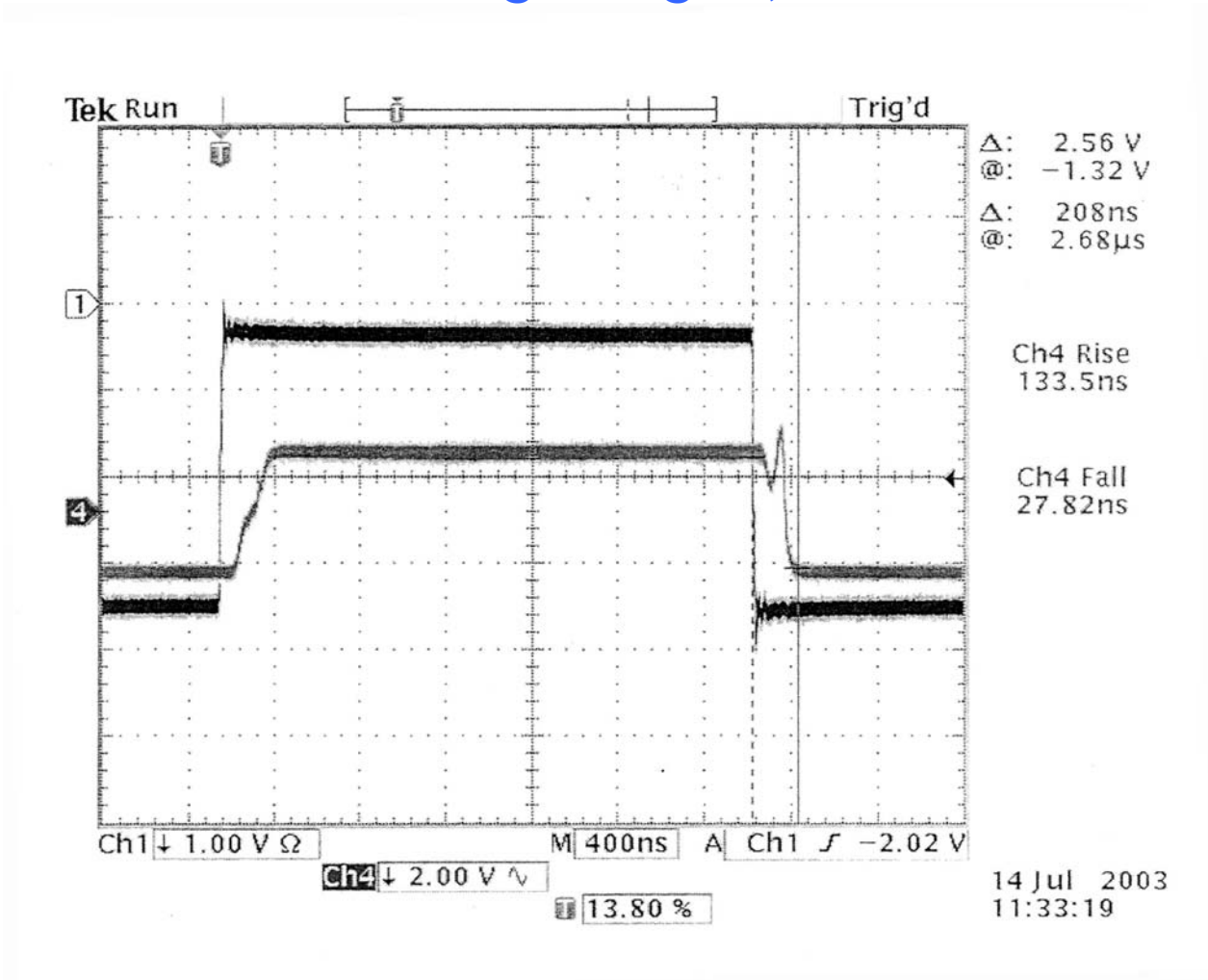


PULSE MODULATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB





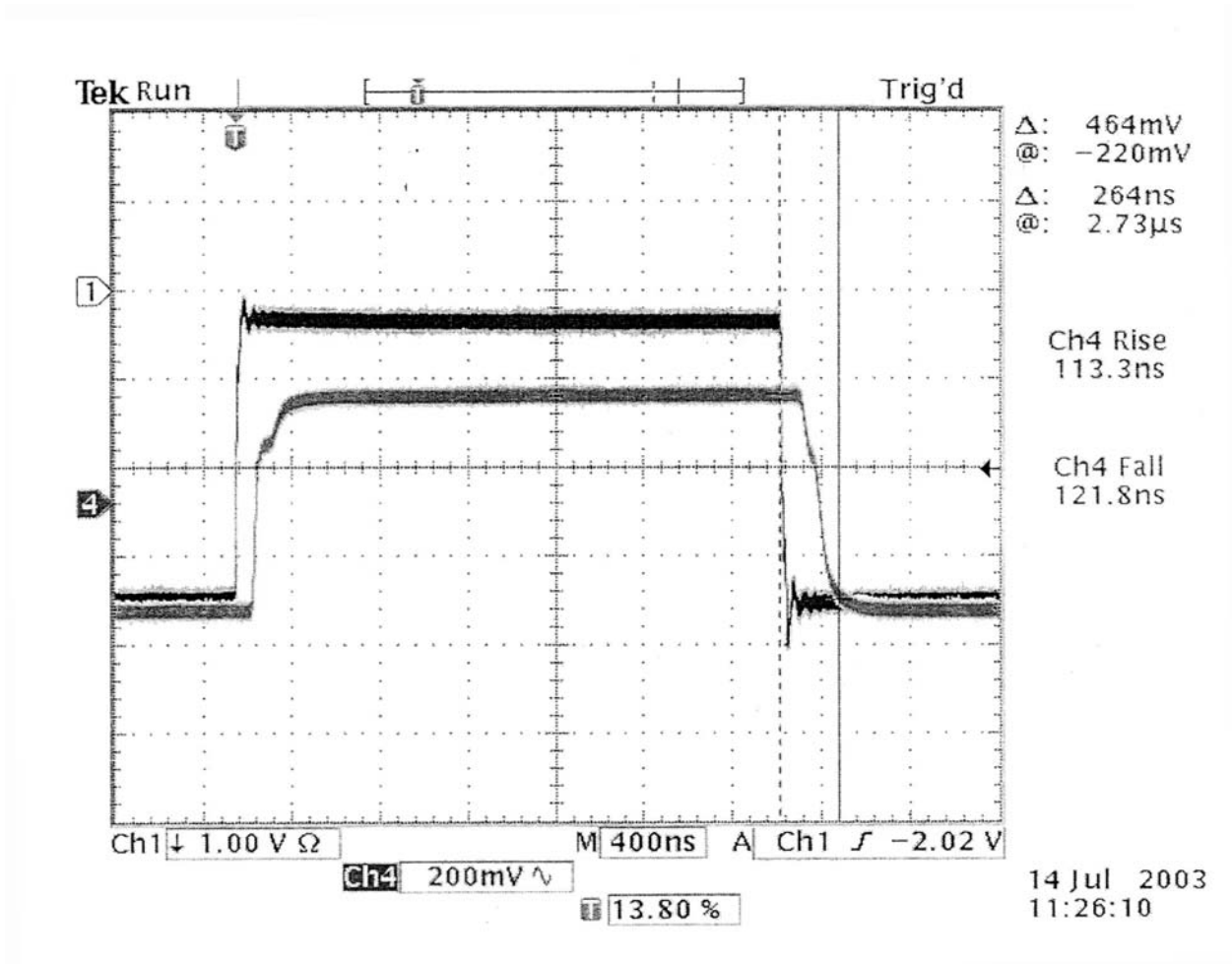
SP5T SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

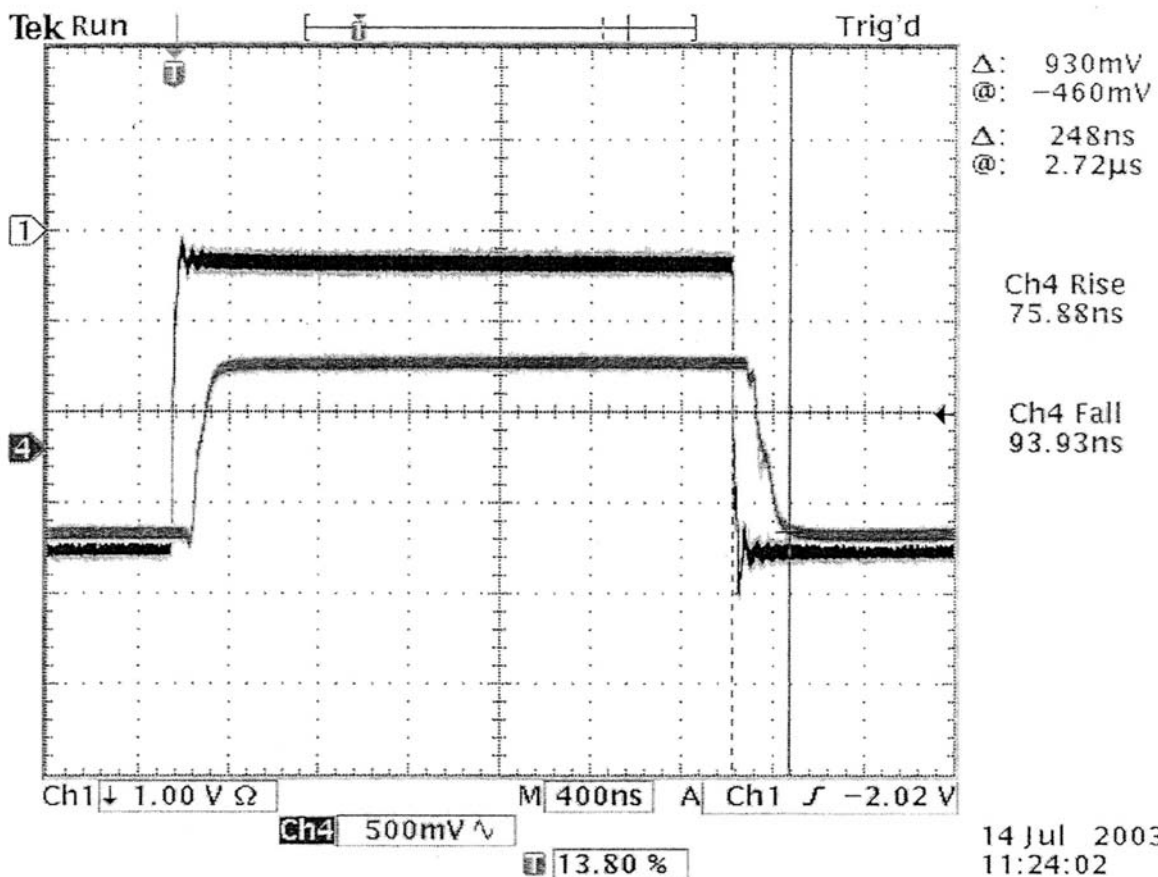
Reference: 10 dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

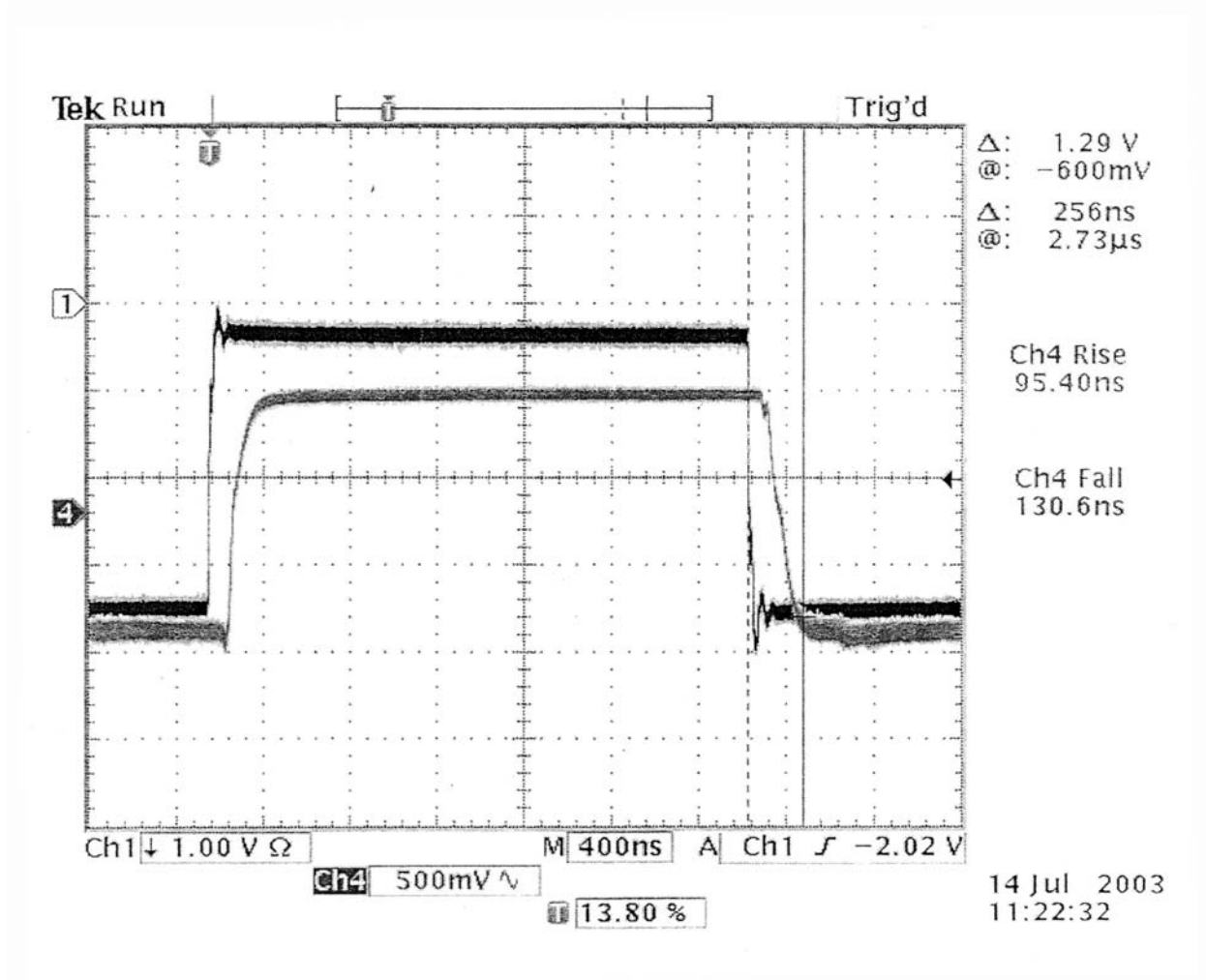
Reference: 20 dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

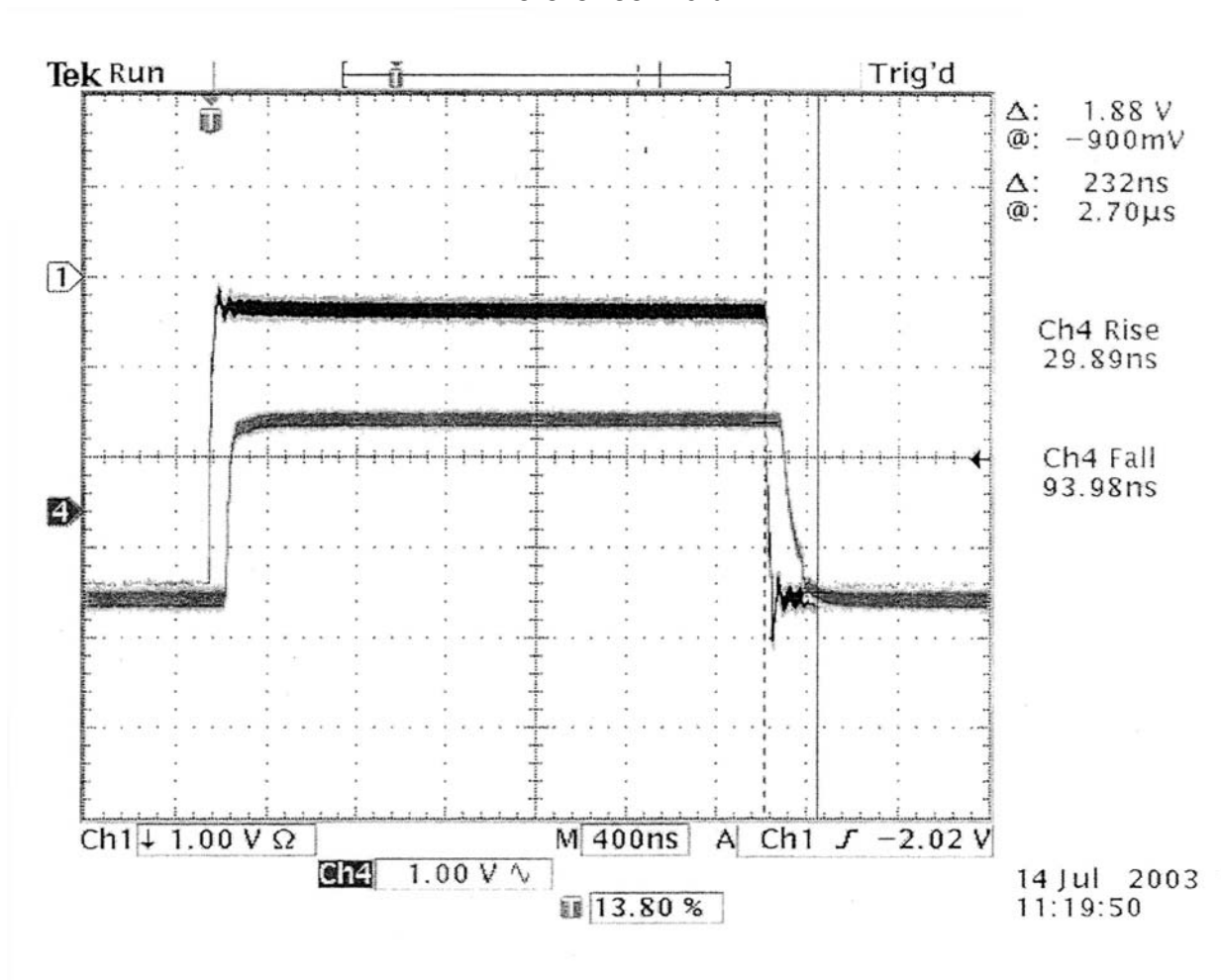
Reference: 30 dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

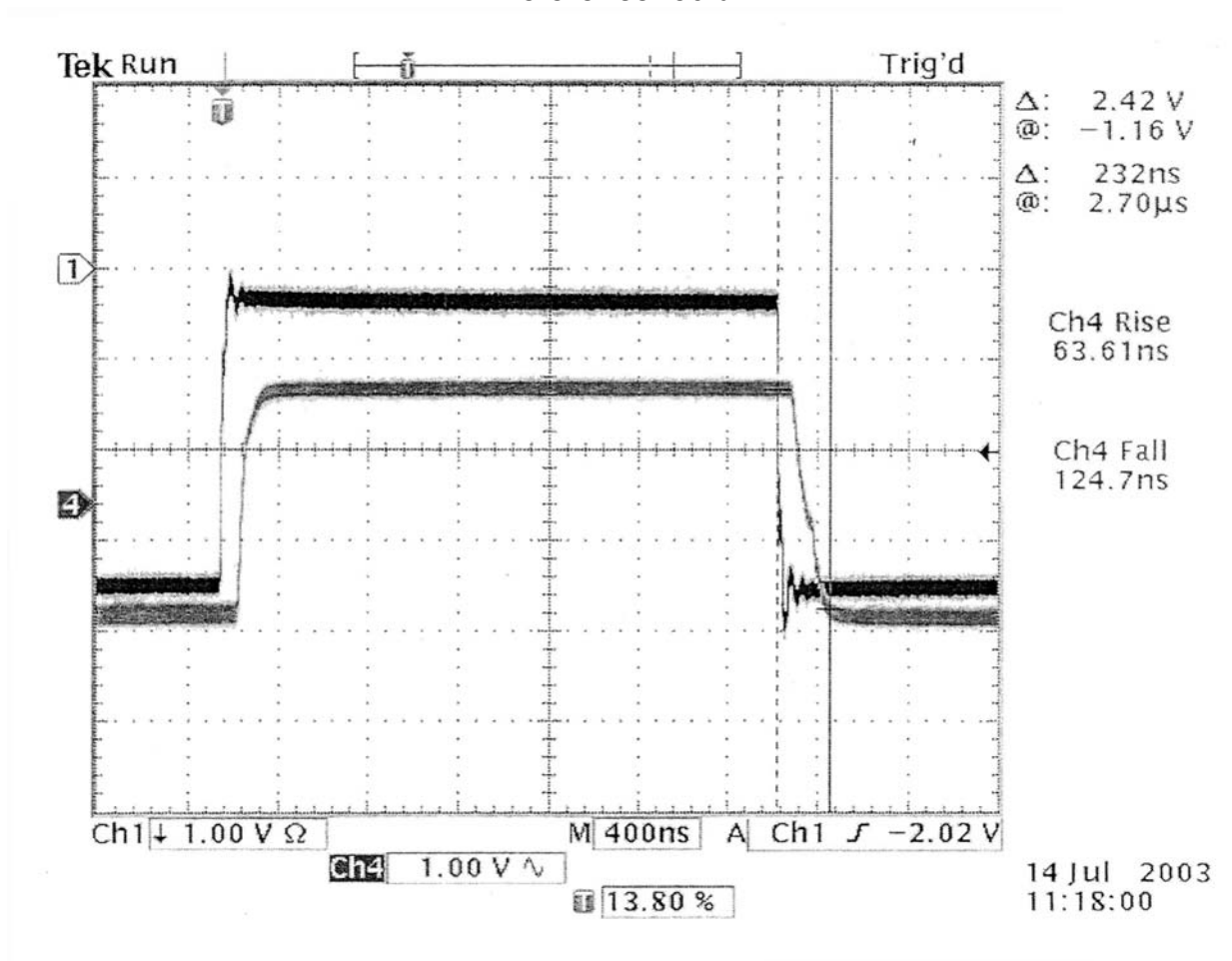
Reference: 40 dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

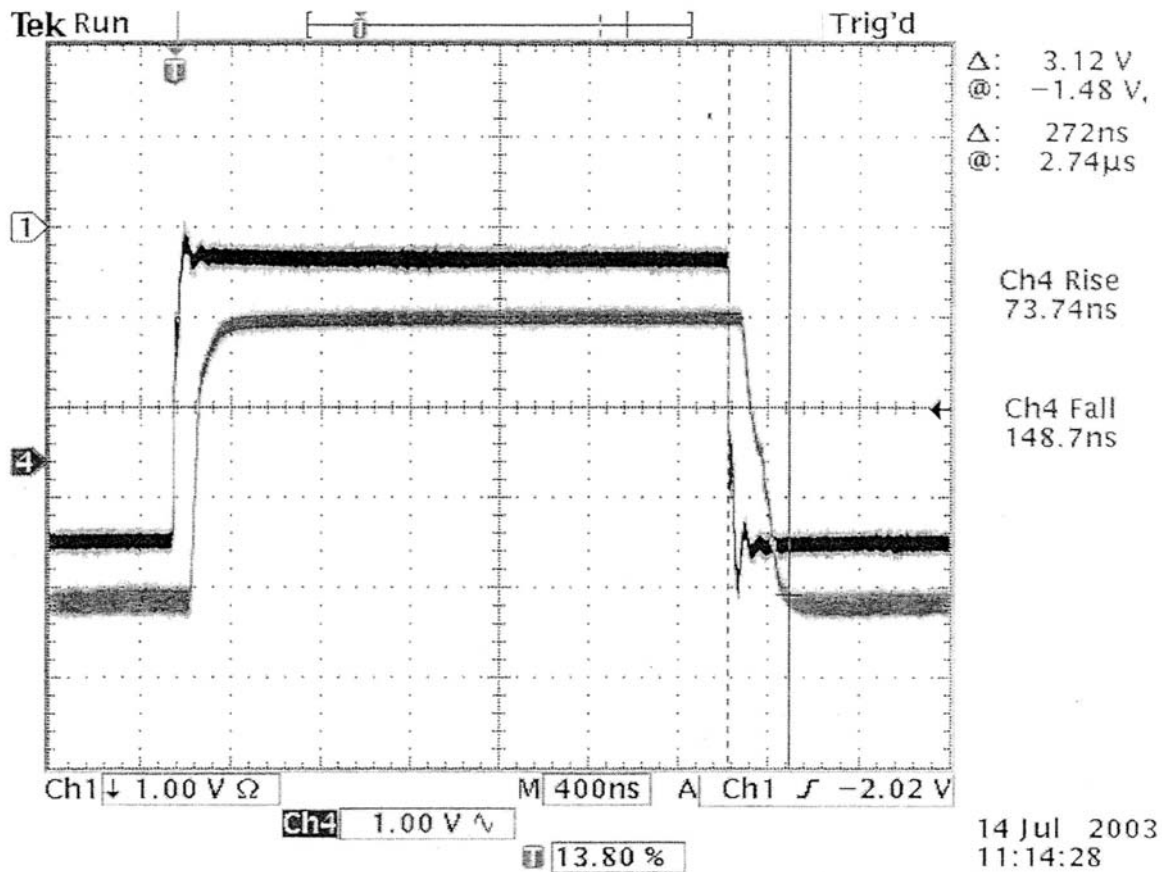
Reference: 50 dB





ATTENUATOR SWITCHING SPEED
-15.5 dBm RF INPUT @ 2.0 GHz @ 25°C, DLVA 50 mV/dB

Reference: 64 dB





SUMMARY TEST DATA
AS
PRESENTED TO CUSTOMER

Serial Numbers:
PM308093, PM308094, PM308095 and PM308096



FORM: LBDFM-FINAL-DTA



PLANAR MONOLITHICS INDUSTRIES
 7311-G GROVE ROAD, FREDERICK, MD 21704
 TEL: 301-631-1579 FAX: 301-662-2029
 URL: WWW.PLANARMONOLITHICS.COM
 EMAIL: SALES@PLANARMONOLITHICS.COM

SUMMARY TEST DATA
 ON

LOW BAND DIRECTION FINDING MODULE (LBDFM)

CUSTOMER: CUBIC DEFENSE SYSTEMS, INC. JOB NO: 21237E
 MODEL NO: LBDFM-052-BD-DP TESTED BY: H. Hahn
 PART NO: 915350027 TEMPERATURE: -20°C TO +40°C
 SERIAL NO: PM 308093 DATE: 10/6/03

Table 1 - Standard Test Conditions

PARAGRAPH	PARAMETER	VALUE	UNITS
3.1	Frequency Range	500 - 2000	MHz
3.2	RF Input Power	+5 to +8	dBm
3.3	Spurious RF Input	-60	dBc Maximum
3.3	Harmonic RF Input	-10	dBc Maximum
3.4	Input Signal / Noise	70	dB Minimum

Table 2 - Test Results

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.5	With +5dBm Input and P(out) CP ≤ 0.9 dB	+14.0	dBm Minimum	+14.31 dBm	
3.6	Output Spurious	-60	dBc Maximum	-60 dBc	
3.6	Output Harmonics	-60	dBc Maximum	-62 dBc	
3.7	Noise Figure	8.5	dB Maximum	8.5 dB	
3.8	Amplitude Taper	8.0	dB p-p Maximum	8 dB	
3.9	Fine Grain Flatness	3.0	dB p-p Maximum	3 dB	
3.10	VSWR Input / Output	2.0:1	Ratio Maximum	2.0:1	
3.11.1	P-Mod Control	Low=Loss	TTL "0" = Low	"0"	
3.11.2	P-Mod Isolation	-60	dBc Maximum	61 dB	
3.11.3	P-Mod Rise/Fall Time	10	Nanosec Maximum	6 nS	
3.11.4	P-Mod Delay Time	N/A	Not Specified	N/A	
3.11.5	P-Mod Delay Sym	10	Nanosec Maximum	2 nS	
3.11.6	P-Mod Video Gen.	-60	dBm Maximum	-60 dBm	
3.12.1	Atten. Range	64	dB Mean	64 dB	
3.12.2	Number of Bits	8	Absolute	8	
3.12.3	LSB Value	0.25	dB Nominal	0.25	
3.12.4	TTL Control (+ True)	b0=LSB	Absolute	LSB	
3.12.5	Resolution	0.25	dB Absolute	0.25	
3.12.6	Commands	0=00h	dB Relative	0=00h	
3.12.7	0 - 20dB Flatness	± 1.0	dB Maximum	See plot	
3.12.7	20 - 40dB Flatness	± 2.0	dB Maximum		
3.12.7	40 - 60dB Flatness	± 3.0	dB Maximum		
3.12.7	60 - 64dB Flatness	± 4.0	dB Maximum		



MODEL NO: LBDFM-052-BD-DP

PART NO: 915350027

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.12.8	0 – 20dB Accuracy	± 1.0	dB Maximum		
3.12.8	20 – 40dB Accuracy	± 1.5	dB Maximum		see
3.12.8	40 – 60dB Accuracy	± 2.0	dB Maximum		plot
3.12.8	60 – 64dB Accuracy	± 3.0	dB Maximum		
3.12.9	Atten. Switching Time	700	Nanosec Maximum	400 μ S	
3.12.10	Atten. Repeat (1 dB)	0.125	dB Maximum	0.125 dB	
3.12.10	Atten Repeat (32 dB)	0.125	dB Maximum	0.125 dB	
3.13.2	Band Switching Time	700	Nanosec Maximum	700 μ S	
3.14	+5 VDC Current	250	Milliamps Maximum	190 mA	
3.14	+15 VDC Current	700	Milliamps Maximum	442 mA	
3.14	-15 VDC Current	250	Milliamps Maximum	52 mA	
3.14	DCV Ripple ((p-p),	250	MV 40kHz – 40 MHz	250 mV	
4.0	Mechanical	In Accordance With (IAW) Fig. 2		Yes	
5.0	Environmental	N/A		N/A	
6.0	Test Data	IAW Contract		Yes	
7.0	Reparability	IAW Contract or This SCD		Yes	

PRODUCTION MANAGER APPROVAL:

DATED: 10/07/03

QA / QC APPROVAL:

[Signature]
 02

DATED: 10/07/03



FORM: LBDFM-FINAL-DTA



PLANAR MONOLITHICS INDUSTRIES
 7311-G GROVE ROAD, FREDERICK, MD 21704
 TEL: 301-631-1579 FAX: 301-662-2029
 URL: WWW.PLANARMONOLITHICS.COM
 EMAIL: SALES@PLANARMONOLITHICS.COM

SUMMARY TEST DATA
 ON

LOW BAND DIRECTION FINDING MODULE (LBDFM)

CUSTOMER: CUBIC DEFENSE SYSTEMS, INC. JOB NO: 21237E
 MODEL NO: LBDFM-052-BD-DP TESTED BY: H. Hahn
 PART NO: 915350027 TEMPERATURE: -20°C TO +40°C
 SERIAL NO: PM308094 DATE: 10/6/03

PARAGRAPH	PARAMETER	VALUE	UNITS
3.1	Frequency Range	500 - 2000	MHz
3.2	RF Input Power	+5 to +8	dBm
3.3	Spurious RF Input	-60	dBc Maximum
3.3	Harmonic RF Input	-10	dBc Maximum
3.4	Input Signal / Noise	70	dB Minimum

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.5	With +5dBm Input and P(out) CP ≤ 0.9 dB	+14.0	dBm Minimum	+14.13 dBm	
3.6	Output Spurious	-60	dBc Maximum	-60 dBc	
3.6	Output Harmonics	-60	dBc Maximum	-60 dBc	
3.7	Noise Figure	8.5	dB Maximum	8.5 dB	
3.8	Amplitude Taper	8.0	dB p-p Maximum	8 dB	
3.9	Fine Grain Flatness	3.0	dB p-p Maximum	3 dB	
3.10	VSWR Input / Output	2.0:1	Ratio Maximum	2.0:1	
3.11.1	P-Mod Control	Low=Loss	TTL "0" = Low	0	
3.11.2	P-Mod Isolation	-60	dBc Maximum	-60 dB	
3.11.3	P-Mod Rise/Fall Time	10	Nanosec Maximum	4 nS	
3.11.4	P-Mod Delay Time	N/A	Not Specified	N/A	
3.11.5	P-Mod Delay Sym	10	Nanosec Maximum	0 nS	
3.11.6	P-Mod Video Gen.	-60	dBm Maximum	-60 dBm	
3.12.1	Atten. Range	64	dB Mean	64 dB	
3.12.2	Number of Bits	8	Absolute	8	
3.12.3	LSB Value	0.25	dB Nominal	0.25	
3.12.4	TTL Control (+ True)	b0=LSB	Absolute	LSB	
3.12.5	Resolution	0.25	dB Absolute	0.25	
3.12.6	Commands	0=00h	dB Relative	0=00h	
3.12.7	0 - 20dB Flatness	± 1.0	dB Maximum		
3.12.7	20 - 40dB Flatness	± 2.0	dB Maximum		
3.12.7	40 - 60dB Flatness	± 3.0	dB Maximum		
3.12.7	60 - 64dB Flatness	± 4.0	dB Maximum		see plot



MODEL NO: LBDFM-052-BD-DP

PART NO: 915350027

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.12.8	0 – 20dB Accuracy	± 1.0	dB Maximum		
3.12.8	20 – 40dB Accuracy	± 1.5	dB Maximum		See Plot
3.12.8	40 – 60dB Accuracy	± 2.0	dB Maximum		
3.12.8	60 – 64dB Accuracy	± 3.0	dB Maximum		
3.12.9	Atten. Switching Time	700	Nanosec Maximum	300nS	
3.12.10	Atten. Repeat (1 dB)	0.125	dB Maximum	0.125	
3.12.10	Atten Repeat (32 dB)	0.125	dB Maximum	0.125	
3.13.2	Band Switching Time	700	Nanosec Maximum	< 700nS	
3.14	+5 VDC Current	250	Milliamps Maximum	190nA	
3.14	+15 VDC Current	700	Milliamps Maximum	439nA	
3.14	-15 VDC Current	250	Milliamps Maximum	48nA	
3.14	DCV Ripple ((p-p)	250	MV 40kHz – 40 MHz	250mV	
4.0	Mechanical	In Accordance With (IAW) Fig. 2		Yes	
5.0	Environmental	N/A		N/A	
6.0	Test Data	IAW Contract		Yes	
7.0	Reparability	IAW Contract or This SCD		Yes	

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DATED: 10/07/03



FORM: LBDFM-FINAL-DTA



PLANAR MONOLITHICS INDUSTRIES
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 TEL: 301-631-1579 FAX: 301-662-2029
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 EMAIL: SALES@PLANARMONOLITHICS.COM

SUMMARY TEST DATA
 ON

LOW BAND DIRECTION FINDING MODULE (LBDFM)

CUSTOMER: CUBIC DEFENSE SYSTEMS, INC. JOB NO: 21237E
 MODEL NO: LBDFM-052-BD-DP TESTED BY: H. Hahn
 PART NO: 915350027 TEMPERATURE: -20°C TO +40°C
 SERIAL NO: PM308095 DATE: 10/6/03

Table 1 - Standard Test Conditions

PARAGRAPH	PARAMETER	VALUE	UNITS
3.1	Frequency Range	500 - 2000	MHz
3.2	RF Input Power	+5 to +8	dBm
3.3	Spurious RF Input	-60	dBc Maximum
3.3	Harmonic RF Input	-10	dBc Maximum
3.4	Input Signal / Noise	70	dB Minimum

Table 2 - Test Results

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.5	With +5dBm Input and P(out) CP ≤ 0.9 dB	+14.0	dBm Minimum	+14.79 dBm	
3.6	Output Spurious	-60	dBc Maximum	-60 dBc	
3.6	Output Harmonics	-60	dBc Maximum	-57.8 @ 1.25 GHz -64.4 @ 1.9 GHz	
3.7	Noise Figure	8.5	dB Maximum	< 8.5 dB	
3.8	Amplitude Taper	8.0	dB p-p Maximum	< 8 dB	
3.9	Fine Grain Flatness	3.0	dB p-p Maximum	< 3 dB	
3.10	VSWR Input / Output	2.0:1	Ratio Maximum	2.0:1	
3.11.1	P-Mod Control	Low=Loss	TTL "0" = Low	"0"	
3.11.2	P-Mod Isolation	-60	dBc Maximum	61 dB	
3.11.3	P-Mod Rise/Fall Time	10	Nanosec Maximum	8 nS	
3.11.4	P-Mod Delay Time	N/A	Not Specified	N/A	
3.11.5	P-Mod Delay Sym	10	Nanosec Maximum	3 nS	
3.11.6	P-Mod Video Gen.	-60	dBm Maximum	-60 dBm	
3.12.1	Atten. Range	64	dB Mean	64 dB	
3.12.2	Number of Bits	8	Absolute	8	
3.12.3	LSB Value	0.25	dB Nominal	0.25	
3.12.4	TTL Control (+ True)	b0=LSB	Absolute	LSB	
3.12.5	Resolution	0.25	dB Absolute	0.25	
3.12.6	Commands	0=00h	dB Relative	0=00h	
3.12.7	0 - 20dB Flatness	± 1.0	dB Maximum		
3.12.7	20 - 40dB Flatness	± 2.0	dB Maximum		see plot
3.12.7	40 - 60dB Flatness	± 3.0	dB Maximum		
3.12.7	60 - 64dB Flatness	± 4.0	dB Maximum		



MODEL NO: LBDFM-052-BD-DP

PART NO: 915350027

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.12.8	0 - 20dB Accuracy	± 1.0	dB Maximum		see plot
3.12.8	20 - 40dB Accuracy	± 1.5	dB Maximum		
3.12.8	40 - 60dB Accuracy	± 2.0	dB Maximum		
3.12.8	60 - 64dB Accuracy	± 3.0	dB Maximum		
3.12.9	Atten. Switching Time	700	Nanosec Maximum	400 nS	
3.12.10	Atten. Repeat (1 dB)	0.125	dB Maximum	0.125	
3.12.10	Atten Repeat (32 dB)	0.125	dB Maximum	0.125	
3.13.2	Band Switching Time	700	Nanosec Maximum	< 700 nS	
3.14	+5 VDC Current	250	Milliamps Maximum	190 mA	
3.14	+15 VDC Current	700	Milliamps Maximum	405 mA	
3.14	-15 VDC Current	250	Milliamps Maximum	56 mA	
3.14	DCV Ripple ((p-p)	250	MV 40kHz - 40 MHz	250 mV	
4.0	Mechanical	In Accordance With (IAW) Fig. 2		Yes	
5.0	Environmental	N/A		N/A	
6.0	Test Data	IAW Contract		Yes	
7.0	Reparability	IAW Contract or This SCD		Yes	

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DATED: 10/07/03

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FORM: LBDFM-FINAL-DTA



PLANAR MONOLITHICS INDUSTRIES
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SUMMARY TEST DATA
 ON

LOW BAND DIRECTION FINDING MODULE (LBDFM)

CUSTOMER: CUBIC DEFENSE SYSTEMS, INC. JOB NO: 21237E
 MODEL NO: LBDFM-052-BD-DP TESTED BY: *H. Hahn*
 PART NO: 915350027 TEMPERATURE: -20°C TO +40°C
 SERIAL NO: *PM 308096* DATE: *10/2/03*

Table 1 - Standard Test Conditions

PARAGRAPH	PARAMETER	VALUE	UNITS
3.1	Frequency Range	500 - 2000	MHz
3.2	RF Input Power	+5 to +8	dBm
3.3	Spurious RF Input	-60	dBc Maximum
3.3	Harmonic RF Input	-10	dBc Maximum
3.4	Input Signal / Noise	70	dB Minimum

Table 2 - Test Results

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.5	With +5dBm Input and P(out) CP ≤ 0.9 dB	+14.0	dBm Minimum	<i>+14.17 dBm</i>	
3.6	Output Spurious	-60	dBc Maximum	<i>-60 dBc</i>	
3.6	Output Harmonics	-60	dBc Maximum	<i>-56 dB @ 1.25 GHz on 14</i>	
3.7	Noise Figure	8.5	dB Maximum	<i>< 8.5 dB</i>	
3.8	Amplitude Taper	8.0	dB p-p Maximum	<i>< 8 dB</i>	
3.9	Fine Grain Flatness	3.0	dB p-p Maximum	<i>< 3 dB</i>	
3.10	VSWR Input / Output	2.0:1	Ratio Maximum	<i>2.0:1</i>	
3.11.1	P-Mod Control	Low=Loss	TTL "0" = Low	<i>0°</i>	
3.11.2	P-Mod Isolation	-60	dBc Maximum	<i>61 dB</i>	
3.11.3	P-Mod Rise/Fall Time	10	Nanosec Maximum	<i>4 ns</i>	
3.11.4	P-Mod Delay Time	N/A	Not Specified	<i>n/A</i>	
3.11.5	P-Mod Delay Sym	10	Nanosec Maximum	<i>6 ns</i>	
3.11.6	P-Mod Video Gen.	-60	dBm Maximum	<i>-60 dBm</i>	
3.12.1	Atten. Range	64	dB Mean	<i>64</i>	
3.12.2	Number of Bits	8	Absolute	<i>8</i>	
3.12.3	LSB Value	0.25	dB Nominal	<i>0.25</i>	
3.12.4	TTL Control (+ True)	b0=LSB	Absolute	<i>LSB</i>	
3.12.5	Resolution	0.25	dB Absolute	<i>0.25</i>	
3.12.6	Commands	0=00h	dB Relative	<i>0=00h</i>	
3.12.7	0 - 20dB Flatness	± 1.0	dB Maximum		
3.12.7	20 - 40dB Flatness	± 2.0	dB Maximum		
3.12.7	40 - 60dB Flatness	± 3.0	dB Maximum		
3.12.7	60 - 64dB Flatness	± 4.0	dB Maximum		<i>see plot</i>



MODEL NO: LBDFM-052-BD-DP

PART NO: 915350027

PARA.	PARAMETER	LIMIT(S)	UNITS	ACTUAL	REMARKS QA/QC
3.12.8	0 – 20dB Accuracy	± 1.0	dB Maximum		see plot
3.12.8	20 – 40dB Accuracy	± 1.5	dB Maximum		
3.12.8	40 – 60dB Accuracy	± 2.0	dB Maximum		
3.12.8	60 – 64dB Accuracy	± 3.0	dB Maximum		
3.12.9	Atten. Switching Time	700	Nanosec Maximum	200ns	
3.12.10	Atten. Repeat (1 dB)	0.125	dB Maximum	0.125	
3.12.10	Atten Repeat (32 dB)	0.125	dB Maximum	0.125	
3.13.2	Band Switching Time	700	Nanosec Maximum	<700ns	
3.14	+5 VDC Current	250	Milliamps Maximum	190mA	
3.14	+15 VDC Current	700	Milliamps Maximum	438mA	
3.14	-15 VDC Current	250	Milliamps Maximum	48mA	
3.14	DCV Ripple ((p-p)	250	MV 40kHz – 40 MHz	150mV	
4.0	Mechanical	In Accordance With (IAW) Fig. 2		Yes	
5.0	Environmental	N/A		n/a	
6.0	Test Data	IAW Contract		Yes	
7.0	Reparability	IAW Contract or This SCD		Yes	

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