EMC LABORATORY

Report No: MCW/99/006 **Issued:** 15th March 1999

Equipment under Test: Alcatel 16 UA Channel MUI Card.

Client Name: Celestica Ltd

Written by:...C. Wilson.....

Authorised by:.....D-L. BALL

Report Copy No: 1 **Test Date:** 13/01/99 – 23/02/99

Contract Ref. No: Q98320/00

PRODUCT RECEIVED: 13/01/99 **DESPATCHED:** 23/02/99

TEST LOCATION: Celestica EMC Test Site
Winsford

SUMMARY:

S1. FCC part 15.109 [15.33(b)(1), 15.35(b)]: The EUT (The Alcatel 16 UA Channel MUI Card), conforms to the standard.
See section 8.0 for details.

S2 Test report from CELESTICA on Alcatel 16 UA Channel MUI Card to CISPR Publication 22 Class B limits with the methodology in accordance with ANSI C63.4 (1992). Frequency range extended in accordance with FCC part 15.33(b)(1).

The CELESTICA Winsford 10 metre Test Facility is compliant with the requirements of section 2.948 of the FCC rules and is listed with the FCC.

TABLE OF CONTENTS

APPENDICES

1.0 CLIENT INFORMATION

CLIENT: Celestica Ltd

ADDRESS: Westfields House
West Avenue
Kidsgrove
Stoke-on-Trent
Staffordshire
ST7 1TL

Tel. No: +44 1782 771000

Fax. No: +44 1782 784210

CONTACT: Mr Mike Wilshaw

2.0 TESTED SYSTEM DETAILS:

2.1 Equipment Under Test (EUT):

Description: 16 UA Channel MUI Card (Internal)
Manufacturer: Alcatel Ltd
Serial No: P1121

Cables: 32 Internal twisted pair Screened Cable with 50 Way RJ21 connection at PC end and 16 RJ11 connections at remote end for connection to data generation equipment.

2.2 Support Equipment:

Description: PC OptiPlex GXi
Manufacturer: Dell
Model No: DCS
Serial No: LWF71
FCC Ident: E2KZERL
Power Cord: 2 metre unscreened

Description: In-Line Mains Filter
Manufacturer: Roxburgh Ltd.
Model No: PMF 6
FCC Ident: Not Applicable
Connection: IEC
Power Cord: 2 metre unscreened

Description: Monitor
Manufacturer: IIYAMA Electric Co. Ltd
Model No: MF-8515G
Serial No: 7046894
FCC Ident: F971596E02
Power Cord: 2 metre unscreened

2.2 Support Equipment: - continued

Description:	Mouse
Manufacturer:	Compaq
Model No:	M-S34
Part No:	141189-401
FCC Ident:	DZL211029
Connection:	PS/2 Mouse Port
Cord:	PS/2 connection 6 pin mini-din 2 metre screened cable

Description:	Keyboard
Manufacturer:	Compaq
Part No:	166514-B31
Serial No:	BOB940B39FB51E
FCC Ident:	AQ6-72BC15
Connection:	PS/2 Keyboard Port
Cord:	PS/2 6 pin mini-din 2 metre screened

Description:	Printer
Manufacturer:	HP
Model No:	C4555A
Serial No:	SG69I160JT
FCC Ident:	894C4555X
Connection:	Parallel Port
Cord:	Parallel cable 1.5 metre screened.

Description:	Modem
Manufacturer:	Multi-Tech
Model No:	MT1932ZDXK
Serial No:	784907
FCC Ident:	AU7USA-20673-MM-E
Connection:	Serial Port.
Cable:	2 metre screened serial cable; AWM E101344 2464 VW-1 60°C 300V 28AWG SPACE SHUTTLE CSA LL80671 AWM II A/B 80°C 300V FT1

Description:	Camera
Manufacturer:	VSI Vision Ltd
Model No:	Vision PPC2
Serial No:	G0998800038U
FCC Ident:	MT2433503
Connection:	USB Port
Cable:	SUNF Fully rated USB Cable 28/20AWG E132276 (UL) Type CM 75°C AWG 28/20 CSA LL64151 AWM II A/B 80°C 150V FT4, Screened, 2m length.

2.2 Support Equipment: - continued

Description:	Mouse
Manufacturer:	Cypress Semiconductor
Model No:	7-895MOUSE
Serial No:	K3007075
FCC Ident:	FSUGMZFG
Connection:	USB Port.
Cable:	1.2m, 4 core screened USB cable.

Description:	Speakers
Manufacturer:	Creative Labs
Model No:	Pro Digital HI-FI System
Serial No:	PEH1064
FCC Ident:	Not Applicable
Connection:	Audio Port.
Cable:	1m unscreened twin core cable

Description:	Uni-Directional Dynamic Microphone
Manufacturer:	Realistic
Part No:	33-9031
FCC Ident:	Not Applicable
Connection:	Microphone Inlet Socket
Cable:	1.5m length screened.

Description:	Headphones
Manufacturer:	Ross
Model No:	RMH-300
FCC Ident:	Not Applicable
Cable:	1.5m length screened.

3.0 TEST SPECIFICATIONS, METHODS AND PROCEDURES, FACILITY:

3.1 Test Specifications.

CISPR Publication 22 (1994) Class B Limits - (ANSI C63.4 (1992) Test Methodology).
Above 1000MHz: FCC Part 15.109. [15.33(b)(1), 15.35(b)] Class B Limits - (ANSI C63.4 (1992) Test Methodology).

3.2 Title of Specifications.

Limits and methods of measurement of radio interference characteristics of information technology equipment.

Federal Communications Commission - The Code of Federal Regulations (10/01/94).

3.3 Methods & Procedures.

The measurement procedure was carried out in accordance with ANSI 63.4 (1992).

3.4 Methods & Procedures Title.

American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment.

3.5 Description of Facility.

The open area test site and conducted measurement facility used for the test is located 200 metres underground at the Winsford Salt Works, Bradford Road, Winsford, UK. This 10 metre site has been fully described in a report dated 24 March 1994 which was submitted to FCC and accepted in return letter (31040/SIT, 1300B3) dated 30 June 1994.

3.6 Purpose of Test.

To determine whether the equipment under test fulfils the requirements of the specification for the purposes of certification.

3.7 Date of Test.

13.01.99, 15.01.99, 23.01.99.

3.8 Climatic Conditions.

Climatic conditions recorded during the testing:-

Open Area Test Site :	
a) Ambient temperature	18.0 °C
b) Relative humidity	49%
c) Atmospheric pressure	100.0 kPa
Screened Room:	
a) Ambient temperature	17.1 °C
b) Relative humidity	59%
c) Atmospheric pressure	101.4 kPa

4.0 ADDITIONS TO, DEVIATIONS OR EXCLUSIONS FROM TEST SPECIFICATIONS:

4.1 The open area test site is 200 metres underground and the ambient RF level is below 0dBμV. All radiated measurements up to 1000MHz both preliminary and final, were carried out at the specified distance of 10 metres.
Above 1000MHz, all radiated measurements were carried out at the specified distance of 3 metres.

4.2 The Maximum EUT oscillator frequency was 266MHz, Therefore tests were performed up to 2000MHz in accordance with FCC part 15.33(b)(1).

4.3 Due to the amount of support equipment present, the wooden tables on which the EUT was placed had to be longer than the specified 1.5m.

5.0 DESCRIPTION OF EUT

5.1 General Description & Modifications

The EUT is a 16 UA Channel MUI PCI Card that plugs into a PCI slot in a PC and provides 16 UA communication channels on an RJ21 connector. These channels are Alcatels propreitary equivalent of ISDN.
Software to exercise the card is down loaded to the on board RAM and executed. The software used to exercise all 16 channels was developed using the Paradign embedded 186 compiler.

Supporting PC System:

1 x Dell OptiPlex Gxi PC
1 x Roxburgh In-Line Mains Filter
1 x IIYAMA Monitor
1 x Compaq Mouse
1 x Compaq Keyboard
1 x HP Printer
1 x Multi-Tech Modem
1 x VSI Vision USB Camera
1 x Cypress Semiconductor USB Mouse
1 Pair of Creative Labs Speakers
1 x Realistic Microphone
1 Pair of Headphones.

5.2 Operating Modes:

The EUT was tested with all 16 UA Channels exercised.

5.3 Configuration and Peripherals:

The EUT (Alcatel 16 UA Channel MUI Card) was configured to exercise all 16 UA Channels. The supporting PC was configured so that each port had a device connected to it.

5.4 Potential Interference Sources:

266MHz PC Processor clock

EUT Master Clock frequencies:-
8kHz, 12.8MHz, 16.384MHz, 65.536MHz

5.5 Interference Suppression Measures:

EMI Chokes on UA Channel Outputs.
EMI Chokes on +5v feed onto EUT.
EMI Chokes on DC (DC Convertor Input)
Filter networks on all clock signals.

5.6 EMC Modifications:

None required. EUT tested as presented for test.

5.7 Configuration of Tested system:

Details of configuration of tested system are shown in block diagram Figure 5.1.

5.8 Block Diagram of EUT:

Block diagram of EUT is shown in Figure 5.2.

5.9 Photograph of Tested Configuration:

5.9.1 Photographs of EUT: Figure 5.3

5.9.2 Test configuration photographs of conducted measurement test: Figure 5.4.

5.9.3 Test configuration photographs of radiated measurement test: Figures 5.5 and 5.6

Figure 5.1 Configuration of Tested System

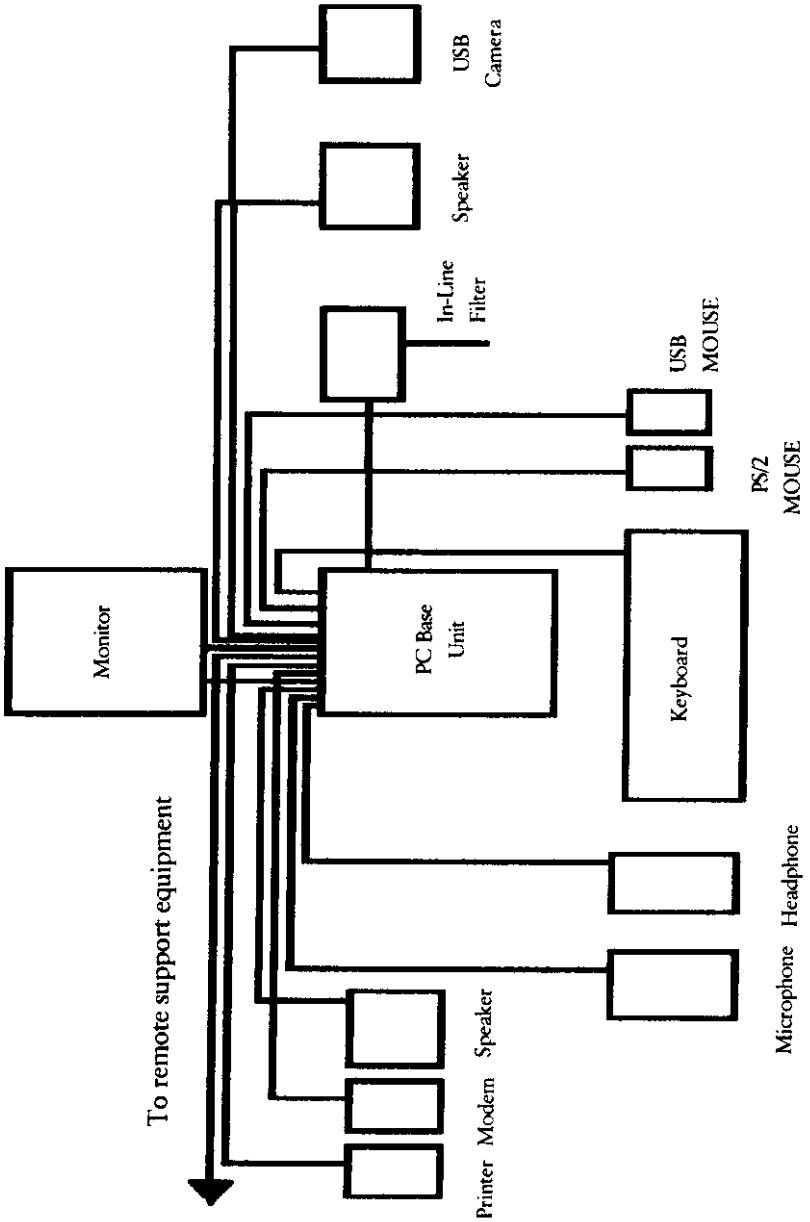
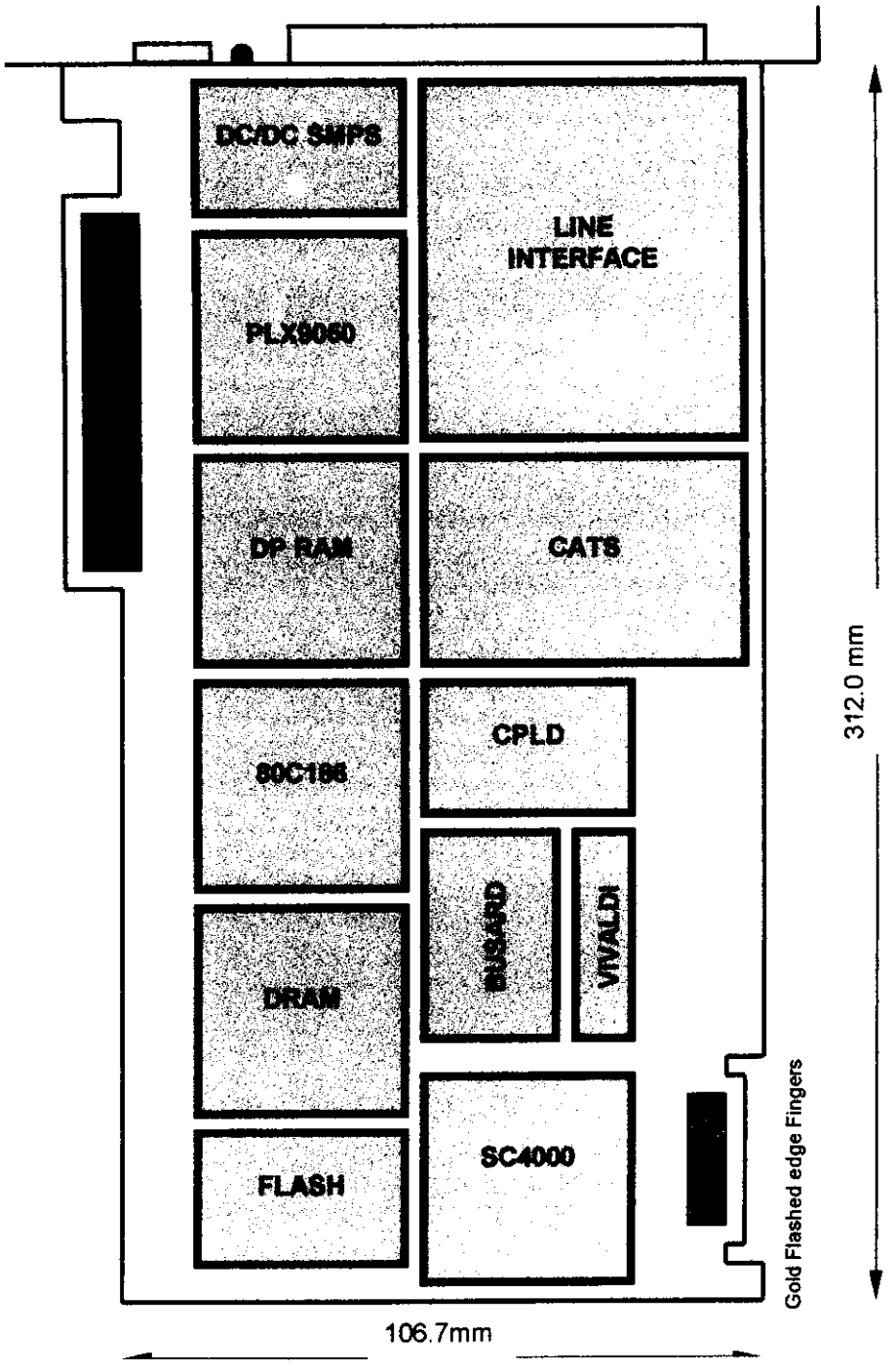


Figure 5.2 Block Diagram of EUT



6.0 MEASUREMENT, EXAMINATION & DERIVED RESULTS.

6.1 General Comments:

6.1.1 For both radiated and conducted measurement. Initial scans were carried out as required by ANSI C63.4: 1992. The initial scans were carried out with the measuring receivers in peak detection mode to determine the emission characteristics of the EUT and frequencies of interest to be maximised. All final measurements up to 1000MHz were made with the receiver in the CISPR detector (Quasi-Peak) mode as specified in the CISPR Publication 22 (1994), test specification (Class B limits); and above 1000MHz with the receiver in Peak and Average modes, as specified in FCC Part 15.35(b), test specification (Class B Limits).

6.1.2 All emission plots, both radiated and conducted, shown in this report, were obtained with the measuring receiver set to Peak detector mode.

6.1.3 All the final measurements, in table form, both radiated and conducted, shown in this report were obtained with the measuring receiver set to Quasi-Peak detector mode for measurements up to 1GHz. Above 1GHz, Peak and Average detectors were used.

6.1.4 Prior to making measurements, the pulse generator was used to verify correct operation of the test equipment.

6.1.5 All the equipment under test was supplied from single phase, neutral and earth 120V rms. 60Hz mains supply.

6.2 Conducted Emission Data:

6.2.1 Test Software Used - As detailed in Para. 5.2.

6.2.2 The conducted emission test was performed in the screened room enclosure. The EUT was arranged as detailed in specification, ANSI C63.4 (1992) sections 6 and 11. The EUT was placed on a wooden bench and the floor and wall of the screened room used as the ground and vertical planes. Photograph, Figure 5.4 shows the test configuration.

6.2.3 Preliminary measurements were performed by repetitively scanning the measuring receiver from 150kHz to 30MHz in Peak detector and Max hold modes. The bandwidth of the receiver used was 9kHz. Conducted interference voltage measurements were made on line and neutral mains supply to the EUT with variability of EUT cable positions. Plots of the preliminary measurements carried out are shown in Appendix 2: Preliminary Measurement Plots - Conducted Emission Data.

6.2.4 Final measurements were made using a receiver, incorporating Quasi-Peak and Average detectors as prescribed in Section 1 of CISPR Publication 16, the bandwidth of the receiver used was 9kHz. Readings were measured using a measurement time of > 1 second and observation time > 15 seconds. Conducted interference voltage measurements were made on line and neutral mains supply to the EUT. Of those emissions less than 20dB below the limit, final measurements were recorded of at least six highest emission frequencies relative to the limit.
Measurements in Quasi-Peak meeting the specification Average limit comply with the specification requirement.

6.2.5 For both emission measurements, preliminary and final, the LISN and cable losses were included in the measuring receiver.

6.2.6 Conducted Interference Voltage Measurements.

Readings and results of the maximum observed levels for EN55022 Class B are shown in tabular form below.

Mains Supply 120V nominal - EUT (Alcatel 16 UA Channel MUI Card inside DELL PC)

Frequency MHz	Interference Voltage dBµV		Spec. limit dBµV 55022 B		Margin inside Spec. dB
	QP	AV	QP	AV	
0.157	53.1	52.9	65.6	55.6	2.7
0.219	43.3	42.9	62.8	52.8	9.9
0.250	45.4	45.2	61.8	51.8	6.6
3.752	45.5	44.2	56.0	46.0	1.8
9.215	40.8	39.3	60.0	50.0	10.7
9.897	41.4	39.0	60.0	50.0	11.0
11.950	46.8	44.0	60.0	50.0	6.0
12.630	47.4	46.1	60.0	50.0	3.9
20.140	38.9	37.6	60.0	50.0	12.4
20.820	39.3	37.7	60.0	50.0	12.3

Note 1. All the above readings conform to specification.

Laboratory records are maintained for all data.

6.3 Radiated Emission Data:

6.3.1 Test Software Used - As detailed in Para. 5.2.

6.3.2 The test was performed on the open area test site details of which are shown in section 3.5 of this report. The EUT was arranged as detailed in specification, ANSI C63.4 (1992) sections 6 and 11. The EUT was placed on a wooden bench with the bench located at the centre of the test site turntable.
Photograph, Figure 5.5 shows the test configuration.

6.3.3 Preliminary measurements were performed by repetitively scanning the measuring receiver from 30MHz to 1000MHz, and from 1000MHz to 2000MHz in Peak detector and Max hold modes. Preliminary radiated emission measurements were made on the EUT of maximum field strength associated with full variability of:-

1) EUT azimuth
2) antenna height (1.5m below 1000MHz. 1.0m, 2.0m and 4.0m above 1000MHz).
3) antenna polarisation (vertical and horizontal).
4) cable movement.

Plots of the preliminary measurements carried out are shown in Appendix 2: Preliminary Measurement Plots - Radiated Emission Data.

6.3.4 Final measurements were made using a receiver incorporating Quasi-Peak, Average and Peak detectors as prescribed in Section 1 of CISPR Publication 16, the bandwidth of the receiver used was 120kHz for frequencies up to 1000MHz, and 1MHz for frequencies above 1000MHz. Readings were measured using a measurement time of > 1 second and observation time > 15 seconds. Of those emissions less than 20dB below the limit, final measurements were recorded of at least six highest emission frequencies relative to the limit.
Records depict maximum field strength associated with full variability of:-

1) EUT azimuth
2) antenna height (1 to 4 m)
3) antenna polarisation (vertical and horizontal).
4) cable movement.

6.3.5 For both emission measurements, preliminary and final, the antenna and cable losses were included in the measuring receiver.

6.3.6 Radiated Interference Emission Data.

Readings and results of the maximum observed levels for EN55022 Class B are shown in tabular form below.

Mains Supply 120V Nominal

Freq MHz	Az deg	Ht cm	Pol V/H	Field Strength dBμV/m @ 10m	Spec. EN55022 B dBμV/m @ 10m	Margin inside Spec. dB
31.057	201	100	V	24.3	30.0	5.7
48.013	223	100	V	24.7	30.0	5.3
52.474	056	100	V	21.1	30.0	8.9
216.040	188	116	V	25.8	30.0	4.2
567.694	245	160	H	34.5	37.0	2.5
994.678	305	150	V	30.7	37.0	6.3

Note 1. All the above readings conform to specification.

Laboratory records are maintained for all data.

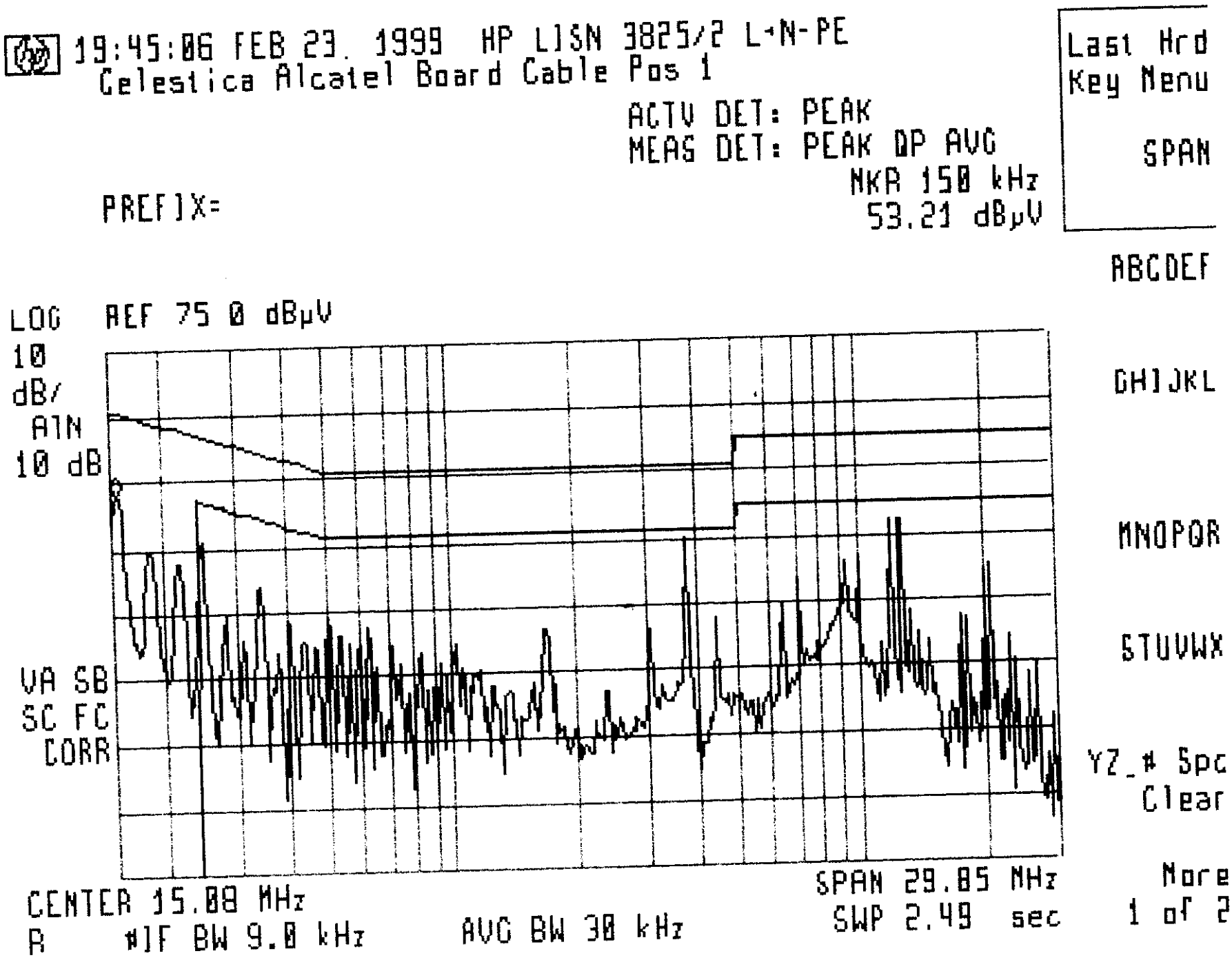
Readings and results of the maximum observed levels for FCC Part 15.109 Class B, between 1000 and 2000MHz are shown in tabular form below.

Mains Supply 120V Nominal

Freq GHz	Az deg	Ht cm	Pol V/H	Field Strength dBμV/m @ 3m		Spec. FCC Class B dBμV/m @ 3m		Margin inside Spec. dB
				Pk	Av	Pk	Av	
1.0161	000	100	V	38.1	27.0	74.0	54.0	27.0
1.0500	000	100	V	37.7	26.1	74.0	54.0	27.9
1.0652	350	100	V	39.6	30.7	74.0	54.0	23.3
1.0838	000	100	V	39.9	31.1	74.0	54.0	22.9
1.1062	000	100	V	41.5	35.1	74.0	54.0	18.9
1.1277	017	100	V	41.3	29.0	74.0	54.0	25.0

Note 2. All The above readings conform to specification.

Laboratory records are maintained for all data.


19:45:06 FEB 23, 1999 HP LISN 3825/2 L-N-PE
Celestica Alcatel Board Cable Pos 1
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 150 kHz
53.21 dBµV
PREFIX=
Last Hrd Key Menu
SPAN
ABCDEF
GHIJKL
MNOPQR
STUVWX
YZ_# Spc
Clear
More
1 of 2
LOG
10
dB/
ATN
10 dB
REF 75 0 dBµV
VA SB
SC FC
CORR
CENTER 15.00 MHz
RBW 9.0 kHz
AVG BW 30 kHz
SPAN 29.85 MHz
SWP 2.49 sec

7.0 MEASUREMENT UNCERTAINTY

The measurement uncertainty for a confidence level of 95% is calculated using statistical analysis.

7.1 RFI Conducted Mains EN55022: ± 2.59dBμV.

7.2 RFI Radiated Emission EN55022: 30-1000MHz: ± 3.12dBμV/m.

RFI Radiated Emission FCC Part 15.109: 1000-2000MHz: Not Available.

8.0 CONFORMANCE STATEMENT

8.1 Conducted Interference Voltage Mains to CISPR 22, EN55022: 1994 Table 2 Class B. Frequency range 150kHz to 30MHz: The EUT conforms to standard with a minimum margin of 1.8dB.

8.2 RFI Radiated Emission to CISPR 22, EN55022: 1994 Table 4 Class B. Frequency range 30 to 1000MHz. The EUT conforms to standard with a minimum margin 2.5dB.

RFI Radiated Emission to FCC Part 15.109 [15.33(b)(1), 15.35(b)] Class B, Frequency range 1000 - 2000MHz: The EUT conforms to the standard with a minimum margin of 18.9dB.

8.3 Overall Test Result: The EUT complied with CISPR 22 Class B limits with the test procedures as given in ANSI C63.4 (1992).

The EUT complied with FCC Part 15.109 [15.33(b)(1), 15.35(b)] Class B limits above 1000MHz, with the test procedure given in ANSI C63.4 (1992)

9.0 RECOMMENDATIONS AND COMMENTS:

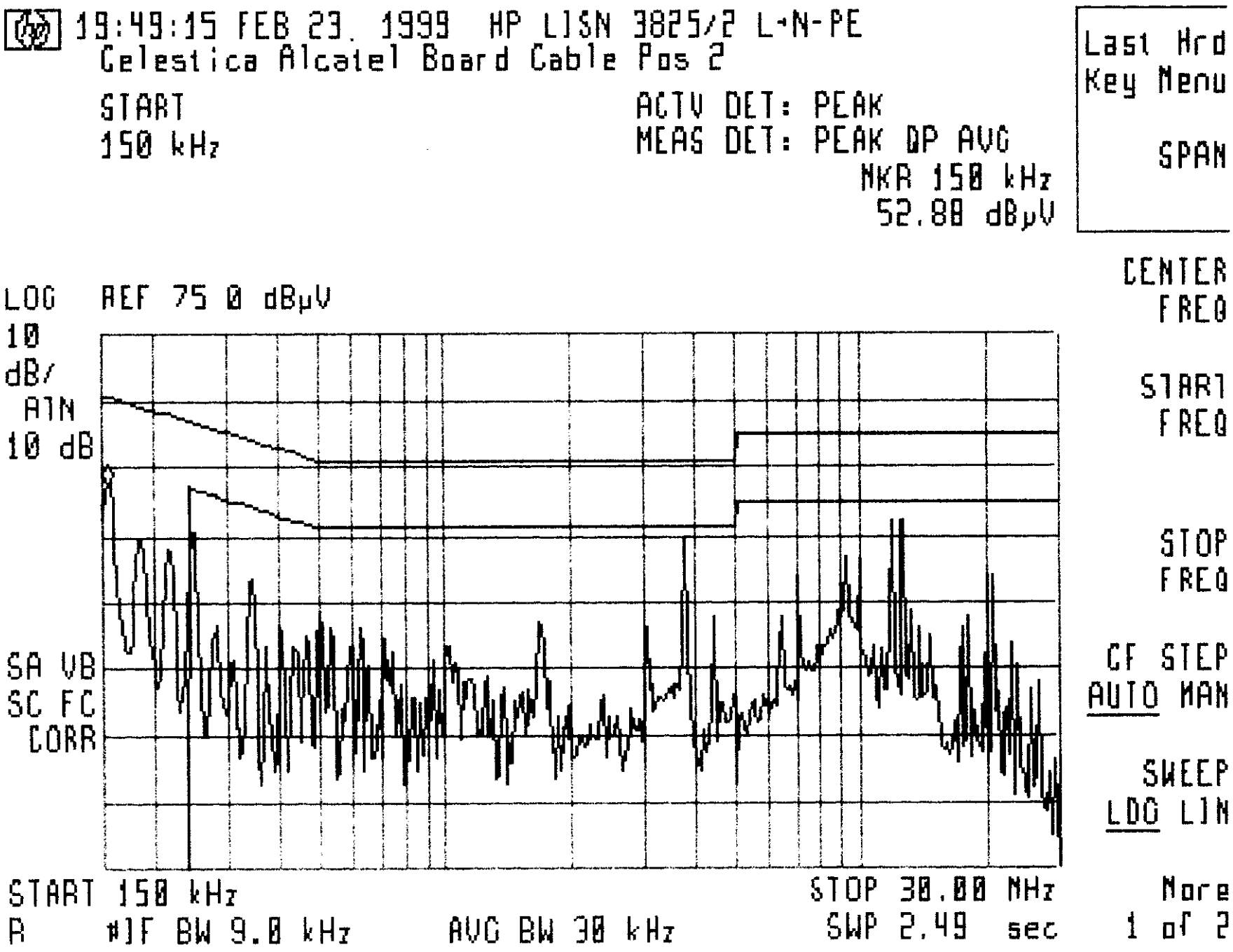
9.1 None required.

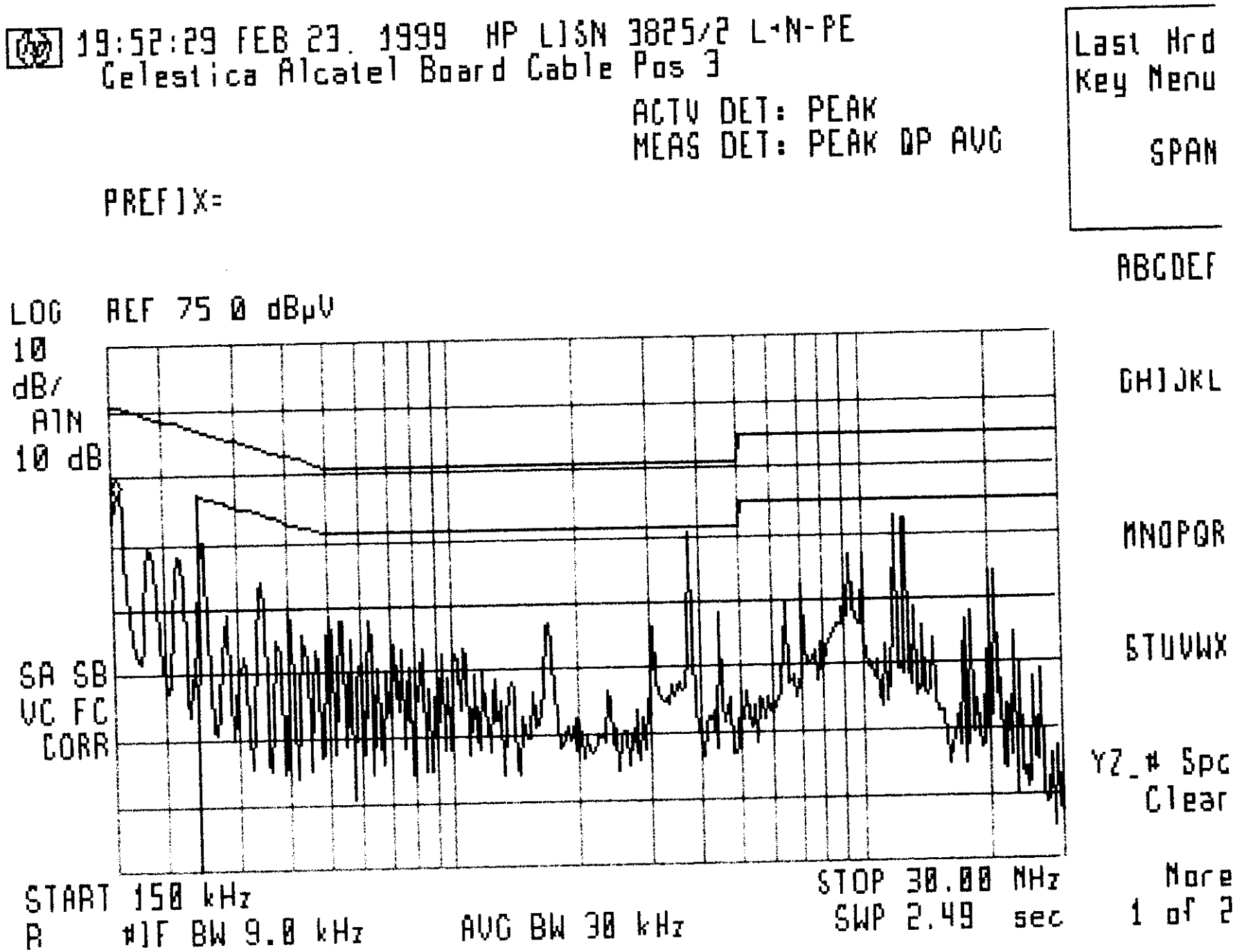
Appendix 1: Test Equipment Used.

Description		Serial Number
Chase Pulse Generator PG1511		5316
Antenna		01
HP 8542E EMI Receiver		3549A00160
HP 85420E RF Filter Section		3427A00155
Bilog Antenna (30 - 1000MHz) Chase CBL6111B		2052
Antenna Cable		WNS/CABLE01
	plus	WNS/CABLE02
Horn Antenna SAS-200/571		284
Antenna Cable HP 64639		N9611878
Chase LISN Network MN2050		1631
LISN HP (EMCO) 3825/2		9605 2564
LISN Cable		WNS/CABLE15

Appendix 2: Preliminary Measurement Plots.
- Continued

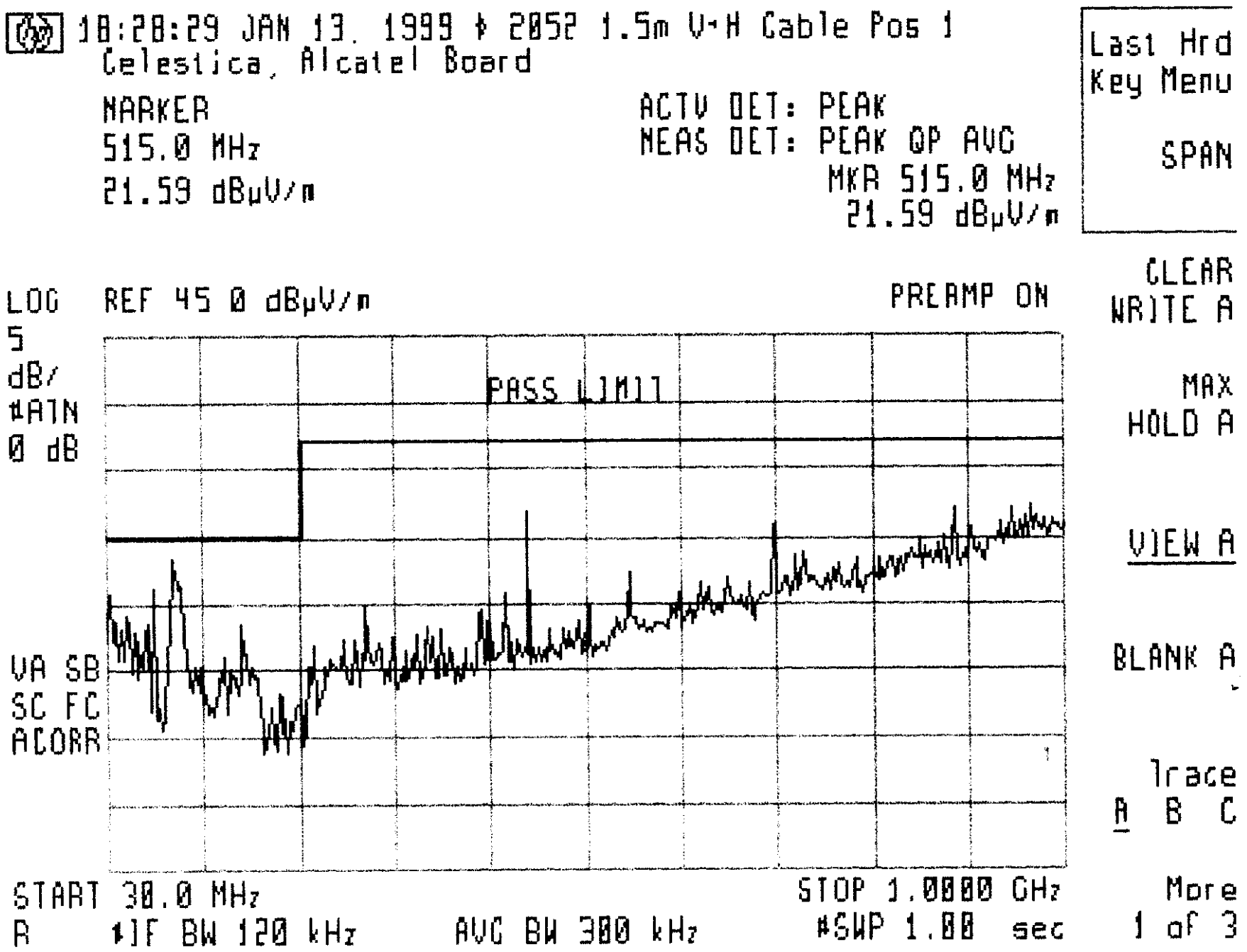
RFI Conducted Emission Mains - 0.15 to 30MHz. – (3 Cable positions investigated – 3 plots)

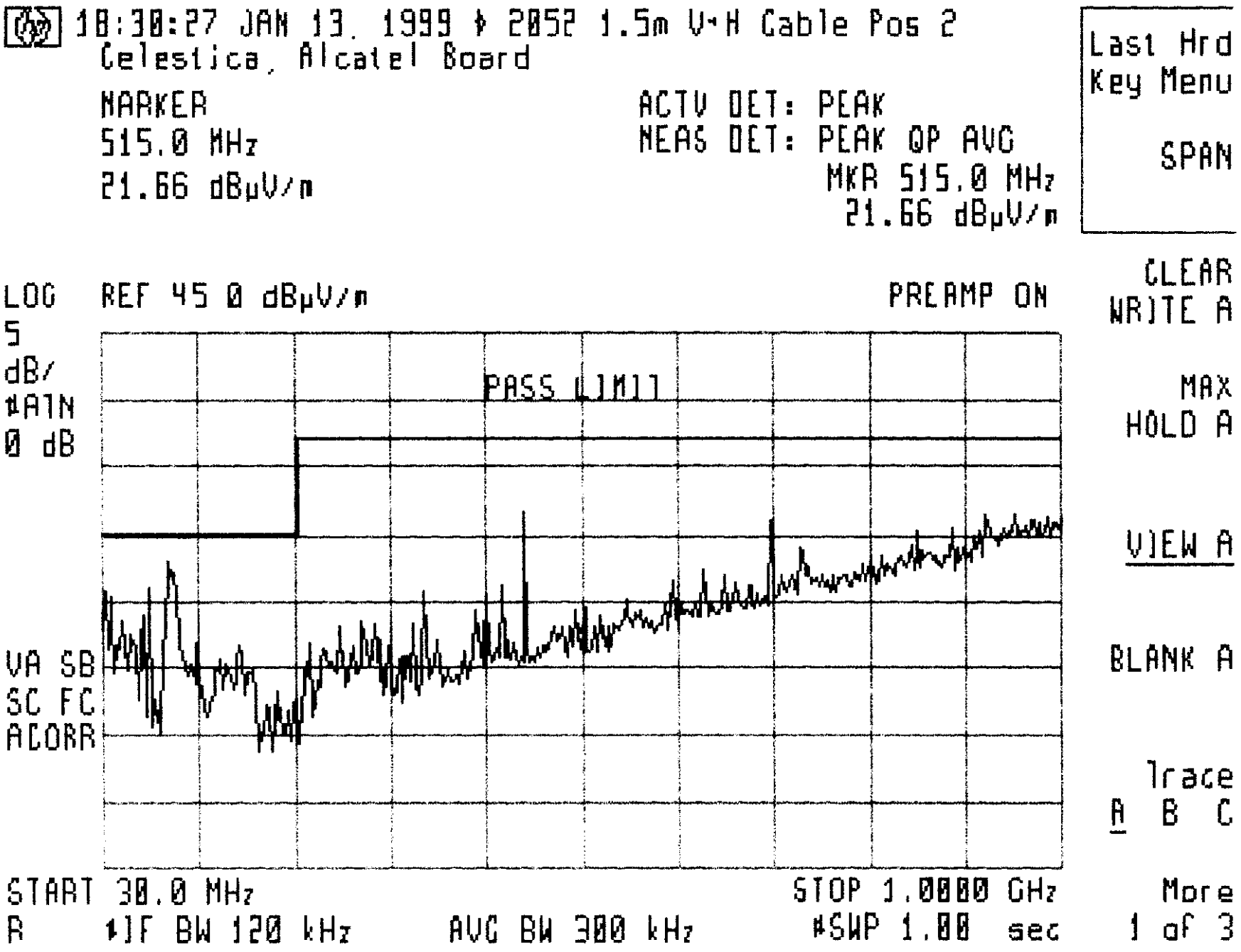

19:49:15 FEB 23, 1999 HP LISN 3825/2 L-N-PE
Celestica Alcatel Board Cable Pos 2
START
150 kHz
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 150 kHz
52.88 dBµV
Last Hrd Key Menu
SPAN
LOG REF 75 0 dBµV
10
dB/
ATN
10 dB
SA VB
SC FC
CORR
CENTER FREQ
START FREQ
STOP FREQ
CF STEP
AUTO MAN
SWEEP
LOG LIN
More
1 of 2
START 150 kHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 30.00 MHz
SWP 2.49 sec
R

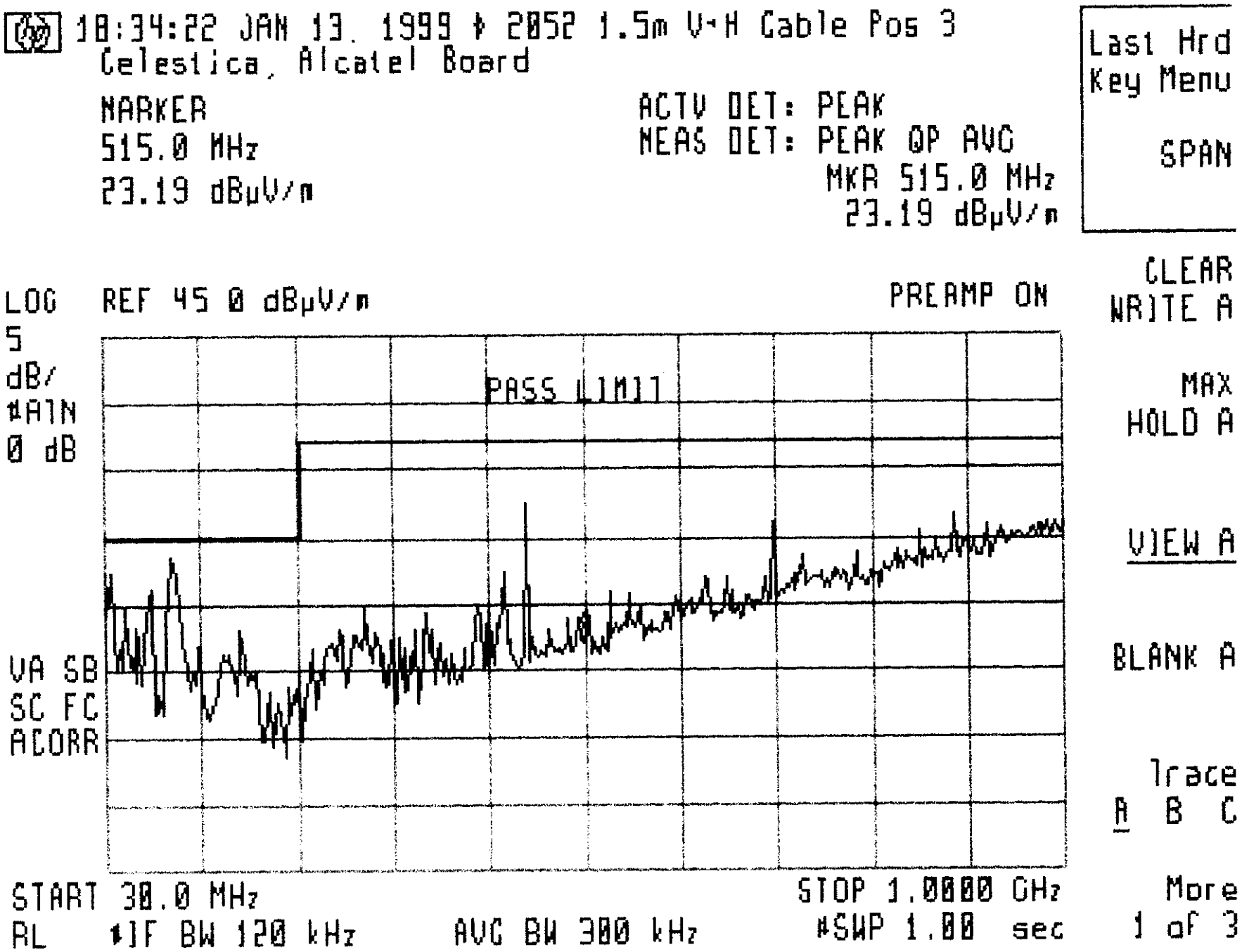

19:52:29 FEB 23, 1999 HP LISN 3825/2 L-N-PE
Celestica Alcatel Board Cable Pos 3
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
PREFIX=
Last Hrd Key Menu
SPAN
ABCDEF
GHIJKL
MNOPQR
STUVWX
YZ_# Spc
Clear
More 1 of 2
LOG 10 dB/
REF 75 0 dBµV
ATN 10 dB
SA SB VC FC CORR
START 150 kHz
#IF BW 9.0 kHz
AVG BW 30 kHz
STOP 30.00 MHz
SWP 2.49 sec

Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 30 to 1000MHz Horizontal and Vertical Polarisation's - Investigation of worst case cable position. (3 Cable positions investigated - 3 plots).

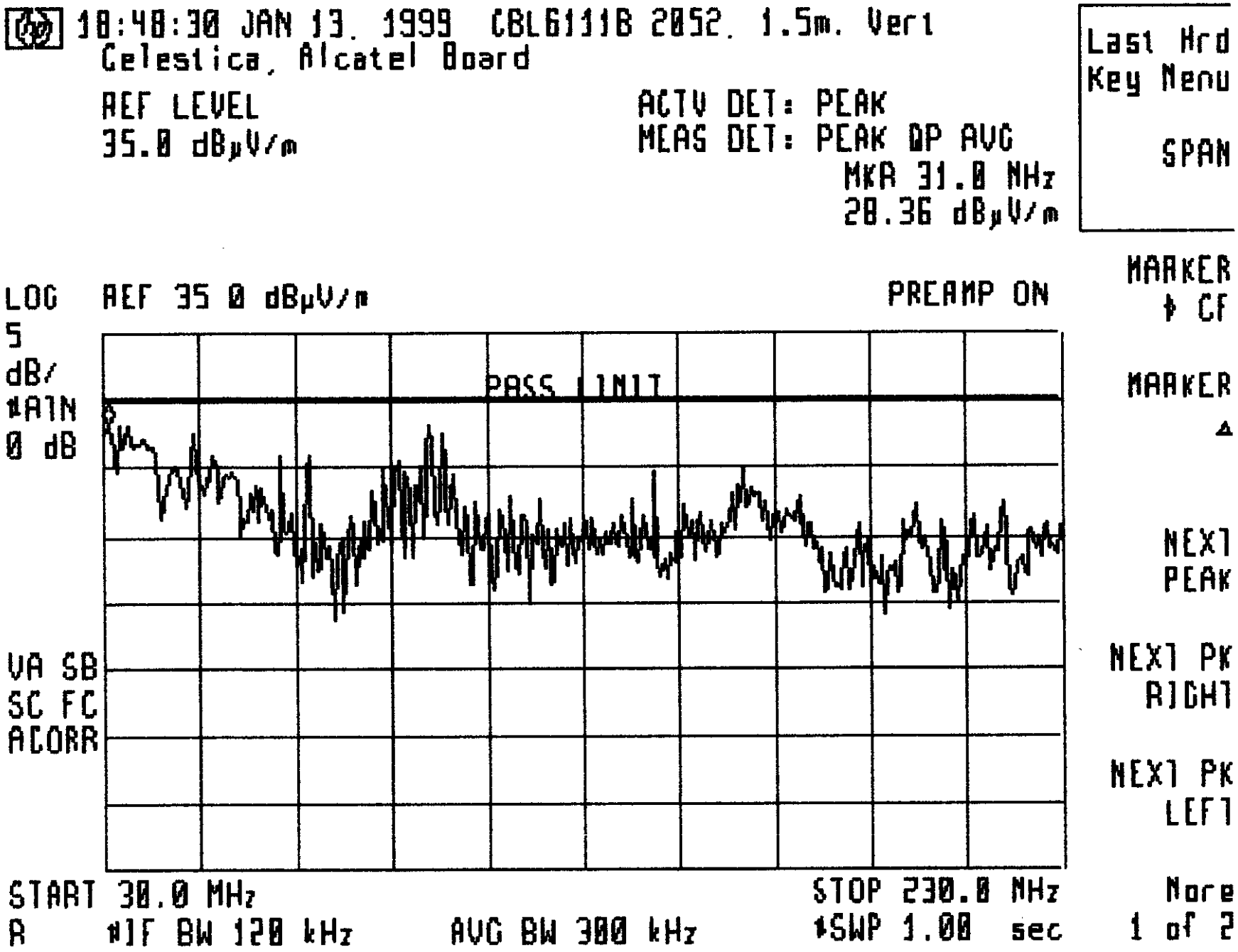

10:28:29 JAN 13, 1999 # 2052 1.5m V-H Cable Pos 1
Celestica, Alcatel Board
MARKER
515.0 MHz
21.59 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 515.0 MHz
21.59 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 45.0 dBµV/m
PREAMP ON
PASS LIMIT
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
ACORR
START 30.0 MHz
#IF BW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 1.00 sec


18:30:27 JAN 13, 1999 # 2052 1.5m V-H Cable Pos 2
Celestica, Alcatel Board
MARKER
515.0 MHz
21.66 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 515.0 MHz
21.66 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 45.0 dBµV/m
PREAMP ON
PASS [LIM1]
VA SB
SC FC
ACORR
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
START 30.0 MHz
#RES BW 120 kHz
VBW 300 kHz
STOP 1.0000 GHz
#SWP 1.00 sec
More
1 of 3


18:34:22 JAN 13, 1999 # 2052 1.5m V+H Cable Pos 3
Celestica, Alcatel Board
MARKER
515.0 MHz
23.19 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 515.0 MHz
23.19 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 45 0 dBµV/m
PREAMP ON
PASS LIM1
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
ACORR
START 30.0 MHz
RL
#IF BW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 1.00 sec

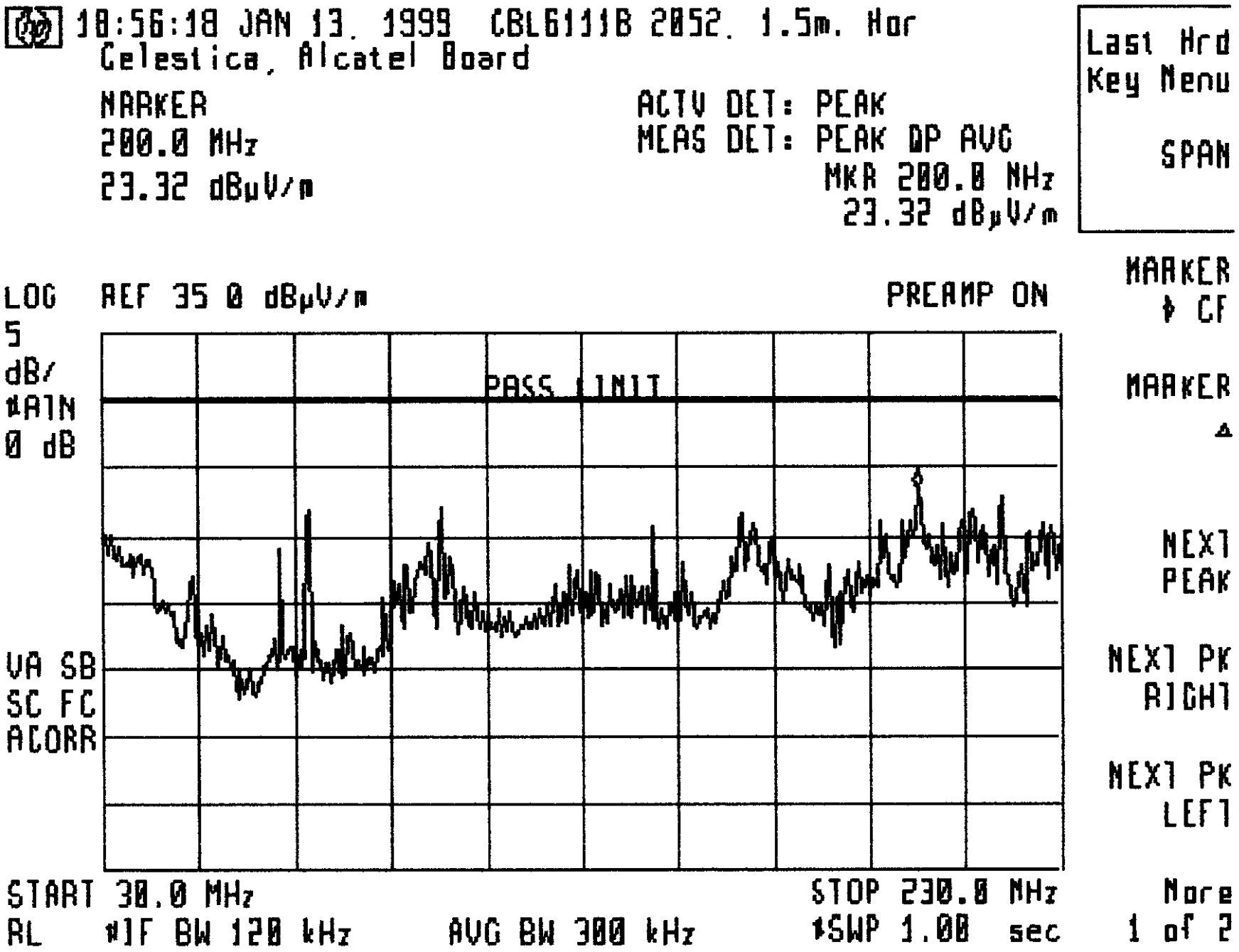
Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 30 to 230MHz Vertical Polarisation (Final mode of operation and cable position - 1 plot):


10:48:30 JAN 13, 1999 CBL6111B 2052, 1.5m, Vert
Celestica, Alcatel Board
REF LEVEL
35.0 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 31.0 MHz
28.36 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATN
0 dB
REF 35.0 dBµV/m
PREAMP ON
PASS LINIT
VA SB
SC FC
ACORR
START 30.0 MHz
#IF BW 120 kHz
AVG BW 300 kHz
STOP 230.0 MHz
#SWP 1.00 sec
MARKER
→ CF
MARKER
Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More
1 of 2

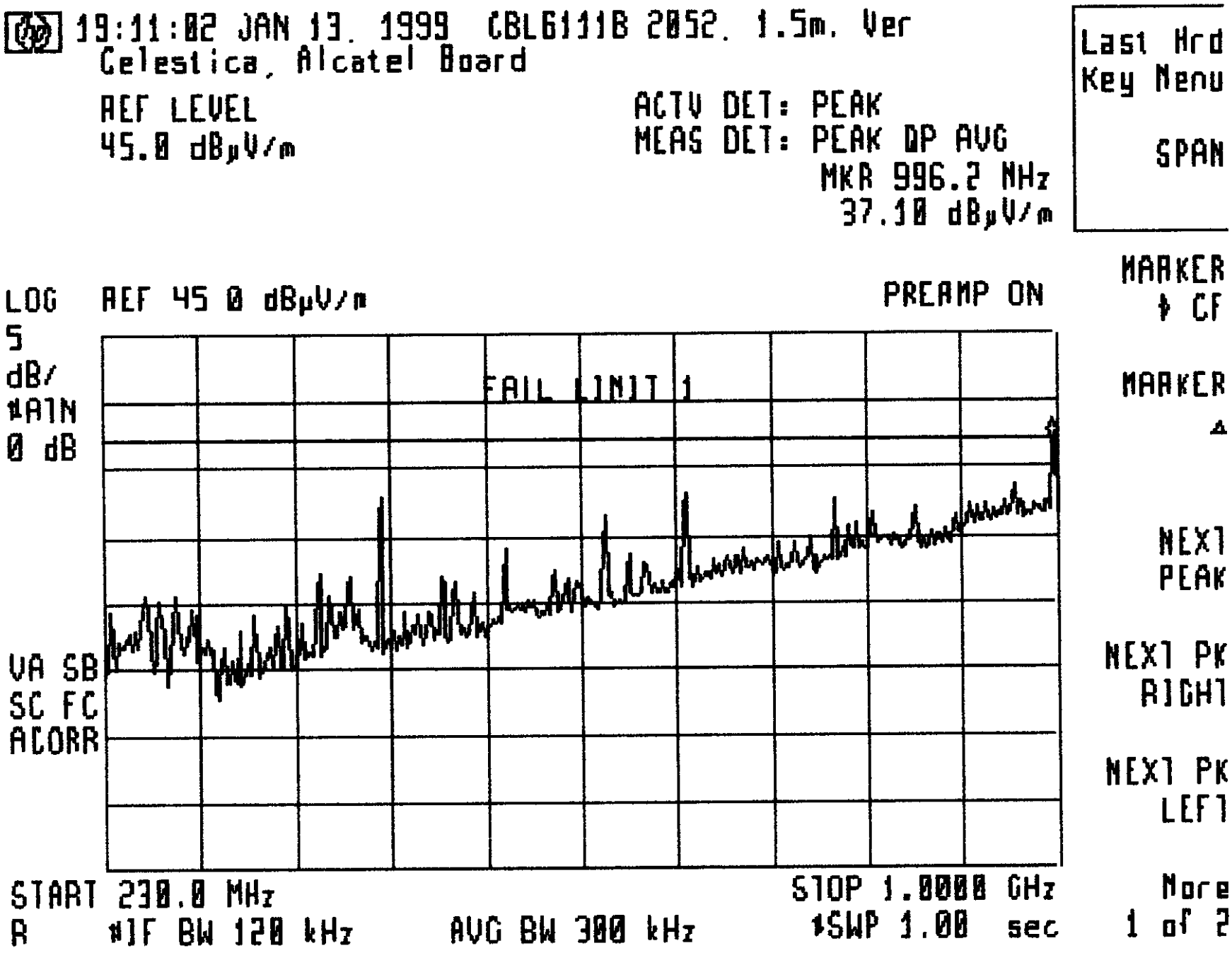
Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 30 to 230MHz Horizontal Polarisation (Final mode of operation and cable position - 1 plot):


18:56:18 JAN 13, 1999 CBL6111B 2052, 1.5m, Hor
Celestica, Alcatel Board
MARKER
200.0 MHz
23.32 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 200.0 MHz
23.32 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 35.0 dBµV/m
PREAMP ON
PASS LIMIT
VA SB
SC FC
ACORR
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
START 30.0 MHz
STOP 230.0 MHz
RL
#IF BW 120 kHz
AVG BW 300 kHz
#SWP 1.00 sec
More 1 of 2

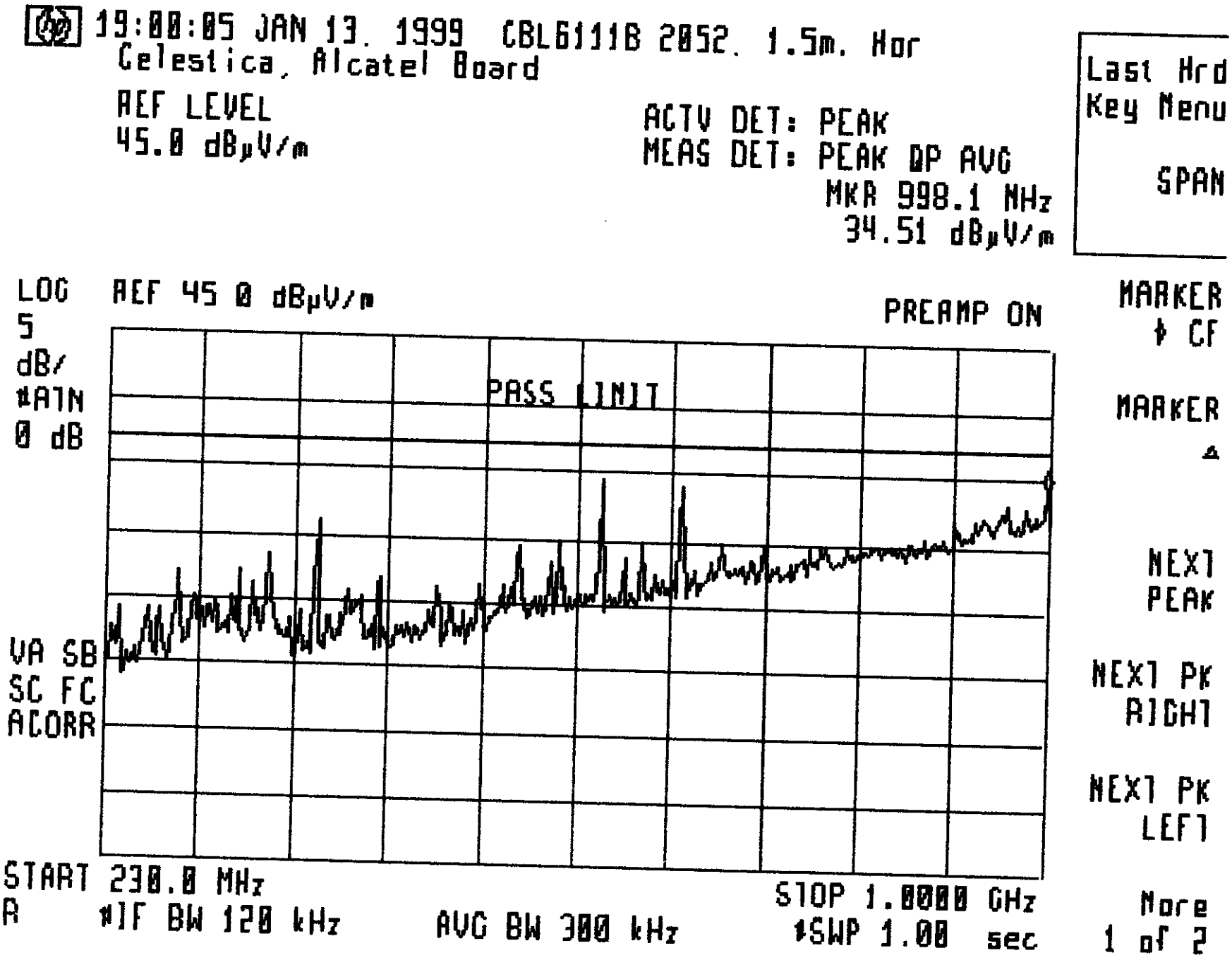
Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 230 to 1000MHz Vertical Polarisation (Final mode of operation and cable position - 1 plot):


19:11:02 JAN 13, 1999 CBL6111B 2052, 1.5m, Ver
Celestica, Alcatel Board
REF LEVEL
45.0 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 996.2 MHz
37.10 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 45.0 dBµV/m
PREAMP ON
FAIL LIMIT 1
MARKER
→ CF
MARKER
Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
VA SB
SC FC
ACORR
START 230.0 MHz
#RBW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 1.00 sec

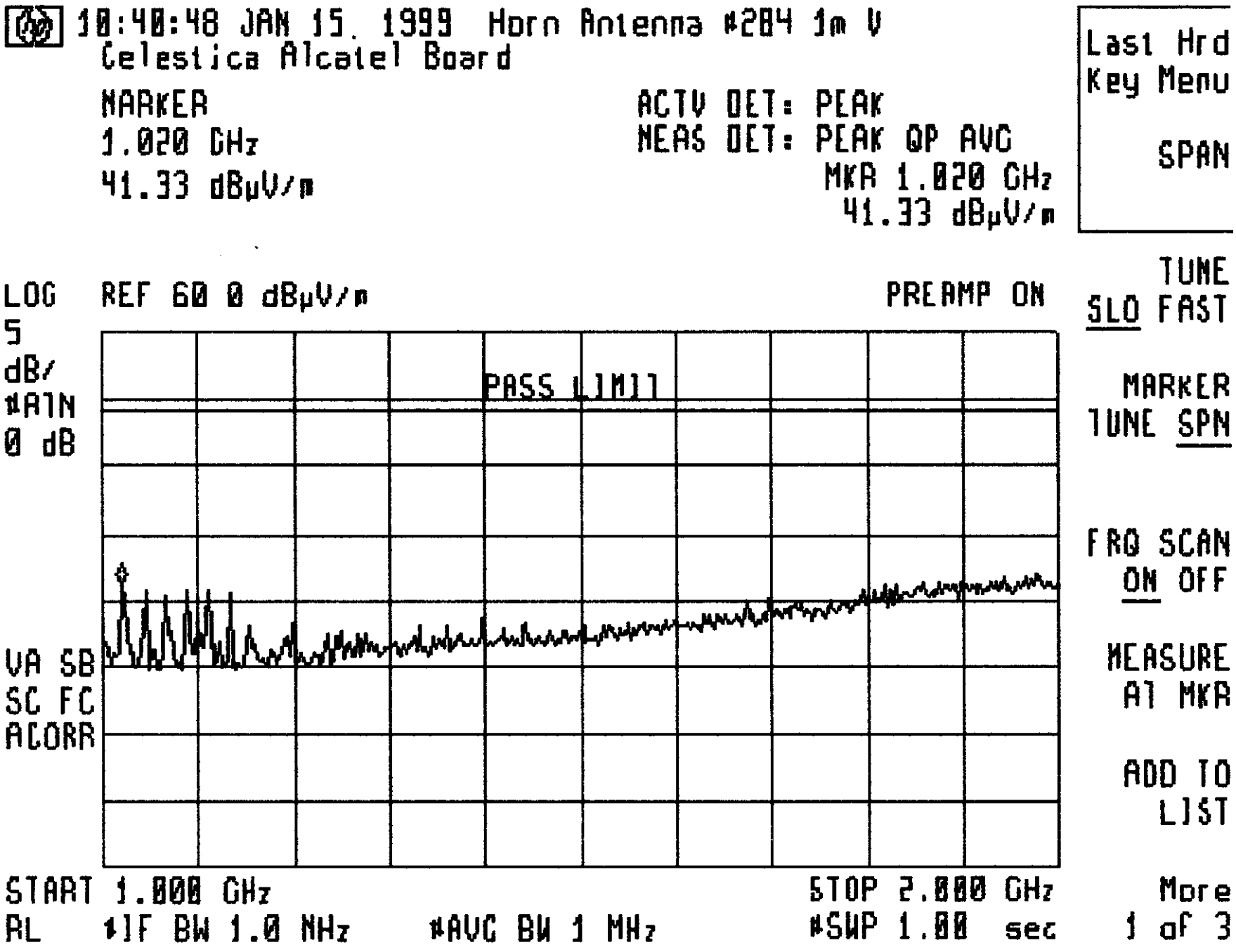
Appendix 2: **Preliminary Measurement Plots.**
- Continued

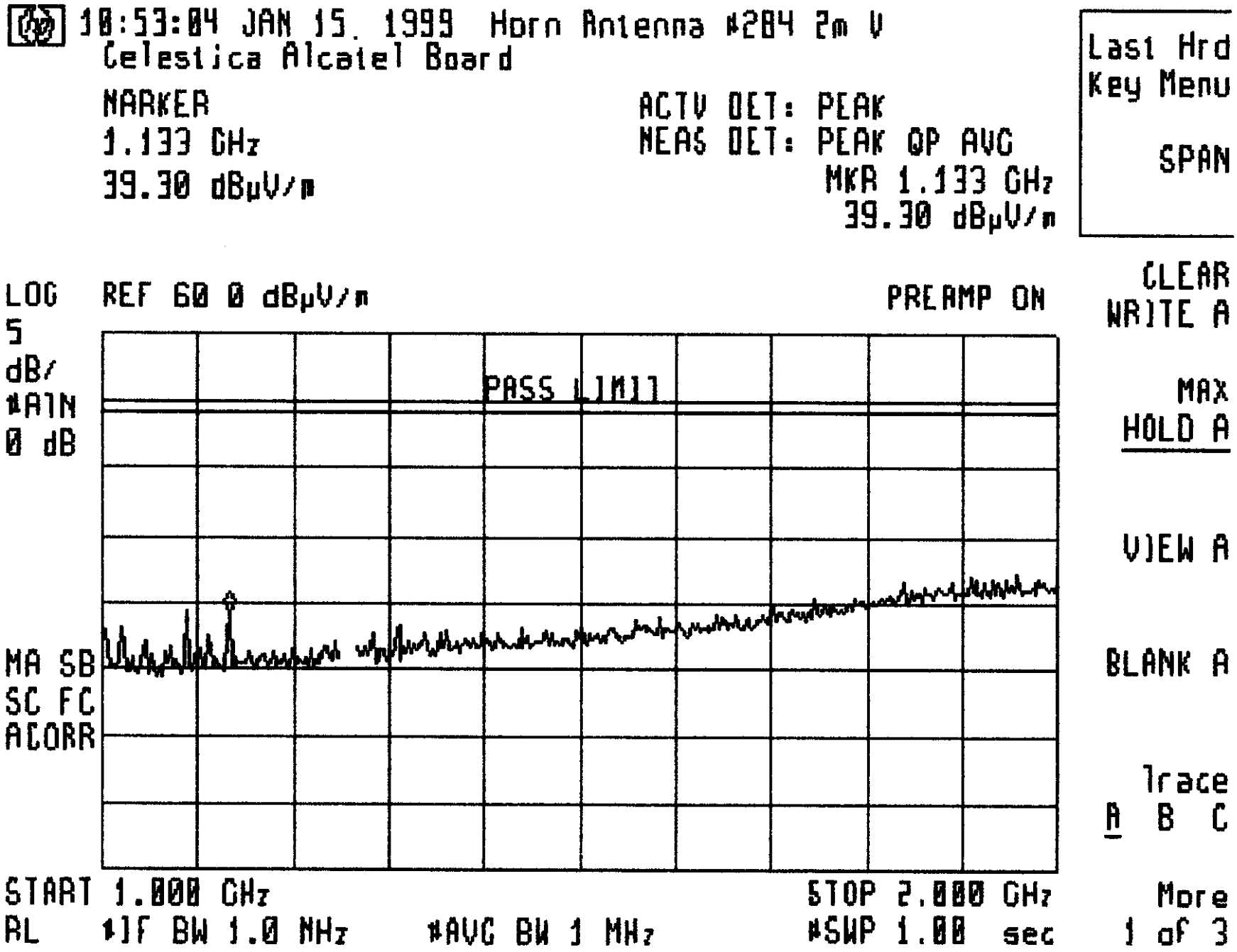
RFI Radiated Emission - 230 to 1000MHz Horizontal Polarisation (Final mode of operation and cable position - 1 plot):

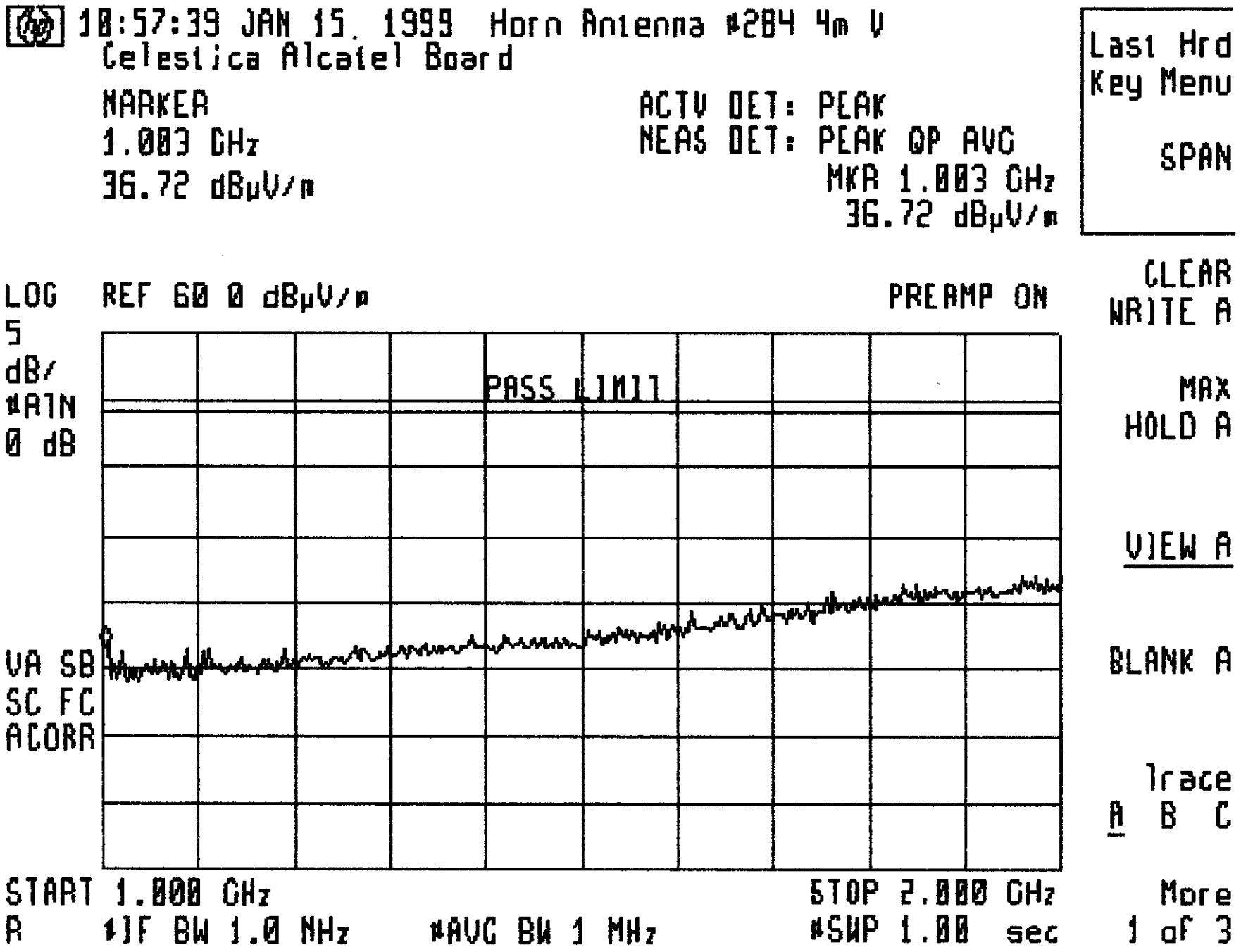

19:00:05 JAN 13, 1999 CBL6111B 2052, 1.5m, Hor
Celestica, Alcatel Board
REF LEVEL
45.0 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 998.1 MHz
34.51 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATN
0 dB
REF 45 0 dBµV/m
PREAMP ON
PASS LINIT
MARKER
CF
MARKER
Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
VA SB
SC FC
ACORR
START 230.0 MHz
#IF BW 120 kHz
AVG BW 300 kHz
STOP 1.0000 GHz
#SWP 1.00 sec

Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 1000 to 2000MHz Vertical Polarisation. 1.0m, 2.0m and 4.0m antenna height - (Final mode of operation and cable position - 3 plots):

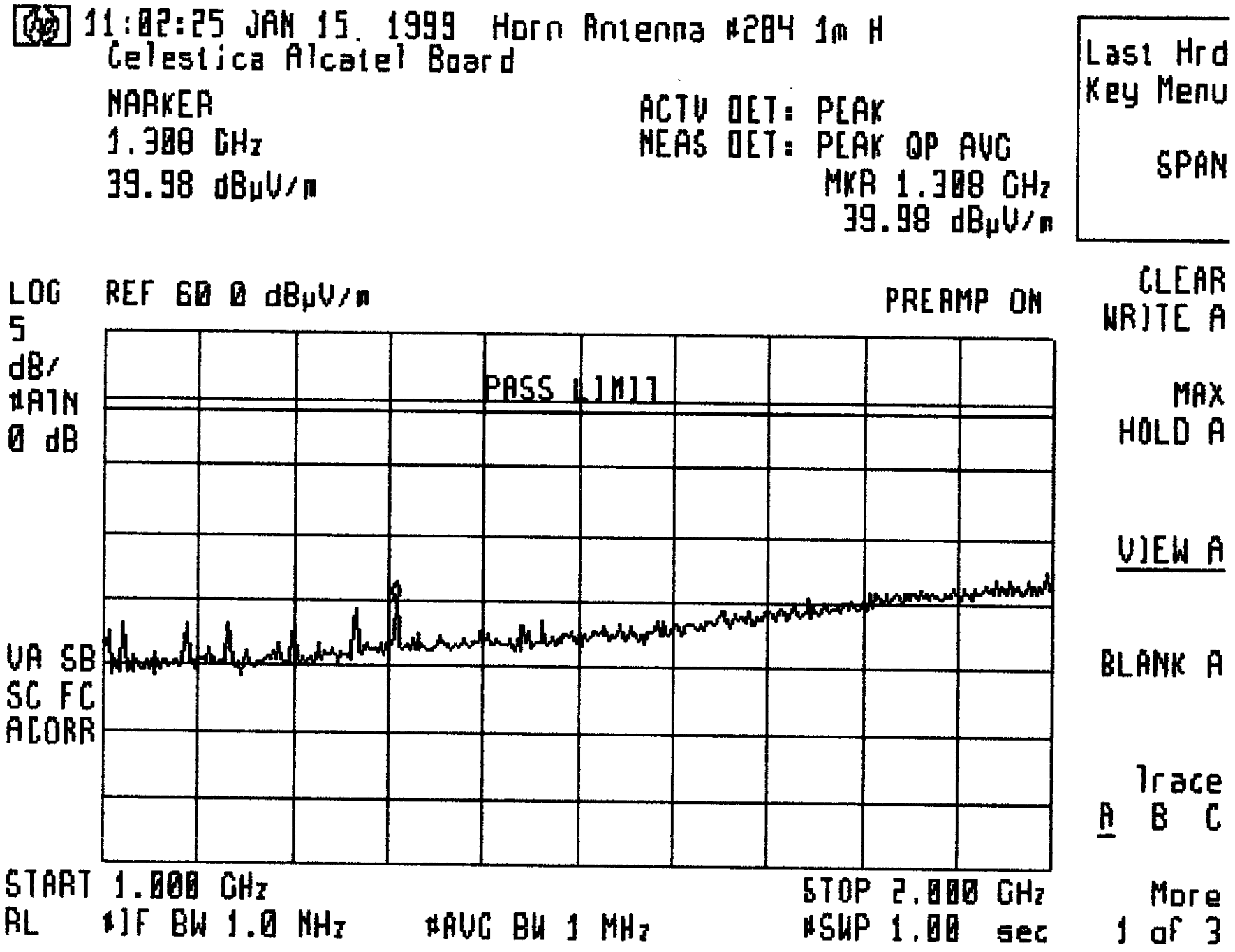

10:40:48 JAN 15, 1999 Horn Antenna #284 1m V
Celestica Alcatel Board
MARKER
1.020 GHz
41.33 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.020 GHz
41.33 dBµV/m
Last Hrd Key Menu
SPAN
LOG
REF 60.0 dBµV/m
PREAMP ON
TUNE
SLO FAST
5
dB/
#ATTN
0 dB
PASS LIMIT
MARKER
TUNE SPN
FRQ SCAN
ON OFF
VA SB
SC FC
ACORR
MEASURE
AT MKR
ADD TO
LIST
START 1.000 GHz
STOP 2.000 GHz
More
1 of 3
RL
#IF BW 1.0 MHz
#AVG BW 1 MHz
#SWP 1.00 sec

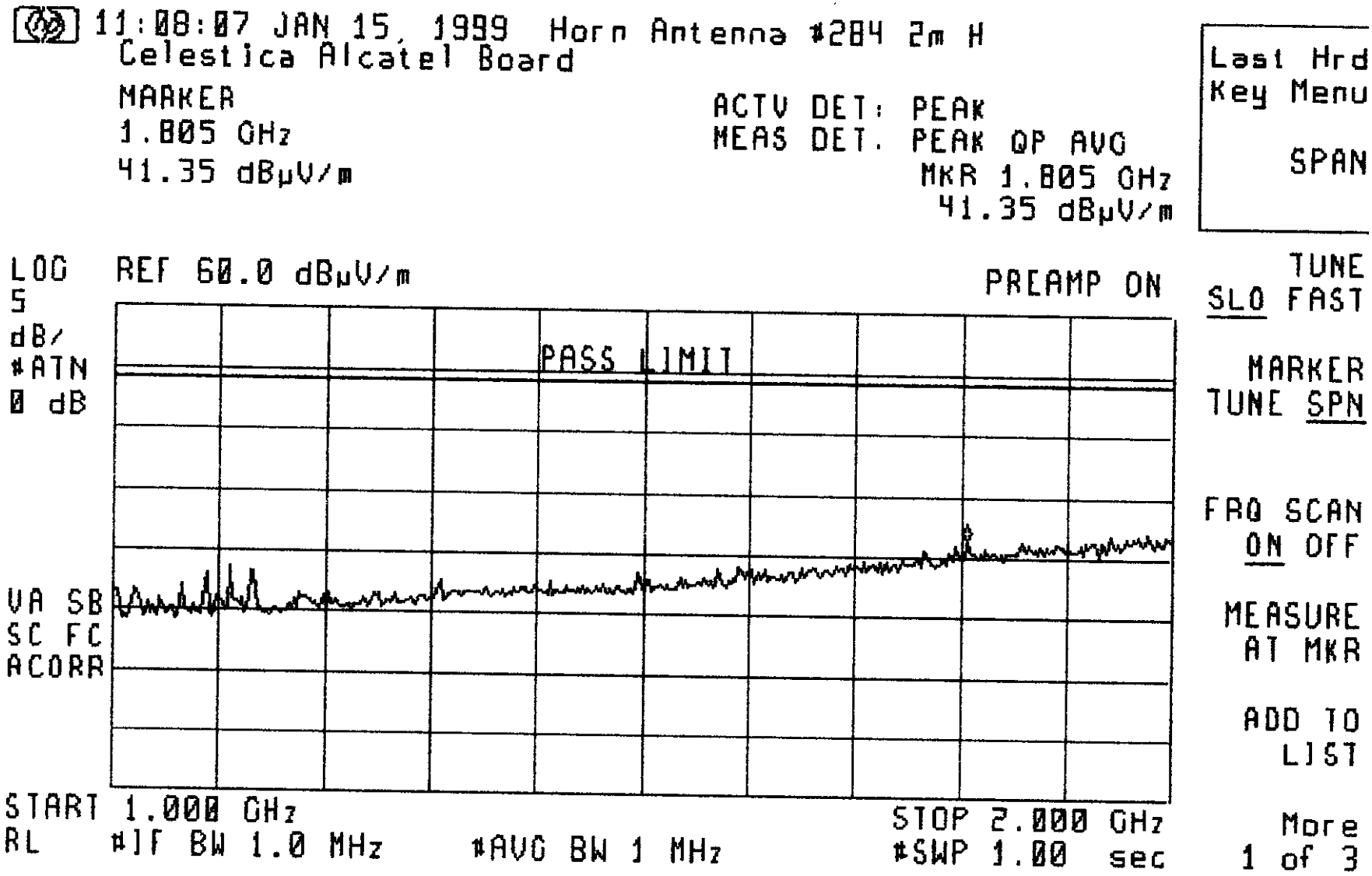

10:53:04 JAN 15, 1999 Horn Antenna #284 2m V
Celestica Alcatel Board
MARKER
1.133 GHz
39.30 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.133 GHz
39.30 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 60 0 dBµV/m
PREAMP ON
PASS LIMIT
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
MA SB
SC FC
ACORR
START 1.000 GHz
STOP 2.000 GHz
RL
#IF BW 1.0 MHz
#AVG BW 1 MHz
#SWP 1.00 sec
More
1 of 3

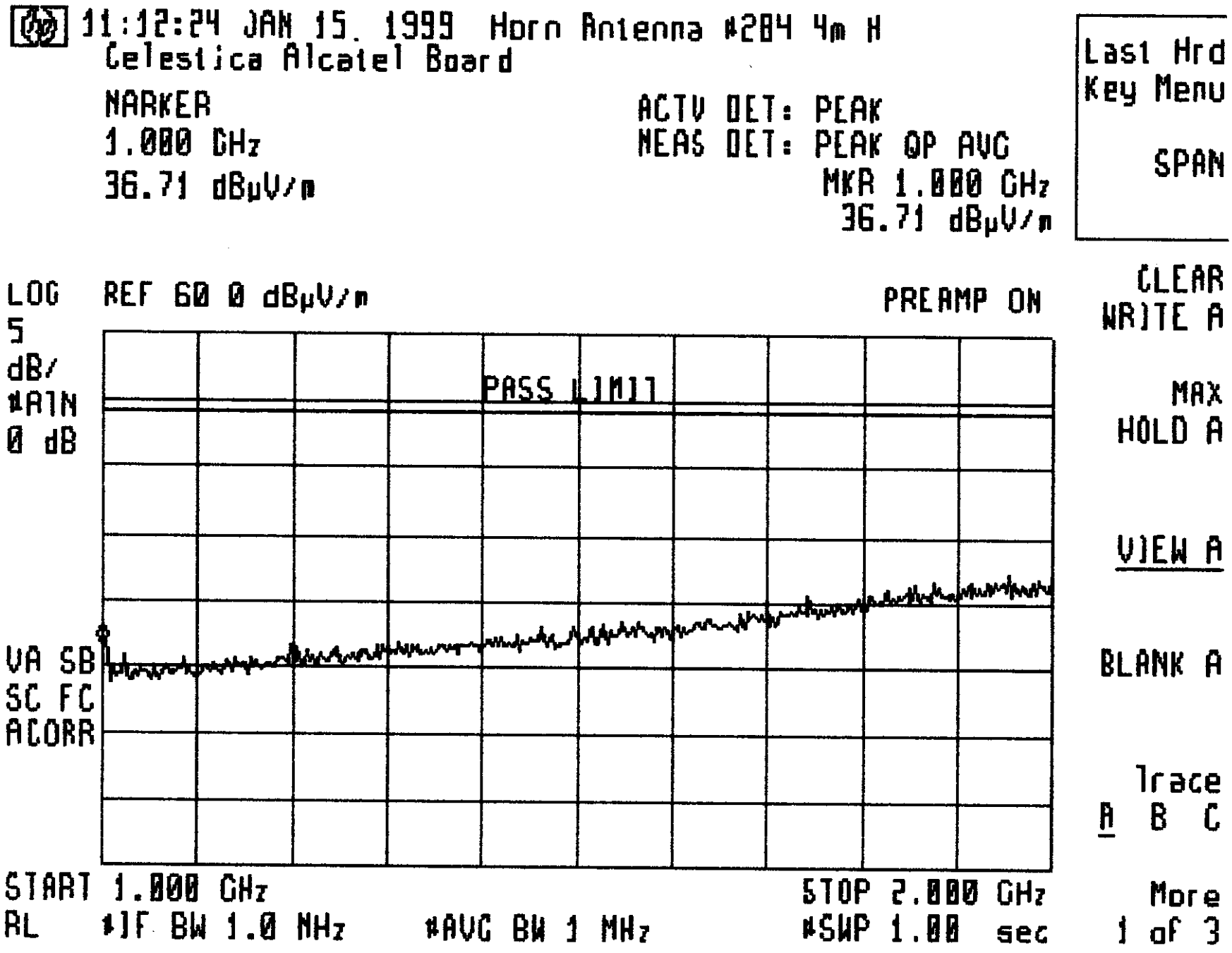

10:57:39 JAN 15, 1999 Horn Antenna #284 4m V
Celestica Alcatel Board
MARKER
1.003 GHz
36.72 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.003 GHz
36.72 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 60 0 dBµV/m
PREAMP ON
PASS LIMIT
VA SB
SC FC
ACORR
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
START 1.000 GHz
#IF BW 1.0 MHz
#AVG BW 1 MHz
STOP 2.000 GHz
#SWP 1.00 sec
More
1 of 3

Appendix 2: Preliminary Measurement Plots.
- Continued

RFI Radiated Emission - 1000 to 2000MHz Horizontal Polarisation. 1.0m, 2.0m and 4.0m antenna height - (Final mode of operation and cable position - 3 plots):


11:02:25 JAN 15, 1999 Horn Antenna #284 1m H
Celestica Alcatel Board
MARKER
1.308 GHz
39.98 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.308 GHz
39.98 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATTN
0 dB
REF 60.0 dBµV/m
PREAMP ON
PASS LIMIT
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
ACORR
START 1.000 GHz
STOP 2.000 GHz
RL
#IF BW 1.0 MHz
#AVG BW 1 MHz
#SWP 1.00 sec


11:08:07 JAN 15, 1999 Horn Antenna #284 2m H
Celestica Alcatel Board
MARKER
1.805 GHz
41.35 dBµV/m
ACTV DET: PEAK
MEAS DET. PEAK QP AVG
MKR 1.805 GHz
41.35 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATN
0 dB
REF 60.0 dBµV/m
PREAMP ON
PASS LIMIT
VA SB
SC FC
ACORR
START 1.000 GHz
RL
#IF BW 1.0 MHz
#AVG BW 1 MHz
STOP 2.000 GHz
#SWP 1.00 sec
TUNE
SLO FAST
MARKER
TUNE SPN
FRQ SCAN
ON OFF
MEASURE
AT MKR
ADD TO
LIST
More
1 of 3


11:12:24 JAN 15, 1999 Horn Antenna #284 4m H
Celestica Alcatel Board
MARKER
1.000 GHz
36.71 dBµV/m
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 1.000 GHz
36.71 dBµV/m
Last Hrd Key Menu
SPAN
LOG
5
dB/
#ATN
0 dB
REF 60 0 dBµV/m
PREAMP ON
PASS LIMIT
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
ACORR
START 1.000 GHz
STOP 2.000 GHz
RL
#IF BW 1.0 MHz
#AVG BW 1 MHz
#SWP 1.00 sec

Appendix 3: Circulation.

Copy 1	Mr Mike Wilshaw - Celestica Ltd
Copy 2	Celestica Laboratory
Copy 3	Celestica Kid01
Copy 4	Mr Mike Wilshaw - Celestica Ltd
Copy 5	Mr Mike Wilshaw - Celestica Ltd