

KTL Test Report No.:

9L0454RUS

Applicant:

Allen Telecom
140 Vista Centre dr.
Forest, VA 24551

Equipment Under Test:

MOR701B

FCC ID:

BCR-RPT-MOR701

In Accordance With:

FCC Part 24, Subpart E
Broadband PCS Repeaters

Tested By:

KTL Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136



Authorized By:

Tom Tidwell, RF Group Manager

Date:

December 14, 1999

Total Number of Pages:

112

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EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Section 1. Summary of Test Results**

Manufacturer: Allen Telecom

Model No.: MOR701B

Serial No.: PT14

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 24, Subpart E.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".

**NVLAP LAB CODE: 100426-0**TESTED BY: Ron Gaytan DATE: Nov. – Dec. 1999

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EQUIPMENT: PCS Repeater**FCC ID:****PROJECT NO.: 9L0454RUS****Summary Of Test Data for MOR701B POWER**

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	20 W	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (GSM)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (NADC)	24.238	Input/Output	See Plots	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-17.95 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	-34.7 dBm	Complies
Frequency Stability	24.235	N/A	N/A	N/A

Summary Of Test Data for MOR701B

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	6.03 W	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (GSM)	24.238	Input/Output	See Plots	Complies
Occupied Bandwidth (NADC)	24.238	Input/Output	See Plots	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-24.55 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	N/R	N/R
Frequency Stability	24.235	N/A	N/A	N/A

Footnotes:

(1) Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.

Measurement uncertainty for each test configuration is expressed to 95% probability.

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Section 2. General Equipment Specification**

Supply Voltage Input:		120 Vac		
Frequency Bands:	Downlink:	☒	Block A :	1930 – 1945 MHz
		☒	Block D :	1945 – 1950 MHz
		☒	Block B :	1950 – 1965 MHz
		☒	Block E :	1965 – 1970 MHz
		☒	Block F :	1970 – 1975 MHz
		☒	Block C :	1975 – 1990 MHz
Frequency Bands:	Uplink:	☒	Block A :	1850 – 1865 MHz
		☒	Block B :	1865 – 1870 MHz
		☒	Block C :	1870 – 1885 MHz
		☒	Block D :	1885 – 1890 MHz
		☒	Block E :	1890 – 1895 MHz
		☒	Block F :	1895 – 1910 MHz
Type of Modulation and Designator:		CDMA (G7W) ☒	GSM (GXW) ☒	NADC (DXW) ☒
Output Impedance:		50 ohms		
RF Output (Rated):	Downlink (701B)	Per channel:	3	W
		Total:	6	W (4W for CDMA)
RF Output (Rated):	Downlink(701B Power)	Per channel:	10	W
		Total:	20	W
Frequency Translation:		F1-F1 ☒	F1-F2 ☐	N/A ☐
Band Selection:		Software ☒	Duplexer ☒	Fullband ☐

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FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

Description of Modifications For Class II Permissive Change

Not Applicable

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

Modifications Made During Testing

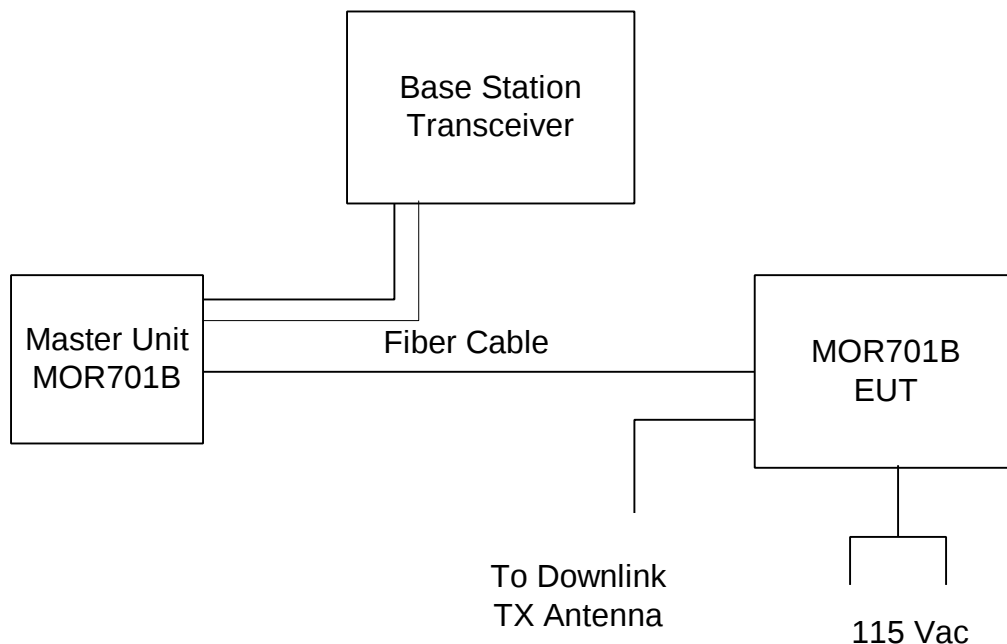
Not Applicable

EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

Description of Operation

The E.U.T. was operated in TX mode at maximum power and low power via Allen Telecom master unit MOR7XXB. I.D. number 148668 S/N 12. The system operates wirelessly in the downlink (Base to Mobile) direction only. In the uplink direction the signal is received at the TX/RX antenna port of the repeater, processed, converted from a rf signal to optical, and then sent via optical fiber to the master unit. The master unit is connected to the base station transceiver via coaxial cable. Test data for the downlink direction is presented in this report.

System Diagram



EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: Ron Gaytan	DATE: 11/05, 08, 09, 11, 17, 29/99, 12/09/99

Test Results: Complies.**Measurement Data:****MOR701B POWER:**

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	N/A	N/A
Downlink	CDMA	39.9	43.0
Uplink	GSM	N/A	N/A
Downlink	GSM	38.2	43.0
Uplink	NADC	N/A	N/A
Downlink	NADC	40.2	43.1

MOR701B:

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	N/A	N/A
Downlink	CDMA	33.5	35.7
Uplink	GSM	N/A	N/A
Downlink	GSM	35.3	37.9
Uplink	NADC	N/A	N/A
Downlink	NADC	35.3	37.9

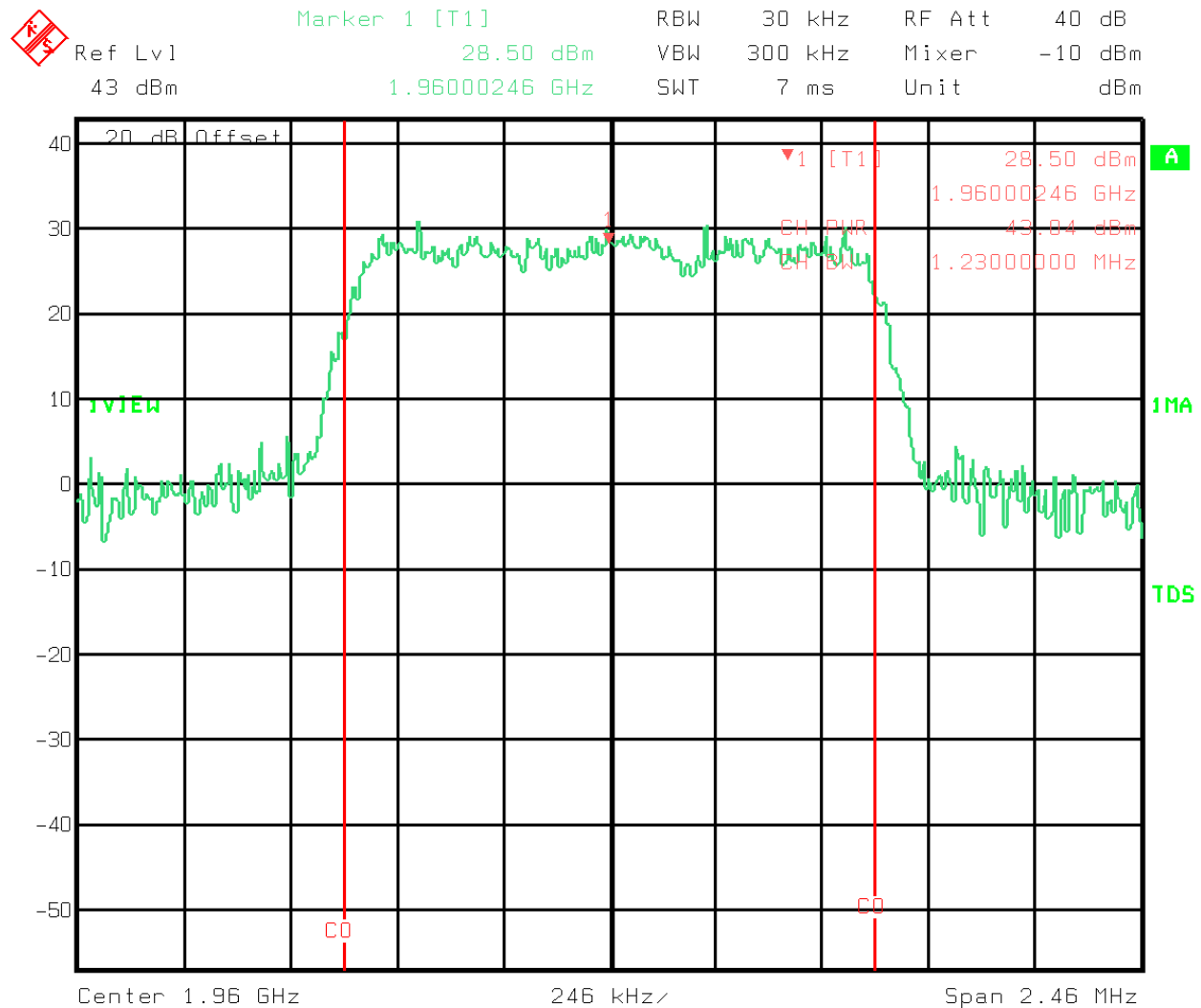
Equipment Used: G2632, G2736, G3726, CF39, CF41**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 24 °C**Relative Humidity:** 46 %

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Power Unit



Title: CDMA MODULE W/EXTENSION MODULE-IS95 (Channel 600)
Comment A: CP06.PCX CHANNEL POWER
Date: 29.NOV.1999 11:57:22

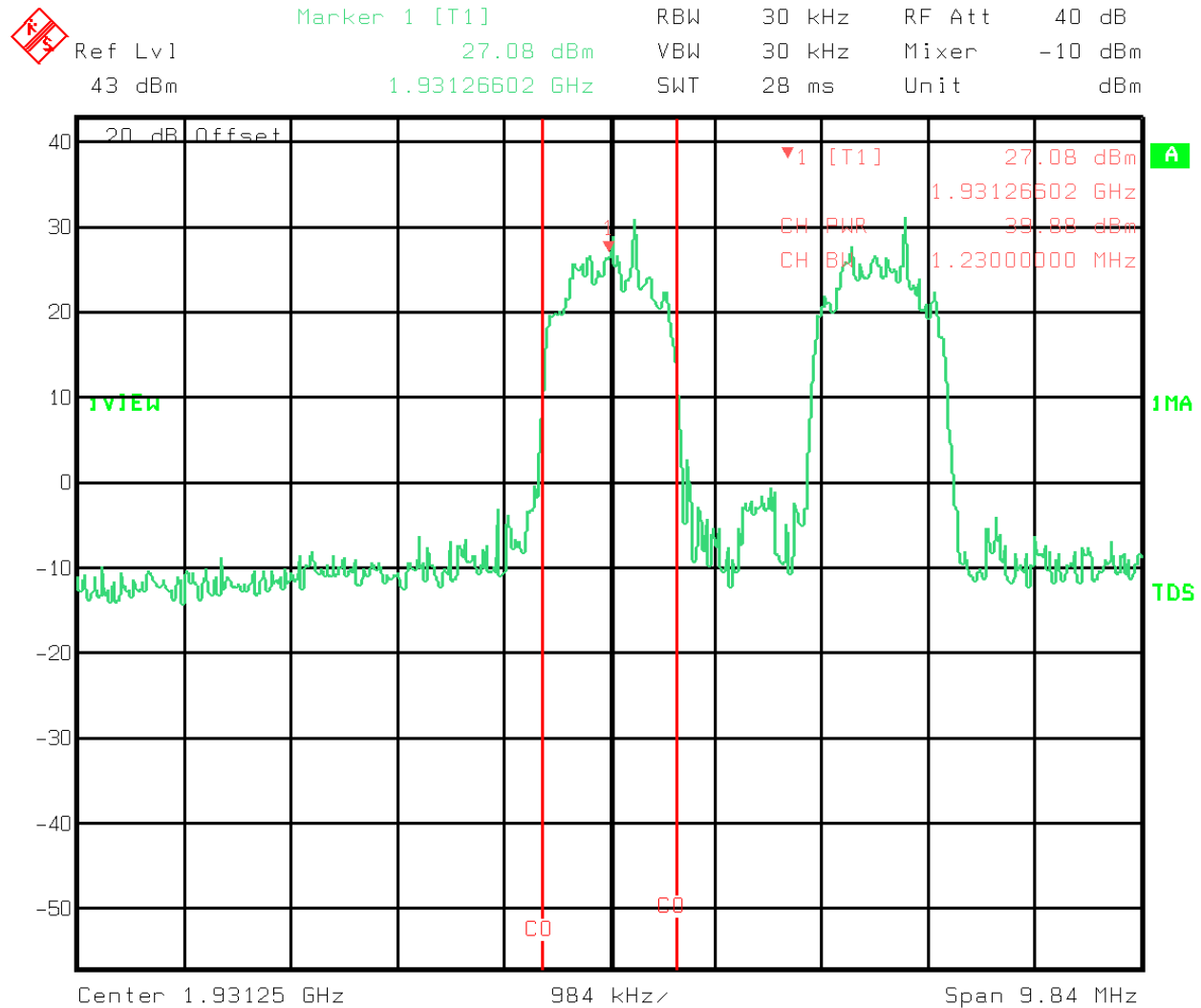
Plot 1 - Single Channel Power Output (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Power Unit

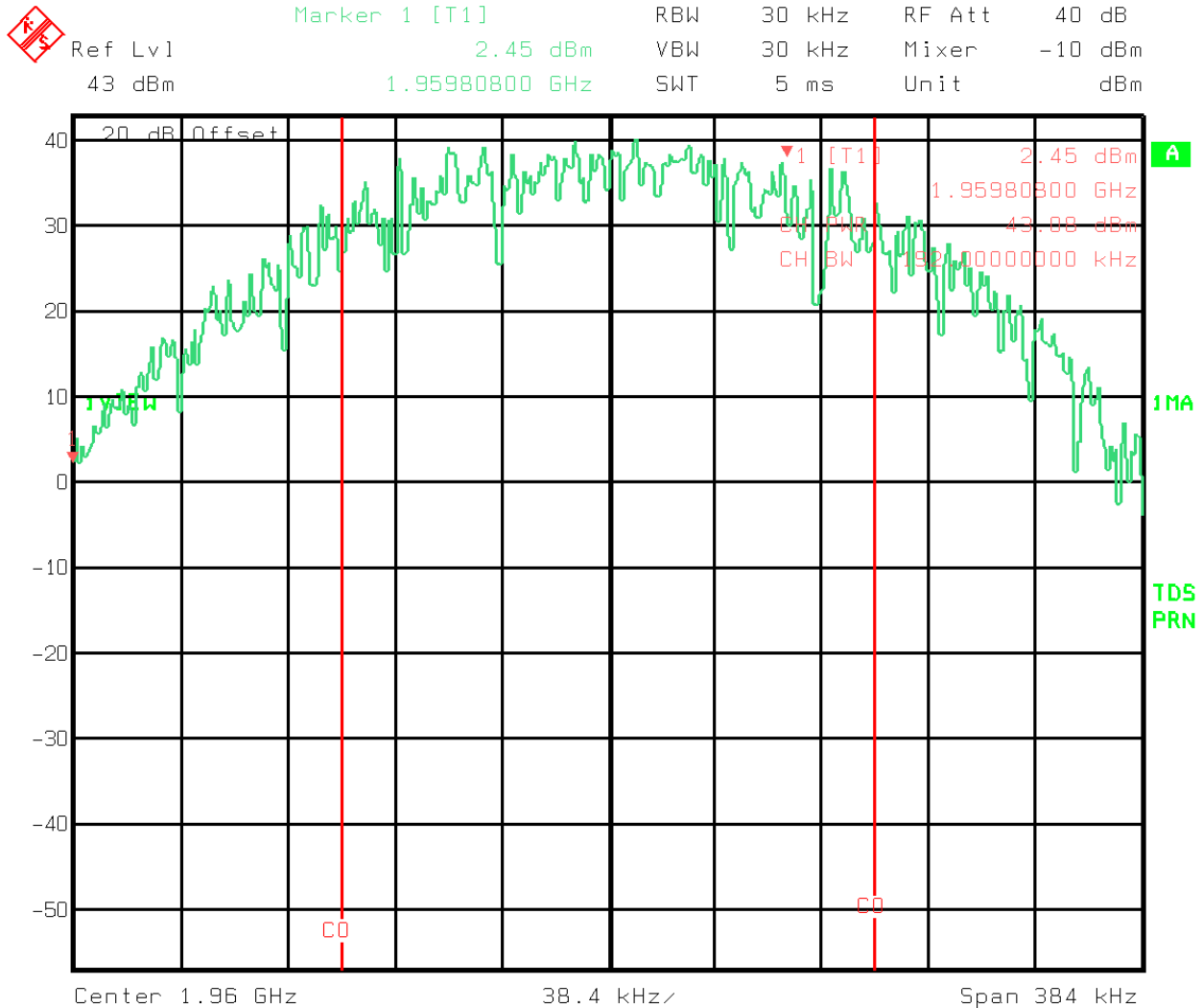


Title: LOWER BAND EDGE VARIABLE BW MODULE (Channel 25 and 50)
Comment A: LBECPO3.PCX
Channel Power Intermodulation CDMA 2 Carriers
Date: 29.NOV.1999 11:03:28

Plot 2 - Two Channel Output Power (CDMA)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****RF Power Output: MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channel 600)
Comment A: CP03.PCX Channel Power (GSM)
Date: 9.NOV.1999 11:19:57

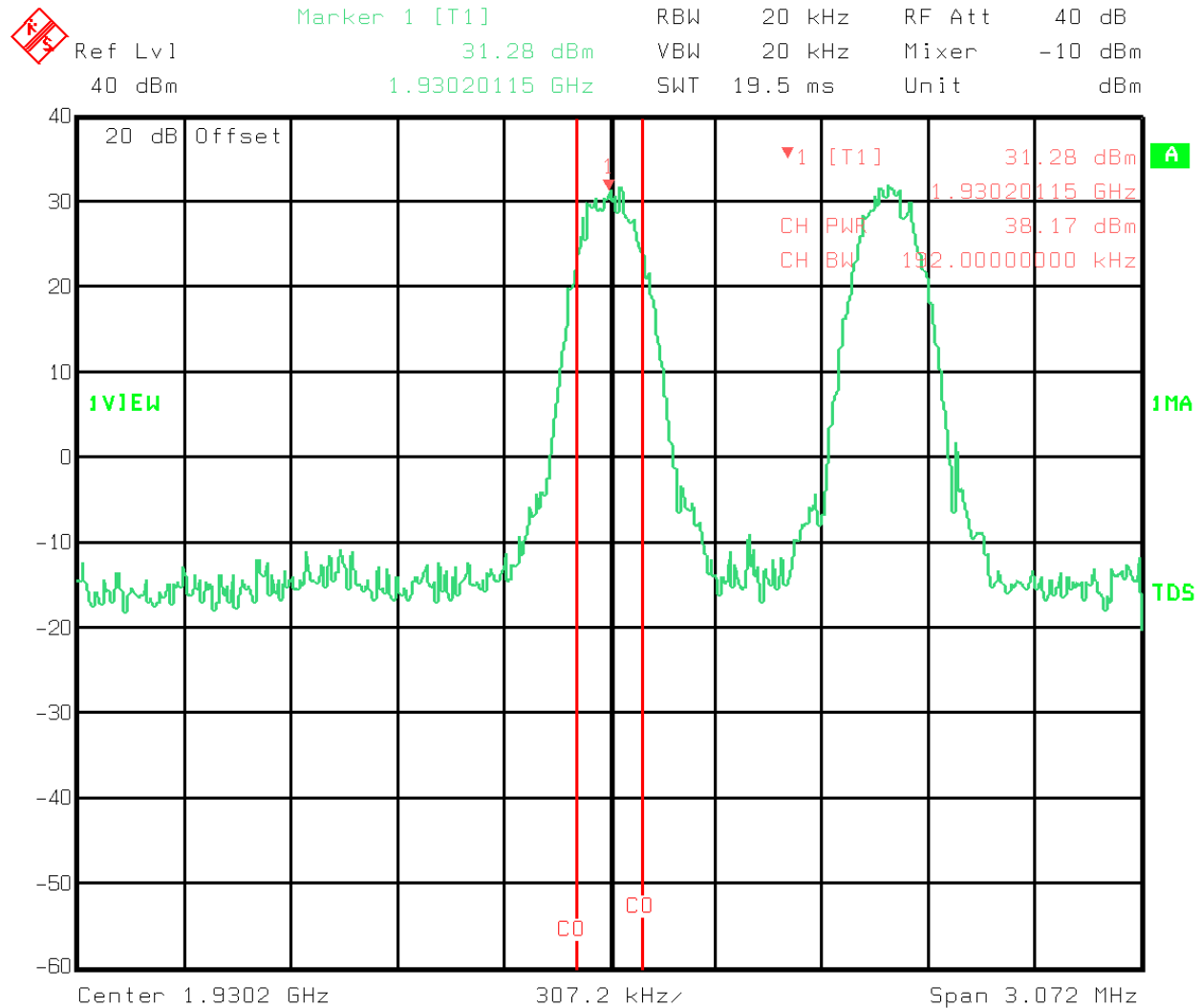
Plot 3 - Single Channel Output Power (GSM)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Power Unit



Title: LOWER BAND EDGE VARIABLE BW MODULE (Channel 4 and 24)
Comment A: LBECPI0.PCX
Channel Power Intermodulation GSM 2 Carriers
Date: 17.NOV.1999 14:26:49

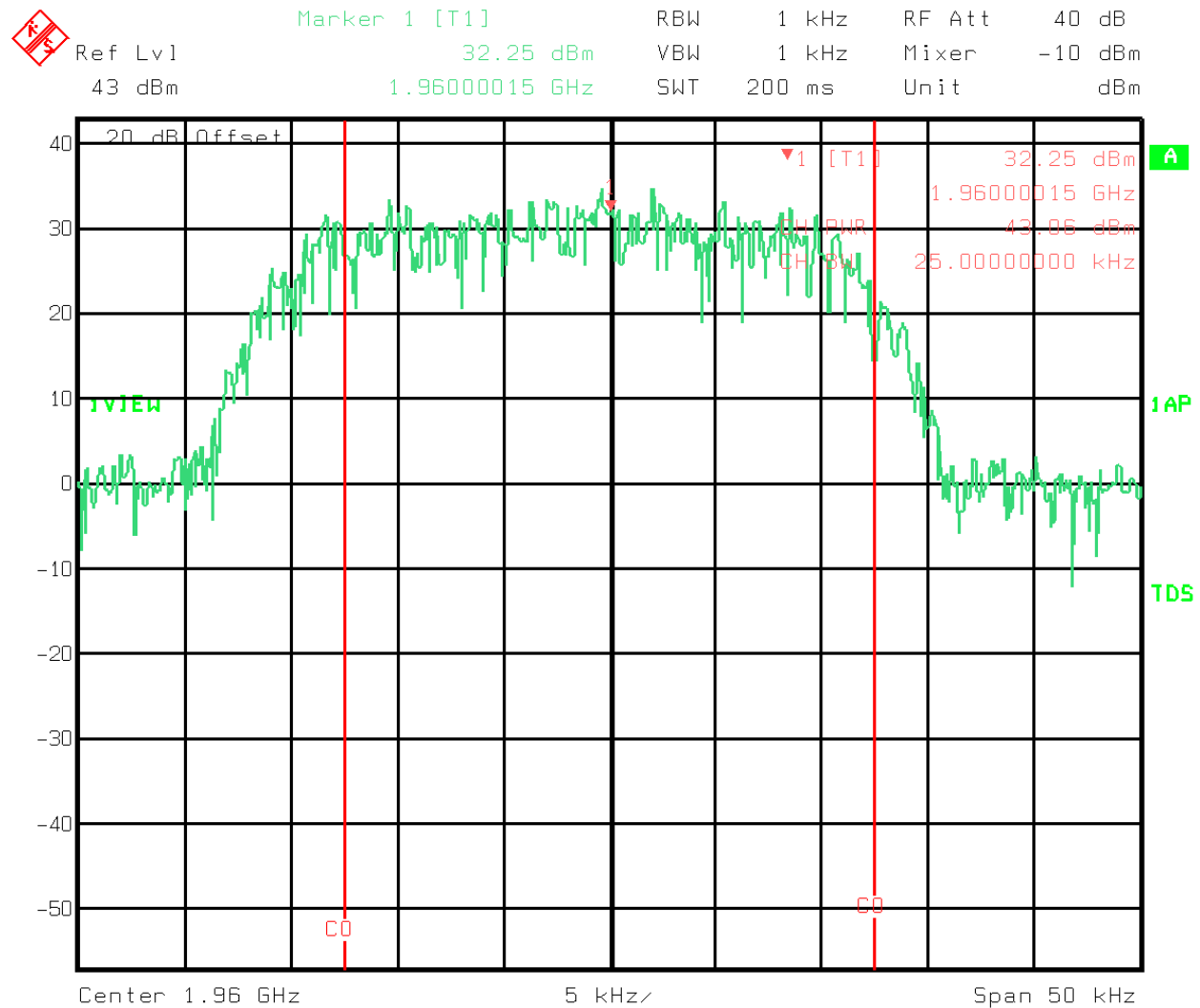
Plot 4 - Two-Channel Output Power (GSM)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: **9L0454RUS**

RF Power Output: MOR701B Power Unit

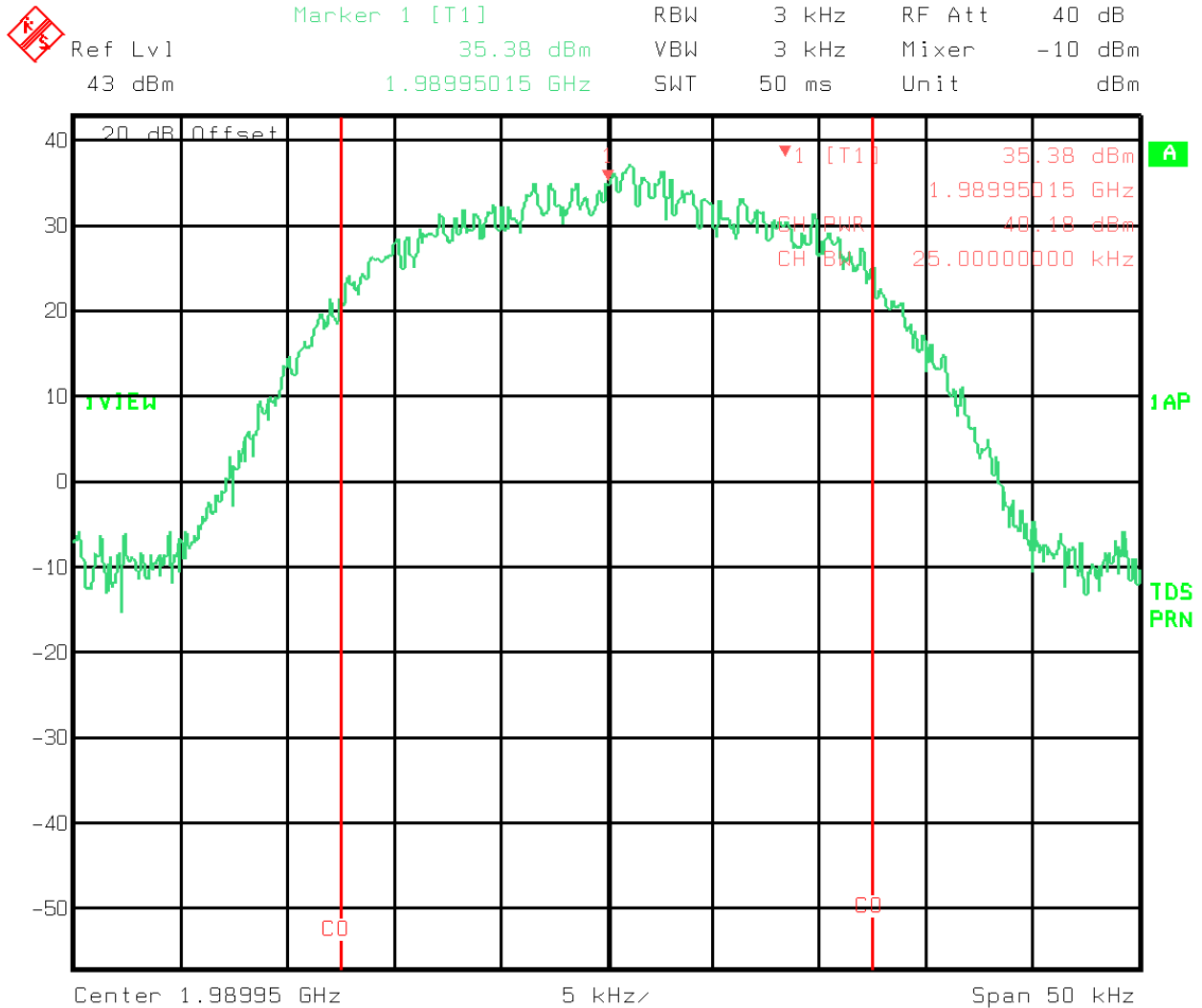


Title: Variable Bandwidth Modules (Channel 600)
 Comment A: CP02.PCX
 Channel Power (NADC)
 Date: 8.NOV.1999 13:47:43

Plot 5 - Single Channel Power (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****RF Power Output: MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channel 1174/1199)
Comment A: UBECPO8.PCX
Upper Bandedge Intermodulation (NADC)
Date: 9.NOV.1999 10:00:12

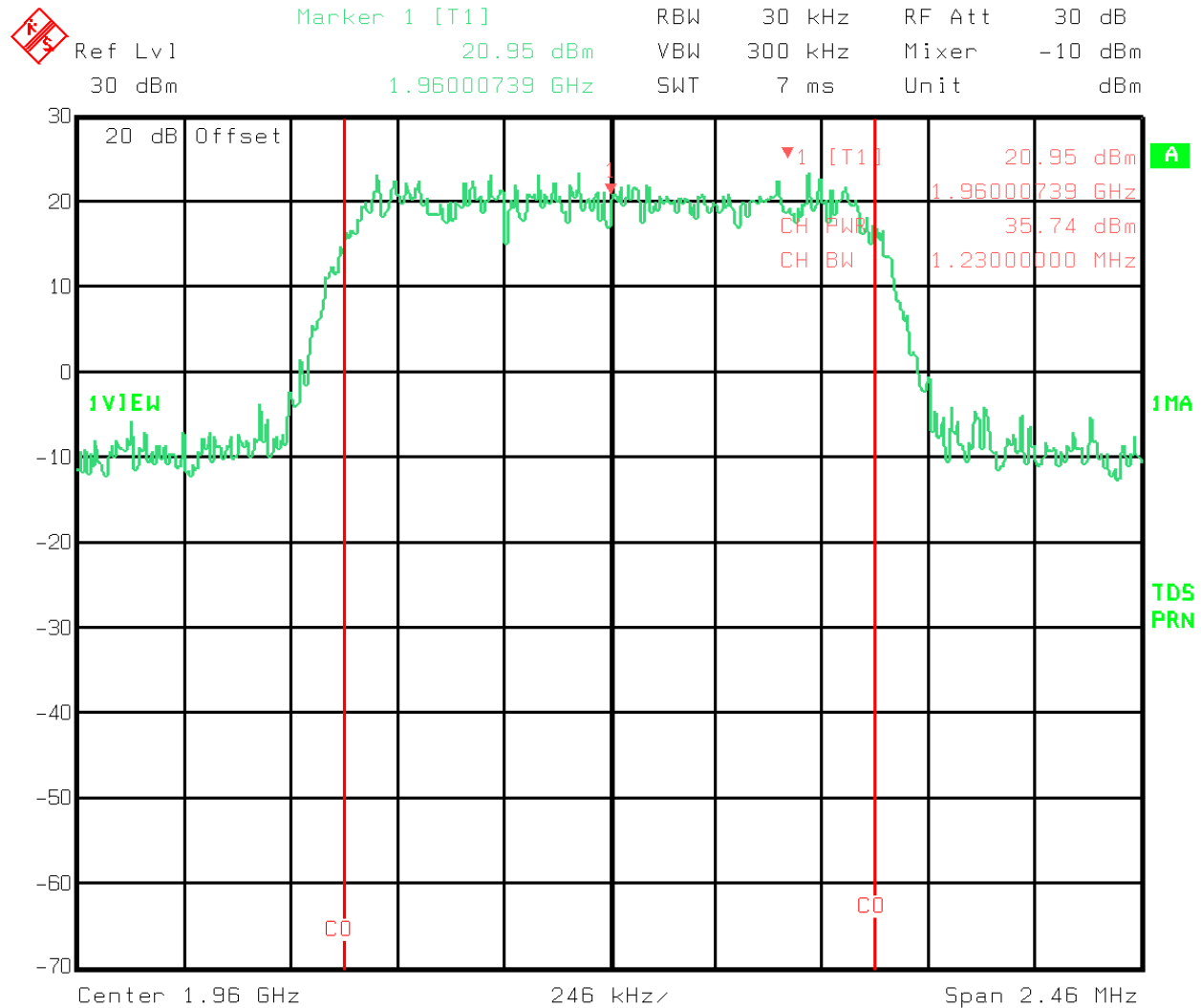
Plot 6 - Two-Channel Power (NADC)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Unit



Title: VARIABLE BW MODULE W/EXTENSION MODULE- IS95 (Channel 25)

Comment A: CP16.PCX CHANNEL POWER

8 WATT AMPLIFIER

Date: 30.NOV.1999 11:56:45

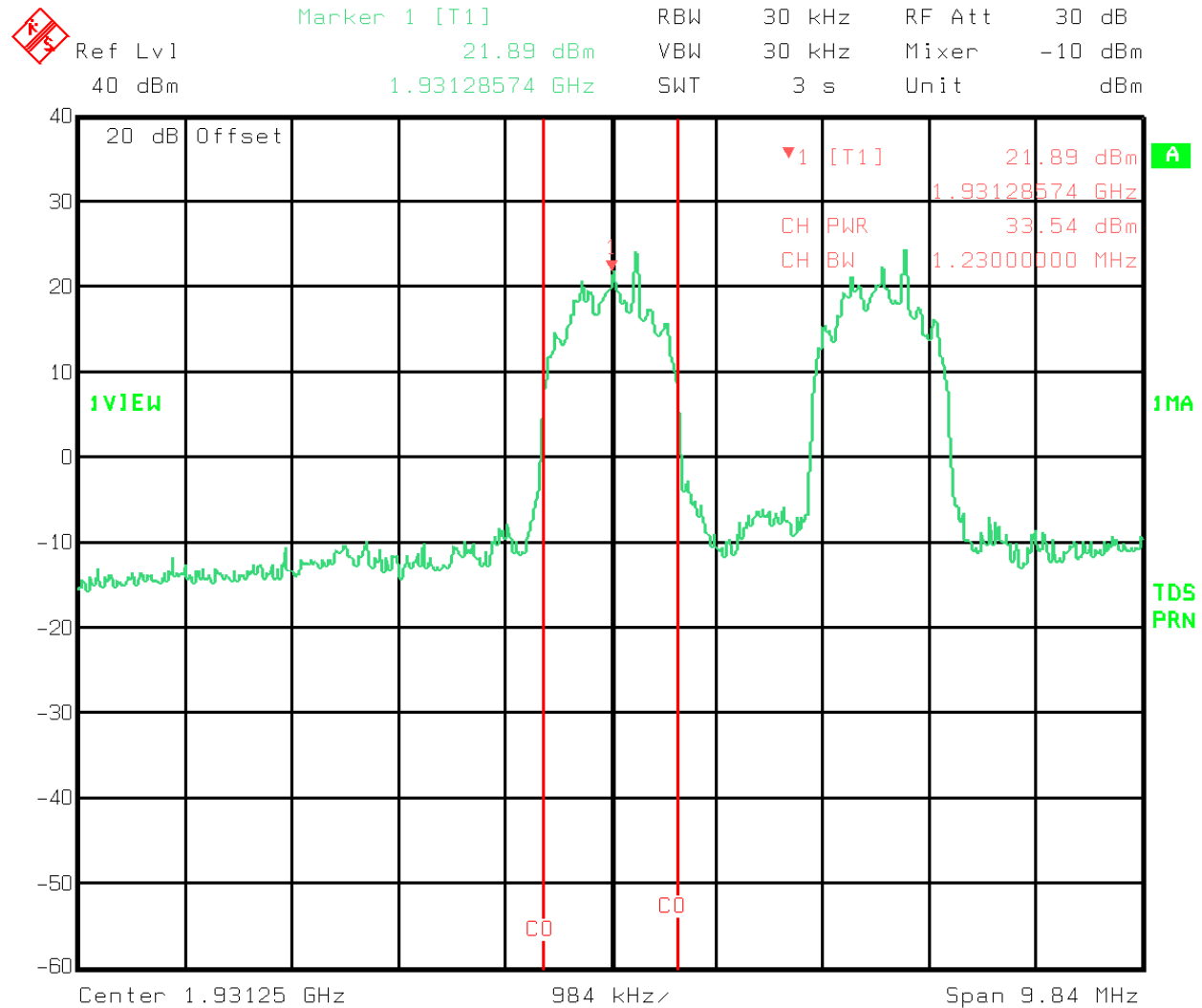
Plot 7 - Single Channel Power (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: **9L0454RUS**

RF Power Output: MOR701B Unit

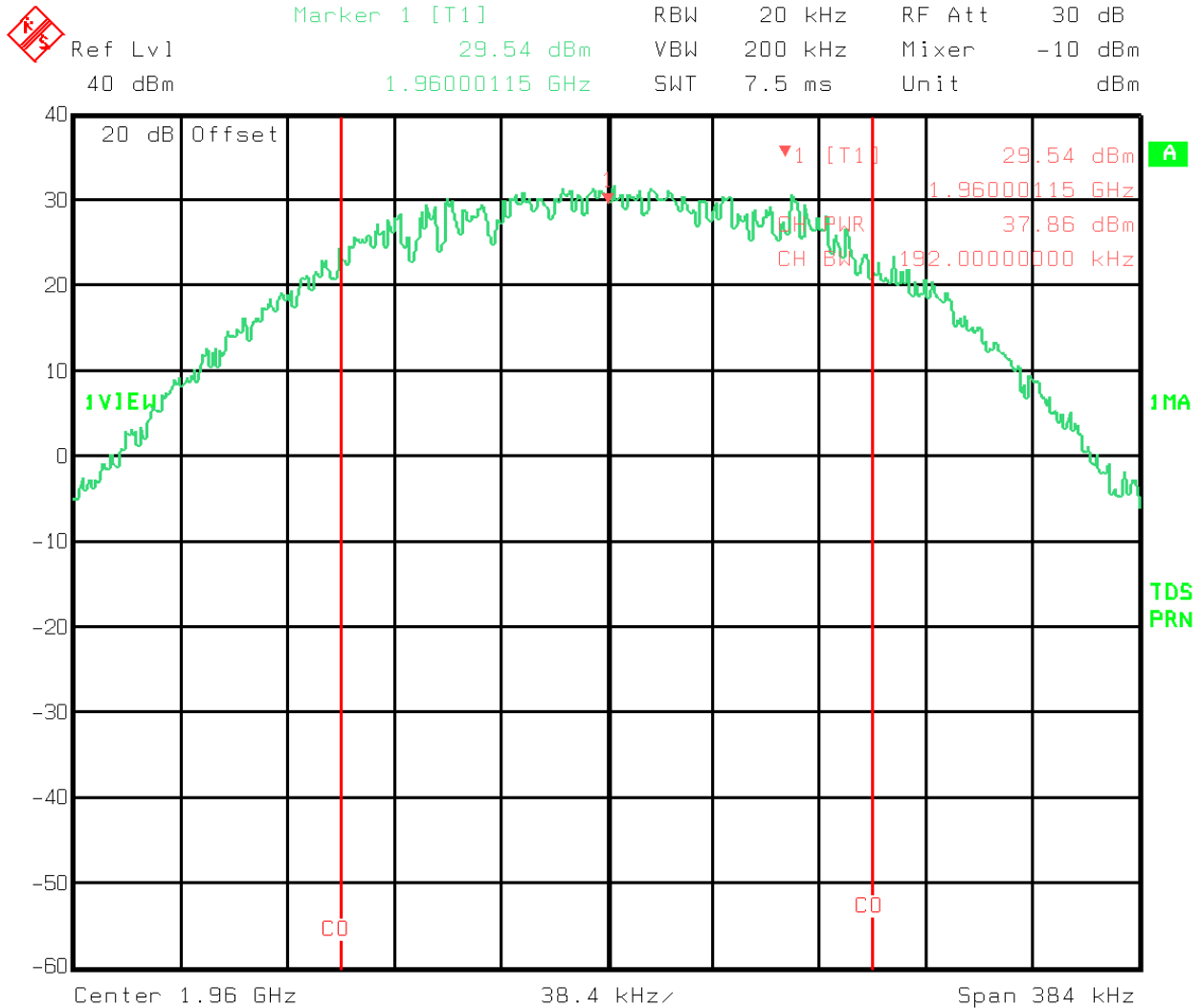


Title: VARIABLE BW W/EXTENSION MODULE- CDMA (Channel 25 & 50)
Comment A: LBECP21.PCX LOWER BAND EDGE CHANNEL POWER
8 WATT AMPLIFIER INTERMODULATION
Date: 8.DEC.1999 12:20:33

Plot 8 - Two-Channel Power (CDMA)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****RF Power Output: MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 600)
Comment A: CP18.PCX CHANNEL POWER
8 WATT AMPLIFIER
Date: 30.NOV.1999 14:05:28

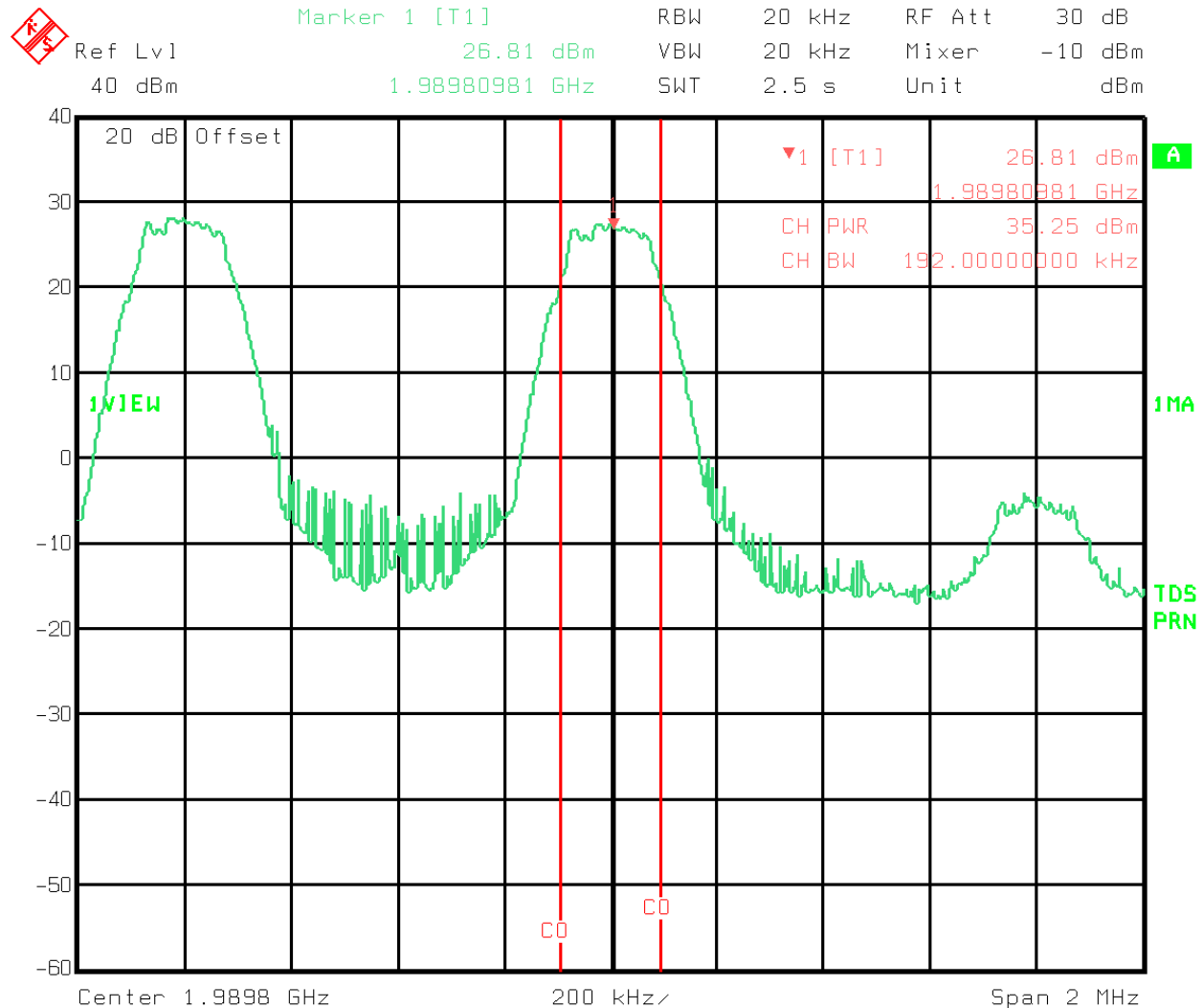
Plot 9 - Single Channel Power (GSM)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Unit



Title: VARIABLE BW W/EXTENSION MODULE- GSM (Channel 1176 & 1196)
Comment A: UBEC19.PCX UPPER BAND EDGE CHANNEL POWER
8 WATT AMPLIFIER INTERMODULATION
Date: 8.DEC.1999 15:21:46

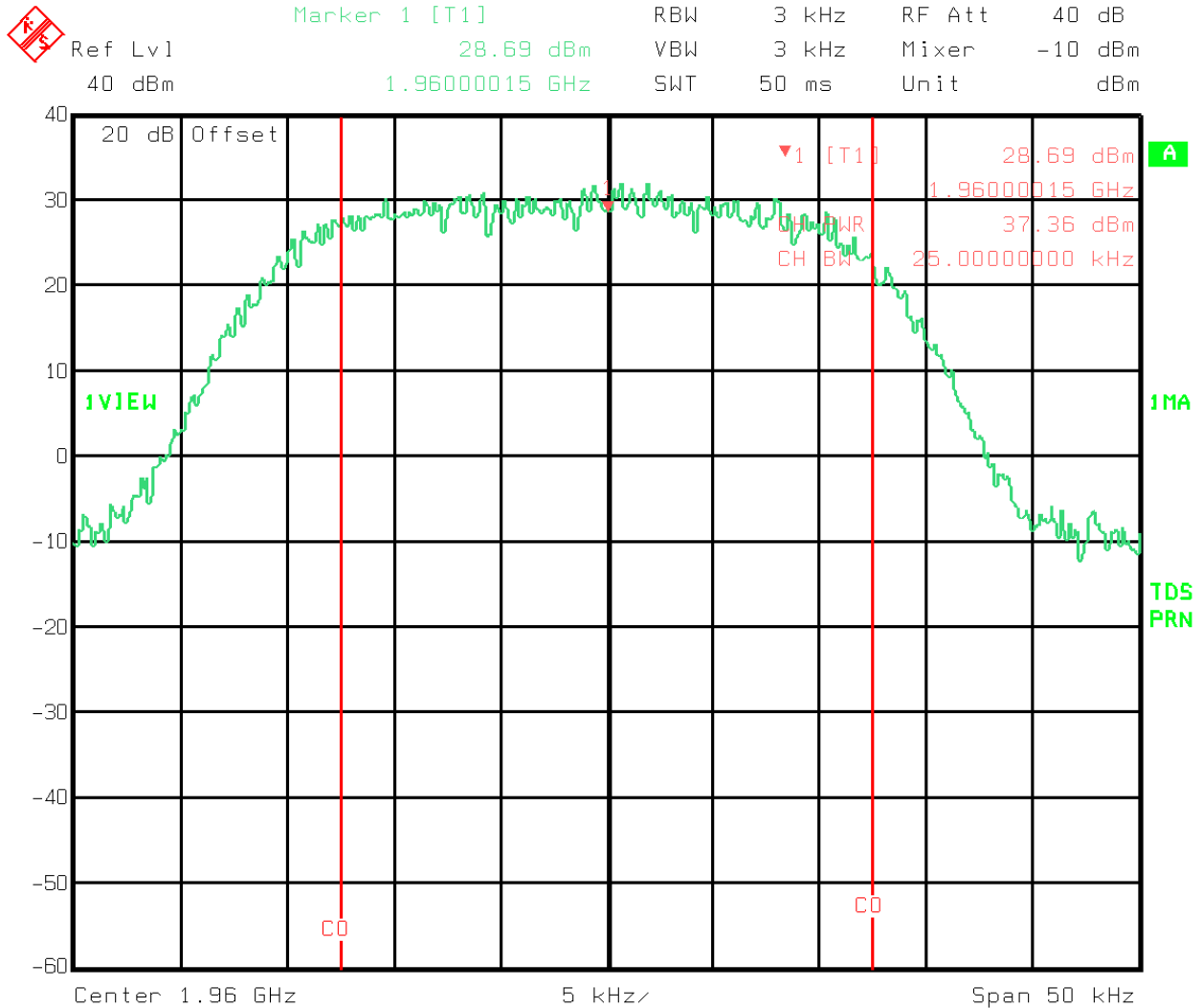
Plot 10 - Two-Channel Output Power (GSM)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

RF Power Output: MOR701B Unit

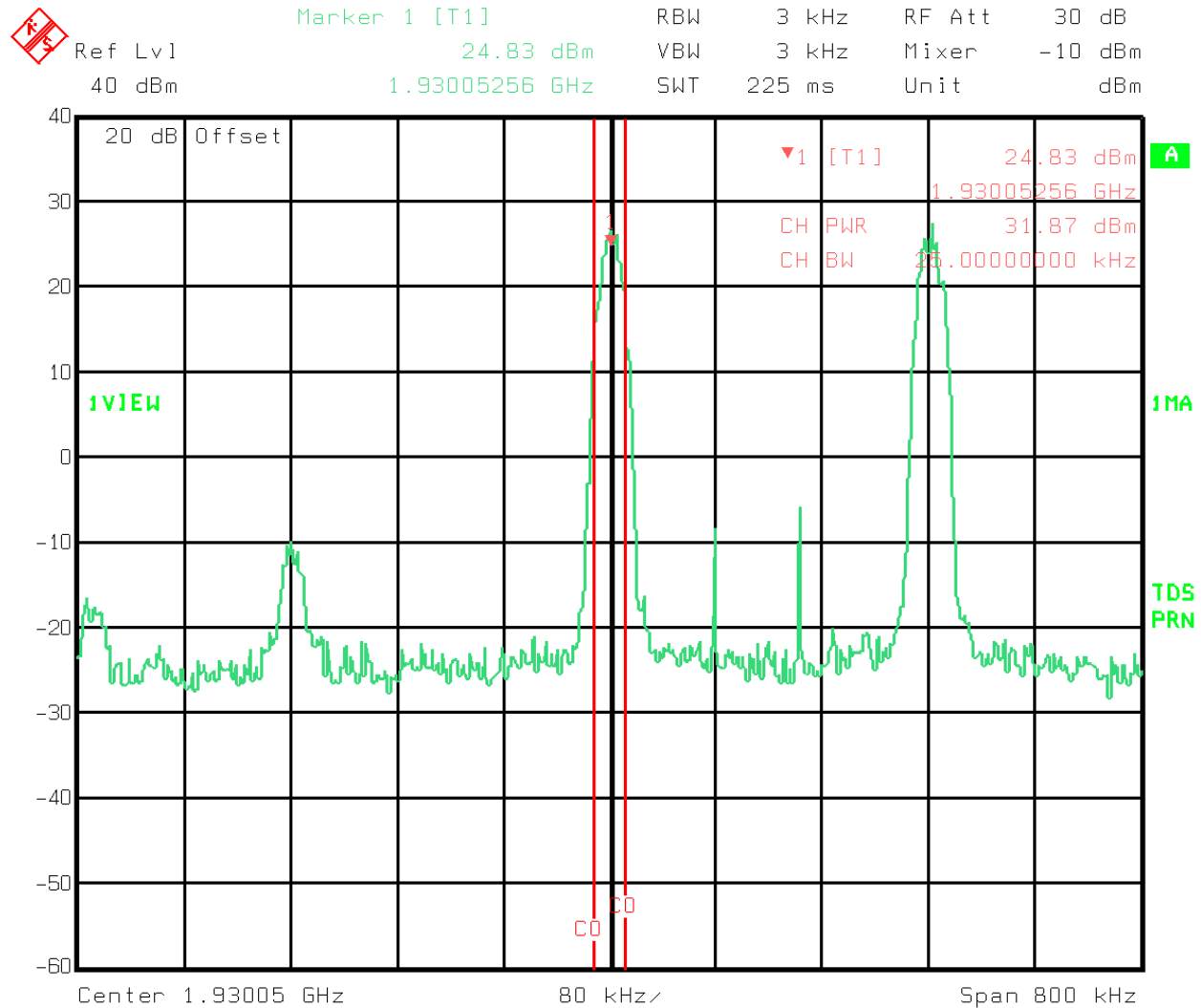


Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: CP07.PCX CHANNEL POWER
8 WATT AMPLIFIER
Date: 29.NOV.1999 15:28:47

Plot 11 - Single Channel Power (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****RF Power Output: MOR701B Unit**

Title: VARIABLE BW W/EXTENSION MODULE- NADC (Channel 1 & 21)
Comment A: LBEC20.PCX LOWER BAND EDGE CHANNEL POWER
8 WATT AMPLIFIER INTERMODULATION
Date: 8.DEC.1999 11:59:05

Plot 12 - Two-Channel Power Output (NADC)

EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.1049
TESTED BY: Ron Gaytan	DATE:11/05, 11/29, 11/30/99

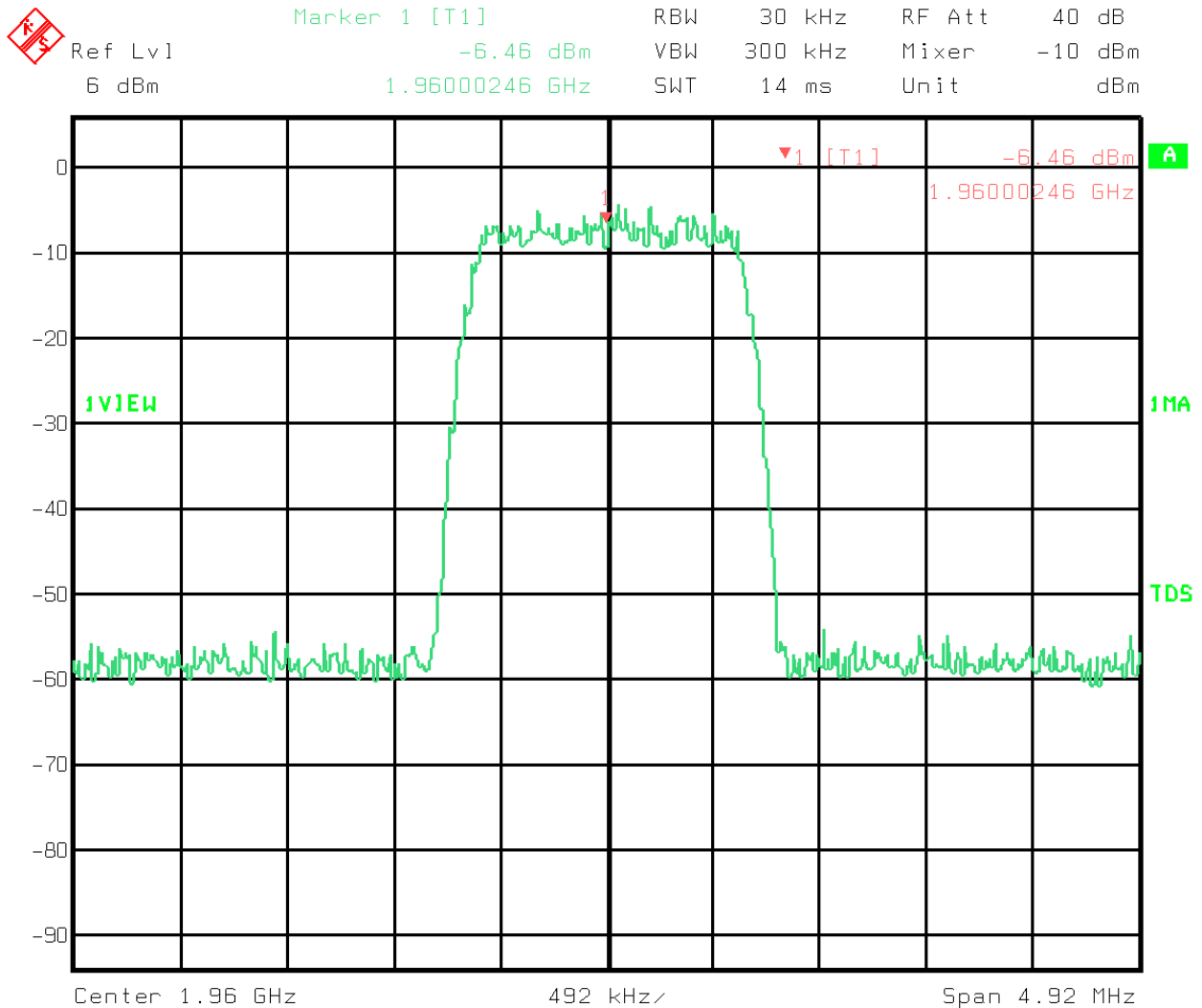
Test Results: Complies.**Test Data:** See attached plot(s).**Equipment Used:** G2632, G2736, G3726, CF39, CF41**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 24 °C**Relative Humidity:** 46 %

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Power Unit



Title: CDMA MODULE W/EXTENSION MODULE-IS95 (Channel 600)
Comment A: OCBWIO6.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)
Date: 29.NOV.1999 12:05:51

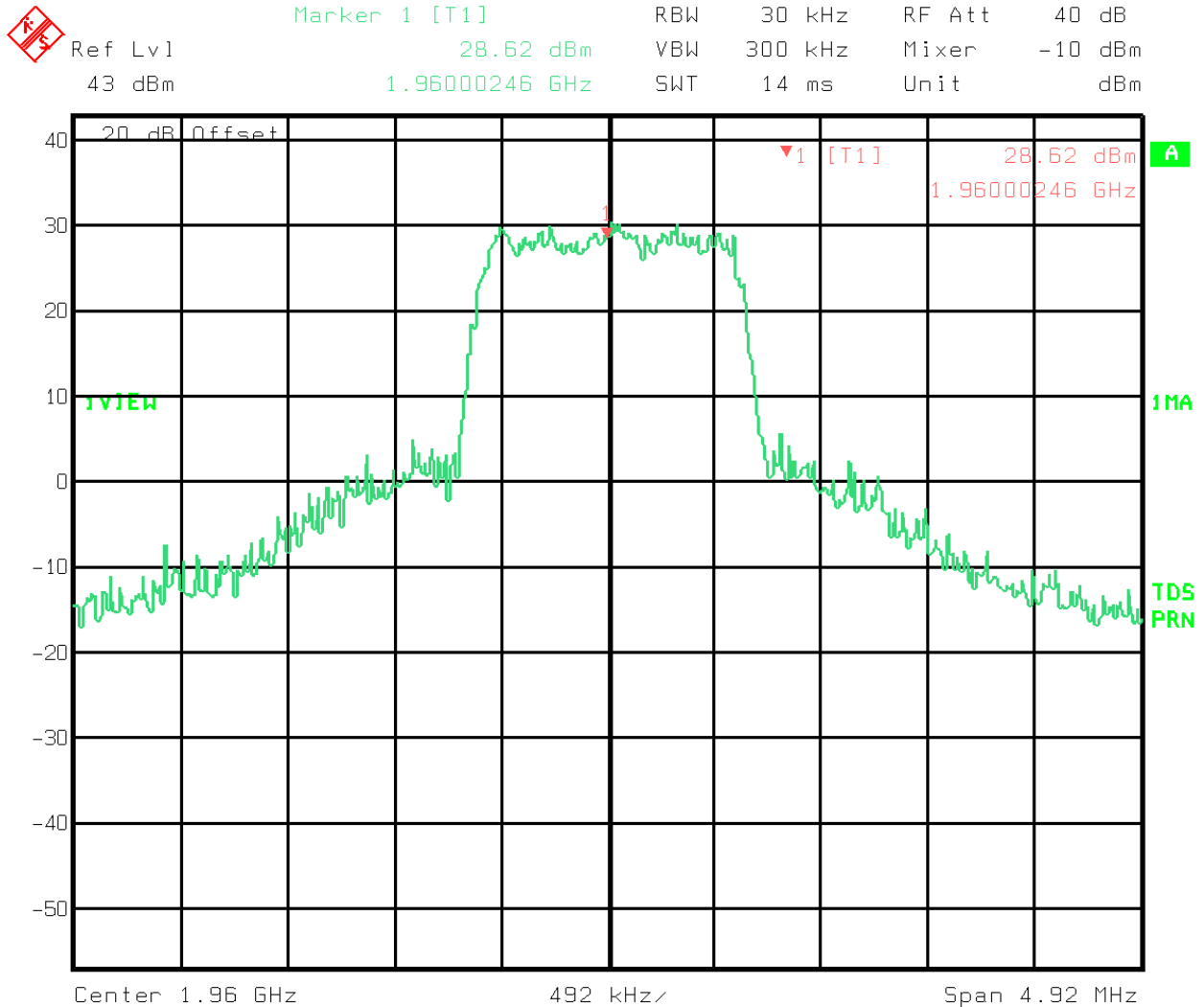
Plot 13 - Input Waveform (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Power Unit



Title: CDMA MODULE W/EXTENSION MODULE-IS95 (Channel 600)
Comment A: OCBW006.PCX OCCUPIED BANDWIDTH
Date: 29.NOV.1999 11:59:57

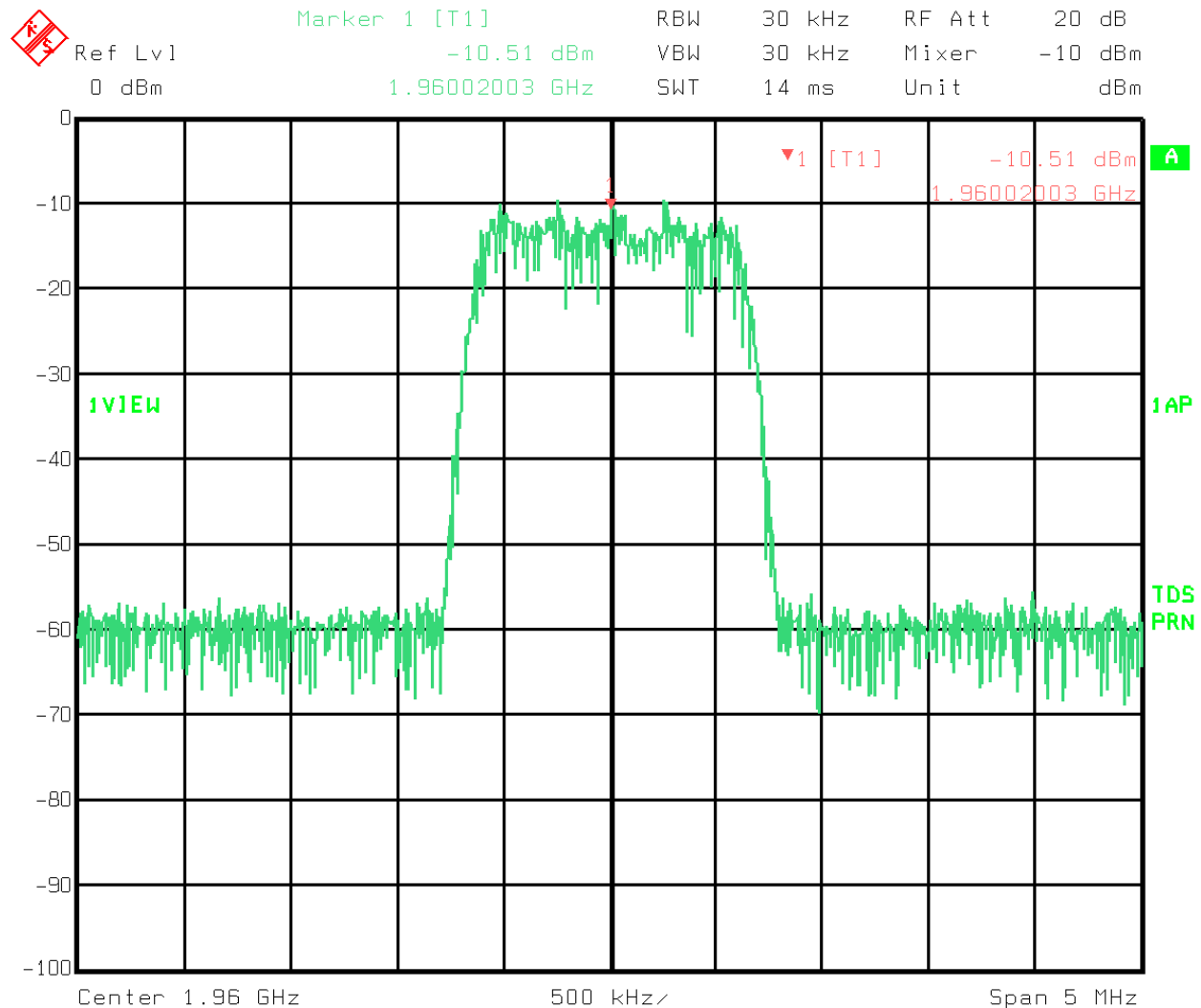
Plot 14 - Output Waveform (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Power Unit



Title: Occupied Bandwidth Variable Bandwidth Modules (Channel 600)
Comment A: OCBW01I.PCX
Input Signal
Date: 5.NOV.1999 17:16:10

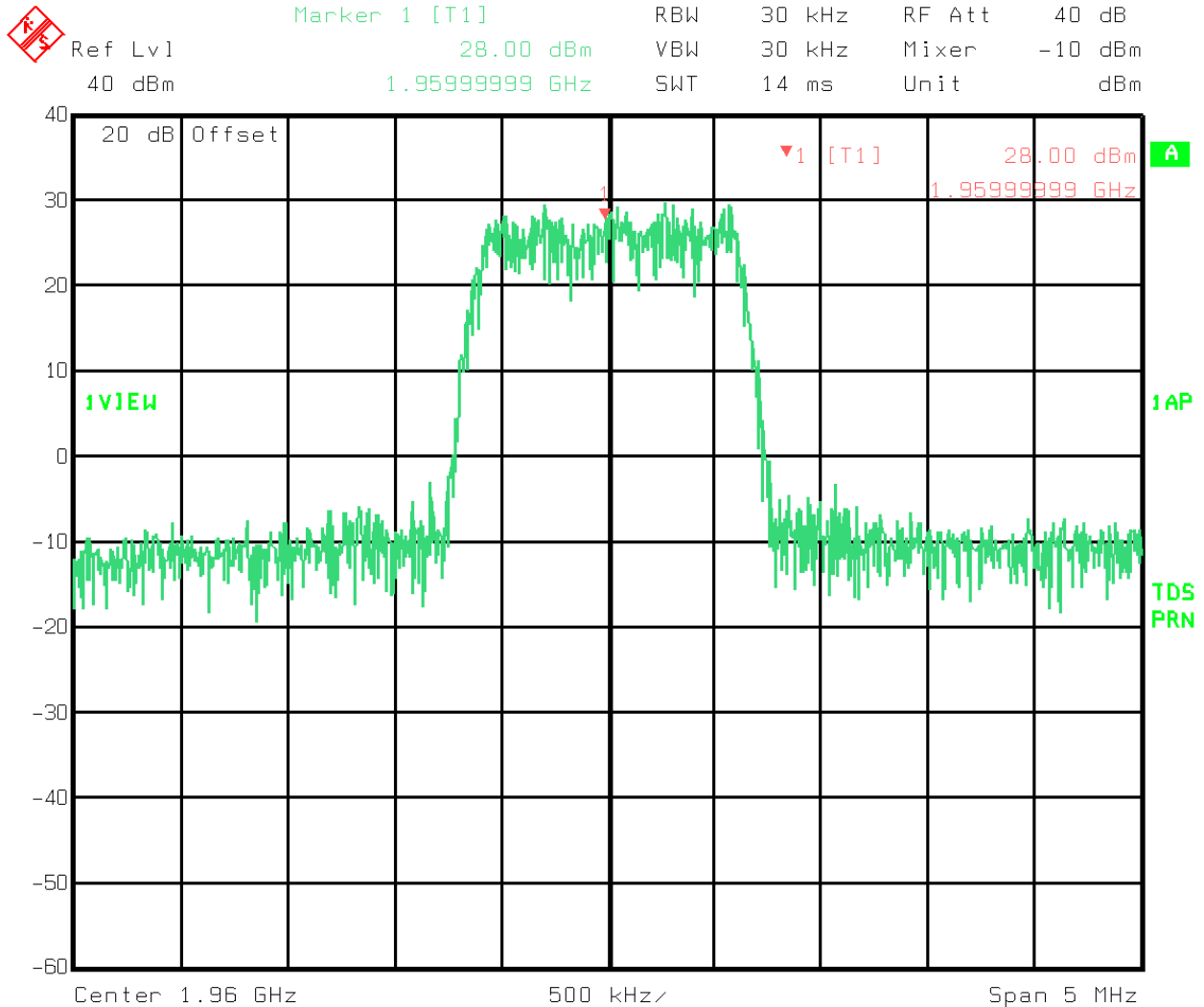
Plot 15 - Input Waveform (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Power Unit



Title: Occupied Bandwidth Variable Bandwidth Modules (Channel 600)
Comment A: OCBW010.PCX
Date: 5.NOV.1999 17:04:05

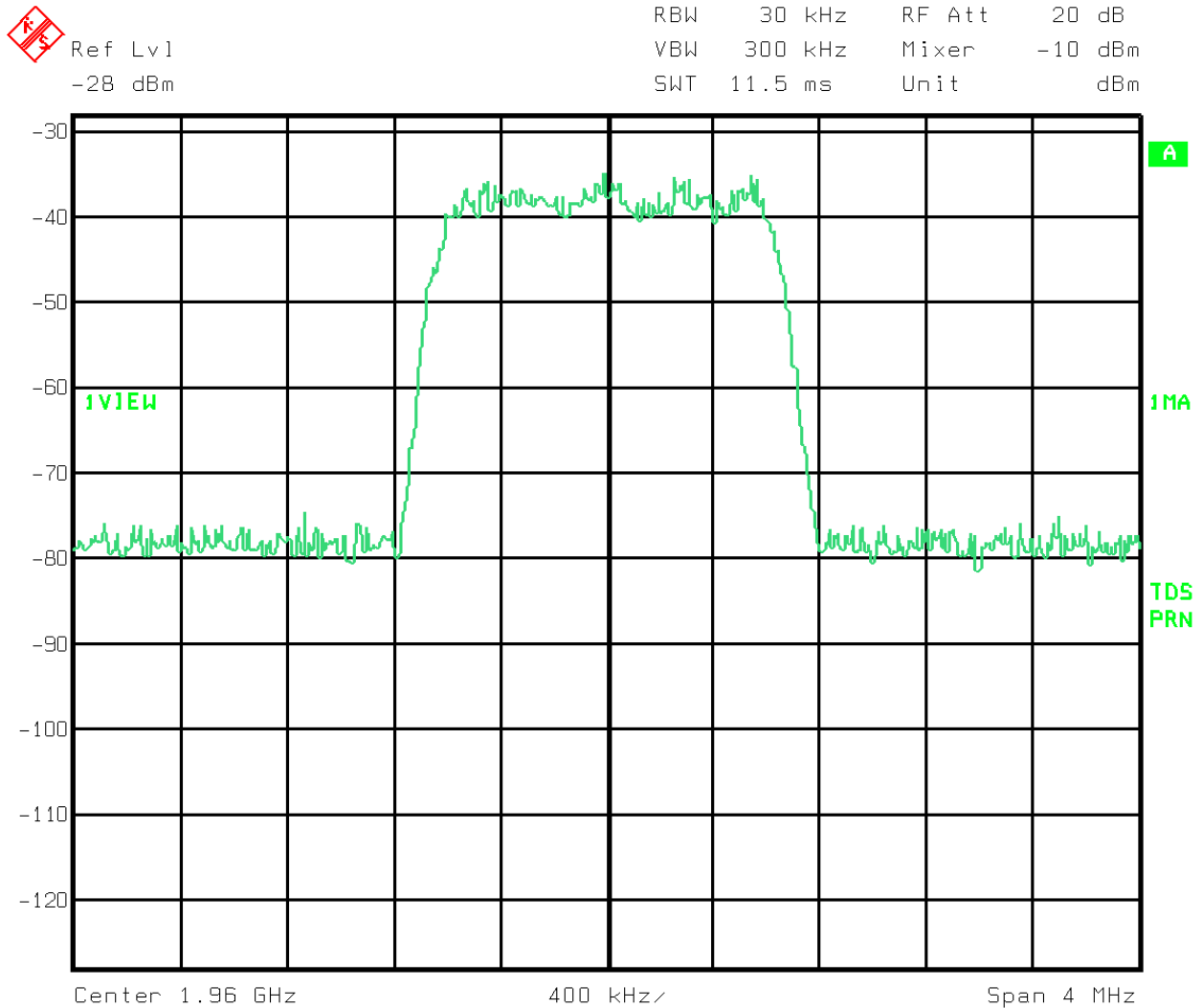
Plot 16 - Output Waveform (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Unit



Title: VARIABLE BW MODULE W/EXTENSION MODULE- IS95 (Channel 25)

Comment A: OCBWI16.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)

8 WATT AMPLIFIER

Date: 30.NOV.1999 12:03:56

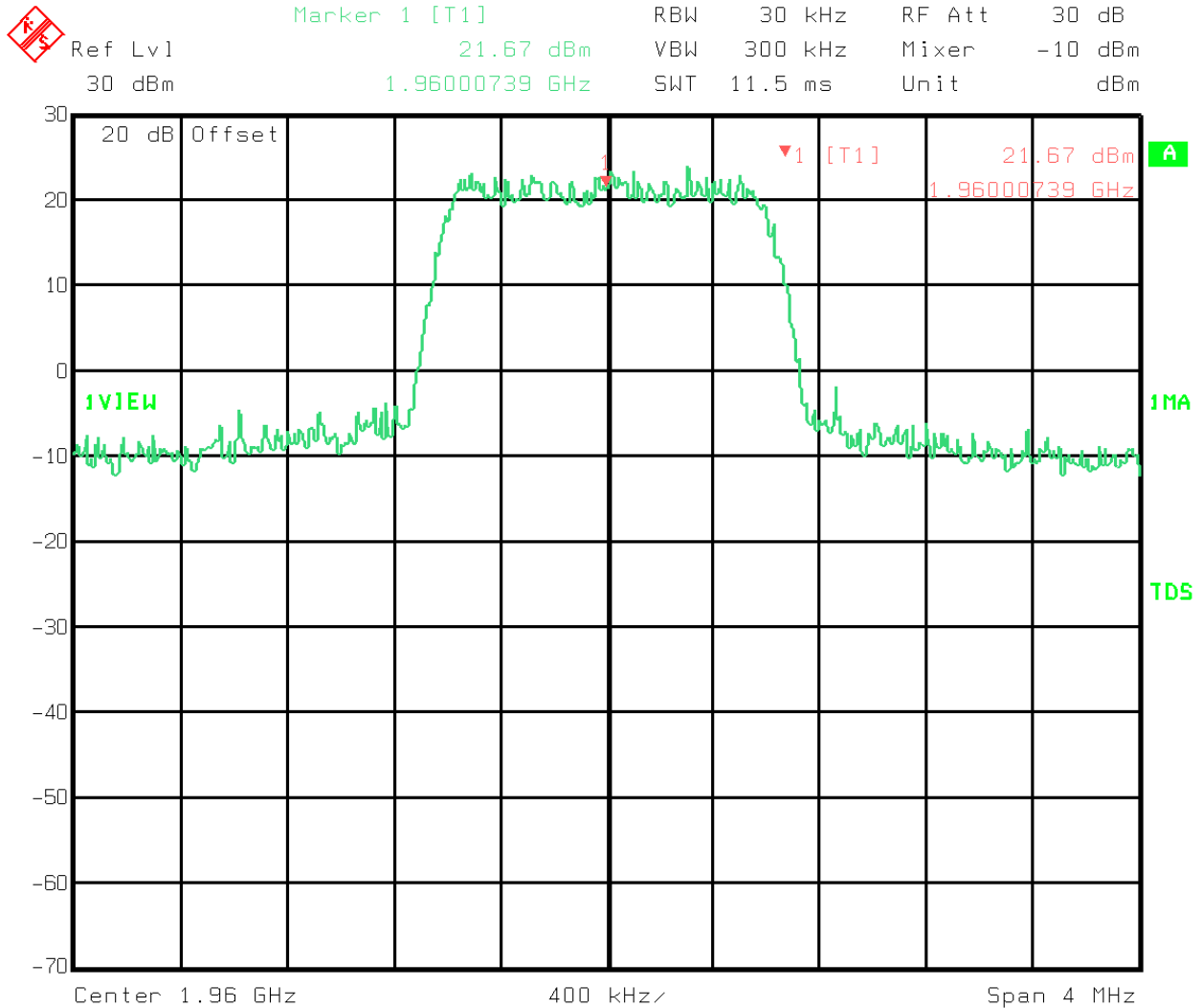
Plot 17 - Input Waveform (CDMA)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Unit



Title: VARIABLE BW MODULE W/EXTENSION MODULE- IS95 (Channel 25)

Comment A: OCBW016.PCX OCCUPIED BANDWIDTH

8 WATT AMPLIFIER

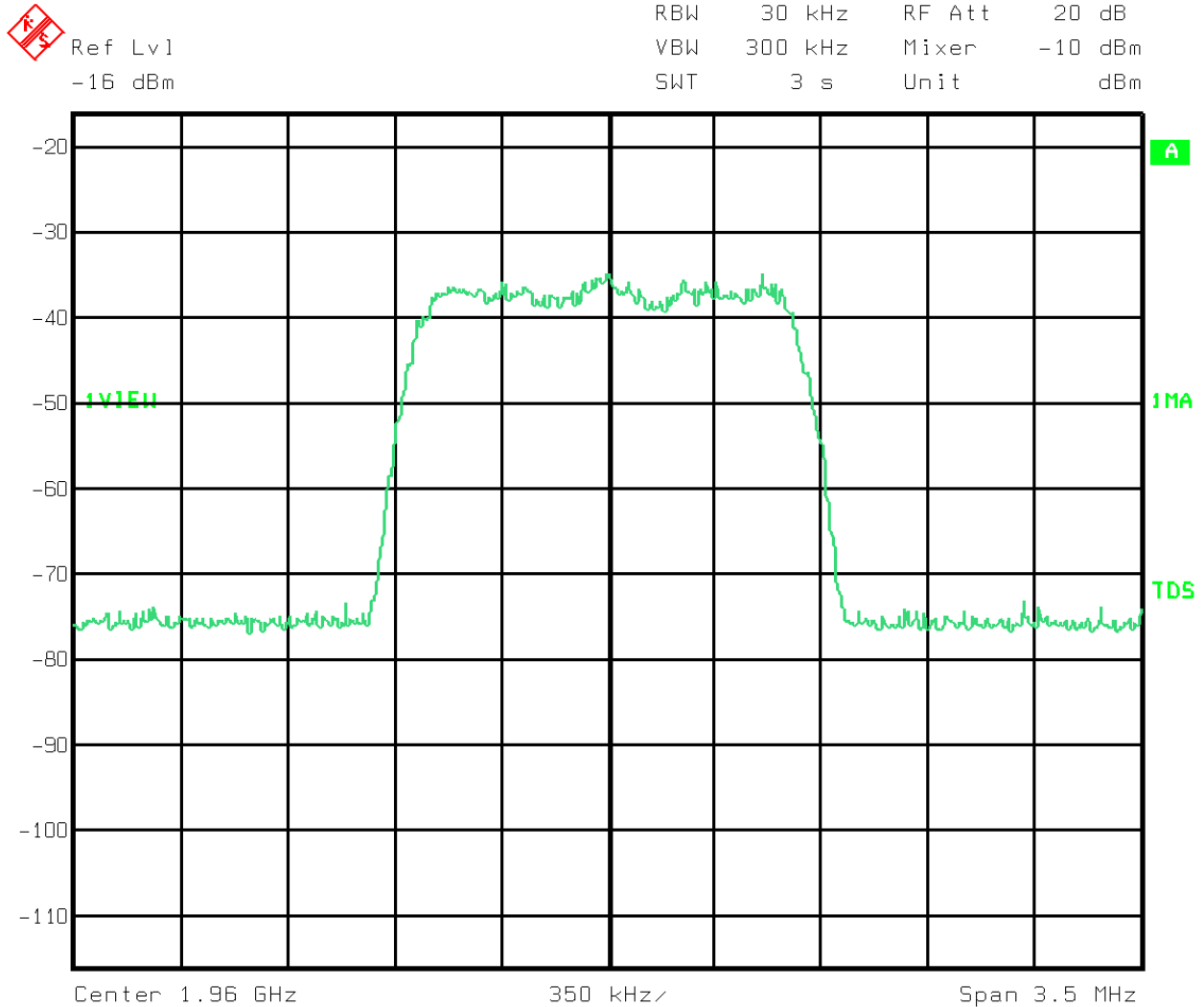
Date: 30.NOV.1999 11:58:54

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth: MOR701B Unit

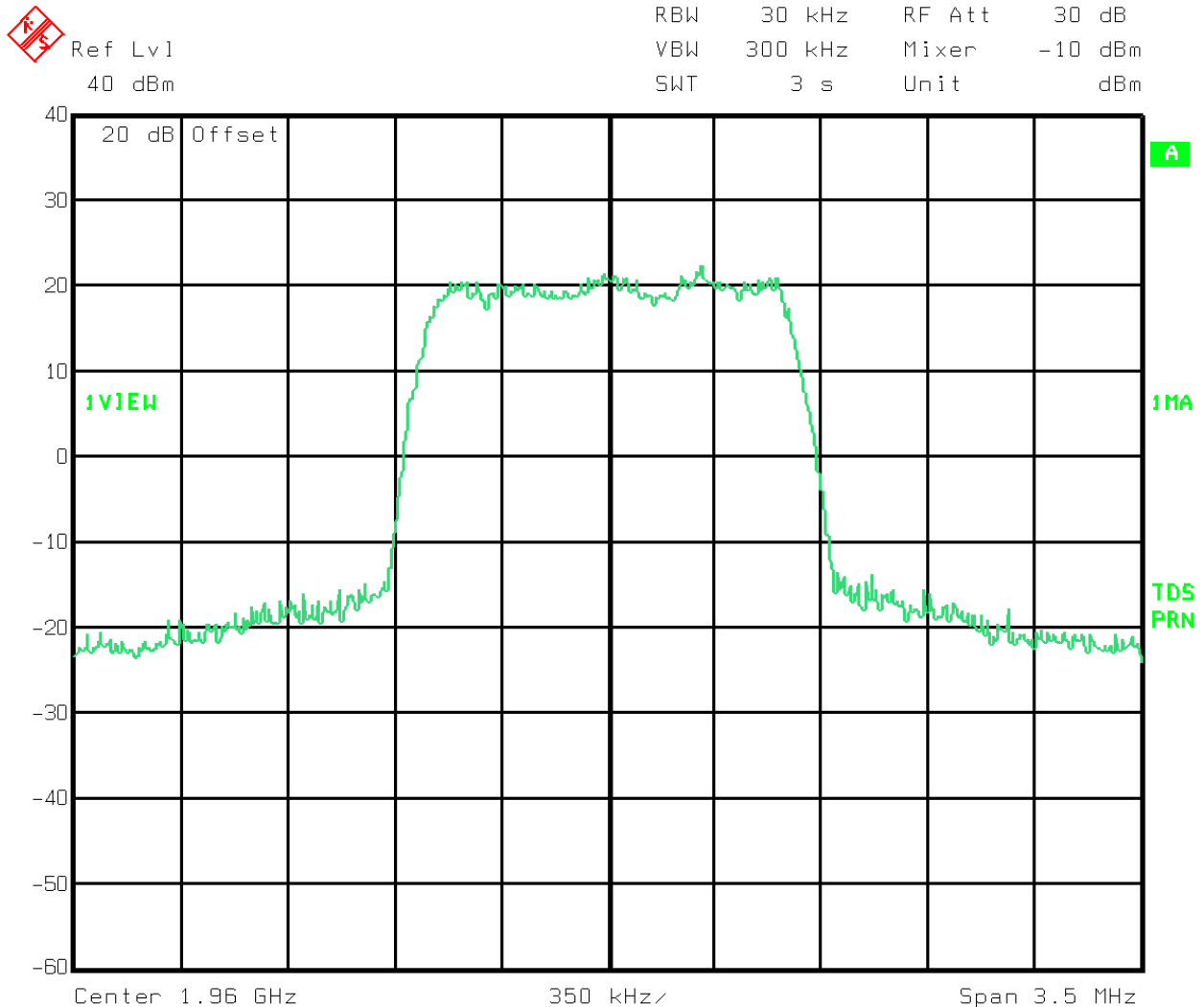


Title: CDMA MODULE W/EXTENSION MODULE- IS95 (Channel 600)
Comment A: OCBWI08.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)
8 WATT AMPLIFIER
Date: 30.NOV.1999 10:42:09

Plot 18 - Input Waveform (CDMA)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth: MOR701B Unit**

Title: CDMA MODULE W/EXTENSION MODULE- IS95 (Channel 600)
Comment A: OCBW008.PCX OCCUPIED BANDWIDTH
8 WATT AMPLIFIER
Date: 30.NOV.1999 10:38:10

Plot 19 - Output Waveform (CDMA)

EQUIPMENT: PCS Repeater**FCC ID:****PROJECT NO.: 9L0454RUS**

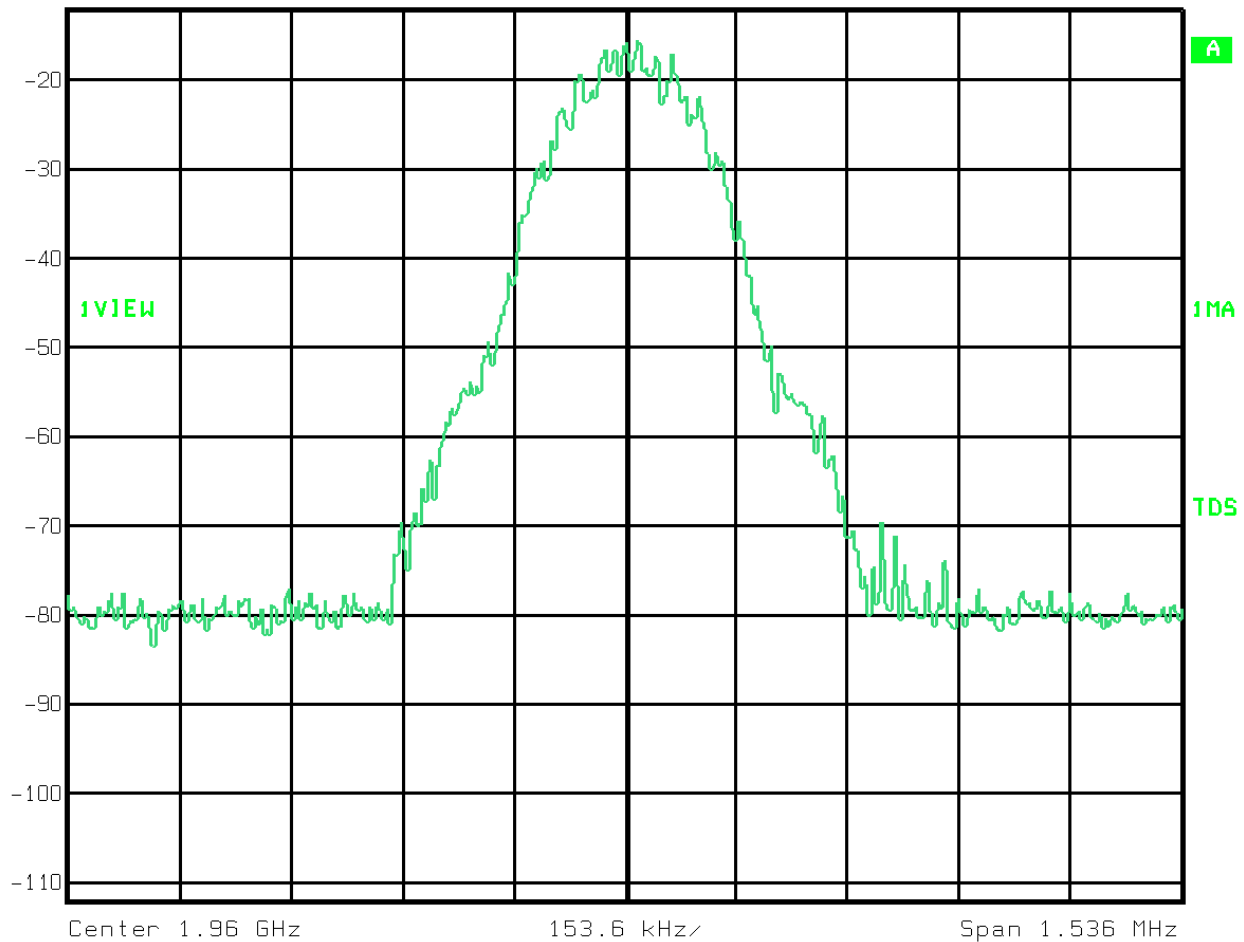
NAME OF TEST: Occupied Bandwidth (GSM)**PARA. NO.:** 2.1049**TESTED BY:** Ron Gaytan**DATE:** 11/09/99, 11/30/99**Test Results:** Complies.**Test Data:** See attached plot(s).**Equipment Used:** G2632, G2736, G3726. CF39, CF41**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 24 °C**Relative
Humidity:** 42 %

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (GSM): MOR701B Power Unit**Ref Lvl
-12 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	5 ms	Unit	dBm



Title: Variable Bandwidth Modules (Channel 600)
Comment A: obw04a.PCX Occupied Bandwidth (GSM)
Input Signal
Date: 9.NOV.1999 11:31:26

Plot 20 - Input Waveform (GSM)

EQUIPMENT: PCS Repeater

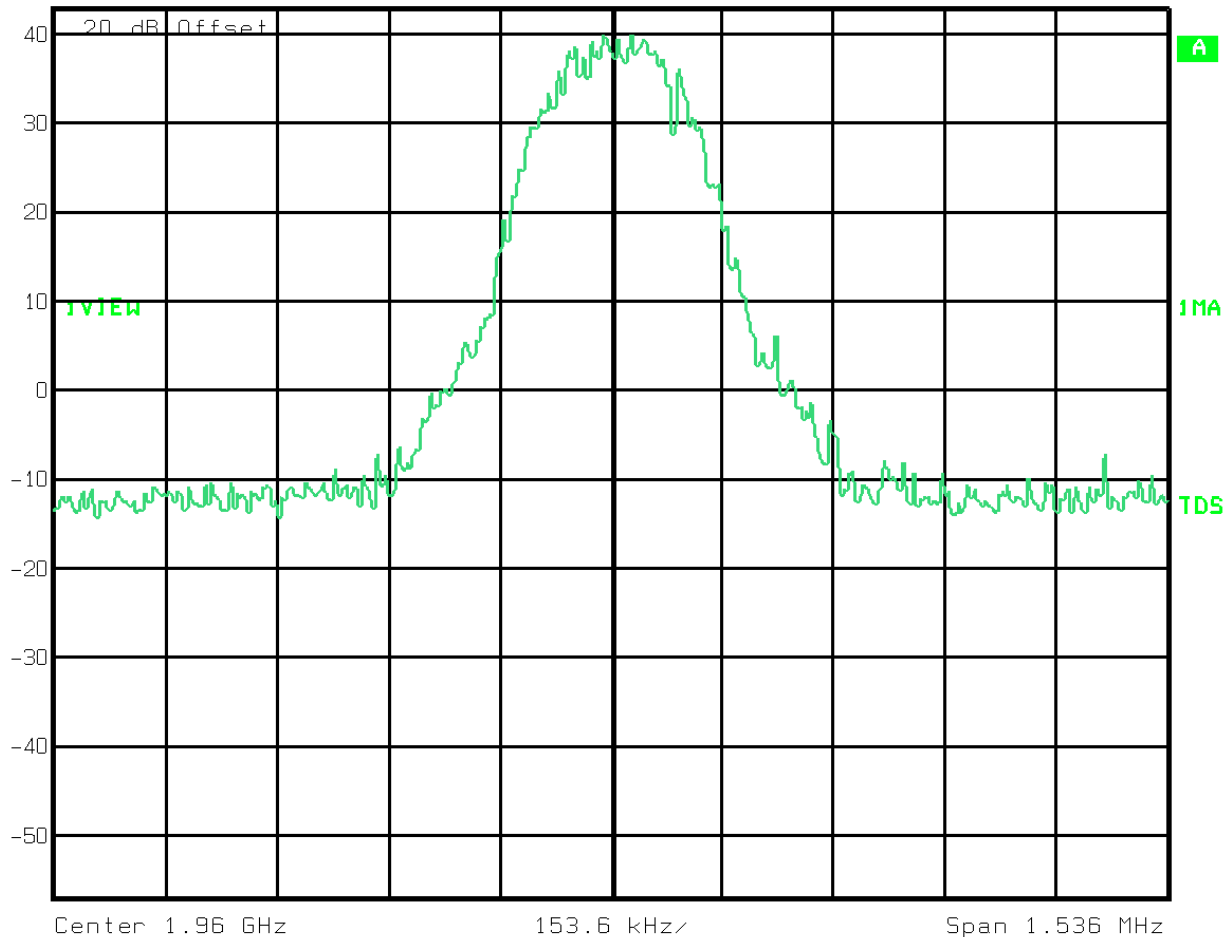
FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth (GSM): MOR701B Power Unit

Ref Lvl
43 dBm

RBW	30 kHz	RF Att	40 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	5 ms	Unit	dBm

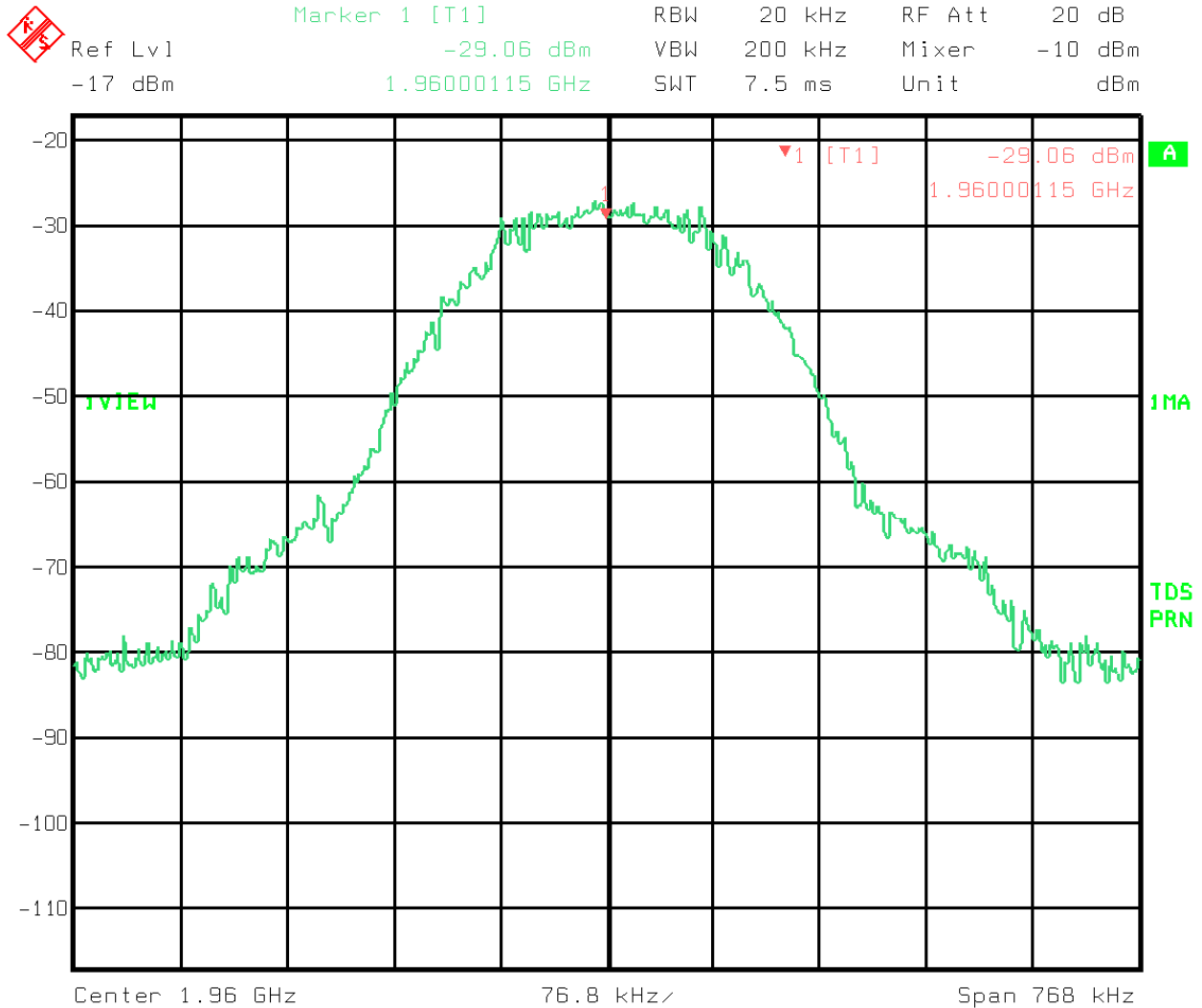


Title: Variable Bandwidth Modules (Channel 600)
Comment A: obw04.PCX Occupied Bandwidth (GSM)
Date: 9.NOV.1999 11:25:46

Plot 21 - Output Waveform (GSM)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (GSM): MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 600)
Comment A: OCBWI18.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)
8 WATT AMPLIFIER
Date: 30.NOV.1999 14:10:41

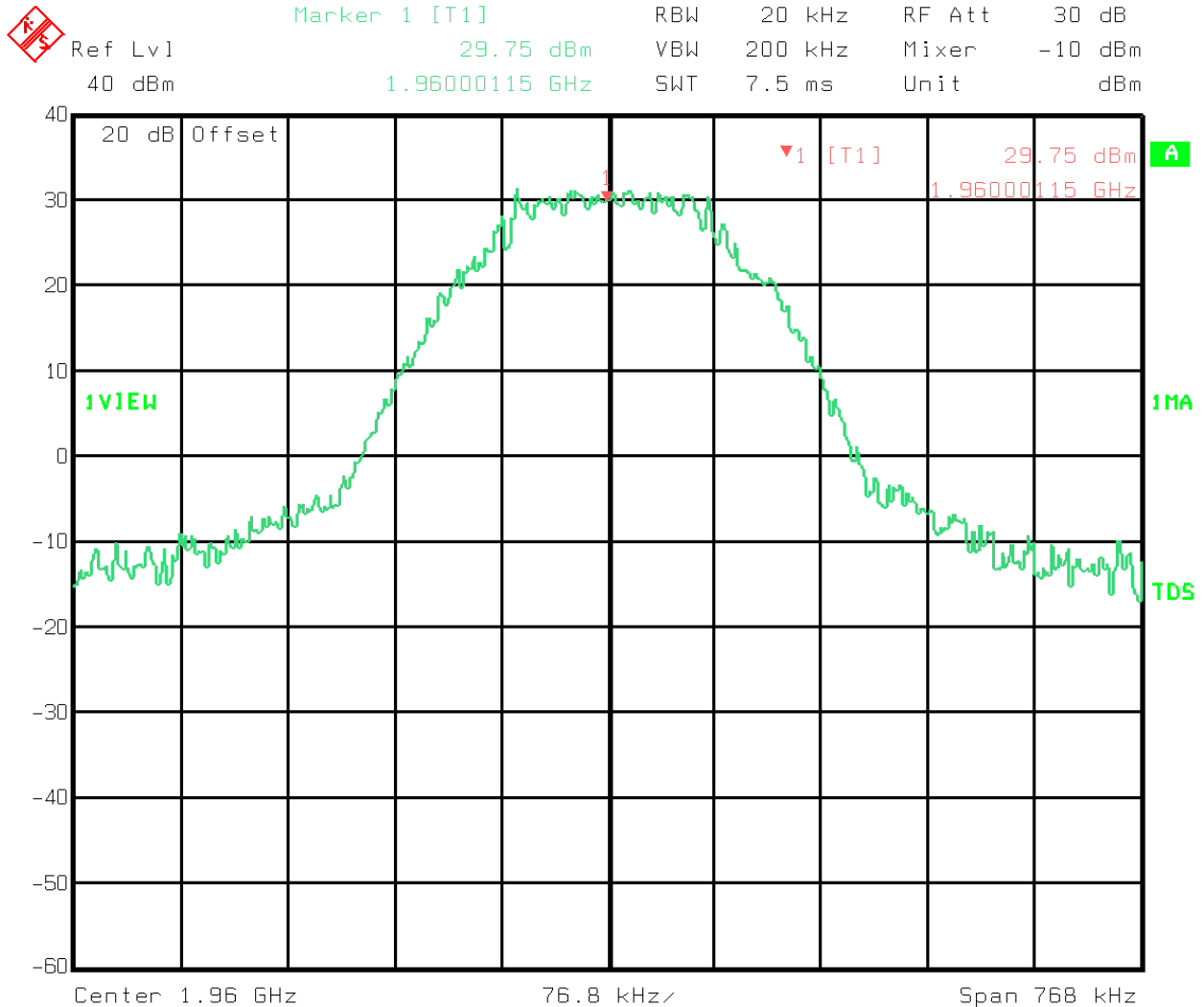
Plot 22 - Input Waveform (GSM)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth (GSM): MOR701B Unit



Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 600)

Comment A: OCBW018.PCX OCCUPIED BANDWIDTH

8 WATT AMPLIFIER

Date: 30.NOV.1999 14:07:11

Plot 23 - Output Waveform (GSM)

EQUIPMENT: PCS Repeater**FCC ID:****PROJECT NO.: 9L0454RUS**

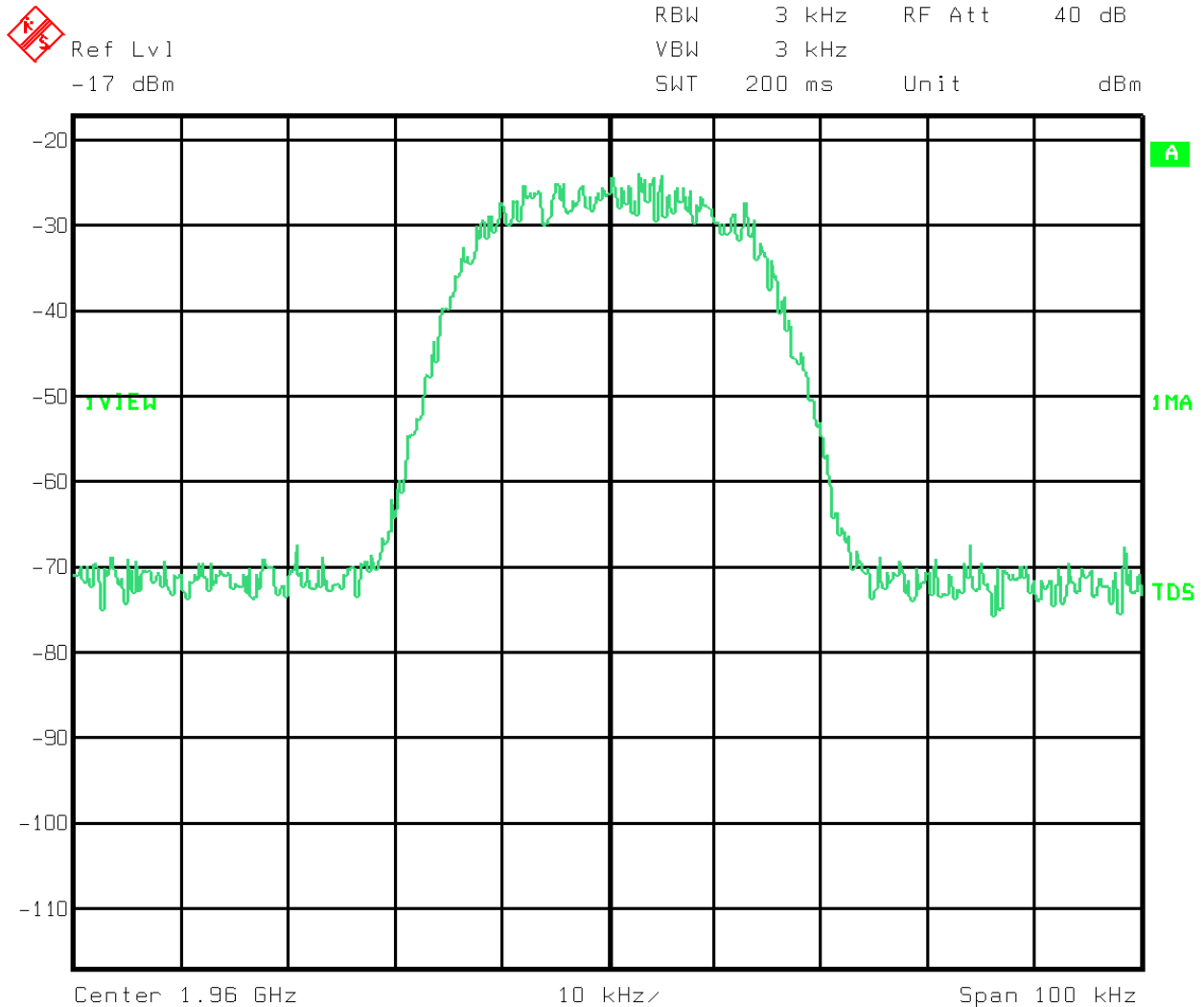
NAME OF TEST: Occupied Bandwidth (NADC)**PARA. NO.:** 2.1049**TESTED BY:** Ron Gaytan**DATE:** 11/08, 11, 29, 30/99**Test Results:** Complies.**Test Data:** See attached plot(s).**Equipment Used:** G2632, G2736, G3726, CF39, CF41**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 22 °C**Relative Humidity:** 48 %

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth (NADC): MOR701B Power Unit

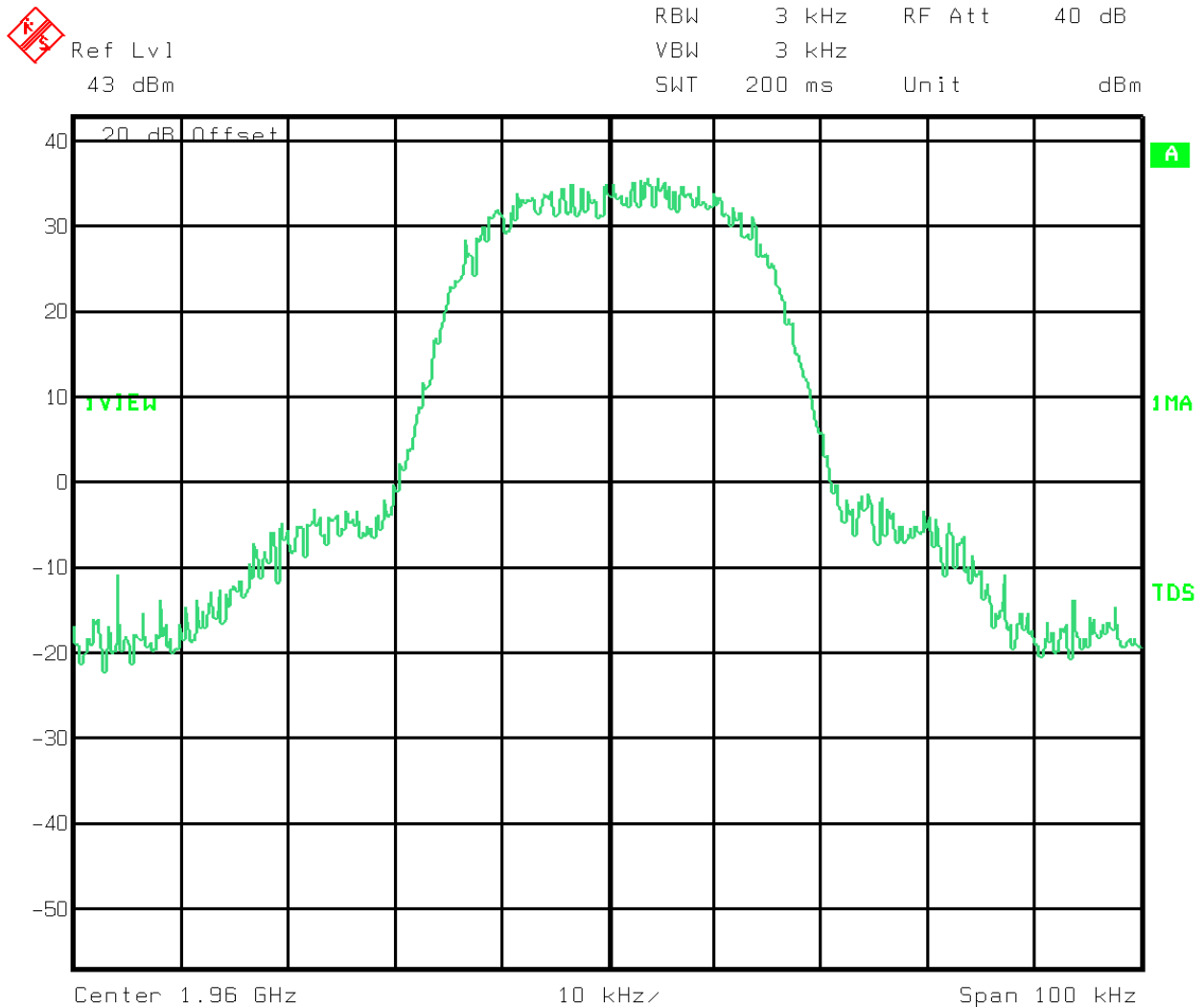


Title: TDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (NADC)
Comment A: OCBW05B.PCX OCCUPIED BANDWIDTH
Date: 11.NOV.1999 14:38:53

Plot 24 - Input Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

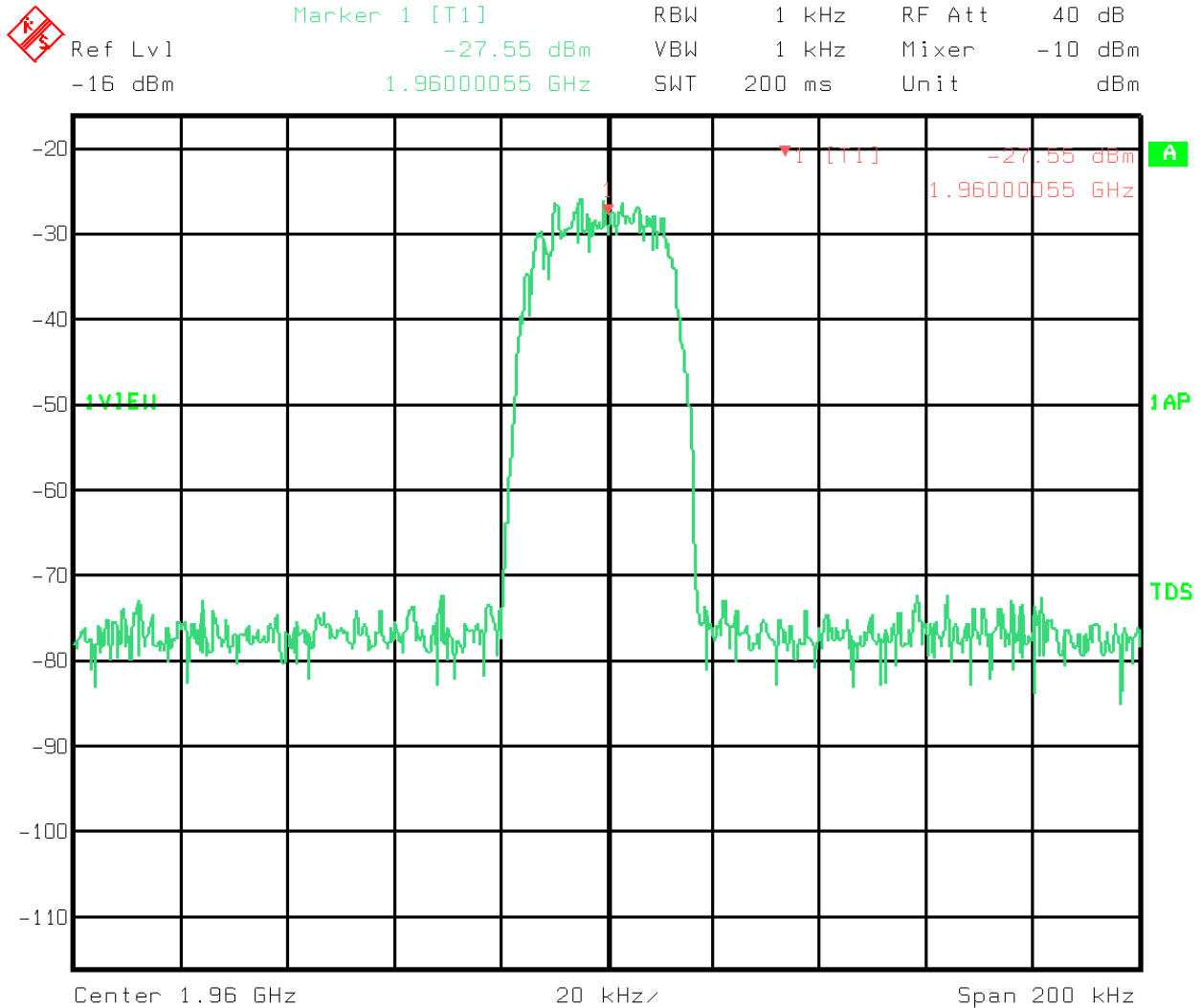
PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Power Unit**

Title: TDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (NADC)
Comment A: OCBW05A.PCX OCCUPIED BANDWIDTH
Date: 11.NOV.1999 14:32:14

Plot 25 - Output Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Power Unit**

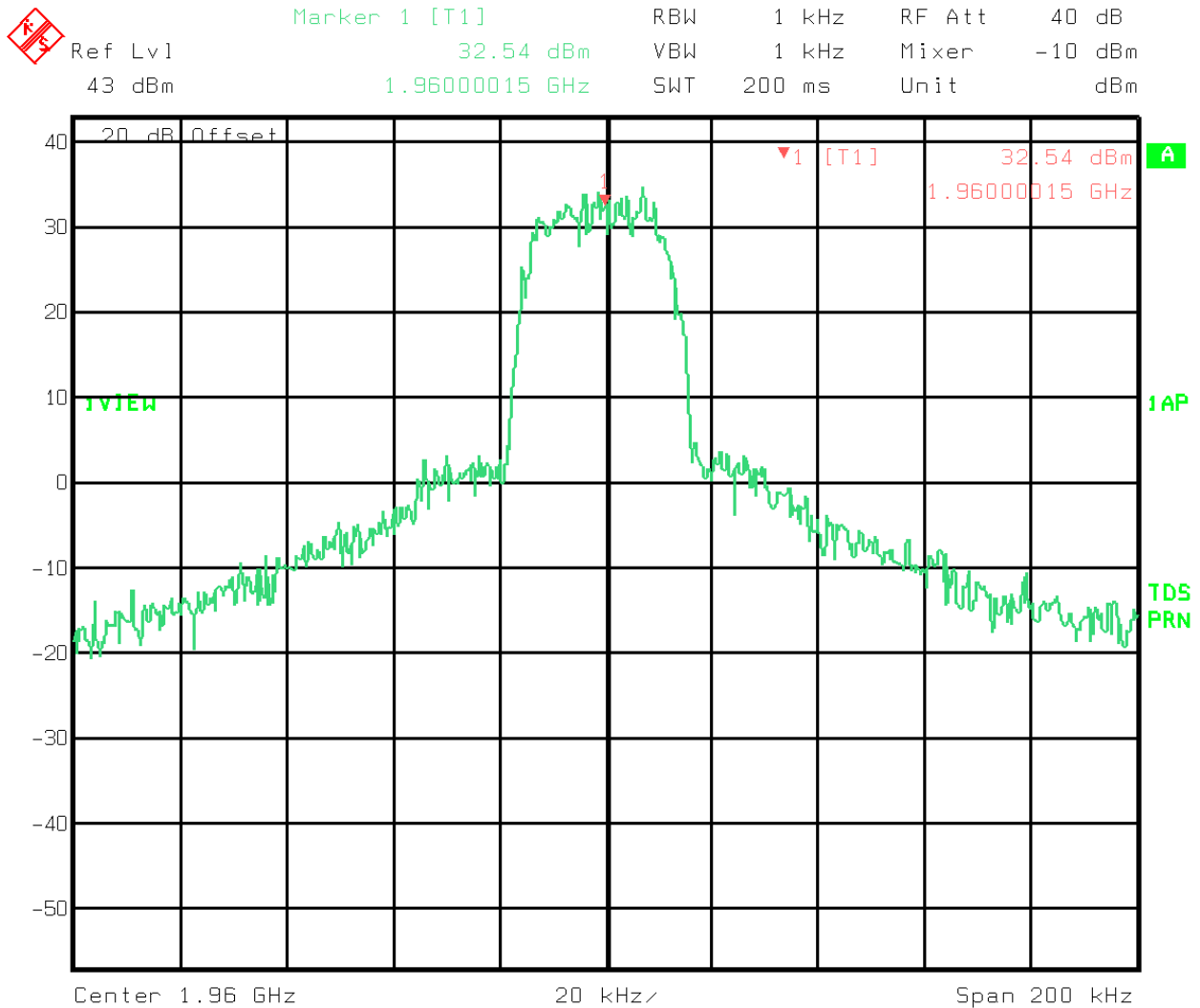
Title: Variable Bandwidth Modules (Channel 600)
Comment A: OCBWI02.PCX
Occupied Bandwidth Input (NADC)
Date: 8.NOV.1999 13:59:16

Plot 26 - Input Waveform (NADC)

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Occupied Bandwidth (NADC): MOR701B Power Unit

Title: Variable Bandwidth Modules (Channel 600)
Comment A: OCBW002.PCX
Occupied Bandwidth (NADC)
Date: 8.NOV.1999 13:50:52

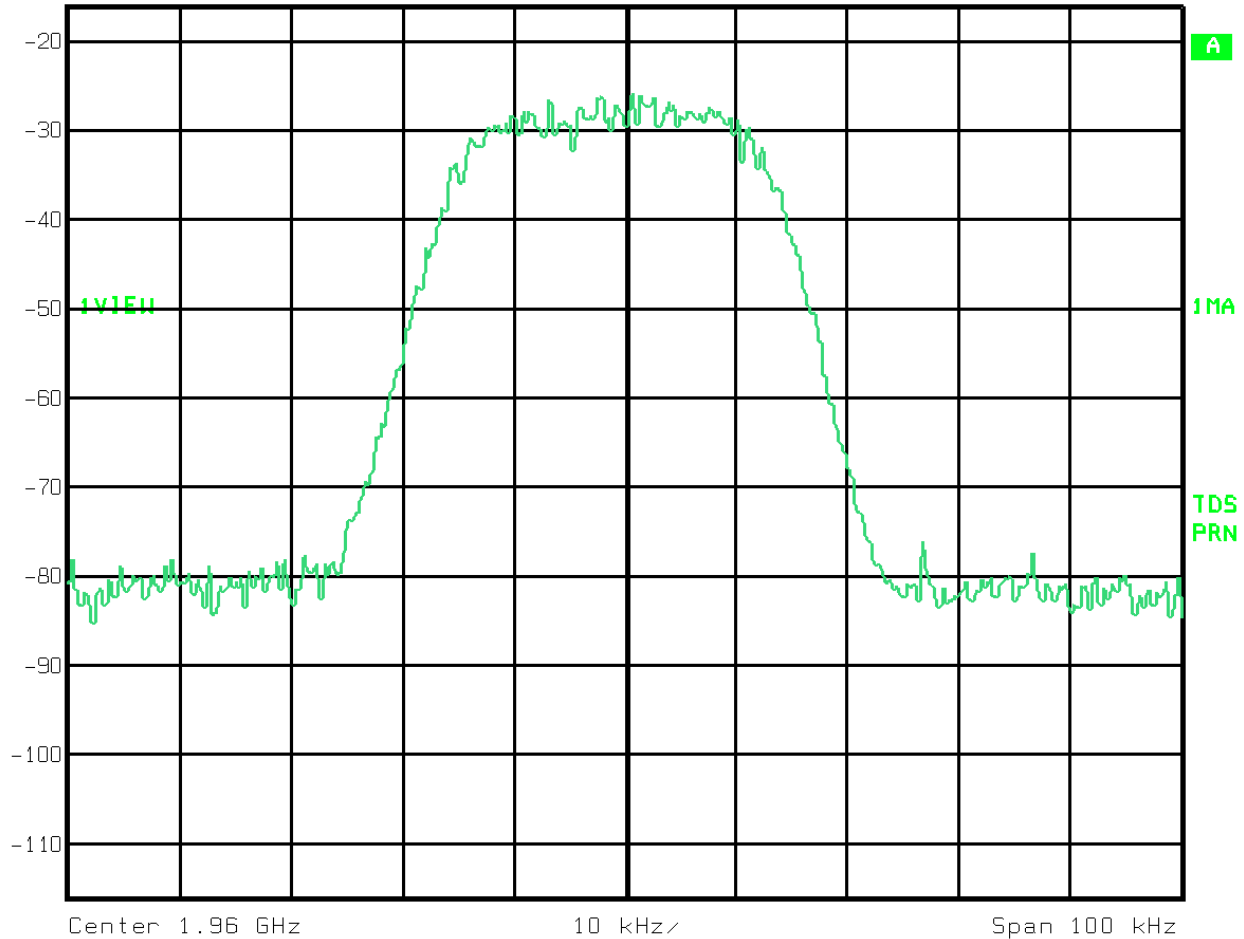
Plot 27 - Output Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Unit**Ref Lvl
-16 dBm

RBW	3 kHz	RF Att	30 dB
VBW	3 kHz	Mixer	-10 dBm
SWT	50 ms	Unit	dBm

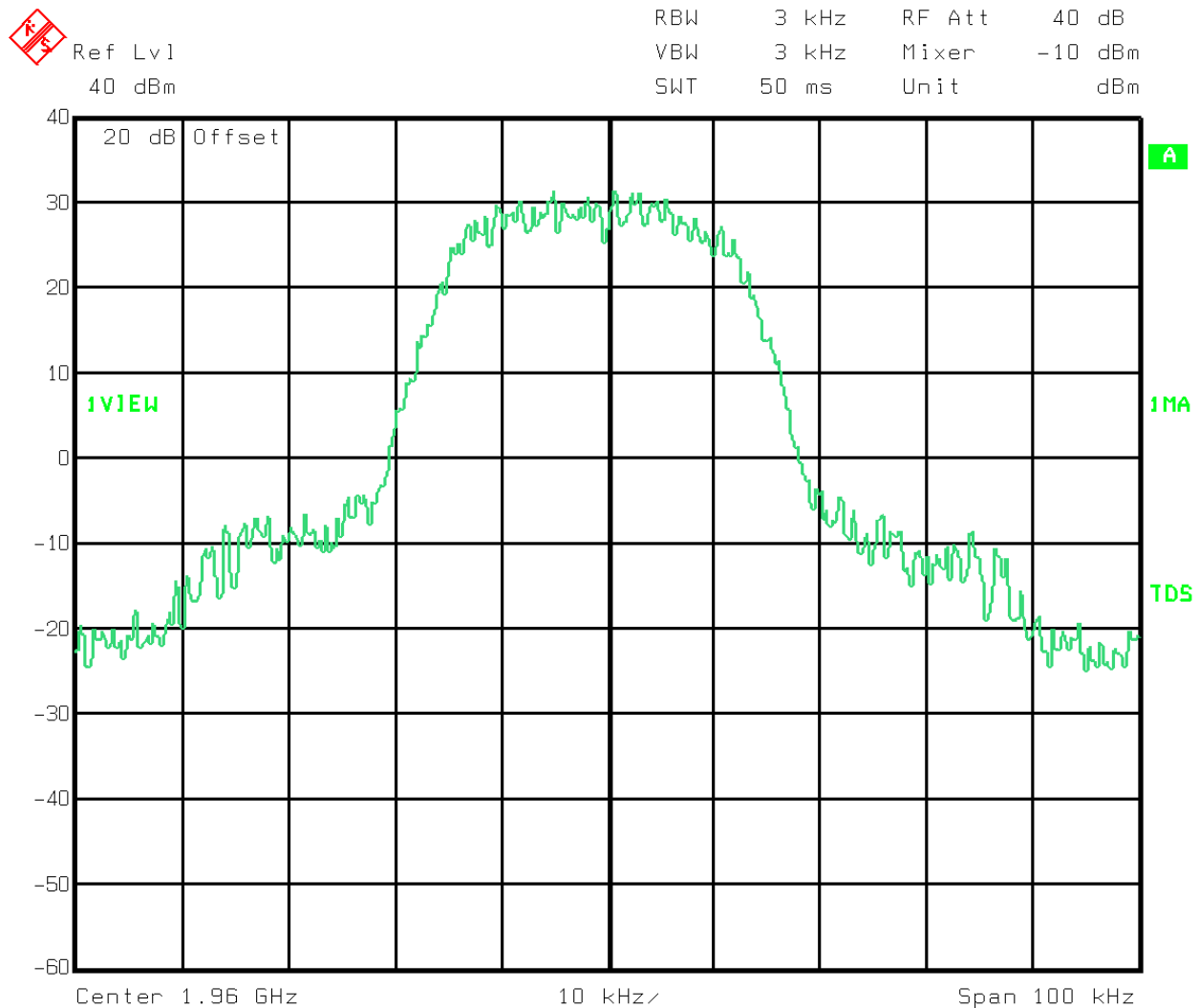


Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: OCBWID7.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)
8 WATT AMPLIFIER
Date: 29.NOV.1999 15:37:13

Plot 28 - Input Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Unit**

Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)

Comment A: OCBW007.PCX OCCUPIED BANDWIDTH

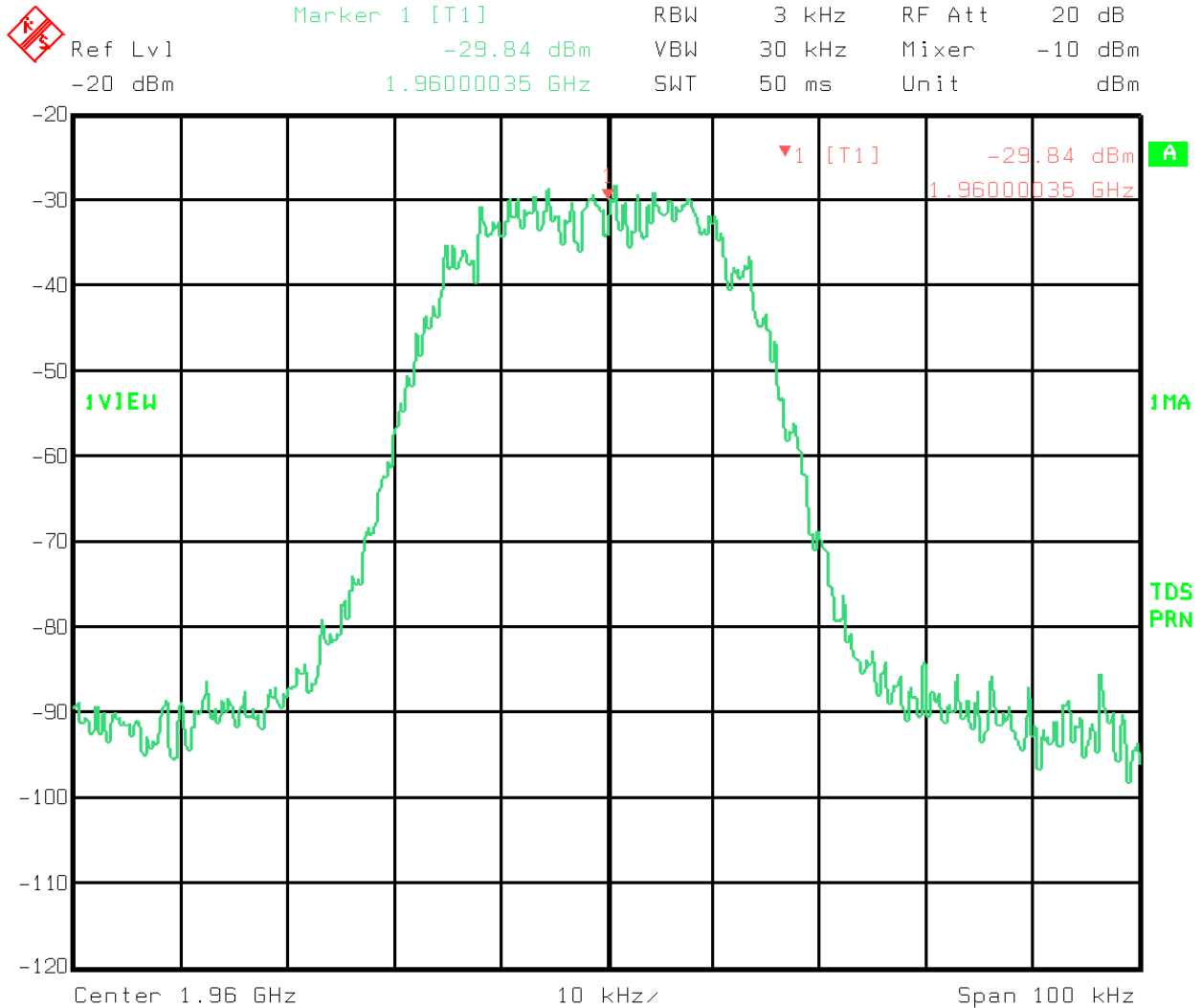
8 WATT AMPLIFIER

Date: 29.NOV.1999 15:32:13

Plot 29 - Output Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

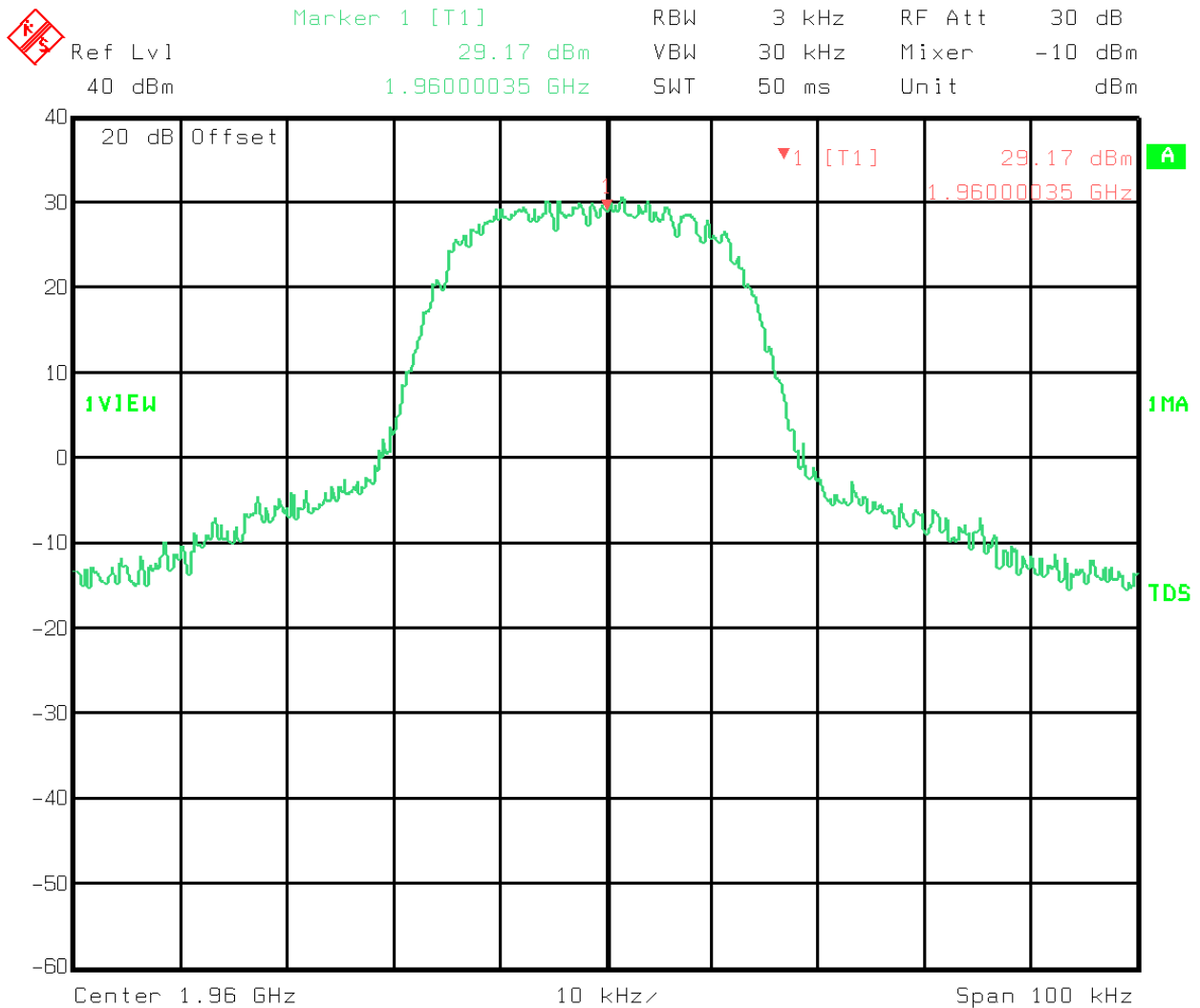
PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 600)
Comment A: OCBWI17.PCX OCCUPIED BANDWIDTH (INPUT SIGNAL)
8 WATT AMPLIFIER
Date: 30.NOV.1999 13:11:25

Plot 30 - Input Waveform (NADC)

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Occupied Bandwidth (NADC): MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 600)

Comment A: OCBW017.PCX OCCUPIED BANDWIDTH

8 WATT AMPLIFIER

Date: 30.NOV.1999 13:14:00

Plot 31 - Output Waveform (NADC)

EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

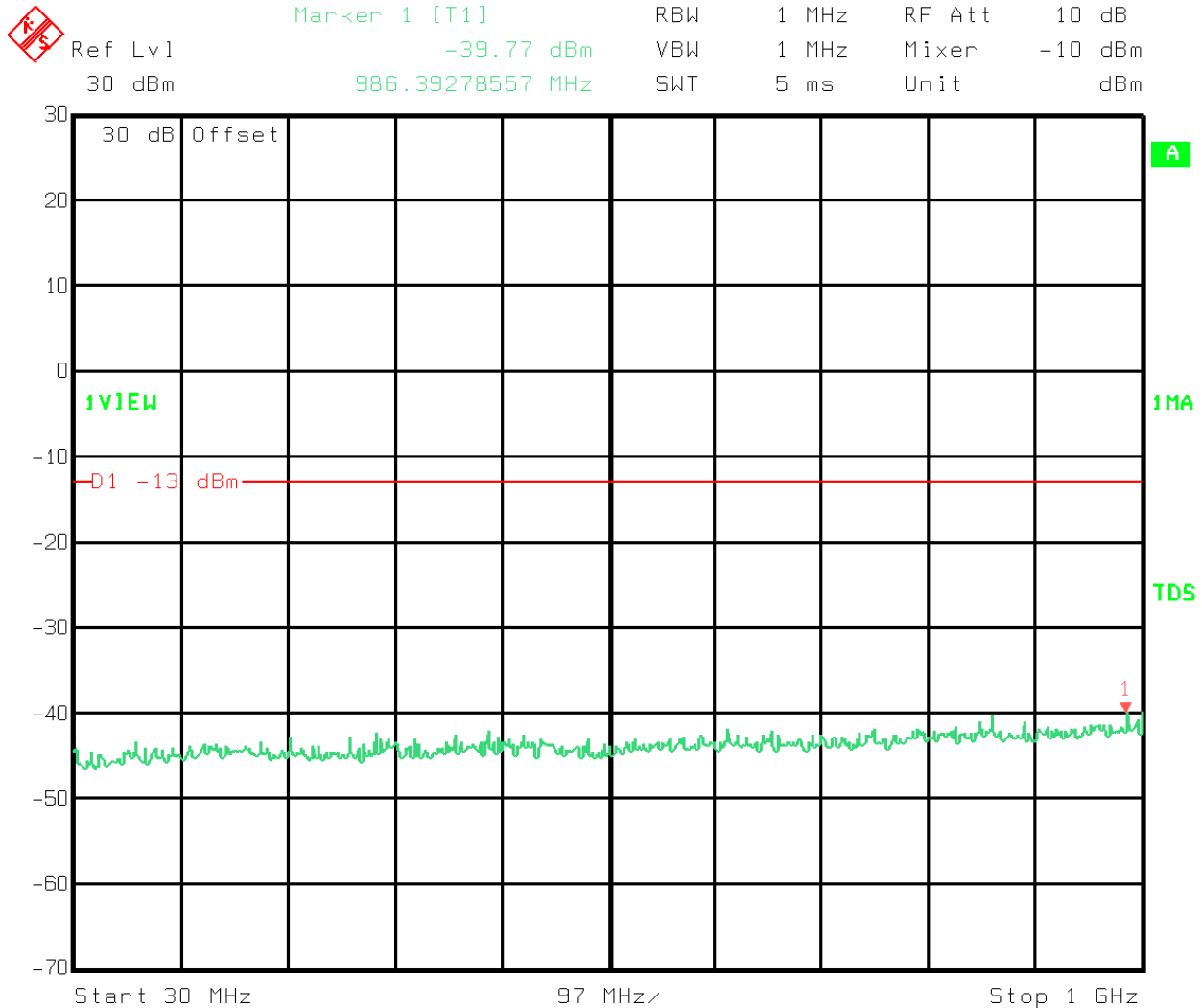
Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: Ron Gaytan	DATE: See Plots

Test Results: Complies.**Test Data:** See attached plot(s).**Equipment Used:** G2632, G2736, G2735, G3726, G1017, G1018, CF39, CF41, K & L p/n
3TNF-1000/2000-N/N S/N 144 Calibration before use**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 23 °C**Relative Humidity:** 46 %

EQUIPMENT: **PCS Repeater**

FCC ID:

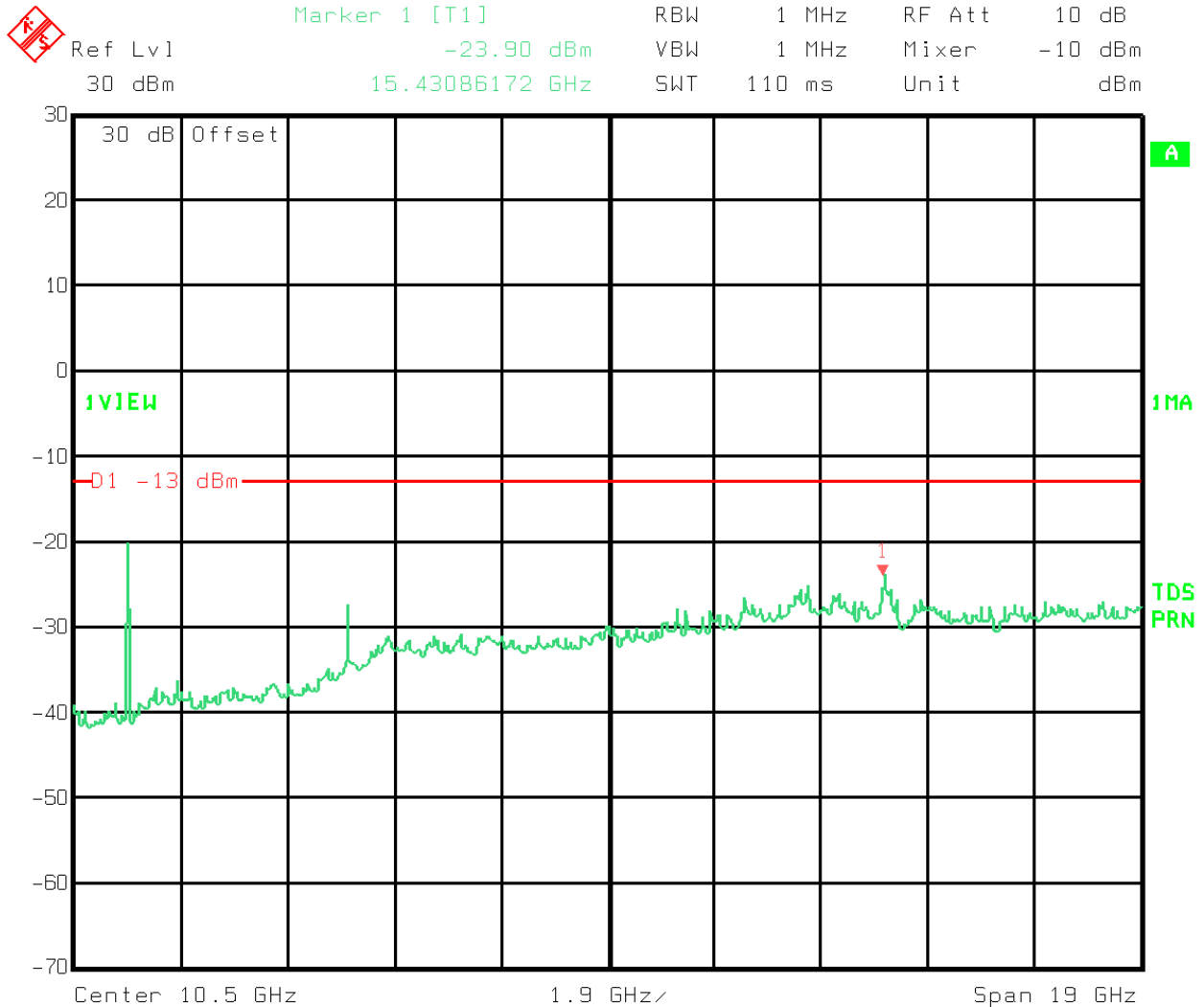
PROJECT NO.: **9L0454RUS****CDMA Module: MOR701B Power Unit**

Title: CDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (IS95)
Comment A: APSE12a.PCX Antenna Port Spurious Emissions
Date: 15.NOV.1999 16:05:32

Plot 32

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****CDMA Module: MOR701B Power Unit**

Title: CDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (IS95)
Comment A: APSE12b.PCX Antenna Port Spurious Emissions
Date: 15.NOV.1999 16:03:17

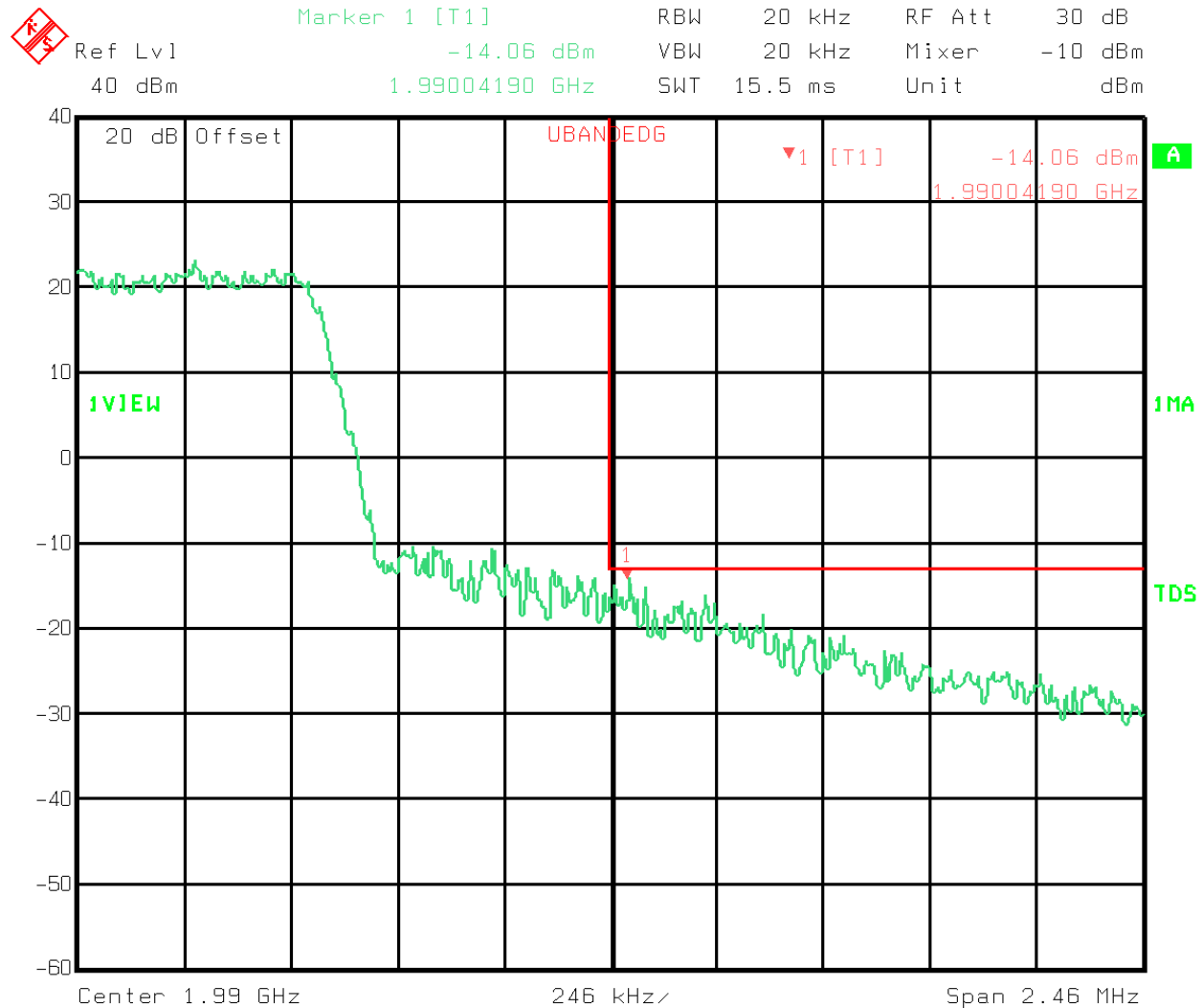
Plot 33

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

CDMA Module: MOR701B Power Unit



Title: CDMA MODULE W/EXTENSION MODULE- (Channel 1175)
Comment A: UBE13.PCX UPPER BAND EDGE
Date: 9.DEC.1999 14:36:33

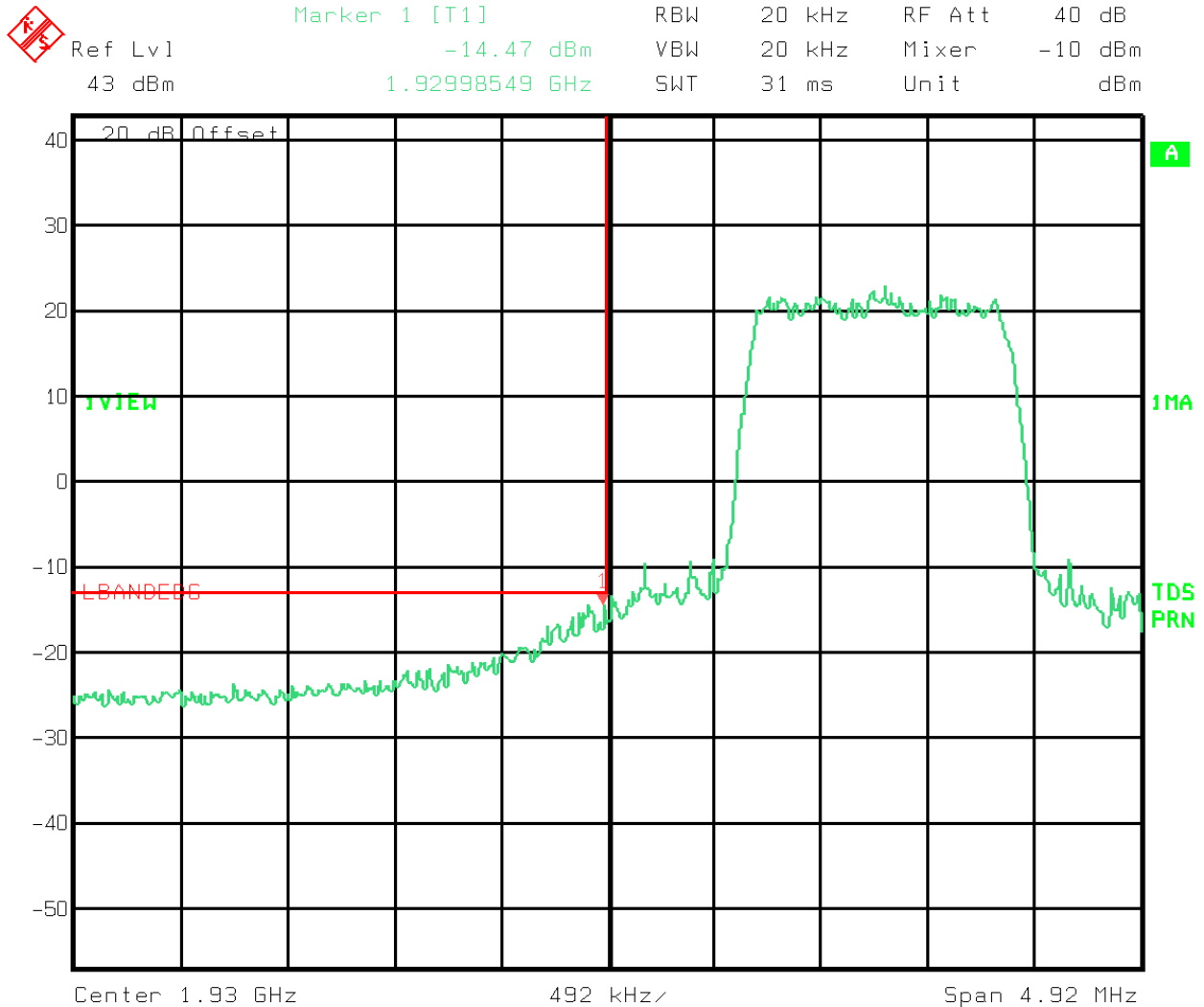
Plot 34

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

CDMA Module: MOR701B Power Unit



Title: CDMA MODULE W/EXTENSION MODULE-IS95 (Channel 25)
Comment A: LBE13.PCX LOWER BAND EDGE
Date: 29.NOV.1999 11:50:54

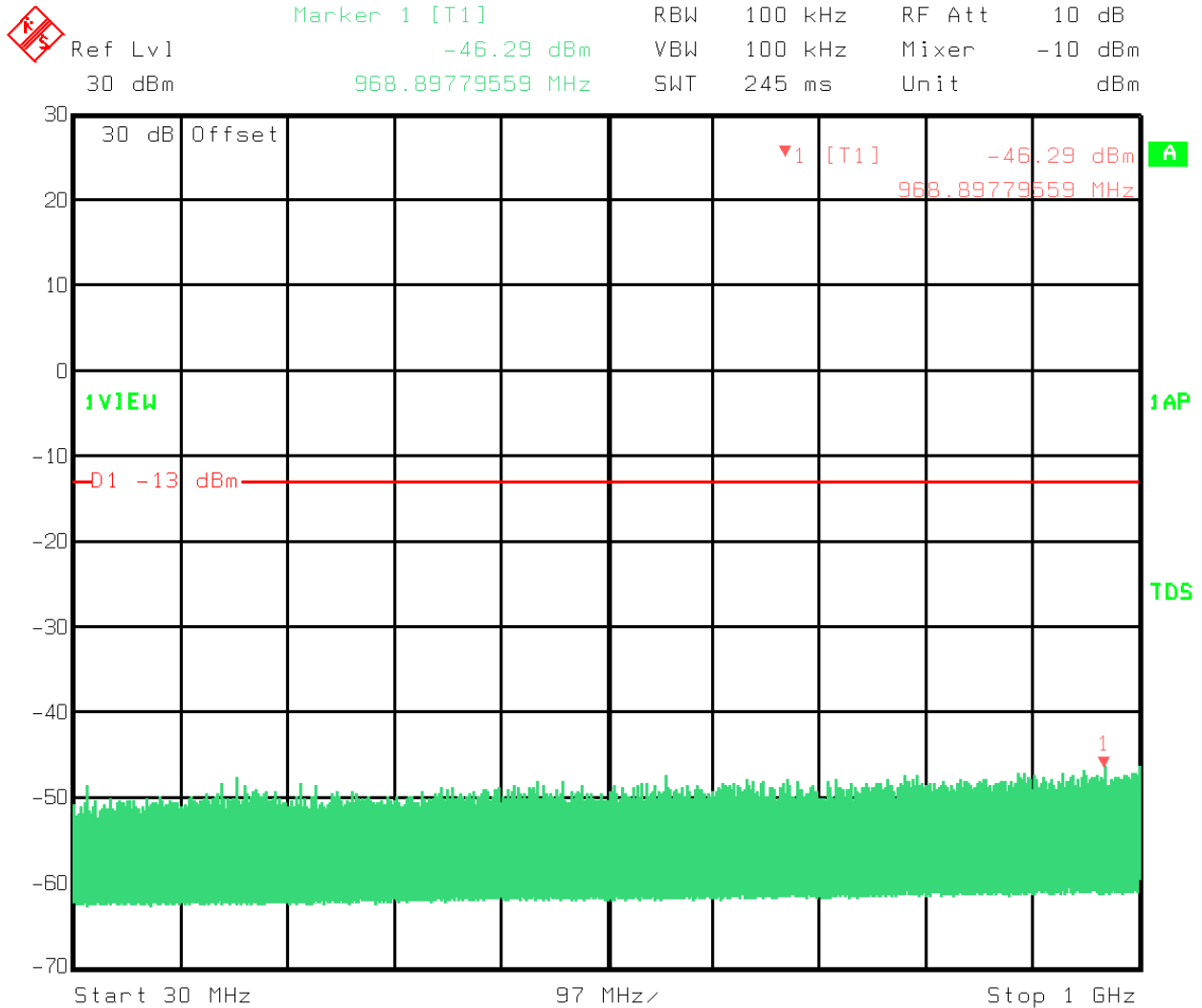
Plot 35

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal): MOR701B Power Unit



Title: Spurious Emissions Variable Bandwidth Modules (Channel 600)
Comment A: APSE02.PCX
NOTCHED OUT FUNDAMENTAL
Date: 5.NOV.1999 16:38:36

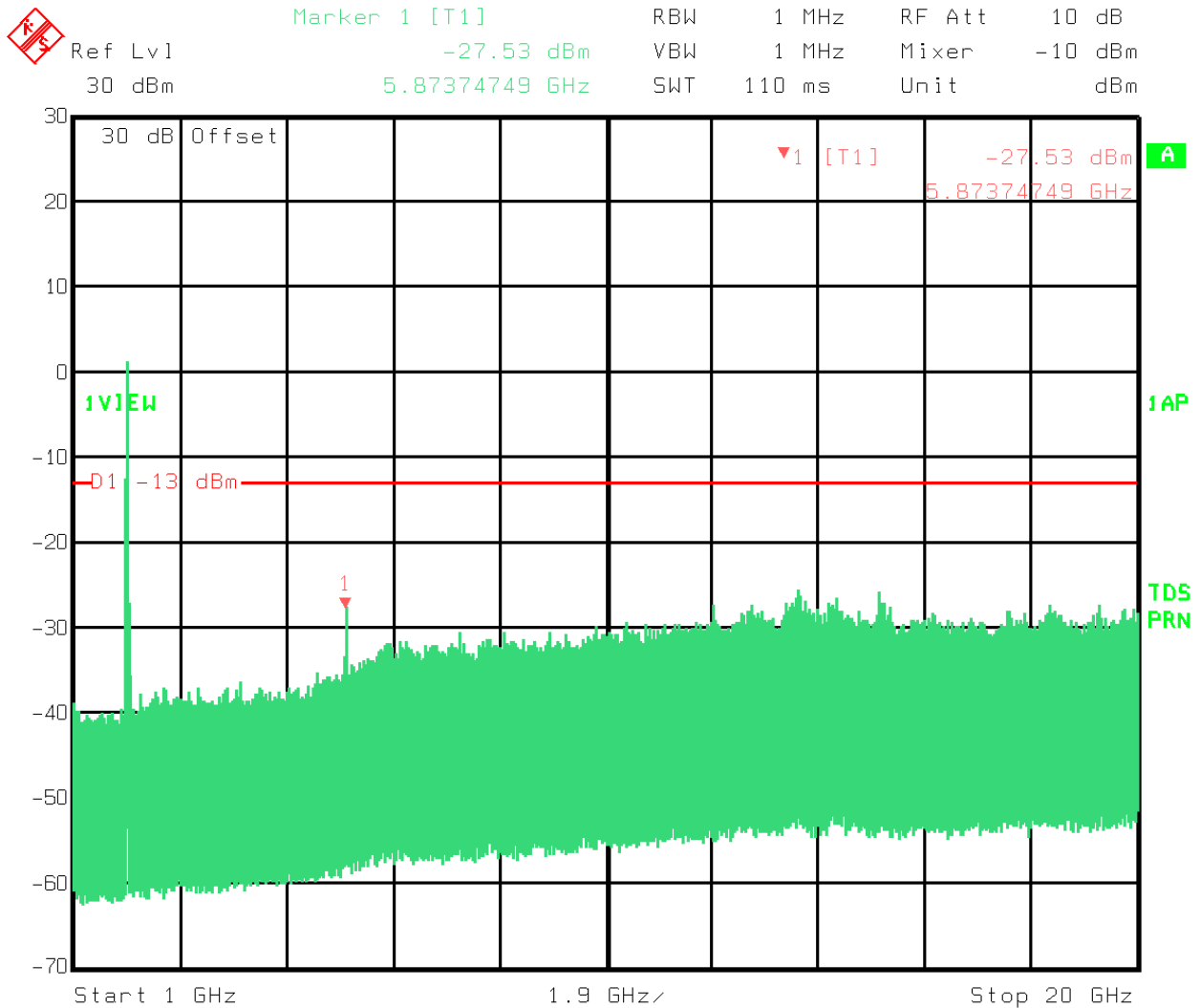
Plot 36

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal): MOR701B Power Unit



Title: Spurious Emissions Variable Bandwidth Modules (Channel 600)
Comment A: APSE02.PCX
NOTCHED OUT FUNDAMENTAL
Date: 5.NOV.1999 16:36:15

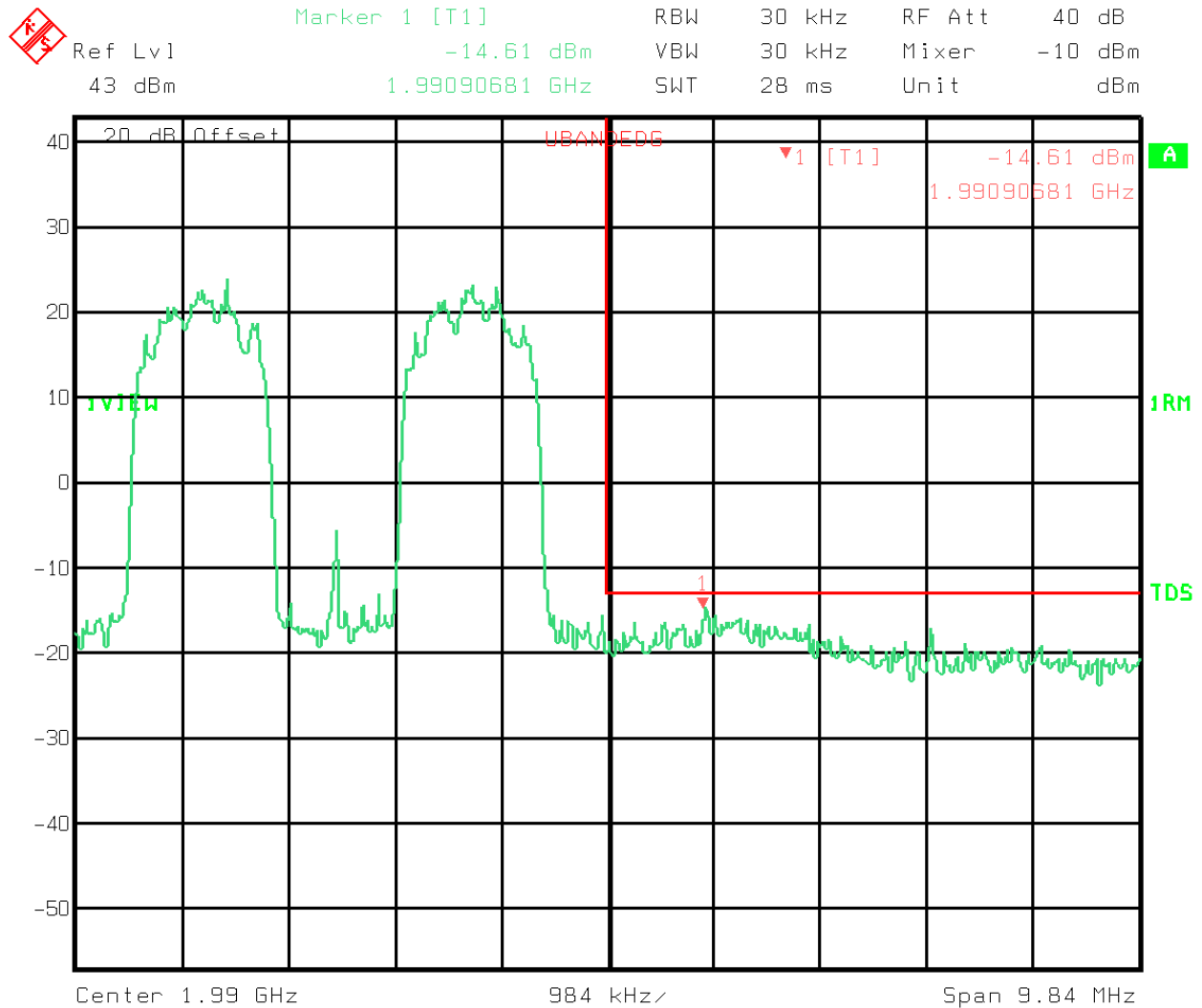
Plot 37

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal): MOR701B Power Unit



Title: Upper Band Edge Variable Bandwidth Modules (Channel 1175)

Comment A: UBE02.PCX

Intermodulation 2 Carriers

Date: 8.NOV.1999 10:07:23

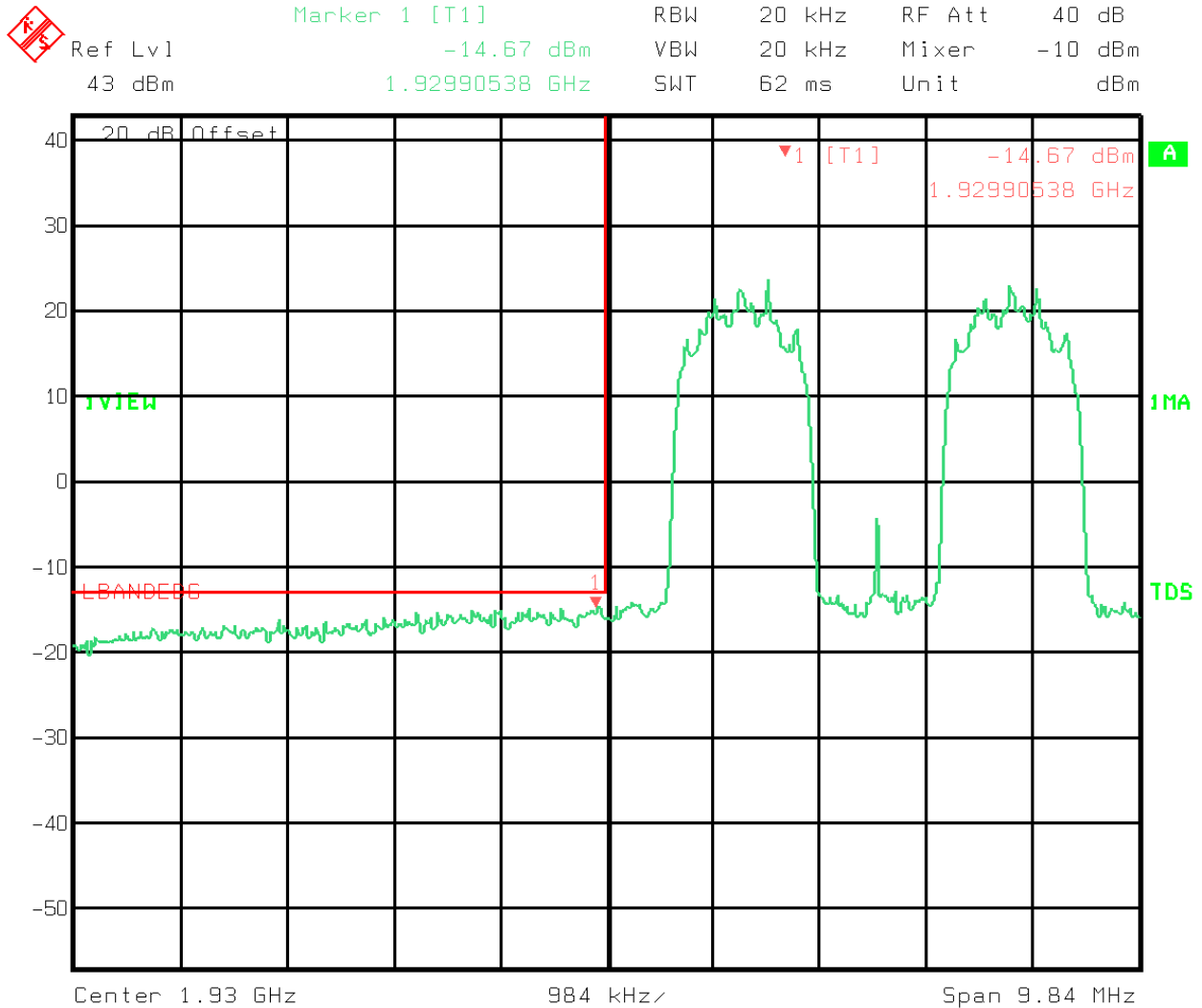
Plot 38

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal): MOR701B Power Unit

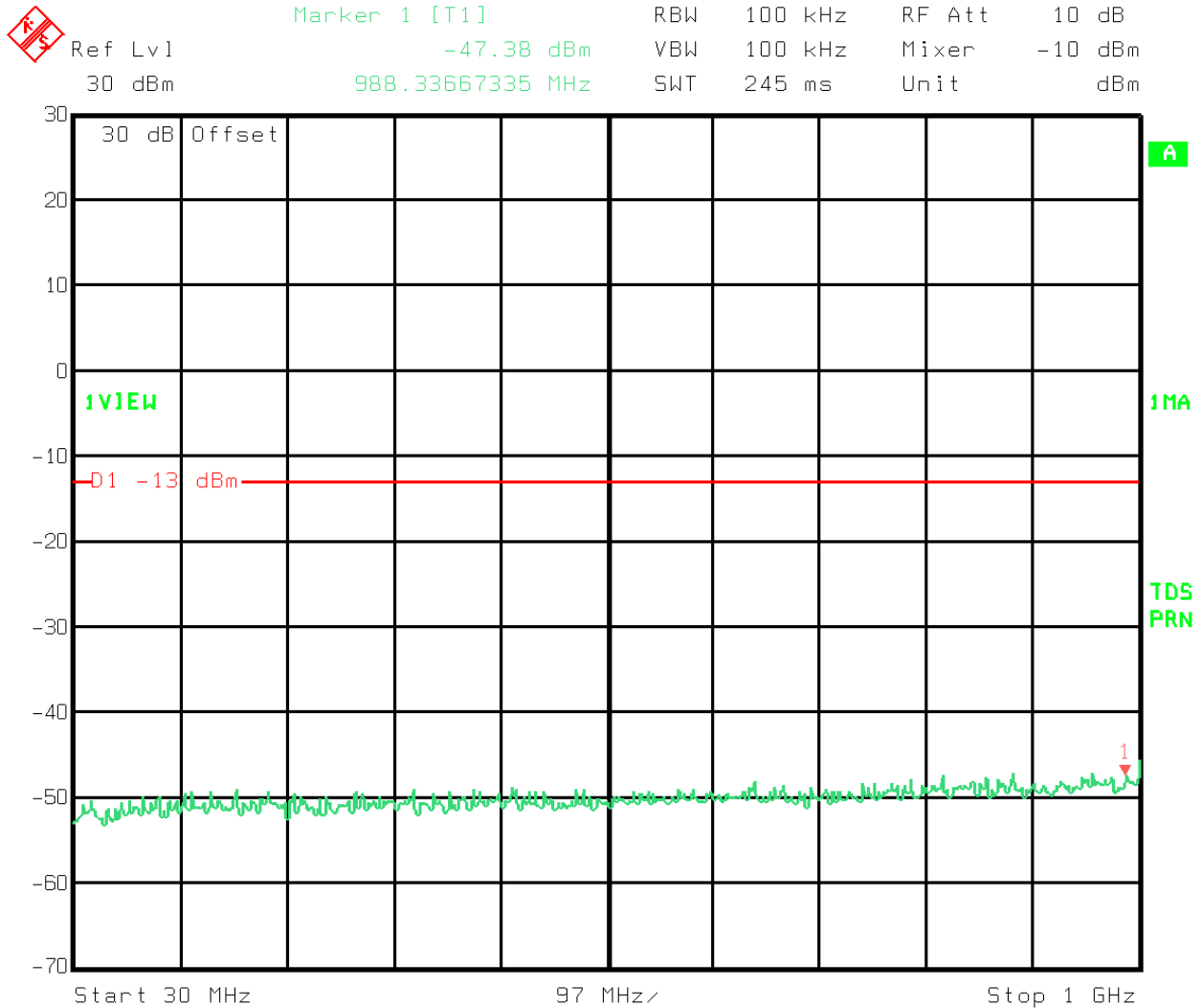


Title: LOWER BAND EDGE VARIABLE BW MODULE (Channel 25 and 50)
Comment A: LBE03.PCX
Intermodulation CDMA 2 Carriers
Date: 29.NOV.1999 11:06:33

Plot 39

EQUIPMENT: **PCS Repeater**

FCC ID:

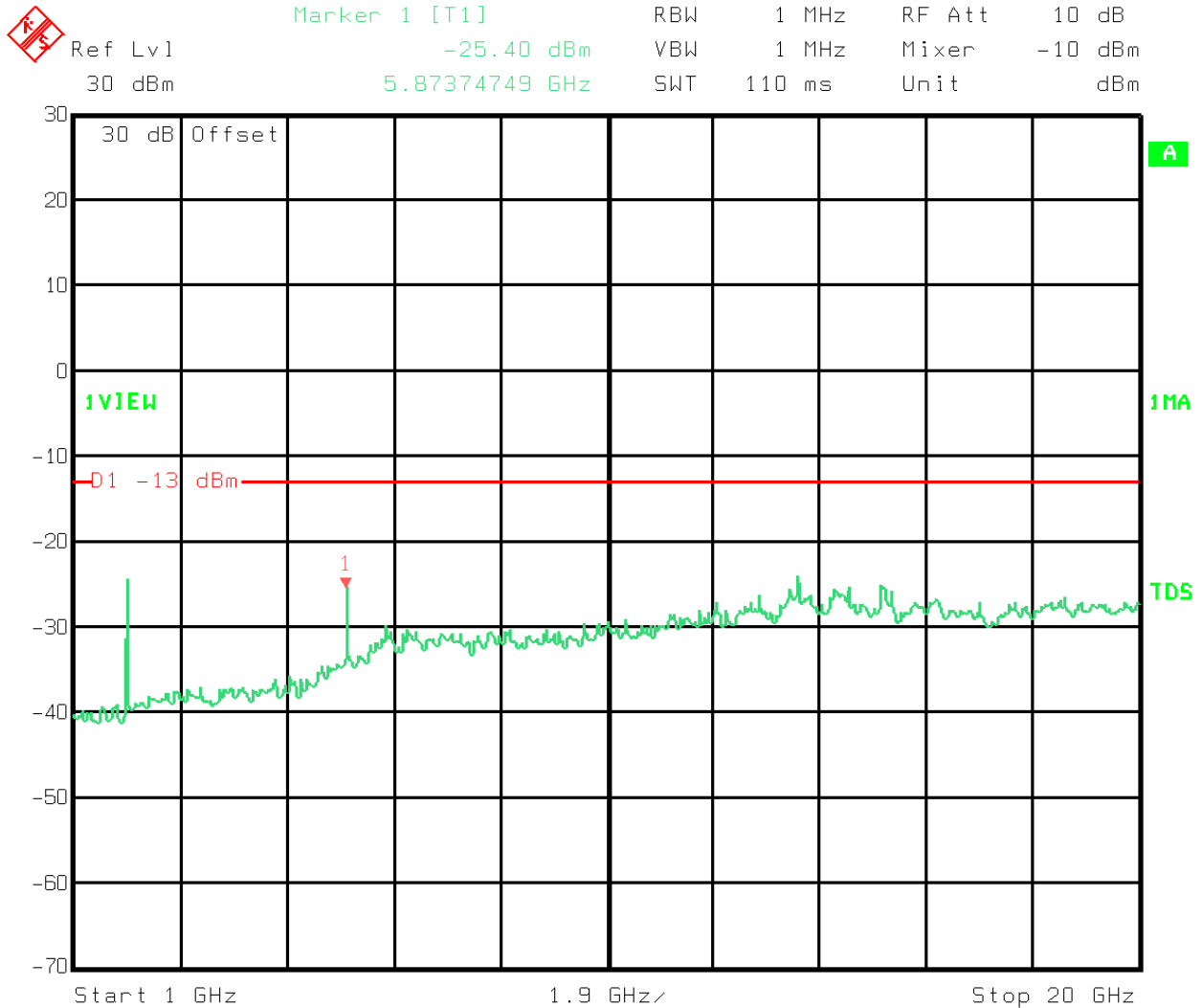
PROJECT NO.: **9L0454RUS****CDMA Module: MOR701B Unit**

Title: CDMA MODULE W/EXTENSION MODULE- CDMA (Channel 600)
Comment A: APSE14A.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER
Date: 30.NOV.1999 9:46:41

Plot 40

EQUIPMENT: **PCS Repeater**

FCC ID:

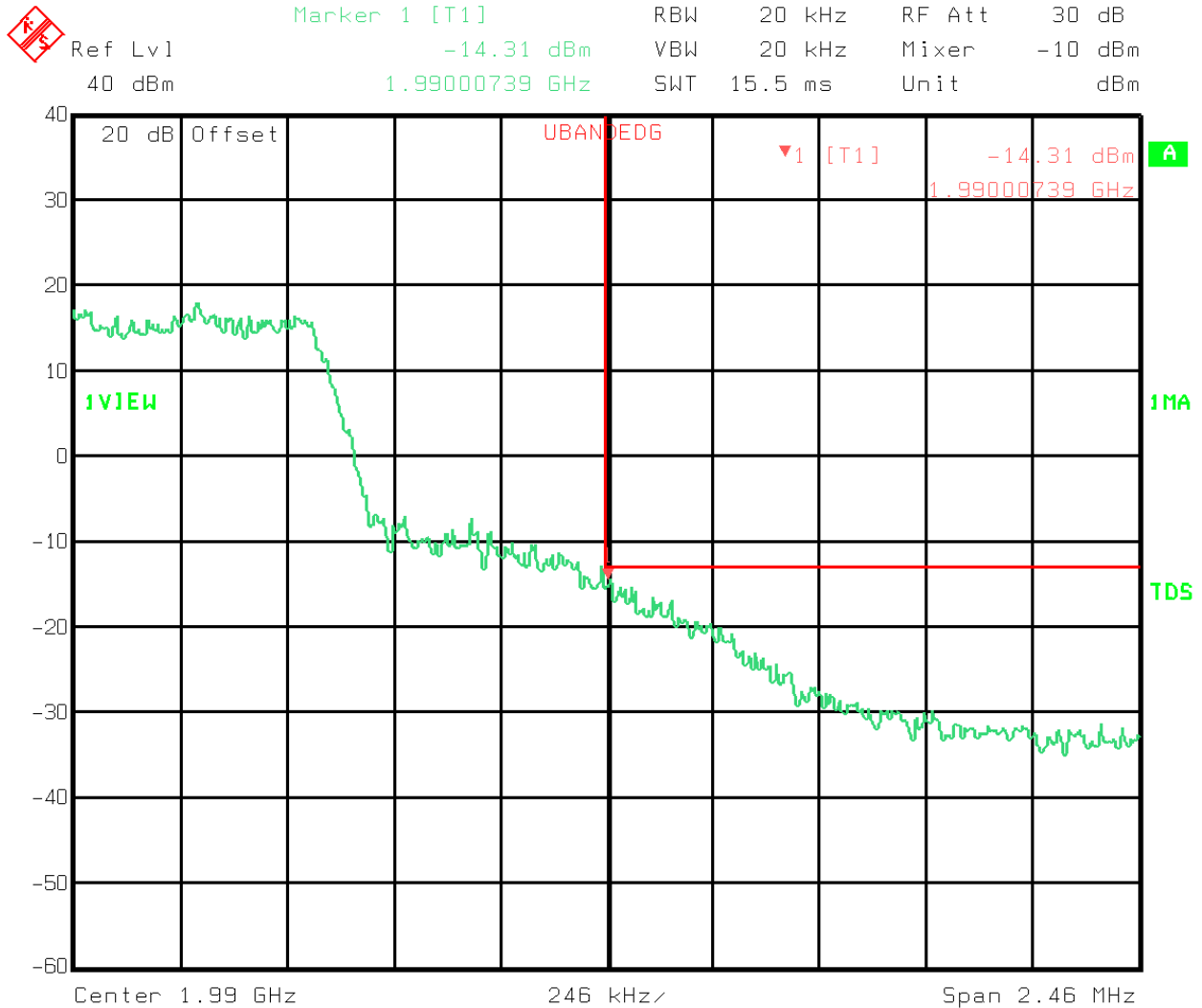
PROJECT NO.: **9L0454RUS****CDMA Module: MOR701B Unit**

Title: CDMA MODULE W/EXTENSION MODULE- CDMA (Channel 600)
Comment A: APSE14B.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER
Date: 30.NOV.1999 9:44:35

Plot 41

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****CDMA Module: MOR701B Unit**

Title: CDMA W/EXTENSION MODULE- CDMA (Channel 1175)
Comment A: UBE15.PCX UPPER BAND EDGE
8 WATT AMPLIFIER
Date: 9.DEC.1999 11:58:04

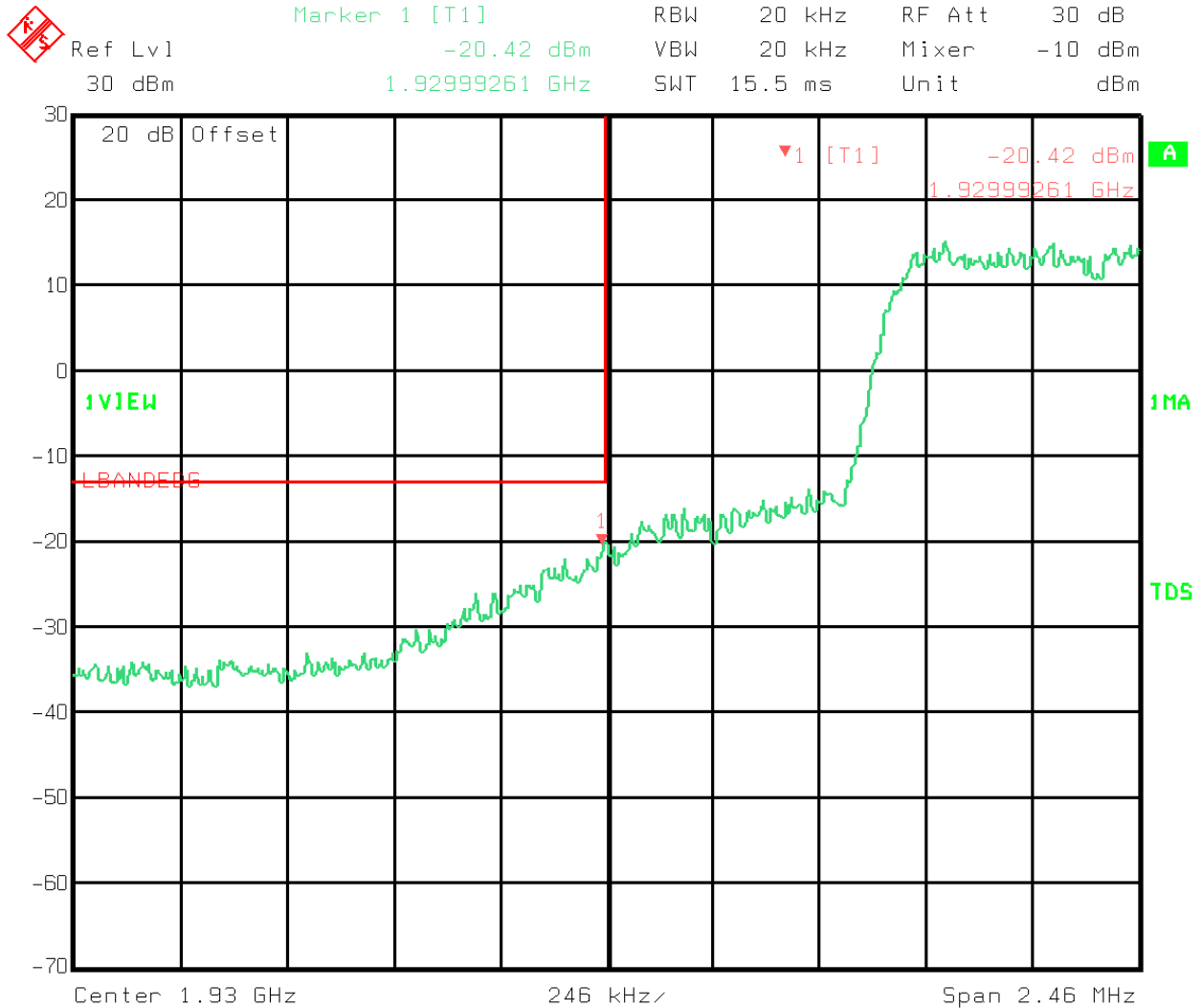
Plot 42

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

CDMA Module: MOR701B Unit

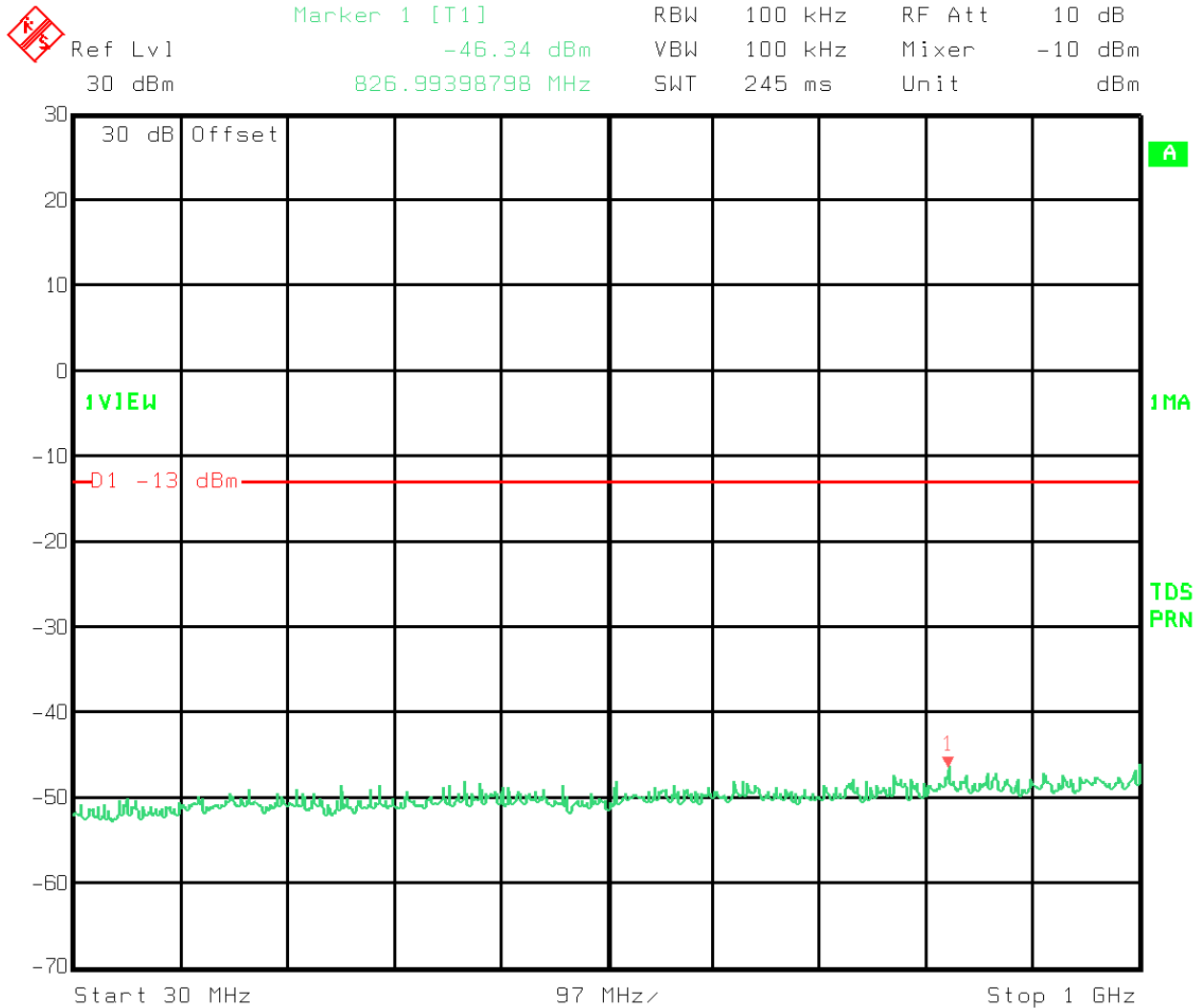


Title: CDMA MODULE W/EXTENSION MODULE- IS95 (Channel 25)
Comment A: LBE15.PCX LOWER BAND EDGE
8 WATT AMPLIFIER
Date: 30.NOV.1999 11:05:20

Plot 43

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (CDMA Signal)**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- IS95 (Channel 600)
Comment A: APSE16A.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER
Date: 30.NOV.1999 12:13:14

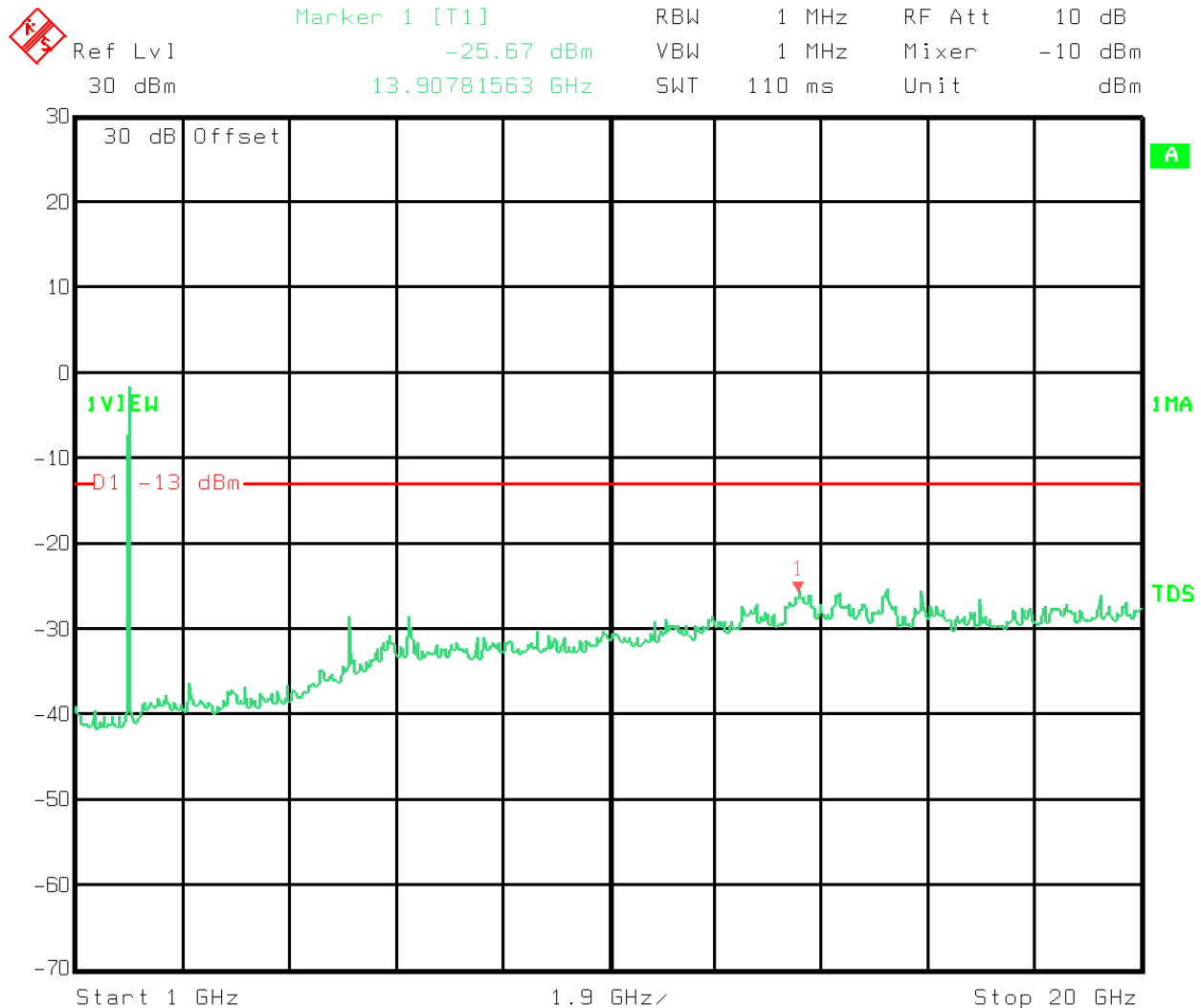
Plot 44

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal)



Title: VARIABLE BW MODULE W/EXTENSION MODULE- IS95 (Channel 600)

Comment A: APSE16B.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER

Date: 30.NOV.1999 12:10:51

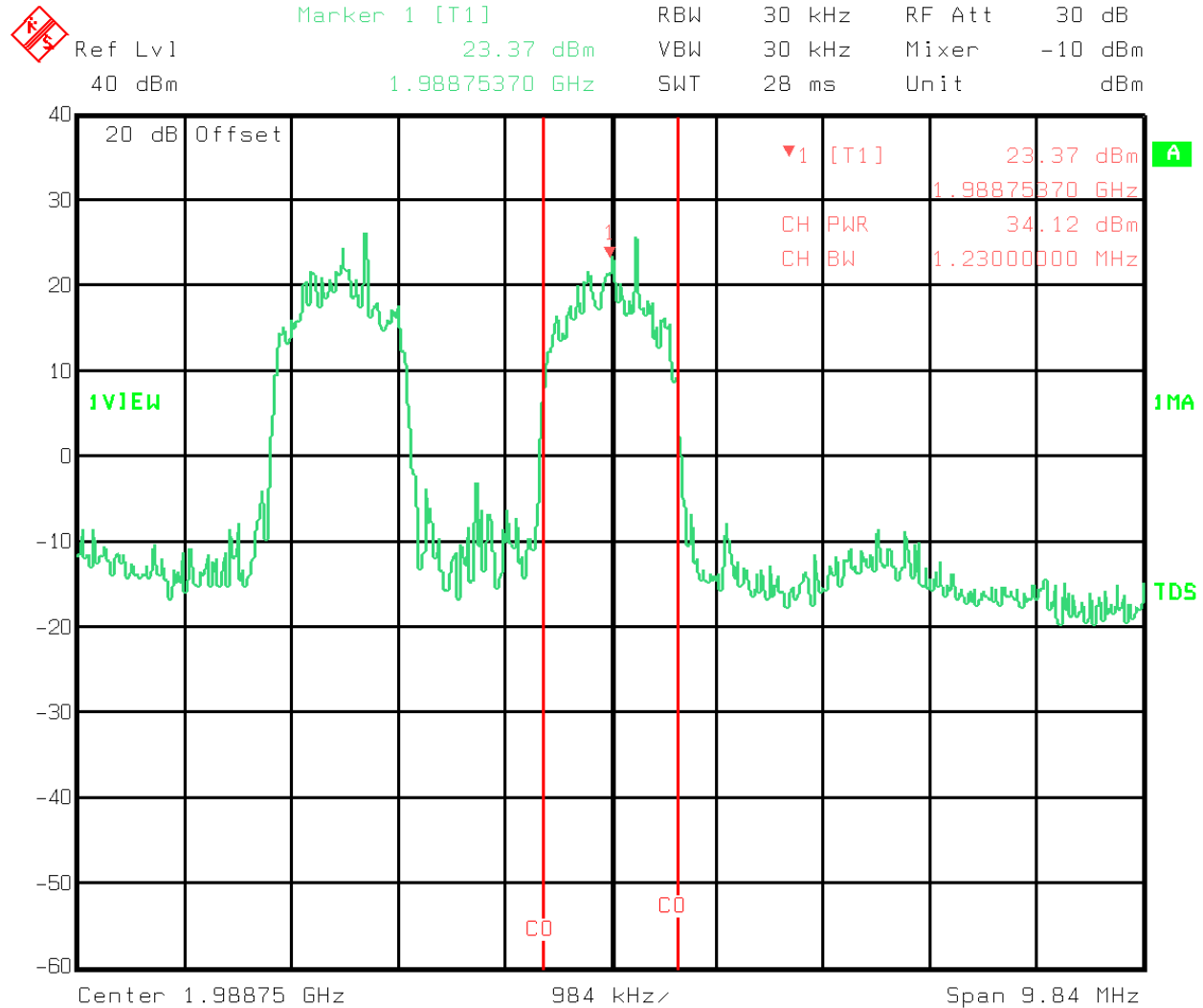
Plot 45

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal)



Title: VARIABLE BW W/EXTENSION MODULE- CDMA (Channel 1175 & 1150)
Comment A: UBEC21.PCX UPPER BAND EDGE CHANNEL POWER
8 WATT AMPLIFIER INTERMODULATION
Date: 9.DEC.1999 11:05:15

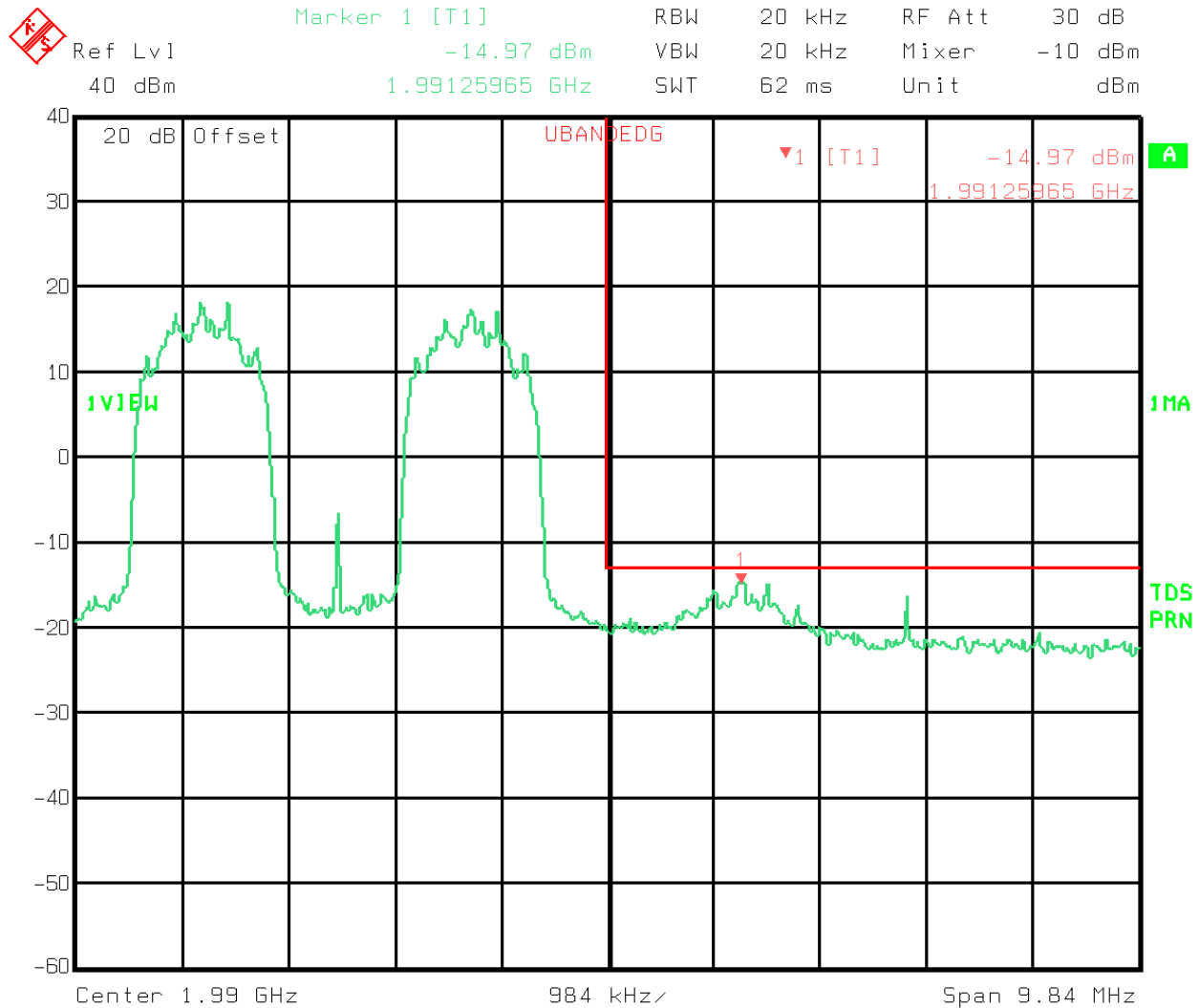
Plot 46

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal)



Title: VARIABLE BW W/EXTENSION MODULE- CDMA (Channel 1175 & 1150)
Comment A: UBE21.PCX UPPER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION
Date: 9.DEC.1999 11:01:50

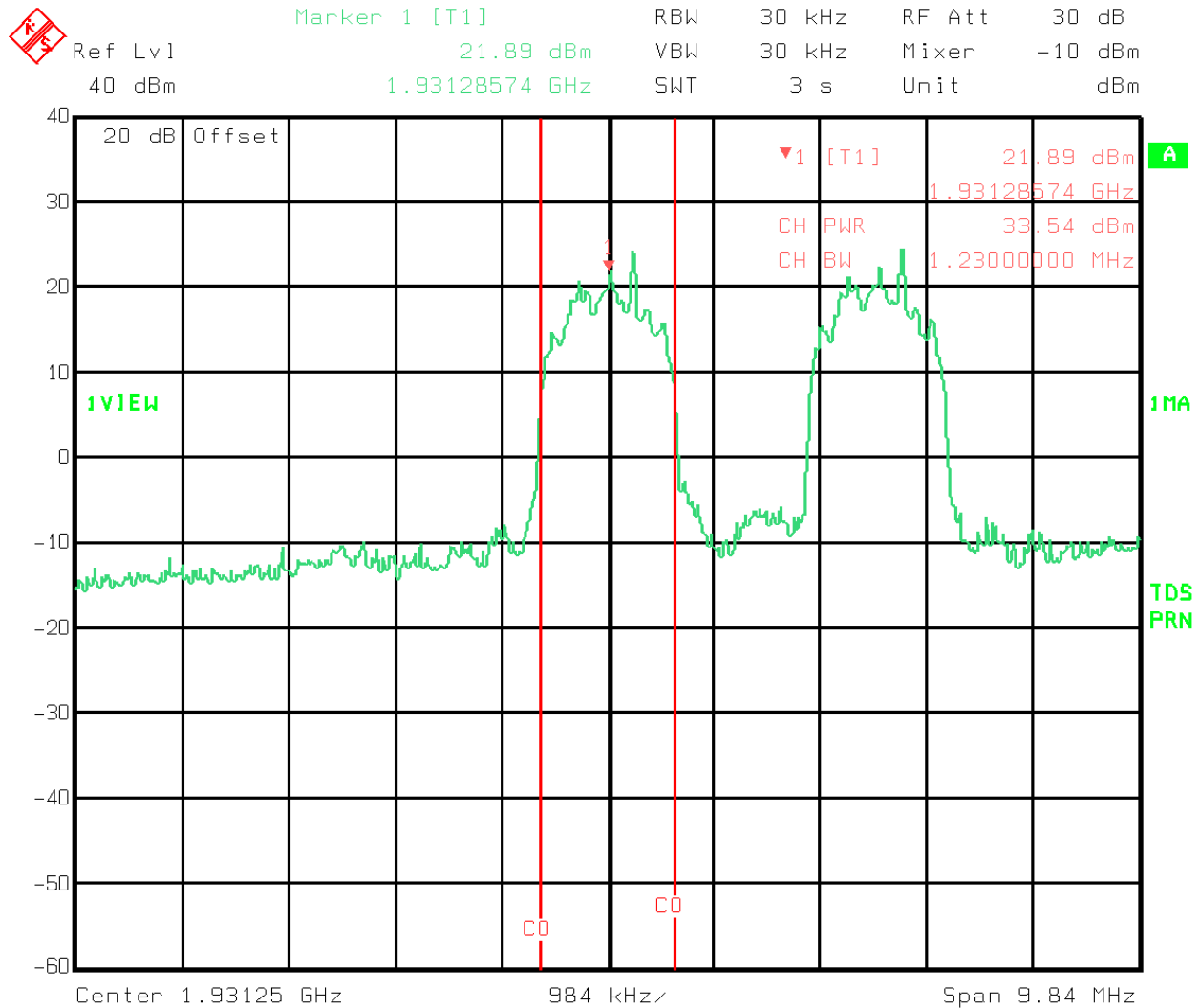
Plot 47

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal)



Title: VARIABLE BW W/EXTENSION MODULE- CDMA (Channel 25 & 50)
Comment A: LBEC21.PCX LOWER BAND EDGE CHANNEL POWER
8 WATT AMPLIFIER INTERMODULATION
Date: 8.DEC.1999 12:20:33

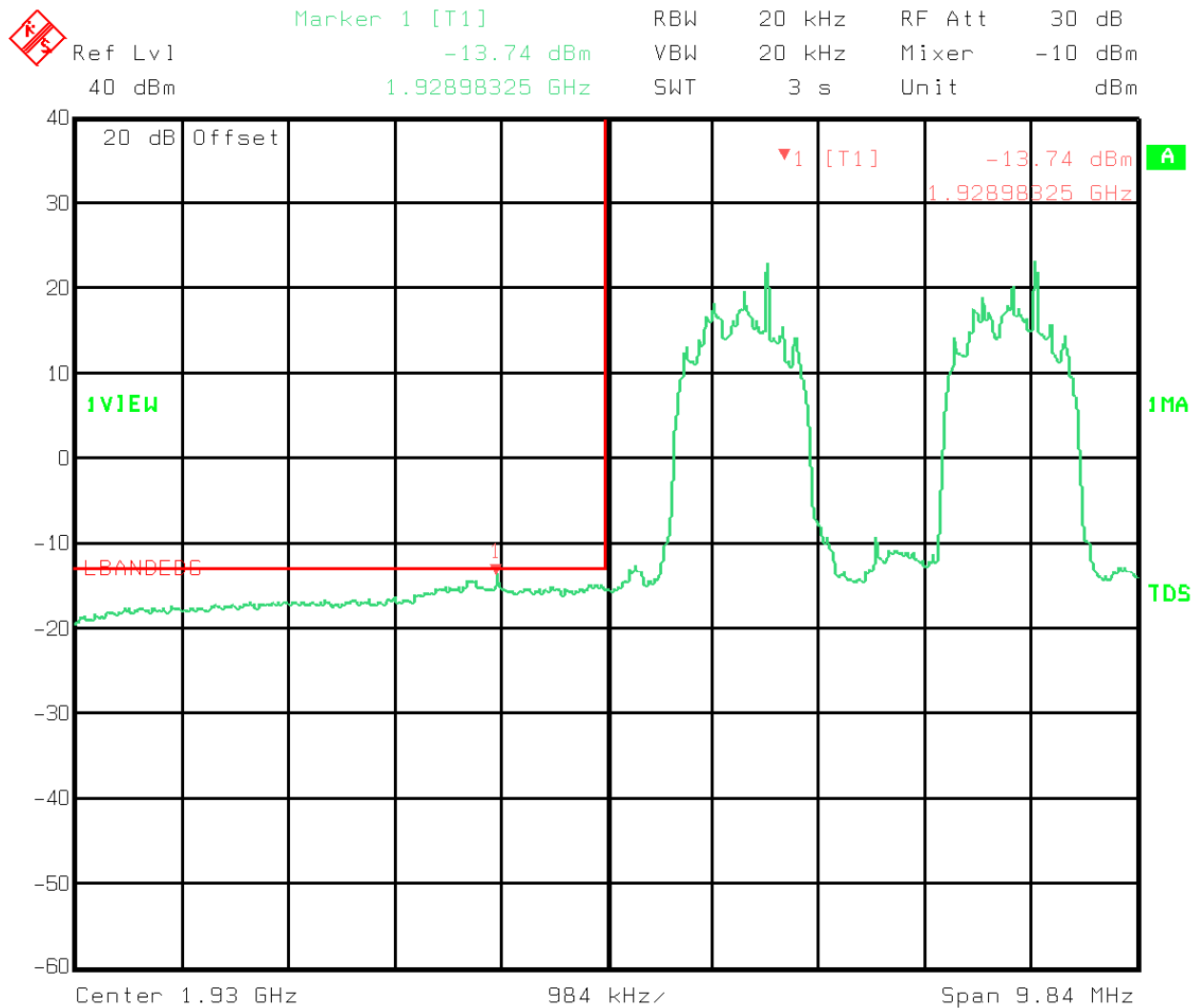
Plot 48

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (CDMA Signal)

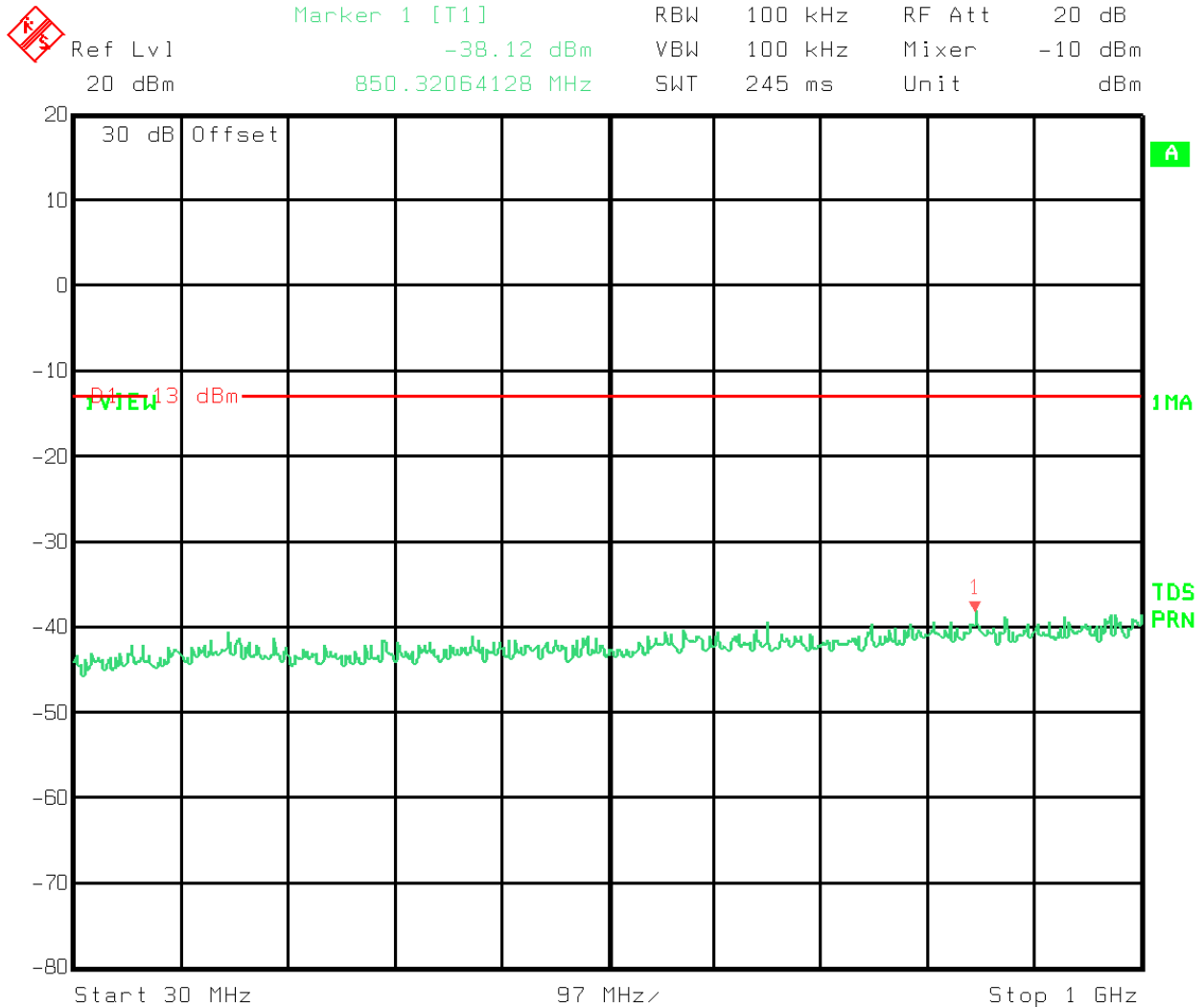


Title: VARIABLE BW W/EXTENSION MODULE- CDMA (Channel 25 & 50)
Comment A: LBE21.PCX LOWER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION
Date: 8.DEC.1999 12:18:03

Plot 49

EQUIPMENT: **PCS Repeater**

FCC ID:

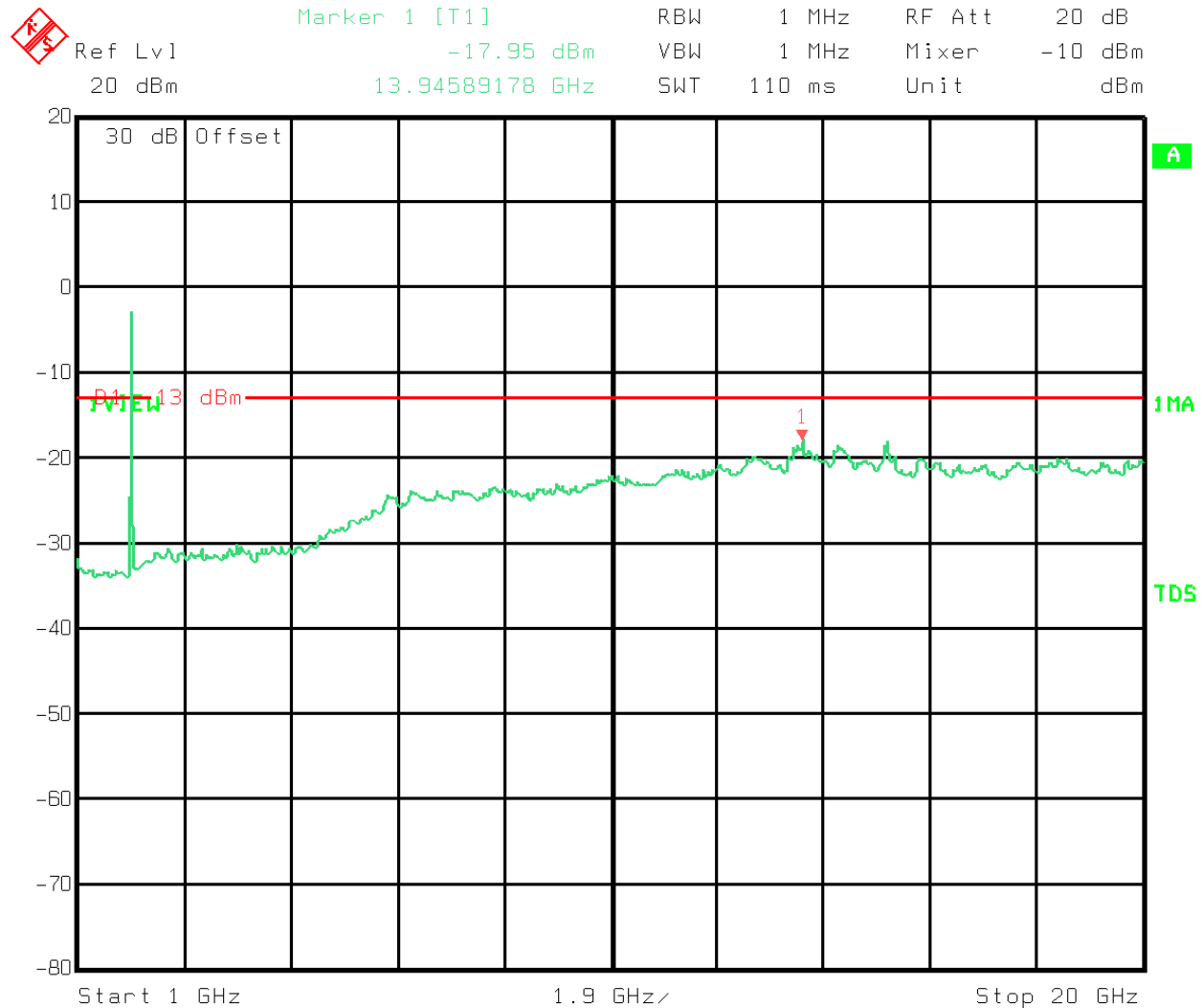
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channel 600)
Comment A: apse07b.PCX Antenna Port Spurious Emissions (GSM)
Date: 9.NOV.1999 11:41:14

Plot 50

EQUIPMENT: **PCS Repeater**

FCC ID:

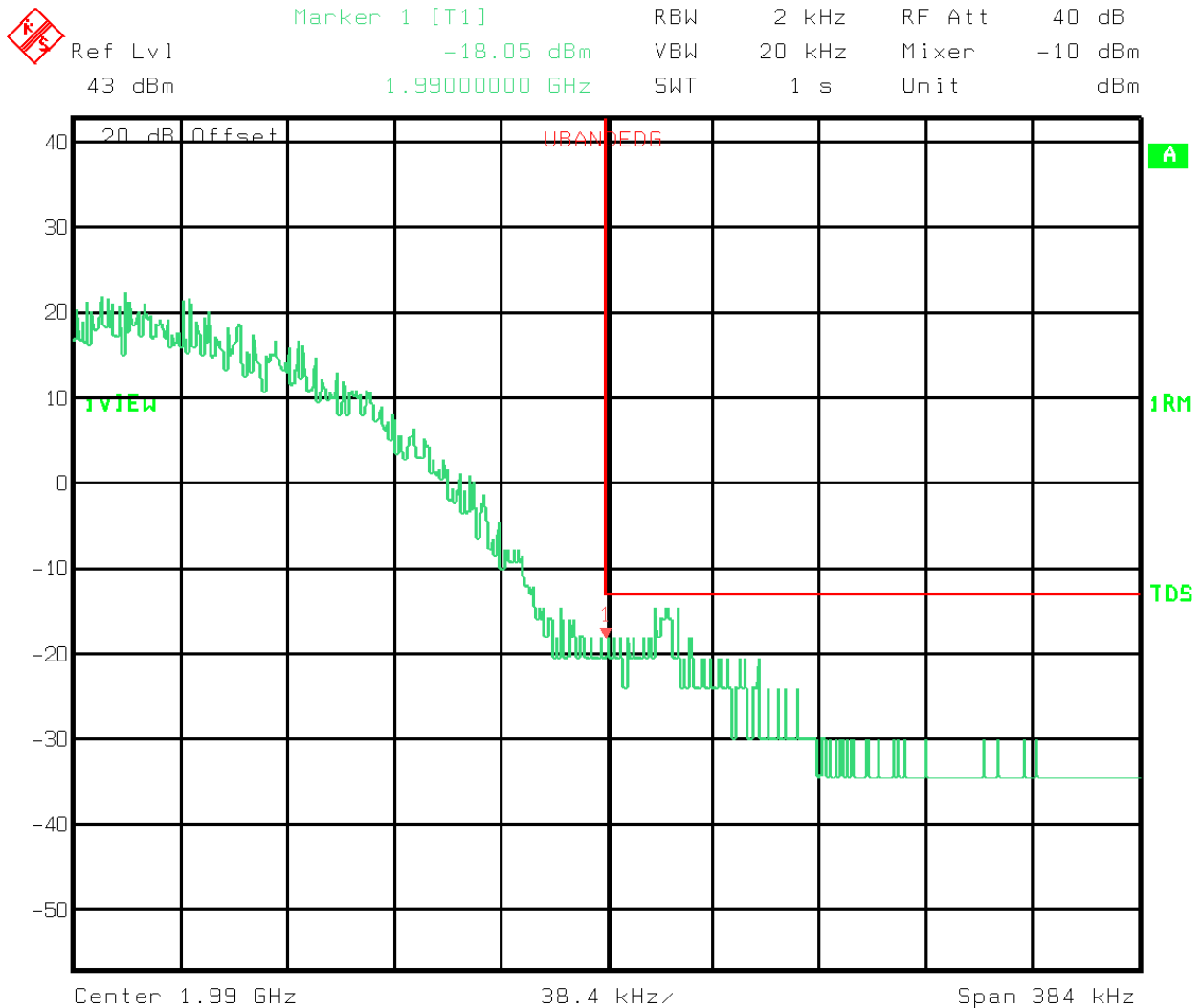
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channel 600)
Comment A: apse07a.PCX Antenna Port Spurious Emissions (GSM)
Date: 9.NOV.1999 11:39:41

Plot 51

EQUIPMENT: **PCS Repeater**

FCC ID:

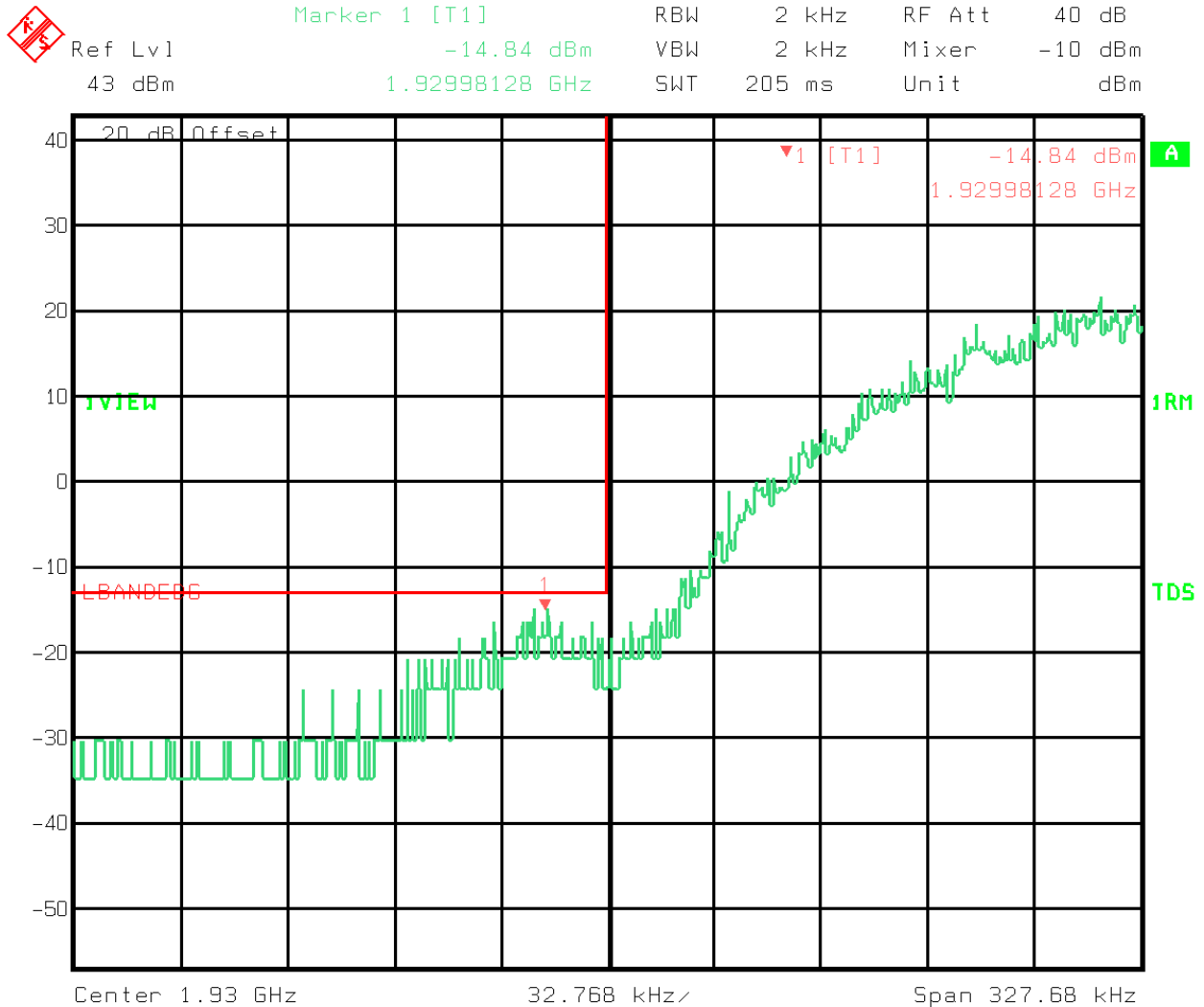
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channel 1196 GSM)
Comment A: ube09.PCX Upper Band Edge Spurious Emissions (GSM)
Date: 9.NOV.1999 15:51:58

Plot 52

EQUIPMENT: **PCS Repeater**

FCC ID:

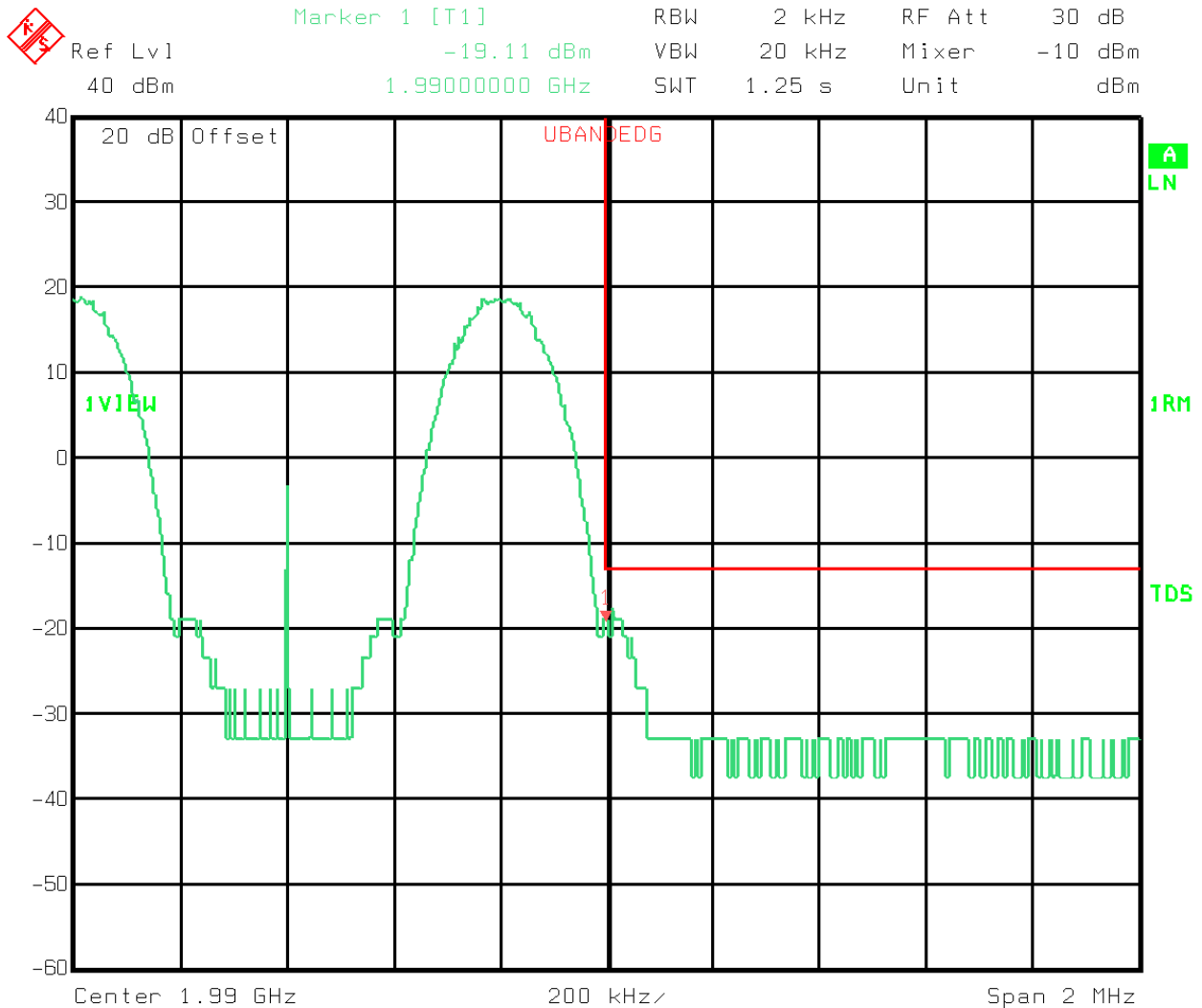
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 4)
Comment A: LBE09.PCX LOWER BAND EDGE
Date: 9.DEC.1999 17:07:32

Plot 53

EQUIPMENT: **PCS Repeater**

FCC ID:

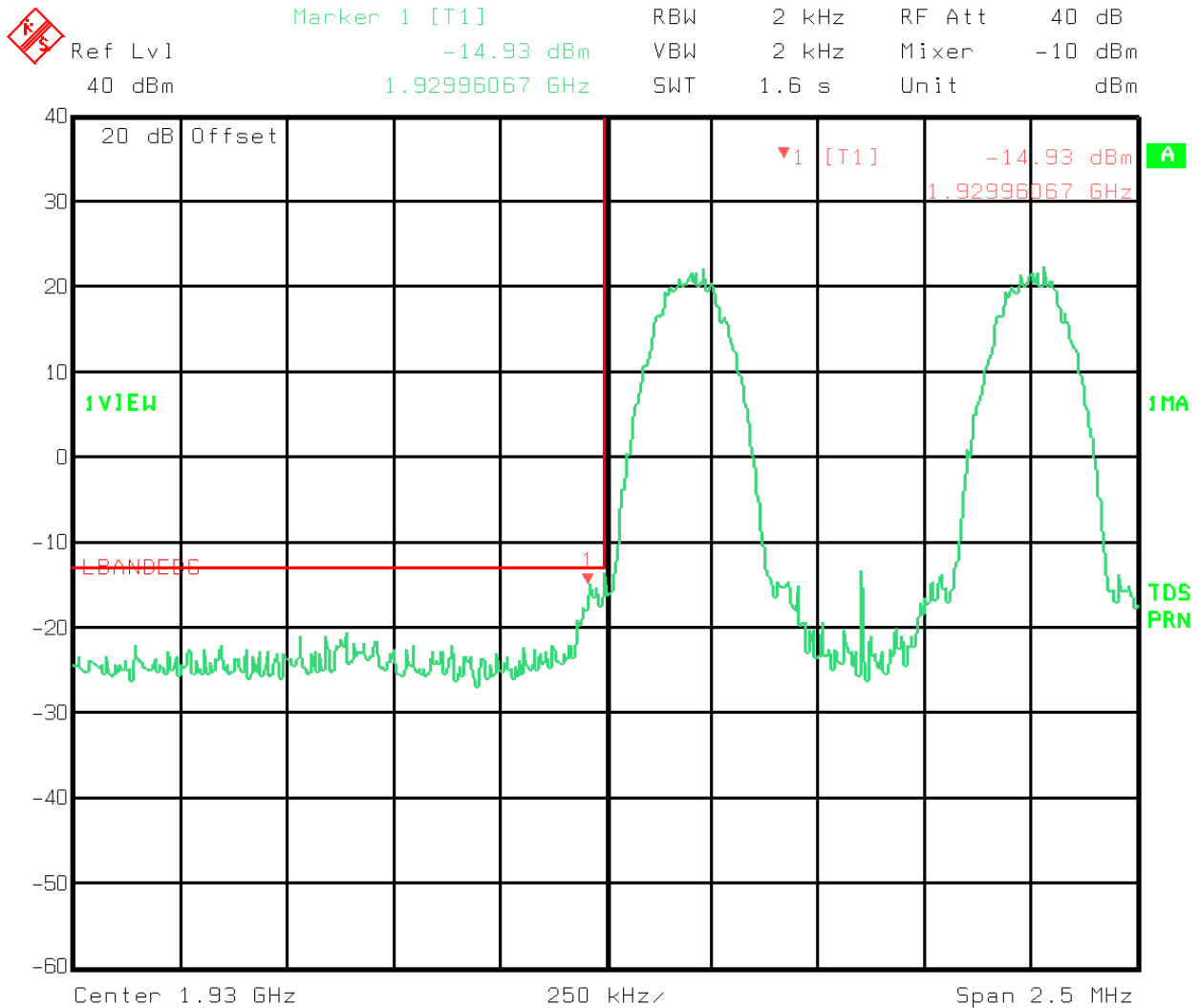
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: Variable Bandwidth Modules (Channels 1176&1196 GSM)
Comment A: ube10.PCX Upper Band Edge Intermodulation (GSM)
Date: 9.NOV.1999 15:04:21

Plot 54

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Power Unit**

Title: LOWER BAND EDGE VARIABLE BW MODULE (Channel 4 and 24)

Comment A: LBE10.PCX

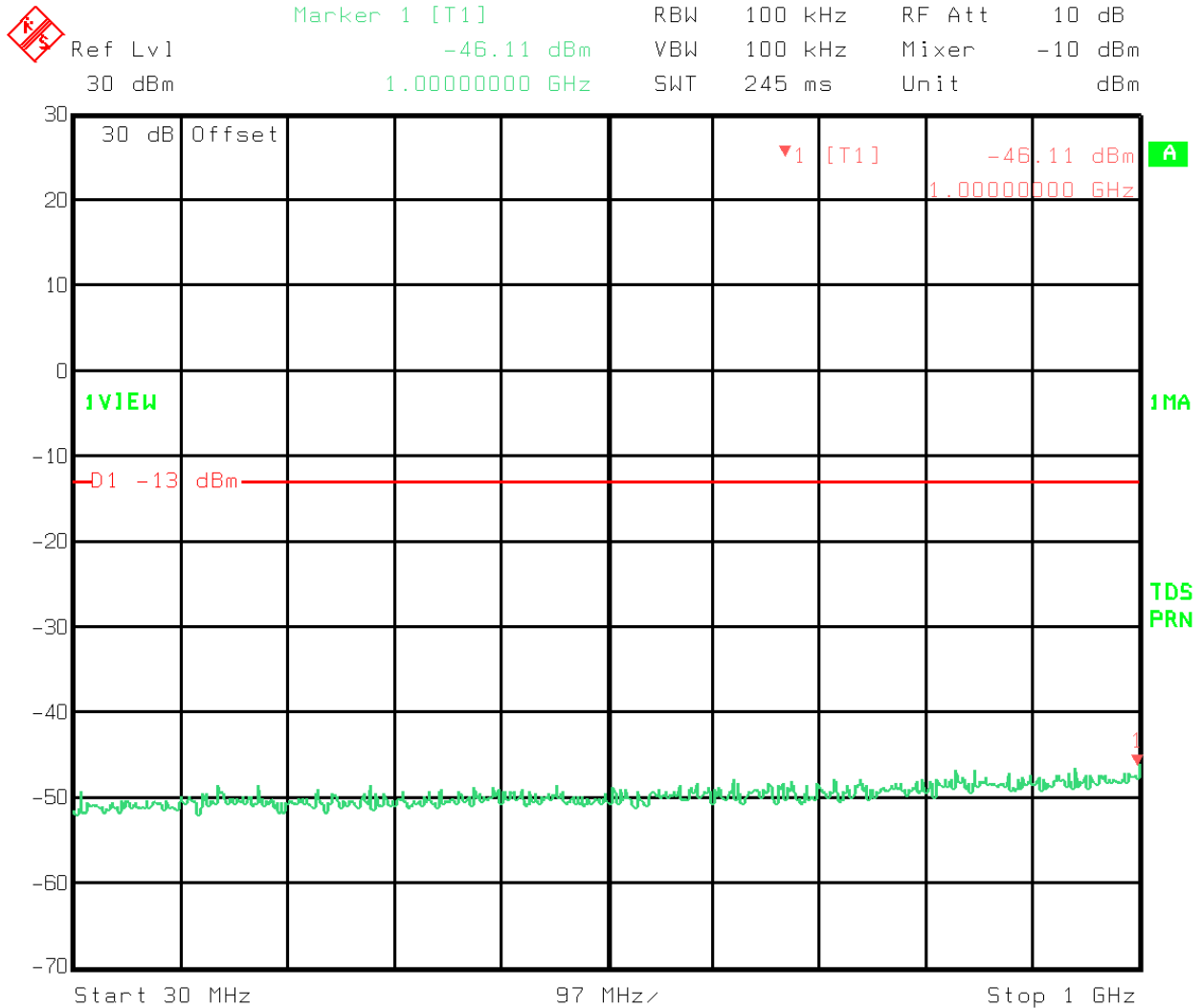
Intermodulation GSM 2 Carriers

Date: 17.NOV.1999 14:40:35

Plot 55

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 600)
Comment A: APSE18A.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER
Date: 30.NOV.1999 14:16:13

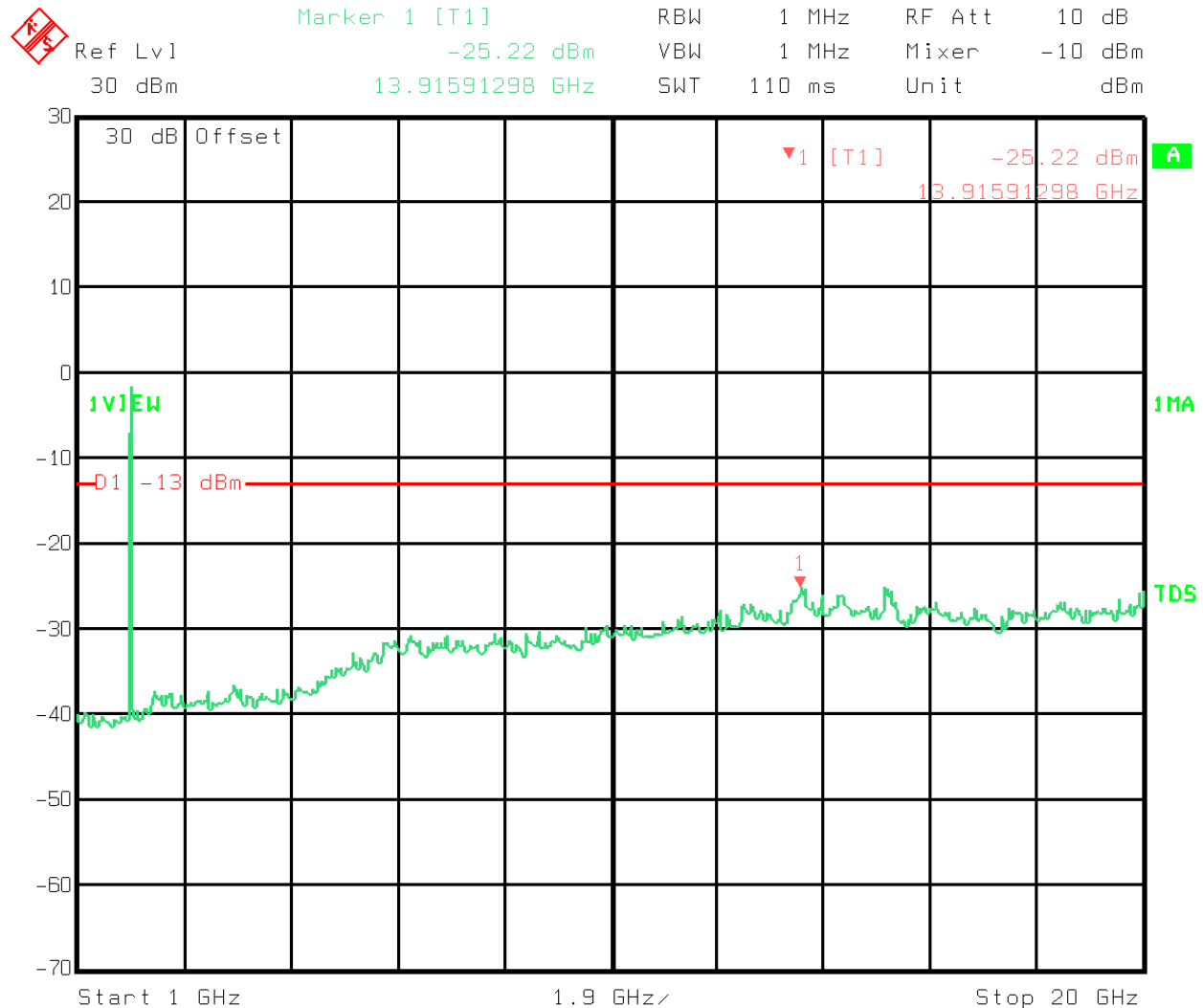
Plot 56

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (GSM Signal): MOR701B Unit



Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 600)

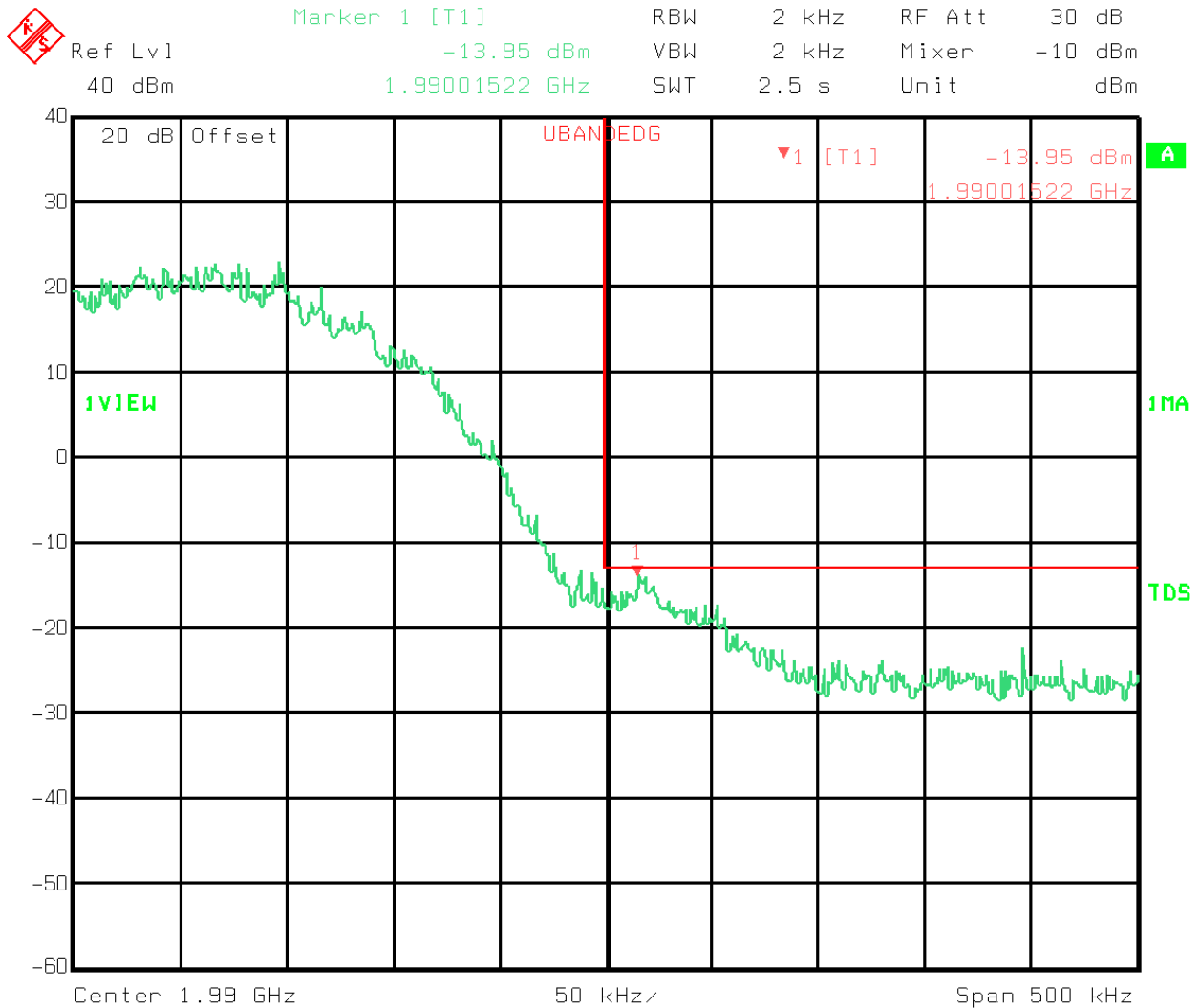
Comment A: APSE18B.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER

Date: 30.NOV.1999 14:15:04

Plot 57

EQUIPMENT: **PCS Repeater**

FCC ID:

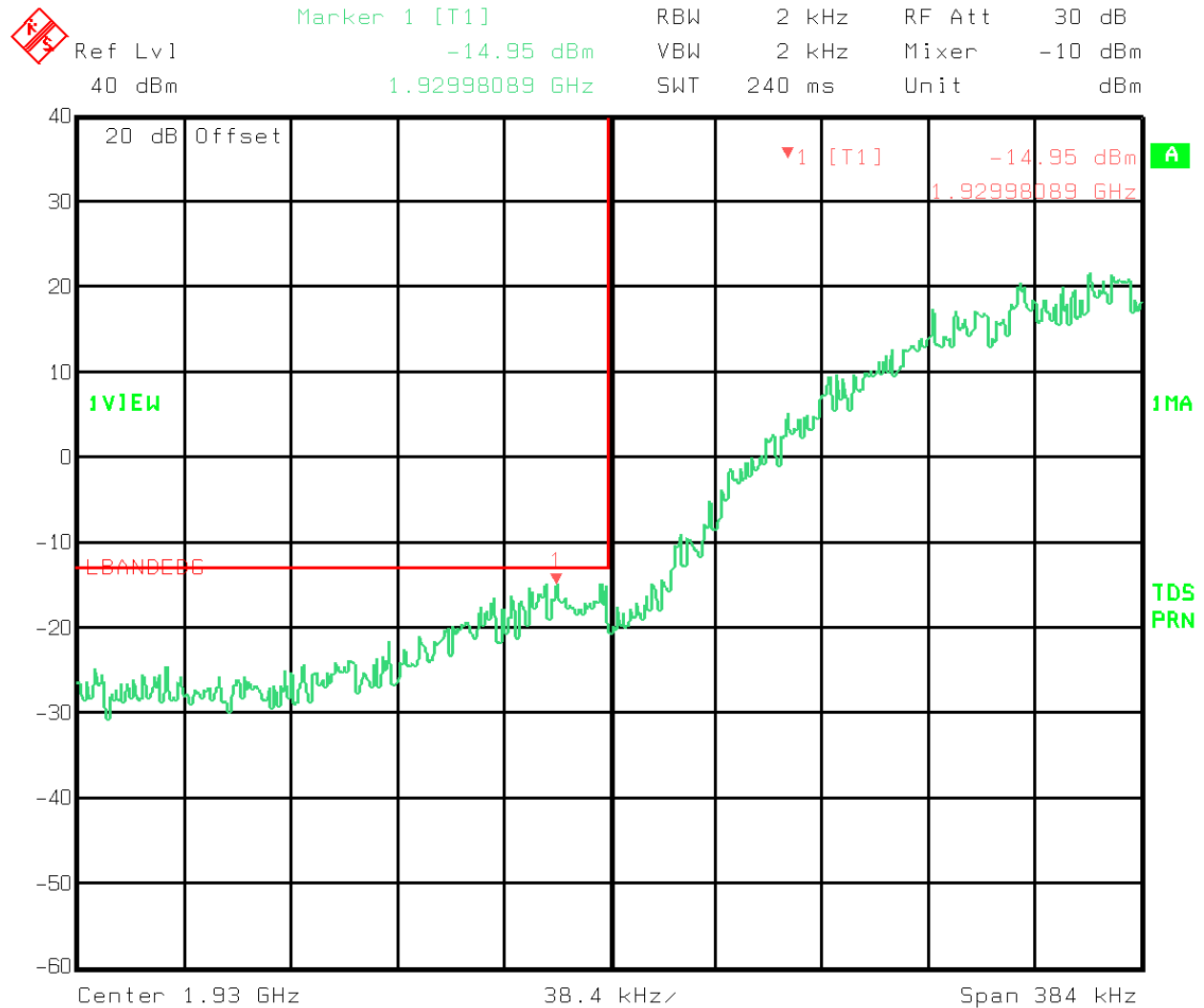
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Unit**

Title: VARIABLE BW W/EXTENSION MODULE- GSM (Channel 1196)
Comment A: UBE18.PCX UPPER BAND EDGE
8 WATT AMPLIFIER
Date: 8.DEC.1999 15:31:07

Plot 58

EQUIPMENT: **PCS Repeater**

FCC ID:

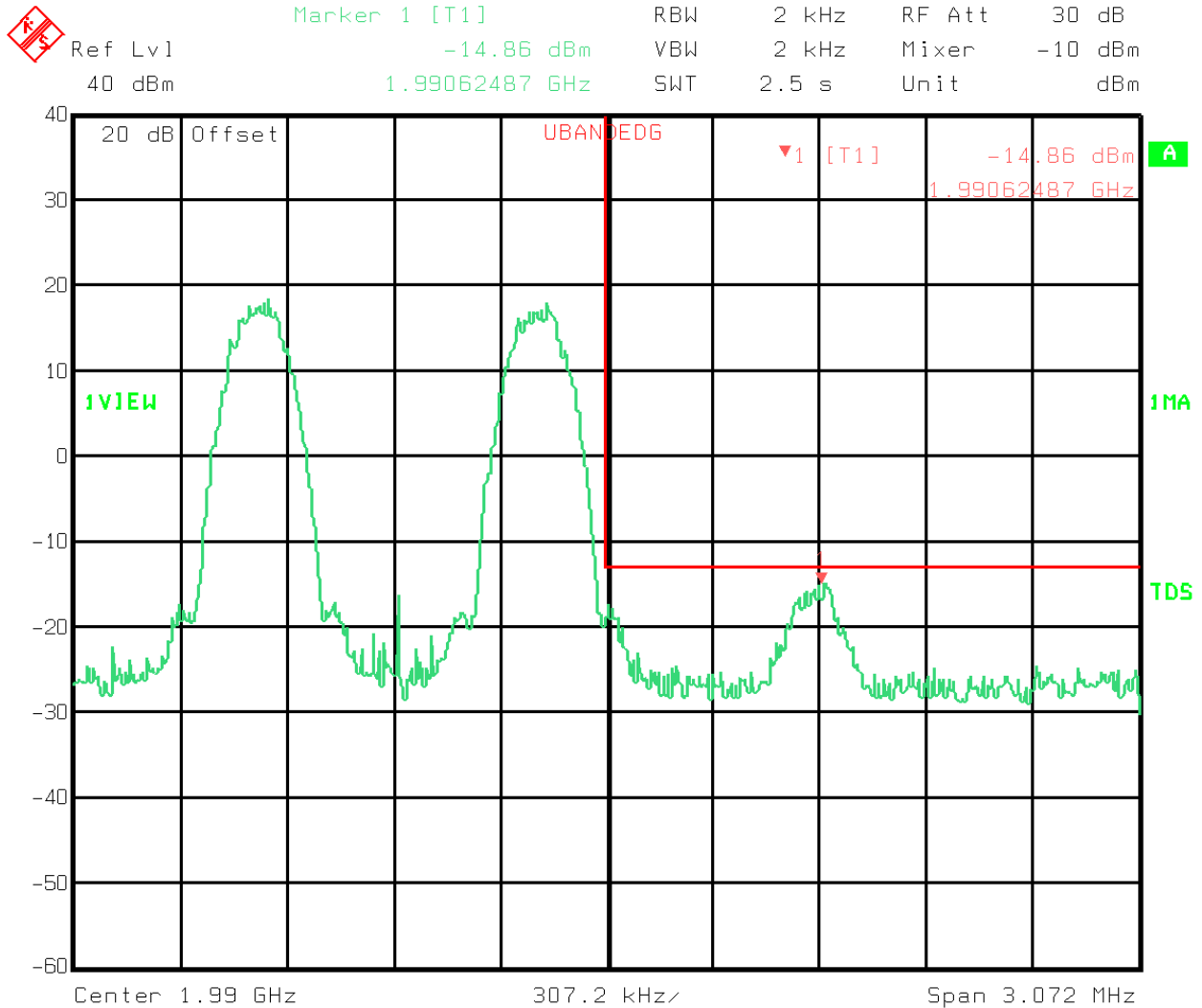
PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Unit**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- GSM (Channel 4)
Comment A: LBE18.PCX LOWER BAND EDGE
8 WATT AMPLIFIER
Date: 30.NOV.1999 13:59:13

Plot 59

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (GSM Signal): MOR701B Unit**

Title: VARIABLE BW W/EXTENSION MODULE- GSM (Channel 1176 & 1196)

Comment A: UBE19.PCX UPPER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION

Date: 8.DEC.1999 15:18:32

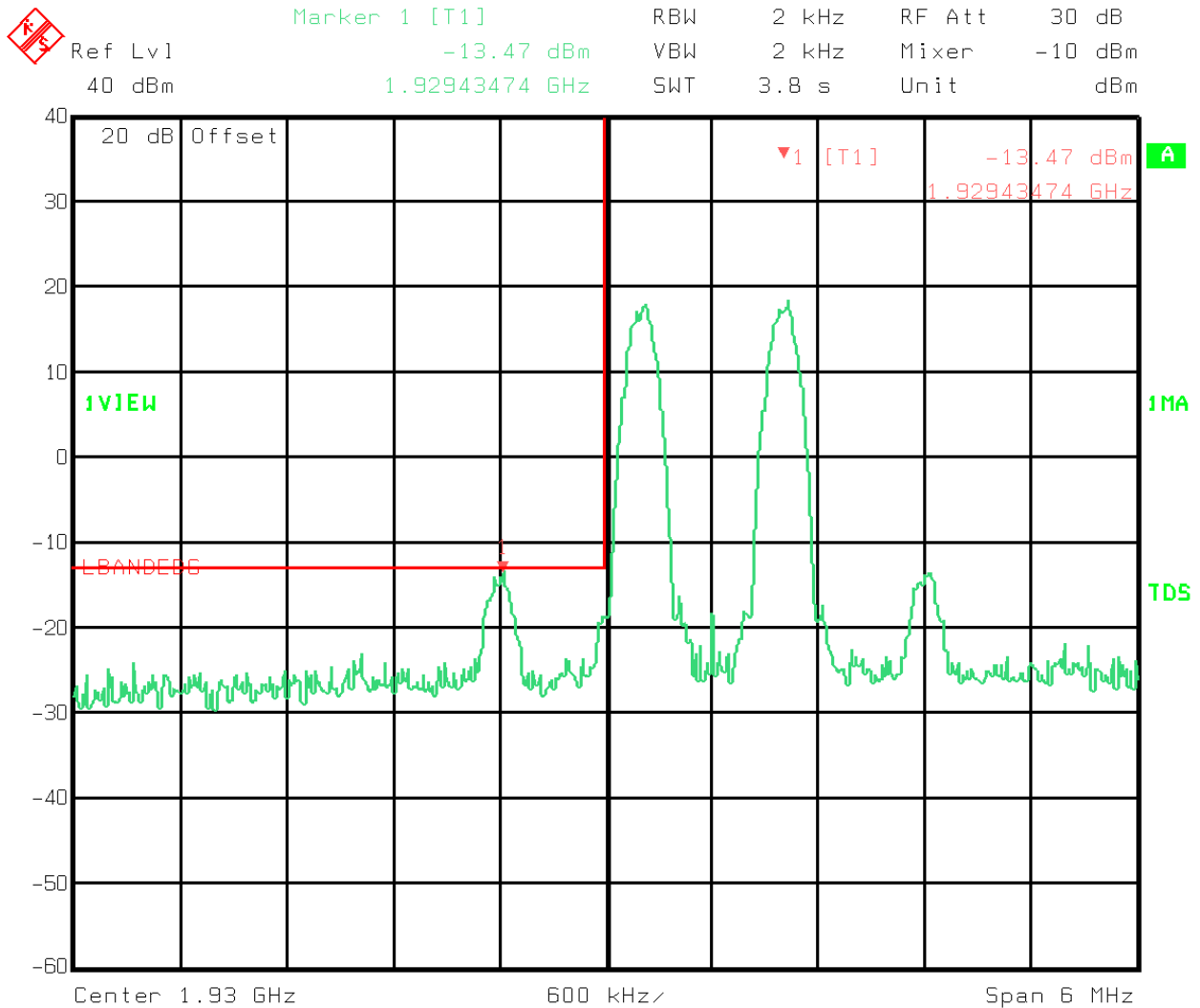
Plot 60

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (GSM Signal): MOR701B Unit

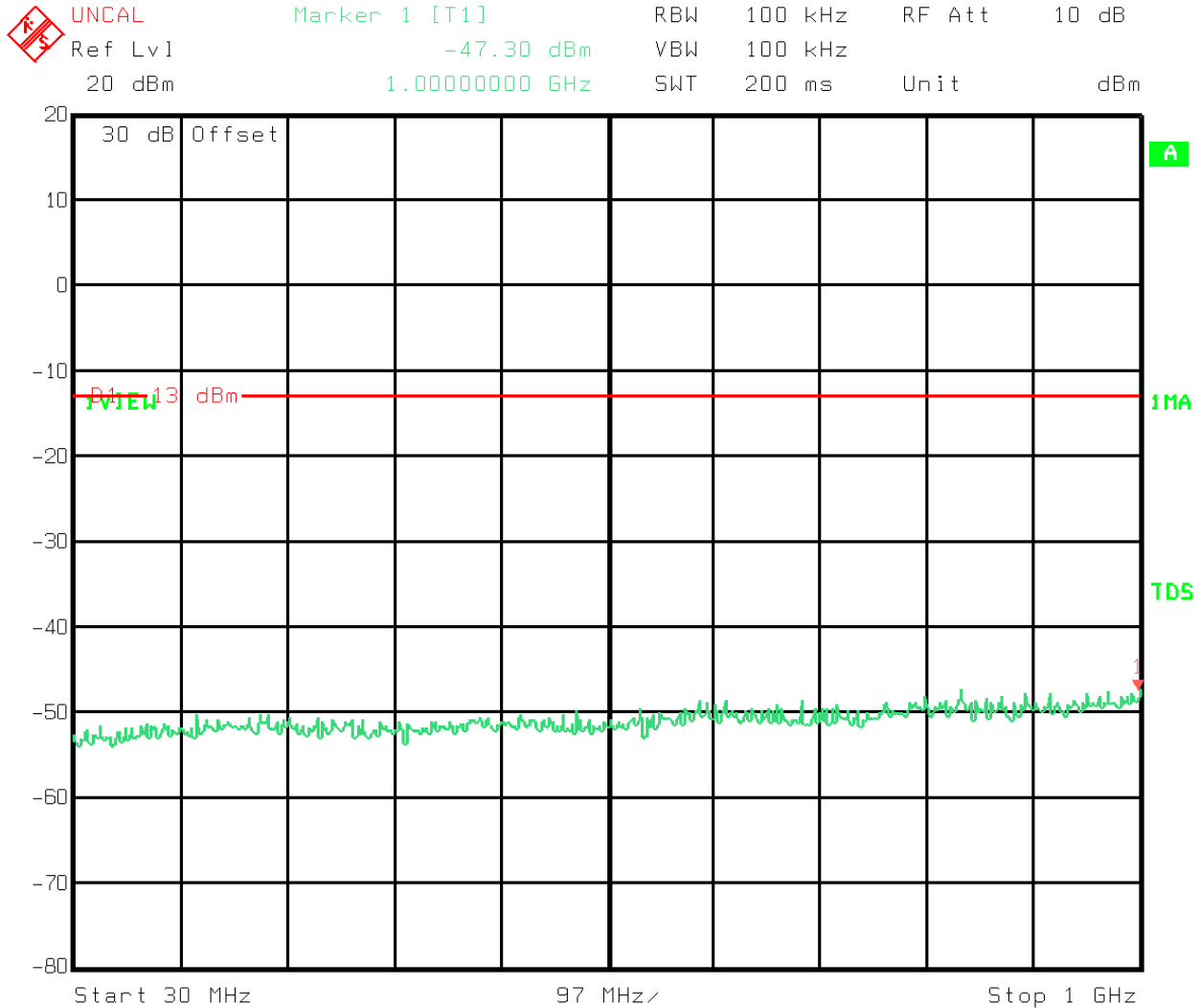


Title: VARIABLE BW MODULE W/EXTENSION MODULE-GSM (Channel 4 and 24)
Comment A: LBE19.PCX LOWER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION
Date: 30.NOV.1999 15:08:16

Plot 61

EQUIPMENT: **PCS Repeater**

FCC ID:

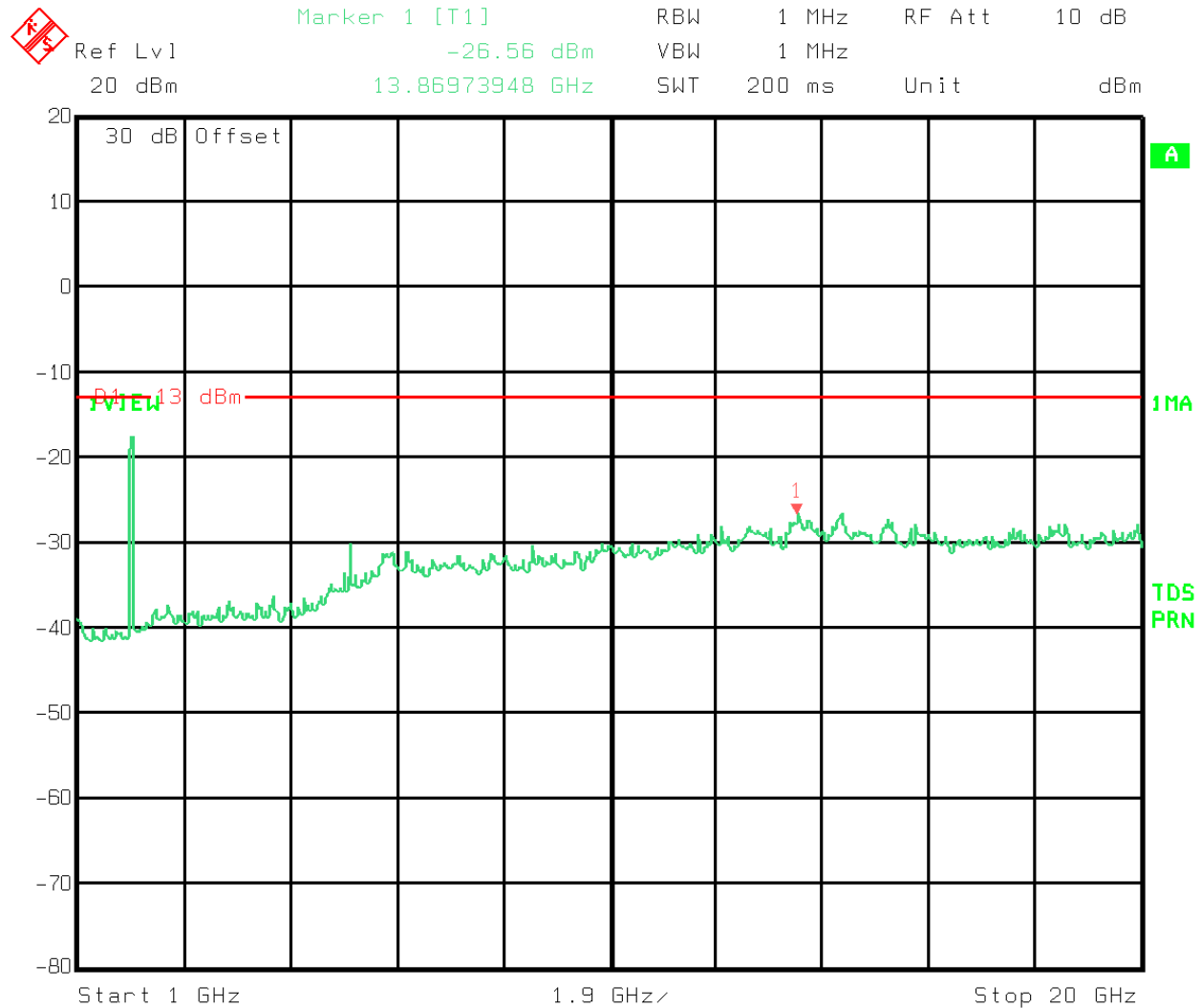
PROJECT NO.: **9L0454RUS****TDMA Module: MOR701B Power Unit**

Title: TDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (NADC)
Comment A: APSE11B.PCX ANTENNA PORT SPURIOUS EMISSIONS
FUNDAMENTAL NOTCHED
Date: 11.NOV.1999 15:06:55

Plot 62

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****TDMA Module: MOR701B Power Unit**

Title: TDMA MODULE W/ EXTENSION MODULE - CHANNEL 600 (NADC)
Comment A: APSE11A.PCX ANTENNA PORT SPURIOUS EMISSIONS
FUNDAMENTAL NOTCHED
Date: 11.NOV.1999 15:05:11

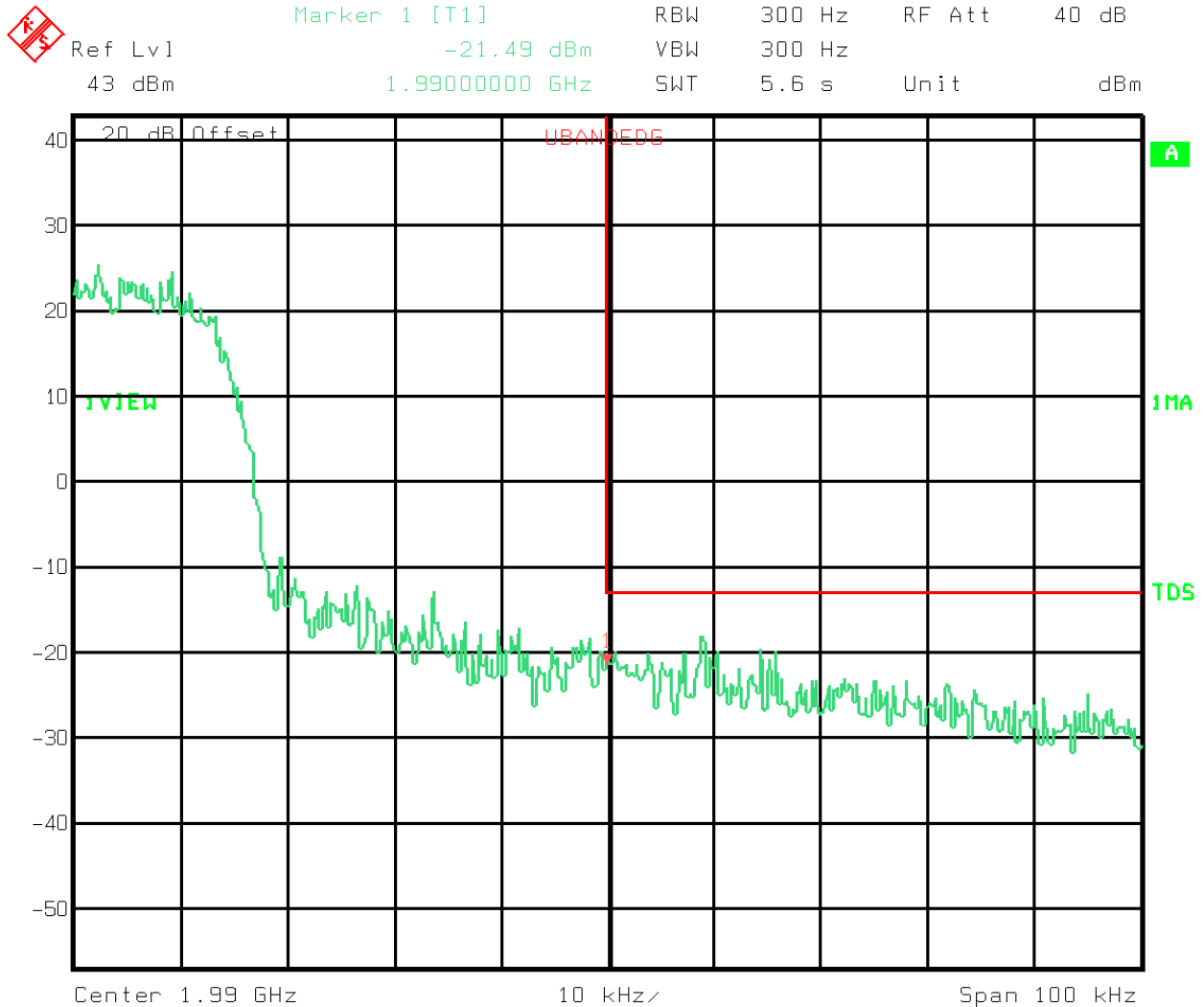
Plot 63

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

TDMA Module: MOR701B Power Unit



Title: TDMA MODULE W/ EXTENSION MODULE - CHANNEL 1199 (NADC)
Comment A: UBE12.PCX UPPER BAND EDGE SPURIOUS EMISSIONS
Date: 11.NOV.1999 15:31:50

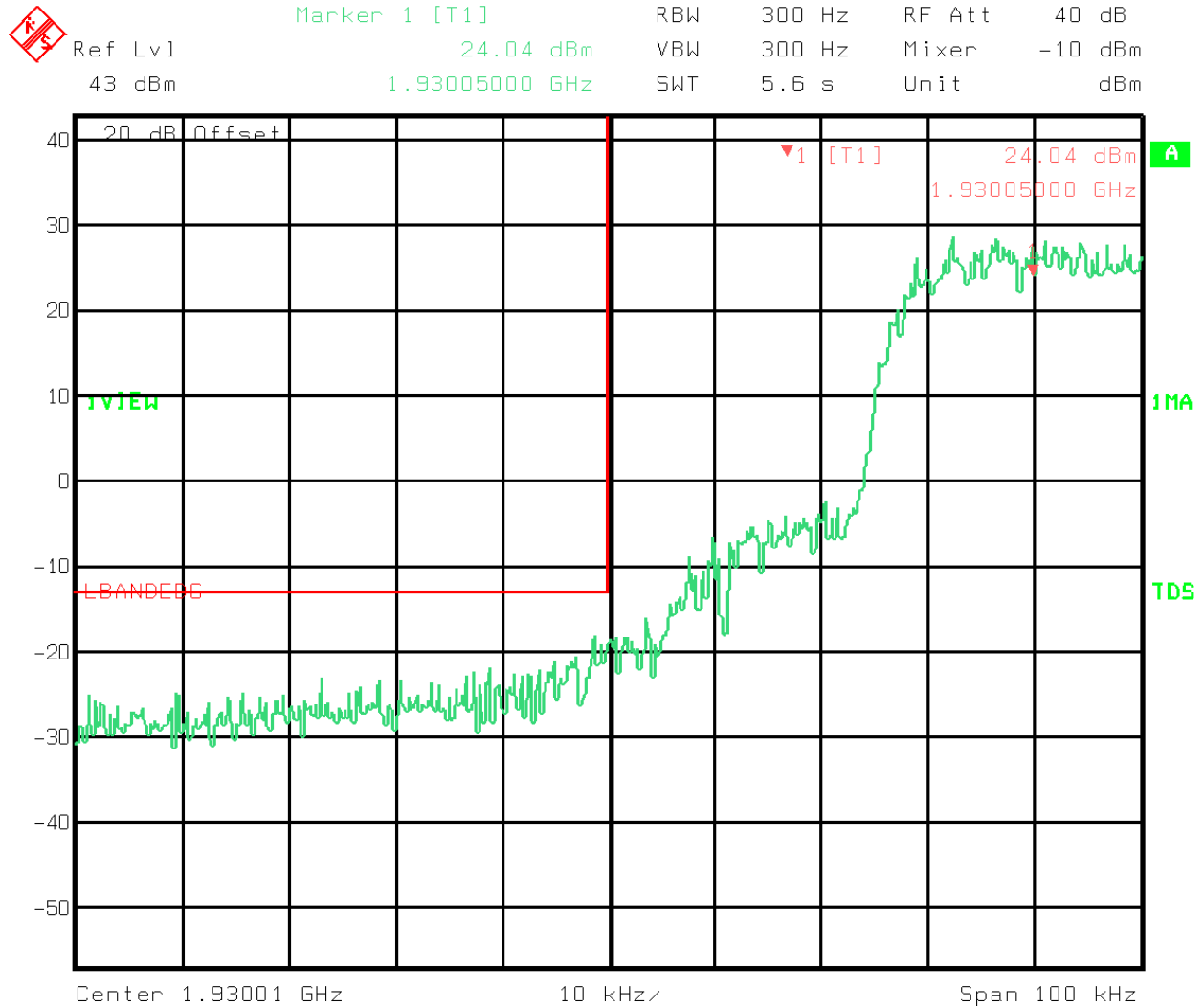
Plot 64

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

TDMA Module: MOR701B Power Unit



Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: LBE12.PCX LOWER BAND EDGE
Date: 29.NOV.1999 14:32:44

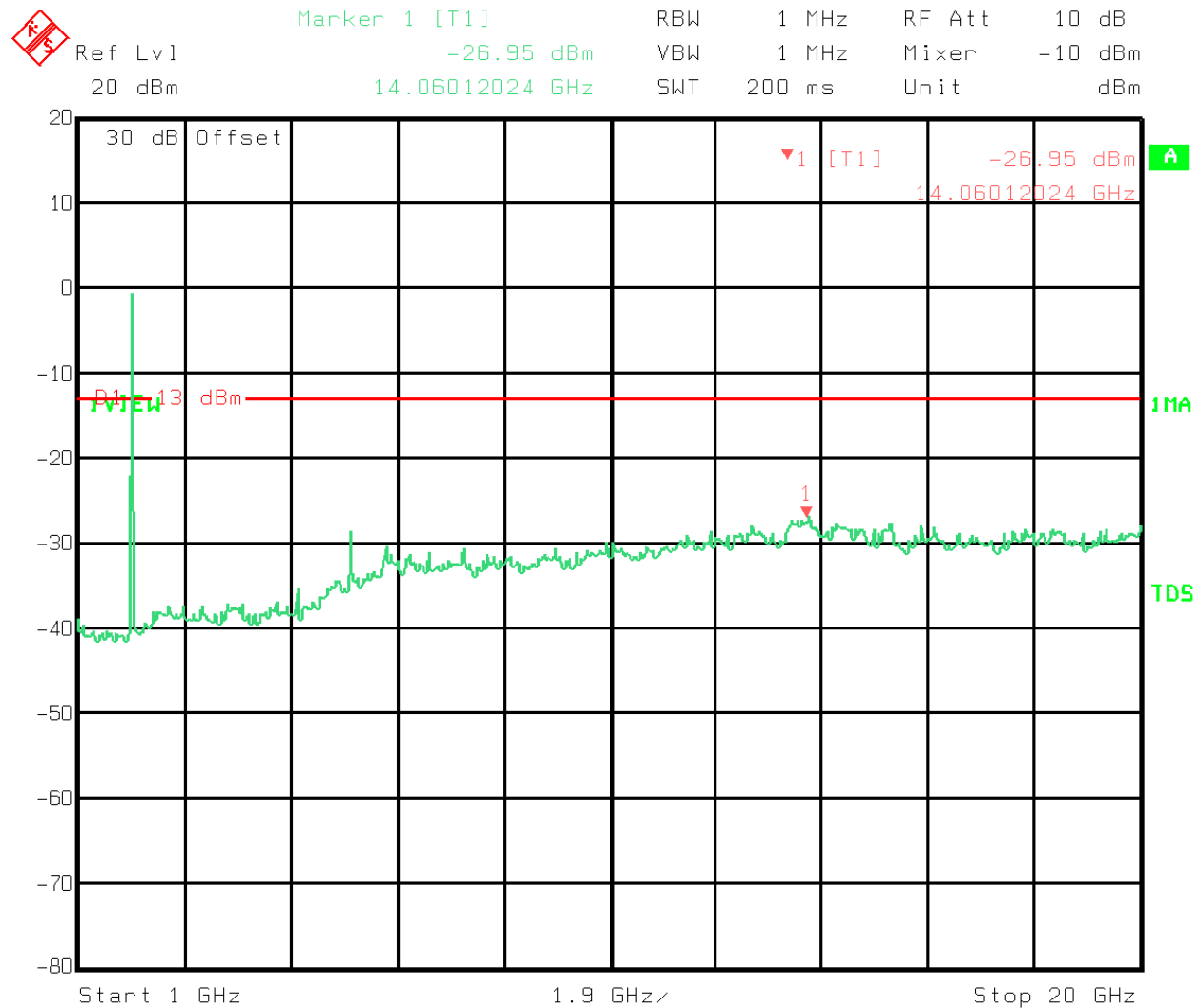
Plot 65

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: **9L0454RUS**

Variable Bandwidth Module (TDMA Signal)

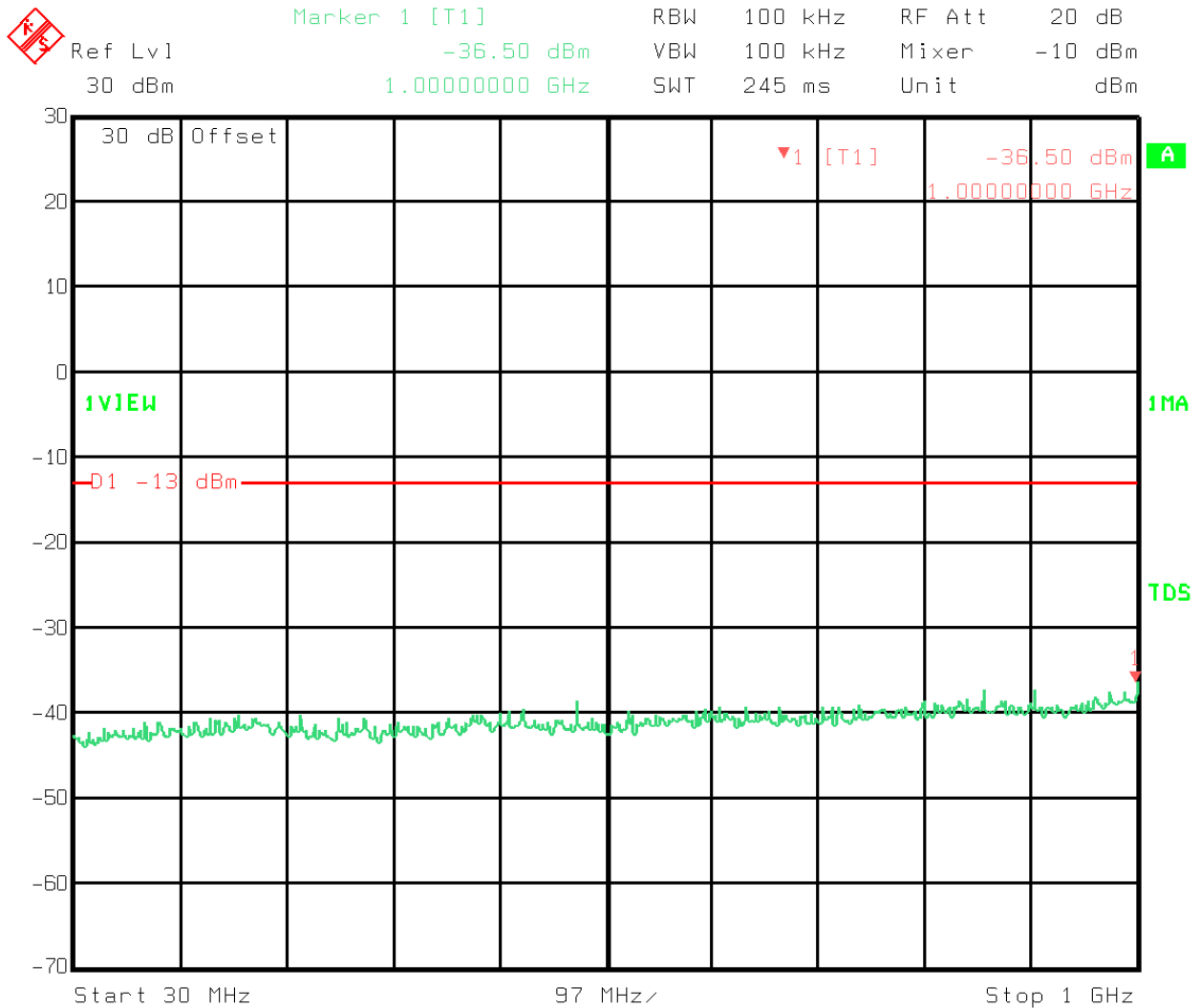


Title: Variable Bandwidth Modules (Channel 600)
Comment A: APSE05.PCX
Antenna Port Spurious Emissions (NADC)
Date: 8.NOV.1999 14:18:54

Plot 66

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (TDMA Signal)**

Title: Variable Bandwidth Modules (Channel 600)
Comment A: APSE05a.PCX
Antenna Port Spurious Emissions (NADC)
Date: 9.NOV.1999 10:25:15

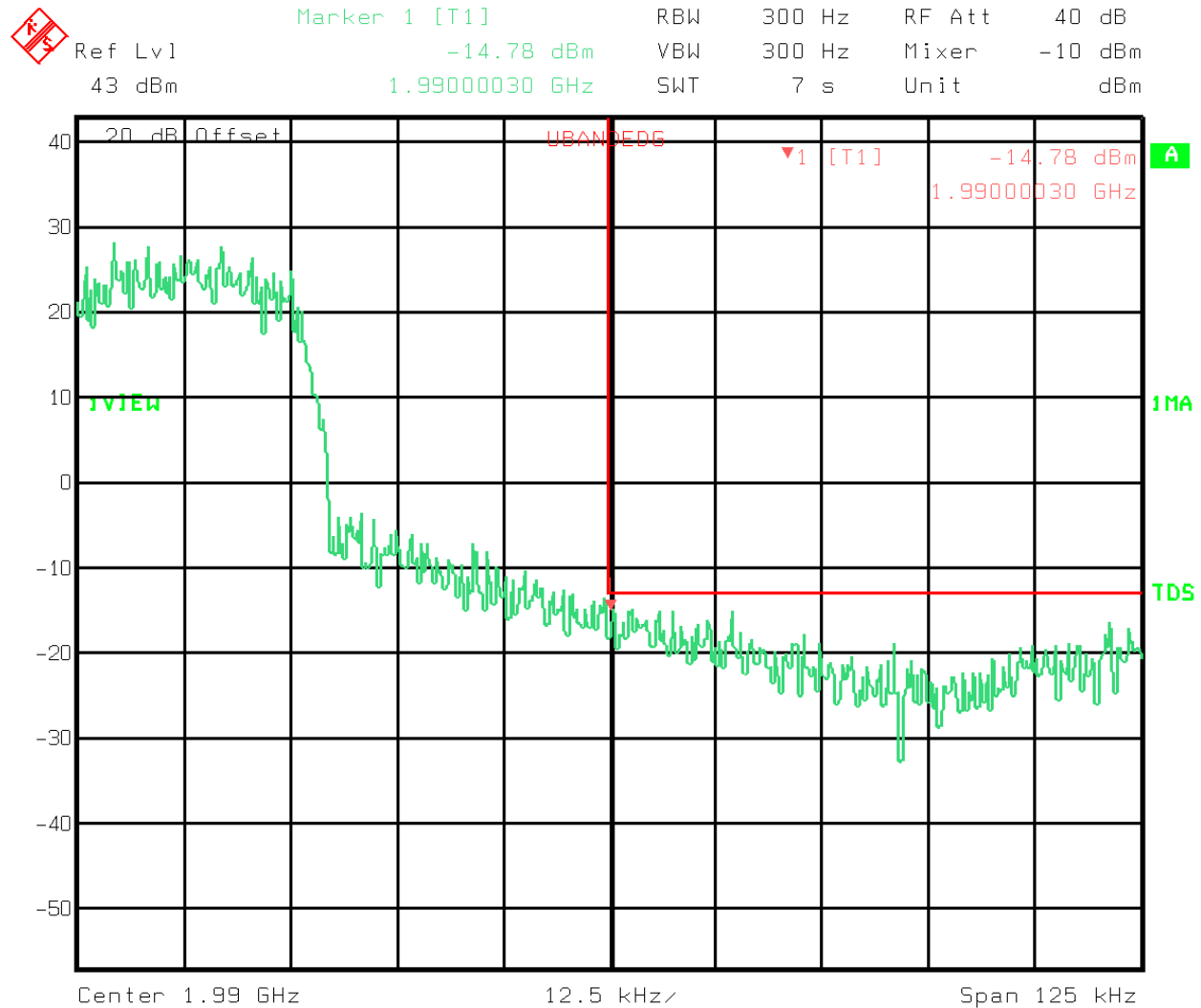
Plot 67

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: Variable Bandwidth Modules (Channel 1199)
Comment A: UBE05b.PCX
Upper Bandedge (NADC)
Date: 9.NOV.1999 10:12:59

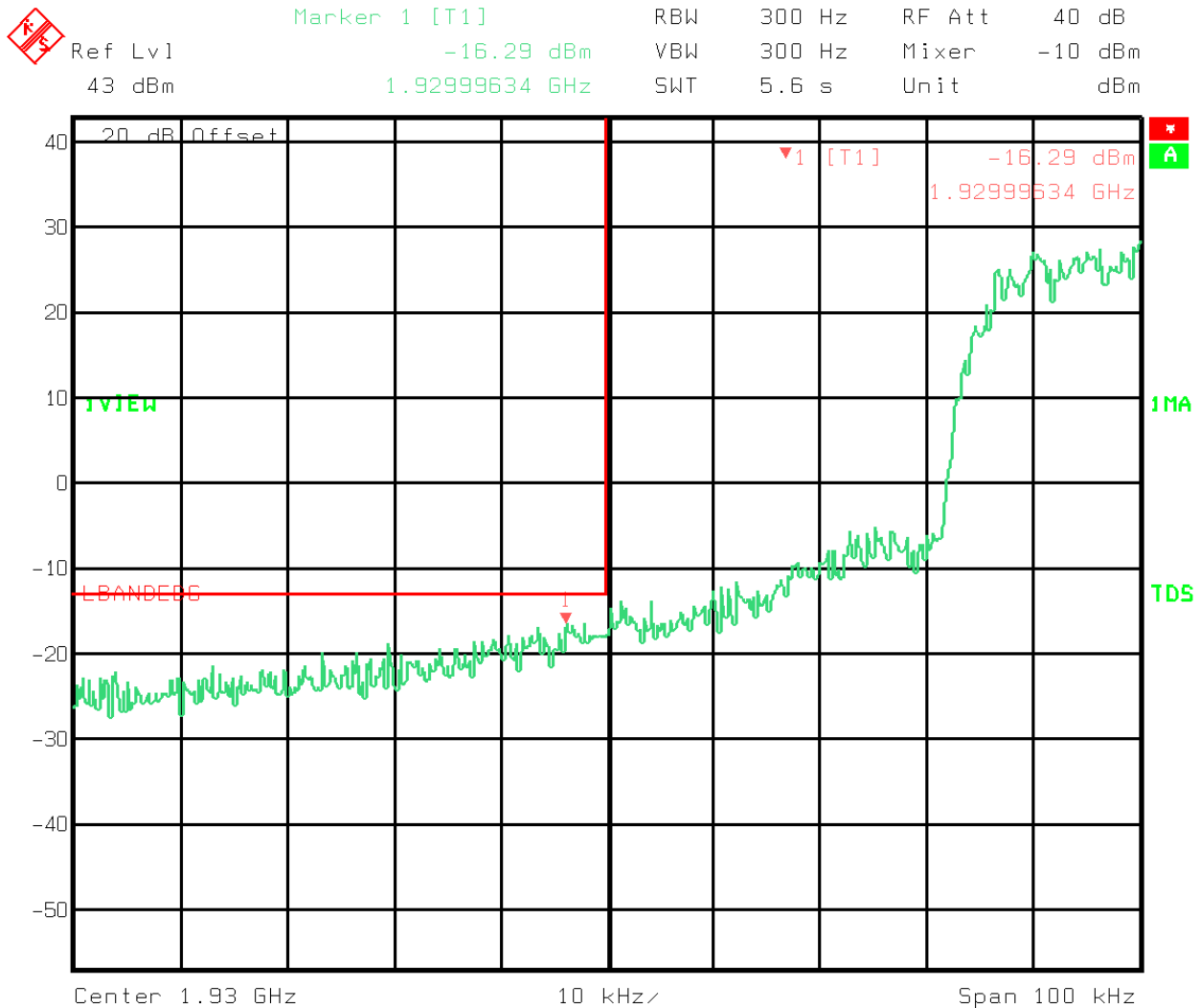
Plot 68

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: LBE05.PCX LOWER BAND EDGE
Date: 9.DEC.1999 17:24:36

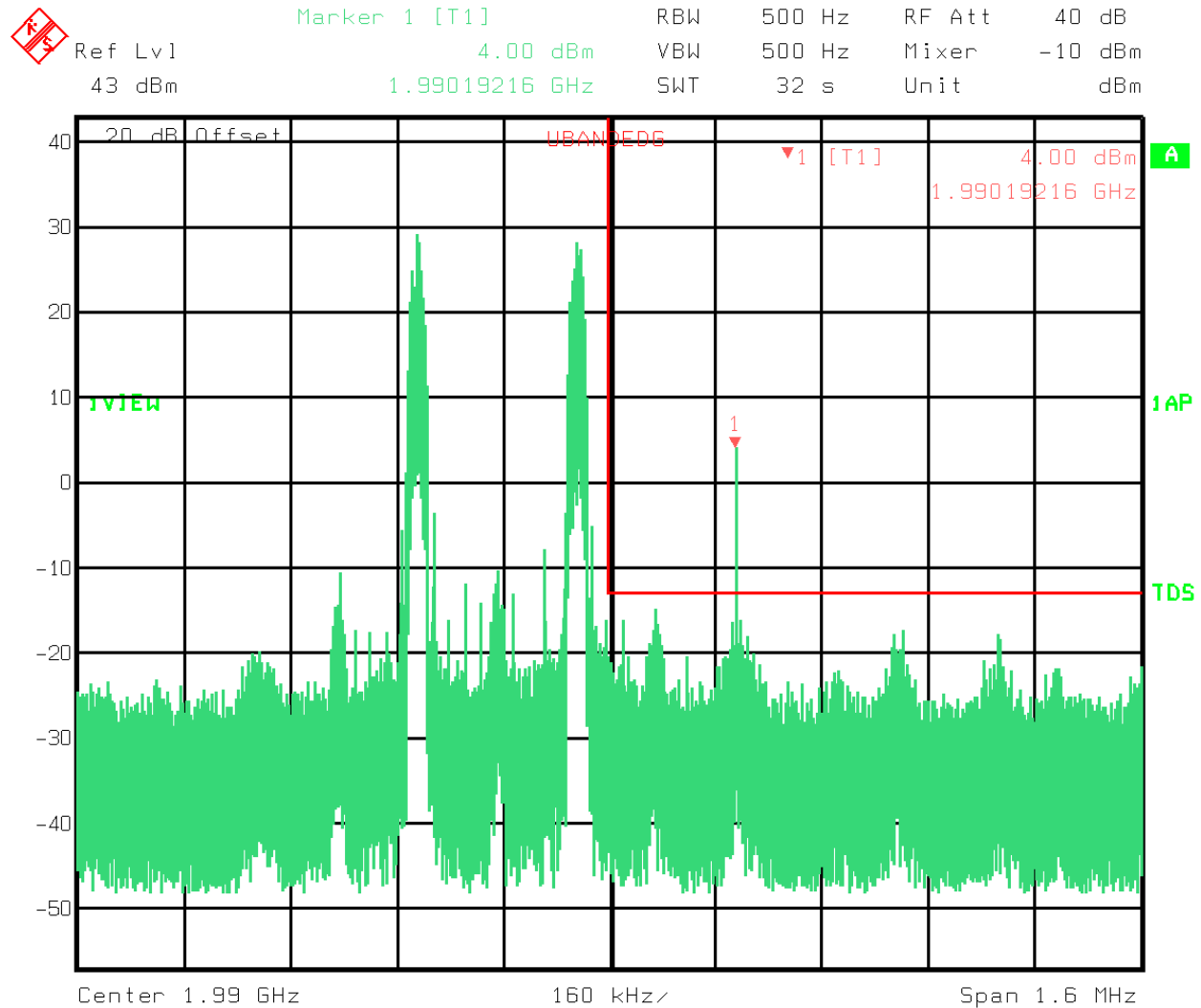
Plot 69

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: Variable Bandwidth Modules (Channel 1174/1199)
Comment A: UBE08.PCX
Upper Bandedge Intermodulation (NADC)
Date: 9.NOV.1999 9:56:05

Plot 70

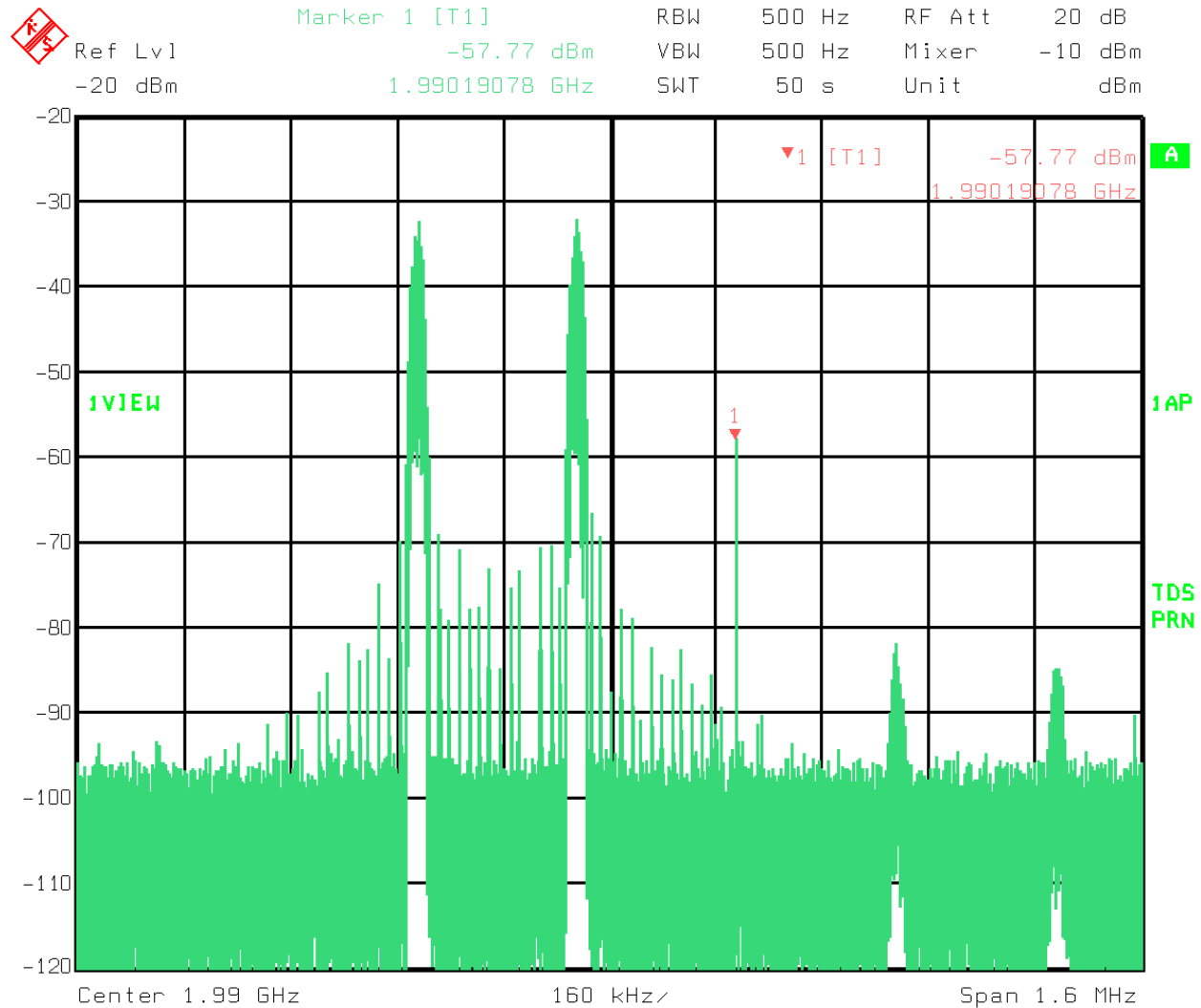
NOTE: The spurious signal identified in the above plot with the marker is an intermittent noise spike caused by the arbitrary waveform signal generation.

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: Variable Bandwidth Modules (Channel 1174/1199)
Comment A: UBEI08.PCX
Intermodulation (NADC) Signal Generator Input
Date: 9.NOV.1999 9:41:08

Plot 71

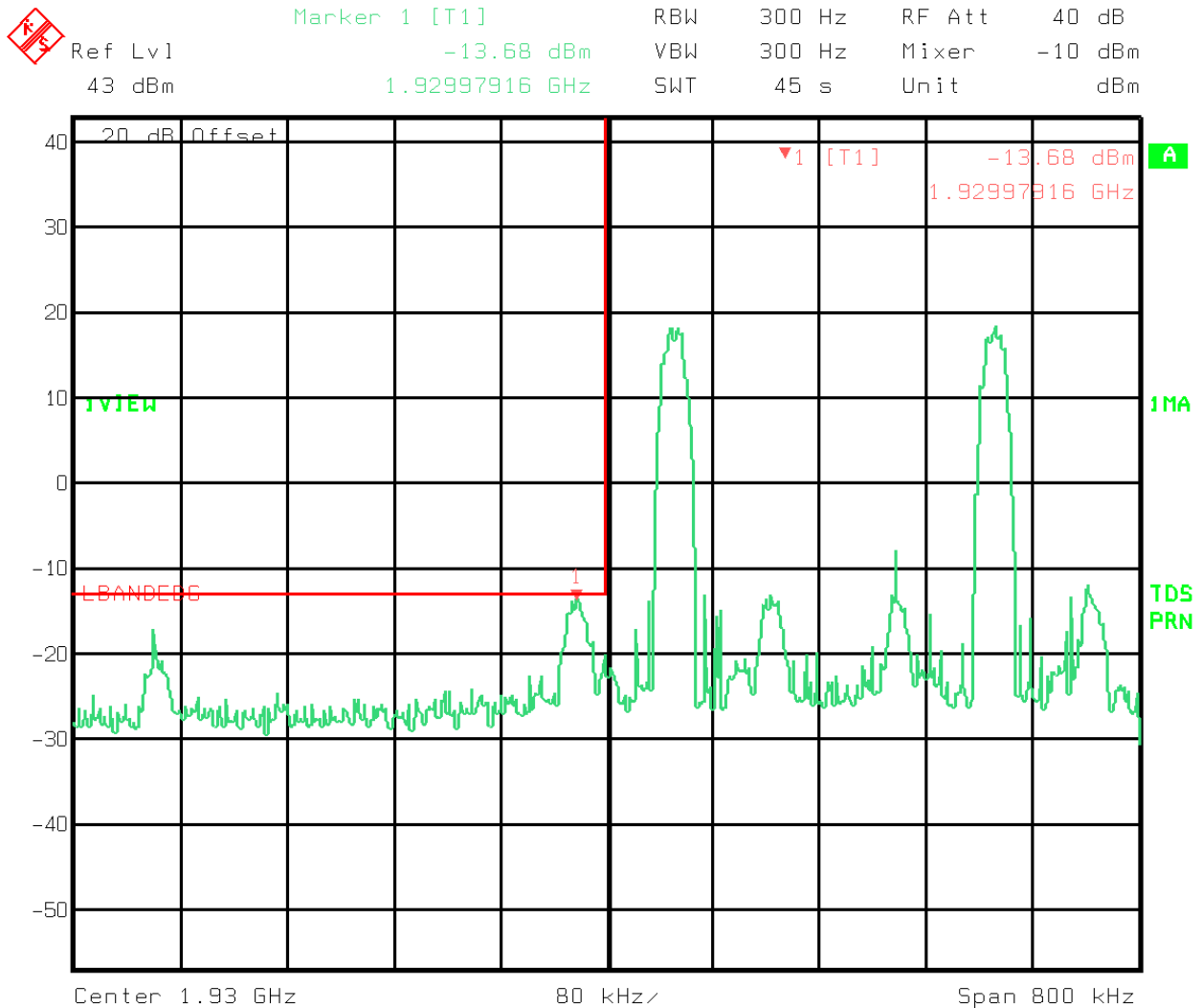
NOTE: The spurious signal identified in the above plot with the marker is an intermittent noise spike caused by the arbitrary waveform signal generation.

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)

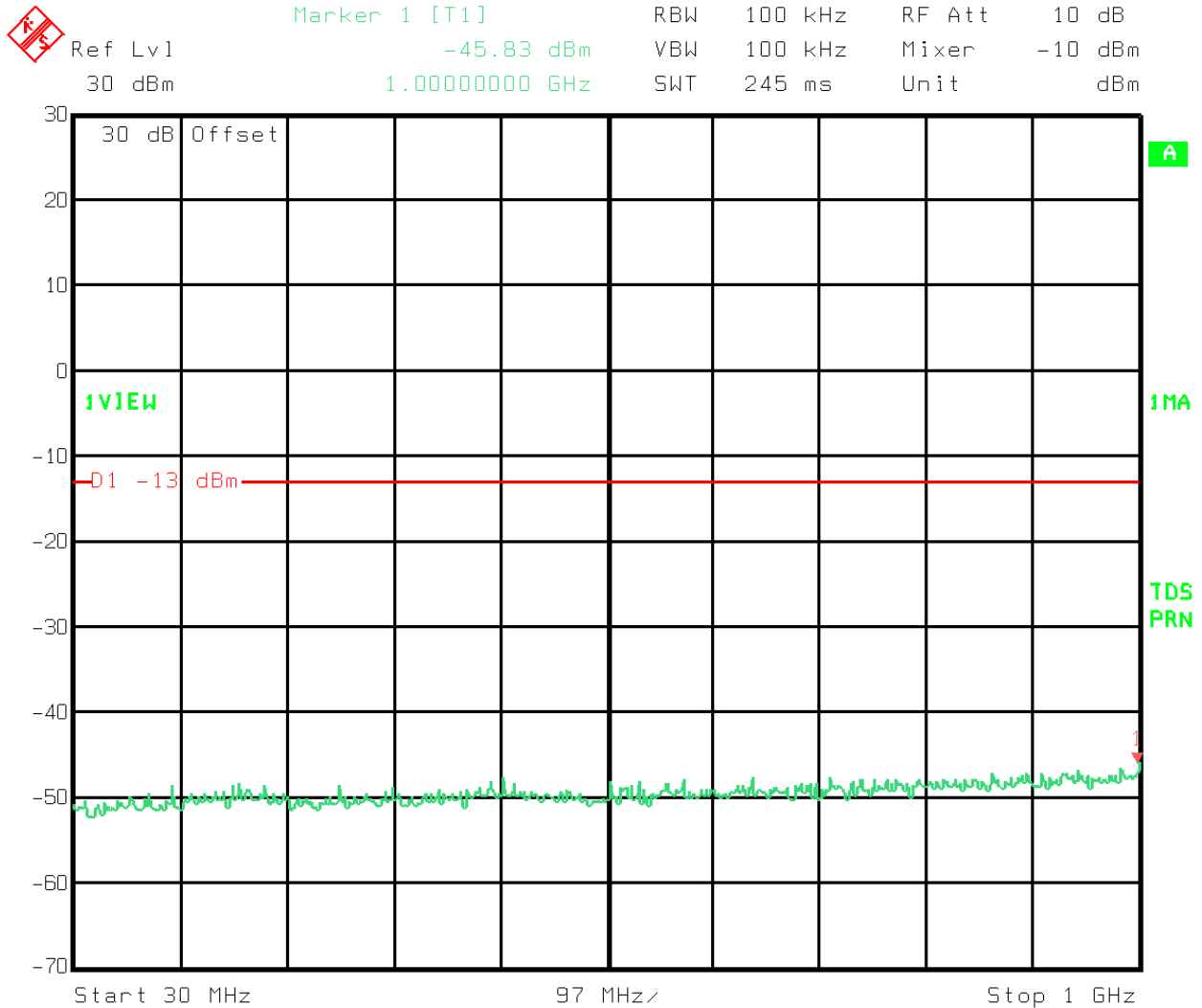


Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 1 & 21)
Comment A: LBE08.PCX LOWER BAND EDGE INTERMODULATION
Date: 9.DEC.1999 17:54:55

Plot 72

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****TDMA Module: MOR701B UNIT**

Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: APSE13A.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER
Date: 29.NOV.1999 16:03:53

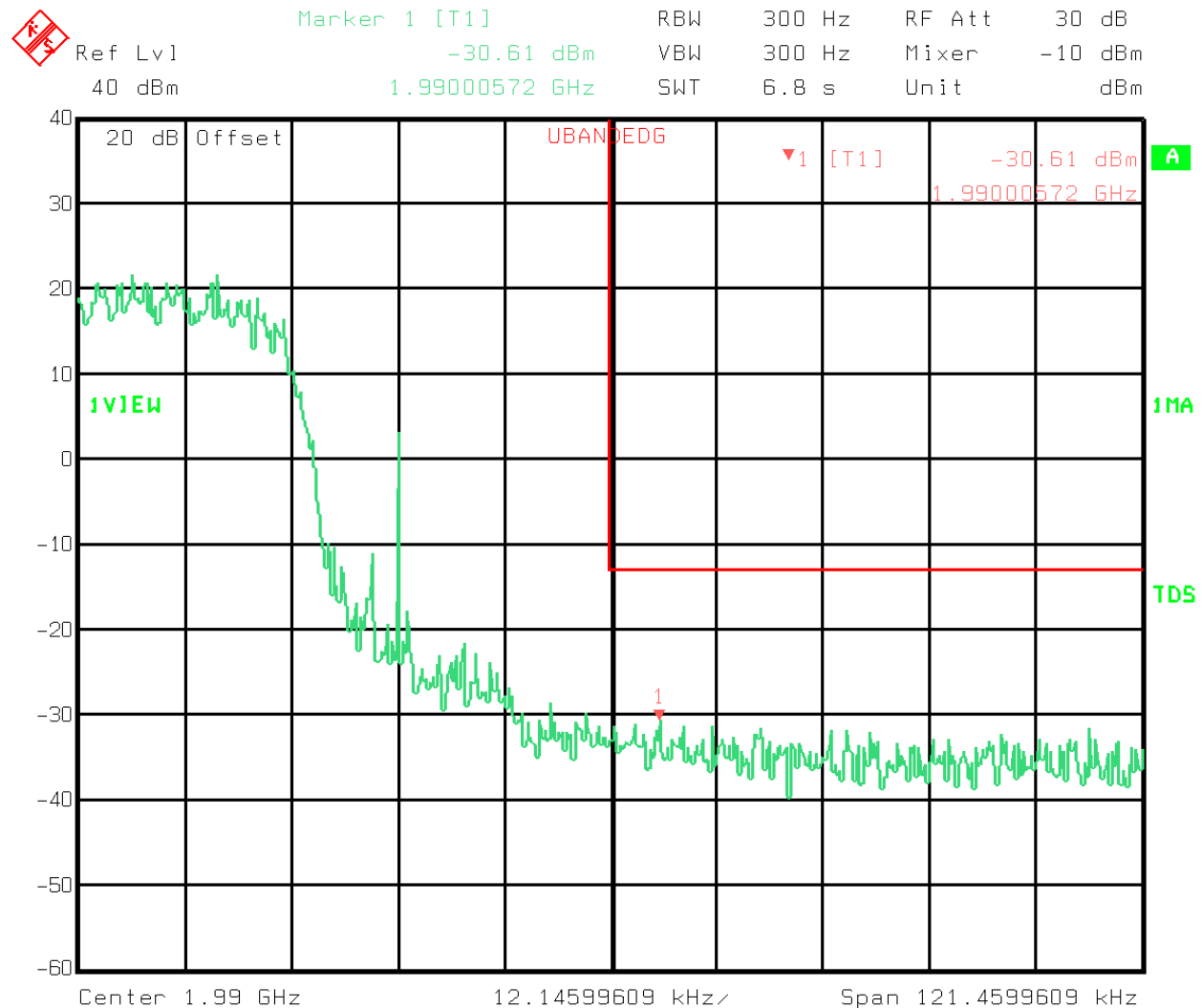
Plot 73

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: **9L0454RUS**

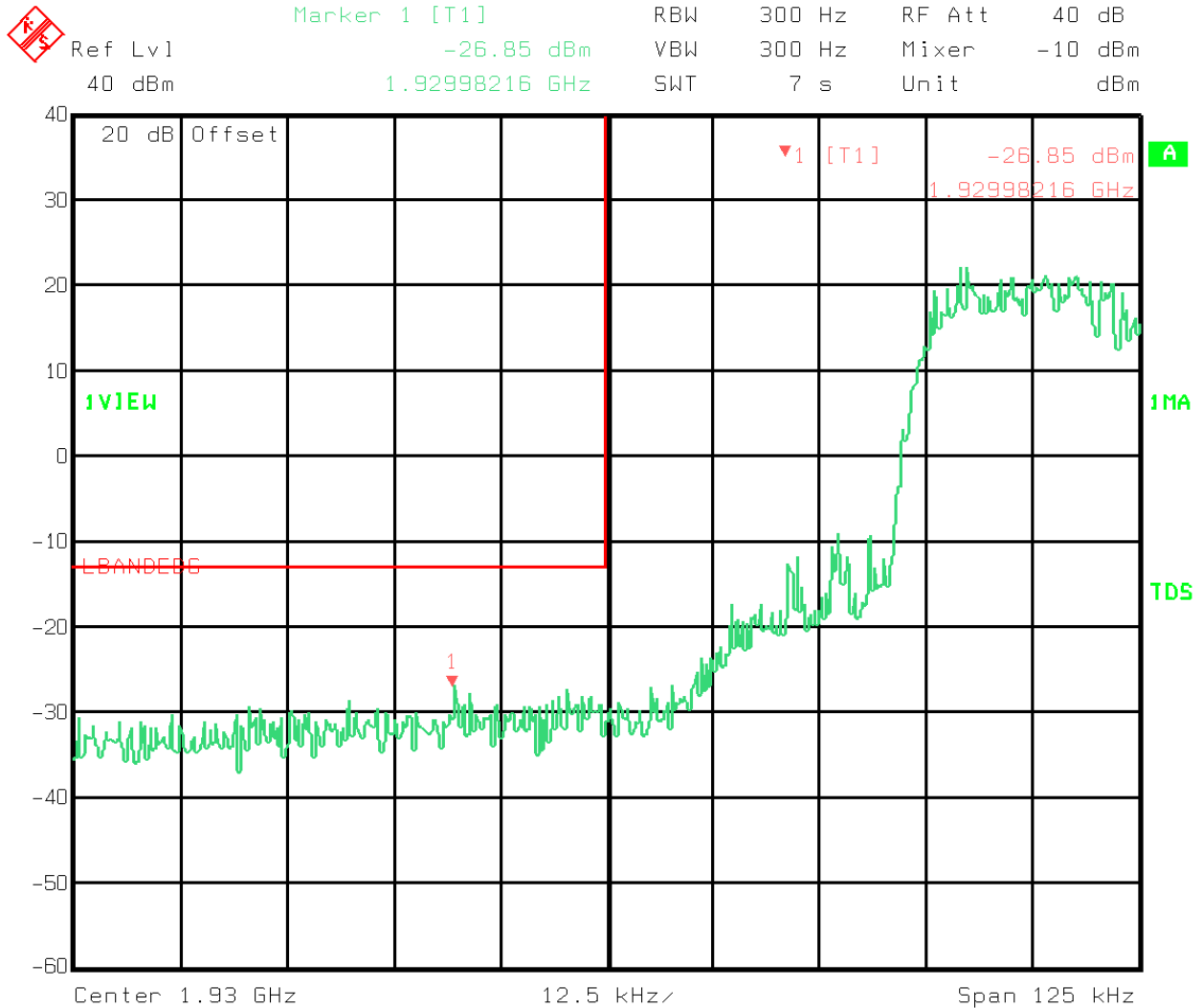
TDMA Module: MOR701B UNIT



Title: TDMA W/EXTENSION MODULE- NADC (Channel 1199)
Comment A: UBE14.PCX UPPER BAND EDGE
8 WATT AMPLIFIER
Date: 9.DEC.1999 12:16:11

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****TDMA Module: MOR701B UNIT**

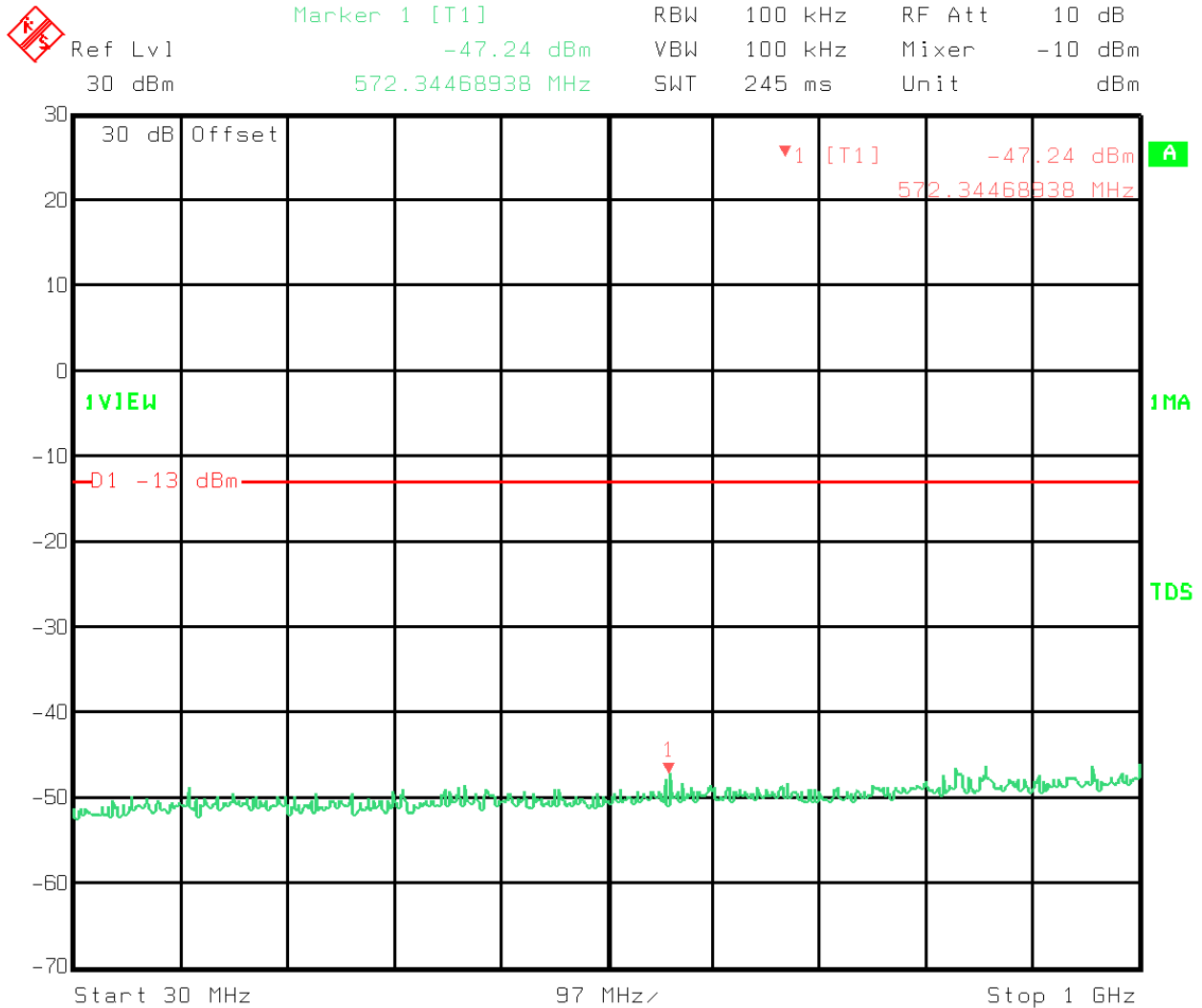
Title: TDMA MODULE W/EXTENSION MODULE- NADC (Channel 1)
Comment A: LBE14.PCX LOWER BAND EDGE
8 WATT AMPLIFIER
Date: 29.NOV.1999 15:18:43

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 600)

Comment A: APSE17A.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER

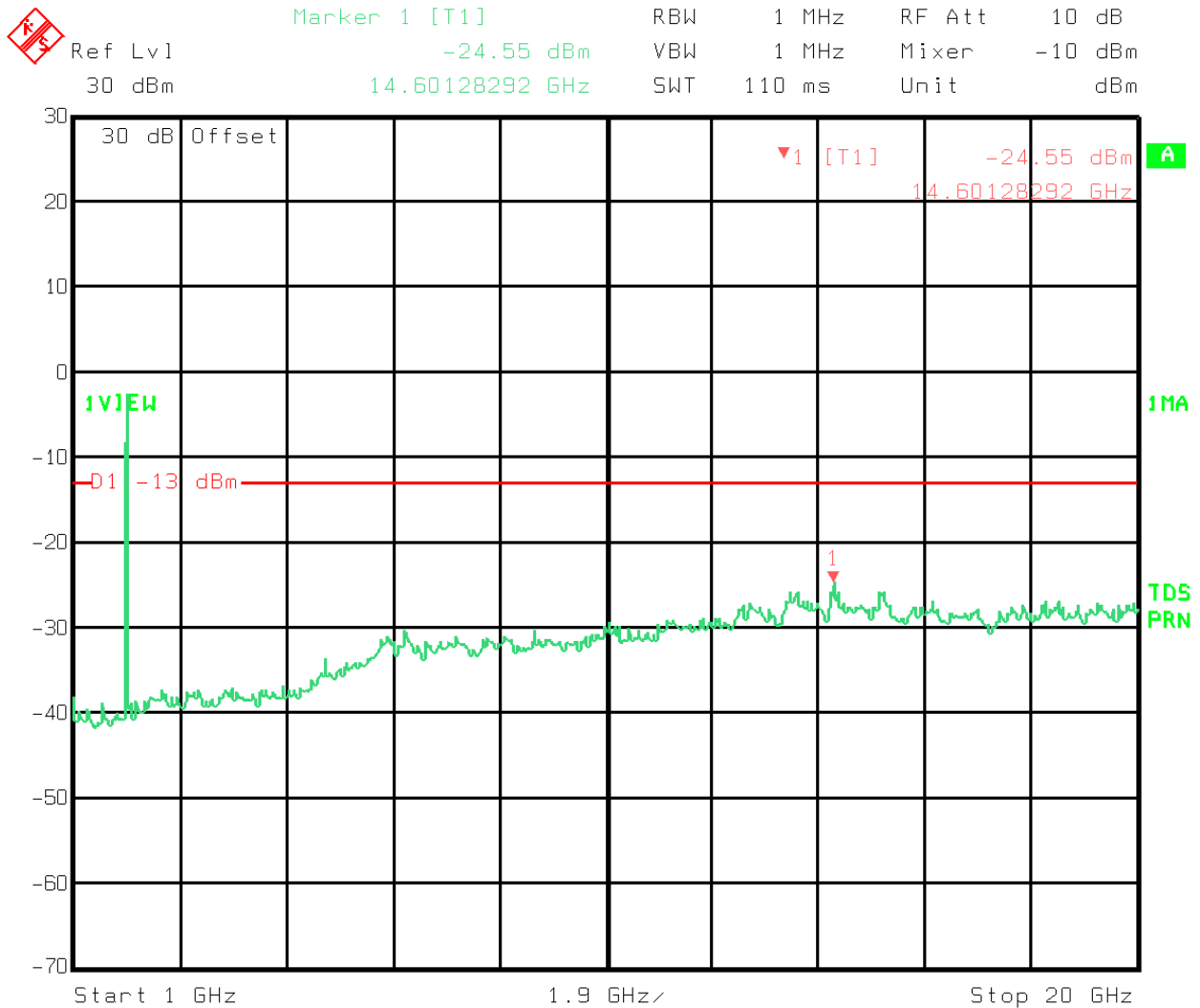
Date: 30.NOV.1999 13:20:47

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



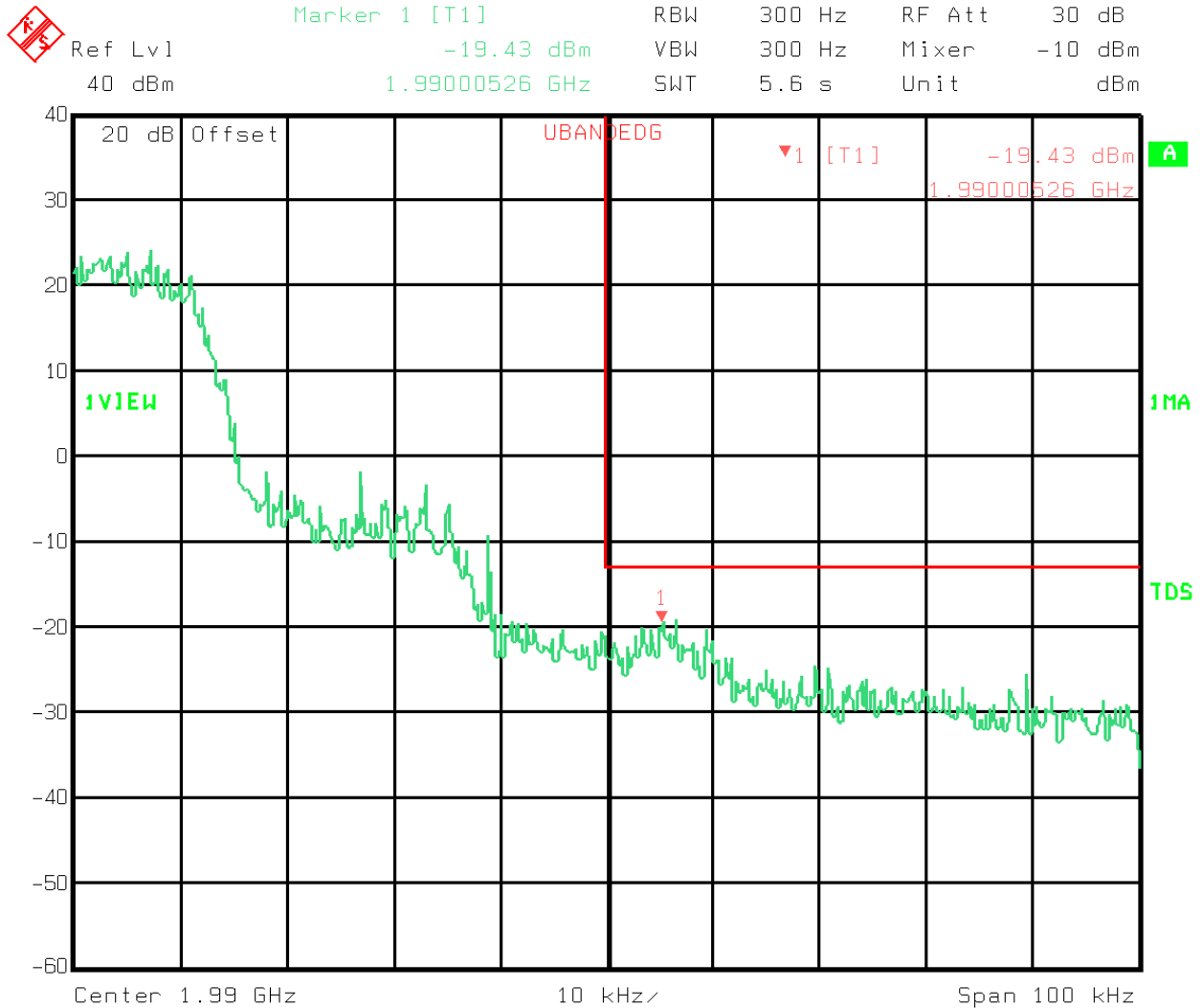
Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 600)

Comment A: APSE17B.PCX ANTENNA PORT SPURIOUS EMISSIONS
8 WATT AMPLIFIER

Date: 30.NOV.1999 13:19:14

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (TDMA Signal)**

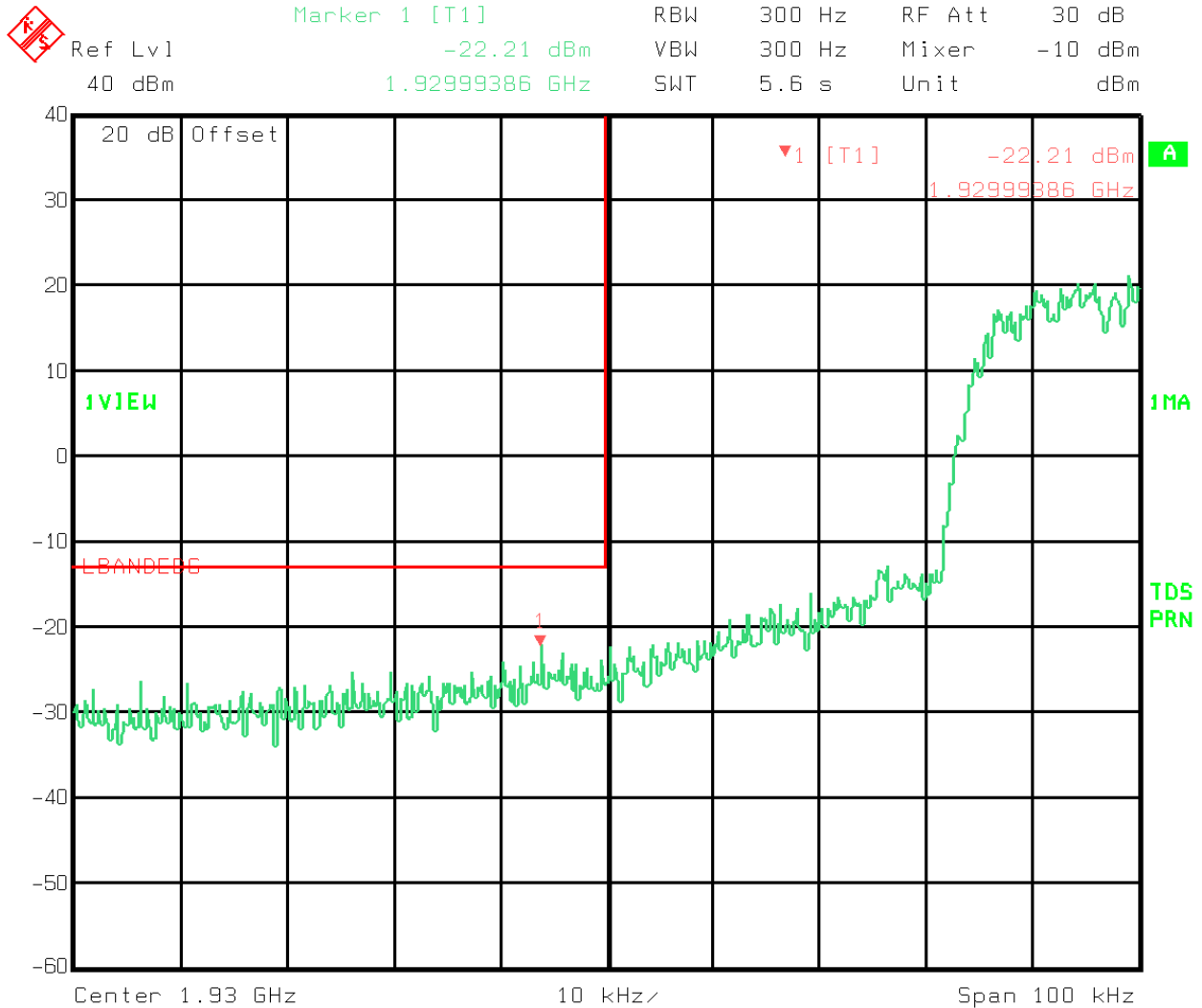
Title: VARIABLE BW W/EXTENSION MODULE- NADC (Channel 1199)

Comment A: UBE17.PCX UPPER BAND EDGE
8 WATT AMPLIFIER

Date: 8.DEC.1999 15:43:37

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Variable Bandwidth Module (TDMA Signal)**

Title: VARIABLE BW MODULE W/EXTENSION MODULE- NADC (Channel 1)

Comment A: LBE17.PCX LOWER BAND EDGE

8 WATT AMPLIFIER

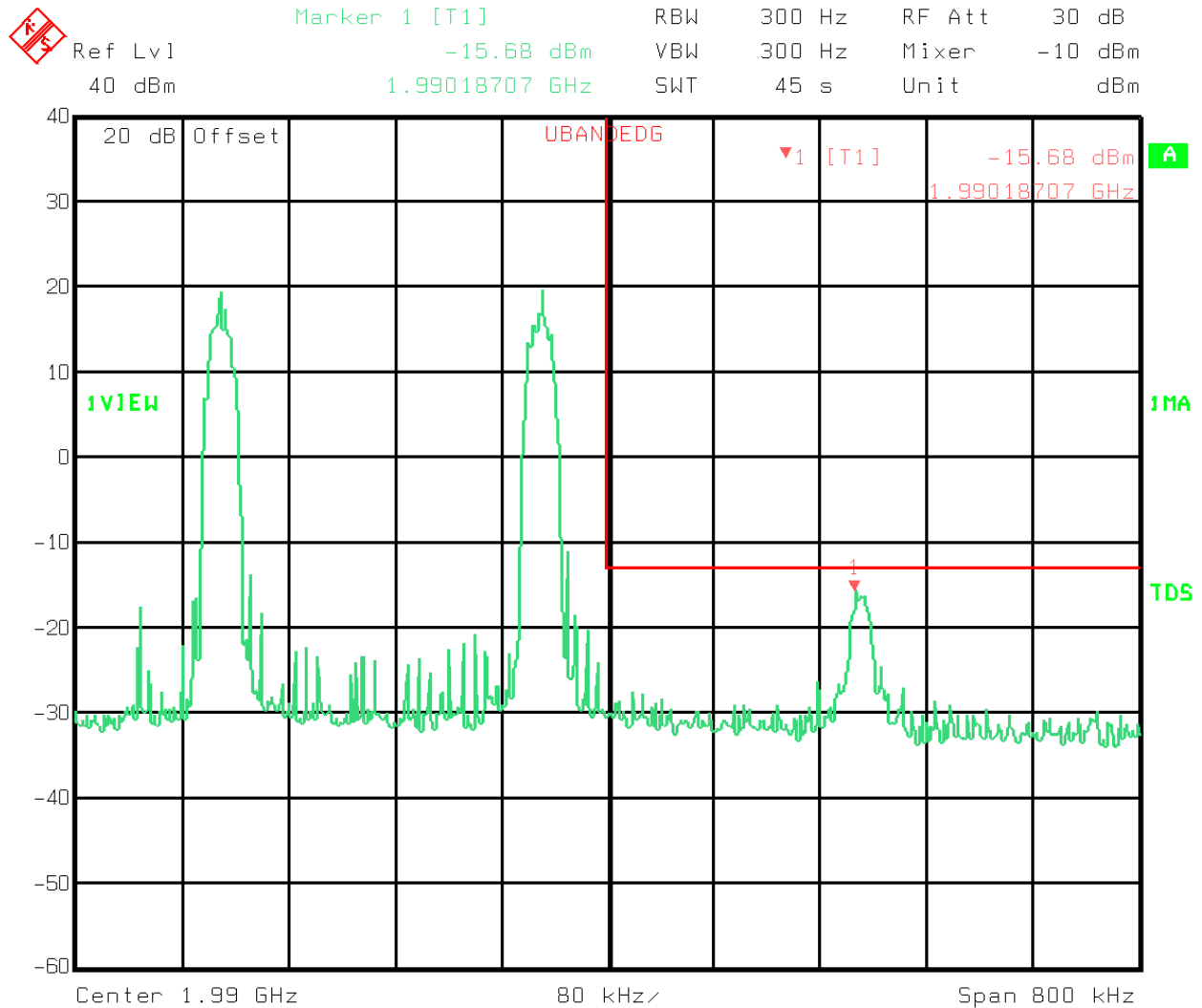
Date: 30.NOV.1999 13:32:34

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: VARIABLE BW W/EXTENSION MODULE- NADC (Channel 1179 & 1199)

Comment A: UBE20.PCX UPPER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION

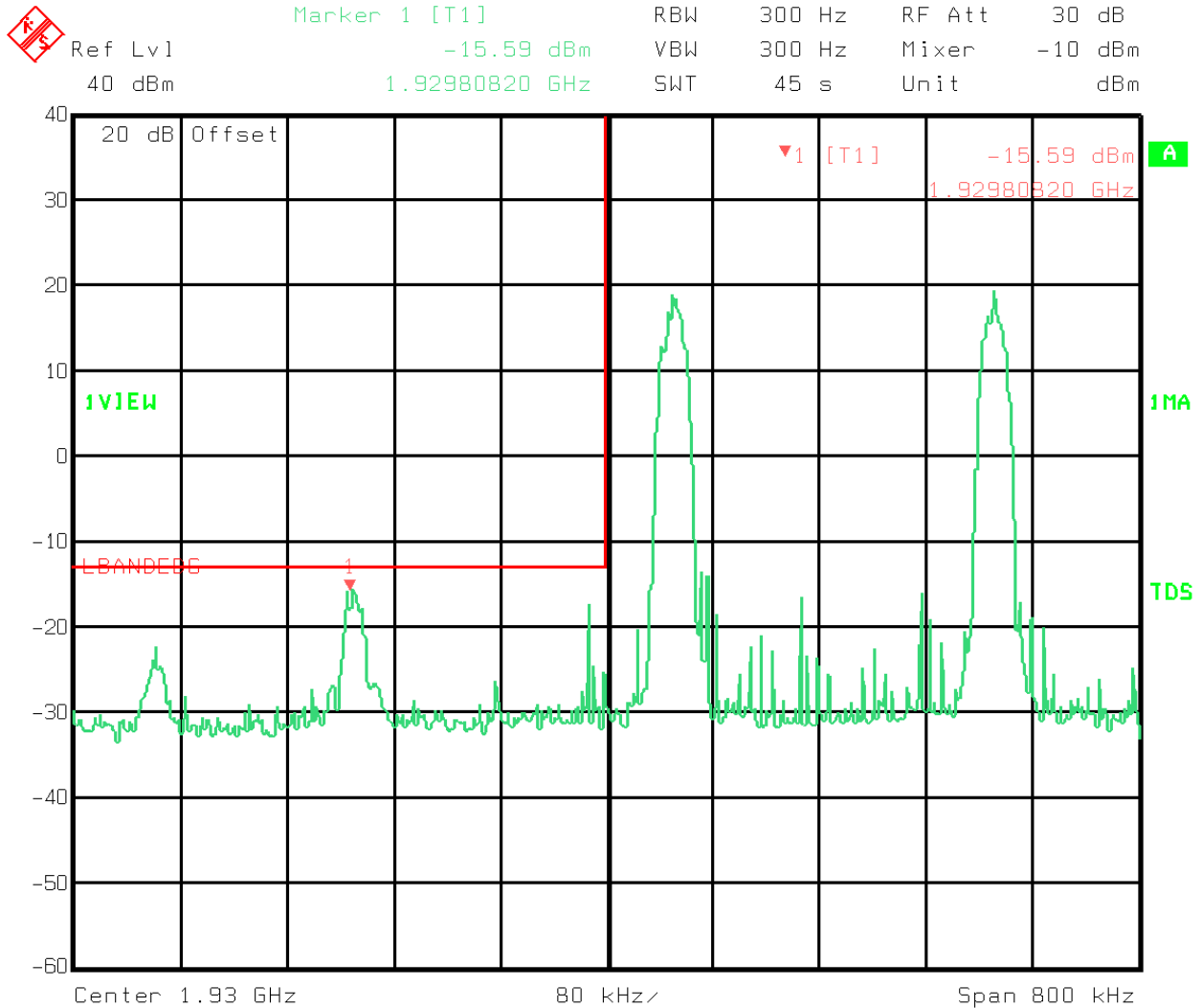
Date: 8.DEC.1999 16:53:29

EQUIPMENT: PCS Repeater

FCC ID:

PROJECT NO.: 9L0454RUS

Variable Bandwidth Module (TDMA Signal)



Title: VARIABLE BW W/EXTENSION MODULE- NADC (Channel 1 & 21)

Comment A: LBE20.PCX LOWER BAND EDGE
8 WATT AMPLIFIER INTERMODULATION

Date: 8.DEC.1999 11:55:30

EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: Ron Gaytan	DATE:11/17/99

Test Results: Complies.**Test Data:** See attached table.**Equipment Used:** G2043, G2230, G1716, G2233, 677, 452, CF45, CF46, CF27**Measurement Uncertainty:** +/- 6 dB**Temperature:** 20 °C**Relative
Humidity:** 38 %

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

Test Data - Radiated Emissions - Uplink

Not Applicable

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Test Data - Radiated Emissions - Downlink****Microwave Radiated Emissions Data**Complete X Preliminary Page 1 of 1Client: ALLEN TELECOM Test #: MW-1 W.O.#: 9L454REUT: MOR701B S/N: PT14 Photo ID: 9L0454R MW-1Technician: Ron Gaytan Specification: CFR47 Part 2.1053 Lab: D OATS Date: 11/17/99Equipment Used: G2043,G2230,G1716,G2233,677,452,CF45,CF46,CF27, G2624,934,Configuration: TX MAX POWER INTO 50 OHMS (VARIABLE BANDWIDTH MODULE)Bandwidth: 100 k Hz Video Bandwidth: 100 kHz Antenna Distance 3 m Detector:

Climatic Conditions: EUT Power: X 115 V.A.C. X 60 Hz X Peak
 Temperature: 20 C 208 V.A.C. 50 Hz Average
 Relative Humidity: 38 % 230 V.A.C.
 Atmospheric Pressure: 992 mbar Other 1 Phase 3 Phase

Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuV/m)	ERP (mW)	ERP (dBm)	Pol.	Comments:
1.952	58	28.0	2.6	18.4	0	70.2	0	-25	H	
3.904	27	31.4	4.5	17.7	0	45.2	0	-50	H	
5.856	58	34.0	5.5	37.0	0	60.5	0	-34.7	H	
7.808	53	36.3	6.7	38.4	0	57.6	0	-37.6	H	
9.757	27	38.3	7.7	37.7	0	35.3	0	-59.9	H	Avg. Det. N.F.
11.712	27	39.7	8.6	37.4	0	37.9	0	-57.3	H	Avg. Det. N.F.
13.664	33	41.4	9.5	43.7	0	40.2	0	-55	H	Avg. Det. N.F.
15.616	31	38.9	10.7	42.6	0	38	0	-57.2	H	Avg. Det. N.F.
1.952	60	28.0	2.6	18.4	0	72.2	0	-23	V	
3.904	26	31.4	4.5	17.7	0	44.2	0	-51	V	
5.856	58	34.0	5.5	37.0	0	60.5	0	-34.7	V	
7.808	51	36.3	6.7	38.4	0	55.6	0	-39.6	V	
9.757	27	38.3	7.7	37.7	0	35.3	0	-59.9	V	Avg. Det. N.F.
11.712	27	39.7	8.6	37.4	0	37.9	0	-57.3	V	Avg. Det. N.F.
13.664	33	41.4	9.5	43.7	0	40.2	0	-55	V	Avg. Det. N.F.
15.616	31	38.9	10.7	42.6	0	38	0	-57.2	V	Avg. Det. N.F.
										Scanned
										1-20 GHz

DATA\COMMON\FORMS\TEST DATA SHEETS\MICRORE REV 030597

EQUIPMENT: **PCS Repeater**
FCC ID:

PROJECT NO.: **9L0454RUS**

Photographs of Test Setup

FRONT VIEW



REAR VIEW



EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY:	DATE:

Test Results: Complies.**Measurement Data:** See attached table.Standard Test Frequency: MHz
Standard Test Voltage:**Equipment Used:**

Not Applicable

Measurement Uncertainty: +/- 1.6 dB**Lab Temperature:** °C**Relative Humidity:** %

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****Section 8. Test Equipment List**

<u>KTL ID</u>	<u>Description</u>	<u>Manufacturer</u> <u>Model Number</u>	<u>Serial Number</u>	<u>Calibration</u> <u>Date</u>
CF27	CABLE, 1m	HP 0	N/A	01/29/99
CF39	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	08/31/99
CF41	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	08/31/99
CF45	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
CF46	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
G1017	ATTENUATOR	NARDA 776B-20	NONE	09/30/99
G1018	ATTENUATOR	NARDA 776B-10	NONE	09/30/99
G1716	NOTCH FILTER	K&L 11SH10-4000/T12000-0/0	2	CBU
G2043	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	06/28/99
G2230	AMPLIFIER, RF	ICC LN1-5	421	04/26/99
G2233	AMPLIFIER, RF 5-12 GHz	ICC LN5-12	430	08/17/99
G2624	SPECTRUM ANALYZER	HP 8563E	3551A04428	11/03/99
G2632	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99
G2735	I/Q MODULATION GENERATOR	ROHDE & SCHWARZ AMIQ	830848/005	05/26/99
G2736	SIGNAL GENERATOR	ROHDE & SCHWARZ SMIQ 03	DE22081	05/03/99
G3726	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	05/19/99

EQUIPMENT: PCS Repeater**FCC ID:****PROJECT NO.: 9L0454RUS**

Test Equipment List (Continued):

<u>KTL ID</u>	<u>Description</u>	<u>Manufacturer</u> <u>Model Number</u>	<u>Serial Number</u>	<u>Calibration</u> <u>Date</u>
452	PREAMP 12-18GHZ	ICC LN12-18	452	06/22/99
677	RECEIVER, 1-18 GHz	ELECTRO METRICS EMC 50	185	08/31/99
934	HORN ANTENNA (18-26.5GHZ)	EMCO 3160-09	9705-1079	08/13/97
	Notch Filter K&L	3TNF-1000/2000-N/N	144	CBU

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

ANNEX A - TEST DETAILS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****NAME OF TEST: RF Power Output****PARA. NO.: 2.1046**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement:Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

EQUIPMENT: **PCS Repeater***FCC ID:*PROJECT NO.: **9L0454RUS**

NAME OF TEST: Occupied Bandwidth**PARA. NO.: 2.1047**

Minimum Standard: Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:CDMA

Spectrum analyzer settings:

RBW: 30 kHz

VBW: $\geq$ RBW

Span: 5 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz

VBW: $\geq$ RBW

Span: 2 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz

VBW: $\geq$ RBW

Span: 1 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051**

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****NAME OF TEST: Field Strength of Spurious Radiation****PARA. NO.: 2.1053**

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Calculation Of Field Strength Limit

An example of attenuation requirement of $43 + 10 \log P$ is equivalent to -13 dBm (5×10^{-5} Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$$GP/4\pi R^2 = E^2/120\pi$$

For emissions ≤ 1 GHz:

$G = 1.64$ (Dipole Gain)

$P = 10^{-5}$ Watts (Maximum spurious output power)

$R = 3\text{m}$ (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V / m} = 84.4 \text{ dBmV / m}$$

For emissions > 1 GHz:

$G = 1$ (Isotropic Gain)

$P = 1 \times 10^{-5}$ Watts (Maximum spurious output power)

$R = 3\text{m}$ (Measurement Distance)

$$E = 84.4 - 20 \log \sqrt{1.64} = 82.3 \text{ dBmV / m@3m}$$

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS****NAME OF TEST: Frequency Stability****PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement:Frequency Stability With Voltage Variation

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

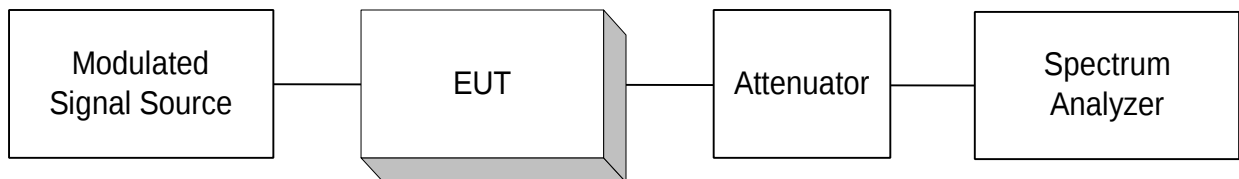
ANNEX B - TEST DIAGRAMS

EQUIPMENT: **PCS Repeater**

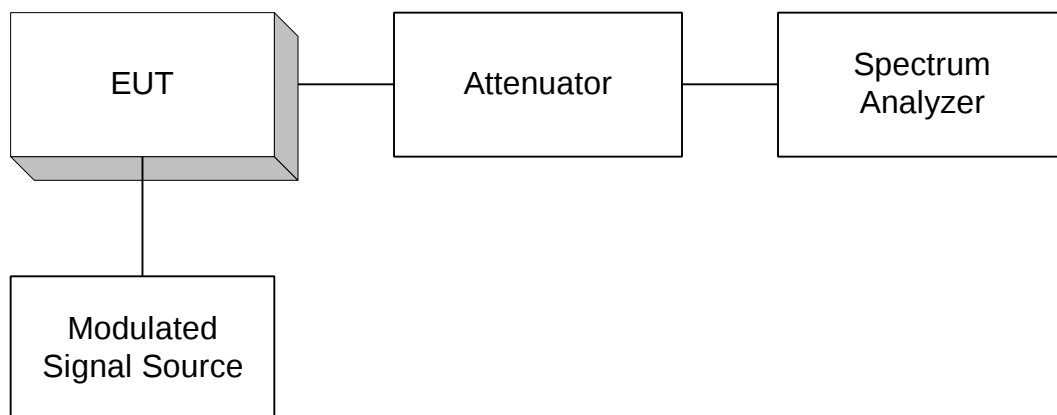
FCC ID:

PROJECT NO.: **9L0454RUS**

Para. No. 2.985 - R.F. Power Output



Para. No. 2.989 - Occupied Bandwidth

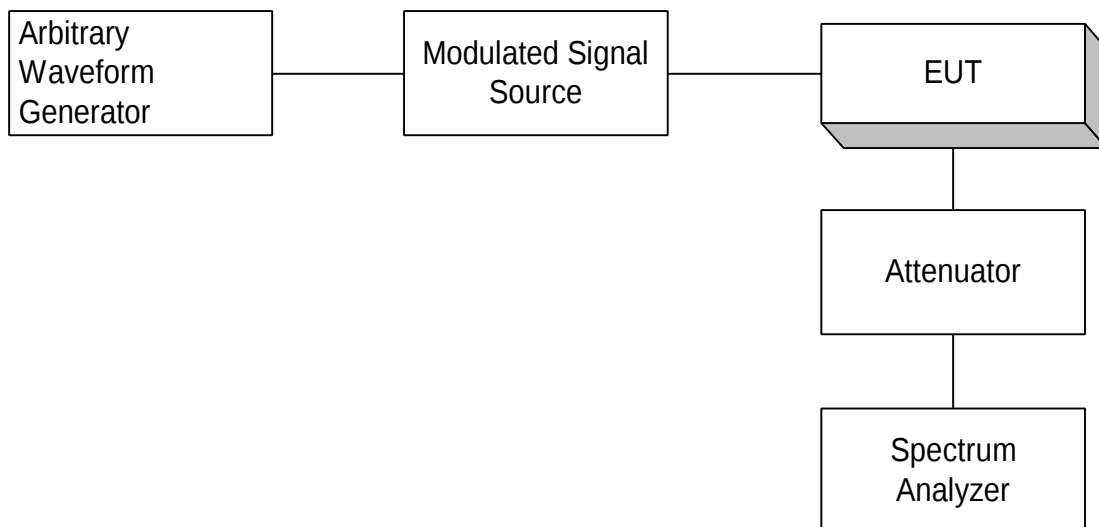
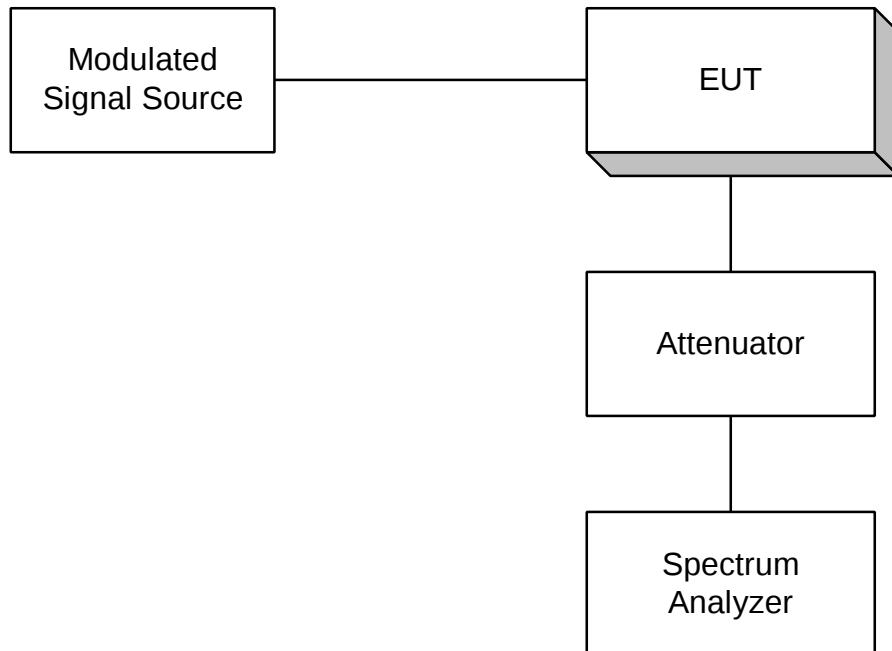


EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

Para. No. 2.991 Spurious Emissions at Antenna Terminals

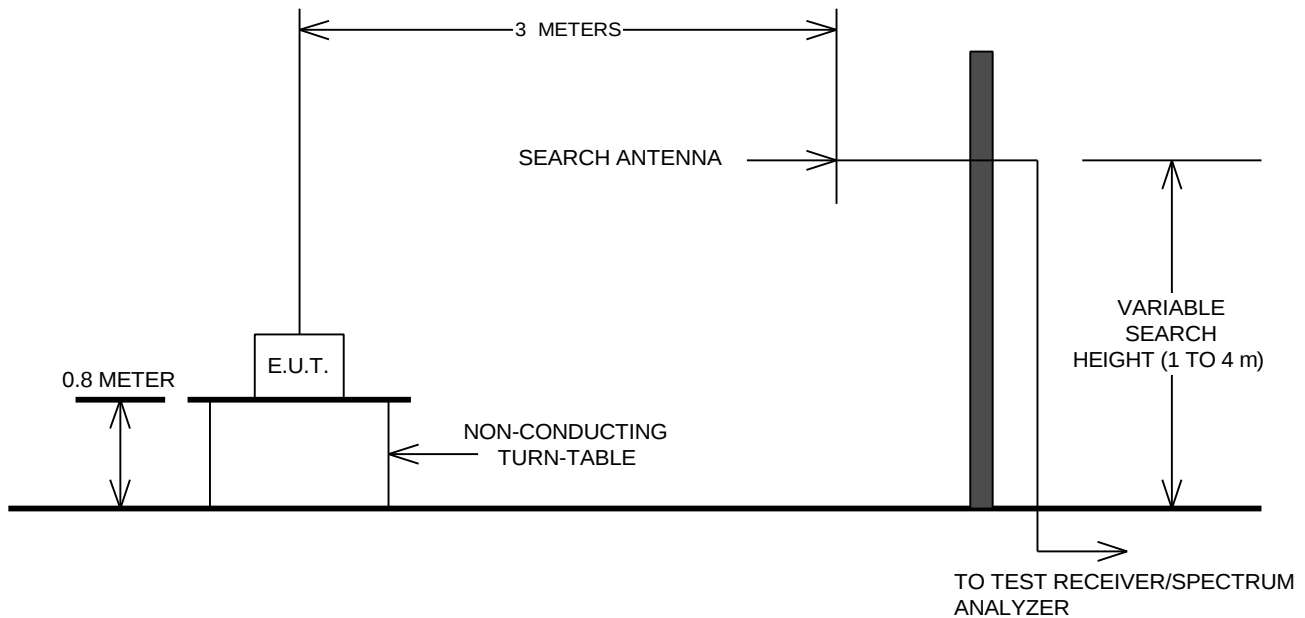


EQUIPMENT: **PCS Repeater**

FCC ID:

PROJECT NO.: **9L0454RUS**

Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

