EXHIBIT 2B

Test Report Provided by Sanmina-SCI

Applicant: Nortel Networks

For Original Equipment Certification on:

AB6NT800MFRM2

SANMINA-SCI

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FCC Part 22, Subpart H Compliance Test Report
Project Code PI80210

CDMA 800 MHz Multicarrier Flexible Radio Module 2 (MFRM 2)

Revision: 2.0

Date: December 10, 2002

Prepared for: Northern Telecom (Nortel Networks).

Authors: Adrian Wong
Glen Moore

Approved by: Glen Moore
EMC Manager

Document Revision Control

Release	Release Author	Reason for Change	Date of Issue
1.0	Adrian Wong	Original release	December 9, 2002
2.0	Adrian Wong	Edits based on Thomas Wong's input	December 10, 2002

Please Note that Revision bars are not used.

1 Introduction

This information is submitted in accordance with the FCC rules and regulations, Part 2, Subpart J, §2.1033 through §2.1057 and Industry Canada RSS 129 radio standard for Type Acceptance/Certification of the Northern Telecom's (Nortel Networks) CDMA 800 MHz Multicarrier Flexible Radio Module 2 (MFRM 2)

This 800 MHz MFRM 2 is intended for use in the Domestic Public Cellular Radio Telecommunications Service and is designed in accordance with the following standards:

- *CFR 47, Part 22, Subpart H, Domestic Public Cellular Radio Telecommunications Service*
- *TIA/EIA/IS-95-A, Mobile Station - Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System, May 1995*

Test Result Summary

Table 1 summarizes the measurement results for the CDMA 800 MHz MFRM for 1, 2 and 3 Carrier configurations.

Table 1: Test Results Summary

FCC Measurement Specification	FCC Limit Specification	Description	Result
2.1046	22.913	RF Output Power	Compliant
2.1047	22.901	Modulation Characteristics	Not Applicable
2.1049	22.917	Occupied Bandwidth	OBW = 1.263 MHz (1 Channel) OBW = 2.469 MHz (2 Channels) OBW = 3.679 MHz (3 Channels)
2.1051, 2.1057	22.917	Spurious Emissions at Antenna Terminals	Compliant
2.1053, 2.1057	22.917	Field Strength of Spurious Emissions	Compliant
2.1055		Frequency Stability	N/A

2 Engineering Declaration

The CDMA 800 MHz Multicarrier Flexible Radio Module 2 (MFRM 2) has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Parts 2 and 22 and Industry Canada Radio Standard Specification 129, issue 2, as directed by Nortel Networks.

To the best of my knowledge, these tests were performed in accordance with good engineering practices using measurement procedures consistent with industry or commission standards or previous Commission correspondence or guidance and demonstrate that this equipment complies with the appropriate standards. All tests were conducted on a representative sample of the equipment for which type acceptance/certification is sought based on information provided by Nortel Networks.

Tested By: *December 10, 2002*

Signature *Date*

Shankara Malwes
Sanmina-SCI
Calgary, Alberta

Reviewed By: *December 10, 2002*

Signature *Date*

Glen Moore, Technical Manager EMC/RF Services
Sanmina-SCI
Calgary, Alberta

3.0 EUT Description

3.1 Name of Applicant

The applicant is Northern Telecom (Nortel Networks) Limited.

3.2 Identification of Equipment

The equipment in this application for type acceptance is the Northern Telecom's (Nortel's) CDMA 800 MHz Multicarrier Flexible Radio Module 2 (MFRM 2). The 800 MHz MFRM 2 will be marketed under the model number NT800MFRM2. The FCC ID number sought is AB6NT800MFRM2.

3.3 Quantity Production

The 800 MHz MFRM 2 will be produced in quantity.

3.4 Technical Description

See Exhibits.

3.5 Types of Emissions

The 800 MHz MFRM 2 Assembly is designed to operate in digital mode. The emission type is F9W for CDMA mode. The emission designator is 1M25F9W(1 Channel), 2M50F9W (2 Channel and 3M73F9W (3 Channel). Testing was conducted in single channel mode, two channel and 3 channel mode to determine compliance. The emission designators were based on requirements of FCC Rule Part 2, Subpart C – Emission, Section 2.201 and Section 2.202.

For Single Carrier mode:

1M25F9W – 1.25 MHz nominal bandwidth.

For Two Carrier mode:

2M50F9W – 2.50 MHz nominal bandwidth.

For Three Carrier mode:

3M73F9W – 3.75 MHz nominal bandwidth.

3.6 EUT Frequency Range

The 800 MHz MFRM 2 operates in the 800 MHz cellular band where the operating frequency ranges are 824 – 849 MHz for the Receiver and 869 – 894 MHz for the Transmitter.

3.7 EUT Range of Operating Power

The 800 MHz MFRM 2 range of operating is 0 dBm to 47.3 dBm .

3.8 EUT Maximum Power Rating

The maximum RF power output of the EUT is 47.3 dBm.

3.9 EUT Identification List

The following table shows the identification of the components tested during conducted measurements in this report

Equipment Description	Model /Part Number	Release Number	Serial Number
Radio Module	NTGY30AA	R2	NNTM533GRKRU
DPM (duplexer Module)	NTGS89DB	14	ALLG740000PQ
FAM (fan module, upper level)	NTGY60AH	N1	NNTM533GR62P
FAM (fan module, tray only)	NTGY60AA	02	SNMN5300RDME
DC Power Cable	NTGS8082	03	N/A
Fiber Cable	NTGY5520	01	N/A
DPM Power/Data cable	NTGS8028	02	N/A
DPM to RX0 Cable	NTGS8016	03	N/A
DPM to RX1 Cable	NTGS8016	03	N/A
TX to DPM Cable	NTGS8013	03	N/A
Main ANT Cable	NTLM00CY	N/A	N/A
Div Ant	A0743835	N/A	N/A

The following table documents the EUT components tested during Radiated Spurious measurements

Module Description		Quantity	PEC Code	Serial Number	Verified
MFRM modules	MTRM	6			☐
MFRM 1	-48V		NTGY30AA R4	NNTM535XDDGG	☐
MFRM 2	-48V		NTGY30AA R3	NNTM533GRKTV	☐
MFRM 3	-48V		NTGY30AA R2	NNTM535XCH58	☐
MFRM 4	-48V		NTGY30AA R2	NNTM533GRLAD	☐
MFRM 5	-48V		NTGY30AA R4	NNTM533GRJEF	☐
MFRM 6	-48V		NTGY30AA R2	NNTM533GRLUX	☐
DPM modules	DPM	6			☐
DPM 1			NTGS89DB 14	ALLG740000Q3	☐
DPM 2			NTGS89DB 14	ALLG740000OX	☐
DPM 3			NTGS89DB 14	ALLG740000PQ	☐
DPM 4			NTGS89DB 14	ALLG740000QP	☐
DPM 5			NTGS89DB 14	ALLG740000PH	☐
DPM 6			NTGS89DB 14	ALLG740000PO	☐
Fan Assembly Modules	FAM	6			☐
FAM 1			NTGY60AD 01	NNTM536KCE4T	☐
FAM 2			NTGY60AD 01	NNTM536KCE7W	☐
FAM 3			NTGY60AD 01	NNTM536KCE8X	☐
FAM 4			NTGY60AD 01	NNTM536KCE3R	☐
FAM 5			NTGS5650 05	NNTM535TRHKY	☐
FAM 6			NTGY60AD 01	NNTM536KCE2	☐
Radio Rack					☐

EUT Module List

Support Equipment used during Radiated Emissions testing

Module Description		Quantity	PEC Code	Serial Number	Verified
GPST M Slot 2 Bottom Shelf	GPS	1	NTGS50AA 18	NNTM74TM2V34	☐
Control Module Slot 4	CM	2	NTGS40AA EX	NNTM5385J0PR	☐
Control Module Slot 5			NTGS40AA EX	NNTM5385J0LN	☐
CORE Slot 6			NTGS30AA AU	NNTM5385HMJ8	☐
CORE Slot 7			NTGS40AA 40	NNTM5385G8LV	☐
Channel Element Module (Upper Shelf)	CEM	6			☐
CEM Slot 1			NTGS63BA 17	NNTM5385CWYQ	☐
CEM Slot 2			NTGS63BA 17	NNTM5385D99F	☐
CEM Slot 3			NTGS63BA 17	NNTM5385D8X3	☐
CEM Slot 4			NTGS63BA 17	NNTM5385CWVM	☐
CEM Slot 5			NTGS63BA 17	NNTM5385D9CJ	☐
CEM Slot 6			NTGS63BA 17	NNTM5385D94A	☐
Shelf			NTGS20AA 12	SNMN5300NY6C	☐

The customer provided the following list of cables and only checked ones were verified by Sanmina-SCI.

Equipment Description	Quantity	PEC Code	Test Setup Used In	Cable Length	Verified
Ground cables	2	N/A	All	1m	☐
System DC power cables	6	Supplied by Lab	All	N/A	☒
Cable from Hubble to LISNs	8	Supplied by Lab	All	1m	☒
MFRM DC power cables	6	NTGS8082	All	7m	☐
Ethernet cable (PC) (rolled)	1	N/A	All	N/A	☐
Tx Out and DPM In	6	NTGS 8013 R7	All	N/A	☐
Rx 1	6	NTGS8016 R7	All	N/A	☐
Rx 2	6	NTGS 8016 R7	All	N/A	☐
DPM Power	6	NTGS8028 R9	All	N/A	☐
Power	6	NTGS8082 r7	All	N/A	☐
RF TX	6	NTGMI00CY RF	All	8m	☐
Fiber Cable	3	NTGS0122	All	15m	☐
RF load cables	6	N/A	All	N/A	☐
Customer Alarm Cables	2	NTGS3518	All	10m	☐

3.10 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Due Date
9 kHz to 40 GHz, Spectrum Analyzer	Rohde & Schwarz	FSEK	DE22471	Mar 12/03
RF Power Meter	Agilent	E4418B	GB402207578	Apr 08/03
Power meter power sensor	HP	8482B	3318A05678	Apr 25/03
Power meter attenuator	HP	8482B	3318A05678	Apr 25/03
Power Splitter	Weinschel	1506A	LH198	
RF Cable	Sucoflex	N/A	9354	Verified before use
RF Cable	Sucoflex	N/A	9355	Verified before use
RF Cable	Sucoflex	N/A	115764	Verified before use
Horn Antenna 1 GHz – 10 Ghz (Rx)	EMCO	3115	40500089	Oct 24/03
Horn Antenna 1 GHZ – 5.95 GHz (Tx)	EMCO	3115	40500090	Jun 21/03
HPIB Extender	HP	HP37204	40500195	N/A

Description	Manufacturer	Model	Serial Number	Cal. Due Date
Standard Gain Horn 5.95 GHz – 8.2 GHz	EMCO	3160-06	40500176	N/A
Standard Gain Horn 8.2 GHz – 10 GHz	EMCO	3160-07	40500177	N/A
High pass filter	K&L	11SH10-3860	1/19900-010	N/A
Step Attenuator/Switch	HP	HP11713A	40500014/-40500276	N/A
DC Power Supply for LNA	Xantrex	LXO 30-2	40500211	N/A
Miteq LNA	Miteq	JSD000121	830620 in box	Apr 24/03
HPIB Extender	HP	HP37204	40500193	N/A
Win 2000 PC with FSEK Manual control software loaded	N/A	N/A	N/A	N/A
Signal Generator 10 MHz – 40 GHz	Rohde & Schwarz	SMP04	40500125	Mar 27/03
Cable from Antenna to LNA	Sucoflex	101PEA	1713/1PEA	Apr 18/03
Mast Controller	EMCO	2090	40500184	N/A
Multi Devis Controller TT1 (Turntable)	EMCO	2090	40500197	N/A
Horn Antenna (Tx) 1 GHz – 18 GHz	EMCO	3115	40500088	N/A
Cable from Rx antenna to 3M center bulk head in 10M chamber	Sucoflex	104	116558/4	Apr 18/03
Cable from 3M center bulk head to Control room	Sucoflex	104	40500627	Apr 18/03
Cable from Control room bulk head TO Signal Generator	Sucoflex	104	40500626	Apr 18/03

Calibration record for Antenna Conducted Measurements

Frequency	Loss (dB)
10kHz	35.1
50MHz	35.6
800MHz	36.5
1GHz	36.6
2GHz	37.1
3GHz	37.5
4GHz	37.7
5GHz	38.6
6GHz	38.2
7GHz	38.5
8GHz	38.5
9GHz	39.0
10GHz	39.1

4 Transmitter Test and Measurement Results

4.1 RF Power Output

4.1.1 RF Power Output Requirements

FCC Part 2.1046 - Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune -up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

FCC Limit (Part 22.913)
(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular transmitters must not exceed 500 Watts.

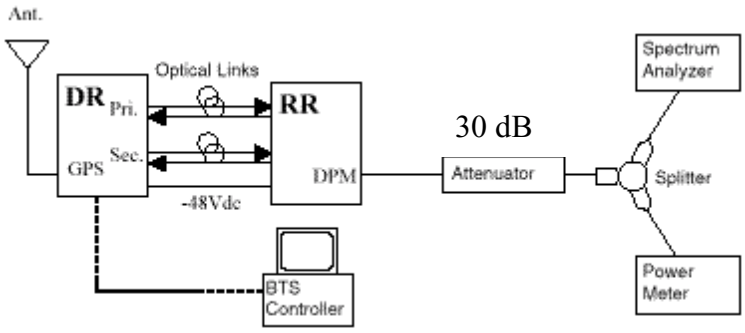
4.1.2 Test Method

The EUT was setup to transmit at maximum power. Measurements were made on channels at the bottom, middle and top of the licensed bands. The RF output power was measured using the power meter.

4.1.3 Test Setup

The set-up used for the EUT output power test is illustrated in Figure 1.

Figure 1: Test Setup for RF Power Output Measurement



4.1.4 Test Result

The 800 MHz MFRM 2 complies with the requirement. The maximum measured RF output power from the MFRM 2 was 47.4 dBm. The RF power output measured on different channels is shown in Tables 2(A), 2(B) and 2(C) for the 1,2 and 3-Carrier case.

Table 2(A): RF Output Power of 800 MHz MFRM 2 in (1) Carrier Mode

Center Channel (Band)	Frequency (MHz)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
4 (A)	870.12	47.0	47.3	50
296 (A)	878.88	47.3	47.3	50
371 (B)	881.13	47.3	47.3	50
630 (B)	888.9	47.3	47.3	50
754 (B')	892.62	47.2	47.3	50
763 (B')	892.89	47.3	47.3	50

Table 2(B): RF Output Power of 800 MHz MFRM 2 in (2) Carrier Mode

Center Channel (Band)	Frequency (MHz)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
4, 45 (A)	870.12, 871.35	47.2	47.3	50

Note: As measurements were done on all channels used for 2 carrier configuration in 3 carrier and single carrier mode, power measurement data was reported on one 2 carrier configuration only.

Table 2(C): RF Output Power of 800 MHz MFRM 2 MFRM in (3) Carrier Mode

Center Channel (Band)	Frequency (MHz)	Measured Maximum RF Output Power (dBm)	Average Maximum Rated Power (dBm)	FCC Limit (dBm)
4, 45, 86 (A)	870.12, 871.35, 872.58	47.4	47.3	50
201, 242,283 (A)	876.42, 877.26, 878.88	47.3	47.3	50
384, 425, 466 (B)	881.13, 882.75, 883.59	47.3	47.3	50
589, 548, 630 (B)	886.44, 887.67, 888.9	47.2	47.3	50

4.2 Occupied Bandwidth (Digital)

4.2.1 Occupied Bandwidth Requirements

FCC Part 2.1049 - Measurements Required: Occupied Bandwidth
The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(g) Transmitter in which the modulating baseband comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

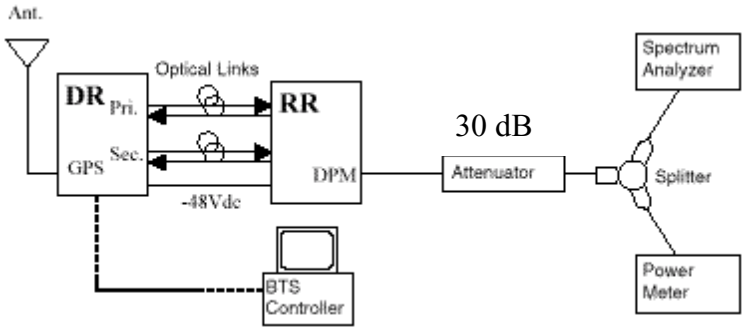
4.2.2 Test Method

The EUT was setup to transmit at maximum power. Measurements were made on channels at the bottom, middle and top of the licensed bands. The occupied bandwidth was measured using the 99% channel power feature of the spectrum analyzer. The measurement was conducted in single carrier, 2-Carrier and 3 Carrier configuration.

4.2.3 Test Setup

The set-up used for the EUT Occupied bandwidth test is illustrated in Figure 2.

Figure 2: Test Setup for Occupied Bandwidth Measurement



4.2.4 Test Results

The maximum measured OBW from the Base Station was 1.263 MHz for single carrier mode, 2.467 MHz for 2 carrier mode and 3.694 MHz in 3 carrier mode. The Base Station complies with the requirement. Tables 3(A,B & C) show the measured occupied bandwidth at the different channels. Figures 3, 4 and 5 are sample plots for 1, 2 and 3-carrier configuration. Note only one 2 carrier configuration was tested as all other occupied BW measurements were consistent, and had no noticeable variation.

Table 3(A): Occupied Bandwidth of 800 MHz MFRM 2 (1 Carrier)

Center Channel (Band)	Frequency (MHz)	Measured Occupied Bandwidth (MHz)
4 (A)	870.12	1.263
296 (A)	878.88	1.263
371 (B)	881.13	1.263
630 (B)	888.9	1.263
754 (B')	892.62	1.263
763 (B')	892.89	1.242

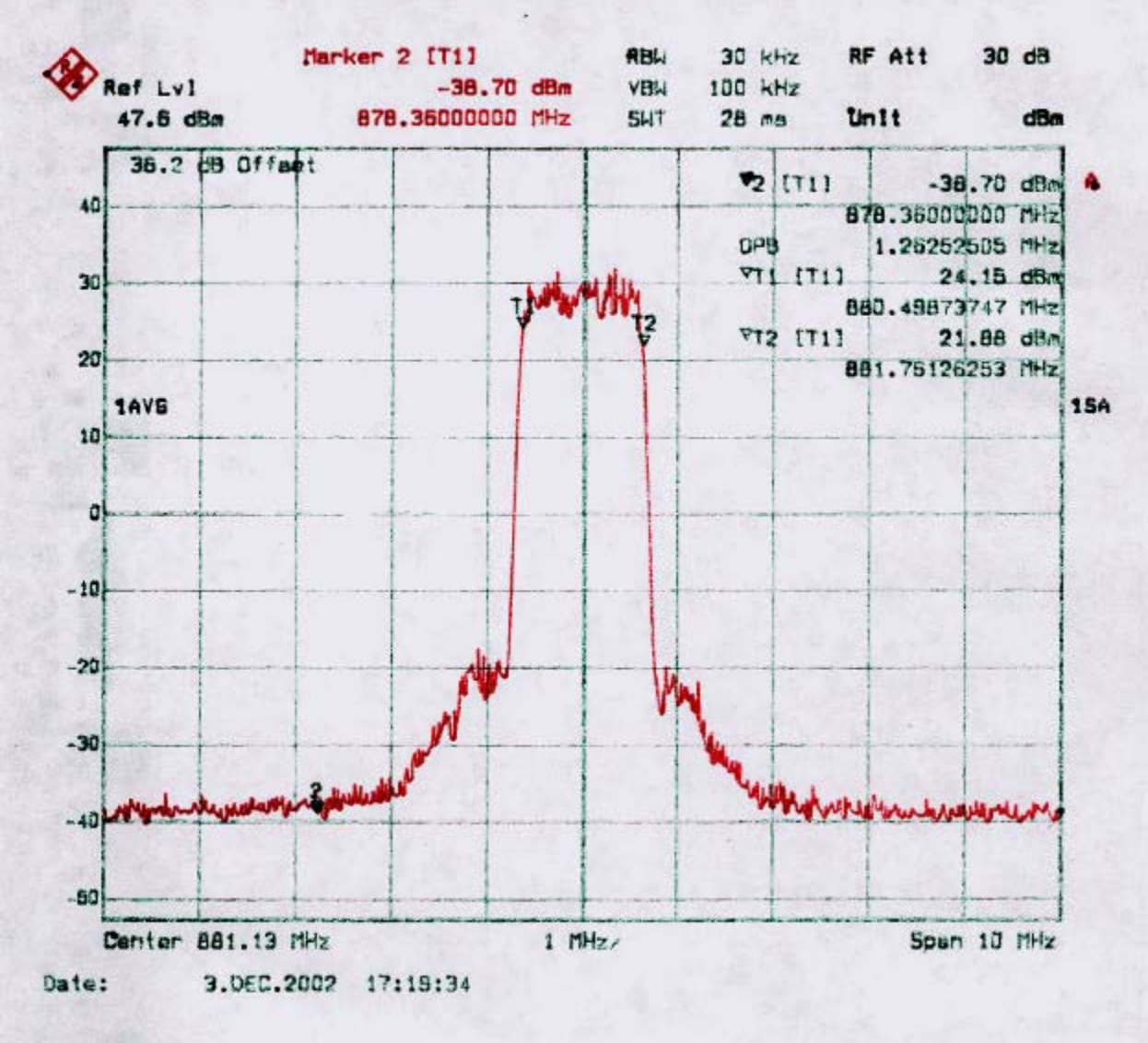
Table 3(B) Occupied Bandwidth of 800 MHz MFRM 2 (2 Carrier)

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (MHz)
4, 45 (A)	870.12, 871,35	2.467

Table 3(C): Occupied Bandwidth of 800 MHz MFRM 2 (3 Carrier Band)

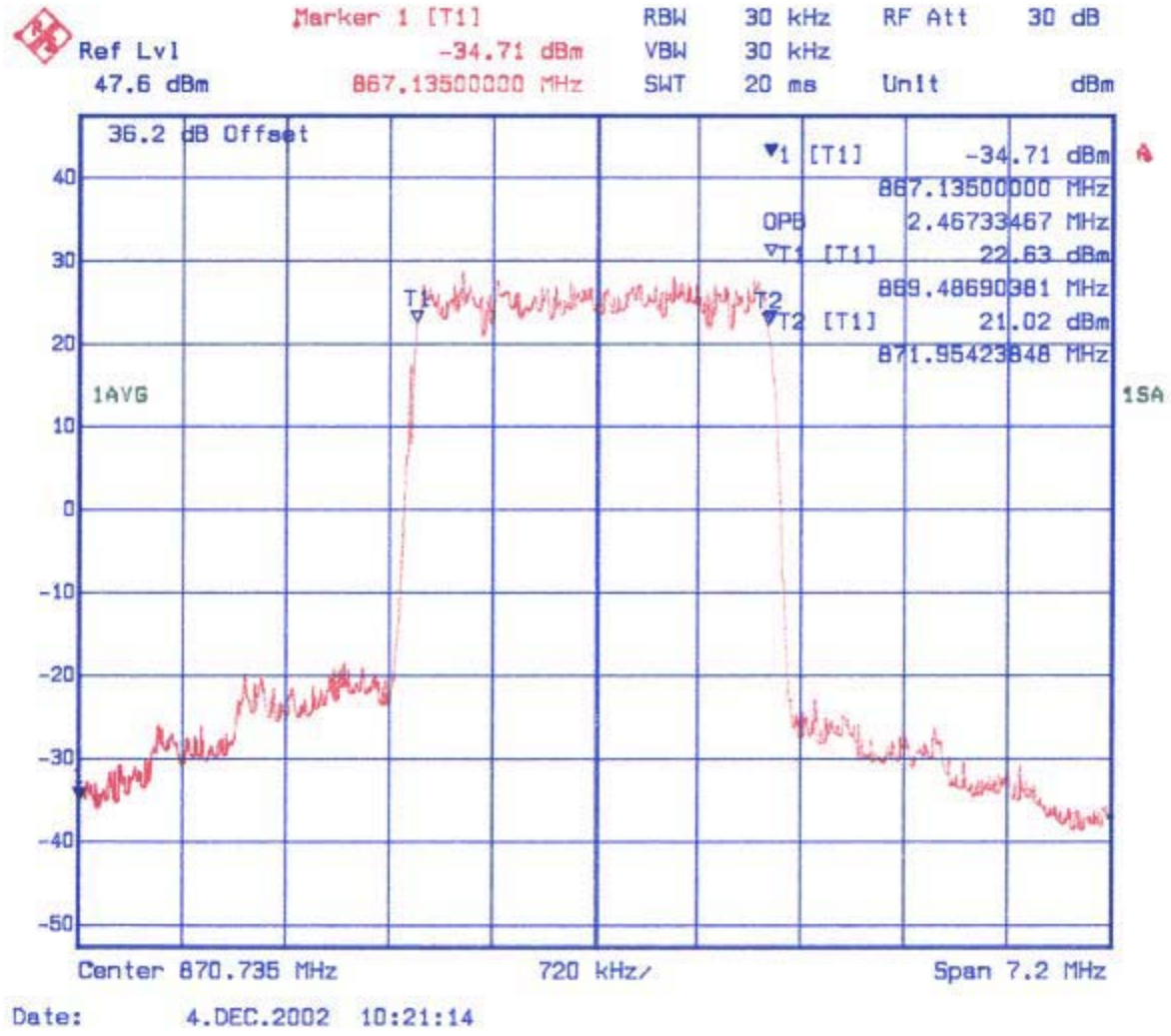
Center Channel (Band)	Frequency (MHz)	Measured Occupied Bandwidth (MHz)
4, 45, 86 (A)	870.12, 871.35, 872.58	3.679
201, 242, 283 (A)	876.42, 877.26, 878.88	3.679
384, 425, 466 (B)	881.13, 882.75, 883.59	3.665
589, 548, 630 (B)	886.44, 887.67, 888.9	3.694

Figure 3: Plot of Occupied Bandwidth: 1 Carrier (Channel 371 (B))



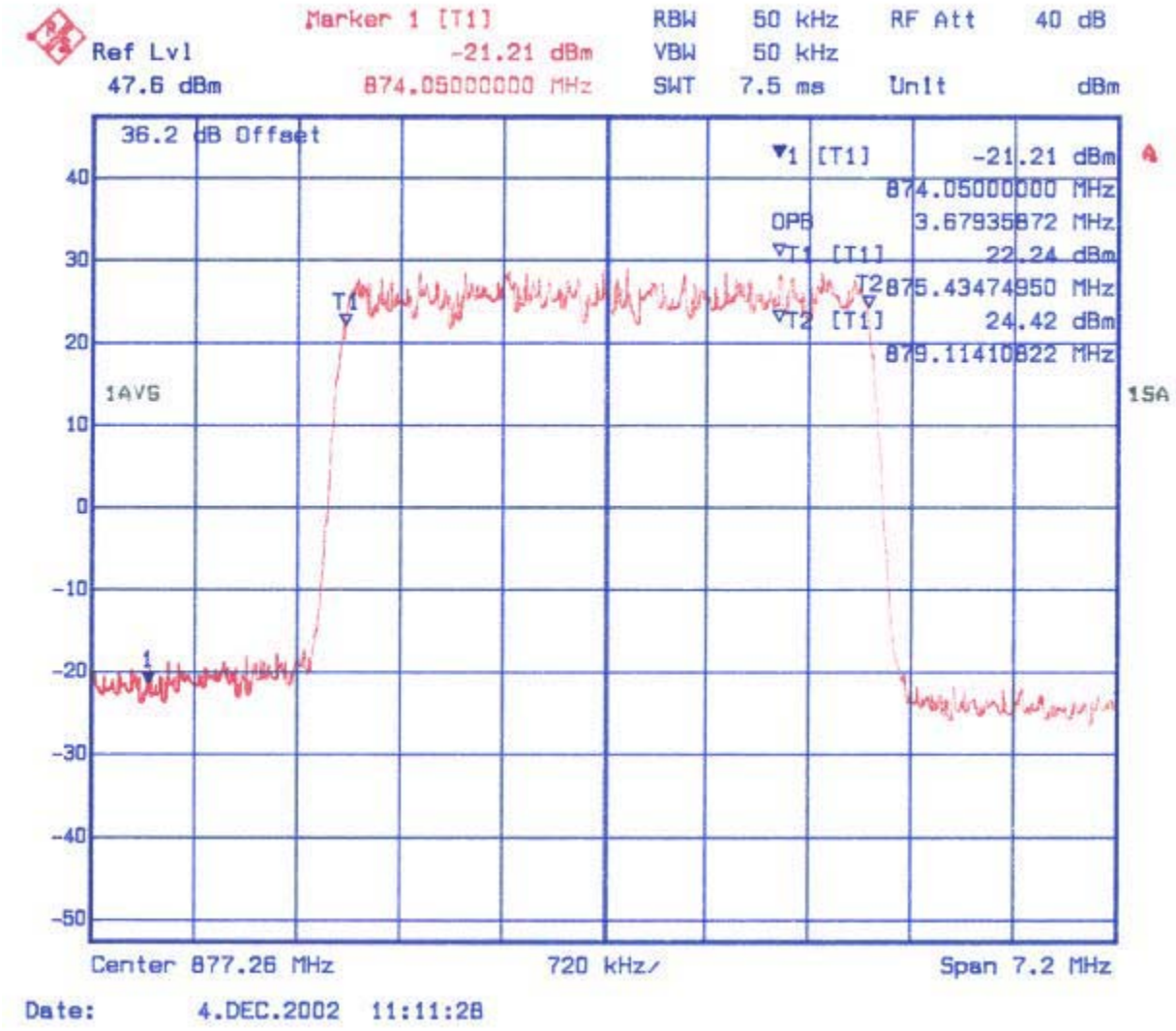
1 Carrier OBW
Channel 371 (B)
Fundamental Frequency 881.13 MHz
OBW 1.263 MHz
Output Power as measured with Power meter: 47.3 dBm

Figure 4: Plot of Occupied Bandwidth: 2 Carrier (Channels 4, 45(A))



2 Carrier OBW
Channel 4, 45(A)
Fundamental Frequency 870.12, 871.35 MHz
OBW 2.467 MHz
Output Power as measured with Power meter: 47.2 dBm

Figure 5: Plot of Occupied Bandwidth: 3 Carrier (Channels 201, 242, and 283(A))



3 Carrier OBW
Channels 201, 242, and 283(A)
Fundamental Frequency 876.42, 877.26, 878.88 MHz
OBW 3.679 MHz
Output Power as measured with Power meter: 47.3 dBm

4.3 Spurious Emissions at Antenna Terminals (Digital Mode)

Industry Canada Requirements

Transmitter Tests (Requirements)
Test results are to be presented in graphical form wherever possible. The graph shall also include the specification limits. If the RF output power is internally adjustable or remotely controllable, set or control it to the maximum rated power of the range for which equipment certification is sought.

Unwanted Emission from Base Stations (Requirements)
The spectrum of the transmitter shall be determined with a spectrum analyser of resolution bandwidths given in Table 8.1, in the average power mode. Sweep the spectrum analyser over a frequency range from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency) up to the 5th harmonic of the highest frequency generated or used.

Minimum Standard (Base Station)

(1) Suppression inside cellular band: For all base station transmit frequencies allocated to the same operator system, the total spurious emissions in any 30 kHz band shall be attenuated below the mean output power level in accordance with the following schedule:

*(a) for all offset frequencies greater than **750 kHz** from the CDMA centre frequency, at least 45 dB.*
*(b) for all offset frequencies greater than **1.98 MHz** from the CDMA centre frequency, at least 60 dB.*
(c) for all offset frequencies not allocated to the same operator system, at least 60 dB or -13 dBm, whichever is less stringent.

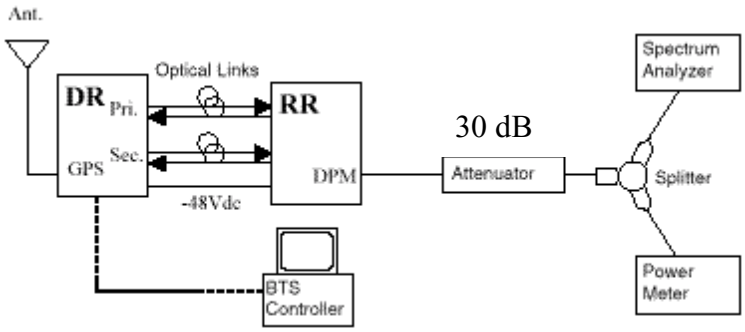
4.3.1 Test Method

The EUT was setup to transmit at maximum power. Measurements were made on channels at the bottom, middle and top of the licensed bands. The channel bandwidth power (integrated power measurement function) was used in a 30 kHz BW at 750 Khz offset and 1.98 Mhz offset from the center frequency of the fundamental. The measurement was conducted in single carrier, 3 Carrier configuration. For Out of band emissions see section 4.3.6 of the test report

4.3.2 Test Setup

The set-up used for the test is illustrated in Figure 2.

Figure 5.1: Test Setup for Antenna Conducted Spurious Measurement



4.3.3 Test Results

The worst case integrated power in a 30KHz band was –13.94 dBm in Single Carrier mode at a 750 KHz offset, and –26.95 dBm at 1.98 MHz in 3 Carrier mode.

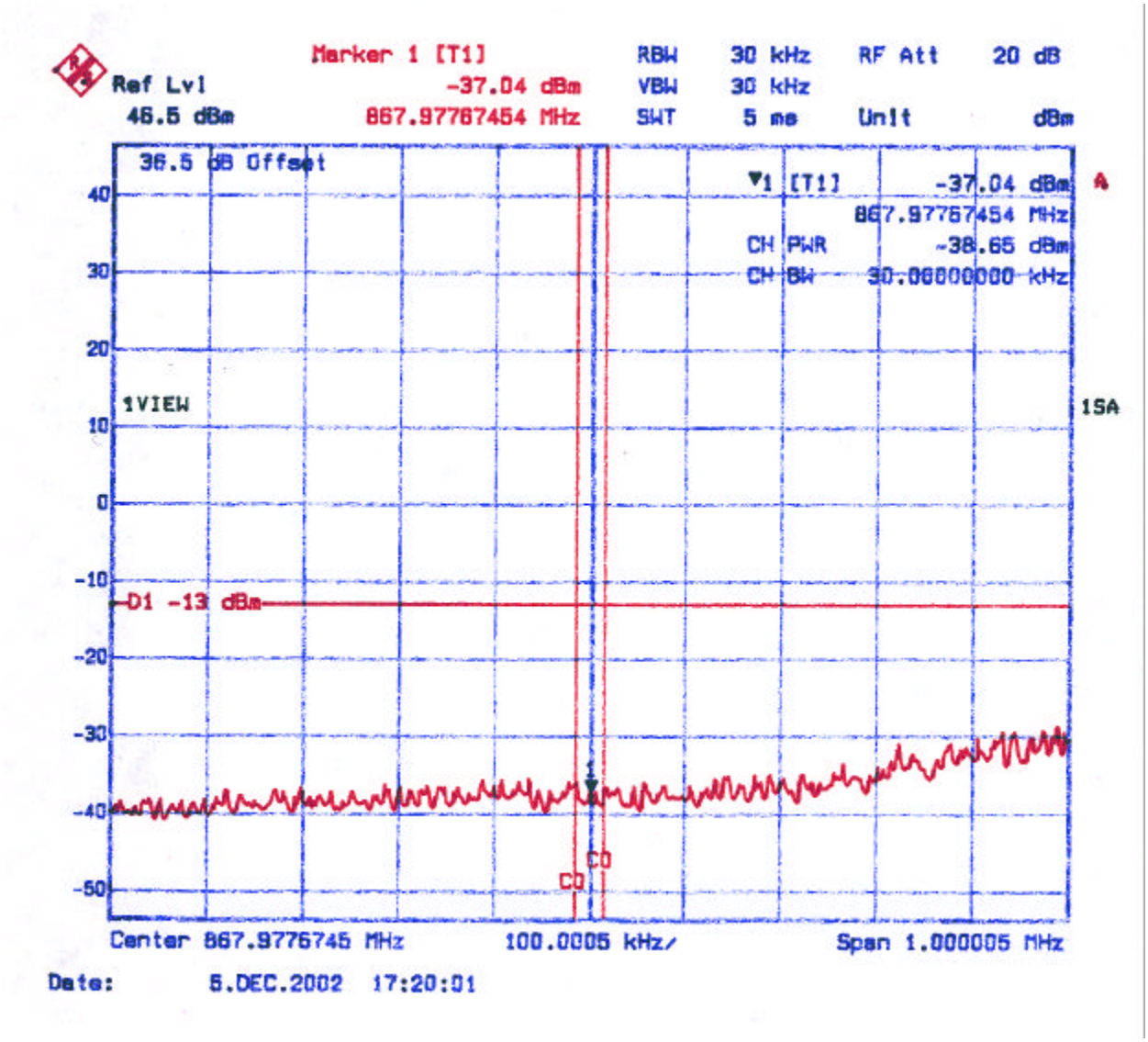
Table 4(A): Band Edge Spurious Emissions (1-Carrier)

Frequency (MHz)	Spurious Emissions Level (dBm)	Carrier Reference Power Level (dBm)	IC Limit (dBc)	Pass Margin (dB)
Single Carrier , Channel 4, 1.98 MHz offset at lower band edge (integrated power in 30 kHz BW)	-38.7	47.1	60	25.8
Single Carrier , Channel 4, 750 KHz offset at lower band edge (integrated power in 30 kHz BW)	-13.94	47.1	45	16.0
Single Carrier , Channel 4, 1.98 MHz offset at upper bandedge (integrated power in 30 kHz BW)	-41.2	47.1	60	28.3
Single Carrier , Channel 4, 750 KHz offset at upper bandedge (integrated power in 30 kHz BW)	-13.97	47.1	45	16.1

Table 4(B): Band Edge Spurious Emissions (3-Carrier)

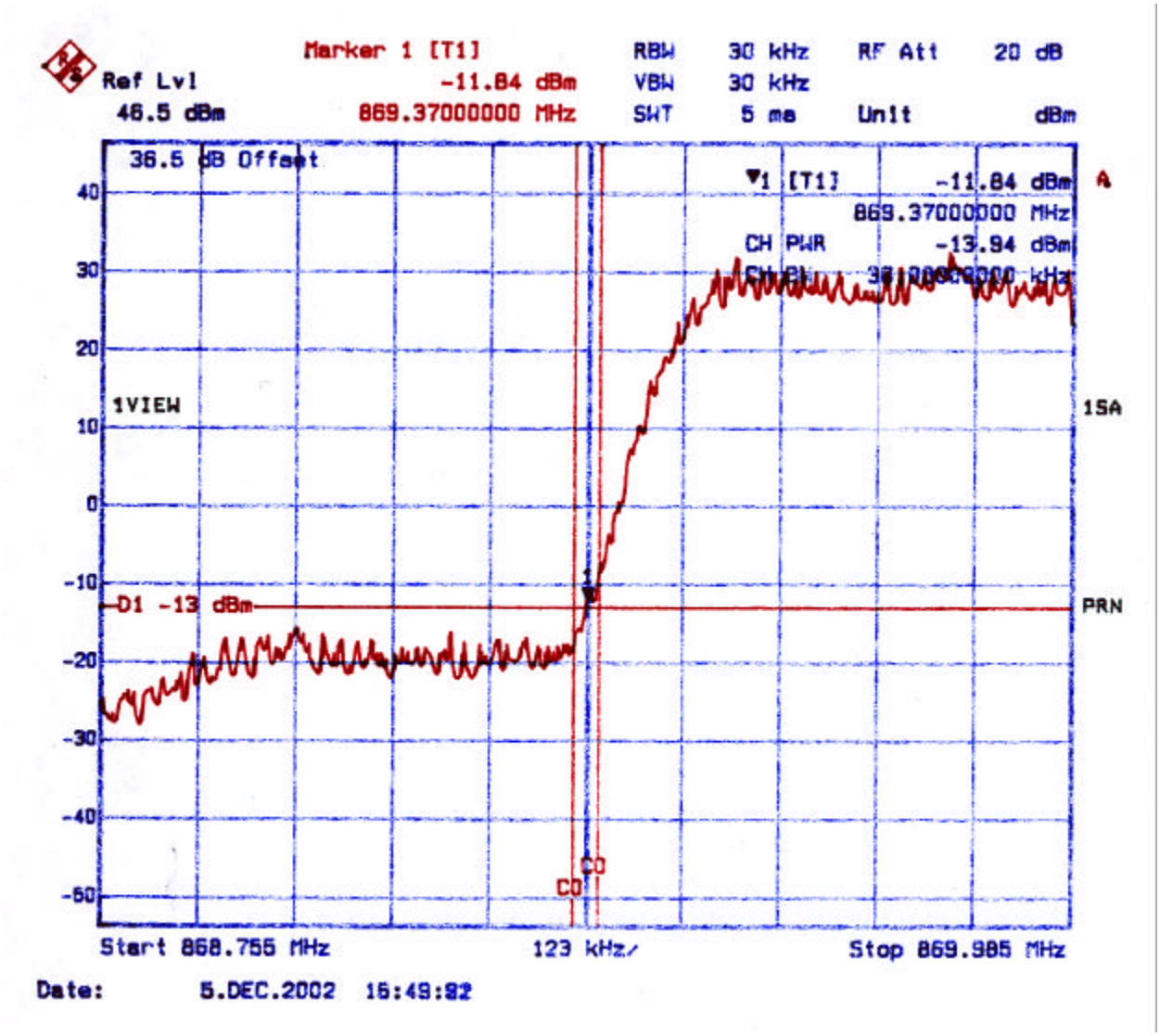
Frequency (MHz)	Spurious Emissions Level (dBm)	Carier Reference Power Level (dBm)	IC Limit (dBc)	Pass Margin (dB)
Three Carrier , Channels 589, 548, 630, 1.98 MHz offset at lower band edge (integrated power in 30 kHz BW)	-26.95	47.1	60	14.1
Three Carrier , Channels 589, 548, 630, 750 KHz offset at lower band edge (integrated power in 30 kHz BW)	-18.45	47.1	45	20.55
Three Carrier , Channels 589, 548, 630, 1.98 MHz offset at upper bandedge (integrated power in 30 kHz BW)	-37.61	47.1	60	24.71
Three Carrier , Channels 589, 548, 630, 750 KHz offset at upper bandedge (integrated power in 30 kHz BW)	-15.66	47.1	45	17.8

Figure 6: 1 carrier lower 1.98 MHz offset



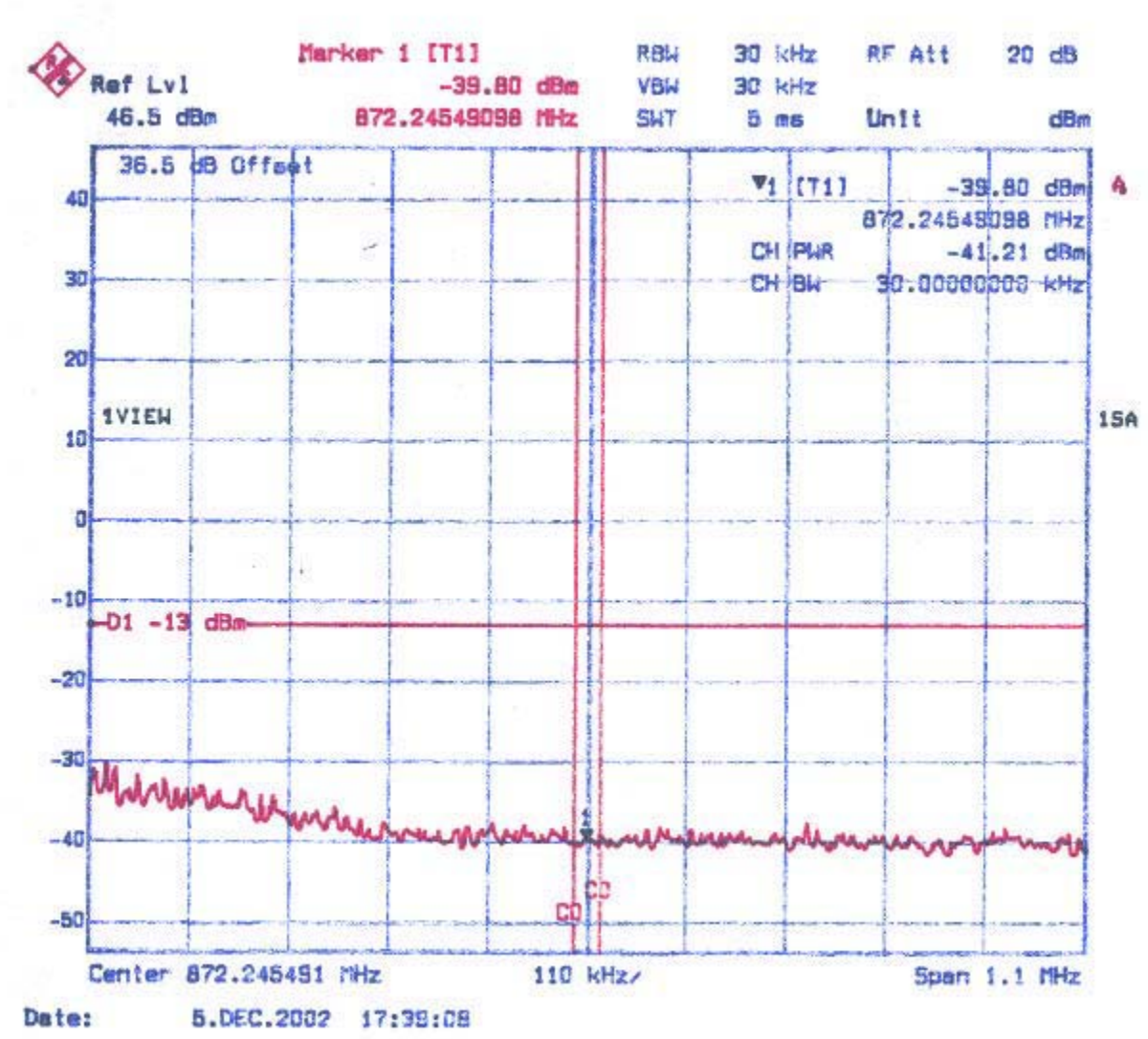
1 Carrier Mode
Channel Number 4
Band: A
Fundamental Frequency: 872.1 MHz
Output power as measured with Power meter: 47.12 dBm
Lower 1.98 MHz offset
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 7: 1 carrier lower 750 kHz offset



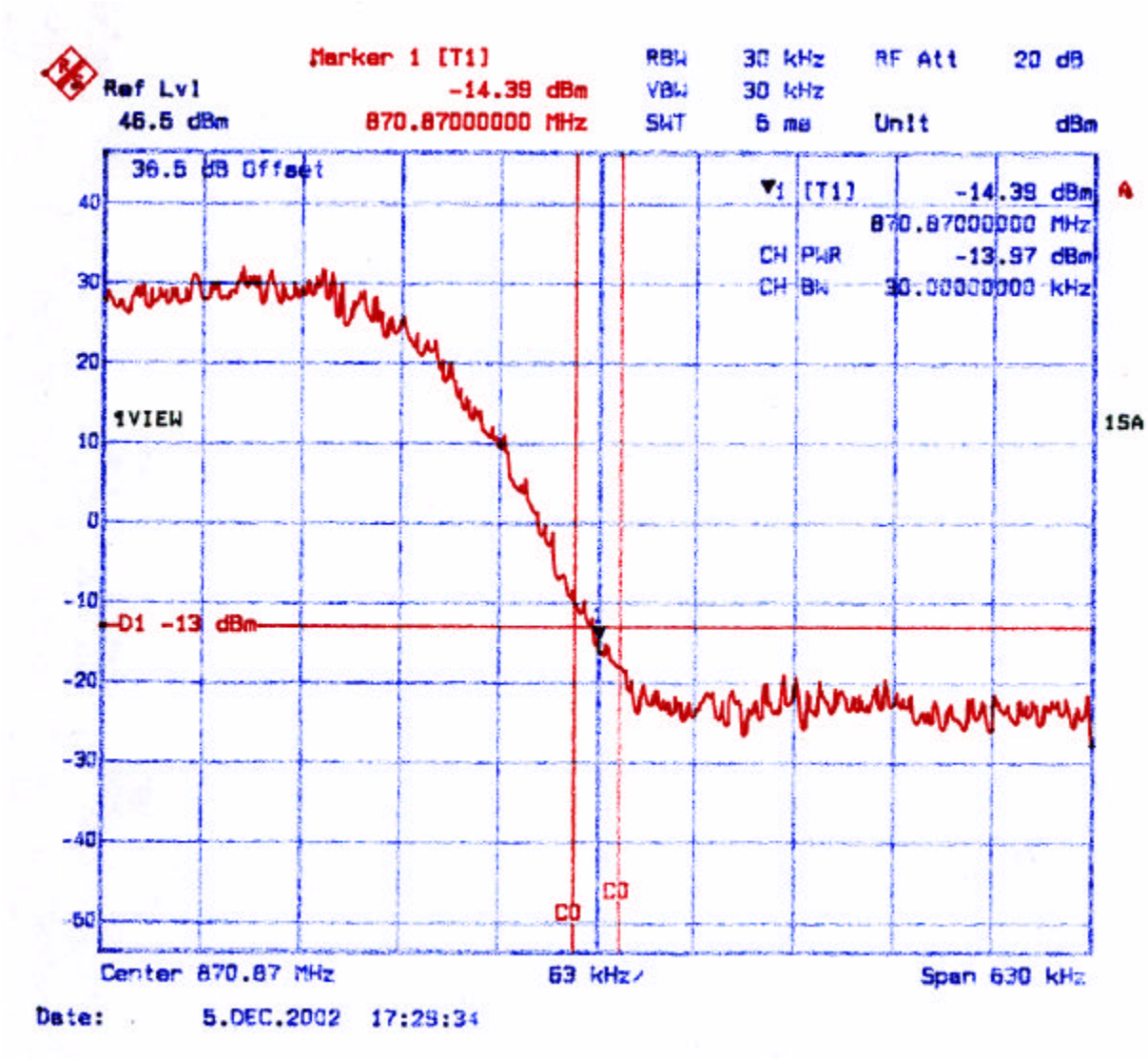
1 Carrier Mode
Channel Number 4
Band: A
Fundamental Frequency: 870.87 MHz
Output power as measured with Power meter: 47.06 dBm
Lower 750 kHz offset
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 8: 1 carrier upper 1.98 MHz offset



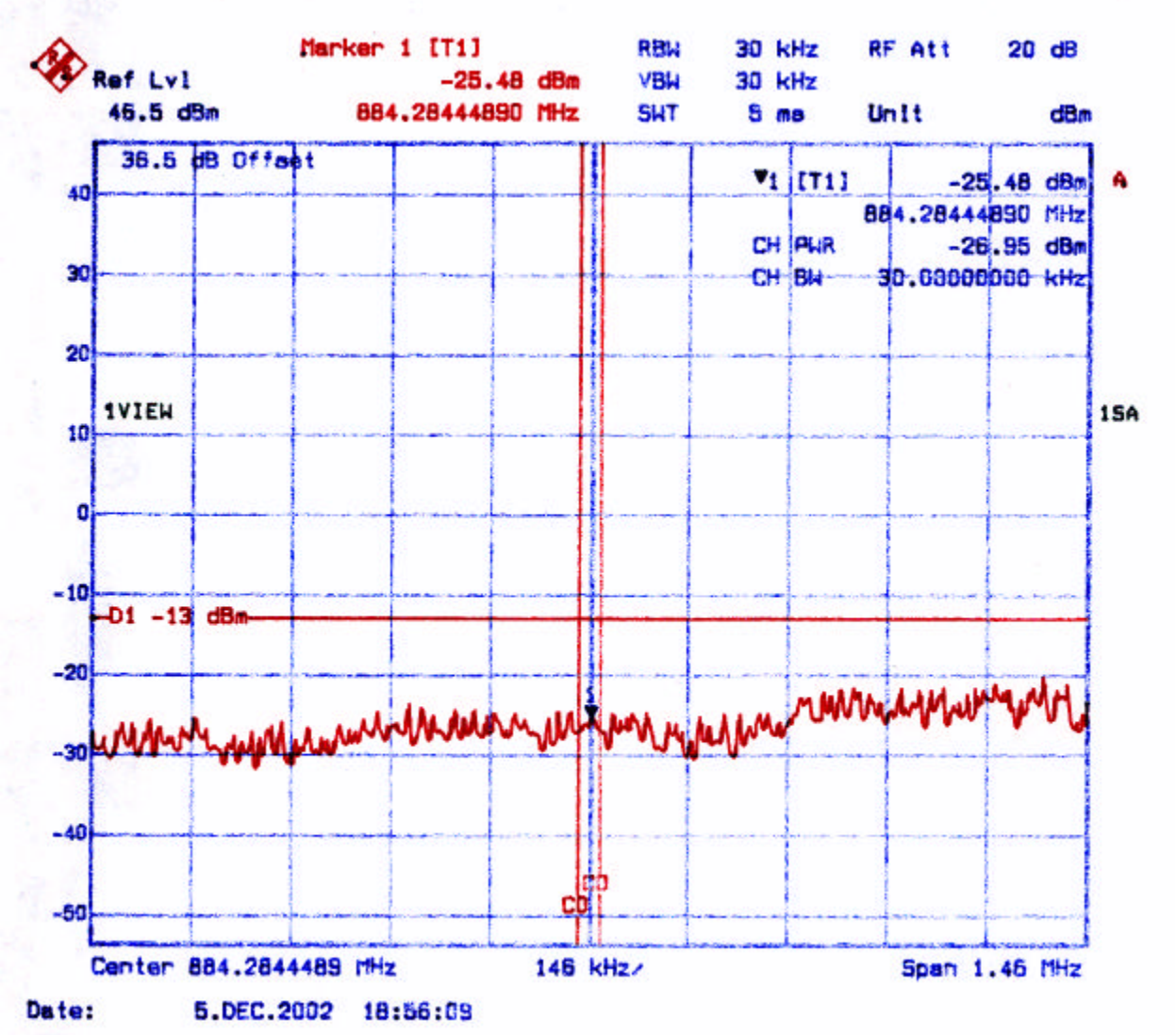
1 Carrier Mode
Channel Number 4
Band: A
Fundamental Frequency: 870.245 MHz
Output power as measured with Power meter: 47.12 dBm
Upper 1.98 MHz offset

Figure 9: 1 carrier upper 750 kHz offset



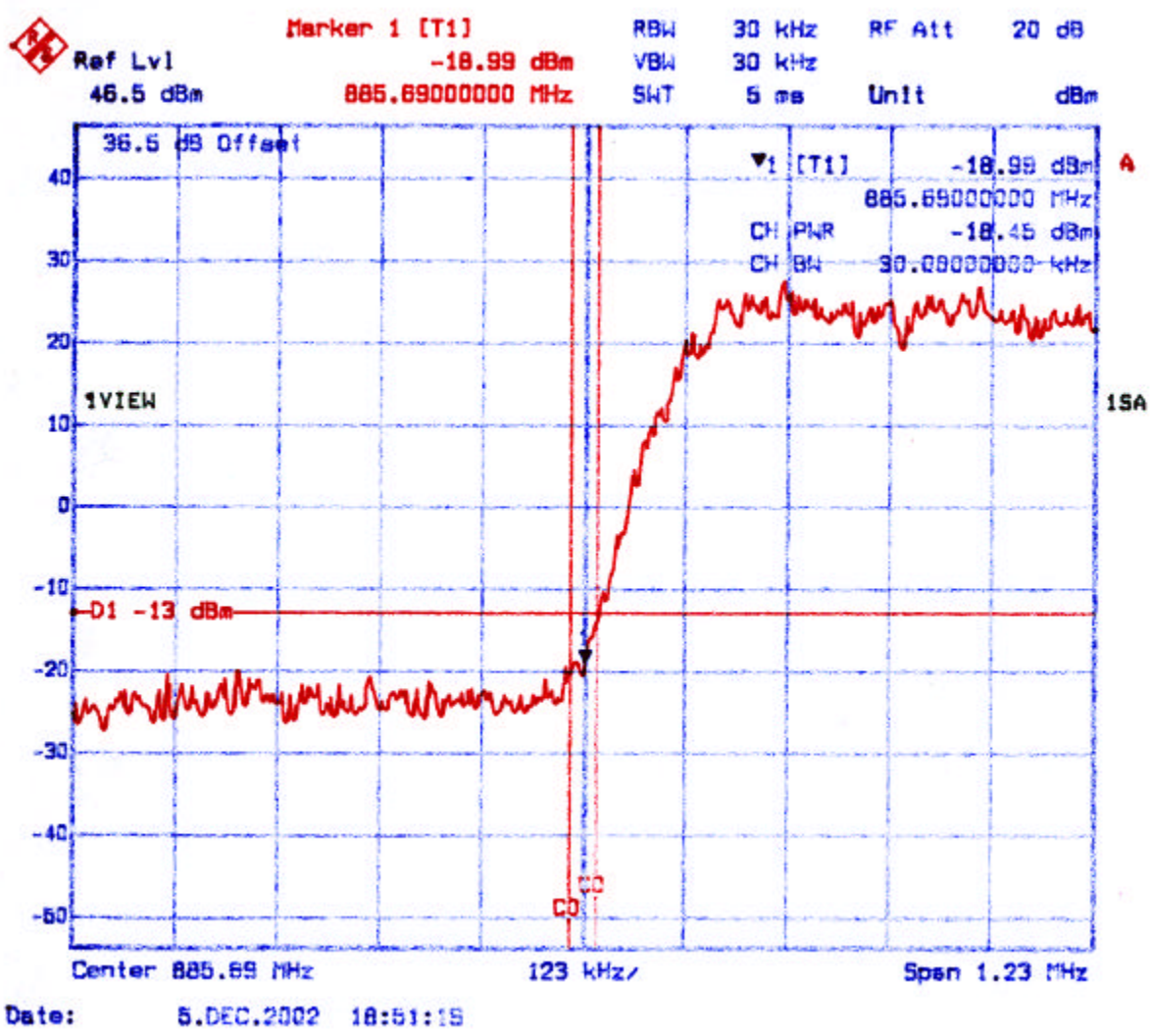
1 Carrier Mode
Channel Numbers 4
Band: A
Fundamental Frequency: 870.87 MHz
Output power as measured with Power meter: 47.09 dBm
Upper 750 kHz offset

Figure 10: 3 carrier lower 1.98 MHz offset



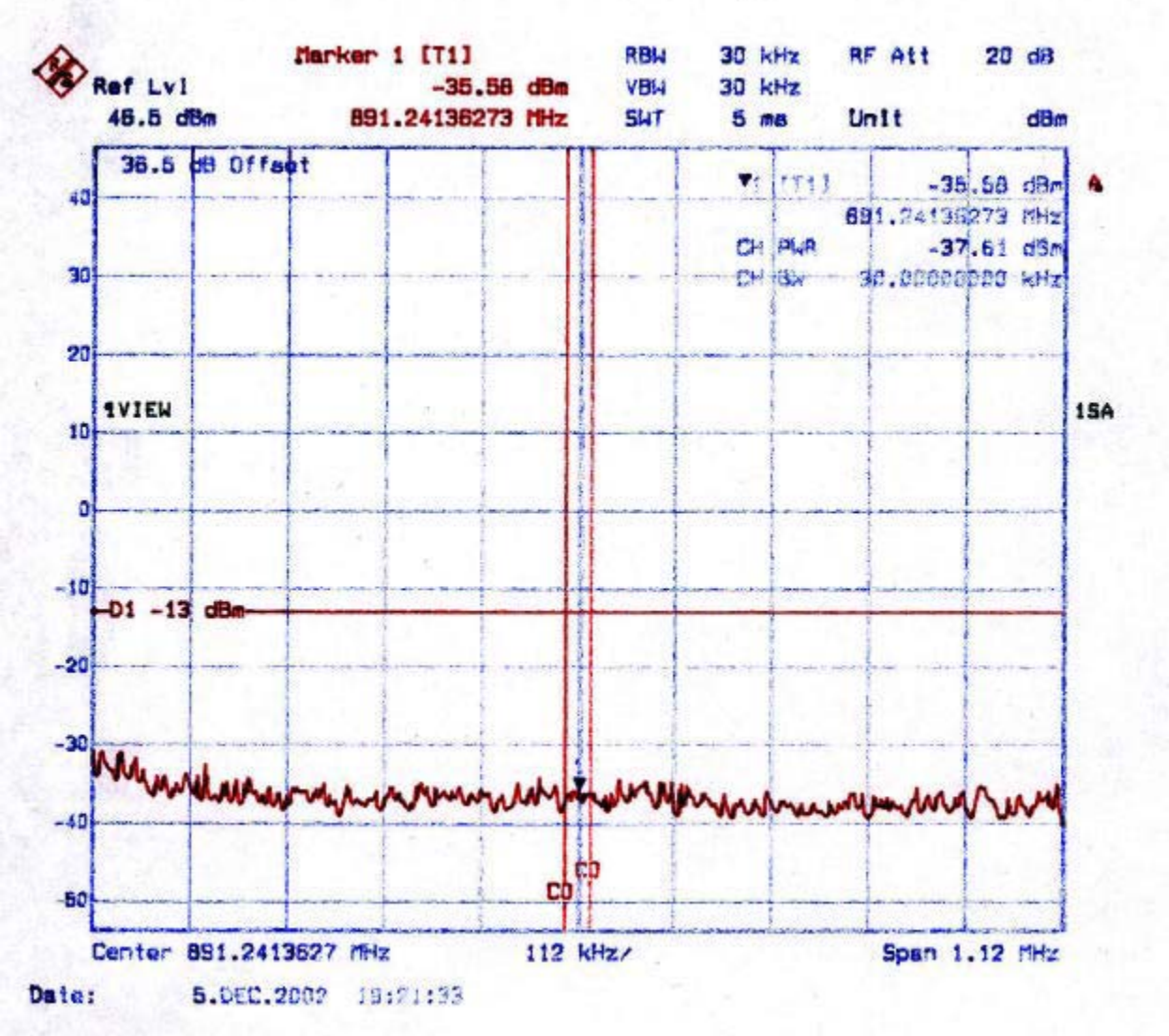
3 Carrier Mode
Channel Numbers 589, 548, 630
Band: B
Fundamental Frequency: 886.44, 887.67, 888.9 MHz
Output power as measured with Power meter: 47.15 dBm
Lower 1.98 MHz offset

Figure 11: 3 carrier lower 750 kHz offset



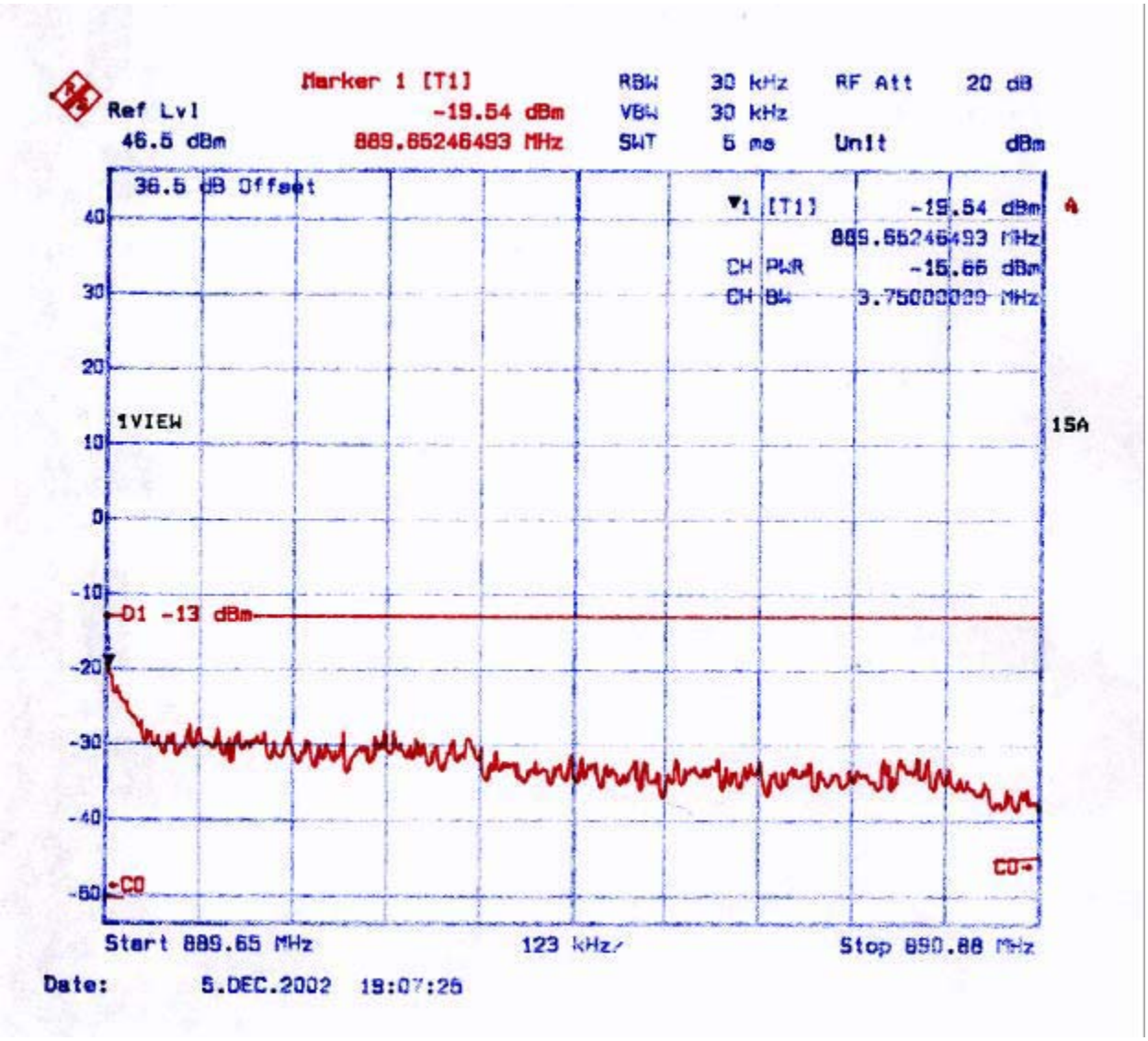
3 Carrier Mode
Channel Numbers 589, 548, 630
Band: B
Fundamental Frequency: 886.44, 887.67, 888.9 MHz
Output power as measured with Power meter: 47.14 dBm
Lower 750 kHz offset

Figure 12: 3 carrier upper 1.98 MHz offset



3 Carrier Mode
Channel Numbers 589, 548, 630
Band: B
Fundamental Frequency: 886.44, 887.67, 888.9 MHz
Output power as measured with Power meter: 47.15 dBm
Upper 1.98 MHz offset

Figure 13: 3 carrier upper 750 kHz offset



3 Carrier Mode
Channel Numbers 589, 548, 630
Band: B
Fundamental Frequency: 886.44, 887.67, 888.9 MHz
Output power as measured with Power meter: 47.14 dBm
Upper 750 kHz offset

4.3.4 Spurious Emissions Requirements

FCC Part 2.1051 - Measurements Required: Spurious Emissions at Antenna Terminals
The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

FCC Part 2.1057 - Frequency Spectrum to be investigated
(a) In all of the measurements set forth in §§ 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the

carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC Part 22.901 - Cellular Service Requirements and Limitations
(d) - Alternative Technologies and co-primary services. Licensees of cellular may use alternative cellular technologies and/or provide fixed services on a co-primary basis with their mobile offerings, including personal communications services (as defined in Part 24 of this chapter) on the spectrum within their assigned block.

(2) Alternative technology and co-primary fixed services are exempt from requirements for incidental communications services of § 22.323, the channeling requirements of § 22.905, the modulation requirements of § 22.915, the wave polarization requirements of § 22.367, the compatibility specification in § 22.933 and the emission limitations of §§ 22.357 and 22.917, except for emission limitations that apply to emissions outside the assigned channel block.

FCC Part 24.238 Limit
a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmit power (P) by at least 43+10 log (P) dB.

b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the

signal between two points, one below the carrier frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

4.3.5 Test Method

The EUT was configured to transmit at maximum power. Measurements were made on channels at the bottom, middle and top of the licensed bands. The following spectrum analyzer setting were used for the measurement of the antenna port spurious emissions:

Adjacent 1MHz to indicated cellular band (Upper and Lower)

Resolution Bandwidth:	30 kHz (1 carrier, 2 carrier), 50 kHz(3 carrier)
Video Bandwidth:	30 kHz (1 carrier, 2 carrier), 50 kHz(3 carrier)
Video Average:	10 Averages
Span:	1 MHz
Attenuation:	30 dB
Ref. Level:	46.5 dBm
Ref. Level Offset:	36.2 dB

All spectrum analyzer settings were coupled as per the manufacturers recommendations to improve measurement time, without compromising the data

All other Spurious Emissions up to 10 GHz

Resolution Bandwidth:	1 MHz (1 carrier, 2 carrier, 3 carrier)
Video Bandwidth:	1 MHz (1 carrier, 2 carrier, 3 carrier)
Video Average:	10 Averages
Span:	Set accordingly
Attenuation:	20 dB
Ref. Level:	46.5 dBm
Ref. Level Offset:	36.2 dBm

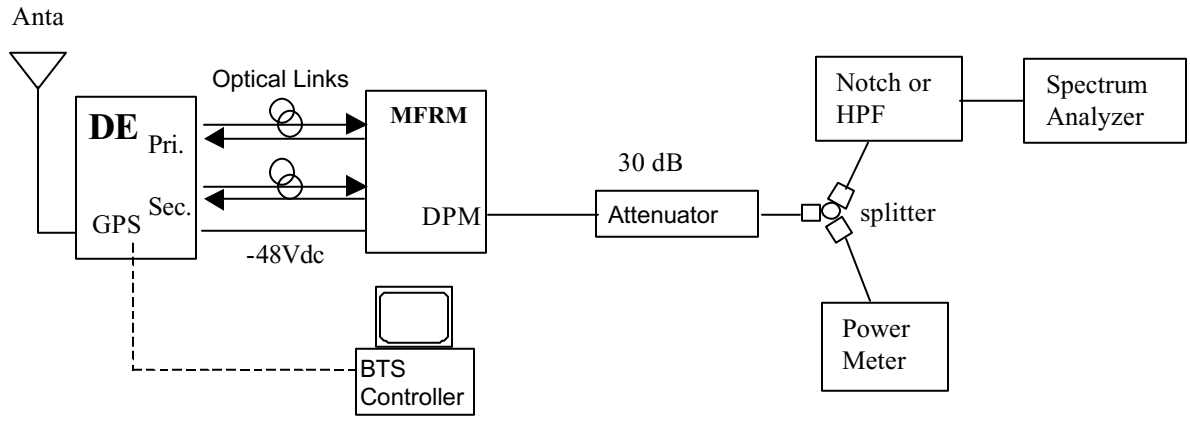
For out of band spurious emissions a Notch Filter was used to improve the dynamic range of the spectrum analyzer and prevent non linearity in the measurement system.

The emissions were investigated up to 10 GHz (the 10^{th} harmonic of the fundamental emission) for all carrier configurations (1,2,3) (FCC Part 22)

4.3.6 Test Setup

The set-up used for the EUT Antenna Port (DPM) Spurious Emission test is illustrated in Figure 6.

Figure 14: Test Setup for Antenna Port Spurious Emission Measurement



4.3.7 Test Results

The frequency spectrum from 10 kHz to 10 GHz was scanned for emissions. The EUT complies with the limit of –13 dBm. A minimum margin of 3.33 dB (1-Carrier) at band edge was achieved. Table 5(A,B C and D) show the band edge spurious emissions at the antenna port of the EUT for 1, 2 and 3-Carriers respectively. Figures 15-40 show emissions plots including the band edge emissions for 1-carrier and 3 carrier modes respectively.

Table 5(A): Band Edge Spurious Emissions (1-Carrier)

Frequency (MHz)	Spurious Emissions Level (dBm)	FCC Limit (dBm)	Pass Margin (dBm)
	1 carrier (30 kHz RWB)	1 carrier	
869 (lower edge of band A) Ch 4	-16.5	-13	3.5
880 (upper edge of band A) Ch 296	-20.12	-13	7.12
880 (lower edge of band B) Ch 371	-18.58	13	5.58
890 (upper edge of band B) Ch 630	-22.71	13	9.71
891.5 (lower edge of band B') Ch 754	-17.61	13	4.61
894 (upper edge of band B') Ch 763	-21.43	-13	8.43
0-1000 (RBW=1 MHz)	-36.21	-13	23.21
1000-2000 (RBW=1 MHz)	-28.84	-13	15.84
2000-3000 (RBW=1 MHz)	-32.72	-13	19.72
3000-4000 (RBW=1 MHz)	-33.54	-13	20.54
4000-5000 (RBW=1 MHz)	-32.9	-13	19.9
5000-6000 (RBW=1 MHz)	-30.9	-13	17.9
6000-7000 (RBW=1 MHz)	-27.84	-13	14.84
7000-8000 (RBW=1 MHz)	-30.13	-13	17.13
8000 9000 (RBW=1 MHz)	-30.32	-13	17.32
9000-10000 (RBW=1 MHz)	-30.47	-13	17.47

Table 5(B): Band Edge Spurious Emissions (2-Carrier)

Frequency (MHz)	Spurious Emissions Level (dBm)	FCC Limit (dBm)	Pass Margin (dB)
30 KHz RBW for 2 Carriers			
869 (lower edge of band A) Ch 4, 45	-18.0	-13	5.0
880 (Upper edge of band A) Ch 255,296	-24.22	-13	11.22
0-1000 (RBW=1 MHz)	-36.60	-13	23.6
1000-2000 (RBW=1 MHz)	-32.18	-13	19.188
2000-3000 (RBW=1 MHz)	-32.13	-13	19.13
3000-4000 (RBW=1 MHz)	-32.06	-13	19.06
4000-5000 (RBW=1 MHz)	-31.92	-13	18.92
5000-6000 (RBW=1 MHz)	-29.01	-13	16.01
6000-7000 (RBW=1 MHz)	-27.10	-13	14.1
7000-8000 (RBW=1 MHz)	-29.0	-13	16.0
8000-9000 (RBW=1 MHz)	-29.4	-13	16.4
9000-10000 (RBW=1 MHz)	-29.33	-13	16.33

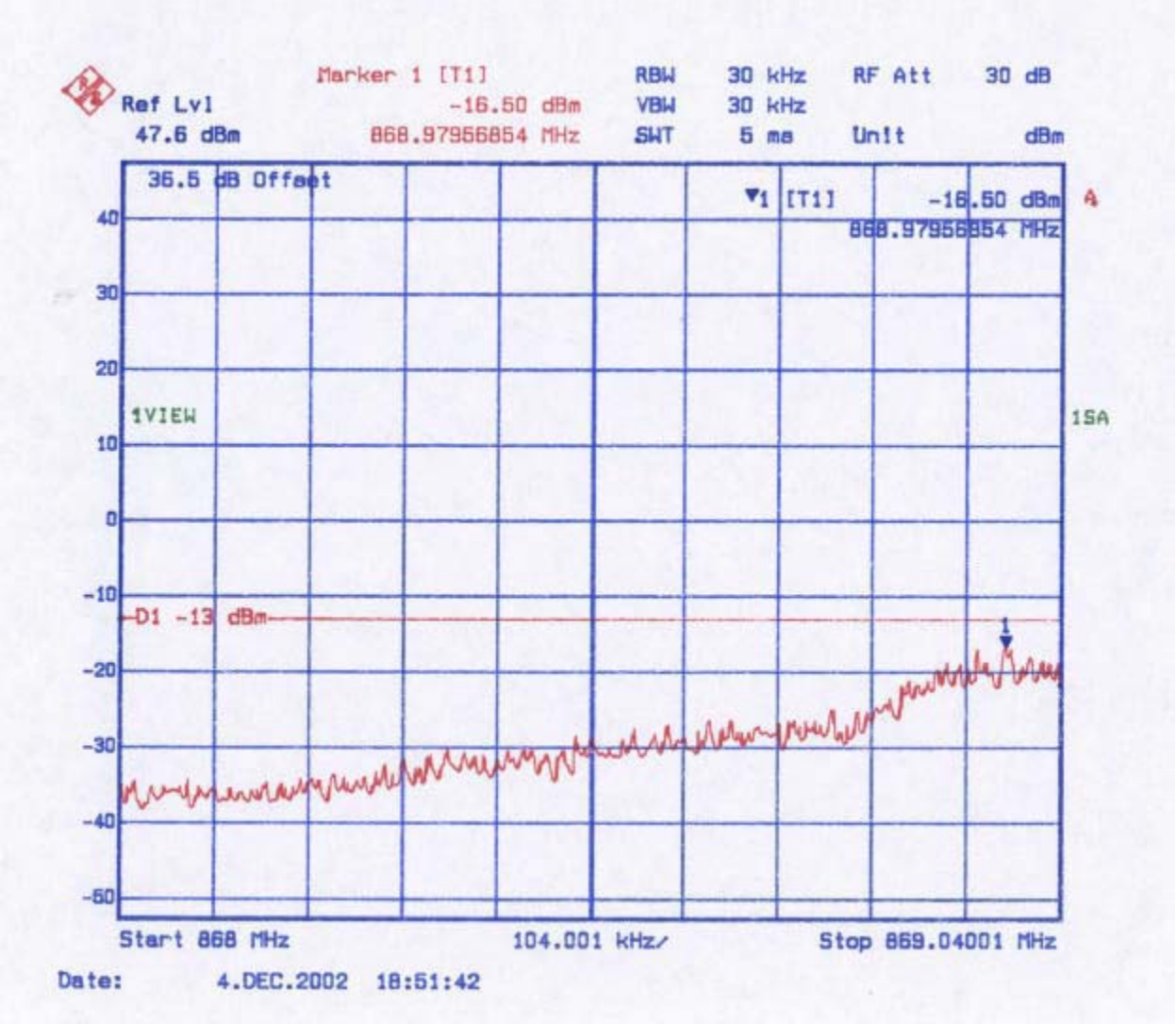
Table 5(C): Band Edge Spurious Emissions (3-Carrier Band A)

Frequency (MHz)	Spurious Emissions Level (dBm)	FCC Limit (dBm)	Pass Margin (dB)
50 KHz RBW for 3 Carriers			
869 (lower edge of band A) Ch 4, 45, 86	-17.44	-13	4.4
880 (upper edge of band A) Ch 214,255,296	-24.95	-13	11.95
0-1000 (RBW=1 MHz)(201, 242, 283)	-34.45	-13	21.45
1000-2000 (RBW=1 MHz)	-31.35	-13	18.35
2000-3000 (RBW=1 MHz)	-31.55	-13	18.55
3000-4000 (RBW=1 MHz)	-31.73	-13	18.73
4000-5000 (RBW=1 MHz)	-31.31	-13	18.31
5000-6000 (RBW=1 MHz)	-29.58	-13	16.58
6000-7000 (RBW=1 MHz)	-27.44	-13	14.44
7000-8000 (RBW=1 MHz)	-29.66	-13	16.66
8000-9000 (RBW=1 MHz)	-28.92	-13	15.92
9000-10000 (RBW=1 MHz)	-28.96	-13	15.96

Table 5(D): Band Edge Spurious Emissions (3-Carrier Band B)

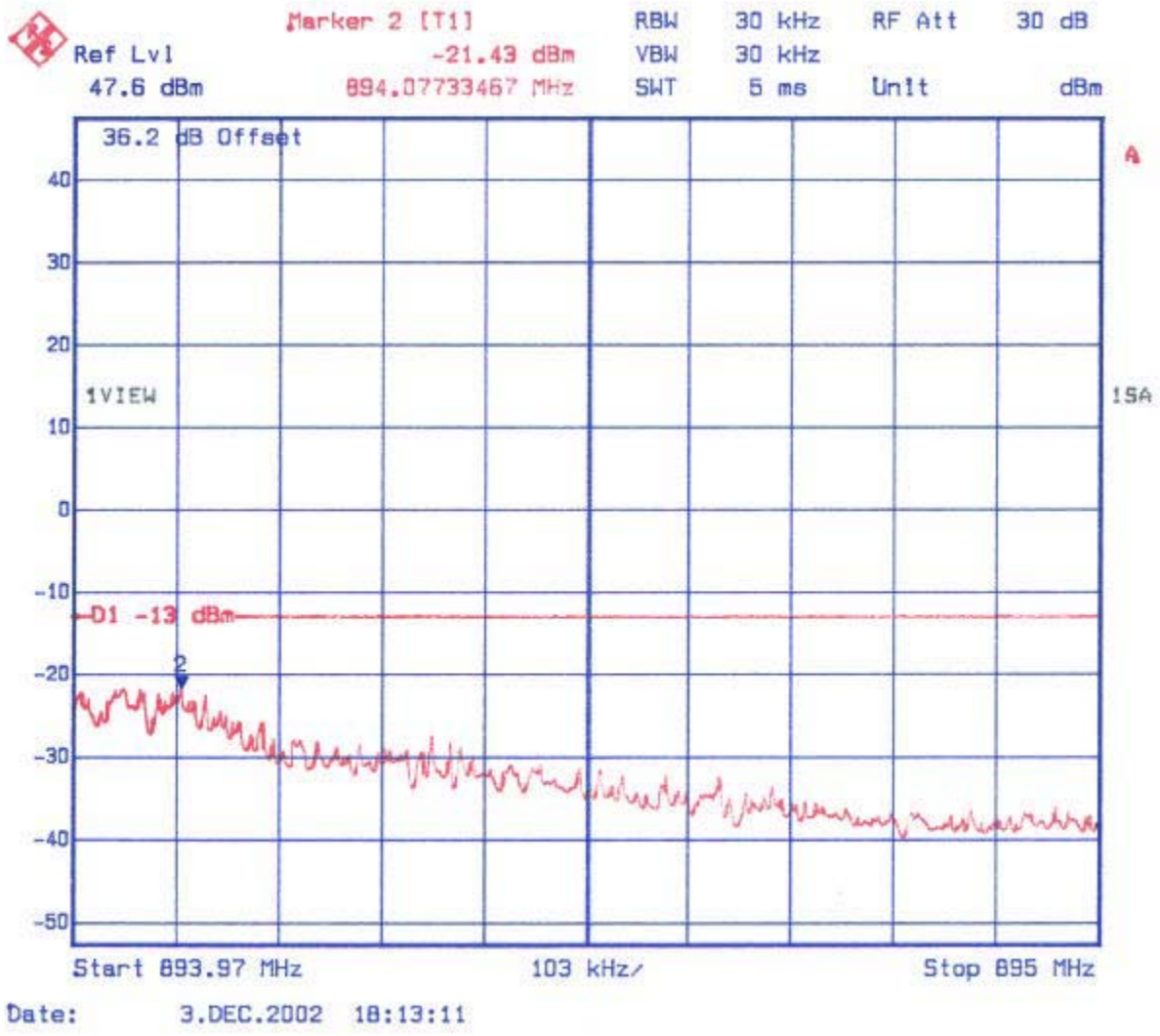
Frequency (MHz)	Spurious Emissions Level (dBm)	FCC Limit (dBm)	Pass Margin (dB)
50 KHz RBW for 3 Carriers			
869 (lower edge of band B) Ch 371,412,453	-16.33	-13	3.33
880 (upper edge of band B) Ch 589, 548, 630 (B)	-27.35	-13	14.35
0-1000 (RBW=1 MHz)	-32.98	-13	19.98
1000-2000 (RBW=1 MHz)	-31.75	-13	18.75
2000-3000 (RBW=1 MHz)	-32.03	-13	19.02
3000-4000 (RBW=1 MHz)	-32.31	-13	19.31
4000-5000 (RBW=1 MHz)	-31.39	-13	18.39
5000-6000 (RBW=1 MHz)	-29.25	-13	16.25
6000-7000 (RBW=1 MHz)	-26.94	-13	13.94
7000-8000 (RBW=1 MHz)	-29.26	-13	16.26
8000-9000 (RBW=1 MHz)	-28.71	-13	15.71
9000-10000	-29.32	-13	16.32

Figure 15: Spurious Emissions – 1 Carrier (Lower Band edge, adjacent 1 MHz)



1 Carrier Mode
Channel Numbers 4
Band: A
Fundamental Frequency: 870.12 MHz
Output power as measured with Power meter: 47.6 dBm
Lower band edge
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 16: Spurious Emissions - 1 Carrier(Upper Band edge, adjacent 1 MHz)



1 Carrier Mode
Channel Numbers 763
Band: B'
Fundamental Frequency: 892.89 MHz
Output power as measured with Power meter: 47.27 dBm
Upper band edge
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 17: Conducted Spurious Emissions - 1 Carrier Channel 4 (10 kHz – 400 MHz)

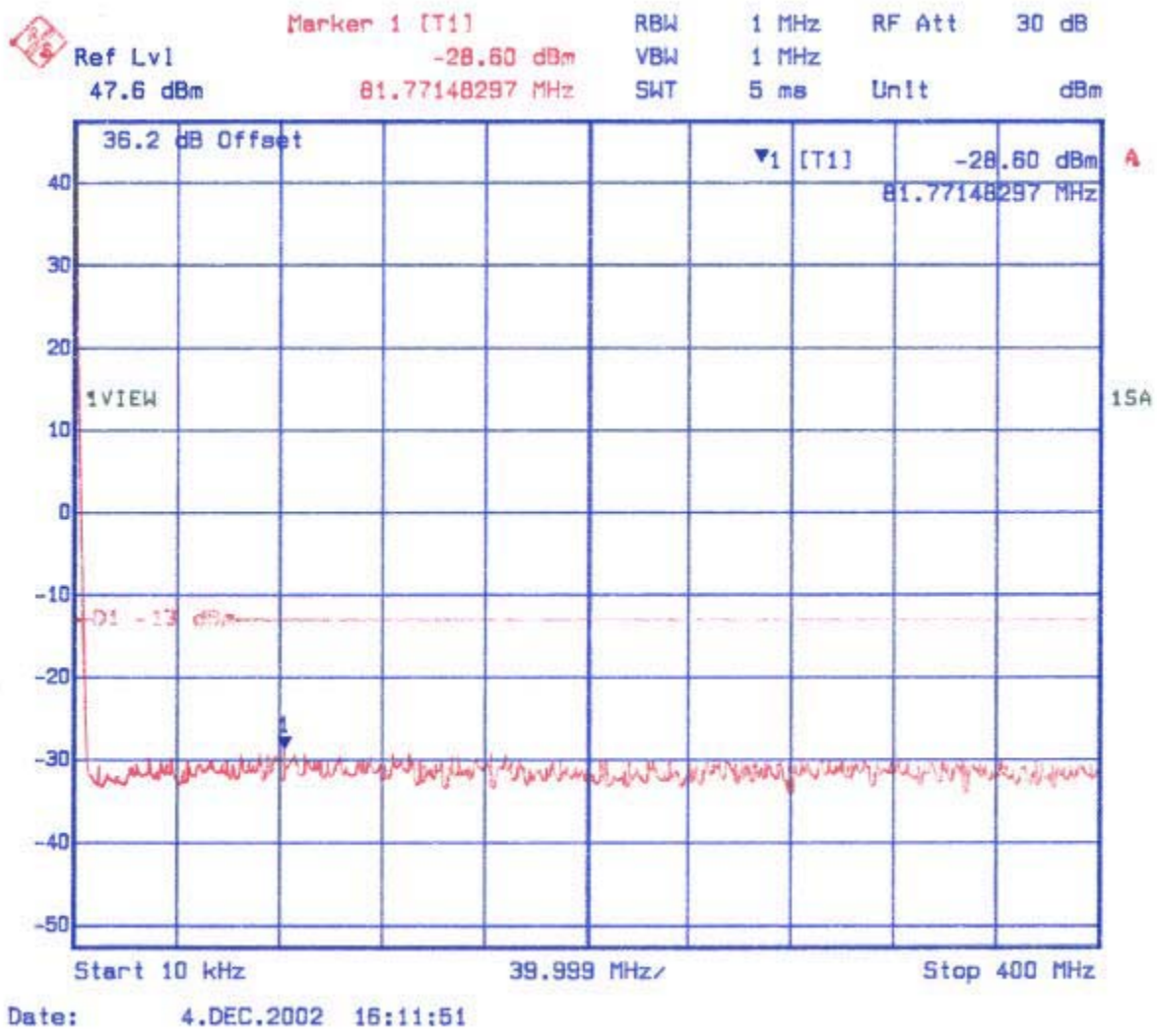


Figure 18: Conducted Spurious Emissions - 1 Carrier Channel 4 (400 MHz – 1 GHz)

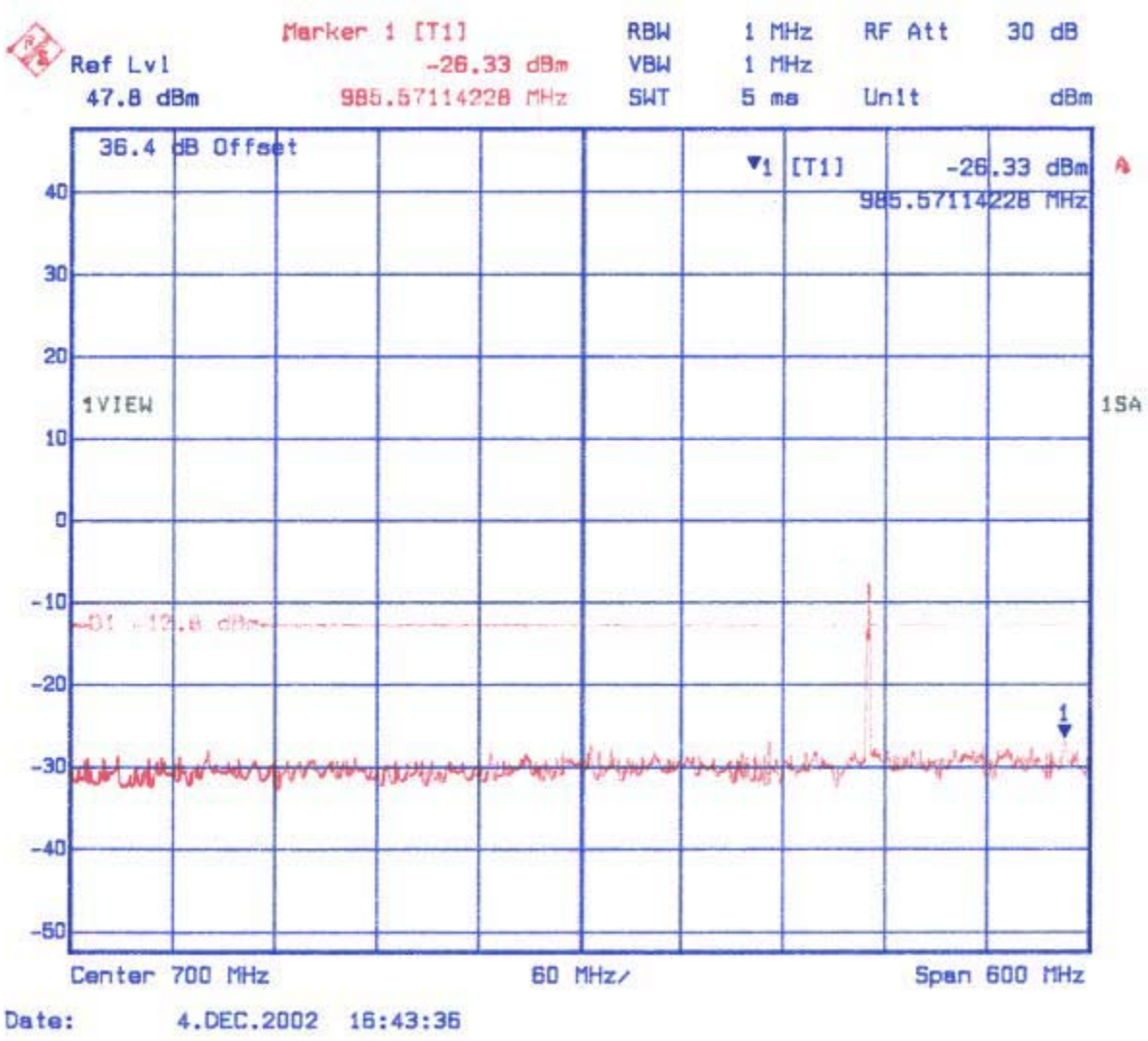


Figure 19: Conducted Spurious Emissions - 1 Carrier Channel 4 (1 GHz –2 GHz)

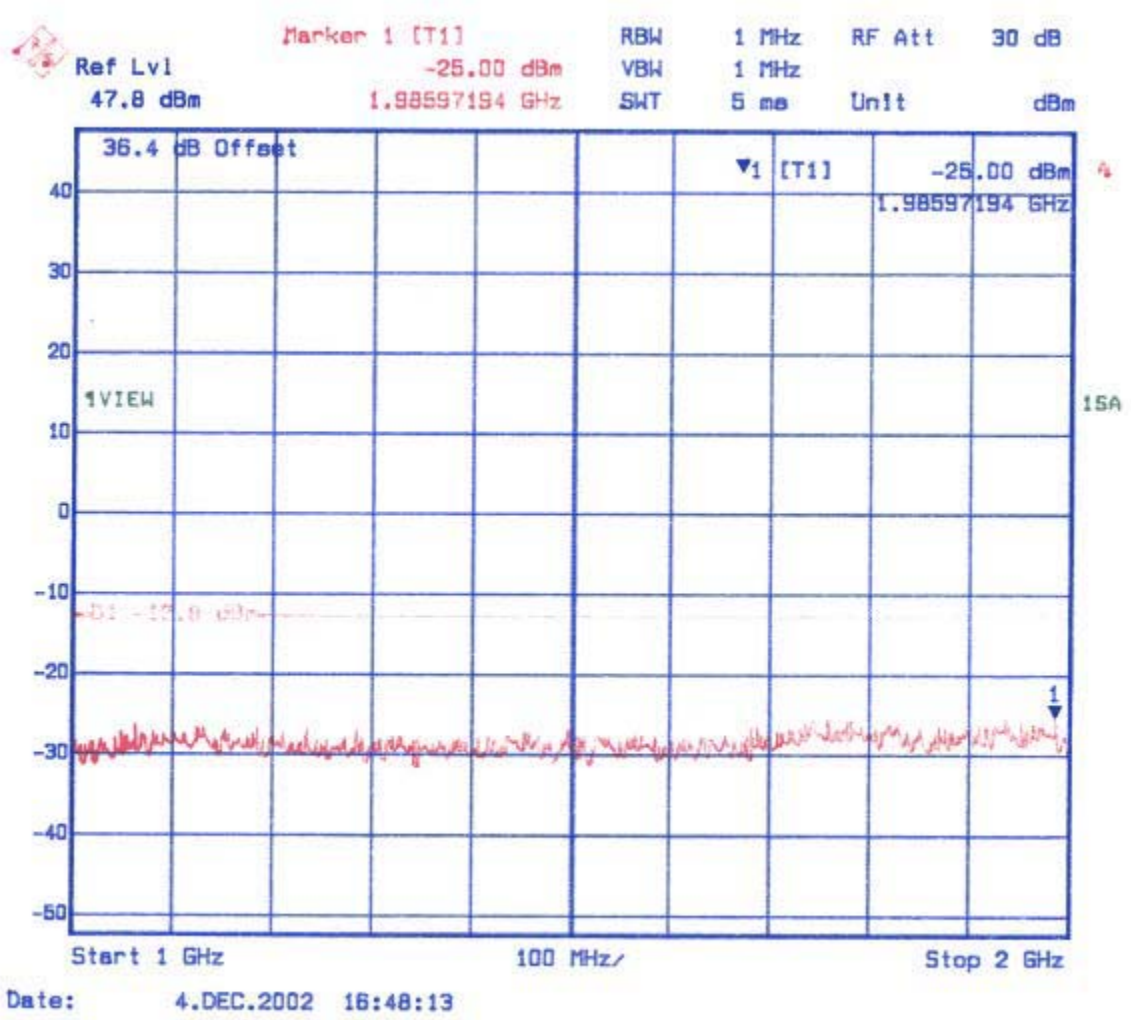


Figure 20: Conducted Spurious Emissions - 1 Carrier Channel 4 (2 GHz – 3 GHz)

Figure 21: Conducted Spurious Emissions - 1 Carrier Channel 4 (3 GHz – 4 GHz)

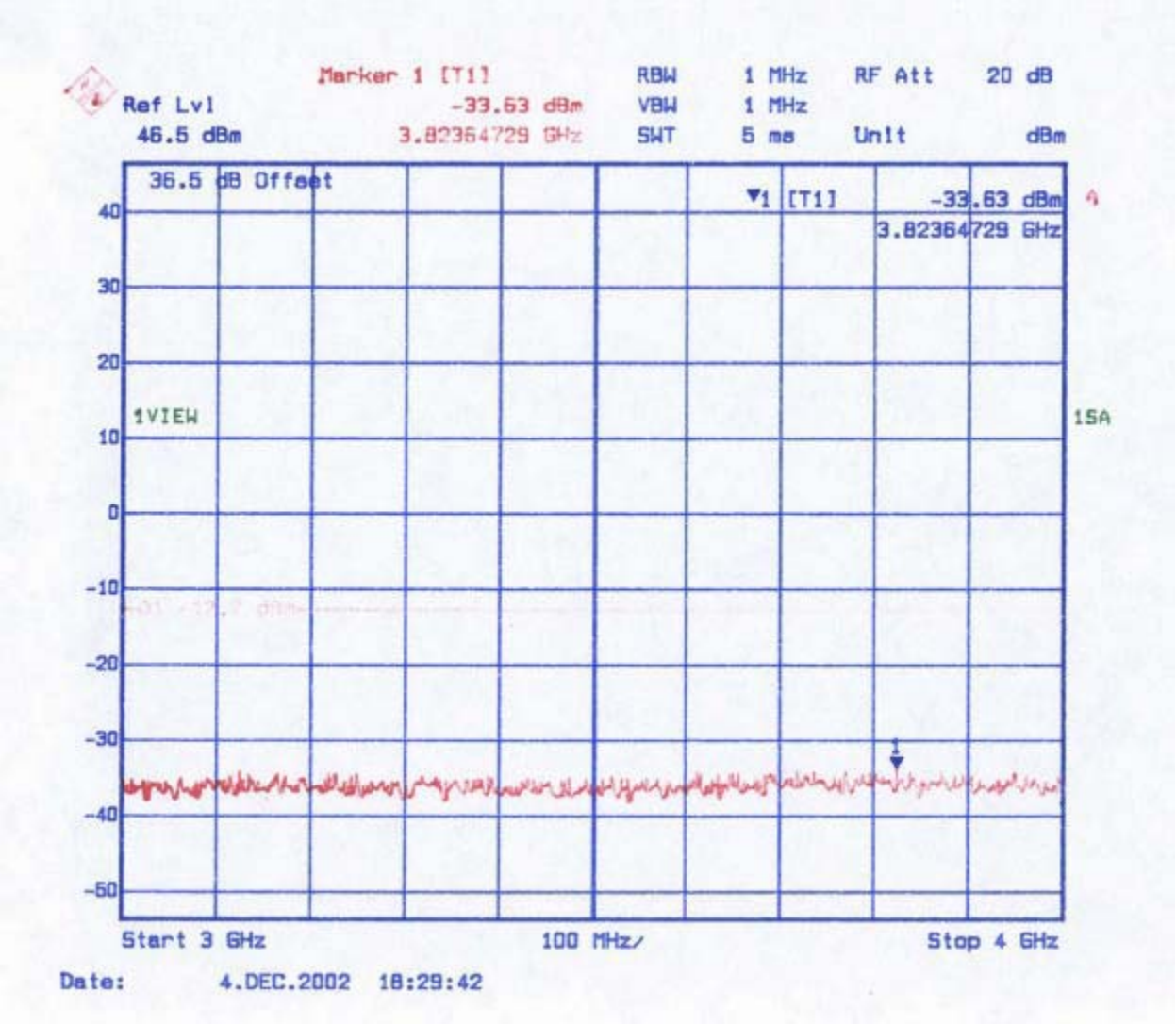


Figure 22: Conducted Spurious Emissions - 1 Carrier Channel 4 (4 GHz – 5 GHz)

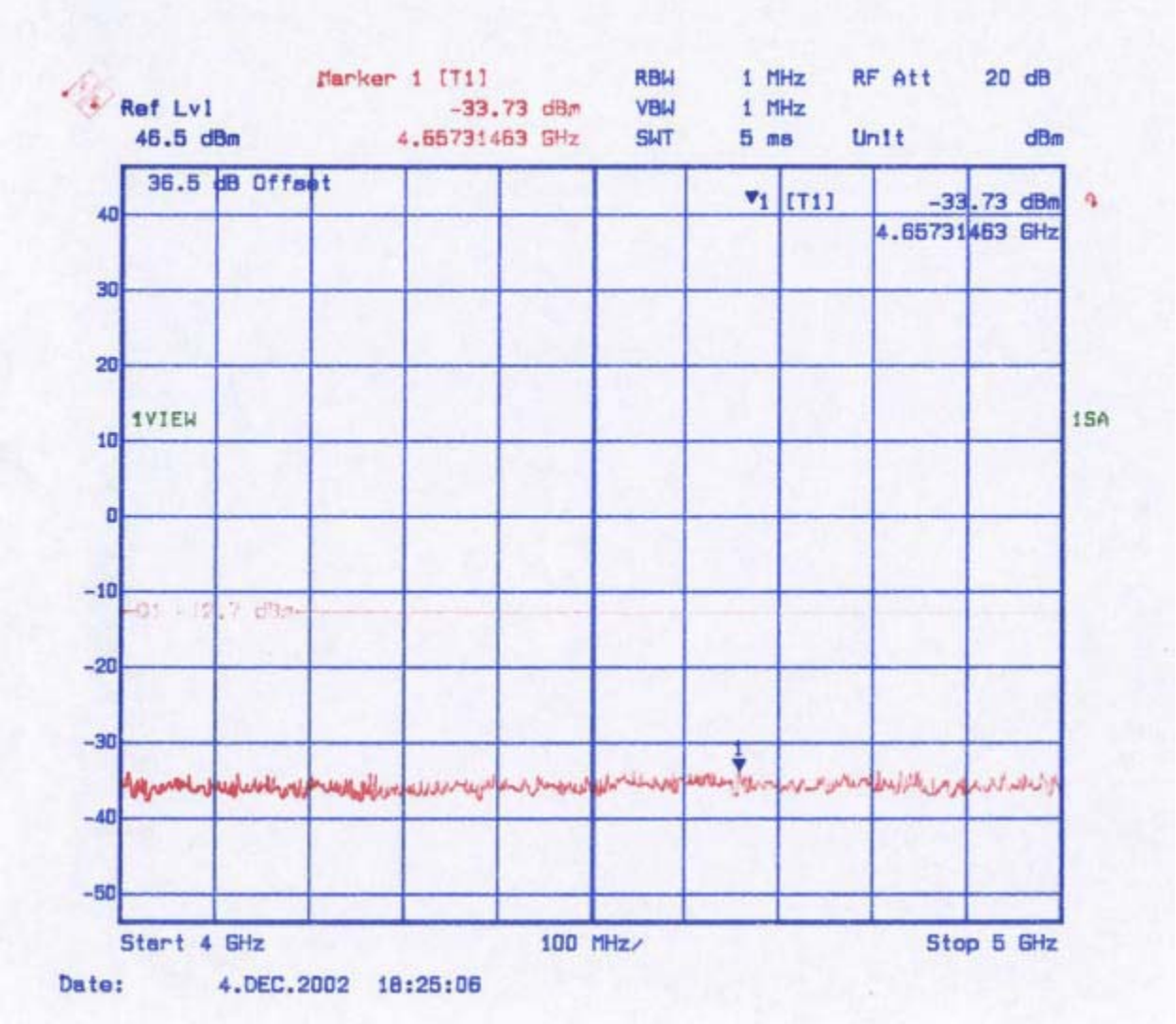


Figure 23: Conducted Spurious Emissions - 1 Carrier Channel 4 (5 GHz – 6 GHz)

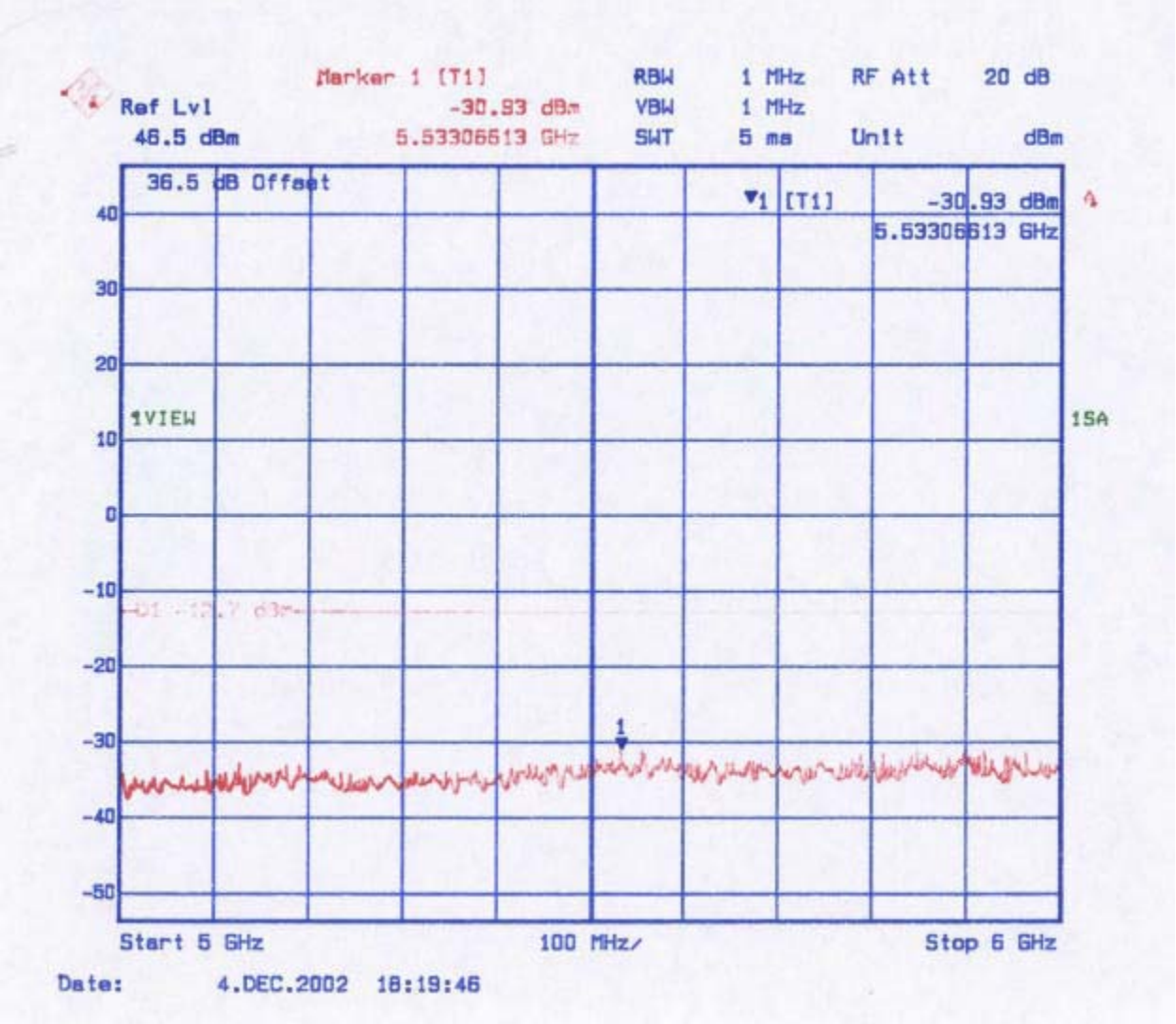


Figure 24: Conducted Spurious Emissions - 1 Carrier Channel 4 (6 GHz – 7 GHz)

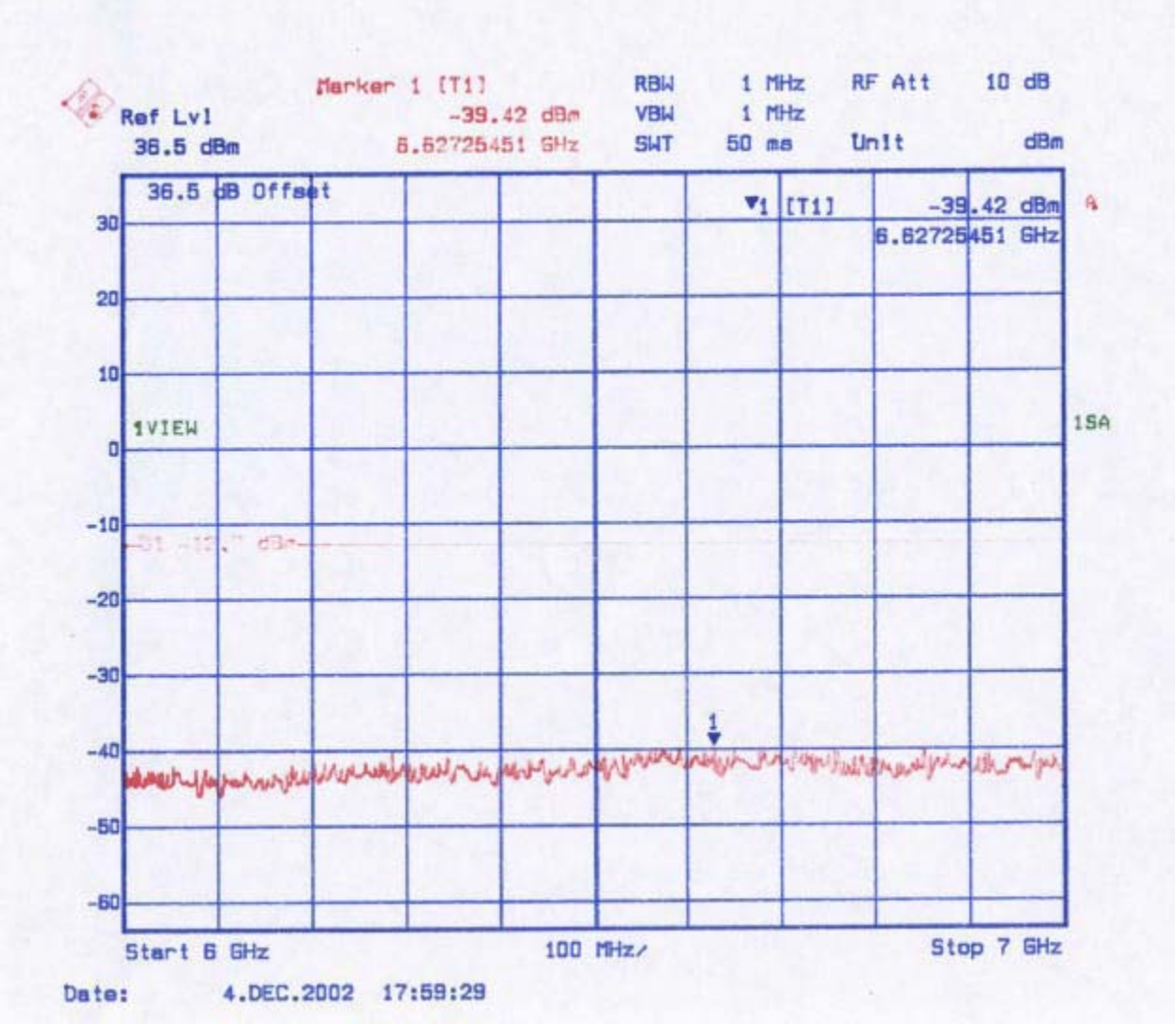


Figure 25: Conducted Spurious Emissions - 1 Carrier Channel 4 (7 GHz – 8 GHz)

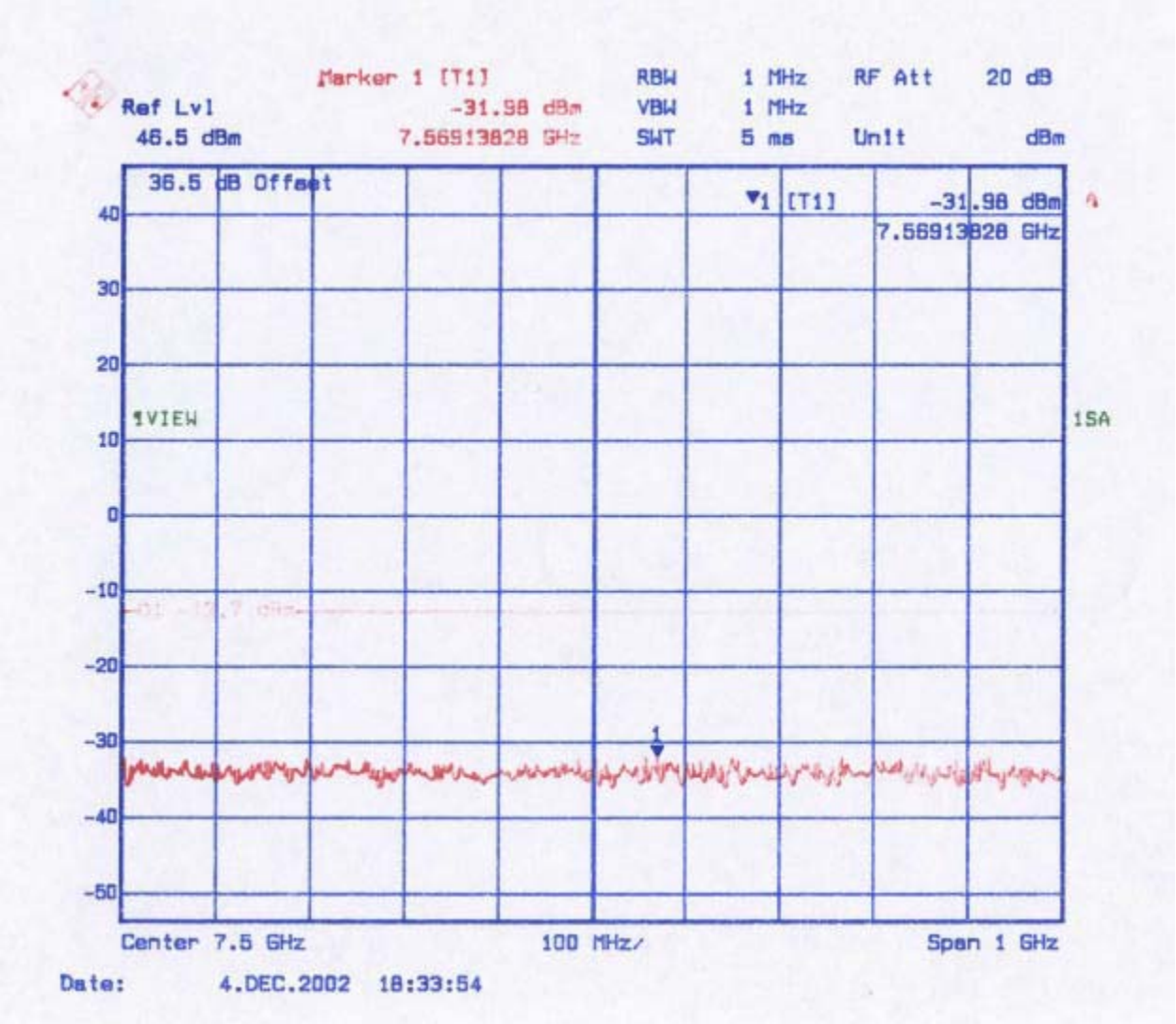


Figure 26: Conducted Spurious Emissions - 1 Carrier Channel 4 (8 GHz – 9 GHz)

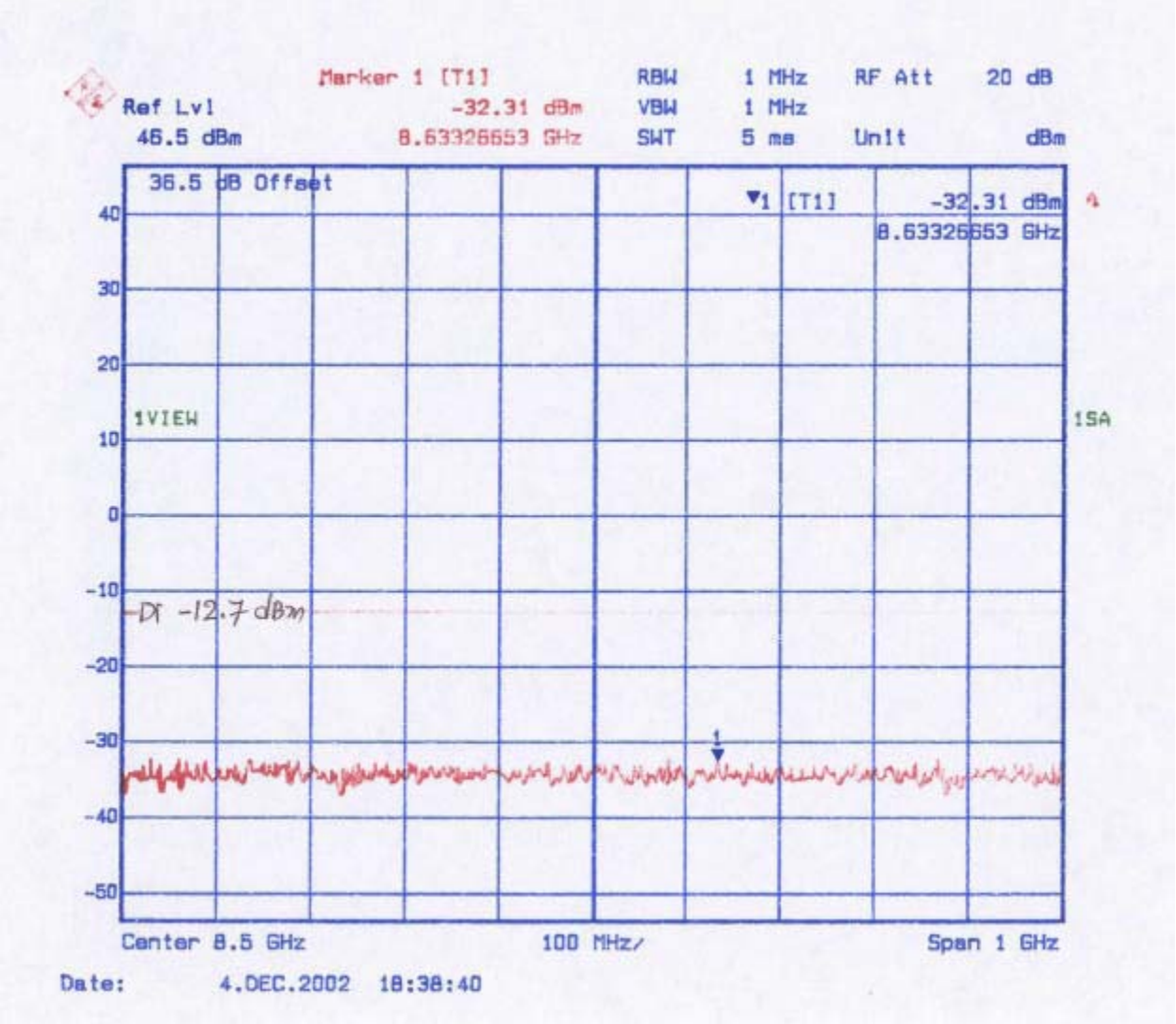


Figure 27: Conducted Spurious Emissions - 1 Carrier Channel 4 (9 GHz – 10 GHz)

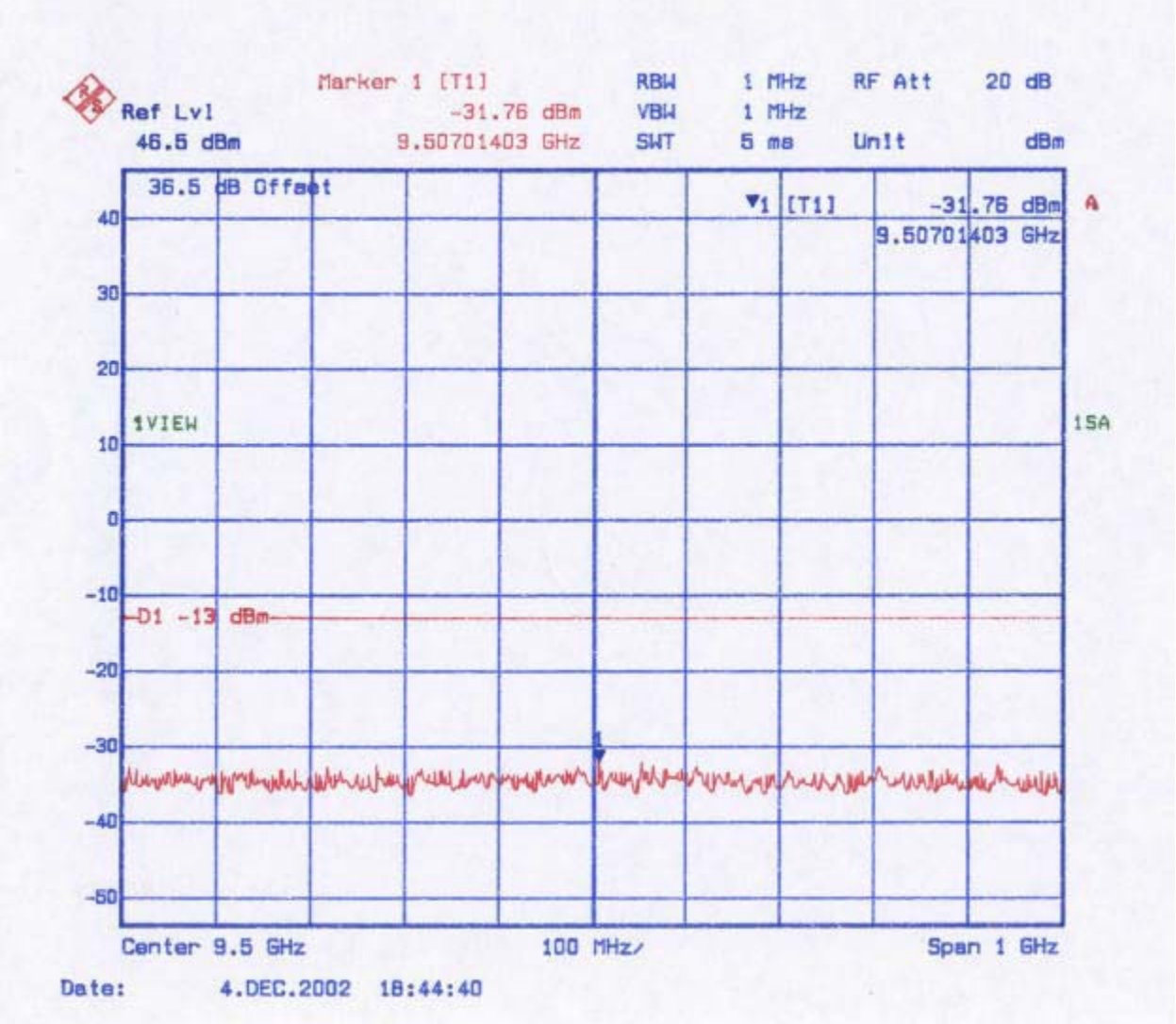
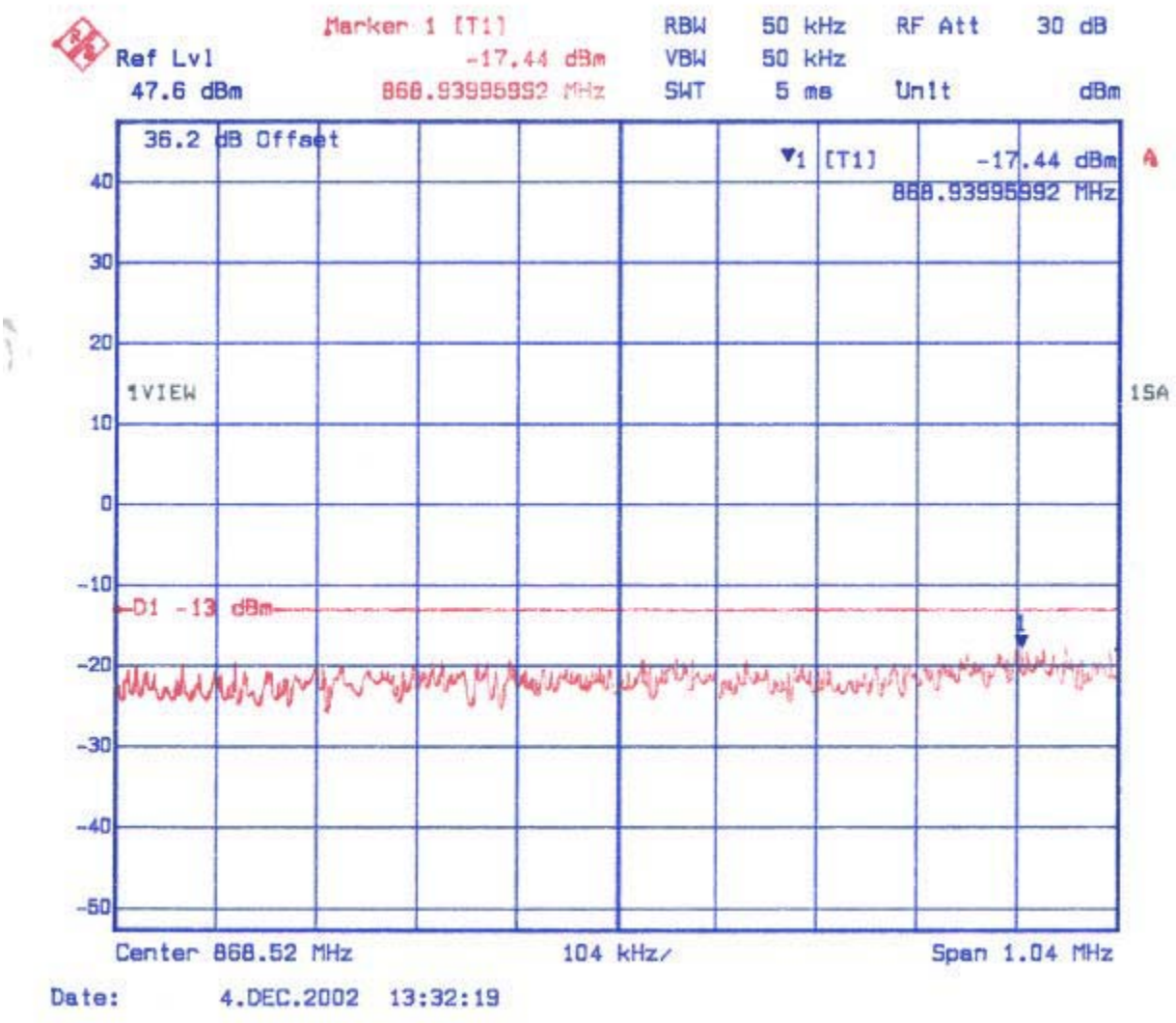
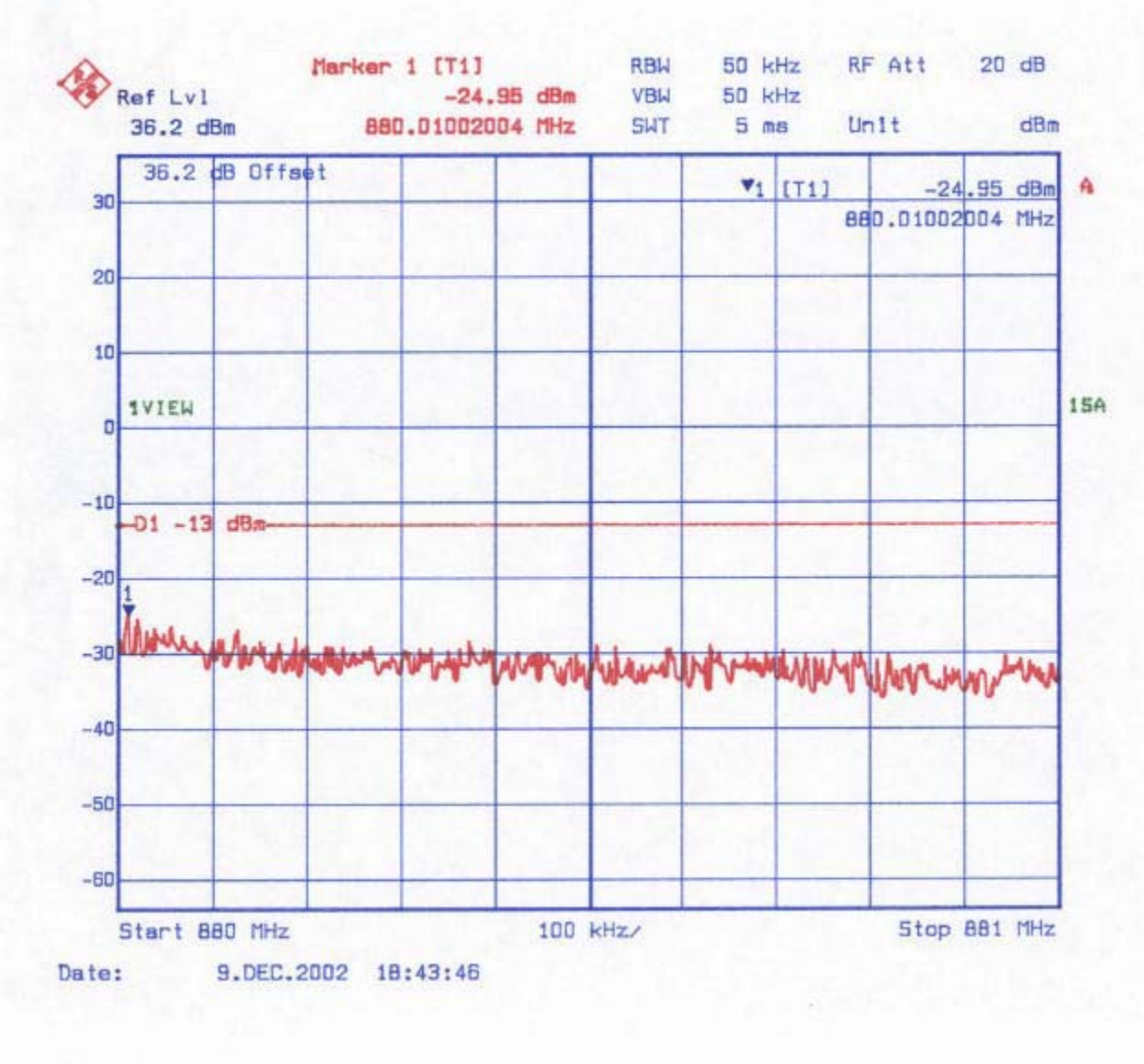


Figure 28: Spurious Emissions – 3 Carrier (Lower Band edge, adjacent 1 MHz)



3 Carrier Mode
Channel Numbers 4, 45, 86
Band: A
Fundamental Frequency: 870.12, 872.34, 873.57 MHz
Output power as measured with Power meter: 47.15 dBm
Lower Band edge
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 29: Spurious Emissions – 3 Carrier (Upper Band edge, adjacent 1 MHz)



3 Carrier Mode
Channel Numbers 214, 255, 296
Band: A
Fundamental Frequency: 876.03, 877.26, 878.49 MHz
Output power as measured with Power meter: 47.15 dBm
Upper Band edge
Note: Measurements were done on upper and lower band edge of each cellular band, no spurious emissions were detected in any case, therefore to reduce file size plots of the extreme band edges only have been provided for the review.

Figure 30: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (10 kHz–400 MHz)

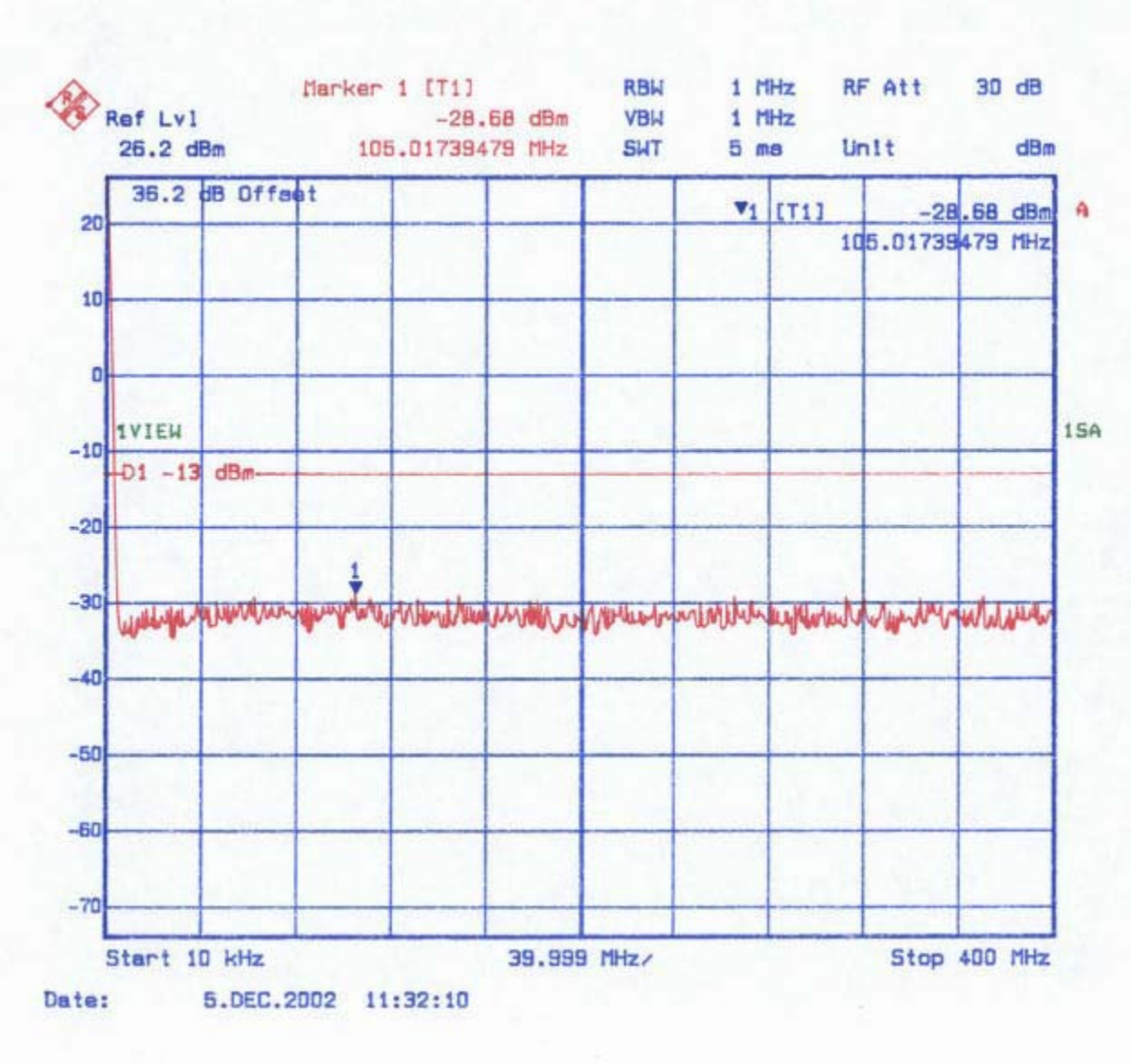


Figure 31: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (400 MHz–1 GHz)

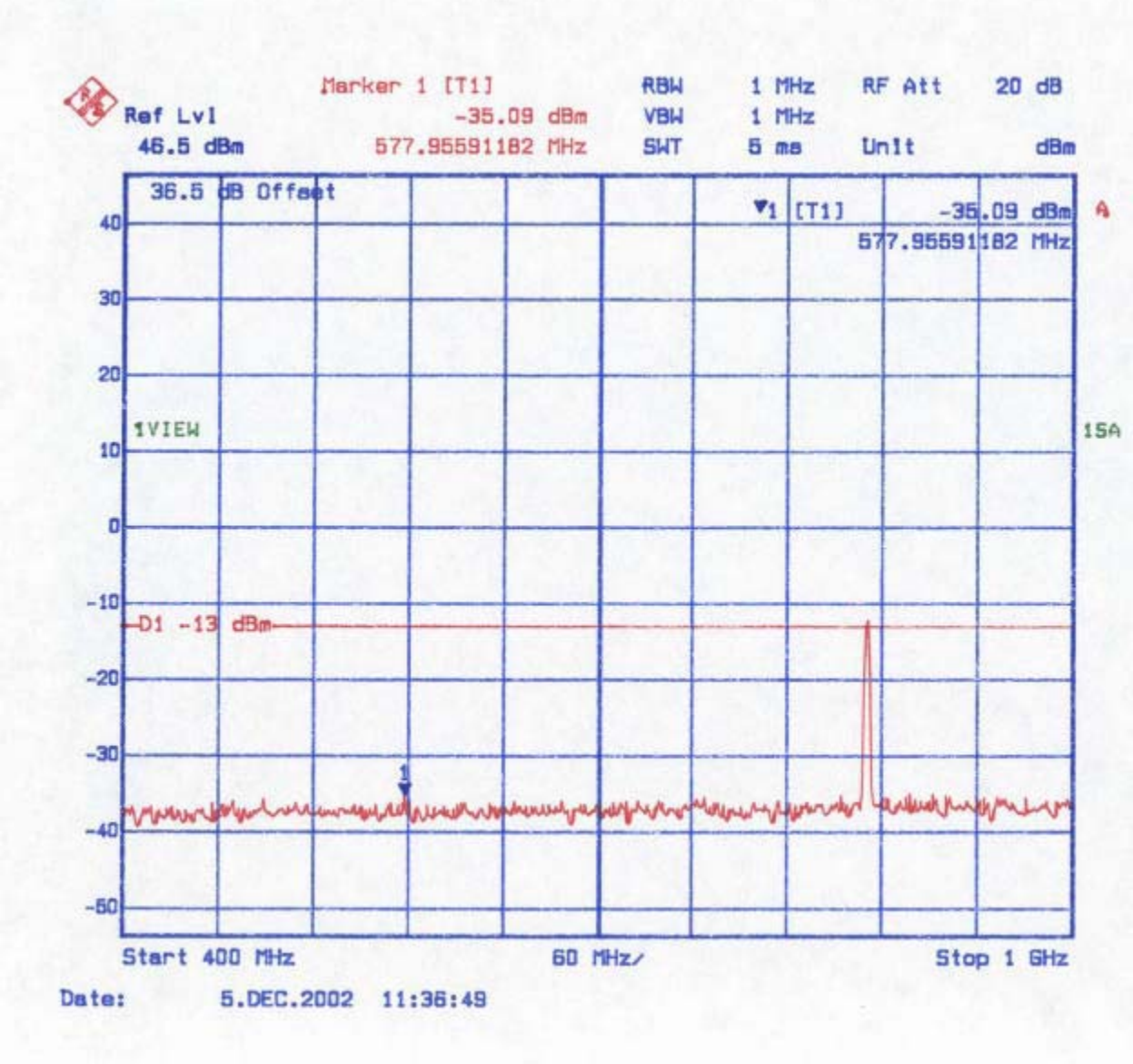


Figure 32: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (1 GHz–2 GHz)

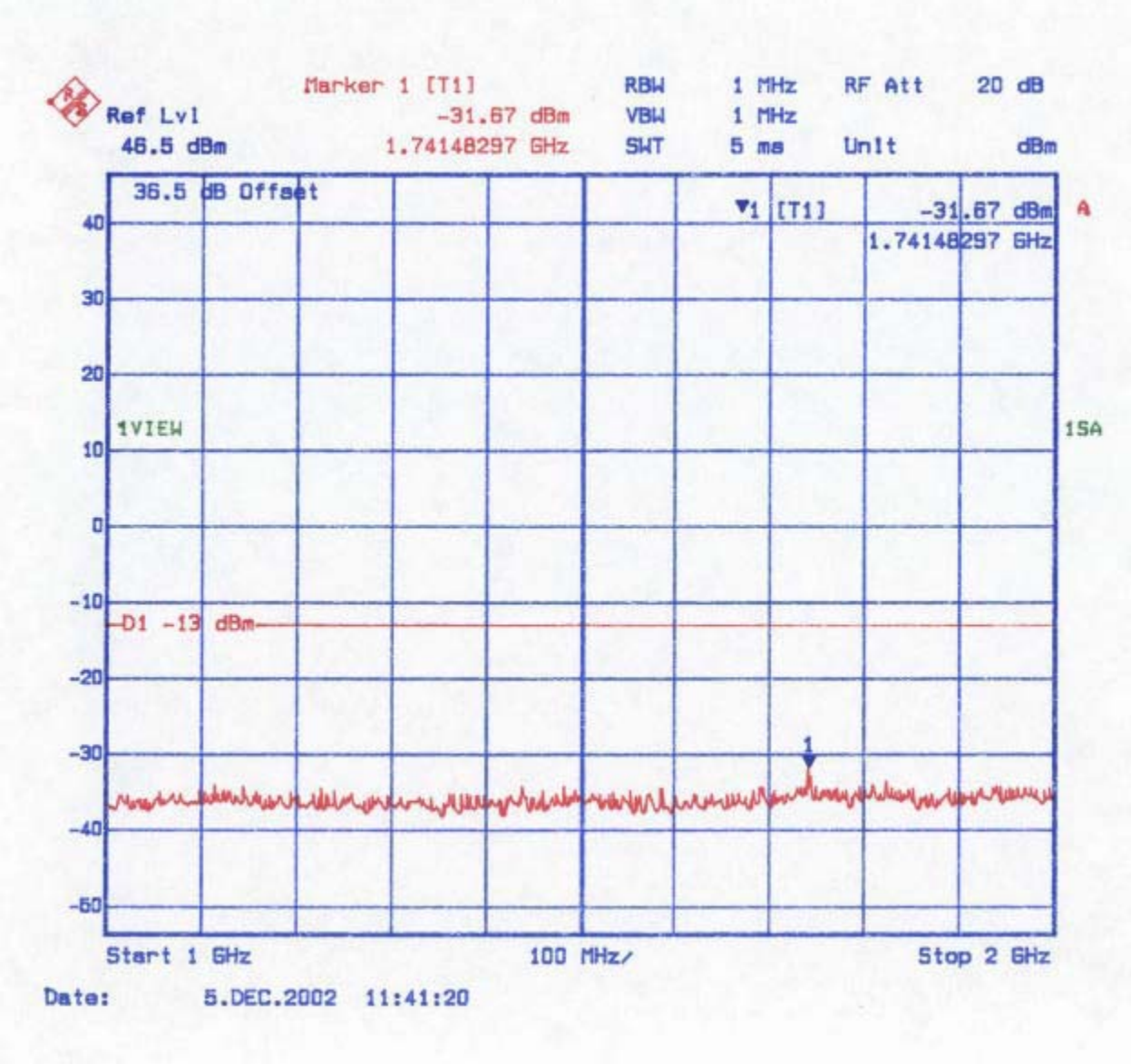


Figure 33: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (2 GHz–3 GHz)

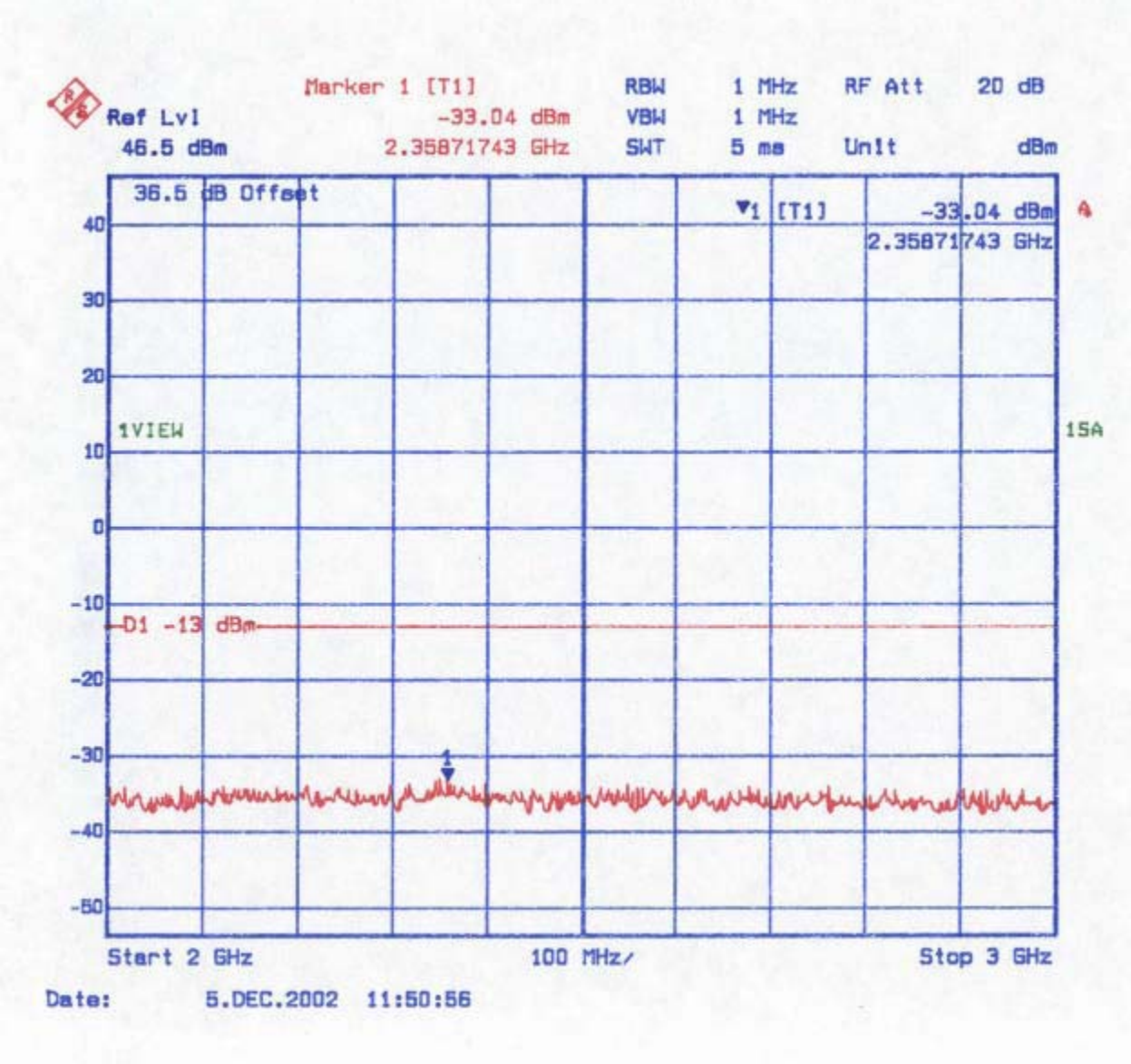


Figure 34: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (3 GHz–4 GHz)

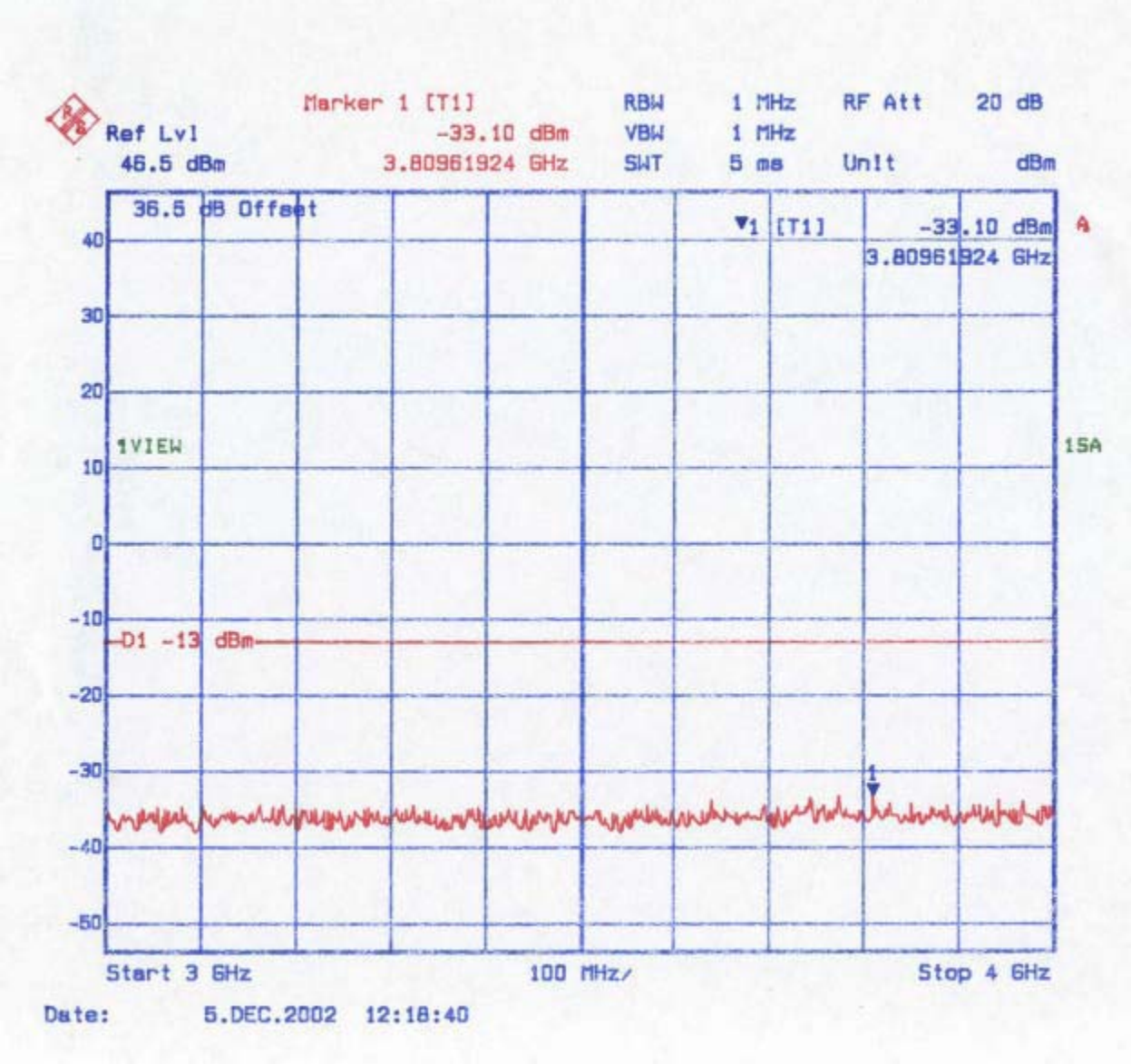


Figure 35: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (4 GHz–5 GHz)

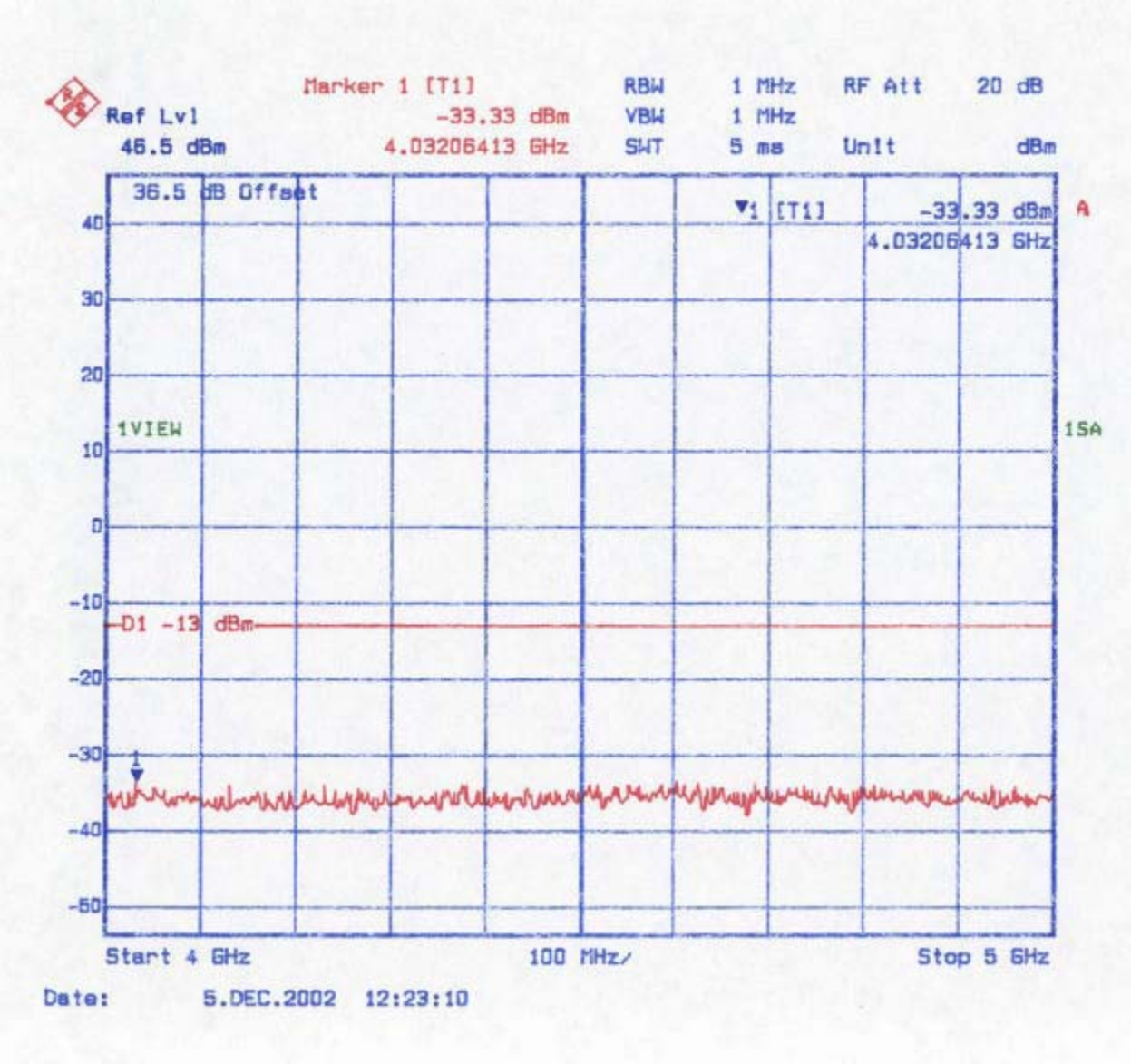


Figure 36: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (5 GHz–6 GHz)

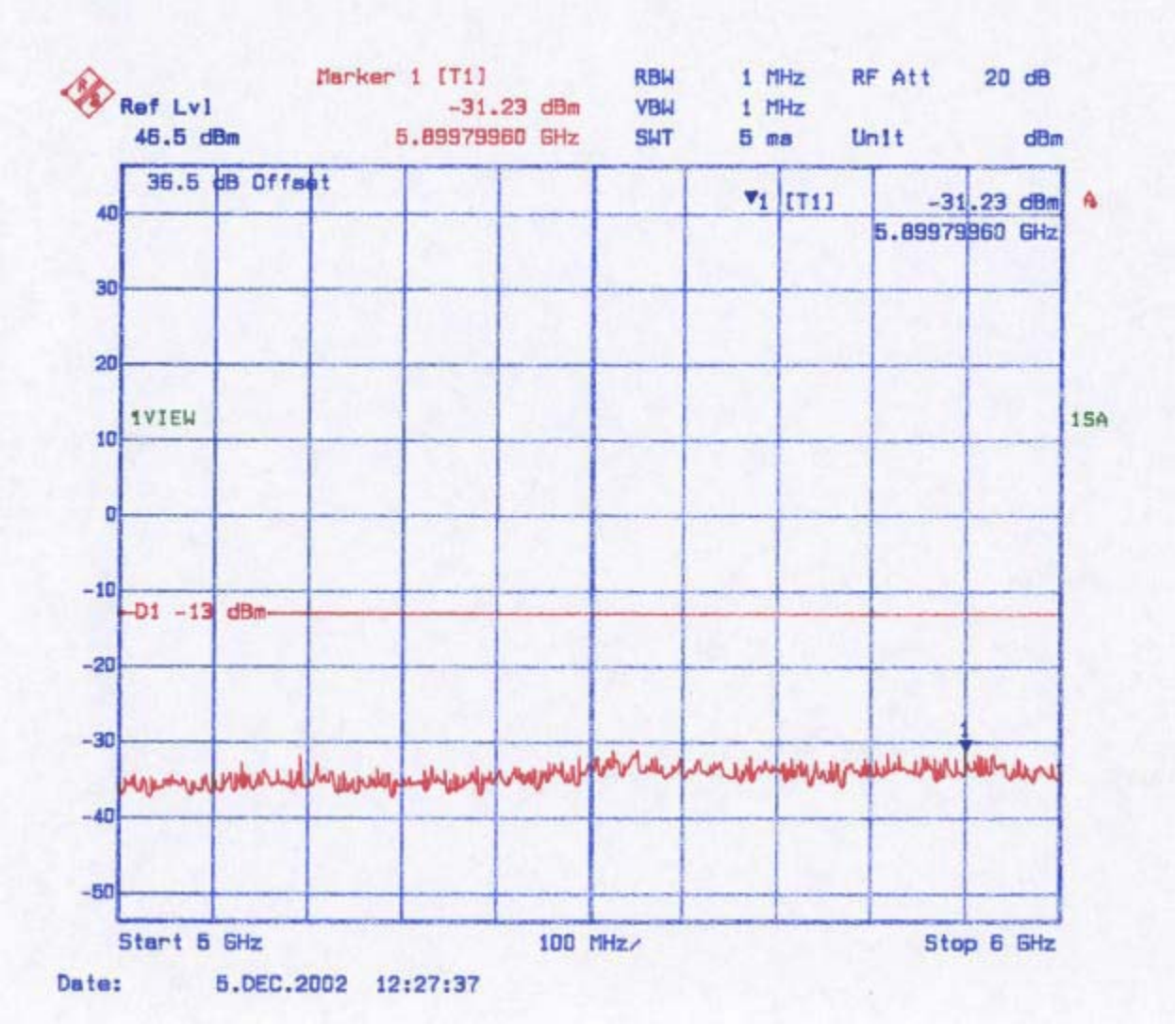


Figure 37: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (6 GHz–7 GHz)

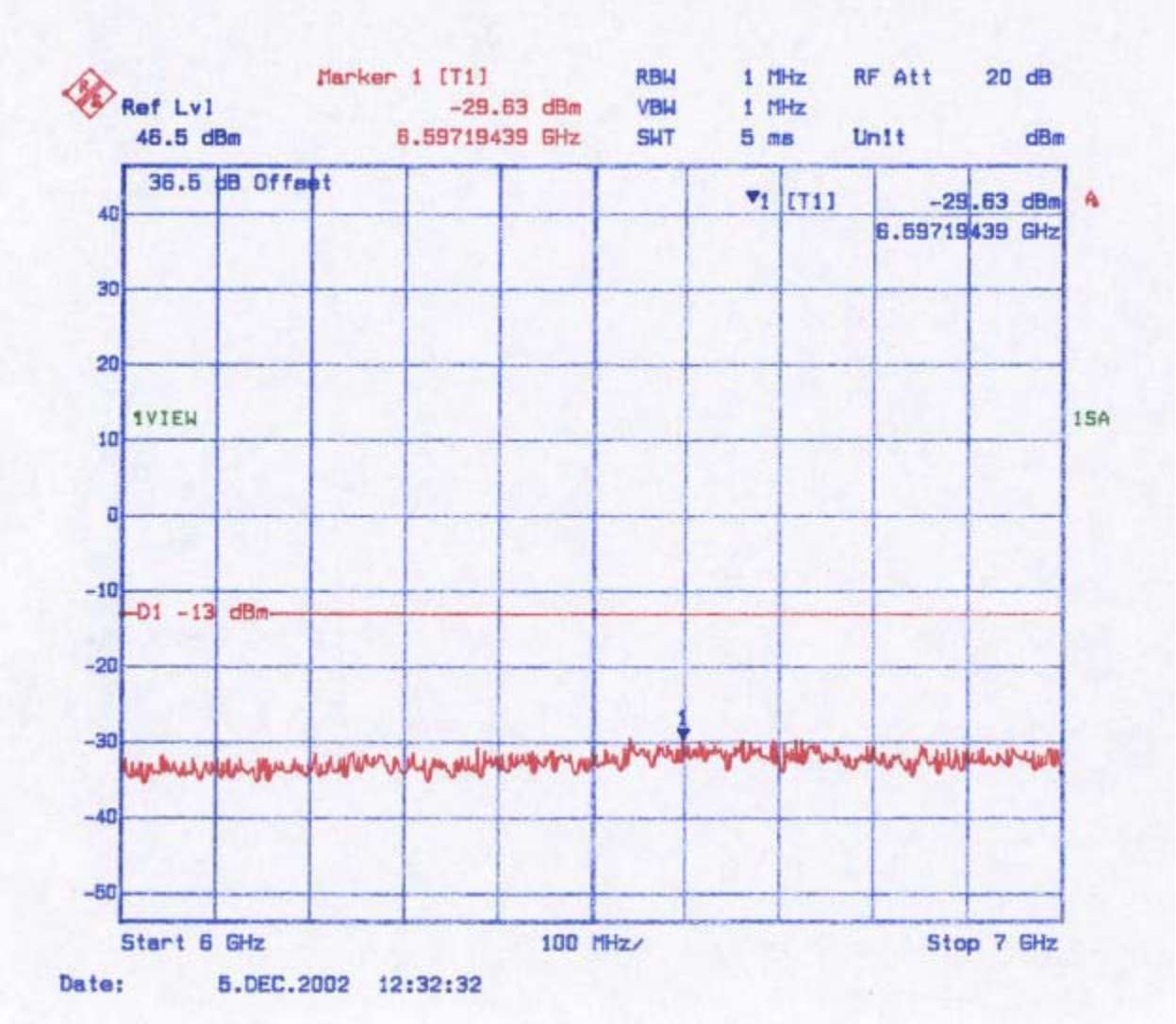


Figure 38: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (7 GHz–8 GHz)

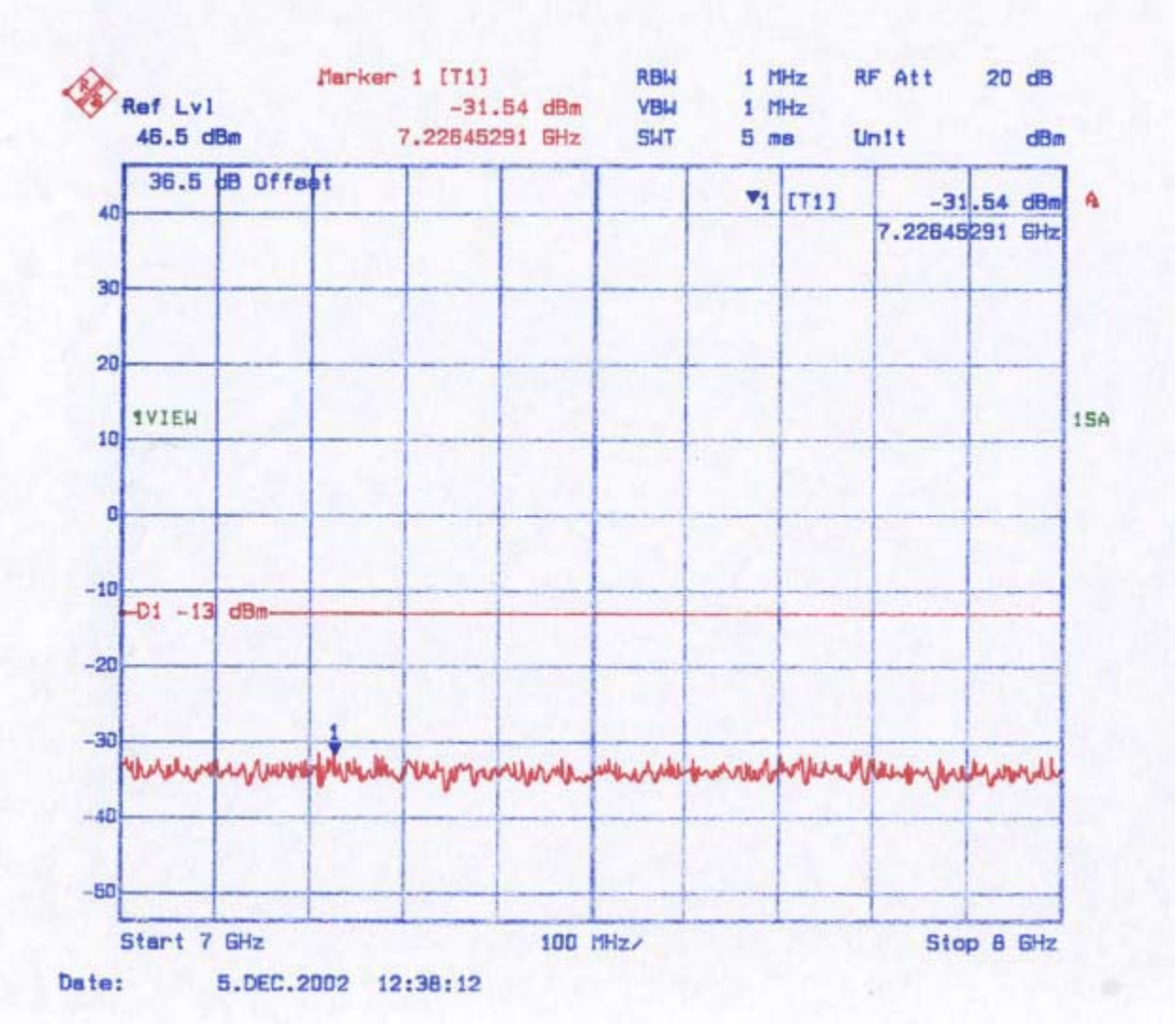


Figure 39: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (8 GHz–9 GHz)

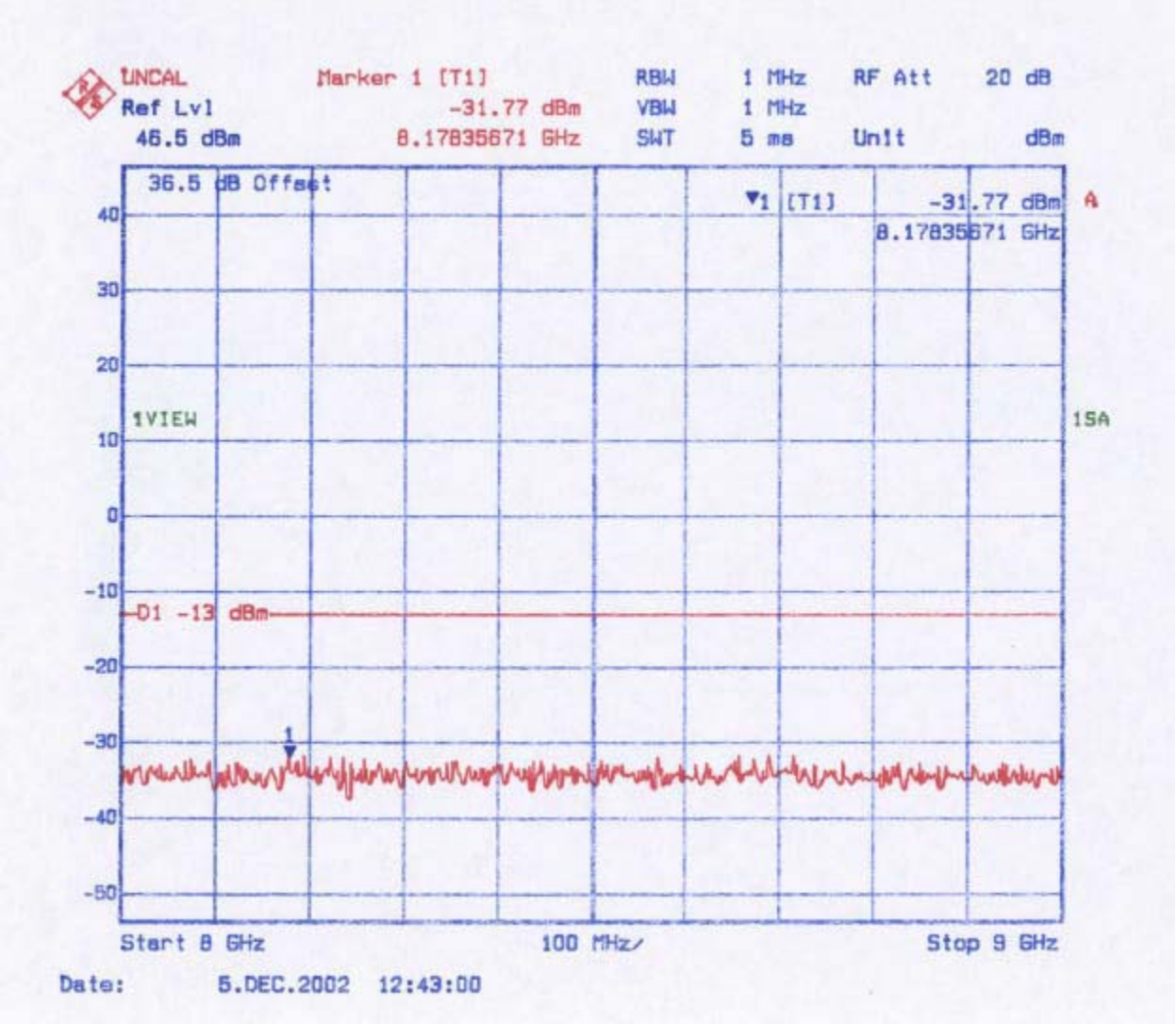
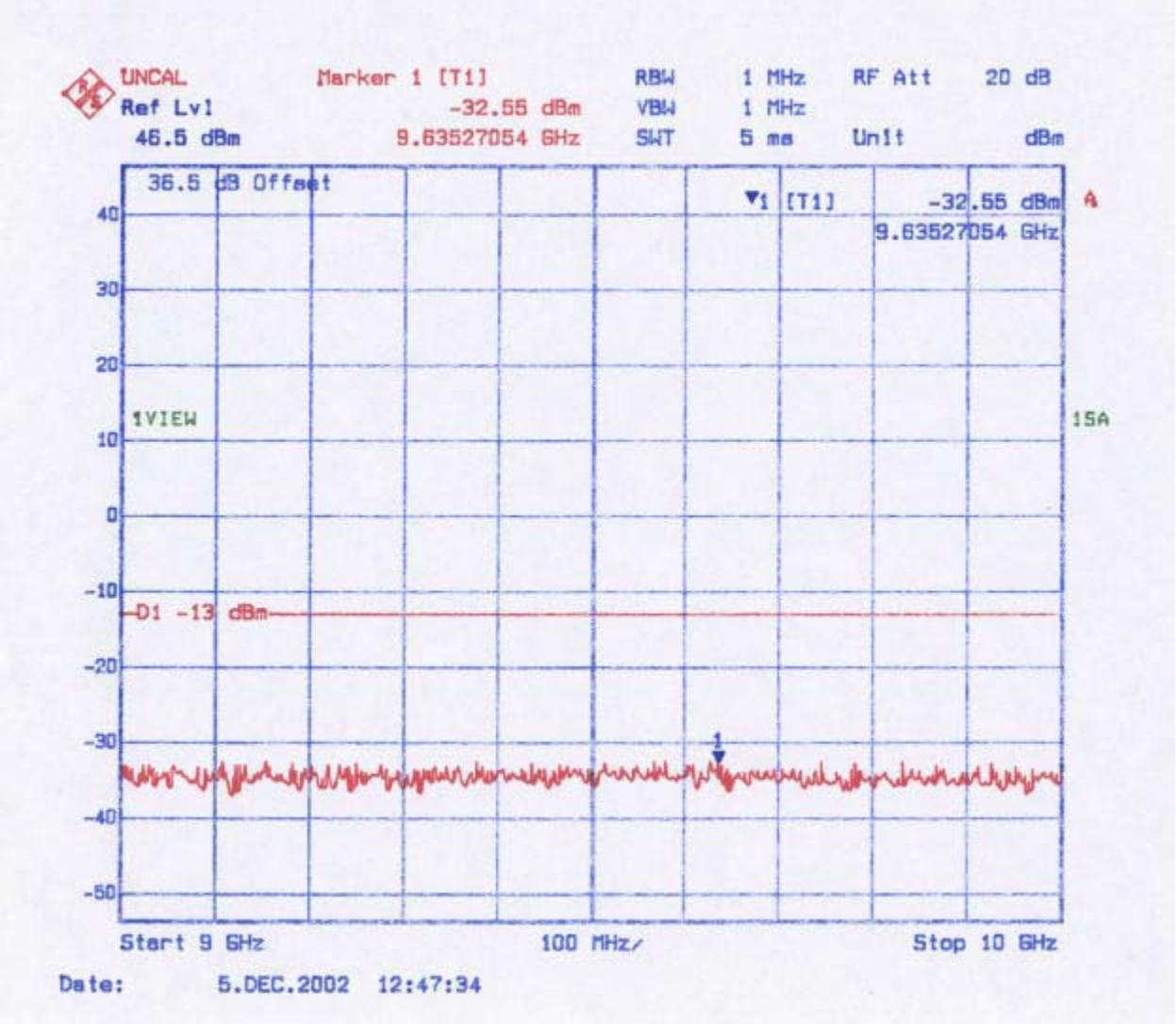


Figure 40: Conducted Spurious Emissions - 3 Carrier Channels 4, 45, 86 (9 GHz–10 GHz)



4.3.8 Frequency Stability Requirements

FCC Limit (Part 22.913)

The frequency stability shall be better than +/- 2.5 ppm over a temperature range of -30 to +50 degrees C.

4.3.9 Results

At the direction of the customer, this test was NOT performed.

4.4 RF Radiation Exposure

Exhibit to be provided by customer

4.5 Field Strength of Spurious and Harmonic Radiation

4.5.1 Radiated Emissions Requirements

FCC Part 2.1053

(a) Measurements was made to detect spurious emissions radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data were supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph 2.989(c) as appropriate. For equipment operating on frequencies below 890 MHz, an Open Field Test is normally required, with the measuring instrument antenna located in the far field at all test frequencies. In event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurement will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with the reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

(b) Measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emission are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

FCC Part 2.1057 - Frequency spectrum to be investigated

The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and sub harmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

4.5.2 Test Method

4.5.2.1 Test Site

Radiated emissions testing was performed at Sanmina Product Integrity Laboratory in the 10 meter Ambient Free Chamber located at 5111 47th Street NE, Calgary, Alberta Canada.

4.5.2.2 Test Procedure

Radiated emission measurements were performed according to the procedures outlined in Section 8 of the ANSI C63.4 standard.

The measurement distance between the center of the measurement antenna and the periphery of equipment under test was 10 meters.

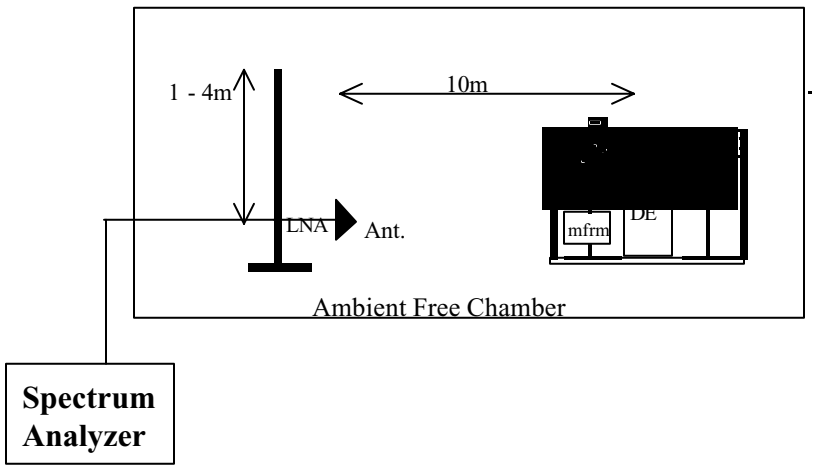
In order to maximize all emission levels from the equipment, the emissions were searched with the receive antenna at varied height levels. The equipment was rotated a full 360 degrees on the turntable with the receive antenna at varying height levels (1 to 4 meters). Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization.

The EUT was transmitting on channels Radio 2, 4, 6 located in side 1 were set to channels 384, 425, 466 (fc 881.52, 882.75, 883.98) Radio 1, 3, 5 were in side 0 with channels 201, 242, 283 (fc 876.03, 877.26, 878.49)

A complete scan of the emissions from 30 MHz to 10 GHz was completed. Quasi-peak detector was used for measurements up to 1GHz. For emissions above 1 GHz the peak detector function was used with an RBW of 1 MHz. The EUT was then removed from the test site and signal substitution was performed on any detected emissions related to the transmitter.

From 1 GHz to 10 GHz was broken-up into two ranges with the first being 1 GHz – 4 GHz, without an Low Noise Amplifier (LNA) and the second being 4 GHz – 10 GHz, with an LNA.

4.5.3 Test Setup



4.5.4 Test Results

No transmitter emissions were detected from the EUT. The measurements below represent the noise floor of the instumentation setup

Table 6: Radiated Spurious Emissions:

Frequency (MHz)	Polarization (V/H)	Emission level	Corrected Substitution measured level	Signal Generator level (source)	Cable factor	Antenna Gain	Effective Radiated Power (E.R.P.)	E.R.P Limit	Margin
		dBuV/m	dBuV/m	dBm	dB	dB	dBm	dBm	dB
2651.12	H	57.25	57.86	-54.40	-6.59	7.78	-55.36	-13	42.36
5871.32	H	55.73	57.86	-56.70	-10.10	9.12	-59.83	-13	46.83
6108.29	H	55.48	55.16	-49.10	-10.31	9.46	-52.10	-13	39.10
8836.67	H	55.67	55.86	-50.40	-12.63	9.32	-55.86	-13	42.86
2650.98	V	61.80	61.73	-47.90	-6.59	7.92	-48.72	-13	35.72
5850.58	V	55.54	55.43	-56.30	-10.06	8.83	-59.68	-13	46.68
6108.71	V	57.59	57.50	-46.00	-10.31	9.15	-49.31	-13	36.31
9162.18	V	55.27	55.19	-49.90	-12.91	9.35	-55.60	-13	42.60