

Nemko Test Report: 1906RUS2

Applicant: Fiber-Span
111 Corporate Blvd, S.
Plainfield, NJ 07080
USA

**Equipment Under Test:
(E.U.T.)** FS31X-87-25-2-RM

In Accordance With: **CFR 47, Part 22, Subpart H**
Cellular Band Repeaters

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, TX
75057-3136

TESTED BY:

A handwritten signature in black ink, appearing to read 'David Light'.

David Light, senior Wireless Engineer

DATE: 10 January 2007

APPROVED BY:

A handwritten signature in black ink, appearing to read 'Kevin Rose'.

Kevin Rose, Wireless Engineer

DATE: 12 January 2007

Number of Pages: 83

Table of Contents

SECTION 1.	SUMMARY OF TEST RESULTS	3
SECTION 2.	GENERAL EQUIPMENT SPECIFICATION	5
SECTION 3.	RF POWER OUTPUT	7
SECTION 4.	OCCUPIED BANDWIDTH	8
SECTION 5.	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	33
SECTION 6.	FIELD STRENGTH OF SPURIOUS	70
SECTION 7.	TEST EQUIPMENT LIST	71
ANNEX A -	TEST DETAILS	72
ANNEX B -	TEST DIAGRAMS	78

EQUIPMENT: **FS31X-87-25-2-RM**PROJECT NO.: 1906RUS2

Section 1. Summary of Test ResultsManufacturer: **Fiber-Span**Model No.: **FS31X-87-25-2-RM**Serial No.: **A1937-4-1**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 CFR 47, Part 22, Subpart H.



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".



Nemko USA Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko USA Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report applies only to the items tested.

EQUIPMENT: **FS31X-87-25-2-RM***PROJECT NO.:* 1906RUS2

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	22.913(a)	500W ERP	Complies
Occupied Bandwidth	Not defined	Input/Output	Complies
Spurious Emissions at Antenna Terminals	22.917	-13 dBm	Complies
Field Strength of Spurious Emissions	22.917	-13 dBm E.I.R.P.	Complies
Frequency Stability	22.355	1.5 ppm	NA

Footnotes:

.

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

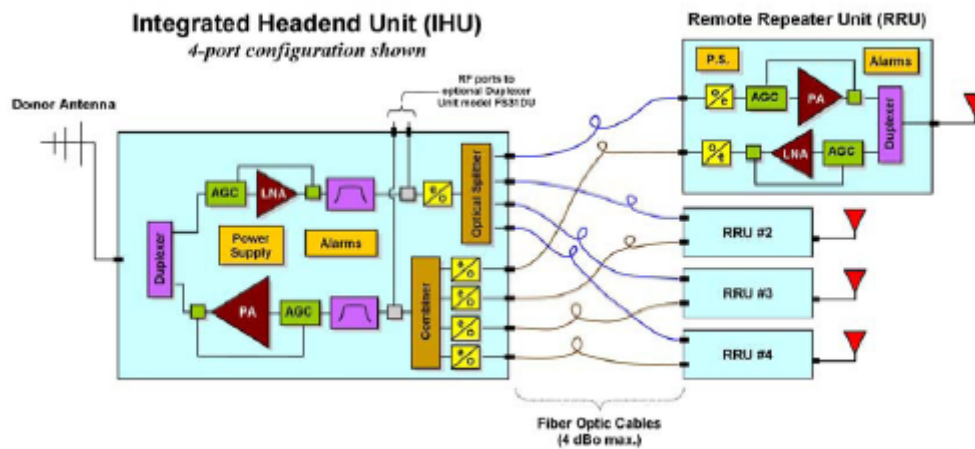
Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac					
Frequency Range:	Downlink:	869-894 MHz					
Frequency Range:	Uplink:	824-849 MHz					
Type of Modulation and Designator:		CDM A F9W	GSM GXW	TDMA DXW	EDGE G7W	WCDMA F9W	Voice F3E
		☒	☒	☒	☒	☒	☒
Output Impedance:		50 ohms					
RF Output (Rated):	Downlink:	2		W			
	Uplink:	33		dBm			
		2		W			
		33		dBm			
Frequency Translation:		F1-F1	F1-F2		N/A		
		☒	☐		☐		
Band Selection:		Software	Duplexer Change		Fullband Coverage		
		☐	☐		☒		

Description of EUT

Fiber optic bi-directional amplifier operating in the 850 MHz cellular band

System Diagram



EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 22.913
TESTED BY: David Light	DATE: 08 January 2007

Test Results: Complies.**Test Data:**

Direction	Modulation	Output per Channel (dBm)	Composite Power (dBm)	Composite Power (W)
Uplink	CDMA	33.4	36.4	4.4
Downlink	CDMA	33.8	36.8	4.8
Uplink	TDMA	33.4	36.4	4.4
Downlink	TDMA	33.9	36.9	4.9
Uplink	EDGE	33.8	36.8	4.8
Downlink	EDGE	33.2	36.2	4.2
Uplink	GSM	33.4	36.4	4.4
Downlink	GSM	33.2	36.2	4.2
Uplink	W-CDMA	33.4	36.4	4.4
Downlink	W-CDMA	33.0	36.0	4.0
Uplink	Analog	33.3	36.3	4.3
Downlink	Analog	33.3	36.3	4.3

Equipment Used: 1036-1469-1604-1064-1082-2071-2072**Measurement Uncertainty:** +/- 1.7 dB**Temperature:** 23 °C**Relative Humidity:** 35 %

EQUIPMENT: **FS31X-87-25-2-RM***PROJECT NO.:* 1906RUS2

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 20 December 06

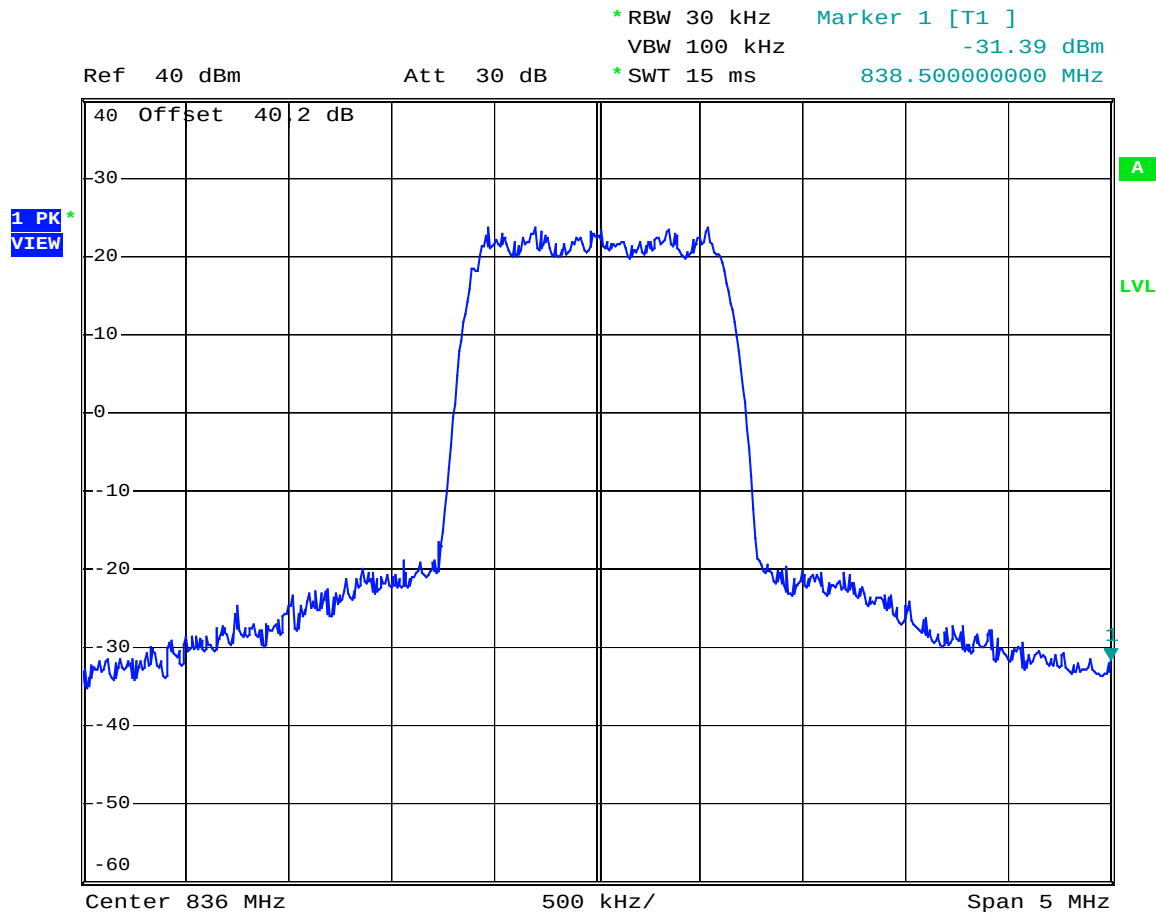
Test Results: Complies.**Test Data:** See attached plot(s).**Equipment Used:** 1036-1469-1604-1064-1082-1659**Measurement Uncertainty:** 1X10⁻⁷ ppm**Temperature:** 24 °C**Relative Humidity:** 38 %

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

CDMA - Output



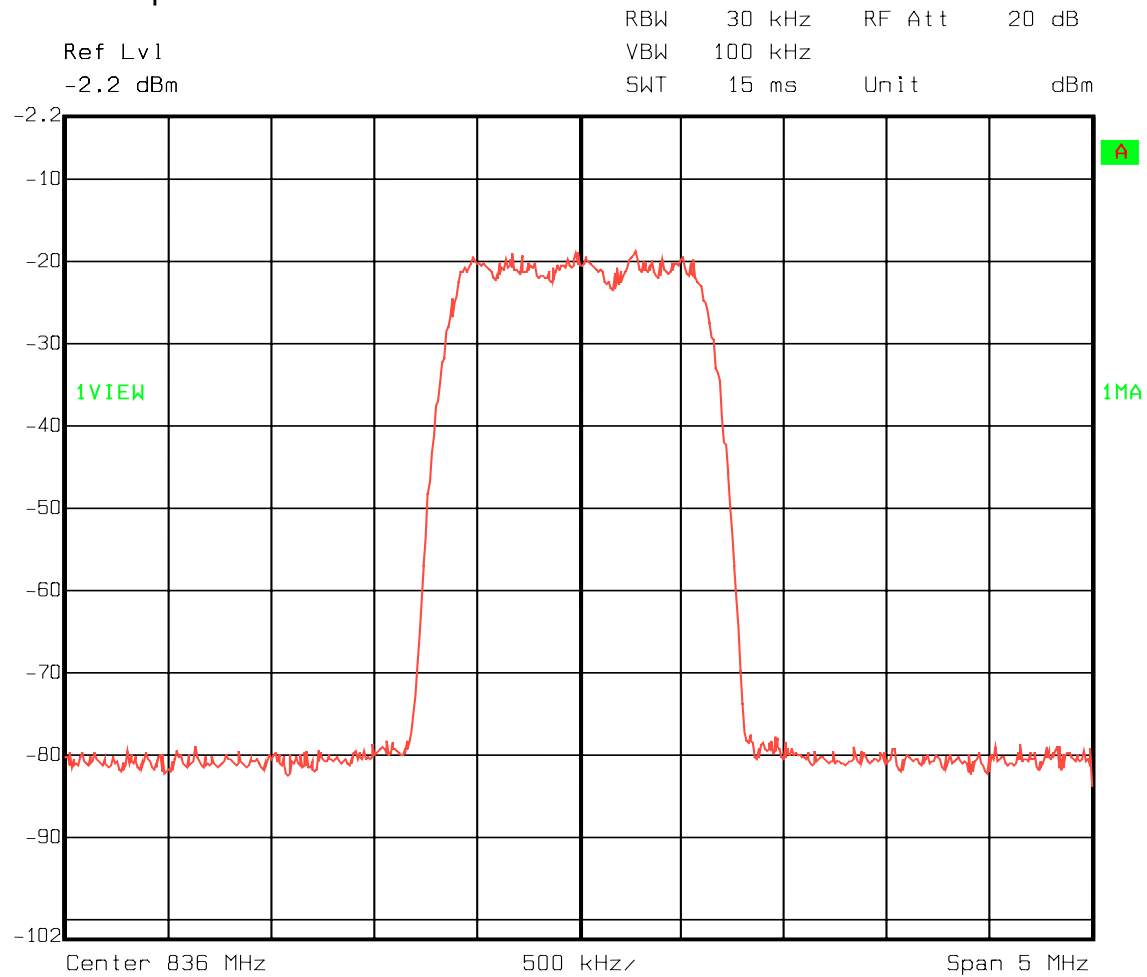
Date: 20.DEC.2006 14:35:27

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

CDMA - Input



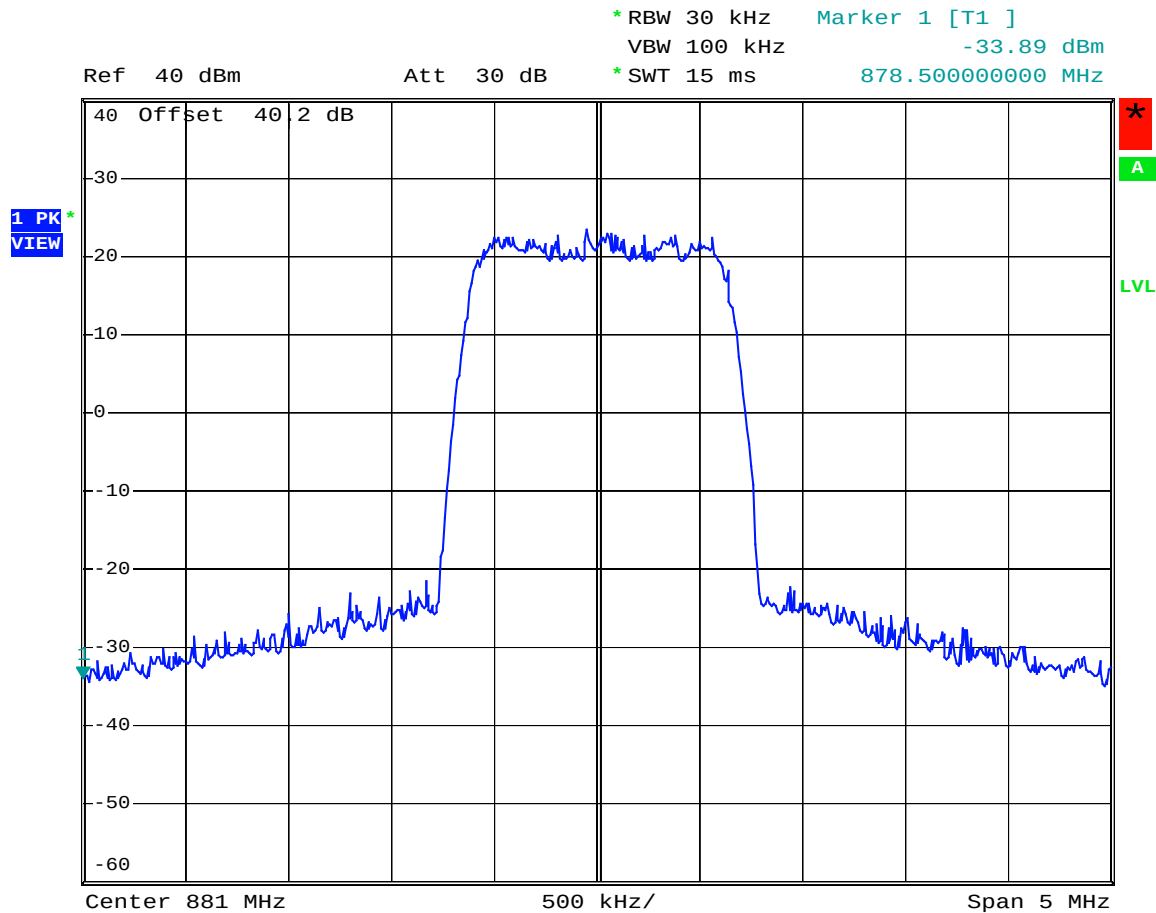
Date: 20.DEC.2006 15:26:22

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

CDMA - Output



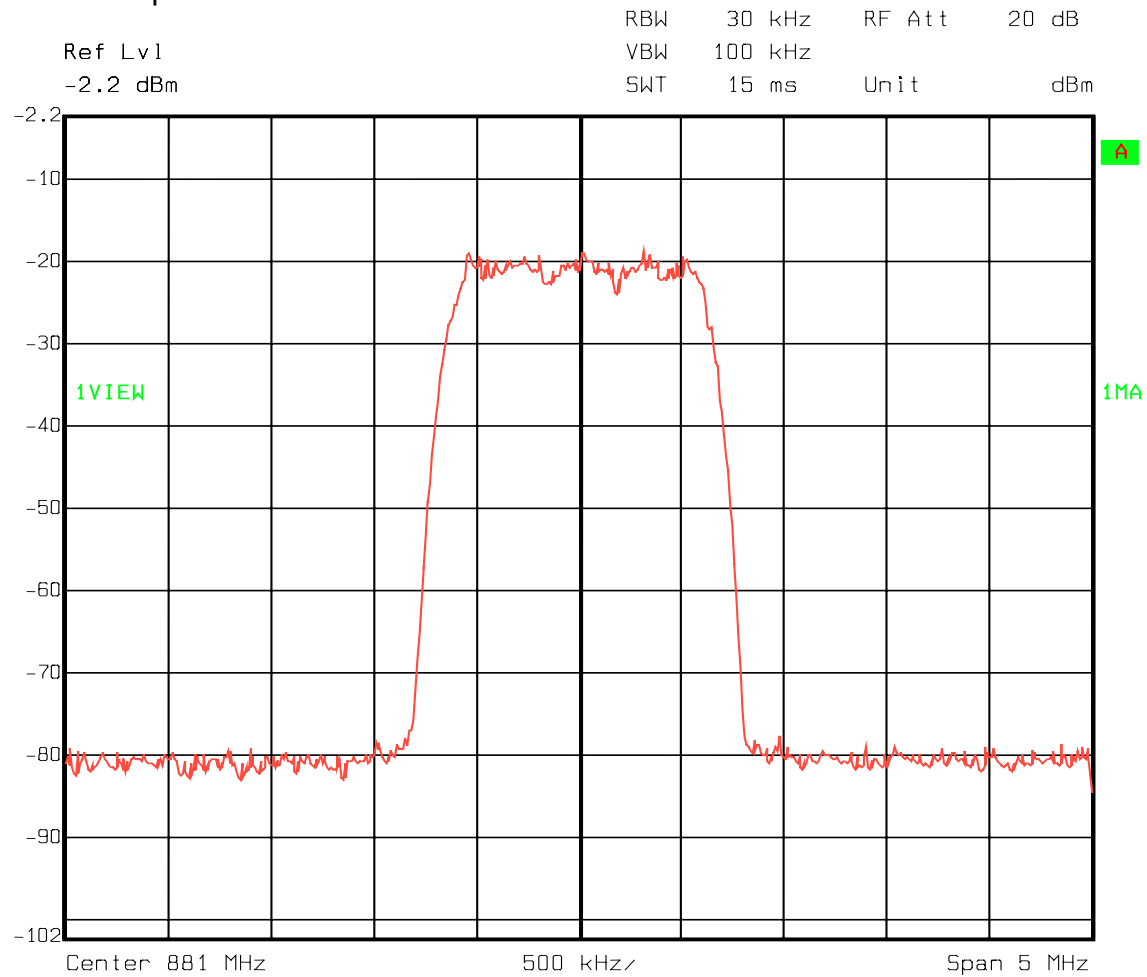
Date: 20.DEC.2006 14:38:07

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

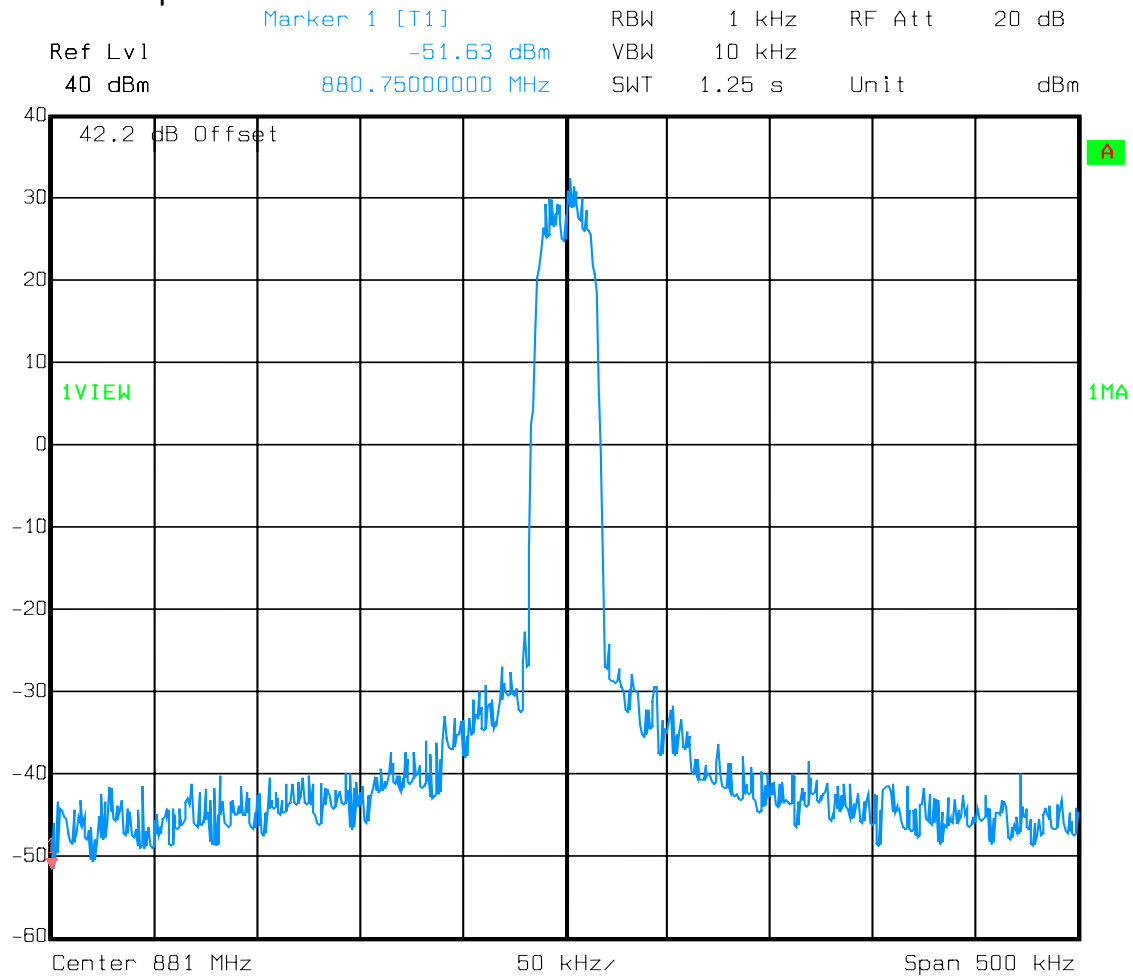
CDMA - Input



Date: 20.DEC.2006 15:27:16

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**TDMA - Output**

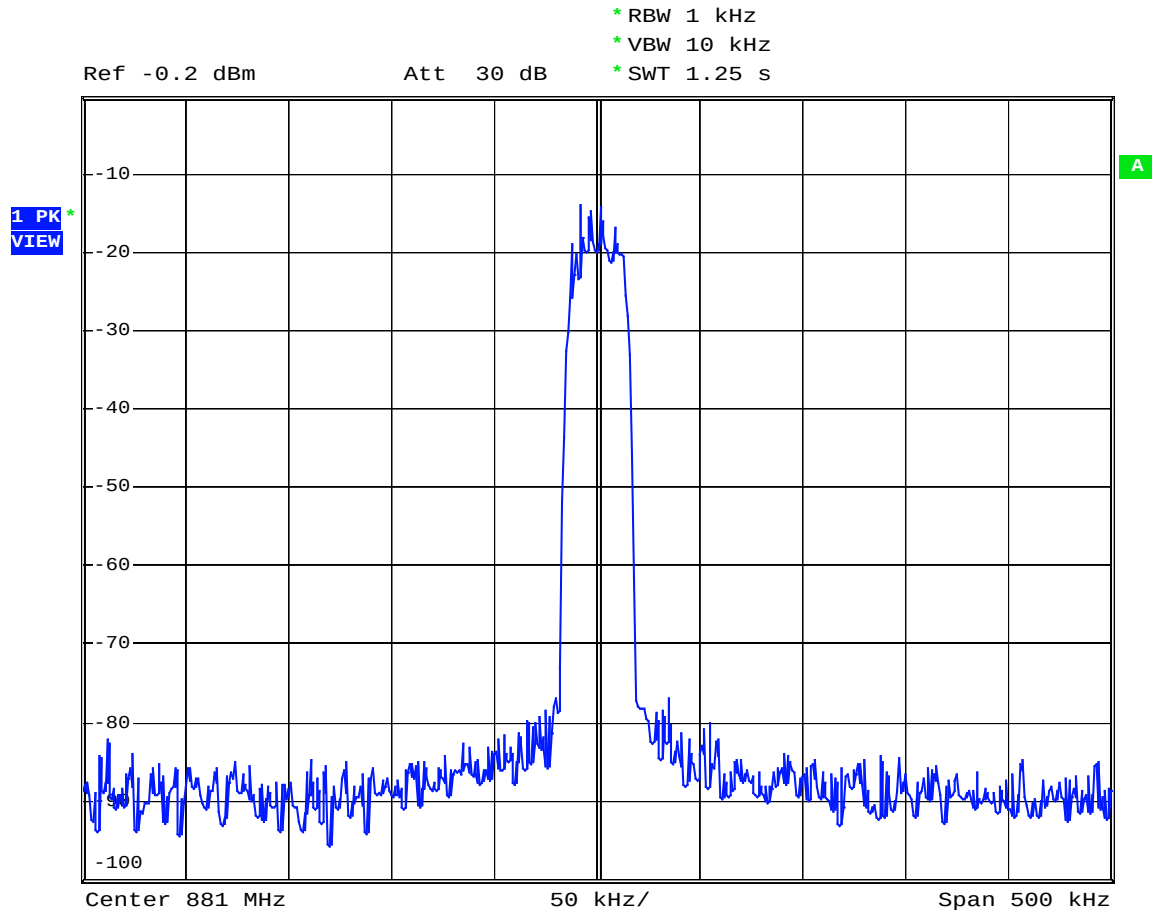
Date: 21.DEC.2006 15:22:17

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

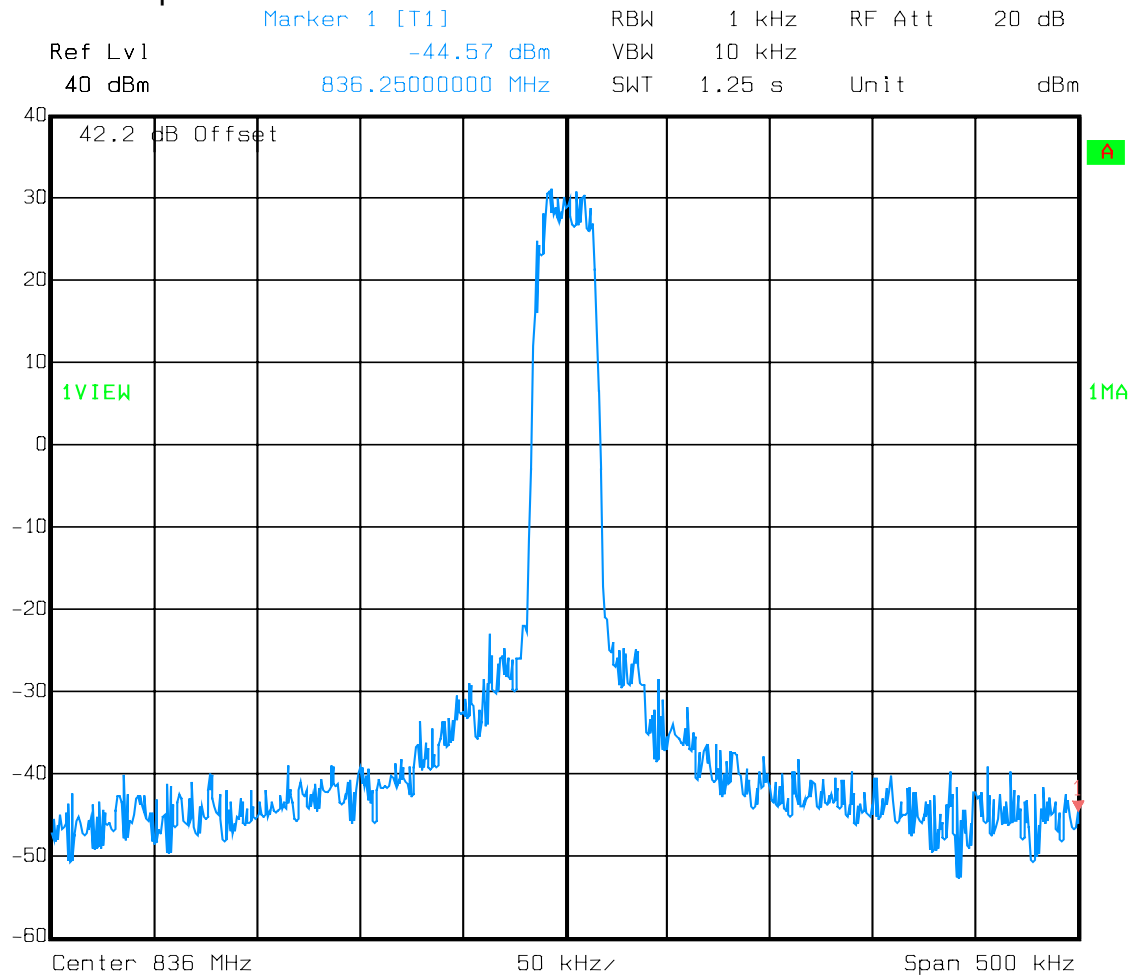
TDMA - Input



Date: 21.DEC.2006 14:32:42

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**TDMA - Output**

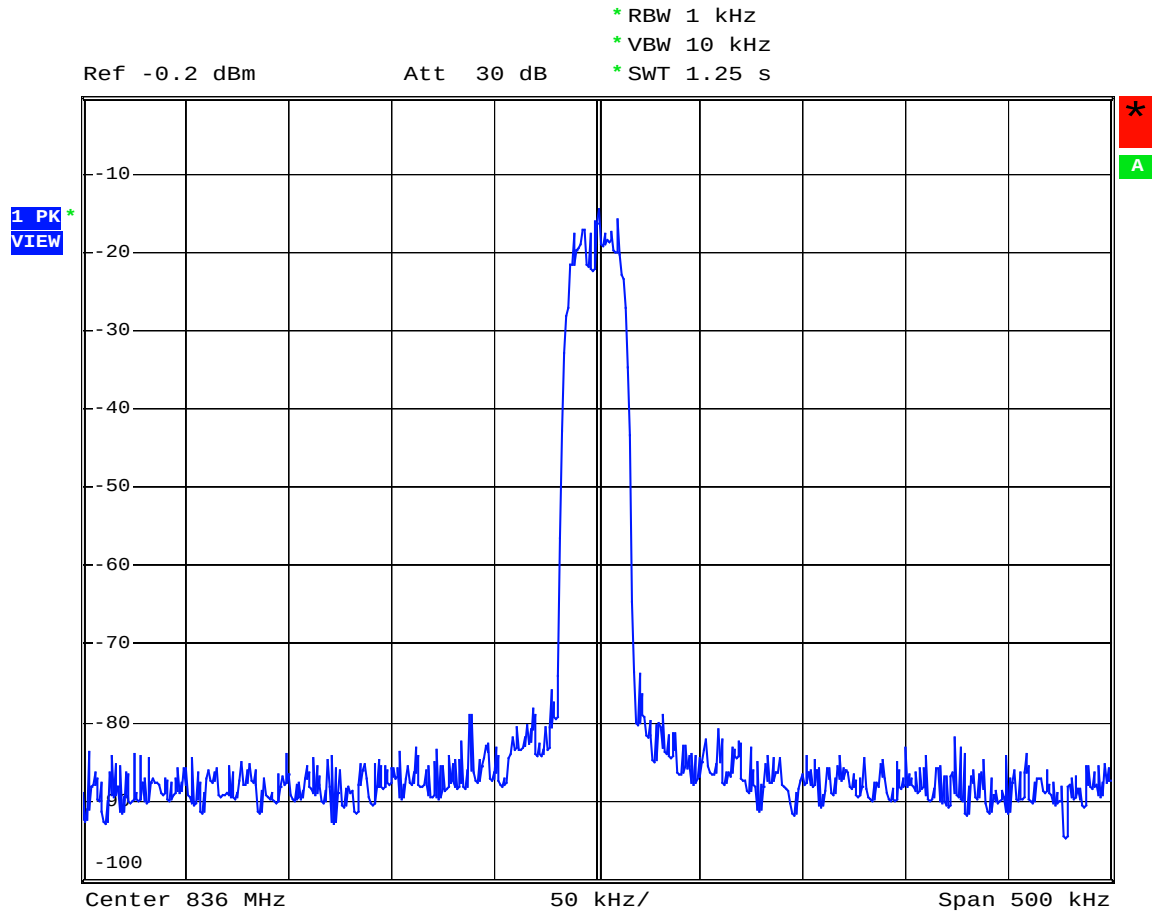
Date: 21.DEC.2006 15:20:23

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

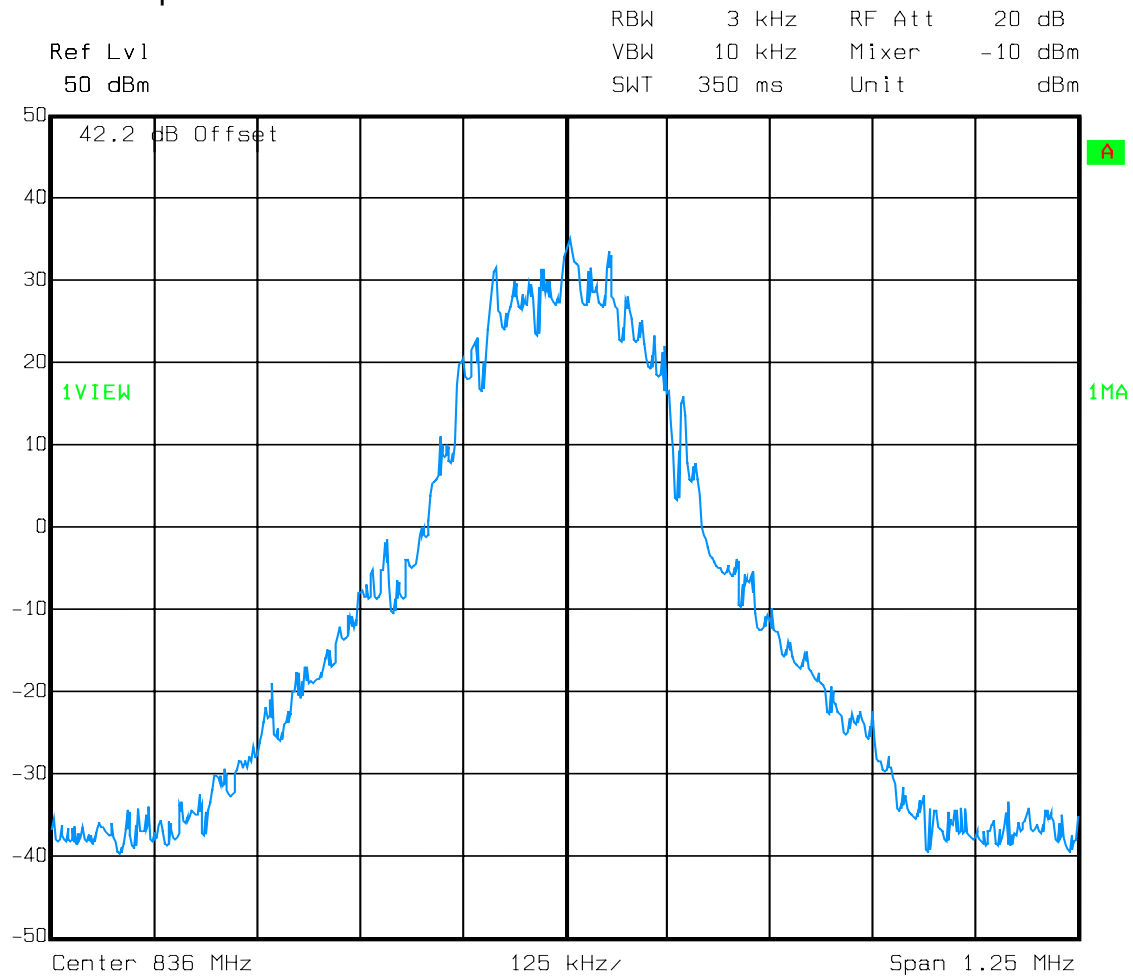
TDMA - Input



Date: 21.DEC.2006 14:31:17

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**EDGE - Output**

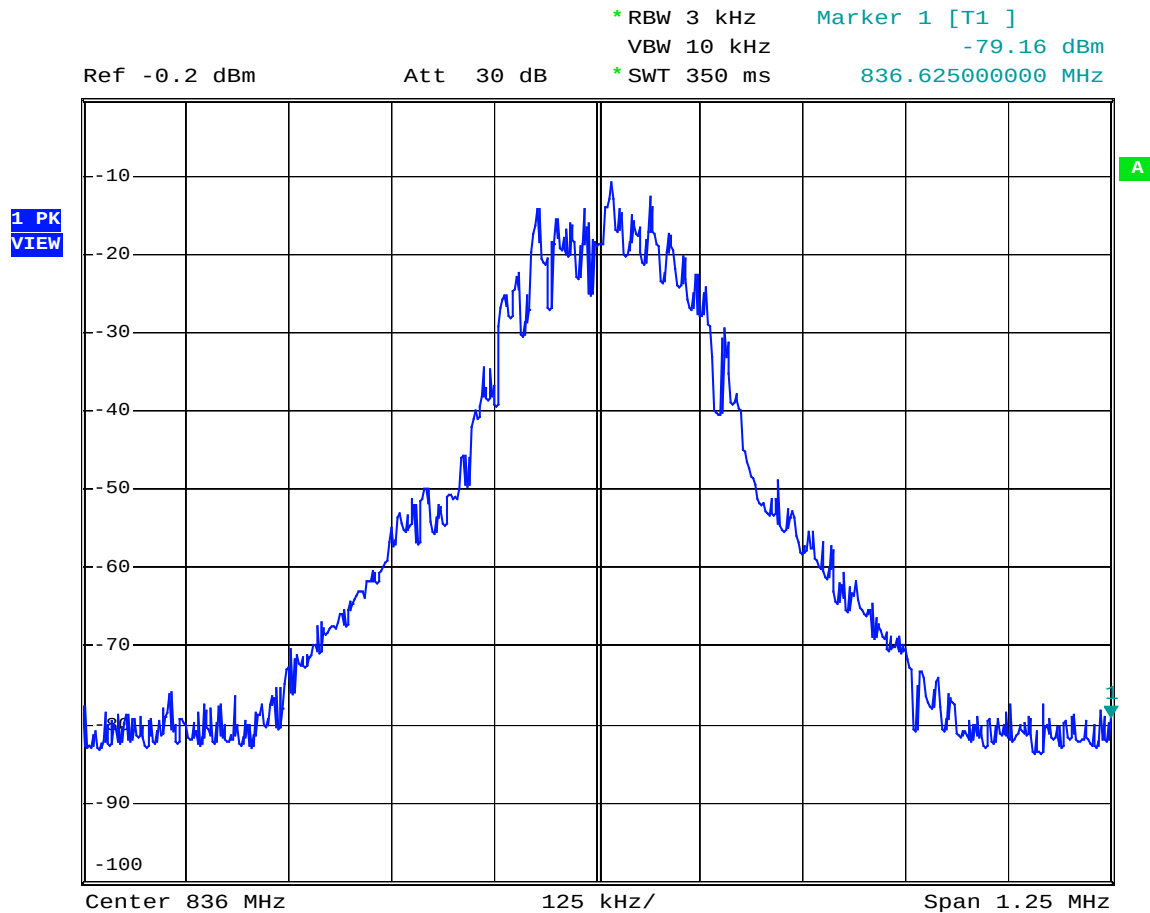
Date: 20.DEC.2006 17:34:07

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

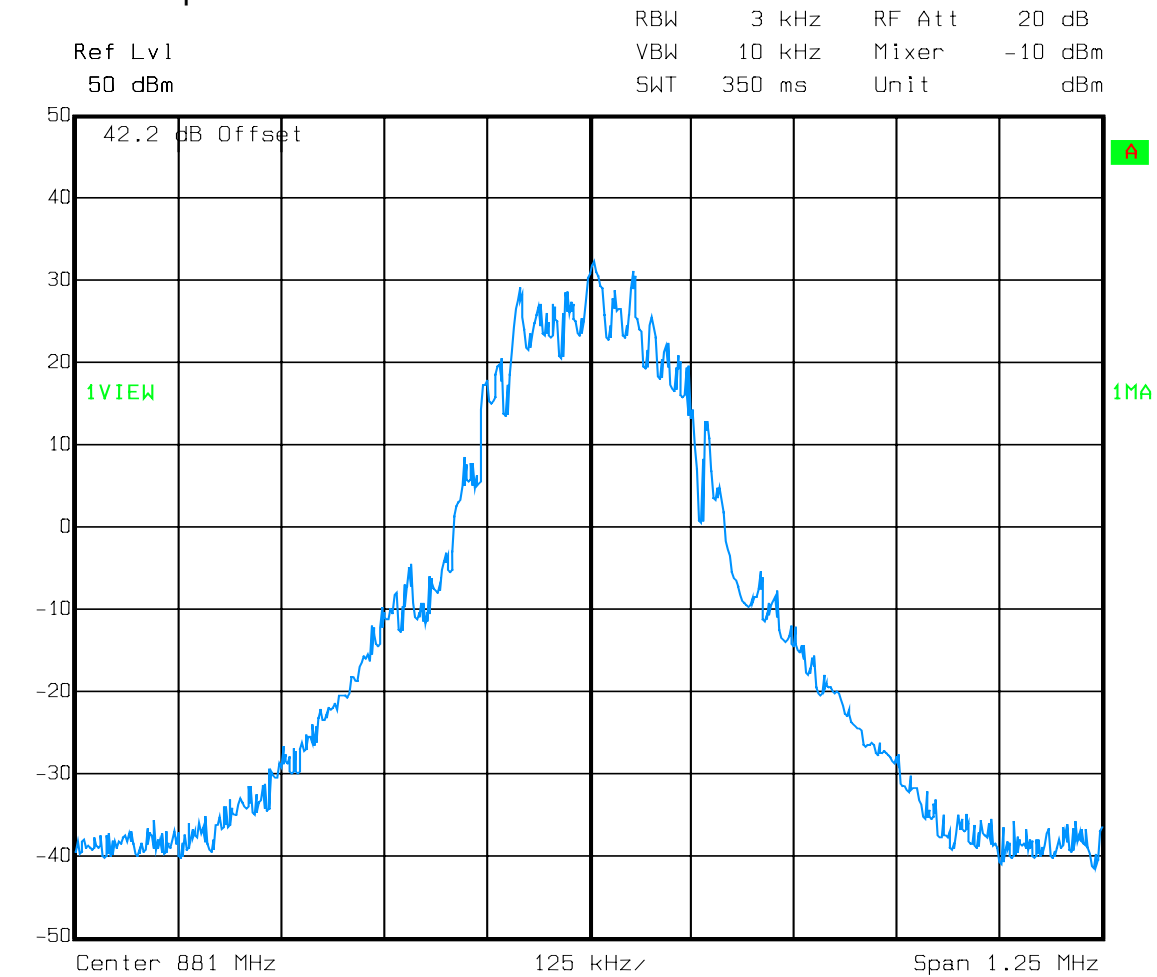
EDGE - Input



Date: 20.DEC.2006 16:44:57

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**EDGE - Output**

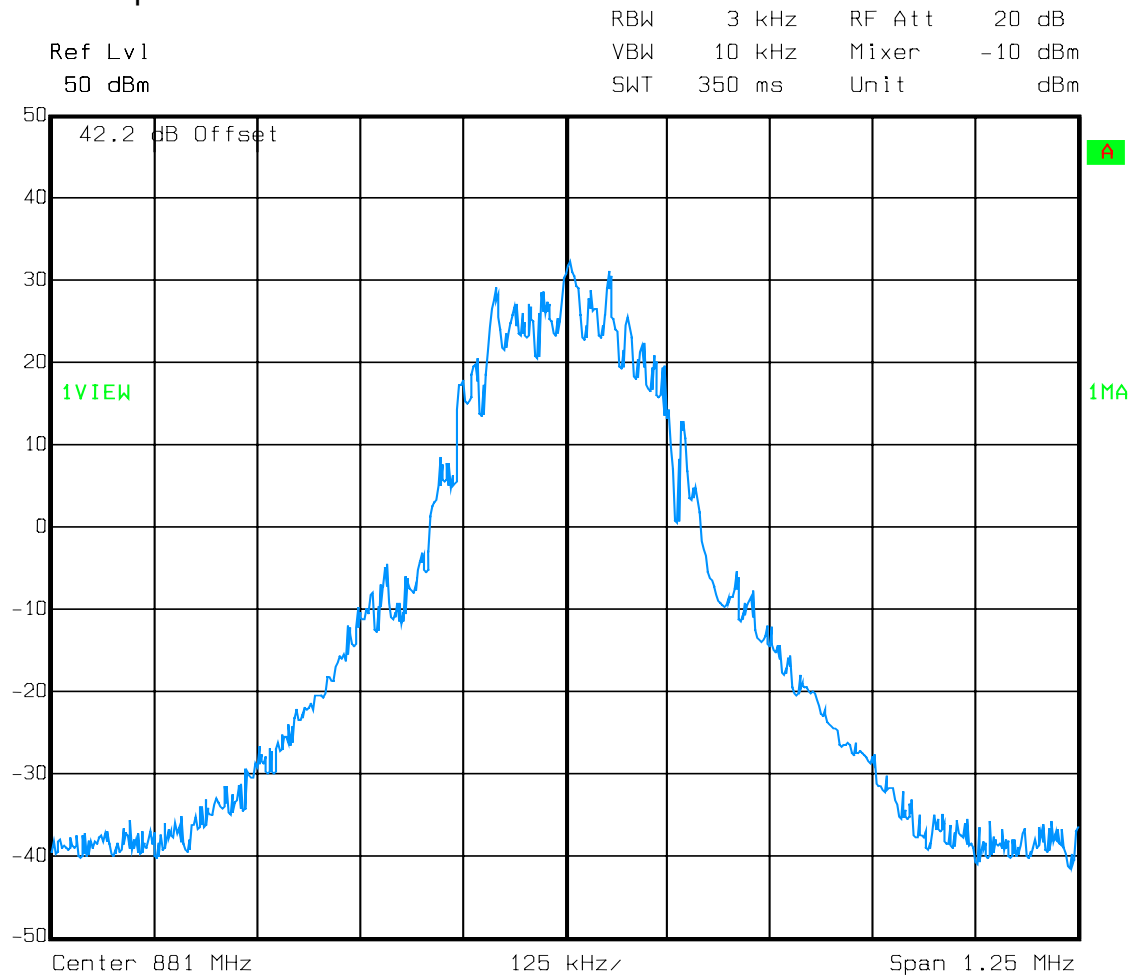
Date: 20.DEC.2006 17:42:52

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

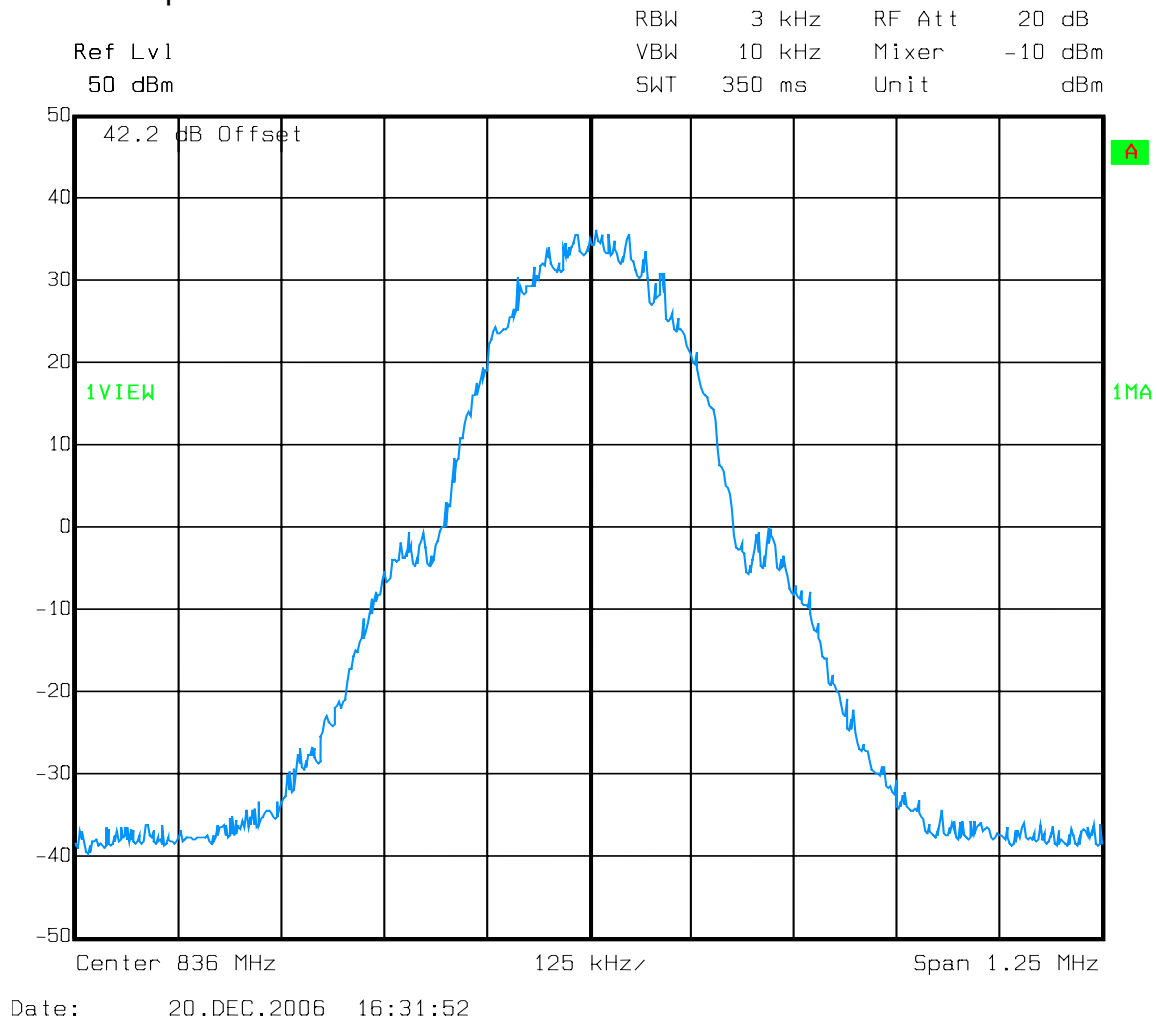
EDGE - Input



Date: 20.DEC.2006 17:42:52

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

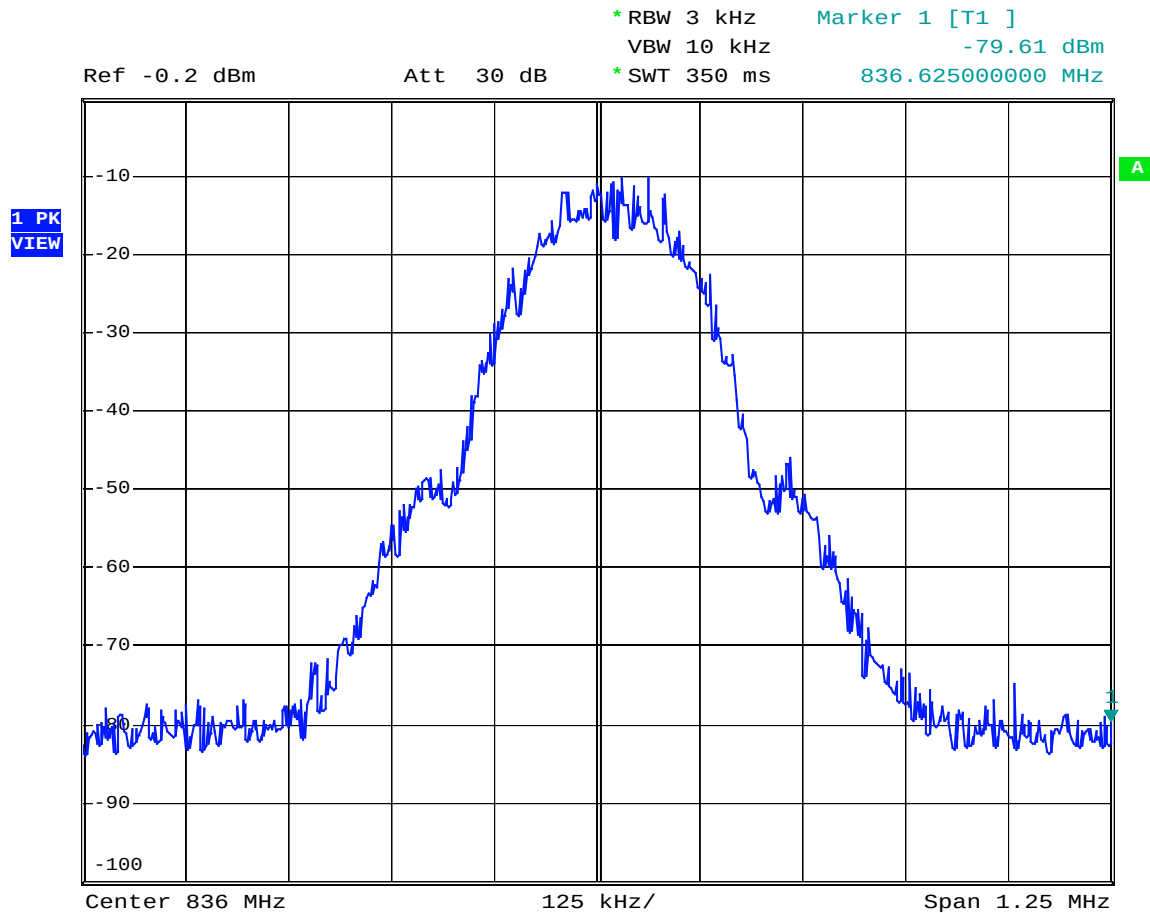
Test Data – Occupied Bandwidth**GSM - Output**

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

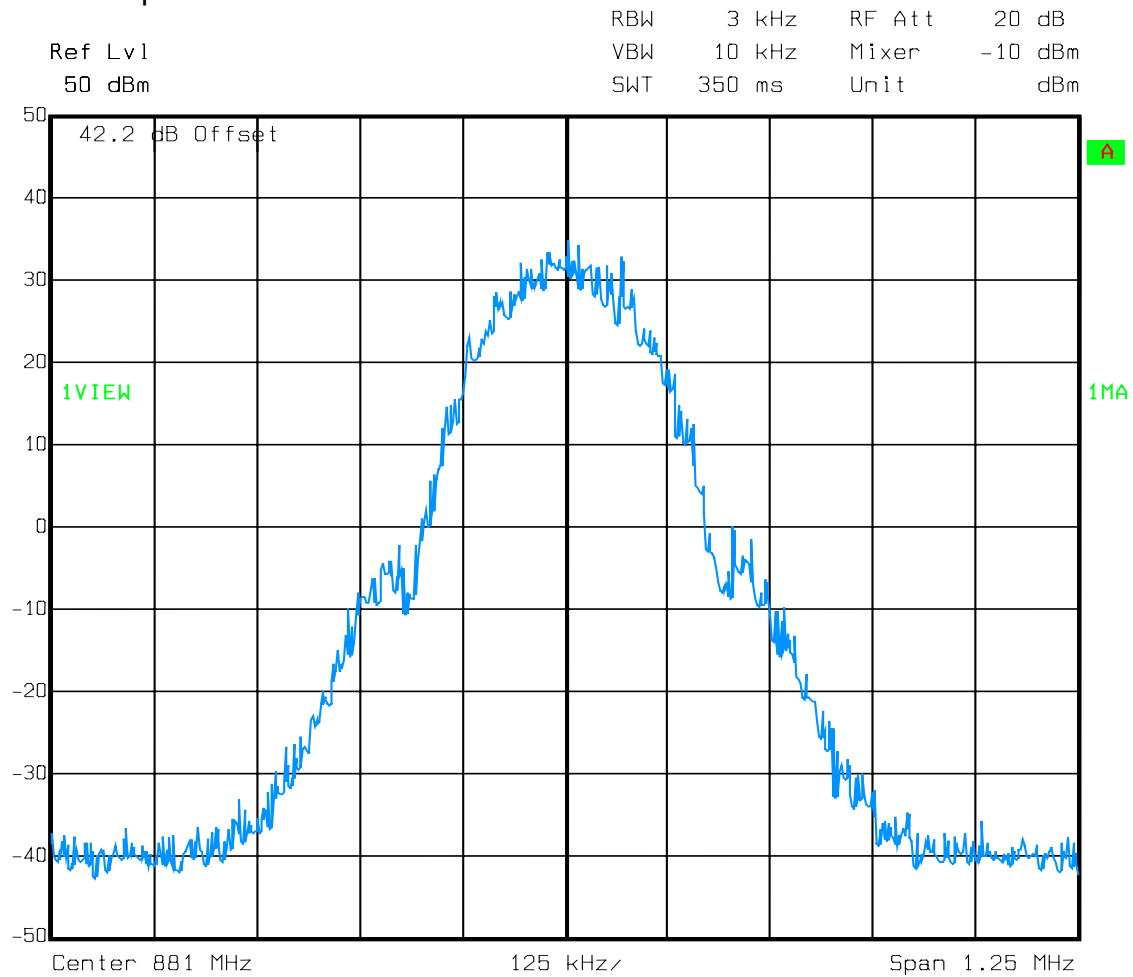
GSM - Input



Date: 20.DEC.2006 15:42:45

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**GSM - Output**

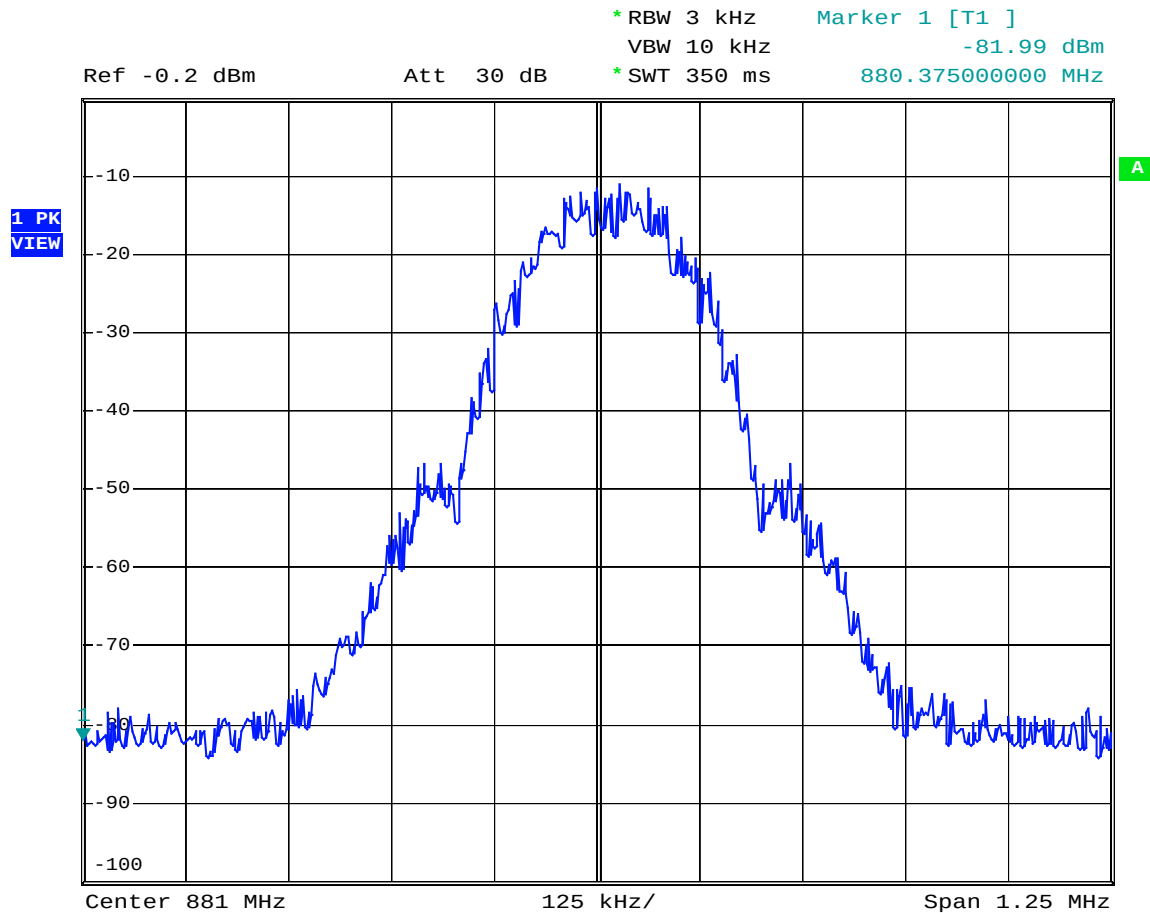
Date: 20.DEC.2006 16:43:03

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

GSM - Input



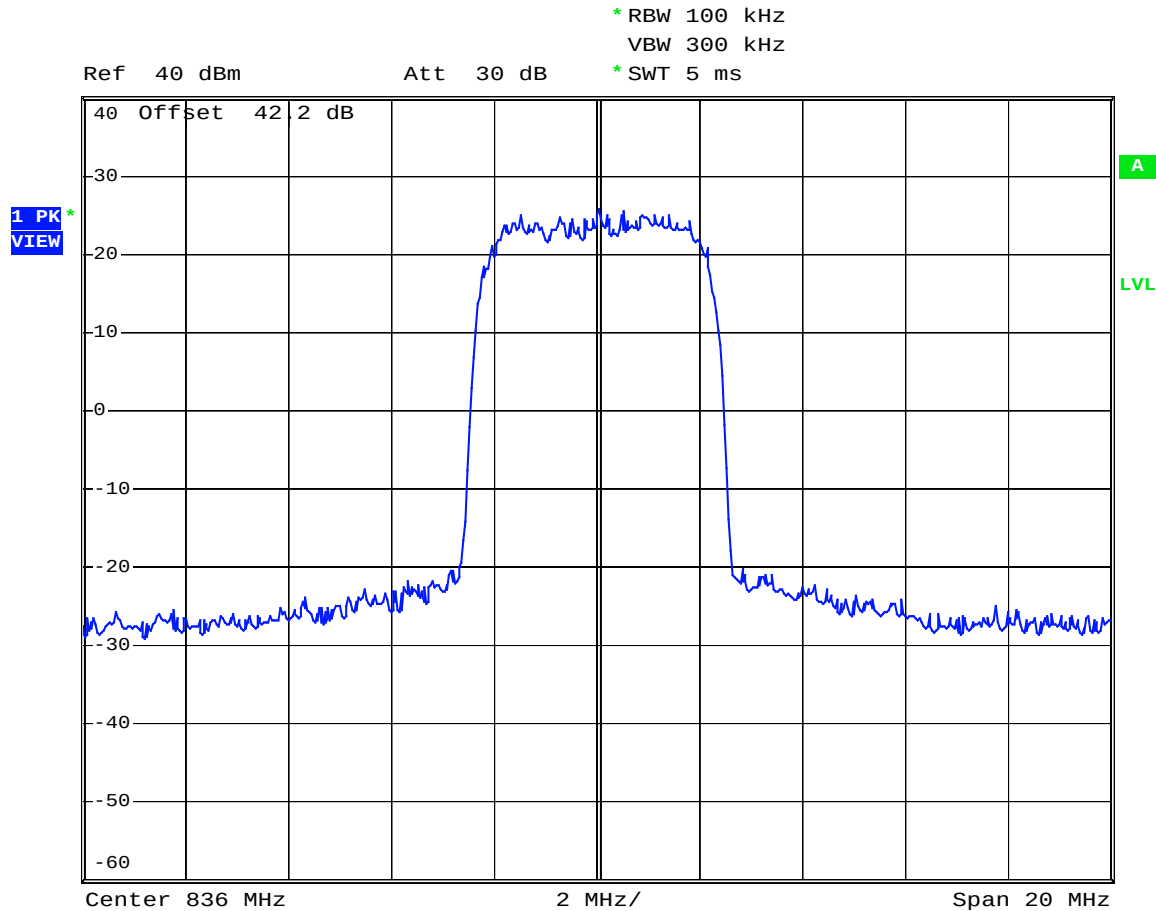
Date: 20.DEC.2006 15:53:24

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

W-CDMA - Output



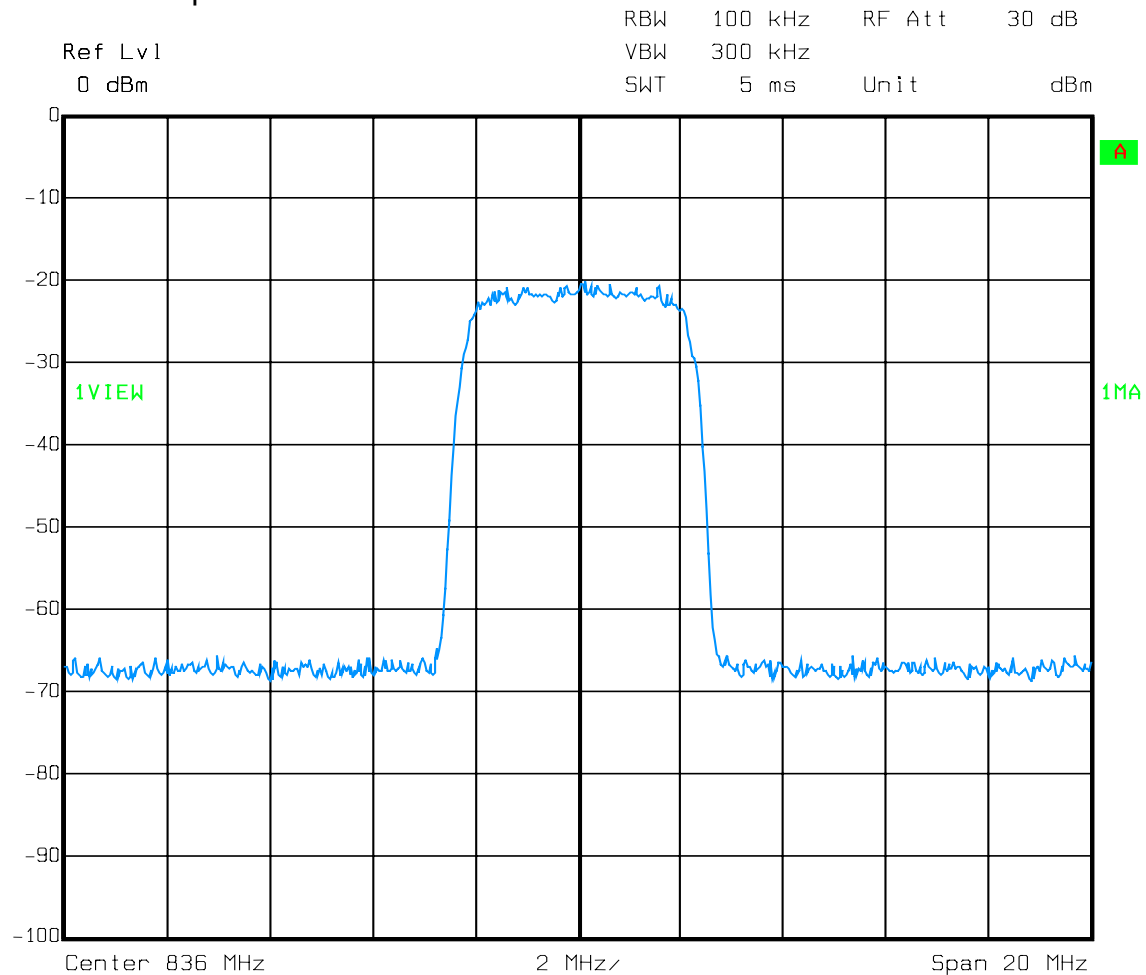
Date: 21.DEC.2006 15:31:05

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

W-CDMA - Input



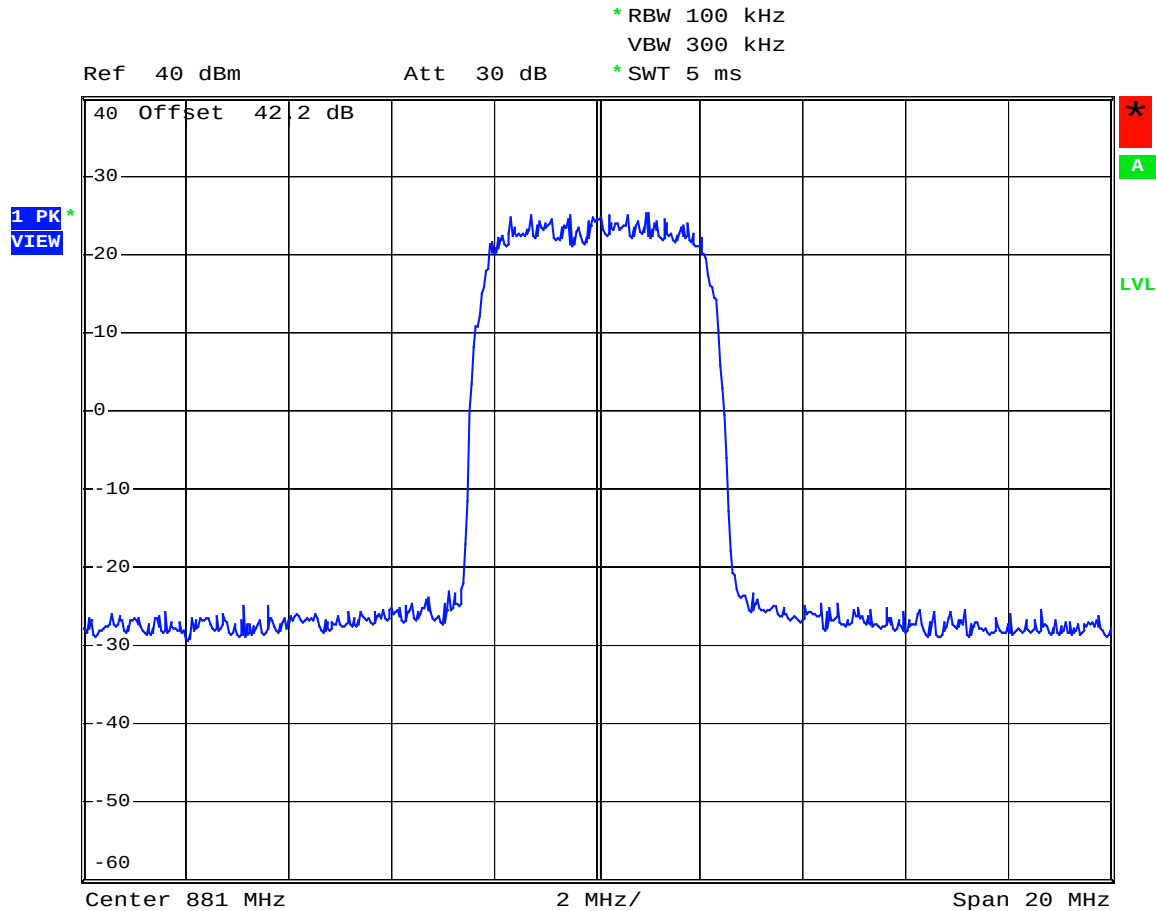
Date: 21.DEC.2006 16:20:37

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

W-CDMA - Output



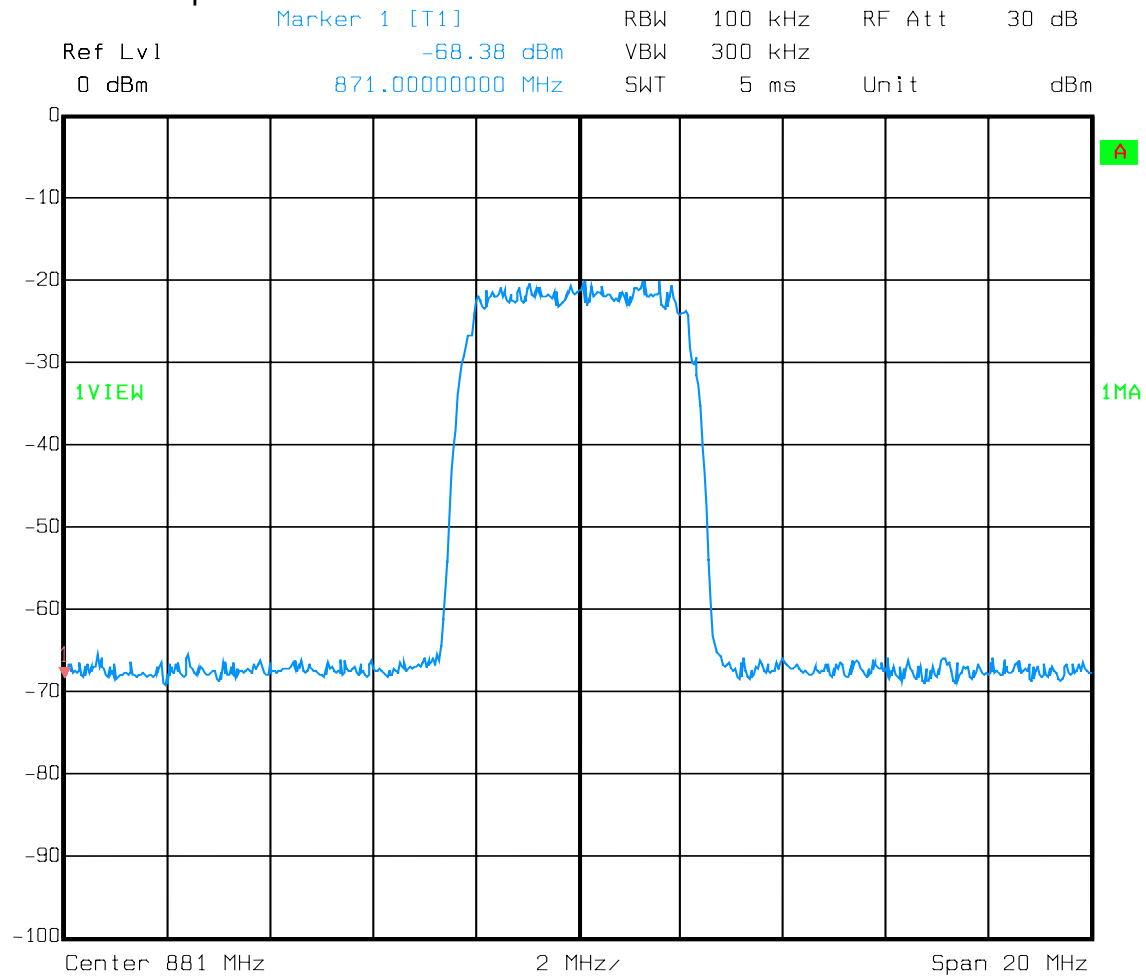
Date: 21.DEC.2006 15:32:26

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

W-CDMA - Input



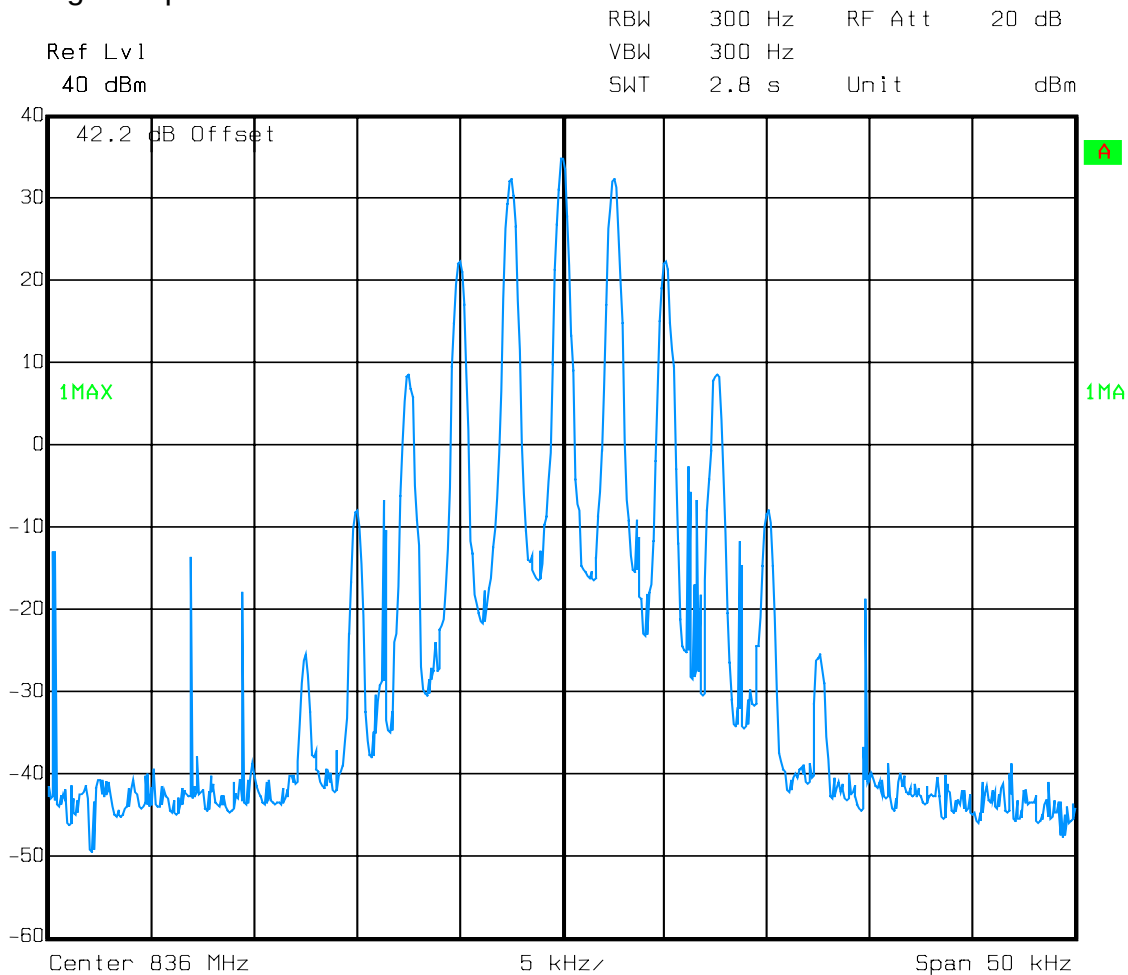
Date: 21.DEC.2006 16:21:33

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

Analog - Output



Date: 21.DEC.2006 17:11:35

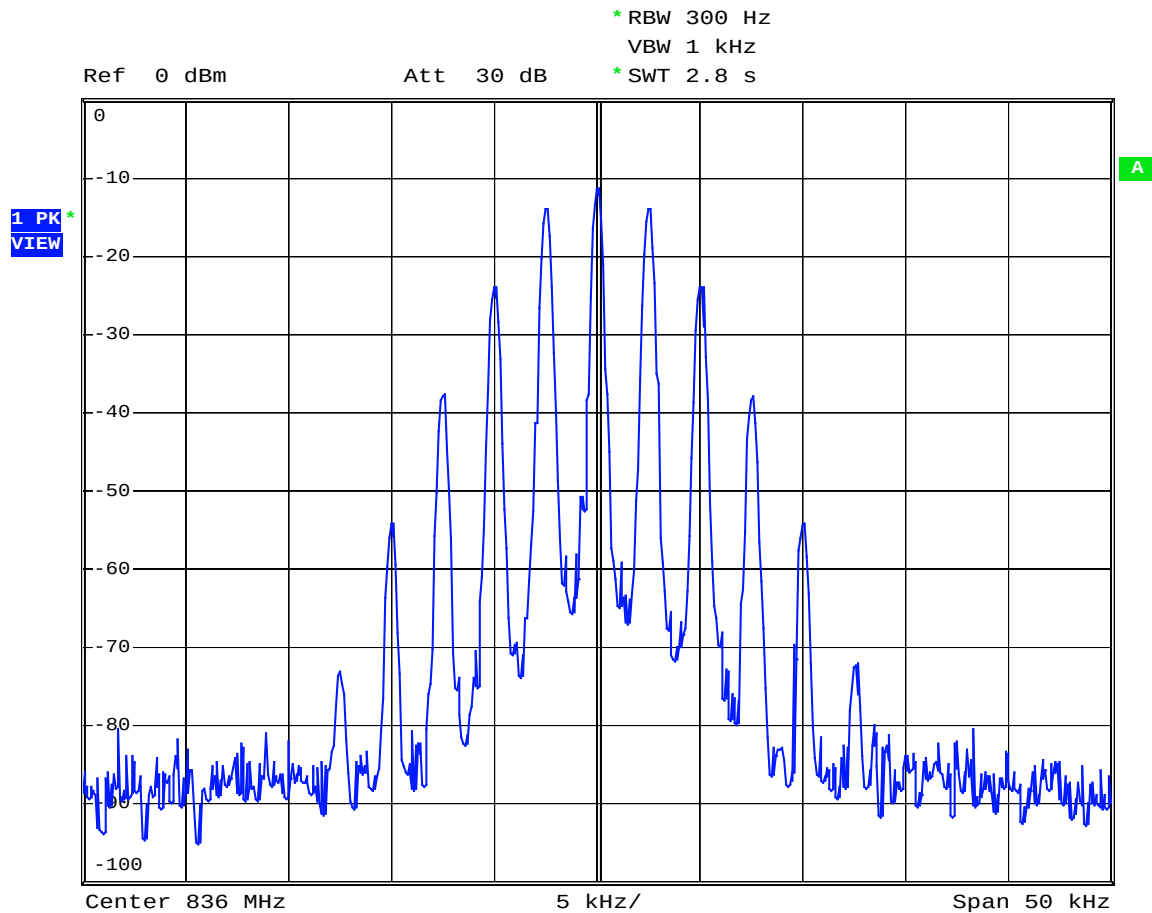
2.5 kHz Tone / 3 kHz Peak deviation

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

Analog - Input

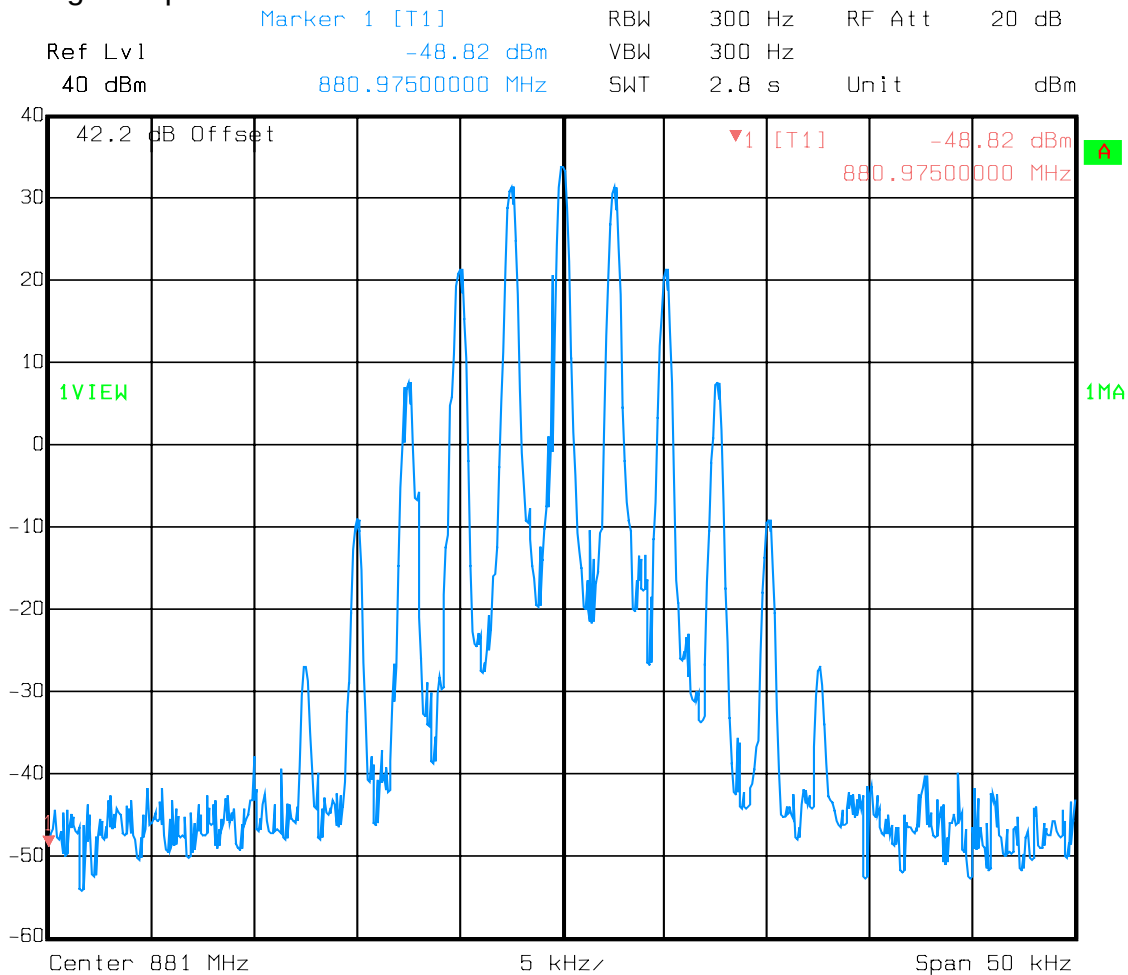


Date: 21.DEC.2006 16:22:30

2.5 kHz Tone / 3 kHz Peak deviation

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth**Analog - Output**

Date: 21.DEC.2006 17:13:59

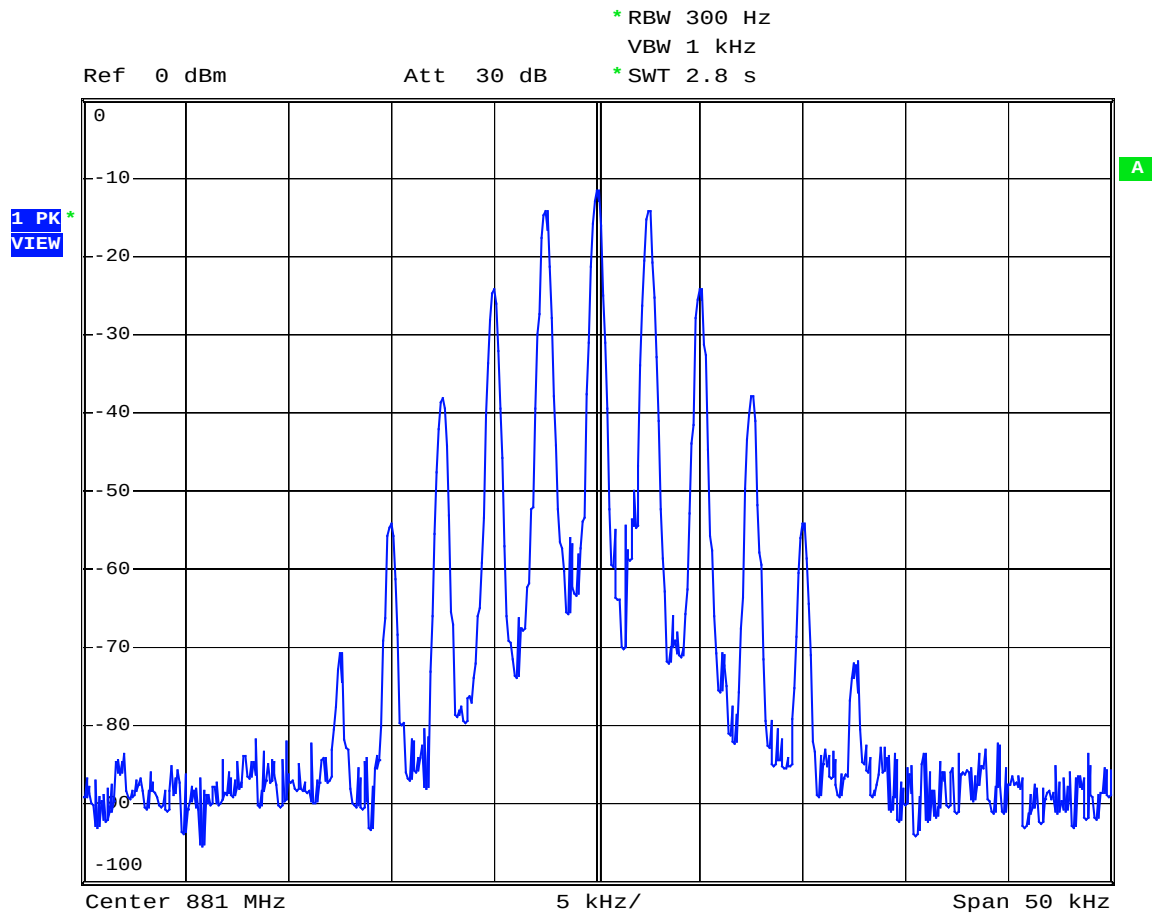
2.5 kHz Tone / 3 kHz Peak deviation

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Occupied Bandwidth

Analog - Input



Date: 21.DEC.2006 16:24:25

2.5 kHz Tone / 3 kHz Peak deviation

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 20 Dec. 06

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1469-1604-1064-1082-1659

Measurement Uncertainty: +/- 1.7 dB

Temperature: 23 °C

Relative Humidity: 36 %

EQUIPMENT: **FS31X-87-25-2-RM**

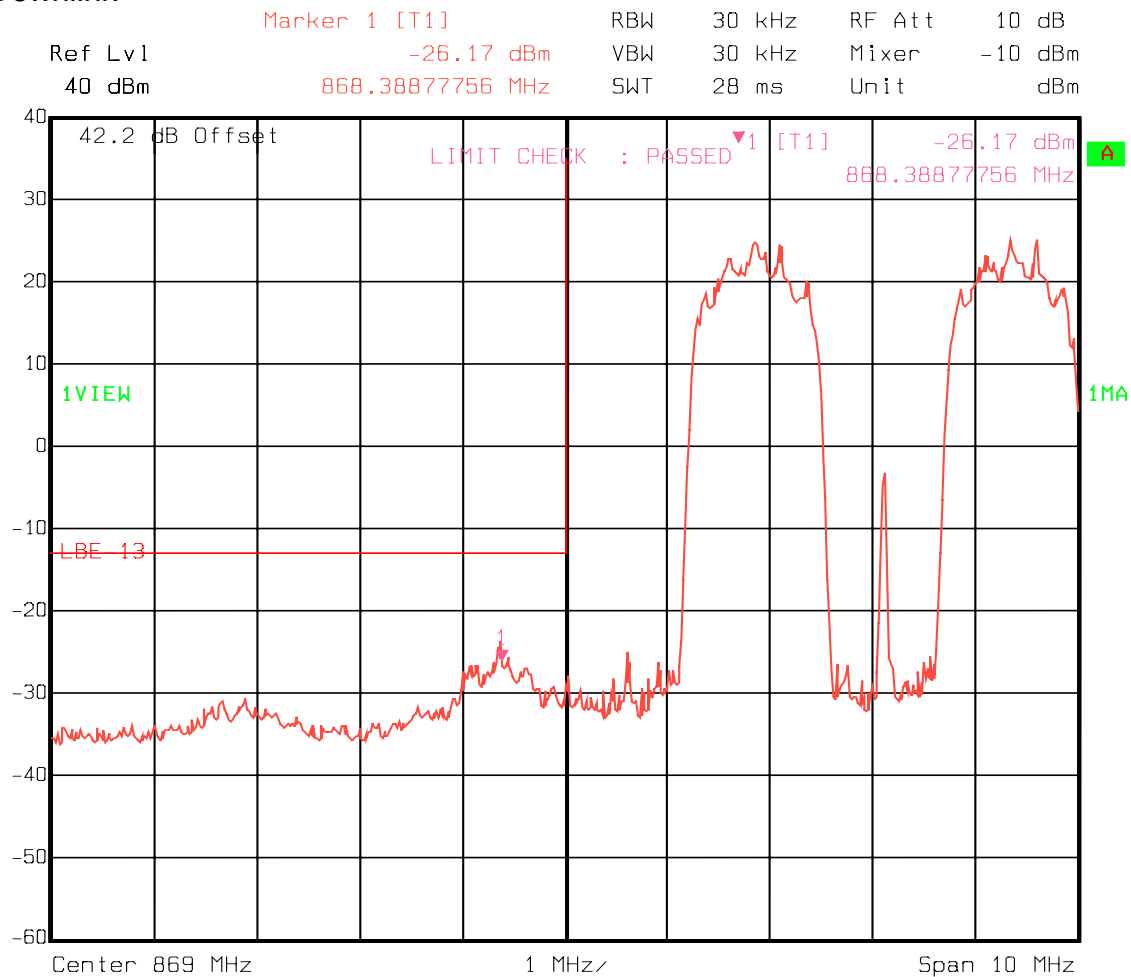
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

CDMA

Downlink



Date: 20.DEC.2006 15:52:15

EQUIPMENT: **FS31X-87-25-2-RM**

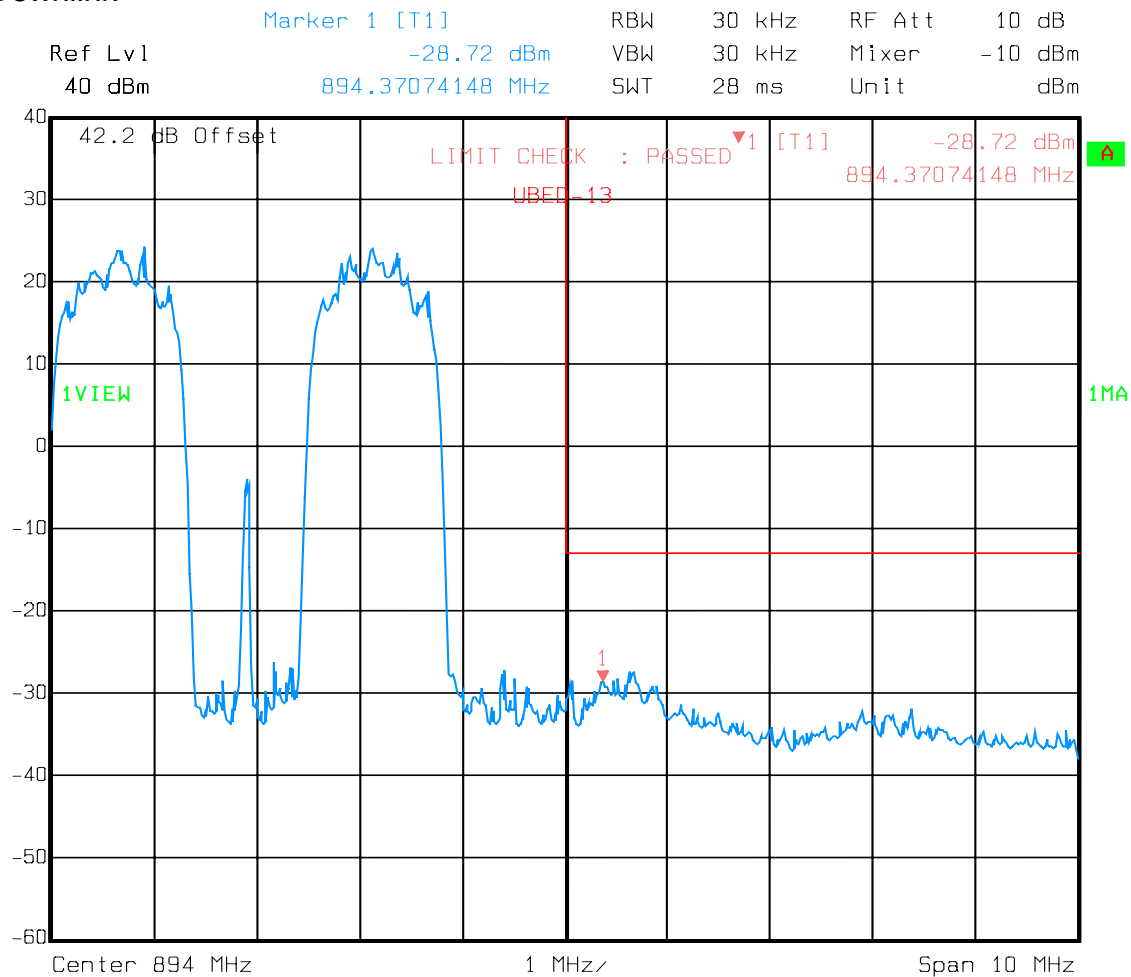
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

CDMA

Downlink



Date: 20.DEC.2006 15:55:16

EQUIPMENT: **FS31X-87-25-2-RM**

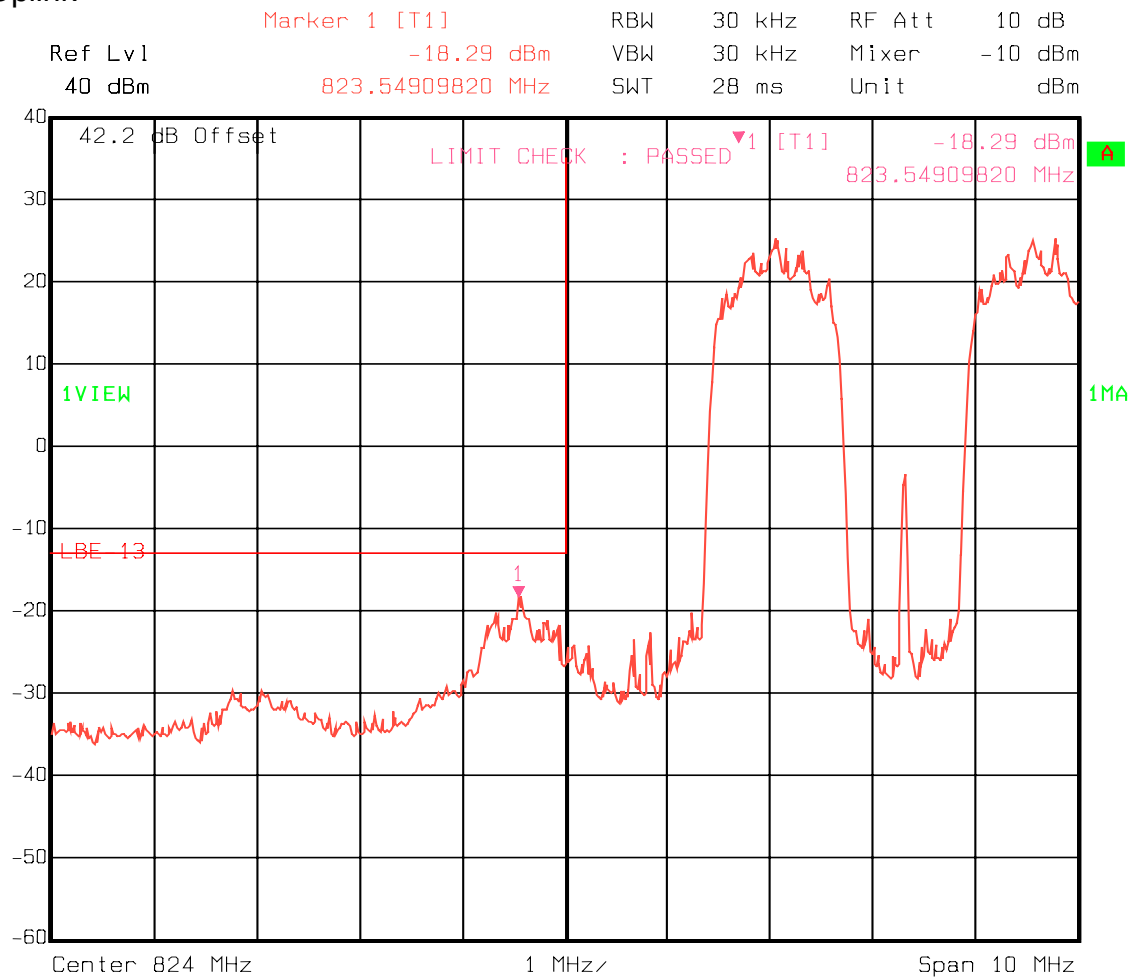
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

CDMA

Uplink



Date: 20.DEC.2006 15:49:04

EQUIPMENT: **FS31X-87-25-2-RM**

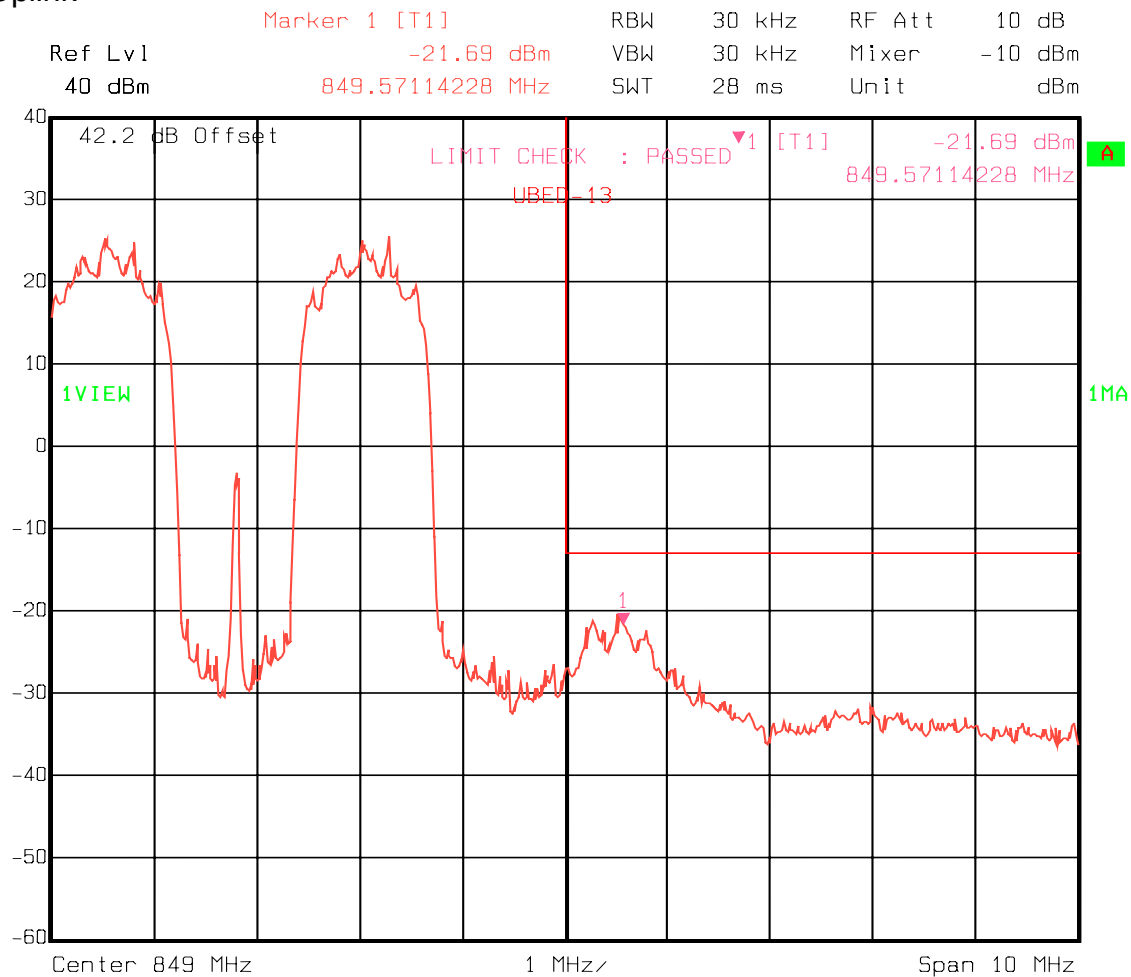
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

CDMA

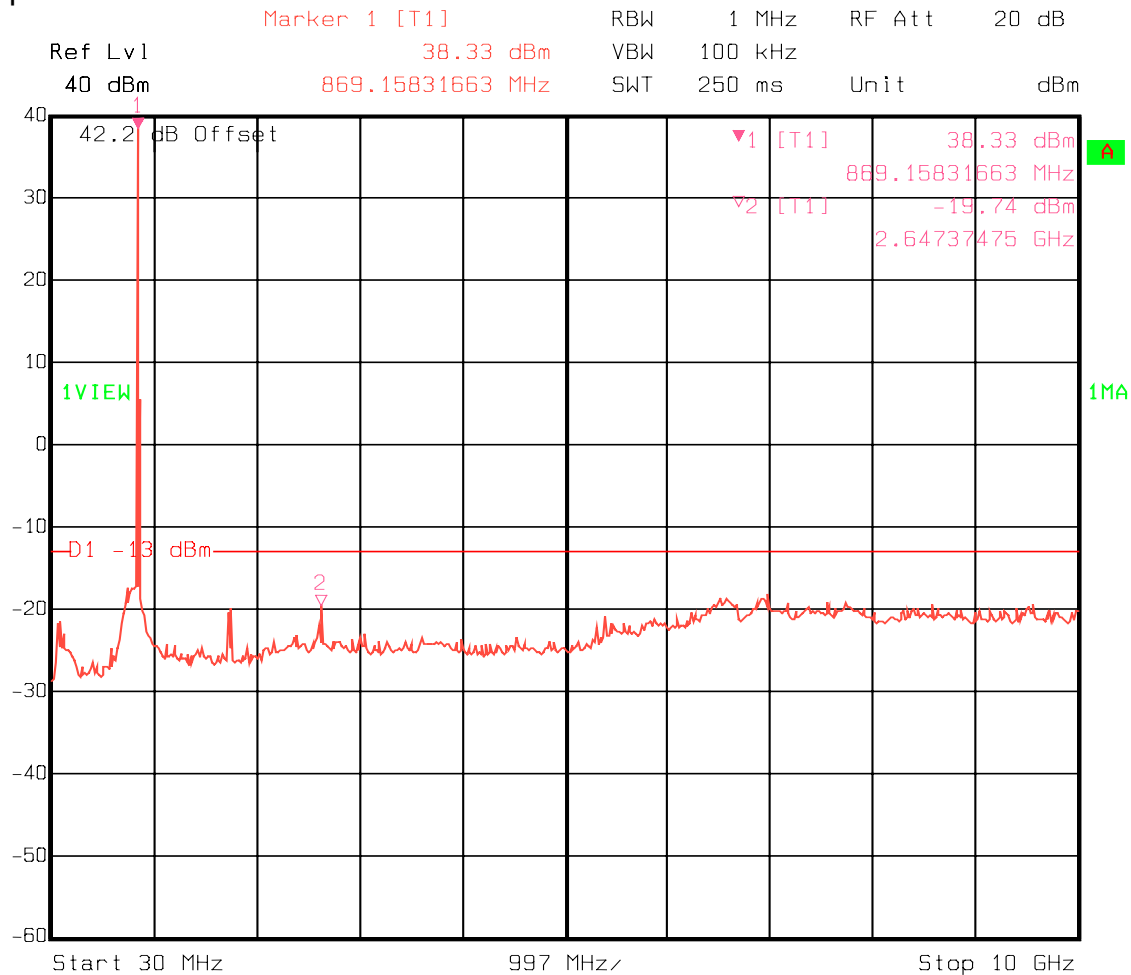
Uplink



Date: 20.DEC.2006 15:51:05

EQUIPMENT: **FS31X-87-25-2-RM**

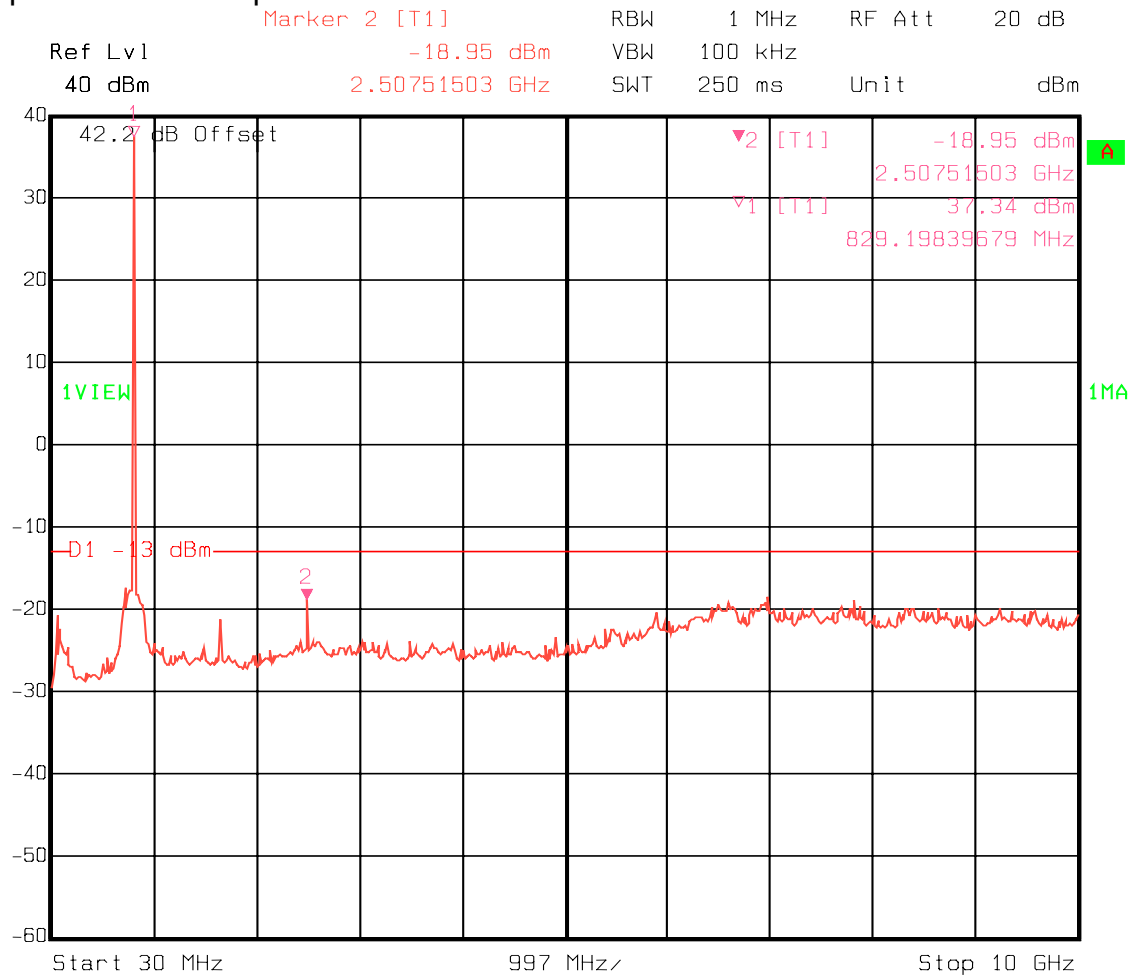
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – CDMA - Downlink**

Date: 20.DEC.2006 15:30:03

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – CDMA - Uplink**

Date: 20.DEC.2006 15:30:47

EQUIPMENT: **FS31X-87-25-2-RM**

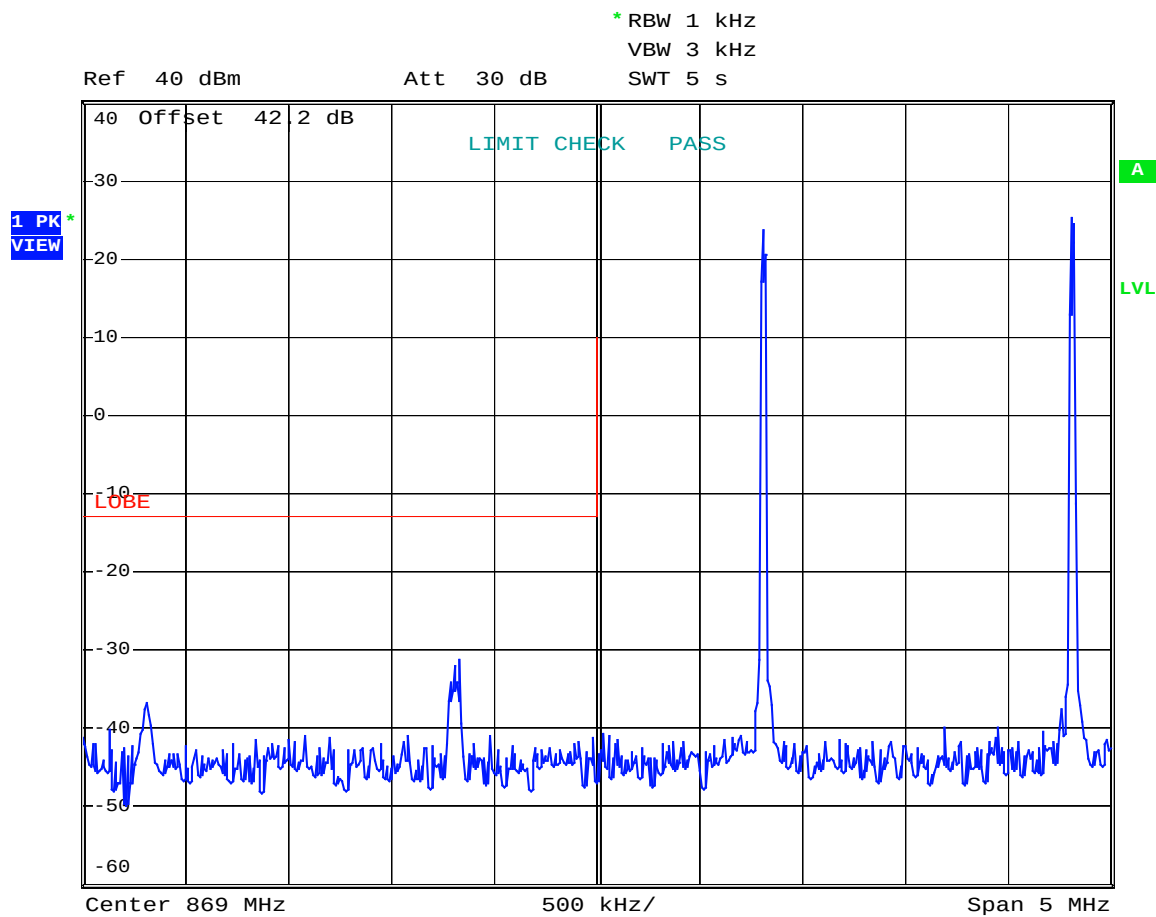
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

TDMA

Downlink



Date: 21.DEC.2006 15:08:21

EQUIPMENT: **FS31X-87-25-2-RM**

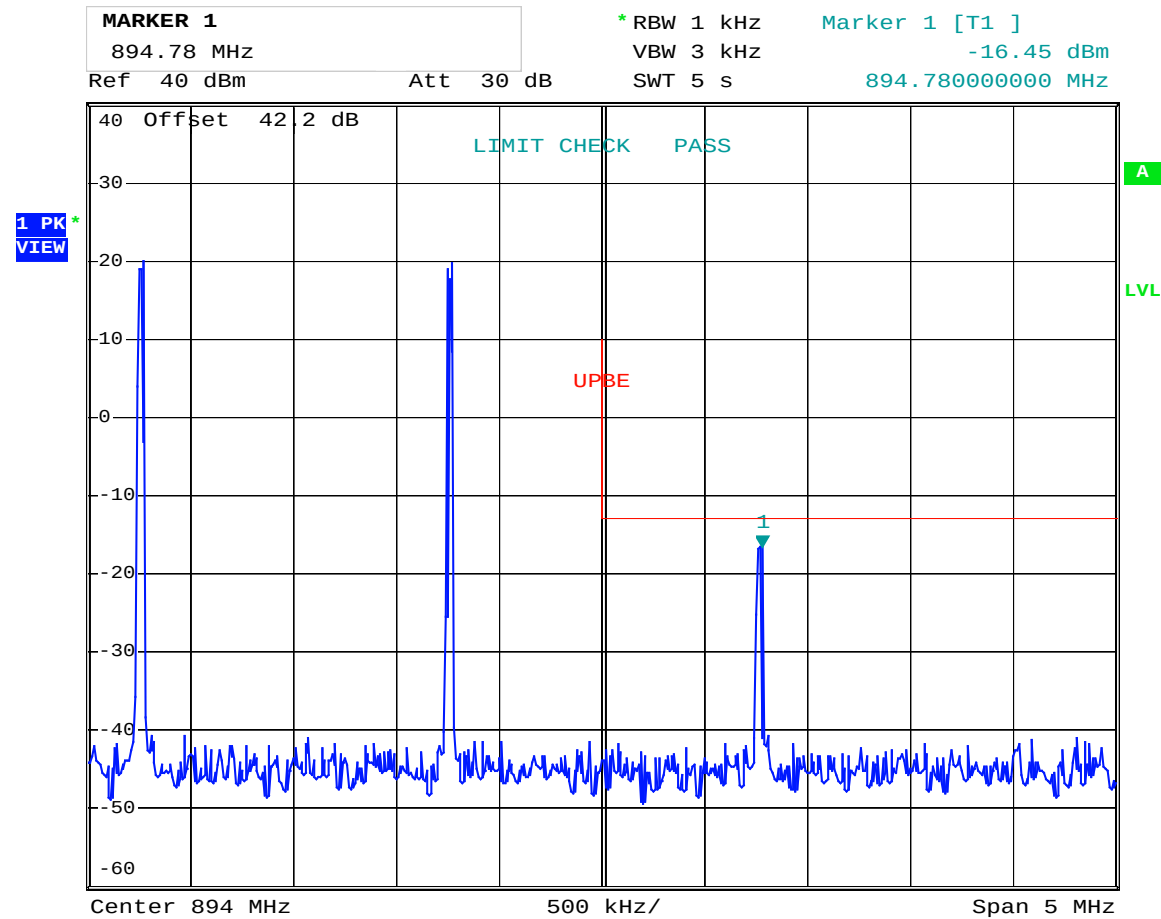
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

TDMA

Downlink



Date: 21.DEC.2006 15:22:52

EQUIPMENT: **FS31X-87-25-2-RM**

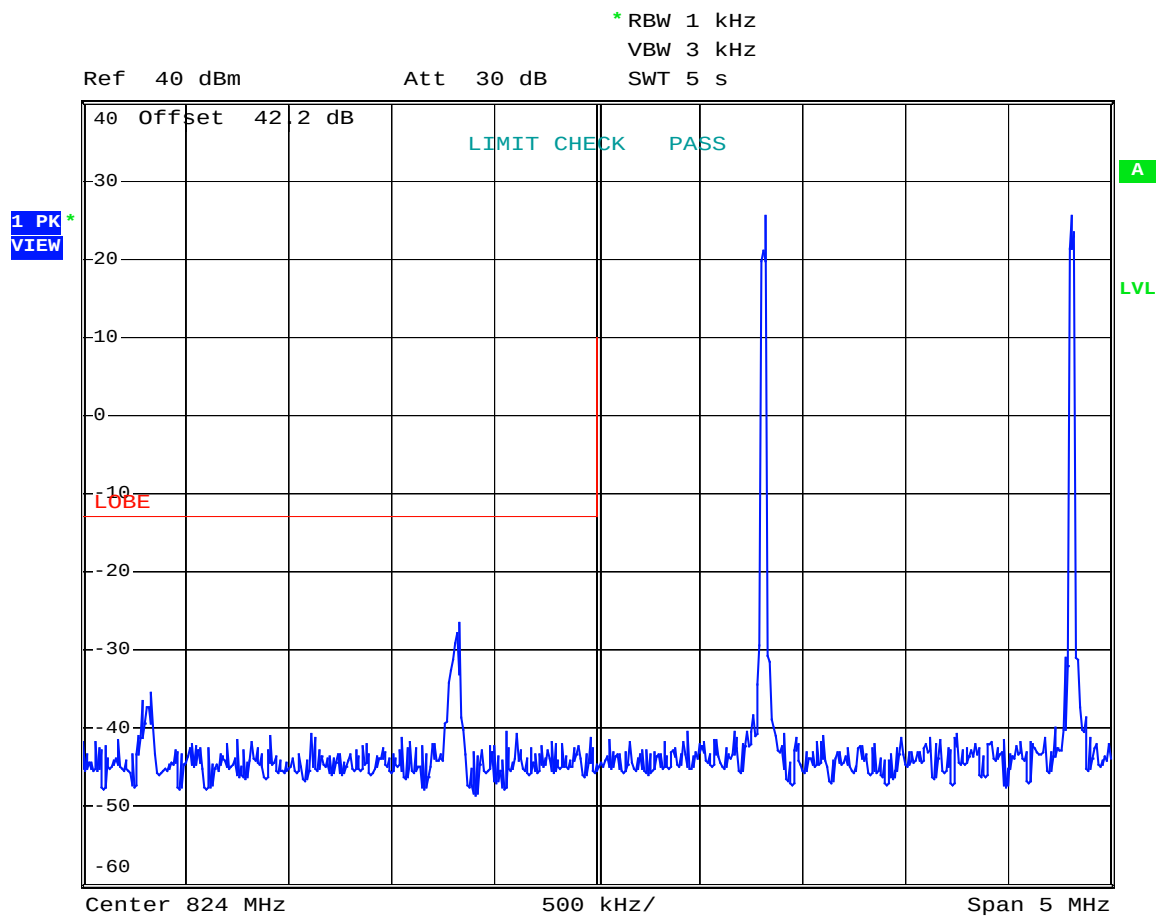
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

TDMA

Uplink



Date: 21.DEC.2006 15:07:37

EQUIPMENT: **FS31X-87-25-2-RM**

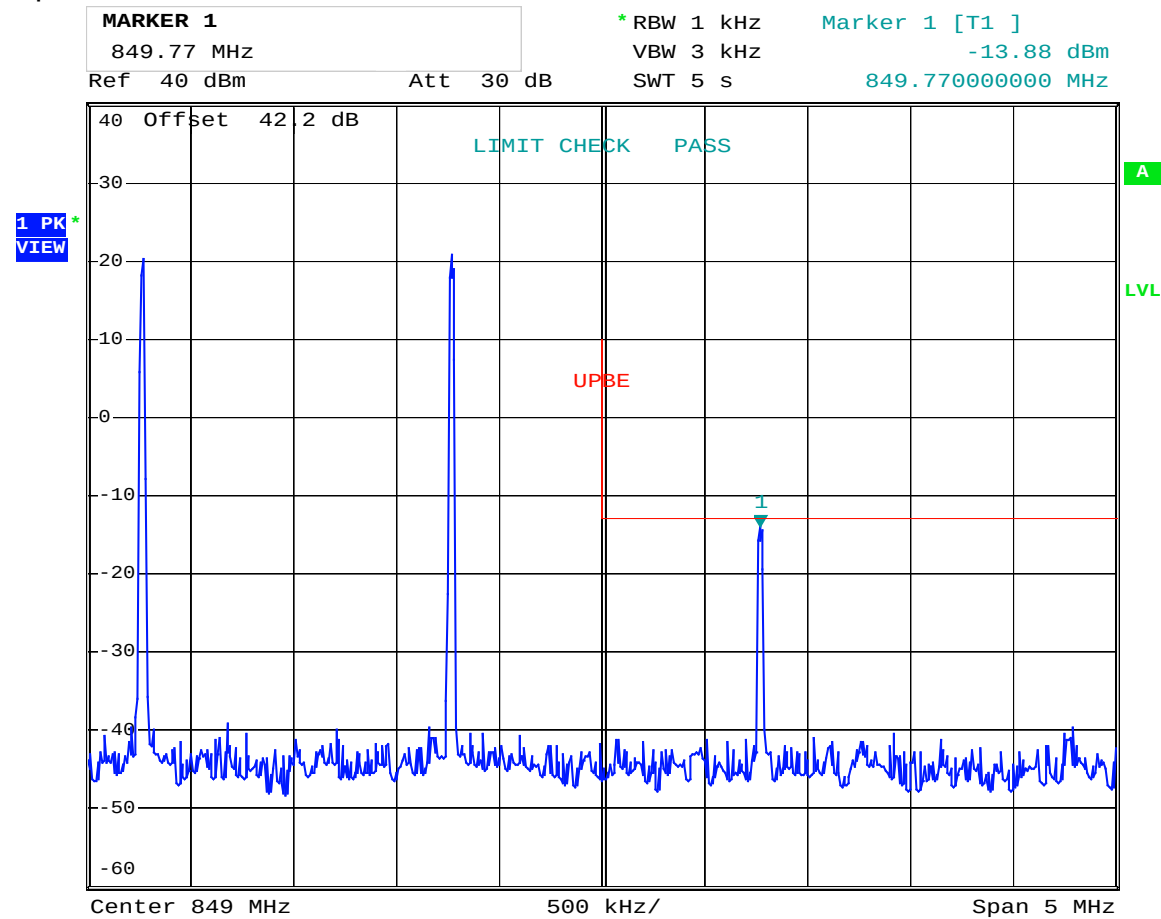
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

TDMA

Uplink



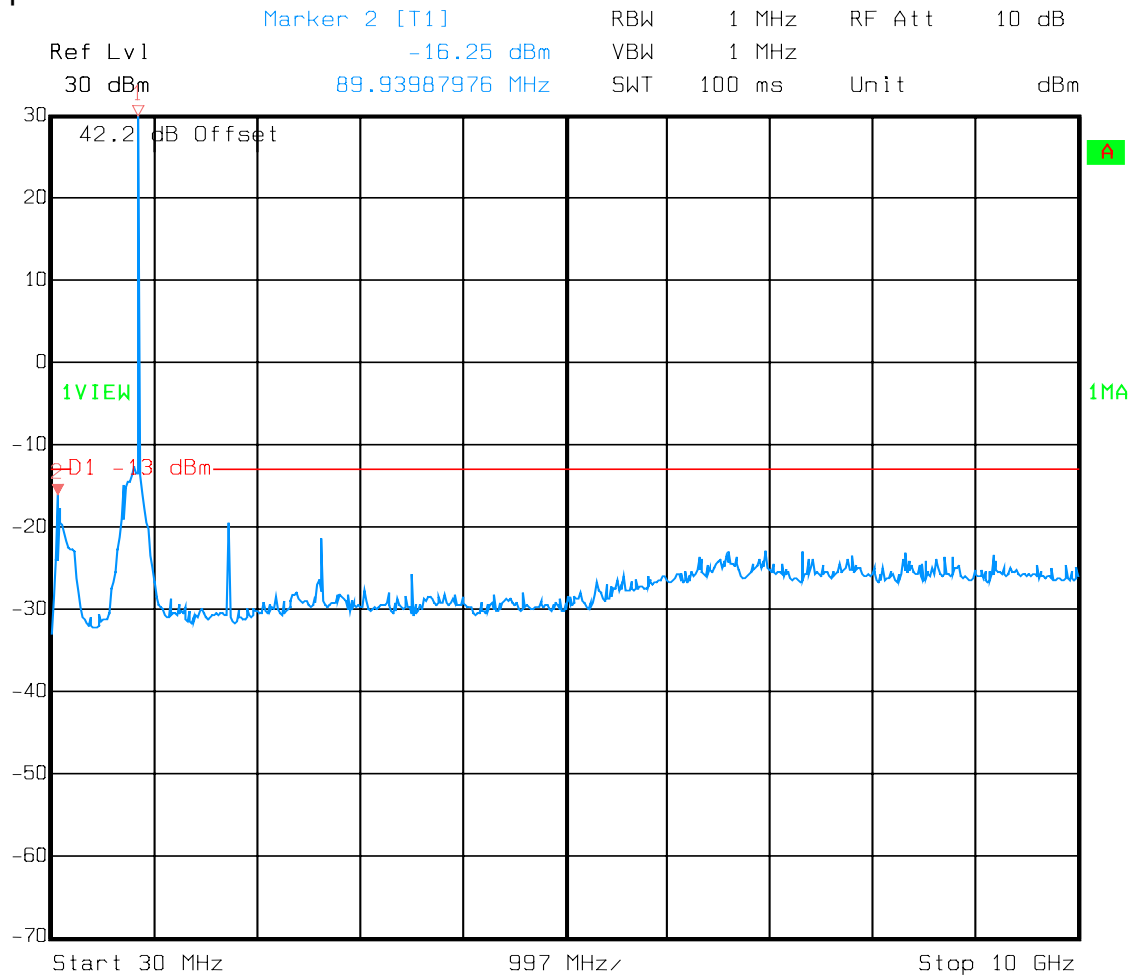
Date: 21.DEC.2006 15:20:06

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Spurs – TDMA - Downlink



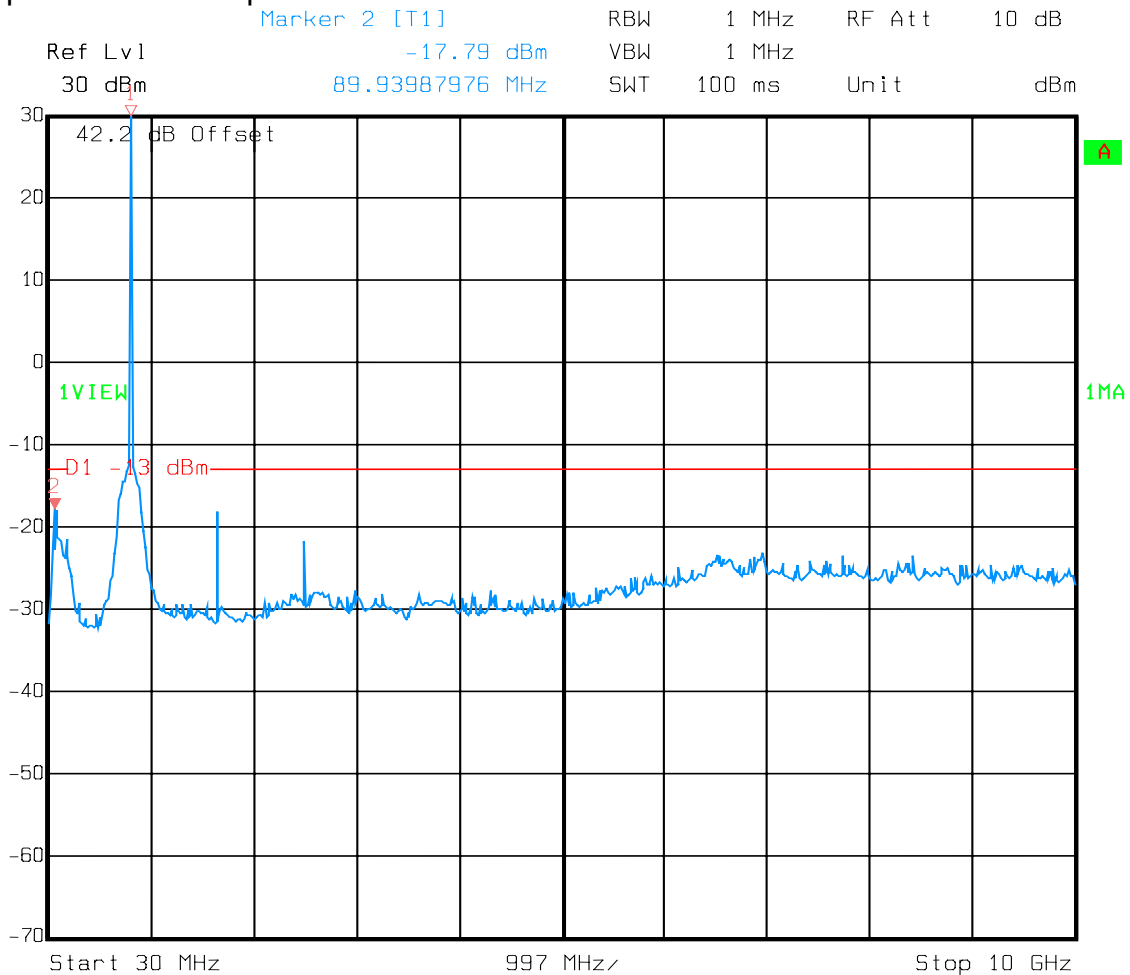
Date: 21.DEC.2006 15:23:38

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Spurs – TDMA - Uplink



Date: 21.DEC.2006 15:24:23

EQUIPMENT: **FS31X-87-25-2-RM**

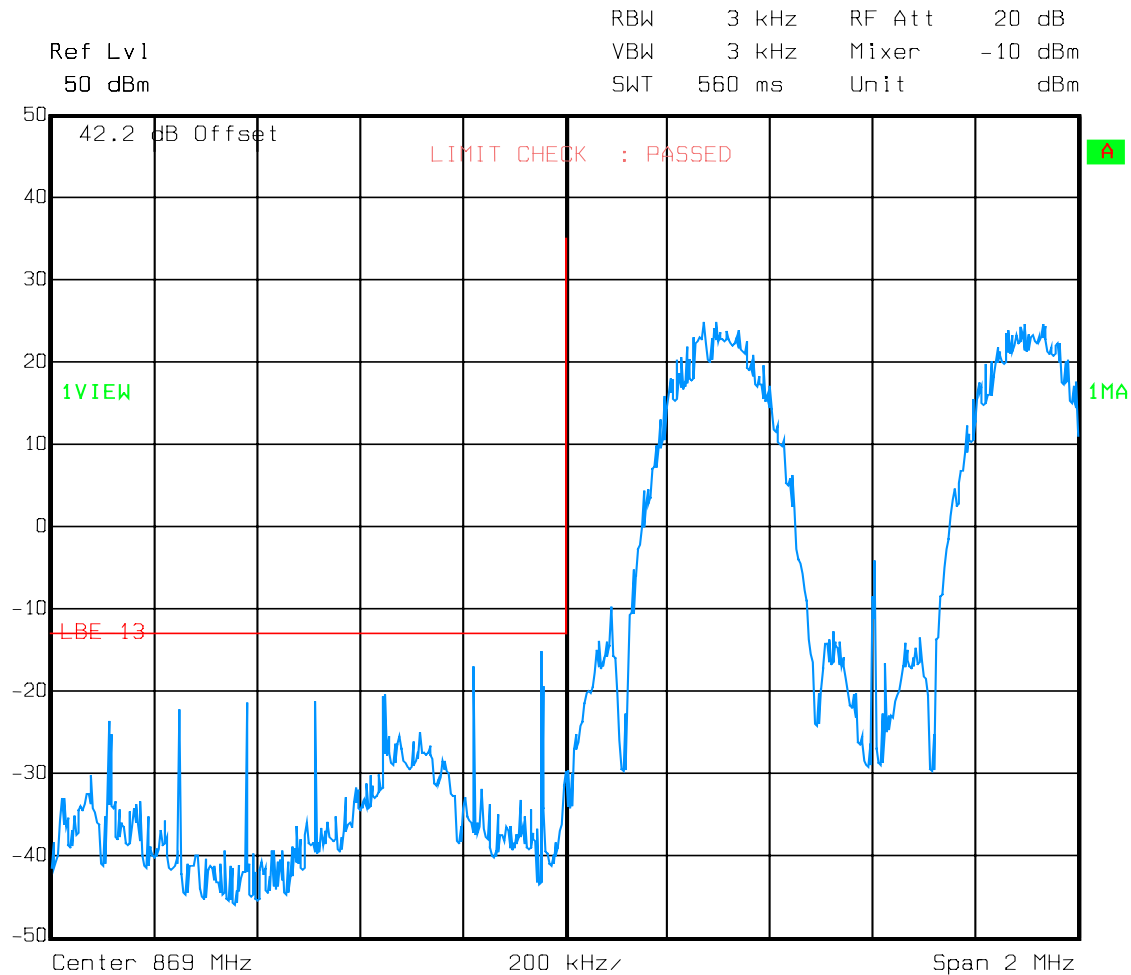
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

EDGE

Downlink



Date: 20.DEC.2006 17:30:34

EQUIPMENT: **FS31X-87-25-2-RM**

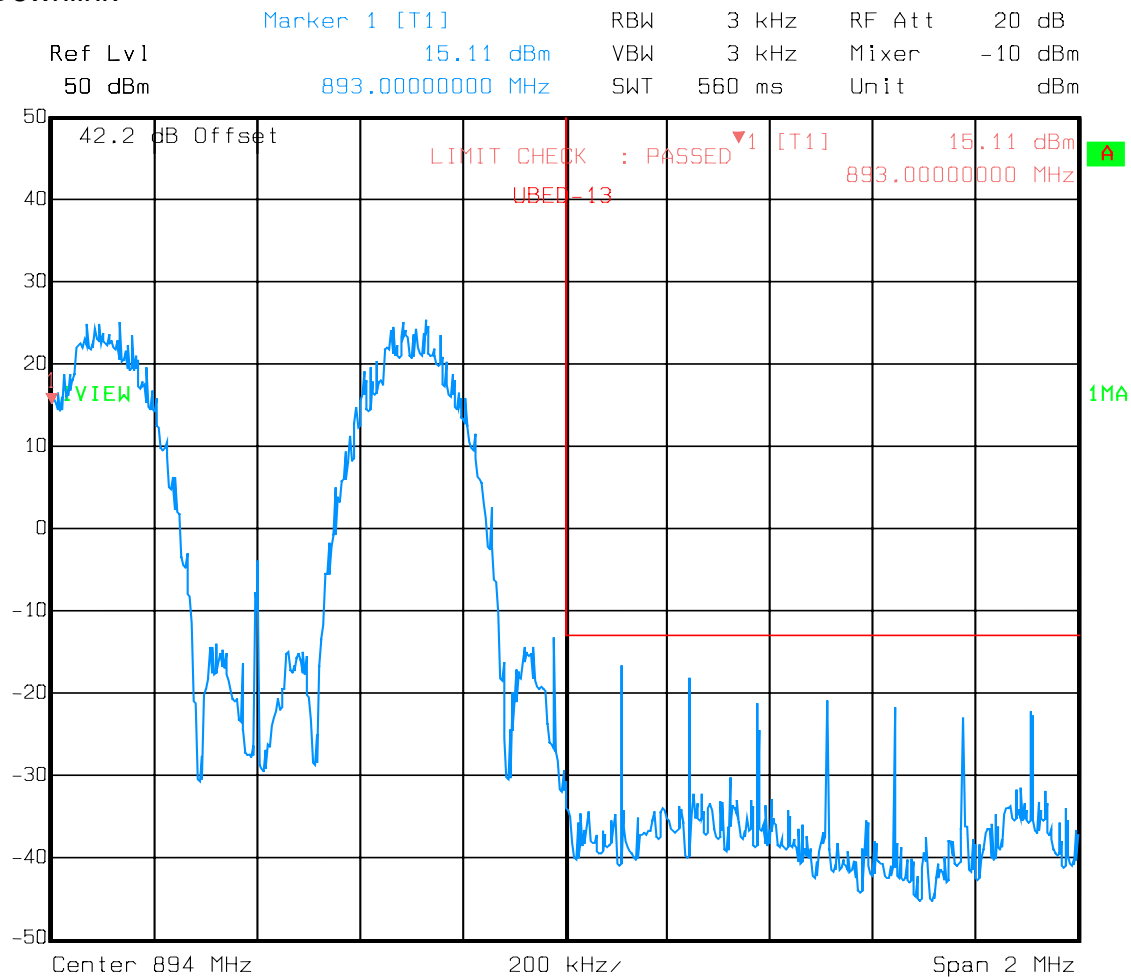
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

EDGE

Downlink



Date: 20.DEC.2006 17:28:13

EQUIPMENT: **FS31X-87-25-2-RM**

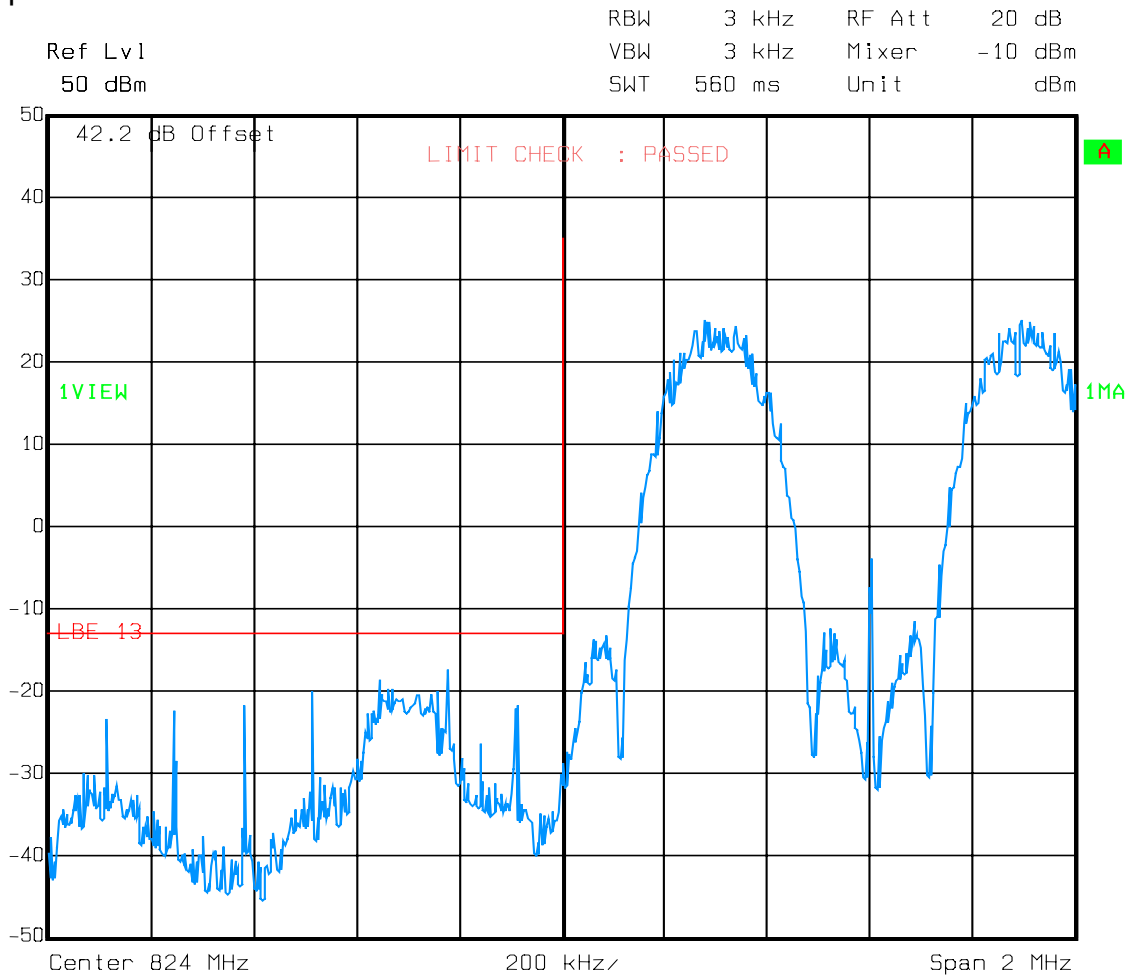
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

EDGE

Uplink



Date: 20.DEC.2006 17:29:52

EQUIPMENT: **FS31X-87-25-2-RM**

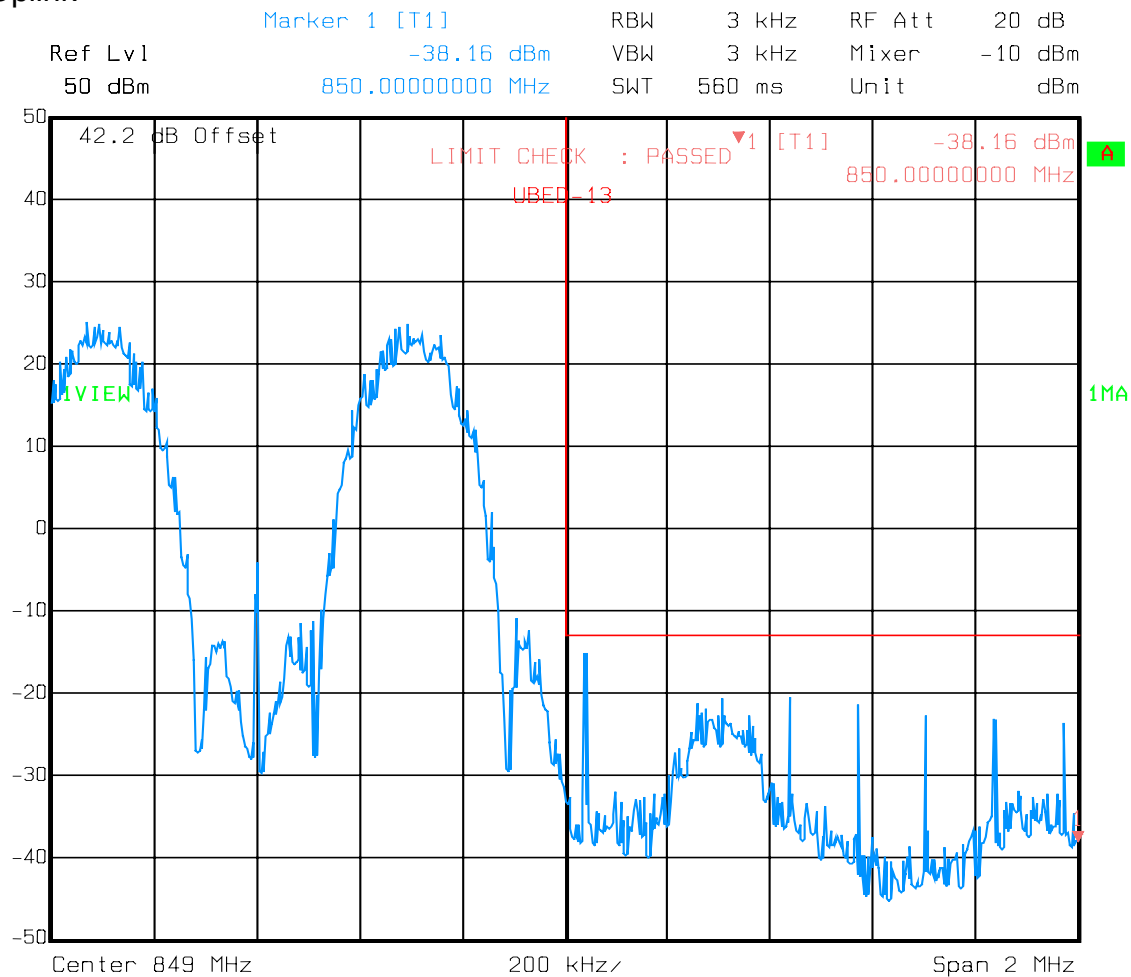
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

EDGE

Uplink



Date: 20.DEC.2006 17:28:57

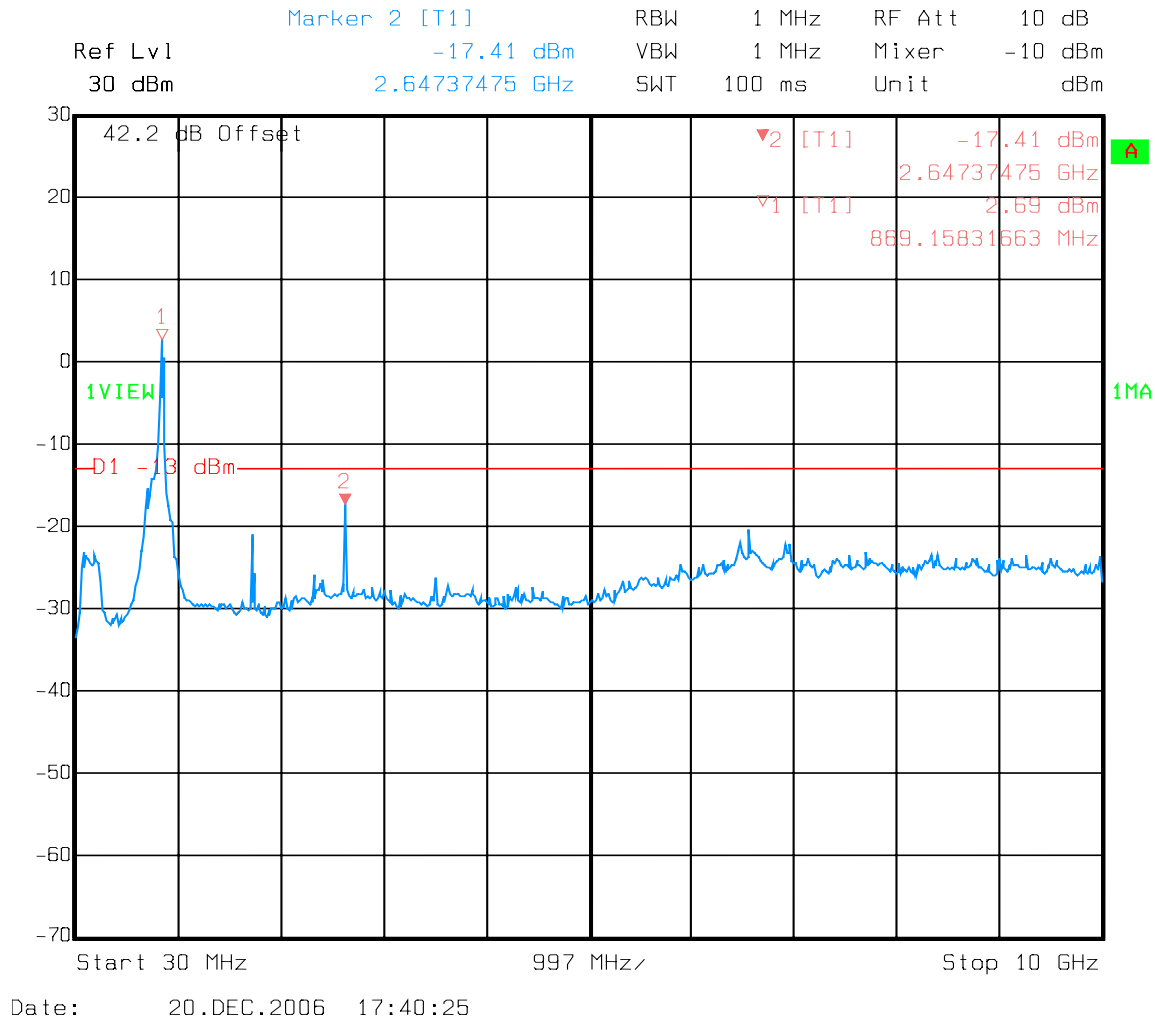
EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

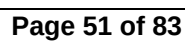
Spurs – EDGE – Downlink

Carrier notched



PROJECT NO.: 1906RUS2

Carrier notched



EQUIPMENT: **FS31X-87-25-2-RM**

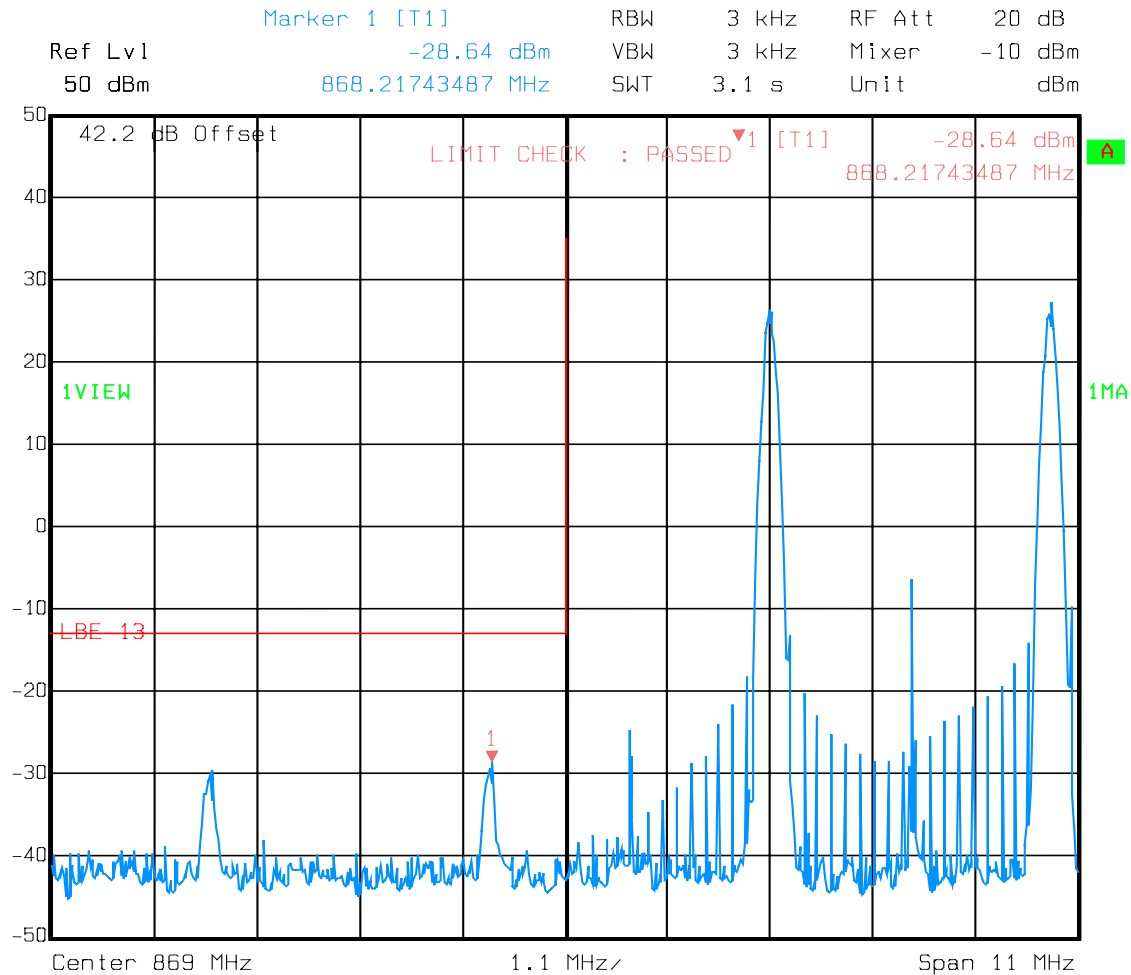
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

GSM

Downlink



Date: 20.DEC.2006 17:02:48

EQUIPMENT: **FS31X-87-25-2-RM**

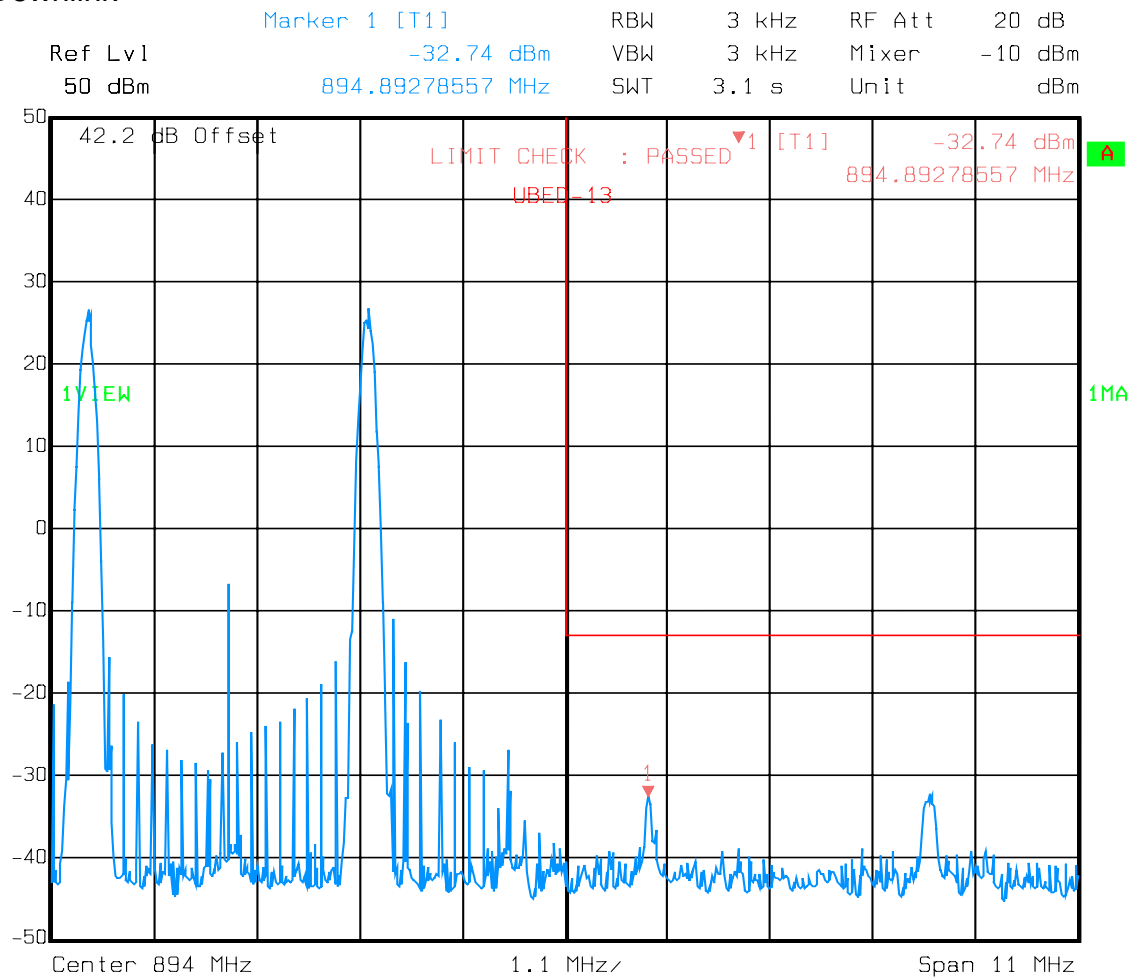
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

GSM

Downlink



Date: 20.DEC.2006 17:04:24

EQUIPMENT: **FS31X-87-25-2-RM**

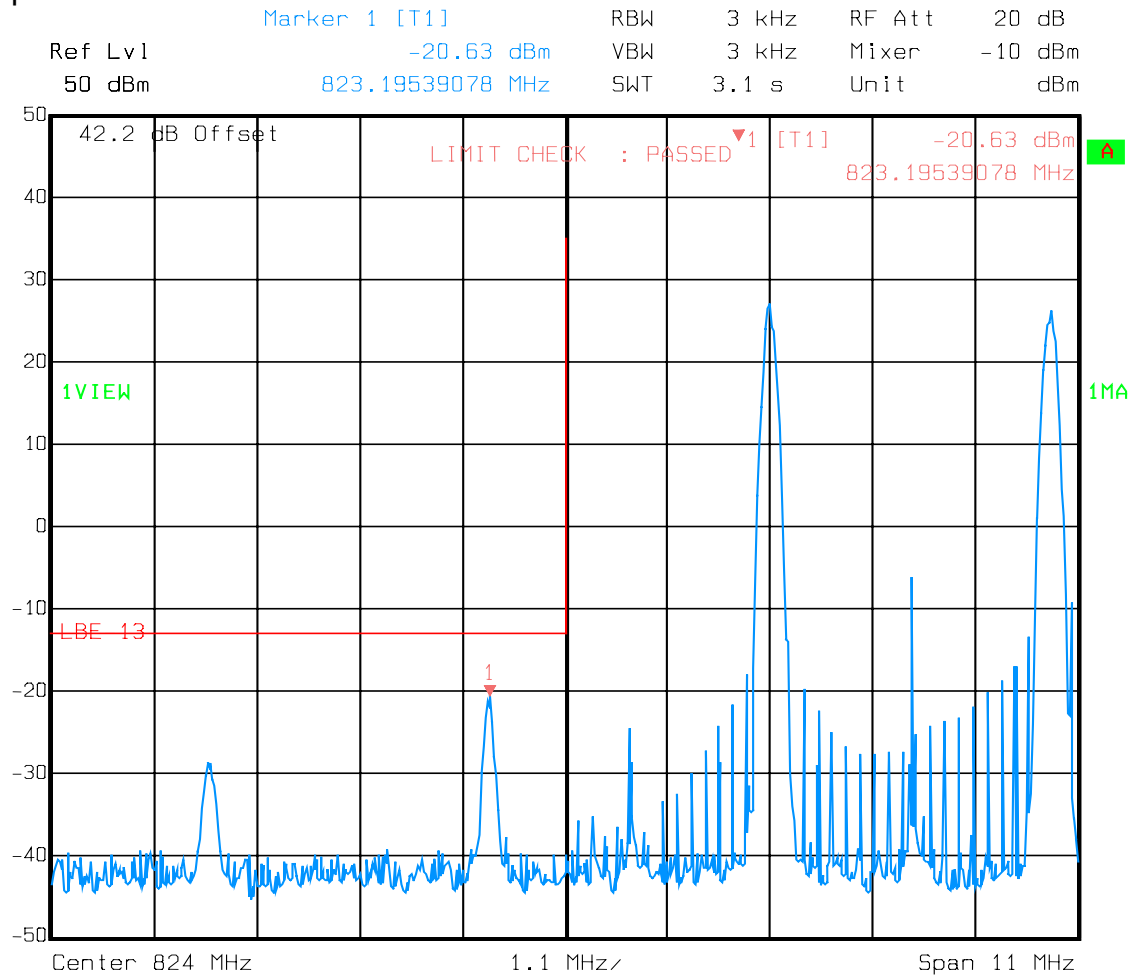
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

GSM

Uplink



Date: 20.DEC.2006 17:01:24

EQUIPMENT: **FS31X-87-25-2-RM**

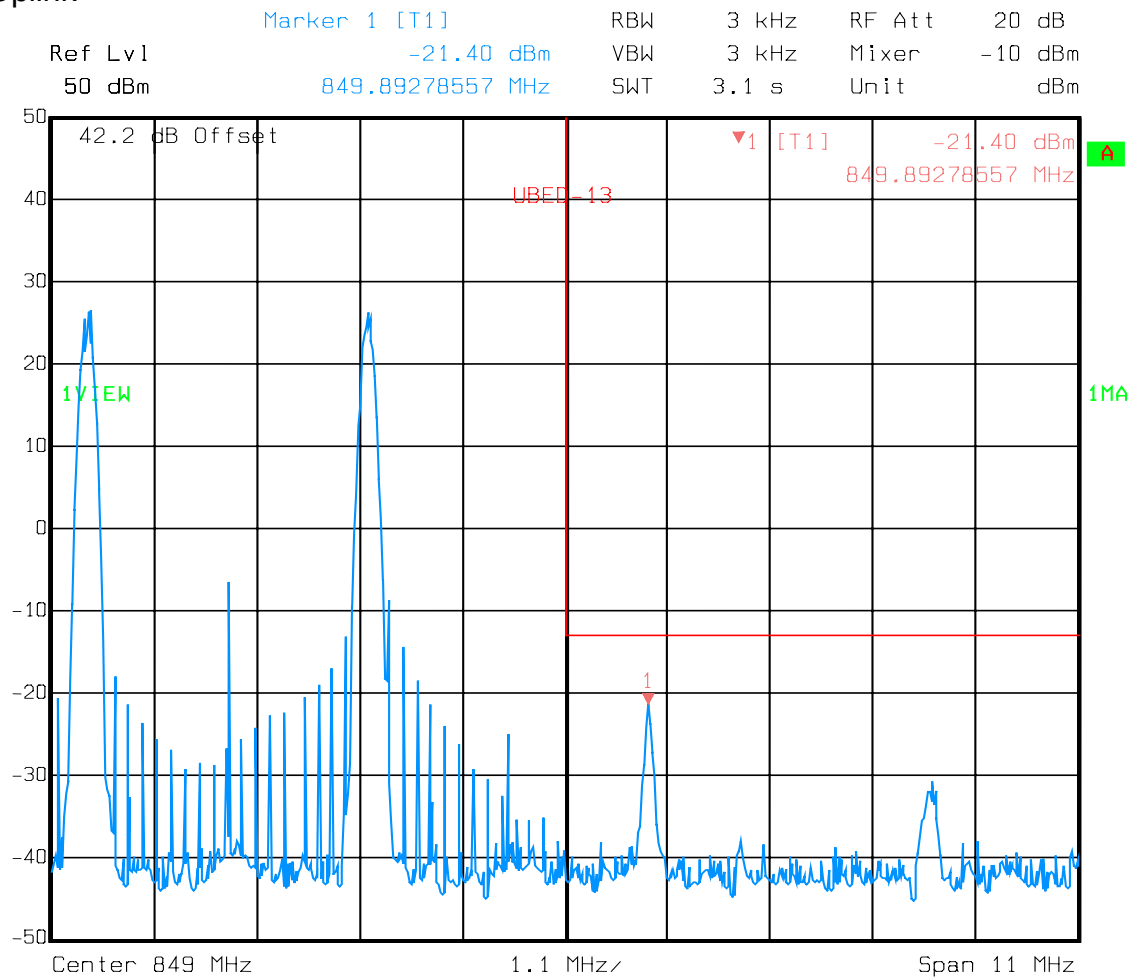
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

GSM

Uplink



Date: 20.DEC.2006 16:59:45

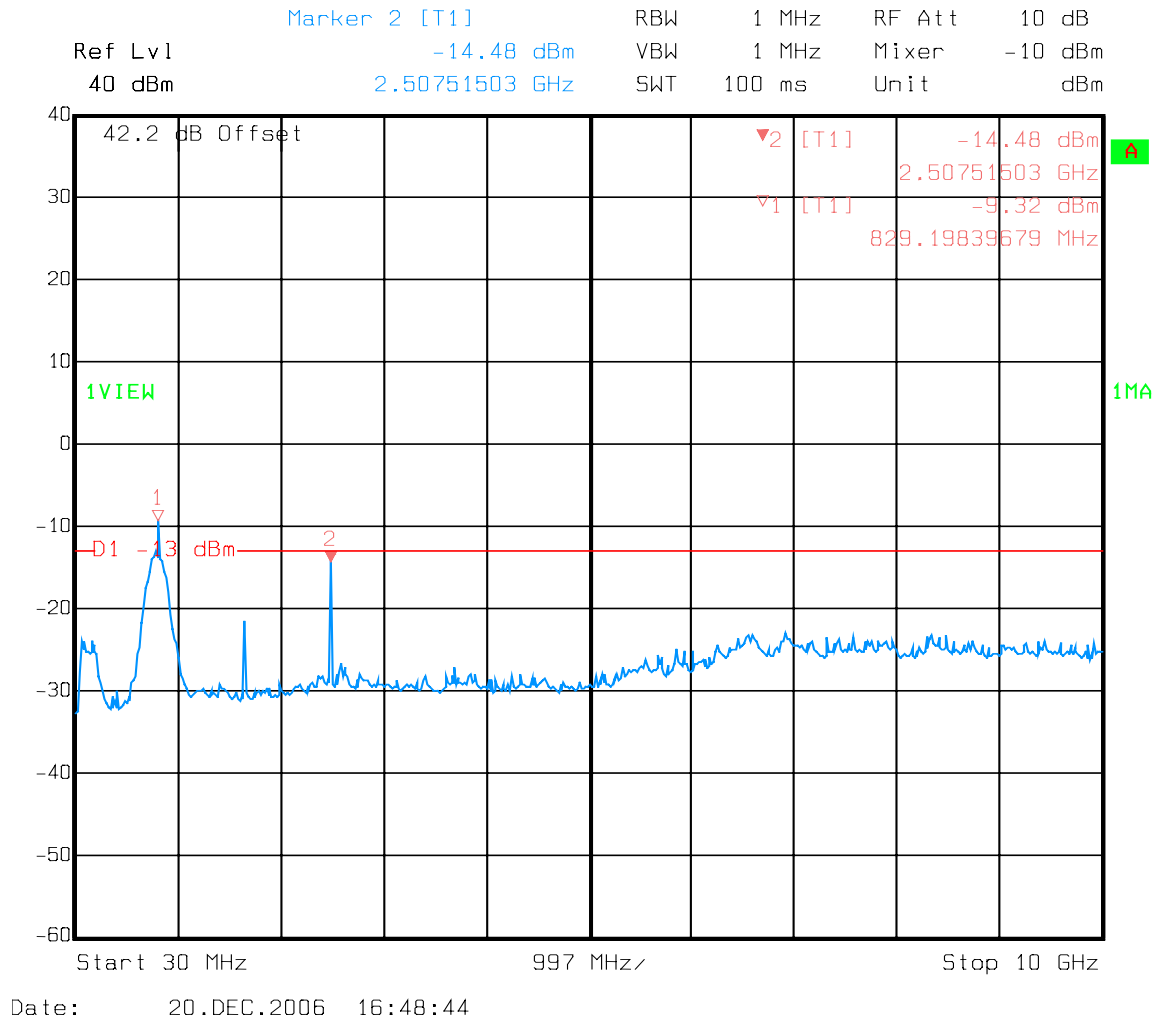
EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Downlink

Carrier notched



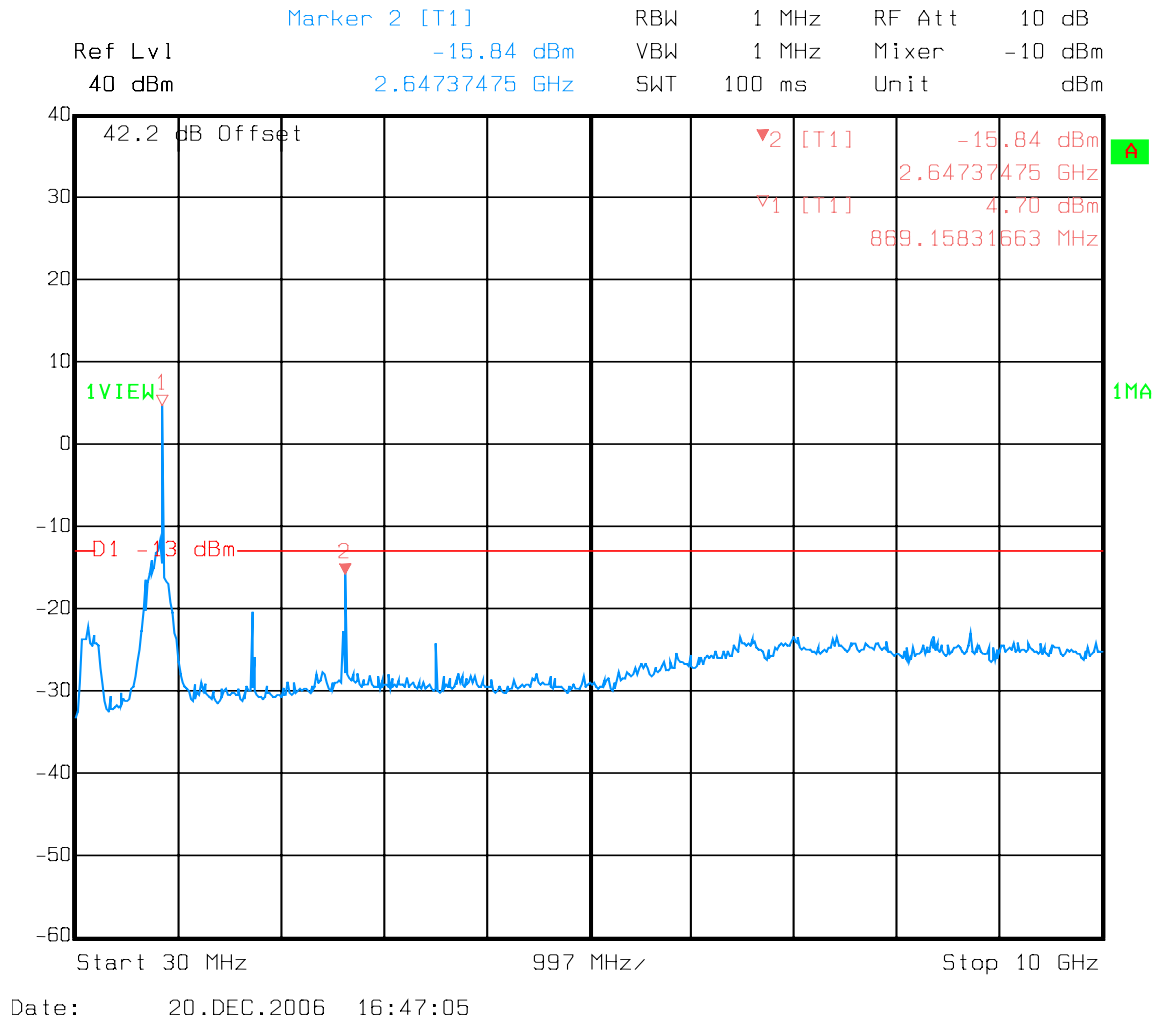
EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM - Uplink

Carrier notched



EQUIPMENT: **FS31X-87-25-2-RM**

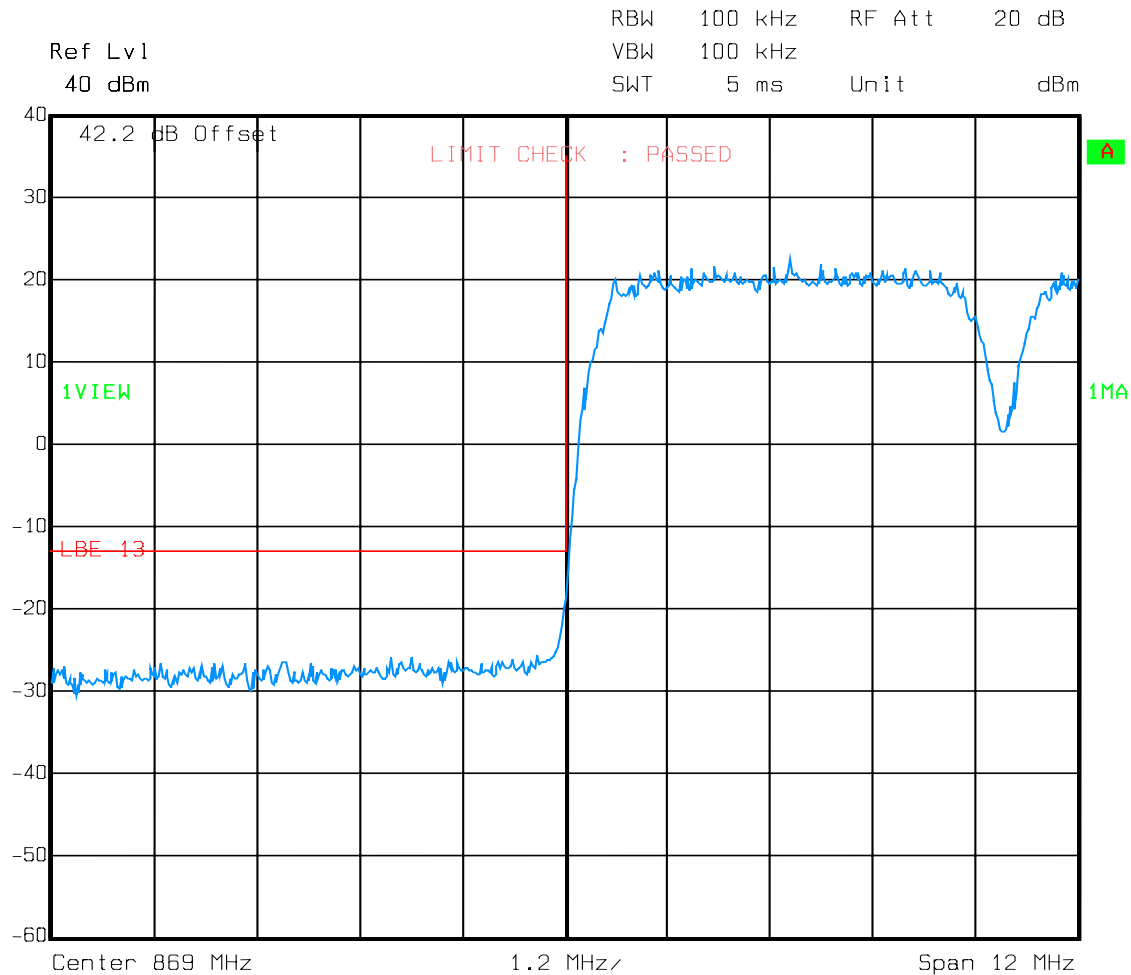
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

W-CDMA

Downlink



Date: 21.DEC.2006 16:29:08

EQUIPMENT: **FS31X-87-25-2-RM**

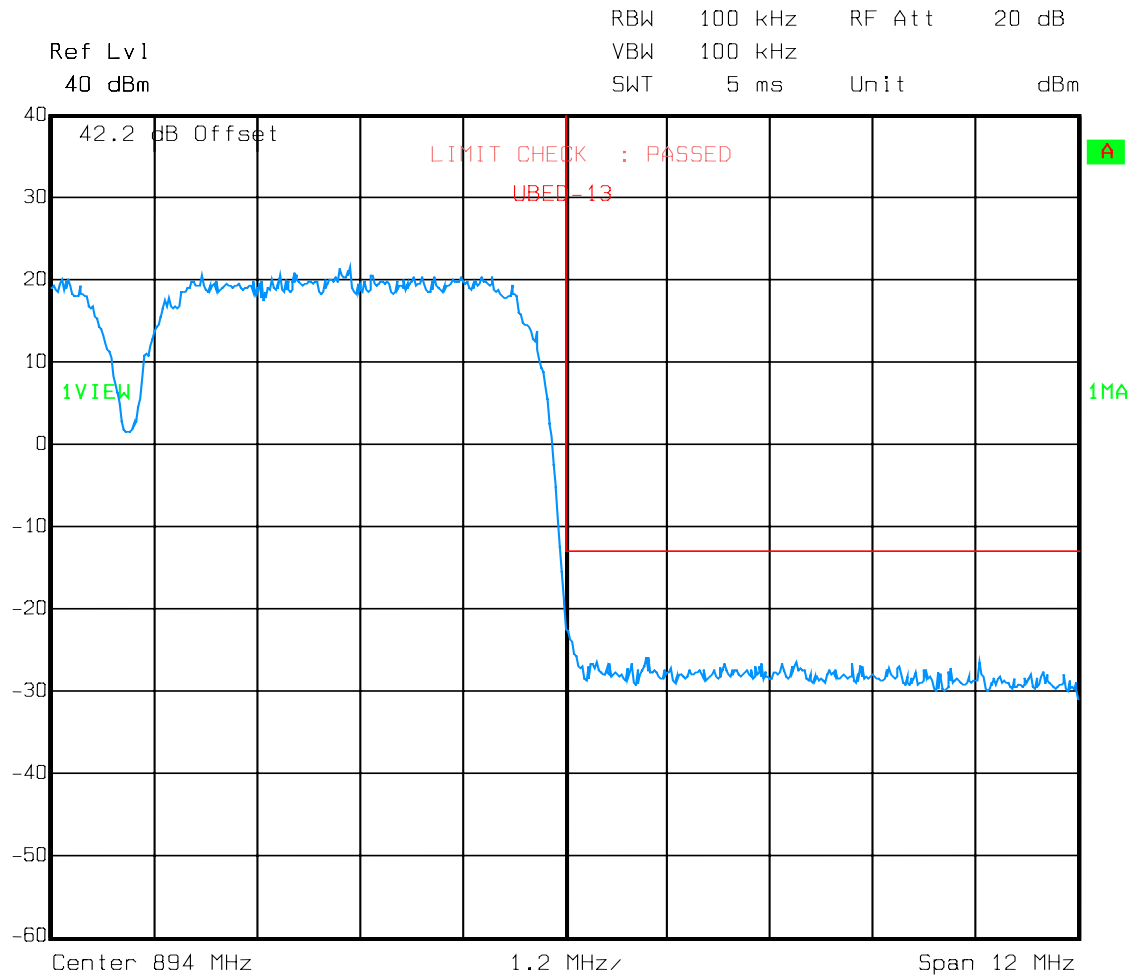
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

W-CDMA

Downlink



Date: 21.DEC.2006 16:31:17

EQUIPMENT: **FS31X-87-25-2-RM**

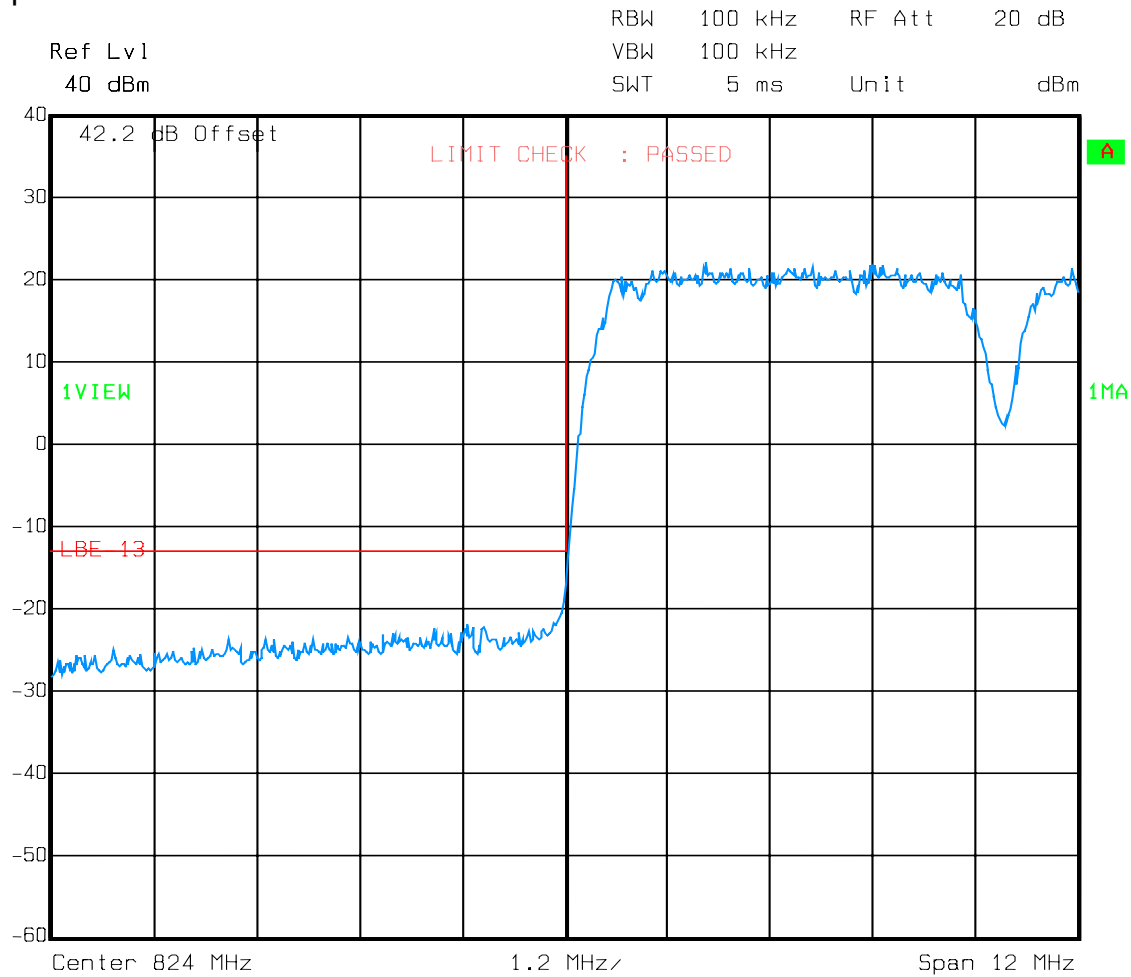
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

W-CDMA

Uplink



Date: 21.DEC.2006 16:28:12

EQUIPMENT: **FS31X-87-25-2-RM**

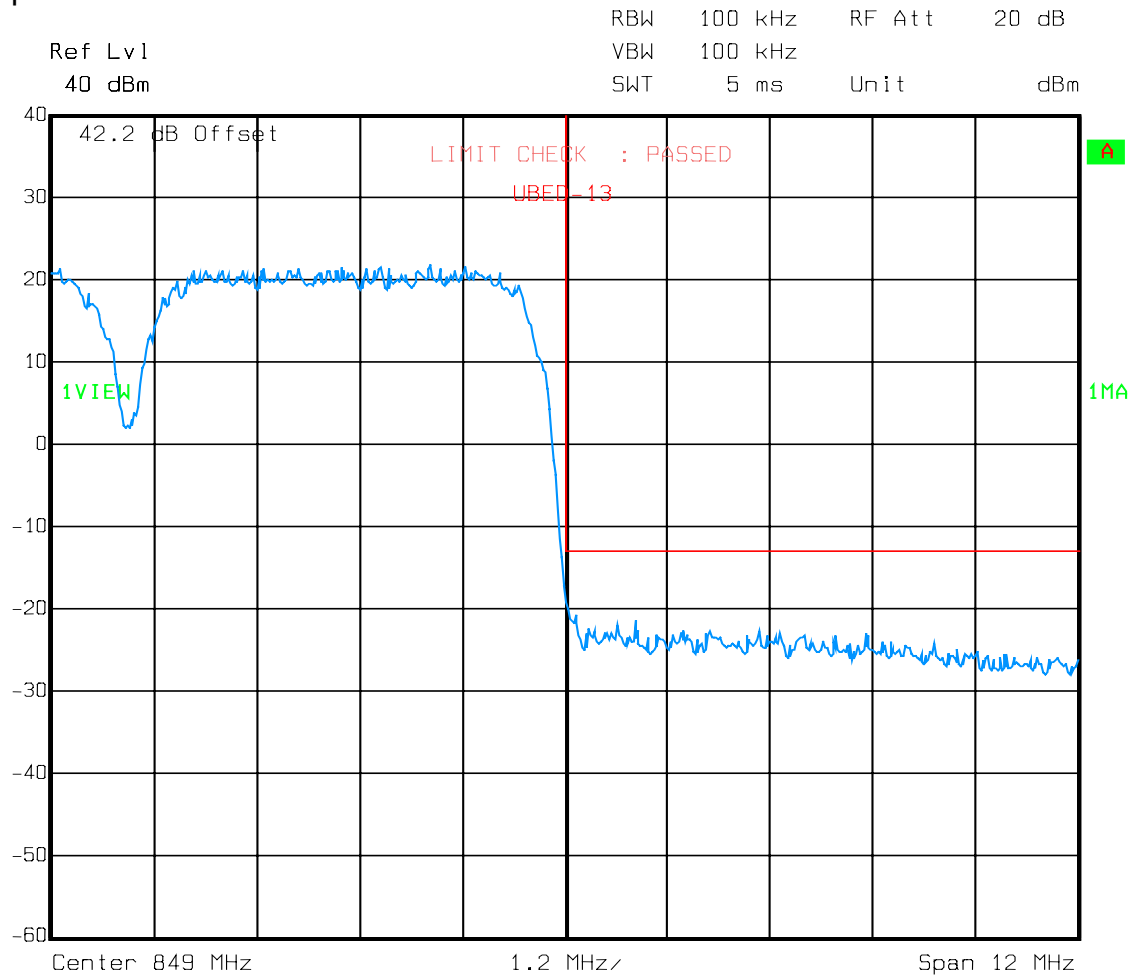
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

W-CDMA

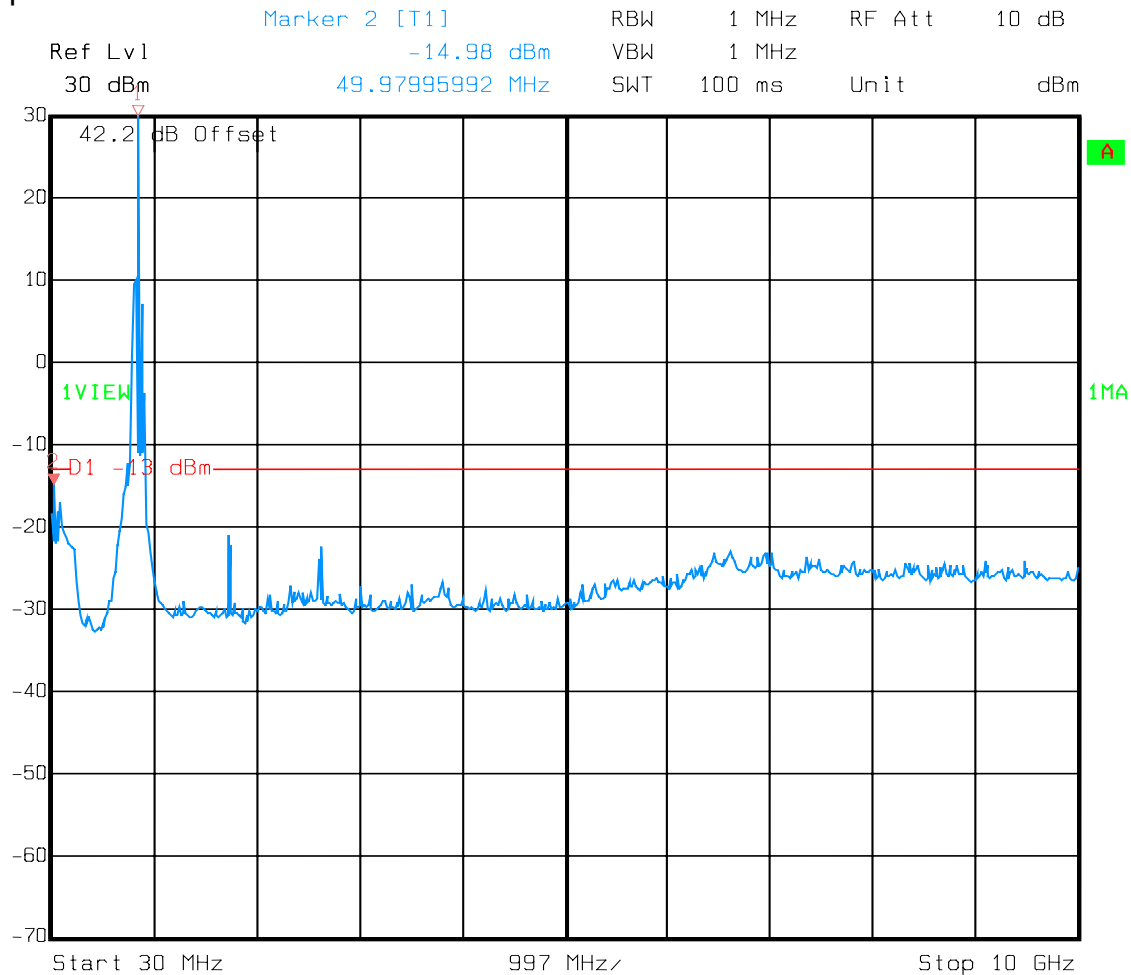
Uplink



Date: 21.DEC.2006 16:30:23

EQUIPMENT: **FS31X-87-25-2-RM**

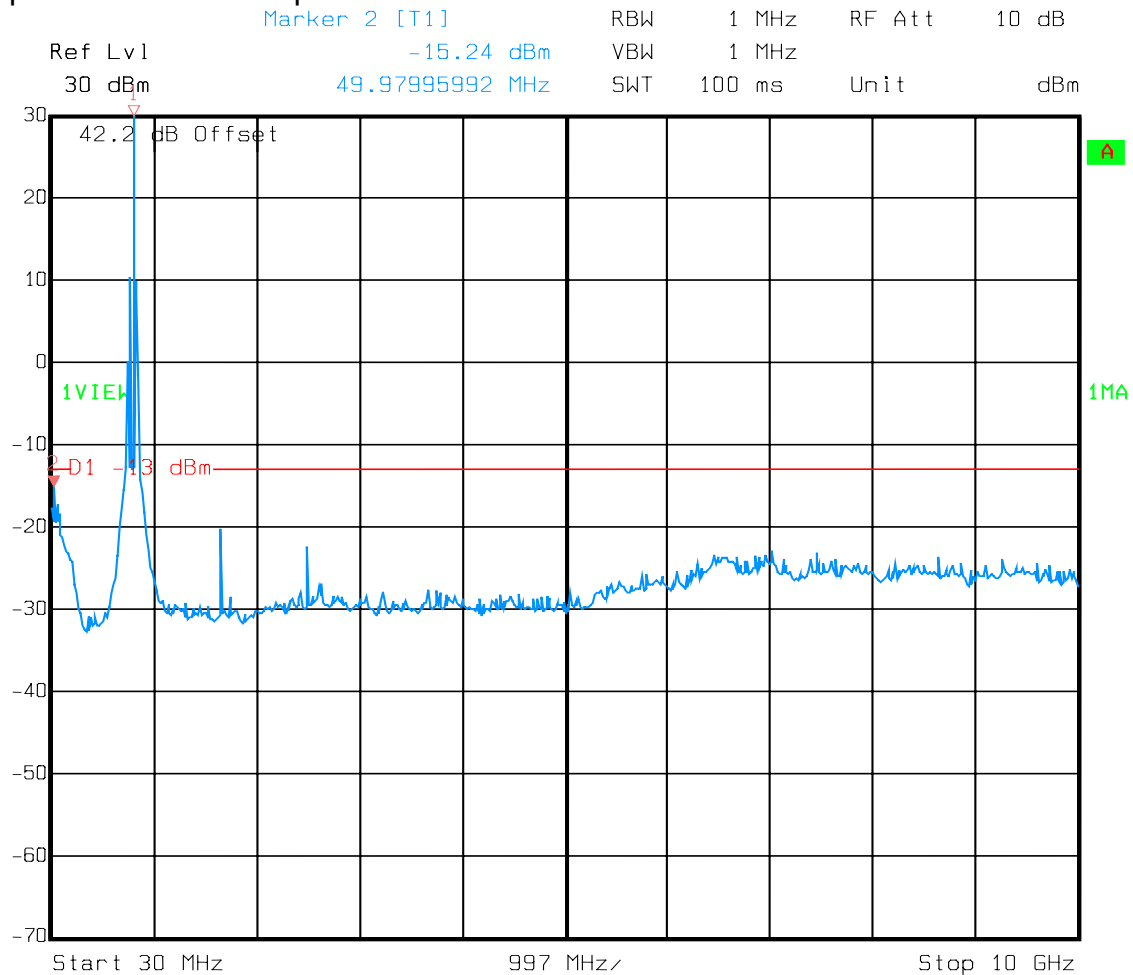
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – W-CDMA - Downlink**

Date: 21.DEC.2006 16:23:17

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – W-CDMA - Uplink**

Date: 21.DEC.2006 16:23:54

EQUIPMENT: **FS31X-87-25-2-RM**

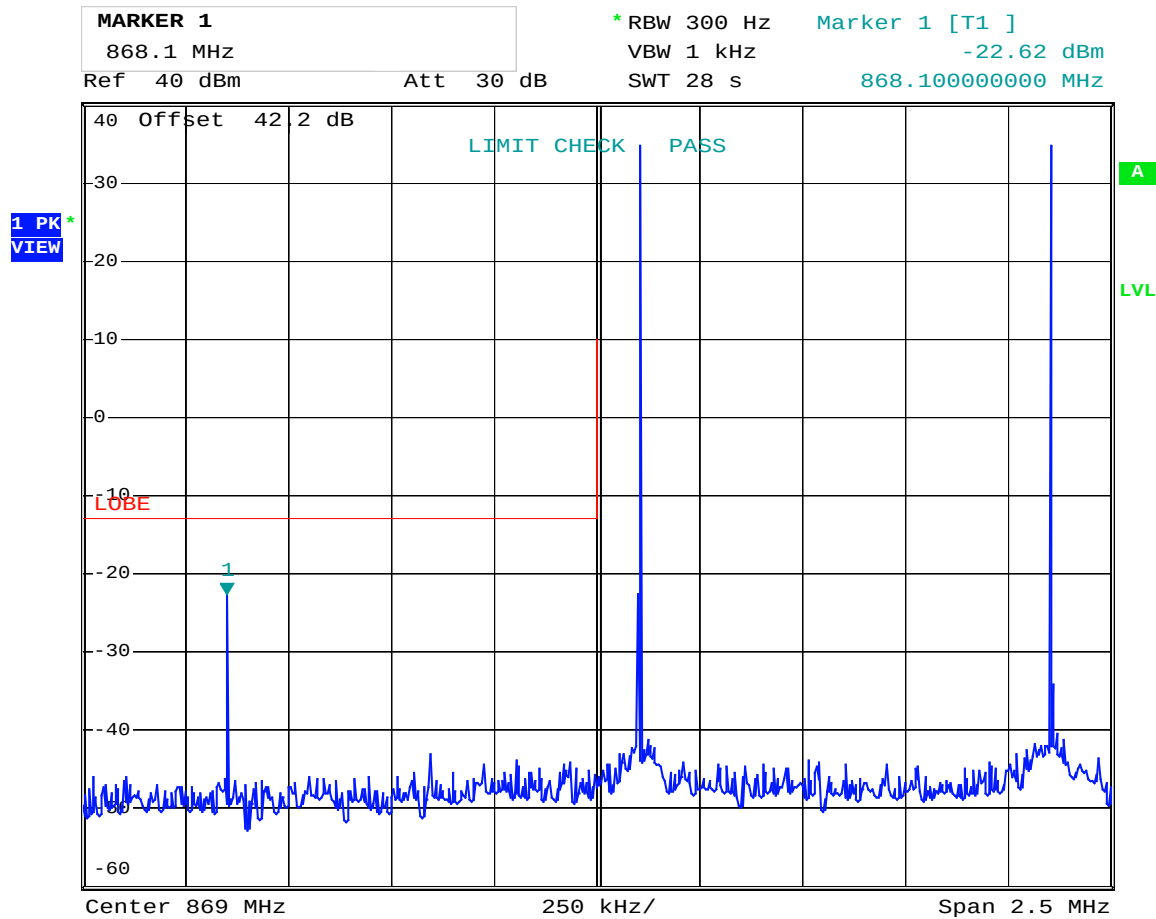
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

Analog

Downlink



Date: 21.DEC.2006 15:55:46

EQUIPMENT: **FS31X-87-25-2-RM**

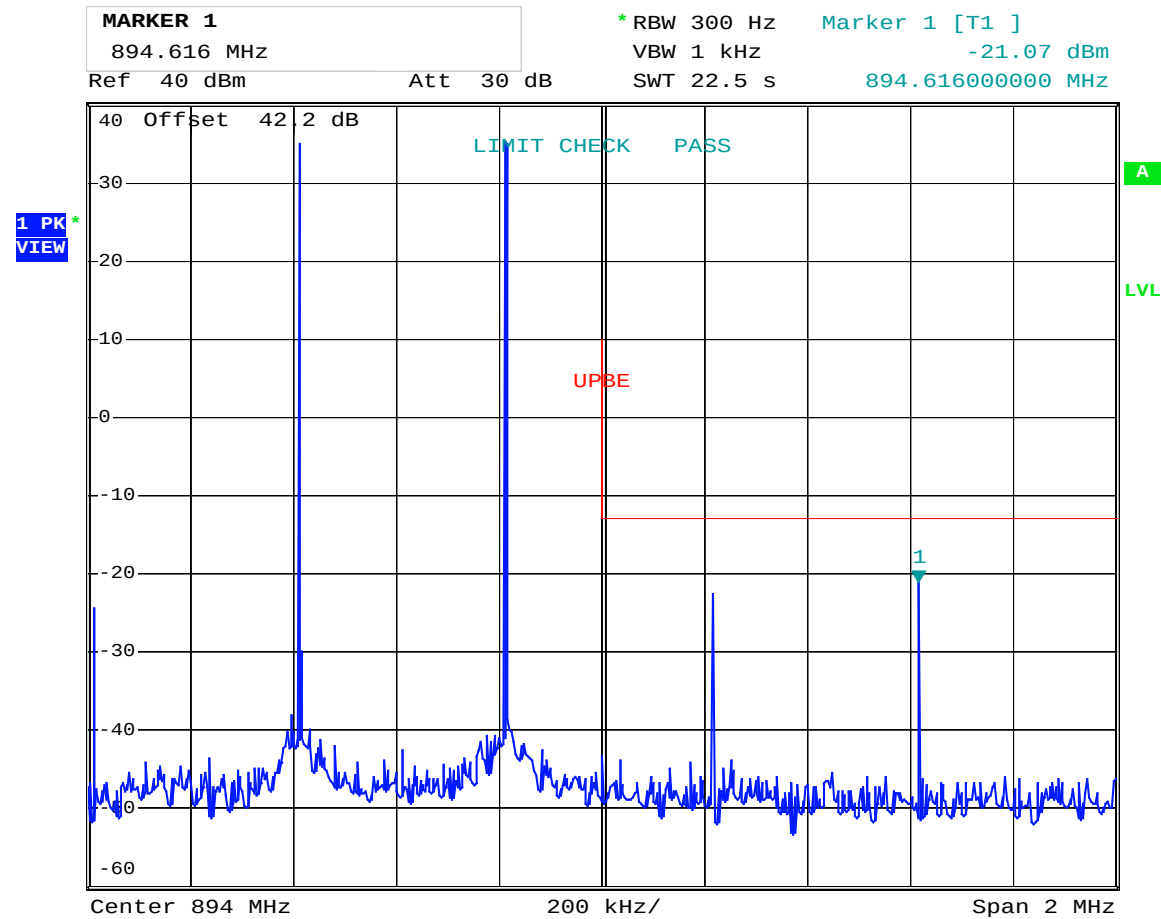
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

Analog

Downlink



Date: 21.DEC.2006 16:09:57

EQUIPMENT: **FS31X-87-25-2-RM**

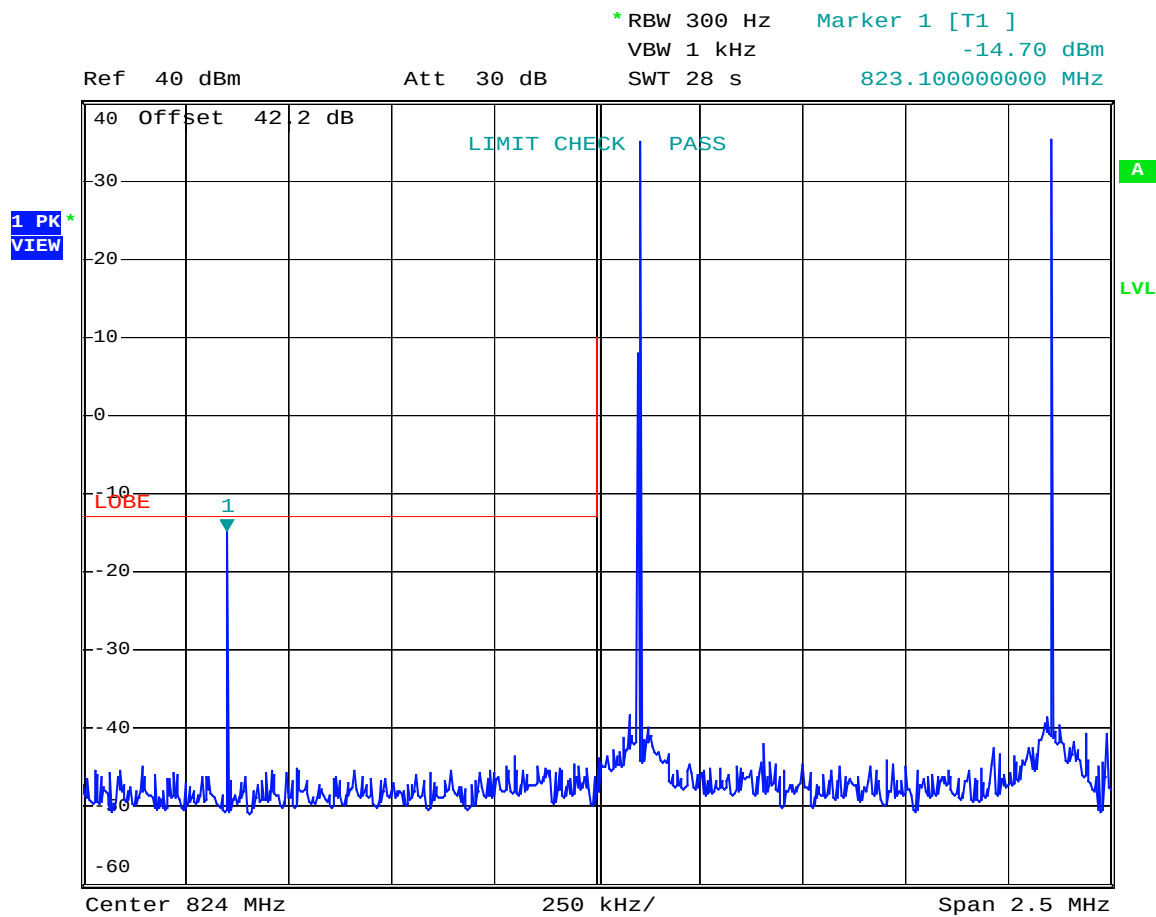
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

Analog

Uplink



Date: 21.DEC.2006 15:54:20

EQUIPMENT: **FS31X-87-25-2-RM**

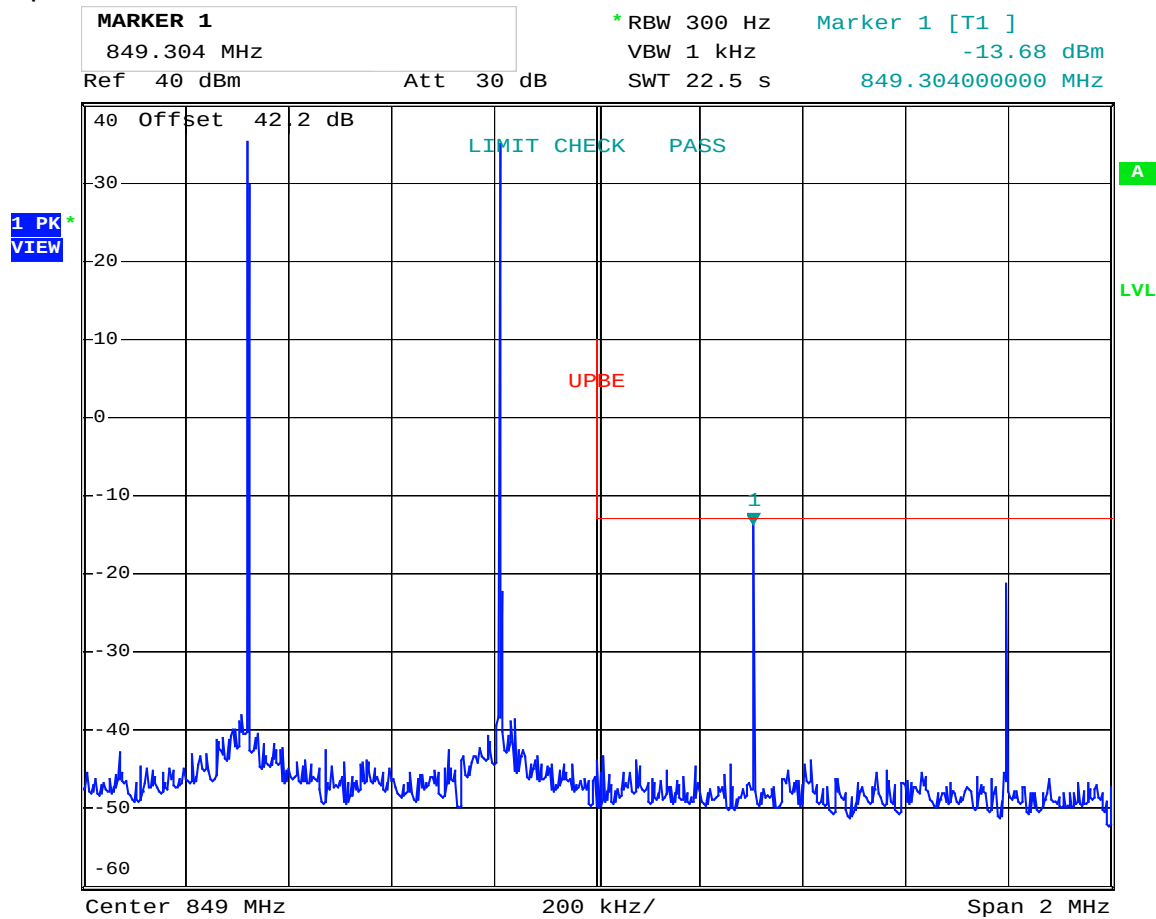
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

Analog

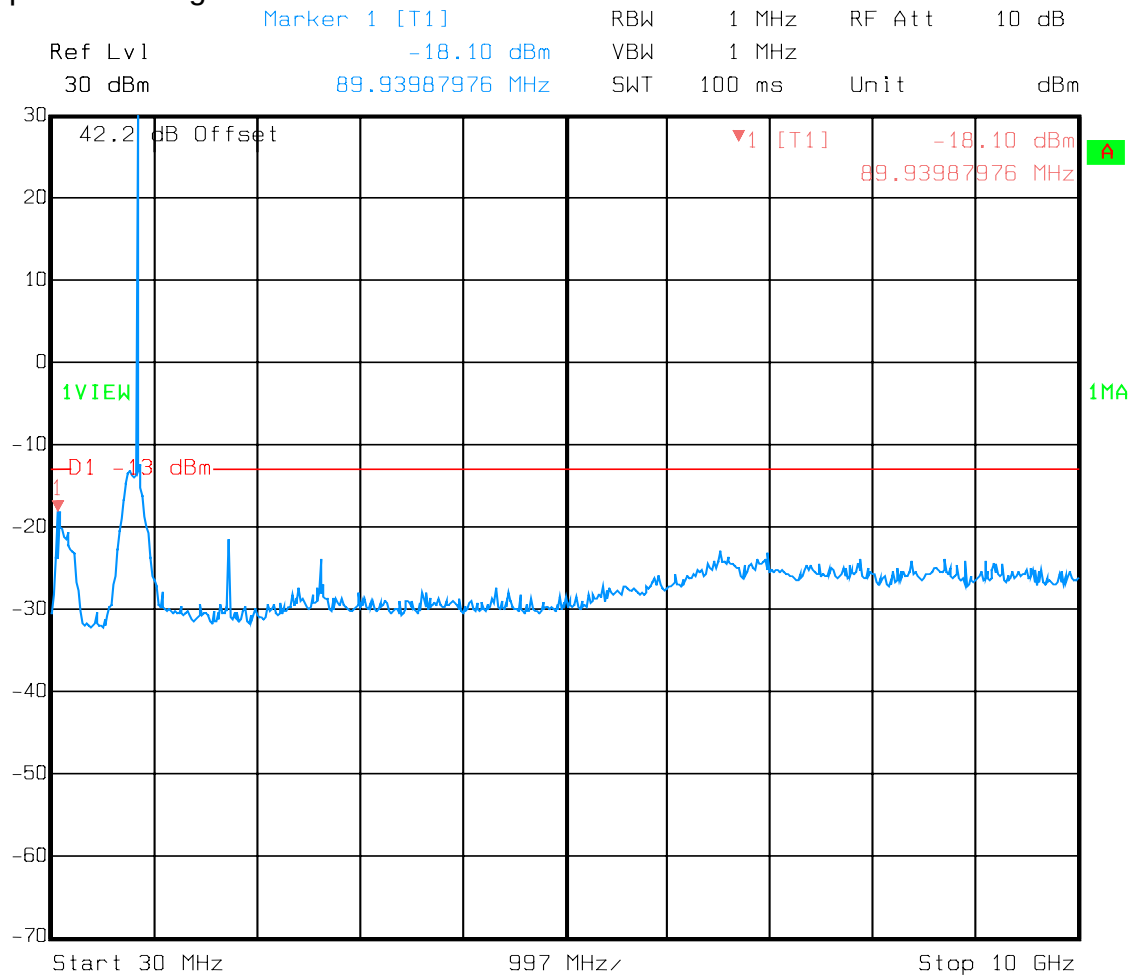
Uplink



Date: 21.DEC.2006 16:07:30

EQUIPMENT: **FS31X-87-25-2-RM**

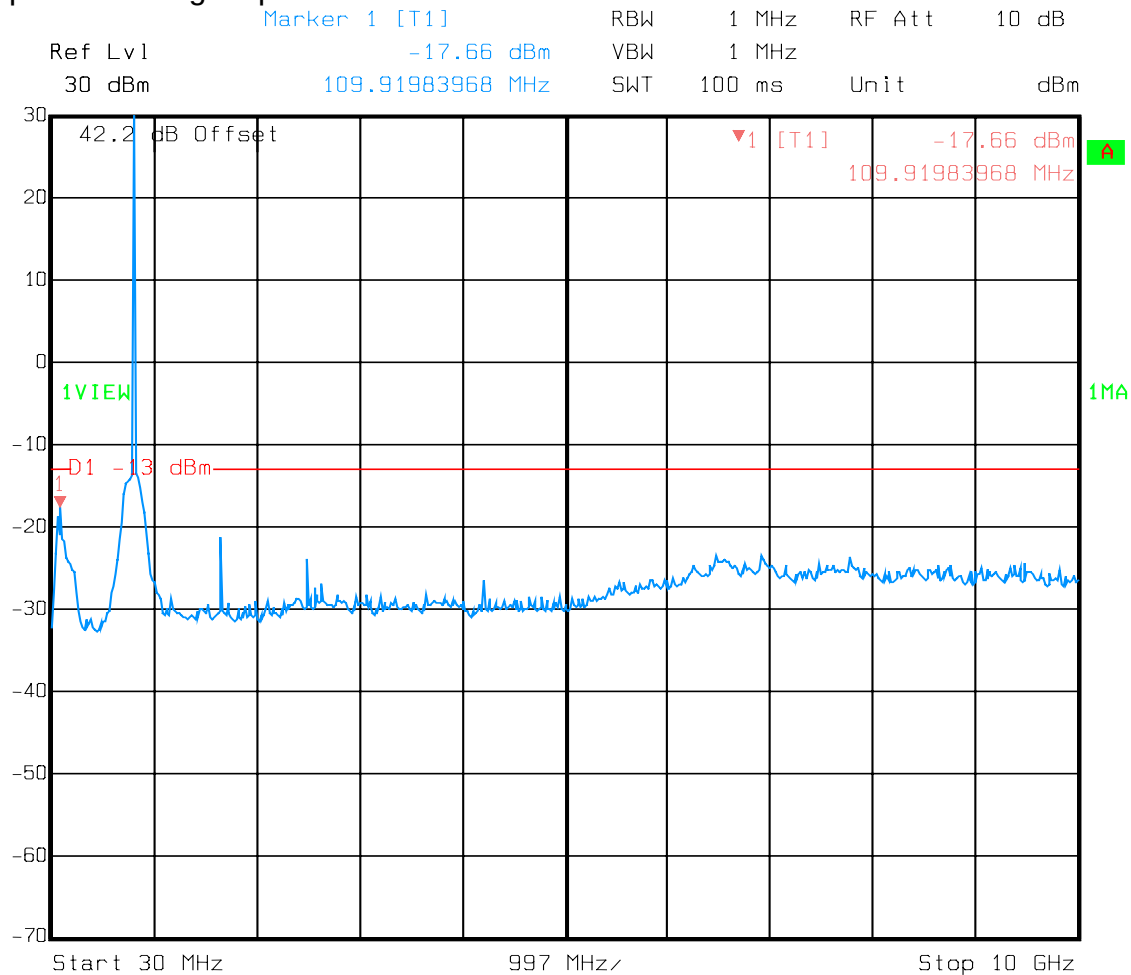
PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – Analog - Downlink**

Date: 21.DEC.2006 17:02:01

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Test Data – Spurious Emissions at Antenna Terminals**Spurs – Analog - Uplink**

Date: 21.DEC.2006 17:01:19

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 05 January 2007

Test Results: Complies.

Test Data: The spectrum was searched from 30 MHz to the tenth harmonic of the carrier. There were no emissions detected above the noise floor which was at least 20 dB below the specification limit.

RBW=VBW=100 kHz below 1000 MHz

RBW=VBW=1 MHz above 1000 MHz

Equipment Used: 759-1195-791-1464-993-1016-1484-1485**Measurement Uncertainty:** +/-1.7 dB**Temperature:** 23 °C**Relative Humidity:** 35 %

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	05/26/06	05/26/08
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1469	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
2071	Power Sensor	Agilent E9304A	MY41495174	11/14/06	11/14/07
2072	Power Meter	HP E4418B	GB39401848	11/13/06	11/13/07
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	02/13/06	02/13/07
1195	ANTENNA,BICONICAL	A.H. SYSTEMS SAS-200/542	235	02/10/06	02/10/07
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	04/20/06	04/20/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	04/20/06	04/20/07
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1484	Cable	Storm PR90-010-072	N/A	10/02/06	10/02/07
1485	Cable	Storm PR90-010-216	N/A	10/02/06	10/02/07
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/10/06	01/10/07

ANNEX A - TEST DETAILS

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

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

Minimum Standard: Para. No. 22.913(a). The maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 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:

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 2.1049

Minimum Standard: Not defined (Input/Output)

Method Of Measurement:

CDMA

Spectrum analyzer settings:

RBW=VBW=30 kHz

Span: 5 MHz

Sweep: Auto

GSM / EDGE

RBW=VBW= 3 kHz

Span: 1 MHz

Sweep: Auto

TDMA

RBW=VBW= 1 kHz

Span: 1 MHz

Sweep: Auto

W-CDMA

RBW=VBW= 100 kHz

Span: 10 MHz

Sweep: Auto

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

**NAME OF TEST: Spurious Emission at Antenna
Terminals****PARA. NO.: 2.1051****Minimum Standard:**

Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least $43 + 10 \log P$. This is equivalent to -13 dBm absolute power.

Method Of Measurement:**Method Of Measurement:**

Spectrum analyzer settings:

CDMA

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

TDMA

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

GSM / EDGE

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

W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 100 kHz (< 1MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: 6 Sweeps

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
---	--------------------------

Minimum Standard:

Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least $43 + 10 \log P$. This is equivalent to -13 dBm absolute power.

Method of Measurement

TIA/EIA-603-1992

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

NAME OF TEST: Frequency Stability**PARA. NO.: 2.1055****Minimum Standard:**

Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Table C-1

Freq. Range (MHz)	Base, fixed	Mobile > 3 W	Mobile ≤ 3 W
821 to 896	1.5	2.5	2.5

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:

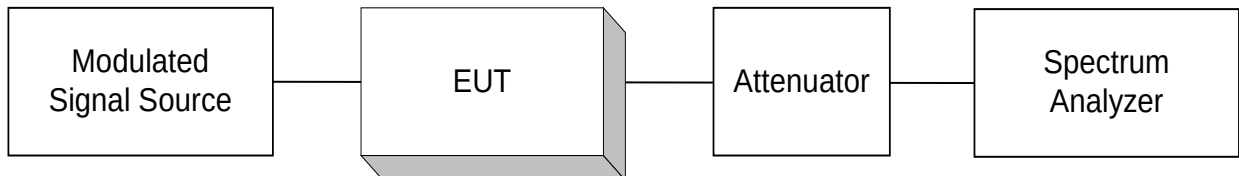
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

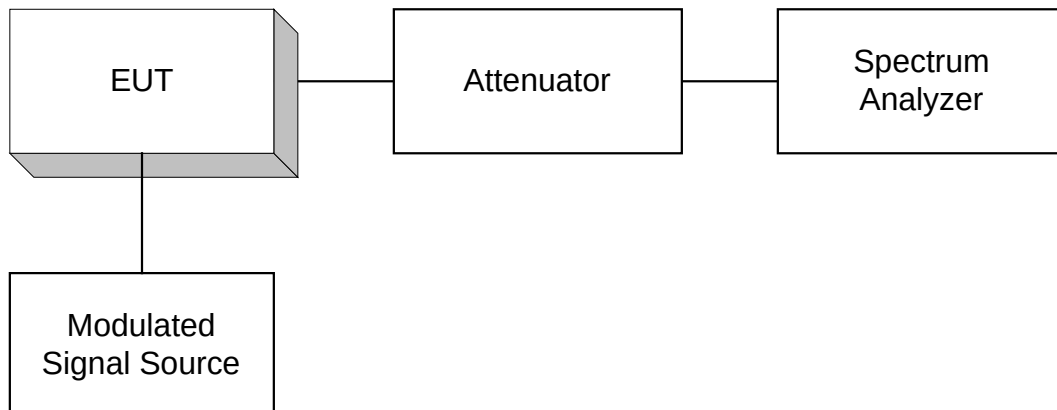
EQUIPMENT: **FS31X-87-25-2-RM**

PROJECT NO.: 1906RUS2

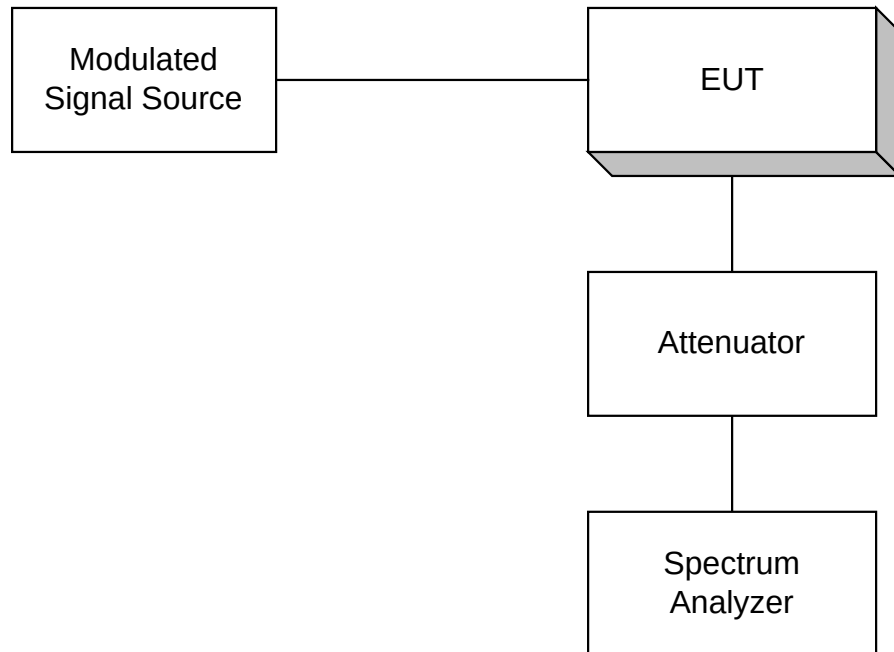
Para. No. 2.1046 - R.F. Power Output



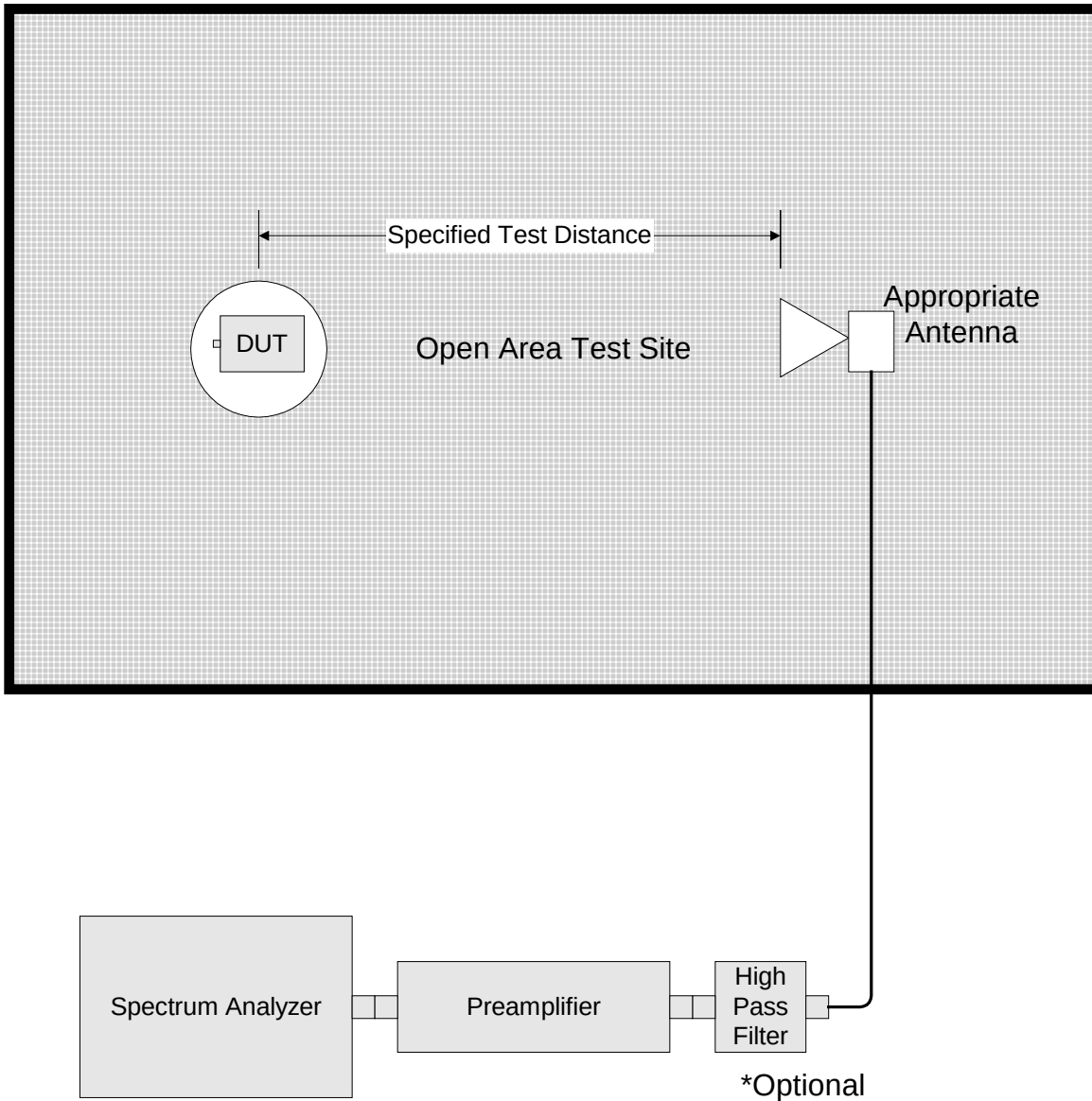
Para. No. 2.1049 - Occupied Bandwidth

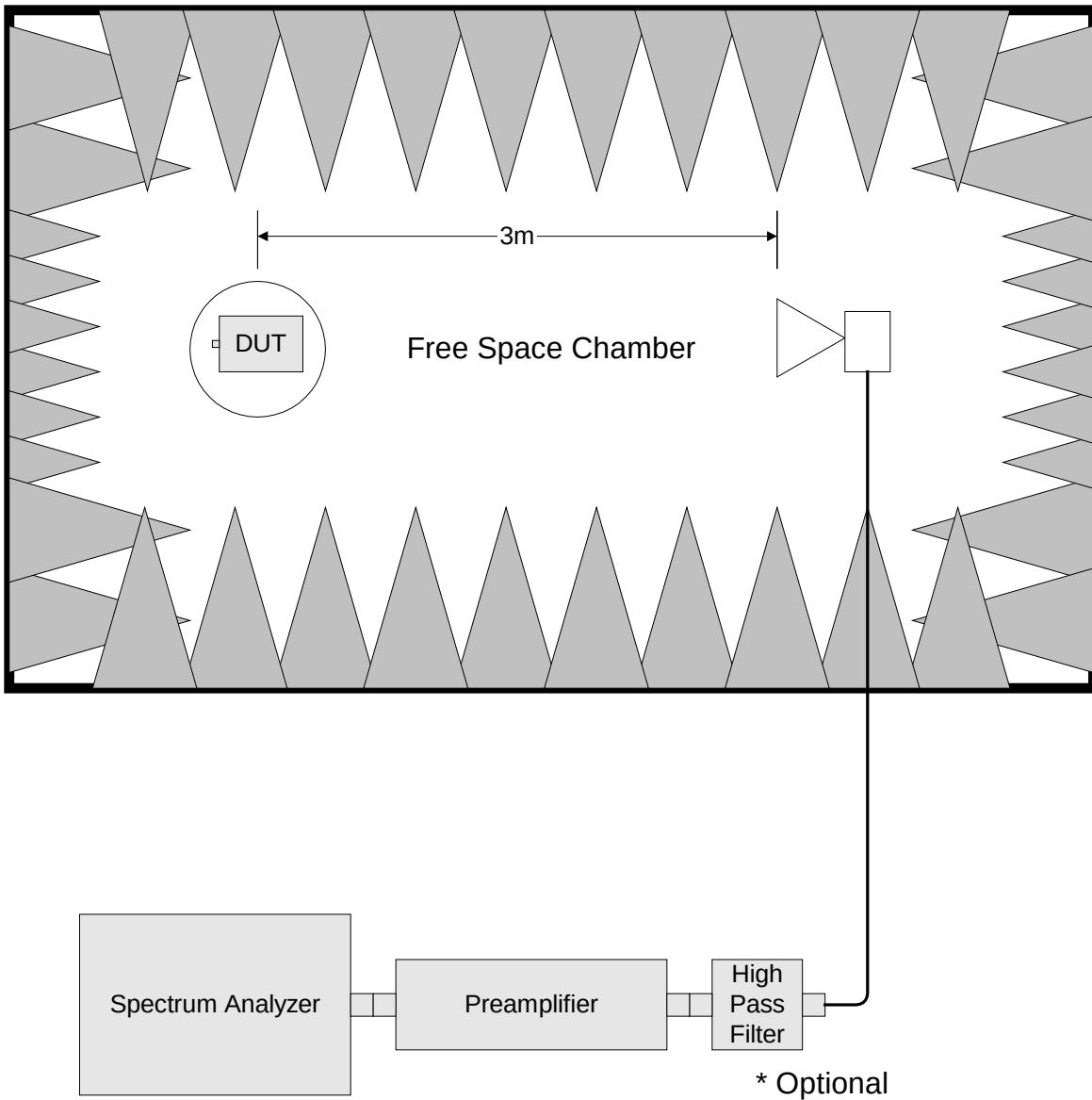


Para. No. 2.1051 Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation





Para. No. 2.1055 - Frequency Stability

