



Nemko Test Report: 41236RUS1

Applicant: Andrew Corporation
620 N. Greenfield Parkway
Garner, NC 27529
USA

**Equipment Under Test:
(E.U.T.)** MR8018

FCC Identifier: BCR-MR8018

In Accordance With: **CFR 47 Part 90, Subpart I**
Private Land Mobile Repeater

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: 28 January 2010

APPROVED BY:

A handwritten signature in black ink, appearing to read 'Tom Tidwell'.

Tom Tidwell, Telecom Direct

DATE: 29 January 2010

Number of Pages: 34

Table of Contents

Section 1. Summary of Test Results	3
Section 2. General Equipment Specification	5
Section 3. Occupied Bandwidth.....	7
Section 4. Spurious Emissions at Antenna Terminals	16
Section 5. Test Equipment List.....	29
ANNEX A - TEST METHODOLOGIES.....	30
ANNEX B - TEST DIAGRAMS	33

EQUIPMENT: MR8018

Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: MR8018

Serial No.: 10

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 Part 90, Subpart I.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

Reason for Class II change: Gain has been increased from 70 dB to 78 dB. Output power remains at 22 dBm. The gain of the amplifier is increased by the removal of attenuation in the system. There was no degradation in the performance of the device tested.

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

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Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	90.635	1 kW ERP	Not tested
Occupied Bandwidth	90.210	Input/Output	Complies
Spurious Emissions at Antenna Terminals	90.210	Plots	Complies
Field Strength of Spurious Emissions	90.210	-20 dBm 50 + 10logP(W)	Not tested
Frequency Stability	90.213	1 ppm	NA

Footnotes For N/A's:

- (1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
- (2) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.

Section 2. General Equipment Specification**Transmitter**

Supply Voltage Input: 120 Vac

Frequency Range: Downlink: 851 to 869 MHz

Uplink: 806 to 824 MHz

Tunable Bands:

Type(s) of Modulation:	F3E (Voice)	F1D	F2D	D7W (QAM)	Other
	☒	☒	☐	☒	☐

Gain: 70 dB

Output Impedance: 50 ohms

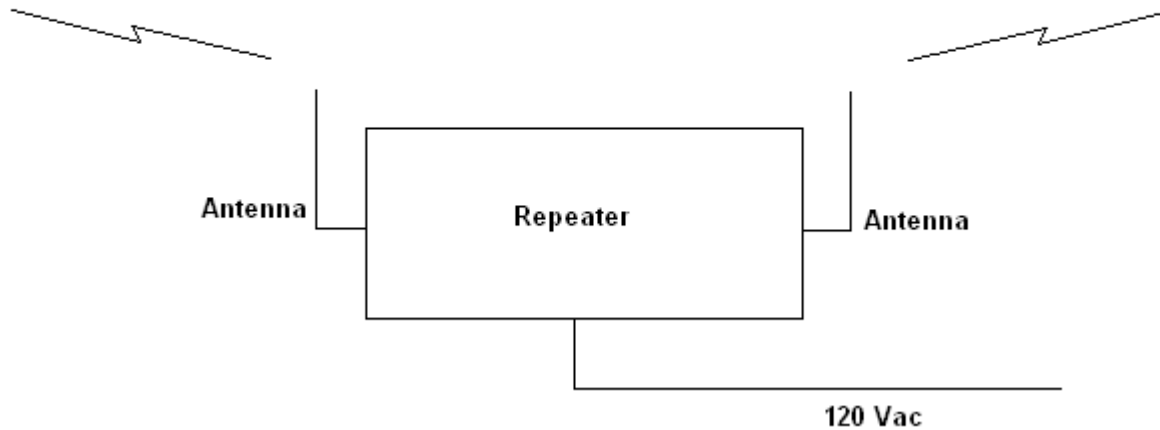
RF Power Output (rated): $\frac{0.158}{22}$ W dBmOperator Selection of
Operating Frequency: SoftwarePower Output Adjustment
Capability: Software

Frequency Translation:	F1-F1	F1-F2	N/A
	☒	☐	☐

Band Selection:	Software	Duplexer Change	Fullband Coverage
	☒	☐	☐

Description of EUT

The miniRepeaters are bi-directional amplifiers used to enhance signals between a mobile and a base station in a wireless network. They have been designed to increase signal strength in small and medium sized areas such as offices, shops, basements and manufacturing facilities.

System Diagram

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
TESTED BY: David Light	DATE: 28 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 2010-1082-1472

Measurement Uncertainty: 1X10⁻⁷ ppm

Temperature: 22 °C

Relative Humidity: 35 %

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

Analog - Output

Downlink

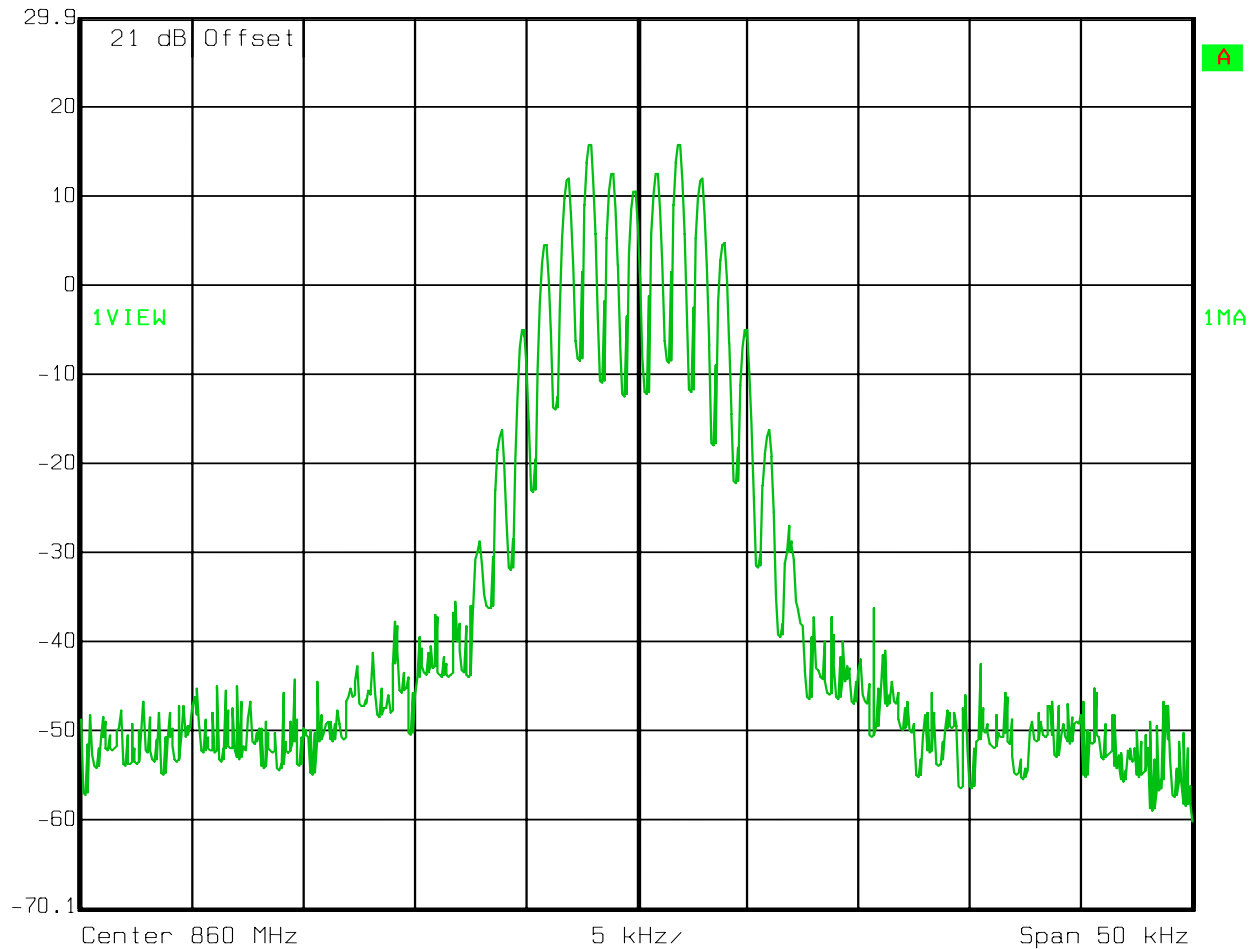
1 kHz Tone / 3 kHz Deviation



Ref Lvl

29.9 dBm

RBW	300 Hz	RF Att	30 dB
VBW	300 Hz		
SWT	2.8 s	Unit	dBm



Date: 28.JAN.2010 14:50:18

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

Analog - Input

Downlink

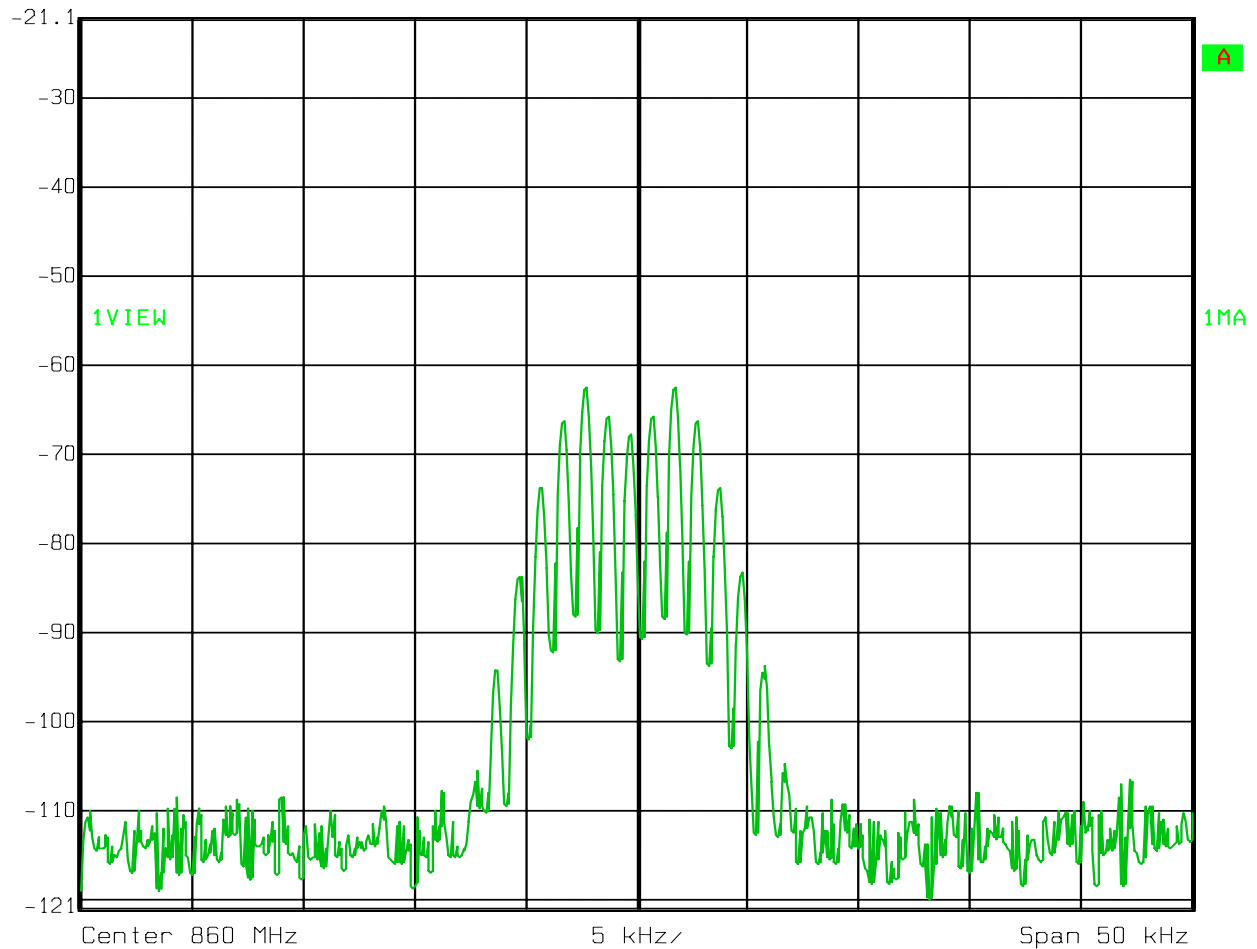
1 kHz Tone / 3 kHz Deviation



Ref Lvl

-21.1 dBm

RBW	300 Hz	RF Att	10 dB
VBW	300 Hz		
SWT	2.8 s	Unit	dBm



Date: 28.JAN.2010 14:53:31

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

Analog – Output

Uplink

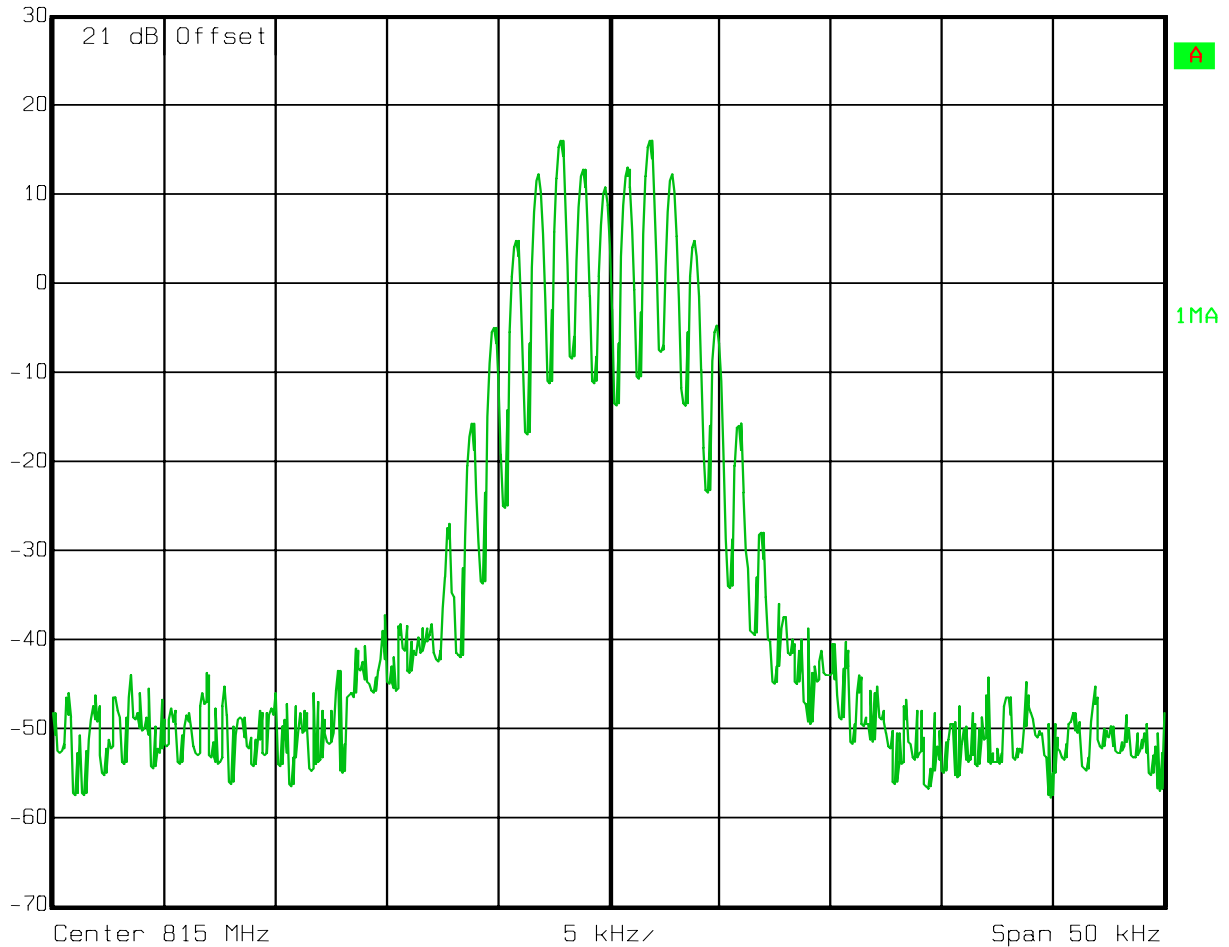
1 kHz Tone / 3 kHz Deviation



Ref Lvl

30 dBm

RBW	300 Hz	RF Att	30 dB
VBW	300 Hz		
SWT	2.8 s	Unit	dBm



Date: 28.JAN.2010 14:56:47

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

Analog - Input

Uplink

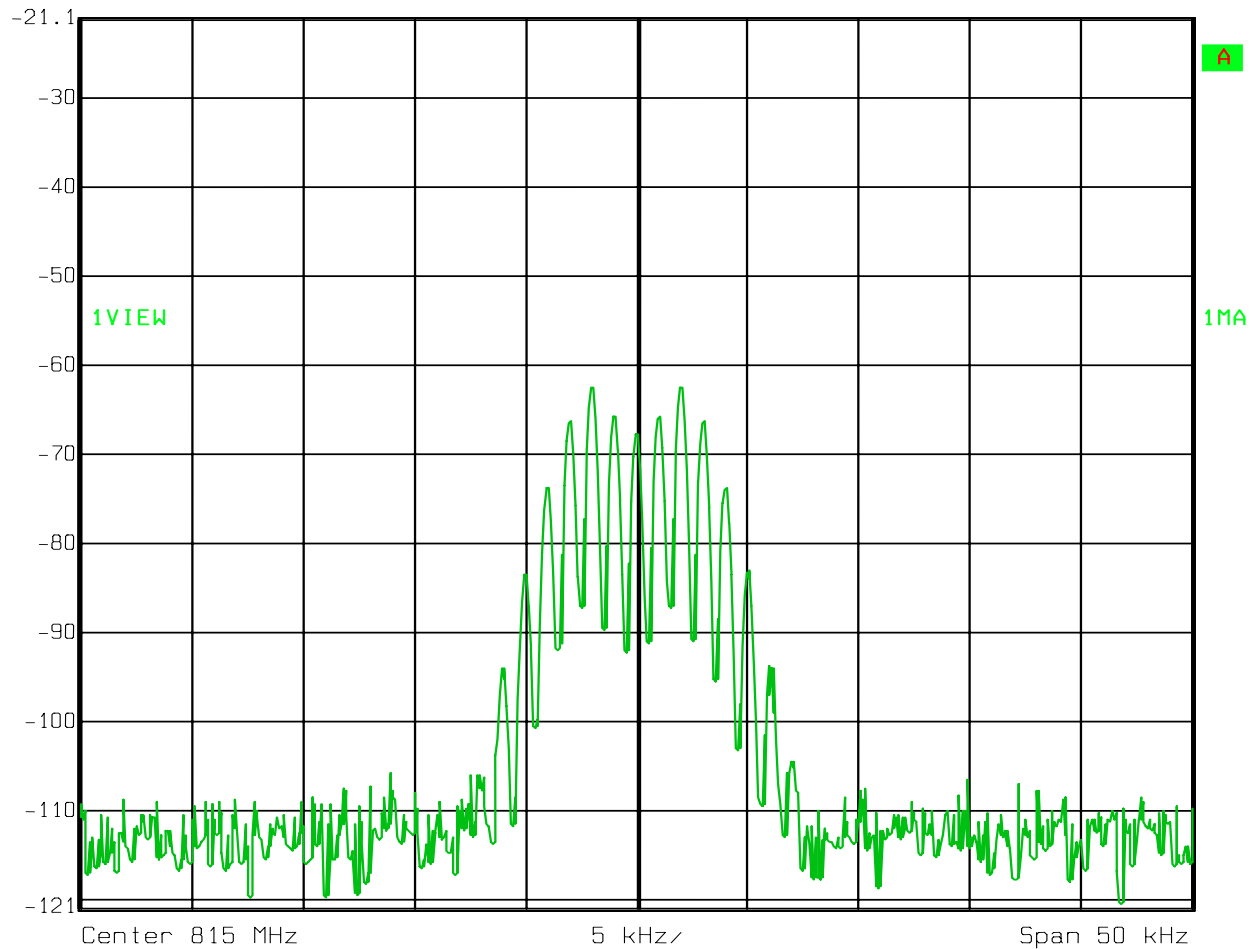
1 kHz Tone / 3 kHz Deviation



Ref Lvl

-21.1 dBm

RBW	300 Hz	RF Att	10 dB
VBW	300 Hz		
SWT	2.8 s	Unit	dBm



Date: 28.JAN.2010 14:54:53

EQUIPMENT: MR8018

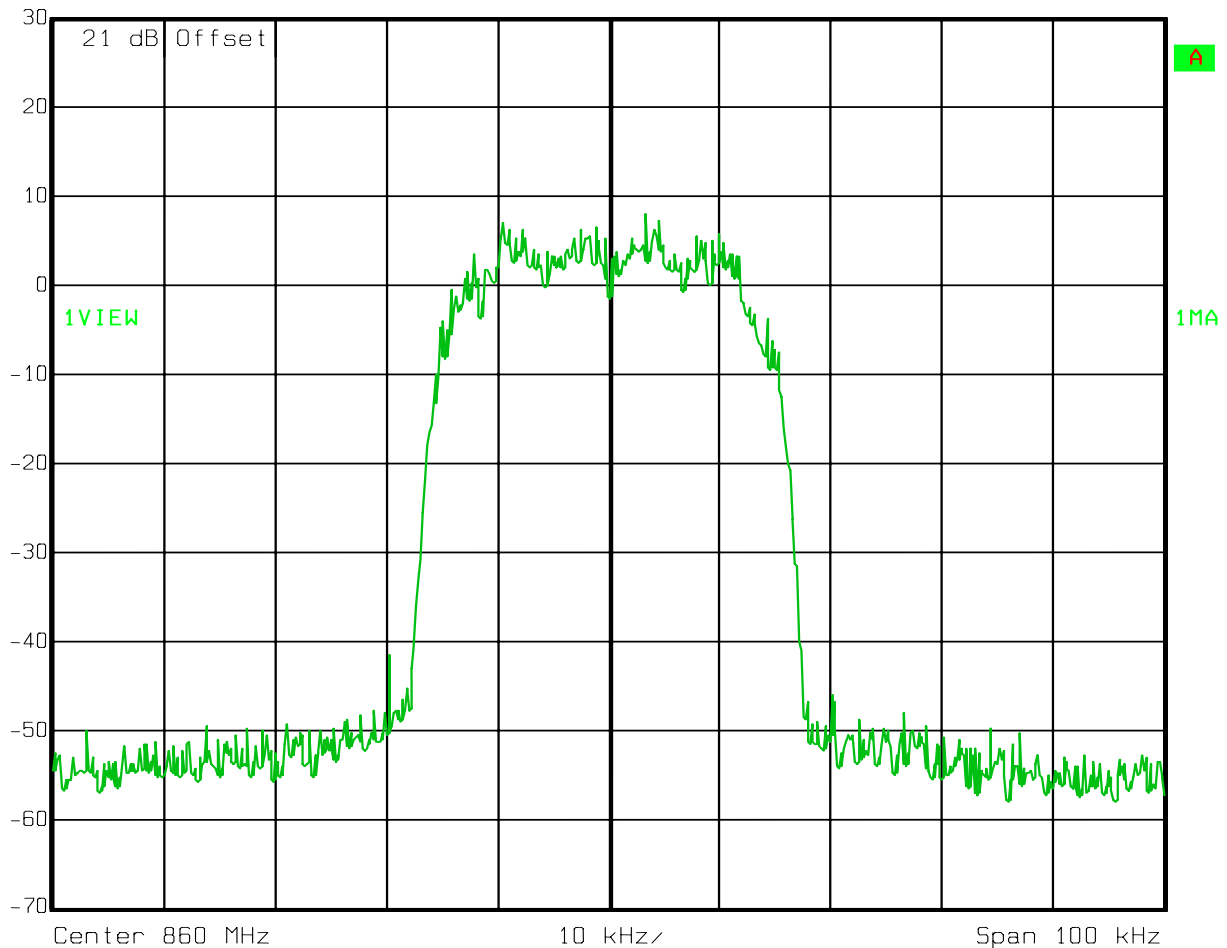
Test Data – Occupied Bandwidth

iDEN - Output
Downlink



Ref Lvl
30 dBm

RBW	300 Hz	RF Att	30 dB
VBW	300 Hz		
SWT	5.6 s	Unit	dBm



Date: 28.JAN.2010 15:04:36

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

iDEN - Input

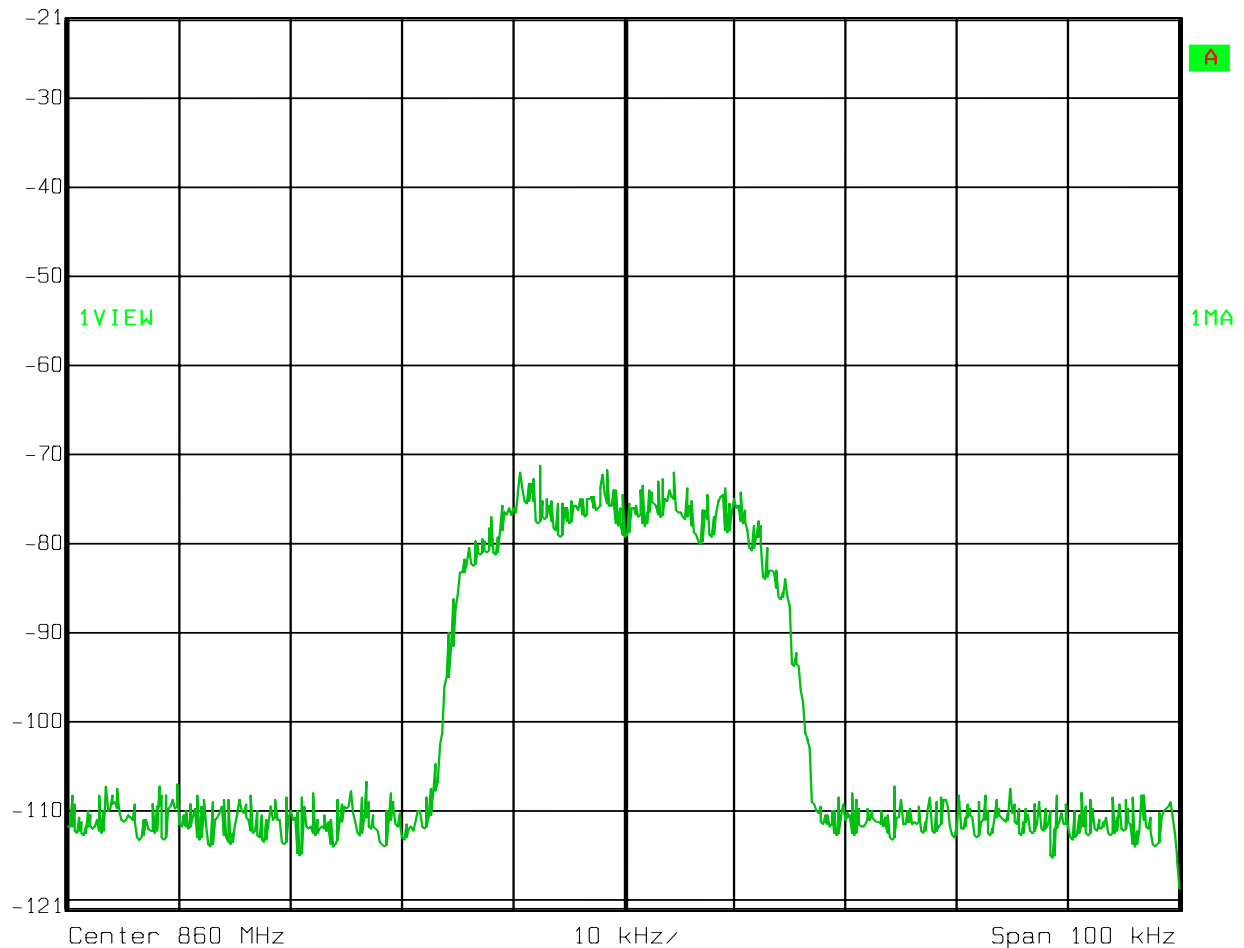
Downlink



Ref Lvl

-21 dBm

RBW	300 Hz	RF Att	10 dB
VBW	300 Hz		
SWT	5.6 s	Unit	dBm



Date: 28.JAN.2010 15:02:25

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

iDEN - Output

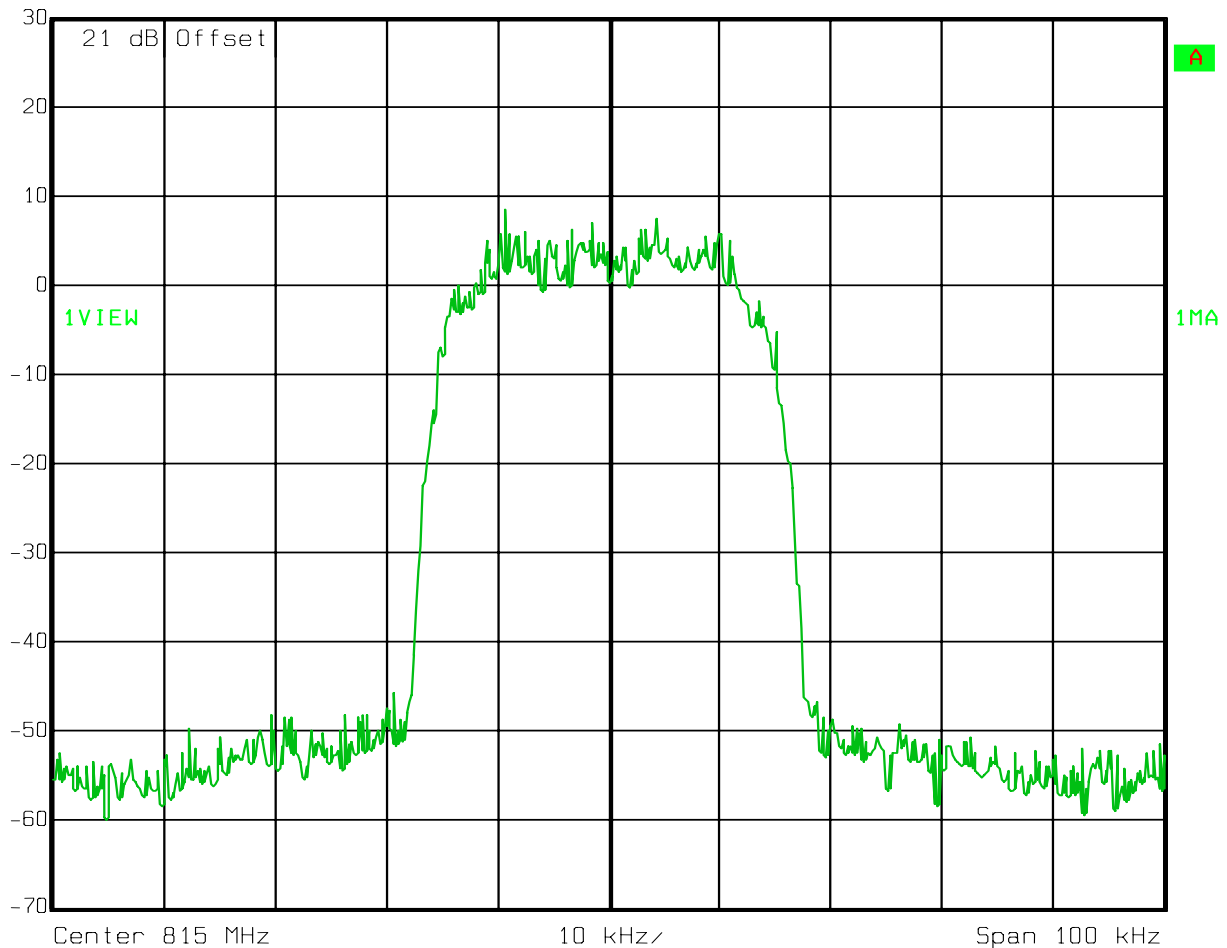
Uplink



Ref Lvl

30 dBm

RBW	300 Hz	RF Att	30 dB
VBW	300 Hz		
SWT	5.6 s	Unit	dBm



Date: 28.JAN.2010 15:00:30

EQUIPMENT: MR8018

Test Data – Occupied Bandwidth

iDEN - Input

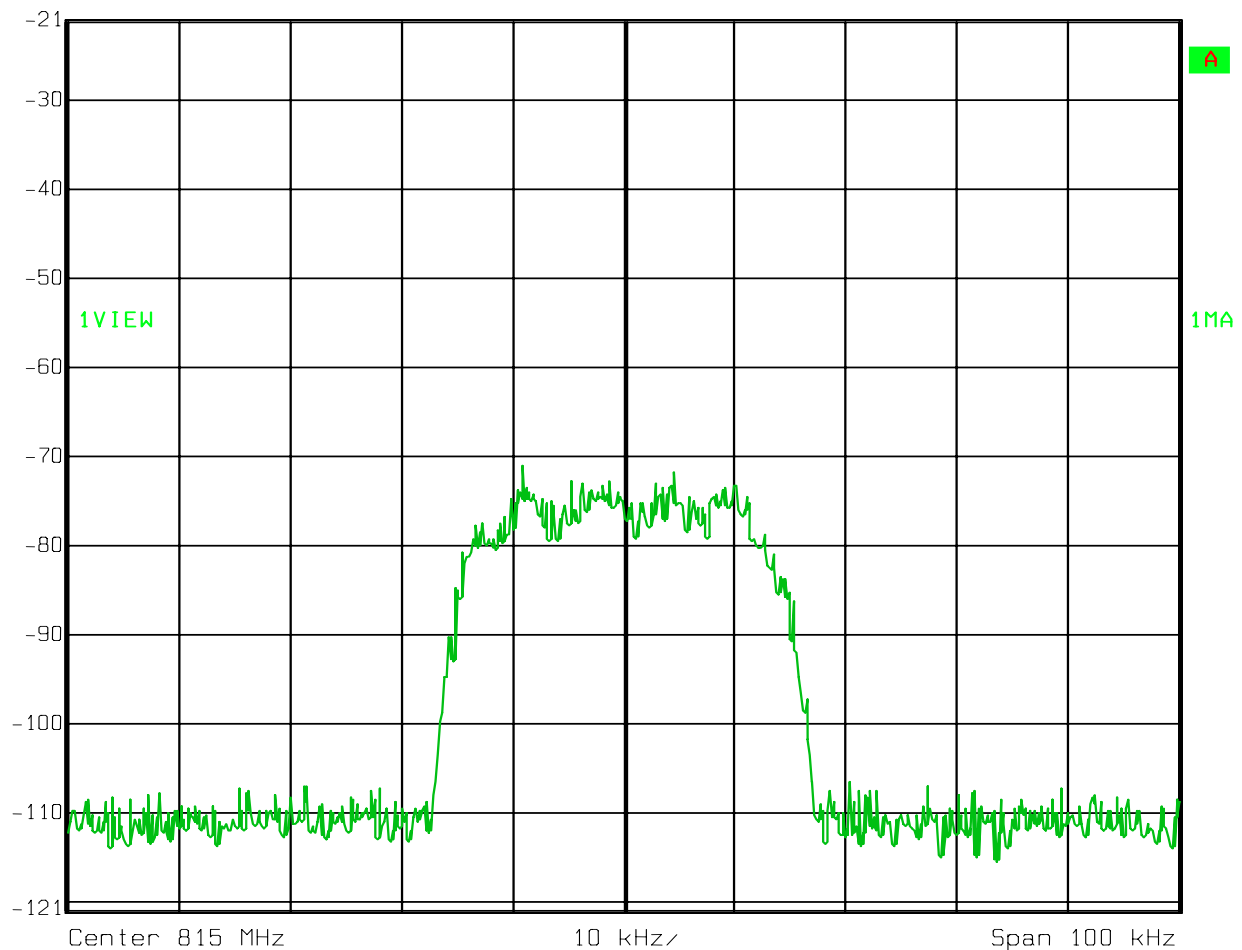
Uplink



Ref Lvl

-21 dBm

RBW	300 Hz	RF Att	10 dB
VBW	300 Hz		
SWT	5.6 s	Unit	dBm



Date: 28.JAN.2010 15:01:46

Section 4. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.991
TESTED BY: David Light	DATE: 28 January 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

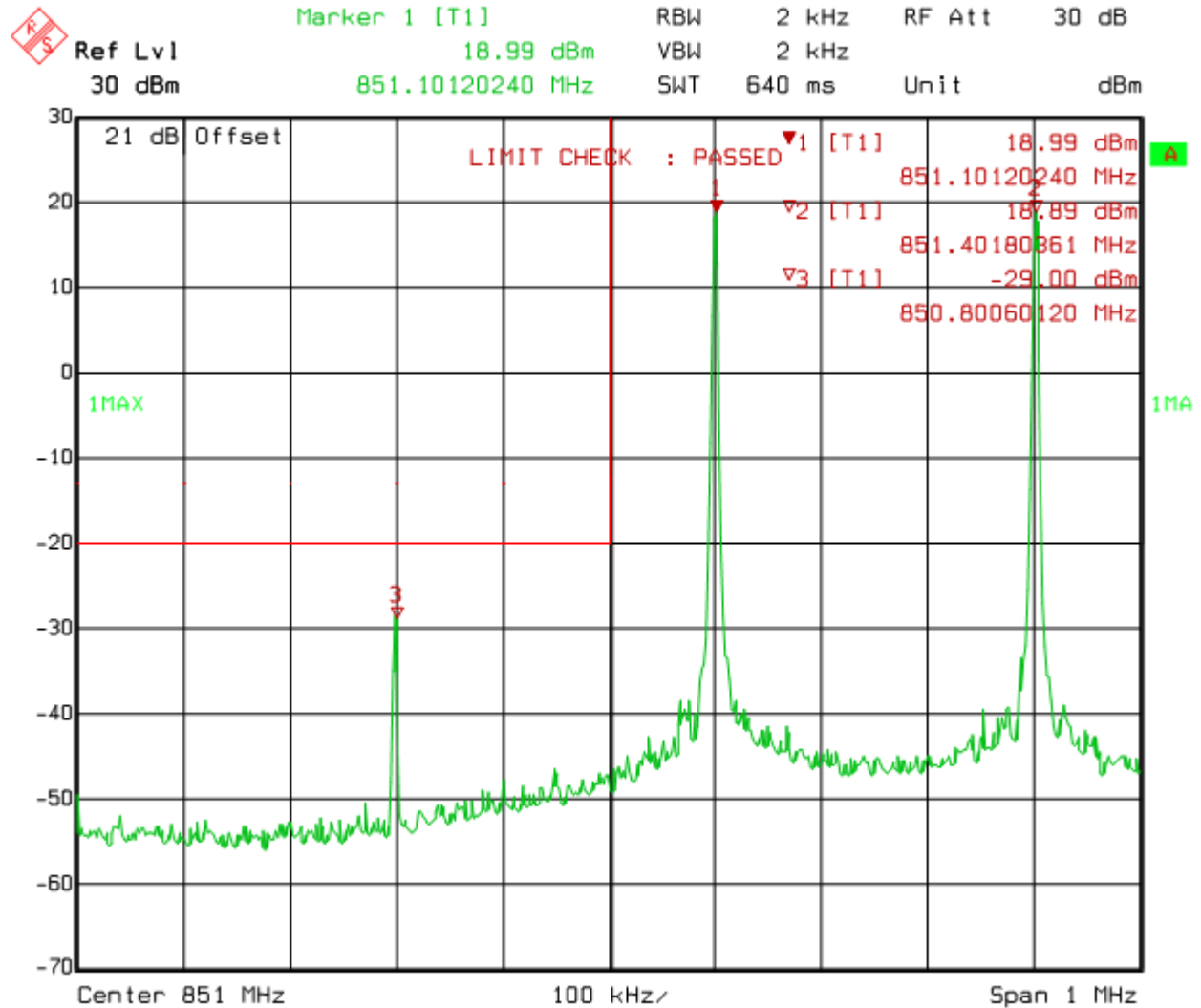
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

Analog

Downlink



Date: 28.JAN.2010 15:08:44

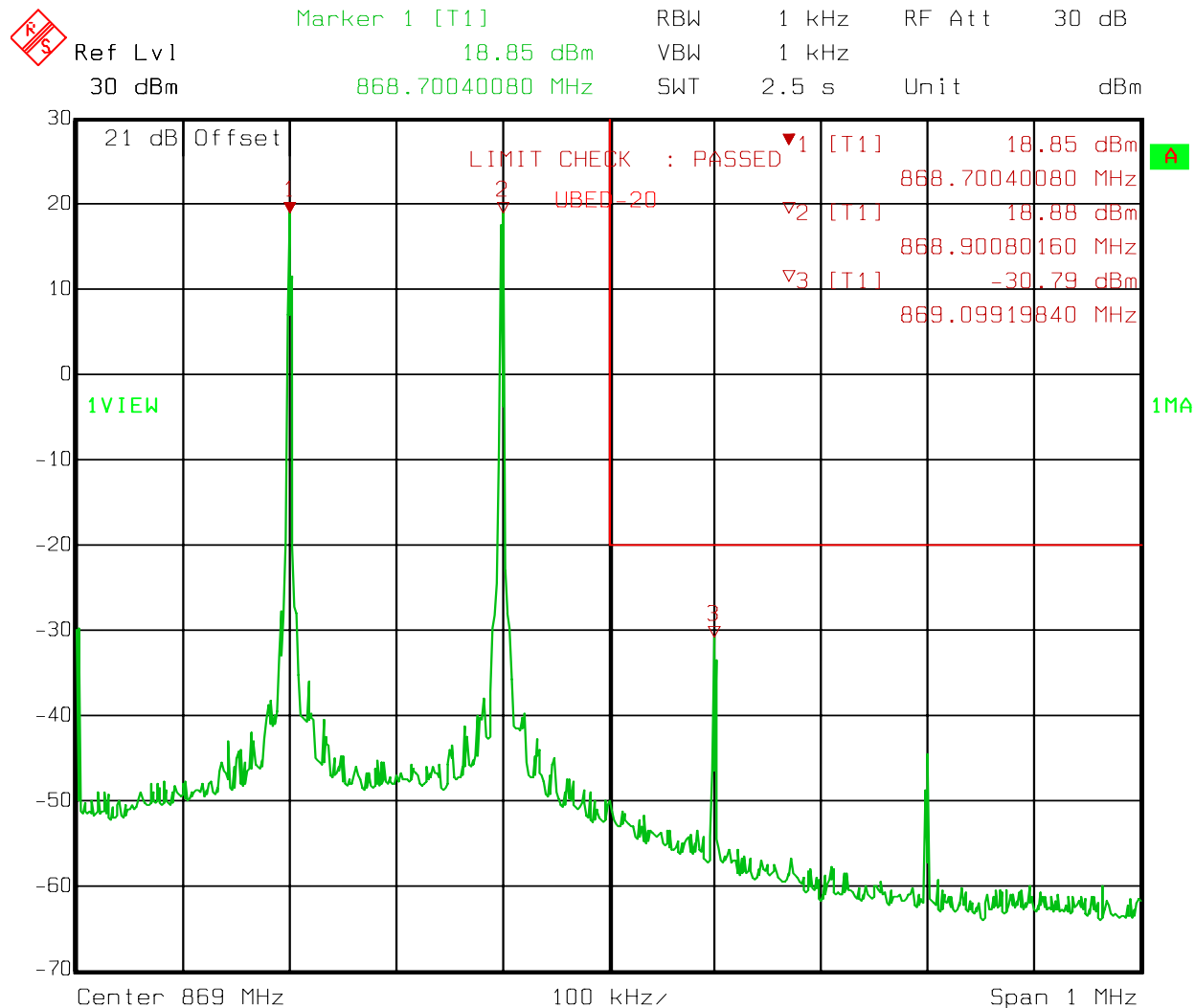
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

Analog

Downlink



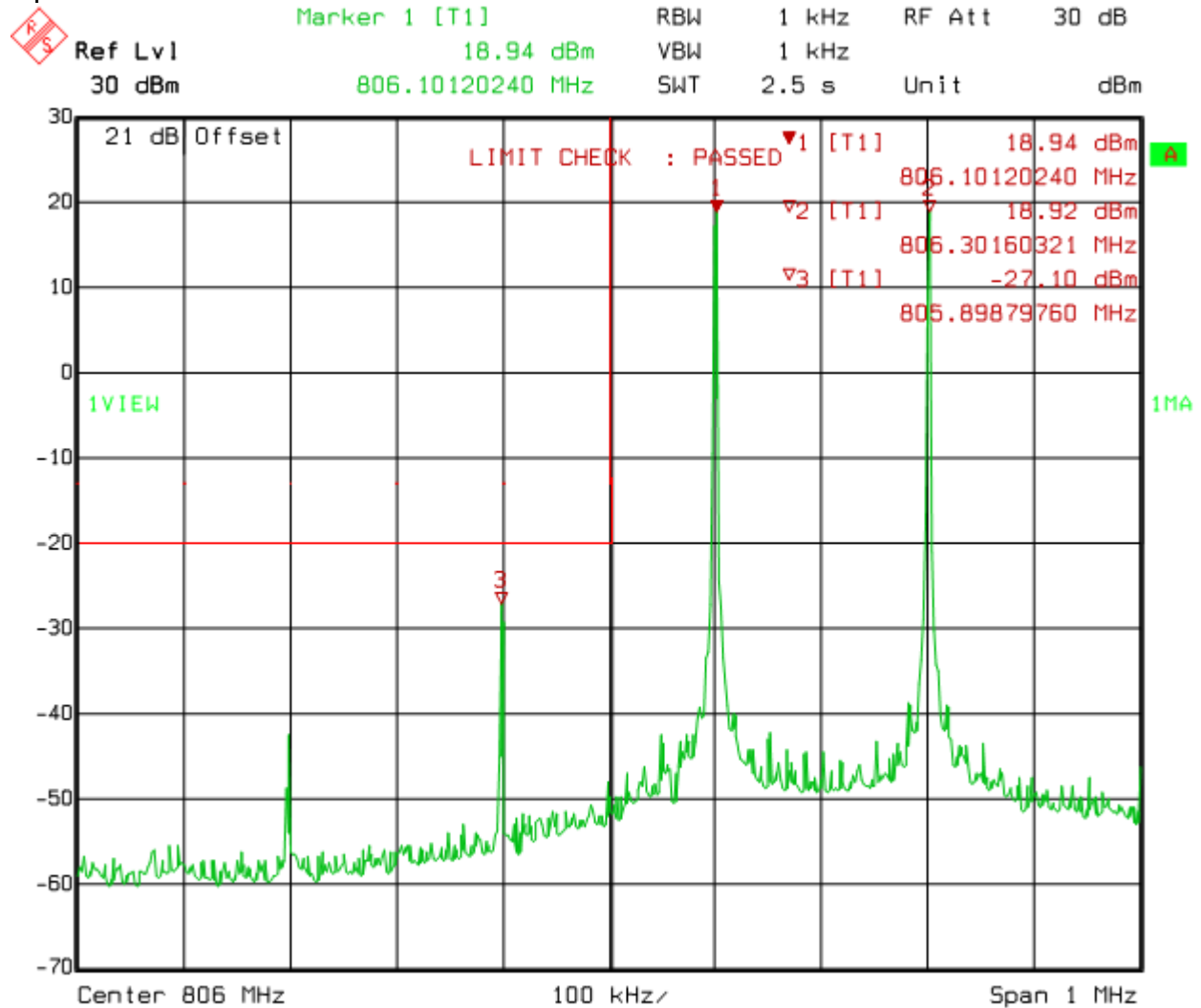
Date: 28.JAN.2010 15:37:01

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

Analog

Uplink



Date: 28.JAN.2010 15:22:11

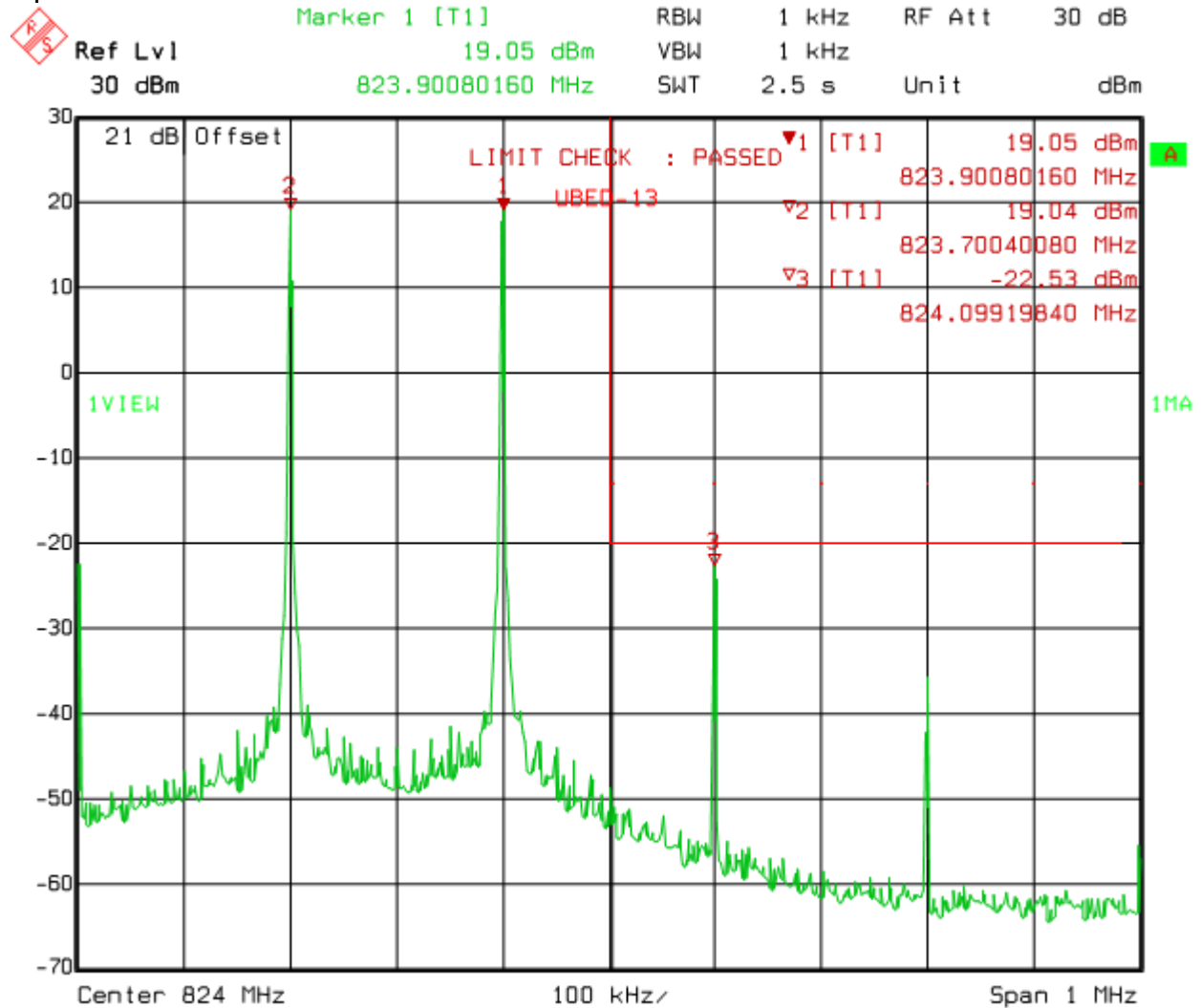
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

Analog

Uplink



Date: 28.JAN.2010 15:29:48

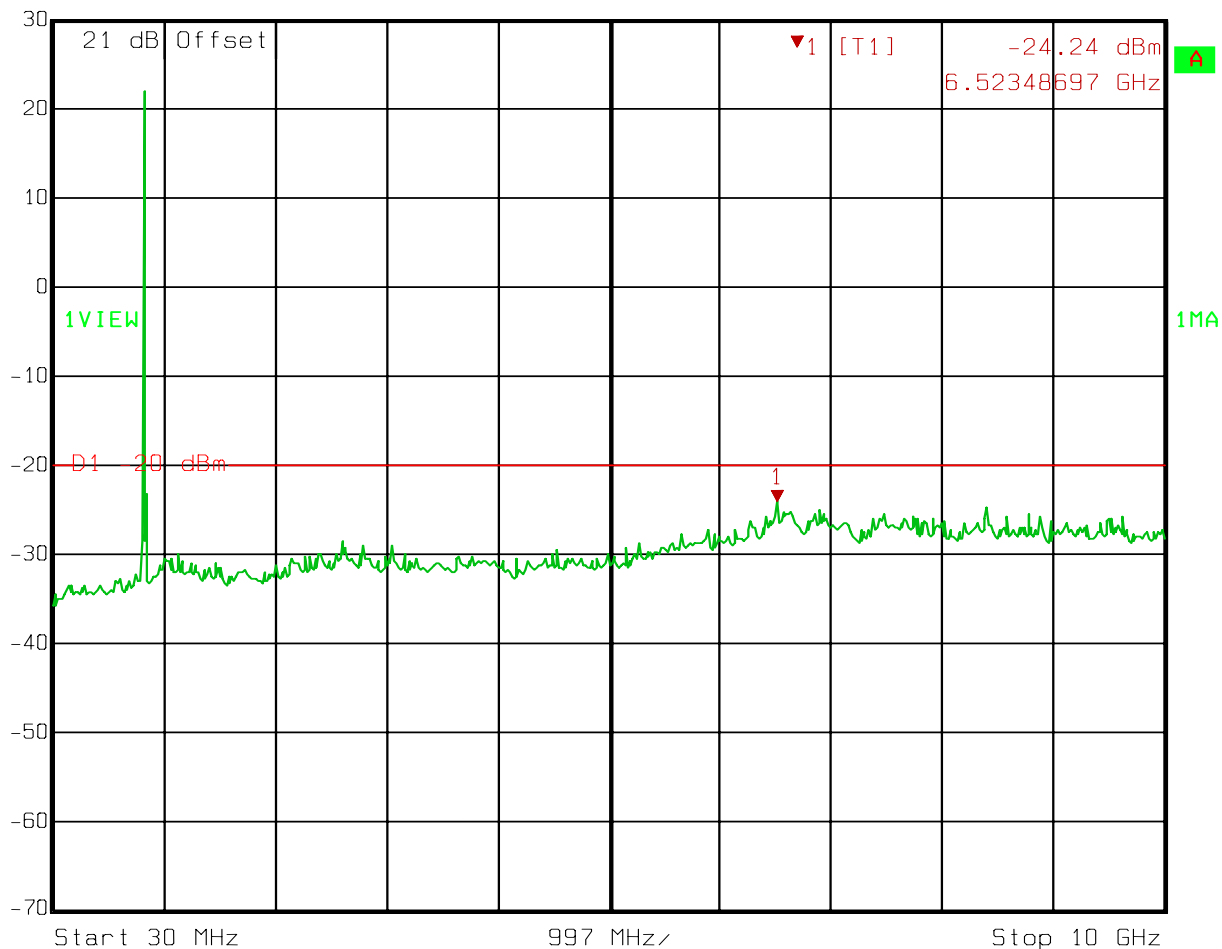
Test Data – Spurious Emissions at Antenna Terminals

Spurs

Downlink

Analog


 Ref Lvl 30 dBm
 Marker 1 [T1] -24.24 dBm
 6.52348697 GHz
 RBW 1 MHz
 VBW 1 MHz
 SWT 100 ms
 RF Att 30 dB
 Unit dBm



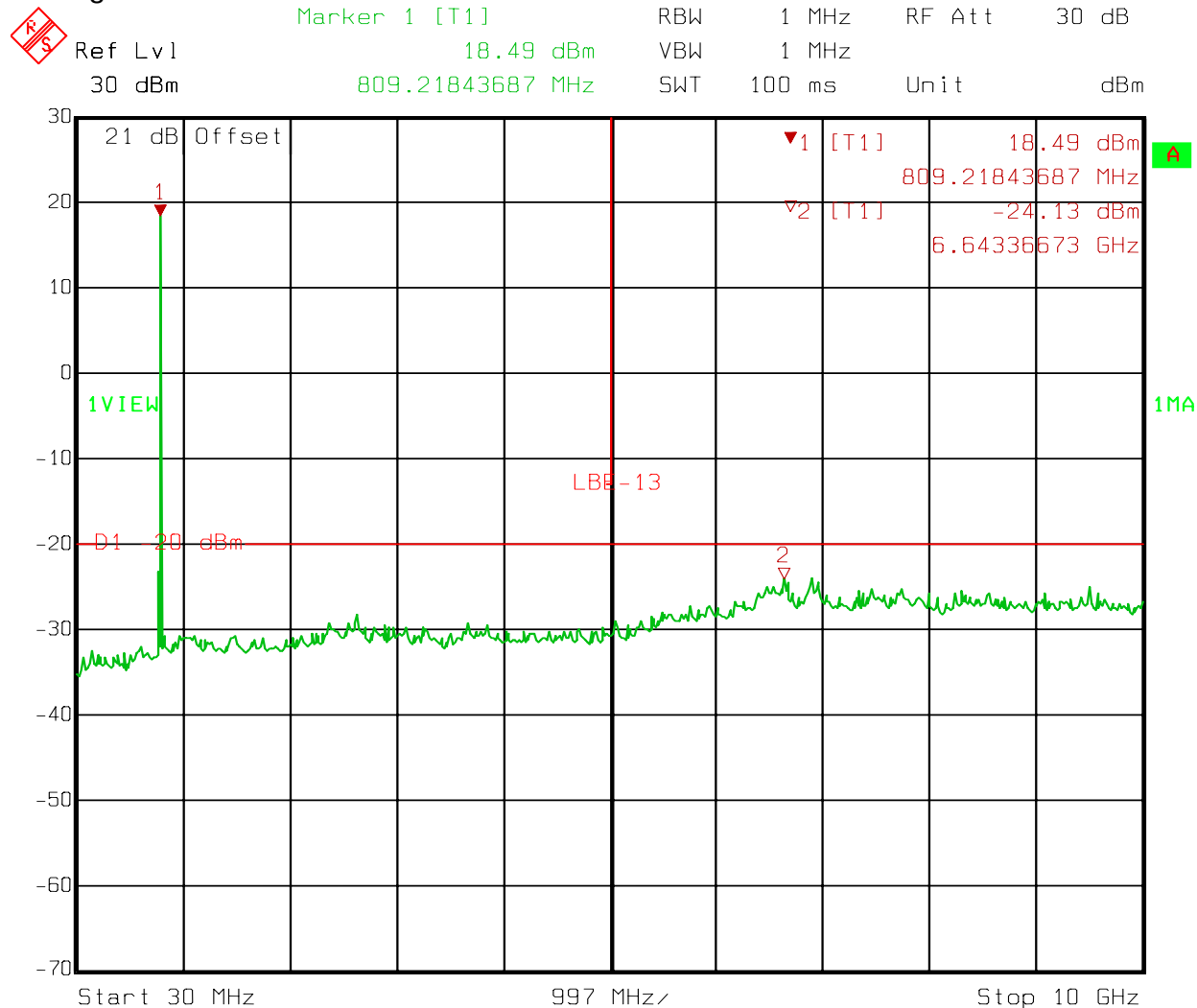
Date: 28.JAN.2010 15:14:36

Test Data – Spurious Emissions at Antenna Terminals

Spurs

Uplink

Analog



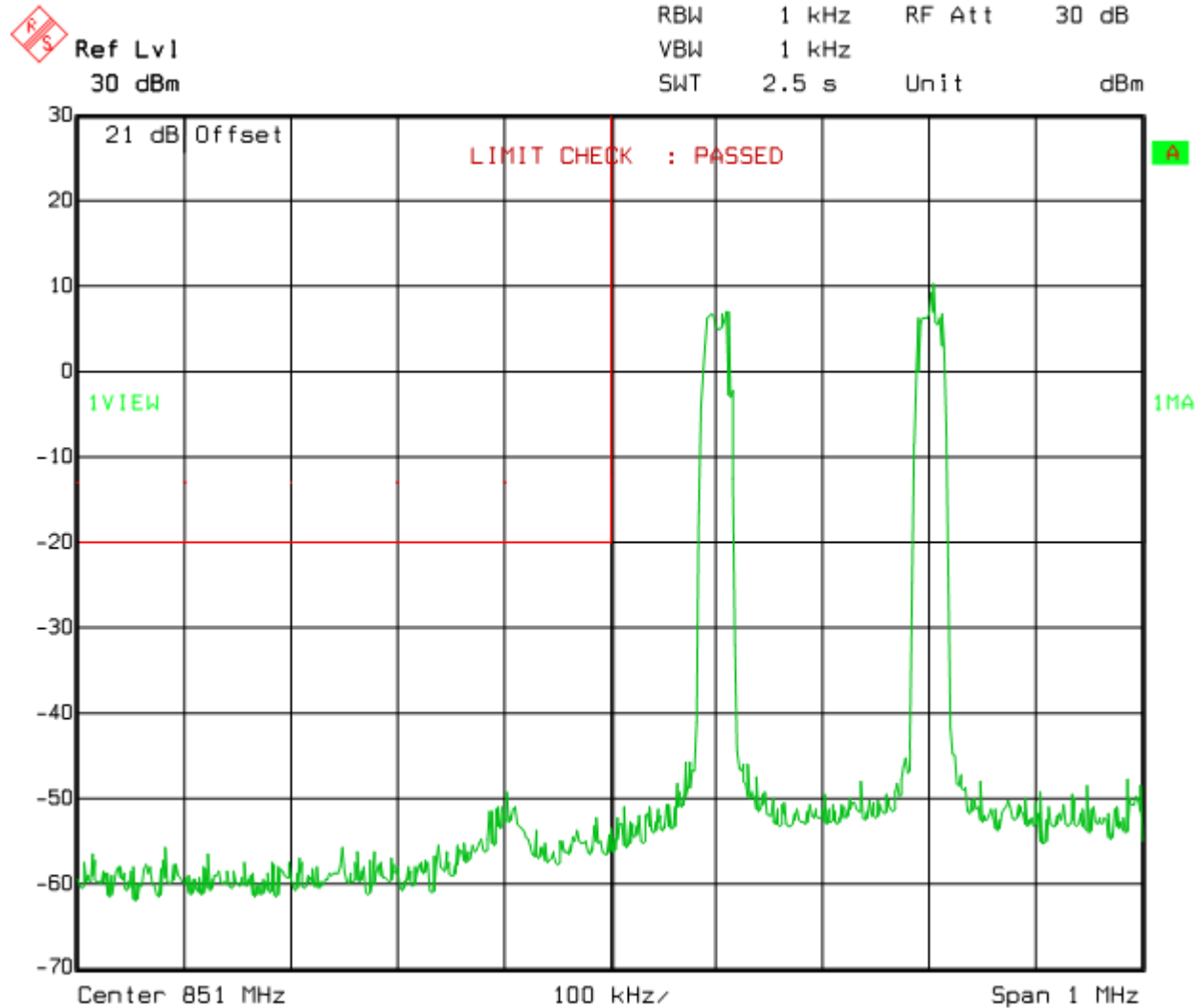
Date: 28.JAN.2010 15:26:47

EQUIPMENT: MR8018**Test Data – Spurious Emissions at Antenna Terminals**

Lower Bandedge Intermodulation

iDEN

Downlink



Date: 28.JAN.2010 15:17:09

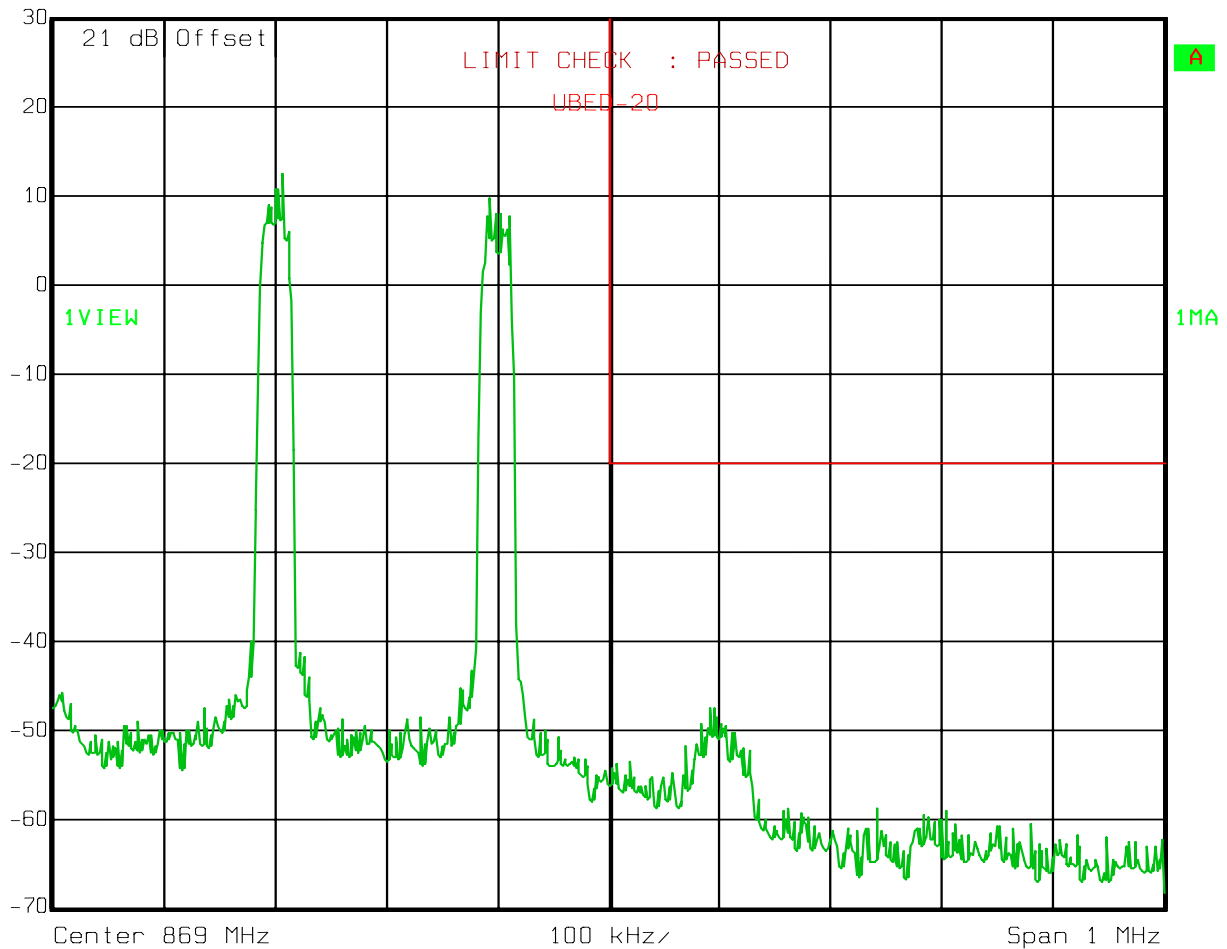
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

iDEN

Downlink

Ref Lvl
30 dBmRBW 1 kHz RF Att 30 dB
VBW 1 kHz
SWT 2.5 s Unit dBm

Date: 28.JAN.2010 15:34:43

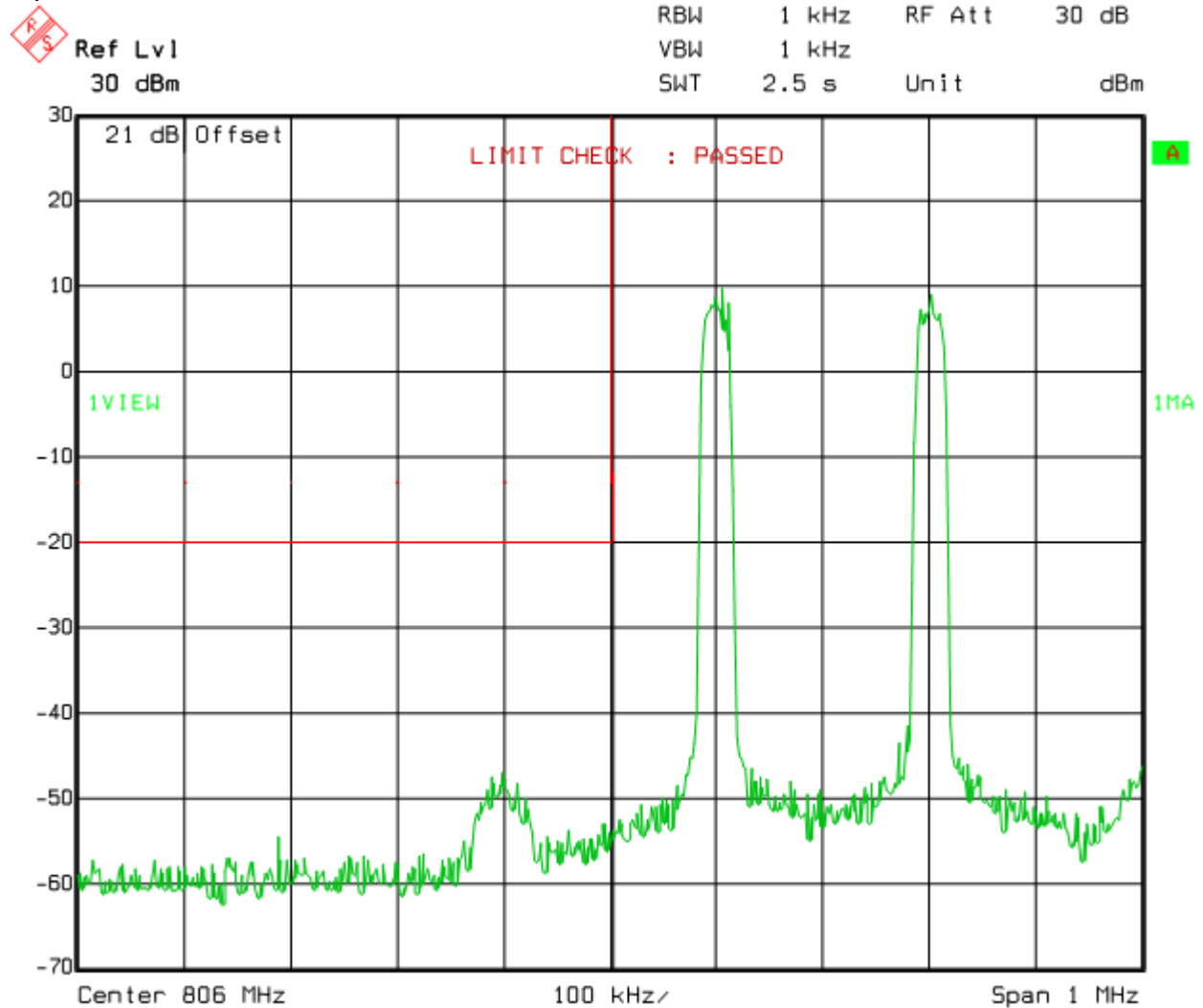
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

iDEN

Uplink



Date: 28.JAN.2010 15:23:38

EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

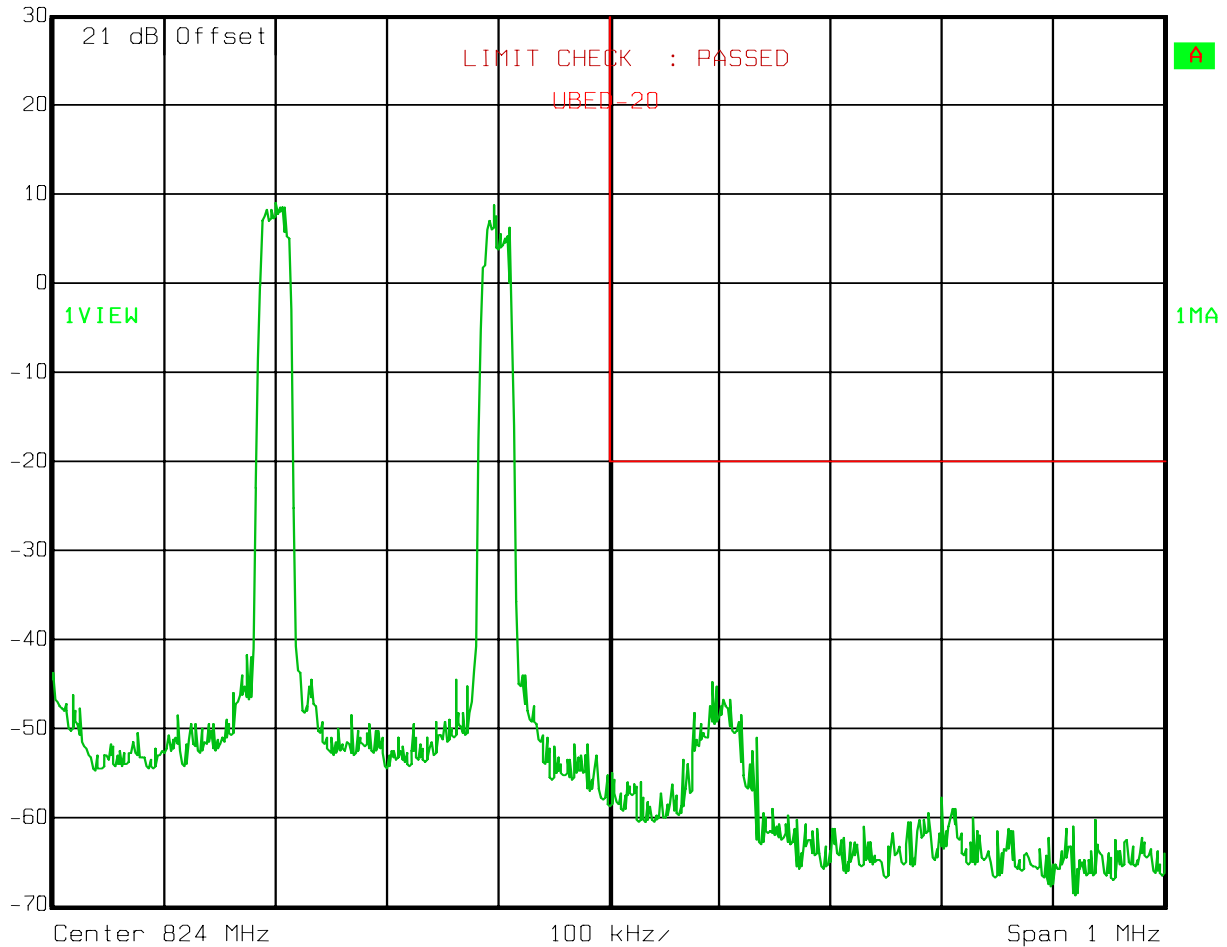
iDEN

Uplink



Ref Lvl
30 dBm

RBW 1 kHz RF Att 30 dB
VBW 1 kHz
SWT 2.5 s Unit dBm



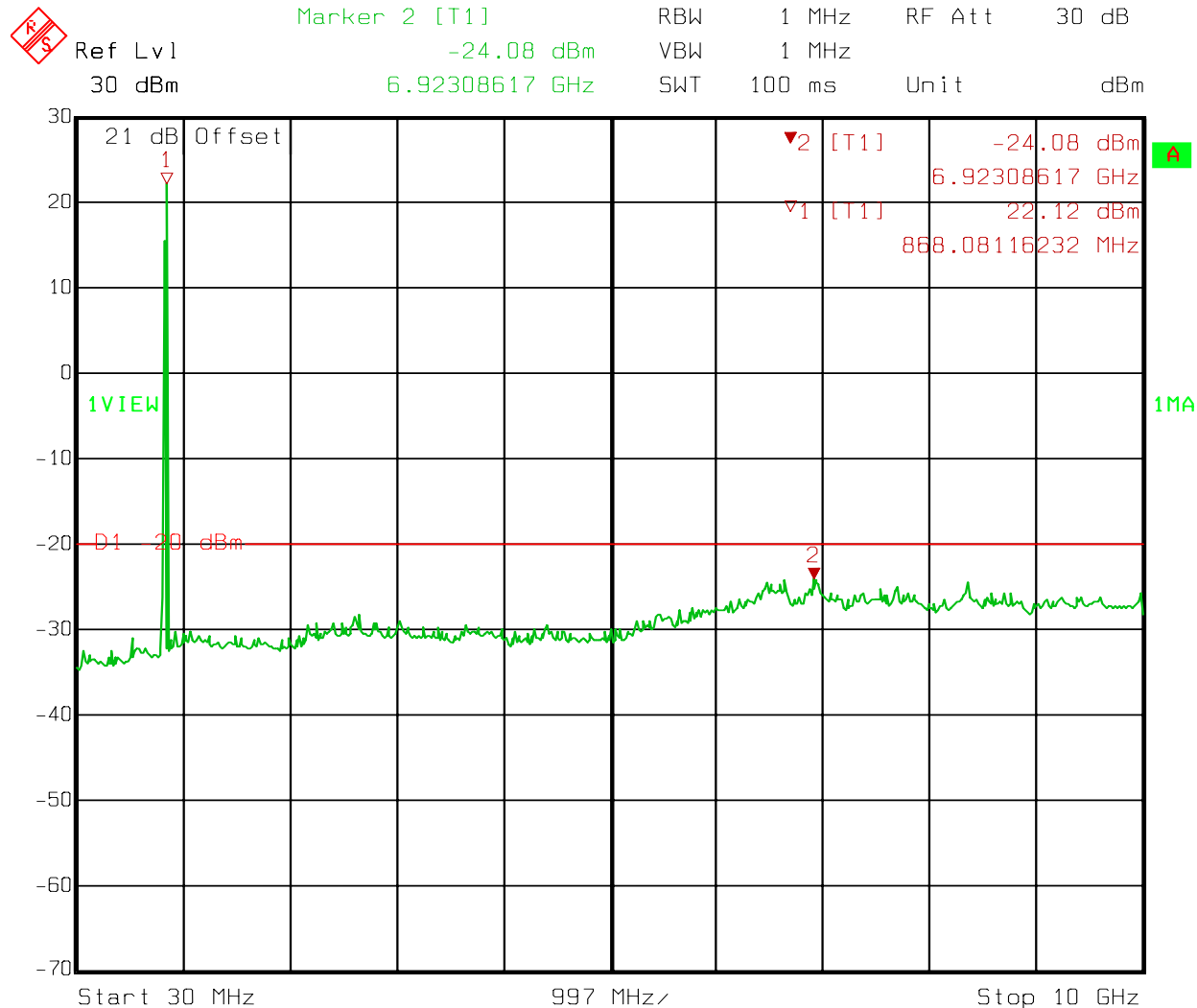
Date: 28.JAN.2010 15:32:46

Test Data – Spurious Emissions at Antenna Terminals

Spurs

Downlink

IDEN



Date: 28.JAN.2010 15:18:37

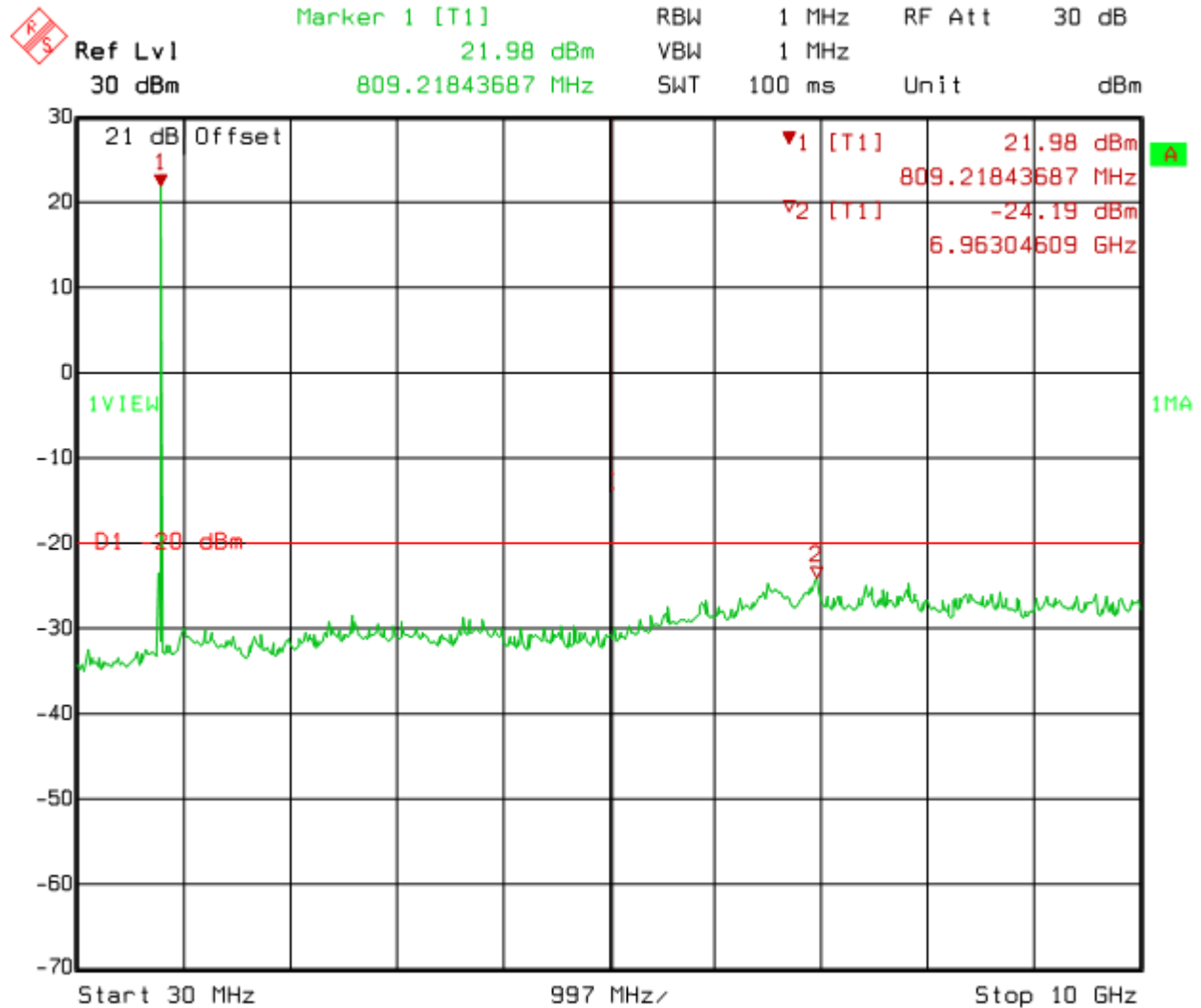
EQUIPMENT: MR8018

Test Data – Spurious Emissions at Antenna Terminals

Spurs

Uplink

IDEN



Date: 28.JAN.2010 15:26:05

Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: Spurious Emissions at Antenna
Terminals

PARA. NO.: 2.991

Minimum Standard:

90.210, Table 1

Table 1

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dB μ V/m@3m	82.2 dB μ V/m@3m
D,J	-20dBm	77.4 dB μ V/m@3m	75.2 dB μ V/m@3m
E,F,K	-25dBm	72.4 dB μ V/m@3m	70.2 dB μ V/m@3m

Test Method:

RBW: 1% of emission bandwidth in the 0 - 1 GHz range.
1 MHz at frequencies above 1 GHz.VBW: $\Rightarrow$ RBW

The spectrum is searched up to 10 times the fundamental frequency.

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
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Minimum Standard: Not defined. Input/Output

Method Of Measurement:

Analog

Spectrum analyzer settings:

RBW=VBW=300 Hz

Span: 100 kHz

Sweep: Auto

iDEN

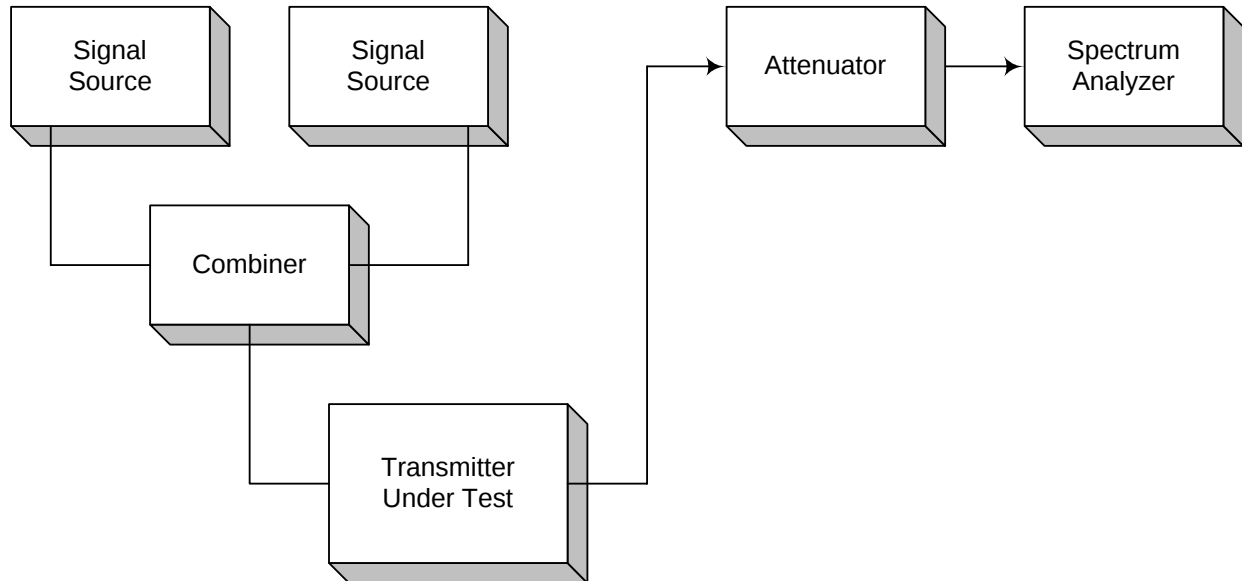
RBW=VBW= 300 Hz

Span: 100 kHz

Sweep: Auto

ANNEX B - TEST DIAGRAMS

Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals

