



**Nemko Test Report:** 6L0432RUS3

**Applicant:** Andrew Corporation  
108 Rand Park Drive  
Garner, NC 27529  
USA

**Equipment Under Test:  
(E.U.T.)** AMR195

**In Accordance With:** **CFR 47, Part 24, Subpart E**  
Broadband PCS Repeaters

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

**TESTED BY:**

David Light Wireless Engineer

**DATE:**

25 September 2006

**APPROVED BY:**

Kevin Rose Wireless Engineer

**DATE:**

29 September 2006

**Number of Pages: 72**

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EQUIPMENT: AMR195

## Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Model No.: AMR195

Serial No.: None

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 24, Subpart E.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

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

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.  
See " Summary of Test Data".



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**Summary Of Test Data**

| NAME OF TEST                            | PARA. NO. | SPEC.               | RESULT   |
|-----------------------------------------|-----------|---------------------|----------|
| RF Power Output                         | 24.232    | 100W                | Complies |
| Occupied Bandwidth                      | 2.1049    | Input/Output        | Complies |
| Spurious Emissions at Antenna Terminals | 24.238(a) | -13 dBm             | Complies |
| Field Strength of Spurious Emissions    | 24.238(a) | -13 dBm<br>E.I.R.P. | Complies |
| Frequency Stability                     | 24.235    |                     | NA       |

**Footnotes:**

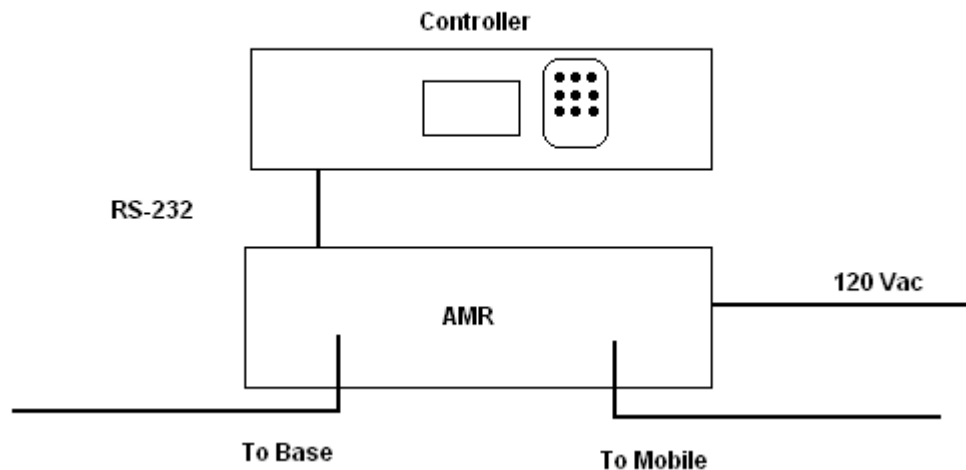
(1) Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.

## Section 2. General Equipment Specification

|                                           |                  |                                                               |                                     |                                     |                                     |                                     |
|-------------------------------------------|------------------|---------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <b>Supply Voltage Input:</b>              |                  |                                                               |                                     |                                     |                                     |                                     |
| <b>Frequency Bands:</b>                   | <b>Downlink:</b> | <input checked="" type="checkbox"/>                           | Block A :                           | 1930 – 1945 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block D :                           | 1945 – 1950 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block B :                           | 1950 – 1965 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block E :                           | 1965 – 1970 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block F :                           | 1970 – 1975 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block C :                           | 1975 – 1990 MHz                     |                                     |                                     |
| <b>Frequency Bands:</b>                   | <b>Uplink:</b>   | <input checked="" type="checkbox"/>                           | Block A :                           | 1850 – 1865 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block B :                           | 1865 – 1870 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block C :                           | 1870 – 1885 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block D :                           | 1885 – 1890 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block E :                           | 1890 – 1895 MHz                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | Block F :                           | 1895 – 1910 MHz                     |                                     |                                     |
| <b>Type of Modulation and Designator:</b> |                  | <b>CDMA<br/>(F9W)</b>                                         | <b>GSM<br/>(GXW)</b>                | <b>NADC<br/>(DXW)</b>               | <b>W-CDMA<br/>(F9W)</b>             | <b>EDGE<br/>(G7W)</b>               |
|                                           |                  | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>System Gain:</b>                       |                  | 89 dB Max                                                     |                                     |                                     |                                     |                                     |
| <b>Output Impedance:</b>                  |                  | 50 ohms                                                       |                                     |                                     |                                     |                                     |
| <b>RF Output (Rated):</b>                 | <b>Uplink</b>    | $\frac{0.32}{25} \text{ W}$ $\frac{\quad}{\quad} \text{ dBm}$ |                                     |                                     |                                     |                                     |
| <b>RF Output (Rated):</b>                 | <b>Downlink</b>  | $\frac{0.50}{27} \text{ W}$ $\frac{\quad}{\quad} \text{ dBm}$ |                                     |                                     |                                     |                                     |
| <b>Frequency Translation:</b>             |                  | <b>F1-F1</b>                                                  | <b>F1-F2</b>                        | <b>N/A</b>                          |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | <input type="checkbox"/>            | <input type="checkbox"/>            |                                     |                                     |
| <b>Band Selection:</b>                    |                  | <b>Software</b>                                               | <b>Duplexer</b>                     | <b>Fullband</b>                     |                                     |                                     |
|                                           |                  | <input checked="" type="checkbox"/>                           | <input type="checkbox"/>            | <input type="checkbox"/>            |                                     |                                     |

**Description of EUT**

Bi-directional amplifier used to enhance signals between a mobile and a base station in a wireless network. Typical applications are coverage improvement in small and medium sized environments such as offices, store fronts, underground floors, and small manufacturing facilities. The AMR family will automatically set its gain to maximize performance. However, an alphanumeric interface allows the user to manually set the gain if desired. ALC, Automatic Level Control, is incorporated to prevent overdriving the amplifier.

**System Diagram**

**Section 3. RF Power Output**

|                               |                      |
|-------------------------------|----------------------|
| NAME OF TEST: RF Power Output | PARA. NO.: 24.232    |
| TESTED BY: David Light        | DATE: 29 August 2006 |

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

| Direction | Modulation | Output per Channel (dBm) | Composite Power (dBm) | Composite Power (W) |
|-----------|------------|--------------------------|-----------------------|---------------------|
| Uplink    | CDMA       | 24.01                    | 27.01                 | 0.50                |
| Downlink  | CDMA       | 22.00                    | 25.00                 | 0.32                |
| Uplink    | TDMA       | 24.03                    | 27.03                 | 0.50                |
| Downlink  | TDMA       | 22.04                    | 25.04                 | 0.32                |
| Uplink    | EDGE       | 24.00                    | 27.00                 | 0.50                |
| Downlink  | EDGE       | 22.01                    | 25.01                 | 0.32                |
| Uplink    | GSM        | 24.00                    | 27.00                 | 0.50                |
| Downlink  | GSM        | 22.04                    | 25.04                 | 0.32                |
| Uplink    | W-CDMA     | 23.99                    | 26.99                 | 0.50                |
| Downlink  | W-CDMA     | 22.01                    | 25.01                 | 0.32                |

**Equipment Used:** 1082-1469-1472-1659**Measurement Uncertainty:** +/- 1.7 dB**Temperature:** 21 °C**Relative Humidity:** 32 %

#### Section 4. Occupied Bandwidth

|                                  |                      |
|----------------------------------|----------------------|
| NAME OF TEST: Occupied Bandwidth | PARA. NO.: 24.238    |
| TESTED BY: David Light           | DATE: 29 August 2006 |

**Test Results:** Complies.

**Test Data:** See attached plot(s).

**Equipment Used:** 1082-1469-1472-1659-1036

**Measurement Uncertainty:** 1X10<sup>-7</sup> ppm

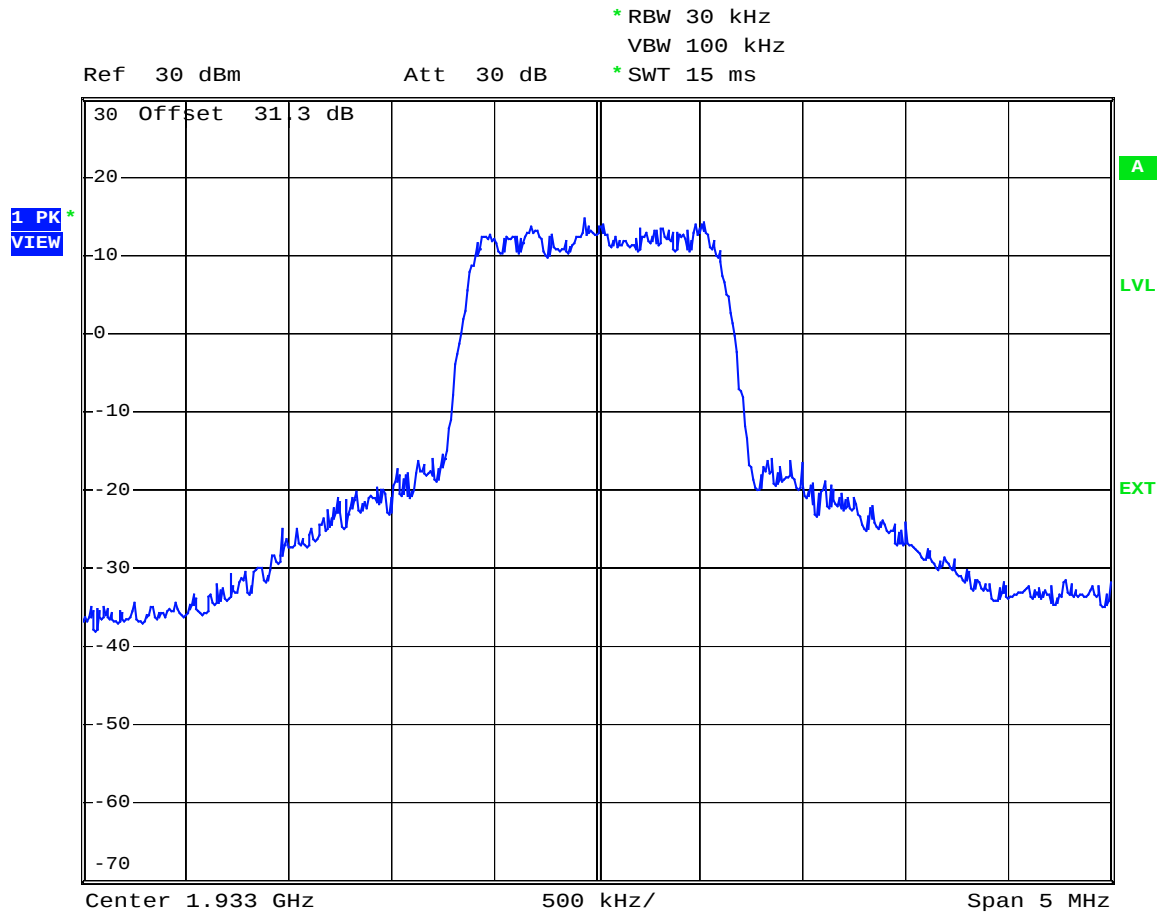
**Temperature:** 21 °C

**Relative Humidity:** 32 %

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

CDMA - Output  
Downlink



Date: 29.AUG.2006 14:10:54

EQUIPMENT: AMR195

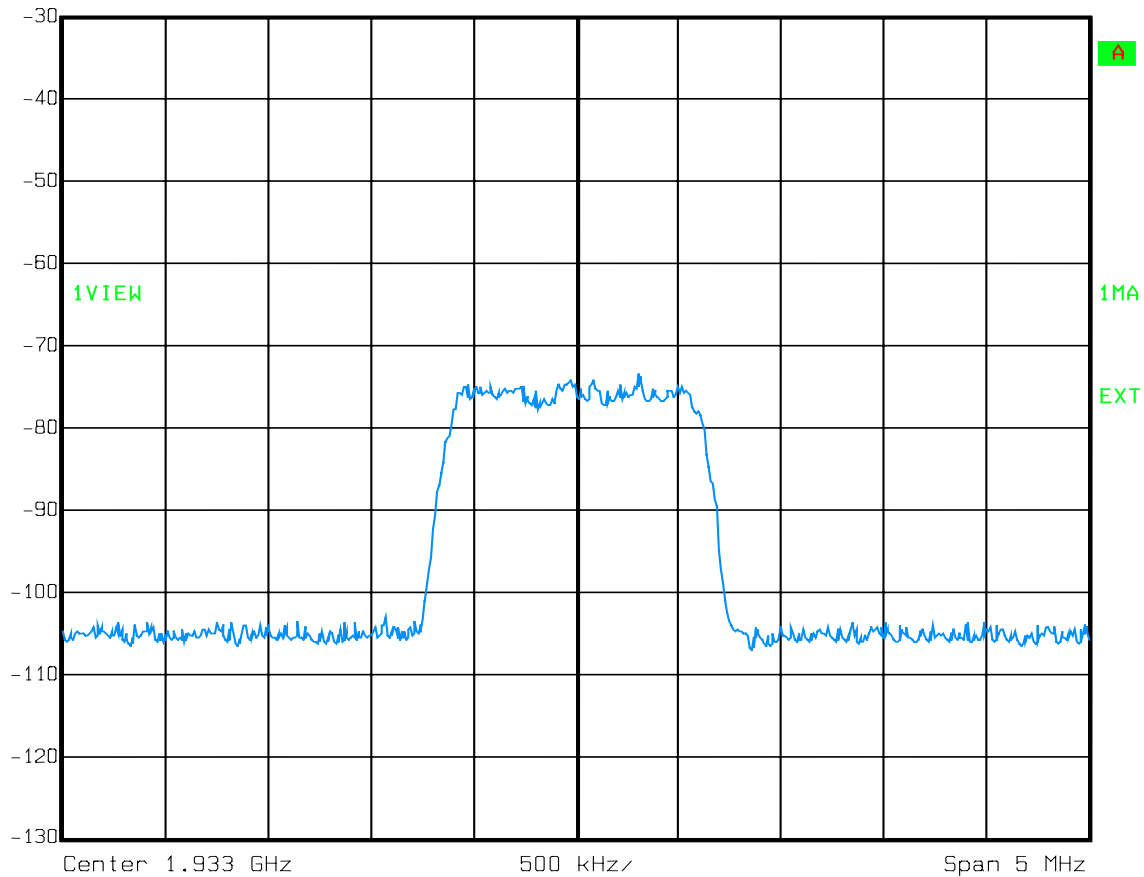
# Test Data – Occupied Bandwidth

CDMA – Input  
Downlink



Ref Lvl  
-30 dBm

|     |         |        |         |
|-----|---------|--------|---------|
| RBW | 30 kHz  | RF Att | 0 dB    |
| VBW | 100 kHz | Mixer  | -10 dBm |
| SWT | 14 ms   | Unit   | dBm     |

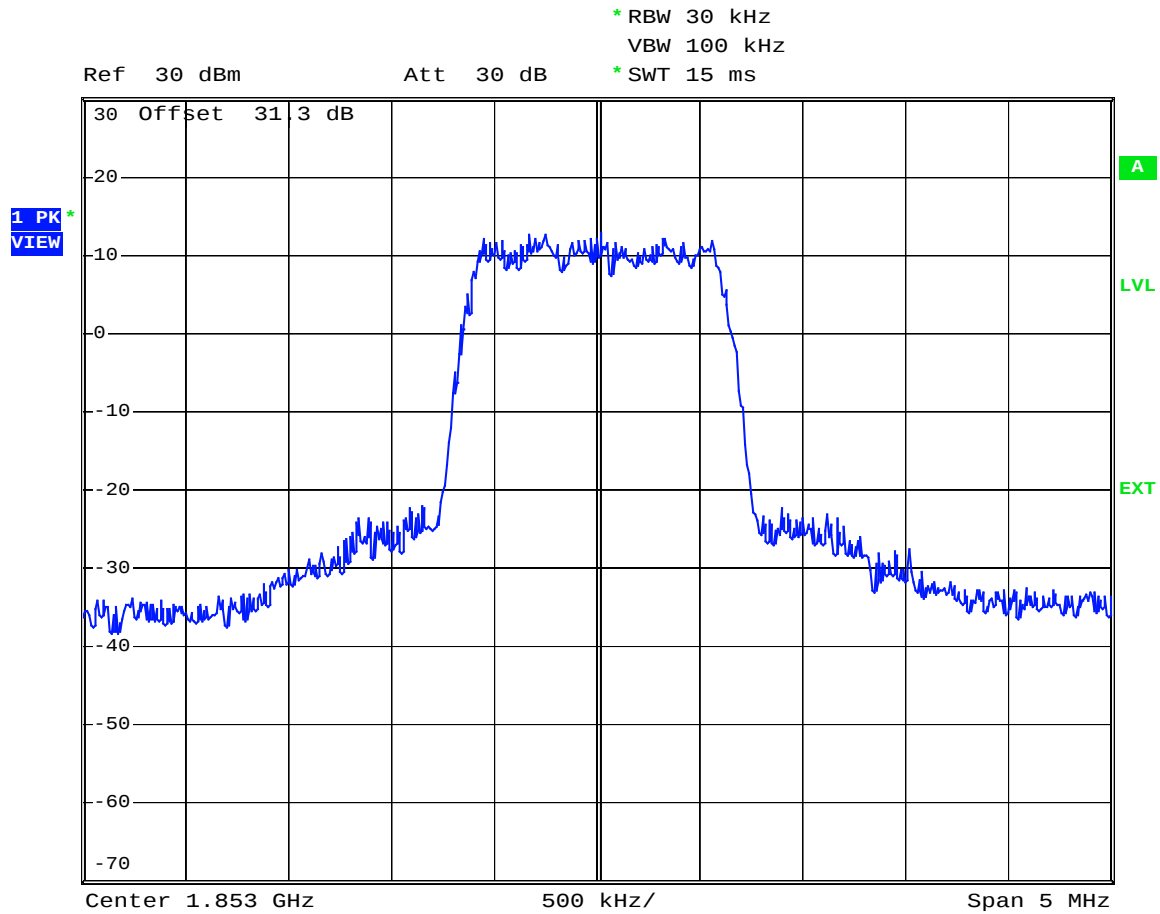


Date: 29.AUG.2006 14:07:11

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

CDMA - Output  
Uplink



Date: 29.AUG.2006 14:15:31

EQUIPMENT: AMR195

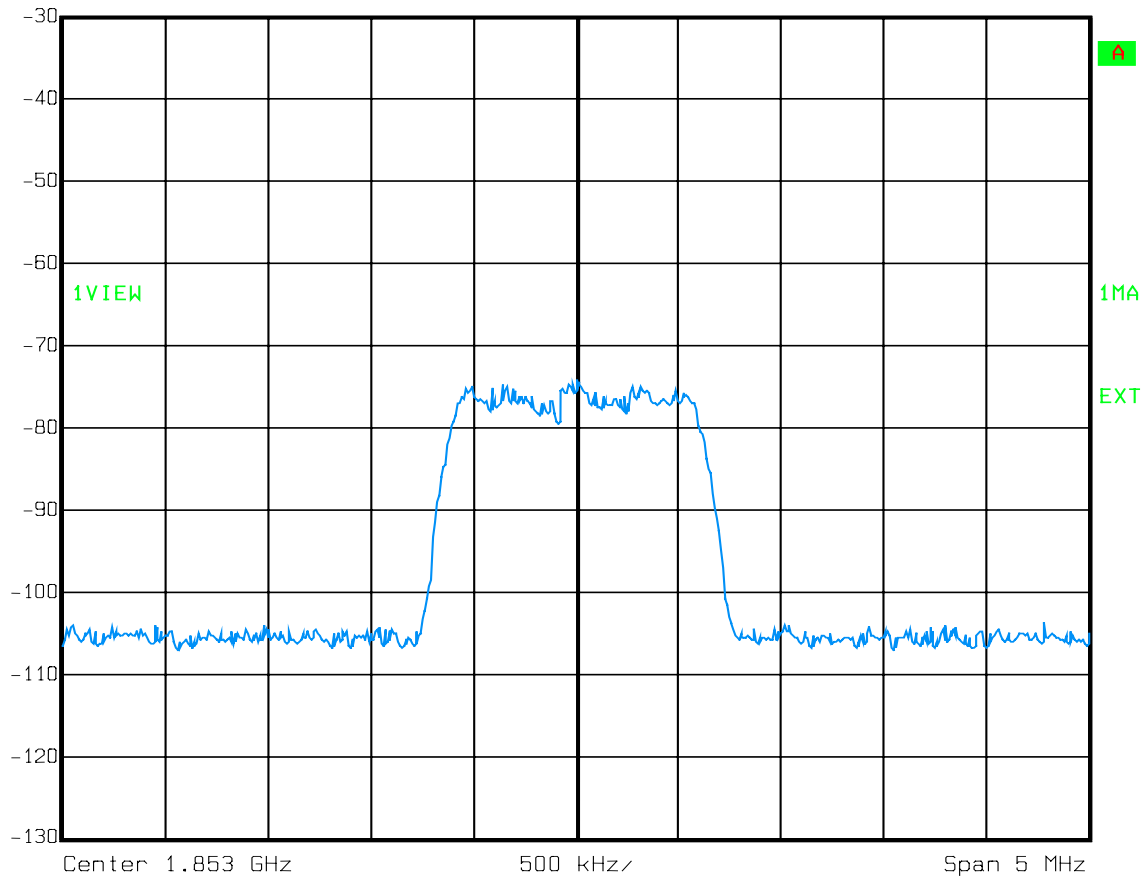
# Test Data – Occupied Bandwidth

CDMA - Input  
Uplink



Ref Lvl  
-30 dBm

|     |         |        |      |
|-----|---------|--------|------|
| RBW | 30 kHz  | RF Att | 0 dB |
| VBW | 100 kHz |        |      |
| SWT | 14 ms   | Unit   | dBm  |

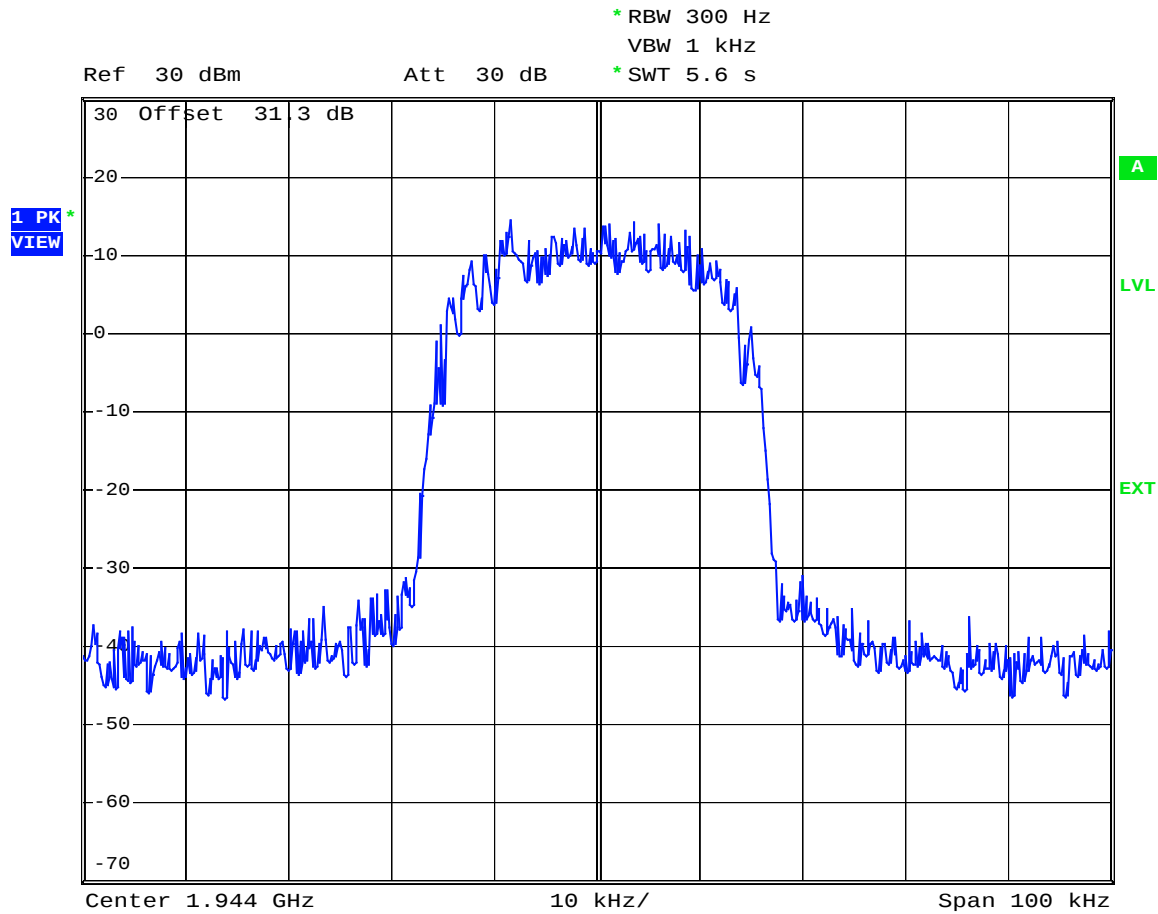


Date: 29.AUG.2006 14:11:08

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

TDMA - Output  
Downlink

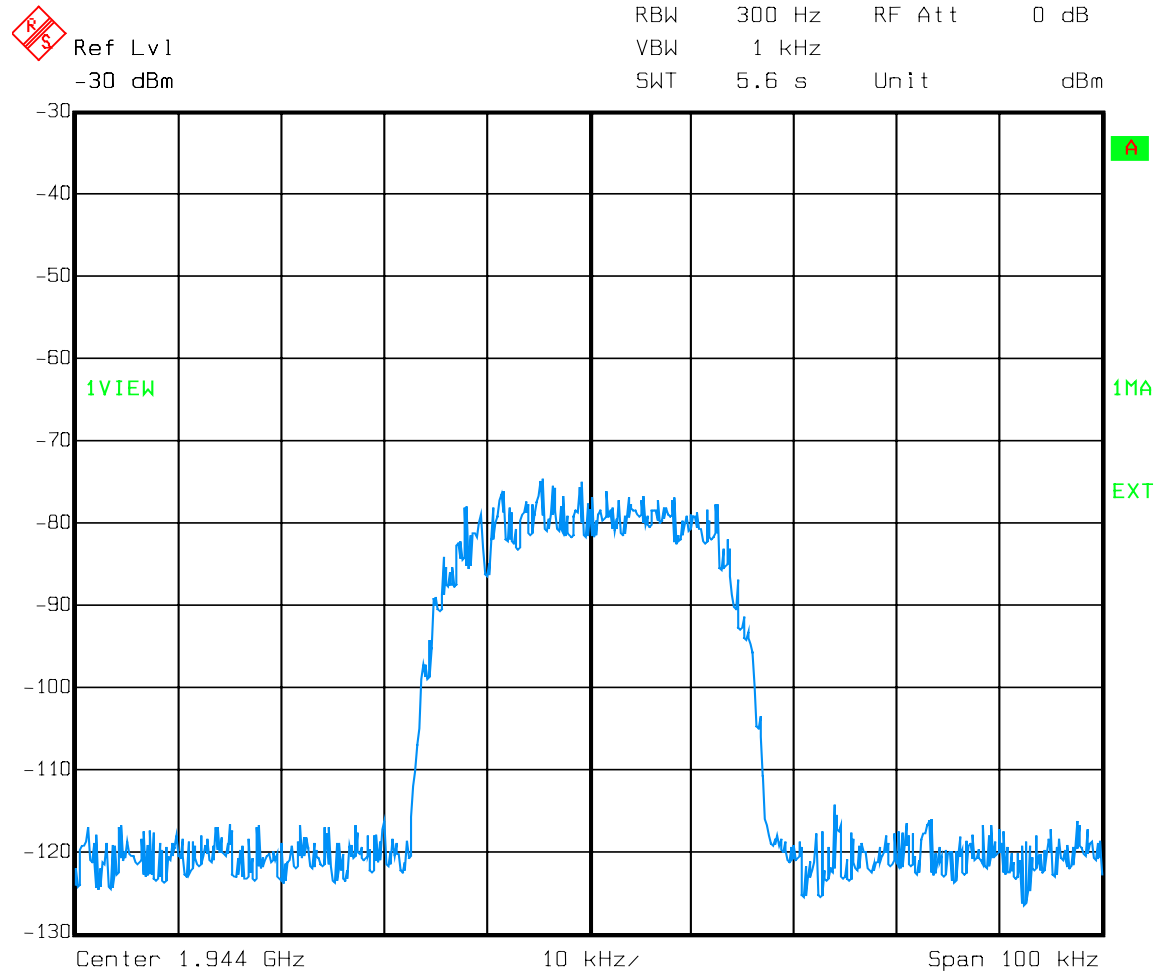


Date: 29.AUG.2006 10:47:48

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

TDMA - Input  
Downlink

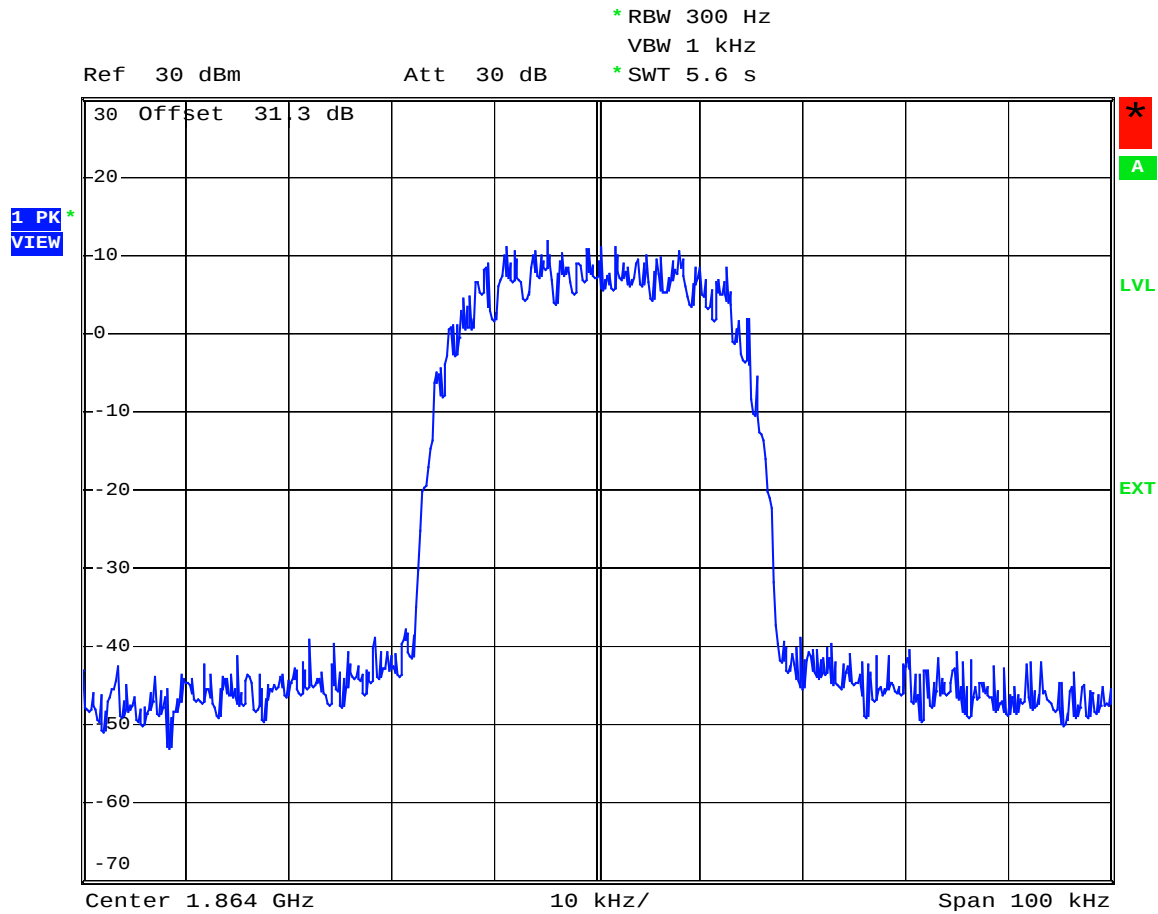


Date: 29.AUG.2006 10:44:34

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

TDMA - Output  
Uplink



Date: 29.AUG.2006 10:51:25

EQUIPMENT: AMR195

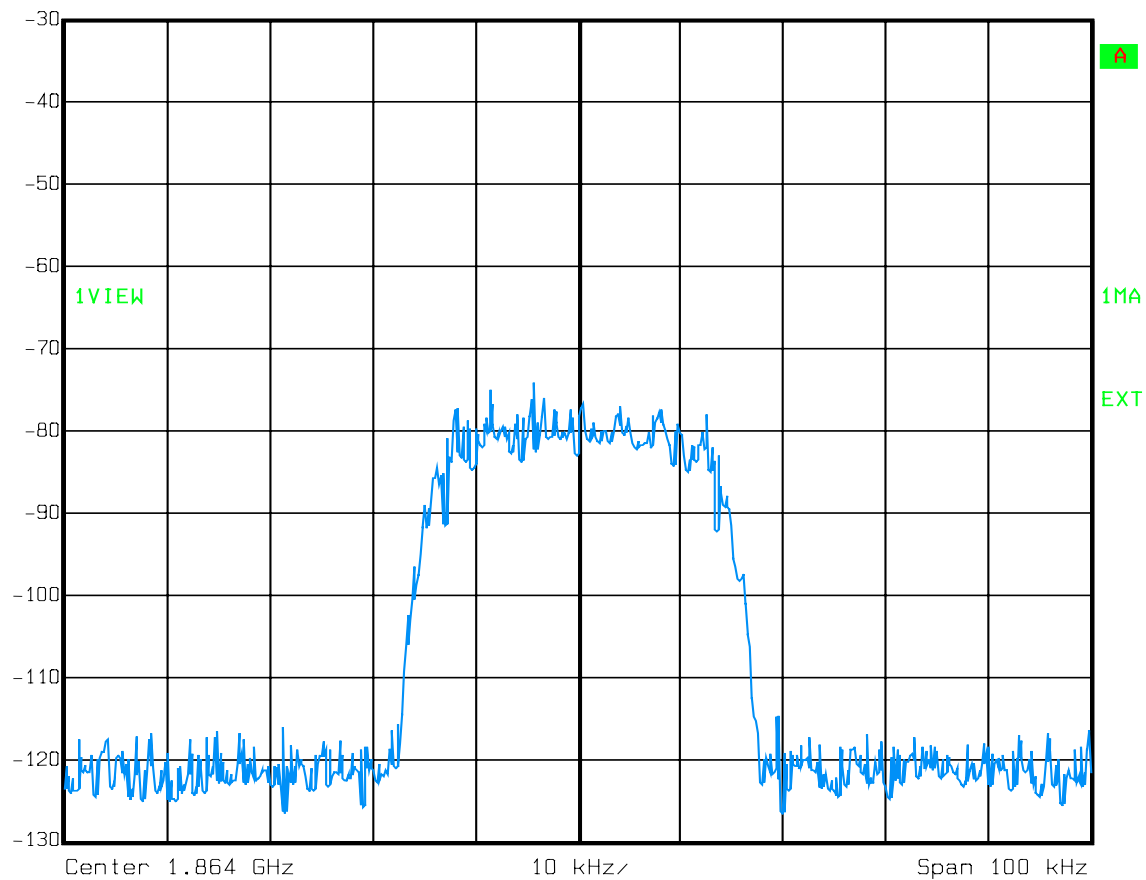
# Test Data – Occupied Bandwidth

TDMA - Input  
Uplink



Ref Lvl  
-30 dBm

RBW 300 Hz RF Att 0 dB  
VBW 1 kHz  
SWT 5.6 s Unit dBm

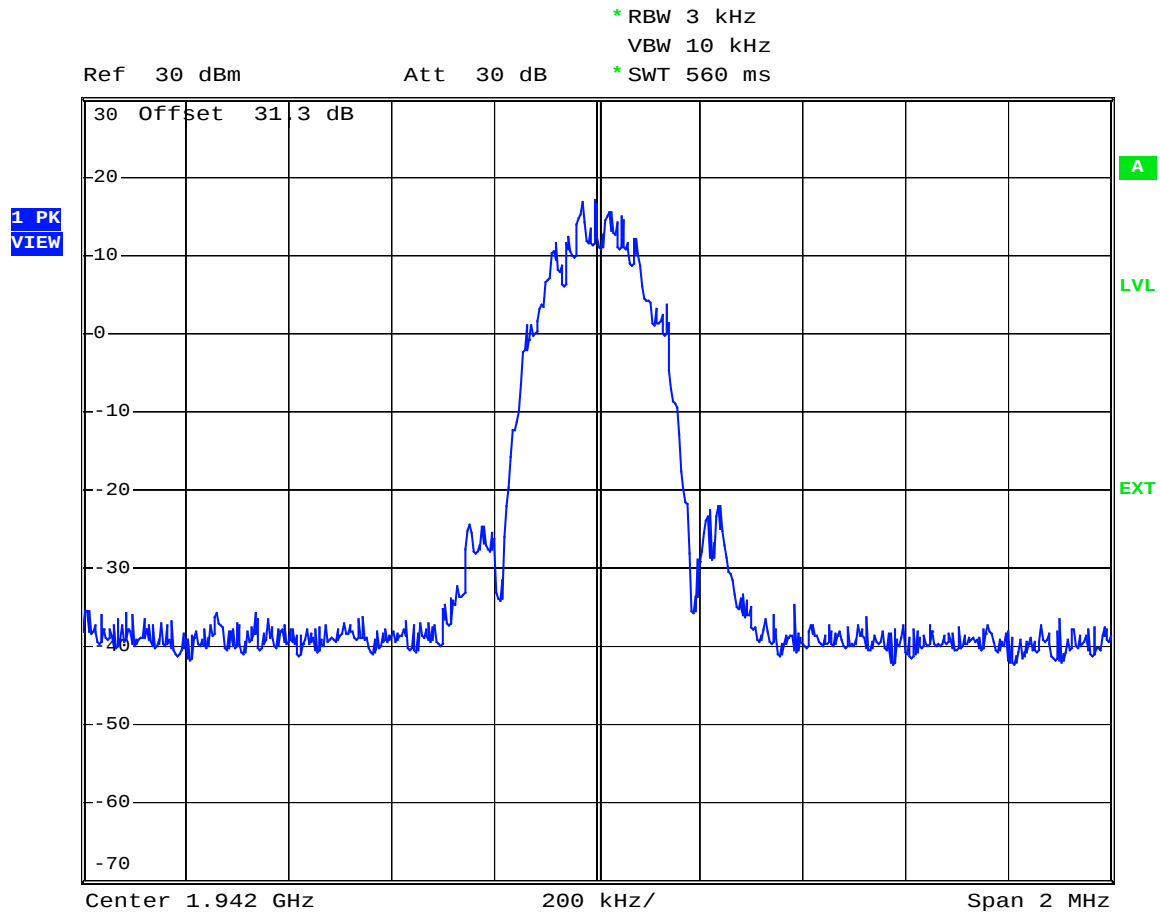


Date: 29.AUG.2006 10:47:02

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

EDGE - Output  
Downlink

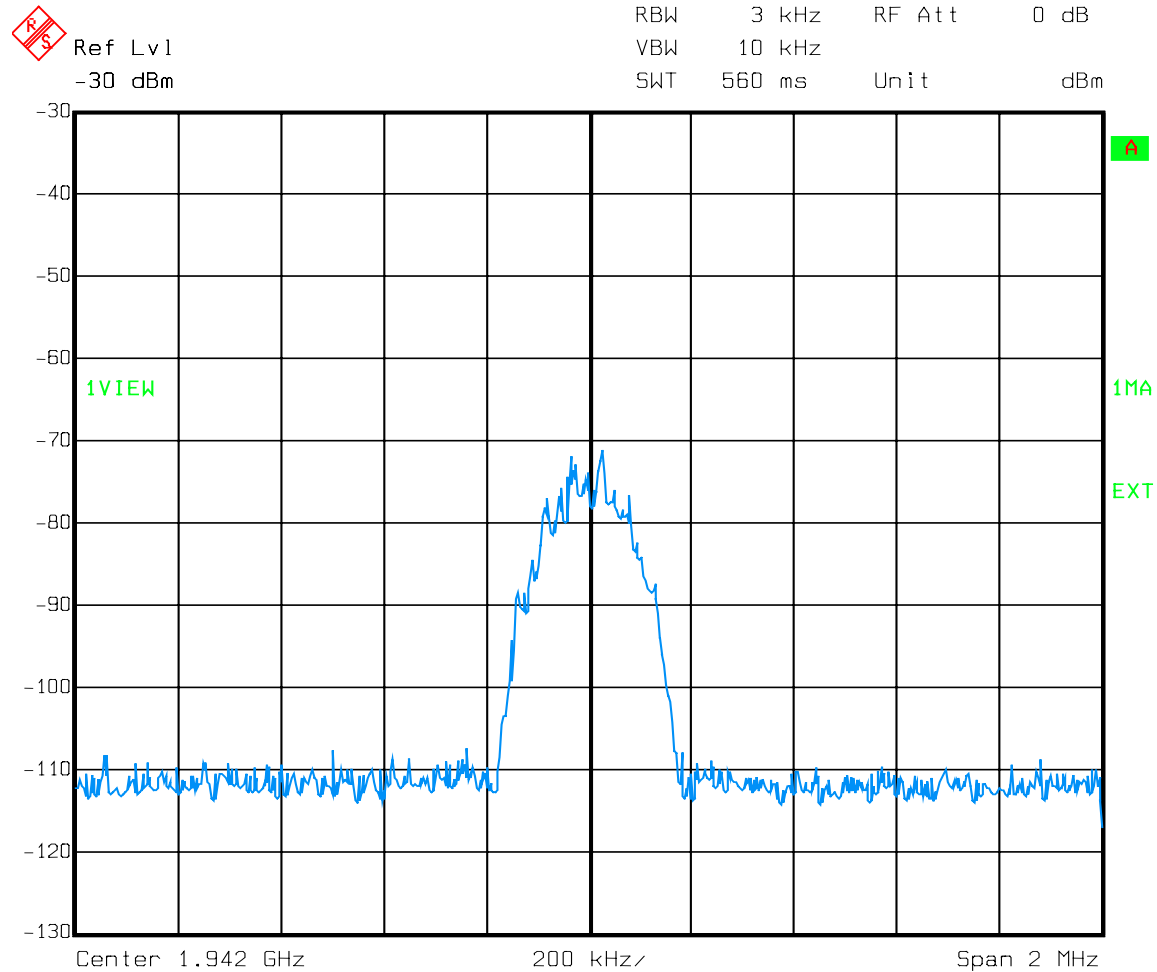


Date: 29.AUG.2006 09:55:14

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

EDGE - Input  
Downlink

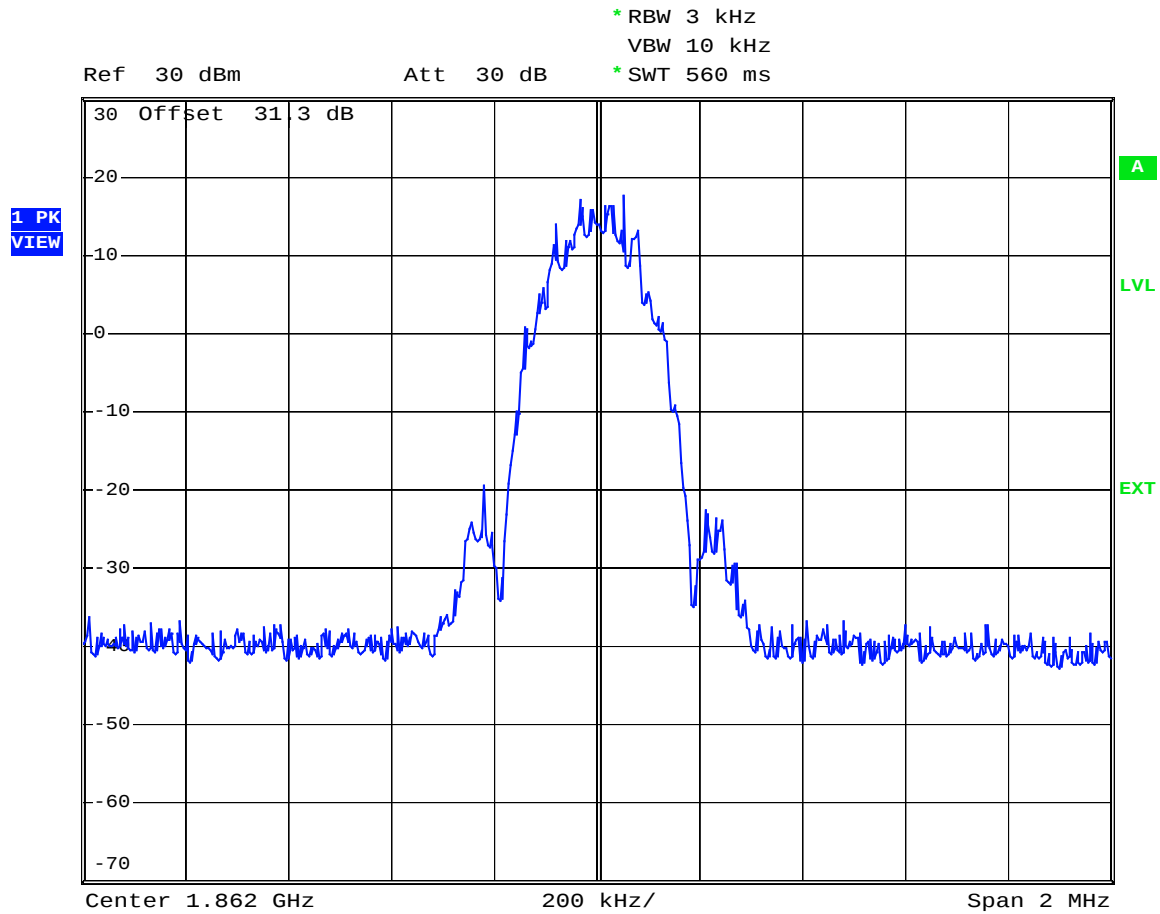


Date: 29.AUG.2006 09:51:54

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

EDGE - Output  
Uplink



Date: 29.AUG.2006 09:58:41

EQUIPMENT: AMR195

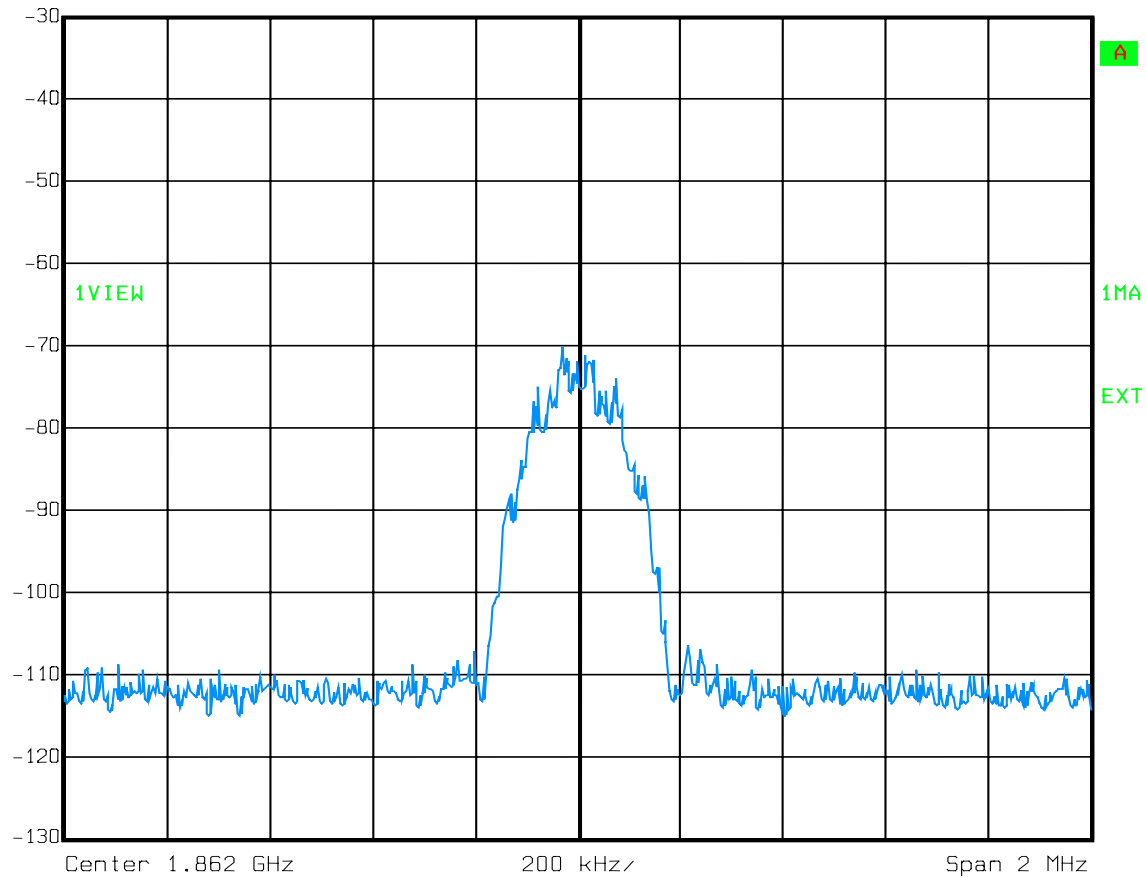
# Test Data – Occupied Bandwidth

EDGE - Input  
Uplink



Ref Lvl  
-30 dBm

RBW 3 kHz RF Att 0 dB  
VBW 10 kHz  
SWT 560 ms Unit dBm

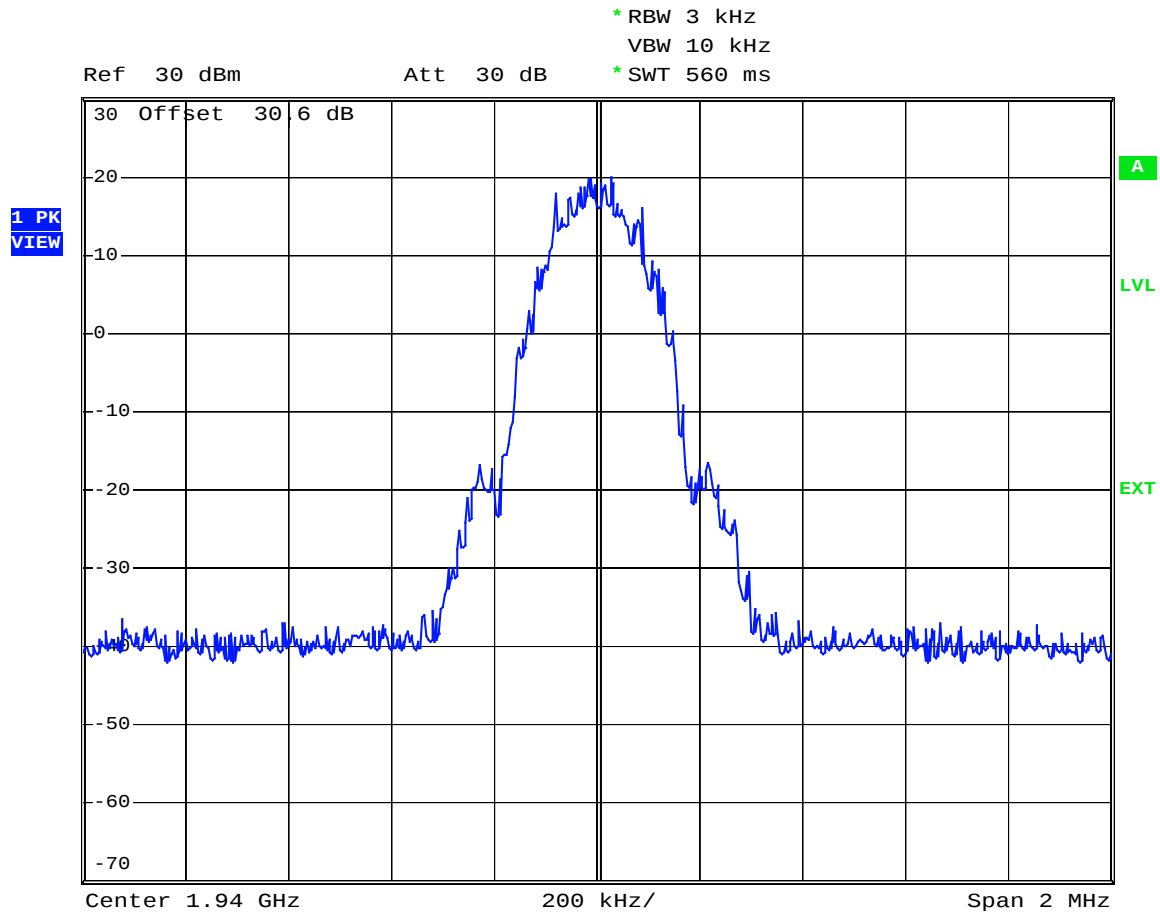


Date: 29.AUG.2006 09:54:15

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

GSM - Output  
Downlink

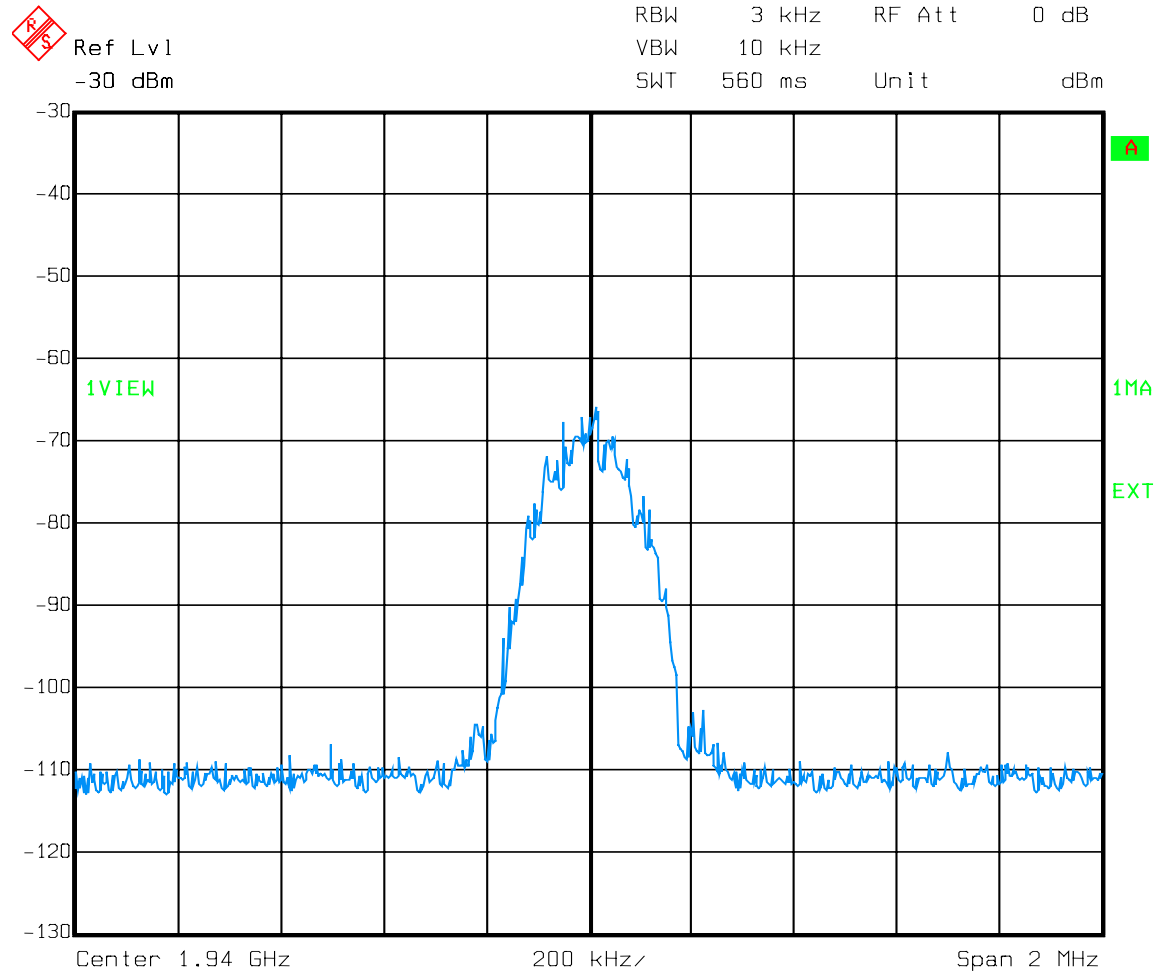


Date: 28.AUG.2006 14:42:17

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

GSM - Input  
Downlink

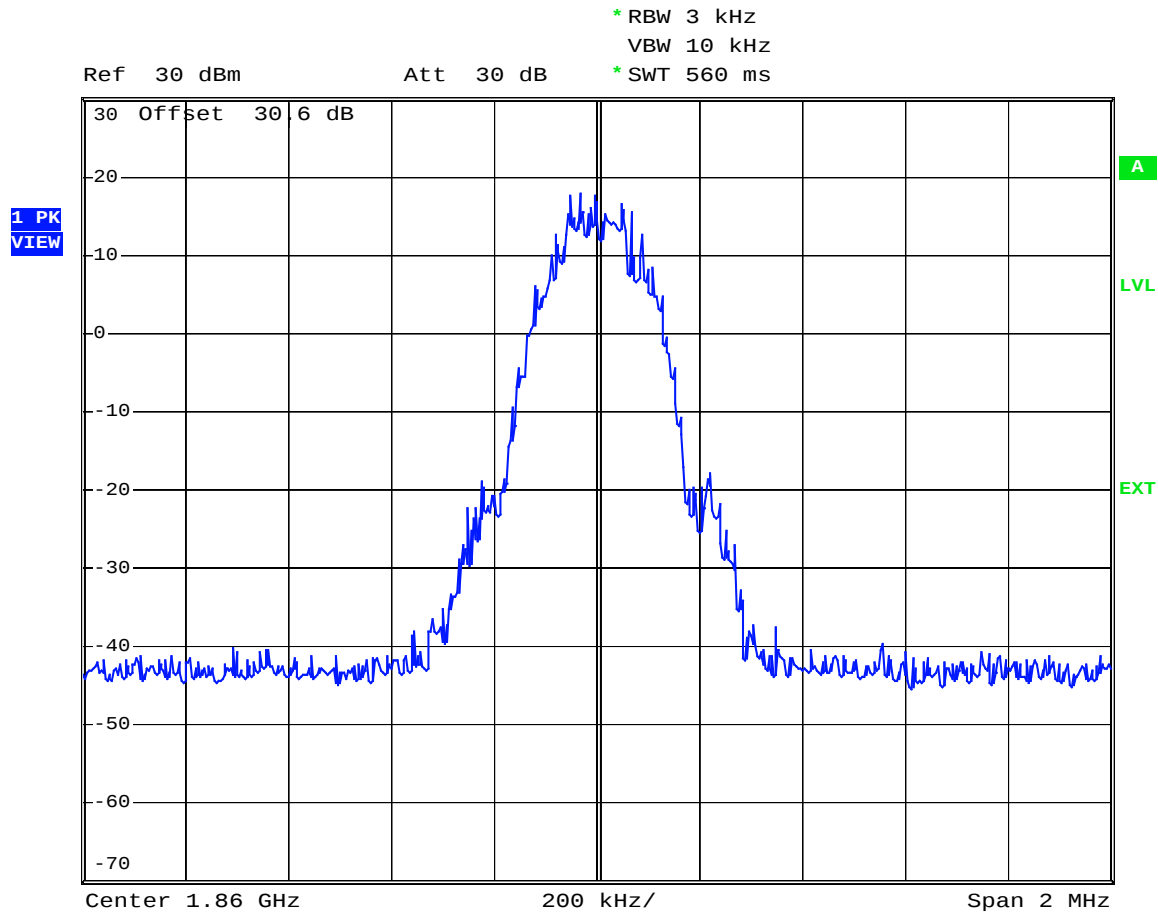


Date: 28.AUG.2006 14:38:38

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

GSM - Output  
Uplink



Date: 28.AUG.2006 14:58:44

EQUIPMENT: AMR195

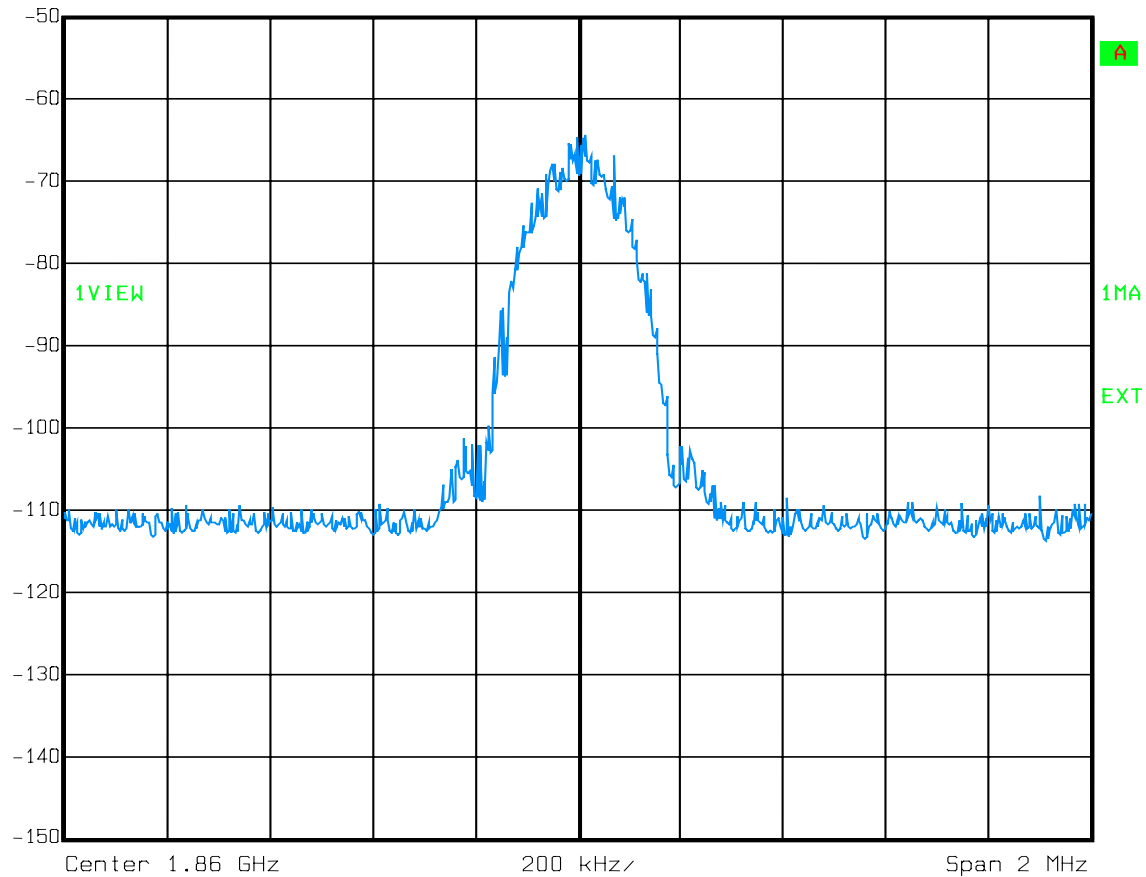
# Test Data – Occupied Bandwidth

GSM - Input  
Uplink



Ref Lvl  
-50 dBm

|     |        |        |      |
|-----|--------|--------|------|
| RBW | 3 kHz  | RF Att | 0 dB |
| VBW | 10 kHz |        |      |
| SWT | 560 ms | Unit   | dBm  |

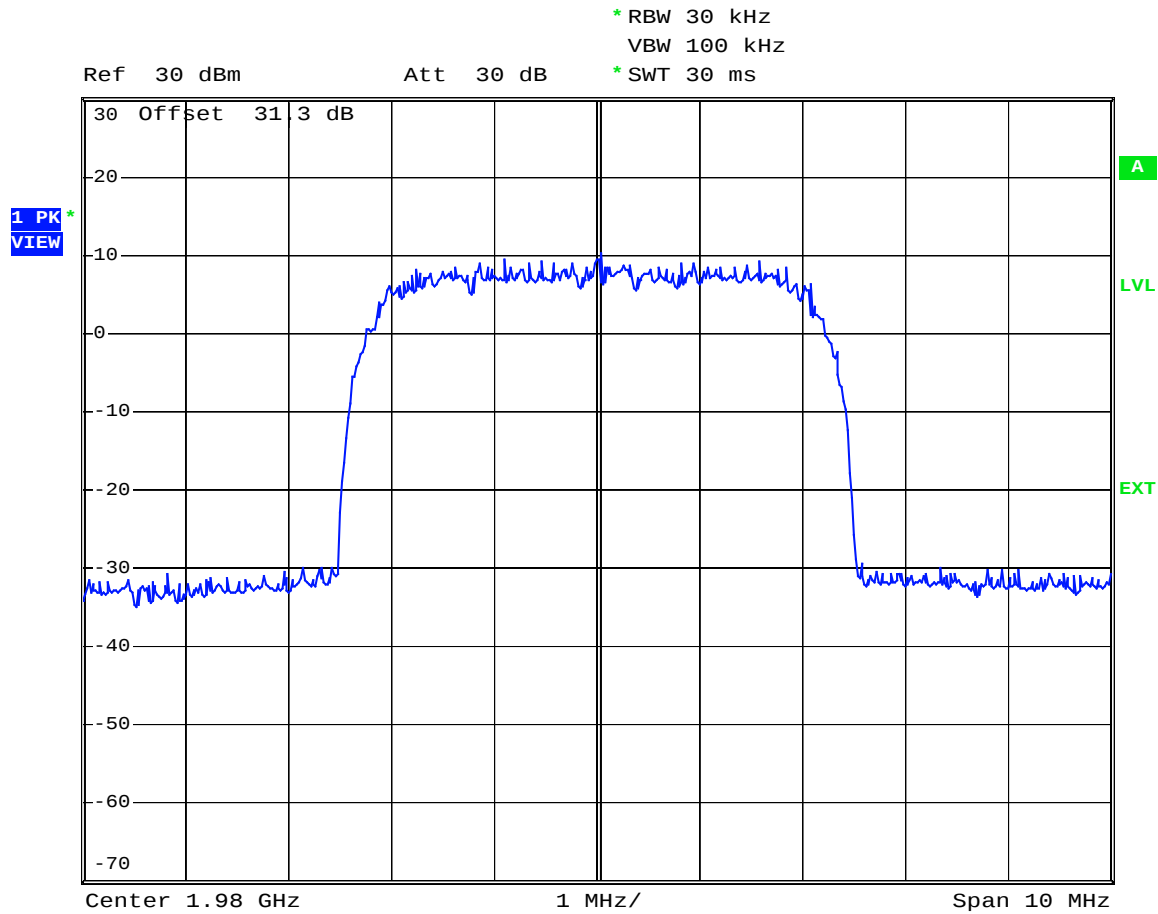


Date: 28.AUG.2006 14:55:08

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

W-CDMA - Output  
Downlink



Date: 30.AUG.2006 10:56:27

EQUIPMENT: AMR195

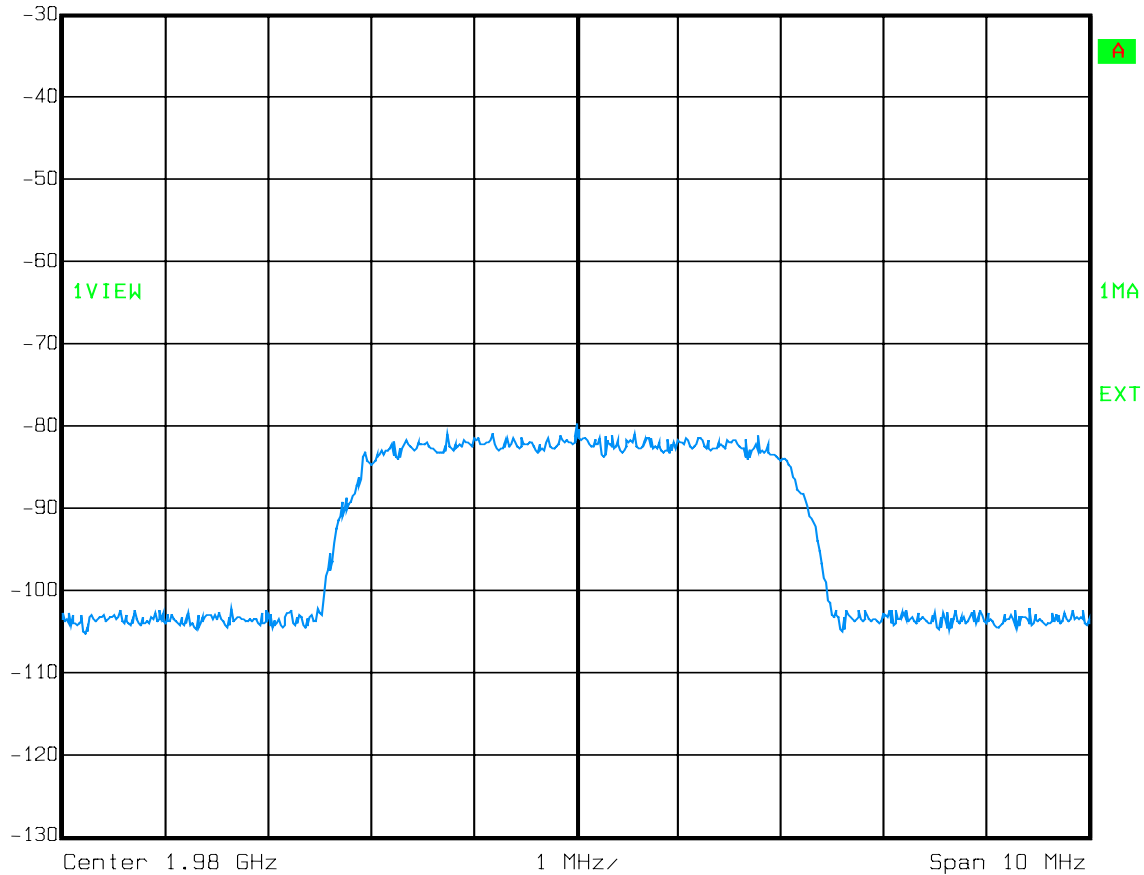
# Test Data – Occupied Bandwidth

W-CDMA - Input  
Downlink



Ref Lvl  
-30 dBm

|     |         |        |      |
|-----|---------|--------|------|
| RBW | 30 kHz  | RF Att | 0 dB |
| VBW | 100 kHz |        |      |
| SWT | 30 ms   | Unit   | dBm  |

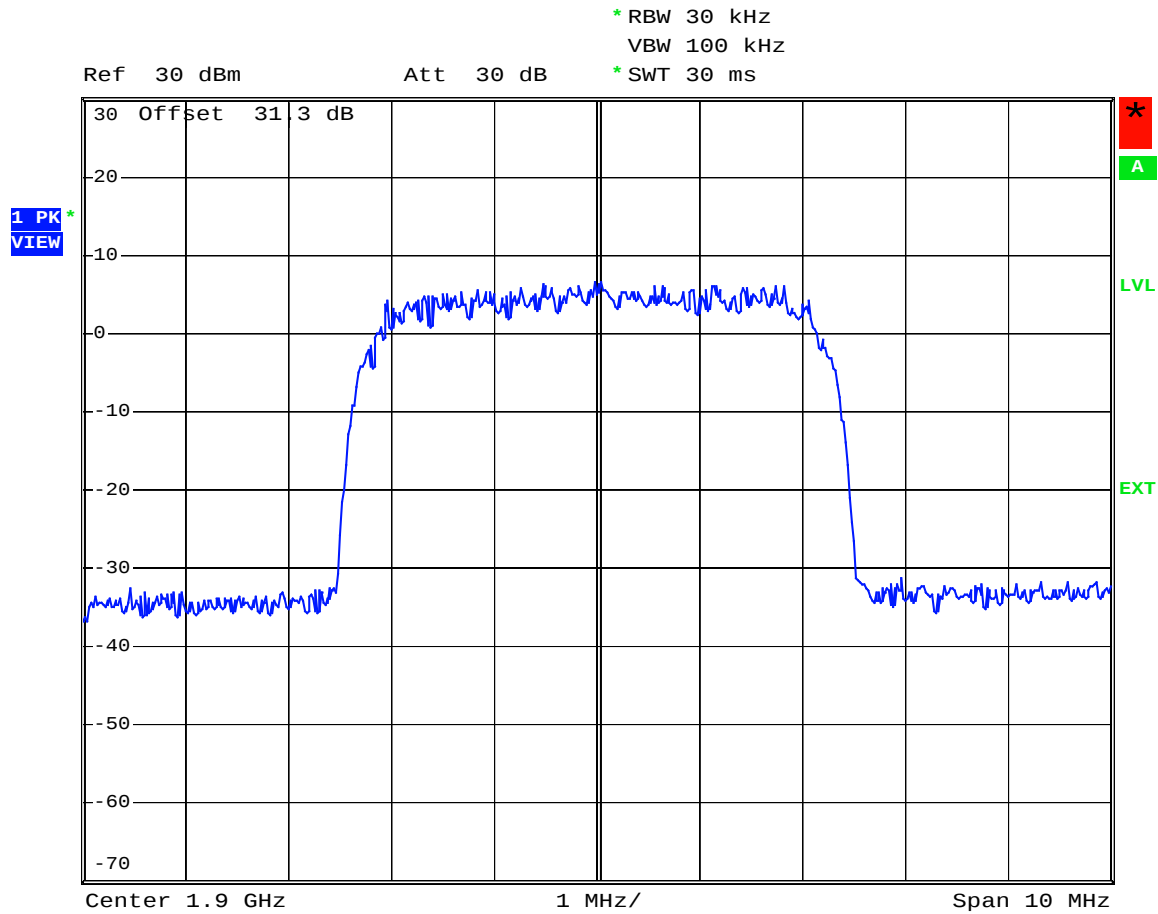


Date: 30.AUG.2006 10:52:01

EQUIPMENT: AMR195

# Test Data – Occupied Bandwidth

W-CDMA - Output  
Uplink



Date: 30.AUG.2006 10:49:00

EQUIPMENT: AMR195

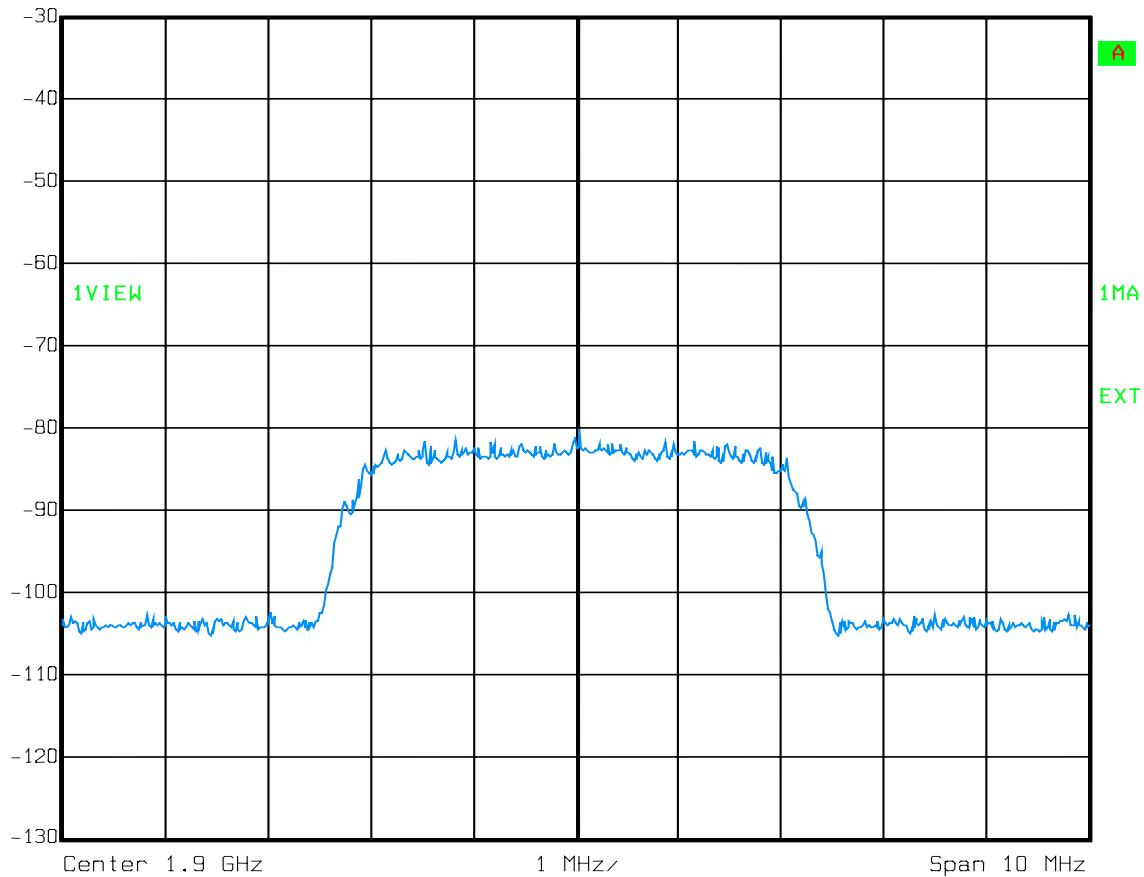
# Test Data – Occupied Bandwidth

W-CDMA - Input  
Uplink



Ref Lvl  
-30 dBm

|     |         |        |         |
|-----|---------|--------|---------|
| RBW | 30 kHz  | RF Att | 0 dB    |
| VBW | 100 kHz | Mixer  | -10 dBm |
| SWT | 30 ms   | Unit   | dBm     |



Date: 30.AUG.2006 10:45:19

## **Section 5. Spurious Emissions at Antenna Terminals**

|                                                      |                      |
|------------------------------------------------------|----------------------|
| NAME OF TEST: Spurious Emissions @ Antenna Terminals | PARA. NO.: 24.238    |
| TESTED BY: David Light                               | DATE: 29 August 2006 |

**Test Results:** Complies.

**Test Data:** See attached plot(s).

**Equipment Used:** 1082-1469-1472-1659-1036

**Measurement Uncertainty:** +/- 1.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 32 %

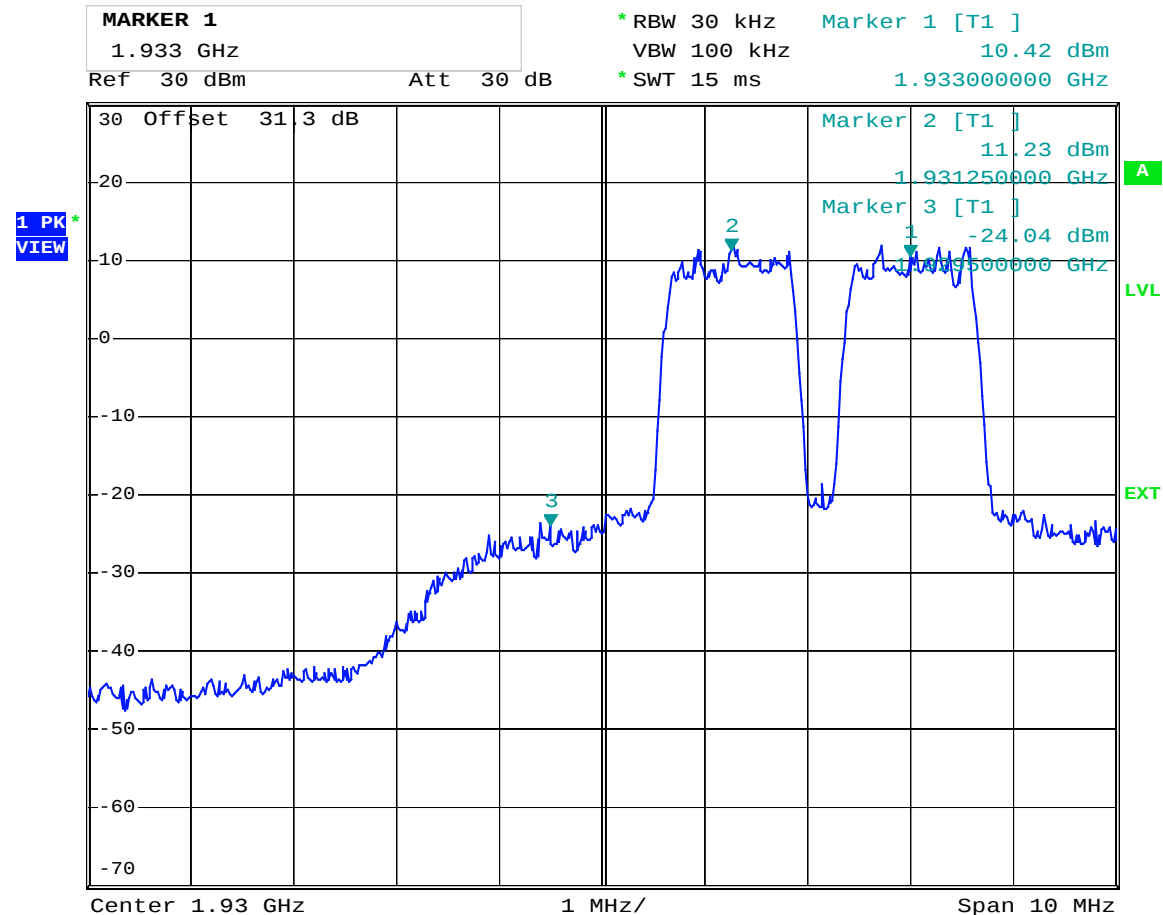
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

CDMA

Downlink



Date: 29.AUG.2006 15:06:08

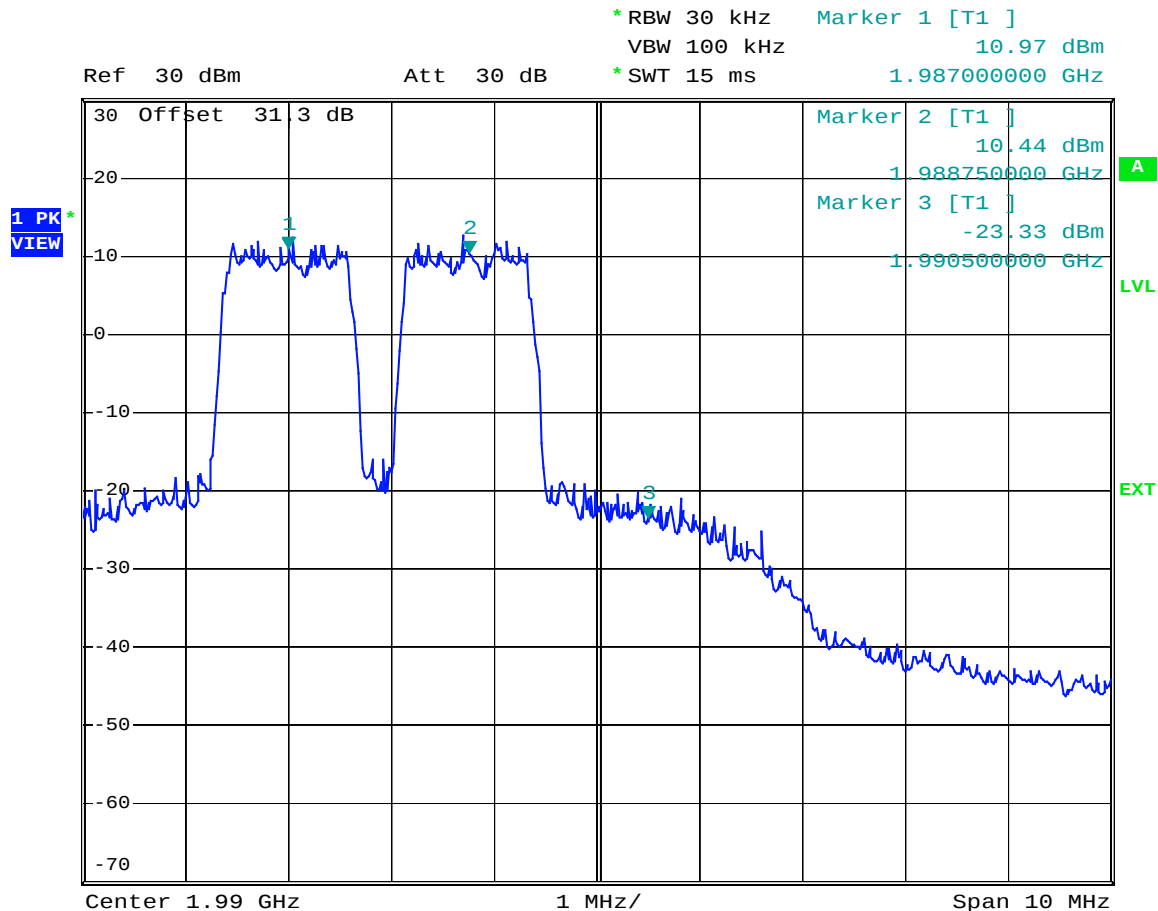
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

CDMA

Downlink



Date: 29.AUG.2006 14:57:09

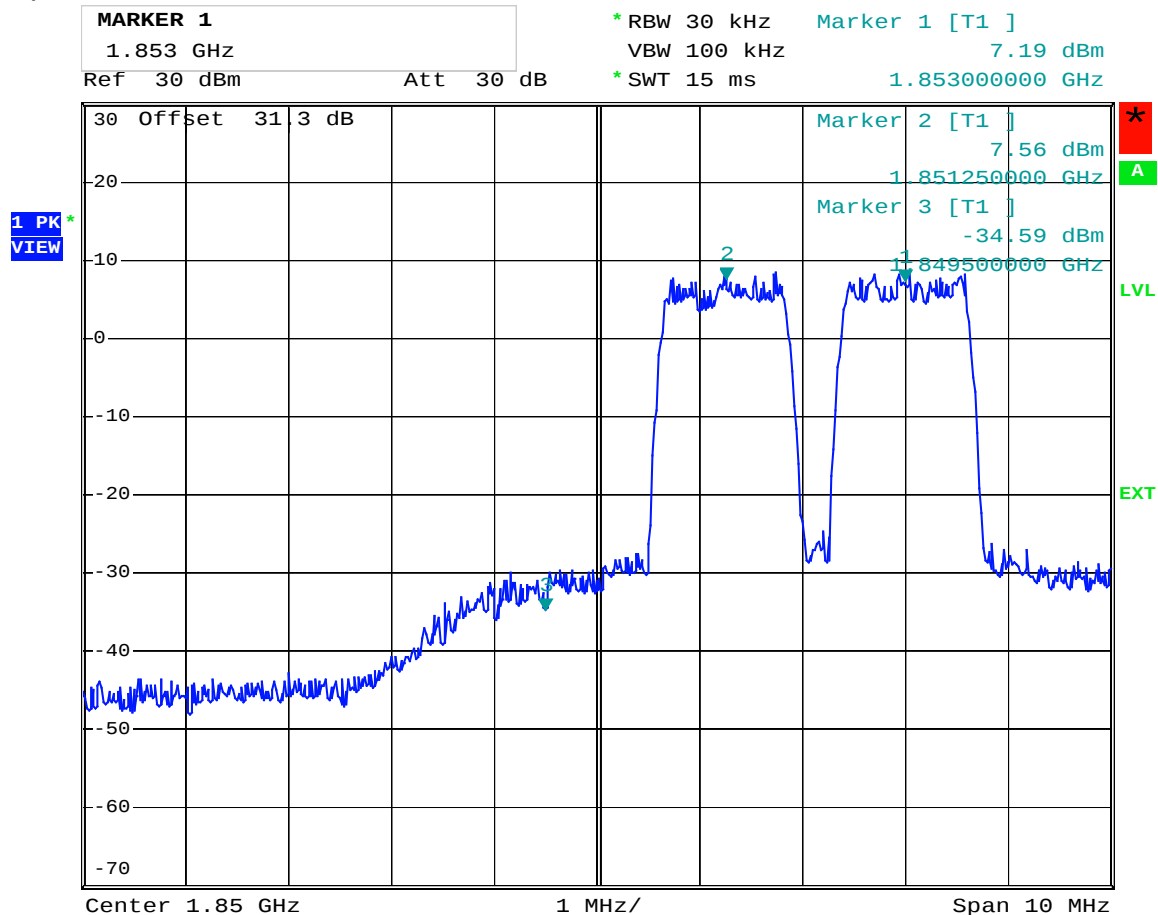
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

CDMA

Uplink



Date: 29.AUG.2006 15:03:01

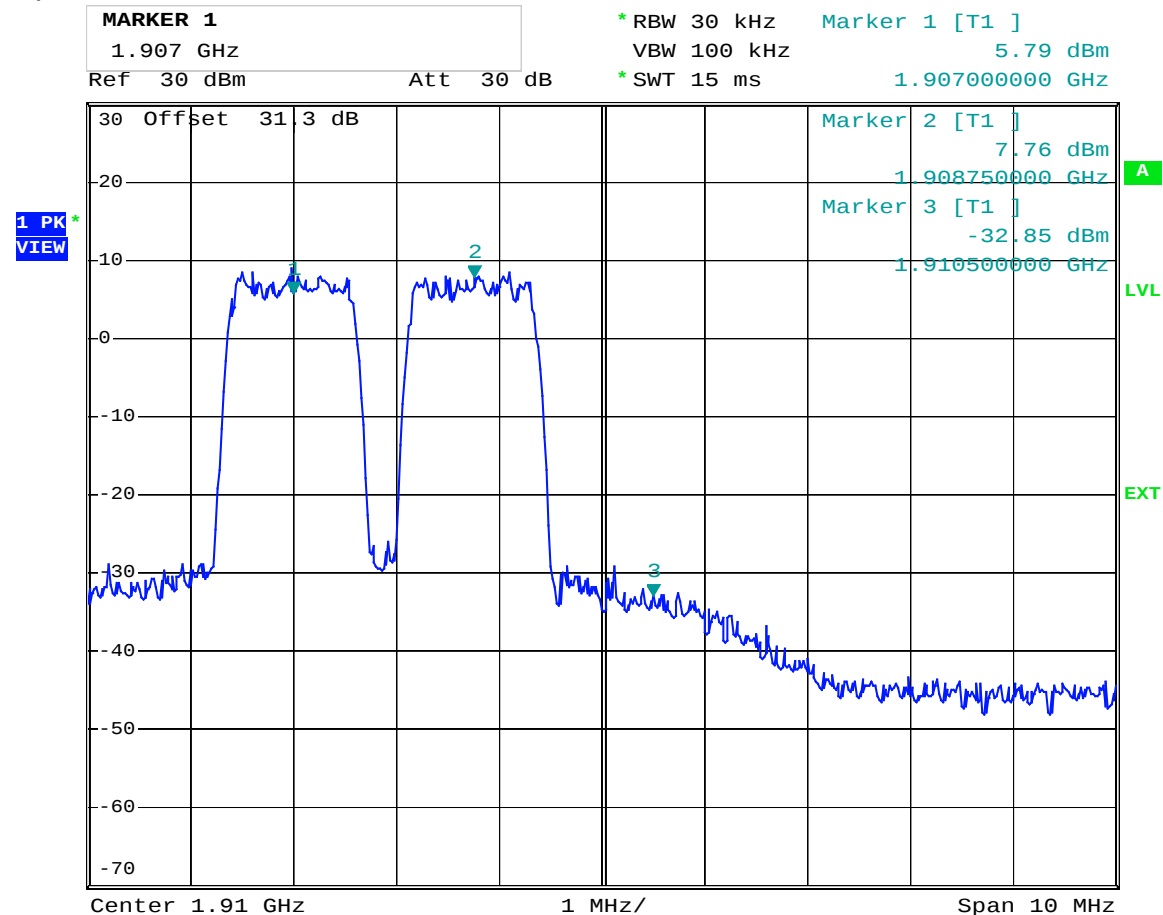
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

CDMA

Uplink

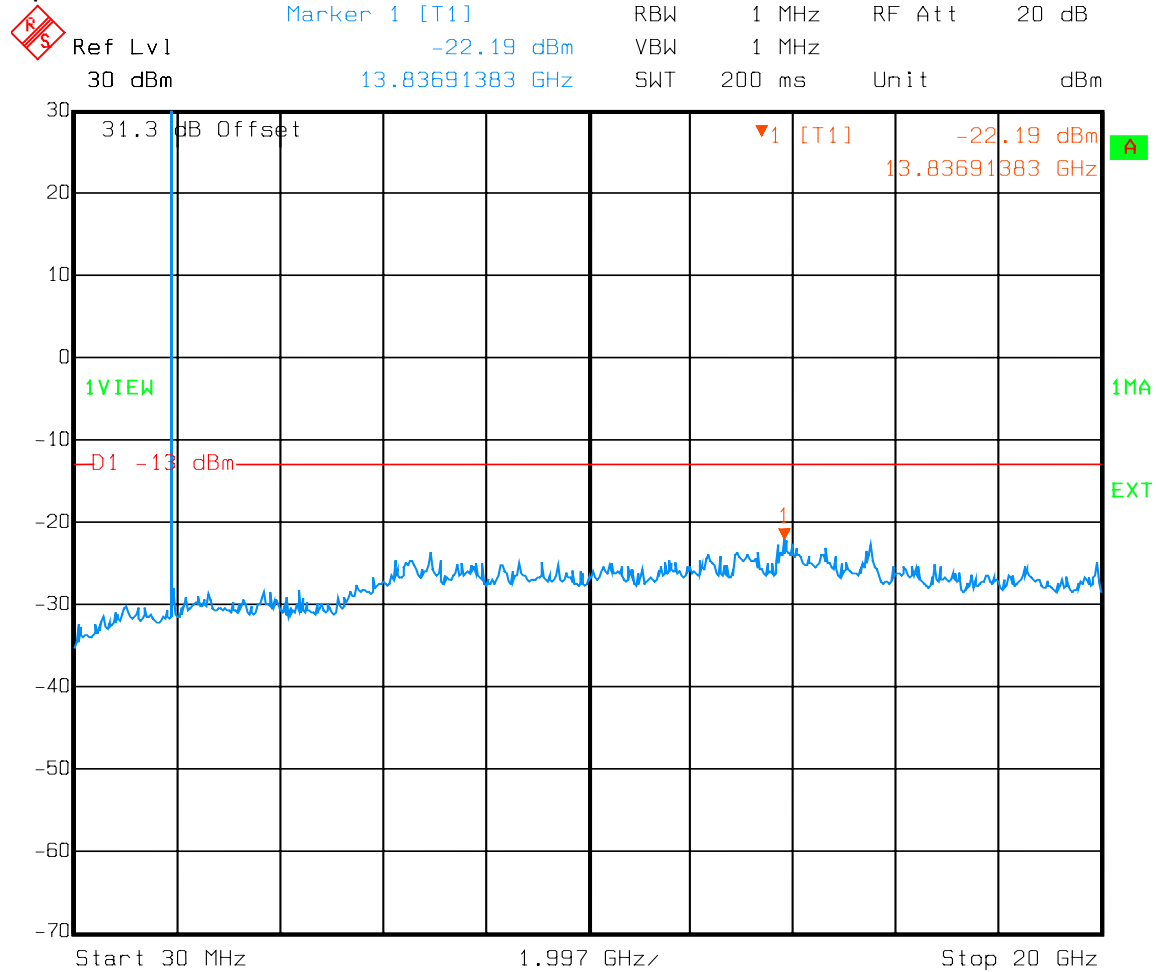


Date: 29.AUG.2006 15:00:11

EQUIPMENT: AMR195

# Test Data – Spurious Emissions at Antenna Terminals

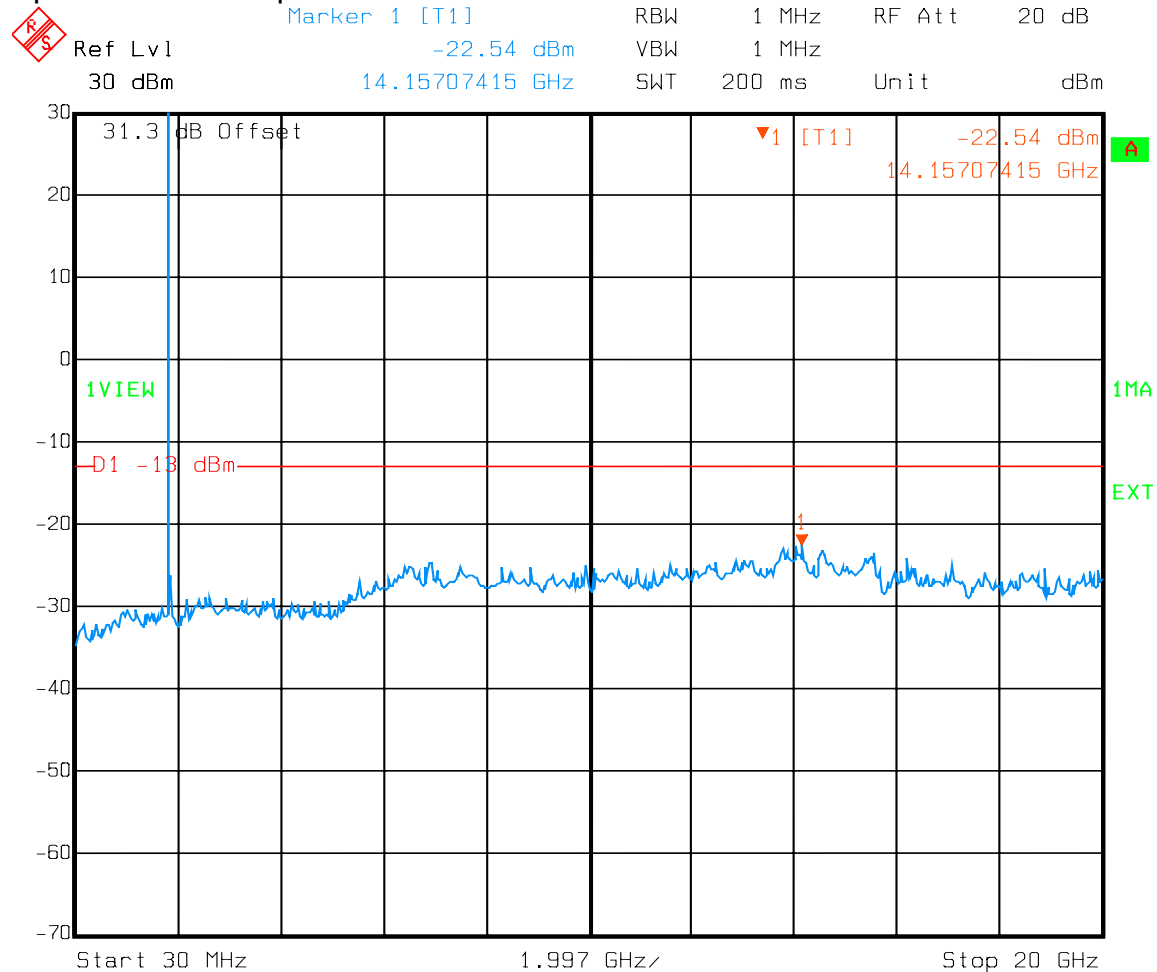
## Spurs – CDMA - Downlink



EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – CDMA - Uplink



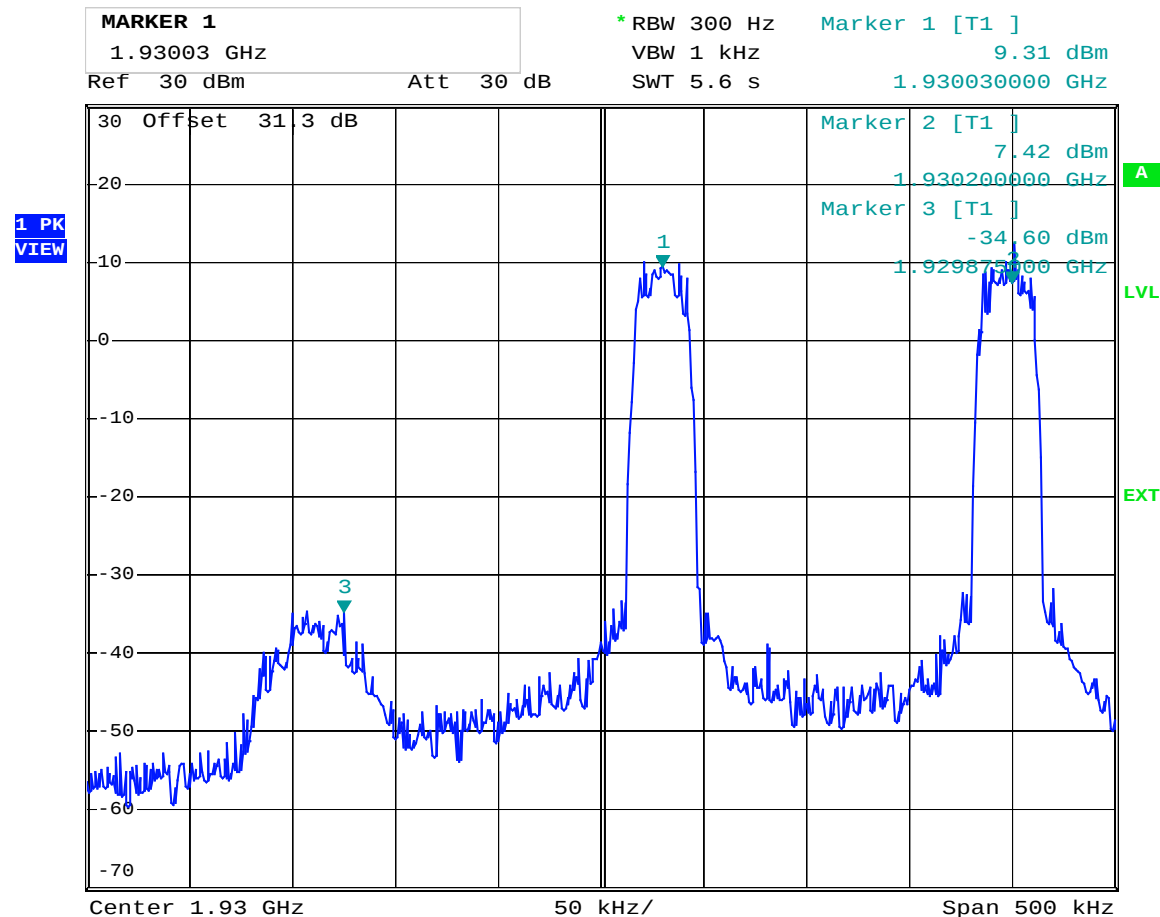
Date: 29.AUG.2006 14:13:26

# Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

TDMA

Downlink



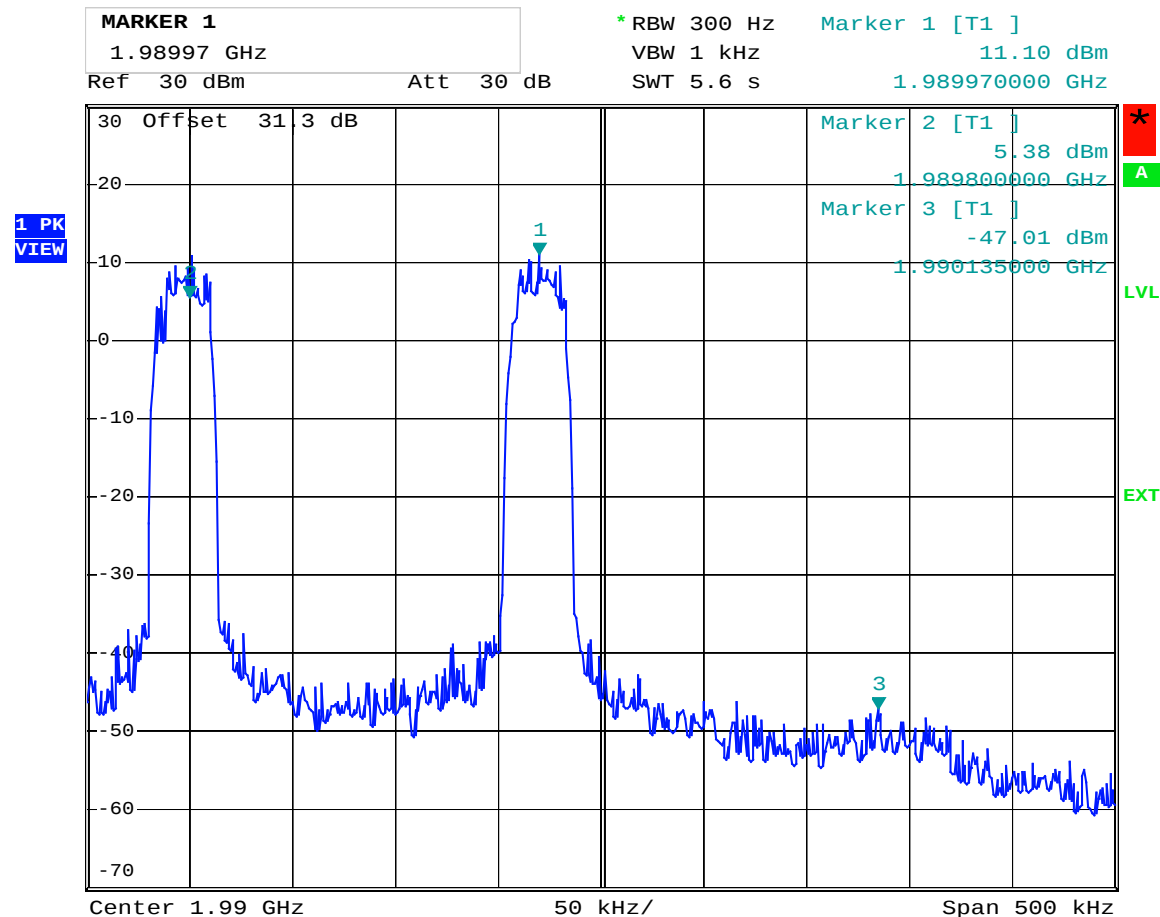
Date: 29.AUG.2006 13:38:08

# Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

TDMA

Downlink



Date: 29.AUG.2006 13:40:25

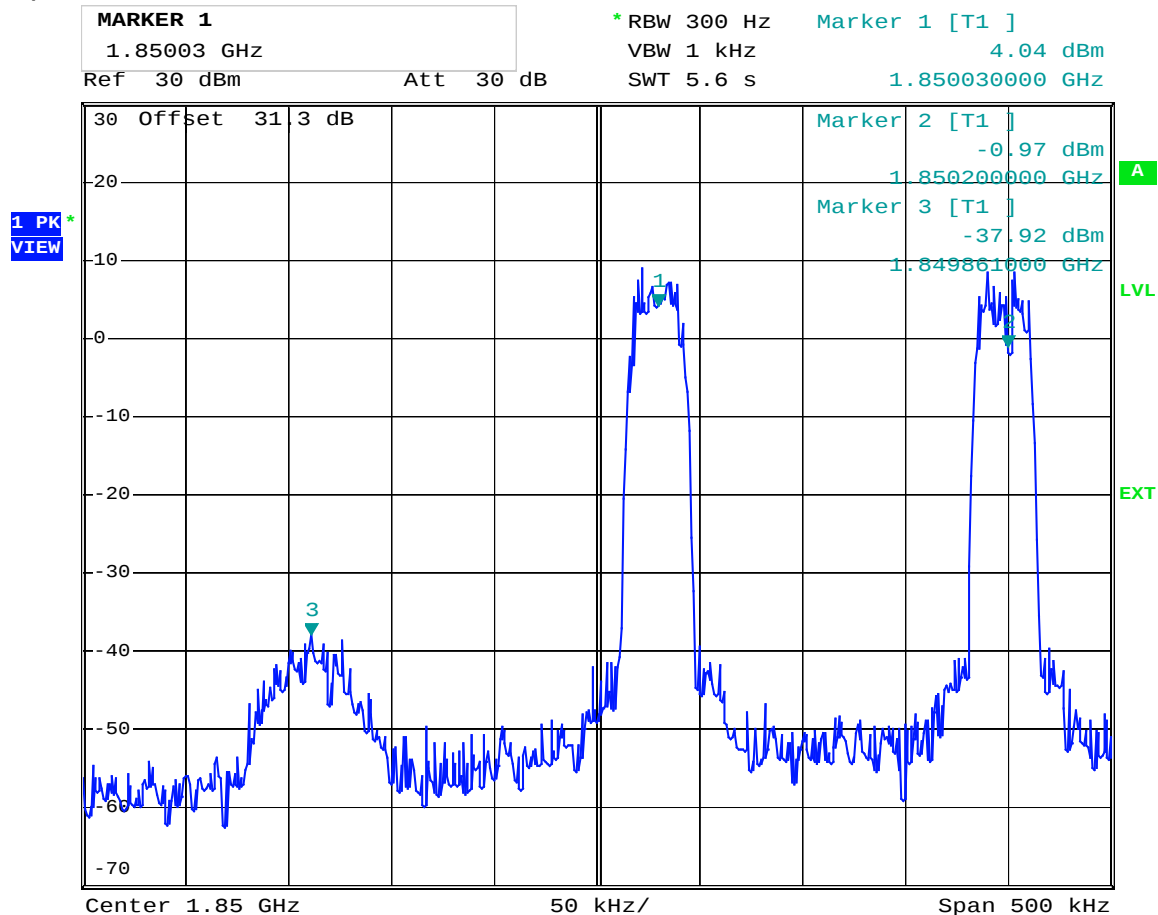
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

TDMA

Uplink



Date: 29.AUG.2006 13:36:18

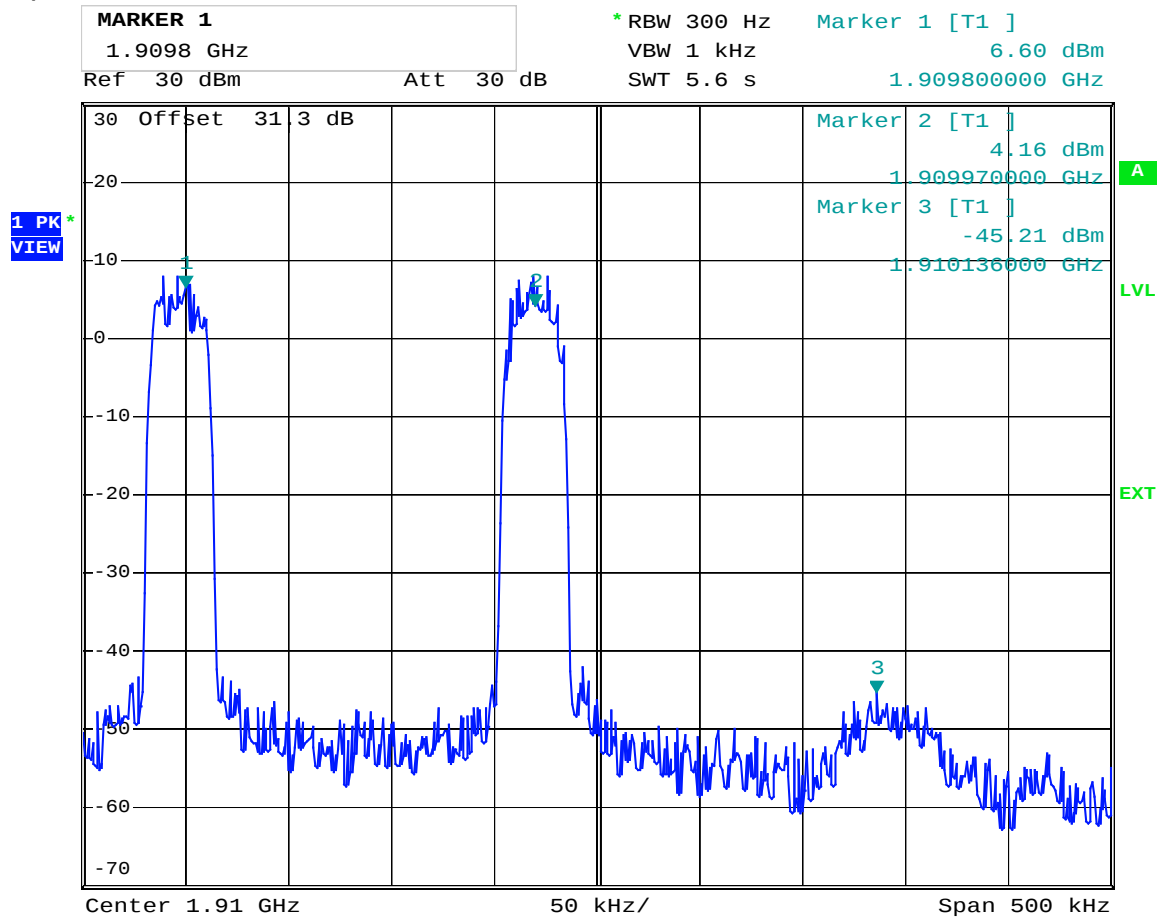
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

TDMA

Uplink

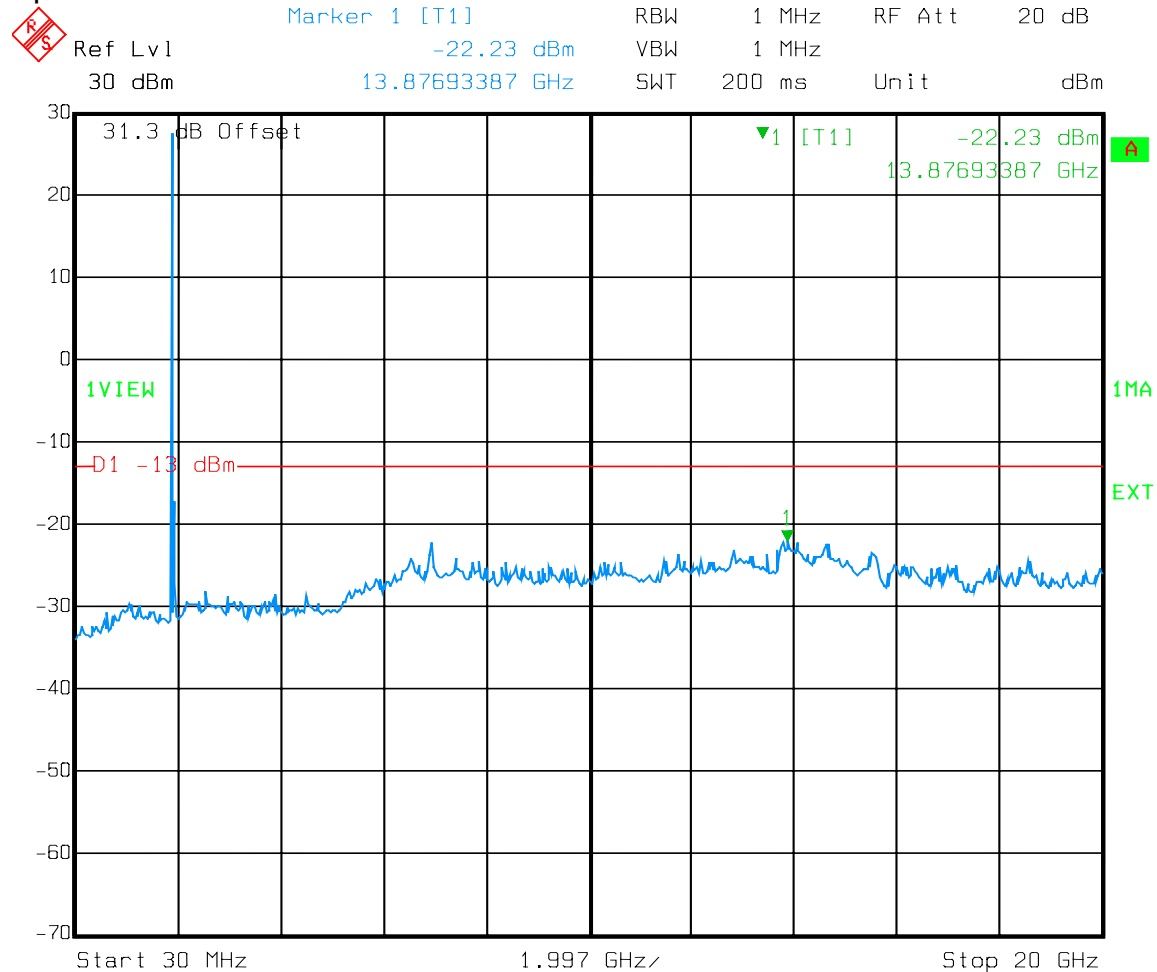


Date: 29.AUG.2006 13:42:37

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – TDMA - Downlink

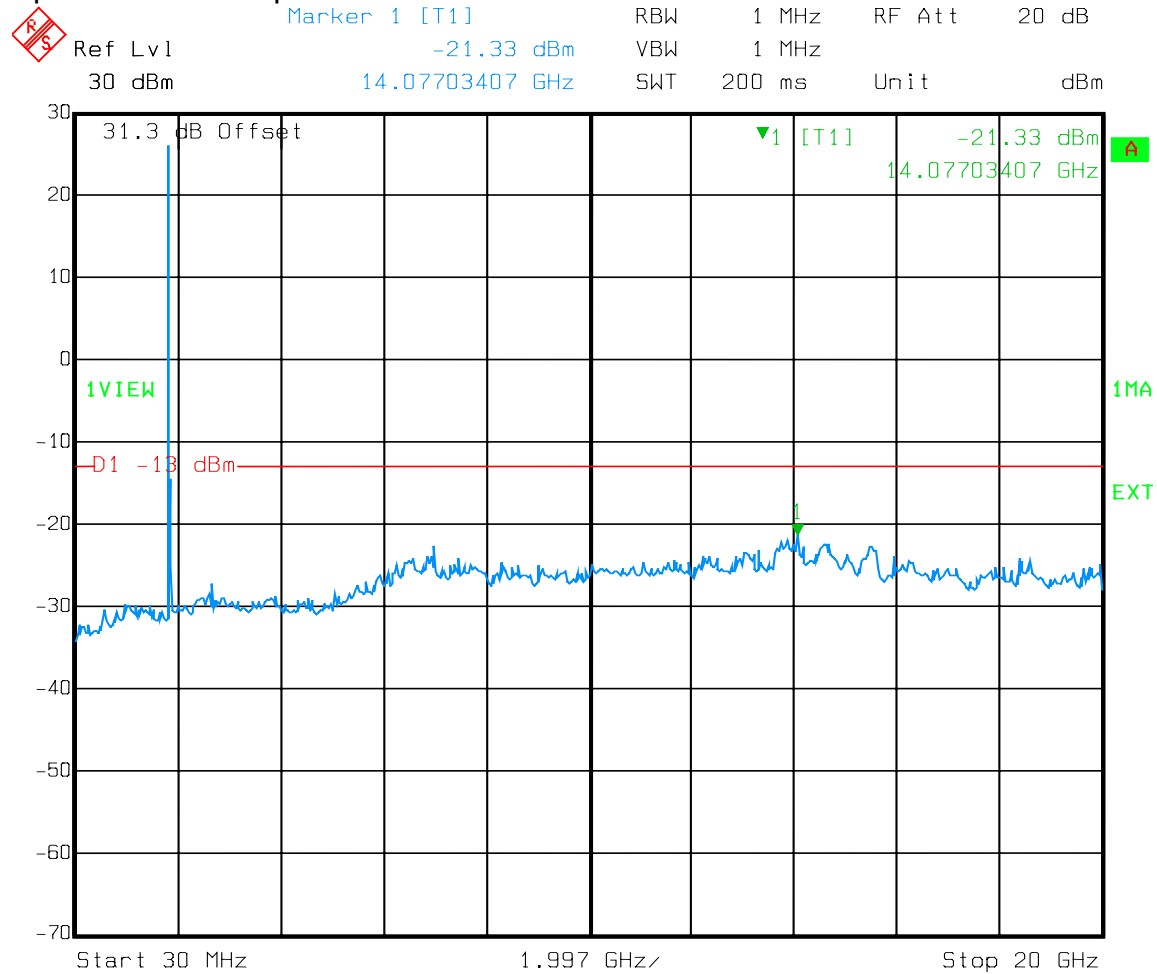


Date: 29.AUG.2006 10:51:17

EQUIPMENT: AMR195

# Test Data – Spurious Emissions at Antenna Terminals

## Spurs – TDMA - Uplink



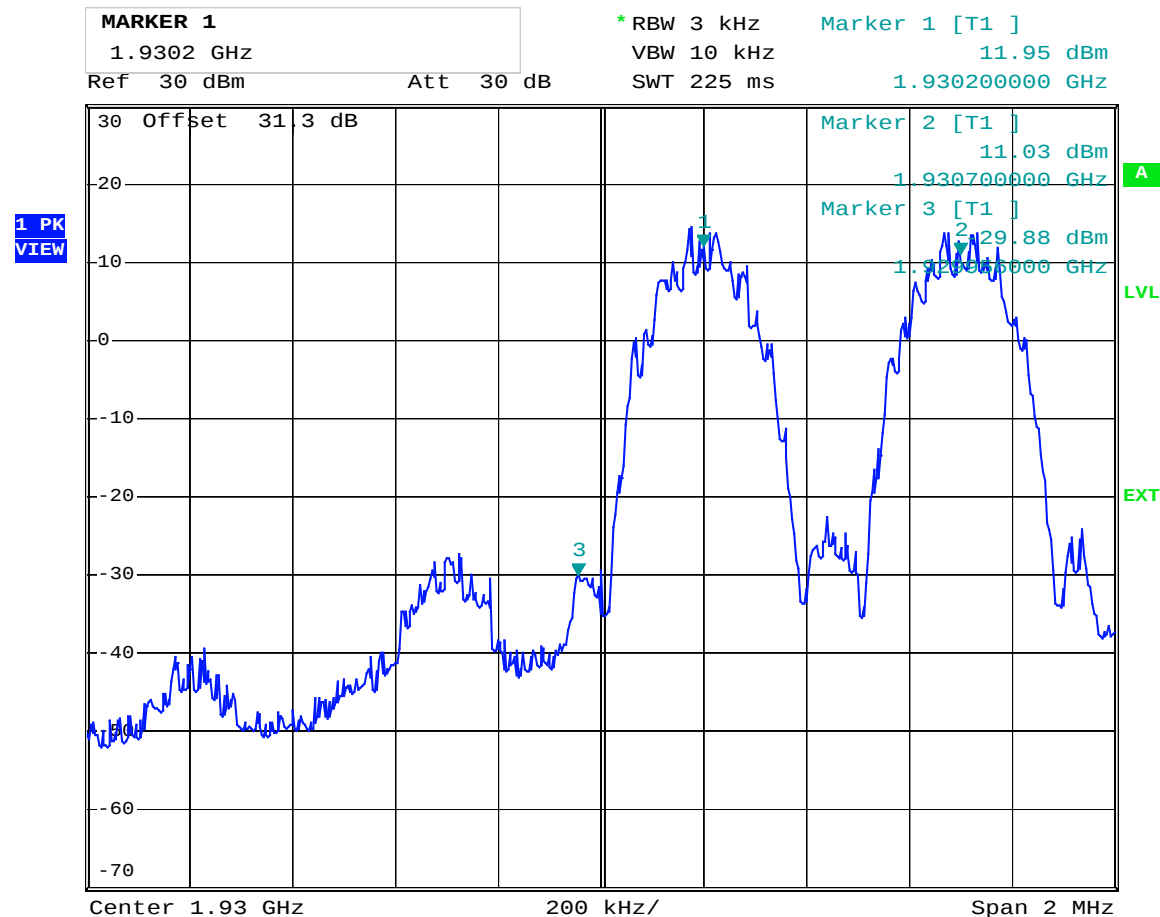
Date: 29.AUG.2006 10:49:20

**Test Data – Spurious Emissions at Antenna Terminals**

Lower Bandedge Intermodulation

EDGE

Downlink



Date: 29.AUG.2006 09:32:55

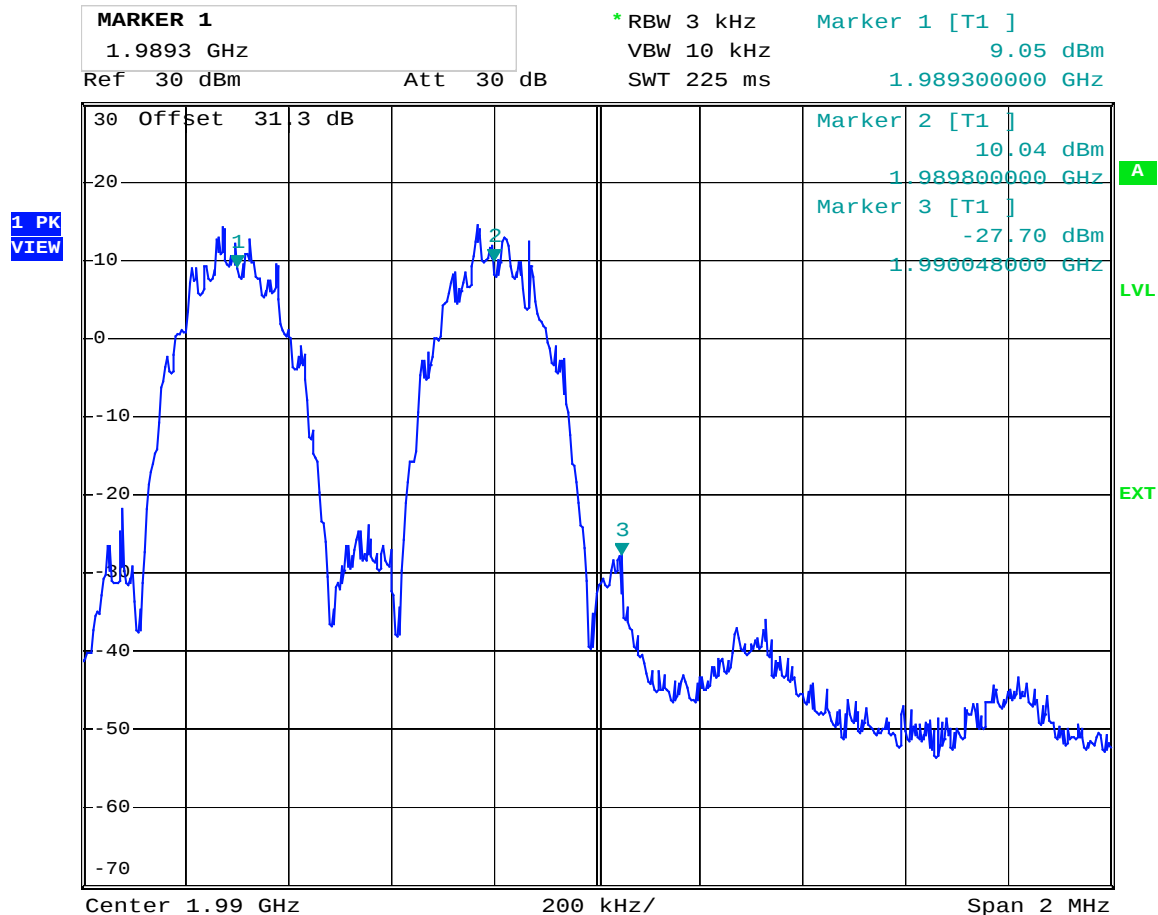
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

EDGE

Downlink



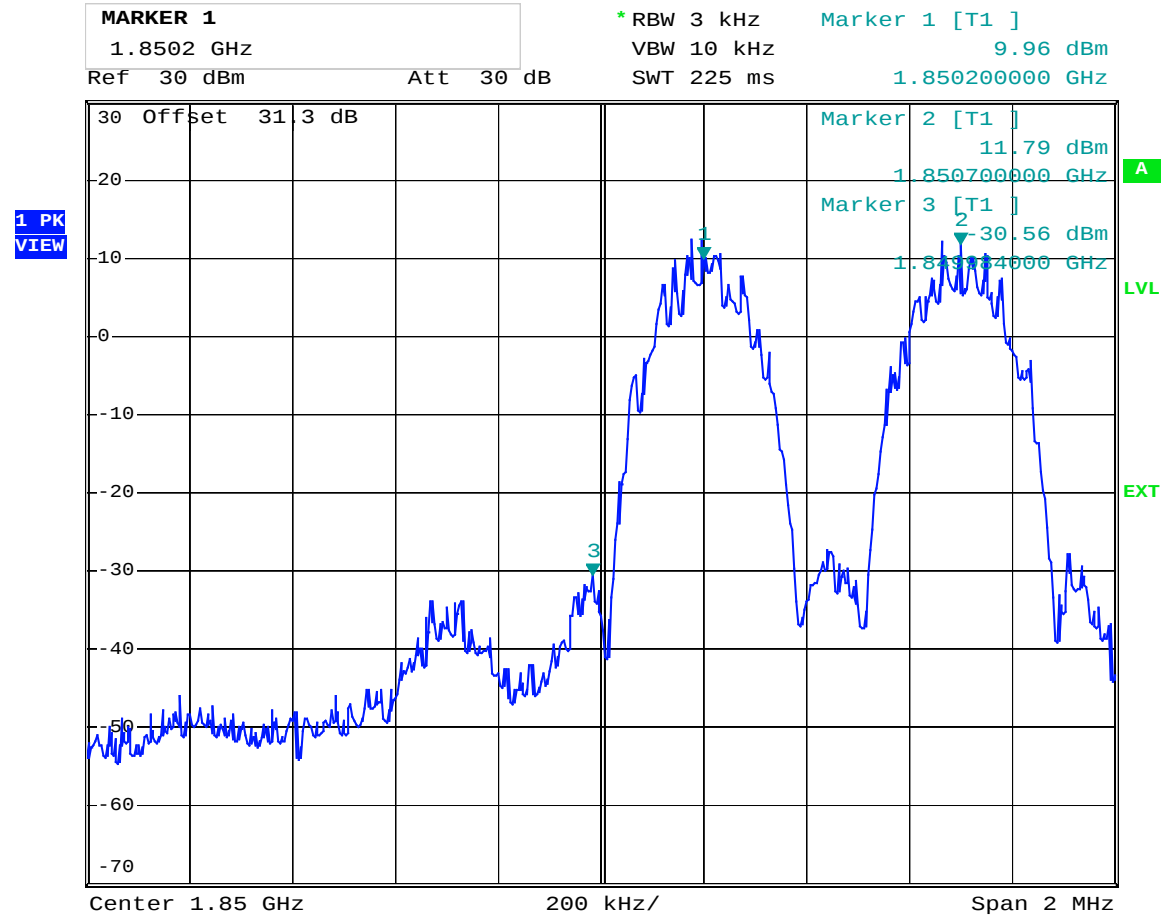
Date: 29.AUG.2006 09:24:19

# Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

EDGE

Uplink



Date: 29.AUG.2006 09:30:39

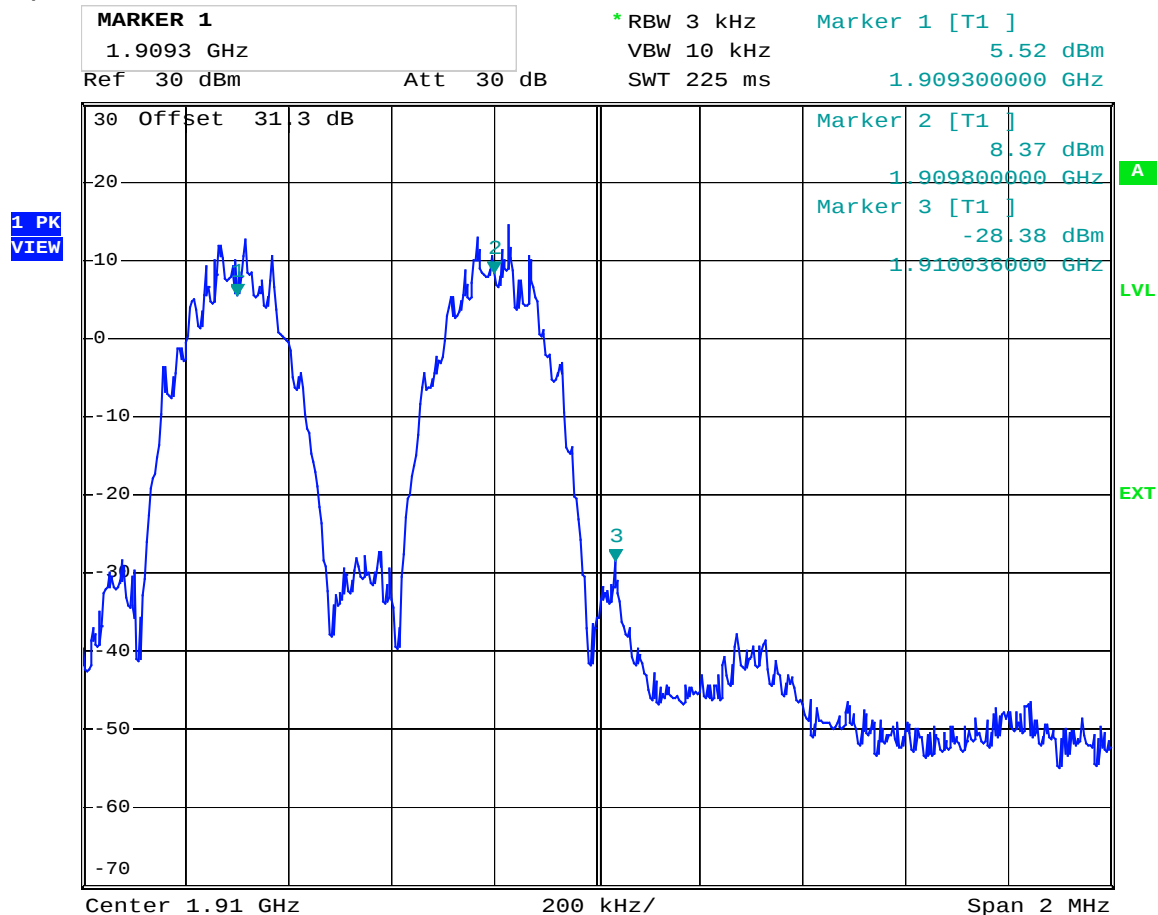
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

EDGE

Uplink

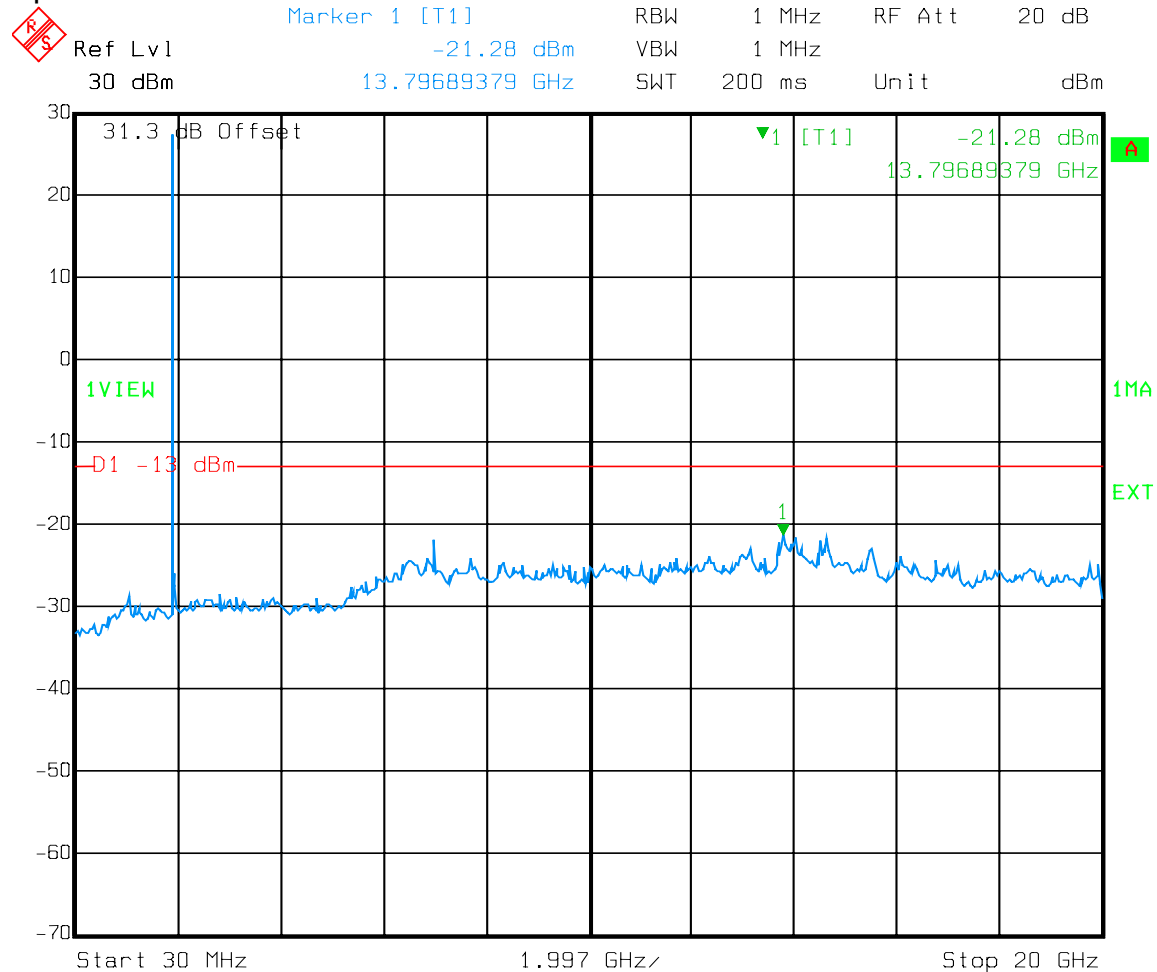


Date: 29.AUG.2006 09:27:31

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – EDGE - Downlink

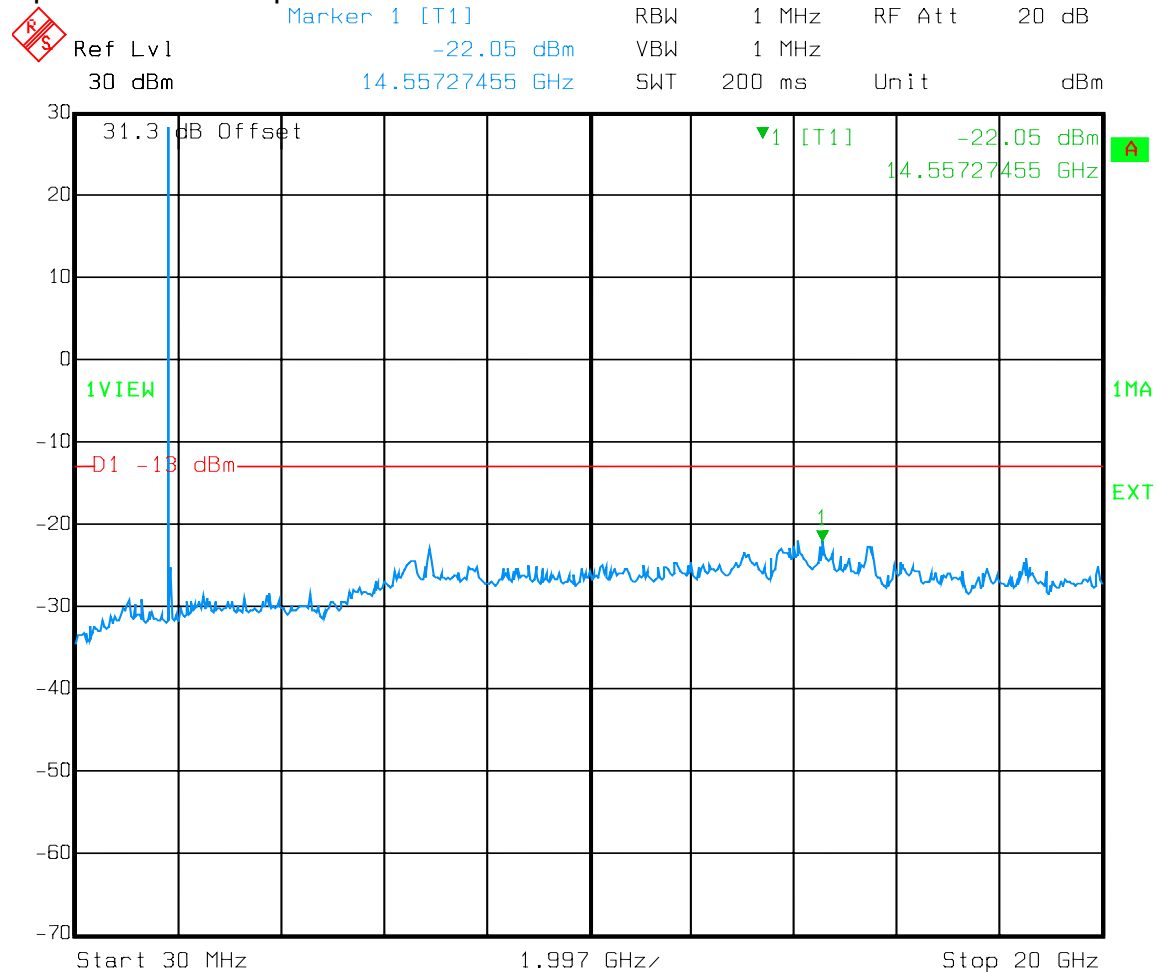


Date: 29.AUG.2006 10:28:41

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – EDGE - Uplink



Date: 29.AUG.2006 10:26:33

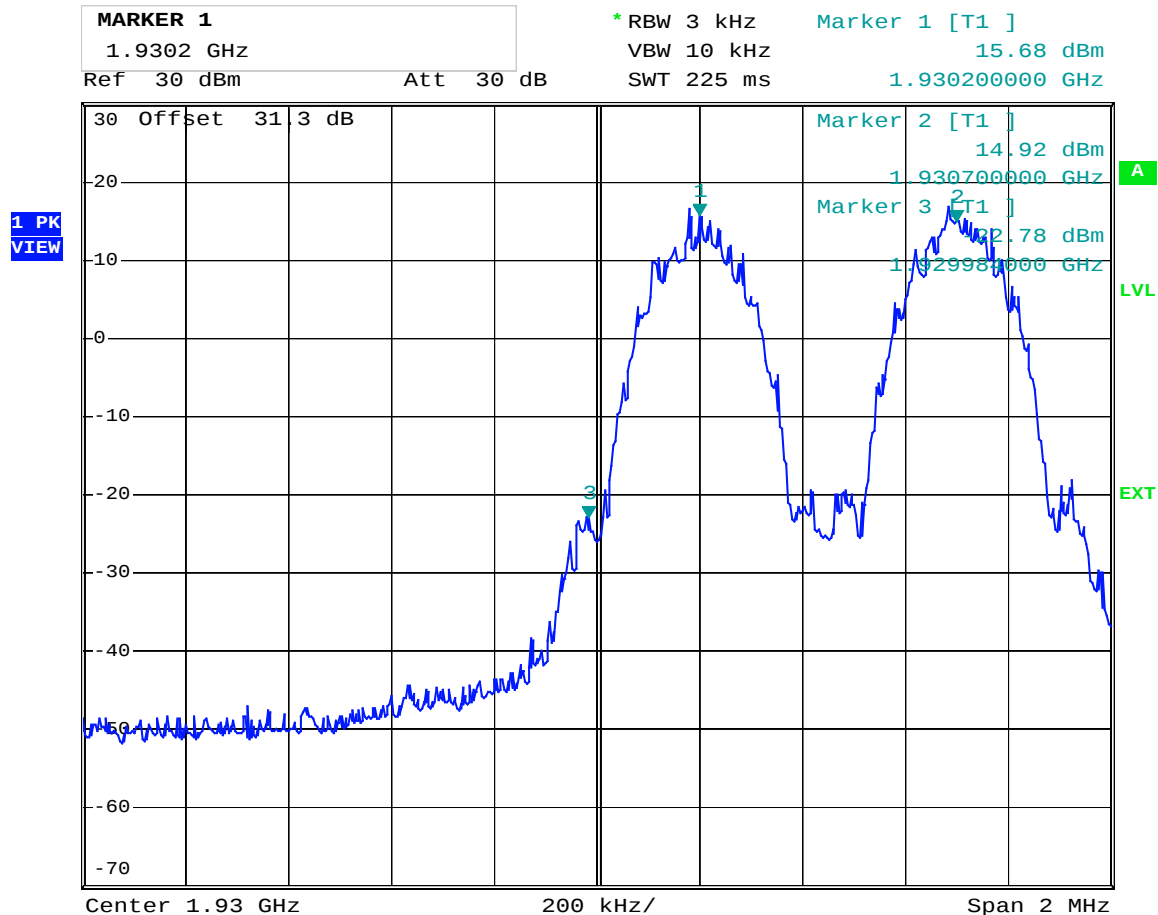
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

GSM

Downlink



Date: 28.AUG.2006 15:33:08

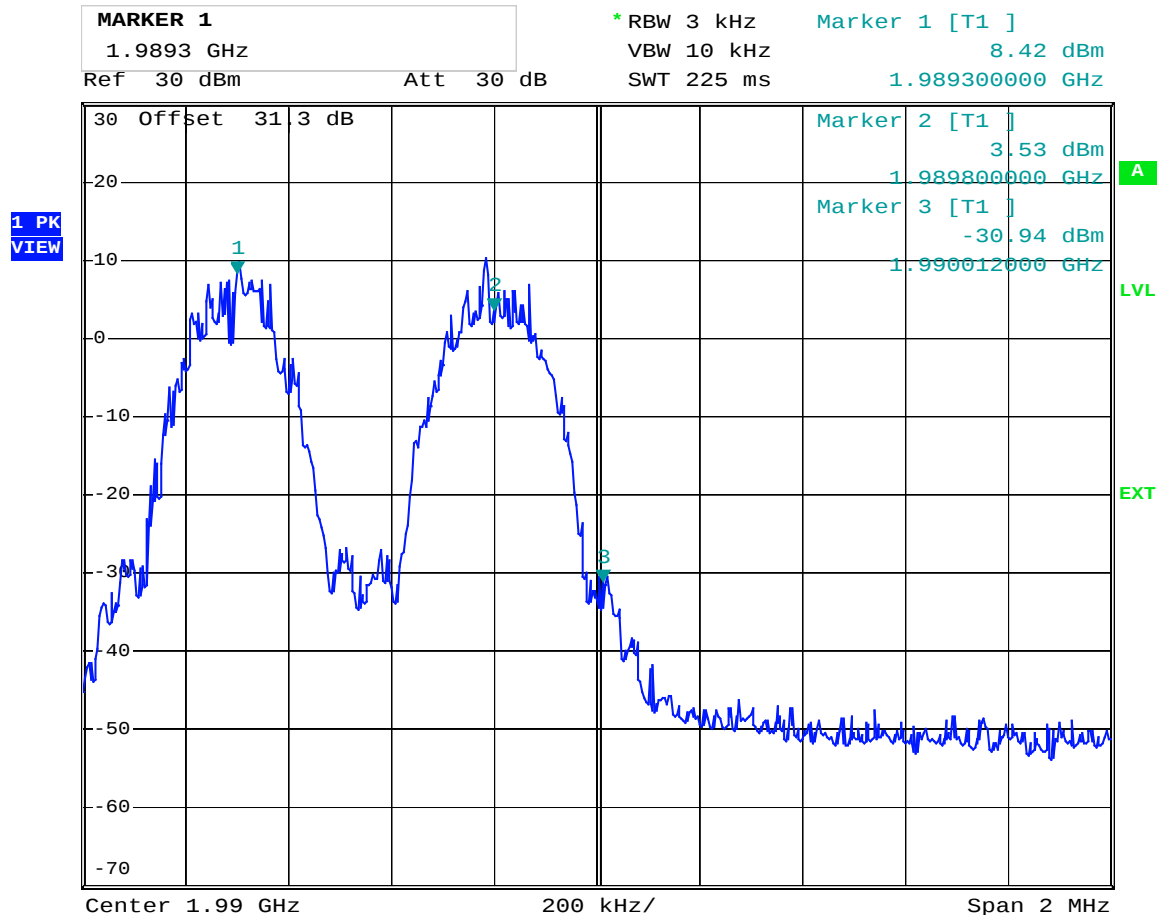
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

GSM

Downlink



Date: 28.AUG.2006 15:38:19

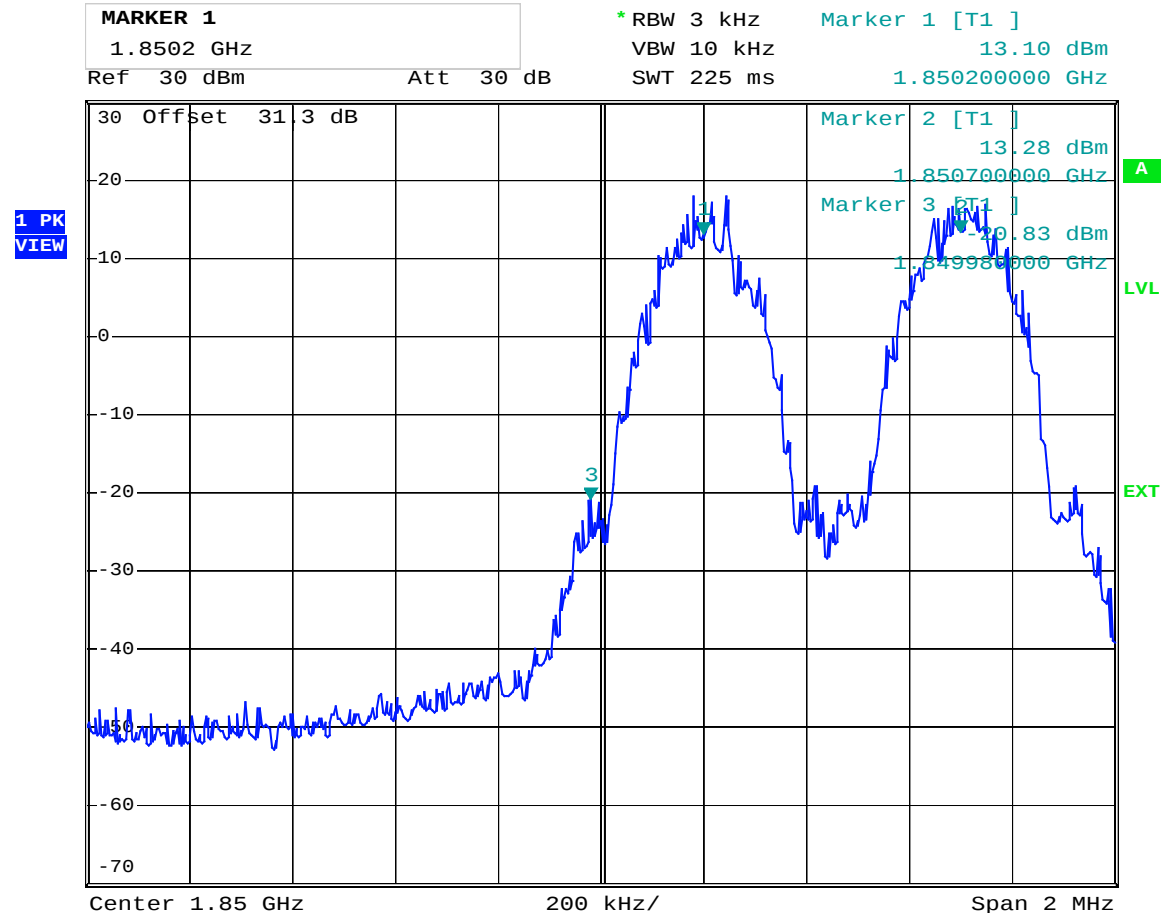
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

GSM

Uplink



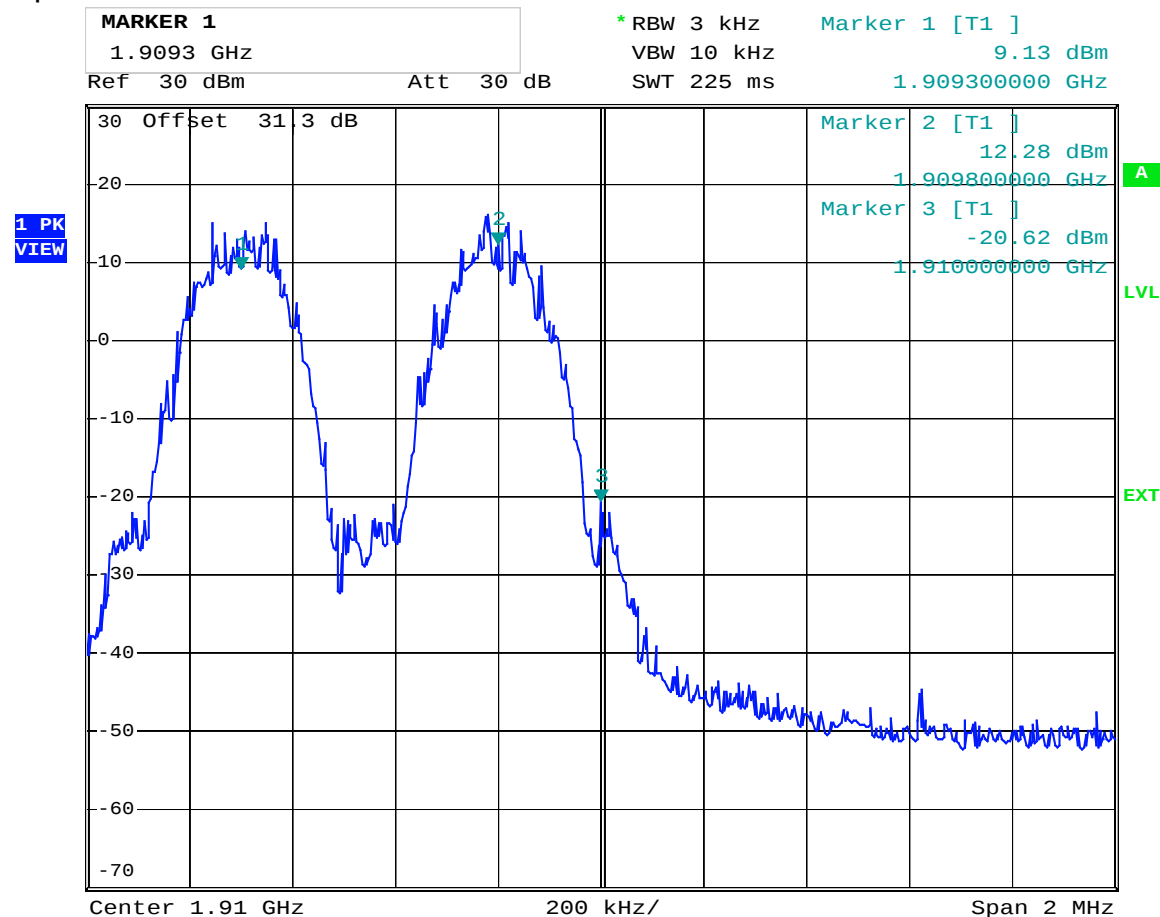
Date: 28.AUG.2006 15:34:34

**Test Data – Spurious Emissions at Antenna Terminals**

Upper Bandedge Intermodulation

GSM

Uplink

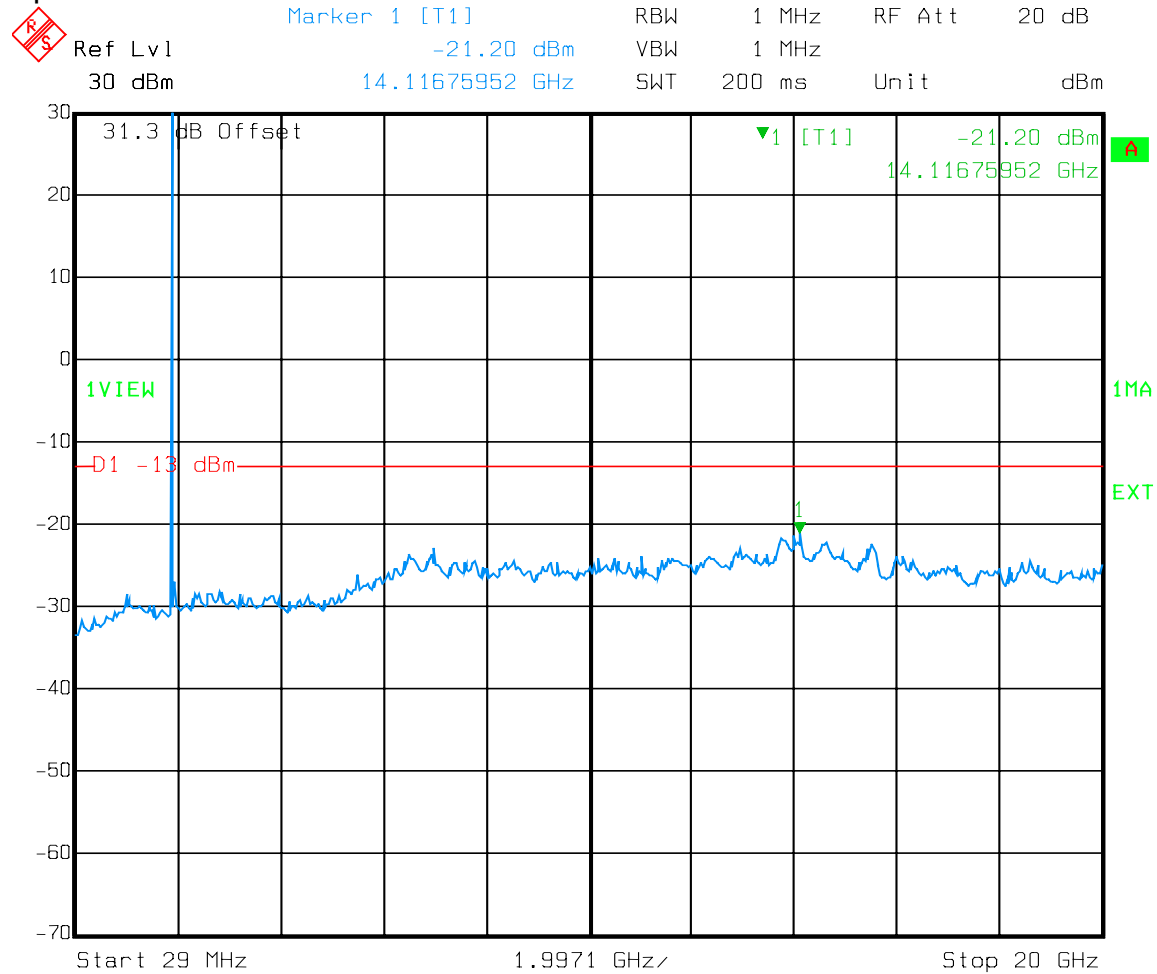


Date: 28.AUG.2006 15:36:53

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – GSM - Downlink

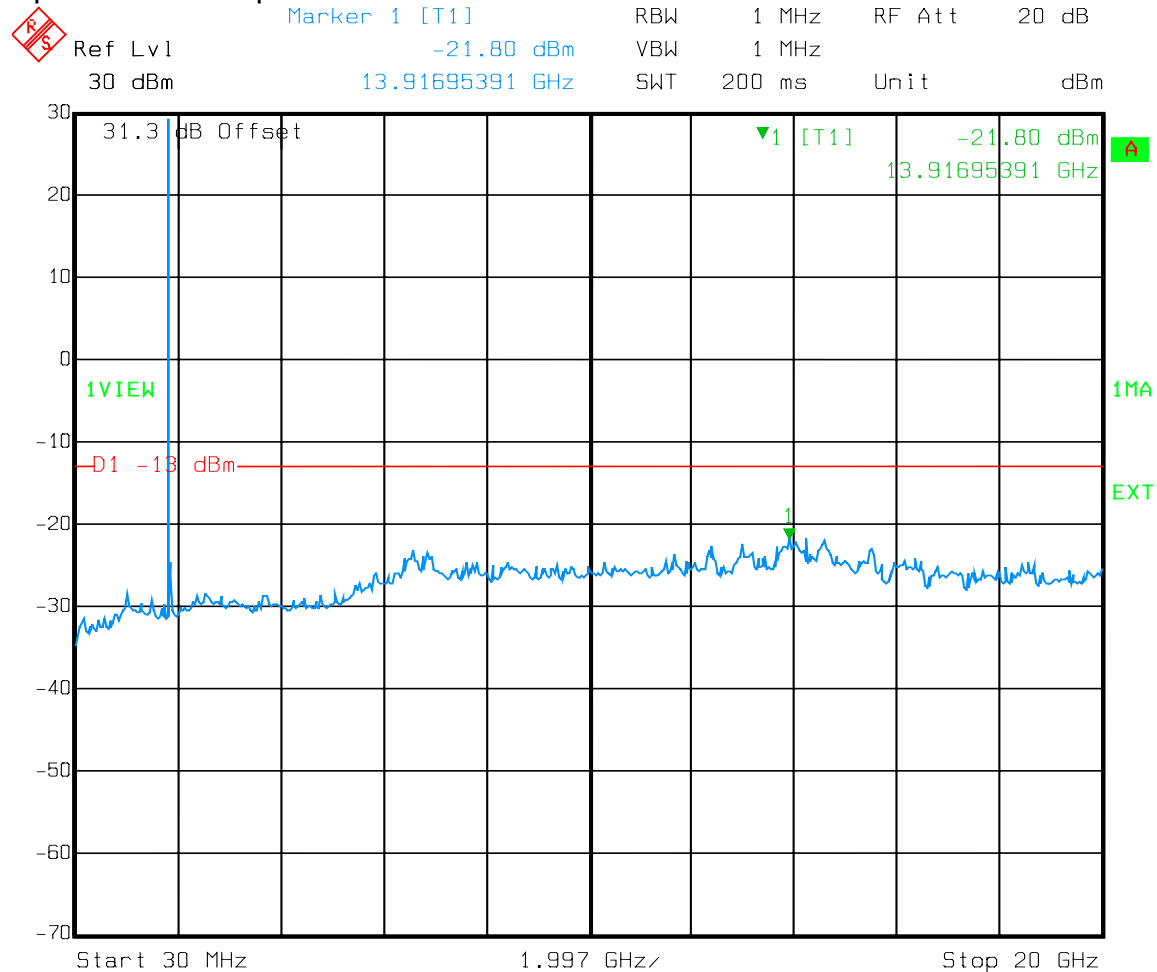


Date: 28.AUG.2006 14:42:56

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – GSM - Uplink



Date: 28.AUG.2006 14:56:46

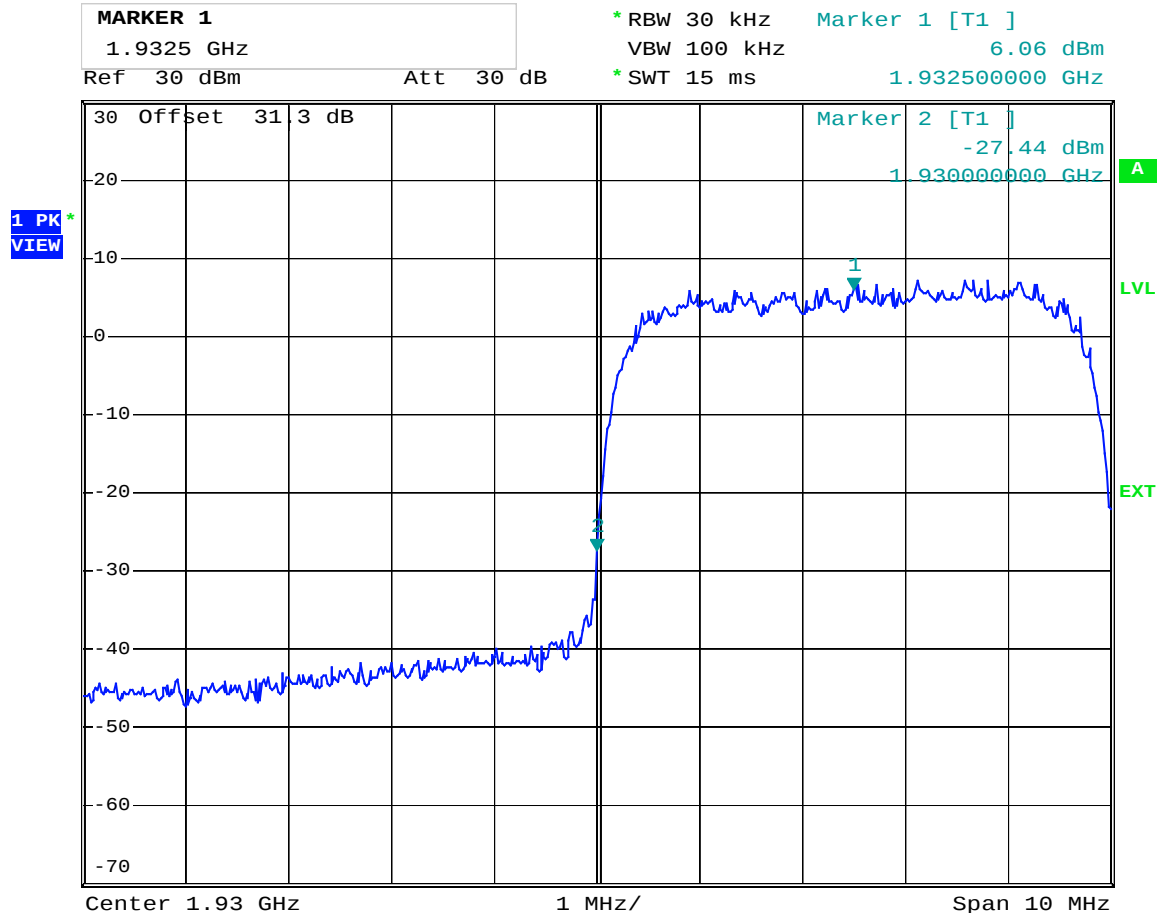
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

W-CDMA

Downlink



Date: 29.AUG.2006 15:22:21

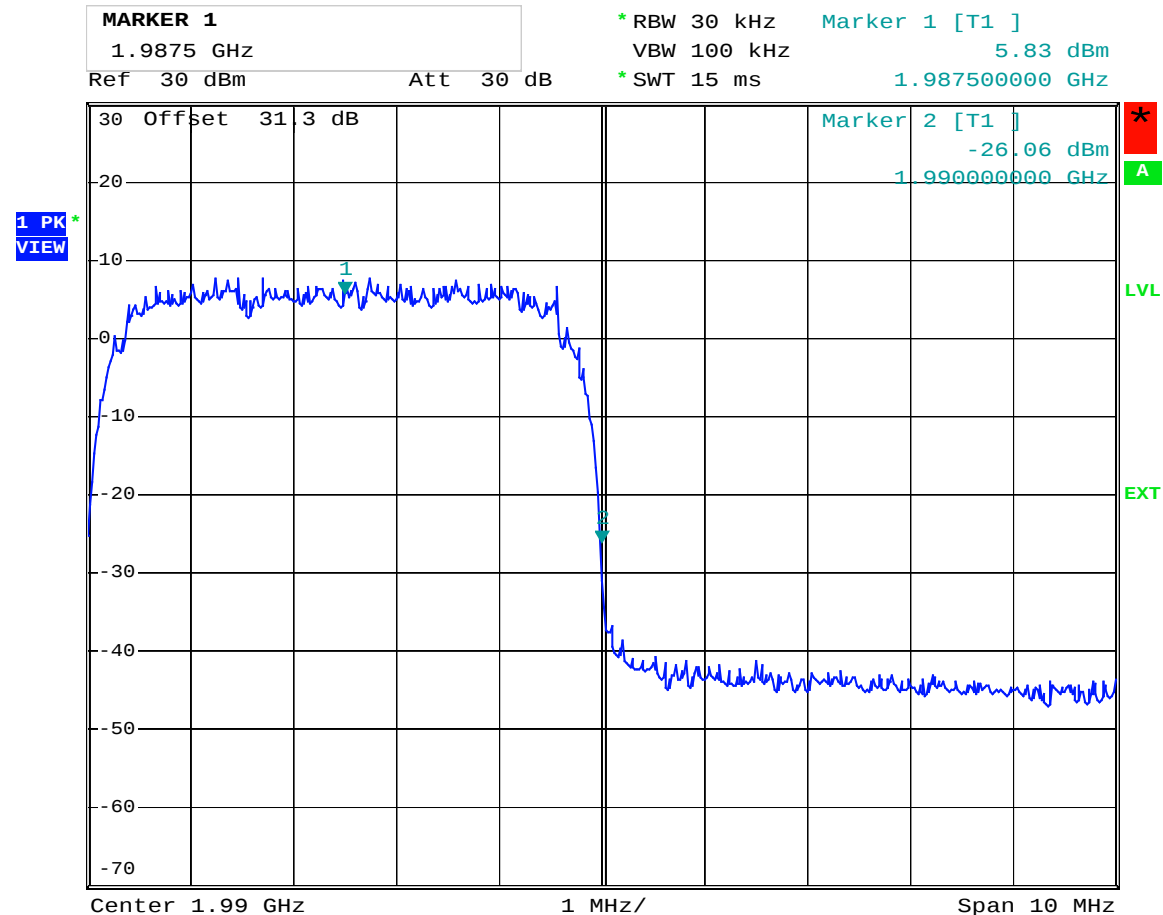
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

W-CDMA

Downlink



Date: 29.AUG.2006 15:29:20

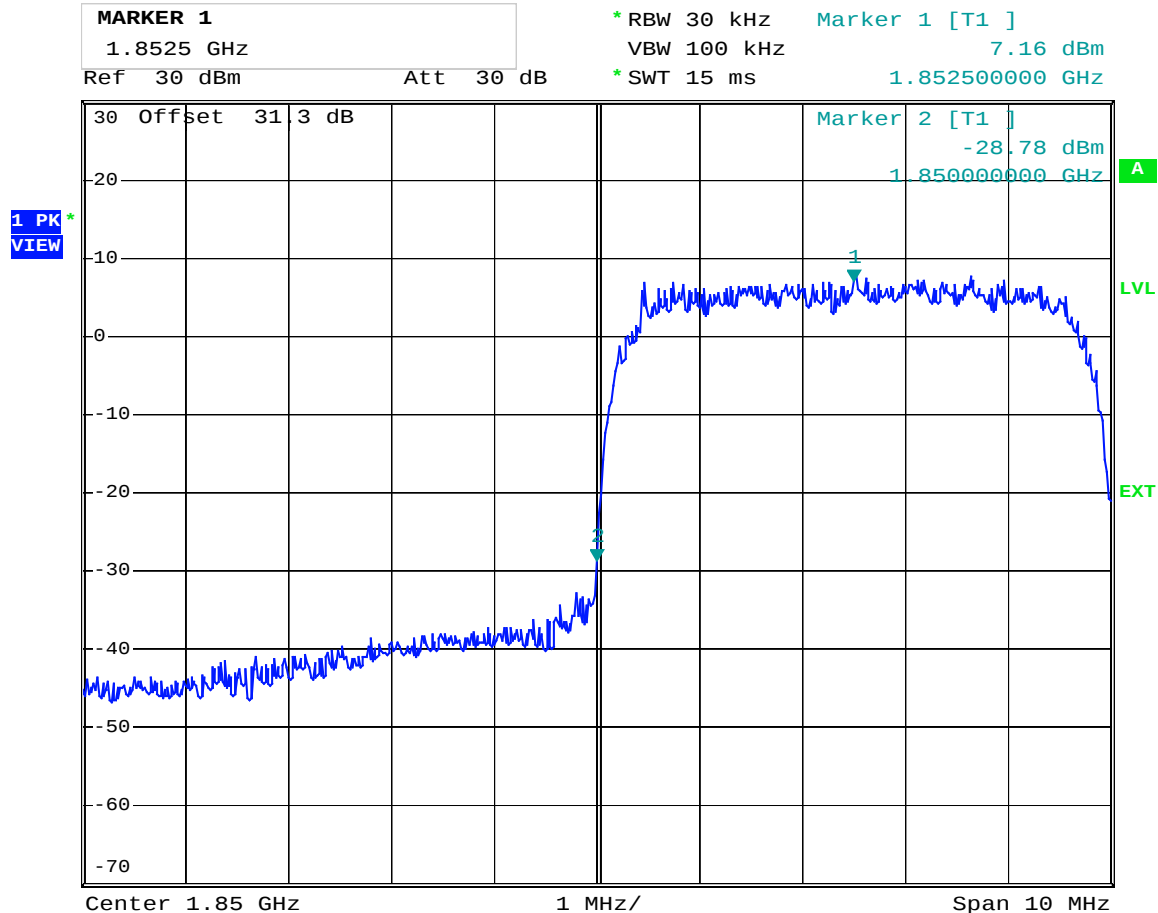
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

W-CDMA

Uplink



Date: 29.AUG.2006 15:24:18

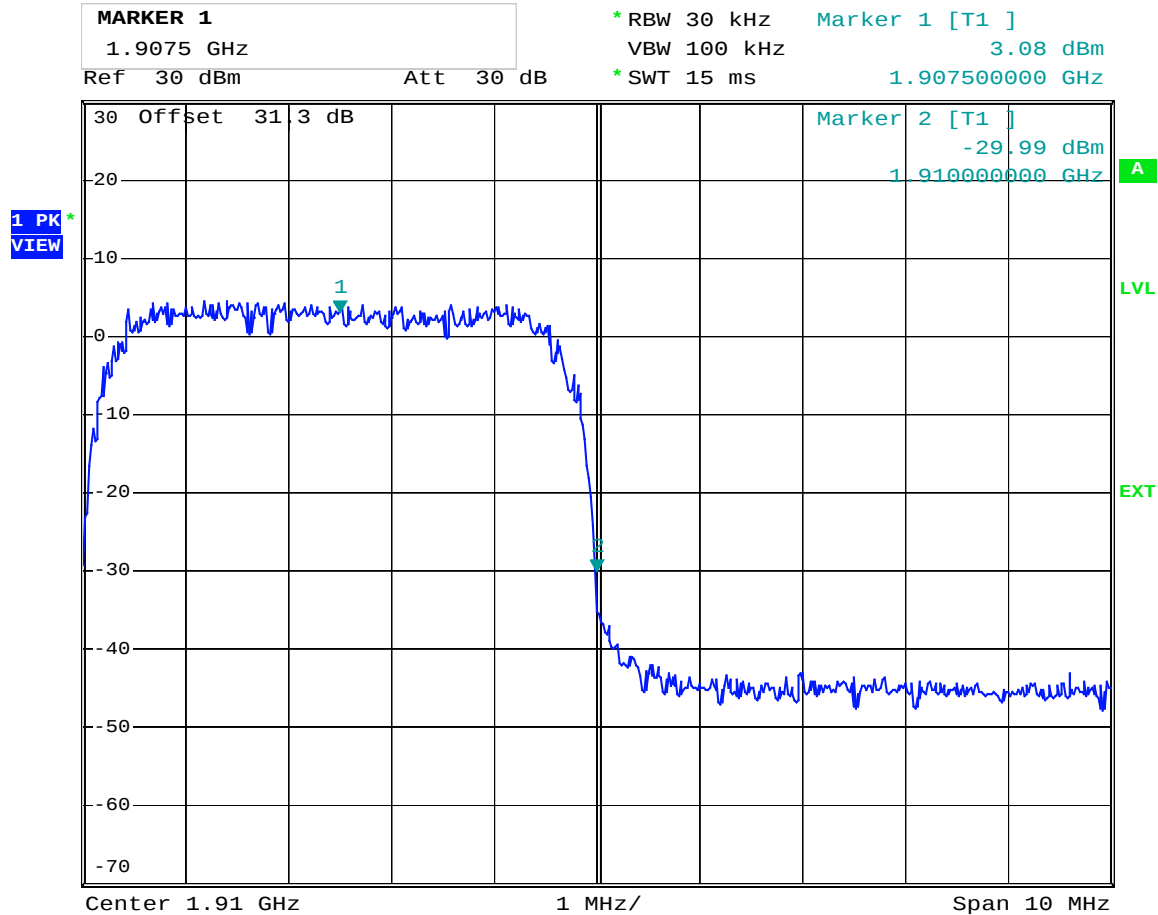
EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

W-CDMA

Uplink

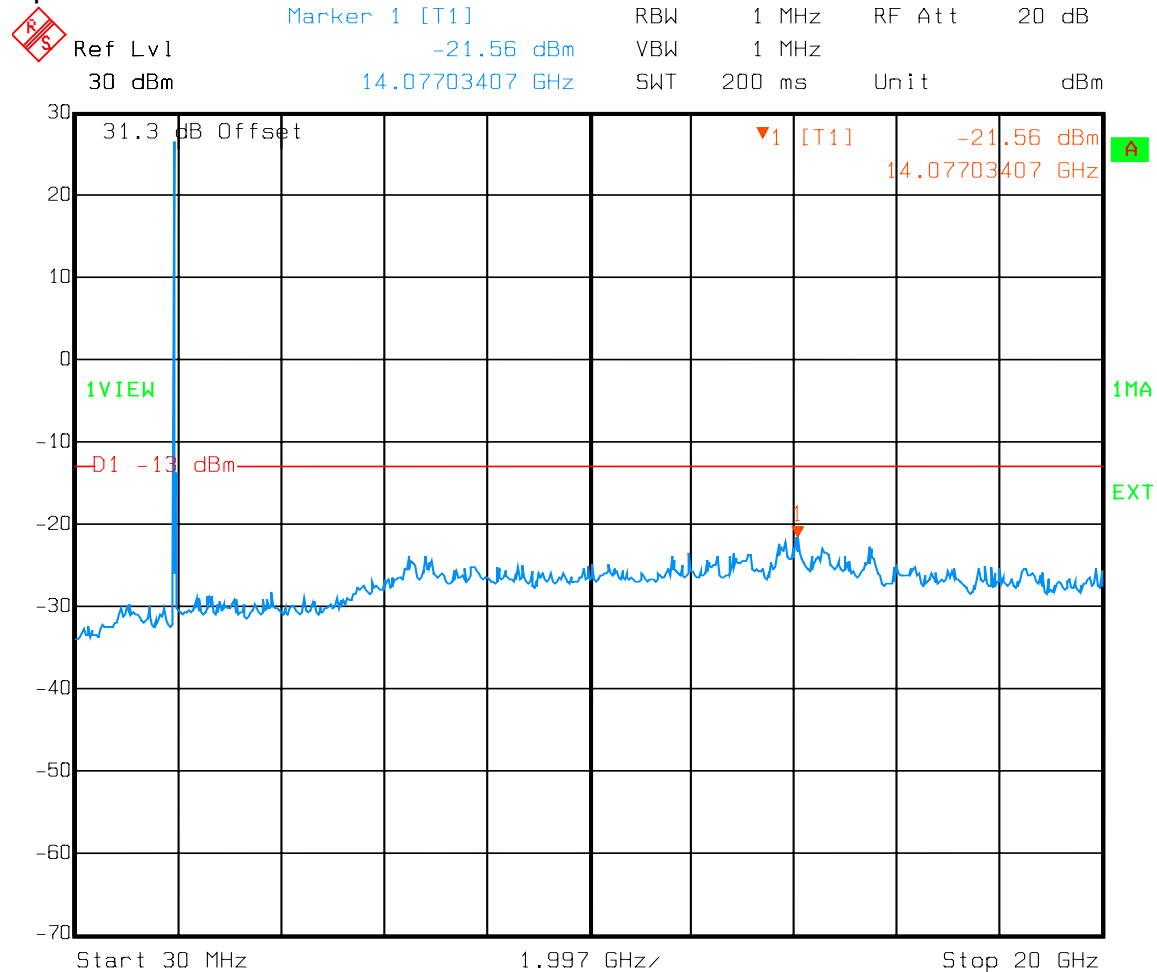


Date: 29.AUG.2006 15:26:25

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – W-CDMA - Downlink

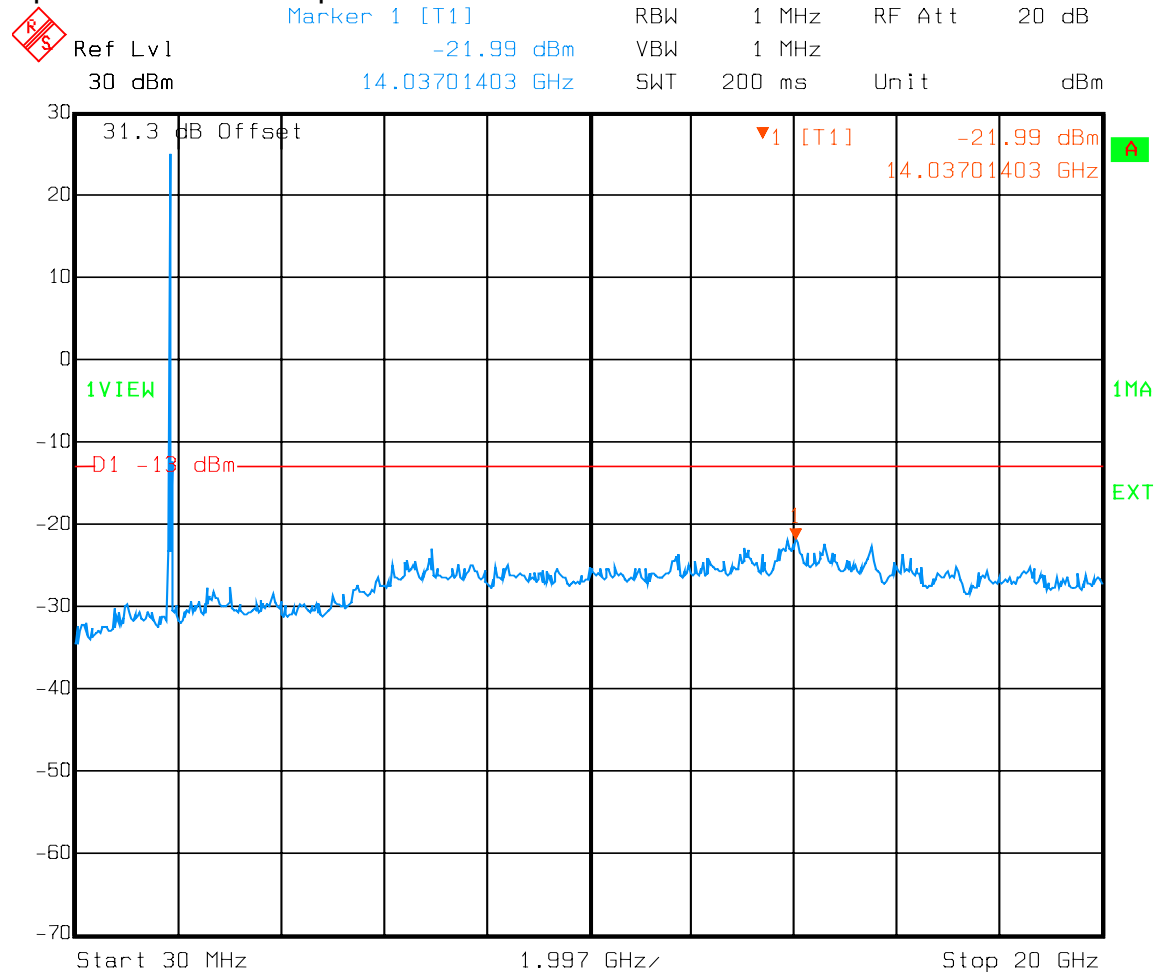


Date: 30.AUG.2006 10:49:56

EQUIPMENT: AMR195

## Test Data – Spurious Emissions at Antenna Terminals

## Spurs – W-CDMA - Uplink



Date: 30.AUG.2006 10:47:04

**Section 6. Field Strength of Spurious**

|                                                    |                      |
|----------------------------------------------------|----------------------|
| NAME OF TEST: Field Strength of Spurious Emissions | PARA. NO.: 24.238    |
| TESTED BY: David Light                             | DATE: 31 August 2006 |

**Test Results:** Complies.

**Test Data:** There were no emissions detected above the noise floor which was at least 20 dB below the specification limit of -13 dBm.

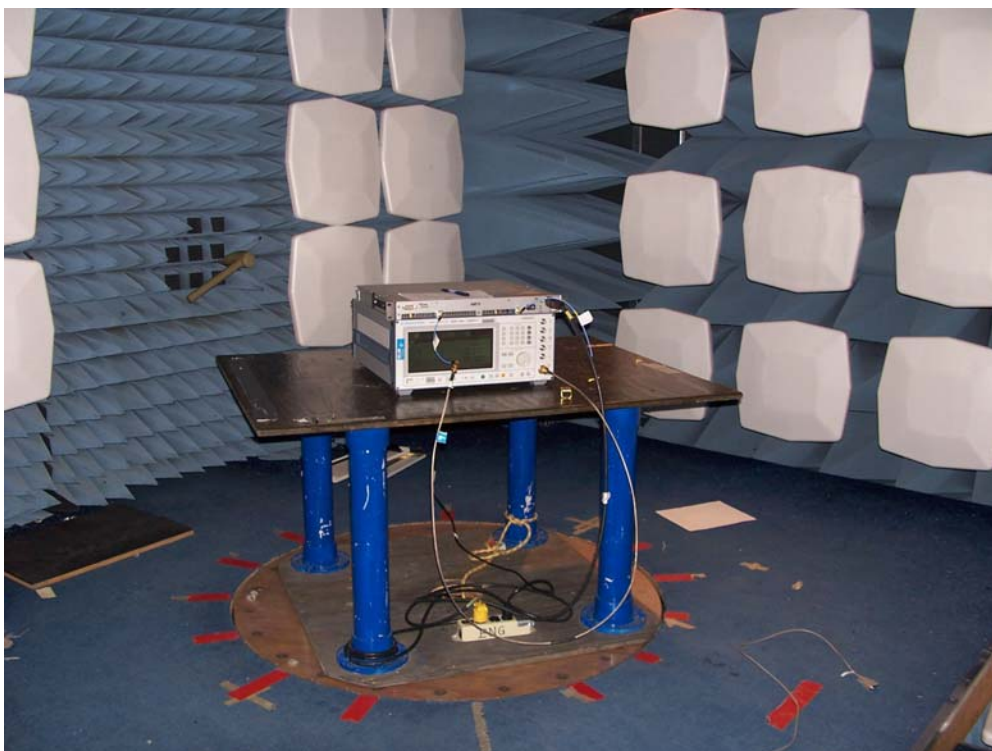
**Equipment Used:** 1484-1485-1464-1016-791-1306-759

**Measurement Uncertainty:** +/-1.7 dB

**Temperature:** 23 °C

**Relative Humidity:** 40 %

### Photographs of Test Setup



## Section 7. Test Equipment List

| Nemko ID | Description                | Manufacturer<br>Model Number   | Serial Number | Calibration<br>Date | Calibration<br>Due |
|----------|----------------------------|--------------------------------|---------------|---------------------|--------------------|
| 1082     | CABLE 2m                   | Astrolab<br>32027-2-29094-72TC | N/A           | CBU                 | N/A                |
| 1469     | 10 db Attenuator DC 18 Ghz | MCL Inc.<br>BW-S10W2 10db-2WDC | NONE          | CBU                 | N/A                |
| 1472     | 20db Attenuator DC 18 Ghz  | Omni Spectra<br>20600-20db     | NONE          | CBU                 | N/A                |
| 1659     | Spectrum Analyzer          | Rhode & Schwarz<br>FSP         | 973353        | 01/10/06            | 01/10/07           |
| 1036     | SPECTRUM ANALYZER          | ROHDE & SCHWARZ<br>FSEK30      | 830844/006    | 05/26/06            | 05/26/08           |
| 1464     | Spectrum analyzer          | Hewlett Packard<br>8563E       | 3551A04428    | 01/14/05            | 01/15/07           |
| 1484     | Cable                      | Storm<br>PR90-010-072          | N/A           | 08/26/05            | 08/26/06           |
| 1485     | Cable                      | Storm<br>PR90-010-216          | N/A           | 08/26/05            | 08/26/06           |
| 791      | PREAMP, 25dB               | Nemko USA, Inc.<br>LNA25       | 398           | 04/20/06            | 04/20/07           |
| 1016     | Pre-Amp                    | HEWLETT PACKARD<br>8449A       | 2749A00159    | 04/20/06            | 04/20/07           |
| 759      | ANTENNA, LOG PERIODIC      | A.H. SYSTEMS<br>SAS-200/510    | 556           | 02/13/06            | 02/13/07           |
| 1306     | Antenna biconical          | Nemko USA, Inc.<br>BCON 30300  | 212           | 02/10/06            | 02/10/07           |

## **ANNEX A - TEST DETAILS**

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

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

**Method Of Measurement:**Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter or spectrum analyzer. 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 an isotropic radiator. 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 eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

**NAME OF TEST: Occupied Bandwidth**

**PARA. NO.: 2.1049**

**Minimum Standard:** 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

**NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 24.238****Minimum Standard:**

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

**Method Of Measurement:**

Spectrum analyzer settings:

CDMA

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

GSM

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

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

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

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

|                                                           |                          |
|-----------------------------------------------------------|--------------------------|
| <b>NAME OF TEST: Field Strength of Spurious Radiation</b> | <b>PARA. NO.: 24.238</b> |
|-----------------------------------------------------------|--------------------------|

**Minimum Standard:**

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

**Method of Measurement**

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 an isotropic radiator. 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 eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

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

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

**Method Of Measurement:**Frequency Stability With Voltage Variation

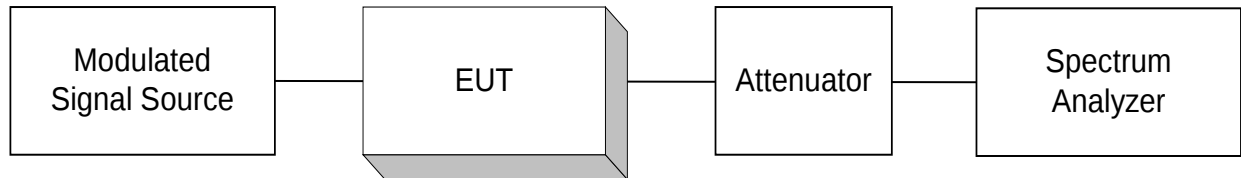
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the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

Frequency Stability With Temperature Variation

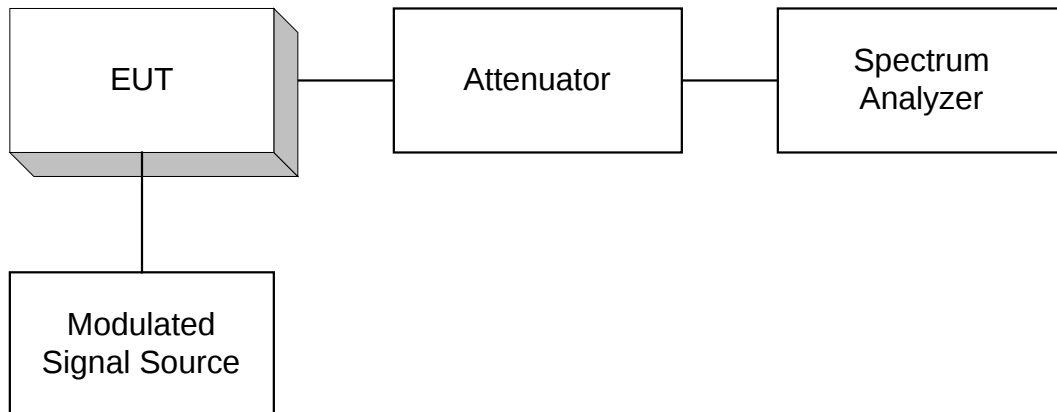
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

## **ANNEX B - TEST DIAGRAMS**

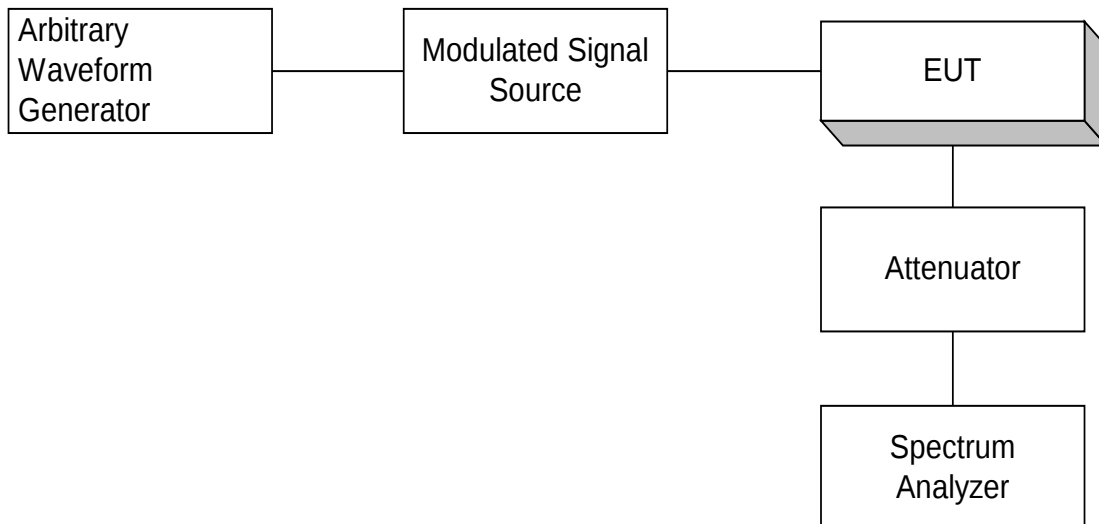
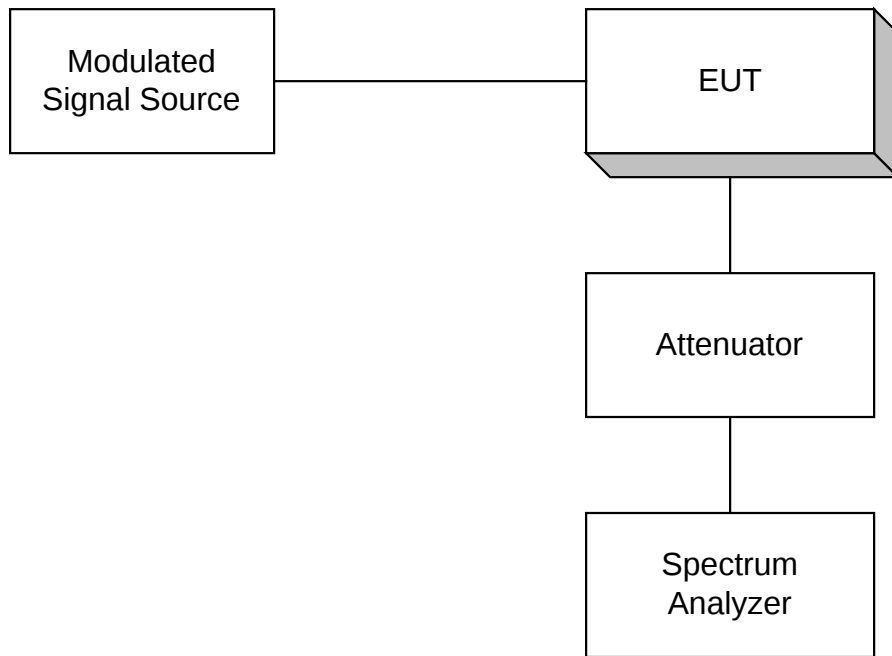
**Para. No. 2.1046 - R.F. Power Output**



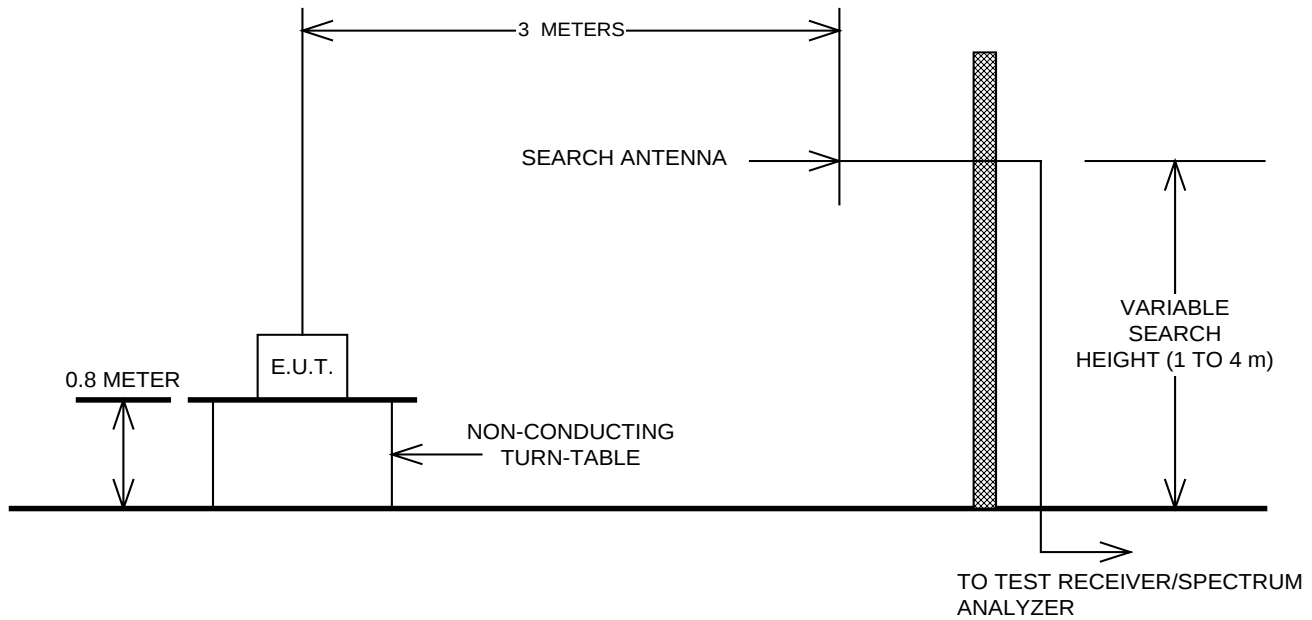
**Para. No. 2.1049 - Occupied Bandwidth**



Para. No. 2.1051 Spurious Emissions at Antenna Terminals



**Para. No. 2.1053 - Field Strength of Spurious Radiation**



**Para. No. 2.1055 - Frequency Stability**

