



**Nemko Test Report:** 131640-6

**Applicant:** TEKO Telecom S.p.A.  
Via Meucci, 24/a  
I-40024 Castel S. Pietro Terme (BO)

**Equipment Under Test:  
(E.U.T.)** TRU8A19AWWV/AC-WS  
( + Master Unit composed by:  
SUB-TRX+TPSU/AC+TPSU/48+TSPV-R+TTTC4W-S)

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

**Tested By:** Nemko Italy S.p.A..  
Via Carroccio, 4  
I-20046 Biassono (Italy)

**G. Curioni**

**TESTED BY:** \_\_\_\_\_ *Curioni G* **DATE:** 18-25 September, 2009

*Barbieri P*  
**P. Barbieri**

**APPROVED BY:** \_\_\_\_\_ **DATE:** 28 September, 2009


**Table of Contents**

<b>SECTION 1.</b>	<b>SUMMARY OF TEST RESULTS</b>	<b>3</b>
<b>SECTION 2.</b>	<b>GENERAL EQUIPMENT SPECIFICATION</b>	<b>5</b>
<b>SECTION 3.</b>	<b>RF POWER OUTPUT</b>	<b>6</b>
<b>SECTION 4.</b>	<b>OCCUPIED BANDWIDTH</b>	<b>13</b>
<b>SECTION 5.</b>	<b>SPURIOUS EMISSIONS AT ANTENNA TERMINALS</b>	<b>30</b>
<b>SECTION 6.</b>	<b>FIELD STRENGTH OF SPURIOUS</b>	<b>59</b>
<b>SECTION 7.</b>	<b>FILTER FREQUENCY RESPONSE</b>	<b>6159</b>
<b>SECTION 8.</b>	<b>TEST EQUIPMENT LIST</b>	<b>63</b>
<b>SECTION 9.</b>	<b>PHOTOS</b>	<b>655</b>
<b>ANNEX A - TEST DETAILS</b>		<b>70</b>
<b>ANNEX B - TEST DIAGRAMS</b>		<b>766</b>

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

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**Section 1. Summary of Test Results**

Manufacturer: TEKO Telecom   
Model No.: TRU8A19AWWV/AC-WS  
Serial No.: 090379001

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.

- |                                     |                            |                                     |                     |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission             | <input checked="" type="checkbox"/> | Production Unit     |
| <input type="checkbox"/>            | Class II Permissive Change | <input type="checkbox"/>            | 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**

<b>NAME OF TEST</b>	<b>PARA. NO.</b>	<b>SPEC.</b>	<b>RESULT</b>
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 erp	Complies
Frequency Stability	24.235		NA

**Footnotes For N/A's:**

Frequency Stability testing was not performed since the E.U.T. does not contain modulation circuitry.

**Section 2. General Equipment Specification**

<b>Supply Voltage Input:</b>	120 Vac		
<b>Frequency Range:</b>	<b>Downlink:</b>	1930 to 1995 MHz	
<b>Frequency Range:</b>	<b>Uplink:</b>	1850 to 1915 MHz	
<b>Type of Modulation and Designator:</b>	<b>CDMA (G7W)</b> <input checked="" type="checkbox"/>	<b>GSM (GXW)</b> <input checked="" type="checkbox"/>	<b>EDGE (G7W)</b> <input checked="" type="checkbox"/>
			<b>W-CDMA (G7W)</b> <input checked="" type="checkbox"/>
<b>Output Impedance:</b>	50 ohms		
<b>RF Output (Rated):</b>	<b>Downlink:</b>	20 W 43 dBm	
	<b>Uplink:</b>	0.0025 W typical 4 dBm typical	
<b>Gain:</b>	<b>Downlink:</b>	48 dB	
	<b>Uplink:</b>	47 dB	
<b>Frequency Translation:</b>	<b>F1-F1</b> <input type="checkbox"/>	<b>F1-F2</b> <input type="checkbox"/>	<b>N/A</b> <input checked="" type="checkbox"/>
<b>Band Selection:</b>	<b>Software</b> <input type="checkbox"/>	<b>Duplexer Change</b> <input type="checkbox"/>	<b>Fullband Coverage</b> <input checked="" type="checkbox"/>

**Description of EUT**

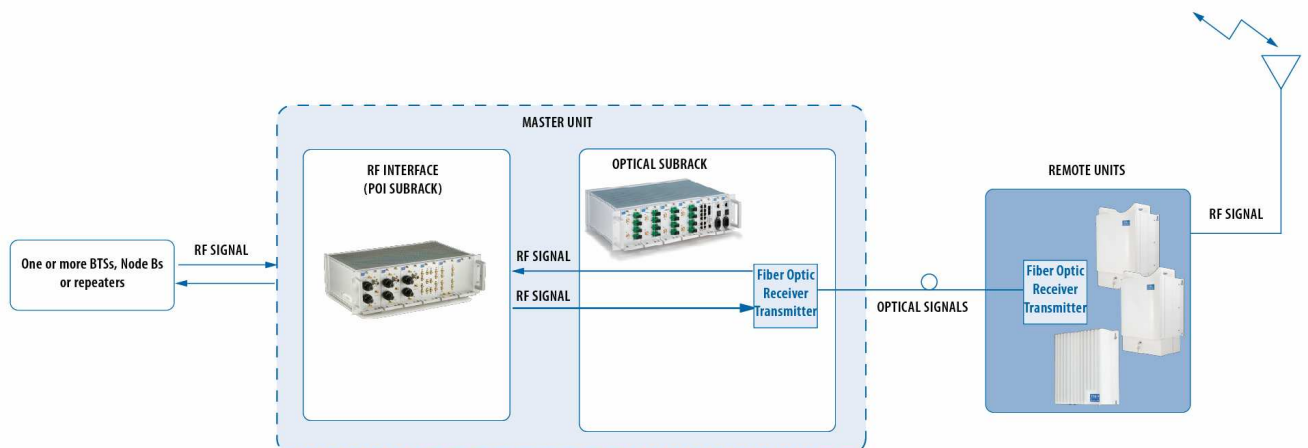
The EUT is a very high power multi-operator optical Remote Unit. It is used in conjunction with a Master Unit in the optical distribution system.

The EUT is a tri-band system; it is able to transport a wide frequency range simultaneously (AMPS, PCS and AWS bands). Single amplifier modules can be combined each other to obtain the following equipment:

<i>Commercial name</i>	<i>Description</i>	
<b>REMOTE UNIT VERY HIGH POWER</b>		
<b>TRUxxxxxcV/zz-kkkj-r</b>	<b>TRU</b>	Teko Telecom Remote Unit
	<b>xxxxx =</b>	<b>Operating band:</b> 7S: SMR700 (UL: 698-716+776-787MHz) DL: 728-757MHz) 7P: Public Safety 700 (DL: 763-775MHz; UL: 793-805MHz) 8S: SMR800 (DL: 851-869MHz; UL: 806-824MHz) 8A: AMPS (DL: 869-894MHz; UL: 824-849MHz) 9S: SMR900 (DL: 935-941MHz; UL: 896-902MHz) 19: PCS1900 (DL: 1930-1995MHz; UL: 1850-1915MHz) AW: AWS2100 (DL: 2110-2155MHz; UL: 1710-1755MHz)  <i>and combination of these</i>
	<b>c =</b>	<b>RF Connector:</b> W: wideband D: duplexed B: bi duplexed N: no duplexed S: single connector
	<b>V =</b>	Very high power
	<b>zz =</b>	<b>Power supply:</b> AC: 85-264Vac, 50-60Hz

	<p>kkk =</p>	<p><b>Laser version:</b></p> <p>Without option: NO WDM</p> <p>Termocontrolled laser version:                  W21: <math>\lambda = 1560,61\text{nm}</math>                  W23: <math>\lambda = 1558,98\text{nm}</math>                  W25: <math>\lambda = 1557,36\text{nm}</math>                  W27: <math>\lambda = 1555,75\text{nm}</math>                  W29: <math>\lambda = 1554,13\text{nm}</math>                  W31: <math>\lambda = 1552,52\text{nm}</math>                  W: <math>\lambda = 1550,92\text{nm}</math>                  W35: <math>\lambda = 1549,32\text{nm}</math>                  W37: <math>\lambda = 1547,72\text{nm}</math></p> <p>No termocontrolled laser version:                  M11: <math>\lambda = 1470 \pm 3 \text{ nm}</math>                  M12: <math>\lambda = 1490 \pm 3 \text{ nm}</math>                  M13: <math>\lambda = 1510 \pm 3 \text{ nm}</math>                  M14: <math>\lambda = 1530 \pm 3 \text{ nm}</math>                  W: <math>\lambda = 1550 \pm 3 \text{ nm}</math>                  M16: <math>\lambda = 1570 \pm 3 \text{ nm}</math>                  M17: <math>\lambda = 1590 \pm 3 \text{ nm}</math>                  M18: <math>\lambda = 1610 \pm 3 \text{ nm}</math></p>
	<p>j =</p>	<p><b>Optical connector:</b></p> <p>S: SC-APC                  E: E-2000</p>
	<p>r =</p>	<p><b>Redundancy:</b></p> <p>Without option: NO redundancy</p> <p>1: Power Supply                  2: HPA                  3: Optical Module                  4: Power Supply + HPA                  5: Power Supply + Optical Module                  6: HPA + Optical Module                  7: Power Supply + Optical Module + HPA</p>

System Diagram



**Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 24.232
TESTED BY: G. Curioni	DATE: 23 September 2009

**Test Results:** Complies.

**Measurement Data:**

Direction	Modulation	Output per Channel (dBm)	Output per Channel Power (W)
Uplink	CDMA	4,40	0.0027
Downlink	CDMA	43,59	22
Uplink	EDGE	4,33	0.0027
Downlink	EDGE	43,30	21
Uplink	GSM	4,77	0.0029
Downlink	GSM	43,11	20
Uplink	W-CDMA	4,43	0.0028
Downlink	W-CDMA	43,37	21

**Equipment Used:** 1 – 2 – 3b - 4

**Measurement Uncertainty:** +/- 1.9 dB

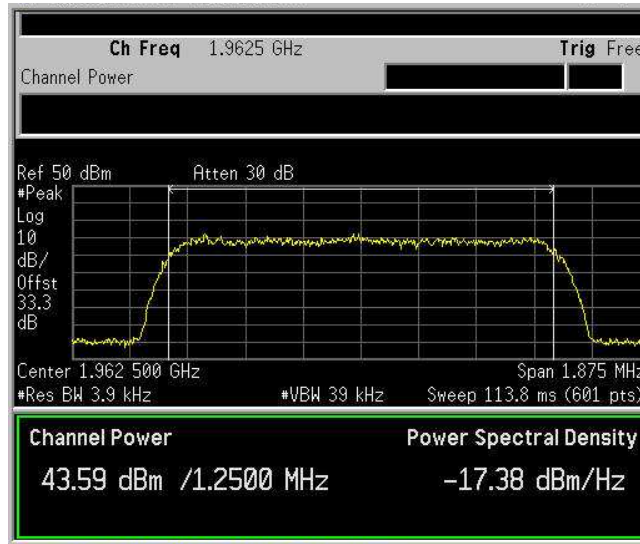
**Temperature:** 24 °C

**Relative Humidity:** 50 %

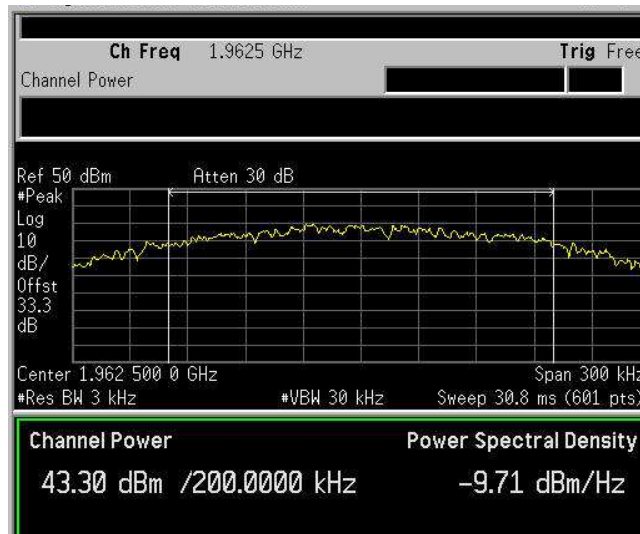


EQUIPMENT: | TRU8A19AWWV/AC-WS

RF Power Output D.L. mod. CDMA

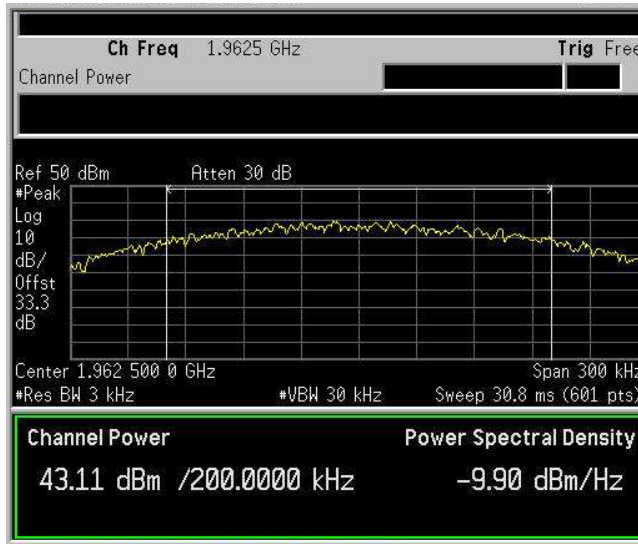


RF Power Output D.L. mod. EDGE

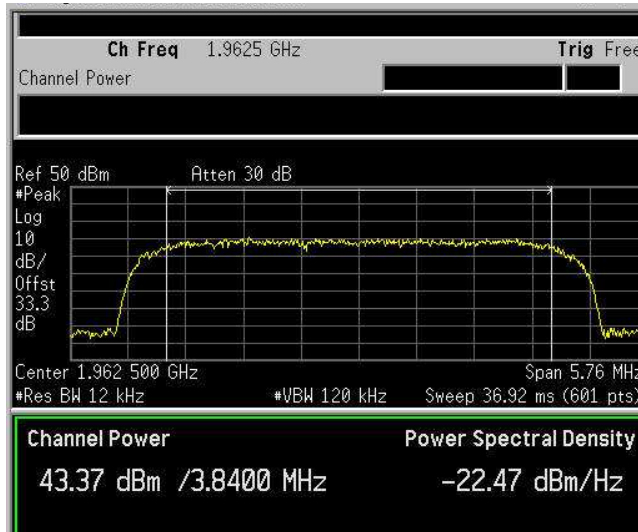


EQUIPMENT: | TRU8A19AWWV/AC-WS

RF Power Output D.L. mod. GSM

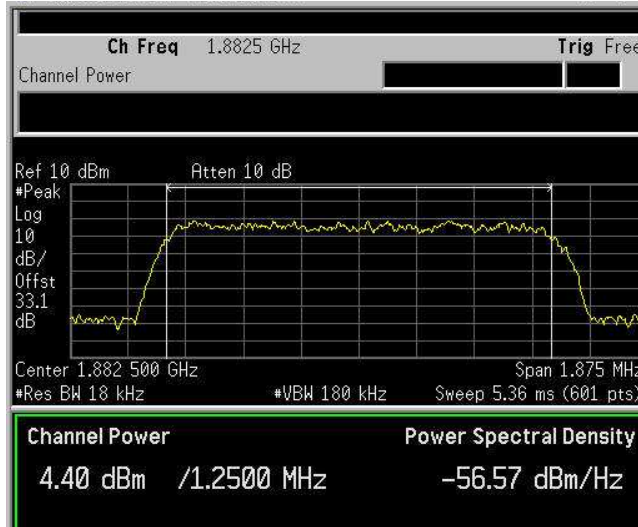


RF Power Output D.L. mod. WCDMA



EQUIPMENT: | TRU8A19AWWV/AC-WS

RF Power Output U.L. mod. CDMA

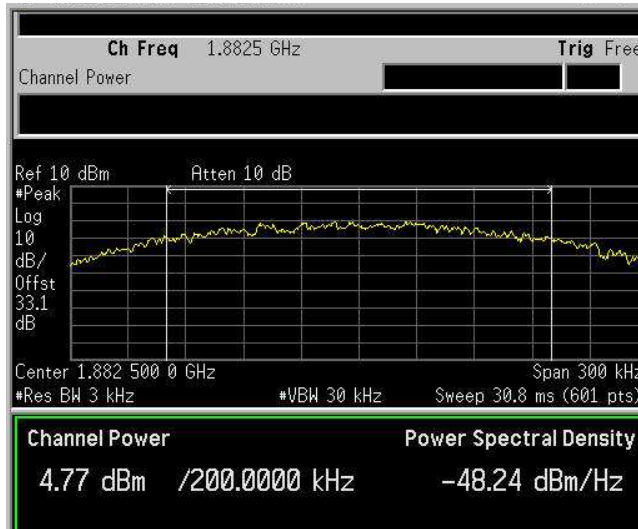


RF Power Output U.L. mod. EDGE

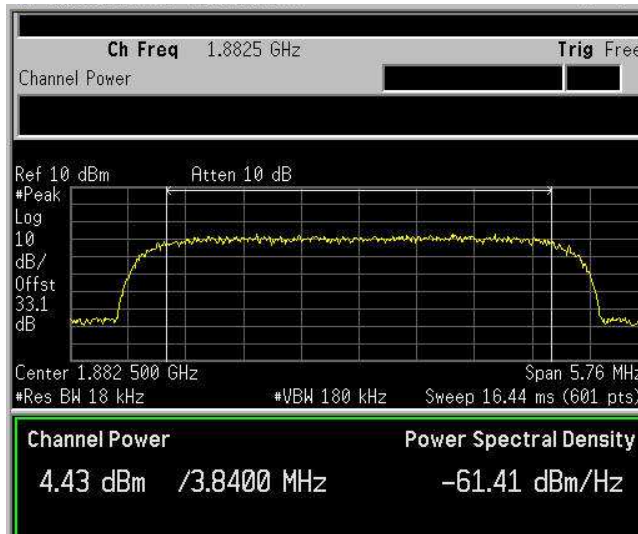


EQUIPMENT: | TRU8A19AWWV/AC-WS

RF Power Output U.L. mod. GSM



RF Power Output U.L. mod. WCDMA



**EQUIPMENT: | TRU8A19AWWV/AC-WS**

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**Section 4. Occupied Bandwidth**

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 24.238
TESTED BY: G. Curioni	DATE:23 September 2009

**Test Results:** Complies.

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

**Equipment Used:** 1 – 2 – 3b - 4

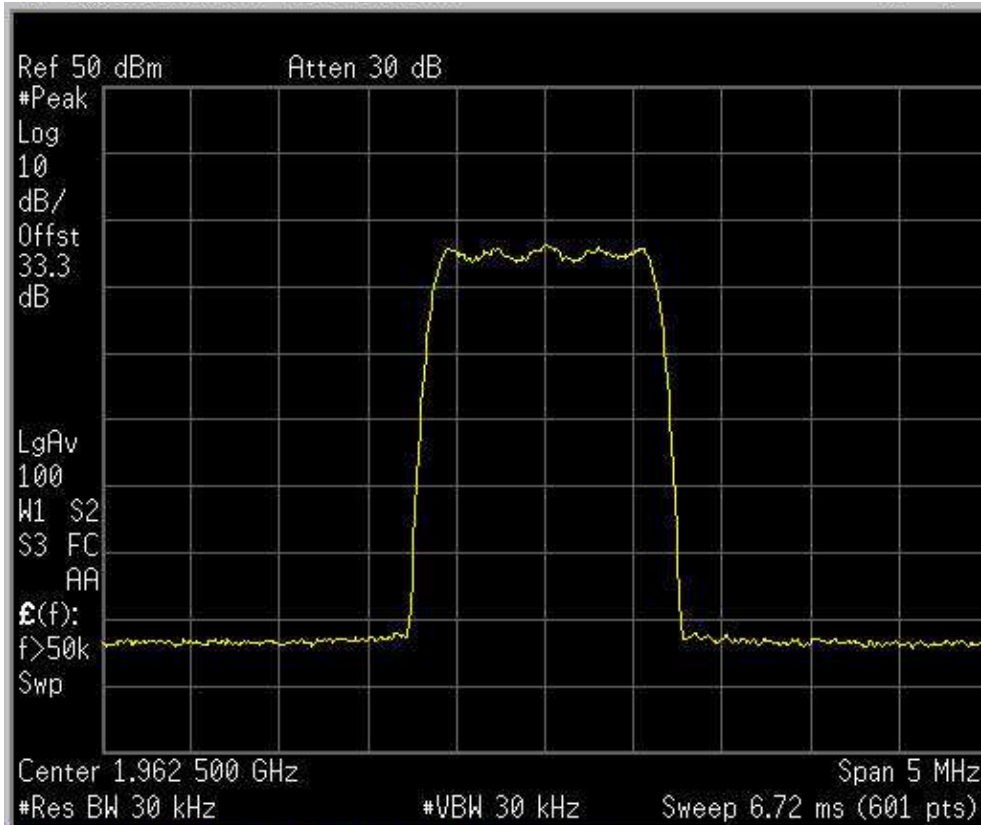
**Measurement Uncertainty:** 1X10<sup>-7</sup>

**Temperature:** 24 °C

**Relative Humidity:** 50 %

EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth  
CDMA – Output  
Downlink

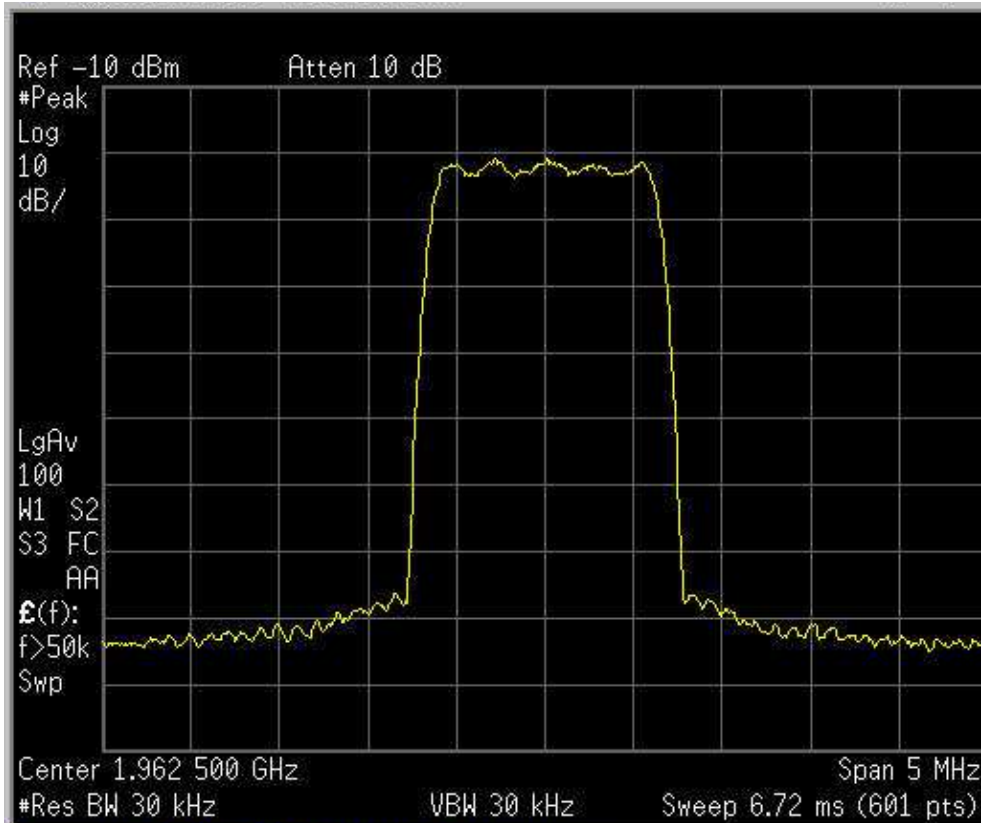


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

CDMA – Input

Downlink

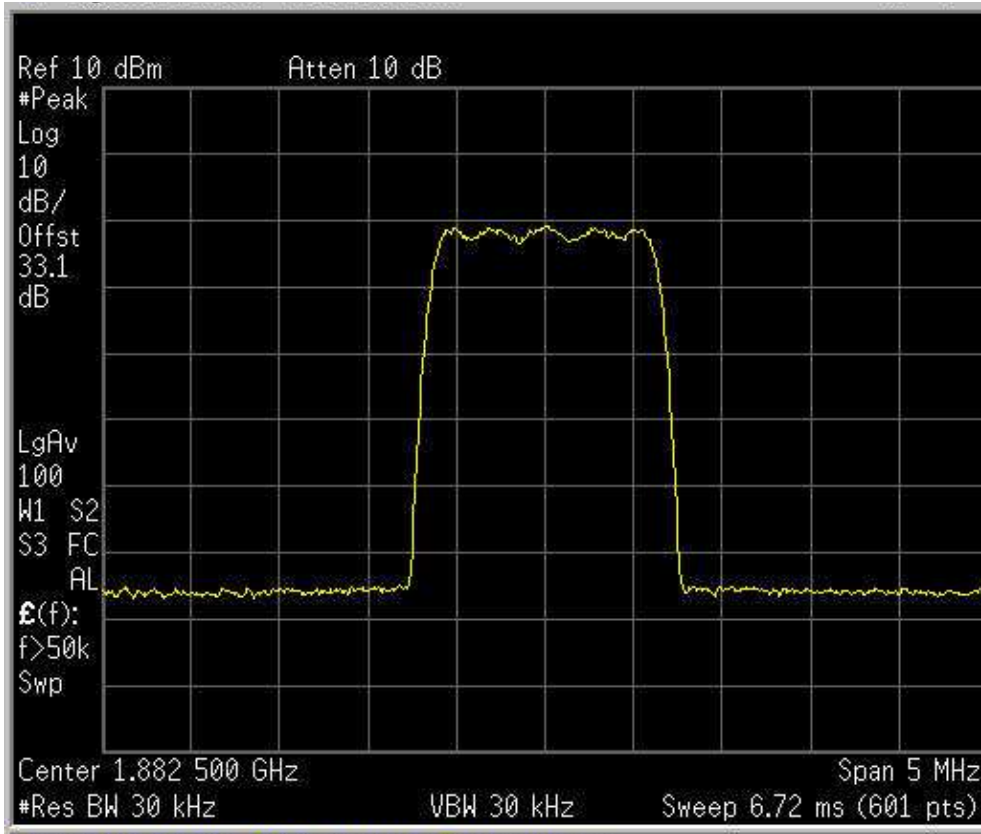


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

CDMA – Output

Uplink



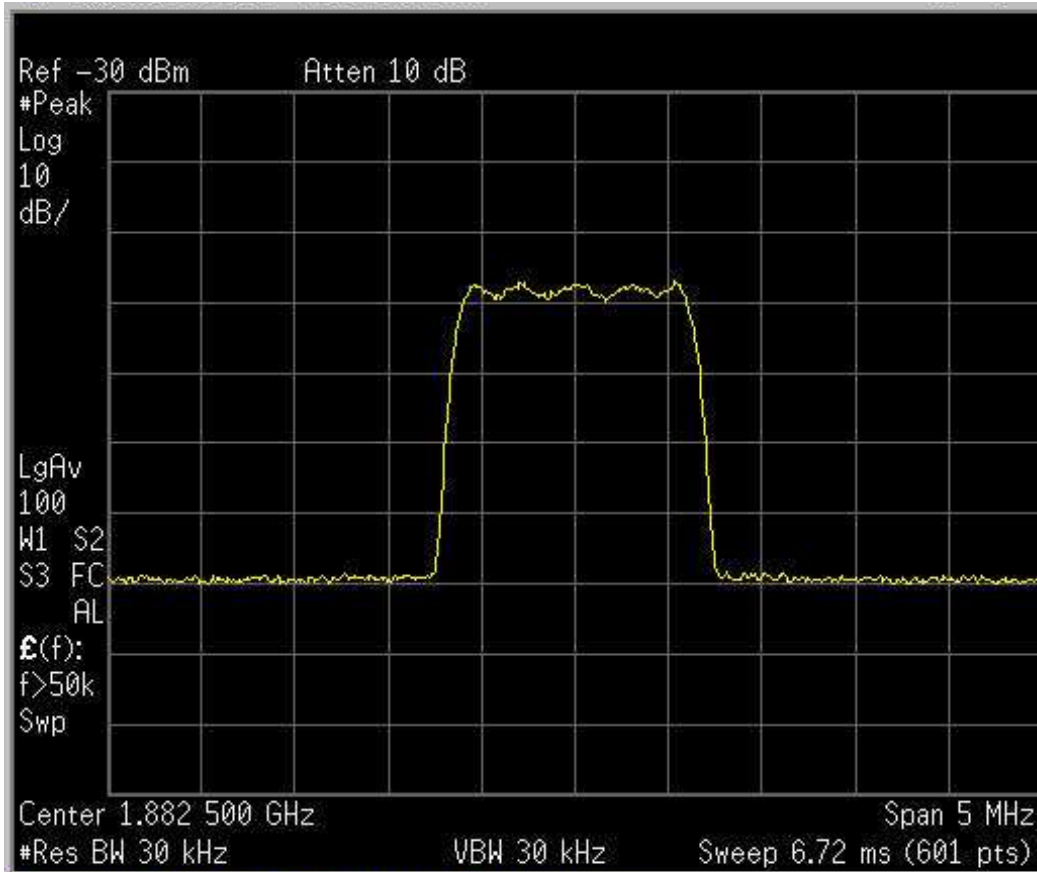


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

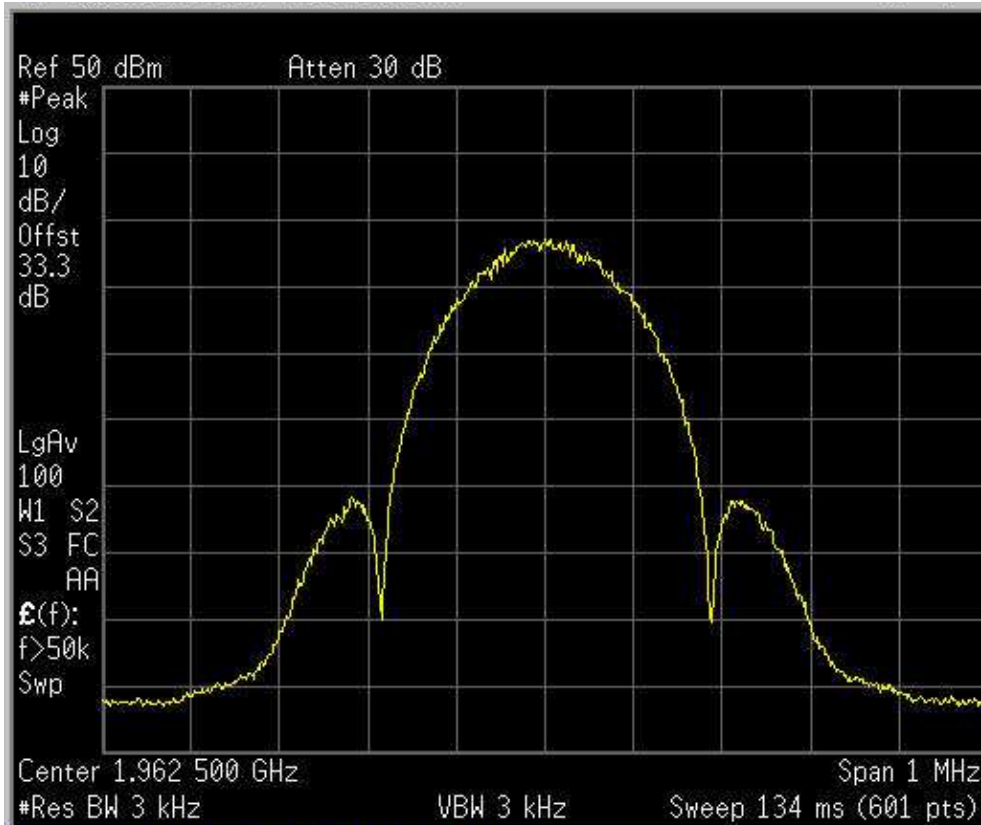
CDMA – Input

Uplink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth  
EDGE – Output  
Downlink

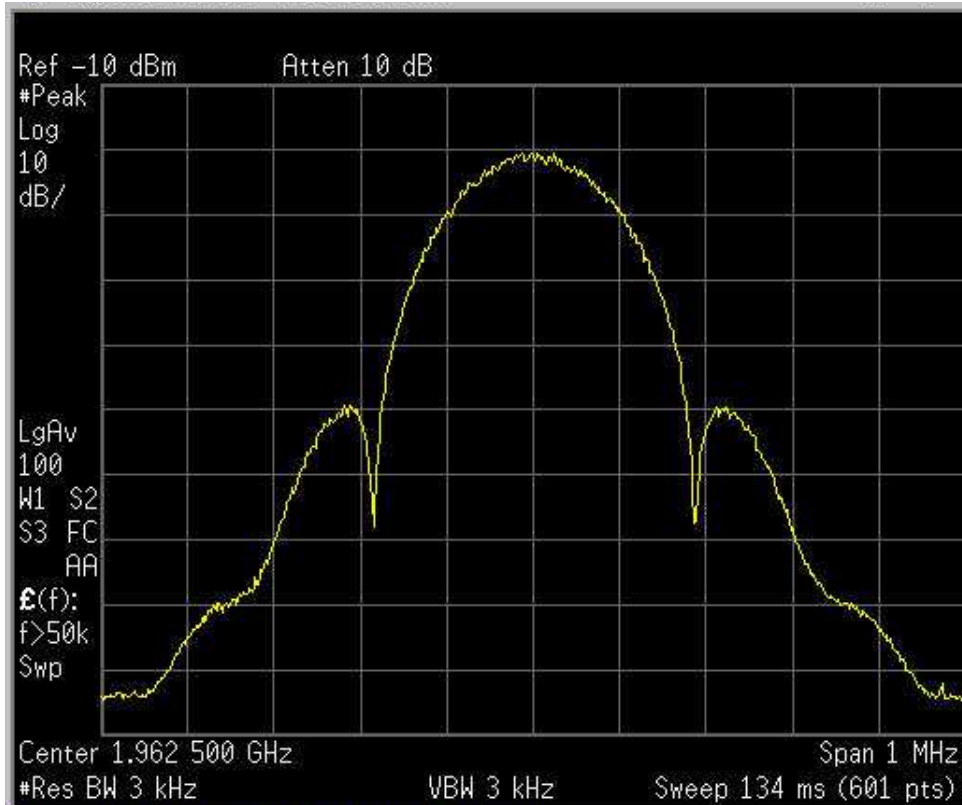


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

EDGE – Input

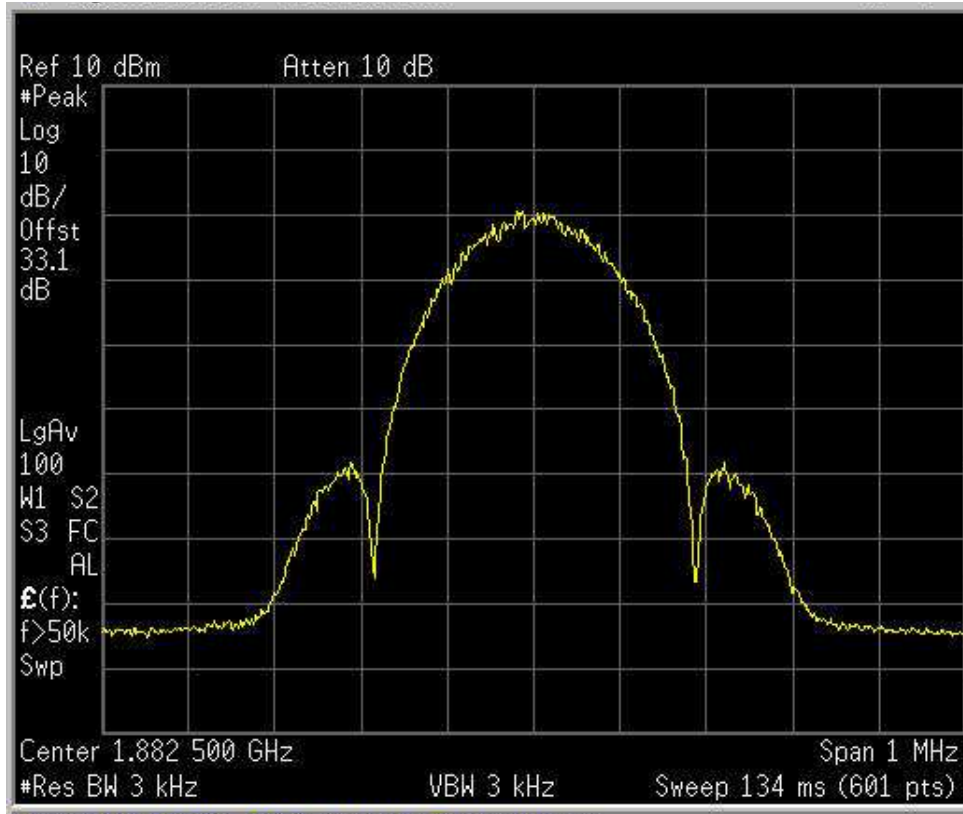
Downlink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

EDGE – Output  
Uplink

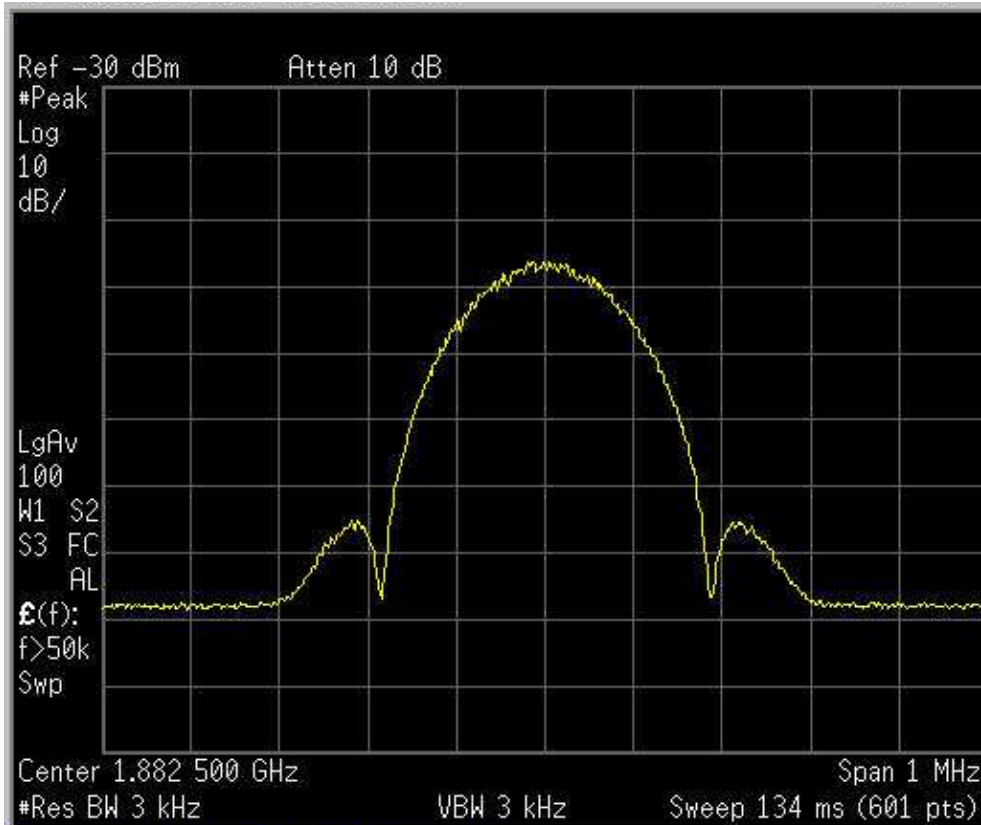


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

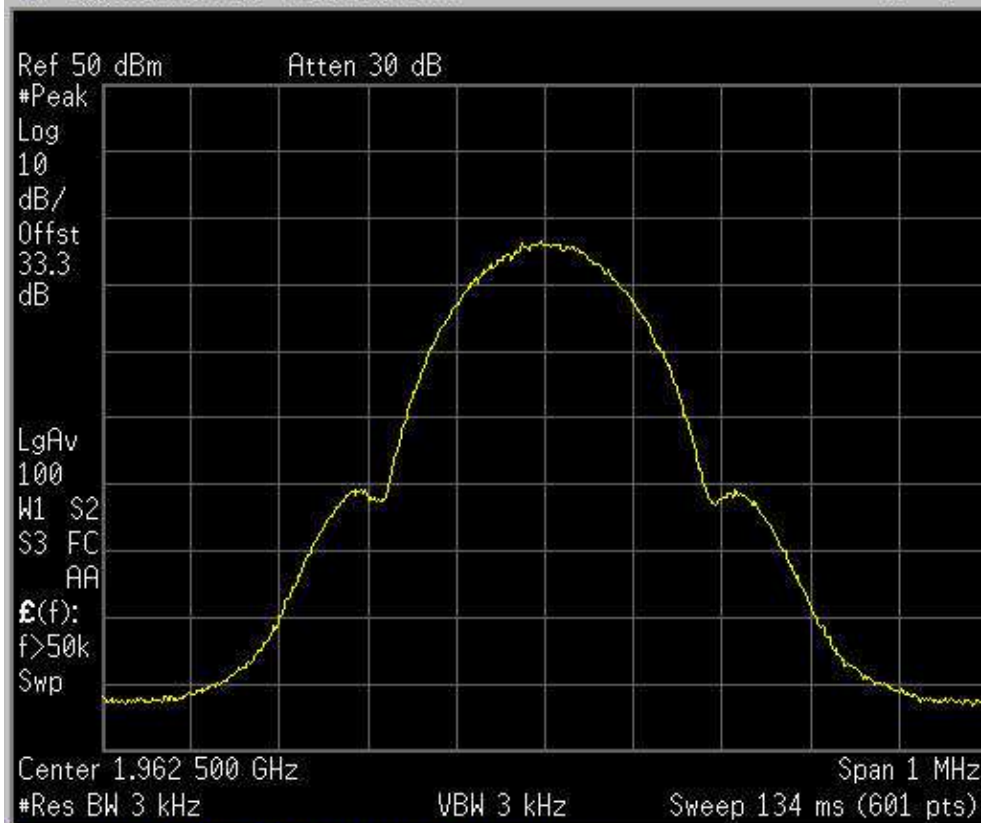
EDGE – Input

Uplink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth  
GSM – Output  
Downlink

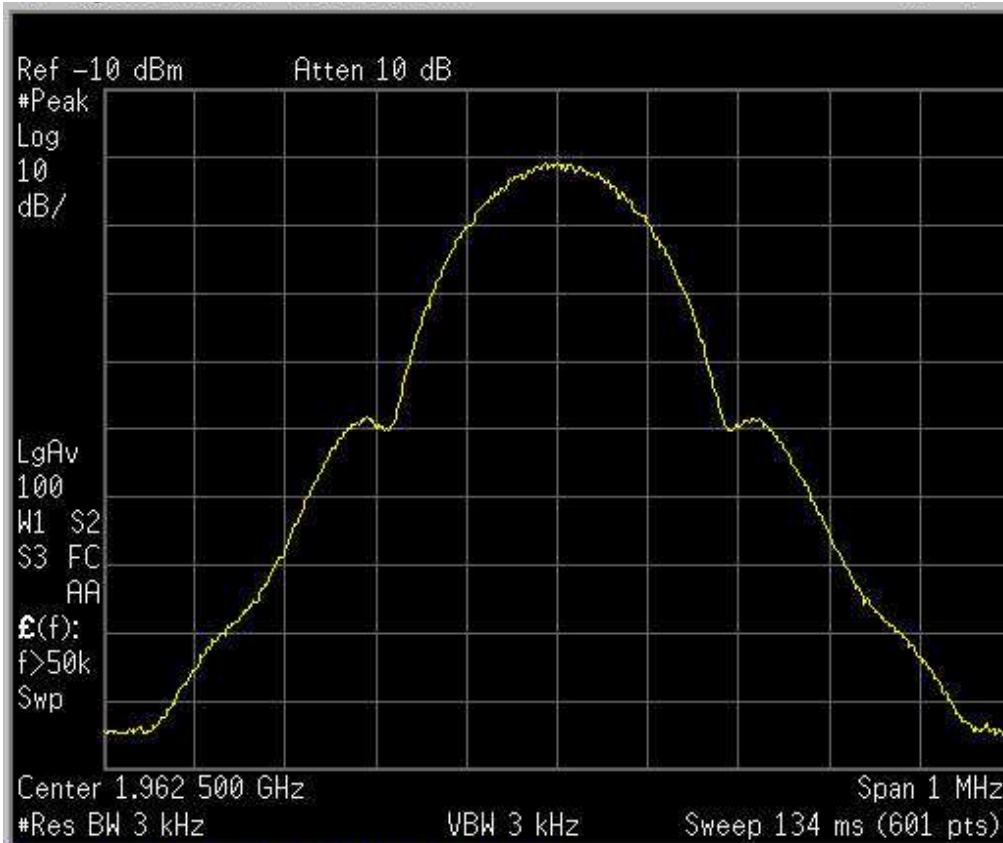


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

GSM – Input

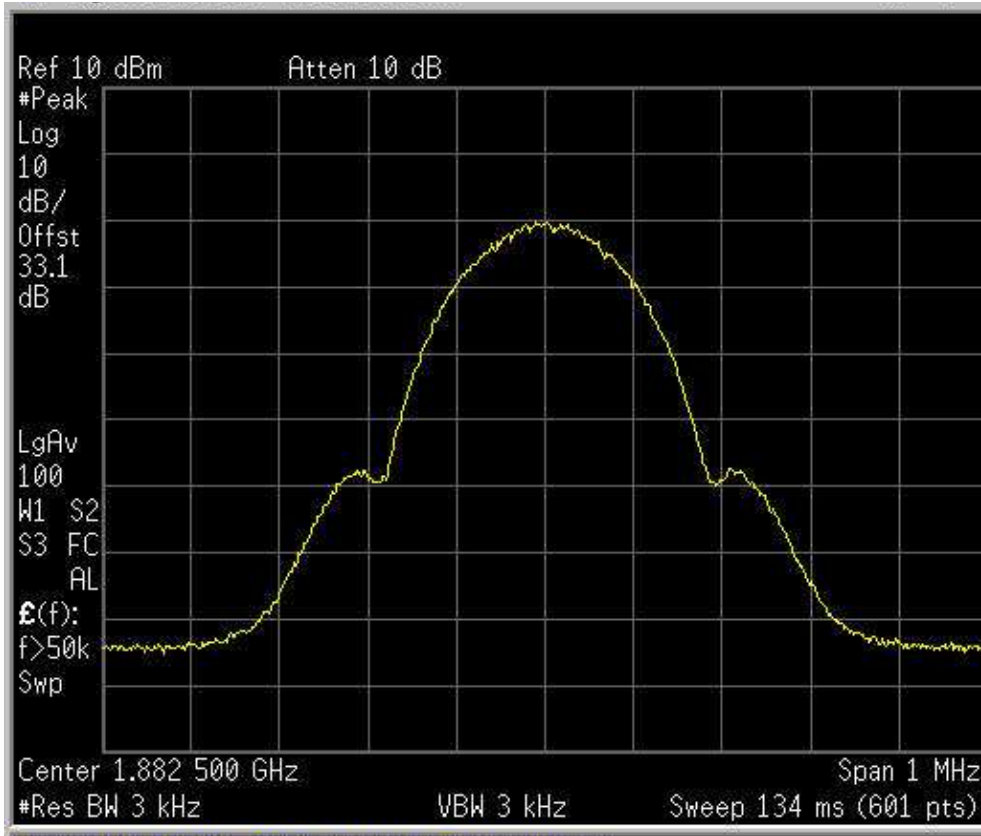
Downlink



**EQUIPMENT:** | TRU8A19AWWV/AC-WS

**Test Data – Occupied Bandwidth**

GSM – Output  
Uplink



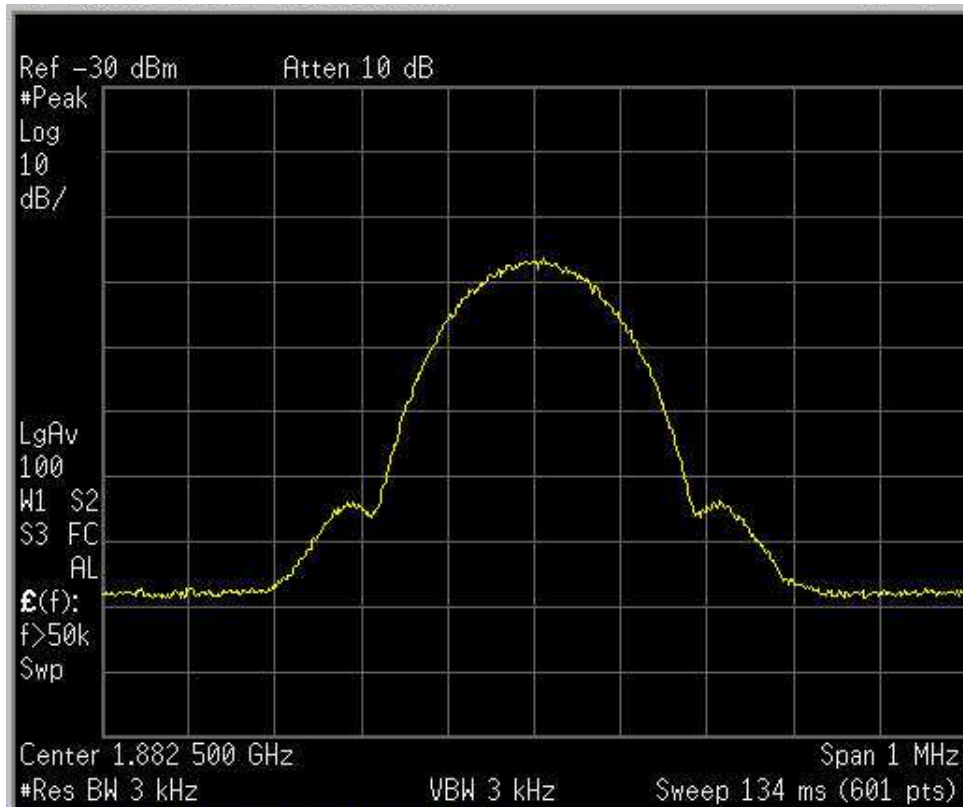


**EQUIPMENT: | TRU8A19AWWV/AC-WS**

**Test Data – Occupied Bandwidth**

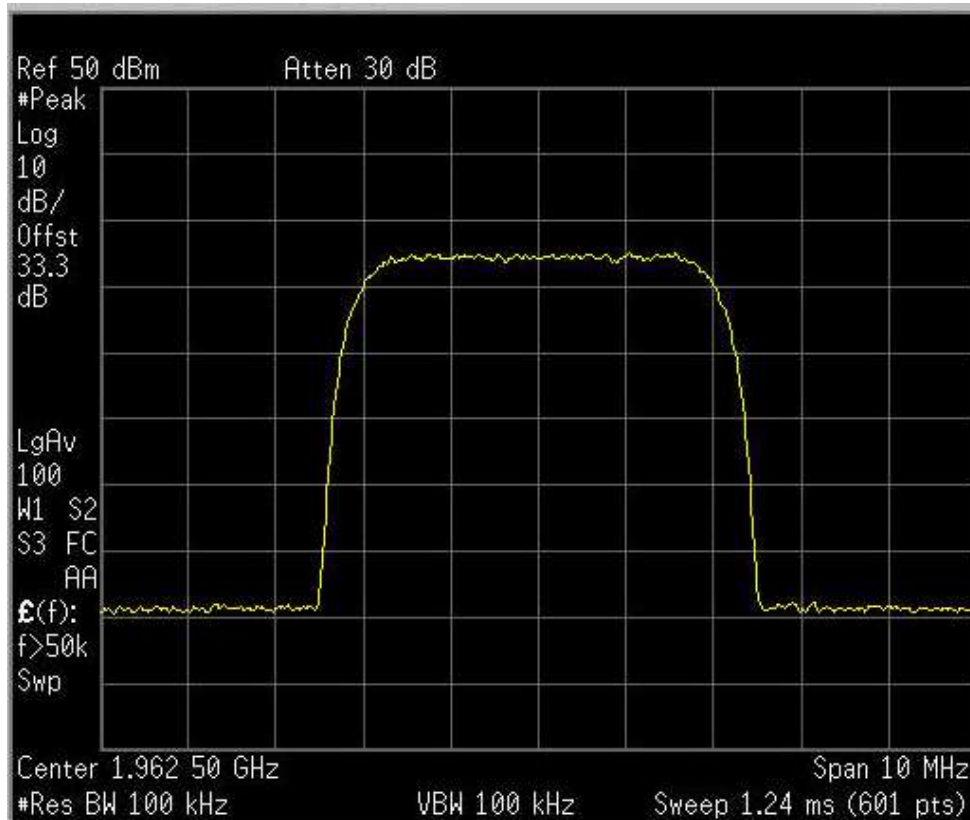
GSM – Input

Uplink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth  
W-CDMA – Output  
Downlink

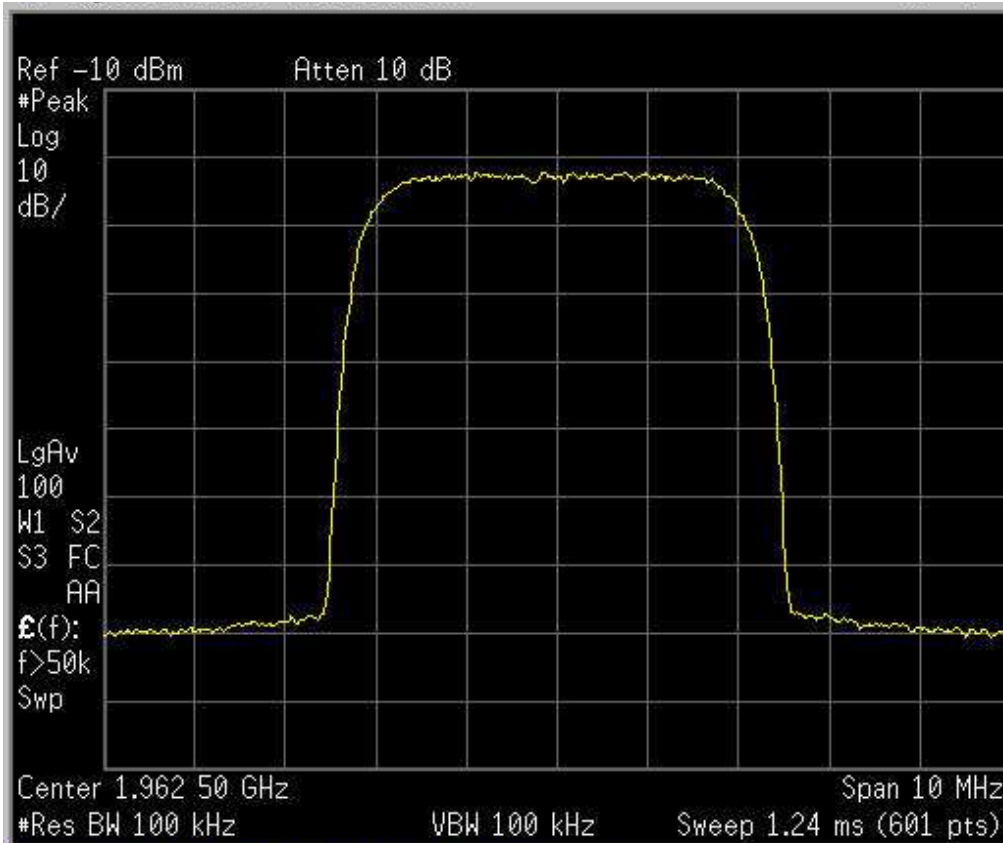


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

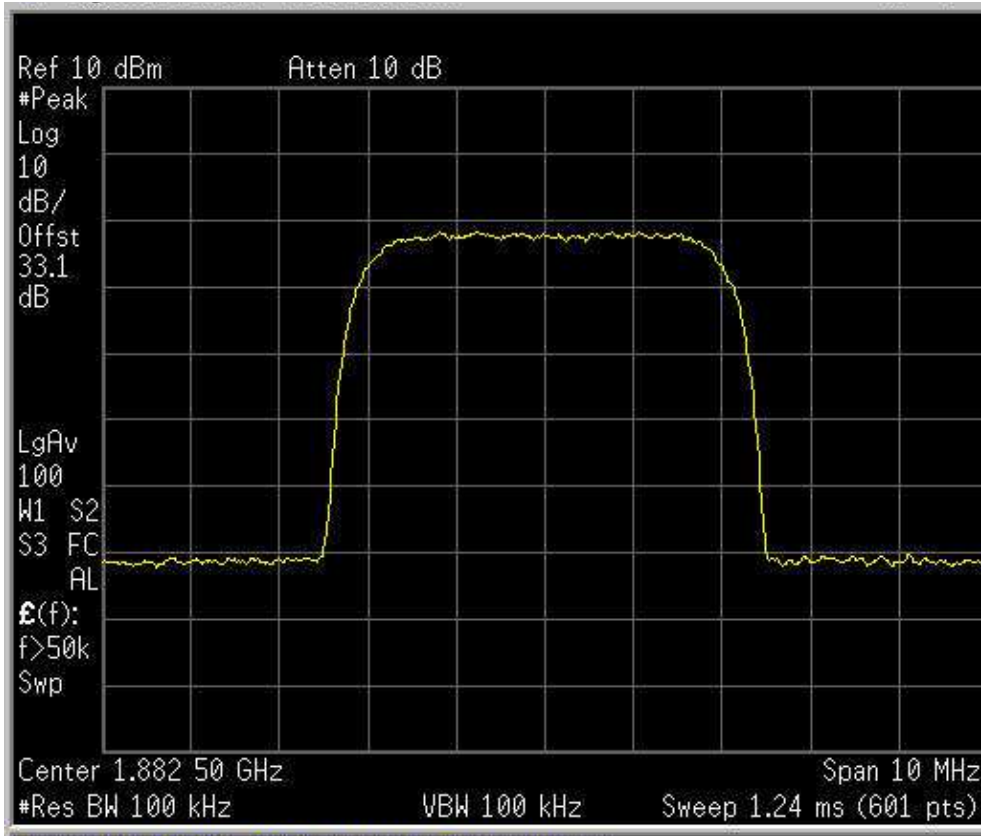
W-CDMA – Input

Downlink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth  
W-CDMA – Output  
Uplink

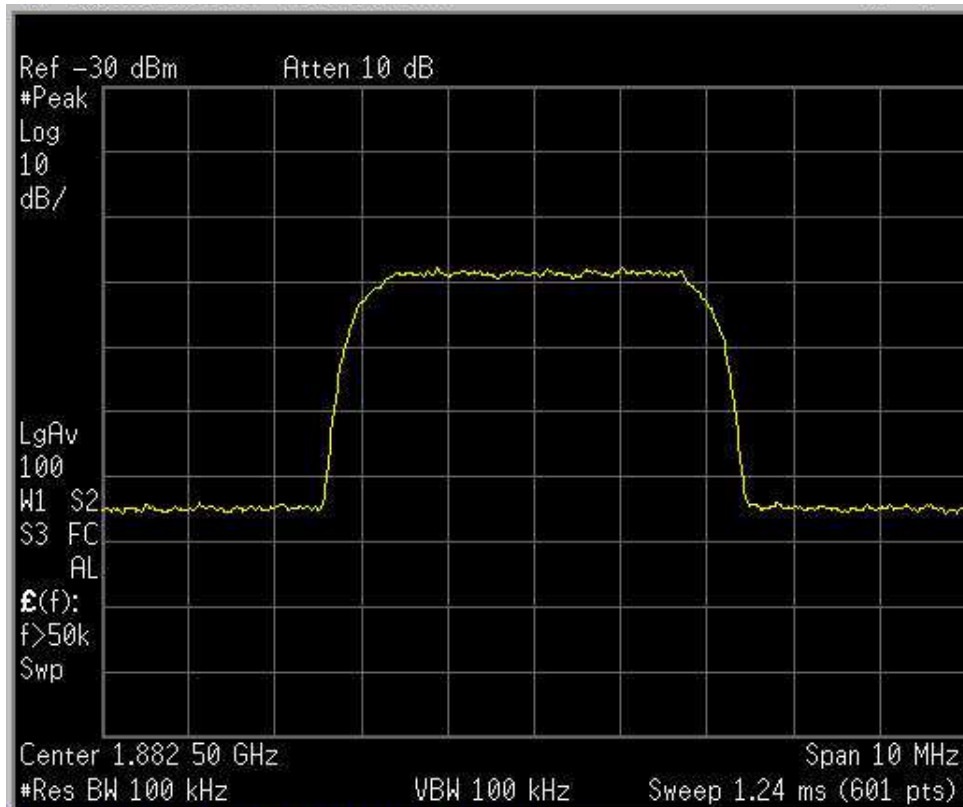


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Occupied Bandwidth

W-CDMA – Input

Uplink



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

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 24.238
TESTED BY: G. Curioni	DATE: 23 September 09

**Test Results:** Complies.

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

**Equipment Used:** 1 – 2 – 3b - 4

**Measurement Uncertainty:** +/- 1.9 dB

**Temperature:** 24 °C

**Relative Humidity:** 50 %

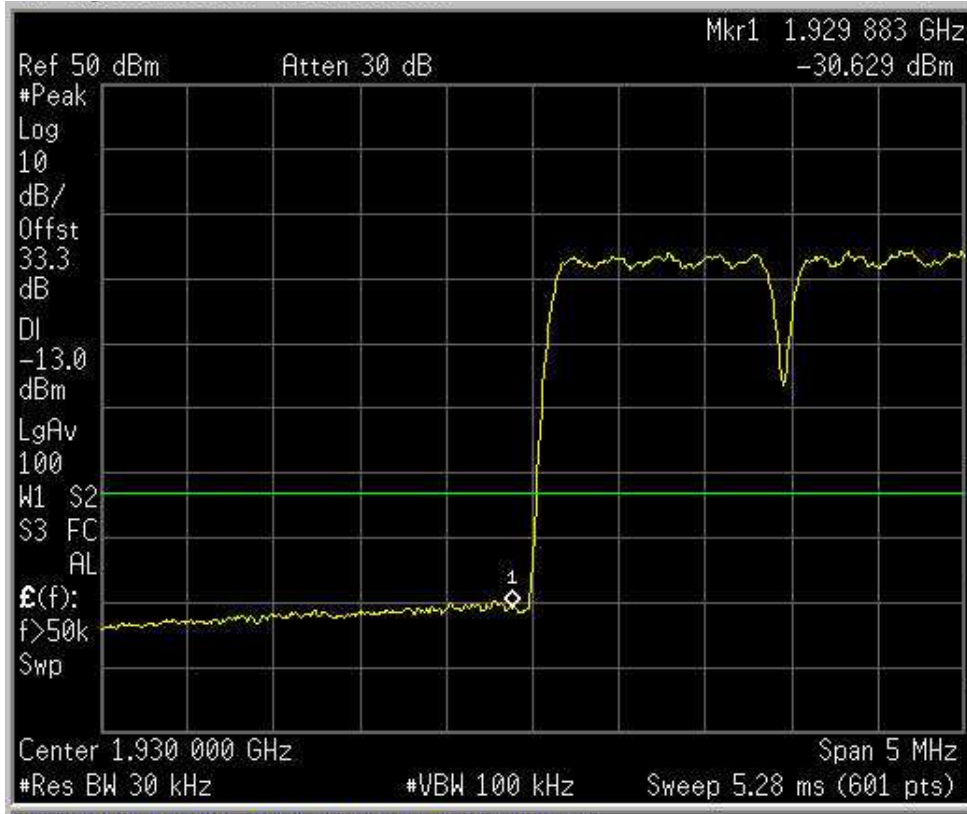
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

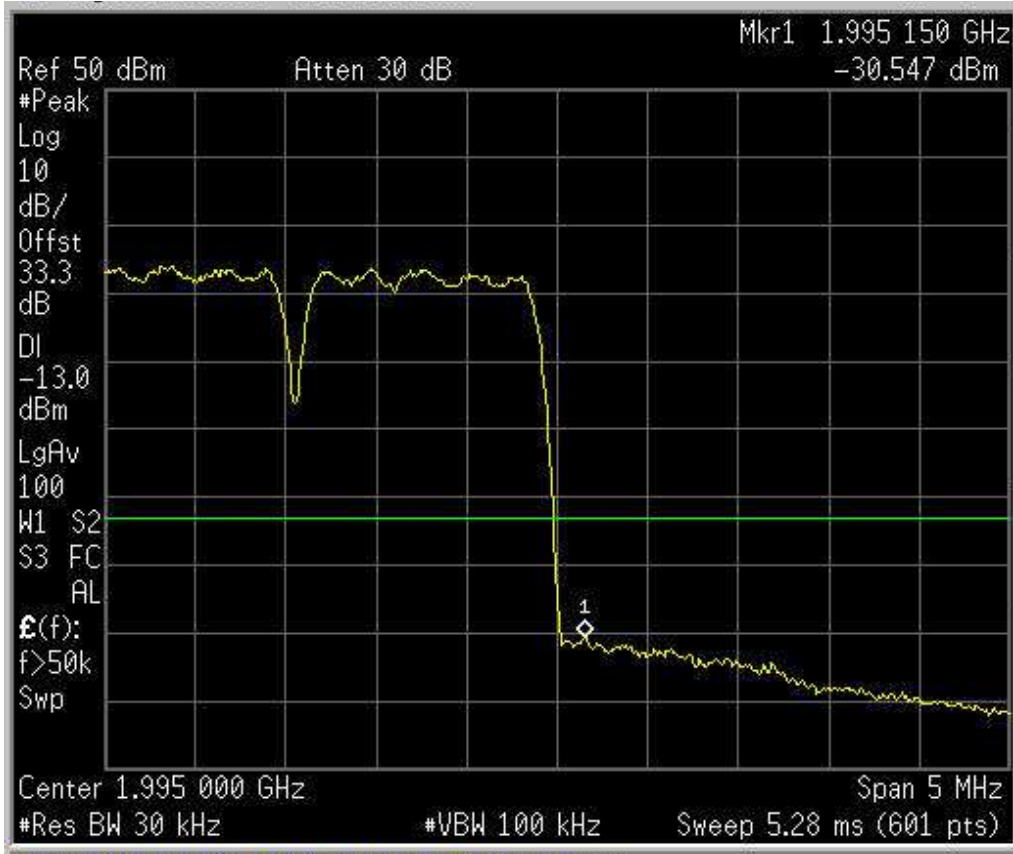
CDMA

Downlink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Upper Bandedge Intermodulation  
CDMA  
Downlink





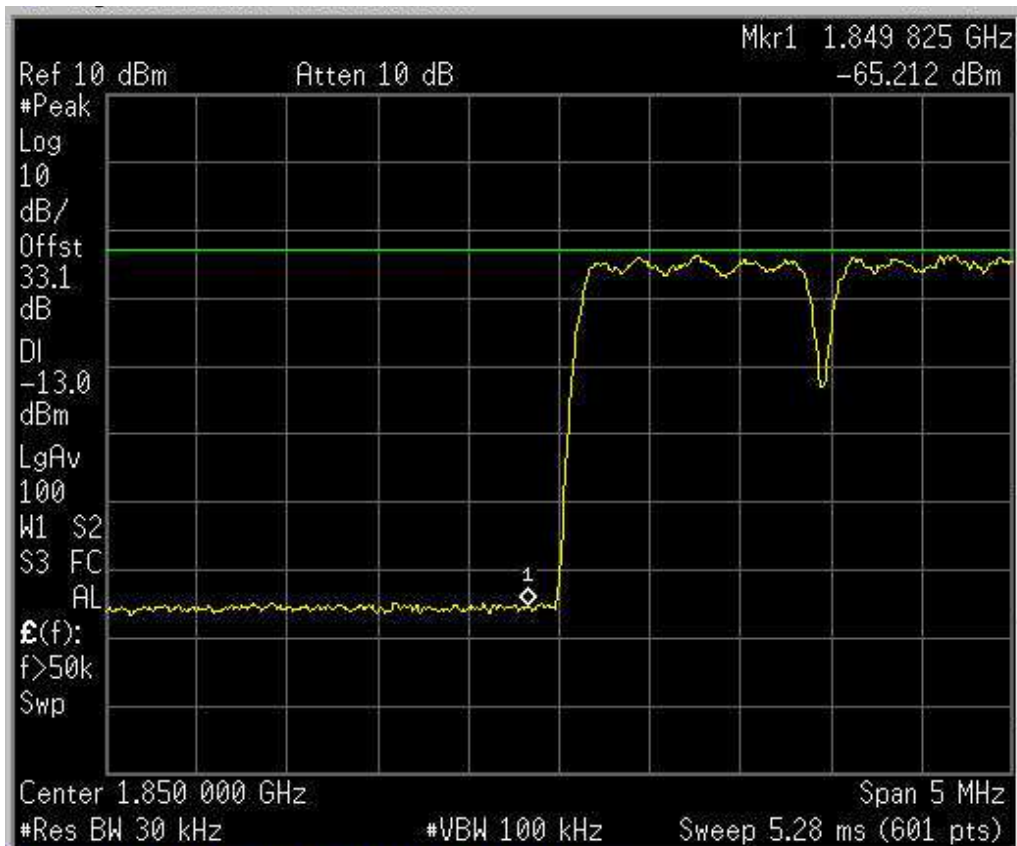
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

CDMA

Uplink



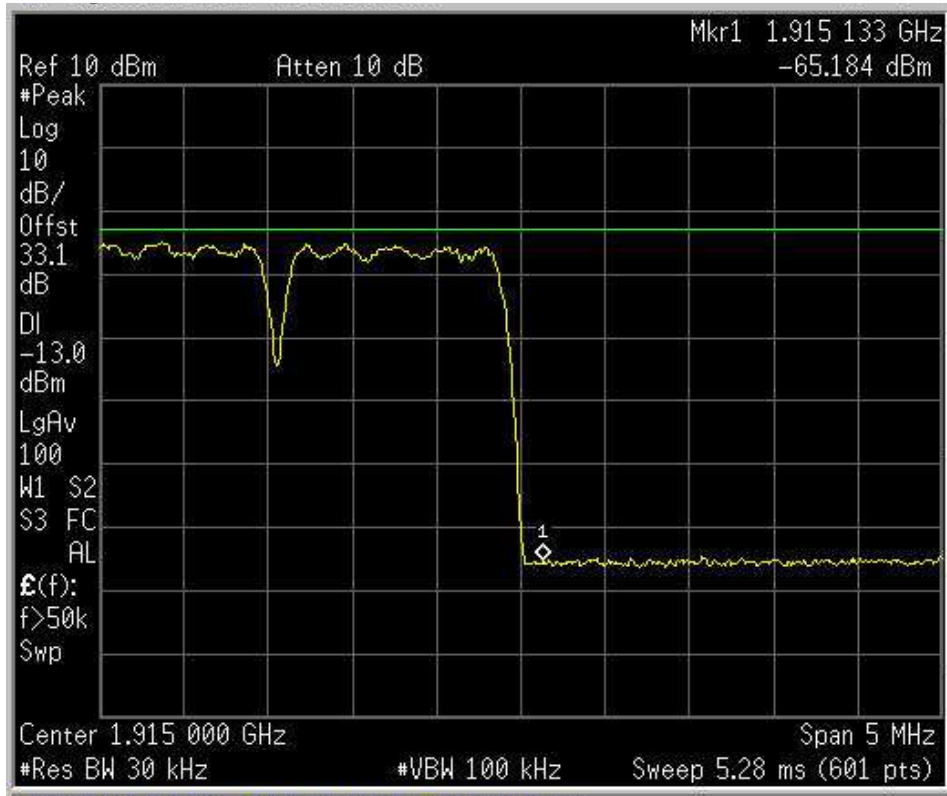
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

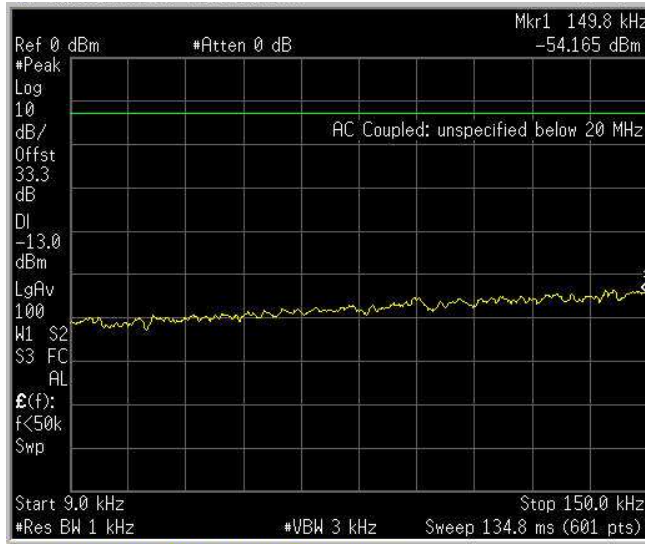
CDMA

Uplink

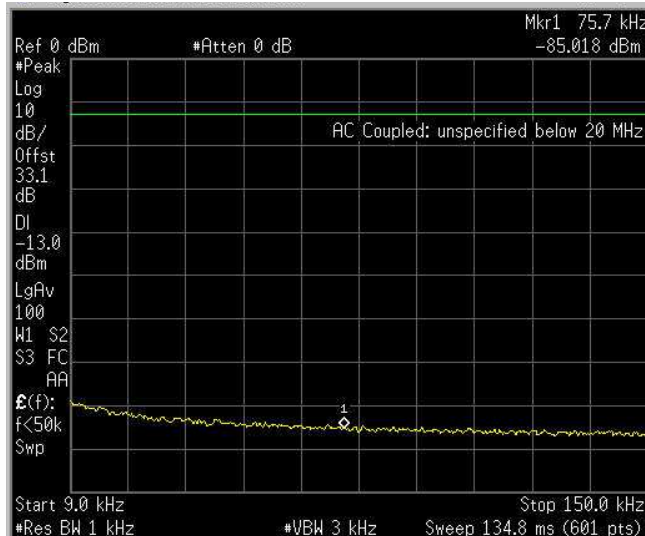


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Spurs – CDMA – Downlink 9 -150 kHz



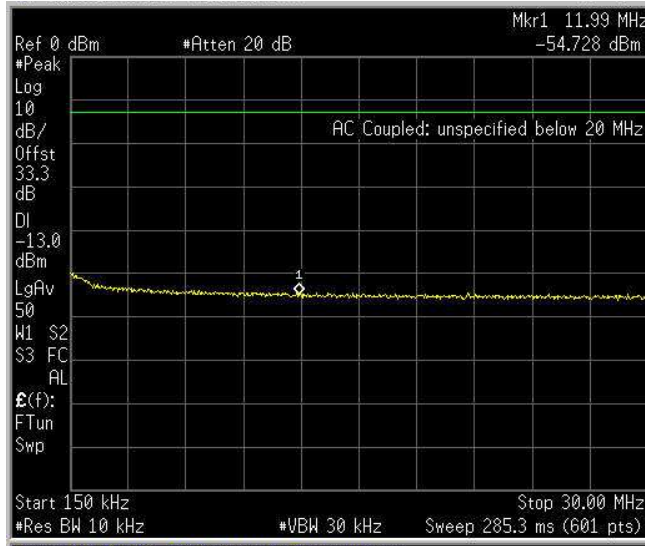
Spurs – CDMA – Uplink 9 -150 kHz



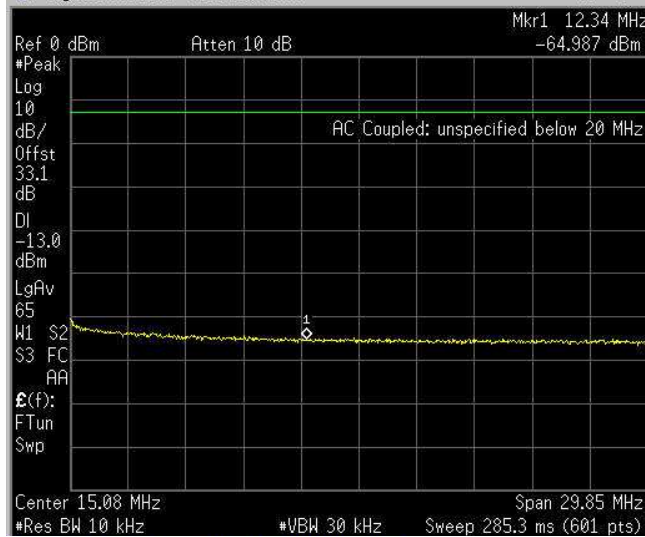
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA – Downlink 150 kHz – 30 MHz



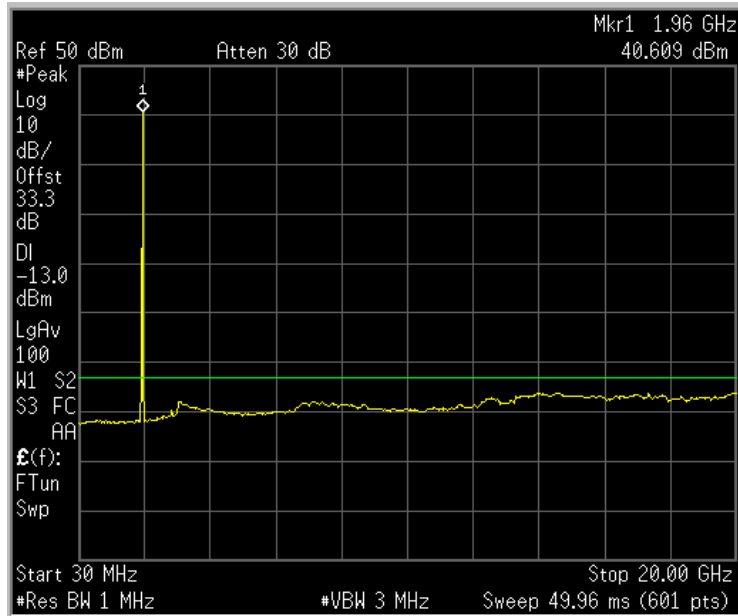
Spurs – CDMA – Uplink 150 kHz – 30 MHz



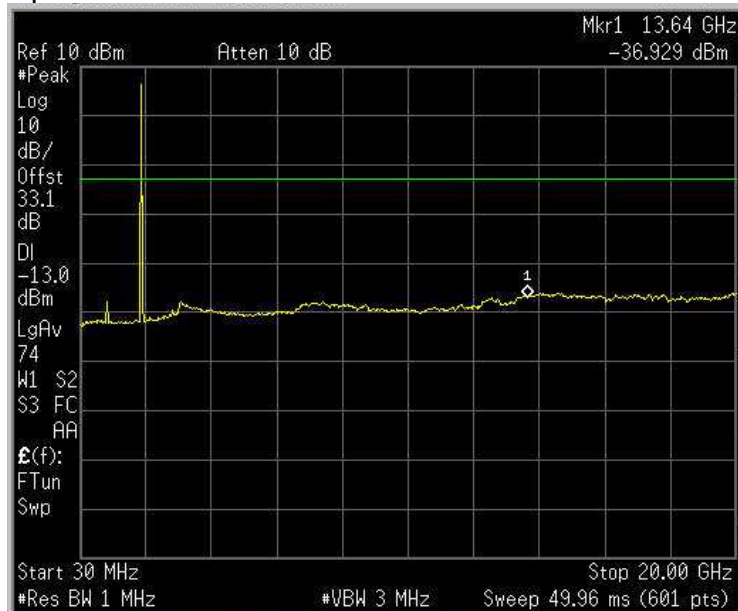
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA – Downlink 30 MHz – 20 GHz



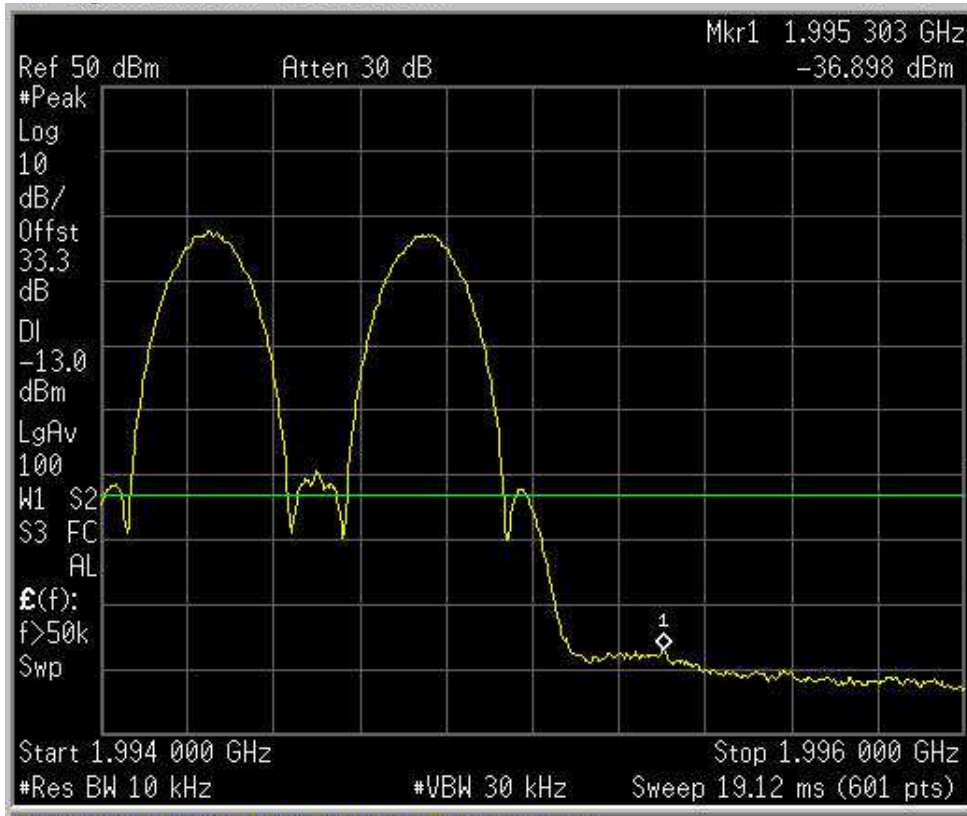
Spurs – CDMA – Uplink 30 MHz – 20 GHz





EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Upper Bandedge Intermodulation  
EDGE  
Downlink



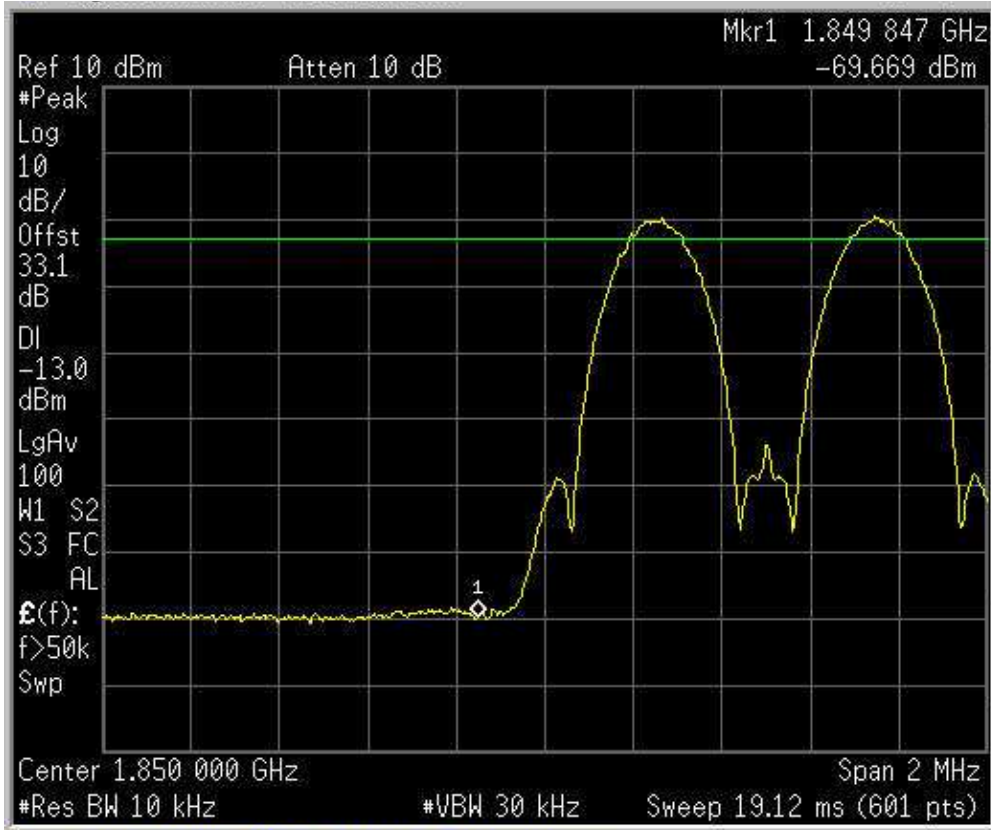
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

EDGE

Uplink





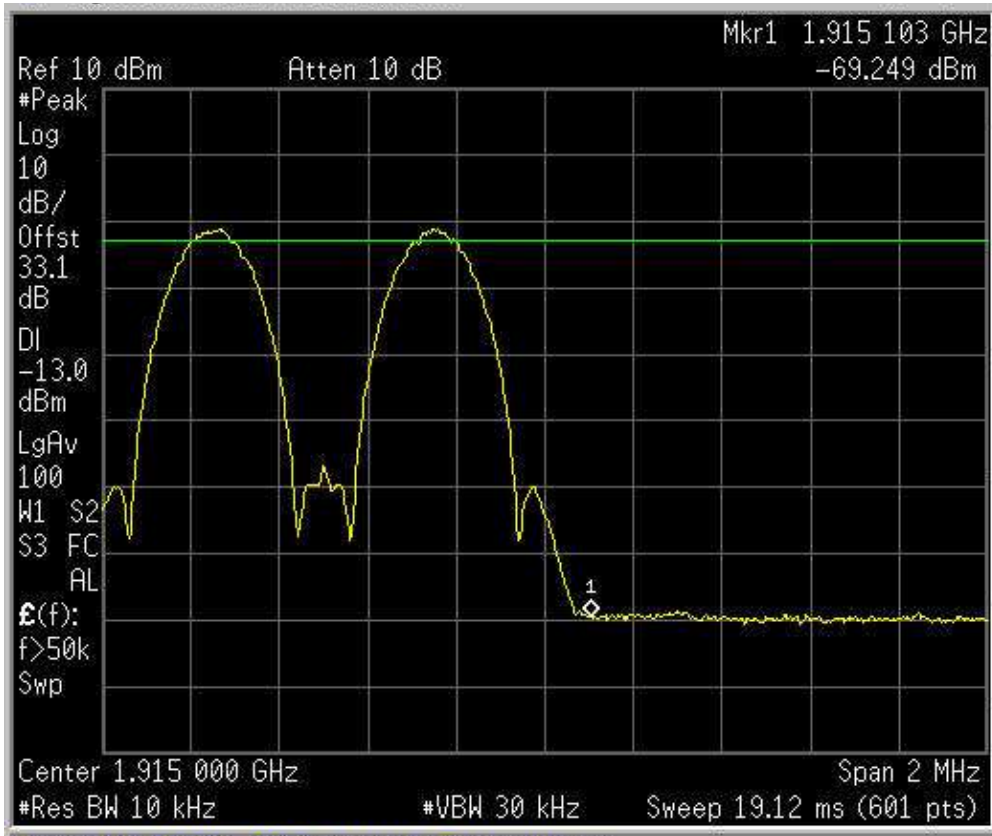
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

EDGE

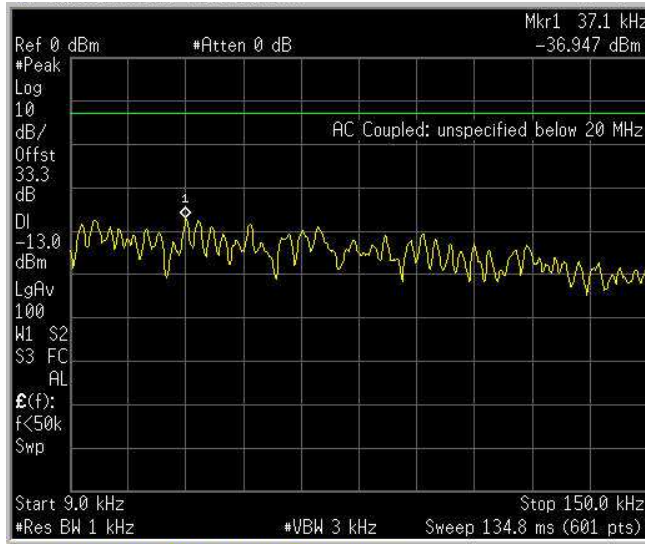
Uplink



EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Downlink 9 – 150 kHz



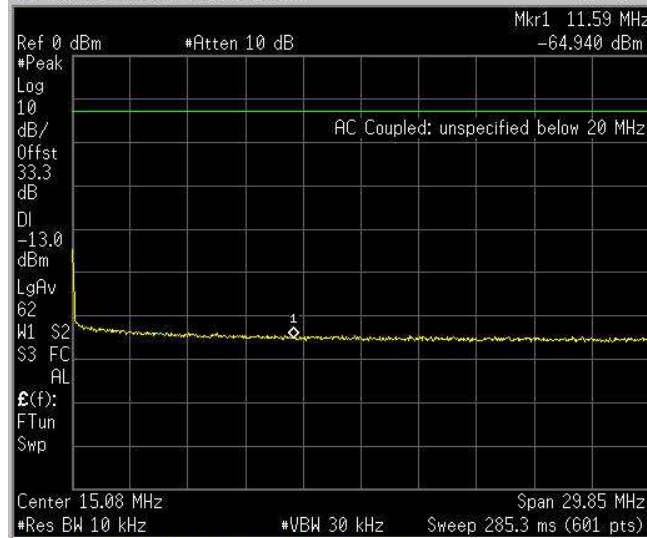
Spurs – EDGE – Uplink 9 – 150 kHz



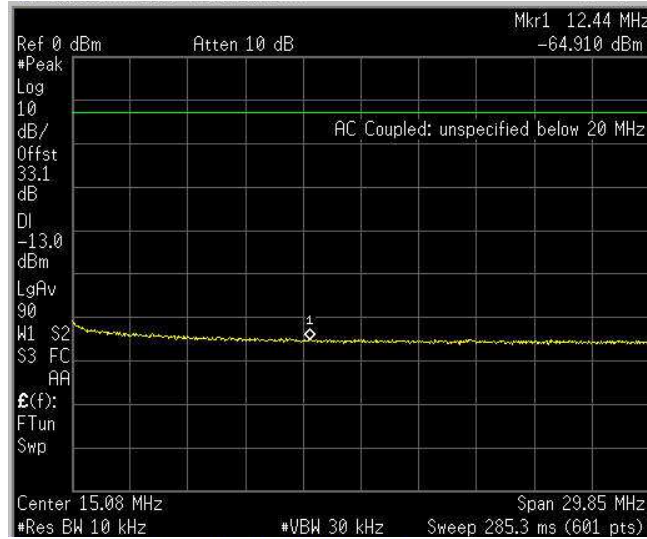
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Downlink 150 kHz – 30 MHz



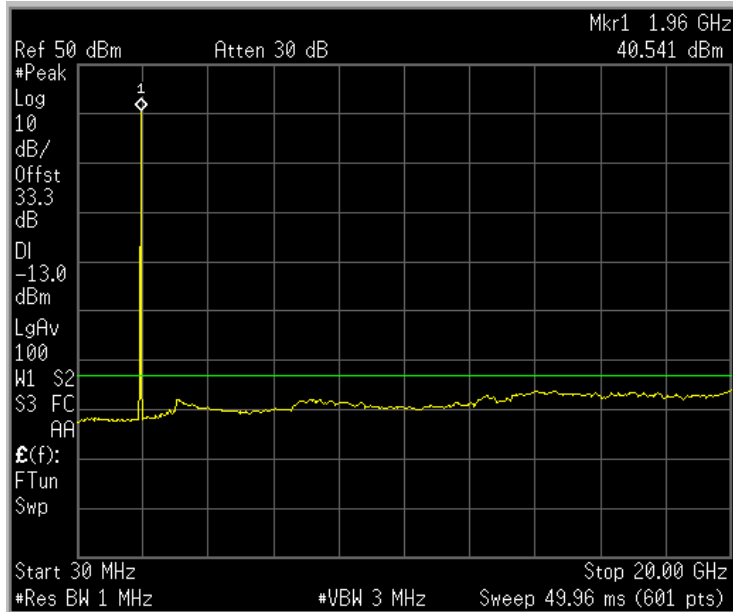
Spurs – EDGE – Uplink 150 kHz – 30 MHz



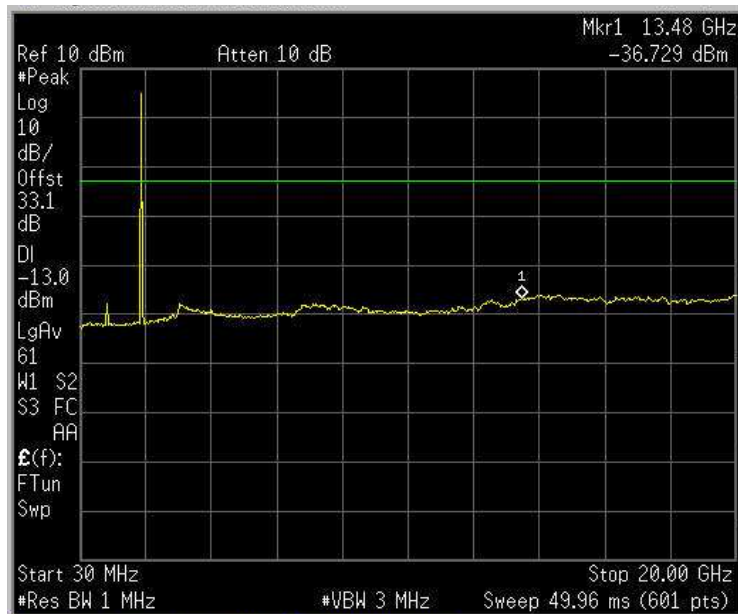
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE – Downlink 30 MHz – 20 GHz



Spurs – EDGE – Uplink 30 MHz – 20 GHz



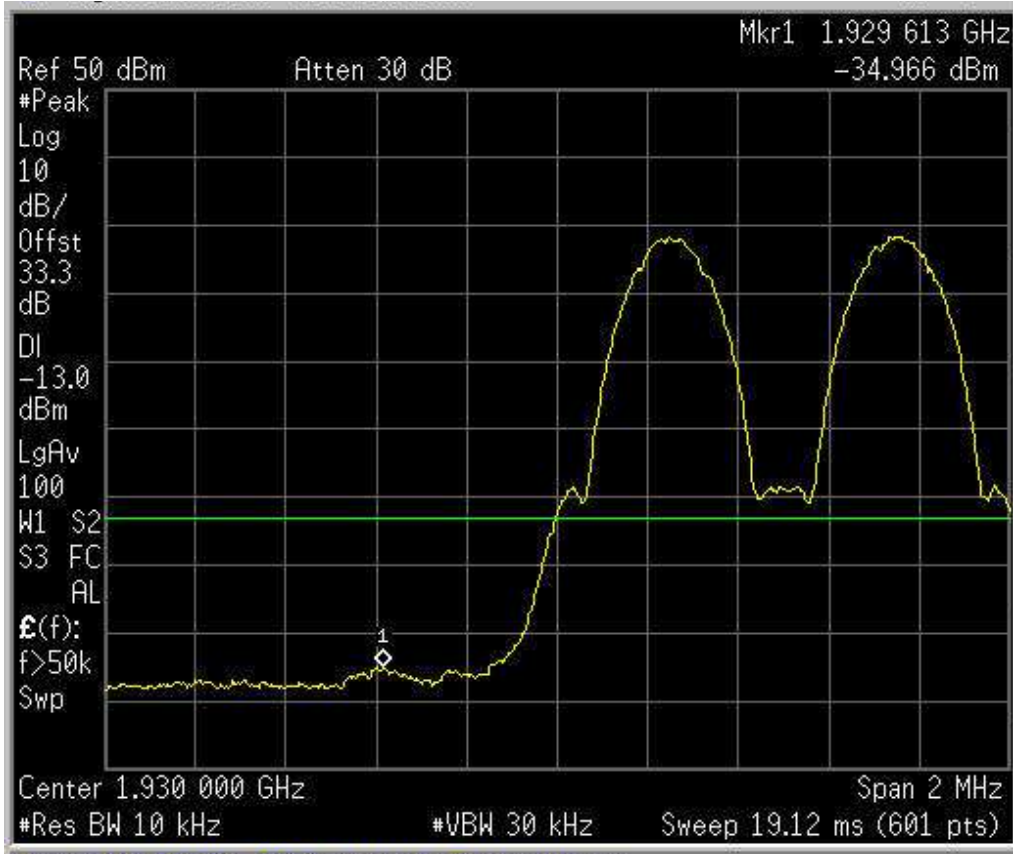
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation

GSM

Downlink



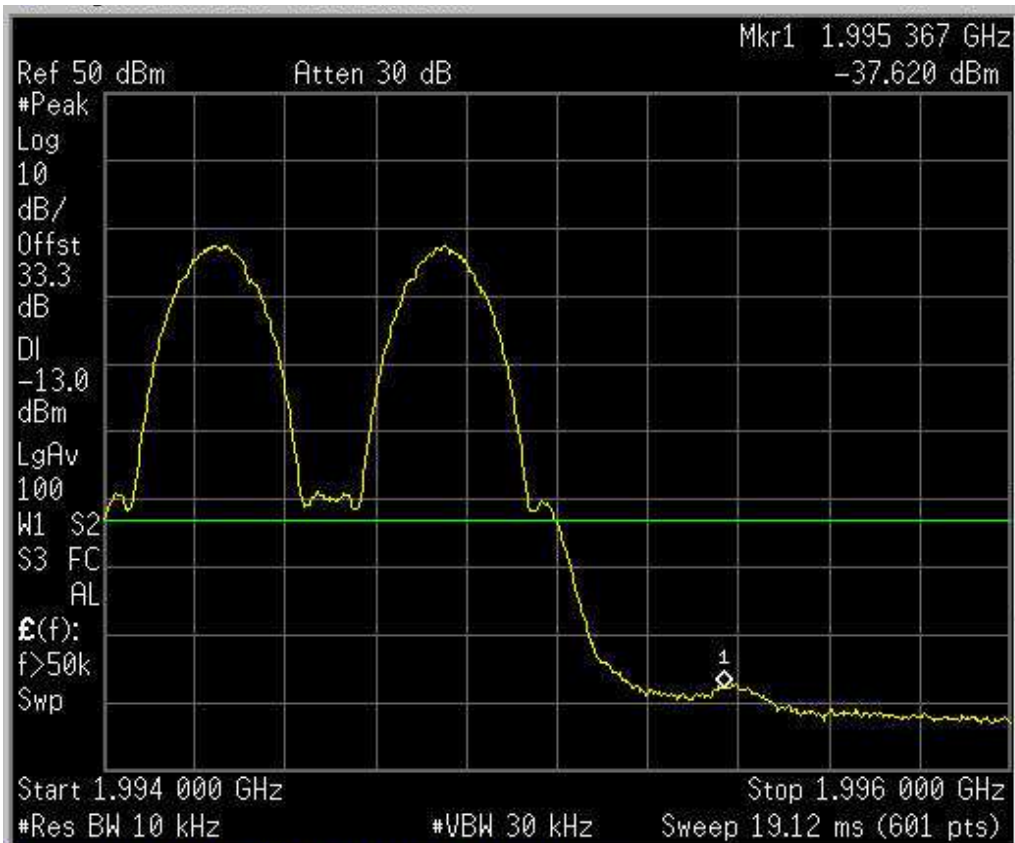
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation

GSM

Downlink



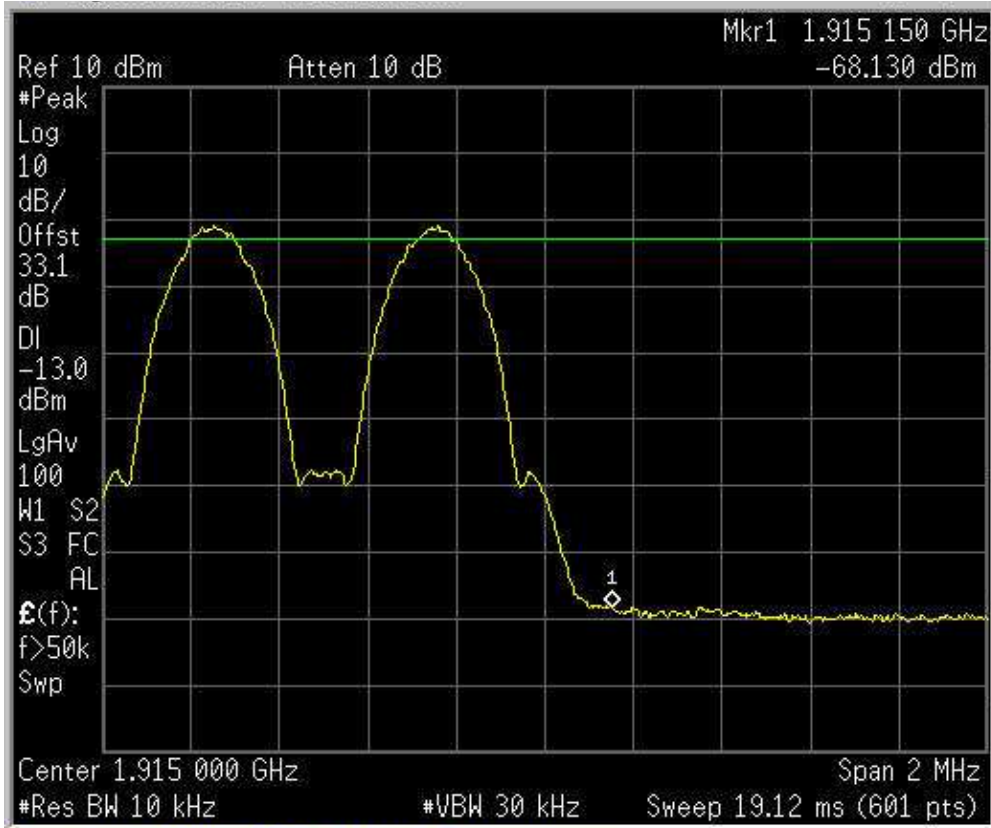
EQUIPMENT: | TRU8A19AWWV/AC-WS

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

Lower Bandedge Intermodulation

GSM

Uplink



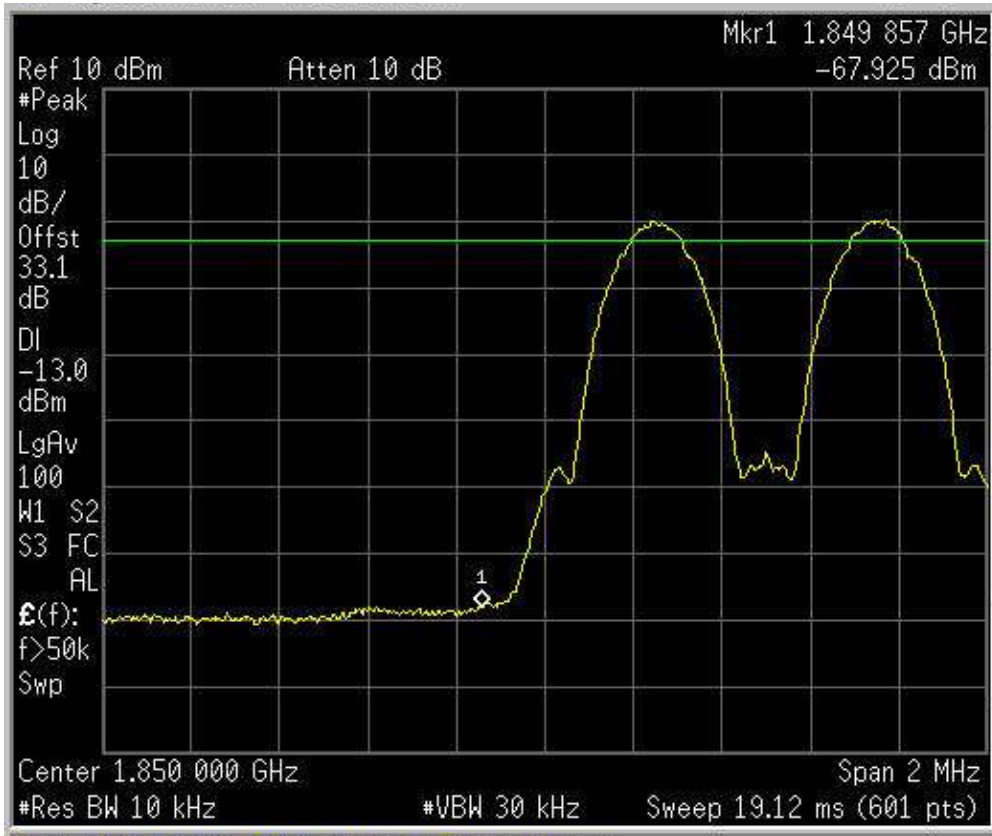
**EQUIPMENT:** | TRU8A19AWWV/AC-WS

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

Upper Bandedge Intermodulation

GSM

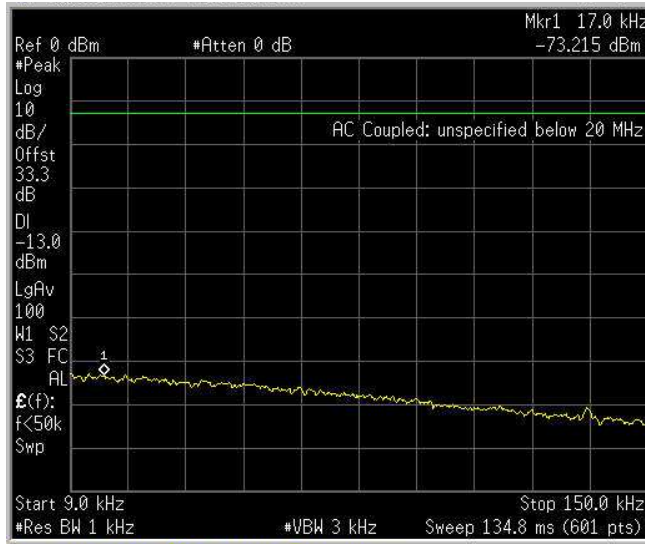
Uplink



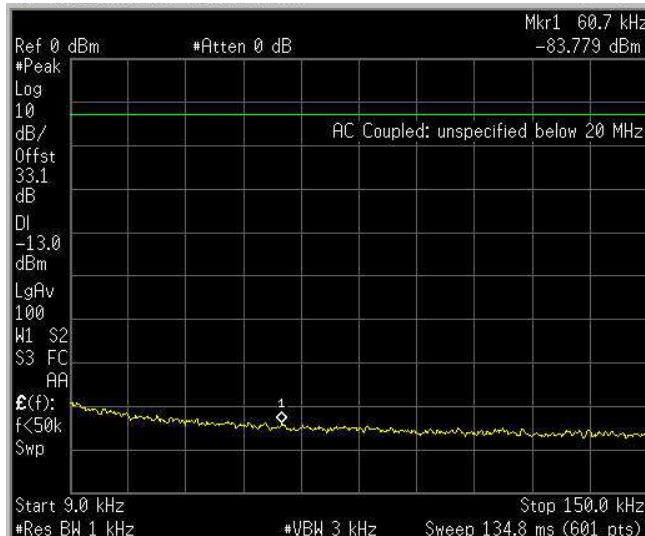


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Spurs – GSM – Downlink 9 – 150 kHz



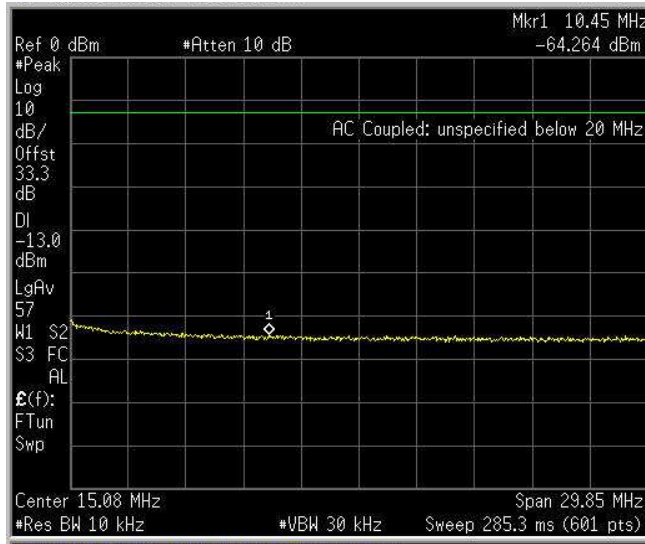
Spurs – GSM – Uplink 9 – 150 kHz



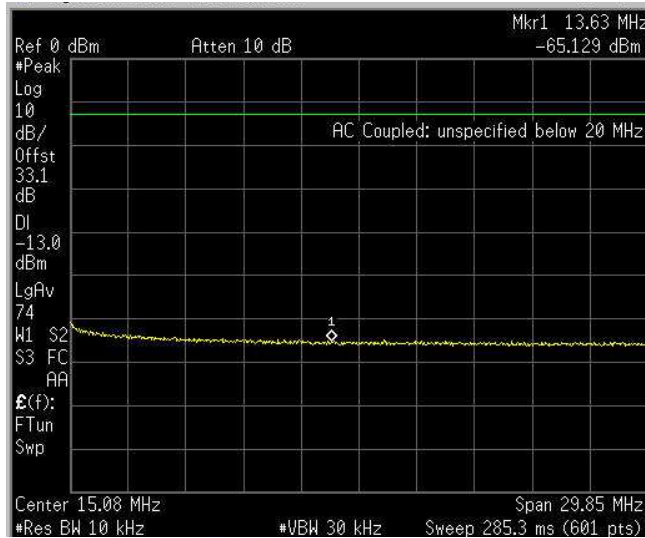
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Downlink 150 kHz – 30 MHz



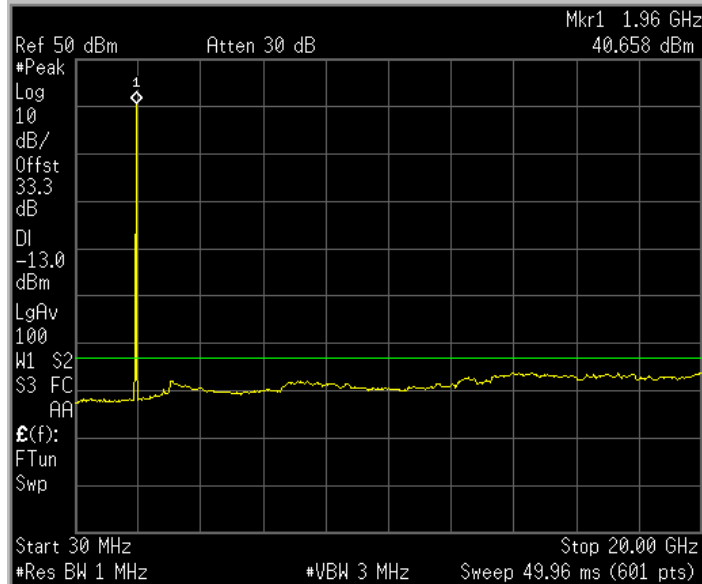
Spurs – GSM – Uplink 150 kHz – 30 MHz



EQUIPMENT: | TRU8A19AWWV/AC-WS

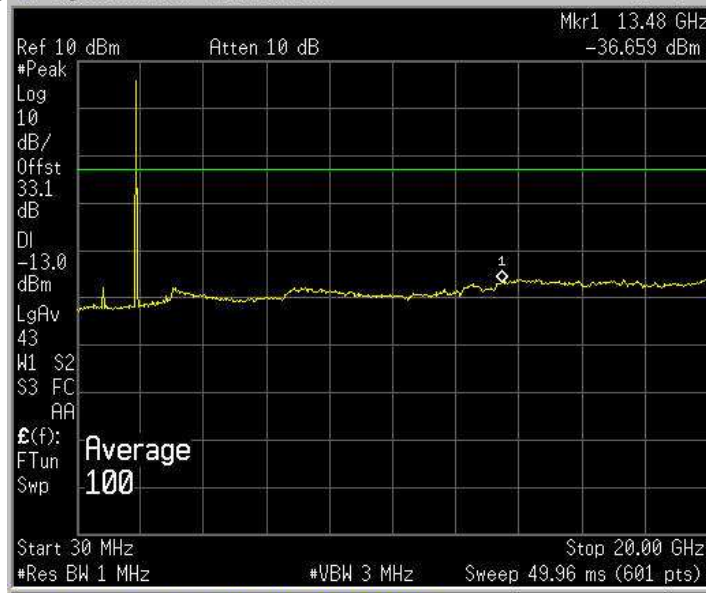
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Downlink 30 MHz – 20 GHz



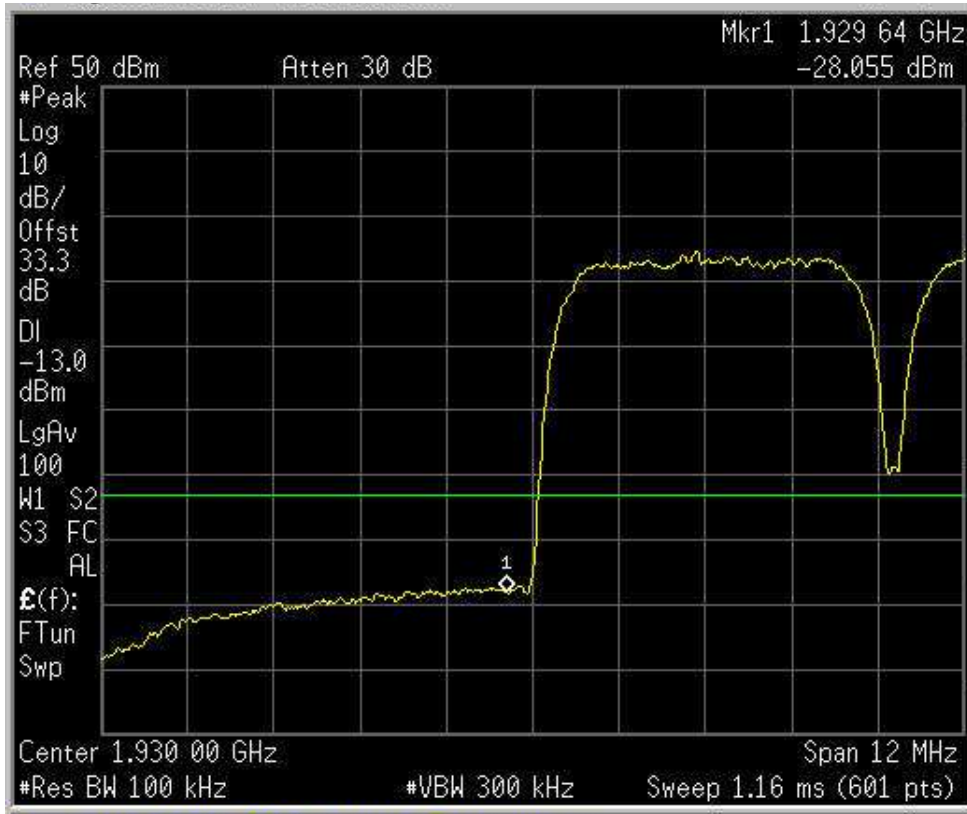
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM – Uplink 30 MHz – 20 GHz



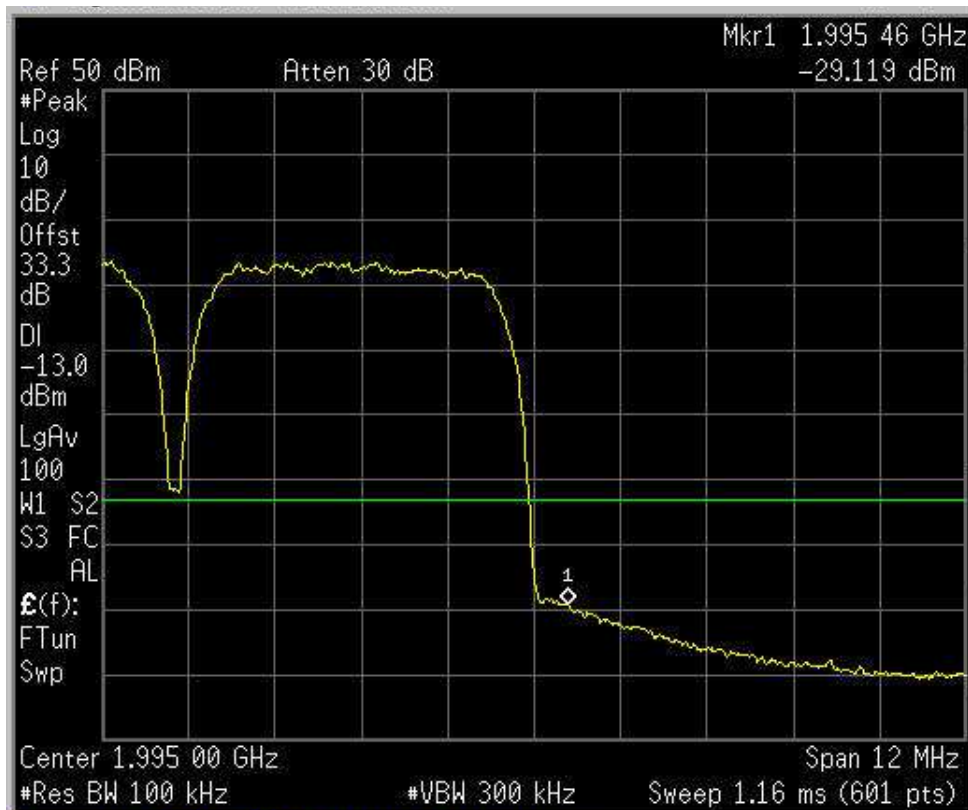
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Lower Bandedge Intermodulation  
W-CDMA  
Downlink



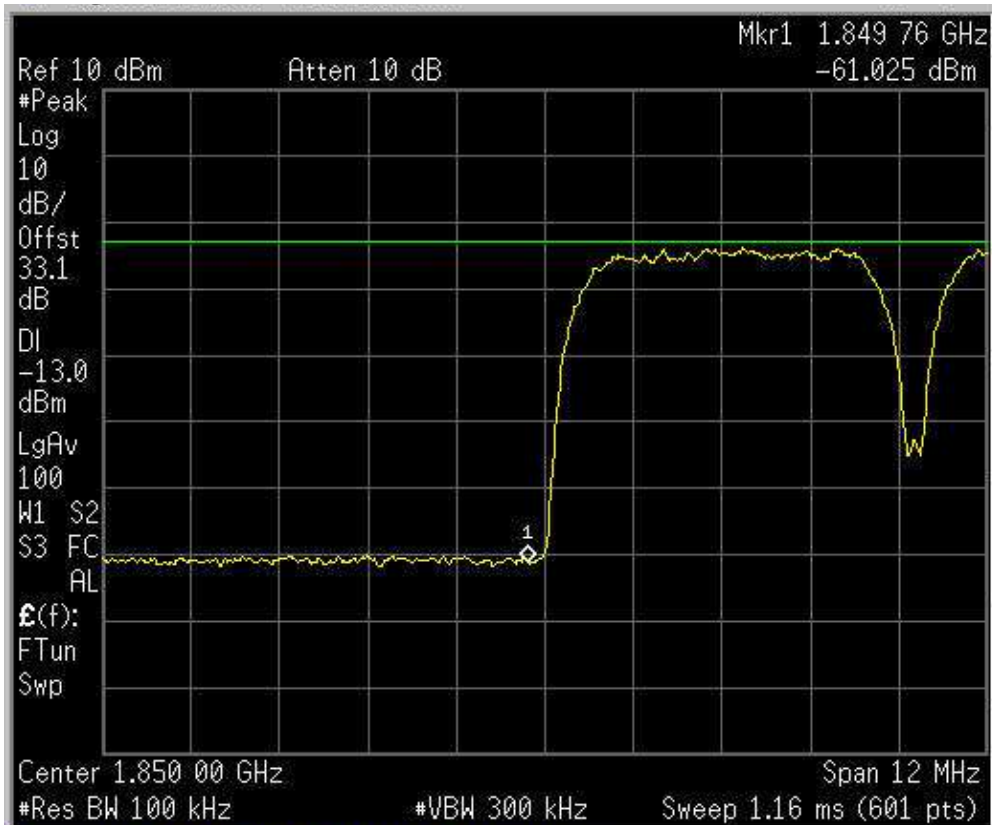
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Upper Bandedge Intermodulation  
W-CDMA  
Downlink



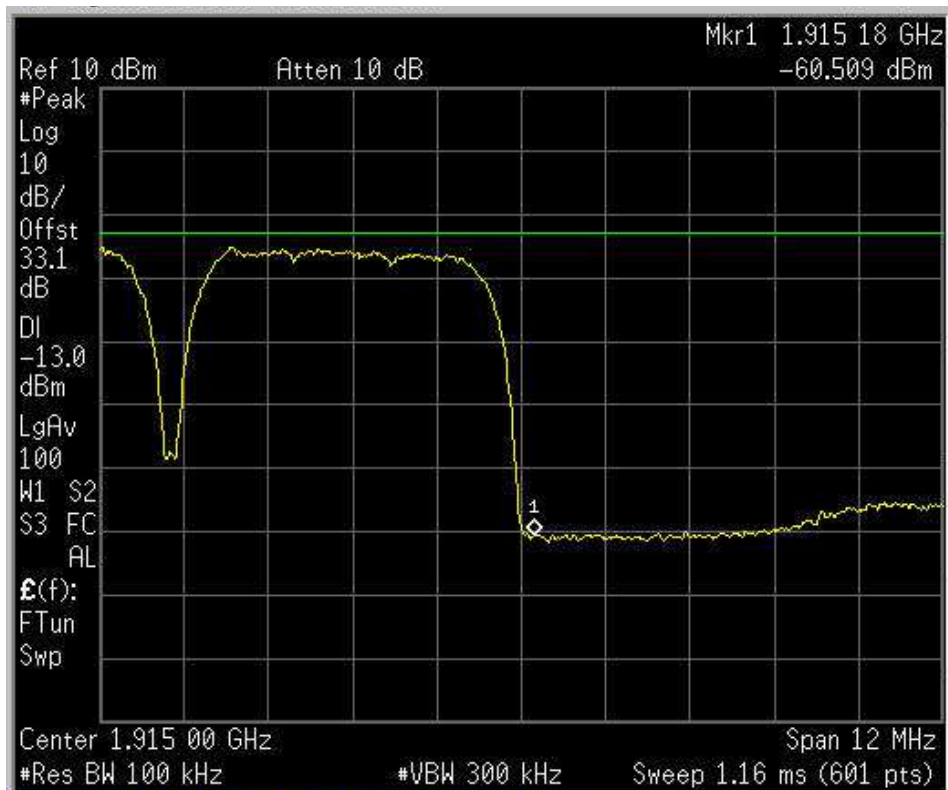
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Lower Bandedge Intermodulation  
W-CDMA  
Uplink



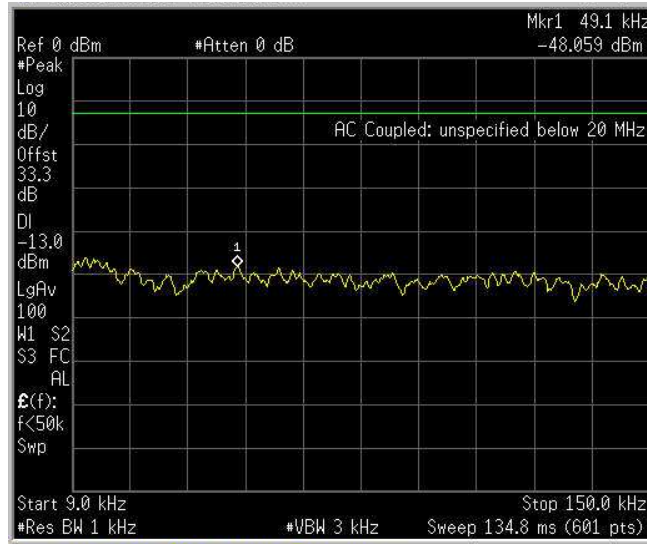
EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Upper Bandedge Intermodulation  
W-CDMA  
Uplink

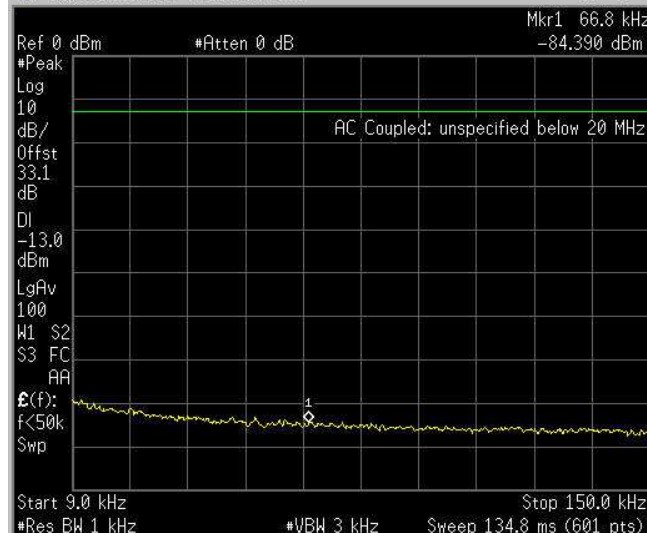


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Spurs – W-CDMA – Downlink 9 – 150 kHz



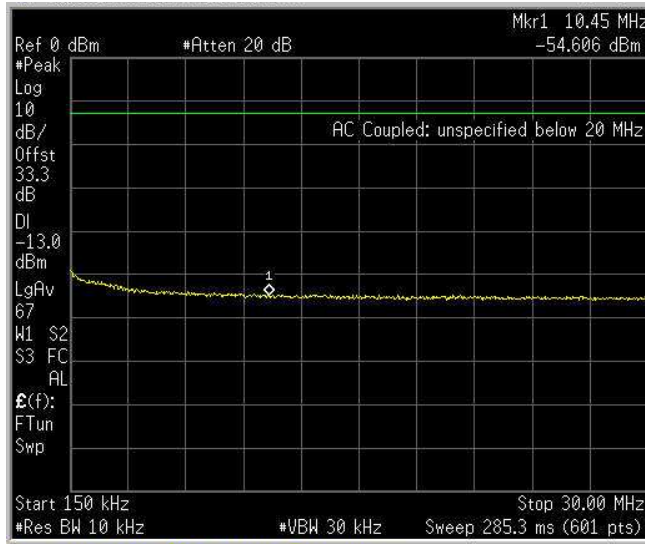
Spurs – W-CDMA – Uplink 9 – 150 kHz



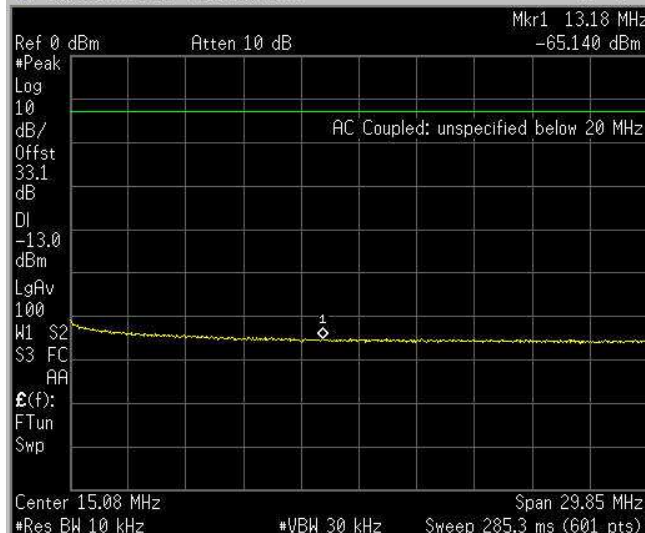


EQUIPMENT: | TRU8A19AWWV/AC-WS

**Test Data – Spurious Emissions at Antenna Terminals**  
 Spurs – W-CDMA – Downlink 150 kHz – 30 MHz

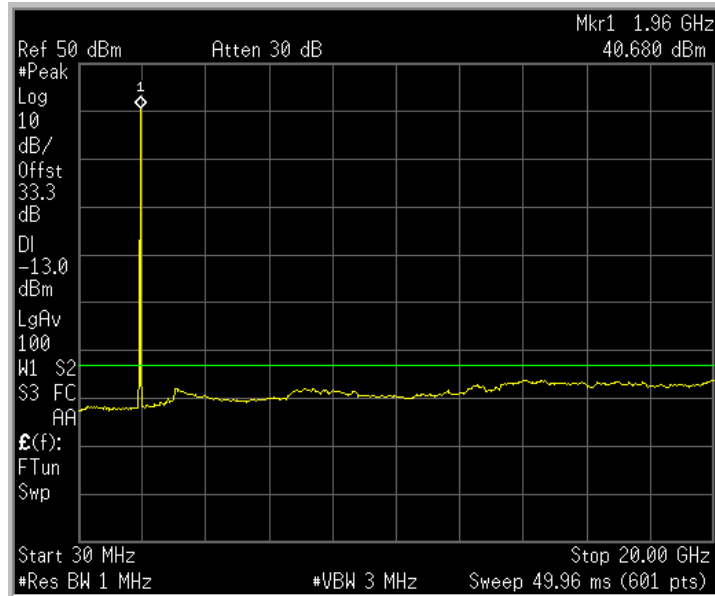


Spurs – W-CDMA – Uplink 150 kHz – 30 MHz

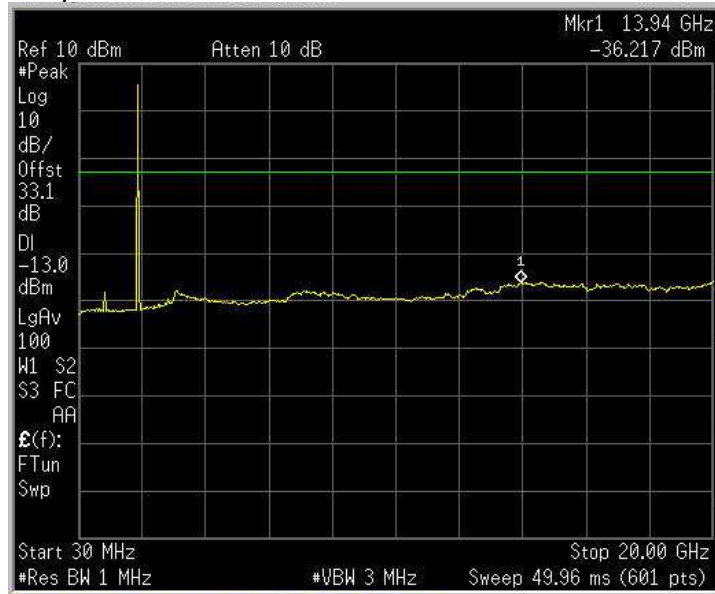


EQUIPMENT: | TRU8A19AWWV/AC-WS

Test Data – Spurious Emissions at Antenna Terminals  
Spurs – W-CDMA – Downlink 30 MHz – 20 GHz



Spurs – W-CDMA – Uplink 30 Mhz – 20 GHz



**Section 6. Field Strength of Spurious**

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 24.238
TESTED BY: G. Curioni	DATE: September 2009

**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.

PCS band - Master/remote 120/120 Vac			
Frequency range	D.L. & U.L.	Result [dBm] Max. field strength pol. V/H	Limit
30 – 1000 MHz	78.6 MHz	-69.2 dBm H	-13 dBm
1 – 20 GHz		negligible	-13dBm

PCS band - Master/remote 48 Vdc/120 Vac			
Frequency range	D.L. & U.L.	Result [dBm] Max. field strength pol. V/H	Limit
30 – 1000 MHz	33.9 MHz 88.3 MHz 9.3 MHz 123.3 MHz 142.7 MHz 154.4 MHz	-52.4 dBm H -62.5 dBm H -63.7 dBm H - 66.1 dBm H - 55.6 dBm V -60.7 dBm H	Limit: -13 dBm
1 – 20 GHz		negligible	Limit: -13 dBm

**Nemko Italy S.p.A.**

CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

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**Equipment Used:** 5 – 6 – 7 – 8 – 9 -10 – 11 – 12 - 13

**Measurement Uncertainty:**  +/-5  dB

**Temperature:**  24  °C

**Relative Humidity:**  50  %

RBW=VBW=100 kHz below 1000 MHz  
RBW=VBW=1 MHz above 1000 MHz  
Peak detector

**Section 7. Filter Frequency Response**

NAME OF TEST: Filter Frequency Response	PARA. NO.: 2-11-04/EAB/RF
TESTED BY: G. Curioni	DATE: 23 January 2010

**Test Results:** Complies.

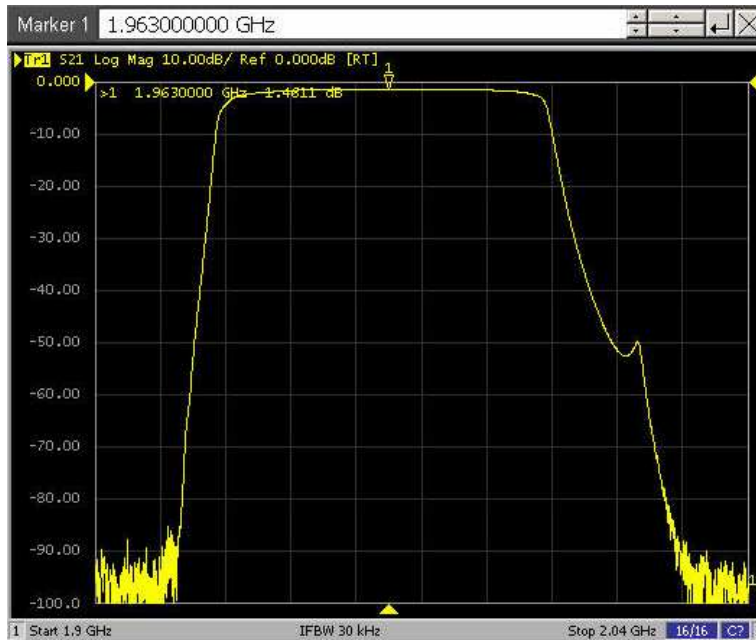
**Test Data:** See attached plot(s).

**Equipment Used:** 3a

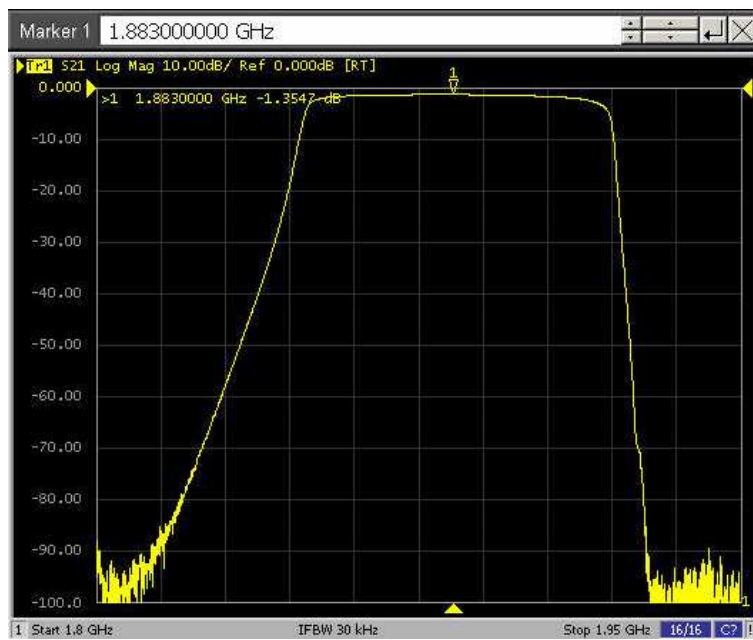
**Measurement Uncertainty:** +/-1,9 dB

**Temperature:** 24 °C

**Relative Humidity:** 55 %



Down-link



Up-link

**Section 8. Test Equipment List**

<i>Identification number</i>	<i>Description</i>	<i>Manufacturer model</i>	<i>s/n</i>	<i>Cal. Due</i>
1	Vector Signal Generator	Agilent H.P. E4438C	MY45094485	July 2010
2	Spectrum Analyzer	Agilent H.P. E4440A	US40420470	December 2009
3a	Network Analyzer	Agilent H.P. E5062A	MY44101829	November 2012
3b	Network Analyzer	Hewlett Packard 8753D	3410A04850	March 2010
4	2xcables+directional coupler+dummyload			

Client's property

Coupling Factor	PCS	UL 1882.5	33.1 dB	
2xcables+directional coupler+dummyload		DL 1962.5	33.3 dB	

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

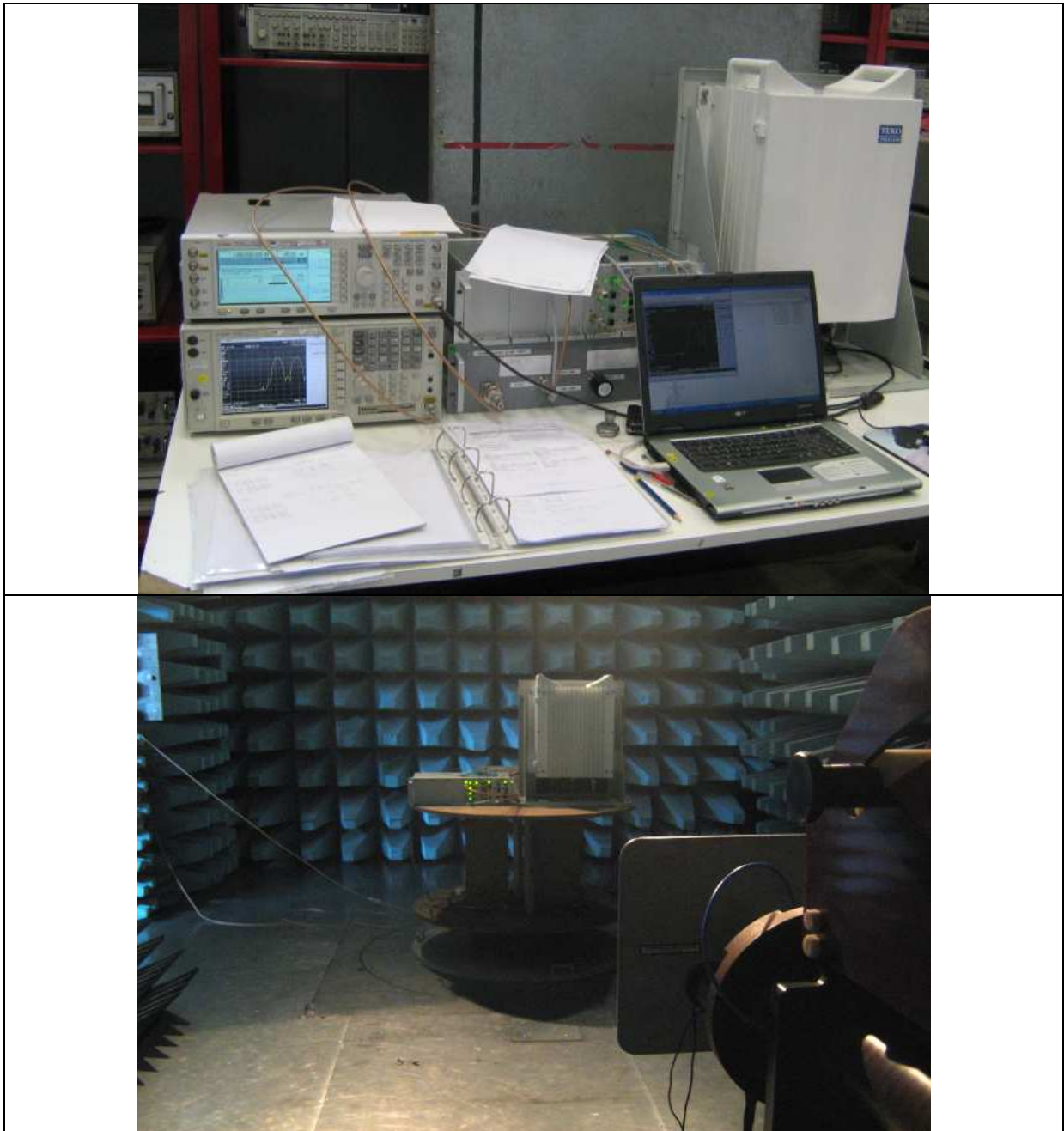
<i>Identification number</i>	<i>Equipment</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial N°</i>	<i>Cal. due</i>
5	Trilog Broadband Antenna	Schwarzbeck	VULB 9163	VULB 9163-286	04/2010
6	Bilog antenna	Schwarzbeck	STLP 9148-123	123	09/2011
7	Broadband preamplifier	Schwarzbeck	BBV 9718	9718-137	05/2011
8	Spectrum Analyzer 9kHz-40GHz	R&S	FSEK	848255/005	09/2010
9	Controller	EMCO	2090	9511-1099	NSC
10	Antenna Tower	EMCO	2071-2	9601-1940	NSC
11	Turning table Controller	EMCO	1061-1.521	9012-1508	NSC
12	Semi-anechoic chamber	Nemko	3m semi-anechoic chamber	70	04/2010
13	Trilog Broadband Antenna	Siemens	3m control room	3	NSC

Property of Nemko Italy



## Section 9. PHOTOS

### SETUP

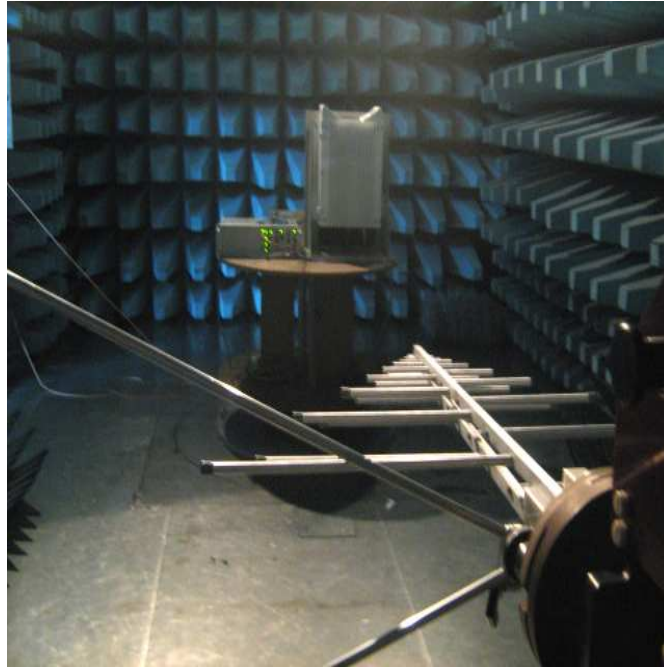


**Nemko Italy S.p.A.**

CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

***EQUIPMENT:* | TRU8A19AWWV/AC-WS**

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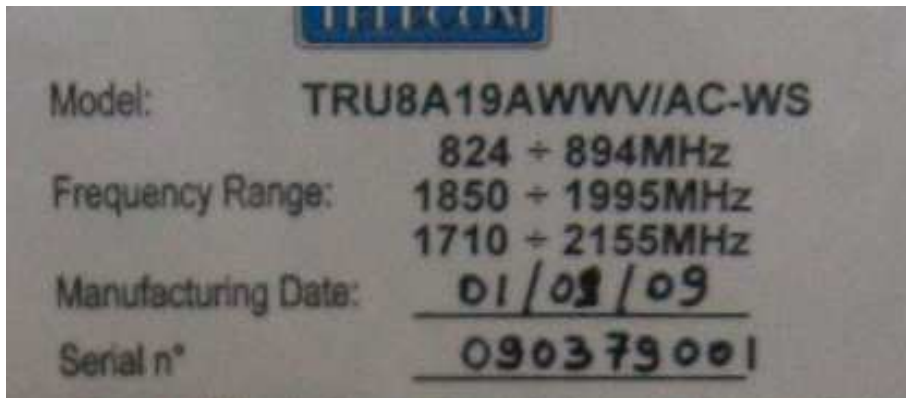


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BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

EQUIPMENT: | TRU8A19AWV/AC-WS

REMOTE



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CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

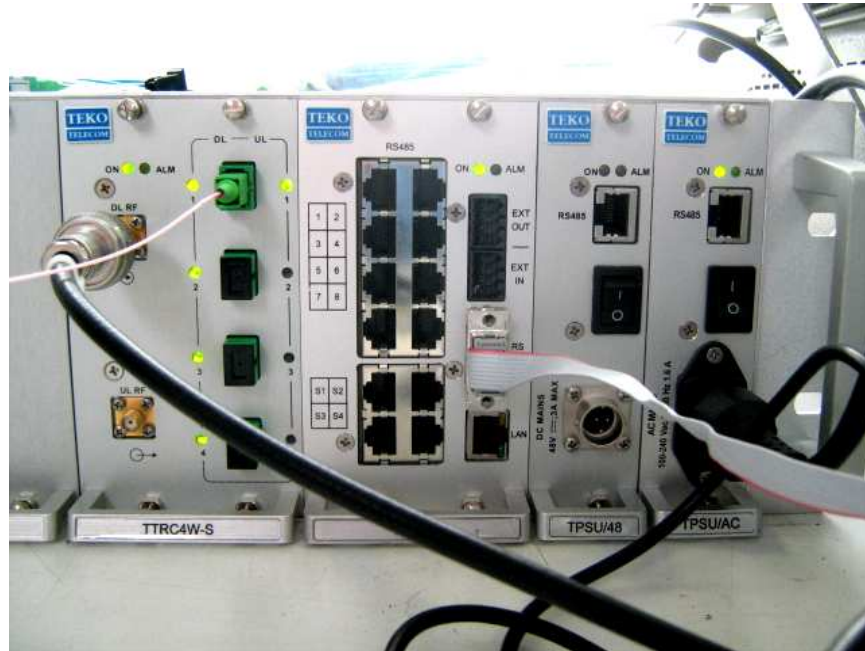
**MASTER**



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CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

EQUIPMENT: | TRU8A19AWWV/AC-WS



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CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

***EQUIPMENT:* | TRU8A19AWWV/AC-WS**

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## **ANNEX A - TEST DETAILS**

**Nemko Italy S.p.A.**

CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

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**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.

**Nemko Italy S.p.A.**

CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

**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

W-CDMA

RBW=VBW= 100 kHz  
Span: 10 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: ≥ RBW  
Sweep: Auto  
Video Avg: 6 Sweeps

GSM / EDGE

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

TDMA

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

W-CDMA

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

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.

**Nemko Italy S.p.A.**

CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

**EQUIPMENT: | TRU8A19AWWV/AC-WS**

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

**Nemko Italy S.p.A.**

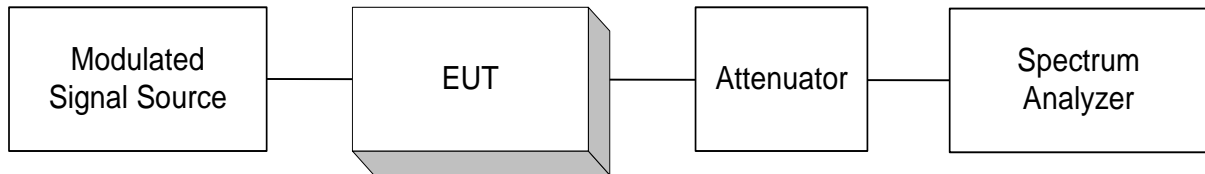
CFR 47, PART 24, SUBPART E  
BROADBAND PCS REPEATERS  
PROJECT NO.: 131640-6

***EQUIPMENT:* | TRU8A19AWWV/AC-WS**

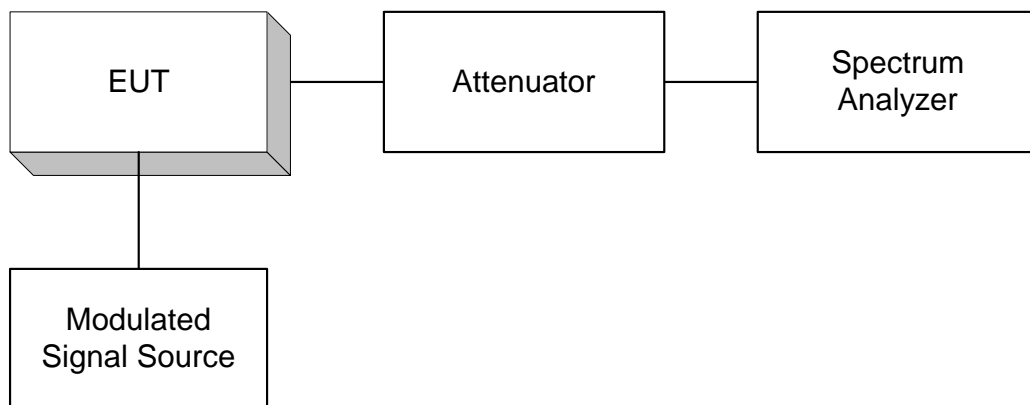
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## **ANNEX B - TEST DIAGRAMS**

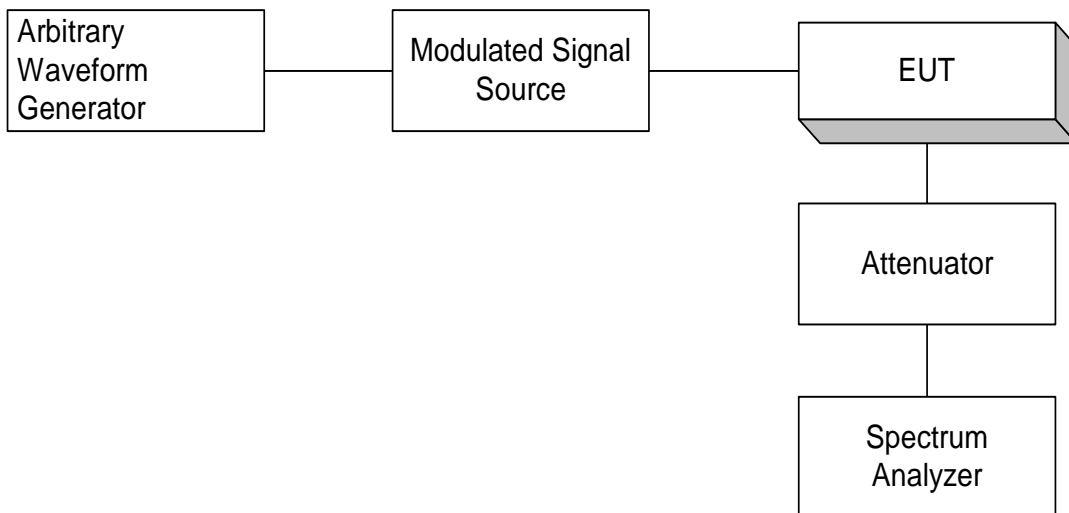
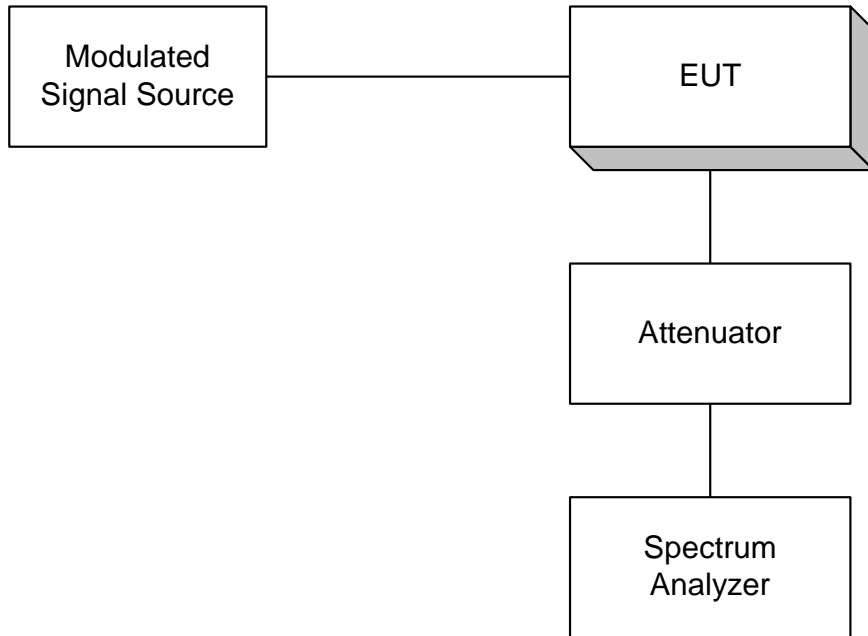
**Para. No. 2.985 - R.F. Power Output**



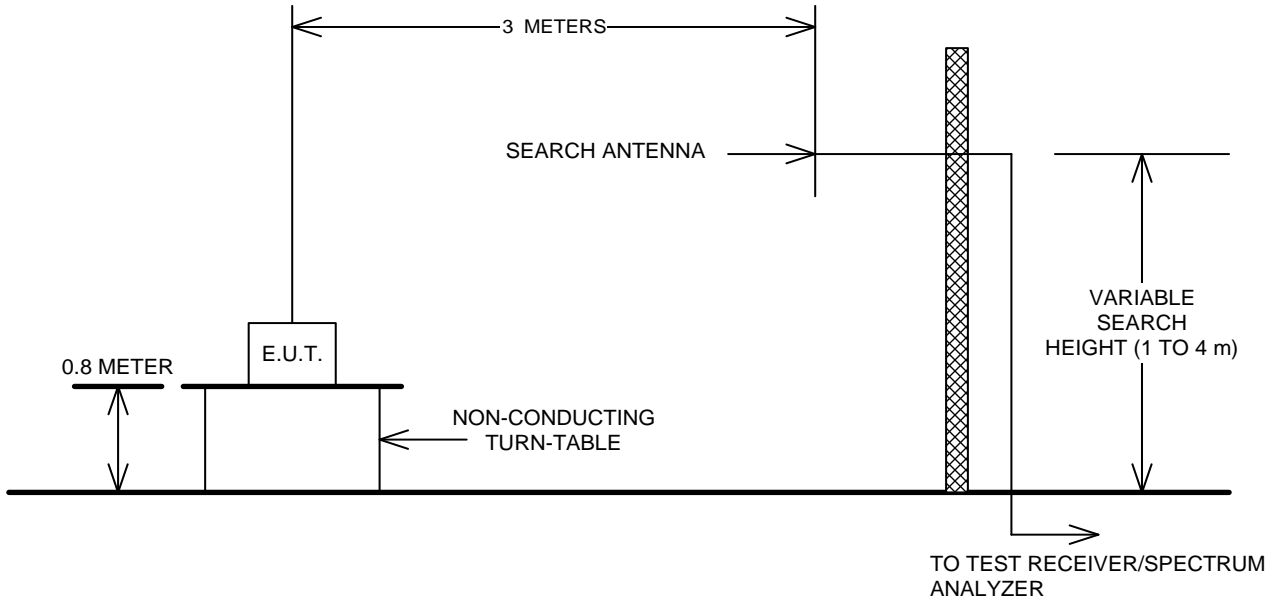
**Para. No. 2.989 - Occupied Bandwidth**



**Para. No. 2.991 Spurious Emissions at Antenna Terminals**



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

