



Nemko Test Report: 51492RUS2

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

Equipment Under Test: Part Number: TFAM17/19
(E.U.T.) Product Name: Remote Unit, ION-B, TFAM17/19

FCC ID: BCR-TFAM1719-W

In Accordance With: **CFR 47, Part 27, Subpart C**
Miscellaneous Wireless Communication Services

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

TESTED BY:

David Light, Senior Wireless Engineer

DATE: 25 June 2010

APPROVED BY:

Tom Tidwell, Telecom Direct

DATE: 01 July 2010

Number of Pages: 30

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Section 1. Summary of Test Results

Manufacturer Andrew Corporation

Part No.: TFAM17/19

Serial No.: 43

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 27, Subpart C.



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	27.50(d)	1640 Watts	Complies
Occupied Bandwidth	2.1049	Input/Output	Complies
Spurious Emissions at Antenna Terminals	27.53(g)	-13 dBm	Complies
Field Strength of Spurious Emissions	27.53(g)	-13 dBm E.I.R.P.	Complies
Frequency Stability	27.54	Must stay in band	NA

Section 2. General Equipment Specification

Supply Voltage Input:	120 VAC				
Frequency Bands: Downlink:	2110 to 2155 MHz				
Frequency Bands: Uplink:	NA				
Type of Modulation and Designator:	CDMA (F9W) <input checked="" type="checkbox"/>	GSM (GXW) <input type="checkbox"/>	NADC (DXW) <input type="checkbox"/>	W-CDMA (F9W) <input checked="" type="checkbox"/>	EDGE (G7W) <input type="checkbox"/>
Output Impedance:	50 ohms				
RF Output (Rated): Downlink	$\frac{0.125}{21.0} \frac{\text{W}}{\text{dBm}}$				
RF Output (Rated): Uplink	$\frac{\text{NA}}{\text{NA}} \frac{\text{W}}{\text{dBm}}$				
Frequency Translation:	F1-F1 <input checked="" type="checkbox"/>	F1-F2 <input type="checkbox"/>	N/A <input type="checkbox"/>		
Band Selection:	Software <input type="checkbox"/>	Duplexer <input type="checkbox"/>	Fullband <input checked="" type="checkbox"/>		

Description of EUT

Wireless over fiber repeater system.

System Diagram

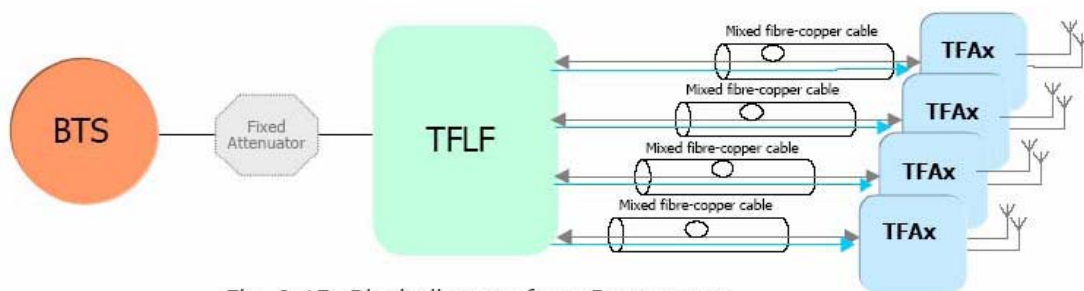


Fig. 2.17: Block diagram for a Fast system

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 27.50
TESTED BY: David Light	DATE: 24-25 June 2010

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

Direction	Modulation	Composite Power (dBm)	RF Power (W)
Downlink	CDMA	21	0.125
	UMTS	21	0.125
Uplink	CDMA	NA	NA
	UMTS	NA	NA

Equipment Used: 1472-1469-1468-1036-1082-1026**Measurement Uncertainty:** +/- 1.7 dB**Temperature:** 22 °C**Relative Humidity:** 35 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 24-25 June 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1472-1469-1468-1036-1082-1026

Measurement Uncertainty: 1X10⁻⁷ ppm

Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Occupied Bandwidth

CDMA/EV-DO

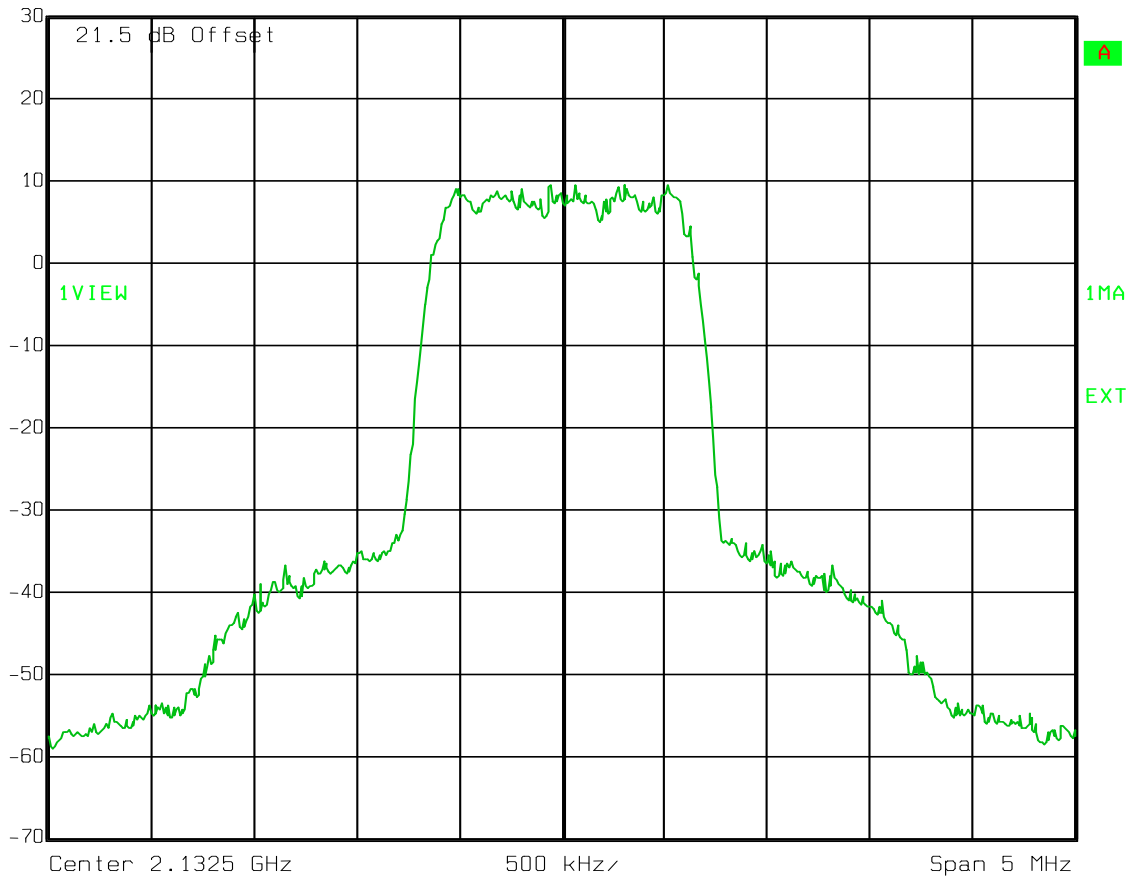
Output

Downlink



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



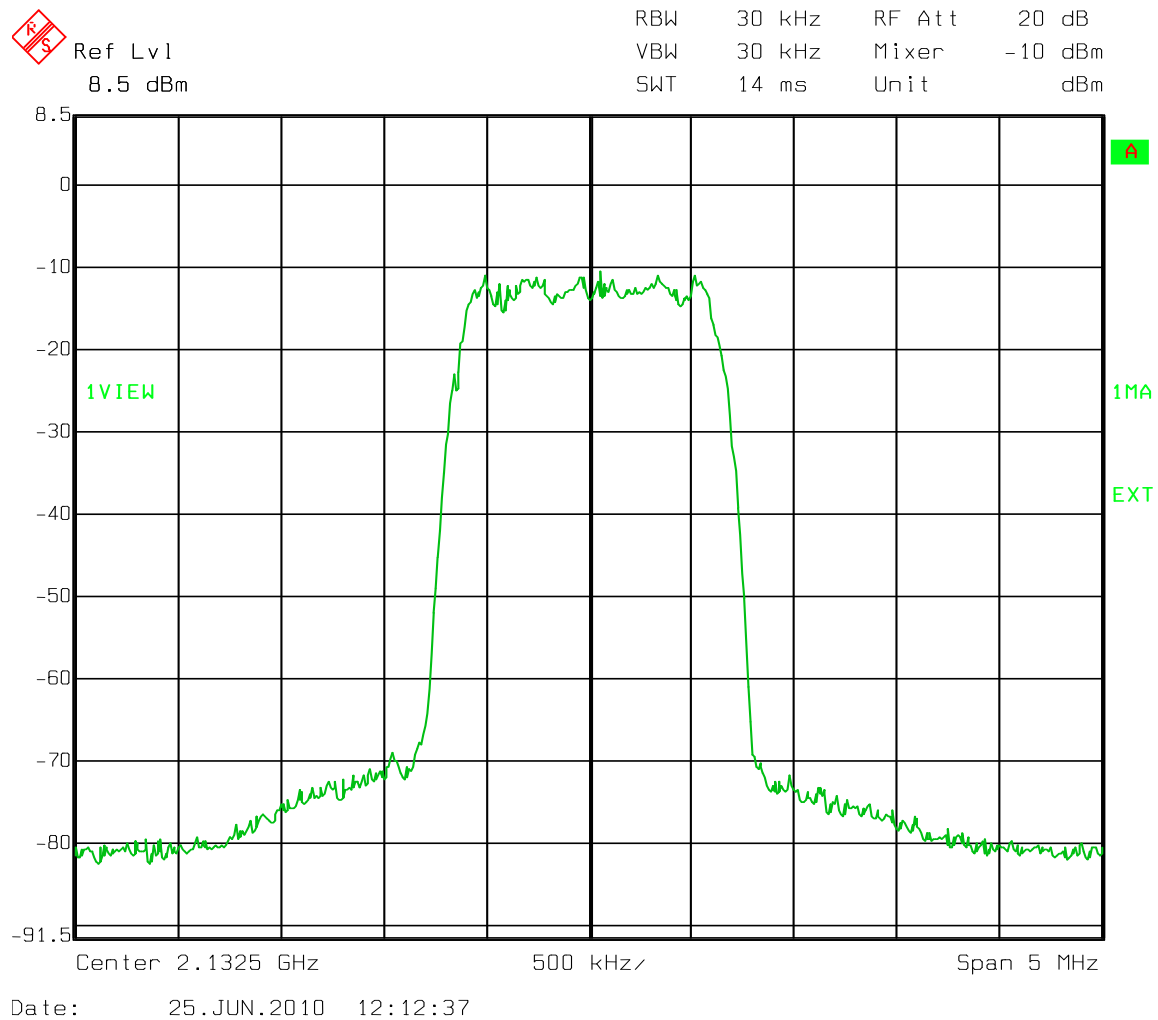
Date: 25.JUN.2010 12:11:26

Test Data – Occupied Bandwidth

CDMA/EV-DO

Input

Downlink



Test Data – Occupied Bandwidth

WCDMA/UMTS

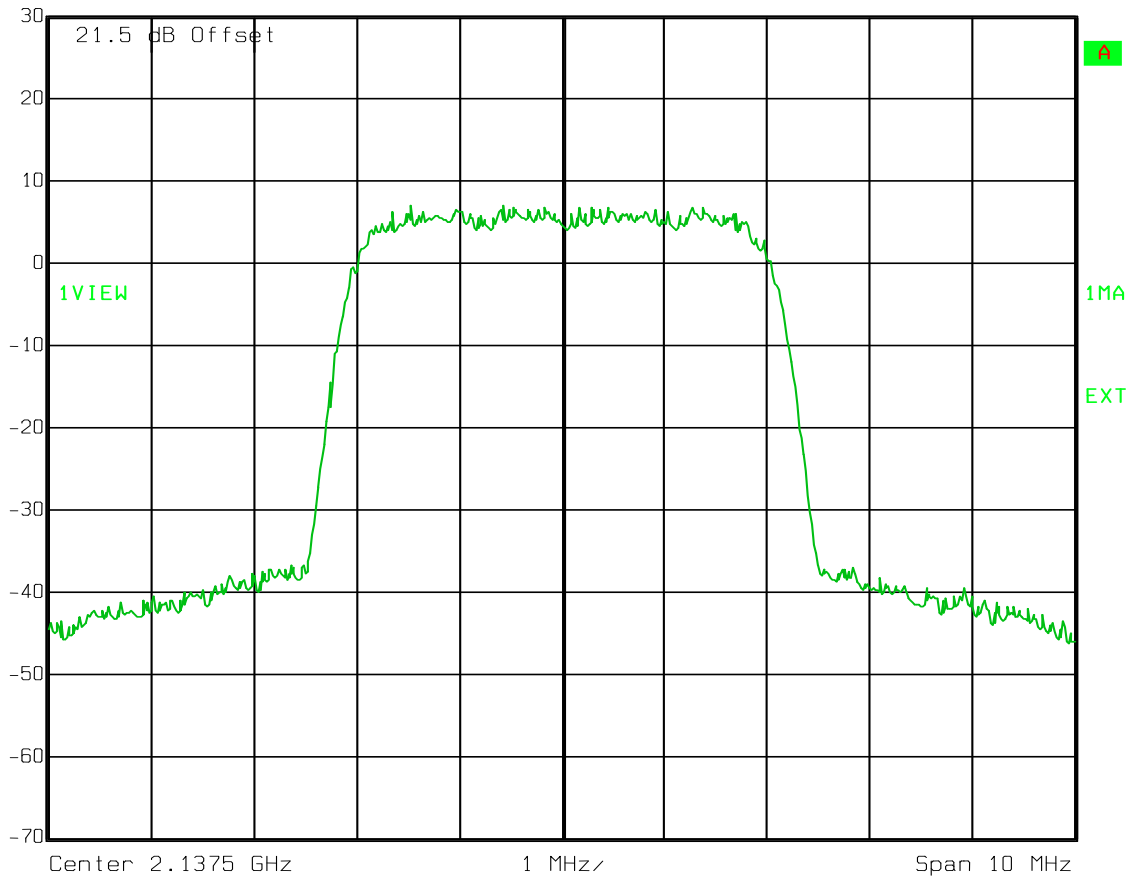
OUTPUT

Downlink



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	10 ms	Unit	dBm



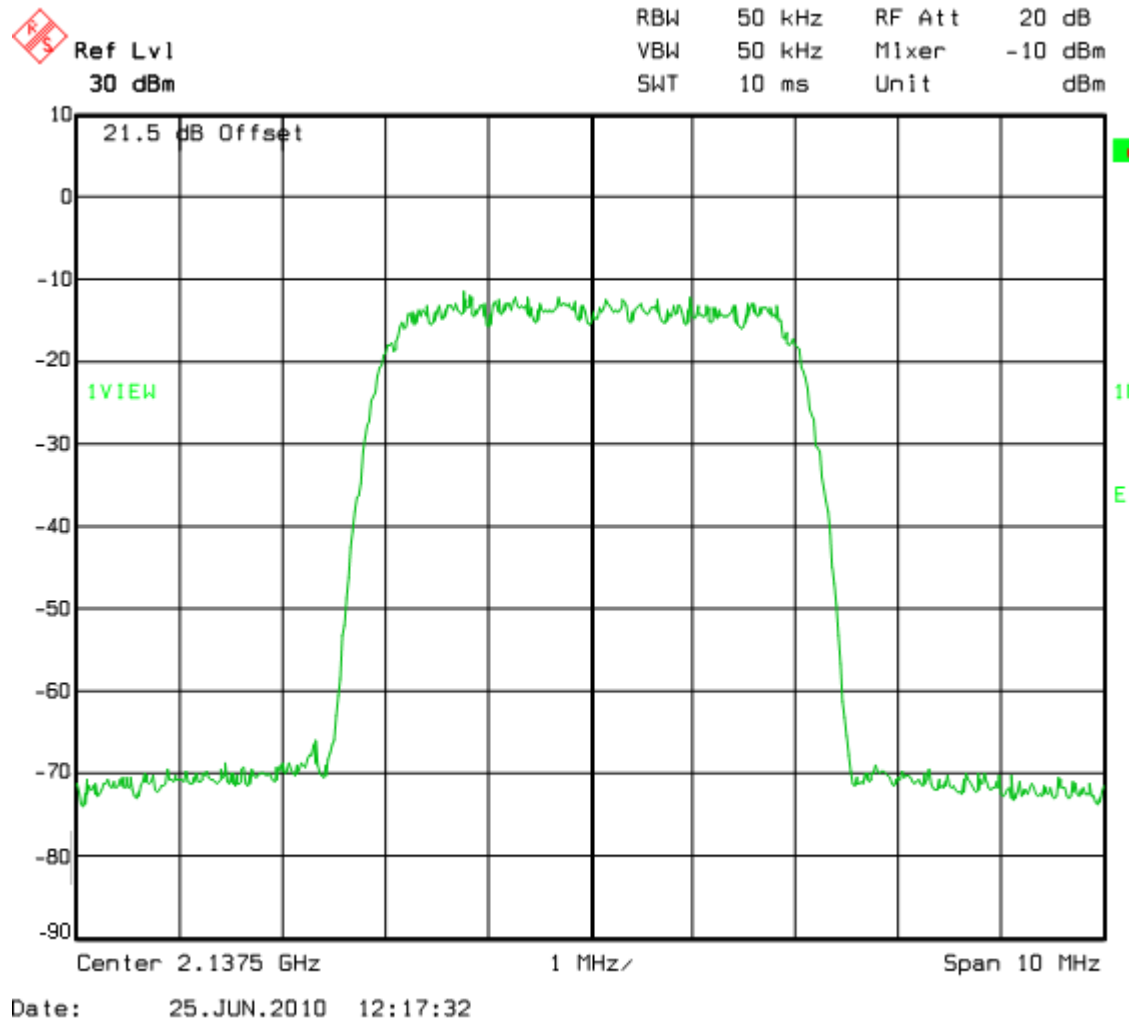
Date: 25.JUN.2010 12:16:47

Test Data – Occupied Bandwidth

WCDMA/UMTS

INPUT

Downlink



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 24-25 June 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1472-1469-1468-1036-1082-1026

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Spurious Emissions at Antenna Terminals

CDMA/EV-DO

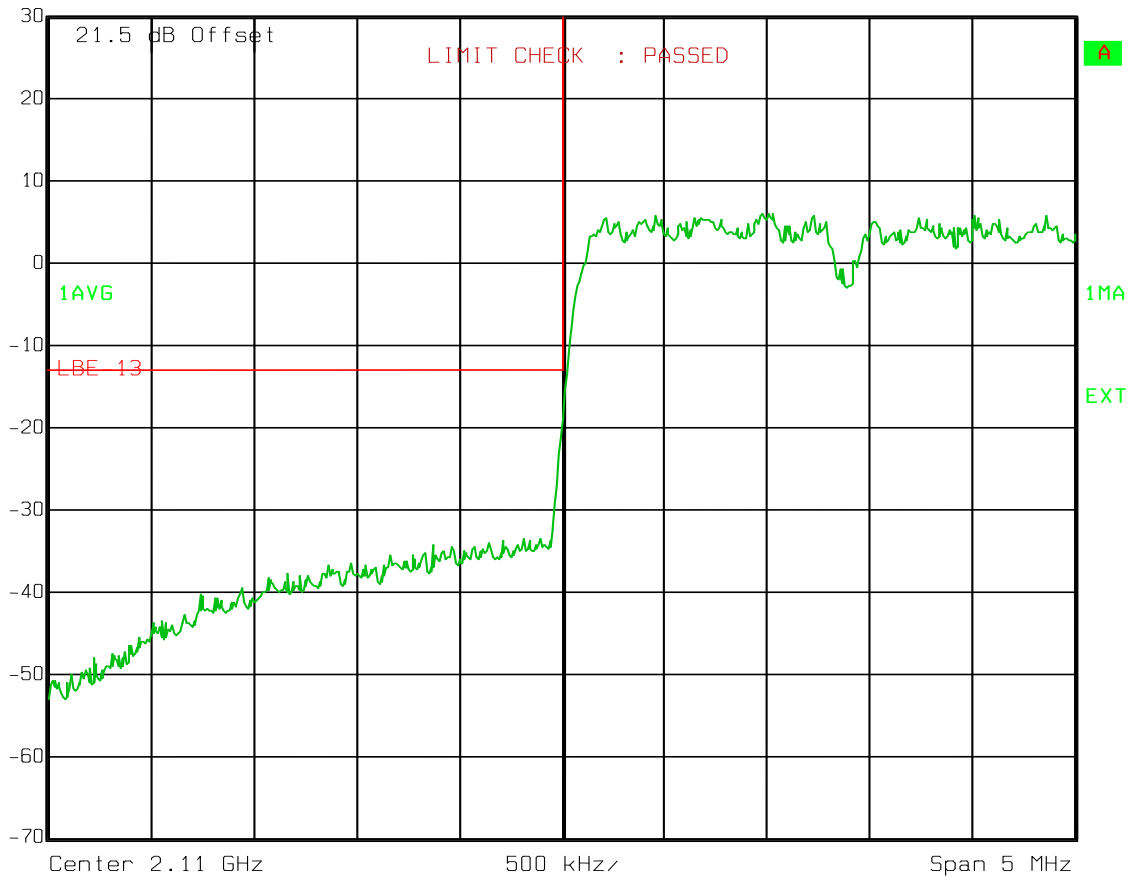
LOW BANDEDGE

Downlink



Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 25.JUN.2010 12:05:28

Test Data – Spurious Emissions at Antenna Terminals

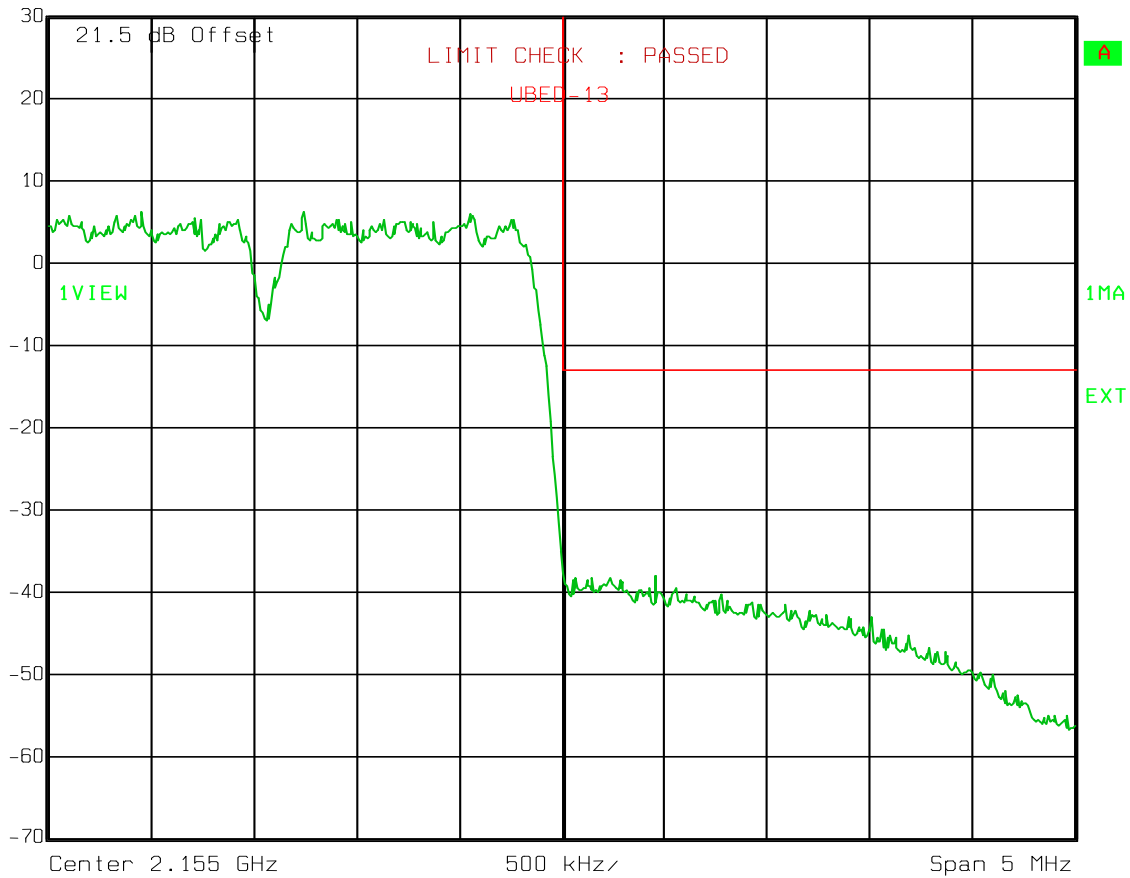
CDMA/EV-DO

HIGH BAND EDGE

Downlink

Ref Lvl
30 dBm

RBW	30 kHz	RF Att	20 dB
VBW	30 kHz	Mixer	-10 dBm
SWT	14 ms	Unit	dBm



Date: 25.JUN.2010 12:10:12

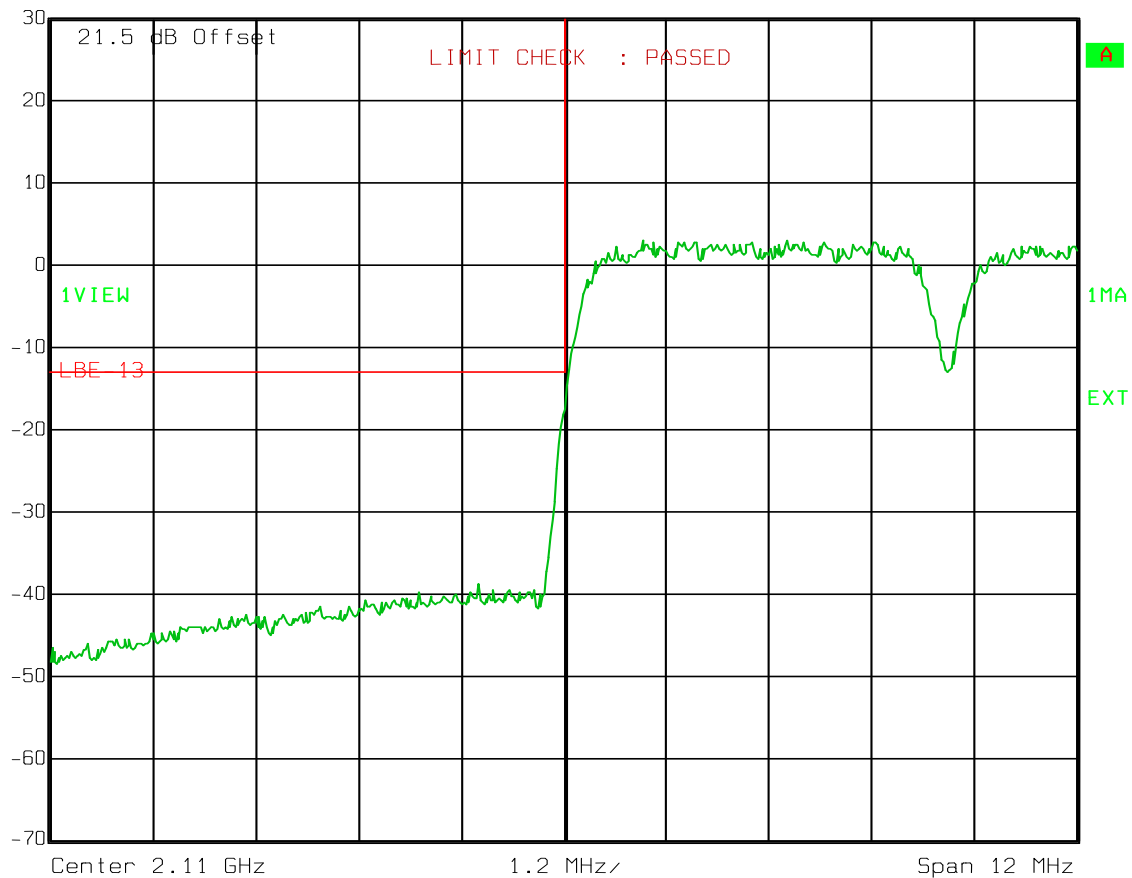
Test Data – Spurious Emissions at Antenna Terminals

WCDMA/UMTS
LOW BANDEDGE
Downlink



Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



Date: 25.JUN.2010 12:07:53

Test Data – Spurious Emissions at Antenna Terminals

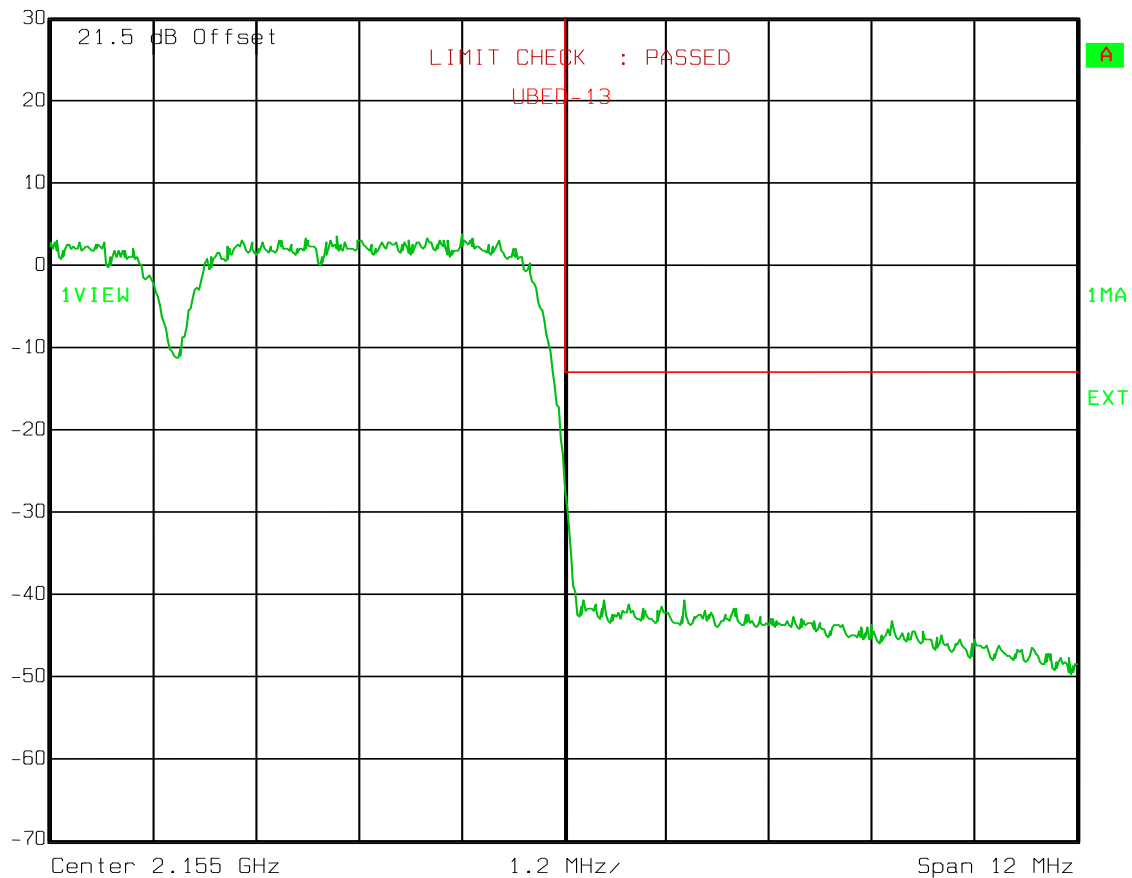
WCDMA/UMTS

HIGH BAND EDGE

Downlink

Ref Lvl
30 dBm

RBW	50 kHz	RF Att	20 dB
VBW	50 kHz	Mixer	-10 dBm
SWT	12 ms	Unit	dBm



Date: 25.JUN.2010 12:09:10

Test Data – Spurious Emissions at Antenna Terminals

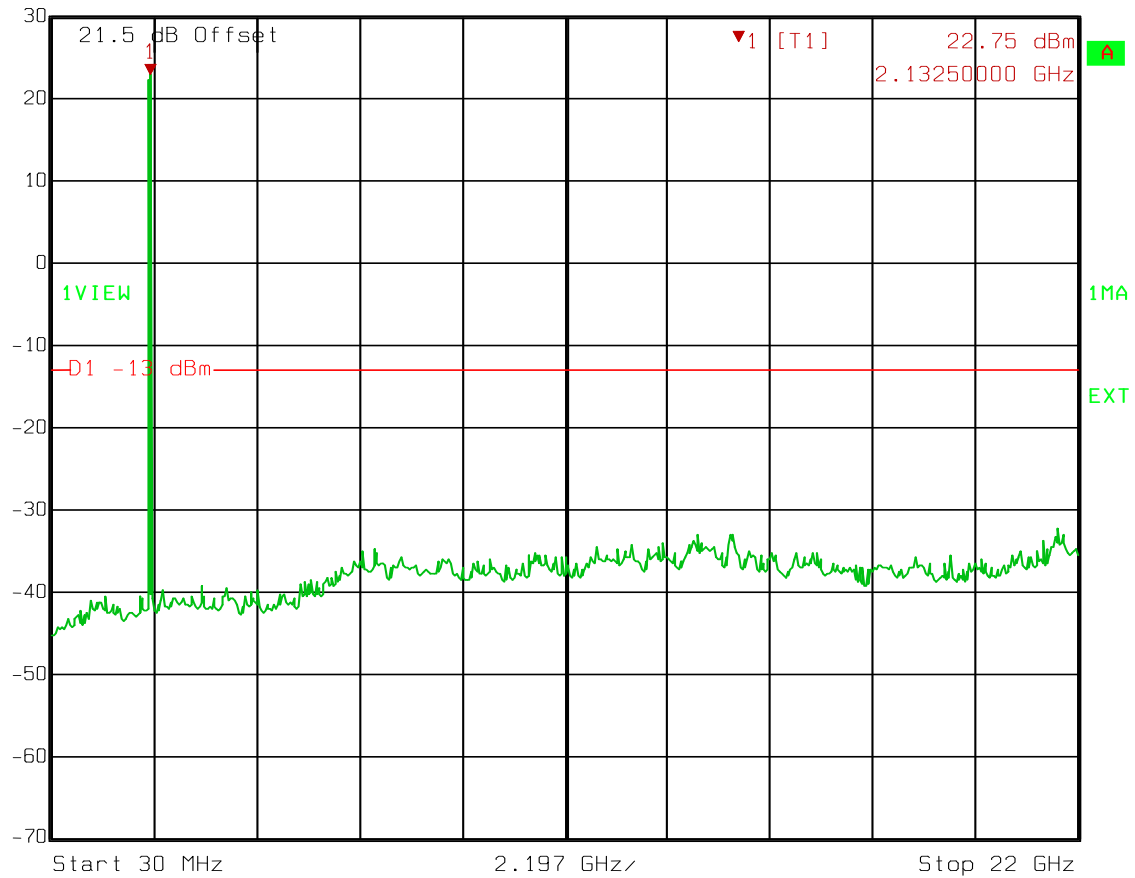
CDMA/EV-DO

SPURS

Downlink



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl 22.75 dBm VBW 1 MHz Mixer -10 dBm
30 dBm 2.13250000 GHz SWT 220 ms Unit dBm



Date: 25.JUN.2010 12:14:06

Test Data – Spurious Emissions at Antenna Terminals

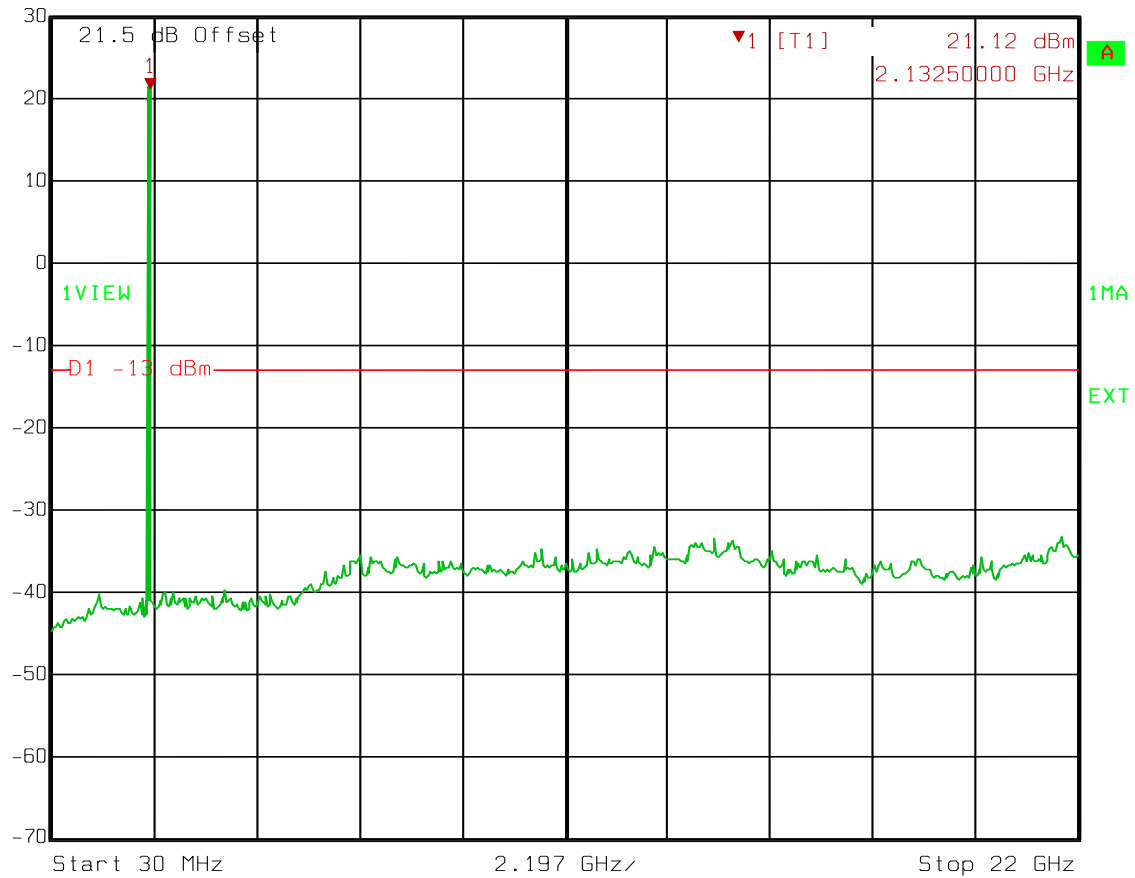
WCDMA/UMTS

SPURS

Downlink



Marker 1 [T1]
Ref Lvl 30 dBm
21.12 dBm
2.13250000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 220 ms
RF Att 20 dB
Mixer -10 dBm
Unit dBm



Date: 25.JUN.2010 12:15:58

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 27.53
TESTED BY: David Light	DATE: 25 June 2010

Test Results: Complies.

Test Data: The spectrum was searched from 30 MHz to 20 GHz. No emissions were detected within 20 dB of the specification limit.

RBW = VBW = 1 MHz Peak detector

Equipment Used: 1464-1484-1485-1016-993-791-1480

Measurement Uncertainty: +/-1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Section 7. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	09-Sep-2009	09-Sep-2011
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	30-Jun-2009	30-Jun-2010
1026	Frequency counter	Hewlett Packard	5350B	8232A01493	21-Dec-2007	21-Dec-2008
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	19-Jan-2009	19-Jan-2011
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1464	Spectrum Analyzer	Hewlett Packard	8563E	3551A04428	27-Feb-2009	27-Feb-2011
1468	Attenuator, 10 db, DC 18 Ghz	MCL Inc.	BW-S10W2 10db-2WDC		N/R	
1469	Attenuator, 10 db, DC 18 Ghz	MCL Inc.	BW-S10W2 10db-2WDC		N/R	
1472	Attenuator, 20dB, DC 18 Ghz	Omni Spectra	20600-20db		N/R	
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	18-Jan-2010	18-Jan-2011
1484	Cable	Storm	PR90-010-072		30-Jun-2009	30-Jun-2010
1485	Cable	Storm	PR90-010-216		30-Jun-2009	30-Jun-2010
791	PreAmp	Nemko, USA			08-Mar-2010	08-Mar-2011

ANNEX A - TEST DETAILS

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

Minimum Standard: Para. No.27.53(d)(1). The power of each fixed or base station transmitting in the 2110-2155 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to a peak equivalent isotropically radiated power (EIRP) of 3280 watts. The power of each fixed or base station transmitting in the 2110-2155 MHz band from any other location is limited to a peak EIRP of 1640 watts. A licensee operating a base or fixed station utilizing a power of more than 1640 watts EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band. Operations above 1640 watts EIRP must also be coordinated in advance with the following licensees within 120 kilometers (75 miles) of the base or fixed station: all Broadband Radio Service (BRS) licensees authorized under Part 27 in the 2155-2160 MHz band and all AWS licensees in the 2110-2155 MHz band.

Method Of Measurement:Detachable Antenna:

The channel power integrated across the carrier's bandwidth at antenna terminals is measured using a 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

W-CDMA

RBW=VBW= 50 kHz

Span: 10 MHz

Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 27.53

Minimum Standard: Para. No.27.53(g) For operations in the 1710-1755 MHz and 2110-2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ 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 / 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

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

W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 50 kHz (< 1MHz from Band Edge)
VBW: \geq 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.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 27.53
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Minimum Standard:

Para. No.27.53(g) For operations in the 1710-1755 MHz and 2110-2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.

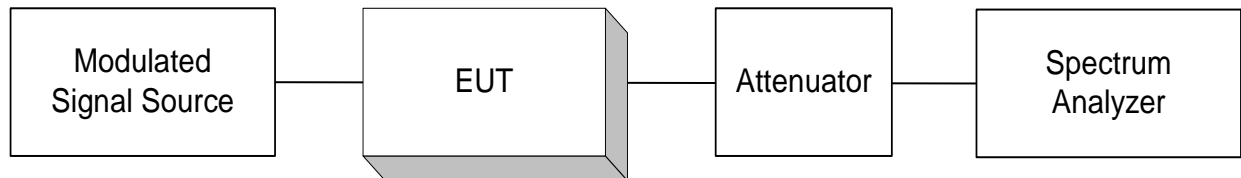
Method of Measurement

TIA/EIA-603-1992

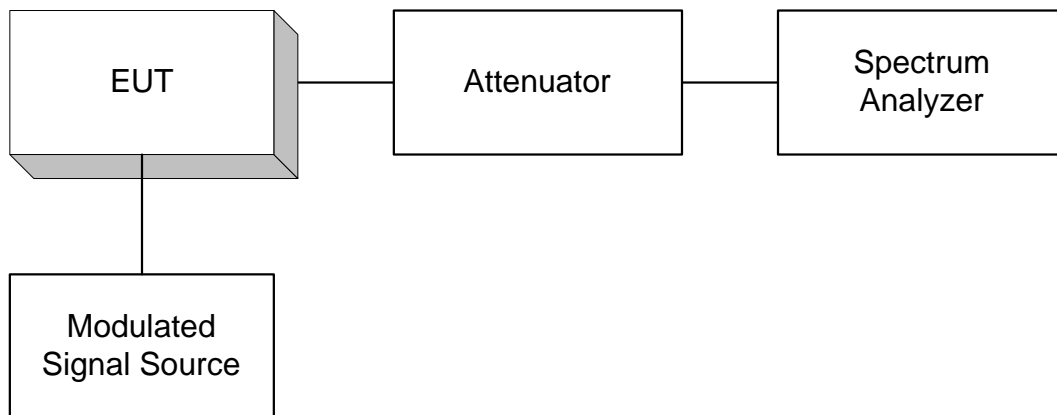
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna 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.

ANNEX B - TEST DIAGRAMS

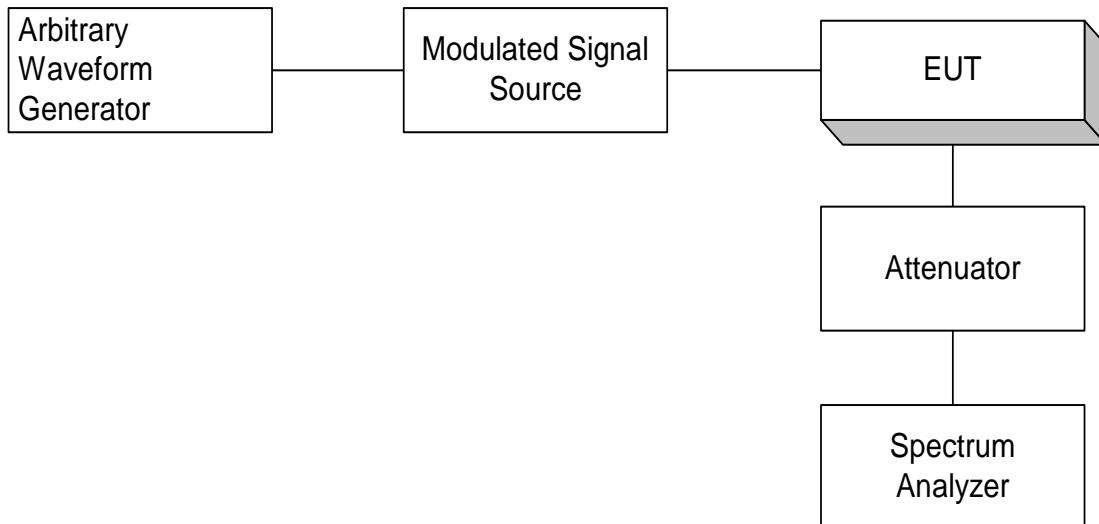
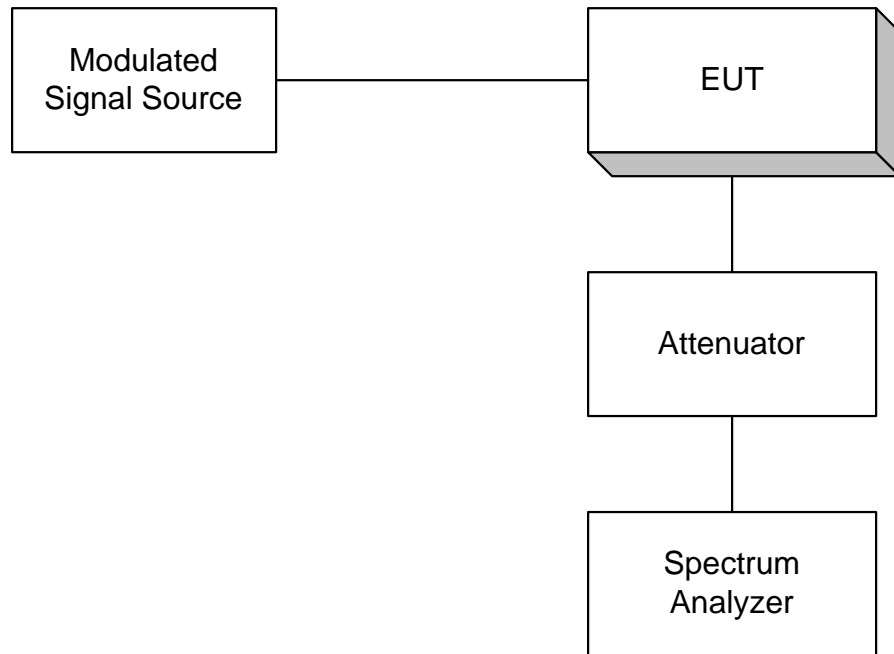
Para. No. 2.985 - R.F. Power Output



Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation

