KTL Test Report:	8R01001
Applicant:	Allen Telecom Group 140 Vista Centre Drive Forest, Virginia 24551
Equipment Under Test: (E.U.T.)	"Prism Plus Indoor" Repeater
FCC ID:	BCR-DBE60-ABE
In Accordance With:	**FCC Part 22, Subpart H** Cellular Band Repeaters
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	_____ W. Waterhouse, RF Engineering Lab Manager
Date:	_____
Total Number of Pages:	92

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Section 1. Summary of Test Results

Manufacturer: Allen Telecom Group

Model No.: Prism Plus Indoor

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 FCC Part 22, Subpart H.

☒ New Submission ☐ Production Unit

☐ Class II Permissive Change ☒ Pre-Production Unit

☐☐☐ Equipment Code

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

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

NVLAP®

NVLAP LAB CODE: 100351-0

TESTED BY: _____ DATE: _____
Kevin Carr, Technologist

TECHNICAL REVIEW: _____ DATE: _____
Tom Tidwell, Wireless Group Manager

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	22.913(a)	500W ERP	Plot	Complies
Occupied Bandwidth (Voice & SAT)	22.917(c)	Mark C	Plot	Complies
Occupies Bandwidth (Wideband Data)	22.917(d)	Mask D	Plot	Complies
Occupied Bandwidth (ST)	22.917(d)	Mask D	Plot	Complies
Occupied Bandwidth (Digital)	None	Input vs. Output	Plot	Complies
Spurious Emissions at Antenna Terminals	22.917	-13 dBm	Plot	Complies
Field Strength of Spurious Emissions	22.917	-13 dBm E.I.R.P.	Chart	Complies
Frequency Stability	22.355	1.5 ppm	N/A	N/A

Footnotes For N/A's:

Test Conditions: Temperature: 23 °C
Humidity: 29%

.

Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac, 60 Hz
Frequency Range:	**Downlink:**	869 - 894 MHz
	CDMA:	869.73 - 893.28 MHz
Frequency Range:	**Uplink:**	824 – 849 MHz
	CDMA:	824.73 – 848.28 MHz
20 dB Bandwidth:	**Uplink:**	36.42 MHz
	Downlink	35.92 MHz

Type of Modulation and Designator:	**CDMA (F9W)**	**GSM (GXW)**	**TDMA (DXW)**	**CDPD (F9W)**	**AMPS (F8W, F1D)**
	☒	☐	☒	☐	☒

AGC Threshold:	Not Applicable
Output Impedance:	50 ohm
Gain:	60 dB Nominal
Max Input Power:	30 dBm Nominal
RF Output (Rated): **Single:**	30 dBm Nominal
Composite:	27 dBm per 2 Channel Nominal

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

Band Selection:	**Software**	**Duplexer Change**	**Fullband Coverage**
	☐	☒	☒

Description of Modifications For Class II Permissive Change

NOT APPLICABLE

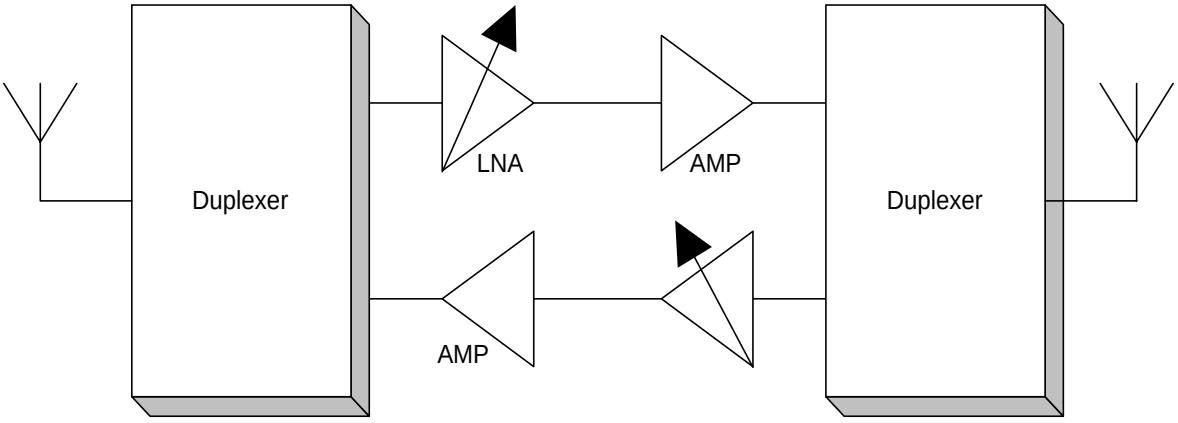
Modifications Made During Testing

NOT APPLICABLE

Theory of Operation

The Prism Plus is an RF booster that is used to extend cellular telephone and 800/900 MHz trunked / conversion coverage in weak signal areas a "dead spots". Prism Plus may be used to make coverage inside buildings more accessible to offices, police stations and emergency communications centers. Increasing cellular accessibility, the Prism Plus has a radius are of up to one mile.

System Diagram



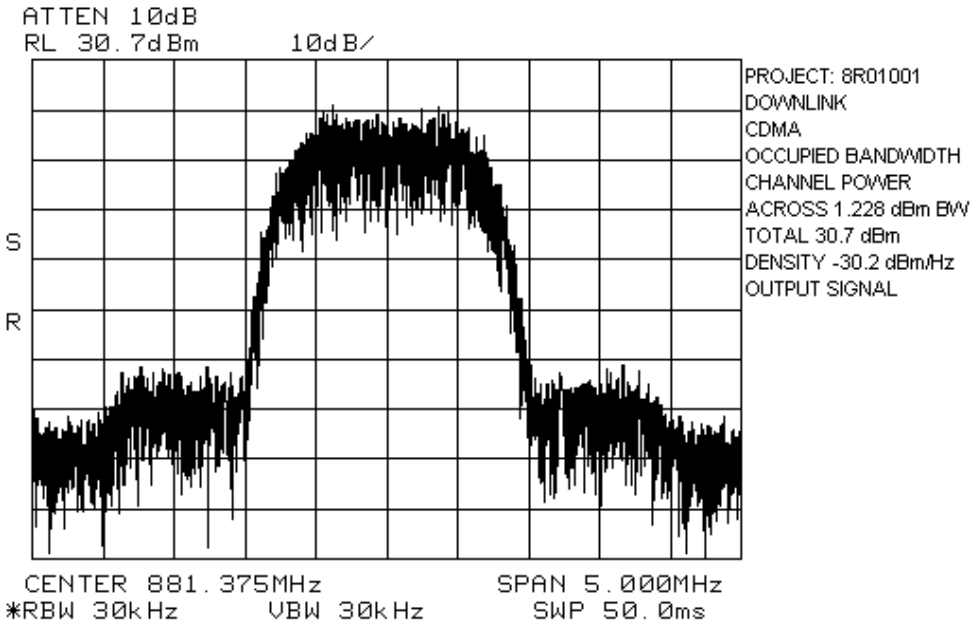
Section 3. RF Power Output

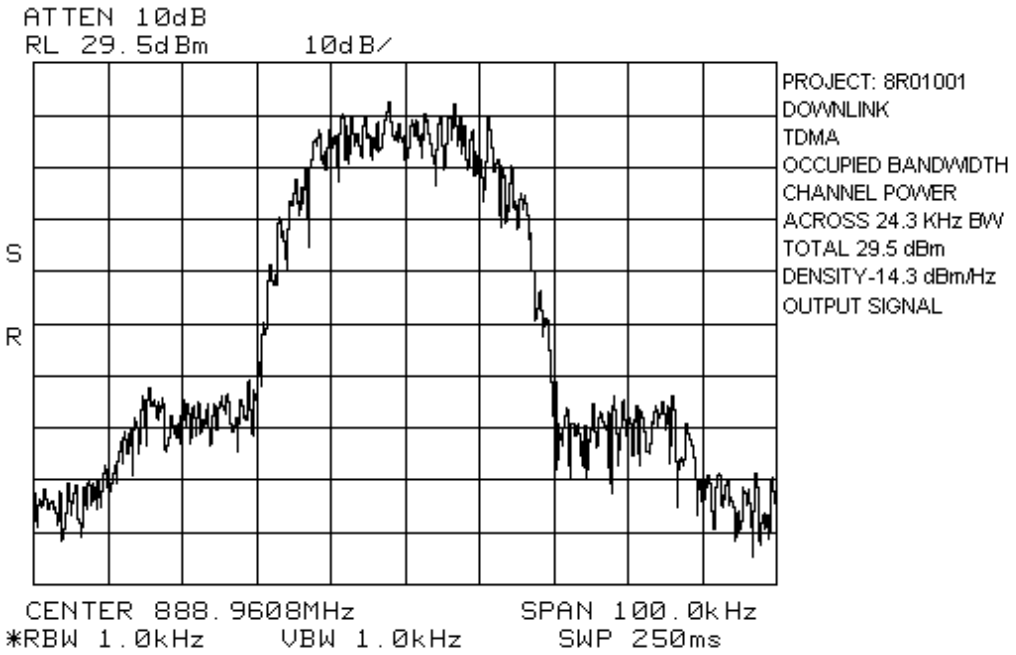
NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Kevin Carr	DATE: October 30, 1998

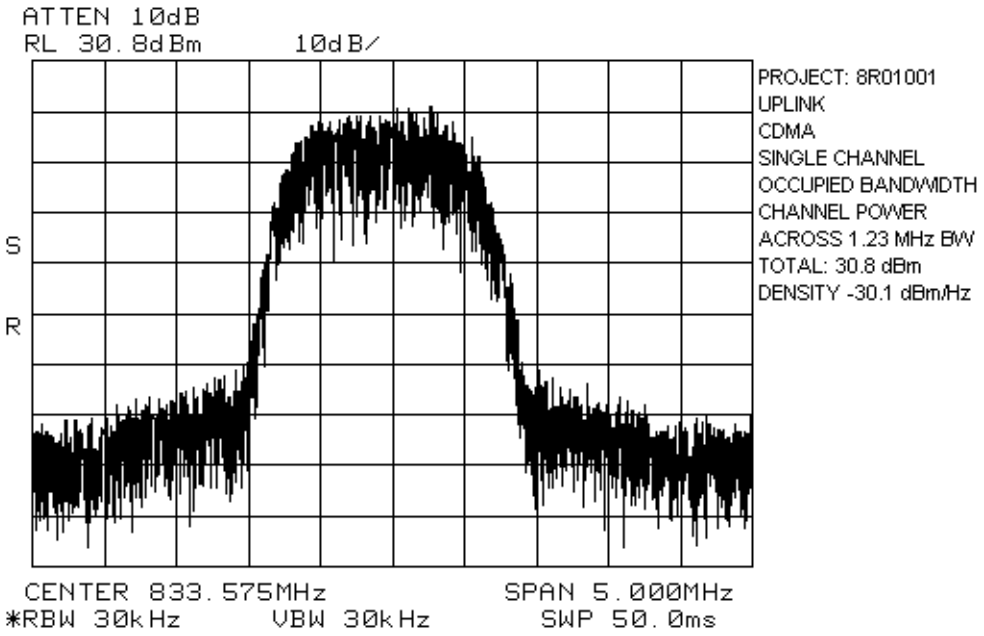
Test Results: Complies.

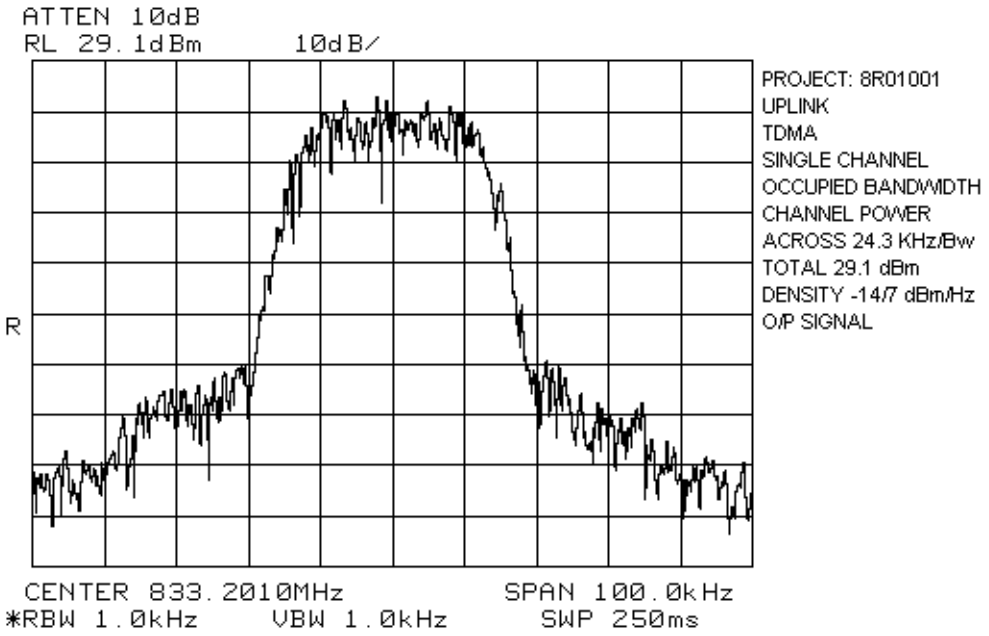
Measurement Data:

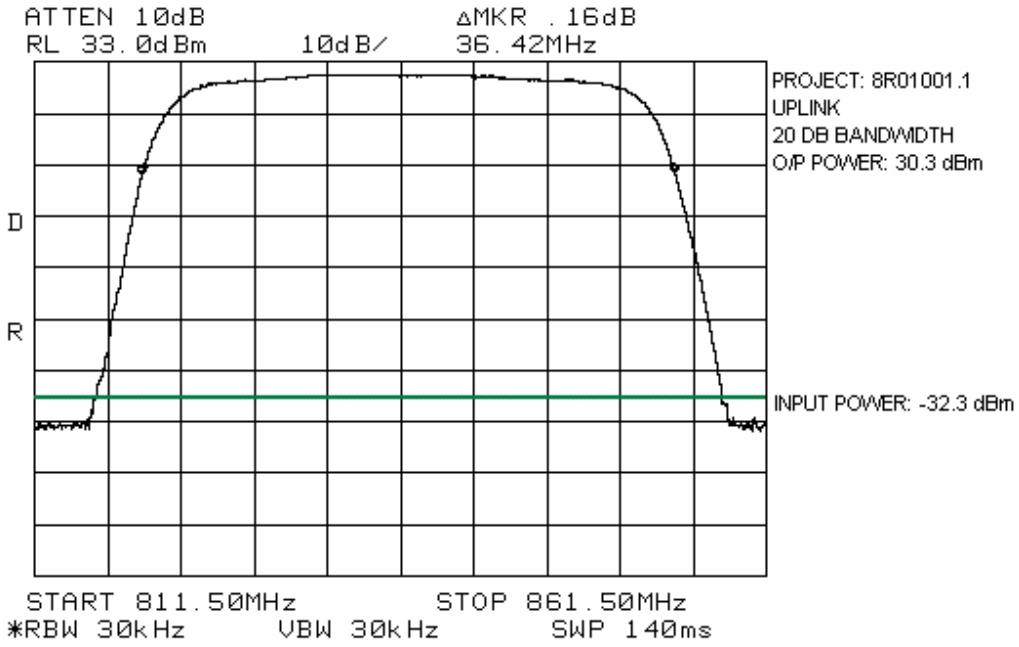
	Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
Uplink	AMPS	30.3	27.3 / 2 Channel
Downlink	AMPS	30.3	27.3 / 2 Channel
Uplink	CDMA	30.8	27.8 / 2 Channel
Downlink	CDMA	30.7	27.7 / 2 Channel
Uplink	TDMA	29.1	26.1 / 2 Channel
Downlink	TDMA	29.5	26.5 / 2 Channel

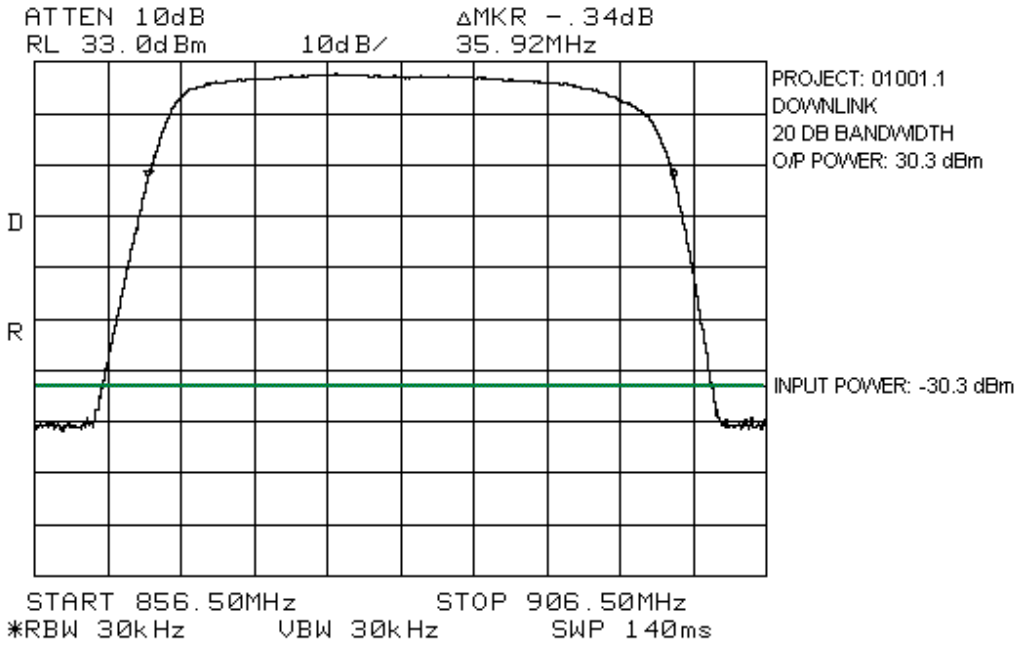

ATTEN 10dB
RL 30.7dBm
10dB/
S
R
PROJECT: 8R01001
DOWNLINK
CDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.228 dBm BW
TOTAL 30.7 dBm
DENSITY -30.2 dBm/Hz
OUTPUT SIGNAL
CENTER 881.375MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL 29.5dBm
10dB/
S
R
PROJECT: 8R01001
DOWNLINK
TDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz BW
TOTAL 29.5 dBm
DENSITY-14.3 dBm/Hz
OUTPUT SIGNAL
CENTER 888.9608MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL 30.8dBm
10dB/
S
R
PROJECT: 8R01001
UPLINK
CDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.23 MHz BW
TOTAL: 30.8 dBm
DENSITY -30.1 dBm/Hz
CENTER 833.575MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL 29.1dBm
10dB/
R
PROJECT: 8R01001
UPLINK
TDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz/Bw
TOTAL 29.1 dBm
DENSITY -14/7 dBm/Hz
O/P SIGNAL
CENTER 833.2010MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL 33.0dBm
10dB/
ΔMKR .16dB
36.42MHz
PROJECT: 8R01001.1
UPLINK
20 DB BANDWIDTH
O/P POWER: 30.3 dBm
D
R
INPUT POWER: -32.3 dBm
START 811.50MHz
STOP 861.50MHz
*RBW 30kHz
VBW 30kHz
SWP 140ms

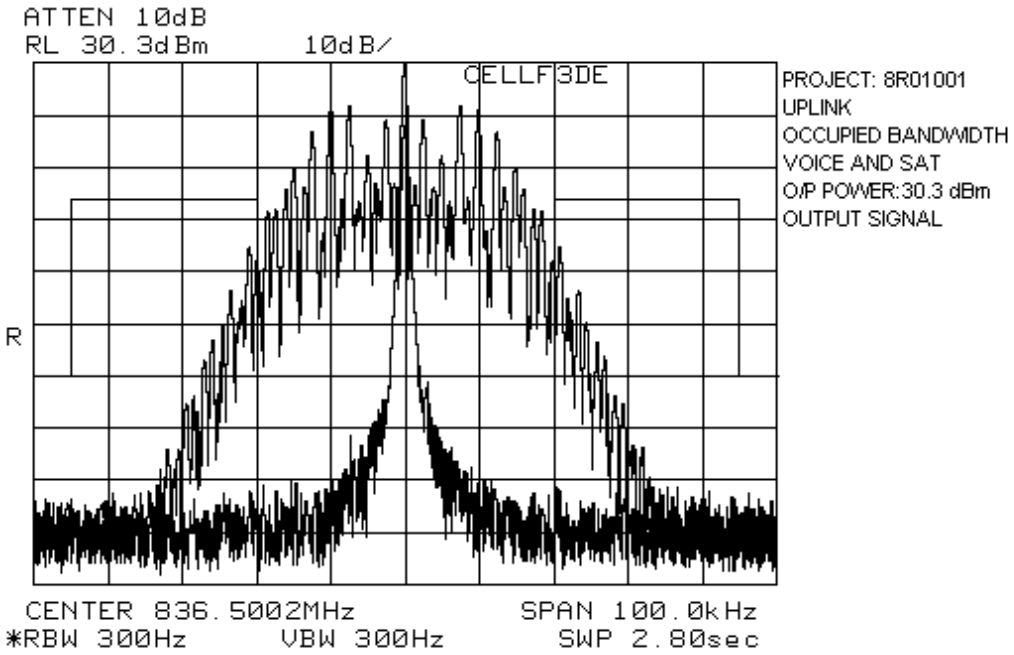

ATTEN 10dB
RL 33.0dBm
10dB/
ΔMKR -.34dB
35.92MHz
PROJECT: 01001.1
DOWNLINK
20 DB BANDWIDTH
O/P POWER: 30.3 dBm
D
R
INPUT POWER: -30.3 dBm
START 856.50MHz
STOP 906.50MHz
*RBW 30kHz
VBW 30kHz
SWP 140ms

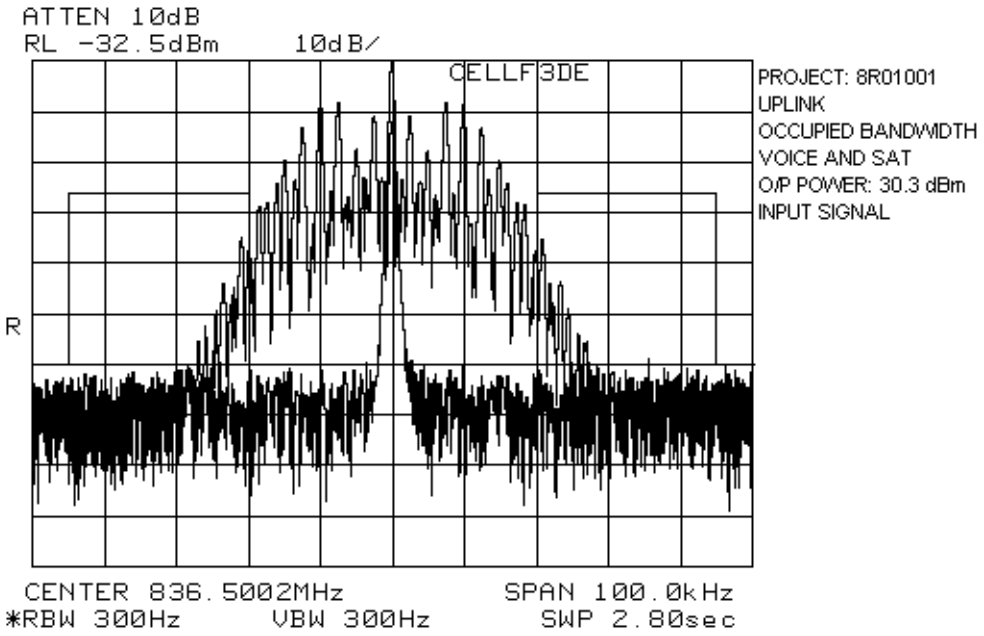
Section 4. Occupied Bandwidth

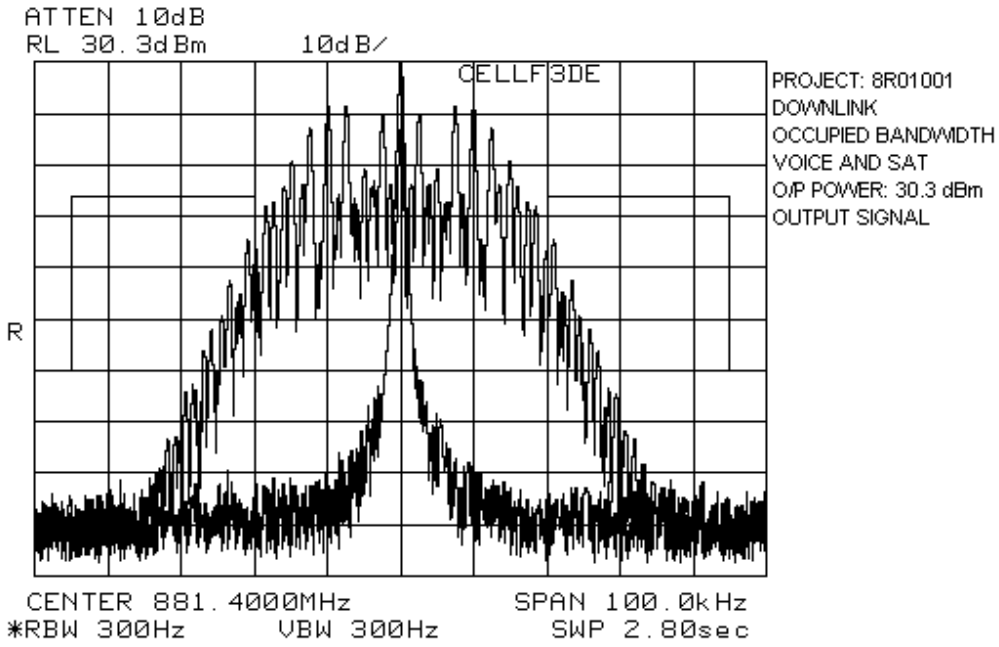
NAME OF TEST: Occupied Bandwidth (Voice + SAT)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: October 30, 1998

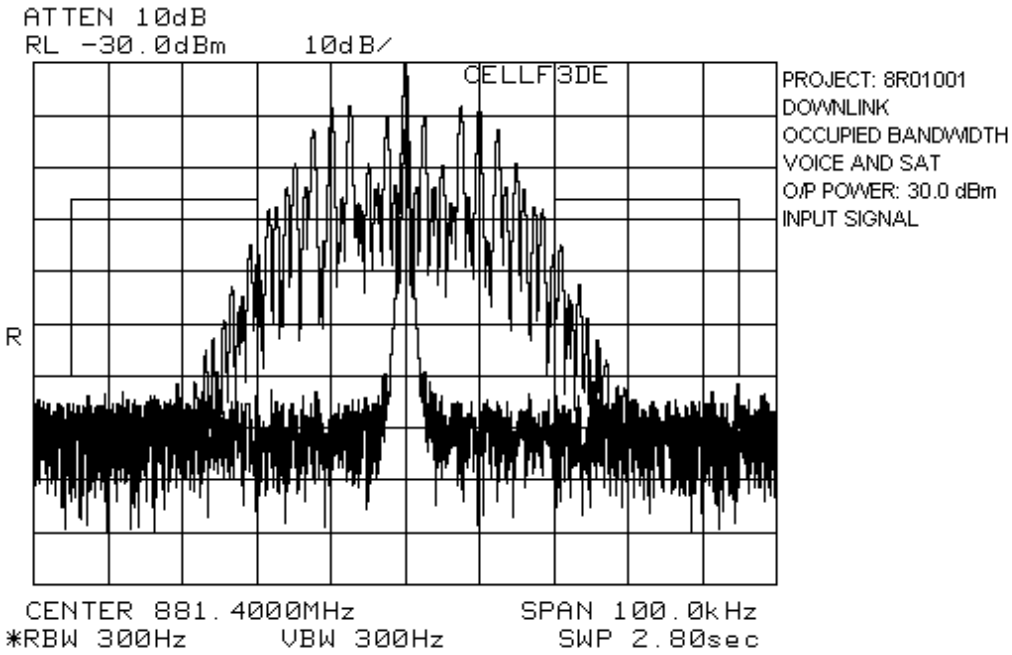
Test Results: Complies.

Test Data: See attached graph(s).


ATTEN 10dB
RL 30.3dBm
10dB/
CELLF3DE
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
VOICE AND SAT
O/P POWER:30.3 dBm
OUTPUT SIGNAL
R
CENTER 836.5002MHz
SPAN 100.0kHz
*RBW 300Hz
VBW 300Hz
SWP 2.80sec


ATTEN 10dB
RL -32.5dBm
10dB/
CELLF3DE
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
VOICE AND SAT
O/P POWER: 30.3 dBm
INPUT SIGNAL
R
CENTER 836.5002MHz
SPAN 100.0kHz
*RBW 300Hz
VBW 300Hz
SWP 2.80sec

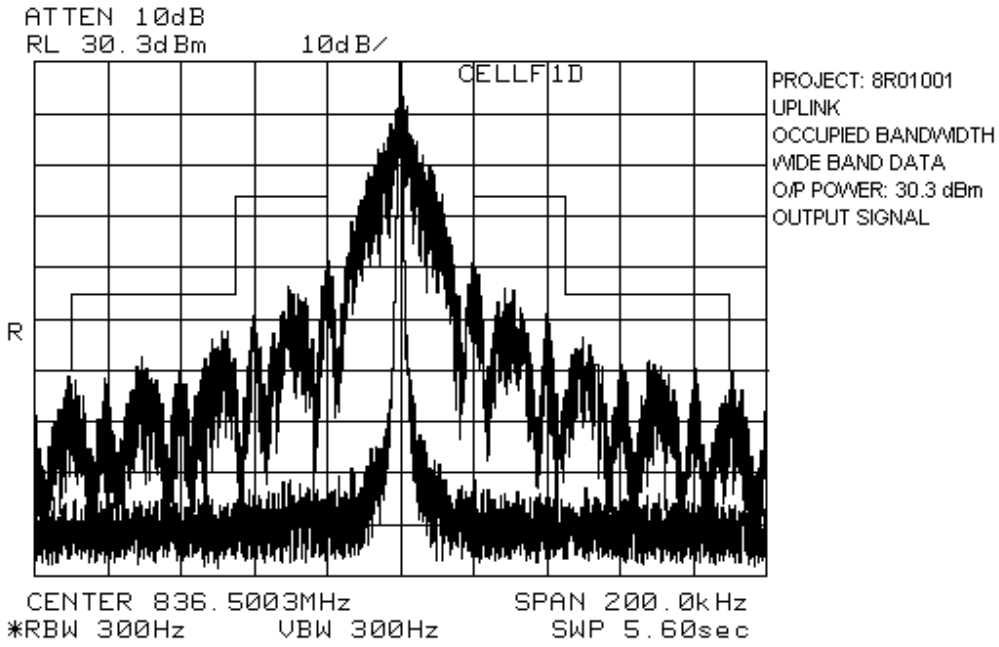

ATTEN 10dB
RL 30.3dBm
10dB/
CELLF3DE
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
VOICE AND SAT
O/P POWER: 30.3 dBm
OUTPUT SIGNAL
R
CENTER 881.4000MHz
SPAN 100.0kHz
*RBW 300Hz
VBW 300Hz
SWP 2.80sec

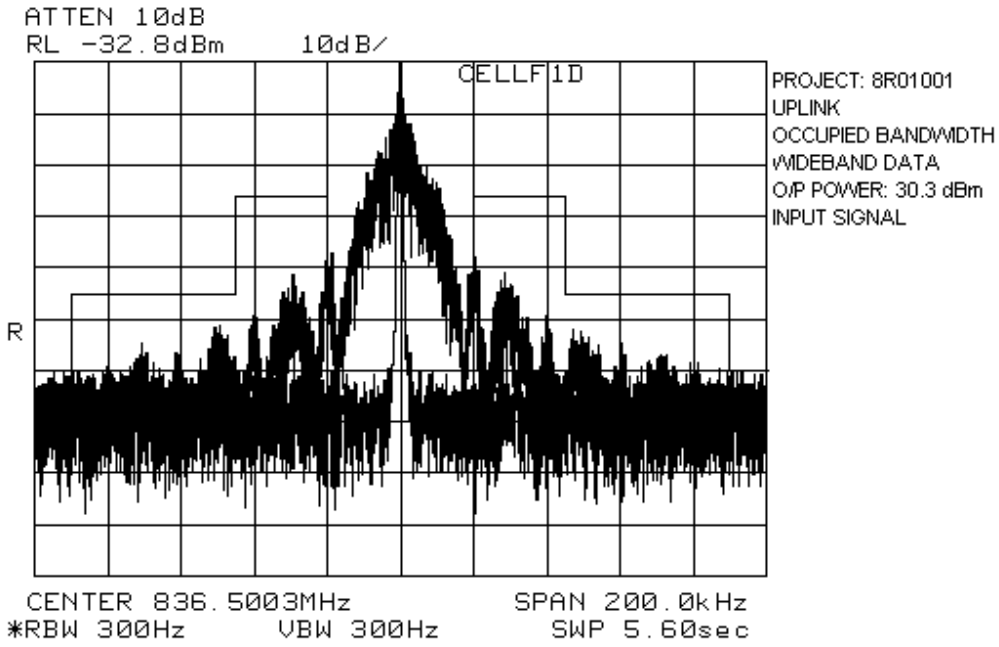

ATTEN 10dB
RL -30.0dBm
10dB/
CELLF3DE
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
VOICE AND SAT
O/P POWER: 30.0 dBm
INPUT SIGNAL
R
CENTER 881.4000MHz
SPAN 100.0kHz
*RBW 300Hz
VBW 300Hz
SWP 2.80sec

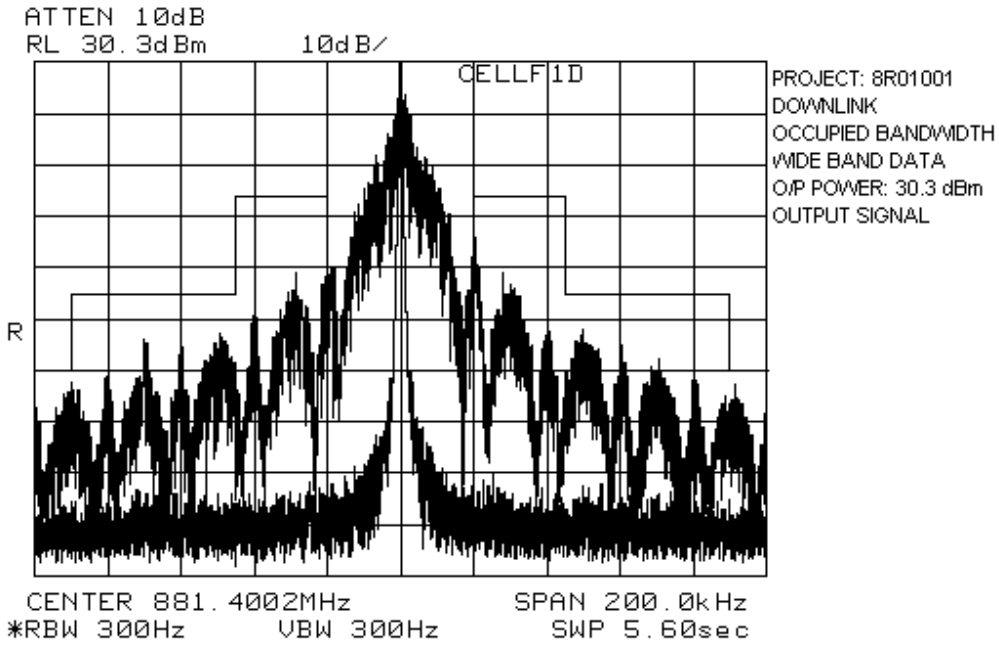
NAME OF TEST: Occupied Bandwidth (WB Data)	PARA. NO.: 2.917 (d)
TESTED BY: Kevin Carr	DATE: October 30, 1998

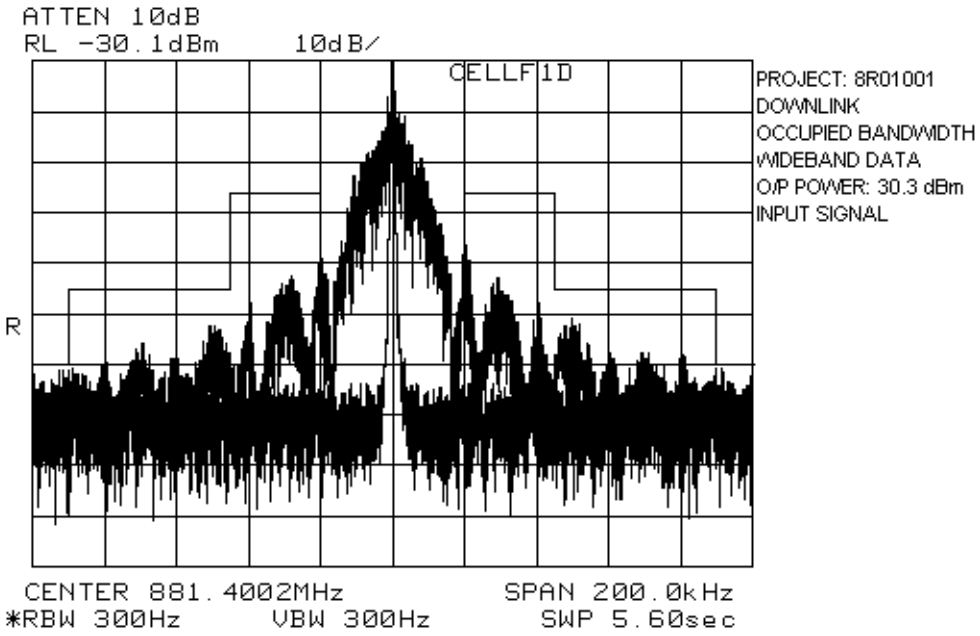
Test Results: Complies.

Test Data: See attached graph(s).


ATTEN 10dB
RL 30.3dBm
10dB/
CELLF1D
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
WIDE BAND DATA
O/P POWER: 30.3 dBm
OUTPUT SIGNAL
R
CENTER 836.5003MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec


ATTEN 10dB
RL -32.8dBm
10dB/
CELLF1D
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
WIDEBAND DATA
O/P POWER: 30.3 dBm
INPUT SIGNAL
R
CENTER 836.5003MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

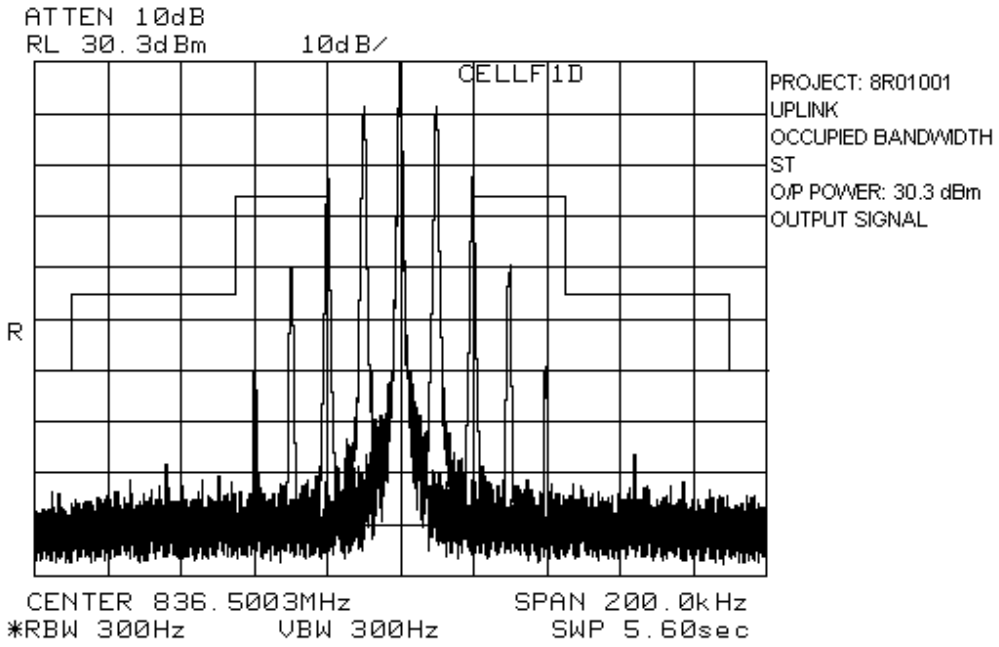

ATTEN 10dB
RL 30.3dBm
10dB/
CELLF1D
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
WIDE BAND DATA
O/P POWER: 30.3 dBm
OUTPUT SIGNAL
R
CENTER 881.4002MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

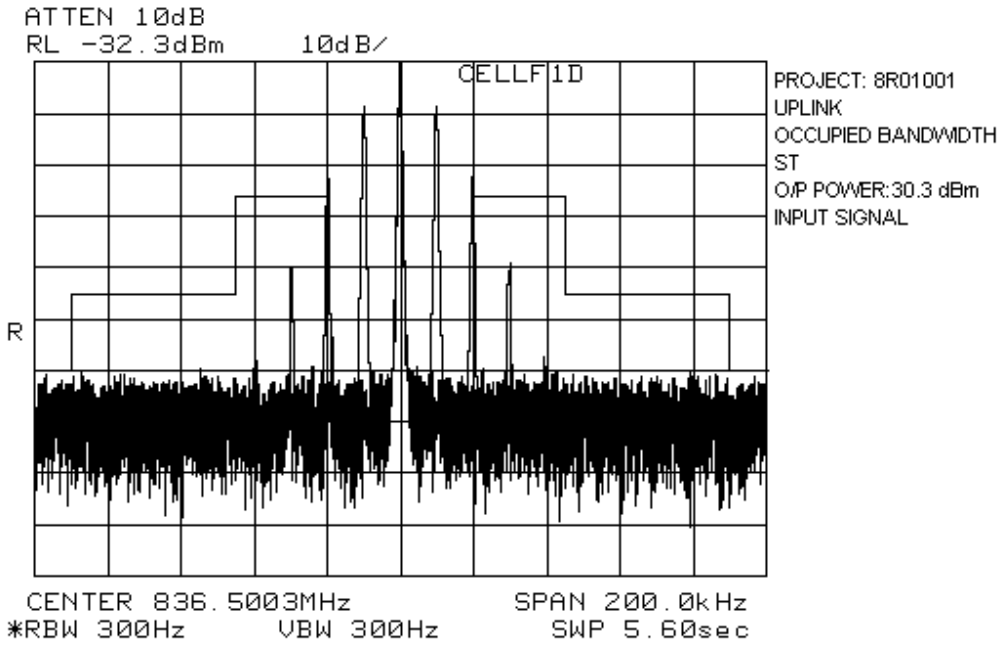

ATTEN 10dB
RL -30.1dBm
10dB/
CELLFID
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
WIDEBAND DATA
O/P POWER: 30.3 dBm
INPUT SIGNAL
R
CENTER 881.4002MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

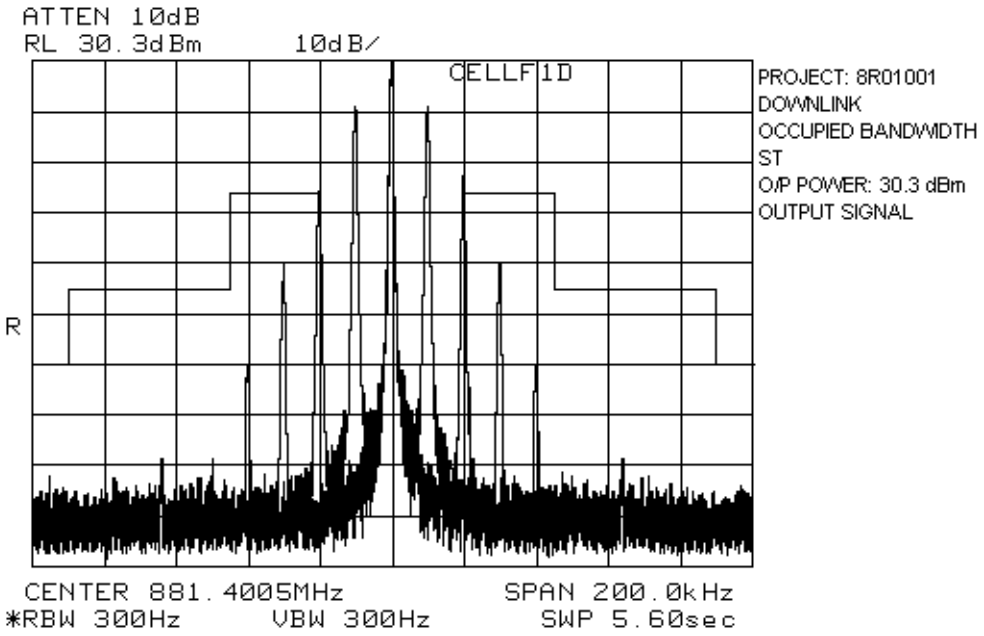
NAME OF TEST: Occupied Bandwidth (ST)	PARA. NO.: 2.917(d)
TESTED BY: Kevin Carr	DATE: October 30, 1998

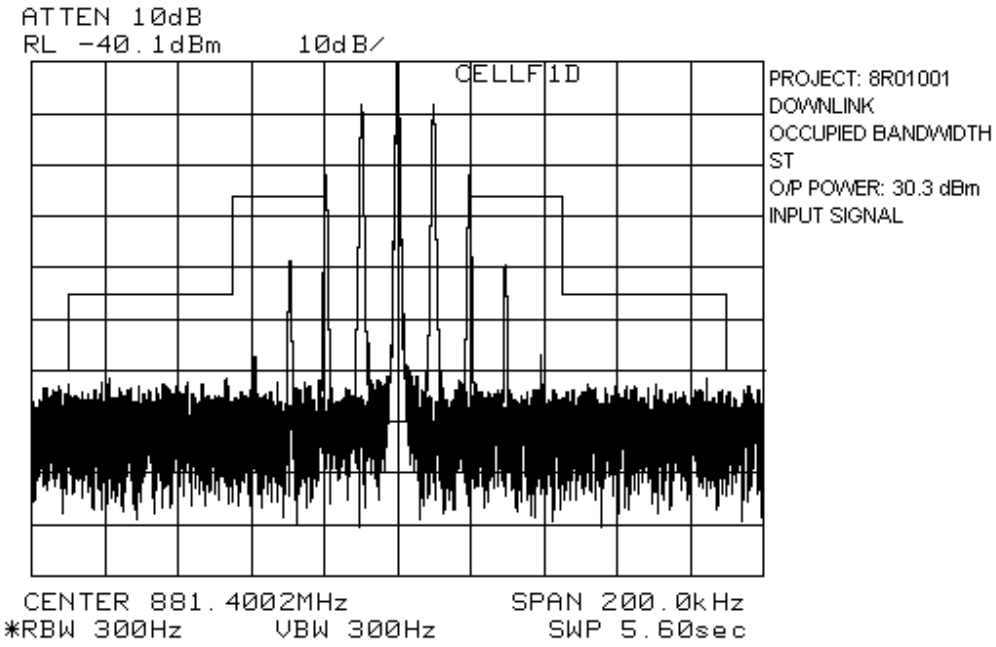
Test Results: Complies.

Test Data: See attached graph(s).


ATTEN 10dB
RL 30.3dBm
10dB/
CELLF1D
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
ST
O/P POWER: 30.3 dBm
OUTPUT SIGNAL
R
CENTER 836.5003MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec


ATTEN 10dB
RL -32.3dBm
10dB/
CELLF1D
PROJECT: 8R01001
UPLINK
OCCUPIED BANDWIDTH
ST
O/P POWER:30.3 dBm
INPUT SIGNAL
R
CENTER 836.5003MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

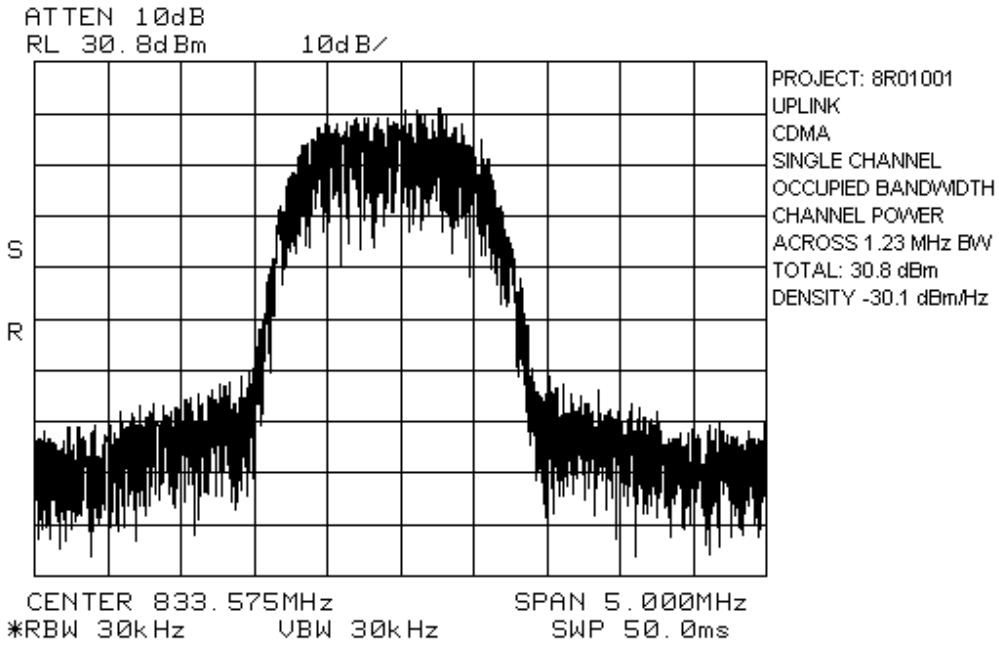

ATTEN 10dB
RL 30.3dBm
10dB/
CELLFID
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
ST
O/P POWER: 30.3 dBm
OUTPUT SIGNAL
R
CENTER 881.4005MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

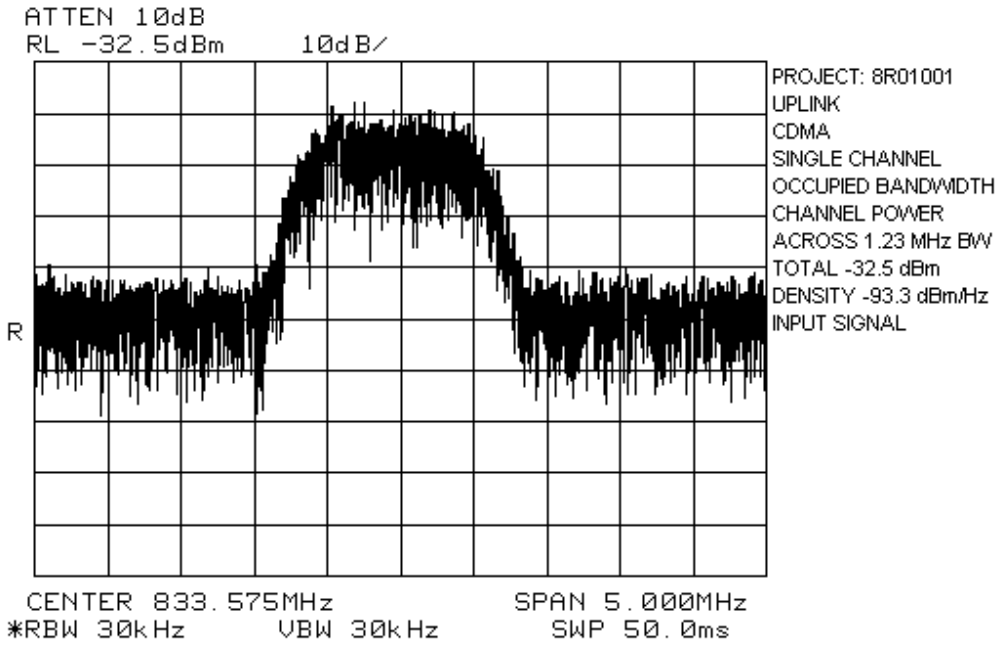

ATTEN 10dB
RL -40.1dBm
10dB/
CELLF1D
PROJECT: 8R01001
DOWNLINK
OCCUPIED BANDWIDTH
ST
O/P POWER: 30.3 dBm
INPUT SIGNAL
CENTER 881.4002MHz
SPAN 200.0kHz
*RBW 300Hz
VBW 300Hz
SWP 5.60sec

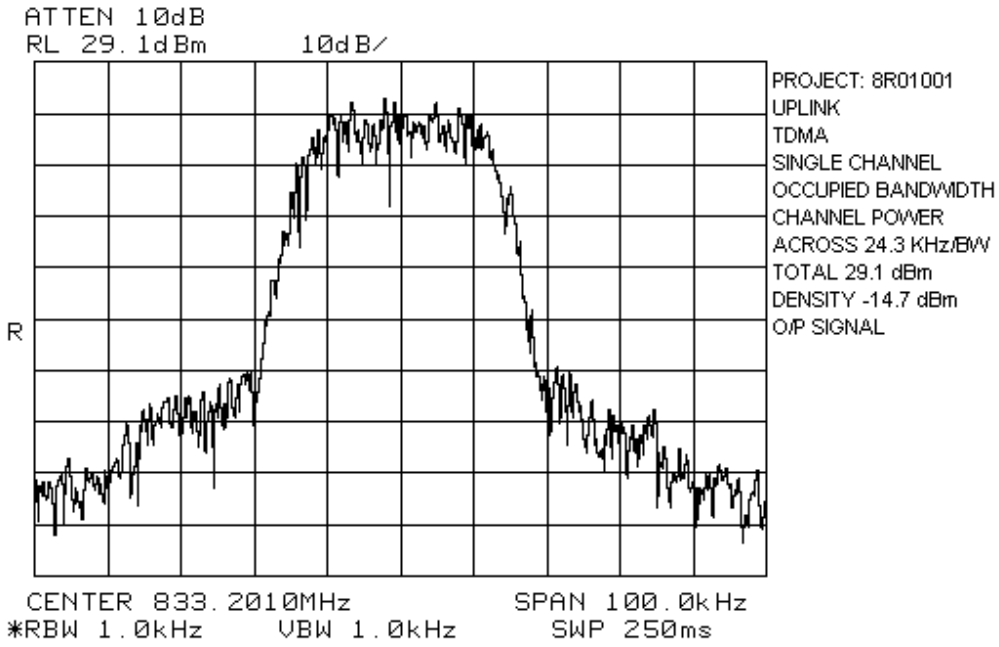
NAME OF TEST: Occupied Bandwidth (Digital Mod.)	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: October 29, 1998

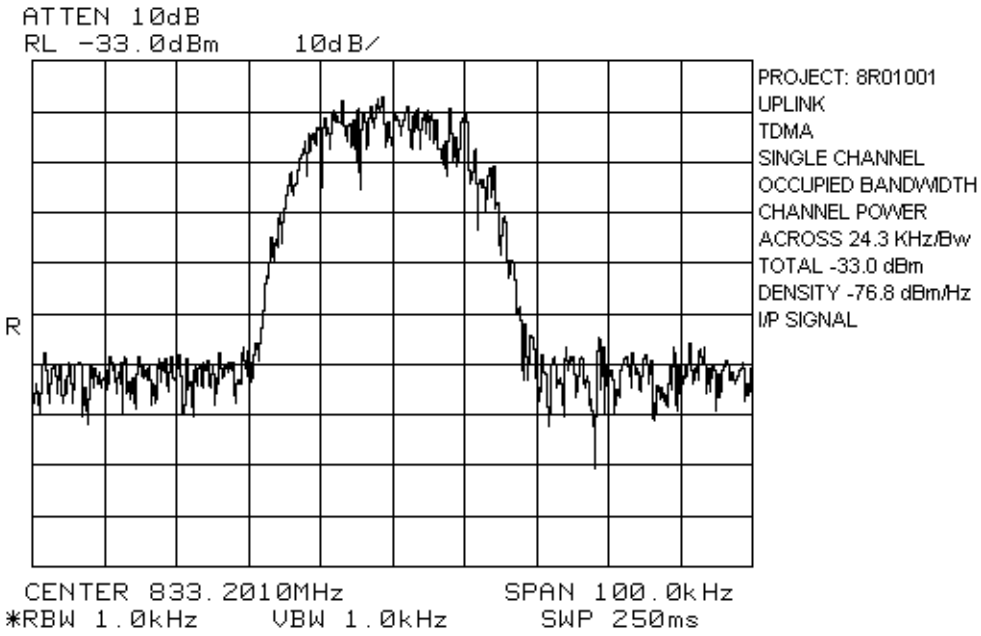
Test Results: Complies.

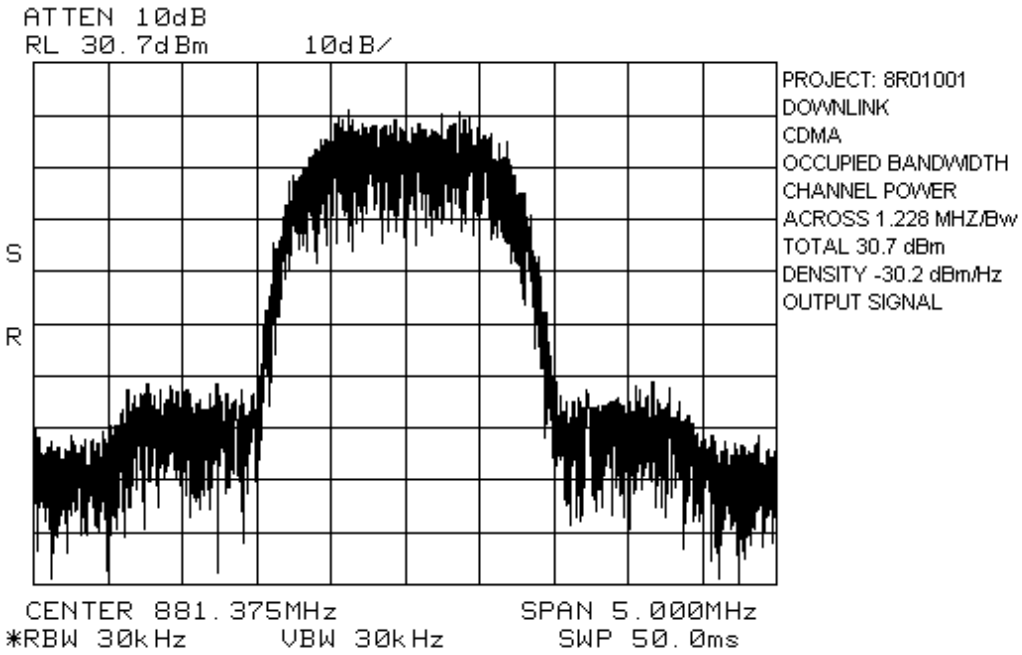
Test Data: See attached graph(s).

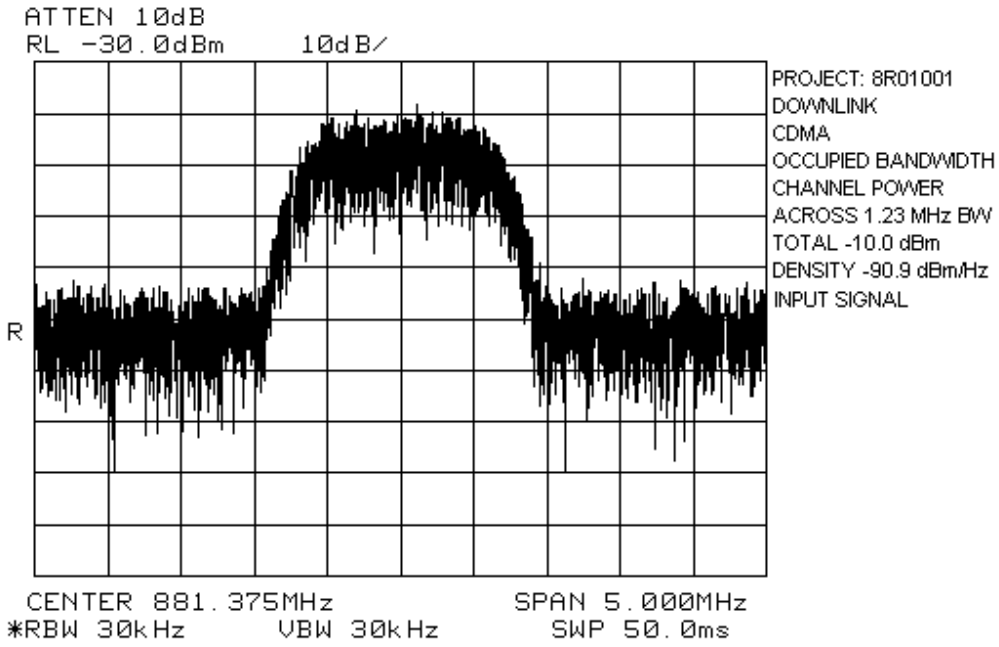

ATTEN 10dB
RL 30.8dBm
10dB/
S
R
PROJECT: 8R01001
UPLINK
CDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.23 MHz BW
TOTAL: 30.8 dBm
DENSITY -30.1 dBm/Hz
CENTER 833.575MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

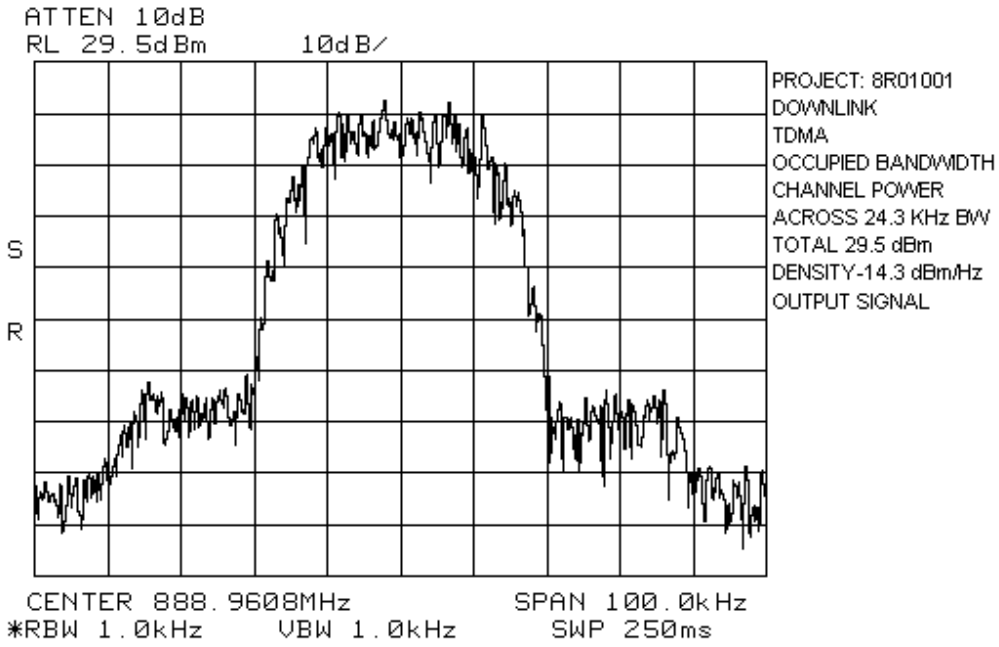

ATTEN 10dB
RL -32.5dBm
10dB/
R
PROJECT: 8R01001
UPLINK
CDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.23 MHz BW
TOTAL -32.5 dBm
DENSITY -93.3 dBm/Hz
INPUT SIGNAL
CENTER 833.575MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

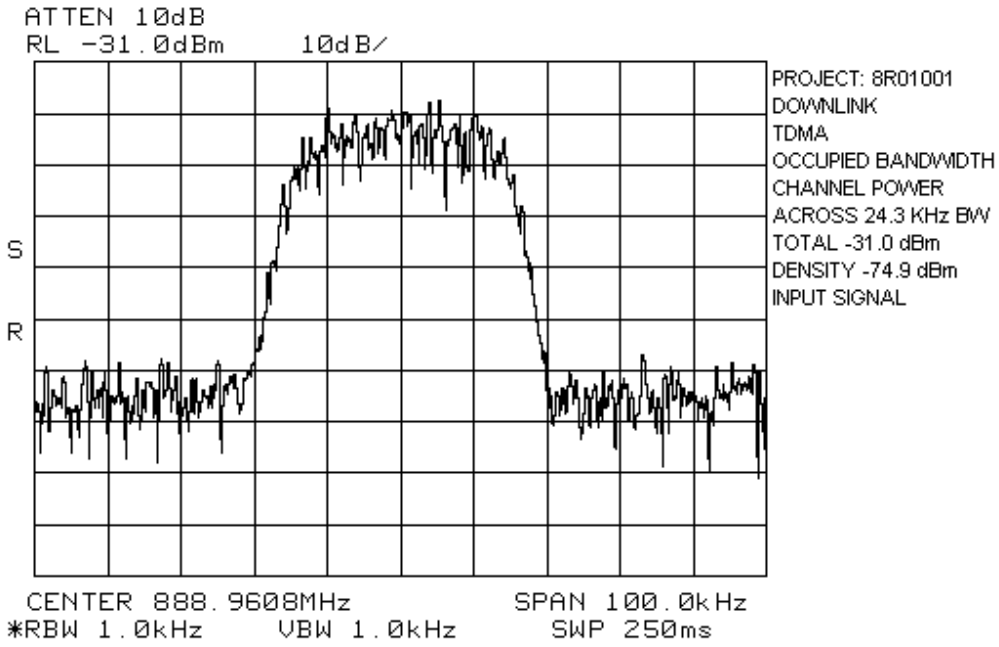

ATTEN 10dB
RL 29.1dBm
10dB/
R
PROJECT: 8R01001
UPLINK
TDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz/BW
TOTAL 29.1 dBm
DENSITY -14.7 dBm
O/P SIGNAL
CENTER 833.2010MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL -33.0dBm
10dB/
R
PROJECT: 8R01001
UPLINK
TDMA
SINGLE CHANNEL
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz/Bw
TOTAL -33.0 dBm
DENSITY -76.8 dBm/Hz
I/P SIGNAL
CENTER 833.2010MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL 30.7dBm
10dB/
S
R
PROJECT: 8R01001
DOWNLINK
CDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.228 MHZ/Bw
TOTAL 30.7 dBm
DENSITY -30.2 dBm/Hz
OUTPUT SIGNAL
CENTER 881.375MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL -30.0dBm
10dB/
R
PROJECT: 8R01001
DOWNLINK
CDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 1.23 MHz BW
TOTAL -10.0 dBm
DENSITY -90.9 dBm/Hz
INPUT SIGNAL
CENTER 881.375MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL 29.5dBm
10dB/
S
R
PROJECT: 8R01001
DOWNLINK
TDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz BW
TOTAL 29.5 dBm
DENSITY-14.3 dBm/Hz
OUTPUT SIGNAL
CENTER 888.9608MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms


ATTEN 10dB
RL -31.0dBm
10dB/
S
R
PROJECT: 8R01001
DOWNLINK
TDMA
OCCUPIED BANDWIDTH
CHANNEL POWER
ACROSS 24.3 KHz BW
TOTAL -31.0 dBm
DENSITY -74.9 dBm
INPUT SIGNAL
CENTER 888.9608MHz
SPAN 100.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 250ms

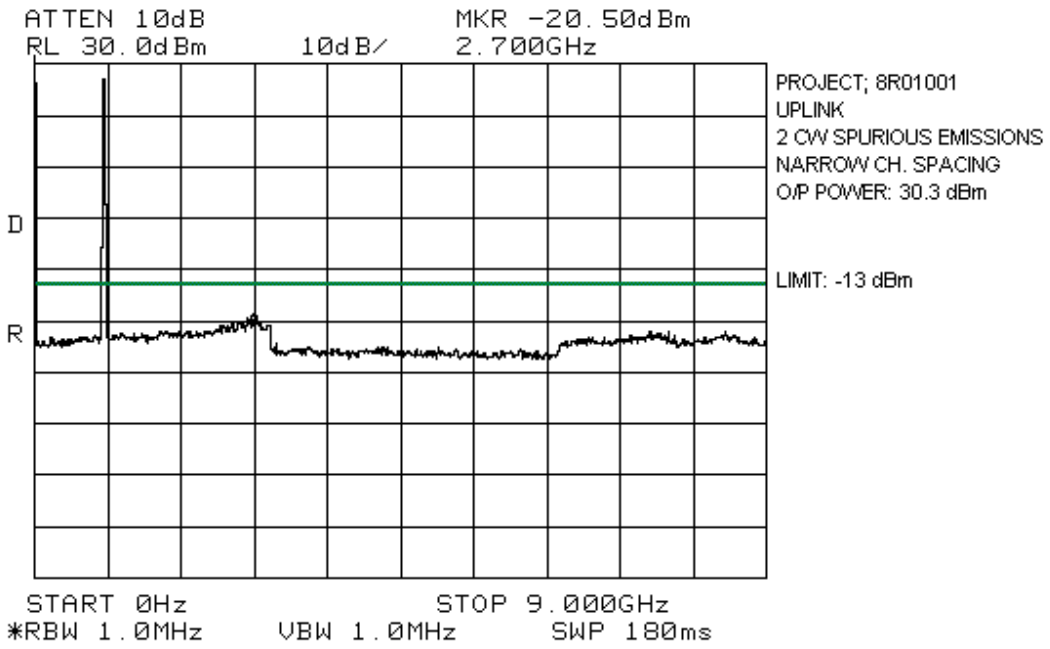
Section 5. Spurious Emissions at Antenna Terminals

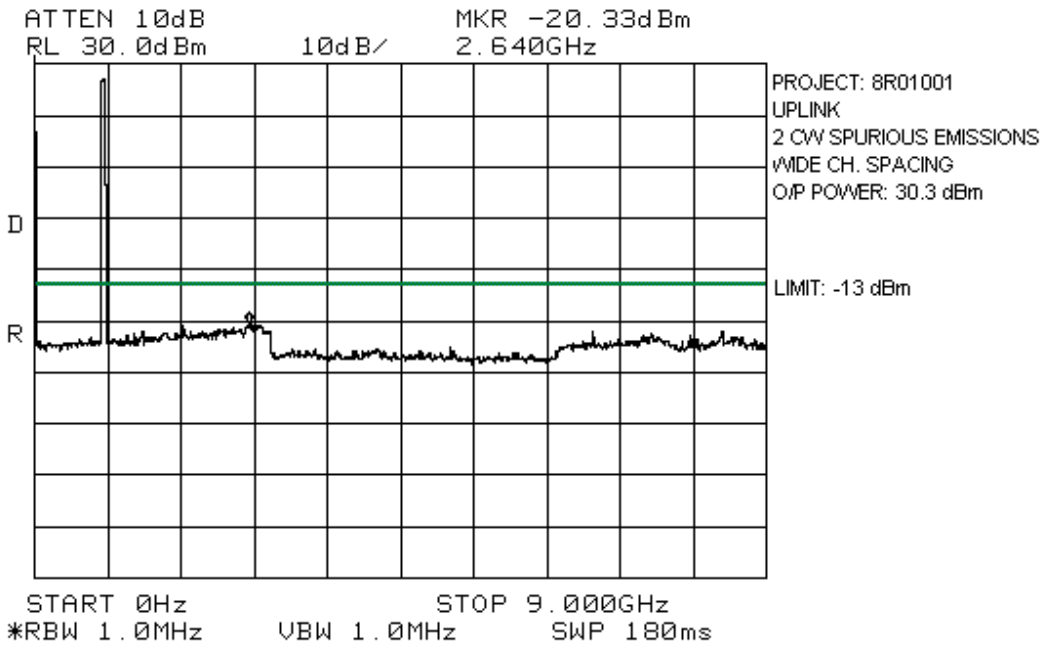
NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: October 29, 1998

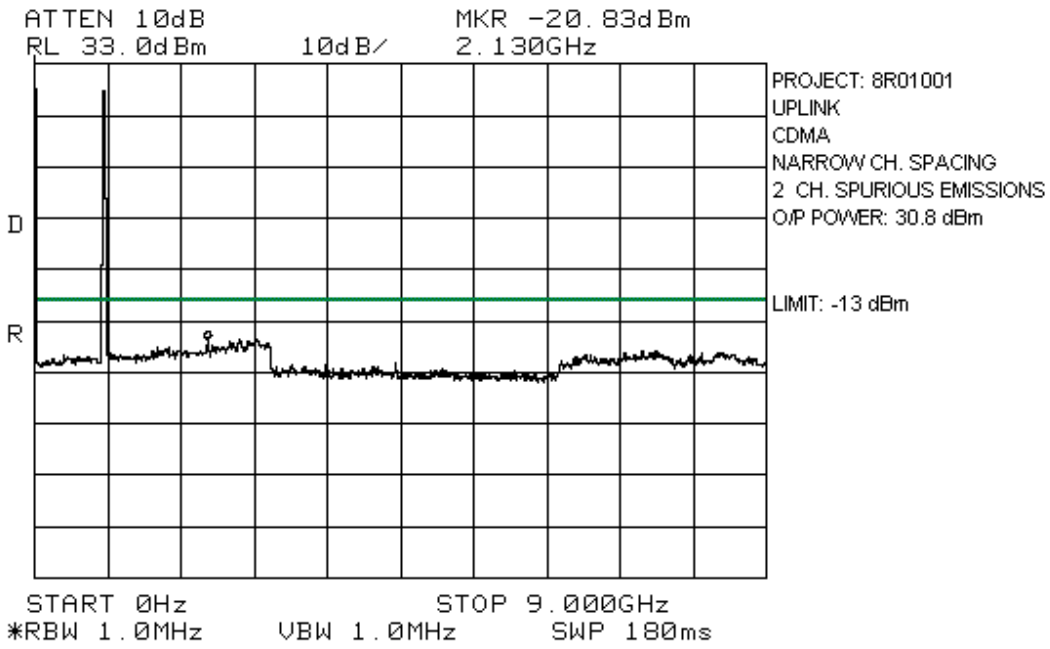
Test Results: Complies.

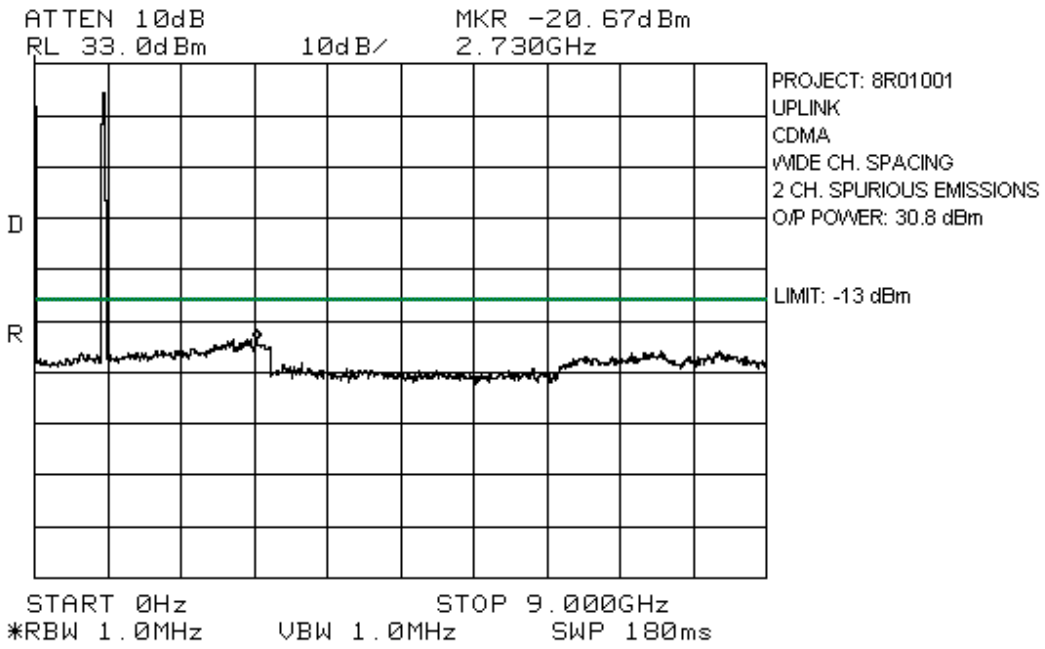
Test Data:

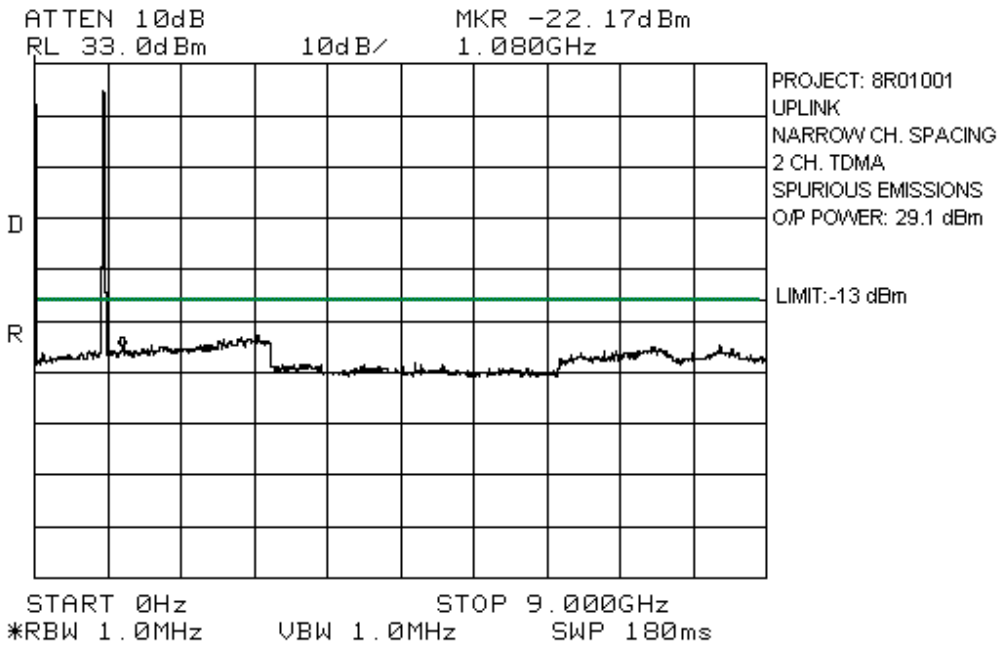
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 10 GHz spurious (Uplink)	-20.17
0 to 10 GHz spurious (Downlink)	-19.83
2 - signal intermodulation (Uplink)	-13.0
2 - signal intermodulation (Downlink)	-13.0
Lower band edge spurious (Uplink)	-18.30
Lower band edge spurious (Downlink)	-14.50
Upper band edge spurious (Uplink)	-13.17
Upper band edge spurious (Downlink)	-13.50

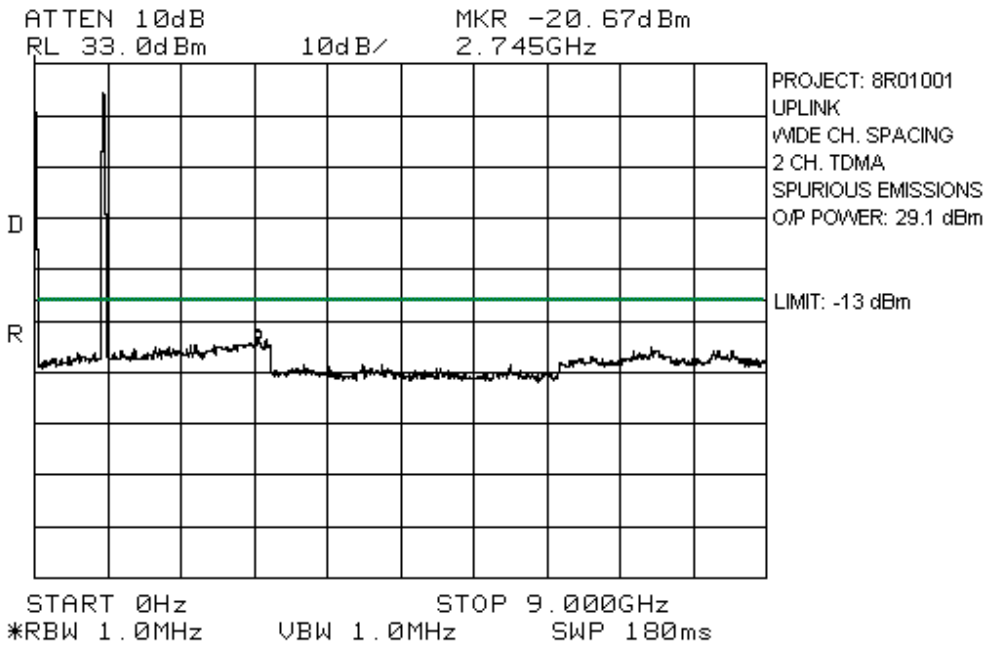

ATTEN 10dB
RL 30.0dBm
10dB/
MKR -20.50dBm
2.700GHz
PROJECT; 8R01001
UPLINK
2 CW SPURIOUS EMISSIONS
NARROW CH. SPACING
O/P POWER: 30.3 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

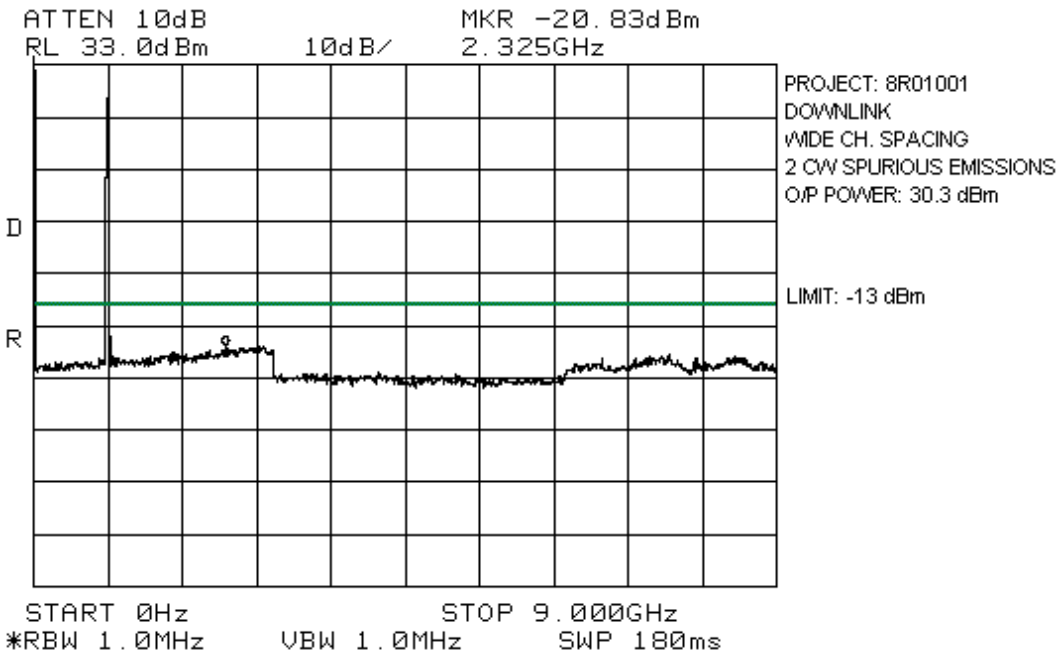

ATTEN 10dB
RL 30.0dBm
10dB/
MKR -20.33dBm
2.640GHz
PROJECT: 8R01001
UPLINK
2 CW SPURIOUS EMISSIONS
WIDE CH. SPACING
O/P POWER: 30.3 dBm
D
LIMIT: -13 dBm
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

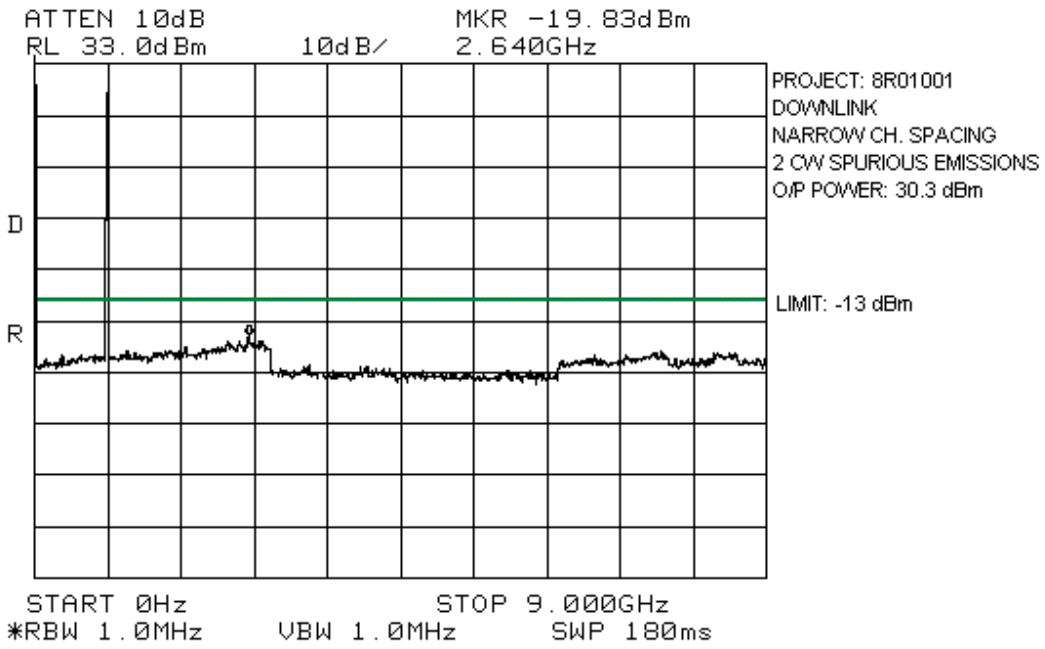

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.83dBm
2.130GHz
PROJECT: 8R01001
UPLINK
CDMA
NARROW CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 30.8 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

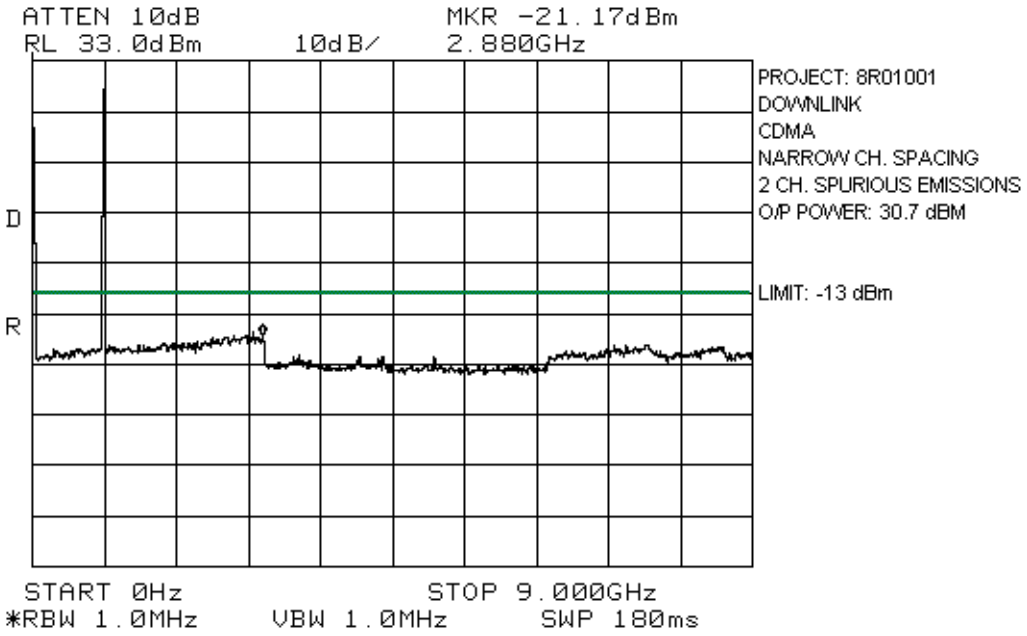

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.67dBm
2.730GHz
PROJECT: 8R01001
UPLINK
CDMA
WIDE CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 30.8 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

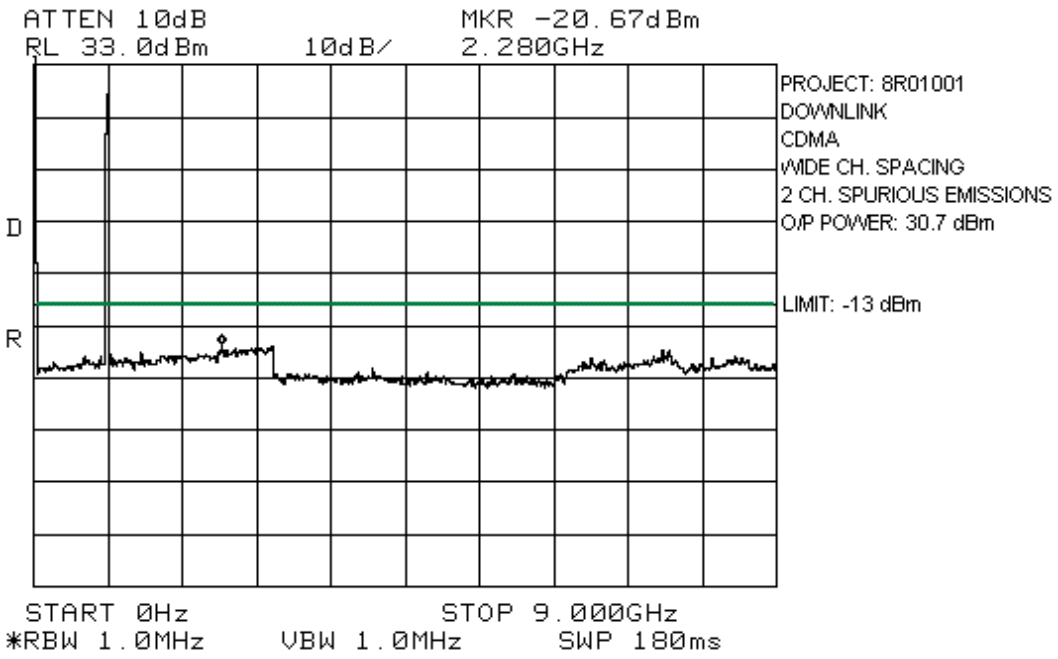

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -22.17dBm
1.080GHz
PROJECT: 8R01001
UPLINK
NARROW CH. SPACING
2 CH. TDMA
SPURIOUS EMISSIONS
O/P POWER: 29.1 dBm
LIMIT:-13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

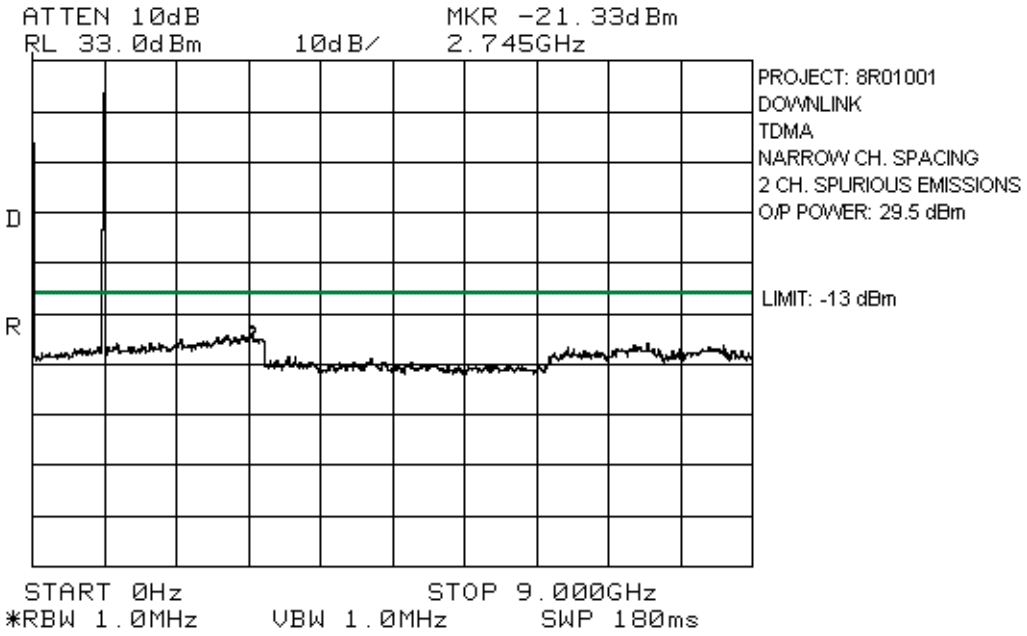

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.67dBm
2.745GHz
PROJECT: 8R01001
UPLINK
WIDE CH. SPACING
2 CH. TDMA
SPURIOUS EMISSIONS
O/P POWER: 29.1 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

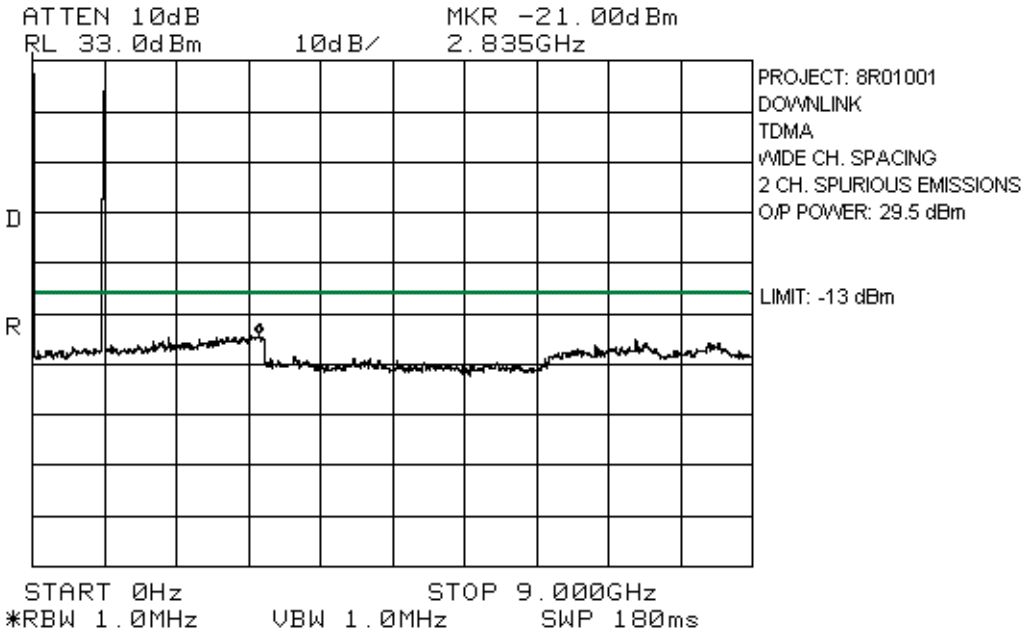

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.83dBm
2.325GHz
PROJECT: 8R01001
DOWNLINK
WIDE CH. SPACING
2 CW SPURIOUS EMISSIONS
O/P POWER: 30.3 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

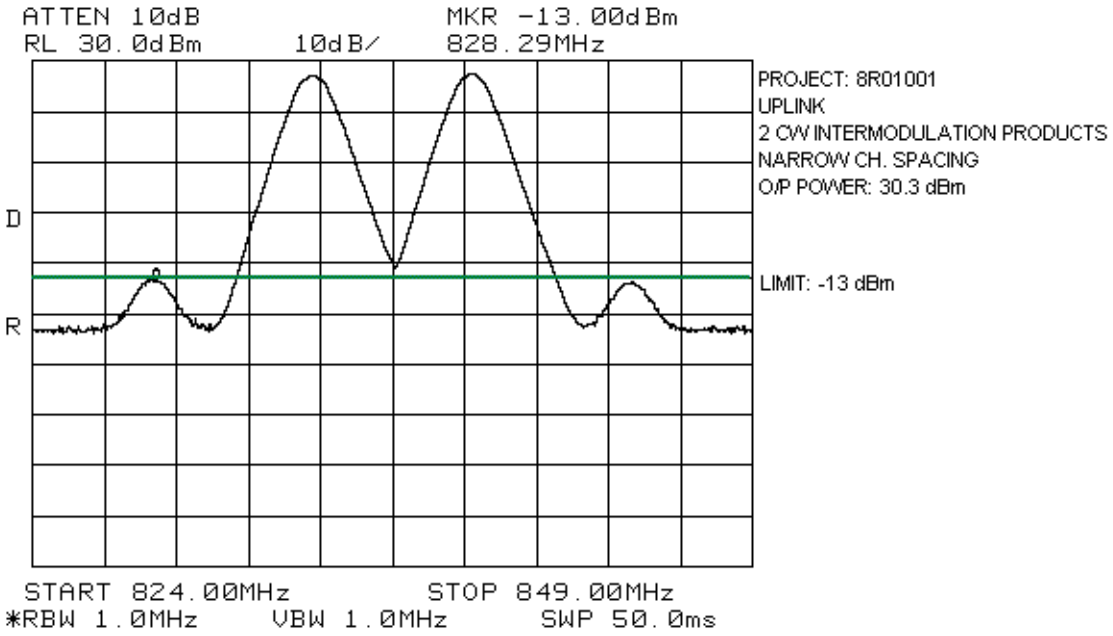

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -19.83dBm
2.640GHz
PROJECT: 8R01001
DOWNLINK
NARROW CH. SPACING
2 CW SPURIOUS EMISSIONS
O/P POWER: 30.3 dBm
D
LIMIT: -13 dBm
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

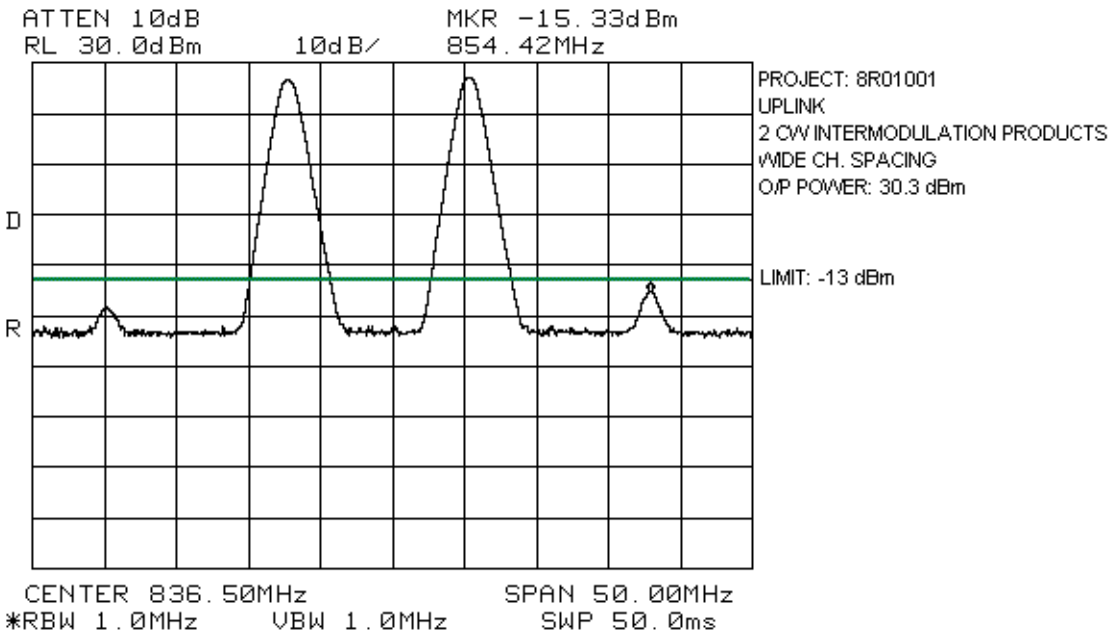

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -21.17dBm
2.880GHz
PROJECT: 8R01001
DOWNLINK
CDMA
NARROW CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 30.7 dBM
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

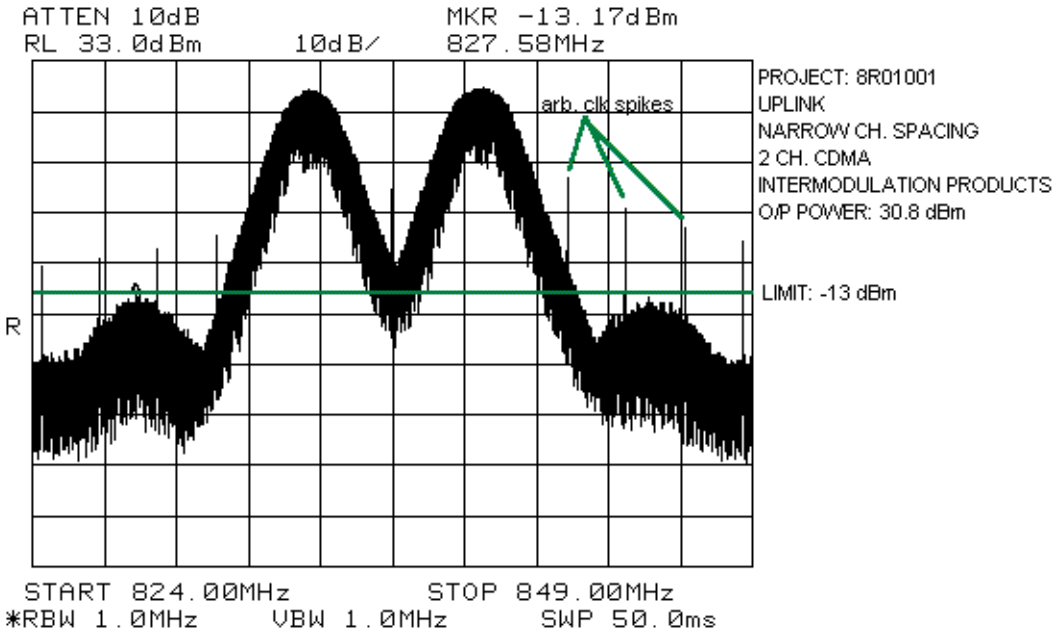

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.67dBm
2.280GHz
PROJECT: 8R01001
DOWNLINK
CDMA
WIDE CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 30.7 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

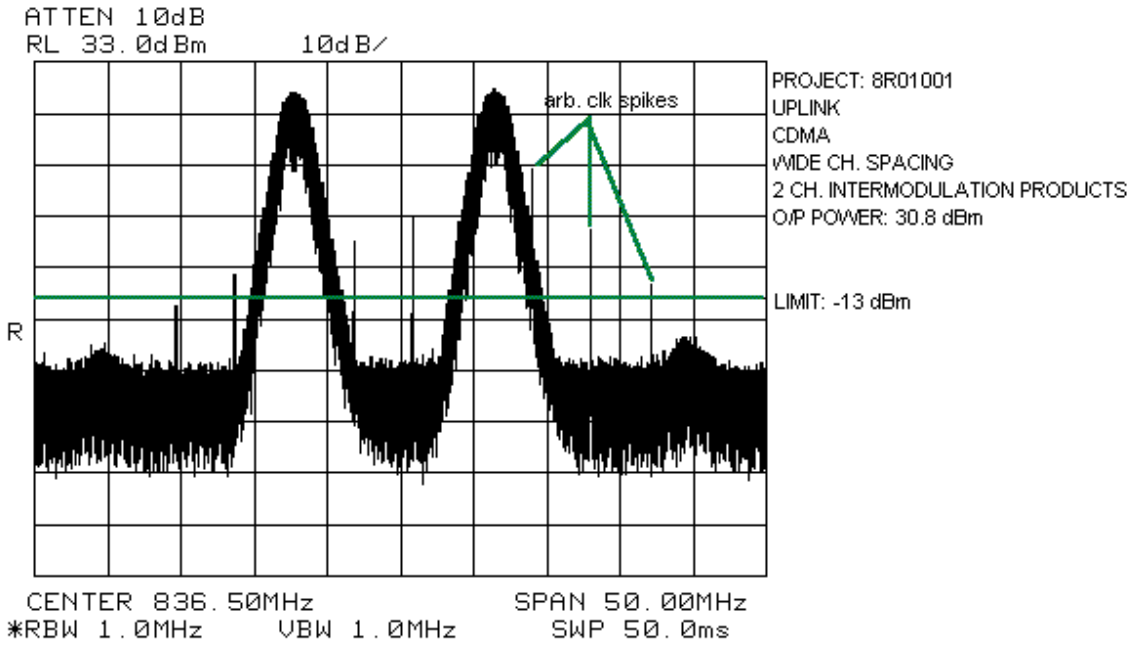

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -21.33dBm
2.745GHz
PROJECT: 8R01001
DOWNLINK
TDMA
NARROW CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 29.5 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

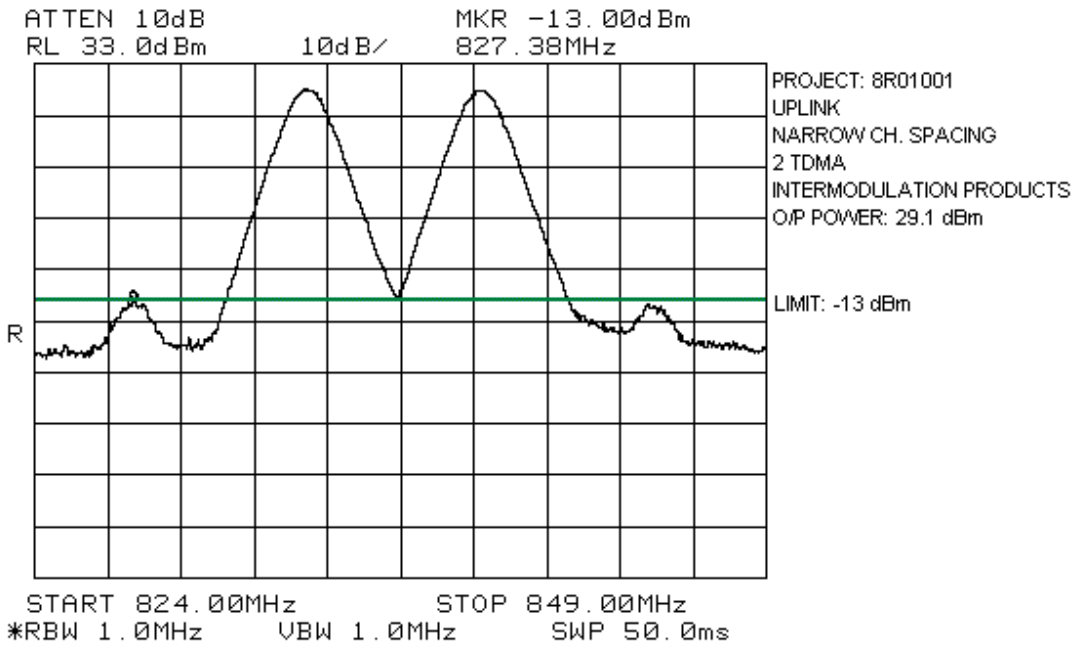

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -21.00dBm
2.835GHz
PROJECT: 8R01001
DOWNLINK
TDMA
WIDE CH. SPACING
2 CH. SPURIOUS EMISSIONS
O/P POWER: 29.5 dBm
LIMIT: -13 dBm
D
R
START 0Hz
STOP 9.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms

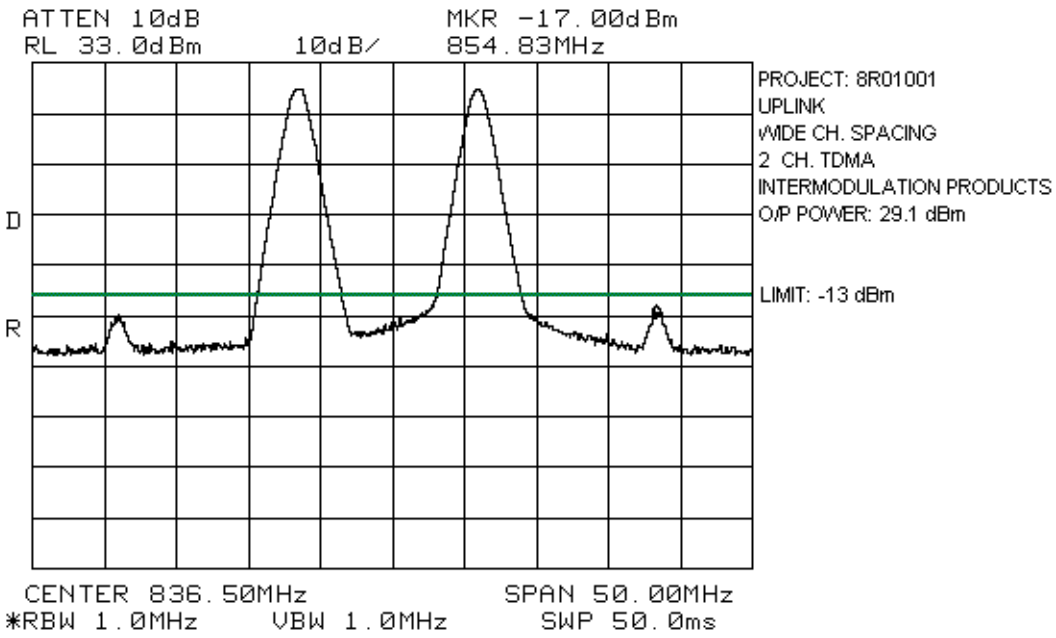

ATTEN 10dB
RL 30.0dBm
10dB/
MKR -13.00dBm
828.29MHz
PROJECT: 8R01001
UPLINK
2 CW INTERMODULATION PRODUCTS
NARROW CH. SPACING
O/P POWER: 30.3 dBm
LIMIT: -13 dBm
D
R
START 824.00MHz
STOP 849.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

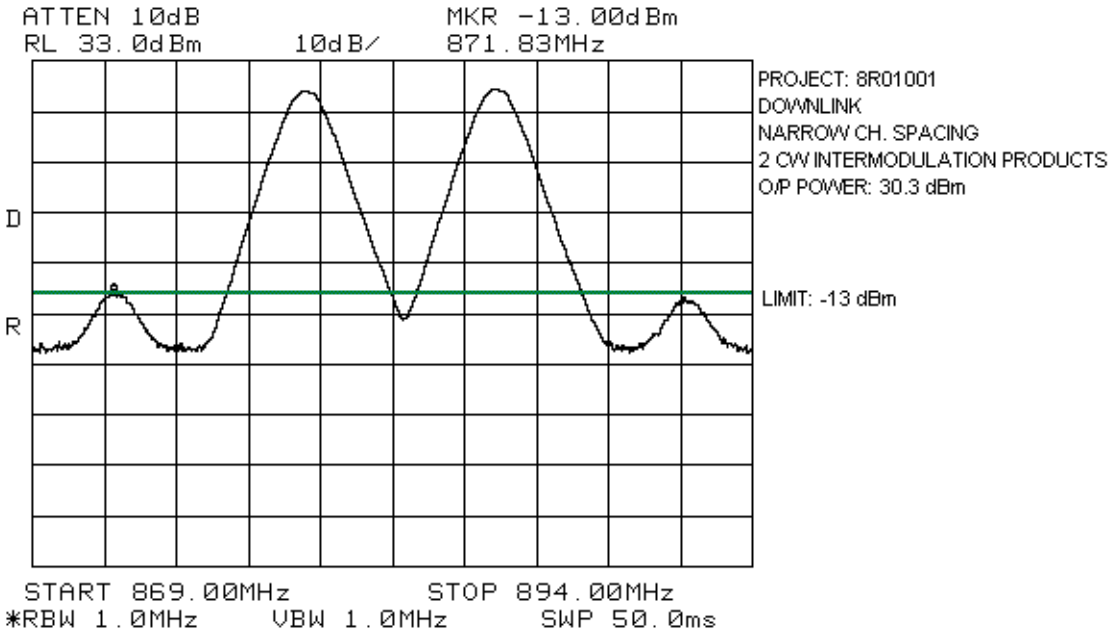

ATTEN 10dB
RL 30.0dBm
10dB/
MKR -15.33dBm
854.42MHz
PROJECT: 8R01001
UPLINK
2 C/W INTERMODULATION PRODUCTS
WIDE CH. SPACING
O/P POWER: 30.3 dBm
LIMIT: -13 dBm
D
R
CENTER 836.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

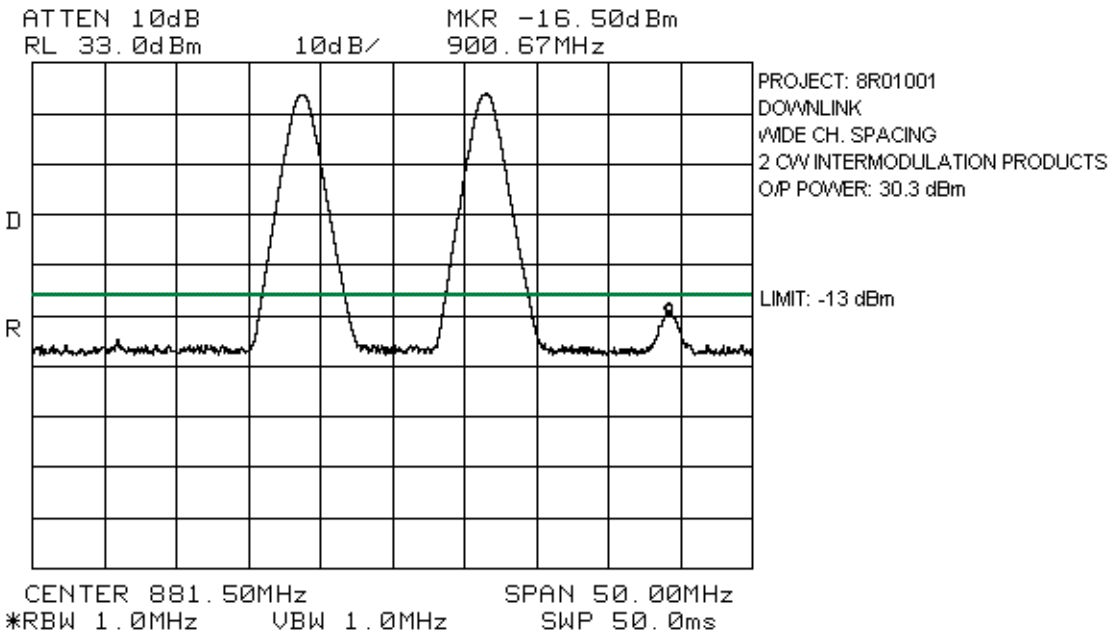

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -13.17dBm
827.58MHz
arb. clk spikes
PROJECT: 8R01001
UPLINK
NARROW CH. SPACING
2 CH. CDMA
INTERMODULATION PRODUCTS
O/P POWER: 30.8 dBm
LIMIT: -13 dBm
R
START 824.00MHz
STOP 849.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

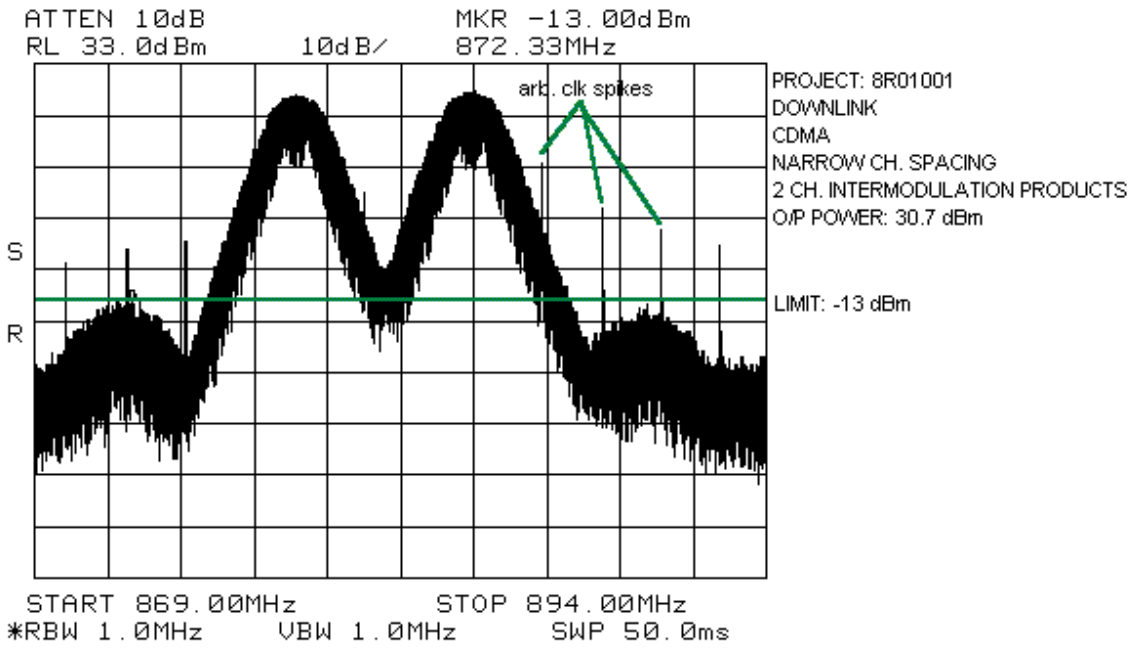

ATTEN 10dB
RL 33.0dBm
10dB/
arb. clk spikes
PROJECT: 8R01001
UPLINK
CDMA
WIDE CH. SPACING
2 CH. INTERMODULATION PRODUCTS
O/P POWER: 30.8 dBm
LIMIT: -13 dBm
R
CENTER 836.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

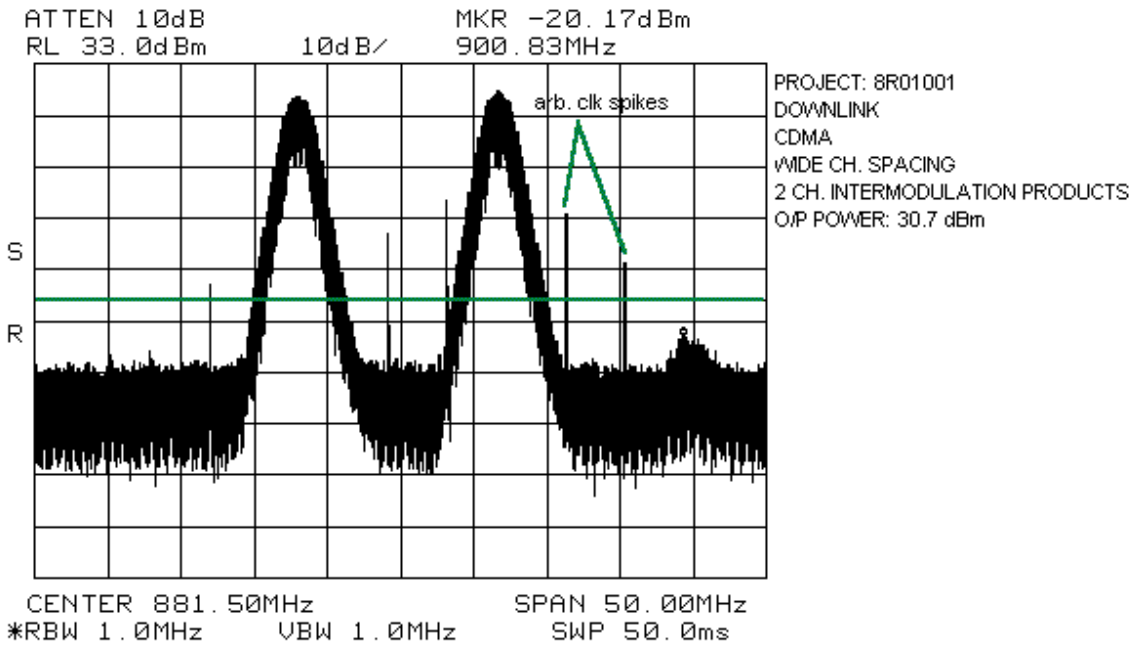

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -13.00dBm
827.38MHz
PROJECT: 8R01001
UPLINK
NARROW CH. SPACING
2 TDMA
INTERMODULATION PRODUCTS
O/P POWER: 29.1 dBm
LIMIT: -13 dBm
R
START 824.00MHz
STOP 849.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

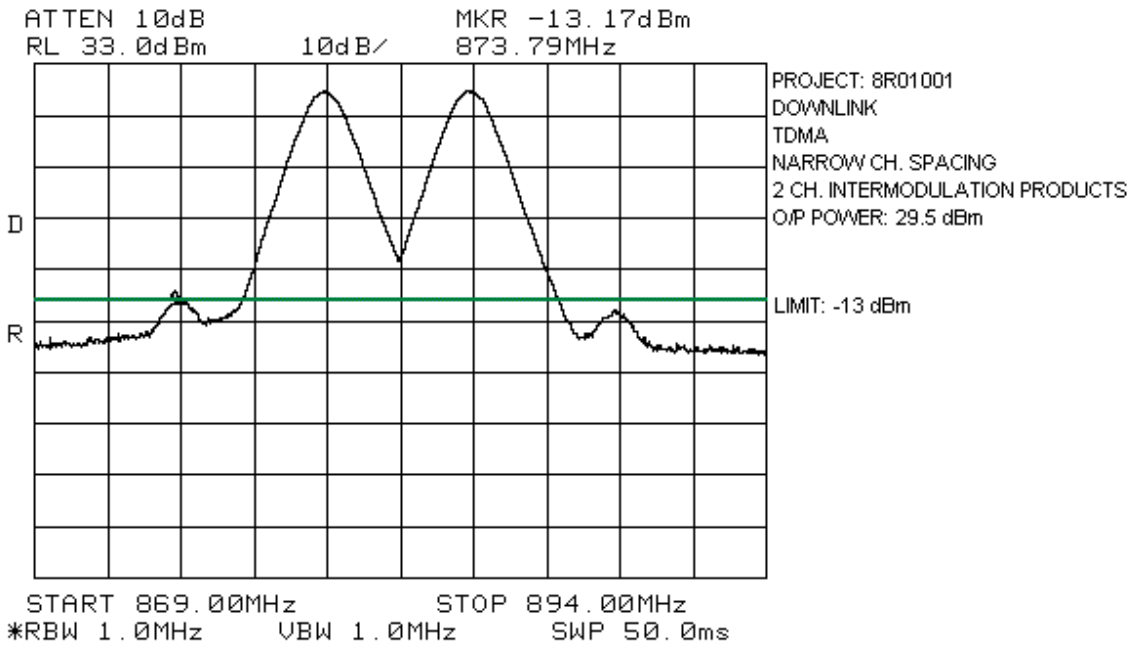

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -17.00dBm
854.83MHz
PROJECT: 8R01001
UPLINK
WIDE CH. SPACING
2 CH. TDMA
INTERMODULATION PRODUCTS
O/P POWER: 29.1 dBm
LIMIT: -13 dBm
D
R
CENTER 836.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

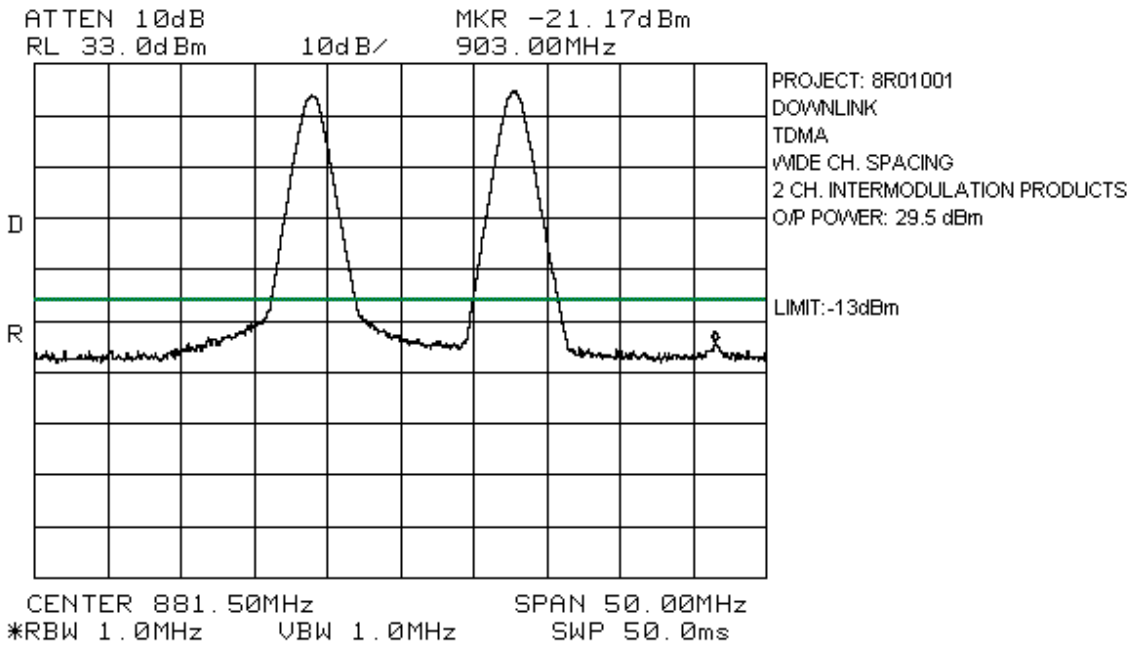

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -13.00dBm
871.83MHz
PROJECT: 8R01001
DOWNLINK
NARROW CH. SPACING
2 C/W INTERMODULATION PRODUCTS
O/P POWER: 30.3 dBm
LIMIT: -13 dBm
D
R
START 869.00MHz
STOP 894.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

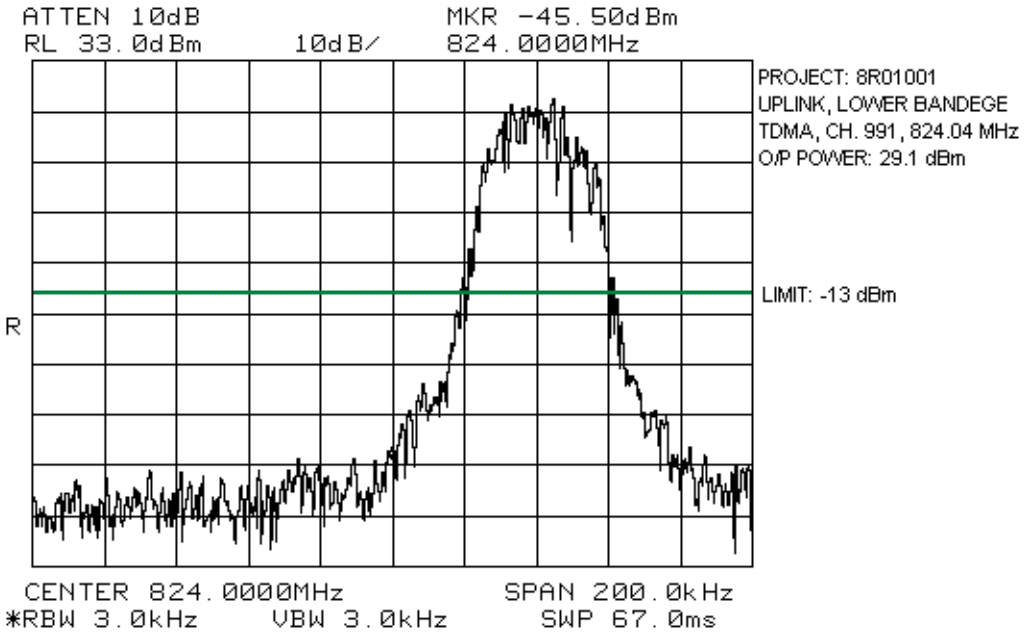

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -16.50dBm
900.67MHz
PROJECT: 8R01001
DOWNLINK
WIDE CH. SPACING
2 C/I INTERMODULATION PRODUCTS
O/P POWER: 30.3 dBm
D
LIMIT: -13 dBm
R
CENTER 881.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

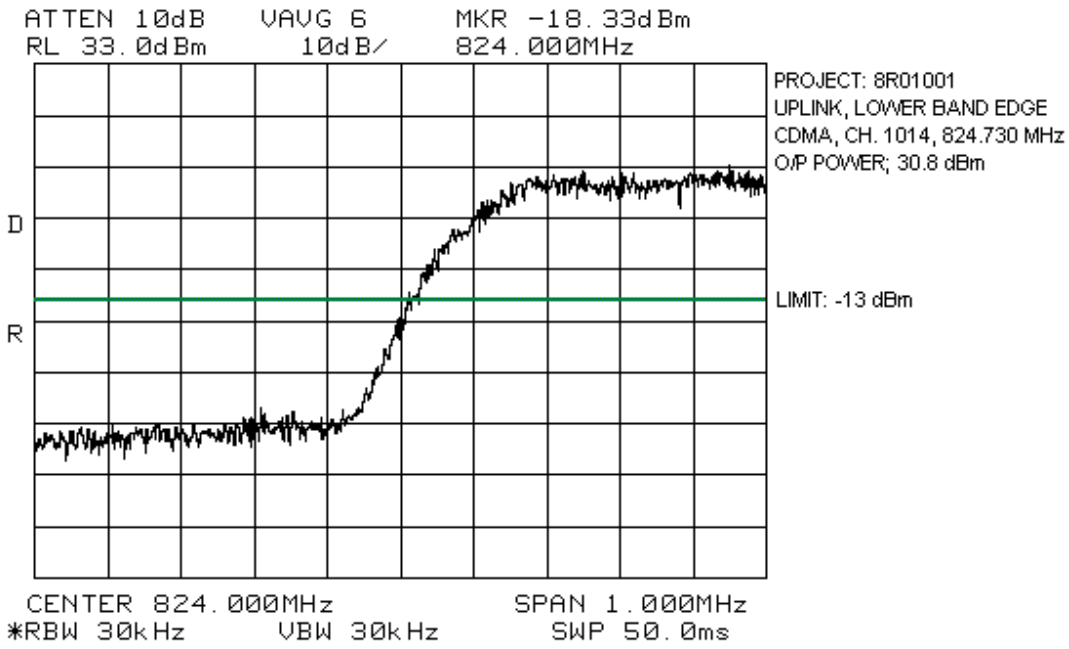

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -13.00dBm
872.33MHz
arb. clk spikes
PROJECT: 8R01001
DOWNLINK
CDMA
NARROW CH. SPACING
2 CH. INTERMODULATION PRODUCTS
O/P POWER: 30.7 dBm
LIMIT: -13 dBm
S
R
START 869.00MHz
STOP 894.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

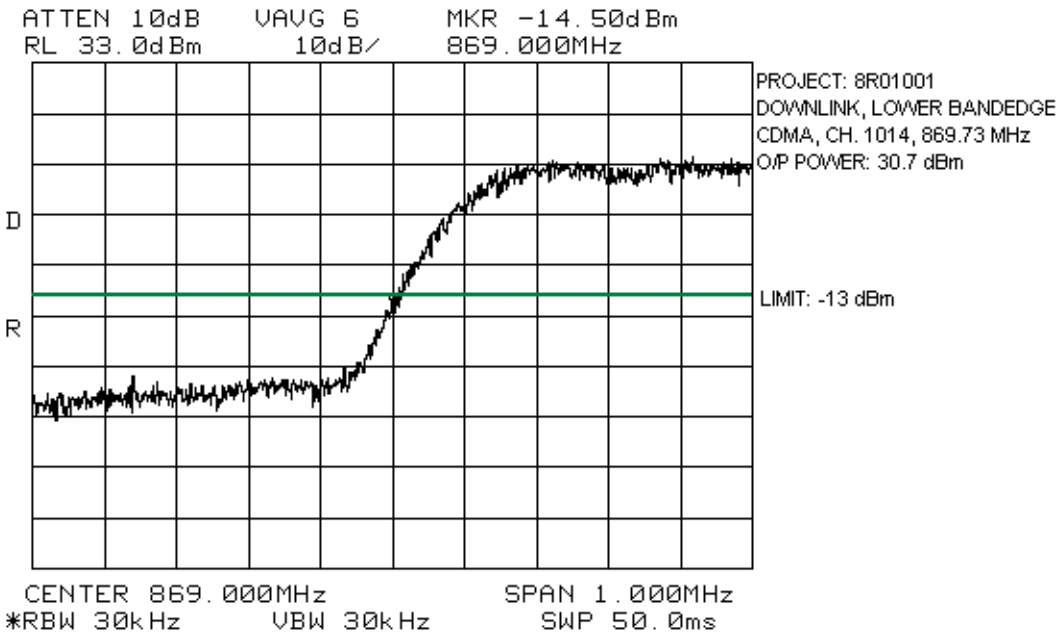

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -20.17dBm
900.83MHz
arb. clk spikes
PROJECT: 8R01001
DOWNLINK
CDMA
WIDE CH. SPACING
2 CH. INTERMODULATION PRODUCTS
O/P POWER: 30.7 dBm
S
R
CENTER 881.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

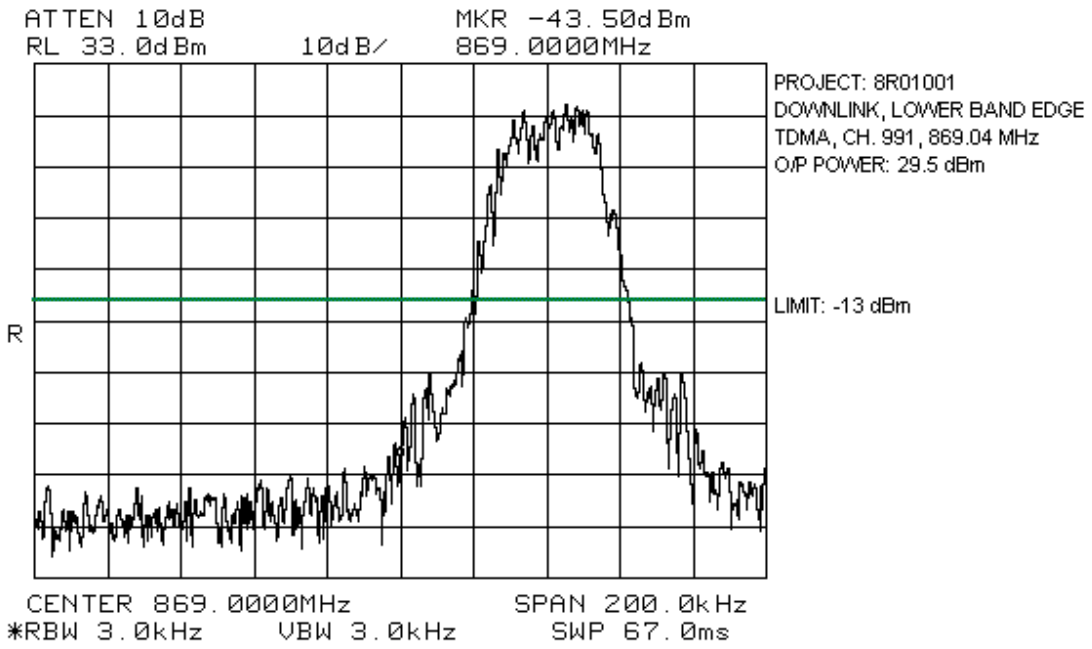

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -13.17dBm
873.79MHz
PROJECT: 8R01001
DOWNLINK
TDMA
NARROW CH. SPACING
2 CH. INTERMODULATION PRODUCTS
O/P POWER: 29.5 dBm
LIMIT: -13 dBm
D
R
START 869.00MHz
STOP 894.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

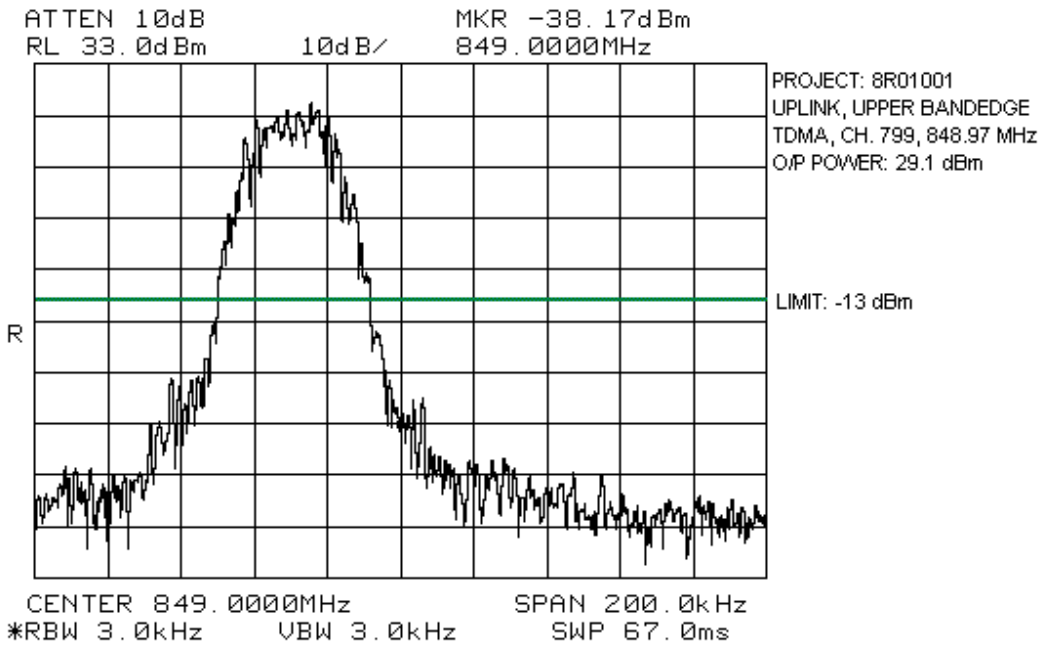

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -21.17dBm
903.00MHz
PROJECT: 8R01001
DOWNLINK
TDMA
WIDE CH. SPACING
2 CH. INTERMODULATION PRODUCTS
O/P POWER: 29.5 dBm
LIMIT:-13dBm
D
R
CENTER 881.50MHz
SPAN 50.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

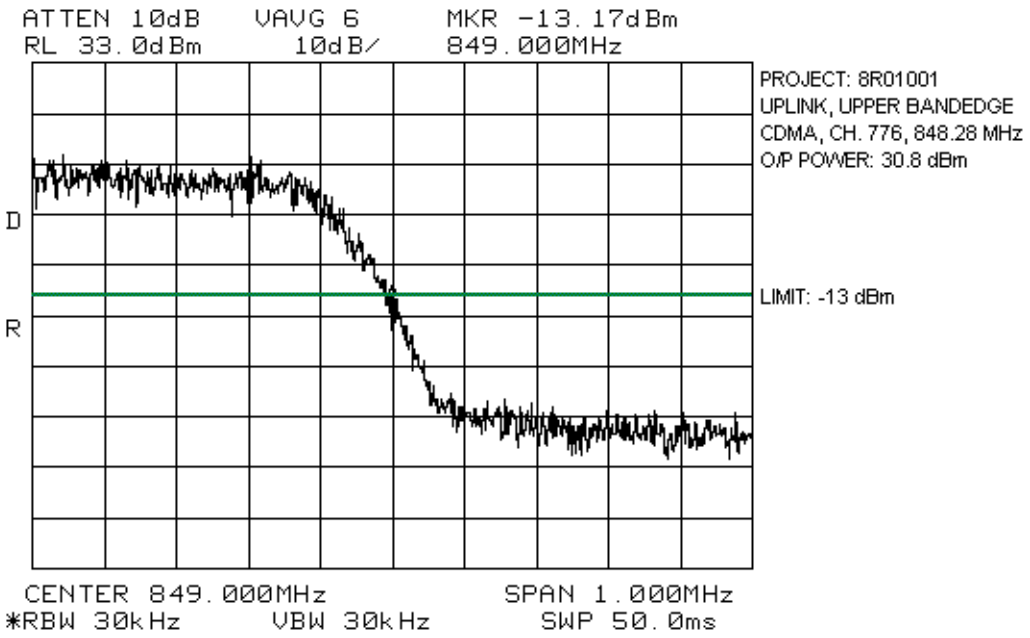

ATTEN 10dB
RL 33.0dBm
10dB/
MKR -45.50dBm
824.0000MHz
PROJECT: 8R01001
UPLINK, LOWER BANDEGE
TDMA, CH. 991, 824.04 MHz
O/P POWER: 29.1 dBm
LIMIT: -13 dBm
R
CENTER 824.0000MHz
SPAN 200.0kHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 67.0ms

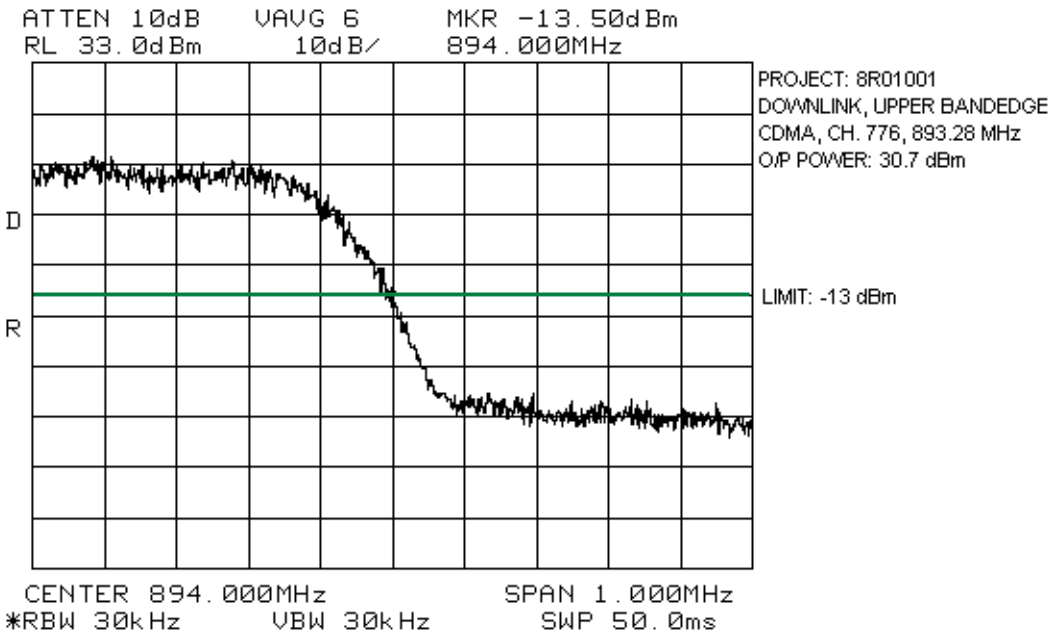

ATTEN 10dB
RL 33.0dBm
VAVG 6
10dB/
MKR -18.33dBm
824.000MHz
PROJECT: 8R01001
UPLINK, LOWER BAND EDGE
CDMA, CH. 1014, 824.730 MHz
O/P POWER; 30.8 dBm
D
R
LIMIT: -13 dBm
CENTER 824.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

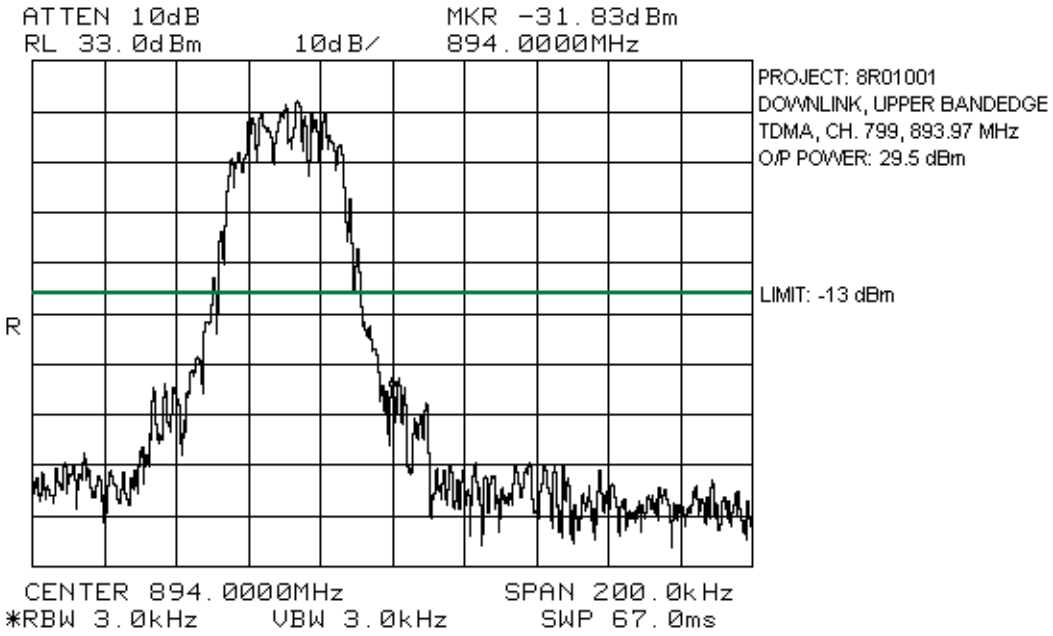

ATTEN 10dB
RL 33.0dBm
VAVG 6
10dB/
MKR -14.50dBm
869.000MHz
PROJECT: 8R01001
DOWNLINK, LOWER BANDEDGE
CDMA, CH. 1014, 869.73 MHz
O/P POWER: 30.7 dBm
D
R
LIMIT: -13 dBm
CENTER 869.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL 33.0dBm
10dB/
MKR -43.50dBm
869.0000MHz
PROJECT: 8R01001
DOWNLINK, LOWER BAND EDGE
TDMA, CH. 991, 869.04 MHz
O/P POWER: 29.5 dBm
LIMIT: -13 dBm
R
CENTER 869.0000MHz
SPAN 200.0kHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 67.0ms


ATTEN 10dB
RL 33.0dBm
10dB/
MKR -38.17dBm
849.0000MHz
PROJECT: 8R01001
UPLINK, UPPER BANDEDGE
TDMA, CH. 799, 848.97 MHz
O/P POWER: 29.1 dBm
LIMIT: -13 dBm
R
CENTER 849.0000MHz
SPAN 200.0kHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 67.0ms


ATTEN 10dB
RL 33.0dBm
VAVG 6
10dB/
MKR -13.17dBm
849.000MHz
PROJECT: 8R01001
UPLINK, UPPER BANDEDGE
CDMA, CH. 776, 848.28 MHz
O/P POWER: 30.8 dBm
D
R
LIMIT: -13 dBm
CENTER 849.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
MKR -13.50dBm
RL 33.0dBm
10dB/
894.000MHz
PROJECT: 8R01001
DOWNLINK, UPPER BANDEDGE
CDMA, CH. 776, 893.28 MHz
O/P POWER: 30.7 dBm
D
LIMIT: -13 dBm
R
CENTER 894.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 10dB
RL 33.0dBm
10dB/
MKR -31.83dBm
894.0000MHz
PROJECT: 8R01001
DOWNLINK, UPPER BANDEDGE
TDMA, CH. 799, 893.97 MHz
O/P POWER: 29.5 dBm
LIMIT: -13 dBm
R
CENTER 894.0000MHz
SPAN 200.0kHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 67.0ms

Section 6. Field Strength of Spurious

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: November 2, 1998

Test Results: Complies.
The maximum field strength is 2.6 dBμV/m @ 3m.

Test Data: See attached tables.

Test Data - Radiated Emissions - Uplink

Test Distance (meters) : 3		Range: B Tower		Receiver: ESVP		RBW(1 MHz): 120		Detector: PEAK			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1672.0	Hrn2	V			45.0	31.6	-44.7		31.9	82.3	50.4
1672.0	Hrn2	H			45.1	31.6	-44.7		32.0	82.3	50.3
2508.0	Hrn2	V			45.1	38.0	-46.4		36.7	82.3	45.6
2508.0	Hrn2	H			45.5	38.0	-46.4		37.1	82.3	45.2
3344.0	Hrn2	V			42.7	41.5	-45.3		38.9	82.3	43.4
3344.0	Hrn2	H			44.0	41.5	-45.3		40.2	82.3	42.1
4180.0	Hrn2	V			41.2	49.5	-45.2		45.5	82.3	36.8
4180.0	Hrn2	H			41.0	49.5	-45.2		45.3	82.3	37.0
5016.0	Hrn2	V			39.8	46.9	-46.0		40.7	82.3	41.6
5016.0	Hrn2	H			40.8	46.9	-46.0		41.7	82.3	40.6
5852.0	Hrn2	V			37.9	52.4	-45.3		45.0	82.3	37.3
5852.0	Hrn2	H			37.4	52.4	-45.3		44.5	82.3	37.8
6688.0	Hrn2	V			37.2	55.5	-46.1		46.6	82.3	35.7
6688.0	Hrn2	H			37.6	55.5	-46.1		47.0	82.3	35.3
7524.0	Hrn2	V			35.0	61.8	-45.6		51.2	82.3	31.1
7524.0	Hrn2	H			35.1	61.8	-45.6		51.3	82.3	31.0
8360.0	Hrn2	V			45.3	68.0	-44.0		69.3	82.3	13.0
8360.0	Hrn2	H			45.4	68.0	-44.0		69.4	82.3	12.9

Notes:
The spectrum was search up to the 10th harmonic of the fundamental frequency.
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Includes cable loss when amplifier is not used.
** Includes cable loss.
( ) Denotes failing emission level.

Test Data - Radiated Emissions - Downlink

Test Distance (meters) : 3		Range: B Tower		Receiver: ESVP		RBW(1 MHz): 120		Detector: PEAK			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1760.0	Hrn2	V			34.5	32.1			66.6	82.3	15.7
1760.0	Hrn2	H			35.5	32.1			67.6	82.3	14.7
2640.0	Hrn2	V			35.8	38.6			74.4	82.3	7.9
2640.0	Hrn2	H			37.3	38.6			75.9	82.3	6.4
3520.0	Hrn2	V			31.5	42.6			74.1	82.3	8.2
3520.0	Hrn2	H			32.0	42.6			74.6	82.3	7.7
4400.0	Hrn2	V			30.7	48.0			78.7	82.3	3.6
4400.0	Hrn2	H			31.7	48.0			79.7	82.3	2.6
5280.0	Hrn2	V			38.3	48.6	-45.8		41.1	82.3	41.2
5280.0	Hrn2	H			39.2	48.6	-45.8		42.0	82.3	40.3
6160.0	Hrn2	V			35.7	52.5	-45.1		43.1	82.3	39.2
6160.0	Hrn2	H			36.2	52.5	-45.1		43.6	82.3	38.7
7040.0	Hrn2	V			35.2	58.8	-46.1		47.9	82.3	34.4
7040.0	Hrn2	H			34.5	58.8	-46.1		47.2	82.3	35.1
7920.0	Hrn2	V			33.2	65.8	-45.6		53.4	82.3	28.9
7920.0	Hrn2	H			33.3	65.8	-45.6		53.5	82.3	28.8
8800.0	Hrn2	V			33.3	73.9	-43.1		64.1	82.3	18.2
8800.0	Hrn2	H			33.4	73.9	-43.1		64.2	82.3	18.1

Notes:
The spectrum was search up to the 10th harmonic of the fundamental frequency.
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Includes cable loss when amplifier is not used.
** Includes cable loss.
( ) Denotes failing emission level.

Photographs of Test Setup

FRONT VIEW

REAR VIEW

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 22.355
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Measurement Data: Standard Test Frequency: _____ MHz
Standard Test Voltage: _____ Vdc

NOT APPLICABLE

Section 8. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	May 20/98	May 20/99	
1 Year	Radio Test Set	Rohde & Schwarz	CMS 52	840.0009.52	July 23/98	July 23/99	
	Power Supply	Astron	VS-50M	8405071	NCR	NCR	
1 Year	Attenuator	Narda	765-20	9510	July 24/98	July 24/99	
1 Year	Attenuator	Narda	768-10	9704	July 24/98	July 24/99	
1 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA000420	July 23/98	July 23/99	
1 Year	Insertion Unit	Rohde & Schwarz	URV5-Z4	FA000905	July 23/98	July 23/99	
1 Year	Receiver	Rohde & Schwarz	ESVS-30	843710/002	Oct. 27/98	Oct. 27/99	
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99	
1 Year	Log Periodic Antenna	EMCO	LPA-25	1141	July 27/98	July 27/99	
	50 Ω Termination	Wiltron	26N50	605248	N/A	N/A	
	50 ohm Combiner Pad	Mini Circuits	ZA3PD-4	9740	Dec. 12/97	Dec. 12/98	
1 Year	Signal Generator	Rohde & Schwarz	SM1Q03	1084-8004-03	July 23/98	July 23/99	
1 Year	Arbitrary Waveform Gen.	Sony/Tektronix	AWG2021	J310495	NCR	NCR	
3 Year	RF Generator	Rohde & Schwarz	SME3	DE14439	June 29/96	June 29/99	

NA: Not Applicable
NCR: No Cal Required

ANNEX A

TEST METHODOLOGIES

NAME OF TEST: RF Power Output **PARA. NO.: 2.985**

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

Method Of Measurement:

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

NAME OF TEST: Occupied Bandwidth (Voice & SAT) PARA. NO.: 2.989

Minimum Standard: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(i) On any frequency removed from the carrier frequency by more than 12 kHz but not more than 20 kHz:

at least 117 log (f_d/12)

(ii) On any frequency removed from the carrier frequency by more than 20 kHz, up to the first multiple of the carrier frequency:

at least 100 log (f_d/11) dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

Method Of Measurement:

Spectrum Analyzer Settings:

RBW: 300 Hz
VBW: ≥ RBW
Span: 100 kHz
Sweep: Auto
Mask: CELLF3E

Input Signal Characteristics (F3E/F3D):

RF level: Maximum recommended by manufacturer
AF1 frequency: 6 kHz
AF1 level: sufficient to produce 2 kHz deviation
AF2 frequency: 2.5 kHz
AF2 level: sufficient to produce 12 kHz deviation.

NAME OF TEST: Occupied Bandwidth (WB Data) PARA. NO.: 2.989

Minimum Standard: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

Method Of Measurement:

Spectrum Analyzer Settings:
RBW: 300 Hz
VBW: ≥ RBW
Span: 200 kHz
Sweep: Auto
Mask: CELLF1D

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer
AF1 frequency: 10 kHz, random bit sequence
AF1 level: sufficient to produce 8 kHz deviation

NAME OF TEST: Occupied Bandwidth (ST)	**PARA. NO.: 2.989**

Minimum Standard: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

Method Of Measurement:

Spectrum Analyzer Settings:
RBW: 300 Hz
VBW: ≥ RBW
Span: 200 kHz
Sweep: Auto
Mask: CELLF1D

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer
AF1 frequency: 10 kHz tone
AF1 level: sufficient to produce 8 kHz deviation

NAME OF TEST: Occupied Bandwidth (Digital Modulation) PARA. NO.: 2.989

Minimum Standard: Not defined by FCC. Input vs. Output.

Method Of Measurement:

Spectrum Analyzer Settings:
RBW: CDMA (30 kHz), GSM (30 kHz), NADC (1 kHz) and CDPD (1 kHz)
VBW: ≥ RBW
Span: As required
Sweep: Auto
Mask:

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.991

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

Method Of Measurement:

Spectrum Analyzer Settings:
RBW: 30 kHz (AMPS). As required for digital modulations.
VBW: ≥ RBW
Start Frequency: 0 MHz
Stop Frequency: 10 GHz
Sweep: Auto

NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 2.993

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

Calculation Of Field Strength Limit:

An example of attenuation requirement of 43 + 10 Log P is equivalent to -13 dBm (5×10^{-5} Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$GP/4\pi R^2 = E^2/120\pi$

For emissions ≤ 1 GHz:

G = 1.64 (Dipole Gain)
P = 10^{-5} Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$\mathrm{E} = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V / m} = 84.4 \text{ dB}\mu\text{V / m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)
P = 1×10^{-5} Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

$$E = 84.4 - 20Log\sqrt{1.64} = 82.3 dB\mu V \text{ / } m@3m$$

The spectrum is searched to 10 GHz.

NAME OF TEST: Frequency Stability **PARA. NO.: 2.995**

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

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

Table C-1

Method Of Measurement:

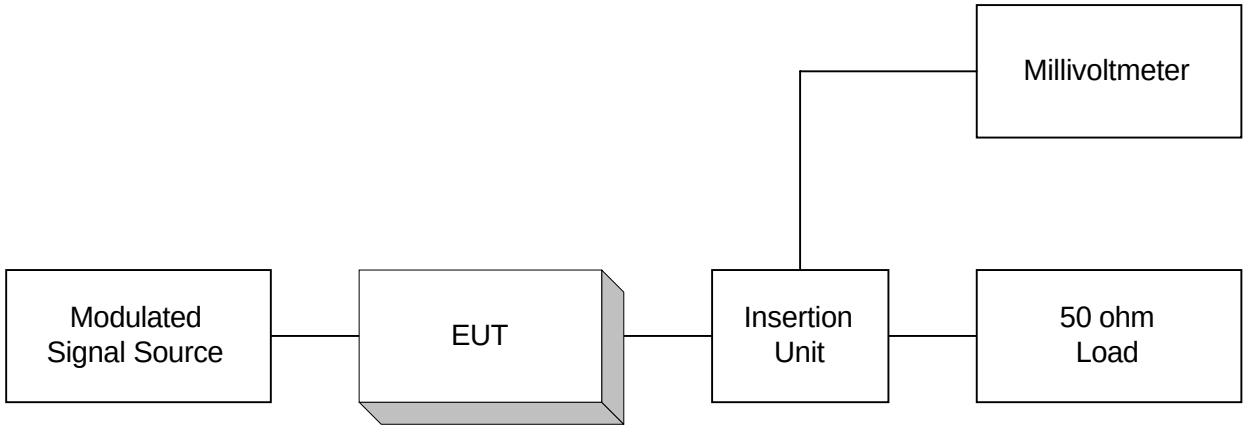
Frequency Stability With Voltage Variation:
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out 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.

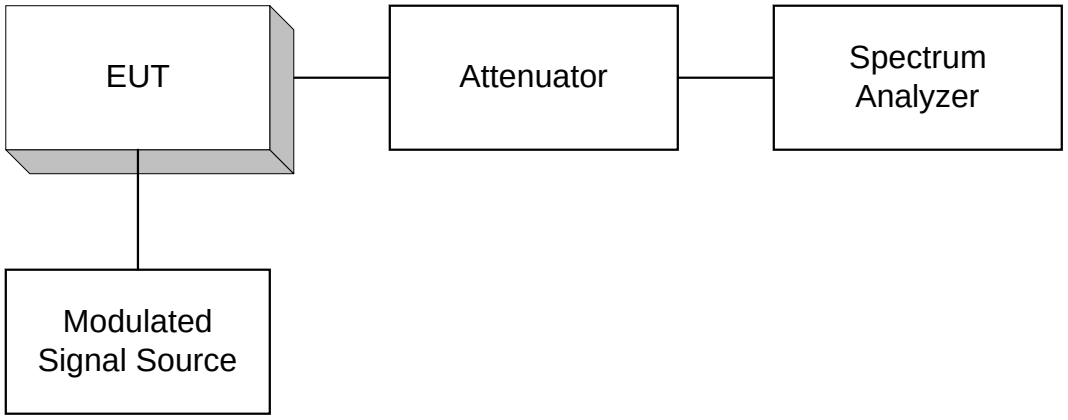
ANNEX B

TEST DIAGRAMS

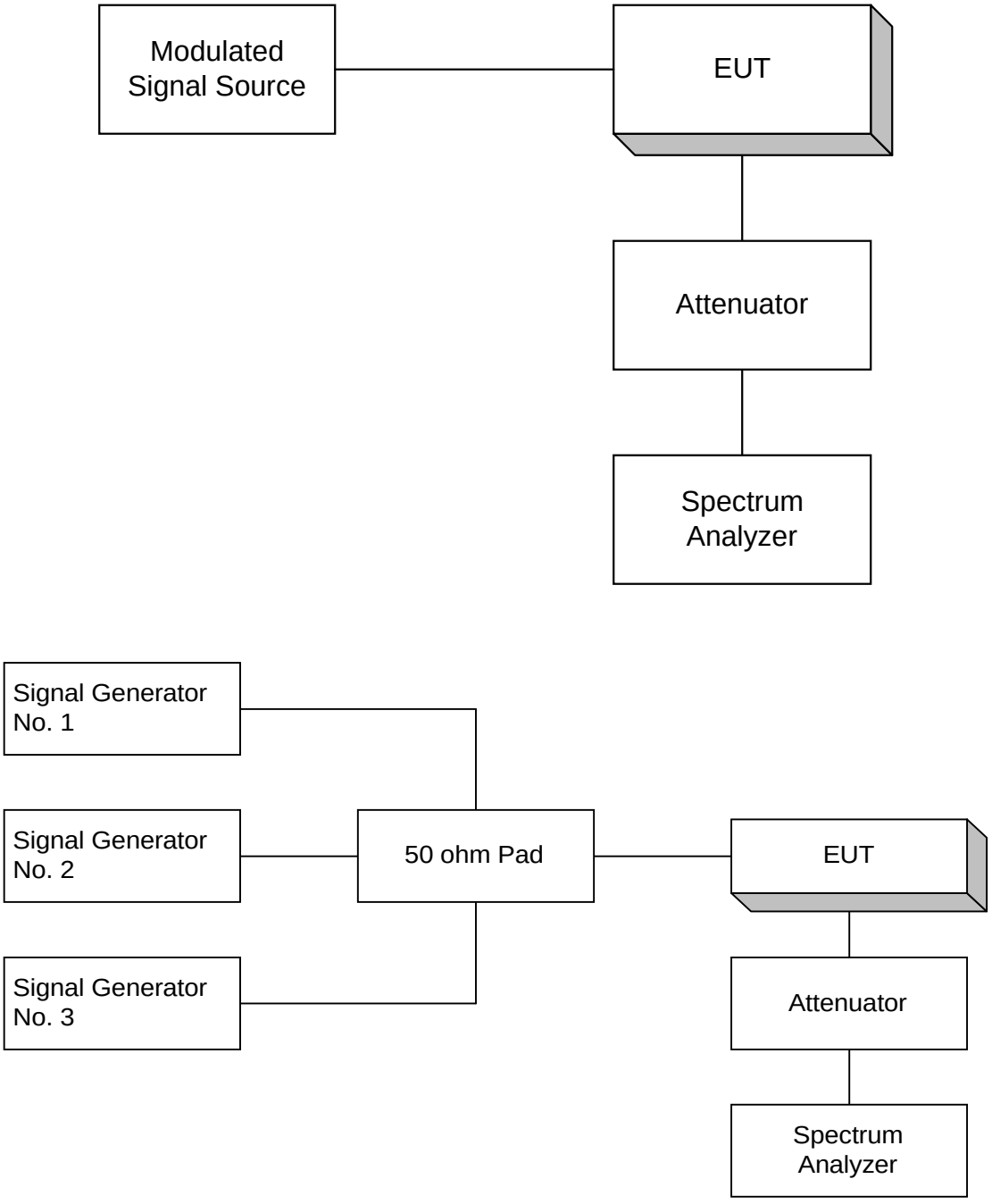
Para. No. 2.985 - R.F. Power Output



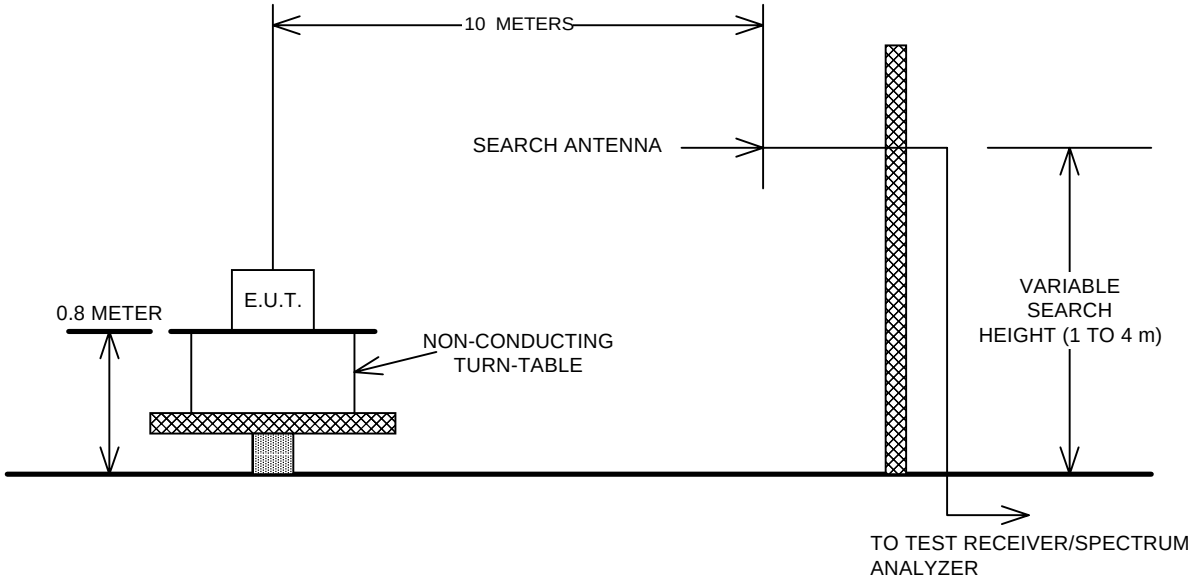
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability