

TEST RESULT SUMMARY FCC PART 90

MANUFACTURER ADC, Incorporated

P. O. Box 1101

Minneapolis MN 55440-1101

NAME OF EQUIPMENT Digivance® CXD

TYPE OF EQUIPMENT Transports RF between a remote antenna and base station

MODEL NUMBER DGVF -01000000XXCRN

TEST REPORT NUMBER WC503856 REV B

TEST DATES July 26 & 27, 2005 (TUV),

August 10 & 11, 2005 (ADC)

According to testing performed at TÜV America Inc., and ADC Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 90.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 90 "Private Land Mobile Radio Services".

& C Sausan

Date: 10 December 2005

Location: Taylors Falls MN USA

J. C. Sausen

Test Engineer

G. Jakubowski Technical Writer

Jakubawshi.

TÜV America Inc is a subcontractor to TÜV America, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV America Inc issued reports.

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TÜV America Inc and its professional staff hold government and professional organization certifications and are members of AAMI. ACIL. AEA. ANSI. IEEE. NVLAP, and VCCI

Not Transferable

File No. NC503856 Rev B Page 1 of 114



EMC EMISSION - TEST REPORT

Test Report File Number: WC503856 REV B Date of Issue: 10 December 2005

DIRECTORY

| | | Page(s) |
|--------|--|-----------|
| 2.1046 | RF Power Output – complies with 90.635 | 3 |
| 2.1049 | Occupied Bandwidth – complies with 90.210 | 4 - 10 |
| 2.1051 | Spurious Emissions at Antenna Terminals - complies with 90.210 | 11 - 35 |
| | Intermodulation | 36 - 72 |
| 2.1053 | Field Strength of Spurious Emissions – complies with 90.210 | 73 - 84 |
| | Conducted Emissions – Line Cord | 85 - 89 |
| | 20 dB Passband | 90 - 91 |
| 2.1055 | Frequency Stability Test Data - complies with 90.213 | 92 - 93 |
| | Test Equipment List | 94 - 95 |
| | Product Information | 96 - 102 |
| | Test Setups, Drawings & Photos | 103 - 112 |
| | Measurement Protocol | 113 - 114 |

REVISION RECORD

| REVISION | TOTAL NUMBER OF PAGES | DATE | DESCRIPTION |
|----------|-----------------------------|-----------|--|
| | 100 | 27 Sep 05 | Initial Release |
| A | 109 | 05 Oct 05 | Revisions include: Replace run 1 radiated emissions data with run 3 data. Replace run 1 radiated emissions test set-up photos with run 3 photos. |
| В | 114 | 10 Dec 05 | Revised to include additional Conducted Emissions Band Edge Test Data for all modulations and revised EIRP data. |

File No. NC503856 Rev B Page 2 of 114

Effective Isotropic Radiated Power Test for ADC Inc. Digivance CXD Model Number DGVF-211100SYS

*Note: The EUT is a fixed repeater and not a base station.

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected to the spectrum analyzer. The carrier output, below, was conducted using a single CW/FM, 16QAM, and CDMA signal generator. The spectrum analyzer level was offset to compensate for attenuators and cable loss between the EUT and the analyzer.

For the CDMA modulation types, the average value of the measured frequency will be 16.23 dB down from the CW peak power.

A signal was used at the low, mid and high parts of the selected band. The spectrum analyzer level was offset by 51.4 dB to compensate for attenuators and cable loss between the EUT and the analyzer.

| CW / FM - 7.71 Watts | | 16QAM – 5.71 Watts | |
|-----------------------------|----------------|--------------------|----------------|
| Band SMR (800) | MHz) | Band SMR (800) | MHz) |
| Carrier Frequency | Carrier Output | Carrier Frequency | Carrier Output |
| 851.0 MHz | 38.83 dBm | 851.0 MHz | 36.23 dBm |
| 858.5 MHz | 38.87 dBm | 858.5 MHz | 37.27 dBm |
| 866.0 MHz | 38.47 dBm | 866.0 MHz | 37.57 dBm |

| <u>CW / FM – 7.19 Watts</u> | | 16QAM – 8.07 Watts | |
|-----------------------------|------------------|--------------------|------------------|
| Band SMR (900 | MHz) | Band SMR (900 | MHz) |
| Carrier Frequency | Carrier Output | Carrier Frequency | Carrier Output |
| 935.0 MHz | 38.57 dBm | 935.0 MHz | <u>36.57</u> dBm |
| 937.5 MHz | <u>37.97</u> dBm | 937.5 MHz | <u>36.97</u> dBm |
| 940.0 MHz | 38.57 dBm | 940.0 MHz | <u>39.07</u> dBm |

CDMA – 5.62 Watts

| Carrier Frequency | Carrier | · Output |
|-------------------|---------|----------|
| 851.0 MHz | 20.11 | _dBm |
| 858.5 MHz | 21.27 | _dBm |
| 866.0 MHz | 20.74 | _dBm |

CDMA – 7.36 Watts

| Band SMR (| (900 MHz) |
|------------|-----------|
|------------|-----------|

| Carrier Frequency | Carrier Output |
|-------------------|------------------|
| 935.0 MHz | <u>20.64</u> dBm |
| 937.5 MHz | <u>21.10</u> dBm |
| 940.0 MHz | 22.44 dBm |

File No. NC503856 Rev B Page 3 of 114

Occupied Bandwidth Modulation Test for ADC Inc. Digivance CXD Model Number DGVF-01000000XXCRN

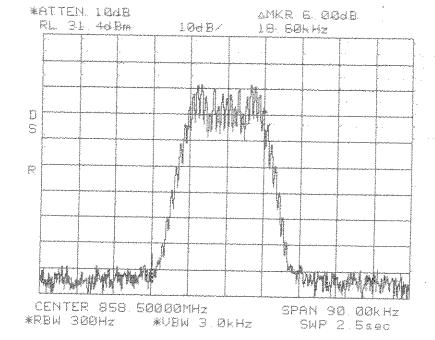
An input/output Occupied Bandwidth test was done with modulation types: FM, 16 QAM, and CDMA. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT. The following plots show input signals vs. output signals.

Results:

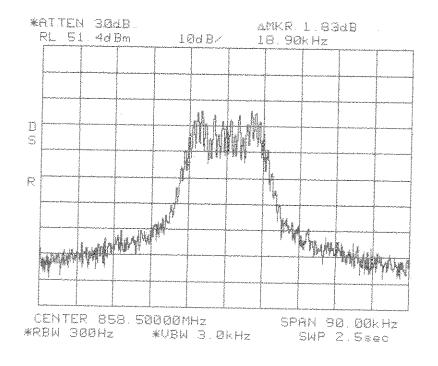
Pass (see plots)

Center: 858.5 MHz Span: 90 KHz

RBW/VBW: 300 Hz / 3 kHz



Occupied Bandwidth FM In SMR 800 MHz



Occupied Bandwidth FM Out SMR 800 MHz

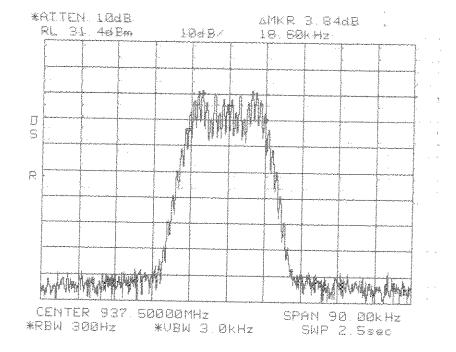
Center: 858.5 MHz

Span: 90 KHz RBW/VBW: 300 Hz / 3 kHz

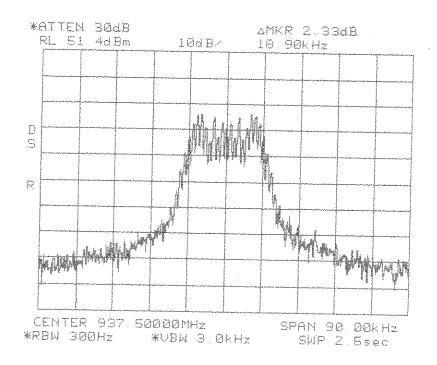
Center: 937.5 MHz

Span: 90 KHz

RBW/VBW: 300 Hz / 3 kHz



Occupied Bandwidth FM In SMR 900 MHz



Occupied Bandwidth FM Out SMR 900 MHz

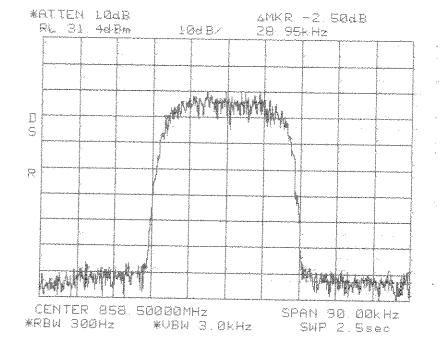
Center: 937.5 MHz

Span: 90 KHz

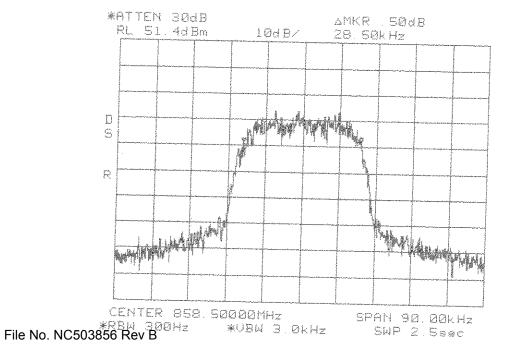
RBW/VBW: 300 Hz / 3 kHz

Center: 858.5 MHz Span: 90 KHz

RBW/VBW: 300 Hz / 3 kHz



Occupied Bandwidth 16 QAM In SMR 800 MHz



Occupied Bandwidth 16 QAM Out SMR 800 MHz

Center: 858.5 MHz

Span: 90 KHz RBW/VBW: 300 Hz / 3 kHz

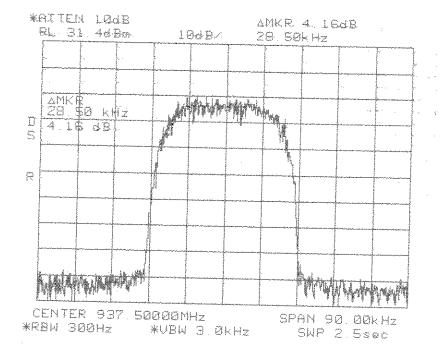
IDW/VDW. OOUTIZ/ S KI I

Page 7 of 114

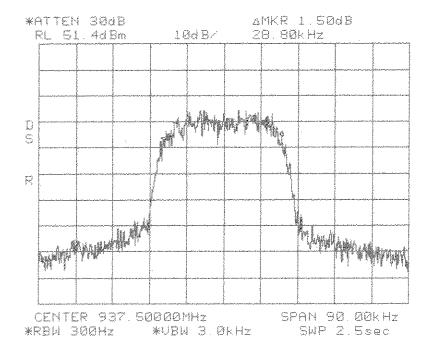
Center: 937.5 MHz

Span: 90 KHz

RBW/VBW: 300 Hz / 3 kHz



Occupied Bandwidth 16 QAM In SMR 900 MHz



Occupied Bandwidth 16 QAM Out SMR 900 MHz

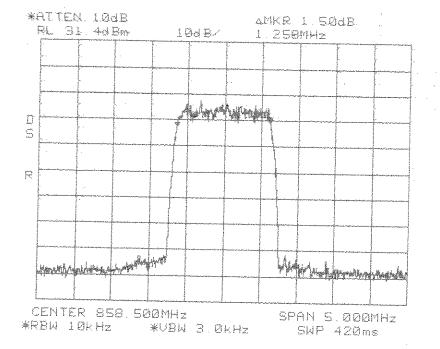
Center: 937.5 MHz Span: 90 KHz

RBW/VBW: 300 Hz / 3 kHz

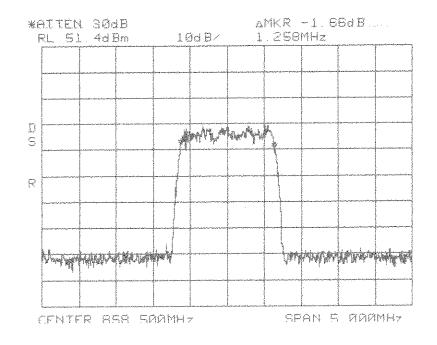
Center: 858.5 MHz

Span: 5 MHz

RBW/VBW: 10 kHz/3 kHz



Occupied Bandwidth CDMA In SMR 800 MHz



Occupied Bandwidth CDMA Out SMR 800 MHz

Center: 858.5 MHz

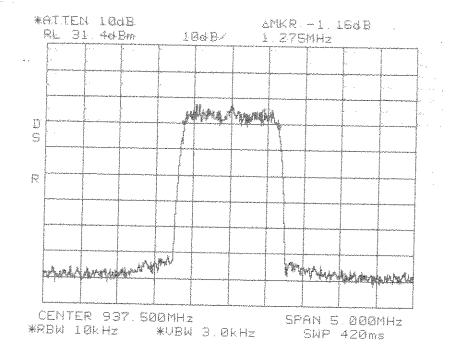
Span: 5 MHz

RBW/VBW: 10 kHz / 3 kHz

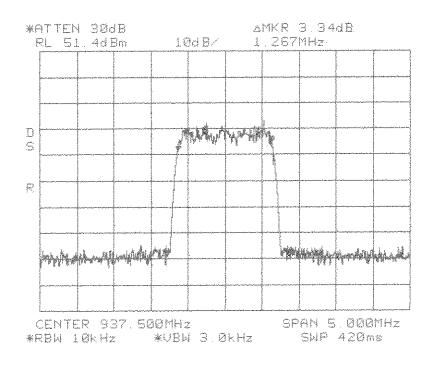
Center: 937.5 MHz

Span: 5 MHz

RBW/VBW: 10 kHz / 3 kHz



Occupied Bandwidth CDMA In SMR 900 MHz



Occupied Bandwidth CDMA Out SMR 900 MHz

Center: 937.5 MHz

Span: 5 MHz

RBW/VBW: 10 kHz/3 kHz

Conducted Emission Limits Test for ADC Inc. Digivance CXD Model Number DGVF-01000000XXCRN

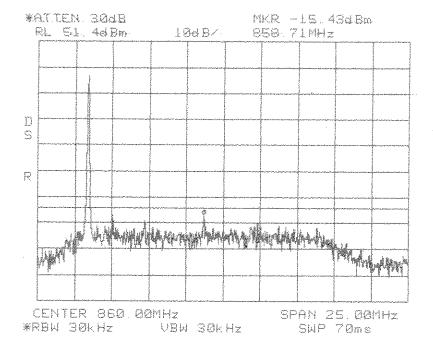
The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10th harmonic of the highest carrier frequency. Test signals used are CW, FM, 16 QAM, and CDMA. The different signals were input one at a time to the EUT. In all cases, the out of band emissions were less than -13dBm from the equation $(19\text{dBm} - [43 + 10\log(0.08\text{W})])$

| Band edge compliance is also demonstrated us | sing a FM signal | at the upper and | lower limits of the | band and a resolution |
|--|------------------|------------------|---------------------|-----------------------|
| bandwidth of 300 Hz. | | | | |

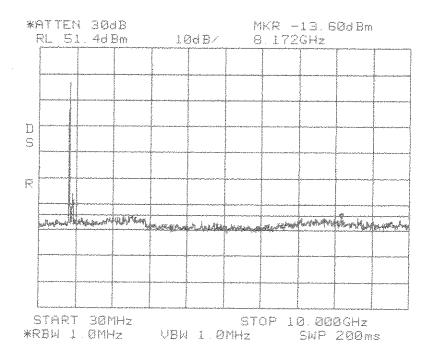
Results: Pass (See plots)

Center: 860.0 MHz Span: 25 MHz

RBW/VBW: 30 kHz



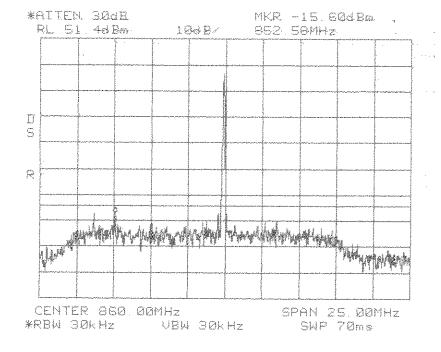
Conducted Emissions Low SMR 800 MHz



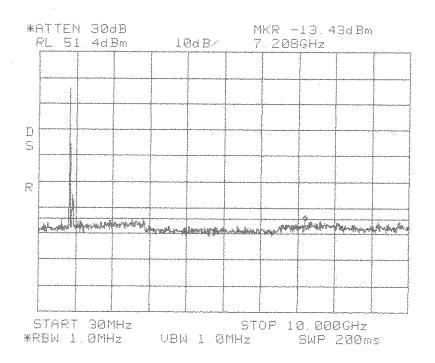
Conducted Emissions Low SMR 800 MHz

Span: 30 MHz to 10 GHz

Center: 860.0 MHz Span: 25 MHz RBW/VBW: 30 kHz



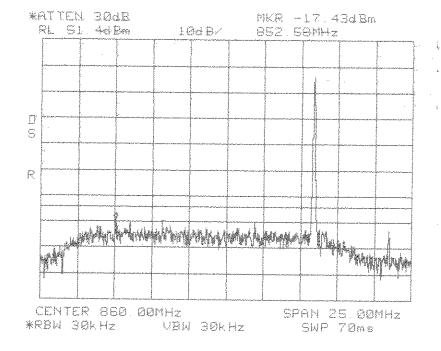
Conducted Emissions Mid SMR 800 MHz



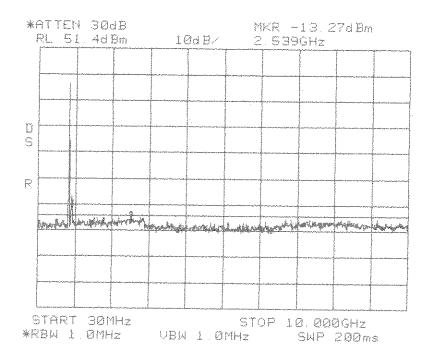
Conducted Emissions Mid SMR 800 MHz

Span: 30 MHz to 10 GHz

Center: 860.0 MHz Span: 25 MHz RBW/VBW: 30 kHz



Conducted Emissions High SMR 800 MHz

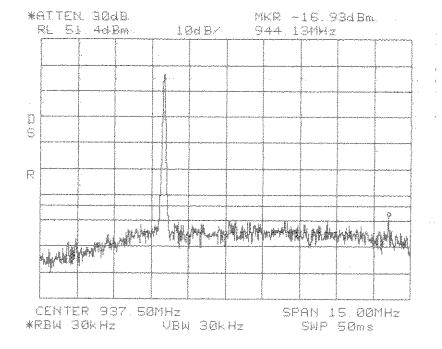


Conducted Emissions High SMR 800 MHz

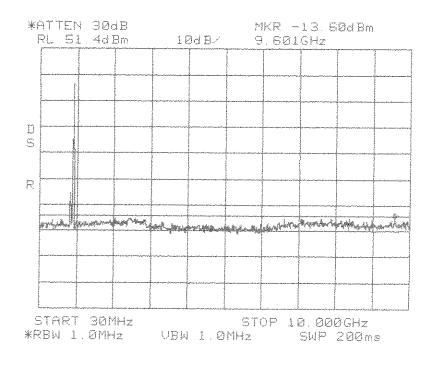
Span: 30 MHz to 10 GHz

Center: 937.5 MHz Span: 15 MHz

RBW/VBW: 30 kHz



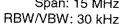
Conducted Emissions Low SMR 900 MHz

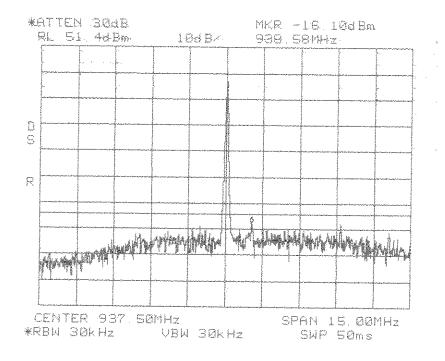


Conducted Emissions Low SMR 900 MHz

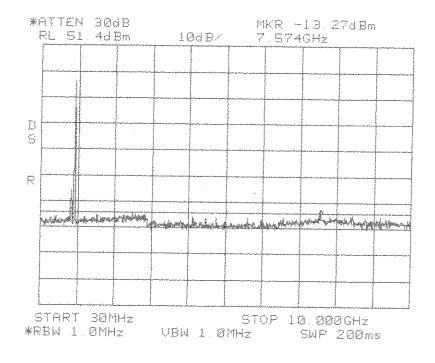
Span: 30 MHz to 10 GHz

Center: 937.5 MHz Span: 15 MHz





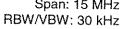
Conducted Emissions Mid SMR 900 MHz

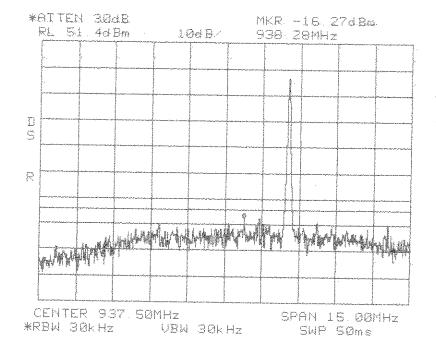


Conducted Emissions Mid SMR 900 MHz

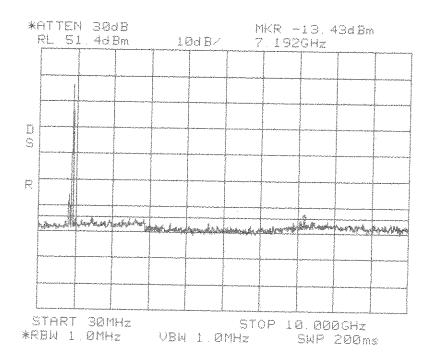
Span: 30 MHz to 10 GHz

Center: 937.5 MHz Span: 15 MHz





Conducted Emissions High SMR 900 MHz

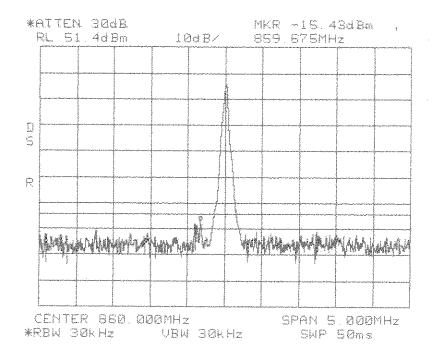


Conducted Emissions High SMR 900 MHz

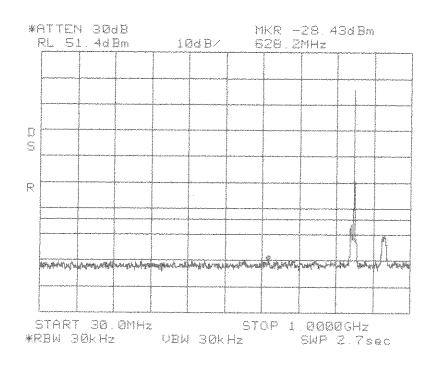
Span: 30 MHz to 10 GHz

Center: 860.0 MHz Span: 5 MHz

RBW/VBW: 30 kHz



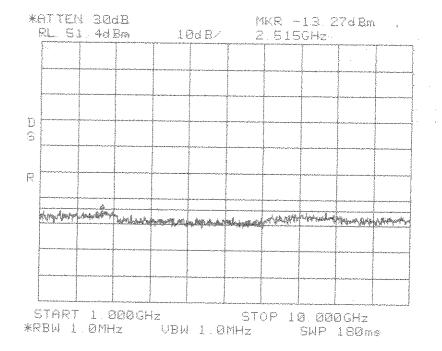
Conducted Emissions FM SMR 800 MHz



Conducted Emissions FM SMR 800 MHz

Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

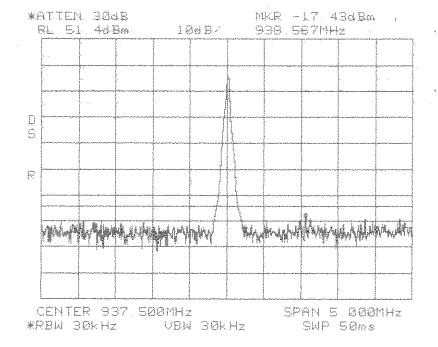
1 GHz to 10 GHz RBW/VBW: 1 MHz



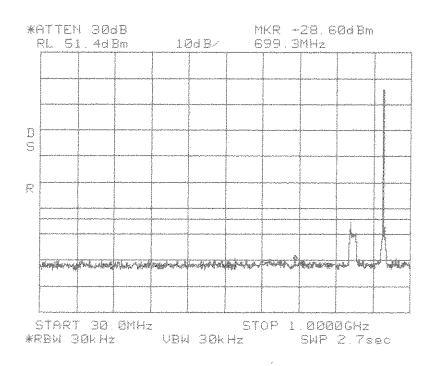
Conducted Emissions FM SMR 800 MHz

Center: 937.5 MHz Span: 5 MHz

RBW/VBW: 30 kHz



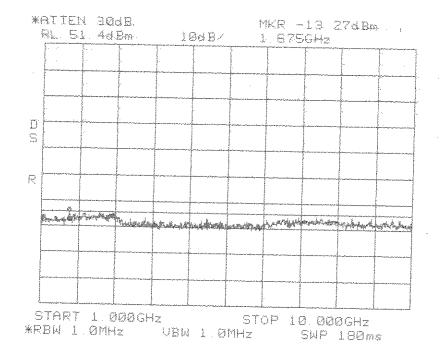
Conducted Emissions FM SMR 900 MHz



Conducted Emissions FM SMR 900 MHz

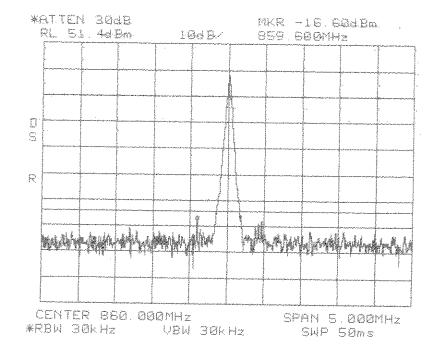
Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

1 GHz to 10 GHz RBW/VBW: 1 MHz

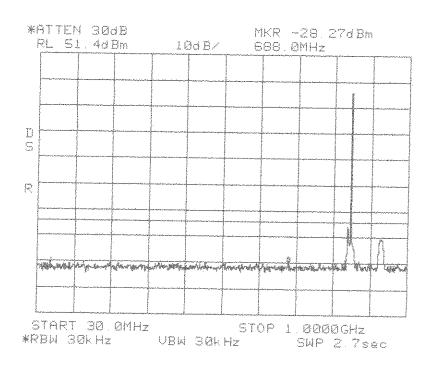


Conducted Emissions FM SMR 900 MHz

Center: 860.0 MHz Span: 5 MHz RBW/VBW: 30 kHz



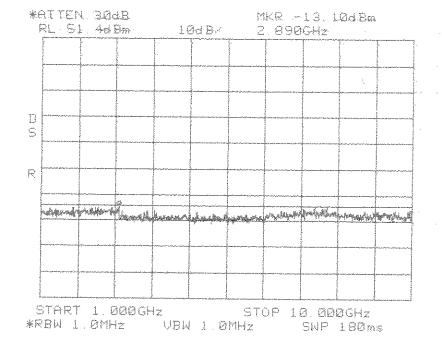
Conducted Emissions 16QAM SMR 800 MHz



Conducted Emissions 16QAM SMR 800 MHz

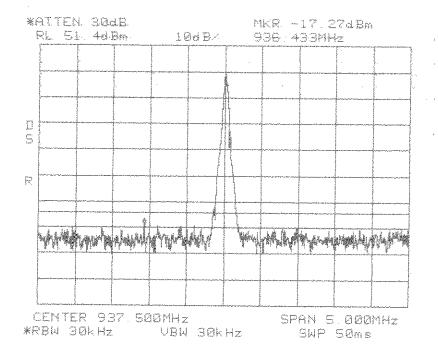
Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

1 GHz to 10 GHz RBW/VBW: 1 MHz

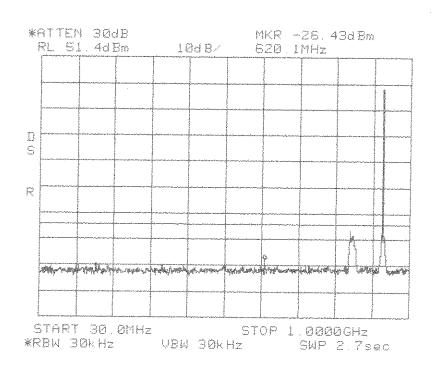


Conducted Emissions 16QAM SMR 800 MHz

Center: 937.5 MHz Span: 5 MHz RBW/VBW: 30 kHz



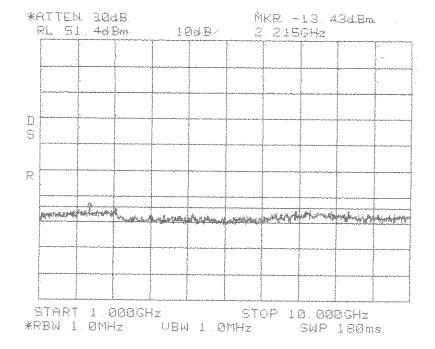
Conducted Emissions 16QAM SMR 900 MHz



Conducted Emissions 16QAM SMR 900 MHz

Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

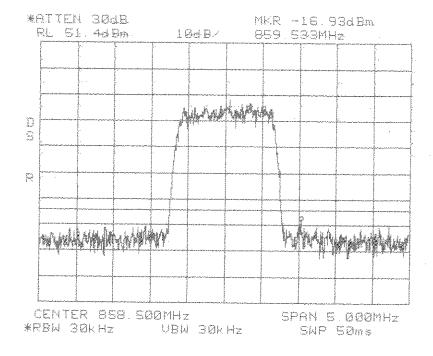
1 GHz to 10 GHz RBW/VBW: 1 MHz



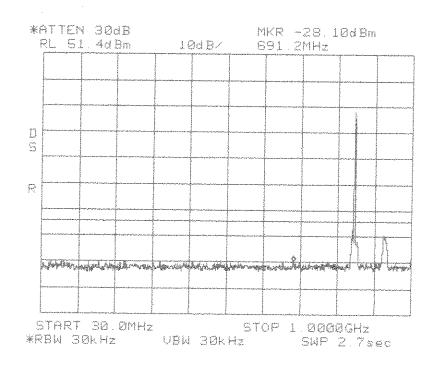
Conducted Emissions 16QAM SMR 900 MHz

Center: 858.5 MHz Span: 5 MHz

RBW/VBW: 30 kHz



Conducted Emissions CDMA SMR 800 MHz

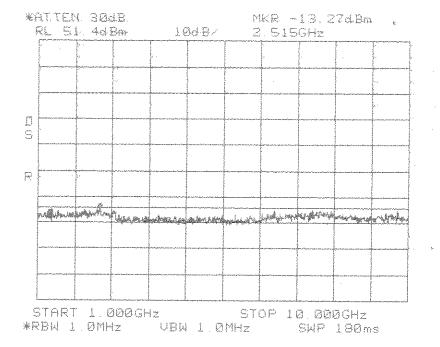


Conducted Emissions CDMA SMR 800 MHz

Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

File No. NC503856 Rev B

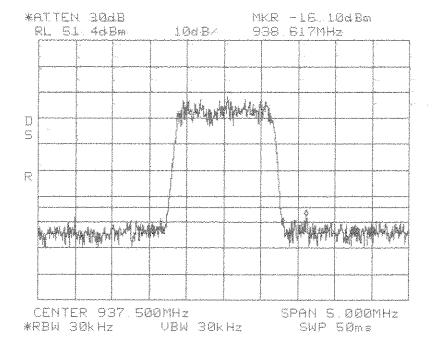
1 GHz to 10 GHz RBW/VBW: 1 MHz



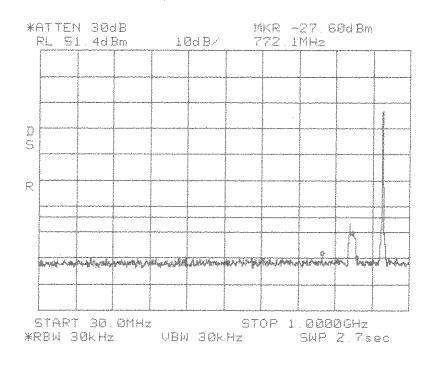
Conducted Emissions CDMA SMR 800 MHz

Center: 937.5 MHz Span: 5 MHz

RBW/VBW: 30 kHz



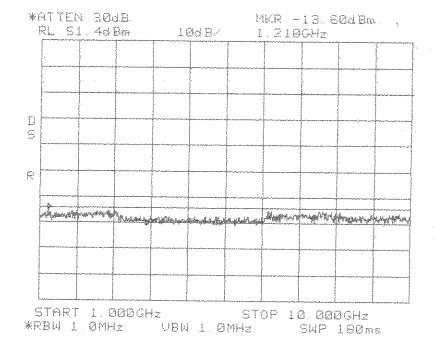
Conducted Emissions CDMA SMR 900 MHz



Conducted Emissions CDMA SMR 900 MHz

Span: 30 MHz to 1 GHz RBW/VBW: 30 kHz

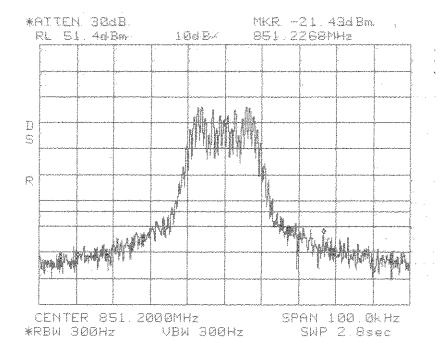
1 GHz to 10 GHz RBW/VBW: 1 MHz



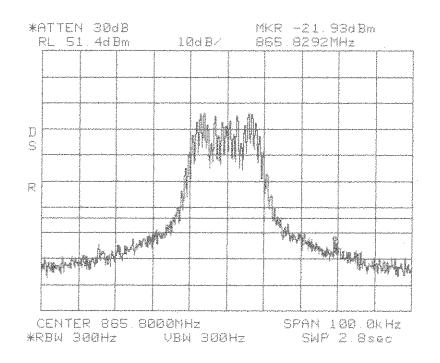
Conducted Emissions CDMA SMR 900 MHz

Center: 851.2 MHz Span: 100 kHz

RBW/VBW: 300 Hz / 300 Hz



Conducted Emissions Band Edge FM SMR 800 MHz



Conducted Emissions Band Edge FM SMR 800 MHz

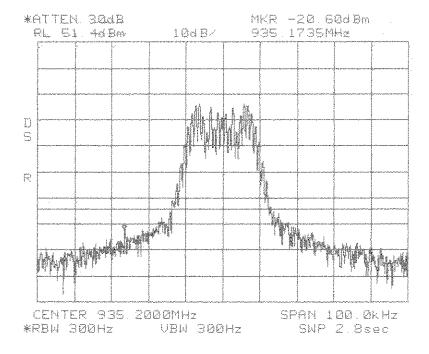
Center: 865.8 MHz

Span: 100 kHz

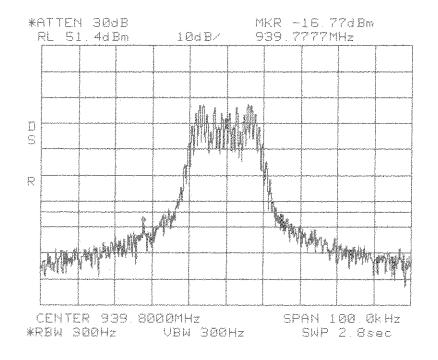
RBW/VBW: 300 Hz / 300 Hz

Center: 935.2 MHz Span: 100 kHz

RBW/VBW: 300 Hz / 300 Hz



Conducted Emissions Band Edge FM SMR 900 MHz



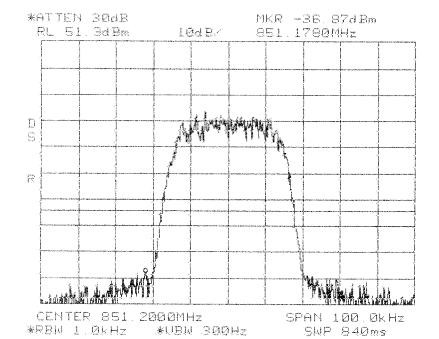
Conducted Emissions Band Edge FM SMR 900 MHz

Center: 939.8 MHz Span: 100 kHz

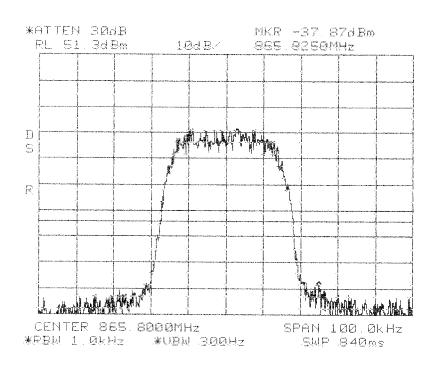
RBW/VBW: 300 Hz / 300 Hz

Center: 851.2 MHz

Span: 100 kHz RBW/VBW: 1 kHz / 300 Hz



Conducted Emissions Band Edge 16QAM SMR 800 MHz



Conducted Emissions Band Edge 16QAM SMR 800 MHz

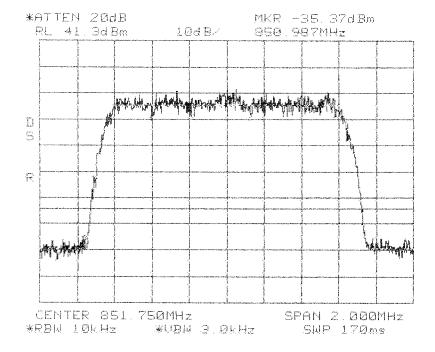
Center: 865.8 MHz Span: 100 kHz

RBW/VBW: 1 kHz / 300 Hz

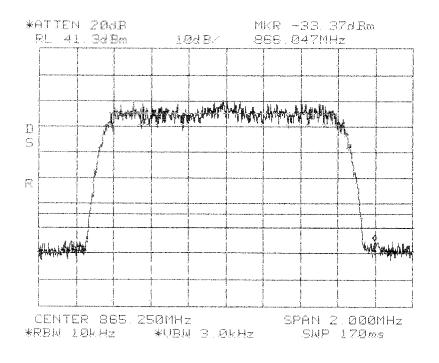
Center: 851.75 MHz

Span: 2 MHz

RBW/VBW: 10 kHz / 3 kHz



Conducted Emissions Band Edge CDMA SMR 800 MHz



Conducted Emissions Band Edge CDMA SMR 800 MHz

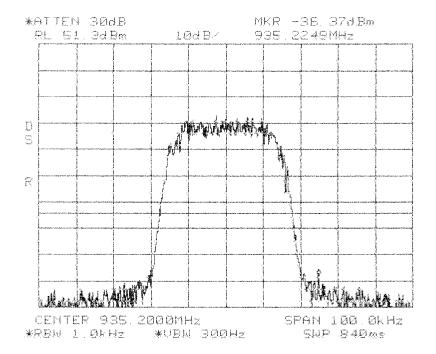
Center: 865.25 MHz

Span: 2 MHz

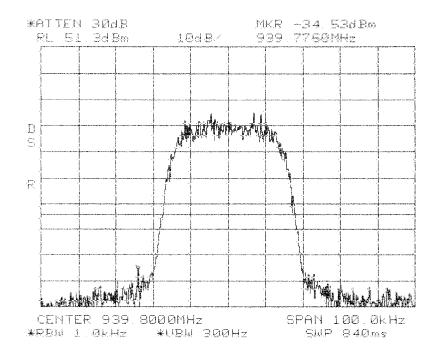
RBW/VBW: 10 kHz/3 kHz

Center: 935.2 MHz Span: 100 kHz

RBW/VBW: 1 kHz / 300 Hz



Conducted Emissions Band Edge 16QAM SMR 900 MHz



Conducted Emissions Band Edge 16QAM SMR 900 MHz

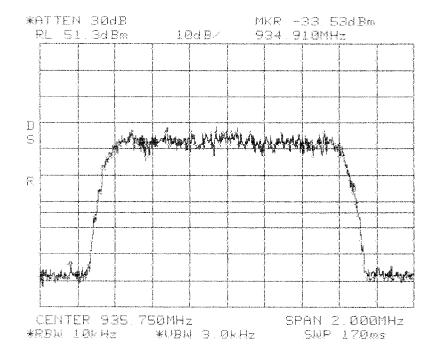
Center: 939.8 MHz Span: 100 kHz

RBW/VBW: 1 kHz / 300 Hz

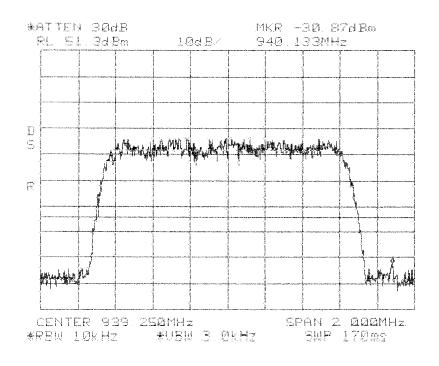
Center: 935.75 MHz

Span: 2 MHz

RBW/VBW: 10 kHz/3 kHz



Conducted Emissions Band Edge CDMA SMR 900 MHz



Conducted Emissions Band Edge CDMA SMR 900 MHz

Center: 939.25 MHz Span: 2 MHz

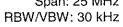
RBW/VBW: 10 kHz / 3 kHz

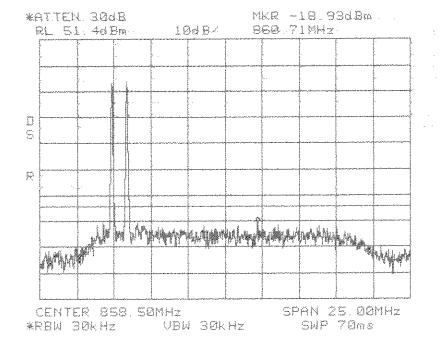
Inter-Modulation Test for ADC Inc Digivance CXD Model Number DGVF-01000000XXCRN

The intermodulation products test was performed for the EUT. Three tests were preformed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals, one at a lower end channel and one at a higher end channel. The modulations type tested was FM, 16 QAM, and CDMA. An investigation was made from 30 MHz to the 10th Harmonic of the highest fundamental frequency (~10 GHz). The following plots show the results.

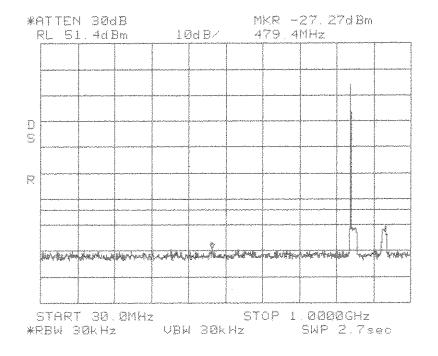
Results: (See Plots)

Center: 858.5 MHz Span: 25 MHz

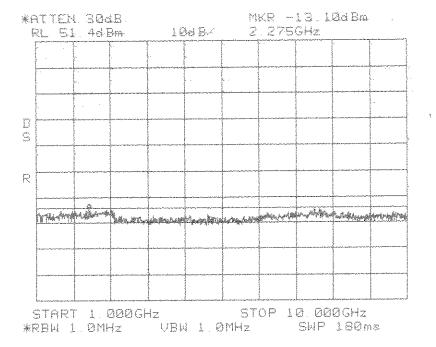




Intermodulation Close Lower FM SMR 800 MHz

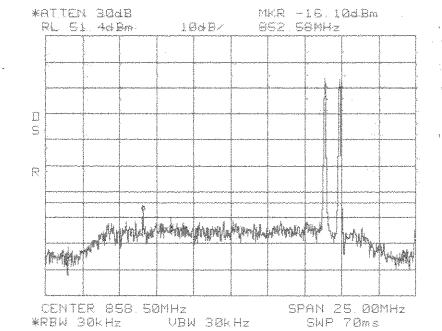


Intermodulation Close Lower FM SMR 800 MHz

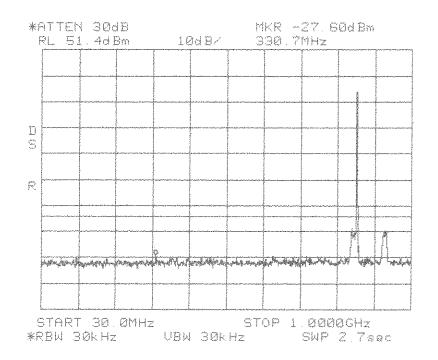


Intermodulation Close Lower FM SMR 800 MHz

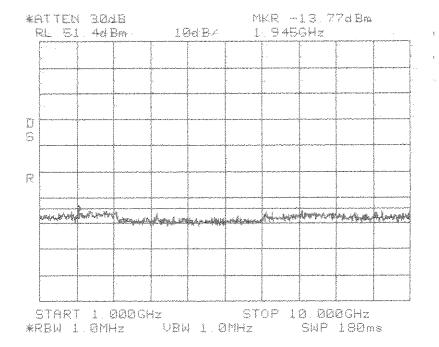
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz



Intermodulation Close Upper FM SMR 800 MHz



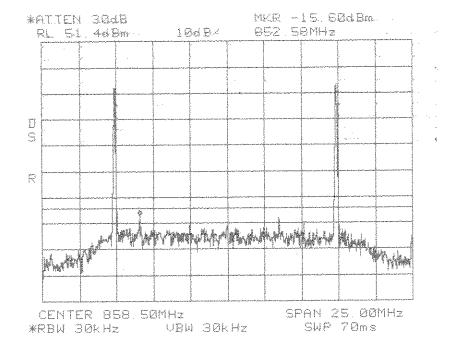
Intermodulation Close Upper FM SMR 800 MHz



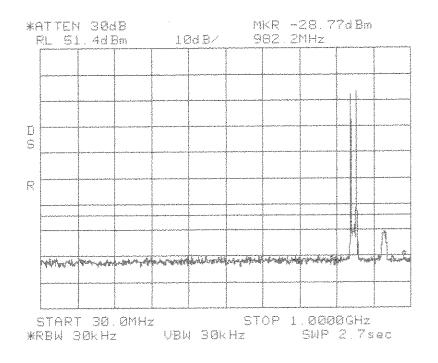
Intermodulation Close Upper FM SMR 800 MHz

Center: 858.5 MHz Span: 25 MHz

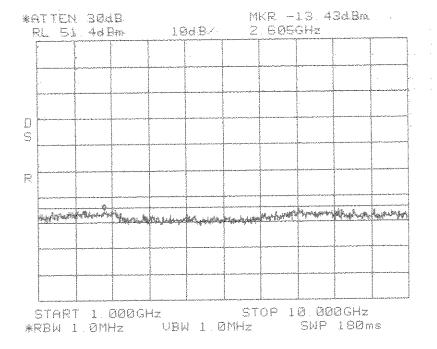
RBW/VBW: 30 kHz



Intermodulation **Apart** FM SMR 800 MHz

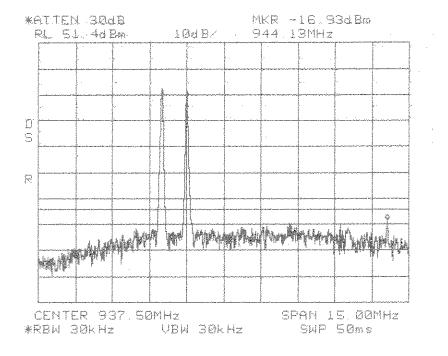


Intermodulation **Apart** SMR 800 MHz

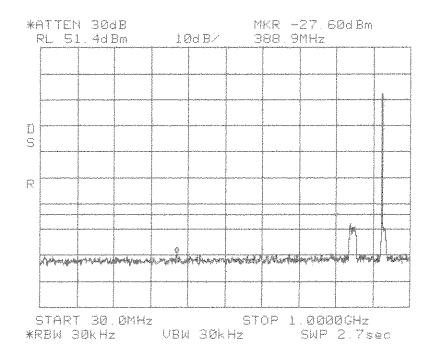


Intermodulation Apart FM SMR 800 MHz

Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz



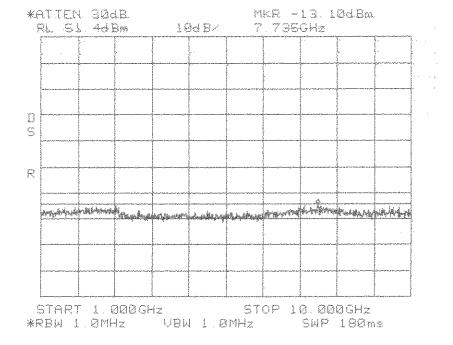
Intermodulation Close Lower FM SMR 900 MHz



Intermodulation Close Lower FM SMR 900 MHz

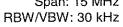
Span: 30 MHz to 1 GHz

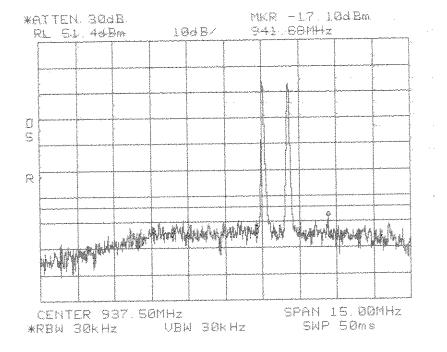
RBW/VBW: 30 kHz



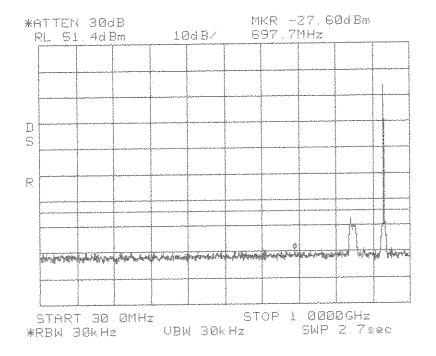
Intermodulation Close Lower FM SMR 900 MHz

Center: 937.5 MHz Span: 15 MHz

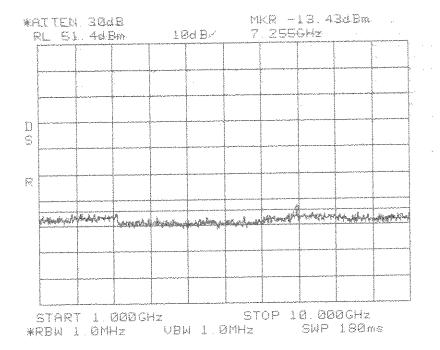




Intermodulation Close **Upper** FM SMR 900 MHz



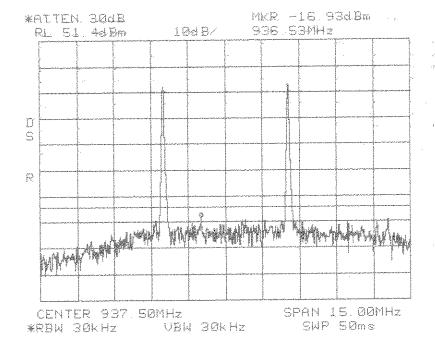
Intermodulation Close **Upper** SMR 900 MHz



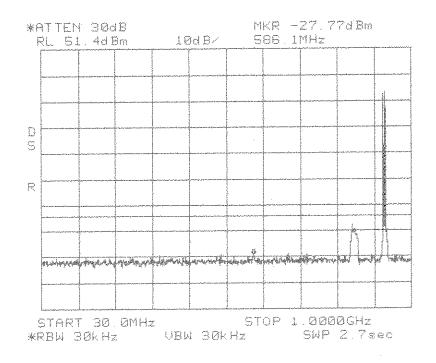
Intermodulation Close Upper FM SMR 900 MHz

Center: 937.5 MHz Span: 15 MHz

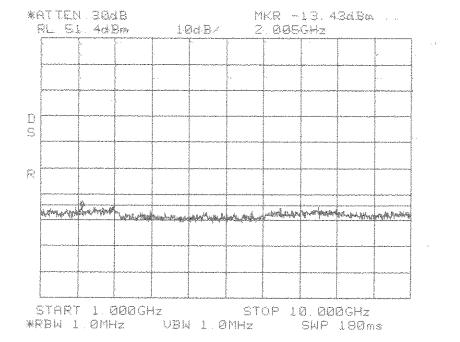
RBW/VBW: 30 kHz



Intermodulation **Apart** FM SMR 900 MHz



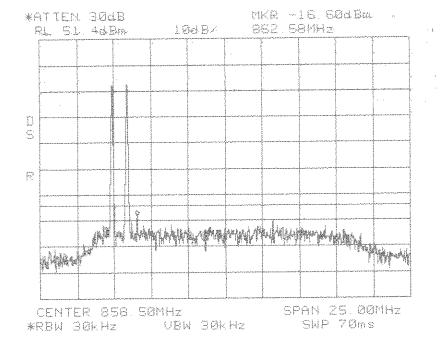
Intermodulation **Apart** SMR 900 MHz



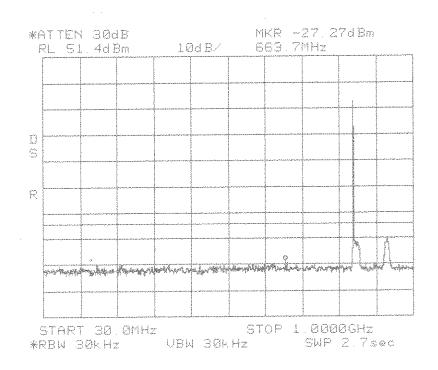
Intermodulation Apart FM SMR 900 MHz

Center: 858.5 MHz Span: 25 MHz

RBW/VBW: 30 kHz



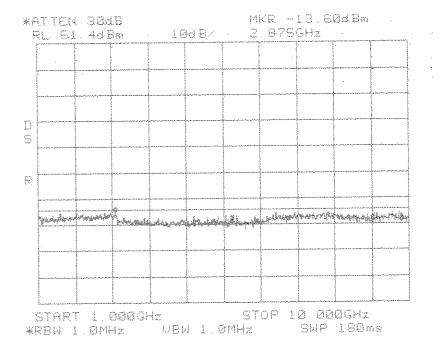
Intermodulation Close Lower **16QAM** SMR 800 MHz



Intermodulation Close Lower **16QAM** SMR 800 MHz

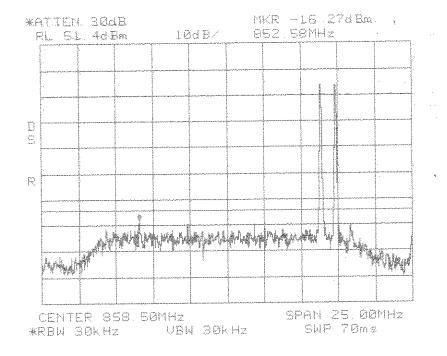
Span: 30 MHz to 1 GHz

RBW/VBW: 30 kHz

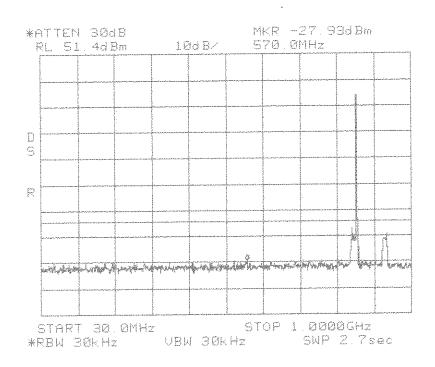


Intermodulation Close Lower 16QAM SMR 800 MHz

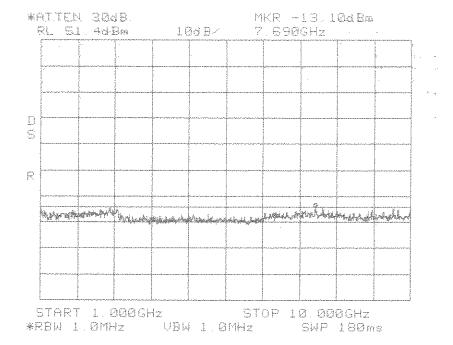
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz



Intermodulation Close **Upper** 16QAM SMR 800 MHz

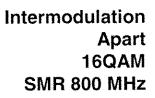


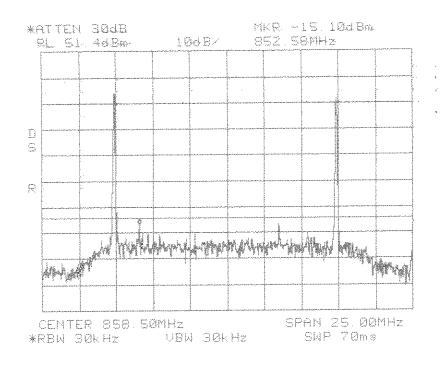
Intermodulation Close Upper 16QAM SMR 800 MHz

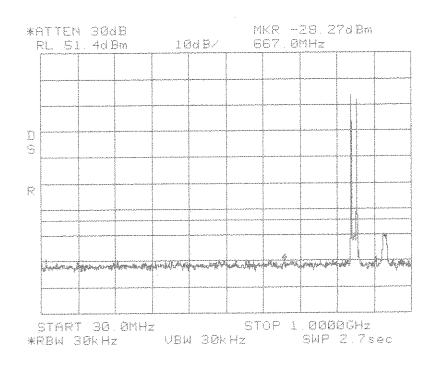


Intermodulation Close Upper 16QAM SMR 800 MHz

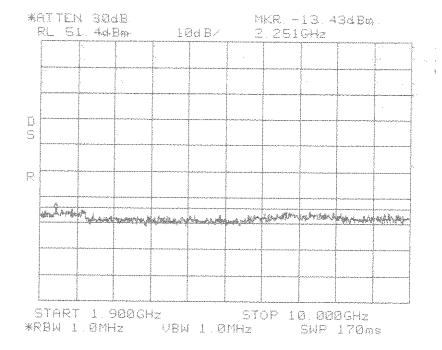
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz





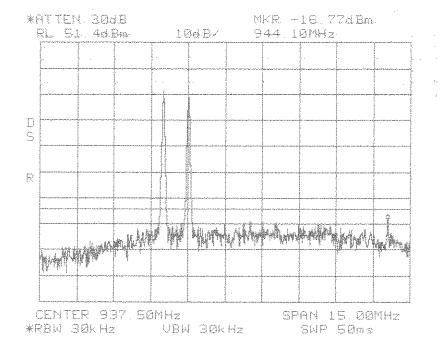


Intermodulation Apart 16QAM SMR 800 MHz

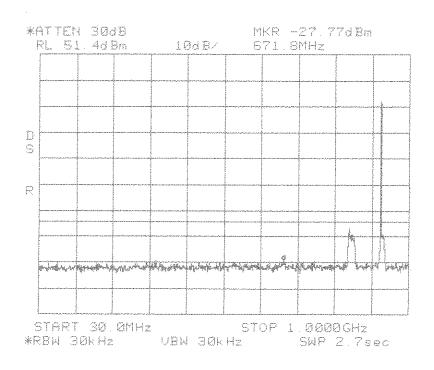


Intermodulation Apart 16QAM SMR 800 MHz

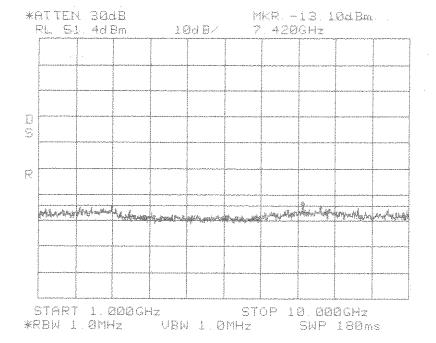
Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz



Intermodulation Close Lower 16QAM SMR 900 MHz

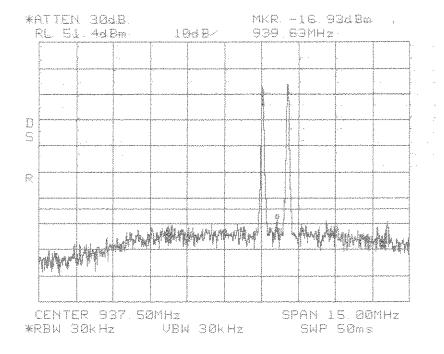


Intermodulation Close Lower 16QAM SMR 900 MHz

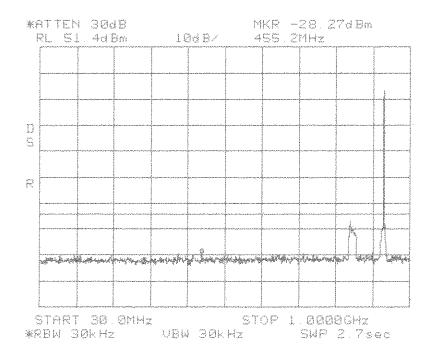


Intermodulation Close Lower 16QAM SMR 900 MHz

Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz



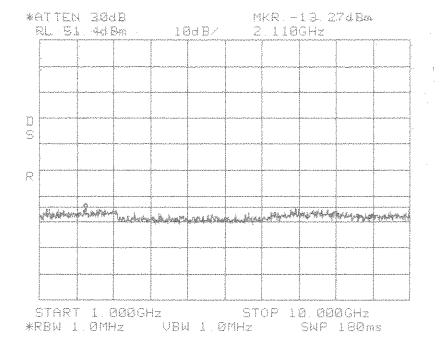
Intermodulation Close Upper 16QAM SMR 900 MHz



Intermodulation Close Upper 16QAM SMR 900 MHz

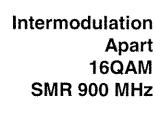
Span: 30 MHz to 1 GHz

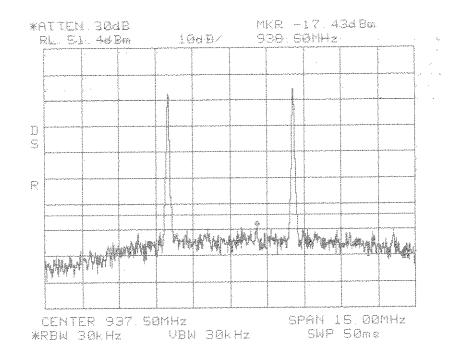
RBW/VBW: 30 kHz

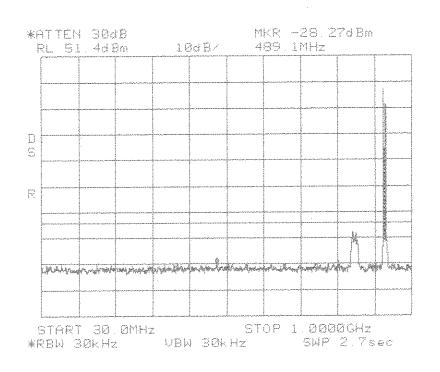


Intermodulation Close Upper 16QAM SMR 900 MHz

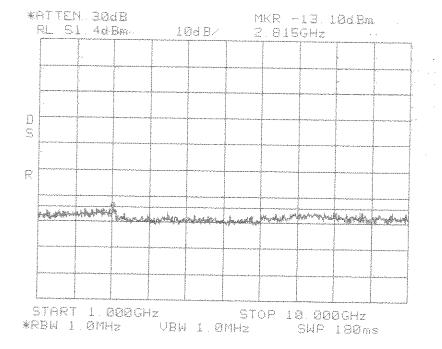
Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz







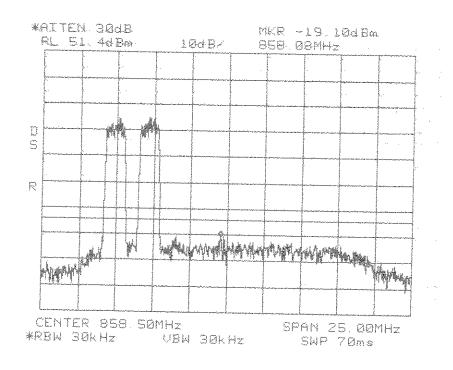
Intermodulation **Apart** 16QAM SMR 900 MHz

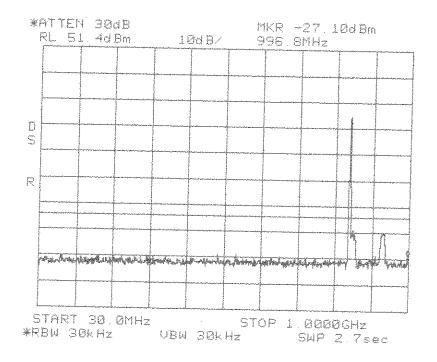


Intermodulation Apart 16QAM SMR 900 MHz

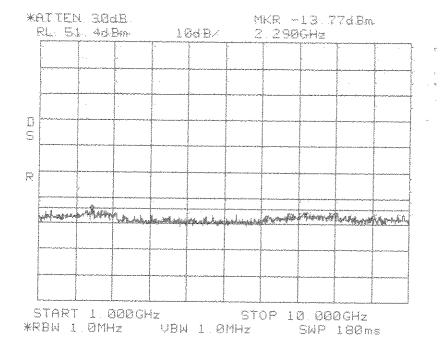
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz

Intermodulation Close Lower CDMA SMR 800 MHz



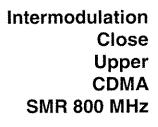


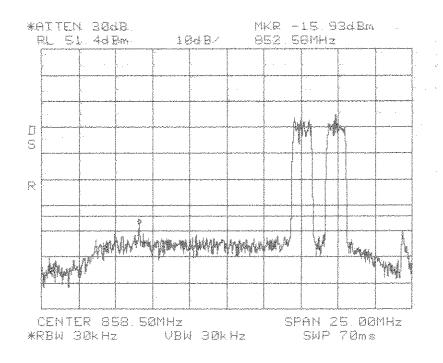
Intermodulation Close Lower CDMA SMR 800 MHz

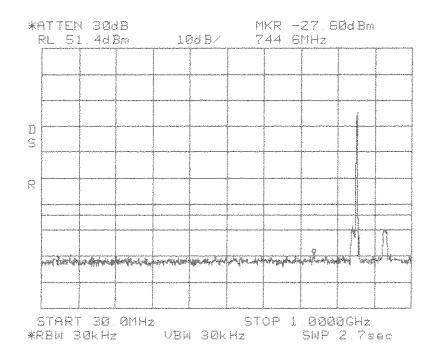


Intermodulation Close Lower CDMA SMR 800 MHz

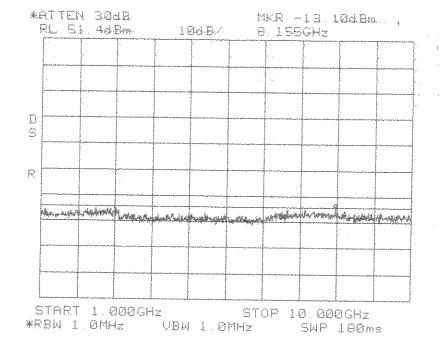
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz





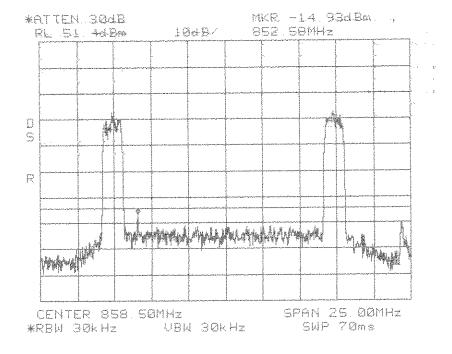


Intermodulation Close Upper CDMA SMR 800 MHz

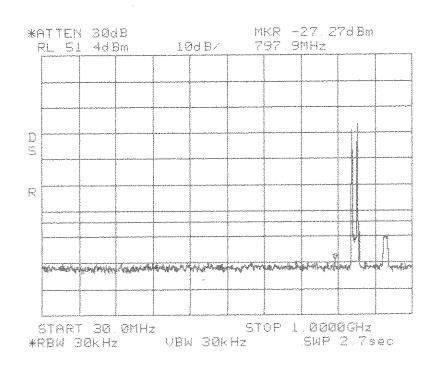


Intermodulation Close Upper CDMA SMR 800 MHz

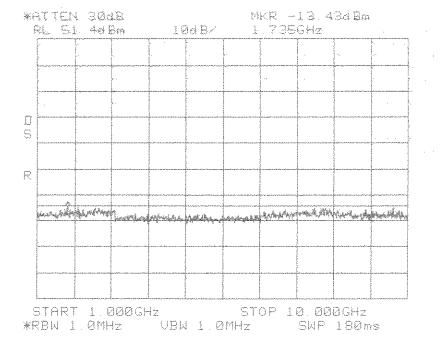
Center: 858.5 MHz Span: 25 MHz RBW/VBW: 30 kHz



Intermodulation Apart CDMA SMR 800 MHz

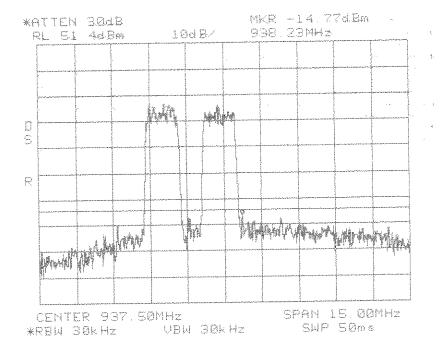


Intermodulation Apart CDMA SMR 800 MHz

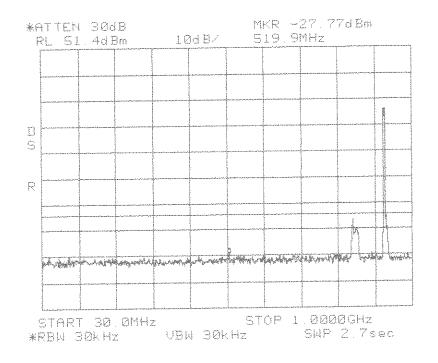


Intermodulation Apart CDMA SMR 800 MHz

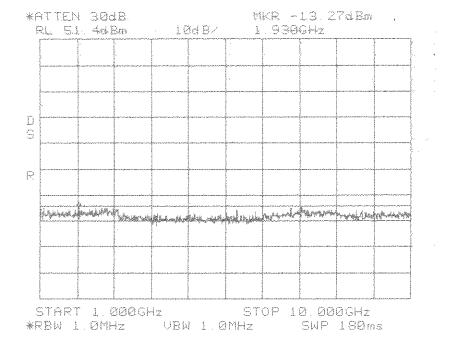
Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz



Intermodulation Close Lower CDMA SMR 900 MHz

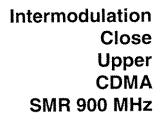


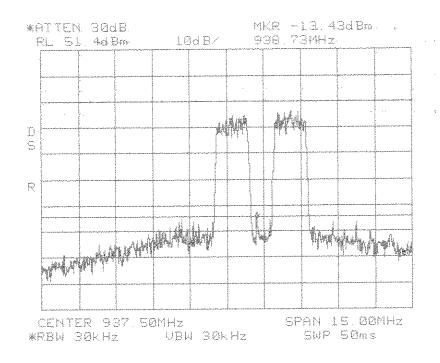
Intermodulation Close Lower CDMA SMR 900 MHz



Intermodulation Close Lower CDMA SMR 900 MHz

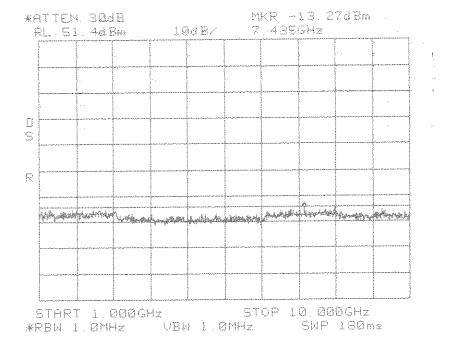
Center: 937.5 MHz Span: 15 MHz RBW/VBW: 30 kHz







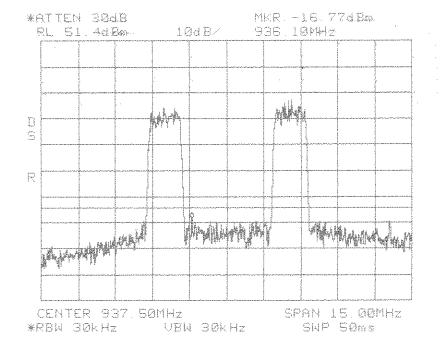
Intermodulation Close Upper CDMA SMR 900 MHz



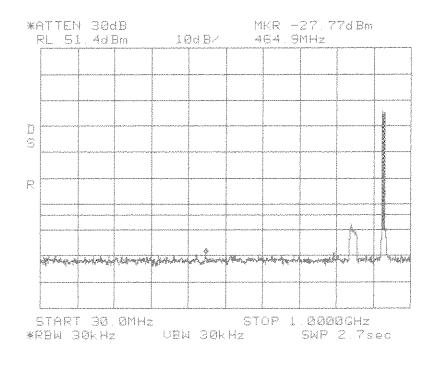
Intermodulation Close Upper CDMA SMR 900 MHz

Center: 937.5 MHz Span: 15 MHz

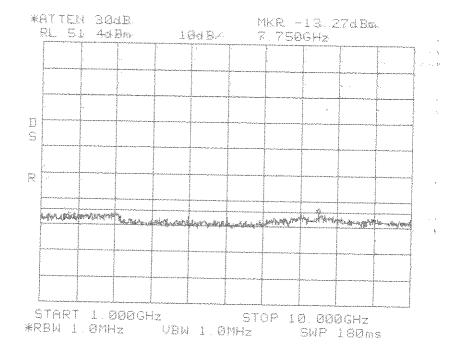
RBW/VBW: 30 kHz



Intermodulation **Apart CDMA** SMR 900 MHz



Intermodulation **Apart CDMA** SMR 900 MHz



Intermodulation Apart CDMA SMR 900 MHz