

TEST RESULT SUMMARY

FCC PART 24 SUBPART E

MANUFACTURER'S NAME ADC, Inc.

NAME OF EQUIPMENT

Digivance™ ICS 1900 MHz Remote Interface Unit

MODEL NUMBER DGVI-3X0000RIU

MANUFACTURER'S ADDRESS PO Box 1101

Minneapolis MN 55440

TEST REPORT NUMBER NC107868

TEST DATE 11 December 2001

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 24 Subpart E.

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 Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 24 Subpart E.

Date: 01 February 2002

Location: Taylors Falls MN

USA

G. S. Jakubowski Test Engineer

Not Transferable

- phulowh

J. T. Schneider Chief Engineer



EMC EMISSION - TEST REPORT

Test Report File No.	:	NC107868	Date of issue: 01 February 2002	
Model / Serial No.	:	DGVI-3X0000RIU	J/	
Product Type	<u>:</u>	Digivance™ ICS	1900 MHz Remote Interface Unit	
Applicant	<u>:</u>	ADC, Inc.		
Manufacturer	:	ADC, Inc.		
License holder	<u>:</u>	ADC, Inc.		
Address	<u>:</u>	PO Box 1101		
	<u>:</u>	Minneapolis MN :	55440	
Test Result	:	■ Positive □	Negative	
Test Project Number Reference(s)	:	NC107868		
Total pages including Appendices		299		

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001. TÜV Product Service 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 Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports. This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

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



DIRECTORY - EMISSIONS

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	Product Information Form	A1 – A7



EMISSIONS TEST REGULATIONS:

The emissions tests were performed according to following regulations:			
□ - EN 50081-1 / 1991 □ - EN 55011 / 1991	□ - Group 1 □ - Class A	□ - Group 2 □ - Class B	
□ - EN 55013 / 1990 □ - EN 55014 / 1987	☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices		
□ - EN 55014 / A2:1990 □ - EN 55014 / 1993	□ - Household appliances and similar□ - Portable tools□ - Semiconductor devices		
□ - EN 55015 / 1987 □ - EN 55015 / A1:1990 □ - EN 55015 / 1993 □ - EN 55022 / 1987 ■ - FCC Part 24 Subpart E	□ - Class A	□ - Class B	
□ - BS □ - VCCI □ - FCC □ - AS 3548 (1992)	□ - Class A □ - Class A □ - Class A	□ - Class B □ - Class B □ - Class B	
□ - CISPR 11 (1990) □ - CISPR 22 (1993)	□ - Group 1 □ - Class A □ - Class A	□ - Group 2 □ - Class B □ - Class B	



Environmental conditions in the lab:

<u>Actual</u> : 23 °C Temperature Relative Humidity : 19 % Atmospheric pressure : 98.6 kPa

Power supply system : 60 Hz - 115 V - 1-phase

Sign Explanations:

□ - not applicable■ - applicable





Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage) per 15.207

The CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE) measurements were performed at the following test location:

-	Test	not	app	licable
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- ☐ Wild River Lab Large Test Site (Open Area Test Site)
- □ Wild River Lab Small Test Site (Open Area Test Site)
- □ Oakwood Lab (Open Area Test Site)
- □ Wild River Lab Screen Room
- □ New Brighton Lab Shielded Room

24.232 Effective Radiated Power Limit

The Effective Radiated Power Limit measurements were tested at the following test location:

□ - Test not applicable

■ - ADC facility

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number	Cal Due
-	8563E	Hewlett-Packard	Spectrum Analyzer	MC27690	Apr 02
■ -	6810.17.A	Huber+Suhner	Attenuator		CNR

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually. Equipment labeled CNR (Calibration Not Required) is verified and compensated for with NIST traceable calibrated equipment.

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected directly to the spectrum analyzer, which was set up with a 1 MHz resolution bandwidth. The spectrum analyzer level was offset by -35 dB to compensate for the attenuators and cable loss between the EUT and the analyzer.

ERP data on next page

Effective Isotropic Radiated Power Limit Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU. Per FCC CFR 47 Part 24.232 (a)

*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 as shown below. A CW signal was used at the low, mid and high parts of the selected band. The spectrum analyzer level was offset by $\approx 35 \, \mathrm{dB}$ to compensate for attenuators and cable loss between the EUT and analyzer.

Band A		Band D	
Carrier Frequency	Carrier Output	Carrier Frequency	Carrier Output
1850.2 MHz	32.43dBm	1865.2 MHz	32.60dBm
1857.5 MHz	32.43dBm	1867.5 MHz	33.43dBm
1864.8 MHz	32.60dBm	1869.8 MHz	33.27dBm
Band B		Band E	
Carrier Frequency	Carrier Output	Carrier Frequency	Carrier Output
1870.2 MHz	33.10dBm	1885.2 MHz	33.27dBm
1877.5 MHz	33.93dBm	1887.5 MHz	33.93dBm
1884.8 MHz	33.93dBm	1889.8 MHz	33.93dBm
Band C		Band F	
Carrier Frequency	Carrier Output	Carrier Frequency	Carrier Output
1895.2 MHz	34.43dBm	1890.2 MHz	34.30dBm
1902.5 MHz	34.43dBm	1892.5 MHz	33.77dBm
1909.8 MHz	34.93dBm	1894.8 MHz	33.20dBm



24.235 Frequency Stability

The Frequency Stability measurements were tested at the following test location :

□ - Test not applicable

■ - ADC facility

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	F-12-CHV-S-5	Despatch/Ecosphere	Temperature chamber	MC21679	Aug 02
■ -	5347A	Hewlett-Packard	Frequency Counter	MC27569	May 02
■ -	HH23	Omega	Microprocessor Thermometer		Nov 02

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Frequency Stability measurements on following pages: EUT is tested form 0° to 50° C, which is the operating temperature of the system. The equipment is specified to be operating in an environment within this range.

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU.

Per FCC CFR 47 Part 24.235

EUT Band A

Input Voltage	Carrier Frequency	Measured Frequency	Meets requirement?
102 VAC	1850.200000 MHz	1850.200000 MHz	Yes
120 VAC	1850.200000 MHz	1850.200000 MHz	Yes
138 VAC	1850.200000 MHz	1850.200000 MHz	Yes
102 VAC	1857.500000 MHz	1857.500000 MHz	Yes
120 VAC	1857.500000 MHz	1857.500000 MHz	Yes
138 VAC	1857.500000 MHz	1857.500000 MHz	Yes
102 VAC	1864.800000 MHz	1864.800000 MHz	Yes
120 VAC	1864.800000 MHz	1864.800000 MHz	Yes
138 VAC	1864.800000 MHz	1864.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1850.200000 MHz	1850.200000 MHz	Yes
10 Deg C	1850.200000 MHz	1850.200000 MHz	Yes
20 Deg C	1850.200000 MHz	1850.200000 MHz	Yes
30 Deg C	1850.200000 MHz	1850.200000 MHz	Yes
40 Deg C	1850.200000 MHz	1850.200000 MHz	Yes
50 Deg C	1850.200000 MHz	1850.200000 MHz	Yes
0 Deg. C	1857.500000 MHz	1857.500000 MHz	Yes
10 Deg C	1857.500000 MHz	1857.500000 MHz	Yes
20 Deg C	1857.500000 MHz	1857.500000 MHz	Yes
30 Deg C	1857.500000 MHz	1857.500000 MHz	Yes
40 Deg C	1857.500000 MHz	1857.500000 MHz	Yes
50 Deg C	1857.500000 MHz	1857.500000 MHz	Yes
0 Deg. C	1864.800000 MHz	1864.800000 MHz	Yes
10 Deg C	1864.800000 MHz	1864.800000 MHz	Yes
20 Deg C	1864.800000 MHz	1864.800000 MHz	Yes
30 Deg C	1864.800000 MHz	1864.800000 MHz	Yes
40 Deg C	1864.800000 MHz	1864.800000 MHz	Yes
50 Deg C	1864.800000 MHz	1864.800000 MHz	Yes

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU.

Per FCC CFR 47 Part 24.235

EUT Band B

Input Voltage	Carrier Frequency	Measured Frequency	Meets requirement?
102 VAC	1870.200000 MHz	1870.200000 MHz	Yes
120 VAC	1870.200000 MHz	1870.200000 MHz	Yes
138 VAC	1870.200000 MHz	1870.200000 MHz	Yes
102 VAC	1877.500000 MHz	1877.500000 MHz	Yes
120 VAC	1877.500000 MHz	1877.500000 MHz	Yes
138 VAC	1877.500000 MHz	1877.500000 MHz	Yes
102 VAC	1884.800000 MHz	1884.800000 MHz	Yes
120 VAC	1884.800000 MHz	1884.800000 MHz	Yes
138 VAC	1884.800000 MHz	1884.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1870.200000 MHz	1870.200000 MHz	Yes
10 Deg C	1870.200000 MHz	1870.200000 MHz	Yes
20 Deg C	1870.200000 MHz	1870.200000 MHz	Yes
30 Deg C	1870.200000 MHz	1870.200000 MHz	Yes
40 Deg C	1870.200000 MHz	1870.200000 MHz	Yes
50 Deg C	1870.200000 MHz	1870.200000 MHz	Yes
0 Deg. C	1877.500000 MHz	1877.500000 MHz	Yes
10 Deg C	1877.500000 MHz	1877.500000 MHz	Yes
20 Deg C	1877.500000 MHz	1877.500000 MHz	Yes
30 Deg C	1877.500000 MHz	1877.500000 MHz	Yes
40 Deg C	1877.500000 MHz	1877.500000 MHz	Yes
50 Deg C	1877.500000 MHz	1877.500000 MHz	Yes
0 Deg. C	1884.800000 MHz	1884.800000 MHz	Yes
10 Deg C	1884.800000 MHz	1884.800000 MHz	Yes
20 Deg C	1884.800000 MHz	1884.800000 MHz	Yes
30 Deg C	1884.800000 MHz	1884.800000 MHz	Yes
40 Deg C	1884.800000 MHz	1884.800000 MHz	Yes
50 Deg C	1884.800000 MHz	1884.800000 MHz	Yes

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU. Per FCC CFR 47 Part 24.235

EUT Band C

T 4 \$7 \$4		Managed Engage	Meets requirement?
Input Voltage	Carrier Frequency	Measured Frequency	
102 VAC	1895.200000 MHz	1895.200000 MHz	Yes
120 VAC	1895.200000 MHz	1895.200000 MHz	Yes
138 VAC	1895.200000 MHz	1895.200000 MHz	Yes
102 VAC	1902.500000 MHz	1902.500000 MHz	Yes
120 VAC	1902.500000 MHz	1902.500000 MHz	Yes
138 VAC	1902.500000 MHz	1902.500000 MHz	Yes
102 VAC	1909.800000 MHz	1909.800000 MHz	Yes
120 VAC	1909.800000 MHz	1909.800000 MHz	Yes
138 VAC	1909.800000 MHz	1909.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1895.200000 MHz	1895.200000 MHz	Yes
10 Deg C	1895.200000 MHz	1895.200000 MHz	Yes
20 Deg C	1895.200000 MHz	1895.200000 MHz	Yes
30 Deg C	1895.200000 MHz	1895.200000 MHz	Yes
40 Deg C	1895.200000 MHz	1895.200000 MHz	Yes
50 Deg C	1895.200000 MHz	1895.200000 MHz	Yes
0 Deg. C	1902.500000 MHz	1902.500000 MHz	Yes
10 Deg C	1902.500000 MHz	1902.500000 MHz	Yes
20 Deg C	1902.500000 MHz	1902.500000 MHz	Yes
30 Deg C	1902.500000 MHz	1902.500000 MHz	Yes
40 Deg C	1902.500000 MHz	1902.500000 MHz	Yes
50 Deg C	1902.500000 MHz	1902.500000 MHz	Yes
0 Deg. C	1909.800000 MHz	1909.800000 MHz	Yes
10 Deg C	1909.800000 MHz	1909.800000 MHz	Yes
20 Deg C	1909.800000 MHz	1909.800000 MHz	Yes
30 Deg C	1909.800000 MHz	1909.800000 MHz	Yes
40 Deg C	1909.800000 MHz	1909.800000 MHz	Yes
50 Deg C	1909.800000 MHz	1909.800000 MHz	Yes

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU.

Per FCC CFR 47 Part 24.235

EUT Band D

		J Danu D	1
Input Voltage	Carrier Frequency	Measured Frequency	Meets requirement?
102 VAC	1865.200000 MHz	1865.200000 MHz	Yes
120 VAC	1865.200000 MHz	1865.200000 MHz	Yes
138 VAC	1865.200000 MHz	1865.200000 MHz	Yes
102 VAC	1867.500000 MHz	1867.500000 MHz	Yes
120 VAC	1867.500000 MHz	1867.500000 MHz	Yes
138 VAC	1867.500000 MHz	1867.500000 MHz	Yes
102 VAC	1869.800000 MHz	1869.800000 MHz	Yes
120 VAC	1869.800000 MHz	1869.800000 MHz	Yes
138 VAC	1869.800000 MHz	1869.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1865.200000 MHz	1865.200000 MHz	Yes
10 Deg C	1865.200000 MHz	1865.200000 MHz	Yes
20 Deg C	1865.200000 MHz	1865.200000 MHz	Yes
30 Deg C	1865.200000 MHz	1865.200000 MHz	Yes
40 Deg C	1865.200000 MHz	1865.200000 MHz	Yes
50 Deg C	1865.200000 MHz	1865.200000 MHz	Yes
0 Deg. C	1867.500000 MHz	1867.500000 MHz	Yes
10 Deg C	1867.500000 MHz	1867.500000 MHz	Yes
20 Deg C	1867.500000 MHz	1867.500000 MHz	Yes
30 Deg C	1867.500000 MHz	1867.500000 MHz	Yes
40 Deg C	1867.500000 MHz	1867.500000 MHz	Yes
50 Deg C	1867.500000 MHz	1867.500000 MHz	Yes
0 Deg. C	1869.800000 MHz	1869.800000 MHz	Yes
10 Deg C	1869.800000 MHz	1869.800000 MHz	Yes
20 Deg C	1869.800000 MHz	1869.800000 MHz	Yes
30 Deg C	1869.800000 MHz	1869.800000 MHz	Yes
40 Deg C	1869.800000 MHz	1869.800000 MHz	Yes
50 Deg C	1869.800000 MHz	1869.800000 MHz	Yes

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU. Per FCC CFR 47 Part 24.235

EUT Band E

		or band E	7.5 / 40
Input Voltage	Carrier Frequency	Measured Frequency	Meets requirement?
102 VAC	1885.200000 MHz	1885.200000 MHz	Yes
120 VAC	1885.200000 MHz	1885.200000 MHz	Yes
138 VAC	1885.200000 MHz	1885.200000 MHz	Yes
102 VAC	1887.500000 MHz	1887.500000 MHz	Yes
120 VAC	1887.500000 MHz	1887.500000 MHz	Yes
138 VAC	1887.500000 MHz	1887.500000 MHz	Yes
102 VAC	1889.800000 MHz	1889.800000 MHz	Yes
120 VAC	1889.800000 MHz	1889.800000 MHz	Yes
138 VAC	1889.800000 MHz	1889.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1885.200000 MHz	1885.200000 MHz	Yes
10 Deg C	1885.200000 MHz	1885.200000 MHz	Yes
20 Deg C	1885.200000 MHz	1885.200000 MHz	Yes
30 Deg C	1885.200000 MHz	1885.200000 MHz	Yes
40 Deg C	1885.200000 MHz	1885.200000 MHz	Yes
50 Deg C	1885.200000 MHz	1885.200000 MHz	Yes
0 Deg. C	1887.500000 MHz	1887.500000 MHz	Yes
10 Deg C	1887.500000 MHz	1887.500000 MHz	Yes
20 Deg C	1887.500000 MHz	1887.500000 MHz	Yes
30 Deg C	1887.500000 MHz	1887.500000 MHz	Yes
40 Deg C	1887.500000 MHz	1887.500000 MHz	Yes
50 Deg C	1887.500000 MHz	1887.500000 MHz	Yes
0 Deg. C	1889.800000 MHz	1889.800000 MHz	Yes
10 Deg C	1889.800000 MHz	1889.800000 MHz	Yes
20 Deg C	1889.800000 MHz	1889.800000 MHz	Yes
30 Deg C	1889.800000 MHz	1889.800000 MHz	Yes
40 Deg C	1889.800000 MHz	1889.800000 MHz	Yes
50 Deg C	1889.800000 MHz	1889.800000 MHz	Yes

Frequency Tolerance Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU. Per FCC CFR 47 Part 24.235

EUT Band F

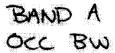
EUI Band F			
Input Voltage	Carrier Frequency	Measured Frequency	Meets requirement?
102 VAC	1890.200000 MHz	1890.200000 MHz	Yes
120 VAC	1890.200000 MHz	1890.200000 MHz	Yes
138 VAC	1890.200000 MHz	1890.200000 MHz	Yes
102 VAC	1892.500000 MHz	1892.500000 MHz	Yes
120 VAC	1892.500000 MHz	1892.500000 MHz	Yes
138 VAC	1892.500000 MHz	1892.500000 MHz	Yes
102 VAC	1894.800000 MHz	1894.800000 MHz	Yes
120 VAC	1894.800000 MHz	1894.800000 MHz	Yes
138 VAC	1894.800000 MHz	1894.800000 MHz	Yes
Temperature	Carrier Frequency	Measured Frequency	Meets requirement?
0 Deg. C	1890.200000 MHz	1890.200000 MHz	Yes
10 Deg C	1890.200000 MHz	1890.200000 MHz	Yes
20 Deg C	1890.200000 MHz	1890.200000 MHz	Yes
30 Deg C	1890.200000 MHz	1890.200000 MHz	Yes
40 Deg C	1890.200000 MHz	1890.200000 MHz	Yes
50 Deg C	1890.200000 MHz	1890.200000 MHz	Yes
0 Deg. C	1892.500000 MHz	1892.500000 MHz	Yes
10 Deg C	1892.500000 MHz	1892.500000 MHz	Yes
20 Deg C	1892.500000 MHz	1892.500000 MHz	Yes
30 Deg C	1892.500000 MHz	1892.500000 MHz	Yes
40 Deg C	1892.500000 MHz	1892.500000 MHz	Yes
50 Deg C	1892.500000 MHz	1892.500000 MHz	Yes
0 Deg. C	1894.800000 MHz	1894.800000 MHz	Yes
10 Deg C	1894.800000 MHz	1894.800000 MHz	Yes
20 Deg C	1894.800000 MHz	1894.800000 MHz	Yes
30 Deg C	1894.800000 MHz	1894.800000 MHz	Yes
40 Deg C	1894.800000 MHz	1894.800000 MHz	Yes
50 Deg C	1894.800000 MHz	1894.800000 MHz	Yes

Occupied Bandwidth Modulation Test for ADC Inc. Digivance 1900 MHz RIU Models DGVI-310000RIU, DGVI-320000RIU, DGVI-330000RIU, DGVI-340000RIU, DGVI-350000RIU, and DGVI-360000RIU.

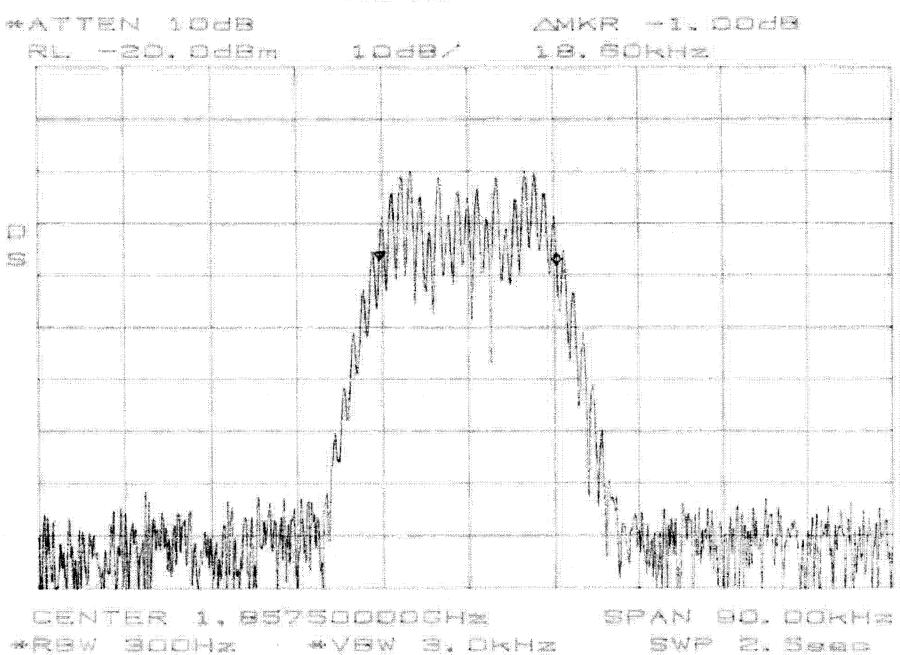
An input/output Occupied Bandwidth test was done with three different modulation types: FM (1 kHz @ 8 kHz deviation) TDMA, and CDMA. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT. The following plots show input signals vs. output signals.

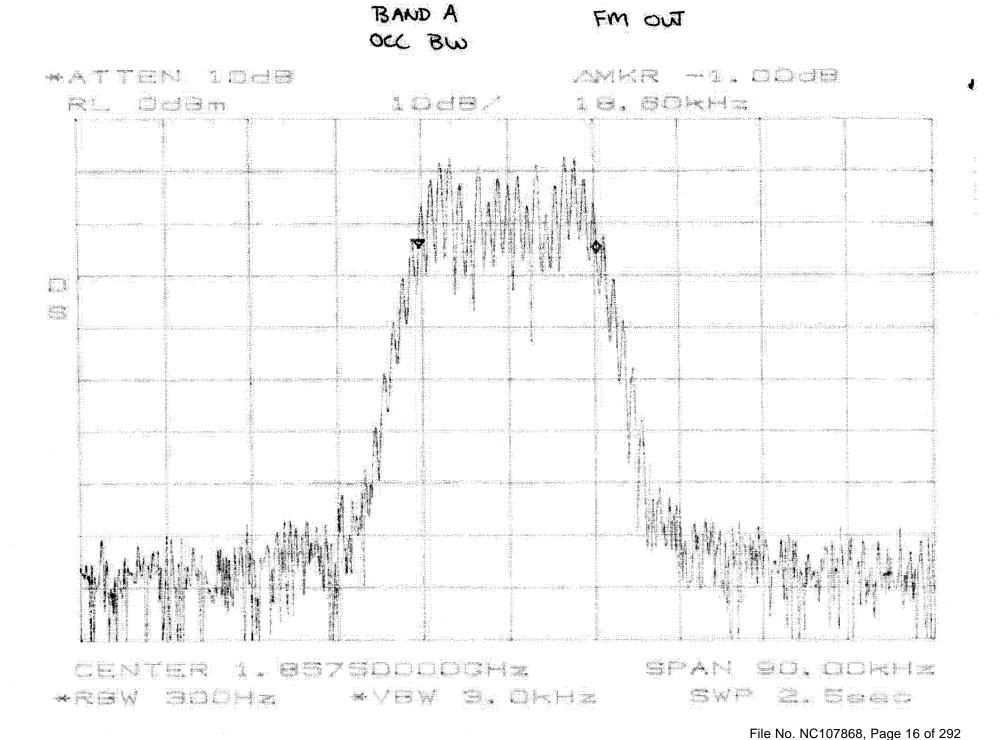
Results:

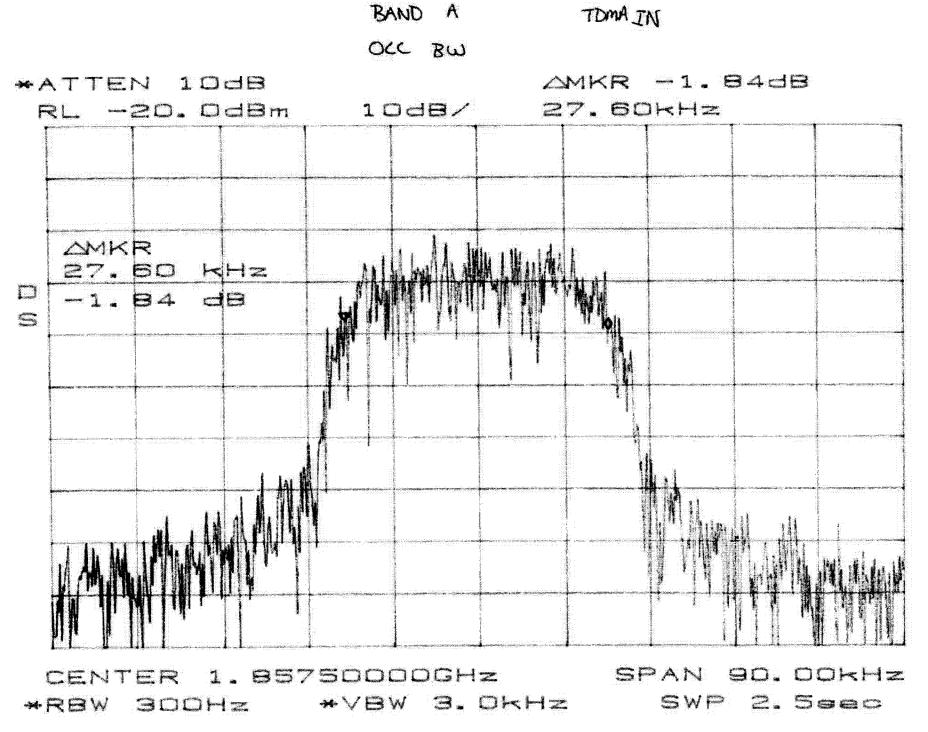
Pass (see plots)

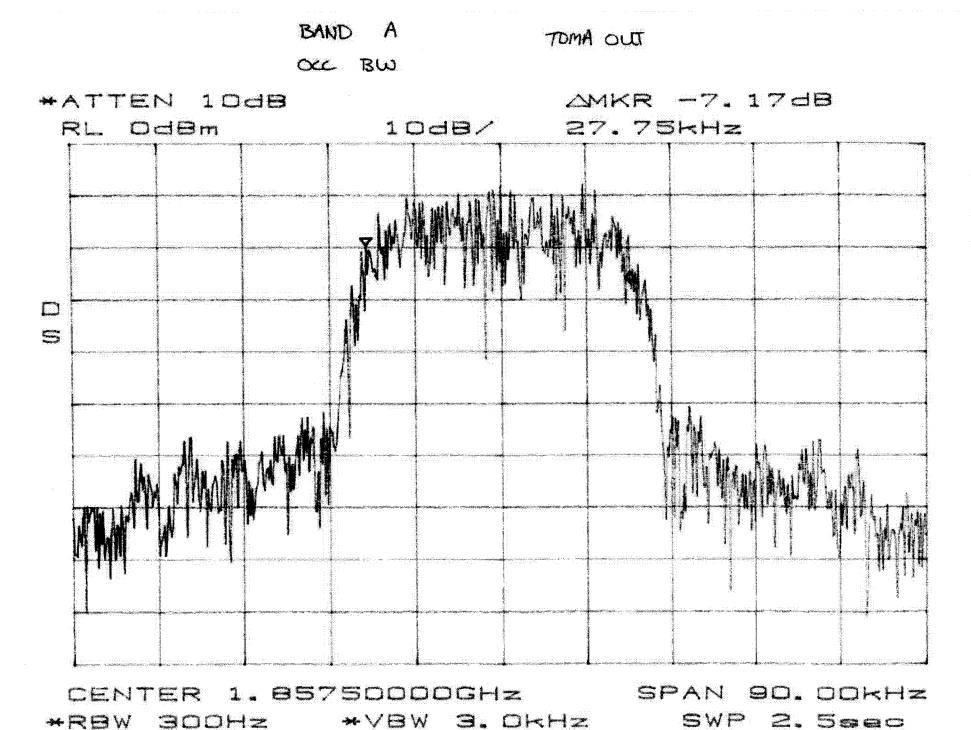


FM IN



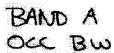




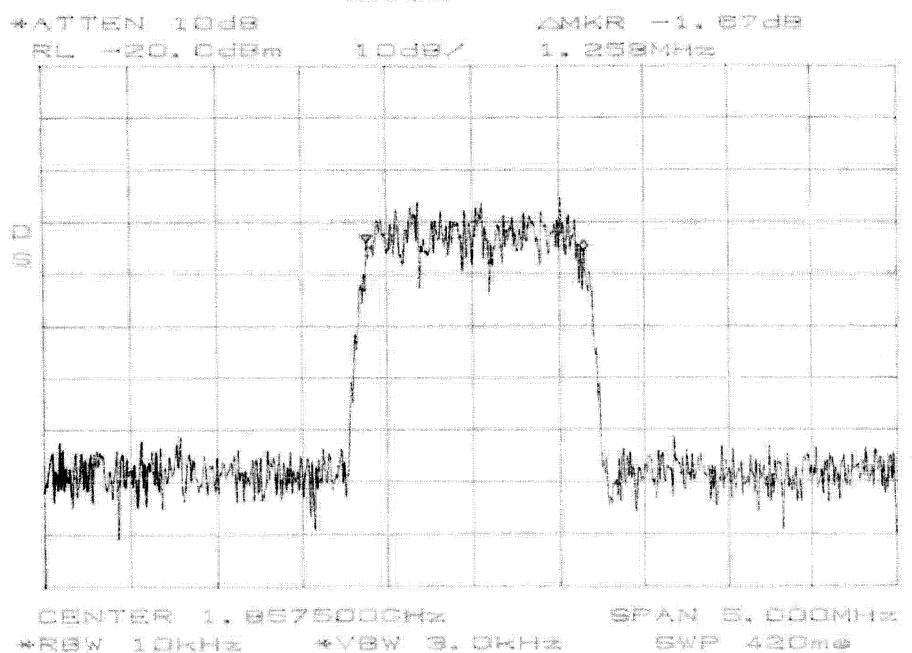


SWP 2.5sec

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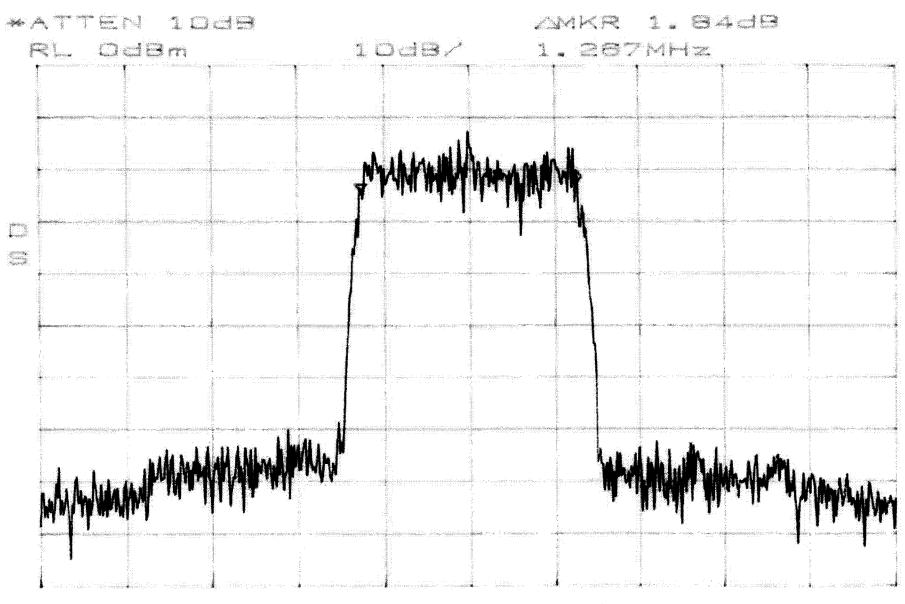
CDMA IN



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CDMM OUT

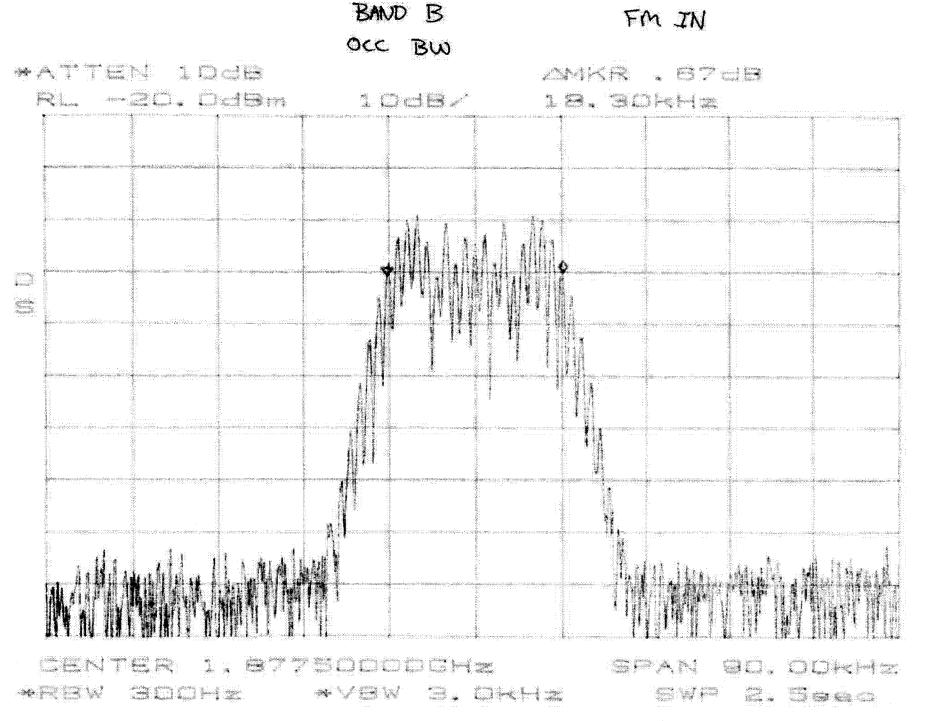


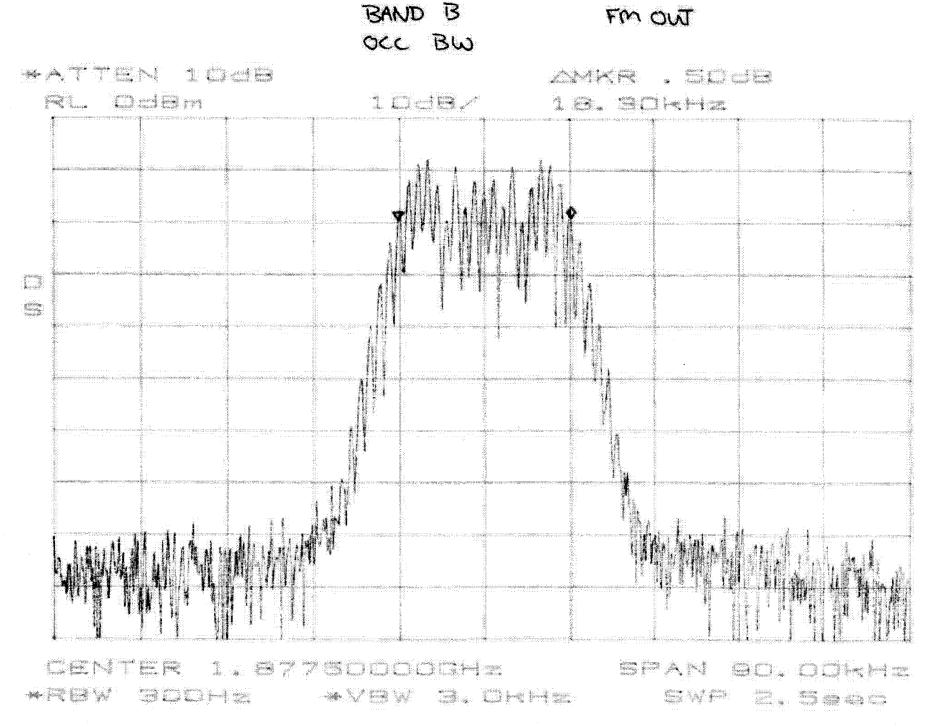
CENTER 1. 8575006Hz

*RBW 10kHz

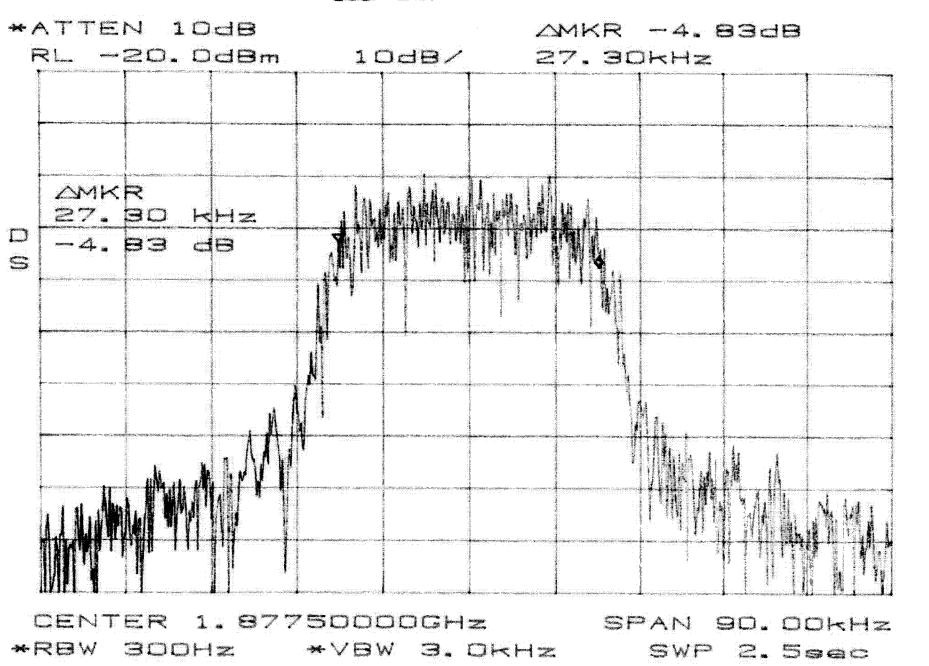
*VBW B. OKHE

SPAN 5. DOOMHE SVP 420ms

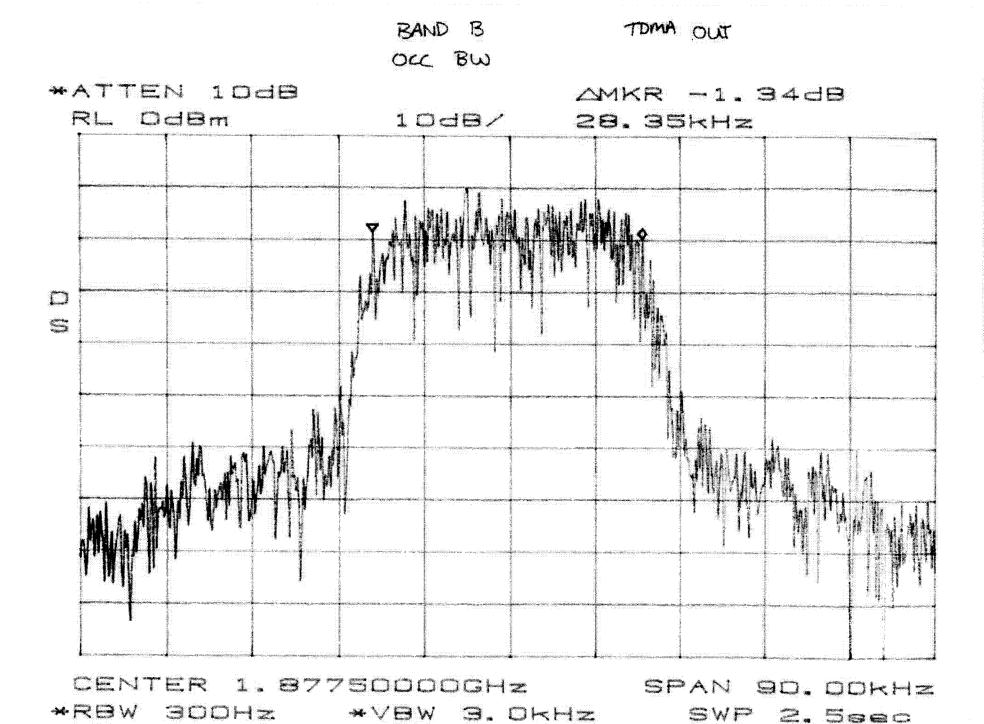




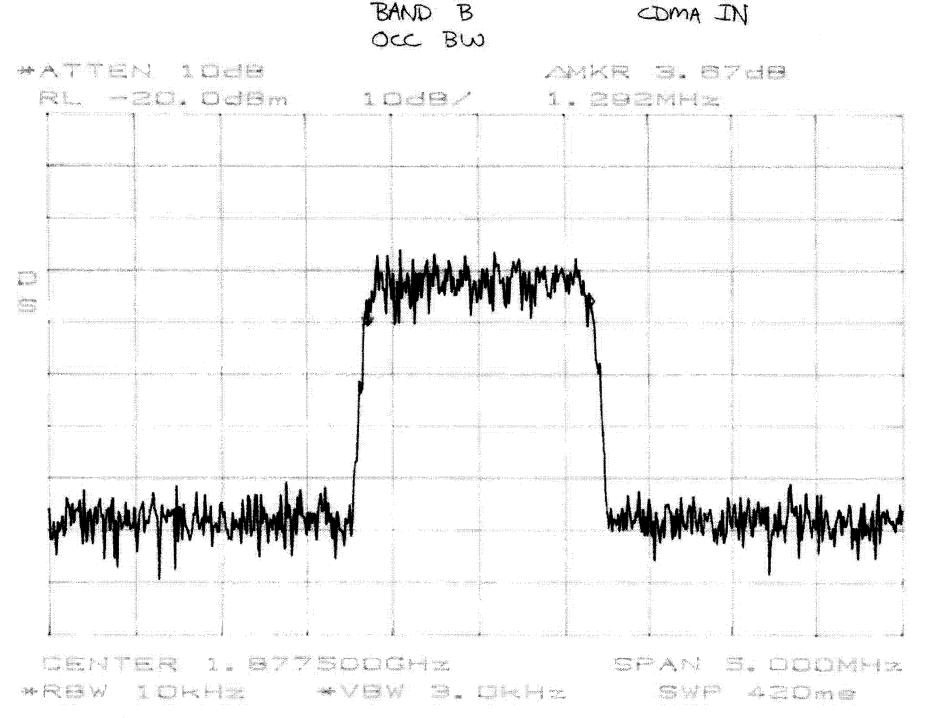
BAND B ∞ C BW

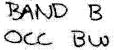


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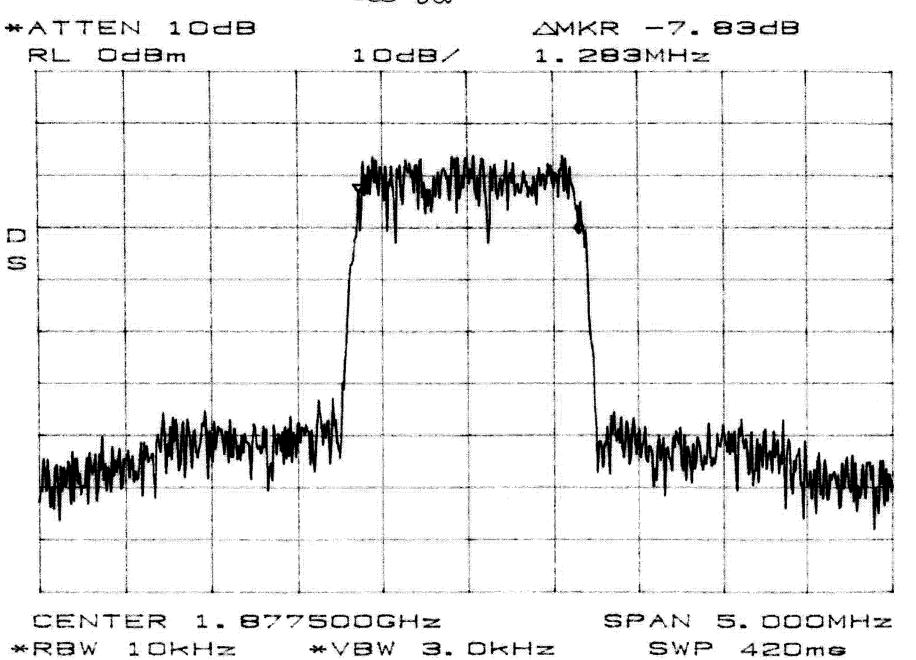


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COMA OUT



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