ENGINEERING REPORT
FM SPECTRUM ANALYSIS

WENS WFMS WYXB WNOU

Indianapolis, IN.

97.1 MHz, 95.5 MHz, 105.7 MHz, 93.1 MHz

December 2003

MUNN–REESE, INC.
Broadcast Engineering Consultants
Coldwater, MI 49036

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CERTIFICATION OF ENGINEERS

The firm of Munn-Reese, Inc., Broadcast Engineering Consultants, with offices at 385 Airport Drive, Coldwater, Michigan, has been retained for the purpose of preparing the technical data forming this report.

Some data utilized in this report was taken from the FCC Secondary Database and data on file. While this information is believed accurate, errors or omissions in the database and file data are possible. This firm may not be held liable for damages as a result of such data errors or omissions.

The report has been prepared by properly trained electronics specialists under the direction of the undersigned whose qualifications are a matter of record before the Federal Communications Commission.

I declare under penalty of perjury that the contents of this report are true and accurate to the best of my knowledge and belief.

December 15, 2003

Munn-Reese, Inc.

By _____
Wayne S. Reese, President

By _____
Edmond R. Trombley, Project Engineer

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COMPLIANCE WITH §73.317
WENS WFMS WYXB WNOU
INDIANAPOLIS, IN.

This firm was retained by Emmis Broadcasting to perform the required measurements to show compliance with the provisions of §73.317 of the Rules governing FM Broadcast Stations. Emmis has installed a panel antenna and associated di-plexer for a combined FM operation. The installed di-plexer combines 2 full time stations but has a third port that is frequency agile between two frequencies, 97.1 MHz and 105.7 MHz. This allows the third port to function as hot standby for two auxiliary backup operations.

Measurements were taken off air to show compliance with either frequency in operation into the third port of the associated di-plexer with the other main stations in operation. The occupied spectrum measurements were made using a properly calibrated and operated spectrum analyzer. That plotted data is found in this report as Figures 1 through 12. Weather conditions at the time of the measurements presented light rain and drizzle. Figures 1 and Figure 8 have spikes in the display created by static discharges.

Intermodulation products were calculated using a computer program to list all possible frequencies that may have developed in the di-plexing process. The list of frequencies were then used to set the field meter frequency dial before the individual measurements were recorded.

The Intermodulation products were measured using a Potomac Instruments Model FIM-71 Field Strength Meter. The measurements were made December 4, 2003. The measurements were taken in an unobstructed location within 1 km of the transmitting antenna. The meter was setup and calibrated in accordance with the manufacturer's instructions, and the readings taken on the fundamental carrier frequencies and on the potential intermodulation frequencies.

The readings were logged. The appropriate antenna factor was determined from the chart in the manual for the meter, and the corrected reading on each frequency was then noted and logged. That logged data was then used to construct Table 1 and Table 2 of this report.

Based on these spectrum measurements and the data logged in Tables 1 and 2 the di-plexing operation at WENS, WFMS, WYXB and WNOU meets the requirements of §73.317 of the Rules governing FM Broadcast Stations.

MUNN–REESE, INC.
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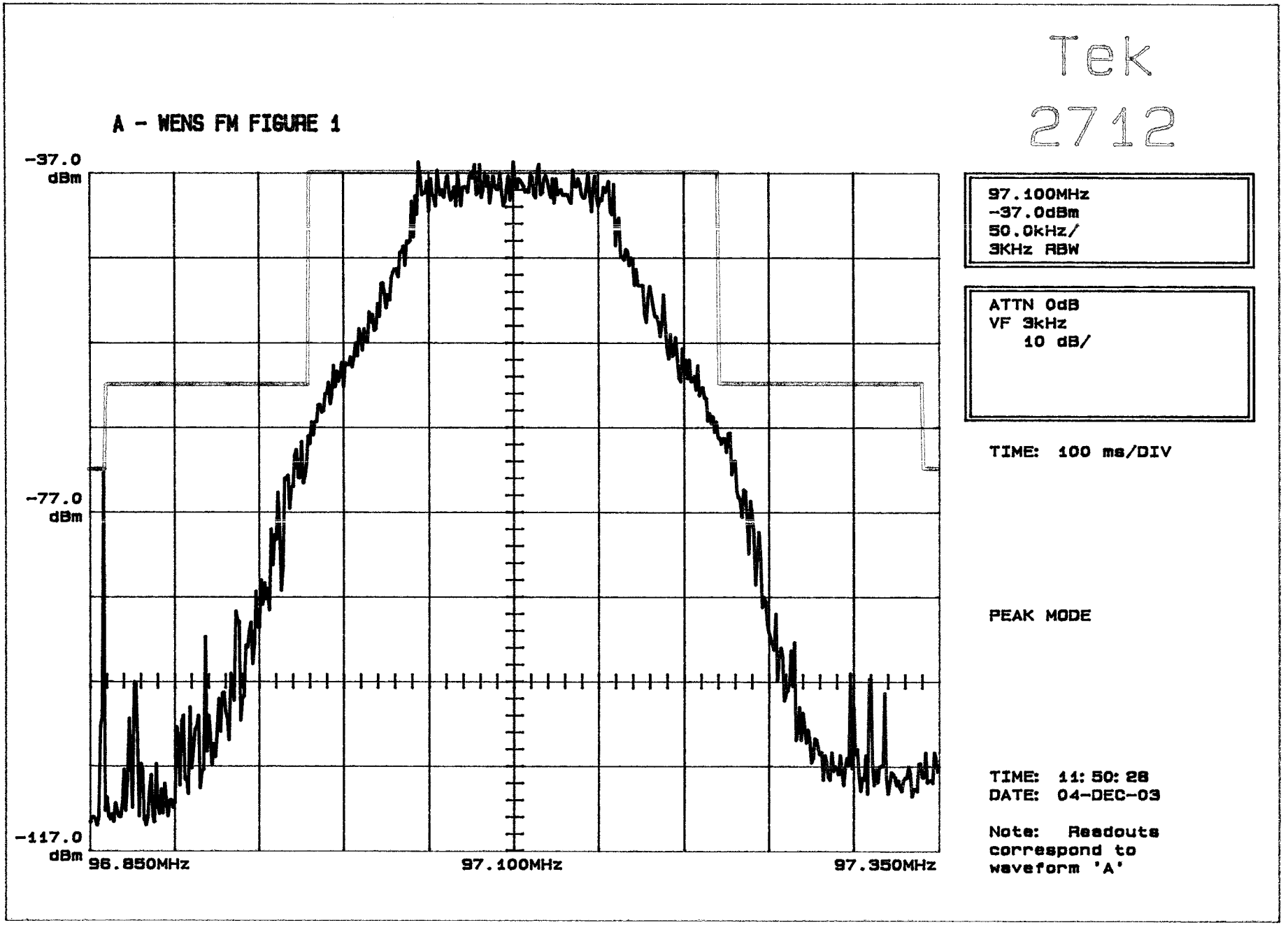
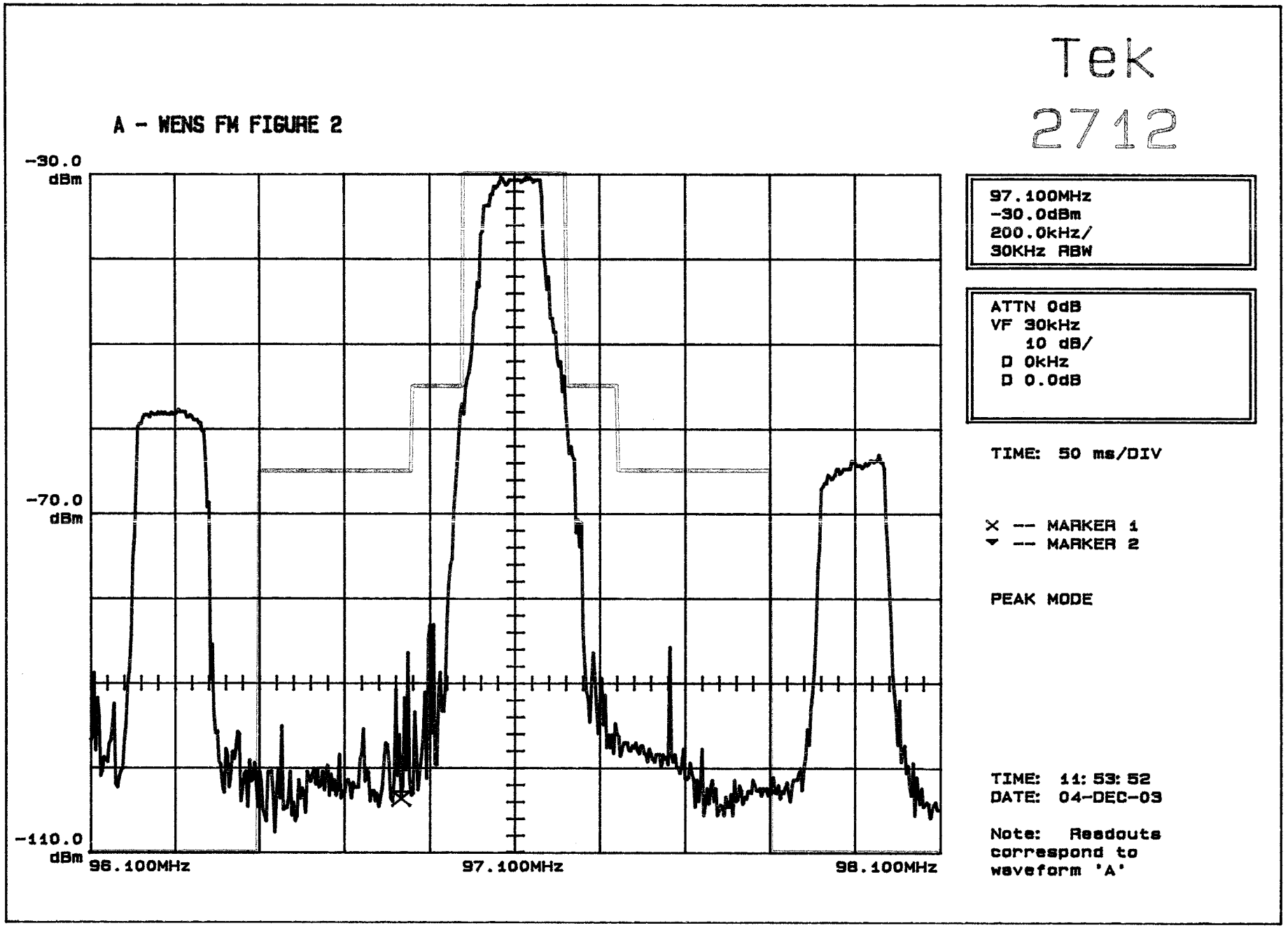
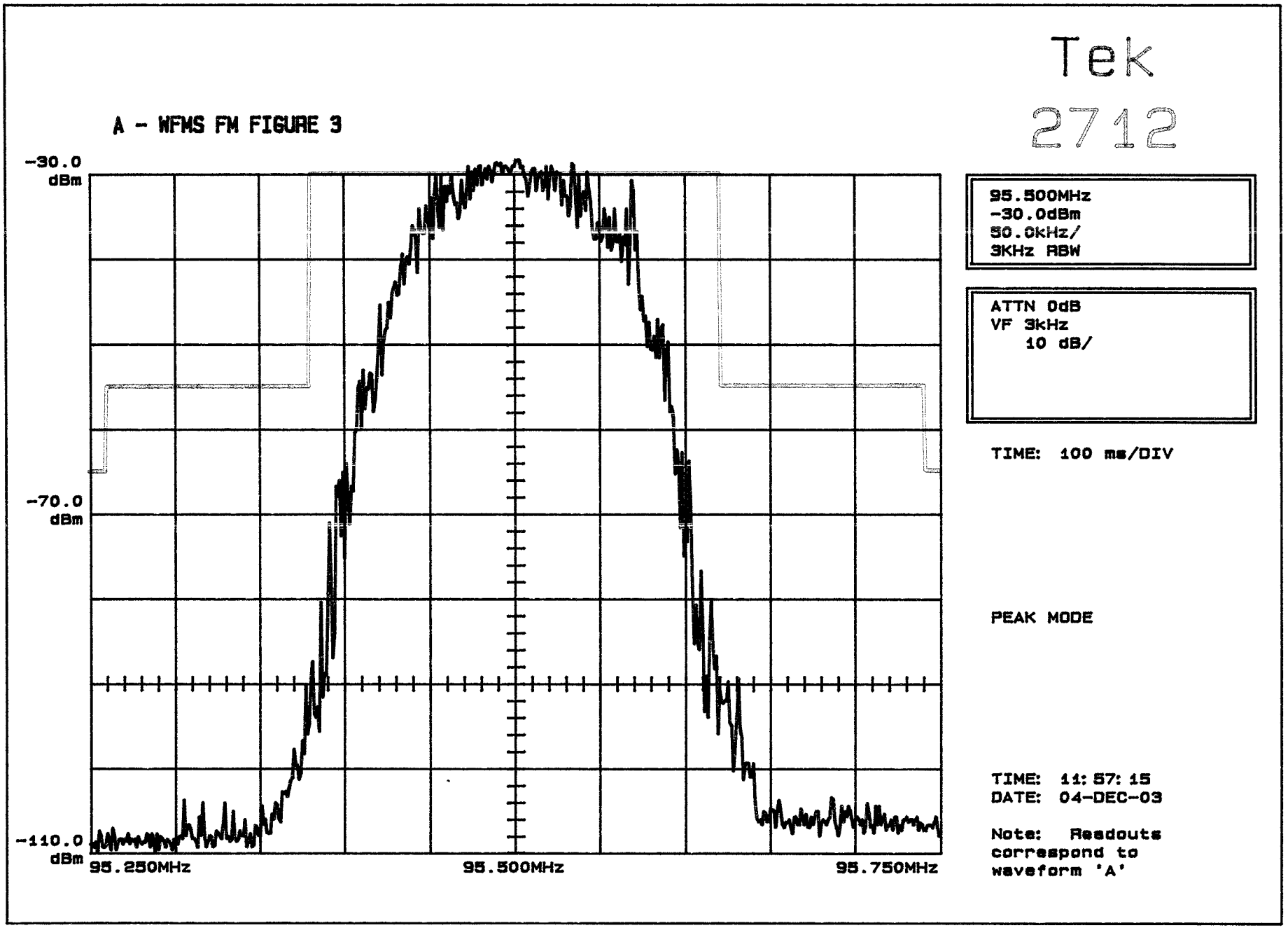
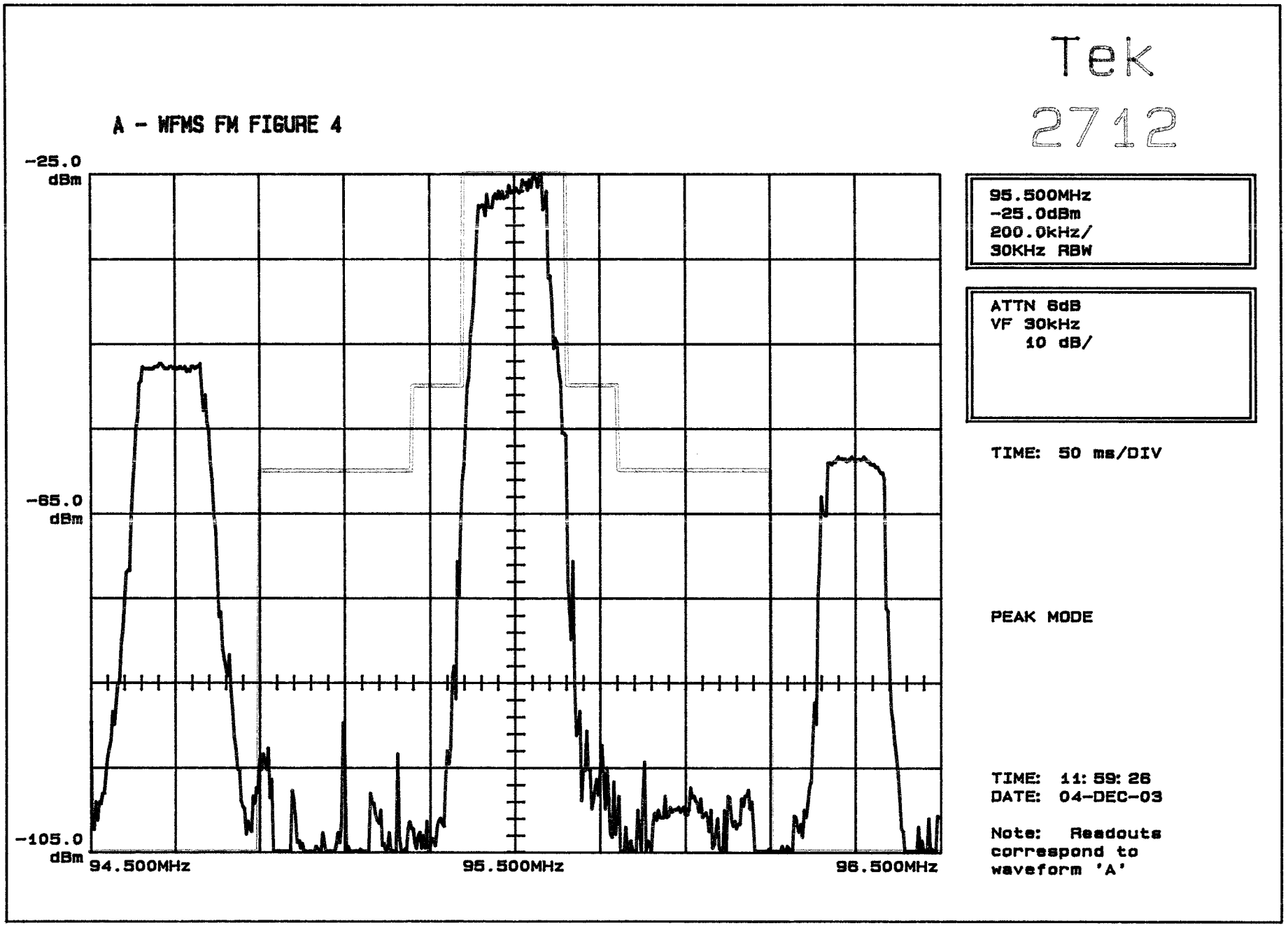
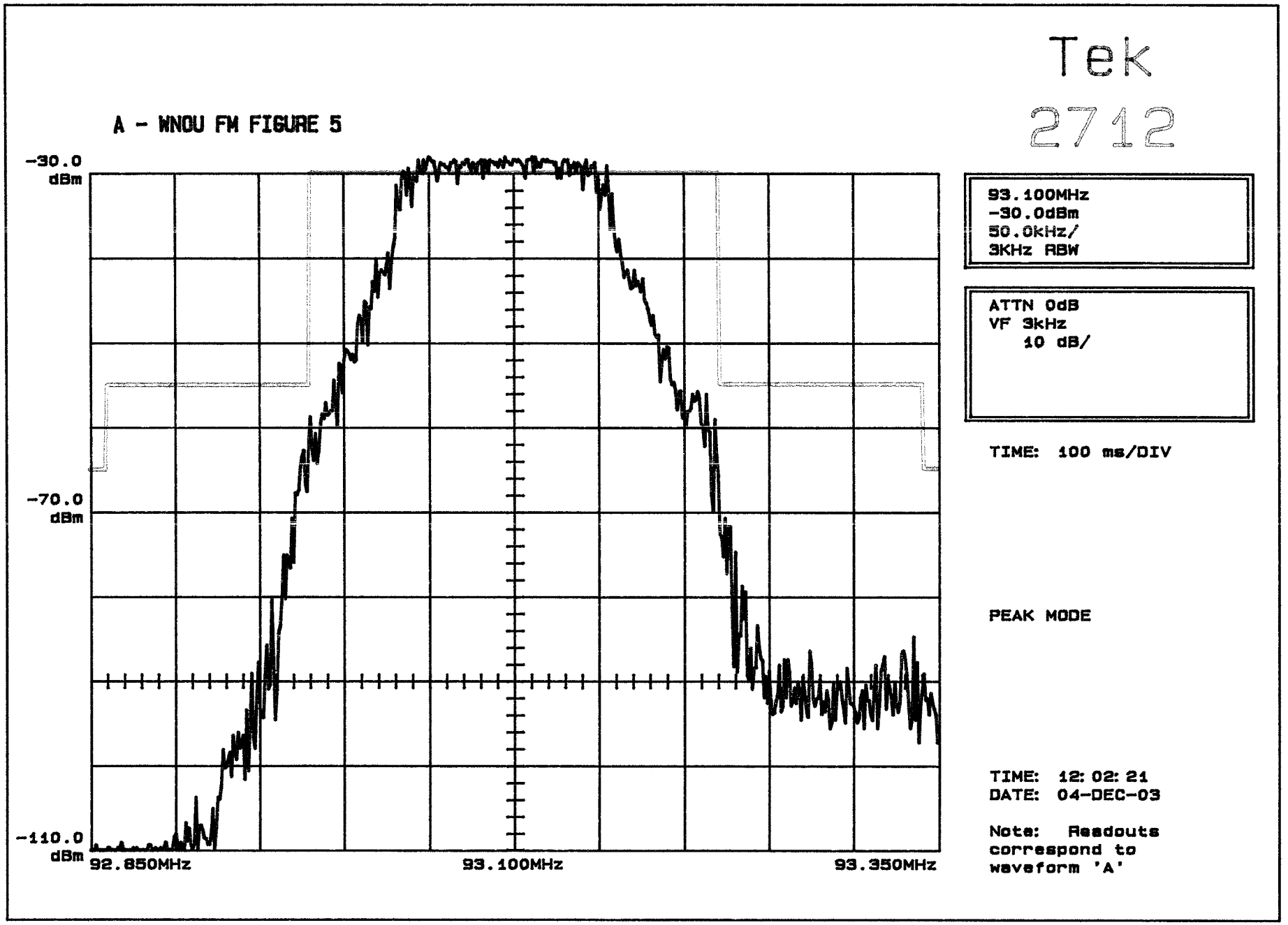
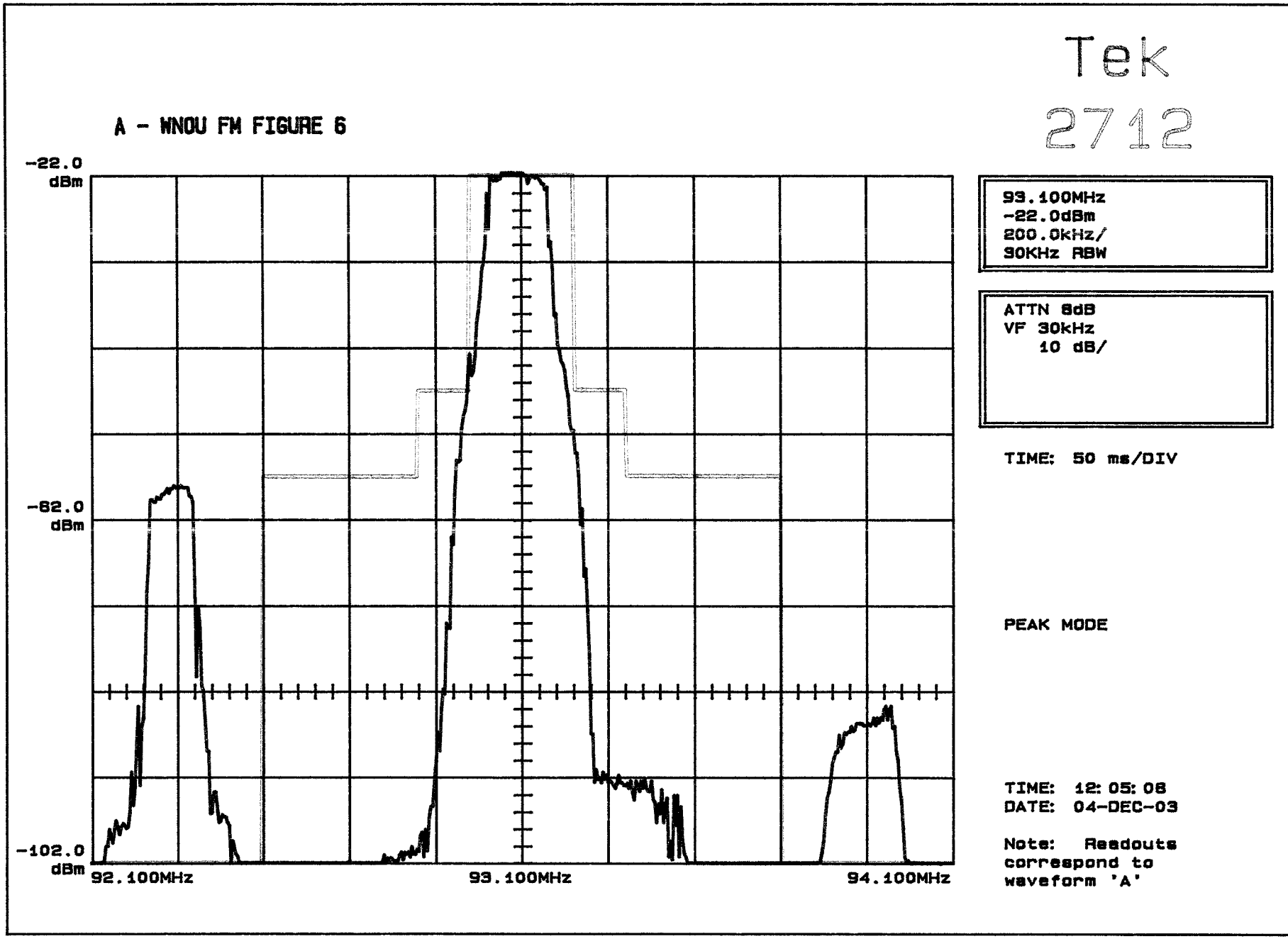

Tek
2712
A - WENS FM FIGURE 1
-37.0
dBm
-77.0
dBm
-117.0
dBm
96.850MHz
97.100MHz
97.350MHz
97.100MHz
-37.0dBm
50.0kHz/
3KHz RBW
ATTN 0dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 11:50:28
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'

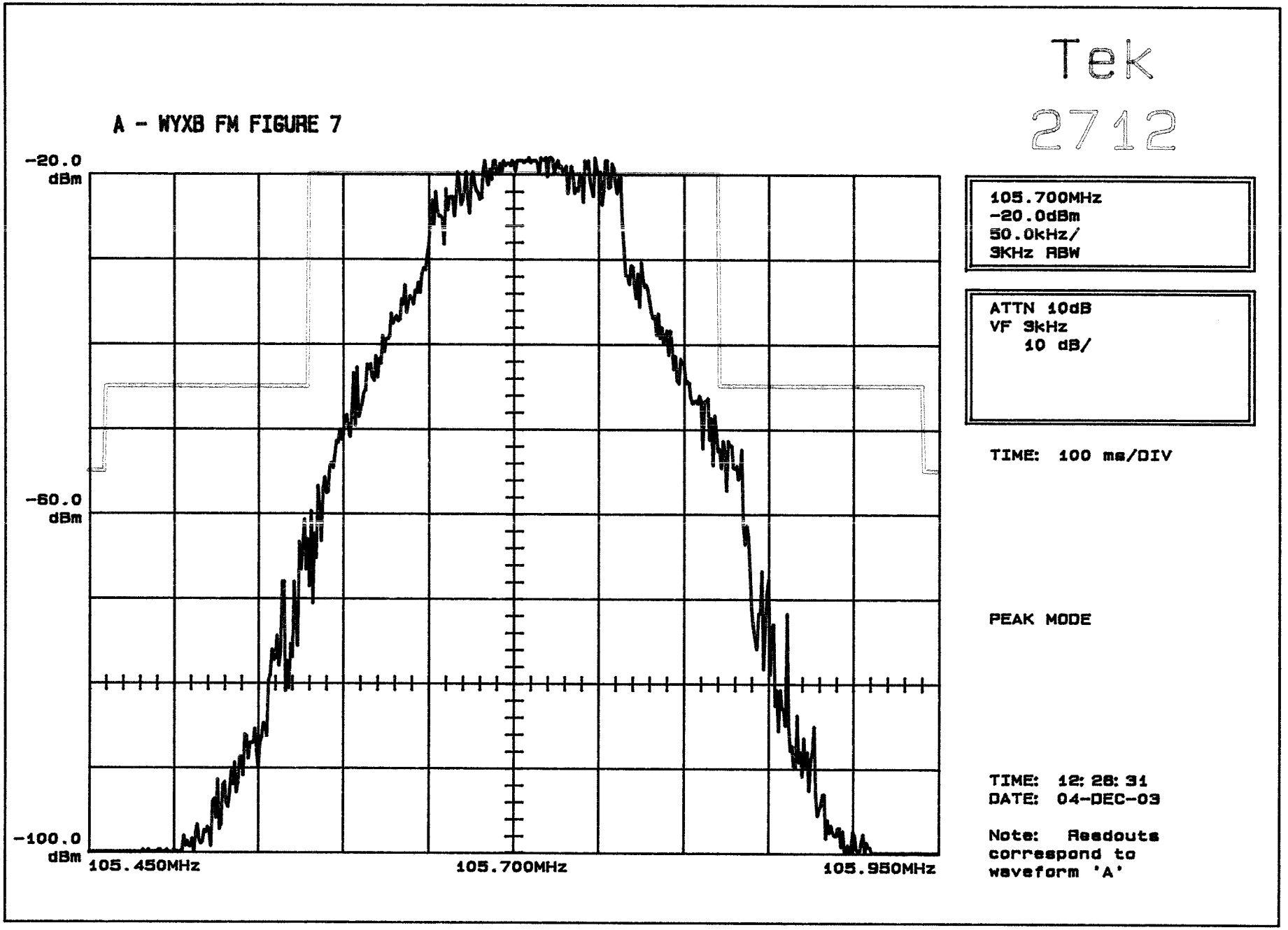

Tek
2712
A - WENS FM FIGURE 2
-30.0
dBm
-70.0
dBm
-110.0
dBm
96.100MHz
97.100MHz
98.100MHz
97.100MHz
-30.0dBm
200.0kHz/
30KHz RBW
ATTN 0dB
VF 30kHz
10 dB/
D 0kHz
D 0.0dB
TIME: 50 ms/DIV
× -- MARKER 1
▼ -- MARKER 2
PEAK MODE
TIME: 11:53:52
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WFMS FM FIGURE 3
-30.0
dBm
-70.0
dBm
-110.0
dBm
95.250MHz
95.500MHz
95.750MHz
95.500MHz
-30.0dBm
50.0kHz/
3KHz RBW
ATTN 0dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 11:57:15
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WFMS FM FIGURE 4
-25.0
dBm
-65.0
dBm
-105.0
dBm
94.500MHz
95.500MHz
96.500MHz
95.500MHz
-25.0dBm
200.0kHz/
30KHz RBW
ATTN 6dB
VF 30kHz
10 dB/
TIME: 50 ms/DIV
PEAK MODE
TIME: 11:59:26
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WNOU FM FIGURE 5
-30.0
dBm
-70.0
dBm
-110.0
dBm
92.850MHz
93.100MHz
93.350MHz
93.100MHz
-30.0dBm
50.0kHz/
3KHz RBW
ATTN 0dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 12:02:21
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'

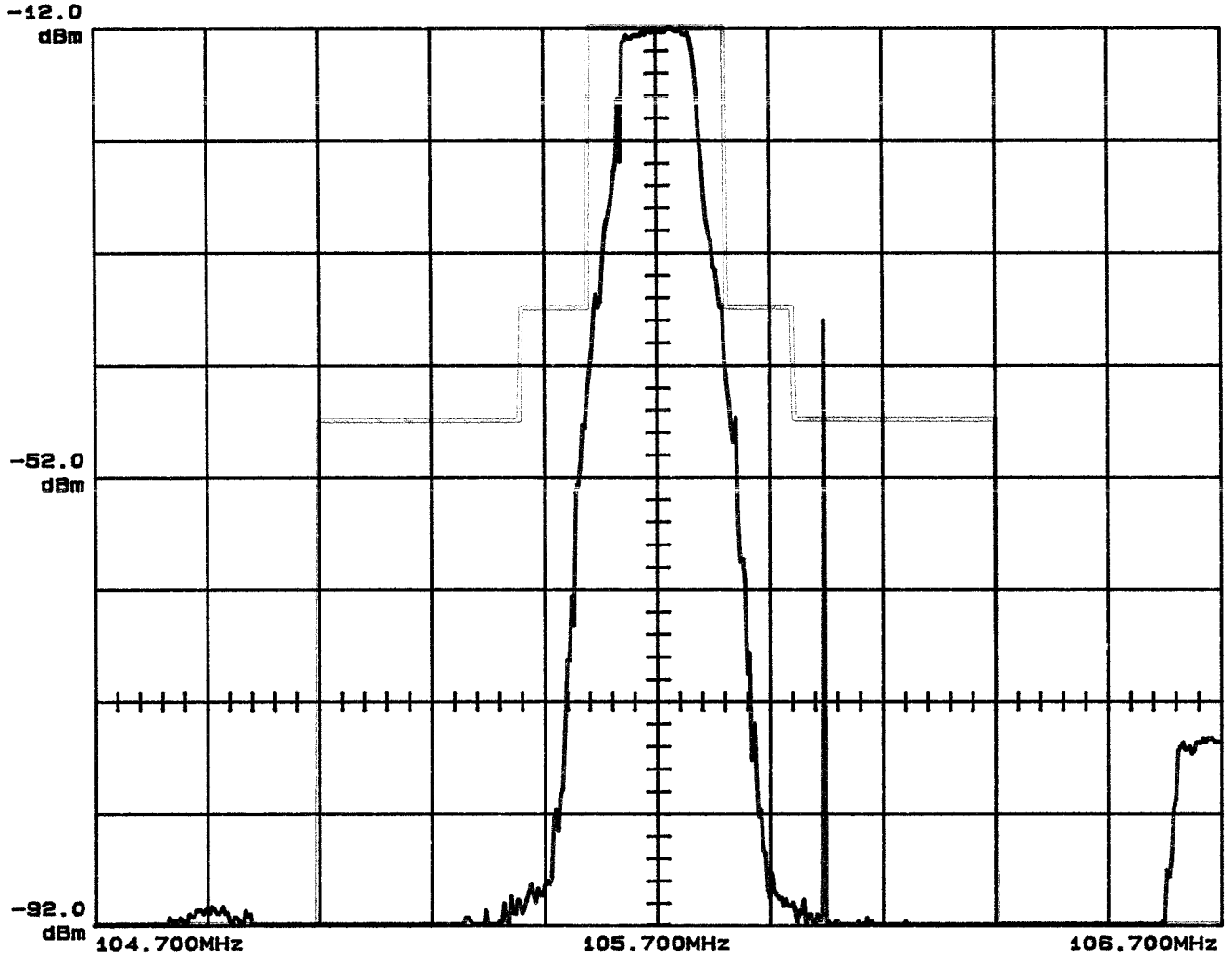

Tek
2712
A - WNOU FM FIGURE 6
-22.0
dBm
-62.0
dBm
-102.0
dBm
92.100MHz
93.100MHz
94.100MHz
93.100MHz
-22.0dBm
200.0kHz/
30KHz RBW
ATTN 8dB
VF 30kHz
10 dB/
TIME: 50 ms/DIV
PEAK MODE
TIME: 12:05:08
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WYXB FM FIGURE 7
-20.0
dBm
-60.0
dBm
-100.0
dBm
105.450MHz
105.700MHz
105.950MHz
105.700MHz
-20.0dBm
50.0kHz/
3KHz RBW
ATTN 10dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 12:28:31
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'

Tek

2712

A - WYXB FM FIGURE 8



105.700MHz
-12.0dBm
200.0kHz/
30KHz RBW

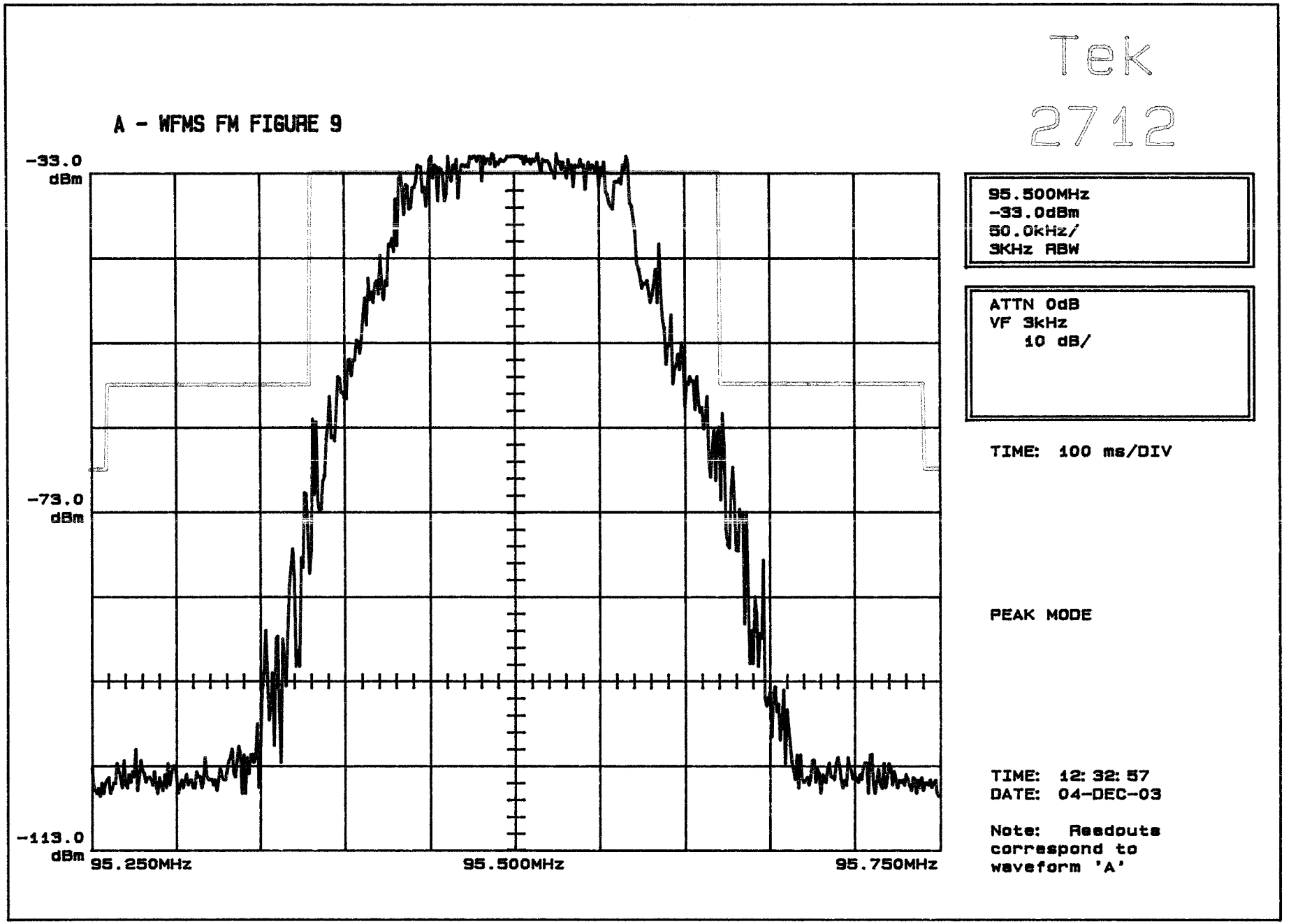
ATTN 18dB
VF 30kHz
10 dB/

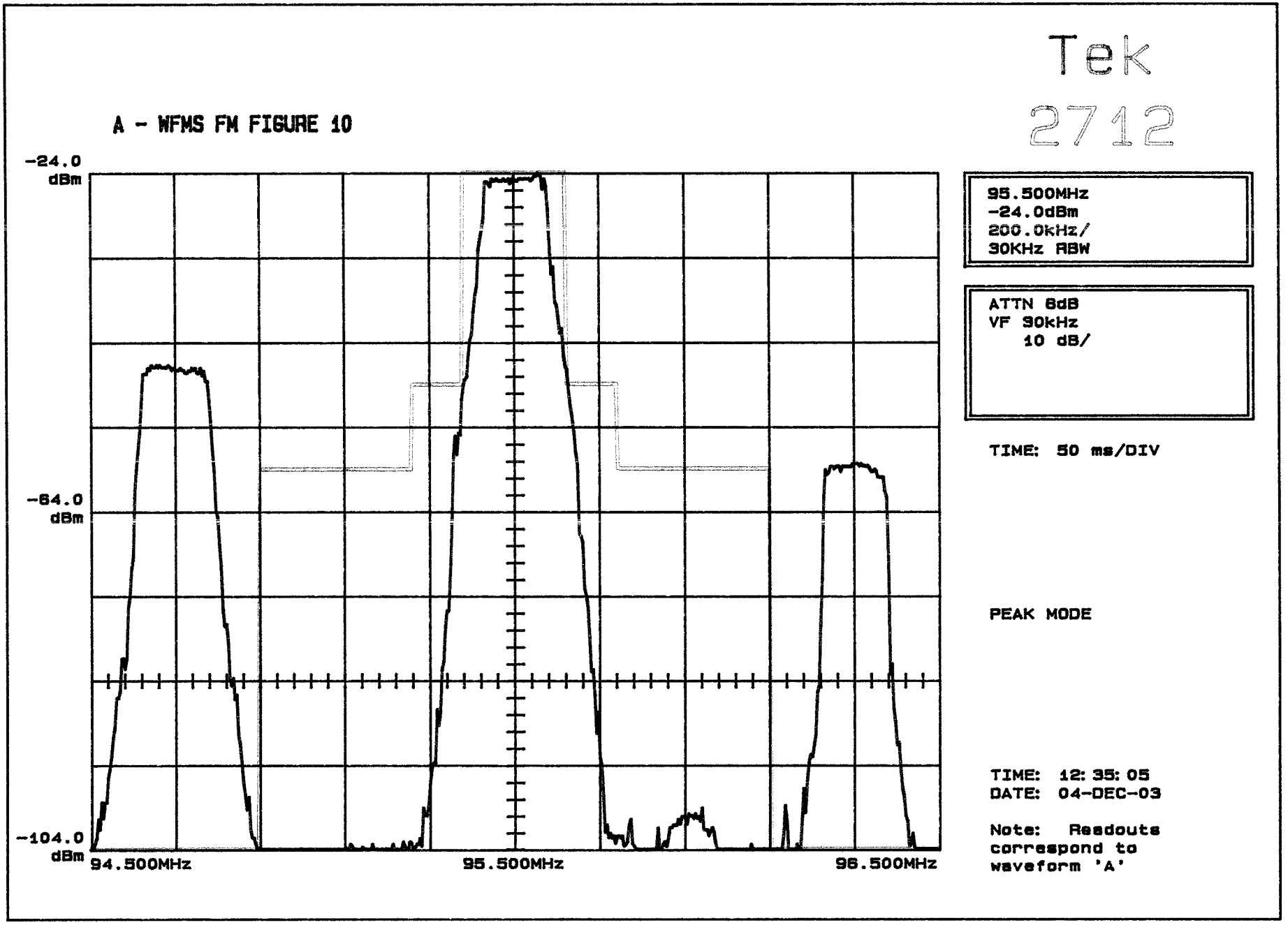
TIME: 50 ms/DIV

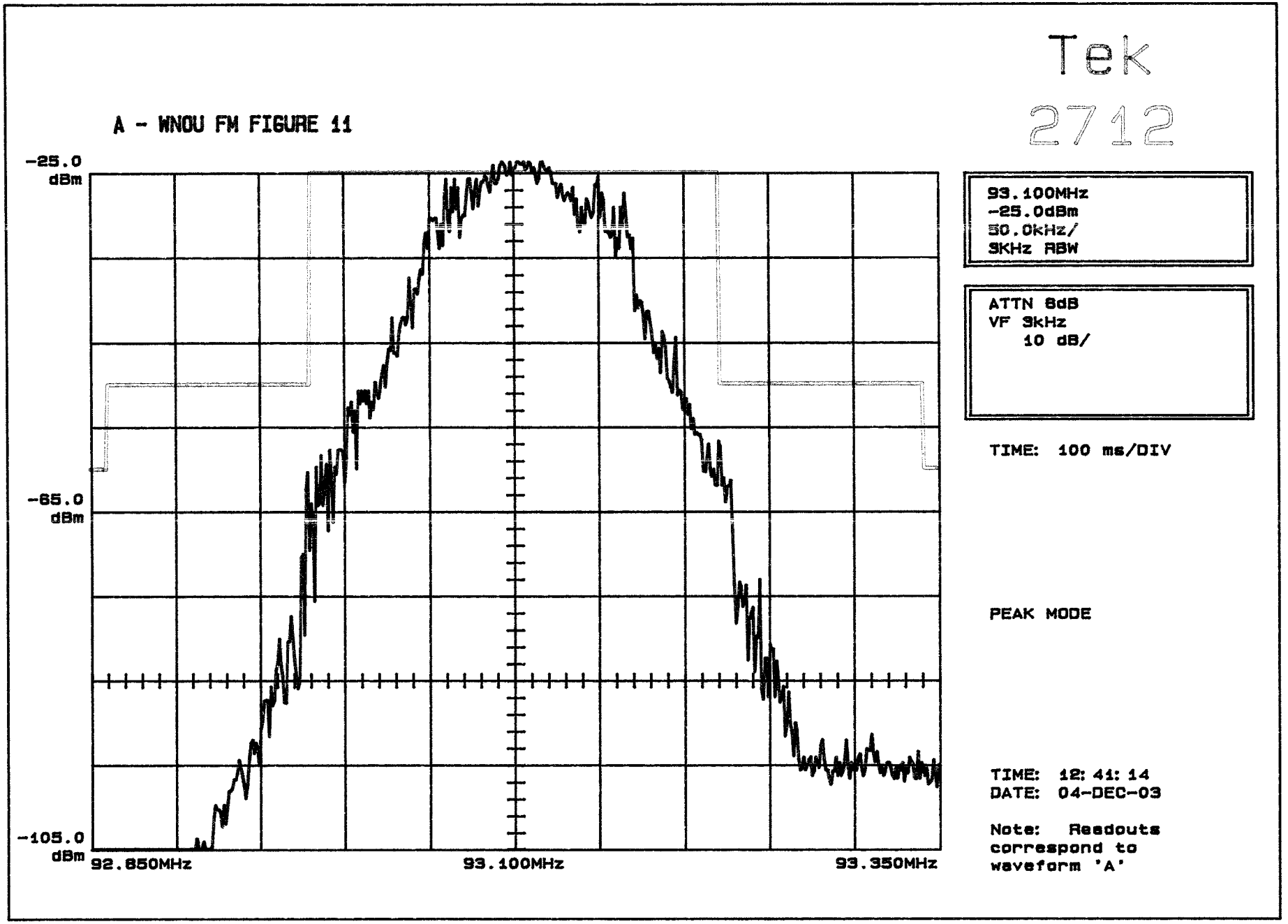
PEAK MODE

TIME: 12:29:01
DATE: 04-DEC-03

Note: Readouts correspond to waveform 'A'

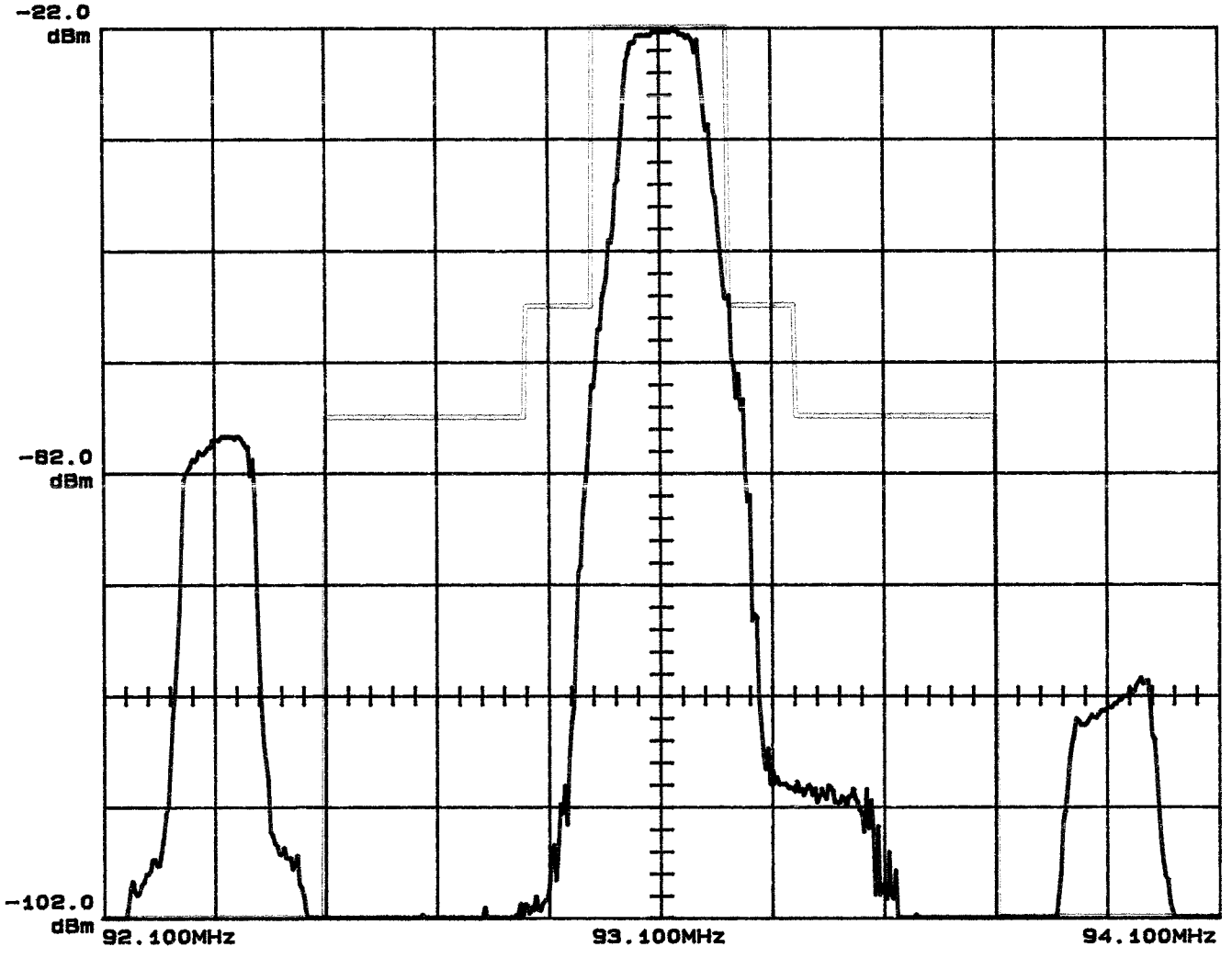

A - WFMS FM FIGURE 9
Tek
2712
-33.0
dBm
-73.0
dBm
-113.0
dBm
95.250MHz
95.500MHz
95.750MHz
95.500MHz
-33.0dBm
50.0kHz/
3KHz RBW
ATTN 0dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 12:32:57
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WFMS FM FIGURE 10
-24.0
dBm
-64.0
dBm
-104.0
dBm
94.500MHz
95.500MHz
96.500MHz
95.500MHz
-24.0dBm
200.0kHz/
30KHz RBW
ATTN 6dB
VF 30kHz
10 dB/
TIME: 50 ms/DIV
PEAK MODE
TIME: 12:35:05
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'


Tek
2712
A - WNOU FM FIGURE 11
-25.0
dBm
-65.0
dBm
-105.0
dBm
92.850MHz
93.100MHz
93.350MHz
93.100MHz
-25.0dBm
50.0kHz/
3KHz RBW
ATTN 8dB
VF 3kHz
10 dB/
TIME: 100 ms/DIV
PEAK MODE
TIME: 12:41:14
DATE: 04-DEC-03
Note: Readouts
correspond to
waveform 'A'

A - WNOU FM FIGURE 12

Tek
2712



93.100MHz
-22.0dBm
200.0kHz/
30KHz RBW

ATTN 8dB
VF 30kHz
10 dB/

TIME: 50 ms/DIV

PEAK MODE

TIME: 12:43:14
DATE: 04-DEC-03

Note: Readouts correspond to waveform 'A'

TABLE 1

Tabluation of Intermod Frequencies and Fields with WENS Active

Call Sign		Frequency	Fundamental Field	ERP Watts	Required Attenuation or 80.00 dB which ever is less
WENS	A	97.1 MHz	125.00 mV/m	23000	86.62 dB.
WFMS	B	95.5 MHz	145.00 mV/m	13000	84.14 dB.
WNOU	C	93.1 MHz	178.00 mV/m	13400	84.27 dB.

Relationship	IM Frequency	Mix Field	Attenuation	Reference Freq	Flag
A + B	192.60 MHz	5.5 µV/m	87.13 dB.	A	Passed
A - B	1.60 MHz	1.0 µV/m	101.94 dB.	A	Passed
A + C	190.20 MHz	7.5 µV/m	84.44 dB.	A	Passed
A - C	4.00 MHz	1.0 µV/m	101.94 dB.	A	Passed
B + A	192.60 MHz	3.0 µV/m	92.40 dB.	A	Passed
B + C	188.60 MHz	8.5 µV/m	84.64 dB.	A	Passed
B - C	2.40 MHz	1.0 µV/m	103.23 dB.	A	Passed
B + A - C	99.50 MHz	7.4 µV/m	84.55 dB.	A	Passed
C + A - B	94.70 MHz	5.5 µV/m	87.13 dB.	A	Passed
C + B - A	91.50 MHz	8.5 µV/m	83.35 dB.	A	Passed
2A + B	289.70 MHz	5.5 µV/m	87.13 dB.	A	Passed
2A - B	98.70 MHz	1.0 µV/m	101.94 dB.	A	Passed
2A + C	287.30 MHz	3.4 µV/m	91.31 dB.	A	Passed
2A - C	101.10 MHz	1.0 µV/m	101.94 dB.	A	Passed
2B + A	288.10 MHz	2.5 µV/m	93.98 dB.	A	Passed
2B - A	93.90 MHz	1.1 µV/m	101.11 dB.	A	Passed
2B + C	284.10 MHz	3.3 µV/m	92.86 dB.	A	Passed
2B - C	97.90 MHz	1.5 µV/m	99.71 dB.	A	Passed
2C + A	283.30 MHz	2.5 µV/m	93.98 dB.	A	Passed
2C - A	89.10 MHz	2.3 µV/m	94.70 dB.	A	Passed
2C + B	281.70 MHz	3.5 µV/m	92.35 dB.	A	Passed
2C - B	90.70 MHz	1.8 µV/m	98.12 dB.	A	Passed

TABLE 2

Tabluation of Intermod Frequencies and Fields with WYXB Active

Call Sign		Frequency	Fundamental Field	ERP Watts	Required Attenuation or 80.00 dB which ever is less
WYXB	A	105.7 MHz	209.00 mV/m	4500	79.53 dB.
WFMS	B	95.5 MHz	145.00 mV/m	13000	84.14 dB.
WNOU	C	93.1 MHz	178.00 mV/m	13400	84.27 dB.

Relationship	IM Frequency	Mix Field	Attenuation	Reference Freq	Flag
A + B	201.20 MHz	11.0 µV/m	85.58 dB.	A	Passed
A - B	10.20 MHz	2.0 µV/m	100.38 dB.	A	Passed
A + C	198.80 MHz	6.0 µV/m	90.84 dB.	A	Passed
A - C	12.60 MHz	1.0 µV/m	106.40 dB.	A	Passed
B + A	201.20 MHz	4.0 µV/m	94.36 dB.	A	Passed
B + C	188.60 MHz	6.0 µV/m	87.66 dB.	B	Passed
B - C	2.40 MHz	1.0 µV/m	103.23 dB.	B	Passed
B + A - C	108.10 MHz	5.0 µV/m	92.42 dB.	A	Passed
C + A - B	103.30 MHz	5.5 µV/m	91.60 dB.	A	Passed
C + B - A	82.90 MHz	8.5 µV/m	87.81 dB.	A	Passed
2A + B	306.90 MHz	5.5 µV/m	91.60 dB.	A	Passed
2A - B	115.90 MHz	2.0 µV/m	100.38 dB.	A	Passed
2A + C	304.50 MHz	3.4 µV/m	95.77 dB.	A	Passed
2A - C	118.30 MHz	2.0 µV/m	100.38 dB.	A	Passed
2B + A	296.70 MHz	2.5 µV/m	98.44 dB.	A	Passed
2B - A	85.30 MHz	1.1 µV/m	105.58 dB.	A	Passed
2B + C	284.10 MHz	3.3 µV/m	92.86 dB.	B	Passed
2B - C	97.90 MHz	10.0 µV/m	83.23 dB.	B	Passed
2C + A	291.90 MHz	3.0 µV/m	96.86 dB.	A	Passed
2C - A	80.50 MHz	2.3 µV/m	99.17 dB.	A	Passed
2C + B	281.70 MHz	2.0 µV/m	97.21 dB.	B	Passed
2C - B	90.70 MHz	1.8 µV/m	98.12 dB.	B	Passed