

EXHIBIT # 16

FCC Requirements CRF 47 Part 2.1033,c (13)

Modulation System Description

JXBLMDSXP4-8T

EXHIBIT 2.1033,c(4)&(5)&(6)

Type of Emission, Necessary Bandwidth and Modulation Characteristics for 4XT1 and the 8XT1 Radio:

The DMC XP4 T-Carrier radio is employed to process digital information of various types. Voice, data, television, and many other information types can be encoded and transmitted across this radio system. The emission designators, 5M00F7W, and 10M0F7W were developed by the following process:

The necessary bandwidth was developed from the following equation: CFR 47 part 2.202, (b)

For 4XT1 Data rate (including overhead):

$$B_n = 2 DK + B$$

$$B = R / \log(\text{base } 2) \text{ of } S$$

$$B = (7.249 \text{ Mbits/sec.}) / 2 = 3.6245 \text{ M Symbols/sec.}$$

Where: B_n = Necessary bandwidth in MHz
 R = Aggregate bit rate in bits/sec = 7.249 Mbits/sec.
 S = number of transmitter levels = 4
 D = deviation in MHz = .687 MHz
 K = 1 for this modulation type

$$\text{Therefore } B_n = (2) (.687\text{E}+6) (1) + 3.624\text{E}+6 = 5.00 \text{ MHz}$$

The F7W portion of the designator is derived as follows

F = Frequency Modulation [CFR47 part 2.201 (c)]

7 = is the nature of the modulation signal [CFR47 part 2.201 (d)]

W = is the type of information transmitted [CFR47 part 2.201 (e)]

The resultant complete emission designator for the 4XT1 can be stated as 5M00F7W

For 8XT Data rate (including overhead):

$$B_n = 2 DK + B$$

$$B = R / \log(\text{base } 2) \text{ of } S$$

$$B = (14.48 \text{ Mbits/sec.}) / 2 = 7.249 \text{ M Symbols/sec.}$$

Where: B_n = Necessary bandwidth in MHz
 R = Aggregate bit rate in bits/sec = 14.48 Mbits/sec.
 S = number of transmitter levels = 4
 D = deviation in MHz = 1.375 MHz
 K = 1 for this modulation type

$$\text{Therefore } B_n = (2) (1.375 + 6) (1) + 7.249 \text{E}+6 = 10.00 \text{ MHz}$$

The F7W portion of the designator is derived as follows

F = Frequency Modulation [CFR47 part 2.201 (c)]

7 = is the nature of the modulation signal [CFR47 part 2.201 (d)]

W = is the type of information transmitted [CFR47 part 2.201 (e)]

The resultant complete emission designator for the 8XT1 can be stated as 10MOF7W

Frequency Range: Three Bands

1. 27,500 to 28,350 MHz
2. 29,100 to 29,250 MHz
3. 31,000 to 31,300 MHz

Range of operating power: 30 db Refer to Exhibit 2.1033,c(4)&(5)&(6) and Exhibit 2.1033 ,c(9) for technical description of power control and operation.

4XT1 XP4 Occupied Bandwidth

Attn_floor := 56

$$\text{Attn_BW}(\text{BW}, x) := 11 + 0.4 \cdot \left\{ \frac{x}{\text{BW}} \cdot 100 - 50 \right\} + 10 \cdot \log(\text{BW})$$

BW is in MHz
x is frequency offset in MHz

$$\text{F_mask}(\text{BW}) := \left\lceil \frac{\text{Attn_floor} - (11 + 10 \cdot \log(\text{BW}))}{0.4} + 50 \right\rceil \cdot \frac{\text{BW}}{100}$$

Attn_P(P_mean) := 43 + P_mean

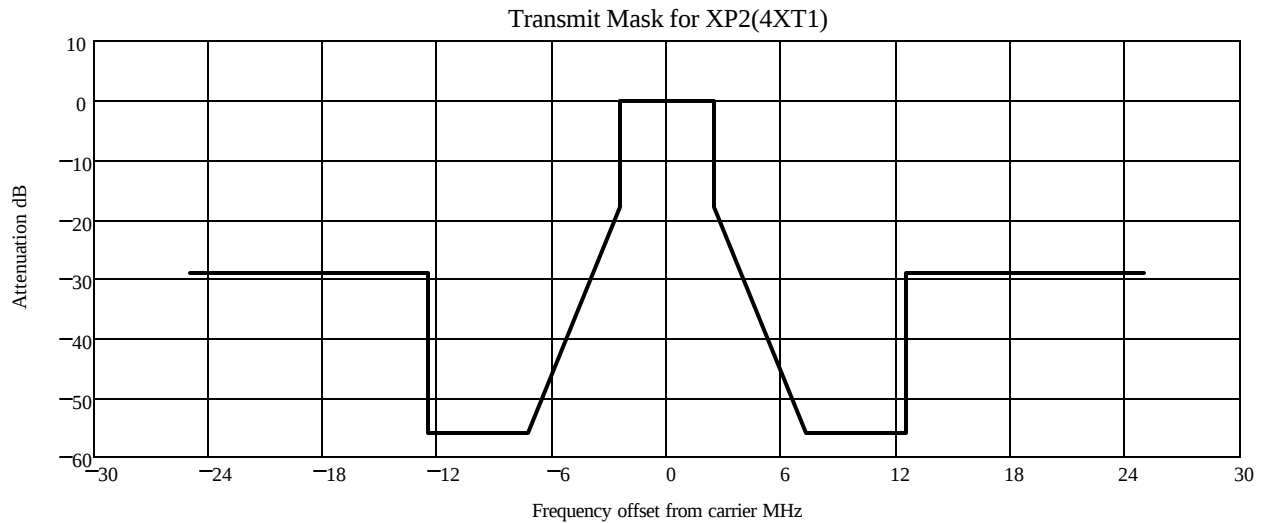
BW := 5.00 **BW is in MHz** P_mean := -14 **P_mean is in dBW**

$$y := \left\{ -\text{Attn_P}(\text{P_mean}) - \text{Attn_P}(\text{P_mean}) - \text{Attn_floor} - \text{Attn_floor} - \text{Attn_BW}\left(\text{BW}, \frac{\text{BW}}{2}\right) \quad 0 \quad 0 - \text{Attn_BW}\left(\text{BW}, \frac{\text{BW}}{2}\right) \right\}$$

$$x := \left\{ -5 \cdot \text{BW} \quad -2.5 \cdot \text{BW} \quad -2.5 \cdot \text{BW} \quad -\text{F_mask}(\text{BW}) \quad \frac{-\text{BW}}{2} \quad \frac{-\text{BW}}{2} \quad \frac{\text{BW}}{2} \quad \frac{\text{BW}}{2} \quad \text{F_mask}(\text{BW}) \quad 2.5 \cdot \text{BW} \quad 2.5 \cdot \text{BW} \quad 5 \cdot \text{BW} \right\}$$

i := 0..11

Power out antenna port is 16 dBm
Transmit Bandwidth is 5.00 MHz



$$y = (-29 \quad -29 \quad -56 \quad -56 \quad -17.99 \quad 0 \quad 0 \quad -17.99 \quad -56 \quad -56 \quad -29 \quad -29)$$

$$x = (-25 \quad -12.5 \quad -12.5 \quad -7.251 \quad -2.5 \quad -2.5 \quad 2.5 \quad 2.5 \quad 7.251 \quad 12.5 \quad 12.5 \quad 25)$$

8XT1 XP4 Occupied Bandwidth

Attn_floor := 56

$$\text{Attn_BW}(\text{BW}, x) := 11 + 0.4 \cdot \left\{ \frac{x}{\text{BW}} \cdot 100 - 50 \right\} + 10 \cdot \log(\text{BW})$$

BW is in MHz
x is frequency offset in MHz

$$\text{F_mask}(\text{BW}) := \left[\frac{\text{Attn_floor} - (11 + 10 \cdot \log(\text{BW}))}{0.4} + 50 \right] \cdot \frac{\text{BW}}{100}$$

Attn_P(P_mean) := 43 + P_mean

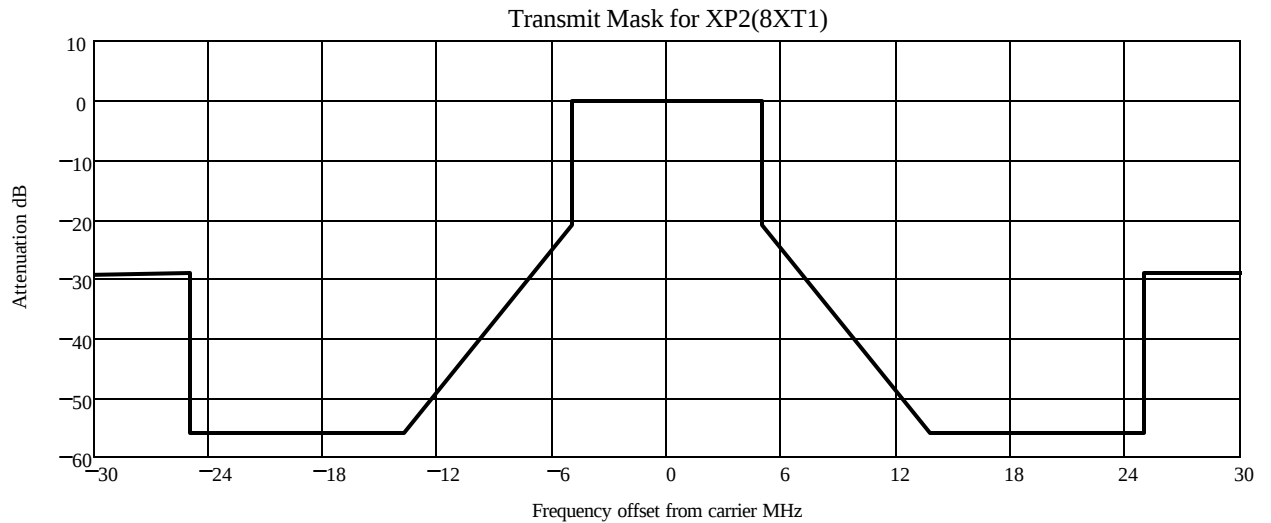
BW := 10.00 **BW is in MHz** P_mean := -14 **P_mean is in dBW**

$$y := \left\{ -\text{Attn_P}(\text{P_mean}) \quad -\text{Attn_P}(\text{P_mean}) \quad -\text{Attn_floor} \quad -\text{Attn_floor} \quad -\text{Attn_BW}\left(\text{BW}, \frac{\text{BW}}{2}\right) \quad 0 \quad 0 \quad -\text{Attn_BW}\left(\text{BW}, \frac{\text{BW}}{2}\right) \right\}$$

$$x := \left\{ -5 \cdot \text{BW} \quad -2.5 \cdot \text{BW} \quad -2.5 \cdot \text{BW} \quad -\text{F_mask}(\text{BW}) \quad \frac{-\text{BW}}{2} \quad \frac{-\text{BW}}{2} \quad \frac{\text{BW}}{2} \quad \frac{\text{BW}}{2} \quad \text{F_mask}(\text{BW}) \quad 2.5 \cdot \text{BW} \quad 2.5 \cdot \text{BW} \quad 5 \cdot \text{BW} \right\}$$

i := 0..11

Power out antenna port is 16 dBm
Transmit Bandwidth is 10.00 MHz



$$y = (-29 \quad -29 \quad -56 \quad -56 \quad -21 \quad 0 \quad 0 \quad -21 \quad -56 \quad -56 \quad -29 \quad -29)$$

$$x = (-50 \quad -25 \quad -25 \quad -13.75 \quad -5 \quad -5 \quad 5 \quad 5 \quad 13.75 \quad 25 \quad 25 \quad 50)$$

ATTEN 10dB
RL -9.4dBm

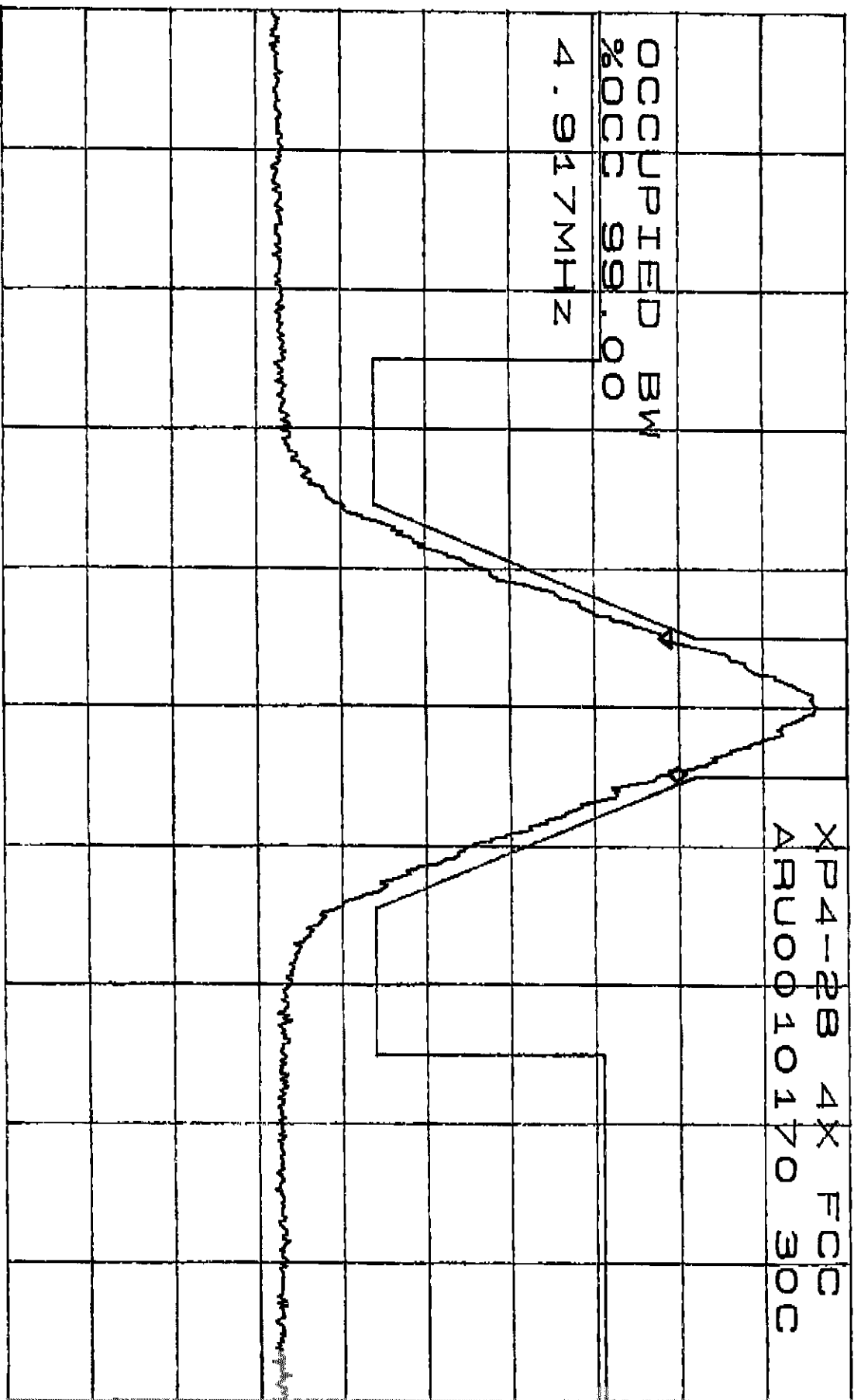
10dB/

ΔMKR -58.92dB/Hz

XP4-28 4X FCC
ARU0010170 30C

OCCUPIED BW
%OCC 99.00

D
4.947MHz



CENTER 27.67250GHz

SPAN 50.00MHz

*RBW 1.0MHz

*VBW 3.0kHz

SMP 50.0ms

ATTEN 10dB
RL -9.4dBm

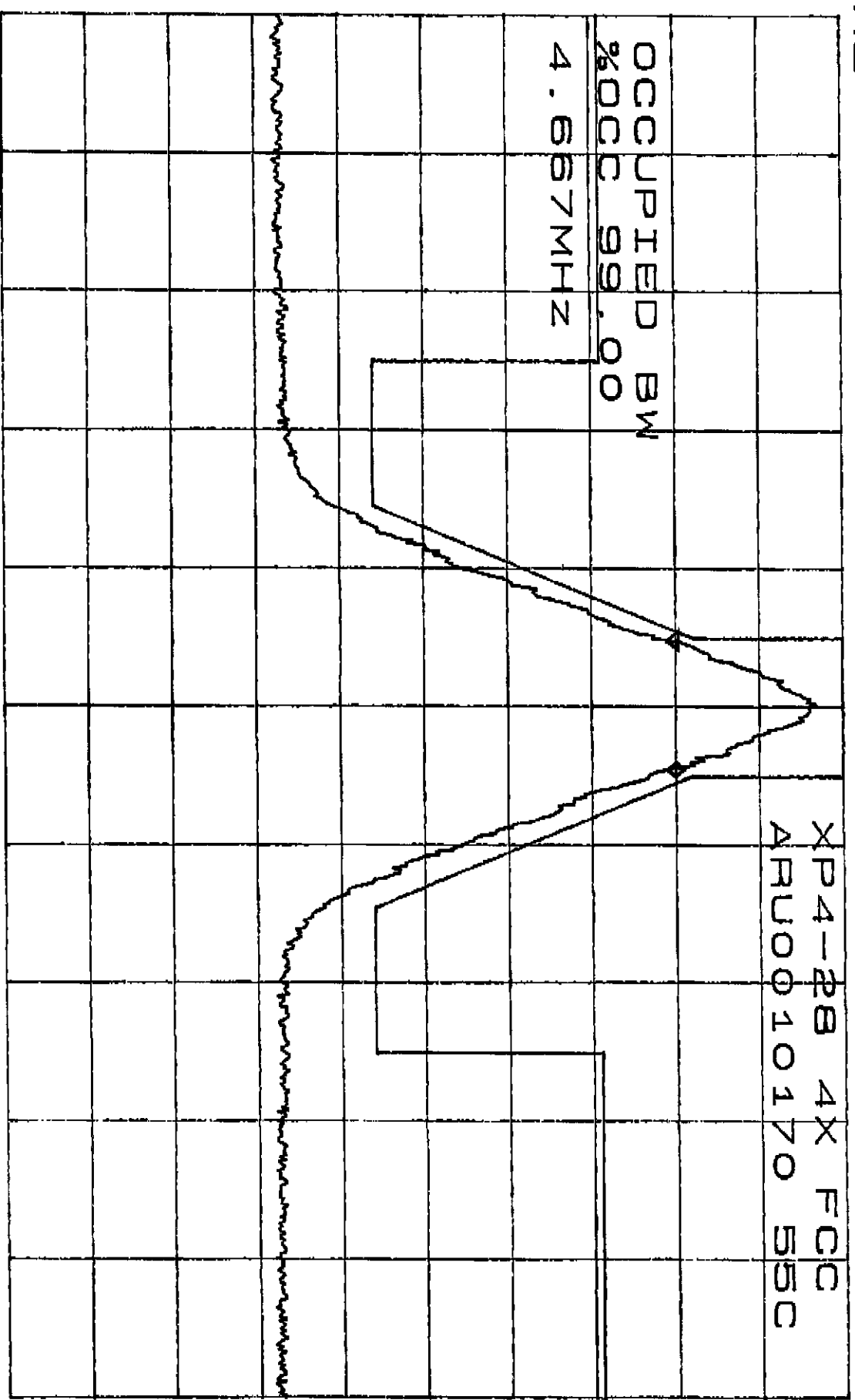
10dB/

ΔMKR -56.92dB/HZ

XP4-28 4X FCC
ARJ0010170 55C

OCCUPIED BW
%OCC 99.00

D
4.667MHz



CENTER 27.67250GHz

SPAN 50.00MHz

*RBW 1.0MHz

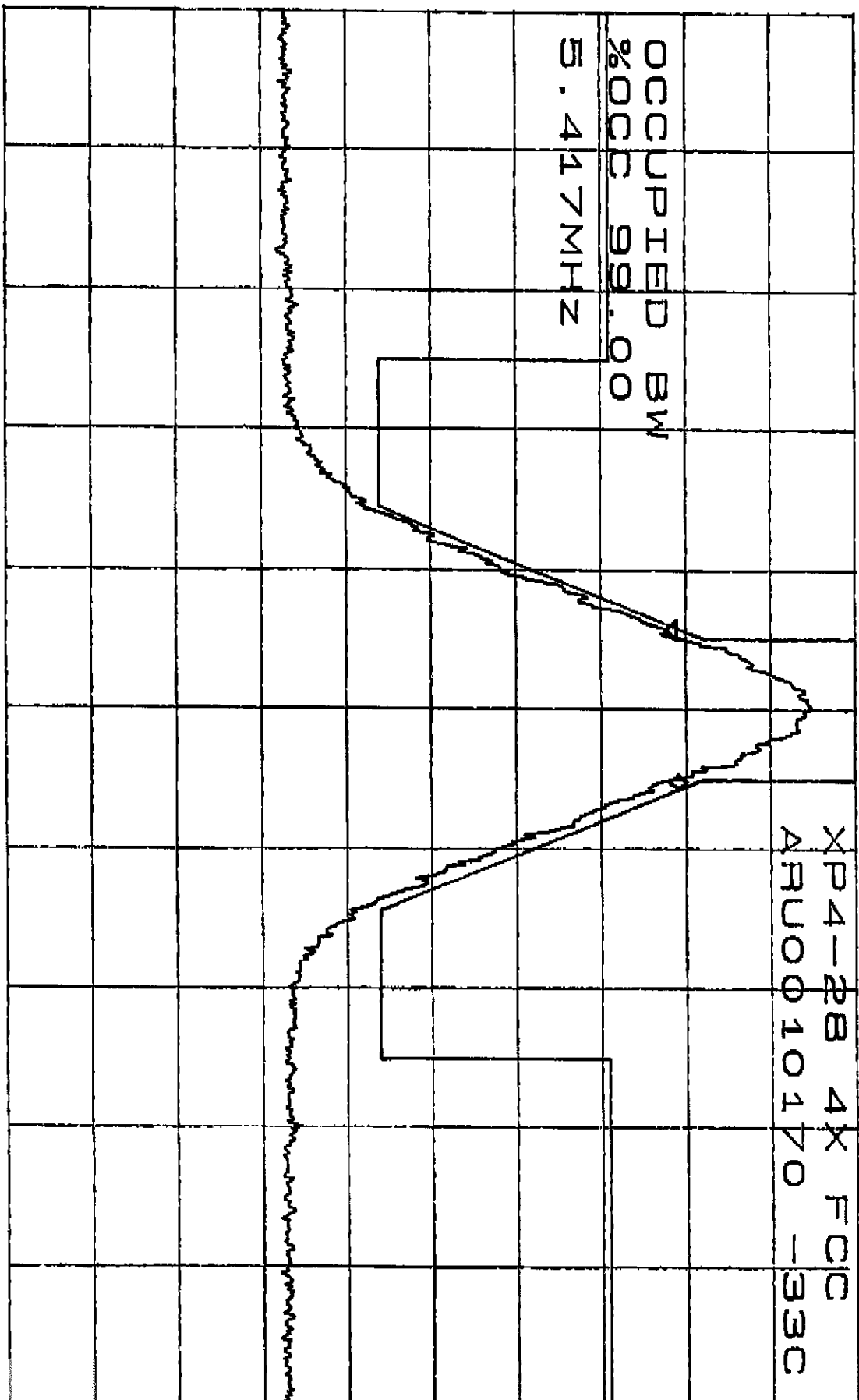
*VBW 3.0kHz

SWP 50.0ms

ATTEN 10dB ΔMKR -57.920B/HZ
RL -9.4dBm 10dB/ 5.33MHz

XP4-2B 4X FCC
ARJ0010170 -33C

OCCUPIED BW
%OCC 99.00
D 5.417MHz



CENTER 27.672506GHZ SPAN 50.00MHz
*RBW 1.0MHz *VBW 3.0KHz SWP 50.0ms

ATTEN 10dB
 FL -8.6dBm

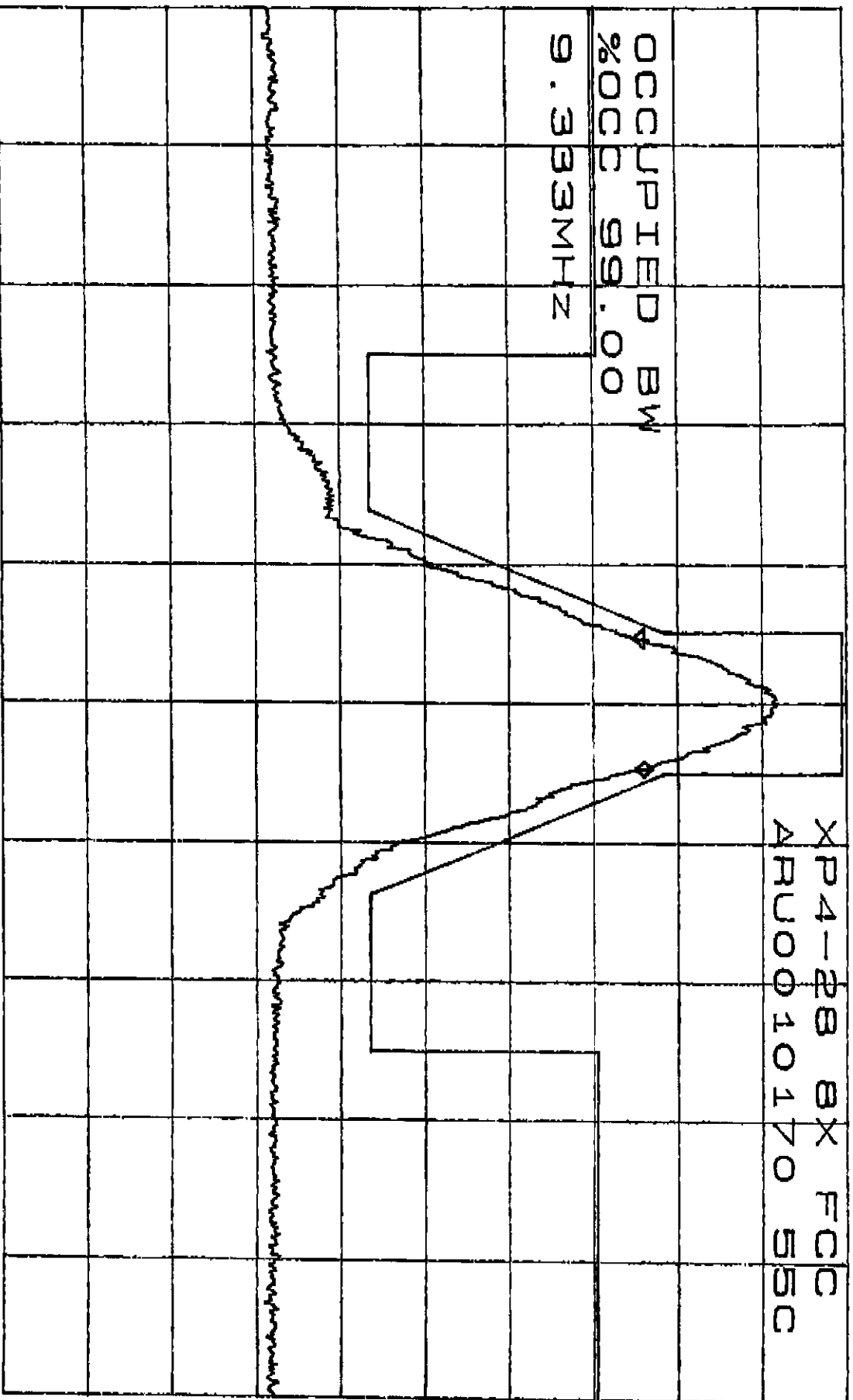
10dB/

ΔMKF -58.75dB/Hz

XP4-28 BX FCC
 ARU0010170 55C

OCCUPIED BW
 %OCC 99.00

D 9.333MHz



CENTER 27.6000GHz

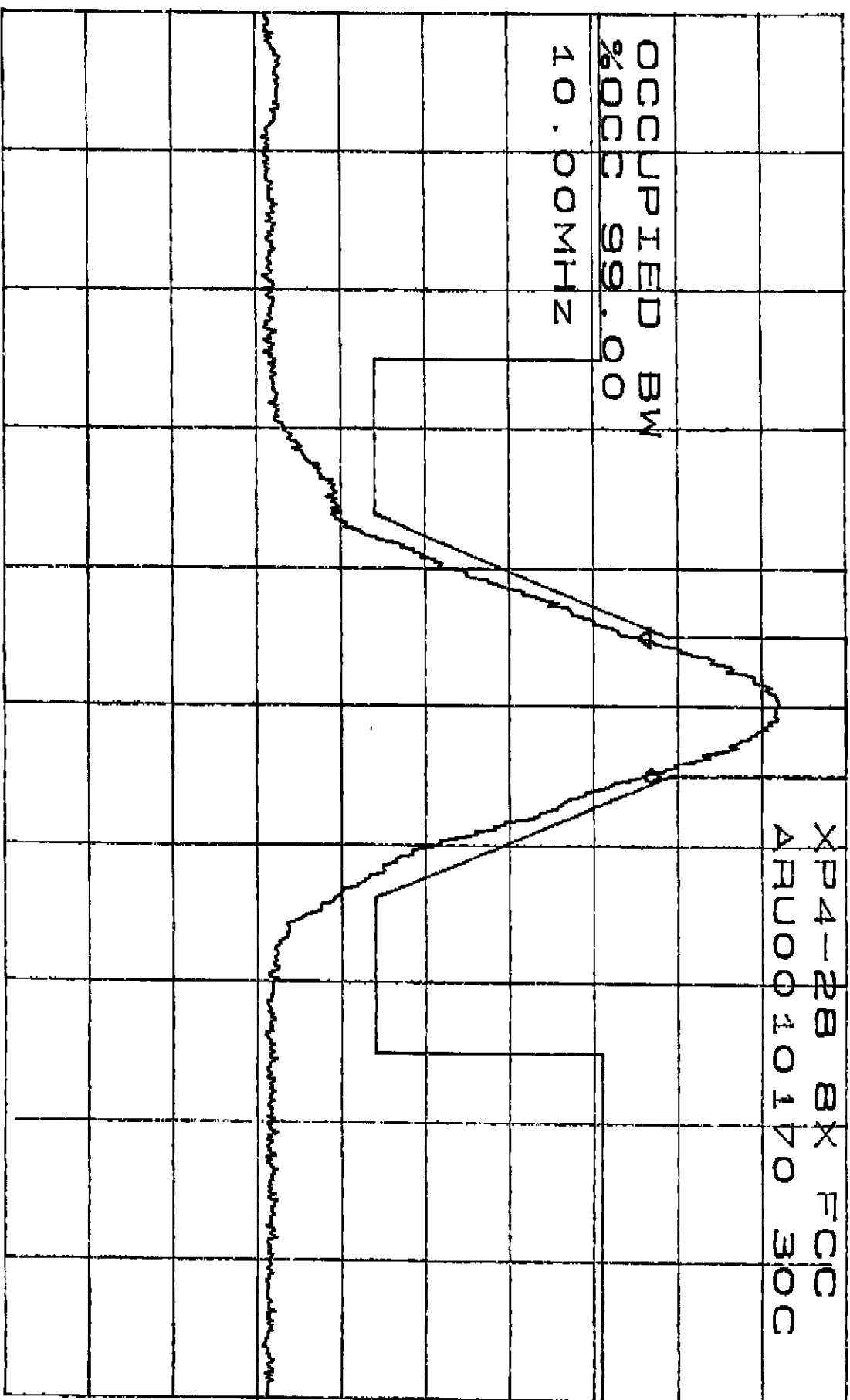
SPAN 100.0MHz

RBW 1.0MHz *VBW 3.0kHz

SMP 84.0ms

ATTEN 10dB
RL -8.0dBm

10dB/

 Δ MKR -57.42dB/Hz
10.0MHzOCCUPIED BW
%OCC 99.00
D 10.00MHzXP4-28 8X FCC
ARU0010170 30C

CENTER 27.60000GHz

SPAN 100.0MHz

*RBW 1.0MHz *VBW 3.0kHz

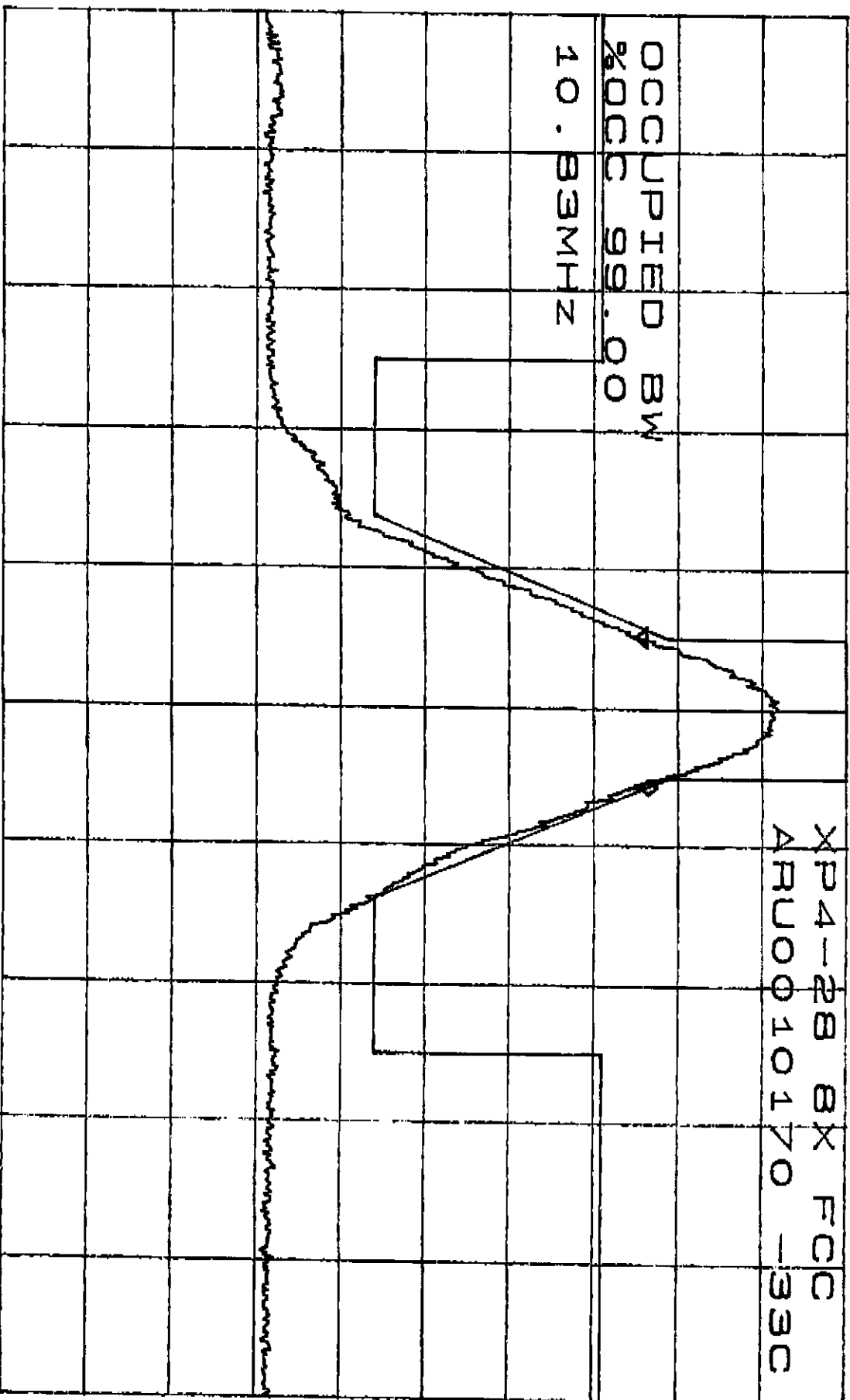
SWP 84.0ms

ATTEN 10dB
RL -8.0dBm

10dB/

 Δ MKR -57.92dB/HZ
10.8MHzOCCUPIED BW
%OCC 99.00

D 10.83MHz

XP4-28 BX FCC
ARU0010170 -33C

CENTER 27.60006GHZ

SPAN 100.0MHZ

*RBW 1.0MHZ *VBW 3.0KHZ

SWP 84.0ms