

MEASUREMENT OF OCCUPIED BANDWIDTH

SECTION 24.238(b) – Measurement 3A

SECTION 2.1049 – Measurement 3B

MEASUREMENT: 3A**SECTION 24.238(b)****MEASUREMENT OF OCCUPIED BANDWIDTH**

The occupied bandwidth of the FCC ID: AS5FLX-01 “Flexent GSM 1900 Transceiver” model TRX19 was measured using a HP 8563E Spectrum Analyzer and an HP Model 7470A Plotter. The Hp 8563E is designed to measure 99% power bandwidth. The measurements were made for Left Edge, and Right Edge of each PCS band.

Section 24.238(b) requires that Resolution Bandwidth (RBW) of at least 1% of emission bandwidth be used to demonstrate RF antenna conducted out-of-band emission compliance at the frequency block edges. Therefore occupied Bandwidth measurements in this section are required to determine RBW at band edges for Measurement 4, Spurious emissions at Antenna Terminals Section (2.1051)

Results:

The plots are provided for Left and Right edges of each PCS band. The Measured 99% power bandwidth is 256 kHz. This determines:

- (1) Emission type : 256KGXW
- (2) Spectrum Analyzer RBW for measurement of antenna conducted emissions in the 1 MHz bands immediately outside and adjacent to the frequency block. A RBW of 10 kHz in 1 MHz band immediately outside and adjacent to frequency blocks was used for Measurement 4.

MEASUREMENT: 3B**SECTION 2.1049****MEASUREMENT OF OCCUPIED BANDWIDTH**

The occupied bandwidth of the FCC ID: AS5FLX-01 “Flexent GSM 1900 Transceiver” model TRX19 was measured using a Rohde & Schwarz FSEK Spectrum Analyzer and an HP Model 520 DeskJet Printer. The RF power level was measured using a RF power meter as shown in the test setup in Figure 3A and 3B. The Figure 3A shows occupied Bandwidth measurement without combiner and Figure 3B shows occupied Bandwidth with combiner. The RF output from the transmitter to spectrum analyzer was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated attenuator. The reference-line on the spectrum analyzer display corresponds to level measured by the RF power meter.

The channel allocations with corresponding frequencies are given in the next page. The channels are available on each authorized frequency blocks are also indicated. The frequencies and channels used are tabulated on the bottom of each plot. Output signal is plotted for a frequency span of 2.4 MHz with channel frequency as center. Plots are provided for Left Edge, Center and Right Edge of each PCS band. These frequencies were chosen to show the occupied bandwidth in the channels in each of the PCS in which this radio can be operated, in compliance with Section 24.229 and 24.238 (c) of the Commission code.

The measurement procedure and specification limits for Occupied Bandwidth are indicated in Section 4.2.1 “spectrum due to the modulation and wide band noise” and Figure A.6a: PCS 1900 BTS Modulation and Noise Spectrum Mask due to GMSK Modulation” of GSM 05.05 “European Standard (Telecommunication Series); Digital Cellular Telecommunication System (Phase 2+); Radio Transmission and Reception” (Release 1999). The measurements were made in accordance with GSM 05.05 using 30 kHz Spectrum Analyzer Resolution Bandwidth. The Resolution Bandwidth setting also meets commissions rule indicated in paragraph 24.238(b) “in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. For conducted spurious emission tests (See Measurement: 4) a resolution bandwidth of 1 MHz is used throughout.”

Results:

The results presented as plots for single carrier:

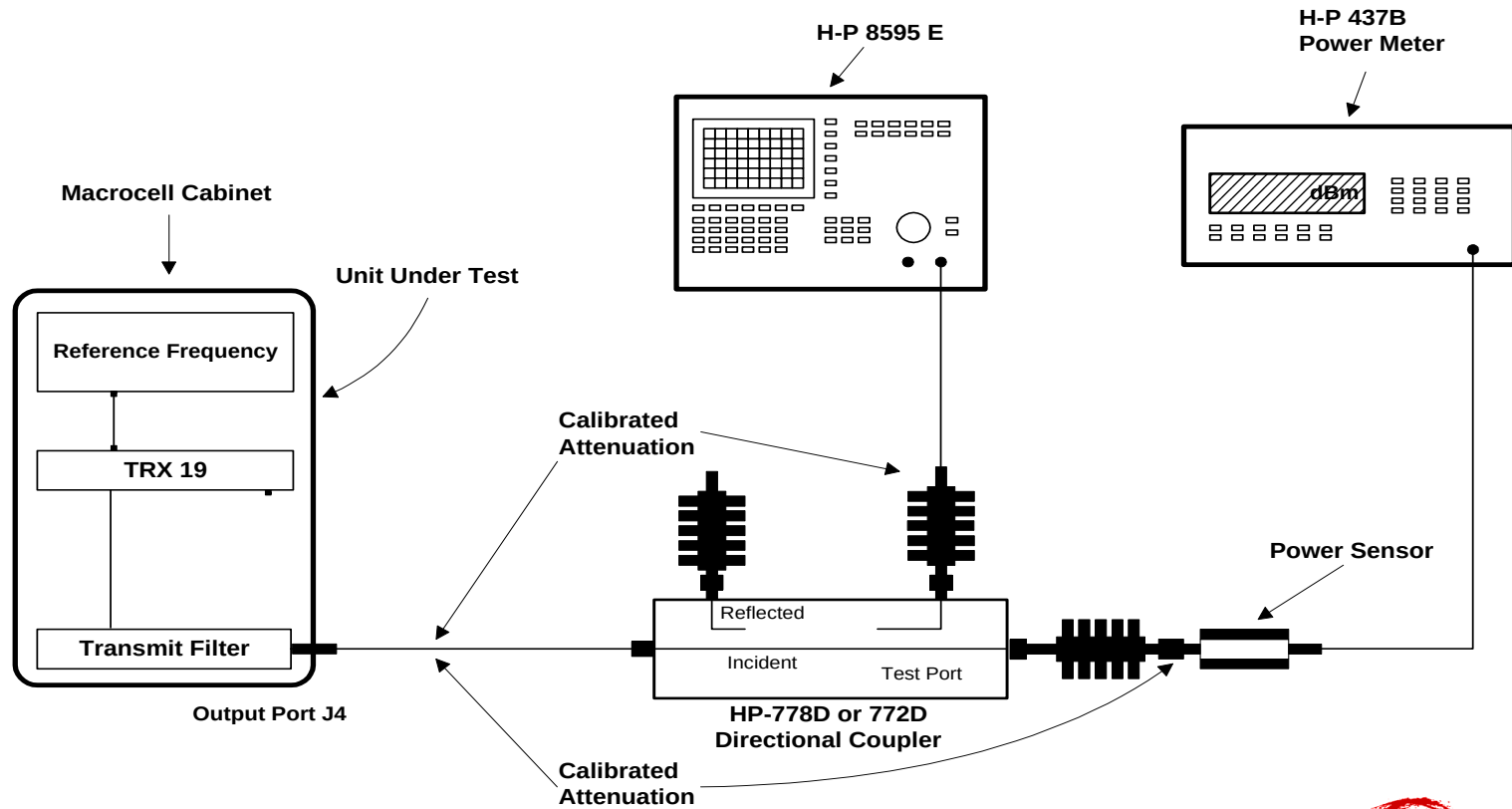
1. For single carrier with TRX19 output directly connected to J4.
2. For single carrier of two carrier combined system.

$$dl(n) = 1930.2 + 0.2 \cdot (n - 512) / \text{MHz}$$

$$\text{ul}(n) = 1850.2 + 0.2 \cdot (n - 512) / \text{MHz}$$

Note:. Channels high lighted are **not available for GSM1900**, in accordance with **FCC Part 24**

Figure 3A. TEST CONFIGURATION FOR OCCUPIED BANDWIDTH

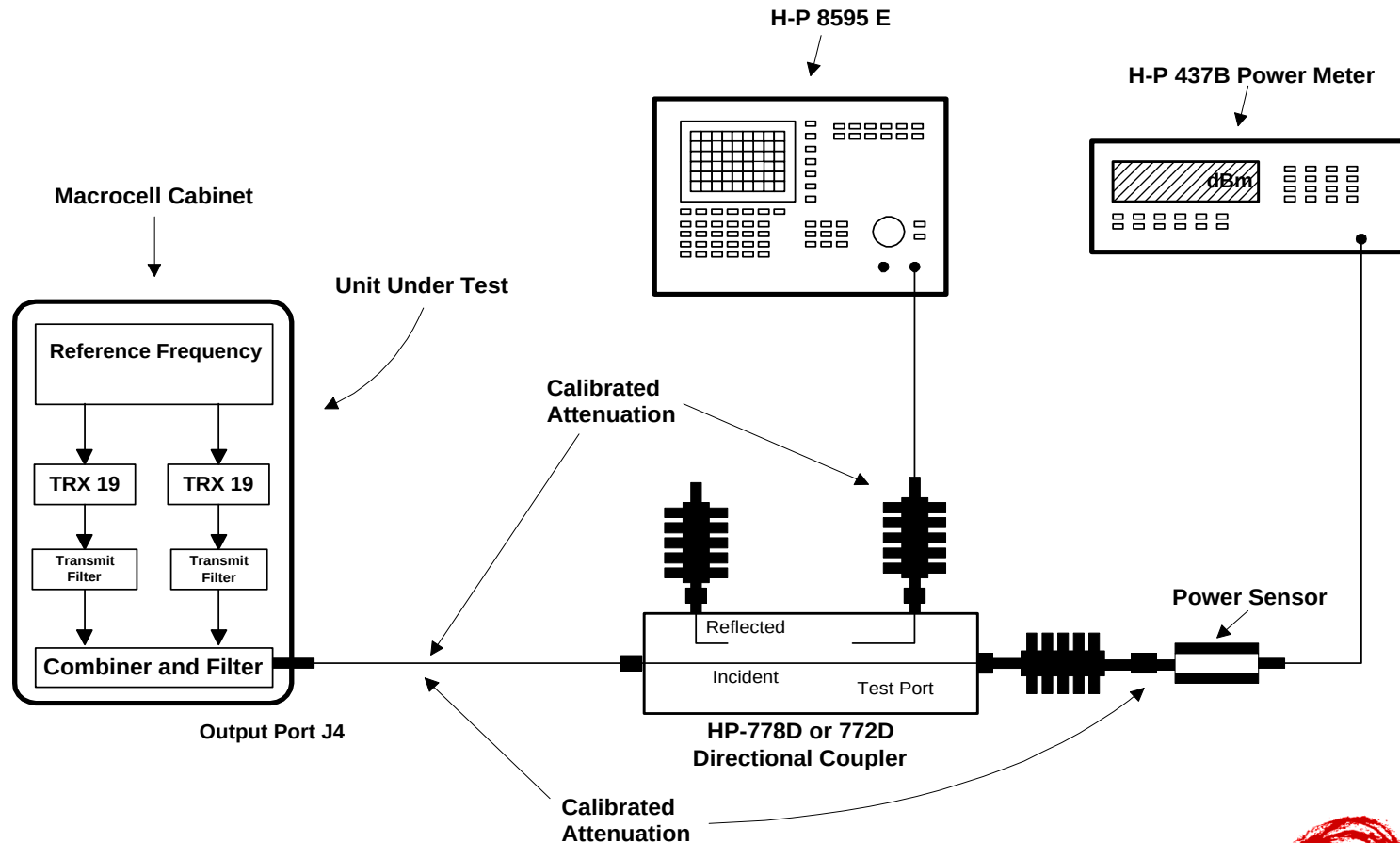


All components are calibrated over the frequency range of interest

Lucent Technologies
Bell Labs Innovations



Figure 3B. TEST CONFIGURATION FOR OCCUPIED BANDWIDTH



All components are calibrated over the frequency range of interest

Lucent Technologies
Bell Labs Innovations



MEASUREMENT OF OCCUPIED BANDWIDTH

SECTION 24.238(b) – Measurement 3A

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK A

(1930 – 1945 MHz)

Left Edge: 1930.4 MHz (Channel 513)

Right Edge: 1944.6 MHz (Channel 584)

19 MAY 2000

FCC ID: AS5FLX-01
Block A Channel 513

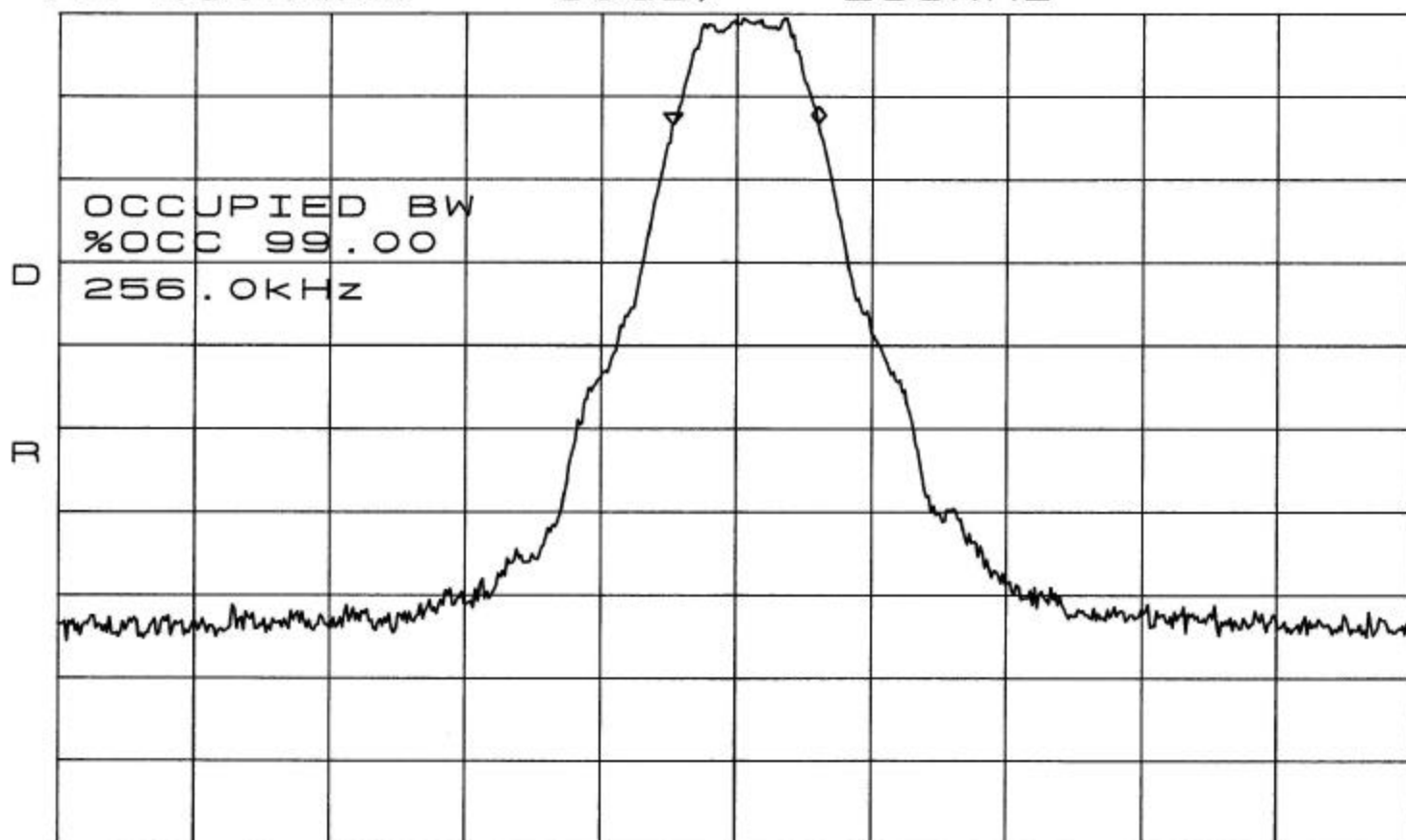
ATTEN 20dB

RL 45.4dBm

10dB/

ΔMKR .16dB

256kHz



CENTER 1.930400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

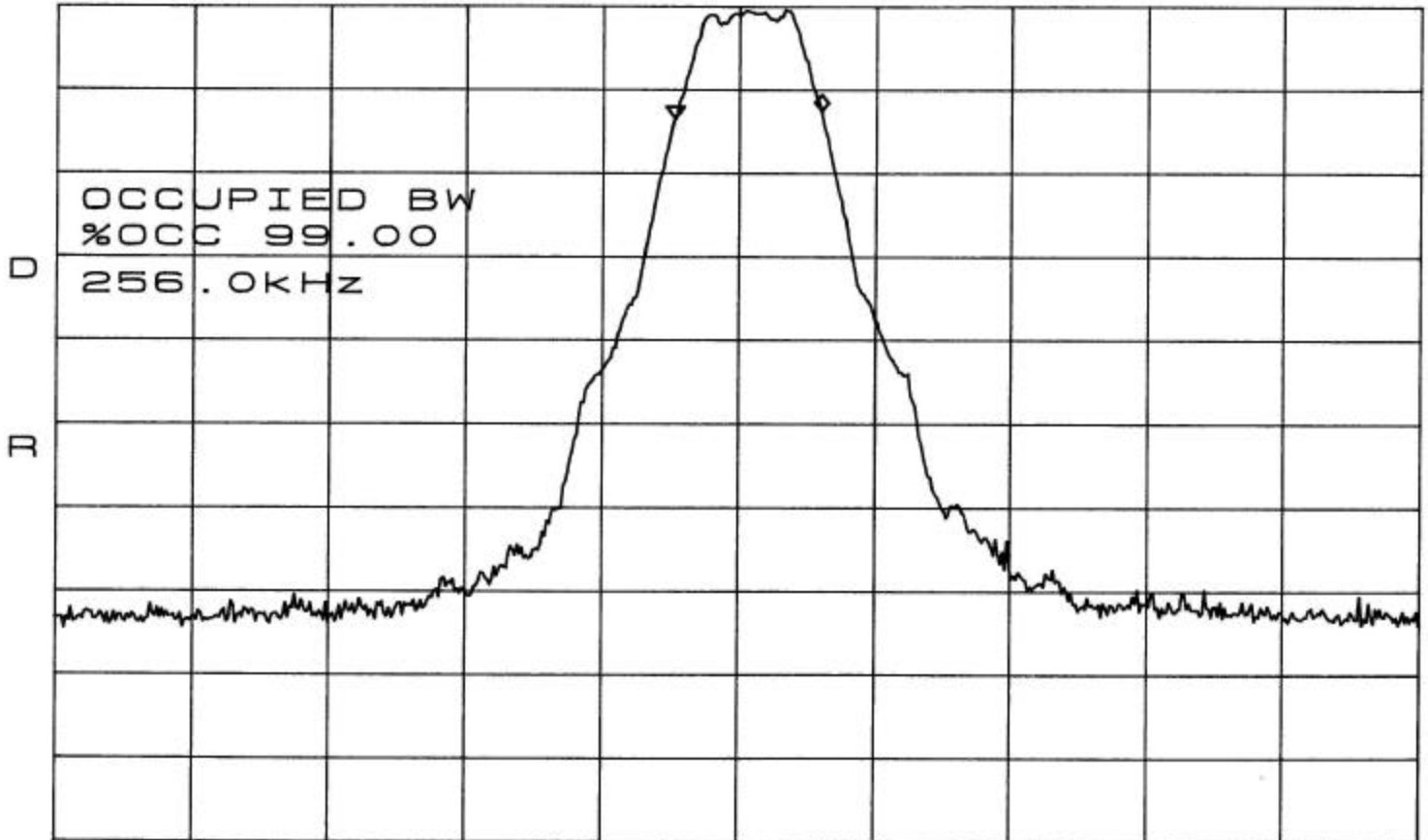
19 MAY 2000

FCC ID: AS5FLX-01
Block A Channel 584

ATTEN 20dB
RL 45.4dBm

Δ MKR .83dB
256kHz

10dB/



CENTER 1.944600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK B

(1950 – 1965 MHz)

Left Edge: 1950.4 MHz (Channel 613)

Right Edge: 1964.6 MHz (Channel 684)

19 MAY 2000

FCC ID: AS5FLX-01
Block B Channel 613

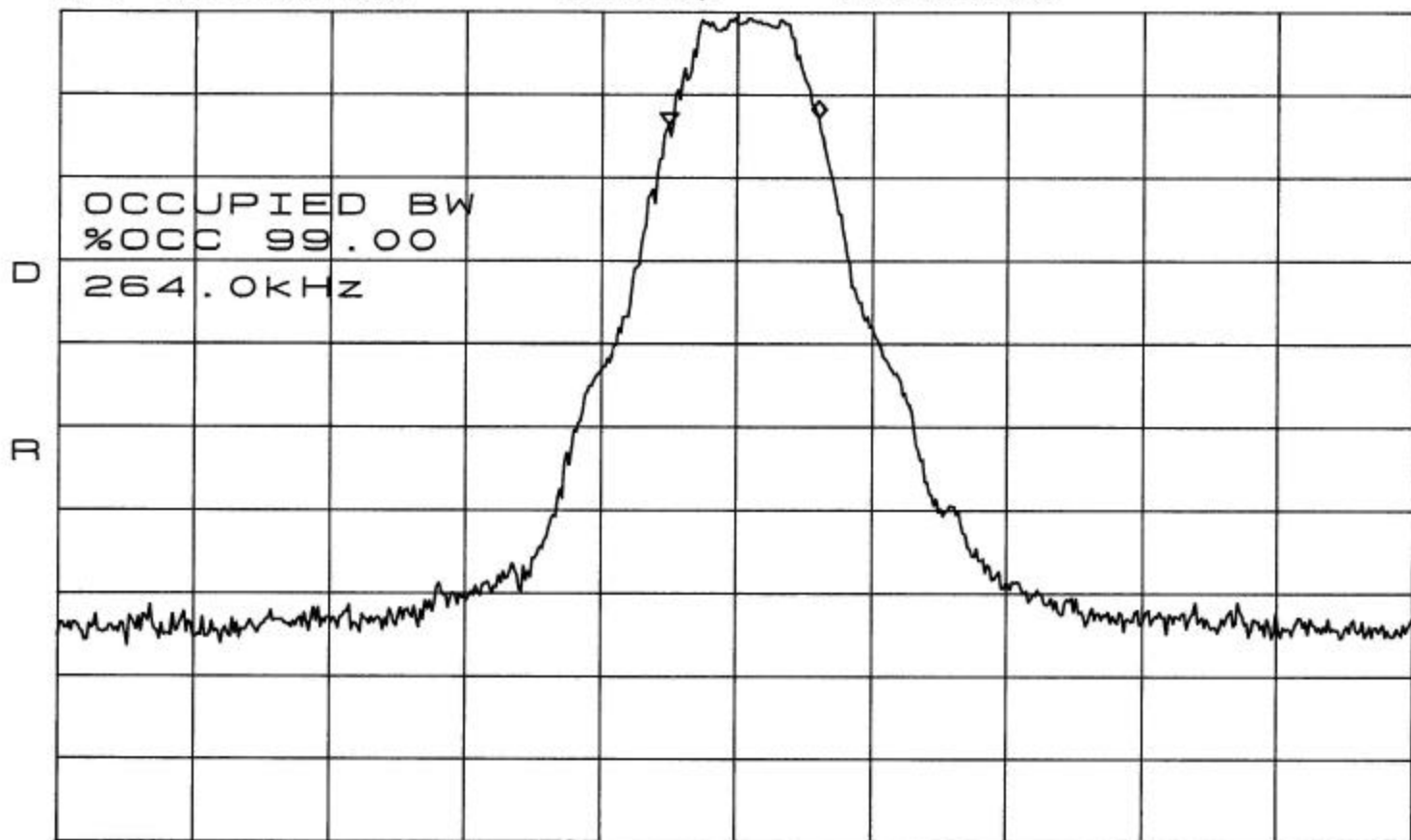
ATTEN 20dB

RL 45.4dBm

10dB/

ΔMKR .83dB

264kHz



CENTER 1.950400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

19 MAY 2000

FCC ID: AS5FLX-01
Block B Channel 684

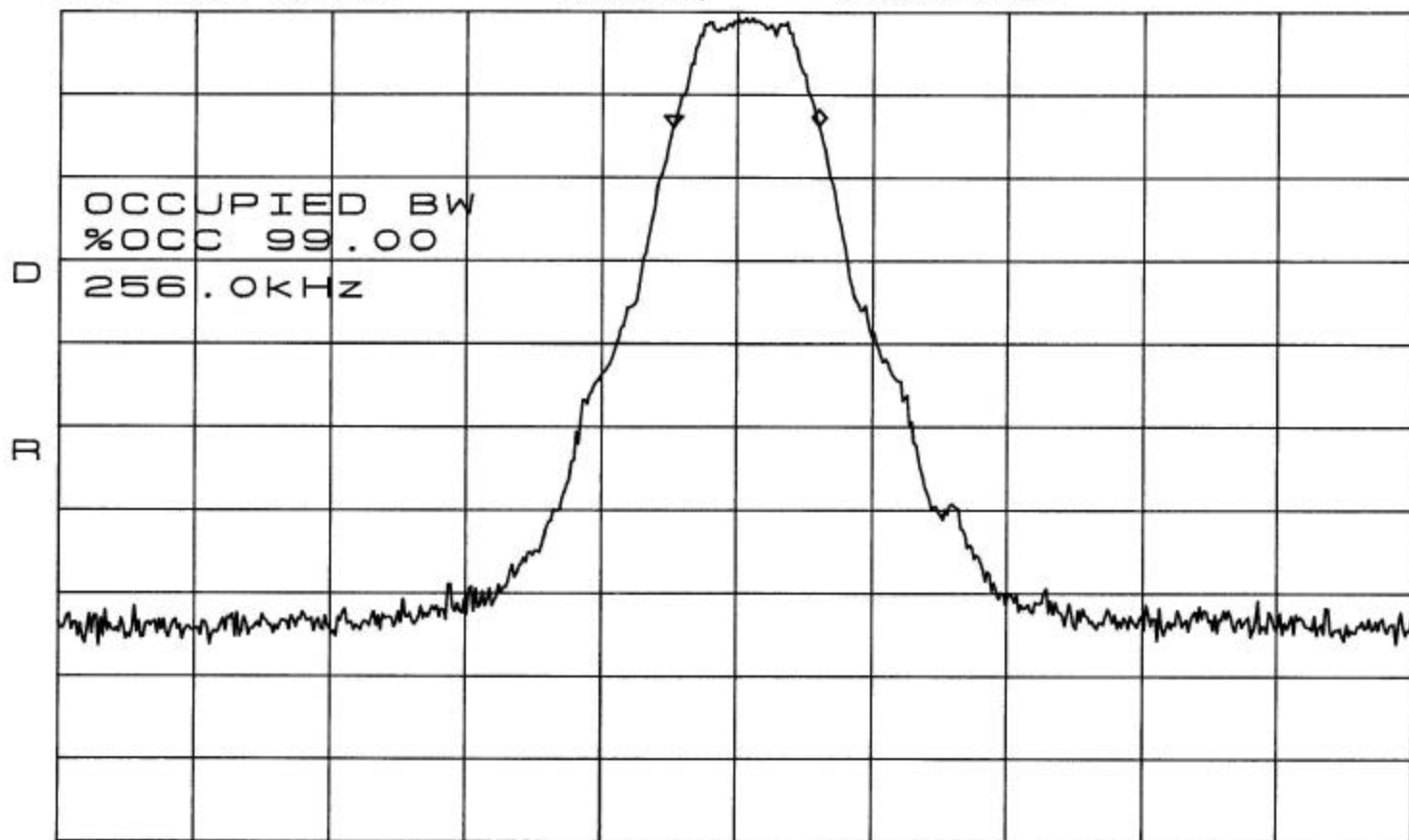
ATTEN 20dB

RL 45.4dBm

10dB/

Δ MKR .16dB

256kHz



CENTER 1.964600GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK C

(1975 – 1990 MHz)

Left Edge: 1975.4 MHz (Channel 738)

Right Edge: 1989.6 MHz (Channel 809)

19 MAY 2000

FCC ID: AS5FLX-01
Block C Channel 738

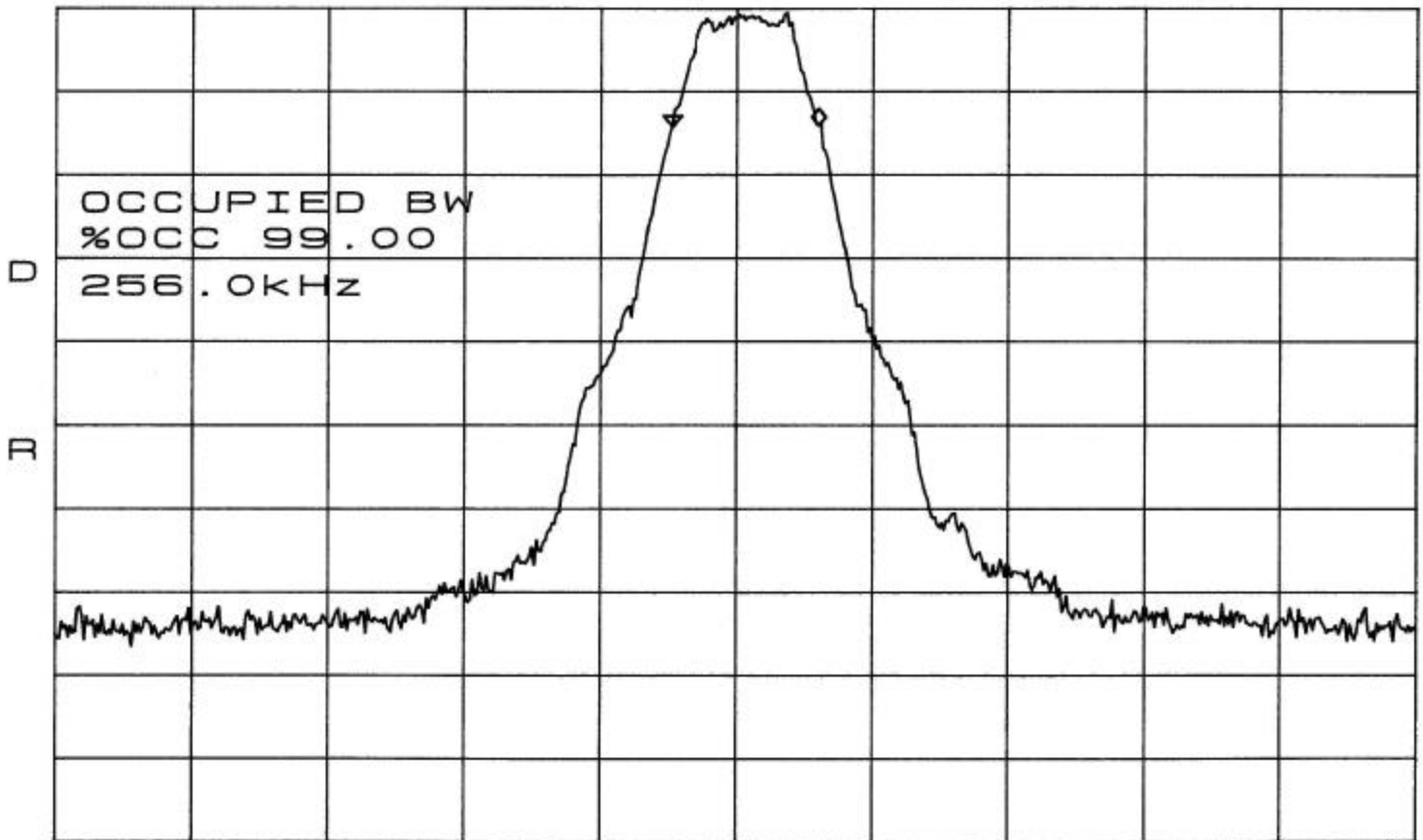
ATTEN 20dB

RL 45.4dBm

ΔMKR .17dB

10dB/

256kHz



CENTER 1.975400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

19 MAY 2000

FCC ID: AS5FLX-01
Block C Channel 809

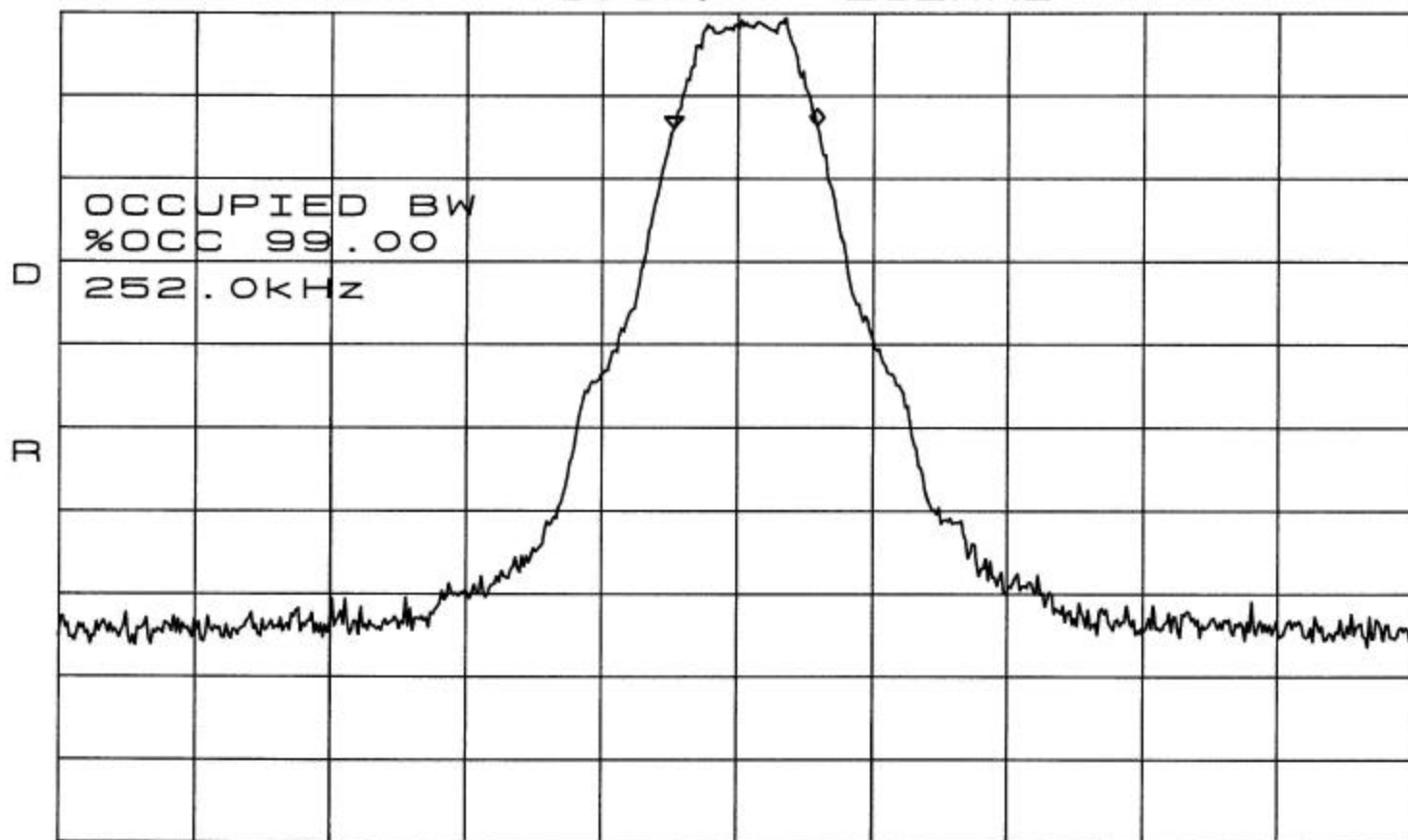
ATTEN 20dB

ΔMKR .33dB

RL 45.4dBm

10dB/

252kHz



CENTER 1.989600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK D

(1945 – 1950 MHz)

Left Edge:	1945.4 MHz (Channel 588)
Right Edge:	1949.6 MHz (Channel 609)

19 MAY 2000

FCC ID: AS5FLX-01
Block D Channel 588

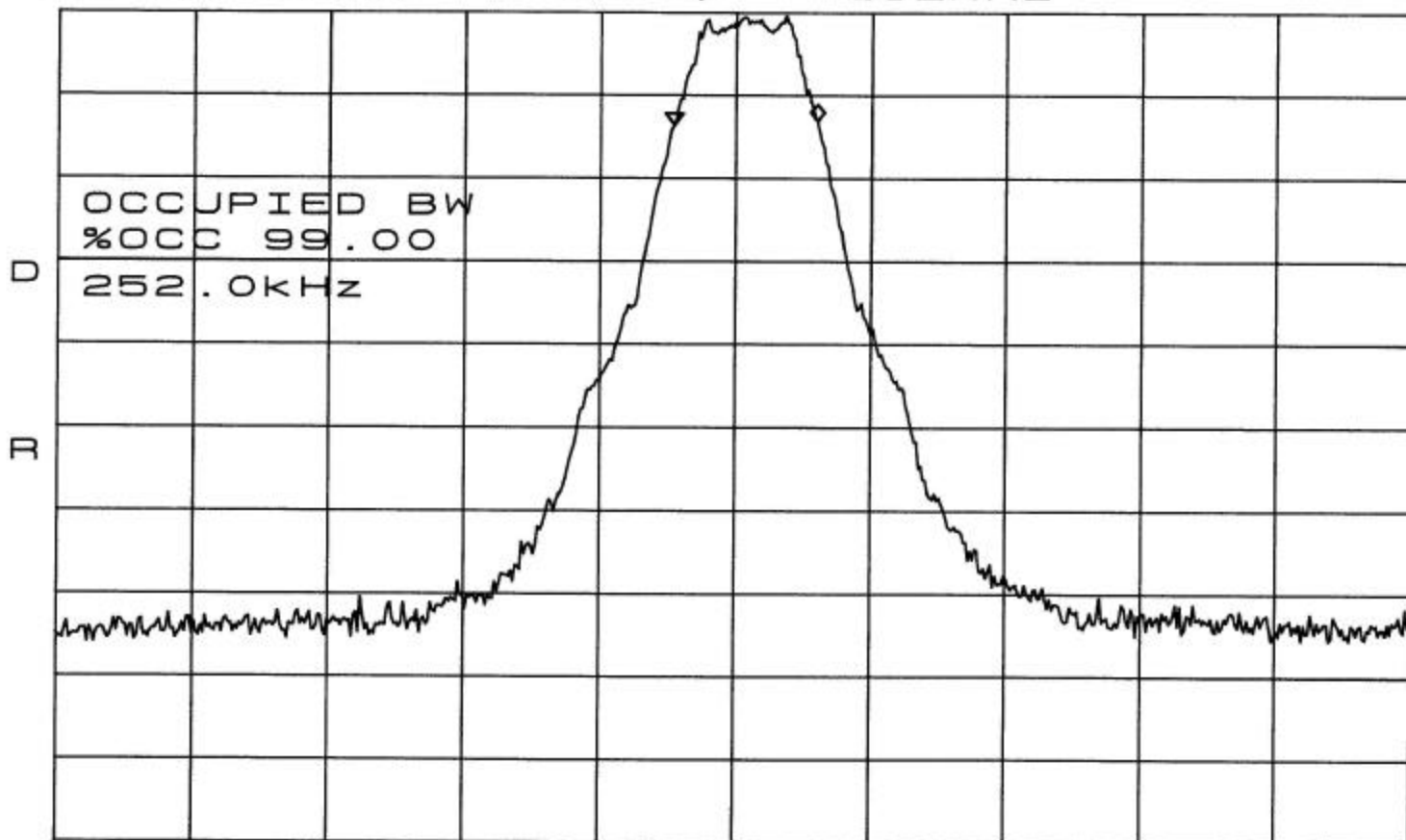
ATTEN 20dB

Δ MKR .50dB

RL 45.4dBm

10dB/

252kHz



CENTER 1.945400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

19 MAY 2000

FCC ID: AS5FLX-01
Block D Channel 609

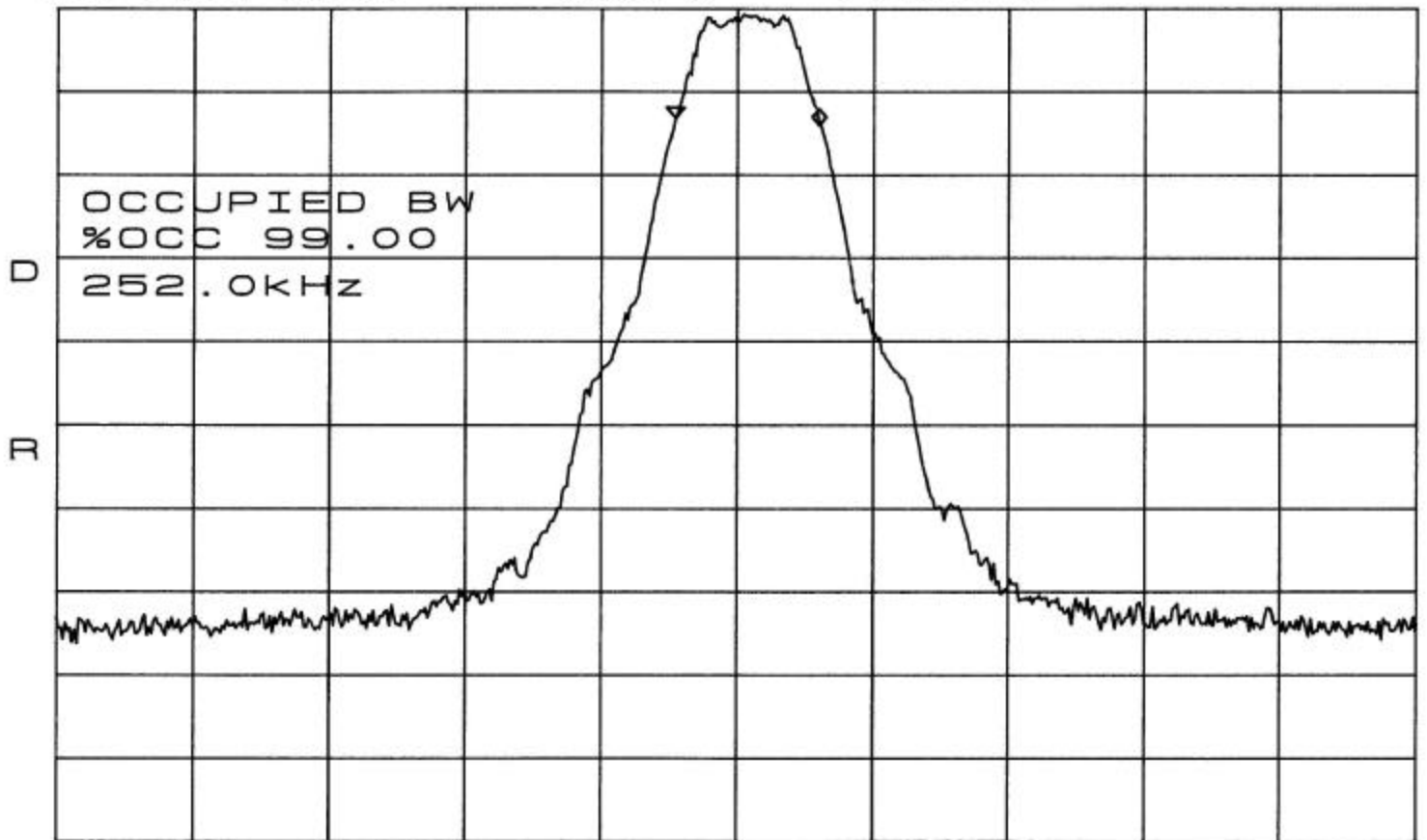
ATTEN 20dB

RL 45.4dBm

ΔMKR - .83dB

10dB/

252kHz



CENTER 1.949600GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK E

(1965 – 1970 MHz)

Left Edge:	1965.4 MHz (Channel 688)
Right Edge:	1969.6 MHz (Channel 709)

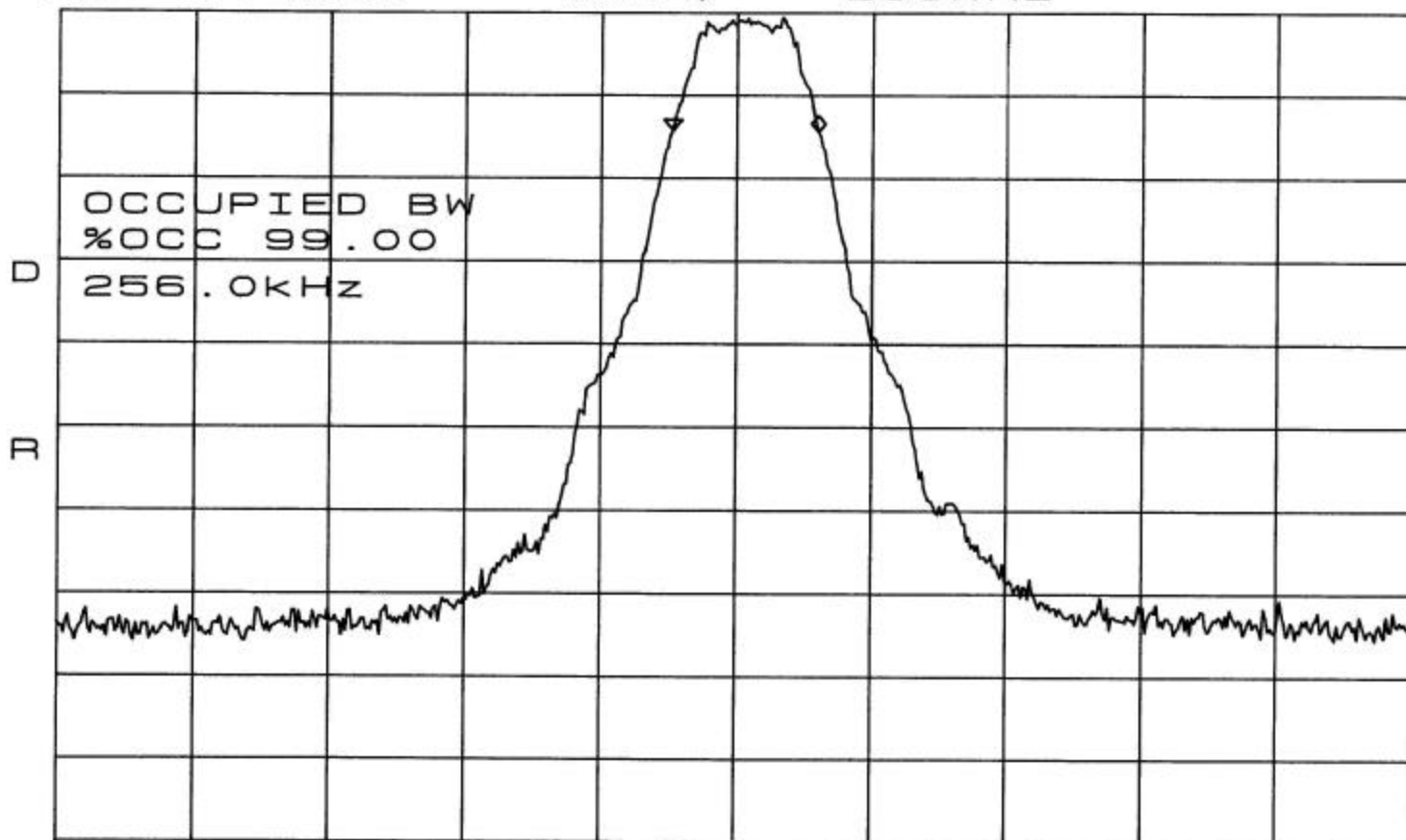
19 MAY 2000

FCC ID: AS5FLX-01
Block E Channel 688

ATTEN 20dB
RL 45.4dBm

ΔMKR -.16dB
256kHz

10dB/



CENTER 1.965400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

19 MAY 2000

FCC ID: AS5FLX-01
Block E Channel 709

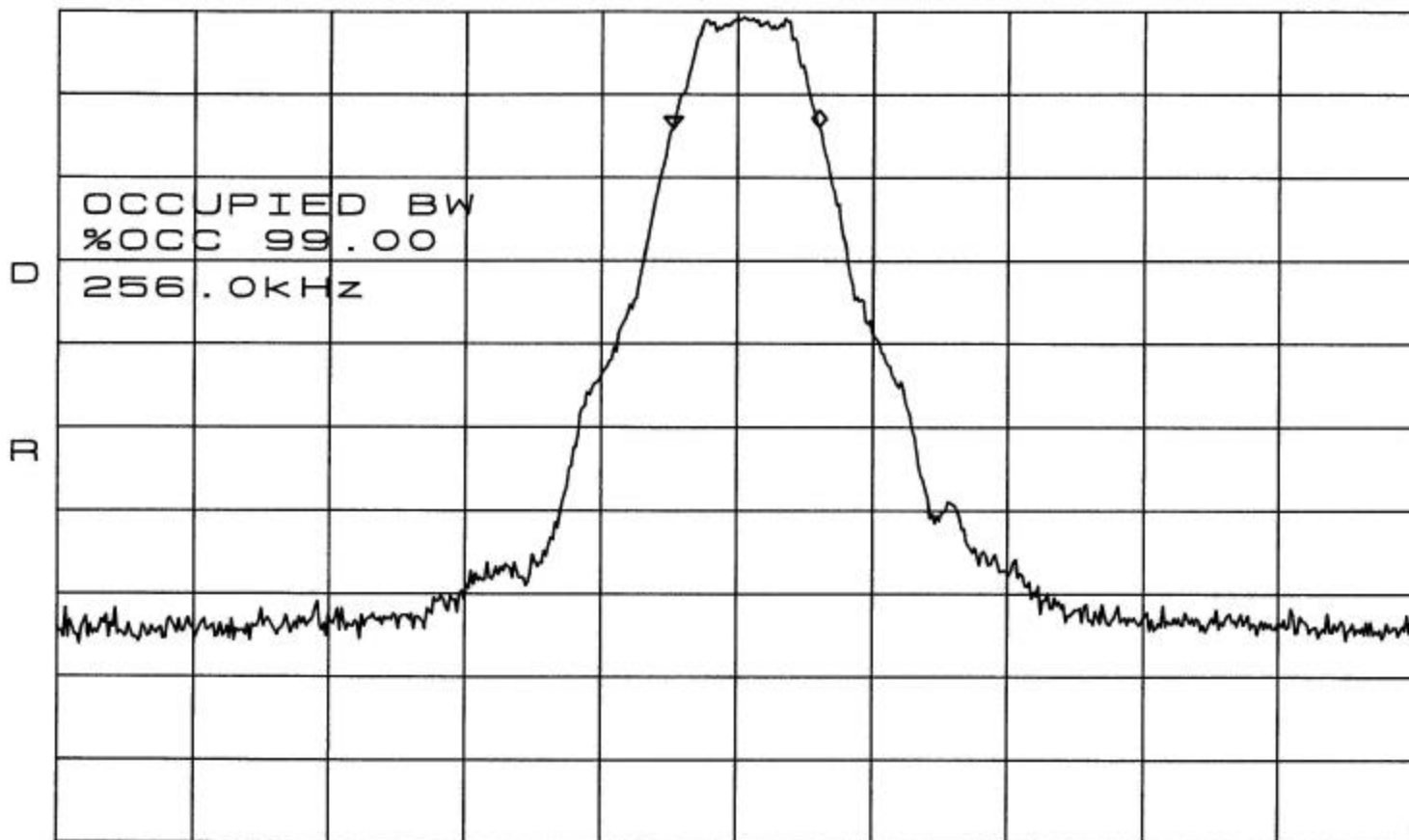
ATTEN 20dB

Δ MKR .17dB

RL 45.4dBm

10dB/

256kHz



CENTER 1.969600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

1 TRX WITHOUT COMBINER

BLOCK F

(1970 – 1975 MHz)

Left Edge:	1970.4 MHz (Channel 713)
Right Edge:	1974.6 MHz (Channel 734)

19 MAY 2000

FCC ID: AS5FLX-01
Block F Channel 713

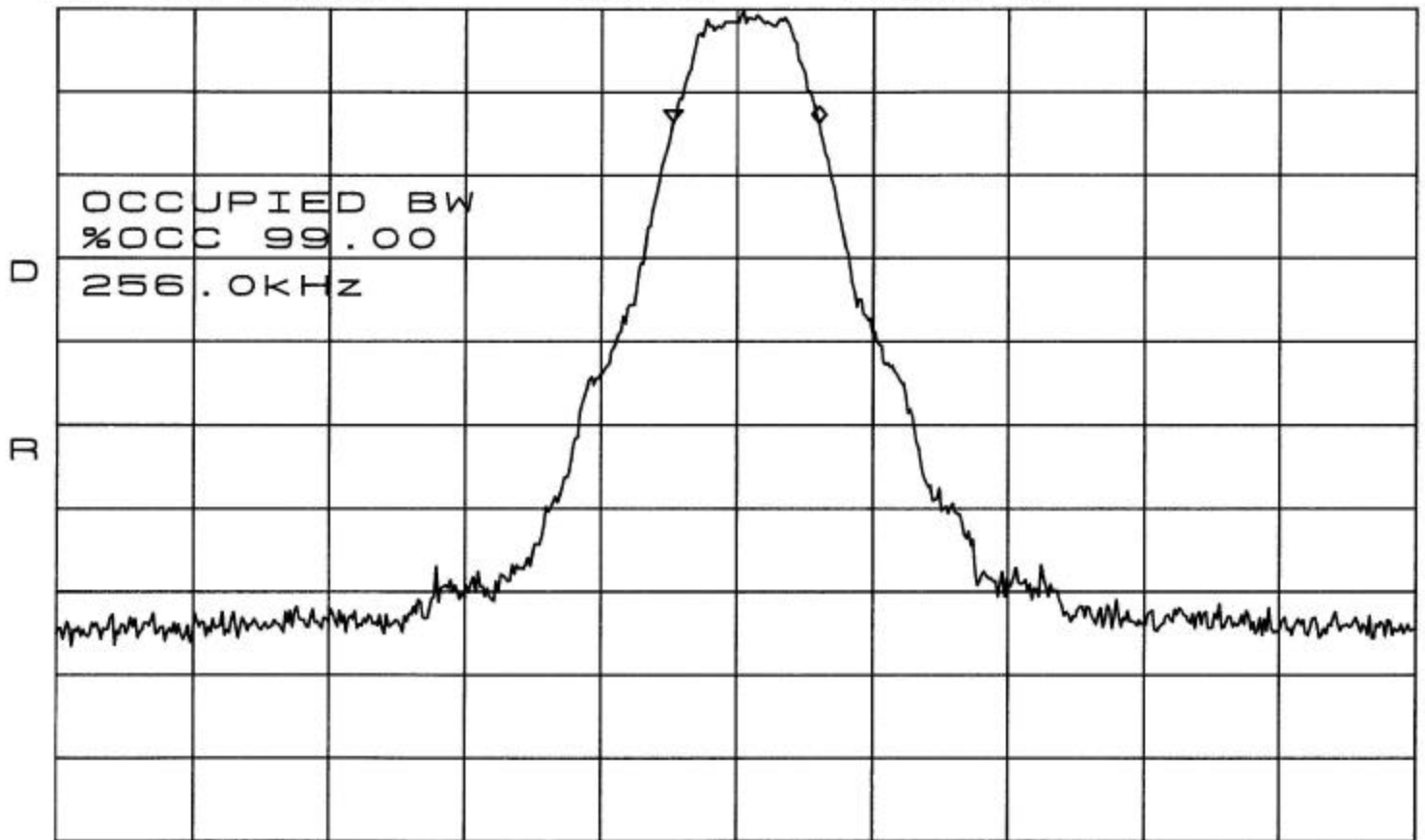
ATTEN 20dB

RL 45.4dBm

10dB/

ΔMKR - .17dB

256kHz



CENTER 1.970400GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

19 MAY 2000

FCC ID: AS5FLX-01
Block F Channel 734

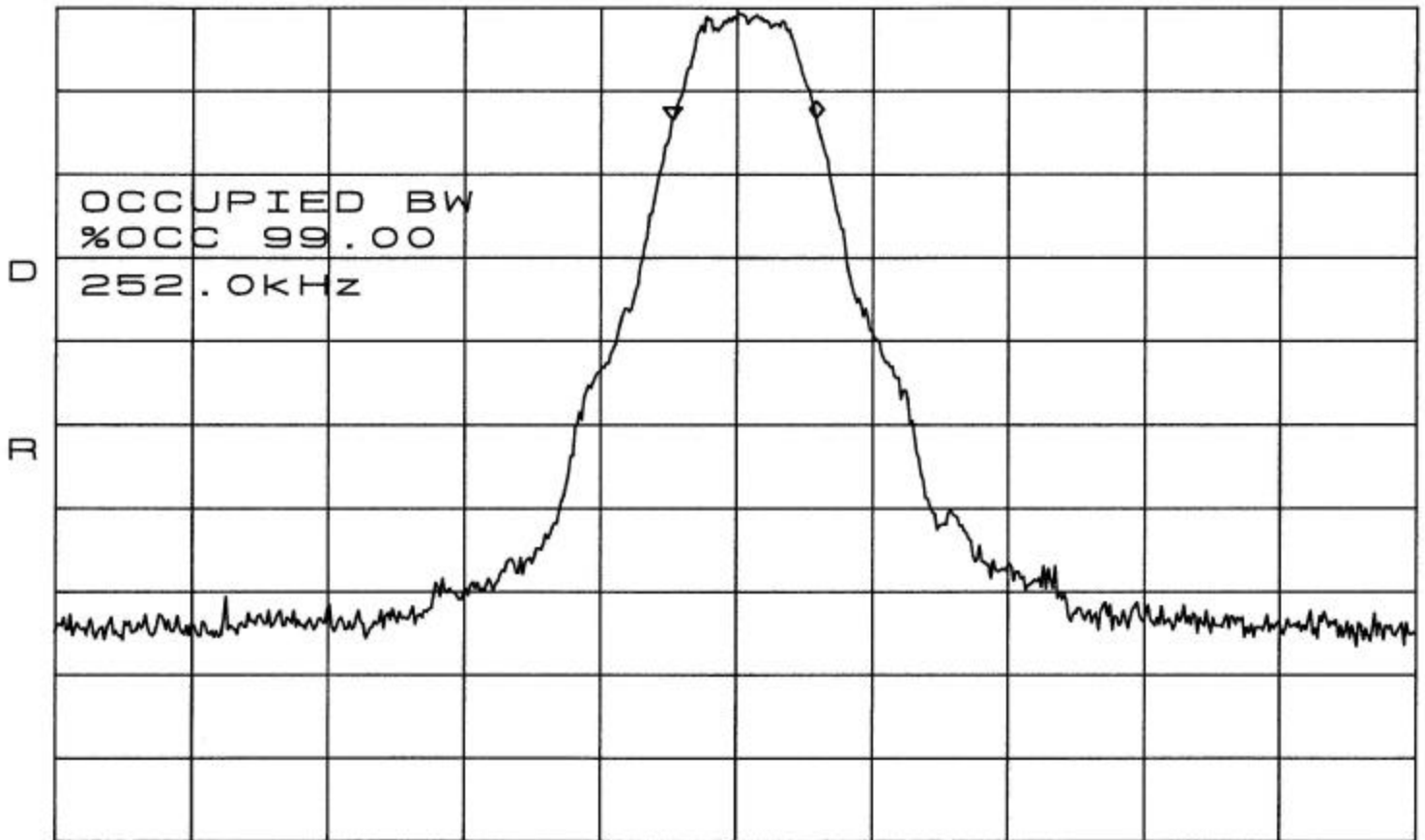
ATTEN 20dB

ΔMKR .16dB

RL 45.4dBm

10dB/

252kHz



CENTER 1.974600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK A

(1930 – 1945 MHz)

Left Edge: 1930.4 MHz (Channel 513)

Right Edge: 1944.6 MHz (Channel 584)

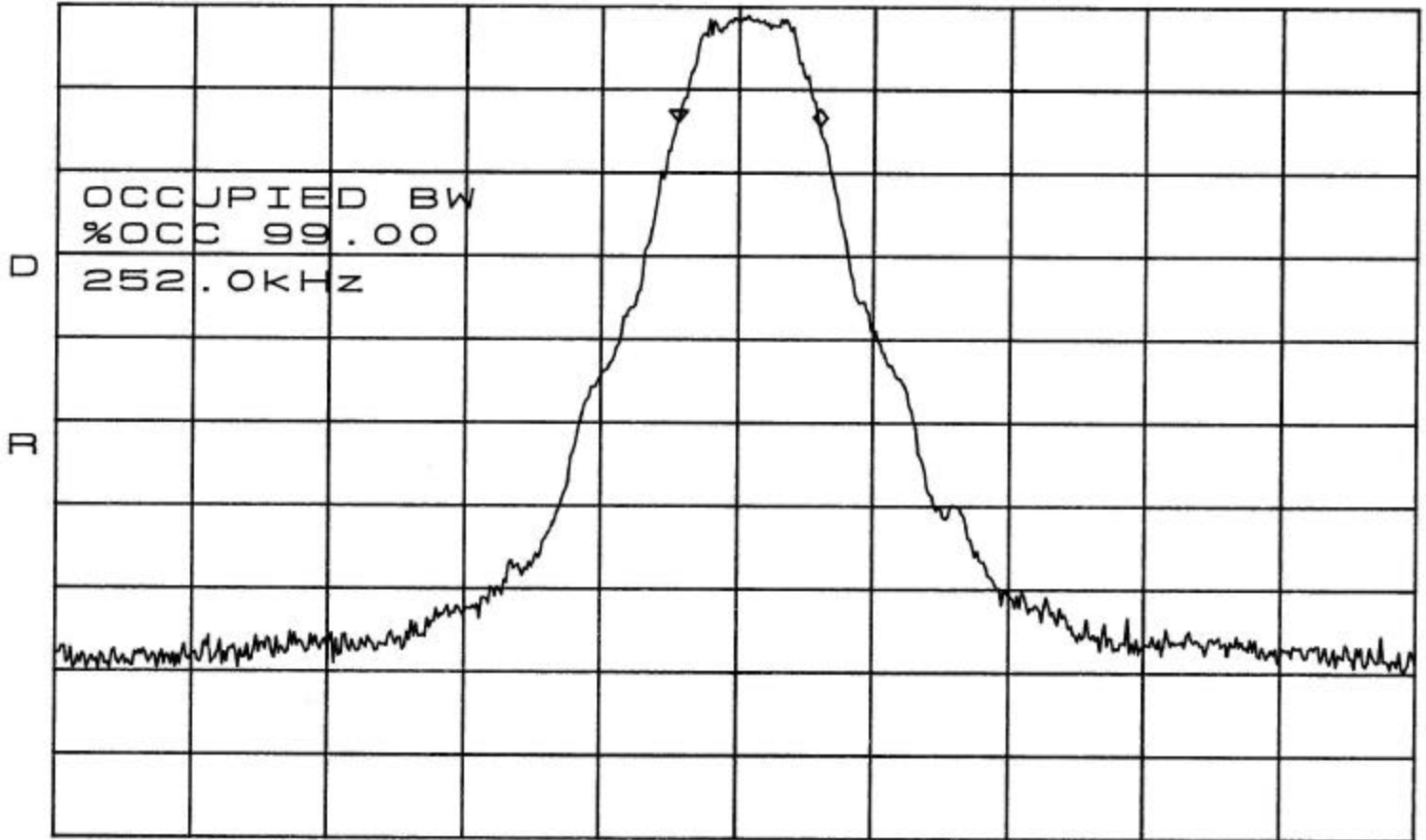
04 MAY 2000

FCC ID: AS5FLX-01
Block A Channel 513

ATTEN 10dB
RL 42.0dBm

10dB/
252kHz

ΔMKR -.50dB



CENTER 1.930400GHz
RBW 30kHz VBW 30kHz

SPAN 2.400MHz
SWP 50.0ms

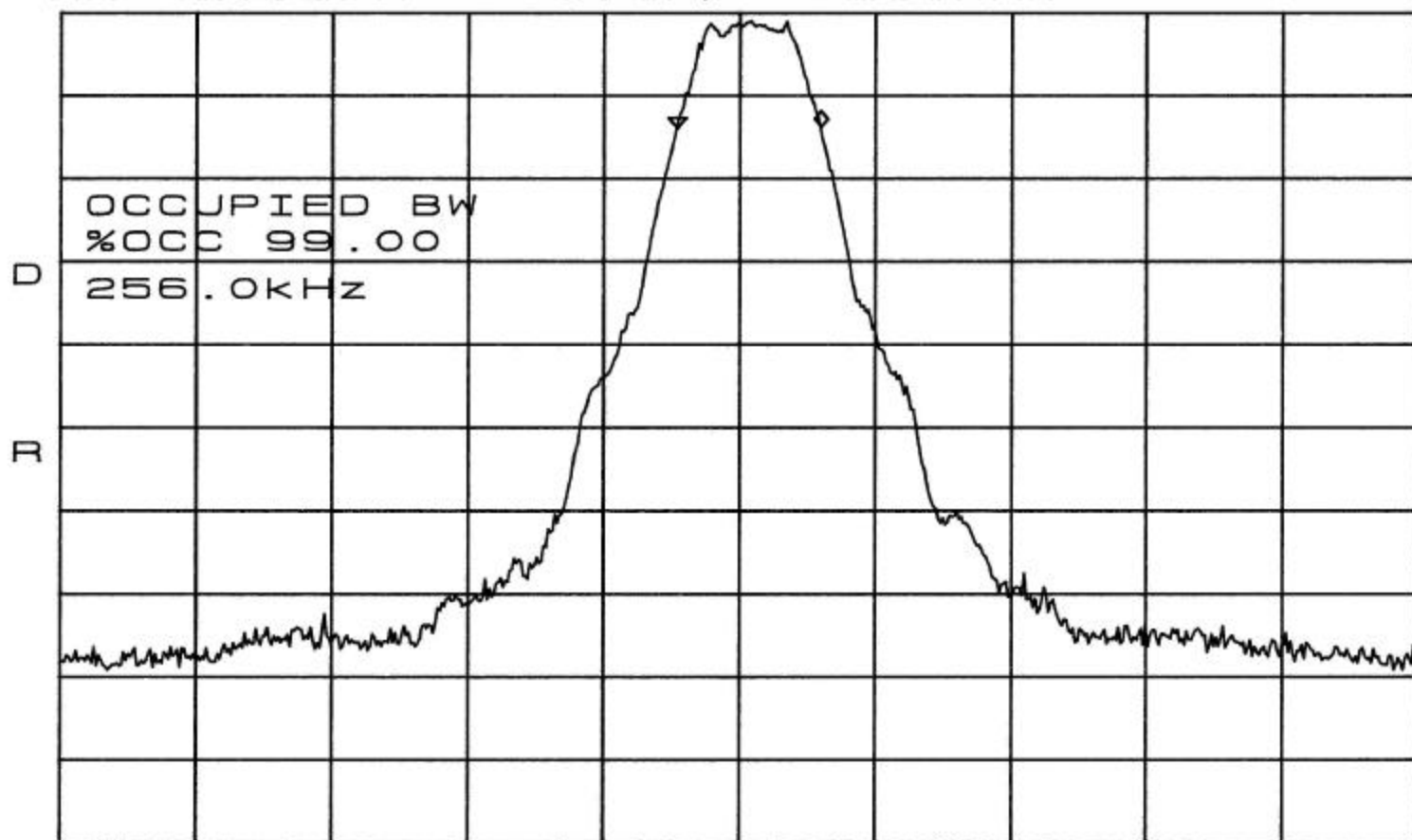
04 MAY 2000

FCC ID: AS5FLX-01
Block A Channel 584

ATTEN 10dB
RL 42.0dBm

ΔMKR .17dB
256kHz

10dB/



CENTER 1.944600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK B

(1950 – 1965 MHz)

Left Edge:	1950.4 MHz (Channel 613)
Right Edge:	1964.6 MHz (Channel 684)

04 MAY 2000

FCC ID: AS5FLX-01
Block B Channel 613

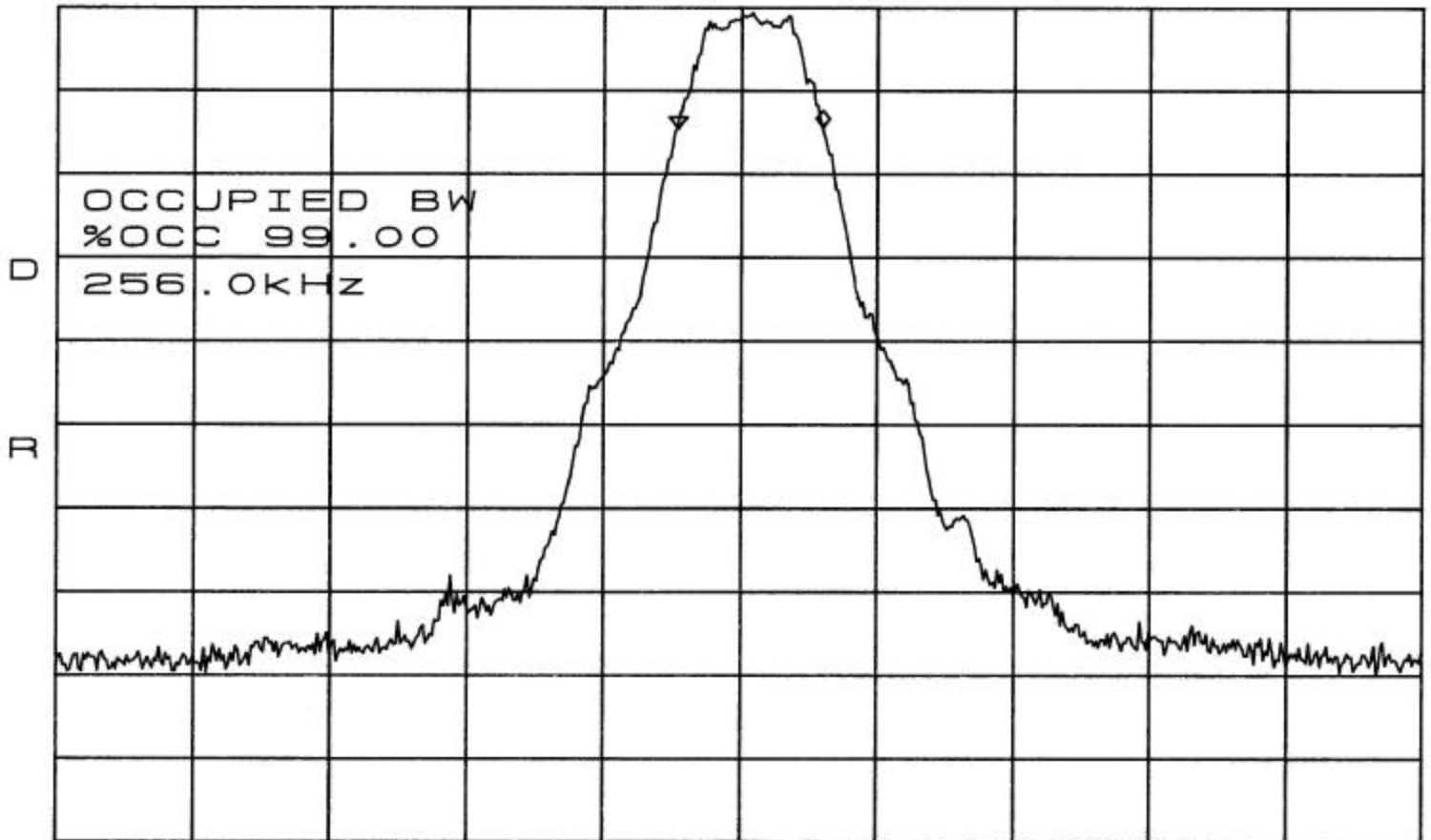
ATTEN 10dB

RL 42.0dBm

ΔMKR .17dB

10dB/

256kHz



CENTER 1.950400GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

04 MAY 2000

FCC ID: AS5FLX-01
Block B Channel 684

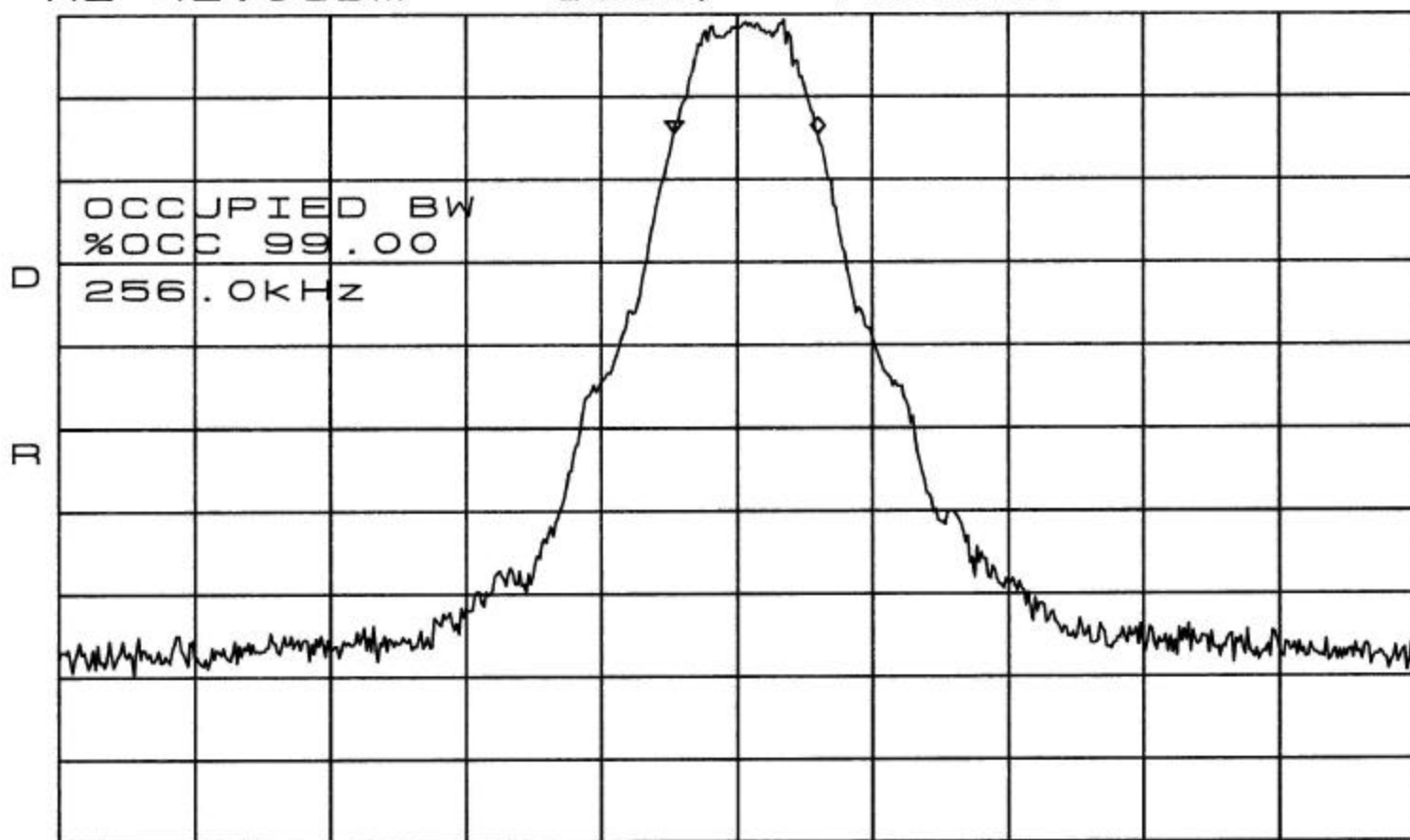
ATTEN 10dB

RL 42.0dBm

ΔMKR -.17dB

10dB/

256kHz



CENTER 1.964600GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK C

(1975 – 1990 MHz)

Left Edge: 1975.4 MHz (Channel 738)

Right Edge: 1989.6 MHz (Channel 809)

04 MAY 2000

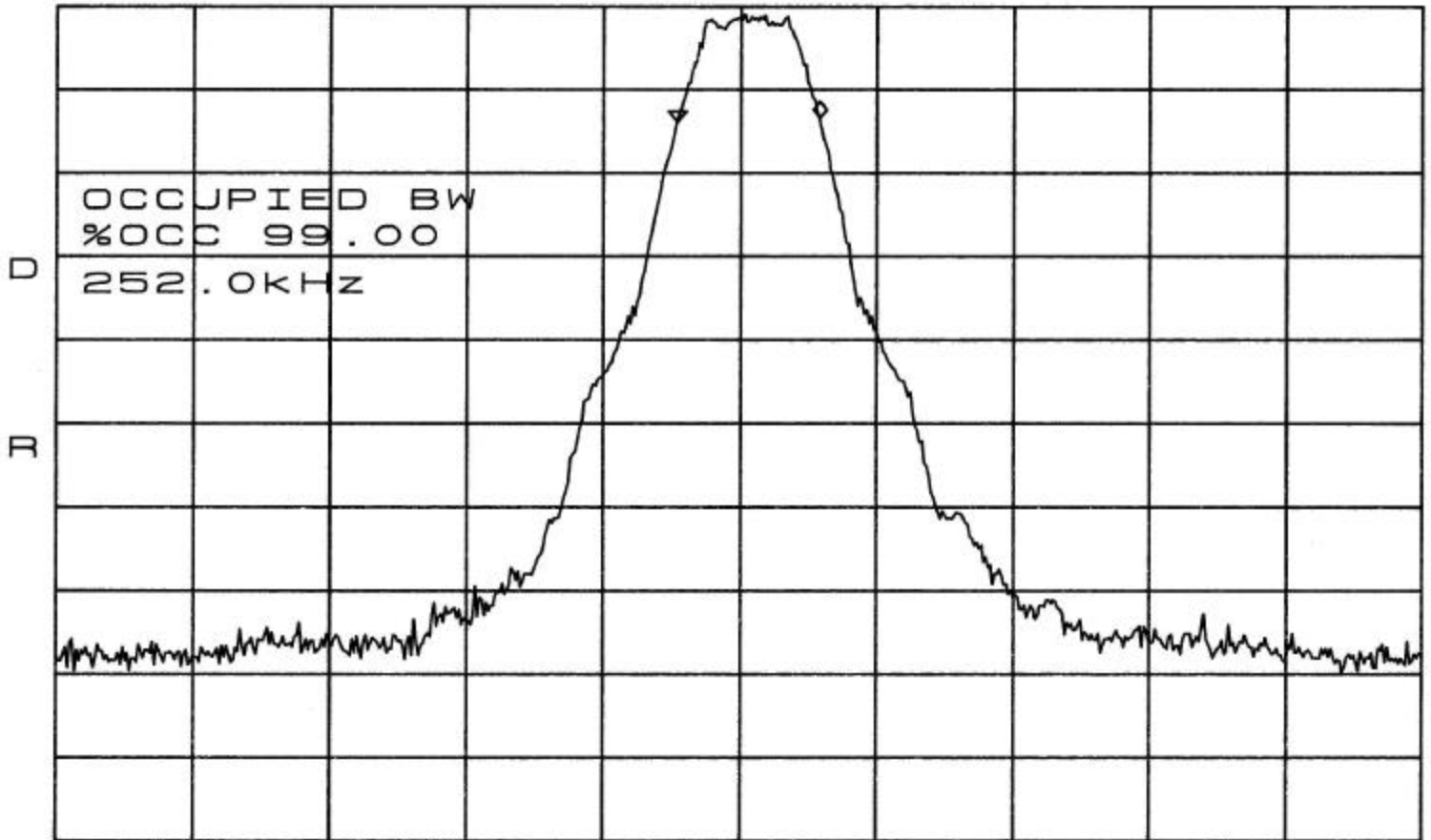
FCC ID: AS5FLX-01
Block C Channel 738

ATTEN 10dB

RL 42.0dBm

Δ MKR .50dB

10dB/ 252kHz



CENTER 1.975400GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

04 MAY 2000

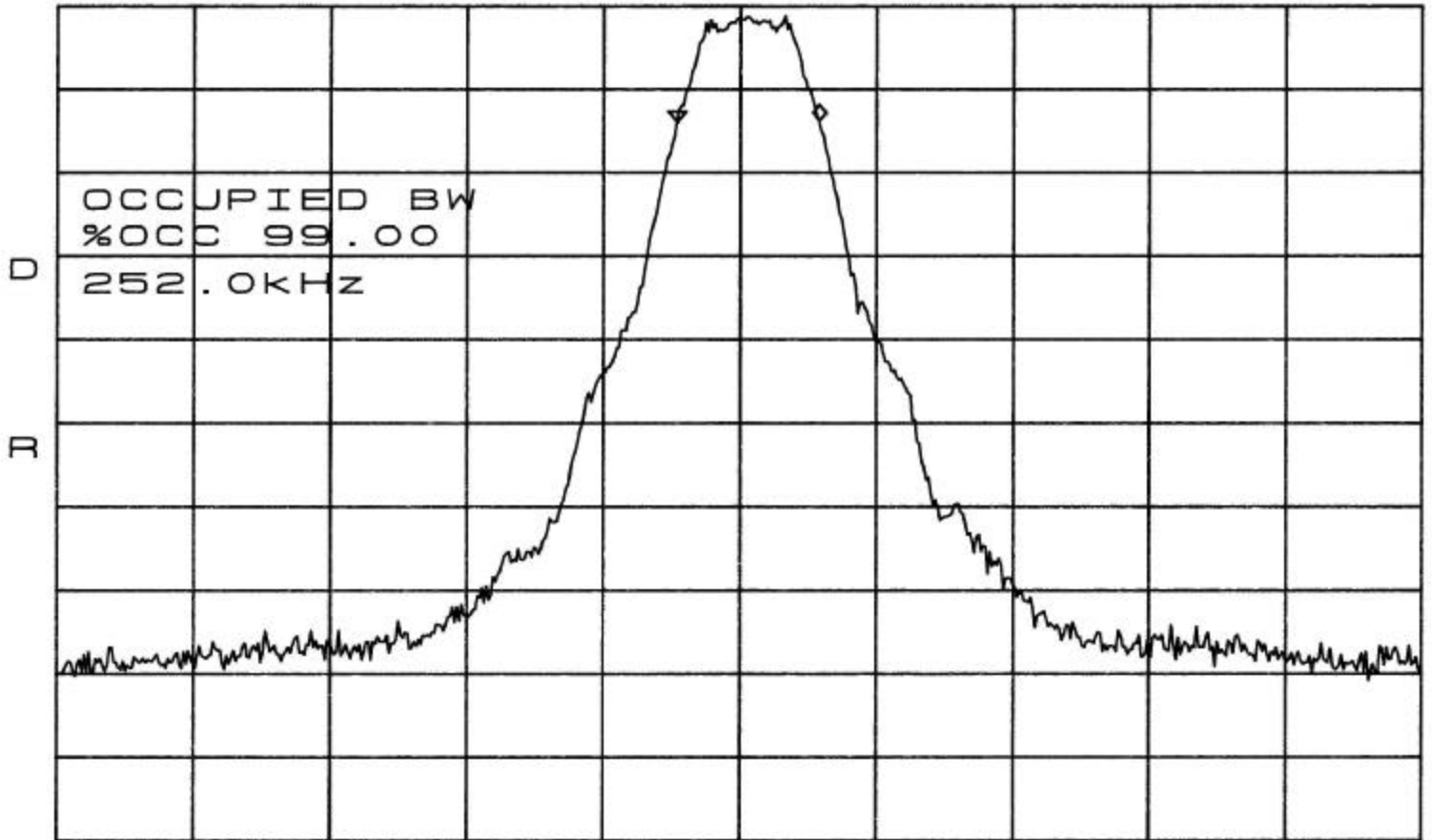
FCC ID: AS5FLX-01
Block C Channel 809

ATTEN 10dB

RL 42.0dBm

ΔMKR .17dB

10dB/ 252kHz



CENTER 1.989600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK D

(1945 – 1950 MHz)

Left Edge: 1945.4 MHz (Channel 588)

Right Edge: 1949.6 MHz (Channel 609)

04 MAY 2000

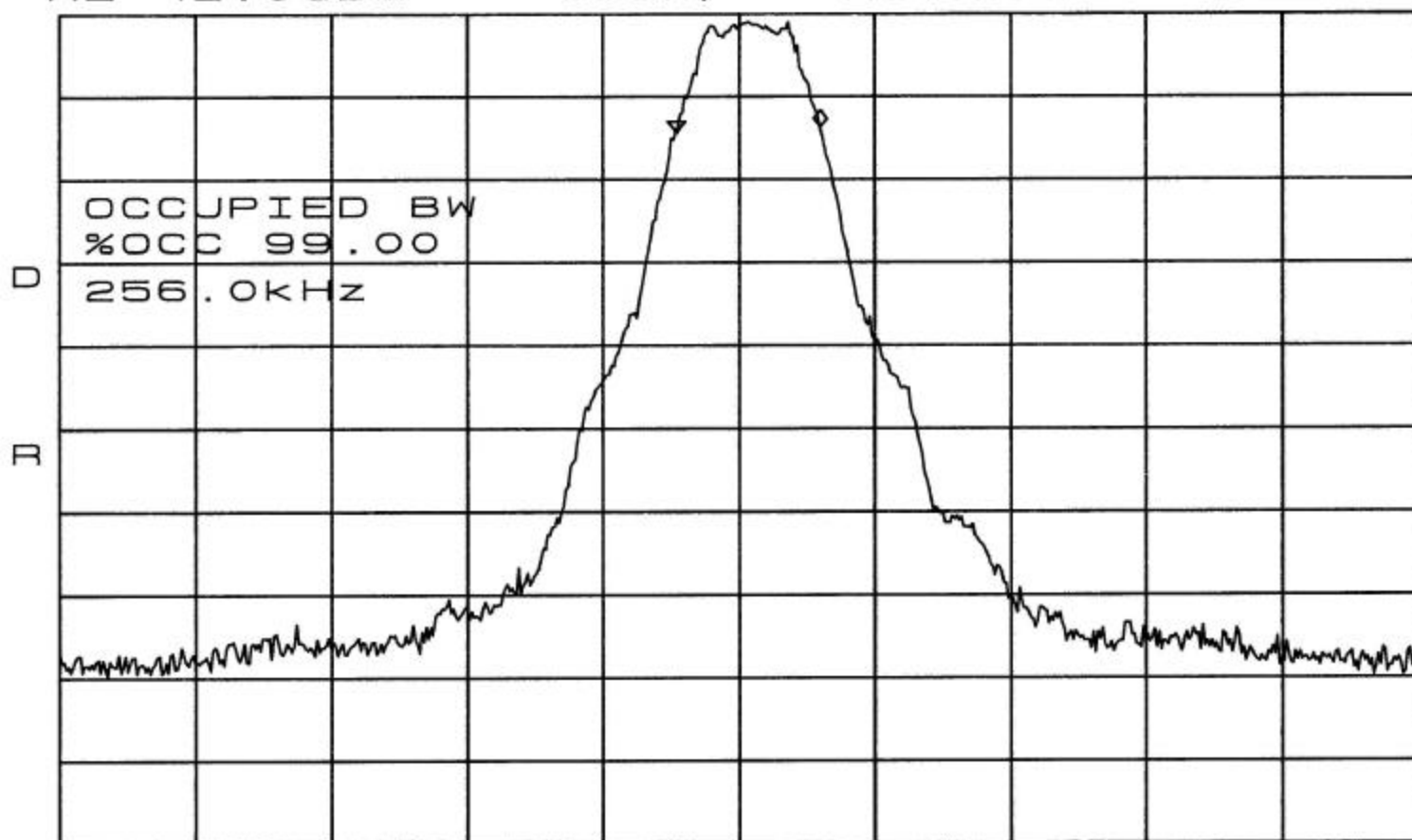
FCC ID: AS5FLX-01
Block D Channel 588

ATTEN 10dB

RL 42.0dBm

Δ MKR .66dB

10dB/
256kHz



CENTER 1.945400GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

04 MAY 2000

FCC ID: AS5FLX-01
Block D Channel 609

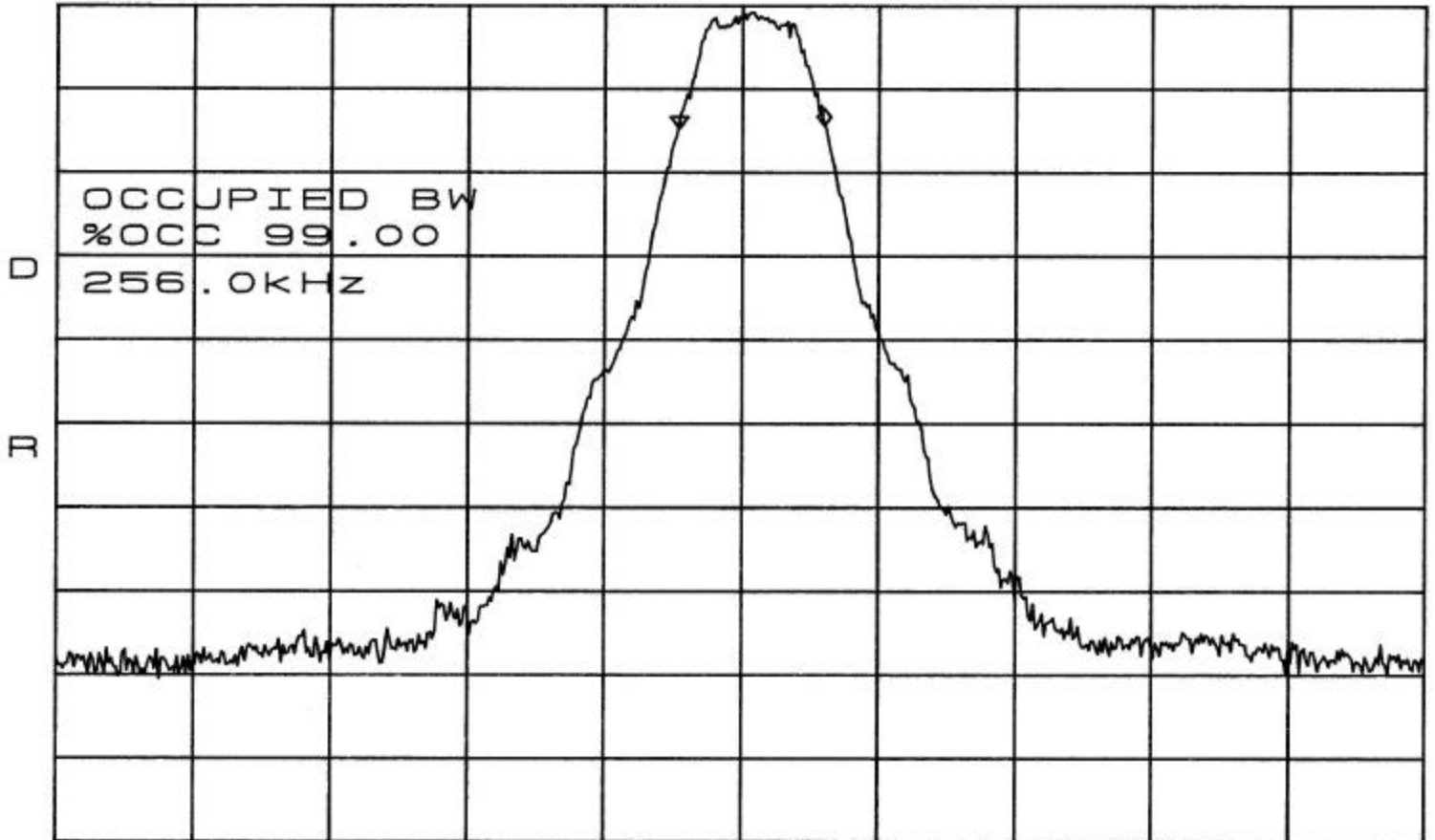
ATTEN 10dB

RL 42.0dBm

10dB/

Δ MKR .34dB

256kHz



CENTER 1.949600GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK E

(1965 – 1970 MHz)

Left Edge:	1965.4 MHz (Channel 688)
Right Edge:	1969.6 MHz (Channel 709)

04 MAY 2000

FCC ID: AS5FLX-01
Block E Channel 688

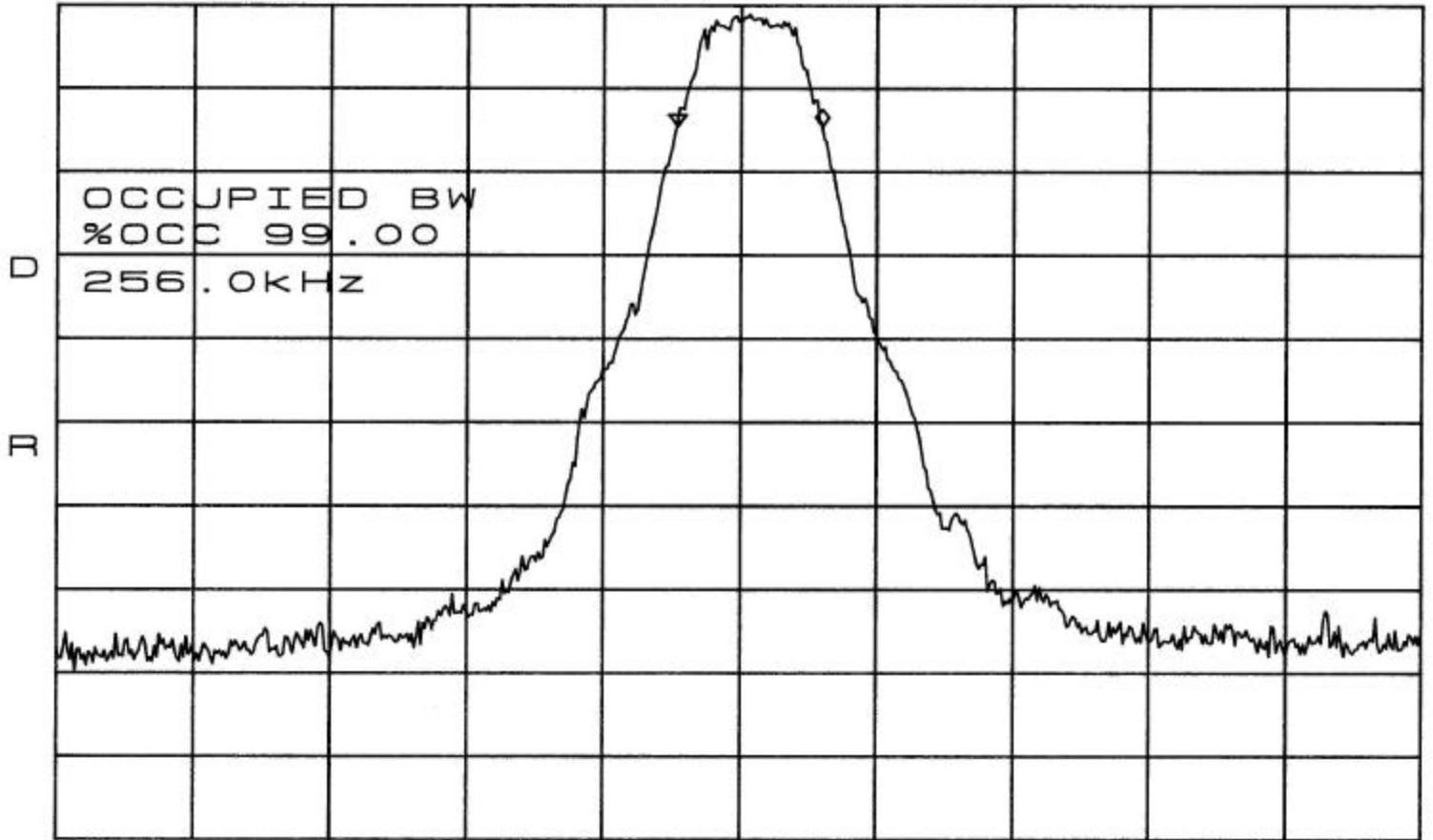
ATTEN 10dB

RL 42.0dBm

Δ MKR 0dB

10dB/

256kHz



CENTER 1.965400GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

SWP 50.0ms

04 MAY 2000

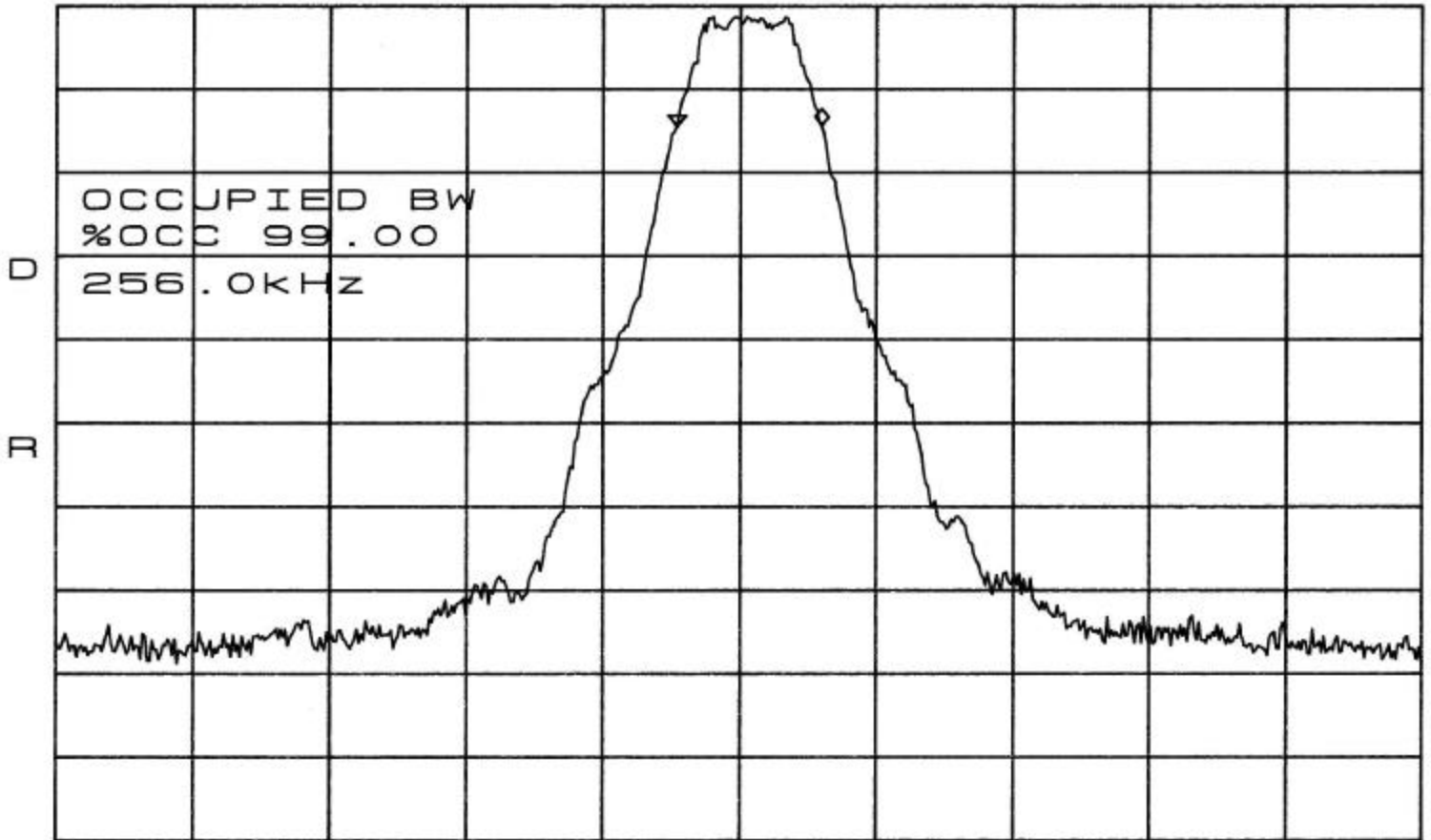
FCC ID: AS5FLX-01
Block E Channel 709

ATTEN 10dB

RL 42.0dBm

Δ MKR .17dB

10dB/ 256kHz



CENTER 1.969600GHz

SPAN 2.400MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

MEASUREMENT: 3A

MEASUREMENT

OF

OCCUPIED BANDWIDTH

99% OF POWER

2 TRX WITH COMBINER

BLOCK F

(1970 – 1975 MHz)

Left Edge:	1970.4 MHz (Channel 713)
Right Edge:	1974.6 MHz (Channel 734)

04 MAY 2000

FCC ID: AS5FLX-01
Block F Channel 713

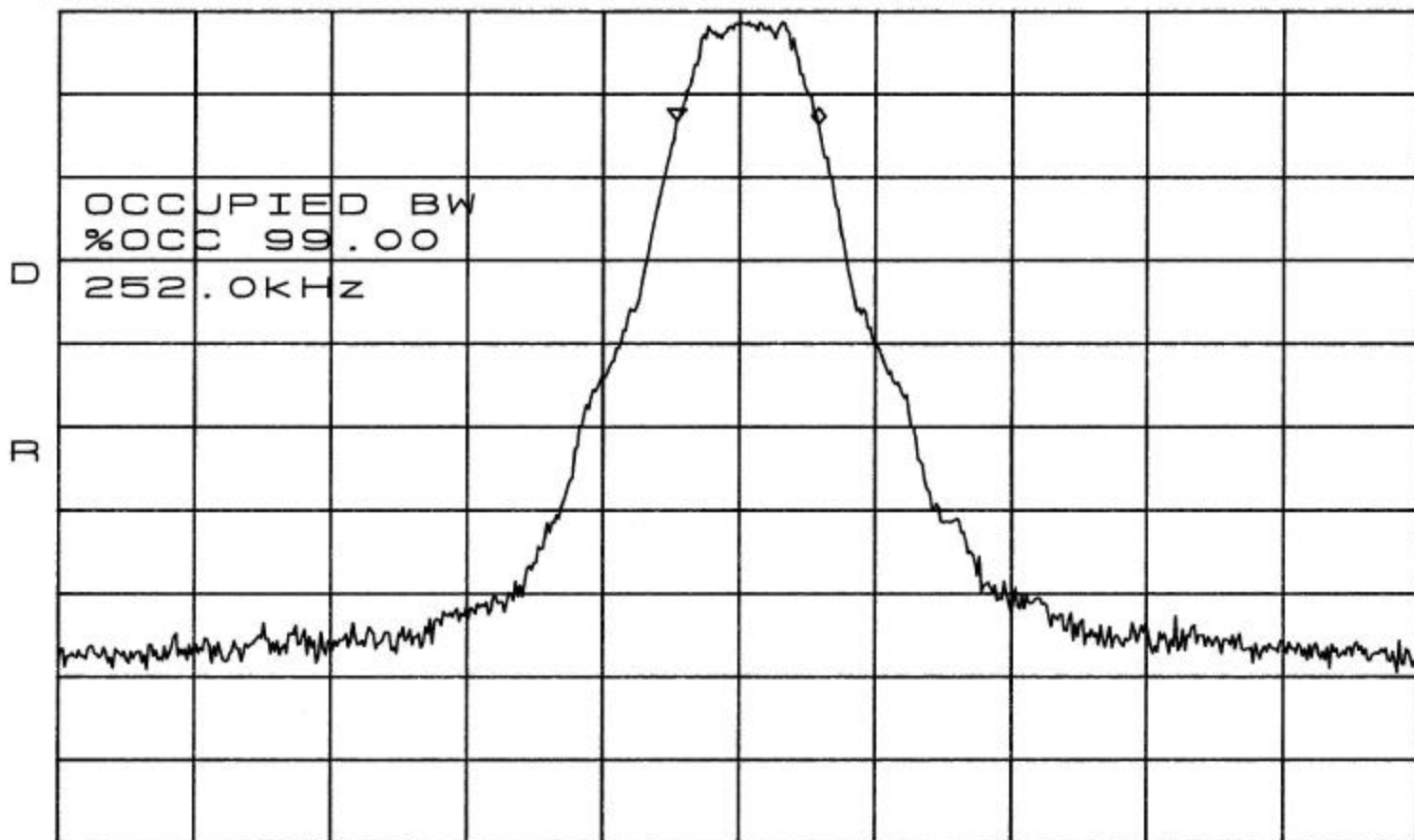
ATTEN 10dB

RL 42.0dBm

ΔMKR -.50dB

10dB/

252kHz



CENTER 1.970400GHz

RBW 30kHz

VBW 30kHz

SPAN 2.400MHz

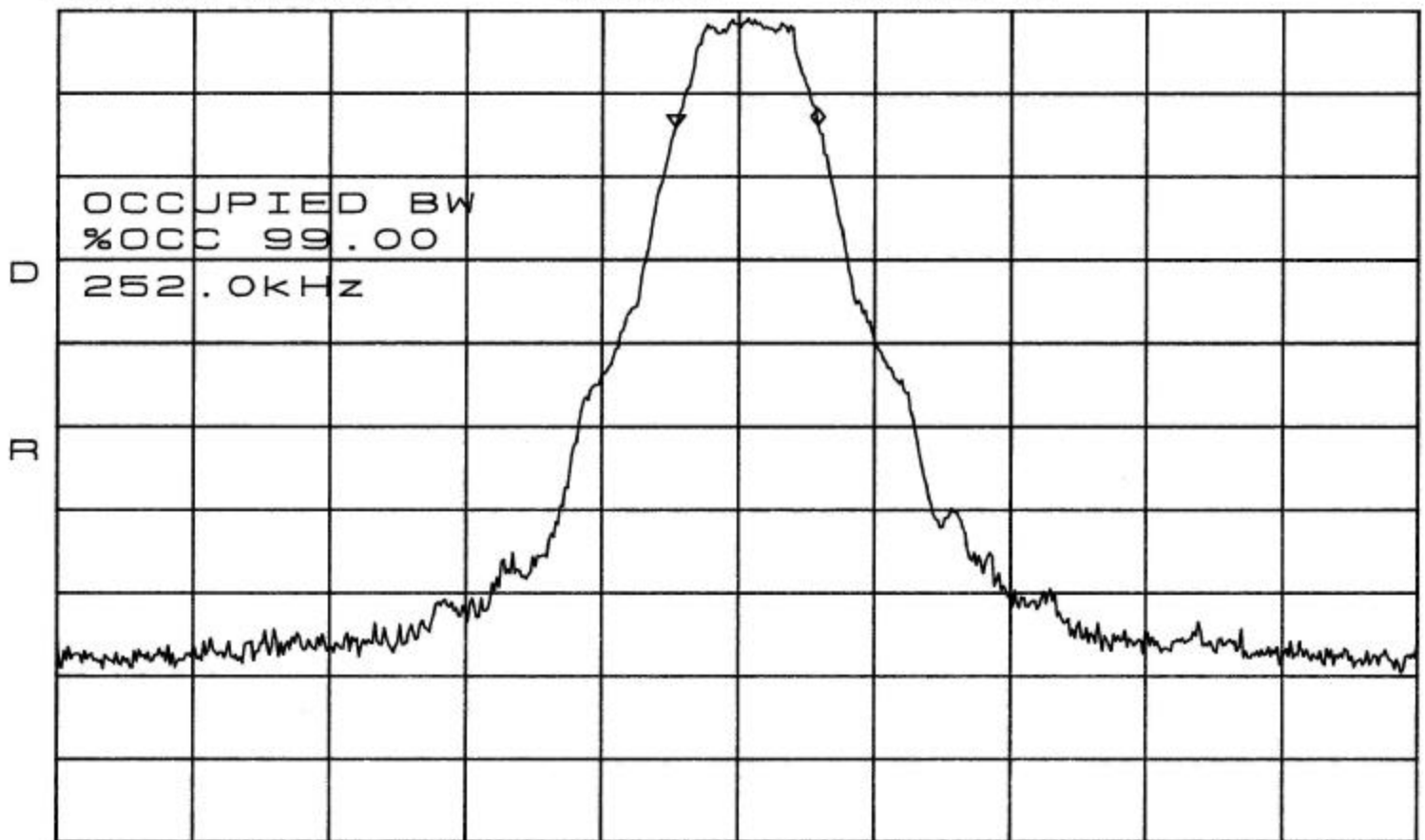
SWP 50.0ms

04 MAY 2000

FCC ID: AS5FLX-01
Block F Channel 734

ATTEN 10dB
RL 42.0dBm

ΔMKR .17dB
10dB/ 252kHz



CENTER 1.974600GHz
RBW 30kHz VBW 30kHz

SPAN 2.400MHz
SWP 50.0ms