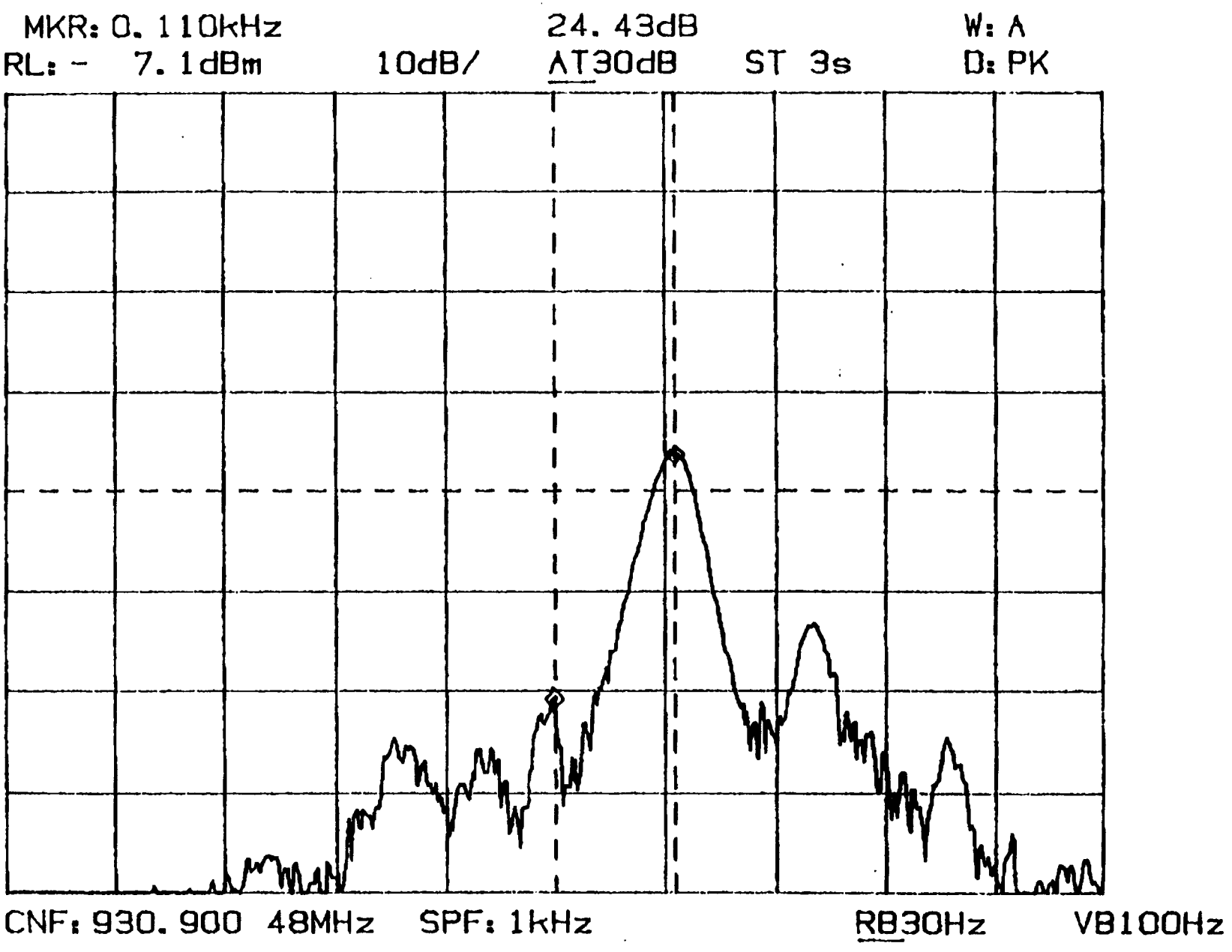
MKR: 0. 110kHz
24. 43dB
W: A
RL: - 7. 1dBm
10dB/
AT30dB
ST 3s
D: PK
CNF: 930. 900 48MHz
SPF: 1kHz
RB30Hz
VB100Hz

Fig. F-9

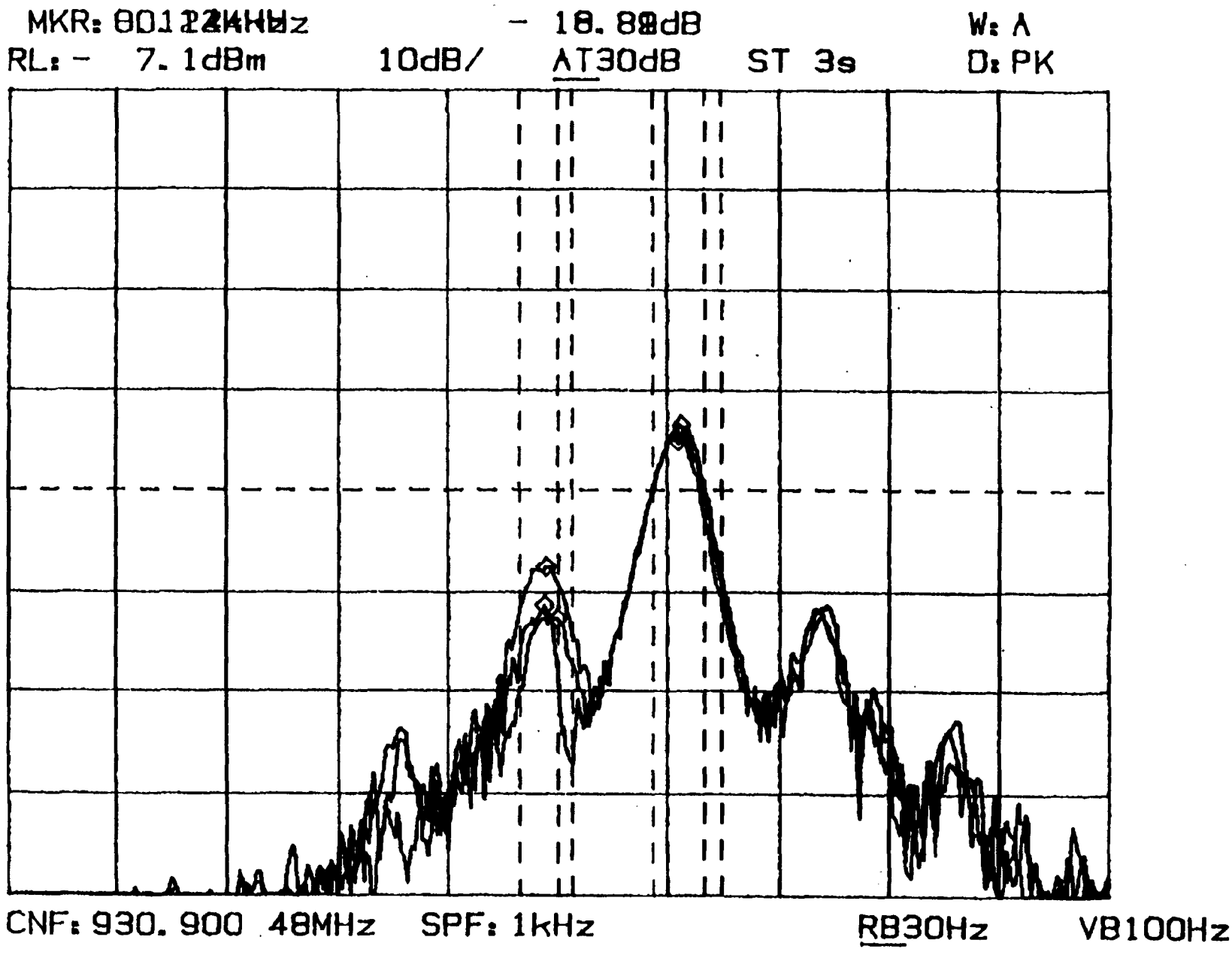
MKR: 801.224kHz
- 18.88dB
W: A
RL: - 7.1dBm
10dB/
AT30dB
ST 3s
D: PK
CNF: 930.900 48MHz
SPF: 1kHz
RB30Hz
VB100Hz

Fig. F-10

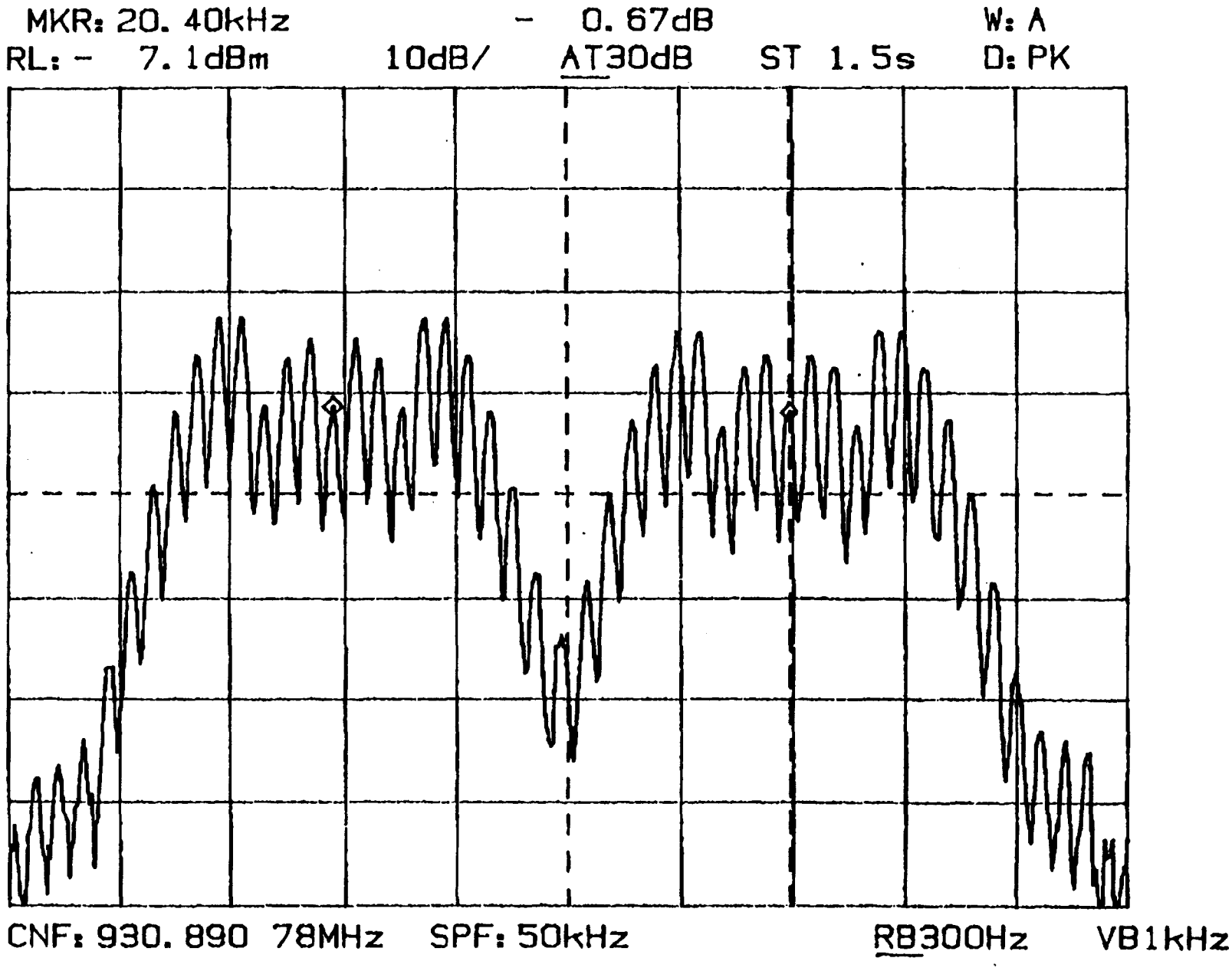
MKR: 20. 40kHz
- 0. 67dB
W: A
RL: - 7. 1dBm
10dB/
AT30dB
ST 1. 5s
D: PK
CNF: 930. 890 78MHz
SPF: 50kHz
RB300Hz
VB1kHz

Fig. F-11

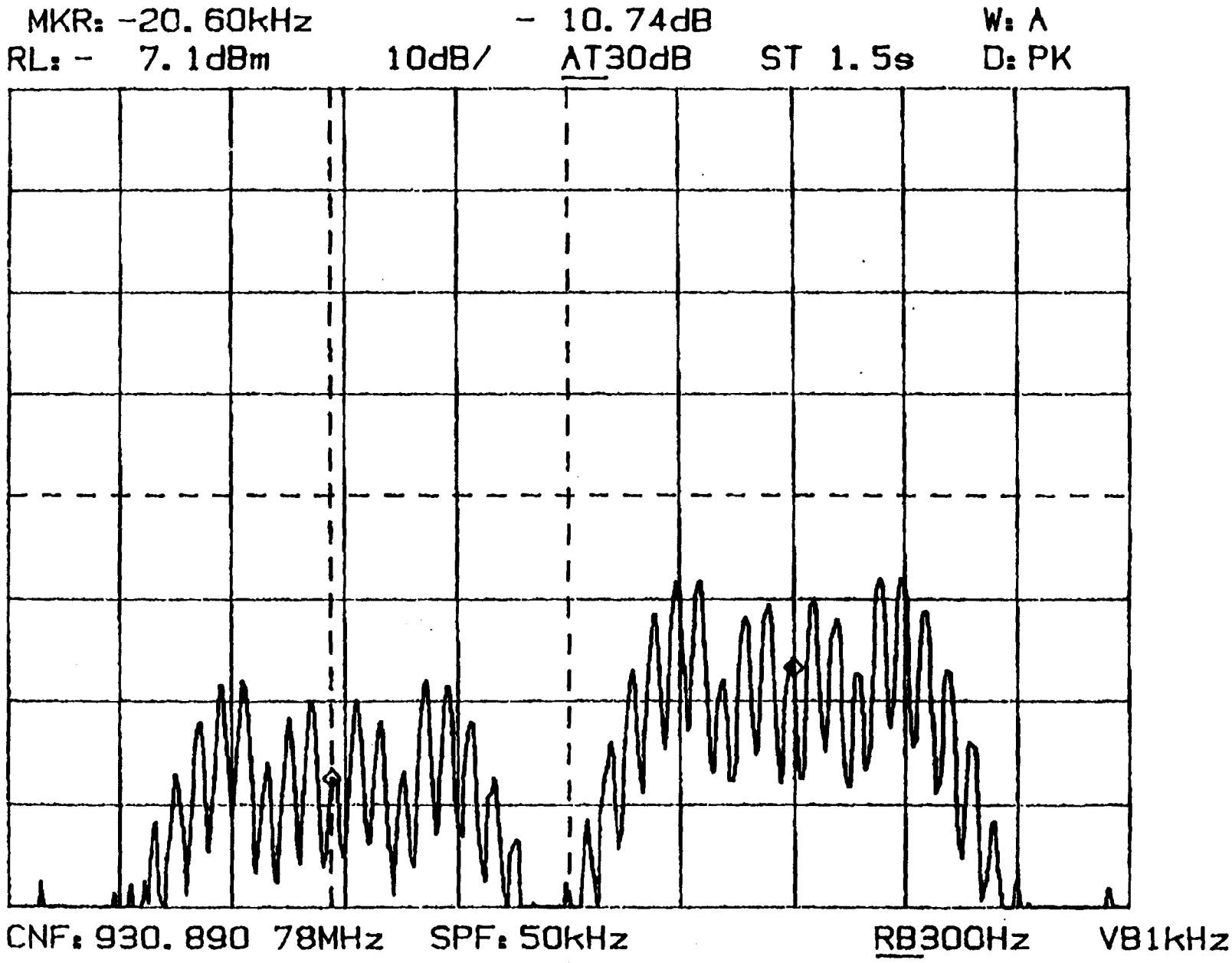
MKR: -20.60kHz
- 10.74dB
W: A
RL: - 7.1dBm
10dB/
AT30dB
ST 1.5s
D: PK
CNF: 930.890 78MHz
SPF: 50kHz
RB300Hz
VB1kHz

Fig. F-12

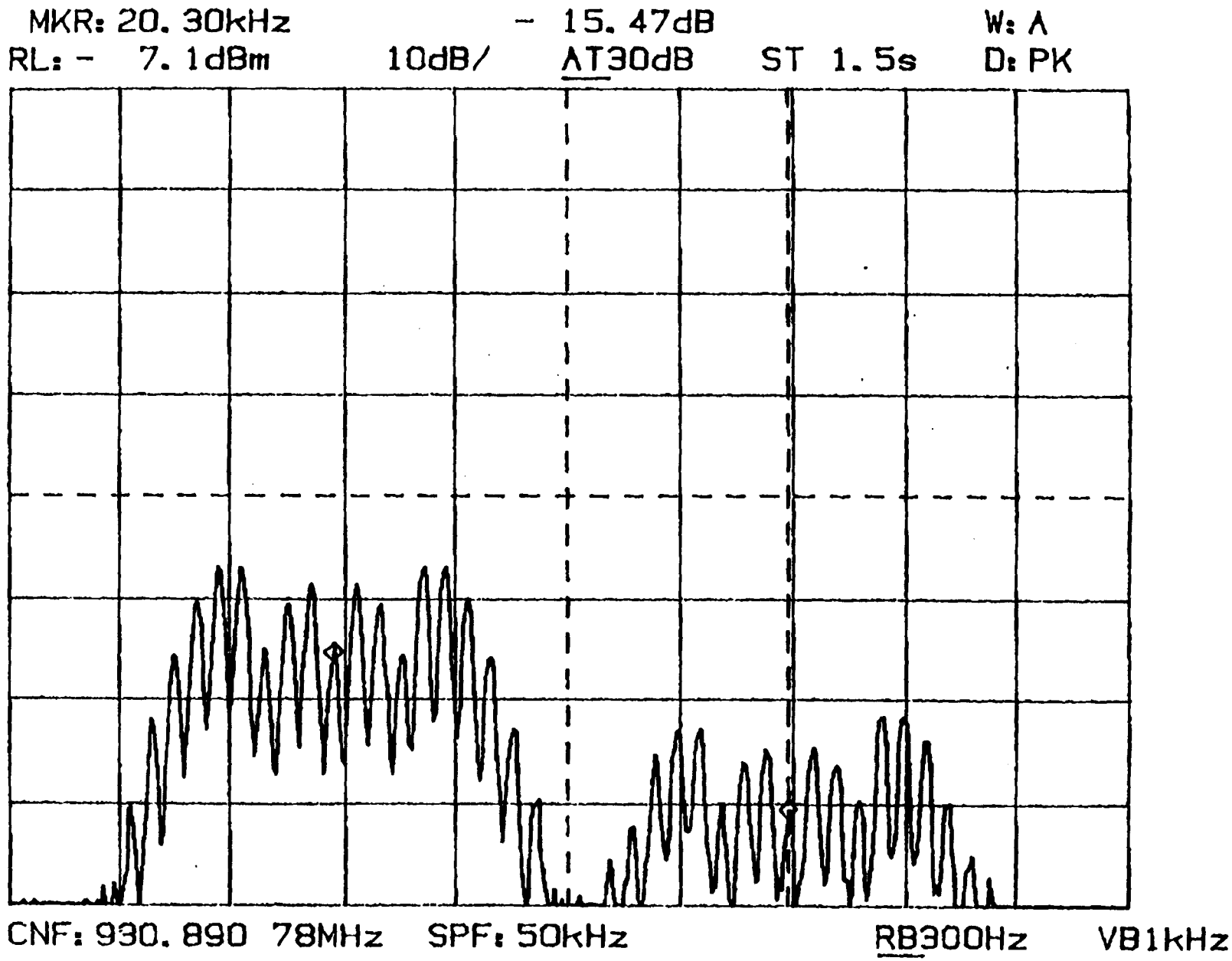
MKR: 20. 30kHz
- 15. 47dB
W: A
RL: - 7. 1dBm
10dB/
AT30dB
ST 1. 5s
D: PK
CNF: 930. 890 78MHz
SPF: 50kHz
RB300Hz
VB1kHz

Fig. F-13

TAB G

Appendix G

Test Results and Examples of Data

During the testing cycle, tests were run in various locations including the lab on campus and locations around the campus and the surrounding area. Two types of data were transmitted and collected: an alphanumeric symbol set and a "canned" word message.

The alphanumeric data consisted of a series of +/- transitions followed by lower case alphabet, numerals 1 through 0 and upper case alphabet. Each line consisted of 80 characters in order to allow the screen to roll into a "waterfall" display to more easily detect errors and to help identify error conditions and analyze the problem.

The word message was repeated continuously and separated by a series of +'s. This was also done with 80 characters per line to get the waterfall effect.

Tests were run continuously and from time to time a screen dump to a printer was done to record data onto paper, although all data were stored on disc files for future analysis. Along with the data, signal strength was recorded and calculated .

The signal strength was calculated by reading the spectrum analyzer, which was hooked up to the second IF of the experimental receiver. Knowing the link budget from the antenna to the IF, an approximate signal strength was derived for each set of data.

A baseline was derived by taking data in the immediate vicinity of each transmitter, where strong signals were present. Figs. G-1 through G-4 show the baseline results for both configurations. As can be seen, no errors are present.

The remaining figures show results taken at various locations throughout the coverage area, including moderate-to-weak simulcast overlap areas. While errors are evident in some of these tests, all data within acceptable signal strength areas have error rates within acceptable limits for error correction.

-21 above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+

Fig. G-1

Site 1, Anderson Hall

Strong Signal

No Detectable Errors

-23 above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+

Fig. G-2

Site 2, Abbeville Tower

Strong Signal

No detectable Errors

```
-25 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstu
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHI
+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-
nopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
WXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghij
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz123456
+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQ
-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+
pqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
BCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
Z$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklm
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890A
+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXY
fghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-
4567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
RSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcde
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz123
+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQ
+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-
vwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
JKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstu
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGH
```

Fig. G-3

Site 1, Anderson Hall

Strong Signal

No detectable Errors

```
-25 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrst
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGH
+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+
nopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+
ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
WXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghi
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz12345
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOP(
-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-
pqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
BCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
Z$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijkl
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890
+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWX
fghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+
4567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
RSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcde
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz12
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOP(
+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-
vwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
JKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstu
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGH
```

Fig. G-4

Site 2, Abbeville Tower

Strong Signal

No Detectable Errors

-24 above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in ordeP to test the robustneWs of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h noWerror correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
 overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+

Fig. G-5

Approximately Midway Between Sites

Signal Strength Apporx. 7dB Above Threshold

Site 2 Approx. 3dB Stronger Signal

No Apparent Errors

```
18 stuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
CDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
XYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghij
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567
-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQ
+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+
rstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
EFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklm
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz12345678
-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTU
-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-
vwxyz1234567890ABCDEFGHIJKLMNOoQySTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
GHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnop
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890A
+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWX
cdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-
z1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
LMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrs
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEF
+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ
ghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-
```

Fig. G-6

Approximately 3 M From Site 2, 4 M From Site 1

Signal Strength Approx. 14 dB above Threshold

Approx. Equi-signal

No Errors

```
-18 jklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-
)cdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-
·+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+
-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-
-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-
-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1K34567890ABCDEFGHIJKLMNOPQRSTUVWXYZ
+-+-+-+-+-+-+-+-+-+-+-+abcdefg0i4k+mn!pqrstuvwxyz1234567o90ABCDEFGHIJKLMNOPQRSTU
-+-+-+-+-h-+-+-f-+-+-+-+-+-lab9qefKhijklgnopqrspuvwxyz1234567890ABCDEFGHIJ2LMN6P
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEvGHIJKL
+-f-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+B+p+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFG
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-^-+-+abcdefghijklmnopqrstuvwxyz123456e890AB
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstu¥wxyz123456n8
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1K3
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwx
-+-+-+-+-+-+-+-J-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrst
^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmno
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+p+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890
+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVW
bcdefghiNklmnopqrstuvwxyz1¥34567890ABCDEFGHIJKLMNOPQySTUVWXYw$^-+-+Bf-+-+-+-+-+-
wxyz1234567890ABCDEFGHIJ2LMNOP-RSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
KLMNOPQRSTUVWXYZ$2-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
6-+aj+Q+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstloxyzF¦456P8
YW+-+-+-+-+-+-+abcdefghijklmeopqrsXuvwxyz1¥3/5t790rCdEWGHIJKLMNkPQRSTUVWXY1$^-+-
cdefghijklmnopqrstucwxyzZ23456789qABaEFZHG+GONOPQRSTUVWtwZ$^-+-+-+-+-+-+-+-+-+
```

Fig. G-7

Same as Fig. G-5

Transmitters Un-synchronized

Error Rate Approx. 10^{-4}

20 above. In the overlap areas, the message is being sent with synchronized an unsynchronized transmissions to prove the receiver is in an overlap area and t prove simulcast capabilities.+

-+++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit no error correction, received in weak and strong signal areas and in simulcast overlap areas. Error correction is not used in order to test the robustness of ie code. This preprogrammed message will be repeated in each of the areas menti ied above. In the overlap areas, the message is being sent with synchronized an unsynchronized transmissions to prove the receiver is in an overlap area and t prove simulcast capabilities.+

-+++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit no error correction, received in weak and strong signal areas and in simulcast overlap areas. Error correction is not used in order to test the robustness of ie code. This preprogrammed message will be repeated in each of the areas menti ied above. In the overlap areas, the message is being sent with synchronized an unsynchronized tr!nsmissions to prove the receiver is in an overlap area and t prove simulcast capabilities.+

+++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit no error correction, received in weak and strong signal areas and in simulcast overlap areas. Error correction is not used in order to test the robustness of ie code. This preprogrammed messageQwillWbe repeated in each of the areas menti ied above. In the overlap areas, the message is being sent with synchronized an unsynchronized tranCmissions to prove the receiver is in an overlap area and t prove simulcast capabilities.+

Fig G-8

Approx. 1 Mile From Site 1 - In Motion (40 MPH)

Signal Strength Approx. 20 dB above Threshold

Error Rate Approx. 10^{-5}

-24 above. In the overlaS ,n7AR, tl7ymessneH2BqHagkaQzWfntRwi3h snRchr8nized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilipies.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal arnas anb Bq sxmulaank
ov7rlap arG7sY Trror 913recUgon BCW,Pt vResWin ¦PE7r 3o 3esSHoh¦ Un!6dpned4zo!¥
tygB9ouxkizlevX1+++++++ThjsRKasC4reaUw3+l be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver isYin an overlnS awgUmaovZX
¦ Yob67QqHdudS¦4t xepAbiderigR..
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be rex!abeahePexng2sbn,Vot.brS07 7eonB
pngV aboqe. KnKthe overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o pr8Xe simulcast capabilities.+
+++++++This is a test of NWN messaging being sent over the air at 24,000 BPS wit
h no error correction, received in weak and strong signal areas and in simulcast
overlap areas. Error correction is not used in order to test the robustness of
the code. This preprogrammed message will be repeated in each of the areas menti
oned above. In the overlap areas, the message is being sent with synchronized an
d unsynchronized transmissions to prove the receiver is in an overlap area and t
o prove simulcast capabilities.+

Fig. G-9

Approx. Equi-distant - In Motion (40 MPH)

Signal Strength At/Bellow Threshold

High Error Rate For Parts of Message, Some Error Free

```
8 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABC
-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWX
fghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-
1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
MNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstu
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEF
+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-
hijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-
567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
OPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvw
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGH
+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-
lmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-
890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
UVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdef
-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLM
-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+
pqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
0ABCDEFGHIJKLMNOPQRSTUVWXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
WXYZ$^-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefgh
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz123
```

Fig. G-10

Appox. Equi-distant (Simulcast)

Strong signal, Approx. 25 dB above Threshold

No Errors.

```
-20 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrs
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuFwxyz1234567890ABCDE
-+-+-+-+-+-+-+-+-+-+abcdefghijklmnopqrstuvwxyz1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ
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Fig. G-11

Approx. 3 Miles From site 2, (20MPH)

Signal Approx 6 dB above threshold - Unisignal

Error Rate Approx 10^{-4}

TAB 2

Arthur D Little

Quantitative Demand Assessment for Nationwide Wireless Network (NWN) Services

Final Report to Mobile Telecommunication Technologies

December, 1992

Arthur D. Little, Inc.

Reference: 42518

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In support of Mobile Telecommunication Technologies' (Mtel) request for spectrum to operate a Nationwide Wireless Network (NWN), market research was undertaken which included:

1. Sizing of the NWN market among both individual business buyers (individual employees or workers) and centralized corporate buyers (e.g., MIS or Communications Managers)
2. Assessing service requirements in terms of message length for buying segments
3. Assessing the relative attractiveness of NWN offerings on a local, a regional, and on a nationwide base
4. Examining the relationships between NWN and acknowledgement paging

Two sets of statistically projectable surveys were undertaken to address these questions:

1. A survey of 800 individual buyers
2. A survey of 401 corporate decisionmakers

The results suggest the following:

1. The markets for NWN and for acknowledgement messaging are quite sizeable in both the near-term (five years) and after ten years of service

2. Individual buyers will dominate demand for NWN offerings – this is probably due, in part, to systems integration requirements in larger firms

3. Marketing and distribution efforts should be focused first on developing the market for NWN among individual buyers

4. Findings from both individual surveys and corporate surveys support the notion that users require relatively short messages

5. Corporate buyers anticipate shorter messages, but greater message traffic than individual buyers

6. Analysis of buyer preference for nationwide, regional and local NWN offerings suggests substantial preference for nationwide offerings – this preference is found among both individual and corporate buyers, but is more pronounced in the corporate sector

In November 1991, Mobile Telecommunication Technologies (Mtel) filed a request with the Federal Communications Commission (FCC) for spectrum to operate a Nationwide Wireless Network (NWN)

- NWN will provide users with two-way messaging capability using small terminals, laptop/palmtop PCs or electronic personal organizers
- The underlying platform can provide capabilities for relatively long messages (including fax and E-mail) offered by NWN as well as brief acknowledgement type messages (as in acknowledgement paging)
- Modest spectrum allocation was requested
- NWN offerings provide nationwide service coverage in which "messages find the users"

A program of market research was undertaken to develop a quantitative picture of the market among both individual and corporate buyers – the objectives of this work included:

1. Sizing of the NWN market among both individual business buyers (individual employees or workers) and centralized corporate buyers (e.g., MIS or Communications Managers)

2. Assessing service requirements in terms of message length for buying segments

3. Assessing the relative attractiveness of NWN offerings on a local, a regional, and on a nationwide base

4. Examining the relationships between NWN and acknowledgement paging