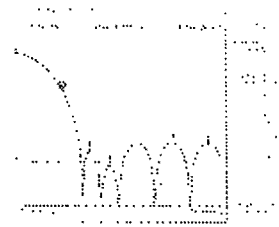


SYSTEM TESTING
FOR
RENDA BROADCASTING
CORKSCREW SITE
MAY, 2006

Gary A. Minker
Radio Works, R. F. Consulting
7225 Catalina Isle Drive
Lake Worth, Florida 33467
Office 561 969-9245
Fax Call to Request
E-mail gary@Radioworksrfconsulting.com

Radio Works R.F. Consulting

Renda Broadcasting
Mr. Jerry Heckerman C.E.
10915 K-Nine Drive
Bonita Springs, Florida 34135
(239) 495-8383



May 5, 2006

Dear Jerry,

Thank you for the opportunity to assist you with the measurements of the new installation of your station on the Carpowitz tower in Corkscrew Swamp. We were called in to make the 302 series of measurements on the newly combined stations with the Beasley group. The stations involved were:

96.1	WRXX
101.9	Gator Country
103.9	WXKB

This installation posed a particular set of problems in that there is no active way to monitor the signals being fed in to each half of the antenna system. This lack of sample portals of any kind make it almost impossible to monitor the health of the antenna and the system operation. This is a hazardous situation given that there is a nominal 105 KW running out of this combiner and being split 50/50 to the upper and lower halves of the antenna.

Lacking the usual sample portals for direct measurements, field readings were necessitated. A testing set up was assembled and a location about 1 Km north of the tower was selected for its vantage point, signal level, lack of obstructions and safety. As this is a three station combined system, a basic intermodulation study was run and utilizing up to the third harmonic and A+B A-B and A+B-C calculations, 83 potential trouble spots on the band were identified by the computer run. Spectrum analysis was performed and the results were very good.

Protocol:

Once the spot was chosen for the measurements the following list of equipment was used

- IFR COM-120B Spectrum Analyzer
- Potomac Instruments calibrated dipole
- Narda precision attenuator
- Par custom made shelving filter
- Antenna stand
- Various cables
- Laptop computer
- Solid state DC/AC inverter

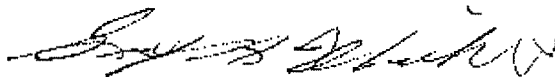
The test system was assembled and a selected value of variable attenuator was set to achieve a top of scale relative zero level for the strongest carrier. Measurements of the primary carrier band were taken and stored in various window widths to show the activities in the band of actual stations. Attention was paid to intermod components that appeared on the calculations sheet. Interspersed with the typical 1 MHz wide window screen prints, were center frequency traces of the 3 involved stations to show clarity of carrier and non interference to adjacent carriers. Screen traces were stored up to 120 MHz and the test set up was revised to discard the attenuator so as to increase the sensitivity of the spectrum analyzer above 120 MHz. During the testing the dipole was adjusted to proper physical dimensions to adjust for frequency curve stability. The 9dB pad was removed and the shelving filter was installed in its place. This filter effectively filters the entire FM band with a very sharp filter roll out at 113 MHz. This 30 dB roll off ensures that full sensitivity may be utilized in the search for unwanted spectral products. Traces were then shot from 115 to 355 MHz so as to show the various encountered R.F. products that the horizontal dipole received. Among the carriers received was a tremendous amount of Aviation traffic and, Television signals. As the dipole was horizontal, a 20 dB rejection of any stray 2-way radio signals was inserted, hence the distinct lack of presence of these types of signals in the majority of the traces, particularly in the VHF business bands.

Once the trace run was complete, deliberate center frequencies were set on the spectrum analyzer with demodulation so as to attempt to insure that there were indeed no concerns about the presence of 2nd and 3rd order harmonics. 2nd harmonics were not demodulatable down to a level exceeding -90 dB below carrier and in some cases 3rd order harmonics were not demodulatable below -104 dB below carrier.

I certify that all equipment utilized in the measurements of this system are in good condition and have up to date calibration testing for accuracy.

If you have any questions about this report, please feel free to call my office at any time. The traces shot are included in this report and should be noted that the initial traces are made with 9 dB of pad inserted which given the gain of the dipole and the inherent losses of the cables, an effective 9 dB of loss may be factored in to the traces recovered. The traces marked "shelf" as the prefix, are with no attenuation as well as the nominal insertion loss of 1 dB given the testing set up and insertion of the shelving filter.

Thank you



Gary A. Minker

BAND 1 TRACES
9dB PAD UTILIZED
NO SHELIVING FILTER

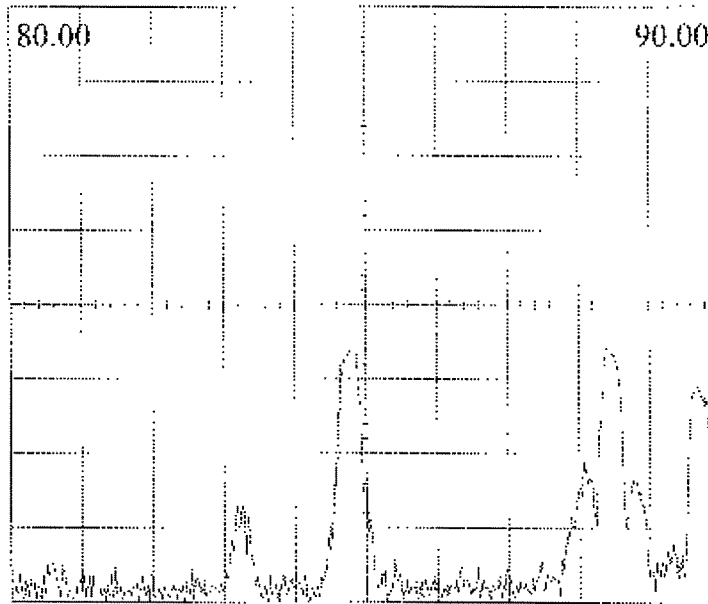
Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 85.00 300 80 TO 90 MHz
MHz/Div MHz kHz Res 05/04/2006 20:31:58

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 88.3968

Peak Level: -65.8

Radio Works R.F. Consulting

COM-120B

Serial # 1176

0.0

90.00

300

85 TO 95 MHZ

kHz/Div

MHz

kHz Res

05/04/2006 20:32:54

dBm

-20

-30

-40

-50

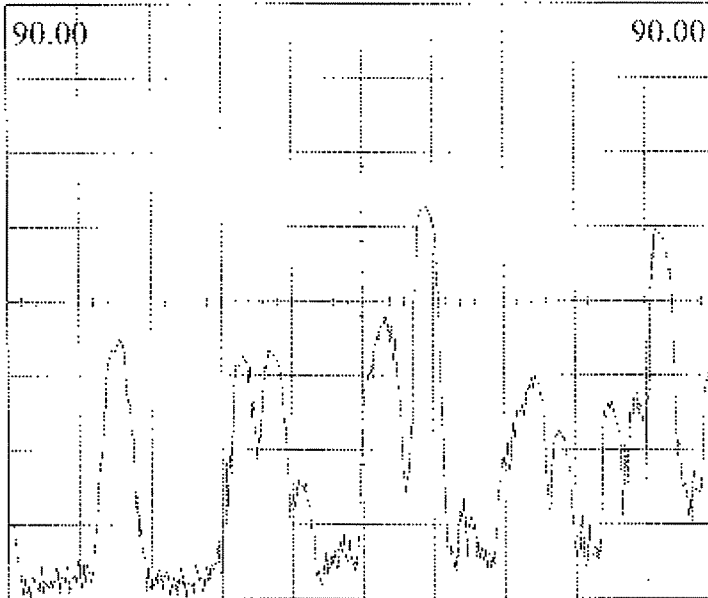
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 90.

Peak Level: -47.29

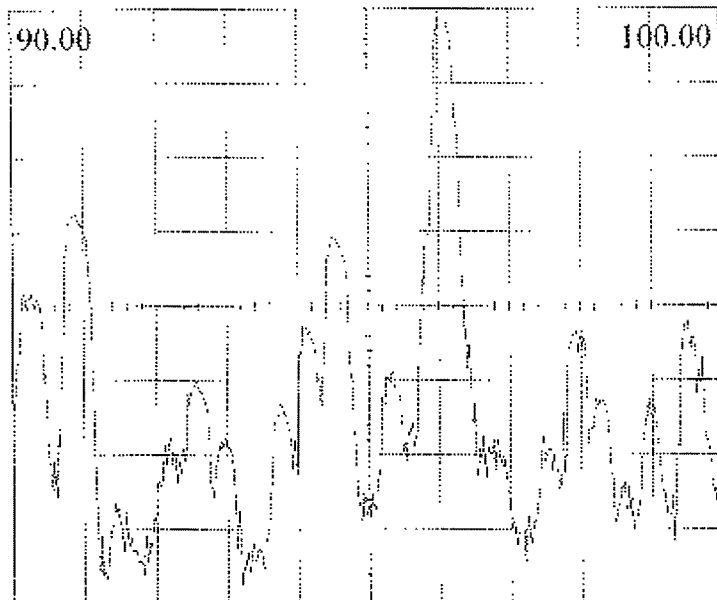
Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 95.00 300 90 TO 100 MHz
MHz/Div MHz kHz Res 05/04/2006 20:33:37

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen n/a dBm

5 mSecs

Peak Freq: 96.0321

Peak Level: -20.94

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm
-20

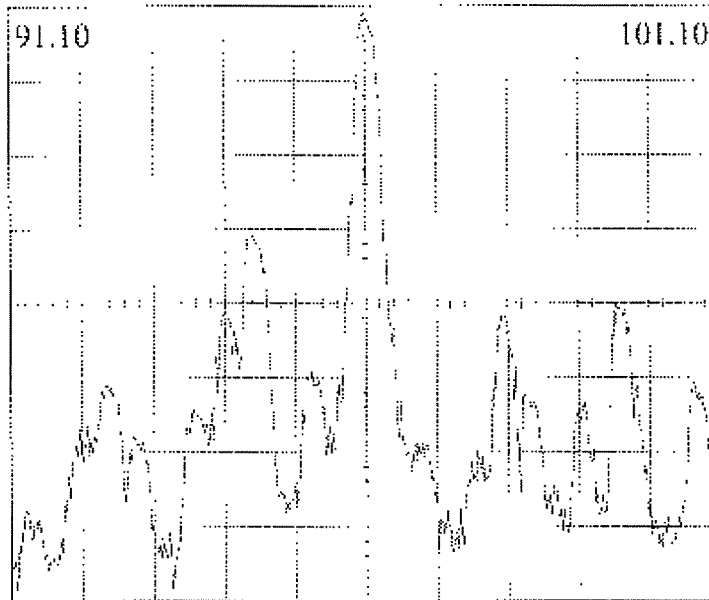
1
MHz/Div

96.10
MHz

300
kHz Res

96.1 CENTER
05/04/2006 20:34:12

-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 96.09

Peak Level: -20.94

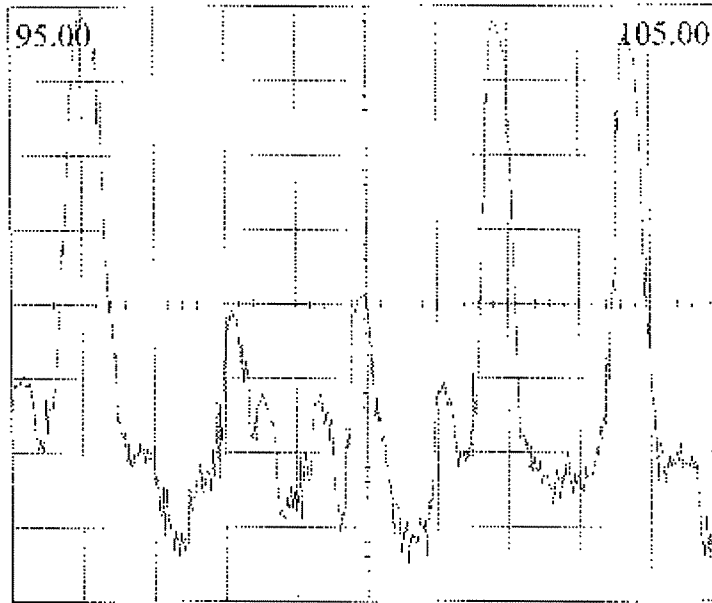
Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 100.00 300 95 TO 105 MHz
MHz/Div MHz kHz Res 05/04/2006 20:34:36

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 96.022

Peak Level: -21.25

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

0.0

105.00

300

100 TO 110 MHz

kHz/Div

MHz

kHz Res

05/04/2006 20:35:18

-20

-30

-40

-50

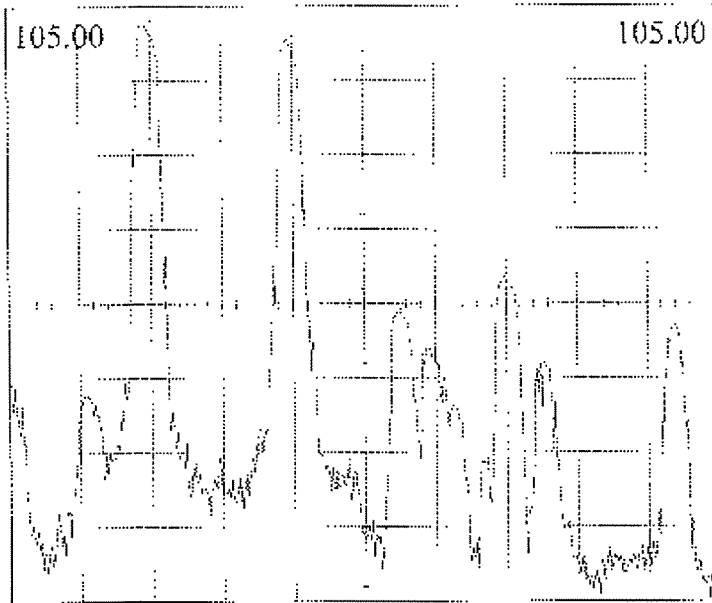
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 105.

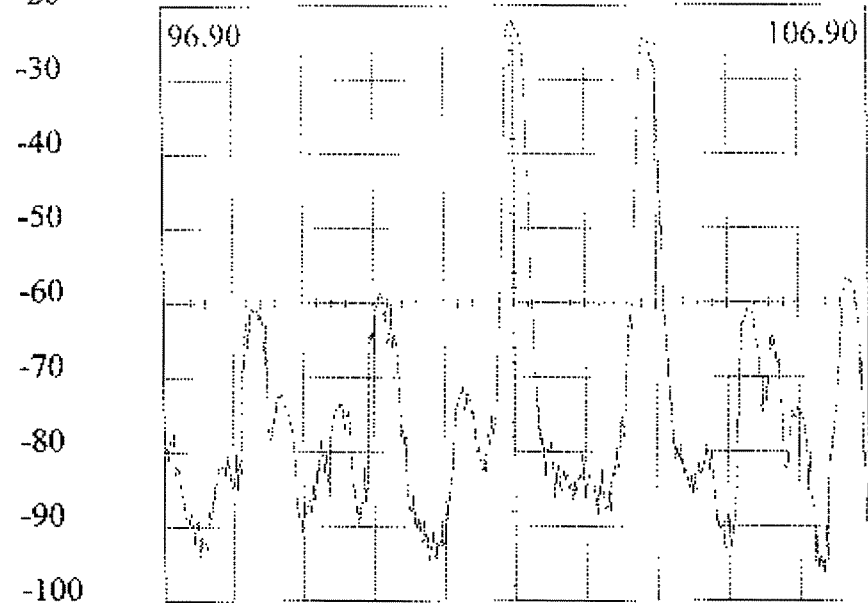
Peak Level: -22.2

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 101.90 300 101.9 CENTER
MHz/Div MHz kHz Res 05/04/2006 20:35:53



dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 101.8699

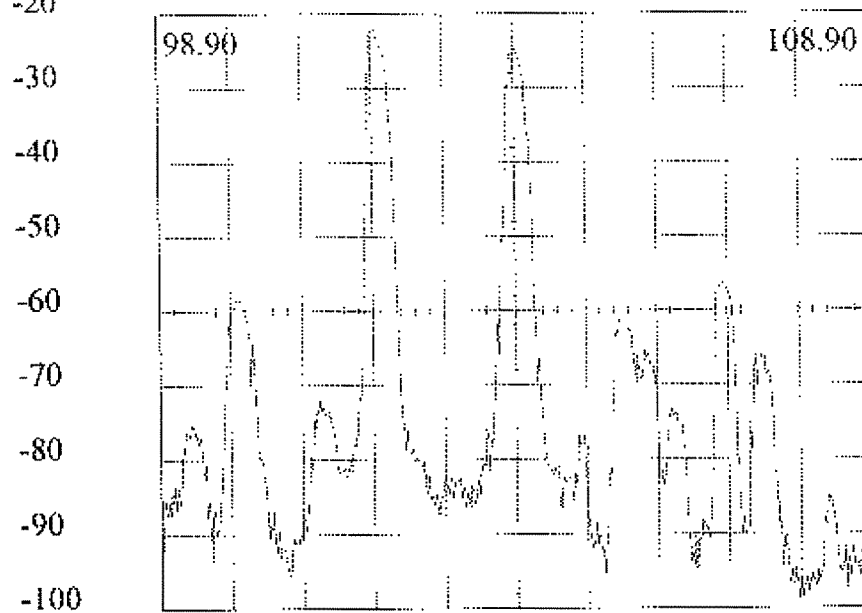
Peak Level: -21.88

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 103.90 300 103.9 CENTER
MHz/Div MHz kHz Res 05/04/2006 20:36:29



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 101.9461

Peak Level: -21.88

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm
-20

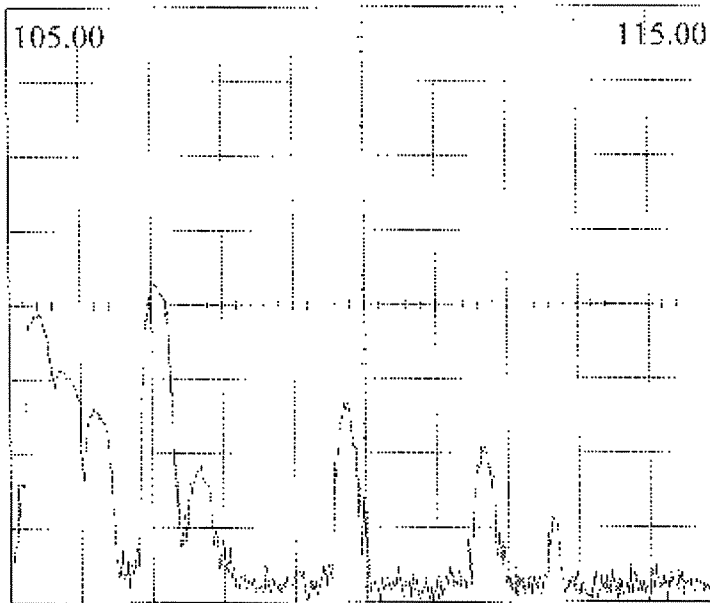
1
MHz/Div

110.00
MHz

300
kHz Res

105 TO 115 MHz
05/04/2006 20:37:15

-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mScos

Peak Freq: 107.0641

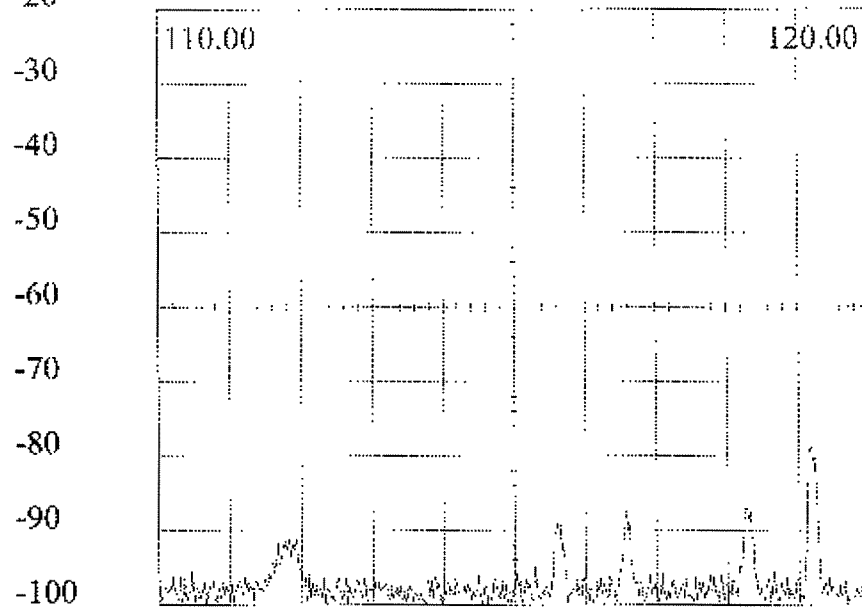
Peak Level: -57.02

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 115.00 0 110 TO 120 MHz
MHz/Div MHz Hz Res 05/04/2006 20:37:56



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 119.1784

Peak Level: -78.35

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm
-20

1
MHz/Div

120.00
MHz

300
kHz Res

115 TO 125 MHz
05/04/2006 20:38:39

-30

-40

-50

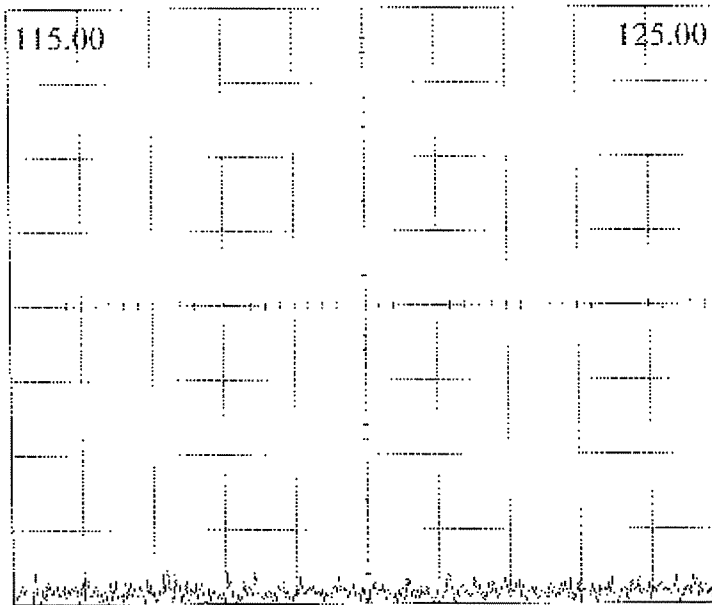
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 117.1844

Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1
MHz/Div

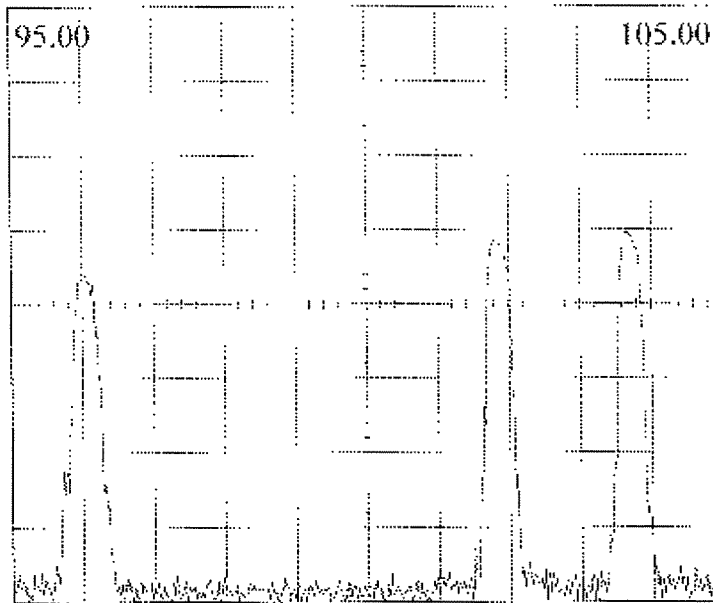
100.00
MHz

300
kHz Res

REF TR FILT NO PAD

05/04/2006 20:52:57

-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

0 mSecs

Peak Freq: 103.6573

Peak Level: -50.43

BAND 2 TRACES
NO PAD INSERTED
SHELVING FILTER
UTILIZED

Radio Works R.F. Consulting

COM-120B

Serial # 1176

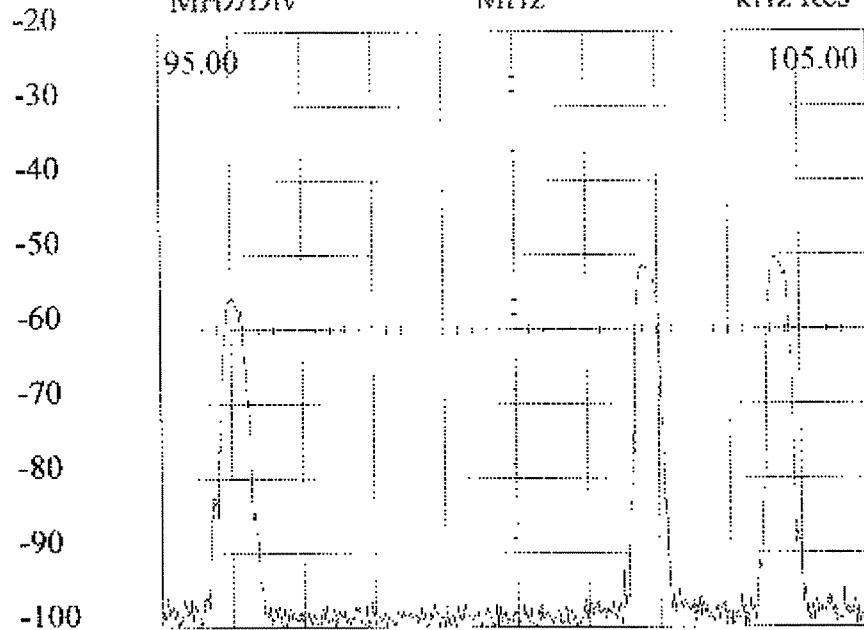
dBm

1
MHz/Div

100.00
MHz

300
kHz Res

REF TR FILT NO PAD
05/04/2006 20:52:57



0 dB Attn

Gen --- dBm

0 mSecs

Peak Freq: 103.6573

Peak Level: -50.43

NO PAD, SELF AT -30 SEE TRACE FOR REF
AT 80 DB WINDOW

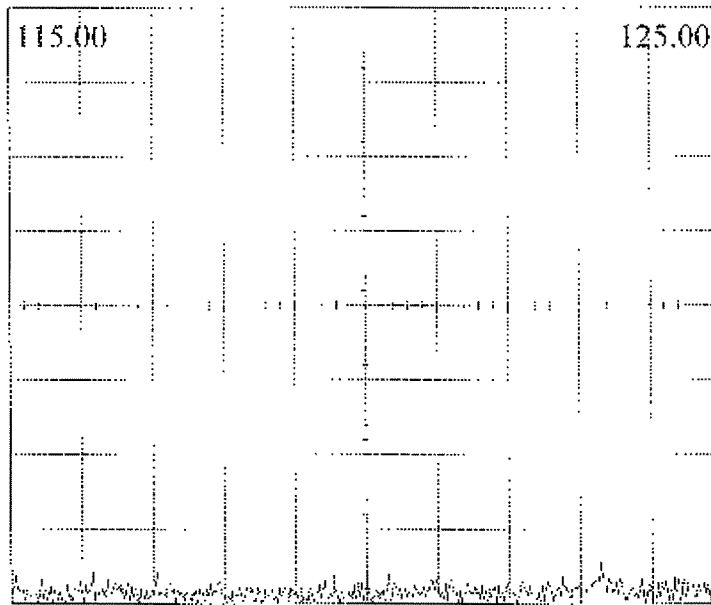
Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 120.00 300 SHELF 115 TO 125
MHz/Div MHz kHz Res 05/04/2006 20:57:36

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 123.2966

Peak Level: -94.35

Radio Works R.F. Consulting

COM-120B

Serial # 1176

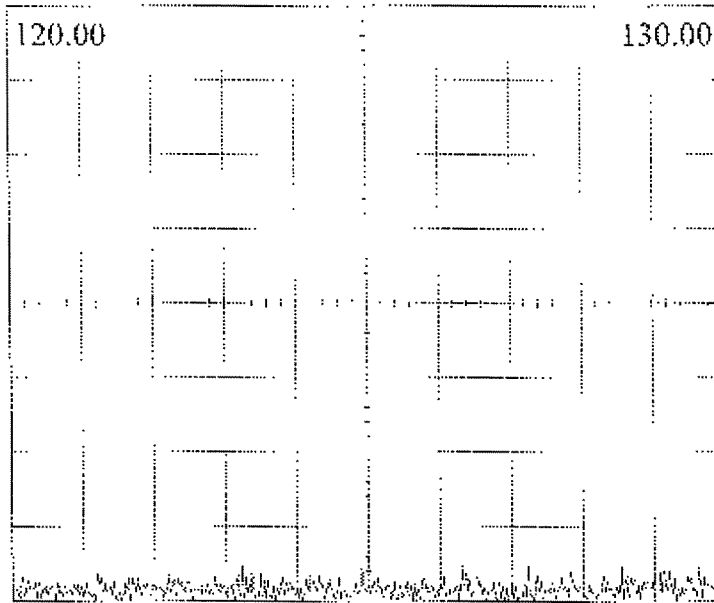
dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100

1
MHz/Div

125.00
MHz

300
kHz Res

SHELF 120 TO 130
05/04/2006 20:59:19



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 124.9098

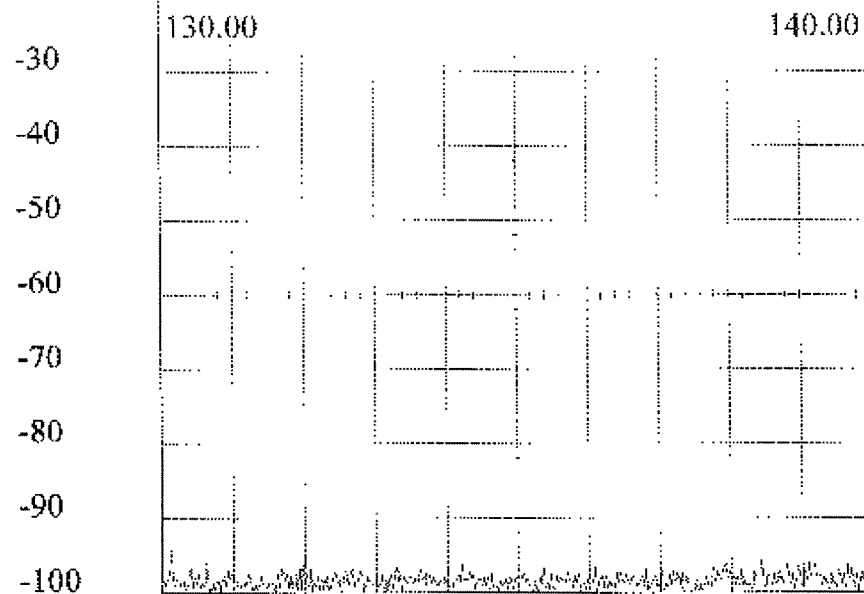
Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 135.00 300 SHELFL 130 TO 140
MHz/Div MHz kHz Res 05/04/2006 20:59:55



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 130.1202

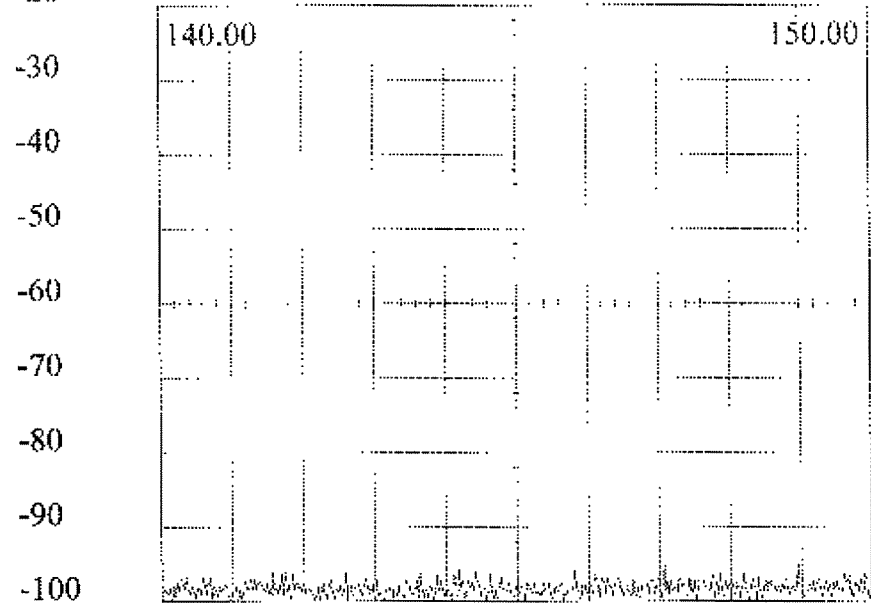
Peak Level: -94.04

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 145.00 300 SHELFB 140 TO 150
MHz/Div MHz kHz Res 05/04/2006 21:00:22



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 147.0741

Peak Level: -94.04

Radio Works R.F. Consulting

COM-120B

Serial # 1176

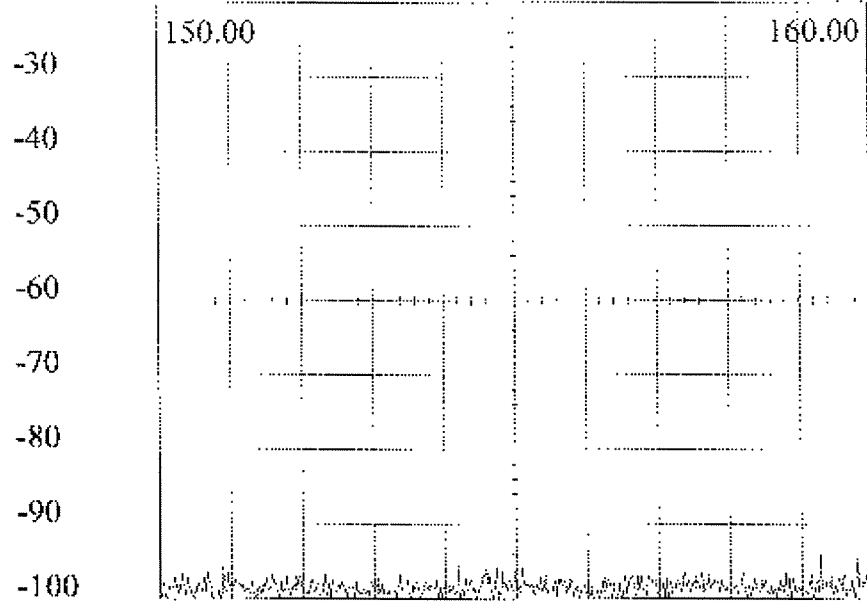
dBm
-20

1
MHz/Div

155.00
MHz

300
kHz Res

SHELF 150 TO 160
05/04/2006 21:00:50



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 159.2786

Peak Level: -93.73

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

175.00

300

SHELF 170 TO 180

MHz/Div

MHz

kHz Res

05/04/2006 21:02:54

-20

-30

-40

-50

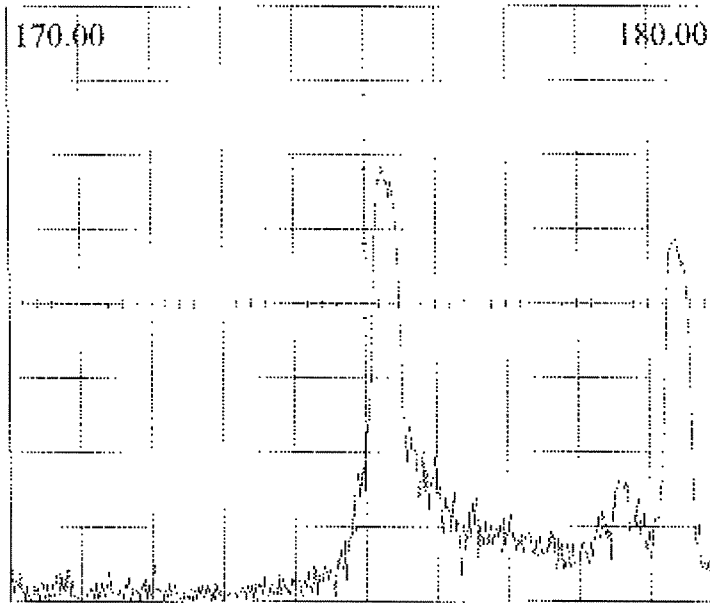
-60

-70

-80

-90

-100



dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 175.2505

Peak Level: -41.33

Radio Works R.F. Consulting

COM-120B

Serial # 1176

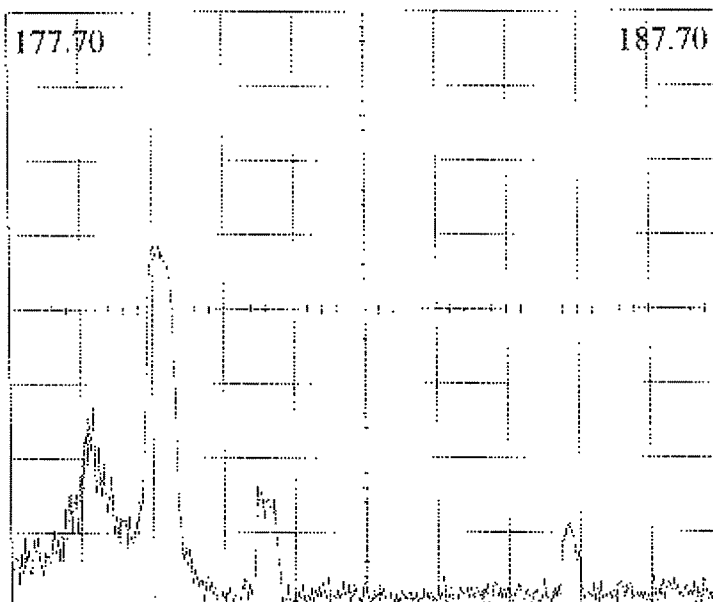
dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100

1
MHz/Div

182.70
MHz

300
kHz Res

SHELF SHOW DIST TV
05/04/2006 21:05:04



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 179.8042

Peak Level: -51.06

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

195.00

300

SHELF SHOW LOC TV

MHz/Div

MHz

kHz Res

05/04/2006 21:06:00

-20

190.00

200.00

-30

-40

-50

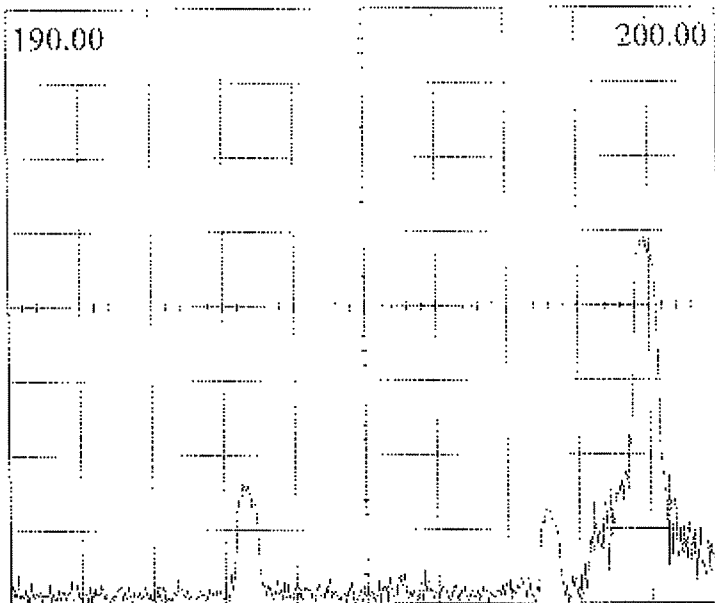
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 198.9579

Peak Level: -50.43

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

202.00

300

SHELF LOC TV

MHz/Div

MHz

kHz Res

05/04/2006 21:06:54

-20

-30

-40

-50

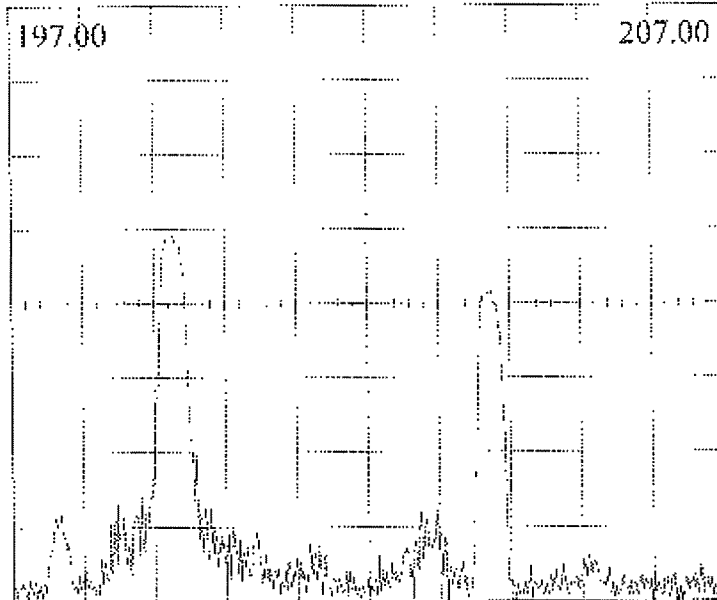
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 199.2846

Peak Level: -50.75

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

215.00

300

SHRLE LOC TV

MHz/Div

MHz

kHz Res

05/04/2006 21:09:16

-20

210.00

220.00

-30

-40

-50

-60

-70

-80

-90

-100

0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 211.2425

Peak Level: -74.9

Radio Works R.F. Consulting

COM-120B

Serial # 1176

0.0

225.00

300

SHELF 220 TO 230 MHz

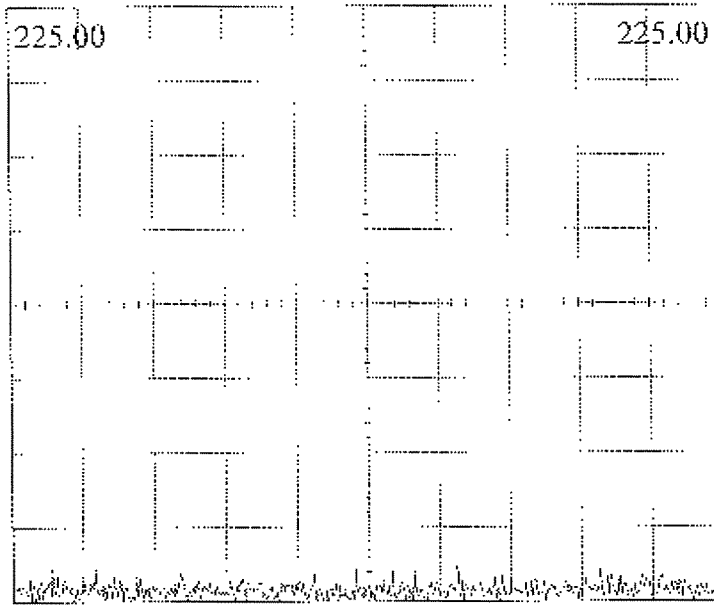
kHz/Div

MHz

kHz Res

05/04/2006 21:09:37

-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 225.

Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

235.00

300

SHELF 230 TO 240 MHz

MHz/Div

MHz

kHz Res

05/04/2006 21:10:15

-20

-30

-40

-50

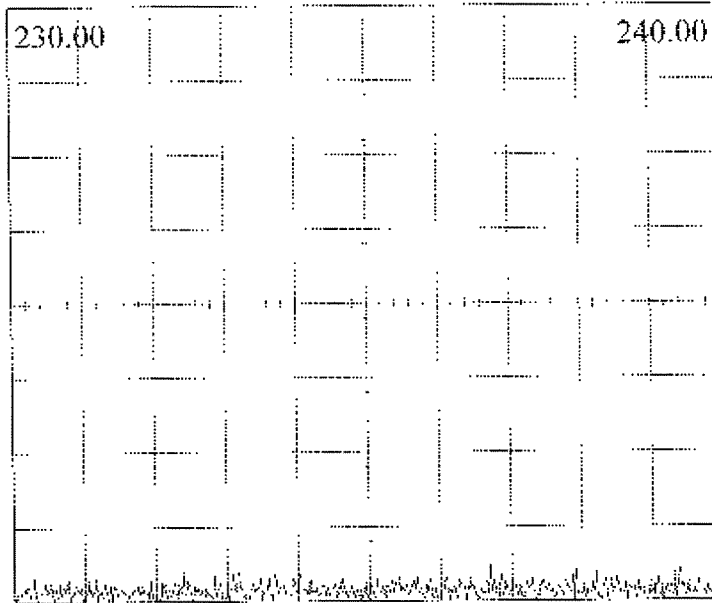
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 236.7134

Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

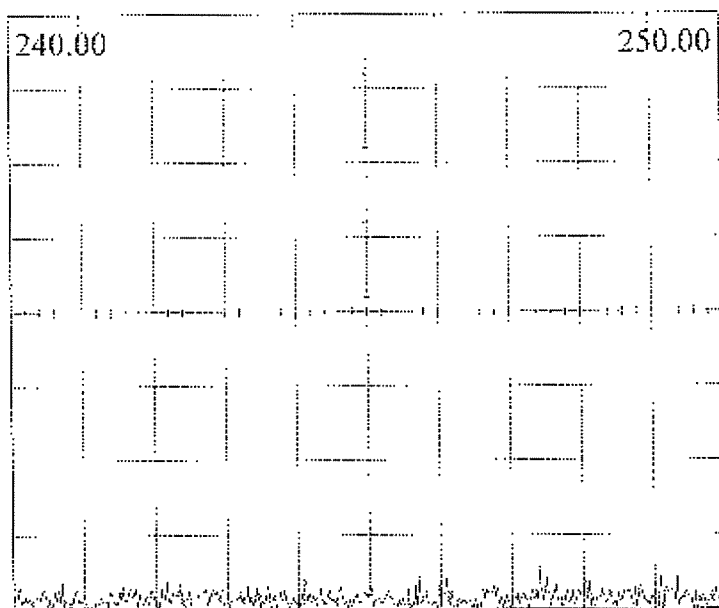
1
MHz/Div

245.00
MHz

300
kHz Res

SHELF 240 TO 250 MHZ
05/04/2006 21:10:40

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 247.3948

Peak Level: -94.35

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1
MHz/Div

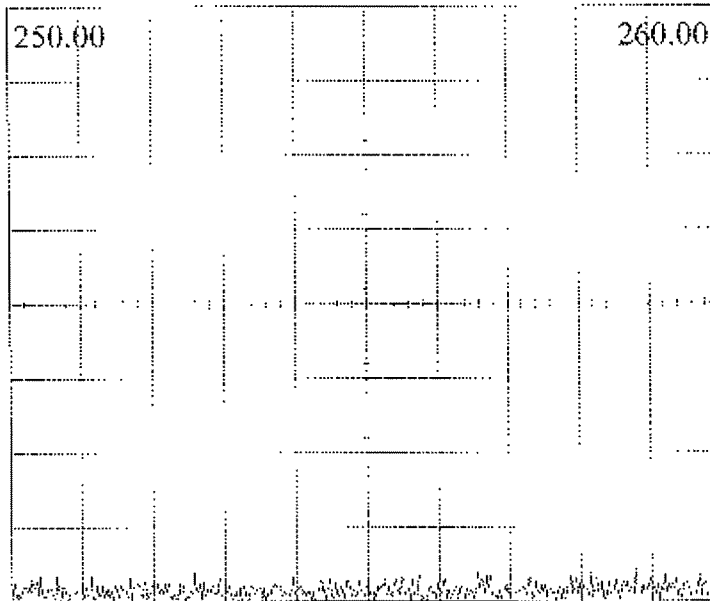
255.00
MHz

300
kHz Res

SHELF 250 TO 260 MHz

05/04/2006 21:10:59

-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 258.7776

Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1
MHz/Div

265.00
MHz

300
kHz Res

SHBLF 260 TO 270 MHz

05/04/2006 21:11:23

-20

-30

-40

-50

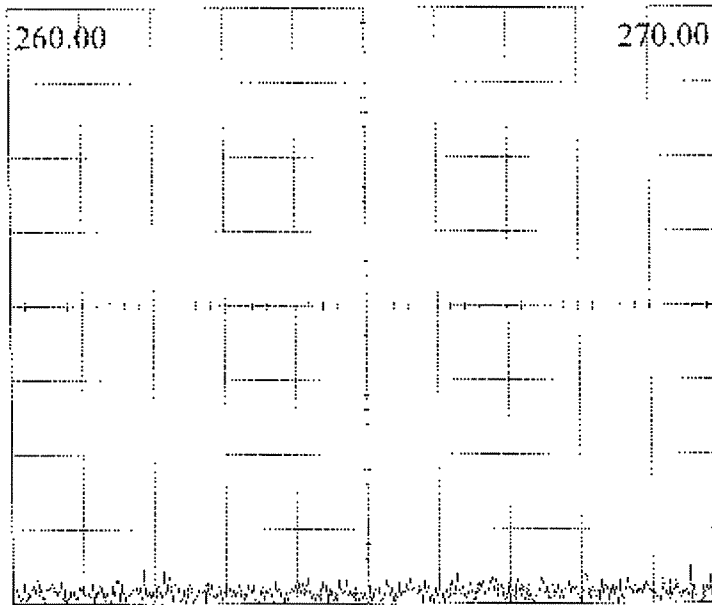
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 269.5391

Peak Level: -94.67

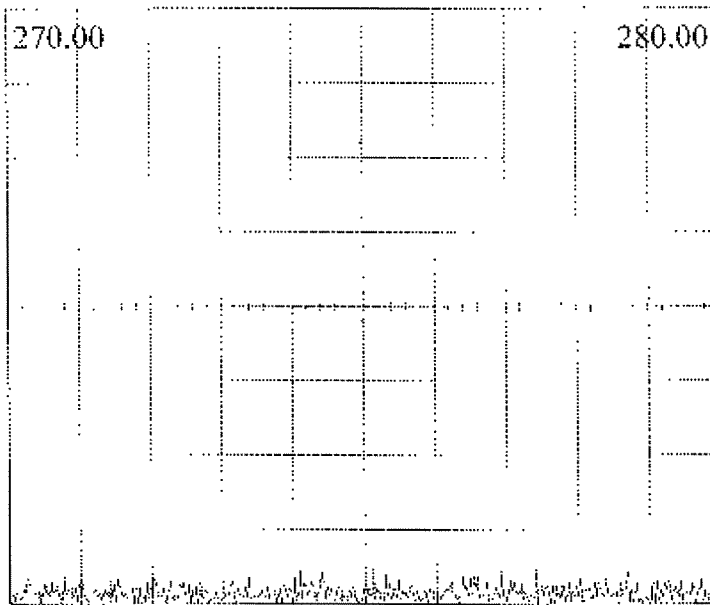
Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 275.00 300 SHELFB 270 TO 280 MHz
MHz/Div MHz kHz Res 05/04/2006 21:13:52

dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 275.1303

Peak Level: -94.67

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

285.00

300

SHELF 280 TO 290 MHZ

MHz/Div

MHz

kHz Res

05/04/2006 21:14:17

-20

-30

-40

-50

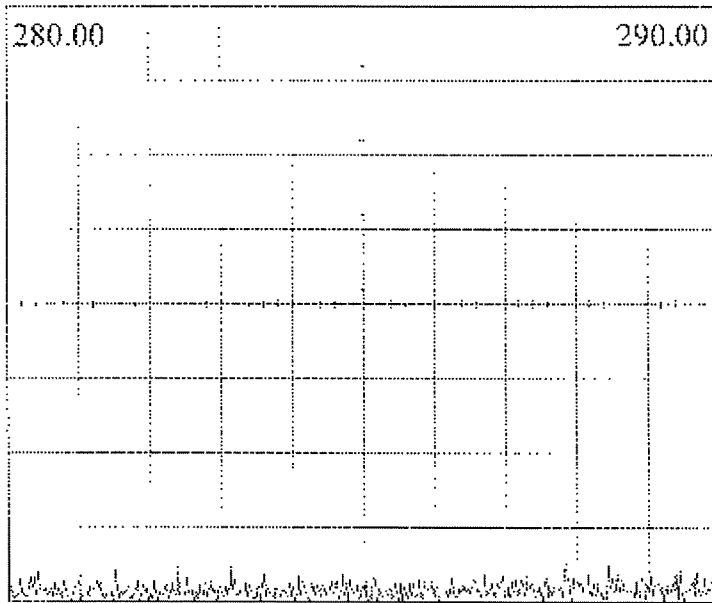
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 287.8357

Peak Level: -94.35

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

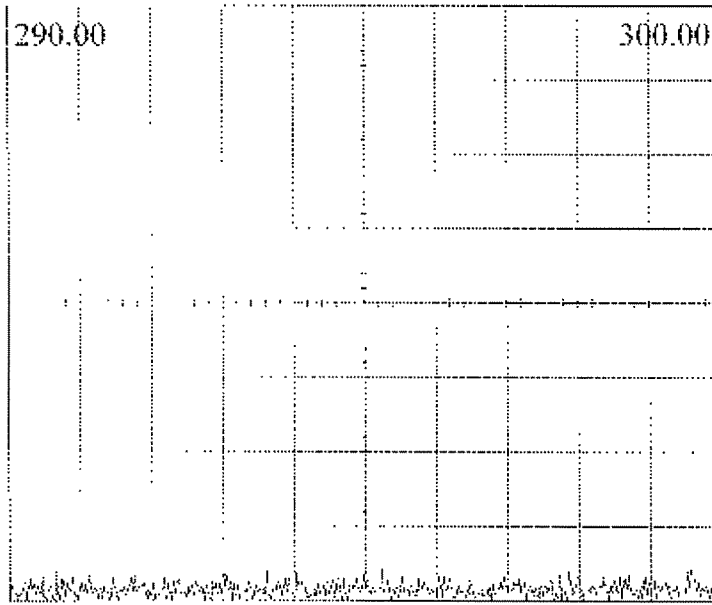
1
MHz/Div

295.00
MHz

0
Hz Res

SHELF 290 TO 30 MHz
05/04/2006 21:14:46

-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 290.6613

Peak Level: -95.61

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

295.00

300

SHELF 290 TO 300 MHZ

MHz/Div

MHz

kHz Res

05/04/2006 21:15:50

-20

-30

-40

-50

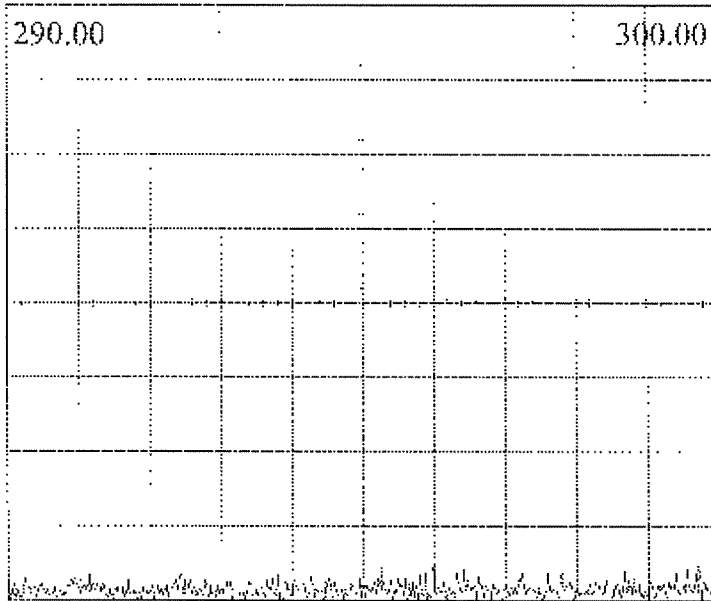
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 299.7194

Peak Level: -94.67

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

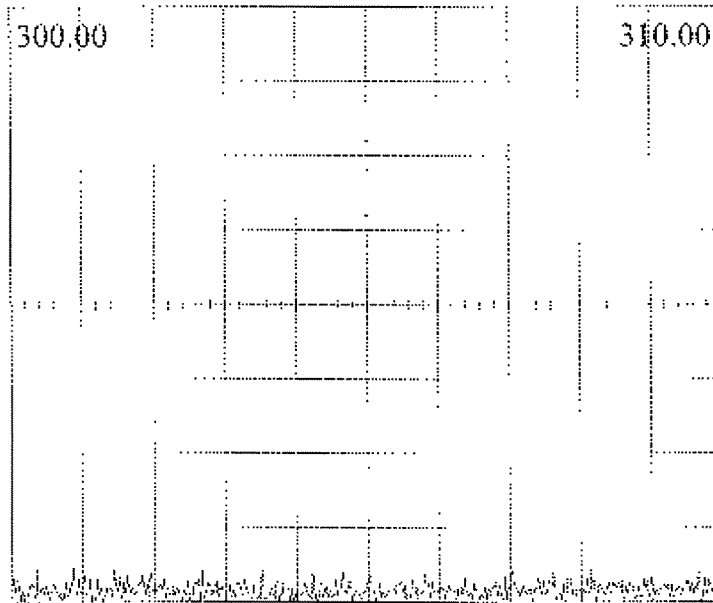
1
MHz/Div

305.00
MHz

300
kHz Res

SHELF 300 TO 310 MHz
05/04/2006 21:16:25

-20
-30
-40
-50
-60
-70
-80
-90
-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 303.507

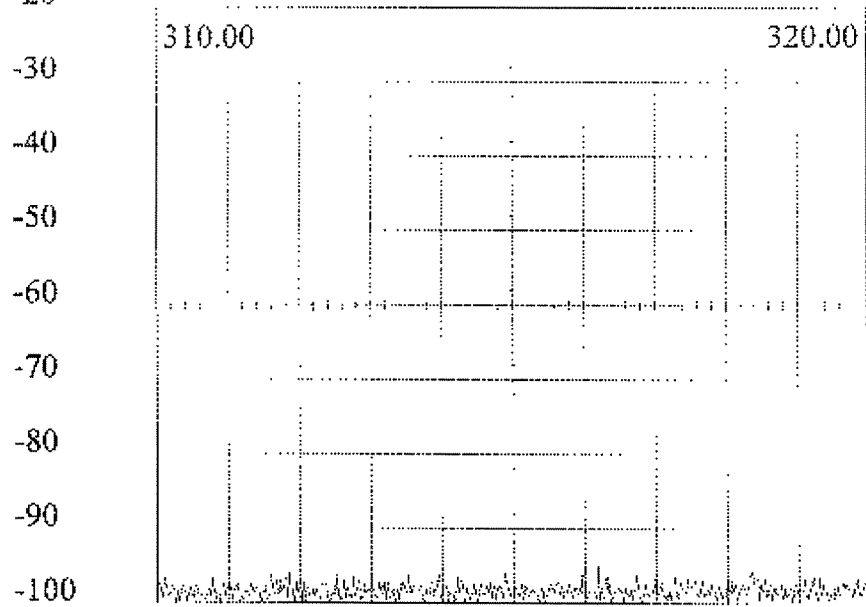
Peak Level: -94.67

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 315.00 300 SHELFR 310 TO 320 MHz
MHz/Div MHz kHz Res 05/04/2006 21:17:40



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 316.1924

Peak Level: -94.98

Radio Works R.F. Consulting

COM-120B

Serial # 1176

dBm

1

335.00

300

SHELF 330 TO 340 MHz

-20

MHz/Div

MHz

kHz Res

05/04/2006 21:22:15

-30

-40

-50

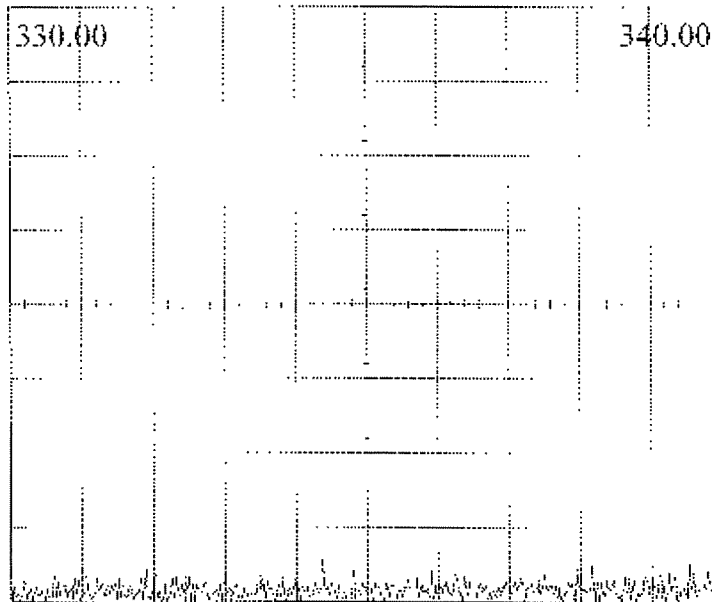
-60

-70

-80

-90

-100



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 334.3687

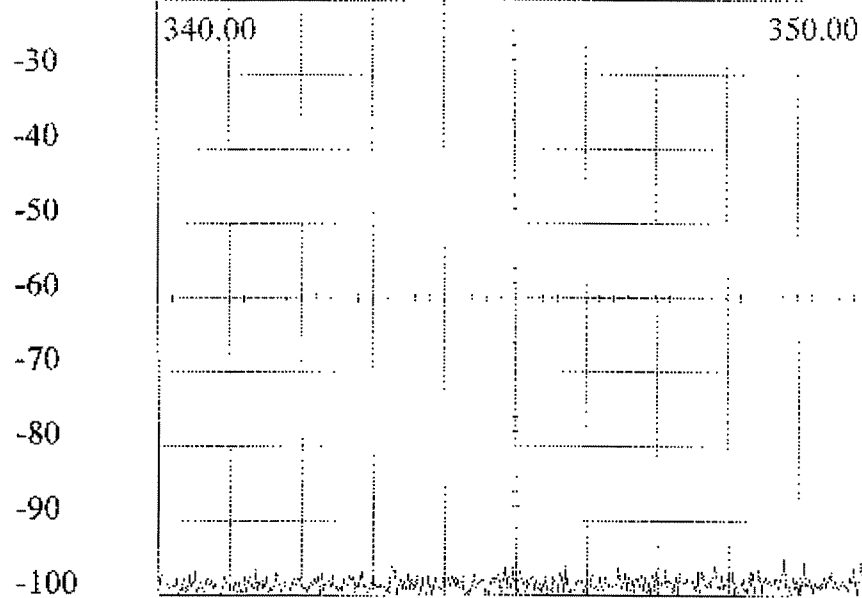
Peak Level: -94.04

Radio Works R.F. Consulting

COM-120B

Serial # 1176

1 345.00 300 SHELFB 340 TO 350 MHz
MHz/Div MHz kHz Res 05/04/2006 21:23:18



0 dB Attn

Gen --- dBm

5 mSecs

Peak Freq: 345.6914

Peak Level: -94.98