DOCKET FILE COPY ORIGINAL

In the Matter of	)	
	)	MB Docket No. 03-185
Rules for Digital Translators	)	

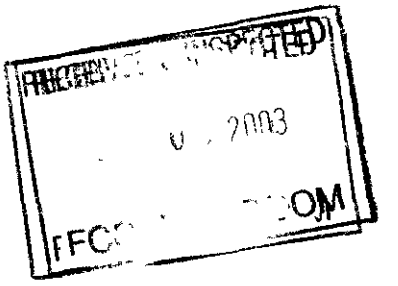
Comments of: Riverton Fremont TV Club Inc; by it's President: Darwin Hillberry.

Phone: (307)856-3322, FAX: (307)856-0707

Address: PO Box 628, Riverton, WY 82501

After making extensive tests on existing and new translators (some of which will be Exhibits) we are making the following comments:

Table of Contents:



No. of Copies rec'd 0+3
List ABCDE

1. Existing Analog Translators Grandfathered to Digital Operations

Existing Heterodyne translators (with no adjacent channels) licensees and CP Holders for analog stations should be grandfathered to digital operation, with a letter to the commission, signed and certified by a qualified person, that the station has met the following criteria for digital operations.

1. Providing the output power of the translator equipment will not exceed 25 Watts average digital power. The ERP does not exceed 2 kW.

2. The translator is operated at 6dB (25%) below its rated NTSC power and meets the mask for grandfathered translators (exhibit 1B) (Translator Tests).

3. The power meter has been calibrated.

4. The translator has a 3 or 4 pole filter on the output (exhibit 2).

5. If the average digital power is above 10 Watts and isolator has been installed between the translator and the filter (exhibit 3).

6. The AGC will hold the output power to less than a $\pm$ 1 dB change for an input increase of 20dB, and a decrease of 10dB when the translator has been optimized for digital transmission.

7. The translator station ID would be made by the primary station or by FSK in Morse Code of the upconverter OSC.

8. The translator should meet the grandfathered mask. The grandfathered mask is needed due to the IF Amps and high powered amps, and the high level converters. With this mask there should not be any interference to anyone as there is no adjacent channel. Most of the current translators under license or construction permits could meet these

standards and mask without any new equipment.

The AGC amps tested held the output change to less than a 1 dB change for a 20 dB increase and a decrease of 10 dB, when optimized for DTV.

If the AGC fails, one of 2 things will happen. 1. The translator will shut down with no output of the AGC Amp, or 2. If the amp should go full on or increase 3 dB, the power output amp will blow the fuse or the power amp transistors will fail. All of the above will cause a failure of the translator and there will not be any output. As the power increases, the margin TOV will go down and the operator will know there is a problem.

The FSK for station ID will not affect the signal or bit error rate when shifted 10 kHz. (Exhibit 4)

The isolator helps the match between the filter and the power amp. Also it prevents the output from getting out of the mask with high VSWR, as with a bad transmission line or ice on the antenna. (Exhibit 4)

Should the operator want to use a digital processor or a regenerator, the tests should still be made. In the future if an adjacent channel is built in the coverage area the operator of the grandfathered license would be required to use a processor or regenerator or a complete new translator built for digital and the more stringent mask.

The above required tests could be exhibits when applying for the license or put in the file and certified by the qualified person making the test.

1B. Cost of Equipment

The cost of this conversion is estimated as follows:

a. Estimated cost of Engineer or qualified person to make the measurements: $500.00.

b. Estimated 3 or 4 pole filter if needed: $700.00 to $850.00

c. Estimated cost of 5 or 6 pole filter if needed: $1,500.00 to $2,000.00.

d. Estimated cost for a processor if needed: $1,000.00 to $2,500.00.

e. Estimated cost of a regenerator if needed: $4,900.00

f. Estimated cost of a new translator with regenerator : $20,000.00

2. New Translators for DTV and Masks and D/U Ratios

Applications for new DTV channels should meet the following:

We concur with the emission masks and D/U interference ratios proposed in the paper by Sprignoli. Should a new station not have any adjacent the simple mask could be used with the stipulation on the license when an adjacent channel comes into the coverage contour, the operator would have to go to the stringent mask. Most spectrum analyzers will not measure at 500 kHz resolution bandwidth, so operators should be able to use the formula 10Log(channel bandwidth 6000 / resolution bandwidth being used).Example 10Log(6000/300) = 13.0 dB. (see exhibit 5).

3. Modifications and Type Acceptance

Type certification should be made on the final amplifier and mask by the translator manufacturers, as the amps and Masks control most of the out of band emissions that could cause interference. At the present time only 1 company makes a regenerator. There are several manufacturers that build 8VSB processors for the cable TV industry.

These processors have very stringent specifications. (Exhibit 6)

Many of the Cable TV Manufacturers of processors will not want to go to the time and expense to get the units type certified for so small of a market. When you consider there are less then 5,000 translators and the Cable industry may use 30 to 50 processors in each head end system, with 50 processors used it would only take 100 cable systems to equal all the 5,000 translators. The FCC should not limit the use of these units or any future technology developed for the cable industry that would benefit the translators.

Should the operator want to convert an analog translator to digital for a new station, it would require a processor or regenerator and the required mask. Only the final amplifier chain above the upconverter could be used, it would require the necessary measurements, I.E. calibrate the power meter, test the AGC limits, the alignment of the complete translator and mask by a qualified person and be an exhibit on the license application or be put in the station file.

The licenses should be able to change the processor or regenerator when the operator sees fit, with a letter to the commission.

4. Digital Call Signs and ID's

Translator station ID could be done by the station or FSK Morse Code as used for analog translators. (Exhibit 4)

5. Microwave Use of Broadcast Auxiliary Service

Use of the Broadcast Auxiliary Service channels will be necessary with the shortage of TV channels that will occur in the digital transition. (Exhibit 9) On tests that were made

on digital microwaves, up to 3 digital stations ca be put on 1 microwave channel.

5. **General Comments**

An initial filing window for new digital stations should be restricted to incumbent stations on a 1 for 1 basis with a two year construction time. The new DTV station should have to maintain the same coverage area. This coverage should be the same as the analog. This new station would not be able to file for a raise in power until after the transition is completed. One of the stations license would have to be returned, I.E. Operators could not use this to increase their number of stations.

We agree with the NPR on the proposal to have a limited window only for existing licenses and CP holders for a second channel for DTV. The licensee should be able to use the second channel to transmit his analog and put the digital on the existing channel or use it for digital and leave the analog where it is now. This may cut the cost of going to digital and also keep the translator's channel identity.

If the Licensee has 2 licenses, 1 DTV and 1 analog, the operator should have to give one back at the end of the transition.

After the limited window, only digital applications could be filed. There should be a freeze on analog translators, with an exception for real rural areas, as defined in the NTA Rural Translator Request for Rule Making, I.E. Only areas that receive less than 4 over the air broadcast TV stations.

7. Other Issues

7-1. FCC 12: You asked for comment on the definition of a DTV Broadcast Translator. The Translator should be a station that retransmits the original signal of a

DTV Broadcast station for the reception of the general public. The translator should not alter the content or format of the primary Broadcast Station except for the 30 second per hour Local Public Service Announcements and Emergency Warnings.

7-2. FCC 13: You asked for comment on Rule for Down Converting a DTV Signal to Analog Format. This should come under the rules for Analog Translators. In many locations, DTV Signals converted to analog would improve the reception to the Analog Viewers. This should be allowed until the end of the translation, I.E. when the NTSC of the Broadcast Station is turned off, so should the translator turn off the Digital Conversion to analog and become a Digital Translator.

7-2. FCC 14: You asked for comment on the use of Heterodyne and Regenerative translators. There is a need for each type and the decision should be left to the operators. The Heterodyne Translator for single Hop Systems work just fine and are not as costly as the Regenerator (See 1B). Most existing analog translators are capable of retransmitting DTV signals.

7-3. FCC 15: You asked for comment on local signal insertions, The translator operator should be allowed to insert up to 30 seconds per hour, at the present time, this would be too costly. Maybe in the future prices and technology will make this feasible. It should be in the rules for now.

7-4. FCC 16: You asked for comment on signal alterations. The DTV translator should not alter the Broadcast stations signal in any way other than frequency and amplitude, for example primary PBS stations will transmit 2 – 3 – or 4 complete DTV signals. For educational learning classes, Commercial Stations may run weather, news, or shopping on their DTV signal. The DTV Broadcast Station may not give

retransmission consent to alter their signal.

7-5. FCC 20: You asked for comment on definition of LPTV and Translator. Any Transmitter that originates programming for more than 30 seconds per hour should be defined as a LPTV Station.

7-6. FCC 25: You asked for comment on minimum video programming service. Under no circumstances should the LPTV or translator operator be able to transmit any signals other than video.

7-7. FCC 28: You asked for comment on the use of VHF 2-13 and UHF 14-59 for analog to digital conversions. This will help in finding channels for new DTV operators during the transition.

7-8. FCC 29: You asked for comment on letting translator and LPTV use channel 52-69. This will help the shortage of channels and should be on a non-interfering basis. This should be used for existing stations converting first before allowing new stations and should be used only when there is a lack of other available channels. Translators should use all the channels 52-69 unless there would be interference to Public Safety Operations.

7-9. FCC 33: You asked for comment on Class A protected contours. This rule should be left as it is.

7-10. FCC 37 & 39: You asked for comment on D/U Rations. D/U Ratios should use section 73, 623(c) and 73,623(c)(2) and 73,623(c)(3).

7-11. FCC 40: D/U ratios should apply to all classes of operation, even digital class A stations.

7-12. FCC 41, 42, 43, 44, 45, & 46: Interference Methodology should use

Longley-Rice Method for waivers of the rules, so as many DTV stations can be licensed as possible. The use of down tilt of the antenna should be put into the software so a waiver is not required.

7-13. FCC 49: The Longley-Rice Method should be used for Digital and analog Translators and LPTV Class A TV service.

7-14. FCC 50: Interference Agreements have been very successful and should be continued with digital translators and LPTVs.

7-15. FCC 52, 53, 54, 55, & 56: Co-located adjacent channel operators should be allowed on the basis of written agreements. This should require a waiver to be co-located on an adjacent channel. If interference occurs it would have to be corrected by the operator that causes it.

7-16. FCC 57: All new applications for major change or new applications should be required to operate with a frequency offset. Many translators in the field will not meet this and could not be converted. This would cause an unneeded expense to small translator operators.

7-17. FCC 58, 59, & 60: The protections in Section 74,703 and 74,709 should remain unchanged. Section 73,1030 should apply to all stations in the vicinity of these protected installations.

7-18. FCC 61: ERP limits for digital and LPTV translators should be at 10dB below analog translator stations.

7-19. FCC 62, 63, 64, 65, 66, and 67. Out of channel emission limits should use the masks based on Sprignolis paper as outlined in FCC 65, with the exception of the grandfathered mask. The grandfathered mask uses the same 3 pole filter as used in the

"simple" mask, only the out of band emissions are different and it is calculated differently:

0 to 6 MHz = A(dB) = 40.6+(Δf X 3.33)

6 to 7.5 MHz = A(dB) =60.6+((Δf –6)X 6.37)

All frequencies greater than 7.5 MHz down greater than 70dB

(see exhibit 1). This would require 3 masks; 1 grandfathered, 1 simple, 1 stringent. The D/U ratio used in the sprignolis report could then be used. See 1B for costs associated with each mask.

7-20. FCC 69 & 70: The use of multiple masks should be based on the adjacent channels and interference tables. The 3 pole filter would be the minimum mask required. If there is an adjacent channel, the operator would have to use a more stringent mask, this should apply to all stations. Most existing Heterodyne translators will have out of band splatter that starts between 30 and 35 dB below the flat top of the signal, using the same 3 pole filter. The out of band splatter is caused by the power output amps and IF Amps. The IF filters in the Heterodyne translators are not as sharp as the saw filters used in the regenerator or processors. The amps also amplify some noise adjacent to the DTV signal. The filters do not change this level, so for existing translators the out of band splatter mask should not be as tight. The translator should have a margin of not less than 30 dB from the top of the signal to where the shoulders fall out of the 6 MHz band. Existing translators licensees and CP holders should be Grandfathered from analog to Digital TV (see paragraph 1). If an adjacent channel is present, the operator would need a digital processor with a saw filter or a regenerator translator with the 5 or 6 pole filter to meet the more stringent mask. Some manufacturers of translators did not use band pass filters (EMCEE Acrodyne), they used notch filters. These translators would

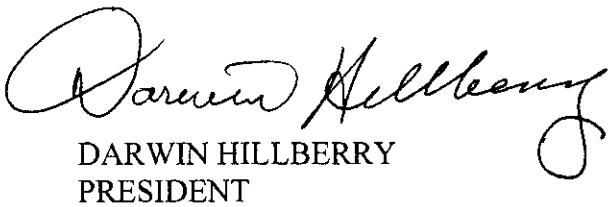
be required to use a band pass mask filter. (See 1B for costs of mask filters).

7-21. FCC 94 and 95: Mutually exclusive applications should be able to use the settlement agreements before having to go to auction.

7-22. FCC 110: Additional channels awarded under the terms of section 336(f)(4) should be protected from displacement by primary stations. This should be extended to cover translator digital channels as is with Class A channels.

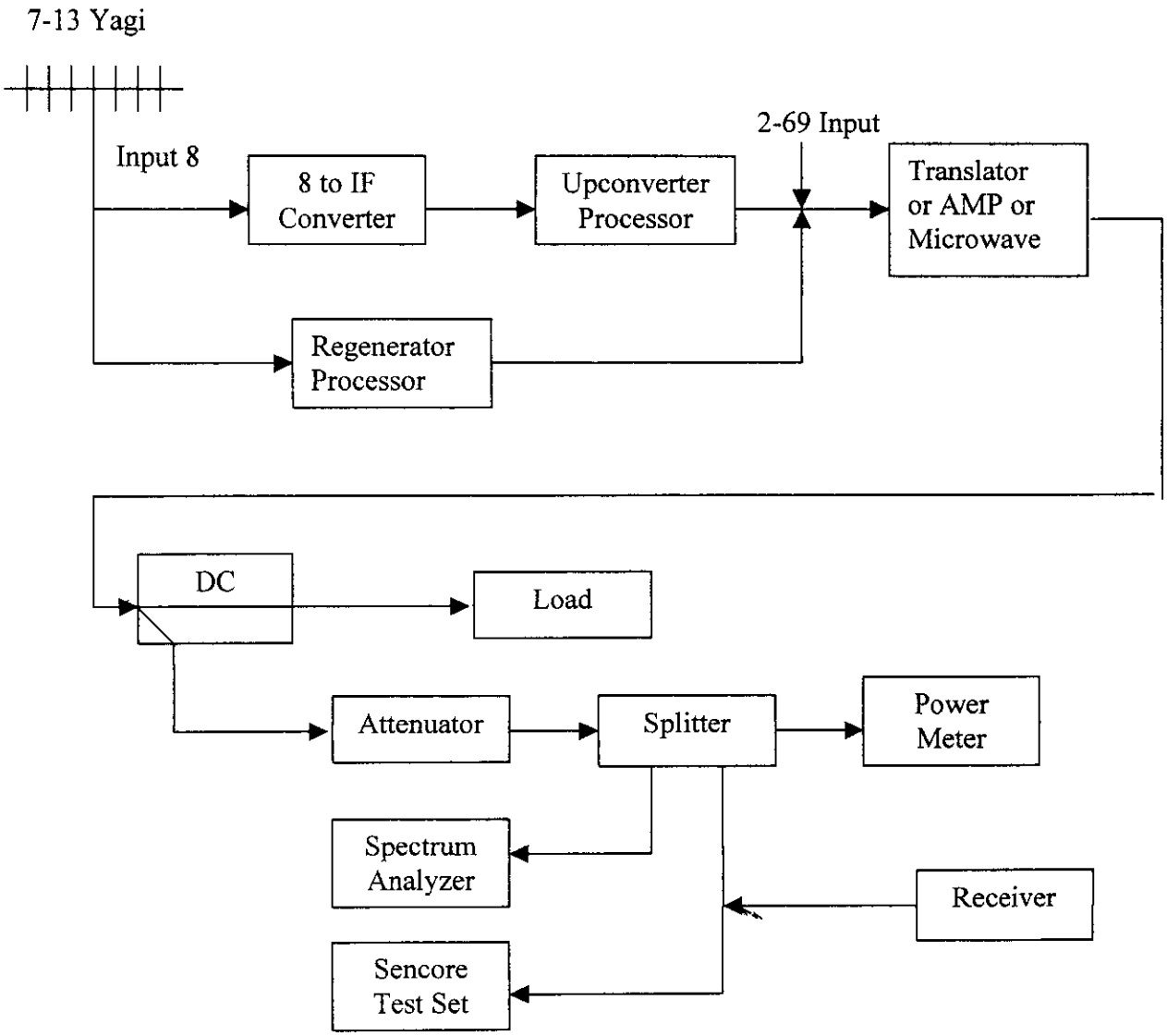
7-23. FCC 112: There should be priority awarded to any class of digital translator station that is displaced by a primary station.

RIVERTON FREMONT TV CLUB, INC.



DARWIN HILLBERRY
PRESIDENT

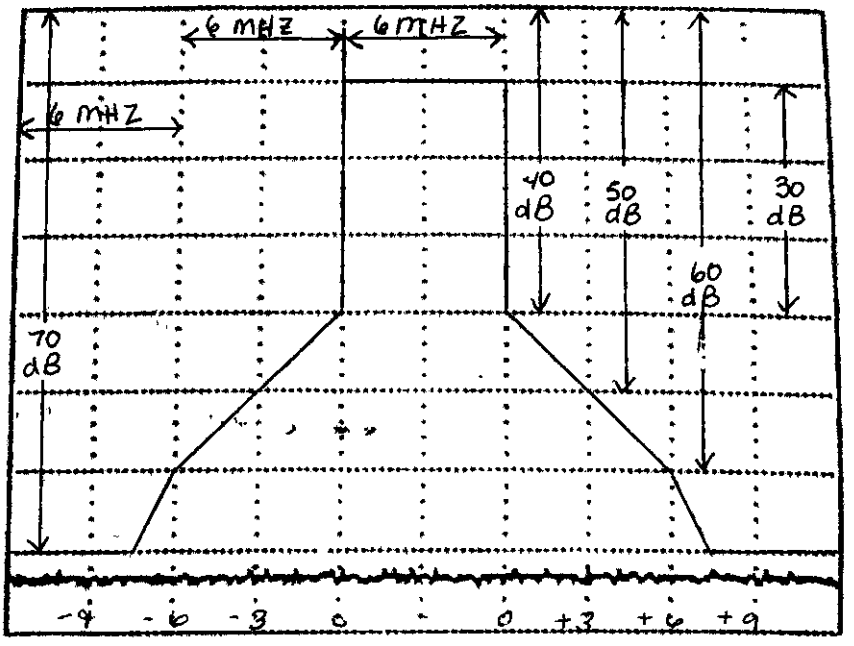
Translator Test Setup



Receiver = RCADTC100
Analyzer = HP8590A
Power Meter = HP432A
DC = Directional Coupler
Sencore = AT1506

EXHIBIT A1

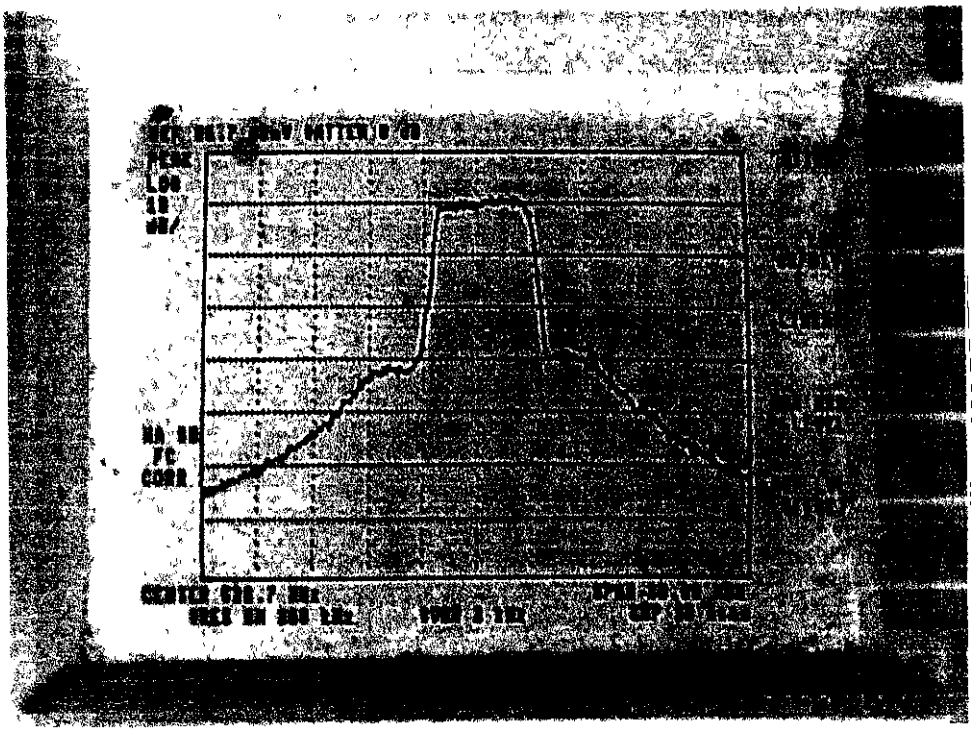
Mask for Grandfathered Translators



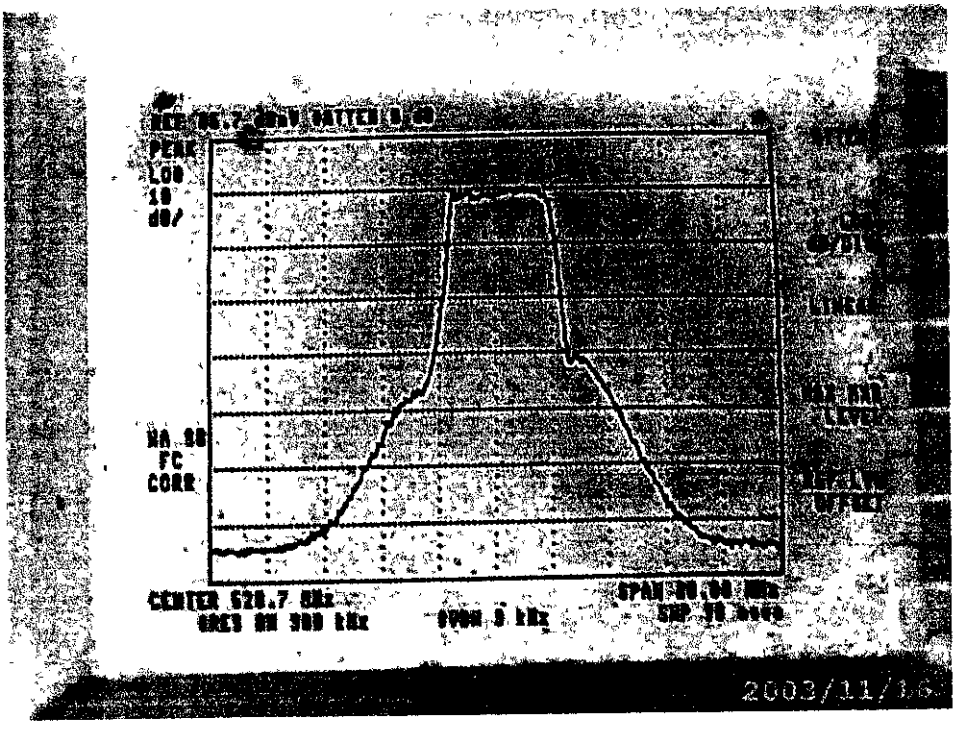
Where A (dB) is the attenuated emission level below the average transmitted power of a DTV channel and Δf is the frequency difference in the MHz from the edge of the channel:

Mask for Grandfathered Translators:
0 to 6 MHz = A(dB) = 40.6+(Δf X 3.33)
6 to 7.5 MHz = A(dB) =60.6+((Δf –6)X 6.37)
All frequencies greater than 7.5 Mhz down greater than 70Db

EXHBIT 1

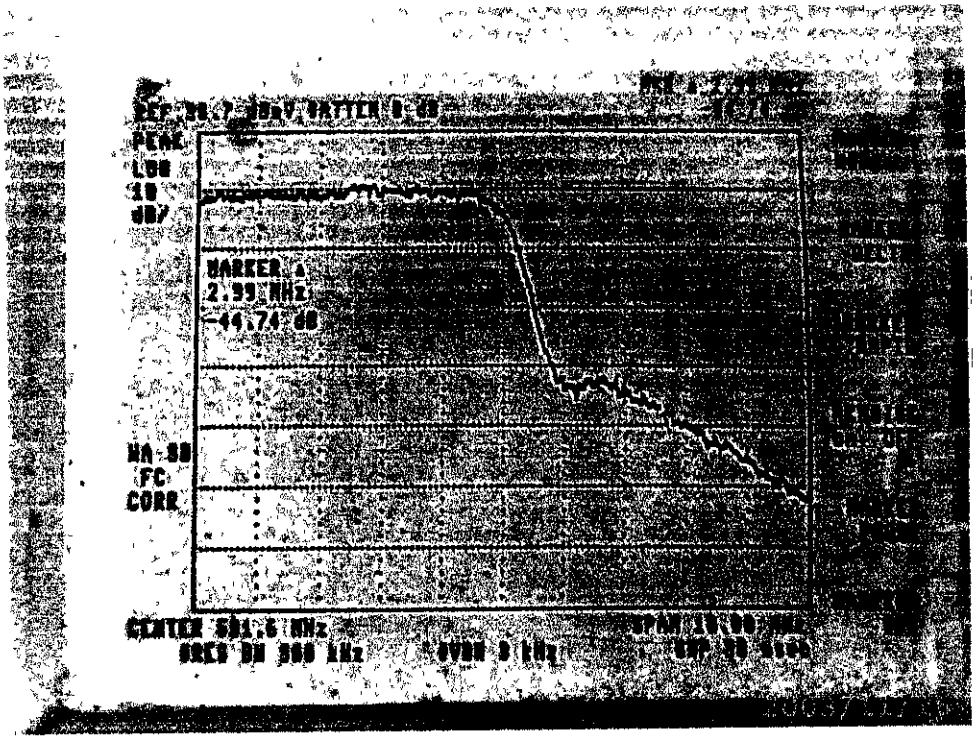


TTC Chn 4 to 23 Translator
XL20 @ 5W without filter

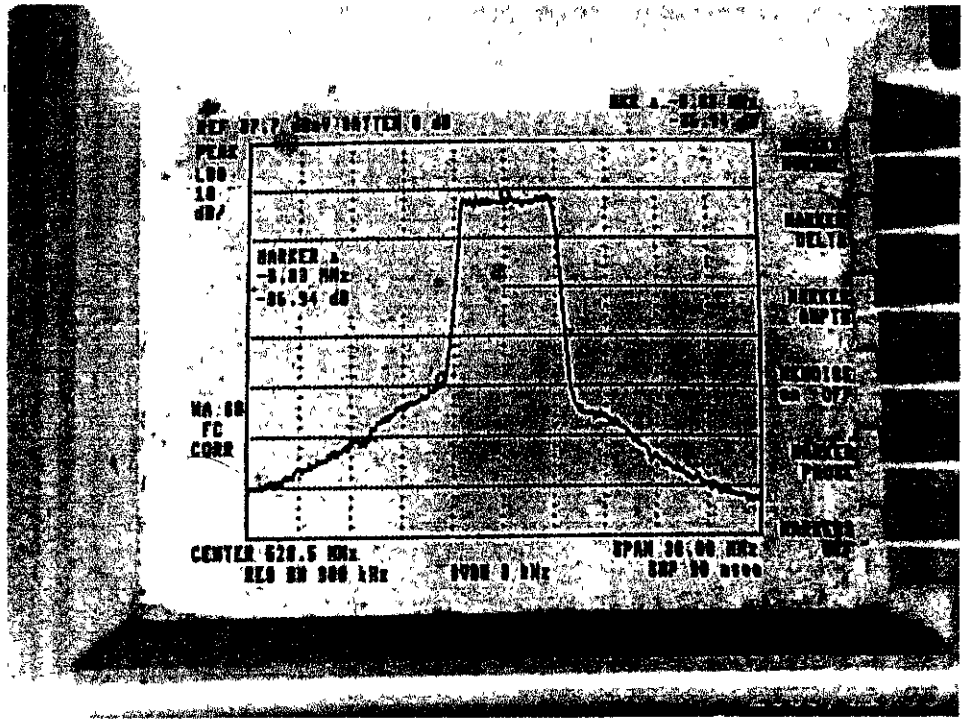


TTC Chn 4-23 Translator
XL20 @ 5W with 3-pole filter

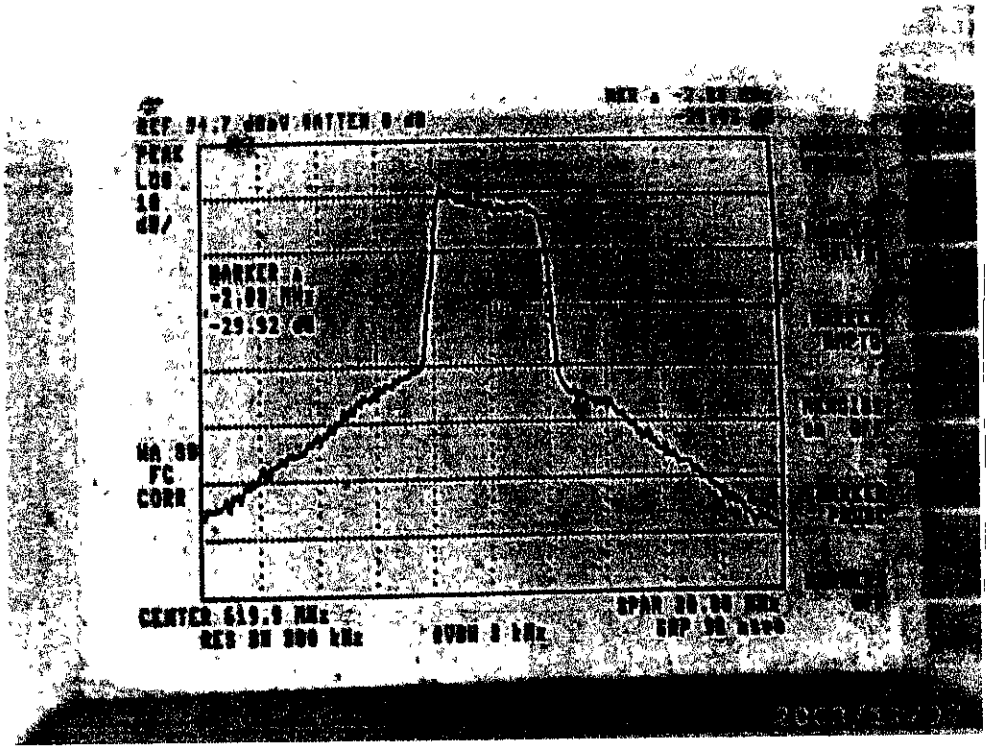
EXHIBIT 1B



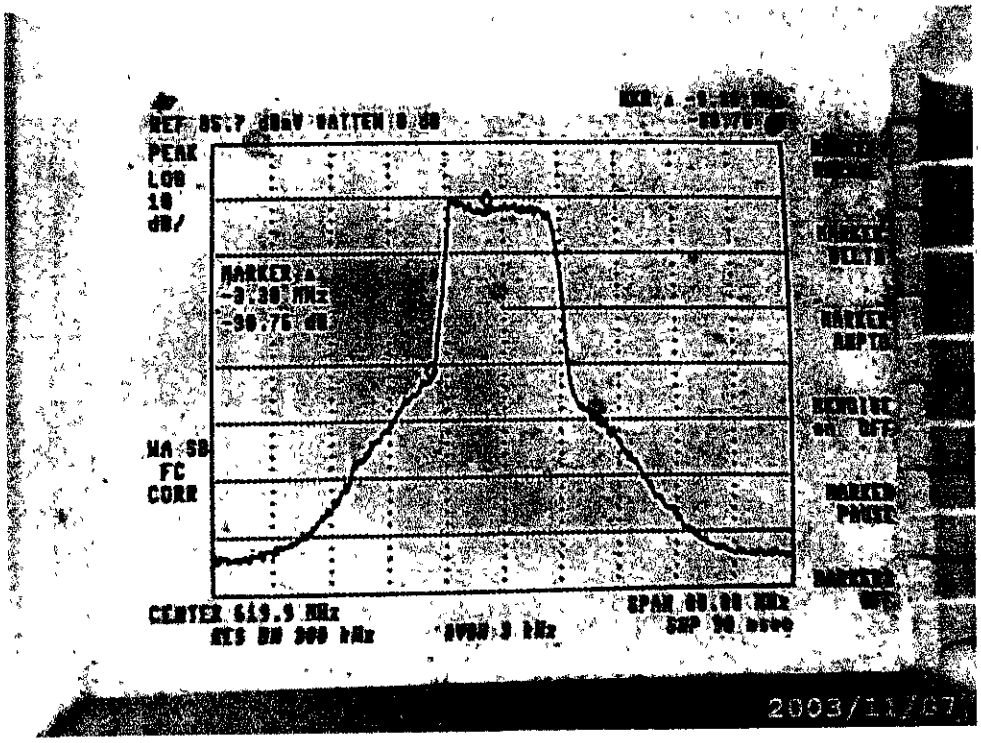
Chn 4-23 Translator
TTC XL20 @ 5W with filter expanded to 1 MHz / Div



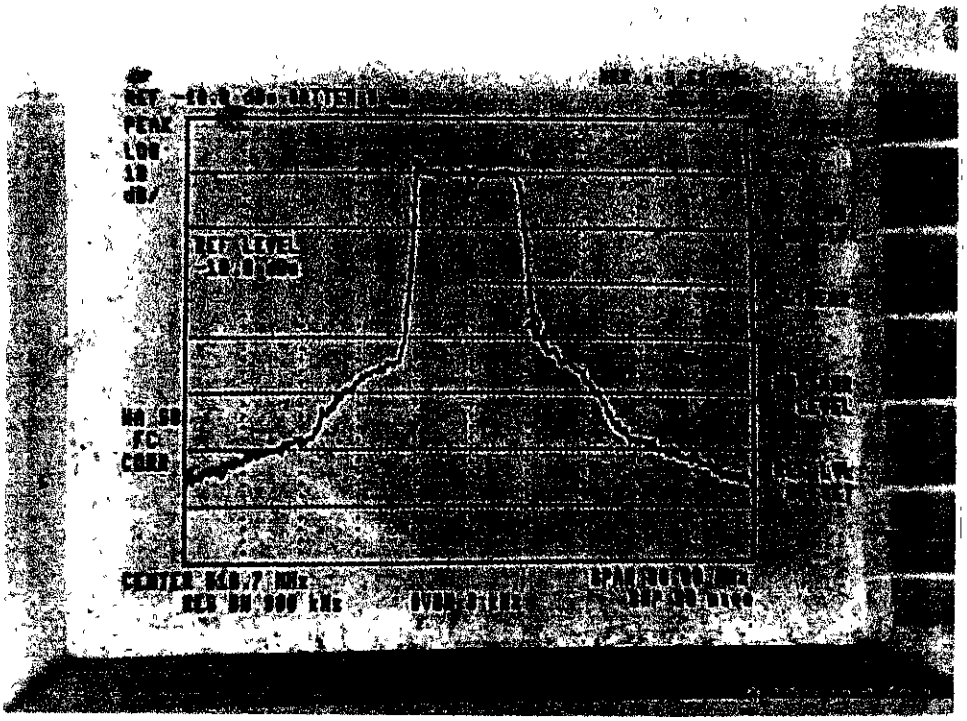
Chn 4-23 Translator
TTC XL20 @ 5W without filter with Drake IF to Upconverter



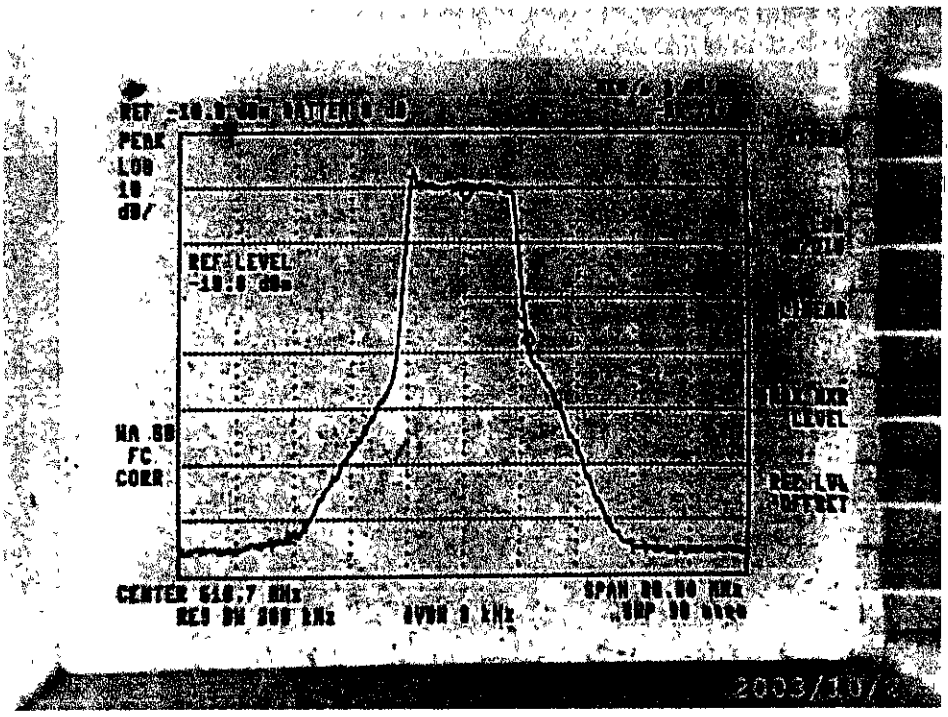
Chn 8-38 Translator
Acrodyne Amp @ 25W without filter



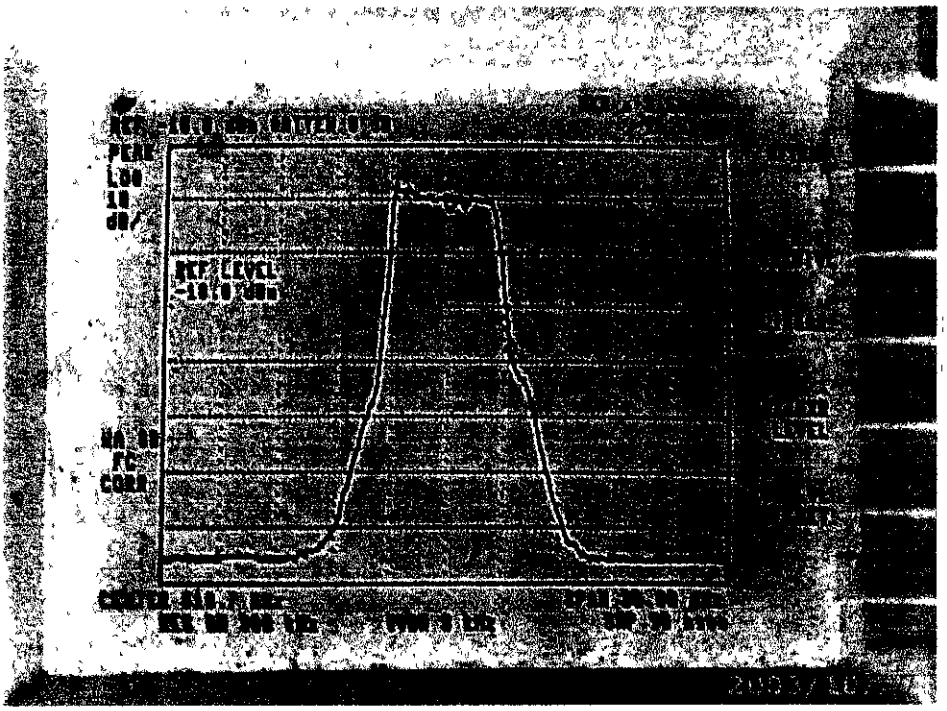
Chn 8-38 Translator
Acrodyn Amp @ 25W with 3 pole filter



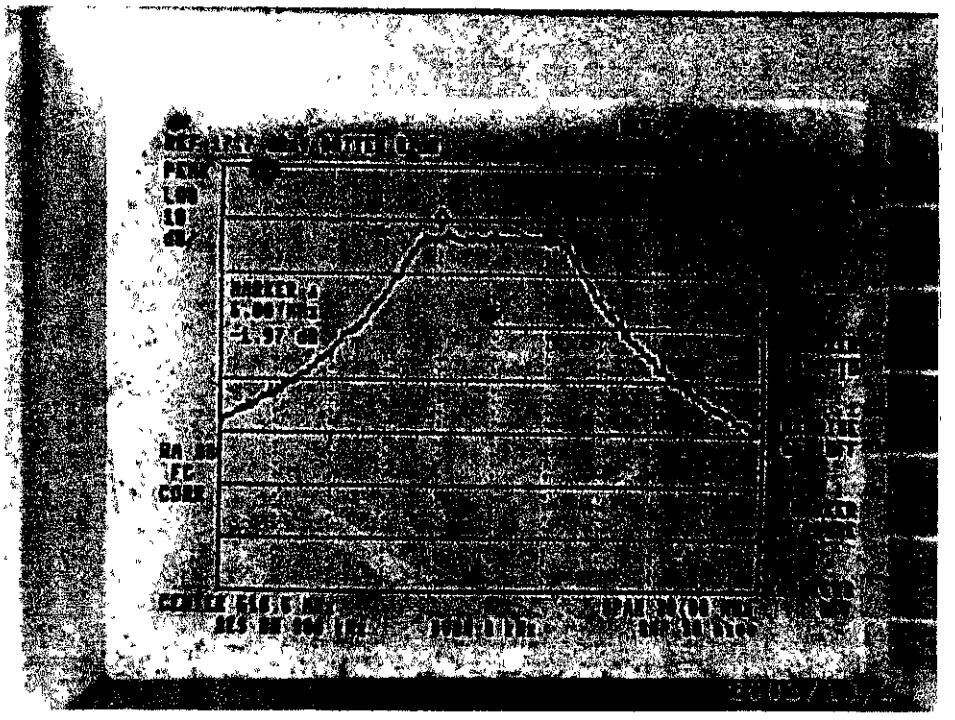
Chn 8-23 Translator
LARCAN MX100 @ 25W with Drake Upconverter, without filter



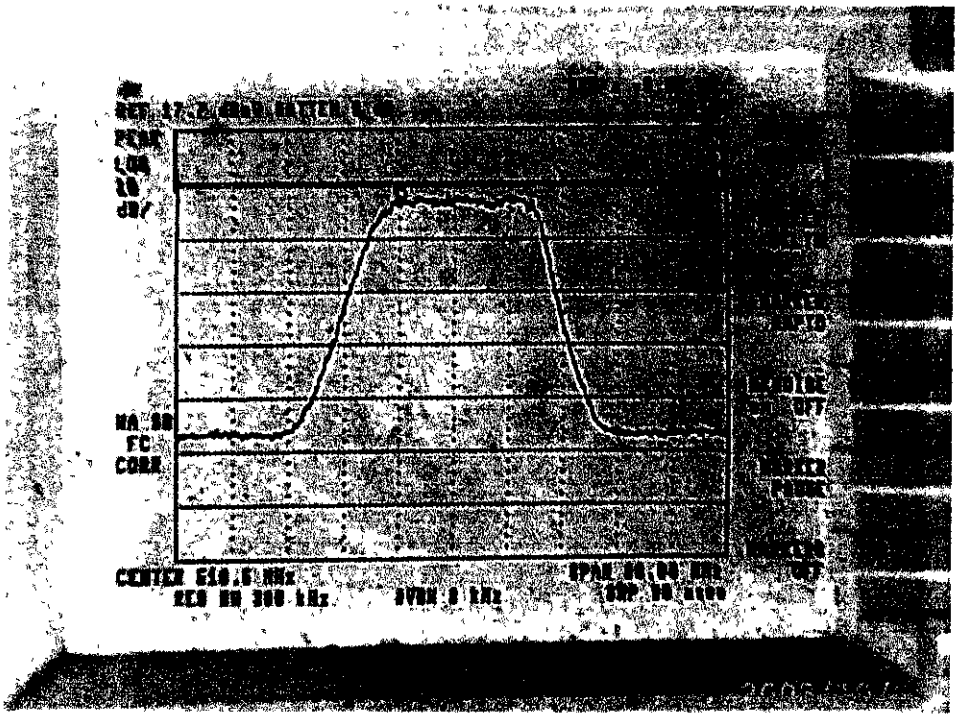
Chn 8-23 Translator
LARCAN MX100 @ 25W with Drake Upconverter, with 3 pole filter



Chn 8-23 Translator
LARCAN MX100 @ 25W with Drake Upconverter,
With EMR 6 pole filter

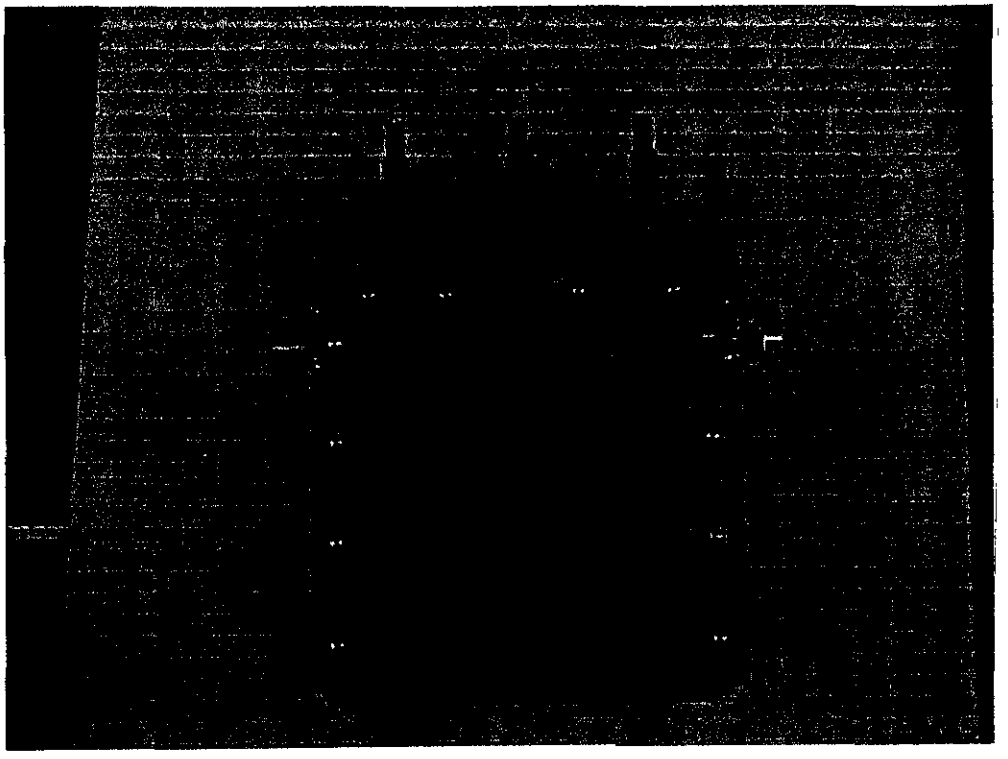


LARCAN 3 Pole Filter

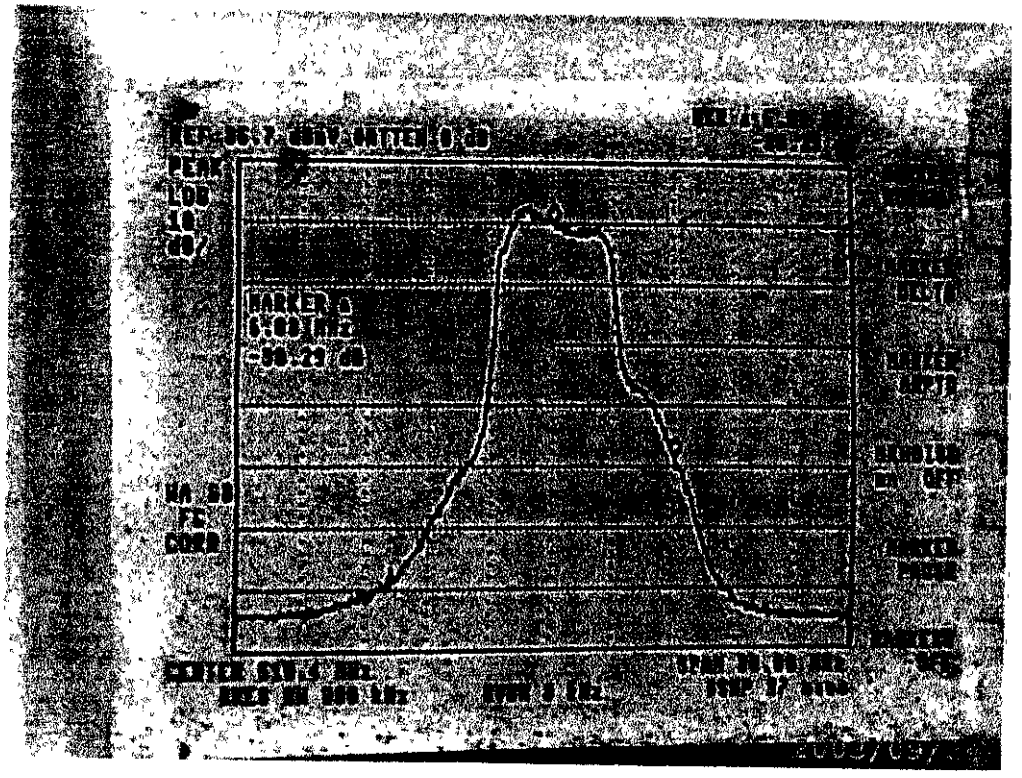


EMR 6 Pole Filter

EXHIBIT 2

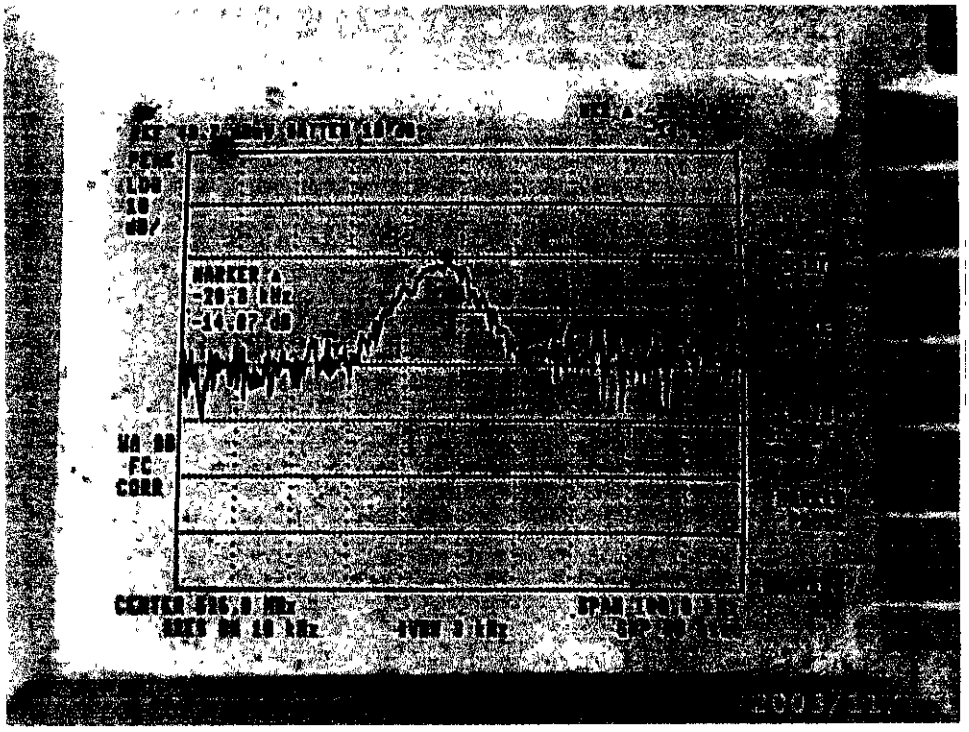


LARCAN MX100 3 Pole BPF Filter
TTC XL Series 3 Pole Filter

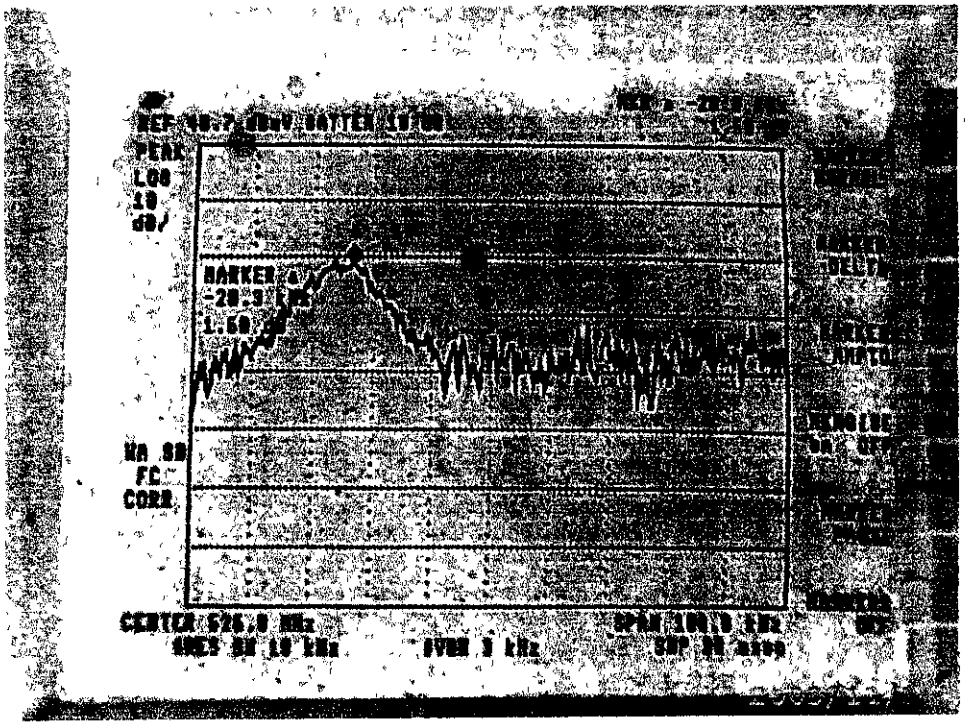


TTC XL20 @ 5W into 25 OHM Antenna
VSWR 1.5 without Isolator, with 3 pole filter

EXHIBIT 3



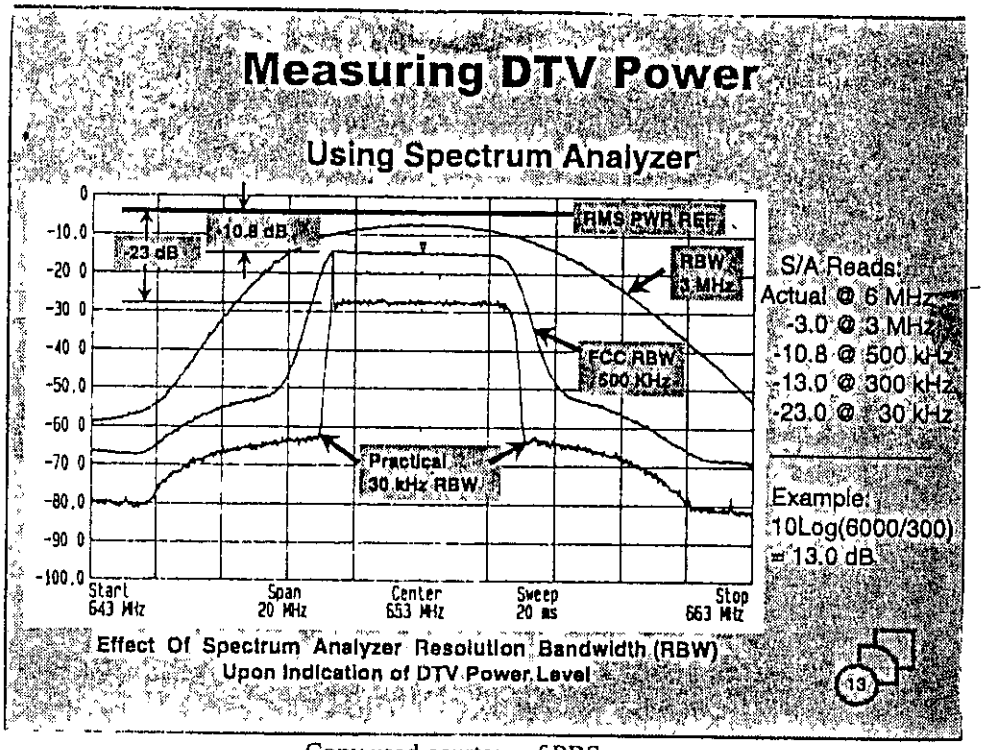
Chn 4-23 Translator
TTC XL20 @ 5W
FSK OFF



Chn 4-23 Translator
TTC XL20 @ 5W
FSK ON

EXHIBIT 4

MEASURING DTV POWER
USING THE SPECTRUM ANALYZER



Copy used courtesy of PBS

Example: Resolution bandwidth set at 300 kHz, set the analyzer gain to show the DTV flattop at 13 dB below the top reference line. The RMS power reference is the top line in dBm. Convert the dBm to watts, this is the digital power output of the translator

EXHIBIT 5

RF INPUT

Frequency Range	* 54 to 806 MHz, OFF-AIR channels 2 to 69, CATV channels 2 to 125
Input level Range	-15 dBmV to +30 dBmV
Impedance	75 Ohms
Noise Figure	12 dB, maximum
Image Rejection	80 dB

Output

IF Frequency	44 MHz
Level	+30 dBmV, ±2 dB
Impedance	75 Ohms
Frequency Stability	±5 PPM
IF Bandwidth	6 MHz @ -3 dB SAW filtered
SSB Phase Noise	-92 dBc @ 10 kHz offset
Amplitude Flatness (6 MHz Channel)	±0 5 dB

Digital Performance

MER with 8VSB	>25 dB (unequalized), >35 dB (equalized)

GENERAL

DC Power Input	+12 V ±5% @ 150 mA typical, 175 mA maximum +5 V ±5% @ 275 mA typical, 325 mA maximum
Operating Temperature	0° C to +50° C ambient
Size	1" W x 3 5" H x 9 25 ' D (2 5 cm) W x (8 9 cm) H x (23 5 cm) D
Weight	15 6 oz (0 44 Kg)

* When the DDC806 is used with the DUC550 or DUC860, the RF input channel should not be the same as the DUC output channel All other channels are available

Drake Processor Specifications

EXHIBIT 6

IF INPUT

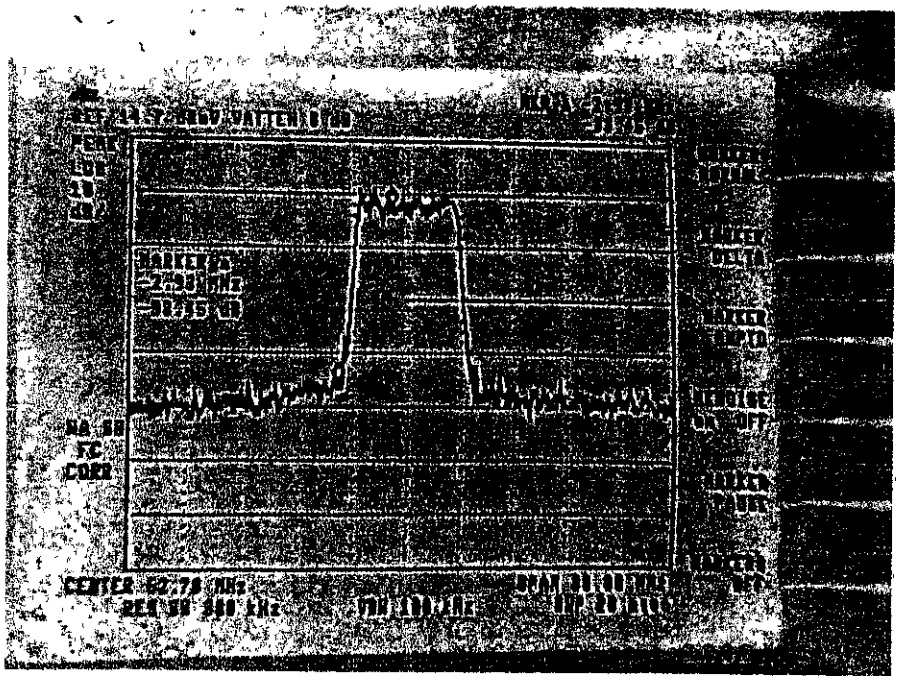
Frequency	44 MHz
Input Level	+30 dBmV, ±2 dB
Input Impedance	75 Ohms, return loss >10 dB

OUTPUT

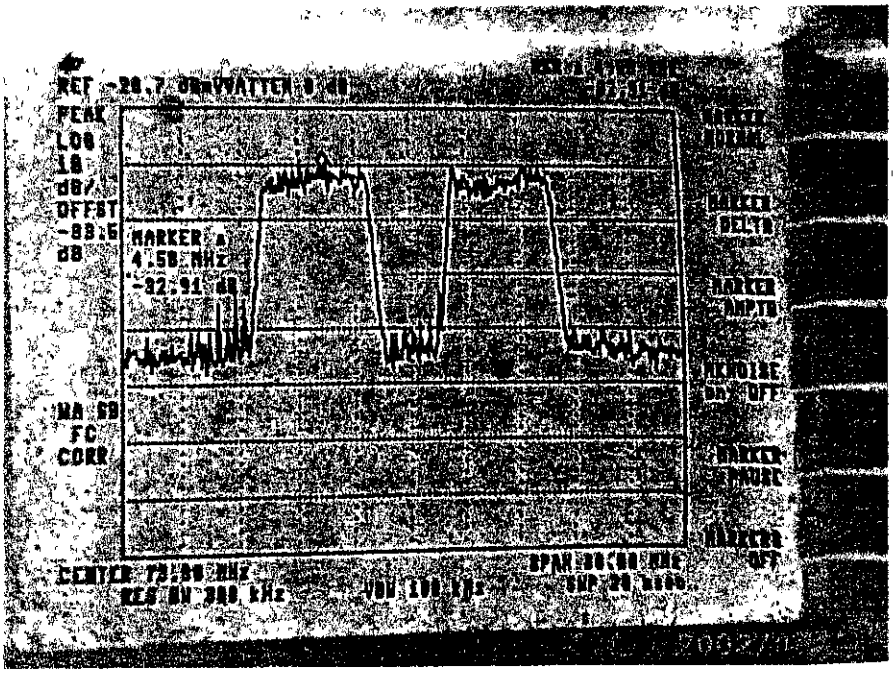
Frequency Range-	
DUC860	550 to 860 MHz, CATV channels 78 to 134, Broadcast TV channels 27-69 (internal jumper set to BC position)
DUC550	50 to 550 MHz, CATV channels 2 to 78, 95 to 99, Broadcast TV channels 2 to 27 (internal jumper set to BC position)
Output level	+45 dBmV minimum, 15 dB adjustment range
Broadband Noise	-73 dBc (6 MHz bandwidth) @ +45 dBmV output level
In Channel C/N	63 dB (6 MHz bandwidth) @ +45 dBmV output level
Spurious Outputs (5 MHz to 900 MHz)	-60 dBc @ +45 dBmV output level
Output Impedance	75 Ohms, >10 dB return loss
Amplitude Flatness Over 6 MHz Channel	±0 25 dB maximum
SSB Phase Noise	-95 dBc @ 10 kHz offset, -65 dBc @ 1 kHz offset
Frequency Stability	±5 ppm
MER	33 dB minimum (unequalized), 36 dB minimum (with blind equalizer)

GENERAL

DC Power Input	+12 V ±5% at 230 mA typical, 250 mA maximum +5 V ±5% at 280 mA typical, 325mA maximum
Operating Temperature	0° C to +50° C, ambient
Size	1" W x 3 5" H x 9 25" D (2 5 cm W x 8 9 cm H x 23 5 cm D)
Weight	1 lb 1 oz (0 45 Kg)

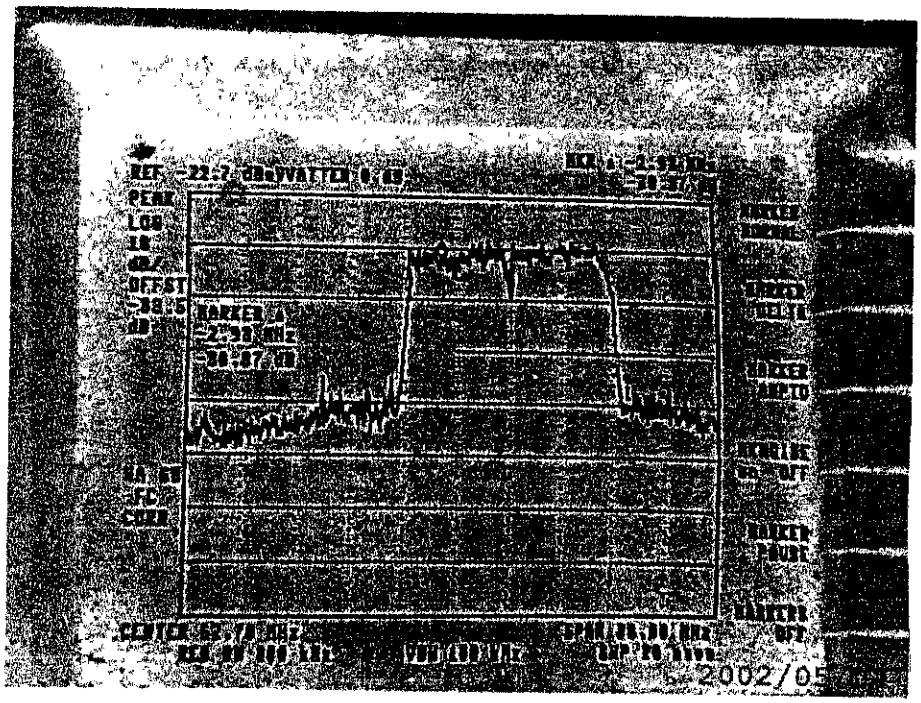


7 GHz 1Γ @ 1 Watt to 1R
Microwave Ch. 4 in transmitter, receiver Ch. 4 out



7 GHz 1Γ @ 1 Watt to 1R
Microwave Ch. 4 & 5 in transmitter, receiver Ch. 4 & 5 out

EXHIBIT 7



7GHz 1T @ 1 Watt to 1R
Microwave Ch. 3 and 4 in transmitter, receiver Ch. 3 & 4 out

EXHIBIT 7
Page 2