

In the Matter of:

Amendment of Parts 73 and 74 of the  
Commission's Rules to Establish Rules for Digital  
Low Power Television, Television Translator, and  
Television Booster Stations and to Amend Rules  
For digital Class A Television Stations )  
)  
)  
)

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ORIGINAL

MB Docket No. 03-185

EX PARTE OR LATE FILED

**NOTICE OF PROPOSED RULEMAKING**

**Adopted: August 6, 2003**

**Released: August 29, 2003**

***Supplemental Reply Comments of:***

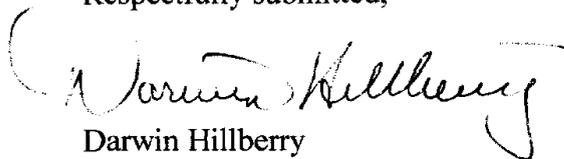
Riverton Fremont TV Club, Inc  
Darwin Hillberry, President  
PO Box 628  
Riverton, WY 82501

RE: Riverton Fremont TV Club, Inc hereby submits these *supplemental* comments in response to MB Docket No. 03-185 Regarding Interference from UHF Digital Low Power Television, Television Translator, and Television Booster Stations to GPS Receivers, as raised by the U.S. GPS Industry Council

The attached statement from Riverton Fremont TV Club, Inc, regarding possible interference to the GPS from TV Translator Stations, as put forth by the U. S. GPS Industry Council, is being filed with the Commission. The original and one copy of this letter and the accompanying statement are being provided for inclusion in the file of the reference proceeding.

Please address any questions you may have to the undersigned at (307) 856-3322.

Respectfully submitted,

  
Darwin Hillberry  
President

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The following tests were made to evaluate the proposed absolute level of out of band emission, generated by a broadcast DTV Translator Station, as stated in the U.S. GPS Industry Council's ex parte presentation.

In the filings in MB Docket # 03-185, the 2 masks were defined as far as adjacent channel splatter, the filters used for the 2 masks were not tested for emissions of the second and third harmonics, in the frequencies from 1 GHz to 2 GHz.

The results of the following tests are compared to the U.S. GPS Industry Council's Table 10 (below). Using Sigrinnoli's level of -76 Then adding a -35dB for the proposed GPS Council limit, = 110 dB from the table.

Table 10  
Comparison of Recommended OBE Limits with Sigrinnoli

Tower height (meter)	Transmitter Power (watts)	Transmitter Power "XP" (dBW)	Recommended OBE limit (dB) (dBW/500Hz)	Sigrinnoli Limit "SL" (dB)	Added Attenuation to Protect GPS <sup>®</sup> (dB)
30	100	22.1	-69	-76	-35.1
200	15,000	43.9	-63	-76	-30.9

The out of band emission measurements were made on a TTC Model XL20, a 20 Watt NTSC Translator at 25% of it's rated power, i.e. 5 Watts 8VSB Digital. (This is a Translator that is in wide use and will be converted to DTV in the field. These Translators are very easy to convert to DTV with a DTV Processor or a Regenerator. ) For test set-up and calibrations see Figures 1 through 3.1. This Translator was taken out of NTSC Service, the only adjustments were to the bias for the driver and output amplifiers, for the 8VSB DTV Signal. This Translator has an internal 3 pole filter to meet the less stringent mask. The second and third harmonics out of this translator are below the 110 dB as proposed in the Table (see Figures 4 through 11). All of the out of band emissions tests were below the noise floor at the HP 8590A Spectrum Analyzer, leaving a margin 6 dB or more beyond the 110 dB from Table 10. The tests prove that this particular model of Translator can meet the standard, if properly adjusted.

We believe the Commission should require a low pass filter for all TV Translator Stations, along with the required mask filter. The addition of a low pass filter would provide an additional 50 dB of attenuation above 1 GHz to provide assurance that there would be no out of band emissions. These low pass filters cost \$150.00. This filter is rated at 150 Watts. With the addition of the low pass filter, the Translator operator should not be required to make any out of band emission tests. This low pass filter should have a red label stating "WARNING! DO NOT REMOVE GPS FILTER!"

I have installed and repaired TV Translators in most of the Rocky Mountain States. To my best estimate, 95% of the Translators are from 20 to 100 Watts NTSC, so 25% of the rated NTSC power is 5 to 25 Watts average DTV Power. With a low pass filter, the out of band emissions

will be far below the 110 dB. With the antenna gains up to 13 dB, the ERP would be 500 Watts less the transmission line loss. The Translator used for these tests is operated at 5 Watts of 8VSB DTV on the test bench. When installed as an operating station with an antenna power gain of 13 dB, would have ERP of less than 100 Watts after the line loss is added in. At this level of in band power, the harmonic level output above 1 GHz is very low since the in band power is so low. Most Translator Station antennas are mounted on poles or towers ranging from 20 to 100 feet. Almost all of the Translator sites in rural areas, usually on mountain tops or high ridges, some distance from the communities they are covering.

If the Commission will accept the low pass filter, using the U.S. GPS Industry Council's proposals, it will protect the GPS System and all other users above 1 GHz. This will also lower the noise floor at the Translator Sites.

Respectfully submitted.

## TABLE OF CONTENTS FOR FIGURES

Figure 1 is a diagram of the test setup

Figure 2 is a chart of the attenuation of the high pass filter and the 20dB pad

Figure 3 is the Mini Circuits NHP-800 High Pass Filter as per the Manufacturer

Figure 3.1 is a sweep pattern of the NHP-800 High Pass Filter made on a HP8590A Spectrum Analyzer

Figure 4 is a plot of the EMR #4550 O/L Low Pass Filter costing \$150.00

Figure 5 is the results of GPS band tests at 1152 MHz

Figure 6 is the results of GPS band tests at 1227 MHz

Figure 7 is the results of GPS band tests at 1572 MHz

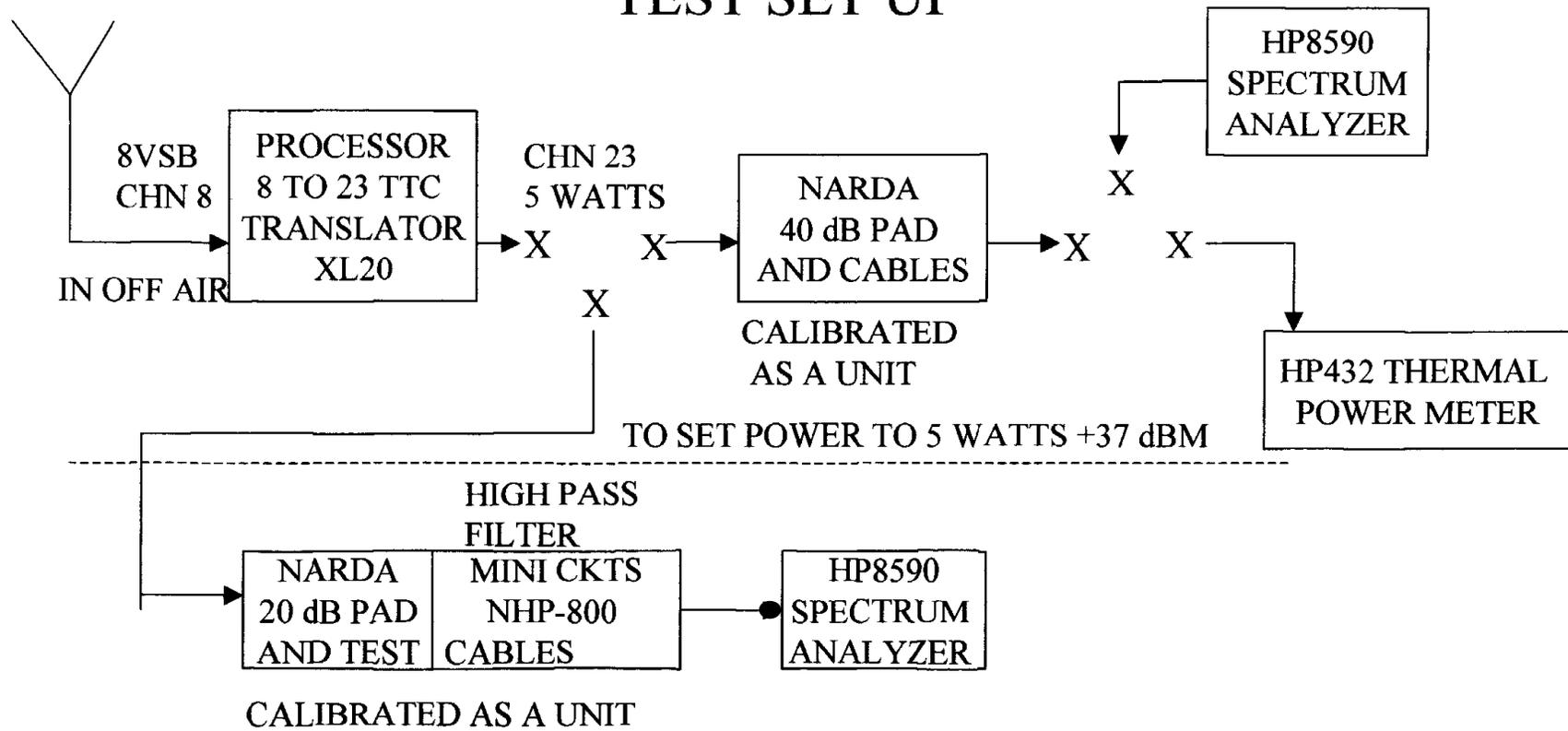
Figure 8 is the results of the second harmonic of channel 23 at 1055 MHz

Figure 9 is the results of the third harmonic of channel 23 at 1581 MHz

Figure 10 is the results of the second harmonic of channel 23 at 1055 MHz with the 3 pole filter Removed

Figure 11 is the results of the second harmonic of channel 23 at 1055 MHz without the 3 pole filter, with the EMR low pass filter

# TEST SET UP



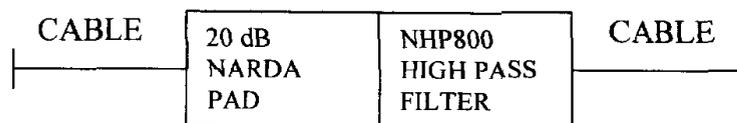
## SET UP FOR HARMONIC TESTS

- \* TTC XL20 SN 6907-5908-006
- \* HP SPECTRUM ANALYZER #8590 SN 2713A01471
- \* HP POWER METER #432A SN 1848A26841
- \* MINI CIRCUITS HIGH PASS FILTER NHP-800 SN 10330
- \* NARDA 30 dB #766-30 AND MINI CIRCUITS 10 dB #UNAT-10
- \* NARDA 20dB ATTENUATOR #768-20SP

FIGURE 1

## CALIBRATION CHART

### EQUIPMENT TESTED AS A COMPLETE UNIT



NARDA 20 Db Pad  
#768-20SP  
DC TO 19.8 GHz

MINI CKTS HIGH PASS  
FILTER # NHP-800  
SN 10330

Channel 23 at 527 MHz = -20.7 dB

At harmonics of Channel 23:

Second harmonics = 1048 to 1060 MHz = - 21.5 dB

Third harmonics = 1570 to 1590 MHz = - 22.1 dB

GPS Frequencies:

1164 to 1188 MHz = -21.5 dB

1215 to 1240 MHz = - 21.7 dB

1559 to 1610 MHz = - 22.1 dB

Total Calibration of the Test Setup:

.5 GHz = - 20.7 dB

1 GHz = - 21.5 dB

1.1 GHz = - 21.6 dB

1.2 GHz = - 21.7 dB

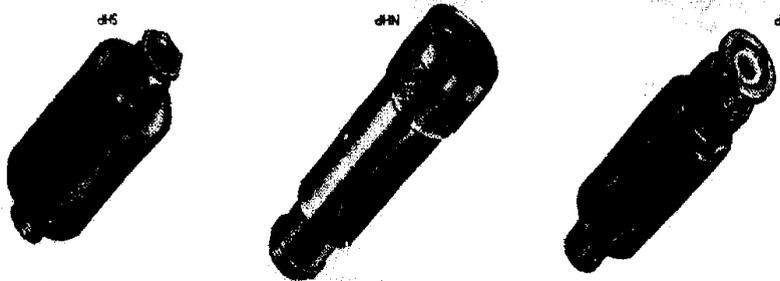
1.3 GHz = - 21.8 dB

1.4 GHz = - 21.9 dB

1.5 GHz = - 22.0 dB

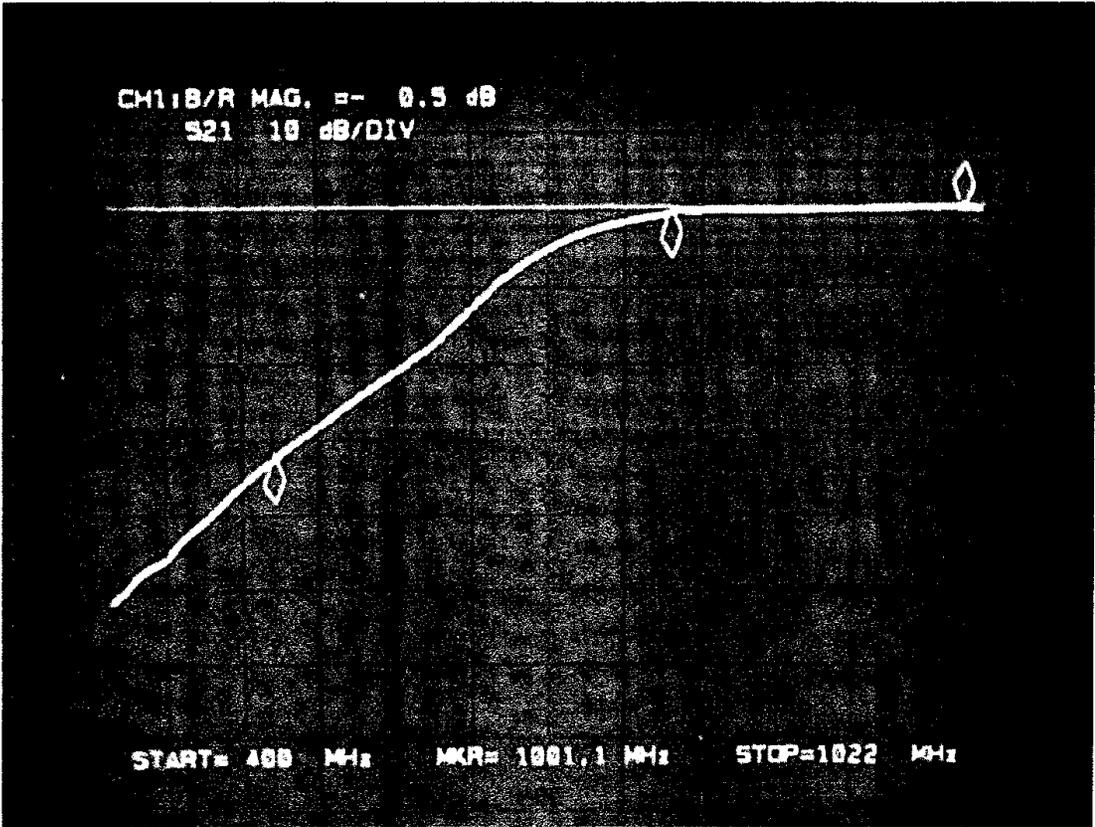
1.6 GHz = - 22.1 dB

FIGURE 2



Part No.	Case Style	Frequency Range	Impedance	Attenuation	Insertion Loss	Return Loss	Shielding	Material	Notes
DC-13	FF57	1.7-1	18.1	0.26	1.71	18.1	1.71	18.1	27.5-200
DC-20	FF55	1.5-1	18.1	0.26	1.71	18.1	1.71	18.1	41-200
DC-40	FF55	1.5-1	18.1	0.26	1.71	18.1	1.71	18.1	90-400
DC-70	FF57	1.5-1	18.1	0.27	1.71	18.1	1.71	18.1	133-600
DC-145	FF57	1.3-1	18.1	0.28	1.71	18.1	1.71	18.1	185-800
DC-210	FF57	1.3-1	18.1	0.28	1.71	18.1	1.71	18.1	275-1200
DC-280	FF55	1.0-1	18.1	0.29	1.71	18.1	1.71	18.1	500-1600
DC-350	FF55	0.9-1	18.1	0.29	1.71	18.1	1.71	18.1	600-1800
DC-425	FF55	0.8-1	18.1	0.29	1.71	18.1	1.71	18.1	700-1800
DC-495	FF55	0.7-1	18.1	0.30	1.71	18.1	1.71	18.1	800-2000
DC-560	FF55	0.6-1	18.1	0.30	1.71	18.1	1.71	18.1	900-2200
DC-630	FF57	0.5-1	18.1	0.30	1.71	18.1	1.71	18.1	1000-2300
DC-700	FF57	0.4-1	18.1	0.30	1.71	18.1	1.71	18.1	1100-2400
DC-770	FF57	0.3-1	18.1	0.30	1.71	18.1	1.71	18.1	1200-2500
DC-840	FF57	0.2-1	18.1	0.30	1.71	18.1	1.71	18.1	1300-2600
DC-910	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1400-2700
DC-980	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1500-2800
DC-1050	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1600-2900
DC-1120	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1700-3000
DC-1190	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1800-3100
DC-1260	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	1900-3200
DC-1330	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2000-3300
DC-1400	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2100-3400
DC-1470	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2200-3500
DC-1540	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2300-3600
DC-1610	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2400-3700
DC-1680	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2500-3800
DC-1750	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2600-3900
DC-1820	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2700-4000
DC-1890	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2800-4100
DC-1960	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	2900-4200
DC-2030	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3000-4300
DC-2100	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3100-4400
DC-2170	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3200-4500
DC-2240	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3300-4600
DC-2310	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3400-4700
DC-2380	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3500-4800
DC-2450	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3600-4900
DC-2520	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3700-5000
DC-2590	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3800-5100
DC-2660	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	3900-5200
DC-2730	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4000-5300
DC-2800	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4100-5400
DC-2870	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4200-5500
DC-2940	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4300-5600
DC-3010	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4400-5700
DC-3080	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4500-5800
DC-3150	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4600-5900
DC-3220	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4700-6000
DC-3290	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4800-6100
DC-3360	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	4900-6200
DC-3430	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5000-6300
DC-3500	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5100-6400
DC-3570	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5200-6500
DC-3640	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5300-6600
DC-3710	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5400-6700
DC-3780	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5500-6800
DC-3850	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5600-6900
DC-3920	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5700-7000
DC-3990	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5800-7100
DC-4060	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	5900-7200
DC-4130	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6000-7300
DC-4200	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6100-7400
DC-4270	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6200-7500
DC-4340	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6300-7600
DC-4410	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6400-7700
DC-4480	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6500-7800
DC-4550	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6600-7900
DC-4620	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6700-8000
DC-4690	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6800-8100
DC-4760	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	6900-8200
DC-4830	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7000-8300
DC-4900	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7100-8400
DC-4970	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7200-8500
DC-5040	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7300-8600
DC-5110	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7400-8700
DC-5180	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7500-8800
DC-5250	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7600-8900
DC-5320	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7700-9000
DC-5390	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7800-9100
DC-5460	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	7900-9200
DC-5530	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8000-9300
DC-5600	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8100-9400
DC-5670	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8200-9500
DC-5740	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8300-9600
DC-5810	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8400-9700
DC-5880	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8500-9800
DC-5950	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8600-9900
DC-6020	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8700-10000
DC-6090	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8800-10100
DC-6160	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	8900-10200
DC-6230	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9000-10300
DC-6300	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9100-10400
DC-6370	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9200-10500
DC-6440	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9300-10600
DC-6510	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9400-10700
DC-6580	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9500-10800
DC-6650	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9600-10900
DC-6720	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9700-11000
DC-6790	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9800-11100
DC-6860	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	9900-11200
DC-6930	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	10000-11300
DC-7000	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	10100-11400
DC-7070	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	10200-11500
DC-7140	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	10300-11600
DC-7210	FF57	0.1-1	18.1	0.30	1.71	18.1	1.71	18.1	10400-11700
DC-7280	FF57	0.1-							

# SWEEP PATTERN OF THE NHP-800 HIGH PASS FILTER



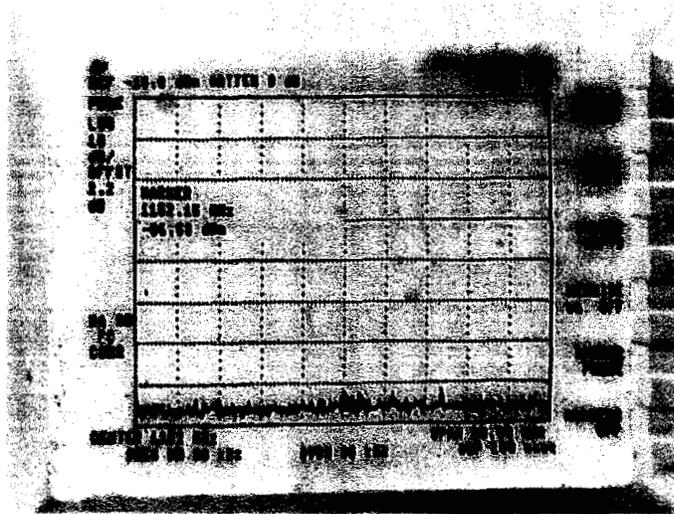
CHN 23 -34.5 dB	825 MHz	1 GHz
@ 527 MHz	-2dB	-.5 dB

As Measured on the HP 8505A Network Analyzer  
SN 2411A02601 OPT 005

FIGURE 3.1



## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL



Measurement of GPS Band 1164 MHz to 1188 MHz.

Analyzer frequency set at 1152 MHz, span 60 Mhz. , 6 MHz/DIV

90 dB = 1 Mega Watt

-(+ 37) dB = 5 Watt Translator

53 dB below 1 Mega Watt

- 86.58 spectrum Analyzer Reading Below 5 Watts

- 139.58 Below 1 Mega Watt

+21.5 Pad and NHP-800 (To Protect Input of Spectrum Anlz)

-118.08 Below 1 Mega Watt

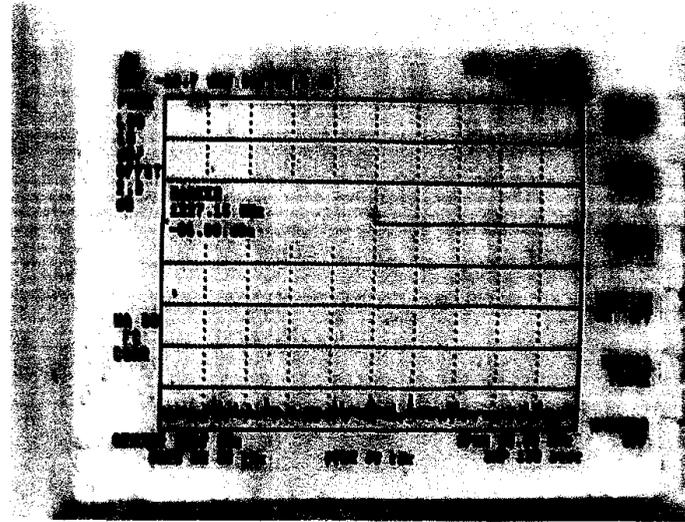
-110 from Table 10

8.08 dB

This exceeds the GPS Standard by 8.08 dB

FIGURE 5

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL



Measurement of GPS Band at 1215 MHz to 1240 MHz.

Analyzer frequency set at 1227 MHz, span 60 Mhz. , 6 MHz/DIV

90 dB = 1 Mega Watt

- (+37) dB = 5 Watt Translator

53 dB below 1 Mega Watt

- 86 spectrum Analyzer Reading Below 5 Watts

- 139 below 1 Mega Watt

+21.7 Pad and NHP-800 (To Protect Input of the Spectrum Anlz)

- 117.3 below 1 Mega Watt

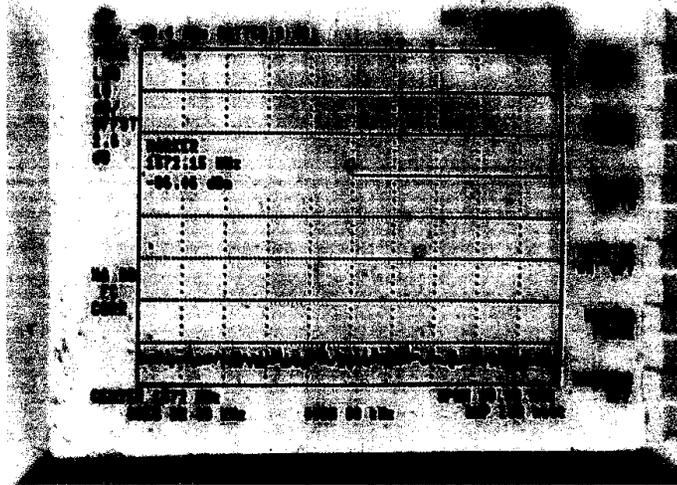
- 110 from Table 10

7.3 dB

This exceeds the GPS Standard by 7.3 dB

Figure 6

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL



Measurement of GPS Band at 1559 MHz to 1610 MHz.

Analyzer frequency set at 1572 MHz, span 60 Mhz. , 6 MHz/DIV

90 dB = 1 Meg a Watt

- (+ 37 dB) = 5 Watt Translator

53 dB below 1 Mega Watt

- 86.46 spectrum Analyzer Reading Below 5 Watts

- 139.46 below 1 Mega Watt

+22.1 Pad and NHP-800 (To Protect Input of Spectrum Anlz)

-117.36 below 1 Mega Watt

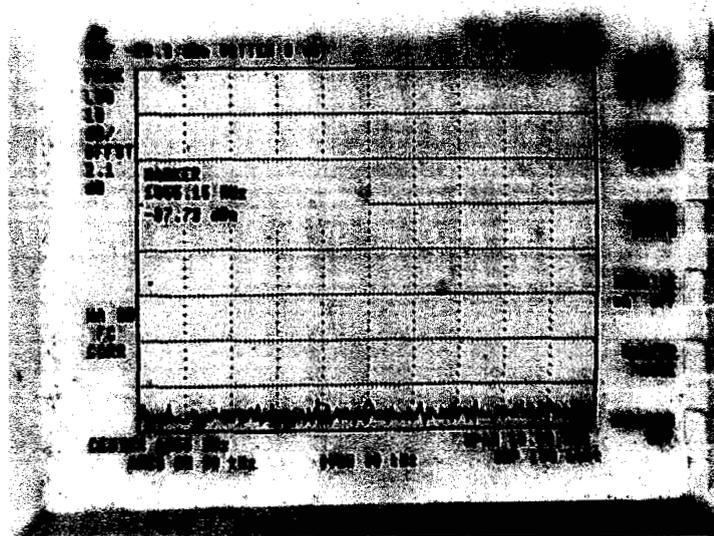
-110 from Table 10

7.36 dB

This exceeds the GPS Standard by 7.36 dB

FIGURE 7

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL

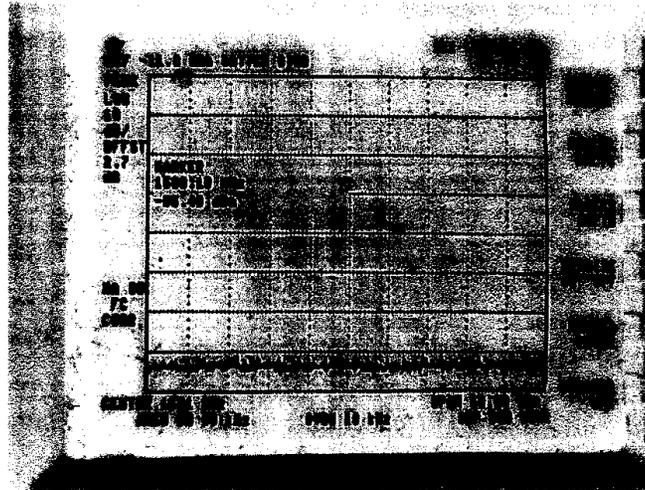


Second Harmonic of Channel 23 = 1048 MHz to 1060 MHz  
Analyzer frequency set at 1055 MHz, span 60 Mhz. , 6 MHz/DIV  
90 dB = 1 Meg a Watt  
-(+ 37 dB) = 5 Watt Translator  
53 dB below 1 Mega Watt  
- 87.73 spectrum Analyzer Reading Below 5 Watts  
- 140.73 below 1 Mega Watt  
+21.5 Pad and NHP-800 (To Protect Input of Spectrum Anlz)  
- 119.23 below 1 Mega Watt  
-110 from Table 10  
9.23 dB

This exceeds the GPS Standard by 9.23 dB

FIGURE 8

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL

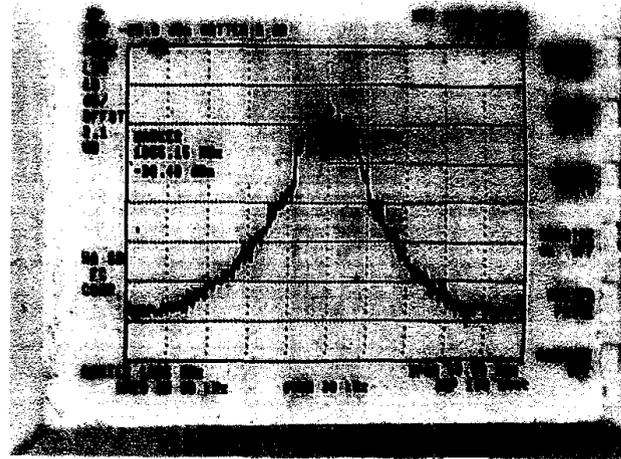


Third Harmonic of Channel 23 = 1572 MHz to 1590 MHz  
Analyzer frequency set at 1581 MHz, span 60 Mhz. , 6 MHz/DIV  
This Harmonic falls in the GPS Band  
90 dB = 1 Mega Watt  
-(+37 dB) = 5 Watt Translator  
53 dB below 1 Mega Watt  
- 85.40 spectrum Analyzer Reading Below 5 Watts  
- 138.4 below 1 Mega Watt  
\*22.1 Pad and NHP-800 (To Protect Input of Spectrum Anlz)  
-116.3 below 1 Mega Watt  
-110 from Table 10  
6.3 dB

This exceeds the GPS Standard by 6.3 dB

FIGURE 9

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL



Second Harmonic of Channel 23 = 1048 MHz to 1060 MHz  
Analyzer frequency set at 1055 MHz, span 60 Mhz. , 6 MHz/DIV  
With 3-Pole Filter Removed (No Filtering)

90 dB = 1 Meg a Watt

-(+ 37 dB) = 5 Watt Translator

53 dB below 1 Mega Watt

- 38.4 spectrum Analyzer Reading Below 5 Watts

- 91.4 below 1 Mega Watt

+21.5 Pad and NHP-800 (To Protect Input of Spectrum Anlz)

- 69.9 below 1 Mega Watt

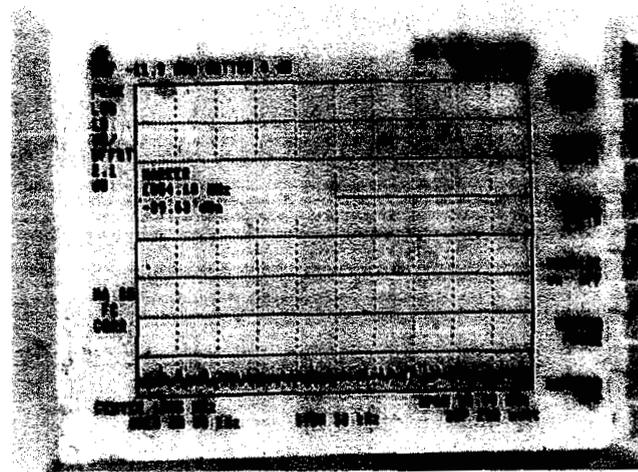
-110 from Table 10

-40.1 dB

Requires 40.1 dB of Filtering to meet the Standard

FIGURE 10

## TTC XL20 TRANSLATOR @ 5 WATTS DIGITAL



Second Harmonic of Channel 23 = 1048 MHz to 1060 MHz  
Analyzer frequency set at 1055 MHz, span 60 Mhz. , 6 MHz/DIV  
Without 3-Pole Filter, With EMR #4550/L Low Pass Filter  
90 dB = 1 Meg a Watt  
-(+ 37 dB) = 5 Watt Translator  
53 dB below 1 Mega Watt  
- 89.63 spectrum Analyzer Reading Below 5 Watts  
- 142.63 below 1 Mega Watt  
+21.5 Pad and NHP-800 To Protect Input of Spectrum Anlz)  
-121.13 below 1 Mega Watt  
-110 from Table 10  
-11.13 dB  
This exceeds the GPS Standard by 11.13 dB

FIGURE 11