P-379 TEST REPORT

S/N: P7898

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Contents

Test Equipment

Equipment	Manufacturer	Model Number	Serial Number
Test Signal Generator	Tektronix	TSG95	B025497
Test Signal Generator	Tektronix	1910	B022706
Spectrum Analyzer	Advantest	R3162	110301419
Spectrum Analyzer	Tektronix	2710	B021677
Waveform Analyzer/Monitor	Tektronix	VM700A	B020283
Radiation Meter	Narda		
Network Analyzer	Agilent	8753ET	US39170436
Frequency Counter	HP	5343A	2428A01747
Audio Generator	HP	209A	1045A06481
Noise and Distortion Meter	HP	334A	1551U00970
Coaxial Attenuator (30 dB)	Bird	8329-310	258
Coaxial Attenuator (30 dB)	Bird	8323	2221
Coaxial Attenuator (6 dB)	Weinschel	58-6-43	
RF Wattmeter	Bird	4304A	0811
RF Wattmeter	Coaxial Dynamics	81060A	1034
RF Load (1200 W)	Microwave Devices	611.11	
RF Load (600W)	Bird	8402	1595
Directional Coupler	HP	778D	
Variable Autotransformer	Staco Energy Products	3PN1010	122-0003 8645
True RMS clamp on meter	Tenma	72-6131	96082691
Digital Multi-meter	Hung Chang	HC-5010EC	15003374
Oscilloscope (150 MHz)	Tektronix	2445	B021074
Television Demodulator	Rhode and Schwarz	EFA83	832495/006
Tunable Down Converter	Tektronix	TDC-10	BO10435
Television Demodulator	MSI	MSI-320	D-022
Digital Camera	Sony	DSC-P73	7412902

Performance Specifications

Visual Power Output Rating

Definition:	The visual power output rating of the television transmitting equipment shall be the peak envelope power. This is also the average power measured during a synchronizing pulse.
Requirement:	Specified by the manufacturer as ______+15_______ dBm peak.
Method:	The visual carrier is modulated with a sync and blanking signal. The aural carrier is not present. An average reading RF wattmeter is placed between the transmitter output (directly on the directional coupler's N connector on the back panel) and the 50 Ω dummy load. The peak visual power is the measured average power multiplied by a factor of 1.68. Due to the low level of the RF Output signal, a spectrum analyzer was used to measure the visual output rating.
Measurement:	The rated visual output power is ______+15_______ dBm peak.

Visual Power Adjustment Capability

Definition: The peak output power adjustment capability is the manual range by which the peak visual output power can be maintained within predetermined limits.

Requirement: Industry Canada – The equipment shall be capable of being adjusted to deliver the rated visual output power when the AC input voltage is 5% above or below rated value. Power output adjustment of the equipment shall permit operation to at least 3 dB below rated power output [BETS-4, section 6.1].

FCC – The transmitter shall be adjustable to 80%, 100%, and 110% of peak visual power simply for the calibration of meters [section 73.663]. Except as operated in a reduced power operation, the visual output power of a TV transmitter or translator must be maintained as near as practicable to the authorized transmitter output power and may not be less than 80% nor more than 110% of authorized power [section 73.1560(c)]

Method: The visual carrier is modulated with a sync and blanking signal. The aural carrier is not present. An average reading RF wattmeter is placed between the transmitter output (directly on the directional coupler's N connector on the back panel) and the 50 Ω dummy load. The peak visual power is the measured average power multiplied by a factor of 1.68. While observing the external wattmeter, the output power is varied to ensure that is adjustable over the proper ranges.

Measurement: Upper limit of visual output power adjustment ____110____%
Lower limit of visual output power adjustment ____0____%

Aural Power Output Rating

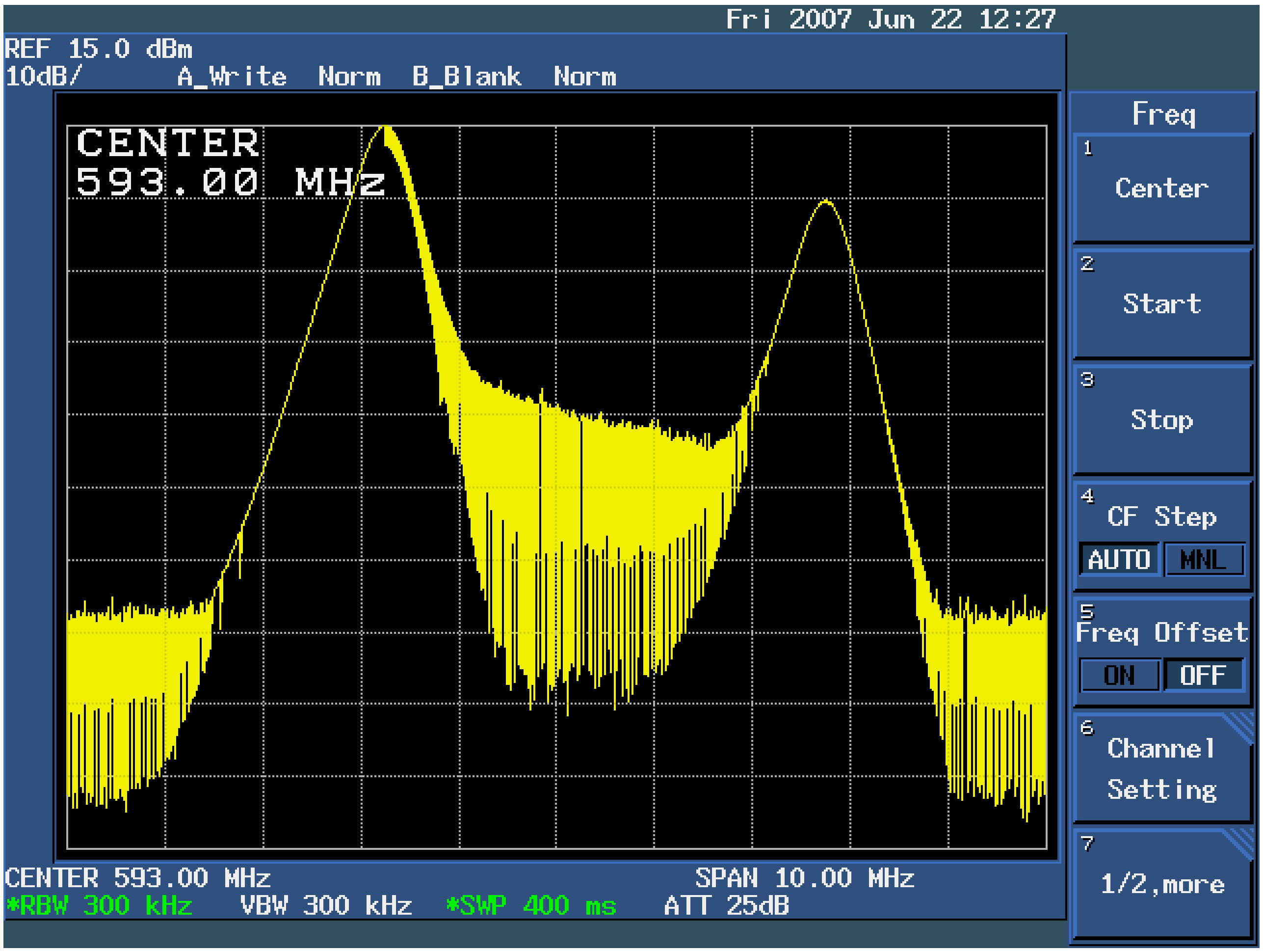
Definition: The aural carrier power output is the power of the aural transmission section available at the output terminals of the equipment when connected to the standard test load.

Requirement: Industry Canada – The measured aural carrier output shall not be less than 10% nor more than 20% of the output power of the visual transmission section for standard power (> 50 watts VHF or > 500 watts UHF) and shall not be less than 5% nor more than 20% of the output power of the visual transmission section for standard low power (≤ 50 watts VHF or ≤ 500 watts UHF) [BETS-4, section 6.2].

FCC – Aural carrier must be at least 6.6 dB below visual carrier power [sections 73.682(a)(15) and 73.1560(c)(2)].

Method: The average power output of the unmodulated aural carrier is measured while operating into the standard test load either by using a power measuring device or by a calorimetric method.

Measurement: The aural carrier is 10.0 dB below the tip of sync of visual carrier. (Also tested at 13.0 dBc)



Aural Power Output with Carrier at 10.0 dB

Carrier Frequency Tolerance

Definition:	Frequency tolerance is a measure of the maximum permissible departure of the characteristic frequency of an emission from its assigned frequency.
Requirement:	Industry Canada – The frequency stability of both visual and aural carriers shall remain within ± 500 Hz of the mean frequency for standard power and shall remain within ± 0.003% of the mean frequency for standard low power [BETS-4, section 6.3]. FCC – The departure of the visual carrier frequency of a TV station may not exceed ± 1,000 Hz from the assigned visual carrier frequency. The departure of the aural carrier frequency of a TV station may not exceed ± 1,000 Hz from the actual visual carrier frequency plus exactly 4.5 MHz. The chrominance subcarrier frequency is 63/68 times precisely 5 MHz. The tolerance is ± 10 Hz and the rate of frequency drift must not exceed 0.1 Hz per second [section 73.1545(c)].
Method:	After a warm up period of at least one hour at rated power, the frequency of the visual and aural carriers is measured at one-minute intervals during a period of fifteen minutes. From these measurements, the mean test frequency is determined of each carrier as well as inter-carrier separation. The operating frequencies are measured at ambient temperatures from –30°C to +50°C (in 10°C steps) and at the following three values of power supply voltage for each of these temperatures; 85%, 100%, and 115% of nominal AC supply voltage.

Measurement: Mean visual carrier frequency is 591.250 290 MHz

TEMPERATURE (˚C)	AC VOLTAGE	VISUAL FREQUENCY (MHz)	VISUAL DEVIATION (Hz)
-30	100	591.250 611	+321
	118	591.250 606	+316
	136	591.250 612	+322
-20	100	591.250 559	+269
	118	591.250 562	+272
	136	591.250 545	+255
-10	100	591.250 463	+173
	118	591.250 458	+168
	136	591.250 456	+166
0	100	591.250 431	+141
	118	591.250 425	+135
	136	591.250 462	+132
5	100	591.250 412	+122
	118	591.250 410	+120
	136	591.250 414	+124
10	100	591.250 370	+80
	118	591.250 372	+82
	136	591.250 374	+84
20	100	591.250 278	-12
	118	591.250 280	-10
	136	591.250 276	-14
30	100	591.250 285	-5
	118	591.250 287	-3
	136	591.250 289	-1
40	100	591.250 275	-15
	118	591.250 270	-20
	136	591.250 271	-19
45	100	591.250 265	-25
	118	591.250 262	-28
	136	591.250 260	-30
50	100	591.250 251	-39
	118	591.250 248	-42
	136	591.250 246	-44

Measurement: Mean aural carrier frequency is 595.750 261 MHz

TEMPERATURE (˚C)	AC VOLTAGE	AURAL FREQUENCY (MHz)	AURAL DEVIATION (Hz)
-30	100	595.750 621	+360
	118	595.750 625	+364
	136	595.750 628	+367
-20	100	595.750 574	+313
	118	595.750 570	+309
	136	595.750 576	+315
-10	100	595.750 536	+275
	118	595.750 541	+280
	136	595.750 539	+278
0	100	595.750 505	+244
	118	595.750 510	+249
	136	595.750 513	+252
5	100	595.750 408	+147
	118	595.750 406	+145
	136	595.750 411	+150
10	100	595.750 322	+61
	118	595.750 331	+70
	136	595.750 353	+92
20	100	595.750 262	+1
	118	595.750 265	+4
	136	595.750 264	+3
30	100	595.750 263	+2
	118	595.750 259	-2
	136	595.750 259	-2
40	100	595.750 236	-25
	118	595.750 233	-28
	136	595.750 235	-26
45	100	595.750 222	-39
	118	595.750 217	-44
	136	595.750 219	-42
50	100	595.750 206	-55
	118	595.750 204	-57
	136	595.750 207	-54

Measurement: Chrominance frequency tolerance deviation < 3.4 Hz

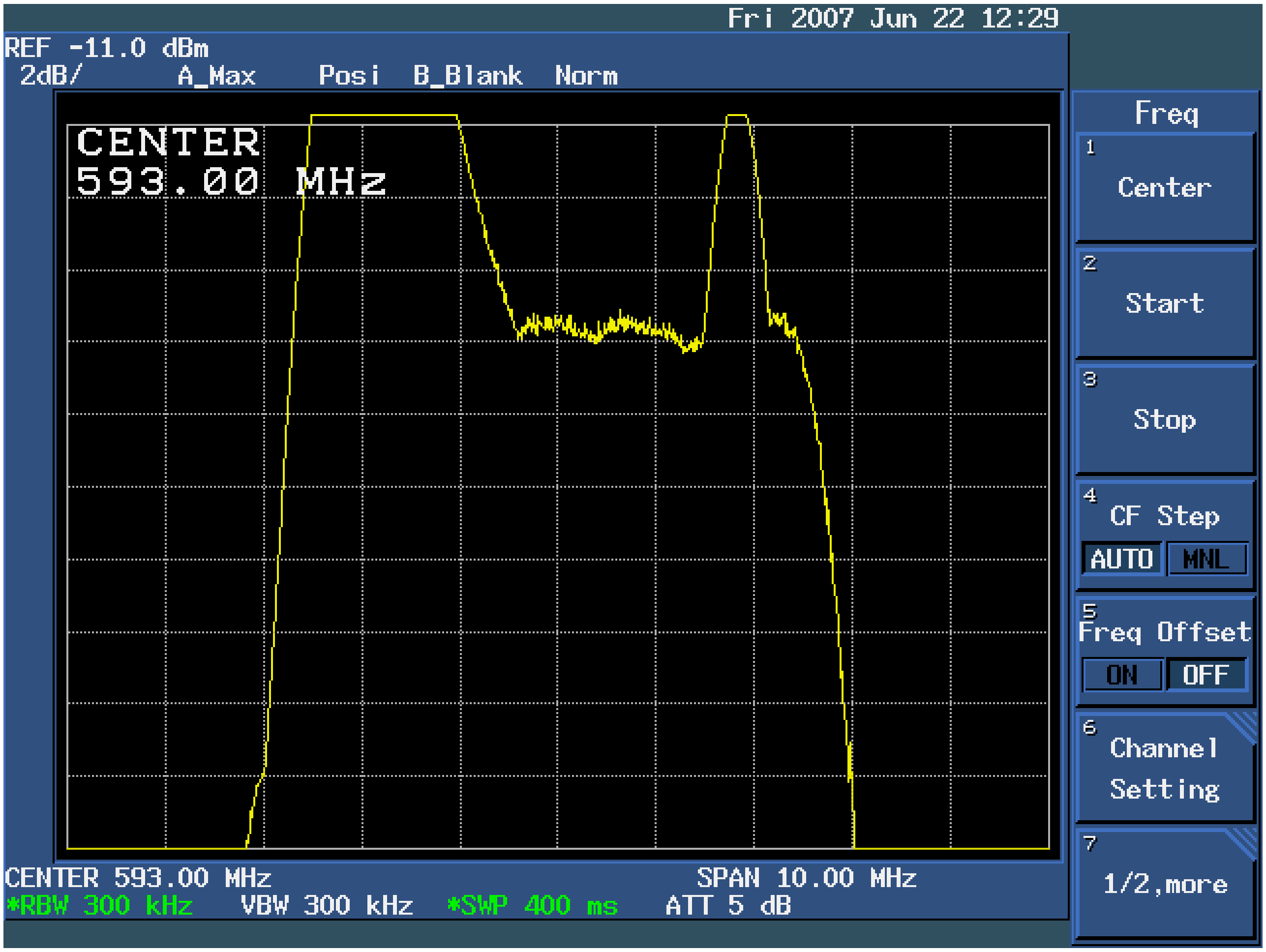
Visual Frequency Response

Definition: The visual frequency response provides a measure of the linearity of the channel passband. This test is completed with just the visual transmitter powered.

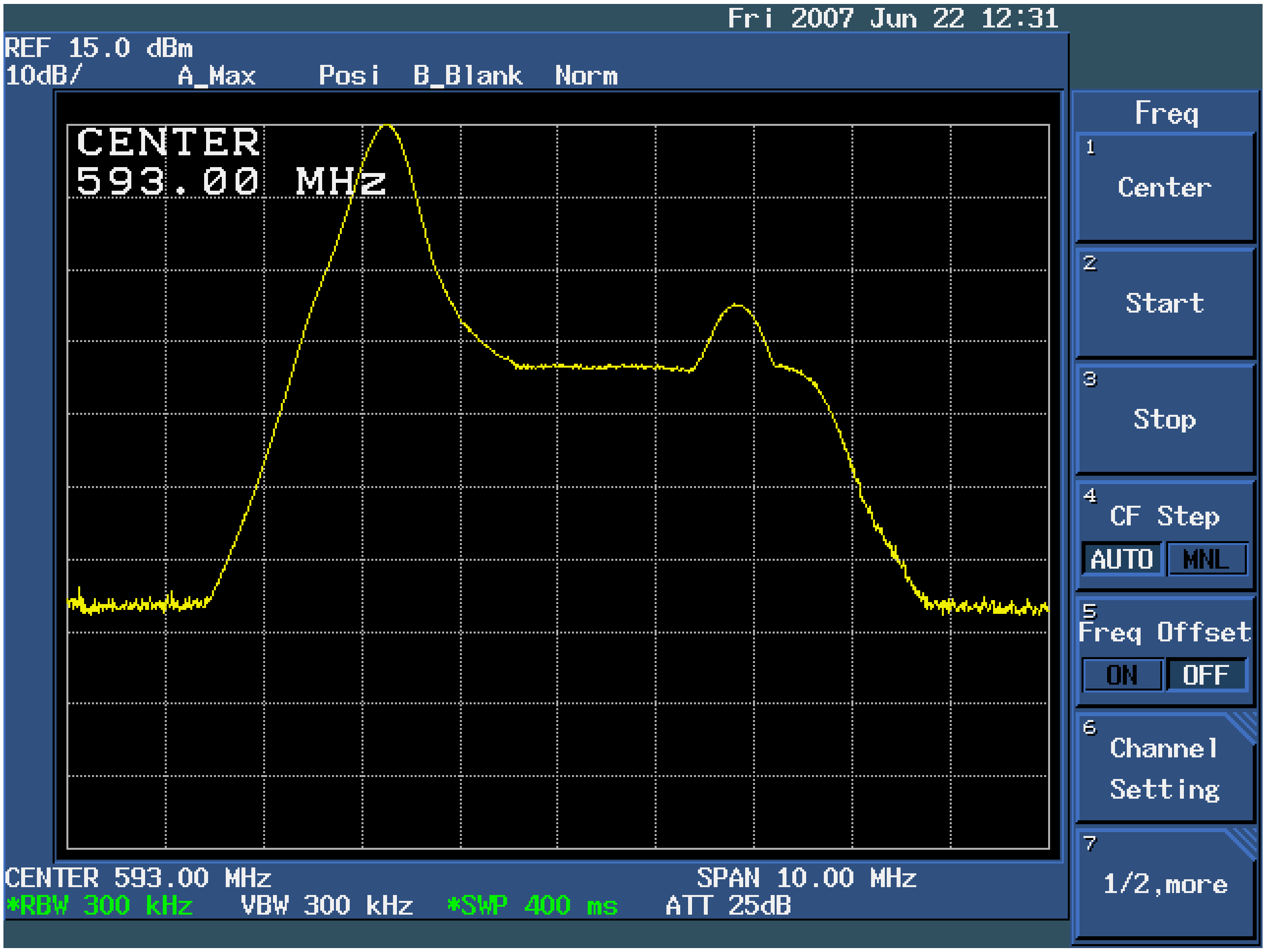
Requirement: FCC – From -1.25 to +4.75 MHz, the visual frequency response should be within a 4 dB window to meet the 4dB window specification. The -3.58 MHz color subcarrier must be -42 dB down. Outside the -1.25 MHz and +4.75 MHz window, the response must be -20 dB.

Method: The visual carrier is modulated with a (sin x)/x test signal with a test signal generator or with a Tektronix 1405 sideband adaptor with 50% APL and 50% sweep amplitude. The aural carrier is removed temporarily. Measure the visual passband frequency response across the channel using a spectrum analyzer in no more than a 2 dB per division scale and also using a 10 dB per division scale.

Measurement: 2 dB and 10 dB responses are plotted on the following pages.



Visual Frequency Response (2dB)



Visual Frequency Response (10dB)

Intermodulation Distortion

Definition: Intermodulation distortion (IMD) products are beat signals generated by various combinations of carriers of the nature mf1 ± nf2 ± pf3 where m, n, and p are integers. The visual and aural carriers and color sub-carrier can combine to form IMD products. Six predominant products, with respect to visual carrier, are at ± 920 kHz, ± 2.66 MHz, + 5.42 MHz, and + 7.16 MHz.

Requirement: Industry Canada – The level of the predominant IMD products shall be at least 53 dBc (dB referenced to visual carrier) for standard power (> 50 watts VHF or > 500 watts UHF) and shall be at least 50 dBc for standard low power (≤ 50 watts VHF or ≤ 500 watts UHF) [BETS-4, section 6.4].

FCC – No FCC requirement.

Method: The visual carrier is modulated with a sync and blanking signal. The aural carrier is removed temporarily. An average reading RF wattmeter is placed between the transmitter output (directly on the directional coupler's N connector on the back panel) and the 50 Ω dummy load. The output power is set to the output power rating. With the power output set, an unmodulated aural carrier applied, the visual carrier is then modulated with a test signal, full field red with 50% APL. The resultant IMD products are measured with respect to the visual carrier.

Measurement:

+ 920 kHz	-56	dBc
- 920 kHz	-63	dBc
+ 2.66 MHz	-68	dBc
- 2.66 MHz	>-80	dBc
+ 5.42 MHz	-76	dBc
+ 7.16 MHz	-77	dBc

Intermodulation Distortion Products

Spurious Emissions

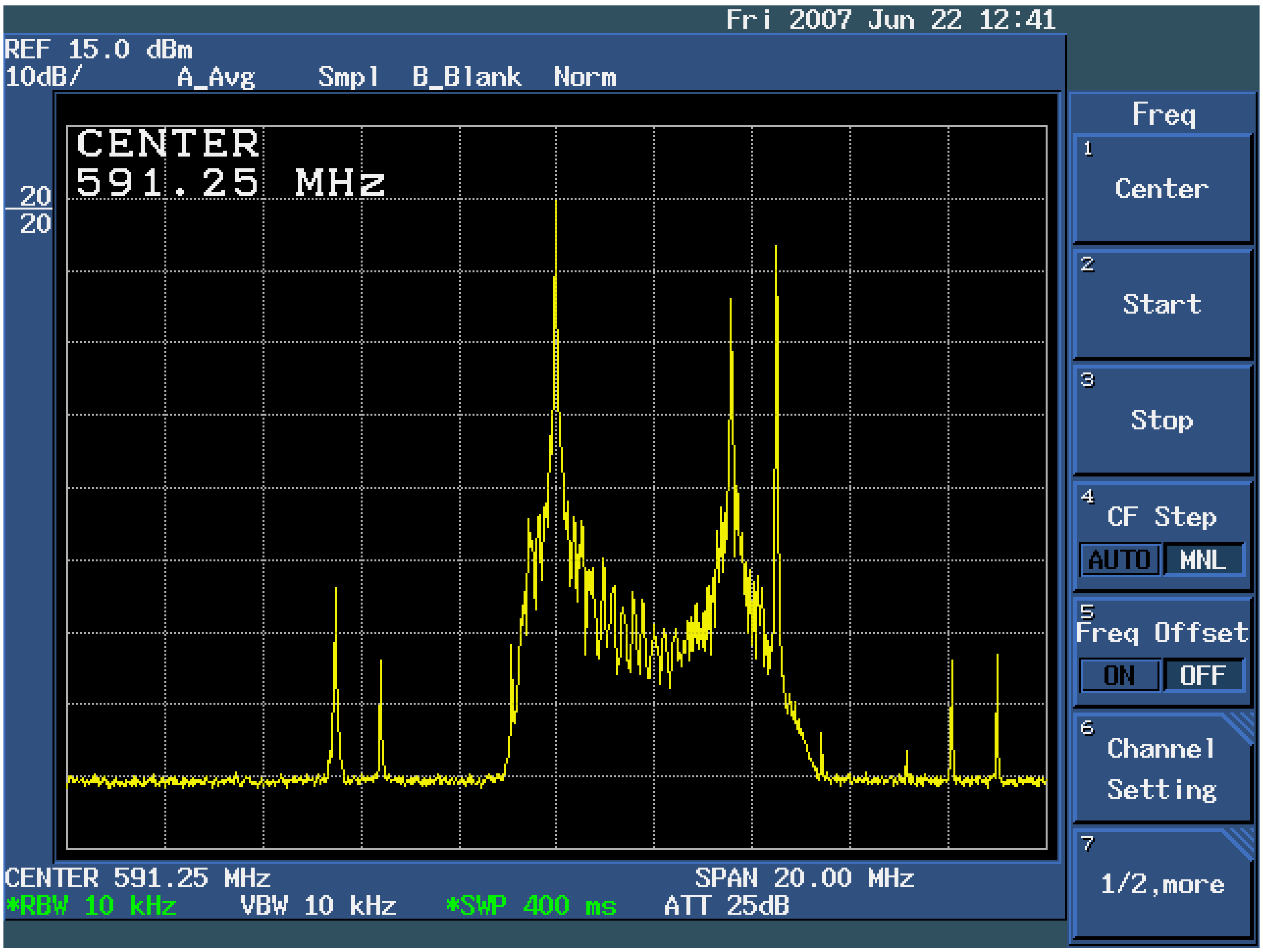
Definition:	Spurious emissions are unwanted emissions occurring at the output terminals of the transmitting equipment, at frequencies other than those of the predominant IMD products.
Requirement:	Industry Canada – The –4.5 MHz and +9.0 MHz spurious emissions shall be –40 dBc. All other spurious and harmonic emissions shall be -15 dBm for transmitted power below 25 watts and 60 dBc when the transmitted power is above 25 watts [BETS-4, section 6.5.3]. FCC – Harmonics and lower/upper sideband spurious signals that are below/above 3 MHz of the channel edge shall be at least 60 dB below peak visual carrier [section 73.687(e)(1)].
Method:	The visual carrier is modulated with a normal black level (with or without sync). The aural carrier is present and unmodulated. The 0 dB reference is established on the spectrum analyzer with the resolution bandwidth initially set to 3 MHz per division. The display is adjusted such that the tip of sync is on the first horizontal graticule line. Once the 0 dB reference is established, all spurious emissions are measured up to the tenth harmonic of the aural carrier frequency.
Measurement:	

Spurs

-4.5 MHz	-58	dBc
+9.0 MHz	-67	dBc
All others	>-67	dBc

Harmonics

2nd	-75	dBc
3rd	-78	dBc
4th	>-80	dBc
5th	>-80	dBc
6th	>-80	dBc
7th	>-80	dBc
8th	>-80	dBc
9th	>-80	dBc
10th	>-80	dBc



Spurious Emissions

Modulation

Definition: Depth of modulation measurements indicate whether or not video signal levels are properly represented in the RF signal. The NTSC modulation scheme yields an RF signal that reaches its maximum peak-to-peak amplitude at sync tip (100%). In a properly adjusted signal, blanking level corresponds to 75%, and peak white to 12.5%. The zero carrier reference level corresponds to 0%.

Requirement: Industry Canada – With the blanking level at 75%, the maximum carrier level shall remain between 98% and 102% of the original, and the white level shall be at 12.5% ± 2.5% [BETS-4, section 1.3].

FCC – The reference white level shall be at 12.5% ± 2.5% of peak carrier level [section 73.682(a)(13)]. The blanking level shall be at 75% ± 2.5% of the peak carrier level [section 73.682(a)(12)]. The setup interval shall be at 7.5% ± 2.5% of the video range from the blanking level to the reference white level [section 73.682(a)(17)].

Method: Modulation depth is measured at the output of a precision demodulator by verifying that the ratios between the parts of the signal are correct. Overall amplitude is not critical, but it should be adjusted in the system to be approximately 160 IRE from sync tip to zero carrier at 100% transmitter or translator power. This will minimize the effects of nonlinearities in the measurement system.

Measurement: The blanking level is at 75 %.
The reference white level is at 12.5 %.
The sync tip is at 100 %.

Chrominance-Luminance Gain Inequality

Definition: The luminance and chrominance of a television signal should be transferred through a system with their relative amplitudes undistorted. The chrominance-luminance gain inequality is defined as the change in level of the chrominance component of the test signal relative to the luminance component and is measured with the modulated 12.5T pulse.

Requirement: Industry Canada – The chrominance-luminance relative amplitude shall be less than 3 IRE units [BETS-4, section 1.11].

FCC – No FCC requirement.

Method: The chrominance-luminance gain inequality is measured by setting the waveform monitor so that the modulated pulse amplitude goes from blanking to the 100 IRE level. If only a gain inequality is present, the baseline of the pulse will describe a continuous curve. The peak amplitude is taken of this curve and is plotted against the vertical axis of a modulated sin^2 pulse application nomograph for measuring this gain inequality. Then the chrominance-luminance gain inequality, or relative chroma level can be determined.

Alternatively, a video measurement system is used to complete this measurement. Chrominance-luminance gain distortion can be measured by selecting CHROM/LUM GAIN DELAY with the Tektronix VM700A in measure mode. The graph plots error with respect to zero and the numeric results are displayed at the top of the screen.

Measurement: The chrominance-luminance relative amplitude is 96.9 % when using the VM700A.

Chrominance-Luminance Delay Inequality

Definition: At the time of signal origination, the chrominance and luminance components of the television signal are correctly timed with respect to one another. If any delay is introduced in one component without an equal delay being introduced in the other, when the signal gets to a picture monitor, both components will be misregistered. This is most often noticed on red letters smeared to the right into a white or neutral background, or as bad as to make the received picture appear to have color ghosts.

Requirement: Industry Canada – The chrominance-luminance relative delay shall be less than 50 nanoseconds [BETS-4, section 1.11]

FCC – No FCC requirement.

Method: The chrominance-luminance delay inequality is measured with the 12.5T pulse. This signal consists of equal peak amplitudes of chrominance and luminance, and is usually transmitted as part of a composite test signal. The test signal is positioned as it was in chrominance-luminance gain measurements. The baseline of the waveform is observed. A sinusoidal shape on the baseline of the pulses indicates the presence of chrominance to luminance delay. The peak-to-peak excursions of the sinusoid are measured and plotted on the same nomograph as used for gain inequality. The intersection of these points indicates the chrominance-luminance delay.

Alternatively, a video measurement system is used to complete this measurement. Chrominance-luminance delay distortion can be measured by selecting CHROM/LUM GAIN DELAY with the Tektronix VM700A in measure mode. The graph plots error with respect to zero and the numeric results are displayed at the top of the screen.

Measurement: The chrominance-luminance delay inequality is ___+29.6___ nsec.

Differential Gain Distortion

Definition: Differential gain distortion refers to a change in chrominance amplitude with changes in luminance level. The vividness of a colored object changes with variations in scene brightness.

Requirement: Industry Canada – The differential gain distortion shall not be greater than 7% for standard power (> 50 watts VHF or > 500 watts UHF) and shall not be greater than 15% for standard low power (≤ 50 watts VHF or ≤ 500 watts UHF) [BETS-4, section 1.6].

FCC – The angles of the subcarrier measured with respect to the burst phase, when reproducing saturated primaries and their complements at 75% of full amplitude, shall be within ± 10° and their amplitudes be within ±20% of the values specified in 73.682(a)(20) [section 73.682(a)(20)(vii)].

Method: The video signal is modulated with a full field five-riser modulated staircase signal (includes 3.58 MHz color subcarrier). The transmitting equipment is run to the specified visual output power level. The output of the transmitter or translator is then demodulated and run into the input of a calibrated vectorscope or video measurement system to observe the 3.58 MHz color subcarrier component of the test signal. Any deviation from a constant amplitude display of the 3.58 MHz signal, when viewed at the line rate frequency, is the differential gain variation. The differential gain is the difference between the maximum and minimum 3.58 MHz signal amplitude divided by the maximum amplitude. The differential gain is observed at 10%, 50%, and 90% APL conditions and the worse case result is recorded.

To make an automatic measurement of differential gain with the VM700A, select DG/DP in the measure mode. Both differential phase and differential gain are shown on the same display (the upper graph is differential gain.

Measurement: The differential gain distortion is 3.79 %.

Differential Phase Distortion

Definition: Differential phase distortion occurs if a change in luminance level produces a change in the chrominance phase. If the distortion is severe, the hue of an object will change as its brightness changes. Differential phase distortion can change with changes in APL.

Requirement: Industry Canada – The differential phase distortion for standard power (> 50 watts VHF or > 500 watts UHF) shall be within ± 4° of the color burst and the overall difference shall not exceed 5°. For standard low power (≤ 50 watts VHF or ≤ 500 watts UHF), the differential phase shall be within ± 7° of the color burst and the overall difference shall not exceed 10° [BETS-4, section 1.7].

FCC – No FCC requirement (only cable systems Part 76 at 10 degrees)

Method: The video signal is modulated with a full field five-riser modulated staircase signal (includes 3.58 MHz subcarrier). The transmitting equipment is run to the specified visual output power level. The output of the transmitter or translator is then demodulated and run into the input of a calibrated vectorscope or video measurement system suitable for measuring differential phase. The differential gain is observed at 10%, 50%, and 90% APL conditions and the worse case result is recorded.

To make an automatic measurement of differential phase with the VM700A, select DG/DP in the measure mode. Both differential phase and differential gain are shown on the same display (the lower graph is differential phase.

Measurement: The differential phase distortion is ___4.68___ degrees.

Group Delay Response

Definition: The group delay of a transmitter or translator is defined as the relationship between the variation of group delay and the frequency of the sideband signal for frequencies within the limits of the output channel bandwidth; the sideband signal being produced by a sinusoidal input signal of given constant amplitude and variable frequency.

Requirement:

	FCC [section 73.687(a)(3)]
1.00 MHz	0 ± 100 nsec relative to 200 kHz
2.00 MHz	0 ± 100 nsec relative to 200 kHz
3.00 MHz	0 ± 100 nsec relative to 200 kHz
3.58 MHz	- 170 ± 50 nsec relative to 200 kHz
4.18 MHz	- 346 ± 100 nsec relative to 200 kHz

Method: The transmitting equipment is operated at rated visual power into the standard test load. The measurement is made either on the transmitting equipment's output signal detected by the standard demodulator, or on the separate sideband signals as detected on a synchronous sweep receiver. The aural carrier is turned off and the video input consists of sync, blanking, and a variable pedestal, initially set to 25 IRE units. Composite video signals may be used if they are without a vertical interval since it obscures the measurement on some types of delay measurement equipment. The equipment output is sampled and is fed into a tracking receiver (sideband analyzer or spectrum analyzer). The 0 dB reference is set to the output level at visual carrier + 200 kHz. High rate group delay ripples as a result of saw filter triple transit effect are excluded.

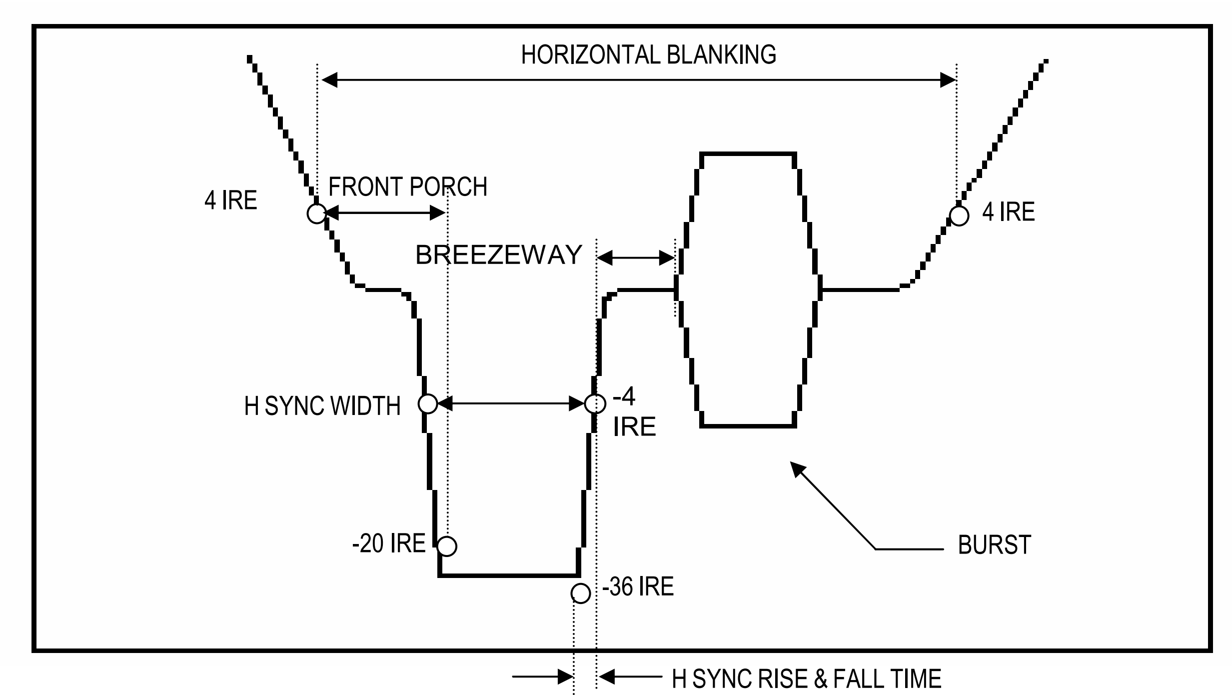
Alternatively, group delay is measured using the (sin x)/x test signal from the TSG-95 generator and the automatic measurement system in the VM700A. Select Group Delay and Gain in the VM700A measure mode.

Measurement:

1 MHz: ____+50____ nsec relative to 200 kHz
2 MHz: ____-35____ nsec relative to 200 kHz
3 MHz: ____-45____ nsec relative to 200 kHz
3.58 MHz: ____-130____ nsec relative to 200 kHz
4.18 MHz: ____-285____ nsec relative to 200 kHz

Horizontal Timing

Definition:



Requirements:

	FCC [section 73.699, fig.6]
Front Porch	1.27 µsec min
H Sync Pulse	4.45 to 5.08 µsec
H Sync Rise/Fall Time	0.254 µsec max
Breezeway	0.38 µsec min
Burst Duration	8 to 11 cycles of chrominance subcarrier
Burst Amplitude	90% to 110% of H sync
Horizontal Blanking	10.49 to 11.49 µsec recommended

Measurement:

Front Porch:	1.53	µsec
H Sync Pulse:	4.72	µsec
H Sync Rise Time (leading):	139	nsec
H Sync Rise Time (trailing):	186	nsec
Breezeway:	0.46	µsec
Burst Duration:	9	cycles
Burst Amplitude:	40.3	IRE
Horizontal Blanking:	10.71	µsec

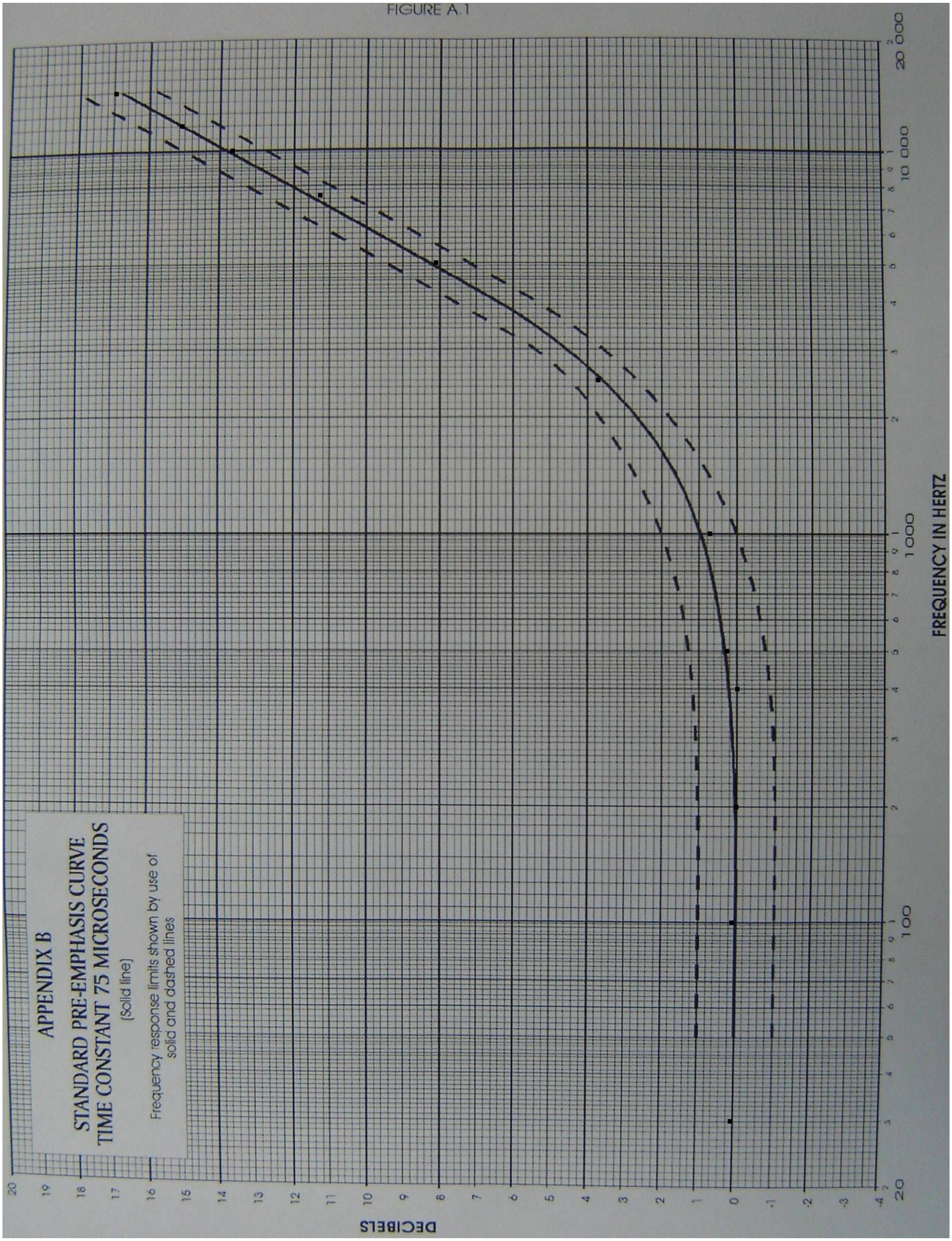
Audio Amplitude Frequency Response

Definition: For the audio input channel, the audio amplitude frequency response of a television transmitter or translator is defined as the ratio of the input voltages at specific frequencies, referenced to a 400 Hz test tone of sufficient amplitude to result in 100% modulation required to obtain a constant percentage of modulation. The input voltages at specific frequencies are within the range from 30 Hz to 15 kHz and the ratio is expressed in dB.

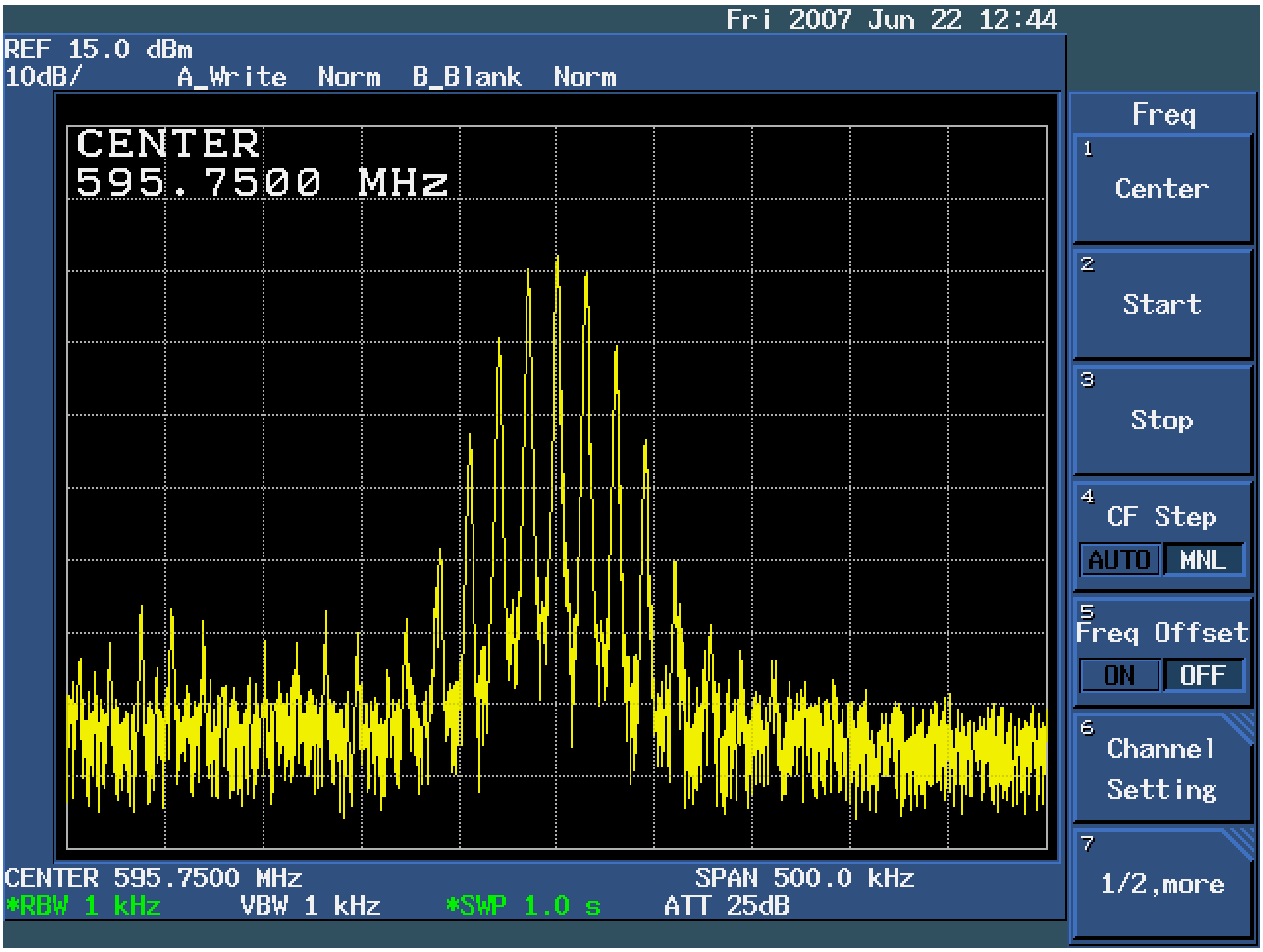
Requirement: Industry Canada – For audio, the maximum departure of the amplitude response from the standard 75 µsec pre-emphasis curve over the range of 30 Hz to 15 kHz shall not exceed ± 0.5 dB up to ± 25 kHz deviation [BETS-4, section 2.3].

FCC – Pre-emphasis shall be employed as closely as practicable in accordance with the impedance-frequency characteristic of a series inductance-resistance network having a time constant of 75 µsec [section 73.687(b)(1) and 73.699, figure 12].

Method: The visual carrier is unmodulated and turned on. A 400 Hz sinusoidal signal from a calibrated audio oscillator is applied to the audio input terminals at a level sufficient to produce 100% modulation. The aural section of the transmitter has the pre-emphasis turned on and a sample from the output is applied to the input of a modulation monitor. The audio oscillator's output level at 400 Hz is adjusted to achieve a + 25 kHz deviation. This level is recorded and used as a reference. The audio output level of the audio oscillator is adjusted at 30, 100, 200, 500, 1000, 2500, 5000, 7500, 10000, 12000, and 15000 Hz to retain the ± 25 kHz deviation and the change in audio output level of the audio oscillator compared to the reference is recorded.



Audio Pre-emphasis Curve



Aural Occupied Bandwidth

Automatic Gain Control Performance

Definition: The AGC performance is the ability of a television translator to maintain a given output level while being fed an input signal of varying levels.

Requirement: Industry Canada – The peak output power level of the television translator shall remain within ±0.5db of its rating [BETS-4, section 3.3].

FCC – The peak visual output power shall remain constant within 2 dB when the strength of the input signal is varied over a range of 30dB and which will not permit the peak visual power output to exceed the maximum rated power output under any condition [sections 74.750(4)].

Method: The translator shall be fed with the standard test input signal of 0-10dBmV. Vary the level over a range of 30dBmV and observe the power output variation.

Measurement: There was no change in the peak output power level of the television translator.

Visual to Aural Cross-Modulation

Definition:	The visual to aural cross-modulation is the extent to which a signal modulating the visual carrier also amplitude modulates the aural carrier when both signals are simultaneously passed through the amplifier stages of the television translator.
Requirement:	Industry Canada – The visual to aural cross modulation shall not exceed 10% peak, i.e the video information shall not amplitude the aural carrier more than 10% peak in a 15Khz bandwidth [BETS-4, section 3.4].
	FCC – No FCC requirement.
Method:	The visual carrier shall be modulated with the standard test signal. The aural carrier shall be unmodulated. An amplitude modulation monitor shall be used to measure the percent amplitude modulation on the aural carrier.
Measurement:	The visual to aural cross-modulation is measured at ___1.31___% peak.

Aural to Visual Cross-Modulation

Definition: The aural to visual cross-modulation is the extent to which the audio information modulating the aural carrier also modulates the visual carrier.

Requirement: Industry Canada – The aural to visual cross-modulation shall be 50dB below the peak to peak video signal [BETS-4, section 3.5].

FCC – No FCC requirement.

Method: The visual carrier shall be modulated with a staircase signal. The aural carrier shall be unmodulated with 4000Hz signal at a deviation of 25KHz. Observe the detected video signal on a waveform monitor at a field rate. Measure the presence of audio on the staircase step.

Measurement: The aural to visual cross-modulation is __>50___dB below the peak to peak video signal.