

## SPECIFICATIONS

### Visual and Audio Carrier Frequency Tolerance

*Reference Rule: 47 CFR, Part 76.605(a)(2), & 76.601(c)(2) 76.612*

*Results "Proofing" this specification can be found in Section 1*

The Audio Carrier Frequency is to be maintained at 4.5 MHz +/- 5 kHz above the video carrier. All Video Carriers operating in the 108 to 137 and 225 to 400 MHz bands must maintain a frequency tolerance of +/- 5 kHz. If a master oscillator is used, as in a Harmonically Related Carrier (HRC) system, the tolerance will be +/- 1 Hz times the integer multiplier. Since the distribution system cannot change the frequency of any carrier, the Headend readings will be representative of the frequencies delivered to all subscriber terminals. The exception would be when a CATV channel selector is in use. In this case, the visual/aural frequency difference will be solely based on the channel selector modulator's difference frequency and the converter does not output any FAA band channels. Additionally, all baseband converters used in this system are specified by the manufacturer to have a visual/aural frequency difference of 4.5 MHz +/- 5 kHz, the same as the FCC spec. Copies of manufacturer's spec sheets are available for inspection upon request. As a good engineering practice, all video and audio carriers on the system will be tested for compliance with the above. For those carriers originating as an offset off-air video carrier, not operating on the cable system in the 108 to 137 or 225 to 400 MHz bands, the frequency tolerance will be +/- 5 KHz from the original resulting offset. Additionally, all I-Net channel carriers in the 108 to 137 and 225 to 400 MHz range will be tested with the expectation that they meet the same frequency standards.

### Carrier-To-Noise

*Reference Rule: 47 CFR, Part 76.605(a)(8), & 76.601(c)(2)*

*Results "Proofing" this specification can be found in Section 2*

The Carrier-To-Noise ratio, as measured at the output of a channel selector, must be at least 43 dB as of June 30, 1995. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. Calculations have confirmed that if the cable system delivers a 44.2 dB Carrier-To-Noise to the channel selectors used in this system, with normal channel selector inputs, the resulting Carrier-To-Noise at the output of the channel selector will be better than the FCC minimum of 43 dB. As a result, and in an attempt to verify the system performance rather than channel selector performance, Carrier-To-Noise will be measured at the end of a 30 meter (98.46 foot) cable drop at all field test points and will be better than 44 dB. To provide an understanding of the Headend performance, this test will also be performed at the Headend test point. (In systems that have been "upgraded" to 550 or 750 Mhz, all Carrier-To-Noise readings are expected to be better than 46 dB.)

### Carrier-To-Coherent Disturbances

*Reference Rule: 47 CFR, Part 76.605(a)(9), & 76.601(c)(2)*

*Results "Proofing" this specification can be found in Section 2*

The Carrier-To-Coherent Disturbances ratio must be at least 47 dB for coherent channel (HRC or IRC) systems and 51 dB for non-coherent channel systems. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. Calculations have confirmed that if the cable system delivers a 51.5 dB Carrier-To-Coherent Disturbance to the channel selectors used in this system, the resultant Carrier-To-Chherent Disturbance at the output of the channel selector will be better than the

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FCC minimum of 51 dB. (For coherent channel systems calculations have shown the minimum delivered by the system must be 47.5 dB.) As a result, and in an attempt to verify the system performance rather than channel selector performance, Carrier-To-Coherent Disturbance will be measured at the end of a 30 meter (98.46 foot) cable drop at all field test points and will be better than 52 dB (48 dB for Coherent channel systems). This test will also be performed at the Headend test point as well.

### Hum Modulation

*Reference Rule: 47 CFR, Part 76.605(a)(11), & 76.601(c)(2)*

*Results "Proofing" this specification can be found in Section 2*

Hum Modulation, peak-to-peak variation in visual signal level caused by undesired low frequency disturbances generated within the system, is not to exceed 3 percent of the visual signal level. Because such low frequency disturbances are not normally frequency dependent this test need only be completed on one low frequency channel and one high frequency channel at each test point.

### Channel Frequency Response

*Reference Rule: 47 CFR, Part 76.605(a)(7), & 76.601(c)(2)*

*Results "Proofing" this specification can be found in Section 4*

The NTSC analog in channel frequency response as measured at the subscriber terminal, will be +/- 2 dB from .75 MHz to 5 MHz above the lower channel boundary. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. This measurement will be made at each test point before the channel selector. Beginning December 30, 1999 this measurement must be made after the channel selector.

### Audio Carrier Level

*Reference Rule: 47 CFR, Part 76.605(a)(6), & 76.601(c)(2)*

*Results "Proofing" this specification can be found in Section 3*

Each NTSC channel's Audio Carrier is to be maintained 6.5 to 17 dB below the channel's video carrier, and shall be maintained at levels not to cause interference to the upper adjacent channel. This measurement is to be made at each test point, and at the Headend test point.

### Visual Carrier Level Variations

*Reference Rule(s): 47 CFR, Part 76.605(a)(5), & 76.601(c)(4), 76.601(c)(3)*

*Results "Proofing" this specification can be found in Section 3*

The Visual Carrier level of each NTSC channel is to be at least 3 dBmV as measured at the end of a 100 foot drop attached to a "normal subscriber's tap", and at least 0 dBmV at the subscriber terminal. Maximum signal level at the subscriber terminal will be such as not to overload the device. The visual carrier is not to vary in level more than 8 dB within any 6 month interval which must include four tests performed in a 24 hour period in January or February and a 24 hour period in July or August. Additionally, the Visual Carrier Level cannot vary more than 3 dB from any visual carrier within 6 MHz, and 10 dB from ANY visual carrier on the cable

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television system of up to 300 MHz of forward bandwidth. (For system having a forward bandwidth greater than 300 MHz, 1 additional dB per 100 MHz of forward bandwidth is allowed).

### Signal Leakage

*Reference Rule: 47 CFR, Part 76.605(a)(13), & 76.609(h)*

*Results "Proofing" this specification can be found in Section 5*

Signal leakage from the cable television system shall not exceed 20 microvolt/meter at 3 meters when measured in the 54 to 216 MHz band.

### Chrominance-Luminance Delay Inequality

*Reference Rule: 47 CFR, Part 76.605(a)(12)(i), & 76.601(c)(2), & 76.601(c)(4), & 76.609(j)*

*Results "Proofing" this specification can be found in Section 4*

The Chrominance to Luminance Delay (chroma delay), which is the change in delay time of the Chrominance component of the signal relative to the luminance component after passing through the system, shall be within 170 nanoseconds. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. This test will be made on the output of the Headend and each test point. Because of possible problems caused by the Diplex Filters, this test must be performed on channel 2 at each field test point. The Rules allow this test to be performed once every three years but it is our standard practice to perform this test every six months.

### Differential Gain

*Reference Rule: 47 CFR, Part 76.605(a)(12)(ii), & 76.601(c)(2), & 76.601(c)(4), & 76.609(j)*

*Results "Proofing" this specification can be found in Section 4*

The Differential Gain, the difference in amplitude between the largest and smallest segments of the Chrominance signal, divided by the largest and express in percent, shall not exceed +/- 20 percent. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. Because the signal distribution system has little or no effect on Differential Gain, this test needs only be performed at the output of the Headend. The Rules allow this test to be performed once every three years but it is our standard practice to perform this test every six months.

### Differential Phase

*Reference Rule: 47 CFR, Part 76.605(a)(12)(iii), & 76.601(c)(2), & 76.601(c)(4), & 76.609(j)*

*Results "Proofing" this specification can be found in Section 4*

The Differential Phase, the largest phase difference in degrees between each segment of the Chrominance signal and reference segment, (the reference segment being at the blanking level of 0 IRE), shall not exceed +/- 10 degrees. This test must be made on a minimum of four channels plus one additional channel for every 100 MHz, or fraction thereof, of forward bandwidth. Because the signal distribution system has little or no effect on Differential Phase, this test needs only be performed at the output of the Headend. The Rules allow this test to be performed once every three years but it is our standard practice to perform this test every six months.

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## Terminal Isolation

*Reference Rule: 47 CFR, Part 76.605(a)(10), & 76.601(c)(2), & 76.609(g)*

*Results "Proofing" this specification can be found in Section 6*

At least 18 dB of Terminal Isolation must be provided between tap ports. As provided in the rule, copies of the manufacture's specifications are provided in lieu of actual testing.

## EAS System Operation

*Reference Rule: 47 CFR, Part 11*

*Results "Proofing" this specification can be found in Section 7*

Cable systems with 10,000 subscriber or more must install EAS equipment that is capable of providing Audio and Video EAS messages on all Programming Channels by December 31, 1998. Cable Systems with 5,000 to 10,000 subscribers must install EAS equipment that is capable of providing Audio and Video EAS messages on all Programming Channels by October 1, 2002. Cable system with Fewer then 5,000 subscribers must by October 1, 2002, (A) provide the National Level EAS Messages on all programmed Channels including the required testing or (B) install EAS equipment that is capable of providing: The audio alert messages on all programmed channels, video interrupt on all programmed channels and audio and video EAS messages on one programmed channel.

Each system that is required to maintain EAS equipment must log all national received and/or transmitted messages and all weekly and monthly tests. It is the Raleigh Division's policy to maintain logs of all messages and maintain these logs for five years. Additionally, a copy of the "Emergency Alart System Cable Handbook" must be maintained at each EAS control site. The Raleigh Division's policy is to also maintain a copy of this handbook in the sytem's public inspection file.

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The following are useful charts for interpreting the above specifications, specifically, the number of channels to be tested, number of test points, and the maximum Peak to Vally allowed.

System Uper Frequency Limit (Highest frequency by design or by use)	Mininum Number of Channels to Test
100 MHz or less	4
101 MHz to 200 MHz	5
201 MHz to 300 MHz	6
301 MHz to 400 MHz	7
401 MHz to 500 MHz	8
501 MHz to 600 MHz	9 (550 MHz "Upgraded" Systems)
601 MHz to 700 MHz	10
701 MHz to 800 MHz	11 (750 MHz "Upgraded" Systems)
801 MHz to 900 MHz	12
901 MHz to 1000 MHz	13

System Uper Frequency Limit (Highest frequency by design or by use)	Maximum Peek to Vally Allowed, expressed in dB
300 MHz or Less	10
301 MHz to 400 MHz	11
401 MHz to 500 MHz	12
501 MHz to 600 MHz	13 (550 MHz "Upgraded" Systems)
601 MHz to 700 MHz	14
701 MHz to 800 MHz	15 (750 MHz "Upgraded" Systems)
801 MHz to 900 MHz	16
901 MHz to 1000 MHz	17

Please note the Headend is not counted as a test pint when calculating the minimam number of test points to use. (This is a Time Warner Raleigh policy, the FCC rules could count it.)

Number of Subscriber in System	Minimum Number of Test Points
1,000 - 12,500	6
12,501 - 25,000	7
25,001 - 37,500	8
37,501 - 50,000	9
50,001 - 62,500	10
62,501 - 75,000	11
75,001 - 87,500	12
87,501 - 100,000	13
100,001 - 112,500	14
112,501 - 125,000	15
125,001 - 137,500	16
137,501 - 150,000	17
150,001 - 162,500	18
162,501 - 175,000	19
175,001 - 187,500	20
187,501 - 200,000	21

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## Over the air Broadcast Stations and Frequency

Listed below you will find the frequency offsets for each analog Television Broadcast signal carried in our Division and. Television Broadcast signals are often offset plus or minus 10 KHz to protect other broadcast channels from interference. When offset signals are received by television processor equipment in the Headend and converted to frequencies used on the CATV system, the resulting CATV frequency is offset by the 10 KHz in the opposite direction. The Time Warner Raleigh Division speck is to hold the video frequency to within +/- 5 KHz of the assigned CATV channel frequency. When an offset Television Broadcast signal is used as the source into a processor, the resulting frequency should be maintained to within +/- 5 KHz of the assigned CATV channel +/- the 10 KHz. However, when an analog Television Broadcast signal is processed to a CATV frequency in the Aeronitical bands of 108 to 137 and 225 to 400 MHz a frequency tolerance of +/- 5 kHz from the assigned CATV signal is required. To maintain a +/- 5 kHz tolerance in the Aeronitical bands the LO in the input circuit of the processor should be adjusted to bring the output into compliance.

<u>Station Call</u>	<u>Affiliate</u>	<u>Channel</u>	<u>Offset</u>
W34AX-LP	IND	34	Plus
W68BK-LP	IND	68	Zero
WBTW-TV	CBS	13	Plus
WCTI-TV	ABC	12	Plus
WECT-TV	NBC	6	Zero
WEPX-TV	PAX	38	Zero
WFPX-TV	PAX	62	Zero
WFXB-TV	FOX	43	Plus
WITN-TV	NBC	7	Zero
WKFT-TV	IND	40	Plus
WLFL-TV	WB	22	Zero
WNCT-TV	CBS	9	Minus
WPDE-TV	ABC	15	Minus
WRAL-TV	CBS	5	Zero
WRAZ-TV	FOX	50	Plus
WRDC-TV	UPN	28	Plus
WRPX-TV	PAX	47	Plus
WTVB-TV	ABC	11	Plus
WUNC-TV	PBS	4	Plus
WUNK-TV	PBS	23	Zero
WUNU-TV	PBS	31	Zero
WWMB-TV	UPN	21	Zero
WYDO-TV	FOX	14	Zero