

# Notice

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**Agilent Technologies**

# **85724A**

## **Broadcast**

## **Measurements Personality**

### **User's Guide**



**HP Part No. 85724-90004**  
**Printed in USA July 2001 Supersedes: June 1994**

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## Printing History

Each new edition of this manual incorporates all material updated since the previous edition. Change sheets may be issued between editions, allowing you to correct or insert information in the current edition.

The part number of this manual changes only when a new edition is published. Minor corrections or additions may be made as the manual is reprinted between editions.

Part Number 85724-90004

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## How to Use This Manual

If you have not installed your spectrum analyzer, or if you are not familiar with its operation refer to “Preparing for Use” in your *8590 Series Spectrum Analyzer User’s Guide*. It describes spectrum analyzer features and tells you how to make spectrum analyzer measurements. Consult that manual whenever you have a question about standard spectrum analyzer use.

If you are ready to use the Broadcast Measurements capability of your spectrum analyzer, turn to Chapter 1, “Getting Started,” in this manual. This chapter introduces you to the Broadcast Measurements Personality, shows you how to load it, and prepares you for making measurements. Chapter 2, “Making Measurements,” describes the tests and functions added by the personality.

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## Notational Conventions Used In This Manual

The display features six **softkeys** at the right-hand side of the display. A softkey executes a function defined by firmware or by software. The name of the function appears on the display next to the activating key.

This manual uses the following conventions:

**FRONT-PANEL KEY**

An function name in a keycap symbol represents a labeled key physically located on the instrument. This key is referred to as either a **key** or a **hardkey**.

**SOFTKEY**

A function name in screen-font indicates a softkey that either directly executes its function or provides access to a subset menu of softkeys.

**Softkey** ON OFF (ON)

A boxed word written in this typeface with the words ON and OFF can turn a function on or off. The underlined function is shown in brackets (parenthesis).

**Softkey** AUTO MAN (AUTO)

A boxed word written in this typeface with the words AUTO and MAN can either be auto-coupled or have its value manually changed. The underlined function is shown in brackets (parenthesis).

**CRT Text**

Unboxed text in a monospace font indicates any displayed text other than softkeys.

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# Getting Started

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Welcome to the *85724A Broadcast Measurements Personality User's Guide*. This guide is divided into 4 Chapters:

## **Getting Started**

Chapter 1 describes the 85724A Broadcast Measurements Personality, how to load and delete it from analyzer memory and how to configure it for your system.

## **Making Measurements**

Chapter 2 describes how to make measurements using an 859X-Series analyzer with the 85724A Broadcast Measurements Personality.

## **Measurement Characteristics**

Chapter 3 outlines the characteristics of the 85724A Broadcast Measurements Personality and tells you what to do if you experience a problem.

## **Broadcast Station Identification**

Appendix A lists the channel plans supported by the 85724A Broadcast Measurements Personality.

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## What You'll Find in This Chapter

This chapter describes the 85724A Broadcast Measurements Personality and tells you how to load it and delete it from the spectrum analyzer memory. This chapter also describes how to configure the spectrum analyzer and Broadcast Measurements Personality for your system.

- Introducing the 85724A Broadcast Measurements Personality.
- Installing the personality.
- Managing memory.
- Configuring the spectrum analyzer and Broadcast Measurements Personality for your system.
- Personality Menu maps.

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## Introducing the 85724A Broadcast Measurements Personality

The 85724A Broadcast Measurements Personality is software permanently stored on a read-only memory (ROM) measurements card. A software personality is a downloadable program (DLP) consisting of measurement routines especially useful for a particular application.

This Broadcast Measurements Personality and an 8590E Series spectrum analyzer, together have all the capabilities and functions of a standard spectrum analyzer with the addition of very specific Broadcast measurement functions.

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### Important

The Spectrum Analyzer must be configured with Options 101, 102 and 107 (Options 101 and 102 are combined for Option 301) to make best use of the measurement capabilities of the 85724A Broadcast personality. To find out what options are fitted in your spectrum analyzer press **CONFIG**, **More 1 of 3, SHOW OPTIONS**. The spectrum analyzer displays the options as shown in the following example:

- 101: FADC
- 102: DEMOD/TV
- 107: TVTUN
- 021: HPIB

Press **EXIT SHOW** to clear the spectrum analyzer screen.

---

Table 1-1 shows the options required, for all 859X-Series analyzers, by the 85724A Broadcast personality measurements.

**Table 1-1. Measurement Capability**

Measurement	8591C	8590E Series	8590L Series
Carrier Level & Frequency	•	•	•
Chroma Level	•	•	•
Vision in sound	•	•	•
3-Tone IP test	•	•	•
Spurious Signals	•	•	•
Depth of Modulation	•	•	•
Depth of Modulation (on individual line)	•	Opt 301	○
Carrier-to-Noise (non-interfering)	Opt 107	Opt 301,107	○
Carrier-to-Noise (interfering)	•	•	•
Intermodulation check	•	Opt 101	○
NICAM IP test	•	Opt 301	○
FM Deviation	•	Opt 102	○
Chroma IP test	•	Opt 301	○
Differential Gain/Differential Phase	Opt 107	Opt 101,107	○
Chroma/Luma Delay Inequality	Opt 107	Opt 101,107	○

**Key:**     • No additional Options required.     ○ Not available.

If you do not have the required options for the measurements you wish to make please contact your local Agilent sales office.

## Personality Description

An 8590E Series spectrum analyzer along with the 85724A Broadcast Measurements Personality allows simple selection of either PAL-I, PAL-B/G, PAL-SCM D/K or NTSC systems. Channel selection can be made by selecting the channel number and channel band. Additionally frequency mode tuning is available allowing you to tune to any carrier by entering its frequency.

The Broadcast Measurements Personality typically performs the following tasks.

- Sets up all spectrum analyzer settings (the analyzer state) required for the measurement.
- Prompts for any adjustments or values.
- Performs the measurements listed in chapter 2.
- Displays the measurement results.

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## Installing the Broadcast Measurements Personality into the Spectrum Analyzer Memory

The 85724A Broadcast Measurements Personality functions are available only if the personality program has been installed in the spectrum analyzer memory. To determine if the Broadcast Measurements Personality program is installed in the spectrum analyzer memory, press **MODE**. If **BRDCST ANALYZER** is one of the softkeys that are displayed, the Broadcast Measurements Personality is installed in the spectrum analyzer memory. If **BRDCST ANALYZER** is not displayed, it is necessary to use the following procedure to install the Broadcast Measurements Personality in the spectrum analyzer memory.

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**Note** If there are several personalities or programs installed in the spectrum analyzer memory, read the following section, “Managing Memory,” *before* performing this installation procedure.

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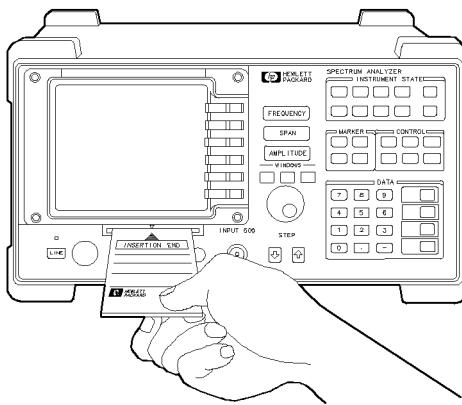
### Installation Procedure

1. Locate the arrow printed on the read-only memory card label.
2. Gently insert the memory card with its arrow matching the raised arrow on the bezel around the memory card-insertion slot. Refer to Figure 1-1.

---

**Note** Improper insertion causes error messages to occur, but generally does not damage the memory card or instrument. Care must be taken, however, not to force the memory card into place. The memory card is easy to insert when inserted properly.

---



**Figure 1-1.**  
**Inserting the Broadcast Personality Read-Only Memory Card**

3. Press the memory card into the slot. When correctly inserted, about 19 mm (0.75 in) of the memory card is exposed.
4. Press **[PRESET]**. Check that only the **SPECTRUM ANALYZER** softkey is displayed on the right side of the display.
5. Press **[PRESET]**, **[RECALL]**. **INTRNL CRD** is displayed on the right side of the display. Press **INTRNL CRD(CRD)**.
6. Press **Catalog Card**,**CATALOG ALL**.
7. If necessary, turn the spectrum analyzer knob to highlight **dBRDCAST**.
8. Press **LOAD FILE**. In approximately 1 minute the Broadcast Measurements Personality will be installed into the spectrum analyzer memory. (If the error message **INVALID SYMTAB ENTRY: SYMTAB OVERFLOW** appears, read the following section “Managing Memory”.)
9. Press **[PRESET]** and check for the presence of **BRDCAST ANALYZER**. This softkey indicates that the personality is in memory, and the **BRDCAST ANALYZER** mode is available.

## Accessing and Exiting the Broadcast Personality

When the Broadcast Measurements Personality is installed, press **[MODE]**, **BROADCAST ANALYZER** to access it.

To exit the Broadcast Measurements Personality and restore normal spectrum analyzer operation, press **[MODE]**, **SPECTRUM ANALYZER**.

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**Note** If you press any of the spectrum analyzer hardkeys or use any of the spectrum analyzer functions whilst in Broadcast Analyzer mode, you may return to the Broadcast Analyzer menus simply by pressing the **[MODE]** hardkey twice (**[MODE]**, **[MODE]**). This is useful if you interactively want to use other spectrum analyzer functions along with the measurements personality.

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## Managing Memory

To install the Broadcast Measurements Personality into spectrum analyzer memory, there must be free spectrum analyzer memory available. The Broadcast Measurements Personality requires a large amount of memory. If there are other personalities or downloadable programs in spectrum analyzer memory, there may not be enough spectrum analyzer memory available to install the Broadcast Measurements Personality. If this occurs the error message **INVALID SYMTAB ENTRY: SYMTAB OVERFLOW** is displayed when you try to load the Broadcast Measurements Personality. The other personalities or functions must be deleted from the spectrum analyzer memory before the Broadcast Measurements Personality can be loaded.

## Deleting a Personality from the Spectrum Analyzer Memory

If you wish to dispose of all the personalities in the spectrum analyzer memory, proceed as follows:

1. Press **CONFIG**, **MORE** 1 of 3.
2. Press **Dispose User Mem** **ERASE DLP MEM**. The message **IF YOU ARE SURE, PRESS KEY AGAIN TO PURGE DATA** is displayed.
3. Press **ERASE DLP MEM** again. When all the personalities have been disposed from the spectrum analyzer memory the **ERASE DLP MEM** key is no longer highlighted.
4. Press **PRESET**.

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## Configuring the Spectrum Analyzer and Broadcast Measurements Personality

In order that the measurements work correctly, you must ensure that the spectrum analyzer and the Broadcast Measurements Personality is configured for your system. This is done in the configuration menu. To access this menu, first install the Broadcast Measurements Personality as described in “Installing the Broadcast Measurements Personality into the Spectrum Analyzer Memory”. The following procedure describes how to configure your system.

### Procedure

1. Press **MODE**, **BROADCAST ANALYZER**. After a few seconds the spectrum analyzer displays the copyright message.
2. Press **More 1 of 4**, **More 2 of 4**, **More 3 of 4**, **Config Menu**.
3. Press **CHANGE DEFAULTS**. This allows you to access other menus and change the default settings used in measurements.
4. Press **DEFAULT NICAM LN**. The message **DEFAULT NICAM IP LN** and the current value is displayed. Use the keypad to enter the line you wish to use for the NICAM intermodulation test. Terminate the entry by pressing **ENTER**. The default line is 6.
5. Press **DEFAULT CHR LINE**. The message **DEFAULT CHROMA LINE** and the current value is displayed. Use the keypad to enter the line you wish to use for the Chroma intermodulation test. Terminate the entry by pressing **ENTER**. The default line is 24.

The remaining 3 softkeys of this menu, **Mod Depth Defaults**, **Color Test Default** and **C/N Setup** allow you to access further menus and setup defaults for the modulation depth, color and carrier-to-noise tests.

Mod Dpth  
Defaults

Press this key to access the default settings for the depth of video modulation test.

DEFAULT  
ITS LINE

Press this key to change the default TV line that the Measurements Personality uses as the Interval Test Signal (ITS) for the TV LINE Modulation depth and blanking level measurements. The default line is 17. Enter the new default value using the keypad. Terminate the entry by pressing **ENTER**.

ITS FIELD  
ODD EVEN

Press this key to select the field for the ITS line. Pressing this key toggles between **ODD** and **EVEN**. This key is used in conjunction with **DEFAULT** **ITS** **LINE**. The default is **ODD**.

Previous  
Menu

Press this key to return to the **Change Defaults** menu.

Colr Tst	Press this key to select the default configurations for the chroma/luma delay inequality and differential gain/differential phase tests.
DEFAULT CLDI LN	Press this key to change the default TV line that the Measurements Personality uses as the Interval Test Signal (ITS) for the chroma/luma delay inequality test. The default line is 18.
CLDI FLD ODD EVEN	Press this key to select the field for the ITS line. Pressing this key toggles between <b>ODD</b> and <b>EVEN</b> . This key is used in conjunction with <b>DEFAULT CLDI LN</b> . The default is <b>EVEN</b> .
DEFAULT DGDP LN	Press this key to change the default TV line that the Measurements Personality uses as the Interval Test Signal (ITS) for the differential gain/differential phase test. The default line is 18.
DGDP FLD ODD EVEN	Press this key to select the field for the ITS line. Pressing this key toggles between <b>ODD</b> and <b>EVEN</b> . This key is used in conjunction with <b>DEFAULT DGDP LN</b> . The default is <b>ODD</b> .
Test Signal	Press this key to access the <b>CCIR</b> , <b>UK ITS</b> , <b>FCC</b> or <b>NTC</b> softkeys. Press one of these to configure the analyzer to the type of test signals available on your system.
Previous Menu	Press this key to return to the <b>Change Defaults</b> menu after you have completed the section of the menu.

C/N Setup	Press this key to select the default configurations for the carrier-to-noise test.
MESMNT BW	Press this key to display and change the default bandwidth used in the carrier-to-noise test. The message <b>Measurement BW</b> and current setting is displayed. The default is 5.00 MHz. Enter the bandwidth you require using the keypad.
CN FRQ OFFSET	Press this key to display the frequency offset used in non-gated carrier-to-noise measurements. Enter the offset frequency you wish to use in positioning the marker below the vision carrier. The default is 1.25 MHz.
DEFAULT LINE	Press this key to configure the test line for a non-interfering carrier-to-noise measurement. The default line is 12.
FLD BOTH EVEN ODD	Press this key to select the field for the test line. Pressing this key toggles between <b>BOTH</b> , <b>EVEN</b> and <b>ODD</b> . The default configuration is <b>BOTH</b> .
GATING YES NO	Pressing this key toggles between <b>YES</b> and <b>NO</b> . With Option 107 installed, select <b>YES</b> to make a non-interfering) carrier-to-noise measurement.
Previous Menu	Press this key to return to the <b>Change Defaults</b> menu after you have completed the section of the menu.

6. Press **Previous Menu** again to return to the **Config Menu**.

**TV Standard**

Press this key to access the TV Standard selection menu. Select the standard in use on your system by pressing the adjacent softkey to underline the standard.

**NTSC**

Press this key to select NTSC broadcast standard.

**PAL-B/G**

Press this key to select PAL-B/G broadcast standard.

**PAL-I**

Press this key to select PAL-I broadcast standard.

**PAL-SCM D/K**

Press this key to select PAL-SCM D/K broadcast standard.

**COUNTRY**

Press this key to toggle between **USA** and **JPN** to configure the analyzer to North American or Japanese NTSC Standards. (This softkey is only available if you have selected **NTSC**.)

**Previous Menu**

Press this key to return to the **Change Defaults** menu after you have completed the section of the menu.

7. Press **More 1 of 2** to access the **PRE AMP** menu and to exit the **Config** menu.

PRE AMP  
YES NO

Press this key to toggle between YES and NO. If you wish to use a pre-amplifier for the carrier-to-noise test select YES.

PRE AMP  
GAIN

Press this key to enter the gain of the pre-amplifier you wish to use. Use the keypad and terminate the entry by pressing [dB]. (This softkey is only available when you have selected PRE AMP YES).

PRE AMP  
NZ FIG

Press this key to enter the Noise figure of the pre-amplifier you wish to use. Use the keypad and terminate the entry by pressing [dB]. (This softkey is only available when you have selected PRE AMP YES).

### Note

If selected, the pre-amplifier information is only required for the carrier-to-noise test and is displayed with the calculation on the MORE INFO screen. No other use is made of this information.

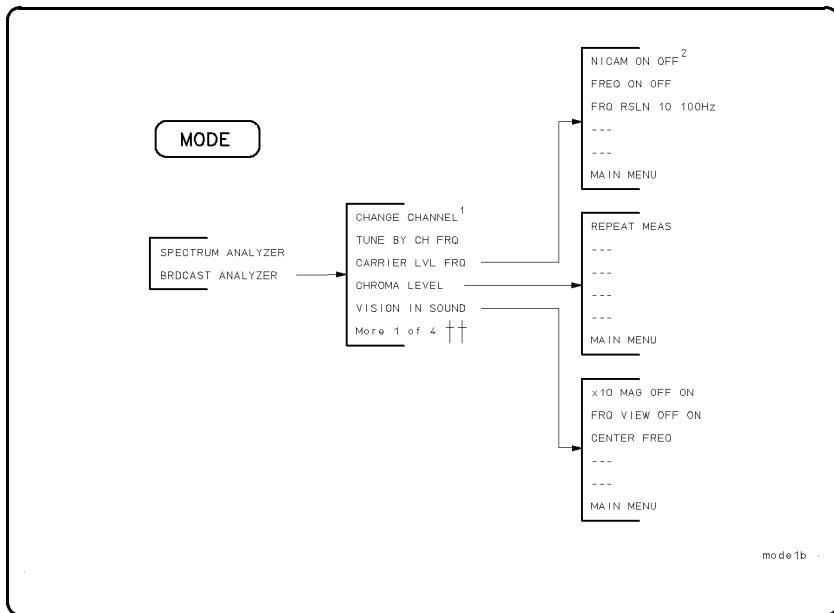
8. If you have completed all configuration selections, press **Exit Config** to return to the main menu.

### Notes

1. The default configuration you have selected is retained by the spectrum analyzer throughout preset or power down.
2. Only use the data keypad to change the default parameters. Do not use the data knob.

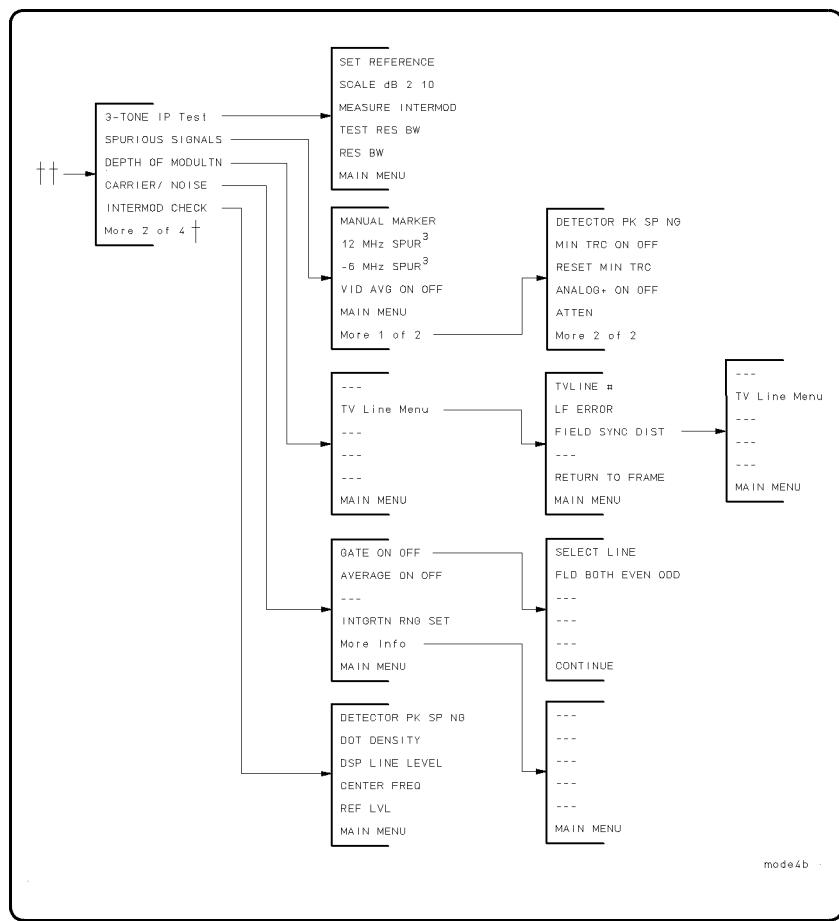
## Menu Maps

The following menu maps are a graphic representation of how the Broadcast Measurements Personality's softkeys are accessed.



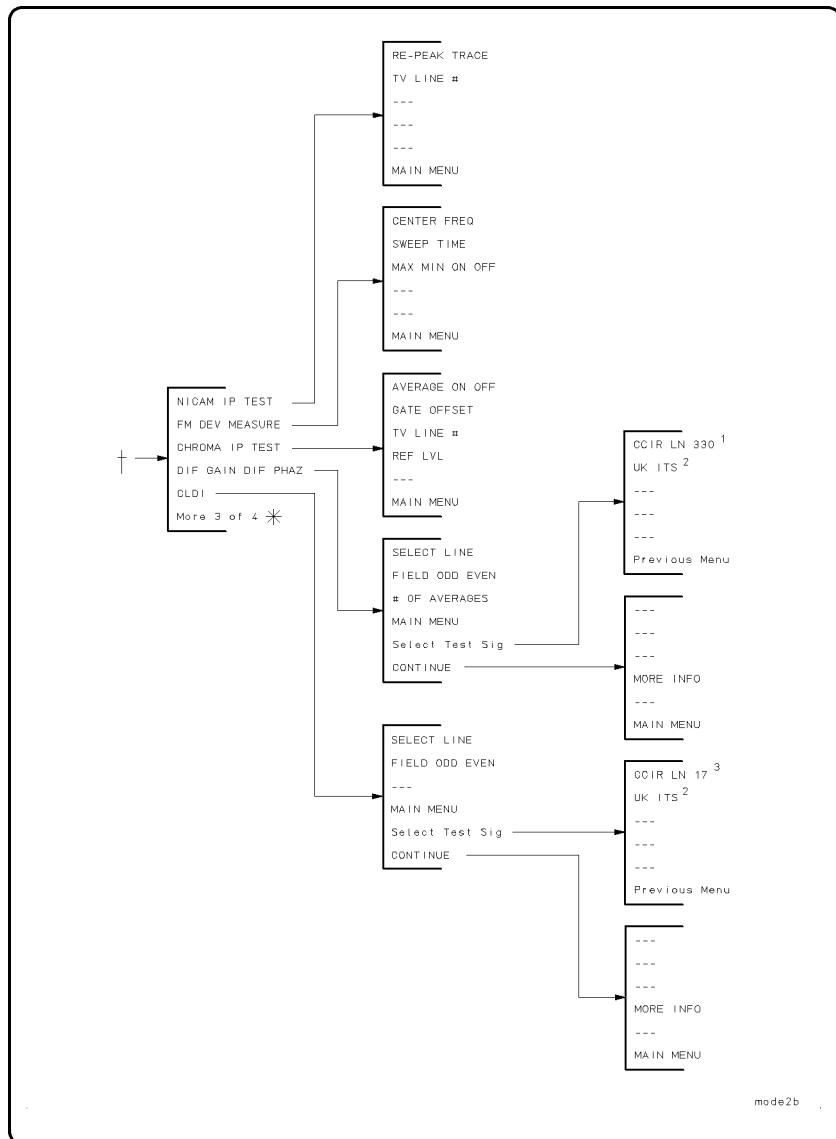
†† Pressing **More 1 of 4** accesses further menu pages.

- 1 **CHANGE CHANNEL** label changes to **CHANGE FREQ** if you have selected tune by frequency.
- 2 **NICAM ON OFF** only available when PAL-I or PAL-B/G are selected TV standards.



† Pressing **More 2 of 4** accesses further menu pages.

<sup>3</sup> The spur values change depending on the selected TV standard.

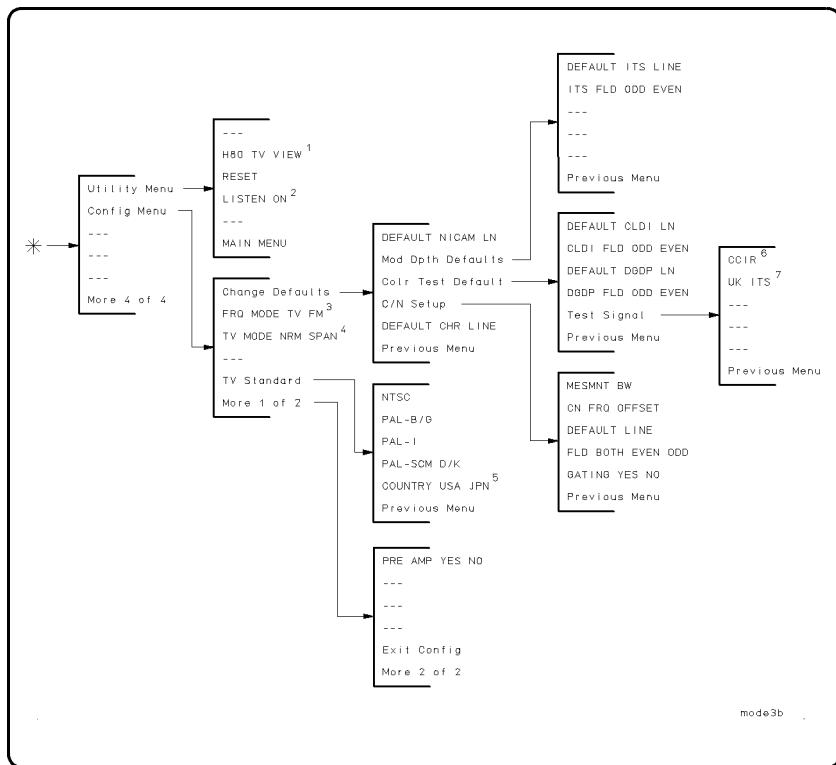


\* Pressing More 3 of 4 accesses further menu pages

<sup>1</sup> CCIR LN 330 changes to FCC COMPOSITE when NTSC is selected.

<sup>2</sup> UK ITS changes to NTC COMPOSITE when NTSC is selected.

<sup>3</sup> CCIR LN 17 changes to FCC COMPOSITE when NTSC is selected.



<sup>1</sup> H80 TV VIEW softkey label changes to PIC SND ON when analyzer is fitted with Option 107.

<sup>2</sup> LISTEN ON changes to LISTEN OFF when pressed.

<sup>3</sup> **FRQ MODE TV FM** only available when tune by frequency selected.

**4 TV MODE NRM SPAN**only available when tune by frequency selected.

<sup>5</sup> COUNTRY USA JPN only available when NTSC selected standard.

<sup>6</sup> CCIR changes to FCC COMPOSITE when NTSC is selected.

7 UK ITS changes to HTC COMPOSITE when NTSC is selected.

## Making Measurements

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### What You'll Find in This Chapter

This chapter describes how to make measurements using 859X-Series spectrum analyzers with the 85724A Broadcast Measurements Personality. The following list shows the chapter organization.

#### ■ Tests

Selecting a Channel .....	CHANGE CHANNEL
Carrier Level Measurement .....	CARRIER LVL FRQ
Chroma Level Measurement .....	CHROMA LEVEL
Vision in Sound Measurement .....	VISION IN SOUND
Three Tone Intermodulation Measurement .....	3-Tone IP Test
Spurious Signals Measurement .....	SPURIOUS SIGNALS
Depth of Modulation Measurement .....	DEPTH OF MODULTH
Carrier to Noise Measurement .....	CARRIER/ NOISE
Intermodulation Measurement .....	INTERMOD CHECK
NICAM Intermodulation Measurement .....	NICAM IP TEST
FM Deviation Measurement .....	FM DEV MEASURE
Chroma Intermodulation Measurement .....	CHROMA IP TEST
Differential Gain/ Differential Phase .....	DIF GAIN DIF PHAZ
Chroma/Luma Delay Inequality .....	CLDI

#### ■ Functions

Listen .....	LISTEN ON
TV View .....	H80 TV VIEW,PIC SND ON.

---

## 2 Selecting a Channel

Before making any measurements you must first tune the analyzer to the signal to be tested by selecting a channel. This configures the spectrum analyzer for broadcast measurements and centers the channel under test on the spectrum analyzer screen.

There are two methods of tuning the spectrum analyzer to TV channels and an additional method of tuning to other carriers (such as FM channels or pilot tones). Frequency and channel allocations are listed in Appendix A.

### Selecting a TV Channel by Channel Number and Band

You can select a TV channel by entering a channel number and band. This method of channel selection can be used if your system conforms to standard channel allocations. The following procedure describes how to tune to a TV channel by channel number entry and band selection.

#### Procedure

1. Press **MODE**, **BRDCST ANALYZER**. After a few seconds the spectrum analyzer displays the copyright message.
2. Press **TUNE BY CH FREQ (CH)**.
3. Press **CHANGE CHANNEL**.
4. Enter the number of the channel to be tested using the data keys. Terminate the entry by pressing **ENTER**. When **CHANGE CHANNEL** is active you can use the up and down arrow keys (**▲** and **▼**) to select the next higher or lower channel in the same band.

The message **USE SOFTKEYS TO SELECT DESIRED BAND** is displayed.

5. Select the desired channel band from the displayed menu by pressing the associated softkey.

The current channel number and band appears in the title line at the top of the spectrum analyzer screen. The span used to display the selected channel depends on the selected TV Standard. The vision carrier is placed just below the reference level. Refer to Figure 2-2.

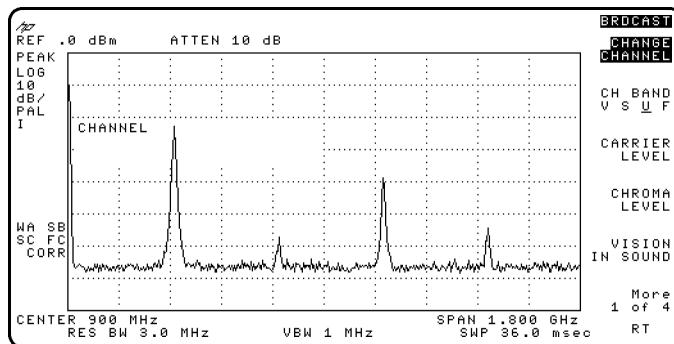


Figure 2-1. Selecting a TV Channel by Channel Number

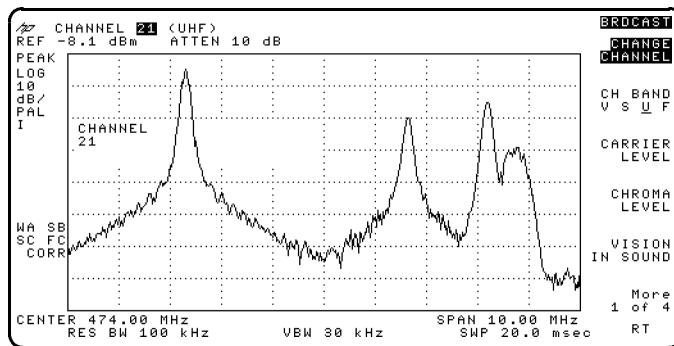


Figure 2-2. TV Channel Selected by Channel Number

## 2 Selecting a TV Channel by Vision Carrier Frequency

You can select a TV channel by entering the frequency of the vision carrier. This method of channel selection should be used if your system does not conform to the standard channel allocations or if you prefer tuning to TV channels using the vision carrier frequency. The following procedure describes how to tune to a TV channel by vision carrier frequency.

### Procedure

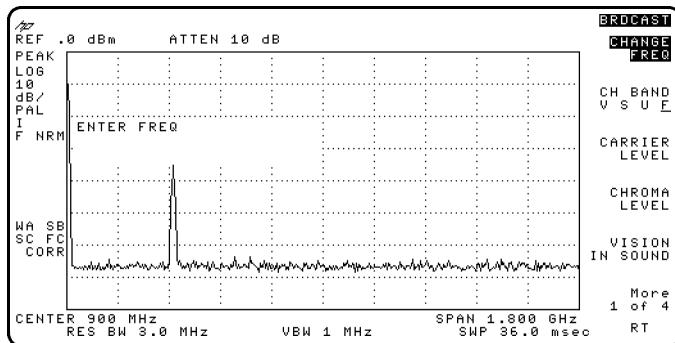
1. Press **MODE**, **BRDCST ANALYZER**. After a few seconds the spectrum analyzer displays the copyright message.
2. Press **TUNE BY CH FRQ (FREQ)**.
3. Press **More 1 of 4, More 2 of 4, More 3 of 4, Config Menu**.
4. Press **FRQ MODE TV FM (TV)**.
5. Press **TV MODE NRM SPAN** and set the default span to one which is suitable for the channel you wish to select. You can enter a default span of 6 MHz to 12 MHz.
6. Press **More 1 of 2, Exit Config, More 4 of 4**.
7. Press **CHANGE FREQ** and **ENTER FREQ** appears in the active area on the spectrum analyzer screen. Refer to Figure 2-3.

---

### Hints

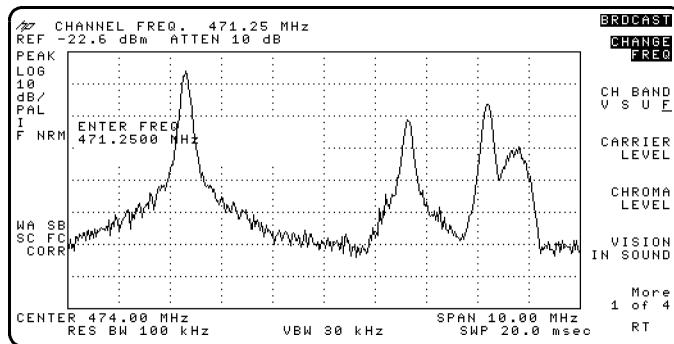
1. The vision carrier of a channel must be “on” before the **CHANGE CHANNEL** function can correctly center the channel and set the Reference Level.
2. Do not use the data knob for selecting channels.

---



**Figure 2-3. Selecting a TV Channel by Vision Carrier Frequency**

- Enter the vision carrier frequency of the channel you wish to select. The selected vision carrier frequency appears at the top of the screen in the title line. Refer to Figure 2-4.



**Figure 2-4. TV Channel Selected by Vision Carrier Frequency**

## 2 Selecting Non-TV Channels by Carrier Frequency

You can select a non-TV channel (for example Pilot Tones or FM channels) by entering the carrier frequency.

The following procedure describes how to select a non-TV channel by carrier frequency.

### Procedure

1. Press **MODE**, **BROADCAST ANALYZER**. After a few seconds the spectrum analyzer displays the copyright message.
2. Press **TUNE BY CH FRQ (FREQ)**.
3. Press **More 1 of 4**, **More 2 of 4**, **More 3 of 4**, **Config Menu**.
4. Press **FRQ MODE TV FM (FM)**.
5. Press **FM MODE CTR SPAN** and set the default span to one which is suitable for the signal you wish to select. You can enter a default span of 100 kHz to 20 MHz.
6. Press **More 1 of 2**, **Exit Config**, **More 4 of 4**.
7. Press **CHANGE FREQ** and **ENTER FREQ** appears in the active area on the spectrum analyzer screen. Refer to Figure 2-3.
8. Enter the signal frequency (in MHz) using the keypad. Terminate the entry by pressing **(MHz)**.
9. The current channel carrier frequency appears at the top of the screen in the title line. The carrier is placed just below the reference level. Refer to Figure 2-6.

---

### Hints

1. The carrier of the channel must be “on” before the **CHANGE CHANNEL** function can correctly center the signal and set the Reference Level.
2. Do not use the data knob for selecting channels.

---

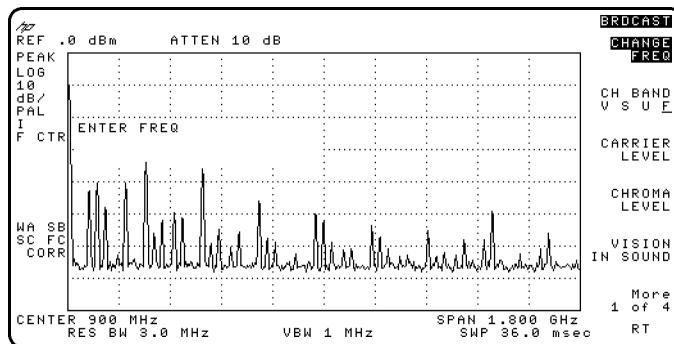


Figure 2-5. Selecting a Non-TV Channel by Carrier Frequency

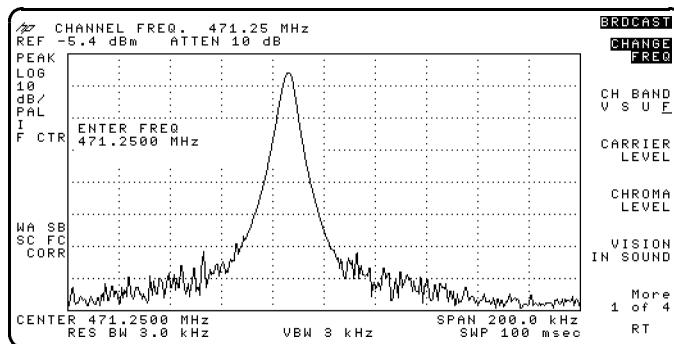


Figure 2-6. Non-TV Channel Selected by Carrier Frequency

## 2 Carrier Level and Frequency

The CARRIER LVL&FRQ test measures the vision carrier frequency and power. The vision-to-sound frequency and power ratio is also measured. For systems with dual sound carriers (PAL-B/G) results for two sound carriers are displayed. For systems with NICAM (PAL-B/G and PAL-I), the vision-to- sound digital carrier power ratio is also measured when NICAM ON OFF(ON) is selected.

### Procedure

1. Select a TV channel as described in "Selecting a Channel".
2. Press CARRIER LVL FRQ to perform the Carrier Level and Frequency measurement.
3. The peak vision carrier level and the relative sound carrier levels are displayed in a table at the base of the screen as shown in Figure 2-7. For signals with dual (stereo) sound carriers (PAL-B/G) and NICAM (PAL-I and PAL-B/G), power ratios for both sound carriers are displayed.

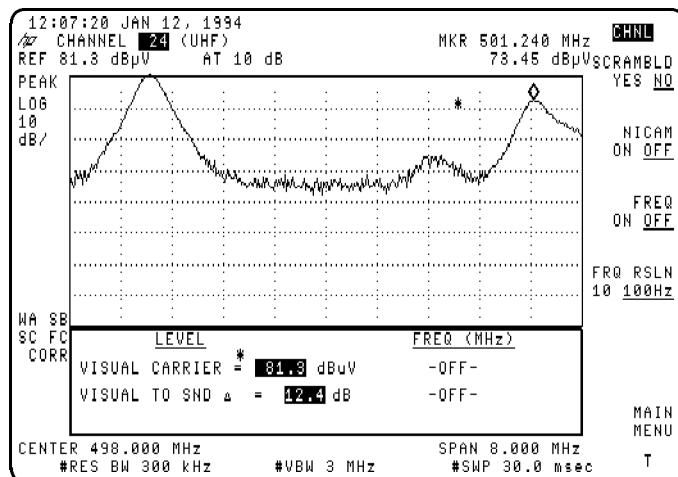
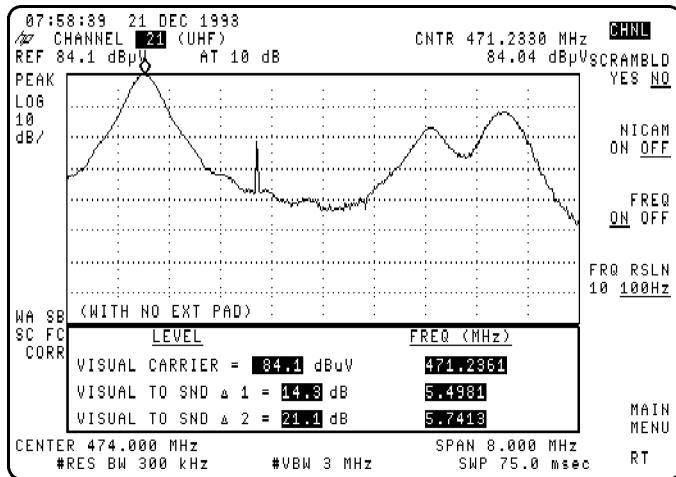


Figure 2-7. Carrier and Sound Levels

4. Press **FREQ** **ON** **OFF** (ON). The frequency of the vision carrier and the offset to the sound carrier(s) are now displayed. (See Figure 2-8.) The Frequency of the NICAM carrier is *not* measured.



**Figure 2-8. Carrier Level and Frequency**

5. If it is available, press **NICAM** **ON** **OFF** (ON). A true RMS power measurement is made of the NICAM carrier and the vision-to-sound power ratios are displayed in the table.

---

**Note** The **NICAM** **ON** **OFF** softkey is available only when PAL-I or PAL-B/G has been selected from the **TV Standard** menu.

---

6. Press **FRQ RSLN** **10** **100** **Hz** to select between the readout resolution of 100 Hz or 10 Hz. The default setting is 100 Hz as 10 Hz significantly slows down the measurement.

7. Press **MAIN MENU** to exit the measurement.

---

**Hints** For best results, the carrier to noise ratio (in a 5 MHz noise power bandwidth) of the system should be 40 dB or greater and the measured signal level should be 30 dB above the displayed noise during the measurement.

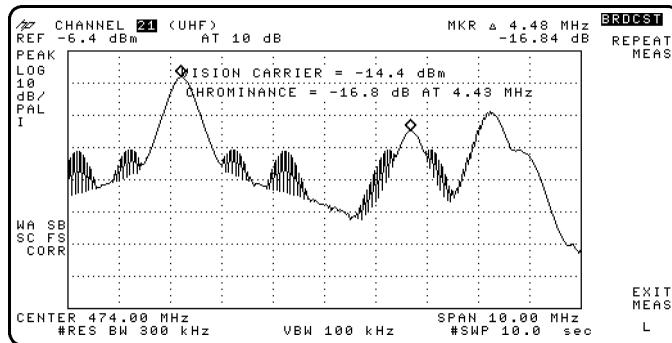
---

## Chroma Level

The Chroma Level test measures the peak vision carrier level (peak sync) and the vision-to-chroma level ratio of a channel.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **CHROMA LEVEL** to perform the Chroma Level measurement.
3. The peak vision carrier level and the vision-to-chroma level ratio is displayed as shown in Figure 2-9.



**Figure 2-9. Chroma Level Measurement**

4. Press **REPEAT MEAS** to repeat the measurement on this channel.
5. Press **MAIN MENU** to exit the measurement.

### Hint

For best results, the carrier to noise ratio (in a 5 MHz noise power bandwidth) of the system should be 40 dB or greater and the measured signal level should be 30 dB above the displayed noise during the measurement.

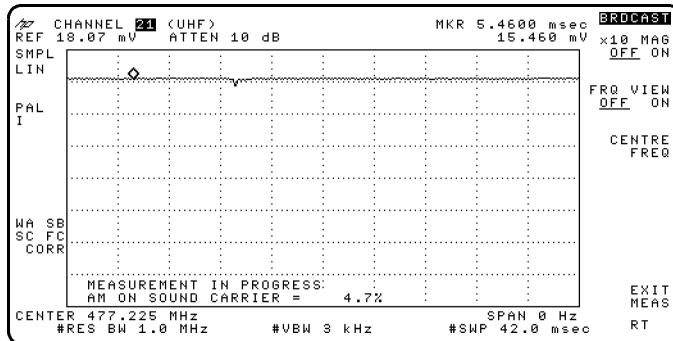
## Vision In Sound

The vision in sound test measures the peak-to-peak percentage amplitude modulation (% AM) of the FM sound carrier. This AM is typically due to cross modulation of video carrier.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **VISION IN SOUND** to perform the Vision In Sound measurement.

The % AM is displayed on the spectrum analyzer screen. The result are updated every ten sweeps and are displayed on the spectrum analyzer screen as shown in Figure 2-10.



**Figure 2-10. Vision in Sound Measurement**

3. Press **MAIN MENU** to exit the measurement.

**Hints**

---

1. If the measurement does not center the sound carrier, press **CENTER FREQ** to locate the exact center (this will typically be where the trace amplitude is at a minimum).
2. To help you determine whether the modulation is random noise or video crossmodulation press  **$\times 10$  MAG ON OFF** such that **ON** is underlined to magnify the trace. In addition you can use **FREQ VIEW OFF ON** to display the frequency content of the time domain trace. A marker is placed at the vision carrier line rate (15.625 kHz) to help you determine if the crossmodulation is video related.

---

## Three Tone Intermodulation

The Three Tone Intermodulation test measures the highest intermodulation product when three continuous wave (CW) test signals are injected in a channel to simulate vision, chroma and sound carriers.

The 3-4 tone test generator **must** be used for this test.

If you wish to make intermodulation tests on modulated carriers, you should use the **INTERMOD** **CHECK**, **NICAM**, **INTERMOD** or **CHROMA IP TEST** measurements.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Once the spectrum analyzer is tuned to the channel correctly, press **More 1 of 4** then **3-Tone IP Test**.
3. The reference level for the channel must first be set by pressing **SET REFERENCE**. The spectrum analyzer sets its reference level to peak-sync of the vision carrier (refer to Figure 2-11).

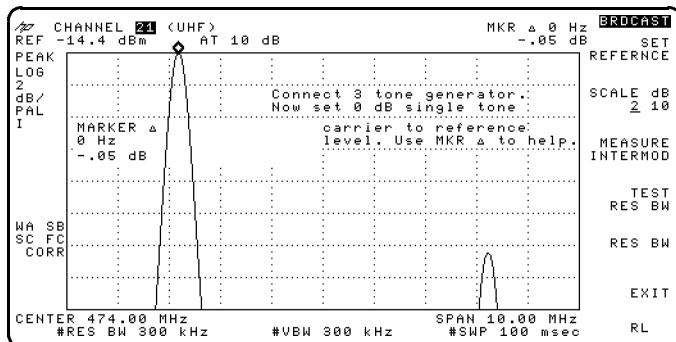


Figure 2-11. Setting the Reference

4. The message **Connect 3 tone generator. Now set 0 dB single tone carrier to reference level. Use MKR Δ to help** is displayed on the spectrum analyzer screen.

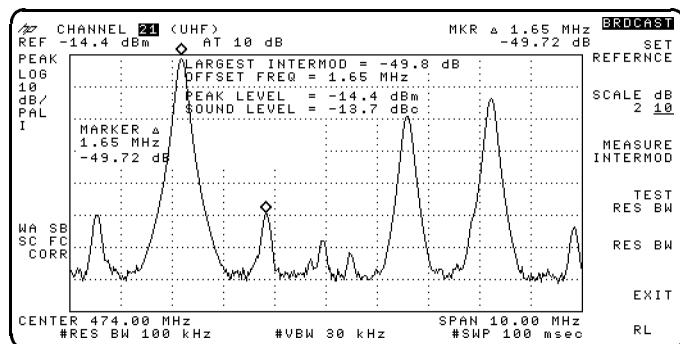
Connect the three tone generator to the spectrum analyzer and set it to output a 0 dB single tone reference carrier. Adjust the three

tone generator output such that the signal peak is exactly at the reference level. Use the marker delta reading to help you set the single tone to 0 dB (a delta reading of 0 dB).

The three tone generator reference is now set.

5. To perform the intermodulation test, set the three tone generator to output the 3-tone test signal, then press **MEASURE INTERMOD**.

The results are displayed on the spectrum analyzer screen as shown in Figure 2-12.



**Figure 2-12. 3-Tone Intermod Measurement**

6. If you require to analyze the results further you can use the marker delta function.
7. Press **MAIN MENU** to exit the measurement.

### Note

- To help set the reference, you may select between 2 dB/div or 10 dB/div using **SCALE dB 2 10**. Pressing **SET REFERENCE** sets the spectrum analyzer for 2 dB/div.
- You may change the resolution bandwidth used during the intermodulation measurement using **TEST RES BW**. The default is 100 kHz, which is typical for most tests. However, if you are measuring intermodulation products which are closer than 1 MHz to the vision carrier, you may

wish to reduce the resolution bandwidth to 30 kHz or even 10 kHz.

The resolution bandwidth you have selected is retained by the spectrum analyzer throughout preset or power down.

- The real-time resolution bandwidth may be altered using **RES** **BW**. However, **TEST** **RES** **BW** over-rides the **RES** **BW** setting when the **MEASURE** **INTERMOD** key is pressed.

---

## Spurious Signals

For the PAL-B/G systems the Spurious Signals test measures the +11 MHz and -5.5 MHz spurious signals relative to the peak sync level of a channels vision carrier.

For the PAL-I system the spurious signals test measures the +12 MHz and -6 MHz spurious signals relative to the peak sync level of a channels vision carrier.

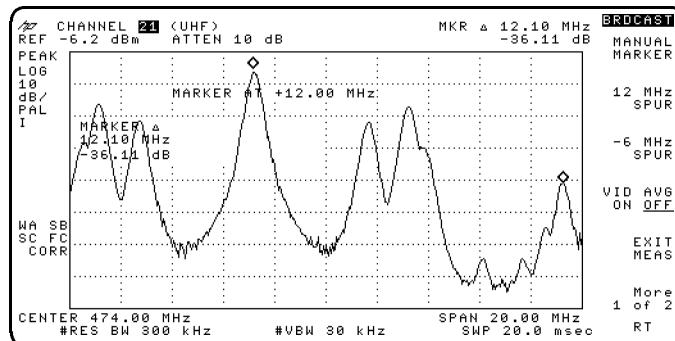
For the PAL-SCM D/K system the spurious signals test measures the +13 MHz and -6.5 MHz spurious signals relative to the peak sync level of a channels vision carrier.

For the NTSC system the spurious signals test measures the +9 MHz and -4.5 MHz spurious signals relative to the peak sync level of a channels vision carrier.

## Procedure

1. Select a channel as described in “Selecting a Channel”.
2. Press **More 1 of 4, SPURIOUS SIGNALS** to perform the Spurious Signals measurement.

The results are displayed on the analyzer screen as shown in Figure 2-13.



**Figure 2-13. Spurious Signals**

3. To locate the spurious signals in the PAL-B/G systems press **+11 MHz SPUR** to locate the upper spur or **-5.5 MHz SPUR** to locate the lower spur.

To locate the spurious signals in the PAL-I system press **+12 MHz SPUR** to locate the upper spur or **-6 MHz SPUR** to locate the lower spur.

To locate the spurious signals in the PAL-SCM D/K system press **+13 MHz SPUR** to locate the upper spur or **-6.5 MHz SPUR** to locate the lower spur.

To locate the spurious signals in the NTSC system press **+9 MHz SPUR** to locate the upper spur or **-4.5 MHz SPUR** to locate the lower spur.

To locate other spurious products press **MANUAL MARKER**.

Note that the marker reading is relative to the peak sync of the vision carrier.

---

**Hints**

1. To reduce the effects of noise when looking for low level spurious signals use video averaging. To select video averaging on press **VID AVG ON OFF** such that **ON** is underlined.
2. To change the input attenuation to suit the signal level under test press **More 1 of 2 ATTN**. If very low level signals are being used setting the attenuation to zero will help reduce the noise floor.
3. To change the detector type press **More 1 of 2 DETECTOR PK SP NG** such that the detector type you desire is underlined.
4. To enable you to see time varying low level spurious signals press **MIN HOLD ON OFF**, this will do a minimum hold on the trace. To reset the minimum hold function press **RESET MIN TRC**.
5. To look for spurious signals using an analog display press **More 1 of 2 ANALOG+ ON OFF** to activate the Analog+ mode. If you are using the Analog+ mode the minimum hold function is not available. For further information on Analog+ and its application, refer to *Product Note 8590-3, Analog Display Benefits with Digital Display Technology*.

---

**Caution**

Extreme care should be taken in setting the attenuator to zero. If power exceeding the maximum input level is applied, the spectrum analyzer may be damaged.

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## Depth of Modulation

The Depth of Modulation test measures the modulation depth of a channel (the ratio of the “white line” to peak sync of a vision carrier). The initial measurement looks at a number of frames to ensure the Vertical Interval Test Signal (VITS) line is captured and the correct peak to peak depth is measured. If the spectrum analyzer is configured with Fast Time Domain and TV trigger options (Options 101 and 102 or 301), this measurement also allows the measurement to be done on individual TV lines (such as the VITS). When measuring individual lines, blanking, depth of modulation and residual carrier are all continuously displayed and updated. When the TV Line measurement is active, access is given to the Low Frequency Amplitude Modulation Error measurement which displays the 50 Hz, 100 Hz and 300 Hz hum components on the vision carrier.

---

### Note

If the spectrum analyzer detects the vision carrier is unmodulated, the depth of modulation tests will not be performed.

---

## Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **More** 1 of 4, **DEPTH OF MODULATION** to perform the Depth of Modulation measurement.

The result is updated every ten sweeps and is displayed on the spectrum analyzer screen as shown in Figure 2-14.

3. Press **MAIN MENU** to exit the measurement.
4. If the spectrum analyzer is configured with Options 101, 102 or 301, press the **TV Line Menu** key to access the TV line trigger mode. Select the line with the Vertical Interval Test Signal (VITS) and the spectrum analyzer automatically measures the blanking level, depth of modulation and residual carrier.

The results are updated every five sweeps and are displayed on the spectrum analyzer screen as shown in Figure 2-15.

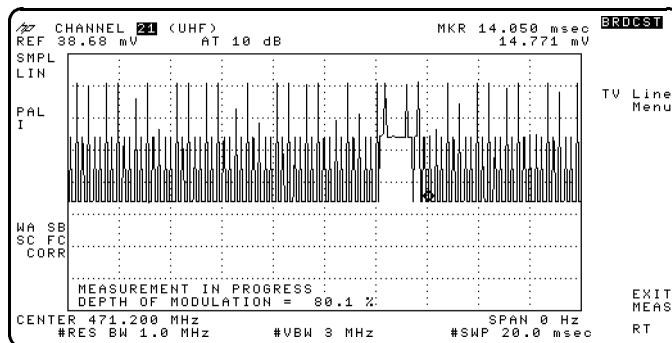


Figure 2-14. Depth of Modulation on a Frame

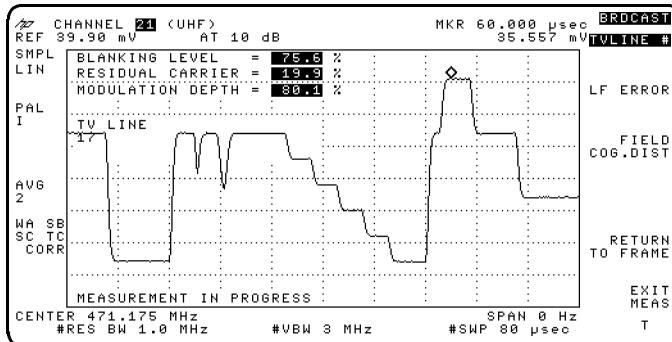


Figure 2-15. Single TV Line Measurement

5. a. To return to the previous menu press **RETURN TO FRAME**.
- b. To exit the measurement press **MAIN MENU**.
- c. Press **LF ERROR** to measure the low frequency amplitude modulation on the vision carrier. This utilizes the FFT (Fast Fourier Transform) capabilities of the spectrum analyzer to measure the 50 Hz, 100 Hz and 300 Hz low frequency components on the vision carrier. The results are updated after each sweep and are displayed on the spectrum analyzer screen as shown in Figure 2-16.
  - i. To return to the previous menu press **TVLINE Menu**.
  - ii. To exit the measurement press **MAIN MENU**.

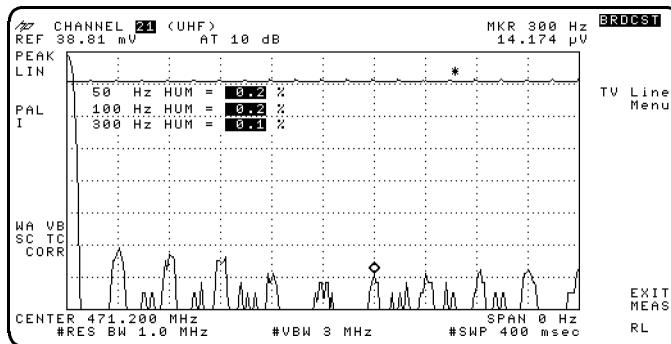


Figure 2-16. LF Error Measurement

d. Press FIELD SYNC DIST to measure the level distortion around the field sync (top, field and end-to-end distortions). The results are updated after each sweep and displayed on the spectrum analyzer screen as shown in Figure 2-17.

- To return to the previous menu press TV Line Menu.
- To exit the measurement press MAIN MENU.

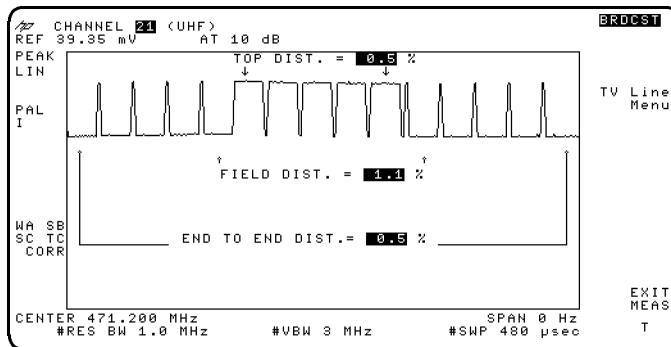


Figure 2-17. Field Coggle Distortion

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## Carrier-to-noise test

The carrier-to-noise test measures the ratio of the peak vision carrier level to the minimum noise level between channels. The result is normalized to the desired noise power bandwidth (**MESMNT BW**). In addition the spectrum analyzer will, when necessary, measure its own displayed average noise level (DANL) and do the necessary noise-near-noise corrections when the noise is actually measured.

If your analyzer has Option 107 installed you can make a non-interfering measurement.

Without Option 107 installed, the modulating signal must be removed or the measurement made outside the vestigial sideband. This point is selected from the **CN FRQ OFFSET** and places the marker below the vision carrier.

The **MESMNT BW** and **CN FRQ OFFSET** are selected from the **C/N Setup** menu accessed from the **Config** menu.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **More 1 of 4, CARRIER/NOISE** to perform the Carrier to Noise measurement.
3. If your analyzer has Option 107 installed and you wish to make a non-interfering measurement, proceed from Step 4.

If your analyzer has Option 107 installed and you selected YES from the **GATING YES NO** in the Config menu, continue at Step 4b.

Otherwise proceed as follows:

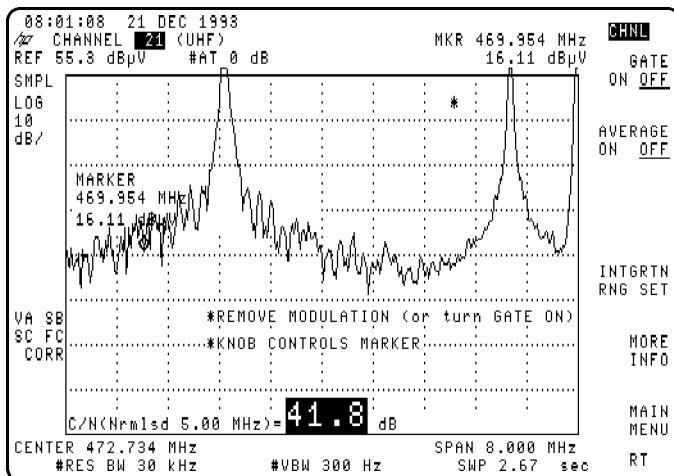
The messages **\*REMOVE MODULATION (or turn GATE ON)** and **\*KNOB CONTROLS MARKER** are displayed.

- a. Remove the channel modulation.
- b. Move the marker using the front panel knob to the minimum noise level between the vision carrier and the sound carrier of the next lower channel.

The measurement result is displayed in the form  
**C/N (NRMLZD X.XX MHz) =YY.Y dB**.

X.XX MHz is the measurement bandwidth selected from the  
**MESMNT BW** in the Setup menu and YY.Y dB is the carrier-to-noise  
ratio, normalized to that bandwidth. (See Figure 2-18.)

c. Continue from Step 5.



**Figure 2-18. Carrier-to-Noise (Gate Off)**

4. Perform the following steps to make a non-interfering measurement (signal turned on) if your analyzer has Option 107 installed.
  - Following the messages **\*REMOVE MODULATION (or turn GATE ON)** and **\*KNOB CONTROLS MARKER** are displayed, press **GATE ON OFF (ON)**.

The messages **SELECT A QUIET LINE** and **LINE NUMBER** and current value are displayed. The default is 12.

- b. Enter a quiet line number using the data keys. Terminate the entry by pressing **ENTER**.
- c. Press **FLD BOTH EVEN ODD** until the desired field is underlined. The default is BOTH.
- d. Press **CONTINUE** to complete the measurement and display the test result on the screen.

The measurement result is displayed in the form

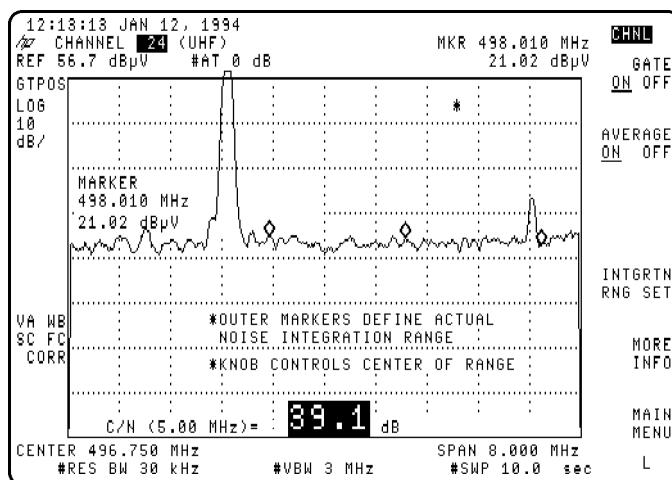
**C/N (X.XX MHz) =YY.Y dB.**

X.XX MHz is the measurement bandwidth selected from the **MESMNT BW** in the Setup menu and YY.Y dB is the RMS noise measured in the X.XX MHz bandwidth. (See Figure 2-19.)

The following messages are displayed:

**OUTER MARKERS DEFINE ACTUAL NOISE INTEGRATION RANGE** and **KNOB CONTROLS CENTER OF RANGE**.

- e. Move the measurement range to the desired position by using the front-panel knob while observing the two outer markers.

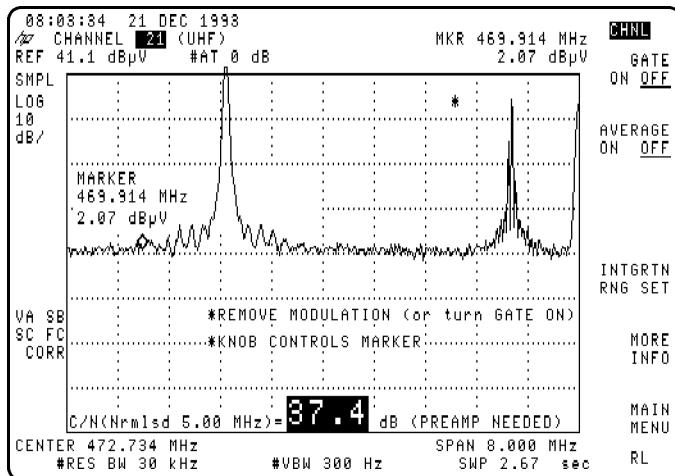


**Figure 2-19. Carrier-to-Noise (Gate On)**

The **INTGRTN** **RNG** **SET** softkey allows you to specify a range over which the measurement will be made. This accounts for the non-flatness of the noise floor.

- f. Press **INTGRTH** **RNG** **SET**. The current value is displayed. To change this, enter a number using the data keys and press **ENTER**. The default value is 85% of the measurement bandwidth (**MESMNT** **BW**).
- g. Reposition the measurement range as required using the front-panel knob.
5. Press **AVERAGE** **ON** **OFF** to turn averaging on or off.

Note that the test compares the noise level at the analyzer input to that of the analyzer itself. If these levels are within 3 dB of each other, the analyzer will display the message (**PREAMP NEEDED**) on the measurement result line. See Figure 2-20.



**Figure 2-20. Preamplifier Needed**

### Note

Refer to “Configuring the Spectrum Analyzer and Broadcast Measurements Personality” in *Chapter 1* to configure the analyzer for use with a preamplifier.

2 6. Pressing **MORE INFO** displays the carrier-to-noise calculation. See Figure 2-21.

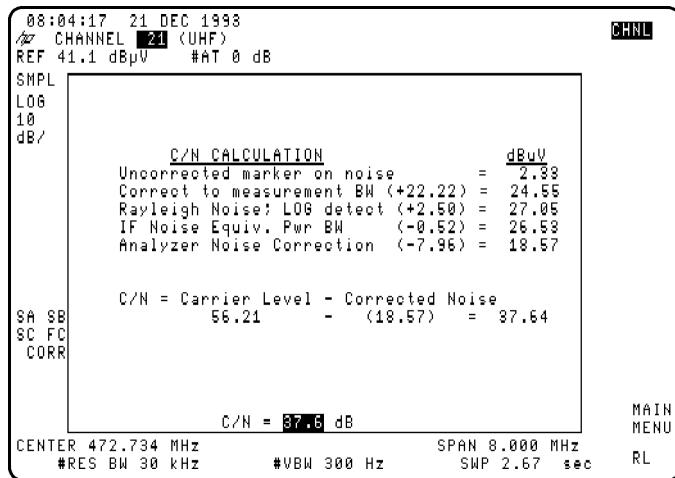
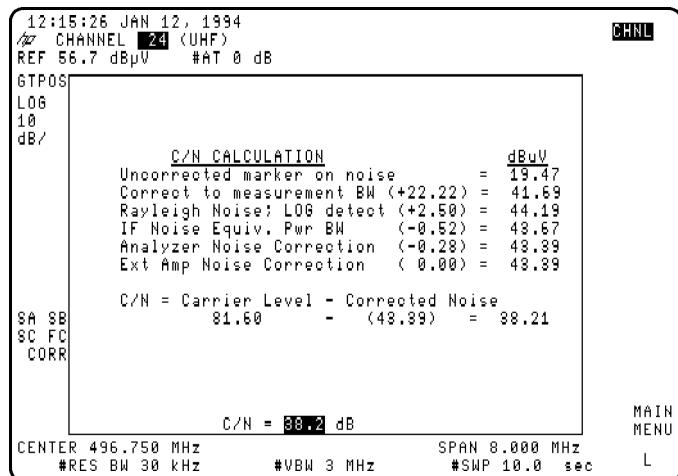


Figure 2-21. Carrier-to-Noise, More Information

7. Press **MAIN MENU**.

If you have not selected GATE ON, the message **CHANNEL TURNED ON?** will be displayed when **MAIN MENU** is pressed. Be sure the carrier is turned on again, and press **MAIN MENU** again.

Note that when an external preamplifier is used and you have selected **EXT AMP YES NO** (YES), the noise contribution of the preamplifier is also included in the calculation. See Figure 2-22. The values for external amplifier gain and noise figure entered in the input configuration, as described in "Configure the test system", are used for this calculation. This is the only use made of the values entered with the external amplifier softkeys (**EXT AMP YES NO**, **EXT AMP GAIN**, or **EXT AMP NZ FIG**).



**Figure 2-22. External Amplifier Calculation**

**Hints**

1. For best results, the vision carrier signal level at the analyzer input should be  $-30$  dBm or higher. If you are using a spectrum analyzer, use a preamplifier, if necessary, and a bandpass filter for lower signal levels.
2. Note that when using a bandpass filter, first peak the bandpass filter using **CARRIER LVL&FREQ**. Then press **CARRIER/NOISE**. Place the marker to measure the carrier-to-noise as close as possible to the carrier to minimize any roll-off effect of the bandpass filter.

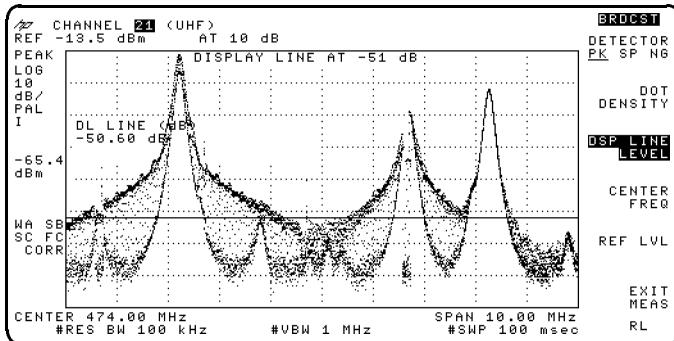
## Intermodulation

The Intermodulation test measures a channels intermodulation products which are present in the video modulation. For this measurement the modulator under test should be applied with a “green-bar” or other high-chroma content baseband video signal.

### Procedure

1. Ensure the modulator or transmitter under test is being applied with a “green-bar” or high chroma content baseband video signal.
2. Select a TV channel as described in “Selecting a Channel”.
3. Press **More 1 of 4**, **INTERMOD CHECK** to perform the Intermodulation measurement.

The result is displayed on the spectrum analyzer screen as shown in Figure 2-23.



**Figure 2-23. Intermodulation Check**

4. Press **MAIN MENU** to exit the measurement.

### Hints

1. A display line is placed at -55 dB from the vision carrier. This enables you to pass or fail the intermodulation products. The level of this line can be altered by pressing **DSP LINE LEVEL** then entering a new value (in dBc) using the keypad. (For example, **0**.)

(**5**, **0**, **(dB)**.) If you enter a positive number, it is changed to a negative number. The display line can also be manually moved by pressing the **DSP** **LINE** **LEVEL** and the spectrum analyzer knob.

2. The detector type can be varied between peak (**PK**), sample (**SP**) or negative (**NG**), by pressing **DETECTOR** **PK** **SP** **NG** such that the detector type you require is underlined.
3. Using **DETECTOR** **PK** **SP** **NG** and **DOT** **DENSITY** allows you to vary the display to best suit the type of intermodulation product you are looking for.

---

## NICAM Intermodulation

The NICAM Intermodulation test measures the intermodulation product between the vision, FM sound and NICAM sound carriers occurring at +558 kHz (for the PAL-I system) or +238 kHz (for the PAL-B/G systems). The intermodulation product is measured as a true RMS power.

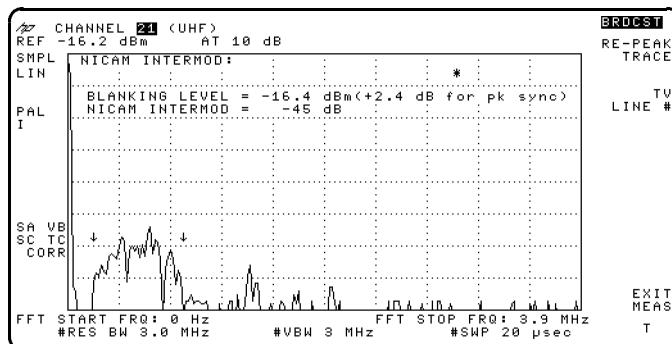
This measurement is for use on channels which have NICAM digital sound carriers.

### Notes

1. If the spectrum analyzer detects that the vision carrier is unmodulated the NICAM Intermodulation test will not be performed.
2. If you are using continuous wave (CW) signals, refer to the Three Tone Intermodulation test.

## Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **More 1 of 4**, **More 2 of 4** then **NICAM IP TEST** to perform the NICAM Intermodulation measurement. The result is updated after each sweep and displayed on the spectrum analyzer screen as shown in Figure 2-24.



**Figure 2-24. NICAM Intermodulation Measurement**

3. Press **MAIN MENU** to exit the measurement.

2

---

## Hints

1. The NICAM Intermodulation test makes measurements during the *quiet* or *noise* line of a channel. The default line measured is line 6. To change the line measured press **Config Menu**,**CHANGE**,**DEFAULTS** then **DEFAULT**,**NSE**,**LINE**.
2. To ensure that the spectrum analyzer is making on optimum measurement, press **RE-PEAK**,**TRACE** if you adjust any levels in the signal.

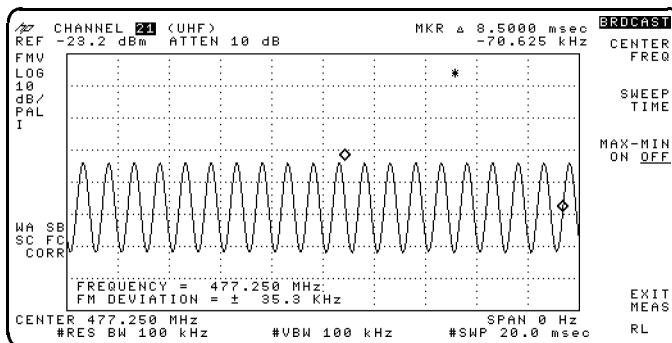
---

## FM Deviation

The **FM DEV** (Frequency Modulation Deviation) test demodulates the FM sound carrier and displays the sound modulation in time domain on the analyzer display. You must use this measurement with audio test tones if the FM deviation of the channel is to be accurately measured and adjusted.

### Procedure

1. Select a channel as described in “Selecting a Channel”.
2. Press **Main 1 of 4**, **Main 2 of 4**, **FM DEV**.
3. The result is displayed as shown in Figure 2-25.
4. If desired, change the number of cycles per measurement by pressing **CYCLES/MSMT**. The default is five cycles per measurement.



**Figure 2-25. FM Deviation**

5. If are testing a PAL-B/G system and have selected **PAL-B/G** from **TV STANDARD** of the Setup menu, the **SOUND 2** softkey is available. Press **SOUND 2** to measure the FM deviation of the second sound carrier.
6. Press **MAIN MENU** to exit the test.

---

## Chroma Intermodulation

The Chroma Intermodulation test measures the intermodulation product between the vision, FM sound and chroma carriers occurring at +1.57 MHz (for the PAL-I system) or +1.07 MHz (for the PAL-B/G systems). The measurement performs a Fast Fourier Transform (FFT) on the center 20  $\mu$ s of the selected TV line and calculates the peak sync to intermodulation ratio.

---

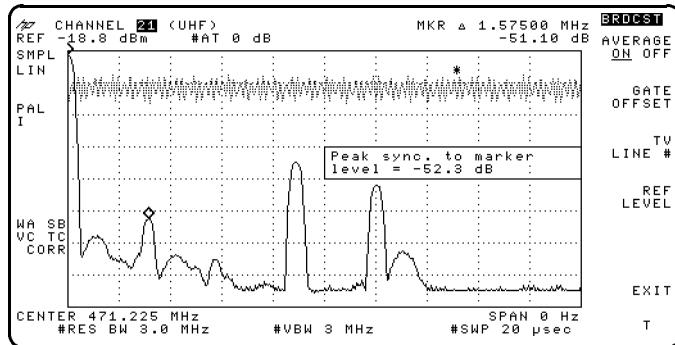
### Notes

1. If the spectrum analyzer detects that the vision carrier is unmodulated the Chroma Intermodulation test will not be performed.
2. If you are using continuous wave (CW) signals, refer to the Three Tone Intermodulation test.

---

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **More 1 of 4,More 2 of 4** then **CHROMA IP TEST** to perform the Chroma Intermodulation measurement.
3. The result is updated after each sweep and displayed on the spectrum analyzer screen as shown in Figure 2-26. Both the time domain and frequency domain traces are shown simultaneously. (The time domain trace is the dashed trace.)



**Figure 2-26. Chroma Intermodulation Measurement**

4. Press **MAIN MENU** to exit the measurement.

### Hints

1. This measurement is performed on a TV line that must consist of a burst of peak chroma (700 mV on the baseband signal). You can do this using a test generator producing a green-bar test pattern or an Interval Test Signal (ITS) line that has 700 mV peak to peak chroma over the entire line length. The default line measured is line 24. To change the line measured press **Config Menu**, **CHANGE DEFAULTS** then **DEFAULT CHR LINE**.
2. By default, the averaging function is switched on. For low levels of intermodulation products this improves the noise floor. For higher levels of intermodulation products or intermodulation products adjustment, the averaging function can be switched off by pressing **AVERAGE ON OFF** such that **OFF** is underlined.
3. To move the time domain trace in the X-axis use the **GATE OFFSET** key. This should be adjusted so that the entire time domain trace consists of the chroma burst. The units of the gate function are in samples. One sample is equivalent to 50 ns.

4. Press **TV LINE** # to change the TV line the measurement is made on.
5. To adjust the height of the time-domain trace on the display use the **REF LEVEL** key. For optimum FFT operation, the time domain trace should be placed 1.5 divisions below the reference level.

---

---

## 2 Differential Gain/Differential Phase

The amplitude of the chrominance signal determines the shade of a color. The differential gain test measures the amount of change in chrominance amplitude as the luminance level changes.

The phase of the chrominance sub-carrier determines the color represented. The differential phase test measures the amount of phase change that occurs in the chrominance signal as the luminance level changes.

The Differential gain/differential phase test carries out these measurements at the same time. A CCIR line 330, UK-ITS, FCC or NTC-7 test signal is required. You *must* have Option 107 installed in your analyzer to make this measurement.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **Main 1 of 4, Main 2 of 4, DIF GAIN DIF PHAZ**.
3. Select the first line number of the test UK-ITS, CCIR line 330, FCC or NTC-7 composite test signal by pressing **SELECT LINE**, entering the first line number of the desired test signal, then pressing **[ENTER]**. The default line number is 18.
4. Press **FIELD ODD EVEN** until the desired field is underlined.

---

#### Note

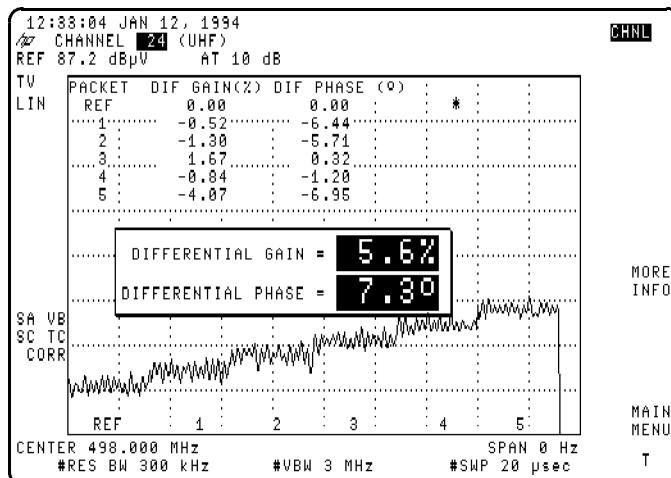
These measurements cannot be performed without a test signal.

---

5. Press **Select Test Sig.**
6. Press **CCIR LN 330, UK ITS, FCC COMPOSIT or NTC COMPOSIT** to select the composite test signal.
7. Press **Prev menu** to return to the **DIF GAIN DIF PHAZ** menu.
8. Press **# OF AVERAGES**, enter the desired number of averages, then press **[ENTER]**. If you are testing with a 0 dBmV signal, you should set the number of averages to 50. The lower the test signal level, the higher the number of averages.

9. Press **CONTINUE** to perform the test.

The result of the measurement is displayed on the analyzer display as shown in Figure 2-27.



**Figure 2-27. Diff Gain/Diff Phase (MORE INFO)**

10. Press **MORE INFO** for more detailed results.

11. Press **MAIN MENU** to exit the test.

---

## 2 Chrominance-Luminance Delay Inequality

The Chrominance-Luminance Delay Inequality test measures the delay between the chrominance and luminance signals. Your analyzer must have Option 107 installed to make this measurement.

A CCIR Line 17, UK ITS, FCC or NTC-7 composite test signal is also required.

### Procedure

1. Select a TV channel as described in “Selecting a Channel”.
2. Press **Main 1 of 4, Main 2 of 4, CLDI**.
3. Select a test line by pressing **SELECT LINE**. Enter the test line number using the data keys and terminate the entry by pressing **[ENTER]**. The default is line 18.
4. Press **FIELD ODD EVEN** to underline the desired field.

---

**Note** These measurements cannot be performed without a test signal.

---

5. Press **Select Test Sig.**
6. Press **CCIR LN 17, UK ITS, FCC COMPOSIT** or **NTC COMPOSIT** to underline the channel vertical interval test signal.
7. Press **Prev menu** to return to the **CLDI** menu.
8. Pressing **CONTINUE** performs the test.

The messages **MEASURING LUMINANCE 100 AVERAGES** and **MEASURING CHROMINANCE 150 AVERAGES** are displayed during the test.

The measurement result is presented on the analyzer display as shown in Figure 2-29.

9. Pressing **MORE INFO** displays more information about the measurement results.

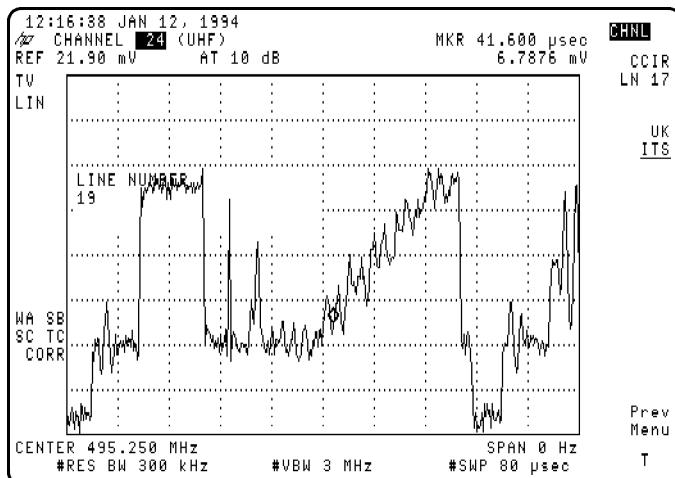


Figure 2-28. UK ITS Test Signal

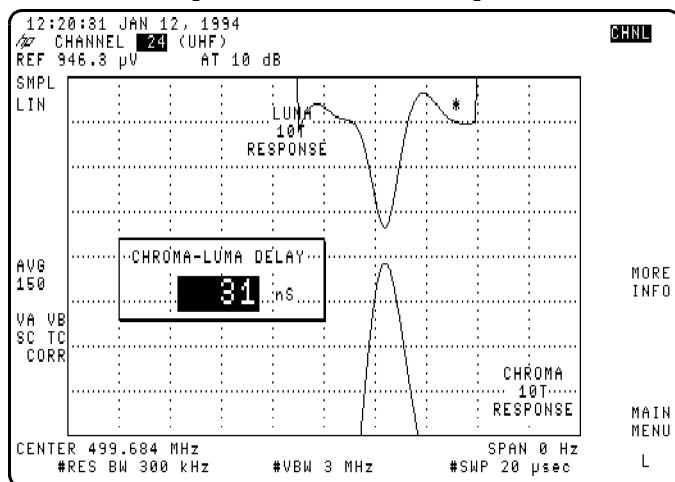


Figure 2-29. Chroma-Luma Delay Inequality (MORE INFO)

10. Press **MAIN MENU** to exit the test.

---

## Listen

The listen function demodulates the sound or aural carrier so that it is audible through the built-in speaker. The channel is displayed on the spectrum analyzer screen.

### Procedure

1. Press **Utility Menu**, **L****I****S****T****E****N** **O****N**. If necessary, select a channel as described in “Selecting a Channel”.
2. Adjust the volume using the the **VOL** control on the spectrum analyzer front panel.
3. Press **L****I****S****T****E****N** **O****F****F** to exit the function.

This function allows you to view a TV function on the spectrum analyzer screen. To use this function the spectrum analyzer must be configured with option H80 or option 107.

### Procedure

1. Select a channel as described in “Selecting a Channel”.
2. Press **Utility** **Menu**.

*If your analyzer has option H80 installed, proceed as follows:*

3. Press **H80** **TV** **VIEW**. This automatically sets up the spectrum analyzer so that you can view the TV picture on the spectrum analyzer screen and monitor the sound through the analyzer's loudspeaker.
4. Press **RESET** to reset the spectrum analyzer screen once you have finished viewing the TV picture.

*If your analyzer has option 107 installed, proceed as follows:*

5. Press **PIC** **SND** **ON**. This automatically sets up the spectrum analyzer so that you can view the TV picture on the spectrum analyzer screen.
6. Press any softkey to reset the spectrum analyzer screen once you have finished viewing the TV picture.

## Measurement Characteristics

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This chapter outlines the characteristics of the 85724A Broadcast Measurements Personality and it tells you what to do if you experience a problem.

The following Measurement Characteristics provide useful, but non-warranted, information in the form of typical, nominal or approximate values for spectrum analyzer performance.

The characteristics listed in Table 3-1 are based on using the 85724A with an 8591E Spectrum Analyzer configured with Options 101, 102 and H80.

All Carrier to Noise (C/N) figures quoted are normalized to a 4.75 MHz noise power bandwidth.

**Table 3-1.**  
**85724A Broadcast Measurements Personality**  
**Characteristics**

<b>Channel Selection</b> The following tune configurations are available:	
TV Channels	CCIR VHF, S and UHF M and B (Netherlands) OIRT Polish FCC-AIR DS, Z and PRC Bands
Non-TV channels	selection by vision carrier frequency using <b>TV NRM</b> mode or <b>FM CTR</b> mode.
<b>System Formats</b>	
	PAL: I, B, G, D NTSC: M SECAM: D, K
<b>Carrier Level</b> Measurement of peak vision level and peak vision to FM sound carrier ratio. NICAM ratio available for PAL systems.	
Range	-50 dBm to +23 dBm
Absolute Accuracy	±2.0 dB
NICAM Accuracy	±2.0 dB
<b>Chroma Level</b> Measurement of peak vision carrier level and peak vision to chroma ratio.	
Range	-50 dBm to +23 dBm
Absolute Accuracy	±2.0 dB for C/N > 40 dB
Vision to chroma ratio	± 1.0 dB for C/N > 40 dB
Relative Accuracy	
<b>Vision in Sound</b> Measurement of peak-to-peak amplitude modulation on the FM modulated carrier.	
Accuracy	± 2.0 % for stable FM sound carrier and C/N > 40 dB
<b>Three Tone Test</b> Measurement of vision-chroma-FM sound intermodulation when a test signal with three discrete CW carriers is inserted to emulate the carriers in a channel.	
Relative Accuracy	± 1.0 dB for C/N > 40 dB and intermodulation level > 10 dB above the noise floor.

3

**Table 3-2.**  
**85724A Broadcast Measurements Personality**  
**Characteristics (continued)**

<b>Spurious Signals</b> Measurement of +11 MHz (+12 MHz for PAL-I) and -5.5 MHz (-6 MHz for PAL-I) spurious on a channel. The spurious peaks must be at least 10 dB above the noise floor.	
Relative Accuracy	± 2.0 dB for peak-detection, no averaging, ANALOG+ off, MIN HOLD off.
<b>Modulation Depth (Frame)</b> Modulation depth across eight successive frames.	
Range	50 % to 93 %
Accuracy	± 2.0 % for C/N > 40 dB
<b>Single Line Levels (TV Line)</b> Measurement of blanking level, residual carrier and modulation depth on a single ITS (Interval Test Signal).	
Range	50 % to 93 %
Accuracy	± 2.0 % for C/N > 40 dB
<b>Low Frequency Error</b> Measurement of low frequency amplitude modulation (AM) on a vision carrier.	
Range	0.5 % to 10.0 %
Accuracy	± 1.0 %
<b>Field Coggle Distortion</b> Measurement of level distortion during field coggle and end-to-end of the field sync.	
Range	0.5 % to 10.0 %
Accuracy	± 2.0 % for C/N > 40 dB
<b>Carrier to Noise</b> Measurement of vision carrier to noise ratio normalized to user specified noise power bandwidth (default 4.75 MHz).	
Range	> 60 dB for input > -9.0 dBm and total power at the mixer < -8 dBm
Accuracy	< ± 1.25 dB for measured noise > 10 dB above the spectrum analyzer noise floor and adjusted < -60 dB from the reference level

**Table 3-3.**  
**85724A Broadcast Measurements Personality**  
**Characteristics (continued)**

3	<b>Intermodulation</b> Digital emulation of an analog display for checking in-channel intermodulation with user definable specification bar.	
	Dynamic Range	70 dB usable to 80 dB
	Specification bar Range	-1 to -79 dB from vision carrier peak
<b>NICAM Intermodulation</b> Measurement of vision, FM sound and NICAM carrier intermodulation measured during a <i>quiet</i> or <i>noise</i> TV line. (A TV line with no video modulation present.)		
	Range	-1 dB to -60 dB for $C/N > 60$ dB -1 dB to -50 dB for $C/N > 50$ dB. Level displayed is relative to the mean level of the quiet or noise line. Default line is 6.
<b>FM Deviation</b> Measurement of the peak-to-peak FM deviation of the FM sound carrier or FM radio channel. These characteristics apply for a fully warmed up spectrum analyzer (at a stable temperature) and after performing the FM CAL procedure.		
	Range	$\pm 1$ kHz to $\pm 100$ kHz (with audio modulation)
	Accuracy	2.0 % for deviation $> 20$ kHz on a stable FM carrier.
	Typical Performance	$\pm 1.0$ % for 25 kHz $<$ deviation $< 75$ kHz for $C/N > 50$ dB.
<b>Chroma Intermodulation</b> Measurement of vision-chroma-FM sound intermodulation of a TV channel. This measurement is made on a single TV line containing more than 50 $\mu$ s of full (700 mV) chroma.		
	Dynamic Range	Better than 60 dB peak vision-to-intermod for $C/N > 50$ dB (average on)
	Accuracy	$\pm 3.0$ dB for $C/N > 50$ dB (average on)

**Table 3-4.**  
**85724A Broadcast Measurements Personality**  
**Characteristics (continued)**

<b>H80/81 Set-Up</b> Function to allow Option H80/81 (TV Picture view) set-up by a single key press.	
<b>Listen On</b> Function to display vision and sound carriers in the frequency domain, while demodulating the audio on the sound carrier.	
Output	Speaker with volume control
Demodulation type	FM
Demodulation time	3 s
Sweep refresh time	75 ms
<b>Differential Gain</b> Measurement of differential gain linearity. (Requires TV receiver, video tester option hardware.)	
Accuracy	± 6 %
<b>Differential Phase</b> Measurement of differential phase linearity. (Requires TV receiver, video tester option hardware.)	
Accuracy	± 4 %
<b>Chrominance to Luminance Delay Inequality</b> Measurement of delay between chrominance and luminance components of the program video. (Requires TV receiver, video tester option hardware.)	
Accuracy	± 40 ns

## How to Contact Agilent Technologies

In the event something goes wrong with your spectrum analyzer, refer to the documentation for the spectrum analyzer about returning it for service. If you need to contact Agilent Technologies about a problem with the Broadcast Measurements Personality, you can call your nearest Agilent Technologies Sales and Service office that is listed

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in the following table.

US FIELD OPERATIONS	EUROPEAN OPERATION	INTERCON OPERATIONS
<b>HEADQUARTERS</b> Agilent Technologies 19320 Pruneridge Avenue Cupertino, CA 95014, USA (408) 973-1919	<b>HEADQUARTERS</b> Agilent Technologies S.A. 150, Route du Nant-d'Avril 1217 Meyrin 2/Geneva Switzerland (41 22) 780.8111	<b>HEADQUARTERS</b> Agilent Technologies 3495 Deer Creek Rd. Palo Alto, California 94304-1316 (415) 857-5027
<b>California</b> Agilent Technologies 1421 South Manhattan Ave. Fullerton, CA 92631 (714) 999-6700	<b>France</b> Agilent Technologies France 1 Avenue Du Canada Zone D'Activite De Courtabœuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60	<b>Australia</b> Agilent Technologies Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 (61 3) 895-2895
Agilent Technologies 301 E. Evelyn Mountain View, CA 94041 (415) 694-2000	<b>Germany</b> Agilent Technologies GmbH Berner Strasse 117 6000 Frankfurt 56 West Germany (49 69) 500006-0	<b>Canada</b> Agilent Technologies (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232
<b>Colorado</b> Agilent Technologies 24 Inverness Place, East Englewood, CO 80112 (303) 649-5000	<b>Great Britain</b> Agilent Technologies Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG11 5DZ England (44 734) 696622	<b>Japan</b> Yokogawa-Agilent Technologies 1-27-15 Yabe, Sagamihara Kanagawa 229, Japan (81 427) 59-1311
<b>Georgia</b> Agilent Technologies 2000 South Park Place Atlanta, GA 30339 (404) 955-1500		<b>People's Republic of China</b> China Agilent Technologies 38 Bei San Huan X1 Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888
<b>Illinois</b> Agilent Technologies 5201 Tollview Drive Rolling Meadows, IL 60008 (708) 255-9800		<b>Singapore</b> Agilent Technologies Singapore Pte. Ltd. 1150 Depot Road Singapore 0410 (65) 273 7388
<b>New Jersey</b> Agilent Technologies 120 W. Century Road Paramus, NJ 07653 (201) 599-5000		<b>Taiwan</b> Agilent Technologies Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Taipei, Taiwan (886 2) 712-0404
<b>Texas</b> Agilent Technologies 930 E. Campbell Rd. Richardson, TX 75081 (214) 231-6101		

# A

## Television Broadcast Station Identification

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### PAL Channels

**Table A-1.**  
**Channel Identification Plan**  
**Standard B, C (7 MHz) Europe**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IF	-	33.15-40.15	38.9	33.4
I	E2	47-54	48.25	53.75
-	E3	54-61	55.25	60.75
-	E4	61-68	62.25	67.75
III	E5	174-181	175.25	180.75
-	E6	181-188	182.25	187.75
-	E7	188-195	189.25	194.75
-	E8	195-202	196.25	210.75
-	E9	202-209	203.25	208.75
-	E10	209-216	210.25	215.75
-	E11	216-223	217.25	222.75
-	E12	223-230	224.25	229.75

**Table A-2.**  
**Channel Identification Plan**  
**Standard B, C (7 MHz) Europe**  
**Special Cable TV Channels**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IF	-	33.15-40.15	38.9	33.4
L2)	S1	104-111	105.25	110.75
-	S2	111-118	112.25	117.75
-	S3	118-125	119.25	124.75
-	S4	125-132	126.25	131.75
-	S5	132-139	133.25	138.75
-	S6	139-146	140.25	145.75
-	S7	146-153	147.25	152.75
-	S8	153-160	154.25	159.75
-	S9	160-167	161.25	166.75
-	S10	167-174	168.25	173.75
U2)	S11	230-237	231.25	236.75
-	S12	237-244	238.25	243.75
-	S13	244-251	245.25	250.75
-	S14	251-258	252.25	257.75
-	S15	258-265	259.25	264.75
-	S16	265-272	266.25	271.75
-	S17	272-279	273.25	278.75
-	S18	279-286	280.25	285.75
-	S19	286-293	287.25	292.75
-	S20	293-300	294.25	299.75
-	S21	302-310	303.25	308.75
-	to			
-	S38	438-446	439.25	444.75

**Table A-3.**  
**Channel Identification Plan**  
**Standard G, H, I, K, L**  
**(CCIR Standard 8 MHz)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)		
				G, H	I	K, L
-	-	-	-	G, H	I	K, L
IF		same as VHF for corresponding country				
IV	21	470-478	471.25	476.75	477.25	477.75
-	22	478-486	479.25	484.75	485.25	485.75
-	23	486-494	487.25	492.75	493.25	493.75
-	24	494-502	495.25	500.75	501.25	501.75
-	25	502-510	503.25	508.75	509.25	509.75
-	26	510-518	511.25	516.75	517.25	517.75
-	27	518-526	519.25	524.75	525.25	525.75
-	28	526-534	527.25	532.75	533.25	533.75
-	29	534-542	535.25	540.75	541.25	541.75
-	30	542-550	543.25	548.75	549.25	549.75
-	31	550-558	551.25	556.75	557.25	557.75
-	32	558-566	559.25	564.75	565.25	565.75
-	33	566-574	567.25	572.75	573.25	573.75
-	34	574-582	575.25	580.75	581.25	581.75
-	35	582-590	583.25	588.75	589.25	589.75
-	36	590-598	591.25	596.75	597.25	597.75
-	37	598-606	599.25	604.75	605.25	605.75

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**Table A-3.**  
**Channel Identification Plan**  
**Standard G, H, I, K, L**  
**(CCIR Standard 8 MHz) (continued)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)		
V	38	606-614	607.25	612.75	613.25	613.75
-	39	614-622	615.25	620.75	621.25	621.75
-	40	622-630	623.25	628.75	629.25	629.75
-	41	630-638	631.25	636.75	637.25	637.75
-	42	638-646	639.25	644.75	645.25	645.75
-	43	646-654	647.25	652.75	653.25	653.75
-	44	654-662	655.25	660.75	661.25	661.75
-	45	662-670	663.25	668.75	669.25	669.75
-	46	670-678	671.25	676.75	677.25	677.75
-	47	678-686	679.25	684.75	685.25	685.75
-	48	686-694	687.25	692.75	693.25	693.75
-	49	694-702	695.25	700.75	701.25	701.75
-	50	702-710	703.25	708.75	709.25	709.75
-	51	710-718	711.25	716.75	717.25	717.75
-	52	718-726	719.25	724.75	725.25	725.75
-	53	726-734	727.25	732.75	733.25	733.75
-	54	734-742	735.25	740.75	741.25	741.75
-	55	742-750	743.25	748.75	749.25	749.75
-	56	750-758	751.25	756.75	757.25	757.75
-	57	758-766	759.25	764.75	765.25	765.75
-	58	766-774	767.25	772.75	773.25	773.75
-	59	774-782	775.25	780.75	781.25	781.75
-	60	782-790	783.25	788.75	789.25	789.75
-	61	790-798	791.25	796.75	797.25	797.75
-	68	846-854	847.25	852.75	853.25	853.75
-	69	854-862	855.25	860.75	861.25	861.75

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**Table A-4.**  
**Channel Identification Plan**  
**Standard M (8 MHz)**  
**B Channels**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
M1	114-122	115.25	120.75
M2	122-130	123.25	128.75
M3	130-138	131.25	136.75
M4	138-146	139.25	155.75
M5	146-154	147.25	152.75
M6	154-162	155.25	160.75
M7	162-170	163.25	168.75

**Table A-5.**  
**Channel Identification Plan**  
**Standard B (8 MHz) Channels**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
B1	230-238	231.25	236.75
B2	254-262	255.25	260.75
B3	262-270	263.25	268.75
B4	270-278	271.25	276.75
B5	278-286	279.25	284.75
B6	286-294	287.25	292.75
B7	294-302	295.25	300.75

**Table A-6.**  
**Channel Identification Plan**  
**Standard B (7 MHz) Australia**  
**VHF Channels**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IF	-	33.15-40.15	38.9	33.4
I	0	45-52	46.25	51.75
-	1	56-63	57.25	62.75
-	2	63-70	64.25	69.75
(II)	3	85-92	86.25	91.75
-	4	94-101	95.25	100.75
-	5	101-108	102.25	107.75
III	6	174-181	175.25	180.75
-	7	181-188	182.25	187.75
-	8	188-195	189.25	194.75
-	9	195-202	196.25	201.75
-	10	208-215	209.25	214.75
-	11	215-222	216.25	221.75

**Table A-7.**  
**Channel Identification Plan**  
**Standard G (8 MHz) Australia**  
**UHF Channels**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IV	21	470-478	471.25	476.75
-	22	478-486	479.25	484.75
-	23	486-494	487.25	492.75
-	24	494-502	495.25	500.75
-	25	502-510	503.25	508.75
-	26	510-518	511.25	516.75
-	27	518-526	519.25	524.75

**Table A-8.**  
**Channel Identification Plan**  
**Standard B (7 MHz) Australia**  
**UHF Channels**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IV	28	526-533	527.25	532.75
-	29	533-540	534.25	539.75
-	30	540-547	541.25	546.75
-	31	547-554	548.25	553.75
-	32	554-561	555.25	560.75
-	33	561-568	562.25	567.75
-	34	568-575	569.25	574.75
-	35	575-582	576.25	581.75
-	36	582-589	583.25	588.75
-	37	589-596	590.25	595.75
-	38	596-603	597.25	602.75
-	39	603-610	604.25	609.75
-	40	610-617	611.25	616.75
-	41	617-624	618.25	623.75
-	42	624-631	625.25	630.75
-	43	631-638	632.25	637.75
-	44	638-645	639.25	644.75
-	45	645-652	646.25	651.75
-	46	652-659	653.25	658.75
-	47	659-666	660.25	665.75
-	48	666-673	667.25	672.75
-	49	673-680	674.25	679.75
-	50	680-687	681.25	686.75
-	51	687-694	688.25	693.75
-	52	694-701	695.25	700.75
-	53	701-708	702.25	707.75
-	54	708-715	709.25	714.75

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**Table A-8.**  
**Channel Identification Plan**  
**Standard B (7 MHz) Australia**  
**UHF Channels (continued)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
IV	55	715-722	716.25	721.75
-	56	722-729	723.25	728.75
-	57	729-736	730.25	735.75
-	58	736-743	737.25	742.75
-	59	743-750	744.25	749.75
-	60	750-757	751.25	756.75
-	61	757-764	758.25	763.75
-	62	764-771	765.25	770.75
-	63	771-778	772.25	777.75
-	64	778-785	779.25	784.75
-	65	785-792	786.25	791.75
-	66	792-799	793.25	798.75
-	67	799-806	800.25	805.75
-	68	806-813	807.25	812.75
-	69	813-820	814.25	819.75

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## SECAM-D/K Channels

**Table A-9.**  
**Channel Identification Plan**  
**OIRT SECAM-D/K (8 MHz)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
TV-I	1	48.5-56.5	49.75	56.25
-	2	58.0-66.0	59.25	65.75
TV-II	3	76.0-84.0	77.25	83.75
-	4	84.0-92.0	85.25	91.75
-	5	92.0-100	93.25	99.75
TV-III	6	174-182	175.25	181.75
-	7	182-190	183.25	189.75
-	8	190-198	191.25	197.75
-	9	198-206	199.25	205.75
-	10	206-214	207.25	213.75
-	11	214-222	215.25	221.75
-	12	222-230	223.25	229.75
TV-IV	21	470-478	471.25	477.75
-	22	478-486	479.25	485.75
-	23	486-494	487.25	493.75
-	24	494-502	495.25	501.75
-	25	502-510	503.25	509.75
-	26	510-518	511.25	517.75
-	27	518-526	519.25	525.75
-	28	526-534	527.25	533.75
-	29	534-542	535.25	541.75
-	30	542-550	543.25	549.75
-	31	550-558	551.25	557.75
-	32	558-566	559.25	565.75
-	33	566-574	567.25	573.75
-	34	574-582	575.25	581.75
-	35	582-590	583.25	589.75
-	36	590-598	591.25	597.75
-	37	598-606	599.25	605.75
-	38	606-614	607.25	613.75
-	39	614-622	615.25	621.75

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**Table A-9.**  
**Channel Identification Plan**  
**OIRT SECAM-D/K (8 MHz) (continued)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
TV-V	40	622-630	623.25	629.75
-	41	630-638	631.25	637.75
-	42	638-646	639.25	645.75
-	43	646-654	647.25	653.75
-	44	654-662	655.25	661.75
-	45	662-670	663.25	669.75
-	46	670-678	671.25	677.75
-	47	678-686	679.25	685.75
-	48	686-694	687.25	693.75
-	49	694-702	695.25	701.75
-	50	702-710	703.25	709.75
-	51	710-718	711.25	717.75
-	52	718-726	719.25	725.75
-	53	726-734	727.25	733.75
-	54	734-742	735.25	741.75
-	55	742-750	743.25	749.75
-	56	750-758	751.25	757.75
-	57	758-766	759.25	765.75
-	58	766-774	767.25	773.75
-	59	774-782	775.25	781.75
-	60	782-790	783.25	789.75
-	61	790-798	791.25	797.75
-	62	798-806	799.25	805.75
-	63	806-814	807.25	813.75
-	64	814-822	815.25	821.75
-	65	822-830	823.25	829.75
-	66	830-838	831.25	837.75
-	67	838-846	839.25	845.75
-	68	846-854	847.25	853.75
-	69	854-862	855.25	861.75

**Table A-9.**  
**Channel Identification Plan**  
**OIRT SECAM-D/K (8 MHz) (continued)**

Band	Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
TV-V	70	862-870	863.25	869.75
-	71	870-878	871.25	877.75
-	72	878-886	879.25	885.75
-	73	886-894	887.25	893.75
-	74	894-902	895.25	901.75
-	75	902-910	903.25	909.75
-	76	910-918	911.25	917.75
-	77	918-926	919.25	925.75
-	78	926-934	927.25	933.75
-	79	934-942	935.25	941.75
-	80	942-950	943.25	949.75

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**Table A-10.**  
**Channel Identification Plan**  
**OIRT A SECAM-D/K (8 MHz)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
A1	110-118	111.25	117.75
A2	118-126	119.25	125.75
A3	126-134	127.25	133.75
A4	134-142	135.25	141.75
A5	142-150	143.25	149.75
A6	150-158	151.25	157.75
A7	158-166	159.25	165.75
A8	166-174	167.25	173.75

**Table A-11.**  
**Channel Identification Plan**  
**OIRT F SECAM-D/K (8 MHz)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
F1	230-238	231.25	237.75
F2	238-246	239.25	245.75
F3	246-254	247.25	253.75
F4	254-262	255.25	261.75
F5	262-270	263.25	269.75
F6	270-278	271.25	277.75
F7	278-286	279.25	285.75
F8	286-294	287.25	293.75
F9	294-302	295.25	301.75

**Table A-12.**  
**Channel Identification Plan**  
**CHINA SECAM-D/K (8 MHz)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
DS-1	48.5-56.5	49.75	56.25
DS-2	56.5-64.5	57.75	64.25
DS-3	64.5-72.5	65.75	72.25
DS-4	76-84	77.25	83.75
DS-5	84-92	85.25	91.75
Z-1	111-119	112.25	118.75
Z-2	119-127	120.25	126.75
Z-3	127-135	128.25	134.75
Z-4	135-142	136.25	142.75
Z-5	142-151	144.25	150.75
Z-6	151-159	152.25	158.75
Z-7	159-167	160.25	166.75
DS-6	167-175	168.25	174.25
DS-7	175-183	176.25	182.75
DS-8	183-191	184.25	190.75
DS-9	191-199	192.25	198.75
DS-10	199-207	200.25	206.75
DS-11	207-215	208.25	214.75
DS-12	215-223	216.25	222.75
Z-8	223-231	224.25	230.75
Z-9	231-239	232.25	238.75
Z-10	239-247	240.25	246.75
Z-11	247-255	248.25	254.75
Z-12	255-263	256.25	262.75
Z-13	263-271	264.25	270.75
Z-14	271-279	272.25	278.75
Z-15	279-287	280.25	286.75
Z-16	287-295	288.25	294.75
Z-17	295-303	296.25	302.75
Z-18	303-311	304.25	310.75

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**Table A-12.**  
**Channel Identification Plan**  
**CHINA SECAM-D/K (8 MHz) (continued)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
Z-19	311-319	312.25	318.75
Z-20	319-327	320.25	326.75
Z-21	327-335	328.75	334.75
Z-22	335-343	336.25	342.75
Z-23	343-351	344.25	350.75
Z-24	351-359	352.25	358.75
Z-25	359-367	360.25	366.75
Z-26	367-375	368.25	374.75
Z-27	375-383	376.25	382.75
Z-28	383-391	384.25	390.75
Z-29	391-399	392.25	398.75
Z-30	399-407	400.25	406.75
Z-31	407-415	408.25	414.75
Z-32	415-423	416.25	422.75
Z-33	423-431	424.25	430.75
Z-34	431-439	432.25	438.75
Z-35	439-447	440.25	446.75
Z-36	447-455	448.25	454.75
Z-37	455-463	456.25	462.75
DS-13	470-478	471.25	477.75
DS-14	478-486	479.25	485.75
DS-15	486-494	487.25	493.75
DS-16	494-502	495.25	501.75
DS-17	502-510	503.25	509.75
DS-18	510-518	511.25	517.75
DS-19	518-526	519.25	525.75
DS-20	526-534	527.25	533.75
DS-21	534-542	535.25	541.75
DS-22	542-550	543.25	549.75

**Table A-12.**  
**Channel Identification Plan**  
**CHINA SECAM-D/K (8 MHz) (continued)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
DS-23	550-558	551.25	557.75
DS-24	558-566	559.25	565.75
DS-25	606-614	607.25	613.75
DS-26	614-622	615.25	621.75
DS-27	622-630	623.25	629.75
DS-28	630-638	631.25	637.75
DS-29	638-646	639.25	645.75
DS-30	646-654	647.25	653.75
DS-31	654-662	655.25	661.75
DS-32	662-670	663.25	669.75
DS-33	670-678	671.25	677.75
DS-34	678-686	679.25	685.75
DS-35	686-694	687.25	693.75
DS-36	694-702	695.25	701.75
DS-37	702-710	703.25	709.75
DS-38	710-718	711.25	717.75
DS-39	718-726	719.25	725.75
DS-40	726-734	727.25	733.75
DS-41	734-742	735.25	741.75
DS-42	742-750	743.25	749.75
DS-43	750-758	751.25	757.75
DS-44	758-766	759.25	765.75
DS-45	766-764	767.25	773.75
DS-46	774-782	775.25	781.75
DS-47	782-790	783.25	789.75
DS-48	790-798	791.25	797.75
DS-49	798-806	799.25	805.75
DS-50	806-814	807.25	813.75
DS-51	814-822	815.25	821.75

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**Table A-12.**  
**Channel Identification Plan**  
**CHINA SECAM-D/K (8 MHz) (continued)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
DS-52	822-830	823.25	829.75
DS-53	830-838	831.25	837.75
DS-54	838-846	839.25	845.75
DS-55	846-854	847.25	853.75
DS-56	854-862	855.25	861.75
DS-57	862-870	863.25	869.75
DS-58	870-878	871.25	877.75
DS-59	878-886	879.25	885.75
DS-60	886-894	887.25	893.75
DS-61	894-902	895.25	901.75
DS-62	902-910	903.25	909.75
DS-63	910-918	911.25	917.75
DS-64	910-918	919.25	925.75
DS-65	918-926	927.25	933.75
DS-66	926-934	935.25	941.75
DS-67	934-942	943.25	949.75
DS-68	942-958	951.25	957.75

**Table A-13.**  
**Channel Identification Plan**  
**POLAND SECAM-D/K (8 MHz)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
1	48-56	48.75	55.25
2	56-64	56.75	63.25
3	64-72	64.75	71.25
4	78.5-86.5	79.25	85.75
5	86.5-94.5	87.25	93.75
6	94.5-102.5	95.25	101.75
7	102.5-110.5	103.25	109.75
8	110.5-118.5	111.25	117.75
9	118.5-126.5	119.25	125.75
10	126.5-134.5	127.25	133.75
11	134.5-142.5	135.25	141.75
12	142.5-150.5	143.25	149.75
13	150.5-158.5	151.25	157.75
14	158.5-166.5	159.25	165.75
15	166.5-174.5	167.25	173.75
16	174.5-182.5	175.25	181.75
17	182.5-190.5	183.25	189.75
18	190.5-198.5	191.25	197.75
19	198.5-206.5	199.25	205.75
20	206.5-214.5	207.25	213.75
21	214.5-222.5	215.25	221.75
22	222.5-230.5	223.25	229.75
23	230.5-238.5	231.25	237.75
24	238.5-246.5	239.25	245.75
25	246.5-254.5	247.25	253.75
26	254.5-262.5	255.25	261.75
27	262.5-270.5	263.25	269.75
28	270.5-278.5	271.25	277.75
29	278.5-286.5	279.25	285.75
30	286.5-294.5	287.25	293.75
31	294.5-302.5	295.25	301.75

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**Table A-13.**  
**Channel Identification Plan**  
**POLAND SECAM-D/K (8 MHz) (continued)**

Channel	Channel Limits (MHz)	Vision Carrier (MHz)	Sound Carrier (MHz)
32	302.5-310.5	303.25	309.75
33	310.5-318.5	311.25	325.75
34	318.5-326.5	319.25	325.75
35	326.5-334.5	327.25	333.75
36	334.5-342.5	335.25	341.75
37	342.5-350.5	343.25	349.75
38	350.5-358.5	351.25	357.75
39	358.5-366.5	359.25	365.75
40	366.5-374.5	367.25	373.75
41	374.5-382.5	375.25	381.75
42	382.5-390.5	383.25	389.75
43	390.5-398.5	391.25	397.75
44	398.5-406.5	399.25	405.75
45	406.5-414.5	407.25	413.75
46	414.5-422.5	415.25	421.75
47	422.5-430.5	423.25	429.75
48	430.5-438.5	431.25	437.75
49	438.5-446.5	439.25	445.75
50	446.5-454.5	447.25	453.75
51	454.5-462.5	455.25	461.75
52	462.5-470.5	463.25	469.75
53	470.5-478.5	471.25	477.75
54	478.5-486.5	479.25	485.75
55	486.5-494.5	487.25	493.75
56	494.5-502.5	495.25	501.75
57	502.5-510.5	503.25	509.75
58	510.5-518.5	511.25	517.75
59	518.5-526.5	519.25	525.75
60	526.5-534.5	527.25	533.75
61	534.5-542.5	535.25	541.75
62	542.5-550.5	543.25	549.75

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## NTSC-M Channels

**Table A-14.**  
**FCC Numerical Designation of Television Channels**  
**(Section 73.603)**

Channel Number	Frequency Band (MHz)
2	54-60
3	60-66
4	66-72
5	76-82
6	82-88
7	174-180
8	180-186
9	186-192
10	192-198
11	196-204
12	204-210
13	210-216
14	470-476
15	476-482
16	482-488
17	488-494
18	494-500
19	500-506
20	506-512
21	512-518
22	518-524
23	524-530
24	530-536
25	536-542
26	542-548
27	548-554
28	554-560
29	560-566
30	566-572

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**Table A-14.**  
**FCC Numerical Designation of Television Channels**  
**(Section 73.603) (continued)**

Channel Number	Frequency Band (MHz)
31	572-578
32	578-584
33	584-590
34	590-596
35	596-602
36	602-608
37	608-614
38	614-620
39	620-626
40	626-632
41	632-638
42	638-644
43	644-650
44	650-656
45	656-662
46	662-668
47	668-674
48	674-680
49	680-686
50	686-692
51	692-698
52	698-704
53	704-710
54	710-716
55	716-722
56	722-728
57	728-734
58	734-740
59	740-746
60	746-752
61	752-758
62	758-764

**Table A-14.**  
**FCC Numerical Designation of Television Channels**  
**(Section 73.603) (continued)**

Channel Number	Frequency Band (MHz)
63	764-770
64	770-776
65	776-782
66	782-788
67	788-794
68	794-800
69	800-806

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<b>Note</b>	You must select TUNE BY CH FRQ(FR Q) to tune the analyzer to the channels in the following Channel Plan.
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**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
1	N/A	72.0036	73.2625	4+, A-8
2	55.25	54.0027	55.2625	
3	61.25	60.0030	61.2625	
4	67.25	66.0033	67.2625	
5	77.25	78.0039	79.2625	A-7(HRC,IRC)
6	83.25	84.0042	85.2625	A-6(HRC,IRC)
7	175.25	174.0087	175.2625	
8	181.25	180.0090	181.2625	
9	187.25	186.0093	187.2625	
10	193.25	192.0096	193.2625	
11	199.25	198.0099	199.2625	
12	205.25	204.0102	205.2625	
13	211.25	210.0105	211.2625	
14	121.2625	120.0060	121.2625	A
15	127.2625	126.0063	127.2625	B
16	133.2625	132.0066	133.2625	C
17	139.25	138.0069	139.2625	D
18	145.25	144.0072	145.2625	E
19	151.25	150.0075	151.2625	F
20	157.25	156.0078	157.2625	G
21	163.25	162.0081	163.2625	H
22	169.25	168.0084	169.2625	I
23	217.25	216.0108	217.2625	J
24	223.25	222.0111	223.2625	K

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**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**  
**(continued)**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
25	229.2625	228.0114	229.2625	L
26	235.2625	234.0117	235.2625	M
27	241.2625	240.0120	241.2625	N
28	247.2625	246.0123	247.2625	O
29	253.2625	252.0126	253.2625	P
30	259.2625	258.0129	259.2625	Q
31	265.2625	264.0132	265.2625	R
32	271.2625	270.0135	271.2625	S
33	277.2625	276.0138	277.2625	T
34	283.2625	282.0141	283.2625	U
35	289.2625	288.0144	289.2625	V
36	295.2625	294.0147	295.2625	W
37	301.2625	300.0150	301.2625	X
38	307.2625	306.0153	307.2625	Y
39	313.2625	312.0156	313.2625	Z
40	319.2625	318.0159	319.2625	DD
41	325.2625	324.0162	325.2625	EE
42	331.2750*	330.0165	331.2750*	FF
43	337.2625	336.0168	337.2625	GG
44	343.2625	342.0171	343.2625	HH
45	349.2625	348.0174	349.2625	II
46	355.2625	354.0177	355.2625	JJ
47	361.2625	360.0180	361.2625	KK
48	367.2625	366.0183	367.2625	LL
49	373.2625	372.0186	373.2625	MM
50	379.2625	378.0189	379.2625	NN
51	385.2625	384.0192	385.2625	OO
52	391.2625	390.0195	391.2625	PP
53	397.2625	396.0198	397.2625	QQ
54	403.25	402.0201	403.2625	RR
55	409.25	408.0204	409.2625	SS

\*This frequency deviates from the pattern.

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**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**  
**(continued)**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
56	415.25	414.0207	415.2625	TT
57	421.25	420.0210	421.2625	UU
58	427.25	426.0213	427.2625	VV
59	433.25	432.0216	433.2625	WW
60	439.25	438.0219	439.2625	XX
61	445.25	444.0222	445.2625	YY
62	451.25	450.0225	451.2625	ZZ
63	457.25	456.0228	457.2625	
64	463.25	462.0231	463.2625	
65	469.25	468.0234	469.2625	
66	475.25	474.0237	475.2625	
67	481.25	480.0240	481.2625	
68	487.25	486.0243	487.2625	
69	493.25	492.0246	493.2625	
70	499.25	498.0249	499.2625	
71	505.25	504.0252	505.2625	
72	511.25	510.0255	511.2625	
73	517.25	516.0258	517.2625	
74	523.25	522.0261	523.2625	
75	529.25	528.0264	529.2625	
76	535.25	534.0267	535.2625	
77	541.25	540.0270	541.2625	
78	547.25	546.0273	547.2625	
79	553.25	552.0276	553.2625	
80	559.25	558.0279	559.2625	
81	565.25	564.0282	565.2625	
82	571.25	570.0285	571.2625	

**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**  
**(continued)**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
83	577.25	576.0288	577.2625	
84	583.25	582.0291	583.2625	
85	589.25	588.0294	589.2625	
86	595.25	594.0297	595.2625	
87	601.25	600.0300	601.2625	
88	607.25	606.0303	607.2625	
89	613.25	612.0306	613.2625	
90	619.25	618.0309	619.2625	
91	625.25	624.0312	625.2625	
92	631.25	630.0315	631.2625	
93	637.25	636.0318	637.2625	
94	643.25	642.0321	643.2625	
95	91.25	90.0045	91.2625	A-5
96	97.25	96.0048	97.2625	A-4
97	103.25	102.0051	103.2625	A-3
98	109.2750*	108.0250	109.2750*	A-2
99	115.2750*	114.0250	115.2750*	A-1
100	649.2500	648.0324	649.2625	
101	655.2500	654.0327	655.2625	
102	661.2500	660.0330	661.2625	
103	667.2500	666.0333	667.2625	
104	673.2500	672.0336	673.2625	
105	679.2500	678.0339	679.2625	
106	685.2500	684.0342	685.2625	
107	691.2500	690.0345	691.2625	
108	697.2500	696.0348	697.2625	
109	703.2500	702.0351	703.2625	
110	709.2500	708.0354	709.2625	

\*This frequency deviates from the pattern.

A

**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**  
**(continued)**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
111	715.2500	714.0357	715.2625	
112	721.2500	720.0360	721.2625	
113	727.2500	726.0363	727.2625	
114	733.2500	732.0366	733.2625	
115	739.2500	738.0369	739.2625	
116	745.2500	744.0372	745.2625	
117	751.2500	750.0375	751.2625	
118	757.2500	756.0378	757.2625	
119	763.2500	762.0381	763.2625	
120	769.2500	768.0384	769.2625	
121	775.2500	774.0387	775.2625	
122	781.2500	780.0390	781.2625	
123	787.2500	786.0393	787.2625	
124	793.2500	792.0396	793.2625	
125	799.2500	798.0399	799.2625	
126	805.2500	804.0402	805.2625	
127	811.2500	810.0405	811.2625	
128	817.2500	816.0408	817.2625	
129	823.2500	822.0411	823.2625	
130	829.2500	828.0414	829.2625	
131	835.2500	834.0417	835.2625	
132	841.2500	840.0420	841.2625	
133	847.2500	846.0423	847.2625	
134	853.2500	852.0426	853.2625	
135	859.2500	858.0429	859.2625	
136	865.2500	864.0432	856.2625	
137	871.2500	870.0435	871.2625	
138	877.2500	876.0438	877.2625	
139	883.2500	882.0441	883.2625	

**Table A-15.**  
**Channel Identification Plan**  
**EIA Interim Standard No. 6 (CP) and FCC Part 76.612**  
**(continued)**

Channel Designation	Picture Carrier Frequency (MHz)			Historical Reference
	STD	HRC	IRC	
140	889.2500	888.0444	889.2625	
141	895.2500	894.0447	895.2625	
142	901.2500	900.0450	901.2625	
143	907.2500	906.0453	907.2625	
144	913.2500	912.0456	913.2625	
145	919.2500	918.0459	919.2625	
146	925.2500	924.0462	925.2625	
147	931.2500	930.0465	931.2625	
148	937.2500	936.0468	937.2625	
149	943.2500	942.0471	943.2625	
150	949.2500	948.0474	949.2625	
151	955.2500	954.0477	955.2625	
152	961.2500	960.0480	961.2625	
153	967.2500	966.0483	967.2625	
154	973.2500	972.0486	973.2625	
155	979.2500	978.0489	979.2625	
156	985.2500	984.0492	985.2625	
157	991.2500	990.0495	991.2625	
158	997.2500	996.0498	997.2625	

A

**Table A-16. FM Broadcast Channels**

Channel No.	Frequency (MHz)
201	88.1
202	88.3
203	88.5
204	88.7
205	88.9
206	89.1
207	89.3
208	89.5
209	89.7
210	89.9
211	90.1
212	90.3
213	90.5
214	90.7
215	90.9
216	91.1
217	91.3
218	91.5
219	91.7
220	91.9
221	92.1
222	92.3
223	92.5
224	92.7
225	92.9
226	93.1
227	93.3
228	93.5
229	93.7
230	93.9
231	94.1
232	94.3
233	94.5
234	94.7

**Table A-16. FM Broadcast Channels (continued)**

Channel No.	Frequency (MHz)
235	94.9
236	95.1
237	95.3
238	95.5
239	95.7
240	95.9
241	96.1
242	96.3
243	96.5
244	96.7
245	96.9
246	97.1
247	97.3
248	97.5
249	97.7
250	97.9
251	98.1
252	98.3
253	98.5
254	98.7
255	98.9
256	99.1
257	99.3
258	99.5
259	99.7
260	99.9
261	100.1
262	100.3
263	100.5
264	100.7
265	100.9
266	101.1
267	101.3
268	101.5

A

**Table A-16. FM Broadcast Channels (continued)**

Channel No.	Frequency (MHz)
269	101.7
270	101.9
271	102.1
272	102.3
273	102.5
274	102.7
275	102.9
276	103.1
277	103.3
278	103.5
279	103.7
280	103.9
281	104.1
282	104.3
283	104.5
284	104.7
285	104.9
286	105.1
287	105.3
288	105.5
289	105.7
290	105.9
291	106.1
292	106.3
293	106.5
294	106.7
295	106.9
296	107.1
297	107.3
298	107.5
299	107.7
300	107.9

**Table A-17. T-Channels**

Channel	Standard		
	Video	Color	Sound
T7	7.00	10.58	11.50
T8	13.00	16.58	17.50
T9	19.00	22.58	23.50
T10	25.00	28.58	29.50
T11	31.00	34.58	35.50
T12	37.00	40.58	41.50
T13	43.00	46.58	47.50

A

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## Channel Survey Map

The following channel survey map is intended to be used as a test aid. Line numbers of quiet lines and test signals should be documented for each channel in your system.

Make photocopies of a blank channel survey map and enter the line numbers and channel numbers corresponding to your system.

A

Channel Number	Line Number				
	Odd Even				

A



Channel Number	Line Number				
	Odd Even				

Channel Number	Line Number				
	Odd Even				

A

**A**

Channel Number	Line Number				
	Odd Even				

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