

GENERAL INFORMATION

AUSTRALIAN MF AM RADIO STEREO STANDARDS

Australian MF AM radio stations may broadcast stereophonic sound. The Government approved a single standard based on the American Motorola system, after the then Department of Communications conducted a comprehensive test program in conjunction with representatives of the broadcasting and receiver industry. The following is an extract from the standards.

THE AM STEREO SIGNAL

The transmitted signal shall be a compatible quadrature amplitude modulated (C-QAM) transmission.

Pilot Tone:	25 Hz \pm 0.1 Hz, with a deviation of 3% to 5% of the quadrature channel.
Frequency Response:	within 2 dB (50 Hz - 7.5 kHz)
Total Harmonic Distortion:	not exceeding 4%, at 80% modulation (400 Hz - 5 kHz)
Stereo Separation:	18 dB minimum (400 Hz - 5 kHz)
Channel Balance:	within 1 dB (50 Hz - 5 kHz)

THE C-QAM SIGNAL

The AM stereo system adopted by Australia is fully compatible with existing monophonic receivers. The amplitude of the transmitted carrier frequency is modulated by the sum of the left and right channel signals. The stereo information is encoded in the instantaneous phase of the transmitted carrier frequency. At the transmitter, the carrier frequency is divided into two components which are separated by 90 degrees relative to each other, that is, they are in quadrature.

One component is modulated by the sum of the left and right channel signals, while the other is modulated by the difference between the left and right channel signals. Thus, two double sideband suppressed carrier signals in quadrature are generated. These are then added vectorially to the carrier. The modulated component due to the sum signals is in phase, and that due to the difference is in quadrature, with the unmodulated carrier.

The recovered phase of this quadrature signal is then used to control the carrier frequency of the amplitude modulated transmitter.

AUSTRALIAN VHF FM RADIO STANDARDS

Australia uses the "pilot-tone" system commonly used throughout the world. Principal characteristics of the system used in Australia are set out below:

Frequency Range:	88 - 108 MHz
Channel Frequencies:	88.1, 88.3, ... 107.7, 107.9 MHz
Deviation:	75 kHz
Pre-emphasis/de-emphasis:	50 μ seconds
Stereo Channel Subcarrier Frequency:	38 kHz
Pilot Frequency:	19 kHz

The stereo baseband signal occupies a frequency range from 35 Hz to 53 kHz.

ANCILLARY COMMUNICATIONS SERVICES

Ancillary communication services may also be added to the main program channel. Principal characteristics of these services are:

Subcarrier Frequency: 67 kHz

Maximum Deviation: 7.5 kHz

Modulation: The subcarrier may be directly FSK modulated or frequency modulated by audio signals (program or tone). The maximum bandwidth of the modulating signals are inter-related and depend on the type of modulating signal. Typically, an audio signal of 5.5 kHz bandwidth may have a maximum deviation of 6 kHz.

Pre-emphasis/de-emphasis: a time constant of up to 150µseconds may be employed.

TRANSMISSION STANDARDS FOR THE AUSTRALIAN TERRESTRIAL TELEVISION SERVICE

RADIATED SIGNAL CHARACTERISTICS

TELEVISION CHANNELS

The width of the television channel shall be 7 MHz. Channels allocated for Australian television services are shown below.

LOCATION OF CARRIERS WITHIN THE CHANNEL

- The nominal vision carrier frequency shall be 1.25 MHz above the lower frequency limit of the channel.
- For single sound carrier transmissions, the unmodulated carrier shall in all cases be 5.5 MHz \pm 500 Hz above the vision carrier.
- For dual sound carrier transmissions the unmodulated first carrier shall in all cases be 5.5 MHz \pm 500 Hz above the vision carrier and the unmodulated second sound carrier frequency (where radiated) shall in all cases be 242.1875 kHz \pm 1 Hz above the first unmodulated sound carrier frequency.
- Frequency offsets from the nominal vision carrier frequency may be prescribed by the Australian Broadcasting Authority.

VISION CARRIER MODULATION

The vision carrier shall be amplitude modulated by the video signal. Negative modulation shall be employed, that is, a decrease in brightness shall cause an increase in mean vision carrier amplitude.

MODULATION LEVELS OF THE VISION CARRIER

Reference black and blanking levels shall be co-incident and correspond to 76% of the peak vision carrier amplitude. Black level shall be independent of light and shade in the picture. Reference white level shall correspond to 20% of the peak vision carrier amplitude.

SOUND CARRIER MODULATION

The sound carrier shall be frequency modulated to a maximum frequency deviation of \pm 50 kHz by the audio signal. Pre-emphasis shall be 50µseconds.

POLARISATION OF THE RADIATED SIGNALS

The polarisation of the radiated signals from both sound and vision transmitters shall be the same and shall be specified by the Australian Broadcasting Authority.

VISION TO SOUND POWER RATIO

The ratio of peak envelope power output of the vision transmitter to mean power output of the sound transmitter shall be:

- for single sound carrier transmissions, 10 dB.
- for dual sound carrier transmissions, 13 dB for channel 1 sound carrier and 20 dB for channel 2 sound carrier.

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The Australian television system uses 625 lines and a field frequency of 50 Hz. The colour subcarrier frequency is 4.43361875 MHz and the phase alternation line (PAL) system is used.

TELEVISION CHANNEL NUMBERS AND FREQUENCY LIMITS

VHF		UHF			
BAND I		BAND IV		47	659-666 MHz
0	45- 52 MHz	28	526-533 MHz	48	666-673 MHz
1	56- 63 MHz	29	533-540 MHz	49	673-680 MHz
2	63- 70 MHz	30	540-547 MHz	50	680-687 MHz
		31	547-554 MHz	51	687-694 MHz
		32	554-561 MHz	52	694-701 MHz
		33	561-568 MHz	53	701-708 MHz
BAND II ⁽²⁾		34	568-575 MHz	54	708-715 MHz
3	85-92 MHz	35	575-582 MHz	55	715-722 MHz
4	94-101 MHz			56	722-729 MHz
5	101-108 MHz			57	729-736 MHz
		BAND V		58	736-743 MHz
BAND III		36	582-589 MHz	59	743-750 MHz
5A ⁽³⁾	137-144 MHz	37	589-596 MHz	60	750-757 MHz
6	174-181 MHz	38	596-603 MHz	61	757-764 MHz
7	181-188 MHz	39	603-610 MHz	62	764-771 MHz
8	188-195 MHz	40	610-617 MHz	63	771-778 MHz
9	195-202 MHz	41	617-624 MHz	64	778-785 MHz
9A	202-209 MHz	42	624-631 MHz	65	785-792 MHz
10 ⁽⁴⁾	208-215 MHz	43	631-638 MHz	66	792-799 MHz
11 ⁽⁴⁾	215-222 MHz	44	638-645 MHz	67	799-806 MHz
12	223-230 MHz	45	645-652 MHz	68	806-813 MHz
		46	652-659 MHz	69	813-820 MHz

- Notes:
1. The dial markings on some older UHF tuners show only approximate channel numbers
 2. No new assignments will be made to television services in Band II
 3. No new assignments will be made to television services on channel 5A
 4. New services on channels 10 and 11 may be assigned to channel 10 (209-216 MHz) and channel 11 (216-223 MHz)