

North American broadcast television frequencies

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The **North American broadcast television frequencies** are on designated television channels numbered 2 through 69, approximately between 54 and 806 MHz. Traditionally, the frequencies are divided into two sections, the very high frequency (VHF) band and the ultra high frequency (UHF) band. The VHF band is further subdivided into two more sections, VHF-Lo (band I) and VHF-Hi (band III). In between lies the FM broadcast band (band II) used for frequency-modulated radio transmissions and a VHF radio band typically used by civil service agencies, amateur radio and aircraft (often called the airband).

On many FM radios, the audio for channel 6 can often be picked-up by turning the tuner dial below the lower FM band edge, at 87.75. The volume is low as the frequency deviation for TV audio is only ± 25 kHz, versus ± 75 kHz for FM broadcasting. WRGB attempted to keep this even after putting its digital signal on 6, but it caused destructive interference with the ATSC DTV signal, despite having opposite radio antenna polarizations. The lower sideband of HD Radio signals on 88.1 also overlap slightly from 87.9 to 88.0.

The FM audio carrier is always 4.5 MHz above the VSB video carrier, and the total channel bandwidth is 6 MHz.

The video carrier is nominally 1.25 MHz above the lower channel edge. In some cases, analog TV stations are assigned carrier frequency offsets of +10 or −10 kHz to minimize RF interference with distant stations on the same channel (see NTSC for more details). Positive-offset station will therefore end in .26, while negative-offset stations will end in .24, and are usually denoted with a plus or minus sign immediately after the number (such as 8+ or 37−). While offsets are rare in digital TV, positive-offset stations end in .3380556, while non-offset stations end in .30944056 (rounded to .31).

Analog stations must be separated by at least one unused channel except for non-adjacent channel pairs 4 and 5, 6 and 7, and 13 and 14.

Wireless microphones and medical telemetry devices already share some of the TV bands, but transmit at a very low power. In early 2010 the Federal Communications Commission (FCC) banned these from using the 700 MHz band in the U.S., effective June 12.

Changes and variations

Channel 1 was removed early on as a community television reservation and given to amateur radio and other uses. Channels 70 through 83 were removed from the bandplan in the 1980s to make way for AMPS mobile phone service. These channels were mainly used in the U.S., and mainly for broadcast translators, some of which continued in operation if their frequencies were not used by cellular. Channel 37 is allocated to radio astronomy and may not be used by any station.

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In the U.S., channels 52 through 69 are being reallocated for other purposes as the transition to digital television broadcasting is completed for low-power TV stations. All full-power analog broadcasts ended in June 2009, and all temporary full-power digital broadcasts moved back down to the lower channels. While most other countries abandoned VHF due to its poor suitability for TV broadcasting and allocation for Digital Audio Broadcasting, the FCC chose to cut high-UHF channels instead, because frequency-use rights could be auctioned for a greater price.^[*citation needed*]

Channels 14 through 19 are used for two-way radio in major cities on a non-interference basis, although the transition to digital television (DTV) has caused problems in certain instances when a previously unused channel has begun to be used for DTV broadcasts. The same holds true for wireless microphones and medical telemetry devices in that band.

In most regions, new digital television stations are placed on UHF (14 to 51, except 37 and sometimes 14 and 20) or high-VHF channels (7-13), although others are used in some of the more crowded media markets. With virtual channel numbering, many digital televisions group digital channels with their corresponding analog broadcasts. For example, the first digital TV stream of a station that broadcasts analog TV on channel 4 will usually appear as 4-1 or 4.1 on a DTV receiver, even though the digital transmissions may be on channel 38. Several digital subchannels can be multiplexed together, so 4-1 through 4-5 might be used by one station. Subchannel 0 (e.g., 4-0) designates the analog broadcast. In the U.S., all channels from 7-36 and 38-51 are frequently used for digital TV broadcasts. However, VHF 2 to 6 are rarely used by DTV broadcasters due to ongoing problems with impulse noise, and channel 6 being an adjacent channel to the FM broadcast band. Additionally, VHF performance is poor for mobile TV, with ATSC-M/H being the standard finalized and approved in late 2009.

The VHF bandplan was modified several times before 1948. The last change was the transfer of channel 1, originally intended as a low-power (less than 1,000 watts) LPTV community channel, to two-way land-mobile radio and the six-meter amateur radio band. [1] (http://www.tech-notes.tv/History&Trivia/Channel%20One/Channel_1.htm) Amateur television (ATV) is used on four channels in the 420-450 MHz (70-centimeter) amateur band; UHF TV channel 14 starts at 470 MHz. These ATV channels are popular for repeater output and direct communications, and are seen over-the-air with a cable-ready tuner set to channels 56 to 59 (14 being seen on 65). ATV is also used on the other amateur bands above 450 MHz.

VHF original bands (historical) UHF band

VHF low-band (band I & II)						UHF band					
1940 U.S. channel assignments (partly deprecated)											
(frequencies in MHz)						Channel	Lower edge	Video carrier	ATSC carrier	Audio carrier	Upper edge
1	50	51.25	55.75	56	Amateur band, TV ch. 2	14	470	471.25	470.31	475.75	476
						15	476	477.25	476.31	481.75	482
						16	482	483.25	482.31	487.75	488
						17	488	489.25	488.31	493.75	494
2	66	67.25	71.75	72	TV ch. 4	18	494	495.25	494.31	499.75	500
						19	500	501.25	500.31	505.75	506
3	72	73.25	77.75	78	Radio-controlled car/plane hobby, TV ch. 5	20	506	507.25	506.31	511.75	512
						21	512	513.25	512.31	517.75	518
						22	518	519.25	518.31	523.75	524
						23	524	525.25	524.31	529.75	530

4	78	79.25	83.75	84	TV ch. 5	24	530	531.25	530.31	535.75	536
5	84	85.25	89.75	90	TV ch. 6, FM radio	25	536	537.25	536.31	541.75	542
						26	542	543.25	542.31	547.75	548
6	96	97.25	101.75	102	FM radio	27	548	549.25	548.31	553.75	554
7	102	103.25	107.75	108	FM radio	28	554	555.25	554.31	559.75	560

VHF high-band (band III)

1940 U.S. channel assignments (partly deprecated)
(frequencies in MHz)

Channel	Lower edge	Video carrier	Audio carrier	Upper edge	Current U.S. use						
8	162	163.25	167.75	168	NOAA Weather Radio (162)	29	560	561.25	560.31	565.75	566
						30	566	567.25	566.31	571.75	572
						31	572	573.25	572.31	577.75	578
						32	578	579.25	578.31	583.75	584
						33	584	585.25	584.31	589.75	590
						34	590	591.25	590.31	595.75	596
						35	596	597.25	596.31	601.75	602
36	602	603.25	602.31	607.75	608						
9	180	181.25	185.75	186	TV ch. 8	37*	608	609.25*	-	613.75*	614
10	186	187.25	191.75	192	TV ch. 9	38	614	615.25	614.31	619.75	620
11	204	205.25	209.75	210	TV ch. 12	39	620	621.25	620.31	625.75	626
						40	626	627.25	626.31	631.75	632
12	210	211.25	215.75	216	TV ch. 13	41	632	633.25	632.31	637.75	638
						42	638	639.25	638.31	643.75	644
13	234	235.25	239.75	240	military	43	644	645.25	644.31	649.75	650
14	240	241.25	245.75	246	military	44	650	651.25	650.31	655.75	656
15	258	259.25	263.75	264	military	45	656	657.25	656.31	661.75	662
16	264	265.25	269.75	270	military	46	662	663.25	662.31	667.75	668
17	282	283.25	287.75	288	military	47	668	669.25	668.31	673.75	674
18	288	289.25	293.75	294	military	48	674	675.25	674.31	679.75	680
						49	680	681.25	680.31	685.75	686
						50	686	687.25	686.31	691.75	692
						51	692	693.25	692.31	697.75	698

VHF bands

VHF low-band (band I)

(Current channel assignments)

Channel	Lower edge	Video carrier	ATSC carrier	Audio carrier	Upper edge	Channel	Lower edge	Video carrier	ATSC carrier	Audio carrier	Upper edge
1*	44	45.25	n/a	49.75	50	52	698	699.25	698.31	703.75	704
2	54	55.25	54.31	59.75	60	53	704	705.25	704.31	709.75	710
3	60	61.25	60.31	65.75	66	54	710	711.25	710.31	715.75	716
4	66	67.25	66.31	71.75	72	55	716	717.25	716.31	721.75	722
5	76	77.25	76.31	81.75	82	56	722	723.25	722.31	727.75	728
6	82	83.25	82.31	87.75	88	57	728	729.25	728.31	733.75	734
						58	734	735.25	734.31	739.75	740
						59	740	741.25	740.31	745.75	746
						60	746	747.25	746.31	751.75	752
						61	752	753.25	752.31	757.75	758
						62	758	759.25	758.31	763.75	764
						63	764	765.25	764.31	769.75	770

Note the upper edge of analog TV 6 slightly overlaps FM channel 200, 87.9 MHz. That FM frequency is used by KSFH, various low power pirate stations, and broadcast translator station K200AA (the only USA repeater licensed to use that frequency). Analog TV 6 audio can be heard on 87.7 or 87.8, but with lower sound volume and therefore fidelity due to differences in the FM

specifications between TV and FM radio. Some low-power analog TV stations (see here) operate on TV 6 with the intent of being heard on FM radio at 87.7 MHz.

VHF high-band (band III)					
Channel	Lower edge	Video carrier	ATSC carrier	Audio carrier	Upper edge
7	174	175.25	174.31	179.75	180
8	180	181.25	180.31	185.75	186
9	186	187.25	186.31	191.75	192
10	192	193.25	192.31	197.75	198
11	198	199.25	198.31	203.75	204
12	204	205.25	204.31	209.75	210
13	210	211.25	210.31	215.75	216
800 MHz band (until 1980s)					
Channel	Lower edge	Video carrier	ATSC carrier	Audio carrier	Upper edge
64	770	771.25	770.31	775.75	776
65	776	777.25	776.31	781.75	782
66	782	783.25	782.31	787.75	788
67	788	789.25	788.31	793.75	794
68	794	795.25	794.31	799.75	800
69	800	801.25	800.31	805.75	806
70	806	807.25	-	811.75	812
71	812	813.25	-	817.75	818
72	818	819.25	-	823.75	824
73	824	825.25	-	829.75	830
74	830	831.25	-	835.75	836
75	836	837.25	-	841.75	842
76	842	843.25	-	847.75	848
77	848	849.25	-	853.75	854
78	854	855.25	-	859.75	860
79	860	861.25	-	865.75	866
80	866	867.25	-	871.75	872
81	872	873.25	-	877.75	878
82	878	879.25	-	883.75	884
83	884	885.25	-	889.75	890

Notes

- The frequencies used by UHF channels 70 through 83 were reallocated to land mobile radio (public safety and trunked radio systems) and mobile phones in a CCIR international convention in 1982, and thus were never used for terrestrial digital TV.
- In certain metropolitan areas of the United States, Channels 14 through 20 have been allocated to Land Mobile Radio (LMR) use. [2] (http://edocket.access.gpo.gov/cfr_2007/octqtr/pdf/47cfr90.303.pdf)
- Channels 52 through 69 in the United States are in the process of being cleared in advance of a similar reallocation once conversion to digital TV has been accomplished.
- Channel 37 is reserved for radio astronomy in the United States, Canada, Bermuda and the Bahamas, thus there are no television stations assigned to it.
- Virtual channels 1, 37, and 70 to 99 can be assigned via PSIP even though there is no corresponding physical station on that channel.

Cable television frequency issues

- UHF channels 14 to 43 translate to common cable-ready channels 65 to 94 (add 51).
- UHF channels 44 to 69 translate to rarely-used cable TV channels 100 to 125 (add 56).

See also

- Broadcast television systems
 - ATSC (standards)
 - Multichannel television sound
 - NTSC
 - NTSC-J
 - PAL
 - RCA
 - SECAM
 - Moving image formats
 - Early television stations
 - Television channel frequencies
 - Very high frequency
 - Ultra high frequency
 - Knife-edge effect
 - Channel One
 - Channel 37
 - North American cable television frequencies
 - Australasian television frequencies
- TV stations in the United States:
 - Channel 2
 - Channel 3
 - Channel 4
 - Channel 5
 - Channel 6
 - Channel 7
 - Channel 8
 - Channel 9
 - Channel 10
 - Channel 11
 - Channel 12
 - Channel 13

External links

- ARRL (<http://www.arrl.org/tis/info/catv-ch.html>) - TV Channel, CATV and FM Broadcast Frequencies by Kevin K. Custer (W3KKC)
- What ever happened to Channel 1? (http://www.tech-notes.tv/History&Trivia/Channel%20One/Channel_1.htm) - J. W. Reiser, based on a Radio-Electronics article of the same name by David A. Ferre.
- Post-transition U.S. digital TV channel assignments as of 1 August 2007 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-138A2.xls)
- U.S. cable television channel frequencies (<http://www.jneuhaus.com/fccindex/cablech.html>)
- TVTower.com - Commercial Television Frequencies (<http://www.tvtower.com/Commercial%20Television%20Frequencies.html>)

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