



## APPENDIX **C**

# Frequency Allocation

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This appendix provides information on broadcast and cable television NTSC and PAL/SECAM standards and frequencies used around the world.

There are three standards for transmitting video. They are defined by the method of encoding color onto a monochrome signal. The methods are defined as:

- **NTSC**—National Television System Committee.  
NTSC is the current standard used for analog television in the United States and elsewhere. NTSC supports color television transmission in a 6 MHz channel bandwidth and has 525 interlaced scan lines. Two fields are interlaced to make one frame with a frame rate of 29.97 frames per second and a field rate of 59.94 fields per second. A fraction (~8%) of the available bandwidth is used for signal synchronization between the transmitter and the receiver giving an effective resolution of 640x480. The aspect ratio, or ratio of picture width to picture height, is 4:3.
- **PAL**—Phase Alternating Line.  
PAL is a composite color system similar to NTSC. In PAL, however, the color difference signals alternate phase at the horizontal line rate. PAL video consists of a 625-line frame, a frame rate of 25 Hz, and a field rate of 50 Hz. As with NTSC, ~8% of the available bandwidth is used for synchronization yielding an effective resolution of 768x576. The aspect ratio is 4:3. The PAL standard and its variants are used primarily in Europe, China, Asia, Africa, Australia, Brazil, and Argentina.
- **SECAM**—SEquential Couleur Avec Memoire.  
SECAM is a color television broadcasting system using 625 picture lines and a 50-hertz (Hz) field rate, in which the two color-difference signals are transmitted sequentially instead of simultaneously.

General NTSC information is covered in [Table C-4](#) and [Table C-5](#). General PAL/SECAM information is covered in [Table C-7](#). Use the information in [Table C-1](#), [Table C-2](#), and [Table C-3](#) to compare analog television standards used around the world.

Check these Web sites for more information about world-wide frequency allocation.

<http://www.blondertongue.com/CATV-Broadband-Reference-Literature>

<http://www.geo-orbit.org/sizepgs/ntscp.html#anchor1016493>

<http://www.acterna.com>

<http://www.apple.com>

<http://www.c-cor.com>

<http://www.atxincorporated.com>

<http://www.alkenmrs.com>

# Standards Comparisons

The following tables (Table C-1, Table C-2, and Table C-3) include data from Recommendation ITU-R BT.470.6, Conventional Television Systems (1998) and provide a comparison of the different standards.

**Table C-1** Analog Television System Baseband Video Parameters

	<b>M</b>	<b>N</b>	<b>B, B1, D1, G</b>	<b>H</b>	<b>I</b>	<b>D, K</b>	<b>K1</b>	<b>L</b>
<b>Lines per frame</b>	525	625	625	625	625	625	625	625
<b>Field rate (Hz)</b>	Monochrome: 60 Color: 59.94	50	50	50	50	50	50	50
<b>Horizontal rate (Hz)</b>	Monochrome: 15,750 Color: 15,734.264	15,625	15,625	15,625	15,625	15,625	15,625	15,625
<b>Video bandwidth (Mhz)</b>	4.2	4.2	5	5	5.5	6	6	6

**Table C-2** Analog Television Chrominance Subcarrier Frequencies

	<b>M/NTSC</b>	<b>M/PAL</b>	<b>B, B1, D, D1, G, H, K, N/PAL</b>	<b>I/PAL</b>	<b>B, D, G, H, K, K1, L/SECAM</b>	<b>N/PAL<sup>1</sup></b>
<b>Chrominance subcarrier frequency (Hz)</b>	3,579,545 ± 10	3,575,611.49 ± 10	4,433,618.75 ± 5	4,433,618.75 ± 1	$f_{OR} = 4,406,250$ ± 2,000  $f_{OB} = 4,250,000$ ± 2,000	3,582,056.25 ± 5

1. This value applies to the combination N/PAL used in Argentina.

**Table C-3** Analog Television System RF Parameters

	<b>M</b>	<b>N</b>	<b>B, B1, G</b>	<b>H</b>	<b>I</b>	<b>D, D1, K</b>	<b>K1</b>	<b>L</b>
<b>Channel bandwidth at RF (MHz)</b>	6	6	B=7 B1, G=8	8	8	8	8	8
<b>Frequency separation between visual and aural carrier (MHz)</b>	4.5	4.5	5.5	5.5	5.9996	6.5	6.5	6.5

# NTSC Cable Television Channels and Relative Frequencies

Table C-4 provides information on the NTSC frequency map for standard 6-MHz channels in North, Central, and South America as well as parts of Asia. Table C-5 lists NTSC assignments for Japan.

**Table C-4** NTSC Cable Television Channels and Relative Frequencies

Channel No. <sup>1</sup>	Channel No., EIA	Bandwidth (MHz)	Visual Carrier (MHz)	Center Freq.	Aural Carrier (MHz)	Incrementally Related Carrier		Harmonically Related Carrier	
						Visual	Aural	Visual	Aural
T-7	none	5.75-11.75	7	8.75	11.5	N/A	N/A	N/A	N/A
T-8	none	11.75-17.75	13	14.75	17.5	N/A	N/A	N/A	N/A
T-9	none	17.75-23.75	19	10.75	23.5	N/A	N/A	N/A	N/A
T-10	none	23.75-29.75	25	26.75	29.5	N/A	N/A	N/A	N/A
T-11	none	29.75-35.75	31	32.75	35.5	N/A	N/A	N/A	N/A
T-12	none	35.75-41.75	37	38.75	41.5	N/A	N/A	N/A	N/A
T-13	none	41.75-47.75	43	44.75	47.5	N/A	N/A	N/A	N/A
TV-IF	none	40.0-46.0	45.75	44.0	41.25	N/A	N/A	N/A	N/A
2	2	54.0-60.0	55.25	57.0	59.75	55.2625	59.7625	54.0027	58.5027
3	3	60.0-66.0	61.25	63.0	65.75	61.2625	65.7625	60.0030	64.5030
4	4	66.0-72.0	67.25	69.0	71.75	67.2625	71.7625	66.0033	70.5030
5	5	76.0-82.0	77.25	79.0	81.75	79.2625	83.7625	78.0039	82.5039
6	6	82.0-88.0	83.25	85.0	87.75	85.2625	89.7625	84.0042	88.5042
	FM	88.0-108.0							
A-5	95	90.0-96.0	91.25	93.0	95.75	91.2625	95.7625	90.0045	94.5045
A-4	96	96.0-102.0	97.25	99.0	101.75	97.2625	101.7625	96.0048	100.5048
A-3	97	102.0-108.0	103.25	105.0	107.75	103.2625	107.7625	102.0051	106.5051
A-2	98 <sup>2</sup>	108.0-114.0	109.25	111.0	113.75	109.2750	113.7750	Cannot lock to comb	
A-1	99 <sup>2</sup>	114.0-120.0	115.25	117.0	119.75	115.2750	119.7750	Reference channel, Refer to FCC regulations	
A	14 <sup>2</sup>	120.0-126.0	121.25	123.0	125.75	121.2625	125.7625	120.0060	124.5060
B	15 <sup>2</sup>	126.0-132.0	127.25	129.0	131.75	127.2625	131.7625	126.0063	130.5063
C	16 <sup>2</sup>	132.0-138.0	133.25	135.0	137.75	133.2625	137.7625	132.0066	136.5066
D	17	138.0-144.0	139.25	141.0	143.75	139.2625	143.7625	138.0069	142.5069
E	18	144.0-150.0	145.25	147.0	149.75	145.2625	149.7625	144.0072	148.5072
F	19	150.0-156.0	151.25	153.0	155.75	151.2625	155.7625	150.0075	154.5075
G	20	156.0-162.0	157.25	159.0	161.75	157.2625	161.7625	156.0078	160.5078
H	21	162.0-168.0	163.25	165.0	167.75	163.2625	167.7625	162.0081	166.5081
I	22	168.0-174.0	169.25	171.0	173.75	169.2625	173.7625	168.0084	172.5084
7	7	174.0-180.0	175.25	177.0	179.75	175.2625	179.7625	174.0087	178.5087

Table C-4 NTSC Cable Television Channels and Relative Frequencies (continued)

Channel No. <sup>1</sup>	Channel No., EIA	Bandwidth (MHz)	Visual Carrier (MHz)	Center Freq.	Aural Carrier (MHz)	Incrementally Related Carrier		Harmonically Related Carrier	
						Visual	Aural	Visual	Aural
8	8	180.0-186.0	181.25	183.0	185.75	181.2625	185.7625	180.0090	184.5090
9	9	186.0-192.0	187.25	189.0	191.75	187.2625	191.7625	186.0093	190.5093
10	10	192.0-198.0	193.25	195.0	197.75	193.2625	197.7625	192.0096	196.5096
11	11	198.0-204.0	199.25	201.0	203.75	199.2625	203.7625	198.0099	202.5099
12	12	204.0-210.0	205.25	207.0	209.75	205.2625	209.7625	204.0102	208.5102
13	13	210.0-216.0	211.25	213.0	215.75	211.2625	215.7625	210.0105	214.5105
J	23	216.0-222.0	217.25	219.0	221.75	217.2625	211.7625	216.0108	220.5108
K	24 <sup>2</sup>	222.0-228.0	223.25	225.0	227.75	223.2625	227.7625	222.0111	226.5111
L	25 <sup>2</sup>	228.0-234.0	229.25	231.0	233.75	229.2625	233.7625	228.0114	232.5114
M	26 <sup>2</sup>	234.0-240.0	235.25	237.0	239.75	235.2625	239.7625	234.0117	238.5117
N	27 <sup>2</sup>	240.0-246.0	241.25	243.0	245.75	241.2625	245.7625	240.0120	244.5120
O	28 <sup>2</sup>	246.0-252.0	247.25	249.0	251.75	247.2625	251.7625	246.0123	250.5123
P	29 <sup>2</sup>	252.0-258.0	253.25	255.0	257.75	253.2625	257.7625	252.0126	256.5126
Q	30 <sup>2</sup>	258.0-264.0	259.25	261.0	263.75	259.2625	263.7625	258.0129	262.5129
R	31 <sup>2</sup>	264.0-270.0	265.25	267.0	269.75	265.2625	269.7625	264.0132	268.5132
S	32 <sup>2</sup>	270.0-276.0	271.25	273.0	275.75	271.2625	275.7625	270.0135	274.5135
T	33 <sup>2</sup>	276.0-282.0	277.25	279.0	281.75	277.2625	281.7625	276.0138	270.5138
U	34 <sup>2</sup>	282.0-288.0	283.25	285.0	287.75	283.2625	287.7625	282.0141	286.5141
V	35 <sup>2</sup>	288.0-294.0	289.25	291.0	293.75	289.2625	293.7625	288.0144	292.5144
W	36 <sup>2</sup>	294.0-300.0	295.25	297.0	299.75	295.2625	299.7625	294.0147	298.5147
AA	37 <sup>2</sup>	300.0-306.0	301.25	303.0	305.75	301.2625	305.7625	300.0150	304.5150
BB	38 <sup>2</sup>	306.0-312.0	307.25	309.0	311.75	307.2625	311.7625	306.0153	310.5153
CC	39 <sup>2</sup>	312.0-318.0	313.25	315.0	317.75	313.2625	317.7625	312.0156	316.5156
DD	40 <sup>2</sup>	318.0-324.0	319.25	321.0	323.75	319.2625	323.7625	318.0159	322.5159
EE	41 <sup>2</sup>	324.0-330.0	325.25	327.0	329.75	325.2625	329.7625	324.0162	328.5162
FF	42 <sup>2</sup>	330.0-336.0	331.25	333.0	335.75	331.2625	335.7625	330.0165	334.5165
GG	43 <sup>2</sup>	336.0-342.0	337.25	339.0	341.75	337.2625	341.7625	336.0168	340.5168
HH	44 <sup>2</sup>	342.0-348.0	343.25	345.0	347.75	343.2625	347.7625	342.0171	346.5171
II	45 <sup>2</sup>	348.0-354.0	349.25	351.0	353.75	349.2625	353.7625	348.0174	352.5174
JJ	46 <sup>2</sup>	354.0-360.0	355.25	357.0	359.75	355.2625	359.7625	354.0177	358.5177
KK	47 <sup>2</sup>	360.0-366.0	361.25	363.0	365.75	361.2625	365.7625	360.0180	364.5180
LL	48 <sup>2</sup>	366.0-372.0	367.25	369.0	371.75	367.2625	371.7625	366.0183	370.5183
MM	49 <sup>2</sup>	372.0-378.0	373.25	375.0	377.75	373.2625	377.7625	372.0186	376.5186
NN	50 <sup>2</sup>	378.0-384.0	379.25	381.0	383.75	379.2625	383.7625	378.0189	382.5189
OO	51 <sup>2</sup>	384.0-390.0	385.25	387.0	389.75	385.2625	389.7625	384.0192	388.5192

Table C-4 NTSC Cable Television Channels and Relative Frequencies (continued)

Channel No. <sup>1</sup>	Channel No., EIA	Bandwidth (MHz)	Visual Carrier (MHz)	Center Freq.	Aural Carrier (MHz)	Incrementally Related Carrier		Harmonically Related Carrier	
						Visual	Aural	Visual	Aural
PP	52 <sup>2</sup>	390.0-396.0	391.25	393.0	395.75	391.2625	395.7625	390.0195	394.5195
QQ	53 <sup>2</sup>	396.0-402.0	397.25	399.0	401.75	397.2625	401.7625	396.0198	400.5198
RR	54	402.0-408.0	403.25	405.0	407.75	403.2625	407.7625	402.0201	406.5201
SS	55	408.0-414.0	409.25	411.0	413.75	409.2625	413.7625	408.0204	412.5204
TT	56	414.0-420.0	415.25	417.0	419.75	415.2625	419.7625	414.0207	418.5207
UU	57	420.0-426.0	421.25	423.0	425.75	421.2625	425.7625	420.0210	424.5210
VV	58	426.0-432.0	427.25	429.0	431.75	427.2625	431.7625	426.0213	430.5213
WW	59	432.0-438.0	433.25	435.0	437.75	433.2625	437.7625	432.0216	436.5216
XX	60	438.0-444.0	439.25	441.0	443.75	439.2625	443.7625	438.0219	442.5219
YY	61	444.0-450.0	445.25	447.0	449.75	445.2625	449.7625	444.0222	448.5222
ZZ	62	450.0-456.0	451.25	453.0	455.75	451.2625	455.7625	450.0225	454.5225
	63	456.0-462.0	457.25	459.0	461.75	457.2625	461.7625	456.0228	460.5228
	64	462.0-468.0	463.25	465.0	467.75	463.2625	467.7625	462.0231	466.5231
	65	468.0-474.0	469.25	471.0	473.75	469.2625	473.7625	468.0234	472.5234
	66	474.0-480.0	475.25	477.0	479.75	475.2625	479.7625	474.0237	478.5237
	67	480.0-486.0	481.25	483.0	485.75	481.2625	485.7625	480.0240	484.5240
	68	486.0-492.0	487.25	489.0	491.75	487.2625	491.7625	486.0243	490.5243
	69	492.0-498.0	493.25	495.0	497.75	493.2625	497.7625	492.0246	496.5246
	70	498.0-504.0	499.25	501.0	503.75	499.2625	503.7625	498.0249	502.5249
	71	504.0-510.0	505.25	507.0	509.75	505.2625	509.7625	504.0252	508.5252
	72	510.0-516.0	511.25	513.0	515.75	511.2625	515.7625	510.0255	514.5255
	73	516.0-522.0	517.25	519.0	521.75	517.2625	521.7625	516.0258	520.5258
	74	522.0-528.0	523.25	525.0	527.75	523.2625	527.7625	522.0261	526.5261
	75	528.0-534.0	529.25	531.0	533.75	529.2625	533.7625	528.0264	532.5264
	76	534.0-540.0	535.25	537.0	539.75	535.2625	539.7625	534.0267	538.5267
	77	540.0-546.0	541.25	543.0	545.75	541.2625	545.7625	540.0270	544.5270
	78	546.0-552.0	547.25	549.0	551.75	547.2625	551.7625	556.0273	550.5273
	79	552.0-558.0	553.25	555.0	557.75	553.2625	557.7625	552.0276	556.5276
	80	558.0-564.0	559.25	561.0	563.75	559.2625	563.7625	558.0279	562.5279
	81	564.0-570.0	565.25	567.0	569.75	565.2625	569.7625	564.0282	568.5282
	82	570.0-576.0	571.25	573.0	575.75	571.2625	575.7625	570.0285	574.5285
	83	576.0-582.0	577.25	579.0	581.75	577.2625	581.7625	576.0288	580.5288
	84	582.0-588.0	583.25	585.0	587.75	583.2625	587.7625	582.0291	586.5291
	85	588.0-594.0	589.25	591.0	593.75	589.2625	593.7625	588.0294	592.5294
	86	594.0-600.0	595.25	597.0	599.75	595.2625	599.7625	594.0297	598.5297

Table C-4 NTSC Cable Television Channels and Relative Frequencies (continued)

Channel No. <sup>1</sup>	Channel No., EIA	Bandwidth (MHz)	Visual Carrier (MHz)	Center Freq.	Aural Carrier (MHz)	Incrementally Related Carrier		Harmonically Related Carrier	
						Visual	Aural	Visual	Aural
	87	600.0-606.0	601.25	603.0	605.75	601.2625	605.7625	600.0300	604.5300
	88	606.0-612.0	607.25	609.0	611.75	607.2625	611.7625	606.0303	610.5303
	89	612.0-618.0	613.25	615.0	617.75	613.2625	617.7625	612.0306	616.5306
	90	618.0-624.0	619.25	621.0	623.75	619.2625	623.7625	618.0309	622.5309
	91	624.0-630.0	625.25	627.0	629.75	625.2625	629.7625	624.0312	628.5312
	92	630.0-636.0	631.25	633.0	635.75	631.2625	635.7625	630.0315	634.5315
	93	636.0-642.0	637.25	639.0	641.75	637.2625	641.7625	636.0318	640.5318
	94	642.0-648.0	643.25	645.0	647.75	643.2625	647.7625	642.0321	646.5321
	100	648.0-654.0	649.25	651.0	653.75	649.2625	653.7625	648.0324	652.5324
	101	654.0-660.0	655.25	657.0	659.75	655.2625	659.7625	654.0327	658.5327
	102	660.0-666.0	661.25	663.0	665.75	661.2625	665.7625	660.0330	664.5330
	103	666.0-672.0	667.25	669.0	671.75	667.2625	671.7625	666.0333	670.5333
	104	672.0-678.0	673.25	675.0	677.75	673.2625	677.7625	672.0336	676.5336
	105	678.0-684.0	679.25	681.0	683.75	679.2625	683.7625	678.0339	682.5339
	106	684.0-690.0	685.25	687.0	689.75	685.2625	689.7625	684.0342	688.5342
	107	690.0-696.0	691.25	693.0	695.75	691.2625	695.7625	690.0345	694.5345
	108	696.0-702.0	697.25	699.0	701.75	697.2625	701.7625	696.0348	700.5348
	109	702.0-708.0	703.25	705.0	707.75	703.2625	707.7625	702.0351	706.5351
	110	708.0-714.0	709.25	711.0	713.75	709.2625	713.7625	708.0354	712.5354
	111	714.0-720.0	715.25	717.0	719.75	715.2625	719.7625	714.0357	718.5357
	112	720.0-726.0	721.25	723.0	725.75	721.2625	725.7625	720.0360	724.5360
	113	726.0-732.0	727.25	729.0	731.75	727.2625	731.7625	726.0363	730.5363
	114	732.0-738.0	733.25	735.0	737.75	733.2625	737.7625	732.0366	736.5366
	115	738.0-744.0	739.25	741.0	743.75	739.2625	743.7625	738.0369	742.5369
	116	744.0-750.0	745.25	747.0	749.75	745.2625	749.7625	744.0372	748.5372
	117	750.0-756.0	751.25	753.0	755.75	751.2625	755.7625	750.0375	754.5375
	118	756.0-762.0	757.25	759.0	761.75	757.2625	761.7625	756.0378	760.5378
	119	762.0-768.0	763.25	765.0	767.75	763.2625	767.7625	762.0381	766.5381
	120	768.0-774.0	769.25	771.0	773.75	769.2625	773.7625	768.0384	772.5384
	121	774.0-780.0	775.25	777.0	779.75	775.2625	779.7625	774.0387	778.5387
	122	780.0-786.0	781.25	783.0	785.75	781.2625	785.7625	780.0390	784.5390
	123	786.0-792.0	787.25	789.0	791.75	787.2625	791.7625	786.0393	790.5393
	124	792.0-798.0	793.25	795.0	797.75	793.2625	797.7625	792.0396	796.5396
	125	798.0-804.0	799.25	801.0	803.75	799.2625	803.7625	798.0399	802.5399
	126	804.0-810.0	805.25	807.0	809.75	805.2625	809.7625	804.0402	808.5402

Table C-4 NTSC Cable Television Channels and Relative Frequencies (continued)

Channel No. <sup>1</sup>	Channel No., EIA	Bandwidth (MHz)	Visual Carrier (MHz)	Center Freq.	Aural Carrier (MHz)	Incrementally Related Carrier		Harmonically Related Carrier	
						Visual	Aural	Visual	Aural
	127	810.0-816.0	811.25	813.0	815.75	811.2625	815.7625	810.0405	814.5405
	128	816.0-822.0	817.25	819.0	821.75	817.2625	821.7625	816.0408	820.5408
	129	822.0-828.0	823.25	825.0	827.75	823.2625	827.7625	822.0411	826.5411
	130	828.0-834.0	829.25	831.0	833.75	829.2625	833.7625	828.0414	832.5414
	131	834.0-840.0	835.25	837.0	839.75	835.2625	839.7625	834.0417	838.5417
	132	840.0-846.0	841.25	843.0	845.75	841.2625	845.7625	840.0420	844.5420
	133	846.0-852.0	847.25	849.0	851.75	847.2625	851.7625	846.0423	850.5423
	134	852.0-858.0	853.25	855.0	857.75	853.2625	857.7625	852.0426	856.5426
	135	858.0-864.0	859.25	861.0	863.75	859.2625	863.7625	858.0429	862.5429
	136	864.0-870.0	865.25	867.0	869.75	865.2625	869.7625	864.0432	868.5432
	137	870.0-876.0	871.25	873.0	875.75	871.2625	875.7625	870.0435	874.5435
	138	876.0-882.0	877.25	879.0	881.75	877.2625	881.7625	876.0438	880.5438
	139	882.0-888.0	883.25	885.0	887.75	883.2625	887.7625	882.0441	886.5441
	140	888.0-894.0	889.25	891.0	893.75	889.2625	893.7625	888.0444	892.5444
	141	894.0-900.0	895.25	897.0	899.75	895.2625	899.7625	894.0447	898.5447
	142	900.0-906.0	901.25	903.0	905.75	901.2625	905.7625	900.0450	904.5450
	143	906.0-912.0	907.25	909.0	911.75	907.2625	911.7625	906.0453	910.5453
	144	912.0-918.0	913.25	915.0	917.75	913.2625	917.7625	912.0456	916.5456
	145	918.0-924.0	919.25	921.0	923.75	919.2625	923.7625	918.0459	922.5459
	146	924.0-930.0	925.25	927.0	929.75	925.2625	929.7625	924.0462	928.5462
	147	930.0-936.0	931.25	933.0	935.75	931.2625	935.7625	930.0465	934.5465
	148	936.0-942.0	937.25	939.0	941.75	937.2625	941.7625	936.0468	940.5468
	149	942.0-948.0	943.25	945.0	947.75	943.2625	947.7625	942.0471	946.5471
	150	948.0-954.0	949.25	951.0	953.75	949.2625	953.7625	948.0474	952.5474
	151	954.0-960.0	955.25	957.0	959.75	955.2625	959.7625	954.0477	958.5477
	152	960.0-966.0	961.25	963.0	965.75	961.2625	965.7625	960.0480	964.5480
	153	966.0-972.0	967.25	969.0	971.75	967.2625	971.7625	966.0483	970.5483
	154	972.0-978.0	973.25	975.0	977.75	973.2625	977.7625	972.0486	976.5486
	155	978.0-984.0	979.25	981.0	983.75	979.2625	983.7625	978.0489	982.5489
	156	984.0-990.0	985.25	987.0	989.75	985.2625	989.7625	984.0492	988.5492
	157	990.0-996.0	991.25	993.0	995.75	991.2625	995.7625	990.0495	994.5495
	158	996.0-1002.0	997.25	999.0	1001.75	997.2625	1001.7625	996.0498	1000.5498

1. This column is for historical channel listings.

2. Aeronautical channels visual carrier frequency tolerance +/-5 kHz.

# NTSC (M) Cable Television Channel Frequencies for Japan

Japan uses NTSC (M) with different channel assignments.

**Table C-5 Japanese Channel Assignments**

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)
1	90.0-96.0	91.25	93.00	95.75
2	96.0-102.0	97.25	99.00	101.75
3	102.0-108.0	103.25	105.00	107.75
4	170.0-176.0	171.25	173.00	175.75
5	176.0-182.0	177.25	179.00	181.75
6	182.0-188.0	183.25	185.00	187.75
7	188.0-194.0	189.25	191.00	193.75
8	192.0-198.0	193.25	195.00	197.75
9	198.0-204.0	199.25	201.00	203.75
10	204.0-210.0	205.25	207.00	209.75
11	210.0-216.0	211.25	213.00	215.75
12	216.0-222.0	217.25	219.00	221.75
C13	108.0-114.0	109.25	111.00	113.75
C14	114.0-120.0	115.25	117.00	119.75
C15	120.0-126.0	121.25	123.00	125.75
C16	126.0-132.0	125.25	129.00	131.75
C17	132.0-138.0	133.25	135.00	137.75
C18	138.0-144.0	139.25	141.00	143.75
C19	144.0-150.0	145.25	147.00	149.75
C20	150.0-156.0	151.25	153.00	155.75
C21	156.0-162.0	157.25	159.00	161.75
C22	164.0-170.0	165.25	167.00	169.75
C23	222.0-228.0	223.25	225.00	227.75
C24	230.0-236.0	231.25	233.00	235.75
C25	236.0-242.0	237.25	239.00	241.75
C26	242.0-248.0	243.25	245.00	247.75
C27	248.0-254.0	249.25	251.00	253.75
C28	254.0-258.0	253.25	257.00	257.75
C29	258.0-264.0	259.25	261.00	263.75
C30	264.0-270.0	265.25	267.00	269.75
C31	270.0-276.0	271.25	273.00	275.75
C32	276.0-282.0	277.25	279.00	281.75

**Table C-5 Japanese Channel Assignments (continued)**

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Center Frequency</b>	<b>Aural Carrier (MHz)</b>
C33	282.0-288.0	283.25	285.00	287.75
C34	288.0-294.0	289.25	291.00	293.75
C35	294.0-300.0	295.25	297.00	299.75
C36	300.0-306.0	301.25	303.00	305.75
C37	306.0-312.0	307.25	309.00	311.75
C38	312.0-318.0	313.25	315.00	317.75
C39	318.0-324.0	319.25	321.00	323.75
C40	324.0-330.0	325.25	327.00	329.75
C41	330.0-336.0	331.25	333.00	335.75
C42	336.0-342.0	337.25	339.00	341.75
C43	342.0-348.0	343.25	345.00	347.75
C44	348.0-354.0	349.25	351.00	353.75
C45	354.0-360.0	355.25	357.00	359.75
C46	360.0-366.0	361.25	363.00	365.75
C47	366.0-372.0	367.25	369.00	371.75
C48	372.0-378.0	373.25	375.00	377.75
C49	378.0-384.0	379.25	381.00	383.75
C50	384.0-390.0	385.25	387.00	389.75
C51	390.0-396.0	391.25	393.00	395.75
C52	396.0-402.0	397.25	399.00	401.75
C53	402.0-408.0	403.25	405.00	407.75
C54	408.0-414.0	409.25	411.00	413.75
C55	414.0-420.0	415.25	417.00	419.75
C56	420.0-426.0	421.25	423.00	425.75
C57	426.0-432.0	427.25	429.00	431.75
C58	432.0-438.0	433.25	435.00	437.75
C59	438.0-444.0	439.25	441.00	443.75
C60	444.0-450.0	445.25	447.00	449.75
C61	450.0-456.0	451.25	453.00	455.75
C62	456.0-462.0	457.25	459.00	461.75
C63	462.0-468.0	463.25	465.00	467.75

# NTSC Cable Television Channel Frequencies for the Republic of Korea

Korea uses NTSC (VHF, UHF) with different channel assignments.

**Table C-6** Korean Channel Assignments

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)	Usage
	5.75-41.75				Return path
2	54.0-60.0	55.25	57.00	59.75	CATV
3	60.0-66.0	61.25	63.00	65.75	
4	66.0-72.0	67.25	69.00	71.75	
5	76.0-82.0	77.25	79.00	81.75	
6	82.0-88.0	83.25	85.00	87.75	Music band
	88.0-108				

Table C-6 Korean Channel Assignments (continued)

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)	Usage
14	120.0-126.0	121.25	123.0	125.75	CATV
15	126.0-132.0	127.25	129.0	131.75	
16	132.0-138.0	133.25	135.0	137.75	
17	138.0-144.0	139.25	141.0	143.75	
18	144.0-150.0	145.25	147.0	149.75	
19	150.0-156.0	151.25	153.0	155.75	
20	156.0-162.0	157.25	159.0	161.75	
21	162.0-168.0	163.25	165.0	167.75	
22	168.0-174.0	169.25	171.0	173.75	
7	174.0-180.0	175.25	177.0	179.75	
8	180.0-186.0	181.25	183.0	185.75	
9	186.0-192.0	187.25	189.0	191.75	
10	192.0-198.0	193.25	195.0	197.75	
11	198.0-204.0	199.25	201.0	203.75	
12	204.0-210.0	205.25	207.0	209.75	
13	210.0-216.0	211.25	213.0	215.75	
23	216.0-222.0	217.25	219.0	221.75	
24 <sup>1</sup>	222.0-228.0	223.25	225.0	227.75	
25 <sup>1</sup>	228.0-234.0	229.25	231.0	233.75	
26 <sup>1</sup>	234.0-240.0	235.25	237.0	239.75	
27 <sup>1</sup>	240.0-246.0	241.25	243.0	245.75	
28 <sup>1</sup>	246.0-252.0	247.25	249.0	251.75	
29 <sup>1</sup>	252.0-258.0	253.25	255.0	257.75	
30 <sup>1</sup>	258.0-264.0	259.25	261.0	263.75	
31 <sup>1</sup>	264.0-270.0	265.25	267.0	269.75	

Table C-6 Korean Channel Assignments (continued)

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)	Usage
32 <sup>1</sup>	270.0-276.0	271.25	273.0	275.75	CATV
33 <sup>1</sup>	276.0-282.0	277.25	279.0	281.75	
34 <sup>1</sup>	282.0-288.0	283.25	285.0	287.75	
35 <sup>1</sup>	288.0-294.0	289.25	291.0	293.75	
36 <sup>1</sup>	294.0-300.0	295.25	297.0	299.75	
37 <sup>1</sup>	300.0-306.0	301.25	303.0	305.75	
38 <sup>1</sup>	306.0-312.0	307.25	309.0	311.75	
39 <sup>1</sup>	312.0-318.0	313.25	315.0	317.75	
40 <sup>1</sup>	318.0-324.0	319.25	321.0	323.75	
41 <sup>1</sup>	324.0-330.0	325.25	327.0	329.75	
42 <sup>1</sup>	330.0-336.0	331.25	333.0	335.75	
43 <sup>1</sup>	336.0-342.0	337.25	339.0	341.75	
44 <sup>1</sup>	342.0-348.0	343.25	345.0	347.75	
45 <sup>1</sup>	348.0-354.0	349.25	351.0	353.75	
46 <sup>1</sup>	354.0-360.0	355.25	357.0	359.75	
47 <sup>1</sup>	360.0-366.0	361.25	363.0	365.75	
48 <sup>1</sup>	366.0-372.0	367.25	369.0	371.75	
49 <sup>1</sup>	372.0-378.0	373.25	375.0	377.75	
50 <sup>1</sup>	378.0-384.0	379.25	381.0	383.75	
51 <sup>1</sup>	384.0-390.0	385.25	387.0	389.75	
52 <sup>1</sup>	390.0-396.0	391.25	393.0	395.75	
53 <sup>1</sup>	396.0-402.0	397.25	399.0	401.75	
54	402.0-408.0	403.25	405.0	407.75	
55	408.0-414.0	409.25	411.0	413.75	
56	414.0-420.0	415.25	417.0	419.75	
57	420.0-426.0	421.25	423.0	425.75	
58	426.0-432.0	427.25	429.0	431.75	
59	432.0-438.0	433.25	435.0	437.75	
60	438.0-444.0	439.25	441.0	443.75	
61	444.0-450.0	445.25	447.0	449.75	
62	450.0-456.0	451.25	453.0	455.75	
63	456.0-462.0	457.25	459.0	461.75	
64	462.0-468.0	463.25	465.0	467.75	
65	468.0-474.0	469.25	471.0	473.75	
66	474.0-480.0	475.25	477.0	479.75	

Table C-6 Korean Channel Assignments (continued)

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)	Usage
67	480.0-486.0	481.25	483.0	485.75	CATV
68	486.0-492.0	487.25	489.0	491.75	
69	492.0-498.0	493.25	495.0	497.75	
70	498.0-504.0	499.25	501.0	503.75	
71	504.0-510.0	505.25	507.0	509.75	
72	510.0-516.0	511.25	513.0	515.75	
73	516.0-522.0	517.25	519.0	521.75	
74	522.0-528.0	523.25	525.0	527.75	
75	528.0-534.0	529.25	531.0	533.75	
76	534.0-540.0	535.25	537.0	539.75	
77	540.0-546.0	541.25	543.0	545.75	
78	546.0-552.0	547.25	549.0	551.75	
79	552.0-558.0	553.25	555.0	557.75	
80	558.0-564.0	559.25	561.0	563.75	
81	564.0-570.0	565.25	567.0	569.75	
82	570.0-576.0	571.25	573.0	575.75	
83	576.0-582.0	577.25	579.0	581.75	
84	582.0-588.0	583.25	585.0	587.75	
85	588.0-594.0	589.25	591.0	593.75	
86	594.0-600.0	595.25	597.0	599.75	
87	600.0-606.0	601.25	603.0	605.75	
88	606.0-612.0	607.25	609.0	611.75	
89	612.0-618.0	613.25	615.0	617.75	
90	618.0-624.0	619.25	621.0	623.75	
91	624.0-630.0	625.25	627.0	629.75	
92	630.0-636.0	631.25	633.0	635.75	
93	636.0-642.0	637.25	639.0	641.75	
94	642.0-648.0	643.25	645.0	647.75	
95	648.0-654.0	649.25	651.0	653.75	
96	654.0-660.0	655.25	657.0	659.75	
97	660.0-666.0	661.25	663.0	665.75	
98	666.0-672.0	667.25	669.0	671.75	
99	672.0-678.0	673.25	675.0	677.75	
100	678.0-684.0	679.25	681.0	683.75	
101	684.0-690.0	685.25	687.0	689.75	

**Table C-6** Korean Channel Assignments (continued)

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Center Frequency	Aural Carrier (MHz)	Usage
102	690.0-696.0	691.25	693.0	695.75	CATV
103	696.0-702.0	697.25	699.0	701.75	
104	702.0-708.0	703.25	705.0	707.75	
105	708.0-714.0	709.25	711.0	713.75	
106	714.0-720.0	715.25	717.0	719.75	
107	720.0-726.0	721.25	723.0	725.75	
108	726.0-732.0	727.25	729.0	731.75	
109	732.0-738.0	733.25	735.0	737.75	
110	738.0-744.0	739.25	741.0	743.75	
111	744.0-750.0	745.25	747.0	749.75	

1. Aeronautical channels visual carrier frequency tolerance +/-5 kHz.

## PAL/SECAM Cable Television Channels and Relative Frequencies

[Table C-7](#) provides information on the Phase Alternating Line (PAL) and SEquential Couleur Avec Memoire (SECAM) frequency map for standard 7 and 8 MHz channel bands in Europe.

The FCS (reference subcarrier frequency) for color integration is different for different countries. As well, the channel/frequency designations is different for different countries. For a summary of the ITU designations for PAL/SECAM systems and Recommendation ITU-R BT.470.6 standards, refer to [Table C-1](#), [Table C-2](#), and [Table C-3](#). These tables provide general information that may help determine frequency allocations for specific countries. [Table C-7](#) is a frequency allocation table for PAL B and G locations. Also note that some countries use different schemes for VHF and UHF. [Table C-8](#) is a frequency allocation table for PAL D and K locations for the People's Republic of China.

More information can be found at the Web sites listed on page E-1.



### Note

The downstream frequency plan will include all center frequencies between 112 and 858 MHz on 250 kHz increments. It is up to the operator to decide which frequencies to use to meet national and network requirements

**Table C-7** Cable Television Channels and Relative Frequencies, PAL B and G

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Aural Carrier (MHz)
E2	47.0-54.0	48.25	53.75
E3	54.0-61.0	55.25	60.75
E4	61.0-68.0	62.25	67.75
S3	118.0-125.0	119.25	124.75

**Table C-7** Cable Television Channels and Relative Frequencies, PAL B and G (continued)

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Aural Carrier (MHz)</b>
S4	125.0-132.0	126.25	131.75
S5	132.0-139.0	133.25	138.75
S6	139.0-146.0	140.25	145.75
S7	146.0-153.0	147.25	152.75
S8	153.0-160.0	154.25	159.75
S9	160.0-167.0	161.25	166.75
S10	167.0-174.0	168.25	173.75
E5	174.0-181.0	175.25	180.75
E6	181.0-188.0	182.25	187.75
E7	188.0-195.0	189.25	194.5
E8	195.0-202.0	196.25	201.75
E9	202.0-209.0	203.25	208.75
E10	209.0-216.0	210.25	215.75
E11	216.0-223.0	217.25	222.75
E12	223.0-230.0	224.25	229.75
S11	230.0-237.0	231.25	236.75
S12	237.0-244.0	238.25	243.75
S13	244.0-251.0	245.25	250.75
S14	251.0-258.0	252.25	257.75
S15	258.0-265.0	259.25	264.75
S16	265.0-272.0	266.25	271.75
S17	272.0-279.0	273.25	278.75
S18	279.0-286.0	280.25	285.75
S19	286.0-293.0	287.25	289.75
S20	293.0-300.0	294.25	299.75
S21	302.0-310.0	303.25	308.75
S22	310.0-318.0	311.25	316.75
S23	318.0-326.0	319.25	324.75
S24	326.0-334.0	327.25	332.75
S25	334.0-342.0	335.25	340.75
S26	342.0-350.0	343.25	348.75
S27	350.0-358.0	351.25	356.75
S28	358.0-366.0	359.25	364.75
S29	366.0-374.0	367.25	372.05
S30	374.0-382.0	375.25	380.75

**Table C-7** Cable Television Channels and Relative Frequencies, PAL B and G (continued)

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Aural Carrier (MHz)</b>
S31	382.0-390.0	383.25	388.75
S32	390.0-398.0	391.25	396.75
S33	398.0-406.0	399.25	404.75
S34	406.0-414.0	407.25	412.75
S35	414.0-422.0	415.25	420.75
S36	422.0-430.0	423.25	428.75
S37	430.0-438.0	431.25	436.75
S38	438.0-446.0	439.25	444.75
S39	446.0-454.0	447.25	452.75
S40	454.0-462.0	455.25	460.75
S41	462.0-470.0	463.25	468.75
21	470.0-478.0	471.25	476.75
22	478.0-486.0	479.25	484.75
23	486.0-494.0	487.25	492.75
24	494.0-502.0	495.25	500.75
25	502.0-510.0	503.25	508.75
26	510.0-518.0	511.25	516.75
27	518.0-526.0	519.25	524.75
28	526.0-534.0	527.25	532.75
29	534.0-542.0	535.25	540.75
30	542.0-550.0	543.25	548.75
31	550.0-558.0	551.25	556.75
32	558.0-566.0	559.25	564.75
33	566.0-574.0	567.25	572.75
34	574.0-582.0	575.25	580.75
35	582.0-590.0	583.25	588.75
36	590.0-598.0	591.25	596.75
37	598.0-606.0	599.25	604.75
38	606.0-614.0	607.25	612.75
39	614.0-622.0	615.25	620.75
40	622.0-630.0	623.25	628.75
41	630.0-638.0	631.25	636.75
42	638.0-646.0	639.25	644.75
43	646.0-654.0	647.25	652.75
44	654.0-662.0	655.25	660.75

**Table C-7** Cable Television Channels and Relative Frequencies, PAL B and G (continued)

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Aural Carrier (MHz)</b>
45	662.0-670.0	663.25	668.75
46	670.0-678.0	671.25	676.75
47	678.0-686.0	679.25	684.75
48	686.0-694.0	687.25	692.75
49	694.0-702.0	695.25	700.75
50	702.0-710.0	703.25	708.75
51	710.0-718.0	711.25	716.75
52	718.0-726.0	719.25	724.75
53	726.0-734.0	727.25	732.75
54	734.0-742.0	735.25	740.75
55	742.0-750.0	743.25	748.75
56	750.0-758.0	751.25	756.75
57	758.0-766.0	759.25	764.75
58	766.0-774.0	767.25	772.75
59	774.0-782.0	775.25	780.75
60	782.0-790.0	783.25	788.75
61	790.0-798.0	791.25	796.75
62	798.0-806.0	799.25	804.75
63	806.0-814.0	807.25	812.75
64	814.0-822.0	815.25	820.75
65	822.0-830.0	823.25	828.75
66	830.0-838.0	831.25	836.75
67	838.0-846.0	839.25	844.75
68	846.0-854.0	847.25	852.75
69	854.0-862.0	855.25	860.75

# PAL SECAM (D/K) Cable Television Channel Frequencies for the People's Republic of China


**Note**

The downstream frequency plan includes all center frequencies between 112 and 862 MHz in 250 kHz increments. It is up to the operator to decide which frequencies to use to meet national and network requirements

**Table C-8** Cable Television Channels and Relative Frequencies, PAL D and K

Channel Number	Bandwidth (MHz)	Visual Carrier (MHz)	Aural Carrier (MHz)
Z1	112.0-119.0	112.25	118.75
Z2	120.0-127.0	120.25	126.75
Z3	128.0-135.0	128.25	134.75
Z4	136.0-143.0	136.25	142.75
Z5	144.0-151.0	144.25	150.75
Z6	152.0-159.0	152.25	158.75
Z7	160.0-167.0	160.25	166.75
DS6	168.0-175.0	168.25	174.75
DS7	176.0-183.0	176.25	182.75
DS8	184.0-191.0	184.25	190.75
DS9	192.0-199.0	192.25	198.75
DS10	200.0-207.0	200.25	206.75
DS11	208.0-215.0	208.25	214.75
DS12	216.0-223.0	216.25	222.5
Z8	224.0-231.0	224.25	230.75
Z9	232.0-239.0	232.25	238.75
Z10	240.0-247.0	240.25	246.75
Z11	248.0-255.0	248.25	254.75
Z12	256.0-263.0	256.25	262.75
Z13	264.0-271.0	264.25	270.75
Z14	272.0-279.0	272.25	278.75
Z15	280.0-287.0	280.25	286.75
Z16	288.0-295.0	288.25	294.75
Z17	296.0-303.0	296.25	302.75
Z18	304.0-311.0	304.25	310.75
Z19	312.0-319.0	312.25	318.75
Z20	320.0-327.0	320.25	326.75
Z21	328.0-335.0	328.25	334.75

**Table C-8** Cable Television Channels and Relative Frequencies, PAL D and K (continued)

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Aural Carrier (MHz)</b>
Z22	336.0-343.0	336.25	342.75
Z23	344.0-351.0	344.25	350.75
Z24	352.0-359.0	352.25	358.75
Z25	362.0-367.0	362.25	366.75
Z26	368.0-375.0	368.25	374.75
Z27	376.0-383.0	376.25	382.75
Z28	384.0-391.0	384.25	390.75
Z29	393.0-399.0	392.25	398.75
Z30	400.0-407.0	400.25	406.75
Z32	408.0-415.0	408.25	414.05
Z32	416.0-423.0	416.25	422.75
Z33	424.0-431.0	424.25	430.75
Z34	432.0-439.0	432.25	438.75
Z35	440.0-447.0	440.25	446.75
Z36	448.0-455.0	448.25	454.75
Z37	456.0-463.0	456.25	462.75
DS13	471.0-478.0	471.25	477.75
DS14	479.0-486.0	479.25	485.75
DS15	487.0-494.0	487.25	493.75
DS16	495.0-502.0	495.25	501.75
DS17	503.0-510.0	503.25	509.75
DS18	511.0-518.0	511.25	517.75
DS19	519.0-526.0	519.25	525.75
DS20	527.0-534.0	527.25	533.75
DS21	535.0-542.0	535.25	541.75
DS22	543.0-550.0	543.25	549.75
DS23	551.0-558.0	551.25	557.75
DS24	559.0-566.0	559.25	565.75
Z38	567.0-574.0	567.25	573.75
Z39	575.0-582.0	575.25	581.75
Z40	583.0-590.0	583.25	589.75
Z41	591.0-598.0	591.25	597.75
Z42	599.0-606.0	599.25	605.75
DS25	607.0-614.0	607.25	613.75
DS26	615.0-622.0	615.25	621.75

**Table C-8** Cable Television Channels and Relative Frequencies, PAL D and K (continued)

<b>Channel Number</b>	<b>Bandwidth (MHz)</b>	<b>Visual Carrier (MHz)</b>	<b>Aural Carrier (MHz)</b>
DS27	623.0-630.0	623.25	629.725
DS28	631.0-638.0	631.25	637.75
DS29	639.0-646.0	639.25	645.75
DS30	647.0-654.0	647.25	653.75
DS31	655.0-662.0	655.25	661.75
DS32	663.0-670.0	663.25	669.75
DS33	671.0-678.0	671.25	677.75
DS34	679.0-686.0	679.25	685.75
DS35	687.0-694.0	687.25	693.75
DS36	695.0-702.0	695.25	701.75
DS37	703.0-710.0	703.25	709.75
DS38	711.0-718.0	711.25	717.75
DS39	719.0-726.0	719.25	725.75
DS40	727.0-730.0	727.25	729.75
DS41	735.0-742.0	735.25	741.75
DS42	743.0-750.0	743.25	749.75
DS43	751.0-758.0	751.25	757.75
DS44	759.0-766.0	759.25	765.75
DS45	767.0-774.0	767.25	773.75
DS46	775.0-782.0	775.25	781.75
DS47	783.0-790.0	783.25	789.75
DS48	791.0-798.0	791.25	797.75
DS49	799.0-806.0	799.25	805.75
DS50	807.0-814.0	807.25	813.75
DS51	815.0-822.0	815.25	821.75
DS52	823.0-730.0	823.25	829.75
DS53	831.0-838.0	831.25	837.75
DS54	839.0-846.0	839.25	845.75
DS55	847.0-854.0	847.25	853.75
DS56	855.0-862.0	855.25	861.75