

4.2 FREQUENCY ALLOTMENTS

4.2.1 Allotment of 27575 and 27585 kHz for Short-Distance Low-Power Service

These allotments are to provide for intermittent miscellaneous U.S. Government short-distance low-power radio communications, radio signaling, and the control of remote objects or devices by means of radio (where the radiated power exceeds the limit established under Part 7.9).

The designated frequencies are allotted for use by U.S. Government agencies and may be authorized for use by agencies as required upon application. All stations operating on these frequencies shall meet the conditions and standards established for this service.

The designated frequencies are available on a shared basis only and will not be authorized for exclusive use of any one agency. No protection from interference can be assured to any station operating in this service. Services involving safety of life and property should not employ these frequencies in view of their unprotected status. All transmissions are to be restricted to official U.S. Government business that requires the use of radio.

Stations in this service shall utilize FCC type-accepted or type-approved Citizens Radio Band equipment or the equivalent. The maximum transmitter output power shall be five watts.

Stations shall be identified in accordance with the regulations of each agency.

The only class of station authorized is Mobile (including portable-type operation).

Frequencies 27575 and 27585 kHz with 6KA2A, 6KA2D and 6KA3E emission are designated for the U.S. Government short-distance low-power radio service.

All applications for the use of these frequencies must bear the note S159 which reads, "U.S. Government short-distance low-power service."

4.2.2 Allotments in the Band 1755-1850 MHz for Fixed Security Surveillance Systems

The frequencies 1760, 1780, and 1800 MHz are allotted for use in fixed security surveillance systems, on a secondary basis to other stations operating in accordance with the Federal Table of Frequency Allocations.

4.2.3 Allotments for Wide-Area, Common-Use Frequencies

1. Wide-Area, Common-Use frequencies are allotted for use by all Federal agencies and are to provide for radio communications that do not justify the assigning of a radio frequency exclusively to that use, i.e., the frequency can be shared with other users.

a. The following paired frequencies are to be used for wide-area (e.g., county-wide, state-wide, USA or USP) operations of a transient nature that require the use of a repeater station. Unpaired, single frequency operations will be permitted on the repeater transmit frequencies and on the repeater receive frequencies only if all other wide-area, common-use frequencies are in use, but only upon showing that none of the unpaired frequencies in subparagraph b., below, are available.

Frequencies (MHz)

| Repeater Transmit | Repeater Receive |
|--------------------------|-------------------------|
| 163.100 | 168.350 |
| 409.050 | 418.050 |
| 409.3375 | 418.3375 |

The frequencies 409.05 and 409.3375 MHz shall not be used in the U.S./Canada Border Areas unless prior coordination has been effected with Canada under the provisions of paragraphs 3.9 and 3.10 of Section 3.4.7 of this Manual, or the output power is 5 watts or less and interference does not occur to Canadian operations.

b. The following frequencies are to be used only for wide-area (e.g., county-wide, state-wide, USA or USP) operations of a transient nature that do not require the use of a repeater station, and shall be used in a simplex mode (use of a base station is allowed):

Frequencies (MHz)

| | |
|---------|----------|
| 412.825 | 412.8375 |
| 412.850 | 412.8625 |

2. All operations shall be authorized in accordance with Chapter 9 of this Manual. The frequencies are available on a shared, non-priority basis only, and will not be authorized for, nor are they intended for, the exclusive use of any one agency. No protection from interference will be provided to any station operating on these frequencies from other stations operating on the same frequency. The use of equipment with coded squelch is strongly encouraged to reduce nuisance interference from other users.

3. These allotments are for use by Federal stations in the Land and Maritime Mobile Services (Table of Services, Station Classes, and Stations, Chapter 6, Section 6.1.4 of this Manual refers), and the following restrictions apply.

- the minimum ERP necessary to support the intended use shall be employed;
- the maximum base or mobile station transmitter output power shall not exceed 30 watts;
- the gain of the base station (or repeater station) antenna shall not exceed 6 dBi;
- the height of the base station (or repeater station) antenna shall not exceed 6 meters above the height of the structure supporting the antenna;
- all equipment shall conform to Part 5.3 of this Manual;

4. Applications for assignments on the frequencies listed in subparagraphs 1.a. and 1.b., above, shall be affixed with Record Note S355, "This assignment is for a wide-area, common-use frequency pursuant to Section 4.2.3 of the NTIA Manual."

4.2.4 Allotments for Local-Area, Common-Use Frequencies

1. Local-Area, Common-Use frequencies are allotted for use by all Federal agencies and are to provide for radio communications that do not justify the assigning of a radio frequency exclusively to that use, i.e., the frequency can be shared with other users.

a. The following paired frequencies are to be used only for local area operations requiring the use of a repeater station at a fixed location. Unpaired, single frequency operations will be permitted on the repeater transmit frequencies, and on the repeater receive frequencies, only if all other local-area, common-use frequencies are in use, but only upon showing that none of the unpaired frequencies in subparagraph b., below, are available:

| Frequencies (MHz) | |
|--------------------------|-------------------------|
| Repeater Transmit | Repeater Receive |
| 173.625 | 167.1375 |
| 407.525 | 416.525 |
| 409.075 | 418.075 |

The frequency 409.075 MHz shall not be used in the U.S./Canada Border Areas unless prior coordination has been effected with Canada under the provisions of paragraphs 3.9 and 3.10 of Section 3.4.7 of this Manual, or the output power is 5 watts or less and interference does not occur to Canadian operations.

b. The following frequencies shall be used only for local area operations that do not require the use of a repeater station, and shall be used only in a simplex mode (use of base stations is allowed):

| Frequencies (MHz) | |
|--------------------------|----------|
| 168.6125 | 163.7125 |
| 412.875 | 412.8875 |
| 412.9 | 412.9125 |

2. All operations shall be authorized in accordance with Chapter 9 of this Manual. The frequencies are available on a shared, non-priority basis only, and will not be authorized for, nor are they intended, for the exclusive use of any one agency. No protection from interference will be provided to any station operating on these frequencies from other stations operating on the same frequency. The use of equipment with coded squelch is strongly encouraged to reduce nuisance interference from other users.

3. These allotments are for use by Federal stations in the Land and Maritime Mobile Services (Table of Services, Station Classes, and Stations, Chapter 6, Section 6.1.4 of this Manual refers), and the following restrictions apply.

- a. The minimum ERP necessary to support the intended use shall be employed;
- b. the maximum base or mobile station transmitter output power shall not exceed 30 Watts;
- c. the gain of the base station (or repeater station) antenna shall not exceed 6 dBi;
- d. the height of the base station (or repeater station) antenna shall not exceed 6 meters above the height of the structure supporting the antenna;
- e. all equipment shall conform to Part 5.3 of this Manual;
- f. radius of operation for mobile stations is limited to 50 kilometers.

4. Applications for assignments on the frequencies listed in subparagraphs 1.a. and 1.b., above, shall be affixed with Record Note S356, "This assignment is for a local-area, common-use frequency pursuant to Section 4.2.4 of the NTIA Manual."

4.3 FREQUENCY PLANS

4.3.1 CW Phase Comparison Radiolocation Plan

This plan provides for the use of frequencies for low power, medium and high frequency radiolocation systems employing harmonically related NON emission phase comparison frequencies and associated 1KA2D emission data link frequencies. These systems normally operate to distances of approximately 400 kilometers offshore and to considerably lesser distances inland.

The following phase comparison frequencies with N0N emission are available for assignment in all areas. Frequency assignments for a band of frequencies shall not be made. Where equipment or other limitations make it impracticable to operate on these channels, applications for other suitable frequencies will be considered on a case-by-case basis.

| 1650.0-1655.0 kHz | | | | | 3300.4-3310.4 kHz | | | | |
|-------------------|--------|--------|--------|--------|-------------------|--------|--------|--------|--------|
| 1650.0 | 1651.0 | 1652.0 | 1653.0 | 1654.0 | 3300.4 | 3302.4 | 3304.4 | 3306.4 | 3308.4 |
| 1650.1 | 1651.1 | 1652.1 | 1653.1 | 1654.1 | 3300.6 | 3302.6 | 3304.6 | 3306.6 | 3308.6 |
| 1650.2 | 1651.2 | 1652.2 | 1653.2 | 1654.2 | 3300.8 | 3302.8 | 3304.8 | 3306.8 | 3308.8 |
| 1650.3 | 1651.3 | 1652.3 | 1653.3 | 1654.3 | 3301.0 | 3303.0 | 3305.0 | 3307.0 | 3309.0 |
| 1650.4 | 1651.4 | 1652.4 | 1653.4 | 1654.4 | 3301.2 | 3303.2 | 3305.2 | 3307.2 | 3309.2 |
| 1650.5 | 1651.5 | 1652.5 | 1653.5 | 1654.5 | 3301.4 | 3303.4 | 3305.4 | 3307.4 | 3309.4 |
| 1650.6 | 1651.6 | 1652.6 | 1653.6 | 1654.6 | 3301.6 | 3303.6 | 3305.6 | 3307.6 | 3309.6 |
| 1650.7 | 1651.7 | 1652.7 | 1653.7 | 1654.7 | 3301.8 | 3303.8 | 3305.8 | 3307.8 | 3309.8 |
| 1650.8 | 1651.8 | 1652.8 | 1653.8 | 1654.8 | 3302.0 | 3304.0 | 3306.0 | 3308.0 | 3310.0 |
| 1650.9 | 1651.9 | 1652.9 | 1653.9 | 1654.9 | 3302.2 | 3304.2 | 3306.2 | 3308.2 | 3310.2 |
| | | | 1655.0 | | | | | | 3310.4 |

The assignment of suitable frequencies for the associated data links with 1KA2D emission shall be considered on a case-by-case basis.

The mean antenna power shall be limited to 100 watts for both N0N and 1KA2D emissions. Only radiolocation land stations and radiolocation mobile stations shall be authorized.

The designated frequencies shall be authorized on a shared non-priority basis only and shall not be authorized for the exclusive use of any one agency. Any harmful interference that may develop between authorized radiolocation operations shall be resolved locally by coordination between the users involved.

Frequency assignments shall be for a temporary period not to exceed two years, and may be renewed.

4.3.2 Plan for Wireless Microphones in the Band 162-174 MHz

The following channels have been allotted for use by wireless microphone systems under the conditions listed in (a) through (e) below:

| | |
|-------------|-------------|
| 169.445 MHz | 171.045 MHz |
| 169.505 MHz | 171.105 MHz |
| 170.245 MHz | 171.845 MHz |
| 170.305 MHz | 171.905 MHz |

(a) The emission bandwidth shall not exceed 54 kHz.

(b) The output power shall not exceed 50 milliWatts.

(c) The frequency stability of wireless microphones shall limit the total emission to within 32.5 kHz of the assigned frequency.

(d) All wireless microphone use will be on an unprotected basis and further will be on a non-interference basis to authorized Federal and non-Federal users with the exception of other wireless microphone users.

(e) Assignment applications for wireless microphone use will be considered on a case-by-case basis by the Frequency Assignment Subcommittee (FAS); and, assignment applications do not need to be coordinated with the Hydrology Subcommittee.

4.3.3 Plan for Hydrologic and Meteorological Operations in the Bands 162-174 and 406.1-420 MHz

1. Hydrologic Channels. This plan identifies the center frequencies of channels used primarily for hydrologic operations.

| MHz | MHz | MHz | MHz |
|----------|----------|----------|----------|
| 169.425 | 170.2625 | 171.1000 | 406.1250 |
| 169.4375 | 170.2750 | 171.1125 | 406.1750 |
| 169.4500 | 170.2875 | 171.1250 | 412.6625 |
| 169.4625 | 170.3000 | 171.8250 | 412.675 |
| 169.4750 | 170.3125 | 171.8375 | 412.6875 |
| 169.4875 | 170.3250 | 171.8500 | 412.7125 |
| 169.5000 | 171.025 | 171.8625 | 412.7250 |
| 169.5125 | 171.0375 | 171.8750 | 412.7375 |
| 169.5250 | 171.0500 | 171.8875 | 412.7625 |
| 170.2250 | 171.0625 | 171.9000 | 412.775 |
| 170.2375 | 171.0750 | 171.9125 | 415.1250 |
| 170.2500 | 171.0875 | 171.9250 | 415.1750 |

a. Use by Federal Agencies.

Federal agencies may use the frequencies listed in the table above only for hydrologic operations, except as indicated in Section 8.3.6 of this Manual.

b. Use by Non-Federal Agencies. As provided in Allocation footnote US13, non-Federal fixed stations may use the frequencies listed in the table above for the specific purpose of transmitting hydrologic and meteorological data in cooperation with agencies of the Federal Government.

c. Coordination. Agencies must coordinate with the Hydrology Subcommittee of the Federal Interagency Advisory Committee on Water Data, as prescribed in Section 8.3.6 of this Manual, when applying for an assignment on one of the frequencies listed in the table above.

d. Narrowband Hydrologic Operations. All new hydrologic systems are required to operate with a necessary bandwidth of less than 12.5 kHz, and may use all the frequencies shown in the table above.

e. Wideband Hydrologic Operations.

Existing systems authorized in the 162-174 MHz band may continue using equipment operating with necessary bandwidths equal to, or greater than, 12.5 kHz, using the center frequencies listed in the table above that are spaced 25 kHz apart and in the columns beginning with 169.425, 170.2625, and 171.1000 MHz, until December 31, 2004. After this date all such operations must have been converted to narrowband equipment operating with a necessary bandwidth of less than 12.5 kHz. In addition, existing systems operating in the 406.1-420 MHz band may, until December 31, 2007, continue using equipment operating with necessary bandwidths of 12.5 kHz or greater on the following frequencies: 406.125, 406.175, 409.675, 409.725, 412.625, 412.675, 412.725, and 412.775 MHz. After December 31, 2007, all hydrologic systems in the 406.1-420 MHz band must have transitioned to the center frequencies listed in the table above, and to equipment operating with necessary bandwidths of less than 12.5 kHz. New assignments on frequencies 406.1250 and 406.1750 MHz are to be primarily for paired operations with frequencies 415.1250 and 415.1750 MHz, respectively.

2. Meteorological and Quasi-Hydrologic Operations. The frequency 171.175 MHz is allotted for meteorological and quasi-hydrologic operations. Coordination with the Hydrology Subcommittee is not required.

4.3.4 Telemetry Plans

1. For the Band 1435-1535 MHz

a. Ninety-nine (99) one-megahertz channels are designated for use for telemetry and associated telecommand during the flight testing of manned or unmanned aircraft, missiles, or major components thereof (Station Classes MOEA, FLEA, MOD, FLD--see Chapter 6).

b. All assignments will be centered on frequencies at standard intervals of 1 MHz, beginning at 1435.5 MHz, and will be authorized bandwidths of 1, 3, or 5 MHz. Assignments with bandwidths greater than 1 MHz will be centered so that they do not extend outside the allocated band.

c. The frequencies 1444.5, 1453.5, 1501.5, 1515.5, 1524.5 and 1525.5 MHz will be shared with flight telemetry mobile stations (Station Classes MOEB, FLEB, MOD, FLD--see Chapter 6). Such uses will be limited to 1 MHz bandwidths except for frequencies 1524.5 and 1525.5 MHz where a bandwidth up to 2 MHz is permitted.

d. Included as permissible use of the 1435-1535 MHz band is telemetry associated with launching and reentry into the Earth's atmosphere, as well as any incidental orbiting prior to reentry, of manned or unmanned objects undergoing flight tests (Station Classes MOEA, FLEA, MOD, FLD apply).

e. Telecommand stations authorized operation in the 1435-1535 MHz band will:

(1) Directly support flight test aeronautical telemetry functions;

(2) Be limited to 1 MHz bandwidth; and,

(3) Use antennas having a half power beamwidth of no more than 8 degrees and a front-to-back ratio of at least 20 dB.

f. In the band 1435-1535 MHz, the channels designated for aeronautical telemetry are also available for space telemetry on a shared basis.

2. For the Band 2200-2300 MHz

a. In the band 2200-2290 MHz, 90 one-megahertz narrowband channels are designated, centered on 2200.5 MHz and each one-megahertz increment thereafter, through and including 2289.5 MHz. The use of emission bandwidths greater than 1 MHz is permitted, provided the assigned frequencies are centered on the center frequencies of narrowband channels. These channels are available for a) telemetry from space research space stations irrespective of their trajectories and b) aeronautical telemetry, including telemetry associated with launch vehicles, missiles, and upper atmosphere research rockets. Such use is on a coequal shared basis with fixed and mobile line-of-sight operations in the band conducted in accordance with the Federal Table of Frequency Allocations. No provision is made in this band for the flight testing of manned aircraft.

b. In the band 2290-2300 MHz, no specific channels have been established.

3. For the Band 2310-2390 MHz--The following applies to Mobile Telemetry and Associated Telecommand:

a. Seventy-three (73) one-megahertz channels are designated for use for telemetry and associated telecommand during the flight testing of manned or unmanned aircraft, missiles, or major components thereof (Station Classes MOEA, FLEA, MOD, FLD--see Chapter 6).

b. All assignments will be centered on frequencies at standard intervals of 1 MHz, beginning at 2310.5 MHz, and will normally be authorized bandwidths of 1, 3, or 5 MHz. Wider bandwidths may be authorized on a case-by-case basis to equipment capable of tuning the entire band. Assignments with bandwidths greater than 1 MHz will be centered so that they do not extend outside the allocated band. Telecommand assignments will be limited to 1 MHz bandwidths (see 3.d below)

c. The frequencies 2312.5, 2332.5, 2352.5, 2364.5, 2370.5, and 2382.5 MHz are also designated for use by both Federal and non-Federal stations on a co-equal basis for telemetering and associated telecommand operations of expendable and re-usable launch vehicles whether or not such operations involve flight testing. Such uses will be limited to 1 MHz bandwidths. (Station classes MOEA, MOEB, MOD, FLEA, FLEB, and FLD apply).

d. Telecommand stations, except as noted in 3c, above, authorized operation in the 2310-2390 MHz band will:

- (1) Directly support flight test aeronautical telemetering functions;
- (2) Be limited to 1 MHz bandwidth; and,
- (3) Use antennas having a half power beamwidth of no more than 8 degrees and a front-to-back ratio of at least 20 dB.

4.3.5 VHF/UHF Plan for Aeronautical Radionavigation

TACAN-DME and VOR comprise the short-distance air navigational system in the common civil/military National Airspace System (NAS). TACAN is capable of providing range and azimuth information to aircraft. Normally range-only information is received by civil aircraft. DME provides range only and VOR provides azimuth only.

Frequencies at 1-MHz increments in the 960-1215 MHz band are used in airborne interrogating and ground transponder equipment as shown in the channel arrangement depicted below. This channel-pairing arrangement, which has been adopted by ICAO for facilities supporting operations in the international aeronautical service, also serves as a basis for all frequency planning and assignments for the NAS. TACAN and DME frequencies are designated on aeronautical charts by channel numbers 1-126. TACAN channels in the National Airspace System plan are paired with VOR or ILS localizer frequencies in the 108-118 MHz band and with glide slope frequencies in the 328.6-335.4 MHz band, as shown. This pairing arrangement facilitates the employment of a VOR in conjunction with a TACAN-DME beacon to form a VORTAC facility to provide simultaneous azimuth and range information to civil aircraft. Similarly TACAN-DME beacons may be paired with ILS facilities to provide both range and terminal guidance (azimuth and glide slope) information to properly equipped aircraft.

When a TACAN or DME transponder is intended to operate in association with a VHF navigational facility (VOR or ILS), the transponder is collocated with the VHF facility and frequency paired with it. If the system is to be used for terminal services such as for airport approach or landing, the facilities are considered to be collocated only if the transponder and VHF antennas are not more than 260 feet (80 meters) apart. For enroute procedures, collocation is considered to exist if the antenna separation does not exceed 2,000 feet (610 meters). Where the separation exceeds these figures, a VOR/ILS frequency from one pair and the TACAN-DME frequency from another pair must be assigned and suitable notations made on aeronautical charts to alert the user that he is not receiving azimuth and range information from the same point.

TACAN channels 17-59 and 70-126 are designated for use in the National Airspace System. Frequency assignments on these channels and for VOR and ILS operations are managed by the Aeronautical Assignment Group (AAG) of the FAS, under the provisions of Sections 1.3.2 and 9.14.1. Most of these TACAN channels are used by the FAA to provide air navigation services.

Channels 1-16 and 60-69 are designated for the military services for tactical uses and are not used in the NAS. The frequency subbands matching these channel designators are assigned to the military departments for use throughout the U. S. and Possessions. Assignments of specific frequencies to areas and locations are accomplished by individual military departments after appropriate coordination between departments. Land and shipborne beacons operating on these channels, as well as airborne beacons for air-to-air operations provide both azimuth and range information to military aircraft.

The FAA recognizes the need of the military services to use NAS frequencies for tactical purposes, including air-to-air operations, on a secondary basis. The military services recognize the need for frequency adjustments to provide protection for new or reclassified facilities of the NAS. Assignments and adjustments in support of these facilities shall be coordinated on a case-by-case basis through the AAG.

To minimize the possibility of harmful interference between the NAS and military operations, the FAA shall make every effort to avoid the use of TACAN Channels 17, 59, and 70 in areas of concentrated fleet activity. The military services shall coordinate in advance with the FAA relative to the use of TACAN Channels 16, 60, and 69 for land-based facilities.

Assignments of TACAN channels in the operational environment of ground radar facilities equipped with Selective Identification Features (SIF) of Secondary Surveillance Radars (SSR) must be considered carefully, in order to avoid interference. The ground SIF/SSR interrogator transmits on 1030 MHz (TACAN Channel 6 interrogator frequency) and the airborne SIF/SSR transponder transmits on 1090 MHz (TACAN Channel 66 interrogator frequency).

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 1X | | 1025 | 12 | 962 | 12 | | |
| 1Y | | 1025 | 36 | 1088 | 30 | | |
| 2X | | 1026 | 12 | 963 | 12 | | |
| 2Y | | 1026 | 36 | 1089 | 30 | | |
| 3X | | 1027 | 12 | 964 | 12 | | |
| 3Y | | 1027 | 36 | 1090 | 30 | | |
| 4X | | 1028 | 12 | 965 | 12 | | |
| 4Y | | 1028 | 36 | 1091 | 30 | | |
| 5X | | 1029 | 12 | 966 | 12 | | |
| 5Y | | 1029 | 36 | 1092 | 30 | | |
| 6X | | 1030 | 12 | 967 | 12 | | |
| 6Y | | 1030 | 36 | 1093 | 30 | | |
| 7X | | 1031 | 12 | 968 | 12 | | |
| 7Y | | 1031 | 36 | 1094 | 30 | | |
| 8X | | 1032 | 12 | 969 | 12 | | |
| 8Y | | 1032 | 36 | 1095 | 30 | | |
| 9X | | 1033 | 12 | 970 | 12 | | |
| 9Y | | 1033 | 36 | 1096 | 30 | | |
| 10X | | 1034 | 12 | 971 | 12 | | |
| 10Y | | 1034 | 36 | 1097 | 30 | | |
| 11X | | 1035 | 12 | 972 | 12 | | |
| 11Y | | 1035 | 36 | 1098 | 30 | | |
| 12X | | 1036 | 12 | 973 | 12 | | |
| 12Y | | 1036 | 36 | 1099 | 30 | | |
| 13X | | 1037 | 12 | 974 | 12 | | |
| 13Y | | 1037 | 36 | 1100 | 30 | | |
| 14X | | 1038 | 12 | 975 | 12 | | |
| 14Y | | 1038 | 36 | 1101 | 30 | | |
| 15X | | 1039 | 12 | 976 | 12 | | |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 15Y | | 1039 | 36 | 1102 | 30 | | |
| 16X | | 1040 | 12 | 977 | 12 | | |
| 16Y | | 1040 | 36 | 1103 | 30 | | |
| 17X | 108.00 | 1041 | 12 | 978 | 12 | | |
| 17Y | 108.05 | 1041 | 36 | 1104 | 30 | | |
| 18X | | 1042 | 12 | 979 | 12 | 108.10 | 334.70 |
| 18Y | | 1042 | 36 | 1105 | 30 | 108.15 | 334.55 |
| 19X | 108.20 | 1043 | 12 | 980 | 12 | | |
| 19Y | 108.25 | 1043 | 36 | 1106 | 30 | | |
| 20X | | 1044 | 12 | 981 | 12 | 108.3 | 334.1 |
| 20Y | | 1044 | 36 | 1107 | 30 | 108.35 | 333.95 |
| 21X | 108.40 | 1045 | 12 | 982 | 12 | | |
| 21Y | 108.45 | 1045 | 36 | 1108 | 30 | | |
| 22X | | 1046 | 12 | 983 | 12 | 108.5 | 329.9 |
| 22Y | | 1046 | 36 | 1109 | 30 | 108.55 | 329.75 |
| 23X | 108.6 | 1047 | 12 | 984 | 12 | | |
| 23Y | 108.65 | 1047 | 36 | 1110 | 30 | | |
| 24X | | 1048 | 12 | 985 | 12 | 108.70 | 330.50 |
| 24Y | | 1048 | 36 | 1111 | 30 | 108.75 | 330.35 |
| 25X | 108.80 | 1049 | 12 | 986 | 12 | | |
| 25Y | 108.85 | 1049 | 36 | 1112 | 30 | | |
| 26X | | 1050 | 12 | 987 | 12 | 108.90 | 329.30 |
| 26Y | | 1050 | 36 | 1113 | 30 | 108.95 | 329.15 |
| 27X | 109.00 | 1051 | 12 | 988 | 12 | | |
| 27Y | 109.05 | 1051 | 36 | 1114 | 30 | | |
| 28X | | 1052 | 12 | 989 | 12 | 109.10 | 331.40 |
| 28Y | | 1052 | 36 | 1115 | 30 | 109.15 | 331.25 |
| 29X | 109.20 | 1053 | 12 | 990 | 12 | | |
| 29Y | 109.25 | 1053 | 36 | 1116 | 30 | | |
| 30X | | 1054 | 12 | 991 | 12 | 109.30 | 332.00 |
| 30Y | | 1054 | 36 | 1117 | 30 | 109.35 | 331.85 |
| 31X | 109.40 | 1055 | 12 | 992 | 12 | | |
| 31Y | 109.45 | 1055 | 36 | 1118 | 30 | | |
| 32X | | 1056 | 12 | 993 | 12 | 109.50 | 332.60 |
| 32Y | | 1056 | 36 | 1119 | 30 | 109.55 | 332.45 |
| 33X | 109.60 | 1057 | 12 | 994 | 12 | | |
| 33Y | 109.65 | 1057 | 36 | 1120 | 30 | | |
| 34X | | 1058 | 12 | 995 | 12 | 109.70 | 333.20 |
| 34Y | | 1058 | 36 | 1121 | 30 | 109.75 | 333.05 |
| 35X | 109.80 | 1059 | 12 | 996 | 12 | | |
| 35Y | 109.85 | 1059 | 36 | 1122 | 30 | | |
| 36X | | 1060 | 12 | 997 | 12 | 109.90 | 333.80 |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 36Y | | 1060 | 36 | 1123 | 30 | 109.95 | 333.65 |
| 37X | 110.00 | 1061 | 12 | 998 | 12 | | |
| 37Y | 110.05 | 1061 | 36 | 1124 | 30 | | |
| 38X | | 1062 | 12 | 999 | 12 | 110.10 | 334.40 |
| 38Y | | 1062 | 36 | 1125 | 30 | 110.15 | 334.25 |
| 39X | 110.20 | 1063 | 12 | 1000 | 12 | | |
| 39Y | 110.25 | 1063 | 36 | 1126 | 30 | | |
| 40X | | 1064 | 12 | 1001 | 12 | 110.3 | 335 |
| 40Y | | 1064 | 36 | 1127 | 30 | 110.35 | 334.85 |
| 41X | 110.40 | 1065 | 12 | 1002 | 12 | | |
| 41Y | 110.45 | 1065 | 36 | 1128 | 30 | | |
| 42X | | 1066 | 12 | 1003 | 12 | 110.50 | 329.60 |
| 42Y | | 1066 | 36 | 1129 | 30 | 110.55 | 329.45 |
| 43X | 110.60 | 1067 | 12 | 1004 | 12 | | |
| 43Y | 110.65 | 1067 | 36 | 1130 | 30 | | |
| 44X | | 1068 | 12 | 1005 | 12 | 110.70 | 330.20 |
| 44Y | | 1068 | 36 | 1131 | 30 | 110.75 | 330.05 |
| 45X | 110.80 | 1069 | 12 | 1006 | 12 | | |
| 45Y | 110.85 | 1069 | 36 | 1132 | 30 | | |
| 46X | | 1070 | 12 | 1007 | 12 | 110.90 | 330.80 |
| 46Y | | 1070 | 36 | 1133 | 30 | 110.95 | 330.65 |
| 47X | 111.00 | 1071 | 12 | 1008 | 12 | | |
| 47Y | 111.05 | 1071 | 36 | 1134 | 30 | | |
| 48X | | 1072 | 12 | 1009 | 12 | 111.10 | 331.70 |
| 48Y | | 1072 | 36 | 1135 | 30 | 111.15 | 331.55 |
| 49X | 111.20 | 1073 | 12 | 1010 | 12 | | |
| 49Y | 111.25 | 1073 | 36 | 1136 | 30 | | |
| 50X | | 1074 | 12 | 1011 | 12 | 111.30 | 332.30 |
| 50Y | | 1074 | 36 | 1137 | 30 | 111.35 | 332.15 |
| 51X | 111.40 | 1075 | 12 | 1012 | 12 | | |
| 51Y | 111.45 | 1075 | 36 | 1138 | 30 | | |
| 52X | | 1076 | 12 | 1013 | 12 | 111.50 | 332.90 |
| 52Y | | 1076 | 36 | 1139 | 30 | 111.55 | 332.75 |
| 53X | 111.60 | 1077 | 12 | 1014 | 12 | | |
| 53Y | 111.65 | 1077 | 36 | 1140 | 30 | | |
| 54X | | 1078 | 12 | 1015 | 12 | 111.70 | 333.50 |
| 54Y | | 1078 | 36 | 1141 | 30 | 111.75 | 333.35 |
| 55X | 111.80 | 1079 | 12 | 1016 | 12 | | |
| 55Y | 111.85 | 1079 | 36 | 1142 | 30 | | |
| 56X | | 1080 | 12 | 1017 | 12 | 111.90 | 331.10 |
| 56Y | | 1080 | 36 | 1143 | 30 | 111.95 | 330.95 |
| 57X | 112.00 | 1081 | 12 | 1018 | 12 | | |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 57Y | 112.05 | 1081 | 36 | 1144 | 30 | | |
| 58X | 112.10 | 1082 | 12 | 1019 | 12 | | |
| 58Y | 112.15 | 1082 | 36 | 1145 | 30 | | |
| 59X | 112.20 | 1083 | 12 | 1020 | 12 | | |
| 59Y | 112.25 | 1083 | 36 | 1146 | 30 | | |
| 60X | | 1084 | 12 | 1021 | 12 | | |
| 60Y | | 1084 | 36 | 1147 | 30 | | |
| 61X | | 1085 | 12 | 1022 | 12 | | |
| 61Y | | 1085 | 36 | 1148 | 30 | | |
| 62X | | 1086 | 12 | 1023 | 12 | | |
| 62Y | | 1086 | 36 | 1149 | 30 | | |
| 63X | | 1087 | 12 | 1024 | 12 | | |
| 63Y | | 1087 | 36 | 1150 | 30 | | |
| 64X | | 1088 | 12 | 1151 | 12 | | |
| 64Y | | 1088 | 36 | 1025 | 30 | | |
| 65X | | 1089 | 12 | 1152 | 12 | | |
| 65Y | | 1089 | 36 | 1026 | 30 | | |
| 66X | | 1090 | 12 | 1153 | 12 | | |
| 66Y | | 1090 | 36 | 1027 | 30 | | |
| 67X | | 1091 | 12 | 1154 | 12 | | |
| 67Y | | 1091 | 36 | 1028 | 30 | | |
| 68X | | 1092 | 12 | 1155 | 12 | | |
| 68Y | | 1092 | 36 | 1029 | 30 | | |
| 69X | | 1093 | 12 | 1156 | 12 | | |
| 69Y | | 1093 | 36 | 1030 | 30 | | |
| 70X | 112.30 | 1094 | 12 | 1157 | 12 | | |
| 70Y | 112.35 | 1094 | 36 | 1031 | 30 | | |
| 71X | 112.40 | 1095 | 12 | 1158 | 12 | | |
| 71Y | 112.45 | 1095 | 36 | 1032 | 30 | | |
| 72X | 112.50 | 1096 | 12 | 1159 | 12 | | |
| 72Y | 112.55 | 1096 | 36 | 1033 | 30 | | |
| 73X | 112.60 | 1097 | 12 | 1160 | 12 | | |
| 73Y | 112.65 | 1097 | 36 | 1034 | 30 | | |
| 74X | 112.70 | 1098 | 12 | 1161 | 12 | | |
| 74Y | 112.75 | 1098 | 36 | 1035 | 30 | | |
| 75X | 112.80 | 1099 | 12 | 1162 | 12 | | |
| 75Y | 112.85 | 1099 | 36 | 1036 | 30 | | |
| 76X | 112.90 | 1100 | 12 | 1163 | 12 | | |
| 76Y | 112.95 | 1100 | 36 | 1037 | 30 | | |
| 77X | 113.00 | 1101 | 12 | 1164 | 12 | | |
| 77Y | 113.05 | 1101 | 36 | 1038 | 30 | | |
| 78X | 113.10 | 1102 | 12 | 1165 | 12 | | |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 78Y | 113.15 | 1102 | 36 | 1039 | 30 | | |
| 79X | 113.20 | 1103 | 12 | 1166 | 12 | | |
| 79Y | 113.25 | 1103 | 36 | 1040 | 30 | | |
| 80X | 113.30 | 1104 | 12 | 1167 | 12 | | |
| 80Y | 113.35 | 1104 | 36 | 1041 | 30 | | |
| 81X | 113.40 | 1105 | 12 | 1168 | 12 | | |
| 81Y | 113.45 | 1105 | 36 | 1041 | 30 | | |
| 82X | 113.50 | 1106 | 12 | 1169 | 12 | | |
| 82Y | 113.55 | 1106 | 36 | 1043 | 30 | | |
| 83X | 113.60 | 1107 | 12 | 1170 | 12 | | |
| 83Y | 113.65 | 1107 | 36 | 1044 | 30 | | |
| 84X | 113.70 | 1108 | 12 | 1171 | 12 | | |
| 84Y | 113.75 | 1108 | 36 | 1045 | 30 | | |
| 85X | 113.80 | 1109 | 12 | 1172 | 12 | | |
| 85Y | 113.85 | 1109 | 36 | 1046 | 30 | | |
| 86X | 113.90 | 1110 | 12 | 1173 | 12 | | |
| 86Y | 113.95 | 1110 | 36 | 1047 | 30 | | |
| 87X | 114.00 | 1111 | 12 | 1174 | 12 | | |
| 87Y | 114.05 | 1111 | 36 | 1048 | 30 | | |
| 88X | 114.10 | 1112 | 12 | 1175 | 12 | | |
| 88Y | 114.15 | 1112 | 36 | 1049 | 30 | | |
| 89X | 114.20 | 1113 | 12 | 1176 | 12 | | |
| 89Y | 114.25 | 1113 | 36 | 1050 | 30 | | |
| 90X | 114.30 | 1114 | 12 | 1177 | 12 | | |
| 90Y | 114.35 | 1114 | 36 | 1051 | 30 | | |
| 91X | 114.40 | 1115 | 12 | 1178 | 12 | | |
| 91Y | 114.45 | 1115 | 36 | 1052 | 30 | | |
| 92X | 114.50 | 1116 | 12 | 1179 | 12 | | |
| 92Y | 114.55 | 1116 | 36 | 1053 | 30 | | |
| 93X | 114.60 | 1117 | 12 | 1180 | 12 | | |
| 93Y | 114.65 | 1117 | 36 | 1054 | 30 | | |
| 94X | 114.70 | 1118 | 12 | 1181 | 12 | | |
| 94Y | 114.75 | 1118 | 36 | 1055 | 30 | | |
| 95X | 114.80 | 1119 | 12 | 1182 | 12 | | |
| 95Y | 114.85 | 1119 | 36 | 1056 | 30 | | |
| 96X | 114.90 | 1120 | 12 | 1183 | 12 | | |
| 96Y | 114.95 | 1120 | 36 | 1057 | 30 | | |
| 97X | 115.00 | 1121 | 12 | 1184 | 12 | | |
| 97Y | 115.05 | 1121 | 36 | 1058 | 30 | | |
| 98X | 115.10 | 1122 | 12 | 1185 | 12 | | |
| 98Y | 115.15 | 1122 | 36 | 1059 | 30 | | |
| 99X | 115.20 | 1123 | 12 | 1186 | 12 | | |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 99Y | 115.25 | 1123 | 36 | 1060 | 30 | | |
| 100X | 115.30 | 1124 | 12 | 1187 | 12 | | |
| 100Y | 115.35 | 1124 | 36 | 1061 | 30 | | |
| 101X | 115.40 | 1125 | 12 | 1188 | 12 | | |
| 101Y | 115.45 | 1125 | 36 | 1062 | 30 | | |
| 102X | 115.50 | 1126 | 12 | 1189 | 12 | | |
| 102Y | 115.55 | 1126 | 36 | 1063 | 30 | | |
| 103X | 115.60 | 1127 | 12 | 1190 | 12 | | |
| 103Y | 115.65 | 1127 | 36 | 1064 | 30 | | |
| 104X | 115.70 | 1128 | 12 | 1191 | 12 | | |
| 104Y | 115.75 | 1128 | 36 | 1065 | 30 | | |
| 105X | 115.80 | 1129 | 12 | 1192 | 12 | | |
| 105Y | 115.85 | 1129 | 36 | 1066 | 30 | | |
| 106X | 115.90 | 1130 | 12 | 1193 | 12 | | |
| 106Y | 115.95 | 1130 | 36 | 1067 | 30 | | |
| 107X | 116.00 | 1131 | 12 | 1194 | 12 | | |
| 107Y | 116.05 | 1131 | 36 | 1068 | 30 | | |
| 108X | 116.1 | 1132 | 12 | 1195 | 12 | | |
| 108Y | 116.15 | 1132 | 36 | 1069 | 30 | | |
| 109X | 116.20 | 1133 | 12 | 1196 | 12 | | |
| 109Y | 116.25 | 1133 | 36 | 1070 | 30 | | |
| 110X | 116.30 | 1134 | 12 | 1197 | 12 | | |
| 110Y | 116.35 | 1134 | 36 | 1071 | 30 | | |
| 111X | 116.40 | 1135 | 12 | 1198 | 12 | | |
| 111Y | 116.45 | 1135 | 36 | 1072 | 30 | | |
| 112X | 116.5 | 1136 | 12 | 1199 | 12 | | |
| 112Y | 116.55 | 1136 | 36 | 1073 | 30 | | |
| 113X | 116.6 | 1137 | 12 | 1200 | 12 | | |
| 113Y | 116.65 | 1137 | 36 | 1074 | 30 | | |
| 114X | 116.70 | 1138 | 12 | 1201 | 12 | | |
| 114Y | 116.75 | 1138 | 36 | 1075 | 30 | | |
| 115X | 116.80 | 1139 | 12 | 1202 | 12 | | |
| 115Y | 116.85 | 1139 | 36 | 1076 | 30 | | |
| 116X | 116.90 | 1140 | 12 | 1203 | 12 | | |
| 116Y | 116.95 | 1140 | 36 | 1077 | 30 | | |
| 117X | 117.00 | 1141 | 12 | 1204 | 12 | | |
| 117Y | 117.05 | 1141 | 36 | 1078 | 30 | | |
| 118X | 117.10 | 1142 | 12 | 1205 | 12 | | |
| 118Y | 117.15 | 1142 | 36 | 1079 | 30 | | |
| 119X | 117.20 | 1143 | 12 | 1206 | 12 | | |
| 119Y | 117.25 | 1143 | 36 | 1080 | 30 | | |
| 120X | 117.30 | 1144 | 12 | 1207 | 12 | | |

| Channel | VOR MHz | DME/TACAN | | | | ILS | |
|---------|------------|-------------------|--------------------|--------------------|--------------------|------------------|--------------------|
| | | Airborne | | Ground | | Localizer MHz | Glide Slope MHz |
| | | Int. Freq. MHz | Pulse Code usec | Reply Freq. MHz | Pulse Code usec | | |
| 120Y | 117.35 | 1144 | 36 | 1081 | 30 | | |
| 121X | 117.40 | 1145 | 12 | 1208 | 12 | | |
| 121Y | 117.45 | 1145 | 36 | 1082 | 30 | | |
| 122X | 117.50 | 1146 | 12 | 1209 | 12 | | |
| 122Y | 117.55 | 1146 | 36 | 1083 | 30 | | |
| 123X | 117.60 | 1147 | 12 | 1210 | 12 | | |
| 123Y | 117.65 | 1147 | 36 | 1084 | 30 | | |
| 124X | 117.70 | 1148 | 12 | 1211 | 12 | | |
| 124Y | 117.75 | 1148 | 36 | 1085 | 30 | | |
| 125X | 117.80 | 1149 | 12 | 1212 | 12 | | |
| 125Y | 117.85 | 1149 | 36 | 1086 | 30 | | |
| 126X | 117.90 | 1150 | 12 | 1213 | 12 | | |
| 126Y | 117.95 | 1150 | 36 | 1087 | 30 | | |

4.3.6 Channeling Plan for Assignments in the Band 29.89-50 MHz

This plan is a guide for identifying the center frequencies normally used for assignments with necessary bandwidths equal to or less than 16 kHz.

CONDITIONS AND LIMITATIONS

1. Narrowband Operations. Assignments with necessary bandwidths equal to or less than 16 kHz (narrowband assignments) may be authorized on the center frequencies shown in this plan and on qualified interstitial channels. A “qualified interstitial channel” is one which:

- a. Has a center frequency which falls exactly halfway between two adjacent center frequencies shown in this plan,
- b. does not overlap an all-government-agencies (AGA) channel,
- c. will result in more efficient use of the spectrum, and
- d. has been properly coordinated with all affected agencies.

2. Wideband Operations. Assignments with necessary bandwidths greater than 16 kHz (wideband assignments) may also be authorized in this band, provided such assignments:

- a. do not exceed 40 kHz of necessary bandwidth,
- b. do not overlap an all-government-agencies (AGA) channel,
- c. are positioned between the center frequencies shown in this plan when this will result in more efficient use of the spectrum,
- d. have been properly coordinated with all affected agencies, and
- e. are needed to satisfy requirements which cannot be accommodated with narrowband state-of-the-art equipment, or

f. are in direct support of military tactical and training operations which conform to the conditions and limitations of Section 7.15.4.

3. Use of Coded Squelch. Coded squelch (squelch control techniques) will be used whenever this technique will promote more efficient use of the spectrum; e.g. use of fewer frequencies, sharing of frequencies, reduction or elimination of interference, etc.

EXCEPTIONS

Exceptions to the above conditions and limitations will be considered by the FAS on a case-by-case basis.

| | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 29.9 | | | | | | | | |
| 30.01 | 32.01 | 34.01 | 36.01 | | 40.01 | 41.01 | | |
| 30.03 | 32.03 | 34.03 | 36.03 | | 40.03 | 41.03 | | |
| 30.05 | 32.05 | 34.05 | 36.05 | | 40.05 | 41.05 | | |
| 30.07 | 32.07 | 34.07 | 36.07 | | 40.07 | 41.07 | | |
| 30.09 | 32.09 | 34.09 | 36.09 | | 40.09 | 41.09 | | |
| 30.11 | 32.11 | 34.11 | 36.11 | | 40.11 | 41.11 | | |
| 30.13 | 32.13 | 34.13 | 36.13 | | 40.13 | 41.13 | | |
| 30.15 | 32.15 | 34.15 | 36.15 | | 40.15 | 41.15 | | |
| 30.17 | 32.17 | 34.17 | 36.17 | | 40.17 | 41.17 | | |
| 30.19 | 32.19 | 34.19 | 36.19 | | 40.19 | 41.19 | | |
| 30.21 | 32.21 | 34.21 | 36.21 | | 40.21 | 41.21 | | |
| 30.23 | 32.23 | 34.23 | 36.23 | | 40.23 | 41.23 | | |
| 30.25 | 32.25 | 34.25 | 36.25 | | 40.25 | 41.25 | | |
| 30.27 | 32.27 | 34.27 | 36.27 | 38.27 | 40.27 | 41.27 | | |
| 30.29 | 32.29 | 34.29 | 36.29 | 38.29 | 40.29 | 41.29 | | |
| 30.31 | 32.31 | 34.31 | 36.31 | 38.31 | 40.31 | 41.31 | | |
| 30.33 | 32.33 | 34.33 | 36.33 | 38.33 | 40.33 | 41.33 | | |
| 30.35 | 32.35 | 34.35 | 36.35 | 38.35 | 40.35 | 41.35 | | |
| 30.37 | 32.37 | 34.37 | 36.37 | 38.37 | 40.37 | 41.37 | | |
| 30.39 | 32.39 | 34.39 | 36.39 | 38.39 | 40.39 | 41.39 | | |
| 30.41 | 32.41 | 34.41 | 36.41 | 38.41 | 40.41 | 41.41 | | |
| 30.43 | 32.43 | 34.43 | 36.43 | 38.43 | 40.43 | 41.43 | | |
| 30.45 | 32.45 | 34.45 | 36.45 | 38.45 | 40.45 | 41.45 | | |
| 30.47 | 32.47 | 34.47 | 36.47 | 38.47 | 40.47 | 41.47 | | |
| 30.49 | 32.49 | 34.49 | 36.49 | 38.49 | 40.49 | 41.49 | | |
| 30.51 | 32.51 | 34.51 | 36.51 | 38.51 | 40.51 | 41.51 | | |
| 30.53 | 32.53 | 34.53 | 36.53 | 38.53 | 40.53 | 41.53 | | |
| 30.55 | 32.55 | 34.55 | 36.55 | 38.55 | 40.55 | 41.55 | | |
| | 32.57 | 34.57 | 36.57 | 38.57 | 40.57 | 41.57 | | |
| | 32.59 | 34.59 | 36.59 | 38.59 | 40.59 | 41.59 | | |
| | 32.61 | 34.61 | 36.61 | 38.61 | 40.61 | 41.61 | 46.61 | 49.61 |
| | 32.63 | 34.63 | 36.63 | 38.63 | 40.63 | 41.63 | 46.63 | 49.63 |
| | 32.65 | 34.65 | 36.65 | 38.65 | 40.65 | 41.65 | 46.65 | 49.65 |
| | 32.67 | 34.67 | 36.67 | 38.67 | 40.67 | 41.67 | 46.67 | 49.67 |
| | 32.69 | 34.69 | 36.69 | 38.69 | 40.69 | 41.69 | 46.69 | 49.69 |
| | 32.71 | 34.71 | 36.71 | 38.71 | 40.71 | 41.71 | 46.71 | 49.71 |
| | 32.73 | 34.73 | 36.73 | 38.73 | 40.73 | 41.73 | 46.73 | 49.73 |
| | 32.75 | 34.75 | 36.75 | 38.75 | 40.75 | 41.75 | 46.75 | 49.75 |
| | 32.77 | 34.77 | 36.77 | 38.77 | 40.77 | 41.77 | 46.77 | 49.77 |
| | 32.79 | 34.79 | 36.79 | 38.79 | 40.79 | 41.79 | 46.79 | 49.79 |
| | 32.81 | 34.81 | 36.81 | 38.81 | 40.81 | 41.81 | 46.81 | 49.81 |
| | 32.83 | 34.83 | 36.83 | 38.83 | 40.83 | 41.83 | 46.83 | 49.83 |
| | 32.85 | 34.85 | 36.85 | 38.85 | 40.85 | 41.85 | 46.85 | 49.85 |
| | 32.87 | 34.87 | 36.87 | 38.87 | 40.87 | 41.87 | 46.87 | 49.87 |
| | 32.89 | 34.89 | 36.89 | 38.89 | 40.89 | 41.89 | 46.89 | 49.89 |
| | 32.91 | 34.91 | 36.91 | 38.91 | 40.91 | 41.91 | 46.91 | 49.91 |
| | 32.93 | 34.93 | 36.93 | 38.93 | 40.93 | 41.93 | 46.93 | 49.93 |

| | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|
| 4.3.6 | | | | 4-180 | | | | 1/2008 (Rev. 9/2009) |
| | 32.95 | 34.95 | 36.95 | 38.95 | 40.95 | 41.95 | 46.95 | 49.95 |
| | 32.97 | 34.97 | 36.97 | 38.97 | 40.97 | 41.97 | 46.97 | 49.97 |
| | 32.99 | 34.99 | 36.99 | 38.99 | 40.99 | 41.99 | 46.99 | 49.99 |

4.3.7 Channeling Plan for Assignments in the Band 162-174 MHz (12.5 kHz Plan)

The channeling plan for the band 162-174 MHz is a guide for identifying the center frequencies used for assignments with necessary bandwidths less than 12.5 kHz. The channeling plan is composed of 942 channels beginning with the center frequency 162.0125 MHz with intervals of 12.5 kHz, excluding frequencies contained within the sub-band 173.2-173.4 MHz.

CONDITIONS AND LIMITATIONS

1. Narrowband Operations. Narrowband assignments (with a necessary bandwidth of less than 12.5 kHz) may be authorized on the center frequencies identified in this plan.

2. Wideband Operations. Wideband assignments (with necessary bandwidths equal to or greater than 12.5 kHz) for new systems are not authorized. Renewals for wideband assignments may be granted with the understanding that operations are subject to the provisions set forth in paragraph 2a below and Section 5.3.5 of this Manual. As an exception, NOAA Weather Radio operations on channels in the frequency range 162.3625-162.5875 MHz may continue to operate with necessary bandwidths equal to 16 kHz. The Automatic Identification System (AIS) (162.025 MHz) will also continue to operate with a 25 kHz bandwidth pursuant to the International Telecommunication Union (ITU) and International Maritime Organization (IMO).

a. Wideband operations may continue after December 31, 2006 with the understanding that an agency with wideband operations ultimately bears responsibility to mitigate harmful interference (e.g. change to narrowband operations, alter technical operating characteristics, change frequency, or assist the narrowband user to find another frequency) within 180⁴ days of notification of an adjacent narrowband use requirement. Agencies requiring use of frequencies for narrowband operations, where wideband operations overlap the proposed narrowband operations shall submit a frequency proposal as formal notice through the FAS assignment process after concluding that they do not have other available options. Prior to formal notification the agency requesting narrowband operations shall inform the agency(ies) with wideband operations of the intended use of the adjacent narrowband frequency (Section 8.2.2). If at any time prior to or within 60 days of formal notification, either agency concludes that they cannot identify between them a resolution, the agency with wideband operations shall submit documentation to the FAS substantiating the requirement for continued wideband operations and describing the options considered in their discussions with the narrowband user. Agencies with wideband operations who do not submit substantiating documentation to the FAS shall be considered in concurrence with the proposed narrowband operation. The FAS will evaluate the documentation and identify any options not previously considered or possibly not available to the two agencies involved. If the subcommittee cannot identify a solution that can be agreed by the two parties, the issue will be referred in accordance with Section 8.1.1 paragraph 4. In cases where no solution can be found, the wideband operations may continue on a non-interference basis.

3. Use of Coded Squelch. Coded squelch (squelch control techniques) will be used whenever this technique will promote more efficient use of the spectrum; e.g. use of fewer frequencies, sharing of frequencies, reduction or elimination of interference, etc.

⁴ For the purpose of this paragraph 180 days begins when the frequency proposal for the specific narrowband frequency first appears on an NTIA FAS Agenda.

4. Time Division Multiple Access (TDMA) Operations. TDMA systems, with at least 1 voice channel per 12.5 kHz, will be allowed and can be accommodated on adjacent 12.5 kHz channels listed in this channeling plan. The center frequency of the TDMA channel must be offset midway between the existing narrowband channels to avoid adjacent channel interference problems with existing or planned narrowband systems. Refer to Part 5.3.5 for technical standards.

5. Paired Frequency Operations. The channeling plan identifies 280 pairs of frequencies that are intended to be used for two-frequency simplex operations using equipment operating with a necessary bandwidth less than 12.5 kHz. The paired-use portion includes 359 channels, however 79 of these channels cannot be used for paired use due to existing limitations on the use of one of the frequencies that comprise these pairs (i.e., the 19 frequencies allotted for the NOAA weather radios, the 17 frequencies contained within the non-Federal sub-band 173.2-173.4 MHz, and 43 frequencies designated for other specified use by US footnote).

a. For paired frequency operations, the frequencies in the range 162.0500-166.4875 MHz will be used for land station receive (or mobile transmit), and frequencies in the range 169.5125-173.9875 MHz will be used for land station transmissions (or mobile receive).

b. Base stations with a power not greater than 125 Watts are permitted to transmit in the range 162.0500-166.4875 MHz for access to the repeater.

c. Mobile and base stations are permitted to use repeater transmit frequencies for talk-around communications.

d. Unpaired single frequency operations may be authorized using either of the paired frequencies, except pairs allotted AGA, if the requesting agency believes it to be a more effective use of the spectrum. All such assignments must bear the Record Note S396 (see Annex A). However, as long as an agency has assignments for unpaired single frequency operations on frequencies designated for paired operations, that agency shall not be authorized paired frequency assignments on designated paired frequencies allotted AGA, unless justified otherwise.

e. An agency may use any of their allotted frequencies in the range 162.0500-166.4875 MHz and any of their allotted frequencies in the range 169.5125-173.9875 MHz to make up a single channel pair.

f. An agency may use any of their allotted frequencies in the range 166.5-169.5 MHz and any of their allotted frequencies in the ranges 162.0500-166.4875 MHz and 169.5125-173.9875 MHz to make up a single channel pair if the requesting agency believes it to be more effective use of the spectrum and if it complies, in part, to the provisions of paragraph 5.a.

g. Existing assignments that do not conform to the provisions of this paragraph and assignments that were converted or are converting to comply with the narrowband mandate are grand fathered until a replacement to those systems are necessary. Additionally, expansion of existing systems will continue to be authorized on the system's current operating frequencies. After January 1, 2019, all assignments must conform to the provisions of paragraph 5a through 5f. After April 1, 2004, assignments for new systems (i.e., those without the Record Note S391) will be approved only if they follow the provisions of paragraph 5a through 5f.

6. Single Frequency Operations. The channeling plan identifies 382 center frequencies that are intended to be used for single frequency operations with necessary bandwidths less than 12.5 kHz. The number of frequencies available for single frequency operations includes the 241 center frequencies contained in the frequency range 166.5-169.5 MHz plus those that cannot be used for paired operations in the remainder of the band.

7. Use of the Band by Military Agencies. Use of the band 162-174 MHz by the military agencies is limited to non-tactical or intra-base radio operations with the following provisions:

a. Frequency assignments may be authorized on the center frequencies designated AF/AR.

b. Frequency assignments for certified trunked systems may be authorized on the center frequencies allotted primarily for non-military agencies or AGA, subject to the conditions imposed on the NTIA certification of spectrum support and coordination between the affected agencies. The priority note P074 shall be applied to assignments on center frequencies allotted primarily for non-military agencies and those allotted for shared use, unless the agency(ies) to which the frequency is primarily allotted agrees to waive this requirement. Applicant agencies obtaining waivers to the imposition of P074 on any assignment shall include in the assignment application the coordination note C095 (see Section 9.8.2, paragraph 18, and Annex A). If a waiver agreement contains any special arrangements, the terms or text of the arrangements must be submitted to the FAS Secretary, where an FAS administrative document number will be assigned. Reference to these arrangements (using the FAS administrative document number as a reference) also shall be included in the frequency assignment application as an *M002 note entry in the Circuit Remarks (see Section 9.8.2, paragraph 39k, Annex A).

c. Frequency assignments for purposes other than trunked systems may be authorized on the center frequencies allotted primarily for non-military agencies or AGA, provided the proper selection and coordination procedures have been followed, and provided the priority note P074 is applied to each such assignment.

8. Exceptions to the above conditions, limitations, and frequency selection/coordination procedures will be considered by the FAS on a case-by-case basis.

4.3.8 Splinter Channel Assignment Plan in the band 162-174 MHz (12.5 kHz plan)

The frequencies shown in this plan are available for assignment to all Federal agencies in accordance with allocation footnote G5 and as specified herein.

| | | | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 162.596875 ² | 163.396875 ² | 164.0 ¹ | 165.796875 ² | 166.421875 ² | 167.196875 ² | 171.221875 ² |
| .6 ¹ | .4 ¹ | 164.003125 ² | .8 ¹ | .425000 ¹ | .2 ¹ | .225 ¹ |
| .603125 ² | .403125 ² | .009375 ² | .803125 ² | .428125 ² | .203125 ² | .228125 ² |
| .796875 ² | .596875 ² | .0125 ¹ | .809375 ² | .646875 ² | .796875 ² | .396875 ² |
| .8 ¹ | .6 ¹ | .015625 ² | .8125 ¹ | .650000 ¹ | .8 ¹ | .4 ¹ |
| .803125 ² | .603125 ² | .846875 ² | .815625 ² | .653125 ² | .803125 ² | 171.403125 ² |
| .809375 ² | .609375 ² | .85 ¹ | | .659375 ² | .809375 ² | .409375 ² |
| .81250 ¹ | .6125 ¹ | .853125 ² | | .662500 ¹ | .8125 ¹ | .4125 ¹ |
| .815625 ² | .615625 ² | | | .665625 ² | .815625 ² | .415625 ² |
| | .796875 ² | | | | | |
| | .8 ¹ | | | | | |
| | .803125 ² | | | | | |
| | 163.996875 ² | | | | | |

¹ These frequencies are available for operations requiring a bandwidth up to 11 kHz.

² These frequencies are available for operations requiring a bandwidth up to 5 kHz.

CONDITIONS FOR USE

1. Use of voice or data with emissions less than 12.5 kHz on footnote one channels is authorized. New users shall ensure that they do not interfere with low power operations.
2. The technical standards applicable to the use of the channels listed above are shown in Section 5.3.6.
3. Directional antennas shall be used where practicable on point-to-point circuits.
4. Transmitter output power shall not exceed 5 watts.
5. Wherever practical, frequencies in the 406.1-420 MHz band, (Section 4.3.9) or the 932.5-935 and 941.5-944 MHz bands, (Section 4.3.14) should be used in lieu of the above frequencies.
6. Exceptions to these conditions will be considered on a case-by-case basis.

4.3.9 Channeling Plan for Assignments in the Band 406.1-420 MHz

This plan is a guide for identifying the center frequencies normally used for assignments with necessary bandwidths less than 12.5 kHz and, until December 31, 2007, for assignments with necessary bandwidths of 12.5 kHz or greater. Tables 1 and 2, below, list the center frequencies of the channels for assignments in the band 406.1-420 MHz. Table 1 contains 391 pairs of frequencies that are to be used primarily for two-frequency simplex operations. Table 2 contains 329 center frequencies that are to be used for single frequency operations.

CONDITIONS AND LIMITATIONS

1. Transition. To allow for an orderly transition from previous channel plans to this plan, the following apply:

a. Agencies shall develop transition plans that outline their plans to narrowband and to change frequencies where necessary. The transition plans will provide an estimated date for narrow banding each assignment not already narrowbanded, and for changing frequencies where necessary. The initial plans shall be presented to the FAS no later than the first FAS meeting held in the year 2001.

b. Agencies having assignments on, or overlapping, frequencies allotted for primary use by other agencies, shall make every attempt to move their operations to frequencies allotted primarily for their own use, or to frequencies allotted for their shared use. All moves shall be done at the earliest possible date, but by no later than December 31, 2007, unless a waiver (an authorization for continued assignment) is recommended by the IRAC's Frequency Assignment Subcommittee (FAS) and approved by NTIA.

c. Any wideband assignment authorized prior to December 31, 2007, and continued in use after that date, that is on, or overlaps, a narrowband frequency allotted for primary use by another agency, shall be vacated by the using agency(ies) within 180 days of a formal notice of requirement from the agency to which the frequency is allotted, provided the notifying agency has demonstrated a valid requirement for the frequency and the FAS recommends the using agency vacate the assignment.

2. Narrowband Operations. Assignments for transmitters with necessary bandwidths less than 12.5 kHz (i.e., narrowband assignments) may be authorized on all of the center frequencies shown in Tables 1 and 2 of this plan. However, until January 1, 2008, narrowband assignments should not be made on center frequencies adjacent to wideband assignments (assignments with bandwidths of 12.5 kHz or greater), unless consideration is given to additional distance separation that may be required due to the increased potential for adjacent channel interference, and then only after proper coordination with affected agencies.

3. Wideband Operations. Renewal of assignments to existing stations with necessary bandwidths of 12.5 kHz or greater may be authorized until December 31, 2007. Assignments for expansion of stations within existing networks operating with bandwidths of 12.5 kHz or greater may also be authorized, but only on the center frequencies listed for the even numbered channels beginning with channel 2 in Table 1 and Channel 392 in Table 2. All such assignments must bear Record Note S391 (see Annex A). By January 1, 2008, all assignments and equipment must conform to the provisions set forth in paragraph 1, above, and Section 5.3.5 of this Manual. The Automated Surface Observing System (ASOS) operations centered on channels 318 and 388 may continue to operate with necessary bandwidths greater than 12.5 kHz, but less than 25 kHz. Exceptions to these rules may be authorized on a case-by-case basis, provided the assignment with bandwidth(s) of 12.5 kHz or greater is needed to satisfy requirements, has been properly coordinated with all affected agencies, and has been recommended for approval by the FAS. However, the rule outlined in subparagraph 1c, above, applies.

4. Use of Coded Squelch. Coded squelch (squelch control techniques) will be used whenever this technique will promote more efficient use of the spectrum (e.g., use of fewer frequencies, sharing frequencies, or reduction or elimination of interference).

5. Time Division Multiple Access (TDMA) Operations. TDMA systems with at least one voice channel per 12.5 kHz will be allowed and accommodated on adjacent 12.5 kHz center frequencies listed in this channeling plan. The center frequency of the TDMA emission must be offset midway between the center frequencies listed in this plan to limit adjacent channel interference problems with existing or planned narrowband operations. Refer to Part 5.3 of this Manual for technical details.

6. Paired Frequency Operations. Table 1 contains a list of 391 pairs of frequencies that are to be used primarily for two-frequency simplex operations using equipment operating with a necessary bandwidth less than 12.5kHz.

a. For paired frequency operations, the frequencies in the range 406.1125-410.9875 MHz will be used for land station transmissions (or mobile receive), and frequencies in the range 415.1125-419.9875 MHz will be used for land station receive (or mobile transmit).

b. Base stations operating with a power not greater than 125 watts are permitted to transmit in the range 415.1125-419.9875 MHz for access to the repeater.

c. Mobile stations are permitted to use repeater transmit frequencies for talk-around communications.

d. Unpaired single frequency operations may be authorized using either of the paired frequencies, except those allotted AGA, if the requesting agency believes it to be a more effective use of the spectrum. All such assignments must bear Record Note S396 (see Annex A). However, as long as an agency has assignments for unpaired single frequency operations on frequencies listed in Table 1, that agency shall not be authorized paired frequency assignments on those frequencies in Table 1 allotted AGA, unless justified otherwise.

e. Agencies will first propose frequency pairs allotted primarily for their own use from the Table 1 structure.

f. If there are no agency allotted structured pairs available, agencies will then propose frequency pairs allotted primarily for AGA use from the Table 1 structure.

g. If there are no AGA allotted structured pairs available, an agency may use any of their allotted frequencies in the range 406.1125 – 410.9875 MHz and any of their allotted frequencies in the range 415.1125 – 419.9875 MHz to make up a single channel pair if the requesting agency believes it to be more effective use of the spectrum and if it complies, in part, to the provisions of paragraph 5.a.

h. If a pair cannot be found from the transmit and receive ranges, an agency may use any of their allotted frequencies in the range 406.1125 – 410.9875 MHz and any of their allotted frequencies in the ranges 411.000 – 415.1000 MHz or 415.1125 – 419.9875 MHz to make up a single channel pair if the requesting agency believes it to be more effective use of the spectrum.

i. Existing narrowband assignments that do not conform to the provisions of this paragraph are grand fathered until 01/01/22. Additionally, expansion of existing narrowband systems will continue to be authorized within this period of time.

7. Single Frequency Operations. Table 2 contains a list of 329 center frequencies that are to be used for single frequency operations with necessary bandwidths less than 12.5 kHz.

8. Use of the Band by Military Agencies. Use of the band 406.1-420 MHz by the military agencies is limited to non-tactical or intrabase radio operations with the following provisions:

a. Frequency assignments may be authorized on center frequencies allotted primarily for DOD.

b. Frequency assignments for certified trunked systems may be authorized on the center frequencies allotted primarily for non-military agencies or AGA, subject to the conditions imposed on the NTIA certification of spectrum support and coordination between the affected agencies. The priority note P076 shall be applied to assignments on center frequencies allotted primarily for non-military agencies and those allotted for shared use, unless the agency(ies) to which the frequency is primarily allotted agrees to waive this requirement. Applicant agencies obtaining waivers to the imposition of P076 on any assignment shall include in the assignment application the coordination note C095 (see Section 9.8.2, paragraph 18, and Annex A). If a waiver agreement contains any special arrangements, the terms or text of the arrangements must be submitted to the FAS Secretary, where an FAS administrative document number will be assigned. Reference to these arrangements (using the FAS administrative document number as a reference) also shall be included in the frequency assignment application as an *M002 note entry in the Circuit Remarks (see Section 9.8.2, paragraph 39k, Annex A).

c. Frequency assignments for purposes other than trunked systems may be authorized on the center frequencies allotted primarily for non-military agencies or AGA, provided the proper selection and coordination procedures have been followed, and provided the priority note P076 is applied to each such assignment.

d. The 406.1-420 MHz band channeling plans are contained in Tables 1 and Table 2. Table 1 contains the paired frequency channels, while Table 2 contains the single changes frequencies. In both tables the old numbered channels are for 12.5 kHz bandwidth assignments, while the even numbered channels are for either 12.5 or 25 kHz assignments. After December 31, 2007 all channels will be 12.5 kHz assignments.

| Channel | Center Frequency | Center Frequency |
|----------------|-------------------------|-------------------------|
| 1 | 406.1125 | 415.1125 |
| 2 | 406.1250 | 415.125 |
| 3 | 406.1375 | 415.1375 |
| 4 | 406.150 | 415.150 |
| 5 | 406.1625 | 415.1625 |
| 6 | 406.175 | 415.175 |
| 7 | 406.1875 | 415.1875 |
| 8 | 406.200 | 415.200 |
| 9 | 406.2125 | 415.2125 |
| 10 | 406.225 | 415.225 |
| 11 | 406.2375 | 415.2375 |

| Channel | Center Frequency | Center Frequency |
|----------------|-------------------------|-------------------------|
| 12 | 406.250 | 415.250 |
| 13 | 406.2625 | 415.2625 |
| 14 | 406.275 | 415.275 |
| 15 | 406.2875 | 415.2875 |
| 16 | 406.300 | 415.300 |
| 17 | 406.3125 | 415.3125 |
| 18 | 406.325 | 415.325 |
| 19 | 406.3375 | 415.3375 |
| 20 | 406.350 | 415.350 |
| 21 | 406.3625 | 415.3625 |
| 22 | 406.375 | 415.375 |

| Channel | Center Frequency | Center Frequency |
|----------------|-------------------------|-------------------------|
| 23 | 406.3875 | 415.3875 |
| 24 | 406.400 | 415.400 |
| 25 | 406.4125 | 415.4125 |
| 26 | 406.425 | 415.425 |
| 27 | 406.4375 | 415.4375 |
| 28 | 406.450 | 415.450 |
| 29 | 406.4625 | 415.4625 |
| 30 | 406.475 | 415.475 |
| 31 | 406.4875 | 415.4875 |
| 32 | 406.500 | 415.500 |
| 33 | 406.5125 | 415.5125 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 34 | 406.525 | 415.525 |
| 35 | 406.5375 | 415.5375 |
| 36 | 406.550 | 415.550 |
| 37 | 406.5625 | 415.5625 |
| 38 | 406.575 | 415.575 |
| 39 | 406.5875 | 415.5875 |
| 40 | 406.600 | 415.600 |
| 41 | 406.6125 | 415.6125 |
| 42 | 406.625 | 415.625 |
| 43 | 406.6375 | 415.6375 |
| 44 | 406.650 | 415.650 |
| 45 | 406.6625 | 415.6625 |
| 46 | 406.675 | 415.675 |
| 47 | 406.6875 | 415.6875 |
| 48 | 406.700 | 415.700 |
| 49 | 406.7125 | 415.7125 |
| 50 | 406.725 | 415.725 |
| 51 | 406.7375 | 415.7375 |
| 52 | 406.750 | 415.750 |
| 53 | 406.7625 | 415.7625 |
| 54 | 406.775 | 415.775 |
| 55 | 406.7875 | 415.7875 |
| 56 | 406.800 | 415.800 |
| 57 | 406.8125 | 415.8125 |
| 58 | 406.825 | 415.825 |
| 59 | 406.8375 | 415.8375 |
| 60 | 406.850 | 415.850 |
| 61 | 406.8625 | 415.8625 |
| 62 | 406.875 | 415.875 |
| 63 | 406.8875 | 415.8875 |
| 64 | 406.900 | 415.900 |
| 65 | 406.9125 | 415.9125 |
| 66 | 406.925 | 415.925 |
| 67 | 406.9375 | 415.9375 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 68 | 406.950 | 415.950 |
| 69 | 406.9625 | 415.9625 |
| 70 | 406.975 | 415.975 |
| 71 | 406.9875 | 415.9875 |
| 72 | 407.000 | 416.000 |
| 73 | 407.0125 | 416.0125 |
| 74 | 407.025 | 416.025 |
| 75 | 407.0375 | 416.0375 |
| 76 | 407.050 | 416.050 |
| 77 | 407.0625 | 416.0625 |
| 78 | 407.075 | 416.075 |
| 79 | 407.0875 | 416.0875 |
| 80 | 407.100 | 416.100 |
| 81 | 407.1125 | 416.1125 |
| 82 | 407.125 | 416.125 |
| 83 | 407.1375 | 416.1375 |
| 84 | 407.150 | 416.150 |
| 85 | 407.1625 | 416.1625 |
| 86 | 407.175 | 416.175 |
| 87 | 407.1875 | 416.1875 |
| 88 | 407.200 | 416.200 |
| 89 | 407.2125 | 416.2125 |
| 90 | 407.225 | 416.225 |
| 91 | 407.2375 | 416.2375 |
| 92 | 407.250 | 416.250 |
| 93 | 407.2625 | 416.2625 |
| 94 | 407.275 | 416.275 |
| 95 | 407.2875 | 416.2875 |
| 96 | 407.300 | 416.300 |
| 97 | 407.3125 | 416.3125 |
| 98 | 407.325 | 416.325 |
| 99 | 407.3375 | 416.3375 |
| 100 | 407.350 | 416.350 |
| 101 | 407.3625 | 416.3625 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 102 | 407.375 | 416.375 |
| 103 | 407.3875 | 416.3875 |
| 104 | 407.400 | 416.400 |
| 105 | 407.4125 | 416.4125 |
| 106 | 407.425 | 416.425 |
| 107 | 407.4375 | 416.4375 |
| 108 | 407.450 | 416.450 |
| 109 | 407.4625 | 416.4625 |
| 110 | 407.475 | 416.475 |
| 111 | 407.4875 | 416.4875 |
| 112 | 407.500 | 416.500 |
| 113 | 407.5125 | 416.5125 |
| 114 | 407.525 | 416.525 |
| 115 | 407.5375 | 416.5375 |
| 116 | 407.550 | 416.550 |
| 117 | 407.5625 | 416.5625 |
| 118 | 407.575 | 416.575 |
| 119 | 407.5875 | 416.5875 |
| 120 | 407.600 | 416.600 |
| 121 | 407.6125 | 416.6125 |
| 122 | 407.625 | 416.625 |
| 123 | 407.6375 | 416.6375 |
| 124 | 407.650 | 416.650 |
| 125 | 407.6625 | 416.6625 |
| 126 | 407.675 | 416.675 |
| 127 | 407.6875 | 416.6875 |
| 128 | 407.700 | 416.700 |
| 129 | 407.7125 | 416.7125 |
| 130 | 407.725 | 416.725 |
| 131 | 407.7375 | 416.7375 |
| 132 | 407.750 | 416.750 |
| 133 | 407.7625 | 416.7625 |
| 134 | 407.775 | 416.775 |
| 135 | 407.7875 | 416.7875 |

Table 1: Paired Channels

| Channel | Center Frequency | Center Frequency |
|---------|------------------|------------------|
| 136 | 407.800 | 416.800 |
| 137 | 407.8125 | 416.8125 |
| 138 | 407.825 | 416.825 |
| 139 | 407.8375 | 416.8375 |
| 140 | 407.850 | 416.850 |
| 141 | 407.8625 | 416.8625 |
| 142 | 407.875 | 416.875 |
| 143 | 407.8875 | 416.8875 |
| 144 | 407.900 | 416.900 |
| 145 | 407.9125 | 416.9125 |
| 146 | 407.925 | 416.925 |
| 147 | 407.9375 | 416.9375 |
| 148 | 407.950 | 416.950 |
| 149 | 407.9625 | 416.9625 |
| 150 | 407.975 | 416.975 |
| 151 | 407.9875 | 416.9875 |
| 152 | 408.000 | 417.000 |
| 153 | 408.0125 | 417.0125 |
| 154 | 408.025 | 417.025 |
| 155 | 408.0375 | 417.0375 |
| 156 | 408.050 | 417.050 |
| 157 | 408.0625 | 417.0625 |
| 158 | 408.075 | 417.075 |
| 159 | 408.0875 | 417.0875 |
| 160 | 408.100 | 417.100 |
| 161 | 408.1125 | 417.1125 |
| 162 | 408.125 | 417.125 |
| 163 | 408.1375 | 417.1375 |
| 164 | 408.150 | 417.150 |
| 165 | 408.1625 | 417.1625 |
| 166 | 408.175 | 417.175 |
| 167 | 408.1875 | 417.1875 |
| 168 | 408.200 | 417.200 |
| 169 | 408.2125 | 417.2125 |

Table 1: Paired Channels

| Channel | Center Frequency | Center Frequency |
|---------|------------------|------------------|
| 170 | 408.225 | 417.225 |
| 171 | 408.2375 | 417.2375 |
| 172 | 408.250 | 417.250 |
| 173 | 408.2625 | 417.2625 |
| 174 | 408.275 | 417.275 |
| 175 | 408.2875 | 417.2875 |
| 176 | 408.300 | 417.300 |
| 177 | 408.3125 | 417.3125 |
| 178 | 408.325 | 417.325 |
| 179 | 408.3375 | 417.3375 |
| 180 | 408.350 | 417.350 |
| 181 | 408.3625 | 417.3625 |
| 182 | 408.375 | 417.375 |
| 183 | 408.3875 | 417.3875 |
| 184 | 408.400 | 417.400 |
| 185 | 408.4125 | 417.4125 |
| 186 | 408.425 | 417.425 |
| 187 | 408.4375 | 417.4375 |
| 188 | 408.450 | 417.450 |
| 189 | 408.4625 | 417.4625 |
| 190 | 408.475 | 417.475 |
| 191 | 408.4875 | 417.4875 |
| 192 | 408.500 | 417.500 |
| 193 | 408.5125 | 417.5125 |
| 194 | 408.525 | 417.525 |
| 195 | 408.5375 | 417.5375 |
| 196 | 408.550 | 417.550 |
| 197 | 408.5625 | 417.5625 |
| 198 | 408.575 | 417.575 |
| 199 | 408.5875 | 417.5875 |
| 200 | 408.600 | 417.600 |
| 201 | 408.6125 | 417.6125 |
| 202 | 408.625 | 417.625 |
| 203 | 408.6375 | 417.6375 |

Table 1: Paired Channels

| Channel | Center Frequency | Center Frequency |
|---------|------------------|------------------|
| 204 | 408.650 | 417.650 |
| 205 | 408.6625 | 417.6625 |
| 206 | 408.675 | 417.675 |
| 207 | 408.6875 | 417.6875 |
| 208 | 408.700 | 417.700 |
| 209 | 408.7125 | 417.7125 |
| 210 | 408.725 | 417.725 |
| 211 | 408.7375 | 417.7375 |
| 212 | 408.750 | 417.750 |
| 213 | 408.7625 | 417.7625 |
| 214 | 408.775 | 417.775 |
| 215 | 408.7875 | 417.7875 |
| 216 | 408.800 | 417.800 |
| 217 | 408.8125 | 417.8125 |
| 218 | 408.825 | 417.825 |
| 219 | 408.8375 | 417.8375 |
| 220 | 408.850 | 417.850 |
| 221 | 408.8625 | 417.8625 |
| 222 | 408.875 | 417.875 |
| 223 | 408.8875 | 417.8875 |
| 224 | 408.900 | 417.900 |
| 225 | 408.9125 | 417.9125 |
| 226 | 408.925 | 417.925 |
| 227 | 408.9375 | 417.9375 |
| 228 | 408.950 | 417.950 |
| 229 | 408.9625 | 417.9625 |
| 230 | 408.975 | 417.975 |
| 231 | 408.9875 | 417.9875 |
| 232 | 409.000 | 418.000 |
| 233 | 409.0125 | 418.0125 |
| 234 | 409.025 | 418.025 |
| 235 | 409.0375 | 418.0375 |
| 236 | 409.050 | 418.050 |
| 237 | 409.0625 | 418.0625 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 238 | 409.075 | 418.075 |
| 239 | 409.0875 | 418.0875 |
| 240 | 409.100 | 418.100 |
| 241 | 409.1125 | 418.1125 |
| 242 | 409.125 | 418.125 |
| 243 | 409.1375 | 418.1375 |
| 244 | 409.150 | 418.150 |
| 245 | 409.1625 | 418.1625 |
| 246 | 409.175 | 418.175 |
| 247 | 409.1875 | 418.1875 |
| 248 | 409.200 | 418.200 |
| 249 | 409.2125 | 418.2125 |
| 250 | 409.225 | 418.225 |
| 251 | 409.2375 | 418.2375 |
| 252 | 409.250 | 418.250 |
| 253 | 409.2625 | 418.2625 |
| 254 | 409.275 | 418.275 |
| 255 | 409.2875 | 418.2875 |
| 256 | 409.300 | 418.300 |
| 257 | 409.3125 | 418.3125 |
| 258 | 409.325 | 418.325 |
| 259 | 409.3375 | 418.3375 |
| 260 | 409.350 | 418.350 |
| 261 | 409.3625 | 418.3625 |
| 262 | 409.375 | 418.375 |
| 263 | 409.3875 | 418.3875 |
| 264 | 409.400 | 418.400 |
| 265 | 409.4125 | 418.4125 |
| 266 | 409.425 | 418.425 |
| 267 | 409.4375 | 418.4375 |
| 268 | 409.450 | 418.450 |
| 269 | 409.4625 | 418.4625 |
| 270 | 409.475 | 418.475 |
| 271 | 409.4875 | 418.4875 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 272 | 409.500 | 418.500 |
| 273 | 409.5125 | 418.5125 |
| 274 | 409.525 | 418.525 |
| 275 | 409.5375 | 418.5375 |
| 276 | 409.550 | 418.550 |
| 277 | 409.5625 | 418.5625 |
| 278 | 409.575 | 418.575 |
| 279 | 409.5875 | 418.5875 |
| 280 | 409.600 | 418.600 |
| 281 | 409.6125 | 418.6125 |
| 282 | 409.625 | 418.625 |
| 283 | 409.6375 | 418.6375 |
| 284 | 409.650 | 418.650 |
| 285 | 409.6625 | 418.6625 |
| 286 | 409.675 | 418.675 |
| 287 | 409.6875 | 418.6875 |
| 288 | 409.700 | 418.700 |
| 289 | 409.7125 | 418.7125 |
| 290 | 409.725 | 418.725 |
| 291 | 409.7375 | 418.7375 |
| 292 | 409.750 | 418.750 |
| 293 | 409.7625 | 418.7625 |
| 294 | 409.775 | 418.775 |
| 295 | 409.7875 | 418.7875 |
| 296 | 409.800 | 418.800 |
| 297 | 409.8125 | 418.8125 |
| 298 | 409.825 | 418.825 |
| 299 | 409.8375 | 418.8375 |
| 300 | 409.850 | 418.850 |
| 301 | 409.8625 | 418.8625 |
| 302 | 409.875 | 418.875 |
| 303 | 409.8875 | 418.8875 |
| 304 | 409.900 | 418.900 |
| 305 | 409.9125 | 418.9125 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 306 | 409.925 | 418.925 |
| 307 | 409.9375 | 418.9375 |
| 308 | 409.950 | 418.950 |
| 309 | 409.9625 | 418.9625 |
| 310 | 409.975 | 418.975 |
| 311 | 409.9875 | 418.9875 |
| 312 | 410.000 | 419.000 |
| 313 | 410.0125 | 419.0125 |
| 314 | 410.025 | 419.025 |
| 315 | 410.0375 | 419.0375 |
| 316 | 410.050 | 419.050 |
| 317 | 410.0625 | 419.0625 |
| 318 | 410.075 | 419.075 |
| 319 | 410.0875 | 419.0875 |
| 320 | 410.100 | 419.100 |
| 321 | 410.1125 | 419.1125 |
| 322 | 410.125 | 419.125 |
| 323 | 410.1375 | 419.1375 |
| 324 | 410.150 | 419.150 |
| 325 | 410.1625 | 419.1625 |
| 326 | 410.175 | 419.175 |
| 327 | 410.1875 | 419.1875 |
| 328 | 410.200 | 419.200 |
| 329 | 410.2125 | 419.2125 |
| 330 | 410.225 | 419.225 |
| 331 | 410.2375 | 419.2375 |
| 332 | 410.250 | 419.250 |
| 333 | 410.2625 | 419.2625 |
| 334 | 410.275 | 419.275 |
| 335 | 410.2875 | 419.2875 |
| 336 | 410.300 | 419.300 |
| 337 | 410.3125 | 419.3125 |
| 338 | 410.325 | 419.325 |
| 339 | 410.3375 | 419.3375 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 340 | 410.350 | 419.350 |
| 341 | 410.3625 | 419.3625 |
| 342 | 410.375 | 419.375 |
| 343 | 410.3875 | 419.3875 |
| 344 | 410.400 | 419.400 |
| 345 | 410.4125 | 419.4125 |
| 346 | 410.425 | 419.425 |
| 347 | 410.4375 | 419.4375 |
| 348 | 410.450 | 419.450 |
| 349 | 410.4625 | 419.4625 |
| 350 | 410.475 | 419.475 |
| 351 | 410.4875 | 419.4875 |
| 352 | 410.500 | 419.500 |
| 353 | 410.5125 | 419.5125 |
| 354 | 410.525 | 419.525 |
| 355 | 410.5375 | 419.5375 |
| 356 | 410.550 | 419.550 |
| 357 | 410.5625 | 419.5625 |
| 358 | 410.575 | 419.575 |
| 359 | 410.5875 | 419.5875 |
| 360 | 410.600 | 419.600 |
| 361 | 410.6125 | 419.6125 |
| 362 | 410.625 | 419.625 |
| 363 | 410.6375 | 419.6375 |
| 364 | 410.650 | 419.650 |
| 365 | 410.6625 | 419.6625 |
| 366 | 410.675 | 419.675 |
| 367 | 410.6875 | 419.6875 |
| 368 | 410.700 | 419.700 |
| 369 | 410.7125 | 419.7125 |
| 370 | 410.725 | 419.725 |
| 371 | 410.7375 | 419.7375 |
| 372 | 410.750 | 419.750 |
| 373 | 410.7625 | 419.7625 |

| Table 1: Paired Channels | | |
|---------------------------------|-------------------------|-------------------------|
| Channel | Center Frequency | Center Frequency |
| 374 | 410.775 | 419.775 |
| 375 | 410.7875 | 419.7875 |
| 376 | 410.800 | 419.800 |
| 377 | 410.8125 | 419.8125 |
| 378 | 410.825 | 419.825 |
| 379 | 410.8375 | 419.8375 |
| 380 | 410.850 | 419.850 |
| 381 | 410.8625 | 419.8625 |
| 382 | 410.875 | 419.875 |
| 383 | 410.8875 | 419.8875 |
| 384 | 410.900 | 419.900 |
| 385 | 410.9125 | 419.9125 |
| 386 | 410.925 | 419.925 |
| 387 | 410.9375 | 419.9375 |
| 388 | 410.950 | 419.950 |
| 389 | 410.9625 | 419.9625 |
| 390 | 410.975 | 419.975 |
| 391 | 410.9875 | 419.9875 |

| Table 2: Single Channels | |
|---------------------------------|-------------------------|
| Channel | Center Frequency |
| 392 | 411.000 |
| 393 | 411.0125 |
| 394 | 411.025 |
| 395 | 411.0375 |
| 396 | 411.050 |
| 397 | 411.0625 |
| 398 | 411.075 |
| 399 | 411.0875 |
| 400 | 411.100 |
| 401 | 411.1125 |
| 402 | 411.125 |
| 403 | 411.1375 |
| 404 | 411.150 |
| 405 | 411.1625 |
| 406 | 411.175 |
| 407 | 411.1875 |
| 408 | 411.200 |
| 409 | 411.2125 |
| 410 | 411.225 |
| 411 | 411.2375 |
| 412 | 411.250 |
| 413 | 411.2625 |
| 414 | 411.275 |
| 415 | 411.2875 |
| 416 | 411.300 |
| 417 | 411.3125 |
| 418 | 411.325 |
| 419 | 411.3375 |
| 420 | 411.350 |
| 421 | 411.3625 |
| 422 | 411.375 |
| 423 | 411.3875 |
| 424 | 411.400 |
| 425 | 411.4125 |
| 426 | 411.425 |
| 427 | 411.4375 |
| 428 | 411.450 |

| Table 2: Single Channels | |
|---------------------------------|-------------------------|
| Channel | Center Frequency |
| 429 | 411.4625 |
| 430 | 411.475 |
| 431 | 411.4875 |
| 432 | 411.500 |
| 433 | 411.5125 |
| 434 | 411.525 |
| 435 | 411.5375 |
| 436 | 411.550 |
| 437 | 411.5625 |
| 438 | 411.575 |
| 439 | 411.5875 |
| 440 | 411.600 |
| 441 | 411.6125 |
| 442 | 411.625 |
| 443 | 411.6375 |
| 444 | 411.650 |
| 445 | 411.6625 |
| 446 | 411.675 |
| 447 | 411.6875 |
| 448 | 411.700 |
| 449 | 411.7125 |
| 450 | 411.725 |
| 451 | 411.7375 |
| 452 | 411.750 |
| 453 | 411.7625 |
| 454 | 411.775 |
| 455 | 411.7875 |
| 456 | 411.800 |
| 457 | 411.8125 |
| 458 | 411.825 |
| 459 | 411.8375 |
| 460 | 411.850 |
| 461 | 411.8625 |
| 462 | 411.875 |
| 463 | 411.8875 |
| 464 | 411.900 |
| 465 | 411.9125 |

| Table 2: Single Channels | |
|---------------------------------|-------------------------|
| Channel | Center Frequency |
| 466 | 411.925 |
| 467 | 411.9375 |
| 468 | 411.950 |
| 469 | 411.9625 |
| 470 | 411.975 |
| 471 | 411.9875 |
| 472 | 412.000 |
| 473 | 412.0125 |
| 474 | 412.025 |
| 475 | 412.0375 |
| 476 | 412.050 |
| 477 | 412.0625 |
| 478 | 412.075 |
| 479 | 412.0875 |
| 480 | 412.100 |
| 481 | 412.1125 |
| 482 | 412.125 |
| 483 | 412.1375 |
| 484 | 412.150 |
| 485 | 412.1625 |
| 486 | 412.175 |
| 487 | 412.1875 |
| 488 | 412.200 |
| 489 | 412.2125 |
| 490 | 412.225 |
| 491 | 412.2375 |
| 492 | 412.250 |
| 493 | 412.2625 |
| 494 | 412.275 |
| 495 | 412.2875 |
| 496 | 412.300 |
| 497 | 412.3125 |
| 498 | 412.325 |
| 499 | 412.3375 |
| 500 | 412.350 |
| 501 | 412.3625 |
| 502 | 412.375 |

| Table 2: Single Channels | |
|---------------------------------|-------------------------|
| Channel | Center Frequency |
| 503 | 412.3875 |
| 504 | 412.400 |
| 505 | 412.4125 |
| 506 | 412.425 |
| 507 | 412.4375 |
| 508 | 412.450 |
| 509 | 412.4625 |
| 510 | 412.475 |
| 511 | 412.4875 |
| 512 | 412.500 |
| 513 | 412.5125 |
| 514 | 412.525 |
| 515 | 412.5375 |
| 516 | 412.550 |
| 517 | 412.5625 |
| 518 | 412.575 |
| 519 | 412.5875 |
| 520 | 412.600 |
| 521 | 412.6125 |
| 522 | 412.625 |
| 523 | 412.6375 |
| 524 | 412.650 |
| 525 | 412.6625 |
| 526 | 412.675 |
| 527 | 412.6875 |
| 528 | 412.700 |
| 529 | 412.7125 |
| 530 | 412.725 |
| 531 | 412.7375 |
| 532 | 412.750 |
| 533 | 412.7625 |
| 534 | 412.775 |
| 535 | 412.7875 |
| 536 | 412.800 |
| 537 | 412.8125 |
| 538 | 412.825 |
| 539 | 412.8375 |

| Table 2: Single Channels | |
|--------------------------|------------------|
| Channel | Center Frequency |
| 540 | 412.850 |
| 541 | 412.8625 |
| 542 | 412.875 |
| 543 | 412.8875 |
| 544 | 412.900 |
| 545 | 412.9125 |
| 546 | 412.925 |
| 547 | 412.9375 |
| 548 | 412.950 |
| 549 | 412.9625 |
| 550 | 412.975 |
| 551 | 412.9875 |
| 552 | 413.000 |
| 553 | 413.0125 |
| 554 | 413.025 |
| 555 | 413.0375 |
| 556 | 413.050 |
| 557 | 413.0625 |
| 558 | 413.075 |
| 559 | 413.0875 |
| 560 | 413.100 |
| 561 | 413.1125 |
| 562 | 413.125 |
| 563 | 413.1375 |
| 564 | 413.150 |
| 565 | 413.1625 |
| 566 | 413.175 |
| 567 | 413.1875 |
| 568 | 413.200 |
| 569 | 413.2125 |
| 570 | 413.225 |
| 571 | 413.2375 |
| 572 | 413.250 |
| 573 | 413.2625 |
| 574 | 413.275 |
| 575 | 413.2875 |
| 576 | 413.300 |

| Table 2: Single Channels | |
|--------------------------|------------------|
| Channel | Center Frequency |
| 577 | 413.3125 |
| 578 | 413.325 |
| 579 | 413.3375 |
| 580 | 413.350 |
| 581 | 413.3625 |
| 582 | 413.375 |
| 583 | 413.3875 |
| 584 | 413.400 |
| 585 | 413.4125 |
| 586 | 413.425 |
| 587 | 413.4375 |
| 588 | 413.450 |
| 589 | 413.4625 |
| 590 | 413.475 |
| 591 | 413.4875 |
| 592 | 413.500 |
| 593 | 413.5125 |
| 594 | 413.525 |
| 595 | 413.5375 |
| 596 | 413.550 |
| 597 | 413.5625 |
| 598 | 413.575 |
| 599 | 413.5875 |
| 600 | 413.600 |
| 601 | 413.6125 |
| 602 | 413.625 |
| 603 | 413.6375 |
| 604 | 413.650 |
| 605 | 413.6625 |
| 606 | 413.675 |
| 607 | 413.6875 |
| 608 | 413.700 |
| 609 | 413.7125 |
| 610 | 413.725 |
| 611 | 413.7375 |
| 612 | 413.750 |
| 613 | 413.7625 |

| Table 2: Single Channels | |
|--------------------------|------------------|
| Channel | Center Frequency |
| 614 | 413.775 |
| 615 | 413.7875 |
| 616 | 413.800 |
| 617 | 413.8125 |
| 618 | 413.825 |
| 619 | 413.8375 |
| 620 | 413.850 |
| 621 | 413.8625 |
| 622 | 413.875 |
| 623 | 413.8875 |
| 624 | 413.900 |
| 625 | 413.9125 |
| 626 | 413.925 |
| 627 | 413.9375 |
| 628 | 413.950 |
| 629 | 413.9625 |
| 630 | 413.975 |
| 631 | 413.9875 |
| 632 | 414.000 |
| 633 | 414.0125 |
| 634 | 414.025 |
| 635 | 414.0375 |
| 636 | 414.050 |
| 637 | 414.0625 |
| 638 | 414.075 |
| 639 | 414.0875 |
| 640 | 414.100 |
| 641 | 414.1125 |
| 642 | 414.125 |
| 643 | 414.1375 |
| 644 | 414.150 |
| 645 | 414.1625 |
| 646 | 414.175 |
| 647 | 414.1875 |
| 648 | 414.200 |
| 649 | 414.2125 |
| 650 | 414.225 |

| Table 2: Single Channels | |
|--------------------------|------------------|
| Channel | Center Frequency |
| 651 | 414.2375 |
| 652 | 414.250 |
| 653 | 414.2625 |
| 654 | 414.275 |
| 655 | 414.2875 |
| 656 | 414.300 |
| 657 | 414.3125 |
| 658 | 414.325 |
| 659 | 414.3375 |
| 660 | 414.350 |
| 661 | 414.3625 |
| 662 | 414.375 |
| 663 | 414.3875 |
| 664 | 414.400 |
| 665 | 414.4125 |
| 666 | 414.425 |
| 667 | 414.4375 |
| 668 | 414.450 |
| 669 | 414.4625 |
| 670 | 414.475 |
| 671 | 414.4875 |
| 672 | 414.500 |
| 673 | 414.5125 |
| 674 | 414.525 |
| 675 | 414.5375 |
| 676 | 414.550 |
| 677 | 414.5625 |
| 678 | 414.575 |
| 679 | 414.5875 |
| 680 | 414.600 |
| 681 | 414.6125 |
| 682 | 414.625 |
| 683 | 414.6375 |
| 684 | 414.650 |
| 685 | 414.6625 |
| 686 | 414.675 |
| 687 | 414.6875 |

| | |
|-----|----------|
| 688 | 414.700 |
| 689 | 414.7125 |
| 690 | 414.725 |
| 691 | 414.7375 |
| 692 | 414.750 |
| 693 | 414.7625 |
| 694 | 414.775 |
| 695 | 414.7875 |
| 696 | 414.800 |
| 697 | 414.8125 |
| 698 | 414.825 |
| 699 | 414.8375 |
| 700 | 414.850 |
| 701 | 414.8625 |
| 702 | 414.875 |
| 703 | 414.8875 |
| 704 | 414.900 |
| 705 | 414.9125 |
| 706 | 414.925 |
| 707 | 414.9375 |
| 708 | 414.950 |
| 709 | 414.9625 |
| 710 | 414.975 |
| 711 | 414.9875 |
| 712 | 415.000 |
| 713 | 415.0125 |
| 714 | 415.025 |
| 715 | 415.0375 |
| 716 | 415.050 |
| 717 | 415.0625 |
| 718 | 415.075 |
| 719 | 415.0875 |
| 720 | 415.100 |

4.3.10 Reserved**4.3.11 Plan for Bio-Medical Telemetry and Medical Radiocommunication****BIO-MEDICAL TELEMETRY ONLY**

| | |
|---------------------|----------------------------|
| 38-41 MHz | See Annex K |
| 174-216 MHz | See Annex K |
| 460.650-460.875 MHz | See US209 in Section 4.1.3 |
| 465.650-465.875 MHz | See US209 in Section 4.1.3 |

MEDICAL RADIOCOMMUNICATION

The following frequencies may be authorized for the purpose of conducting radio operations for the delivery or rendition of medical services to individuals, subject to the indicated limitations.

| Frequency (MHz) | Class of Station(s) | Limitation |
|-----------------|---------------------|------------|
| 150.775 | Base and Mobile | 1 |
| 150.790 | Base and Mobile | 1 |
| 152.0075 | Base | 2 |
| 163.250 | Base | 2 |
| 462.950 | Base and Mobile | 3,5 |
| 462.975 | Base and Mobile | 3,5 |
| 463.000 | Base and Mobile | 3,4,6,7 |
| 463.025 | Base and Mobile | 3,4,6,7 |
| 463.050 | Base and Mobile | 3,4,6,7 |
| 463.075 | Base and Mobile | 3,4,7,8 |
| 463.100 | Base and Mobile | 3,4,7,8 |
| 463.125 | Base and Mobile | 3,4,7,8 |
| 463.150 | Base and Mobile | 3,4,7,8 |
| 463.175 | Base and Mobile | 3,4,7,8 |
| 467.950 | Mobile Only | 3,5,9 |
| 467.975 | Mobile Only | 3,5,9 |
| 468.000 | Mobile Only | 3,4,6,7,9 |
| 468.025 | Mobile Only | 3,4,6,7,9 |
| 468.050 | Mobile Only | 3,4,6,7,9 |
| 468.075 | Mobile Only | 3,4,6,7,9 |
| 468.100 | Mobile Only | 3,4,6,7,9 |
| 468.125 | Mobile Only | 3,4,6,7,9 |
| 468.150 | Mobile Only | 3,4,6,7,9 |
| 468.175 | Mobile Only | 3,4,6,7,9 |

1. This frequency may be authorized for base (FB or FC), mobile (ML or MS), mobile repeater (MLR), and for fixed (FX) operations to access a repeater which retransmits on a different frequency. This frequency shall be authorized for both federal and non-federal use with a maximum Effective Radiated Power (ERP) of 100 watts. Airborne operations on this frequency are prohibited. The fixed station classes included in this limitation are in addition to those mentioned in US216 (A).

2. This frequency may be authorized only for one-way paging communications to mobile receivers. Transmissions for the purpose of activating or controlling remote objects on this frequency will not be authorized.

3. For two-frequency systems, separation between base and mobile transmit frequencies is 5 MHz.

4. For applications for new radio systems received after August 15, 1974, the eight frequency pairs listed below will be assigned in a block for shared operations subject to the following:

a. For uniformity in usage, these frequency pairs may be referred to by channel name, as follows:

| Base and Mobile MHz | Mobile Only MHz | Channel Name |
|--------------------------------|----------------------------|---------------------|
| 463.000 | 468.000 | MED-ONE |
| 463.025 | 468.025 | MED-TWO |
| 463.050 | 468.050 | MED-THREE |
| 463.075 | 468.075 | MED-FOUR |
| 463.100 | 468.100 | MED-FIVE |
| 463.125 | 468.125 | MED-SIX |
| 463.150 | 468.150 | MED-SEVEN |
| 463.175 | 468.175 | MED-EIGHT |

b. Except as provided in subparagraphs e. and f. of this paragraph, mobile or portable stations must employ equipment which is both wired and equipped to transmit/receive, respectively, on each of these eight frequency pairs.

c. Except as provided in subparagraph f. of this paragraph, base and fixed stations⁵ must employ equipment which is both wired and equipped to transmit/receive, respectively, on at least four (three, if bio-medical telemetry operation is not employed in the system) of these eight frequency pairs.

d. Multi-channel equipment requirements for use of these frequency pairs are intended to afford capability for alternating use of the individual frequencies, and ability to conduct simultaneous operations is not required. These requirements may be met in a single equipment unit or in any combination of equipment units suitable to the applicant's operations.

e. Portable (hand-held) units operated with a maximum output power of 2.5 watts are exempted from the multi-channel equipment requirements specified in subparagraph c. of this paragraph.

f. Stations located in the Canadian coordination zone (see Part 3.4), will be required to meet multi-channel equipment requirements only for those frequencies up to the number specified in subparagraphs b. and c. of this paragraph which have been assigned to the licensee after coordination with Canada in accordance with the applicable US-Canada agreement.

5. This frequency may be authorized for the dispatch of medical-care vehicles and personnel for the rendition or delivery of medical services. Central-dispatch operations serving multisystem requirements in an area-wide medical radio communications plan may be authorized and may include the designation of this frequency for intra-system and inter-system mutual assistance purposes.

6. This frequency may be authorized on a primary basis for operations in bio-medical telemetry systems. F1D, F2D, and F3E emissions may be authorized. On a secondary basis, subject to noninterference to bio-medical telemetry systems, this frequency may be authorized for the transmission of messages related to the efficient administration of organizations and facilities engaged in medical services operations.

7. The continuous carrier mode of operation may be authorized for use of telemetry emission on this frequency.

⁵ As indicated in Limitation 9, Section 4.3.11, transmissions by fixed stations are limited to the control of base station repeaters.

8. This frequency may be authorized on a primary basis for communications, between medical facilities, vehicles, and personnel, related to medical supervision and instruction for treatment and transport of patients in the rendition or delivery of medical services. F2D and F3E emissions may be authorized. On a secondary basis, subject to noninterference to the foregoing types of operations, this frequency may be authorized for the transmission of messages related to the efficient administration of organizations and facilities engaged in medical services operations and for bio-medical telemetry transmissions, including the use of F1D emission.

9. This frequency may be assigned to a fixed station for the control of a base station repeater (FBR) if it is also assigned to the associated mobile station. Fixed stations operating on this frequency shall comply with the following requirements if they are located within 120 kilometers of the center of urbanized areas of 200,000 or more population.

a. If the station is used to control one or more base station repeaters located within 45 degrees of azimuth, a directional antenna having a front-to-back ratio of at least 15 dB shall be used at the fixed station. For other situations, where a directional antenna cannot be used, a cardioid, bi-directional or omni-directional antenna may be employed. In each case, the antenna used must, consistent with reasonable design, produce a radiation pattern that provides only the coverage necessary to permit satisfactory control of each base station repeater and limit radiation in other directions to the extent feasible.

b. The strength of the signal of a fixed station, controlling a single base station repeater, may not exceed by more than 6 dB, at the antenna terminal of the base station repeater receiver, the signal strength produced there by a unit of the associated mobile station. When the station controls more than one base station repeater, the 6 dB control-to-mobile signal difference need be verified at only one of the base station repeater sites. The measurement of the signal strength of the mobile unit must be made when such unit is transmitting from the fixed station location or, if that is not practical, from a location within 400 meters of the fixed station site.

c. Each application for a fixed station to be authorized under the provisions of this paragraph shall be accompanied by a statement certifying that the output power of the proposed station transmitter will be adjusted to comply with the foregoing signal level limitation. Records of the measurements used to determine the signal ratio shall be kept with the station records and shall be made available for inspection upon request.

d. Urbanized areas of 200,000 or more population are defined in the U.S. Census Population, 1960, Vol. 1, Table 23, Page 50. The centers of urbanized areas are determined from the Appendix, page 226, of the U.S. Commerce publication "Air Line Distance Between Cities in the United States."

4.3.12 Channeling Plan for Assignments in the Fixed Service in the 14500.0 to 14714.5 and 15136.5 to 15350.0 MHz

1. The following channeling plan became effective on January 1, 1982, for all assignments in the Fixed Service.

2. Existing assignments as of January 1, 1982 in the Fixed Service which are in the bands 14500.0 to 14714.5 MHz and 15136.5 to 15350.0 MHz that are not in compliance with the channeling plan may be retained until January 1, 1997. However, if existing equipment is replaced prior to January 1, 1997, assignments for the replaced equipment must be in accordance with the channeling plan.

3. This channeling plan is only applicable to assignments in the Fixed Service in the bands 14500.0 to 14714.5 and 15136.5 to 15350.0 MHz. The assigned frequency shall be chosen such that the frequency "2 of its necessary bandwidth shall not extend beyond the upper or lower limits of bands indicated herein. A general breakdown of these bands is:

- a. For emission bandwidths equal to or greater than 3.5 MHz:
 - 14500.0 to 14710.0 MHz
 - 15140.0 to 15350.0 MHz

b. For emission bandwidths less than 3.5 MHz:

14710.0 to 14714.5 MHz

15136.5 to 15140.0 MHz

4. Criteria for assignments in the Fixed Service with emission bandwidths equal to or greater than 3.5 MHz:

a. The assigned frequency must center on one of the frequencies given in Table 1.

b. Multiple contiguous channels are to be used for emission bandwidths of 3.5 MHz or greater.

c. In order to promote uniformity and to establish a natural guard band, it is strongly urged that frequencies be selected in pairs from the bands 14500.0 to 14710.0 and 15140.0 to 15350.0 on an equal basis.

5. Criteria for assignments in the Fixed Service with emission bandwidth of less than 3.5 MHz:

a. Assignments in the Fixed Service with emission bandwidths of less than 3.5 MHz are restricted to the bands:

14710.0 to 14714.5 MHz

and

15136.5 to 15140.0 MHz

b. Narrowband assignments, those with less than 3.5 MHz of necessary bandwidth, shall not be made in the bands 14500.0 to 14710.0 and 15140.0 to 15350.0 MHz.

Table 1. Center Frequencies (MHz) of 2.5 MHz Channels in the Bands 14500.0-14714.5 MHz and 15136.5-15350.0 MHz

| 14500.0-14714.5 MHz | 15136.5-15350.0 MHz |
|---------------------|---------------------|
| *14501.25 | *15141.25 |
| 14503.75 | 15143.75 |
| 14506.25 | 15146.25 |
| 14508.75 | 15148.75 |
| 14511.25 | 15151.25 |
| 14513.75 | 15153.75 |
| 14516.25 | 15156.25 |
| 14518.75 | 15158.75 |
| 14521.25 | 15161.25 |
| 14523.75 | 15163.75 |
| 14526.25 | 15166.25 |
| 14528.75 | 15168.75 |
| 14531.25 | 15171.25 |
| 14533.75 | 15173.75 |
| 14536.25 | 15176.25 |
| 14538.75 | 15178.75 |
| 14541.25 | 15181.25 |
| 14543.75 | 15183.75 |
| 14546.25 | 15186.25 |
| 14548.75 | 15188.75 |
| 14551.25 | 15191.25 |
| 14553.75 | 15193.75 |
| 14556.25 | 15196.25 |

Table 1. Center Frequencies (MHz) of 2.5 MHz Channels in the Bands 14500.0-14714.5 MHz and 15136.5-15350.0 MHz

| 14500.0-14714.5 MHz | 15136.5-15350.0 MHz |
|---------------------|---------------------|
| 14558.75 | 15198.75 |
| 14561.25 | 15201.25 |
| 14563.75 | 15203.75 |
| 14566.25 | 15206.25 |
| 14568.75 | 15208.75 |
| 14571.25 | 15211.25 |
| 14573.75 | 15213.75 |
| 14576.25 | 15216.25 |
| 14578.75 | 15218.75 |
| 14581.25 | 15221.25 |
| 14583.75 | 15223.75 |
| 14586.25 | 15226.25 |
| 14588.75 | 15228.75 |
| 14591.25 | 15231.25 |
| 14593.75 | 15233.75 |
| 14596.25 | 15236.25 |
| 14598.75 | 15238.75 |
| 14601.25 | 15241.25 |
| 14603.75 | 15243.75 |
| 14606.25 | 15246.25 |
| 14608.75 | 15248.75 |
| 14611.25 | 15251.25 |
| 14613.75 | 15253.75 |

| Table 1. Center Frequencies (MHz) of 2.5 MHz Channels in the Bands 14500.0-14714.5 MHz and 15136.5-15350.0 MHz | |
|---|----------------------------|
| 14500.0-14714.5 MHz | 15136.5-15350.0 MHz |
| 14616.25 | 15256.25 |
| 14618.75 | 15258.75 |
| 14621.25 | 15261.25 |
| 14623.75 | 15263.75 |
| 14626.25 | 15266.25 |
| 14628.75 | 15268.75 |
| 14631.25 | 15271.25 |
| 14633.75 | 15273.75 |
| 14636.25 | 15276.25 |
| 14638.75 | 15278.75 |
| 14641.25 | 15281.25 |
| 14643.75 | 15283.75 |
| 14646.25 | 15286.25 |
| 14648.75 | 15288.75 |
| 14651.25 | 15291.25 |
| 14653.75 | 15293.75 |
| 14656.25 | 15296.25 |
| 14658.75 | 15298.75 |
| 14661.25 | 15301.25 |
| 14663.75 | 15303.75 |
| 14666.25 | 15306.25 |
| 14668.75 | 15308.75 |
| 14671.25 | 15311.25 |
| 14673.75 | 15313.75 |
| 14676.25 | 15316.25 |
| 14678.75 | 15318.75 |
| 14681.25 | 15321.25 |
| 14683.75 | 15323.75 |
| 14686.25 | 15326.25 |
| 14688.75 | 15328.75 |
| 14691.25 | 15331.25 |
| 14693.75 | 15333.75 |
| 14696.25 | 15336.25 |
| 14698.75 | 15338.75 |
| 14701.25 | 15341.25 |
| 14703.75 | 15343.75 |
| 14706.25 | 15346.25 |
| *14708.75 | *15348.75 |

* These channels cannot be used for bandwidths greater than 2.5 MHz. Total number of channels available--168.

4.3.13 Channeling Plan for Assignments in the Maritime Mobile Service in the Bands 4000-4063 and 8100-8195 kHz

1. For the band 4000-4063 kHz:

a. Frequency assignments for ship stations in the band 4000-4063 kHz must conform to the channeling plan shown below in accordance with Appendix 17 Part B Section I, Sub-Section C-1, of the International Radio Regulations.

b. Frequencies may be used by ship stations:

- or supplementing ship-to-shore channels for duplex operation with coast station channels listed in Table 1 of Annex H;
- for intership simplex (single-frequency) operation;
- for duplex operation with coast stations working in the band 4438-4650 kHz;
- for duplex operation with Channel Nos. 428 and 429 of Table 1, Annex H.

Table. Recommended Single-Sideband Transmitting Frequencies (in kHz) for Ship Stations in the Band 4000-4063 kHz

| Channel No. | Carrier Frequency | Assigned Frequency |
|-------------|-------------------|--------------------|
| 1 | 4000 | 4001.4 |
| 2 | 4003 | 4004.4 |
| 3 | 4006 | 4007.4 |
| 4 | 4009 | 4010.4 |
| 5 | 4012 | 4013.4 |
| 6 | 4015 | 4016.4 |
| 7 | 4018 | 4019.4 |
| 8 | 4021 | 4022.4 |
| 9 | 4024 | 4025.4 |
| 10 | 4027 | 4028.4 |
| 11 | 4030 | 4031.4 |
| 12 | 4033 | 4034.4 |
| 13 | 4036 | 4037.4 |
| 14 | 4039 | 4040.4 |
| 15 | 4042 | 4043.4 |
| 16 | 4045 | 4046.4 |
| 17 | 4048 | 4049.4 |
| 18 | 4051 | 4052.4 |
| 19 | 4054 | 4055.4 |
| 20 | 4057 | 4058.4 |
| 21 | 4060 | 4061.4* |

* Effective 1 July 1991, in the maritime mobile service, this frequency is available exclusively for non-Federal use.

2. For the band 8100-8195 kHz:

a. Frequency assignments for maritime mobile stations in the band 8100-8195 kHz must conform to the channeling plan show below in accordance with Appendix 17 Part B Section I, Sub-Section C-2, of the International Radio Regulations.

b. Frequencies may be used by maritime mobile stations:

- for supplementing ship-to-shore channels for duplex operation with coast station channels listed in Table 1 of Annex H;
- for intership simplex (single-frequency) operations;
- for ship-to-shore or shore-to-ship simplex operations;
- for duplex operation with Channel Nos. 834, 835, 836 and 837 of Table 1, Annex H.

| Table. Recommended Single-Sideband Transmitting Frequencies (in kHz) for Ship and Coast Stations in the Band 8100-8195 kHz | | |
|---|--------------------------|---------------------------|
| Channel No. | Carrier Frequency | Assigned Frequency |
| 1 | 8101 | 8102.4 |
| 2 | 8104 | 8105.4 |
| 3 | 8107 | 8108.4 |
| 4 | 8110 | 8111.4 |
| 5 | 8113 | 8114.4* |
| 6 | 8116 | 8117.4 |
| 7 | 8119 | 8120.4 |
| 8 | 8122 | 8123.4 |
| 9 | 8125 | 8126.4 |
| 10 | 8128 | 8129.4* |
| 11 | 8131 | 8132.4 |
| 12 | 8134 | 8135.4 |
| 13 | 8137 | 8138.4 |
| 14 | 8140 | 8141.4 |
| 15 | 8143 | 8144.4 |
| 16 | 8146 | 8147.4 |
| 17 | 8149 | 8150.4 |
| 18 | 8152 | 8153.4 |
| 19 | 8155 | 8156.4 |
| 20 | 8158 | 8159.4 |
| 21 | 8161 | 8162.4 |
| 22 | 8164 | 8165.4 |
| 23 | 8167 | 8168.4 |
| 24 | 8170 | 8171.4 |
| 25 | 8173 | 8174.4 |
| 26 | 8176 | 8177.4 |
| 27 | 8179 | 8180.4 |
| 28 | 8182 | 8183.4 |
| 29 | 8185 | 8186.4 |
| 30 | 8188 | 8189.4 |
| 31 | 8191 | 8192.4 |

* Effective 1 July 1991, in the maritime mobile service, this frequency is available exclusively for non-Federal use.

4.3.14 Channeling Plan for Assignments in the Fixed Service in the Bands 932.4-935 MHz and 941.4-944 MHz

This plan is a guide for identifying the center frequencies of those paired frequencies that normally are used for assignments with a necessary bandwidth that can be accommodated within 12.5, 25, 50, 100 and 200 kHz. Transportable Operations are not permitted in the point-to-point bands 932.5-935.0 and 941.5-944.0 MHz. To permit flexibility, applicants for either point-to-point or point-to-multipoint channels will be permitted to combine channels upon a showing that there is a need and sufficient frequencies are available to permit this. Applicants may split channels if they choose to do so. The

frequencies listed in this plan are shared with non-Federal users, and applications for assignment from Federal users are subject to coordination with non-Federal users prior to NTIA approval.

CONDITIONS AND LIMITATIONS

1. Point-to-Multipoint Assignments:

Table 1 contains a list of five pairs of frequencies that are designated for use only in fixed point-to-multipoint assignments operating with a necessary bandwidth of 12.5 kHz or less.

a. For paired frequency operations the 941.4-941.5 MHz frequencies will be used to transmit to the multipoint receiving stations, and the 932.4-932.5 MHz frequencies will be used for reverse link communications.

b. Unpaired, single frequency, one-way point-to-multipoint operations are permitted, using either of the paired frequencies. However, when the multipoint receiving stations are located less than 48 kilometers (30 miles) from the transmitting station, frequencies from the 932-932.5 MHz band must be used.

c. Point-to-point use of the 932.4-932.5 MHz frequencies will be permitted but only when the transmission is relayed by a station transmitting in the 941.4-941.5 MHz band.

d. Frequencies will be used so as to facilitate communications on an interference-free basis in each operational/service area. In order to facilitate maximum reuse of frequencies, stations separated by 113 kilometers (70 miles) or more, and operating on the same frequency (co-channel), will be considered as interference free (see also Section 8.2.16). However, at distances of less than 113 km, reuse of a frequency (co-channel) will be permitted only upon providing evidence that the operation will not cause harmful interference to existing users.

e. Equivalent power and antenna-height restrictions:

| Antenna Height in Meters | Maximum Effective Radiated Power | |
|--------------------------|----------------------------------|--------|
| | In Watts | In dBm |
| 152.5 and below | 1,000 | 60 |
| Above 152.5 up to 182 | 630 | 58 |
| Above 182 up to 213 | 500 | 57 |
| Above 213 up to 244 | 400 | 56 |
| Above 244 up to 274 | 315 | 55 |
| Above 274 up to 305 | 250 | 54 |
| Above 305 | 200 | 53 |

2. Point-to-Point Assignments:

Table 2 contains a list of thirty pairs of frequencies that are designated for two-way use in fixed point-to-point operations with a necessary bandwidth of 200 kHz or less. Frequencies shall be selected in pairs. However, unpaired frequency use, or single frequency one-way use, will be permitted, but only upon showing that spectrum is not available in other bands and that paired use will not be adversely affected.

EXCEPTIONS

Exceptions to the above conditions and limitations will be considered by the FAS on a case-by-case basis.

| MHz | MHz |
|------------|------------|
| 932.44375 | 941.44375 |
| 932.45625 | 941.45625 |
| 932.46875 | 941.46875 |
| 932.48125 | 941.48125 |
| 932.49375 | 941.49375 |

| 25 kHz Bandwidth Pairs | | 50 kHz Bandwidth Pairs | | 100 kHz Bandwidth Pairs | | 200 kHz Bandwidth Pairs | |
|-------------------------------|------------|-------------------------------|------------|--------------------------------|------------|--------------------------------|------------|
| MHz | MHz | MHz | MHz | MHz | MHz | MHz | MHz |
| 932.5125 | 941.5125 | 932.7000 | 941.7000 | 932.8250 | 941.8250 | 933.1750 | 942.1750 |
| 932.5375 | 941.5375 | 932.7500 | 941.7500 | 932.9250 | 941.9250 | 933.3750 | 942.3750 |
| 932.5625 | 941.5625 | 934.8000 | 943.8000 | 933.0250 | 942.0250 | 933.5750 | 942.5750 |
| 932.5875 | 941.5875 | | | 934.5250 | 943.5250 | 933.7750 | 942.7750 |
| 932.6125 | 941.6125 | | | 934.6250 | 943.6250 | 933.9750 | 942.9750 |
| 932.6375 | 941.6375 | | | 934.7250 | 943.7250 | 934.1750 | 943.1750 |
| 932.6625 | 941.6625 | | | | | 934.3750 | 943.3750 |
| 934.8375 | 943.8375 | | | | | | |
| 934.8625 | 943.8625 | | | | | | |
| 934.8875 | 943.8875 | | | | | | |
| 934.9125 | 943.9125 | | | | | | |
| 934.9375 | 943.9375 | | | | | | |
| 934.9625 | 943.9625 | | | | | | |
| 934.9875 | 943.9875 | | | | | | |

4.3.15 Channeling Plan for Land Mobile Assignments in the Band 220-222 MHz

The following channeling plan is composed of 200 frequency pairs for shared Federal/non-Federal land-mobile operations with necessary bandwidths less than or equal to 4 kHz. Of these 200 channel pairs, 60 pairs are for nationwide use and 140 pairs are for shared local use. Of the 60 nationwide channel pairs, 10 are for exclusive Federal use and 50 are for exclusive non-Federal use. Of the 140 shared local-use channel pairs, 100 are available for trunked operations or other operations of equivalent or greater efficiency, 20 are set aside for data only operations until March 31, 2000, 10 are available for public safety/mutual aid, and the remaining 10 channel pairs have no restrictions on use.

The following table indicates the channel designations of frequencies (channel number, base station frequency and function) available for assignment under the following conditions:

- 1) Frequencies shall be assigned in pairs, with base station frequencies taken from the 220-221 MHz band, corresponding mobile frequencies being 1 MHz higher, taken from the 221-222 MHz band.
- 2) Only the lower half of the frequency pairs is listed in the table.

TABLE OF 220-222 MHz CHANNEL DESIGNATIONS
(Channel Number, Base Frequency in MHz and Function)

| Trunked Systems (See next paragraph for Trunked Channel Groups) | | | |
|---|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 1 | 220.0025 | 11 | .0525 |
| 2 | .0075 | 12 | .0575 |
| 3 | .0125 | 13 | .0625 |
| 4 | .0175 | 14 | .0675 |
| 5 | .0225 | 15 | .0725 |
| 6 | .0275 | 16 | .0775 |
| 7 | .0325 | 17 | .0825 |
| 8 | .0375 | 18 | .0875 |
| 9 | .0425 | 19 | .0925 |
| 10 | .0475 | 20 | .0975 |

| Non-Federal Nationwide System | | | |
|--------------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 21 | 220.1025 | 26 | 220.1275 |
| 22 | .1075 | 27 | .1325 |
| 23 | .1125 | 28 | .1375 |
| 24 | .1175 | 29 | .1425 |
| 25 | .1225 | 30 | .1475 |

| Trunked Systems (See next paragraph for Trunked Channel Groups) | | | |
|---|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 31 | 220.1525 | 41 | 220.2025 |
| 32 | .1575 | 42 | .2075 |
| 33 | .1625 | 43 | .2125 |
| 34 | .1675 | 44 | .2175 |
| 35 | .1725 | 45 | .2225 |
| 36 | .1775 | 46 | .2275 |
| 37 | .1825 | 47 | .2325 |
| 38 | .1875 | 48 | .2375 |
| 39 | .1925 | 49 | .2425 |
| 40 | .1975 | 50 | .2475 |

| Non-Federal Nationwide Systems | | | |
|---------------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 51 | 220.2525 | 56 | .2775 |
| 52 | .2575 | 57 | .2825 |
| 53 | .2625 | 58 | .2875 |
| 54 | .2675 | 59 | .2925 |
| 55 | .2725 | 60 | .2975 |

| Trunked Systems | | | |
|------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 61 | 220.3025 | 71 | .3525 |
| 62 | .3075 | 72 | .3575 |
| 63 | .3125 | 75 | .3625 |
| 64 | .3175 | 74 | .3675 |
| 65 | .3225 | 75 | .3725 |
| 66 | .3275 | 76 | .3775 |
| 67 | .3325 | 77 | .3825 |
| 68 | .3375 | 78 | .3875 |
| 69 | .3425 | 79 | .3925 |
| 70 | .3475 | 80 | .3975 |

| Non-Federal Nationwide Systems | | | |
|---------------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 81 | 220.4025 | 86 | .4275 |
| 82 | .4075 | 87 | .4325 |
| 83 | .4125 | 88 | .4375 |
| 84 | .4175 | 89 | .4425 |
| 85 | .4225 | 90 | .4475 |

| Trunked Systems | | | |
|------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 91 | 220.4525 | 101 | .5025 |
| 92 | .4575 | 102 | .5075 |
| 93 | .4625 | 103 | .5125 |
| 94 | .4675 | 104 | .5175 |
| 95 | .4725 | 105 | .5225 |
| 96 | .4775 | 106 | .5275 |
| 97 | .4825 | 107 | .5325 |
| 98 | .4875 | 108 | .5375 |
| 99 | .4925 | 109 | .5425 |
| 100 | .4975 | 110 | .5475 |

| Federal Nationwide Systems | | | |
|-----------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 111 | 220.5525 | 116 | 220.5775 |
| 112 | .5575 | 117 | .5825 |
| 113 | .5625 | 118 | .5875 |
| 114 | .5675 | 119 | .5925 |
| 115 | .5725 | 120 | .5975 |

| Trunked Systems | | | |
|------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 121 | 220.6025 | 131 | 220.6525 |
| 122 | .6075 | 132 | .6575 |
| 123 | .6125 | 133 | .6625 |
| 124 | .6175 | 134 | .6675 |
| 125 | .6225 | 135 | .6725 |
| 126 | .6275 | 136 | .6775 |
| 127 | .6325 | 137 | .6825 |
| 128 | .6375 | 138 | .6875 |
| 129 | .6425 | 139 | .6925 |
| 130 | .6475 | 140 | .6975 |

| Non-Federal Nationwide Systems | | | |
|---------------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 141 | 220.7025 | 151 | .7525 |
| 142 | .7075 | 152 | .7575 |
| 143 | .7125 | 153 | .7625 |
| 144 | .7175 | 154 | .7675 |
| 145 | .7225 | 155 | .7725 |
| 146 | .7275 | 156 | .7775 |
| 147 | .7325 | 157 | .7825 |
| 148 | .7375 | 158 | .7875 |
| 149 | .7425 | 159 | .7925 |
| 150 | .7475 | 160 | .7975 |

| Public Safety/Mutual Air Operations | | | |
|--|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 161 | 220.8025 | 166 | 220.8275 |
| 162 | .8075 | 167 | .8325 |
| 163 | .8125 | 168 | .8375 |
| 164 | .8175 | 169 | .8425 |
| 165 | .8225 | 170 | .8475 |

| Available for any use | | | |
|------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 171 | 220.8525 | 176 | 220.8775 |
| 172 | .8575 | 177 | .8825 |
| 173 | .8625 | 178 | .8875 |
| 174 | .8675 | 179 | .8925 |
| 175 | .8725 | 180 | .8975 |

| Data Operations (See Note *) | | | |
|-------------------------------------|--------------------------------|--------------|--------------------------------|
| Ch. # | Base Frequency (in MHz) | Ch. # | Base Frequency (in MHz) |
| 181 | 220.9025 | 191 | 220.9525 |
| 182 | .9075 | 192 | .9575 |
| 183 | .9125 | 193 | .9625 |
| 184 | .9175 | 194 | .9675 |
| 185 | .9225 | 195 | .9725 |
| 186 | .9275 | 196 | .9775 |
| 187 | .9325 | 197 | .9825 |
| 188 | .9375 | 198 | .9875 |
| 189 | .9425 | 199 | .9925 |
| 190 | .9475 | 200 | .9975 |

Note: Channels 181-185 and 196-200 are indefinitely reserved until further FCC action and are not currently available for assignment or use.

Trunked Channel Groups

The channel groups listed in the following Table are available to both Federal and non-Federal applicants for trunked operations.

| Table - Trunked Channel Groups | | | |
|---------------------------------------|------------------|----------------|------------------|
| Group # | Channel # | Group # | Channel # |
| 1 | 1-31-61-91-121 | 11 | 11-41-71-101-131 |
| 2 | 2-32-62-92-122 | 12 | 12-42-72-102-132 |
| 3 | 3-33-63-93-123 | 14 | 14-44-74-104-134 |
| 4 | 4-34-64-94-124 | 15 | 15-45-75-105-135 |
| 5 | 5-35-65-95-125 | 16 | 16-46-76-106-136 |
| 6 | 6-36-66-96-126 | 11 | 11-41-71-101-131 |
| 7 | 7-37-67-97-127 | 17 | 17-47-77-107-137 |
| 8 | 8-38-68-98-128 | 18 | 18-48-78-108-138 |
| 9 | 9-39-69-99-129 | 19 | 19-49-79-109-139 |
| 10 | 10-40-70-100-130 | 20 | 20-50-80-110-140 |

4.3.16 Plans for Federal Interoperability Channels for Interagency Law Enforcement and Incident Response Operations in the Bands 162-174 MHz and 406.1-420 MHz

CONDITIONS FOR USE

1. The plans shown in Tables 1 and 2 show frequencies available for assignment to all federal agencies to satisfy law enforcement and public safety incident response interoperability requirements. These frequencies will be referred to hereinafter as "Federal Interoperability Channels".

2. The Federal Interoperability Channels are available for use among federal agencies and between federal agencies and non-federal entities with which federal agencies have a requirement to operate. The channels are available to federal agencies on a shared basis and will not be authorized for the exclusive use of any one federal agency.

3. The channels are available to non-federal entities to enable joint federal/non-federal operations for law enforcement and incident response, subject to the condition that harmful interference will not be caused to federal stations. These channels are restricted to interoperability communications and are not authorized for routine or administrative uses.

4. Extended operations and congestion may lead to frequency conflicts. Coordination with NTIA is required to resolve these conflicts.

5. Only narrowband emissions are to be used on the Federal Interoperability Channels.

6. Federal agencies should have an assignment in the Government Master File (GMF) or be included in the Joint Applications (*JNT) circuit remarks in accordance with Chapter 9 of this Manual.

7. Exceptions to the above restrictions will be considered by the Interdepartment Radio Advisory Committee (IRAC)/Frequency Assignment Subcommittee (FAS) on a case-by-case basis.

LAW ENFORCEMENT PLANS

1. Frequencies 167.0875 MHz and 414.0375 MHz are designated as National Calling Channels for initial contact and will be identified in the radio as indicated in Table 1.

2. Initial contact communications will be established using analog FM emission (11KF3E).

3. The interoperability channels will be identified in mobile and portable radios as follows with Continuous Tone-Controlled Squelch Systems (CTCSS) frequency 167.9 Hz and/or Network Access Code (NAC) \$68F:

| LE VHF PLAN | | | LE UHF PLAN | | |
|--------------------|------------------------------|-----------------------------|--------------------|------------------------------|-----------------------------|
| Identifier | Mobile Transmit (MHz) | Mobile Receive (MHz) | Identifier | Mobile Transmit (MHz) | Mobile Receive (MHz) |
| LEA | 167.0875 (Simplex) | 167.0875 | LEB | 414.0375 (Simplex) | 414.0375 |
| LE1 | 162.0875 | 167.0875 | LE10 | 418.9875 | 409.9875 |
| LE2 | 162.2625 | 167.2500 | LE11 | 419.1875 | 410.1875 |
| LE3 | 162.8375 | 167.7500 | LE12 | 419.6125 | 410.6125 |
| LE4 | 163.2875 | 168.1125 | LE13 | 414.0625 (Simplex) | 414.0625 |
| LE5 | 163.4250 | 168.4625 | LE14 | 414.3125 (Simplex) | 414.3125 |
| LE6 | 167.2500 (Simplex) | 167.2500 | LE15 | 414.3375 (Simplex) | 414.3375 |
| LE7 | 167.7500 (Simplex) | 167.7500 | LE16 | 409.9875 (Simplex) | 409.9875 |
| LE8 | 168.1125 (Simplex) | 168.1125 | LE17 | 410.1875 (Simplex) | 410.1875 |
| LE9 | 168.4625 (Simplex) | 168.4625 | LE18 | 410.6125 (Simplex) | 410.6125 |

INCIDENT RESPONSE PLANS

1. Frequencies 169.5375 MHz, paired with 164.7125 MHz, and 410.2375 MHz, paired with 419.2375 MHz, are designated as the calling channels for initial contact and will be identified in the radio as indicated in Table 2.

2. Initial contact will be established using analog FM emission (11KF3E).

3. To ensure access by stations from outside the normal area of operation, CTCSS will not be used on the calling channels.

4. The interoperability channels will be identified in mobile and portable radios as follows:

| IR VHF PLAN | | | | IR UHF PLAN | | | |
|--------------------|------------------------------|-----------------------------|--------------|--------------------|------------------------------|-----------------------------|--------------|
| Identifier | Mobile Transmit (MHz) | Mobile Receive (MHz) | CTCSS | Identifier | Mobile Transmit (MHz) | Mobile Receive (MHz) | CTCSS |
| NC 1 Calling | 164.7125 | 169.5375 | None | NC 2 Calling | 419.2375 | 410.2375 | None |
| IR1 | 165.2500 | 170.0125 | As required | IR10 | 419.4375 | 410.4375 | As required |
| IR2 | 165.9625 | 170.4125 | As required | IR11 | 419.6375 | 410.6375 | As required |
| IR3 | 166.5750 | 170.6875 | As required | IR12 | 419.8375 | 410.8375 | As required |
| IR4 | 167.3250 | 173.0375 | As required | IR13 | 413.1875 (Simplex) | 413.1875 | As required |
| IR5 | 169.5375 (Simplex) | 169.5375 | As required | IR14 | 413.2125 (Simplex) | 413.2125 | As required |
| IR6 | 170.0125 (Simplex) | 170.0125 | As required | IR15 | 410.2375 (Simplex) | 410.2375 | As required |
| IR7 | 170.4125 (Simplex) | 170.4125 | As required | IR16 | 410.4375 (Simplex) | 410.4375 | As required |
| IR8 | 170.6875 (Simplex) | 170.6875 | As required | IR17 | 410.6375 (Simplex) | 410.6375 | As required |
| IR9 | 173.0375 (Simplex) | 173.0375 | As required | IR18 | 410.8375 (Simplex) | 410.8375 | As required |

4.3.17 Plan for JTIDS TDMA Waveform Systems

1. The Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS) Time Division Multiple Access (TDMA) Waveform is the designation for the tactical data link system used by the military services, which is critical to the “Command and Control” infrastructure of the Department of Defense (DOD). This waveform designation applies to the JTIDS family of terminals (Class 1, Class 2, Class 2M and Class 2H); MIDS Low Volume Terminal (LVT) variants (LVT-1, LVT-2, LVT-3/Fighter Data Link); and future approved systems incorporating the JTIDS/MIDS TDMA Waveform implementation. These TDMA systems provide the DOD with totally Integrated Communications, Navigation and Identification (ICNI) capabilities. The DOD refers to these terminals collectively as “Link 16”.

2. JTIDS/MIDS TDMA Waveform operation is authorized in the 960-1215 MHz band and in addition, the DOD and the Department of Transportation (DOT) have made agreements to assure spectrum access and to maintain mutual compatibility between Air Traffic Control (ATC) systems and JTIDS/MIDS TDMA Waveform systems within the United States and its possessions (US&P). The following paragraphs are consistent with DOD - DOT agreements:

a. Uncoordinated JTIDS/MIDS TDMA Waveform operations are authorized in the 960-1215 MHz band in accordance with the coordinations outlined in Authorizing NTIA Spectrum Certification Document(s).

b. The DOD shall incorporate engineering features in the JTIDS/MIDS TDMA Waveform equipment in accordance with the NTIA guidance and requirements for JTIDS/MIDS EMC features. The engineering features when implemented shall minimize the possibility for harmful interference between ATC and JTIDS/MIDS TDMA Waveform systems operating in the US&P.

c. The DOT will support US&P frequency assignments for JTIDS/MIDS TDMA Waveform operations, with the conditions identified in the authorizing NTIA Spectrum Certification Documents and as set forth herein.

d. The DOD will ensure that by 2020, all JTIDS/MIDS TDMA Waveform Terminals are capable of remapping frequencies. Any JTIDS/MIDS TDMA Waveform Terminal produced after July 1, 2007 will be capable of remapping and the capability will be added to all terminals produced prior to that date during any scheduled system updates/modifications or when the terminals are brought in for maintenance. All fielded JTIDS/MIDS TDMA Waveform Terminals will incorporate the remapping capability by 2020. The remapping implementation will be flexible, but there will not be a requirement to remap more than 14 carrier frequencies. The remapping capability will be utilized as necessary to prevent harmful interference with ATC systems that have been approved by a NTIA Stage 4 Spectrum Certification. The Legacy JTIDS Terminals (Class 1, 2, 2M, 2H) for operations prior to 2020 are not required to implement the remapping feature.

e. The DOT will ensure that planned and future systems/equipment subject to its jurisdiction that are to be implemented using spectrum not subject to remapping will be designed to satisfy their minimum performance standards in their intended electromagnetic environments. This environment includes JTIDS/MIDS TDMA Waveform systems operating in conformance with the remapping requirement. This will ensure that such new or modified systems shall incorporate features so as to not constrain JTIDS/MIDS TDMA Waveform Terminals operations in accordance with the approved NTIA Spectrum Certification.

f. Coordination procedures for JTIDS/MIDS TDMA Waveform operations involving all 51 frequencies, operations exceeding approved NTIA Spectrum Certification conditions and operations involving non-US and new terminals shall be cooperatively developed by DOD and DOT.

4.3.18 4400-4940 MHz Channel Plan

1. This section describes the 4400-4940 MHz Channel Plan for stations operating in the fixed service and provides guidance on its implementation. This channel plan will become effective on August 1, 2009 and all incumbent frequency assignments in the 4400-4940 MHz band and will be grandfathered until the equipment or frequency is changed.³

2. Figure 1 provides an overview of the 4400-4940 MHz Channel Plan.

³ Any system currently in the Government Master File or on the Frequency Assignment Subcommittee agenda before August 1, 2009 will be "grandfathered."

Figure 1: The 4400-4940 MHz Channel Plan

| 4400 - 4940 MHz CHANNEL PLAN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|--------------|----|----------------------------|----|----|----|----|----|----|-----|-----|-----|-------------------------|----------------------|-----|--------------|-----|------------------------------|-----------|-----|------------------------|-----|-----|-----|------|------|------|--|--|--|
| 4.670 GHz → ← 4.670 GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 GHz Channel Bandwidths | Lower Band | | | | | | | | | | | | Upper Band | | | | | | | | | | | | | | | | | |
| | ← 4.400 GHz | | | | | | | | | | | | ← 4.700 GHz | | | | | | | | | | | | | | | | | |
| | 4.640 GHz → | | | | | | | | | | | | 4.940 GHz → | | | | | | | | | | | | | | | | | |
| 40.00 MHz (A) | A1 | A2 | A3 | A4 | A5 | A6 | | | | | | | A1' | A2' | A3' | A4' | A5' | A6' | | | | | | | | | | | | |
| 30.00 MHz (B) | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B1' | B2' | B3' | B4' | B5' | B6' | B7' | B8' | | | | | | | | | | | | |
| 20.00 MHz (C) | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C1' | C2' | C3' | C4' | C5' | C6' | C7' | C8' | C9' | C10' | C11' | C12' | | | |
| 10.00 MHz (D) | (D1-D4) | | (20) 10 MHz (D5-D24) | | | | | | | | | | 25 | 26 | 27 | 28 | 29 | 30 | (D1'-D4') | | (20) 10 MHz (D5'-D24') | | | | | | | | | |
| 5.00 MHz (E) | (8) 5 MHz | | (40) 5 MHz* (E9-E48) | | | | | | | | | | (12) 5.00 MHz (E49-E60) | | | (8) 5 MHz | | (40) 5 MHz* (E9'-E48') | | | | | | | | | | | | |
| 2.50 MHz (F) | (16) 2.5 MHz | | (80) 2.5 MHz* (F17-F96) | | | | | | | | | | (24) 2.50MHz (F97-F120) | | | (16) 2.5 MHz | | (80) 2.5 MHz* (F17'-F96') | | | | | | | | | | | | |
| 1.25 MHz (G) | (32) 1.25MHz | | (160) 1.25 MHz* (G33-G192) | | | | | | | | | | (48) 1.25MHz(G193-G240) | | | (32) 1.25MHz | | (160) 1.25 MHz* (G33'-G192') | | | | | | | | | | | | |
| | | | | | | | | | | | | | | One-Way Applications | | | | | | | | | | | | | | | | |

NOTE: Paired channels will be implemented for fixed service assignments using A1 with A1', A2 with A2', etc.

3. Applicable Guidance. In implementing the 4400-4940 MHz Channel Plan, the following guidance applies.

- a. This channel plan only applies to fixed and/or transportable fixed assignments. For mobile or airborne assignments, this channel plan should be used to the extent possible.
- b. Incumbent fixed and/or transportable fixed assignments will be grandfathered until the end of the life-cycle of the equipment⁷ and all replacement equipment will utilize frequencies in accordance with this channel. Other assignments should use this channel plan to the extent possible.
- c. Any request for changes or modifications to “grandfathered” fixed service and/or transportable fixed assignments, except for the frequency, will be governed by existing NTIA procedures. However, if the operating frequency is to be modified, the replacement frequency will be selected in accordance with this channel plan.
- d. The First Priority Channels will be considered first before the other designated channels.
- e. The Second Priority Channels will be considered if the First Priority Channels are not available..
- f. The wide-band Third Priority Channels (i.e., A1/A1'; B1/B1'; B9 and B10; C13, C14, and C15) will be considered only if their respective First and Second Priority Channels are not available.
- g. The narrow-band Third Priority Channels (i.e., E-, F-, and G-Channels) will be considered only if their respective First Priority Channels are not available. The following narrow-band channels: E9/E9' and E10/E10'; F17/E17' through F20/F20'; G33/G33' through G40/G40' will be considered first before the other respective narrow-band channels.
- h. Fixed and/or transportable fixed assignments, may use either channel of a paired-channel if the one-way link First Priority Channels are not available.⁸ or if multiple one-way links assignments are required.
- i. Fixed and/or transportable fixed assignments for which the emission bandwidth exceeds the bandwidth of a channel will use the next available wider channel in the channel plan. For example, an assignment with an emission bandwidth of 24 MHz will use a 30 MHz channel (*e.g., Channel B6 centered at 4565 MHz and see also Channel D17 in Table 4*).
- j. Fixed and/or transportable fixed assignments for which the emission bandwidth exceeds 40 MHz may use concatenated channels⁹ commensurate with the emission bandwidth. However, the center frequency of the concatenated channels should be one of the center frequencies listed in the channel plan. For example, an assignments with a emission bandwidth of 60 MHz would require two concatenated 30 MHz channels, such as channels B7 and B8 with the center frequency being 4610 MHz (*see Channel C11 in Table 3*).

4. The following tables list the center frequencies for narrowband, wideband and single or unpaired channels.

- a. Tables 1 through 4 show the center frequencies of the wide-band paired channels (*i.e., Channels A-40 MHz, B-30 MHz, C-20 MHz, and D-10 MHz*) in the 4400-4940 MHz Channel Plan and their respective channel status.

⁷ Transportable fixed assignments, include assignments employing one-way link applications; such as video target scoring, air-to-ground video downlink, ground-to-ground video and/or voice transmissions, etc.

⁸ Currently, land mobile radio assignments are not deployed in the 4400-4940 MHz band. In such time that land mobile radio assignments will be deployed in the band, the base stations will transmit at channels from the upper portion of the channel plan (*i.e., 4670-4940 MHz band segment*) and mobile units will transmit from the lower portion of the channel plan (*i.e., 4400-4670 MHz band segment*).

⁹ The term “concatenated channels” means any two or more adjacent channels in the 4400-4940 MHz band joined together for the purpose of accommodating a assignment having an emission bandwidth that exceeds the widest channel bandwidth in the channel plan.

CENTER FREQUENCIES FOR THE WIDE-BAND PAIRED CHANNELS

Table 1: The Center Frequencies for the 40 MHz Wide-Band Paired Channels (A-Channels)

| Table 1 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| A2/A2' (4460/4760) | A3/A3' (4500/4800) | A4/A4' (4540/4840) |
| Second Priority Channels | | |
| A5/A5' (4580/4880) | A6/A6' (4620/4920) | |
| Third Priority Channels | | |
| A1/A1' (4420/4720) | | |

Table 2: The Center Frequencies for the 30 MHz Wide-Band Paired Channels (B-Channels)

| Table 2 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| B6/ B6' (4565/4865) | B7/B7' (4595/4895) | B8/B8' (4625/4925) |
| Second Priority Channels | | |
| B2/B2' (4445/4745) | B4/B4' (4505/4805) | B5/B5' (4535/4835) |
| B3/B3' (4475/4775) | | |
| Third Priority Channels | | |
| B1/B1' (4415/4715) | | |

Table 3: The Center Frequencies for the 20 MHz Wide-Band Paired Channels (C-Channels)

| Table 3 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| C1/C1' (4410/4710) | C2/C2' (4430/4730) | |
| Second Priority Channels | | |
| C3/C3' (4450/4750) | C7/C7' (4530/4530) | C10/C10' (4590/4890) |
| C4/C4' (4470/4770) | C8/C8' (4550/4850) | C11/C11' (4610/4910) |
| C5/C5' (4490/4790) | C9/C9' (4570/4870) | C12/C12' (4630/4930) |
| C6/C6' (4510/4810) | | |

Table 4: The Center Frequencies for the 10 MHz Wide-Band Paired Channels (D-Channels)

| Table 4 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| D1/D1' (4405/4705) | D3/D3' (4425/4725) | D4/D4' (4435/4735) |
| D2/D2' (4415/4715) | | |
| Second Priority Channels | | |
| D5/D5' (4445/4745) | D12/D12' (4515/4815) | D19/D19' (4585/4885) |
| D6/D6' (4455/4755) | D13/D13' (4525/4825) | D20/D20' (4595/4895) |
| D7/D7' (4465/4765) | D14/D14' (4535/4835) | D21/D21' (4605/4905) |
| D8/D8' (4475/4775) | D15/D15' (4545/4845) | D22/D22' (4615/4915) |
| D9/D9' (4485/4785) | D16/D16' (4555/4855) | D23/D23' (4625/4925) |
| D10/D10' (4495/4795) | D17/D17' (4565/4865) | D24/D24' (4635/4935) |
| D11/D11' (4505/4805) | D18/D18' (4575/4875) | |

b. Tables 5 through 7 show the center frequencies of the narrow-band paired channels (i.e., Channels E-5 MHz, F-2.5 MHz, and G-1.5 MHz) in the 4400-4940 MHz Channel Plan and their respective channel status.

CENTER FREQUENCIES FOR THE NARROW-BAND PAIRED CHANNELS

Table 5: The Center Frequencies for the 5 MHz Narrow-Band Paired Channels (E-Channels)⁷

| Table 5 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| E1/E1' (4402.5/4702.5) | E4/E4' (4417.5/4717.5) | E7/E7' (4432.5/4732.5) |
| E2/E2' (4407.5/4707.5) | E5/E5' (4422.5/4722.5) | E8/E8' (4437.5/4737.5) |
| E3/E3' (4412.5/4712.5) | E6/E6' (4427.5/4727.5) | |
| Third Priority Channels | | |
| E9/E9' (4442.5/4742.5) | E23/E23' (4512.5/4812.5) | E37/E37' (4582.5/4882.5) |
| E10/E10' (4447.5/4747.5) | E24/E24' (4517.5/4817.5) | E38/E38' (4587.5/4887.5) |
| E11/E11' (4452.5/4752.5) | E25/E25' (4522.5/4822.5) | E39/E39' (4592.5/4892.5) |
| E12/E12' (4457.5/4757.5) | E26/E26' (4527.5/4827.5) | E40/E40' (4597.5/4897.5) |
| E13/E13' (4462.5/4762.5) | E27/E27' (4532.5/4832.5) | E41/E41' (4602.5/4902.5) |
| E14/E14' (4467.5/4767.5) | E28/E28' (4537.5/4837.5) | E42/E42' (4607.5/4907.5) |
| E15/E15' (4472.5/4772.5) | E29/E29' (4542.5/4842.5) | E43/E43' (4612.5/4912.5) |
| E16/E16' (4477.5/4777.5) | E30/E30' (4547.5/4847.5) | E44/E44' (4617.5/4917.5) |
| E17/E17' (4482.5/4782.5) | E31/E31' (4552.5/4852.5) | E45/E45' (4622.5/4922.5) |
| E18/E18' (4487.5/4787.5) | E32/E32' (4557.5/4857.5) | E46/E46' (4627.5/4927.5) |
| E19/E19' (4492.5/4792.5) | E33/E33' (4562.5/4862.5) | E47/E47' (4632.5/4932.5) |
| E20/E20' (4497.5/4797.5) | E34/E34' (4567.5/4867.5) | E48/E48' (4637.5/4937.5) |

7. There are no secondary channels for the E-Channels (5 MHz channels).

| Table 5 | | |
|-------------------------------|-------------------------------|-------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| E21/E21' (4502.5/4802.5) | E35/E35' (4572.5/4872.5) | |
| E22/E22' (4507.5/4807.5) | E36/E36' (4577.5/4877.5) | |

Table 6: The Center Frequencies for the 2.5 MHz Narrow-Band Paired Channels (F-Channels)⁸

| Table 6 | | |
|--------------------------------|-------------------------------|-------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| F1/F1' (4401.25/4701.25) | F7/F7' (4416.25/4716.25) | F12/F12' (4428.75/4728.75) |
| F2/F2' (4403.75/4703.75) | F8/F8' (4418.75/4718.25) | F13/F13' (4413.25/4731.25) |
| F3/F3' (4406.25/4706.25) | F9/F9' (4421.25/4721.25) | F14/F14' (4433.75/4733.75) |
| F4/F4' (4408.75/4708.25) | F10/F10' (4423.75/4723.25) | F15/F15' (4436.25/4736.25) |
| F5/E5' (4411.25/4711.25) | F11/F11' (4426.25/4726.25) | F16/F16' (4438.75/4738.75) |
| F6/F6' (4413.75/4713.25) | | |
| Third Priority Channels | | |
| F17/F17' (4441.25/4741.25) | F44/F44' (4508.75/4808.75) | F71/F71' (4576.25/4876.25) |
| F18/F18' (4443.75/4743.75) | F45/F45' (4511.25/4811.25) | F72/F72' (4578.75/4878.75) |
| F19/F19' (4446.25/4746.25) | F46/F46' (4513.75/4813.75) | F73/F73' (4581.25/4881.25) |
| F20/F20' (4448.75/4748.75) | F47/F47' (4516.25/4816.25) | F74/F74' (4583.75/4883.75) |
| F21/F21' (4451.25/4751.25) | F48/F48' (4518.75/4818.75) | F75/F75' (4586.25/4886.25) |
| F22/F22' (4453.75/4753.75) | F49/F49' (4521.25/4821.25) | F76/F76' (4588.75/4888.75) |
| F23/F23' (4456.25/4756.25) | F50/F50' (4523.75/4823.75) | F77/F77' (4591.25/4891.25) |
| F24/F24' (4458.75/4758.75) | F51/F51' (4526.25/4826.25) | F78/F78' (4593.75/4893.75) |
| F25/F25' (4461.25/4761.25) | F52/F52' (4528.75/4828.75) | F79/F79' (4596.25/4896.25) |
| F26/F26' (4463.75/4763.75) | F53/F53' (4531.25/4831.25) | F80/F80' (4598.75/4898.75) |
| F27/F27' (4466.25/4766.25) | F54/F54' (4533.75/4833.75) | F81/F81' (4601.25/4901.25) |
| F28/F28' (4468.75/4768.75) | F55/F55' (4536.25/4836.25) | F82/F82' (4603.75/4903.75) |
| F29/F29' (4571.25/4771.25) | F56/F56' (4538.75/4838.75) | F83/F83' (4606.25/4906.25) |
| F30/F30' (4473.75/4773.75) | F57/F57' (4541.25/4841.25) | F84/F84' (4608.75/4908.75) |
| F31/F31' (4476.25/4776.25) | F58/F58' (4543.75/4843.75) | F85/F85' (4611.75/4911.75) |
| F32/F32' (4478.75/4778.75) | F59/F59' (4546.25/4846.25) | F86/F86' (4613.25/4913.25) |
| F33/F33' (4481.25/4781.25) | F60/F60' (4548.75/4848.75) | E87/F87' (4616.25/4916.25) |
| F34/F34' (4483.75/4783.75) | F61/F61' (4551.25/4851.25) | F88/F88' (4618.75/4918.75) |
| F35/F35' (4486.25/4786.25) | F62/F62' (4553.75/4853.75) | F89/F89' (4621.25/4921.25) |
| F36/F36' (4488.75/4788.75) | F63/F63' (4556.25/4856.25) | F90/F90' (4623.75/4923.75) |
| F37/F37' (4491.25/4791.25) | F64/F64' (4558.75/4858.75) | F91/F91' (4626.25/4926.25) |
| F38/F38' (4493.75/4793.75) | F65/F65' (4561.25/4861.25) | F92/F92' (4628.75/4928.75) |
| F39/F39' (4496.25/4796.25) | F66/F66' (4563.75/4863.75) | F93/F93' (4631.25/4931.25) |
| F40/F40' (4498.75/4798.75) | F67/F67' (4566.25/4866.25) | F94/F94' (4633.75/4933.75) |
| F41/F41' (4501.25/4801.25) | F68/F68' (4568.75/4868.75) | F95/F95' (4636.25/4936.25) |
| F42/F42' (4503.75/4803.75) | F69/F69' (4571.25/4871.25) | F96/F96' (4638.75/4938.75) |

8. There are no secondary channels for the F-Channels (2.5 MHz channels).

| Table 6 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| F43/F43' (4506.25/4806.25) | F70/F70' (4573.75/4873.75) | |

Table 7: The Center Frequencies for the 1.25 MHz Narrow-Band Paired Channels (G-Channels)⁹

| Table 7 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| First Priority Channels | | |
| G1/G1' (4400.625/4700.625) | G12/G12' (4414.375/4714.375) | G23/G23' (4428.125/4728.125) |
| G2/G2' (4401.875/4701.875) | G13/G13' (4415.625/4715.625) | G24/G24' (4429.375/4729.375) |
| G3/G3' (4403.125/4703.125) | G14/G14' (4416.875/4716.875) | G25/G25' (4430.625/4730.625) |
| G4/G4' (4404.375/4704.325) | G15/G15' (4418.125/4718.125) | G26/G26' (4431.875/4731.875) |
| G5/G5' (4405.625/4705.625) | G16/G16' (4419.375/4719.375) | G27/G27' (4433.125/4733.125) |
| G6/G6' (4406.875/4706.825) | G17/G17' (4420.625/4720.625) | G28/G28' (4434.375/4734.375) |
| G7/G7' (4408.125/4708.125) | G18/G18' (4421.875/4721.875) | G29/G29' (4435.625/4735.625) |
| G8/G8' (4409.375/4708.375) | G19/G19' (4423.125/4721.125) | G30/G30' (4436.875/4736.875) |
| G9/G9' (4410.625/4710.625) | G20/G20' (4424.375/4724.375) | G31/G31' (4438.125/4738.125) |
| G10/G10' (4411.875/4711.875) | G21/G21' (4425.625/4725.625) | G32/G32' (4439.375/4739.375) |
| G11/G11' (4413.125/4713.125) | G22/G22' (4426.875/4726.875) | |
| Third Priority Channels | | |
| G33/G33' (4440.625/4740.625) | G87/G87' (4508.125/4808.125) | G141/G141' (4575.625/4875.625) |
| G34/G34' (4441.875/4741.875) | G88/G88' (4509.375/4809.375) | G142/G142' (4576.875/4876.875) |
| G35/G35' (4443.125/4743.125) | G89/G89' (4510.675/4810.675) | G143/G143' (4578.125/4878.125) |
| G36/G36' (4444.375/4744.375) | G90/G90' (4511.875/4811.875) | G144/G144' (4579.375/4879.375) |
| G37/G37' (4445.625/4745.625) | G91/G91' (4513.125/4813.125) | G145/G145' (4580.625/4880.625) |
| G38/G38' (4446.875/4746.875) | G92/G92' (4514.625/4814.625) | G146/G146' (4581.875/4881.875) |
| G39/G39' (4448.125/4748.125) | G93/G93' (4515.625/4815.625) | G147/G147' (4583.125/4883.125) |
| G40/G40' (4449.375/4748.375) | G94/G94' (4516.875/4816.875) | G148/G148' (4584.375/4884.375) |
| G41/G41' (4450.625/4750.625) | G95/G95' (4518.125/4818.125) | G149/G149' (4585.625/4885.625) |
| G42/G42' (4451.875/4751.875) | G96/G96' (4519.375/4819.375) | G150/G150' (4586.875/4886.875) |
| G43/G43' (4453.125/4753.125) | G97/G97' (4520.625/4820.625) | G151/G151' (4588.125/4888.125) |
| G44/G44' (4454.375/4754.375) | G98/G98' (4521.875/4821.875) | G152/G152' (4589.375/4889.375) |
| G45/G45' (4455.625/4755.625) | G99/G99' (4523.125/4823.125) | G153/G153' (4590.625/4890.625) |
| G46/G46' (4456.875/4756.875) | G100/G100' (4524.375/4824.375) | G154/G154' (4591.875/4891.875) |
| G47/G47' (4458.125/4758.125) | G101/G101' (4525.625/4825.625) | G155/G155' (4593.125/4893.125) |
| G48/G48' (4459.375/4759.375) | G102/G102' (4526.875/4826.875) | G156/G156' (4594.375/4894.375) |
| G49/G49' (4460.625/4760.625) | G103/G103' (4528.125/4828.125) | G157/G157' (4595.625/4895.625) |
| G50/G50' (4461.875/4761.875) | G104/G104' (4529.375/4829.375) | G158/G158' (4596.875/4896.875) |
| G51/G51' (4463.125/4763.125) | G105/G105' (4530.625/4830.625) | G159/G159' (4598.125/4898.125) |
| G52/G52' (4464.375/4764.375) | G106/G106' (4531.875/4831.875) | G160/G160' (4599.375/4899.375) |
| G53/G53' (4465.625/4765.625) | G107/G107' (4533.125/4833.125) | G161/G161' (4600.625/4900.625) |
| G54/G54' (4466.875/4766.875) | G108/G108' (4534.375/4834.375) | G162/G162' (4601.875/4901.875) |
| G55/G55' (4468.125/4768.125) | G109/G109' (4535.625/4835.625) | G163/G163' (4603.125/4903.125) |
| G57/G57' (4470.625/4770.625) | G110/G110' (4536.875/4836.875) | G164/G164' (4604.375/4904.375) |
| G58/G58' (4471.875/4771.875) | G111/G111' (4538.125/4838.125) | G165/G165' (4605.625/4905.625) |
| G59/G59' (4473.125/4773.125) | G112/G112' (4539.375/4839.375) | G166/G166' (4606.875/4906.875) |
| G60/G60' (4474.375/4774.375) | G113/G113' (4540.625/4840.625) | G167/G167' (4608.125/4908.125) |
| G61/G61' (4475.625/4775.625) | G114/G114' (4541.875/4841.875) | G168/G168' (4609.375/4909.375) |
| G62/G62' (4476.875/4776.875) | G115/G115' (4543.125/4843.125) | G169/G169' (4610.625/4910.625) |

⁹. There are no secondary channels for the G-Channels (1.25 MHz channels).

| Table 7 | | |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| G63/G63' (4478.125/4778.125) | G116/G116' (4544.375/4844.375) | G170/G170' (4611.875/4911.875) |
| G64/G64' (4479.375/4779.375) | G117/G117' (4545.625/4845.625) | G171/G171' (4613.125/4913.125) |
| G65/G65' (4480.625/4780.625) | G118/G118' (4546.875/4846.875) | G172/G172' (4614.375/4914.375) |
| G66/G66' (4481.875/4781.875) | G119/G119' (4548.125/4848.125) | G173/G173' (4615.625/4915.625) |
| G67/G67' (4483.125/4783.125) | G120/G120' (4549.375/4849.375) | G174/G174' (4616.875/4916.875) |
| G56/G56' (4469.375/4768.375) | G121/G121' (4550.625/4850.625) | G175/G175' (4618.125/4918.125) |
| G68/G68' (4484.375/4784.375) | G122/G122' (4551.875/4851.875) | G176/G176' (4619.375/4919.375) |
| G69/G69' (4485.625/4785.625) | G123/G123' (4553.125/4853.125) | G177/G177' (4620.625/4920.625) |
| G70/G70' (4486.875/4786.875) | G124/G124' (4554.375/4854.375) | G178/G178' (4621.875/4921.875) |
| G71/G71' (4488.125/4788.125) | G125/G125' (4555.625/4855.625) | G179/G179' (4623.125/4923.125) |
| G72/G72' (4489.375/4789.375) | G126/G126' (4556.875/4856.875) | G180/G180' (4624.375/4924.375) |
| G73/G73' (4490.625/4790.625) | G127/G127' (4858.125/4858.125) | G181/G181' (4625.625/4925.625) |
| G74/G74' (4491.875/4791.875) | G128/G128' (4559.375/4559.375) | G182/G182' (4626.875/4926.875) |
| G75/G75' (4493.125/4793.125) | G129/G129' (4560.625/4860.625) | G183/G183' (4628.125/4928.125) |
| G76/G76' (4494.375/4794.375) | G130/G130' (4561.875/4861.875) | G184/G184' (4629.375/4929.375) |
| G77/G77' (4495.625/4795.625) | G131/G131' (4563.125/4863.125) | G185/G185' (4630.625/4930.625) |
| G78/G78' (4496.875/4796.875) | G132/G132' (4564.375/4864.375) | G186/G186' (4631.875/4931.875) |
| G79/G79' (4498.125/4798.125) | G133/G133' (4565.625/4865.625) | G187/G187' (4633.125/4933.125) |
| G80/G80' (4499.375/4799.375) | G134/G134' (4566.875/4866.875) | G188/G188' (4634.375/4934.375) |
| G81/G81' (4500.625/4800.625) | G135/G135' (4568.125/4868.125) | G189/G189' (4635.625/4935.625) |
| G82/G82' (4501.875/4801.875) | G136/G136' (4569.375/4869.375) | G190/G190' (4636.875/4936.875) |
| G83/G83' (4503.125/4803.125) | G137/G137' (4570.625/4870.625) | G191/G191' (4638.125/4938.125) |
| G84/G84' (4504.375/4804.375) | G138/G138' (4571.875/4871.825) | G192/G192' (4639.375/4939.375) |
| G85/G85' (4505.625/4805.625) | G139/G139' (4573.125/4873.125) | |
| G86/G86' (4506.875/4806.875) | G140/G140' (4574.375/4874.375) | |

c. Table 8 shows the center frequencies of the unpaired or single channels in the 4400-4940 MHz Channel Plan and their respective channel status.

CENTER FREQUENCIES OF THE UNPAIRED OR SINGLE CHANNELS

Table 8: The Center Frequencies for the Unpaired or Single Channels in the 4400-4940 MHz Channel Plan

| Table 8 | | |
|--|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| 30 MHz Channels (Third Priority B-Channels) | | |
| B9 (4655) | B10 (4685) | |
| 20 MHz Channels (Third Priority C-Channels) | | |
| C13 (4650) | C14 (4670) | C15 (4690) |
| 10 MHz Channels (First Priority D-Channels) | | |
| D25 (4645) | D27 (4665) | D29 (4685) |
| D26 (4655) | D28 (4675) | D30 (4695) |
| 5 MHz Channels (First Priority E-Channels) | | |
| E49 (4642.5) | E53 (4662.5) | E57 (4682.5) |
| E50 (4647.5) | E54(4667.5) | E58 (4687.5) |
| E51 (4652.5) | E55 (4672.5) | E59 (4692.5) |
| E52 (4657.5) | E56 (4677.5) | E60 (4697.5) |

| Table 8 | | |
|--|---------------------------------------|---------------------------------------|
| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
| 2.5 MHz Channels (First Priority F-Channels) | | |
| F97 (4641.25) | F105 (4661.25) | F113 (4681.25) |
| F98 (4643.75) | F106 (4663.75) | F114 (4683.75) |
| F99 (4646.25) | F107 (4666.25) | F115 (4686.25) |
| F100 (4648.75) | F108 (4668.75) | F116 (4688.75) |
| F101 (4651.25) | F109 (4671.25) | F117 (4691.25) |
| F102 (4653.75) | F110 (4673.75) | F118 (4693.75) |
| F103 (4656.25) | F111 (4676.25) | F119 (4696.25) |
| F104 (4658.75) | F112 (4678.75) | F120 (4698.75) |
| 1.25 MHz Channels (First Priority G-Channels) | | |
| G193 (4640.625) | G209 (4660.625) | G225 (4680.625) |
| G194 (4641.875) | G210 (4661.875) | G226 (4681.875) |
| G195 (4643.125) | G211 (4663.125) | G227 (4683.125) |
| G196 (4644.375) | G212 (4664.375) | G228 (4684.375) |
| G197 (4645.625) | G213 (4665.625) | G229 (4685.625) |
| G198 (4646.875) | G214 (4666.875) | G230 (4686.875) |
| G199 (4648.125) | G215 (4668.125) | G231 (4688.125) |
| G200 (4649.375) | G216 (4669.375) | G232 (4689.375) |
| G201 (4650.625) | G217 (4670.625) | G233 (4690.625) |
| G202 (4651.875) | G218 (4671.875) | G234 (4691.875) |
| G203 (4653.125) | G219 (4673.125) | G235 (4693.125) |
| G204 (4654.375) | G220 (4674.375) | G236 (4694.375) |
| G205 (4655.625) | G221 (4675.625) | G237 (4695.625) |
| G206 (4656.875) | G222 (4676.875) | G238 (4696.875) |
| G207 (4658.125) | G223 (4678.125) | G239 (4698.125) |
| G208 (4659.375) | G224 (4679.375) | G240 (4699.375) |

4.3.19 7125-8500 MHz Channel Plan

1. This section describes the 7125-8500 MHz Channel Plan for stations operating in the fixed service and provides guidance on its implementation. This plan will become effective December 1, 2009 and all incumbent frequency assignments in the 7125-8500 MHz band will be grandfathered until the equipment or frequency is changed.¹⁰

2. Figure 1 and 2 provide an overview of the 7125-8500 MHz Channel Plan. The plan consists of the 7125-7750 MHz (7GHz) Channel Plan (Figure 1) and the 7750-8500 MHz (8GHz) Channel Plan (Figure 2).

¹⁰ Any system currently in the Government Master File or on the Frequency Assignment Subcommittee agenda before December 1, 2009 will be “grandfathered”.

3. Procedure for Frequency Selection

a. The selection of frequencies for new fixed service systems (does not include transportable systems) will be performed by NTIA Spectrum Engineering and Analysis Division (SEAD) in conjunction with the NTIA Frequency Assignment Branch (FAB) within 9 workdays of receipt of complete data.

b. The federal agency submitting a frequency selection request must provide the following information in card format to SEADFASupport@ntia.doc.gov.

- (1) Transmitter and Receiver nomenclature and model (e.g. Alcatel MDR-8704S-155)
- (2) Transmitter and Receiver coordinates of the proposed location(s) of deployment
- (3) Transmitter power (in watts)
- (4) Transmitter Equivalent Isotropically Radiated Power (in watts)
- (5) Transmitter emission spectrum (i.e., -3dB, -20dB, and -60dB)
- (6) Emission designator (modulation type and bandwidth) (e.g. 5M50D7W)
- (7) Receiver radio frequency and intermediate frequency selectivity (i.e., -3dB, -20dB, and -60dB)
- (8) Receiver noise figure (in dB)
- (9) Transmitter and Receiver antenna model (e.g. Andrew HP6-44)
- (10) Transmitter and Receiver antenna type
- (11) Transmitter and Receiver mainbeam antenna gain (in dBi)
- (12) Transmitter and Receiver antenna azimuth and elevation gain pattern (dB relative to mainbeam)
- (13) Transmitter and Receiver antenna heights (in meters)
- (14) Transmitter and Receiver antenna elevation (above mean sea level) (in meters)
- (15) Transmitter and Receiver antenna polarization

c. SEAD will be provided to the requesting agency the selected frequencies for review. Upon agreeing to the frequencies identified, the agency will submit the selected frequencies to the FAS using the existing process. If the submitting agency disagrees with the selected frequencies, the agency will work with SEAD staff members to identify mutually agreeable frequencies.

4. Agency's shall enter the link ID number (seven digit number) and date at the bottom right hand corner of SEAD report in the GMF application remarks line.

5. Applicable Guidance. In implementing the 7125-8500 MHz Channel Plan, the following guidance applies.

a. This channel plan only applies to fixed and/or transportable assignments. This plan does not apply to mobile, airborne, air to ground (i.e. Space to Earth) or ground to air (i.e. Earth to space) operations, however, NTIA encourages that agencies use this channel plan whenever possible.

b. Incumbent fixed and/or transportable assignments will be grandfathered until the end of the life-cycle of the equipment and all replacement equipment will utilize frequencies in accordance with the channel plan. Other assignments should use this channel plan to the extent possible.

c. Any request for changes or modifications to "grandfathered" fixed and/or transportable assignments, except for the frequency, will be governed by existing NTIA procedures. However, if the operating frequency is to be modified, the replacement frequency will be selected in accordance with the channel plan.

d. The First Priority Channels will be considered first before the other designated channels.

e. The Second Priority Channels will be considered if the First Priority Channels are not available.

f. Fixed assignments may use either channel of a paired-channel if the one-way channels are not available and one-way channels may be used for paired assignments if paired channels are not available.

g. Fixed and/or transportable assignments for which the emission bandwidth of a channel will use the next available wider channel in the channel plan. For example, an assignment with an emission bandwidth of 24 MHz will use a 30 MHz channel.

h. Fixed and/or transportable assignments for which the emission bandwidth exceeds 40 MHz may use concatenated channels¹¹ commensurate with the emission bandwidth. However, the center frequency of the concatenated channels should be one of the center frequencies listed in the channel plan. For example, an assignment with an emission bandwidth of 60 MHz would require two concatenated 30 MHz channels.

i. Experimental stations may use any frequency in the 7125-8500 MHz under the condition that if the equipment/system becomes operational it must comply with the channel plan.

5. The following tables list the center frequencies of the paired-channels and single or unpaired channels.

a. Tables 1 through 5 shows the center frequencies of the paired-channels in the 7125-8500 MHz channel plan and their priority status.

Table 1: The Center Frequencies of the 30 MHz Paired Channels¹²

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| A1/A1' (7165 / 7465) | A7/A7' (7345 / 7645) | A9/A9' (7405 / 7705) |
| A2/A2' (7195 / 7495) | A8/A8' (7375 / 7675) | A10/A10' (7435 / 7735) |
| SECOND PRIORITY CHANNELS | | |
| A11/A11' (7765 / 8125) | A13/A13' (7825 / 8185) | A21/A21' (8065 / 8425) |
| A12/A12' (7795 / 8155) | A14/A14' (7855 / 8215) | A22/A22' (8095 / 8455) |

Table 2: The Center Frequencies of the 20 MHz Paired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| B16/B16' (7760 / 8120) | B18/B18' (7800 / 8160) | B20/B20' (7840 / 8200) |
| B17/B17' (7780 / 8140) | B19/B19' (7820 / 8180) | B21/B21' (7860 / 8220) |
| SECOND PRIORITY CHANNELS | | |
| B1/B1' (7160 / 7460) | B11/B11' (7360 / 7660) | B15/B15' (7440 / 7740) |
| B2/B2' (7180 / 7480) | B12/B12' (7380 / 7680) | B31/B31' (8060 / 8420) |
| B3/B3' (7200 / 7500) | B13/B13' (7400 / 7700) | B32/B32' (8080 / 8440) |
| B10/B10' (7340 / 7640) | B14/B14' (7420 / 7720) | B33/B33' (8100 / 8460) |

Table 3: The Center Frequencies of the 10 MHz Paired Channels

¹¹ The term “concatenated channels” means any two or more adjacent channels in the 7125-8500 MHz band joined together for the purpose of accommodating a radio communication system or operation having an emission bandwidth that exceeds the widest channel bandwidth in the channel plan.

¹² In the situation wherein one site is transmitting and receiving multiple 30 MHz bandwidth (BW) channels, unless a site engineering study is performed, precautions should be taken to allow a minimum transmit-receive (T/R) separation of 60 MHz between the transmit and receive frequencies to ensure sufficient isolation between the transmitter and the receiver. In this case, avoid assigning channels A1/A1' and A10/A10' (T/R = 30 MHz between A1' and A10) or A11/A11' and A22/A22' (T/R = 30 MHz between A11' and A22) at a single site.

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| C61/C61' (8055 / 8415) | C63/C63' (8075 / 8435) | |
| C62/C62' (8065 / 8425) | C64/C64' (8085 / 8445) | |
| SECOND PRIORITY CHANNELS | | |
| C1 /C1 ' (7155 / 7455) | C24/C24' (7385 / 7685) | C35/C35' (7795 / 8155) |
| C2 /C2 ' (7165 / 7465) | C25/C25' (7395 / 7695) | C36/C36' (7805 / 8165) |
| C3 /C3 ' (7175 / 7475) | C26/C26' (7405 / 7705) | C37/C37' (7815 / 8175) |
| C4 /C4 ' (7185 / 7485) | C27/C27' (7415 / 7715) | C38/C38' (7825 / 8185) |
| C5 /C5 ' (7195 / 7495) | C28/C28' (7425 / 7725) | C39/C39' (7835 / 8195) |
| C6 /C6 ' (7205 / 7505) | C29/C29' (7435 / 7735) | C40/C40' (7845 / 8205) |
| C19/C19' (7335 / 7635) | C30/C30' (7445 / 7745) | C41/C41' (7855 / 8215) |
| C20/C20' (7345 / 7645) | C31/C31' (7755 / 8115) | C42/C42' (7865 / 8225) |
| C21/C21' (7355 / 7655) | C32/C32' (7765 / 8125) | C65/C65' (8095 / 8455) |
| C22/C22' (7365 / 7665) | C33/C33' (7775 / 8135) | C66/C66' (8105 / 8465) |
| C23/C23' (7375 / 7675) | C34/C34' (7785 / 8145) | |

Table 4: The Center Frequencies of the 5 MHz Paired Channels¹³

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| D62/D62' (8092.5 / 8452.5) | D64/D64' (8102.5 / 8462.5) | |
| D63/D63' (8097.5 / 8457.5) | D65/D65' (8107.5 / 8467.5) | |
| SECOND PRIORITY CHANNELS | | |
| D6 /D6 ' (7152.5 / 7452.5) | D13/D13' (7187.5 / 7487.5) | D56/D56' (8062.5 / 8422.5) |
| D7 /D7 ' (7157.5 / 7457.5) | D14/D14' (7192.5 / 7492.5) | D57/D57' (8067.5 / 8427.5) |
| D8 /D8 ' (7162.5 / 7462.5) | D15/D15' (7197.5 / 7497.5) | D58/D58' (8072.5 / 8432.5) |
| D9 /D9 ' (7167.5 / 7467.5) | D16/D16' (7202.5 / 7502.5) | D59/D59' (8077.5 / 8437.5) |
| D10/D10' (7172.5 / 7472.5) | D17/D17' (7207.5 / 7507.5) | D60/D60' (8082.5 / 8442.5) |
| D11/D11' (7177.5 / 7477.5) | D54/D54' (8052.5 / 8412.5) | D61/D61' (8087.5 / 8447.5) |
| D12/D12' (7182.5 / 7482.5) | D55/D55' (8057.5 / 8417.5) | |

¹³ In the situation wherein one site is transmitting and receiving multiple 20 MHz BW channels, unless a site engineering study is performed, precautions should be taken to allow a minimum T/R separation of 40 MHz between the transmit and receive frequencies to ensure sufficient isolation between the transmitter and the receiver. In this case, avoid assigning channels B1/B1' and B15/B15' (T/R = 20 MHz between B1' and B15) or B16/B16' and B33/B33' (T/R = 20 MHz between B16' and B33) at a single site.

Table 5: The Center Frequencies of the 2.5 MHz Paired Channels¹⁴

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|--------------------------------|--------------------------------|--------------------------------|
| FIRST PRIORITY CHANNELS | | |
| E123/E123' (8091.25/8451.25) | E126/E126' (8098.75 / 8458.75) | E129/E129' (8106.25 / 8466.25) |
| E124/E124' (8093.75/8453.75) | E127/E127' (8101.25 / 8461.25) | E130/E130' (8108.75 / 8468.75) |
| E125/E125' (8096.25/8456.25) | E128/E128' (8103.75 / 8463.75) | |
| SECOND PRIORITY CHANNELS | | |
| E11 /E11 ' (7151.25 / 7451.25) | E25 /E25 ' (7186.25 / 7486.25) | E111/E111' (8061.25 / 8421.25) |
| E12 /E12 ' (7153.75 / 7453.75) | E26 /E26 ' (7188.75 / 7488.75) | E112/E112' (8063.75 / 8423.75) |
| E13 /E13 ' (7156.25 / 7456.25) | E27 /E27 ' (7191.25 / 7491.25) | E113/E113' (8066.25 / 8426.25) |
| E14 /E14 ' (7158.75 / 7458.75) | E28 /E28 ' (7193.75 / 7493.75) | E114/E114' (8068.75 / 8428.75) |
| E15 /E15 ' (7161.25 / 7461.25) | E29 /E29 ' (7196.25 / 7496.25) | E115/E115' (8071.25 / 8431.25) |
| E16 /E16 ' (7163.75 / 7463.75) | E30 /E30 ' (7198.75 / 7498.75) | E116/E116' (8073.75 / 8433.75) |
| E17 /E17 ' (7166.25 / 7466.25) | E31 /E31 ' (7201.25 / 7501.25) | E117/E117' (8076.25 / 8436.25) |
| E18 /E18 ' (7168.75 / 7468.75) | E32 /E32 ' (7203.75 / 7503.75) | E118/E118' (8078.75 / 8438.75) |
| E19 /E19 ' (7171.25 / 7471.25) | E33 /E33 ' (7206.25 / 7506.25) | E119/E119' (8081.25 / 8441.25) |
| E20 /E20 ' (7173.75 / 7473.75) | E34 /E34 ' (7208.75 / 7508.75) | E120/E120' (8083.75 / 8443.75) |
| E21 /E21 ' (7176.25 / 7476.25) | E107/E107' (8051.25 / 8411.25) | E121/E121' (8086.25 / 8446.25) |
| E22 /E22 ' (7178.75 / 7478.75) | E108/E108' (8053.75 / 8413.75) | E122/E122' (8088.75 / 8448.75) |
| E23 /E23 ' (7181.25 / 7481.25) | E109/E109' (8056.25 / 8416.25) | |
| E24 /E24 ' (7183.75 / 7483.75) | E110/E110' (8058.75 / 8418.75) | |

b. Tables 6 through 10 shows the center frequencies of the unpaired-channels in the 7125-8500 MHz channel and their priority status.

Table 6: The Center Frequencies of the 30 MHz Unpaired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| ⁶ A3 (7225) | A6 (7315) ¹⁵ | A5' (7585) |
| ⁶ A4 (7255) | A3' (7525) | A6' (7615) |
| A5 (7285) ¹⁵ | A4' (7555) | |

¹⁴ In the situation wherein one site is transmitting and receiving multiple 10 MHz BW channels, unless a site engineering study is performed, precautions should be taken to allow a minimum T/R separation of 20 MHz between the transmit and receive frequencies to ensure sufficient isolation between the transmitter and the receiver. In this case, avoid assigning channels C1/C1' and C30/C30' (T/R = 10 MHz between C1' and C30) or C31/C31' and C66/C66' (T/R = 10 MHz between C31' and C66) at a single site.

¹⁵ This channel may also be used for pairing with a narrower bandwidth channel in the Unpaired Channels pool (e.g. A3/D'18, or A3/E'35) for applications that have asymmetric radio capacity requirement (i.e. radio capacity requirement in one direction is greater than the other direction).

| SECOND PRIORITY CHANNELS | | |
|--------------------------|-------------|-------------|
| A15 (7885) | A19 (8005) | A17' (8305) |
| A16 (7915) | A20 (8035) | A18' (8335) |
| A17 (7945) | A15' (8245) | A19' (8365) |
| A18 (7975) | A16' (8275) | A20' (8395) |

Table 7: The Center Frequencies of the 20 MHz Unpaired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| B22 (7880) | B26 (7960) | B24' (8280) ¹⁵ |
| B23 (7900) | B27 (7980) | B25' (8300) ¹⁵ |
| B24 (7920) | B22' (8240) ¹⁵ | B26' (8320) ¹⁵ |
| B25 (7940) | B23' (8260) ¹⁵ | B27' (8340) ¹⁵ |
| SECOND PRIORITY CHANNELS | | |
| B4 (7220) | B4' (7520) | B28 (8000) |
| B5 (7240) | B5' (7540) | B29 (8020) |
| B6 (7260) | B6' (7560) | B30 (8040) |
| B7 (7280) | B7' (7580) | B28' (8360) |
| B8 (7300) | B8' (7600) | B29' (8380) |
| B9 (7320) | B9' (7620) | B30' (8400) |

Table 8: The Center Frequencies of the 10 MHz Unpaired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|-------------------------------|-------------------------------|-------------------------------|
| FIRST PRIORITY CHANNELS | | |
| C55 (7995) | C59 (8035) | C57' (8375) ¹⁵ |
| C56 (8005) | C60 (8045) | C58' (8385) ¹⁵ |
| C57 (8015) | C55' (8355) ¹⁵ | C59' (8395) ¹⁵ |
| C58 (8025) | C56' (8365) ¹⁵ | C60' (8405) ¹⁵ |
| SECOND PRIORITY CHANNELS | | |
| C7 (7215) | C11' (7555) | C51 (7955) |
| C8 (7225) | C12' (7565) | C52 (7965) |
| C9 (7235) | C13' (7575) | C53 (7975) |
| C10 (7245) | C14' (7585) | C54 (7985) |
| C11 (7255) | C15' (7595) | C43' (8235) |
| C12 (7265) | C16' (7605) | C44' (8245) |
| C13 (7275) | C17' (7615) | C45' (8255) |
| C14 (7285) | C18' (7625) | C46' (8265) |
| C15 (7295) | C43 (7875) | C47' (8275) |

| | | |
|-------------|------------|-------------|
| C16 (7305) | C44 (7885) | C48' (8285) |
| C17 (7315) | C45 (7895) | C49' (8295) |
| C18 (7325) | C46 (7905) | C50' (8305) |
| C7' (7515) | C47 (7915) | C51' (8315) |
| C8' (7525) | C48 (7925) | C52' (8325) |
| C9' (7535) | C49 (7935) | C53' (8335) |
| C10' (7545) | C50 (7945) | C54' (8345) |

Table 9: The Center Frequencies of the 5 MHz Unpaired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|---------------------------------------|---------------------------------------|---------------------------------------|
| FIRST PRIORITY CHANNELS | | |
| D1 (7127.5) | D5 (7147.5) | D69' (8487.5) |
| D2 (7132.5) | D66' (8472.5) | D70' (8492.5) |
| D3 (7137.5) | D67' (8477.5) | D71' (8497.5) |
| D4 (7142.5) | D68' (8482.5) | |
| SECOND PRIORITY CHANNELS | | |
| D18 (7872.5) | D38 (7972.5) | D22' (7532.5) |
| D19 (7877.5) | D39 (7977.5) | D23' (7537.5) |
| D20 (7882.5) | D40 (7982.5) | D24' (7542.5) |
| D21 (7887.5) | D41 (7987.5) | D25' (7547.5) |
| D22 (7892.5) | D42 (7992.5) | D26' (7552.5) |
| D23 (7897.5) | D43 (7997.5) | D27' (7557.5) |
| D24 (7902.5) | D44 (8002.5) | D28' (7562.5) |
| D25 (7907.5) | D45 (8007.5) | D29' (7567.5) |
| D26 (7912.5) | D46 (8012.5) | D30' (7572.5) |
| D27 (7917.5) | D47 (8017.5) | D31' (7577.5) |
| D28 (7922.5) | D48 (8022.5) | D32' (7582.5) |
| D29 (7927.5) | D49 (8027.5) | D33' (7587.5) |
| D30 (7932.5) | D50 (8032.5) | D34' (7592.5) |
| D31 (7937.5) | D51 (8037.5) | D35' (7597.5) |
| D32 (7942.5) | D52 (8042.5) | D36' (7602.5) |
| D33 (7947.5) | D53 (8047.5) | D37' (7607.5) |
| D34 (7952.5) | D18' (7512.5) | D38' (7612.5) |
| D35 (7957.5) | D19' (7517.5) | D39' (7617.5) |
| D36 (7962.5) | D20' (7522.5) | D40' (7622.5) |
| D37 (7967.5) | D21' (7527.5) | D41' (7627.5) |

Table 10: The Center Frequencies of the 2.5 MHz Unpaired Channels

| Channel (Frequency in MHz) | Channel (Frequency in MHz) | Channel (Frequency in MHz) |
|---------------------------------------|---------------------------------------|---------------------------------------|
| FIRST PRIORITY CHANNELS | | |
| E1 (7126.25) | E9 (7146.25) | E137' (8486.25) |
| E2 (7128.75) | E10 (7148.75) | E138' (8488.75) |
| E3 (7131.25) | E131' (8471.25) | E139' (8491.25) |
| E4 (7133.75) | E132' (8473.75) | E140' (8493.75) |
| E5 (7136.25) | E133' (8476.25) | E141' (8496.25) |
| E6 (7138.75) | E134' (8478.75) | E142' (8498.75) |
| E7 (7141.25) | E135' (8481.25) | |
| E8 (7143.75) | E136' (8483.75) | |
| SECOND PRIORITY CHANNELS | | |
| E35 (7871.25) | E75 (7971.25) | E43' (7531.25) |
| E36 (7873.75) | E76 (7973.75) | E44' (7533.75) |
| E37 (7876.25) | E77 (7976.25) | E45' (7536.25) |
| E38 (7878.75) | E78 (7978.75) | E46' (7538.75) |
| E39 (7881.25) | E79 (7981.25) | E47' (7541.25) |
| E40 (7883.75) | E80 (7983.75) | E48' (7543.75) |
| E41 (7886.25) | E81 (7986.25) | E49' (7546.25) |
| E42 (7888.75) | E82 (7988.75) | E50' (7548.75) |
| E43 (7891.25) | E83 (7991.25) | E51' (7551.25) |
| E44 (7893.75) | E84 (7993.75) | E52' (7553.75) |
| E45 (7896.25) | E85 (7996.25) | E53' (7556.25) |
| E46 (7898.75) | E86 (7998.75) | E54' (7558.75) |
| E47 (7901.25) | E87 (8001.25) | E55' (7561.25) |
| E48 (7903.75) | E88 (8003.75) | E56' (7563.75) |
| E49 (7906.25) | E89 (8006.25) | E57' (7566.25) |
| E50 (7908.75) | E90 (8008.75) | E58' (7568.75) |
| E51 (7911.25) | E91 (8011.25) | E59' (7571.25) |
| E52 (7913.75) | E92 (8013.75) | E60' (7573.75) |
| E53 (7916.25) | E93 (8016.25) | E61' (7576.25) |
| E54 (7918.75) | E94 (8018.75) | E62' (7578.75) |
| E55 (7921.25) | E95 (8021.25) | E63' (7581.25) |
| E56 (7923.75) | E96 (8023.75) | E64' (7583.75) |
| E57 (7926.25) | E97 (8026.25) | E65' (7586.25) |
| E58 (7928.75) | E98 (8028.75) | E66' (7588.75) |
| E59 (7931.25) | E99 (8031.25) | E67' (7591.25) |
| E60 (7933.75) | E100 (8033.75) | E68' (7593.75) |
| E61 (7936.25) | E101 (8036.25) | E69' (7596.25) |
| E62 (7938.75) | E102 (8038.75) | E70' (7598.75) |
| E63 (7941.25) | E103 (8041.25) | E71' (7601.25) |
| E64 (7943.75) | E104 (8043.75) | E72' (7603.75) |

| | | |
|---------------|----------------|----------------|
| E65 (7946.25) | E105 (8046.25) | E73' (7606.25) |
| E66 (7948.75) | E106 (8048.75) | E74' (7608.75) |
| E67 (7951.25) | E35' (7511.25) | E75' (7611.25) |
| E68 (7953.75) | E36' (7513.75) | E76' (7613.75) |
| E69 (7956.25) | E37' (7516.25) | E77' (7616.25) |
| E70 (7958.75) | E38' (7518.75) | E78' (7618.75) |
| E71 (7961.25) | E39' (7521.25) | E79' (7621.25) |
| E72 (7963.75) | E40' (7523.75) | E80' (7623.75) |
| E73 (7966.25) | E41' (7526.25) | E81' (7626.25) |
| E74 (7968.75) | E42' (7528.75) | E82' (7628.75) |

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