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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: IMPLEMENTATION OF 50 kHz/Y CHANNELS FOR ILS/VOR/DME

1. **PURPOSE.** This circular advises aircraft owners, operators and radio equipment manufacturers of plans for future implementation of split channel assignments in the aeronautical radio navigation bands.
2. **GENERAL.** Rapidly expanding aviation services have resulted in the need for additional instrument landing systems and enroute navigational aids. The resulting problem of radio frequency congestion for ILS and VOR systems has become acute in the Boston/New York/Washington, Chicago/Detroit, and San Francisco/Los Angeles areas. Planned ILS systems will enlarge the congestion areas.

The shortage has now reached the stage where it is impossible to provide frequencies for all proposed navigational aids. Additionally, limitations have been imposed on new or renewal license applications to assure accommodation of certain planned National Airspace System ground facilities.

Geographical separation criteria have been refined and computer techniques developed to ensure optimum utilization of all channels now available.

Computer analysis has been made of alternate assignment schemes, including the possibilities of complete re-frequencing of all existing facilities, in order to ascertain if relief could be obtained. Only minimal benefits were indicated. Since the navigational aid band is sandwiched between the FM broadcast band and the aeronautical mobile communication band, a wider band to provide additional frequencies is not available.

The next logical step toward providing additional frequencies for new facilities will be implementation of 50 kHz VOR and ILS channels and the associated "Y" DME channels. For VOR and ILS this means

use of the mid point frequencies, 110.35, 116.15, for examples, between the existing 110.30 and 110.40, and 116.10 and 116.20 MHz channels. A corresponding change in the 962-1213 MHz band will provide the additional paired DME channels. For convenience, the channel designators X for the existing and Y for future channels are used in the proposed assignment plan as portrayed in Attachment I. This plan is approved, basically, in Annex 10, ICAO, International Standards and Recommended Practices.

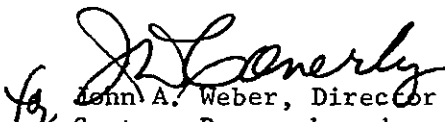
Action is now under way to establish national and international schedules for implementation. A target date of January 1, 1973 is proposed for beginning national use. It should be understood that the new frequencies will only be used where necessary to accommodate new facilities in the congested areas. There should be no effect on operators in non-congested areas, unless they wish to fly into or near the areas where the new frequencies are being used.

3. AIRCRAFT EQUIPMENT. This circular, in addition to advising of the new frequencies, is also intended as advance notice that aircraft equipment which is not configured for the new channels may have limited service life expectancy, depending on its area of use.

Modern air carrier ILS/VOR receivers with 50 kHz channel selection capability are understood to be capable of split channel operation now or with a minor modification. The associated DME equipment is considered to be in the same category.

General aviation hardware, for the most part, has no provision for 50 kHz ILS/VOR or Y channel DME. Not only will the older model receivers not tune to the new channels, but the receiver bandpass characteristics will not permit their use in the new frequency environment. One of these receivers being used on a 100 kHz facility, could receive disruptive interference from an adjacent 50 kHz channel. Means of modification of crystal controlled equipment for operation on 50 kHz channels are being studied.

4. SUMMARY. Radio frequency congestion in certain areas makes it necessary to implement split channel assignments to accommodate new facilities in those areas. Aircraft equipment which is not configured, by original design or carefully engineered modification, for the new channel arrangement may not operate safely in the new environment. Aircraft operators are advised to consider this when purchasing or replacing radio equipment.


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VHF/UHF NAV AID
FREQUENCY CHANNELING AND PAIRING

Channel	VOR MHz	DME/TACAN				ILS	
		Airborne		Ground		Localizer MHz	Glide Slope MHz
		Int. Freq. MHz	Pulse Code u sec	Reply Freq. MHz	Pulse Code u sec		
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		
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	108.2	1043	12	980	12		
19Y	108.25	1043	36	1106	30		
20X		1044	12	981	12	108.3	334.10
20Y		1044	36	1107	30	108.35	333.95
21X	108.4	1045	12	982	12		
21Y	108.45	1045	36	1108	30		
22X		1046	12	983	12	108.5	329.90
22Y		1046	36	1109	30	108.55	329.75
23X	108.6	1047	12	984	12		
23Y	108.65	1047	36	1110	30		

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		
24X	108.8	1048	12	985	12	108.7	330.50
24Y		1048	36	1111	30	108.75	330.35
25X		1049	12	986	12		
25Y		1049	36	1112	30		
26X	108.85	1050	12	987	12	108.9	329.30
26Y		1050	36	1113	30	108.95	329.15
27X		1051	12	988	12		
27Y		1051	36	1114	30		
28X	109.00	1052	12	989	12	109.1	331.40
28Y		1052	36	1115	30	109.15	331.25
29X		1053	12	990	12		
29Y		1053	36	1116	30		
30X	109.2	1054	12	991	12	109.3	332.00
30Y		1054	36	1117	30	109.35	331.85
31X		1055	12	992	12		
31Y		1055	36	1118	30		
32X	109.4	1056	12	993	12	109.50	332.60
32Y		1056	36	1119	30	109.55	332.45
33X		1057	12	994	12		
33Y		1057	36	1120	30		
34X	109.6	1058	12	995	12	109.70	333.20
34Y		1058	36	1121	30	109.75	333.05
35X		1059	12	996	12		
35Y		1059	36	1122	30		
36X	109.8	1060	12	997	12	109.90	333.80
36Y		1060	36	1123	30	109.95	333.65
37X		1061	12	998	12		
37Y		1061	36	1124	30		
38X	110.00	1062	12	999	12	110.1	334.40
38Y		1062	36	1125	30	110.15	334.25
39X		1063	12	1000	12		
39Y		1063	36	1126	30		
40X	110.2	1064	12	1001	12	110.3	335.00
40Y		1064	36	1127	30	110.35	334.85
41X		1065	12	1002	12		
41Y		1065	36	1128	30		
42X	110.4	1066	12	1003	12	110.5	329.60
42Y		1066	36	1129	30	110.55	329.45
43X		1067	12	1004	12		
43Y		1067	36	1130	30		
44X	110.6	1068	12	1005	12	110.70	330.20
44Y		1068	36	1131	30	110.75	330.05
45X		1069	12	1006	12		
45Y		1069	36	1132	30		
46X	110.8	1070	12	1007	12	110.90	330.80
46Y		1070	36	1133	30	110.95	330.65

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		
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	332.9
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	333.5
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	331.1
56Y		1080	36	1143	30	111.95	330.95
57X	112.00	1081	12	1018	12		
57Y	112.05	1081	36	1144	30		
58X	112.10	1082	12	1019	12		
58Y	112.15	1082	36	1145	30		
59X	112.50	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		

Channel	VOR MHz	DME/TACAN				ILS	
		Airborne		Ground		Localizer MHz	Glide Slope MHz
		Int. Freq. MHz	Pulse Code u sec	Reply Freq. MHz	Pulse Code u sec		
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	26	1038	30		
78X	113.10	1102	12	1165	12		
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	1042	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		

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		
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		
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	116.10	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	116.50	1136	12	1199	12		
112Y	116.55	1136	36	1073	30		
113X	116.60	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		

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		
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		
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		