

Railroad Radio Future

By Mike Harris & Bill Martin ©

Starting in June of 2010 and ending in 2013 all two-way radios for railroad use will be converting to comply with new technical rules for voice and eventually digital communication modes.

If the volume level seems low when you are listening to the Railroad frequencies, you are hearing the first change. Explained below is insight into what is happening, when it is happening, how it affects Regional Railroads, Contract Operators, Switching Operations and what you need to do about it.

Those of you that have heard about this have asked for more detail. I will offer the short answers then delve lightly into the technical aspects. First, if your existing two-way radio (mobile, base or handheld) was manufactured since 1997 you don't need to do anything before Jan. 2013. If not, you will still be able to use them as you have been up until Jan. 2013. After that, you probably can still receive but not legally transmit with them. Though the change will affect all Business Band radio devices, I am specifically addressing the radios we use to communicate with the railroad personnel on our various moves.

Overview

Two-way radios for use on the railroads and all business band radios will be changing. Currently we use VHF FM in the 160.215 to 161.565 Megahertz (MHz) range for voice communications with train crews and stations. With the introduction of newer technologies and devices, the railroads and other industries have expressed a desire for more radio channels for their communications. The Federal Communication Commission (FCC) saw the opportunity to expand their fee base by selling licenses on these additional frequencies and implemented changes to the rules that take effect on Jan. 1, 2013.

The Rules

By January 1, 2013 all two-way radios governed by Federal Communications Commission Part 90 Land Mobile Radio Service rules, operating in the 150-174 MHz and 421-512 MHz frequency band, must meet certain new technical requirements (47 C.F.R. 90.203(j), 90.209(b)). The new requirements are designed to increase the number of operating frequencies (channels) for all services currently operating there. The new rules also allow for (but do not require) existing frequency spectrum to use digital communication modes.

Implementation

To accomplish the frequency expansion the existing bandwidth (frequency spread) used for each channel is being reduced. The FCC has mandated that since 1997 all two-way radio manufacturers offer only equipment that accommodates the new rules. The bandwidth reduction has happened before as electronics technology has advanced. The two-way radio industry has endured this event at least twice in the past 40 years and most everyone has survived. This is similar to what we have recently experienced with the change to Digital Television.

The Railroad Radio Band is currently arranged with 96 channels spaced 15 Kilohertz (KHz) apart. With the addition of a new channel between each existing channel, 96 new operating channels are created, ending up with 192 channels spaced 7.5 KHz apart.

Key Dates

June 1, 2010, the AAR has started the change over to narrow banding for locomotives used in interchange and may complete the change before the required drop dead date of January 1, 2013 set by the FCC. The AAR has been instrumental in aligning the railroads in the implementation plan to avoid the political problems encountered by the Public Safety and Local Government agencies.

January 1, 2011, the FCC will no longer permit the sale of wideband radios.

January 1, 2013, all Industrial/Business and Public Safety Radios must operate on the narrower channels.

The Railroads

The Class 1 Railroads, including Amtrak, have implemented definitive plans for compliance. The switch to narrow band equipment includes portable handheld radios, mobile units, and base stations alike. The towers, antennas, and power sources do not need to be changed only the radios. Some are embracing the digital modes for utility and secure applications such as Railroad Police.

Selected Equipment

The railroads plan to use the following "FCC Type Accepted" equipment:

BNSF: Kenwood TK-290 & TK-2180 portables, some Motorolas,
Kenwood TK-790 & 740 mobiles.

CSX:

Icom portables, Motorola mobiles and Kenwood portables.

Norfolk Southern:

Kenwood TK-290 portables, unknown mobiles.

UPRR:

Kenwood TK-290 & TK-2180 portables.

P&W, MBTA & Amtrak (nationwide):

Icom F5061 mobile and the F3161 portable.

Motorola has apparently abandoned the railroad market. While Icom and Kenwood have partnered in the development of a digital mode called NextEdge (NXDN) none of the radios listed above support the digital mode. These radios will not become obsolete when the digital mode is used, as the digital mode fits in between the channels used by these radios.

Private Car and Railroad Operators

You will have to assess your current equipment to see if it can work with the new narrow banding. If it does, reprogramming is probably all you will need. If it does not, prepare to spend some money. The changes to a radio are almost always done with a change to the software operating program of the radio and not by tweaking or an adjustment. There is no indication that the dates will be extended like we experienced for the DTV changeover. The FCC has not approved any 'kits' to modify non-compliant equipment into compliance.

Railroad, Switching Operations and PV operators using Motorola brand radios must contact a Motorola dealer such as Railcom (901-755-1514, www.railcom.net), for assistance in narrow banding. Motorola has very strict controls for its programming software and equipment for their radios.

Railroad, Switching Operations and PV operators using Kenwood, Icom, Bendix/King, Johnson, and other brands of commercial radios can not only be assisted by the dealers, but many times can find reprogramming equipment and software on the internet (eBay).

The good news is that 'digital' modes required for current types of communication are still a few years away. Digital modes will probably be initially implemented for large yard operations using a trunked repeater system. Also the new rules do not apply to FCC Part 95 (FRS, GMRS, MURS Radios) or to Part 97 (Amateur Radio) or National Weather Service broadcasts. The two-way radios and scanners you currently operate can still monitor the narrow band frequency in FM analog mode. The volume will have to be adjusted to hear the lower signal deviation though. The two-way's must not be used to transmit after Jan. 1, 2013 without modification. At this time there are no scanner manufacturers offering 'railroad digital mode' receivers but that may change.

Conclusion

Railroad (and business) radio is changing. The FCC will not jump on you the first day for non-compliance because they don't have the manpower. Sooner or later though, someone on an adjacent channel will receive interference from you and will complain about it, hopefully to you and not to the people (FCC) that rammed the new requirements down their throat. If the FCC eventually gets around to finding out where the interference came

from, the fines are stiff (up to \$20k). Prices for some of the Kenwood mobile radios are in the \$500 range. Handheld radios are in the \$1100-\$1500 range, but still a lot cheaper than a citation.

Another thing that requires attention is that all licenses you might currently have for radios in this (or any affected) service must be modified to include the new emission type (i.e., 20K0F3E in addition to 7K60FXE or 4K00F1E, or other) by **January 1, 2013**. Consult with your local radio supplier for assistance in doing this. More information to be available as the date draws closer. The future will be now before you know it. So you should start thinking about getting rid of your 20 year old radios. Consult your local radio supplier to explore the pricing opportunities. They have 'Sales' like any other retailer. This is your early warning.

References & Resources

http://tech.groups.yahoo.com/group/LMR_Narrowbanding/
http://wiki.radioreference.com/index.php/Narrowband_VHF_Railroad_Frequencies
http://www.dpdproductions.com/page_rrfreqs_newplan.html
http://www.nxdn-forum.com/aboutnxdn/data/Information_paper_nxdn.pdf
http://www.railcom.net/fcc_rr_qa.htm
http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-2589A1.pdf
<http://www.narrowbandinglaw.com/rules.html>

The next page lists the AAR channels and the frequencies of the new narrow band.

AAR Channels and Frequencies for Narrow Banding. The original channels are numbered 02 to 97. The new channels are numbered in the 100's, 104 to 197.

Future Railroad Band Plan		06	160.200	11	160.275	16	160.350
CH #	(MHz)	106	160.2075	111	160.2825	116	160.3575
02	159.810	07	160.215	12	160.290	17	160.365
03	159.930	107	160.2225	112	160.2975	117	160.3725
04	160.050	08	160.230	13	160.305	18	160.380
104	160.1775	108	160.2375	113	160.3125	118	160.3875
05	160.185	09	160.245	14	160.320	19	160.395
105	160.1925	109	160.2525	114	160.3275	119	160.4025
		10	160.260	15	160.335	20	160.410
		110	160.2675	115	160.3425	120	160.4175

21	160.425
121	160.4325
22	160.440
122	160.4475
23	160.455
123	160.4625
24	160.470
124	160.4775
25	160.485
125	160.4925
26	160.500
126	160.5075
27	160.515
127	160.5225
28	160.530
128	160.5375
29	160.545
129	160.5525
30	160.560
130	160.5675
31	160.575
131	160.5825
32	160.590
132	160.5975
33	160.605
133	160.6125
34	160.620
134	160.6275
35	160.635
135	160.6425
36	160.650
136	160.6575
37	160.665
137	160.6725
38	160.680
138	160.6875
39	160.695
139	160.7025
40	160.710
140	160.7175
41	160.725
141	160.7325
42	160.740
142	160.7475
43	160.755
143	160.7625
44	160.770
144	160.7775
45	160.785
145	160.7925
46	160.800
146	160.8075

47	160.815
147	160.8225
48	160.830
148	160.8375
49	160.845
149	160.8525
50	160.860
150	160.8675
51	160.875
151	160.8825
52	160.890
152	160.8975
53	160.905
153	160.9125
54	160.920
154	160.9275
55	160.935
155	160.9425
56	160.950
156	160.9575
57	160.965
157	160.9725
58	160.980
158	160.9875
59	160.995
159	161.0025
60	161.010
160	161.0175
61	161.025
161	161.0325
62	161.040
162	161.0475
63	161.055
163	161.0625
64	161.070
164	161.0775
65	161.085
165	161.0925
66	161.100
166	161.1075
67	161.115
167	161.1225
68	161.130
168	161.1375
69	161.145
169	161.1525
70	161.160
170	161.1675
71	161.175
171	161.1825
72	161.190
172	161.1975

73	161.205
173	161.2125
74	161.220
174	161.2275
75	161.235
175	161.2425
76	161.250
176	161.2575
77	161.265
177	161.2725
78	161.280
178	161.2875
79	161.295
179	161.3025
80	161.310
180	161.3175
81	161.325
181	161.3325
82	161.340
182	161.3475
83	161.355
183	161.3625
84	161.370
184	161.3775
85	161.385
185	161.3925
86	161.400
186	161.4075
87	161.415
187	161.4225
88	161.430
188	161.4375
89	161.445
189	161.4525
90	161.460
190	161.4675
91	161.475
191	161.4825
92	161.490
192	161.4975
93	161.505
193	161.5125
94	161.520
194	161.5275
95	161.535
195	161.5425
96	161.550
196	161.5575
97	161.565
197	161.5725

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