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FreeWave Technologies, Inc.

225-400 MHz User Manual Addendum

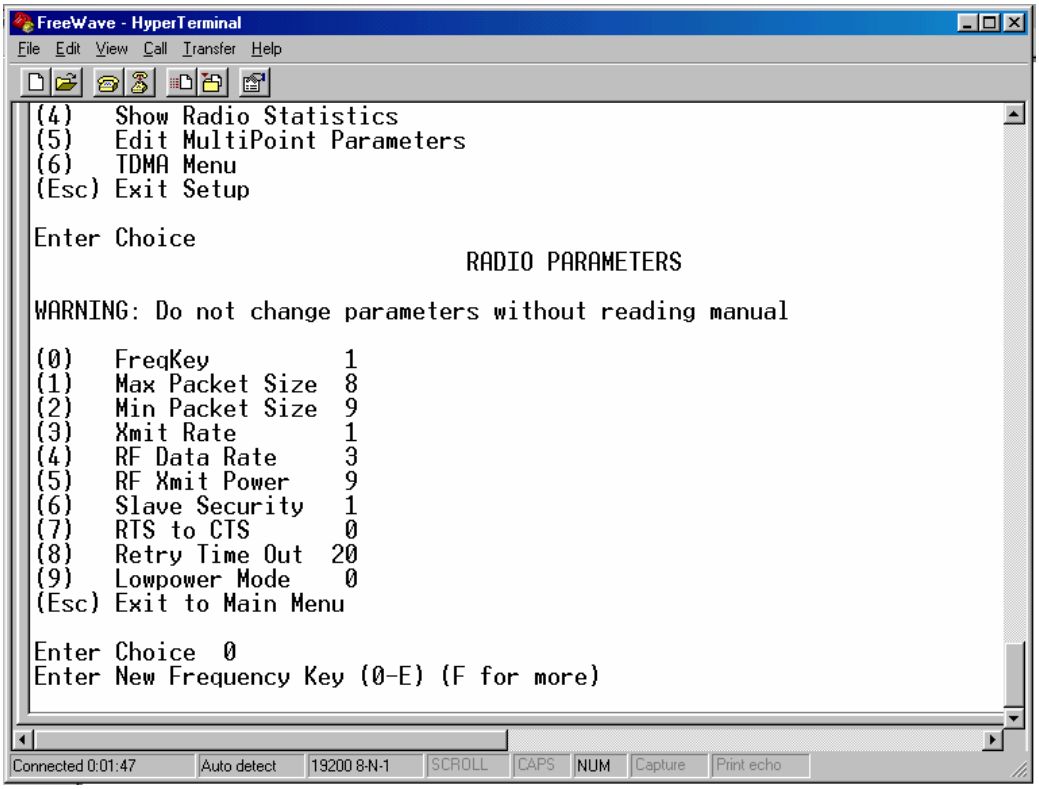
The FreeWave Technologies 225-400 MHz (DGBRxxx) transceivers operate in substantially the same manner as the 900 MHz and 2.4 GHz transceivers. They may be operated in point to point, multipoint, and repeater modes, with essentially the same parameter options.

The one difference is in the operation of the Frequency Key, and consequently setting of the frequencies used. The DGBRxxx family of transceivers may be set up to operate in single frequency mode or as a frequency hopping transceiver, utilizing all or any part of the 225-400 MHz band.

***Note**: All DGBRxxx transceivers used in a network must be set to identical frequency parameters.*

To set the frequencies to be used (either single channel or frequency hopping) enter the Radio Parameters section of the transceiver's setup menu, as shown in Figure 1 (how to get into this menu is described in more detail in the User Manual).

Figure 1: Radio Parameters Menu



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Operation in Frequency Hopping Mode

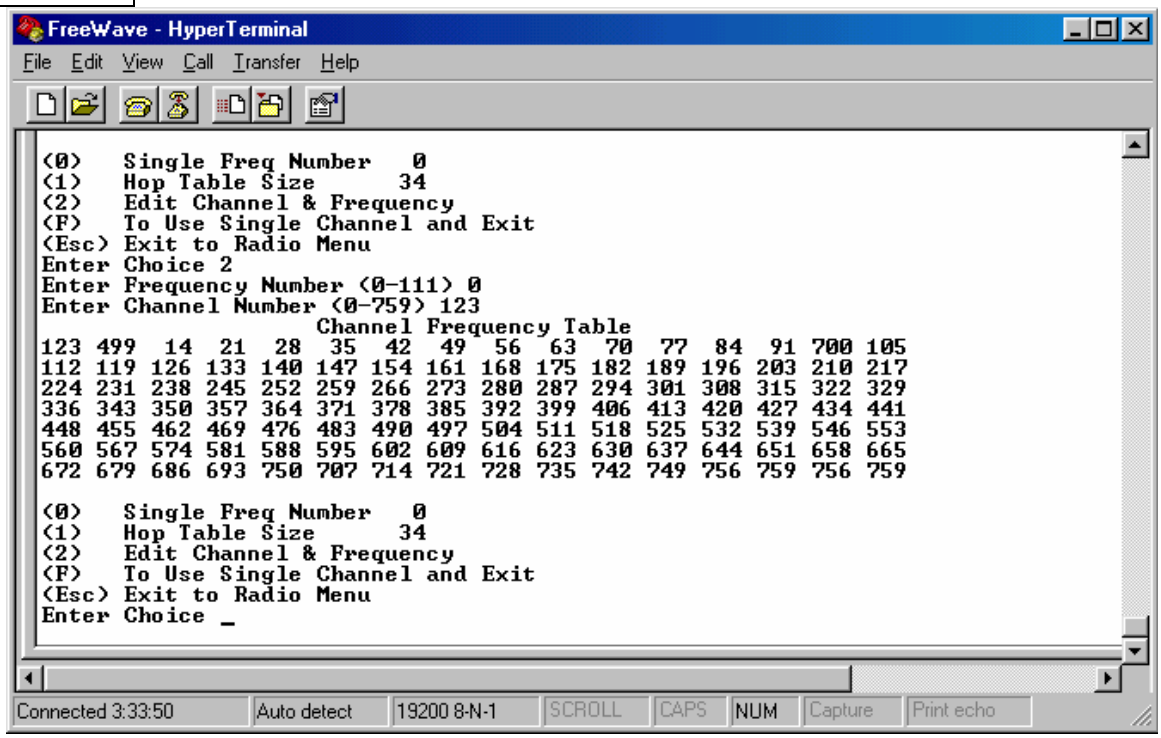
The DGBRxxx family of transceivers may be set up to use anywhere from 2 to 112 frequencies when in frequency hopping mode. The transceiver is programmable to use any of the frequencies listed in Appendix A.

To operate the transceiver in frequency hopping mode:

1. If the transceiver is set in single frequency mode change it back to frequency hopping by selecting a frequency key between 0 through 9 or *a* through *e*. If the transceiver is set to single frequency mode the FreqKey setting will read Single Channel.
2. Set the Hop Table size. The size of the Hop Table may be anywhere between 2 and 112 frequencies. The Hop Table size is set by with the following steps:
    - Choose 3 from the Main Menu (Edit Radio Transmission Characteristics)
    - Choose 0 from the Radio Parameters menu (FreqKey)
    - Enter F when prompted for a New Frequency Key. After choosing F the menu in Figure 2 will appear. At this point choose (1) Hop Table Size, enter the number of frequencies you wish to hop across and press *enter*.
3. Edit the channels / frequencies for the transceiver to use. This is accomplished by choosing (2) Edit Channel & Frequency from the same menu used to set the Hop Table Size.
    - You will then be prompted to choose the specific frequency you wish to edit (Enter Frequency Number (0-111), after entering that parameter press return.
    - You will then be prompted to enter the channel number to use (Enter Channel Number (0-759), once again press return after entering the parameter.
    - This process should be followed until all frequencies being used have been entered. Figure 2 shows the process to modify frequency 0 to use channel 123, and then resulting entry in position 0 (the top left corner of the Channel Frequency Table).

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Figure 2: Channel & Frequency Menu



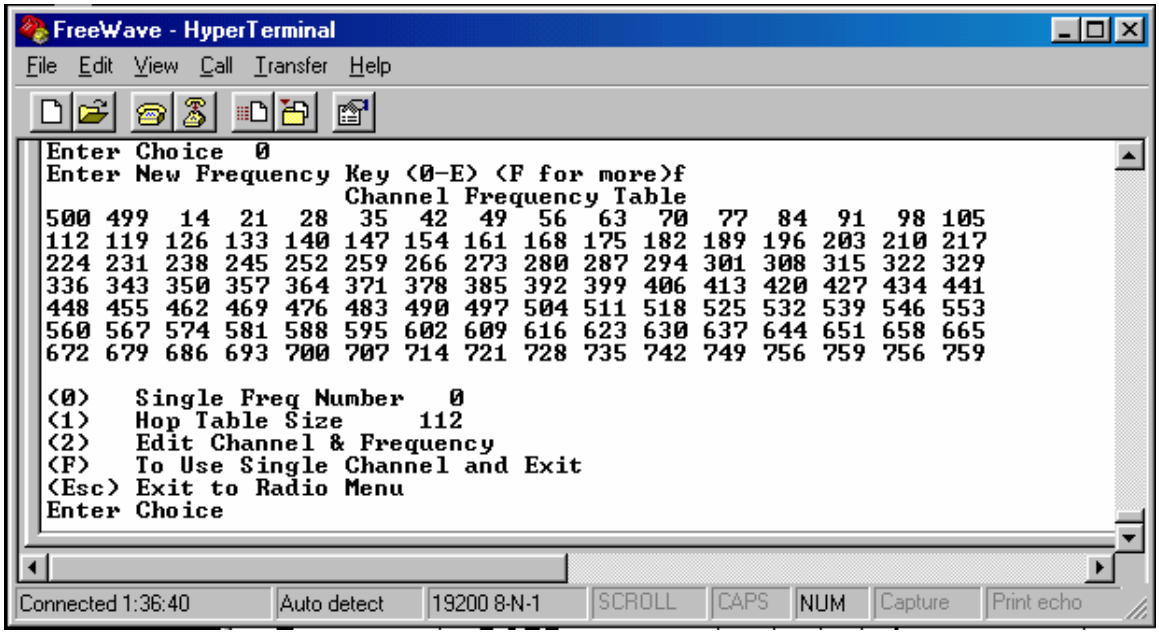
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Operation in Single Frequency Mode

To operate the DGBRxxx transceiver in single frequency mode two steps must be followed:

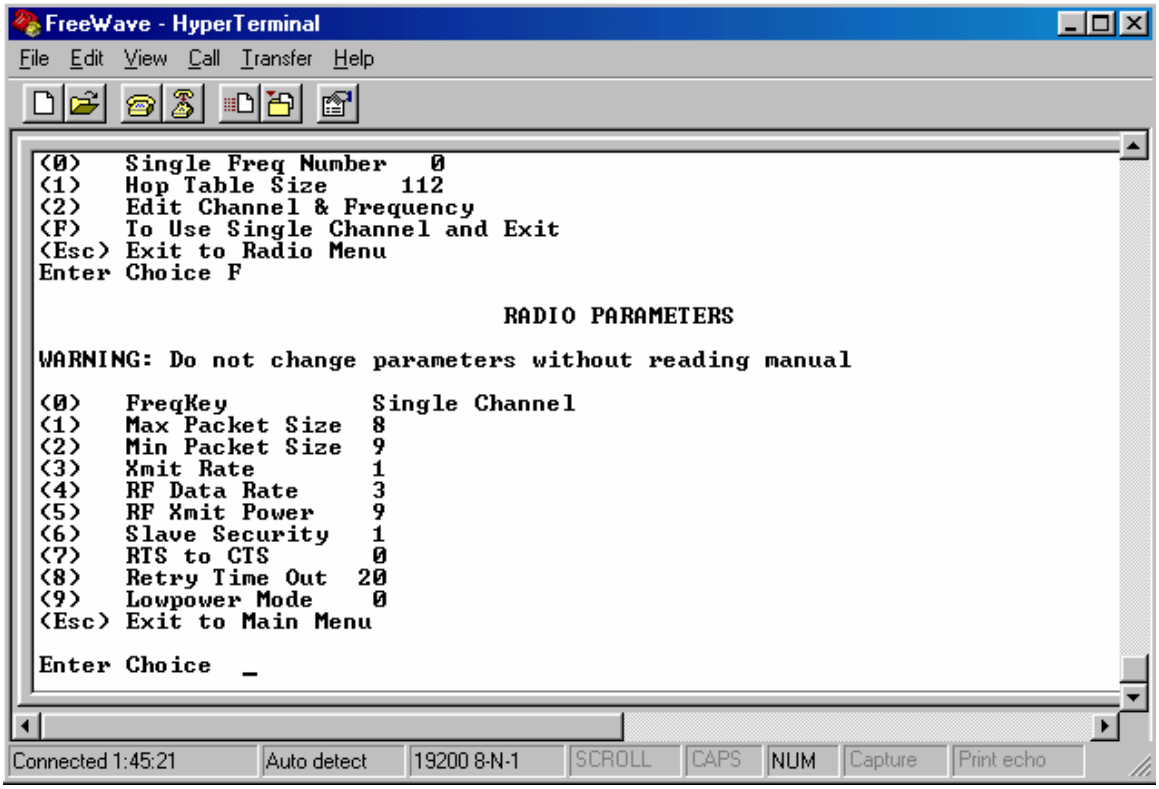
1. Set the transceiver up in single frequency mode. This is accomplished by the following:
   - Choose 3 from the Main Menu (Edit Radio Transmission Characteristics)
   - Choose 0 from the Radio Parameters menu (FreqKey)
   - Enter F when prompted for a New Frequency Key
   - After entering F the menu shown below will appear. To enable the single frequency mode choose F. Once this has been done correctly the FreqKey setting will read Single Channel as shown in Figure 4.

Figure 3: Channel & Frequency Menu



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Figure 4: 225-400MHz Transceiver set to Single Channel



2. Choose the frequency to use. Once the transceiver has been set up in single frequency mode the frequency to use must be chosen. There are two steps to this process:
    1. Select the Frequency Number to use between 0 and 111
    2. Program the Channel Number desired for that Frequency Number.

    The following example shows how to set the transceiver up to operate in single frequency mode, frequency number 5, at 340.992 MHz:
    1. When in the Main Menu enter (3) Enter Radio Transmission Characteristics
    2. Enter (0) FreqKey
    3. Enter F (F for More)
    4. Enter (0) Single Freq Number
    5. You will be prompted to Enter Frequency to Use (0-111). Enter 5 and press return.
    6. Enter (2) Edit Channel & Frequency. You will be prompted to Enter Frequency Number (0-111). Enter 5 and press return.
    7. You will be prompted to Enter Channel Number (0-759). Enter 623 and press return. In Appendix A channel 623 corresponds to 340.992 MHz.
    8. Finally type F which will instruct the transceiver to operate in single frequency mode, and FreqKey will now display Single Channel.

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Appendix A

DGBRxxx Channel Numbers and Frequencies Used

Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz
0	225.1008	40	234.3168	80	243.5328	120	252.7488
1	225.3312	41	234.5472	81	243.7632	121	252.9792
2	225.5616	42	234.7776	82	243.9936	122	253.2096
3	225.7920	43	235.0080	83	244.2240	123	253.4400
4	226.0224	44	235.2384	84	244.4544	124	253.6704
5	226.2528	45	235.4688	85	244.6848	125	253.9008
6	226.4832	46	235.6992	86	244.9152	126	254.1312
7	226.7136	47	235.9296	87	245.1456	127	254.3616
8	226.9440	48	236.1600	88	245.3760	128	254.5920
9	227.1744	49	236.3904	89	245.6064	129	254.8224
10	227.4048	50	236.6208	90	245.8368	130	255.0528
11	227.6352	51	236.8512	91	246.0672	131	255.2832
12	227.8656	52	237.0816	92	246.2976	132	255.5136
13	228.0960	53	237.3120	93	246.5280	133	255.7440
14	228.3264	54	237.5424	94	246.7584	134	255.9744
15	228.5568	55	237.7728	95	246.9888	135	256.2048
16	228.7872	56	238.0032	96	247.2192	136	256.4352
17	229.0176	57	238.2336	97	247.4496	137	256.6656
18	229.2480	58	238.4640	98	247.6800	138	256.8960
19	229.4784	59	238.6944	99	247.9104	139	257.1264
20	229.7088	60	238.9248	100	248.1408	140	257.3568
21	229.9392	61	239.1552	101	248.3712	141	257.5872
22	230.1696	62	239.3856	102	248.6016	142	257.8176
23	230.4000	63	239.6160	103	248.8320	143	258.0480
24	230.6304	64	239.8464	104	249.0624	144	258.2784
25	230.8608	65	240.0768	105	249.2928	145	258.5088
26	231.0912	66	240.3072	106	249.5232	146	258.7392
27	231.3216	67	240.5376	107	249.7536	147	258.9696
28	231.5520	68	240.7680	108	249.9840	148	259.2000
29	231.7824	69	240.9984	109	250.2144	149	259.4304
30	232.0128	70	241.2288	110	250.4448	150	259.6608
31	232.2432	71	241.4592	111	250.6752	151	259.8912
32	232.4736	72	241.6896	112	250.9056	152	260.1216
33	232.7040	73	241.9200	113	251.1360	153	260.3520
34	232.9344	74	242.1504	114	251.3664	154	260.5824
35	233.1648	75	242.3808	115	251.5968	155	260.8128
36	233.3952	76	242.6112	116	251.8272	156	261.0432
37	233.6256	77	242.8416	117	252.0576	157	261.2736
38	233.8560	78	243.0720	118	252.2880	158	261.5040
39	234.0864	79	243.3024	119	252.5184	159	261.7344

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Appendix A Continued

Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz
160	261.9648	200	271.1808	240	280.3968	280	289.6128
161	262.1952	201	271.4112	241	280.6272	281	289.8432
162	262.4256	202	271.6416	242	280.8576	282	290.0736
163	262.6560	203	271.8720	243	281.0880	283	290.3040
164	262.8864	204	272.1024	244	281.3184	284	290.5344
165	263.1168	205	272.3328	245	281.5488	285	290.7648
166	263.3472	206	272.5632	246	281.7792	286	290.9952
167	263.5776	207	272.7936	247	282.0096	287	291.2256
168	263.8080	208	273.0240	248	282.2400	288	291.4560
169	264.0384	209	273.2544	249	282.4704	289	291.6864
170	264.2688	210	273.4848	250	282.7008	290	291.9168
171	264.4992	211	273.7152	251	282.9312	291	292.1472
172	264.7296	212	273.9456	252	283.1616	292	292.3776
173	264.9600	213	274.1760	253	283.3920	293	292.6080
174	265.1904	214	274.4064	254	283.6224	294	292.8384
175	265.4208	215	274.6368	255	283.8528	295	293.0688
176	265.6512	216	274.8672	256	284.0832	296	293.2992
177	265.8816	217	275.0976	257	284.3136	297	293.5296
178	266.1120	218	275.3280	258	284.5440	298	293.7600
179	266.3424	219	275.5584	259	284.7744	299	293.9904
180	266.5728	220	275.7888	260	285.0048	300	294.2208
181	266.8032	221	276.0192	261	285.2352	301	294.4512
182	267.0336	222	276.2496	262	285.4656	302	294.6816
183	267.2640	223	276.4800	263	285.6960	303	294.9120
184	267.4944	224	276.7104	264	285.9264	304	295.1424
185	267.7248	225	276.9408	265	286.1568	305	295.3728
186	267.9552	226	277.1712	266	286.3872	306	295.6032
187	268.1856	227	277.4016	267	286.6176	307	295.8336
188	268.4160	228	277.6320	268	286.8480	308	296.0640
189	268.6464	229	277.8624	269	287.0784	309	296.2944
190	268.8768	230	278.0928	270	287.3088	310	296.5248
191	269.1072	231	278.3232	271	287.5392	311	296.7552
192	269.3376	232	278.5536	272	287.7696	312	296.9856
193	269.5680	233	278.7840	273	288.0000	313	297.2160
194	269.7984	234	279.0144	274	288.2304	314	297.4464
195	270.0288	235	279.2448	275	288.4608	315	297.6768
196	270.2592	236	279.4752	276	288.6912	316	297.9072
197	270.4896	237	279.7056	277	288.9216	317	298.1376
198	270.7200	238	279.9360	278	289.1520	318	298.3680
199	270.9504	239	280.1664	279	289.3824	319	298.5984

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Appendix A Continued

Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz
320	298.8288	360	308.0448	400	317.2608	440	326.4768
321	299.0592	361	308.2752	401	317.4912	441	326.7072
322	299.2896	362	308.5056	402	317.7216	442	326.9376
323	299.5200	363	308.7360	403	317.9520	443	327.1680
324	299.7504	364	308.9664	404	318.1824	444	327.3984
325	299.9808	365	309.1968	405	318.4128	445	327.6288
326	300.2112	366	309.4272	406	318.6432	446	327.8592
327	300.4416	367	309.6576	407	318.8736	447	328.0896
328	300.6720	368	309.8880	408	319.1040	448	328.3200
329	300.9024	369	310.1184	409	319.3344	449	328.5504
330	301.1328	370	310.3488	410	319.5648	450	328.7808
331	301.3632	371	310.5792	411	319.7952	451	329.0112
332	301.5936	372	310.8096	412	320.0256	452	329.2416
333	301.8240	373	311.0400	413	320.2560	453	329.4720
334	302.0544	374	311.2704	414	320.4864	454	329.7024
335	302.2848	375	311.5008	415	320.7168	455	329.9328
336	302.5152	376	311.7312	416	320.9472	456	330.1632
337	302.7456	377	311.9616	417	321.1776	457	330.3936
338	302.9760	378	312.1920	418	321.4080	458	330.6240
339	303.2064	379	312.4224	419	321.6384	459	330.8544
340	303.4368	380	312.6528	420	321.8688	460	331.0848
341	303.6672	381	312.8832	421	322.0992	461	331.3152
342	303.8976	382	313.1136	422	322.3296	462	331.5456
343	304.1280	383	313.3440	423	322.5600	463	331.7760
344	304.3584	384	313.5744	424	322.7904	464	332.0064
345	304.5888	385	313.8048	425	323.0208	465	332.2368
346	304.8192	386	314.0352	426	323.2512	466	332.4672
347	305.0496	387	314.2656	427	323.4816	467	332.6976
348	305.2800	388	314.4960	428	323.7120	468	332.9280
349	305.5104	389	314.7264	429	323.9424	469	333.1584
350	305.7408	390	314.9568	430	324.1728	470	333.3888
351	305.9712	391	315.1872	431	324.4032	471	333.6192
352	306.2016	392	315.4176	432	324.6336	472	333.8496
353	306.4320	393	315.6480	433	324.8640	473	334.0800
354	306.6624	394	315.8784	434	325.0944	474	334.3104
355	306.8928	395	316.1088	435	325.3248	475	334.5408
356	307.1232	396	316.3392	436	325.5552	476	334.7712
357	307.3536	397	316.5696	437	325.7856	477	335.0016
358	307.5840	398	316.8000	438	326.0160	478	335.2320
359	307.8144	399	317.0304	439	326.2464	479	335.4624

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Appendix A Continued

Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz
480	335.6928	520	344.9088	560	354.1248	600	363.3408
481	335.9232	521	345.1392	561	354.3552	601	363.5712
482	336.1536	522	345.3696	562	354.5856	602	363.8016
483	336.3840	523	345.6000	563	354.8160	603	364.0320
484	336.6144	524	345.8304	564	355.0464	604	364.2624
485	336.8448	525	346.0608	565	355.2768	605	364.4928
486	337.0752	526	346.2912	566	355.5072	606	364.7232
487	337.3056	527	346.5216	567	355.7376	607	364.9536
488	337.5360	528	346.7520	568	355.9680	608	365.1840
489	337.7664	529	346.9824	569	356.1984	609	365.4144
490	337.9968	530	347.2128	570	356.4288	610	365.6448
491	338.2272	531	347.4432	571	356.6592	611	365.8752
492	338.4576	532	347.6736	572	356.8896	612	366.1056
493	338.6880	533	347.9040	573	357.1200	613	366.3360
494	338.9184	534	348.1344	574	357.3504	614	366.5664
495	339.1488	535	348.3648	575	357.5808	615	366.7968
496	339.3792	536	348.5952	576	357.8112	616	367.0272
497	339.6096	537	348.8256	577	358.0416	617	367.2576
498	339.8400	538	349.0560	578	358.2720	618	367.4880
499	340.0704	539	349.2864	579	358.5024	619	367.7184
500	340.3008	540	349.5168	580	358.7328	620	367.9488
501	340.5312	541	349.7472	581	358.9632	621	368.1792
502	340.7616	542	349.9776	582	359.1936	622	368.4096
503	340.9920	543	350.2080	583	359.4240	623	368.6400
504	341.2224	544	350.4384	584	359.6544	624	368.8704
505	341.4528	545	350.6688	585	359.8848	625	369.1008
506	341.6832	546	350.8992	586	360.1152	626	369.3312
507	341.9136	547	351.1296	587	360.3456	627	369.5616
508	342.1440	548	351.3600	588	360.5760	628	369.7920
509	342.3744	549	351.5904	589	360.8064	629	370.0224
510	342.6048	550	351.8208	590	361.0368	630	370.2528
511	342.8352	551	352.0512	591	361.2672	631	370.4832
512	343.0656	552	352.2816	592	361.4976	632	370.7136
513	343.2960	553	352.5120	593	361.7280	633	370.9440
514	343.5264	554	352.7424	594	361.9584	634	371.1744
515	343.7568	555	352.9728	595	362.1888	635	371.4048
516	343.9872	556	353.2032	596	362.4192	636	371.6352
517	344.2176	557	353.4336	597	362.6496	637	371.8656
518	344.4480	558	353.6640	598	362.8800	638	372.0960
519	344.6784	559	353.8944	599	363.1104	639	372.3264

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Appendix A Continued

Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz	Channel#	Operational frequency, MHz
640	372.5568	680	381.7728	720	390.9888
641	372.7872	681	382.0032	721	391.2192
642	373.0176	682	382.2336	722	391.4496
643	373.2480	683	382.4640	723	391.6800
644	373.4784	684	382.6944	724	391.9104
645	373.7088	685	382.9248	725	392.1408
646	373.9392	686	383.1552	726	392.3712
647	374.1696	687	383.3856	727	392.6016
648	374.4000	688	383.6160	728	392.8320
649	374.6304	689	383.8464	729	393.0624
650	374.8608	690	384.0768	730	393.2928
651	375.0912	691	384.3072	731	393.5232
652	375.3216	692	384.5376	732	393.7536
653	375.5520	693	384.7680	733	393.9840
654	375.7824	694	384.9984	734	394.2144
655	376.0128	695	385.2288	735	394.4448
656	376.2432	696	385.4592	736	394.6752
657	376.4736	697	385.6896	737	394.9056
658	376.7040	698	385.9200	738	395.1360
659	376.9344	699	386.1504	739	395.3664
660	377.1648	700	386.3808	740	395.5968
661	377.3952	701	386.6112	741	395.8272
662	377.6256	702	386.8416	742	396.0576
663	377.8560	703	387.0720	743	396.2880
664	378.0864	704	387.3024	744	396.5184
665	378.3168	705	387.5328	745	396.7488
666	378.5472	706	387.7632	746	396.9792
667	378.7776	707	387.9936	747	397.2096
668	379.0080	708	388.2240	748	397.4400
669	379.2384	709	388.4544	749	397.6704
670	379.4688	710	388.6848	750	397.9008
671	379.6992	711	388.9152	751	398.1312
672	379.9296	712	389.1456	752	398.3616
673	380.1600	713	389.3760	753	398.5920
674	380.3904	714	389.6064	754	398.8224
675	380.6208	715	389.8368	755	399.0528
676	380.8512	716	390.0672	756	399.2832
677	381.0816	717	390.2976	757	399.5136
678	381.3120	718	390.5280	758	399.7440
679	381.5424	719	390.7584	759	399.9744

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