



Contest Cookbook

2004 -- 2005

Reserve These Dates!

CQWW SSB 0000z Oct. 30 – 2400z Oct. 31

CQWW CW 0000z Nov. 27 – 2400z Nov. 28

ARRL DX CW 0000z Feb. 19 – 2400z Feb. 20

ARRL DX SSB 0000z Mar. 5 – 2400z Mar. 6

ARRL Sweepstakes CW 2100z Nov. 6 – 0300z Nov. 8

ARRL Sweepstakes Phone 2100z Nov. 20 – 0300z Nov. 22

Editors: Jim McCobb – W1LLU and George Harlem – W1EBI

Publishers: Lisa Zeug – K1UQT and Mike Zeug – W7OT

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INTRODUCTION

Jim McCobb – WILLU

It is a privilege to be among such skillful and knowledgeable talent in writing this Introduction to “The 2004-2005 Contest Cookbook”, a product that is unmatched in the world of amateur radio contesting.

On the following pages there are articles, most new along with a few reprints, based on hundreds of years of experience. The writers are experts at and professional in their approach to their avocation in general and contesting in particular. So as soon as you get a chance, read it and learn a lot as I did. I want to pass along a big “Thank You!” to all of the authors for their great work.

There are very few things in life like sitting down at the designated time at the “controls” of a contesting station, be it modest or grandiose. “Strap yourself in” and get ready for lots of fun and work. But you must know what you are doing in order to achieve full potential from your activities. All things take at least a while to learn--me, after more than 45 years in amateur radio, I am still learning and enjoying every moment of it.

We were all beginners. It was hectic, frenzied, mysterious, nerve-racking and full of paper during my first time at the controls--the 1960 Novice Round-Up. I had beginner’s luck, and, if you are just starting out, hopefully you will too--achieving your goals, whatever they might be. In order to get you there, read on--most of the mysteries, “tricks of the trade,” the “how-tos,” strategies, checklists, charts, etc., are set out for you on the following pages. And if there is something you don’t see, ask a question on the reflector. I am sure you will receive a quick and complete response.

I believe that the novice as well as the most experienced tester will learn something from

reading The Cookbook--so just do it, and I am sure that your next contest effort will be at least a bit more rewarding and fruitful.

I want to thank George, W1EBI, for his assistance in performing a second reading/editing of all the articles contained herein. Also, I wish to extend my thanks to Lisa, K1UQT, and Mike, W7OT, for their assistance in general, and in particular with the publishing effort. To all the English majors, we gave it our best. And please don’t forget to

KICK BUTT!

GETTING SET FOR THE CONTEST

Jack Schuster - W1WEF

You've all seen these suggestions before, but perhaps this will serve as a reminder in preparing for a serious effort in any contest. The following is a checklist that I try to follow.

1. Give the family as much advanced notice as possible. Suggest a visit to Mom that weekend, especially if it's a phone contest.
2. Start checking out the station as early as possible. Are the antennas still pointing where they're supposed to? Are the rotors still turning all the way? Are the antennas still working with the same SWR as before?
3. Walk the beverage; check the elevated radials.
4. Check the backup gear (if you have any). Is that radio or amplifier that you haven't turned on in a year still working?
5. Check out the computer with the software you will use. Download the latest SCP or Master data files. Run the software simulating the

contest with the amplifier on (if you're using one), to be sure there isn't any new RFI problem when you turn the antennas toward the shack on any band, and that there's no new RFI to or from the computer as a result of changes you made since the last contest. Load the F-key memories as well as the outboard memory keyer or DVK if you're using one. Put a fresh battery in the Logikeyer (my homebrew one is battery powered).

6. Don't forget to unplug that TV set in the shack that generates RF noise even though it's turned off!

7. Review the contest rules not only to refresh your memory, but also to see if anything has changed.

8. Dig out that zone map (where applicable) and refresh your memory as to where the CQ or ITU zones are.

9. Get as active on the bands the week before the contest as you can. Get a feel for propagation, and see what expeditions are around. Review the NG3K contest expedition list to see who is traveling for the contest and what calls they might be using.

10. Keep an eye on the club reflector so you know about YCCC expeditions! Working them counts twice for the club!

11. Review your old logs, and published or online contest results, and set a goal for yourself, but don't get hung up on it. Conditions might be better or worse than expected, so just keep plugging, and figure everyone else has the same conditions. Keep a copy of your previous best .brk file on the desk for reference. Print the N6BV propagation predictions from the Club web site.

12. Reset your computer clock to WWV in GMT.

13. Make sure everything in the shack including keyboard function keys are clearly labeled so that you have a chance of doing the right thing when you have to troubleshoot a problem or hit the right key when you can't keep your eyes open!

14. During the week before the contest cut down on your normal caffeine dosage. Get as much extra sleep as you can. Plan what you'll need in the cooler chest beside you for food and drink during the contest. Mountain Dew is loaded with caffeine, and works well with a straw in phone contests (Tnx Dean Straw).

12. As far in advance as possible, if you're not already on an exercise program, try to get in as good physical shape as you can. Take a good walk every day if you can. Cut down on the junk food. [good advice even if you aren't planning to operate a 48 hour contest! – ed]

13. Start checking the bands an hour before the start, and decide what band to start on. Write down the good multipliers you hear and the frequencies. As it gets closer to the start, you can start putting calls in the band map.

14. Although I don't use packet or telnet, be sure to check them out if you are assisted or multi-op.

15. If it's a phone contest, be sure to use compression and check that you have the microphone gain and compression levels set properly. Check out the voice recorder, and load the memories.

Remember--do as I say, not as I do! **KB**

LOW POWER CONTESTING

Mike Loukides – W1JQ

There's one big principle in low power contesting: if what you're doing isn't working, do something else. Seriously. When things get slow, change bands, change modes (if you can), try

running (if you're hunting), or try hunting (if you're running).

"Operate on the highest band that's open" is a truism, but if that isn't working, try the lowest band that's open or a band in between. When you don't have a big signal, sometimes being where everyone else isn't pays off; sometimes it doesn't. (This will be a problem in the coming years; with 10m down for the count, and 15m weakening, there will be fewer choices.) I've heard lots of people say that 40m and 80m are the preserve of high power stations, but that's not true, particularly on CW. Look at it this way: compared to the 1500W station, you're down 2 S-units to start with. On 15m, you have a tribander at 40 feet, and he has a 6-element monobander at 100 feet. But on 80m, you both have dipoles.

It's a good idea to spend a lot of time on air in the week before a contest. That's easy for me to say because my shack is in my office. Listen for two or three minutes every couple of hours; get up early to listen on 40m and 80m in the morning; figure out what you're hearing and when. When is 15m starting to open? When is it closing? When do you hear JA on 20m? When do you hear VK? When does 40m start to open to Europe? The N6BV propagation reports are helpful in figuring out what to expect, but nothing beats being on the bands.

In the big DX contests, I spend most of my time hunting (search and pounce), as opposed to running. I'm still trying to find the right relationship between the two. I can hunt very quickly, but the key to a good score is working the stations that aren't calling CQ. I usually give up running if I go two minutes without a response, but I've been told that I'm just not patient enough. I think Ted, KT1V, said that it's not uncommon to go "dry" for a few minutes; and he's a high power station. The longer you stay in one place, the more likely it is that someone will spot you. So I don't have a good answer. Ann, WA1S, says she's had sustained run rates as high as 150/hour (when operating as DX);

she implies that if it's below 60, it's time to think about hunting. (Ann also has a fairly hefty antenna system.) Whether these targets make sense at the bottom of the sunspot cycle, when 10m is dead and 15m is weak, is another question. In any case, if you run, find a spot high in the band. The low end of the band is dominated by the big guns, and they'll cover you up.

It's worth spending some time building your hunting skills, recognizing (and typing) calls quickly, responding quickly, and using the second VFO to find the next station up the band. On a clean band, hunt rates can be as high as 150 Qs/hour. Not that you can maintain that for an hour--at least I can't. But it is possible to sustain rates like that for 10 or 15 minutes. A more reasonable rate is something like 80 Qs/hour, dropping to 40 when the band is tired and messy.

My strategy for hunting is to divide the band up into segments--50 kHz on phone (100 kHz on 10m), 10 kHz on CW. Then scrape every QSO you can out of each segment. If a segment is messy or confusing, make a note of it and come back 10 minutes later. (I often find that a particular segment of one band is full of signals, but I can't make any sense of them. Sometimes it's because I'm tired, sometimes it's because a few loud stations are splattering.) The top ends of the bands are your friends. At the top end of the bands, you'll find the least QRM, the most new signals, the most movement (new stations showing up, old ones moving off). On phone, I'd scan 21375 kHz to 21450 kHz twice or even three times for every time I scan 21200 kHz to 21275 kHz. On CW, the same idea applies. Nothing against the bottoms of the bands, but they tend to be the "personal property" of a few big multi-multi stations: they move in early, and never leave. On 40m and 80m phone, that's reversed; the big guns hang out just under 7200 kHz and 3800 kHz, and you have to watch for stations towards the bottom of the bands.

I usually find that a band is getting pretty "dirty" after I've been on it for an hour or so. When I think I've cleaned the band out reasonably well, I try to go to another band for a while. Even if the QSO rates aren't as good, that time on the second band gives stations on the first band time to QSY, gives new stations a chance to arrive, and so on. I find that it's a good idea to be bouncing back and forth between two bands. Don't waste time DXing. The contest is ultimately about bulk, not about rare multipliers. I try not to call any station more than 3 or 4 times—5, if he's going fast. At the same time, DO set a memory on rare DX stations and come back every 15 minutes or so. In my experience, 90% of the time, you'll eventually work him.

Listen really carefully. There are a lot of small signals that no one notices. You have to work them. Sometimes these small signals are the rare multipliers. Don't worry about how weak they are; if you can hear them, they can hear you. Think loud! And on CW, never underestimate the ability of a Russian or a Ukrainian to copy a very weak signal.

Read articles written by QRPer. Those guys have even weaker signals than you; and the really good operators, like N1TM, put in scores that are almost as good as 100W stations. So figure out what they know, and learn it. One good principle I picked up from a QRP article: "last man on the pile-up wins." Wait a couple of seconds before calling, or until you hear a hole in the pile-up. I've heard people say this is good advice for CW, but it doesn't work on phone. Not true--it works well, and I find it easier to do on phone. Of course, the opposite can be true too. Sometimes it works to sneak your call in before anyone else gets there. Remember, if what you're doing isn't working, try something else.

There's no such thing as too many antennas. If you're just using a couple of dipoles, put up a few more: some high, some low, some at right angles. Wire beams can work really well on the upper bands. You don't have to "open up the

band." You aren't going to compete with the big guns. If you get up at 6:30 a.m. and the signals on 20m are weak, pick off a few South Pacific stations on 40m. Go take a shower and have breakfast. You'll feel better the whole day, and 20m will probably have opened up by the time you're back.

W1CTN suggests getting to know the big DX stations by name, and then calling them by name: "Gunter, this is W1CTN." He says that hearing their name in the pile-up will always get their attention. I've never tried this, and I don't know very many names. But I will...

If you don't work CW, you should. Yes, I know, YCCC right now needs more points in the phone contests, so I'm not trying to discourage you. But a little power on CW goes further than a little power on phone.

More than anything else: with 100 watts, you're not going to be boasting about run rates of 250 Qs/hour. Don't get discouraged, and take breaks when you need to. A long, slow slog is going to end up working a lot of contacts. There's a sense in which contesting is a game of being too stupid to stop. But seriously, the biggest trick to low power contesting is just not stopping.

LOW POWER — LOW ANTENNA CONTESTING STRATEGIES

Brian Szewczyk – NJ1F

Over the past 20 or so years, I have operated contests from my home station and from stations without 100 foot towers and stacks. I have operated contests from super-stations like K1TTT's, K2TR's, and K1RQ's when he lived in Massachusetts and in Maine. I have operated contests from my station at my mother's house in western Massachusetts at which I had a 6-element tribander at 105 feet and phased verticals for 80 meters. I subscribe to the theories

that “Life is too short for QRP”, and “There is no such thing as an antenna that is too big!”

My station here in Saratoga Springs, New York, is comprised of an 80 meter dipole at about 50 feet hung in my trees and a FT-1000. Most of the operations from here have been to get on and work some of the club members in Sweepstakes and WPX. I get on and make some points for the club during CW DX contests. During the past CQWW CW contest, I wanted to make as many points for the club as possible and have fun doing it. During the ARRL CW contest, I was on from K1RQ’s in Florida and we did a multi-single, low power. However, because of the current ARRL rules, not one point of this score counted for the YCCC. (Maybe it is time for a change in the rules!)

When I operate from home, I am seriously antenna challenged, but I want to maximize my points. One of the first choices I have to make when operating low power, antenna limited is whether or not to use packet. I have found that, for me, it is much more fun and enjoyable to use packet or telnet. First, it fills the band maps with mults and Qs. Second, it saves time in identifying those DXpeditions that give their call once every 100 Qs even on Sunday afternoon. Third, it tells you what bands are open. Fourth, it helps you find new mults quickly. Last, it adds a dimension of camaraderie to the contest.

Change your packet use behavior. One of the biggest and obvious changes that I had to make after switching to low power operation was with the use of packet spots. I could no longer point and shoot to a spot and work it in one call within 50 nanoseconds of receiving the spot. Many times I could not even hear the spotted station, especially early in the contest. I did have good success in going to the station 5 to 10 minutes after it was first spotted, and, with a few calls, break the pile-up, and work it. I also avoided jumping on spots of Caribbean stations during the first few hours of the contest. Those

stations will be there all weekend and, in 24 hours, will be begging for someone to call them.

Don’t chase DX during the contest. Remember that the XU, 3B9 or other “rare” DX is worth the same to your score as the G or DL that you are missing on 15 meters! This is especially true if you are only operating a limited amount of time. Spending more than two minutes in a pile-up is a waste of operating time. Turn the dial! Most of the time, within a few kHz, I have found another new multiplier calling CQ. When you only are working 100 or so stations on a band, the Q to mult ratio is going to be very high.

Set a goal for your operation even if you are only going to be on for a short time. This helps keep you focused and prevents you from becoming a DXer. The goal can be something very simple like “I am going to make 200 Qs in 10 hours,” or “I am going to make 30 Qs per hour S&Ping,” etc. I recommend thinking about a goal in the weeks before the contest. Do not wait until 23:57 on Friday evening to begin thinking about it. The goal you set should be one that will keep you in the chair and on the air. Do not set it too low or too high. However, being in sales, I can tell you that you want to make it a challenge; otherwise, it can become Boring!

Plan your operating time. What bands are going to be open when you are operating compared to the antennas that you have? With some careful scheduling, you can make a lot of points and still have a “Family Life.” Here in the northeast, you can have a dinner out with the family and maybe catch an early movie on the Friday evening of CQWW, either mode. You won’t miss a lot when you’re using a wire antenna and have a low power station. For the ARRL contests, remember that DX stations must work the U.S. Therefore, you might want to skip the movie!

Have a strategy. If you have family commitments during the day, consider getting up before

the rest of the family on both Saturday and Sunday morning. Get on and work Europe on the highest band that is open. I usually start at the bottom of the band and tune my way up, working every station I can in two or three calls. I don't spend a lot of time trying to call, especially on the first pass. When I reach the top of the band, I do one of three things: 1) If conditions are good I will QSY to the next higher band and do the same. 2) If conditions are not very good, I start dialing back down the band I am on to try to catch the stations that I did not work on the way up as well as pick up any new ones. 3) QSY to a lower band and dial up the band. I have found that this is a very good way to build multipliers quickly, especially on Sunday morning, because there are few pile-ups as most of the full time stations have already worked the mult.

Have an antenna strategy. One of the other factors you should take into consideration is what kind of antennas you have. In my case, I have an 80 meter dipole that has resonant wires for other bands. I feel that I have a good signal on 80m and 40m, but on 20m through 10 meters, I am not as strong as other low power stations using a tribander. Therefore I tend to operate more when the low bands are open. Plus I am more of a low band op anyway, and this also helps keep the family happy. I do, however, sneak away for a few hours during the day to get on 20m through 10 meters to help produce a bigger score.

You are louder than you think. Yes, I will say it again. You are louder than you think you are. With an antenna system like mine, if you can hear it, you can usually work it. To put it into prospective, 100 watts into a dipole on any given path might have a receive signal of S7. Increasing the output power to 1500 watts to the same antenna on the same path only increases the signal from S7 to S9! I have also found that CW is far more fun to operate low power than SSB. All it takes to make a score for the club operating low power is some good old-fashioned operating skills and tenacity.

Remember that if the YCCC had thirty low power logs turned in for ARRL SSB this year, we could have won! Likewise, don't forget that every log, no matter how small, counts. Be proud of every minute you operate a contest and turn in the log!

TIPS FOR LITTLE GUNS & CONTESTERS WITH LIMITED TIME

Jeff Briggs – K1ZM

With updates by C. Morrison - N1RR

<Reprinted from the 2002-2003 Cookbook>

So you don't have a lot of time to get into the contests, or you have a small to medium station. No need to get on in the contests, right? **WRONG!**

It is a fact (proven again and again) that it is not the K1ARs and K1KIs of contest clubs who enable a club to win it all. Sure they are a necessary part of the mix, but it is the LITTLE GUNS who enable a club to win a contest at the super-club level.

The small and medium guns and contesters with limited amounts of operating time are an equally important part of the mix, and YCCC will never win a major contest without getting nearly ALL of its members, large and small, on the air this contest season.

If you have a small station

If you don't have a powerhouse station, or if you have only dipoles and wires, contests can still be fun by picking your shots and strategically selecting times and bands where you can maximize your contribution to the club.

Here are a few DOs and DON'Ts:

DON'T expect to call CQ very often and and maintain a high rate...

DON'T expect to crash through big pile-ups easily, if at all...

DON'T expect too much out of 20m at sunrise on Saturday morning...

DON'T work too hard at sunset on the low bands--you will not likely be heard...

DO expect far better results Sunday morning as 20m and 15m open into Europe...

DO push hard on 10m (even CQ high in the band) if 10m opens to Europe either day...

DO answer CQs anywhere on Sunday since most other stations have already worked the larger stations...

DO check the low bands, 80m, 40m and even 160m on Saturday night from 0300z-0800z AFTER they have worked the big guns on Friday night...

DO chase all the Caribbean mults and expeditions on Sunday afternoon when they will be begging for Qs and are likely to be listening for any signal they can hear...

You will be surprised what you can do if you follow this game plan. And remember the old adage: "There is no meters like 10 meters."

If it opens, you will do very well by CQing high in the band--even up as far as 28.900 MHz. Good luck and please do the best you can to help YCCC this time out!

If you have little time

If you are limited by time but have a good signal, then these suggestions will help you maximize your score to help the club score points.

4 hours operating time

Saturday -

20m at around 1200z

15m around 1300z

You will work bunches of Qs and multipliers.

Sunday -

20m at 1300z

15m at 1400z

On both days, check if 10m is open at 1300z.

6 hours operating time

Saturday -

20m at around 1200z

15m around 1300z

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

Sunday -

20m at 1300z

15m at 1400z

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

8 hours operating time

Saturday -

40m at around 0600z -- EU Sunrise

20m at around 1200z

15m around 1300z

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

Sunday -

80m at around 0600z -- EU Sunrise

20m at 1300z

15m at 1400z

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

10 hours operating time

Saturday -

40m at around 0600z -- EU Sunrise

20m/15m/10m -- 3 hours

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

Sunday -

80m at around 0600z -- EU Sunrise

20m/15m/10m -- 3 hours

On both days, check if 10m is open at 1300z.

20m/15m/10m around 2000z and watch for South America + Pacific on the high bands

Add an hour each day to either 20m or 15m in the morning running Europeans. Make sure to select the band you get out BEST ON. Milk it for all it is worth!

12 hours of operating time

Operate as described above but begin nightly operations on the low bands at 0500z each night and go for 2 hours instead of just one.

14 hours of operating time

Operate as described above with an additional hour of operating time to work multipliers and call CQ each morning on 10m/15m/20m bring this up to 3 hours each morning.

16 hours of operating time

Operate as described above with an additional hour each afternoon for chasing multipliers on 10m/15m/20m.

18-24 hours of operating time

Extend all of the above as you see fit according to where you think your station plays best. Do hit 160m at European sunrise as this will be the

time when it will be easiest to work people even in the Caribbean and even with modest antennas and power levels.

So, the words are simple: GO FOR IT and do your best to help YCCC! Hope to CU in the pile-ups!

160 METERS

David Robbins – K1TTT

The sun is getting quieter this year. The Solar Flux has been below 100 regularly and will probably be getting lower and lower as the year progresses. While this may be bad for the high bands, it's a boon for the low bands. Nighttime becomes more important now as absorption decreases and lack of activity up higher forces stations to move down to the lower bands earlier in the evening.

There are several things you can do to maximize your multipliers on 160m. First, don't worry about the number of QSOs you make here, even big multi-multi stations don't make much in the way of volume. The key is how many multipliers you can grab, how fast, and then go somewhere more productive. Even if you are a loud single op, don't plan on spending lots of time here. Let the multi-ops slug it out for the weaker mults--they have time, you don't.

There are a couple important times to remember on 160m:

Caribbean expeditions often go to 160m for 5-10 minutes at the top of the hour starting about 0000z or so. If they aren't making QSOs pretty quickly, they don't stick around long. Remember, they have to deal with tropical noise, temporary installations, and other crud so they may be hard of hearing.

Gray lines. These are the magical times around sunrise and sunset where fun things happen on the low bands, especially 160m. Get a computer-generated map that you can watch during

a contest that shows sunrise and sunset. There are many free ones including my MOF/LOF program. When we are in darkness, you should pay special attention to areas that are in twilight. At our sunrise/sunset, watch for anywhere that is in the dark, and especially for other areas in twilight for the extra special double gray line paths. One opening that is easy to miss is sunset across the Pacific--this happens while it is still time to be running Europe, but if you take a bit of time to listen to the west sometimes you can get easy multipliers before any one else realizes they are there.

DX-window and band plan. Check the contest rules for definitions and requirements for staying out of a DX-window if they have one. Don't be surprised to be harassed if you are CQing between 1830 kHz and 1835 kHz or even near there, even if the contest doesn't specify a window. And don't forget the new ARRL band plan; stay above 1843 kHz for SSB. Not everyone has the word on this yet, so expect stateside to operate below there and many DX stations to be working simplex down there. I tell my ops to go work them if they are simplex, just not to call CQ below 1843 kHz. Pass the word to your 160m DX buddies that working split on 160m is a good thing--TX below 1843 kHz and listen as far up the band as they can hear. Remember, for the most part, these aren't the good old days when most countries only had 10 kHz windows here and there. Now, DX spreads out and will call you even way up the band.

On antennas. High is good. Vertical is really good. Really tall verticals are even better. BUT! Diversity can be a really good thing. I have an inverted V at 180 feet and a pair of inverted Ls with raised radials that are about 100 feet tall. Which one is best at any given time is about a 50-50 guess ... and which one is best can change quickly, sometimes on 10-15 minute time scales. So if you have the room and height, have something vertical, and something horizontal, and get the best of both worlds. And of course beverage antennas are the best thing since vacuum tubes were invented, but don't

listen on them exclusively if you are calling CQ, or you may miss calls off the side or back.

80 METER CW

by Robye Lahlum - W1MK

<Reprinted from the 2002 Cookbook>

Working Europe in CQWW

As others have correctly said before, the best strategy for this band is to work Europe, work Europe, and work more Europe. In CQWW, the Europeans tend to work each other a lot on this band for 2-point contacts, but they are very happy to work U.S. stations for a 3-point contact. The problem is to find a clear frequency to call CQ--a clear frequency in Europe, that is.

Unfortunately, any time a European station settles in on your run frequency in CQWW; it's most likely time to give some thought to moving. Fair or not, that is the way it is. So move when necessary, do a little S&P and try to find a new frequency to CQ on. When you're looking for a run frequency, concern yourself with how you might sound in Europe. I like to use the lower 10-20 kHz but others such as N2RM tend to do very well using frequencies as high as 3550 kHz. There are often a few multipliers that drop in around 3550 kHz, especially in the final hours of the contest.

Consider your 80m signal's strength into Europe, and adjust your operating style accordingly.

While many European stations operate at high wpm (the contest is like SS to them with a couple thousand strong nearby stations to work), I suggest sending a little slower. The path to Europe usually has dispersion on it and limited Signal/Noise, and no matter how big you think you are, you are just a moderate signal in Europe. When doing S&P, I recommend sending your call twice if the station you are calling is a little weak. It is a little slower, but it may

be faster in the long run to get the call right the first time. Also if there is a collision, you have a better chance of getting through. If the station comes back and asks for your call again, I recommend that at this point you always send your call twice. I know that flies in the face of conventional wisdom but my experience has been that this has been an effective approach for this band.

The most productive operating hours

Early in the evening, the Europeans often can't hear you, but you hear them just fine, and, as time goes on, they copy you better. For the northeast, I believe the most productive times are around 2330z-0130z and again around 0600z in CQWW. I suspect you could do very well between 0200z-0600z if many European operators did not catch some sleep then, and I think you could do great between 2100z-2330z if conditions were better to Europe during that period. Europe slows down a lot by 0830z in CQWW, and it is time to look elsewhere for Qs. Unfortunately, by this time most of eastern South America is already past sunrise, and the sun is quickly moving across the remaining part of the continent. At this point (0830z-1130z), the technique is mostly "Search, Search, and more Search" interrupted by a CQ every few minutes or so. We in the northeast are now on the very bottom of the food chain and we need to be there as early as possible in the pile-ups. The CT bandmap helps a lot in the search mode, but many of the DX stations move a bit, so you have to keep it up to date.

You might keep an ear on the likes of W3LPL, KC1XX, or K3LR from time to time. If you hear them calling or working someone during the slow hours, chances are it is a new multiplier. If it is a station they moved from another band, you may be able to pick up an easy one with some timely tail ending. Even during the morning hours (0830z-1130z), when S&P seems best, I do a little CQing every five minutes or so. In about one out of 100 CQs, someone actu-

ally answers me! I work them and let them have the frequency, as they are generally a new multiplier, which attracts a crowd.

ARRL contest

ARRL is in many ways a much different contest. Call CQ a lot more, and don't give up your frequency to a European easily just because he wants to call CQ on your run frequency. The band opens to Europe about 2200z and is closed by about 0630z, and the best times are 0000z-0130z and around 0500z. Don't worry about South America when Europe is open. There is lots of time to work South America after Europe shuts down. The European activity level on this band for ARRL is tremendous; however, after Europe shuts down things can really get slow especially on Sunday morning.

75 METER PHONE

Brian Szewczyk – NJ1F

I am writing this while sitting poolside on a sunny, hot, and humid late August afternoon. It's hard to think that another contest season is upon us. While it is late August, a few trees are beginning to show the signs of fall by changing their colors. Quiet QRN-free nights are just a few weeks away, and CQWW is only two months away!

75 meters has been my favorite contest band for the past 20+ years. With the sunspots going away this year, we need a little luck. Here on the east coast, we have to hope our EU friends will get on to make 75 meters sound like 20 meters at the peak of the sunspot cycle. The past season had good conditions but a lack of activity.

75 meters is also a band on which we have a major geographic advantage over the rest of the U.S. into Europe. In the winter, New England sunset is about an hour before most of the rest of the east coast. Therefore, low power stations that often do not spend much time on 75 meters

should be encouraged to give it a shot. I know that it can be tough with all the big stations on the band, but remember from New England even low power stations with a dipole can work European and Caribbean stations easily.

75 meters is a band that can yield between 20 and 40 multipliers with a few hours of work. In the CQWW contests, the second night can be far easier; as the Europeans will have all worked each other and will be begging for Qs. The most productive times are between 0200z and 0800z. That is European sunrise, and the band fills with European and Caribbean stations.

Even if you can only operate a few hours, you might want to stay up late one night to get the multipliers. This combined with a few hours on 20m and 15m makes for a nice score that will help YCCC win again.

The Basics

Most of the DX on phone will be worked while using split frequency. This is also the case for a few of the big DXpeditions on CW. Remember some DX stations have privileges in our phone band as well. Knowing where to look for DX is half the battle. Knowing when to look is the other half. The majority of DX can be found from 3640 kHz on the low end with some of the Caribbean stations up at 3850 kHz.

Most of the Europeans will be listening split above 3800 kHz. Check these frequencies for multipliers:

3640 -- 3650 kHz - Russian SSB sub-band

3600 -- 3800 kHz - Most of Europe plus South America and Caribbean

3790 -- 3805 kHz - Japan and South Pacific. Some VKs on 3525 to 3700 kHz and some JAs are also on 3747 to 3755 kHz

3800 kHz and up - Caribbean, South and Central America, KH1, KH0, KP2, and KP4

Search and pounce (S&P) mode of operation can be highly effective at increasing multipliers quickly. I like to start at the low end of the band and dial up to the high end. I then tune back down the band. I use a computer-controlled radio and the band map feature of CT to speed up the downward tuning process. I will also use my radio's memories to store pile-ups that I was unable to break quickly. I will usually spot a station even if I cannot work it. This will help out the club's score and maybe the packet pile-up will get the DX station's attention. The strategy of the game is to work as many multipliers and stations as possible quickly.

Don't become a DXer

Don't spend 45 minutes trying to work a rare DX station. You'll miss working 20 other stations, some of which are bound to be multipliers. That's not the best strategy for maximizing your score! Last time I checked, CQWW and ARRL DX contests were not won by having the rarest DX in your log, but rather having the most Qs and mults! On the low bands, the openings are short, and you must utilize your time on the band as effectively as possible.

Knowledge is Power

Learn the sunrise and sunset times for your QTH. Learn the sunrise and sunset times for Europe, the Caribbean, and the Pacific. Most contest software has an option for showing the sunrise and sunset GMT times as well as beam headings from your QTH. Knowing if the band is opening or closing to the station you are trying to work is very important.

From the eastern U.S., the best time to work Europe is from about 0230z to 0800z (their sunrise), with the peak activity occurring between 0330z and 0730z. Often there is an opening at our local sunset, but stick to your plan. If you are running on the higher bands, you're probably better off to continue running JAs on 20m than to hit 75 meters to work the few EU stations that you can hear. It's very likely that they

will still be there at their sunrise, and they'll be much easier to work. Unless high band conditions are really poor, or it is Sunday evening, the best rate will be on a higher band. N1RR has pointed out that you might work a G, EA8, EA9, EI, or CU station an hour or more after their sunrise. While true, unless you are a multi-multi or multi-two, you would probably be better off getting some sleep or checking other bands for runs.

There are locations such as VK6 that we have openings to at both our sunrise and at our sunset. Which time will yield the strongest signals is largely dependent on conditions. I tend to favor the opening around our sunset as the band is usually a lot quieter, and I don't have to compete with the loud west coast U.S. stations. If you are a single op looking to maximize your score, your time might be better spent on a higher band than on 75m at sunset. Of course, if you've worked out the other bands, or it's Sunday morning, 75m could be worth checking out.

Spot DX on packet to help the club! When spotting DX that is working split, always enter the QSX frequency. A computer-controlled radio will do this automatically, so everyone on the cluster with computer-controlled radios can "grab" the spot and set the radio on the right frequencies. Also please make sure that you verified the call and typed it correctly, BEFORE you log it or spot it!

Running on 75m is just like running on 40m

On 75 meters, split operation is the norm. Most contacts are worked split with U.S. stations transmitting above 3.8 MHz and listening below 3.75 MHz. This split operation combined with the nightly "Pig Farmer" nets, round tables, and other activities makes 75m operation much more difficult than 80m CW. Having a radio with dual receive like the FT-1000 series is a definite plus, especially while CQing as many South American and Caribbean stations will call

on your transmit frequency. Even though it is more difficult to run stations on 75m when using low power, if you find a clear spot, spend a few minutes CQing.

Note that the FCC has cited U.S. stations that have caused harmful interference to existing QSOs for not checking if the frequency was in use before transmitting. Avoid this problem by asking, "Is the frequency in use?" Listen for a response before calling CQ or answering a DX station.

Also, below 3.800 MHz, if you find a frequency that sounds clear locally, it may not be clear in EU. I have noticed on both 160m and 80m when using a low dipole that what sounds like a clear frequency could actually have a DX station on it working split where you can't hear the station. If this is the case, you will be told after the first CQ by at least 50 stations that the frequency is in use. If, after the second and third CQ, nothing like that happens, you probably have a clear frequency!

Working Europeans on 75m can be a challenge. Remember that in Europe, broadcast and other services are also assigned to the 75 meter band. That carrier or RTTY you hear weakly at "S1" on your transmit frequency could be a short-wave station that is S9 + 60 dB in Europe. Maybe that is why you aren't working anybody! I have also had great runs dry up because of this. Another thing I have noticed is that around European sunrise, the band can change rapidly. Watch the rate meter, and if a run dries up at the top or bottom of an hour, you may have to go hunting for a new transmit frequency. Asking a station who calls if your frequency is clear is a great idea. But choose one that will or does speak English fluently. I have found DLs and Gs to be very helpful in tuning in on a clear frequency. In many cases, they will even tell you to move up or down and give you a comparison of your signal to other U.S. stations.

Once you have a clear transmit frequency, it's equally important to have a clean receive fre-

quency. I have had great clear receive frequencies turn into HG73DX's CQ frequency! There is not much you can do if that happens, unless you are quick to get to his RX frequency and can convince him to move. Another common problem is that if your receive frequency is in the U.S. novice CW band, a novice (or a Canadian) can begin to call CQ where you're listening. Again, there is not much you can do except find another receive frequency.

As I've already said, 75m is a challenging band especially when working split. If you're CQing, you can hear stations calling on your listen frequency. Problem is that they are really calling another station that is using the same listen frequency. Make sure that the station you hear is calling you and not someone else. When answering a station, I always ask them if they are calling me. "S50A from NJ1F, you're 59 05. Do you QSL NJ1F?" This takes a few extra seconds, but I'd rather take the time to make sure the station is really calling me. Sure beats losing a multiplier plus several Qs! I started asking this question when a station called me about 2 minutes after he had last called me, or more correctly, when I thought he had called and worked me!

Operating points to remember

- The QSO rates on 75m are not as high as achieved on the other bands. Therefore, it is quite easy to be CQing and dialing the band on the other VFO between CQs. This can really help out your QSO rate, especially at European sunrise.
- Because DX stations from the Caribbean, Central and South America as well as the Pacific may call you on your transmit frequency, listen to it often. Having a radio with dual receive is very handy for this.
- Install a receive antenna such as a beverage or receive loop. These are helpful for two reasons: they reduce noise, and they tend to reject high-angle signals. Even the use of a

40m or 80m low dipole may help. You may also want to add a pre-amp to the loop or beverage, especially if it is short. A word of caution about pre-amps: if you live near a high power AM broadcast station, the amplifier can get overloaded and cause intermod. You might have to build a band pass filter to trap out the broadcast station's signal.

- If you can, put up several transmit antennas. I have noticed that when the band first opens, a vertical antenna usually works best. Later in the opening the high dipole/wire beam works better. I switch antennas frequently during the contest to make sure I have selected the best one for the conditions.
- In pile-ups, it is important to let the DX station come up and work someone. I have heard several DX stations give up because the pile-up got out of control. Recently, one DX station actually left the frequency and went up the band a few kHz and called CQ again. He was easily worked while the original pile-up continued.
- Listen on the frequency before you transmit, and ask if it is in use before calling a DX station. These simple steps can help you avoid a FCC citation!

I hope that these tips will help you get on and make a lot of Qs on 75 meters. Help the YCCC defeat the FRC!

40 METERS

Randy Thompson – K5ZD

Forty meters is probably my favorite contesting band. It offers worldwide propagation throughout the sunspot cycle. Openings are every bit as good as 20m, although often not as long. When one end of the path is at sunrise or sunset, anything is possible!

There's just one little problem--the rest of the world also uses the band for commercial broad-

casting. Throw in a mismatch between our allocations on phone, and 40m becomes a bit more challenging. Unfortunately, many people hurt their contest scores by letting the band intimidate them. Since phone and CW have completely different “personalities”, I will discuss them separately. Most of the comments below equally apply to CQWW and ARRL DX, although the ARRL contest is usually much easier (especially on phone) since the DX is always looking for us.

Phone

In Region 2, we enjoy full use of 7150 to 7300 kHz. In much of the rest of the world, the phone band is crowded into 7040 to 7100 kHz. The result is bedlam down below and required split frequency operation for us. It may seem hard to believe, but the amount of commercial broadcasting on 40m is going down each year. There are now many listening (transmitting) spots where U.S. stations can be heard by the DX. The multi-multi stations usually take the best ones, but it pays to listen for clear spots and try some opportunistic CQs.

In CQWW Phone 2003, an excellent single op 40m line score was 200/23/80. Multi-multi stations did a little better with 400/29/100. On 40m phone, it's a game of multipliers rather than rate.

Success and effort is the key to building a winning multiplier total. The propagation in late October is usually excellent, but the split frequency operation and broadcast QRM make it difficult to generate big QSO totals except for those with large antennas. It will test your ability to tune and react rather than just sit and call CQ.

Expect propagation to Europe from the start of the contest until 0800z. Look for the loud Caribbean stations all night and certainly after 0600z. The early morning hours are often very slow with a few loud KH6, VK, and ZL stations to call. Be happy if you work one or two JA

stations just to get the multiplier. The band opens to Europe again about 2200z or 2300z. If you are going to have a chance to call CQ and get answers, the 2300z hour is usually one of the best.

Here are a few additional tips that will help your phone score:

- Get a computer-controlled radio! Working split is easy when you just have to type in the frequency the DX is saying and then call.
- Make it easy for the DX station to recognize you. Always say the callsign of the DX station once when you are calling. With many stations listening on the same frequency, this will help them lock in on you. Send both calls when you give the exchange as well. This will help prevent costly not-in-log QSOs.
- Make sure you know who you are working. This seems obvious, but there are many bad packet spots that list the wrong call or the wrong split frequencies, so be careful.
- Tune slowly and listen carefully. With so little room, stations are often stacked 2 or 3 deep. Since QSOs may take longer in all the QRM, you are more likely to tune across a needed multiplier while he is listening, or while he's covered up by a loud Slovenian or Italian!
- Don't be afraid to call CQ. Pay attention to the frequencies where the Europeans are listening. If you hear one of them clearly, try a few CQs listening down. I have had my best luck CQing early (2200z-0000z) and late (after 0700z). CQing is often the only way to get some of the “second-tier” multipliers that don't ever call CQ themselves. It's tempting to listen down very low in the band to find a clear spot, but many Europeans respect the IARU recommended phone allocation and will not call you below 7040 kHz.

If you do listen below 7040 kHz (and don't be surprised to hear stations listening as low as 7010 kHz), do expect to get some negative comments from Europeans. I try not to listen down that low, but sometimes it is the only way to hear anything.

- Don't forget to listen up above 7150 kHz. A quick scan of the band will sometimes uncover a South American or VK station working transceive. And if all of the bands fold during a solar storm, try 40 meters transceive and beg for VE QSOs (in CQWW they are worth 2 points each!).
- Finally, remember to be sure and work a U.S. station for the country multiplier, and zones 3, 4, and 5 for the zone multipliers! Do this even if you have to move one of the locals to 40m during the day.

CW

In CQWW CW 2003, conditions were good both nights and activity stretched across the entire band. Top single op, NT1Y, had over 1500 QSOs! A more typical single op line score was 900/31/90. The top tier multi-multis were around 2000/40/135. Wow! This is a band where even simple wire antennas can produce score-building numbers.

For CW DX contests, 40m is a 'volume' band with two solid opportunities each day for rich European runs. For a single op or multi-single, 40m should get serious consideration as the band to start the contest. With some luck, we will have excellent propagation for the first hour or more. At this point in the cycle, we have a good chance for the MUF to stay above 7 MHz for most of the evening. Don't forget to scan for multipliers from the rest of the world on a regular basis.

As the sun comes up across Europe, the band really quiets down, and some good runs can be expected from around 0600z to 0930z. It is amazing how late the UK stations will come in

after their sunrise. After this time, it's a game of multiplier hunting.

At our sunrise, the band offers a short opening to JA. Sometimes direct path, but more often via skew path beaming west. After sunrise, long path possibilities exist to VR2, YB0, DU, and the rest of southeast Asia. The multi-multis and multi-singles will love it, but the competitive single op should keep an eye on 20m for more productive action.

The real advantage for New Englanders occurs in the afternoon well before sunset. European QSOs are possible as early as 1900z, but the real action gets underway during the 2100z hour. This is still well before our sunset, but the band has lengthened out in Europe so that all they can hear is loud W1s calling CQ. We have an "exclusive" into Europe for a while and this is the time to secure a good run frequency.

Don't forget to check for long path openings at our sunset. The CQWW CW contest often has workable JAs and other Asians mixed in among the loud Europeans and Ws calling CQ. This is also the place to find those zone 24, 26 and 29 multipliers. But you have to listen hard as they are often very weak compared to the loud U.S. and Europeans calling CQ. This opening isn't a factor during ARRL DX.

The big guns always seem to work their way into the bottom 10 kHz of the band. But don't forget about the upper ranges. It's a lot easier to hear and be heard, if you pick a CQing frequency up above 7030 kHz. Plus, when tuning for multipliers, check all the way up to 7075 kHz. There were lots of juicy multipliers last year above 7050 kHz (that's the only place many low power DXpeditions can get a spot). Be prepared to use your narrow filters. "Clear frequencies" are narrow and hotly contested, so the challenge is being able to hear weak Europeans amongst our loud North American neighbors.

Good luck in your 40m contesting efforts this season. Anyone with a dipole up 60' or more should be able to take full advantage of the above tips. With less antenna, plan on working a little harder, but with an equally positive impact on your score.

20 METERS

Dave Robbins - K1TTT

With updates by C. Morrison - N1RR

<Reprinted from the 2002 Cookbook>

While 20m may be open to all areas, there are definite 'openings' that emphasize signals to specific areas. These conditions are important for the single op or multi-single stations who can't be on 20m all the time. Keep them in mind when planning your weekends. South America should be strong for 20 to 22 hours per day.

0000z-0300z -- Europe fading. Open well to SA, AF, AS, and OC.

0300z-0600z -- Asia weakening. Open to SA and AF; listen for early signs of JA + long path to EU

0600z-0900z -SA is best. Some PAC/VK/ZL. Listen for long path to AF and EU.

0900z-1200z -- AF + some EU + weak Asians come in after Europe opens. JA often very workable by beaming about 30° without losing much of Europe.

1200z-1500z -- AS, EU, and AF all should be good. Oceania may appear both short and long path.

1500z-1800z -- Open everywhere, though signals may fade due to daytime E and D layer absorption.

1800z-2100z -- Open everywhere. Signals improving to AS and to OC. If EU faded during midday, it would return now. Long path to VK

probable. Daytime E and D layer absorption weakens some paths.

2100z-2400z -- Open everywhere. EU beginning to fade. Open well to SA, AF, AS, and OC.

Other interesting propagation notes:

- Usually 1500z-1800z, EU signals will fade. The midday D and E layers begin to affect signal strength and/or close paths. Near the end of this period, EU signals should return. Expect the best rates of the contest with a few Asian and OC multipliers at the same time. Low antennas may be more effective to EU now.
- Overnight during 0600z-1000z, Europe may be loud via the long path. They often won't be able to hear us over the louder local and Asian stations they are running. Many times these long path signals will take a sudden fade about ½ hour before the band opens short path with a vengeance. If you are on the band and hear this sudden fade, it's time to turn all beams on the European short path and start CQing and running guys.
- Along with JA in the morning there can be other Asian or Oceania stations. The real interesting ones are the weakest callers under the European pile-up. Don't give up too easy on the weak ones, and you may be rewarded with some interesting multipliers.
- Also overnight, there can be other strange long path and skewed path openings. Listen for:
 - Asia over the South Pole
 - VKs/ ZLs to the east
 - Africans to the west
 - Europe from southwest

Operating

First tip: Have an operating plan for your time. Check out the propagation predictions, check out past year rate sheets. But plan to be flexible during the contests. NO pre-contest predictions will be exactly right--last minute changes on the sun can make huge changes in actual propagation. Learn to use the rate meter along with your decisions to QSY.

Next tip: If 15m and/or 10m propagation is poor, there will be more activity on 20m. With the new multi-two category in CQWW, 20m will surely be more crowded.

Expect top stations in the northeast U.S. to score similar to this on 20m:

Category	QSOs	Zones	Countries
SOAB(HP)	700-1,200	32-37	100-115
SOAB-LP (Tribander)	500-800	30-35	100+ CW 120+ ph
M/S	1,000- 1,500	38-40	135+
M-2	1,250- 1,750	38-40	135+ CW 155+ph
M/M	2,000+	39-40	135+ CW 155+Ph

If propagation is really good, more activity will move to 10m and 15m so totals on 20m may drop. If propagation is only fair to average, then 20m will be more active for longer, and the band totals will go up.

Putting it all together, how do you decide when to switch from 20m to 15m in the morning?

For the single operator, plan to move to 15m around 1100z in average conditions. But at 1100z, I wouldn't just switch to 15m and start calling CQ blindly. Begin checking 15m about 1030z to see if any Europeans can be heard. Are any YCCC stations running Europe? Once you can hear most of the EUs they are working, you should leave 20m.

Until 15m is open enough for you and your station, keep the QSO rate up on 20m. When you do go to 15m, try calling CQ. If you can't get anyone to answer, you have to do something different. Try S&P on 15m, or S&P on 20m, or call CQ on 20m.

Continue to keep an eye on our multi-multis on 15m, because that's where you're heading.

15 METERS

Dave Pascoe - KM3T

<Reprinted from the 2002 Cookbook>

With the solar flux hanging in at fairly high levels, 15m should again prove to be one of the main "money" bands for the CQWW Contests. The beauty of 15m is that it offers QSO rates similar to 10m but with longer openings and more widespread propagation. Whatever happens with 10m, 15m will be an important band for you to focus on. Remember the golden rule: you generally want to be running on the highest band open to Europe!

With high solar activity, 15m will likely open before sunrise. Vertical angles of arrival on EU signals will change all day. When the band first opens, angles will be fairly low and those with higher antennas (100 ft. or more) will be able to "open the band." Within an hour the vertical angles will increase sharply, and those with lower antennas can really get running. You can do extremely well on 15m, even with a modest tribander at 50 feet.

Early in the opening, you will find Russians and good Asian multipliers e.g., EX, UN. As the opening progresses, it will sweep lowly westward. Later in the day, you will find more western EU. Plan on spending the first hour after sunrise on 15m because that will provide the peak rates; then plan on moving to 10m, if it's open. Also watch around 1500z-1800z for YB and other potential multipliers like 9V. If you

can split power between 2 antennas, keep one north around this time. You might be surprised.

You don't need a KW amplifier to run Europeans! You will need a clear frequency. So, work on your frequency finding skills. Don't be afraid to go way up the band to get good results. If there's activity up there, you'll be able to run. If you can't run, try to find a better frequency, or do some S&P for a while. Do whatever it takes to keep the rate up!

JA will start rolling in around 2100z and, from then through 0100z, you will find lots of JA and other Far East and Pacific goodies. This opening can really boost your multiplier/QSO totals, but don't stay too late if you're an All Band entry.

Many juicy multipliers will call you, but don't neglect hunting around for multipliers. The only way to get a high multiplier total is to periodically sweep the band for multipliers. Some rarer mults may only call CQ, so you'll need to find them. If your run rate is starting to drop off, it may be time to S&P up and down the band tuning for multipliers. Use the rate meter as a guide. You'll need a feel for when it makes sense to S&P.

Remember, whether 10m opens well or not, your 15m effort will be critical to your total score.

10 METERS

David Robbins – K1TTT

The sun is getting quieter this year. The Solar Flux has been below 100 regularly and will probably be getting lower and lower as the year progresses. While this may be good for the low bands, it is horrible for 10m. This means that everyone must adjust 10m strategy a bit for the next couple of years.

No longer can you count on going to 10m for a nice run starting early in the morning and going

into the afternoon. Now you must monitor closely for the few multipliers you can scrounge up, and keep your fingers crossed that the band may open to Europe for a quick run. For those using the DX spotting network, this means a bigger advantage as you can count on the multi-multi stations spotting every little multiplier that pops up. For those who don't use the network, you will have to make regular checks of a quiet band while trying to keep your rate up on the more crowded 15m and 20m bands.

BUT! Don't count 10m completely out. Watch the WWV numbers and other solar activity reports. There is still a chance for solar fireworks that add to the fun on 10m. Stay especially alert 28 days before each contest, as the conditions are likely to be repeated the weekend of the contest.

As far as antennas are concerned, higher is better. Longer is better as well. The higher and longer you can get them, the better they will work the odd paths and weak signals.

If conditions are quiet as expected, there are a couple of important things to keep in mind. First, the normal short path or direct path to Europe probably won't work. From New England to most of Europe, the shortest path is northeast. This direction goes closer to the pole which gets less solar radiation and therefore has less ionization, thus not reflecting the higher frequency bands as well. Better propagation is found beaming to the east or south. This is good for Africa and South America where you can have openings even at the very bottom of the cycle, but it can also help work those few European multipliers that are so hard to find now.

The key is called "backscatter" or "skew" path. This happens because the paths to the south from here and Europe are both open at the same time and to the same areas. (It can also happen from here to Asia but is much less likely.) When this condition exists, contacts can be made by using the south Atlantic as a big mir-

ror. We beam to the southeast, and Europeans beam to the southwest, and there is just enough reflection back to make weak contacts. You won't run the 100W stations this way, but you will be able to work the KW stations to grab those multipliers.

One thing that can help is to ask the loud stations on 15m or 20m that you need for multipliers on 10m to beam southwest and meet you on 10m. This not only gives them the correct beam heading but also helps by adding about 20 dB of callsign recognition in very weak signal conditions. A handy indicator of conditions is to find a loud European multi-multi calling CQ and then turn your antenna to find the best beam heading where he's loudest. Another handy indicator is to find one of the big northeast multi-multi stations calling CQ. If they aren't getting any answers, it probably isn't worth spending much time on the band. If you are on a spotting network, they'll be easy to find as they will be spotted regularly.

If nothing else, be sure to get zones 3, 4, 5, K, VE, a couple of Caribbean multipliers, and some South and Central Americans. A bit more time should get you some Africans and maybe even ZL in the evening.

On CW, watch out for CB QRM on 28005 kHz, 28015 kHz, 28025 kHz, and up through 28315 kHz. This is common in South and Central America and can make it hard to hear weak signals.

Areas vs. Time:

This is a rough prediction of where to look for possible openings with low solar flux during fall or winter contests:

0900z-1100z -- PY, Africa--starting south and moving north

1100z-1700z -- southern Europe, Africa, South and Central America, Caribbean

1700z-1900z -- KH6, KL7, South and Central America, Caribbean, west coast of U.S., Southern Africa

1900z-2100z -- KH6, ZL, ZS, South and Central America, Caribbean, west coast of U.S.

2200z-2400z -- ZL, VK3, South and Central America, Caribbean

Have fun and keep checking the "spots".

MULTI-OPERATOR CONTESTING

Jim Idelson – K1IR

Multi-op contesting is a great way to generate points for the club. With the right mix of operators, equipment, antennas--and a good plan--you can be very successful in the multi-op categories. Why enter a multi- category? There are many good reasons:

- You might find that building a multi-capable station offers some new and exciting technical challenges.
- Perhaps you're not up to a full-time single op effort, but you still want to put your station on the air for the whole weekend.
- You like the idea of working with a team.
- You want to provide an opportunity for some of YCCC's stationless operators to get on in the contest.

What category should you choose?

This is an important question that you need to answer early. First, you need to decide what you want to accomplish in the contest. Do you want to do some technical experiments with multiple stations? See how many points you can generate for the club? Be in a position to win your category?

Second, if you want to be reasonably competitive, you need to choose a category that matches your resources, or build up your resources to match the category! The resources we're talking about, of course, are your station and your operators.

Multi-multi is a special case, where you need to have at least three stations that can be on the air simultaneously. You also need a heck of a lot of operators. In this article, we'll focus on multi-single and multi-two.

Station Capabilities

To be a competitive multi-single or multi-two, you need to be able to have more than one station working the bands at the same time. Those two or more stations will be on different bands, must have lots of flexibility, and they shouldn't interfere with one another. The interference requirements are very important for multi-two, but not as critical for multi-single.

One way to easily minimize the interference problems is to run low power. The minute you turn off the amplifiers, you will eliminate many inter-station interference issues. If you choose to stay with high power, you'll want to do lots of testing in advance to know where the interference problems potentially are and take action to solve those problems.

Antennas

Doing well in any category depends in great measure on your antenna farm. In the current portion of the declining sunspot cycle, your primary bands will be 15m through 160m. You'll have three main situations to think about: daylight hours, darkness hours, and gray line hours.

During daylight hours, you'll want to be all over 20m and 15m, with the ability to scour 10m for multipliers and possibly get a run going if there's activity out of Europe.

In the nighttime hours, you will need to handle more bands. Running aggressively on 40m and 80m, with regular visits to 20m and 160m for those critical multipliers and maybe a run on 20m at European sunrise will be the *modus operandi*.

Gray line hours in the late afternoon and in the morning can be very exciting times in multi-op efforts. You may need to bounce from band to band and use combinations that don't make a lot of sense during the rest of the contest like 15m and 40m.

What does all this mean? Lots of antenna switching flexibility and the ability to have antennas pointed in different directions at the same time will allow the different stations to go where they need to go at any time during the contest.

Monoband solutions are very important for multi-op environments. A single tribander just cannot be shared adequately amongst all the stations that need antennas. If you have a single tribander and a 40m yagi on the same mast/rotator, you might want to think seriously about putting up another tribander, fixed on Europe or rotatable, plus another 40m antenna with some gain fixed on Europe. This could be a simple wire beam in the trees, but the flexibility it offers will be extremely valuable when you need to work JA, HL and other Pacific multipliers on 20m while the main station is best placed on 40m running Europe!

There are a variety of interesting ways to provide antenna-switching flexibility. You can use two stations set up in a SO2R kind of configuration with a SixPack that allows all the antennas to be switched to either of two rigs. You can also use a dedicated radio approach with 160m, 80m, and 20m on one rig, and 40m, 15m, and 10m on the other rig. This allows most of the important band combinations, but not all. It's a trade-off you have to think about in advance of the contest.

Rigs and Computers

How many rigs can you set up simultaneously? In multi-single and multi-two, you can effectively use up to four rigs at the same time. Not all will be able to transmit at the same time, but the non-transmitting rigs can be used as multiplier and QSO hunting rigs to help fill the band map. And, of course, you need a computer for every operating position, with a networked contest logging solution. Most of the popular contest logging software packages allow for networked logging in multi-op environments. Don't forget to connect to the DX cluster for those all-important packet spots.

Configuring and testing the logging software and hardware setup well in advance of the contest is very important. Many a contest operation has lost valuable hours at the start of the contest due to improper or incomplete setup of the logging computers and software. On CW, make sure all the messages are programmed into the memories and make sure the keying works at every operating position. On phone, make sure the messages are pre-recorded and that the transmitted audio sounds great at every operating position.

The Team

The people on your team can make all the difference between success and failure. A great station with the wrong operator team just won't deliver, while a great team can make up for many deficiencies in the station. You need certain skills on the team:

- Run ops -- operators who can generate high rates
- Multiplier ops -- operators who can dig out every available multiplier
- Planners -- team members who focus on making tactical operating decisions throughout the contest

- Technicians -- team members who know how the station is built and can fix anything at a moment's notice

Most successful multi-op teams perform best when the roles are defined in advance and the players stick to those roles throughout the contest. Try to get ops to commit to the whole weekend. Relying on part-timers often results in missed operating time and poor overall team performance.

Planning

Knowing what you are going to accomplish in the contest, who is going to do it, and exactly how it is going to happen is invaluable in multi-op contesting. Well in advance of the contest, devise your strategy. Leverage the strengths of the station and the team; figure out ways to compensate for weaknesses.

Meet with the whole team to talk about strategy and roles. Get the whole team to buy into the plan. Write out your plans, post them, and stick to them. Define roles, post an operating schedule, and set band by band QSO and multiplier targets at various milestone points throughout the contest. Decide how band changes will be determined. Provide complete information on the station and the operating plan to all ops well in advance.

Training is another crucial element that falls under the planning umbrella. Training includes having all the operators spend time working with the station in the actual configuration that will be used in the contest. "How do I send a spot out to the packetcluster?" is the kind of question that shouldn't need to be asked during the course of the contest. All station functions--switches, buttons, and indicators--should be clearly marked so that a fatigued operator doesn't become confused.

Conclusion

Bringing together a station and a team to compete in a multi-operator effort is a great way to advance your contesting skills. There are many ways to contribute to such an effort, and the results are very satisfying. With careful consideration of the technical, operating, and planning aspects of the effort, your next multi-op entry could be a winner!

HOW DOES IT SOUND FROM THE CARIBBEAN?

Don Toman – K2KQ

DXpeditions in the Caribbean offer a variety of good experiences:

- The opportunity to be DX for a change
- A chance to build operating skill...fast
- An occasion to make new friends

Looking at the experience can be examined from two perspectives:

- What does the station in the Caribbean experience so you can understand what it takes to work them?
- What to look out for should you decide to go on a Caribbean DXpedition yourself.

The two main DX contests (CQWW and ARRL DX) offer different perspectives, experiences, and strategies. We'll get to those after discussing the sounds of the bands from low latitudes.

The very enjoyable experience of being DX with a big signal can be summarized by relating the experience of one of our members who was seated at the 40m CW position at J3A a few years ago. It was suggested he find a (relatively) clear spot and call CQ. He did. The band fell in on him in an instant, and he yelled "Holy ****! What do I do now?" The an-

swer... "Work them ... one at a time." Before long, he was doing just that, at a respectable rate, and enjoying every second.

As to choices of places to operate, there is no doubt that the experience of operating from the southern Caribbean (J3, J6, 8P, J7) is really worthwhile. Yet there are also advantages to operating from places like VP5, ZF, U.S. VI, BVI, Anguilla, which are a lot closer to the U.S., and therefore more productive with a low power station and simple antennas. What is said below about band behavior applies more to the southern Caribbean, but it applies in the north as well.

How do the bands sound?

In the tropics, the sun comes up and sets abruptly. That's because the angle the sun's apparent path makes relative to the horizon is closer to vertical in the tropics than it is in our temperate latitudes. For that reason, sunrise and sunset are not prolonged events, especially when you get to latitudes below 12 degrees.

At low latitudes, you find that the higher bands will be open to places for which they are closed at higher latitudes. Those auroral circles you see on the space weather charts do not extend into the tropics. A solar flare that wipes the bands out in New Hampshire for a couple of hours will have an effect for a much shorter time in Grenada.

The great circle map looks a bit different from the lower eastern Caribbean. The most pronounced difference you will note is that HS, XZ, 9M, YB, and the like do not arrive over the North Pole. They propagate over Europe, don't have polar flutter, and will often surprise you with their strength.

Propagation to Japan does go over the North Pole, and the Caribbean is very difficult for Japanese stations. There's nothing like a JA pile-up where all of them are equally weak and equally polite! It doesn't help them either that

the path to JA goes right through the U.S. west coast.

At low latitudes, there is considerably more noise due to atmospheric activity, especially on 160m and 80 meters. Both the ambient noise and the static crashes are strong. The two extreme bands, 160m and 10 meters, are subject to the combined effects the most.

160 Meters

160m in the tropics shows the local sunrise and sunset effects we see at temperate latitudes, but they don't last very long. If you are going to work a VK or ZL, right around sunrise is the time to do it, just about the time 10 meters is opening to the east.

It's a little different at sunset. Signals from the east, especially from comparable latitude, begin to appear before sunset, and build as darkness falls. As an example, a few years ago, when CN8WW was active in CQWW, they could be heard well before sunset. Stations like D4B and 3V8BB fall in the same category.

The U.S. starts to appear right at sunset on the east coast, follows sunset across the country, and continues all night. The main limit to working U.S. stations besides absorption is atmospheric noise (QRN).

When you are at low latitude, a large region of tropical weather activity lies between you and the stations you want to work to the north. For that reason, receiving antennas that feature azimuth directivity alone are not very useful. Effective receiving antennas do not respond to signals arriving at high elevation angles. Long beverage antennas work. Pennants do not.

Since static crashes are both frequent and strong, high speed on CW is generally not useful, and sending your call once at 35 wpm is not the best approach to getting a quick answer. A single call at 20 wpm is much more likely to be

heard and understood. As always, good timing is essential.

Local Caribbean signals tend to be very loud. V47KP's 160m signal melts brass. For that reason, care must be taken to avoid the pile-ups of other Caribbean stations. Some stations have very effective receiving antennas, and it can be frustrating to call one that's running the U.S., is S9 + 40, and yet doesn't return your call.

80 meters

What's said for 160m is pretty much the story for 80m, except not as extreme. Atmospheric noise makes fast exchanges difficult. If you want a quick QSO with a Caribbean station on 80m, you are better off calling at 20-25 wpm than at 35-40, just to dodge the static crashes.

The band remains open for about an hour after sunrise, and QSOs into the Pacific are possible. Sometimes (rarely) 80m is open to JA-- something that happens around local sunrise and JA sunset for about an hour either side.

Contacts to the U.S. are possible throughout the hours of darkness.

40 meters

40m is a money band from the Caribbean. It opens to Europe well before local sunset and remains open into the U.S. and Pacific until a couple of hours past sunrise. QRN is not as intense on 40m as on 80m and 160m, signals are big, but the usual 40m problems abound. It's crowded. In a CW contest, it's often productive to operate up in the band as high as 7075 kHz or so. In a phone contest, dodging the European broadcast stations is an art. While Caribbean stations can operate in the U.S. phone band, hardly anyone listens there, so it's usually best to operate split, below the U.S. phone band.

40m is where you are likely to be surprised to hear a loud, steady YB or HS call you in the

midst of a European pile-up. Since the direct path is over Europe, they sound the same.

There's often a chance to work a few JAs, even a decent run under the right conditions, beginning around 0700z.

It's difficult for a Caribbean station to run Europe on CW because U.S. stations are so loud. For that reason, stations with a yagi might put the ends on U.S. to work Europe, then turn to put the ends on Europe to work the U.S.

For phone operation, Europe can be worked below the U.S. phone band, but then you have any number of guys popping up (illegally, of course) telling you to "listen up".

Somehow, it all works out.

20 meters

20m is also a money band. From the Caribbean, it's usually open 24 hours a day, so, unlike the other bands, it demands full-time operation. From the Caribbean, it sounds pretty much as it does from the U.S., with the exception of HS, XZ, etc., popping up with big signals with no polar flutter. That's always a treat. European signals die down overnight and then begin to rise again around European sunrise.

Working 20m SSB can be fatiguing from the Caribbean. There are so many signals, so many of them really poor quality, vast differences in accents and few of them (except the 200 JAs calling you at the same low signal strength) are weak. It's frustrating to get everyone else to shut up while you try to run a weak JA pile-up, but that's the situation you are going to face. Operator shifts seldom last more than 4 hours on 20m SSB, unless there's a mutant in the chair – and the YCCC has a few them.

CW is easier. At least you can work the edges of pile-ups to get things somewhat separated.

Even though 20m is open 24 hours a day, it doesn't turn in the QSO totals or the rates you will see on 15m and 10 meters.

15 meters

15m opens to Europe about an hour before sunrise (sometimes more), and it will be more reliable than 10m in times of low sunspot activity.

Because there's more room on 15m, working 15m SSB is not as fatiguing as 20m SSB, and an operator will be able to last longer than 4 hours at a time.

15m CW can be the best daylight experience. It's not as good as sunning yourself with a cool beverage in hand, snorkeling, or bikini watching on the beach, but it comes close.

10 meters

10m opens very abruptly at sunrise. Within a matter of minutes, the band will go from very quiet to full of signals from the east, beginning possibly with a few VU stations, followed quickly by stations in eastern Europe. If you are after maximum rate on 10 meters, you must stake out a frequency about a half hour before sunrise and be ready for high rates once you become established. As the earth rotates under the sun, the band follows. As the sun moves across the U.S., the east coast will be followed by the midwest and then the west coast. After sunset, 10 meters can remain open well into the dark hours, especially into regions of comparable latitudes.

Signal level is seldom the limiting factor in determining your rates on 10 meters. The noise level is low, but the QRM level is enormous. Dealing with the QRM is a matter of individual operator preference. My preferences are:

- Go as fast as conditions will permit
- Establish a rhythm and stick as close to it as possible

- Return to partials with a full exchange and correct after the other station has given you a chance to correctly read the call sign.

Working split is difficult in a contest on 10m, but that doesn't mean you can't work the edges of a pile-up to gain the effect of operating split, at least on CW. On SSB, it's more a matter of picking the loud ones or the ones with good timing and keeping the rate going. Timing is important. Sometimes on CW, a weak signal that's 10 dB weaker than the rest, but slightly off frequency and timed just right, will nail an instant QSO in the presence of much stronger signals all calling at exactly the same frequency at exactly the same time.

It's never hard to work South America from the Caribbean. They hear you off the back of your directional antenna and they will work you that way. If all else fails, you can run PY and LU stations until you run out of them.

Even at the bottom of the sunspot cycle, 10m may be open for part of the day to Europe. It's never a good idea to ignore the band completely.

CQWW vs. ARRL DX

Working CQWW and ARRL DX from the Caribbean are two entirely different experiences.

A Caribbean CQWW DXpedition will turn in more points for the same operating effort than staying home. It's not too hard to run up 5-7 million points in a single operator, low power operation with fairly modest antennas. Of course, a multi-multi with a decent location and serious antennas will bring in somewhat in excess of 20 million points.

Conversely, in ARRL DX, because you are working only the U.S. and Canada, even though you can get some great rates, the number of multipliers is limited, and the score you can achieve is comparable to what you can run up at home. You do DXpeditions in ARRL DX more

for the fun factor than for the score you can bring in for the club. A single op, low power score of 3 million is achievable, but going beyond that is difficult.

For ARRL DX, you don't need a rotator. You just point your antenna at the U.S. You don't need a great location. The north side of a hill, on the beach, is a great spot for ARRL DX. In fact, a big hill blocking the general direction of Europe can be an advantage, since it keeps you from being pestered by EU stations that insist on calling, even though you explain patiently that you are listening for W/VE only.

For ARRL DX, you don't need to operate when the U.S. is trying to run Europe on 10m, 15m, and 20m. Their antennas are not on you in your early morning, and you are better off taking time off and having breakfast by the pool. Aside from a short time around sunrise, when 40m can be productive, you are better off holding off your operating on the higher bands until 11 am or so local time. Going from 11 am to about 3 am on Saturday is about as long a stint as you will need. Since the contest doesn't start until 8 p.m. local on Friday night and ends at 8 p.m. on Sunday night, you can arrange to eat, sleep, and lounge by the pool a lot more than you could if doing CQWW. You can turn in a very respectable ARRL DX score with less than 30 hours out of 48 in the chair.

The friendship factor

Regardless of all the other incentives, one of the greatest is to hook yourself up with the local hams, who are invariably friendly and happy to help you. Some friendships will last you a lifetime. The only way to find out is to try.

If you are going to go on a Caribbean DXpedition, check on the licensing requirements well before you decide to go. Not all the islands have the same reciprocal licensing arrangements. A local can help you to sort things out, and can often file papers for you so that you will have a license on arrival. Sometimes, having a

license in hand is a definite advantage when trying to clear customs in a place that never heard of you before.

Whatever you do, enjoy yourself and...work them...one at a time!

PACKET SPOTTING, PLUS USING YOUR COMPUTER SUCCESSFULLY

David Robbins – K1TTT

Using DX Spots can increase your contest score and enjoyment if used properly. If not used properly, they can be a distraction and annoyance. Since the first contest where packet radio was used to transmit DX spots, I have watched the volume and range of information available grow tremendously. In the first contests, we were working out how to do it and may have sent and received a couple of spots an hour on average. Now, in a major contest, we are approaching 40 thousand spots in 48 hours or over 800 spots per hour. Needless to say, just reading that many spots in a weekend is a major job. Fortunately, the node software and logging software have both been improved to make sifting out just what you want much easier.

Some Background

There are several sources of DX spots available these days:

1. The traditional RF packet radio cluster. While many nodes still support RF users, there are very few (if any?) nodes in the northeast that are connected only by RF these days. Because of the volume of spots available during contests, RF backbones and user connections can be easily overloaded and normally must filter the spots to only get those originating in a small area.

2. Telnet nodes. These nodes use a simple text protocol to send and receive data over the Internet. Most windows-based loggers that are on a

computer connected to the Internet can access them. There are also programs like my Win-TelnetX and others that let you take data from a telnet node and convert it to simple serial data so it can be used with older loggers that expect to talk to a TNC. There are several flavors of these nodes. Most popular in the U.S. are the AR-Cluster and DX Spider nodes. Others include CLX, DX Net, and Clusse. I won't try to summarize commands or how to use each type; there are web sites that give summaries of commands. Also, each logging program is a bit different in how you set it up to use these nodes.

3. Webclusters. These are web sites that collect DX spots. I am not thrilled with these, as they tend to be slow and waste bandwidth. This is a smaller problem today with many users having broadband Internet access. Using these does seem to be less reliable and requires your software to do more processing to receive and filter the incoming spots. It may also slow down spots you send from getting out as they go to the web page and are then sent to some other node or outlet to get to the rest of the world.

4. IRC Chat. The #CQDX IRC channel has a feed of DX spots from around the world available and can also send spots. It is a bit better than a webcluster, but still relies on connections to telnet nodes for most of its information and to get spots out to the world.

Some Warnings

1. Do not set software to reconnect instantly to telnet clusters. Any cluster running under Windows on a non-server OS version could lock up if too many users reconnect too quickly after a crash or Internet hiccup. If you can, set a delay of a couple minutes to reconnect.

2. Do not set software that is designed for webclusters to access telnet nodes. This can confuse the telnet nodes, and won't let you send or receive anything.

General Tips

Connect early. Set up your logging software and connect to your selected source(s) early and often. Don't expect node sysops or logging program authors to help sort out problems Friday night before a contest.

Test your setup. Send spots, receive spots, make sure you can grab them and send them to the radio if you are set up for that. Also check the commands for showing recent spots for a single band or all bands, so you can repopulate your band maps and spot lists if your logger crashes, or after you reconnect after a break.

Set filters and test. If you want to use node side filtering, set the filters early and make sure they give you what you want. If you have enough bandwidth I prefer to let the node send everything, and let my logger do the sorting--that's just one less thing I have to remember to set up.

Have backup connections ready and test them too. While it is much less likely that an Internet connected node will lose its connections to the world than it was with the RF backbone, nodes do crash, Internet connections break, ISPs shut off occasionally for maintenance, etc. So be sure you have selected a backup connection and know how to shift to it without wasting a lot of time. It is usually easiest if the backup is the same type of node, so you don't have to worry about configuring different filters or changing settings.

Receiving and using spots

The #1, most important, absolutely necessary, don't forget tip on using spots: **COPY THE CALL YOURSELF!** Don't ever trust the call that is spotted to be correct.

Practice using spots. Figure out how to use your logging software, so you can jump to a spot, work the station, and get back to your run frequency without losing time or forgetting what your run frequency is. Each logging pro-

gram is a bit different, and there are some pitfalls, so try it in the configuration you expect to use, and figure out how to recover if you mess it up.

Think before grabbing. Some things you should think about:

1. Do I think I can hear and work the DX? You should know your station capabilities. Combine that with expected propagation and what you are hearing that weekend.
2. Do I have time or is my run too busy? How much is a multiplier worth vs. how many Qs might I lose?
3. Is the DX someone who will be there all weekend or maybe only NOW?
4. If I call CQ enough will that station or another station from that country call me normally anyway?
5. Should I really be somewhere else? Instead of grabbing stuff on this band, should I be on another band? If you have time to think about grabbing spots, you may be in the wrong place.

Spot Volume

There can be 800+ spots/hour with worldwide feed in a major contest. You don't even want to think about watching that whole stream of data. Learn how to set up your node connection and your logger to show you what you think you can use.

Some hints for dealing with the volume of spots:

1. Reduce spot expiration time in band map to 15-30 minutes. After that time, many stations have moved. If they haven't moved, they will be spotted again.
2. If you are on RF link, filter to spots originated in just W1/2/3 or Zone 5 or a similar area. If you try to see everything, your connection

will back up and you will either be disconnected or get very old spots.

Ways to use spots

The Band map. When tuning the band, watch the band map scroll along with you. When you pass someone calling CQ and only catch a couple letters that happen to match who was spotted, you can be reasonably sure who it is and keep going or stop to work them. This is particularly useful on 2 VFO radios if you can scroll one band map on VFO B while you keep CQing on VFO A, or vice versa.

Point, Shoot, and Grab. When doing this, I start with the most recent spots as they are the ones most likely to still be on the same frequency. If I go there and don't hear them, I will usually clear the spot from the list so I don't go back. Keep going until all multipliers are worked, then switch and start working QSOs. Some software like the N1MM logger lets you point and shoot or use keyboard shortcuts to work your way up or down the band map that can be handy as well.

Dial them in. This is actually my favorite when using the FT-1000MP. Dial in the multiplier on the sub-VFO, then go to dual RX to check pile-up. Time his CQ with mine and swap VFOs to work the spotted station, and go right back to CQing. This is good if you know you are LOUD and won't have to wait.

Sending spots

Spot everything. As I like to tell my operators: if you type in a call and it's a dupe, spot it. If it isn't a dupe, work it, and then spot it. Don't worry about dupe spots; the nodes have filters to reduce them. Don't worry about spotting "common" stuff; everyone needs a G, a DL, etc., on six bands in CQWW DX and ARRL DX. Your spot of a G on 10m may be the only one this year, but may be a notice to everyone that the band is open.

Some software will automatically spot S&P QSOs. BEWARE! If you are running, you can accidentally switch into this S&P mode. If this happens you may end up spotting your log, which is confusing, and can cause you to lose your run frequency when the pile-up shows up to work something that just called you.

Watch for "stuck radio syndrome". Periodically watch the spots you send and make sure they are on the right frequency. Radio-computer communication failure can cause all spots to come out on one frequency. A misconfigured radio can cause spots to be anywhere. For example, using the FT-1000MP in M-Tune mode, most software will spot the VFO (A or B) frequency instead of the M-Tune frequency you see. This may also cause you to log stuff on the wrong band or frequency.

Great Debates

Yes, spot club members when you hear them CQing. It helps let those of us who may be too close yet too far avoid stomping on them. Some contesters think this is a form of self-promotion or cheerleading. But it is obvious from the analysis I have done of spots in many contests that making random spots for a friend is way different than having a dedicated spotter that spots the same station dozens of times and does little else. In DX contests, it would be node users in other countries who would use these spots and many of them have filtered out stateside-originated spots anyway, so the distribution is not as high as the cheerleaders might hope.

Spotting something that calls you creates another dilemma in contest spotting. I like to spot the really rare thing that calls me on the band edge with a comment like "called me". This takes a few seconds to do, but could be a great tip to someone who isn't CQing that they should find a spot and CQ for a while.

Another great debate is what to do when you find a bad spot. Some groups send the bad call with "/BUST" appended or some such other

comment. I think this is more annoying than the bad call itself as most loggers will try to figure out what country /BU is and flag it as another multiplier. I think it is sufficient to just spot the correct call and, if you must add a comment, put it in as a comment, not part of the call.

Worldwide spots

There has been much discussion both pro and con over the years about how useful spots from outside the local area are. After much listening, watching spots, and many contests with full worldwide spots coming in, I have found several good uses for them:

1. 10m/15m bands not open yet? Don't want to waste time tuning there? The European or Asian DX spots will let you know who is where before you can hear them. This lets you use a big station you recognize as a band opening beacon (i.e., a European spots 9A1A--put your VFO there and listen for first signals). Also use to find open path--turn antenna from northeast to south to see if backscatter may be open.
2. Sort out pile-up. Hear a pile-up but no state-side calling and no stateside spots? It's likely it's been spotted in Europe or Asia. The spot may alert you to a rare multiplier and let you turn your antenna to find them. Long path Asia openings are good ones for this.
3. Sunday QSOs. Worked all the possible mults by Sunday? Go work stuff off band map. Europeans spot lots of Asians and Africans that we don't get spotted locally, they are often workable on 20m/40m (and other bands if propagation is good) but might be missed in scan of band.
4. Pile-up shows up on your frequency, but they aren't calling you?!?! Wait a minute and see who gets spotted, then at least you know who to yell at as you QSY.

One last reminder, packet spots are a great way to increase your multiplier count but always **COPY THE CALL YOURSELF!**

KEEPING MORE OF WHAT YOU MAKE

Dave Hoaglin – K1HT

Once we've sent in our logs, the final scores are up to the log-checkers. Most of our final scores wind up lower than the claimed score. Some reduction is almost unavoidable, but most of us can take steps during the contest to reduce errors and keep more of those hard-earned points. After a brief review of the process of log-checking and score reductions in CQWW (via the UBN report), this article discusses some of the strategies that experienced operators use to minimize score reductions.

Log-Checking in CQWW

Nearly all of us now submit logs in electronic form. The CQWW Committee uses software for most phases of log-checking; but the final scores are reviewed, and perhaps adjusted, by human log-checkers. The discussion below refers to the UBN report that is available from the CQWW Committee for any log submitted electronically.

Before any checking, each log is rescored, using the same standard multiplier data and the same scoring algorithms. In this step you may lose or gain some zone or country multipliers. If your final score is higher than your claimed score, it's likely that you failed to claim a multiplier or two. The result of this rescoring appears as the first tabulation under LOG SUMMARY, at the end of your UBN report.

The letters "U", "B", and "N" stand for "unique," "bad," and "not-in-log," the three categories of QSOs flagged by the software. A "unique" call sign appears only in your log, out

of all the logs submitted. It merits attention, but no credit is automatically removed.

A “bad” callsign has definitely been miscopied, either because it is not in the callsign database for its country or because further analysis of the logs has shown it to be the result of copying errors. The software flags the QSO with “-B” and automatically removes credit for it from your log.

The software classifies a QSO as “not-in-log” when your callsign does not appear in the other station’s log on that band. (As I understand it, this check uses only the list of callsigns that each station worked on each band. It does not take into account the date and time at which you claimed to have made the QSO. This is why it always pays to log all dupes!) If the other station’s log contains callsigns that are close to yours, the program lists them and marks the QSO with “N”. You do not automatically lose credit for these QSOs (perhaps the other station miscopied your callsign). If the other station’s log contains no callsign close to yours, the program flags the QSO with “-N” and automatically removes credit for it.

We want to minimize the number of “-B” and “-N” QSOs. They’re especially important because they also incur a penalty equal to three times the point value of the QSO. One of these stinkers can cost up to 12 QSO points. And if the QSO was your only one with that zone or country on that band, you also lose the multiplier(s), making the damage even worse.

What To Do

Some of the “-N” QSOs may not be your fault. If the other station actually worked you, but didn’t log the QSO, you’re stuck. But experience has shown that the operator is responsible for most of the “-N” QSOs and all of the “-B” QSOs, so let’s see what we can do to avoid them. Getting the callsign correct is the key.

Do you have the correct callsign? If you have any doubt when the station calls you, ask for the callsign again, and make sure you have it correct before you give your exchange. If you’re doing S&P, listen to the callsign once more before you call (if the station isn’t giving it regularly, tune on and avoid the risk). If you have super-check-partial, use it for clues to whether you have the right callsign, but be aware that its database may contain broken callsigns from the logs on which it is based.

To get the callsign right, you have to avoid copying errors. Examples on SSB include copying OZ1JVX as OZ1JVE and copying EA3KT as EG3KT. “Xray” and “Echo” do sound a bit alike, even without a crowded band and an unfamiliar accent. CW examples include copying OH8RC as OH8RF, EA1FBJ as EA1FDJ, ES6CO as ES6CM, and PA2DGR as PA3DGR. It’s not hard to lose a dit or even a dah in QRM, QRN, or QSB, and not everyone has good keying skills. Not so long ago PA2 callsigns were rare, and PA3 would have been a good bet. Beware of operators who send a K that blends in with the end of the call sign. In Saul K2XA’s 40m CW log G5MYK was flagged as “-B”. The correct call sign was G5MY, but it appeared in only 33 band-logs, compared with 20 band-logs for G5MYK, so poor sending (with too little space between Y and K) probably contributed. I don’t have a lot of advice on copying more accurately. Be aware of the phonetics and characters that sound similar. If you have UBN reports from previous years’ contests, study them to see what mistakes you made. If you’re not sure about a callsign, take the time to confirm it (remember those penalties).

Is the callsign valid? If you think you’re working an EA0 or a G9 station, the odds are that you’ve got it wrong. Learn the patterns and rules that other countries’ callsigns follow. For example, UA5CLB, logged in 2000 CQWW SSB, was flagged as “-B”; the correct callsign was UA9CLB (I don’t think any UA5 callsigns are valid). Super-check-partial is a great source

of help. If you see other callsigns with a similar pattern, you can get some assurance that you have a valid callsign.

Accept no substitutes for copying the callsign yourself. If you use packet, make sure to confirm the callsign. Too many packet spots give busted callsigns. Also, a different station may be on the spotted frequency when you arrive.

Watch your typing. Transpositions and adjacent letters or digits are the main culprits. For example, logging DL9PB as DL9BP, YL2SM as LY2SM, F6OYU as F6OYI, LZ5Z as LZ6Z, and HG8W as G8W all resulted in “-B” QSOs. If you’re a skilled touch typist with a fairly low error rate, you may prefer to steam ahead. I’m not, so I try to make sure that the logging line has the correct call sign. Your rate will seldom be so high that you don’t have time to look at what you are logging. Get in the habit of always looking at the QSO that you’re about to enter and making sure that it is what you worked.

Become familiar with the callsigns you expect to hear. Study a list of the announced DX operations before the contest. NG3K publishes such a list for each major contest:

<http://www.ng3k.com/misc/adxo.html>.

Many of them will be unique multipliers. There is no excuse for losing one of these because you logged it incorrectly.

Is the other station working you? Make sure that the other station has your callsign correct. If not, it’s a sure “N” QSO, and maybe a “-N”. When the other station busts your callsign, one good strategy is to give only your callsign when it’s your turn. For example,

DX: “Kilo One Golf Tango, five nine fifteen.”

K1HT: “Kilowatt One HOTEL Tango, Kilowatt One HOTEL Tango.”

DX: “Kilo One Hotel Tango, five nine fifteen.”

K1HT: “five nine five.”

By not giving your exchange, you make it clear that the callsign is wrong, and less likely that the other station will log the QSO without correcting it.

With the roles reversed, a related problem arises on CW when two stations are running on nearby frequencies; you call one of them, and both respond. (You can usually hear this happening.) When it’s your turn, send the callsign of the station that you’re actually working before you send your exchange, so that the second station doesn’t log you. It would be an “N” (or “-N”) QSO for that station, but that’s not the reason. You want a QSO with the second station also, not to be told “QSO B4.” (This is one reason why it’s a good idea to log dupes while you’re running.) I try to work the second station as my next QSO; most operators figure out what happened.

Split operation (on 40m SSB and 80m SSB) produces another version of this problem, when two stations are using the same listening frequency. You can reduce the chance of an “N” QSO in both directions by repeating the other station’s callsign and your callsign during each QSO.

When the station is not in his log, but the operator tells him “QSO B4,” Saul almost always asks for the time of the QSO. Sometimes he finds that he has broken the other station’s callsign and corrects it, thus avoiding the penalty for a “-B” QSO.

Is your log on the same band as your radio?

Some QSOs are “not-in-log” because one of the stations logged the QSO on the wrong band. For example, K2XA’s QSO with VE3RM on 15m SSB was flagged as “-N”, but Saul’s NIL report (which lists stations that claimed a QSO with you that wasn’t in your log) included VE3RM on 20m SSB. If your logging program is interfaced with your radio (sharing band data, etc.), being on the right band should not be a problem. Still, it’s a good idea to check before

the contest that the interface is working properly.

Confirm default and remembered exchanges. Your logging program may fill in part of the exchange automatically. For example, it may take the other station's zone in CQWW from the country file or from an earlier QSO. Make sure that the exchange you're about to log is what the station actually sent.

Make several QSOs in each U.S. zone (in CQWW). Because the QSOs are worth 0 points, some U.S. stations don't log QSOs with other U.S. stations. Guard against losing a zone multiplier by making several QSOs (per band) with U.S. stations in each zone. For example, K2XA's QSO with W3PP on 80m CW turned out to be "-N", but Saul had worked other U.S. stations in Zone 5, so it cost him nothing ($4 \times 0 = 0$). I, on the other hand, lost a double multiplier on 160m a couple of years ago when a well-known station didn't log the QSO. Little pistols face more risk of this problem.

I doubt that this list is complete, but these strategies should help us minimize our score reductions. With experience, they become second nature. Many of the most experienced operators can sense that something about a QSO isn't correct, and they ask for a repeat. There is no substitute for getting on the air between the major contests and practicing. Not only will you get better at recognizing callsigns, but also other people will become familiar with yours. Both types of experience will contribute to a lower error rate and fewer lost points.

I would like to thank Saul K2XA for making available his UBN reports from 2000 CQWW SSB and CW; and I'm grateful to Saul, Tom, K1KI, and Randy, K5ZD, for suggestions. Also, the discussion on the YCCC Reflector in July 2004 of UBN reports from CQWW 2003 brought out a number of good tips. I have incorporated suggestions from AD1C, K1ZZ, and K3NA.

A SLEEP STRATEGY FOR DX CONTESTING

Randy Thompson – K5ZD

Sleep deprivation continues to be one of the challenges for maximizing single op scores in DX contests. The Boston Marathon has its hills; DX contests have the wee hours of Sunday morning.

This article will present a strategy I use to get through DX contests with the minimum amount of sleep (and maximum score). I have no medical experience or training. The ideas presented are based on techniques learned in conversations with many successful contesters and my own experience.

There is no magical or perfect technique for controlling the effects of sleep deprivation during a contest. Probably the most important aid is simply the knowledge of what sleep deprivation feels like. The more you understand the effects and how they influence your own mental and physical attitude, the better equipped you are to compensate for them.

Sleep Basics

There are a few basic aspects of sleep that are useful to know. Researchers have found that sleep is structured into approximately 90 minute cycles. A typical night's sleep typically has 4 to 6 cycles. Each cycle begins with light sleep, progresses into deep (or delta) sleep, and ends with dream or rapid eye movement (REM) sleep. The first sleep cycle has a predominance of delta sleep with a short period of REM sleep tacked on to the end. With each cycle, delta sleep diminishes and REM sleep occupies more of the 90 minute cycle. By the fifth cycle, sleep is almost totally REM.

Since REM sleep is associated with being closest to wakefulness, it seems logical that it will be easiest to wake up during this time. Since the first sleep cycle ends with a short period of

REM, you want to try to time your contest naps to match the 90 minute cycle.

The body temperature falls during sleep and typically reaches its lowest point approximately 1.5 hours before the usual waking time in the morning. This minimum in body temperature coincides with the time of minimal alertness, if you happen to be awake. Lower body temperature is the reason that waking up just before sunrise during a contest often includes a period of chills and uncontrollable shivering. As you become more awake, your body warms up, and the feeling of cold goes away.

Before the Contest

Contesting is hard work that places both physical and mental stress on the body. You can practice the mental skills of contesting by operating in lots of contests. As for the physical aspect, I divide my preparation into two parts: fitness and sleep.

Do your family or co-workers laugh when you tell them contesting is a physically demanding activity? It takes a lot of energy to sit up straight, talk or send CW, concentrate on listening, type on the keyboard, and reach all of the switches and knobs found in your station. A 48 hour contest is the equivalent of six 8 hour workdays. Imagine sitting at your desk at work for just one work day with little or no breaks and then multiply by six!

The sleep preparation for a contest begins five to seven days before the contest. The goal is to be as well rested as possible going into the event. I try to get as much sleep as I can each night during the week. While sleep cannot be "stored," the benefits of starting well rested are obvious.

The night before the contest I go to sleep as early as possible. I have learned that excitement, anticipation and nervousness will have me awake at dawn. Some people even take a sleeping pill Thursday evening to insure a solid

night's sleep. Not knowing if there are residual effects of these pills, I have avoided this.

One questionable technique many people try is to stay up late on Thursday evening in the hope of sleeping late on Friday morning. This sounds like a good plan but there are several things at work against it. The body's natural rhythms, referred to as circadian rhythms, modulate the physiologic functions such as sleep, hunger, etc. If you normally wake up at 7 a.m., there is a good chance that you will wake up at 7 a.m. the morning of the contest. If you stayed up late, you are just reducing the amount of sleep you are likely to get. Nerves and anticipation will increase the chance of waking early and not being able to fall back asleep.

A 1.5 or 3 hour nap prior to the contest is crucial in making it through the first 24 hours without sleep. You may find it difficult to sleep with the contest only hours away, but it has to be attempted. I often practice relaxation techniques to help fall asleep. If I wake up early, I repeat the process. I want to wake up about an hour before the contest starts.

The last bit of preparation before the contest is a meal. I try to keep it light and not drink too much liquid. The goal is to have enough fuel to make it through European sunrise (0900z) without having to get out of the chair.

The First 24 Hours

For me, the first 2 or 3 hours of the contest are some of the most difficult. The nerves are on edge, adrenaline is flowing, and the body must adjust to the demands of operating. It is even harder when no one answers your CQ and all that energy must be channeled into a S&P effort!

I have two simple goals for the first 24 hours of the contest: operate as much as possible and maximize the score. For most contests, I am out of the chair no more than three times for a total of less than 15 minutes in the first 24 hours. I

do not even consider sleeping. By pushing so hard the first night and covering all the bands, I usually have a good multiplier count and understanding of the available propagation. This will be important when planning the sleep strategy during the second night.

If you do need to sleep the first night, the best time (from the eastern U.S.) seems to be the hours between European sunrise and local sunrise. The 0800z-1100z hours often consist of very low rate multiplier chasing. You can sleep for 90 minutes at a cost of approximately 30 contacts and 10 multipliers.

If you can arrange your shack so that you can see the sun rise through a window, this can be a great lift. There is something about seeing the sun come up that energizes the body and improves alertness (remember those circadian rhythms). It also keeps you in tune with when you should make the last low band sweep for multipliers before moving to the higher bands.

The Second 24 Hours

"Fatigue makes cowards of us all."--Vince Lombardi

I am convinced almost anyone can get through 24 hours of contesting just on their love of the game. But the second day requires a solid commitment, desire, and preparation. The fact that contesting is a solitary pursuit both helps and hinders the participants. It helps because the scores of other participants are not known, which makes it easy to justify continuing. The enemy is fatigue that will cause doubts and questions on whether it is even worth continuing!

The top competitors have committed themselves to the contest. They know they must go on no matter what. It's not easy, but this little fact will help them ride through all but the worst problems. Everyone feels the same pain and effects of sleep deprivation. It's really a question of how bad you want to win. My commitment to a

contest often starts many weeks before the contest. As the contest approaches, I become more focused and more committed to doing a full effort. The build up and motivation gained over the weeks makes it almost impossible to give up or stop.

Maybe it is just a mental let down, but it always seems as if the propagation and activity take a dive immediately after 0000z. Rates are slow because many Europeans have gone to bed and the South Americans have all been worked before. By 0100z or 0200z, it is becoming a battle to stay awake.

I usually take 30 to 45 minutes during the 0100z or 0200z hours to take a shower and eat dinner. The shower wakes me up enough to get through the crucial hours of European sunrise. I eat sitting at the radio tuning for multipliers.

After European sunrise, about 0900z, the contest really slows down. Attention is split between random CQing and tuning for new multipliers. Here is where commitment will be really tested!

I base my sleep strategy on the activity and propagation that was available during the first night. I know what multipliers I am missing on the low bands and can decide if sleep is more important than taking the chance of finding them.

Once the decision to sleep is made, it is important to get right to bed. Don't waste time trying to think about the contest. When you lay down, clear the mind and fall asleep as quickly as possible. Set the alarm for either 90 or 180 minutes later to take advantage of the natural sleep cycle. If you try to wake up from deep sleep, a form of disorientation I call sleep drunkenness may result. Worse than the hallucinations and disorientation is the real possibility that you will go back to sleep without ever waking completely up. This has happened to me twice. One time I even had a conversation with a local multi-op on two meters (so they said, I can't re-

member it at all) and woke up four hours later in another room of the house. This fear of not waking up is usually the real reason I try to stay awake and keep going!

When you wake up, you will probably feel very cold. Be prepared for this by having something warm to drink available and a sweatshirt or sweater you can pull on. Take a few minutes to get fully awake and eat something. Once you sit down at the rig, you must plan to be there until the end of the contest (with only short breaks). As soon as the sun comes up or you pass your normal wake up time, it is easy to stay awake. The battle is in the minutes or hours before dawn.

The last 12 to 13 hours of the contest coincides with my normal rhythm for being awake. The only difficulty is fighting the effects of sleep deprivation. These are not usually obvious at the time. However, there is an easy way to see just what the loss in mental sharpness is. During the next DX contest, tape record a run during the first morning. Then tape record a similar time the second morning. After the contest, play the two tapes back to back. You won't believe how much your callsign recognition and ability to get calls on the first try is degraded! Unfortunately, there is not much you can do except recognize the problem and work through it.

After the Contest

One thing I have always been amazed by is the adrenaline generated by the excitement of the end of the contest. The pressure of the last two hours is trying to push the score on the computer screen over the next milestone. Should I call CQ or tune? Or a combination of both? When it's over, I am tired and almost incoherent (just listen to the single ops on 3830 kHz for proof). Afterwards, I can't fall asleep for several hours. If only we could bottle that feeling!

Expect any contest effort of more than 44 hours to require several days of recovery. I usually

sleep for 12 to 15 hours after the contest. And I still feel sleepy until about Wednesday!

I hope the ideas presented here are of help to you in your next serious DX contest effort. As long as DX contests are 48 hours, the serious single operator entrants must deal with the effects of sleep deprivation. Good preparation, serious commitment, and a well-tuned sleep strategy may be just the edge you need to beat your competition.

Note: This article is adapted from one I wrote for the NCJ over 10 years ago. The full text of the original article can be found on my web site at:

http://www.k5zd.com/articles/Sleep_Strategy.html

THOUGHTS ON VHF/UHF CONTESTING

Don Toman – K2KQ

The June VHF QSO Party happens at an especially well-chosen time for New England. In most years, the second weekend in June coincides with excellent extended propagation on the VHF bands along the coast due to the likelihood of still, cool water and warm, moist air coming together and producing thermal inversions. Couple that with the likelihood of sporadic-E propagation on 6 meters, and it can make for quite a bit of excitement.

The MIT Radiation Laboratory, during the early years of WWII, pioneered the understanding of extended-range propagation at VHF, UHF and microwave propagation. They conducted extended tests, propagating signals across Cape Cod Bay with transmitters and receivers covering a wide range of wavelengths located at multiple heights. They did it continuously over several years. The experiments are described in the Radiation Laboratory's 23 volume summary, published after the war. From that set of data,

it's not too hard to figure out the best weekend for a VHF QSO party here in New England!

So, just getting on the air can be a lot of fun, especially if you are located on Long Island or the New England coast. The QSO party gets people on the air, and that's a good thing.

Now, for contesters, we add the possibility of competing and actually winning something. With a good strategy, that can be a probability instead of just a possibility.

Assume that you have equipped yourself with decent radios and amplifiers, and that you will work both CW and phone. What separates merely a good time from a win boils down to making as many QSOs on as many bands as possible with as big a multiplier count as you can generate. To do that requires a good location and plenty of antenna aperture.

As in HF contesting, you need RATE. Rate comes from a big signal to a large number of stations that will answer your CQs. As with HF, multipliers will come along naturally, and you can usually add multipliers by knowing when to look for extended propagation. If you expect to maximize multipliers, you must utilize weak-signal operation, namely CW!

A good location has line-of-sight coverage to a large number of VHF contesters. Distance to the horizon increases as the square root of height above average terrain, or the area you can cover is directly proportional to your height above average terrain. If you are in a densely populated area, you don't have to be in a high spot. If you are located to the side of a densely populated area, you need to be high enough to cover it.

Assume station A and station B are both located in a densely populated area with constant amateur population density.

If station A has a height of 600 ft., the distance to the horizon is 34.6 miles, and coverage is

about 3760 square miles. If station B is at twice the height, or 1200 ft., the line-of-sight horizon increases by a factor of 1.414 to 49 miles and station B covers 7518 square miles. If all other things are equal, station B has twice the number of potential stations within line-of-sight as station A.

A mountain top 100 miles away needs to be at 5000 ft. in order to break even!

My most successful VHF contesting has been done in the June VHF QSO Party, running a multi-multi from my home station in New York with a total of six operators. It's a field day style operation, with stations in temporary locations throughout the house (including the garage) and antennas on supports ranging from the HF tower to a guyed extension ladder on an upstairs deck.

The first time a bunch of us decided to do it, we overwhelmed the IBM Radio Club (in Dutchess County, NY) who were used to winning ENY with an elaborate setup and about 15 operators. We easily beat them three years in a row and retired after that. My group then did a couple of June operations from Yarmouth, NS, before retiring from VHF contesting.

The keys to winning are:

1. Location
2. Good operators
3. Antennas with adequate aperture and azimuth coverage consistent with the high volume sectors desired
4. Maximum legal/practical power with control of RFI
5. Schedules to raise the multiplier level
6. Location (just like real estate, it's Location, Location, Location!)

Location

The key to winning is to make contacts. To make large numbers of contacts, nothing beats a

location that is within line-of-sight to a very large population center. In my case, my location is in Westchester County, NY, on a 650 ft. ridge, 30 miles from New York City, with a clear line-of-sight all the way to the horizon in the southwest quadrant. That puts the densely populated parts of New Jersey and the western parts of New York City within line-of-sight. From there, we had as many QSOs in EPA as we did in NNJ and NLI.

That location, with all the attendant conveniences, easily beat our performance on a mountaintop expedition (by the same crowd) to 4200 ft. high Slide Mountain, 80 miles north, in the Catskill Mountains. The 4200 ft. elevation has a horizon of 91 miles, but since it's 80 miles away from the populated area, it doesn't beat the closer in 650 ft. location.

One of our past members does an effective operation from Bear Mountain in the northwest corner of the New York metropolitan area. That's about 900 ft. above the Hudson.

Antennas

Believe it or not, signal density (watts per square meter) at a distant point depends only on transmitting aperture, and not on wavelength. Because of that, I ignore the fiction of gain. The rule is "the bigger the better," and that goes regardless of wavelength!

A rule of thumb I've used is to make the effective size of my antennas, regardless of wavelength, about 30 feet. That 30 feet can come from one long-boom yagi of 30 ft. length, four 7.5 footers in a box or four 7.5 footers in a 12 foot vertical stack. In fact, a 30 ft. stack of omni-directional turnstile antennas has the same aperture as a 30 foot long yagi, and the same distant signal performance. That's an antenna used by TV and FM broadcast stations.

The major differences among those examples are mechanical considerations and azimuth cov-

erage. Of course, a tall stack needs to be high above ground to work correctly.

How you distribute your aperture depends on what kind of azimuth coverage you want. If you are in the middle of a populated area and want to avoid having to turn a big antenna, you can make a 30 ft. stack of turnstiles out of PVC pipe and aluminum clothesline wire, and you can hang it from a catenary rope between a couple of 70-100 ft. high trees. If you are off to the side of a populated area, you may be able to use a stack of moderate yagis, or even a box. It's important to be able to cover lots of stations without the need to turn the antenna.

Control of RFI

If you are operating as a single op, you need not worry about RFI, but if you are on multiple bands simultaneously, you will have to pay serious attention to inter-station interference. My VHF contest operations utilized homemade cavity filters constructed out of large orange juice cans. We used them on 50 MHz, 144 MHz, 222 MHz, and 432 MHz. The loss you get is easily compensated for by the ability to operate in the presence of all the other stations' signals.

Smart Chasing of Multipliers

Be aware of how the bands work. Coastal inversions really get going after the sun goes down. Sporadic-E is best when the sun is up. Our experience with scatter QSOs was best in the small hours of the morning, when stations known to be good scatter candidates can be stalked and worked.

Conclusion

VHF/UHF contesting has not been a focus of YCCC, so up to now there has not been a contribution to the Cookbook dealing with VHF/UHF contests. Consider this one a work in progress that will improve as needed.

NO SPOTS? NO SWEAT! THE TOP TEN LIST OF FUN THINGS TO DO WHEN THE FLUX SUX

Dave Patton - NN1N (or whatever his call is this week)

Here is my list of favorite things to do, some serious and some not quite so serious, when my little station can't rely on 10m to run up a big score!

10. Answer all your QSL bureau requests

I actually keep up fairly well with my QSLing chores, but the low flux periods are great times to work on your cards. There truly are "black-lists" out there, and you don't want to be on them. Some stations will stop working you if you don't QSL. So, spend a few bucks, print some cards, download BV by DF3CB, and answer everybody. While you're at it, send some money to your QSL Bureau so that the never-ending supply of cards continues to arrive at your QTH uninterrupted! If you spend all the hours working on cards that you would have spent running on 10 meters, you can do a lot of QSLing and ensure better rates in 2008!

9. Work the WARC bands

If you haven't done this yet, you will find that DXing unfamiliar bands is a little bit like a contest that never ends. Working WAS is actually much harder than DXCC and will allow you to polish your rag-chewing skills and your CW sending proficiency. If you don't have 6 meters, you may be interested in adding equipment and an antenna for this band. Then start working countries using sporadic-E skip during the summers!

8. SWL Stuff

Sometimes low-cycle contesting can wear one down. You're tired of listening to the Zone 21 station on 7.068 MHz who won't listen up, and you're tired of getting beat to every station on 75m, or you just can't find a frequency on which to CQ on 40m, so what to do? I get a kick out of listening to the VLF bands and logging CW airport beacons around 200-300 kHz! Another fun thing to do is find a really loud broadcast station around 7 MHz and then see if you can log its 2nd harmonic. When that gets old, you can make hourly propagation charts by listening to the IARU or NCDXF beacon station frequencies and log the beacons from around the world!

7. Stop the Neglect and Disrespect!

Once you have logged the 30 or so LUs on 10m, and the easy 50 or 60 countries on 15m, it is time to look around you. Move your chair to the other side of the shack. Smell stuff there. Hook up the dummy load and start the keyer running and then walk around the desk and look for sparks and smell for smoke. Walk around your house and look for water damage, insect and rodent infestations, burn marks, dead animals, and children that you may not have seen for a few years, or perhaps completely forgotten. The low-cycle is a great time to fix some of these problems. Clean the shack. Fumigate stuff. Make up with your wife and attend your kids' weekend events. You could even replace shack furniture, paint the walls, replace coax and connectors, make a coax input panel and fix grounds. Go to the museum on Saturday morning with your wife or take the family to the mall and see a matinee! You can build up quite a nice family life again by the time 2008 rolls around. And have a new(er) shack too!

6. Copy KC1XX's Pile-Up!

This is really a very fun thing to do. And you can do it with just about anyone who is CQing. You can log their run directly into CT (or your

favorite logging program) and pretend you are doing the work! Not only will you get to experience nice rate and crystal clear frequencies, you won't even have to find mults or suffer the frequency fights, because they will do it for you! C'mon, lets face it, IF you could find a usable frequency on 20m, you actually could get answers to CQs with your small antenna. But no self-respecting multi-multi operator is going to just let you do that, so have some fun anyway, and see what you can hear on somebody else's frequency! It is truly amazing to listen to the big guys run stuff and you will discover that, hey, an 8/8/8/8/8/8/8/8 stack really does work, and you can't hear too much of what is calling in! And for a real eye and ear opener, try listening to the big boys run on 75m or 80m and check out what they are hearing that you can't!

5. *Is the Frequency in Use??*

One of my favorites. Try moving slowly up and down 20m and 15 meters on phone. Find those crystal clear frequencies where one of the multi-ops or really slow single ops has left the frequency to go work a packet spot. See how many times you can ask "Is this frequency in use?" before one of three things happens: (1) The original user comes back; (2) Some interloper hears your query and decides to CQ immediately; or (3) you decide to CQ after a few queries only to discover that the original frequency owner has returned and is both CQing and alternately deriding you and the interloper for CQing on an obviously busy frequency. Extra points are earned for actually logging one or two QSOs before the rightful owner returns! This works on CW too and can actually pay off when the rightful owner doesn't know CW well enough to properly run you off. You will also quickly discover which stations have two radios running per band because they will respond to your query as soon as the interlock lets up after the second station works the packet spot.

4. *Join or Create a Multi-op*

Some of the best times you can have during contesting come when you are jostling with your fellow operators for chair time! No, silly, not chair time in front of the radio, but chair time at the dinner table or in front of the TV! The idea is to wrangle your way in front of the radio from about 1230z to 1430z on 15m, and maybe, just maybe, from about 1 p.m. until 2:30 p.m. when only the east coast can run Europe on 20m! All the rest of the hours are for the fun of the multi-op! Get the new guy to sit down at 20m around 8 a.m. and find a good frequency! Find the guy who doesn't get to operate much from home and he'll really enjoy CQing on 40m phone all night! Have some fun on 10m by sending in Spanish and seeing if some wayward CE will call in! The bonding from this event will bring you all closer together, and hopefully match you up with fellow ops who are really good with fumigating or happen to own a land-scaping company or something.

3. *Try a Single Band Category*

So you know that 10 meters is your best and favorite band. Why not give that a try during the solar lull? You can almost always work 9 or 10 countries in 36 hours of effort. Sometimes the band will really open and you will bag a ZL or VK too! But really, this is an absolutely great time to work on those Spanish language skills (maybe this is a parallel activity that can fit under number 7 above as well?) and work quite a few Latin stations. The band will be quiet, and you won't hurt your ears too badly. Here's a good tip: Remember number 6 above? – listening to somebody else CQ? That works truly well here. Find a big multi-multi operation where they have ops with nothing to do, and they will sit there and punch buttons automatically CQing all day long. Then, fix yourself a nice mint julep, tune the multi-multi station in, and have a good long listen. If they get an answer, and you hear the calling station, you know that the band is open! So, you can either call your own CQs (make sure you don't go further

than 3 kHz away or the station that called the multi-multi won't find you), or you can wait until the multi-multi finishes with this QSO, and then call the DX station right there and ask him to move down 5! Make the QSO quick and get back to listening and slurping that mint julep because there are some points to be had!

2. **Operate Some Sort of Domestic or Weird-Mode Contests**

The solar slow down can be a great time to try out new contests. There are many contests that involve making QSOs with your own country, and these can be really fun because now your less than optimal wire antennas can be put to good use on the low bands. You will find that KT1V won't kick your butt in every pile-up because his monster 3-element 40 is too big and too high to compete with your NVIS (No Vertical Installed Still) dipole at 30 ft. to the W8 station in West Virginia! And you can make a lot of QSOs with good rates! Another good bet is the 10 meter contest. Remember the Spanish skills work? Oh, there will probably be a little bit of sporadic-E, and you will work stations brand new to actually working anybody, and that can be a lot of fun! Everybody's computer has a sound card now, so you can also try decoding some of those weird signals up around 14.080 MHz that always QRM the crud out of you when you are looking for that last tiny bit of 100 Hz spectrum to CQ on in CQWW. Well, we testers make contests out of anything, and guys in your club have been known to make more than 1000 QSOs on RTTY alone in just one weekend! Another great possibility involves those weird frequencies up around what the police officers use to clock your new Porsche (from idea number 7 again). You can find equipment for those frequencies and their accompanying little, tiny antennas, and take it all up on a beautiful hill on a beautiful fall day and work guys all over your part of the country! And those guys you are working know what they are doing and will be happy to help you

understand where you can use CW and phone and FM on the same weekend!

1. **Go Somewhere with a Beach and Ignore the Sun!**

By far the best plan for surviving the low-cycle years is to invest in some great vacations! You've all heard them—the DXpeditioners and contest-peditioners. They go all over the world and just have tremendous times working the contests and seeing the sights. Traveling with amateur radio has never been easier. Equipment is small, antennas can be small (and really, really work well if you put them near the ocean!), and all the testers in Europe, Asia and North America will idolize you for going to these terrible places and giving them a multiplier—and not making them learn Spanish to get it!! Just last year some guy went on a torturous trip to St. Martin in the Caribbean and survived it all to make more than 4500 QSOs with low power! Other guys went to Jamaica and ran less than 5 watts to verticals and made far more QSOs than a lot of us can do all weekend. Of course they had to struggle with the swimming pool, exotic food, Red Stripes, and a nice sea breeze, but they made it through OK. Plus, you can be a real hero and work some more of #7 in here and take the family on a fabulous vacation at the same time, and truly everybody will be happy! An even better thing about operating from some strange place is you can always find a place to CQ. Even when the band is full!

PROPAGATION CHARTS

Dean Straw - N6BV

About The Charts

The following tables list predicted signal strengths in S-units. I have divided the world up into seven geographic areas, as follows:

- EU = Europe; zones 14, 15, 16, 20 and 40
- FE = Far East; zones 19, 24, 25, 26 and 28

- SA = Central/South America/Caribbean; zones 7, 8, 9, 10, 11, 12 and 13
- AF = Africa; zones 33, 34, 35, 36, 37, 38 and 39
- AS = Central and South Asia; zones 17, 18, 21, 22 and 23
- OC = Oceania; zones 27, 29, 30, 31 and 32
- NA = North America; zones 1, 2, 3, 4, 5 and 6.

As usual, the predictions were done using *IONCAP*, and they assume undisturbed geomagnetic conditions. The antennas used at each end of all circuits represent typical good-sized contest stations: 100 foot high dipoles on 80m and 40 meters, a 3-element yagi at 100 feet on 20 meters, and 4-element yagis at 60 feet for 15m and 10 meters. The transmitter power at each end of the circuit is assumed to be 1500W. I am assuming that an S-meter is relatively generous at 4 dB/S-unit. Scale the results for different types of antennas or transmitting power levels according to the following rules of thumb:

- Subtract 2 S-units for a dipole instead of a yagi at the same height
- Subtract 3 S-units for a dipole at 50 feet instead of a yagi at 100 feet
- Subtract 1 S-unit for a dipole at 50 feet instead of a dipole at 100 feet
- Subtract 3 S-units for 100W instead of 1500W
- Subtract 6 S-units for 5W instead of 1500W

CQWW SSB 160m

160 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	2	3	5	5	5	5	5	5	6	5	3	1	-	-	-	-	-	-	-	-	-	-
VO2 = 02	9	9	9	9	9	9	9	9	9	9	9	9	9	6	4	-	-	-	4	9	9	9	9	9
W6 = 03	4	5	6	9	9	9	9	9	9	9	9	9	6	5	1	-	-	-	-	-	-	-	-	3
W9 = 04	9	9	9	9	9	9	9	9	9	9	9	9	9	9	5	4	-	-	-	-	6	9	9	9
W3 = 05	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6	9	9	9	9	9	9
XE1 = 06	6	9	9	9	9	9	9	9	9	9	9	9	6	3	-	-	-	-	-	-	-	-	2	5
TI = 07	9	9	9	9	9	9	9	9	9	9	9	6	4	-	-	-	-	-	-	-	-	-	3	6
VP2 = 08	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	-	-	-	2	6	9	9
P4 = 09	9	9	9	9	9	9	9	9	9	9	9	6	3	-	-	-	-	-	-	-	-	3	6	9
HC = 10	6	9	9	9	9	9	9	9	9	9	6	4	-	-	-	-	-	-	-	-	-	-	1	5
PY1 = 11	5	6	6	6	6	6	6	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	1	4
CE = 12	3	5	6	6	6	6	6	6	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	1
LU = 13	4	6	6	6	6	6	6	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	2
G = 14	5	6	6	6	9	9	9	6	5	3	1	-	-	-	-	-	-	-	-	-	-	1	3	5
I = 15	3	4	5	6	6	9	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2
UA3 = 16	3	4	4	5	5	6	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
UN = 17	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
UA9 = 18	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
UA0 = 19	-	-	-	-	-	-	-	4	5	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-
4X = 20	5	6	6	6	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	5
HZ = 21	5	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4
VU = 22	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	2	4	5	6	6	6	6	6	6	5	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	5	5	5	5	4	4	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9	9	5	5	9	9	9	6	5	2	-	-	-	-	-	-	-	-	-	-	1	3	5	6
SU = 34	6	6	6	6	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	5
6W = 35	5	6	9	6	6	6	6	6	5	2	-	-	-	-	-	-	-	-	-	-	-	1	2	6
D2 = 36	5	6	6	5	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5
5Z = 37	5	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4
ZS6 = 38	3	4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
FR = 39	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FJL = 40	3	2	2	3	3	3	3	3	2	2	3	2	-	-	-	-	-	-	-	-	-	-	1	2
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

160 meter signal strengths are estimated using 80 meter numbers, minus 3 S-units.

CQWW SSB 80m

80 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	2	3	5	6	8	8	8	8	8	8	9	8	6	4	1	-	-	-	-	-	-	-	-	2
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	5	2	1	1	2	7	9+	9+	9+	9+
W6 = 03	7	8	9	9+	9+	9+	9+	9+	9+	9+	9+	9	8	4	-	-	-	-	-	-	-	-	1	6
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	7	1	1	1	3	9	9+	9+	9+
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+	9+	9+
XE1 = 06	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	-	-	-	-	-	-	-	-	-	5	8
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	-	-	-	-	-	-	-	-	-	6	9
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	-	-	-	-	-	-	-	5	9	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	-	-	-	-	-	-	-	-	6	9	9+
HC = 10	9	9+	9+	9+	9+	9+	9+	9+	9+	9	7	3	-	-	-	-	-	-	-	-	-	-	4	8+
PY1 = 11	8	9	9	9	9	9	9	8	8	5	2	-	-	-	-	-	-	-	-	-	-	-	4	7
CE = 12	6	8	9	9	9	9	9	9	8	8	5	1	-	-	-	-	-	-	-	-	-	-	-	4
LU = 13	7	9	9	9	9	9	9	8	8	6	3	-	-	-	-	-	-	-	-	-	-	-	1	5
G = 14	8	9	9	9	9+	9+	9+	9	8	6	4	1	-	-	-	-	-	-	-	1	2	4	6	8
I = 15	6	7	8	9	9	9+	6	5	2	1	-	-	-	-	-	-	-	-	-	-	-	2	4	5
UA3 = 16	6	7	7	8	8	9	6	4	-	-	-	-	-	-	-	-	-	-	-	-	1	4	5	6
UN = 17	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6
UA9 = 18	6	6	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	5	5
UA0 = 19	-	-	-	-	-	-	-	-	7	8	8	7	6	-	-	-	-	-	-	-	-	-	1	-
4X = 20	8	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	8
HZ = 21	8	8	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7
VU = 22	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	1	6	6	4	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	5	7	8	9	9	9	9	9	8	1	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	8	8	8	8	7	7	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	8	8	9+	9+	9+	9	8	5	1	-	-	-	-	-	-	-	-	1	4	6	8	9
SU = 34	9	9	9	9	8	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	8
6W = 35	8	9	9+	9	9	9	9	9	8	5	1	-	-	-	-	-	-	-	-	-	1	4	5	9
D2 = 36	8	9	9	8	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	8
5Z = 37	8	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7
ZS6 = 38	6	7	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
FR = 39	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
FJL = 40	6	5	5	6	6	6	6	6	5	5	6	5	2	1	-	-	-	-	-	-	1	2	4	5
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

CQWW SSB 40m

40 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	8	9	9	9	9	8	6	6	6	7	8	6	6	8	7	7	5	3	4	5	5	6	8	8
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9+	9+	9+	9+	9+
W6 = 03	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	5	2	1	1	5	6	8	9
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9	9+	9+	9+	9+
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
XE1 = 06	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	8	4	1	-	-	1	5	8	9	9+
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	4	1	-	-	-	1	6	8	9	9+
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	5	3	-	3	5	7	9+	9+	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	2	1	-	-	1	3	8	9+	9+	9+
HC = 10	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	5	1	-	-	-	-	3	8	9	9+	9+
PY1 = 11	9+	9+	9+	9+	9+	9+	9+	9+	9	8	3	-	-	-	-	-	-	-	-	3	7	8	9	9
CE = 12	9	9	9+	9+	9+	9+	9+	9+	9+	9	6	2	-	-	-	-	-	-	-	-	-	2	5	8
LU = 13	9	9+	9+	9+	9+	9+	9+	9+	9	9	8	4	1	-	-	-	-	-	-	-	1	4	6	8
G = 14	9+	9+	9+	9+	9	9	9	9	8	9	8	7	5	3	1	1	3	5	6	8	9	9	9	9
I = 15	9	9+	9+	9+	9+	8	9	5	8	7	4	2	1	-	-	-	-	2	4	7	8	9	9	9
UA3 = 16	7	7	8	8	8	8	8	8	7	7	6	4	3	2	1	1	1	3	5	7	8	8	8	8
UN = 17	9	9	8	7	1	1	1	-	-	1	1	3	2	1	1	1	-	1	1	2	7	8	9	9
UA9 = 18	8	8	8	8	7	7	7	7	8	8	7	6	5	5	4	3	2	3	5	6	8	8	8	8
UA0 = 19	2	3	3	4	5	6	8	8	9	9	9	9	8	8	6	5	3	2	3	4	4	4	5	5
4X = 20	9	9	9	9	9	9	8	6	3	-	-	-	-	-	-	-	-	1	4	6	8	8	9	9
HZ = 21	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8	8	8	9
VU = 22	8	8	7	5	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	6	7	8	8
JT = 23	6	6	-	-	-	-	-	1	8	8	7	7	6	6	-	-	-	-	-	-	8	8	7	7
VS6 = 24	-	-	-	-	-	-	-	-	-	6	6	5	5	-	-	-	-	-	-	-	-	5	4	3
JA1 = 25	-	-	-	-	-	-	6	8	8	9	9	9	8	7	-	-	-	-	-	-	-	2	2	-
HS = 26	4	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	6	6	5
DU = 27	-	-	-	-	-	-	-	-	-	6	7	6	6	2	-	-	-	-	-	-	-	1	1	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	-	-	1	4	4
VK6 = 29	-	-	-	-	-	-	-	-	-	2	6	7	2	-	-	-	-	-	-	-	-	1*	1*	-
VK3 = 30	-	-	-	-	-	-	-	2	6	8	8	8	7	1	-	-	-	-	-	-	-	1*	-	-
KH6 = 31	-	4	7	8	9	9	9	9	9	9	9	9	9	8	7	3	1	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	8	9	9	9	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	9+	9+	9+	9+	9+	9	9	9	8	5	1	-	-	-	-	-	5	7	9	9	9+	9+
SU = 34	9	9+	9	9	9	9	8	6	3	1	-	-	-	-	-	-	-	1	3	6	8	9	9	9
6W = 35	9+	9+	9+	9+	9+	9+	9+	9+	9	9	7	2	-	-	-	-	-	-	-	7	7	9	9	9+
D2 = 36	9	9+	9+	9	9	9	8	6	-	-	-	-	-	-	-	-	-	-	-	-	7	8	9	9
5Z = 37	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	8	8	9
ZS6 = 38	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	7	8	9
FR = 39	9	9	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	7	8
FJL = 40	8	9	9	9	9	9	9	9	8	9	9	9	8	7	5	3	2	4	4	6	7	8	8	8
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

CQWW SSB 20m

20 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	9	9	5	-	-	-	-	-	-	-	-	-	-	-	-	5	9	9	9	9	9	9+	9+	9+
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	8	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W6 = 03	9+	9+	5	-	-	-	-	-	-	-	-	-	-	2	9+	9+	9+	9+	8	8	9+	9+	9+	9+
W9 = 04	9	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9
W3 = 05	-	1	1	2	2	2	1	1	2	2	1	1	-	-	1	1	1	3	4	4	4	2	-	1
XE1 = 06	9+	6	9	9	8	9	9	9	9	8	5	9	1	9+	9+	9+	8	9+	9+	9+	9+	9+	9+	9+
TI = 07	9+	3	9	9	9	9	9	9	9	7	7	8	9+	9+	9+	9	8	9+	9	9+	9+	9+	9+	9+
VP2 = 08	9+	9+	9	9	9+	9+	9+	9+	7	4	9+	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9+	9+
P4 = 09	9	9+	9+	9+	9+	9+	9+	9+	9	7	9	9	9+	9+	9+	9+	9+	9	9+	9+	9+	9+	9+	9+
HC = 10	7	9	1	-	-	2	5	8	3	-	-	9	9+	9+	9+	9	8	8	8	9	9+	9+	9+	9+
PY1 = 11	9+	8	8	9	9	9+	9+	8	4	6	9	9+	9	7	4	3	4	6	7	9	9+	9+	9+	9+
CE = 12	9+	8	8	8	8	8	9	8	7	1	7	9+	9+	8	6	4	4	4	5	7	9	9	9+	9+
LU = 13	9+	9	8	8	8	9	9	9	7	3	7	9+	9	7	5	3	3	4	6	8	9	9+	9+	9+
G = 14	-	-	-	-	-	-	-	-	-	-	8	9+	9+	9+	9+	9	9+	9+	9+	9+	9+	9	5	1
I = 15	-	1	2	1	-	-	-	-	-	-	8	9	9	9	8	9	9	9+	9+	9+	8	8	3	1
UA3 = 16	-	-	-	-	-	-	-	-	-	-	3	8	9	9	9	9	8	7	7	5	2	1	1	1
UN = 17	1	5	7	7	4	1	-	-	-	-	1	9	9	9	9	9	8	8	7	8	8	7	6	2
UA9 = 18	6	7	7	6	4	2	-	-	-	-	-	7	9	6	1	1	1	2	1	1	1	5	6	6
UA0 = 19	9	8	5	4	1	1	1	-	-	-	-	1	7	6	5	1	-	-	1	1	6	9	9	9
4X = 20	8	7	7	4	6	1	-	-	-	-	8	8	8	8	8	8	9	9	9+	9	9	8	8	8
HZ = 21	8	8	8	8	6	1	-	-	-	-	7	8	8	9	8	8	9	9	9	9	8	9	9	9
VU = 22	7	8	6	5	1	1	-	-	-	-	2	9	9	9	8	8	9	8	7	8	8	8	8	8
JT = 23	9	8	6	4	3	2	1	-	-	-	-	7	9	8	2	2	2	1	2	1	1	1	8	9
VS6 = 24	8	3	4	2	1	1	1	-	-	-	-	6*	9	9	8	8	8	8	8	2	4	3	9	9
JA1 = 25	9	8	5	4	2	1	1	-	-	-	-	4*	7	8	7	5	4	2	4	5	9	9	9	9
HS = 26	8	6	2	2	1	-	-	-	-	-	-	6	9	9	8	8	8	7	7	9	8	5	2	9
DU = 27	8	5	2	1	1	1	1	-	-	-	-	5*	8	9	8	8	8	8	9	6	5	7	9	8
YB = 28	9	5	2	-	-	-	-	-	-	-	-	6	9	9	8	8	8	8	8	9	9	5	5	9
VK6 = 29	8	4	-	-	-	-	-	-	-	-	-	4*	7	9+	9	9	8	8	8	8	6	9	8	7
VK3 = 30	-	-	-	-	-	-	2	7	8	2	-	-	7	9+	8	8	1	-	1	4	2	8	1*	-
KH6 = 31	9	9	8	4	1	2	3	2	1	-	-	3	6	2	8	8	9	9	8	9	8	8	8	8
KH8 = 32	4	7	8	6	3	4	7	8	8	3	-	1*	8	9+	8	-	8	6	5	4	4	1	1	1
CN = 33	-	-	1	2	2	-	-	-	-	2	9+	9+	9	9	9	9	9	9+	9+	9+	9+	9+	9	5
SU = 34	8	7	7	6	6	2	-	-	-	-	8	8	8	8	8	8	9	9	9+	9	9	8	8	8
6W = 35	6	2	3	7	9	8	5	-	-	7	9+	9+	9	8	8	6	8	9	9+	9+	9+	9+	9+	9+
D2 = 36	9	8	8	9	9	7	7	-	-	5	6	3	1	1	2	5	6	8	9	9+	9+	9+	9+	9+
5Z = 37	8	8	8	7	8	5	-	-	-	1	3	2	2	5	5	7	8	9	9	9+	9+	9+	9+	9+
ZS6 = 38	8	7	6	5	6	9	5	1	-	2	2	-	-	-	1	2	5	7	9	9	9+	9+	9+	9+
FR = 39	9	7	8	8	7	2	-	-	-	-	-	-	1	3*	3	1	1	8	8	9	9+	9+	9+	9+
FJL = 40	8	5	2	1	-	-	-	-	-	-	-	4	9	9	8	8	8	8	9	9	9	9	9	8
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and 3-element yagis at 100 feet at each station.

CQWW SSB 15m

15 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	3	-
VO2 = 02	1	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	5	5	7	8	8	8	8	4
W9 = 04	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	1	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1
XE1 = 06	8	4	-	-	-	-	-	-	-	-	-	1	-	5	7	6	5	5	7	9+	9+	8	1	
TI = 07	7	1	-	-	-	-	-	-	-	-	-	8	7	9+	9+	9+	9+	9+	9+	9+	9+	9+	6	
VP2 = 08	4	-	-	-	-	-	-	-	-	5	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
P4 = 09	7	-	-	-	-	-	-	-	-	5	8	5	7	4	8	9	9	8	8	7	1	9+	9+	
HC = 10	-	-	-	-	-	-	-	-	-	6	5	1	-	-	-	-	-	1	3	4	1	9	9	
PY1 = 11	1	-	-	-	-	-	-	-	-	1	8	9	9	8	8	8	9	9	9+	9+	9+	9+	6	
CE = 12	5	-	-	-	-	-	-	-	-	-	9	9	9	9	8	8	9	9	9	9+	9+	9+	9	
LU = 13	4	-	-	-	-	-	-	-	-	5	9	9	9	8	8	8	9	9	9+	9+	9+	9+	8	
G = 14	-	-	-	-	-	-	-	-	-	-	7	9	9	8	9	9	8	3	-	-	-	-	-	
I = 15	-	-	-	-	-	-	-	-	-	2	6	5	5	7	8	7	7	3	-	-	-	-	-	
UA3 = 16	-	-	-	-	-	-	-	-	-	-	4	6	6	5	3	1	-	-	-	-	-	-	-	
UN = 17	-	-	-	-	-	-	-	-	-	-	5	6	5	1	-	-	-	-	-	-	-	-	-	
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
UA0 = 19	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	
4X = 20	-	-	-	-	-	-	-	-	-	5	9	9	9	9	9	9	5	3	-	-	-	-	-	
HZ = 21	-	-	-	-	-	-	-	-	-	5	9	9	9	9	9	5	4	-	-	-	-	-	-	
VU = 22	-	-	-	-	-	-	-	-	-	-	5	9	8	4	1	2	1	1	-	-	-	-	-	
JT = 23	4	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	
VS6 = 24	1	-	-	-	-	-	-	-	-	-	1*	3*	6	4*	1	-	1	-	-	-	-	-	2	
JA1 = 25	4	-	-	-	-	-	-	-	-	-	3*	5*	-	-	-	-	-	-	-	-	5	8	7	
HS = 26	-	-	-	-	-	-	-	-	-	-	1	6	5	4*	2	1	1	2	1	-	-	-	-	
DU = 27	1	-	-	-	-	-	-	-	-	-	2*	4*	5	4*	-	-	-	-	-	-	-	4	5	
YB = 28	-	-	-	-	-	-	-	-	-	-	-	2	5	8	8	8	9	7	1	-	-	-	1	
VK6 = 29	3	-	-	-	-	-	-	-	-	-	-	-	4	6	5	4	3	-	-	-	-	7	4	
VK3 = 30	5	1	-	-	-	-	-	-	-	-	-	2	6	5	-	-	-	-	6	8	8	8	8	
KH6 = 31	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3	9	9	9	9	9	9	9	8	
KH8 = 32	7	4	-	-	-	-	-	-	-	-	-	2	-	-	-	9	9	9	9	9	9	9	8	
CN = 33	-	-	-	-	-	-	-	-	-	7	9	9	9	9	9	9+	9+	9	6	-	-	-	-	
SU = 34	-	-	-	-	-	-	-	-	-	6	9	9	9	9	9	9	6	5	-	-	-	-	-	
6W = 35	-	-	-	-	-	-	-	-	-	9	8	9	7	8	9	9	9+	9+	9	8	1	-	-	
D2 = 36	-	-	-	-	-	-	-	-	5	9	9	9	9	9	9	9	9+	9+	9+	9+	9+	9	2	
5Z = 37	-	-	-	-	-	-	-	-	-	1	7	8	8	9	9	9	9+	9+	9+	9+	9	6	1	
ZS6 = 38	-	-	-	-	-	-	-	-	-	3	8	7	7	8	8	9	9	9+	9+	9+	9+	8	1	
FR = 39	-	-	-	-	-	-	-	-	-	7	8	8	8	8	9	9	9+	9+	9+	9	4	-	-	
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element yagis at 60 feet at each station.

CQWW SSB 10m

10 Meters: Oct. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
XE1 = 06	1	-	-	-	-	-	-	-	-	-	-	-	-	7	8	9	9	9	9+	8	8	9	4	
TI = 07	-	-	-	-	-	-	-	-	-	-	-	-	6	9	-	7	8	8	-	-	-	9	5	
VP2 = 08	-	-	-	-	-	-	-	-	-	-	2	9	9	8	8	8	8	9	9+	9+	9	2	1	
P4 = 09	-	-	-	-	-	-	-	-	-	4	9	9	9	9+	9+	9+	9+	9+	9+	9+	9+	8	4	
HC = 10	-	-	-	-	-	-	-	-	-	-	-	-	2	5	5	8	8	8	9	9	8	2	-	
PY1 = 11	-	-	-	-	-	-	-	-	-	-	-	-	6	8	7	7	7	7	8	9	8	6	2	
CE = 12	-	-	-	-	-	-	-	-	-	-	-	3	7	7	7	6	7	8	9	9	8	5	1	
LU = 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
I = 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4X = 20	-	-	-	-	-	-	-	-	-	-	-	2	1	1	1	-	-	-	-	-	-	-	-	
HZ = 21	-	-	-	-	-	-	-	-	-	-	-	3	2	2	-	-	-	-	-	-	-	-	-	
VU = 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
JA1 = 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VK3 = 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
KH6 = 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
KH8 = 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	4	3	2	-	
CN = 33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SU = 34	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	-	-	-	-	-	-	-	-	
6W = 35	-	-	-	-	-	-	-	-	-	-	1	3	1	-	1	4	5	5	-	-	-	-	-	
D2 = 36	-	-	-	-	-	-	-	-	-	1	5	6	7	7	7	8	9	7	6	1	-	-	-	
5Z = 37	-	-	-	-	-	-	-	-	-	2	5	5	5	5	6	7	6	3	-	-	-	-	-	
ZS6 = 38	-	-	-	-	-	-	-	-	-	1	6	5	5	5	6	8	8	5	1	1	-	-	-	
FR = 39	-	-	-	-	-	-	-	-	-	4	5	5	5	5	6	7	8	7	2	-	-	-	-	
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element yagis at 60 feet at each station.

CQWW CW 160m

160 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	2	2	4	5	5	5	5	5	6	6	6	4	2	-	-	-	-	-	-	-	-	-	1
VO2 = 02	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	4	2	4	5	9	9	9	9	9
W6 = 03	5	6	6	9	9	9	9	9	9	9	9	9	9	6	3	-	-	-	-	-	-	-	-	4
W9 = 04	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	5	9	9	9	9
W3 = 05	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
XE1 = 06	9	9	9	9	9	9	9	9	9	9	9	9	6	5	-	-	-	-	-	-	-	-	3	6
TI = 07	6	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	-	-	-	-	-	-	5	6
VP2 = 08	9	9	9	9	9	9	9	9	9	9	9	9	6	-	-	-	-	-	-	-	3	6	9	9
P4 = 09	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	-	-	-	-	4	6	9
HC = 10	6	9	9	9	9	9	9	9	9	9	6	6	1	-	-	-	-	-	-	-	-	-	2	6
PY1 = 11	6	6	6	6	6	6	6	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	4
CE = 12	4	5	6	6	6	6	6	6	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	1
LU = 13	5	6	6	6	6	6	6	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	2
G = 14	6	6	6	6	9	9	9	9	6	5	2	-	-	-	-	-	-	-	-	-	1	4	5	6
I = 15	4	4	4	4	6	6	6	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
UA3 = 16	4	4	4	5	5	5	5	3	1	-	-	-	-	-	-	-	-	-	-	-	1	2	3	4
UN = 17	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
UA9 = 18	4	5	4	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	3	4	5
UA0 = 19	-	-	-	-	-	-	-	3	5	5	5	5	5	-	-	-	-	-	-	-	-	-	-	-
4X = 20	6	6	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	5
HZ = 21	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5
VU = 22	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2
JT = 23	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	3	2
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	4	4	5	5	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	3	5	5	6	6	6	6	6	6	3	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	4	4	5	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9	9	6	5	9	9	9	6	6	3	-	-	-	-	-	-	-	-	-	-	2	5	6	6
SU = 34	6	6	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	5
6W = 35	6	9	9	6	6	6	6	6	5	2	-	-	-	-	-	-	-	-	-	-	-	3	2	6
D2 = 36	6	6	6	5	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5
5Z = 37	5	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5
ZS6 = 38	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
FR = 39	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
FJL = 40	2	2	3	3	3	3	4	3	3	3	5	3	2	-	-	-	-	-	-	-	-	1	2	4
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

160 meter signal strengths are estimated using 80 meter numbers, minus 3 S-units.

CQWW CW 80m

80 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
KL7 = 01	3	5	5	7	8	8	8	8	8	9	9	9	7	5	2	1	-	-	-	-	-	-	2	4	
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	5	7	8	9+	9+	9+	9+	9+	
W6 = 03	8	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	-	-	-	-	-	-	-	3	7	
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	3	2	3	8	9+	9+	9+	9+	
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
XE1 = 06	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	8	-	-	-	-	-	-	-	-	6	9	
TI = 07	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	-	-	-	-	-	-	-	-	-	8	9	
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	-	-	-	-	-	-	-	6	9	9+	9+	
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	-	-	-	-	-	-	-	-	7	9	9+	
HC = 10	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	4	-	-	-	-	-	-	-	-	-	-	5	9	
PY1 = 11	9	9	9	9	9	9	9	8	8	5	1	-	-	-	-	-	-	-	-	-	-	-	5	7	
CE = 12	7	8	9	9	9	9	9	9	8	8	5	1	-	-	-	-	-	-	-	-	-	-	-	4	
LU = 13	8	9	9	9	9	9	9	8	8	6	3	-	-	-	-	-	-	-	-	-	-	-	1	5	
G = 14	9	9	9	9	9+	9+	9+	9+	9	8	5	2	-	-	-	-	-	-	1	3	4	7	8	9	
I = 15	7	7	7	7	9	9	9	6	4	2	-	-	-	-	-	-	-	-	-	-	1	3	5	6	
UA3 = 16	7	7	7	8	8	8	8	6	4	1	-	-	-	-	-	-	-	-	-	1	4	5	6	7	
UN = 17	7	8	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	7	
UA9 = 18	7	8	7	-	-	-	-	-	-	-	5	4	3	-	-	-	-	-	-	-	-	-	6	7	8
UA0 = 19	-	-	-	-	-	-	-	6	8	8	8	8	8	-	-	-	-	-	-	-	-	2	2	-	
4X = 20	9	9	9	9	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	8	8	
HZ = 21	9	9	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	8	
VU = 22	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	5	
JT = 23	-	-	-	-	-	-	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	6	5	
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
JA1 = 25	-	-	-	-	-	-	-	-	7	7	8	8	1	-	-	-	-	-	-	-	-	-	-	-	
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DU = 27	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VK3 = 30	-	-	-	-	-	-	-	-	-	-	3	4	-	-	-	-	-	-	-	-	-	-	-	-	
KH6 = 31	-	-	-	6	8	8	9	9	9	9	9	9	9	6	1	-	-	-	-	-	-	-	-	-	
KH8 = 32	-	-	-	-	-	-	7	7	8	8	7	6	-	-	-	-	-	-	-	-	-	-	-	-	
CN = 33	9+	9+	9	8	9+	9+	9+	9	9	6	3	-	-	-	-	-	-	-	-	2	5	8	9	9	
SU = 34	9	9	9	9	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	8	8	
6W = 35	9	9+	9+	9	9	9	9	9	8	5	1	-	-	-	-	-	-	-	-	-	2	6	5	9	
D2 = 36	9	9	9	8	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	8	
5Z = 37	8	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	
ZS6 = 38	7	7	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	
FR = 39	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	
FJL = 40	5	5	6	6	6	6	7	6	6	6	8	6	5	2	1	-	-	-	-	1	2	4	5	7	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

CQWW CW 40m

40 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	9	9	9	9	5	5	6	6	9	9	8	9	6	5	8	8	6	5	5	6	7	8	8	8
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9+	9+	9+
W6 = 03	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	8	6	4	2	3	6	8	9	9
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9+	9+
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
XE1 = 06	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	1	1	1	6	8	9	9+
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	2	-	-	-	1	6	9	9+	9+
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	7	4	3	4	6	9	9+	9+	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	-	-	1	6	9	9+	9+	9+
HC = 10	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	-	-	-	-	3	8	9	9+	9+
PY1 = 11	9+	9+	9+	9+	9+	9+	9+	9+	9	8	3	-	-	-	-	-	-	-	-	3	7	8	9	
CE = 12	9	9	9+	9+	9+	9+	9+	9+	9+	9	9	6	2	-	-	-	-	-	-	-	2	5	8	8
LU = 13	9	9+	9+	9+	9	9+	9+	9+	9	9	8	5	1	-	-	-	-	-	-	-	3	6	8	8
G = 14	9	9	9+	9+	9	9	7	9	9	9	9	8	7	5	4	3	5	6	8	9	9	9	9	9
I = 15	9	9	9	9	9+	8	9	9	8	8	6	3	1	1	1	2	4	6	8	9	9	9	9	9
UA3 = 16	8	8	7	8	6	4	8	8	8	7	7	4	5	4	2	1	4	5	7	8	7	6	7	7
UN = 17	9	9	9	8	7	2	2	1	-	2	6	4	4	5	4	1	1	2	2	7	8	8	9	9
UA9 = 18	8	9	9	8	8	8	8	8	8	8	8	8	8	7	7	6	5	6	6	8	8	8	8	8
UA0 = 19	6	5	4	5	5	7	8	8	9	9	9	9	9	8	8	6	5	5	6	6	6	6	6	6
4X = 20	9	9	9	9	9	9	8	7	2	-	-	-	-	-	-	1	3	5	7	8	9	9	9	
HZ = 21	9	9	9	9	8	8	1	-	-	-	-	-	1	-	-	-	-	-	7	8	8	9	9	
VU = 22	8	8	8	6	-	-	-	-	-	-	2	2	3	-	-	-	-	-	6	7	7	8	8	8
JT = 23	8	7	7	1	-	-	1	8	8	9	8	8	8	8	1	-	-	-	1	8	8	9	8	8
VS6 = 24	1	-	-	-	-	-	-	-	1	7	8	7	6	6	-	-	-	-	-	4	6	5	5	5
JA1 = 25	-	-	-	-	-	-	7	8	9	9	9	9	9	8	7	-	-	-	-	5	4	3	3	3
HS = 26	5	2	-	-	-	-	-	-	-	-	5	4	4	1	-	-	-	-	-	4	7	8	7	7
DU = 27	-	-	-	-	-	-	-	-	4	7	8	8	7	6	-	-	-	-	-	-	4	2	2	2
YB = 28	-	-	-	-	-	-	-	-	-	-	1	4	5	1	-	-	-	-	-	-	2	6	5	5
VK6 = 29	-	-	-	-	-	-	-	-	-	-	7	8	5	2	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	4	8	8	9	8	4	-	-	-	-	-	-	-	-	-	-
KH6 = 31	1	5	8	9	9	9+	9	9	9+	9+	9	9	9	9	8	5	1	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	8	8	9	9	9	9	9	9	9	7	5	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	9+	9+	9+	9+	9+	9	9+	9	8	5	2	1	-	-	2	5	6	8	9	9+	9+	9+
SU = 34	9	9	9	9	9	9	9	7	4	1	-	-	-	-	-	1	2	5	7	8	9	9	9	
6W = 35	9+	9+	9+	9+	9+	9+	9+	9+	9	9	8	4	-	-	-	-	-	4	6	8	9	9+	9+	
D2 = 36	9	9+	9+	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	7	8	9	9	
5Z = 37	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	6	7	8	9	9	
ZS6 = 38	9	9	9	9	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	9	9	
FR = 39	9	9	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6	8	9	
FJL = 40	9	9	9	9	9	9	9	9	9	6	9	9	8	8	6	5	4	5	6	8	8	9	9	9
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

CQWW CW 20m

20 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	9	7	1	-	-	-	-	1	3	-	-	-	-	-	2	8	9	9	9+	9+	9+	9+	9+	9+
VO2 = 02	9	9	9+	9+	9+	9	9	9	9	8	8	8	7	9	9+	9+	9+	9+	9+	9+	9+	9+	8	9
W6 = 03	9+	9	1	-	-	-	-	-	-	-	-	-	-	-	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W9 = 04	8	9	9	9	9	9	9	9	8	8	7	7	7	8	9+	9+	9+	9+	9+	9+	9+	9+	9+	7
W3 = 05	-	1	1	1	1	1	1	1	1	1	1	1	-	-	4	4	5	5	5	4	1	-	-	-
XE1 = 06	9	3	9	9	9	9	9	9	9+	9	8	9	-	9+	9+	9+	9+	9	9+	9+	9+	9+	9+	9+
TI = 07	9	8	9	9	9	9	9	8	9+	9	8	8	9+	9+	9+	9+	9	9	9+	9	9+	9+	9+	9+
VP2 = 08	9+	9+	9	8	9	9+	9+	9+	9	8	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+	9+	9+	9+
P4 = 09	9+	9+	9+	9	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9	8	9+	9+	9+	9+	9+	9+	8
HC = 10	9	6	4	1	1	3	8	8	5	-	-	9	9+	9+	9	8	9	8	9	9	9+	9+	9+	5
PY1 = 11	7	8	8	6	8	9	9	9	5	6	9	9+	9	7	4	3	3	6	7	9	9+	9+	9+	9+
CE = 12	9+	9+	9+	9+	9+	9+	9+	9+	9	8	9	9+	9	7	4	1	-	-	1	4	8	9	9+	9+
LU = 13	9	9	8	8	8	9	9+	9	8	6	8	9+	9	8	5	3	3	4	5	7	9	9+	9+	9+
G = 14	-	-	-	-	-	-	-	-	-	-	2	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	1	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	6	9	9	9	9	9	9+	9+	9	8	4	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	6	9	9+	9	8	5	-	-	-	-	-	-	-
UN = 17	1	1	1	5	5	1	-	-	-	-	-	7	9	9	7	2	1	3	4	7	8	6	3	3
UA9 = 18	2	2	4	4	4	4	2	-	-	-	-	2	3	-	-	-	-	-	1	-	4	3	1	1
UA0 = 19	8	7	6	4	1	1	5	1	-	-	-	-	-	1	4	1	-	-	-	1	5	8	9+	9+
4X = 20	4	2	2	2	1	-	-	-	-	-	4	8	8	9	9	9	9	9	8	8	6	6	5	6
HZ = 21	5	4	3	4	5	2	-	-	-	-	5	8	8	8	9	9	9	8	8	8	7	8	8	7
VU = 22	4	4	5	1	2	1	-	-	-	-	-	7	9	9	9	5	4	5	5	6	8	8	8	5
JT = 23	8	7	6	4	2	2	2	-	-	-	-	1	1*	-	-	-	-	1	2	2	1	1	4	6
VS6 = 24	7	4	1	1	1	1	1	-	-	-	-	3*	8	9	8	4	5	5	5	7	1	-	7	9
JA1 = 25	9	5	3	1	1	1	4	2	-	-	-	3*	5	3	6	5	2	1	-	2	8	9	9	9
HS = 26	7	4	2	1	1	1	-	-	-	-	-	2	9	9	9	7	5	5	2	7	8	-	-	5
DU = 27	6	3	1	1	-	1	1	-	-	-	-	3*	6	9	8	8	4	5	6	6	-	-	9	9
YB = 28	5	3	1	-	-	-	-	-	-	-	-	2*	9	9	9	8	8	8	8	9	8	1	1	9
VK6 = 29	6	1	-	-	-	-	-	1	-	-	-	4*	1	8	9	9	8	8	8	9	9	9	9	8
VK3 = 30	-	-	-	-	-	1	1	7	8	8	2	-	5	9+	9	7	7	7	5	3	8	8	-	-
KH6 = 31	9	9	7	2	1	1	1	1	1	1	-	-	4	-	1	9	9	8	9	8	8	8	8	9
KH8 = 32	4	7	8	5	2	2	6	8	8	8	2	1	7	9+	8	-	8	7	5	4	2	1	1	1
CN = 33	-	-	-	-	-	-	-	-	-	-	9+	9+	9+	9	9	9	9+	9+	9+	9+	9	5	1	1
SU = 34	3	2	2	2	4	2	-	-	-	-	6	8	8	8	9	9	9	9	9	8	8	8	6	6
6W = 35	1	-	-	-	2	6	1	-	-	5	9	9+	9	8	7	7	9	9	9+	9+	9+	9+	9+	9
D2 = 36	8	3	1	5	8	7	7	-	1	5	7	4	2	1	2	6	7	8	9	9+	9+	9+	9+	9
5Z = 37	5	5	2	2	6	2	-	-	-	1	4	2	2	4	6	7	8	9	9	9+	9+	9+	9+	8
ZS6 = 38	5	5	2	1	8	9	4	-	-	2	2	-	-	-	4*	2	5	8	8	9	9+	9+	9	9
FR = 39	5	2	1	1	2	2	-	-	-	-	-	-	1	9	4	5	7	8	9	9	9+	9+	9+	7
FJL = 40	3	1	-	-	-	-	-	-	-	-	-	-	8	9	8	8	8	8	9	9	9	9	8	8
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and 3-element yagis at 100 feet at each station.

CQWW CW 15m

15 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8	9	9	7	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-
W6 = 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	9	9+	9+	9+	9+	9+	9	2
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	5	4	3	2	1	-	-
W3 = 05	1	1	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1
XE1 = 06	6	1	-	-	-	-	-	-	-	-	-	-	-	8	9+	9+	9+	9+	9+	9+	9+	9+	6	-
TI = 07	3	-	-	-	-	-	-	-	-	-	-	-	8	9	9+	9+	9+	9+	9+	9+	9+	9	4	7
VP2 = 08	-	-	-	-	-	-	-	-	-	-	1	9+	9+	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	8
P4 = 09	1	-	-	-	-	-	-	-	-	-	2	8	8	9+	9+	8	7	6	6	5	2	9	8	8
HC = 10	-	-	-	-	-	-	-	-	-	-	-	6	2	9+	9+	4	1	-	-	-	5	9	2	3
PY1 = 11	-	-	-	-	-	-	-	-	-	-	5	9	9	8	8	8	9	9	9	9	9+	9	3	3
CE = 12	1	-	-	-	-	-	-	-	-	-	-	9	9	9	8	8	8	8	9	9	9+	9	5	5
LU = 13	-	-	-	-	-	-	-	-	-	-	3	9	9	9	8	8	8	9	9	9+	9+	9	6	6
G = 14	-	-	-	-	-	-	-	-	-	-	-	5	9	9	9	9	8	-	-	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	6	5	9	8	6	4	-	-	-	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	2	6	5	2	-	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
4X = 20	-	-	-	-	-	-	-	-	-	-	1	8	9	9	9	7	-	-	-	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	1	9	9	9+	7	1*	1*	-	-	-	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	3	5	5*	-	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	1*	2	1	-	-	-	-	-	-	-	-	-	-
JA1 = 25	1	-	-	-	-	-	-	-	-	-	-	2*	-	-	-	-	-	-	-	-	-	4	7	5
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	5*	3	2	1	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	1*	2*	2*	-	-	-	-	-	-	-	-	-	2
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	1	7	9	9	8	7	6	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	9	8	7	1	-	1	7	3	3
VK3 = 30	2	-	-	-	-	-	-	-	-	-	-	-	-	6	5	-	-	-	1	8	8	8	7	7
KH6 = 31	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9	9	9	9	9	9	7	7
KH8 = 32	5	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	8	9	9	9	9	9	8	8
CN = 33	-	-	-	-	-	-	-	-	-	-	2	9	9	9	9	9	9	8	1	-	-	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	2	8	9	9	9	9	1	-	-	-	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	7	7	9	9	9	9	9	9	9	4	2	-	-	-
D2 = 36	-	-	-	-	-	-	-	-	-	-	2	9	9	9	9	9	9+	9+	9+	9+	8	5	-	-
5Z = 37	-	-	-	-	-	-	-	-	-	-	5	8	9	9	9	9	9+	9+	9+	9	3	1	-	-
ZS6 = 38	-	-	-	-	-	-	-	-	-	-	1	7	7	7	7	8	9	9	9+	9+	8	5	-	-
FR = 39	-	-	-	-	-	-	-	-	-	-	3	8	8	8	9	9	9	9+	9+	8	2	1	-	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element yagis at 60 feet at each station.

CQWW CW 10m

10 Meters: Nov. 2004, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W0 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	1	1	2	2
XE1 = 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	9	7	-
TI = 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	3	-
VP2 = 08	-	-	-	-	-	-	-	-	-	-	1	9	9+	9+	9+	9	9	9	9	9	9	6	-	-
P4 = 09	-	-	-	-	-	-	-	-	-	-	3	9+	-	8	9+	9+	9+	9+	9+	9	8	1	-	-
HC = 10	-	-	-	-	-	-	-	-	-	-	-	2	7	8	6	8	8	8	7	7	7	6	5	-
PY1 = 11	-	-	-	-	-	-	-	-	-	-	-	2	7	8	6	8	8	8	7	1	-	-	-	-
CE = 12	-	-	-	-	-	-	-	-	-	-	-	-	8	9	8	8	7	7	7	7	6	5	-	-
LU = 13	-	-	-	-	-	-	-	-	-	-	-	2	8	9	8	8	8	8	8	7	4	4	-	-
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4X = 20	-	-	-	-	-	-	-	-	-	-	-	-	3	4	1	-	-	-	-	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7	6	5	1	-
KH8 = 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	8	8	7	3	-
CN = 33	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	-	-	3	4	2	-	-	-	-	-	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	-	-	4	5	4	4	4	1	-	-	-	-	-	-
D2 = 36	-	-	-	-	-	-	-	-	-	-	3	6	8	7	7	7	7	7	3	-	-	-	-	-
5Z = 37	-	-	-	-	-	-	-	-	-	-	1	6	7	7	5	4	2	-	-	-	-	-	-	-
ZS6 = 38	-	-	-	-	-	-	-	-	-	-	5	6	8	6	6	7	7	3	-	-	-	-	-	-
FR = 39	-	-	-	-	-	-	-	-	-	-	2	5	7	7	7	7	5	1	-	-	-	-	-	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element yagis at 60 feet at each station.

ARRL DX CW 160m

160 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	1	1	3	4	5	5	5	5	5	5	6	6	4	2	-	-	-	-	-	-	-	-	-	-
VO2 = 02	9	9	9	9	9	9	9	9	9	9	9	9	9	9	5	1	-	-	5	9	9	9	9	9
W6 = 03	5	6	6	9	9	9	9	9	9	9	9	9	9	6	3	-	-	-	-	-	-	-	-	3
W9 = 04	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	6	9	9	9
W3 = 05	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6	9	9	9	9	9	9
XE1 = 06	6	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	-	-	-	-	1	5
TI = 07	9	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	-	-	-	-	-	-	3	6
VP2 = 08	9	9	9	9	9	9	9	9	9	9	9	9	6	-	-	-	-	-	-	-	-	5	9	9
P4 = 09	9	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	-	-	-	-	-	2	6	9
HC = 10	6	9	9	9	9	9	9	9	9	9	6	5	-	-	-	-	-	-	-	-	-	-	1	5
PY1 = 11	5	6	6	6	6	6	6	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-	1	4
CE = 12	3	5	6	6	6	6	6	6	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-
LU = 13	4	5	6	6	6	6	6	5	5	4	1	-	-	-	-	-	-	-	-	-	-	-	-	2
G = 14	6	6	6	6	9	9	9	9	6	4	2	-	-	-	-	-	-	-	-	-	-	3	5	6
I = 15	3	4	4	4	6	6	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
UA3 = 16	5	4	5	5	6	5	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	5
UN = 17	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
UA9 = 18	5	5	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	4	4
UA0 = 19	-	-	-	-	-	-	-	2	4	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-
4X = 20	6	6	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	5
HZ = 21	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5
VU = 22	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	4	5	5	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	4	5	5	6	6	6	6	6	6	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	4	5	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9	5	6	5	5	9	9	6	5	3	-	-	-	-	-	-	-	-	-	-	1	3	5	6
SU = 34	6	6	6	6	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	5
6W = 35	6	6	9	9	6	6	6	6	5	2	-	-	-	-	-	-	-	-	-	-	-	1	4	5
D2 = 36	5	6	6	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4
5Z = 37	5	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
ZS6 = 38	3	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
FR = 39	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FJL = 40	5	5	3	3	3	3	3	3	3	3	4	3	2	-	-	-	-	-	-	-	-	1	3	4
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

160 meter signal strengths are estimated using 80 meter numbers, minus 3 S-units.

ARRL DX CW 80m

80 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	4	4	6	7	8	8	8	8	8	8	9	9	7	5	2	1	-	-	-	-	-	-	1	2
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	4	2	2	8	9+	9+	9+	9+	9+
W6 = 03	8	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	-	-	-	-	-	-	1	6
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	2	1	1	3	9	9+	9+	9+
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+	9+	9+
XE1 = 06	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	-	-	-	-	-	-	-	-	4	8
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	-	-	-	-	-	-	-	-	-	6	9
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	-	-	-	-	-	-	-	-	8	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	-	-	-	-	-	-	-	-	5	9	9+
HC = 10	9	9+	9+	9+	9+	9+	9+	9+	9+	9	8	-	-	-	-	-	-	-	-	-	-	4	8	
PY1 = 11	8	9	9	9	9	9	9	8	7	6	2	-	-	-	-	-	-	-	-	-	-	4	7	
CE = 12	6	8	9	9	9	9	9	9	8	7	6	1	-	-	-	-	-	-	-	-	-	-	-	3
LU = 13	7	8	9	9	9	9	9	8	8	7	4	-	-	-	-	-	-	-	-	-	-	1	5	
G = 14	9	9	9	9	9+	9+	9+	9+	9	7	5	2	-	-	-	-	-	-	1	3	6	8	9	
I = 15	6	7	7	7	9	9	9	5	3	1	-	-	-	-	-	-	-	-	-	-	2	4	6	
UA3 = 16	8	7	8	8	9	8	9	5	2	1	-	-	-	-	-	-	-	-	-	2	5	7	8	
UN = 17	7	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	7
UA9 = 18	8	8	6	-	-	-	-	-	-	1	4	2	-	-	-	-	-	-	-	-	-	1	7	7
UA0 = 19	-	-	-	-	-	-	-	5	7	8	8	8	7	-	-	-	-	-	-	-	-	-	1	-
4X = 20	9	9	9	9	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	8
HZ = 21	9	9	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	8
VU = 22	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
JT = 23	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	6
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	7	8	8	1	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	1	7	8	8	9	9	9	9	9	2	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	7	8	8	8	8	6	1	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	8	9	8	8	9+	9+	9+	8	6	2	-	-	-	-	-	-	-	1	4	6	8	9	
SU = 34	9	9	9	9	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	8
6W = 35	9	9	9+	9+	9	9	9	9	8	5	1	-	-	-	-	-	-	-	-	-	-	4	7	8
D2 = 36	8	9	9	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7
5Z = 37	8	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6
ZS6 = 38	6	7	7	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
FR = 39	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
FJL = 40	8	8	6	6	8	8	8	6	6	6	7	6	5	2	1	-	-	-	1	2	4	6	7	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

ARRL DX CW 40m

40 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
KL7 = 01	9	9	9	9	9	5	6	6	6	7	8	9	6	5	8	7	6	5	5	6	6	7	8	8	
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9+	9+	9+	
W6 = 03	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	8	6	2	2	1	2	6	8	9	
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9+	9+	9+	9+	
W3 = 05	9+	9	9+	9+	9+	9+	9+	9+	9	9	8	8	8	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
XE1 = 06	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	5	1	1	-	-	1	7	9	9+	
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	5	2	-	-	-	1	5	8	9	9+	9+	
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	3	2	2	4	7	9	9+	9+	9+	9+	
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	8	3	1	-	-	1	2	8	9+	9+	9+	
HC = 10	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	1	-	-	-	-	-	2	7	9	9+	9+	
PY1 = 11	9+	9+	9+	9+	9+	9+	9+	9+	9	8	3	-	-	-	-	-	-	-	-	2	6	8	9	9	
CE = 12	9	9	9+	9+	9+	9+	9+	9+	9+	9	9	9	7	3	-	-	-	-	-	-	-	2	5	8	8
LU = 13	9	9+	9+	9+	9+	9+	9+	9+	9	9	8	5	1	-	-	-	-	-	-	-	-	3	6	8	8
G = 14	8	8	9	9	9	9	7	8	8	8	9	8	6	4	1	2	2	4	6	8	9	9	9+	9+	9+
I = 15	9	9	9	9	9+	8	7	5	8	7	5	3	-	-	-	1	2	5	8	9	9	9	9	9	9
UA3 = 16	8	7	7	8	6	3	8	8	7	6	7	5	5	4	2	1	1	5	6	8	8	8	8	8	8
UN = 17	9	9	9	8	7	1	1	-	-	1	2	4	4	3	3	2	1	1	1	3	8	8	9	9	9
UA9 = 18	9	9	9	8	8	8	8	8	8	8	8	8	7	7	5	5	4	4	5	6	8	8	8	9	9
UA0 = 19	5	4	4	4	5	6	8	8	9	9	9	9	9	8	7	5	4	4	4	5	7	7	6	6	6
4X = 20	9	9	9	9+	9+	9	8	6	3	1	-	-	-	-	-	-	1	4	6	8	9	9	9	9	
HZ = 21	9	9	9	9	8	8	1	-	-	-	-	-	-	-	-	-	-	-	1	8	8	9	9	9	9
VU = 22	9	8	8	6	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	7	7	8	8	8	8
JT = 23	8	8	7	-	-	-	-	1	8	9	8	8	7	7	1	-	-	-	-	1	8	8	8	8	8
VS6 = 24	-	-	-	-	-	-	-	-	-	7	7	7	7	2	-	-	-	-	-	-	-	4	5	4	4
JA1 = 25	-	-	-	-	-	-	6	8	8	9	9	9	9	8	1	-	-	-	-	-	-	4	3	-	-
HS = 26	5	2	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	6	7	6	6
DU = 27	-	-	-	-	-	-	-	-	-	7	8	8	6	3	-	-	-	-	-	-	-	-	3	1	1
YB = 28	-	-	-	-	-	-	-	-	-	-	5	1	-	-	-	-	-	-	-	-	-	2	5	5	5
VK6 = 29	-	-	-	-	-	-	-	-	-	7	7	7	1	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	7	8	8	8	7	2	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	4	7	8	9	9	9	9	9	9	9	9	9	8	5	1	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	7	8	9	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	9+	9+	9+	9+	9	9	8	9	8	6	2	-	-	-	2	5	7	9	9+	9+	9+	9+	
SU = 34	9	9	9	9	9	9	8	7	4	2	-	-	-	-	-	-	1	3	6	8	9	9	9	9	
6W = 35	9+	9+	9+	9+	9+	9+	9+	9	9	9	8	4	-	-	-	-	-	2	7	9	9	9+	9+	9+	
D2 = 36	9	9	9+	9	9	9	8	6	-	-	-	-	-	-	-	-	-	-	-	6	8	9	9	9	
5Z = 37	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	7	8	8	9	9	
ZS6 = 38	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	9	9	
FR = 39	9	9	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	8	8	8	
FJL = 40	9	9	9	9	9	9	9	9	8	5	5	8	8	7	7	5	4	4	6	7	8	9	9	9	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

ARRLDX CW 20m

20 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
KL7 = 01	9+	9	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8	9	9	9+	9+	9+	9+	9+	
VO2 = 02	9+	9+	9+	9+	9+	9+	9	9	8	6	4	2	1	7	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9		
W6 = 03	9+	9+	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	9+	9+	9+	9	9	9+	9+	9+	9+	
W9 = 04	8	9	9	9	9	9	9	9	9	8	7	7	6	5	7	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	
W3 = 05	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
XE1 = 06	9+	8	9	9	9	9	9	9	9	9+	9+	9	8	9+	8	9+	8	9+	9+	9+	9	8	9+	9+	9+	9+	9+	9+	
TI = 07	9+	6	9	9	9	9	9	9	8	8	9	9	9	7	9+	9+	9	9	8	9+	9+	9+	9+	9+	9+	9+	9+	9+	
VP2 = 08	9+	9+	9	9	9	9+	9+	9+	9+	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
P4 = 09	6	9+	9+	9	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9	8	9+	9+	9	8	9+	9+	9+	9+	9+	9+	9+	9+	
HC = 10	5	9	3	1	2	4	7	9	8	6	2	2	1	9+	9+	9	8	8	8	8	8	8	8	8	9+	9+	9+	9+	
PY1 = 11	9+	8	7	8	8	8	9	9	3	4	8	9+	9	7	4	3	4	6	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	
CE = 12	9+	9	8	7	7	9	9	9	9	8	8	9	9+	9	6	4	3	3	4	6	8	9	9+	9+	9+	9+	9+		
LU = 13	9+	8	8	8	8	8	9	9	9	8	8	9	9	8	4	3	2	3	4	7	9	9+	9+	9+	9+	9+	9+		
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	-	8	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	6	-	-	
I = 15	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	9	9	9	9	9	9	9+	9+	9+	9+	8	5	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	-	3	8	9	9	9	9	7	7	2	-	-	-	-	-	-	
UN = 17	2	1	1	2	2	-	-	-	-	-	-	-	-	-	9	9	9	9	7	2	-	1	1	5	7	7	7	5	
UA9 = 18	4	6	7	1	1	2	1	-	-	-	-	-	-	-	5	6	3	1	-	1	1	2	3	5	5	5	4	4	
UA0 = 19	9	5	4	1	-	1	1	1	-	-	-	-	-	2	2	4	4	4	4	3	2	1	2	7	8	8	9+		
4X = 20	6	2	1	1	1	-	-	-	-	-	1	8	8	8	8	8	8	9	9	9	9	9	9	8	8	7	8	8	
HZ = 21	5	4	2	2	2	1	-	-	-	-	-	-	-	8	8	9	8	8	8	9	8	8	7	8	8	9	9	9	
VU = 22	6	2	2	1	-	-	-	-	-	-	-	-	-	2	9	9	9	9	6	5	4	4	7	8	8	8	7	7	
JT = 23	9	7	5	2	1	1	1	-	-	-	-	-	-	5*	7	2	-	2	3	4	1	2	2	2	5	7	7	7	
VS6 = 24	8	5	2	1	-	-	1	-	-	-	-	-	-	1*	3*	8	7	5	5	4	6	5	3	2	8	9	9	9	
JA1 = 25	9	8	5	2	1	-	1	1	1	-	-	-	-	4*	2*	5	7	5	4	3	2	4	7	9	9	9	9	9	
HS = 26	8	4	1	-	-	-	-	-	-	-	-	-	-	-	6	9	9	8	7	6	6	8	8	6	1	2	2	2	
DU = 27	8	5	2	-	-	-	-	-	-	-	-	-	-	2*	4*	7	8	7	6	6	6	5	2	1	8	9	9	9	
YB = 28	6	3	1	-	-	-	-	-	-	-	-	-	-	-	6*	9	9	9	9	9	8	8	9	9	1	-	8	8	
VK6 = 29	9	3	-	-	-	-	-	-	-	-	-	-	-	5*	1*	2	9	9	9	9	9	8	8	6	4	9	8	8	
VK3 = 30	-	-	-	-	-	-	1	3	8	8	2	1*	-	9	9	8	7	-	1	6	2	9	-	-	-	-	-	-	
KH6 = 31	9	9	9	2	1	1	1	1	1	1	-	-	-	2	-	-	-	7	9	8	8	8	8	8	8	8	9	9	
KH8 = 32	3	6	9	6	2	2	3	7	8	8	5	1	1	9+	6	-	-	7	5	4	5	1	1	1	1	1	1	1	
CN = 33	-	-	-	-	-	-	-	-	-	-	-	5	9	9+	9	8	9	9	9	9+	9+	9+	9+	9+	9	9	4	4	
SU = 34	6	2	1	2	2	-	-	-	-	-	1	8	8	8	8	8	8	9	9	9	9	9	8	8	8	8	8	8	
6W = 35	8	1	-	-	2	2	-	-	-	-	9+	9+	9	8	6	6	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
D2 = 36	8	5	3	6	8	5	4	-	-	2	8	4	1	1	1	6	6	8	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	
5Z = 37	8	5	1	3	4	3	-	-	-	2	2	2	5	5	6	8	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	
ZS6 = 38	8	2	2	5	3	7	4	-	-	-	4	1	-	-	1*	2	4	7	8	9	9+	9+	9+	9+	9+	9+	9+	9+	
FR = 39	7	4	2	2	2	1	-	-	-	-	-	-	-	1	9	4*	1	1	8	9	9	9+	9+	9+	9+	9+	9+	9+	
FJL = 40	2	2	-	-	-	-	-	-	-	-	-	-	-	1	7	8	9	9	9	9	9	9	8	7	5	2	2	2	
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					

UTC --> * = Long path

Expected signal levels using 1500W and 3-element yagis at 100 feet at each station.

ARRL DX CW 15m

15 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	7	6	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	8	9	9	9	8	4	-
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	1	1	1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1
XE1 = 06	9+	5	-	-	-	-	-	1	-	-	-	-	5	-	5	7	4	3	4	5	6	5	-	-
TI = 07	6	2	-	-	-	-	-	1	-	-	-	1	-	8	9+	8	8	8	8	9	9+	9	7	-
VP2 = 08	7	-	-	-	-	-	-	-	-	-	-	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
P4 = 09	8	1	-	-	-	-	-	1	-	-	-	9	-	6	5	2	7	8	2	1	2	-	9	-
HC = 10	1	-	-	-	-	-	-	-	-	-	-	-	7	-	-	2	2	2	3	-	-	6	9	-
PY1 = 11	2	-	-	-	-	-	-	-	-	-	2	9	9	9	8	8	8	9	9	9+	9+	9+	9+	7
CE = 12	6	-	-	-	-	-	-	-	-	-	-	7	9	9	9	9	9	9	9	9	9	9+	9+	9
LU = 13	6	-	-	-	-	-	-	-	-	-	-	9	9	9	9	8	9	9	9	9	9+	9+	9	-
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	6	9	9	8	5	-	-	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	2	6	1	5	6	7	1	-	-	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	3	5	2	-	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
4X = 20	-	-	-	-	-	-	-	-	-	-	-	4	9	9+	9	9	3	-	-	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	-	5	9	9+	9+	6	1*	1*	-	-	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	-	3	6*	1	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	4*	2*	1*	-	-	-	-	-	-	-	-	5
JA1 = 25	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	7
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	3*	4	4*	4*	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	4*	3*	4*	-	-	-	-	-	-	-	-	2
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	5	8	7	4	-	-	-	-	-
VK6 = 29	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	5	3	-	-	-	-	4	-
VK3 = 30	7	2	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	4	8	8	8	8
KH6 = 31	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9	9	9	9	9	9	9
KH8 = 32	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9	9	9	9	9	9	9
CN = 33	-	-	-	-	-	-	-	-	-	-	-	6	9	9	9	9+	9+	9+	8	1*	-	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	-	5	9	9+	9+	9	5	-	-	-	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	1	8	6	6	7	9	9	9	9	9+	7	2*	-	-
D2 = 36	-	-	-	-	-	-	-	-	-	-	6	9	9	9	9	9	9+	9+	9+	9+	9	8	4	4
5Z = 37	-	-	-	-	-	-	-	-	-	-	-	8	9	9	9	9+	9+	9+	9+	8	4	2	-	-
ZS6 = 38	-	-	-	-	-	-	-	-	-	-	4	7	7	7	9	9	9	9+	9+	9+	8	7	2	2
FR = 39	-	-	-	-	-	-	-	-	-	-	-	8	8	8	9	9	9	9+	9+	9	5	2	-	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element Yagis at 60 feet at each station.

ARRL DX CW 10m

10 Meters: Feb. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2
XE1 = 06	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	8	8	9	9	9	9	7	1
TI = 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	9	9	9	9	9	9	7	4
VP2 = 08	-	-	-	-	-	-	-	-	-	-	-	-	-	4	8	8	8	8	8	7	5	5	1	2
P4 = 09	-	-	-	-	-	-	-	-	-	-	-	-	-	7	9	9	9	9	9	9	9	9	7	5
HC = 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PY1 = 11	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	5	5	8	7	5	1	-	-
CE = 12	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	6	4	5	5	4	4	5	4	3
LU = 13	-	-	-	-	-	-	-	-	-	-	-	-	-	2	7	6	5	5	6	5	3	6	4	2
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4X = 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	1	-	-	-
CN = 33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2 = 36	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	2	2	4	3	1	-	-	-	-
5Z = 37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZS6 = 38	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	3	2	4	3	-	-	-	-	-
FR = 39	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	2	1	-	-	-	-	-	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element Yagis at 60 feet at each station.

ARRL DX SSB 160m

160 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

	UTC -->																							
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	1	2	4	5	5	5	5	5	5	4	3	1	-	-	-	-	-	-	-	-	-	-
VO2 = 02	9	9	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	5	9	9	9	9
W6 = 03	4	5	6	9	9	9	9	9	9	9	9	9	6	5	-	-	-	-	-	-	-	-	-	-
W9 = 04	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	-	-	-	-	-	1	6	9	9
W3 = 05	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6	6	9	9	9	9	9
XE1 = 06	6	9	9	9	9	9	9	9	9	9	9	9	6	3	-	-	-	-	-	-	-	-	-	5
TI = 07	9	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	-	-	-	-	-	-	-	6
VP2 = 08	9	9	9	9	9	9	9	9	9	9	9	9	5	-	-	-	-	-	-	-	-	3	6	9
P4 = 09	9	9	9	9	9	9	9	9	9	9	9	9	4	-	-	-	-	-	-	-	-	-	5	9
HC = 10	6	9	9	9	9	9	9	9	9	9	6	5	1	-	-	-	-	-	-	-	-	-	-	5
PY1 = 11	5	6	6	6	6	6	6	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	4
CE = 12	4	5	6	6	6	6	6	6	5	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-
LU = 13	4	5	6	6	6	6	5	5	5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	1
G = 14	6	6	9	9	9	9	9	6	5	3	-	-	-	-	-	-	-	-	-	-	-	1	3	5
I = 15	3	4	4	6	6	9	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
UA3 = 16	3	4	5	6	6	6	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
UN = 17	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA9 = 18	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
UA0 = 19	-	-	-	-	-	-	-	-	3	5	5	4	2	-	-	-	-	-	-	-	-	-	-	-
4X = 20	5	6	6	6	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5
HZ = 21	5	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
VU = 22	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	3	5	5	6	6	6	6	6	5	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	4	5	5	5	4	3	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9	9	9	9	9	9	9	6	5	2	-	-	-	-	-	-	-	-	-	-	-	1	5	6
SU = 34	5	6	6	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5
6W = 35	6	9	9	9	9	9	9	6	5	2	-	-	-	-	-	-	-	-	-	-	-	2	2	5
D2 = 36	5	5	6	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
5Z = 37	4	5	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
ZS6 = 38	3	4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR = 39	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FJL = 40	3	4	3	3	3	4	4	3	2	2	3	2	-	-	-	-	-	-	-	-	-	-	1	2
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path
160 meter signal strengths are estimated using 80 meter numbers, minus 3 S-units.

ARRL DX SSB 80m

80 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	1	2	4	5	7	8	8	8	8	8	8	7	6	4	1	-	-	-	-	-	-	-	-	-
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	1	1	1	2	8	9+	9+	9+	9+
W6 = 03	7	8	9	9+	9+	9+	9+	9+	9+	9+	9+	9	8	3	-	-	-	-	-	-	-	-	-	3
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	3	1	-	-	1	4	9	9+	9+
W3 = 05	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+	9+	9+
XE1 = 06	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	6	-	-	-	-	-	-	-	-	-	8
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	-	-	-	-	-	-	-	-	-	-	9
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	-	-	-	-	-	-	-	-	6	9	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	7	-	-	-	-	-	-	-	-	-	8	9+
HC = 10	9	9+	9+	9+	9+	9+	9+	9+	9+	9	8	4	-	-	-	-	-	-	-	-	-	-	2	8
PY1 = 11	8	9	9	9	9	9	9	7	7	6	3	-	-	-	-	-	-	-	-	-	-	-	1	7
CE = 12	7	8	9	9	9	9	9	9	8	7	5	2	-	-	-	-	-	-	-	-	-	-	-	3
LU = 13	7	8	9	9	9	9	8	8	8	6	4	-	-	-	-	-	-	-	-	-	-	-	-	4
G = 14	9	9	9+	9+	9+	9+	9+	9+	8	6	3	1	-	-	-	-	-	-	-	1	2	4	6	8
I = 15	6	8	7	9	9	9+	6	5	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2	5
UA3 = 16	6	7	8	9	9	9	6	4	-	-	-	-	-	-	-	-	-	-	-	-	1	2	4	6
UN = 17	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
UA9 = 18	7	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6
UA0 = 19	-	-	-	-	-	-	-	-	6	8	8	7	5	-	-	-	-	-	-	-	-	-	-	-
4X = 20	8	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	8
HZ = 21	8	8	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
VU = 22	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	7	6	4	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	6	8	8	9	9	9	9	8	1	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	-	-	7	8	8	8	7	6	-	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	9+	9+	9+	9+	9+	9	8	5	1	-	-	-	-	-	-	-	-	-	2	4	8	9
SU = 34	8	9	9	8	8	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6	8
6W = 35	9	9+	9+	9+	9+	9+	9+	9	8	5	1	-	-	-	-	-	-	-	-	-	-	5	5	8
D2 = 36	8	8	9	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
5Z = 37	7	8	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
ZS6 = 38	6	7	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
FR = 39	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FJL = 40	6	7	6	6	6	7	7	6	5	5	6	5	2	1	-	-	-	-	-	-	1	2	4	5
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

ARRL DX SSB 40m

40 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	8	9	9	9	9	9	9	6	6	7	7	6	5	9	8	6	4	3	2	1	2	2	5	8
VO2 = 02	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	8	9	9	9	9+	9+	9+	9+
W6 = 03	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	7	5	1	-	-	1	5	7	9
W9 = 04	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	8	8	9	9	9+	9+	9+
W3 = 05	9	9+	9	9	9+	9+	9+	9	9	8	7	6	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
XE1 = 06	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	3	1	-	-	-	1	6	9	9+
TI = 07	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	4	1	-	-	-	-	1	7	9	9+
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	5	-	-	-	3	5	9	9+	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	2	-	-	-	-	1	7	9	9+	9+
HC = 10	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	6	1	-	-	-	-	-	1	5	9	9+
PY1 = 11	9+	9+	9+	9+	9+	9+	9+	9	9	8	4	-	-	-	-	-	-	-	-	-	1	6	8	9
CE = 12	9	9	9+	9+	9+	9+	9+	9+	9+	9	8	7	4	-	-	-	-	-	-	-	-	1	5	8
LU = 13	9	9+	9+	9+	9+	9+	9+	9+	9+	9	8	6	1	-	-	-	-	-	-	-	-	2	6	8
G = 14	9+	9+	9+	9+	9	9	9	9	8	9	8	7	5	2	-	-	1	3	5	7	8	9	9	9
I = 15	9+	9+	9+	9+	9+	9	9	8	8	6	3	2	1	-	-	-	-	-	2	5	8	8	9	9
UA3 = 16	7	8	8	8	8	8	8	8	5	6	5	3	2	1	-	-	-	2	4	6	8	8	8	7
UN = 17	9	9	8	8	4	1	-	-	-	-	1	1	2	1	-	1	-	-	1	2	4	8	8	8
UA9 = 18	8	8	8	8	8	6	6	6	8	8	8	6	5	4	2	1	1	2	3	5	7	7	8	8
UA0 = 19	3	2	2	3	4	6	8	8	8	9	9	9	8	7	6	3	2	1	2	2	3	4	4	5
4X = 20	9	9	9+	9	9	9	8	5	2	-	-	-	-	-	-	-	-	-	1	5	7	8	9	9
HZ = 21	9	9	9	9	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	8	8	8
VU = 22	8	8	7	6	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	7	7	8
JT = 23	7	6	-	-	-	-	-	-	1	8	7	6	5	5	-	-	-	-	-	-	1	8	7	7
VS6 = 24	-	-	-	-	-	-	-	-	-	1	5	5	5	-	-	-	-	-	-	-	-	-	4	2
JA1 = 25	-	-	-	-	-	-	-	7	8	9	9	9	8	7	-	-	-	-	-	-	-	-	1	-
HS = 26	4	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	2	5	5
DU = 27	-	-	-	-	-	-	-	-	-	6	6	6	6	2	-	-	-	-	-	-	-	-	2	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	2
VK6 = 29	-	-	-	-	-	-	-	-	-	-	6	6	2	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	-	-	-	-	-	-	-	7	8	9	8	7	1	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	2	6	8	9	9	9	9	9	9	9	9	8	6	2	-	-	-	-	-	-	-	-	-
KH8 = 32	-	-	-	-	7	9	9	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-
CN = 33	9+	9+	9+	9+	9+	9+	9+	9	9	9	8	5	1	-	-	-	-	-	-	7	8	9	9+	9+
SU = 34	9	9+	9+	9	9	9	8	6	2	-	-	-	-	-	-	-	-	-	1	5	7	8	9	9
6W = 35	9+	9+	9+	9+	9+	9+	9+	9+	9	9	7	3	-	-	-	-	-	-	-	4	8	9	9	9+
D2 = 36	9	9	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	9
5Z = 37	9	9	9	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	8	9
ZS6 = 38	9	9	9	9	8	7	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7	8
FR = 39	8	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	8
FJL = 40	9	9	9	9	9	9	9	9	9	9	8	8	8	7	5	3	2	2	4	5	7	8	8	9
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and dipoles at 100 feet at each station.

ARRL DX SSB 20m

20 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	9	9	7	2	-	-	-	-	-	-	-	-	-	-	-	1	7	9	9	9	9+	9+	9+	9+
VO2 = 02	9	9+	9+	9+	9+	9+	9	9	8	6	4	1	3	8	5	9+	9+	3	9+	9+	9+	9+	9	9
W6 = 03	9+	9+	8	1	-	-	-	-	-	-	-	-	-	-	9	9+	9+	9+	7	5	1	9+	9+	9+
W9 = 04	9	8	9	9	9	9	9	9	9	8	6	4	2	6	8	9	9+	9+	9+	5	9+	9+	9+	9
W3 = 05	1	1	1	2	2	2	2	2	2	2	1	1	-	-	-	-	-	1	1	1	1	1	-	2
XE1 = 06	9+	9+	3	9+	9	9	9	9	9	9	7	9	8	9+	9+	9+	9+	9+	9	9	9+	9+	9+	9+
TI = 07	9+	9+	3	9+	9	9	9	9	9	8	7	9	8	9+	9	8	9+	9	9	9+	9+	9+	9+	9+
VP2 = 08	9+	9+	9+	9+	9+	9+	9+	9+	8	5	9	9+	9+	9+	9+	9	9	9	9	9+	9+	9+	9+	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9	8	9	9+	9+	9+	9+	9+	9	9	9	9+	9+	9+	9+	9+
HC = 10	9+	6	9	3	2	4	6	7	2	-	-	3	1	9+	9+	9	8	7	8	9	9	9+	9+	9+
PY1 = 11	9+	9+	9	9	9	9+	9	8	1	3	8	9+	9	7	5	4	3	4	6	8	9	9+	9+	9+
CE = 12	9+	9+	9+	9	9	9+	9	9	8	7	7	9+	9+	9	6	4	2	2	3	6	8	9	9+	9+
LU = 13	9+	9+	9+	9+	9	9	9+	9	7	7	7	9+	9	8	5	4	2	2	5	6	8	9	9+	9+
G = 14	-	-	-	-	-	-	-	-	-	-	4	9+	9	9	9	8	9	9	9+	9+	9+	9+	8	2
I = 15	-	-	-	-	-	-	-	-	-	-	8	9	9	9	9	5	9	9	9+	9+	9	8	7	2
UA3 = 16	-	-	-	-	-	-	-	-	-	-	1	6	8	8	7	8	8	8	8	7	5	2	1	-
UN = 17	2	5	6	4	2	-	-	-	-	-	1	7	9	9	7	9	8	7	6	5	5	5	5	3
UA9 = 18	6	7	5	4	2	-	-	-	-	-	-	5	9	8	6	5	3	3	1	1	5	5	6	6
UA0 = 19	9	8	6	5	3	1	1	-	-	-	-	1	6	7	5	1	1	1	1	1	2	7	9	9
4X = 20	7	7	5	2	4	-	-	-	-	-	5	7	8	8	8	8	8	9	9	9	9	8	8	8
HZ = 21	6	8	6	6	5	-	-	-	-	-	4	7	7	9+	8	8	8	8	9	9	9	8	9	9
VU = 22	6	6	6	1	-	-	-	-	-	-	1	7	9	8	8	8	8	8	7	6	7	8	8	7
JT = 23	8	8	6	4	2	1	1	-	-	-	-	4	9	9	7	4	2	-	1	1	3	3	7	8
VS6 = 24	8	3	3	1	-	-	-	-	-	-	-	1	5	9	8	8	8	8	8	7	3	5	8	9
JA1 = 25	9	8	5	5	4	1	-	-	-	-	-	4*	5	8	8	6	5	5	5	5	7	9	9	9
HS = 26	8	6	1	1	-	-	-	-	-	-	-	5	9	9	8	8	6	8	8	9	9	8	4	7
DU = 27	8	5	2	1	-	-	-	-	-	-	-	2*	7	9	8	8	7	7	8	8	3	6	9	9
YB = 28	9	5	2	-	-	-	-	-	-	-	-	4	8	9	8	8	7	7	8	8	9	4	-	9
VK6 = 29	8	4	1	-	-	-	-	-	-	-	-	5*	2	8	9	8	8	7	8	7	5	4	8	8
VK3 = 30	-	-	-	-	1	1	1	1	4	1	-	-	6	9	9	7	2	-	-	-	1	1	-	2*
KH6 = 31	9	9	9	7	4	2	2	2	1	-	-	-	2	5	1	4	8	8	8	8	8	7	7	8
KH8 = 32	2	6	9	7	4	3	4	5	4	3	1	1	8	9+	9	-	1	6	4	3	4	1	1	1
CN = 33	4	-	-	1	1	-	-	-	-	-	9+	9	9	9	9	8	9	9+	9+	9+	9+	9+	9+	8
SU = 34	5	7	2	2	4	-	-	-	-	-	6	8	8	8	7	8	8	9	9	9	9	9	8	8
6W = 35	9+	8	5	7	8	7	5	-	-	3	9	9+	9	8	4	4	8	9	9	9+	9+	9+	9+	9+
D2 = 36	9+	9	9	9	9	6	6	-	-	5	6	3	1	1	1	3	5	8	9	9	9+	9+	9+	9+
5Z = 37	9+	8	8	2	6	2	-	-	-	1	3	2	1	3	4	5	7	8	9	9	9+	9+	9+	9+
ZS6 = 38	9+	8	6	5	4	9	5	-	-	2	2	1	-	-	-	1	2	5	8	9	9	9+	9+	9+
FR = 39	9+	8	6	5	7	1	-	-	-	-	-	-	1	1	3*	-	-	1	8	9	9	9+	9+	9
FJL = 40	6	5	1	-	-	-	-	-	-	-	-	1	8	9	9	8	8	9	9	9	9	8	8	7
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

UTC --> * = Long path

Expected signal levels using 1500W and 3-element Yagis at 100 feet at each station.

ARRL DX SSB 15m

15 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	2	1	1	-
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	1	1	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	1	1	1	1
XE1 = 06	3	9	3	-	-	-	-	-	-	-	-	-	8	-	1	-	-	1	1	3	5	5	3	-
TI = 07	5	8	3	-	-	-	-	-	-	-	-	6	-	6	5	4	5	7	8	9+	9	9	9	-
VP2 = 08	9+	6	-	-	-	-	-	-	-	-	-	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
P4 = 09	9+	8	2	-	-	-	-	-	-	-	-	9+	-	1	8	9	9	9	8	3	8	1	9	-
HC = 10	8	-	-	-	-	-	-	-	-	-	-	-	9	5	4	4	2	-	-	-	-	5	8	-
PY1 = 11	8	3	1	-	-	-	-	-	-	-	4	8	9	8	8	8	8	9	9	9+	9+	9+	9	-
CE = 12	9	6	1	-	-	-	-	-	-	-	-	8	9	9	8	8	8	9	9	9	9+	9+	9+	9
LU = 13	9	5	-	-	-	-	-	-	-	-	-	9	9	9	8	8	8	8	9	9	9+	9+	9+	9+
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	2	3	3	4	2	3	1	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	2	6	8	8	8	8	7	5	1	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	1	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	1	5	2	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
4X = 20	-	-	-	-	-	-	-	-	-	-	1	5	8	8	8	8	8	5	4	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	1	5	8	8	9	8	6	4	1	1*	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	1	4	5	1	1*	1	-	-	-	-	-	-	-
JT = 23	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	2*	4*	3*	1	-	-	-	-	-	-	-	2
JA1 = 25	3	-	-	-	-	-	-	-	-	-	-	-	3*	-	-	-	-	-	-	-	1	2	5	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	1	5*	3	4	2	2	2	2	-	-	-	-
DU = 27	1	-	-	-	-	-	-	-	-	-	-	-	4*	4*	4	1	1	1	-	-	-	1	4	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	4	4	5	4	2	-	-	-	-
VK6 = 29	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	2	-	-	-	1	3	-
VK3 = 30	7	4	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	4	8	7	7	-
KH6 = 31	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	9	9	9	9	6	6	-
KH8 = 32	8	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	5	9	9	9	9	9	9	-
CN = 33	-	-	-	-	-	-	-	-	-	-	-	5	8	8	8	8	9	9	9+	8	2	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	1	5	8	8	8	8	8	8	7	1	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	5	9	8	7	8	8	9	9	9	9	9	6	-	-
D2 = 36	4	-	-	-	-	-	-	-	-	1	8	9	8	8	8	9	9	9+	9+	9+	9+	9	8	-
5Z = 37	-	-	-	-	-	-	-	-	-	-	4	8	8	9	9	9	9	9+	9+	9+	9	7	5	-
ZS6 = 38	-	-	-	-	-	1	-	-	-	-	5	8	8	7	8	9	9	9	9+	9+	9	6	3	-
FR = 39	1	-	-	-	-	-	-	-	-	-	2	7	8	6	9	8	9	9	9+	9+	9	6	3	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element Yagis at 60 feet at each station.

ARRL DX SSB 10m

10 Meters: Mar. 2005, YCCC, for SSN = Low, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO2 = 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6 = 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W9 = 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3 = 05	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
XE1 = 06	5	-	-	-	-	-	-	-	-	-	-	-	-	1	5	6	8	8	9	9	9	8	8	8
TI = 07	5	-	-	-	-	-	-	-	-	-	-	-	2	6	8	8	9	9+	9+	8	9+	9	9	9
VP2 = 08	1	-	-	-	-	-	-	-	-	-	-	-	2	5	2	3	5	6	7	6	5	4	4	4
P4 = 09	4	-	-	-	-	-	-	-	-	-	-	-	6	8	8	9	9	9	9+	9	9	9	9	9
HC = 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
PY1 = 11	-	-	-	-	-	-	-	-	-	-	-	-	1	2	4	6	8	8	8	8	6	5	5	5
CE = 12	1	-	-	-	-	-	-	-	-	-	-	-	2	5	2	3	5	6	7	8	7	6	6	6
LU = 13	1	-	-	-	-	-	-	-	-	-	-	-	4	4	3	4	6	7	8	8	6	6	6	6
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA3 = 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UN = 17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA9 = 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UA0 = 19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4X = 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HZ = 21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU = 22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JT = 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VS6 = 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JA1 = 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HS = 26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DU = 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YB = 28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK6 = 29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK3 = 30	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KH6 = 31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KH8 = 32	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	-	-
CN = 33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SU = 34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6W = 35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2 = 36	-	-	-	-	-	-	-	-	-	-	1	2	1	3	5	6	7	6	3	-	1	-	-	-
5Z = 37	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	1	1	-	-	-	-	-	-
ZS6 = 38	-	-	-	-	-	-	-	-	-	1	2	1	2	3	5	6	-	-	-	-	-	-	-	-
FR = 39	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	1	-	-	-	-	-	-
FJL = 40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Long path

Expected signal levels using 1500W and 4-element Yagis at 60 feet at each station.