



Duane C. Frymire, L.S.
Land Boundary Consultant

1283 Bear Creek Rd.
Woodgate, NY 13494
Phone/fax - 315-392-2384
Cell - 315-281-3926
Email - dcfpls@hotmail.com

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JAVAD, GNSS

RE: FCC Licensing

Dear Javad:

I haven't found good information on FCC licensing for RTK. I do know that fines are substantial and can be levied against the company as well as users. I've put together these instructions, but may have missed something or maybe it's not the best advice. But I hope it is helpful in some small way. Please feel free to modify with better information or corrections. I'm no expert at this, but I think users need some guidance on how to use the radios properly within the regulatory framework.

It might be a good idea to include these or better instructions with the sale of RTK radios.

Or, it might be worth it to include an itinerant license and only itinerant channels with each sale (in the name of the purchaser). That would cover the company liability problem to some extent at least. This would add \$165 to the cost, plus the time it takes to fill out the online application. But once you know all the fields, the application should only take 5 minutes or so. Seems like a minimal investment to help protect the company from FCC liabilities. Users can upgrade the license through a coordinator if they so choose.

FCC Licensing for RTK Surveying

Data transmission via UHF radio for RTK surveying requires a license from the FCC (in the U.S.). There are two types of license available.

The first is an Itinerant license which users can apply for themselves via the FCC universal licensing system at <http://wireless.fcc.gov/uls/index.htm?job=home>. With this type license the user must accept all interference. It may not be the best solution in highly populated areas, but might suffice in more rural settings. The cost is \$165 for ten years, and it can be modified to the second type of license if it turns out not to be satisfactory. Note that this is not sufficient if you will be setting a fixed station at

your office that is broadcasting to a surrounding area you work in. It only covers "itinerant" use.

The second type license gets you some assigned frequencies that should relieve interference problems. These need to be assigned by a "frequency coordinator". You can modify an existing itinerant license if you already have one, but it has to go through coordination. Modification appears to be a \$100 fee to the coordinator plus \$65 FCC fee, through the following coordinator. <http://www.pcia.com/frequency-coordination-2/fee-schedule> . This link also lists companies that will assist in filling out the forms for a fee. You can simply go to one of these companies initially and have them take care of everything. That way the cost appears to be several hundred dollars. But it does eliminate costs you may incur if you make errors or mistakes in the application process. If you are in a large urban environment on a regular basis and near airports, construction projects, etc., you should probably go with one of these companies. Operating outside your license has fines, just as operating without a license does. Note that if you use this method you will still need to obtain an FRN in step one below before another party can apply for you through the online system.

How to apply for an Itinerant License for RTK Surveying:

- 1) First you need to register with the FCC and obtain an FRN number at: <http://wireless.fcc.gov/uls/index.htm?job=home>
- 2) When you receive your FRN, you return to the site and login, and you can start the application process. You may need to delete the most current JAVA on your computer and load an older version. See the help files on the site for your operating system.
- 3) Find information you will need for the application before you start it. Go to <http://www.fcc.gov/data> , click on "Search FCC Databases", click on "Equipment Authorization Search". Using the FCC ID found on the back of your radio, fill out the top two boxes and check exact match. Example from my HPT404BT:

Grantee Code = WJ4

Product Code = HPT404

Click search at bottom, then click "display grant" next to your radio.

This is where you will find your "Emission Designator". Of course there are more than one to choose from.

You will see in your user manual that the Triumph LS is set up to use "DQPSK" modulation. This is a phase type modulation (you can look these up online) that receives the letter "G" in the emission designator (although either G or F can be used). The "D" on the end means it's for data.

Go back to the page where you clicked “display grant”, and this time click “detail” under the display exhibits heading. Scroll down to the occupied bandwidth area and look in the tables at results for 12.5 kHz at the lower and upper end, in my case 406.1 and 470. Occupied bandwidth is topping out around 6.

So, my emission designator is 6K05G1D.

In this same detail report you will find the Effective Radiated Power (ERP), in this case 4.45 Watts.

4) Next we need to know which frequencies are available for licensing under the itinerant license. These are listed in the FCC rules part 90.35 limitations 10, 17, 34, but I’ll just list those I found useable for 12.5 kHz.

451.800, 451.8125, 456.800, 456.8125, 469.550 (this last is not available without coordination within 35 miles of Detroit, MI, and is limited to 35 watts).

So, there will be five to choose from and you would use the Triumph to scan for the best channel in each location you visit.

5) Armed with the above information and your FRN, you are ready to start the application. It is fairly straight forward, and you can check for errors before you submit. The process can take up to 90 days or so, but the rules seem to suggest that you can begin using the radio 10 days after you submit your application. Some clarifications by page are below:

The Radio service = IG, for industrial business pool, conventional. Much of the application is greyed out and unavailable after you make this pick. Only the necessary stuff can be answered.

Application Information page:

Special temp authorization = no

Regulatory status = private internal users

Type of service = mobile and non-common carrier

Control Point page:

Even though itinerant, you need a control point. Just use your office or home.

Administration page:

Activity = describe the activity enough to prove the use, in this case itinerant. Something like “RTK surveying at varying locations throughout.....” NOTE: my

initial application was held up for the reason they wanted elaboration on this. I wrote a full page and submitted it as an attachment in the ULS.

Associated call sign = If you don't have one leave it blank, they will assign you one.

Location page:

Location description = Itinerant

Area of operation = whatever you described under activity. There is no difference in cost between county, state, nation.....

Frequency coordination with Canada = No. If you go with a coordinated license and work within 70 miles of Canada you would need this.

Antenna page:

You don't do anything here because you will not have a fixed site antenna.

Frequency page:

Pick the one antenna and then hit the add button.

Lower or center = type in one of the five frequencies from above

Upper = leave blank

Carrier = leave blank

Station class = MOI

No. Units = 1

No. paging receivers = leave blank

Output power = whatever your radio is. From my example it is 4.

ERP = whatever you found in above steps. My example it is 4.45.

Repeat for each frequency.

You should now see them listed. Pick on them one at a time, and click the add emission designator button toward bottom of page. Type in the emission designator you found in above steps. In my example it is 6K05G1D.

Check for errors before you submit. And you must pay in order for the submission to go through. You can come back and work on the application before submitting. You have 30 days to complete and submit it.

Sincerely,

Duane C. Frymire, L.S., E.J.D.
NY Land Surveyor Lic. # 050224
Executive Juris Doctor