

CodeRunner FCC LICENSING

At long last, with its Report and Order in November of 2002, the FCC has authorized digital and digital/analog composite radios to operate in the 7 GHz and 13 GHz Auxiliary Broadcast bands. The CodeRunner can be configured as either an analog radio or a digital radio and needs to be licensed accordingly. MRC has created emission designators based on the FCC guidelines. As a result of the new rules, the FCC 601 Form and Schedule I are the only documents needed for licensing. Prior to the recent ruling, a 601, Schedule I and a request for Special Temporary Authorization (STA) were required. This paper will detail how to fill out the 601, now that the FCC Rules allow it.

The 601 Main Form (4-pages)

Upon initial study, the forms, instructions and supporting schedules appear quite menacing and complex. The total document and instructions total 103 pages. One must understand that the 601 is a universal licensing form to be used by many services and for many purposes.

For the Auxiliary Broadcast Microwave Service, only the following sections apply:

Form 601 Instructions (22 pages)

Main Form 601 (4 pages)

Schedule I Instructions (18 pages)

Schedule I Form with supplements (5 pages)

So we are down to 40 pages of instructions and only 9 pages of forms. MRC will take you through each item number of each form that pertains to filling out a CodeRunner license application for digital service.

Main Form 601 Item-by-item entries: Read the instructions (22-pages) for more guidance

Item 1 Radio Service Code – Select the appropriate code from the following list:

TI – TV ICR

TB – TV Microwave Booster

TP – TV Pickup

TS – TV STL

TT – TV Translator Relay

It is likely to be TV Pickup.

Item 1a Existing Radio Service Code – Select from the same above list if you are changing from one type of radio service to another.

Item 2 Application Purpose – Select only one. It will most likely be **NE – New** or **MD - Modification**

Items 3a through 6 – Self explanatory

Item 7 – Application is considered a major modification if it is a modification of an existing analog license. MRC attempted to convince the FCC to make it just a minor modification but the FCC disagreed.

Item-by-item entries (continued):

Item 8a Does this filing request a Waiver of the Commission’s rules? – Answer “No”

Item 8b Not applicable if no Waiver is requested

Item 9 Answer “Yes” or “No” as appropriate

Items 10 through 34 – Routine Applicant Information

Item 35 Regulatory Status – Check “Broadcast Service” box

Item 36 Type of Radio Service – Check both “Mobile” and “Broadcast Service”

Item 37 Interconnected Service – Answer “Yes” or “No” as appropriate

Items 38 through 52 – Answer or sign as appropriate

FCC 601 Schedule I Item-by-item entries: Read the instructions (18-pages) for more guidance

Administrative Information:

Item 1 – Answer appropriately “Yes” or “No”

Items 2a and 2b – Answer if applicable

Item 3 Type of Operation – Check “Temporary Fixed/Mobile”

Item 4 Station Class – Select “MO” or “MO5” whichever is appropriate from the following:

Fixed – FXO

Temporary Fixed – FX5

Mobile – MO

Mobile & Temporary Fixed – MO5

Item 5 – Not Applicable

Item 6 – Answer “Yes” or “No” as appropriate

Item 7 Frequency Coordination – For new station applications, formal PCN is now required through a professional coordination service such as Comsearch, Spectrum Planning, Consolidated Spectrum Services, etc. However, local area self-coordination is still allowed for TV Pickup stations.

Items 8 through 11 – Fill in using the information supplied from your local area frequency coordinator. If self-coordinating, so indicate.

Item-by-item entries (continued):

Items 12 and 13 – Fill in if appropriate

Items 14 through 16 Technical Point of Contact – Indicate “A” (add) or “M” (modify) as appropriate and fill in the location and telephone number information.

FCC 601 Schedule I Supplement 1 – Location Data

The FCC ruling has not changed this section.

FCC 601 Schedule I Supplement 2 – Path Data

The FCC ruling has not changed this section.

FCC 601 Schedule I Supplement 3 – Passive Repeater Data

The FCC ruling has not changed this section.

FCC 601 Schedule I Supplement 4 – Frequency Data

This page contains the crux of the changes brought about by the FCC rulemaking. The CodeRunner radio can be set up either as an analog or digital radio.

Item 1 Transmit Location Name – Fill in as you have done before for TV Pickup facilities. It is permissible to be vague and use terms such as “various” or “San Francisco Bay Area” for example.

Item 2 Path Number – Not applicable to Mobile or TV Pickup operation.

Item 3 Frequency Information – Fill in as appropriate – **A (Add)** or **M (Modify)**. The FCC requires individual entries for each type of modulation the CodeRunner is expected to operate with. Thus both analog FM and digital COFDM listings are required. Page 5 of 601 Form Supplement I has room for 5 different entries. Typically, you would make just 2 entries – one for analog and the other for digital operation. Even though CodeRunner can be configured for several types of digital modulation, we suggest you list only the types you will be using *most of the time*.

Item 4 Lower or Center Frequency (MHz) – For 2/2.5 GHz and 6.5 GHz BAS applications, use the Center Frequency. For example, 2 GHz channel 3 (A3) has, as its band edges, 2025 and 2042 MHz. Although it can be defined by its band edges, the FCC prefers to use its Center Frequency, which is 2033.5 MHz. This should be entered in the Item 4 box. To avoid confusion, it is recommended that the words “Lower or” be crossed out.

Item 5 Upper Frequency (MHz) – Put in “NA” (not applicable).

Item 6 Tolerance (%) – For CodeRunner, fill in “+/- 0.0005”

Item 7 EIRP (dBm) – This is the effective isotropic radiated power (rounded to one decimal place) radiated off the transmitting antenna and expressed in dBm (dB above 1 milliwatt). Refer to the CodeRunner Data Sheet for the power output in the desired frequency band and in the desired type of service. For example, a 2 GHz CodeRunner transmitter has a +41 dBm (12-watt) analog output whereas for a digital CodeRunner operating QPSK, the power output in the 1.9-2.1 GHz band is +38 dBm (6-watts).

Item-by-item entries (continued):

Starting with the transmitter output power, subtract all losses between it and the antenna. Do the entire math in either dBms or dBs. Here is an example:

Analog transmit power is 12 watts (+41 dBm). Coax loss between the RF amplifier and antenna is typically 1 dB. Thus at the antenna, the power level is +40.0 dBm. Now add the antenna gain. For a ProStar 2A20 antenna, its gain is 20.0 dB at mid-band. That number added to +40.0 dBm gives a final EIRP of +60.0 dBm. This could also be expressed in decibels above 1 watt. That number would be +30.0 dBw.

Item 8 Emission Designator – For analog service, the correct entry for the CodeRunner is **17M0F8W**. For COFDM digital service using QPSK, the correct entry for the CodeRunner is **17M0W7D**. If and when the 2 GHz ENG band is split into 14 MHz, 12 MHz or smaller channels, the first part of the designator will be changed.

Items 9 and 10 – Not Applicable for analog service. Enter **“N/A”**. For digital service, enter the baseband data rate as expressed in Kbps. They are looking for the total data rate and not just the payload data rate. For example, a typical COFDM ENG signal operates at approximately 12 Mbps total data rate with actual payload data rate typically in the 4 to 6 Mbps area with 1/2 forward error correction (FEC) and 1/4 guard interval adding the rest. Enter **“12000”** in Column 9. Enter the digital modulation type in Column 10. For the planned service, enter the modulation type **“QPSK”** in Column 10 as this is what will normally be used.

Item 11 Transmitter Manufacturer – Enter **Microwave Radio Communications**

Item 12 Transmitter Model – Enter **CodeRunner**

Item 13 Automatic Transmitter Power Control – Enter **“No”**