Please keep your signals clean in RSGB Contests

Every year we get many complaints from RSGB Contest entrants about the signals radiated by their competitors. We only have limited bandwidth for our contests, and we also share the bands with other users, therefore it is important that we maintain clean signal quality and are prepared to listen if we receive comments about our signals.

The ARRL have been campaigning to improve amateur signals with a "Clean Signal Initiative" and they have identified several root causes of poor-quality signals:

1. Over the years, transmitter signal purity has lagged behind receiver performance.
2. Solid-state amplifiers often exhibit compromised linearity compared to vacuum tubes.
3. Transmitted composite noise levels are sometimes too high.
4. Intermodulation distortion (IMD) from misadjusted speech and data modulation in transmitters can be too high.
5. Keying artifacts (clicks) are a problem in some transceivers, especially if misadjusted.

We have produced this simple guide to help you adjust your transmissions to avoid these conditions. This is intentionally quite short and so can't cover all situations but is intended to provide helpful guidance. Problems can be mode-specific or general across all modes, so some of the advice is repeated for multiple modes.

There are sometimes specific signal quality challenges at VHF – especially for well sited, high-power stations. These have been well covered in specific articles, and you'll find links to these in the November 2025 Contesting Column in RadCom.

CW

- Avoid fast rise and fall time waveforms. Where a selection of CW keying rise and fall times is available, 6ms or longer is normally adequate for all normal contest speed CW and will provide the cleanest signals. These are sometimes not the default settings but modern Yaesu, Icom and Kenwood radios usually provide the option to adjust this.
- Elecraft radios do not provide adjustment but have clean keying waveforms by default
- Some older radios do not have adjustable rise and fall times and may cause clicks. For example - the Yaesu FT1000MP has a well-documented key click issue, with a fix documented by W8JI at https://www.w8ji.com/keyclick_mp.htm.
- Do not overdrive a linear amplifier - if you see no increase in output power while increasing drive power, you should reduce drive power until output power starts to drop.

SSB

- Minimize any part of the audio signal below about 400 Hz and do not waste bandwidth by transmitting sound above 3kHz. For example, for recent Yaesu radios select 300-2700Hz for the transmit bandpass filter.
- Do not enable ESSB or wide filters for SSB transmit.
- Set audio compression so that it indicates no more than 10-15dB on voice peaks.
- Check that your ALC settings are within the levels defined by the manufacturer.
- Listen to your audio off-air if possible, to check its quality (using a true off-air monitor function) – and then get a knowledgeable trusted station, with whom you are a strong signal, to check the signal – both on and around your frequency for evidence of splatter.
- If using a solid-state linear amplifier, don't drive it to its absolute maximum of output power. It's difficult to be specific because different amplifiers are built with differing levels

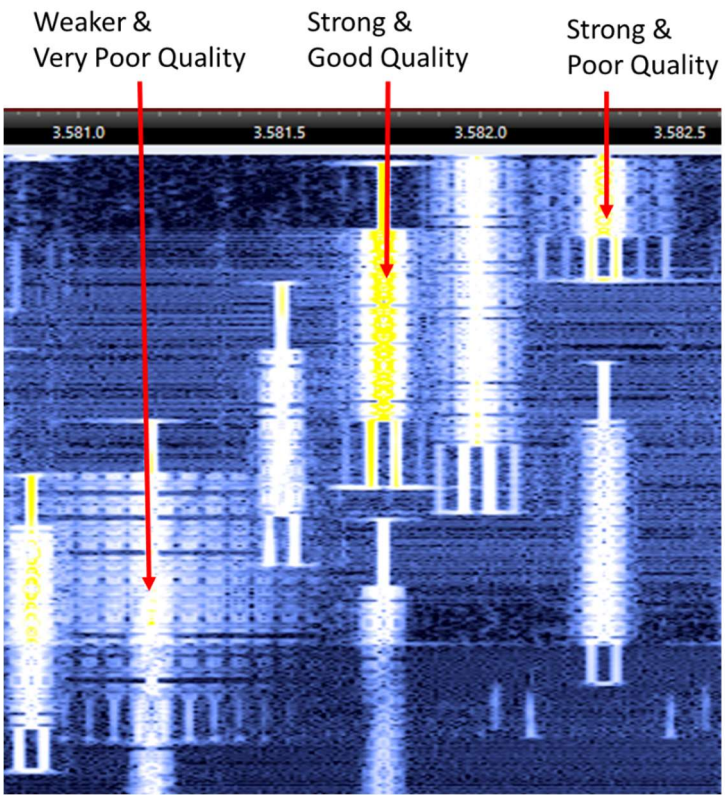
of headroom, but as a guide do not exceed 1kW output for amplifiers with single 1.8kW class LDMOS transistors and correspondingly less for smaller devices.
- For a valve amplifier the reduction needed is typically smaller and quite device dependant. As a guideline, a single good 3CX800 or GU74b can deliver about 1kW cleanly. A single 3-500Z or a pair of 572Bs about 500W. Don't exceed these sorts of level. Make sure your amplifier is correctly tuned and loaded and worn-out tubes are replaced or run at reduced power.
- If your equipment supports 'Pure Signal' transmitter linearisation (typically in modern SDR based radios) – go ahead and turn this on – it makes a big difference to near-in signal quality.

FT4/FT8

- Ensure that audio compression or processing is turned off.
- Adjust the audio drive levels from the computer to the radio and MIC/LINE gain settings so that you are **just** at or below the point where power stops increasing with additional audio input. Keep the audio drive levels low enough to stay out of Automatic Level Control (ALC) operation. You may need an attenuator between the computer and radio to achieve this.
- Set your transmit tones to be in the range 1500 Hz – 2000 Hz– this will ensure that any audio harmonics are rejected by the SSB transmit filter in the radio. You will need to use the 'Fake It' or Split function found under Settings… Split…in WSJT.
- If your radio supports it – turn on transmitter audio filtering to further suppress spurious noise from the computer.

PSK63

- Ensure that audio compression or processing is turned off.
- Adjust the audio drive levels from the computer to the radio and MIC/LINE gain settings so that you are **just** at or below the point where power no longer increases with additional audio input. Keep the audio drive levels low enough to stay out of Automatic Level Control (ALC) operation.
- Set your transmit tone to be in the range 1500 Hz – 2000 Hz– this will ensure that any audio harmonics are rejected by the SSB transmit filter in the radio.
- If your radio supports it – turn on transmitter audio filtering to further control spurious noise from the computer.
- PSK is particularly easy to overdrive and generate intermodulation products and needs particularly careful adjustment of drive levels. If you can observe your signal on a local SDR or a Web SDR, do so and keep your drive levels low enough to keep the signal narrow. The diagram below shows some real examples from an 80m CC contest of good and poor quality PSK63 signals. The wide signals are particularly noticeable during the idle tones period present at the start of each transmission. If you can measure it – a good target is for the intermodulation products to be 30dB down on the main signal.
- If you are using an amplifier, all the same guidelines around de-rating from full power for SSB apply here.



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RTTY

- Adjust the audio drive levels from the computer to the radio and MIC/LINE gain settings so that you are **just** at or below the point where power no longer increases with additional audio input. Keep the audio drive levels low enough to stay out of Automatic Level Control (ALC) operation.
- Set your transmit tone to be in the range 1500 Hz – 2000 Hz– this will ensure that any audio harmonics are rejected by the SSB transmit filter in the radio.
- If your radio supports it – turn on transmitter audio filtering to further suppress spurious noise from the computer.