

# **Icom IC-7610 with RF Kit RF2K-S LDMOS Amplifier**

## **Evaluation of DPD & Non DPD IMD Performance Using White Noise Source**

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## **Introduction**

Recent firmware for the Icom IC-7610 incorporates a Digital Predistortion (DPD) capability. This provides for improvement in transmitted phone signal quality, obtained by predistorting the analogue output from the TX D/A converter via a transfer function the inverse of that inherent in the later analogue RF amplifier stages of the transceiver. This capability is provided in the IC-7610 at firmware revision 1.41.

## **Test Setup**

IC-7610 S/N 23002453 F/W 1.41

Evaluation was undertaken using DL1JM's white noise audio test file available from the Files area of the group as follows:

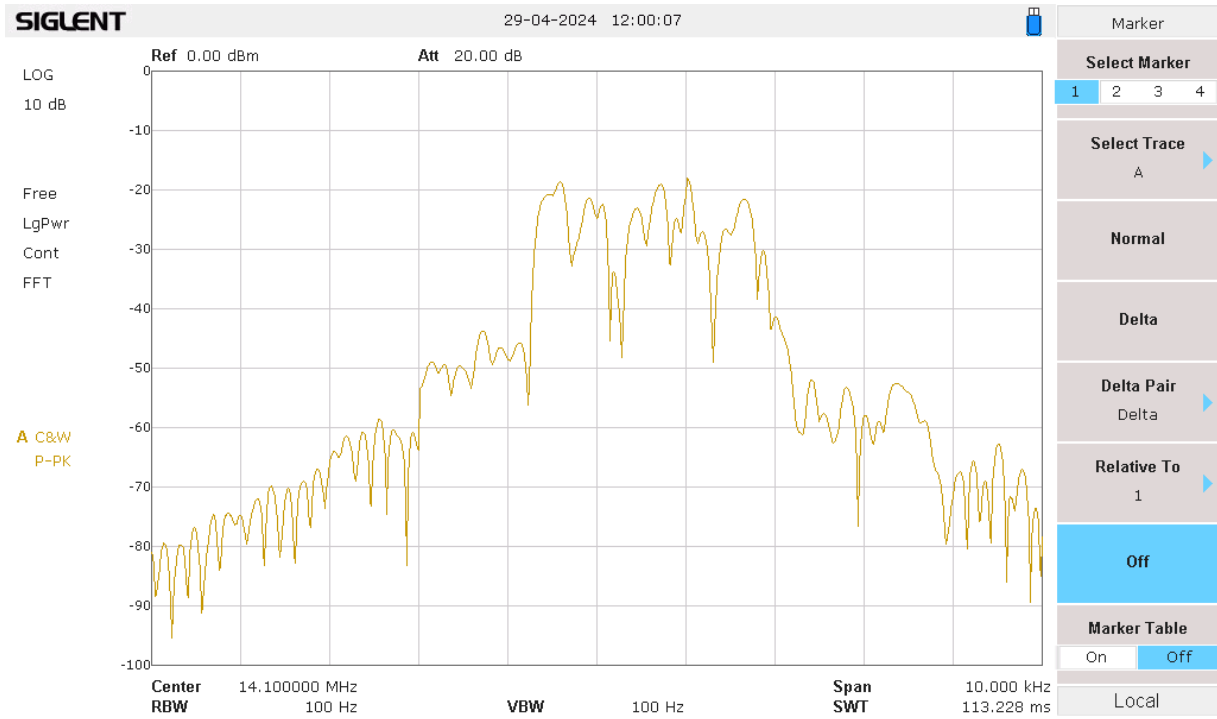
<https://groups.io/g/ic-7610/files/DL1JM%27s%20TransmitAudio%20Test%20Files>

Transmit bandwidth was set to maximum and the compressor was turned off.

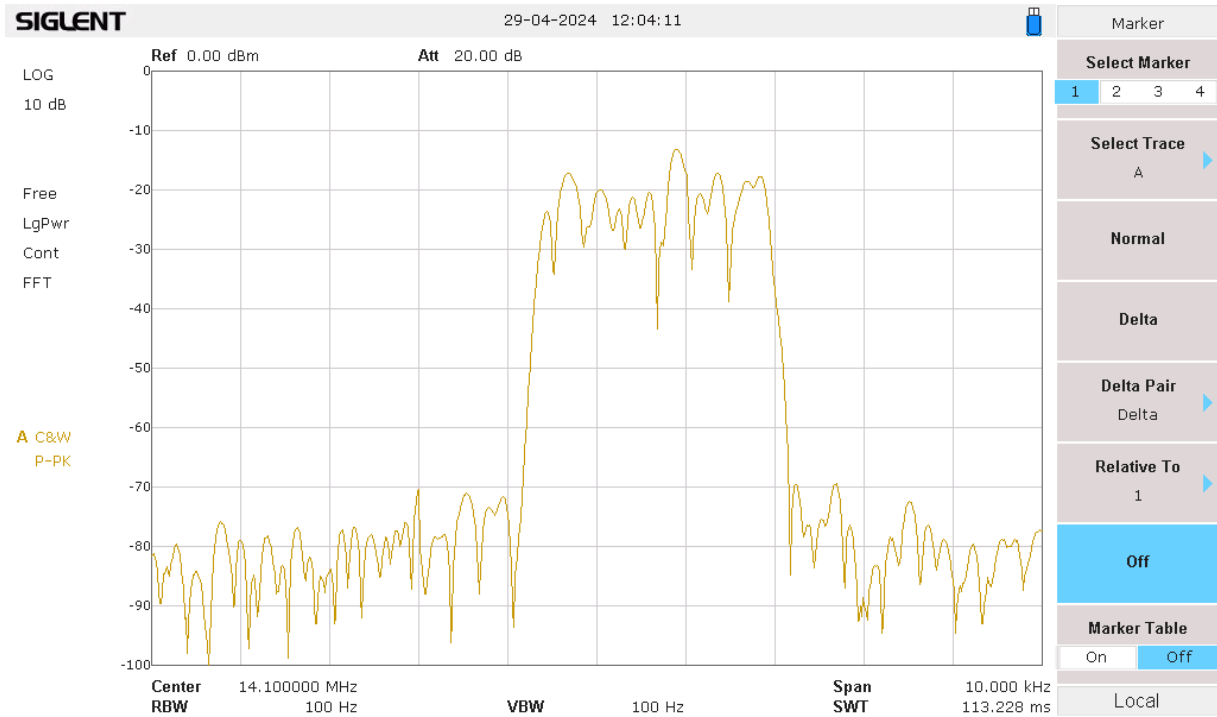
Output in all cases was fed to a high power dummy load with built-in monitor port to which a Siglent SSA3021X spectrum analyser was connected. The plots incorporated in this report were output directly from the Siglent analyser.

PEP output levels were set and measured using an N8LP LP-500 station monitor.

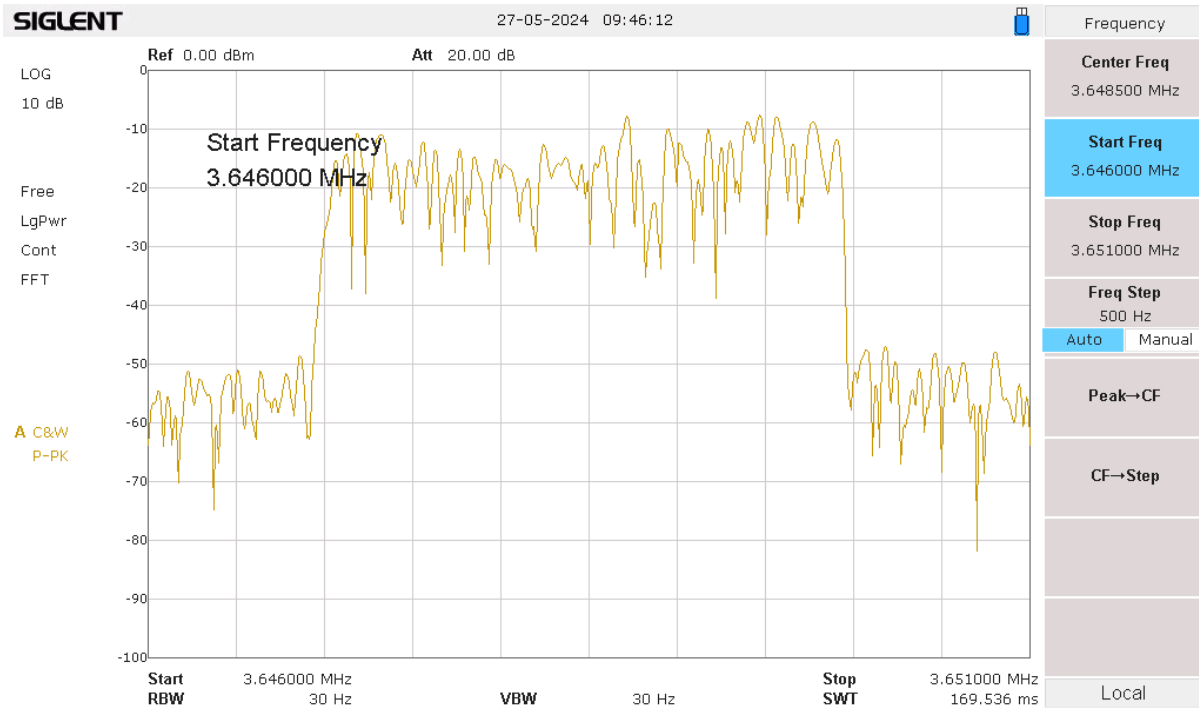
# 1. IC-7610 Barefoot 100W No DPD



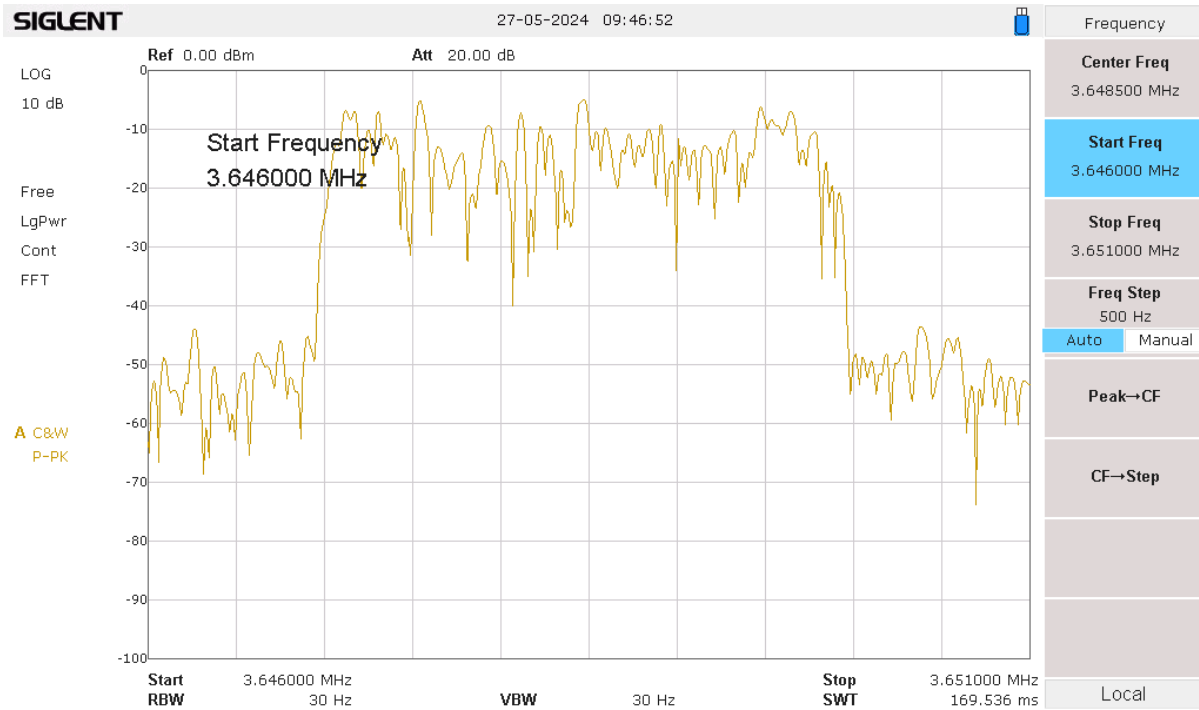
# 2. IC-7610 Barefoot 100W DPD Enabled



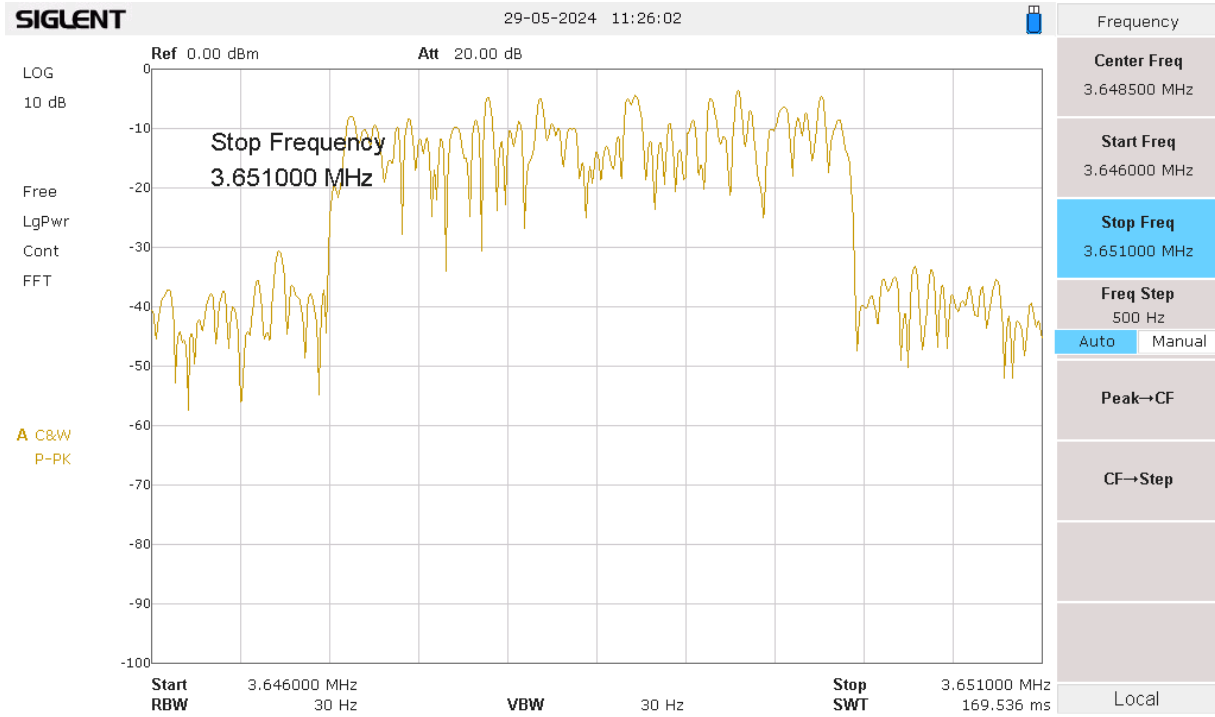
### 3. IC-7610 DPD Enabled +RF Kit RF2K-S @ 900W PEP



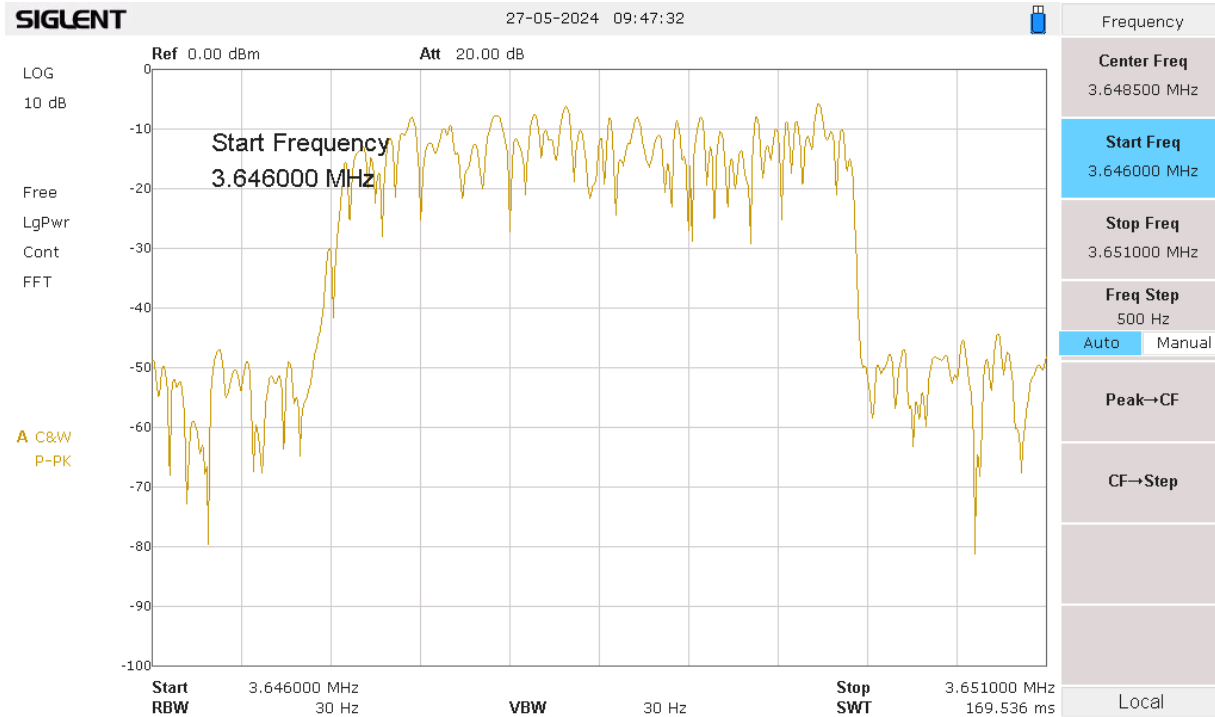
### 4. IC-7610 DPD Enabled + RF Kit RF2K-S @ 1200W PEP



## 5. IC-7610 DPD OFF + RF Kit RF2K-S @ 1500W PEP



## 6. IC-7610 DPD Enabled + RF Kit RF2K-S @ 1500W PEP



## Summary

1. Using a White Noise source the IMD performance of the IC-7610 was assessed, firstly barefoot at 100W PEP output without DPD enabled. IMD products were generally <-30dB with a few on the low side at only -25dB.
2. Test conditions were unchanged except IC-7610 DPD was enabled. IMD significantly improved to <-50dB.
3. The IC-7610 with DPD enabled drives an RF2K-S to 900W PEP output. The RF2K-S is outside the DPD loop. Output IMD is -40dB.
4. The IC-7610 with DPD ON drives the RF2K-S to 1200W PEP output. IMD is maintained at -40dB.
5. The IC-7610 with DPD OFF drives the RF2K-S to 1500W PEP output. IMD at around -30dB is defined by the source.
6. The IC-7610 with DPD ON drives the RF2K-S to 1500W PEP output. IMD returns to -40dB now defined by the RF2K-S.

## Conclusion

LDMOS amplifiers are not created equal! The RF Kit RF2K-S benefits significantly from IC-7610 DPD despite being outside the correction loop. At 1500W PEP a full 10dB improvement in output IMD is realised when IC-7610 DPD is turned on.

Thank you Icom!