VHF drivers for Microwave local oscillators

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History

1. My DEMI xverter drifts on 1296 EME (but 10G one doesn't!). Need to fix especially for JT65c
2. Been looking at DMK type circuits for a while; unexpectedly poor phase noise
3. WA1ZMS had given presentation at Martlesham Round Table on 134GHz equipment which renewed my interest in solving the problem using Direct Frequency Synthesis
Generic DFS

OUTPUT = (C * R) + (R * B / A)
DFS9096 Block Diagram
First wanted to try 90MHz multiplier/filter circuit of WA1ZMS design.
Multiplier Prototype

With mod amp 10dBm in at 10MHz gave 13.8dBm at 90MHz.
With crystal filter could be used as driver for 2304/144 Local oscillator
90MHz Mult/Filter/Amp output

Note: Stray signals around 90MHz are VHF Broadcast stations (due to lack of screening)
74F161 Divider

A, B, C, D pulled up internally, therefore preset (DCBA) = 1011 = 11.
74161 will count down from 16 to 11 = 5 before resetting.
Choose Q output that has closest to 50% duty cycle
G4DDK DFS96

96MHz Direct Frequency Synthesiser

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G4DDK Unit
WW2R DFS9096
DFS9096
6MHz signal into mixer
96MHz output from mixer

*ATTEN 20dB
RL 10.0dBm
CNT -2.33dBm
10dB/ 96.00 MHz

CENTER 96.00MHz
*RBW 100kHz
VBW 100kHz
SPAN 20.00MHz
SWP 50ms
Crystal filter improves medium and far out phase noise as well as broader spectrum.
96MHz O/P

*ATTEN 20dB
RL 10.0dBm

CNT 9.33dBm
10dB/96.00001 MHz

CENTER 96.00MHz
*RBW 100kHz
VBW 100kHz
SPAN 50.00MHz
SWP 50ms
Summary

• Technique good for some frequencies but impossible for others with 10MHz reference
• Output = (C * R) + (R * B / A )
• Easy Freqs to achieve: 92, 98, 116, 101MHz
• Harder Freqs to achieve: 106.5, 101.5, 94.75
Other Possibilities

3456/144MHz

2320/144MHz
References