EVLASynthesizers

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Local Oscillators

• 2 – 12-20 GHz per antenna
• 4 – 10-15 GHz per antenna
• Identical “Mother Boards”
• Daughter cards
Module Features

• Emphasis on Manufacturability
• Emphasis on servicing
• Labview to Calibrate / Troubleshoot
L30x Synthesizer showing Daughter Cards and MIB
Dual DDS Daughter Card
L301 Main Features

- 12 – 20 GHz EM YIG (18W @ 20 GHz)
- 256 MHz Step
- 128 MHz IF
- 512 / 128 Mhz Reference
- Phase Noise –115 dBc @100 kHz @ 14 Ghz
- ~13 fs 100 kHz to 1 Mhz
L301 Block

Phase Det → G(S) → YIG → A1 → Comb Gen

Fout = (N*512) ± 128 MHz
23 < N < 40
11.904 - 20.352 GHz
L301 Phase Noise

L301 #1


ε(f) [dBc/Hz] vs. f[Hz]
L301 Integrations

- 100 KHz – 1 Mhz
- 0.124 deg
- 21 fs
- -110 dBc @ 100 KHz
- 16 GHz
- “Bargain” reference source
L302

• 10.8 – 14.8 GHz PM YIG (3W @ 10 GHz)
• Dual Loop
• Continuous Tuning (DDS Resolution)
• 128 MHz Reference
• Phase Noise – 104 @ 100 kHz @ 12 GHz
• 38 fs (100 kHz to 1 MHz)
L302 Phase Noise

L302 #2


$\xi(f)$ [dBc/Hz] vs. $f$[Hz]
L302 Integrations

- 100KHz - 1MHz
- 0.172 deg
- 37 fS
- -97 dBc @ 100 KHz
- 12.9 GHz
- “Bargain” reference source
Software

- Common Tasks
- “Smart” Image Loading
- Cal factors stored in synth EEPROM
Phase v. Temp
L302’s v. 128 ref
Integrated Module

- Cost reduction ~$3 - $4K in quantity
- Integrated RF “Output” module.
- Sampling Mixer v. Comb gen / Mixer
- Ability to monitor actual frequencies of DDS and Microwave in L302.
- Ability to monitor frequency to >= 18 GHz in L301. (Prescaler not spec’d, but probably functional)