

LMX2531-xxxx Evaluation Board

User's Guide



November 2013

SNAU077A



LMX2531-xxxx

High Performance Frequency Synthesizer System with Integrated VCO
Evaluation Board Operating Instructions

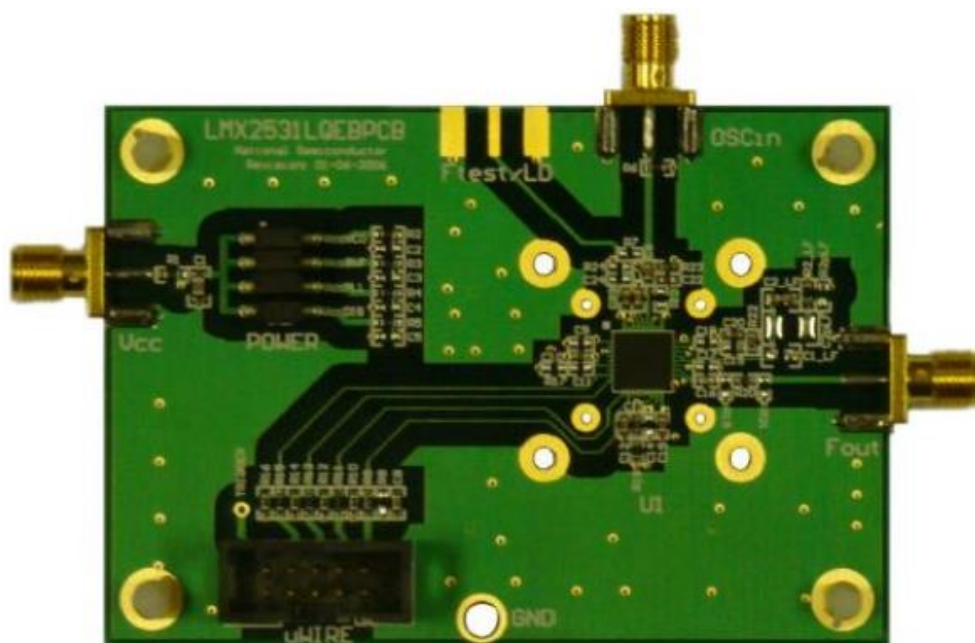


TABLE OF CONTENTS

EQUIPMENT.....	4
BASIC OPERATION.....	5
LMX2531-xxxx BOARD INFORMATION	7
APPENDIX A: SCHEMATICS.....	27
APPENDIX B: BUILD DIAGRAM.....	28
APPENDIX C: QUICK START ON EVM COMMUNICATION	30

Equipment

Power Supply

The Power Supply should be a low noise power supply. An Agilent 6623A Triple power supply with LC filters on the output to reduce noise was used in creating these evaluation board instructions.

Signal Generator

The Signal Generator should be capable of frequencies and power level required for the part. A Rohde & Schwarz SML03 was used in creating these evaluation board instructions.

Phase Noise / Spectrum Analyzer

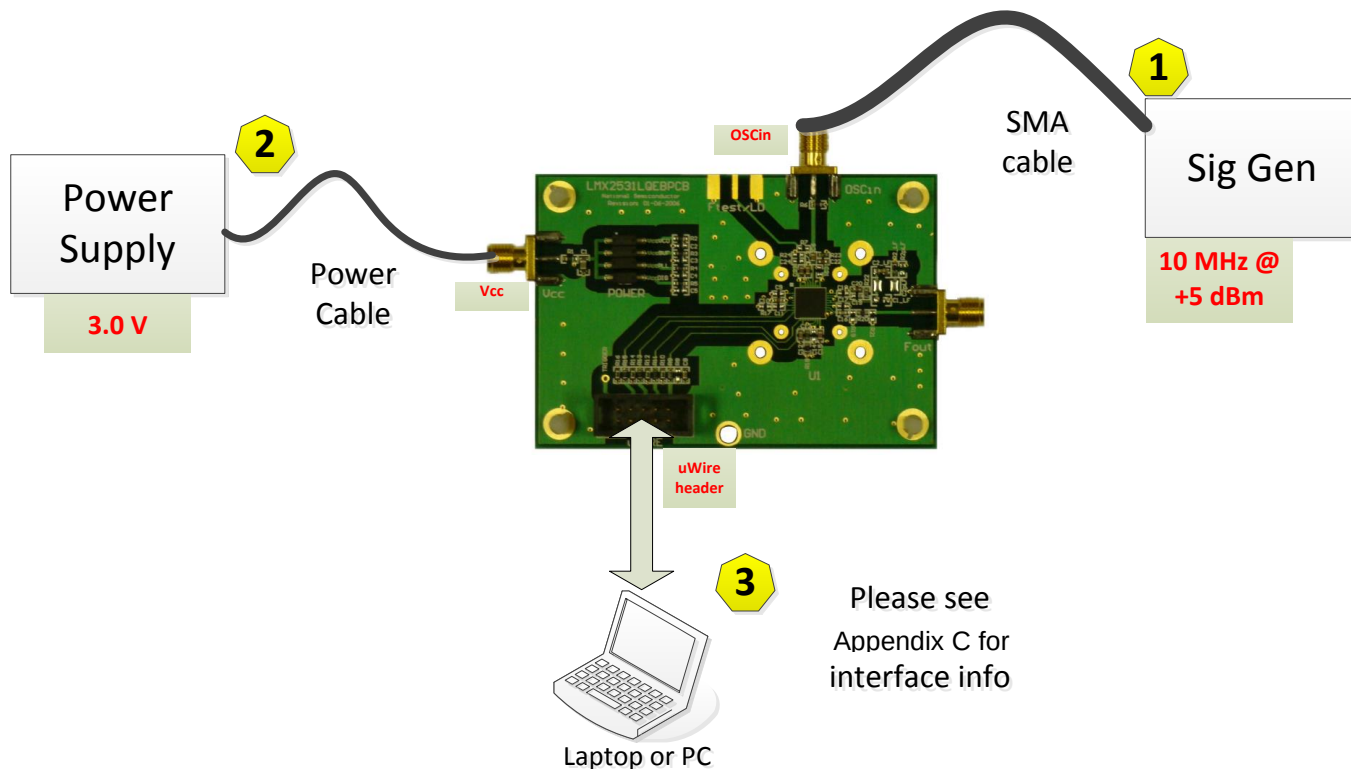
For measuring phase noise an Agilent E5052A is recommended. An Agilent E4445A PSA Spectrum Analyzer with the Phase Noise option is also usable although the architecture of the E5052A is superior for phase noise measurements. At frequencies less than 100 MHz the local oscillator noise of the PSA is too high and measurements will be of the local oscillator, not the device under test.

Oscilloscope

The oscilloscope and probes should be capable of measuring the output frequencies of interest when evaluating this board. The Agilent Infiniium DSO81204A was used in creating these evaluation board instructions.

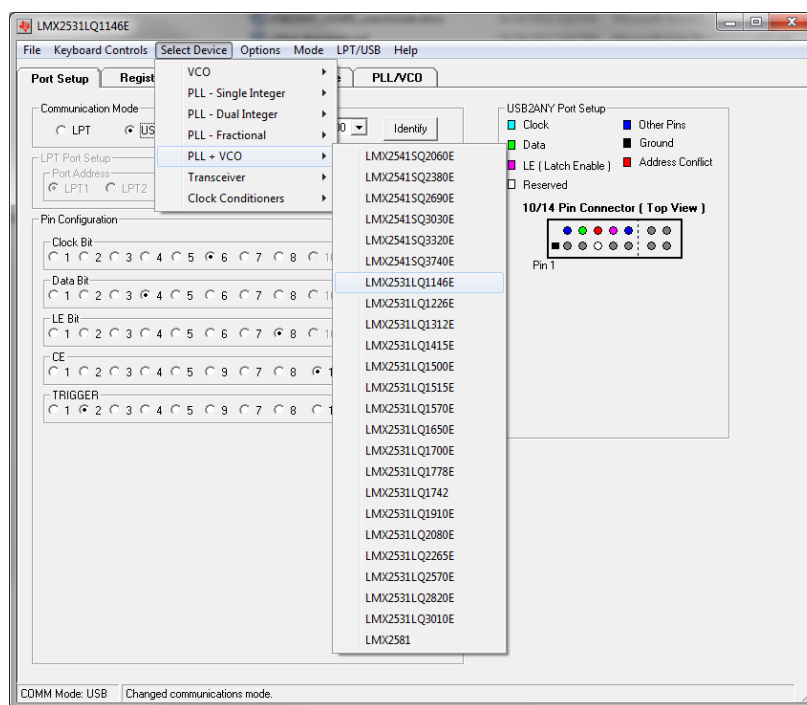
Basic Operation

1. Connect the **signal generator output** to the **OSCin** input of the board. For this example we use a 10 MHz sin signal at +5dBm power level.
2. Connect a low noise **3.3 V** power supply to the **Vcc** connector located at the top left of the board.
3. Please see **Appendix D** for quick start on interfacing the board. Connect PC to the **uWire** header.

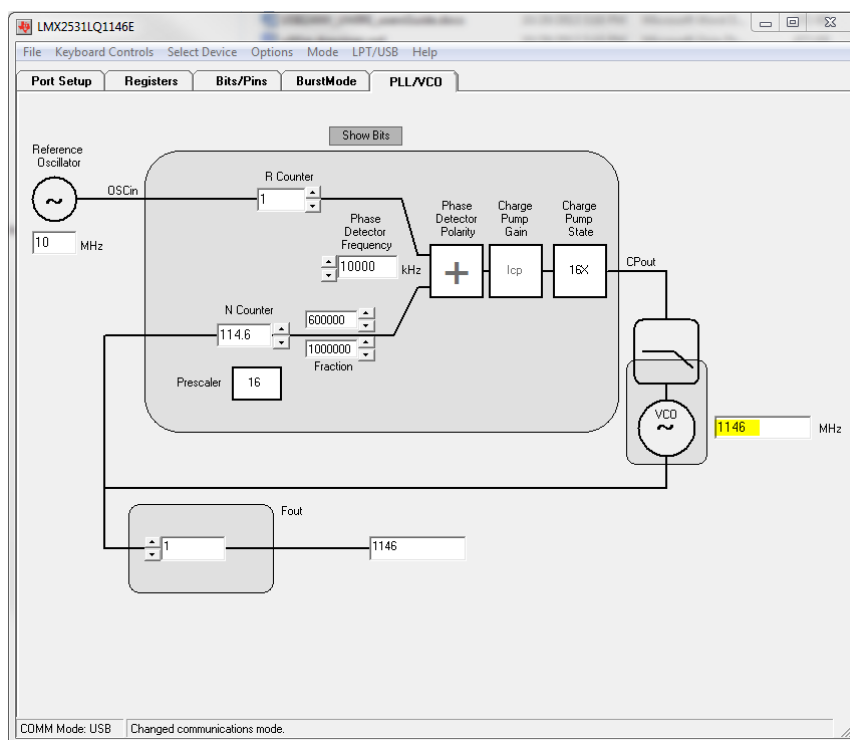


4. Start CodeLoader4.exe.
5. Select USB or LPT Communication Mode on the Port Setup tab as appropriate.

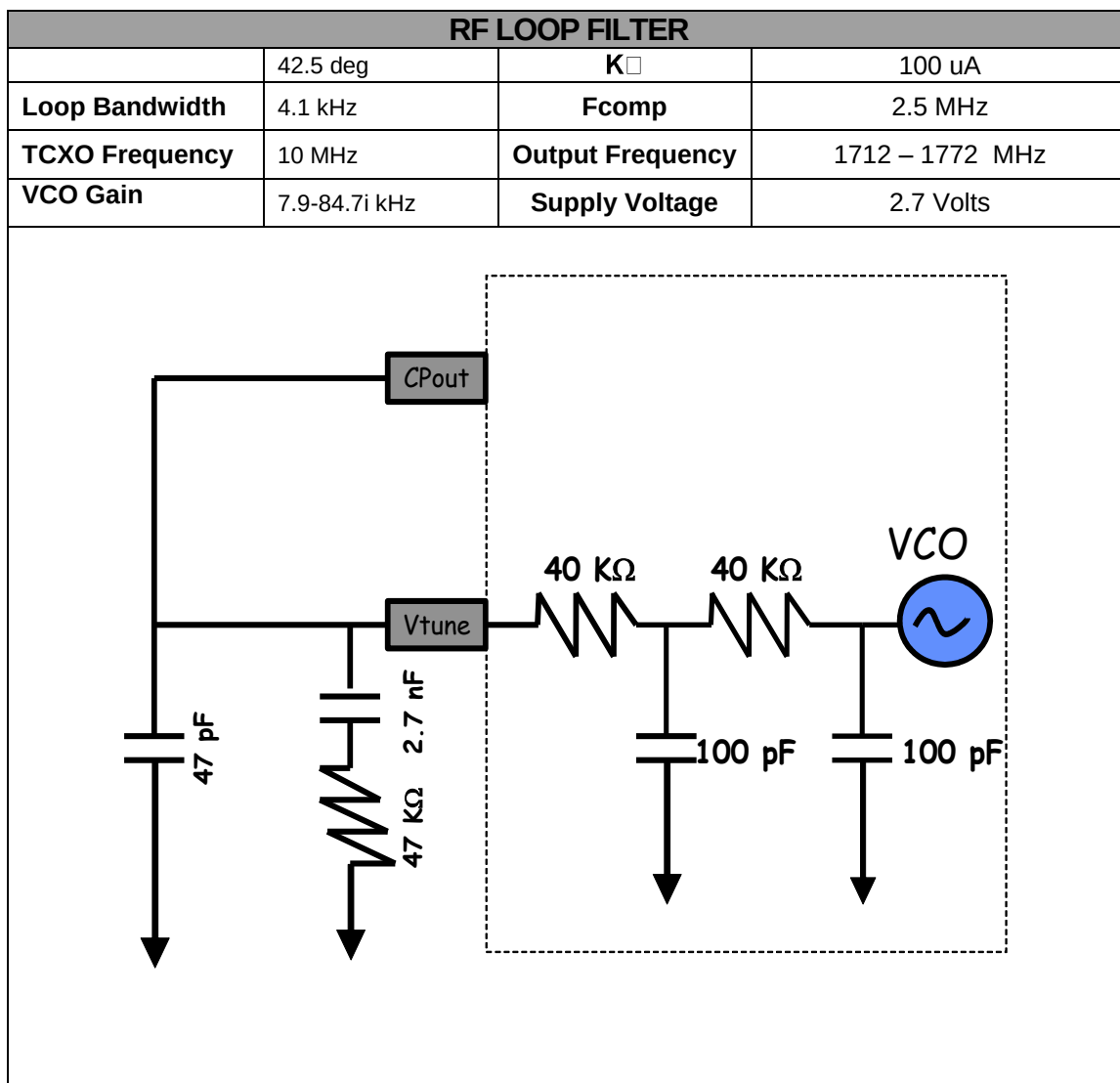
- Click "Select Device" → "PLL-VCO" → LMX2531xxxx depending on which chip is on your board.

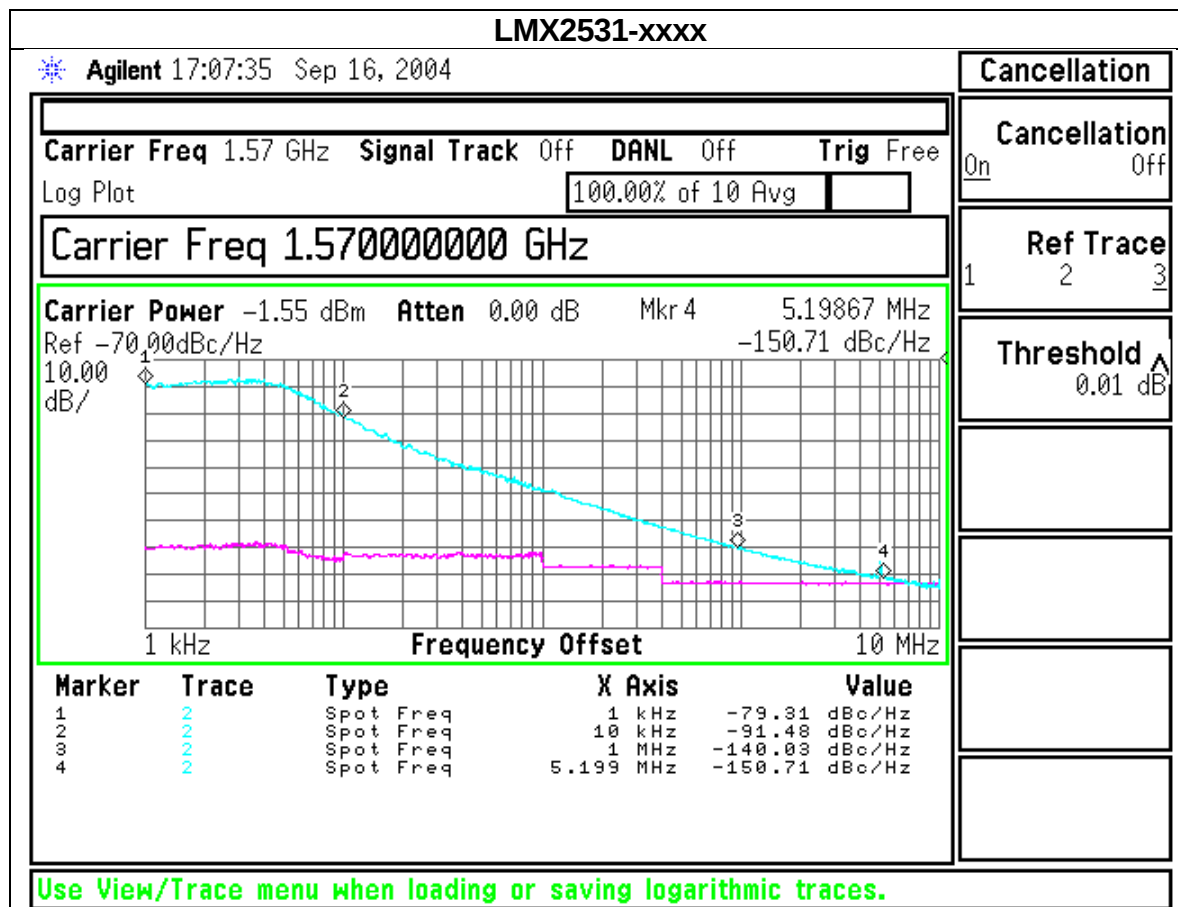


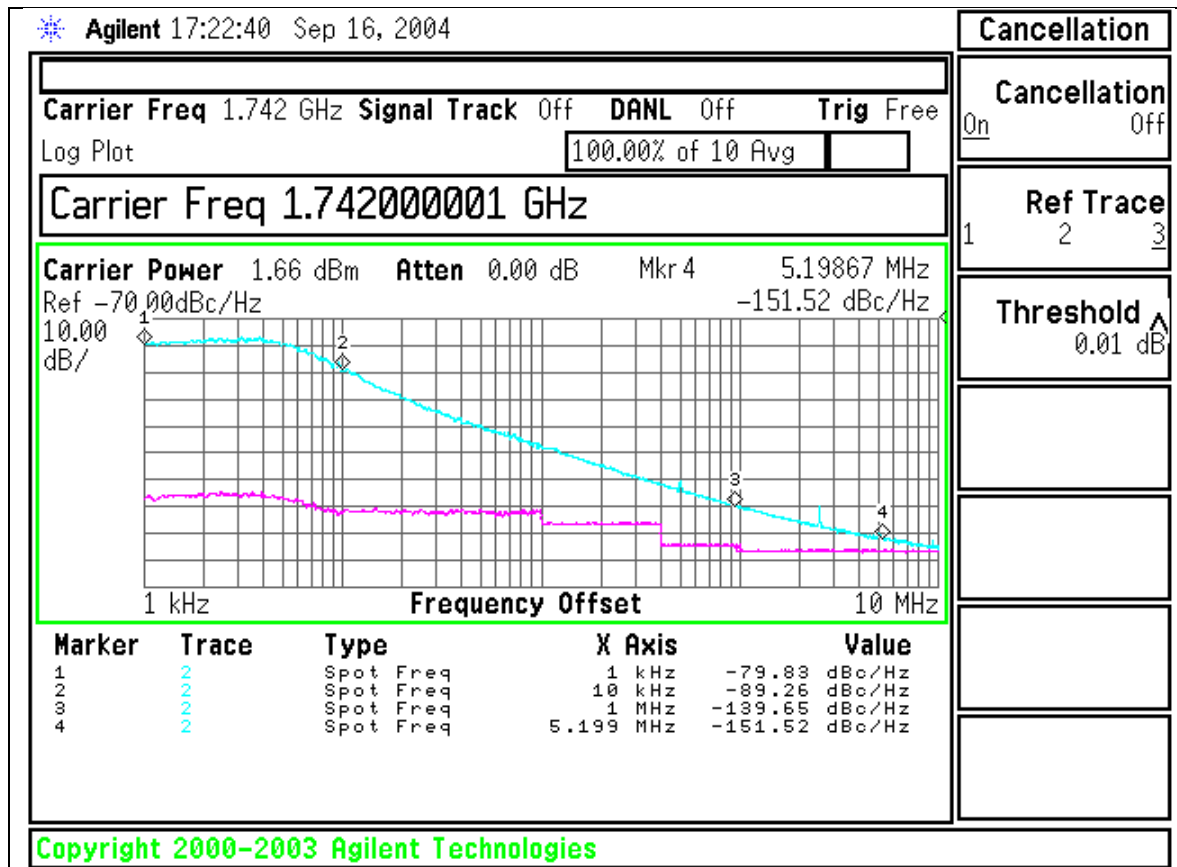
- Check your window with "PLL/VCO" Tab screenshot, 10 MHz input, but with VCO output will be different depending on which LMX2531xxxx you selected



LMX2531-xxxx Board Information







Agilent 10:26:22 Sep 17, 2004

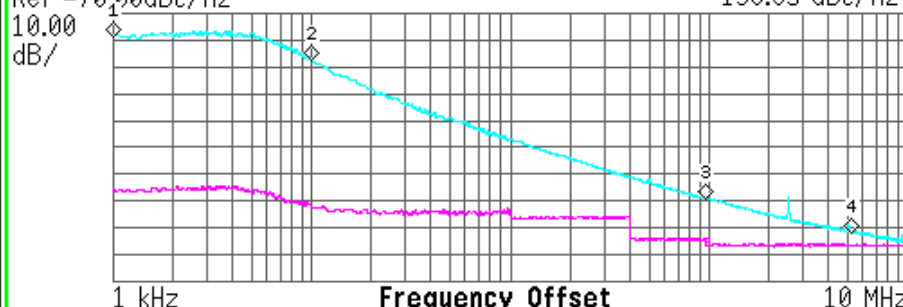
Carrier Freq 1.778 GHz Signal Track Off DANL Off Trig Free

Log Plot

100.00% of 10 Avg

Carrier Freq 1.778000000 GHz

Carrier Power 1.54 dBm Atten 0.00 dB Mkr 3 1.00000 MHz
Ref -70.00 dBc/Hz -138.95 dBc/Hz



Marker	Trace	Type	X Axis	Value
1	2	Spot Freq	1 kHz	-79.08 dBc/Hz
2	2	Spot Freq	10 kHz	-87.87 dBc/Hz
3	2	Spot Freq	1 MHz	-138.95 dBc/Hz
4	2	Spot Freq	5.199 MHz	-151.56 dBc/Hz

Cancellation

Cancellation

On Off

Ref Trace

1 2 3

Threshold

0.01 dB

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Agilent 17:34:00 Sep 16, 2004

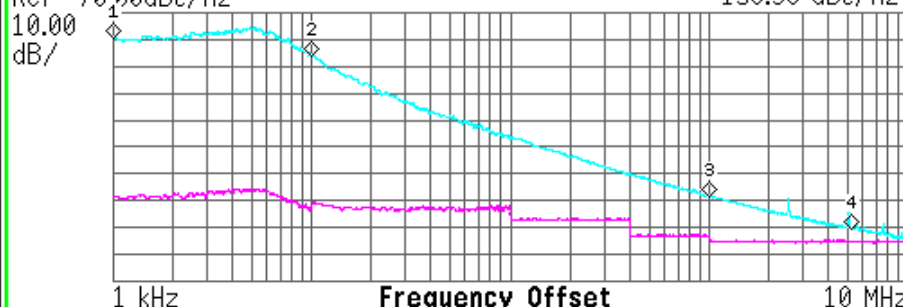
Carrier Freq 1.95 GHz Signal Track Off DANL Off Trig Free

Log Plot

100.00% of 10 Avg

Carrier Freq 1.950000000 GHz

Carrier Power 0.52 dBm Atten 0.00 dB Mkr 4 5.19867 MHz
Ref -70.00 dBc/Hz -150.36 dBc/Hz



Marker	Trace	Type	X Axis	Value
1	2	Spot Freq	1 kHz	-79.89 dBc/Hz
2	2	Spot Freq	10 kHz	-86.18 dBc/Hz
3	2	Spot Freq	1 MHz	-138.12 dBc/Hz
4	2	Spot Freq	5.199 MHz	-150.36 dBc/Hz

Cancellation

Cancellation

On Off

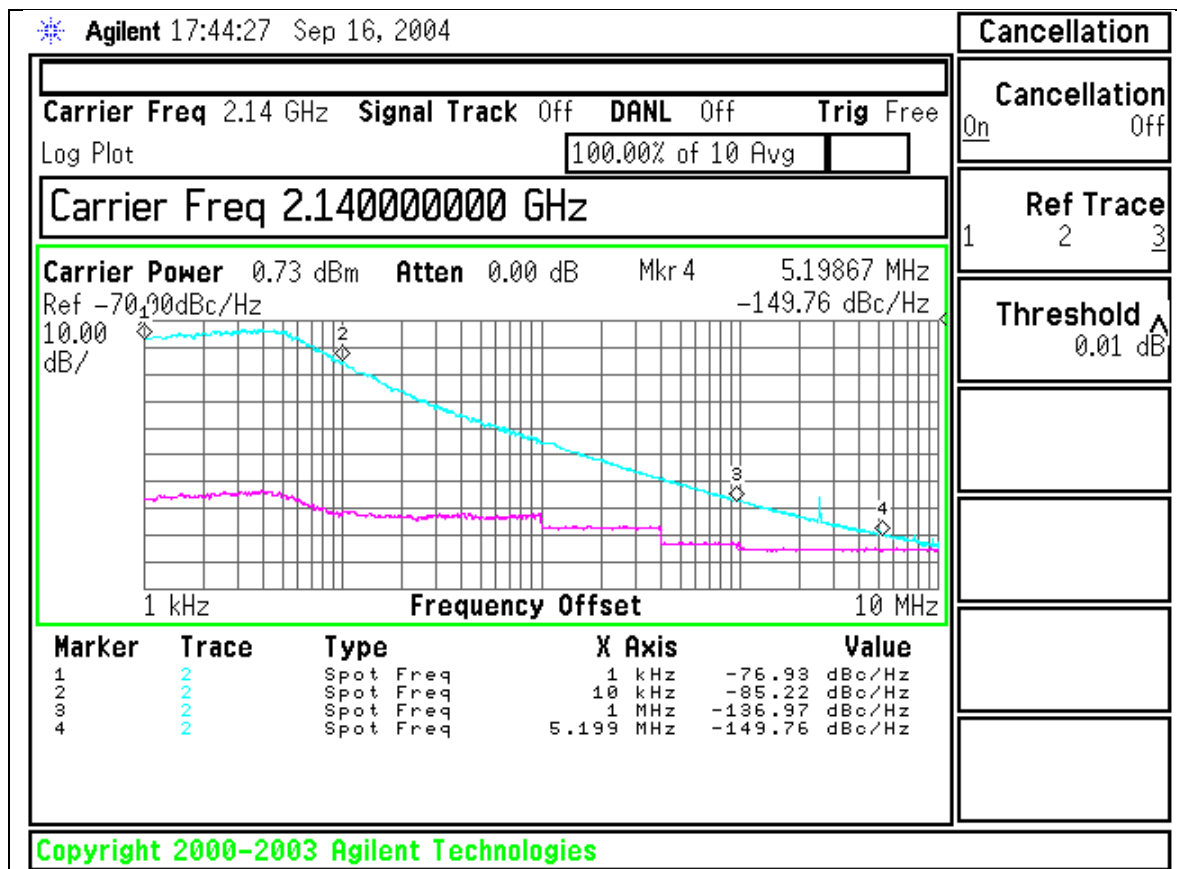
Ref Trace

1 2 3

Threshold

0.01 dB

Cancellation trace has different X-Scale to Smoothed trace.



Agilent 17:49:52 Sep 16, 2004

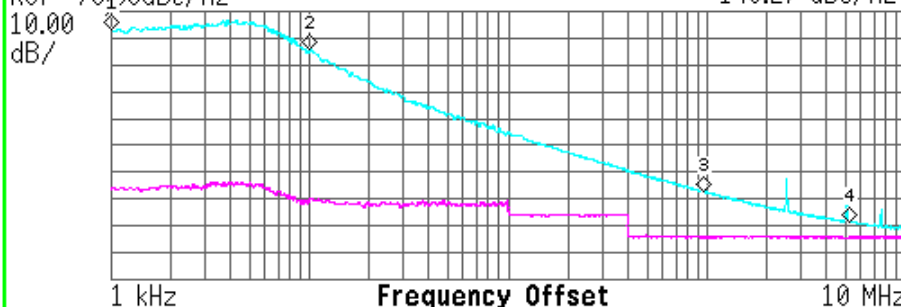
Carrier Freq 2.265 GHz Signal Track Off DANL Off Trig Free

Log Plot

100.00% of 10 Avg

Carrier Freq 2.265000001 GHz

Carrier Power -0.27 dBm Atten 0.00 dB Mkr 4 5.19867 MHz
Ref -70.00 dBc/Hz -148.27 dBc/Hz



Marker	Trace	Type	X Axis	Value
1	2	Spot Freq	1 kHz	-77.30 dBc/Hz
2	2	Spot Freq	10 kHz	-84.40 dBc/Hz
3	2	Spot Freq	1 MHz	-137.25 dBc/Hz
4	2	Spot Freq	5.199 MHz	-148.27 dBc/Hz

Cancellation

Cancellation

On Off

Ref Trace

1 2 3

Threshold

0.01 dB

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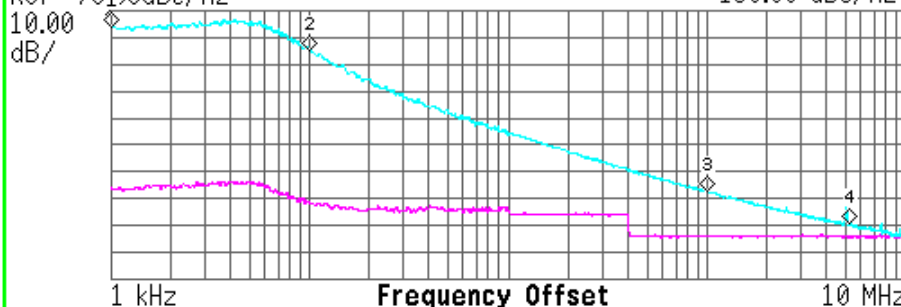
Carrier Freq 2.294 GHz Signal Track Off DANL Off Trig Free

Log Plot

100.00% of 10 Avg

Carrier Freq 2.294000000 GHz

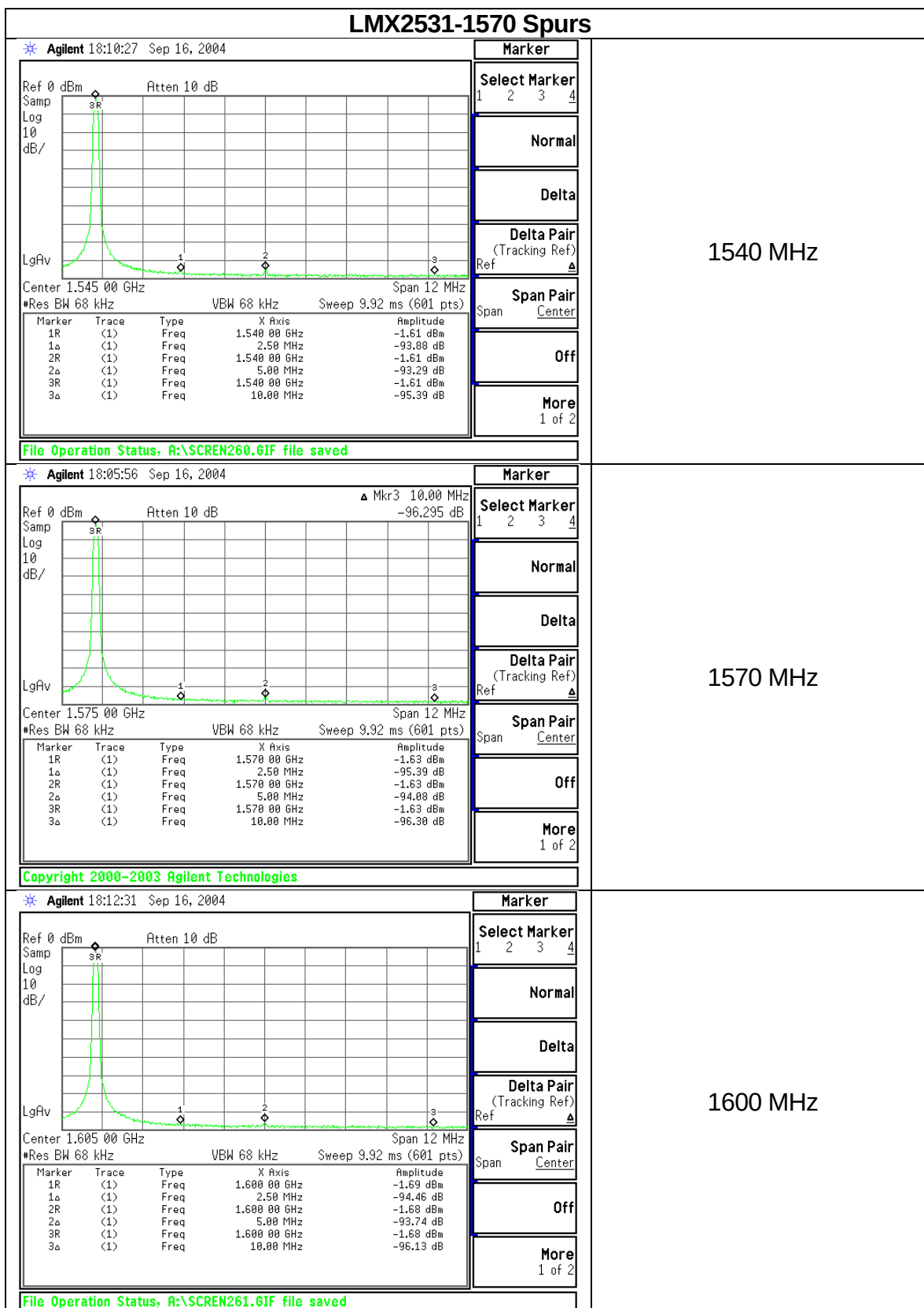
Carrier Power -0.35 dBm Atten 0.00 dB Mkr 3 999.654 kHz
Ref -70.00 dBc/Hz -136.90 dBc/Hz



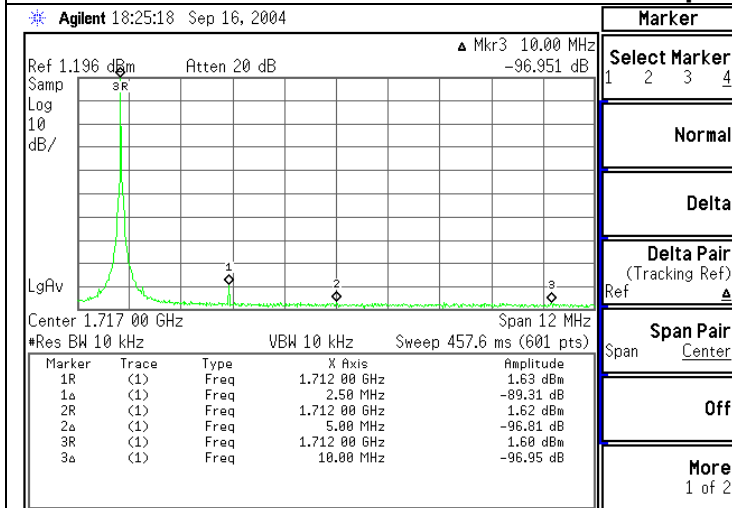
Marker	Trace	Type	X Axis	Value
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2	2	Spot Freq	10 kHz	-84.98 dBc/Hz
3	2	Spot Freq	999.7 kHz	-136.91 dBc/Hz
4	2	Spot Freq	5.199 MHz	-149.32 dBc/Hz

Peak Search

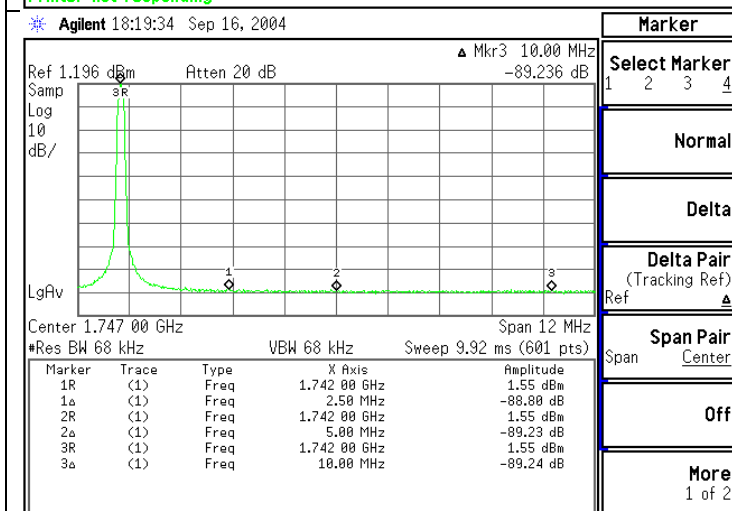
Copyright 2000-2003 Agilent Technologies



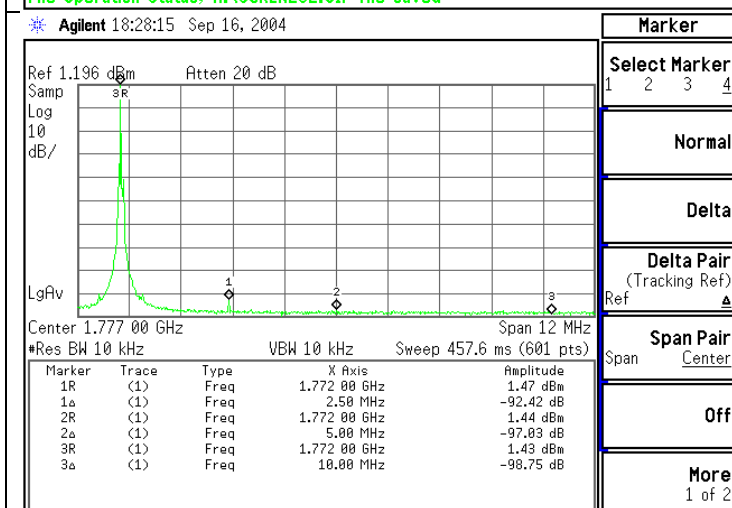
LMX2531-1742 Spurs



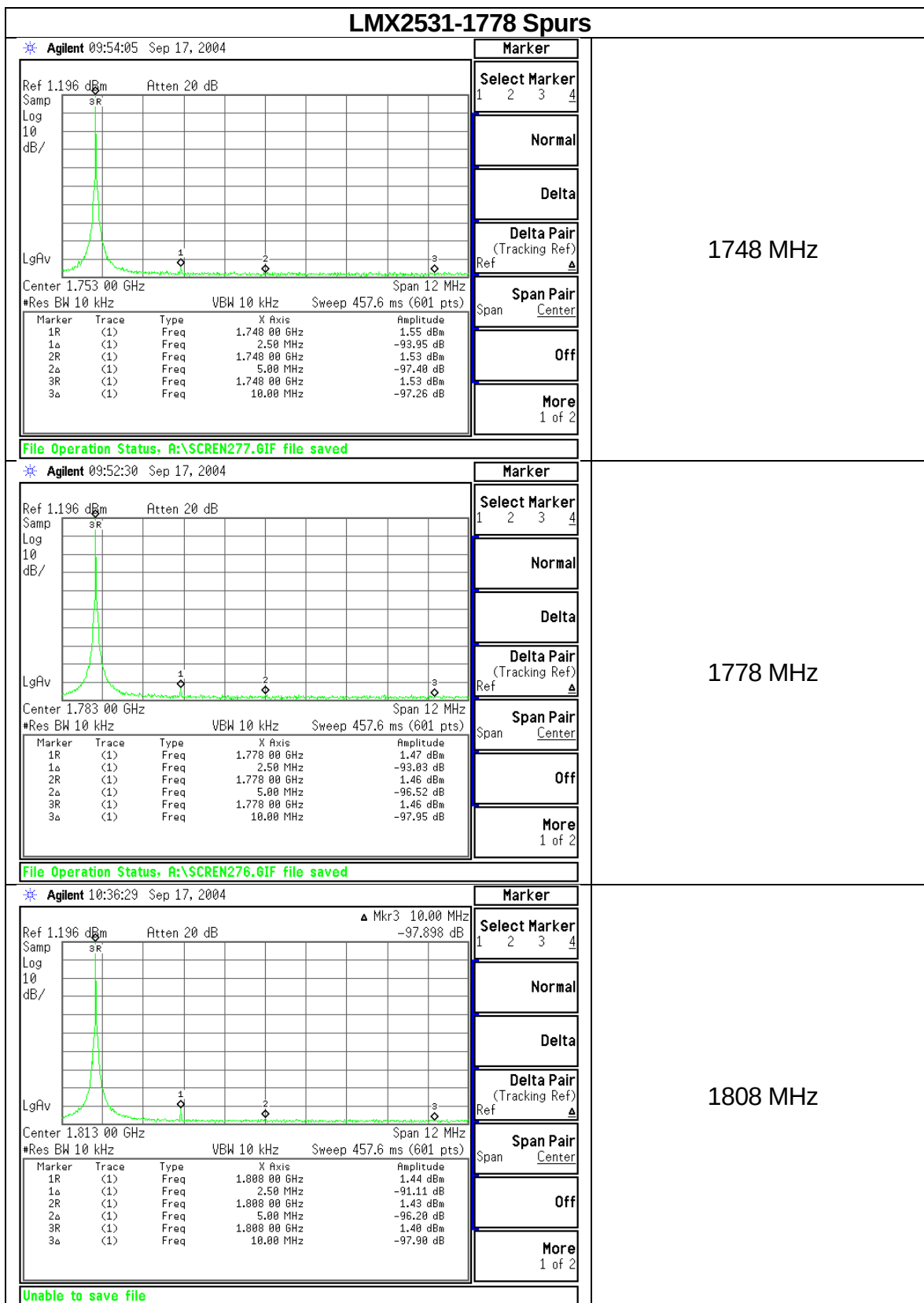
1712 MHz



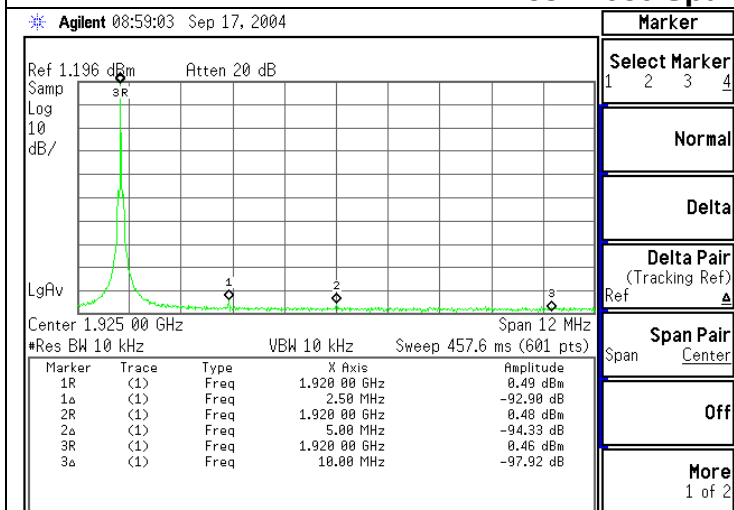
1742 MHz



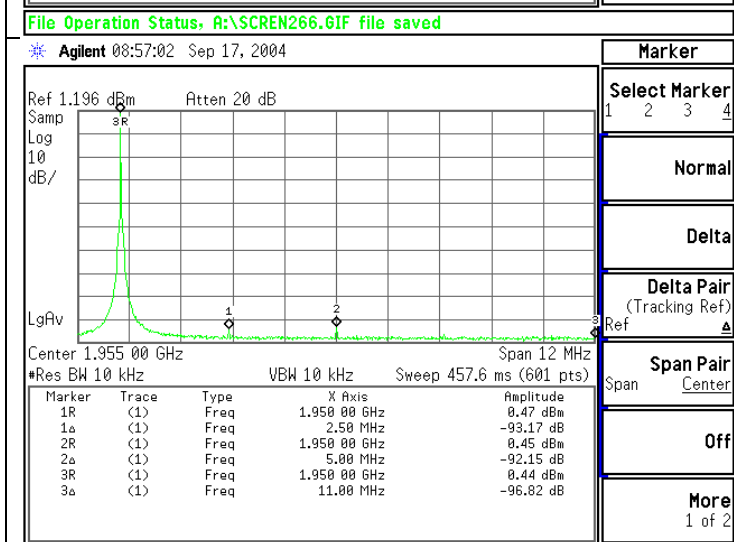
1772 MHz



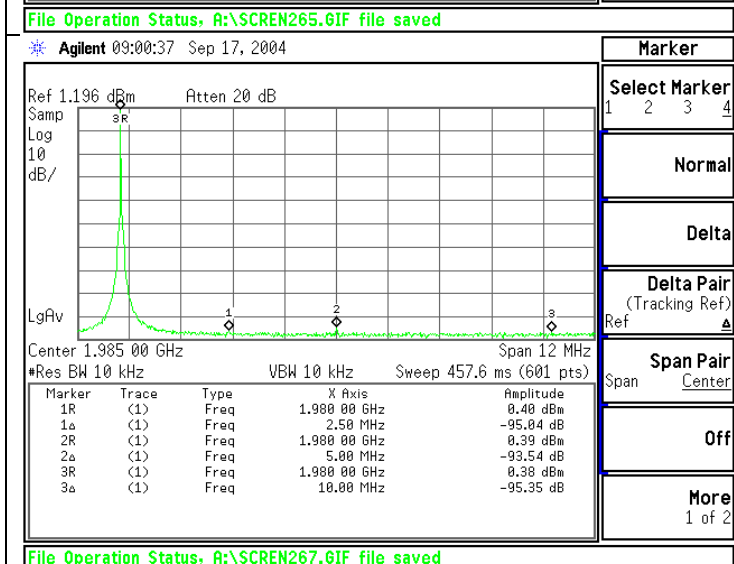
LMX2531-1950 Spurs



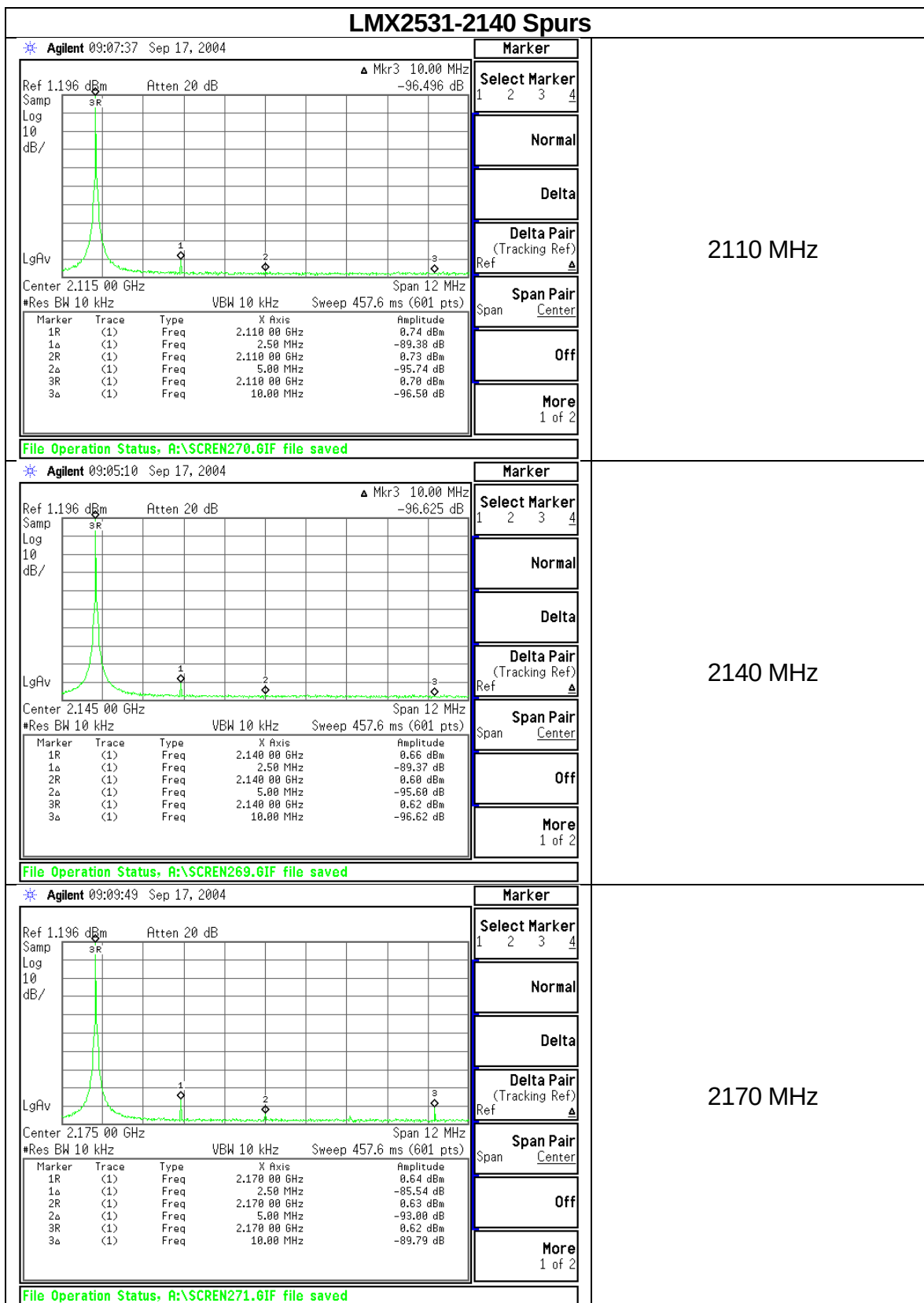
1920 MHz



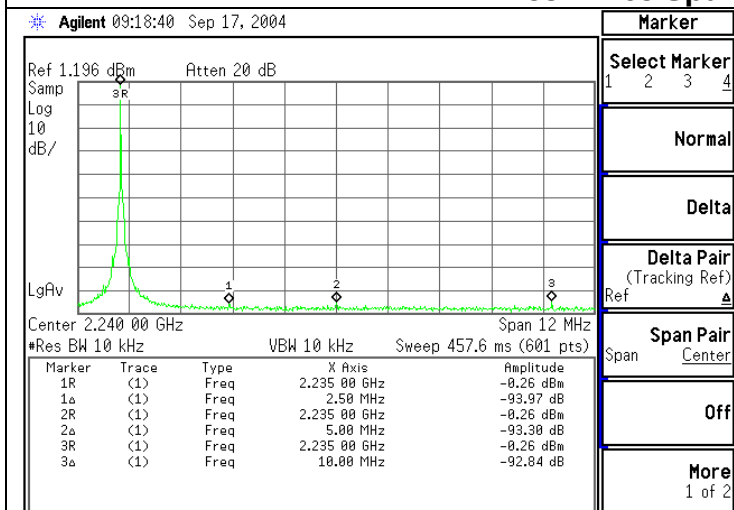
1950 MHz



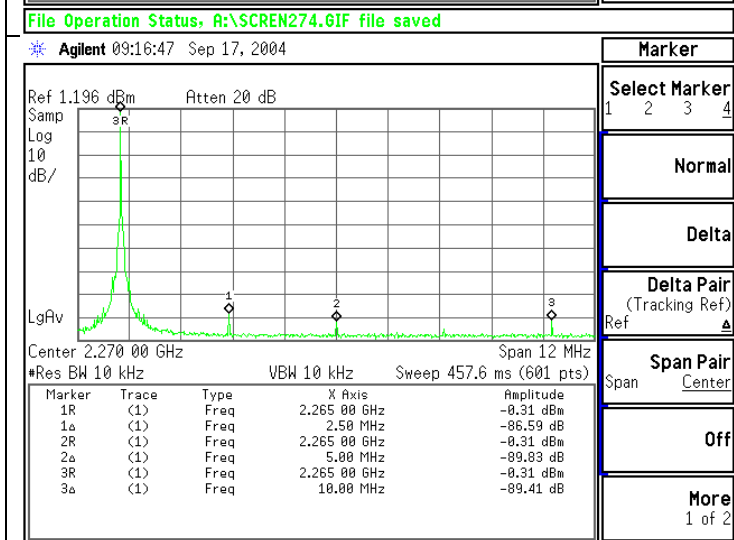
1980 MHz



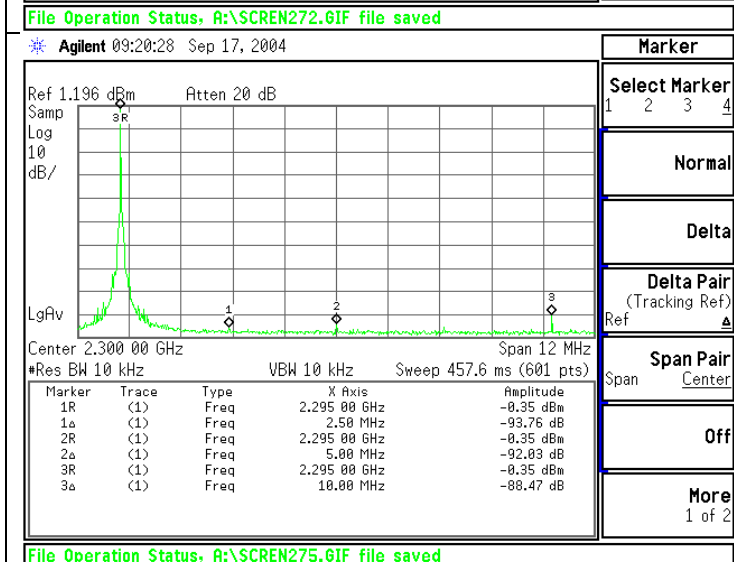
LMX2531-2265 Spurs



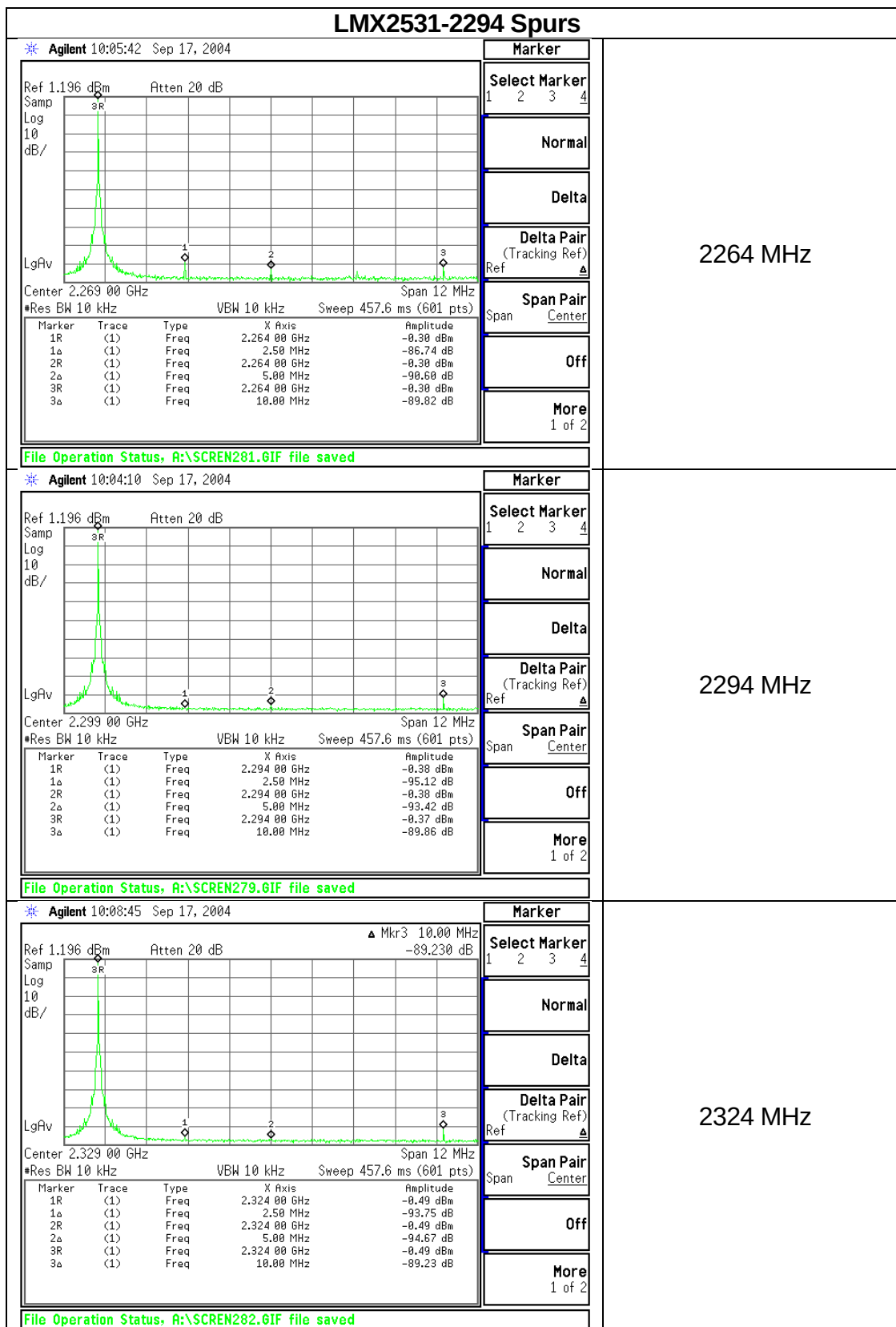
2235 MHz



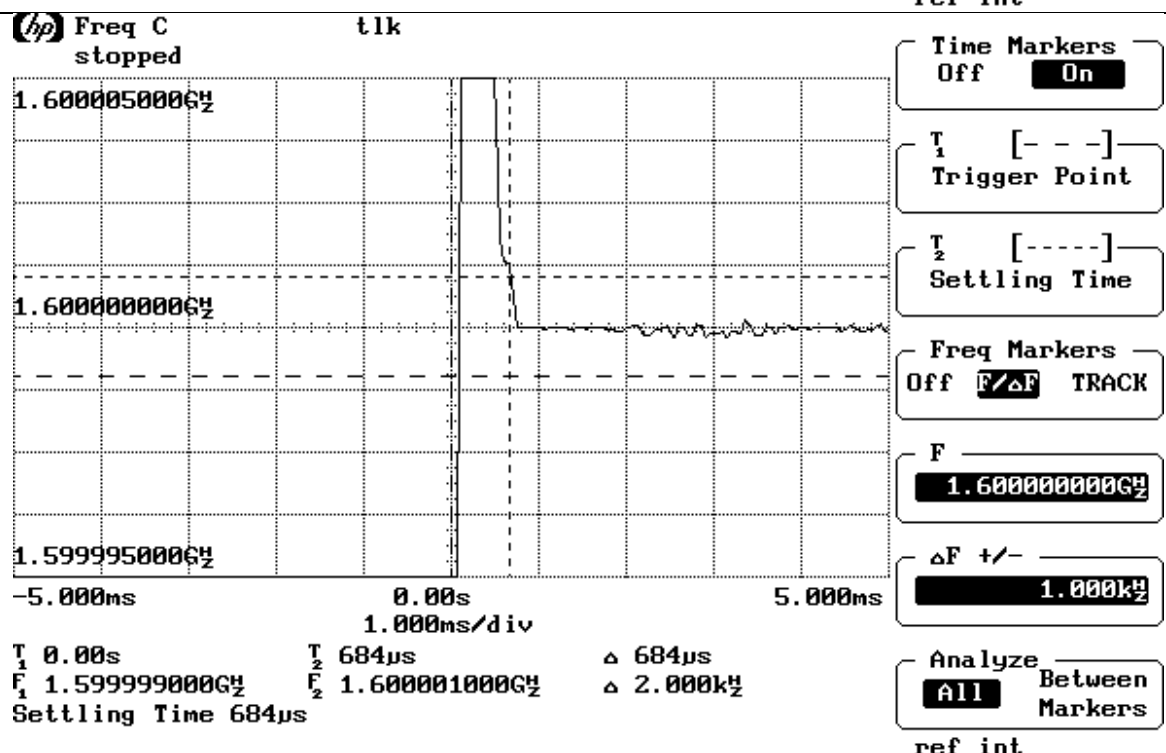
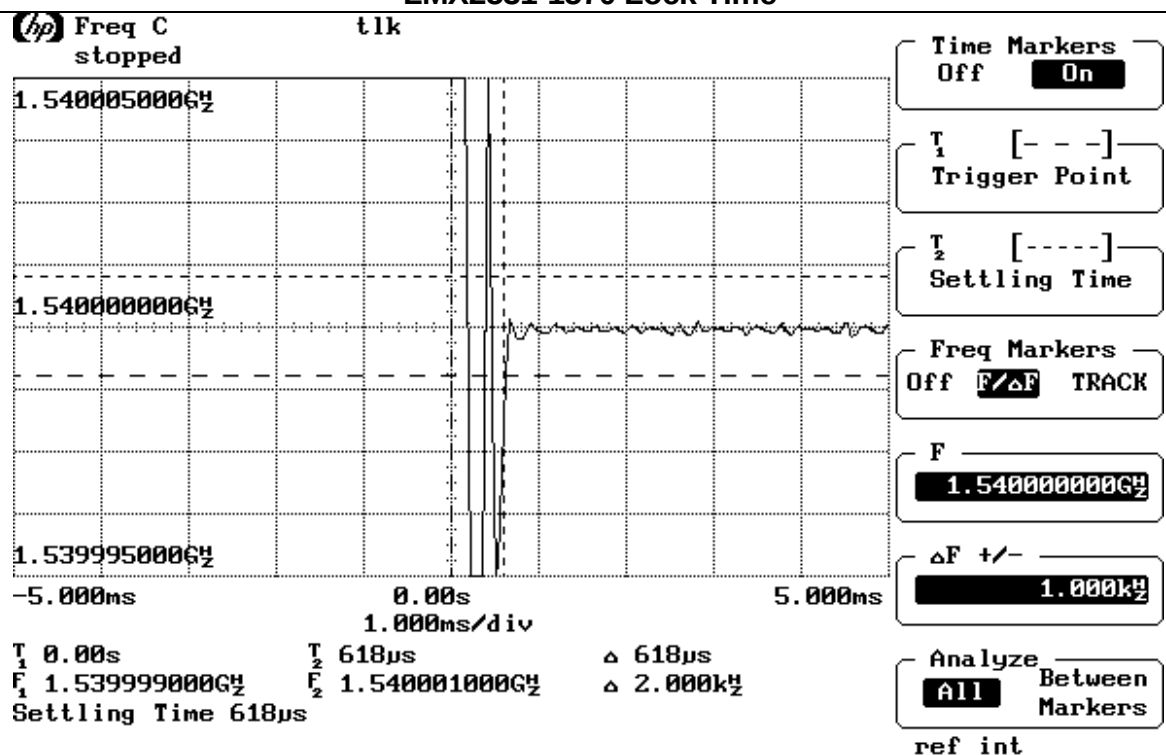
2265 MHz

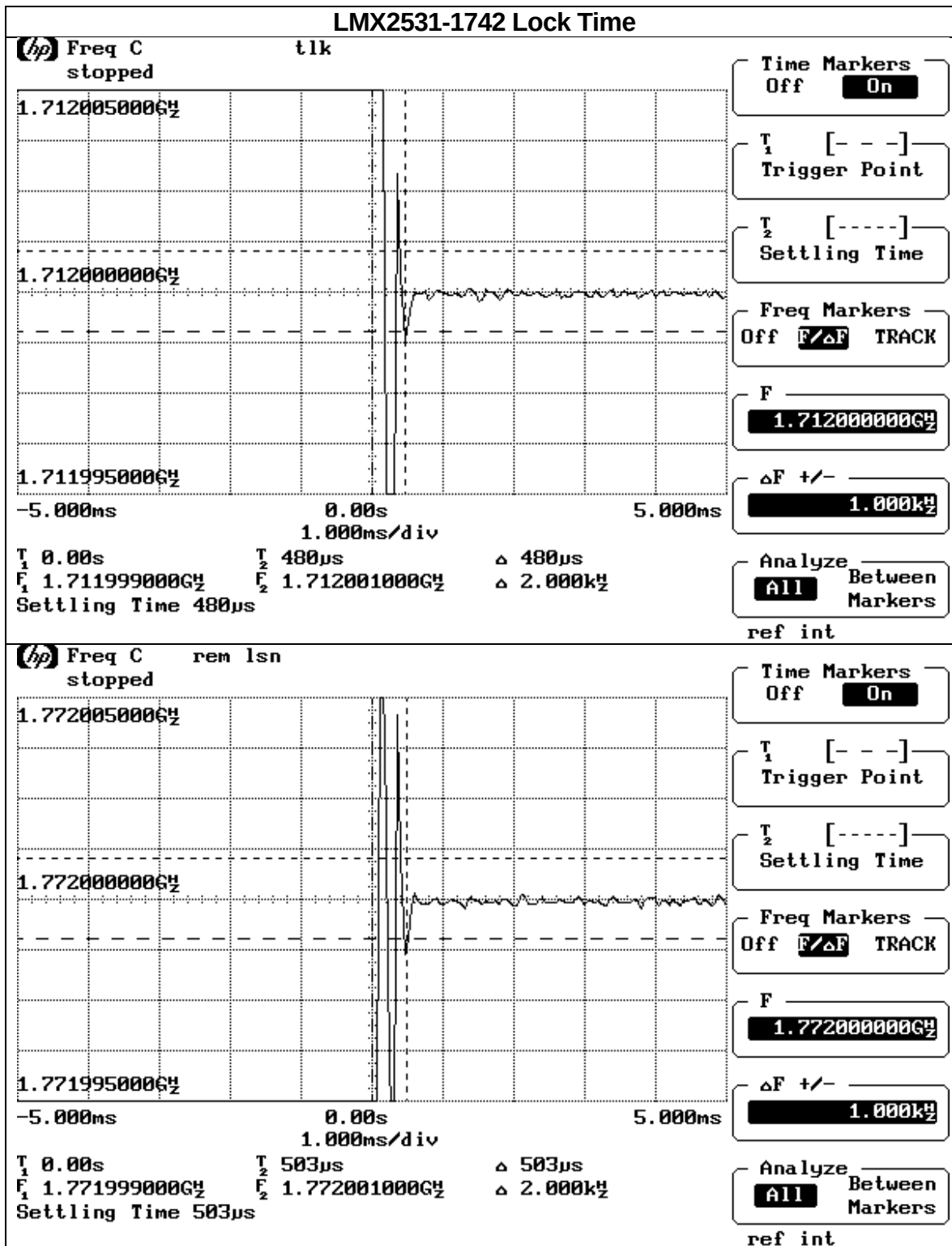


2295 MHz

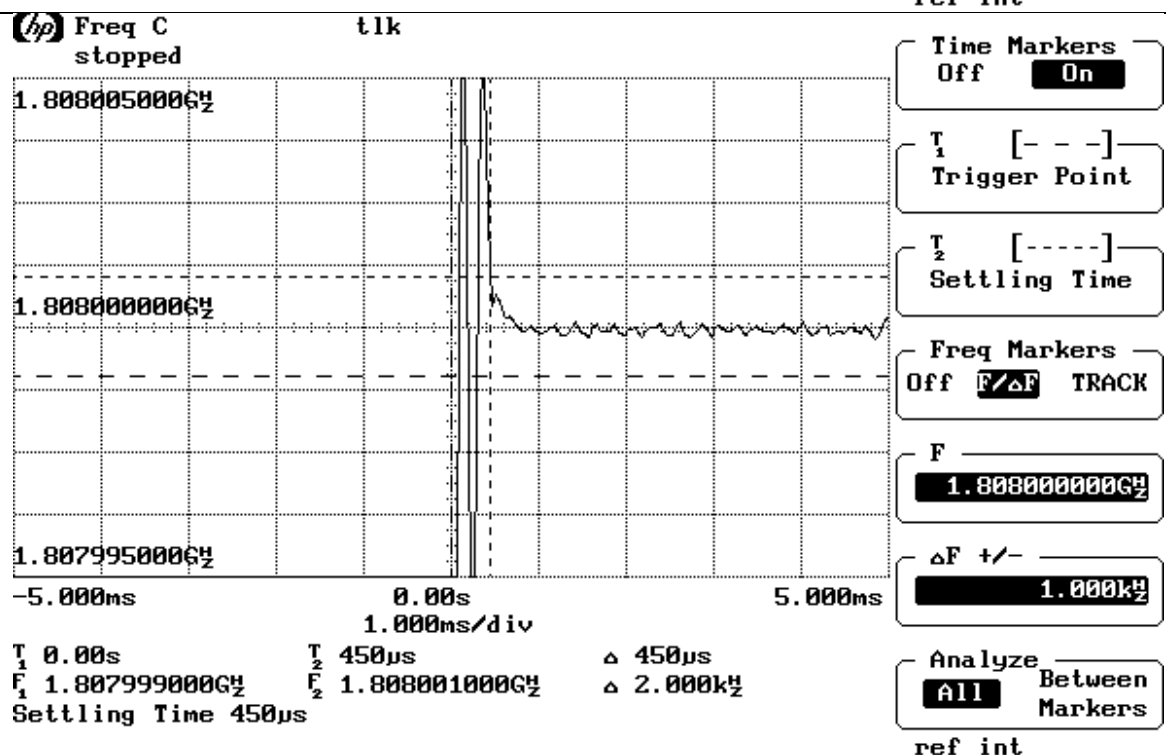
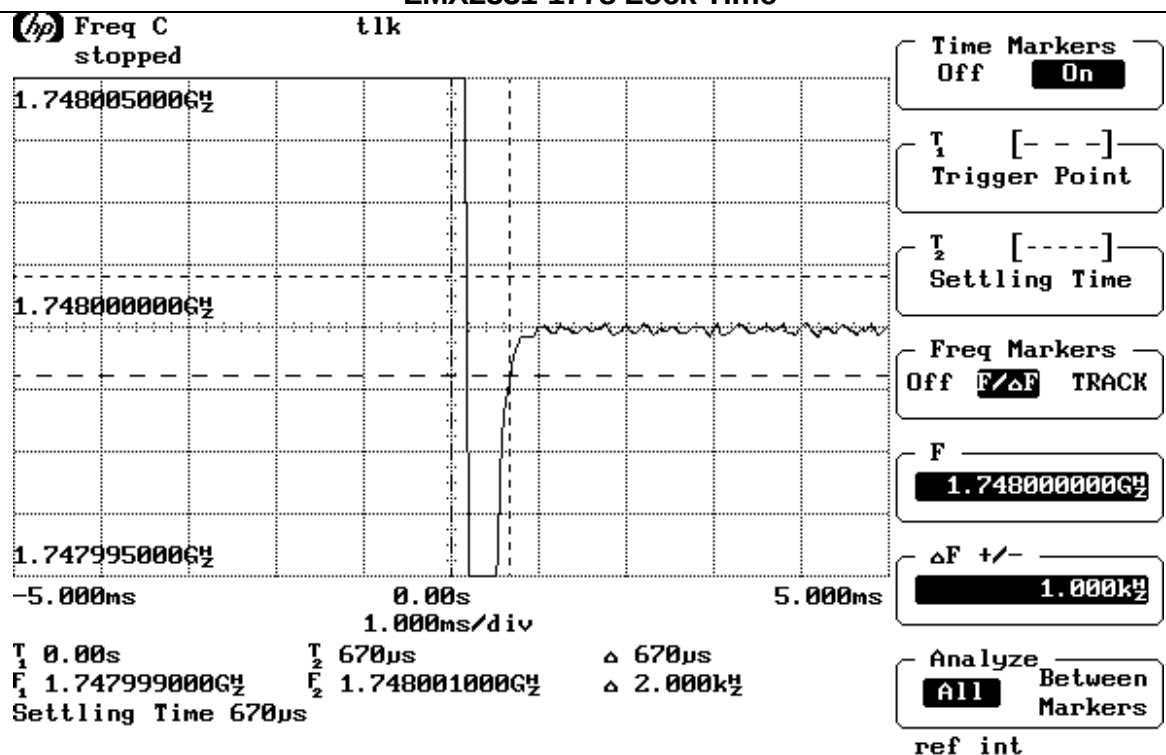


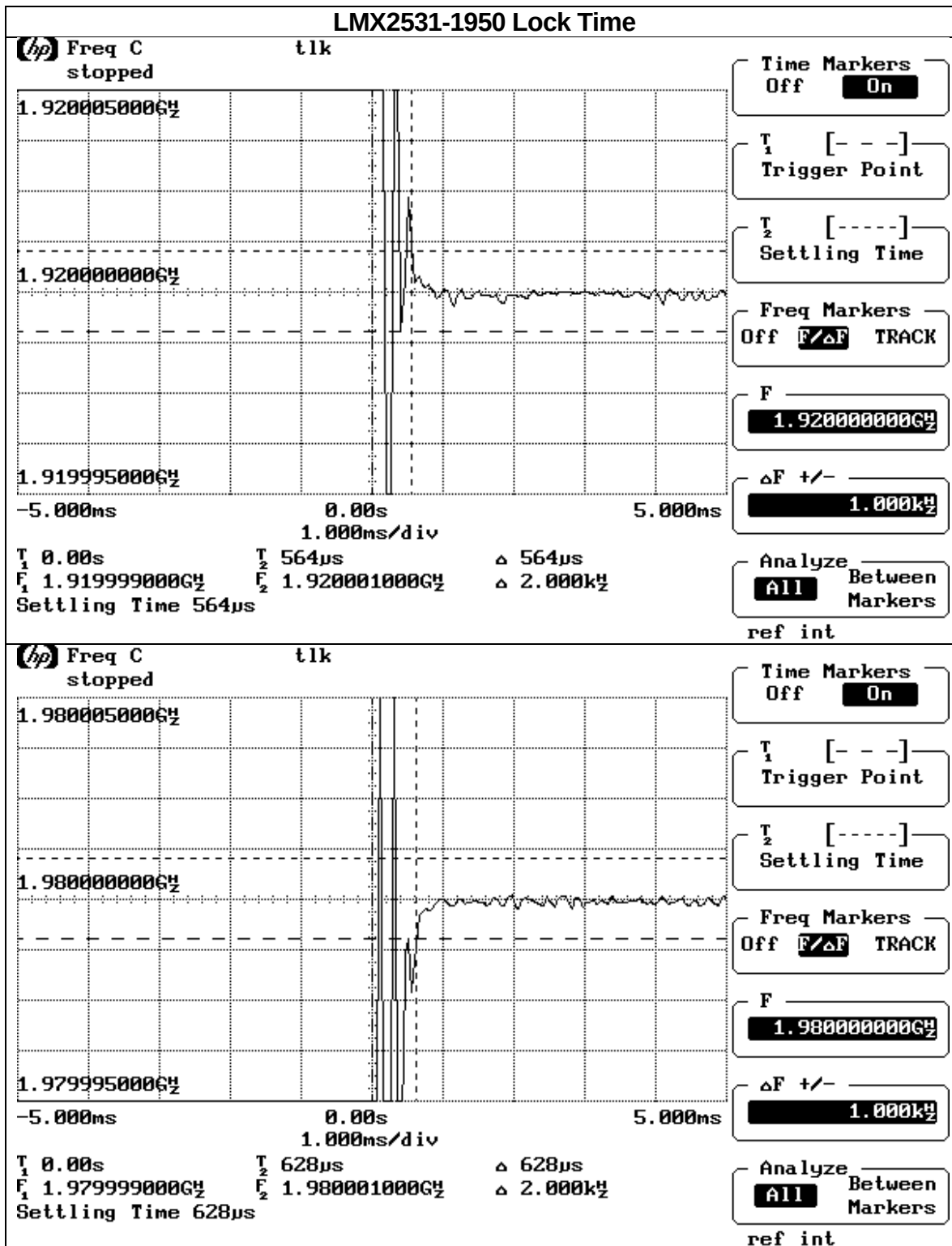
LMX2531-1570 Lock Time



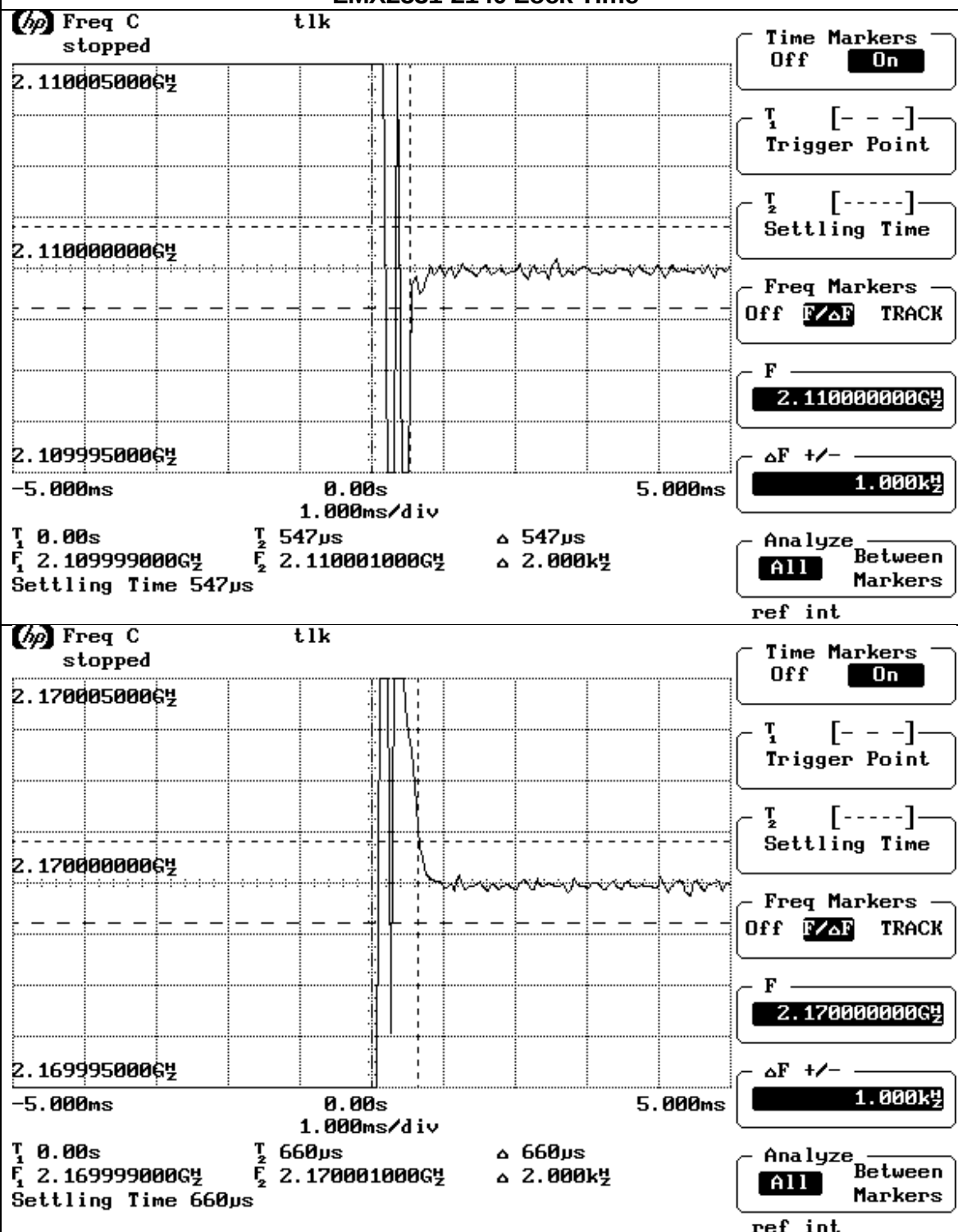


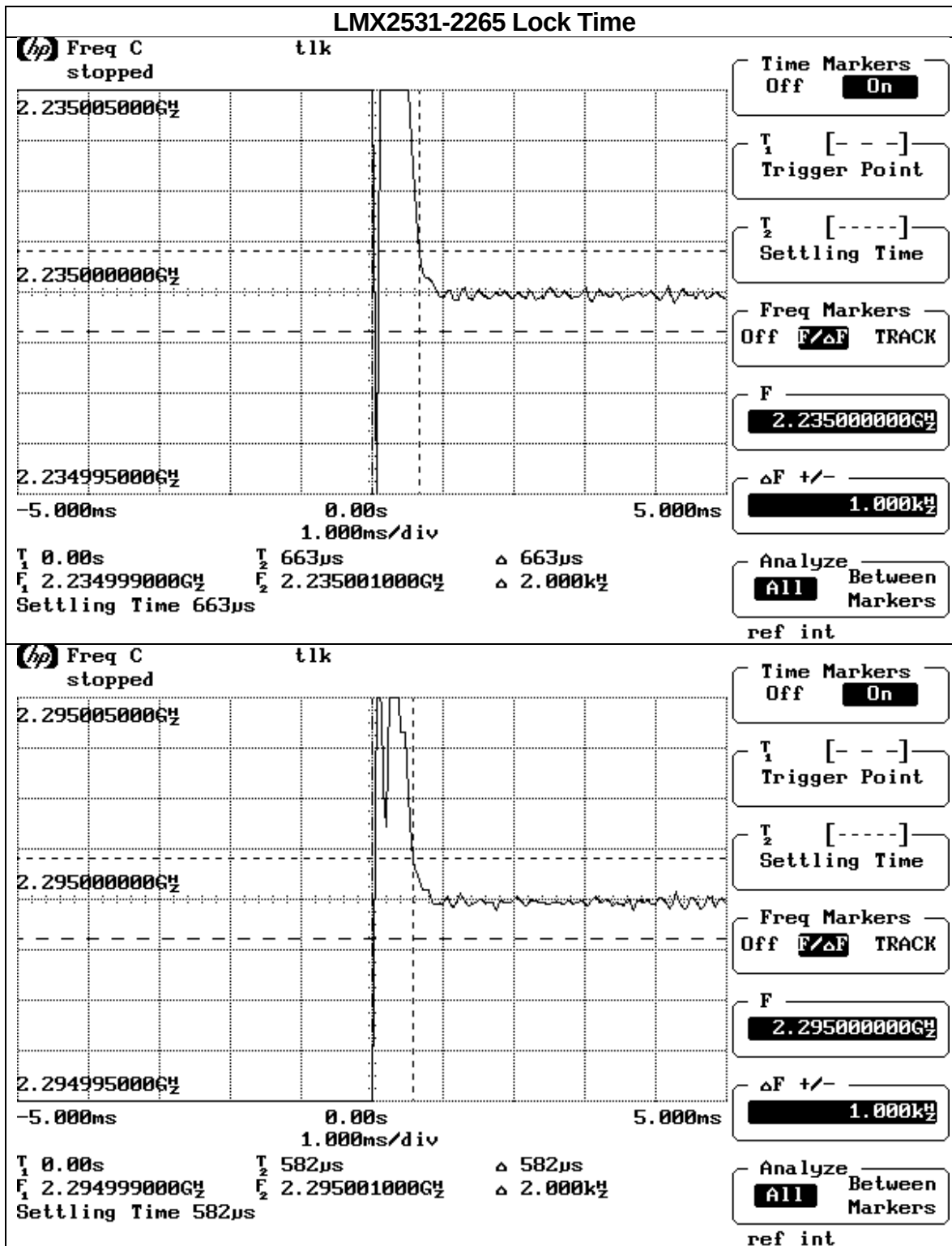
LMX2531-1778 Lock Time

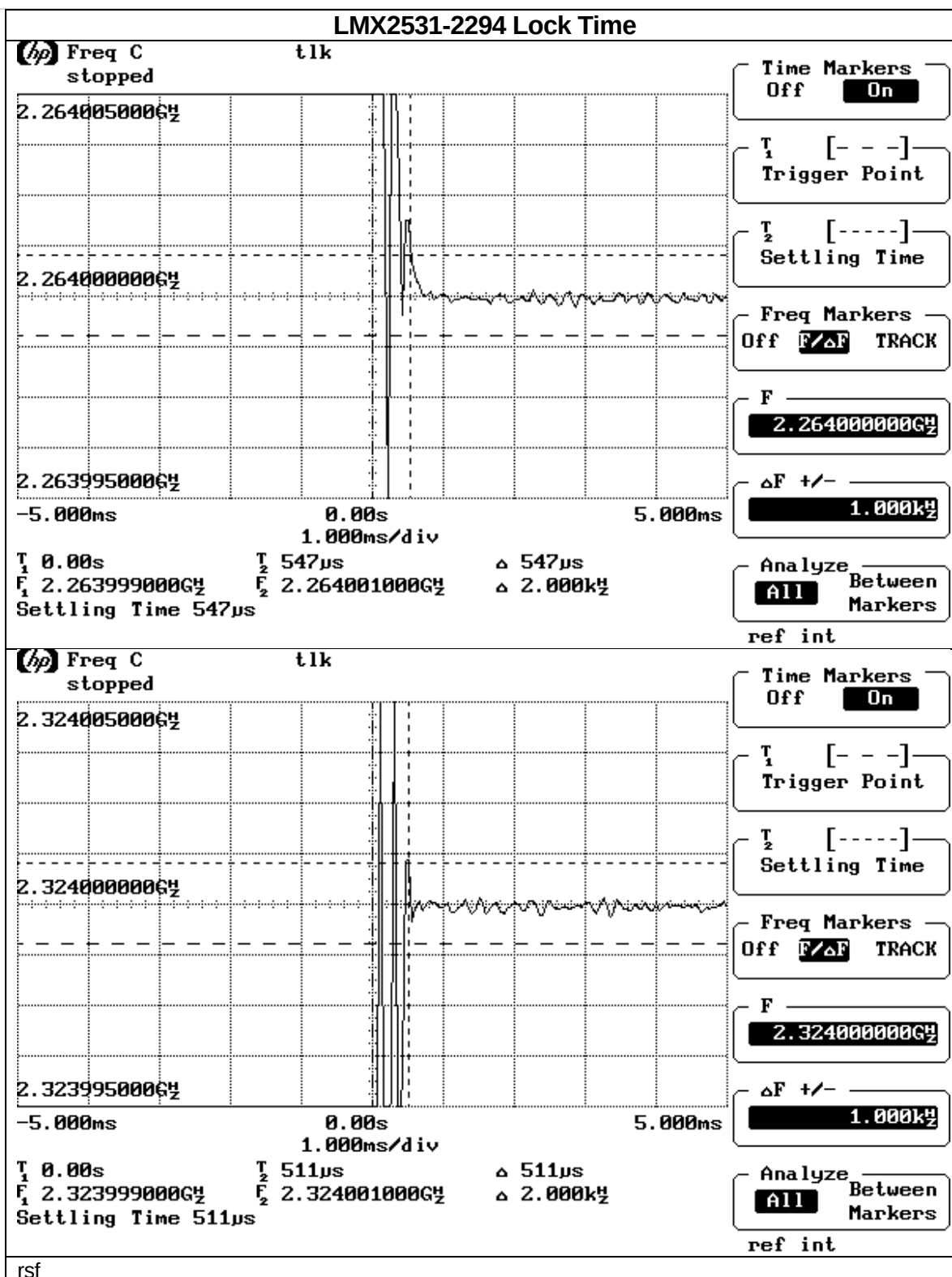




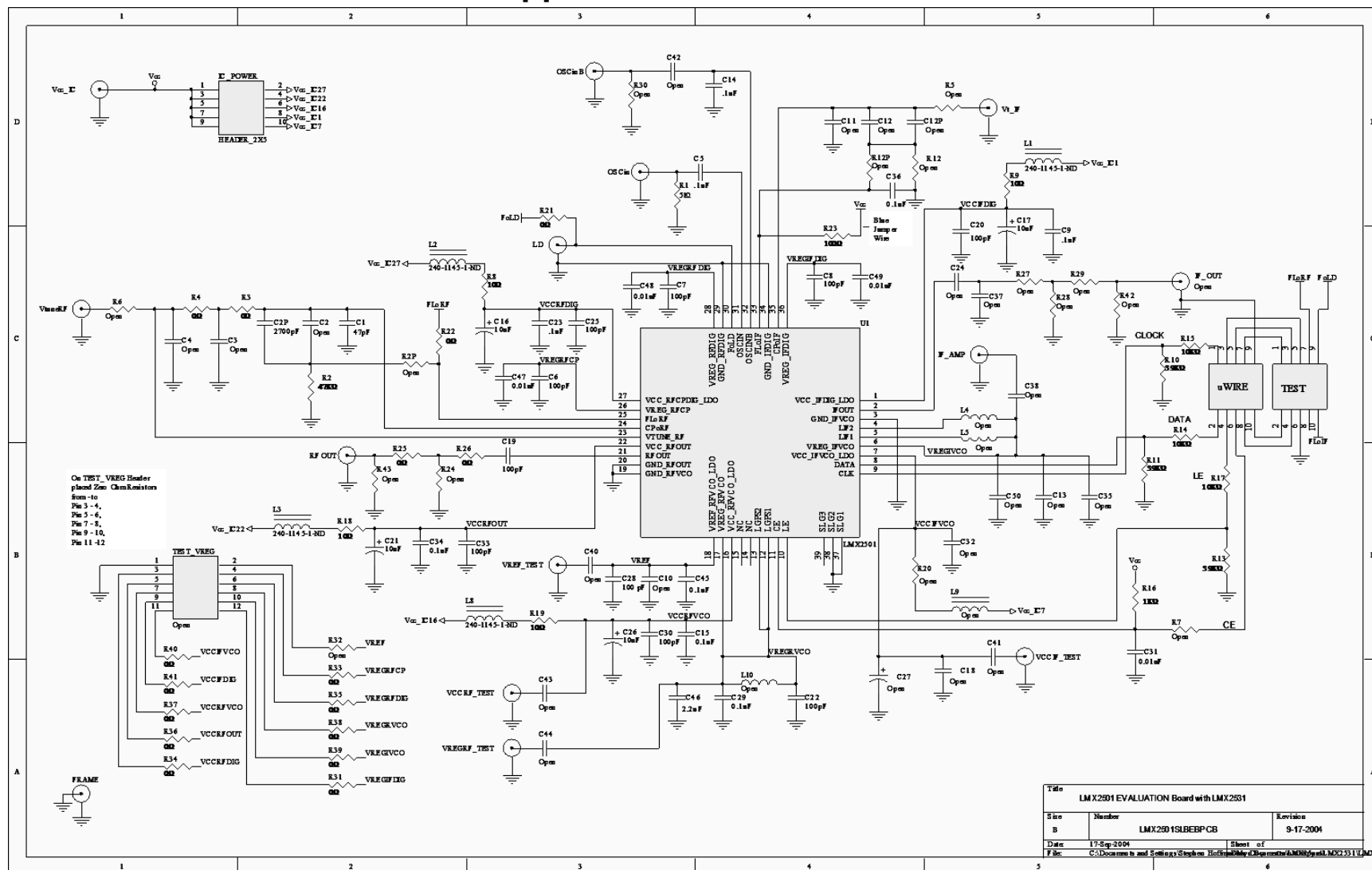
LMX2531-2140 Lock Time





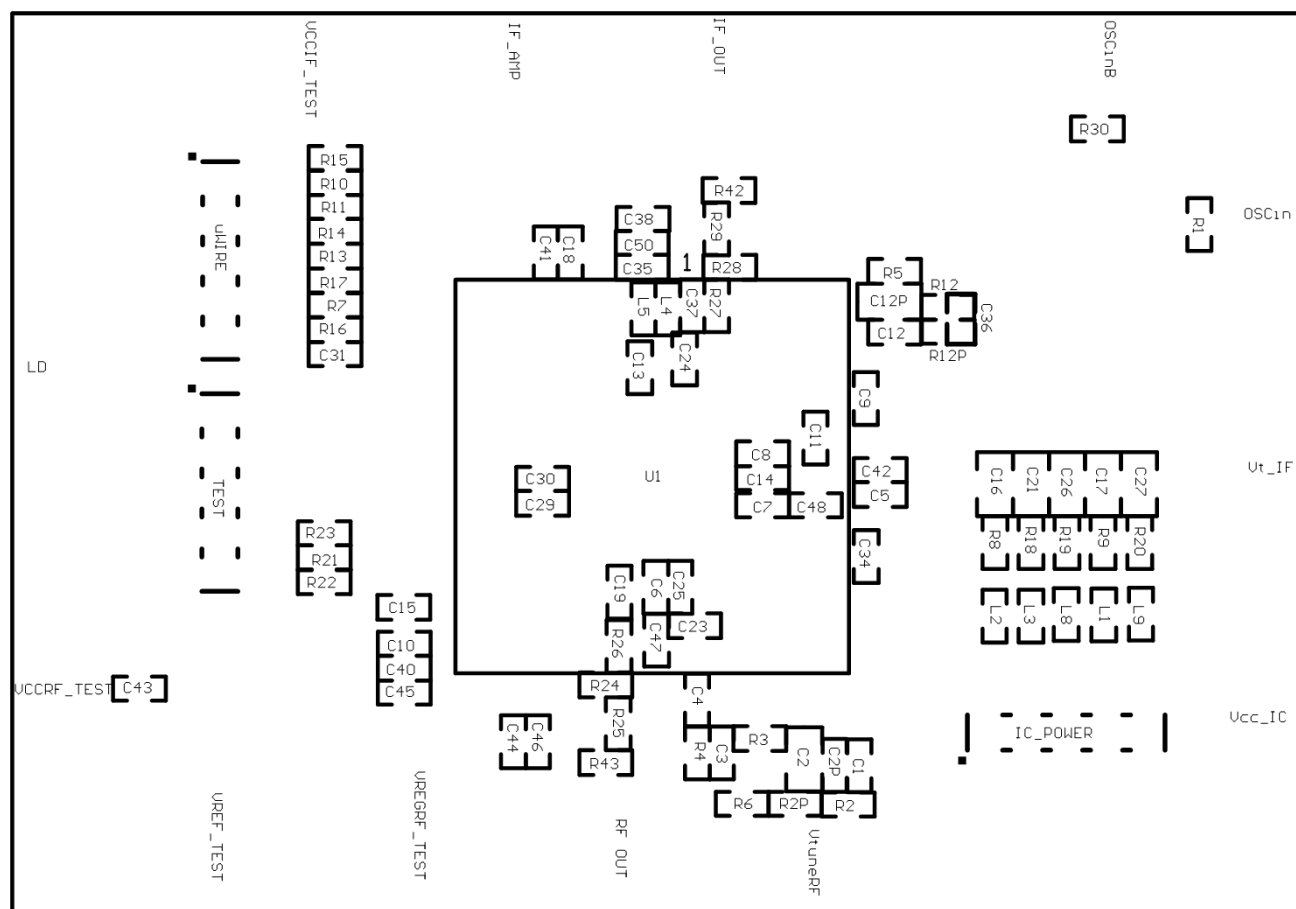


Appendix A: Schematics

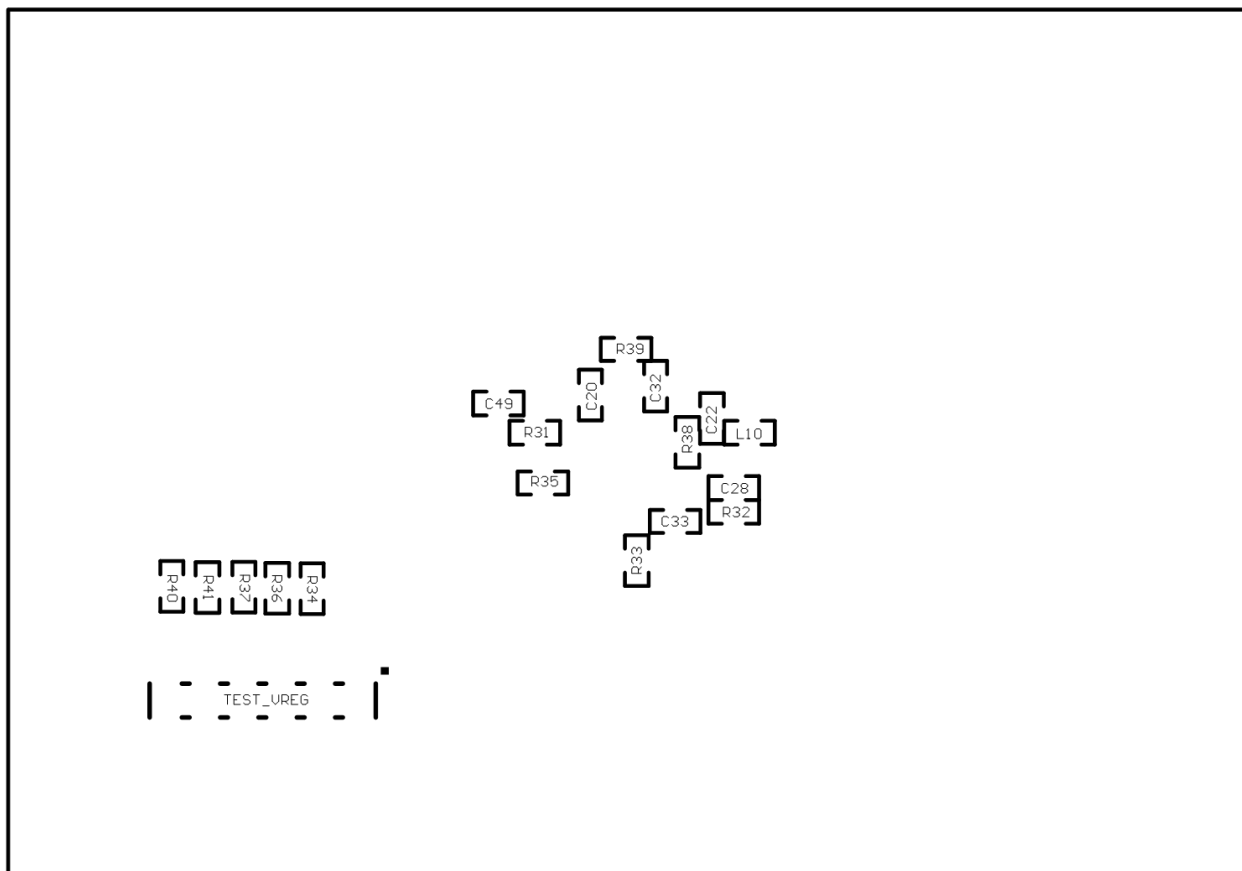


Appendix B: Build Diagram

Top Overlay



Bottom Overlay

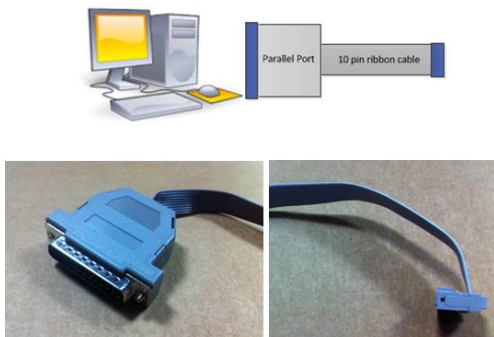


Appendix C: Quick Start on EVM Communication

Codeloader is the software used to communicate with the EVM (Please download the latest version from TI.com - <http://www.ti.com/tool/codeloader>). This EVM can be controlled through the uWire interface on board. There are two options in communicating with the uWire interface from the computer.

OPTION 1

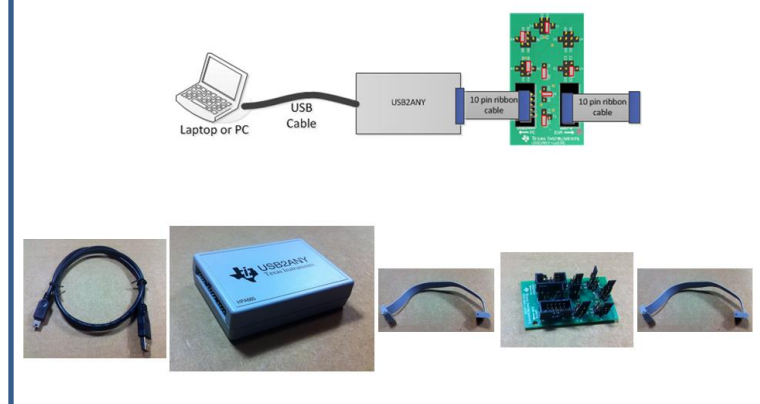
LPT (aka Parallel port)



Open Codeloader.exe → Click “Select Device” → Click “Port Setup” tab → Click “LPT” (in Communication Mode)

OPTION 2

USB2ANY-uWire

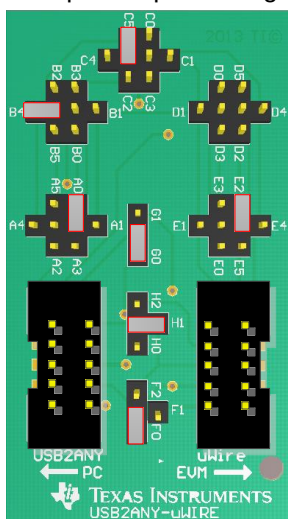


The Adapter Board

This table describes the pins configuration on the adapter board for each EVM board (See examples below table)

EVM	Jumper Bank								Code Loader Configuration
	A	B	C	D	E	F	G	H	
LMX2581	A4	B1	C2		E5	F1	G1	H1	BUFEN (pin 1), Trigger (pin 7)
LMX2541	A4		C3		E4	F1	G1	H1	CE (pin 1), Trigger (pin 10)
LMK0400x	A0		C3		E5	F1	G1	H1	GOE (pin 7)
LMK01000	A0		C1		E5	F1	G1	H1	GOE (pin 7)
LMK030xx	A0		C1		E5	F1	G1	H1	SYNC (pin 7)
LMK02000	A0		C1		E5	F1	G1	H1	SYNC (pin 7)
LMK0480x	A0	B2	C3		E5	F0	G0	H1	Status_CLKin1 (pin 3)
LMK04816/4906	A0	B2	C3		E5	F0	G0	H1	Status_CLKin1 (pin 3)
LMK01801	A0	B4	C5		E2	F0	G0	H1	Test (pin 3), SYNC0 (pin 10)
LMK0482x (prelease)	A0	B5	C3	D2	E4	F0	G0	H1	CLKin1_SEL (pin 6), Reset (pin 10)
LMX2531	A0				E5	F2	G1	H2	Trigger (pin 1)
LMX2485/7	A0		C1		E5	F2	G1	H0	ENOSC (pin 7), CE (pin 10)
LMK03200	A0				E5	F0	G0	H1	SYNC (pin 7)
LMK03806	A0		C1		E5	F0	G0	H1	
LMK04100	A0		C1		E5	F1	G1	H1	

Example adapter configuration (LMK01801)



Open CodeLoader.exe → Click “Select Device” → Click “Port Setup” Tab → Click “USB” (in Communication Mode)

**Remember to also make modifications in “Pin Configuration” Section according to Table above.*

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