

Patent Owner Demonstrative

MediaTek Inc. (Petitioner)
v.
ParkerVision Inc. (Patent Owner)

Case: IPR2024-00796
U.S. Patent No. 7,483,686
Oral Hearing: September 9, 2025

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

1

Claim Construction

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Claim Construction – “Energy Transfer Signal”

1. An apparatus capable of performing simultaneous multi-platform operations, comprising:
at least one multi-platform module including a plurality of transceivers each having at least one frequency translating module, wherein said at least one frequency translating module comprises
a switch configured to operate according to an energy transfer signal, and to sub-sample and transfer energy from a first electromagnetic (EM) signal, and

11. A method for performing simultaneous multi-platform operations, comprising:
(1) controlling at least one multi-platform module to communicate with at least one of a plurality of communication links using a control module having a plurality of standard/protocol sub-modules, wherein the at least one multi-platform module includes a plurality of transceivers each having at least one frequency translation module, wherein said at least one frequency translation module comprises
a switch configured to operate according to an energy transfer signal, and to sub-sample and transfer energy from a first electromagnetic (EM) signal, and

Claim Construction – “Energy Transfer Signal”

Proposed Construction:

Petitioner

- Plain and Ordinary Meaning

Patent Owner

- “An independent control input of an energy transfer system having pulses with non-negligible apertures”

Petitioner's Interpretation Is Overbroad

Petitioner: Any signal that causes a switch to close would be an “energy transfer signal”

A POSITA would have understood Estabrook-Thesis teaches an “energy transfer signal” because its ILO transfers energy for a non-negligible aperture by closing the diode switch for approximately 50% of the duty cycle of the IRF.

This interpretation *reads out the phrase “energy transfer”*

Claim Construction – “Energy Transfer Signal”

“When the parties raise an actual dispute regarding the proper scope of these claims, the court...must resolve that dispute.”

O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1360 (Fed. Cir. 2008)

Claim Construction – “Energy Transfer Signal”

5/3/2024 – Joint Claim Construction Statement

5/21/2024 – IPR Petition Filed

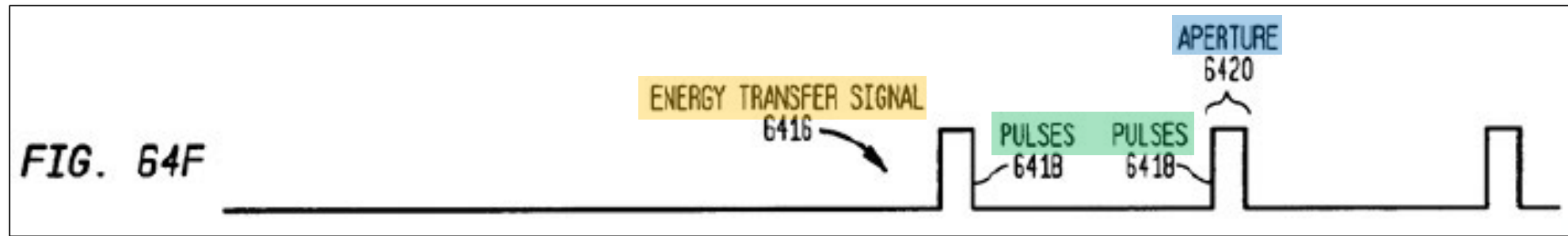
PO's Construction Is Supported By The Specification – Pulse and Non-Negligible Apertures

When the pulses of the control signal 2006 have non-negligible apertures, the aliasing module 2000 is referred to interchangeably herein as an energy transfer module or a gated transfer module, and the control signal 2006 is referred to as an energy transfer signal. Exemplary systems and meth-

EX1001: Figs. 49B/C, 51A/B, 52C, 61, 64F, 71A;

EX1008: Figs. 49A-H, 50C/51C/52C/53C/54C/55C/57C/58C/59C/60C/61C
/62C/75C/83C, 72A-B, 56B/67B

PO's Construction Is Supported By The Specification – Pulse and Non-Negligible Apertures



Petitioner Admits That “Energy Transfer Signal” Requires Non-Negligible Apertures

Reply:

Avitable teaches an “energy transfer signal” because it teaches a signal which closes a switch for a non-negligible aperture, thus transferring energy from the first EM signal to a capacitor (storage module).

Petitioner Admits That “Energy Transfer Signal” Requires Non-Negligible Apertures

Reply:

However, this explanation merely clarifies that an energy transfer signal must close a switch for a sufficient aperture to transfer a non-negligible amount of energy. EX1049, ¶¶22-23. '

Larson:

Q Right. Well, you can't transfer nonnegligible amounts of energy without using nonnegligible apertures according to the patent. Correct? That's how the patent puts it?

A According to the specification in the patent, nonnegligible amounts of energy are associated with nonnegligible -- nonnegligible amounts of energy transferred are associated with a nonnegligible aperture.

Reply, 8; Sur-Reply, 3; Ex. 2013, 10:21-11:9.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

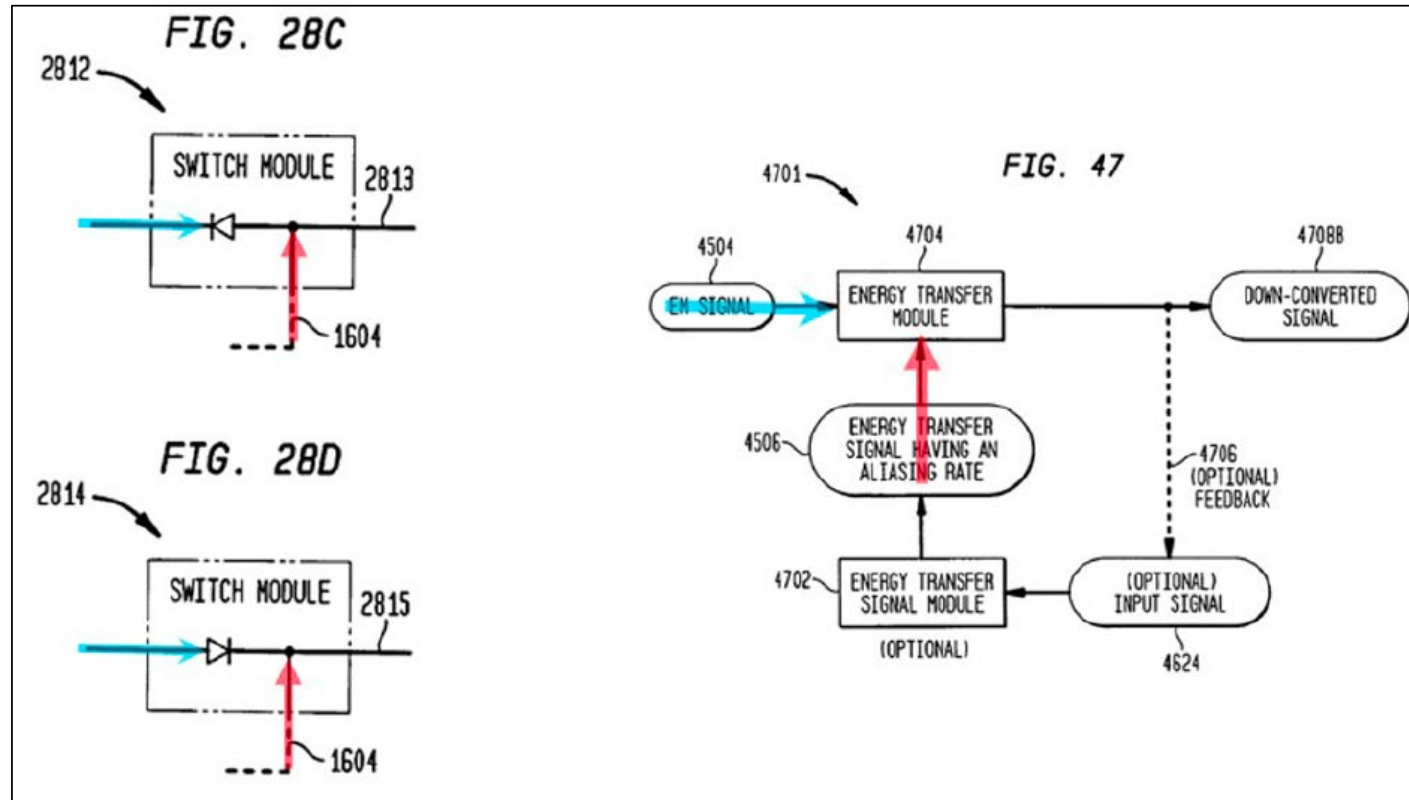
11

PO's Construction Is Supported By The Specification – “Independent Control Input”

'686 patent: Figures 1A-1C, 2, 19, 20A, 20A-1, 25B, 28, 29, 45A-45D, 47, 51A, 51B, 61

'551 patent: Figures 28A-28D, 63, 64A, 64B, 65, 66A-66D, 67A, 68G, 69, 74, 76A-76E, 82A, 82B, 94A, 95

PO's Construction Is Supported By The Specification – “Independent Control Input”

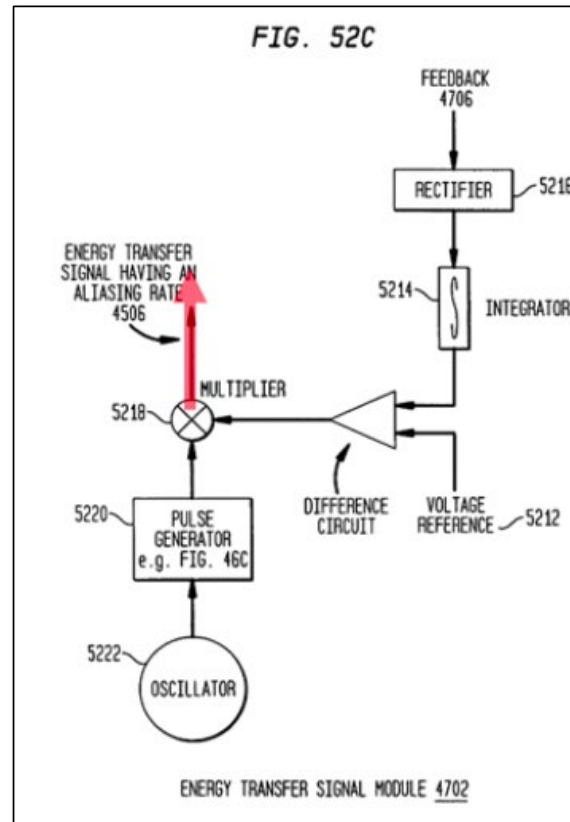


Sur-Reply, 5-6; Ex. 1008, Figs. 28C, 28D;
Ex. 1001, Figs. 47, 52C.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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PO's Construction Is Supported By The Specification – “Independent Control Input”



Sur-Reply, 5-6; Ex. 1001, Fig. 52C.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Petitioner's Reliance on Prior PTAB Construction of "Switch" is Misplaced

PTAB:

- An "independent control input" is not a feature of a "switch"

Specification:

- Consistently shows/describes "***energy transfer signal***" as an ***independent control input***

Petitioner's Reliance on Prior PTAB Construction of "Storage Module" is Misplaced

PTAB:

- "Energy transfer system" excluded from "storage module" based on lexicography

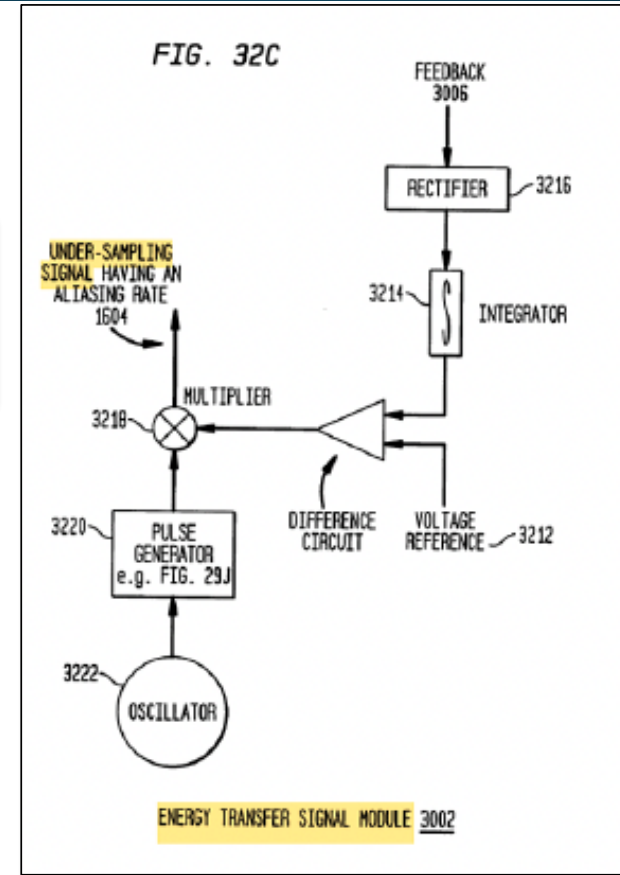
'686 patent claims expressly recite:

- "transfer[ing] energy,"
- "stor[ing] said transferred energy," and
- a signal "generated from said stored energy"

The Label for Figure 32C is a Clear Typographical Error

5. Optional Optimizations of Under-Sampling at an Aliasing Rate

Under-sampling signal module 3002, as shown in FIG. 32C, can be an analog circuit that enables an automatic gain control function.



Sur-Reply, 8-9; Ex. 1008, Fig. 32C, 59:29-30, 62:52-53.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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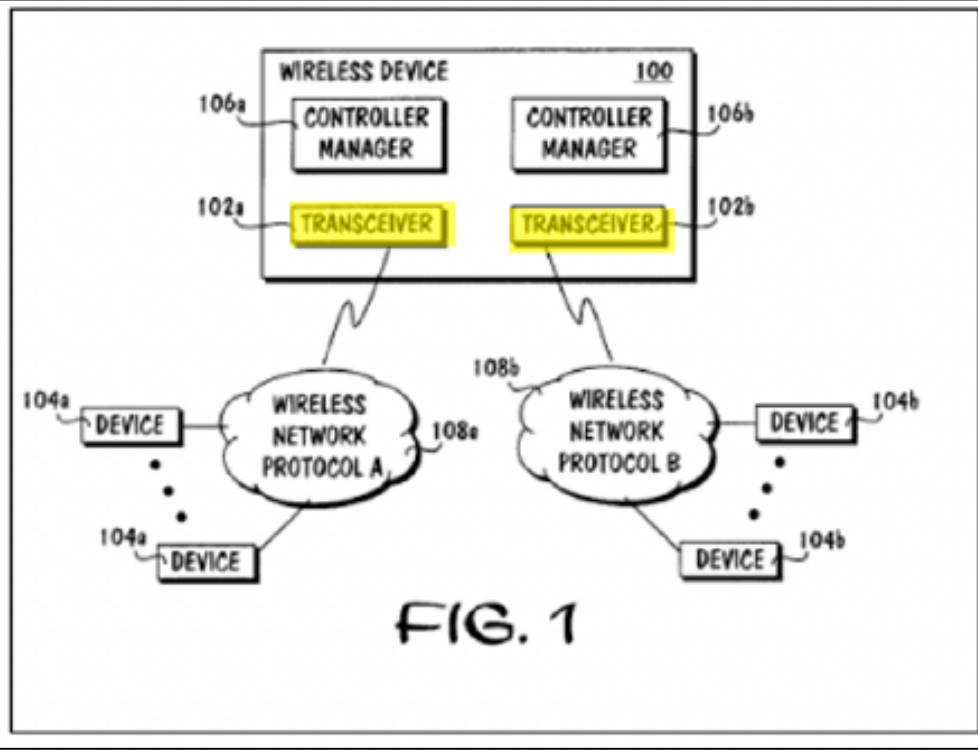
Lack of Motivation to Combine

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

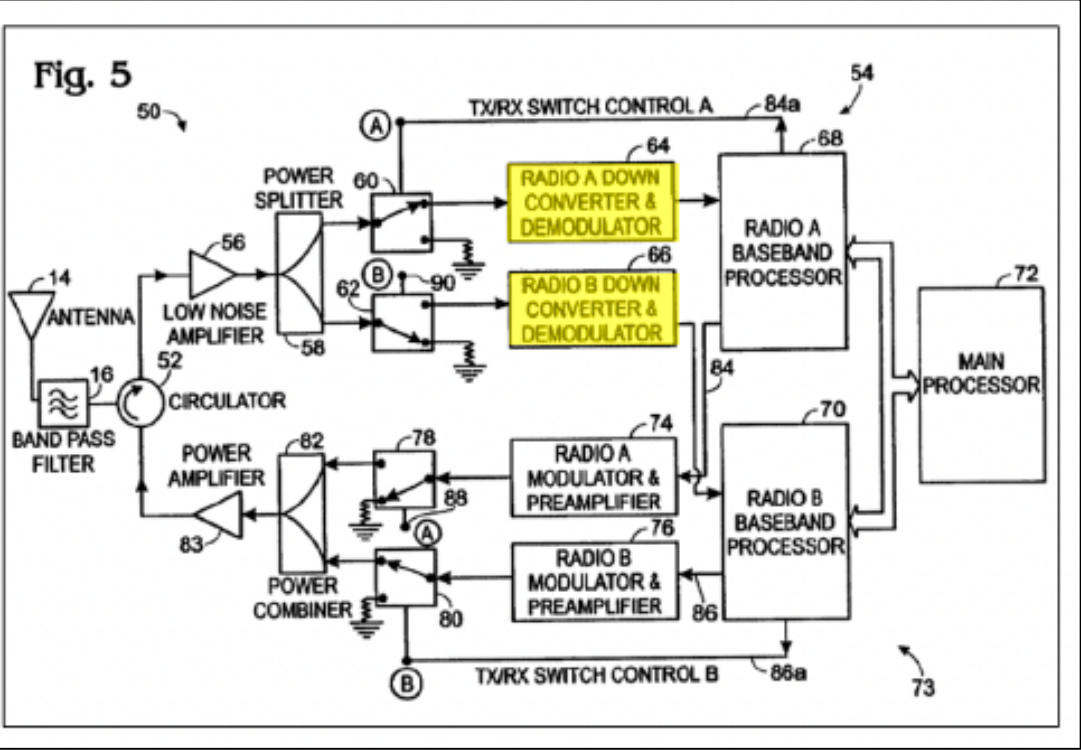
18

Petitioner Has Not Demonstrated A Motivation To Combine

Nevo:



Young:



Nevo/Avitable

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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No Motivation To Combine Nevo/Avitable

Nevo (Consumer Applications):

A leading candidate to accomplish the former is commonly known to those skilled in the art as the Bluetooth technology or Bluetooth protocol. Examples of technology to accomplish the later include the different variants of the IEEE 802.11 Standard published by the Institute of Electrical and Electronic Engineers, 802.11 (Frequency Hopping, Direct Sequence), 802.11a, 802.11b, as well as Home RF, also known as Shared Wireless Access Protocol (SWAP) to those skilled in the art.

Avitable:

S-band digital downconverter for radar applications based on a GaAs MMIC fast sample-and-hold

This is, in particular, the case of a Doppler radar receiver, where the two I and Q components are postprocessed in a FFT processor after detection. Based on the previously described subharmonic sampling technique, the complex demodulation requested in a Doppler-radar receiver can be easily performed. The digital downconverter can be used directly at the antenna front-end, or at an intermediate frequency sufficiently high for preventing intermodulation interferences. For that reason, operation around 1GHz or more is particularly well suited.

No Motivation To Combine Nevo/Avitable

Avitable:

1 Introduction

Radar and communication systems often require complex waveform detection to be implemented for separately processing the in-phase (I) and quadrature (Q) components of the received complex waveform.

This is, in particular, the case of a Doppler radar receiver, where the two I and Q components are postprocessed in a FFT processor after detection.

Young/Estabrook

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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No Motivation To Combine Young/Estabrook

Young:

In the 2.4 GHz ISM band, there are many existing and emerging standards, e.g., 802.11 WLAN, Bluetooth™ and HomeRF. Bluetooth™

Desensitization is a phenomenon wherein a receiver's sensitivity degrades due to excessive signal strength, which may overload the front-end circuits of the radio. The receiver will be desensitized if there is a second radio operating in close proximity, particularly if the two radios do not transmit in synchronization with each other.

There is no known prior art which provides a solution for simultaneous dual mode operations in the shared spectrum using different transceivers in a single enclosure.

Estabrook:

This thesis discusses the design of a direct conversion receiver. This receiver architecture is intended for applications where single channel reception with low cost compact transceivers is desired. The issues of achievable gain and phase match between the receiver's 'I' and 'Q' channel and the design of receiver front-end components are specifically addressed. Designs for a low conversion loss RF mixer whose input frequency is 1GHz or lower, a low frequency (DC to 100's KHz) low noise amplifier, and a low frequency low noise active filter stage are developed and analyzed.

Sur-Reply, 13-15; Ex.1003, 1:20-22, 1:43-48, 1:53-56; Ex. 1005, Abstract; Exs. 1016, 1107, 1017, 63; Ex. 2006, ¶¶304,306,324.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Nevo/Avitable Does Not Disclose

“A Plurality Of Protocol/Standard Sub-modules”

“[First/Second] Protocol/Standard Combination”

Nevo/Avitable System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts:

251. Even if combined with Nevo, Avitable does not disclose how it would meet fundamental performance requirements in terms of dynamic range, sensitivity, and interference tolerance, which are essential for Bluetooth and IEEE.11 compliance:

Nevo/Avitable System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts:

252. Dynamic Range: Bluetooth and IEEE 802.11 require transceivers to support a wide range of signal levels from strong (-10 dBm) to weak (-90 dBm) signals. Avitable's sample-and-hold (SH) circuit lacks automatic gain control (AGC) or any adaptive mechanism to maintain dynamic range. Nevo is also silent on AGC or any equivalent mechanism for controlling gain, meaning that a POSITA would not find a solution in the proposed combination.

Nevo/Avitable System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts:

254. Sensitivity: Wireless transceivers must have high sensitivity to detect weak signals in noisy environments. Bluetooth and IEEE 802.11 set strict minimum sensitivity levels (e.g., -70 dBm for Bluetooth and -90 dBm for IEEE 802.11n at MCS0). Notably Avitable has 26dB of loss, which would any receiver further into the noise floor.

A POSITA “Figuring It Out” is Not the Legal Standard

Designing a complete transceiver compliant with Bluetooth and IEEE 802.11 protocols would have been well within the scope of a POSITA at the time; indeed, it would not make sense for the industry to develop protocols that the industry could not comply with. EX1049, ¶¶79-81. As ParkerVision admits (POR, 64), Avitable

Petitioner fails to demonstrate that “***figuring it out***” would not require ***undue experimentation***.

'551 Patent Discloses How to Meet Protocols/Standards

'551 patent (incorporated by reference into '686 patent) discloses:

- Capacitor values (e.g., 18 pF)
- Amplifier/filtering stage after a switch/capacitor to provide “additional receiver sensitivity, bandwidth control, or signal conditioning”
- Differential input/output configurations and pulse signals designed to avoid interference

Larson admits these guidance relate to Wi-Fi/Bluetooth standards

Sur-Reply, 18-19; Ex. 1008, 67:14-24, 113:56-58, 103:1-7, 114:1-6, Figs.76A-E, 106-110; Ex. 2013,13:3-16:22; 54:13-55:14, 56:15-59:7, 64:10-66:22, 71:4-74:1

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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'686 Patent Discloses How to Meet Protocols/Standards

'686 patent discloses:

- Formulas for calculating the frequency of the control signal based on the frequency of the input signal
- How to achieve frequency selectivity before down-conversion
- Input impedance matching to filter out unwanted signals and maximize power/energy transfer and improve efficiency

Larson admits these guidance relate to Wi-Fi/Bluetooth standards

Sur-Reply, 20-21; Ex. 1001, 11:28-12:67,
27:17-24, 27:62-28:2, 15:20-23, 21:32-33,
21:40-43, 16:25-28, 16:30-32; Ex. 2013,
42:18-43:8, 43:20-46:13, 46:22-49:2; 60:21-
62:3, 73:8-74:1

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Young/Estabrook Does Not Disclose

“A Plurality Of Protocol/Standard Sub-modules”

“[First/Second] Protocol/Standard Combination”

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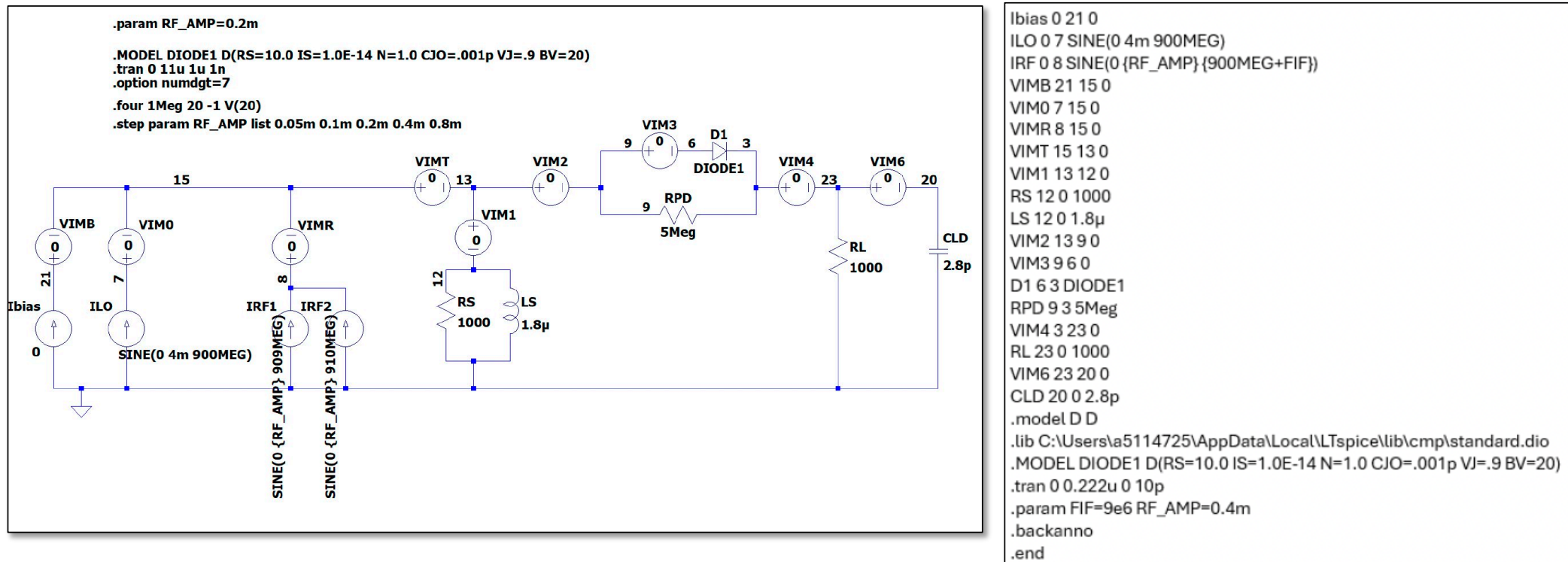
Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts:

330. Estabrook's mixer (1) lacks image rejection and (2) exhibits high second-order intermodulation distortion (IM2), and (3) inadequate C/I ratio performance. Even if integrated into Young's receiver, Estabrook's circuit would not operate in conformance with a protocol/standard combination as required by claim 11.

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



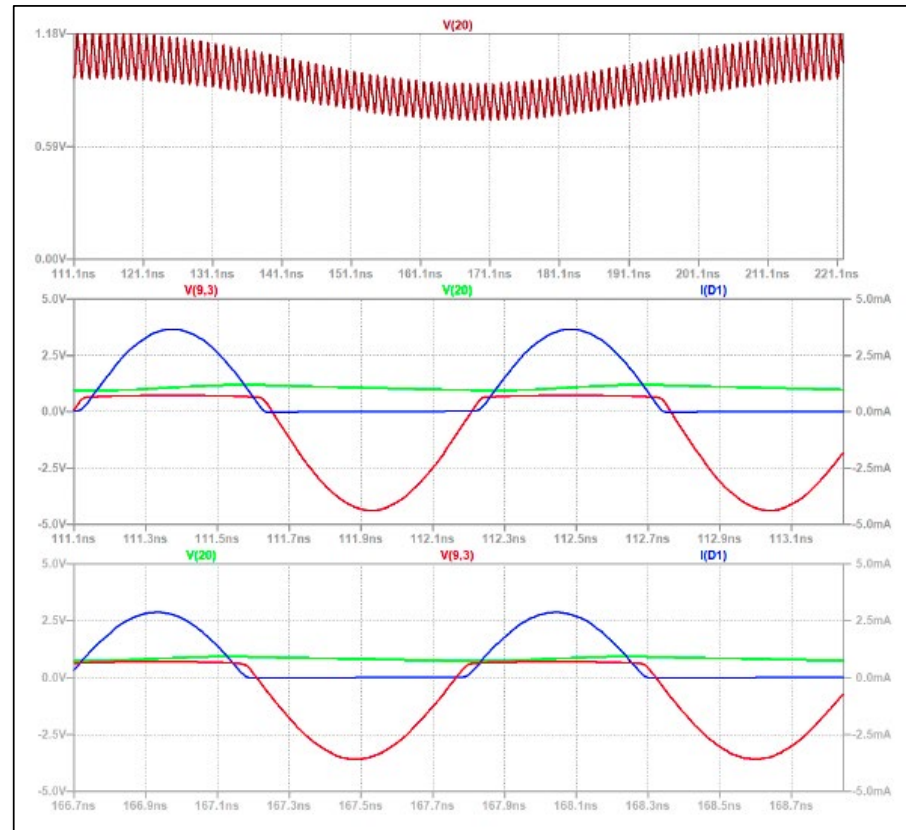
POR, 66-69; Sur-Reply, 21-24;
Ex. 2006, ¶¶215-20.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:

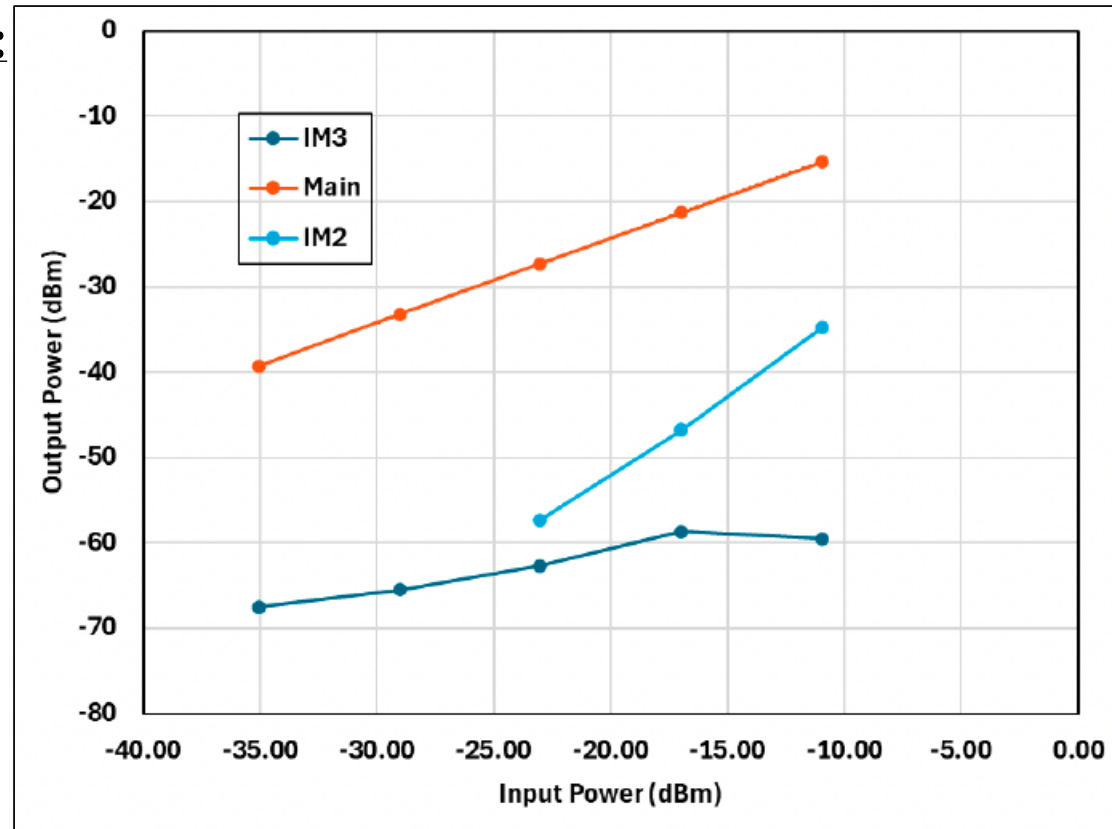


DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

POR, 66-69; Sur-Reply, 21-24;
Ex. 2006, ¶¶215-20.

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



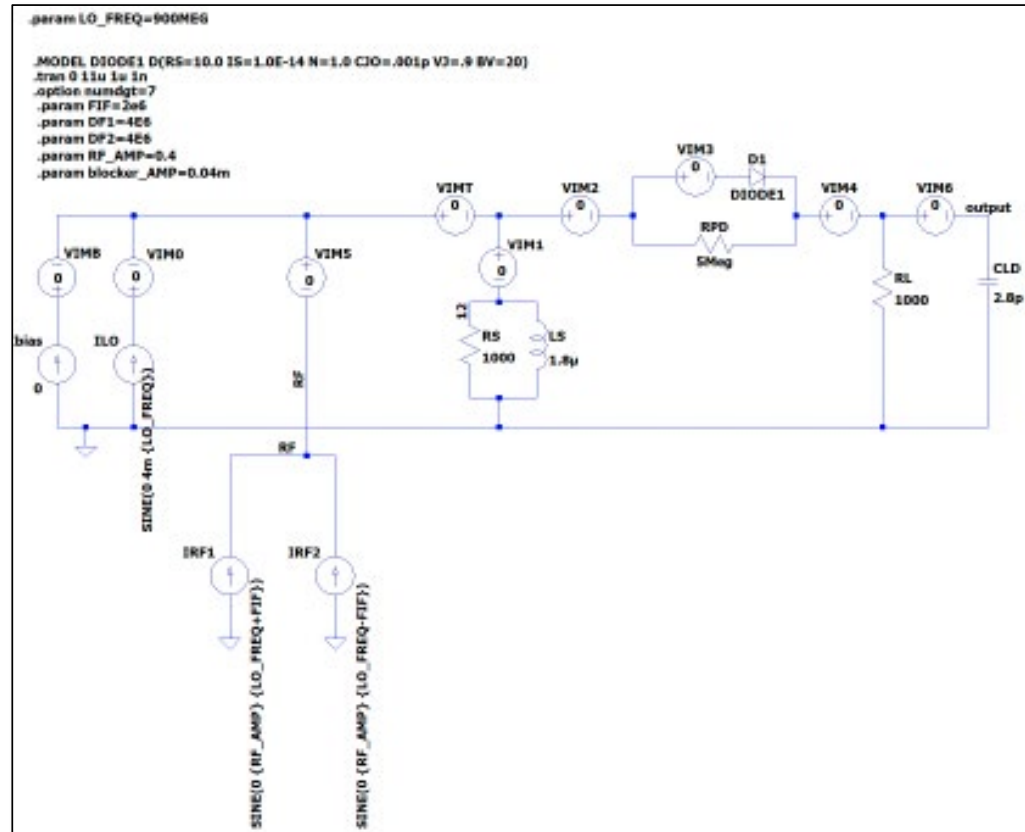
POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

37

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



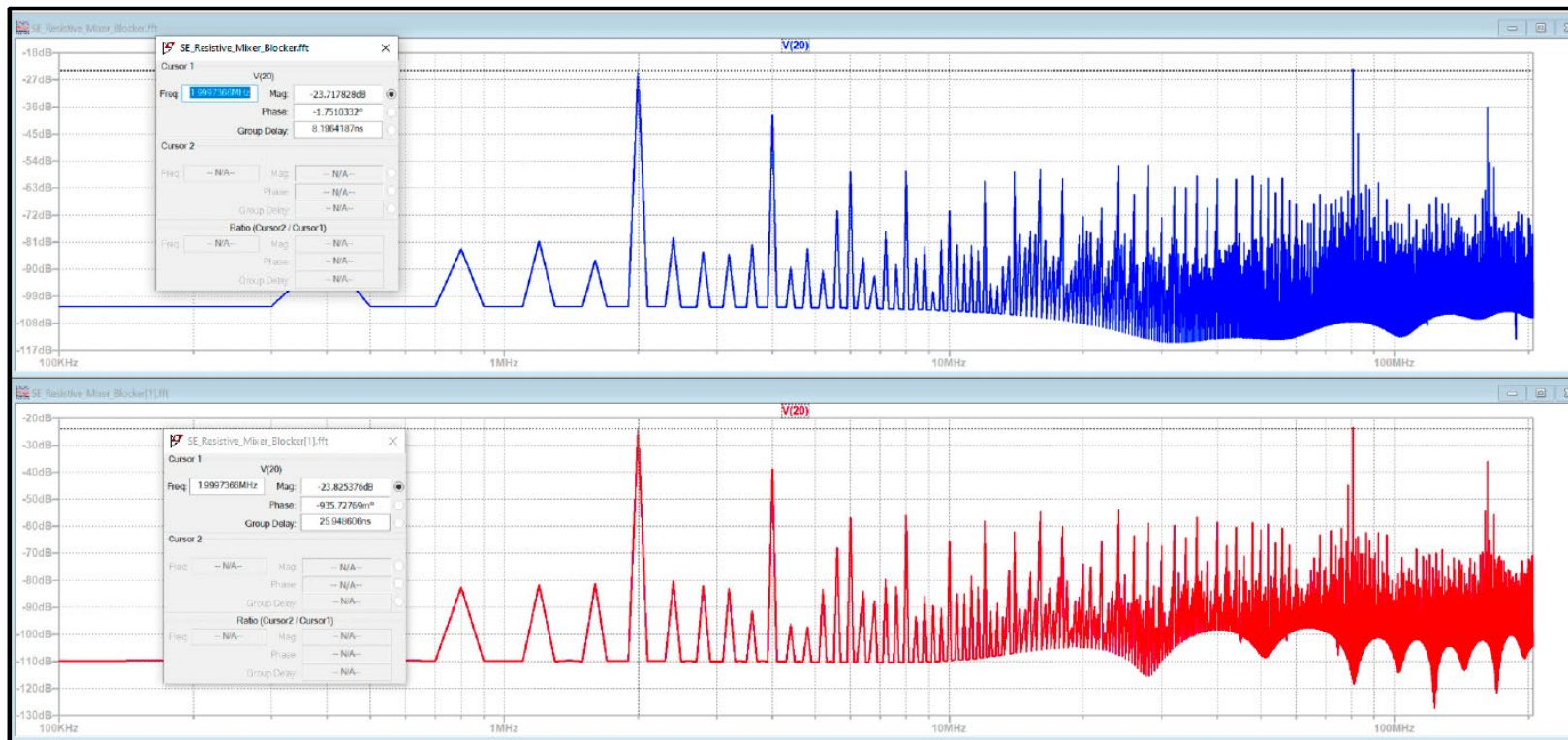
POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

38

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



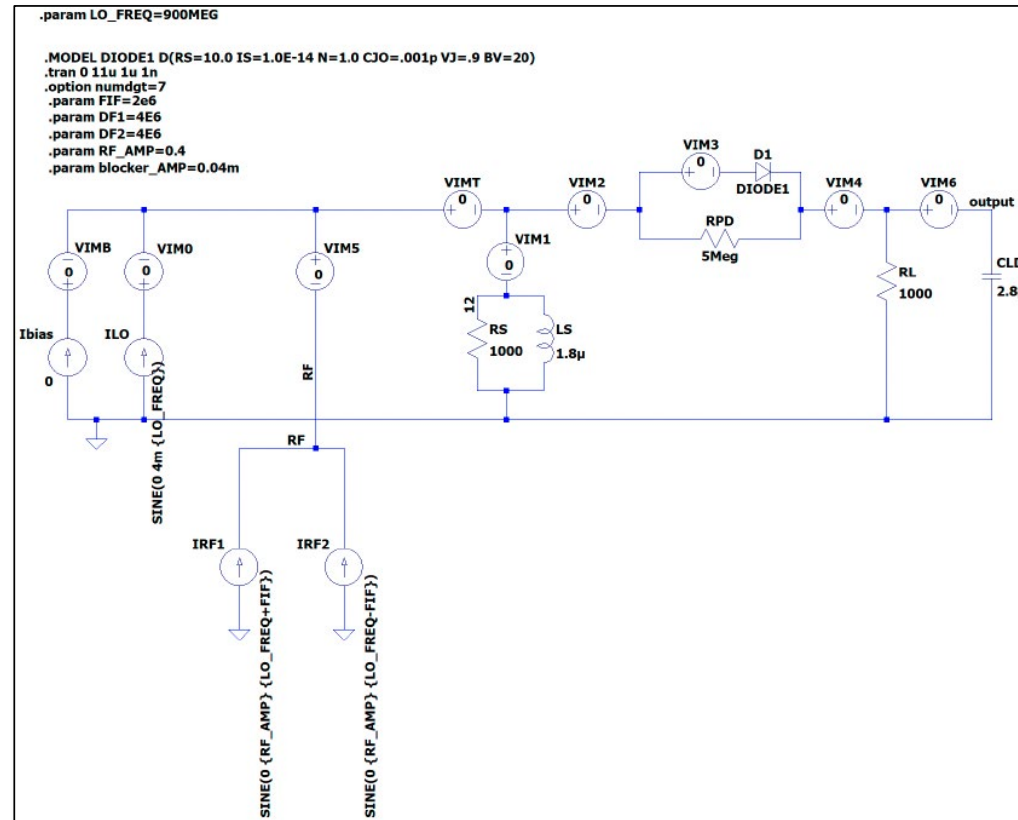
POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

39

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



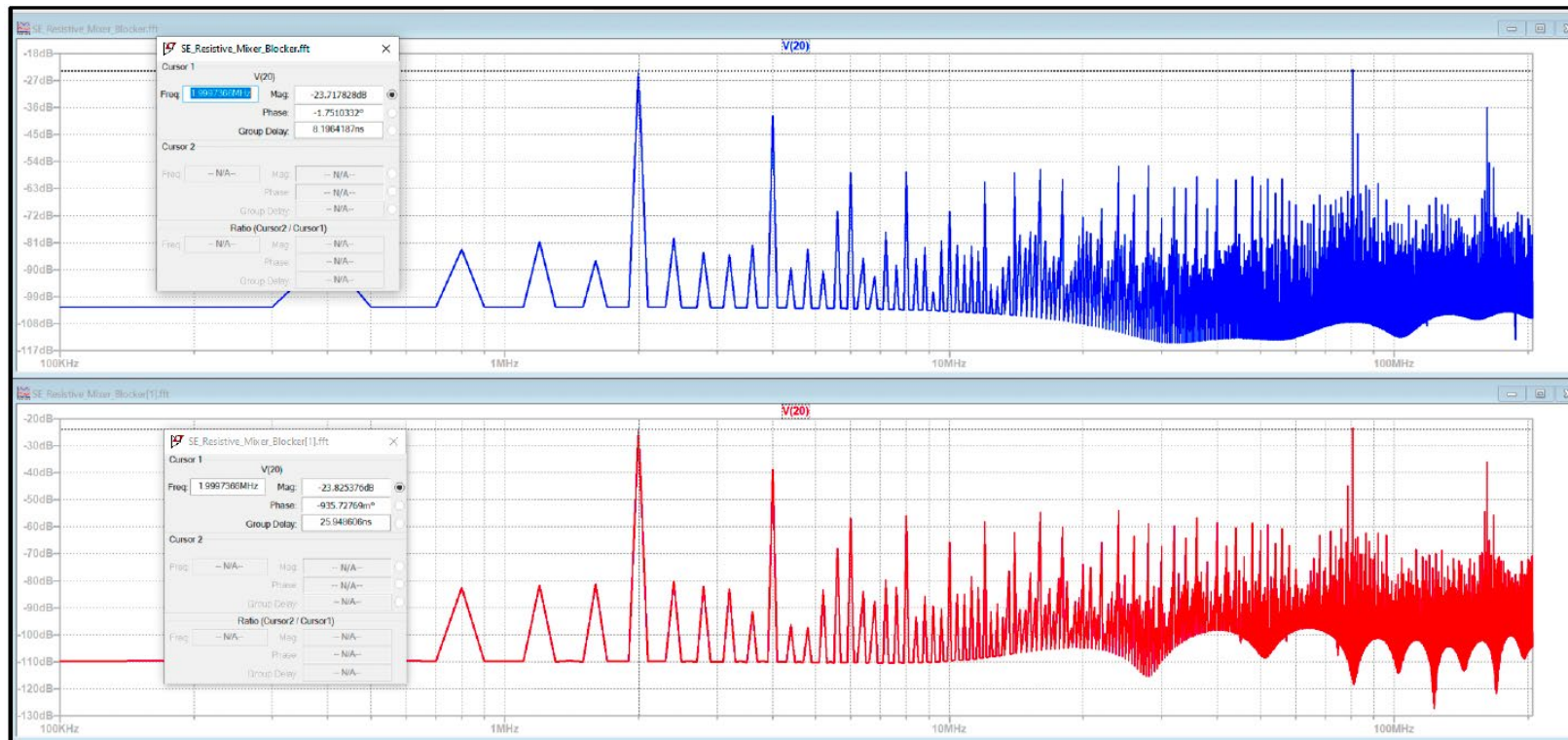
DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

40

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



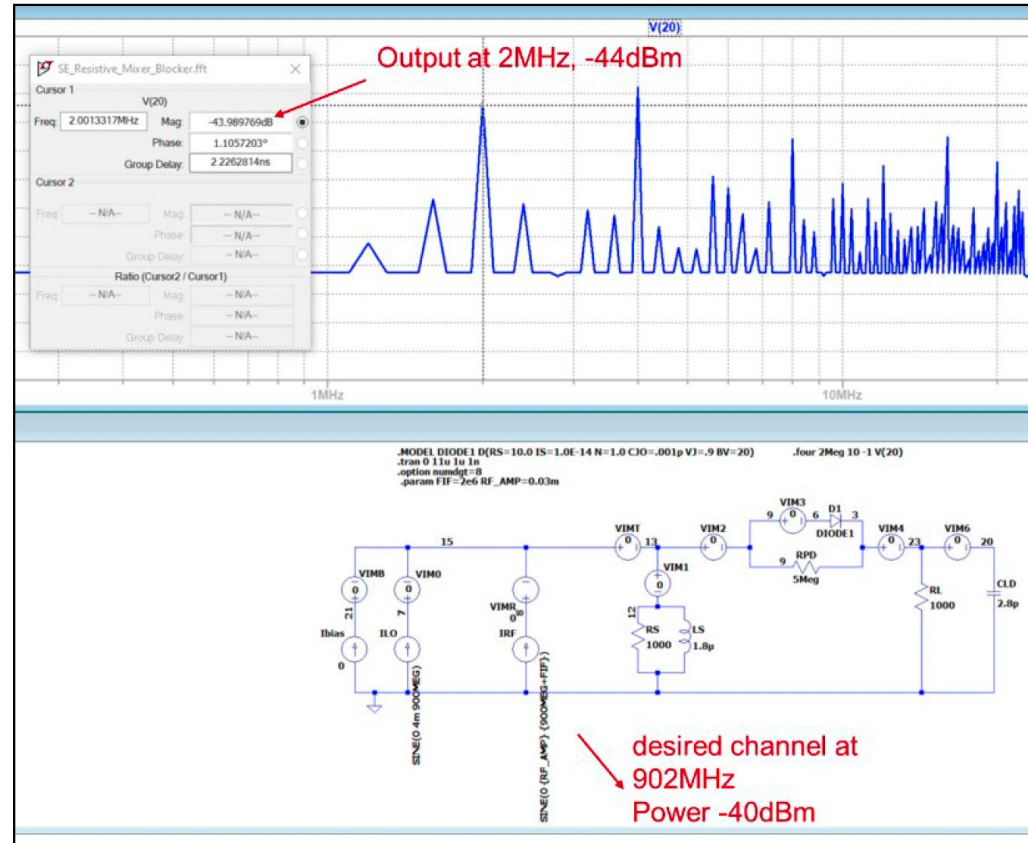
POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

41

Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



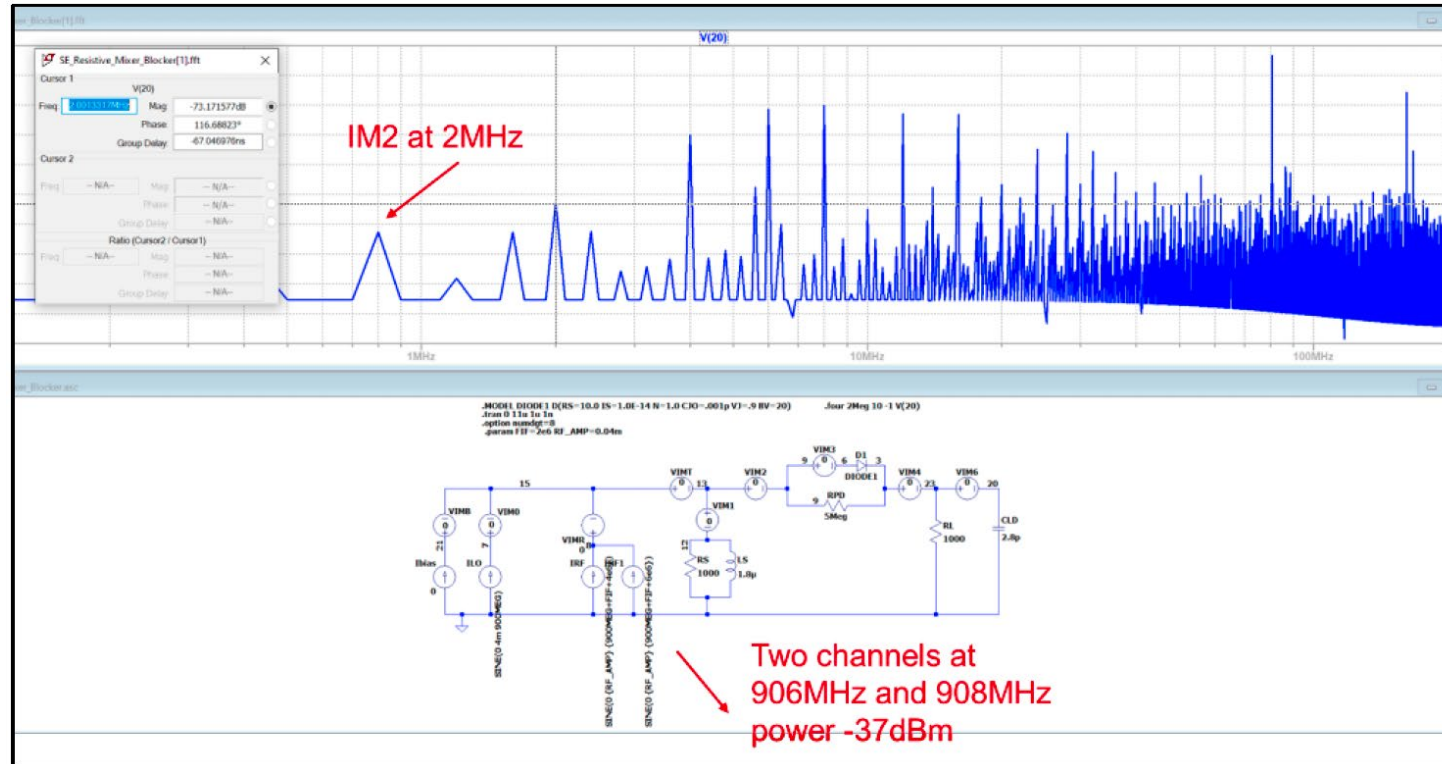
POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Young/Estabrook System Does Not Disclose/Suggest a Plurality of Protocols/Standards

Ricketts' Simulation:



POR, 79-85; Sur-Reply, 21-24;
Ex. 2006, ¶¶316-31.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Nevo/Avitable Does Not Disclose

**“A Second EM Signal Is Generated
From Said Stored Energy”**

Nevo/Avitable Does Not Disclose “A Second EM Signal Is Generated From Said Stored Energy”

11. A method for performing simultaneous multi-platform operations, comprising:

- (1) controlling at least one multi-platform module to communicate with at least one of a plurality of communication links using a control module having a plurality of standard/protocol sub-modules, wherein the at least one multi-platform module includes a plurality of transceivers each having at least one frequency translation module, wherein said at least one frequency translation module comprises

a switch configured to operate according to an energy transfer signal, and to sub-sample and transfer energy from a first electromagnetic (EM) signal, and

a storage module coupled to said switch and configured to store said transferred energy, wherein a second EM sig-

nal is generated from said stored energy, said second EM signal having a frequency different from said first EM signal;

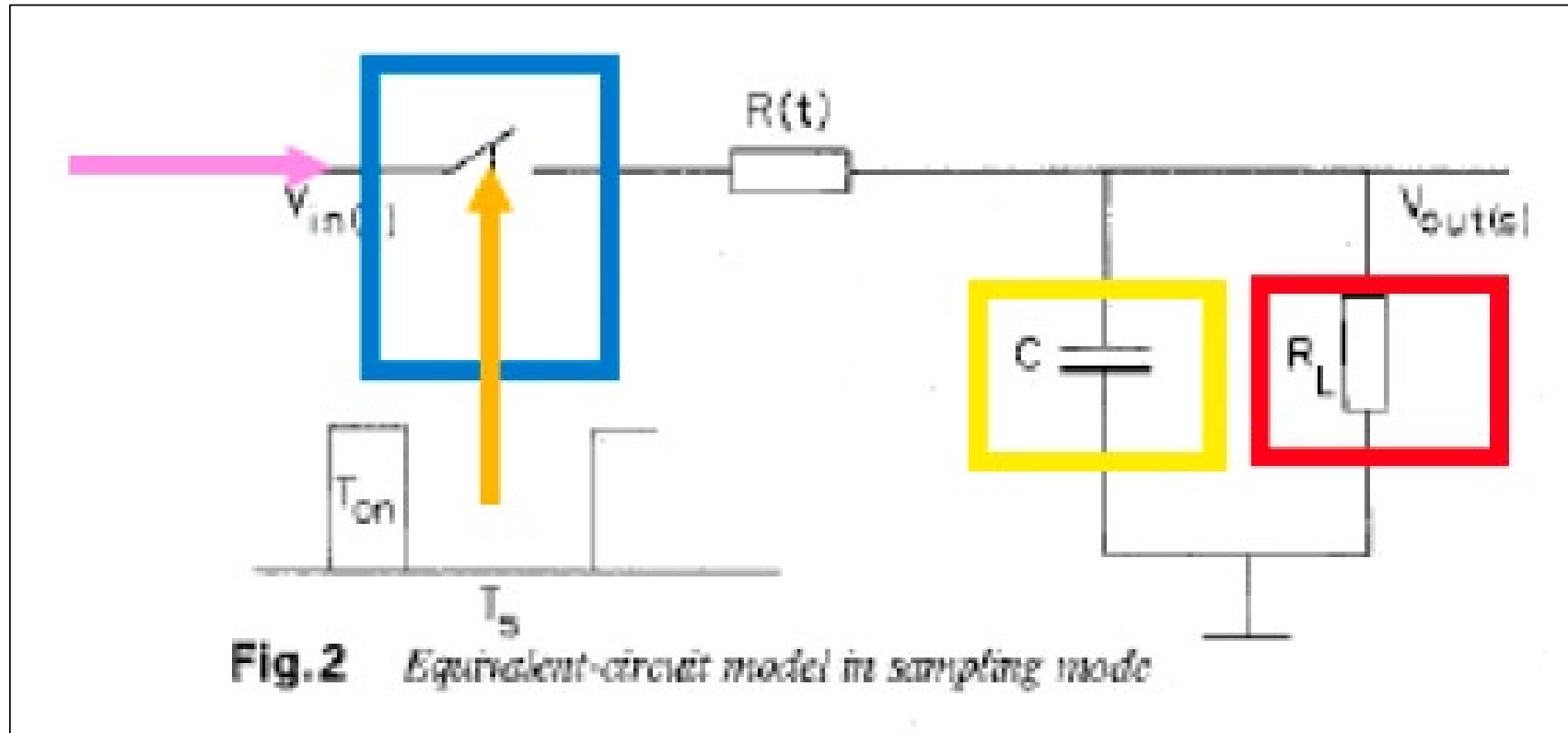
- (2) operating a first transceiver in conformance with a first protocol/standard combination using a first standard/protocol sub-module; and
- (3) operating a second transceiver in conformance with a second protocol/standard combination using a second standard/protocol sub-module.

Nevo/Avitabile Does Not Disclose “A Second EM Signal Is Generated From Said Stored Energy”

1 Introduction

Radar and communication systems often require complex waveform detection to be implemented for separately processing the in-phase (I) and quadrature (Q) components of the received complex waveform. Subsequent conversion in numeric form, if requested, requires that the sampling and holding operation to be performed after demodulation. The resulting downconverter architecture represents a critical and costly unit of the receiver. This paper describes a new digital downconverter configuration which performs complex detection by means of the sample-and-hold (SH) in a single step by using a single-channel configuration.

Nevo/Avitable Does Not Disclose “A Second EM Signal Is Generated From Said Stored Energy”



The '518 Patent Re-examination is Relevant

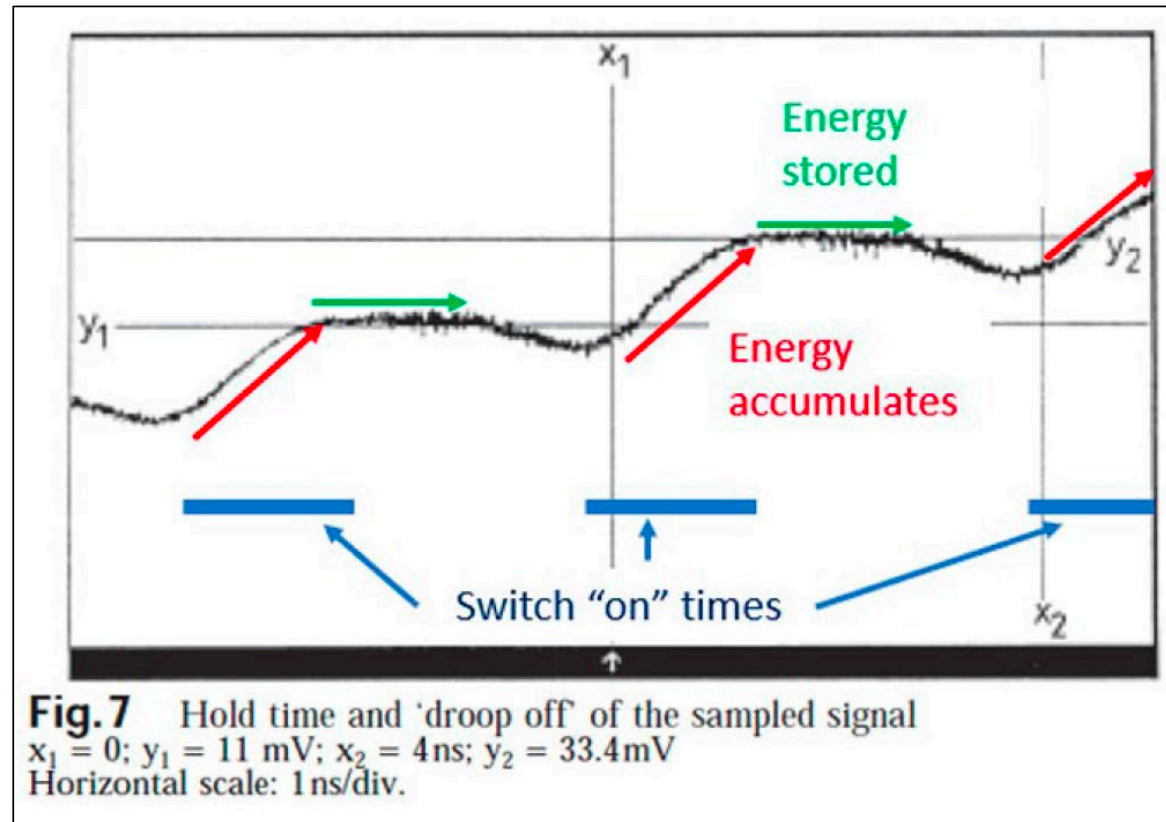
1. A method for down-converting a carrier signal to a baseband signal, comprising the steps of:
 - (1) receiving a carrier signal that includes at least one of amplitude variations, phase variations, or frequency variations at a frequency lower than a carrier frequency of the carrier signal;
 - (2) sampling the carrier signal over aperture periods to transfer energy from the carrier signal at an aliasing rate, the aliasing rate determined according to a frequency of the carrier signal divided by N, wherein N indicates a harmonic or sub-harmonic of the carrier signal;
 - (3) integrating the energy over the aperture periods; and
 - (4) generating the baseband signal from the integrated energy.

Reply, 11-14; Sur-Reply, 26-27;
Ex. 1053, Claim 1.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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The '518 Patent Re-examination is Relevant



Nevo/Avitable Does Not Disclose

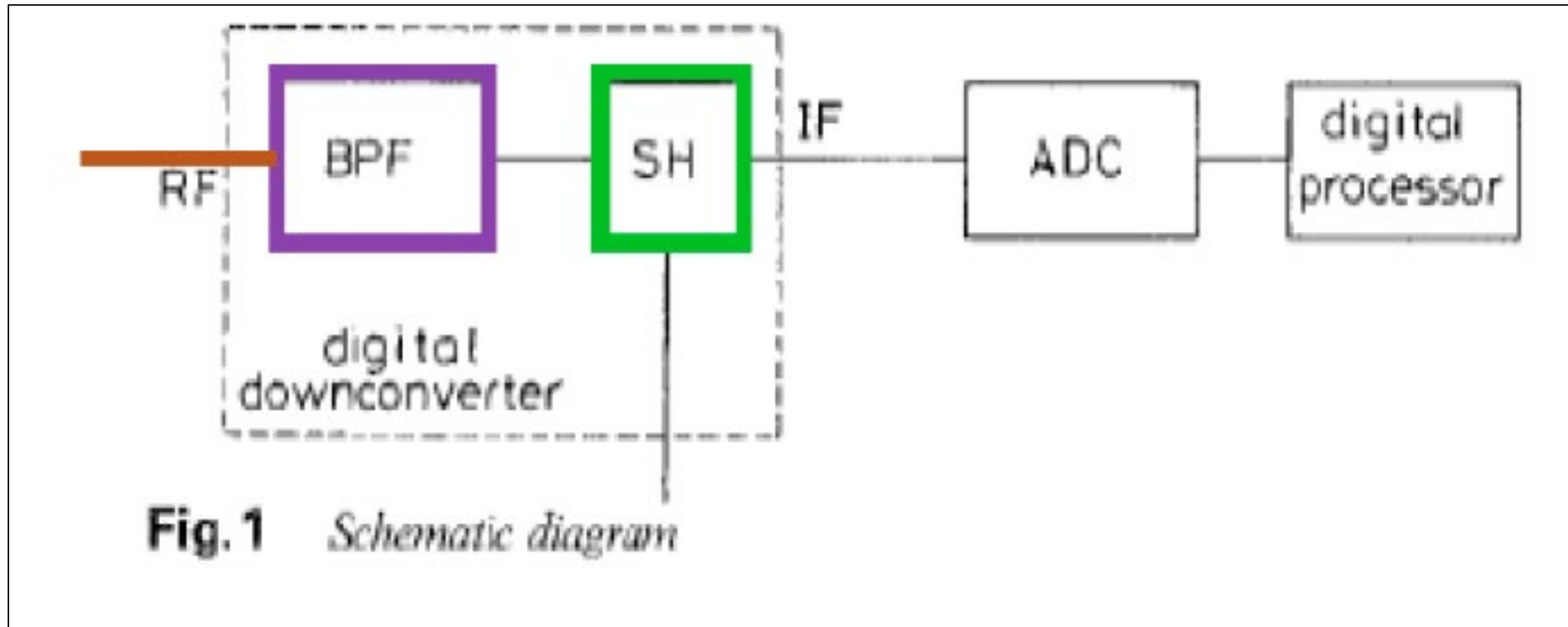
An “Energy Transfer Signal”

Nevo/Avitabile Does Not Teach/Disclose An “Energy Transfer Signal”

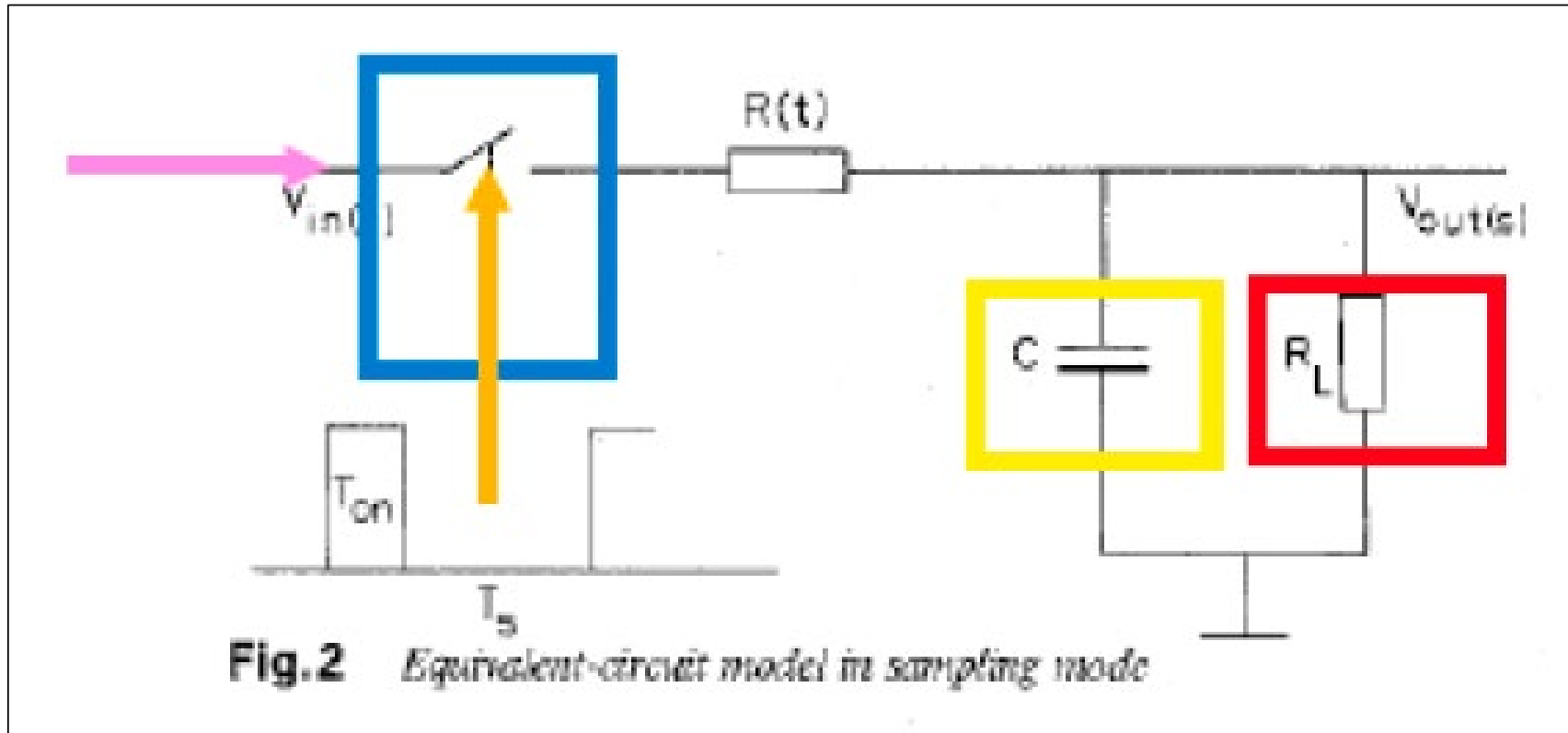
1 Introduction

Radar and communication systems often require complex waveform detection to be implemented for separately processing the in-phase (I) and quadrature (Q) components of the received complex waveform. Subsequent conversion in numeric form, if requested, requires that the sampling and holding operation to be performed after demodulation. The resulting downconverter architecture represents a critical and costly unit of the receiver. This paper describes a new digital downconverter configuration which performs complex detection by means of the sample-and-hold (SH) in a single step by using a single-channel configuration.

Nevo/Avitabile Does Not Teach/Disclose An “Energy Transfer Signal”



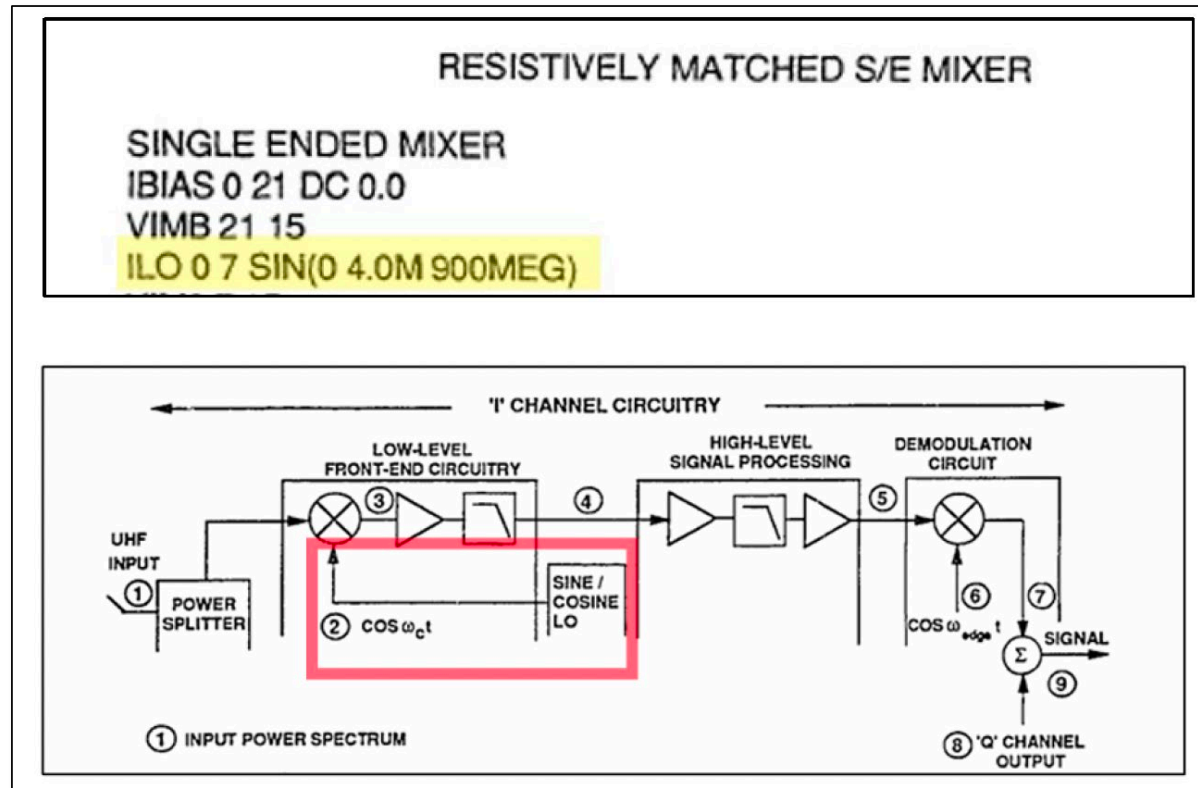
Nevo/Avitabile Does Not Teach/Disclose An “Energy Transfer Signal”



Young/Estabrook Does Not Disclose

“A Switch Configured To Operate
According To An Energy Transfer Signal”

Young/Estabrook Does Not Disclose “A Switch Configured To Operate According To An Energy Transfer Signal”



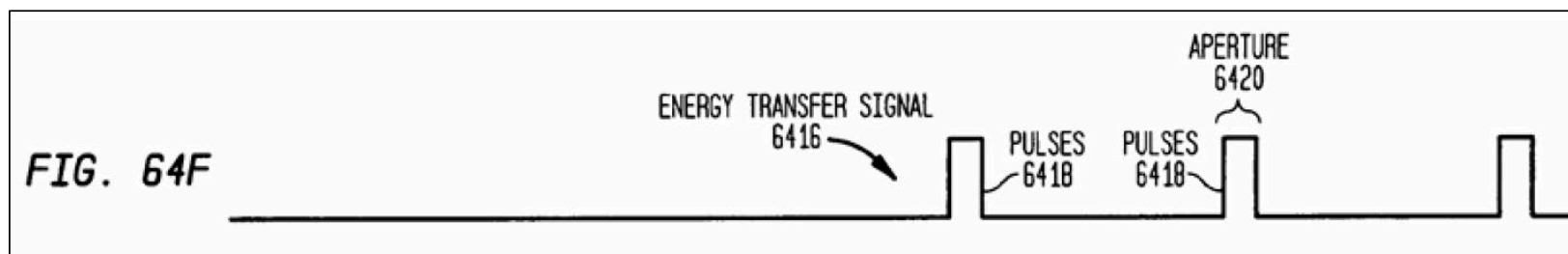
Sine Wave
Not Pulse

POR, 73-74; Sur-Reply, 29-31;
Ex. 1005, Fig. 14(b).

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Young/Estabrook Does Not Disclose “A Switch Configured To Operate According To An Energy Transfer Signal”



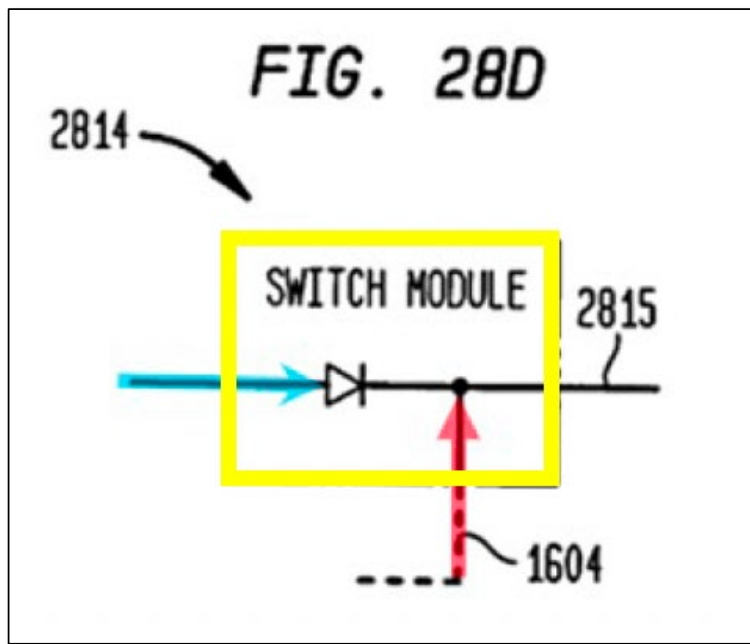
A sine-wave does **not** have apertures

A sine-wave is a ***continuous*** waveform

Young/Estabrook Does Not Disclose “A Switch Configured To Operate According To An Energy Transfer Signal”

Patent:

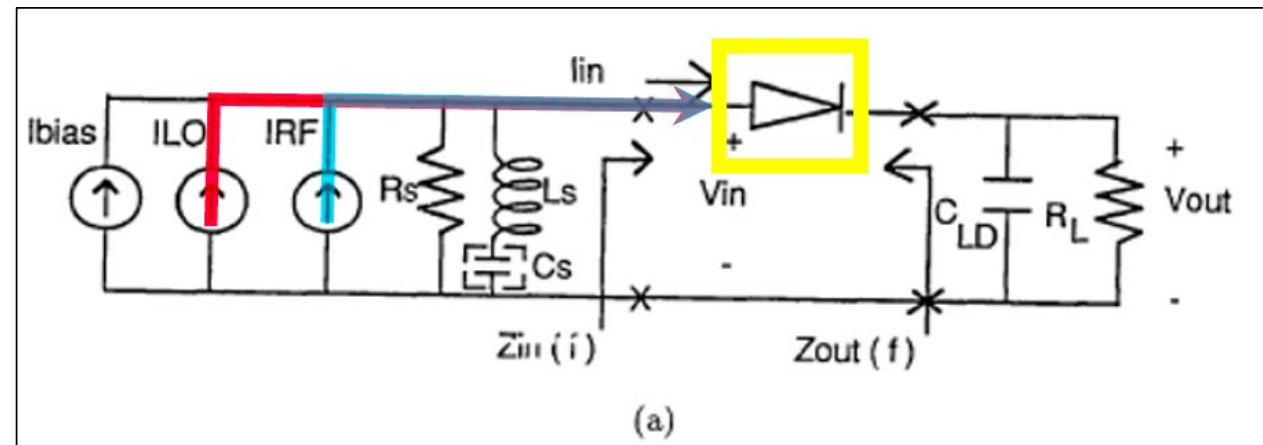
Independent control input



Sur-Reply, 29-31; Ex. 1001, Fig. 28D;
Ex. 1005, Fig. 14(a).

Estabrook:

No independent control input

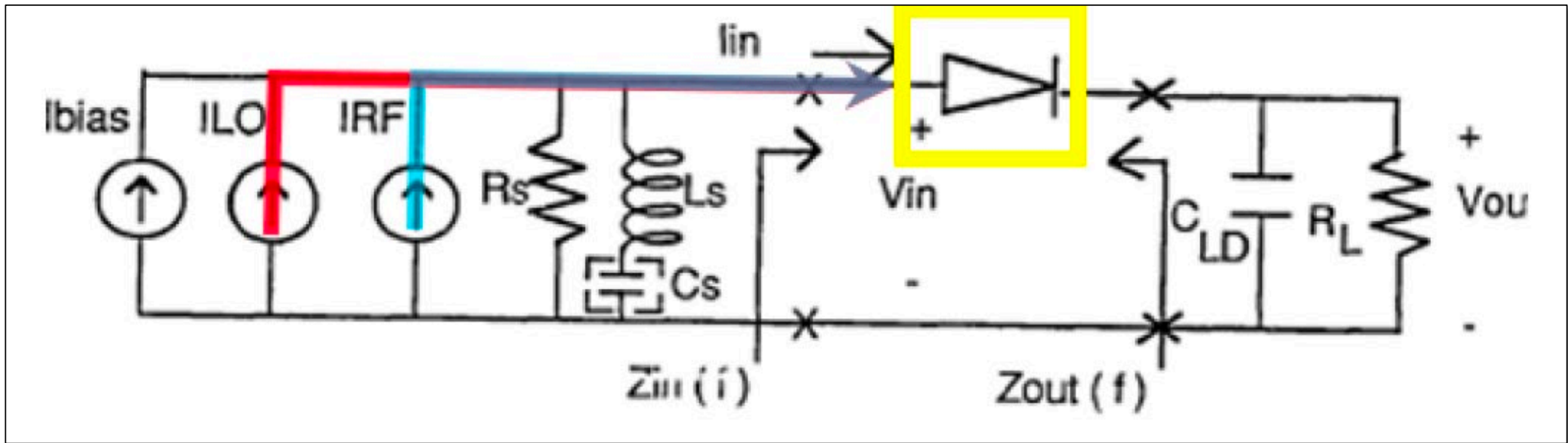


DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

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Estabrook's Diode Is Not Operating According To An “Energy Transfer Signal”

The alleged switch (diode) is **not** operating according to ILO

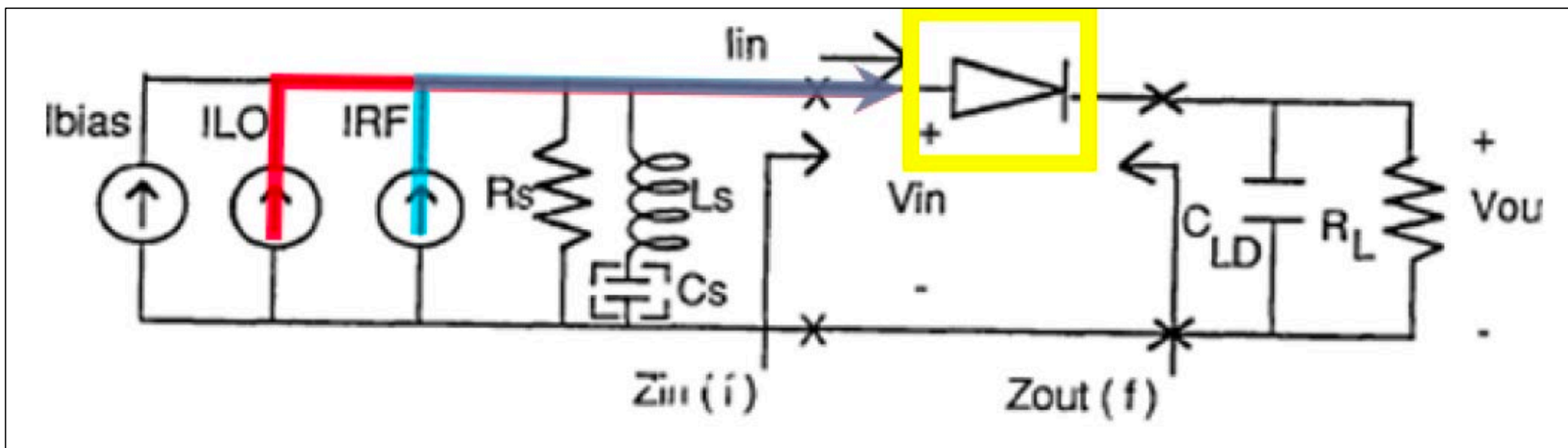


Young/Estabrook Does Not Disclose

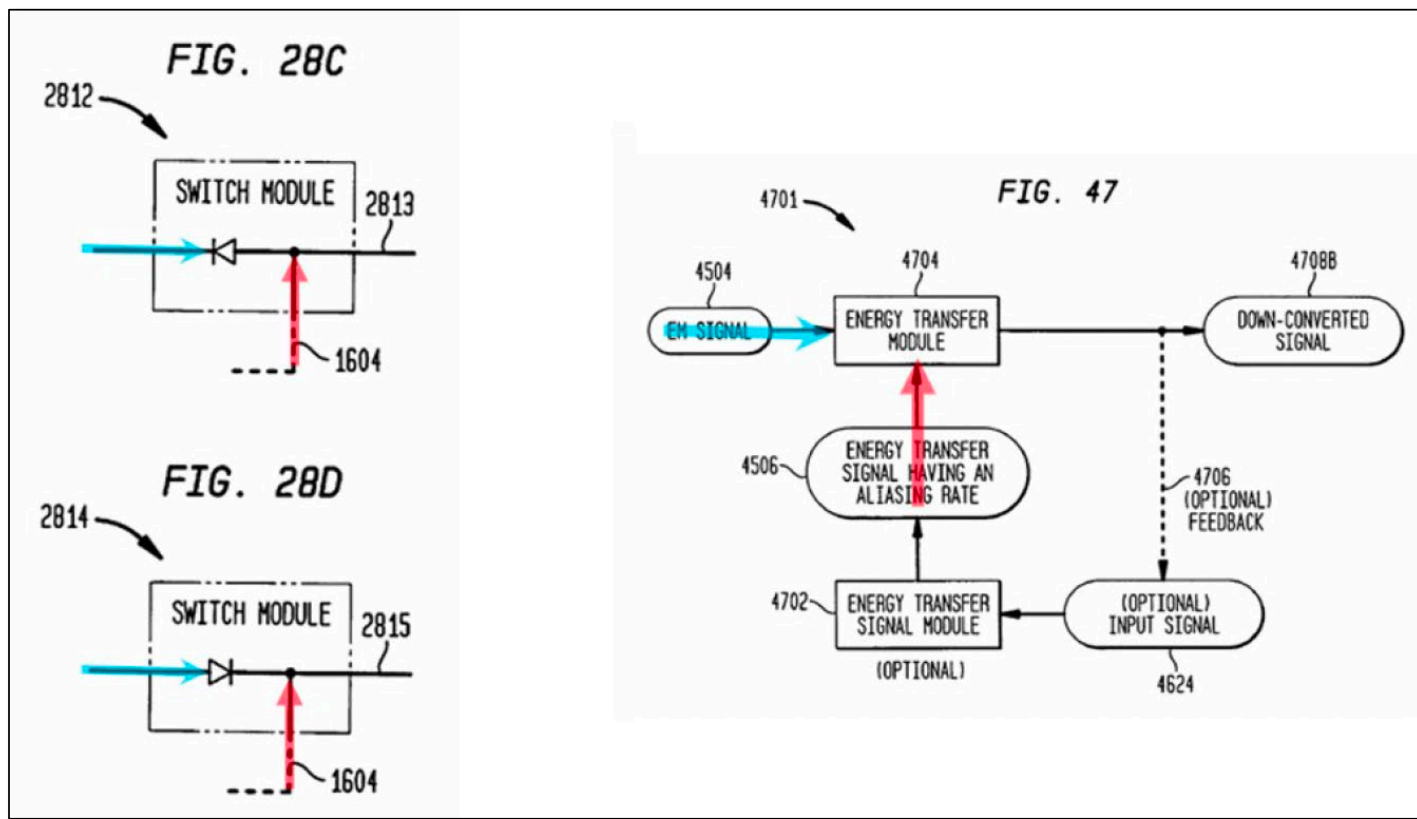
“A Switch Configured . . . To Sub-sample...a First
Electromagnetic (EM) Signal”

Young/Estabrook Does Not Disclose “A Switch Configured ... To Sub-sample ... a First Electromagnetic (EM) Signal”

The alleged switch (diode) does **not** sub-sample the IRF



Young/Estabrook Does Not Disclose “A Switch Configured . . . To Sub-sample...a First Electromagnetic (EM) Signal.”



Sur-Reply, 31-32; Ex. 1001, Figs. 28C/D, 47.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

61

Young/Estabrook Does Not Disclose “A Switch Configured . . . To Sub-sample...a First Electromagnetic (EM) Signal.”

