



PTAB Oral Argument

July 11, 2024

**MICROSOFT CORPORATION and
AFFIRMED NETWORKS, INC.,**
PETITIONERS

v. **LEMKO CORPORATION**
PATENT OWNER

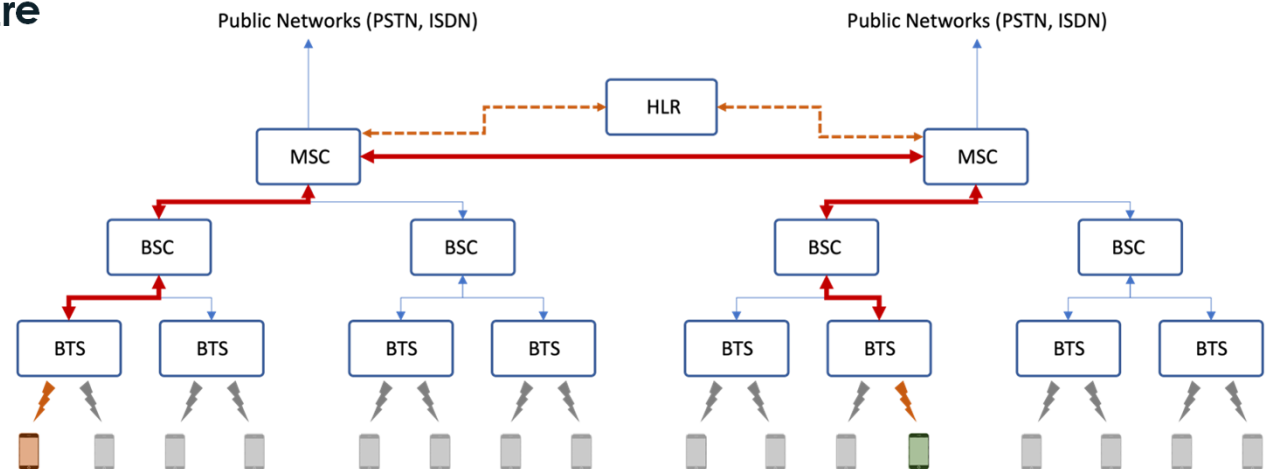
IPR2023-00529 (U.S. PAT NO. 7,653,414)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Technical Background

Conventional cellular network architecture:

- **Centralized**
- **Hierarchical**
- **Specialized-Hardware**
- **Expensive**



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POR at 3-9, 72-77; Ex. 2021 at ¶33; Ex. 2022 at 4-5;
Ex. 2003; Ex. 2002 at 1-3; Ex. 2032 at 3

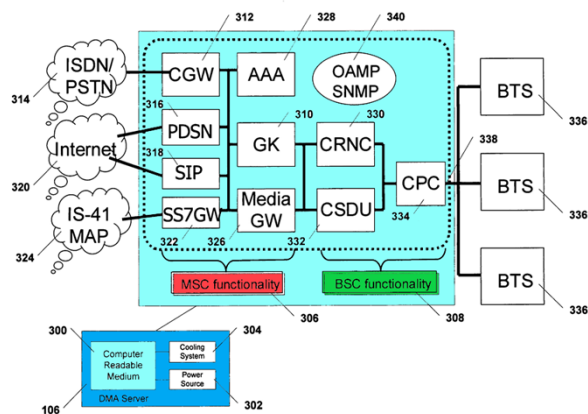
Acronyms / Glossary

MSC	Mobile switching center
BSC	Base station controller
BTS	Base transceiver station
HLR	Home location register
VLR	Visitor location register
UE	User Equipment (e.g., cellphone)
WWAN	Wireless wide area network
WLAN	Wireless local area network
NIB	Network-in-a-box

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'414 Patent: DMA Call Routing

- Peer-to-peer network of DMA nodes
- MSC/BSC controlling logic distributed amongst nodes



- Benefit: eliminate/reduce need for expensive centralized hubs and expensive backhaul connections

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4

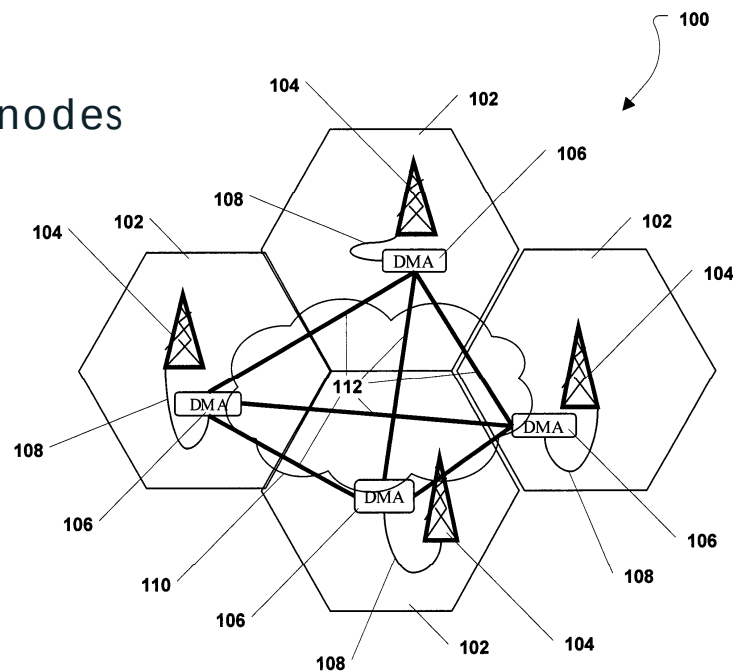
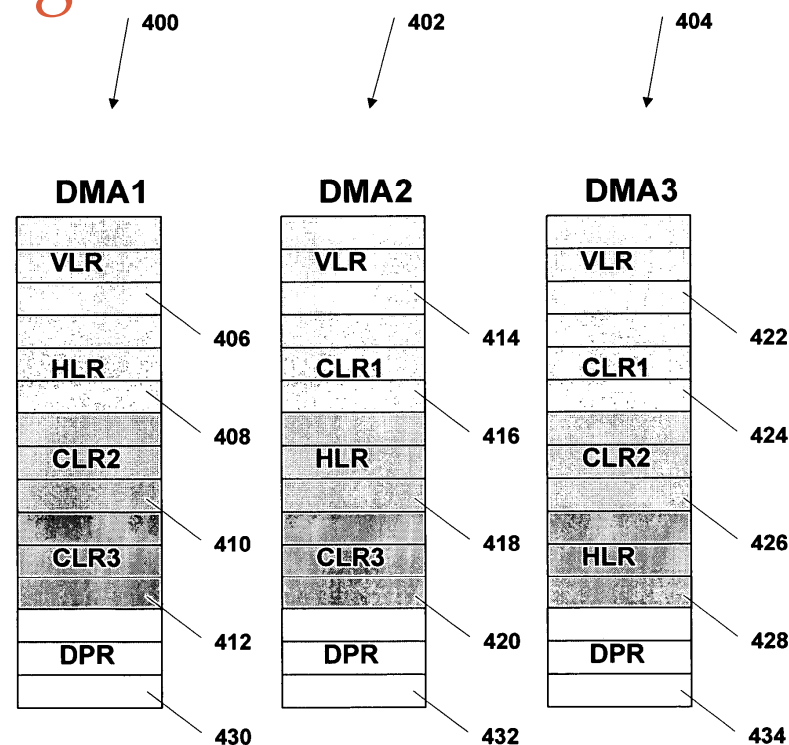


FIG. 1

POR at 9-15; '414 Pat, Fig. 1, 3 (annotated);
Ex. 2021 at ¶39-43

'414 Patent: DMA Call Routing

- The inventors created new technical features to implement '414 Patent's novel distributed mobile architecture:
 - Destination preference register (DPR)
 - Community location register (CLR)



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5

POR at 12-15, 46-47;
'414 Pat, Fig. 4, 5:41-54, 3:28-35, 8:3-29, 8:30-36

'414 Patent – Claim 1

1. A method, comprising:

- receiving, at a first distributed mobile architecture (DMA) system of a DMA network, a call from a first mobile subscriber to a second mobile subscriber, wherein the DMA network includes at least the first DMA system and a second DMA system;
- determining whether the second mobile subscriber is located within a first wireless coverage area of the DMA network that is associated with the first DMA system based on information stored at a home location register (HLR) of the first DMA system and a visitor location register (VLR) of the first DMA system;
- when the second mobile subscriber is located within the first wireless coverage area, connecting the call to the second mobile subscriber via the first DMA system;
- when the second mobile subscriber is not located within the first wireless coverage area, determining whether the second mobile subscriber is located within a second wireless coverage area of the DMA network that is associated with the second DMA system based on information stored at a community location register (CLR) associated with the second DMA system, wherein the CLR associated with the second DMA system is stored at the first DMA system; and
- when the second mobile subscriber is not located within the first wireless coverage area and is not located within the second wireless coverage area, determining a preferred call path to route the call outside of the DMA network based on information stored at a destination preference register (DPR), wherein the DPR is stored at the first DMA system.

'414 Patent – Claim 8

8. A method, comprising:

- receiving, at a first distributed mobile architecture (DMA) system of a DMA network, a call from a first mobile subscriber to a second mobile subscriber, wherein the DMA network includes at least the first DMA system, a second DMA system, and a third DMA system;
- determining whether the second mobile subscriber is located within a first wireless coverage area of the DMA network that is associated with the first DMA system based on information stored at a home location register (HLR) of the first DMA system and a visitor location register (VLR) of the first DMA system;
- when the second mobile subscriber is located within the first wireless coverage area, connecting the call to the second mobile subscriber via the first DMA system;
- when the second mobile subscriber is not located within the first wireless coverage area, determining whether the second mobile subscriber is located within a second wireless coverage area of the DMA network that is associated with the second DMA system based on information stored at a community location register (CLR) associated with the second DMA system, wherein the CLR associated with the second DMA system is stored at the first DMA system;
- when the second mobile subscriber is not located within the first wireless coverage area and is not located within the second wireless coverage area, determining whether the second mobile subscriber is located within a third wireless coverage area of the DMA network that is associated with the third DMA system based on information stored at a CLR associated with the third DMA system, wherein the CLR associated with the third DMA system is stored at the first DMA system; and
- when the second mobile subscriber is not located within any of the first wireless coverage area, the second wireless coverage area, and the third wireless coverage area, determining a preferred call path to route the call outside of the DMA network based on information stored at a destination preference register (DPR), wherein the DPR is stored at the first DMA system.

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7

'414 Patent – Claim 11

11. A distributed mobile architecture (DMA) system, comprising:

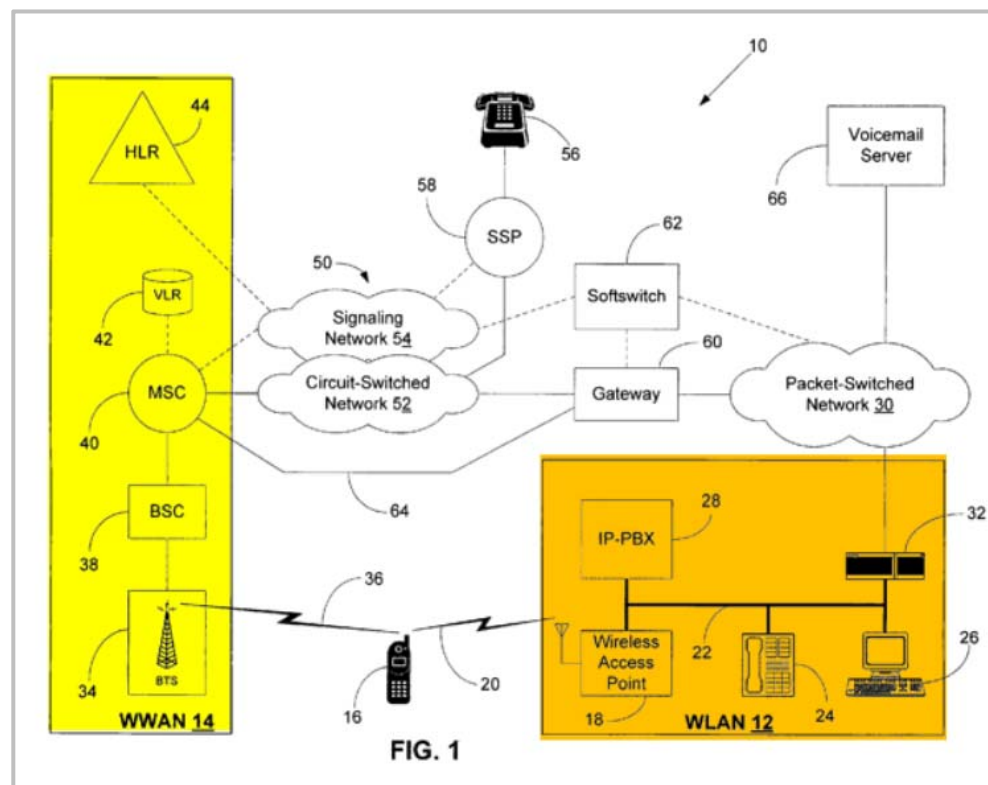
- a housing;
- a base transceiver station coupled to the housing, the base transceiver station operable to receive a call from a mobile subscriber;
- a computer readable storage medium within the housing, the computer readable storage medium comprising:
 - an authentication, authorization, and accounting (AAA) module embedded within the computer readable storage medium, the AAA module comprising:
 - a home location register (HLR) that stores information associated with one or more mobile subscriber devices that are registered with the DMA system;
 - a visitor location register (VLR) that stores information associated with one or more roaming mobile subscriber devices that are temporarily registered with the DMA system;
 - a community location register (CLR) that stores information associated with a second HLR of a second DMA system, wherein the second HLR stores information associated with one or more mobile subscriber devices that are registered with the second DMA system; and
 - a destination preference register (DPR) that stores one or more preferred call paths for calls to be routed outside of a DMA network that is accessible to the DMA system, wherein the DMA network includes at least the first DMA system and the second DMA system,
- a call routing component embedded within the computer readable storage medium, the call routing component comprising processor executable instructions to route the call via a particular preferred call path of the one or more preferred call paths stored at the DPR when the AAA module determines that the call is directed to a destination device that is outside of the DMA network.

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Mauer (Ex. 1005)

- Mauer is about a “multi-mode” mobile phone that can communicate over two different types of existing wireless networks
- Mauer’s WWAN and WLAN use conventional cellular and wireless networks



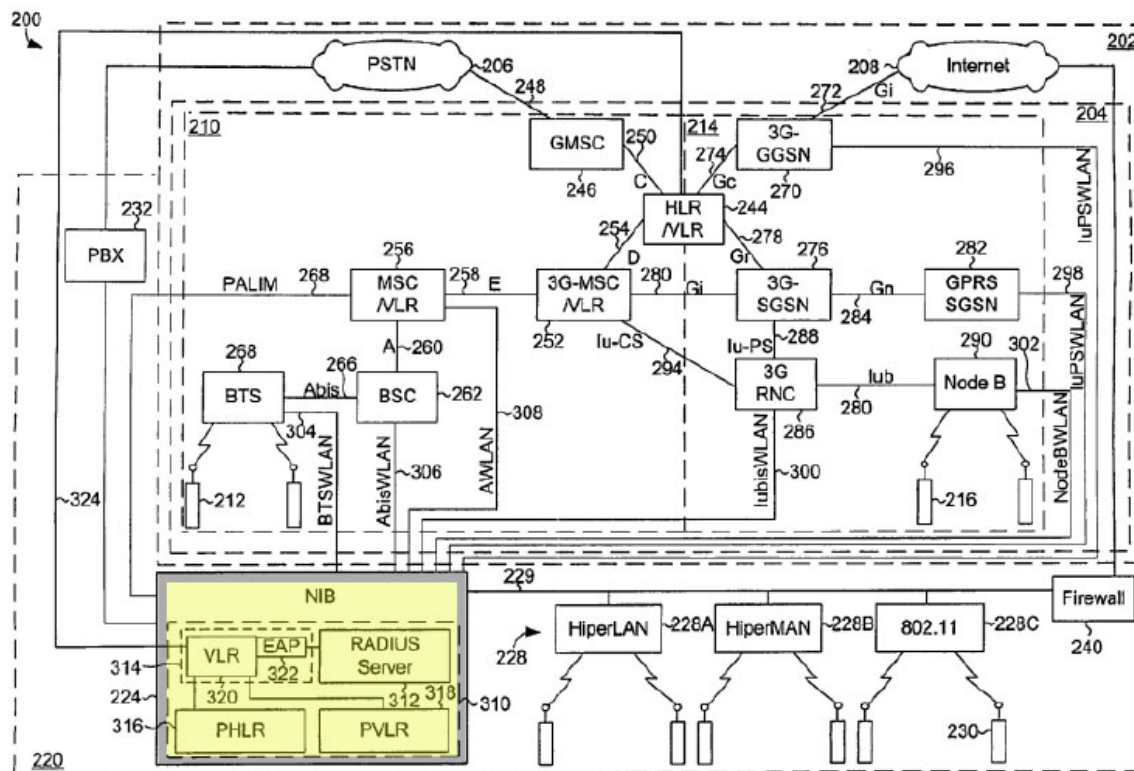
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

9

POR at 17-19; Pet. at 12;
Ex. 1005, Fig. 1 (Petitioners' annotation)

Waylett (Ex. 1006)

- Traditional hierarchical approach to cellular
- Network-in-a box (NIB)
 - InterWAVE's WAVExpress NIB commercial product



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

10

POR at 15-17; Pet. at 8;
Ex. 1006, Fig. 6 (Petitioners' annotation)

Why Challenged Claims are Patentable over Maurer and Waylett

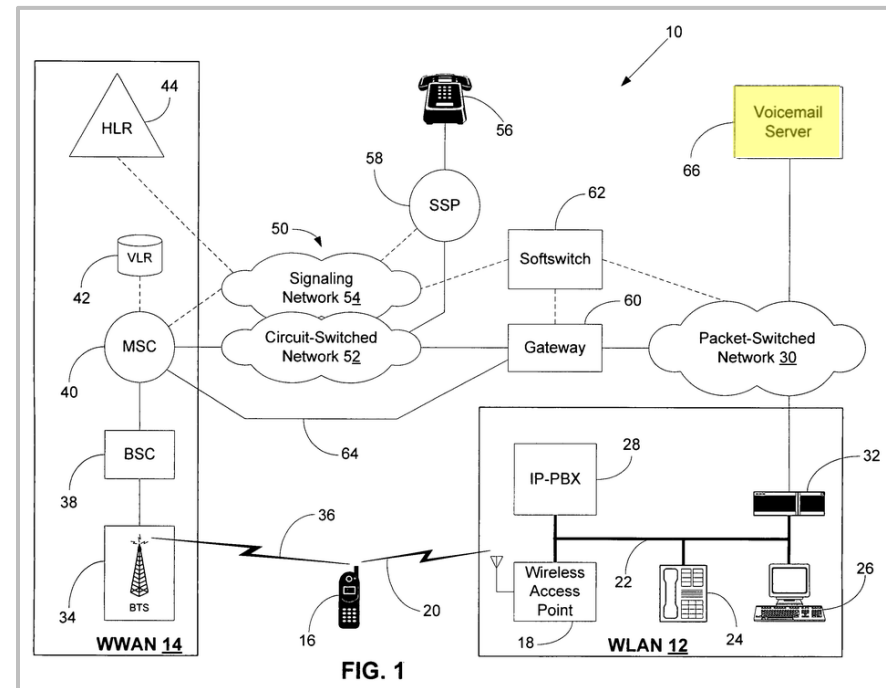
1. No Destination Preference Register (DPR)
2. No DMA systems of a DMA network
3. No Community Location Register (CLR)
4. No CRM having software-based MSC, BSC, and CDR functionality
5. Objective indicia of non-obviousness



Destination Preference Register

Mauer's Voicemail Option Does Not Render Obvious the Destination Preference Register

1. Routing to a voicemail server is not the call to the second mobile subscriber/destination device
2. Voicemail fallback option is not triggered in response to the second mobile subscriber being located outside of the DMA network
3. Voicemail server is not “outside” the alleged DMA network
4. Mauer does not disclose info stored at a DPR at a DMA system



POR at 45-58; Sur-Reply at 1-11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

13

Mauer and Waylett fail to disclose the destination preference register limitation

- Claims 1 and 8:
 - “receiving... a call from a first mobile subscriber to a second mobile subscriber...”
 - “determining a preferred call path to route the call outside of the DMA network based on information stored at a destination preference register (DPR), wherein the DPR is stored at the first DMA system”
- Claim 11:
 - “route the call via a particular preferred call path of the one or more preferred call paths stored at the DPR when the AAA module determines that the call is directed to a destination device that is outside of the DMA network”

Destination Preference Register

- Check if destination number is located in CLR
- If no, identify path based on MDN prefix
- E.g., : VoIP, ISDN, MSC

Referring to FIG. 6, a method of determining a preferred call path for calls to be routed outside of a DMA network is shown and commences at block 600. At block 600, a DMA registers a mobile subscriber within a home location register (HLR) of the DMA. At block 602, the DMA receives a call directed to a destination mobile directory number (MDN) that is not within any community location register (CLR) stored within the DMA. In a particular embodiment, this is an indication that the call is being made to a mobile directory number that is outside of a DMA network provided by one or more DMAs. Moving to block 604, the DMA determines a preferred call path based on the prefix of the MDN. In a particular embodiment, the DMA can match the prefix of the MDN with an MDN prefix within a destination preference register (DPR) stored within the DMA in order to determine a hierarchy of preferred call paths for routing the call to the MDN. In a particular embodiment, the MDN is a ten digit telephone number, e.g., 222-333-4444, and the prefix of the MDN can be the first three digits of the number, e.g., 222. Further, in a particular embodiment, the preferred call path can be placed over a VoIP interface, an ISDN interface, or an MSC interface.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

15

POSR at 2; '414 Pat at 9:26-10:19

Destination Preference Register

- Peer-to-peer DMA systems
- Each DMA system can have its own separate interface to networks outside of the DMA network
- When a call is made to a destination **outside** of the DMA network, peer-to-peer nature of the DMA network makes available all of these interfaces for routing the call outside of the DMA network
- Benefits: peers share interfaces, reduce duplicative interfaces

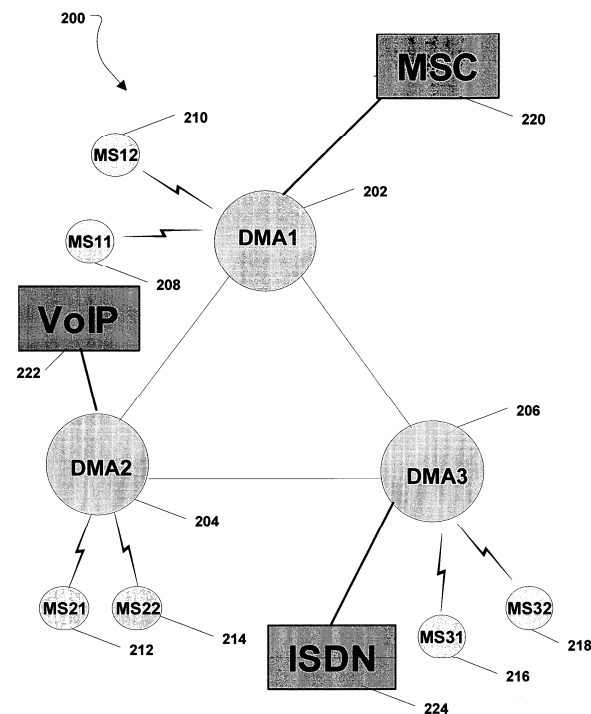


FIG. 2

POR at 45-46; '414 Pat at 5:3-20, 5:3-54, 5:62-6:4, 9:59-10:4

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

16

Destination Preference Register

500

510 512 514 516 518 520 522 524 526 528 530

	DMA1	IMSI	ESN	MDN	Loc	TLDN	Reg?	Timer	MSC1 Prefer	ISDN Prefer	VoIP Prefer
	HLR	IMSI11	ESN11	MDN11	@IP		y	4hr			
	IP Addr	IMSI12	ESN12	MDN12	@IP		y	4hr			
	GPS Loc	IMSI13	ESN13	MDN13		TLDN	y	4hr	@PC		
		IMSI14	ESN14	MDN14			n				
502	CLR2	IMSI21	ESN21	MDN21	NA	NA					
	IP Addr	IMSI22	ESN22	MDN22	NA	NA					
	GPS Loc	IMSI23	ESN23	MDN23	NA	NA					
	NB List	IMSI24	ESN24	MDN24	NA	NA					
504	CLR3	IMSI31	ESN31	MDN31	NA	NA					
	IP Addr	IMSI32	ESN32	MDN32	NA	NA					
	GPS Loc	IMSI33	ESN33	MDN33	NA	NA					
	NB List	IMSI34	ESN34	MDN34	NA	NA					
506	VLR	IMSIa	ESNa	NA	NA	TLDNa	y	4hr	@PC		
		IMSib	ESNb	NA	NA	TLDNb	y	4hr	@PC		
508		IMSIc	ESNc	NA	NA	TLDNc	y	4hr	@PC		
		Partial	Prefer	Prefer	Prefer						
		MDN	1	2	3						
	DPR	P1-MDN	MSC	ISDN	VoIP						
		P2-MDN	ISDN	MSC	VoIP						
		P3-MDN	VoIP	ISDN	MSC						

532 534 536 538

FIG. 5

'414 Pat at Fig. 5 (annotated)

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Routing to a voicemail server is not the call to the second mobile subscriber

- Claims require “the call” that is routed “outside of the DMA network” is the same “call from a first mobile subscriber to a second mobile subscriber”
 - Antecedent basis issue
- Petitioners do not dispute that Mauer cancels SS7 signaling for routing original call
- Establishing a call to a voicemail server is outside the scope of claims requiring call routing to original destination of “the call”

Claim construction: “the call” (Claims 1 and 8)

1. A method, comprising:

- receiving, at a first distributed mobile architecture (DMA) system of a DMA network, a call from a first mobile subscriber to a second mobile subscriber, wherein the DMA network includes at least the first DMA system and a second DMA system;
- determining whether the second mobile subscriber is located within a first wireless coverage area of the DMA network that is associated with the first DMA system based on information stored at a home location register (HLR) of the first DMA system and a visitor location register (VLR) of the first DMA system;
- when the second mobile subscriber is located within the first wireless coverage area, connecting the call to the second mobile subscriber via the first DMA system;
- when the second mobile subscriber is not located within the first wireless coverage area, determining whether the second mobile subscriber is located within a second wireless coverage area of the DMA network that is associated with the second DMA system based on information stored at a community location register (CLR) associated with the second DMA system, wherein the CLR associated with the second DMA system is stored at the first DMA system; and
- when the second mobile subscriber is not located within the first wireless coverage area and is not located within the second wireless coverage area, determining a preferred call path to route the call outside of the DMA network based on information stored at a destination preference register (DPR), wherein the DPR is stored at the first DMA system.

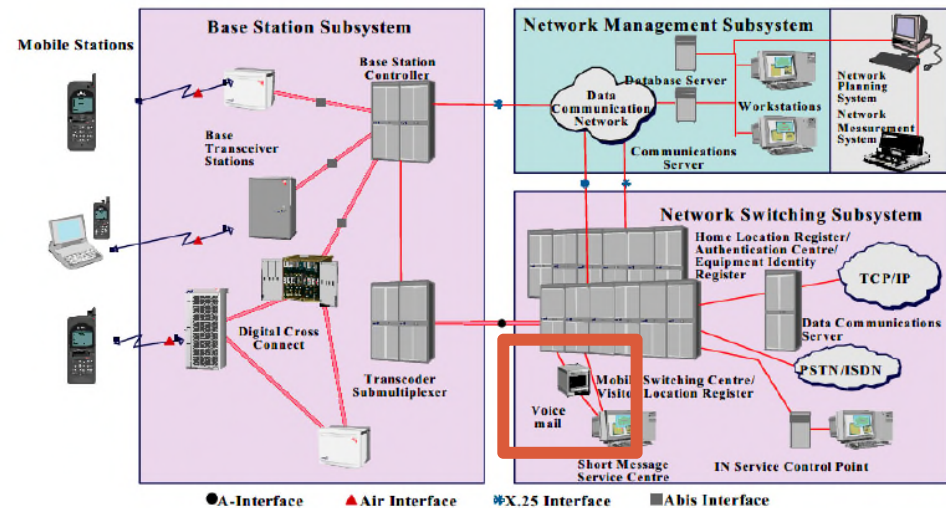
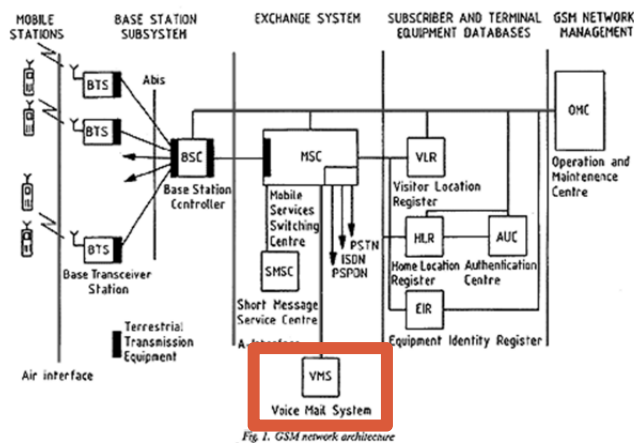
Claim construction: “the call” (Claim 11)

11. A distributed mobile architecture (DMA) system, comprising:

- a housing;
- a base transceiver station coupled to the housing, the base transceiver station operable to **receive a call from a mobile subscriber**;
- a computer readable storage medium within the housing, the computer readable storage medium comprising:
 - an authentication, authorization, and accounting (AAA) module embedded within the computer readable storage medium, the AAA module comprising:
 - a home location register (HLR) that stores information associated with one or more mobile subscriber devices that are registered with the DMA system;
 - a visitor location register (VLR) that stores information associated with one or more roaming mobile subscriber devices that are temporarily registered with the DMA system;
 - a community location register (CLR) that stores information associated with a second HLR of a second DMA system, wherein the second HLR stores information associated with one or more mobile subscriber devices that are registered with the second DMA system; and
 - a destination preference register (DPR) that stores one or more preferred call paths for calls to be routed outside of a DMA network that is accessible to the DMA system, wherein the DMA network includes at least the first DMA system and the second DMA system,
- a call routing component embedded within the computer readable storage medium, the call routing component comprising processor executable instructions to route **the call** via a particular preferred call path of the one or more preferred call paths stored at the DPR when the AAA module determines that **the call is directed to a destination device that is outside of the DMA network**.

Mauer's Voicemail Server is Part of the Alleged DMA Network

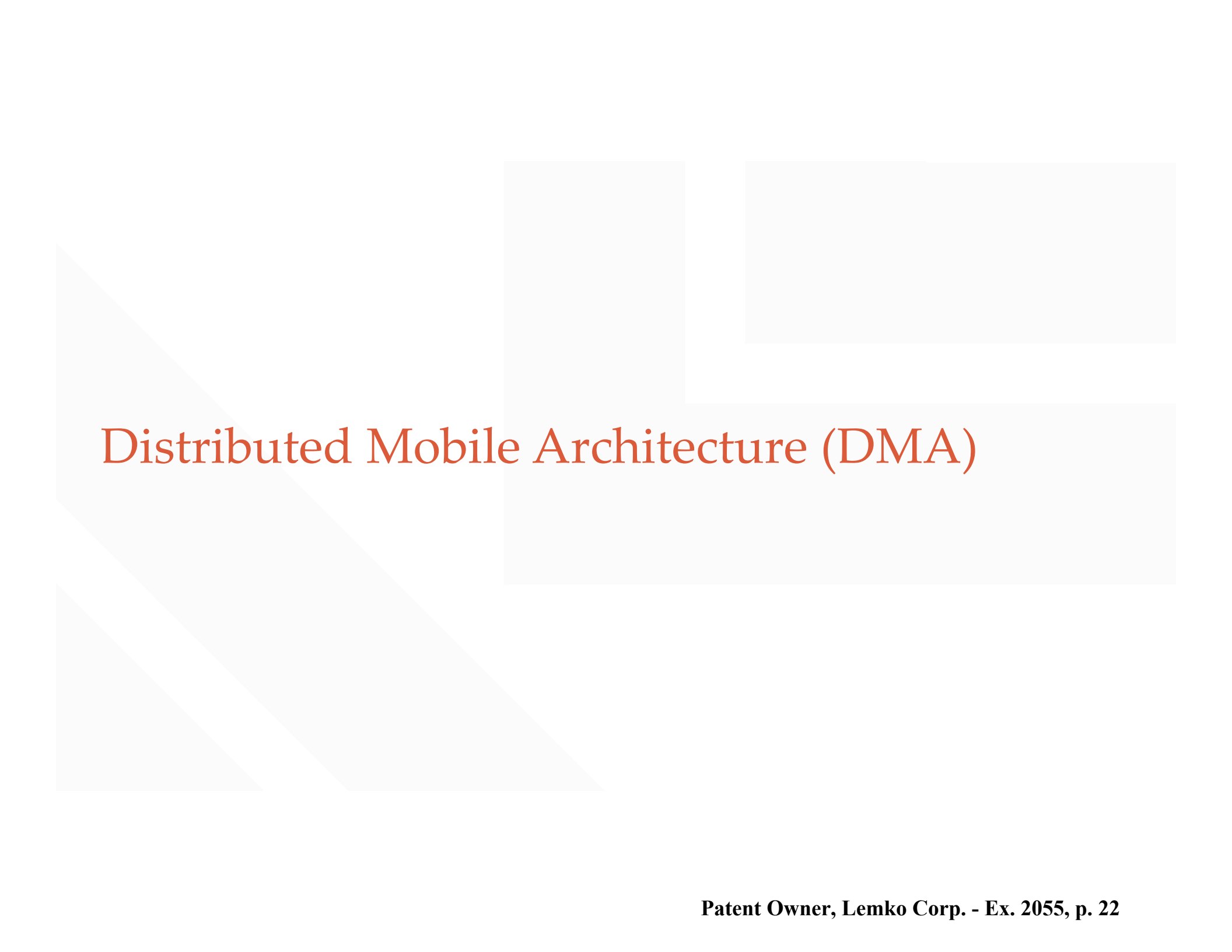
- Voicemail servers are part of the mobile architecture



POR at 47-52; Sur-Reply at 1-11; Ex. 2034; Ex. 2035 at 20

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

21



Distributed Mobile Architecture (DMA)

Claim Construction: DMA

“Distributed Mobile Architecture”

Lemko	Petitioners
“a network architecture where DMA systems have distributed call-routing functionality and are connected with other DMA systems through peer-to-peer connections (i.e., without connecting through a hierarchical network hub architecture)”	Plain and ordinary meaning of individual terms distributed - “parts of the system are placed in different locations throughout a network” mobile - ? architecture - ?

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

23

POR at 19-34; Sur-Reply at 11-14; Pet. Reply at 1-3

Claim Construction: DMA

- Intrinsic Evidence:

As illustrated in FIG. 1, each DMA 106 is interconnected with the other DMAs 106 via an Internet protocol network 110. As such, there exists a peer-to-peer connection 112 between each DMA 106 in the system 100. The DMAs 106 can handle telephony traffic that is communicated at each antenna 104. For example, the DMAs 106 can switch and route calls received via each antenna 104. Additionally, the DMAs 106 can hand-off calls to each other as mobile communication devices move around and between the cellular coverage sites 102. The DMAs 106 can communicate with each other via the IP network 110 and can further transmit calls to each other via the IP network 110. It should be understood that more than four cellular coverage sites 102 can

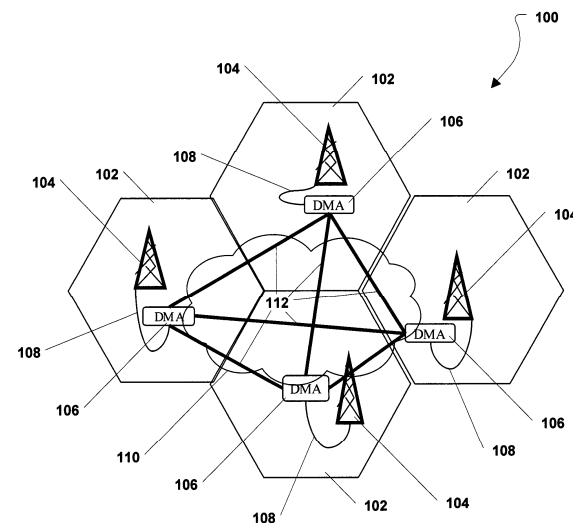
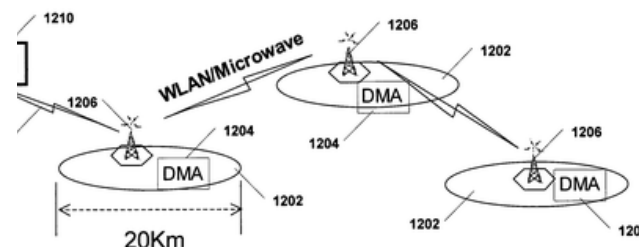


FIG. 1



POR at 19-34; Sur-Reply at 11-14;
'414 Pat at 4:28-40, 17:47-49, 16:55-57, Fig. 1, 12

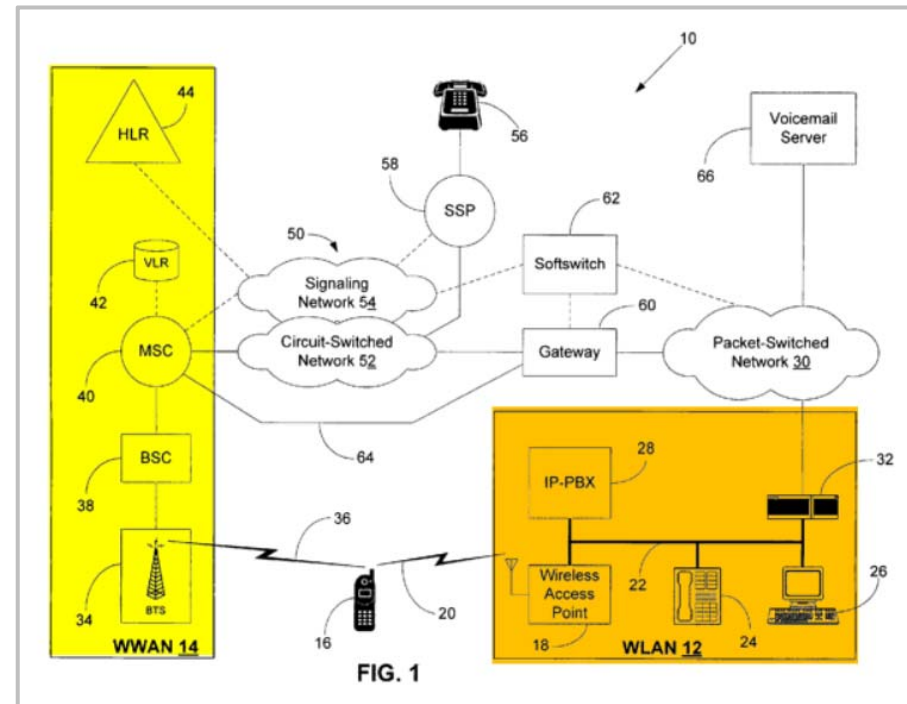
Claim Construction: DMA

- The doctrine of claim differentiation does not preclude Lemko's proposed construction

Proposed Construction	Dependent Claim 3
"a network architecture where DMA systems have distributed call-routing functionality and are connected with other DMA systems through peer-to-peer connections (i.e., without connecting through a hierarchical network hub architecture)"	3. The method of claim 1, further comprising: connecting the call via an Internet Protocol (IP) peer-to-peer connection between the first DMA system and the second DMA system when the second mobile subscriber is located within the second wireless coverage area.

Mauer/Waylett Combination Does Not Teach DMA Systems

- Mauer's WLAN and WWAN are NOT connected via peer-to-peer connections
- Mauer's WLAN and WWAN do NOT have distributed call-routing functionality
- SIP protocol's alleged peer-to-peer connections are NOT between *DMA* systems



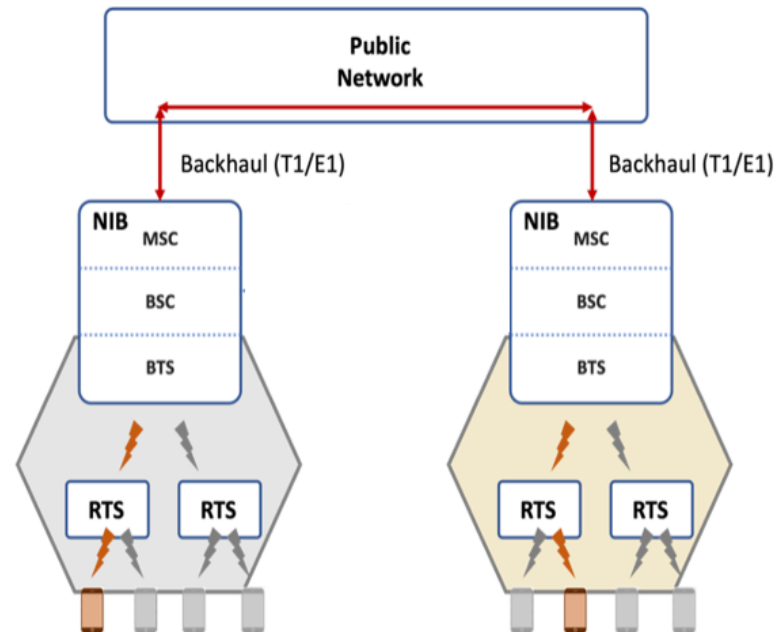
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

26

POR at 35-46; Sur-Reply at 14-20;
Ex. 1005 at Fig. 1, 7:30-36; Ex. 2021 at ¶81

Mauer/Waylett Combination Fails to Result in DMA Systems

- Waylett's NIBs does not cure Mauer's deficiencies
 - Multiple NIBs would still use conventional backhaul and PWAN
 - No disclosure or suggestion of peer-to-peer connections between NIBs



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

27

POR at 38-40; Sur-Reply at 14-20;
Ex. 1006 at Fig. 11; Ex. 2013; Ex. 2021 at ¶82-83

Mauer/Waylett Combination Fails to Result in DMA Systems

- No motivation to combine
 - A single NIB from Waylett would provide both of Mauer's communication modes (cellular and WLAN), no need for separate NIBs
 - Having an extraneous NIB runs contrary to Waylett's goals of reducing costs
 - POSITA would not implement an existing WWAN with a NIB

Petitioners' New Evidence (Ex. 1020)

- Petitioners rely on single mention of “distributed architecture”
- **BUT:** refers to all InterWAVE products, not just the NIB product
- **AND** consistent with other InterWAVE webpages submitted by Lemko
 - Ex. 2012 (InterWAVE GSM Product Desc)
 - Ex. 2013 (WAVEXPRESS NIB Datasheet)
 - Ex. 2014 (WAVExchange II MSC Datasheet)



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

29

Sur-Reply at 15-19; Ex. 1020 at 1

Petitioners' New Evidence (Ex. 1020)

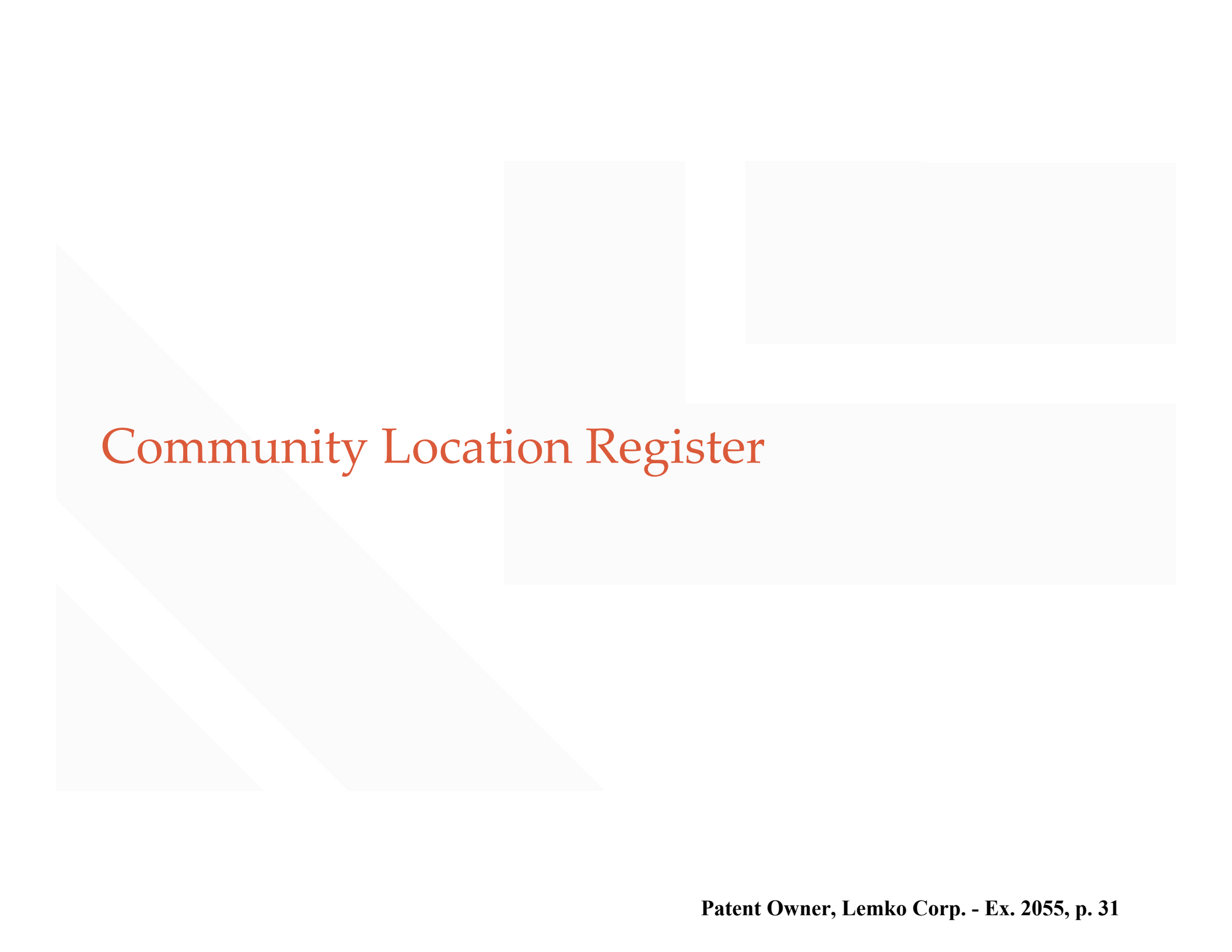
- Untimely new prima facie obviousness theory
- No explanation from Petitioners' expert,
No Reply Declaration
- Petitioners failed to offer Lemko's expert opportunity to respond during cross-examination despite having document in hand



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

30

Sur-Reply at 15-19; Ex. 1020 at 1



Community Location Register

Mauer and Waylett fail to disclose the community location register limitation

- Claim 1 and 8:
 - “when the second mobile subscriber is not located within the first wireless coverage area, **determining whether the second mobile subscriber is located within a second wireless coverage area** of the DMA network that is associated with the second DMA system **based on information stored at a community location register (CLR)** associated with the second DMA system, wherein the CLR associated with the second DMA system is stored at the first DMA system; ...”
- Claim 11:
 - “**a community location register (CLR)** that stores information associated with a second HLR of a second DMA system, wherein the second HLR stores information associated with one or more mobile subscriber devices that are registered with the second DMA system;”

Waylett fails to render obvious the claimed CLR

- Petitioners admit Mauer does not disclose a CLR
 - Relies on Waylett's "configuration tables"
- BUT undisputed that:
 - Waylett's configuration table is not a location register, let alone a CLR
 - Waylett's configuration table stores a correspondence between ranges of IMSI identifiers and HLRs
- The configuration table NOT used to determine if a mobile phone is in a coverage area

In addition to the above, preferably the communication system **200** further includes a RADIUS server **312** capable of performing following functions:

Interface with the access points **228A**, **228B**, **228C**, for authentication of private UEs **230**, through interpretation of either a Username field or a EAP User Identity field in the RADIUS authentication request **398**.

Route the authentication request to the appropriate authentication server **328**.

Act as a proxy to the public HLR/VLR **244** or to an external RADIUS system **310** or private HLR **316** if roaming is enabled, by routing of user authentication request to the appropriate HLR based upon information contained in the Username field.

Where the public or private HLR **244**, **316**, is a central HLR, the RADIUS Server **212** will act as a proxy to forward authentication request to the HLR.

Where the public or private HLR **244**, **316**, is a distributed HLR, the RADIUS Server **312** could be adapted to contact the correct HLR in either of the following ways:

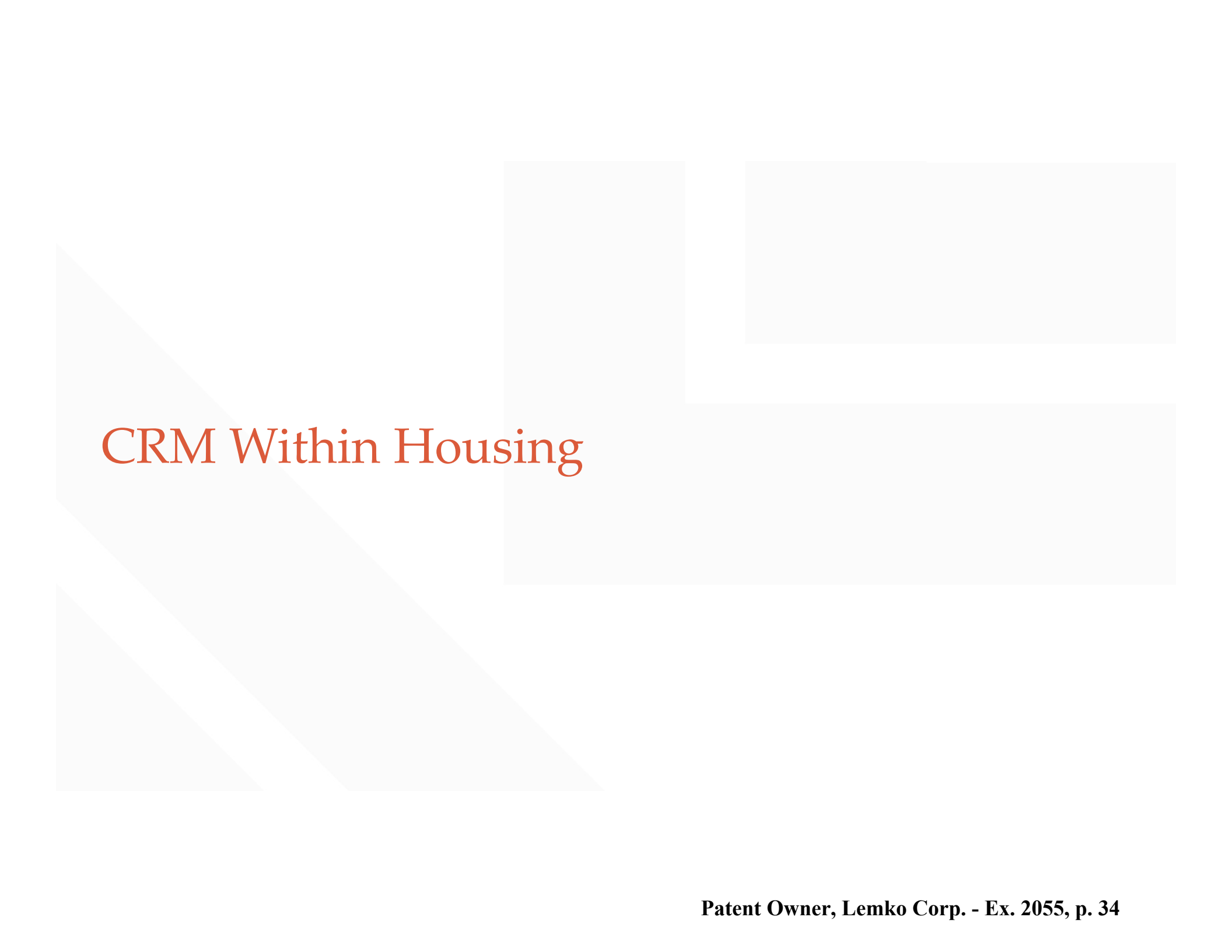
1. Query a standalone Central Address Table (CAT) Server (not shown) to match the HLR corresponding to subscriber IMSI; or

2. Use a configuration table (not shown) that matches IMSI ranges of the UE **230** with the controlling HLR. (This model works if IMSI partitioning is implicitly or explicitly enabled for subscriber provisioning across multiple HLRs)

POR at 58-61; Sur-Reply at 20-21; Ex. 2021 at ¶121-128;
Ex. 1006 at 21:1-28; Proctor Tr. at 91:3-93:19

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

33



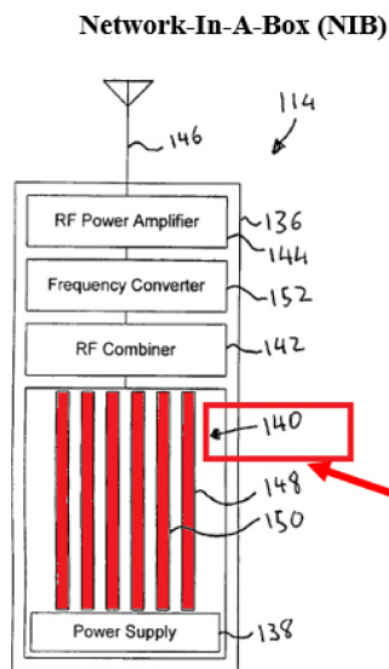
CRM Within Housing

Mauer and Waylett fail to disclose the software-based MSC, BSC, and CDR functionality

- Claim 21. The DMA system of claim 11, further comprising: a mobile switching center (MSC) module embedded within the computer readable storage medium;
 - a base station controller (BSC) module embedded within the computer readable storage medium; and
 - a call detail record (CDR) generation program embedded within the computer readable storage medium, the CDR generation program adapted to store a set of call detail records.

Waylett's NIB uses Hardware-based Cards

- Extrinsic evidence shows a POSITA would have understood Waylett's NIB uses hardware-based network cards



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

36

POR at 15-17; Ex. 2021, ¶71
Ex. 1006, Fig. 2 (annotated); Ex. 2012 at 1 (annotated)

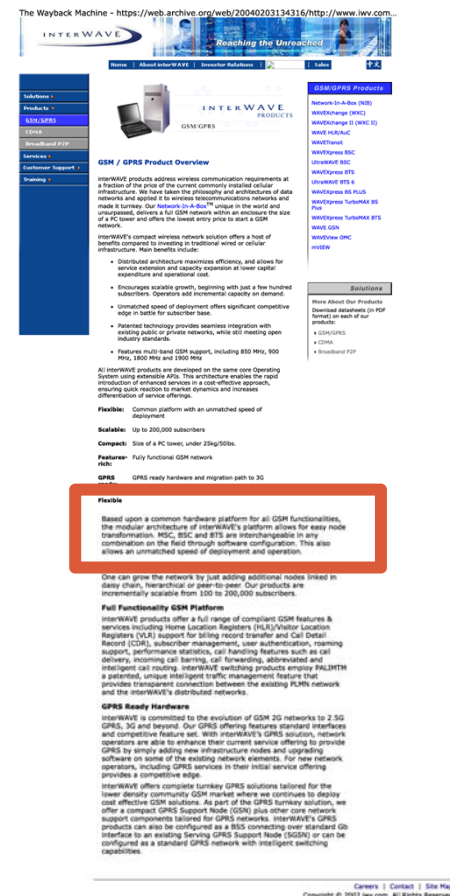
Petitioners' New Evidence (Ex. 1020)

- InterWAVE Product Overview:

Flexible

Based upon a common hardware platform for all GSM functionalities, the modular architecture of interWAVE's platform allows for easy node transformation. MSC, BSC and BTS are interchangeable in any combination on the field through **software configuration**. This also allows an unmatched speed of deployment and operation.

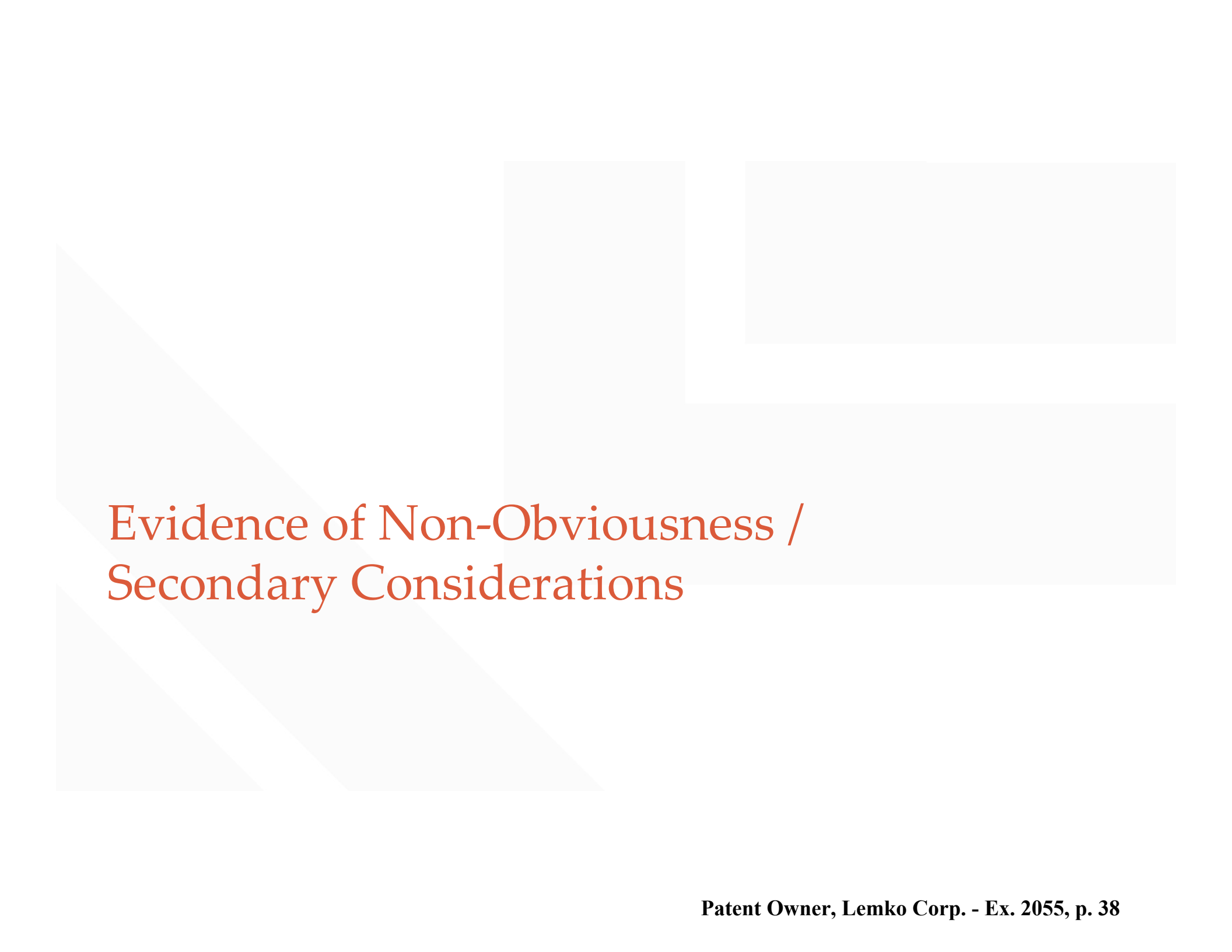
- **BUT** this refers to “common hardware platform”
- Consistent with interchangeable use of hardware cards
- No explanation from Petitioners' expert
- Petitioners' counsel failed to offer Lemko's expert opportunity to comment despite having the document in hand



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

37

Sur-Reply at 22-23; Ex. 1020 at 2



Evidence of Non-Obviousness / Secondary Considerations

Secondary Considerations

- Established nexus with Node1 commercial product
 - Inventor Shaowei Pan declaration (Ex. 2023)
 - Node1 Product manual and exhibits (Exs. 2037-38)
- Long-felt Need
 - NFV Paper (Ex. 2008)
- Praise and Commercial Success
 - AT&T Emails (Exs. 2043, 2044)
 - News articles about successful customers (Exs. 2045-52)



POR at 67-80; Sur-Reply at 23-26; Ex. 2008

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

39

Patent Owner, Lemko Corp. - Ex. 2055, p. 39