United States Patent [19]

Fuentes

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[54] **ARCHITECTURE FOR A CELLULAR WIRELESS TELECOMMUNICATION SYSTEM**

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[73] Assignee: **AT&T Corp.**, Murray Hill, N.J.

[21] Appl. No.: **281,249**

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Related U.S. Application Data

[63] Continuation of Ser. No. 998,310, Dec. 30, 1992, abandoned.

[51] **Int. Cl.⁶** H04Q 7/24
[52] **U.S. Cl.** 379/60; 379/59; 455/33.2; 370/110.1
[58] **Field of Search** 379/59, 60, 63; 455/33.1, 33.2; 370/110.1

[56] **References Cited**

U.S. PATENT DOCUMENTS

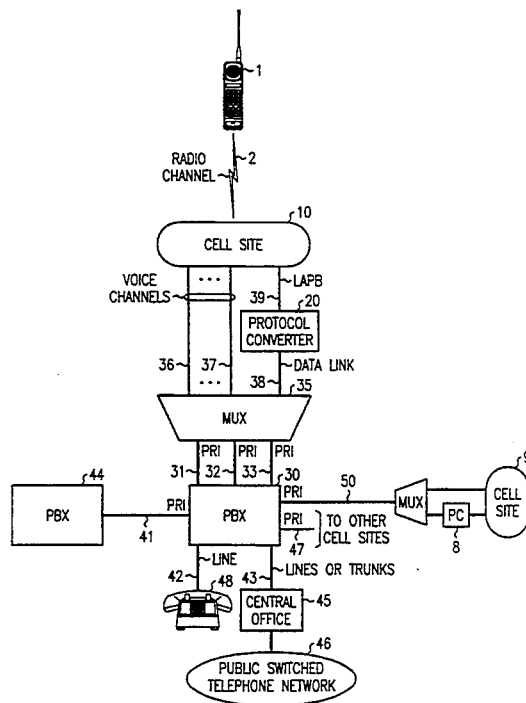|			
4,245,538	12/1980	Ito et al. .	
4,599,490	7/1986	Cornell et al. .	
4,811,380	3/1989	Spear	379/60
4,827,499	5/1989	Warty et al. .	
5,090,050	2/1992	Heffernan	379/60
5,117,502	5/1992	Onoda et al.	379/60

OTHER PUBLICATIONS

Commutation & Transmission article, "PAN–European Digital Cellular System for Mobile Telephones", Duplessis et al., No. 2, 1986, pp. 5–14.
Ultraphone 100 Wireless Digital Loop Carrier ™,
System Description, International Mobile Machines Corporation, 1987, pp. 1.1–5.3.
V. Breton et al., "Tangara: digital cordless telephone system", *Commutation Et Transmission*, vol. 13, No. 3, 1991, Paris, pp. 23–32.

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[57] **ABSTRACT**

This invention relates to a method and apparatus for offering wireless telecommunication service. A switch such as an automatic Private Branch Exchange (PBX), equipped to communicate with Integrated Services Digital Network (ISDN) station sends ISDN signaling messages to and receives ISDN signaling messages from a protocol converter. The protocol converter, which also communicates with a wireless cell site, converts messages between the ISDN protocol and a protocol for communicating with the wireless cell site. The cell site sets up wireless connections to a mobile station, essentially in its prior art mode, and the PBX sets up connections to the cell site essentially in its prior art ISDN station control mode. The system can also hand off calls from one cell site to another connected to the same PBX, using the protocol converter to generate and distribute the locate request messages. The system can further process roamers by allowing them to register locally and by directly connecting intra-system traffic to such roamers.
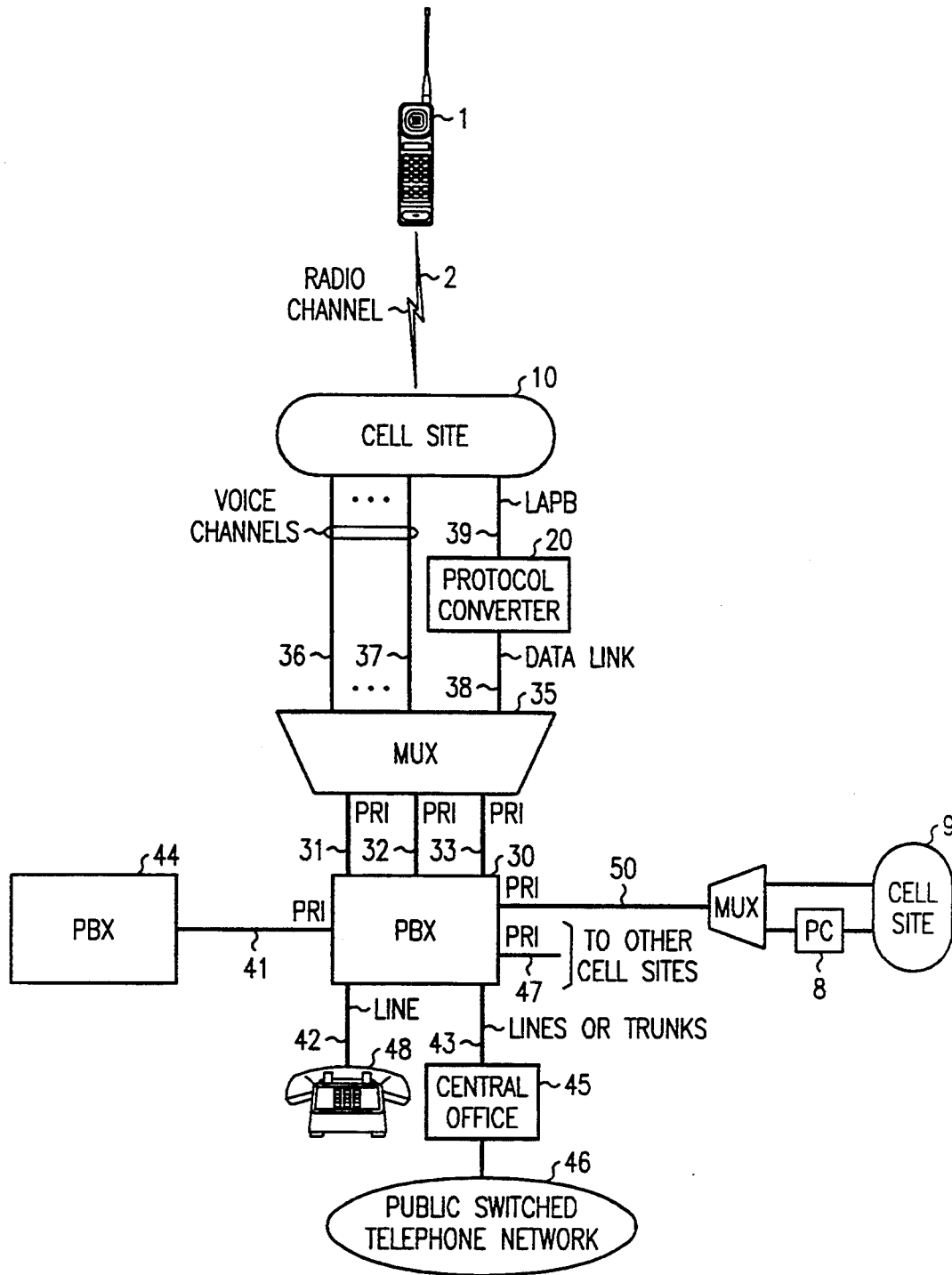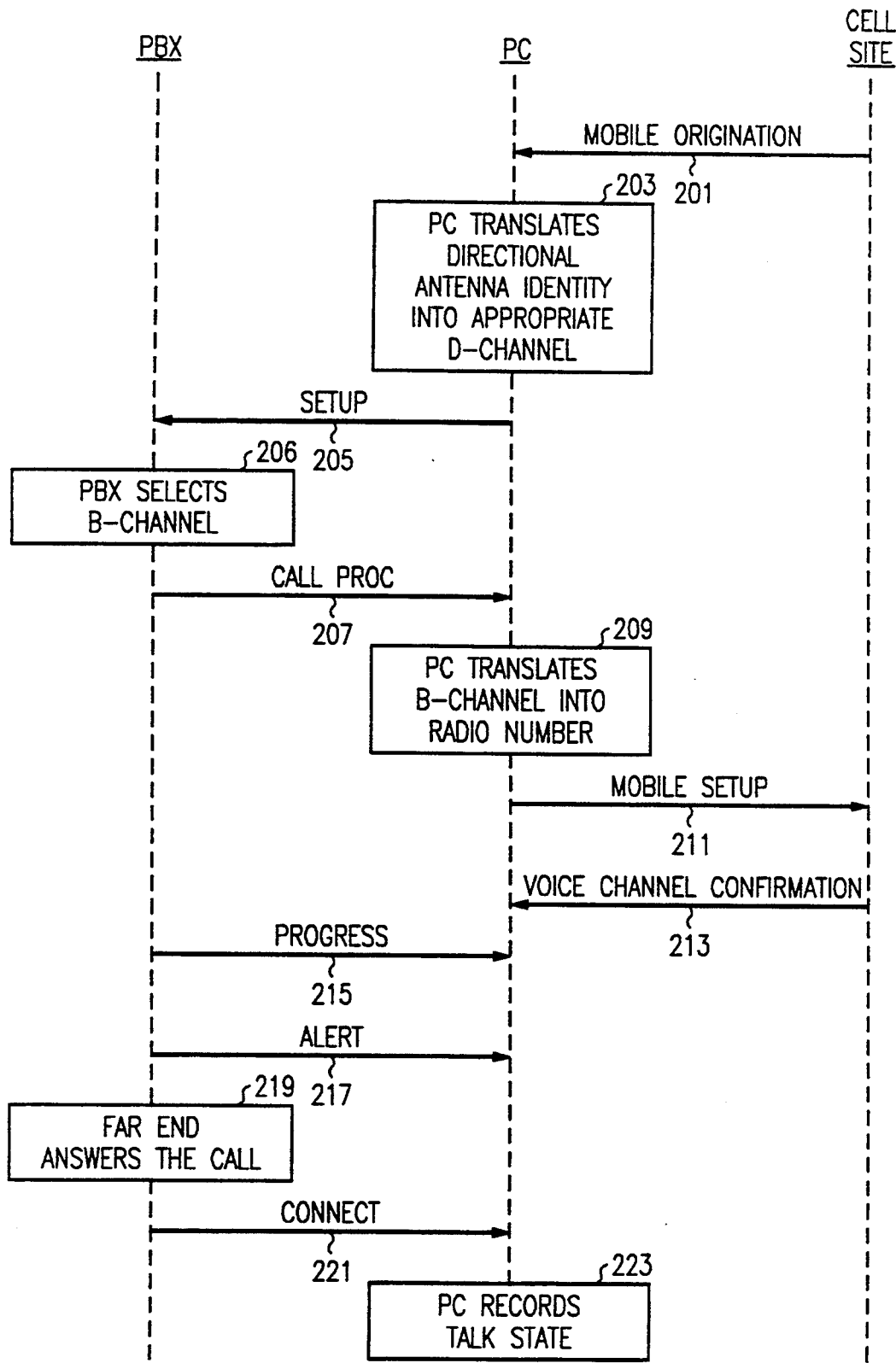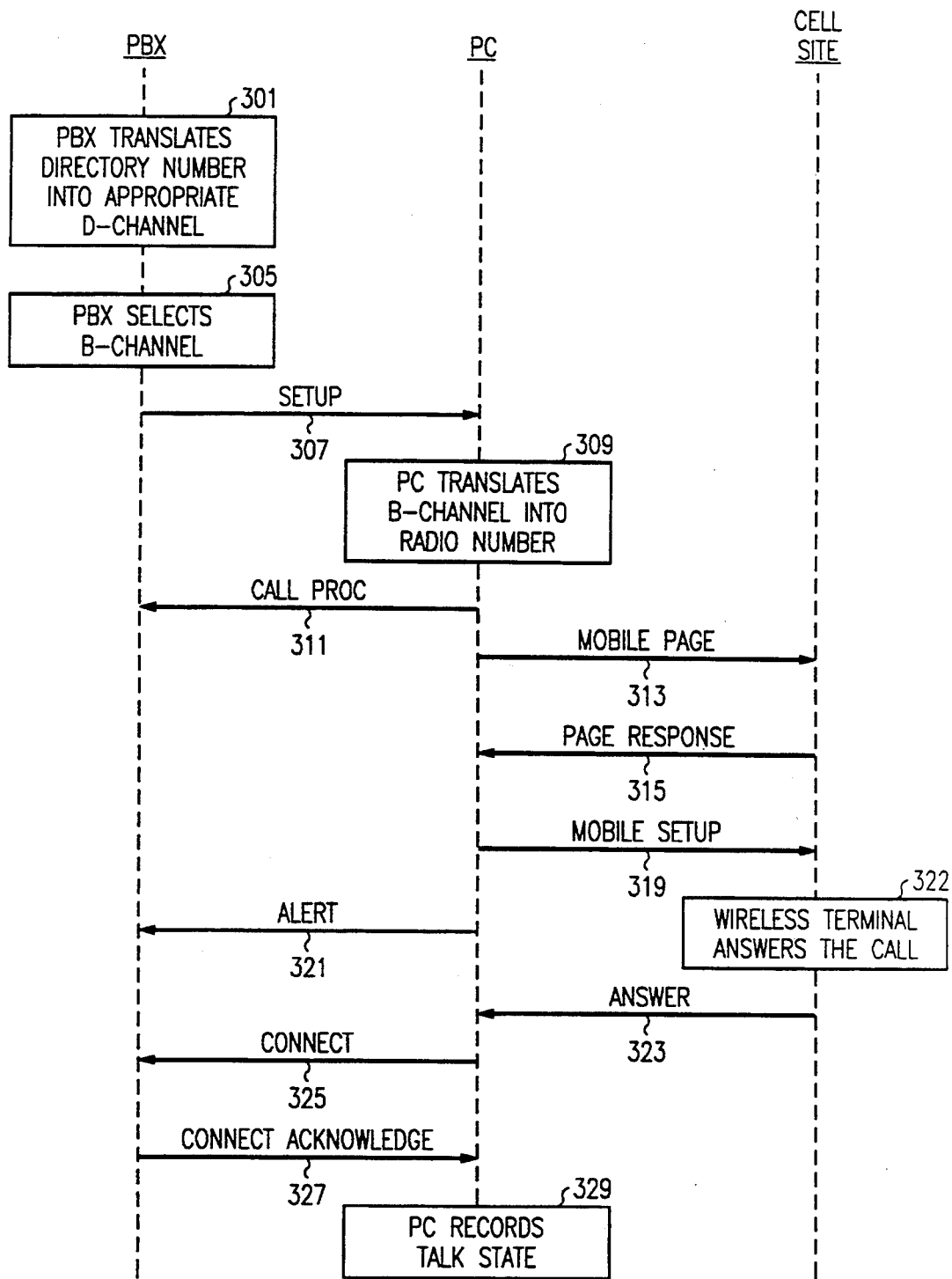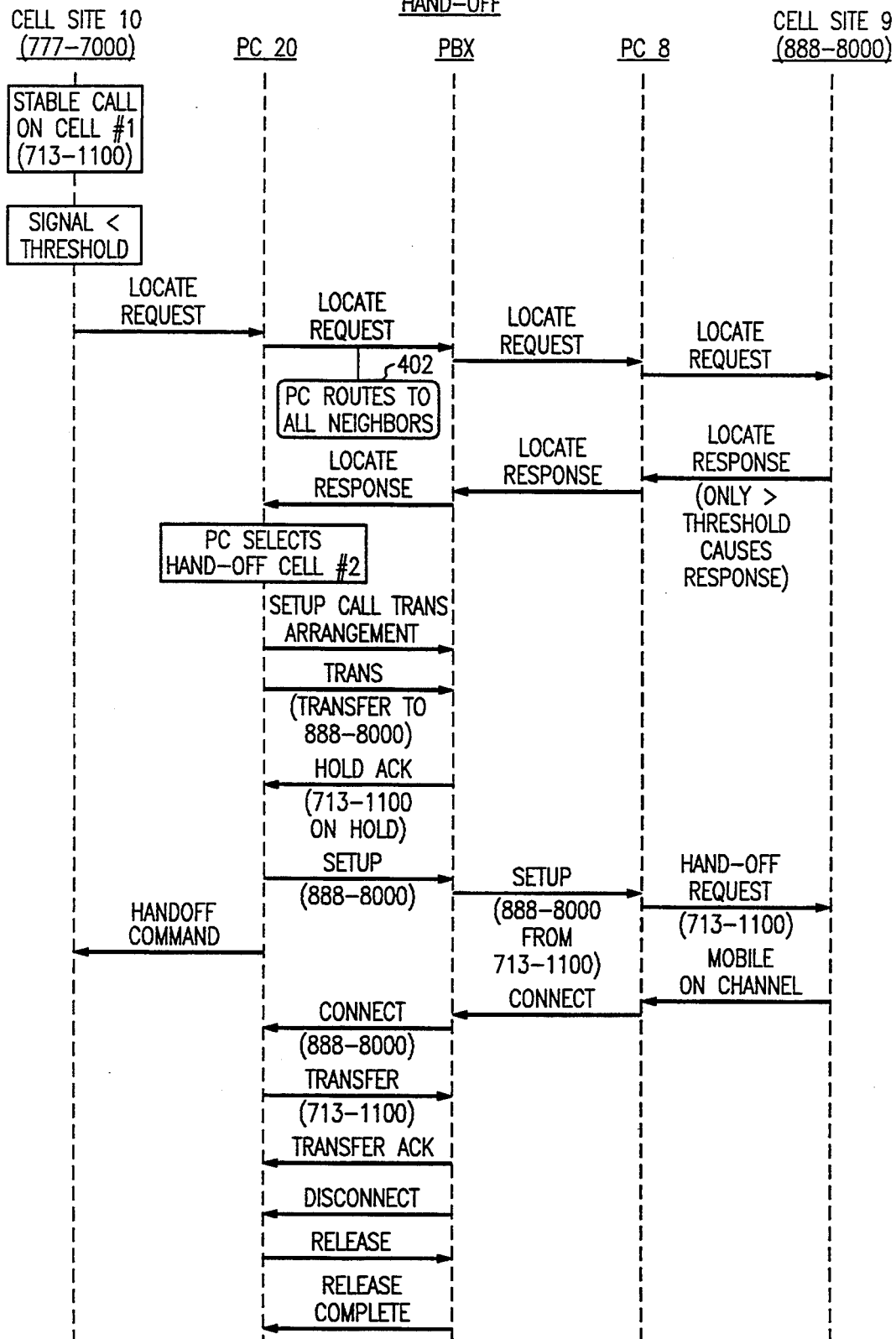
10 Claims, 5 Drawing Sheets

FIG. 1

WIRELESS ORIGINATED CALL

WIRELESS TERMINATED CALL

FIG. 3

FIG. 4
HAND-OFF

CELL SITE 10
(777-7000)

PC 20

PBX

PC 8

CELL SITE 9
(888-8000)

STABLE CALL
ON CELL #1
(713-1100)

SIGNAL <
THRESHOLD

LOCATE
REQUEST

LOCATE
REQUEST

402
PC ROUTES TO
ALL NEIGHBORS

LOCATE
REQUEST

LOCATE
REQUEST

LOCATE
RESPONSE

LOCATE
RESPONSE

LOCATE
RESPONSE
(ONLY >
THRESHOLD
CAUSES
RESPONSE)

PC SELECTS
HAND-OFF CELL #2

SETUP CALL TRANS
ARRANGEMENT

TRANS
(TRANSFER TO
888-8000)

HOLD ACK
(713-1100
ON HOLD)

SETUP
(888-8000)

SETUP
(888-8000
FROM
713-1100)

HAND-OFF
REQUEST
(713-1100)

MOBILE
ON CHANNEL

HANDOFF
COMMAND

CONNECT
(888-8000)

CONNECT

CONNECT

TRANSFER
(713-1100)

TRANSFER ACK

DISCONNECT

RELEASE

RELEASE
COMPLETE

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