

Indoor Location Mechanisms for Emergency Services

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- *In this Fourth Report and Order, we adopt measures that will significantly enhance the ability of Public Safety Answering Points (PSAPs) to accurately identify the location of wireless 911 callers when the caller is indoors. We also strengthen our existing E911 location accuracy rules to improve location determination for outdoor as well as indoor calls.*
- http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0310/FCC-15-9A1.pdf

Indoor Device Location

- Today, cellular networks in the US return
 - (phase 1) Course tower location
 - (phase 2) Geo location
 - Handset based (assisted GPS or advanced forward link trilateration)
 - Network based (uplink time difference of arrival)
- The ultimate goal of Public Safety/FCC R&O is to deliver dispatchable location when the caller is indoors.

Where is the caller? (actual phase2 location)

The screenshot displays the TCS GEM911 web interface. At the top, the browser address bar shows '10.32.118.44/#'. The page header includes the TCS GEM911 logo, a 'Help' link, and a 'Sign Out (Lance Pitt)' link. The main content area is divided into three sections:

- Message Transcript: 1-206-321-7809**: This section contains two messages. The first is a blue bubble: "I Testing outdoor 911 location" (1-206-321-7809 Thu Sep 18 2014 7:42:03 PDT). The second is a green bubble: "✓ You have reached 911. Where is the emergency?" (Thu Sep 18 2014 7:43:03 PDT Lance Pitt).
- My Active Sessions**: A list showing one active session: "1-206-321-7809" by Lance Pitt.
- Other Active Sessions**: A list showing two other active sessions: "1-425-877-4300 (1)" by Rod Robinson and "1-206-518-0767" by Rod Robinson.

Below the transcript, there is a form for sending a response:

- A dropdown menu with the selected text: "You have reached 911. Where is the emergency?"
- A text input field labeled "Enter text to be sent."
- Buttons for "Send Message" and "Clear".

On the right side, a map shows a street view of a city area. A purple circular overlay highlights a specific location. Two red location pins are visible: pin 1 is at the intersection of Indiana Ave NW and C St NW, and pin 2 is slightly north of it. A scale bar indicates 250 feet and 50 meters. Below the map, the following location data is displayed:

- Located At: Sep 18 7:44:10 PDT
- Latitude: +38.89417
- Longitude: -77.02028
- Hor Uncertainty: 148
- Position Source: 135
- Status: ✓ Location Found

A "Refresh Location" button is located below the location data. The Windows taskbar at the bottom shows the system time as 12:13 PM on 9/18/2014.

Where is the caller? (WLAN location demo)

TCS GEM911™

Help Sign Out (kcso user one)

Unassigned Queue
1-206-661-1895 (1) 43340 min(s)

My Active Sessions
▶ 1-303-766-7777 kcso user one

Other Active Sessions
No other active sessions.

■ End Session

Font Size: + -

I need help
1-303-766-7777 Fri Oct 03 2014 14:15:31 PDT

✓ 911, what's your emergency?
Fri Oct 03 2014 14:18:25 PDT kcso user one

Fell down some stairs
1-303-766-7777 Fri Oct 03 2014 14:17:04 PDT

✓ I have you at 2250 East President George Bush Highway. Is this correct?
Fri Oct 03 2014 14:19:23 PDT kcso user one

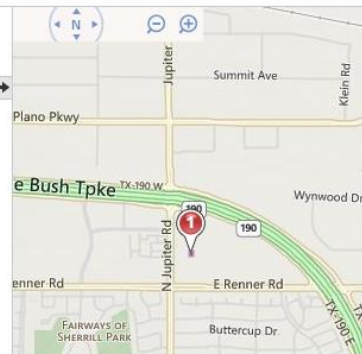
Select an immediate response

Enter text to be sent

Send Message Clear

characters used = 0 | remaining = 254

Transfer



indoor location

Campus: Richardson TX 75082
Building: Cisco Building 5
Floor: 2250 East PGBT First Floor
Uncertainty Radius: 4.88 meters
Zoom: + -

A detailed floor plan of the Cisco Building 5, First Floor. The plan shows various rooms and corridors. A red circle is overlaid on the floor plan, indicating the caller's location. The circle is centered in a room that is colored red. Other rooms are colored in green, blue, and orange.

How do we get there?

- Currently, two proposals for obtaining dispatchable location
 - Beacons
 - Pre-provisioned Beacon location database
 - Real-time network-based
 - Building WLAN- trilateration using RSSI
 - New mechanisms on the horizon

Beacons

- BLE Beacon
 - Provides proximity; not location data, which is in database
- WLAN APs
 - Can provide pre-provisioned reference point
 - Can also provide location in management frames
 - Requires a supporting database
- In GeoPriv terms, Beacon mechanisms use Location by Reference
 - DB query returns a Presence Information Data Format Location Object (PIDF-LO)

Real-time WLAN location query

- The cellular carrier asks the WLAN network to locate a client device
- WLAN network Location Information Server returns a dispatchable location
 - Network locates device based on the device WLAN MAC address
 - Utilizes RSSI and trilateration (today), additional mechanisms under development
 - Can return a building map

What can ECRIT do?

- Adopt this draft, <http://www.ietf.org/id/draft-marshall-ecrit-indoor-location-00.txt> as WG item
 - To document the problem statement, use case (informal) and protocol requirements
- Specify a protocol for query and response of dispatchable location from WLAN Location Information Servers
 - Evaluate alternative protocols
 - HELD?
 - A new profile?