

The background of the slide features a city skyline across a body of water, with a road in the foreground. Overlaid on this is a network diagram with various icons (cloud, Wi-Fi, car, house, bicycle, etc.) connected by lines, representing V2X communication zones.

# V2X geographical areas and zones proposal

October 2017

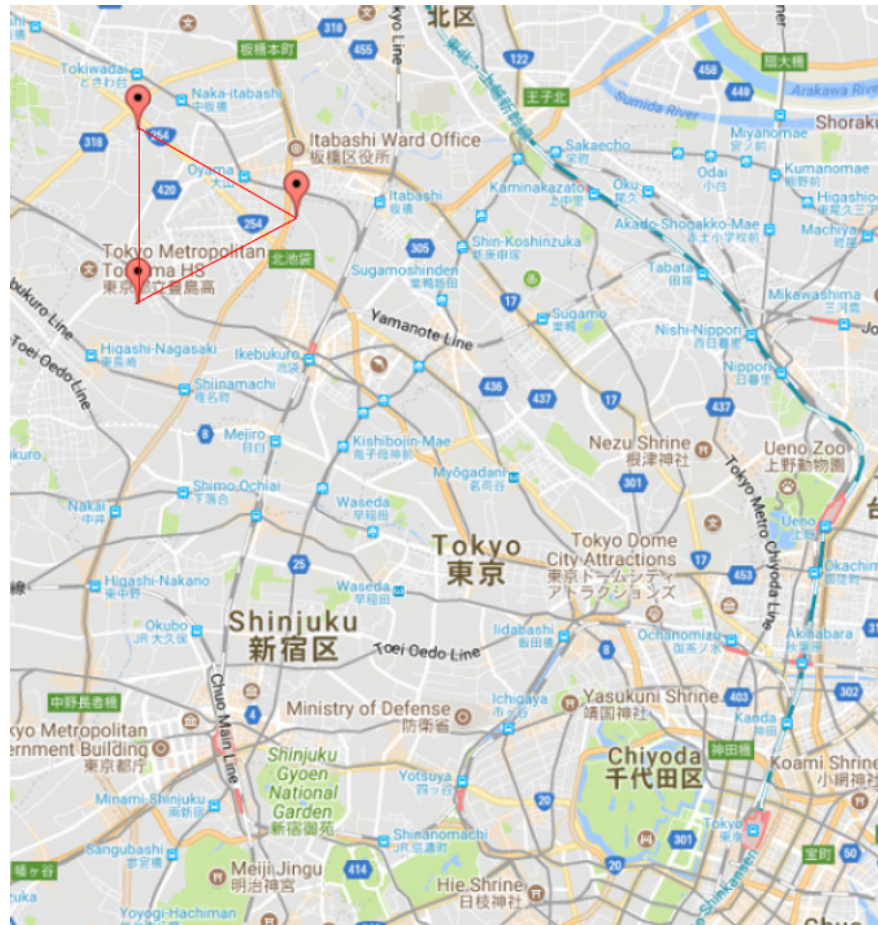


## Use existing parameter values wherever possible ... 1

### ■ Geographical area

- Geographical area #1 (used in most tests even if not mentioned):
  - Use TS 36.508, clause 4.9.3.1: Modified contents of the USIM Elementary Files and additional USIM Elements files at the DF ProSe level,  $EF_{PROSE\_RADIO\_COM}$ , “first data object” from **ProSe Radio parameters information**:
    - Point 1: Degrees of latitude: 35.753056, Degrees of longitude: 139.689167
    - Point 2: Degrees of latitude: 35.735278, Degrees of longitude: 139.689167
    - Point 3: Degrees of latitude: 35.744167, Degrees of longitude: 139.709167
  - See next slide

## Geographical area #1





## Proposed values in geographical area #1

- “Inside” geographical area #1:
  - Use point close to “centre” of geographical area #1 which is the point between zones 0, 1, 2 and 3 (see next slides)
    - Long: 139.69827, Lat: 35.74402
- “Outside” geographical area #1:
  - Use point 970 m due south of “inside” point (on same latitude as point 2 on slide 2)
    - Long: 139.69827, Lat: 35.735278
- Where necessary “move” at 10m/s from “inside” to “outside” (97 seconds) (or faster?)



## Use existing parameter values wherever possible ... 2

### ■ Zones (used in test 24.1.9)

- Assume inside Geographical area #1 (not completely clear in RAN 2 specs!)
- Use zone parameter values from TS 36.523-1, Table 24.1.9.3.3-1: *SL-V2X-Preconfiguration* :
  - zoneLength-r14: 50m
  - zoneWidth-r14: 20m
  - zoneIdLongiMod-r14: 2
  - zoneIdLatiMod-r14: 2
- Set in “centre” (as close as possible) of Geographical area #1
- See next slide

## Zones in “centre” of geographical area #1





## Proposed zone values ... 1

- **Assume** WGS 84 model and geodesic distances (not specified by RAN 2)
- From TS 36.331, clause 5.10.13.2:  $\text{Zone\_id} = y_1 * Nx + x_1$ 
  - $x_1 = \text{Floor}(x / L) \text{ Mod } Nx$ ,  $y_1 = \text{Floor}(y / W) \text{ Mod } Ny$
  - $L$  is the value of *zoneLength* (assume longitude length),  $W$  is the value of *zoneWidth* (assume latitude length)
  - $Nx$  is the value of *zoneIdLongiMod*,  $Ny$  is the value of *zoneIdLatiMod*
  - $x$  is the distance in longitude between UE's current location and geographical coordinates (0, 0),  $y$  is the distance in latitude between UE's current location and geographical coordinates (0, 0)

	Long (deg)	Lat (deg)	Long distance from 0,0 in m (x)	Lat distance from 0,0 in m (y)	Zone_id (Nx, Ny = 2, L = 50, W = 20)
Centre of zone 0	139.69736	35.74392	11061725	3957130	$y_1 = 0, x_1 = 0$
Centre of zone 1	139.69840	35.74392	11061775	3957130	$y_1 = 0, x_1 = 1$
Centre of zone 2	139.69810	35.74411	11061725	3957150	$y_1 = 1, x_1 = 0$
Centre of zone 3	139.69915	35.74411	11061775	3957150	$y_1 = 1, x_1 = 1$
Point in the middle between zones 0, 1, 2, 3 (for reference only)	139.69827	35.74402	11061750	3957140	
Centre of geographical area 1 (for reference)	139.699167	35.744167			

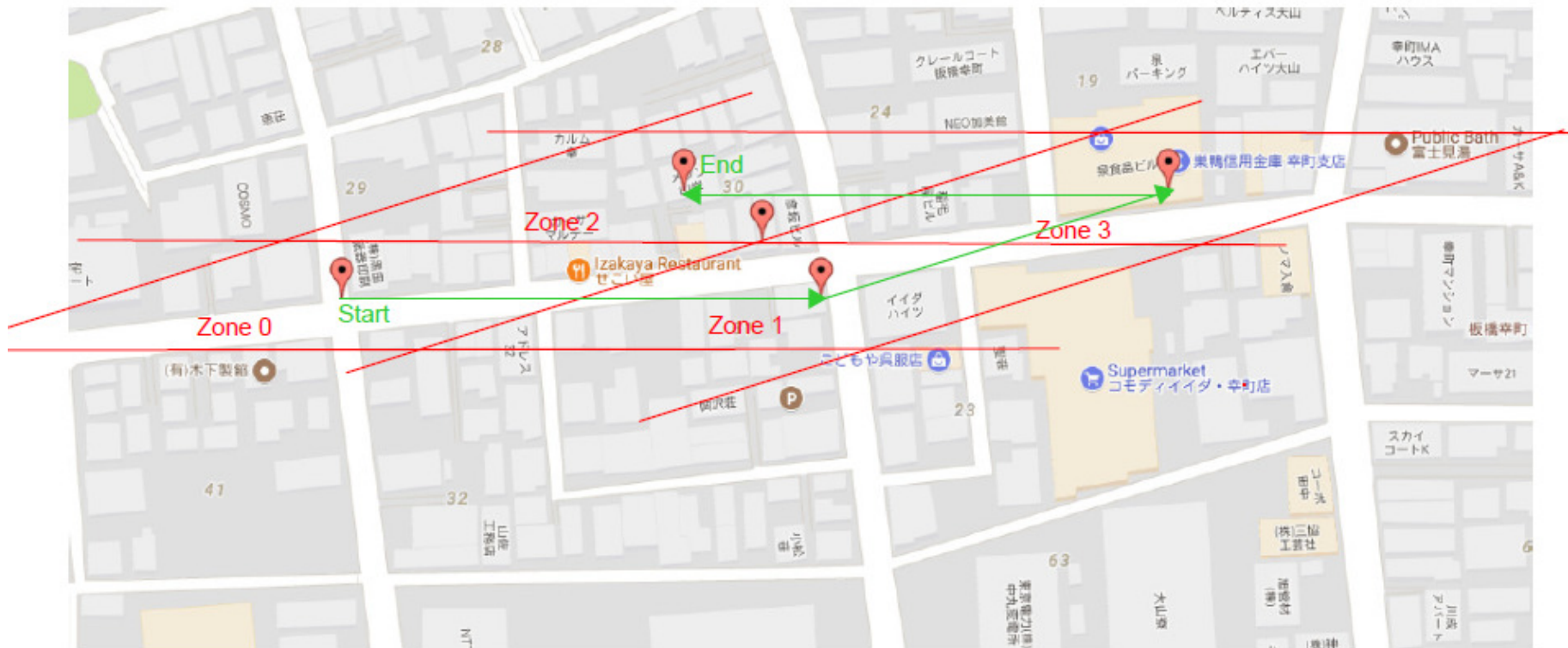


## Proposed zone values ... 2

- All distances are +/- 1m (website used only gave 1m resolution)
- Companies should check calculations!
- Sensible to “move” from zone 0 to zone 1 to zone 3 to zone 2 ...
- Required positioning accuracy in UE is quite high!
- When required “move” at 2m/s from zone centre to zone centre (25 seconds) (or faster?)
- See next slide



## Zones and “moves”





## Conclusions / proposals

- We can generally use existing values
- We should change “moves” in test 24.1.9 to zone 0 to zone 1 to zone 3 to zone 2
- Need to confirm that we should use WGS 84 / geodesic distances



# Questions / comments?