

3GPP TSG RAN Meeting #78

RP-172379

Lisbon, Portugal, Dec. 18-21, 2017

Agenda Item: 10.1.2

**Motivation for New WID:
Bluetooth/WLAN measurement collection in
MDT**

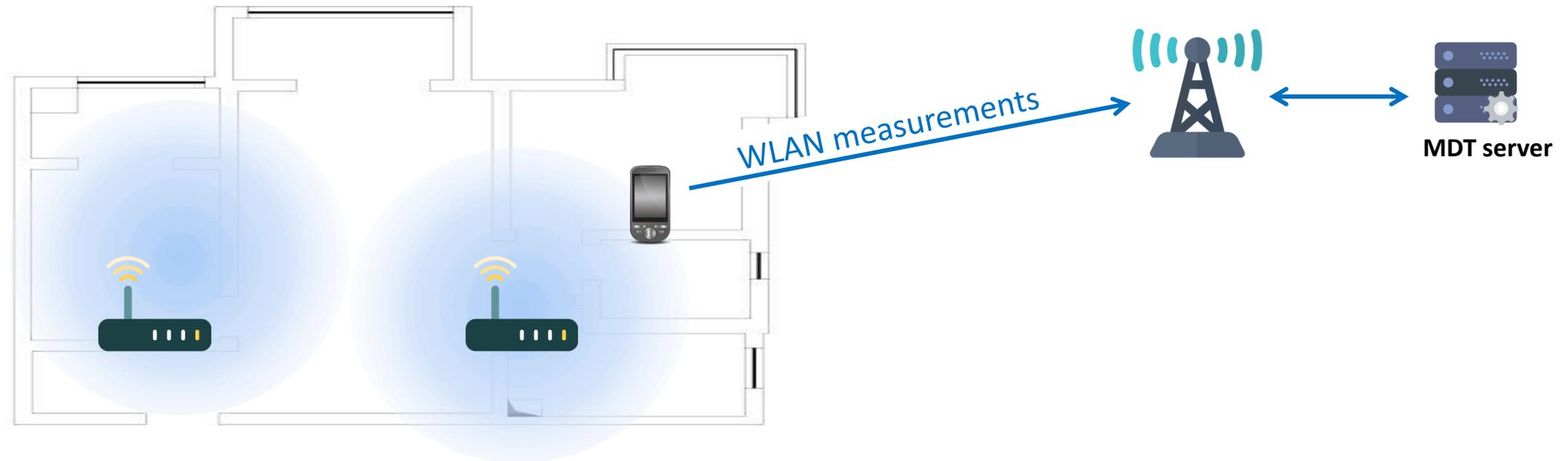
CMCC, CATT, vivo, ZTE

Background

- **Minimization of driving test (MDT) is a standardized mechanism introduced from Rel-10 to provide operators with network performance optimization.**
 - ✓ MDT effectively helps optimizing the outdoor network performance, which is attributed to plenty of UEs supporting MDT and available coverage of GPS in outdoor scenario.
- **Today data traffic generated indoors account for around 60%-70% of the total volume.**
 - ✓ WLAN is usually deployed by operators as the supplementary of indoor coverage and capacity.
 - ✓ Bluetooth is deployed for the positioning and tracking purpose by operators.
 - ✓ However, the current MDT doesn't support WLAN/Bluetooth measurement collection yet.
- **In order to monitor and assess indoor performance more effectively and thoroughly, introducing new measurements for WLAN and Bluetooth in MDT is needed.**

Motivation 1: to assess indoor performance of WLAN

WLAN is usually deployed by operators as the supplementary of indoor coverage and capacity. However MDT method has not been introduced yet to evaluate the WLAN coverage.



- Bluetooth/WLAN measurements can be used to assess the indoor performance of WLAN deployed by operators.

Motivation 2: to monitor cellular coverage performance

by associating the cellular measurements with Bluetooth beacon locations

A pilot project conducted in a square in Jiangsu province in China

- ✓ The spots mark the places of the Bluetooth beacons. The accurate Bluetooth beacon locations could be learned from engineering drawings .
- ✓ When receiving Bluetooth measurements and associated cellular measurements (e.g. RSRP/ SINR) from the UEs, the network would autonomously associate the RSRP/SINR values to the corresponding Bluetooth beacon location and immediately recognize the weak cellular coverage area based on the corresponding Bluetooth beacon location.

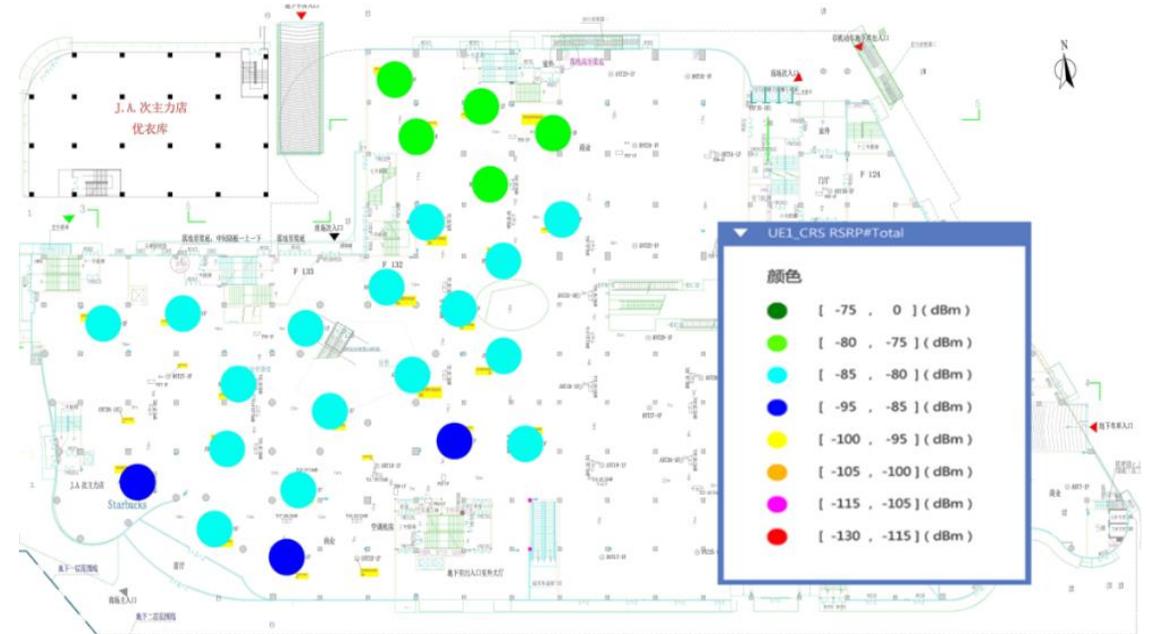


Figure: RSRP coverage diagram

- Bluetooth/WLAN measurements can be used as location information through Bluetooth/WLAN based RF fingerprint.
- This kind of location information is valuable and important for MDT itself especially for the indoor scenario where GNSS is not available.

Motivation 2: to monitor cellular coverage performance

A field test on our indoor working space to demonstrate the location accuracy of Bluetooth method

The spots 1-37 are the chosen test points, therein to the red points 1-18 are the physical locations of Bluetooth beacons.



Table 1: Actual test results of Bluetooth location accuracy

- For the good points, the accuracy is less than 0.2 meters
- Even for the bad points, the accuracy is still less than 12.7 meters

No.	mean errors	std	remarks	No.	mean errors	std	remarks
1	0.028	0.019	Good point	19	7.3	2.1	bad point
2	0.049	0.004	Good point	20	12.6	1.2	bad point
3	0.029	0.024	Good point	21	4.4	1.3	mid point
4	0.037	0.0013	Good point	22	4.9	0.76	mid point
5	0.028	0.016	Good point	23	12.4	1.1	bad point
6	0.043	0.049	Good point	24	5.1	2.1	mid point
7	0.086	0.088	Good point	25	10.6	0.22	bad point
8	0.070	0.057	Good point	26	5.9	0.04	mid point
9	0.074	0.046	Good point	27	12.7	4.1	bad point
10	0.017	0.002	Good point	28	8.8	0.5	bad point
11	0.083	0.128	Good point	29	5.6	1.2	mid point
12	0.043	0.036	Good point	30	5.3	2.3	mid point
13	0.015	0.012	Good point	31	9.4	2.9	bad point
14	0.125	0.146	Good point	32	6.1	1.9	mid point
15	0.165	0.298	Good point	33	3.4	1.6	mid point
16	0.060	0.039	Good point	34	8.7	0.13	bad point
17	0.044	0.003	Good point	35	11.3	0.03	bad point
18	0.050	0.045	Good point	36	10.0	0.008	bad point
				37	7.7	0.44	bad point

- Bluetooth/WLAN measurements can be used as location information through Bluetooth/WLAN based RF fingerprint.
- This kind of location information is valuable and important for MDT itself especially for the indoor scenario where GNSS is not available.

Objectives of WI

The objective of this work item is to introduce Bluetooth (BT) and WLAN measurement collection in MDT to monitor and assess coverage performance of operator-deployed BT and WLAN and also to provide location information for the associated other MDT measurements.

The following detailed work plan listed below should be followed:

For RAN2:

- ✓ Specify new measurements of BT and WLAN for MDT if feasible. Reuse the existing BT and WLAN measurements in TS 36.305 as much as possible.
- ✓ Specify corresponding procedure and signalling for collecting the specified new measurements through MDT framework. If needed, co-operate with SA5 and RAN3.

Thank you!