

# Indoor walk Testing Solution by RantCell

A residential survey use case report

RantCell Pro product of Megron Tech Ltd UK

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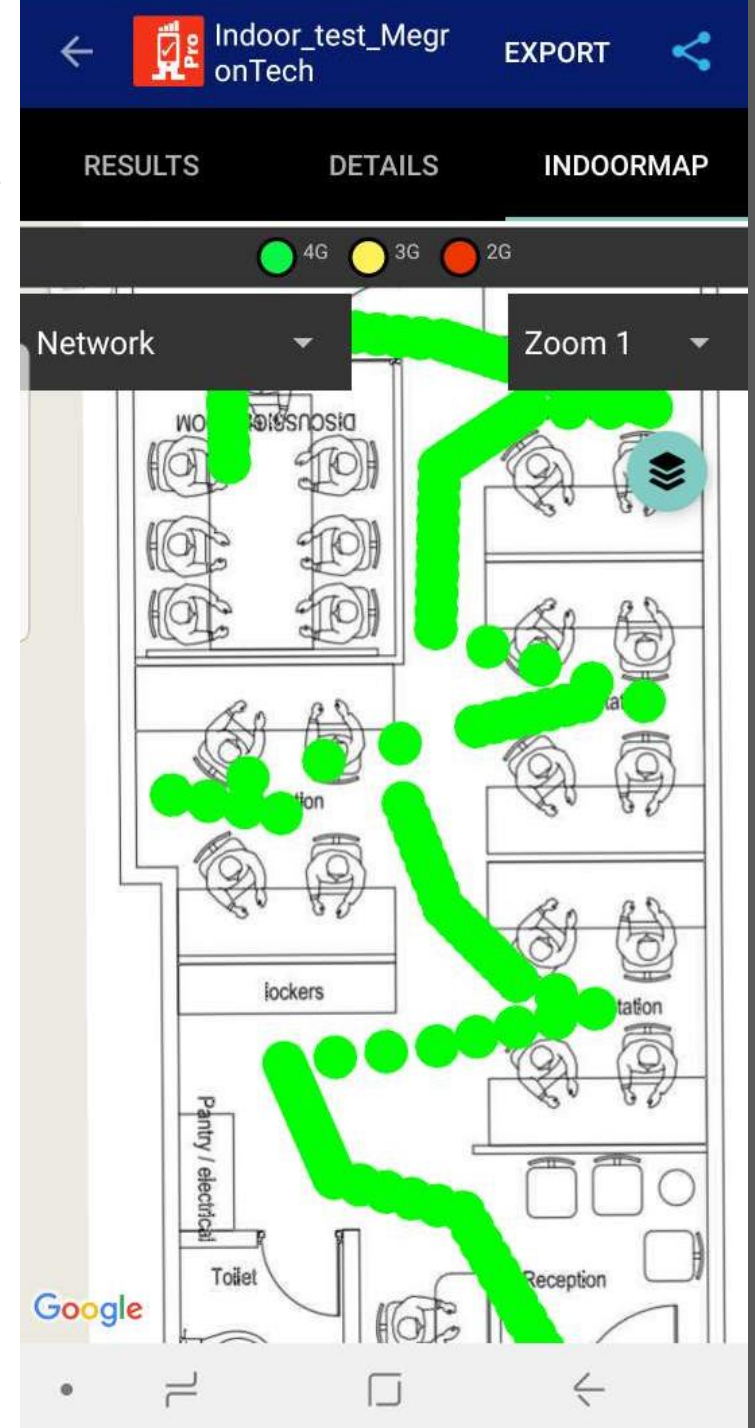


# Test Setup

<b>Test Performed By:</b>	<b>Team Megron Tech</b>
Test Date:	9 <sup>th</sup> September 2019
Test Venue:	UK Residence
Test Methodology:	Indoor Network Test / Walk Test
Test Name:	Indoor Test
RantCell Enterprise App Version:	
RantCell Web Dashboard Version:	v6.4
Android Devices Used:	Samsung S9
Test mode	RantCell idle survey and Voice call tests

# About RantCell indoor walk test solution.

- With RantCell app transform any Android smart phone to indoor coverage test tool by loading floor plans in jpg or simply by clicking photo of floor plan via smart phone camera.
- Users can easily load small (ex : residence) to large floor plans (shopping complex etc. ,any shape of building) from Android photo Gallery and overlay on Google indoor map satellite view of buildings.
- Floor plans and reports stored centrally on cloud and can be shared between your colleagues who are using RantCell App.
- Ease of operation, tests and indoor navigation could be conducted by a non-technical staff also can be deployed to customer smart phones.
- Test data uploaded in real time to RantCell Cloud server.
- Online Web-based dashboard indoor floor plan for post analysis.
- Cost effective, no investment required on specific hardware and post analysis tools etc.
- Available as on online subscription plan starting from \$125/month for small scale users.
- Mass deployable in excess of 500+ devices on RantCell Enterprise solution or on RantCell crowd Metrix solutions.

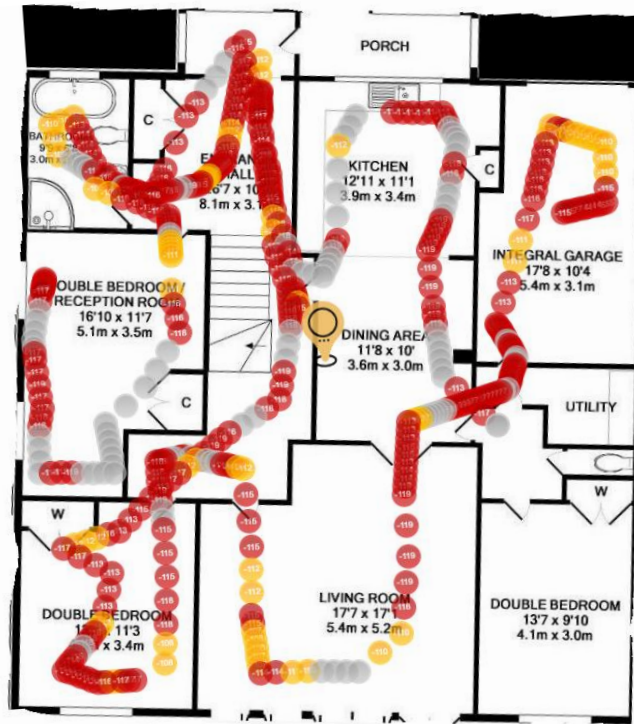




## RantCell tests detects poor signal at customer residence

### Current scenario

A resident has been facing calls drops , slow internet speeds and poor network signals at home. RantCell indoor walk testing app was deployed to investigate. Test data was uploaded to RantCell cloud in real time for operator analyze.



## Handover KPIs

### Operators

4G to 4G

4G to 3G

4G to 2G

3G to 3G

3G to 2G

2G to 3G

2G to 2G

Ee

42

2

0

0

2

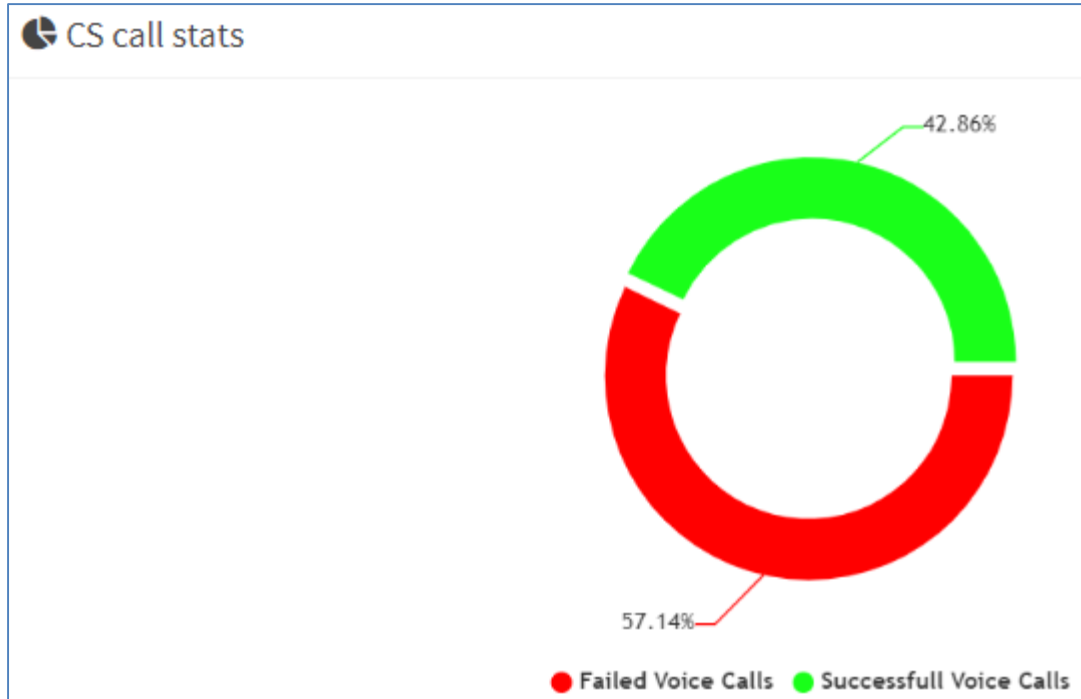
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19

## Analysis from indoor coverage survey

- Noticed that there is no 100% 4G coverage within this building while performing voice calls.
- Too many handovers during Voice calls and being handed over to 3G (CSFB) or 3G to 2G in some cases.

## Voice call KPI's



- CSSR 42.86% total calls 7 and 4 calls dropped.
- 2 x CSFB to 3G network
- Highest Setup Time (sec) 26.95
- Lowest Setup Time (sec) 4.14



## Voice Call test view



## Indoor dropped calls locations



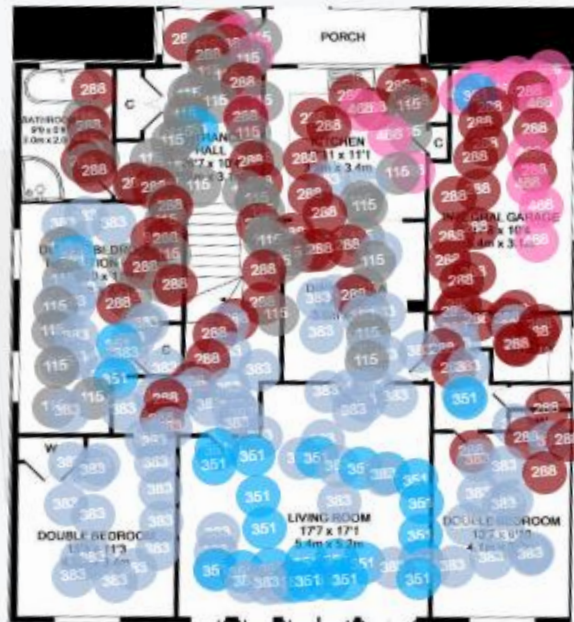
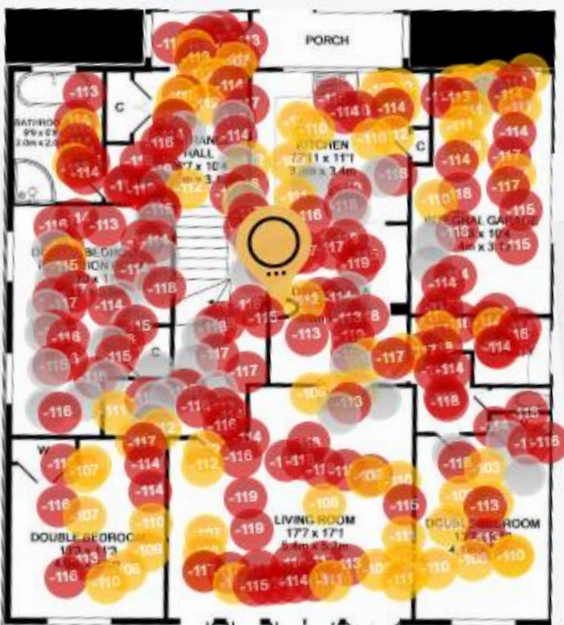
## Location of call drops on view on floor map

- 4 x call drop occurred out of 7 test calls. Test call duration was set to 300secs.
- All 4 calls dropped while on 4G .
- This is an example of very bad Voice QoE , customer is most likely to leave the network as 1 in every 2 call is set to drop during conversation.

## RSRP

## PCI

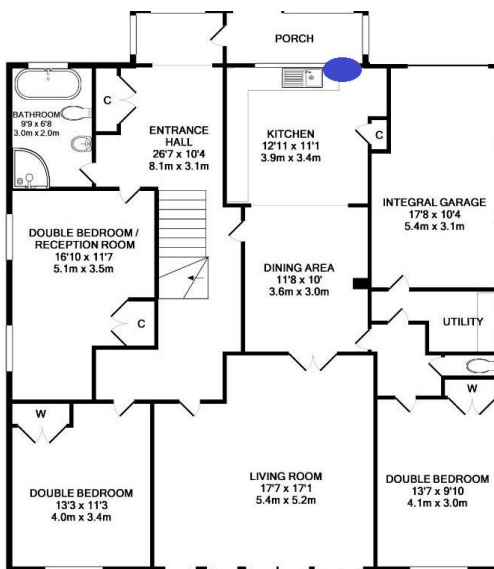
## Idle mode survey map RSRP and PCI view



RSRP	EE
Green( $\geq$ to -95dBm)	0.00 %
Amber(B/w -112dBm to -96dBm)	26.24 %
Red(B/w -119dBm to -113dBm)	57.09 %
Grey( $\leq$ -120dBm)	16.67 %
<b>Total Geo samples</b>	<b>282</b>

- IDLE mode coverage measurement shows within the indoor is RSRP very poor and about 16.67% of the area is having signals strength less than -120dbm as shown in table.
- During idle mode measurement noticed the user stays 100% of the time on 4G ,however there are too many cells covering this building as you can on PCI view . Hence most likely this building is falling in cell edge zone.

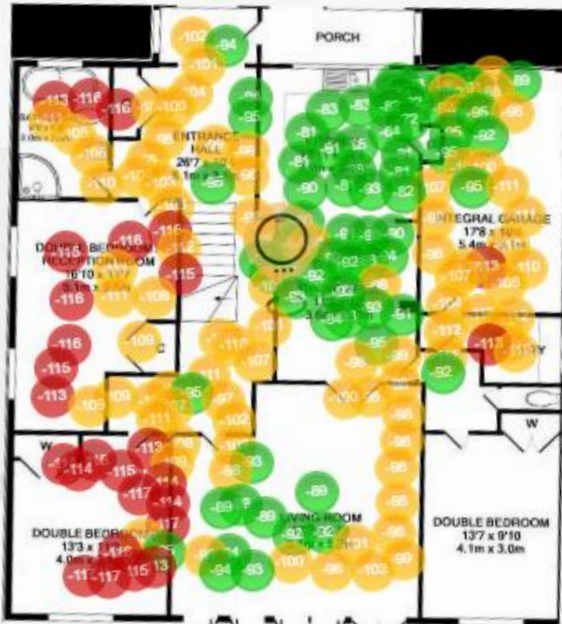




# The Solution

- Service provider shipped a 4G indoor repeater to get better reception indoor to the customer.
- 4G indoor repeater was placed in location highlighted in blue.
- Post installation testing was carried out using RantCell to recheck on user experience.

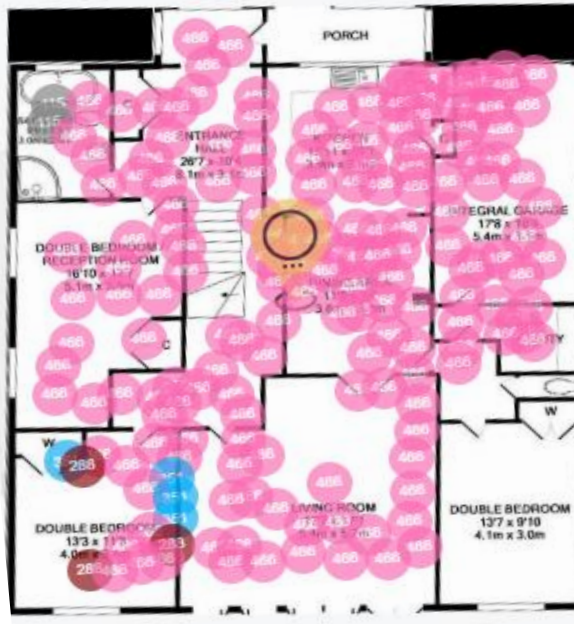
RSRP view



RSRP KPI's stats PRE

RSRP	EE
Green (>= to -95dBm)	0.00 %
Amber (B/w -112dBm to -96dBm)	26.24 %
Red (B/w -119dBm to -113dBm)	57.09 %
Grey (<= -120dBm)	16.67 %
<b>Total Geo samples</b>	<b>282</b>

PCI view



RSRP KPI's stats POST

RSRP	EE
Green (>= to -95dBm)	37.22 %
Amber (B/w -112dBm to -96dBm)	47.78 %
Red (B/w -119dBm to -113dBm)	15.00 %
Grey (<= -120dBm)	0.00 %
<b>Total Geo samples</b>	<b>180</b>

## Idle mode survey RSRP and PCI map view

- IDLE mode coverage measurement shows significant improvement in indoor coverage. Refer to pre and post tables show here.
- More than 90% of the residence now covered by 4G repeater.

## Voice Call test view

## RAN type view during voice test



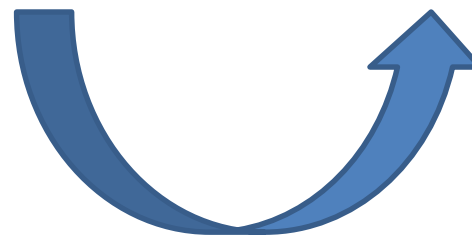
## Post 4G repeater voice call test results.

- 7 x test voice calls were successful , there were no call drops faced.
- All 7 x test voice calls (VoLTE) were carried over 4G network and on 4G repeater cells.
- There was no handover to macro noticed during the voice call tests

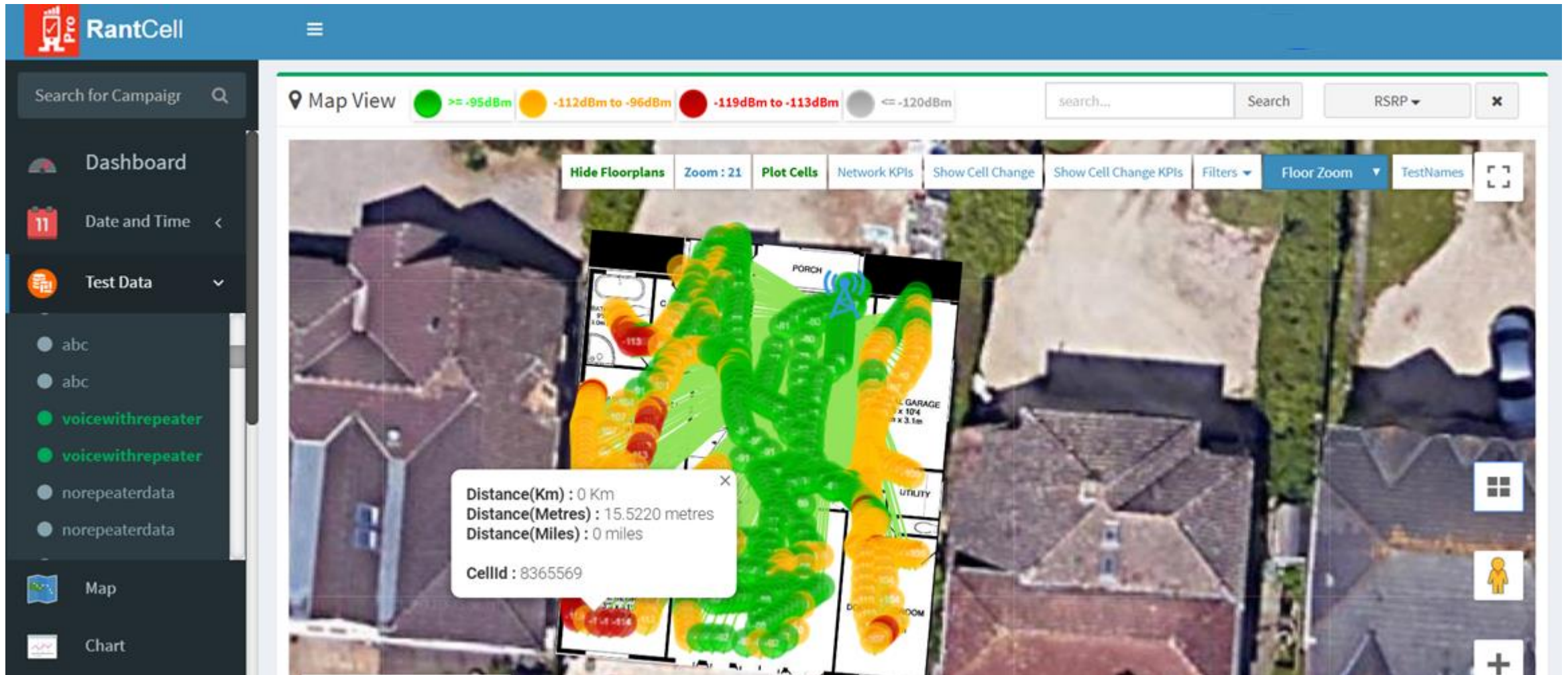


# Comparison of indoor coverage while on voice test calls

Network coverage plot before and after the installation of Repeater

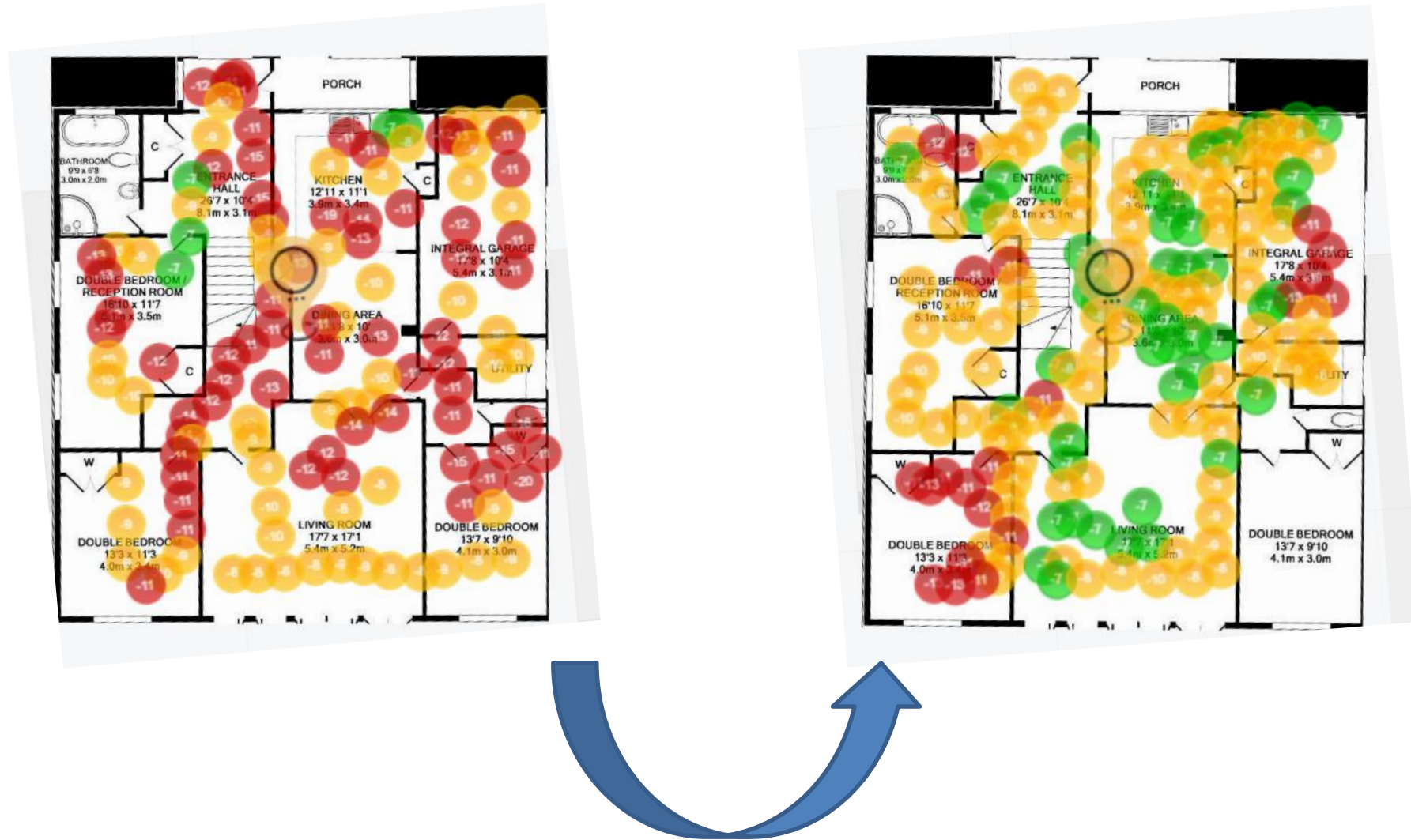


# RantCell measurement shows 4G repeater was able to cover farthest point of 15.5 meters indoor





# RSRQ measurements pre and post installation of 4G repeater



# Summary



By installing 4G indoor repeater Quality of Experience (QoE) on network significantly improved.



Voice call test survey from RantCell app concluded that there was no more call drop issue faced by user.



100% of VoLTE traffic was carried over 4G repeater for entire indoor area of residence.

# Thank You

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