

Huawei probe user manual

Application ver. 2.0



Overview of Huawei probe

Huawei probe is an android application used for mobile network coverage and quality measurement. It can perform measurement of all common standard mobile network types from 2G to 4G networks. The results are visualized in map regarding to the GPS position of the mobile device. There are multiple tests from coverage, web speed, data speed to voice quality test, available to run from the application or remotely from the web interface. The results can be exported in the standard output format for additional processing.

Prerequisites for running Huawei probe

The phone must have Android version 5 or newer installed.

The phone have to be registered in a particular mobile network.

The phone have to be connected to the Internet through mobile data network or WiFi.

Installation of Huawei probe

The application can be installed by downloading installation package from [Huawei probe website](#) under [Download Huawei probe application link](#).

User have to **allow installation** from the **unknown sources** and confirm all required permissions.

After the successful installation, the Huawei probe icon will be displayed in the phone's menu.







Launching of Huawei probe application

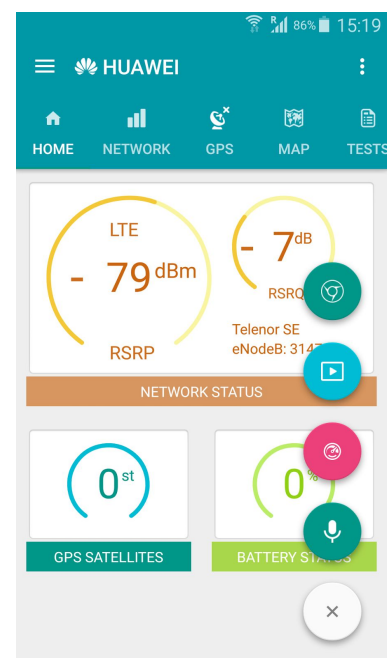
Launch Huawei probe by tapping the Huawei icon in the phone's application launcher.



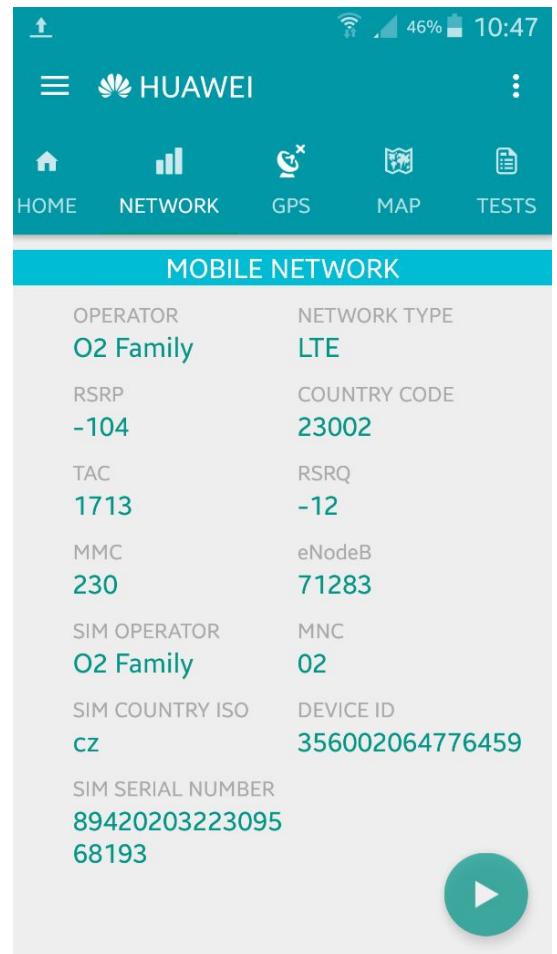
Huawei probe user interface

Once Huawei probe has initialized, it will display a home screen that holds the actual main information such as

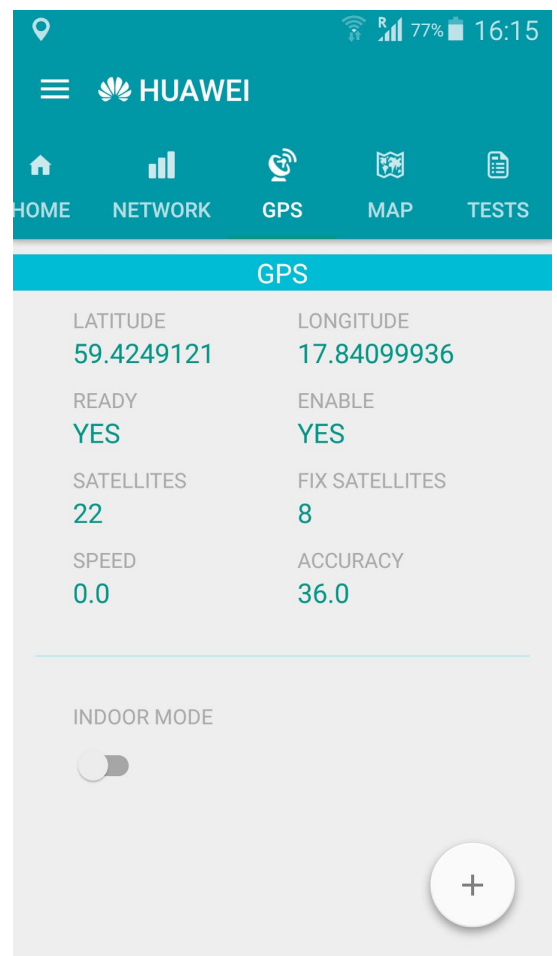
- Network status - display actual network parameters specific for particular type of network
- Count of connected GPS satellites
- Battery status
- Start Button,  which contains 4 types of tests, which can be performed by short tap - the test will be performed once or long tap - launch automatic tests in period set in settings
 - Coverage 
 - FTP test 
 - Voicetest 
 - Webtest 
- Settings menu 



- **NETWORK TAB** - display real-time mobile network parameters such as
- LTE network
 - Operator Name
 - Network Type
 - RSRP (from -140 dBm to -44 dBm)
 - RSRQ (from -3 dB to -19.5 dB)
 - SNR
 - TAC
 - eNodeB
 - PCellID
 - MCC
 - MNC
 - SIM Operator
 - SIM country ISO
 - SIM serial number
 - Device ID
- Other networks (2G,3G,3,5G)
 - Network Type (HSPAP, HSPA, UMTS (3G), EDGE, UNKNOWN – no signal)
 - ASU (0 – 31)
 - RSSI (2 x ASU - 113) (from -113 to -51 dB)
 - LAC
 - CELLID

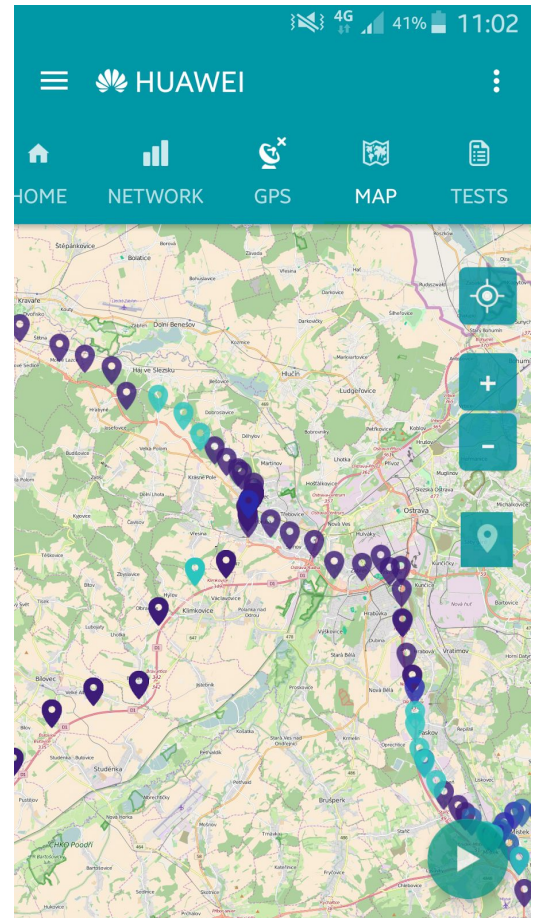


- **GPS tab** - display real-time GPS location parameters
- GPS latitude
- GPS longitude
- READY - YES/NO - notify, if the phone is located correctly
- ENABLE - YES/NO - notify, if the GPS module is enabled
- SATELLITES - count of available satellites
- FIX SATELLITES - count of fixed satellites
- SPEED - actual speed
- ACCURACY - accuracy of GPS position
- INDOOR mode - Enabled/Disabled
 - Indoor mode can be activated in the case of indoor or outdoor measurement, when no GPS signal is available. You can set GPS position manually by pinpointing from MAP tab and perform measurement with that GPS coordinates instead of real coordinates obtained from GPS module.



- **MAP tab** - display real-time position and results
- Results are differentiated by coloured flags

- LTE
- HSPAP
- HSPA
- UMTS
- EDGE
- UNKNOWN
- Web speed test
- FTP speed test



- **Result details** - when you tap on the result flag, the particular network coverage results are displayed related to the test position
 - **Zoom IN** - when you tap on the zoom in button, you can change to displayed range of visible part of map
 - **Zoom OUT** - when you tap on the zoom in button, you can change to displayed range of visible part of map
 - **Reset position** - when you tap on the map reset button, the map will be moved to your actual position
 - **Set position** - when you tap on the map set position button, you can set your position by pinpointing the flag into your chosen position on the map
- This option is available ONLY during enabled indoor mode.**



- **TESTS tab** - display performed test's results

- Test ID
- Timestamp
- Operator Name
- Network quality values
- Network type
- Network identification

- Test type

- Coverage



- Web speed



- FTP speed



HUAWEI					
HOME	NETWORK	GPS	MAP	TESTS	
70	NAME	TYPE			
15:28:26 23.10.2016	Telenor SE	HSDPA			
	RSSI	ASU	LAC	Cell ID	
	-91	11	340	942691	
69	NAME	TYPE			
13:36:28 15.10.2016	Telenor SE	LTE			
	RSRP	RSRQ	TAC	eNodeB	
	-78	-9	34105	314339	
68	NAME	TYPE			
13:34:32 15.10.2016	Telenor SE	LTE			
	RSRP	RSRQ	TAC	eNodeB	
	-87	-8	34036	314575	
67	NAME	TYPE			
13:33:43 15.10.2016	Telenor SE	LTE			
	RSRP	RSRQ	TAC	eNodeB	
	-106	-12	34036	314575	

- **Result details** - when you tap on the particular test result, you will obtain details about network parameters and position details during the test
- **GO MAP** - show the particular test result in the map

HUAWEI

HOME

02.11.2016

17:34:03

7

17:34:03

02.11.2016

7

17:34:03

02.11.2016

6

17:34:03

02.11.2016

5

17:34:03

02.11.2016

4

17:12:23

02.11.2016

DIALOG

COVERAGE

POSITION

NAME

Telenor SE

TYPE

LTE

TIME

02.11.2016 | 17:34:03

eNodeB

314557

RSRP

-85

RSRQ

-7

TAC

34031

SNR

0

PCellID

243

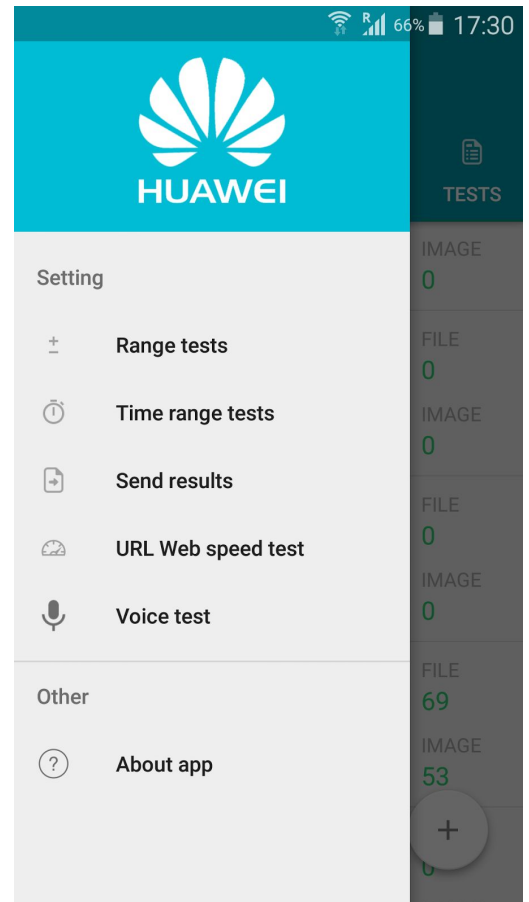
GO MAP

CANCEL

LOAD TIME

1259 s

- **Application settings** - it is possible to set a few parameters of the application such as
- Range tests - number of displayed tests in the tests list and in the map
- Time range tests - time period of repeating automatic tests
- Send results - export results to the files and server
 - Generate json
 - Generate csv
 - Send results to FTP server
 - Send results to REST server
- URL Web speed test - set webpage used for Web speed test - e.g. www.seznam.cz
- Voice test - Mobile phone number for incoming testing call in 9 digits format XXXXXXXXXX - **available only for czech operators range numbers**
- About app - contains version of application



Launching of Huawei probe tests

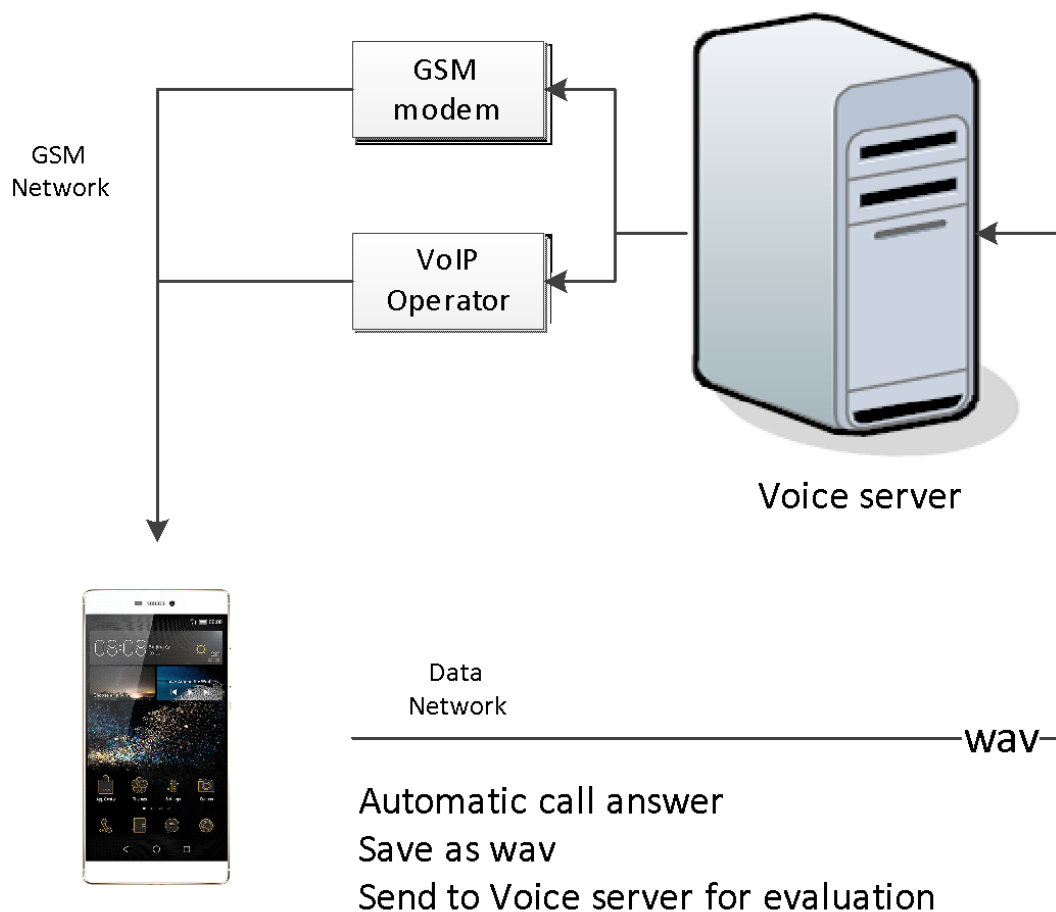
Application allows user to launch particular test from the application by choosing the appropriate test icon from under the start button menu. The tests are performed in the following scenarios.

- **Coverage test** - When the coverage test is launched, the application controls a few conditions before:
 - The GPS position have to be in the READY state or INDOOR mode activated
 - The phone have to be registered in a mobile network
 - The battery status have to be > 20%

When all the conditions are fulfilled, the test perform the coverage measurement and store the results into its database. The the application contacts REST server for sending the results into the server database.

- **Web speed test** - When the web speed test is launched, the application performs the coverage test first. It means that the web speed test waits for the same conditions as the coverage test. When the coverage test is done, the web test will perform measurement of web speed parameters against set web page in application settings and store and send the results on the remote server.

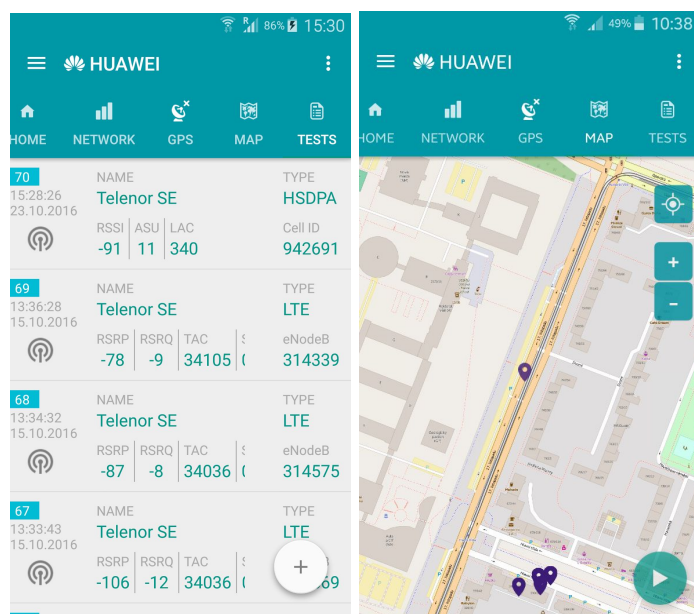
- FTP speed test** - When the web speed test is launched, the application performs the coverage test first. It means that the FTP speed test waits for the same conditions as the coverage test. When the coverage test is done, the FTP test will perform measurement of FTP parameters against the pre-configured FTP server. The measurement consists of 10s uploading and 10s of downloading huge file on and from the FTP server. After the test is done, the results are stored into internal and remote database for next visualization.
- Voicetest** - When the voicetest is launched, the application performs the coverage test first. It means that the voicetest waits for the same conditions as the coverage test. When the coverage test is done, the application sends coverage results into the remote database and ask server to call phone's mobile number set in the application settings. After a few seconds, the incoming call comes on the phone. When user answers the call, there is 90s long record played to the user. After 90 seconds, the call is hanged up and record file saved in the phone is sent over data network to the remote server for next evaluation. The speech quality and access time is evaluated and the results are displayed on the server. The figure below describes the voicetest evaluation process.



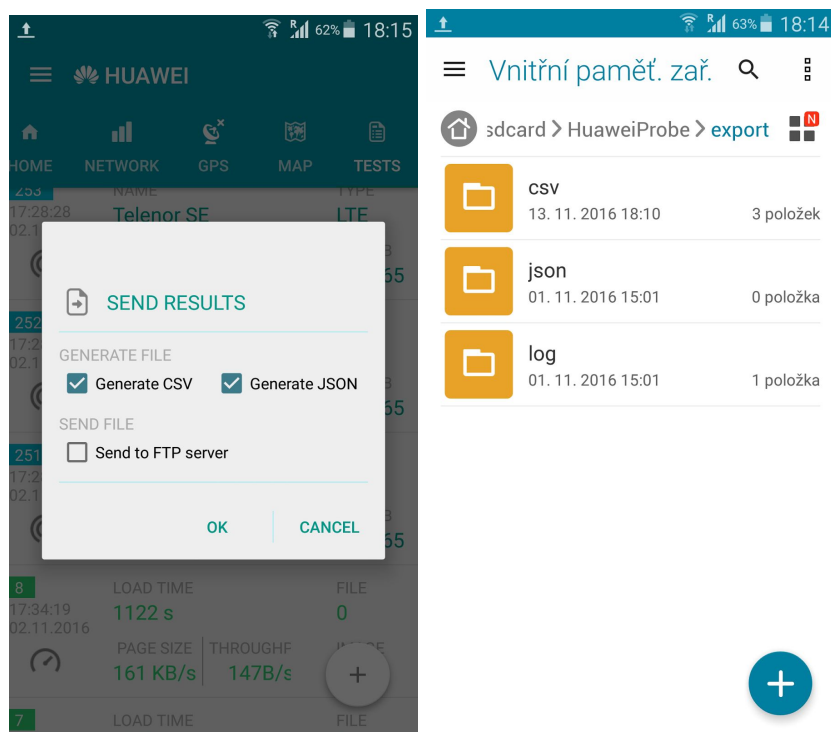
Results export and visualization

The test's results are stored in the application database (apart from voicetest) and in the remote server database (all tests).

The **results are displayed** in the application in the TESTS tab and in the MAP tab.



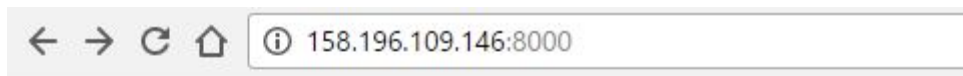
The results can be **exported** into common formats such as csv or json from the application settings menu. The results can be then imported into user familiar programs such as excel or map layers program. You can find the exported files in the HuaweiProbe folder in your phone's memory.



The results are sent to the central server and can be displayed via web interface under URL <http://158.196.109.146:8000/>

You can find the results in the separate tables according to the type of test

- Coverage <http://158.196.109.146:8000/coverage>
- Webtest <http://158.196.109.146:8000/webtest>
- FTP test <http://158.196.109.146:8000/ftptest>
- Voicetest <http://158.196.109.146:8000/voicetest>



Huawei probe results

- Voicetest
- FTPtest
- Webtest
- Coverage

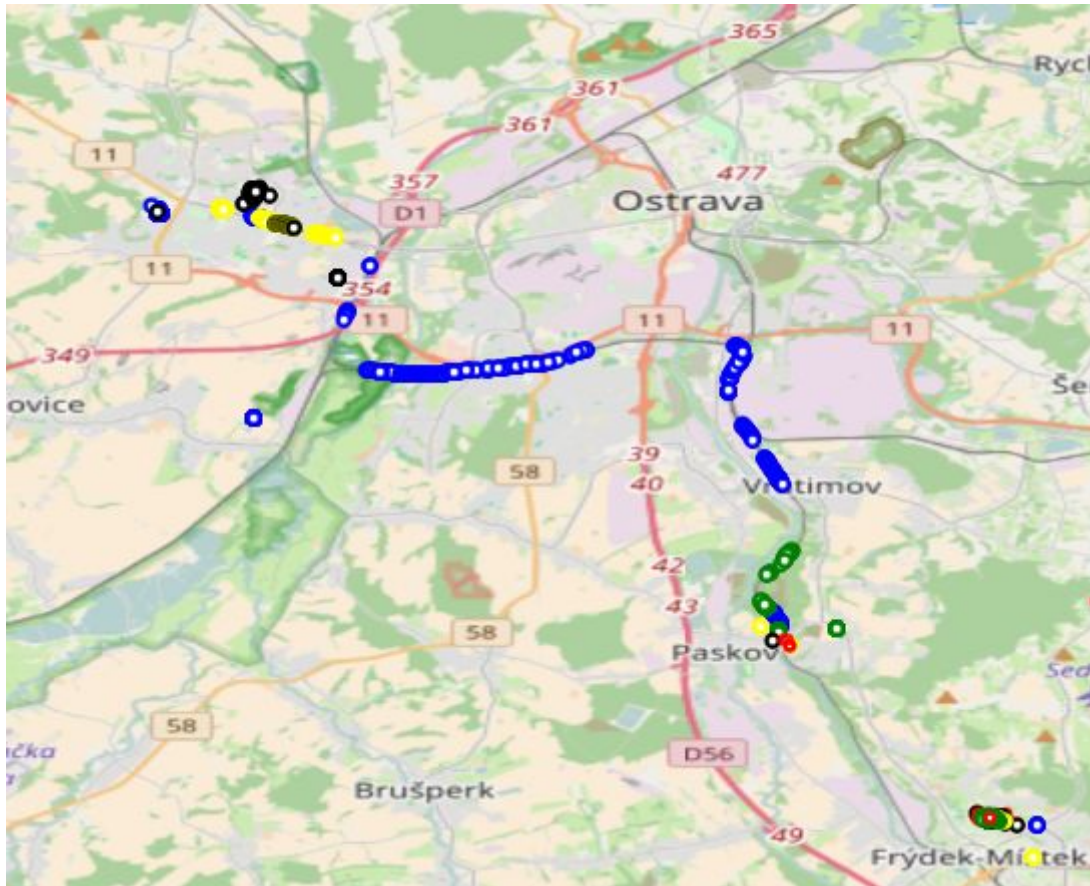
Huawei remote access

Download Huawei probe application

The test results can be filtered according every test parameter (e.g Device Id, Network Type, Operator Name,...)

The coverage results are visualized in the map layer in the following address

<http://158.196.109.146:8888/visual/>



Remote access

























































The Huawei probe application allows remote launching of the tests from web interface. When the Huawei probe application is installed on a new device, it is registered to the central server during the initial startup of the application.

The device is then available for remote access from the web interface

<http://158.196.109.146:8888/>

The following functions are available from the web interface

- Launching Coverage, Webtest, FTP test and Voicetest remotely on the chosen device - the results are sent to the server and can be displayed via web interface
- Automatic launching of the chosen test in set period and duration - it means how often I want to launch the test and how long, e.g. coverage test every 60 s for 10 minutes
- Stop automatic launching of the chosen test
- Enable/Disable Indoor mode on the chosen device

COVERAGE RESULTS VOICETEST RESULTS FTP TEST RESULTS WEBTEST RESULTS									
ID	Device Id	Id Device	Tests	Interval	Duration	Stop	Indoor	mode	
20	google Nexus 5	95646ba8ec97e108	   	Time in seconds	Time in minutes				
180	Lenovo Lenovo S1a40	eb598a1f00101b7	   	Time in seconds	Time in minutes				
382	samsung GT-I9305	71272cca76547c47	   	Time in seconds	Time in minutes				
406	DOOGEE X5pro	a0a76c629e912103	   	Time in seconds	Time in minutes				
407	HONOR PLK-L01	32ea09dab9879850	   	Time in seconds	Time in minutes				
408	samsung GT-I9506	a0fc56b76eaa029f	   	Time in seconds	Time in minutes				
460			   	Time in seconds	Time in minutes				
462	samsung SM-G900F	1f8491be26b238be	   	Time in seconds	Time in minutes				

Appendix

List of used abbreviations

ASU	Arbitrary Strength Unit
EDGE	Enhanced Data Rates for GSM Evolution
eNodeB	Evolved Node B
FTP	File Transfer Protocol
GPS	Global positioning system
HSPA	High Speed Packet Access
HSPAP	High Speed Packet Access Plus
LAC	Location Area Code
LTE	Long term evolution
MCC	Mobile Country Code
MNC	Mobile Network Code
PCellID	Physical Cell ID
REST	Representational State Transfer
RSSI	Receive Signal Strength Indication
RSRP	Received Signal Code Power
RSRQ	Reference Signal Received Quality

SNR	Signal Noise Ratio
TAC	Tracking area code
UMTS	Universal Mobile Telecommunications System

Export file formats

CSV

coverage.id,coverage.GUID,coverage.DEVICE_ID,coverage.GPS_POSITION_LAT,coverage.GPS_POSITION_LONG,coverage.GPS_SPEED,coverage.GPS_VARIANCE,coverage.GSM_UMTS_ASU,coverage.UMTS_ECNO,coverage.GSM_BER,coverage.GSM_UMTS_CELLID,coverage.GSM_UMTS_LAC,coverage.GSM_UMTS_RSSI,coverage.LTE_ENB,coverage.LTE_OPERATOR_CODE,coverage.LTE_OPERATOR_NAME,coverage.LTE_PCELLID,coverage.LTE_SINR,coverage.LTE_RSRP,coverage.LTE_RSRQ,coverage.LTE_TAC,coverage.NETWORK_TYPE,coverage.TIMESTP
9280,2382193d-16cb-4821-8a70-1da86ab3b4ec,a0fc56b76eaa029f,59.42426848,17.83134585,3.0,13.0,0,0,99,0,0,0,314557,24008,Telenor SE,0,200,-84,-7,34031,LTE,1478104457

JSON

```
[
  {
    "GPS_POSITION_LAT": 59.42426848,
    "LTE_OPERATOR_NAME": "Telenor SE",
    "UMTS_ECNO": 0,
    "GUID": "2382193d-16cb-4821-8a70-1da86ab3b4ec",
    "id": 9280,
    "DEVICE_ID": "a0fc56b76eaa029f",
    "NETWORK_TYPE": "LTE",
    "GSM_UMTS_RSSI": 0,
    "LTE_OPERATOR_CODE": 24008,
    "LTE_PCELLID": 0,
    "TIMESTP": 1478104457,
    "GPS_SPEED": 3,
    "GSM_BER": 99,
    "LTE_RSRP": -84,
    "LTE_TAC": 34031,
    "LTE_ENB": 314557,
    "LTE_RSRQ": -7,
    "LTE_SINR": 200,
    "GPS_POSITION_LONG": 17.83134585,
    "GSM_UMTS_LAC": 0,
```

```
        "GSM_UMTS_CELLID": 0,  
        "GPS_VARIANCE": 13,  
        "GSM_UMTS_ASU": 0  
    }  
]
```

XML

```
<?xml version="1.0"?>  
-<rows>  
-<row>  
<GPS_POSITION_LAT>59.42426848</GPS_POSITION_LAT>  
<LTE_OPERATOR_NAME>Telenor SE</LTE_OPERATOR_NAME>  
<UMTS_ECNO>0</UMTS_ECNO>  
<GUID>2382193d-16cb-4821-8a70-1da86ab3b4ec</GUID>  
<NETWORK_TYPE>LTE</NETWORK_TYPE>  
<DEVICE_ID>a0fc56b76eaa029f</DEVICE_ID>  
<GPS_POSITION_LONG>17.83134585</GPS_POSITION_LONG>  
<id>9280</id>  
<GSM_UMTS_RSSI>0</GSM_UMTS_RSSI>  
<LTE_OPERATOR_CODE>24008</LTE_OPERATOR_CODE>  
<LTE_SINR>200</LTE_SINR>  
<TIMESTP>1478104457</TIMESTP>  
<GPS_SPEED>3.0</GPS_SPEED>  
<GSM_BER>99</GSM_BER>  
<LTE_RSRP>-84</LTE_RSRP>  
<LTE_TAC>34031</LTE_TAC>  
<LTE_RSRQ>-7</LTE_RSRQ>  
<LTE_PCELLID>0</LTE_PCELLID>  
<GSM_UMTS_LAC>0</GSM_UMTS_LAC>  
<LTE_ENB>314557</LTE_ENB>  
<GSM_UMTS_CELLID>0</GSM_UMTS_CELLID>  
<GPS_VARIANCE>13.0</GPS_VARIANCE>  
<GSM_UMTS_ASU>0</GSM_UMTS_ASU>  
</row>  
</rows>
```

Contact: liptel@vsb.cz

Ostrava, November 2016