iMeasure Data sheet

Version 4.1.0

support@atecwireless.com

5/16/2022

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Approved	Rev	File/Reference
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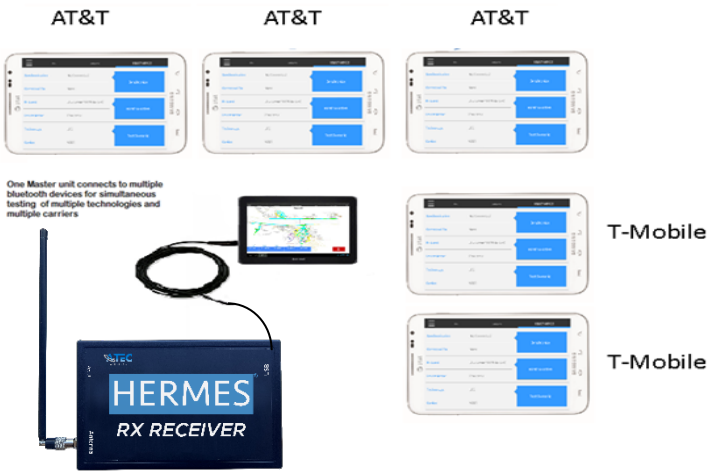
Table of Contents

4.1.0 Updates

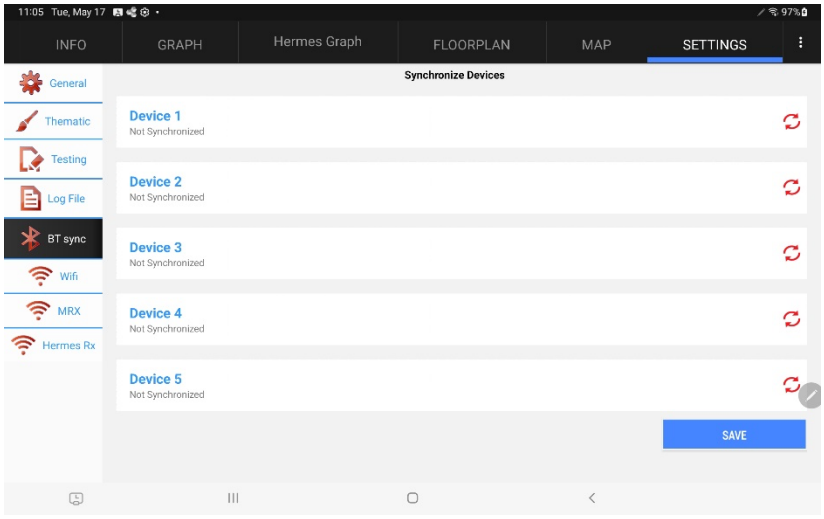
Current release added LTE and CW capabilities. 4.1.0 release offers two software modules:

- iMeasure-Master: The module can link multiple UE devices where one device, the Master Module is used for mapping while the BT Modules and CW receiver stream data to the master and recently added iMeasure support for CW collection. An option to record signal strength via USB from the MRX-34-C Receiver or HERMES RX Receiver.
- iMeasure-BT: Synchronized via Bluetooth with up to 5 UEs to the Master unit



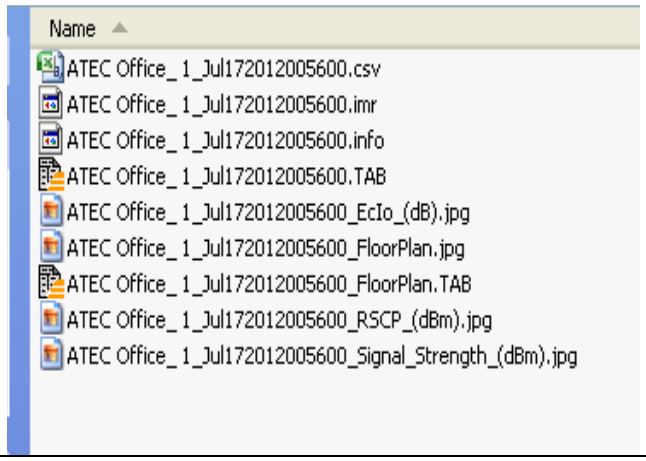
List of features and improvements:

I. Utilizing Bluetooth device synchronization eliminates the need for multiple cables.

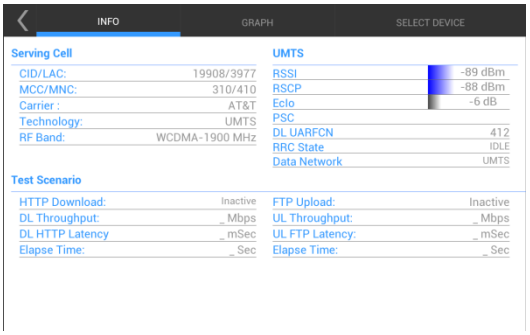


II. Active monitoring of the linked devices through the master unit.

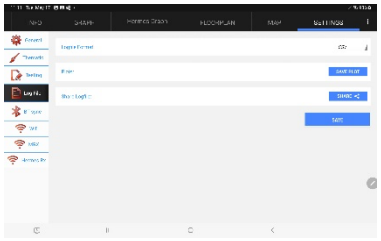
III. All log files collected by BT devices are stored on the master unit.

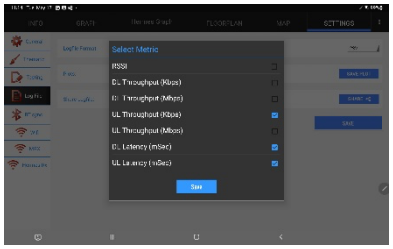


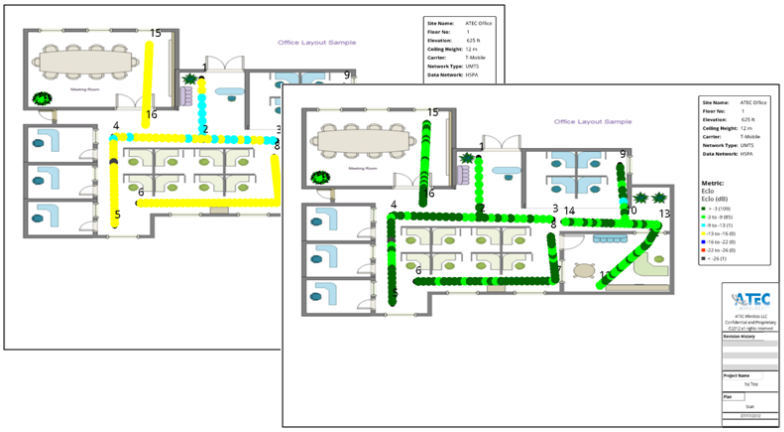
IV. BT Client module will work on all approved phone models compatible with the master module.



V. This version allows producing multiple plots when saving the session. The user can choose between the KPI's list of available metrics to generate the required plots at once.







Output ==➔

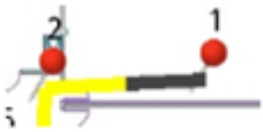
VI. Multiple file formats

- IMR : Propriety iMeasure file format allows to reload and replay old sessions
- CSV: Comma delimited file
- TAB: Tabular file ready to be opened in MapInfo and IBWave.
- XML: Extensible Markup Language is markup language that is a standard input to tools such as Actix.

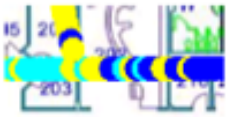
VII. Improved user interface

VIII. Improved output plots

3.4 Format



3.5 Format



IX. Fixes to prior 3.4 issues

X. Fixes to prior 3.5 issues

XI. Fixes to prior 3.7 issues

a. Notification to user a test scenario has finished

b. Added a customizable HTTP Download and Upload setup

XII. Fixes to prior 3.8 issues

a. Call status icons added to thematic plot

b. Rooted Jelly Bean OS support

Introduction

iMeasure is a pocket-size Android based solution for comprehensive measurements of the wireless air interface. iMeasure is designed and tested on most Android-based devices and supports GSM / EDGE / GPRS / WCDMA / HSUPA / CDMA / EVDO / HSPA/LTE/5G and CW. iMeasure is compatible with both Android-based handsets and tablet devices.

This document is intended to describe the specifications and functionality of the iMeasure data collection tool. The information in this document pertains to version 4.1 and is subject to changes and updates. For further information regarding other versions contact support@atecwireless.com.

Minimum Requirements

- Android 9.0 or later releases (9.1 and later may need to be customized depending on device make and model)
- Touch screen display
- Internet connectivity
- Built in camera
- Built in USB port for CW connectivity
- 20 GB minimum memory storage capacity
- 1 GHz Processor
- 1.5 GB RAM
- Built in GPS
- Bluetooth connectivity

Key Features

- Extended Life Battery
- Android based application
- X-Y coordinates associated with all metrics – for indoor mode
- Latitude-Longitude associated with all metrics – for outdoor mode
- Supports measurements on GSM, GPRS, EDGE, CDMA2000, EV-DO, WCDMA, HSPA/HSPA+ and LTE/5G networks
- Supports CW measurements when the CW receiver is connected
- Real-time display of Signal Strength and key network information
- Screen capture of measurements with camera background
- User friendly interface
- Lightweight and discreet
- Supports chart and text views
- Ability to insert notes and comments during recording
- Ability to insert pictures and anchor them to the location where it was taken
- Floor plan import capability
- Floor plan snapshot capability
- Color coded data points overlay on plan layout for in-building testing
- Color coded data points overlay on Google maps for outdoor testing
- Custom naming convention
- Label markers on the floor plan with Signal Strength values, Cell ID and/or carrier
- Site look up feature to load site related information such as site name, locations, etc
- Voice and data test scenarios
- Collects data both indoor and outdoor
- Technology and band lock capabilities
- Connect multiple devices

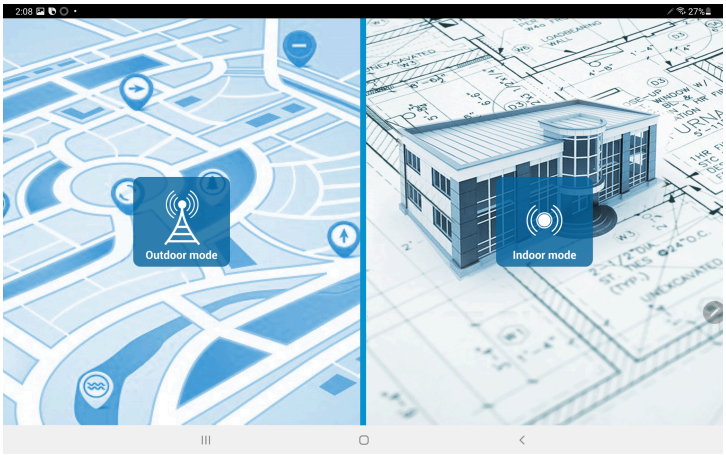
Installation

To install the application on Android device, simply follow the following steps:

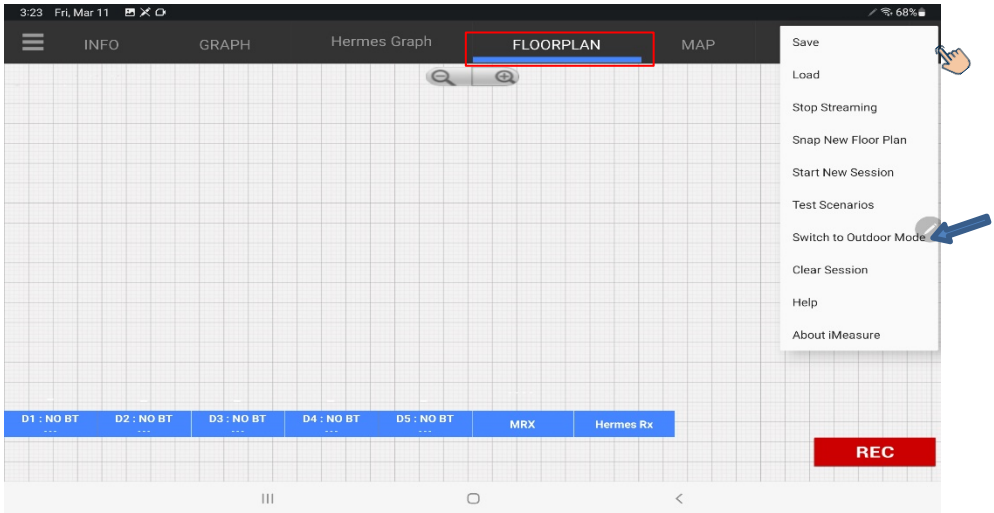
- Contact iMeasure support at support@atecwireless.com for the most updated iMeasure APK file
- Copy the iMeasure's *.apk file to the device or the device's SD card. You can copy the file by downloading it from an email account directly to the device, or by copying the file from a PC through a USB cable.
- On your device, allow "install of non-market application" through the device's settings.
- Uninstall any previous iMeasure installations.
- Install the copied *.apk file.

Login Screen

After launching the application, a mode of operation menu will be displayed to allow users to select indoor or outdoor mode of operation. The indoor mode of operation utilizes the user input to identify the location throughout a floor plan. The outdoor mode of operation utilizes GPS coordinates to identify the location.

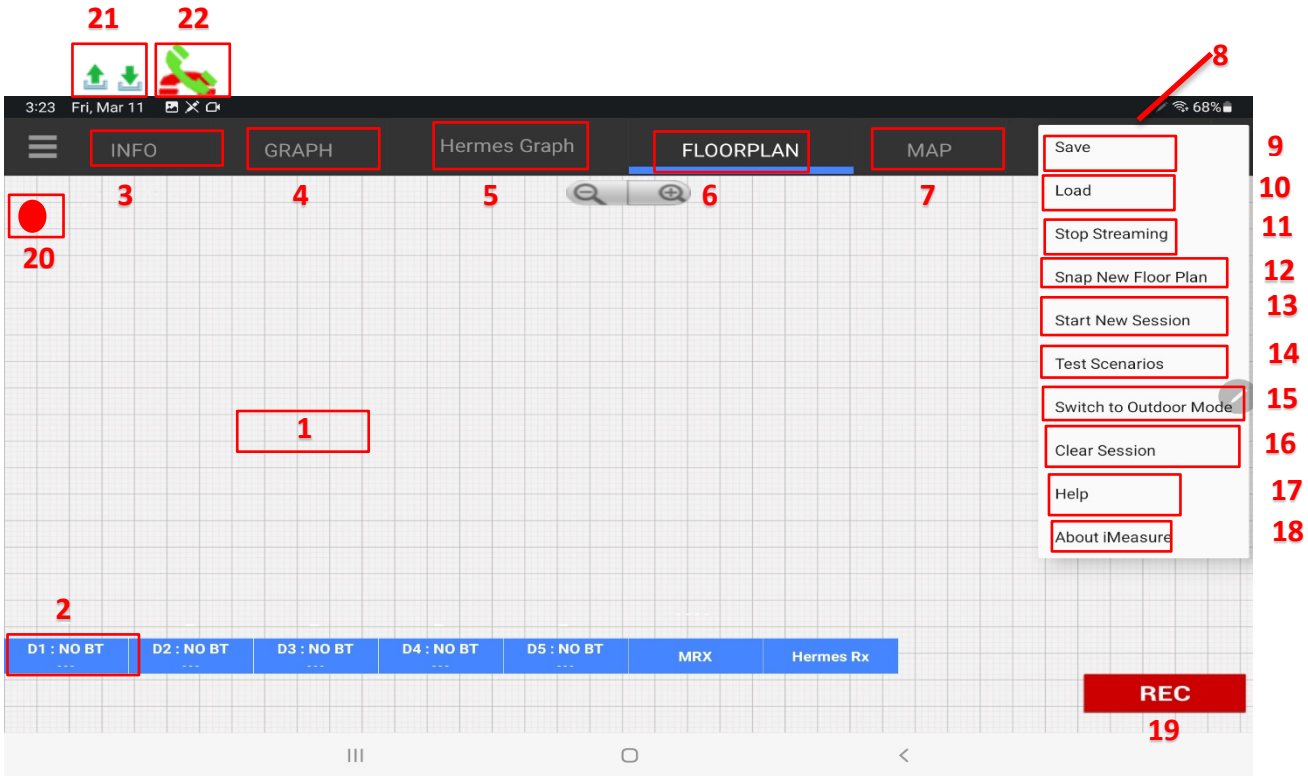


The tester may also switch between indoor or outdoor mode through application menu.
Path: Floor plan tab > Menu > Switch to Outdoor Mode.



Indoor Layout Screen

In-door version of iMeasure offers a layout screen that allows users to load the building floor plan and collect coverage information in customized thematic layer.



Buttons and display Index information

1. Default Layout
2. Device Connection Status (Solid Blue: Disconnected, Transparent background and font is blue: Connected, Blinking Information: Unsteady connection, Dark Blue Font: Connected but not receiving data),
3. Information Screen (Real Time Metrics)
4. Graph screen
5. Hermes Graph to check live view measurements
6. FLOORPLAN

7 Map for outdoor

8 Settings (General Settings – Thematic Settings – Test Scenario Settings – Log File Settings – Bluetooth Synchronization-MRX – Hermes RX)

9 Save Current Session

10 Load Old Recorded Session or Load default

11 Stop Streaming

12 Take a Picture to be Used as a Layout

13 Start New Session

14 Launch voice and data test scenarios

15 Switch to outdoor mode

16 Clear session

17 Help menu

18 Version information

19 Record/Pause

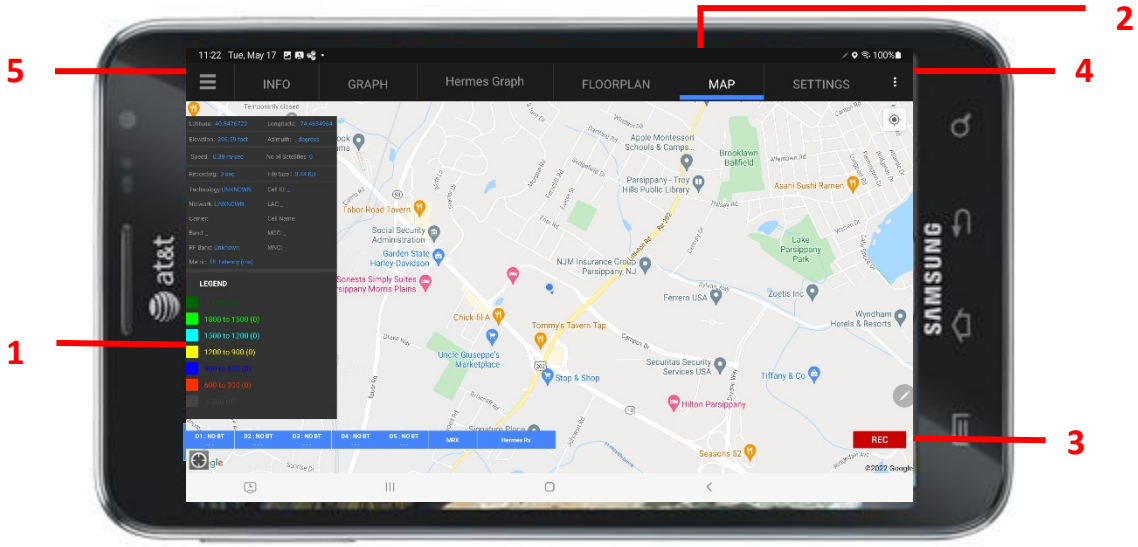
20 Recording Status

21 Uploading Speed Test in progress and Downloading Speed test in progress

22 Call test in progress

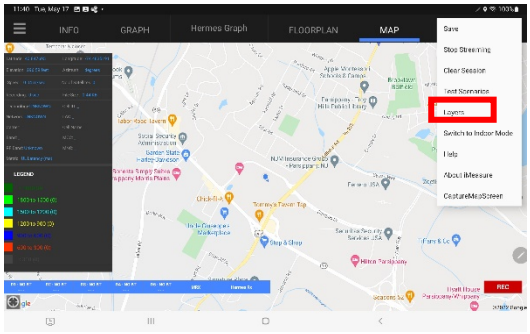
Outdoor Map Screen

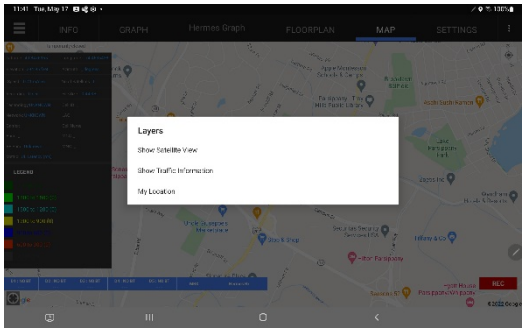
When in outdoor mode, the application automatically utilizes Google maps as the default background.



1. Information panel
2. Switch between text, graph and map screens
3. Start/Stop recording
4. Menu Button (plot metric and configure thematic colors and settings)
5. Toggle Outdoor Info overlay

The map navigation functionality is similar to Google maps where the user can zoom in and out with one or two fingers and panning the map with one figure. The map also allows the users to choose between satellite or map views and to identify the current location.





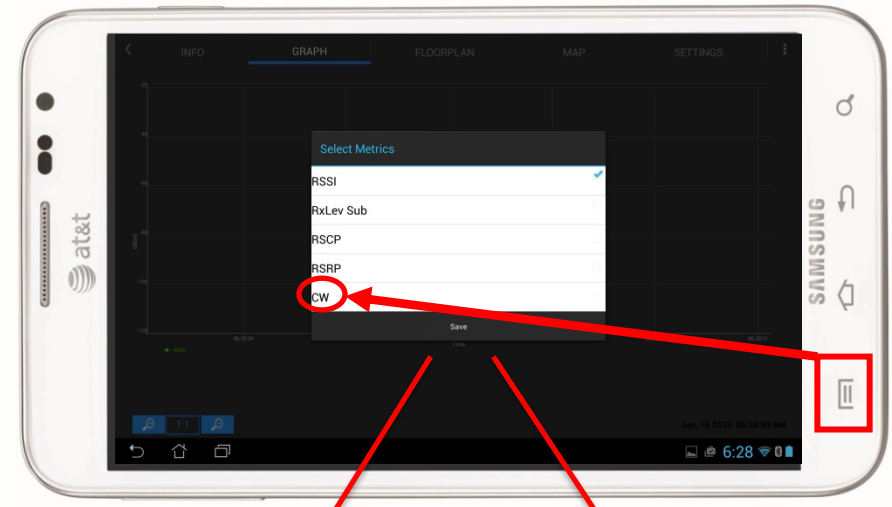
Depending on the phone data capability, the background map may be disabled, however the Lat/Long data would still be recorded.

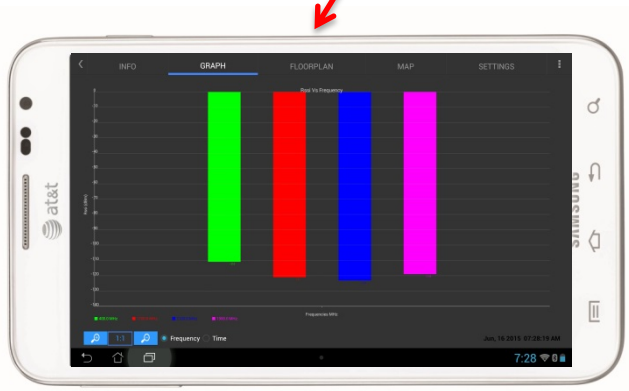
Charting

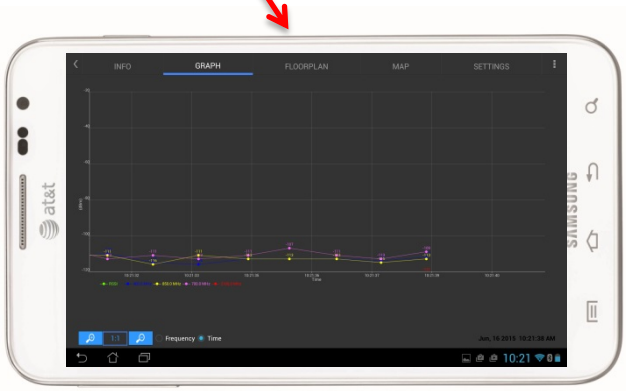
The chart screen is used to track and chart metrics such as RSSI, RxLevel, RSRP, RSCP, FTP Throughput, etc. The chart allows charting multiple metrics referenced to primary and secondary y axis. The chart allows zooming in and out using multi-touch.

Key Features

1. Zooming control
2. Chart
3. Primary axis menus (also located at the top right corner of iMeasure)
4. Icons to switch between chart, text, layout and map screens
5. Slide able area to display past graph or to zoom (two finger touch)


INFO
GRAPH
FLOORPLAN
MAP
SETTINGS
Select Metrics
RSSI
RxLev Sub
RSCP
RSRP
CW
Save
at&t
SAMSUNG
6:28

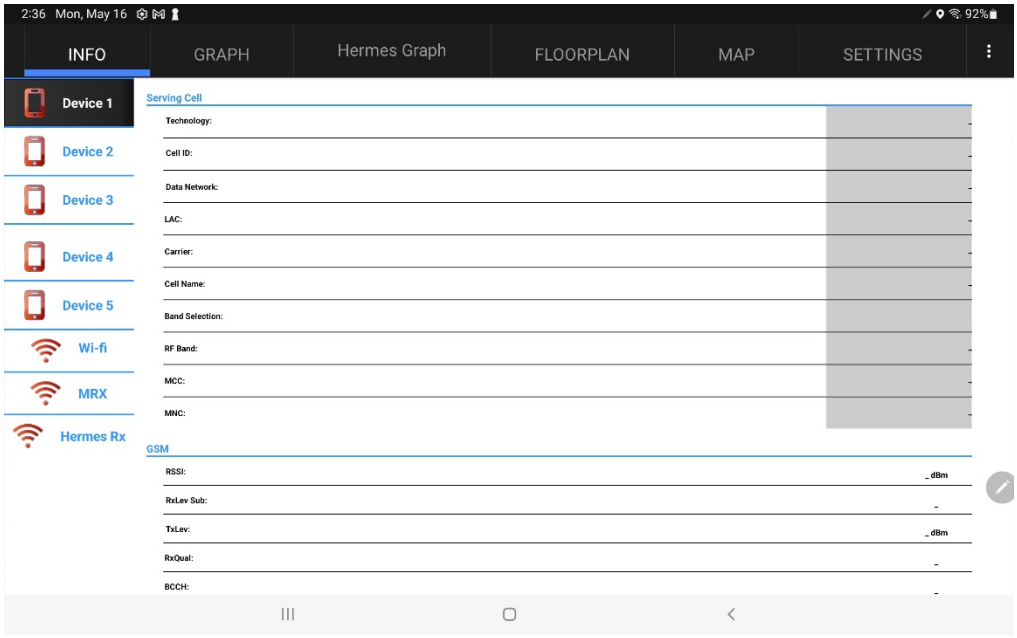

INFO
GRAPH
FLOORPLAN
MAP
SETTINGS
7:28


INFO
GRAPH
FLOORPLAN
MAP
SETTINGS
10:21

Info Screen

Info screen display allows live monitoring to vital network information. The info screen is divided into three sections:

1- Serving Cell
2- Technology
3- Test scenarios



Technology and Band Lock

iMeasure allows locking the mobile device to a specific technology and a specific band to allow forcing the mobile device to monitor and record data only on the selected technology and band. The locking capability allows locking the mobile device to:

- A specific band within a specific technology
- Auto selection between all bands within a specific technology
- Auto selection between all bands and all technologies

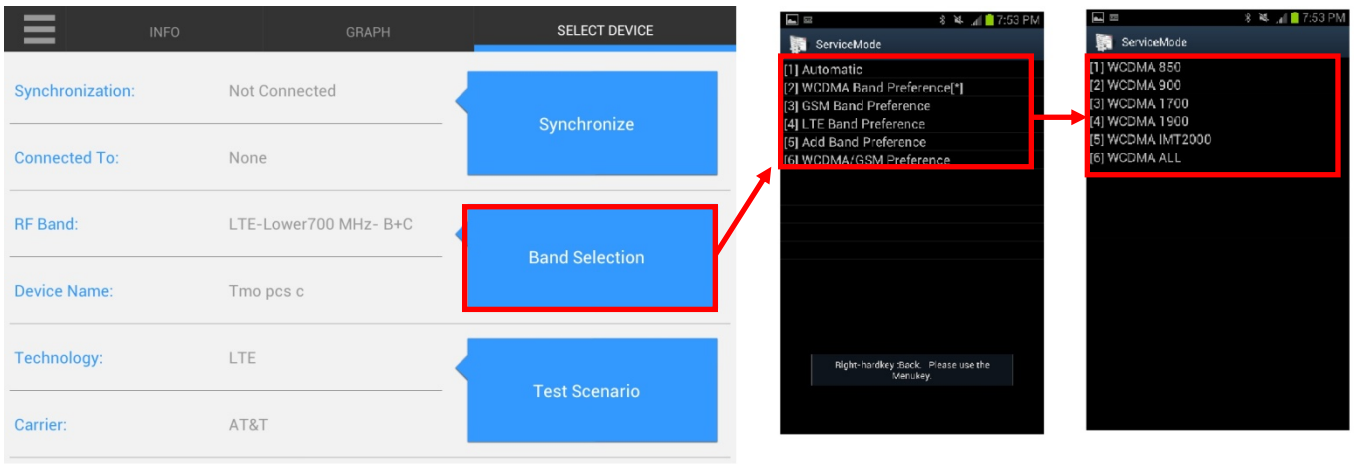
Depending on the technologies supported by the mobile device, the following technologies could be selected:

- GSM
- LTE
- UMTS
- CDMA

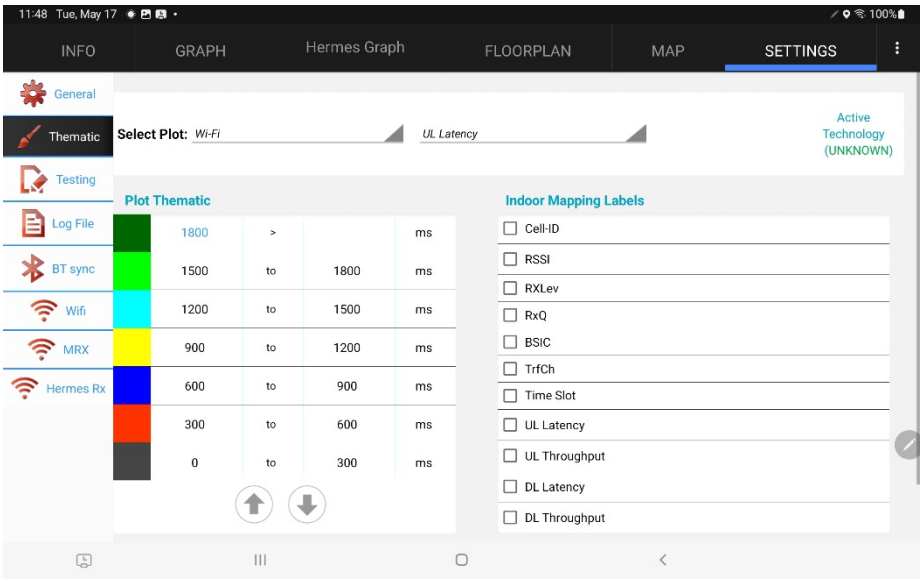
Depending on the bands and technologies supported by the mobile device, the following examples can be selected:

- WCDMA 850
- WCDMA 900
- WCDMA 1700
- WCDMA 1900
- WCDMA IMT2000
- GSM 850
- GSM 900
- GSM 1800
- GSM 1900
- GSM 850/1900
- GSM 900/1800
- LTE B3
- LTE B4
- LTE B5
- LTE B7
- LTE 17
- LTE B20

To lock your mobile device on a specific technology or band, click the configuration icon as shown



Personalize Your Application



If you are using the application for the first time, you can define the following:

Define Signal Range and Colors

Click on the settings tab on the top right, then click the thematic button on the left. Once the signal setting screen is opened, you can select the signal label that needs to be changed by using the up and down buttons to increase/decrease the corresponding value. Once all signal values are set to the desired settings, click “Save Settings” (you may need to scroll down depending on the screen size) to save the changes and exit the setting screen. The saved changes will be used to create the thematic overlay during the survey and will also be used to color the graphs presented.

Recording Your First Session

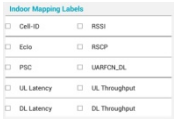
Once you have completed the previous section “setting up your application for the first time”, you will prepare the application for your session. The following are session specific settings:

Setting Appearance Preferences

Depending on the size of the building being tested and the zoom level, you may need to adjust the size of the markers placed on the screen as well as the width of the lines. You can customize the size of the markers and lines placed during the session by going to “Settings” screen and change the “Indoor Point Size” and “Outdoor Point Size”.

Selecting Marker Labels

You can select to label the markers created during recording by Signal Strength Value, Cell ID, Carrier, PSC, Throughput, or any combination.



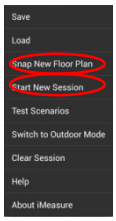
Selecting Metrics

The following metrics could be selected based on the current technology to be plotted:

- RSSI
- RxLev Sub
- RxQual
- RSCP
- EcIo
- RSRP
- RSRQ
- FTP DL/UP Throughput
- FTP DL/UP Latency

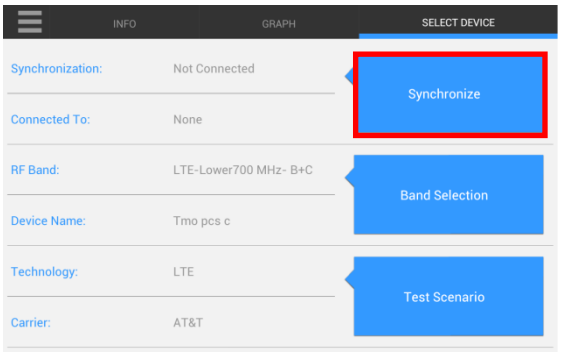
Start new Session & Uploading the Floor Plan Layout (Indoor Mode)

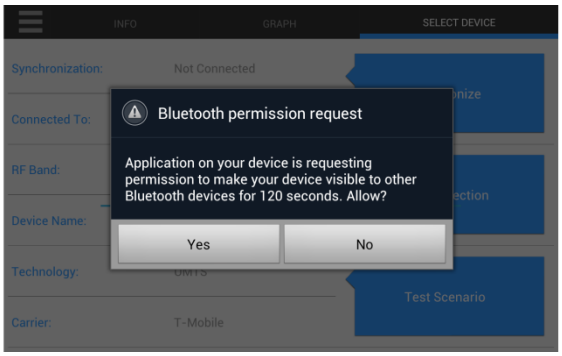
You can input your floor plan either by selecting an existing file or by taking a picture and using it as a layout. To capture a floor plan using the camera, open the menu on the right (by clicking the device menu button), Click “Snap New Floor Plan” marked in red below, a camera screen will open to allow you to capture the floor plan image, and you can then use –or discard and re-take- the captured image.



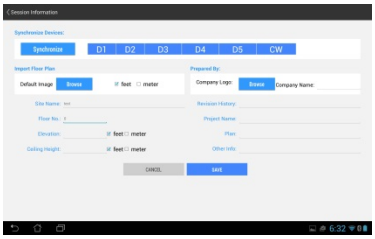
To select an existing file, open the menu on the right (by clicking the 3 dot menu button), Click “Start New Session” marked in yellow above, you will be directed to new page to setup the new session, by selecting "Browse" for importing a floor plan you can navigate to the desired folder and select the desired floor plan jpg image. At this point the BT units will be connected to the master unit. To connect your blue tooth devices, press "Synchronize".

1. Start iMeasure-BT on the slave device
2. Click “Device Synchronization” to get Bluetooth permission.

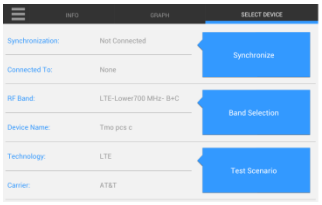


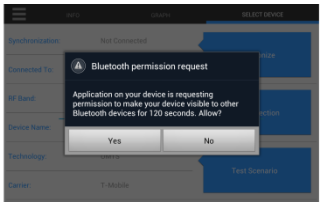


3. On the master unit Press "Synch"

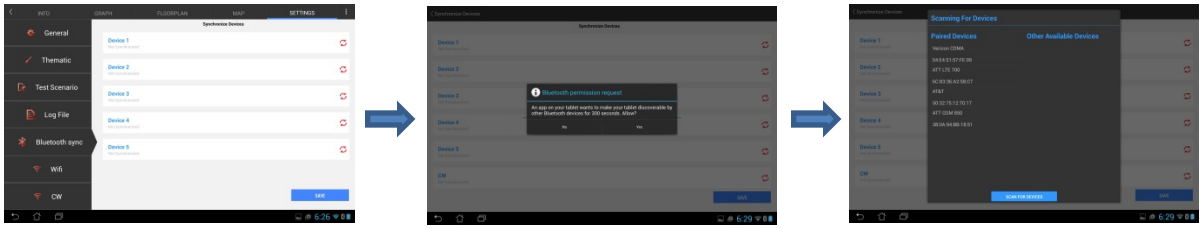


4. Click on Device 1 connection to activate the Bluetooth and find devices to synchronize

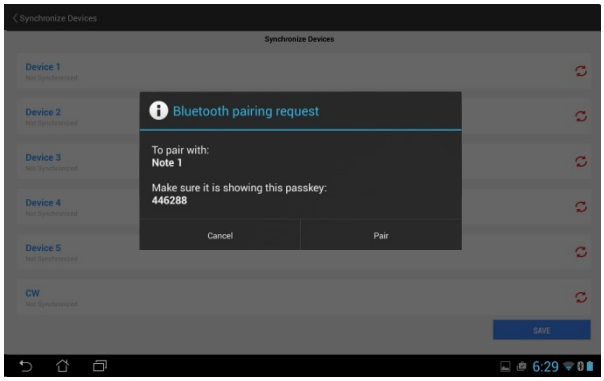


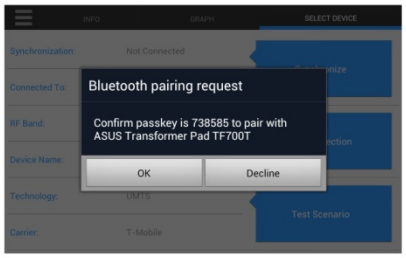


5. Search for the Device name or scan to find the iMeasure-BT device



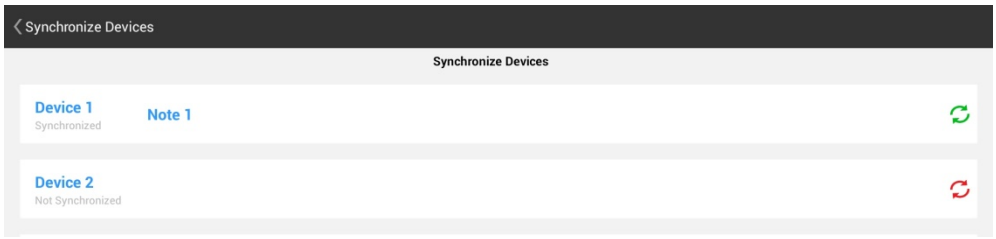
6. After you select the device you will be asked to accept pairing on both iMeasure-Master and iMeasure-BT devices.



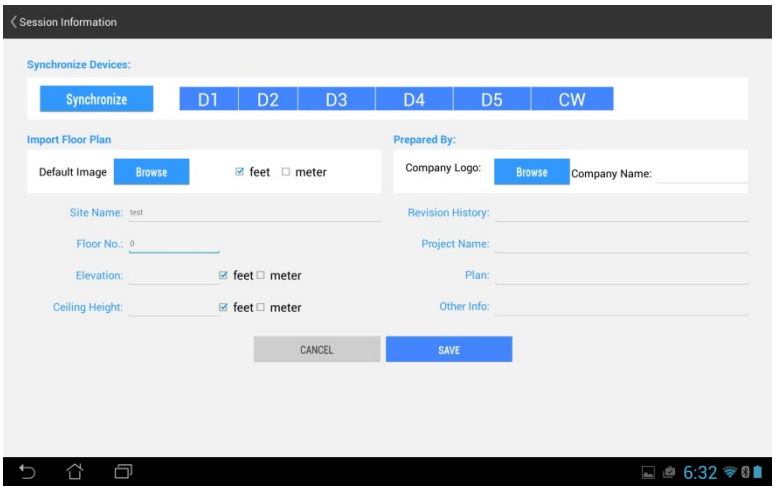


iMeasure Master **iMeasure BT**

7. Both devices will be connected and synchronized, click “Save Settings” on iMeasure-Master unit and you are ready start recording or monitor data from both the master and all connected BT devices.



Fill all the information needed to have it in your presentation and then click save

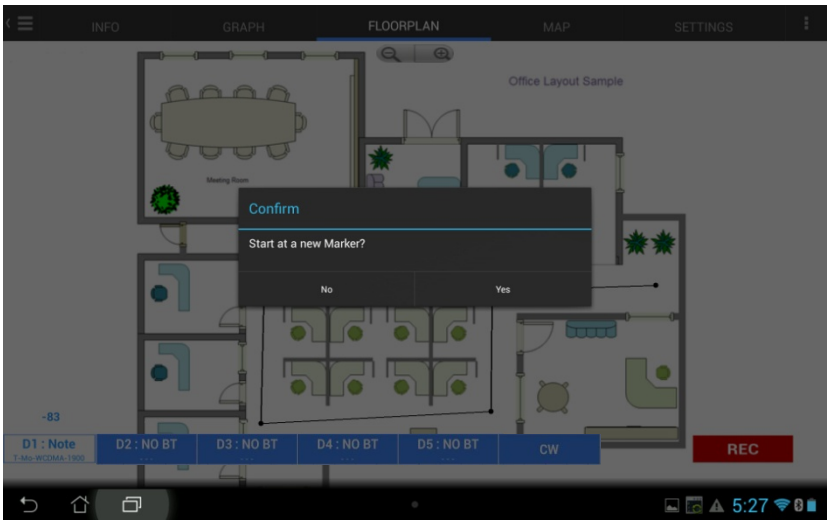


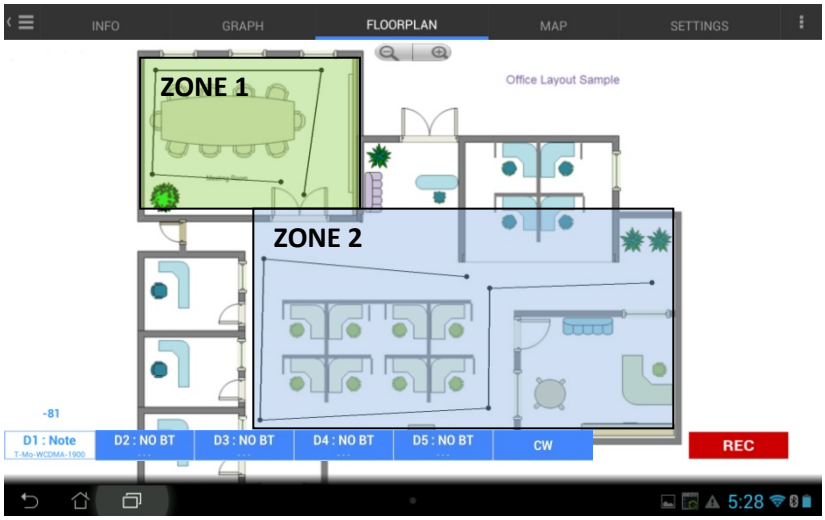
Start Recording-Indoor Mode

REC By now you have uploaded your floor plan, defined the signal colors and ranges to be used and you are ready to start recording. To start your session, use the record button on the bottom right corner on the screen – the device should be in the horizontal position during the test session. As you are walking through the building, identify your location by tapping the screen at the corresponding location in the layout. You only need to tap the screen each time you make a turn. After completing your session, click on the record button – it will have a pause symbol when recording is active- to stop recording -click save in the right menu.

Recoding Separate Zones

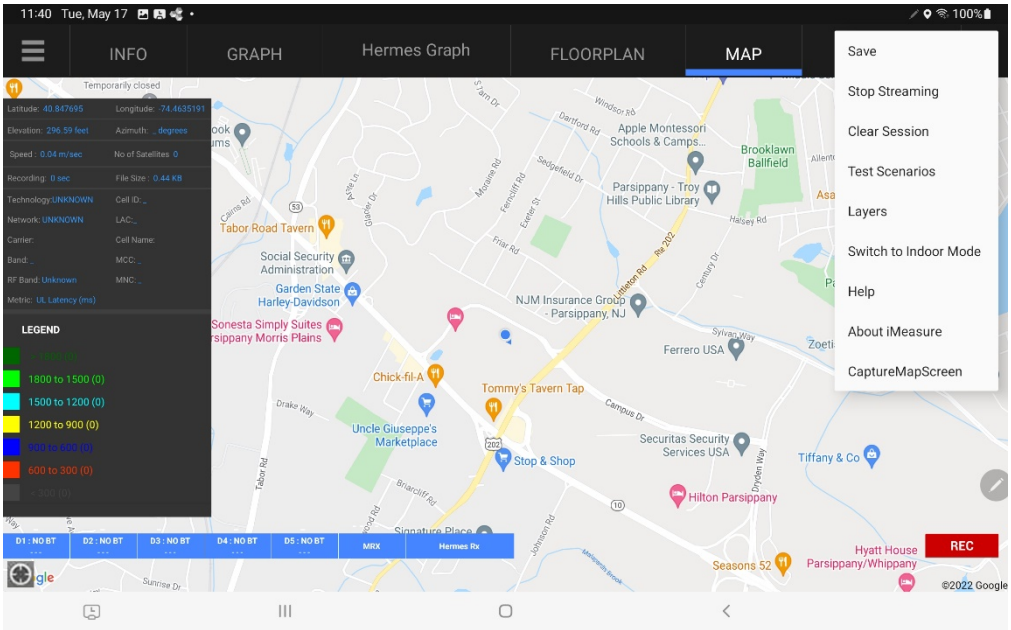
When surveying large floor plan, the tool allows placing markers in different zones in the layout. To record multiple zones, simply click the pause button after completing the current zone, and then click the record button again to start a new zone. Once the recording button is clicked; a message will appear to allow continuing placing markers in the same zone or placing new markers in a new zone. All recorded zones will be placed in the same session within the same log file.



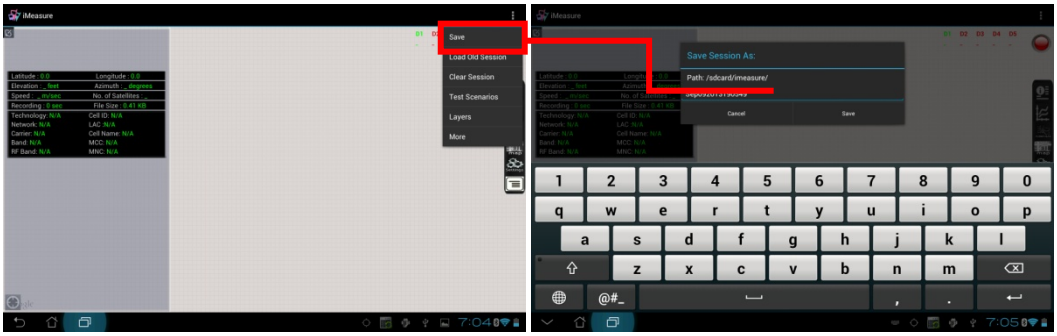


Start Recording-Outdoor Mode

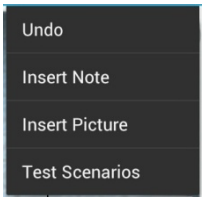
To start your session, select outdoor mode or switch to outdoor using the tab at the top. Then use the record button on the bottom right corner on the screen. As you are driving through the test route, the data points will be plotted on the screen according to the GPS coordinates and the pre-defined colors if selected.



After completing your route, click on the record button – it will have a pause symbol when recording is active- to stop recording -click save in the menu. You can pause and continue recording as many times as needed during a session.

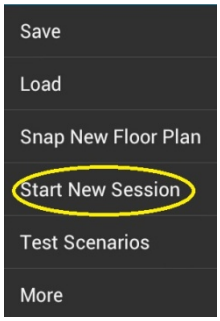


Placing Notes and Pictures While Recording



You can insert notes and picture anytime during recording by clicking “Insert Note”, “Insert Picture” respectively in the right menu. Once a note or a picture is inserted, a symbol will be placed on the layout/map to point out where the note or the picture was taken. The contents of the note and the name of the picture will be placed in the session log file and will be placed in the corresponding folder. Please note, in indoor mode, when adding a note or a picture, the corresponding symbol will not show on the screen until the next marker is placed since the location of the note or the picture is between the marker placed before and the marker placed after inserting the note or the picture.

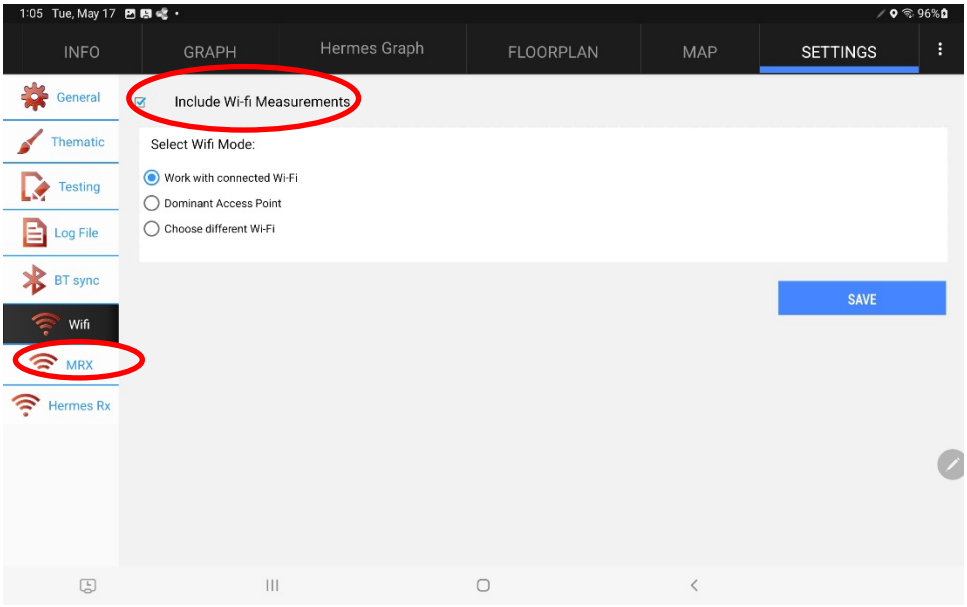
Starting a New Session



To erase the screen and start a new recording session, go to menu, Clear Session. In indoor mode, the same layout image will be reloaded without the thematic layer of the previous session. In outdoor mode, the thematic layer on the screen will be cleared.

Include Wi-Fi Measurements

iMeasure can include Wi-Fi measurements within the session simultaneously.



iMeasure will create a separate folder once the session is saved. The folder will include all the necessary files with the collected data for later analysis.

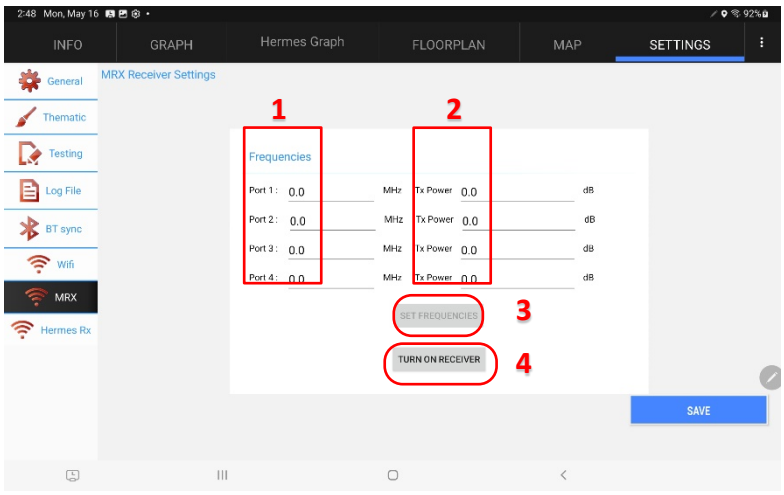
Wi-Fi Mode

- Work With Connected Wi-Fi
- Dominant Access Point
- Choose different Wi-Fi

Include CW Measurements

❖ MRX

iMeasure is capable of including CW measurements to the session at the same time you are collecting cellular and Wi-Fi measurements.

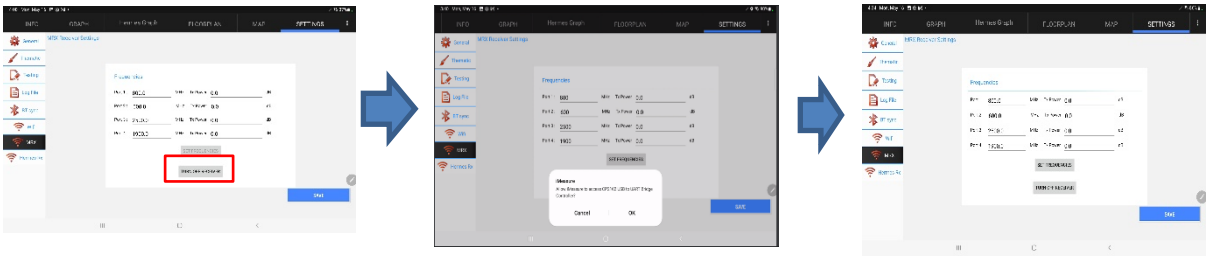


Options

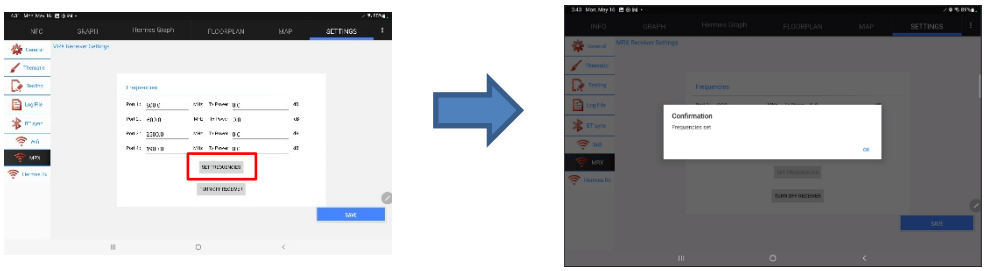
1. Frequencies
2. Transmit Power
3. Set Frequencies
4. Turn On Receiver connection

Connect to MRX Receiver

After connecting the receiver through the USB port, the CW configuration can be setup as follows:



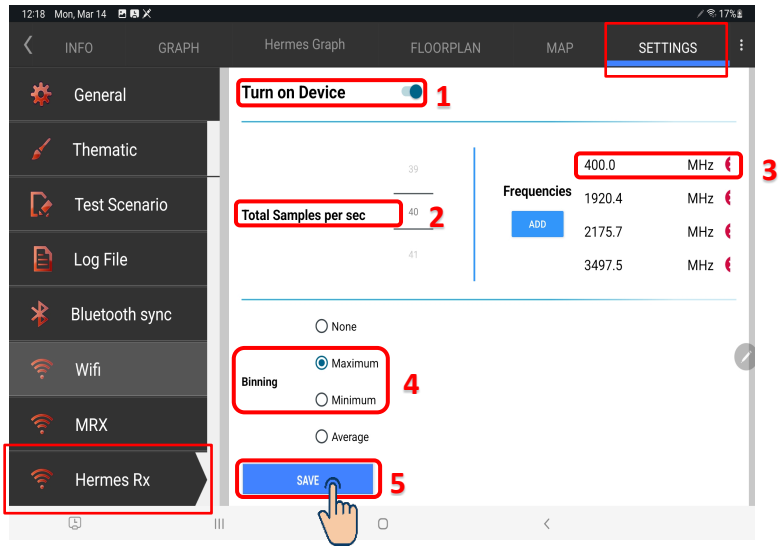
Once the MRX permission has been granted and the receiver connection has started:



❖ Hermes RX

It is possible to change one or more frequency when in live view mode (prior to recording data)

<u>This is live view only, it won't save any data or record a Session</u>



1- Turn on Receiver connection.

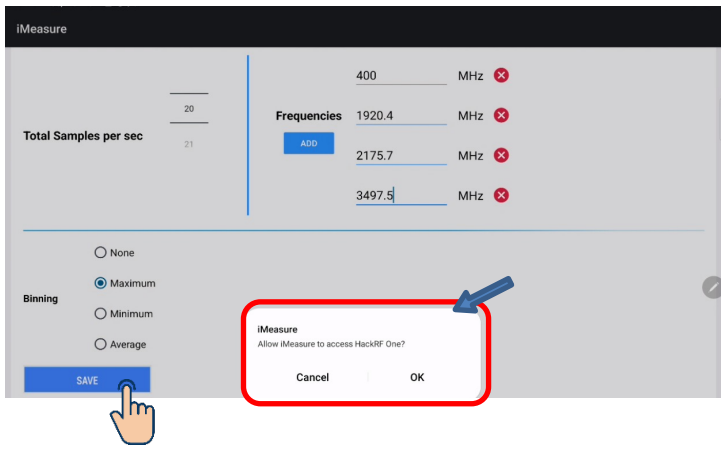
2- Enter the number of Samples per second. 20-300 samples per second.

3- Add Frequencies. Up to 20 Frequencies, 50Mhz- 6Ghz.

4- Binning (average/min/max).

5- Save settings.

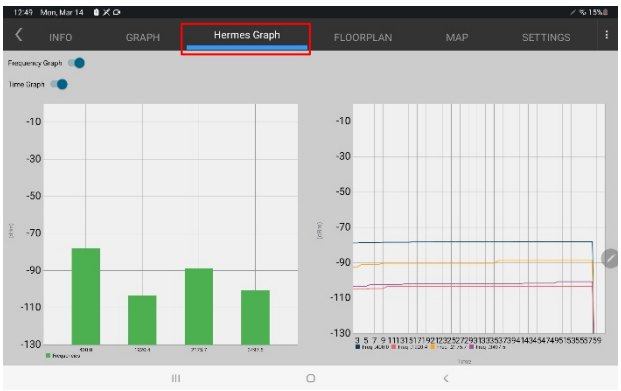
When the receiver is connected to the tablet, and "save" is pressed, a message will indicate that receiver was found, and it is ready to sync with iMeasure. Press OK and it will be ready to proceed with the testing.



After saving CW settings and syncing Hermes RX, here is where numbers can be seen in different ways.

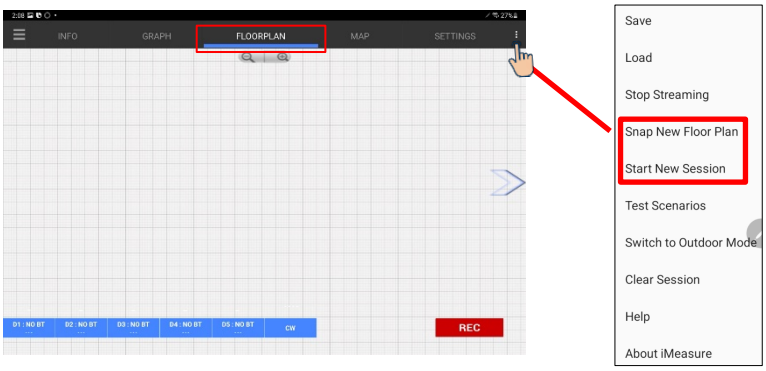
Under “Hermes Graph” and “FLOORPLAN” tab, check live view measurements.

Frequencies are shown as well their power level.



Start new session & Upload a Floor Plan Layout (Indoor Mode)

You can import your floor plan by either selecting an existing image or by taking a picture and using it as a layout. To capture a floor plan using the camera, open the menu ⋮ (3 dots on the top right corner), Click *"Snap New Floor Plan"* the camera will open to allow you to capture the floor plan image, take a picture and use it –or discard and re-take- the captured image.

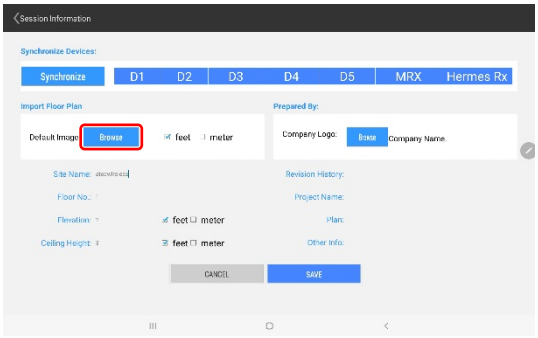


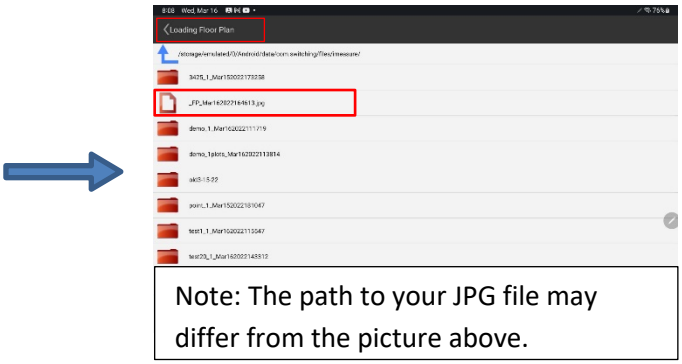
In order to start a new session and use a file stored in your tablet device, open the menu ⋮, Click *"Start New Session"*. You will be directed to *"Session Information"*. Import a new Floor plan image, by selecting *"Browse"*. Import a floor plan of your choice in the device folder and select the desired floor plan. Image extension that are accepted *.jpg files.

Note: on this screen there are also options to change metric/imperial unit, add company's logo, sync Hermes RX, site name, floor no, revision history, project name, plan and other info.

1 Import a floor plan:

Floorplan > Menu > Start New Session > Import floor plan-browse > select jpg image >import >Save.



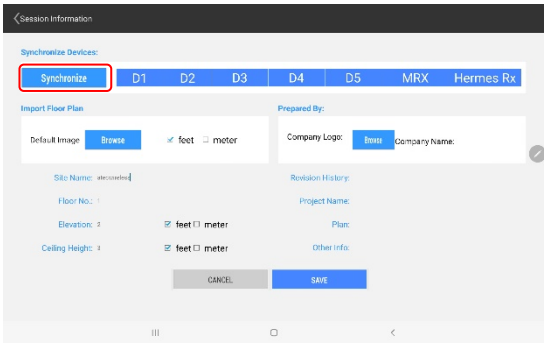


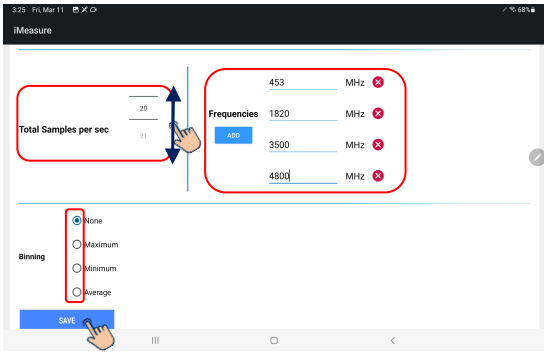
Note: The path to your JPG file may differ from the picture above.

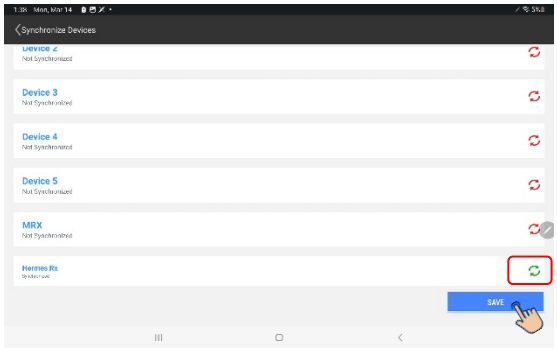
2 Synchronize Hermes RX with iMeasure.

Sync receiver and set up measurement path:

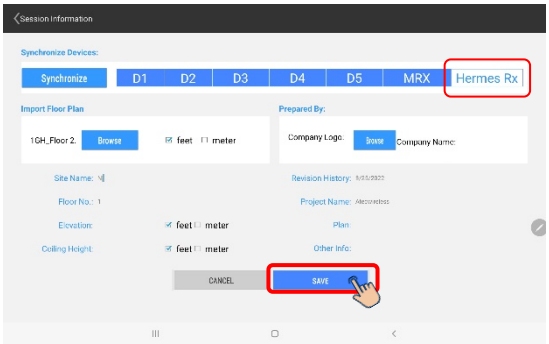
Floorplan > Menu > Start New Session > Synchronize >Hermes RX > Set up measurements > SAVE under Imeasure window > SAVE under synchronize Devices window > SAVE under session information window.







Icon Turns Green when Hermes RX in Synced

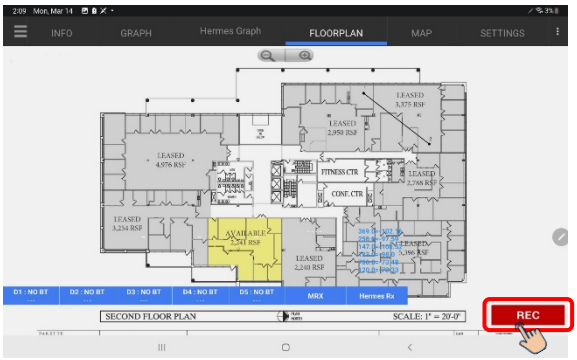


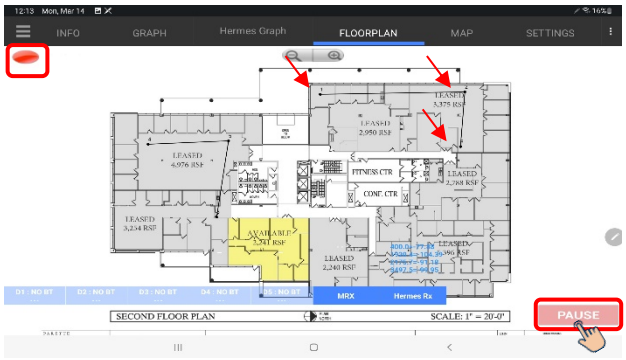
Hermes RX changes to white box, blue font

3 Record Indoor mode.

REC At this point, the floor plan is uploaded, log file named, frequencies entered, sample rate and binning set. To record the session, tap the record button on the bottom right corner on the screen. As you are walking through the building, identify your location by tapping the screen at the corresponding location in the layout. You only need to tap the screen each time you make a turn. After completing your session, click on the pause button – it will have a pause symbol when recording is active- to stop recording -click save in the right menu.

- When session is finished, tap PAUSE > MENU > SAVE in order to save the project. File name can be edited as well as file location.

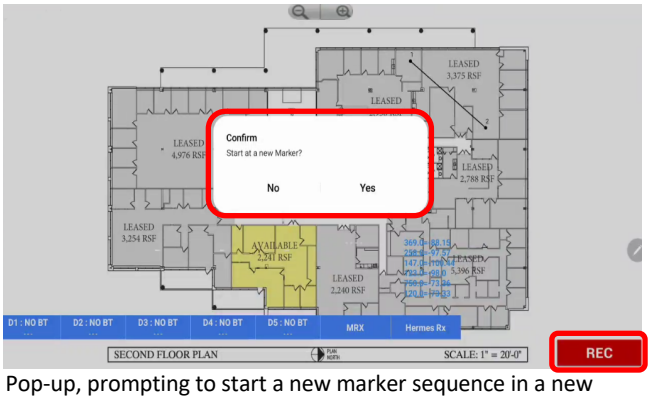




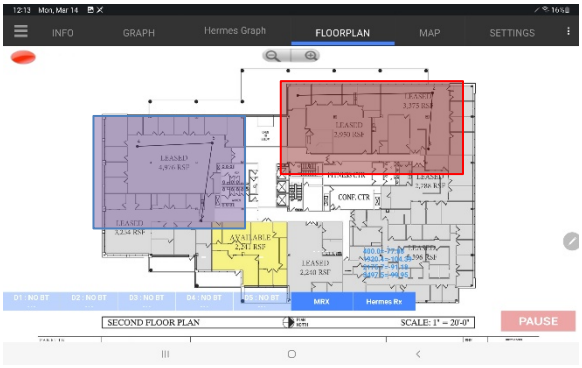
4 Recoding Separate Zones.

When surveying a large floor plan, iMeasure allows placing markers in different zones in the layout. To record multiple zones, simply click on “PAUSE” button after completing the current zone, and then click “REC” button again to start a new zone. Once “REC” button is clicked; a message will appear to allow continuing placing markers in the same zone or start a new marker in a new zone. All recorded zones will be placed in the same session within the same log file.

Black dots connected with a line represents the zone and direction changes in the zone.



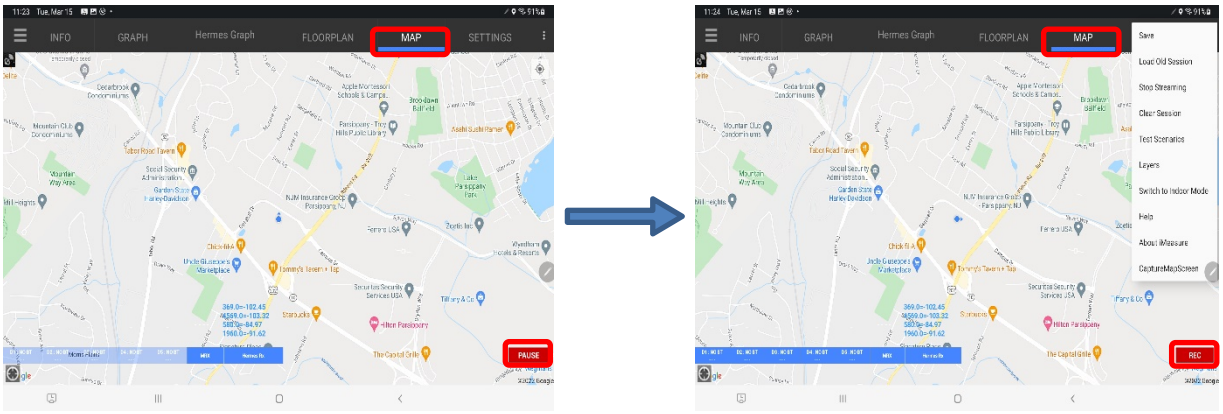
Pop-up, prompting to start a new marker sequence in a new zone or resume with the same zone sequence.



2 zones highlighted in the current session (blue and green squares.

5 Outdoor Mode

To start an Outdoor session, tap FLOORPLAN> MENU > switch to Outdoor mode. Outdoor mode can also be selected on the screen when the iMeasure app is opened.
Tap MAP, and start a session tapping REC. The markers on map will drop as vehicle moves based on actual location utilizing the devices GPS
As you are driving through the test route, the data points will be plotted on the screen according to the GPS coordinates and the pre-defined colors.

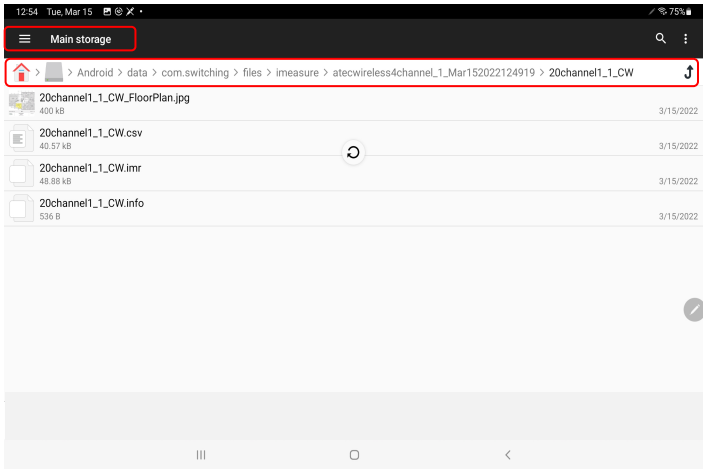


File Extension:
IMRO : iMeasure file format.
CSV: Comma delimited excel file.
TAB: Tabular file ready. It Can also be opened in MapInfo and IBWave.

7 File Path

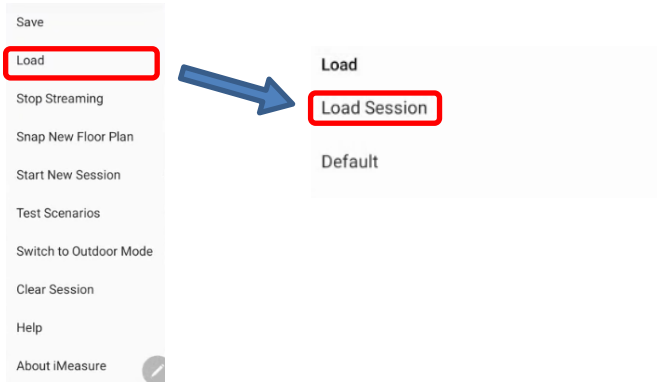
File path could change by devices, however, the path below is the default path where imeasure app stores projects.

Andriod > data > com.switching > files > imeasure.

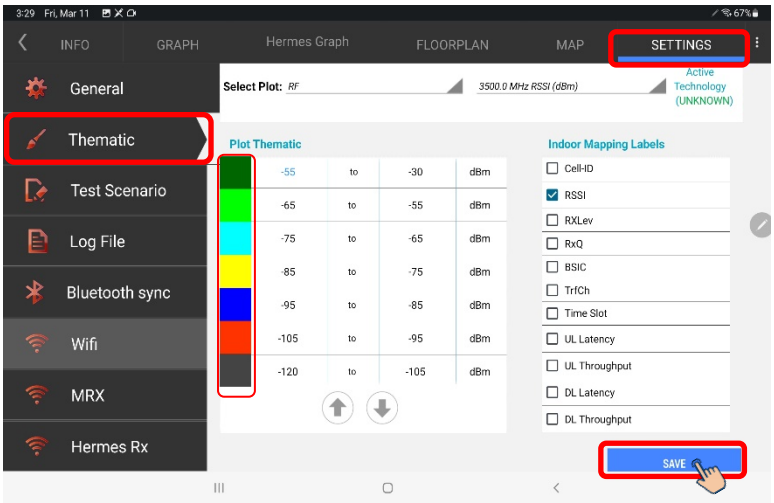


Load Saved Sessions

Saved sessions can be reloaded into Imeasure. When it is reloaded, the thematic as well as other characteristics can be changed. A window will prompt to browse the folder in the tablet's internal memory.

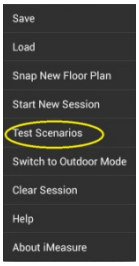


Once a saved session is loaded, you can re-plot thematic color settings as needed. (Note: it is not possible to add markers once a session is saved – indoor mode)



Test Scenarios

Test scenario allows the user to collect data during an active call or and an active data session. To set up and start a test scenario, select “Test Scenarios” from the main menu



Once the test scenarios button is clicked the following menu will appear to specify the required scenario:

- Start upload Test
- Start Download test
- Start Voice Test

Call Test Scenarios

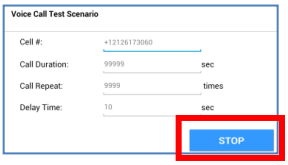
To set up and start a call test scenario, select “Start Voice Test”

and fill out the required information:

- Test phone number
- Call duration
- Call repeat
- Duration between calls

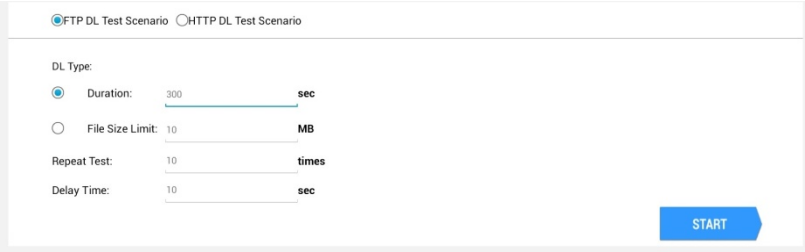
After filling out the call test scenario information, select “Start Test”. An icon is placed on the layout where the test call starts and ends.

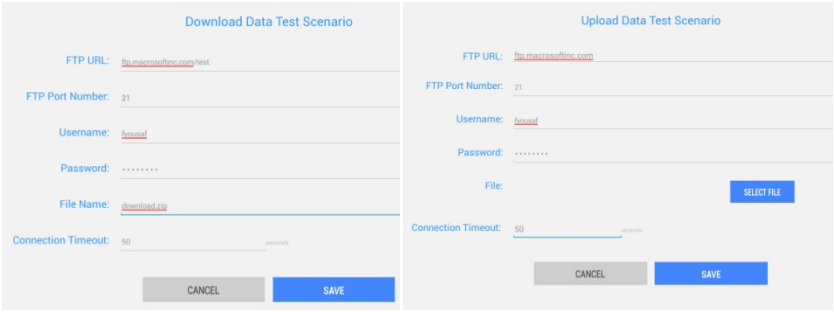
To stop the call test scenario, select “Stop Voice Test” from the “Test Scenarios” menu.

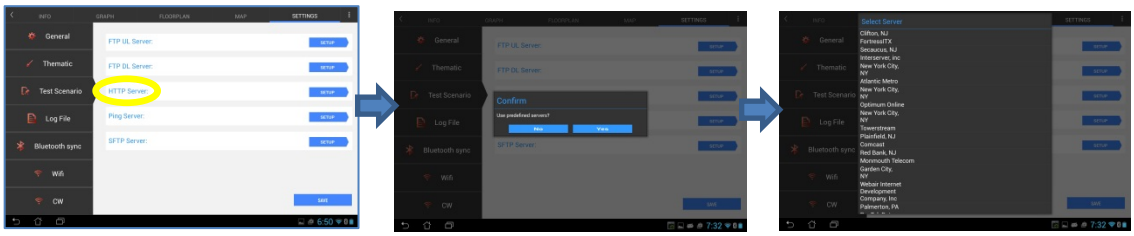


Data Test Scenarios

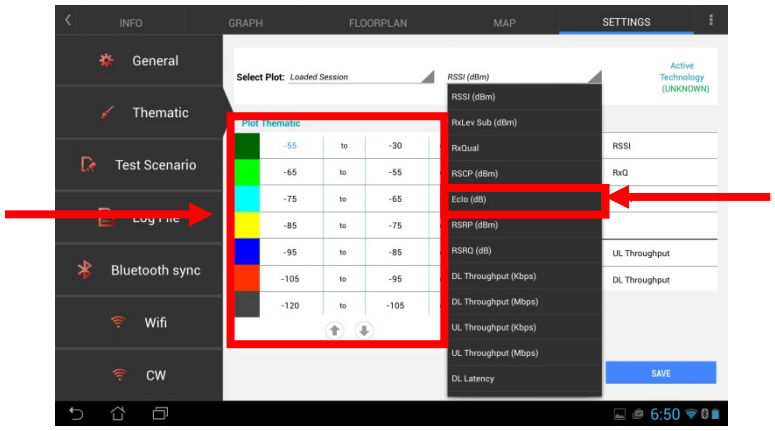
To set up and start a data test scenario, click the menu button on the top right from either indoor or outdoor mode and select "Test Scenarios. In this menu a test scenario can be started or started or stopped. To select the advanced data settings, tap the menu button again to select "Test Scenario Setup." Select " FTP DL Test Scenario Setup" or "HTTP DL Test Scenario Setup" to customize these settings. After the advanced setup is complete click "Save. To begin your test scenario, fill out the required information and click “Start upload Test” or “Start Download Test”.







iMeasure allows the user to present the download/upload throughput in the layout plot. To select plotting upload or download throughput, open Settings > Thematic screen and select "Download"/"Upload" and select the throughput ranges and corresponding colors and select "Save"



The following plot demonstrate download throughput:

Phone Type	Network Type	Base Station ID	Cdma Dbm	Cdma Ecio	Evdo Dbm	Network Operator	Calling Status	Upload Rate	Upload Status	Download Rate	Download Status
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		4088	STARTED
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		7072	_
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		7136	_
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		5544	_
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		5552	_
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		5544	_
CDMA	EVDO_A	4375	-96	-16	-96	Verizon Wireless		0		5544	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		5568	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		5576	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		5608	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		5624	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		0	STOPPED
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		0	_
CDMA	EVDO_A	4375	-101	-16	-101	Verizon Wireless		0		14560	STARTED

Download started

Throughput

Download stopped

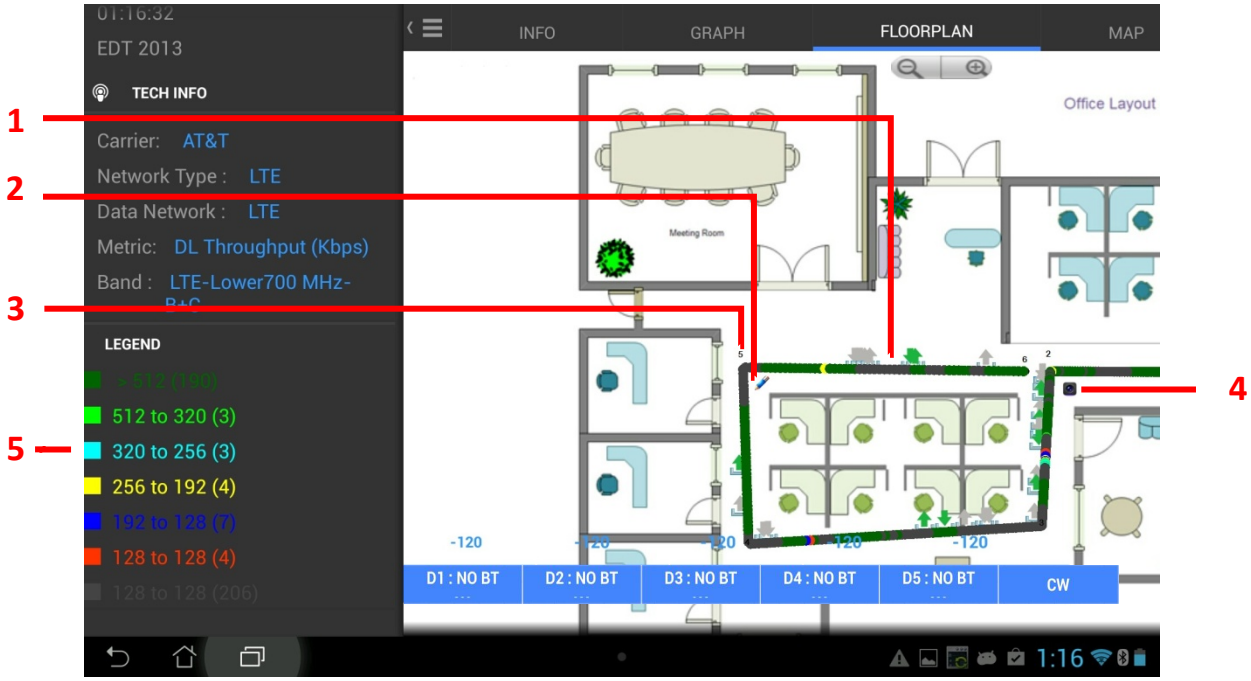
While a data session is up, the user can switch between the layout and graph screen. When in the graph screen, the data throughput is color coded according to the user defined legend and charted in the graph.

Recorded Results Package

iMeasure produces a complete survey package that includes:

- Formatted Coverage Plot (Indoor Mode)
- Measurements Log File
- Survey Pictures
- Measurements Screen Captures

Formatted Coverage Plot



The following are the key features of the output plot:

1 **Color Coded Data Points**

2 **Note Icon**: Indicates that a note was inserted at this location. The details of the note is recorded in the CSV log file (between the two markers 11 and 12 in this example) at the exact timestamp

3 **Marker Number and Label**: A marker icon is inserted each instance the screen is touched identify the location of each time turn is made while walking through the floor plan. The marker is labeled by a

sequence number as well as custom labels. You can label you markers with the signal strength reading and/or Cell ID

4 Picture Icon: Indicates that a picture was taken at this location. The name and folder of the picture is noted in the CSV log file (between the two markers 1 and 2 in this example) at the exact timestamp.

5 Plot Info: This section includes network information, plot legend and a list of serving cells. The plot legend includes a count of the data points collected at each signal range. The list of serving cells is sorted by strength as well as by dominance (highest data point count).

Measurement Log File

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Marker Number	Date	Image Name	X	Y	Phone Type	Network Type	Cell ID	Lac	Gsm Bit Error Rate	Signal Strength	Network Country Code	Network Operator	Subscriber ID	Data Activity	Data State	Comments	Picture Path	Provider	CELL	LATITUDE	LONGITUDE	ORIENTATION	VENDOR
2	11	Oct_13	/sdcard/in	334	159	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
3	11	Oct_13	/sdcard/in	336	151	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
4	11	Oct_13	/sdcard/in	338	144	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
5	11	Oct_13	/sdcard/in	339	136	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
6	11	Oct_13	/sdcard/in	341	128	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected	Note							
7	11	Oct_13	/sdcard/in	343	120	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
8	11	Oct_13	/sdcard/in	345	112	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
9	11	Oct_13	/sdcard/in	346	105	GSM	EDGE	39803	32167	-1	-91	us	T - Mo	3E+14	None	Disconnected								
10	12	Oct_13	/sdcard/in	314	50	GSM	EDGE	39803	32167	-1	-89	us	T - Mo	3E+14	None	Disconnected								
11	12	Oct_13	/sdcard/in	309	50	GSM	EDGE	39803	32167	-1	-89	us	T - Mo	3E+14	None	Disconnected								
12	12	Oct_13	/sdcard/in	303	50	GSM	EDGE	39803	32167	-1	-89	us	T - Mo	3E+14	None	Disconnected								
13	12	Oct_13	/sdcard/in	298	50	GSM	EDGE	39803	32167	-1	-89	us	T - Mo	3E+14	None	Disconnected		/sdcard/imeasure/IM-Oct132011160009.png						
14	12	Oct_13	/sdcard/in	292	50	GSM	EDGE	39803	32167	-1	-89	us	T - Mo	3E+14	None	Disconnected								

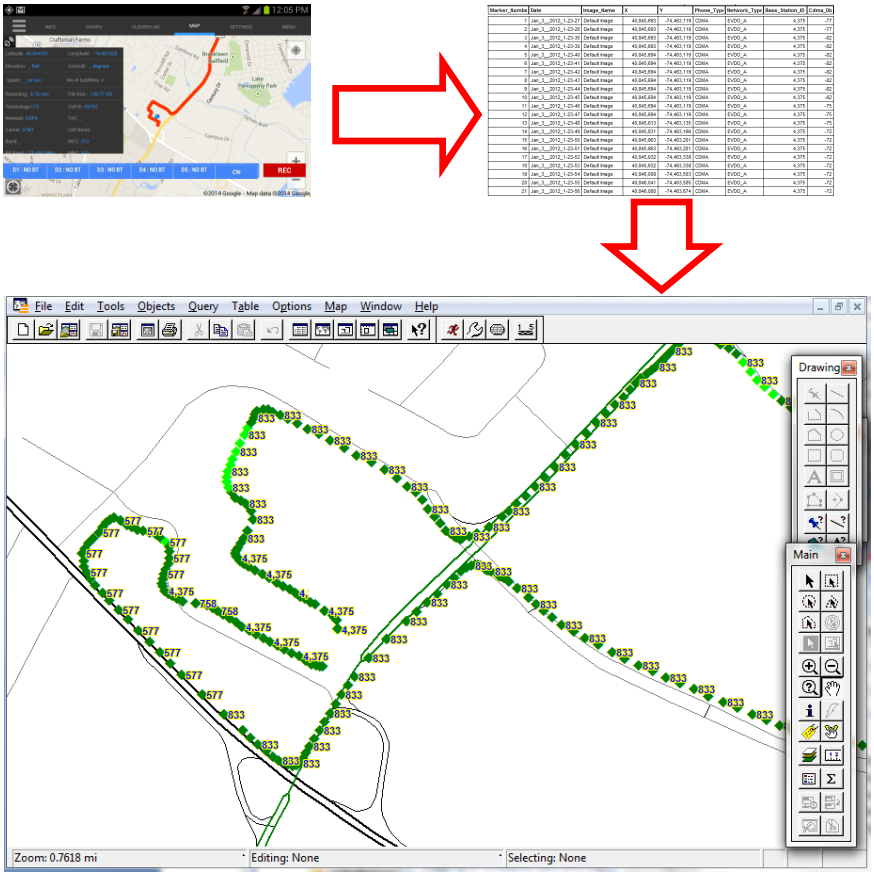
Columns recorded in the output log file will differ based on the technology of the device and the network. The following is a list of the general columns:

- **Marker Number**: Marker numbers correspond to the markers placed on the layout plot
- **Date**: Date and timestamp
- **Image Name**: The plot background layout image information
- **X and Y**: Coordinates reference the top left corner of the image. The coordinates recorded do not only correspond to the markers positions but they correspond to each data point collected. The coordinates of the data points between each of the two markers are mathematically calculated to correspond to the time of each data point. The coordinates could be easily imported into MapInfo or other GIS tools for further processing
- **Phone Type**: GSM phone represents both GSM and UMTS technologies.

- **Network Type**: EDGE/GPRS represent GSM, HSDPA represents UMTS and EVDO represent CDMA
- **Comments**: Collects notes inserted during the survey
- **Picture Path**: Pictures taken during the survey

Columns shown after the picture column are appended from the lookup file (refer to "Using Site Lookup Files" section)

iMeasure output log file could be easily imported to MapInfo or similar tools

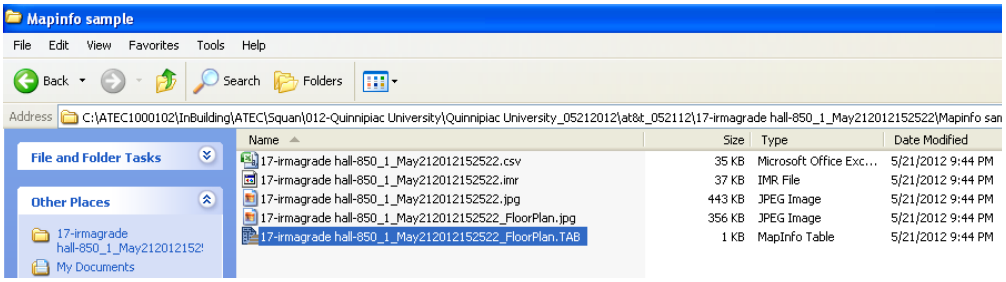


MapInfo Plot

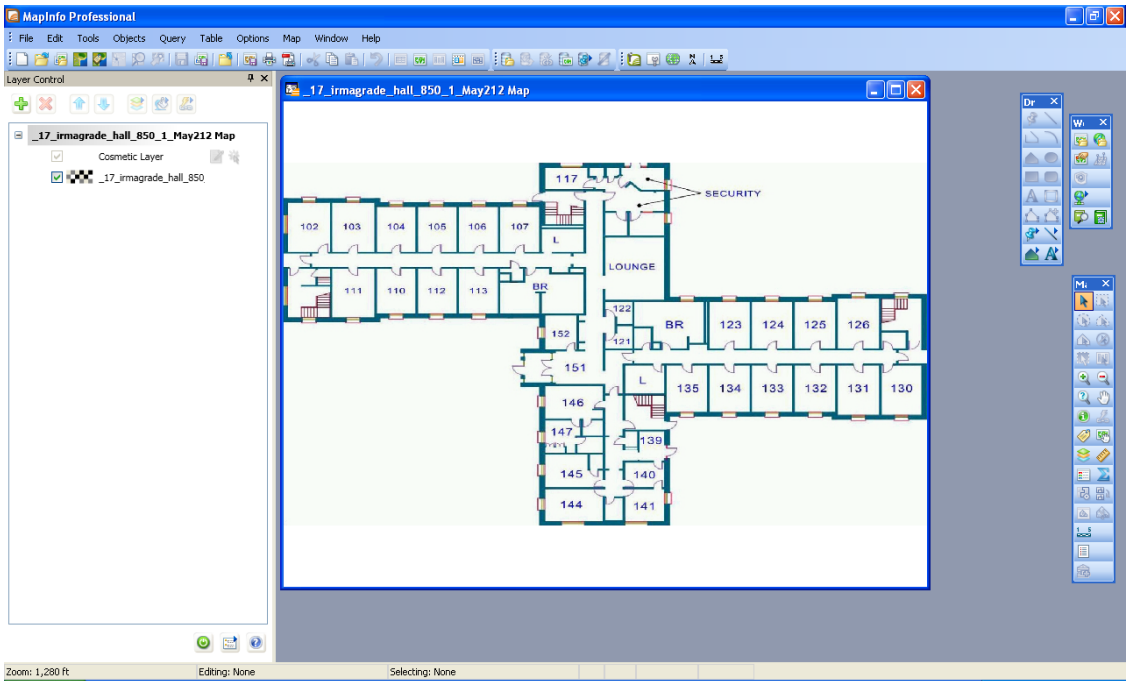
Post-processing & Plotting In-Building Data on Floor Plan Using MapInfo:

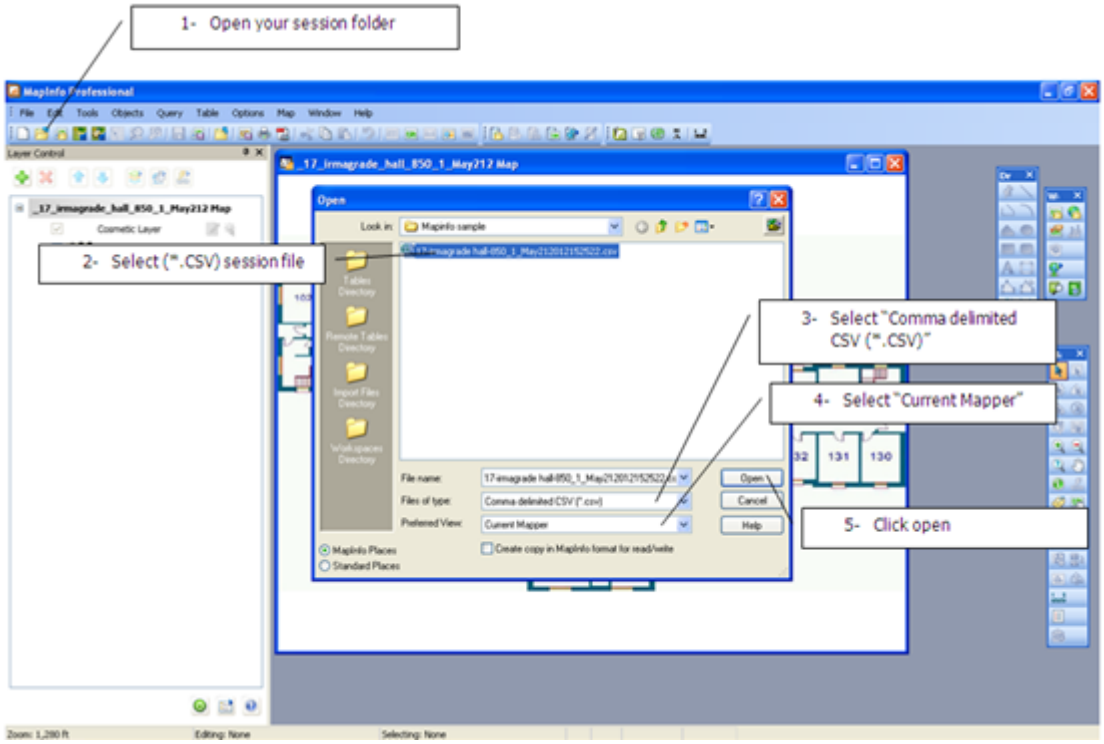
This information is based on MapInfo Professional Version 11.0 (there is a slight difference in steps when using other versions)

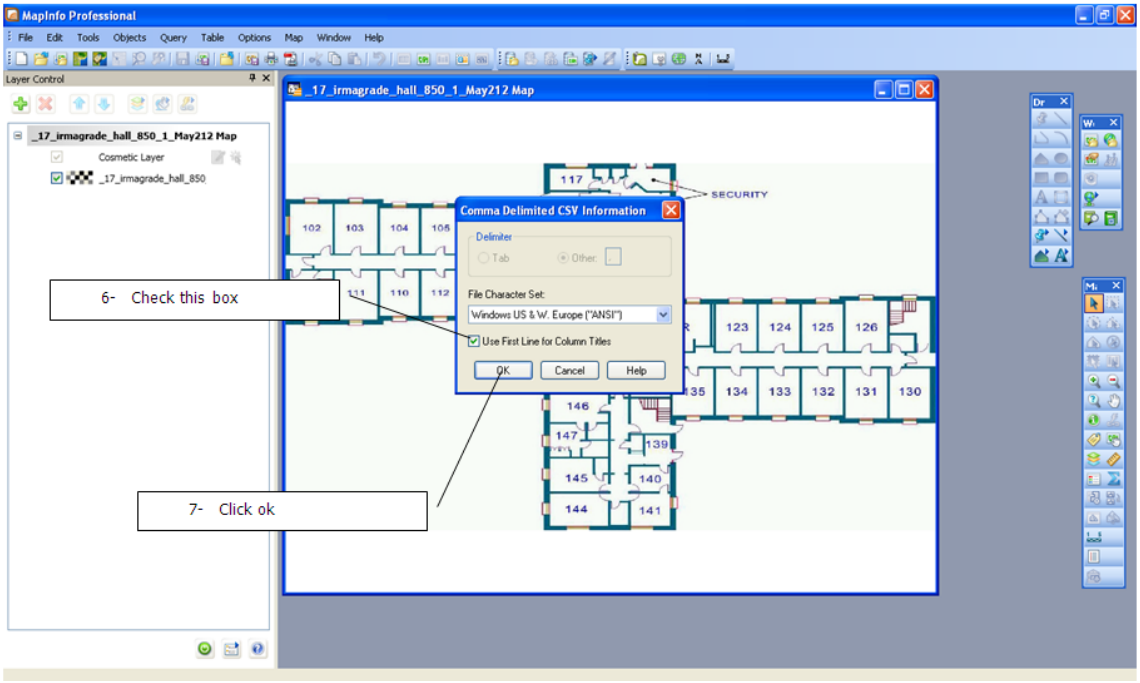
From iMeasure session folder open (*_FloorPlan.TAB) file

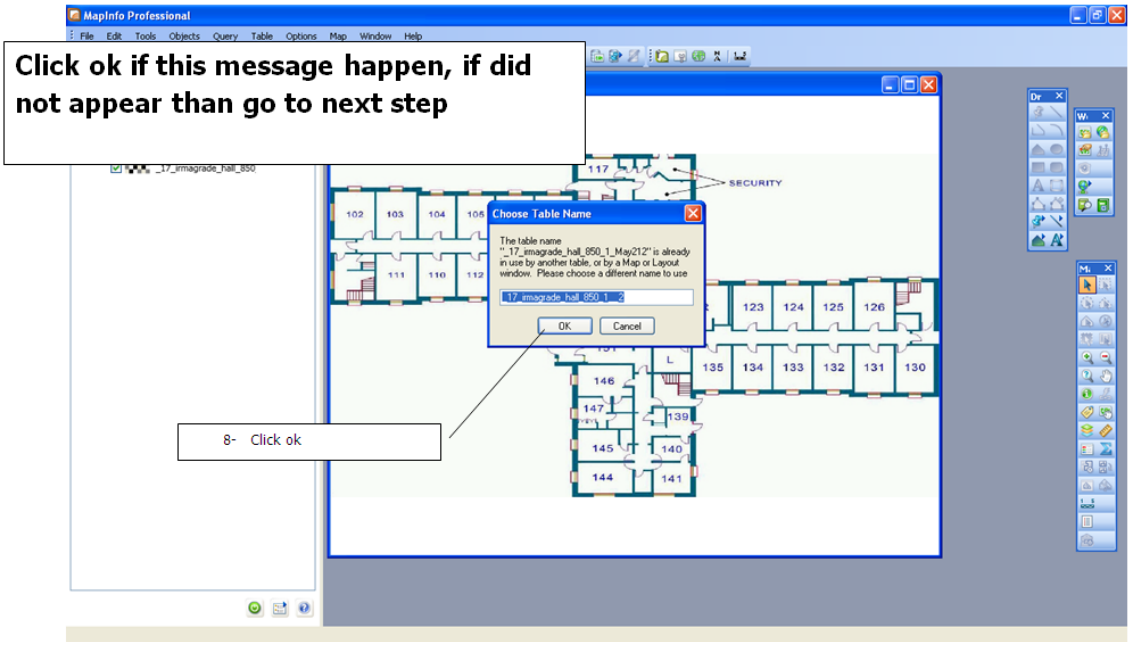


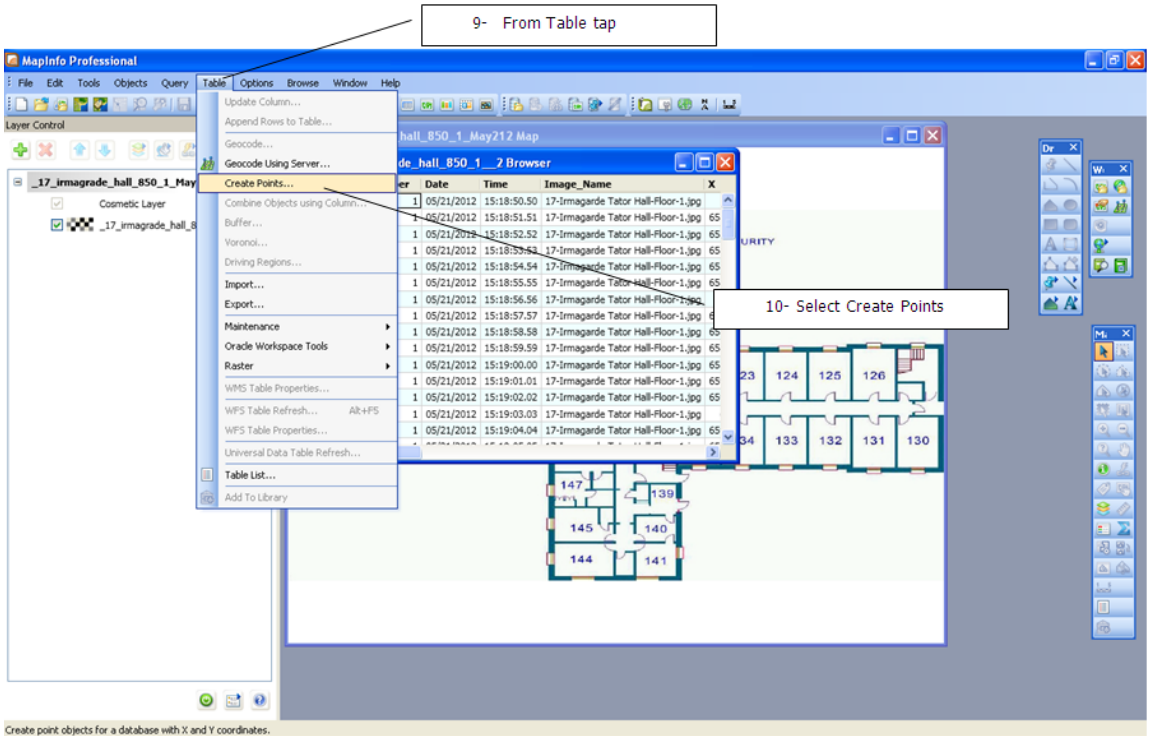
This will open the floor plan in MapInfo as seen below:

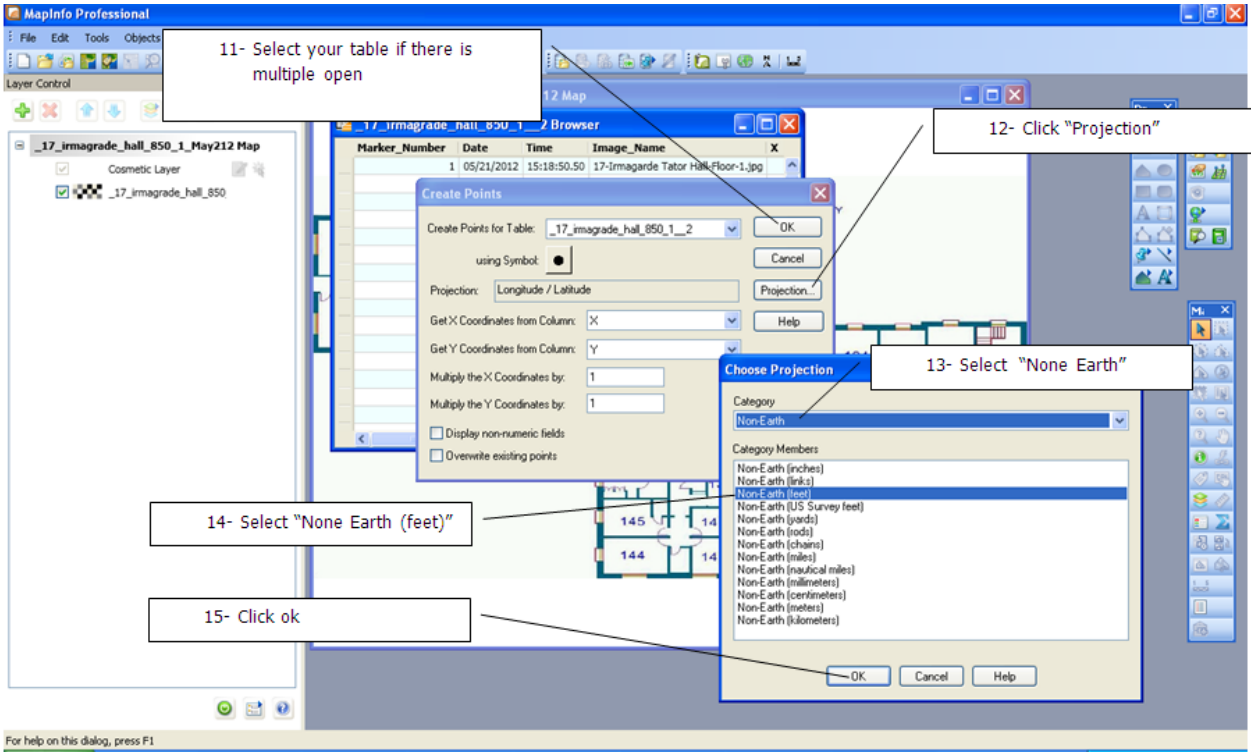


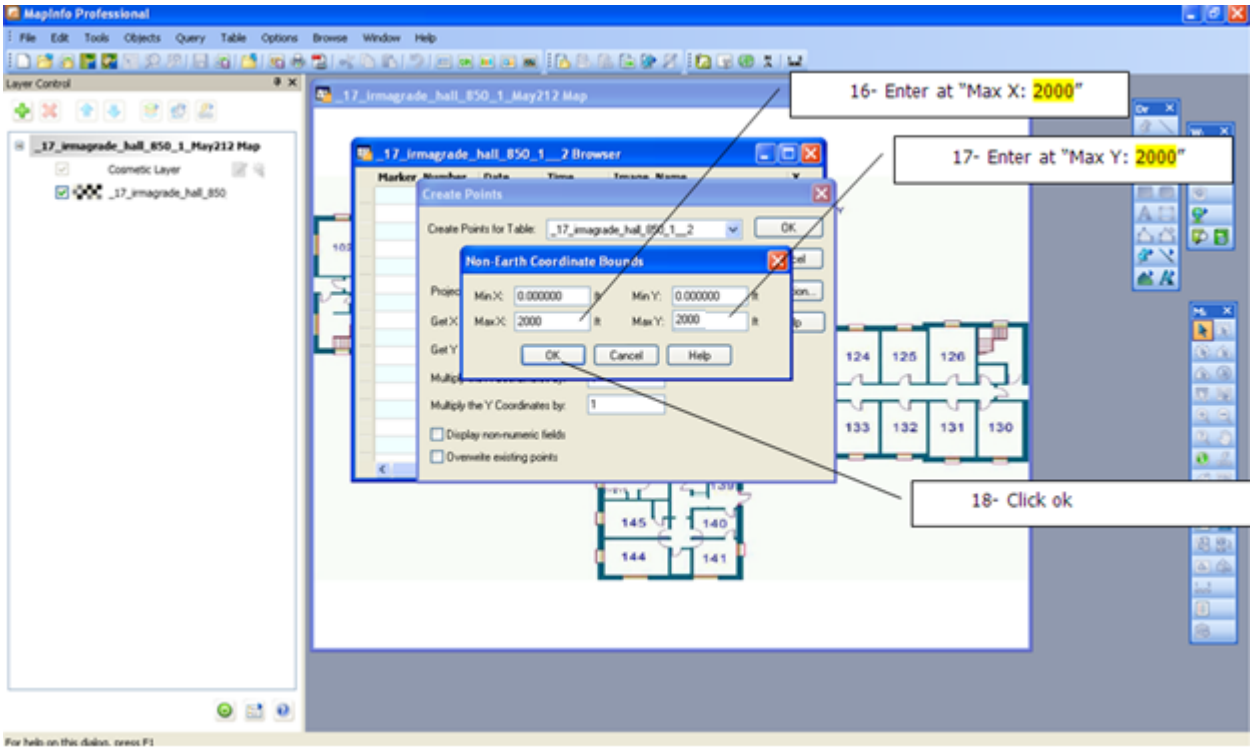

1- Open your session folder
2- Select (*.CSV) session file
3- Select "Comma delimited CSV (*.CSV)"
4- Select "Current Mapper"
5- Click open

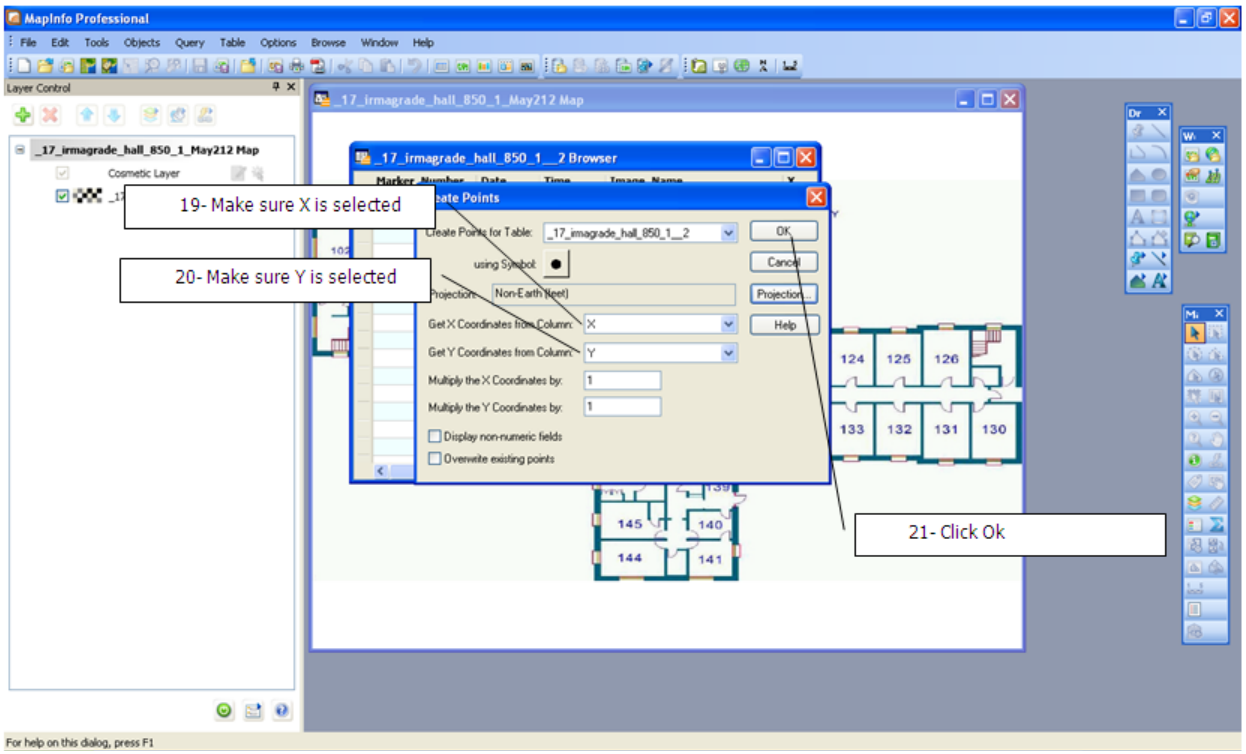

6- Check this box
7- Click ok
Comma Delimited CSV Information
Use First Line for Column Titles
OK
Cancel
Help

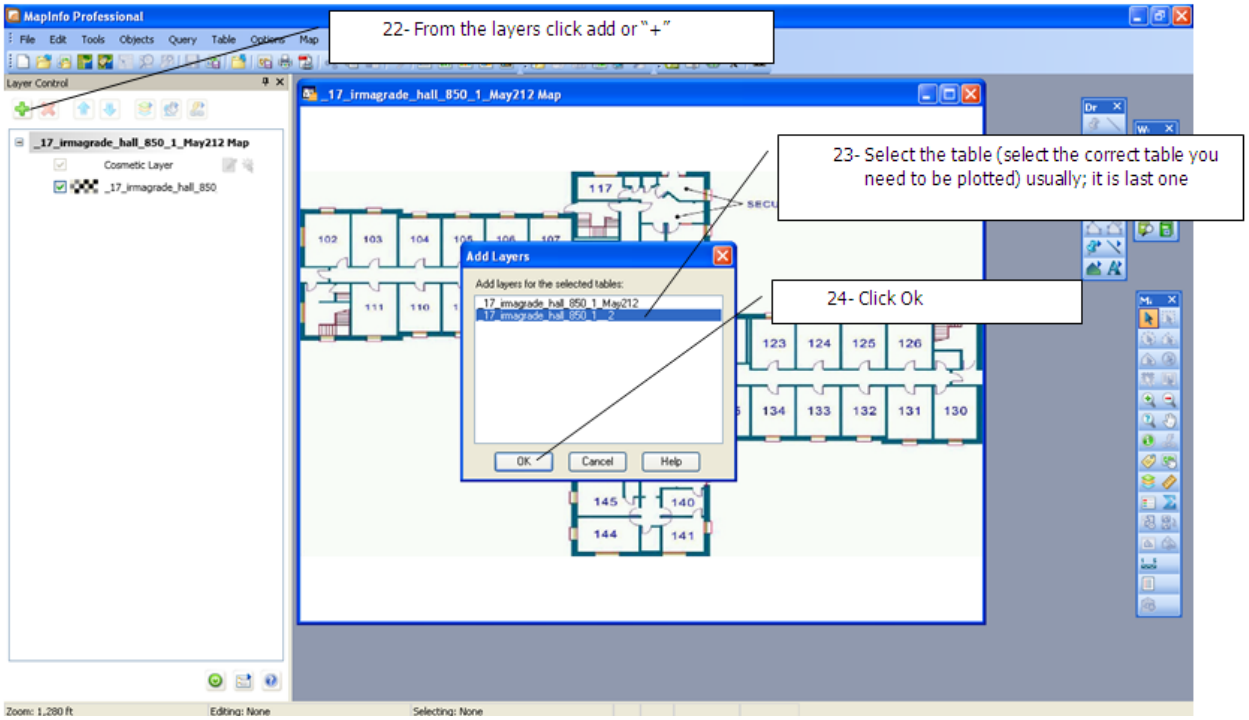

Click ok if this message happen, if did not appear than go to next step
MapInfo Professional
Choose Table Name
OK
Cancel
8- Click ok


9- From Table tap
MapInfo Professional
Table
Create Points...
10- Select Create Points
Create point objects for a database with X and Y coordinates.

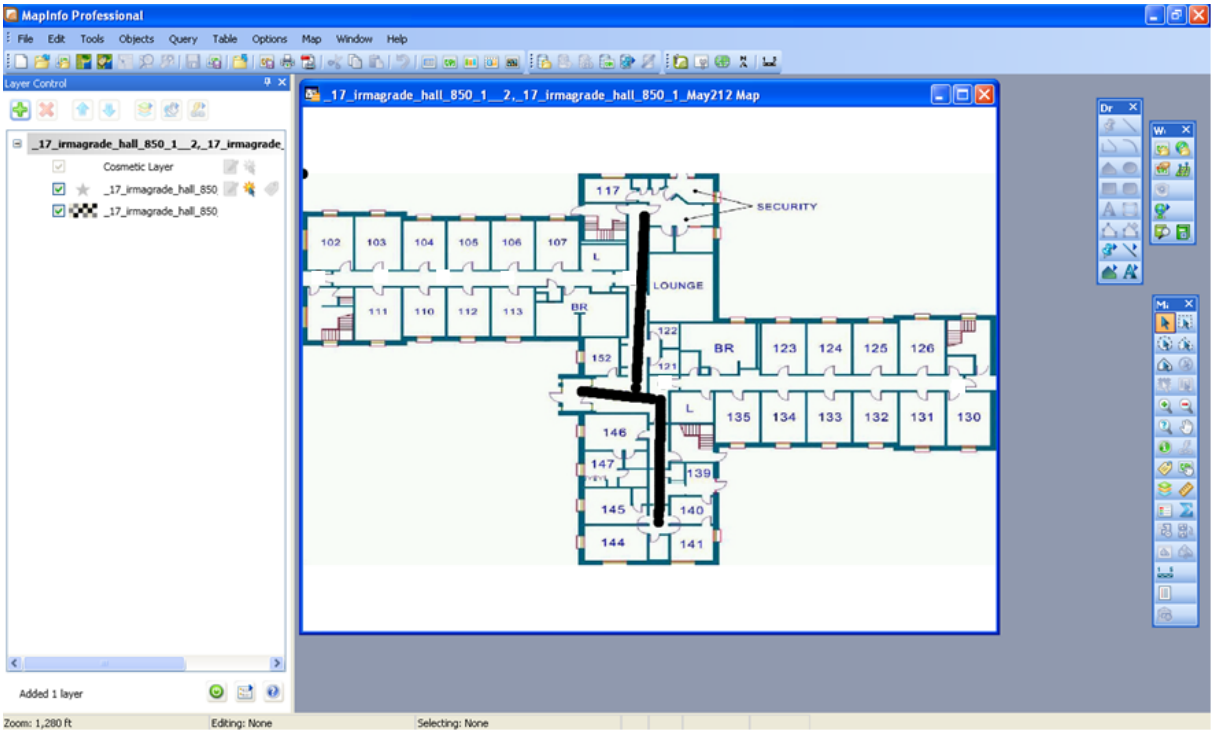

11- Select your table if there is multiple open
12- Click "Projection"
13- Select "None Earth"
14- Select "None Earth (feet)"
15- Click ok
Create Points
Choose Projection
Non-Earth (feet)


16- Enter at "Max X: 2000"
17- Enter at "Max Y: 2000"
18- Click ok
Non-Earth Coordinate Bounds

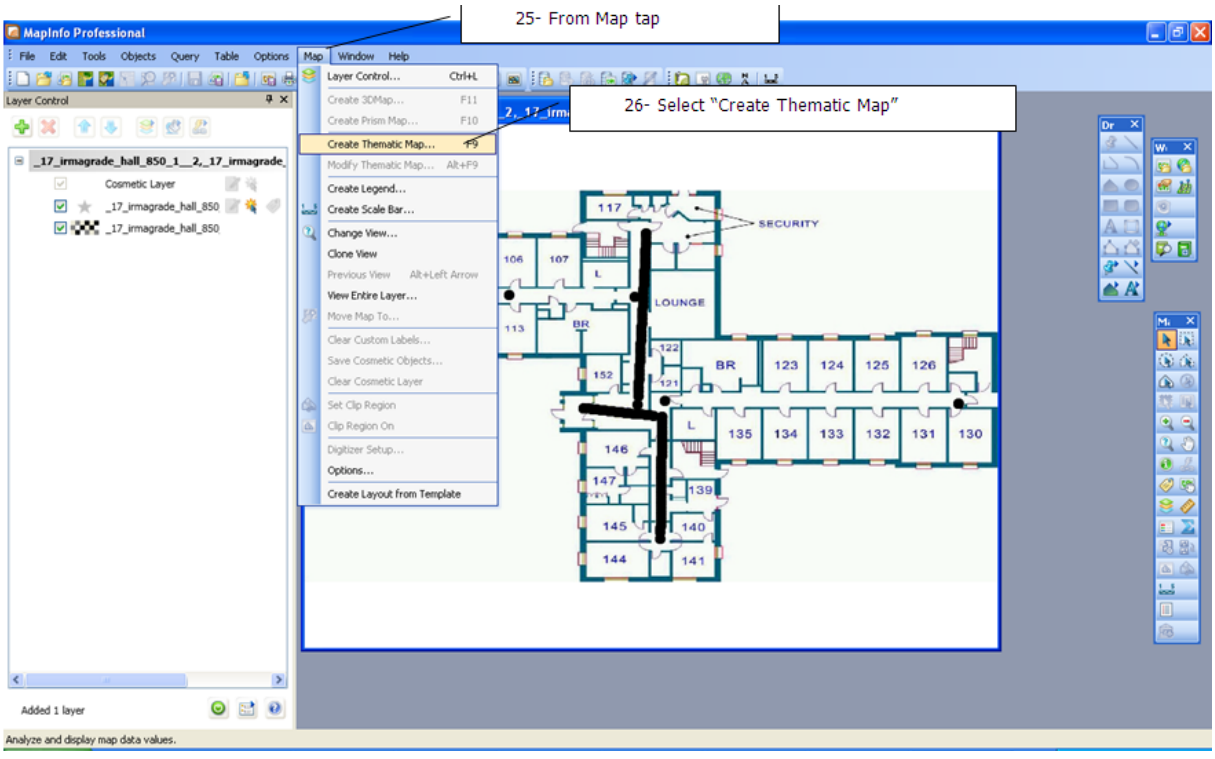

MapInfo Professional
19- Make sure X is selected
20- Make sure Y is selected
21- Click Ok

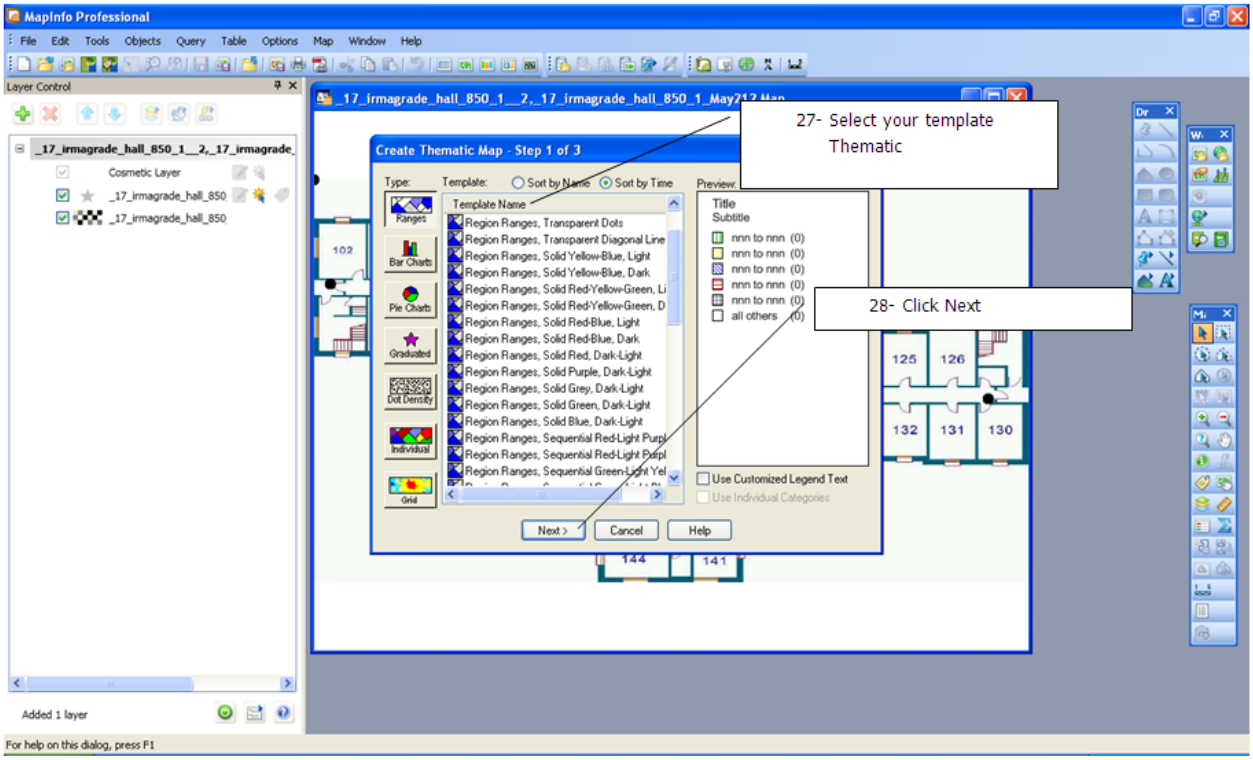

MapInfo Professional
22- From the layers click add or "+"
23- Select the table (select the correct table you need to be plotted) usually; it is last one
24- Click Ok
Add Layers

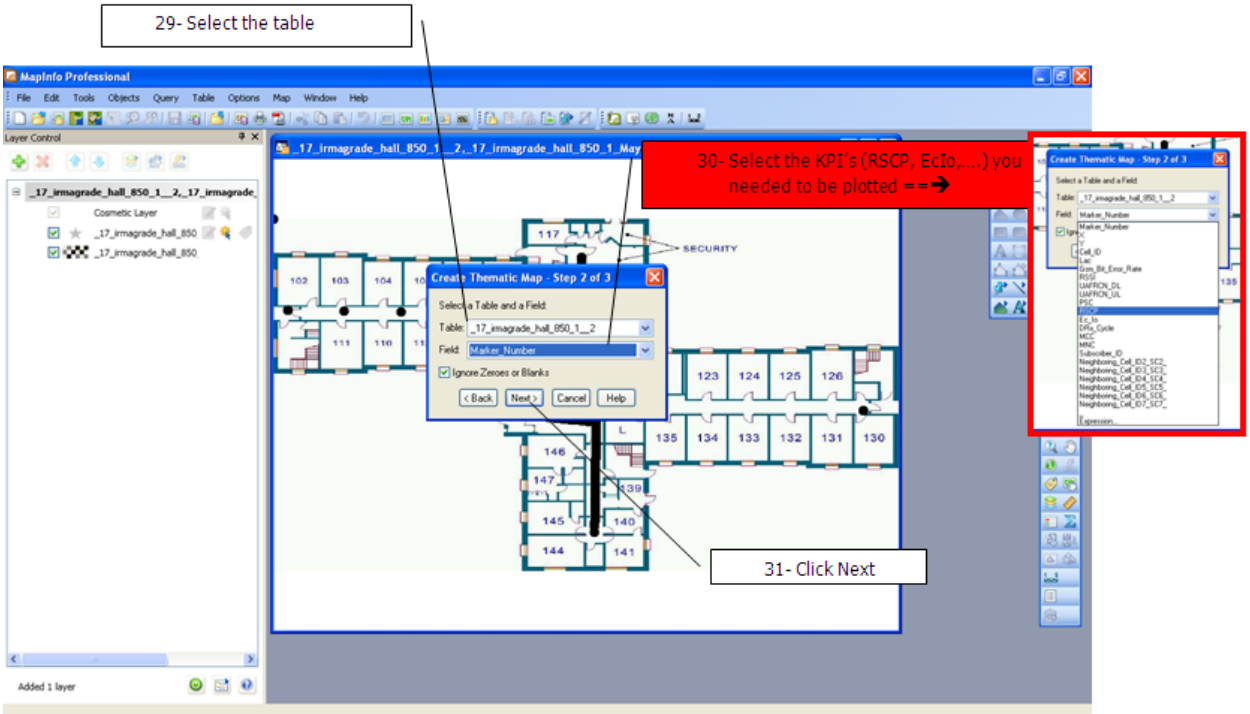
This is what you will see:

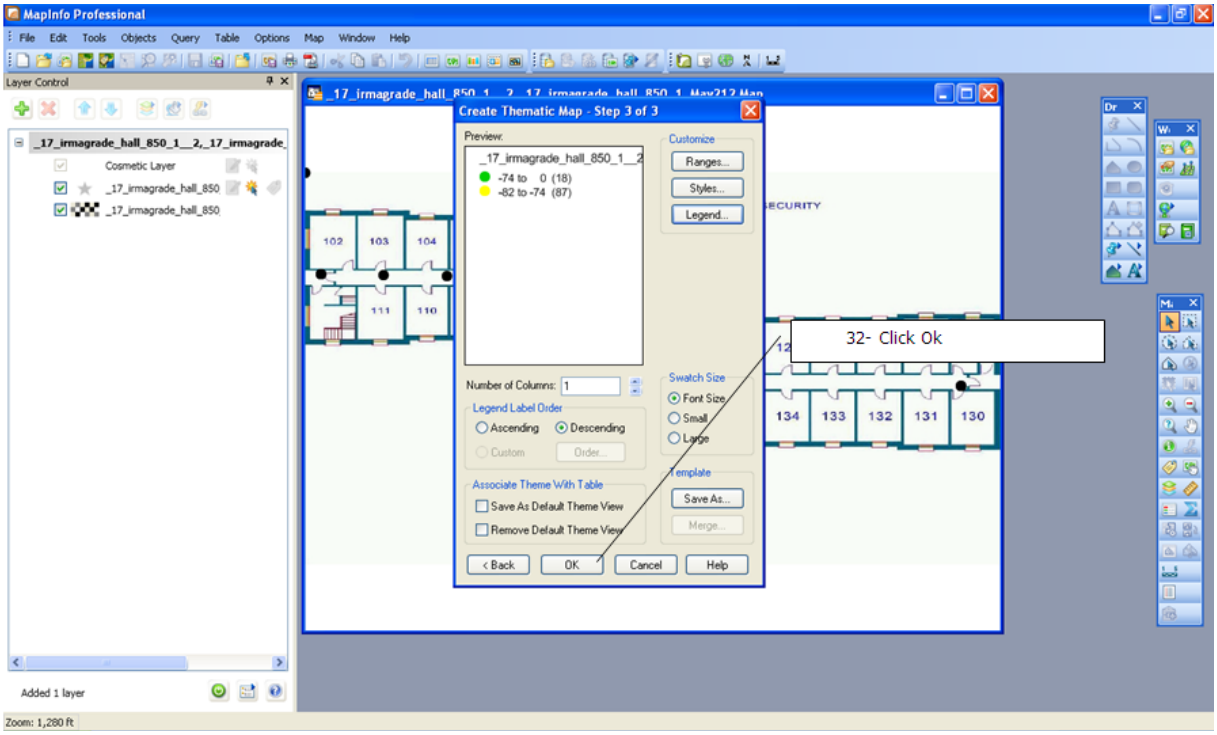


To create a thematic layer for one of the KPIs:

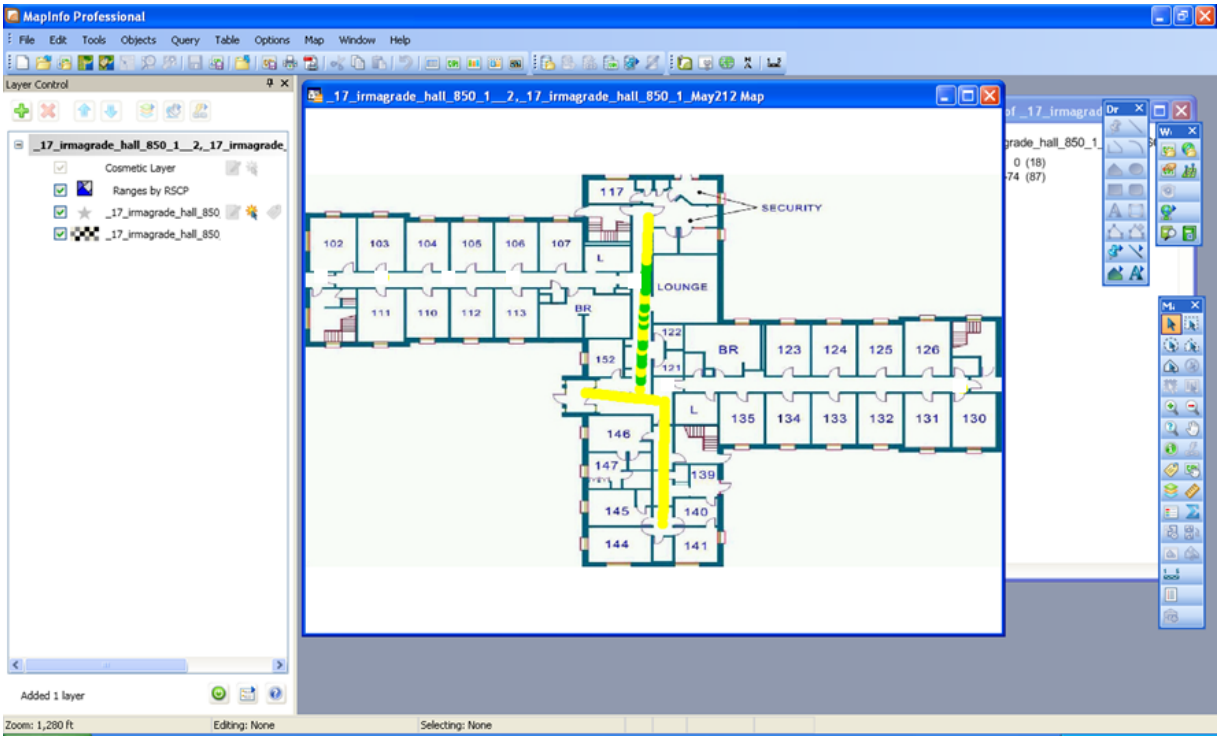



MapInfo Professional
Create Thematic Map - Step 1 of 3
27- Select your template Thematic
28- Click Next
Next >
Cancel
Help


29- Select the table
MapInfo Professional
Create Thematic Map - Step 2 of 3
30- Select the KPI's (RSCP, EcIo,....) you needed to be plotted ==➔
31- Click Next



Here you will see your plot



Survey Pictures

Survey pictures are saved in the iMeasure folder defined in the configuration screen. Each time a survey picture is inserted; the user is prompted to enter a picture name or just used the default naming convention.

Real-Time Metrics

General

Carrier	Network Operator Name
Phone Type	Phone Type (CDMA/GSM)
Network Type	Network Type (EDGE/HSDPA/EVDO/LTE)
Cell ID	Numeric Site/Cell Identification
Signal Strength	Signal Strength of the Current Technology
Network Country Code	Network Country Code
Network Operator (Numeric)	Network Operator Code
Subscriber ID	Phone Number of the Device Used During the Data collection
Data Activity	Status of the Data Activity (IN/INOUT/OUT/DORMANT/NONE)
Data State	Data Connection State (Connected/Disconnected/Suspended)
Neighboring Cell ID#	Neighbor Cell IDs
Comments	Comments Collected During the Survey
Picture Path	Path and Name of the Pictures Collected During the Survey

CDMA

CDMA dBm	CDMA Received Signal Strength
CDMA EcIo	CDMA Ec/Io
EVDO dBm	EVDO Received Signal Strength
EVDO EcIo	EVDO Ec/Io
EVDO Snr	EVDO Signal to Noise Ratio

GSM

GSM RSSI	GSM Signal Strength
GSM RxLev Sub	GSM Rx Level Sub
GSM RxQual	GSM Rx Quality
GSM TxLev	GSM Transmit Power Level
GSM TS	GSM Time Slot
GSM BCCH AFRCN	GSM BCCH Freq Channel Number
GSM TCH AFRCN	GSM TCH Freq Channel Number
GSM Band	GSM Freq Band
LAC	Location Area Code

UMTS

UMTS RSSI	UMTS Signal Strength
UMTS RSCP	UMTS Pilot RSCP
UMTS EcIo	UMTS Pilot EcIo
UMTS EcNo	UMTS Pilot EcNo
UMTS EbNo	UMTS Pilot EbNo
UMTS TxLev	UMTS Transmit Power Level
PSC	Primary Scrambling Code
UMTS DL UAFRCN	UMTS Uplink Frequency Channel Number
UMTS UL UAFRCN	UMTS Downlink Frequency Channel Number
UMTS RRC State	UMTS RRC State
LAC	Location Area Code

LTE

LTE RSSI	LTE Signal Strength
LTE RSRP	LTE Reference signal receive power
LTE RSRQ	LTE Reference signal receive quality
LTE Bandwidth	LTE Transmission Bandwidth
LTE TAC	LTE Tracking area code
LTE PCI	LTE Physical Cell Identifier
LTE EARFCN	LTE Frequency Channel Number
LTE RRC Status	LTE Radio Resource Control Status
LTE AtCo	
LTE TaAtCo	
LTE DeAtCo	
LTE ReCau	
LTE Frequency	
LTE EmS	
LTE EmSS	
LTE MeC	
LTE EUpS	

CW

Signal strength
Frequency

FAQ

The application will not start on my phone?

- Verify that your device is registered on the iMeasure license server and your license has not expired. If you are not sure, please contact us at support@atecwireless.com.
- Make sure you have internet connectivity before launching the application. The application will use the internet connectivity to authenticate the application license.

Can I use the application to record idle and active data?

You can use the application to record both active and idle data. To record active data, initiate the desired test scenario within the iMeasure application.

Do I need GPS to perform a survey?

You only need GPS if you are planning to collect measurements in an outdoor mode. In Indoor mode, you do not need a GPS to complete your survey. The application correlates the collected data to the floor plan image and assigns x/y values to each collected data point.

I have more than one device; can I move the application between my devices?

Each device has a unique equipment identification number. The ID of each of your devices should be registered on the license server in order for the application to function on these devices. To move your application between devices, contact support@atecwireless.com with the old and the new device ID (IMEI or MEID) and your license number.

What do I do if I placed a wrong marker on the screen?

Go to menu, Undo Last Marker. This will erase the last placed marker and the line between the previous marker.

How can import the collected data to MapInfo?

You can import both indoor and outdoor data into MapInfo. To import indoor data follow the following two steps:

- Register the floor-plan image in MapInfo
  Depending on the MapInfo version being used, the menus to register the image may be different. You may have to consult MapInfo help for the exact steps. However, registering an

image in MapInfo is relating the log-file coordinates to the floor-plan background image. This is typically done by choosing three or more reference points on the image and typing in the corresponding X, Y of each of these points. You can use any of the markers' X, Y to define your reference points.

- Import iMeasure log file: Once the image is registered in MapInfo, you will then open your log file and create points using X, Y to place these points on the floor plan layer.

My log file does not have headings

In some cases, headings in the log files are not included if the session was not terminated properly. Stop the previous session and initiating a new session will resolve the issue.

Support:

Call us at:
Monday to Friday: 10:00 am to 6:00 pm EST
Tell: +1 (678) 871-2129 Ext 400

E-mail us any time at:
support@atecwireless.com

Or mail us at:
ATT: iMeasure Support
ATEC Wireless, LLC
1 Gatehall Dr #202,
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