



# Signal Analyser

QUICK GUIDE &  
INSTRUCTION MANUAL

CONNECTED • SECURE • LIVE



# INSTALLING CONFIDENCE

At CSL we give you the right tools for maximum support and minimum hassle.

It's service that's built around you.

[csl-group.com/installer](http://csl-group.com/installer)



24/7 HELP DESK



LIVE CHAT



TRAINING VIDEOS



COVERAGE MAPS



APPS

## FAQs

### Do I need to use a SIM?

A SIM is not needed for surveys. It is only required when using Monitor Mode. The SIM used must be at least the same RAT (i.e. 2G/3G/4G) that you are looking to monitor, however it does not need to be on the same network. (The SIM card inserted will be able to pick up all available networks and will not be restricted to the network of the SIM).

### Can I use my own SIM?

Yes, any SIM can be used as long as the pin code function has been removed. If you wish to use a micro or nano SIM, the SIM carrier provided must be used to make it the required size and ensure it fits into the device correctly.

### I am running a survey but want to cancel?

While a survey is running you cannot cancel or complete any other actions, you must wait for the survey to complete or power off the device.

### What is the difference between Battery Saver and Auto Turn Off?

Battery Saver puts the radio module into sleep mode and dims the brightness of the screen to save battery power. Auto Turn Off enables you to select a time, that if the unit is not in use, it will automatically power off to conserve battery power (as standard this is set to 5 minutes).

### Why can't I see all the networks? (in Single Network or Monitor Mode)

If you can't see your preferred network try refreshing the network. After this refresh the networks available in your location will be displayed, if you still can't see your chosen network it may be that it is not available in that area.

### What do the icons mean?

If you are unsure what the function of an icon is you can use the Help Text function to display a description (press and hold the icon for 3 seconds).

### My device appears to be performing slower than it used to. What is the cause?

If your Signal Analyser is close to reaching the maximum number of saved files (240) it takes longer to process tasks. By deleting old saved files you will reduce the amount of storage. Details can be found under the 'DELETING SAVED FILES' section in this guide. To view the storage space, go to:


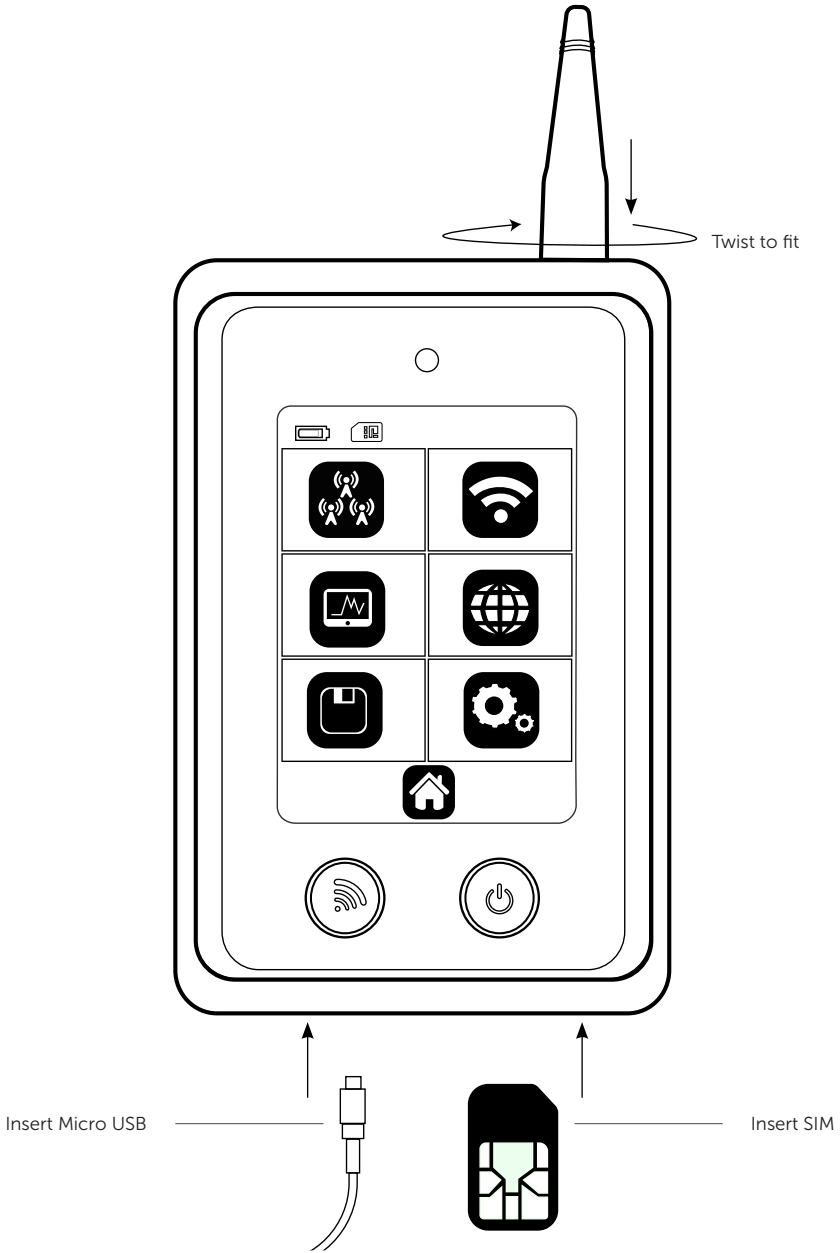
Settings > Device Information  (it will be shown within the storage space bar).

Figure 1 - Signal Analyser Diagram



# QUICK GUIDE

This section provides basic information to enable you to set up your Signal Analyser quickly.

## AERIAL

1. Connect the aerial on top of the device

## POWERING UP YOUR DEVICE

1. Make sure the battery is fully charged using the Micro USB port on the bottom of the device (this typically takes 2 hours). The device will not operate correctly for surveys or monitoring while a USB is connected.
2. Once power is connected the device will turn on

The first ever power up may take 2-3 minutes as the unit will be doing a background network search to establish the available networks in your location

## FITTING A SIM

A SIM is only required when using Monitor Mode and not when performing single or multiple network surveys

1. Ensure your device is powered down and insert the SIM into the SIM slot on the bottom right hand side of your Signal Analyser. To remove the SIM, use a pen to depress before detaching. When a SIM is inserted a SIM icon will be displayed in the top left hand corner of the screen

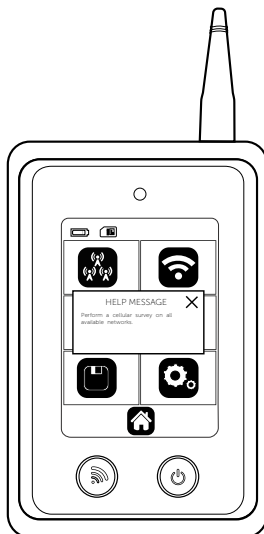
If you wish to use a Micro/Nano SIM you will need to use the SIM carrier supplied

2. Place the SIM inside the carrier and push this into the SIM slot on the bottom right hand side of your Signal Analyser. To release use a pen to depress the SIM carrier and then detach

## HELP TEXT






1. Press and hold (for 3 seconds) the icon you would like explaining. A pop up box will then show with the description
2. To close the pop up box press the X in the top right hand corner

Figure 2 - Help Text





## PERFORMING A SITE SURVEY




### MULTI NETWORK SURVEY

1. Select the Cellular icon on the home screen 
2. Select the Multi Network icon 
3. Choose either 2G, 3G, 4G or all technologies (for the 2G variant the technology will be limited to 2G only)
4. Select the Start icon  for the survey to begin. If you wish to name the survey before you start select the Name Survey icon  and press Go 
5. A Survey Progress bar will then display the status of your survey. The survey should take 2-3 minutes
6. Once the survey has been completed the results will be available

### SINGLE NETWORK SURVEY

1. Select the Cellular icon on the home screen 
2. Now select Single Network icon 
3. Choose either 2G, 3G, 4G or all technologies (for the 2G variant the technology will be limited to 2G only)
4. Select the required network (if you can't see your preferred network press refresh so that the unit locates all available networks in the area). You can also select Any Network option which allows the radio module to decide which is best for your location.

Refreshing networks may take 2-3 minutes

5. Select the Start icon  for the survey to begin. If you wish to name the survey before you start select the Name Survey Icon , name your survey and press Go 
6. A survey progress bar will then display showing the progress of the survey. The survey should take 2-3 minutes
7. Once the survey has been completed the results will be available

## RESULTS

### TOP NETWORKS

Shows the highest signal strength readings for each available network in your location; up to 5 networks will be displayed (if available). Press the right arrow to enter the Best Cells section.

### BEST CELLS

Shows the highest signal strength readings across all technologies and networks in your location; up to 5 cells will be displayed (if available). Press the right arrow to enter the Cell Properties section.

### CELL PROPERTIES

Shows basic information for each cell. To view advanced information press the screen in the appropriate area. See below for more information. If further results are available use the down arrow to view these.

### ADVANCED CELL PROPERTIES

PARAMETER	DESCRIPTION	TECHNOLOGY
Network	The network to which the cell belongs	2G, 3G, 4G
Type	The radio technology	2G, 3G, 4G
Cell Number	The cell number you are investigating	2G, 3G, 4G
ARFCN	The cell carrier assigned radio channel (BCCH - Broadcast Control Channel)	2G
BSIC	Base Station Identification Code	2G
RSSI (RxLev)	Reception Level (in dBm)	2G, 3G, 4G
BER	Bit Error Rate (in %)	2G
MCC	Mobile Country Code	2G, 3G, 4G
MNC	Mobile Network Code	2G, 3G, 4G
LAC	Location Area Code	2G, 3G
CELLID	Cell Identifier	2G, 3G
Cell Status	Cell status; Outputs [suitable, low priority based on the received system information, forbidden, barred based on the received system information, low level, unknown]	2G, 3G, 4G
NUMARFCN	Number of valid channels in the Cell Channel Description	2G
ARFCNN	ARFCN of a valid channel in the Cell Channel Description	2G
NUM CHANNELS	Number of valid channels in the BCCH Allocation list	2G
BAN	The ARFCN of a valid channel in the BA list	2G
SCR CODE	Scrambling Code	3G
RSCP	Received Signal Code Power - RSCP level (in dBm)	3G
ECIO	EC/IO ratio level (in dB)	3G
BW	Bandwidth (in MHz)	4G
TAC	Tracking Area Code	4G
UARFN	The cell carrier frequency designated by UTRA Absolute Radio Frequency Channel	3G
EARFCN	Cell carrier frequency designated by EUTRA Absolute Radio Frequency Channel Number	4G
PHY CELL ID	Physical Cell ID	4G
RSRP	Reference Signal Received Power	4G
RSRQ	Reference Signal Received Quality - RSRQ level (in dBm)	4G

Figure 3 - Cell Properties

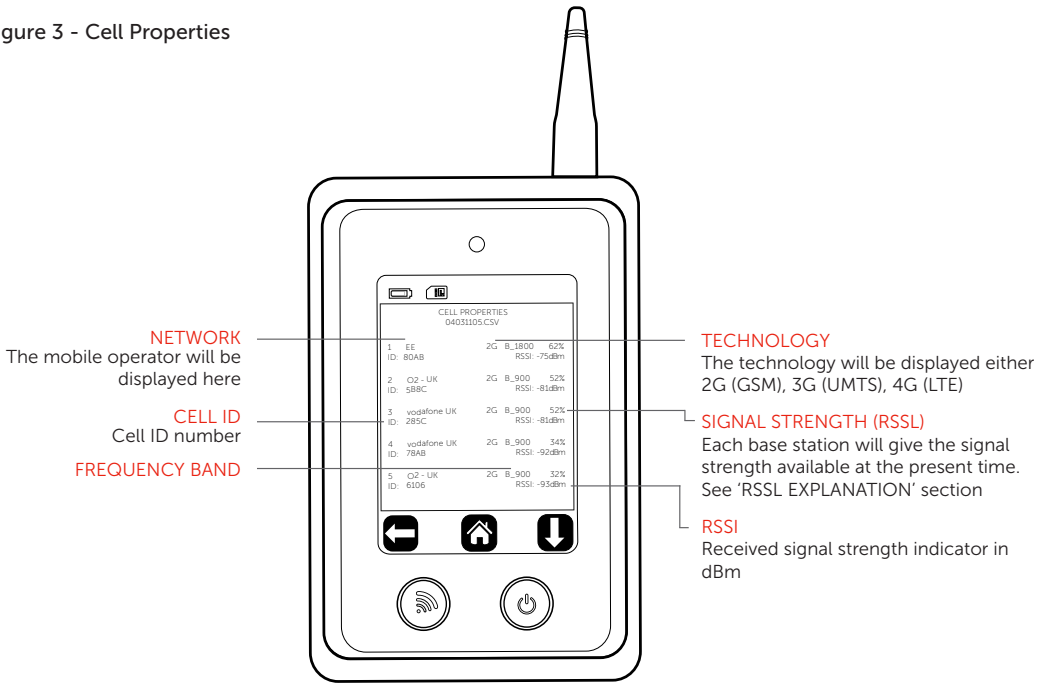
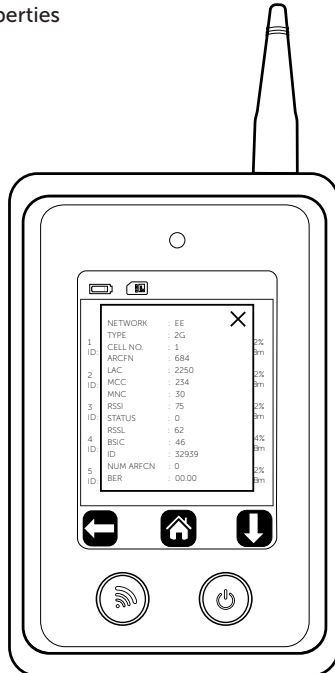






Figure 4 - Advanced Cell Properties





## PERFORMING A SITE SURVEY

### WI-FI SURVEY

1. Select the Wi-Fi icon on the home screen 
2. Select the Start icon  for the survey to begin. If you wish to name the survey before you start select the Name Survey Icon , name your survey, and press Go 
3. A survey progress bar will then display, showing the progress of the survey. The survey should take 5-10 seconds
4. Once the survey has been completed the results will be available

### RESULTS

#### TOP SSID

Shows the highest signal strength readings for each available SSID in your location and the number of Access Points (APs); up to 5 networks will be displayed (if available). Press the right arrow to enter the Best Access Points section.

#### BEST ACCESS POINTS



Shows the Best Access Points for your location and the channel number. Press the right arrow to enter the Access Point section.

#### ACCESS POINT PROPERTIES

Shows basic information for each SSID. To view advanced information, press the screen in the appropriate area. See below for more information. If further results are available use the down arrow to view these.

PARAMETER	DESCRIPTION
SSID NAME	Wi-Fi network name
ENCRYPTION	Wi-Fi security protocol
MAC	Media Access Control (device identifier)
RSSI	Received Signal Strength Indicator (in dBm)
SIG	Signal Strength (%)
FREQ OFFSET	Frequency Offset of Access Points
FREQ CALIB	Calibration for Frequency Offset
CHN	Channel

## MONITOR MODE - CELLULAR

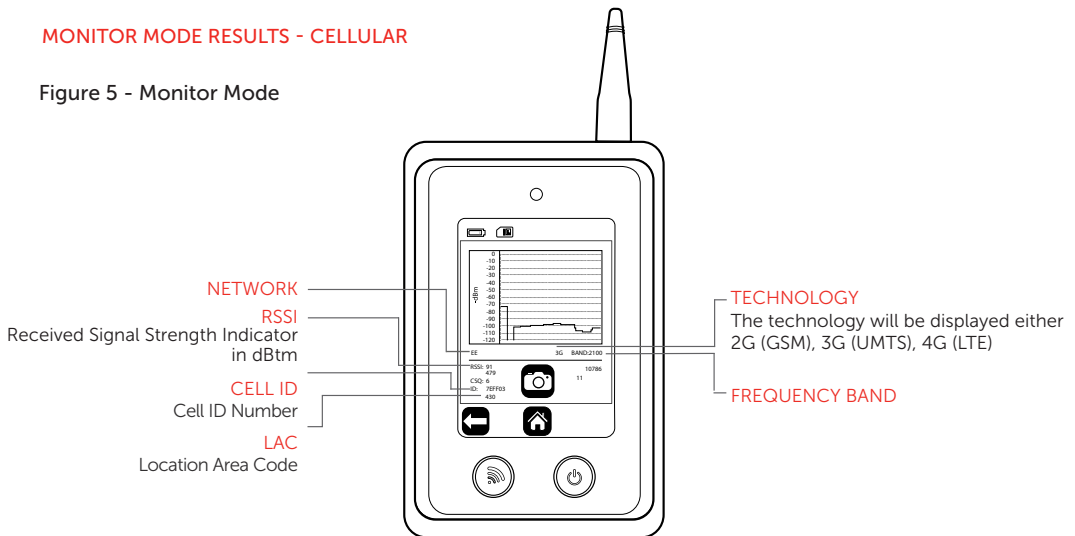
1. If you are performing Monitor Mode on 4G, ensure a SIM card is inserted as per the 'FITTING A SIM' section. The SIM card used must be the technology required or higher e.g. 4G is capable to perform Monitor Mode for 4G, 3G and 2G. The SIM does not need to be for the same network provider you wish to monitor
2. Select the Monitor Mode icon 
3. Select the Single Network icon 
4. Choose either 2G, 3G or 4G or any network (for the 2G variant the technology will be limited to 2G only)
5. Select the required network (to ensure all available networks are displayed press refresh)

Refreshing networks may take 2-3 minutes



6. Live Monitor Mode will now run

## MONITOR MODE RESULTS - CELLULAR



Figure 5 - Monitor Mode



## MONITOR MODE SNAPSHOT


1. Ensure Monitor Mode is running
2. Press the Snapshot icon 
3. The rename survey option will automatically display, name the survey then press Go  to save.  
A file will now be created, but can only be viewed in a table format on your laptop/PC (you will not see a graph)

## MONITOR MODE - WI-FI

1. Select the Monitor Mode icon 
2. Select the Wi-Fi icon 
3. Choose either SSID, Channel, MAC, Connect


### SSID

Live Monitor Mode will run on a specific SSID

1. Select the SSID icon 
2. Choose the SSID you wish to monitor (to ensure all available SSIDs are displayed press refresh)
3. Live Monitor Mode will now run


### CHANNEL

Live Monitor Mode will run on a specific channel

1. Select Channel icon 
2. Choose the channel you wish to monitor
3. Live Monitor Mode will now run a list of Access Points (APs) per channel which will be displayed via a table. Push any channel with APs present to view the SSIDs and signal strengths (in dBm)


### MAC

Live Monitor Mode will run on a specific MAC address

1. Select MAC icon 
2. Select the MAC address you wish to monitor
3. Live Monitor Mode will now run

### CONNECT

Live Monitor Mode will run on a specific MAC address

1. Select the connect icon  and it will constantly signal Google to provide you with ping times in ms
2. Select the SSID you wish to connect to
3. Enter the password for the SSID you have selected
4. Live Monitor Mode will now run

## MONITOR MODE - SAVE RESULTS



1. Ensure Monitor Mode is running
2. Press the Save Results icon 
3. The Rename Survey option will automatically display, name the survey then press Go  to save.  
A file will now be created, but can only be viewed in a table format on your laptop/PC (you will not see a graph)

Figure 6 - Wi-Fi monitor when SSID, MAC and Connect options are selected

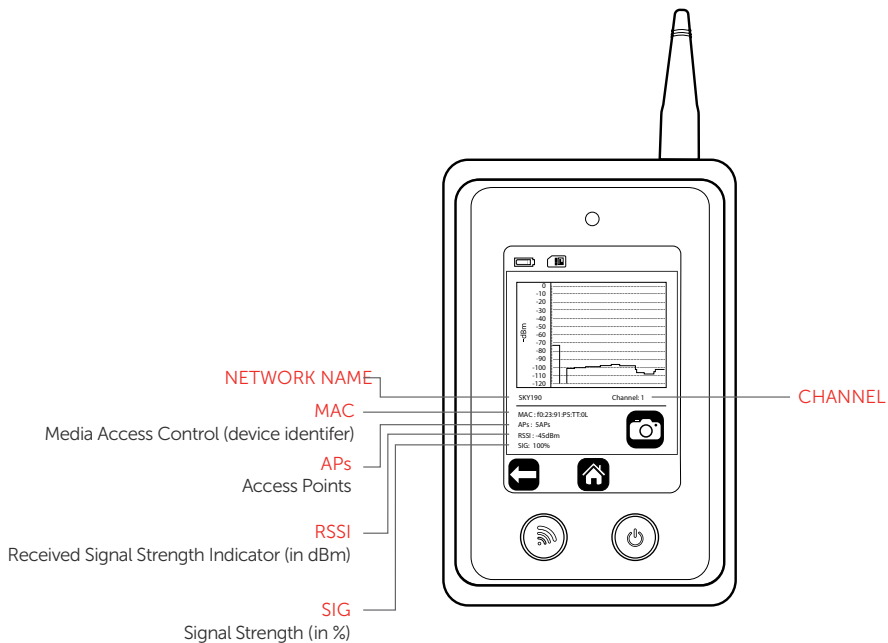
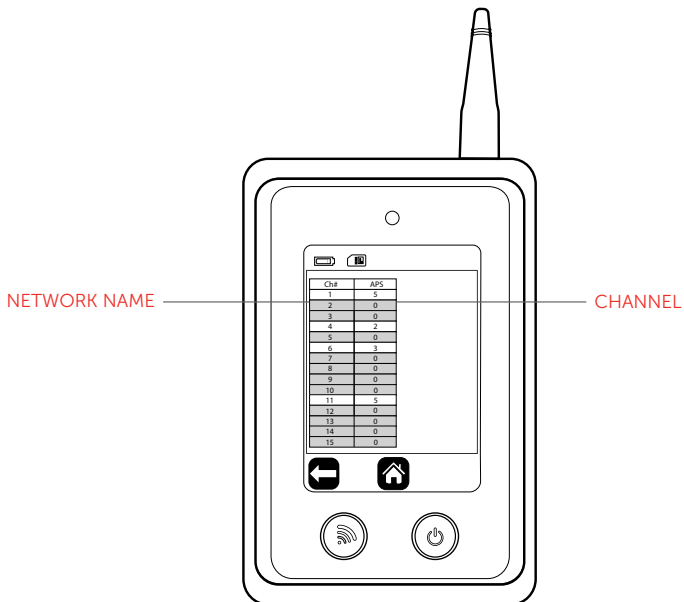





Figure 7 - Wi-Fi monitor when the Channel option is selected



## SAVED FILES

1. Select the Saved Results icon . Results will be shown in descending order by time
2. Then select either the Multi Cellular icon  or Wi-Fi . Results will be shown in descending order by time
3. Select the file you wish to view. Results will now be shown in the same format as per the 'RESULTS' section

## DELETING SAVED FILES

1. Select and hold the file you wish to delete. A Delete icon  will now show in the top right hand corner

## SAVED FILE DOWNLOAD

1. Ensure the Signal Analyser is switched on










If the device is switched off and connected to the USB port on a PC/Laptop this will charge the device only

2. Connect Signal Analyser via a USB lead to your PC/Laptop
3. Once connected click on Start then select Computer. The Signal Analyser files will be shown under devices with removable storage
4. Select Analyser
5. Select the applicable folder (Cellular Snapshot, Cellular Survey , Wi-Fi Snapshot and Wi-Fi survey) and your results will be displayed as a CSV file.
6. These files can now be moved to your required folder or displayed as a CSV file.

You cannot read/write files and run a survey while the Signal Analyser is connected to the USB port, this may cause the unit to crash

## SETTINGS

Enter the settings menu

ICON	DESCRIPTION	FUNCTION
Brightness Icon 	Adjust brightness	Increase/decrease brightness
Languages Icon 	Change device language	Select language
Time Icon 	Set time/date	Set time/date
Auto-Off Icon 	Define how long the device stays powered on with no action	Set auto-off time
Default Survey Icon 	Define which survey the quick survey button on the front of the device executes	Select survey
Sounder Icon 	Turn sound on/off	Turn sound on/off
Power Save Icon 	Power saver to send radio module to sleep	Turn power save on/off
Device Information Icon 	View firmware version	View firmware version, Radio module, Radio firmware, IMEI, SIM status
Factory Reset Icon 	Restore factory defaults	Complete a factory reset back to default settings

## RSSL EXPLANATION

To ensure that a consistent approach is used to all Radio Access Technologies (RAT) - such as 2G, 3G and 4G - a new, more accurate method for calculating percentage of the signal strength has been introduced. The RSSL is not based on CSQ readings alone provided by the radio module, but is calculated from the raw data received from the network readings. The value is mapped through the whole range and is consistent across each RAT. The value calculation includes both signal strength and signal quality measurements.

The example of such mapping for a 3G cell is:

RSCP: -80 dBm

RSRQ: -4 dB

CSQ: 19

RSSL: 67%

## SPECIFICATIONS

Model	CS2369 2G/GSM CS2389 2G/GSM, 3G/UMTS, 4G/LTE
Dimensions	172mm (h) x 72mm (w) x 20mm (d)
Weight	149g including aerial
Temperature	-20°C to + 60°C transit, -4°C to +40°C operating
Humidity	0-80% non-condensing
Warranty	2 years
Radio Technology	GSM, UMTS, LTE, Wi-Fi 2.4Ghz (depending on version)
Battery	3.7 Volt 1000mAh
Charger	5 Vdc micro USB plug-top charger or equivalent

## FREQUENCY BAND

PART NUMBER	CS2369	CS2379	CS2389	CS2389-NA	CS2389-AU
4G Bands (MHz)	●	●	800 (B20) 900 (B8) 1800 (B3) 2100 (B1) 2600 (B7)	700 (B12/B13) 850 (B5) 1700 AWS (B4) 1900 (B2)	700 (B28) 1800 (B3) 2600 (B7)
3G Bands (MHz)	●	900 (B8) 2100 (B2)	900 (B8) 2100 (B2)	850 (B5) 1900 (B2)	●
2G Bands (MHz)	850 (B5) 900 (B8) 1800 (B3) 1900 (B2)	900 (B8) 1800 (B3)	900 (B8) 1800 (B3)	●	●
Wi-Fi	●	●	2.4Ghz	●	2.4Ghz

## CERTIFICATIONS

International Radio Approval

The CS2369/CS2379/CS2389 Signal Analyser incorporates an independently tested and approved 4G/3G/2G radio module that meets the requirements of European radio communication standards

Approval Authority: CE1909



## SUPPORT

For more information on the Signal Analyser or other CSL products please contact CSL Technical Support:

UK Tel: +44 (0)1895 474 444

Ireland Tel: 1800 855 695

Email: support@cs-l-group.com

Hours: 08.30 to 18.00 weekdays, 10.00 to 16.00 Saturday

Visit [www.cs-l-group.com](http://www.cs-l-group.com) for the latest copies of all manuals.