

CellTracker by BKP Horn: Instructions

CellTracker.apk (for Android 14) (compatible from Android 10)

- From Android 10, files from different apps are kept apart from each other in a (hidden) file structure. Using an attached computer, look in **Android > data > com.example.myandroid/files** or **Android > data > com.welwitschia.celltracker/files**
- CellTracker can record CSV files of base station and GPS data. Look for files with names like "cell_DATE_TIME.csv" ('DATE' and 'TIME' show when that file was started). To turn on recording, check "Record ... Data" in the (:) menu.
- From Android 7.0 (API Level 24), CellTracker uses Google Maps API v2 and a more detailed way of getting information on cellular connections. It can also use the new Google FusedLocationApi. From this version, the app depends on Google Play Services.
- See also [Timing Advance!](#)

Supplied "as is" — no warranty implied.

Information displayed on screen by line number:

Underlined text is shown. Commas are not shown, just spaces.
DSS 5G NSA is recognized and behaves much like 4G LTE.

(1) Voice connection information:-

For CDMA or GSM: Base station ID, (BID/CID in hex), guess at direction to antenna, passing sense, lines written.

Base Station ID is SID:NID:BID for CDMA; MCC:MNC LAC:CID for GSM.

Direction to antenna (*if known*) (SW, NW, or E) – estimated ($\pm 90^\circ$).

Passing sense (*if known*), 'L' for left or 'R' for right – which side of one's path the tower is on.

For VoLTE: N/A or (0) or VoLTE, MCC:MNC, TAC:ECI, ?, (ECI in hex).

This can vary, even in the same phone.

(2) Voice connection information:-

For CDMA: signal strength (dBm + EcIo). For GSM: signal strength (ASU + BER).

For VoLTE: VoLTE voice connection (GSM).

(3) Data connection information:-

For CDMA: signal strength (dBm + SNR), technology: eHPRD, EVDOA, or 1xRTT.

For GSM: signal strength (dBm + SNR), technology: UTMS, HSPA+, HSDPA, EDGE, or GPRS.

For LTE: LTE, EARFCN, (Band), Bandwidth MHz, Timing Advance, LTE – *if available* (^{\$})([@]).

(4) Location data:- provider (GPS, WiFi, Cell, or Network), latitude ($^\circ$), longitude ($^\circ$), altitude (m, but notoriously inaccurate from GPS) – *if available*.

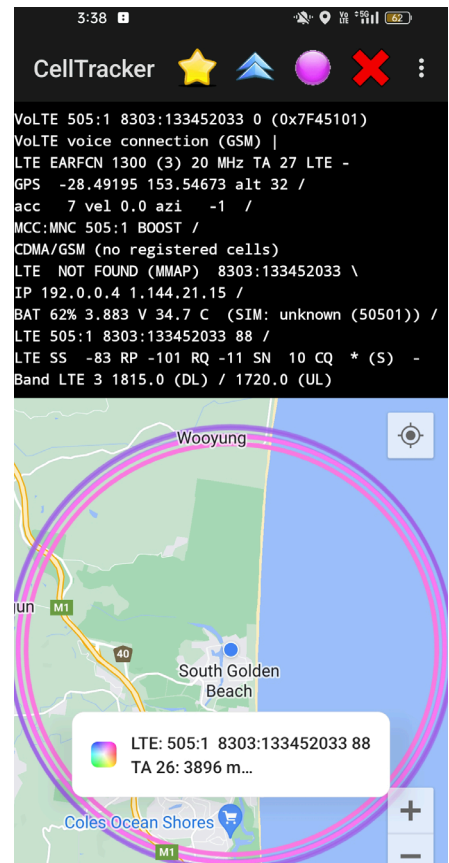
(5) Location data:- horizontal accuracy (m), velocity (m/sec), azimuth ($^\circ$), Satellites used / tracked by GPS – *if available* (Sat data provision is variable, even in the same phone).

(6) For CDMA: latitude and longitude of base station *if provided by base station* (⁺).

For LTE: MCC:MNC and network operator.

(7) Google geolocation of voice connection, and spread (m) of area covered by base station antenna – *either ineffective outside USA or needs an app tweak to use VoLTE in google api*.

(8) Google geolocation of data connection, and spread (m) of area covered (tries MMAP) – *either ineffective outside USA or needs an app tweak to use 4G / 5G in google api*.



ECI=133452033 (0x7F45101), eNB=521297, local CELLID=1, PCI=15. (No 0 or 88).

(9) Local IP address, external IP address – *if available*.

(10) Power source (BAT, USB, or PWR), battery %, voltage (V), temperature (°C), (SIM: data).

(11) For LTE data connection:- MCC:MNC, TAC:ECI, ?, PCI (*)^(@).

(12) For LTE data connection:- RSSI?, RSRP, RSRQ, RSSNR, CQI, (S or C?) (*)^(@).

(13) For LTE data connection:- Band LTE, frequency (DL) / frequency (UL) (*)^(@).

Lines may end with a “spinner” which changes when that line is refreshed.

(The spinners cycle through the sequence of symbols: |, /, -, \).

The icons in the “Action Bar” are:

Yellow star → Show version info;

Blue double up arrow → Save data in file and start new CSV file;

Magenta blob → hide “Action Bar” (long click on first line of text to put it back)

Red cross → Exit CellTracker

Vertical ellipsis (⋮) → menu for additional settings.

Some overlays may be shown on the map:

Small blue circle is where your phone thinks it is located; translucent surround indicates uncertainty.

(may increase with ‘location accuracy’ enabled in phone); blue arrow is direction since previous.

Light red circle (*if present*) is the location of the CDMA voice base station (†)^(†).

Other colour rings are TA distances (colour varies by antenna sector). If your phone does not report TA, there may be a small ring around your location. Remove or reset TA rings under ⋮ menu.

Transparent orange disc is approximate spread covered by the voice connection – *if available*.

Transparent blue-green disc is approximate spread covered by the data connection – *if available*.

If you touch an overlaid item, information about that item will be shown in text form.

Footnotes:

(*) Lines tagged with an asterisk require Android 4.2 or later (API17) and may not be fully implemented on some phones and some versions of Android. *For LTE:- TA, PCI, RSSI, RSSNR and CQI may be unknown, wrong, or depend on Band; and if unknown may be missing or show blank, 0, -1 or *.*

(§) Absolute Radio Frequency Channel Numbers (EARFCN) requires Android 6.1 (API 24).

(†) For CDMA, base station location is available only *if* the carrier provides it:

U.S. Cellular does encode it (yeah!),

Verizon Wireless does not (boo!),

SPRINT provides the average of places where signals from the antenna are received rather than the location of the antenna itself – and this will change a bit with time as it is updated (sigh).

For 4G or 5G, Telcos rarely provide transceiver locations. Even without geolocation working for 4G, *CellTracker* can help you to locate eNBs by (i) showing signal distance from TA for triangulation; (ii) revealing ECI (thus eNB) to search in the databases of programs like CellMapper.

(†) *If* CDMA base station location is known, and *if* it is possible to guess which of three sector antennas is being used, a red half-circle will be used to indicate roughly in which directions signals are likely to be aimed.

(@) In the case of LTE carrier aggregation, the information shown is about the first registered LTE connection. *In some phones it seems that data is shown for the serving cell (S) at most times, but the displayed data (at least for line 12) regularly flicks to the first neighbour cell (C). Not all phones follow this explanation.*

NOTE: The screen dims after a while to conserve battery power. (A short screen touch makes it bright again). A long click on one of the last few text lines dims the screen right away.

NOTE: CellTracker keeps the GPS on while in the foreground and so will increase battery drain. It helps to be plugged into a USB cord or charger.