How customer enable and test RTK on QESDK target

From SM8550, EDGNSS/RTK feature enable is via QESDK. Runtime enable or disable DLP is controlled through QESDK API. Enable or disable control through Location SDK is deprecated on Location software v22(SM8550).

1. How to enable RTK

(1) License :QESDK license is required for OEM application to start a RTK session. Contact QESDK Customer Engineering (CE) team for evaluation/commercial QESDK license application and queries related to QESDK feature, API, and license installation. RTK license bundle include both RTK and eDgnss feature id 2641 and 2642.

Select problem area BSP/HLOS-> Qualcomm Enhanced SDK .

(2) Download QPPE and QFE libraries from Chip code:

In SM8550 code, we do not release RTK code with SW build. So you need to download RTK code from Chipcode.

QPPE:https://chipcode.qti.qualcomm.com/XXXXXXXXXXX/qualcomm-ppe-zip-1-0_hlos_standard_oem_mobile-3-0 < in this URL, will download libqppe.so>

QFE: https://chipcode.qti.qualcomm.com/XXXXXXXXXXXX/qualcomm-usap-zip-1-0_hlos_standard_oem_mobile-1-0 < in this URL, will download libqfe.so and apdr.conf >

Replace xxxxx with OEM company name such as zte-corporation, xiaomi-inc. Select Files tab and download latest build.

eg:

https://chipcode.qti.qualcomm.com/zte-corporation/qualcomm-ppe-zip-1-0_hlos_standard_oem_mobile-3-0

https://chipcode.qti.qualcomm.com/zte-corporation/qualcomm-usap-zip-1-0_hlos_standard_oem_mobile-1-0

(3) In izat.conf: Ensure that libqfe.so and libqppe.so process(PROCESS_STATE) are enabled.

LA.VENDOR.13.2.0/vendor/qcom/proprietary/gps/etc/izat.conf

```
230 ########################################
231 # Engine Service which host DRE module #
232 # To enable DRE engine service, change #
233 # PROCESS_STATE=ENABLED                #
234 ########################################
235 PROCESS_NAME=engine-service
236 PROCESS_ARGUMENT=DRE-INT libqfe.so
237 PROCESS_STATE=ENABLED
238 PROCESS_GROUPS=gps diag inet qwes oem 2901 system drmrpc
239 PREMIUM_FEATURE=0
240 IZAT_FEATURE_MASK=0
241 PLATFORMS=all
242 SOC_IDS=all
243 BASEBAND=all
244 LOW_RAM_TARGETS=DISABLED
245 HARDWARE_TYPE=all
246 VENDOR_ENHANCED_PROCESS=1
247 LAUNCH_TRIGGER_MASK=0xc

271 ########################################
272 # Engine Service which host QPPE module #
273 # To enable QPPE engine service, change #
274 # PROCESS_STATE=ENABLED                #
275 ########################################
276 PROCESS_NAME=engine-service
277 PROCESS_ARGUMENT=PPE-INT libqppe.so
278 PROCESS_STATE=ENABLED
279 PROCESS_GROUPS=gps diag drmrpc
280 PREMIUM_FEATURE=0
281 IZAT_FEATURE_MASK=0
282 PLATFORMS=all
283 SOC_IDS=all
284 BASEBAND=all
285 LOW_RAM_TARGETS=DISABLED
286 HARDWARE_TYPE=all
287 VENDOR_ENHANCED_PROCESS=1
288 LAUNCH_TRIGGER_MASK=0xc
```

(4) gps.conf

LA.VENDOR.13.2.0/hardware/qcom/gps/etc/gps.conf

a. Uncomment ENGINEHUB_TIMER_OFFSET_MSEC and set its value to 200 msec. **ENGINEHUB_TIMER_OFFSET_MSEC = 200**

The position report with GPS integer timestamp is received at integer time + time offset.

b. Append the following line at the end of gps.conf file. **EHUB_AGGREGATOR_POSITION_AGE_MSEC = 1000**

Position with age exceeding 1000 msec is not used in the aggregator

(5) Push libqppe.so, libqfe.so, and apdr.conf to default paths:

/vendor/lib64/libqfe.so

/vendor/etc/apdr.conf

/vendor/lib64/libqppe.so

2. How to test RTK

QC have a sample app that run on QESDK . The sample app is in this place https://www.qualcomm.com/products/application/smartphones/qesdk . OEM needs to build own APK based on QESDK sample code .refer to QC doc

Qualcomm®Location Software v22 Feature Overview 80-Y8888-107 in chapter 2 .

(1) Click "**Software tab**", download it. and follow up https://docs.qualcomm.com/bundle/resource/topics/80-PV345-88/introduction.html to bring up this sample app.

(2) provider licensee hash from an Android application. OEM shall apply their own license by providing HASH key, the sample app is released as source code, no license included.

(3)Apply the temp/commercial license from QESDK team with above Hash key.

(4) Build the apk with provided licenses.

(5) push this sample apk to /system_ext/priv-app/. Do not need to adb install to install sample apk .

(6) Start using the app on customer device.

There are two NTRIP client implementation.

Native NTRIP client : is same as the before PLs

(1) (Optional)If a third-party native NTRIP client is used, configure NTRIP_CLIENT_LIB_NAME in gps.conf.
(2) Precise position service opt-in : call to QESDK is required to enable complete end-to-end eDGNSS/RTK operation.

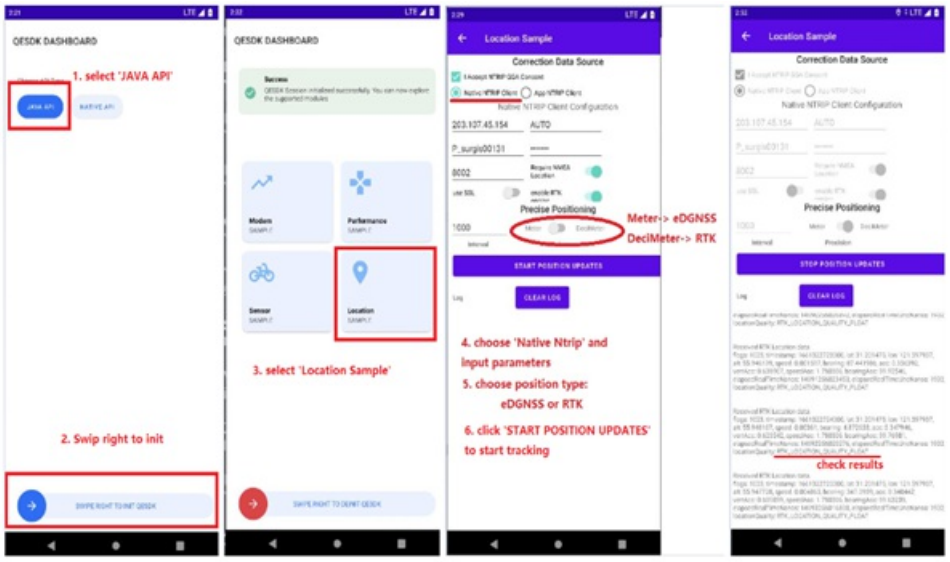
**** if OEM use QX ntrip client, and the build include this CR **Requirement CR 3289172 | GNSS Android: add minijail policy for edgnss-daemon,**add minijail policy for edgnss-daemon. you need to add below change in this file LA.VENDOR.13.2.0/hardware/qcom/gps/etc/seccomp_policy/gnss@2.0-edgnss-daemon.policy

+ fchmodat: 1

otherwise, you will see edgnss-daemon restart again and again. The reason is that QX SDK is loaded into the Qualcomm process and called by the Qualcomm process. And writing a file is done by the Qianxun SDK. Because it runs in the Qualcomm process, it is the Qualcomm process that creates the file. It requires the Qualcomm process to have permissions to create files and write and read files.so edgnss-daemon need fchmodat.

APP NTRIP client

(1) NTRIP client is integrated with OEM application.
(2) OEM application handles NTRIP data request and directly injects correction data to QESDK.



2022 Jul 25 03:07:15.256250 [00] 0x1DCB QesdkPositionReport
version = 1
qesdkSessionId = 1
locationFlags = 1023
timestamp = 1658718435000
latitude = 31.201475105
longitude = 121.597939286
altitude = 54.6881
speed = 0.00255684
bearing = 63.512
accuracy = 0.0499241
verticalAccuracy = 0.0855557
speedAcuracy = 1.08715
bearingAccuracy = 99.6001
elapsedRealTimeNanos = 149250605566
elapsedRealTimeUncNanos = 2192
locationQuality = LOCATION_QUALITY_FIXED # report quality includes Standalone, DGNSS, Float or Fixed

If location Quality is EDGNSS_LOCATION_QUALITY_DGNSS that is EDGNSS solution and if location Quality is RTK_LOCATION_QUALITY_FLOAT, the solution is RTK. You also check it from adb log .

02-22 10:28:51.179 10332 13696 D QESDK_App_Location: flags: 1023, timestamp: 1677032931000, lat: 22.508222, lon: 113.94126, alt: 3.256381, speed: 9.215632, bearing: 268.8245, acc: 0.225365, vertAcc: 0.303925, speedAcc: 1.092055, bearingAcc: 0.898293, elapsedRealTimeNanos: 6140090157500, elapsedRealTimeUncNanos: 2045, locationQuality: RTK_LOCATION_QUALITY_FLOAT

02-22 10:28:52.179 10332 13614 D QESDK_App_Location: flags: 1023, timestamp: 1677032932000, lat: 22.508221, lon: 113.941165, alt: 3.196617, speed: 9.612576, bearing: 269.1862, acc: 0.22658, vertAcc: 0.303014, speedAcc: 1.09205, bearingAcc: 0.860832, elapsedRealTimeNanos: 6141090152969, elapsedRealTimeUncNanos: 2045, locationQuality: RTK_LOCATION_QUALITY_FLOAT

02-22 10:28:53.182 10332 13616 D QESDK_App_Location: flags: 1023, timestamp: 1677032933000, lat: 22.50822, lon: 113.941073, alt: 3.141976, speed: 9.456949, bearing: 269.47516, acc: 0.227432, vertAcc: 0.301007, speedAcc: 1.09188, bearingAcc: 0.865158, elapsedRealTimeNanos: 6142090148385, elapsedRealTimeUncNanos: 2045, locationQuality: RTK_LOCATION_QUALITY_FLOAT

02-22 10:28:54.180 10332 13660 D QESDK_App_Location: flags: 1023, timestamp: 1677032934000, lat: 22.50822, lon: 113.940983, alt: 3.063246, speed: 9.289678, bearing: 269.55078, acc: 0.228809, vertAcc: 0.30135, speedAcc: 1.092061, bearingAcc: 0.891441, elapsedRealTimeNanos: 6143090143957, elapsedRealTimeUncNanos: 2045, locationQuality: RTK_LOCATION_QUALITY_FLOAT

More detail ,refer to https://docs.qualcomm.com/bundle/resource/topics/80-PV345-88/location_feature.html

3. Log requirement :

based on the before log mask, you need to enable below log . Or ask CE to get this log mask.