

TECHNICAL ASSESSMENT REPORT

BLE Smart Lock Module + Android SDK

Sample validation and supplier engineering verification

Prepared for	Overseas buyer (smart-home product company, EU). Name withheld.
Supplier	Shenzhen-based module manufacturer. Name withheld.
Product under test	BLE 5.0 smart lock controller module, firmware v2.3.1, Android SDK v1.8.0
Package	Supplier Engineering Check (sample validation + supplier communication)
Sample received	Day 0 (shipping time not counted toward delivery)
Testing period	Day 0 to Day 12
Report date	Day 14
Assessor	Independent China-based mobile / IoT engineer, acting for the buyer

About this document. This is an illustrative sample report. The product, supplier and client are anonymised and the figures are representative of a typical engagement rather than taken from a single real project. It shows the structure, depth and tone of the report you receive. It is not a certification, compliance audit or laboratory test report.

1. Executive Summary

The buyer is evaluating this module as the lock controller for a retrofit smart-lock product sold in the EU. The decision to be made is whether to proceed to a 500-unit pilot order and start integrating the supplier's Android SDK into the buyer's own app.

Overall recommendation	CONDITIONAL
Hardware behaviour	Core lock / unlock, battery reporting and BLE advertising work as described in the datasheet.
SDK / integration	SDK is usable but has two defects that would reach end users if integrated as-is (F-02, F-03).
Documentation	Chinese documentation is reasonably complete. English SDK docs lag one version behind the code.
Supplier responsiveness	Engineers replied within one working day in all four exchanges. One fix delivered during the test window.
Conditions to proceed	Receive and verify SDK v1.8.1 (reconnect fix). Obtain written confirmation on the OTA rollback behaviour (F-04).

Findings at a glance

ID	Severity	Area	Summary	Status at report date
F-01	Low	Hardware	Battery percentage jumps in 10% steps, not 1% as datasheet states	Supplier confirmed: datasheet error, doc to be corrected
F-02	High	SDK	Auto-reconnect fails after phone Bluetooth is toggled off/on	Fix delivered in SDK v1.8.1-rc, verified on 2 of 3 phones
F-03	Medium	SDK	Lock state callback can fire twice for one physical unlock	Supplier acknowledged, fix planned for v1.9
F-04	Medium	Firmware	OTA rollback behaviour on failed update is undocumented	Awaiting written answer from supplier
F-05	Low	Docs	English SDK guide refers to removed method <code>initWithKey()</code>	Supplier acknowledged

2. Scope and Test Setup

2.1 Agreed scope

The scope below was agreed in writing with the buyer before testing started. Behaviour outside this list was not tested and is not covered by this report.

#	Scenario	Source of expectation
S1	BLE advertising, discovery and bonding from a fresh Android phone	Datasheet §4, SDK guide ch.2
S2	Lock / unlock command round-trip and physical actuation	Datasheet §5.1
S3	Lock-state synchronisation when the lock is operated manually (key / inside knob)	Buyer requirement
S4	Battery level reporting accuracy and update interval	Datasheet §6
S5	Reconnect behaviour after BLE interruption, phone Bluetooth off/on, app background / foreground	Buyer requirement
S6	SDK integration into a minimal Android app (Kotlin) and a Flutter app via platform channel	Buyer requirement
S7	Firmware OTA update via supplier demo app	Datasheet §8

Out of scope: iOS SDK, cloud / gateway features, mechanical durability, water ingress, security penetration testing, radio certification (CE RED), power consumption over full battery life.

2.2 Test environment

Item	Detail
Sample	1 × controller module on supplier evaluation board, 1 × lock body with motor, 4 × AA cells as supplied
Firmware	v2.3.1 (as shipped). v2.3.2 received Day 9 for F-04 investigation.
SDK	Android SDK v1.8.0 (.aar). v1.8.1-rc received Day 8.
Phones	Pixel 7 (Android 14), Samsung A54 (Android 14, One UI 6), Xiaomi Redmi Note 12 (Android 13, MIUI 14)
Tools	nRF Connect for BLE inspection, Android Studio logcat, HCI snoop log, supplier demo app v3.2
Fixture	3D-printed bench mount so the lock bolt can be observed and manually operated without disassembly

3. Detailed Findings

Each finding lists what was expected, what was observed, how to reproduce it, and what the supplier said. Evidence files (photos, screen recordings, logs) are delivered alongside this report and referenced by name.

F-01 Battery level reported in 10% steps

Severity	Low
Scenario	S4
Expected	Datasheet §6 states battery level is reported in 1 % resolution.
Observed	Over 48 hours of logging the value only took values 100, 90, 80. Raw ADC value is available in the GATT characteristic but the SDK rounds it.
Reproduce	Subscribe to battery characteristic 0x2A19 in nRF Connect; compare with SDK <code>getBatteryLevel()</code> output.
Evidence	F01_battery_log.csv, F01_nrfconnect.png
Supplier response	Day 3: confirmed as a documentation error. 10% steps are by design to reduce BLE traffic. Datasheet to be corrected.
Impact for buyer	Low. Fine for a battery icon, not suitable if the buyer's app wants to show a precise percentage.

F-02 Auto-reconnect fails after phone Bluetooth is toggled off and on

Severity	High
Scenario	S5
Expected	SDK guide ch.4: the SDK reconnects automatically within 10 s once the lock is back in range or Bluetooth is re-enabled.
Observed	After toggling Bluetooth off/on on the phone, the SDK stays in CONNECTING indefinitely. Only a full app restart recovers. Reproduced on all three phones with SDK v1.8.0. Walking out of range and back reconnects correctly.
Reproduce	1. Connect via demo app. 2. Turn phone Bluetooth off, wait 5 s, turn on. 3. Observe connection state in demo app and logcat (tag LockSdk).
Evidence	F02_reconnect_pixel7.mp4 (2:10), F02_logcat.txt, F02_hci_snoop.log
Supplier response	Day 5: reproduced on their side. Root cause: the SDK's GATT callback is not re-registered after the adapter restarts. Day 8: v1.8.1-rc delivered. Verified fixed on Pixel 7 and Samsung A54. On Redmi Note 12 reconnect now works but takes 25-40 s; supplier attributes this to MIUI background restrictions and is checking.
Impact for buyer	High if shipped as-is: users would see the lock as 'offline' after a common action. Mostly resolved; the Xiaomi delay should be re-tested on the release build of v1.8.1.

F-03 Duplicate lock-state callback for a single physical unlock

Severity	Medium
Scenario	S3
Expected	One onLockStateChanged(UNLOCKED) callback per state change.
Observed	When the lock is opened with the inside knob, the SDK fires the UNLOCKED callback twice, 300-600 ms apart, in roughly 1 of 5 attempts. Not observed for app-initiated unlocks. The GATT notification itself arrives once; the duplicate originates in the SDK.
Reproduce	Register state listener, operate inside knob 20 times, count callbacks. See attached counter app.
Evidence	F03_callback_counter.mp4 (1:35), F03_logcat.txt
Supplier response	Day 6: acknowledged. A debounce was added for app-initiated commands but not for external state changes. Fix scheduled for SDK v1.9, no date given.
Impact for buyer	Medium. Harmless for a UI toggle; a problem if the buyer's app counts events for an activity log or triggers automations on each callback. Buyer can de-duplicate on their side as a workaround.

F-04 OTA rollback behaviour on failed update is undocumented

Severity	Medium
Scenario	S7
Expected	Datasheet §8 describes the OTA process but says nothing about what happens if the transfer is interrupted.
Observed	OTA v2.3.1 to v2.3.2 completed successfully 3 of 3 times when uninterrupted (approx. 4 min each). When the phone was moved out of range at ~60%, the module rebooted into v2.3.1 twice and once stayed in a state advertising as 'DFU' until power-cycled. The lock could still be opened mechanically in all cases.
Reproduce	Start OTA in demo app, move phone 15 m away at 60% progress, observe advertising name and firmware version after 2 min.
Evidence	F04_ota_interrupted.mp4 (3:50), F04_photos/ (bench photos of each attempt)
Supplier response	Day 10: engineer explained dual-bank firmware with fallback, and said the DFU state should time out after 5 min. Our observation was no recovery after 10 min. Written confirmation of the intended behaviour requested, not yet received.
Impact for buyer	Medium. A stuck DFU state in the field means a service visit. Needs a written answer and a re-test before the pilot order.

F-05 English SDK guide references a removed method

Severity	Low
Scenario	S6
Expected	English guide and SDK v1.8.0 are consistent.
Observed	English guide (v1.7) documents initWithKey(); v1.8.0 replaced it with init(config). The Chinese guide is already updated. Integration into a Kotlin sample app and a Flutter app via MethodChannel otherwise took about half a day each with no blockers.
Evidence	F05_doc_diff.md (side-by-side of Chinese vs English guide, translated)
Supplier response	Day 3: acknowledged; English docs are updated 'after each major release'.
Impact for buyer	Low, but expect English documentation to lag. I can translate relevant sections from the Chinese docs when needed.

4. Supplier Communication Log

All communication was in Chinese via the supplier's WeChat engineering group and email, with the buyer copied on a summary in English after each exchange. Times are supplier working days.

Day	Raised by me	Supplier answer	Response time	Outcome
3	F-01 battery resolution, F-05 doc mismatch	Datasheet error confirmed; docs lag explained	Same day	Closed
5	F-02 reconnect failure with logs and video	Reproduced; root cause identified	1 working day	Fix promised
6	F-03 duplicate callback with counter data	Acknowledged; scheduled for v1.9	Same day	Open, workaround available
8	Requested v1.8.1 build	v1.8.1-rc delivered	n/a	Verified, see F-02
10	F-04 OTA stuck DFU state	Verbal explanation of dual-bank fallback	1 working day	Written confirmation outstanding
12	Follow-up on F-04 and Xiaomi reconnect delay	Will reply after internal test	Pending	Open

Assessment of supplier technical capability

The engineers were technically competent and responsive. They reproduced F-02 within a day and shipped a fix in three. They were open about design trade-offs (F-01) rather than defensive. Weak points: English documentation is maintained as an afterthought, and firmware edge cases (F-04) do not seem to have been tested systematically. Release planning is informal; no dates were given for v1.9.

5. Integration Risks for the Buyer

Risk	Likelihood	Mitigation
SDK regressions between versions with no changelog	Medium	Ask the supplier for a changelog with each release. Keep a small regression test set (S1 to S5) and re-run on each SDK drop.
Behaviour differs across Android OEMs (seen on Xiaomi)	Medium	Test on at least one Samsung, one Xiaomi and one Pixel before each release. Document background-restriction guidance for users.
Field units stuck in DFU after interrupted OTA	Low to medium	Do not ship OTA to end users until F-04 is answered and re-tested. Consider requiring the phone to stay within 2 m during update.
English documentation lags the SDK	High	Treat the Chinese documentation as the source of truth. Budget for translation of relevant sections.
Single-engineer dependency on supplier side	Unknown	Ask who else on their team can support the SDK. Agree a support channel and expected response time in writing.

6. Recommendation

CONDITIONAL

Proceed to the pilot order once the conditions below are met. The hardware does what the datasheet claims in the tested scenarios, and the supplier has shown it can fix defects quickly. The open items are specific and verifiable rather than structural.

Conditions before pilot order

1. Release build of SDK v1.8.1 received and reconnect (S5) re-verified on all three phones, including the Xiaomi delay.
2. Written confirmation from the supplier of the OTA fallback and DFU timeout behaviour, followed by a re-test of the interrupted-OTA case.
3. Supplier commits to a date for SDK v1.9 (F-03) or the buyer accepts the de-duplication workaround in their own app.

Suggested next step for the buyer's engineering team

Start integration against SDK v1.8.1 now, wrapping the SDK behind your own interface so that callback de-duplication and future SDK changes are isolated in one place. Do not build OTA into the first app release until F-04 is closed.

Limitations. This report is an independent technical assessment based on one sample unit, the firmware and SDK versions listed, and the scenarios agreed in §2.1. It is not a certification, compliance audit, security audit or laboratory test report, and it does not assess the supplier's commercial, financial or manufacturing capability. Results may differ on other units or versions.

Deliverables accompanying this report

Evidence folder (6 screen recordings, 14 bench photos, 4 logcat / HCI logs, 1 battery CSV), Kotlin and Flutter minimal integration samples, translated excerpts of the Chinese SDK guide, and the English summaries sent to the buyer after each supplier exchange.