

To whom it may concern:

The Swiss Center for Biometrics Research and Testing (SCBRT) is part of the Biometrics Security and Privacy group at the Foundation of the Idiap Research Institute. The SCBRT is also a FIDO Alliance Accredited Biometrics Laboratory (ABL). Under contract with mobai, the SCBRT has evaluated the efficacy of mobai's face presentation attack detection (PAD) solution, in accordance with ISO/IEC 30107-3 evaluation protocols. This letter describes the evaluation and summarizes the main outcomes.

Target Of Evaluation (TOE): Client version 1.0.1 and server version 1.3.1.

Test Harness:

- iPhone 7, running iOS 14.1;
- Samsung S9, running Android 10; and
- laptop, running Ubuntu version 20.04.

The client runs on each phone, to capture face biometric samples. It transmits each sample to the server via a wireless connection. The server processes the biometric sample and transmits the decision ('*bona fide*' or 'presentation attack') back to the client, which displays the result on the phone-screen. The *bona fide* subjects and the testers interact only with client on each phone.

Scope of Evaluation: Presentation Attack Detection (PAD), using Level B attacks only. The Presentation Attack Instruments (PAI) have been created in accordance with ISO standards used to assess and triage the attack potential of presentation attacks (PA). Level B PAIs are attack instruments that can be created within a week, requiring some degree of expertise and technology.

PAIs of the following five Level B species have been used in this study:

- four PAI species representing printed-photo attacks, using two kinds of photo-quality paper (matte and glossy) to print face images on two different kind of printers (labelled B1 ... B4), and
- one PAI species of replay-attacks, using face images displayed on an iPad 2 (PAI species B5).

The face images used to create the PAIs here have been captured using a good quality camera, and have been digitally enhanced to mitigate the effects of printing and recapture.

The TOE has been evaluated using *bona fide* and PA transactions, where each transaction may consist of up to five attempts (each attempt being a single presentation) performed within a period of 30 seconds. The TOE records the result of each attempt of each transaction in a logfile.

Ten PAIs of each species have been used. For each species, five PAIs have been used to evaluate the TOE on the iPhone 7 and the remaining five have been used for PAs on the Samsung S9.

To help generate a reference *bona fide* score-distribution, 10 subjects (four female and six male) have participated in this evaluation. Each subject performed five transactions on each phone. Thus, in total, 50 *bona fide* transactions and 125 Level B PA transactions (25 per PAI species) have been made on each phone.

The performance of the TOE in this evaluation are quantified using the metrics listed in Table 1.

| Metric | Explanation |
|--------|---|
| BPCER | Bona-fide Presentation Classification Error Rate |
| APCER | Attack Presentation Classification Error Rate |
| BPNRR | <i>Bona fide</i> Presentation Classification Error Rate |
| APNRR | Attack Presentation Non-Response Rate |
| APAR | Attack Presentation Acquisition Rate |

Table 1: Performance metrics estimated for the TOE in this evaluation. See ISO/IEC 30107-3 for definitions of these metrics.

Evaluation Results: The BPCER and APCER achieved by the TOE in this evaluation, on each phone, are given in Table 2.

| Phone | BPCER (%) | APCER (%) |
|------------|-----------|-----------|
| Samsung S9 | 4 | 0 |
| iPhone 7 | 0 | 0 |

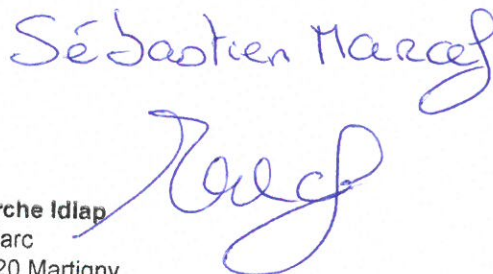
Table 2: BPCER and APCER values, summarizing the PAD performance of the TOE for Level B PAs on both phones.

The failure-to-acquire (FTA) events recorded in this evaluation are expressed using the metrics BPNRR, APNRR, and APAR. No failure-to-acquire (FTA) event occurred for any of the *bona fide* presentations. Therefore, the BPNRR of the TOE is zero for both phones. For PAs also, no FTA event was recorded for any PAI, on either phone. The APNRR and APAR values achieved by the TOE on each phone, for each of the five Level B PAI species, are given in Table 3.

| PAI Species | Samsung S9 | | iPhone 7 | |
|-------------|------------|---------|----------|---------|
| | APNRR(%) | APAR(%) | APNRR(%) | APAR(%) |
| B1 | 0 | 100 | 0 | 100 |
| B2 | 0 | 100 | 0 | 100 |
| B3 | 0 | 100 | 0 | 100 |
| B4 | 0 | 100 | 0 | 100 |
| B5 | 0 | 100 | 0 | 100 |

Table 3: APNRR and APAR values for the TOE on each phone, quantifying the FTA events recorded for the various PAI species.

Sincerely yours,



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