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
- łaptop, 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 A 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 A PAIs are attack instruments that can be created within a day, requiring neither sophisticated equipment nor a high degree of expertise. PAIs of the following six Level A 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 A1 $\cdots$ A4), and
- two PAI species of digital replay-attacks, displaying face images on two different devices with different screen resolutions, an iPad 2, and a smartphone (PAI species A5 and A6, respectively).

The TOE was 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, a total of 50 *bona fide* transactions and 150 Level A 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	*Bona fide* 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.

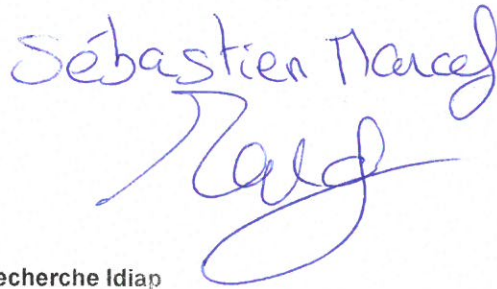| Phone	BPCER (%)	APCER (%)
Samsung S9	4	16
iPhone 7	0	48

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

The failure-to-acquire (FTA) events recorded in this evaluation are expressed using the metrics BP-NRR, 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, a single FTA event was recorded on the iPhone 7 for one PA of species A3 (out of 25 transactions of this PAI species made on this phone). The APNRR and APAR values achieved by the TOE on each phone, for each of the six Level A PAI species, are given in Table 3.

PAI Species	Samsung S9		iPhone 7	
	APNRR(%)	APAR(%)	APNRR(%)	APAR(%)
A1	0	100	0	100
A2	0	100	0	100
A3	0	100	4	96
A4	0	100	0	100
A5	0	100	0	100
A6	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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