

Minutes of the 44th meeting of WG8 Task Force 2

held at: Hotel Parador de Salamanca
Teso de la Feria, 2
37008 Salamanca
Spain

on: 23rd, 24th and 25th September 2014

Participants:

Pascal ROUX	Convener	
Josef GRUBER	Austria	
Reinhard MEINDL	Austria	
Erich REISENHOFER	Austria	
Michael STARK	Austria	
Per Klaus NIELSEN	Denmark	
Franck BRICOUT	France	
Stéphane JOBARD	France	
Jean-Luc MERIDIANO	France	
Kostas ASLANIDIS	Germany	
Michael HEGENBARTH	Germany	
Florian PETERS	Germany	
Uwe SCHNABEL	Germany	
Hemy ITAY	Israel	
Yoshiaki KANEKO	Japan	
Kazuyuki KASHIWABARA	Japan	(Observer)
Kenichi NAKAMURA	Japan	
Antonio CANDEL	Spain	
Jose Luis GEIJO LIMA PEREZ	Switzerland	
Emeric PIERRE	Switzerland	
Walt BONNEAU	USA	
Ryan BOUDREAU	USA	
David MAIN	EMVCo/Visa liaison	

OPENING OF THE MEETING

1. The convener opened the forty-fourth meeting of WG8 Task Force 2 by welcoming all the participants. He expressed special thanks to AENOR, Carlos III University of Madrid (UC3M) and Fabrica Nacional de Moneda y Timbre (FNMT) for the organization of this meeting.

ROLL CALL

2. No roll call was made as several delegates were attending a simultaneous TF3 meeting and most delegates already knew each other.

REVIEW OF THE MEMBERSHIP LIST

3. An attendance register was circulated during the meeting. The TF2 membership is mentioned in the document WG8 SD2. The regular delegates are requested to register as TF2 members (through their national bodies) to get access to the TF2 documents.

ADOPTION OF THE AGENDA

4. The agenda (document TF2 N854) was agreed with the following additions:
 - comparison of ISO/IEC 10373-6 and ISO/IEC 19369 PICC test for PICC supporting both Type A and Type B,
 - status of RFU guidelines Technical Report,
 - clarification of antenna dimensions in ISO/IEC 14443-1/AMD 1, Annex A,
 - application profile for the contactless interface of eMRTDs and associated readers in ICAO 9303.

APPROVAL OF THE LAST MEETING MINUTES

5. The minutes of the forty-third TF2 meeting in Neuchâtel (document TF2 N851) were approved.

REVIEW OF AVAILABLE DOCUMENTS

6. The documents submitted before, during and just after this meeting were as follows:

TF2 N851	Minutes of the 43 rd meeting of WG8/TF2 Neuchâtel, Switzerland – 7 th and 8 th April 2014	(TF2 convener)
TF2 N852	S(PARAMETER) usage clarification	(NXP)
TF2 N853	Request to WG8 to amend 14443-1(v2)	(WG1)
TF2 N854	Agenda of the 44 th meeting of WG8/TF2 Salamanca, Spain – 23 rd , 24 th and 25 th September 2014	(TF2 convener)
TF2 N855	R2 values for the alternating field test at $4/3 H_{max}$	(Xerox)
TF2 N856	Draft Text for conformance test plan amendment	(Project editor)

TF2 N857	WD ISO/IEC 14443-4:2010/PDAMx — Identification cards — Contactless integrated circuit cards - Proximity cards — Part 4: Transmission Protocol S-Parameter Clarification	(Project editor)
TF2 N858	WD ISO/IEC 10373-6/Amd.xx — Identification cards — Test methods — Part 6: Proximity cards — AMENDMENT xx: Active and passive PICC transmissions	(Project editor)
TF2 N859	Phase drift analysis tool software	(Project editor)
TF2 N860	Timing tolerances for waveform adjustment	(Xerox)
TF2 N861	EMD pre-condition test PICC Classes 1-6	(Infineon)
TF2 N862	Magnitude criterion for MS1 & MS2	(Infineon)
TF2 N863	S(PARAMETER) Clarification	(Infineon)
TF2 N864	Application Profile for the Contactless Interface of eMRTDs and associated readers in ICAO 9303	(Bundesdruckerei)
TF2 N865	Phase drift analysis evaluation - 2	(AMS)
TF2 N866	ATQ timing requirement - Comparison of ISO/IEC 10373-6 and ISO/IEC 19369 PICC test for PICC supporting both Type A and Type B	(Japan)
TF2 N867	R2 values for the alternating field test at $4/3 H_{max}$	(FIME)
TF2 N868	R2 values for the alternating field test at $4/3 H_{max}$ (revision of document TF2 N855)	(Xerox)

TF2 contributions should be submitted at least 2 weeks before TF2 meetings so that delegates can study them in advance.

PICCS WITH EXTERNAL POWER SUPPLY (ACTIVE AND PASSIVE PICC TRANSMISSIONS)

7. The document TF2 N858 was presented by Michael Stark. The phase drift analysis tool was improved by addition of a Butterworth filtering. The unmodulated state (US) averaging time was discussed and the value $128/f_c$ was agreed. An updated version of the phase drift analysis tool was distributed as document TF2 N859.
8. The document TF2 N865 was presented by Pascal Roux. The Butterworth filtering added in the phase drift analysis tool reduces a lot the error induced by noise at high field strength (approximately 5° instead of 23° without this filtering). The current noise floor precondition test was therefore considered relevant for phase drifts measurements.
9. The proposed new PICC load modulation test was clarified. In ISO/IEC 10373-6:2011, only the PICC load modulation amplitude is measured, using one single discrete Fourier transformation of six subcarrier cycles of the PICC modulation waveform to get the peak amplitudes of the upper and lower sidebands.

In the proposed evolution of ISO/IEC 10373-6, three tests will check the PICC load modulation, using continuous signal processing during the whole PICC response:

- phase drift analysis,

- load modulation amplitude measurement (in every part of the PICC modulation waveform with 6 subcarrier cycles),
- $||MS1-US||$ amplitude check at the beginning of the PICC response (useful for FDT).

10. The PCD maximum load modulation amplitude test was also discussed. The Reference PICC modulation modifies the PCD field in amplitude and in phase, and consequently its own phase reference. But the PCD under test has a stable phase (the PCD phase stability is checked by a specific test); therefore solutions can be found for this PCD maximum load modulation amplitude test.

Action 1 The project editor will update the working draft amendment to ISO/IEC 10373-6 which is now considered mature for submission to WG8, to be balloted with the 2nd CD amendment to ISO/IEC 14443-2.

11. The document TF2 N862 was presented by Josef Gruber. Some passive PICCs do not respect the criterion previously proposed ($||MS1-US|| > 0,5 \times ||MS2-US||$). After discussion, it was agreed that this relative criterion should be replaced by an absolute one: $||MS1-US|| > V_{LMA}$, considering that V_{LMA} represents approximately half the load modulation time domain amplitude.

Note: A multiplying factor may be needed in this new requirement so that the time domain amplitude of a perfect rectangular amplitude modulation signal corresponds to $2 \times V_{LMA}$.

Action 2 The project editor will provide the updated text of the 2nd CD amendment to ISO/IEC 14443-2 which is now considered stable and should be balloted with the associated test methods.

EMD REQUIREMENTS FOR CLASSES 2, 3, 4, 5 AND 6

12. The document TF2 N861 was presented by Josef Gruber. The noise floor is measured (using a sampling rate of 1 or 4 Gsamples/s) with all six Reference PICCs and EMD limits are proposed for all six classes.

13. Measurements with Reference PICCs 1, 2 and 3 show that:

- the noise floor precondition is passed for class 1, with little margin,
- the measured noise floor for classes 2 and 3 is significantly lower (~40% lower).

It is therefore possible to define a slightly lower EMD limit for classes 2 and 3, useful for PCDs having a small antenna. Infineon recommends defining the same EMD limit for classes 1, 2 and 3.

14. Measurements with Reference PICCs 4, 5 and 6 show that the measured noise floor is very similar for classes 4, 5 and 6. The EMD limit for classes 4, 5 and 6 proposed by Infineon is considered too high because:

- the noise floor for classes 4, 5 and 6 is significantly below the third of the proposed EMD limit,
- the factor between load modulation amplitude limits and the proposed EMD limit is much less than 10, especially for classes 5 and 6.

TF2 agreed that lower EMD limits should be proposed for classes 4, 5 and 6.

Action 3 Propose EMD limits for classes 2 to 6 taking into account noise floor measurements.

TEST PLAN INCLUDING ALL PCD AND PICC REQUIREMENTS DEFINED IN ISO/IEC 14443

15. The document TF2 N856 was presented by Stéphane Jobard and partially reviewed. An updated version will be prepared and distributed before end of November 2014, so that comments may be done before next TF2 meeting.

Action 4 Stéphane Jobard will distribute a revised working draft before end of November 2014.

Action 5 Comments on the updated working draft test plan.

S(PARAMETER) USAGE CLARIFICATION

16. The working draft amendment to ISO/IEC 14443-4 (document TF2 N857) was presented by Reinhard Meindl, the project editor of this amendment. A new working draft amendment will be prepared, including the modifications agreed by TF2, in particular the following one:

- the PICC and PCD maximum frame sizes shall be large enough to contain the largest possible S(PARAMETERS) block; a note will explain that this required size may be increased in the future when new S(PARAMETERS) options are added.

17. The document TF2 N863 was presented by Erich Reisenhofer. The proposed simplifications were discussed with the following results (included in the new working draft amendment to be prepared by the project editor):

- there is no mandatory order of TLV content,
- there is no limitations on the number of requests of the same option,
- there is no limitations on the number of activations of the same option,
- unknown tags shall be skipped by the receiver when parsing the TLV; a corresponding test will be added in ISO/IEC 10373-6,
- request and activation in the same S(PARAMETERS) block is possible, e.g. to activate a likely supported bit rate and get other supported bit rates at the same time.

Action 6 A revised working draft amendment to ISO/IEC 14443-4 will be prepared by the project editor.

TYPE B CID AND TYPE A CID

18. The five clarifications agreed during previous TF2 were proposed by France as technical comments to the ballot on ISO/IEC 14443-3:2011/DAM4 (Handling rules of RFU bits).

Similar clarifications on type A CID in ISO/IEC 14443-4 are not necessary as the CID negotiation is done differently (the PCD assigns a CID before knowing if the PICC supports CID).

DEFAULT TOLERANCES

19. The document TF2 N860 was presented by Pascal Roux and discussed. The proposed tolerance on timings for high bit rates were considered small enough for the purpose of the PICC reception test.

R2 VALUE AT $4/3 H_{MAX}$ FOR REFERENCE PICCS 2 TO 6

20. The documents TF2 N867 and N868 were reviewed. The differences between the two sets of measured R2 values never exceed 10%, therefore it is possible to propose, for each Reference PICC, the average of the measured values as the nominal R2 value, with a $\pm 10\%$ tolerance.

Besides, the R2 potentiometer value was discussed: for this test, only a small portion of its resistive stripe is used which makes the adjustment difficult and may not be optimum for power dissipation (up to 0,15 W).

As the R2 topic is currently under ballot, related contributions may be sent directly to WG8, although TF2 may also discuss any improvement of test methods or tools at any time.

CONSIDERATION ON ISO/IEC 10373-6 TESTS

21. The document TF2 N844 was presented by Per Klaus Nielsen. PICCs with antennas much smaller than Class 6 maximum size are integrated into small medical devices. Their load modulation amplitude is very close to the Class 6 limits in the field range 4,5-6 A/m, even if they start operating at 2,5 A/m. Load modulation amplitude tests are therefore considered inconclusive by the laboratory.

The requested modification of the Class 6 minimum load modulation amplitude was discussed and finally not accepted. If there is a market for PICCs smaller than Class 6, new classes (e.g. Class 7) should be created, with new field strength and load modulation amplitude limits, new Reference PICC and maybe new Test PCD assembly. A new work item proposal is the appropriate procedure for such an evolution.

As Class 6 is currently the smallest class with no minimum antenna size limit, a warning could be added in ISO/IEC 14443-2 explaining that the smaller the PICC antenna size, the more difficult to comply with minimum field strength and minimum load modulation amplitude requirements.

Besides it was pointed out that in ISO/IEC 14443-2:2010/Amd.2:2012, the subclause 5.2.2.1 (the PCD may support only particular classes in specific cases), is in contradiction with the subclause 5.2.2 (the PCD shall support mandatory classes 1, 2 and 3), even with the note in 5.2.2.1 (explaining that a PCD not supporting one of the mandatory classes 1, 2 and 3 is not fully compliant with 14443-2).

Action 7 Contributions are welcome to improve this PCD compliance subclause.

22. The document TF2 N845 was presented by Per Klaus Nielsen. The many variations which may affect FDT were discussed:
- the waveshape received by the PICC (timing t_4): from 0 (fast rising edge) to $7/f_c$ (slow edge),
 - the fact that the PICC uses an integer counter: from 0 to $1/f_c$,

- the productions variations: from 0 to approximately $3/fc$,
- the field strength ($H_{\min} - H_{\max}$): from 0 to approximately $3/fc$, maybe due to a long t_4 and a "fixed" threshold in the PICC.

Adding all worst cases gives a large possible variation of approximately $14/fc$ while one subcarrier period equals $16/fc$.

After discussion, a proposed change to ISO/IEC 14443-3 could be:

The measured FDT shall be between the value given in Table 2 - $1/fc$ and the value given in Table 2 + $t_{4 \max, \text{PICC}} + 1/fc$ when measured:

- both with maximum and with minimum t_4
- and between H_{\min} and H_{\max} .

Another possibility is to leave $0,4 \mu\text{s}$ (+/- $1/fc$, to be decided) because most PICCs use the beginning of the PCD rising edge for reference.

The FDT measurement method was also discussed. EMD test method ("5.5.2 Computation of power versus time") may be a good test method for FDT, but as it rejects 13,56MHz, a good FDT measurement method could be:

- use the (Hilbert) tool defined in 10373-6, Annex E to detect the end of PCD's PauseA,
- use the (Fourier) tool defined in 10373-6, Annex J to detect the start of PICC modulation,
- compensate for the delay introduced by the moving average filter and for any other delay.

Action 8 Contributions are requested on FDT limits and associated test methods:

- measurements of real PICCs (to justify larger FDT tolerance),
- problems created on PCDs by large FDTs (to justify smaller FDT tolerance),
- measurement methods,
- test conditions,
- comparison with EMVCo FDT requirements and test methods.

23. The document TF2 N846 was presented by Per Klaus Nielsen. When used at high field strengths, the test PCD assembly becomes detuned, especially if resistors heat a lot. TF2 confirmed that this is not a major problem as the test PCD assembly parameters are monitored through the calibration coil. Besides, there is already some information in ISO/IEC 10373-6, A.2:

The test PCD assembly as defined in 5.3 and in this Annex is intended to be used for time limited measurements, to avoid any overheating of the individual components. If the test is run continuously, heat dissipation shall be improved. Care shall be taken to keep maximum voltages and maximum heat dissipation within the specified limits of the individual components.

24. The document TF2 N847 was presented by Per Klaus Nielsen. Two new test methods to measure PICC resonance frequency are proposed:

- the first one computes the difference between the test PCD assembly frequency response with and without the PICC under test,

- the second one computes the derivative of the frequency response magnitude of a test setup using one "driving" calibration coil and one "coupling" calibration coil in close coupling with the PICC under test.

Hemy Itay proposed a third test method for PICC resonance frequency, using the test PCD assembly with a (non-tuned) sense coil instead of the (tuned) main coil. Alternatively, three identical coils smaller than the PICC under test may be used, to get a low coupling with the PICC.

Measuring PICC resonance frequency can be done with two field strengths:

- a low field strength gives the resonance frequency without the chip effect,
- a high field strength gives the resonance frequency with the chip effect.

All these resonance frequency test methods are valid alternatives to the methods described in ISO/IEC 10373-6, 7.2.3.2.

COMPARISON OF ISO/IEC 10373-6 AND ISO/IEC 19369 PICC TEST

25. The document TF2 N866 was presented by Kenichi Nakamura and discussed. It was agreed that the 1 ms mentioned in ISO/IEC 19369 is only a timeout for the PICC test apparatus and not a frame delay time. The following replacement text will be proposed by SC17/WG8 to SC6:

- 1) If the IUT answers with ATQA in accordance with ISO/IEC 14443-3 and passes the PICC tests specified in ISO/IEC 10373-6, it passes the test, otherwise
- 2) Let the LT send REQB of ISO/IEC 14443-3: if the IUT answers with ATQB in accordance with ISO/IEC 14443-3 and passes the PICC tests specified in ISO/IEC 10373-6, it passes the test otherwise it fails the test.

Note: it is sufficient for the test apparatus waits for a timeout of 1 ms.

STATUS OF RFU GUIDELINES TECHNICAL REPORT

26. The draft text was prepared by the project editor in 2013 then approved by WG8 for ballot. The ballot should start immediately.

CLARIFICATION OF ANTENNA DIMENSIONS IN ISO/IEC 14443-1/AMD 1, ANNEX A

27. The document TF2 N853 was reviewed and it was agreed that the current text could be improved to avoid wrong interpretations.

28. Besides, the 300 mm² maximum connection area size was also discussed as this maximum area size is currently identical for all classes and does not depend on the number of antenna turns. It was proposed to define the maximum connection area size in percentage of the allowed antenna area.

As the effect of the connection area probably depends on the ratio between the connection area size and the allowed antenna area size, the area of each antenna turn in the allowed antenna area could be added before calculating the allowed percentage for the connection area

29. It was agreed to postpone WG1's requested change until next TF2 so that contributions may propose both technical and editorial changes.

Action 9 Propose a better definition for the maximum connection area size for classes 1 to 6.

APPLICATION PROFILE FOR THE CONTACTLESS INTERFACE OF EMRTDS AND ASSOCIATED READERS IN ICAO 9303

30. The document TF2 N864 was presented by Florian Peters and reviewed in detail. An updated version will be prepared and circulated for comments before finalization and submission to WG3.

Action 10 Florian Peters will update the application profile document.

PATENTS

31. No patent was declared by any participant on topics which were presented and discussed during this TF2 meeting.

ACTIONS FOR NEXT MEETING

32. Project editors: see 10, 11, 15, 17 and 30.

33. All delegates: see 14, 15, 21, 22 and 29.

NEXT TF2 MEETINGS

34. The forty-fifth meeting will be held in Hiroshima, Japan, in February 2015, on Monday 23rd and Tuesday 24th.

35. The forty-sixth meeting will be held in Vienna, Austria, in September 2015, on Monday 21st and Tuesday 22nd.

Distribution: WG8 and TF2 members
Pascal ROUX