Proficiency test through interlaboratory comparison –
Conducted emission measurements in the 9 kHz to 30 MHz frequency range –
Scheme of the proficiency test PTC(CE-9k-30M-VI)

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1. Scope

1.a) This document describes the participation scheme to a proficiency test performed through an interlaboratory comparison of conducted emission measurements. The scheme includes:

- The description of the interlaboratory comparison;
- The selection criteria of the participants and the terms of admission to the proficiency test;
- The description of the technique adopted for the statistical analysis of the results of the interlaboratory comparison;
- The instructions to the participating laboratory (briefly, Laboratory) on how to perform measurements;
- The description of the method by which the results of the proficiency test are registered by the Laboratory and by the Coordinator of the proficiency test;
- The test reports forms to be filled by the Laboratory and by the Coordinator;
- The registration forms (Doodle link for selecting the week for measurements, the contract regulating the agreements between the Laboratory and the Coordinator).

1.b) The last revision of the present document can be downloaded from the following URL:
https://www.dinfo.unifi.it/vp-436-schemes-of-the-proficiency-tests.html

2. Coordinator

2.a) The Coordinator of the proficiency test is Carlo Carobbi, from Università degli Studi di Firenze. The Coordinator relies on the technical and scientific support from:
- Alessio Bonci, ITT G. Ferraris (San Giovanni Valdarno, Firenze, ITALY);
- Marco Cati, Powersoft S.p.A. (Firenze, ITALY).

2.b) The contact details of the Coordinator are reported below:
Carlo Carobbi
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Università degli Studi di Firenze
Via S. Marta, 3 – 50139 Firenze
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3. Type of interlaboratory comparison

3.a) The interlaboratory comparison consists in the comparison of the measurements of a travelling standard (Sample) provided by the Coordinator. Each Laboratory makes a quantitative examination (measurement) of the Sample thus providing the Coordinator with a measurement result.

3.b) The Coordinator designed and assembled the Sample.

3.c) The Coordinator assigns to the Sample two reference values and the corresponding uncertainties. One reference value, X_{cal} (and its expanded uncertainty U_{cal}), is obtained by the Coordinator through measurements and numerical predictions. The reference value X_{cal} (and U_{cal}) is known before the start of the proficiency test. The other reference value, x^* (and its expanded uncertainty U^*), is obtained by the Coordinator through the statistical analysis of the measurement results provided by the Laboratories during the proficiency test. The reference value x^* (and U^*) will be known at the end of the proficiency test, after that the last participating Laboratory has sent its measurement results.
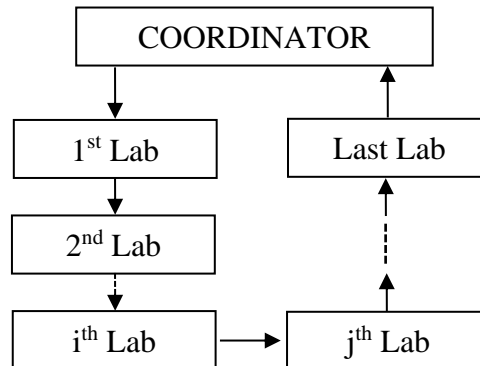

Fig. 1: Sequence by which the Sample is passed from the Coordinator to the Laboratories and from the Laboratories to the Coordinator.

3.d) The scheme of participation in the proficiency test is sequential and it is illustrated in Fig. 1. The Coordinator passes the Sample to the 1st participating Laboratory. The 1st Laboratory makes the measurement thus obtaining the 1st measurement result. Then, the 1st Laboratory passes the Sample to the 2nd Laboratory which, in turns, makes the measurement and determines the 2nd measurement result. The 2nd Laboratory passes the Sample to the 3rd Laboratory which determines the 3rd measurement result, and so on. The last Laboratory passes back the Sample to the Coordinator. The proficiency test is completed when all participating Laboratories have sent their measurement results to the Coordinator.

3.e) The measurement result provided by each Laboratory consists of a measured value x and its expanded uncertainty U_{lab}. The measurement result provided by each Laboratory shall be compared against one or both the reference values assigned by the Coordinator (see below).

3.f) Two options are available to Laboratories:

- **Option I**: The transmission of the test report from the Coordinator to the Laboratory will take place only after the proficiency test is concluded. No communication of the results of the proficiency test shall be done by the Coordinator to the Laboratory in the time period between the beginning and the conclusion of the proficiency test. The measurement result provided by each Laboratory shall be compared against the reference value x^* (and its expanded uncertainty U^*).

- **Option II**: The Laboratory sends the measurement result to the Coordinator and the Coordinator immediately communicates to the Laboratory the outcome of the comparison between the measurement result and the reference value X_{cal} and its expanded uncertainty U_{cal}. The communication of the outcome of the comparison between the measurement result provided by the Laboratory, x and U_{lab}, with x^* and its expanded uncertainty U^* will be made at the conclusion of the proficiency test. The Coordinator will therefore send two test reports:
    o The first test report with the outcome of the comparison between the measurement result, x and U_{lab}, and the reference value X_{cal} and U_{cal}.
    o The second test report with the outcome of the comparison between the measurement result, x and U_{lab}, and the reference value x^* and U^*.

3.g) The participation fee is specified in the Contract that must be stipulated between the Laboratory and Università degli Studi di Firenze – Dipartimento di Ingegneria dell'Informazione (Annex A – Italian or Annex B – English).

3.h) A higher participation fee is requested to the Laboratory willing to choose Option II, in addition to the agreement to not disclose the reference value X_{cal} and U_{cal} assigned by the Coordinator (see the Contract in Annex A – Italian – or Annex B – English).

3.i) The Laboratory has one (1) week available to perform the measurement and one week to communicate the measurement result to the Coordinator. Late results may not be accepted nor processed by the Coordinator.

3.j) In case that a Laboratory is willing to submit more than one set of measurement results (e.g. because the Laboratory wants to assess the performance of different instrumentation) then the Laboratory shall contact the Coordinator in order to determine the appropriate scheduling and participation fee. In such case more than one test report shall be issued by the Laboratory, one for each submitted set of measurement results. Any request for more than one test report must be individually evaluated by the Coordinator (the Laboratory shall contact the Coordinator to this purpose), and it will imply, if viable, a higher cost (500 Euro for any additional test report).

3.k) It is intended that the subscription of the contract in Annex A (Italian) or Annex B (English) allows for the submission of a single test report, both by the Laboratory and by the Coordinator.

4. **Admission requirements**

4.a) The present scheme applies to Electromagnetic Compatibility (EMC) test Laboratories that:

-   Can make conducted emission measurements in accordance to the methods described in §7.4.2 of EN 55016-2-1:2014 and next amendments, in the frequency range between 9 kHz and 30 MHz;

-   Have evaluated the measurement uncertainty U_{lab} of the measurement method mentioned in the previous clause - and U_{lab} is less than or equal to the corresponding U_{cispr} value reported in EN 55016-4-2:2011, i.e. $U_{lab} \leq 3,8$ dB in band A and $U_{lab} \leq 3,4$ dB in band B.

4.b) Accreditation to ISO/IEC 17025 is not required for admission to the proficiency test. The Coordinator designed the present scheme assuming participation of both accredited and non-accredited Laboratories.

4.c) The Coordinator starts the proficiency test if there are at least five participating Laboratories. The maximum number of participating laboratories is thirty (30) which corresponds to a total duration of the proficiency test of less than one year.

4.d) The Laboratory that is willing to participate in the proficiency test shall:

-   Fill, print, sign, scan and send by certified e-mail to the certified e-mail address dinfo@pec.unifi.it the contract in Annex A (Italian) **or** Annex B (English). It is generally intended that Italian laboratories use Annex A, foreign laboratories use Annex B.

-   Designate a Technical Responsible. The Technical Responsible shall sign the test report submitted by the Laboratory to the Coordinator (Annex C), in addition he/she will be the reference person for correspondence with the Coordinator.

-   Select the period during which the measurement will be performed by using the Doodle link https://doodle.com/poll/3keccsrc672ys3sm. Use the Laboratory name when making the selection, do not use the code assigned by the Coordinator.

4.e) The Laboratory shall observe the following shipping rules:
-   Shipping of the Sample from the Coordinator to the Laboratory is in charge of the Coordinator;
-   Shipping of the Sample from Laboratory X to the next Laboratory Y or to the Coordinator is in charge of Laboratory X;
-   Shipments shall be done by means of an express courier;
-   The same packaging used by the Coordinator shall be used by the Laboratory.

Information to each Laboratory about the address and contact details of the previous and the next Laboratories in the round is provided by the same Doodle link. Be accurate when inserting the address and contact details in the "Comment" field provided by Doodle.

4.f) Handle with care the travelling Sample. A damage to the Sample will cause a delay and eventually the interruption of the proficiency test. Each Laboratory shall verify by inspection the mechanical integrity of the Sample. Possible defects or damages, proven or suspected, shall be immediately notified to the Coordinator. A verification of the electrical performance of the Sample is also envisaged (see §7).

4.g) The Coordinator assigns a code to the Laboratory. The same code will be used to identify the Laboratory in the correspondence and in the test reports. The code is as follows:

PTC(CE-9k-30M-VI)LAB(#)

The code is the combination of a general part – PTC(CE-9k-30M-VI) – that identifies the measurement method, and therefore a homogenous set of measurement results, and a specific part – LAB(#) – that identifies a particular Laboratory.

5. Statistical analysis of the measurement results

5.a) The statistical analysis is based on the zeta-scores (symbol ζ) performance statistics (see §9.6 of ISO 13528:2015). The measurement result x_i, in dB(μV), provided by the i-th Laboratory ($i = 1, 2, ..., p$, where p is the number of participating Laboratories) is compared with the reference value X, in dB(μV), assigned by the Coordinator. The standard uncertainty of x_i is $u_{xi} = \left(U_{lab}\right)_i \big/ 2$ where $\left(U_{lab}\right)_i$, in dB, is the expanded uncertainty stated by the i-th Laboratory (see §3). The standard uncertainty of X is $u_X = U/2$, where U, in dB, is the expanded uncertainty obtained multiplying the standard uncertainty by a coverage factor $k = 2$ (which corresponds to a coverage probability of about 95 %, assuming a normal distribution) that the Coordinator assigned to the reference value X. The Coordinator calculates the following measure ζ_i of relative deviation between x_i and X :

$$\zeta_i = \frac{x_i - X}{\sqrt{u_{xi}^2 + u_X^2}} \, . \tag{1}$$

The value of ζ_i is calculated for each Laboratory, for each investigated frequency and for each conductor (line and neutral). Therefore as many values of ζ_i will be calculated as the number of investigated frequencies times the number of conductors (ten frequencies investigated, four conductors then forty values of ζ_i for the i-th Laboratory). The measurement result provided by the i-th Laboratory will produce a warning signal if, at least at one frequency, we have ζ_i less than −2 or greater than +2. The measurement result provided by the i-th Laboratory will produce an action signal if, at least at one frequency, we have ζ_i less than −3 or greater than +3. If at all frequencies we have ζ_i greater than −2 and less than +2 then the measurement result provided by the i-th Laboratory will not give evidence of any anomaly.

5.b) The reference values X and U that the Coordinator uses to evaluate the performance of a Laboratory may be only x^* and U^* or both x^* and U^* and X_{cal} and U_{cal}, depending on the Option I or II chosen by the Laboratory (see §3).

5.c) The standard uncertainty of the reference value $X = x^*$ is $u_X = U^* \big/ 2 = 1,25 \cdot s^* \big/ \sqrt{p}$. Both x^* and s^* are obtained from the statistical analysis of the measurement results provided by the p laboratories.

5.d) The values of x^* and s^* are obtained by the Coordinator by using the robust analysis (Algorithm A) described in Annex C of ISO 13528:2015. The robust analysis is based on an iterative calculation. At the first step of iteration

$$x^* = \text{median of } x_i \quad (i = 1, 2, ..., p) \tag{2}$$

and

$$s^* = 1,483 \cdot \left\{ \text{median of } \left| x_i - x^* \right| \right\} \quad (i = 1, 2, ..., p) . \tag{3}$$

NOTE 1: The factor 1,483 which appears in (3) represents the ratio between the standard deviation σ and the median of the absolute deviations from the median, MAD, assuming normal distribution. It is indeed possible to show that in the case of symmetric distribution, $MAD / \sigma = \Phi^{-1}(3/4)$, where Φ is the cumulative distribution function. In the case of normal distribution $\Phi^{-1}(3/4) = 0,6745$ and therefore $\sigma = 1,4826 \cdot MAD$.

NOTE 2: The factor 1,25 that appears in the formula $U^*/2 = 1,25 \cdot s^*/\sqrt{p}$ represents the ratio between the standard deviation of the median and the standard deviation of the mean (see the note 2 in §7.7.3 of ISO 13528:2015). Therefore x^* and s^* are interpreted as the median and the standard deviation of the mean of the measurement results, respectively.

NOTE 3: The Coordinator compares the reference value assigned to the voltage generated by the Sample with the average of the measurement results provided by the Laboratories by using the performance statistic described in §7.8.1 of ISO 13528:2015 where x^* and s^* are obtained by using the robust analysis (Algorithm A) described in Annex C of ISO 13528:2015. In this way the Coordinator can highlight the presence of a possible bias affecting the reference value (due to an uncorrected systematic effect) or affecting the measurement results produced by the Laboratories (because inherent in the standard measurement method).

6. Characteristics of the Sample

6.a) The Sample is a voltage source made of the combination of a comb generator, a matching network and including a single-phase plug, see Fig. 2.

6.b) The Sample is fed by the AMN. When the Sample is connected to the single-phase Equipment Under Test (EUT) port of the AMN and the AMN is turned on the Sample generates the signal to be measured (the green led, see Fig. 2(a), lights up). No signal is generated by the Sample if the AMN is turned off.

6.c) The nominal voltage between line and neutral at the AMN EUT port shall be 230 V (rms).

6.d) In the frequency range between 9 and 150 kHz (band A) the harmonic spacing is approximately 15,5 kHz and the smallest signal frequency available is 23,25 kHz (1st harmonic in band A).

6.e) In the frequency range between 150 kHz and 30 MHz (band B) the harmonic spacing is approximately 250 kHz and the smallest frequency available is 375 kHz (1st harmonic in band B).

6.f) When the Sample is on (the green led lights) the signal is simultaneously present at the phase (L) and neutral (N) pins (see Fig. 2).

(a)
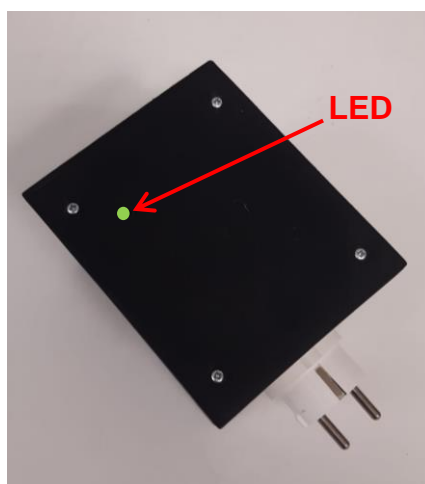
(b)

Fig. 2: (a) – The travelling Sample. (b) – Detail of the single-phase plug and assignment of each pin to phase, neutral and protective earth conductors.

6.g) In order to turn off the Sample turn off the AMN.

6.h) The Sample does not require warm up prior to measurement.

6.i) The Coordinator identifies the harmonics to be measured through their ordinal number in the selected frequency range (band A or band B) and the approximate frequency value. For

example: the 5th harmonic in band A is approximately at 85,25 kHz, the 10th harmonic in band B is approximately at 2625 kHz.

6.j) **What identifies the harmonic is its order not its frequency. Frequencies are given only for guidance.**

6.k)   The housing of the Sample is made of a plastic (insulating) material.

6.l)   The combination of the lock is 183. Input the figures from top to bottom.

Fig. 3: Picture of the lock.

7.   Measurement procedure

7.a)   Measurement by using the AMN and EMI receiver shall be performed according to §7.4.2 of EN 55016-2-1:2014, and next amendments, by using a V-type Artificial Mains Network (AMN).

7.b)   An adapter can be used to connect the Sample (the EUT) to the AMN EUT port. The length of the adapter should not exceed 50 cm.

7.c)   The minimum 80 cm distance requirement between the Sample (the EUT) and the AMN does not apply since the Sample is directly connected to the AMN EUT port.

7.d)   The Laboratory shall measure the amplitude of ten (10) harmonics selected by the Coordinator in the frequency range between 9 kHz and 30 MHz (i.e. covering both band A and band B). The disturbance injected by the Sample into line and neutral conductors shall be measured. A total number of twenty (20) measurements (two conductors times ten frequencies) shall be reported to the Coordinator by the Laboratory.

7.e)   The average detector shall be used.

7.f)   The following sequence of operations shall be observed for the measurement:
  i)   Verify that the neutral position of the AMN EUT port corresponds to pin N or pin L1 in Fig. 2(b).
  ii)   Verify that the power frequency voltage between each line and neutral at the AMN EUT port is 230 V (rms).

iii) Connect the Sample to the single-phase EUT port of the AMN: the AMN shall not be powered when the Sample is connected to the AMN;

iv) Power up the AMN;

v) Verify that the green led of the Sample lights up;

vi) Verify that the amplitude of the signal at the frequency of 375 kHz (band B, 1st harmonic) is 92,0 dB(μV) ± 6 dB;

vii) If the preliminary verification is successful then the Laboratory can pass to the next step, otherwise the Coordinator is informed, and the measurement is temporarily delayed;

viii) Measure the amplitude of the ten harmonics selected by the Coordinator by using the EMI receiver set with average detector;

ix) Connect the EMI receiver first to the line (L1) and then to the neutral (N) conductors at each frequency (twenty measurements total);

x) Power off the AMN;

xi) Disconnect the Sample from the AMN.

7.g) The measurement result provided by the Laboratory shall be:

- The estimate x, expressed in dB(μV), of the amplitude of the selected harmonics, measured both line-to-ground (x_{line}) and neutral-to-ground ($x_{neutral}$), see Table 1;

- The expanded uncertainty of the estimate x, U_{lab}, expressed in dB and obtained multiplying the combined standard uncertainty by the coverage factor $k = 2$ (which corresponds to a coverage probability of about 95 % assuming normal distribution).

7.h) The Laboratory may assign a different value of U_{lab} to each measured frequency.

8. Recording disturbance voltage measurement results

8.a) The measured disturbance voltage x, in dB(μV), shall be rounded up to 1 decimal figure (e.g. 68,5 dB(μV)). Measurement uncertainty U_{lab}, in dB, shall be rounded up to 2 significant figures (e.g. 3,2 dB).

8.b) The values of x_{line}, $x_{neutral}$ and U_{lab} shall be recorded in the eighth, ninth and tenth column of Table 1, respectively. The Coordinator will complete the rest of Table 1.

Table 1: Table to be used for recording the voltage measurement result x_{line} and $x_{neutral}$ and its measurement uncertainty U_{lab}. Columns eight, nine and ten shall be filled up by the Laboratory, the other columns will be filled up by the Coordinator.

1	2	3	4	5	6	7	8	9	10	11	12
Band	Harmonic #	f MHz	X dB(μV)	U dB	x^* dB(μV)	s^* dB	x_{line1} dB(μV)	$x_{neutral}$ dB(μV)	U_{lab} dB	ζ_{line}	$\zeta_{neutral}$
A	2	0,03875	-	-	-	-				-	-
A	5	0,08525	-	-	-	-				-	-
A	8	0,125	-	-	-	-				-	-
B	5	1,375	-	-	-	-				-	-
B	20	5,125	-	-	-	-				-	-
B	35	8,875	-	-	-	-				-	-
B	50	12,625	-	-	-	-				-	-
B	65	16,375	-	-	-	-				-	-
B	80	20,125	-	-	-	-				-	-
B	100	25,125	-	-	-	-				-	-

8.c) The Laboratory fills columns eight, nine and ten, and sends a copy of Table 1 to the Coordinator (see §9). The Coordinator completes the rest of Table 1 and sends a copy to the Laboratory. The proficiency test result does not give evidence of any anomaly if, at all frequencies, $-2 \le \zeta_{line1,2,3} \le 2$ and $-2 \le \zeta_{neutral} \le 2$. Otherwise anomalies shall be described in terms of warning and action signals as discussed in §5.

NOTE 1: Warning signals do not add up to give an action signal.

NOTE 2: If at a specific frequency one performance statistics (e.g. ζ_{line}) gives evidence of an anomaly while the other ($\zeta_{neutral}$) does not the anomaly is however confirmed.

9. Test reports

9.a) The test report issued by the Laboratory to the Coordinator shall conform to Annex C and it shall be signed by the Technical Responsible or his/her Deputy (see §4.d). The test report issued by the Coordinator to the Laboratory will conform to Annex D. Annexes C and D, once completed by the Laboratory and by the Coordinator, will be integral part of the present document and they will provide evidence to any interested part (e.g. the Accreditation Body) of the participation of the Laboratory to the proficiency test.

9.b) The test report shall include:
   i)   Pictures of the measurement setups used in the different frequency ranges;
   ii) A list of the measurement equipment.

10. Remarks and complaints

10.a) The Coordinator issued and made freely available this document in order to prevent remarks and complaints from the Laboratories during the progress of the proficiency test.

10.b) Remarks and complaints will be considered by the Coordinator only if they are related to management or technical aspects relevant to the proficiency test but not considered in the present document. Subscription of the contract in Annex A (Italian) or B (English) implies formal acceptance of the terms and conditions of participation in the proficiency test described in this document.

10.c) Laboratories can verbally contact (e.g. by phone) the Coordinator to represent possible remarks and complaints about management and technical problems related to the proficiency test that appear during the progress of the proficiency test itself. If possible and depending on the importance of the problem originating the remark or complaint, the Coordinator will give advice to the Laboratories in order to resolve the problem.

10.d) If the Coordinator judges that the problem cannot be verbally solved through an advice to the Laboratory, then he will ask the Laboratory a written communication of the remarks and complaints. The Coordinator will discuss the remarks and complaints with his technical and scientific collaborators (see §2) and collectively take a decision about their management.

10.e) Possible technical problems related to the management of the Sample (including shipment), delay in the progress of the proficiency test caused by a Laboratory or by the Coordinator himself, can be solved by the Coordinator without involving the scientific and technical collaborators.

11. Confidentiality and impartiality

11.a) The Coordinator and his technical and scientific collaborators will keep confidential any information pertaining to the performance of the Laboratories involved in the proficiency test during its progress and after its completion. The Coordinator warrants that the results originated from the participation of the Laboratories in the proficiency test will be kept confidential through:

- Keeping anonymous the result associated with each Laboratory. The individual result produced by each Laboratory may be released only in such a way that the anonymity of the Laboratory is preserved.

- Keeping anonymous aggregate results (i.e., statistical average, dispersion, …). The aggregate proficiency test results may be released only in such a way that the anonymity of the Laboratories that generated the results is preserved.

- Informing accredited Laboratories about a possible request of the Accreditation Body to reveal their proficiency test result. The proficiency test result will be revealed to the Accreditation Body under written permission of the accredited test Laboratory.

11.b) The Coordinator and his scientific and technical collaborators will avoid any conduct that could cause some Laboratories to take advantage with respect to the others in the successful participation in the proficiency test.

11.c) Laboratories shall avoid raising issues that, if accepted by the Coordinator and his scientific and technical collaborators, could generate a situation of disparity in the successful completion of the proficiency test.

Compilare inserendo i seguenti dati negli appositi campi evidenziati in giallo nel testo del contratto:

- (1) Ragione sociale
- (2) Codice fiscale
- (3) Partita IVA
- (4) Indirizzo
- (5) Nome, cognome e qualifica del rappresentante
- (6) Scegliere l'importo corrispondente a Opzione I (1000 €) oppure Opzione II (1500 €) e cancellare l'altro, vedere §3 dell'Allegato Tecnico
- (7) Indirizzo PEC
- (8) Codice univoco
- (9) Link informativa
- (10) Titolare del trattamento dati personali
- (11) Luogo
- (12) Data
- (13) Nome e cognome di chi firma

Verificare di aver inserito tutti i dati richiesti ed eliminare queste note. Possibilmente, firmare digitalmente e spedire il contratto con PEC alla seguente PEC dinfo@pec.unifi.it
_____

CONTRATTO TRA LA …(1)… E IL DIPARTIMENTO DI INGENERIA DELL'INFORMAZIONE DELL'UNIVERSITA' DI FIRENZE PER L'EFFETTUAZIONE DELLA SEGUENTE PRESTAZIONE:

"Prova valutativa di misure di emissione condotta nell'intervallo di frequenza 9 kHz – 30 MHz – PTC(CE-9k-30M-VI)"

(Art. 3/C del Regolamento sullo svolgimento di attività di ricerca o didattica commissionate da soggetti pubblici e privati emanato con D.R. 451/2018, Prot. 63016 del 16/04/2018)

Tra

…(1)… c.f. …(2)… P.I. …(3)… con sede in …(4)… in seguito indicata/o "Committente", rappresentato da …(5)…

e

il Dipartimento di Ingegneria dell'Informazione dell'Università di Firenze, c.f. e P.I. 01279680480, in seguito indicato "Unità Amministrativa", rappresentato dal Prof. Enrico Vicario in qualità di Direttore autorizzato a firmare il presente atto ai sensi dell'art. 36, comma 6 del Regolamento di Amministrazione, Finanza e Contabilità dell'Ateneo Fiorentino.

PREMESSA

DINFO ha le capacità per fornire servizi di circuito interlaboratorio ai Laboratori operanti nel settore delle prove di Compatibilità Elettromagnetica e il Committente intende dare evidenza della propria competenza tecnica attraverso la partecipazione a circuiti interlaboratorio.

SI CONVIENE E SI STIPULA QUANTO SEGUE

Art. 1

Oggetto del contratto

L'Unità Amministrativa effettuerà la seguente prestazione:

"Prova valutativa di misure di emissione condotta nell'intervallo di frequenza 9 kHz – 30 MHz – PTC(CE-9k-30M-VI)", voce di tariffa "Partecipazione a circuito interlaboratorio tipo C (Opzione I) oppure "Partecipazione a circuito interlaboratorio tipo E" (Opzione II) approvata dal Consiglio dell'Unità Amministrativa in data 30 Gennaio 2019.

Art. 2

Responsabile dell'attività

Responsabile dello svolgimento della prestazione è il Prof. Carlo Carobbi. La prestazione sarà eseguita nei locali dell'Unità Amministrativa con le modalità definite nel documento tecnico dal titolo "Proficiency test through interlaboratory comparison – Conducted emission measurements in the 9 kHz to 30 MHz frequency range – Scheme of the proficiency test PTC(CE-9k-30M-VI)" (Allegato Tecnico) che accompagna il presente atto e ne costituisce parte integrante.

Art. 3

Pagamenti

Per la realizzazione della prestazione il Committente corrisponderà all'Università la somma di …(6)… € 1000 (Opzione I) *oppure* € 1500 (Opzione II) oltre IVA (oppure indicare il titolo di inapplicabilità dell'IVA). Il pagamento verrà effettuato dal Committente:

- entro 30 giorni dal ricevimento di fattura elettronica; la fattura elettronica sarà trasmessa all'indirizzo PEC …(7)… e codice destinatario (codice univoco) …(8)…
- in conformità a quanto previsto dal Decreto Semplificazioni (DL n. 76 del 16/07/2020) esclusivamente attraverso l'utilizzo del Sistema pagoPA. Ogni pagamento sarà identificato univocamente dal codice IUV (Identificativo Univoco di Versamento), generato in sede di creazione della fattura e notificato al Committente tramite un Avviso di Pagamento contenente anche il Codice Avviso di Pagamento, il Codice QR e il Codice Interbancario (circuito CBILL: AAB1Y) che consentono di effettuare il pagamento – con le seguenti modalità:
- in un'unica soluzione alla stipula del presente atto.

Art. 4

Risultati e proprietà intellettuale

La conoscenza pregressa di ciascuna parte è e rimane di proprietà della stessa parte.

L'Università di Firenze si riserva i diritti di proprietà intellettuale relativi ai servizi erogati nell'ambito del presente accordo.

Le parti concordano che, in base alla natura del servizio, non si prevede che possano derivare da questa attività invenzioni brevettabili.

Gli eventuali risultati della ricerca condivisa saranno pubblicati dopo che tutte le parti si saranno accordate sui termini e le condizioni della pubblicazione medesima.

Art. 5

Durata e termini di esecuzione del servizio

La prestazione avrà inizio dalla data di stipula del presente accordo e verrà effettuata entro un anno secondo la procedura descritta nell'Allegato Tecnico, che costituisce parte integrante del presente Contratto. Firmando questo Contratto il Committente accetta i termini di svolgimento del servizio descritti nell'Allegato Tecnico.

L'importo delle prestazioni e la durata possono essere estesi attraverso un nuovo accordo sottoscritto dalle parti.

Art. 6

Riservatezza e pubblicità

Il Dipartimento ed il personale coinvolto sono tenuti a rispettare gli obblighi di non concorrenza e riservatezza (le informazioni che devono essere considerate riservate sono specificate nell'Allegato Tecnico).

Art. 7

Trattamento dei dati

I dati forniti dalle Parti saranno trattati per le finalità del presente contratto, nel rispetto dei principi di liceità, correttezza, trasparenza, adeguatezza, pertinenza e necessità di cui all'art.5, paragrafo 1 del Regolamento Generale sulla Protezione dei Dati (GDPR). Il conferimento di tali dati tra le Parti è obbligatorio al fine di adempiere a tutti gli obblighi di contratto comunque connessi all'esecuzione del rapporto instaurato con il presente atto.

I medesimi dati potranno essere comunicati unicamente all'interno della struttura del Committente e del Dipartimento per la gestione del rapporto instaurato dal presente atto.

I dati forniti dalle Parti saranno raccolti e trattati, con modalità manuale, cartacea e informatizzata, mediante il loro inserimento in archivi cartacei e/o informatici.

L'informativa completa dell'Università di Firenze sulla protezione dei dati personali degli operatori economici relativi al presente contratto è disponibile al seguente link https://www.unifi.it/upload/sub/protezionedati/Informativa_TERZI.pdf

L'informativa completa del Committente sulla protezione dei dati personali degli operatori economici relativi al presente contratto è disponibile al seguente link …(9)…, ovvero allegata al presente contratto.

Con la sottoscrizione del presente atto le parti esprimono il proprio consenso al trattamento ed alla comunicazione dei propri dati personali secondo le modalità e per le finalità sopra descritte. Titolari del trattamento sono l'Università degli Studi di Firenze e il Committente e, Referenti per la protezione dei dati sono il Direttore del Dipartimento per l'Università e …(10)… per il Committente. Ai sensi dell'art. 8 del Regolamento per lo Svolgimento di attività di ricerca o didattica commissionate da soggetti pubblici e privati, l'Università di Firenze potrà utilizzare i dati del presente atto in forma anonima per analisi statistiche sull'andamento delle attività conto terzi (https://www.unifi.it/upload/sub/statuto_normativa/dr825_100718_regolamento_conto_terzi.pdf).

Art. 8

Disposizioni finali e Foro Competente

Per tutto quanto non espressamente stabilito, restano ferme le disposizioni previste dal Codice Civile. Tutte le eventuali dispute connesse all'esecuzione del presente contratto dovranno essere risolte in via amichevole fra le parti. In caso ciò non risultasse possibile, si dichiara sin d'ora che deve considerarsi foro esclusivamente competente il Tribunale di Firenze

Art. 9

Spese del contratto

Il presente atto verrà registrato solo in caso d'uso ai sensi dell'art. 5, II comma, del D.P.R. n. 131 del 26/4/1986 e successive modifiche, a cura e spese della parte richiedente.

Le spese di bollo sono a carico del Committente

p. il COMMITTENTE   …(11)…, lì …(12)…

(…………(13)…………)

……………………………. (firma)

p. l'UNITA' AMMINISTRATIVA   Firenze, lì ………………………

(Il Direttore Prof. Enrico Vicario)

……………………………. (firma)

Per presa visione,

il responsabile dell'attività

(Prof. Carlo Carobbi)

………………………………… (firma)

Annex B

Fill the relevant fields highlighted in yellow in the contract by inserting the following information:

- (1) Corporate name
- (2) Tax identification number
- (3) Address
- (4) Name, surname and qualification of the representative
- (5) Choose between the fee corresponding to Option I (1000 €) or Option II (1500 €) and delete the other one, see §3 of the Technical Annex
- (6) Address for billing notice and invoice
- (7) Jurisdiction of the defendant
- (8) Place
- (9) Date
- (10) Name and surname of who signs the contract

Check that the required information has been inserted, delete these notes, print, sign and scan the contract, then send it to carlo.carobbi@unifi.it. If possible, please use digital signature.

_____

AGREEMENT BETWEEN …(1)… AND THE DEPARTMENT OF INFORMATION ENGINEERING OF THE UNIVERSITY OF FLORENCE FOR THE FOLLOWING SERVICE

"Proficiency test of conducted emission measurement in the frequency range between 9 k Hz – 30 MHz – PTC(CE-9k-30M-VI)"

(Art. 3, paragraph C, of the Regulation about the execution of research or academic activities commissioned by public and private entities issued by D.R. 451/2018, Prot. 63016 on 16 April 2018)

Between

…(1)…, tax identification number …(2)…, with premises in …(3)… hereinafter referred to as "the Laboratory", represented by …(4)…

and

The Department of Information Engineering of the University of Florence, fiscal code and VAT number 01279680480, hereinafter referred to as "DINFO", represented by Prof. Enrico Vicario, in the capacity of Department head, authorized to sign the present agreement pursuant to art. 36,

paragraph 6 of the Regulations of Administration, Finance and Accounting of the University of Florence

whereas

DINFO has the capability to provide the interlaboratory comparison service to Laboratories operating in the sector of Electromagnetic Compatibility testing and the Laboratory is willing to give evidence of his technical competence through participation to interlaboratory comparisons.

the following agreement is drawn-up

Art.1. – Subject of the Contract

DINFO will carry out the following service "Proficiency test of conducted emission measurement in the frequency range between 9 k Hz – 30 MHz – PTC(CE-9k-30M-VI)" price list item "Participation in interlaboratory comparison type C" (Option I) or "Participation in interlaboratory comparison type E" (Option II) as approved by the Board of DINFO in January 30, 2019.

Art. 2. Responsibility of the service

The person (Responsible) in charge of carrying out the service is Prof. Carlo Carobbi. The service will be carried out in the DINFO premises according to the procedure defined in the technical document titled "Proficiency test through interlaboratory comparison – Conducted emission measurements in the 9 kHz to 30 MHz frequency range – Scheme of the proficiency test PTC(CE-9k-30M-VI)," (for brevity "Technical Annex" in the following) which is an integral part of this Contract.

Art. 3. Fees

In order to obtain the service specified in the Technical Annex, the Laboratory will pay the sum of …(5)… € 1000 (Option I) *or* € 1500 (Option II) plus VAT (or indicate the title of inapplicability of VAT).

- within 30 days from receipt of billing notice which will be followed by regular invoice, the billing notice and subsequent invoice will be sent to the address …(6)…

All payments will be made by the Laboratory addressed to:

Bank name: UNICREDIT Banca SpA

Bank's address: Via Vecchietti 11 – Firenze

Account holder: University of Florence - Department of Information Engineering - (cod. UA. 58507)

IBAN: IT88A0200802837000041126939

BIC/SWIFT: UNCRITM1F86

Art. 4. Results and Intellectual property

The background of each party is and remains property of the same party.

The University of Florence retains the intellectual property related to the concept of the services supplied.

The parties agree that, due to the nature of the service, it is not expected that patentable inventions can arise from this activity. Possible joint results of the research will be published after both parties have agreed about the publication terms.

Art. 5. Duration and terms of execution of the service

The service will be completed within one year starting from the date of drawing up of this Contract (*). The service will be performed according to the procedure described in the Technical Annex which is an integral part of this Contract. By signing this Contract, the Laboratory agrees on the terms of execution of the service as described in the Technical Annex. The amount of the services and the duration can be extended through an agreement signed by the parties.

(*) When the signatures have not been placed contemporarily, the date of the last signature marks the stipulation of the Contract.

Art. 6. Confidentiality and publicity

DINFO, the Laboratory and the staff involved are bound to respect the obligations of non-rivalry and confidentiality (possible details about which information must be considered confidential are specified in the Technical Annex).

Art. 7. Data processing

Pursuant to Legislative Decree no. 196/2003, the parties mutually authorize the processing of personal data, computer and / or paper, in order to fulfil all legal and contractual obligations in any case related to the execution of the relationship established with the present contract. The data will be made accessible only to those who, both within the structure of the Customer and the Department, and outside, need it exclusively for the management of the relationship established by this contract. It is right of the contracting parties to obtain confirmation of the existence of the data and to know its content and origin, verify its accuracy or request its integration, updating or correction and to oppose, for legitimate reasons, to their treatment. By signing this document, the parties express their consent to the processing and communication of their personal data according to the methods and for the purposes described above. The Data Controller is the Customer, and the Data Processor is the Director of the Department. Pursuant to art. 8 of the Regulations for the conduct of research or teaching activities commissioned by public and private subjects, the University of Florence may use the data in this document anonymously for statistical analysis on the performance of activities on behalf of third parties.

Art. 8. Final provisions

For whatsoever has not been expressly agreed, the laws of the Civil Code abide. All disputes or differences between the Parties arising out or in connection with this Agreement which the Parties cannot settle amicably shall be finally submitted to the jurisdiction of the defendant, that is …(7)… if the Laboratory is the defendant, Florence Court if the University of Florence is the defendant.

Art. 9. Cost of the Contract

This Contract will be registered only in the case of use according to art. 5, paragraph II of the D.P.R. 26/4/1986 n. 131 and subsequent modifications. The Laboratory is responsible for the necessary arrangements and expenses, including the cost of stamps.

-----oo----

For the Laboratory

…(8)…, …(9)…

(……………(10)……………)

…………………………… *(signature)*

For the Department of Information Engineering

Florence, …………………………

(Prof. Enrico Vicario)

…………………………… *(signature)*

Signature of acknowledgment of the Responsible of the service

Prof. Carlo Carobbi

…………………………… *(signature)*

Annex C

Test report issued by the participating Laboratory

Laboratory: Name of the Laboratory
Laboratory Code: PTC(CE-9k-30M-VI)LAB(#)
Address: Address of the Laboratory
Technical Responsible: First name and last name of the Technical Responsible or his/her Deputy
E-mail: E-mail address of the Technical Responsible or his/her Deputy
Phone: Phone number of the Technical Responsible or his/her Deputy
Date of issue: Date of issue of this test report

Date of Sample receipt: ....
Date of measurements: ....
Data of Sample shipment: ....

Test result

Fill in the empty cells of columns eight, nine and ten with the measured value x_{line}, $x_{neutral}$ and the measurement uncertainty U_{lab}.

1	2	3	4	5	6	7	8	9	10	11	12
Band	Harmonic #	f MHz	X dB(µV)	U dB	x^* dB(µV)	s^* dB	x_{line1} dB(µV)	$x_{neutral}$ dB(µV)	U_{lab} dB	ζ_{line}	$\zeta_{neutral}$
A	2	0,03875	-	-	-	-				-	-
A	5	0,08525	-	-	-	-				-	-
A	8	0,125	-	-	-	-				-	-
B	5	1,375	-	-	-	-				-	-
B	20	5,125	-	-	-	-				-	-
B	35	8,875	-	-	-	-				-	-
B	50	12,625	-	-	-	-				-	-
B	65	16,375	-	-	-	-				-	-
B	80	20,125	-	-	-	-				-	-
B	100	25,125	-	-	-	-				-	-

Comments: Comments may be inserted here (optional)

Photos: At least one photo shall be inserted here (mandatory).

Sign of the Technical Responsible or his/her Deputy

....

Test report no. XYZ
Issued by the Coordinator of the proficiency test code PTC(CE-9k-30M-VI)

Carlo Carobbi
Dipartimento di Ingegneria dell'Informazione
Università degli Studi di Firenze
Via S. Marta, 3 – 50139 Firenze
Phone: +39 055 2758501
Mob. phone: +39 329 6509116
e-mail: carlo.carobbi@unifi.it

to the participating Laboratory

Laboratory: Name of the Laboratory
Laboratory Code: PTC(CE-9k-30M-VI)LAB(#)
Address: Address of the Laboratory

Start and stop dates of the proficiency test:
Number of participants:
Date of measurements of the participating Laboratory:
Data of issue of this report:

Test result

The cells of columns eight, nine, ten are filled in by the Laboratory, the other ones are filled in by the Coordinator.

1	2	3	4	5	6	7	8	9	10	11	12
Band	Harmonic #	f MHz	X dB(μV)	U dB	x^* dB(μV)	s^* dB	x_{line} dB(μV)	$x_{neutral}$ dB(μV)	U_{lab} dB	ζ_{line}	$\zeta_{neutral}$
A	2	0,03875	-	-	-	-				-	-
A	5	0,08525	-	-	-	-				-	-
A	8	0,125	-	-	-	-				-	-
B	5	1,375	-	-	-	-				-	-
B	20	5,125	-	-	-	-				-	-
B	35	8,875	-	-	-	-				-	-
B	50	12,625	-	-	-	-				-	-
B	65	16,375	-	-	-	-				-	-
B	80	20,125	-	-	-	-				-	-
B	100	25,125	-	-	-	-				-	-

Outcome

Here the Coordinator inserts the applicable outcomes:
- No anomaly is detected
- Warning signal(s) is (are) detected
- Action signal(s) is (are) detected

Sign of the Coordinator

....