**IND60 EMC:**

**Improved EMC Test Methods in Industrial Environments**

*from laboratory to industrial environment (2441 k€, 249.5 MM)*

**Objectives**
- Evaluation and improvement of existing alternative test methods used in industry
- Development of new EMC test methods and test systems in accordance with the needs of European industry
- Establishment of correlation between alternative tests in industry and laboratory tests
- Uncertainty calculations and traceability evaluation for alternative EMC tests
- Reference sources for comparison measurements for both emission and immunity tests
- Conform with the EMRP Outline 2008 and roadmap of TC/EM
- JRP also addresses the EMRP objectives such as: integration & efficiency, developing metrology capacity by the creation of new alternative test methods, stimulating innovation in EMC testing area and standards

**Quality of the Consortium and Management (8 MM)**
- Coordinator: Mustafa Çetintas (TUBITAK, Turkey)
- 8 funded partner + 2 REGs from 8 EU countries
- Top experts in EMC
- Excellent facilities available
- Close link to stake-holders to ensure dissemination and knowledge transfer
- Project board made of JRP coordinator and WP leaders to facilitate the completion of deliverables in the given timeframe
- Regular project meetings, reports and website sharepoint
- Good assessment of the scientific and management risks

**Standard laboratory**
- Traceability
- Uncertainty
- Precision
- Reliability
- Reflections
- Near Field Effects
- Line Impedance
- Field Uniformity
- NSA
- CM Impedance
- EUT - Antenna Coupling
- Correlation

**Industrial environment**
- Traceability
- Uncertainty
- Precision
- Reliability
- Reflections
- Near Field Effects
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- Field Uniformity
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**Need for Project**
- Implementation and maintenance of the standard EMC measurement facility in accordance with standards are heavy loads for industry in development/production stage of products.
- “The large size of our machine does indeed lead to metrological challenges in EMC.” – Director Strategic Technology Program, ASML B.V.
- “EMC testing in industry environment in our premises can be a very good solution to this type of problems.” – Representative of TurkTraktor
- “Europe is still strong in the field of complex and large installation...Therefore the uncertainty of the alternative test techniques and the correlation with existing standard techniques, as well as the traceability have to be solved.” – Chair of EMC-ESD Association
- “the correlation with standard test methods and the uncertainty of the new alternative test techniques ...has never been done before” – EMG Manager, THALES Group
- “the evaluation and development of alternative test and measurement methods including the development of the different EMC devices for round robin tests may be of interest.” – Manager NLR EMC test facility

**Scientific and Technical Excellence**
- Improvement of existing alternative EMC test methods which are widely used in industry
- Development of new alternative EMC test methods in order to meet the requirements of European industry
- Development of new measurement systems such as harmonic/ticker measurement system to be used directly in industry
- Development of coaxial-banana adapters for precise LISN calibrations

**WP1: Conducted Emission (62.8MM)** (TUBITAK, VSL, LNE, CM, METAS, SP, SIQ, INTA, UTwente, UPC)
- PQ measurement under undefined mains impedance and polluted mains in industry
- using clamp and voltage probe instead of USNs
- alternative methods for large current applications
- developing a coaxial-banana adapter for LISN using VNA
- measuring conducted emission in time domain
- survey and new developments

**WP3: Radiated Emission (66.2MM)** (UTwente, TUBITAK, VSL, LNE, CM, METAS, SP, SIQ, INTA, UTwente)
- using antennas at non-standard distance in presence of background noise and investigation of near-field effects
- surface wire method for large or stationary EUTs
- using reverberation, GTEM and TEM cells
- changing Q value in industrial environment
- influence of supports for EUT on radiated emission tests
- measuring radiated emissions in time domain
- survey and new developments

**WP5: EMC reference devices for round-robin tests (29MM)** (METAS, TUBITAK, VSL, LNE, CM, SIQ, SP, INTA, UPC, UTwente)
- developing concepts and EMC test devices used for inter-laboratory comparisons for both emission and immunity tests
- Inter-comparison tests among JRP partners

**WP2: Conducted Immunity (19.2MM)** (VSL, SIQ, TUBITAK)
- alternative method for large or stationary EUTs by using EM clamp or current clamp
- test method in high frequency harmonics range
- alternative methods by using waveform metrology
- ESD Tests in the range 15 kV - 30 kV
- survey and new developments

**WP4: Radiated Immunity (53.9MM)** (TUBITAK, VSL, SIQ, TUBITAK)
- scanning the surface of EUT at non-standard distance and investigation of near-field effects
- using reverberation, GTEM and TEM cells
- using bulk current injection method
- alternative GSM radiated immunity tests
- effects of test setup for different devices
- survey and new developments

**WP6: Impact (11MM)** (VSL, TUBITAK, LNE, ENSL, SIQ, METAS, SP, INTA, UPC, UTwente)
- Direct impact on European manufacturers and test laboratories
- Economical and financial impact through EMC tests on design stage of products in absence of EMC Laboratories, which results in reduction of cost and consumed time
- Impact on EC Directives and many European EMC standards such as 2004/108/EC, 75/322/EEC, EN 55011, EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-6, EN 61000-3-2, EN61000-3-3
- Post reviewed publications – in IEEE journals and trade journals
- Conference presentations and special sessions in Symposia
- Project website
- Workshops for stakeholders
- "Best Practice" guides
- Information/data provided to standardization working groups

**Partners**

**REGs**

**Supports**