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*ITU Regional Seminar "Radio frequency spectrum
management. Radio monitoring as an effective tool for radio
frequency spectrum management", Kyiv, 10-12.07.13*

Frequency management and spectrum monitoring during the EURO-2012 in Ukraine





Event



- From 8 June to 1 July 2012, the Union of European Football Associations (UEFA) staged the final tournament of its 14th European Football Championship (EURO 2012) in Poland and Ukraine
- Sixteen national teams competed in a total of 31 matches, which were broadcast live to more than 200 territories around the world, enabling several billion television viewers to share the excitement with over 1.4 million people in the stadiums





ITU role



- Major events like EURO-2012 are mainly characterized by a variety of radio applications and a substantial number of radio equipment aggregated within a limited area, that requires the adequate spectrum planning, licensing, spectrum monitoring, inspection of radio stations and processing of radio interferences
- ITU developed a guidance for Administrations on spectrum management and monitoring during major events





ITU-R Report SM.2257



ITU-R defined the following important aspects of spectrum management activities in terms of the major events preparation:

- organization team
- coordination with other organizations
- frequency planning
- licensing
- fees collection
- labelling
- interference investigation
- logistics
- radiocommunication equipment for spectrum management and monitoring staff
- appearance in public

<p>Activities before the event</p> <ul style="list-style-type: none">• Consulting the organizer in written form• Counselling interview with the organizer• Information about the radio monitoring/inspection service• Further meetings with the organizer• Providing information on the organizer's home page; a link to the spectrum agency would be advisable• Providing event related information on the spectrum agency's home page• Visit of the event location• Drawing up a time-table• Labelling required: yes or no?• Assigning tasks to the spectrum monitoring/inspection service• Fixing the manpower requirements• Review of the s• Fixing the locat• Organization of• Contacting the l• Contacting secu• Monitoring the• Allowing specta• Handling of app<ul style="list-style-type: none">- Consider- Spectru- Approv• Hotel booking• Organizing an o• Planning of com• Preparation of c• Arrangement of• Carry out any r	<p>Activities during the event</p> <ul style="list-style-type: none">• Coordination of the staff involved in the event• Processing short term applications• Documentation of all activities including date and time• Client counselling• Contacting the relevant persons (event manager, companies, public authorities)• Inspection and labelling of radio equipment; at least the frequency should be checked• Monitoring the spectrum• Interference investigation• Identification and elimination of unlicensed frequency use. <p>Activities after the event</p> <ul style="list-style-type: none">• Equipment removal• Return transport of staff• Return of borrowed equipment• Settlement of accounts• Finalization of interference handling if necessary• Initiation of legal measures (in cases of identified infringements)• Reporting, including relevant findings, should be retained for use at later events.• Create Statistics for evaluation and later use• Final review.
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Activities have to be carried out **BEFORE, DURING** and **AFTER** the major events



Actions before EURO 2012



- UCRF started to prepare for EURO 2012 more than two years before the event
- Order of the National Commission for Communications Regulation of Ukraine of 25.12.2009
- 26-30.04.2010 we visited the Austrian Telecommunication Authority and learned how Austria and Switzerland had cooperated for EURO 2008
- ✓ UCRF main tasks
- ✓ UCRF working team
- ✓ Contacts with UEFA and the Office of Electronic Communications of Poland (UKE)





Actions before EURO 2012



- Since December 2010 a number of meetings between UCRF, UKE and UEFA were arranged
- UCRF and UKE exchanged information about frequency use, operation and import authorization, licensing fees
-
- UEFA requirements:
 - application process timing
 - downloadable forms in English
 - reasonable fees
 - 1 month assignment period
 - temporary import
 - UCRF and UKE presence at the stadia
 - testing and labeling the radio equipment
 - UCRF and UKE hotline number
 - Common action plan





Specific tasks at a stage of long-term preparation to EURO 2012



- obtaining the preliminary information on required spectrum, potential frequency users and radio technologies
- simplifying an application procedure for temporary permissions on import and operation of radio electronic facilities (REFs)
- initial spectrum occupancy measurements (verification of existing use, elimination of illegal use, checking the availability of frequencies)
- EMC analysis, frequency planning and refarming to meet an estimated spectrum demand and protect existing local frequency users
- defining the stadium area to be controlled as well as required spectrum monitoring manpower and technical facilities
- implementation of dedicated UCRF web-page devoted to EURO 2012
- creation of special e-mail address for receiving the applications and queries from the spectrum users
- coordination of authorization procedure with UKE and UEFA (starting time and deadline, forms of applications, tariffs etc)
- providing the information to broadcasters and journalists about frequency usage and authorization in Ukraine
- development of proposals for cellular mobile operators to ensure the respective level of QoS during the event.



Actions before EURO 2012



- **Final tournament draw** (Kyiv, 2 December 2011) provided a good chance for testing:
- workability of frequency authorization process
- efficiency of radio monitoring
- technical check and labeling of radio equipment
- Resulted in improvement of application procedure and gave practical knowledge to UCRF and UKE staffs on performing their tasks during UEFA events





Actions before EURO 2012



- UCRF and UKE ensured that everybody is aware of the regulations on frequency use by providing the information to broadcasters and journalists about frequency usage and authorization in Ukraine and Poland during two World Broadcasting Meetings, organized by UEFA in June and December 2011

UCRF web-site: WWW.UCRF.GOV.UA

On dedicated page of the UCRF web-site there is a detailed information on frequency assignment procedure, application forms, tariffs, labeling and admission of radio equipment to stadia, frequency monitoring and interference elimination, hotline services and other issues related to frequency usage in Ukraine during the UEFA EURO 2012™.

Contacts

Special UCRF e-mail address for UEFA EURO 2012™ applications, queries, complaints etc is available now: euro2012@ucrf.gov.ua

UCRF hotline number (2 weeks before tournament): +380 44 4229385

UCRF fax number: +380 44 4228181

Address:
Ukrainian State Centre of Radio Frequencies
130A Kyiv, Homotsevo ave.
01179 Kyiv
Ukraine

State Enterprise
«Ukrainian State Centre of Radio Frequencies»

Radio Frequency Utilization for the
UEFA EURO 2012™

2nd UEFA EURO 2012™ Broadcast Partner Workshop
Kyiv, Ukraine, December 2011

Timing

January 5th, 2012 – start of the UCRF application process for the UEFA EURO 2012™

April 15th, 2012 – deadline for registration of applications by the UCRF. For the Applications received after that date the timely radio frequency assignment is not guaranteed!

Period of consideration of applications by the UCRF – up to 1 month from the date of registration.

Technical check and labeling on stadia

All users have to label their radio equipment with country specific or stadium specific UEFA EURO 2012™ stickers well in advance.

Technical check of radio equipment characteristics and labeling by the UEFA EURO 2012™ Stickers carried out by the UCRF staff in designated points.

Conditions of labeling:

- 1) presence of the UCRF permission
- 2) availability of document confirming the right on admission
- 3) technical characteristics in compliance with notified to the UCRF

ДОЗВІЛ

1) наявності дозволу УКРЧ

2) наявності документа, що підтверджує право на вступ

3) технічних характеристик, що відповідають повідомленим до УКРЧ





Actions before EURO 2012



Detailed information related to frequency usage in Ukraine during EURO 2012 was available on dedicated web-page of the UCRF:

- ✓ frequency assignment procedure,
- ✓ downloadable application forms (doc, pdf) and filled samples
- ✓ tariffs
- ✓ rules of REFS' operation in Ukraine
- ✓ information about import procedure
- ✓ REFS' labeling and admission to the stadia
- ✓ monitoring and interference elimination
- ✓ contacts

Government portal | NCCR | UCRF | Contacts | e-mail | Site map | Українська

УКРАЇНСЬКИЙ ДЕРЖАВНИЙ ЦЕНТР РАДІОЧАСТОТ

УКРАЇНСЬКИЙ ДЕРЖАВНИЙ ЦЕНТР РАДІОЧАСТОТ

The Ukrainian State Centre of Radio Frequencies – "EURO2012"

OFFICIAL INTERNET-PORTAL

Frequency usage and authorization for UEFA EURO 2012 (08 June – 01 July 2012)

UEFA EURO2012 POLAND-UKRAINE

Dear broadcasters, members of the press, service providers and partners of the UEFA EURO 2012

Welcome to a dedicated page of the Ukrainian State Centre of Radio Frequencies (UCRF), on which you will find all the necessary information about frequency usage, application of radio electronic equipment in Ukraine, and authorization of their import and operation during the UEFA EURO 2012.

All broadcasters, journalists and partners of the UEFA EURO 2012 are encouraged to apply for the UCRF permission to operate the radio equipment as early as possible because of a high demand for spectrum and a finite quantity of available radio frequency resource.

General information about the tournament can be found on the UEFA web-site under: <http://www.uefa.com/uefaeuro2012/index.html>

Information concerning registration, application and certification issues for radio equipment in Poland is provided by the Office of Electronic Communications on its dedicated website <http://euro2012.uke.gov.pl>

If you have any further questions please [contact us](#) by mail, fax or e-mail.

Best regards, **UCRF team**



Actions before EURO 2012



- A simplified procedure for temporary frequency assignment for foreign users during EURO 2012 had been approved by the National Commission for Communications Regulation of Ukraine on 1 December 2011
- Authorized broadcasters, journalists and partners could import the radio equipment for EURO 2012 without permission from the UCRF
- Frequency authorization stage started on 5 January 2012
- Deadline for frequency application - 15 April 2012
- Only 45 percent of applications were submitted prior to the official deadline (a month and a half before the tournament)

Додаток 3
до Положення про надання тимчасовим користувачам дозволу на введення та експлуатацію радіоелектронних засобів на період проведення Євро-2012

ЗАЯВА
про видачу дозволу на введення та експлуатацію
пересувної земної станції супутникового зв'язку
APPLICATION FORM
for issuing the permission for import and operation
of the transportable earth station for satellite communication

Заявка може бути направлена поштою, факсом та на електронну пошту.
Український державний центр радіочастот, 15-й етаж, просп. Перемоги, Київ, 01179, Україна, факс: +380 44 422 8181, euro2012@ucrf.gov.ua

Application form can be sent by post, fax and e-mail to:
Ukrainian State Center of Radio Frequencies, 15th floor, Prospekt Peremohy ave., Kyiv, 01179, Ukraine, fax: +380-44-422-8181, euro2012@ucrf.gov.ua

Власник радіоелектронного засобу (PEЗ) Owner of radio electronic facility (REF)		
Місцезнаходження власника PEЗ Location of REF's owner / postal address		
Особа, яка відповідає за експлуатацію Name of person responsible for operation		
Номер телефону / номер факсу Telephone number / telefax number	тел. tel.	факс fax
Адреса електронної пошти E-mail address		
Код згідно УКТЗЕД / Code according to the Ukrainian Classification of Commodities of Foreign Economic Activity		
Дати ввезення і вивозу Dates of import and export	з / from	до / till
Дати початку і закінчення експлуатації Dates of beginning and ending of operation	з / from	до / till
Назва супутникової мережі (орбітальна позиція ГСО) Name of satellite network (GSO orbital position)		
Регіон використання PEЗ Region for REF's operation		
Назва / тип PEЗ Name / type of REF		
Максимальна потужність передатника на вході антени, дБВт Maximum power of transmitter at antenna input, dBW		
Тип антени, розміри, м Antenna type, dimension, m		
Коефіцієнт підсилення антени ПРД/ПРМ, дБ Antenna gain in transmission/reception mode, dB		
Номинальні робочі частоти (смуги) МГц (тип поляризації) / Nominal(s) of operating frequencies (bands) MHz, (polarization type)	у режимі передачі: in transmission mode:	у режимі прийому: in reception mode:
Ширини(и) смуги та клас(и) випромінювання(я) Bandwidth(s) and class(es) of emission(s)		
Марка та державний номер транспортного засобу Mark of vehicle and its registration number		
Особи, пов'язані з експлуатацією засобу, з якими необхідно ознайомитися Persons related to the operation of the facility, with whom it is necessary to be acquainted with		





Specific tasks at an authorization stage and preparation just before the event



- processing the applications, EMC analysis and frequency assignment
- on-site spectrum monitoring
(ensuring the availability of assigned frequencies, frequency occupancy measurements, suppressing unauthorized usage)
- labeling and technical check of radio equipment of local services before event
(police, ambulance, fire-fighting, security etc labeled their equipment 15, 10 and 5 days before the first match)
- completing logistic arrangements
(accreditation of main and reserve staff, vehicles position in compounds, staff desks position at the stadia, electricity supply, internet access, ensuring communication with UEFA and between monitoring team members, staff schedule and uniform)
- supplementing the UCRF dedicated web-page with updated or additional information





Authorization stage



- In total, UCRF received **3773** applications from **83** companies (including 1163 portable radio stations, 920 TETRA terminals, 229 base stations of UHF communication, 1199 radio microphones, 134 SNG stations)
- Based on “first come first served” principle, foreign users obtained **3569** permissions for operation of their radio equipment during EURO 2012 in Ukraine
- All applications, permissions and related correspondence with the UCRF staff were ensured both in English and Ukrainian languages
- Consideration of applications – no more than 1 month

УКРАЇНСЬКИЙ ДЕРЖАВНИЙ ЦЕНТР РАДІОЧАСТОТ

ДОЗВІЛ

(PERMISSION) № XX-XX-XXXXXXX

на ввезення з-за кордону та експлуатацію перенесної земної станції супутникового зв'язку
for import and operation of the transportable earth station for satellite communication

Дійсний до / Valid till: XX,XX,XXXX

Власник радіоелектронного засобу (РЕЗ) Owner of radio electronic facility (REF)	
Місцезнаходження власника РЕЗ Location of REF's owner	
Код УКТЗЕД (згідно Українського класифікатора товарів зовнішньоекономічної діяльності) HDCDS code (according to the Ukrainian Classification of Commodities of Foreign Economic Activity)	
Назва / тип РЕЗ Name / type of REF	
Мета ввезення / Purpose of import	код 31, забезпечення проведення СВРО-2012
Назва супутникової мережі, (орбітальна позиція ГСО) Name of satellite network (GSO orbital position)	
Регіон використання РЕЗ Region for REF's operation	
Макс. потужність передавача на вхід антени, дБВт Maximum power of transmitter at antenna input, dBm	
Тип антени, розміри, м / Antenna type, dimension	
Коефіцієнт підсилення антени ПРД/ПРМ, дБ Antenna gain in transmission/reception mode, dB	
Номинали робочих частот (смути) МГц, (тип поляризації) Nominals of operating frequencies (bands) MHz, (polarization type)	
Ширин(и) смуги та клас(и) випромінювання Bandwidth(s) and class(es) of emission(s)	
Марка та державний номер транспортного засобу Mark of vehicle and its registration number	
Оригінал дозволу та його копія, засвідчена установою / Permission original and its copy, certified authority	
Особливі умови експлуатації	

041159

Уповноважена особа УДЦР (посада, підпис)
UCRF's authorized person (position, signature, initials)

УКРАЇНСЬКИЙ ДЕРЖАВНИЙ ЦЕНТР РАДІОЧАСТОТ

ДОЗВІЛ № XX-XX-XXXXXXX

(PERMISSION)

на ввезення з-за кордону та експлуатацію абонентського радіоелектронного засобу (РЕЗ)
for import and operation of the terminal station

Дійсний до / Valid till: XX,XX,XXXX

Власник РЕЗ / Owner of radio electronic facility (REF)	
Регіон використання РЕЗ Region for REF's operation	
Код УКТЗЕД/НДСДС code	
Мета ввезення Purpose of import	код 31, забезпечення проведення СВРО-2012
Тип РЕЗ застосування РЕЗ Type of REF's usage	
Ідентифікатор мережі Network identifier	
Назва, тип РЕЗ/РЕЗ'я назве, зусре Заводський номер Name, type of REF/REF's name, type, Factory number	
Номинали радіочастот приймаючих передавачів, МГц receiving transmitting frequencies, MHz	

385077

Уповноважена особа УДЦР (посада, підпис, дата видачі) / UCRF's authorized person (position, signature, name, date, date of issue)



Authorization stage



The main **complexity of authorization stage** may be characterized by:

- **55%** of applications were submitted after the deadline (UCRF received applications from **20** companies for more than **400** REFs after start of EURO 2012)
- due to operation of some equipment in both countries users intended to use the same frequencies in Poland and Ukraine despite variety of spectrum availability and differences of national frequency usage plans
- numerous corrections to applications were required after check for completeness and validity
- in most cases applications had to be corrected after initial consideration by frequency managers and proposing alternative frequencies
- mistakes in paying the invoices (outstanding bank commissions, use of incorrect data for bank transfer) led to delays in issuance of permissions



Activities just before and during EURO 2012



During the tournament the UCRF staff was working at all stadiums in days before and during matches of EURO 2012 in Ukraine, **ensuring**:

- radio frequency monitoring on assigned frequencies
- determination of unlicensed emissions
- detection and elimination of sources of harmful interference
- technical check and labeling of radio equipment for foreign users
- rapid consideration of late applications (**above 400 REFs were applied for authorization after start of event**)
- QoS measurements in relation to major cellular mobile operators in Kyiv





Activities during EURO 2012



- UEFA used the frequency stickers as a tool that helped to identify which radio equipment was authorized for the use at stadia and broadcasting compound in match days
- All accredited users had to address the UCRF staff to label their equipment with country specific or stadium specific stickers in advance

Conditions of labeling:

- presence of the UCRF permission
- technical characteristics in compliance with notified to the UCRF

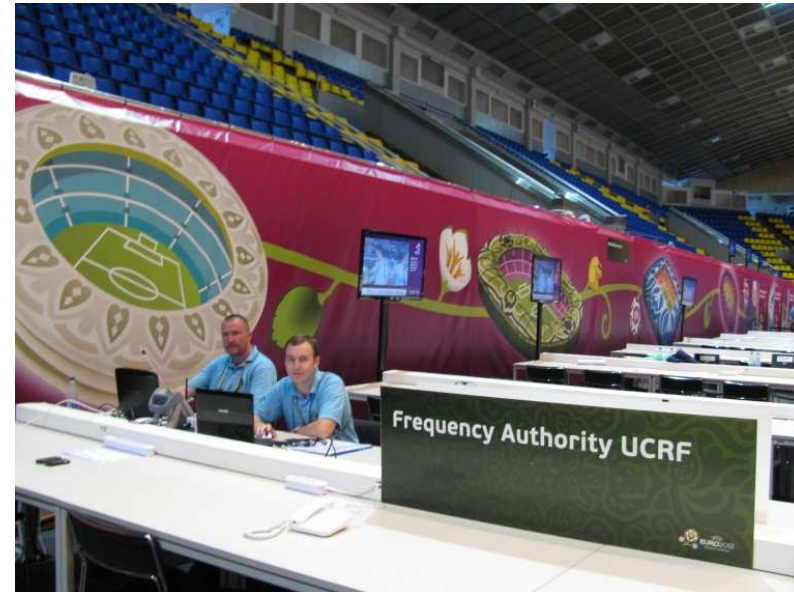
UEFAEURO2012™	All Stadia
UEFAEURO2012™	All Stadia UKR
UEFAEURO2012™	KYI
UEFAEURO2012™	DON
UEFAEURO2012™	LVI
UEFAEURO2012™	KHA
UEFAEURO2012™	



Activities during EURO 2012



In media center and broadcasting compound of each stadium there were **UCRF points** for issuing the stickers and checking the technical characteristics of radio equipment on compliance with authorized ones





Activities during EURO 2012



- Noting that intervals between matches ranged from 4 to 7 days, **3 stages** were defined for monitoring activities at each stadium:
- 2 days before match (MD-2)
- 1 day before match (MD-1)
- Match Day (MD)
- **Timing:**
- MD-2 – from 10:00 to 17:00
- MD-1 – from 10:00 to 18:00
- MD – from 11:00 to 21:00 and from 12:00 to 24:00 (for match start at 19:00 or 21:45)
- **Features:**
- MD-2 – test switching on of UHF base stations and SNG stations
- MD-1 – test switching on of data communication equipment and wireless cameras





Olympic Stadium in Kyiv



- At 4 stadiums the UCRF spectrum monitoring system was ensured by using **8 fixed** and **18 mobile monitoring stations and walking groups** equipped with **13 handheld** direction finders



Fixed monitoring station
(media tribune)



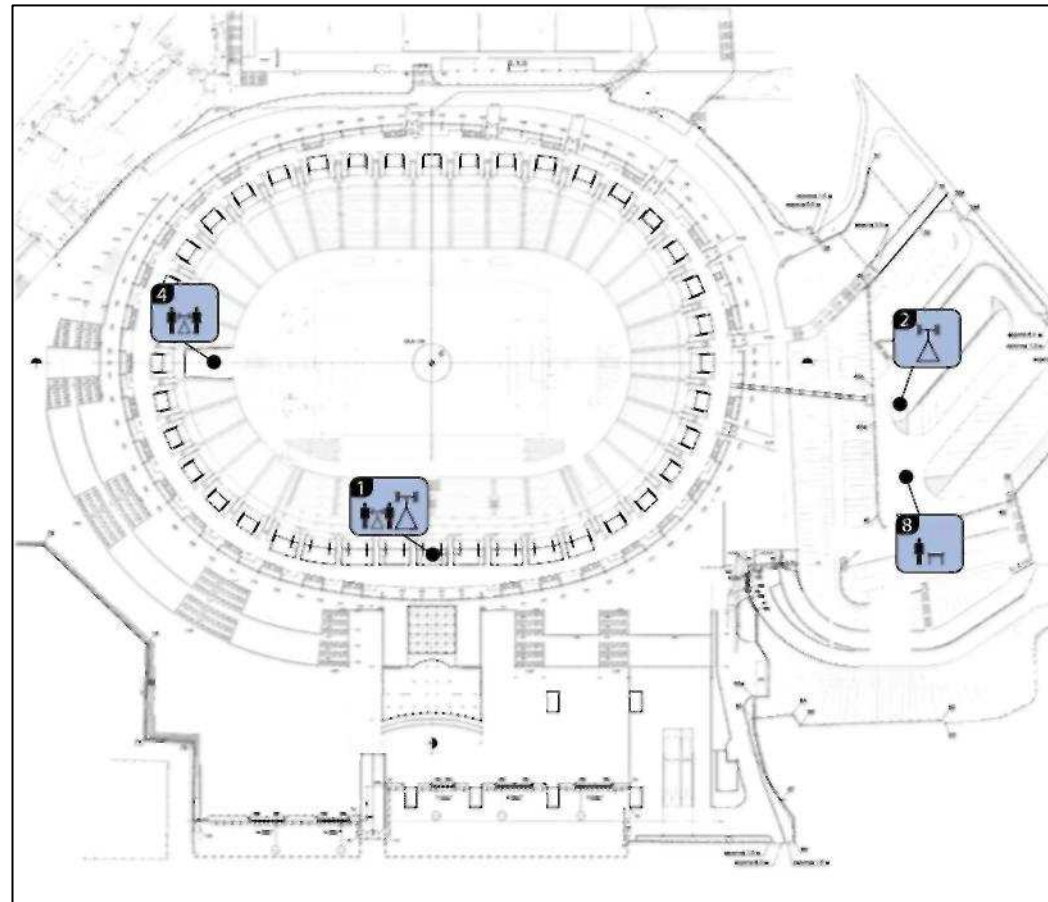
Mobile monitoring station
(broadcasting compound)



Walking monitoring group
(pitch exit)

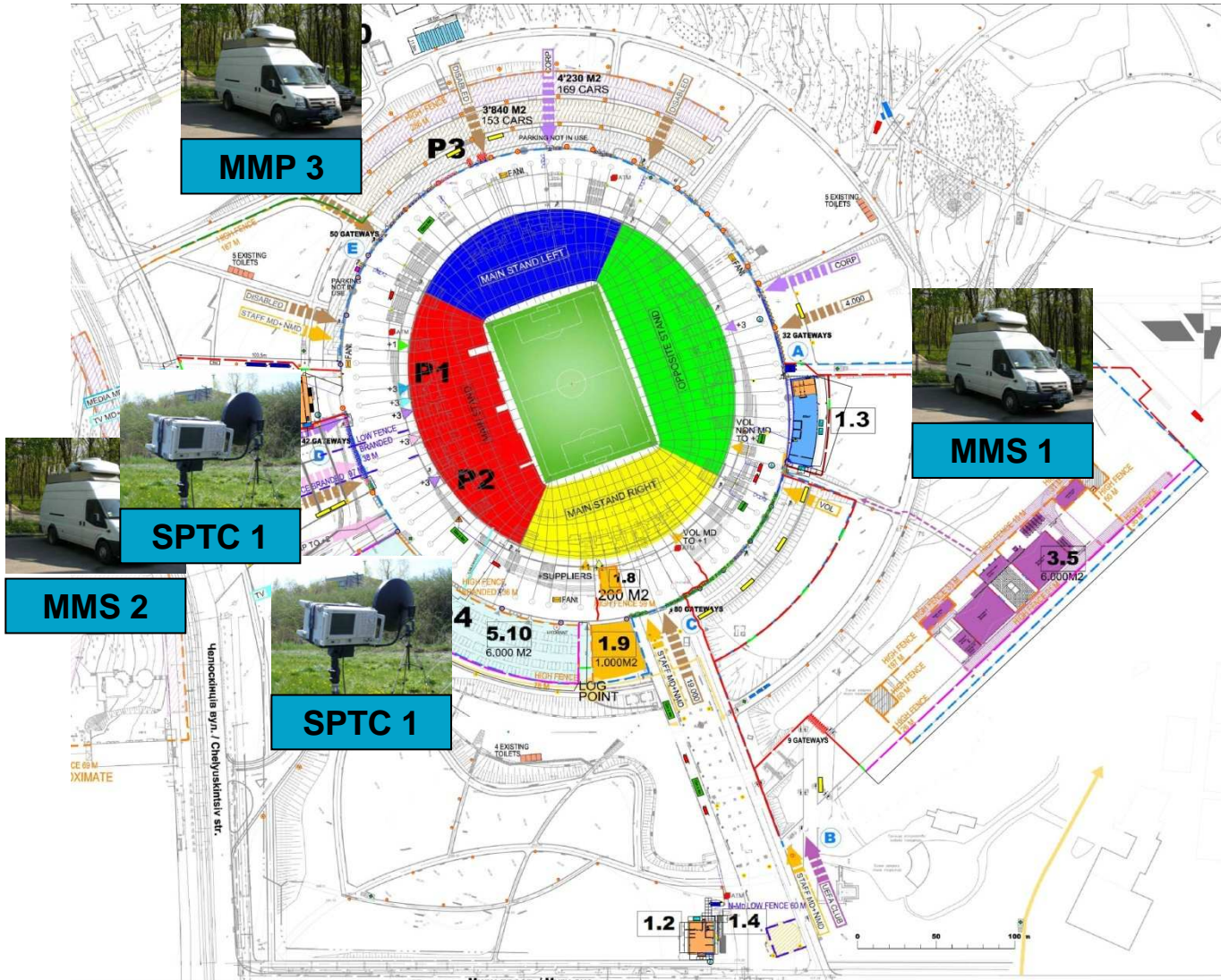


Special point of technical control
(broadcasting compound)





Donbass Arena Stadium in Donetsk



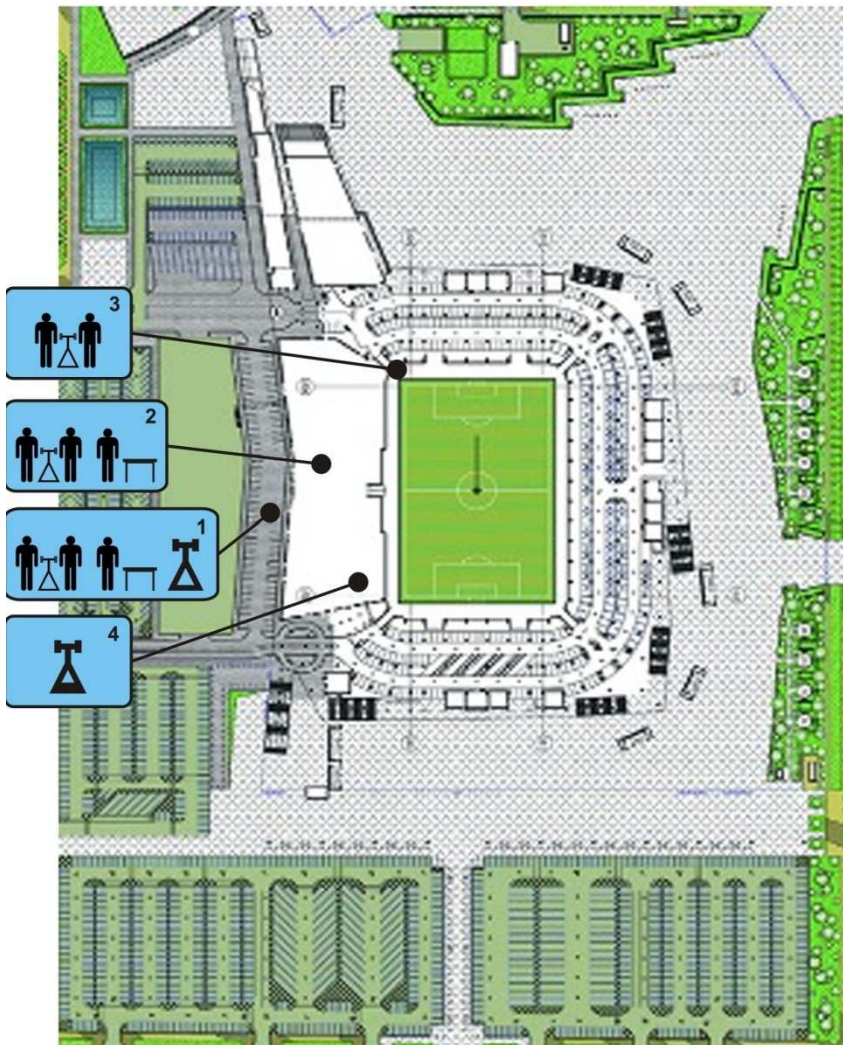
MMS 1, 2 -
Mobile monitoring station,

MMP 3 -
Mobile monitoring
point, walking group

SPTC 1, 2 -
Special point of technical
control (in Media Center
and Broadcasting Compound)



Arena Lviv Stadium

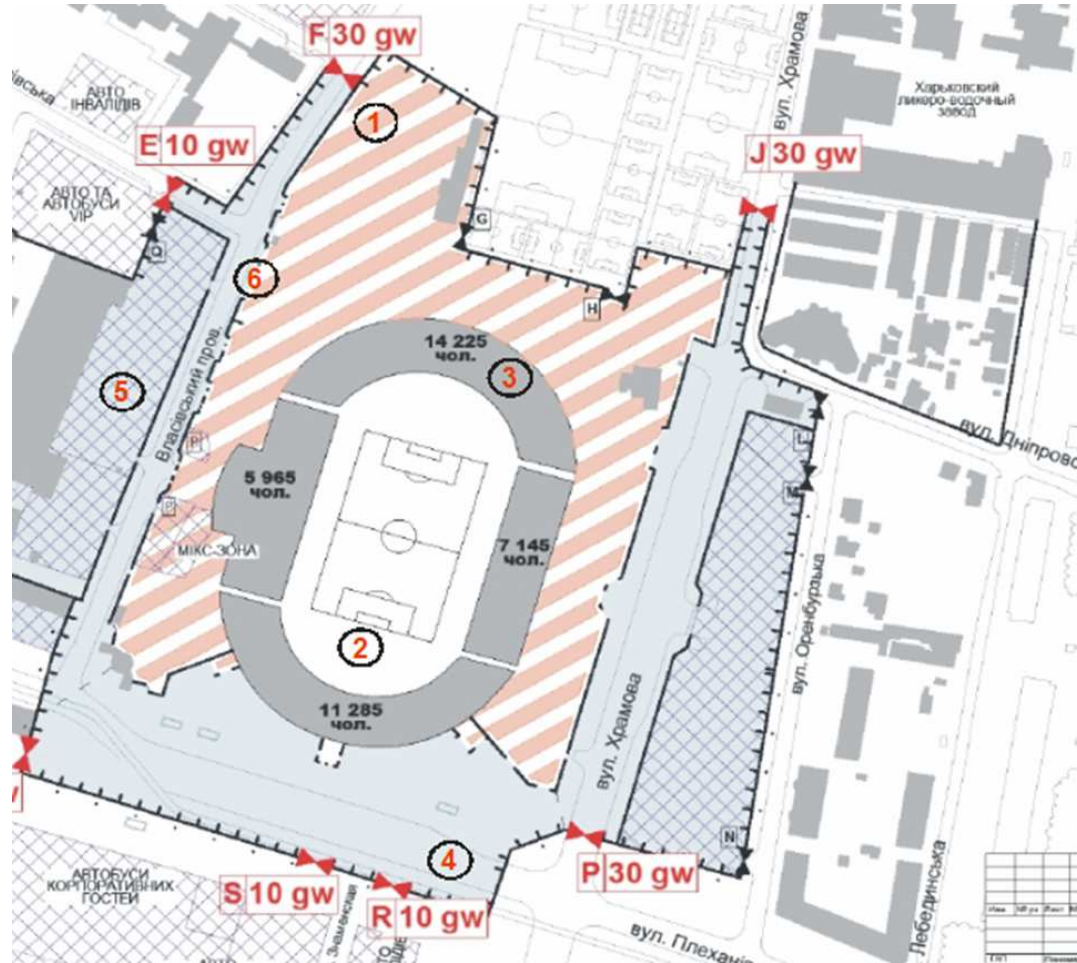


- Fixed monitoring station
- Mobile monitoring station
- Walking monitoring group
- Special point of technical control

- 1 – Broadcasting Compound
- 2 – Media Center
- 3 – Walking group
- 4 – Technical control



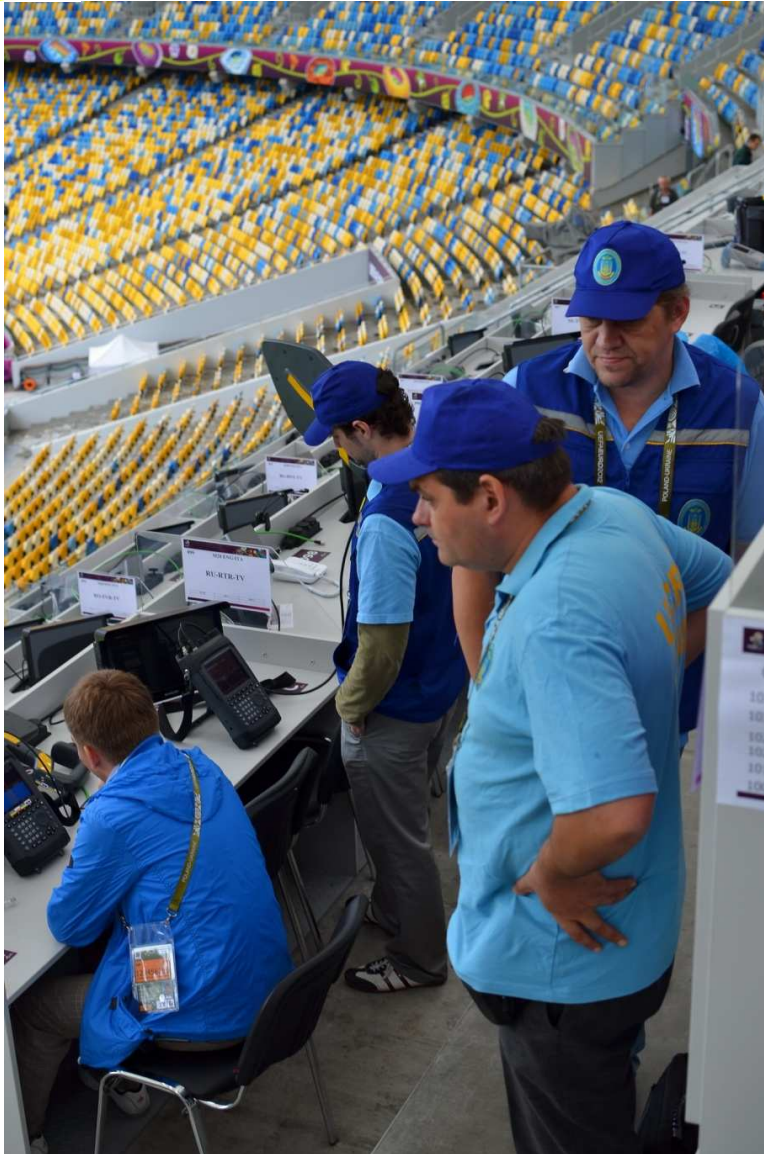
Metalist Stadium in Kharkiv



- 1) Mobile monitoring station - (group №1) – outer perimeter of stadium
- 2) Semi-fixed monitoring station (group № 2) – inside stadium’s cup
- 3) Walking monitoring group (group № 3) – inside stadium (top of cup)
- 4) Mobile monitoring station (group № 4) – outer perimeter of stadium
- 5) Mobile point of technical control № 1 (group № 5) – Media Center
- 6) Point of technical control № 2 (group № 6) – between outer and inside perimeters of stadium



Fixed monitoring station at Olympic Stadium in Kyiv





Walking monitoring group



- In case of interference, the walking monitoring groups were involved in determination and elimination of interference source within stadium or broadcasting compound





Monitoring stations at broadcasting compound





UCRF monitoring team at Olympic Stadium in Kyiv





Spectrum monitoring



- When using so many radio facilities in a small area, it is not possible to avoid harmful interference completely
- Summarizing the **interference cases**, they were caused by:
- operation of radio equipment with wrong or exceeding parameters with respect to authorized ones,
- illegal operation,
- faulty equipment programming,
- damaged cables
- Checking the stadia in the period of their construction was also important – UCRF radio monitoring specialists helped to avoid the potential interference due to unshielded cable laying





Spectrum monitoring



- More than **9000** radio electronic facilities were monitored at preparatory stage and during tournament in Ukraine
- UCRF space radio monitoring station performed a control of **59** earth satellite stations, operated by broadcasters within stadia and compounds areas
- Effective monitoring activity before event – **87** sources of interference eliminated on assigned frequencies
- In the period of EURO 2012 there were only **11** interference cases and **7** illegal operation cases, detected in Ukraine
- All cases required immediate response, so they were settled within the shortest possible time, which on practice varied from several minutes to two hours





Activities during EURO 2012



- The **UCRF telephone hotline** was in operation 2 weeks before EURO 2012 and during full period of event, including weekends, providing all necessary assistance and clarification to spectrum users
- 9:00 - 17:00 from Monday till Thursday
- 9:00 - 16:00 on Fridays
- 9:00 - 22:00 on MD-1
- 9:00 - 23:00 on MD
- For overall period a number of queries to hotline exceeded **700** calls





Specific tasks after event



Shortly after EURO 2012 the following **post-event works** were performed by the UCRF:

- staff and equipment removal from all stadiums
- finalizing the settlement of accounts by last minute applicants
- summarizing the statistics for frequency authorization, radio monitoring and interference cases
- overview of overall activity on debriefing meeting

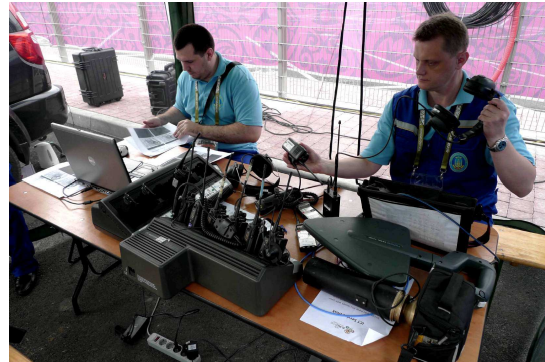




Conclusions



- In the case of such major events, like EURO 2012, having a numerous number of radio applications and equipment, operated at the same time within a limited area, it is possible to minimize interference by doing the most of works before event
- ITU-R Report SM.2257 contains the necessary guidelines and practical experience of other administrations, which may be essential for performing the proper planning and ensuring the successful activity of frequency management authority before, during and after the major events
- UCRF activities on frequency use planning, simplification of authorization procedure, technical check of radio equipment, spectrum monitoring, efficient interference elimination and close cooperation with UEFA ensured non-interference operation of radio-electronic facilities for EURO-2012





- **UEFA:** *“Only with the great commitment of experienced partners like the Ukrainian State Centre of Radio Frequencies, we were able to make this challenging UEFA EURO 2012™ a fantastic event leaving that we hope to be significant legacy in both host countries”*





Thank you for your attention! Any questions?

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