

**IARU Region 1 EMC Committee meeting
Vienna (Interim Meeting)
16th to 17th April 2016**

1. Opening of the meeting, Welcome, Roll Call (DL9KCE)

DL9KCE opened the meeting at 13.30 and welcomed members to the first ever meeting of the EMC permanent committee.

Members of the committee were asked to introduce themselves and give a brief overview of their background and also if they were involved with their national standards bodies (see attached attendance sheet.)

DL9KCE noted that it was good to see how many members had professional EMC experience, as well as having direct contact with their national regulators and standards bodies.

2. Changes during and after the Conference in Albena 2014 (DL9KCE)

At the IARU conference in Albena, it was voted that the EMC Working Group would be enhanced to a full committee. As a result the EMC Committee was formed as a permanent committee within IARU Region 1.

IARU R1 is now a full liaison member of EMC working party, TCAM, CENELEC TC210

- TCAM and EMC WP is observed by Seamus, EI8BP
- Cenelec TC210 - is observed by Thilo, DL9KCE

3. EMC Standardization

3a. Structure and Status Quo (DARC, DL9KCE, C7 09)

As this was the first meeting, Thilo presented paper C7 09 and gave an overview of how the standardisation process works in CISPR, CENELEC and ETSI.

IARU IS is an international member of CISPR with all rights, except for the ability to vote. IARU is represented on CISPR A, B, F, H and I. As yet we have no representation on CISPR D. IARU R1 is member of CENELEC (see above) and ETSI. Within ETSI IARU R1 also has voting rights.

In terms of ongoing standards work, DL9KCE will continue to advise National Societies on the approach for submitting comments to national standards committees.

ACTION DL9KCE

3b. Past, Ongoing and Future Standardization Projects (DARC, DL9KCE, C710)

DL9KCE presented paper C7 10

In the past, limits did little to protect the Amateur Service. Now with more broadband signals the problem has worsened and products are pushing the limits of standards.

Ongoing issues include:

- PLC (access < 30 MHz)
- PLC in home
- Photovoltaic (validation of limits)
- LED (validation of limits)
- Multimedia Equipment
- Wireless Power Transfer
- VDSL (potential to raise a new work item here)

Issues which will need monitoring In the future are:

- VDSL+ (G Fast)
- DC/DC converters
- Wind Turbines
- PLC intermodulation problems
- Power supplies

DL9KCE has been invited to participate in discussions on wind turbine issues.

3c. Electric Cars and Chargers (NRRL, LA9QL, C701, C702)

LA9QL presented papers C7 01 and C7 02

Paper C7 01 Electric Cars and Chargers

Norway has one of the highest numbers of electric cars in Europe. NRRL has carried out measurements to assess the interference generated from public chargers, in home chargers as well as interference generated by the cars themselves whilst being driven. Public chargers are mainly found in areas of high background noise.

- Significant EMC issues arose with both AC and DC charging
- Public charging is potentially a significant problem
- Problems also exist with chargers in the domestic environment.
- Driving behind cars did not seem to detect too much interference.

Chargers from different manufacturers generated different levels of interference, as did different cars. The bands most affected were 1.8 – 10MHz.

LA9QL mentioned that Norwegian Electricity network is an IT network (high impedance to earth), this differs from many networks in Europe.

EI6IZ, to make some measurements on his own Nissan Leaf, with advice and guidance from LA9QL.

ACTION EI6IZ, LA9QL

Paper C7 02 briefly discussed LA9QL's measurement methods and measurement antenna. DL9KCE asked about the K factor of the PAORTD antenna LA9QL had done some tests, which were not conclusive but design notes suggest K factor as 21dB. It is possible to convert from dBm to dBuV by adding 107.

It was also discussed to extend measurements in Norway including current probe measurements on the AC or DC cable between charger and car.

5d. Man-made noise measurement campaign (PA0JMG, C7 03)

This item was taken out of order since PA0JMG had also to present the same paper to the C4 working group later in a separate room.

PA0JMG presented paper C7 03 (refer to Conference paper where graphs showing measurement results are available)

VERON has carried out a comprehensive noise floor survey at 60 amateur stations located in 6 types of environments ranging from Quiet Rural to Residential 4 (large apartment buildings in cities including Amsterdam). It was noted that the ITU R 'Business' designation, was now designated as 'City'.

This programme of measurements was supported by the regulator. An official report will be produced soon.

The issue of coupling to nearby antennas and cables was raised. This had been taken into account in the calculations.

ITU R is doing its own noise floor measurements and is expected to report a drop in the noise floor. **National Societies are encouraged to do measurements.**

3d. Photovoltaic Installations threaten Ham Radio in the Netherlands (VERON, PA0JMG, C7 05)

PA0JMG presented paper C7 05

- Price and efficiency are the main things driving the market
- DC-DC converters (optimisers) do not currently have to meet any emissions standards if the DC lead length is under 30m (EN61000-6-3 and 4)
- PLC communications in use in some systems to provide communications between DC-DC converters and the system control system
- G4JKS handed out a summary of UK EMC measurements of emissions from solar PV installations
- Regulator takes no action in Netherlands.

G4JKS: Asked if national administrations considered Solar PV to be fixed installations. After a discussion, the majority view was that Solar PV installations are clearly fixed installation. The interpretation of what is a fixed installation will be defined in the EMCD Guide. EI8BP is on the working group considering the Guide. The definition is not clear enough in the draft Guide as it relates to Solar PV installations. G4JKS to contact EI8BP to push for him to try and get a clearer definition in the Guide.

ACTION G4JKS

VERON considers that advice is needed in Region 1 to help radio amateurs install and set up solar arrays.

Recommendation: “To develop and distribute an installation Guide for amateurs on how to set up/install and deal with PV installations”. After a discussion on possible IARU liability in relation to health & safety, it was decided to change the wording of the document to be produced to, ‘Solar PV EMC Guide’.

This was unanimously supported.

ACTION PA0JMG/DL9KCE

DL9KCE to contact the EMC officer for IARC in relation to engaging with a manufacturer of optimisers in Israel, with the aim of seeking improved EMC compliance of the product.

ACTION DL9KCE

3e. Standardisation and the role of Region 1 Member Societies (RSGB, G4JKS, C7 04)

A lot of discussion had already taken place in relation to standards and representation on standardisation bodies in 3a. Around two thirds of those societies present were involved in the standardization process. There was still a need to encourage others, so questions on this issue to be added to the Questionnaire being proposed to go to all Region 1 Societies.

Recommendations: To identify members to participate in the standardization process.
This to be done via the EMC Questionnaire

To build up a ‘virtual group’ to discuss & formulate a joint position on standards. This to be done via a ‘closed’ reflector dealing specifically with standards

It was thought that there was a need for two ‘closed’ reflectors, one for standards related issues and one for general EMC issues (threats to the spectrum).

ACTION DL9KCE

These recommendations were supported.

It was also decided that because EMC was a fast moving topic, C7 should meet by Skype on a monthly basis for one hour with specific agendas. Skype addresses to be collected and meetings set up. Doodle suggested as a possible scheduling tool (<http://doodle.com/>)

ACTION DL9KCE

3f. PLC and Intermodulation (DARC, DL9KCE, C7 13)

Work on this issue is being carried out under the TC210 working group established to look at ‘new issues in EMC’, this group is also looking at issues around devices and their degradation over time. The problem deals with one device in one position (the environment) but does not take into account the situation with multiple devices.

3g. Measurements on PLC Devices (DARC, DL8MCG, C7 14)

DL8MCG presented paper C7 14

- Tests had been carried out on 3 devices based on Homeplug standards
- Newer Homeplug based devices had poorer notch depth than older devices, QRM a problem.
- Sample was shown of a prototype compliant with EN 50561-1. Device showed

good notches, working dynamic notching and working dynamic power control. There is a need to ensure that in testing PLC devices, they are appropriately loaded with traffic. Some method of stress testing at IP layer is needed.

Brendan was asked to provide information about how to generate and measure test IP network traffic in a repeatable way using open source network testing software tools (iPerf)

ACTION- E161Z

Section 4 on EMF Regulation was moved to Sunday morning's session. The meeting continued with section 5.

5. Interference

5a. Action by national administrations in interference cases (RSGB, G4JKS, C7 06)

G4JKS presented paper C7 06:

UK has transposed the EMC directive into law and strictly imposed the terms of the Directive. There are many ways open to the regulator to deal with interference issues.

- Focus is on when apparatus is first placed on the market
- Fixed installations are subject to a different regime and UK does not consider Solar PV as a fixed installation
- Enforcement power for a wide range of apparatus is via the Wireless Telegraphy Act and this has just been changed (new act comes in force on 18th April 2016) and now includes enforcement against RFI from apparatus that is already in service.
- UK television licence allows regulator to take action against owners of TV sets that are causing interference.

There followed a long discussion on the way national administrations handled enforcement and the way amateurs were treated, by their regulator.

The discussion centered around three key issues,

1. Legal status of amateur radio and the protection of the Amateur Service
2. Whether the regulator has adequate staffing to deal with EMC issues
3. Whether the regulator has adequate understanding of amateur issues?

Individuals put forward the situation as they saw it in their countries, which can be summarised as follows:

In all countries the Amateur Service is a protected service

3 out of 10 respondents deemed staffing levels to be adequate

2 out of 10 respondents were satisfied with competence level.

There are issues around the ability of regulators to attract competent staff. Engineering seems to be attracting fewer youngsters. There needs to be a drive in schools to raise the profile of Engineering roles.

DL9KCE asked about individual states implementation of the EMC Directive.

Virtually all countries have implemented the EMC directive apart from Norway and Germany, which is awaiting a second draft, however enforcement levels vary.

5b. Interference Database of Signatures and Remedies (RSGB, G4JKS, C707)

G4JKS presented the paper (C7 07)

Many amateurs are aware they are suffering from interference but have difficulty identifying the source. As technology advances more and more interference is being generated. Amateurs need to be able to easily identify noise sources. One way of doing this is by providing sound clips or RFI signatures.

- RSGB RFI noise Measurements were circulated.
- RSGB produces leaflets to help its members. Leaflet 15 specifically deals with VDSL and how to identify that the interference comes from VDSL.
- We need to have a database of Interference signatures, available to all

The ability to notch VDSL in the amateur bands in other countries was discussed. DL9KCE stated that it is a requirement of the VDSL specification, that notching can be implemented on an 'as required' basis.

In Ireland notching was implemented locally at the Cabinet level to resolve the only VDSL interference case to date.

It was generally thought that sharing information on identifying interference sources and methods of solving them would be beneficial as a central resource where societies could upload their information sheets, sample files etc.

It was proposed that the IARU R1 EMC committee compile and implement a central resource in the form of a closed Wiki (viewable by all but editable by C7 members)

ACTION- DL9KCE/ DL8MCG

The CQDL article on VDSL to be translated into English and uploaded.
The DARC PV Advice Sheet to be translated into English and uploaded

ACTION DL9KCE/DL8MCG

The RSGB Leaflet 15 to be uploaded.

ACTION G4JKS

All national societies, which have useful leaflets, which would benefit the Region 1 amateurs, to translate them into English and upload them.

ACTION All C7 members

Publicise and promote this new facility via IARU R1 EMC website and society magazines.

5c. Helpful programmes on interference assessment (DARC, DL8MCG)

DL8MCG showed different methods of calculating the field strength and QRM potential from PLC and other interference sources.

This software is now available via the IARU R1 EMC web page

<http://iarur1.org/index.php/emc/1549emccommitteedatabase>

DARC also has a spreadsheet intended to help with assessing interference severity and tolerable background noise levels for different areas, this will be made available when work is complete

5d Man –made noise management campaign. This was taken earlier.

5e. Quantification survey/Analysis of EMC problems (DL9KCE/ G4JKS)

A Questionnaire to be drawn up to help provide information for a more in depth data -base of national societies involvement in EMC.

Action Item G4JKS/DL9KCE

5f. REF EMC Report dated on January 2016 (REF, F6FHV, C7 08)

F6FHV gave a report on the situation in France and identified the following as being of concern:-

- Wireless power transfer
- PLC as used in Smart metering 'LINKY' (domestic power meters)
- Photovoltaic switchers
- Ventilation controllers
- Digital controls for lift machinery

It was thought that information on the 'LINKY' smart metering system would be of interest to other amateurs in the region. F6FHV to write a piece for the website.

ACTION F6FHV

4. EMF Regulation (taken out of Agenda order)

4a. Report from ICNIRP Workshop (DARC, DL9KCE, C7 11)

Due to lack of time, a short overview of the changes in ICNIRP limits was given by DL9KCE

- EU 1999 recommendation is based on ICNIRP recommendations from 1998
- ICNIRP plans to rewrite the standard and are working on this now
- Limits not expected to be lowered, they may if anything increase
- Finalisation and publication is at least 5 years away.
- If EU adopts the revised ICNIRP document then we can expect EU changes approximately 2 years later
- General situation is not too bad except for Belgium where much lower limits than the ICNIRP levels were adopted.

4b. EMF regulation in Germany (DARC, DL9KCE, C712)

DL9KCE presented paper C7 12

- There were problems in the beginning when German amateurs had to do measurements. Amateurs can rent measurement equipment to check field strength.
- Now there are over 30,000 stations registered with the administration (for transmitters over 10 W EIRP)
- The limits were revised in 2013, less restrictive for amateurs with the removal of special limits for pacemaker patients.

- EMF database available to register emitters. Commercial entry compulsory and chargeable, amateur voluntary and free.
- Software by DL9KCE available on DARC website for carrying out compliance assessment and calculating safety distances
- Administration carried out 40 spot checks, 5 stations were initially found non compliant (4 of which were administration errors, one was non compliant)
- DL9KCE demonstrated the use of a software tool for compliance calculations (safety distances) and why it is helpful to take into account 3 dimensions when making compliance assessments.

4c. Discussion on local EMF regulations (all)

For most national societies EMF is not currently an issue, amateurs are expected to comply with ICNIRP limits but do not have to make any special declarations or official assessments. In Sweden EMF compliance work is the responsibility of the Swedish Radiation Safety Authority rather than the radio regulator and work is now ongoing within SSA

- Doing nothing is not an option
- Directive is now in law
- Particular issues for people operating from apartments with antennas on balconies
- Need to ensure amateurs are educated on EMF and how to assess compliance
- Need to Include questions on EMF in examinations
- Emotive language should be avoided when talking to public, never say danger or risk

DARC has done a lot of work on educating amateurs by providing software tools and holding seminars with radio club to help educate them on how to do the calculations. In Spain calculations are made on a 6 minute transmit interval however amateur radio has an extremely low duty cycle in the long term.

ICNIRP makes no distinction between a transmitter that runs 24/7 or a station that only transmits one hour a year.

The World Health Organisation and ICNIRP are very much together on this so it does not make sense to fight ICNIRP. The only thing we can do is to try and influence how they look at things, e.g. Low Duty Cycle.

6. Work in the Committee

6a. Review Terms of Reference of the C7 Committee

It was considered that no changes were needed at this stage.

6b How to improve efficiency

- It was felt that there was a need for better and more frequent communications between C7 Members. Acknowledgement of correspondence by members is important.
- Mailing lists to be kept up to date.
- Regular monthly Skype meetings and WIKI to keep members in touch
- Need to share information on issues, new problems and solutions.

7 Any other business

1. WIKI, Covered elsewhere and agreed.

2. LOAFR

- LOFAR is an EU wide very large baseline radio telescope project looking at 250MHz and lower.
- Antenna system distributed across Europe. Most are in Netherlands but also Germany, France, UK and Sweden. Low Frequency Array to be installed in Ireland.
- Possible area of common interest with regard to EMC matters

EI6IZ to get in touch with the Professor in charge of the Irish portion of the project to see if there are any areas of common interest with regard to EMC matters.

ACTION EI6IZ

3. LED Floodlights

DL8MCG presented a short paper

- Low cost LED Floodlights are a serious issue
- The Power supply is the problem.
- The mains, goes directly to the rectifier and there is no mains filtering.
- The low cost devices tested all failed to meet EMC standards by a large margin.
- They are CE marked but not with a valid CE mark.
- If bought directly by end-user from outside the EU (Ebay) the end-user becomes the 'importer'
- Results were shown from a slightly more expensive LED floodlight that passed, the difference being the use of a better PSU (filtered) and appropriate grounding.

In Sweden amateurs test devices and pass findings on to authorities, who will then impose sales bans, the problem is that if you buy directly from outside the EU then you are the importer.

In the Netherlands 50 LED lamps were tested, 10 were taken off the market immediately due to safety issues. Of the remainder, none fully complied with regulations but the manufacturer was given time to correct the problem.

Also in Sweden there is an old established mail order company that sells a range of equipment. They have their own EMC test lab to be able to check the things they sell. DL8MGC reported that a local village was due to replace the streetlights, so a colleague asked them to check the EMC conformity prior to the contract being decided.

8. Next meeting

To be confirmed, however it is hoped that a meeting will be arranged soon on SKYPE .
Doodle (www.doodle.com) could be used to help with scheduling.

ACTION DL9KCE

9. Closure of the meeting

Meeting ended at 12.40.