Radiocommunication Study Groups

Document 3L/TEMP/45-E
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English only

Chairman, Sub-Working Group 3L-1 & 3L-2

REPORT ON THE MEETING OF SUB-WORKING GROUP 3L-1 MF, LF AND LOWER FREQUENCY PROPAGATION & SUB-WORKING GROUP 3L-2 HF PROPAGATION

Geneva, 15-23 May 2019

1 General

The Sub-Working Party 3L-1 MF and LF propagation and the Sub-Working Group 3L-2 HF propagation were chaired by Eng. Angelo Canavitsas, from Brazilian Delegation.

Two meetings were held, one on May 16, 2019, covering SWG 3L-1 and SWG 3L-2 issues [Summary of the meeting described in section 4], and the second on May 20, 2019, which was the Draft Group that presented 3L-1 and 3L-2 documents [Summary of the meeting described in section 5].

A description of the work carried out at each of the mentioned meetings and the documents addressed to SWG 3L-1 and 3L-2 are presented in the following sections of this document.

2 Documentation within the scope of SWG 3L-1 and 3L-2

2.1 Questions

Question ITU-R	Title	Category	Approval date	Target date
202- 4/3*	Methods for predicting propagation over the surface of the Earth	S2	2007	2019
209-2/3	Variability and risk parameters in system performance analysis	S3	2012	2019
225-7/3	The prediction of propagation factors affecting systems at LF and MF including the use of digital modulation techniques	S3	2012	2019
229-3/3	Prediction of sky-wave propagation conditions, signal intensity, circuit performance and reliability at frequencies between approximately 1.6 and 30 MHz, in particular for systems using digital modulation techniques	S3	2012	2019
230-3/3	Prediction methods and models applicable to power line telecommunications systems	S2	2012	2019
212-3/3	Ionospheric properties	S3	2009	2019

* jointly with WP 3J

2.2 Recommendations

Recommendation ITU-R	Title	Approval date	Reference in RR*	Comments
P.368-9	Ground-wave propagation curves for frequencies between 10 kHz and 30 MHz	02/2007	Res. **612 (Rev.WRC-12)** *recognizing d)*	
P.371-8	Choice of indices for long-term ionospheric predictions	07/1999		
P.532-1	Ionospheric effects and operational considerations associated with artificial modification of the ionosphere and the radio-wave channel	03/1992		
P.533-13	Method for the prediction of the performance of HF circuits	07/2015	Res.**535 (Rev.WRC-03)** Annex	
P.534-5	Method for calculating sporadic E-field strength	02/2012		Q.211/3
P.842-5	Computation of reliability and compatibility of HF radio systems	09/2013	Res.**535 (Rev.WRC-03)** Annex	
P.843-1	Communication by meteor-burst propagation	08/1997		Q.221/3
P.845-3	HF field-strength measurement	08/1997		Former: Q.223/3
P.846-1	Measurements of ionospheric and related characteristics	10/1995		Q.222/3
P.1060-0	Propagation factors affecting frequency sharing in HF terrestrial systems	08/1994		Former: Q.219/3
P.1144-7	Guide to the application of the propagation methods of Radiocommunication Study Group 3	07/2015		WP3M leads
P.1148-1	Standardized procedure for comparing predicted and observed HF sky-wave signal intensities and the presentation of such comparisons	05/1997		Q.222/3
P.1239-3	ITU-R Reference ionospheric characteristics	02/2012		Q.212/3
P.1240-2	ITU-R methods of basic MUF, operational MUF, and ray-path prediction	07/2015		Q.212/3
P.1321-5	Propagation factors affecting systems using digital modulation techniques at LF and MF	07/2015		

2.3 Reports

Report ITU-R	Title	Approval date	Comments
P.2011-1	Propagation at frequencies above the basic MUF	01/1999	
P.2297-0	Electron density models and data for trans-ionospheric radio	07/2013	

2.4 Handbooks

Handbook	Title	Approval date
32	Ionosphere and its Effects on Radiowave Propagation	1998
59	Handbook on Ground-wave propagation	2014

2.5 Opinions

Opinion ITU-R	Title	Approval date
23-6	Observations needed to provide basic indices for ionospheric propagation	1999

3 Allocation of Contributions to SGW 3L-1 and SWG 3L-2

Doc. 3L/	Title	Source	Destination
[80] +Ann.1-11	Report on the meeting of Working Party 3L – Ionospheric Propagation and Radio Noise – Montreal, Canada, 21-28 June 2018	Chairman, WP 3L	ALL
[81]	Note from Chairman of Working Party 3J to the Chairmen of Working Parties of 3K, 3L and 3M – Review of the use of the terminology for "transmission loss"	Chairman, WP 3J	Plenary
[83]	Note to Chairman of Working Party 5B – Study on Resolution **763 (WRC-15)**, "Stations on board sub-orbital vehicles"	Chairman, WP 3L	Plenary
[85]	Reply liaison statement to Working Parties 3L and 7C – Ionospheric sounders used for space weather remote sensing	WP 5C	3L-2
[91]	Working document towards a preliminary draft new Recommendation ITU-R P.[DIGPROD] – Acquisition, presentation, analysis and use of digital products in studies of radiowave propagation	CG 3M-4	**3M-4**, ALL
[92]	Working document towards a fascicle defining working methods of Study Group 3 regarding integral vs. supplemental (example) data products	United States of America	**3M-4**, ALL
[98]	Discussion document – Report of researches on a regional HF radio propagation model in day-to-day time varying ionosphere	Japan	3L-2
[99]	Drafts for Study Group 3 description templates for digital data sets and computer programs and Study Group 3 computer programs – Requirements as referenced in working document towards a new draft Recommendation ITU-R P.[DIGPROD] "Acquisition, presentation, analysis and use of digital products in studies of radiowave propagation"	Austria, Belgium, Czech Technical University in Prague, Faculty of Electrical Engineering, European Space Agency	ALL

4 Report of the SWG 3L-1 & 3L-2 meeting – May 16, 2019

4.1 Organization and Allocation of WP 3L Contributions

The Sub-Working Party 3L-1 MF and LF propagation and the Sub-Working Party 3L-2 HF propagation had a meeting held on May 16, 2019 chaired by Eng. Angelo Canavitsas.

TABLE 1

Input Documents Considered by SWG 3L-1 and SGW 3L-2

Doc. 3L/	Title	Source	Destination
[80] +Ann.1-11	Report on the meeting of Working Party 3L – Ionospheric Propagation and Radio Noise – Montreal, Canada, 21-28 June 2018 – Annex 2	Chairman, WP 3L	Plenary
[82]	Liaison statement to Working Parties 3L and 5C – Ionospheric sounders used for space weather remote sensing	WP 7C	3L-2
[84]	Liaison statement to Working Parties 1A and 3L (copy to Working Parties 1B, 5B and 6A) – Comments on Report ITU-R SM.[WPT_100-148.5kHz]	WP 5A	3L-1
[85]	Reply liaison statement to Working Parties 3L and 7C – Ionospheric sounders used for space weather remote sensing	WP 5C	3L-2
[86]	Liaison statement to Working Parties 1C and 3L – Working document towards a preliminary draft new Report ITU-R M.[HF NOISE AT SEA]	WP 5B	3L-2
[91]	Working document towards a preliminary draft new Recommendation ITU-R P.[DIGPROD] – Acquisition, presentation, analysis and use of digital products in studies of radiowave propagation	CG 3M-4	3M-4, ALL
[92]	Working document towards a fascicle defining working methods of Study Group 3 regarding integral vs. supplemental (example) data products	United States of America	3M-4, ALL
[98]	Discussion document – Report of researches on a regional HF radio propagation model in day-to-day time varying ionosphere	Japan	3L-2
[99]	Drafts for Study Group 3 description templates for digital data sets and computer programs and Study Group 3 computer programs – Requirements as referenced in working document towards a new draft Recommendation ITU-R P.[DIGPROD] "Acquisition, presentation, analysis and use of digital products in studies of radiowave propagation"	Austria, Belgium, Czech Technical University in Prague, Faculty of Electrical Engineering, European Space Agency	ALL

4.2 Documents

4.2.1 Document 3L/80-E Annex 2 - Preliminary draft revision of Recommendation ITU-R P.684-7

The WP 3L 2018 Chairman's Report Annex 2 was presented. The document proposes a revision of ITU-R P. 684-7 - Prediction of field strength at frequencies below about 500 kHz. This study was presented last year in IUT SG 3 meeting hold in Montreal, Canada. The meeting has no objection to forward the document to be approved, nevertheless the WP 3L Chairman, ask for a new presentation, in a Draft Group, in order to follow the ITU procedures.

4.2.2 Document 3L/82-E - 1 October 2018 - Working Party 7C - LIAISON STATEMENT TO WORKING PARTIES 3L AND 5C - IONOSPHERIC SOUNDERS USED FOR SPACE WEATHER REMOTE SENSING

This document is a Liaison Statement from WP 7C - Remote sensing systems, it requests information about space weather remote sensing and ionospheric sounders used for High Frequency (HF) communications planning and propagation studies.

The main questions to answer are the following:

a) What are the characteristics of ionospheric sounder systems used for HF communications planning and propagation studies?

b) What is the applicable radio service(s) for the ionospheric sounders used for HF communications planning and propagation studies?

c) What are the ITU-R Recommendations or Reports that provide technical and operational characteristics for ionospheric sounder systems used for HF communications planning and propagation studies?

d) Is there any known overlap in stations used for HF communications planning and propagation studies and those stations used for space weather remote sensing, which are provided in the attached?

It was elaborated a Liaison Statement to WP 7C and WP 5C (copy) to be presented in a Draft Group meeting (DG 3L-1 and 3L-2), in order to discuss the propose and approve the document, following the adequate procedures.

4.2.3 Document 3L/57 – Liaison statement to Working Parties 3L, 5A, 5B and 6A – Working document towards a preliminary draft new Report ITU-R SM.[WPT_100-148.5kHz]

This document was produced in the last meeting of ITU SG 3 – WP 3L and deals with studies of wireless power transmission (WPT) for mobile device charging using non-beam inductive charging in the 100-148.5 kHz frequency range. In the liaison statement, WP 1A asked WP 3L to provide propagation models that would be applicable. SWG 3L-1 drafted a liaison reply and presented it to WP 3L as Document 1A/345. This potential interference issue was highlighted by the SWG 3L-1 Chairman, who asked Working Party 3L to encourage administrations to carry out specific studies in this area.

In this regard, the Brazilian delegation presented a report that shows electromagnetic compatibility measurements for the certification of wireless chargers for mobile phones. In this report are available measurements of the radioelectric spectrum with the central frequency of the charger operating at 111 kHz and the spurious emitted. There is also the relation of equipment and characteristics of the tests carried out in semi anechoic chamber.

The paper will be submitted next year as a contribution, since it is understood that useful information will be made available for the topic discussed.

4.2.4 Document 3L/85-E - 16 November 2018 - Working Party 5C - REPLY LIAISON STATEMENT TO WORKING PARTIES 3L AND 7C - Ionospheric sounders used for space weather remote sensing

The WP 5C shows, in this document, a review of the publications available related to the use of ionosondes in the fixed service (and the land mobile service, at frequencies of 30 MHz and less). In this Liaison Statement WP 5C also indicates some recommendations that provide guidance on adaptive HF system planning and operation using prediction methods.

4.2.5 Document 5B/TEMP/277-E - 13 November 2018 - Working Party 5B - (WG 5B-3) - WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW REPORT ITU-R M. [HF NOISE AT SEA]

The document was analysed by SWG 3L-3, nevertheless it was presented to the SWG 3L-1 and 3L-2, because there was useful information for HF propagation. The draft new report mentioned that during the recent decades, a proliferation of technologies such as computers, switch-mode power supplies, powerline telecommunications and photovoltaic installations, amongst others, can be observed.

The study mentions the categorization of noise according to Recommendation ITU-R P.372-13. ("Business", "Residential", "Rural" and "Quite rural") and informs that it was expected that the noise level at sea would be equal to the "Quite rural". The results of measurements show that the White Gaussian Noise - WGN in business and residential areas was even somewhat lower than in the measurements made on 1970s.

There is a section describing the noise measurement setup that was used at sea. The background noise measured at sea is substantially higher than expected. Considering the spirit of the Constitution of the ITU and of the RR, it may well be concluded that an increase of HF noise at sea by 15 to 20 dB is not acceptable and needs to be corrected.

4.2.6 Document 3L/91-E - 19 April 2019 - DRAFT RECOMMENDATION ITU-R P. [DIGPROD] - Acquisition, presentation, analysis and use of Digital Products in studies of radiowave propagation

The proposed document is a Recommendation that describes the digital products and the procedures for their acceptance and validation used by Study Group 3. This study is being conducted by SWG 3M-4, however probably it will be applied on SG 3, and there are important topics as "2.6 Type VI Ionospheric effects", "2.7 Type VII Ground Wave Propagation at lower frequencies" and "2.8 Type VIII Radio Noise" that affects directly the WP 3L.

4.2.7 Document 3L/92-E - 30 April 2019 - United States of America - WORKING DOCUMENT TOWARDS A FASCICLE DEFINING WORKING METHODS OF STUDY GROUP 3 REGARDING INTEGRAL VS. SUPPLEMENTAL (EXAMPLE) DATA PRODUCTS

This document was sent to all Working Party of Study Group 3 and it augments ITU-R Resolution 25-3 by providing suggested inputs towards a fascicle that defines the working methods of regarding SG 3 integral vs. supplemental software and data products. Here are some guidelines to follow, such as:

a) The software must be supplied with its source code and approved by SG 3.

b) If a software supplements a Recommendation, it must be made available on the ITU website.

c) In the event that software is required to automate a recommendation, it must be considered part of it and be approved by the same procedure.

Some cases are considered complex, in which the software has restrictions in its application, for example, only for scientific purposes.

Finally, the document conclude that some Study Group 3 recommendations do not comply with these guidelines, Study Group 3 should consider requesting a revision of the ITU Copyright Guidelines document to be consistent with Study Group 3 practice.

4.2.8 Document 3L/98-E - 9 May 2019 - DISCUSSION DOCUMENT - REPORT OF RESEARCHES ON A REGIONAL HF RADIO PROPAGATION MODEL IN DAY-TO-DAY TIME VARYING IONOSPHERE

The Japan delegation presented a radio propagation simulator, HF-START (HF Simulator Targeting for All-users' Regional Telecommunications), which is being developed mainly for Japan and Southeast Asia.

The system proposes a realistic simulation of local radio propagation, by reconstruction of 3-dimensional time-varying ionospheric density distribution from real observation. The reconstruction can be achieved by using observation data from vertical ionospheric sounding network.

The ionospheric propagation prediction tool proposed by Japan has great potential, although it is not yet available for general use. WP 3L encourages the Japanese Administration to continue these studies so that the tool is consistently made available, in the near future, for use in other areas.

4.2.9 Document 3L/99-E - 7 May 2019 - Austria, Belgium, Czech Technical University in Prague, European Space Agency - DRAFTS FOR SG 3 DESCRIPTION TEMPLATES FOR DIGITAL DATA SETS AND COMPUTER PROGRAMS AND SG 3 COMPUTER PROGRAMS - REQUIREMENTS AS REFERENCED IN WORKING DOCUMENT

This document shows the paths to be followed for the implementation of digital products in the ITU Recommendations. The work is based on new draft Recommendation ITU-R P.[DIGPROD] “Acquisition, presentation, analysis and use of Digital Products in studies of radiowave propagation” (Doc. 3J/213), which defines new directions for WPs.

In this context, some new procedures will have to be adopted, in the near future. It should be noted to WP 3L that the zipped file “SG3 Digital Data Sets” incorporated on document text has some forms dealing with areas of study of WP 3L, as:

a) Type VI - Ionospheric effects;

b) Type VII - Ground Wave Propagation at lower frequencies; and

c) Type VIII - Radio Noise.

The team working on WP 3L should be aware of these new modifications so that they are well understood and properly applied, in a near future.

4.3 Unfolding actions of the meeting

The documents mentioned in the previous section were presented and discussed at the SWG 3L-1 and 3L-2 meeting. As actions to be deployed, the following items were considered:

a) Annex 2 to Document 3L/80-E - 5 July 2018 - Annex 2 to Working Party 3L Chairman’s Report - PRELIMINARY DRAFT REVISION OF RECOMMENDATION ITU-R P.684-7.

Considering that the changes in Document 3L/80-E are editorial only, the document will be sent to the WP 3L Chairman Report, however, it was deemed necessary to present the document in a Draft Group 3L-1, so that the participants of the meeting have the opportunity to express their opinion and possibly send some suggestions.

b) Document 3L/82-E - 1 October 2018 - Working Party 7C - LIAISON STATEMENT TO WORKING PARTIES 3L AND 5C - IONOSPHERIC SOUNDERS USED FOR SPACE WEATHER REMOTE SENSING and Document 3L/85-E - 16 November 2018 - Working Party 5C - REPLY LIAISON STATEMENT TO WORKING PARTIES 3L AND 7C - Ionospheric sounders used for space weather remote sensing.

This topic deals with the 7C Liaison Statement (3L/82-E), sent to 3L and 5C, and the 5C Liaison Statement (3L/85-E), sent to 7C and 3L, responding the Document 3L/82-E.

The group was assigned the responsibility of issuing a Draft Liaison Statement for 7C and it was requested a meeting for Draft Group 3L-2, in order to permit that the proposal could be tabled and discussed. The Draft Group 3L-1 and 3L-2 meeting was scheduled for May 20, 2019.

5 Report of the DG 3L-1 & 3L-2 meeting – May 20, 2019

5.1 Actions of the DG 3L-1 and 3L-2 meeting

As agreed by SWG 3L-1 and 3L-2, the meeting of DG 3L-1 and 3L-2 was held to May, 20 2019, for the submission of the following documents:

a) Annex 2 to Document 3L/80-E - 5 July 2018 - Annex 2 to Working Party 3L Chairman's Report - PRELIMINARY DRAFT REVISION OF RECOMMENDATION ITU-R P.684-7.

b) Draft Liaison Statement to WP 7C to response Document 3L/82-E - 1 October 2018 - Working Party 7C - LIAISON STATEMENT TO WORKING PARTIES 3L AND 5C - IONOSPHERIC SOUNDERS USED FOR SPACE WEATHER REMOTE SENSING.

The Document 3L/80-E - 5 July 2018 (WP 3L Chairman Report Annex 2) was presented and opened for discussion. After the evaluation of this document has been agreed that it will be sent to the WP 3L Chairman Report.

The Draft Liaison Statement to WP 7C was also presented and opened for discussion. After minor editorial changes, it was agreed that the document will be sent as a Draft Liaison Statement to WP 7C proposal for WP 3L.

6 Assigned texts & Future works

6.1 Assigned texts

Sub-Working Group 3L-1 and 3L-2 reviewed its Questions, Opinions, Recommendations and Reports and made no proposals for change.

6.2 Future works

Brazilian delegation should submit a contribution to WP 3L, in the next year, on the certification method and tests of wireless power transmission (WPT) for mobile device charging. The intention is collaborating to electromagnetic compatibility measurements for the certification these kinds of devices.

The review of the performance of Recommendation ITU-R P.533 will be continued. To the extent possible, the associated programme ITURHFPROP will also be tested and reviewed.

7 Thanks

Sub-Working Party 3L-1 and 3L-2 wants to thank all the participants of the SWG / DG 3L-1 and 3L-2 meetings. The activities of the participants were active and greatly aided the development of the works.

Thanks also to the WP 3L Chairman for the confidence and opportunity to chair two important Sub-Working Groups of Working Party 3L - Ionospheric propagation and radio noise.

Finally, am grateful to our expert Counsellor for SG 3, who always acts in the improvement of the studies and reports presented.