



Radiocommunication Bureau (BR)

Administrative Circular
CACE/1151

8 August 2025

**To Administrations of Member States of the ITU, Radiocommunication Sector Members,
ITU-R Associates and ITU Academia**

Subject: **Call for administrations to encourage experts and scientists of academia and research institutions to participate and contribute to the work of ITU-R Study Group 3**

1 Introduction

At the meeting of Radiocommunication Advisory Group, held on 14-17 April 2025, the group advised the Director of the Radiocommunication Bureau to consider issuing a circular letter inviting administrations to encourage experts and scientists of Academia and research institutions to participate and contribute to the work of ITU-R Study Group 3 (see the summary of conclusions of the 32nd Radiocommunication Advisory Group meeting in Administrative Circular, [CA/277](#)). At that meeting the importance of ITU-R Study Group 3 Working Parties' work was recognized in the design of radiocommunication systems and the evaluation of interference between such systems, a fact that was further reinforced by the download statistics of ITU-R recommendations, for which the P-series remained consistently the most downloaded over a period of more than 15 years.

2 Purpose of this Circular Letter

The purpose of this Circular Letter is to invite all administrations of Member States and Radiocommunication Sector Members to encourage and facilitate research and academic institutions located in their countries in contributing to the Working Party activities in ITU-R Study Group 3.

The next meetings of ITU-R Working Parties 3J, 3K, 3L and 3M are planned for 15-25 June 2026, Geneva and that of ITU-R Study Group 3 on 26 June 2026. Participation in such meetings is possible both in-person and remotely. Contributions to those meetings should be submitted to the ITU-R Secretariat no later than 1600 UTC on 3 June 2026 at brsgd@itu.int.

3 Activities in ITU-R Study Group 3

At its meeting on 6 June 2025, ITU-R Study Group 3 decided to maintain its structure of four Working Parties, revised their terms of reference and elected their chairs and vice-chairs as provided in Annex 1. Progress on the work in ITU-R Study Group 3's Working Parties continues to rely extensively on advances in research and academic institutions, as well as on contributions from the membership, which are active in the discipline of radio-wave propagation prediction modelling.

Each Working Party maintains a work programme on topics for which such contributions would specifically be relevant as listed in Annex 2. Between the annual meetings of the Working Parties, work on specific items continue within correspondence groups established for that purpose. Lists of the active correspondence groups within each Working Party are provided in Annex 3.

ITU-R Study Group 3 maintains a databank of measurements of various phenomena relevant to the modelling of radio-wave propagation. Such measurements are of cardinal importance to develop models and validate their accuracy. Furthermore, such measurements should be representative of as many geographical regions and radio-climatic zones as possible. For this reason, measurements in frequency bands and from geographical regions which are not represented in ITU-R Study Group 3's databanks, especially from developing countries, particularly those in tropical and similar areas thus satisfying *aware a)* of Resolution **5 (Rev.WRC-23)** "Technical cooperation with the developing countries in the study of propagation in tropical and similar areas", would be of considerable value. Consequently, administrations with territories in such areas are specifically encouraged to contribute measurement results to the Working Parties of ITU-R Study Group 3 and support their propagation experts to participate in those Working Parties.

Many of the P-series recommendations contain complex algorithms and there was a significant effort over recent years to develop software implementations of those complex methods which are made freely available via the Study Group 3 software webpage (<https://www.itu.int/en/ITU-R/study-groups/rsg3/Pages/iono-tropo-spheric.aspx>). Software implementations of P-series recommendations are also welcomed.

Mario Maniewicz
Director

Annexes : 3

Annex 1

Organization of the work of ITU-R Study Group 3

Following consultation in accordance with sections A1.3.1.4, A1.3.1.4*bis* and A1.3.1.4*ter* of Resolution [ITU-R 1-9](#), ITU-R Study Group 3 decided at its meeting on 6 June 2025 that its structure shall continue to be organized in four Working Parties (WPs) with responsibilities, and chairs and vice-chairs as provided below.

1 [Working Party 3J](#) – Fundamentals of radio-wave propagation in non-ionized media

Working Party 3J is responsible for providing information and developing models describing the fundamental principles and mechanisms of radio-wave propagation in non-ionized media. Other Working Parties of Study Group 3 use those deliverables as the basis to develop radio-wave propagation prediction methods.

Chair: Dr Laurent CASTANET (F)

Vice-Chair: Mr Eric HILL (USA)

2 [Working Party 3K](#) – Radio-wave propagation prediction for point-to-area propagation paths

Working Party 3K is responsible for developing radio-wave propagation prediction methods for point-to-area paths associated with terrestrial and aeronautical stations in non-ionized media for frequency bands above 30 MHz.

Chair: Dr Hajime SUZUKI (AUS)

Vice-Chair: Dr Wataru YAMADA (J)

3 [Working Party 3L](#) – Ionospheric and ground-wave propagation prediction and radio noise

Working Party 3L is responsible for providing information and developing models describing the fundamental principles and mechanisms for radio-wave propagation in and through ionized media; and developing prediction methods for ground-wave propagation between terrestrial stations below 30 MHz and paths affected by the ionosphere. It also addresses the topic of radio noise arising from both natural and man-made sources and to quantify the levels of such noise.

Chair: Dr Angelo CANAVITSAS (B)

Vice-Chairs: Mr Adam HICKS (USA), Mr Seok-Hee BAE (KOR)

4 [Working Party 3M](#) – Radio-wave propagation prediction for point-to-point paths and paths between the Earth and space

Working Party 3M is responsible for developing radio-wave and optical propagation prediction methods for point-to-point paths associated with terrestrial, aeronautical, maritime and space stations above 30 MHz, as well as for Earth-to-space, space-to-Earth and space-to-space paths.

Chair: Dr Richard RUDD (G)

Vice-Chairs: Dr Leke LIN (CHN), Dr Reza AREFI (USA) and Dr Olga IASTREBTSOVA (RUS)

Annex 2

Topics of continued effort in ITU-R Study Group 3 Working Parties' work programmes

1 Working Party 3J – Fundamentals of radio-wave propagation in non-ionized media

The effects of clear atmosphere:

- Improved parameterization of radio-meteorological input variables is needed for low-angle propagation predictions resulting in improved impairment estimation, particularly multipath effects for propagation over sea and at high latitudes. Modelling of refractive fading at low path angles should be improved in addition to simplified methods to estimate gaseous attenuation on paths below 5°.
- Accurate estimation of the atmospheric refractive index and tropospheric excess path length (variability), need to be addressed and tested using new experimental tables of climatological parameters for which new data are required to assess the prediction error. Models need to be further developed involving the atmospheric radio refractive index and its effects on radio-wave propagation.
- The modelling of excess path length needs to be updated to reflect the use of new radio-meteorological data, which could be used to calculate model parameters (such as the average temperature of the water vapour column and others) on a monthly/daily basis.
- Review of the measurements of gaseous absorption lines for the full range of atmospheric parameters and different atmospheric conditions (troposphere and stratosphere) is needed to improve Recommendation [ITU-R P.676](#).
- Modelling of attenuation due to gaseous absorption and related effects for the design of Earth-space systems operating between 20 THz and 375 THz should be improved to revise Recommendation [ITU-R P.1621](#).

Effects of clouds and precipitation:

- Extend the statistical modelling for spatial and temporal variability of precipitation to improve Recommendation [ITU-R P.837](#). The accuracy of the log-normal model needs to be improved based on experimental observations in specific climates. Studies on these topics could lead to an improvement of the accuracy of the precipitation model of Recommendation ITU-R P.837.
- Improve the rain height model based on new consolidated data to investigate the relationship of the altitude of the 0-degree isotherm with clouds and precipitation.
- Data from ground microwave radiometers are needed to evaluate the modelling of attenuation due to clouds for effects between 20 and 375 THz. The relationship between the occurrence of clouds and precipitation needs to be investigated with the long-term objective of statistics of cloud liquid content conditioned to the presence of precipitation and clear air conditions.
- The assessment and characterization of the return period of extreme precipitation events are needed for system reliability analyses (e.g., for safety-of-life and mission-critical radio communication systems).
- Modelling of the total ice content in clouds and the microphysical properties of cloud and precipitation particles is required for atmospheric depolarization and attenuation.

- Data need to be processed on micro-physical properties of precipitation particles (e.g., disdrometer data) that should be expanded to include additional instruments and new experimental results.
- The characterisation of rain specific attenuation including the effects of multiple scattering of electromagnetic waves in precipitation in the 100-200 GHz frequency range with a possible extension to 1 000 GHz need to be improved using the statistical properties of drop size distribution characteristics of long-term experimental data.

Global mapping and statistical aspects:

- Maps of atmospheric parameters coming from recent high resolution numerical products were produced. Harmonization needs to be done for maps of parameters that have not been generated yet (rain height, refractivity, ice content, ...).
- The inter-month and inter-season variabilities (from one given month or season in a year to the same month or season in another year) of rain attenuation and rainfall rate, and the inter-annual variability of water vapour and cloud attenuation should be investigated.
- The time series synthesis, especially for non-GSO systems, should be further developed.

The effects of obstacles and vegetation:

- Due to the wide variety of vegetation and the difficulty of classifying it, experimental results and practical calculation methods for estimating the associated losses due to vegetation are required.
- The model for propagation over terrain needs improvement, particularly taking non-great-circle paths into account via reflection and scattering, including modelling the effect of terrain height variation transverse to the direction of propagation. There is also a growing need to estimate the statistics of losses resulting from urban and terrain modelling, requiring a three-dimensional approach and identifying what type of information best characterizes the respective environments.
- Measurement data such as broadcast coverage measurements are required to assist in determining how to take clutter loss into account in high-low terrestrial paths.
- There is a need for detailed information on the characteristics of diffuse scattering from building surfaces.
- Measurement data are required to develop models of the reflection coefficient of the various types of Earth surfaces for the range of frequencies employed by Earth exploration-satellite service (passive) and (active) sensors.
- Further improvements are required to radio-wave propagation modelling in lunar environments.

2 Working Party 3K – Radio-wave propagation prediction for point-to-area propagation paths

- Propagation models need to be further developed that could provide reliable basic transmission loss predictions for both terrestrial and air-ground paths, which include dense urban, urban, suburban and rural environments, taking into account the irregular nature of the terrain on the path, the “settled field” behaviour characteristic of over-rooftop propagation by diffraction in more densely built-up quasi smooth environments and the presence of terrain obstacles and earth bulge effects in less densely built-up or vegetated environments and on longer paths.

- These models should also provide for the time and location variability of the field strength/basic transmission loss on the path in a manner consistent with the terminals' heights, their respective environments and the path length and propagation mechanisms such as anomalous propagation, ducting and tropospheric scatter.
- Three-dimensional building and vegetation locations, footprints and heights information would need to be ubiquitously available in digital databases in formats that are suitable for extraction for radio-wave propagation applications for use in such models.
- Develop method(s) for extracting terrain and clutter profiles from digital terrain and surface models along a geodesic line between terminals, including software and validation data for this type of analysis.
- Extension of the applicable frequency ranges of the models is required to account for the increasing importance of multiple reflection and scattering processes, including hydrometeor scattering, along with gaseous absorption at frequencies above about 20 GHz.
- Improved building entry loss models are required for use in propagation models used in system planning and inter-system electromagnetic compatibility studies, in particular how building entry losses and losses due to clutter can be combined.
- Additional measurement data and modelling results are required to continue development of methods used for the planning of indoor and short-range outdoor radiocommunication systems and radio local area networks and terrestrial broadband radio access systems.
- Consideration of the full cumulative distribution functions, i.e., both the enhancement and fading sides of the median time variability is required in radio-wave propagation modelling development.
- Methods are required for simulating aggregated sources of interference with and without correlation.
- Further development is required of the prediction of the delay profile for broadband land mobile services using UHF and SHF bands, extending the application range to greater distances.
- Further improvements are required to propagation prediction methods for assessment of the impact of ultra-wideband devices.
- Diversity techniques (space, polarization, antenna sector and frequency) should be considered in the short-range scenarios. Diversity techniques and information on angle of arrival are useful for the development of systems such as multiple input/multiple output (MIMO).

3 Working Party 3L – Ionospheric and ground-wave propagation prediction and radio noise

- Improvements are required to the model for the prediction of field strength at frequencies below about 150 kHz.
- Further measurements are required to verify and improve the performance of the method for the prediction of the performance of HF circuits.
- Radio-navigation techniques need to be further developed to retrieve ionospheric parameters.
- Data are required for the further development and validation of models describing scintillation due to the ionosphere.
- Collaborative work is needed to develop a low-cost measurement system to capture radio noise globally and to share and harmonize radio noise measurement reduction techniques.

4 Working Party 3M – Radio-wave propagation prediction for point-to-point paths and paths between the Earth and space

Terrestrial point-to-point paths

- Models need to be developed and tested for the prediction of attenuation due to rain on short paths for backhaul and fronthaul links for base stations at millimetre wave frequencies.
- Measurements of attenuation due to rain on very short terrestrial line-of-sight paths are required. Such measurements should use one-minute integration time for the measurement of coincident attenuation and rain rate and should be corrected to eliminate wet antenna effects.
- Long-term measurement data are required to develop prediction models for line-of-sight (LOS) MIMO links.
- Measurements of attenuation due to specular reflection and diffraction are required to develop prediction methods for short LOS and non-LOS paths for systems operating at millimetre-wave frequencies providing gigabit capacities for base station sites in cities.
- Long-term measurements are required for comparison with historical statistics, to allow the potential impact of systematic climate change on the accuracy of current prediction methods to be evaluated.
- Measurements are required, and a prediction method needs to be developed for the outage intensity caused by precipitation and clear air fading affecting unavailability and error performance of terrestrial links.
- Measurements of scintillation on terrestrial paths are required and should be used to separate the effects of clear-air scintillation and scintillation associated with rain events.
- Measurements are required and analysed to develop physical global models for the prediction of fade dynamics including duration, diurnal variation, and short-term multipath fading and rain attenuation. The dynamic characteristics include the number of fades in precipitation and multipath conditions, and the duration of fade and inter-fade periods with further consideration of diurnal variation due to multipath over periods of a few days.
- Detailed visibility and scintillation measured data, as well as precipitation sorted into rain, wet and dry snow are required to improve the prediction models for the design of links in the 275-1 000 GHz range and free space optics links.
- Measurement data are required for dual polarized systems to model outage prediction for systems using space and frequency diversity protection and to investigate the outage and refine the prediction method to take diversity protection into account.
- A method is to be developed to include a worst-month annual conversion for troposcatter modelling in trans-horizon radio relay systems.

Earth-space paths

- Further studies and experimental data are needed to propose a procedure to calculate the probability density function of rain attenuation and total attenuation for Earth-space paths and to extend and test models of radio-wave propagation impairments at frequencies up to at least 100 GHz at higher time percentages resulting from multiple, simultaneous propagation impairments, such as rain attenuation, cloud attenuation, gaseous absorption, melting layer attenuation and tropospheric scintillation. The frequency, elevation angle, and polarization scaling methods, in particular, rain attenuation and cross-polarization effects need to be reconsidered and the use of the total impairment prediction methods for monthly predictions should be evaluated, particularly at low and high latitudes.

- Prediction methods for propagation impairment due to tropospheric effects (scintillation and multipath fading, rain, clouds, water vapour, etc.) on Earth-space paths at low elevation angles ($<5^\circ$) need to be improved for satellite communication systems at high latitudes and non-GSO systems such as Earth observation data downlinks, communications with aircraft and mega-constellations.
- Measurement data are required to support the development and testing of time diversity prediction methods. Further improvement is required for modelling the dependence of fade dynamics on climate and elevation angle for fade slope prediction. Modelling of inter-fade duration also needs to be improved noting its importance not only for GSO systems, but also for non-GSO systems in the fixed-satellite service (FSS), where the satellite motion affects the dynamic characteristics.
- The prediction method of site diversity needs to be further developed to predict statistics of joint attenuation on multiple sites over wide ranges of distances. The model for the prediction of differential rain attenuation also needs improvement and a new method is required to predict spatial correlations for satellite diversity, in particular for Earth-space links with multiple satellites. Propagation campaigns with non-GSO satellites are needed to validate and improve those models. The global spatial correlation function and the potential development of regional or local spatial correlation functions at small, mid and large scales also need validation.
- Experimental data are needed to revise the prediction methods for Earth-space free-space optical communication systems and a model for the prediction of attenuation due to aerosols needs to be developed. Further studies are required on the prediction of attenuation due to rain as multiple scattering effects were likely to be considered for frequencies higher than 300 GHz and especially in the optical domain.
- There is a need to extend the applicability of existing propagation prediction models for systems in the mobile-satellite service (MSS) and FSS specifically for the modelling of satellite diversity and the statistical model for mixed propagation conditions as well as the requirements of global navigation-satellite systems (GNSS).
- Propagation measurements are needed to improve the prediction methods for attenuation due to clouds and tropospheric scintillation on paths between an airborne platform and either the surface of the Earth or space.

Interference paths

- Long-term propagation measurements are required to extend the model for interference calculation on terrestrial paths to cover the frequency range up to 105 GHz.
- The sensitivity of prediction results to the resolution of the path profile step (prediction resolution) needs to be explored, with the aim of developing proposals for more consistent performance across all prediction resolutions.
- A more quantitative categorization of clutter needs to be developed and there is a continuing need to evaluate the potential benefit of the direct use of surface height data within current propagation models. Optimal methods for choosing terrain and clutter profiles for given terrain elevation and clutter databases (including methods for interpolation/combination of terrain and clutter profiles) need to be investigated.
- The troposcatter basic transmission loss prediction method needs to be improved and tested to include the full range of parameters and all scenarios to cover the full validity range of propagation prediction methods where it is used.
- A suitable method is required and needs to be tested to account for the partial correlation of attenuation due to gaseous absorption and tropospheric scintillation for basic

transmission losses not exceeded for small percentages of time, that are less than 20%, and typically 1% and less.

- Long-term measurement data relating to bistatic rain-scatter at frequencies up to 105 GHz are required for the validation of terrestrial interference paths models.

Application of machine learning

- In the application of machine learning on radio-wave propagation prediction the following items need to be addressed:
 - understanding how machine learning techniques/tools can be used for developing radio-wave propagation prediction methods;
 - establishing the procedures to ensure that a propagation model developed using machine learning algorithms can be generalized and be representative of all the possible conditions, in particular those not considered in the dataset used to develop the model;
 - using machine learning in conjunction with physical and statistical propagation models to test and validate the representativeness of machine learning models within the bounds of current physical knowledge.
- There is a need to review and develop machine learning algorithms and frameworks so that it can be used for:
 - the development and the improvement of radio-wave propagation models able to cope with complex scenarios and environments;
 - analysing and processing propagation data to generate insights and inputs for ongoing studies;
 - analysing empirical data in order to improve parameters in current propagation models.

Annex 3

Active correspondence groups maintained in ITU-R Study Group 3's Working Parties

Correspondence groups in Working Party 3J			
Group	Title	Chair/Co-Chairs	
CG 3J-1	Gaseous attenuation in Recommendation ITU-R P.676	Erik Hill (USA)	Antonio Martellucci (ESA)
CG 3J-2	Modelling of spatial and temporal variability of precipitation	Arsim Kelmendi (F)	Antonio Martellucci (ESA)
CG 3J-3	Time series synthesisers	Laurent Castanet (F)	Carlo Riva (I)
CG 3J-4	Statistical issues for testing and testing metric definition	Laurent Castanet (F)	Antonio Martellucci (ESA)
CG 3J-3M-5	Effect of clouds and precipitation on attenuation and depolarization on slant paths	Antonio Martellucci (ESA)	Leke Lin (CHN)
CG 3J-3K-3M-8	Building entry loss	Richard Rudd (G)	–
CG 3J-10	Coordination of Working Party 3J	Carlo Riva (I)	–
CG 3J-11	Reference standard atmospheres in Recommendation ITU-R P.835	Erik Hill (USA)	–
CG 3J-3M-13	Validation examples	Luis Emiliani (LUX)	–
CG 3J-3K-3M-14	Study issues relating to the HAPS propagation model	Hajime Suzuki (AUS)	–
CG 3J-3K-3M-16	The atmospheric radio refractive index and its effects on radio-wave propagation	Antonio Martellucci (ESA)	Leke Lin (CHN)
CG 3J-17	Modelling of Earth or other planetary surfaces bistatic scattering	Paolo de Matthaeis (IEEE)	Ryan McDonough (USA)
CG 3J-23	General path modelling of slant path terrain diffraction	Bolun Guo (CHN)	–
CG 3J-26	Modelling lunar radio-wave propagation	Erik Hill (USA)	–
CG 3J-3K-3L-3M-27	Machine learning for propagation studies	Zubeir Bocus (G)	–

Correspondence groups in Working Party 3K			
Group	Title	Chair/Co-Chairs	
CG 3K-1	Testing of Recommendation ITU-R P.1812	Alakananda Paul (USA)	–
CG 3K-2	ITU-R SG3 databank on measurements for Table VI-1 (Terrestrial Point-to-area data)	Richard Rudd (G)	–
CG 3K-4	Issues relating to Recommendation ITU-R P.1546	Richard Rudd (G)	–
CG 3K-5	Issues relating to Recommendation ITU-R P.1411	Sana Salous (G)	–
CG 3K-6	Propagation models and characteristics for higher frequencies	Juyul Lee (KOR)	–
CG 3J-3K-3M-8	Building entry loss	Richard Rudd (G)	–
CG 3K-3M-9	Propagation of radio-waves along aeronautical paths	William Kozma (USA)	–
CG 3K-3M-12	Prediction of clutter loss up to 105 GHz	Clare Allen (G)	Reza Arefi (Apple)
CG 3J-3K-3M-14	Study issues relating to the HAPS propagation model	Hajime Suzuki (AUS)	–
CG 3J-3K-3M-16	The atmospheric radio refractive index and its effects on radio-wave propagation	Antonio Martellucci (ESA)	Leke Lin (CHN)
CG 3K-3M-18	Study specific issues common to Recommendations ITU R P.452 , ITU-R P.1812 and ITU-R P.2001	Ivica Stevanovic (SUI)	–
CG 3K-21	Prediction model of the effect of human body shadowing	Sana Salous (G)	–
CG 3K-24	Estimation model of line-of-sight probability	Jelena Senic (USA)	–
CG 3J-3K-3L-3M-27	Machine learning for propagation studies	Zubeir Bocus (G)	–

Correspondence groups in Working Party 3L			
Group	Title	Chair/Co-Chairs	
CG 3L-2	Handbook 32 on Ionosphere and its effects on radio-wave propagation	Adam Hicks (USA)	–
CG 3L-5	Radionavigation techniques to retrieve Ionospheric parameters	Raül Orús-Pérez (ESA)	Mamoru Ishii (J)
CG 3L-6	Ionospheric scintillation model	Raül Orús-Pérez (ESA)	–
CG 3L-7	Radio noise	Erik Hill (USA)	–
CG 3L-20	Recommendation ITU-R P.684-8 – Prediction of field strength at frequencies below about 150 kHz	Adam Hicks (USA)	–
CG 3J-3K-3L-3M-27	Machine learning for propagation studies	Zubeir Bocus (G)	–

Correspondence groups in Working Party 3M			
Group	Title	Chair/Co-Chairs	
CG 3M-2	Status of the DBSG3 databanks	Antonio Martellucci (ESA)	–
CG 3M-4	Activities for software products, digital maps and reference numerical data	Thomas PrechtI (AUT)	Raül Orús-Pérez (ESA)
CG 3J-3M-5	Effect of clouds and precipitation on attenuation and depolarization on slant paths	Antonio Martellucci (ESA)	Leke Lin (CHN)
CG 3M-8	Earth-to-space Path Communications Handbook	Luis Emiliani (LUX)	Richard Rudd (G)
CG 3J-3K-3M-8	Building entry loss	Richard Rudd (G)	–
CG 3K-3M-9	Propagation of radio-waves along aeronautical paths	William Kozma (USA)	–
CG 3M-10	Development of the hydrometeor scatter model in Recommendation ITU-R P.452	Ryan McDonough (USA)	–
CG 3K-3M-12	Prediction of clutter loss up to 105 GHz	Clare Allen (G)	Reza Arefi (Apple)
CG 3J-3M-13	Validation examples	Luis Emiliani (LUX)	–
CG 3J-3K-3M-14	Study issues relating to the HAPS propagation model	Hajime Suzuki (AUS)	–
CG 3M-15	Improvement of rain and total attenuation models in Recommendation ITU-R P.618	Laurent Castanet (F)	–
G 3J-3K-3M-16	The atmospheric radio refractive index and its effects on radio-wave propagation	Antonio Martellucci (ESA)	Leke Lin (CHN)
CG 3K-3M-18	Study specific issues common to Recommendations ITU-R P.452, ITU-R P.1812, or ITU-R P.2001	Ivica Stevanovic (SUI)	–
CG 3M-22	Investigation of rain attenuation measurements indicating path reduction factors exceeding unity on short paths	Lorenzo Luini (I)	–
CG 3M-25	Update of Handbook 58 ITU-R propagation prediction methods for interference and sharing studies	Ryan McDonough (USA)	–
CG 3J-3K-3L-3M-27	Machine learning for propagation studies	Zubeir Bocus (G)	–