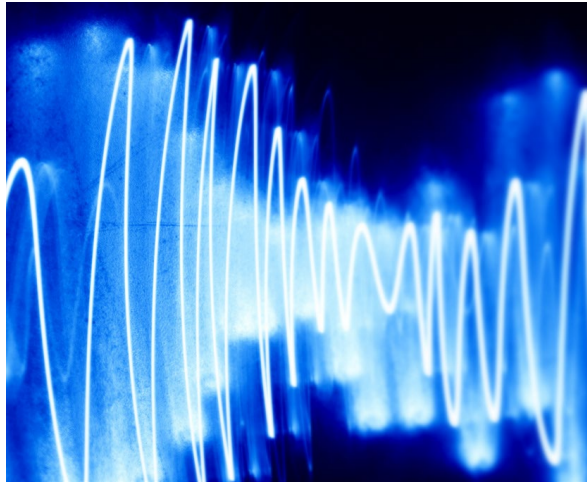


ITUWRS
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29TH WORLD RADIOCOMMUNICATION SEMINAR
30 November - 11 December 2020

ITU-R Study Group 1 on-going activities on **Spectrum Management**

Webpage

www.itu.int/ITU-R/go/rsg1

Wael SAYED

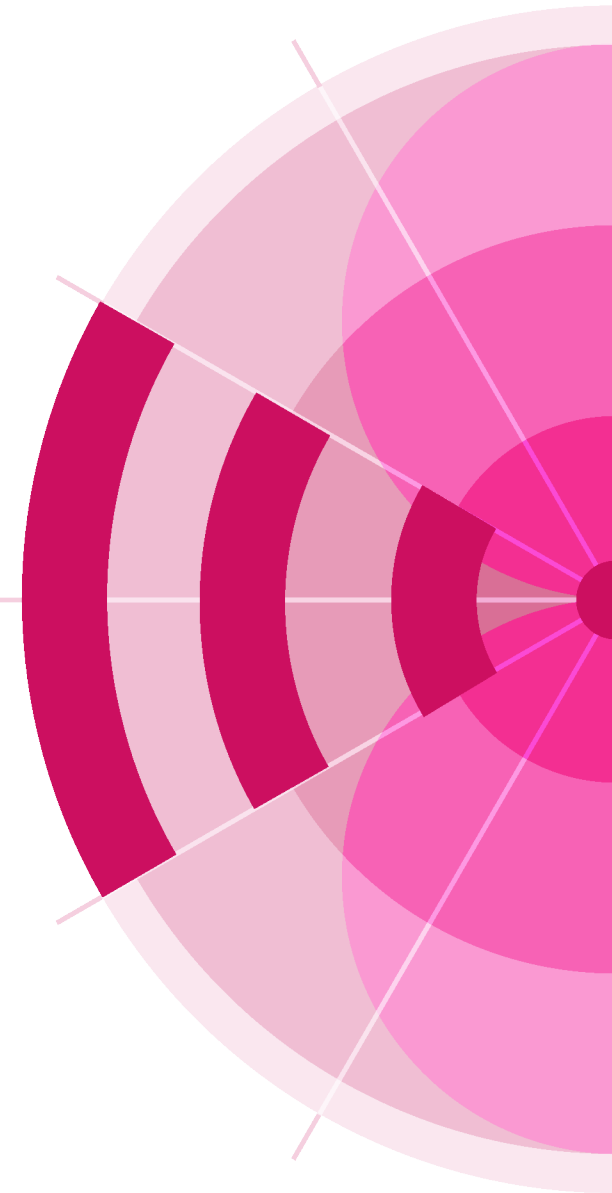
Chairman, ITU-R Study Group 1

Philippe AUBINEAU

ITU-R SG1 Counsellor

www.itu.int/go/wrs-20

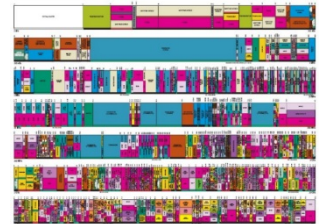
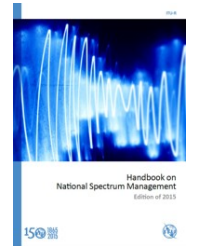
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Study Group 1

Spectrum Management

- Spectrum management-principles & techniques
- Spectrum monitoring
- General principles of sharing
- Long-term strategies for spectrum utilization
- Economic approaches to national spectrum management
- Automated techniques and assistance to developing countries (ITU-D)



SG 1 & WPs Chairmen & Vice-Chairmen

Study Group 1 – Spectrum Management (details [online](#))

Chairman: Mr W. SAYED *

Egypt (Arab Rep. of)

* *New since RA-19 (see [Res. ITU-R 4-8](#))*

Vice-Chairmen:

Mr M. AYOUB *

Lebanon

Mr G. ABDULLAYEV*

Azerbaijan (Rep. of)

Mr. A.W. AHMED*

Iraq (Rep. of)

Mr J.A. AL MAHRUQI

Oman (Sultanate of)

Mr G. CHAND*

India (Rep. of)

Mr S. COULIBALY*

Mali (Rep. of)

Mr R. GARCIA DE SOUZA*

Brazil (Federative Rep. of)

Mr M. HAJI *

Kenya (Republic of)

Mr T.H. LE

Viet Nam (Socialist Rep. of)

Vice-Chairmen:

Dr I.-K. LEE

Korea (Rep. of)

Mr A. NALBANDIAN*

Armenia (Rep. of)

Dr G. OWEN

Netherlands (Kingdom of the)

Dr A. SCOTTI

Italy

Ms B. SYKES

United States of America

Ms. T. SUKHODOLSKAIA*

Russian Federation

Mr. Z. ZHAO*

China (People's Rep. of)

Mrs S. ZAIRI*

Morocco (Kingdom of)

Working Party 1A – Spectrum engineering techniques (details [online](#))

Chairman: Mr R. GARCIA DE SOUZA

Brazil (Federative Rep. of)

Vice-Chairman: Dr G. OWEN

Netherlands (Kingdom of the)

Working Party 1B – Spectrum management methodologies and economic strategies (details [online](#))

Chairman: Mr L. KIBET BORUETT

Kenya (Rep. of)

Vice-Chairman: Mr B. LIU

China (People's Rep. of)

Working Party 1C – Spectrum monitoring (details [online](#))

Chairman: Mr R. TRAUTMANN

Germany (Federal Rep. of)

Vice-Chairman: Mr M. AL-SAWAFI

Oman (Sultanate of)

ITU-R publications (Question, Rec., Rep., HB, Res., etc.*) on Spectrum Management (SM series) assigned to SG 1 Working Parties

✓ **93** ITU-R Rec. and **56** ITU-R Reports in force on:

* See Doc 1/1, including lists of ITU-R Questions, Recommendations, Reports, Handbooks, Resolutions, Opinions, Decisions W(A)RC Resolutions and Recommendations

WP 1A ➤ unwanted emissions, freq. tolerance, technical aspects of sharing, computer programs, technical definitions, etc.

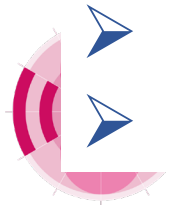
WP 1B ➤ economic strategies, regulatory framework, methodology, national organization, flexible allocations, planning, etc.

WP 1C ➤ techniques for observing the use of the spectrum, measurements techniques, inspection of radio stations, identification of emissions and location of interference sources, etc.

✓ **3** ITU-R Handbooks (on NSM, Spectrum Monitoring and on CAT)

ITU-R SG 1 collaboration with other sectors and organizations

- Other ITU Sectors: ITU-T (Res. ITU-R 6-3) and ITU-D (Res. ITU-R 7-4)
- Other relevant organizations, incl. ISO, IEC & **CISPR** (Res. ITU-R 9-6)



RA Resolutions of interest to SG 1

Res. ITU-R	Title	WP
11-5	Further development of the SM system for developing countries	1A
22-5 *	Improvement of national radio SM practices and techniques	1B
23-3	Extension of the international monitoring system to a worldwide scale	1C
54-3 *	Studies to achieve harmonization for short-range devices	1B **
55-3 *	ITU studies of disaster prediction, detection, mitigation and relief	1B, 1C
58-2 *	Studies on the implementation and use of cognitive radio systems	1A, 1B, [1C]
59-2 *	Studies on availability of frequency bands for worldwide and/or regional harmonization and conditions for their use by terrestrial electronic news gathering systems	1B
60-2 *	Reduction of energy consumption for environmental protection and mitigating climate change by use of ICT/radiocommunication technologies and systems	1B
61-2 *	ITU-R's contribution in implementing the outcomes of the World Summit on the Information Society and the 2030 Agenda for Sustainable Development	1A, 1B
62-2 *	Studies related to testing for conformance with ITU-R Recommendations and interoperability of radiocommunication equipment and systems	1B
64	Guidelines for the management of unauthorized operation of earth station terminals	1B, 1C
66-1 *	Studies related to wireless systems and applications for the development of the Internet of Things (IoT)	1A, 1B
67-1 *	Telecommunication/ICT accessibility for persons with disabilities and persons with specific needs	All 3

ITU-R Questions within SG 1

Question ITU-R	Title	WP
<u>205-2/1</u>	Long-term strategies for spectrum utilization	1B
<u>208-1/1</u>	Alternative methods of national spectrum management	1B
<u>210-3/1</u>	Wireless power transmission (WPT)	1A *
<u>216-1/1</u>	Spectrum redeployment as a method of national spectrum management	1B
<u>221-2/1</u>	Compatibility between radiocommunication systems and high data telecommunication systems using wired electrical power supply	1A
<u>222/1</u>	Definition of the spectral properties of transmitter emissions	1A
<u>232/1</u>	Methods and techniques used in space radio monitoring	1C
<u>235/1</u>	Spectrum monitoring evolution	1C
<u>236/1</u>	Impact on radiocommunication systems from wireless & wired data transmission technologies used for the support of power grid management systems	1A
<u>237/1</u>	Technical and operational characteristics of the active services operating in the range 275-1 000 GHz	1A
<u>238/1</u>	Characteristics for use of visible light for broadband communications	1A
<u>239/1</u>	Electromagnetic field measurements to assess human exposure	1C
<u>240/1</u>	Assessment of spectrum efficiency and economic value	1B
<u>241/1</u>	Methodologies for assessing or predicting spectrum availability	1B



WP 1B studies on new Question ITU-R 241/1

✓ **Methodologies for assessing or predicting spectrum availability** (approved in August 2019)

- ✓ **Larger and more complex SM data** in the viewpoint of data science
- ✓ May **require advanced data analysis methods** including **machine learning**

➤ **Criteria and information?**

➤ **Methodologies?**

➤ **Technical approaches, such as data-driven management, etc., that may improve overall spectrum utilization?**



Main topics under study within WP 1A

- Smart grids and smart metering (**revision of Report ITU-R SM.2351**)
- Multiple input multiple output operation in PLT (**new ITU-R Report**)
- Evaluation of radiated electromagnetic disturbances of household appliances and their interferences over an IoT network (**new ITU-R Report**)
- Wireless power transmission (WPT) (**Rev. of Question ITU-R 210-3/1**)(**new ITU-R Report**) (**revision of Report ITU-R SM.2392-0**)(**2 new ITU-R Recommendations**)
- Reducing the constraints of current radio frequency delivery mechanisms using optical wireless communication (**new ITU-R Recommendation**)
- Technology trends of active services in the frequency range 275-3 000 GHz (**revision of Report ITU-R SM.2352-0**)

Main topics under study within WP 1B

- Frequency ranges for global or regional harmonization of short-range devices (**Revision of Recommendation ITU-R SM.1896-1**)
- Assessment of spectrum efficiency and economic value (**new ITU-R Report**)
- Spectrum management principles, challenges and issues related to dynamic access to frequency bands by means of radio systems employing cognitive capabilities (**Revision of Report ITU-R SM.2405**)
- Methodologies for assessing or predicting spectrum availability under (**Question 241/1**)
- Act as a contributing group in WRC-23 Ai 1.1 – 9.1(a) – 9.1(c)

Main topics under study within WP 1C

- Test procedure for measuring monitoring system field strength measurement accuracy in the VHF/UHF frequency range **(new ITU-R Recommendation)**
- Test procedure for measuring geolocation accuracy of TDOA emitter location systems **(new ITU-R Recommendation)**
- Performance evaluation of mobile DF units in operational environment **(new ITU-R Recommendation)**
- Use of unmanned aerial vehicles for spectrum monitoring and measurements **(new ITU-R Report)**
- Essential requirements for a spectrum monitoring system for developing countries **(Revision of Recommendation ITU-R SM.1392-2)**
- Use of small satellites for Spectrum Monitoring **(new ITU-R Report)**

Thank you for your attention

wsayed@tra.gov.eg

ITU-R SG1 Chairman

philippe.aubineau@itu.int

Counsellor for ITU-R SG1 & CPM

ITU-R Study Groups: www.itu.int/ITU-R/go/rsg

Email: brsgd@itu.int

ITU-R Study Group 1: www.itu.int/ITU-R/go/rsg1

ITU – Radiocommunication Bureau

Questions to rsg1@itu.int

Additional slides on

- **ITU-R Recommendations & Reports approved in 2019**
- **Further details on the on-going studies**

SG 1/WPs Reports from previous meetings

	May-June 2019 meetings
WP 1A Chairman's Report	Document 1A/454 *
WP 1B Chairman's Report	Document 1B/380 *
WP 1C Chairman's Report	Document 1C/226 *
SG 1 Summary Record	Document 1/226 *

Texts (Questions, Rec., Rep., Res., HB) **assigned to SG 1/WPs:**
see latest version of [Doc. 1/1](#) at: <http://www.itu.int/md/R19-SG01-C-0001/en>

SG 1 block of meetings

- ✓ **Recent virtual meetings from 24 November to 3 December 2020 (all WPs and SG 1)**
- ✓ **Planned meetings from 25 May to 3 June 2021 (all WPs and SG 1)**
(to be confirmed by ITU BR Administrative Circular and Circular Letters in early 2021)

WP 1A approved publications after May-June 2019 (1/2)

✓ on **WPT non-beam** in response to Question ITU-R 210-3/1

- Recommendation ITU-R [SM.2110-1](#) – **Guidance on frequency ranges for operation of non-beam WPT for electric vehicles** (Approved in Oct. 2019)
- **New** Report ITU-R [SM.2449-0](#) (ex.[WPT_100-148.5kHz]) – **Technical characteristics and impact analyses of non-beam inductive WPT for mobile and portable devices on radiocommunication services** (Approved in Jun. 2019)
- Recommendation ITU-R [SM.2129-0](#) (ex.[WPT_MOBILE]) - **Guidance on frequency ranges for operation of non-beam WPT systems for mobile and portable devices** (Approved in Aug. 2019)

✓ on **necessary bandwidth**

- Recommendation ITU-R [SM.1138-3](#) - **Determination of necessary bandwidths including examples for their calculation and associated examples for the designation of emission** (Approved in Oct. 2019 and incorporated by reference at WRC-19 in the 2020 Edition of the Radio Regulations)

✓ on **Earth Station Coordination Area**

- Recommendation ITU-R [SM.1448-1](#) – **Determination of the coordination area around an earth station in the frequency bands between 100 MHz and 105 GHz** (Approved in Oct. 2019)

WP 1A approved publications after May-June 2019 (2/2)

✓ on **sharing and compatibility studies in the frequency range 275-450 GHz** in response to WRC-19 agenda item 1.15

- **New** Report ITU-R [SM.2450-0](#) (ex.[275-450GHz_SHARING]) – **Sharing and compatibility studies between land-mobile, fixed and passive services in the frequency range 275-450 GHz** (Approved in Jun. 2019)

✓ on **Optical Wireless Communication (Question ITU-R 238/1)**

- Report ITU-R [SM.2422-1](#) – **Visible light for broadband communications** (Approved in Jun. 2019)

✓ **Review of relevant ITU-R Recommendations in SM series**

- 29 ITU-R Recs. related to WP 1A were editorially updated in June 2019 (see Doc. [1/204](#))

WP 1A on-going studies on EMI/EMC issues

✓ Studies on **Coexistence of radiocommunication systems with wired telecommunication** (Questions ITU-R 221-2/1 & 236/1)

- WD PDN Report ITU R SM.[MIMO_PLT] – **Multiple Input Multiple Output operation in power line telecommunications** (see Annex 11, [WP1A Chairman's Report](#))
- WD PDR of Report ITU-R [SM.2351-2](#) – **Smart grid utility management systems** (see Annex 10, [WP1A Chairman's Report](#))
- Risks of interference of an EMC nature and the effects of RF noise affecting the operation of radiocommunication systems and services

✓ Studies on **electromagnetic disturbances over IoT network**

- WD PDN ITU-R Report - **Evaluation of radiated electromagnetic disturbances of household appliances and their interferences over an IoT network** (see Annex 12, [WP1A Chairman's Report](#))

• **Correspondence Group on EMC Related Interference and Coexistence of Wired Telecommunications Systems with Radiocommunication Systems**

(see ToR on Annex 13(Rev.1), [WP1A Chairman's Report](#))

Mailing list: rwp1a-rg-wired-and-radio@itu.int ([Archives](#) & [SharePoint](#)) **Chairman: Mr J. Shaw**

WP 1A on-going studies on **Wireless Power Transmission**

✓ **Future work on WPT:** To avoid confusion and facilitate the participation of the membership, **WP 1A** is now the responsible group for **all WPT issues**

✓ **Draft revision of Question ITU-R 210-3/1 on WPT issues to update the studies to be performed based on recent results**

(see Annex 1, [WP1A Chairman's Report](#))

✓ **Studies on WPT non-beam:**

➤ **WD PDN Rec. ITU-R SM.[WPT-EMISSIONS] – Limits and Measures to mitigate disturbances from WPT systems to radio. systems operating below [30 MHz]**

(see Annex 2, [WP1A Chairman's Report](#))

✓ **Studies on WPT via radio frequency beam:**

➤ **WD PDN Report SM.[WPT.BEAM.IMPACTS] – Impact study and human hazard issues for WPT via radio frequency beam** (see Annex 8, [WP1A Chairman's Report](#))

➤ **WD PDN Recommendation ITU-R SM.[WPT.BEAM.FRQ] - Frequency ranges for operation of WPT systems via radio frequency beam** (see Annex 4, [WP1A Chairman's Report](#))

➤ **WD PDR of Report SM.2392-0 – Applications of WPT via radio frequency beam**
(see Annex 6, [WP1A Chairman's Report](#))

Other WP 1A on-going studies

✓ on **Optical Wireless Communication** (Question ITU-R 238/1)

- WD PDN Recommendation SM.[OPTICAL WIRELESS] – Reducing the constraints of current radio frequency delivery mechanisms using Optical wireless communication

(see Annex 14, [WP1A Chairman's Report](#))

✓ on **technology trends of active service above 275 GHz** (Q. ITU-R 237/1)

- WD PDR of Report ITU-R [SM.2352-0](#) - Technology trends of active services in the frequency range **275-3 000 GHz** (see Annex 15, [WP1A Chairman's Report](#))

✓ **Expected studies in response to Res. 731 (Rev.WRC-19) invites ITU-R 2 and in relation to Report ITU-R [SM.2450-0](#)**

- to determine the specific conditions to be applied to the land mobile and fixed service applications to ensure the protection of Earth exploration-satellite service (passive) applications in the frequency bands 296-306 GHz, 313-318 GHz and 333-356 GHz

WP 1B approved publications after May-June 2019

✓ on **Short range radiocommunication devices (SRD)** (Res. ITU-R 54)

- Report ITU-R SM.2153-7 – Technical and operating parameters and spectrum use for SRDs (Approved in June 2019)

✓ on **long-term strategies for spectrum utilization** (Question ITU-R 205-2/1)

- Report ITU-R SM.2015-1 - **Methods for determining national long-term strategies for spectrum utilization** (Approved in June 2019)

✓ on **WPT for Electric Vehicle** (Question ITU-R 210-3/1 & WRC-19 agenda item 9.1-6)

- **New** Report ITU-R SM.2451-0 - **Assessment of impact of wireless power transmission for electric vehicle charging on radiocommunication services** (Approved in June 2019)

✓ **New Studies on Spectrum availability**

- **New** Question ITU-R 241/1 (ex.[SPEC-AVAILABILITY]) – **Methodologies for assessing or predicting spectrum availability** (Approved in Aug. 2019)

✓ **Review of relevant ITU-R Recommendations in SM series**

- 13 ITU-R Recs. related to WP 1B were editorially updated in June 2019 (Doc. 1/193)

WP 1B on-going studies

- ✓ on **Short range radiocommunication devices (SRD)** in response to **Resolution ITU-R 54**

- PDR of Recommendation ITU-R [SM.1896](#) – **Frequency ranges for global or regional harmonization of SRDs** (Annex 1 to the [WP1B Chairman's Report](#))

- ✓ on **Dynamic Access to Spectrum and Cognitive Radio Systems (CRS)** in response to **Resolution ITU-R 58**

- PDR of Report ITU-R [SM.2405-0](#) – **SM principles, challenges and issues related to dynamic access to frequency bands by means of radio systems employing cognitive capabilities** (see Annex 2, [WP1B Chairman's Report](#))

- ✓ on **Economic Aspects of Spectrum Management** (Question ITU-R 240/1)

- WD PDN Report ITU-R SM.[ASSESS-SPEC-EFFI-AND-ECON-VAL] – **Assessment of spectrum efficiency and economic value** (see Annex 3, [WP1B Chairman's Report](#))

WP 1C approved publications after May-June 2019 (1/2)

- ✓ **Studies on Method of measuring the maximum frequency deviation of FM broadcast emissions at monitoring stations**
 - Rec. ITU-R [SM.1268-5](#) (Approved in Aug. 2019)
- ✓ **Studies on Monitoring of radio emissions from spacecraft at monitoring stations**
 - Rec. ITU-R [SM.1054-1](#) (Approved in Aug. 2019)
- ✓ **Studies on DVB-T/T2 coverage measurements and evaluation of planning criteria**
 - Rec. ITU-R [SM.1875-3](#) (Approved in Aug. 2019)
- ✓ **Studies on EMF measurements to assess human exposure**
 - **New** Report ITU-R [SM.2452-0](#) (ex.[EMF-MON]) (Approved in June 2019)
- ✓ **Studies on Cooperation in the field of space radio monitoring**
 - **New** Report ITU-R [SM.2453-0](#) (ex.[SAT MON COOPERATION]) (Approved in June 2019)

WP 1C approved publications after May-June 2019 (2/2)

- ✓ **Studies on Assessment of electromagnetic environment in the GNSS frequency bands**
 - **New** Report ITU-R [SM.2454-0](#) (ex. [MEAS-GNSS]) (Approved in June 2019)
- ✓ **Studies on Measurement facilities available for the measurement of emissions from both GSO and non-GSO space stations**
 - Report ITU-R [SM.2182-3](#) (Approved in June 2019)
- ✓ **Studies on Spectrum Monitoring Evolution**
 - Report ITU-R [SM.2355-1](#) (Approved in June 2019)
- ✓ **Studies on Spectrum management and monitoring during major events**
 - Report ITU-R [SM.2257-5](#) (Approved in June 2019)
- ✓ **Review of relevant [ITU-R](#) Recommendations in SM series**
 - 30 ITU-R Recommendations related to the WP 1C activities were editorially updated in June 2019

WP 1C on-going studies (1/2)

✓ on Performance evaluation of mobile DF units in operational environment

- WD PDN Rec. ITU-R SM.[MOB DF PERF] (Annex 1 to the [WP1C Chairman's Report](#))
- *Rapporteur Group Mailing List:* rwp1c-cg-mob-df@itu.int ([SharePoint](#)),
Rapporteur: **Mr A. Agius** (see ToR in Annex 2 to the [WP1C Chairman's Report](#))

✓ on Population coverage measurement with public wireless networks

- WD PDN Rep. ITU-R SM.[POPULATION_COVERAGE] (Annex 14 to the [WP1C Chairman's Report](#))
- *Correspondence Group (CG) Mailing List:* rwp1c-cg-pop-cov@itu.int ([SharePoint](#))
Chairman: **Mr V. Blagodarnyi**

✓ on Test procedure for measuring accuracy of TDOA emitter location systems

- [WD]PDN Rec. ITU R SM.[TDOA-ACC] (see Annex 6 to the [WP1C Chairman's Report](#))
- *CG ML:* rwp1c-cg-tdoa-acc@itu.int ([SharePoint](#)), *Chairman:* **Mr J. Yang**

✓ on Essential requirements for a spectrum monitoring system for developing countries

- PDR of Rec. ITU-R [SM.1392-2](#) (see Annex 7 to the [WP1C Chairman's Report](#))
- *CG ML:* rwp1c-cg-1392@itu.int ([SharePoint](#)), *Chairman:* **Mr M. Al-Sawafi**

✓ on Reporting harmful interference in support of RR Appendix 10

- WD PDN [Rec./Rep.] ITU-R SM.[APP10] (see Annex 11 to the [WP1C Chairman's Report](#))

WP 1C on-going studies (2/2)

✓ on Test procedure for measuring monitoring system field strength measurement accuracy in the VHF/UHF frequency range

- WD PDN Rec. ITU-R SM.[FS-ACC] (see Annex to the [WP1C Chairman's Report](#))
- CG ML: rwp1c-cg-fs-accuracy@itu.int ([SharePoint](#)), Chairman: **Mr J. Wang**

✓ on Use of commercial drones operating within visible line of sight for measurement of own country spectrum

- WD PDN Report ITU-R SM.[UAVs] (see Annex 3 to the [WP1C Chairman's Report](#))
- CG ML: rwp1c-cg-uav-mon@itu.int ([SharePoint](#)), Chairman: **Dr. K. Kim** (kangheekim@etri.re.kr) (see ToR in Annex 4 to the [WP1C Chairman's Report](#))

✓ on Use of small satellites for Spectrum Monitoring

- WD PDN Report ITU-R SM.[SMALL-SAT] (see Annex 9 to the [WP1C Chairman's Report](#))
- CG ML: rwp1c-cg-small-sat@itu.int ([SharePoint](#)), Chairman: **Mr C. Hao** (see ToR in Annex 10 to the [WP1C Chairman's Report](#))

✓ on Spectrum Monitoring Handbook

- CG ML: rwp1c-handbook@itu.int ([SharePoint](#))
Chairman: **Mr R. Trautmann** (see ToR in Annex 12 to the [WP1C Chairman's Report](#))

✓ on EMF measurements to assess human exposure (updating Rep. ITU-R [SM.2452](#))

Other RA-19 outcomes involving SG 1

- ✓ **Draft new ITU-R Question proposed to RA-19 (see Doc. [RA19/PLEN/29](#)) on “*Impact of unintentional electromagnetic energy generated by electrical or electronic apparatus to the radiocommunication services*”**
 1. How their development and proliferation are **affecting the man-made noise levels in the radio spectrum?**
 2. How should their development and proliferation **affect the way in which their interferences are measured**, taking into account the real operating environment with their typical proximity to radiocommunication equipment and systems?
 3. What **technical characteristics and limits should apply to them so as to avoid harmful interferences to radiocommunications services and not increase the noise floor?**
 4. What **regulatory provisions are needed** to provide effective protection for radiocommunications services against harmful interferences from them to keep the noise floor as low as possible?
- **RA-19 invited administrations to contribute directly to SGs 1 and 3 in order to revise relevant existing ITU-R Questions (see Summary report of RA-19 5th Plenary in Doc. [RA19/PLEN/83](#))**



SG 1 on-going activities on **liaison with CISPR**

✓ **Rapporteur Group on Liaison with CISPR**

Mailing list: rsg1-rg-cispr@itu.int (See also [Archives](#) and [SharePoint](#))

Rapporteur: **Ms Gabriele Meindl** (gabriele.meindl@bnetza.de)

Rapporteur on WPT issues: **Dr Fumito Kubota** (f-kubota@telec.or.jp)

- **Held e-meeting on 28 Aug. 2020 to consider urgent CISPR issues, incl.:**
 - **Wireless Power Transmission** – draft amendments to pub. CISPR 11
 - **Interference from LED lighting**
 - **IEC radio services database**
- **Provided comments to CISPR representatives**
- **Sent liaison statement to CISPR and CISPR-H to provide additional information on the **impact of WPT-EV on LF and MF broadcasting****
- **Prepare for ITU-R representation in future CISPR e-meetings**