International Consortium for Telemetry Spectrum

ICTS REGION I REPORT

Update 2018

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Agenda

- **L , S & C-Band in Europe, AMT and Common Allocations**

- **WRC-19 Action Items,** issues ***impacting AMT***, AI 1.16 and 9.1.8

- **Further Threats** to the ***AMT- Bands***

  „Licenced Shared Access“(LSA) & **„Licensed Assisted Access“(LAA**)-LTE, ***a threat potential ?***

- **Conclusions**

Frequency Spectrum Stewardship

for Aeronautical Mobile Telemetry (AMT)

- Provide an independant assessment of ITU-Region 1 issues & positions that could impact AMT capabilities, in preparation of the WRC-19.
- Sources of information (meetings & reports) from:

  CEPT, *European Conference of Postal & Telecommunications*

  RCC, *Regional Commonwealth in Communications*

  ASMG, *Arab Spectrum Management Group*

  ATU, *African Telecommunication Union*
- **ITU(R)** Preparation Process for WRC-19, conferences & meetings: Reports from Study Groups, Joint Task Groups, Working Parties

AMT: L-Band in Europe

- AMT L-band ***still used*** despite of CEPT / ERC Rec. 62-02E (1997) ,as a consequence of the WRC-95 allocations to the Satellite – ***D****igital* ***A****udio* ***B****roadcast* service in that band:

Russian Federation & Allies	**1429 – 1535 MHz**
France	**1427 – 1429 MHz**
Switzerland	**1429 - 1445 MHz**
Spain &UK	**1427 – 1452 MHz**

- ***Res.223*** *(Rev.WRC-15):* **1427-1452 MHz**, 1492-1518 MHz identified for IMT worldwide;

  1452-1492 MHz in Region 2+3; in Region 1 in some African and Middle-East countries, only : **not supported by CEPT.**

- ***RR Article 5 footnotes*** **included to protect AMT ops !**

AMT: S- & C Band in Europe

- **S-band for AMT** (CEPT/ERC Rec.62-02E)
  - **Core band** **2300 – 2330 MHz**
  - **Extension band** **2330 – 2400 MHz**

  Some countries still use parts of 2025 - 2300 MHz for AMT !
- **S-band for Terrestrial Telemetry** ***2200 – 2400 MHz***
  allocable in some countries.

- **WRC-07 C-band global** **5091 – 5150 MHz**
  Region 1 **5150 – 5250 MHz**

  That is the only real harmonized AMT band in Europe !

On the way to WRC-19

Threats to AMT

- Res. COM 6/16 (WRC-15):

Action item 1.16

„..inviting to perform sharing and compatibility studies with WAS/RLAN applications and incumbent services in frequ.band 5150-(5250)-5350 MHz with possibility of enabling ***outdoor WAS/RLAN ops*** including ***possible associated conditions***“.

- Res. COM 6/20 (WRC-15):

Action item 1.13 **supports identification** of additional bands for **future IMT-development**: *„…inviting to conduct sharing & compatibility studies for band* **24,25 – 27,5 GHz“.**

That band would be a favourite candidate for extention requirements of AMT (time horizon 2020 & beyond) !

CEPT Position on AI 1.16

CEPT supports studies to be performed under AI 1.16 in accordance with Res. 239 (WRC-15).

„In the **5150 – 5350 MHz** band, CEPT would support relaxing the access conditions applicable to WAS / RLANs***, if results show sharing and compatibility cannot be achieved*** with EESS, radars, Sat-feederlinks, aeronautical navigation and **aeronautical telemetry**".

„However CEPT noted that the ***current studies*** have shown **difficulties** in **achieving co-existence** with incumbent services" (3rd meeting, May 2017).

CEPT **revised that position further** in its 4th meeting, March, 2018, especially with reference to the band **5150 – 5250 MHz.** The **result** of **coexistence studies** was now **included** into the Draft **CEPT Brief** (7th group meeting, September 2018).

CEPT–Position on AI 1.16

(Draft CEPT Brief, 28 Sept. 2018)

- In the 5150 - 5250 MHz band, CEPT notes that an outdoor relaxation to WAS/RLAN would affect the operation of the MSS feeder links, aeronautical radio navigation and aeronautical telemetry (see No 5.446C).
- However, CEPT is *still studying* ***usage restrictions*** (e.g. in vehicle use) *combined with appropriate* ***mitigation techniques*** **to achieve co-existence** with incumbent services, to enable outdoor **WAS/RLAN** use in this band."

Last Minute WRC-19 **AI 9.1.8**

for *Wireless Industrial Applications*

- **Industry 4.0**, „**Smart Manufacturing**“, is on the roadmap to standardisation, supported by ***ETSI, IEC, ISA, IEEE, OneM2M et.al.***
- Industrial radio links *presently in the unlicensed 2,4 GHz band* investigate licensed allocations from 1,5 – 6 GHz, spectrum requirements ***80 MHz (2x40MHz)*** !
- **Candiates for studies: *2340 - 2400 MHz & 5150 – 5250 MHz***
- The ***„one M2M Partnership Project“*** (>200 members worldwide) succeeded to bring that issue on the ITU (R) list **of *„urgent studies required in preparation of the WRC-19“,*** as ***AI 9.1.8*** Res.958 (WRC-15): *Narrow & broadband **M**achine-**T**ype **C**ommunication infrastructures* (to be studied by WP5D)

AI 9.1.8, MTC

Preliminary Position of ITU-WP5D

Working Doc towards Draft CPM-Text for WRC-19:

"Analysis of the current and future spectrum use for narrowband and broadband machine type communications (MTC), as expressed in AI 9.1.8 Resolution 958 (WRC-15), concluded that there *is no need to identify specific spectrum* for those applications in the Radio Regulations.

MTC / IoT applications and devices can be used effectively with all the benefits of *the existing bands and the new frequency bands under study for IMT*, as well as those for SRD and ISM applications". That position was also supported by ECC PT1 (Meeting # 60, Sept. 2018).

Threats to S-Band *2300-2400 MHz* by further IMT Allocations

- Band has already to be shared with **Low Power Services**

Medical Implants (LP-AMI)	2360 – 2400 MHz
Medical Telemetry (MBANS)	2360 – 2400 MHz
Short Range Devices (Indust.+ UWB)	2360 – 2400 MHz

- Band also to be shared with **High Power Services**

Video Links (PMSE SAP / SAB)	*2320 – 2400 MHz*

- **ECC FM(12)017 „*Current& Future Usage 2300 – 2400 MHz*“:**
  Current use: PMSE applications (in 27 countries)
  Future use: IMT (incl.LTE or WiMAX), BWA (in 16 countries)
- ***Recent Spectrum Auction in the UK :***

  2350 – 2390 MHz now allocated for use with 5G,

  to Telefonica UK Ltd.

Licenced Shared Access(LSA)
Threat for the AMT S-Band ?

- **LSA** was seen as enabler to release additional spectrum for Mobile Broadband Services, sharing with incumbants, on a secondary basis ***assessing protection of existing services*** (Concept: Radio Spectrum Policy Group, DIGITALEUROPE).
- ***CEPT Report Nr. 52:*** describes the ***„technological and regulatory options for sharing between WBB and the relevant incumbent services/applications in the 2,3 GHz band“.***
- **LSA Demo & Testing:** by **Italy,** Finland, **France**, The Netherlands and Spain successfully concluded by 2017 end.
- **Further work *delegated to ITU(R)*** ***:“to develop the regulatory frame conditions for LSA implementation“ (WP1B) & “to study the necessary mitigation techniques“ (WP5A).***
- **LSA Specs released: National implementation possible !**

Thread to C-Band 5150–5250 MHz

LAA-LTU Cells on secondary basis

- **Band has already to be shared** with the

  ***A**eronautical **M**ob.(**R**oute) **S**ervice, **F**ixed **S**atellite **S**ervice (uplink), **A**ero. **R**adio **N**avigation **S**ervice* *5091 - 5250 MHz*
  P**ublic **M**obile **S**ervice &* ***WLAN indoor 5150 - 5250 MHz

- **Licensed Assisted Access (LAA)** idea is, that LTE cells operating in other bands synchronise **secondary cells** in C-band, **5150 – 5250 - (5350) MHz** (that band is presently allocated to indoor **WLAN** on a power level +**23 dBm**, only !)

- **But Outdoor LAA - cells can affect AMT Ops, especially with the proposed power level of +36 dBm !** ICTS has to monitor further intentions & studies .

LTE- Advanced
Standard „Advanced-Pro“

Europe: ***(introduction tried since 2017, but still in planning status!)***

LAA-LTE bands 5150 – 5350 MHz; 5470 – 5725 MHz

in band 5150 – 5250 MHz: 5 channels x 20 MHz

The Americas:

LTE-U bands 5150 – 5250 MHz; 5250 – 5750 MHz

in band 5150 – 5250 MHz: 4 channels x 20 MHz

Proposed extention of the transmitting levels:

- **Power levels:** Elevation 0 < 30 deg. **+ 36 dBm**
  > 30 deg. +21 dBm
- **Power flux density** *+ 17 dBm / MHz*

Ref: LTE-U Technical Report (2015-02) et al

What Can the ICTS Do

- The ***Agenda Items for the WRC-19*** and **regional BWS- initiatives (LSA, LAA-LTE)** have to be carefully studied and assessed.

  Provide **early warning** with respect to **spectrum threats** emerging in other areas of the world.

- **Support relevant study groups in AMT-critical issues**, e.g. the technical & operational characteristics in band 5150 – 5250 MHz, in the

  ITU (R) Working Party 5B and Joint Task Group meetings (Geneva) !

- *Monitor CEPT & ATU, RCC and ASMG meetings and workshops.*

- Possible tasking to investigate the feasibility of **augmenting the current AMT bands by new allocations in *Ku, K, and Ka bands (15 - 30 GHz).***

Conclusions

EU harmonisation level for **S-Band** still poor ; **C-band** use in progress,

in ***9 EU - countries*** presently.

Action Items WRC-19:

AI 1.16: ***"WAS and BWA in the 5 GHz range",*** with 5150-5250 MHz as one target band". **Feasibility of *WLAN outdoor ops is still under study.***

AI 9.1.8 ***„to study Machine-Type Comm. infrastructures for wireless industrial applications" ;*** candidates were AMT S- and C-bands,too ! Prelim. Position of WP5D: **„No need to identify specific spectrum. Use the existing & future IMT-bands !"**

Shared Use of AMT bands on a secondary basis (LSA & LAA-LTE)

LSA specs released, national licensing possible. Some adminitrations are still hesitating to grant licences, to protect the incumbent services. The LAA introduction is in a similar process.

For more information

- European Communication Office (ECO)

  www.cept.org/eco

- European Frequency Information System (EFIS) www.efis.dk

- CEPT / ECC Study Groups

  www.cept.org/ecc

ANNEX:
European C-band Introduction

- ***Austria:*** Payload tests for border surveillance
- ***France:*** Airbus Operations to test AB 350 et al.

  Spain *may* be later part of the Airbus network.
- ***Germany:*** *DLR and* Fraunhofer doing operational tests, Airbus Helicopters in opl.- status from end of 2018 onward.
- ***The Netherlands:*** NRL, systems procurred & operational.
- ***Sweden & Norway:*** VIDSEL Range: procurement C-band tracking station in process, flight tests concluded. Andoya Range in introduction process.
- **Switzerland:** Armasuisse and Swiss Copter Group in introduction process.
- **UK:** BAES and Qinetiq in planning status for 2018 onward.

C- Band Test Activities

- **Airbus Operations Toulouse** regular FT with10 Mbps 10W onboard with C-band gnd network, with OFDM Transmitter.
- **Airbus Defense and Space Manching** concluded FT C-band vs. S-band, with small aircraft and Tornado.
- **Airbus Helicopters** rolls out regular flight tests in C-band.
- **Vidsel Range** in Sweden did flight tests S-band vs. C-band (with Helicoper), inclusive interference studies from their C-band Radar.

Questions / Discussion

Acronyms

AMT	Aeronatical Mobile Telemetry
BWA	Broadband Wireless Access
CEPT	Conferénce Européenne des Administrations de Poste
ERC	European Radio Communications
EEES	Earth Exploration Satellite Service
RR	Radio Rules
PMSE	Programme Making Special Events
SAB	Services Ancillary to Broadcast
SAP	Services Ancillary to Program Making
WAS	Wireless Access Systems
WBB	Wireless Broad Band