



International Consortium for Telemetry Spectrum



ICTS REGION I REPORT

Update 2018

Region I Coordinator: Gerhard Mayer

Former Chair ICTS

gmayer@gym-consultants.com



Agenda



- L , S & C-Band in Europe, **AMT and Common Allocations**
- **WRC-19 Action Items**, issues impacting AMT, AI 1.16, 1.8 and 9.1.8
- „Licenced Shared Access“(LSA) *and* „Licensed Assisted Access“(LAA)-LTE, *a threat potential ?*
- **Conclusions**



Frequency Spectrum Stewardship

for Aeronautical Mobile Telemetry (AMT)



- Provide an independent 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 - DAB 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**
- **WRC-07 C-band global** **5091 – 5150 MHz**
 - Region 1** **5150 – 5250 MHz**

That is the only real harmonized AMT band in Europe !



European C-band Introduction



- **Austria:** Payload tests for border surveillance
- **France:** Airbus to test AB 350 et al.
- **Spain** may be later part of the Airbus network.
- **Germany:** DLR and Fraunhofer doing operational tests, Airbus-Eurocopter in opl.- status from end of 2018 onward.
- **The Netherlands:** NRL, systems procured & 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.



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 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) !



Draft CEPT Brief on WRC-19 for 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 !**



CEPT–Position on AI 1.16

(Draft CEPT Brief, 15 June 2018)



“In the 5 150-5 250 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) !**
- **Candidates 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 machine-type communication 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”.



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



- **LSA** was seen as enabler to release additional spectrum for **Mobile Broadband Services**, sharing with incumbents, on a secondary basis **assessing protection of existing services**.
- Concept put forward by the „Radio Spectrum Policy Group“ (RSPG), supported by **DIGTALEUROPE**.
- **ECC Report 172:** „**Sharing with incumbent services as secondary service *feasible***, by proper mitigation techniques“ (adjacent channel ops, geographical separation, time sharing)
- **Modifications** to the final report were accepted, as recommended by the ICTS :
 - **PFD by interferers** must be not more than **-180dBm** (in any 4KHz part of the AMT signal).
 - **Availability** of transmitted **AMT data** (with high integrity) must be better than **0,995** of the test period.



LSA final report and proposed studies by ITU(R)



- **CEPT Report Nr. 52:** describing the „*technological and regulatory options for sharing between WBB and the relevant incumbent services/applications in the 2,3 GHz band*“ was released.
- **LSA Demo & Testing** supported by **Italy**, Finland, **France**, The Netherlands and Spain (and their industrial partners) further by the **Joint Research Centre** of the **European Commission**, started from Oct. 2015 up to Jan. 2017.
- **Further work** was proposed to delegate to the **ITU(R) Study Groups:**
WP1B:“*to develop the regulatory frame conditions for LSA implementation*“
WP5A:“*to study the necessary mitigation techniques*“
- **With LSA issues on an ITU-level the LSA-idea is on way from a regional to a global level !!**



MFCN Cells on secondary basis: LAA-LTE(U) in AMT C - Band



- Licensed Assisted Access (LAA) idea is, that LTE cells operating in other bands synchronise secondary cells in C-band, 5150-5350 MHz (that band is presently allocated to indoor WLAN on a power level +23 dBm, only !)
- Outdoor cells can affect AMT Ops..ICTS has to monitor further intentions & studies in band **5150 -5250 MHz**, with Res. 418 (Rev.WRC-15) allowing now a global allocation for AMT for that band !!



LTE- Advanced Standard „Advanced-Pro“



Europe: (introduction from **2017 on**, 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

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



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 of 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)*.
- *Monitoring 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 (LAA & LAA-LTE)

LSA specs released, national licensing possible. Some administrations 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.ero.dk

- European Frequency Information System (EFIS)

www.efis.dk

- CEPT / ECC Study Groups

www.cept.org/ecc



Annex



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- European Common Allocations, S- and C-Band
 - European C - Band Test Activities



2300-2400 MHz

European Common Allocations



- Amateur Radio Service 2320 – 2450 MHz
- **Aeronautical Mobile Telemetry 2300 – 2400 MHz**
- **BWS – Usage (BWA, LTE / WiMAX) 2300 – 2400 MHz**
- Medical Implants (LP-AMI) 2360 – 2400 MHz
- Medical Telemetry (MBANS) 2360 – 2400 MHz
- Short Range Dev. (SRD, Ind.+ UWB) 2360 – 2400 MHz
- **Video Links (PMSE SAP / SAB) 2320 – 2400 MHz**

Results of a questionnaire to CEPT Admins „Current & Future Usage 2300 – 2400 MHz“ ECC FM(12)017:

Current use: PMSE applications (27 countries)

Future use: IMT (incl. LTE or WiMAX), BWA (16 countries)



5091-5250 MHz

European Common Allocations



- **Aer. Mobile (Route) Service** 5091 – 5250 MHz
- **Aero Mobile Telemetry** **5091 – 5250 MHz**
- **Fixed Sat. Service (uplink)** 5091 – 5250 MHz
- **Aero Radio Navation Service** 5091 – 5150 MHz
- **WLAN (indoor)** **5150 – 5250 MHz**
- **Public Mobile Service** 5150 – 5250 MHz



C- Band Test Activities



- **Airbus Toulouse** regular FT with 10 Mbps 10W onboard with C-band gnd network, now with OFDM Transmitter.
- **Airbus Defense and Space** concluded FT C-band vs. S-band, with small aircraft and Tornado.
- **Airbus Helicopters** did successful evaluation flights, using a Zodiac test system (7W, COFDM).
- **Vidjel Range** in Sweden did flight tests S-band vs. C-band (with Helicopter), inclusive interference studies from their C-band Radar.



Questions / Discussion