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| Plenary | | | Doc. ECC(16)067 | |
| 42nd Meeting | |  | |
| Stockholm, Sweden, 14-17 June 2016 | |  | |
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| Date issued: | 8 June 2016 | | |
| Source: | ECO | | |
| Subject: | ECO Bulletin on on-going/new issues in other regions or organisations | | |
| N  Group membership required to read? (Y/N) | | | |
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| Summary: | | | | |
| This ECO Bulletin provides a summary update on aspects of progress in spectrum management outside the CEPT. The items in this bulletin include:   1. FCC - Incentive Auction Spectrum Target 2. FCC and FAA Regulations Applying to Drones 3. USA: 60 GHz WiGig Devices – RF Exposure Limitations 4. USA: The American Space Renaissance Act 5. Information about 5G in the USA 6. Air-to-Ground Communications (satellite and direct-air-to-ground) 7. One Web 8. O3b acquired by SES Global 9. FCC Issues Fines Related to Signal Jammers 10. FCC Consultation about the Use of Maritime DSC Equipment 11. 3GPP RAN4 specifying LTE-based V2X applications 12. LTE in PPDR - Whitepaper | | | | |
| Proposal: | | | | |
| This bulletin is to note by the ECC Plenary. More detailed input on some of the subjects covered is being input to the groups dealing with the respective subjects.  Several of the issues covered in this bulletin should be noted or discussed at the respective WG/ PT level. This includes amongst others information related to the ongoing US Incentive Auction, air-to-ground (satellite and DA2GC), satellite based services including new satellite constellations (NGSO), 5G in the USA - considerations, LTE-based V2X work in 3GPP, FCC fines jammers, and LTE in PPDR whitepaper with information about developments outside of Europe. There was no news observed from APT since March 2016 (last ECC meeting). | | | | |
| Background: | | | | |
| The Office brings to each ECC meeting a bulletin on activities in radio communications in other world regions, where a regulatory dimension is raised (e.g. by innovative services or technology).  The primary objective is to identify whether the ECC needs to investigate further or consider possible new actions. A secondary but more frequently addressed objective is to enable comparison to be made with the regulatory approach in other regions to subjects already treated by the ECC (including, where relevant, to the work of the CPG). | | | | |

**FCC - Incentive Auction Spectrum Target**

The Federal Communications Commission (FCC) issued an initial clearing target of 126 MHz set for the terrestrial broadcasting spectrum incentive auction on 29 April 2016.



<https://wireless.fcc.gov/auctions/incentive-auctions/auction-1001.html>

The FCC has launched the reverse auction on 31 May 2016 (Auction 1001). The reverse auction will run for 52 rounds, which means that it could last for about 100 days.

The US Congress in 2012 created a framework for an incentive auction to be overseen by the FCC. Spectrum auctions are nothing new for the FCC: the agency uses auctions any time it wants to allocate new blocks of spectrum. The current incentive auction is different, though, because for the first time, the FCC will use an auction to encourage companies to relinquish spectrum and then allocate it to different users.

The FCC’s convoluted incentive auction process consists of **three phases**.

The **first phase** is called the “reverse auction. TV broadcasters will auction their spectrum licenses to the government. The FCC will provide an opening price as high as $900 million and then give broadcasters three options: 1) go off the air, 2) move to another channel frequency, or 3) relinquish their current channel to share a channel with another broadcaster. The price to relinquish a spectrum license will then decrease until a deal can be reached between the broadcaster and the government.

The FCC’s goal is to acquire as much spectrum as possible for the lowest possible price from the more than 1,800 eligible TV broadcasters. Local affiliates of the large networks like Fox or CBS will stay on the air. The FCC expects participation in the auction to come from independent TV stations.

Once the FCC acquires its targeted amount of spectrum, it will then sell that spectrum to wireless companies in the **second stage**, called the “forward auction”. The forward auction works like a standard auction, with the FCC selling spectrum licenses to the highest bidder. Most of the major mobile companies are expected to bid. Analysts project that AT&T, Verizon, and T-Mobile will spend around $10 billion each.

Some spectrum will be off limits to the big players to encourage competition. The proceeds from the forward auction will then be used to pay the broadcasters in the reverse auction. These first two stages should be completed by the end of summer 2016.

The **final stage** of the process is called “repacking.” After the auctions finish, the FCC will re-arrange and consolidate television station channels so that they occupy a smaller portion of spectrum in order to free up space for mobile companies. This process will take thirty-nine months; a period which some broadcasters are concerned will not be long enough. For consumers, this means that people who receive their TV through an antenna will need to learn new channel numbers for their favorite programming once repacking is complete.

The entire process could fail if one stage fails, since the reverse and forward auctions are dependent upon one another. Broadcaster participation is crucial for the FCC to obtain the necessary amount of spectrum, and many broadcasters might drop out if the prices in the reverse auction fall too low. So far, broadcaster participation is strong enough for the FCC to meet its target amount of spectrum. Broadcasters must then accept the government’s bids for their spectrum.

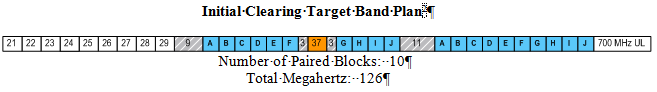
Likewise, if the mobile companies do not bid high enough in the forward auction, then there will not be enough money to pay the broadcasters. The major mobile companies spent heavily in the last major auction in 2014 in the USA, meaning that they may have less capital to spend this time.

If the auction is successful, the role of the community broadcaster will decrease in favor of enabling mobile companies to meet consumer expectations for more online content streamed to their smartphones and tablets.

FCC’s 126 MHz target:

It aims to make 126 MHz of near-nationwide spectrum available in the 600 MHz band in the upcoming incentive auction - 50 per cent more than the FCC’s previous estimate of 84 MHz.

If the FCC manages to acquire 126 MHz of spectrum in every market, it can offer operators 10 paired blocks of 5 MHz in the forward auction.



(For consideration/information at ECC and ECC PT1)

**USA: FCC and FAA regulations applying to drones**

The following information has recently been given by the FCC in response to some questions to the applying regulations:

**Question:** We designed a small drone with a transmitter and a camera video system. What FCC regulations apply to this device?

**Answer:** First, be aware that in addition to FCC regulations, drones are subject to FAA regulations. Additional information on FAA regulations for drones can be found [here](http://rheintech.us4.list-manage1.com/track/click?u=ea8729ded10d990820bca7414&id=ee9e5d8afd&e=56b0e30a9b).

Radio Control/remote control is commonly used as the communications link between the operator/ground control station and devices such as model aircraft (including drones) and boats, located at places distant from the operator.

A small drone with a radio control/remote control transmitter falls under FCC [47CFR§95 Subpart C, Radio Control Radio Service](http://rheintech.us4.list-manage.com/track/click?u=ea8729ded10d990820bca7414&id=34254453d2&e=56b0e30a9b), a private, one-way, short distance non-voice communications service for the operation of devices at remote locations. Authorised channels for this service are between 72.0‑73.0 MHz and 75.4‑76.0 MHz, along with six channels between 26.995‑27.255 MHz that may be used to control devices.

Most radio control/remote control transmitters are certified by the manufacturer or vendor for low-powered, unlicensed operations on frequency bands authorised under Part 15. The transmitters are certified for compliance with certain technical standards designed to limit interference with other devices, and as indicated, do not require an operator’s license.

However, if the drone includes a camera/ video system, which typically requires more output power than allowed under Part 15, and as a result, cannot be certified for unlicensed operations, the operator of this drone will have to obtain an Amateur Radio license from the FCC pursuant to [47CFR§97.7](http://rheintech.us4.list-manage2.com/track/click?u=ea8729ded10d990820bca7414&id=758d724101&e=56b0e30a9b). There are three levels of Amateur Radio licenses – Technician, General, and Amateur Extra. In the USA, the lowest level license (technician) is sufficient.

(For information in the WGFM CG drones – the idea inherently covered by the approach to consider amateur radio and its related licenses as an opportunity for more professional drones, could be worth to discuss)

**60 GHz WiGig Devices – RF exposure limitations**

As was recently reported, the FCC proposes to authorise operations in the 64-71 GHz band (extension above 64 GHz) under Part 15 based on the rules recently adopted for the adjacent 57-64 GHz band. This action will provide more spectrum for unlicensed uses such as Wi-Fi-like “WiGig” operations. Some questions were raised with regard to RF exposure limitations (such operations, due to the high frequency range, use quite high spectral power density emissions).

Question: We have designed a 60 GHz WiGig (Wireless Gigabit) portable transceiver for installation in laptop computer housings. It is our understanding that there are no measurement systems available today to make power density measurements at 60 GHz, required to meet the FCC’s portable RF exposure requirement. How do we proceed?

Answer: To obtain clear guidance on how to properly conduct RF exposure measurements for your device, you should submit a FCC Knowledge Database (KDB) inquiry that includes the technical specifications of your device, and a statement of the intended use for installation in laptop computer housings only, prior to the start of testing, to ensure you are using the appropriate test configurations.

The FCC stated that meeting the RF exposure limits can be established by measurements, numerical simulation, or a combination of both. Nonetheless, 60 GHz measurements in the reactive near-field are generally difficult to accomplish due to antenna loading and field perturbation issues.

As such, the FCC allows the exploration of plane-wave spectrum techniques to estimate near-field exposure according to measured far-field results with the implementation of such estimation. An example of this technique is reported in the literature “Application of the Planar-Scanning Technique to the Near Field Dosimetry of Millimeter-Wave Radiators”; BioElectroMagnetics, Volume 36, Issue 2, pages 108–117, February 2015.

The FCC also allows SAR evaluation using numerical simulation in agreement with Section 4.5 of [447498, D01 General RF Exposure Guidance v06](http://rheintech.us4.list-manage2.com/track/click?u=ea8729ded10d990820bca7414&id=83f0de4386&e=56b0e30a9b), RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices, to determine the exposure limit of 60 GHz devices, as well as the use of mapping systems that support far-field to near-field transformation.

(for consideration at SRD/MG, in relation to the proposal to consider relaxed emission limits > 40 dBm e.i.r.p. – though exposure limits may not be in the remit of the ECC, relaxed e.i.r.p. emission limits also need to comply to the European regulations for it and hence, a closer look on that, could be advisable to avoid difficulties for use cases such as in laptops. See also existing liaison between ETSI, WGFM/SRD/MG, and WGSE/SE19).

**USA : The American Space Renaissance Act**

The American Space Renaissance Act was officially introduced on April 12, 2016, at the 32nd Space Symposium. The bill is intended to update national space policy to address the changing geopolitical and economic environment that pressures the country’s economic and military security, and in doing so covers the triad of US space interests: national security, civil, and commercial space. The bill is comprised of three titles, which correspond to each of the three space sectors. This three-part series will review the significant provisions of each title of the act with corresponding analysis where appropriate.

<http://spacerenaissanceact.com/wp-content/uploads/2016/03/American-Space-Renaissance-Act.pdf>

It includes a mandate for the FCC to ensure commercial satellites in geostationary and non- geostationary orbits have primary status for current and future individually licensed earth stations in the frequency range of 27.5-28.35 GHz, and to ensure access to those frequencies is not required to be obtained through auction or secondary market procedures. This is interesting because the band is also identified by the FCC for 5G (see below)

(For information to FM44 and ECC PT1)

**Information about 5G in the USA**

The following statements were made on May 25, 2016 by Michael O’Rielly, FCC Commissioner:

Four spectrum bands – specifically, 27.5-28.35 GHz, 37-38.6 GHz, 38.6-40 GHz and 64-71 GHz – are identified/ will be made available for mobile use, with the first three on a licensed basis and the last for unlicensed applications.



Some additional information on 5G spectrum maps in the USA: How much 24 GHz, 28-29 GHz, 31 GHz, 39 GHz spectrum is available and where? Information can be found on the following webpage: <http://www.fiercewireless.com/tech/special-reports/5g-spectrum-maps-how-much-24-ghz-28-29-ghz-31-ghz-39-ghz-spectrum-available>

The 4G Americas has recently published a whitepaper discussing future 5G use and made some recommendations about future spectrum use (<http://www.4gamericas.org/files/6514/3930/9262/4G_Americas_5G_Spectrum_Recommendations_White_Paper.pdf> ):

The executive summary points out that:

* The 5G spectrum requirements are primarily driven by the combination of expected increases in traffic capacity demands and the support for new use cases that will be enabled by the 5G ecosystem. The 5G technical requirements to support 5G use cases (e.g. peak data rate greater than 10 Gbps, cell edge data rate of 100 Mbps and 1 msec end-to-end latency1) could potentially be met in a variety of carrier frequencies. These 5G use cases include enhanced mobile broadband to deliver applications such as high definition video, supported both in very high density (e.g., stadiums) and with ubiquitous coverage. Other categories of 5G use cases include ultra-reliable communications for industry/transport automation, low latency communications applications, and high/medium data rate service for massive Machine Type Communication (MTC) for various applications like e-health, vehicle-to-vehicle (V2V), augmented reality and tactile internet. These and other use cases will further impact the expected increase in spectrum demand.

The suitability to support various use cases depends on the physical characteristics of different frequency bands, ranging from low frequency (~500MHz) to high frequency (>60 GHz). While the lower frequencies have better propagation characteristics for better coverage and thus can support both macro and small cell deployments, the higher frequencies support wider bandwidth carriers (due to potential large spectrum availability at mm-wave bands).

(For information to ECC PT1, WGFM, SRD/MG-> 60 GHz)

**Air-to-Ground Communications**

There are currently a lot of considerations and competition with regard to air-to-ground communications (see ViaSat presentation at the last WGFM). In this context the following information can be noted from articles and publicly available information:

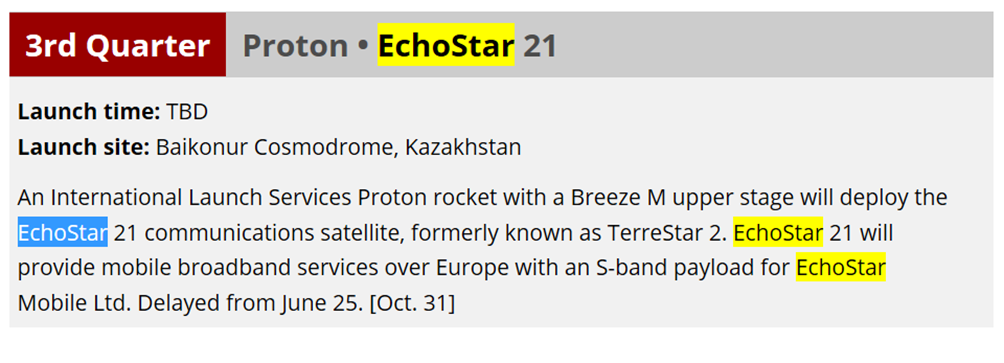
<http://spacenews.com/inmarsat-says-its-aero-broadband-business-has-no-fear-of-viasats-mythical-beast/> (Inmarsat views in response to ViaSat – ‘no fears’ in terms of the capacity a geostationary solution could provide compared to a CGC network; note that the solution in Europe by Inmarsat and Deutsche Telekom is using the 15 MHz of spectrum with 6 satellite footprints over Europe and 300 CGC base stations, each having 3 sectors on the ground, i.e. the vast majority of the network capacity is in the CGC network (factor 900/6 frequency re-use). In addition, geostationary satellite solutions require a certain minimum energy per bit, so one could develop the view that it is unlikely they could compete for intra-European flights on this basis).

<http://www.satellitetoday.com/telecom/2016/06/02/inmarsat-looks-to-capitalize-on-growing-chinese-ifc-market/?hq_e=el&hq_m=3252146&hq_l=1&hq_v=33c944cd8c>

<http://epaper.chinadailyasia.com/asia-weekly/article-6766.html>

(Inmarsat, Air China and others may look to find a solution for the Chinese market for Air-to-Ground communications, see mentioning of MSS/CGC and ATG – thought to be DA2GC without satellite connectivity; Air China already operates a DA2GC test network in China).

Finally, EchoStar (2 GHz MSS licence holder for 15 MHz of spectrum, as Inmarsat) has plans to launch a satellite at the end of October 2016 in Baikonur with a 2 GHz MSS payload onboard, though no precise plans announced how exactly EchoStar will use this.



There is no new information known about the plans from the FCC how to continue with DA2GC communications after the expiry of the existing Gogo-services licence at the end of this year, i.e. an anouncement may to be expected soon, also with regard to the earlier reported question about using Ku-Band uplink frequencies in the 14 GHz range in the future for DA2GC.

(for information for WGFM, FM44)

**OneWeb**

There are some news from OneWeb. Qualcomm was among a group of companies that just last month invested $500 million into OneWeb's plan to deploy hundreds of low-orbit satellites operating in the 12-18 GHz Ku spectrum band. OneWeb hopes to use the satellites to offer high-speed Internet services to a wide range of customers.

Now, OneWeb LLC has submitted its application for satellite-based Internet operations to the FCC. The application seeks access to the U.S. market for the company’s planned low-Earth orbit satellite constellation. Read more at <http://www.spaceflightinsider.com/missions/commercial/oneweb-submits-application-space-based-internet/#tiiHWB5ELTEPMc2R.99>

In addition, the satellite procurement process goes on and Airbus (prime contractor) and OneWeb have selected several sub-contractors; <http://www.satellitetoday.com/technology/2016/06/01/oneweb-satellites-picks-its-first-three-subcontractors/?hq_e=el&hq_m=3251710&hq_l=4&hq_v=33c944cd8c> . The satellites are scheduled to be launched with Arianespace and Virgin Galactic as of 2018.

(for information for FM44 and SE40, ongoing studies for earth stations operating to NGSO systems in 10.7-12.75 GHz (space to Earth) and 14-14.5GHz (Earth to space) FSS allocation (for fixed and moving platforms); ETSI in process of developing an ETSI Srdoc in support of this process)

(To note by FM44 and SE40)

**O3b**

SES Global has acquired 100% of O3b Networks:

<http://spacenews.com/ses-exercises-option-to-buy-100-of-o3b-networks-will-raise-new-equity/>

Please note that the ECO has received a first operator notification under ECC/DEC/(15)04: Land and Maritime ESOMPs operating with NGSO FSS satellite systems in the frequency ranges 17.3-20.2 GHz, 27.5-29.1 GHz and 29.5-30.0 GHz, see <http://www.erodocdb.dk/doks/filedownload.aspx?fileid=4234&fileurl=http://www.erodocdb.dk/Docs/doc98/official/zip/ECCDEC1504.ZIP>

(To note by FM44 and SE40)

**FCC Issues Fines Related to Signal Jammers**

See: <http://www.radioresourcemag.com/News/NewsDetails/NewsID/14309> (26May 2016)

This concerns cellular, GPS and other signal jamming devices. It includes that after investigating a company, the FCC proposed a $34.9 million fine for marketing 285 jammer models in the U.S. and ordered that the company comply with federal law.

(For WGFM; WGFM#85 approved recently the amendment of ECC/REC/(04)01 - Forbidding the placing on the market and use of Jammers)

**FCC Consultation about the use of maritime DSC equipment**

Issued on 19 May 2016, the ECC started a consultation to investigate permitting use of Class D VHF DSC equipment in lieu of Class A equipment:

<http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0519/DA-16-558A1.pdf>

This was triggered by the U.S. Coast Guard. It concerns small vessels and proposes Class D equipment, which is less costly and provides minimum facilities for VHF DSC distress, urgency, and safety, as well as routing calling and reception, but is not in full conformance with GMDSS requirements for VHF installations.

(for information of the WGFM Maritime Forum Group)

**3GPP RAN4 specifying LTE-based V2X applications**

V2X applications were mentioned at the recent CEPT M2M Workshop in March 2016. Please note that 3GPP RAN4 has started to specify V2X applications and also conducts co-existence considerations (more precisely: adjacent coexistence evaluation of LTE based V2V operation and DSRC/IEEE 802.11p on adjacent carrier frequencies at the 5.9GHz ITS spectrum (latter one standardised by ETSI as ‘ITS G5’ – note that ‘DSRC’ means ‘ITS’ in this context, and not CEN DSRC road tolling).



WGFM noted the information on LTE V2X during the M2M workshop and discussions in the SRD/MG came to a confirmation that ITS G5 and LTE V2X could indeed not be operated on the same frequencies. This would be needed to be taken into account if a request for studies would be raised in the future within the ECC. In addition, the on-going investigations on Urban Rail applications (two different tracks: either using their own proprietary technology or use of the ITS protocol), as currently considered in ETSI, based on the request from WGFM, may also need to be considered in this context as well as the implementation memorandum in Europe of the Car-2-Car consortia to implement ITS G5 as specified in ETSI TC ITS.

(For information for the ECC, WGFM, ECC PT1 and SRD/MG)

**LTE in PPDR - Whitepaper from Huawei**

Published in May 2016, this whitepaper includes also some information about the actual deployment status and progress in select regions outside of Europe.



(For background information; ECC expected to finally adopt ECC/DEC/(16)02 for BB-PPDR)