MAJOR WRC-15 OUTCOMES

ANALYSIS REPORT ©

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Background

The International Telecommunication Union (ITU) convened the World Radiocommunication Conference 2015 (WRC–15) in Geneva, Switzerland, from 2 to 27 November 2015. WRCs are held every three to four years to review the regulatory framework for international spectrum management and satellite coordination. This framework is contained in the treaty level Radio Regulations. WRC–15 was the largest WRC held to date, with around 3800 registered participants representing over 160 of the ITU's Member states and other observers.

WRC–15 considered an agenda of 36 items, some of which contained multiple issues. The large agenda is a reflection of the complexity of the global radiocommunications environment (a complexity due in part to the rapid introduction of new technologies).

Qatar is a signatory to the ITU Convention, which is a treaty-level legal instrument that obliges Qatar to comply with the Radio Regulations. In essence, Qatar radiocommunications services must not cause interference to the services of other countries where those services operate in accordance with the Radio Regulations. Conversely, Qatar services are entitled to protection against interference from other countries.

The international spectrum management environment codified in the Radio Regulations also facilitate spectrum harmonization and resulting economies of scale in equipment manufacture.

Key National Objectives met at WRC–15

After almost a month's negotiation and debate, the delegation of Qatar at the recent International Telecommunication Union (ITU) 2015 World Radiocommunication Conference (WRC–15) in Geneva played a significant role in securing major outcomes for spectrum management to be integrated into the national regulatory framework over the next 12 months.

The benefits to Qatar from the outcomes of WRC–15 are considerable, and will form the basis of revisions of the CRA spectrum planning for the next four years.

These outcomes are a tribute to the extensive preparation in Qatar leading up to WRC–15 and the key government and industry experts participating in the delegation of Qatar at the conference.

Key outcomes include:

1. An allocation of 91 MHz in the frequency range 1427-1518 MHz for globally harmonized International Mobile Telecommunications (IMT).
2. Additional IMT identification in the band 694-790 MHz.
3. Agreement to a new agenda item for WRC–19 to explore options for additional IMT identifications above 6 GHz in support of new 5G technologies.
4. A single globally harmonized frequency range 694-894 MHz for Public Protection and Disaster Relief (public safety communications).
5. Agreement on an allocation in the frequency range 1087.7-1092.3 MHz to support global flight tracking by satellite receivers of civilian aircraft using existing transmissions from aircraft. (The agreement is part of the ITU's response to the disappearance of Malaysian Airlines Flight MH370 in March 2014.)
6. A global allocation for short-range high-resolution automotive radar in the 79 GHz frequency band.
7. A new Resolution that opens the way for the development by the International Civil Aviation Organization (ICAO) of worldwide standards for unmanned aircraft systems' satellite communications in certain frequency bands, and international regulatory conditions that may be applied to these systems.
8. Global spectrum allocation for wireless avionics intra-communications (WAIC) to facilitate the transition to wireless within aeroplanes.
9. An allocation of 250 MHz in the frequency range 13.5-13.75 GHz (DL) and 14.5-14.75 GHz (UL) for downlink and uplink of the fixed satellite service.

Following the formal treaty level approval processes, the many WRC–15 outcomes directly impacting Qatar will be integrated by the CRA into the national regulatory framework in preparation for the bringing into force of the latest version of the ITU Radio Regulations at the start of 2017.

The agenda for the next WRC to be held in 2019 (WRC–19) will be the focus of attention in the coming months as the CRA and industry consider the national implications and associated studies required to get preparatory work underway.

Major WRC-15 Outcomes

A number of WRC agenda items were identified as being of particular interest to Qatar. These items are summarized below, along with a summary of key conference outcomes.

1. International Mobile Telecommunications

Agenda item 1.1 International Mobile Telecommunications (IMT): Proposed to identify spectrum that would facilitate new mobile broadband applications. The issue is frequently contentious, as IMT applications often cannot share spectrum with other radiocommunication services in the same geographic and spectrum space.

WRC Outcome: Agenda item 1.1 was very contentious with negotiations and discussions continuing well into the final week of the conference. The final outcomes were that:

- 91 MHz in the frequency range 1427-1518 MHz was essentially globally harmonized for IMT (while Europe did not identify the range 1452-1492 MHz, in reality Europe already uses the band for IMT). This outcome was in line with Qatar objectives.

- The frequency range 3400-3600 MHz was also significantly internationally harmonized with Regions 1, 2 and a number of countries in Region 3 identifying the range for IMT. This outcome was in line with Qatar objectives. However, the identification of the band was on share basis with the Fixed Satellite Service and subject to regulatory conditions.

- Other bands, while not gaining such widespread support, were identified for use by IMT by groups of countries. These included 470-694/698 MHz, 3300-3400 MHz, 3700-3800 MHz and 4800-4990 MHz. This outcome was in line with Qatar objectives. However, the band 3300-3400 MHz was additionally considered by the region for fixed and mobile services.

- In addition, 96 MHz in the frequency range 694/698-790 MHz (the digital dividend) was significantly internationally harmonized with the Region 1 IMT identification coming into force.

As a final note, 13 of the 19 candidate bands considered resulted in no identification for IMT.

These WRC developments regarding IMT spectrum identifications are of relevance to the national spectrum planning for mobile broadband and in the main serve to reinforce thinking of the mobile broadband strategy.

CRA Plan:

1. To update the NFAP of Qatar as per the followed procedures;
2. To develop proposal for the band plan of the 700 MHz;
3. To develop proposal for the L-Band and explore the opportunity for regional harmonization of the band plan;
4. To regionally discuss the efficient use of the C-Band based on the new allocation;
5. To discuss with the industry the way forward of the IMT.

Agenda item 10 New agenda items for the next conference: Prior to the conference, there was widespread interest in establishing a new agenda item at WRC–19 to consider identification of spectrum for IMT with a focus on bands above 6 GHz. This is related to the WRC–15 agenda item 1.1 on IMT.

WRC Outcome: WRC–15 agreed on an agenda for WRC–19 that included an item to consider IMT identification in higher frequency ranges. This future agenda item has a number of specific ranges to study for a possible future IMT identification and hence is consistent with the Qatar objective of a focused future agenda item on IMT matters.

CRA Plan:

1. To discuss with the stakeholders the issues of the agenda items of WRC-19 and agree on common proposals;
2. To invite the industry for contributions on the technical discussions.

2. Safety Requirements

Agenda item 1.1 International Mobile Telecommunications (IMT): Proposed to identify spectrum that would facilitate new mobile broadband applications on share basis with the some other bands. As IMT applications often cannot share spectrum with other radiocommunication services in the same geographic and spectrum space, Qatar position was very clear to avoid the allocation and identification of spectrum on share basis between IMT and some other applications used by military and security agencies.

WRC Outcome: Agenda item 1.1 was very contentious with negotiations and discussions continuing well into the final week of the conference. The final outcomes were that:

- 200 MHz in the frequency range 2700-2900 MHz was not identified to facilitate new mobile broadband applications on share basis. The band was secured for the aeronautical radionavigation and radiolocation services.

- 100 MHz in the frequency range 3300-3400 MHz was not identified to facilitate new mobile broadband applications on share basis. The band was secured for radiolocation service.

- 190 MHz in the frequency range 4800-4990 MHz was not identified to facilitate new mobile broadband applications on share basis. The band was secured for fixed and mobile services.

- 200 MHz in the range of 3400-3600 MHz needs to be reconsidered in term of radiolocation service (secondary basis) after the identification of IMT within the range.

Agenda item 1.3 Public Protection and Disaster Relief (PPDR) communications: The purpose of this agenda item was to revise Resolution 646 on PPDR to include specific harmonized frequency arrangements for broadband PPDR communications.

WRC Outcome: Agenda item 1.3 was very contentious with negotiations and discussions continuing well into the final week of the conference. The final outcomes were that:

- The Resolution was updated to include a single globally harmonized frequency range for PPDR communications (694-894 MHz).

- Resolution 646 (Rev WRC-15) has taken into consideration the 700 MHz and 800 MHz bands for the broadband PPDR Applications.

- Administrations will now be able to choose a subset of that frequency range so as to leverage the economies of scale for PPDR equipment, which will result from harmonization. While this frequency range is not specifically earmarked for narrowband or broadband PPDR, it spans a number key sub-1 GHz IMT bands below 1 GHz, so it is expected to enhance markets for broadband PPDR equipment. A separate suite of regionally harmonized ranges was also agreed.

- The revised Resolution also now specifies that individual country PPDR frequency arrangements will be captured in an ITU-R Recommendation. That recommendation will effectively act as a repository for specific information on the PPDR frequency arrangements used by different countries for both narrowband and broadband PPDR communications, thereby providing further scope for economies of scale as well as improved cross-border cooperation in times of emergency.

- The combination of these measures will help improve equipment markets, particularly for broadband PPDR-grade (typically 4G-based) technologies, while retaining flexibility for administrations to choose frequencies/delivery models to suit their individual needs when establishing broadband PPDR capabilities. These outcomes were consistent with Qatar's preferred method to satisfy this agenda item.

CRA Plan:

1. To update the NFAP of Qatar as per the followed procedures;
2. To develop the band plan for the 700 MHz based on the outcomes of the region discussion and discuss with the stakeholders the way forward for the assignment of 700 MHz band;
3. To discuss with the stakeholders the current allocation of service within the 3400-3600 MHz band and agree on the way forward.

3. Satellite Services

Agenda item 1.5 Unmanned aircraft systems (UAS): Proposed to make provision in the Radio Regulations for the use of the fixed-satellite service (FSS) for the safe integration of remotely piloted aircraft systems into airspace shared with conventional air traffic.

WRC Outcome: This was a difficult political issue (concerns in some regions about drone aircraft) and a difficult technical issue, both in the lead-up to and at the conference.

- The final outcome was a complicated technical Resolution enabling use of the geostationary fixed-satellite service spectrum by UASs, however significant regulatory challenges need to be overcome first, including the adoption of relevant International Civil Aviation Organisation (ICAO) standards and recommended practices, and the successful conclusion of further ITU technical studies.

- Provisional allocation will come into force after the WRC-19 approval of technical conditions of command and non-payload communication (CNPC) links usage of those bands.

- These activities are not expected to conclude before WRC-19.

CRA Plan:

1. Coordinate with the main stakeholders for efficient contributions for the ongoing studies on this topic.

Agenda item 1.6 Fixed Satellite Service (FSS): Proposed to make an allocation in the frequency range 13.5-13.80 GHz and 14.5-14.80 GHz for downlink and uplink of the fixed satellite service.

WRC Outcome: The satellite industry secured additional Ku-band spectrum for fixed-services, although with some technical limitations on the new uplink allocations 14.5-14.8 GHz band. The outcome was entirely consistent with Qatar's position to WRC–15. Qatar took a leading role within the region, and indeed internationally, to ensure that an allocation was successful.

Agenda item 1.10 Mobile Satellite Service (MSS): Proposed to consider spectrum requirements and possible additional spectrum allocations for the mobile-satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including International Mobile Telecommunications (IMT), within the frequency range from 22 GHz to 26 GHz.

WRC Outcome: allocation was not achieved due to the fact the proponent were not to proof the compatibility between the mobile satellite service and the fixed and mobile services. The outcome was entirely consistent with Qatar's position to WRC–15 as Qatar interest was to safeguard the existing and future terrestrial services rather than including new satellite service on share basis with the existing services without acceptable compatibility.

Other Satellite issues: Mobility applications accessing the fixed-satellite service spectrum also received a boost with 1.2m earth stations on vessels being approved beyond 330Km of shore, and with the access to the Ka-bands 19.7-20.2 GHz and 29.5-30 GHz by earth stations in motion (ESIMs).

- The WRC-19 will consider extending ESIM access in the Ka-band to include the 17.7-19.7 GHz and 27.5-29.5 GHz bands. Regulatory procedures relating to non-geostationary networks had been in focus, following industry interest and the report of the Director for the Radiocommunication Bureau, but the procedures will be left unchanged pending technical studies for WRC-19.

- The WRC-19 Conference is also set to consider the regulatory framework for Q- and V-band non-geostationary satellite systems, as the fixed-satellite community seek to extend their operations to these higher frequency bands.

The Qatar delegation to the Conference had supported changes to the regulations at WRC-15 to avoid any potential 'gaming' of the current procedures for bringing frequency assignments into use by non-geostationary network operators between now and the 2019 Conference.

CRA Plan:

1. To update the NFAP of Qatar as per the followed procedures;
2. To update the Maritime Ship Station license terms and conditions by incorporating the changes made in the regulatory provisions regarding use of Ka band (17.7-19.7 GHz and 27.5-29.5 GHz) by ESoVs;
3. To coordinate with the stakeholders and discuss future satellite requirements;
4. To study ESOMPs matter on national and regional levels to set out the necessary regulatory framework.

4. Navigation Services

New Issue GFT Global Flight Tracking for civil aviation: This was an issue added to the WRC–15 agenda late in the WRC cycle. It proposed to improve the tracking of aircraft anywhere in the world and had considerable profile due to loss of various commercial aircraft in recent years.

WRC Outcome: Agreement was reached on an allocation in the frequency range 1087.7-1092.3 MHz to support global flight tracking of civilian aircraft using existing transmissions from aircraft by satellite receivers.

- This system is known as Automatic Dependent Surveillance (ADS-B). This followed the ICAO encouraging the ITU to take urgent action to provide the necessary spectrum allocation to support emerging aviation needs.

- The identification of the 1090MHz band for satellite-enabled automatic dependent surveillance-broadcast (ADS-B) generated much optimism. In the wake of recent commercial aviation disasters, this allocation was welcomed universally.

The outcome was entirely consistent with Qatar's position to WRC–15. Qatar took a role within the region, and indeed internationally, to ensure that an allocation was successful, but also to ensure that existing use of the band was not compromised.

Agenda item 1.15 Maritime Services: Proposed to consider the spectrum demand for on-board communication stations in the maritime mobile service.

WRC Outcome: No identification of additional spectrum for on-board communications in UHF.

- Promote efficient usage of the existing spectrum by implementing 12.5 and 6.25 kHz bandwidth for all channels identified for on-board communications.

- RR footnote No. 5.287 amended ("…The characteristics of the equipment and the channeling arrangement shall be in accordance with Recommendation ITU-R M.1174-3…")

- Suppression of Resolution 358 (WRC-12) "Consideration of improvement and expansion of on-board communication stations in the maritime mobile service in the UHF bands".

CRA Plan:

1. To reserve the frequency pair of 457.5375 and 467.5375 MHz with 12.5 kHz channeling space for on-board vessel communications as per ITU-R M.1174-3 in light of RR 5.287;
2. To promote the use of 6.25 kHz for DMR Technology to achieve more spectrum efficiency.

Agenda item 1.16 Enable possible new Automatic Identification System (AIS) technology applications and possible new applications to improve maritime radiocommunication. This was an important agenda item for Qatar as it has been identified that in countries or regions where AIS is

used for purposes other than GMDSS, there will be problem of VHF channel loading on currently used two channels (i.e. 87 and 88).

In Qatar, we use these channels for other purposes than GMDSS (e.g. AIS over small ships as per the recent decision by MOTC in 2015). The problem of channel loading will be there in near future; hence, we need additional spectrum for AIS so that all these applications are catered properly.

WRC Outcome: Identification of Application Specific Messages (ASM) Channels (Channels 2027 and 2028) effective from 1 Jan 2019,

- Protection of the existing AIS
- Identification of the terrestrial component of the VHF data exchange system (VDES) and the international VDES channels, with effect from 1 Jan 2017 within frequency bands 157.200-157.325 MHz and 161.800-161.925 MHz (corresponding to channels: 24, 84, 25, 85, 26 and 86)
- Regarding the satellite component of the VDES, it was agreed to revise the associated Resolution 360 and to consider the issue further at WRC-19.

CRA Plan:

1. To update the NFAP of Qatar by incorporating the recent modifications in RR Appendix 18 and other relevant ITU-R recommendations as per the followed procedures;
2. To set a roadmap for implementation of VDES to ensure smooth implementation of this recent application;
3. To conduct workshops and meetings with stakeholders to ensure full understanding of the newly and future allocations of frequencies for maritime applications.

Agenda item 1.9.2 Allocation to the maritime-mobile satellite service in the 7-8 GHz range. Qatar position was to oppose any new allocations for Maritime Mobile-Satellite Service in both bands to protect the existing services in these bands.

WRC Outcome: Allocation of the band 7375-7750 MHz (Space-to-Earth) for Maritime Mobile Satellite Services with conditions: limited to geostationary satellites, and that MMSS does not claim

protection from, nor constrain the use or development of the existing terrestrial services in this band. No change in the band 8025-8400 MHz (Earth-to-Space).

CRA Plan:

1. To update NFAP of Qatar with the relevant new footnotes as per the followed procedures;
2. To coordinate with stakeholders to see their future requirements regarding this new allocation;
3. To evaluate the possible regulatory constraints for this new service in the band 7375-7750 MHz.

5. Others

Agenda item 1.4 Amateur Radio Service (ARS): Proposed an allocation of spectrum in the frequency range 5250-5450 KHz for amateur radio service.

WRC Outcome: Agreement reached to allocate 15 KHz bandwidth for the amateur radio service within the frequency range 5351.5-5366.5 KHz on secondary basis and subject to other regulatory conditions. This will improve the amateur operation experience when the propagation conditions do not allow proper communications in the lower and upper bands.

The outcome was entirely consistent with Qatar's position to WRC–15.

Agenda item 1.14 Future of Coordinated Universal Time (UTC): This considered the possible cessation of the global practice of the occasional insertion of a leap second to UTC to maintain accurate time. The matter has implications beyond radiocommunications across many industry interests.

WRC Outcome: WRC-15 did not resolve issues relating to the insertion of a leap second into UTC. Instead, WRC–15 agreed to transfer ownership of the issue to another international body with a clearer role in time-related matters. In effect, this will defer resolution of the UTC issue for a number of years. While this outcome did not see the removal of the 'leap second', this outcome is considered a pragmatic way forward.

Agenda item 1.17 Wireless avionics intra-communication systems (WAIC): proposed to consider possible spectrum requirements and regulatory actions, including appropriate aeronautical allocations, to support wireless avionics intra-communications (WAIC).

WRC Outcome: Another win came in the form of an allocation in the 4200-4400 MHz band for wireless avionics intra-communication systems (WAIC). This had been a long-standing objective of airline manufacturers striving to capture increased volumes of data from aircraft systems during all phases of flight.

CRA Plan:

1. To update NFAP of Qatar as per the followed procedures;
2. To follow up and explore the Standards and Recommended Practices (SARPs) that will be prepared by ICAO for WAIC systems as per Resolution COM4/1 WRC-15;
3. To coordinate with the concerned parties regarding the implementation of the WAIC once becomes mature application in the allocated frequency band.

Agenda item 1.18 Global allocation for short-range high-resolution automotive radar in the 77.5 - 78.0 GHz frequency band.

WRC Outcome: Allocation agreed on primary basis. The use of the frequency band 77.5-78 GHz by the radiolocation service shall be limited to short-range radar for ground-based applications, including automotive radars.

– The automotive industry, and others interested in future intelligent transport initiatives, will optimism the identification of spectrum for short-range vehicular in the 78-80 GHz band to aid automotive safety,

– The associated provisions, refer to the most recent version of Recommendation ITU-R M.2057, which contains the technical characteristics of the automotive radars and to a new WRC Resolution providing information on the compatibility studies performed by ITU-R during the study cycle and calling for further studies to assist administrations in ensuring compatibility between applications of the various services operating in the 76-81 GHz frequency range.

– While WRC-19 will consider the possible global and regional harmonisation of radio spectrum for intelligent transport systems (ITS) under the existing mobile-service allocations.

CRA Plan:

1. To update NFAP of Qatar as per the followed procedures;
2. To follow up the technical studies on the coexistence of the radiolocation service, amateur, amateur-satellite and radio astronomy services in the frequency band 76-81 GHz;
3. To coordinate with the stakeholders regarding the implementation of the ITS systems operating on this band.

Next steps

National implications from WRC-15

As usual, changes to the international Radio Regulations will have some flow-on impact to the national spectrum management arrangements, in particular the next update to the Qatar national frequency allocation plan. WRC–15 outcomes also provide market signals, in terms of the evolving use of the spectrum in various bands and hence will also influence interest in various bands for different applications, in particular mobile broadband by way of IMT identifications. These factors will be considered as part of the CRA's ongoing awareness of spectrum management trends.

Issues for WRC–19

Agenda items for WRC–19 are now largely fixed, excluding very unusual circumstances such as when Global Flight Tracking for Civil Aviation was added to WRC–15 agenda. The nature of any issues or difficulties for Qatar spectrum users for the various agenda items will become clearer over the next 12 months or so, as methods for addressing the items begin to be developed by the various international and national study groups.

– WRC-19 will address potential further spectrum to be identified for IMT in the 24.5-27.5 GHz band and several further bands above 30 GHz. It will be interesting to see whether these bands

present the opportunity for the mobile industry to secure long-proposed identification of several gigahertz of bandwidth for IMT applications;

- Global Aeronautical and Global Maritime Distress and Safety Systems (more familiar as GADSS and GMDSS, respectively);

- Additional 5 GHz spectrum for radio local area networks (WAS/RLANs);

- Compatibility of mobile-satellite, meteorological satellite and earth exploration-satellite services in the 400MHz band;

- New maritime mobile-satellite service allocations for VHF data exchange systems;

- Spectrum needs for telemetry, tracking and command in the space operation service for short duration non-geostationary satellite systems;

- Spectrum requirements for high-altitude platform stations within existing fixed-service allocations for the provision of ultra-fast broadband.