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ITU Forum “*Towards 5G Enabled Gigabit Society*”

Regulation and award of 5G pioneer bands in Italy

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Timeline of the AGCOM Decision n. 231/18/CONS

1st January: the *budget law 205/2017* for 2018-2020 entered into force.

- According to the law, AGCOM had to set the rules for awarding and using the available frequencies of the three pioneer bands for 5G in Europe, i.e. 694-790 MHz (to be freed for MFCN use by July 1st, 2022), 3.6-3.8 GHz and 26.5-27.5 GHz (both to be freed by December 1st, 2018)
- The ministry of economic development (MISE), based on the AGCOM rules, had to carry out the spectrum auction by September 2018
- Agcom had to publish its regulation by 30 April 2018
- The budget law set two goals:
 - income from the auction should be not lower than 2500 million € (1.25 billion € to be paid by 2018, the other part in 4 annual installments);
 - ensuring the widest level of 5G coverage and access for all users on the national territory

5th March: with Decision n. 89/18/CONS, AGCOM launched a public consultation on the rules to award the 5G pioneer bands for wireless broadband and to use the spectrum

4th April: End of the public consultation (24 participants (including Defense) + AGCM (Antitrust Authority) opinion)

8th May: AGCOM approved the final Decision n. 231/18/CONS (published on 23th May)

- AGCOM is the first NRA to define rules for the assignment and the use of spectrum in all the three pioneer bands for 5G in Europe

Spectrum offered

5G development can benefit from synergies among pioneer bands

- *Coverage-oriented band:*
 - **2x30 MHz** FDD and **up to 20 MHz** SDL in the 694-790 MHz band
- *Intermediate (coverage-capacity) band:*
 - **200 MHz** TDD in the 3.6-3.8 GHz band
- *Capacity-oriented band:*
 - **1 GHz** TDD in the 26.5-27.5 GHz band
- According to the budget law, protection must be guaranteed to:
 - the existing uses in terms of Fixed Satellite Services (FSS) and Earth Exploration Satellite Services (EESS)
 - the ongoing 5G trial projects in the 3.7-3.8 GHz sub-band, currently operating in 5 Italian cities (Milan, Prato, L'Aquila, Bari and Matera)

Packaging (1/3)

- 700 MHz band

- **FDD**: 6 blocks of 2x5 MHz (nationwide)
 - ❑ Reserved spectrum: 2 blocks (out of six) pre-auctioned to new entrants and the remedy taker of the merger case *M.7758 – Hutchinson 3G Italy/WIND/JV* (namely Iliad)
- **SDL**: up to 4 blocks of 5 MHz SDL (nationwide)
 - ❑ MISE decided to assign 3 blocks based on the verification of requirements of public protection and disaster relief (PPDR) sector

694-703	703-708	708-713	713-718	718-723	723-728	728-733	733-738	738-743	743-748	748-753	753-758	758-763	763-768	768-773	773-778	778-783	783-788	788-790
	FDD uplink							SDL				FDD downlink						
9 MHz guardband	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	5 MHz guardband	Abstract B1 - B3	Abstract B1 - B3	Abstract B1 - B3		Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	Abstract A1 - A6	2 MHz guardband

Packaging (2/3)

- 3600-3800 MHz band
 - 2 blocks of 80 MHz (nationwide)
 - 2 blocks of 20 MHz (nationwide)

3600-3620	3620-3640	3640-3660	3660-3680	3680-3700	3700-3720	3720-3740	3740-3760	3760-3780	3780-3800
TDD									
Abstracts C2 (80 MHz) C3 (20 MHz) C4 (20 MHz)						Concrete C1 (80 MHz)			

Packaging (3/3)

- 26 GHz band
 - 5 blocks of 200 MHz (nationwide)
 - individual licence not exclusive: “club use” (see later)

26500-26700	26700-26900	26900-27100	27100-27300	27300-27500
TDD				
Abstract D1 - D5	Abstract D1 - D5	Abstract D1 - D5	Abstract D1 - D5	Abstract D1 - D5

Spectrum caps

- 700 MHz FDD band
 - *intra*-band: 2x15 MHz
 - *inter*-band: 2x30 MHz including the 800 MHz and 900 MHz bands
- 700 MHz SDL band
 - none
 - ❑ (10 MHz if all the available 4 blocks were assigned by MISE)
- 3600-3800 MHz band
 - *intra*-band: 100 MHz
 - *inter*-band: 100 MHz including frequencies in the 3400-3600 MHz band
 - ❑ transitional cap until 2023, i.e. the deadline of the RoU
- 26 GHz band
 - 400 MHz (i.e. 2 blocks of 200 MHz)

Award procedure

- Simultaneous multi-band award procedure
 - All the assignments (for all the bands) as part of a single award procedure
 - Auction format: *simultaneous multiple round auction* (SMRA)
 - The assignment of the reserved lot (i.e. 2 blocks of 2x5 MHz FDD in the 700 MHz band) is performed before the other assignments
- Allocation of the abstract lots at the end of the award procedure
 - Once the bidding phase is concluded, within the next 10 days, operators are invited to present an allocation proposal for the abstract lots
 - If allocation proposals are not submitted by winning operators or accepted by MISE, MISE will carry out a public assignment procedure
 - In the latter case operators may choose respecting the order set by the average lot price paid, provided that all operators can get contiguous blocks (no other fees to pay)

Licence term

- 31th December 2037 for all the assigned lots
 - 700 MHz band: licence duration of 15 years and 6 months
 - 3600-3800 MHz and 26 GHz bands: licence duration of 19 years
- Appropriate time for the development of the new 5G technologies as well as to ensure the ROI.

Reserve price

Sigla del lotto	Banda (MHz)	Sistema duplex	Ampiezza Blocco (MHz)	Tipo di lotto	Denominazione	Numero lotti	Importo minimo
700_R	700	FDD	2 x 10	generico	A1-A2	1	€ 676.472.792,00
700_FDD	700	FDD	2 x 5	generico	A3-A6 (A1-A6) ²	4(6) ²	€ 338.236.396,00
700_SDL	700	FDD-SDL	1 x 5	generico	B1-B3	3	€ 84.559.099,00
3700_C1	3700	TDD	1 x 80	specifico	C1	1	€ 158.374.470,00
3700_C2	3700	TDD	1 x 80	generico	C2	1	€ 158.696.043,00
3700_C3-C4	3700	TDD	1 x 20	generico	C3-C4	2	€ 39.674.011,00
26G	26000	TDD	1 x 200	generico	D1-D5	5	€ 32.586.535,00

The reserve prices of all the spectrum to be awarded (excluding SDL band) ensure to reach the minimum target set by the budget law (i.e. **2,5 billion €**)

Obligations

- Three kinds of obligations in the licence conditions:
 - Obligations of spectrum usage
 - Coverage obligations
 - ❑ excluding 700 MHz SDL and 26 GHz bands
 - Access obligations
- If obligations are not respected, rights of use can be revoked
- Spectrum trading is not allowed within 2 years from the award
 - extended to 4 years for the frequencies of the reserved lot

Obligation of spectrum usage

- Starting from the award (or from the availability of the assigned frequencies, if later) licensees must use the awarded frequencies in all the Italian provinces within:
 - 2 years for the 3600-3800 MHz band,
 - 3 years for the 700 MHz SDL band,
 - 4 years for the 26.5-27.5 GHz band
- “*Use of the awarded frequencies*” means:
 - the activation of the physical carriers of BS/fixed links, connected to an *end-to-end* transport network, and
 - the commercial launch of the wireless broadband service (retail or wholesale), also in the form of roaming, MORAN, MOCN, or supply of network slices (normally with prohibition of frequency pooling)

Coverage obligations: 700 MHz FDD (1/2)

2 individual obligations

- Coverage of population:
 - within 3 years (4 for new entrants) from the availability of the awarded frequencies, each licensee must provide at least 80% of population with 5G services (eMBB, URLLC, mMTC), reasonably also indoor
 - in case of eMBB services, download speed of at least 30 Mbit/s must be ensured
 - coverage must include all the municipalities with more than 30,000 inhabitants and all the provincial capitals
 - for municipalities a sharing agreement is permitted at most by 2 operators and with specific 700 MHz frequencies
- Coverage of tourist areas:
 - within 48 months from the availability of frequencies, each licensee must provide 5G services (see above) in a certain number of tourist locations (max 2400 for all the licensees) throughout the national territory
 - within 2 years from the assignment, MISE will define the touristic areas to be covered, characterized by a significant number of tourists with respect to the residents
 - ❑ areas typically suffering from coverage/capacity issues since not stably inhabited (i.e. resorts, spas, villas, isolated groups of houses inhabited seasonally, etc.)
 - The identified locations are divided in 6 lists each associated by sorting to a single 2x5 FDD block; each operator must cover 90% of the areas in the list associated to its blocks

Coverage obligations: 700 MHz FDD (2/2)

2 **collective** obligations: aimed at cooperation among MNOs to cover remote areas and the main transport routes, as required by the European framework

- Coverage of population:
 - within 54 months from the availability of the awarded frequencies, licensees collectively (compliant with competition law) must provide at least 99,4% of population with 5G services (as above)
 - coverage must include at least 90% of the population of each of 120 municipalities identified as “*deep digital divide*” areas
 - roaming with spectrum pooling is permitted
- Coverage of the major terrestrial transport paths:
 - within 42 months from the availability of the awarded frequencies, licensees collectively (compliant with competition law) must provide the main national road and rail transport routes with 5G services (as above, but here considering the specific mobility requirements) - i.e. motorways and high speed railways, including connected nodes, such as stations and other important traffic nodes, such as ports and airports
 - at least one operator should cover the above areas; roaming (or other equivalent technical means) with spectrum pooling is permitted, and is mandatory in extra-urban areas
 - coverage must include corridors identified at European level

Coverage obligations: 3.6-3.8 GHz (1/2)

- **Obligation list:** for each region, at least 10% of the municipalities with less than 5.000 inhabitants
 - to be presented by each licensee within 90 days from the award
 - according to a complementary approach, only the buildings not covered by the national strategic plan for ultra-broadband services are part of the obligation
- ***Demand-driven service obligation:*** each licensee with at least 80 MHz at national level (in this band or in general in the 3.4-3.8 GHz band) must be “ready to deliver” 5G services (as above) to any (residential or business) applicant customer in the obligation area, within 6 months from the demand
 - offer conditions (including price) must be non-discriminatory and equivalent compared to the rest of the users and without charging any burden arising from the location of the applicant
 - in case of eMBB services, download speed of at least 30 Mbit/s must be ensured

Coverage obligations: 3.6-3.8 GHz (2/2)

- **“Use-it-or-lease-it”:**

- “free list”: the set of municipalities with less than 5.000 inhabitants (so called “*small commons*”) not included in the obligation lists of all licensees
- other operators not licensed in the frequency bands up to 3.6-3.8 GHz (or licensees in 3.5 GHz but with frequencies covering less than 40% of the national population) can use the frequencies in the 3.6-3.8 GHz band not used by the licensees in any municipalities of the “free list”, by leasing them
- price of leasing is set to the appropriate proportion of the winning bid
- the operators that lease frequencies have the same *demand-driven* service obligation of the licensees in the municipalities selected from the “free list”
- licensees may increase their obligation lists with new municipalities (when not already selected by operators requesting leasing)

Access obligations: 700 MHz FDD

- **National roaming:** operators that acquire spectrum in the 700 MHz FDD band must offer national roaming on their 700, 800 and 900 MHz networks to a new entrant acquiring spectrum in this band (excluding the *remedy taker*) for:
 - 30 months in the entire national territory;
 - 60 months in the areas not covered by the new entrant.
- Roaming conditions must be fair, non-discriminatory and transparent
- The new entrant has the right to national roaming only if it had launched commercial service and covered at least 10% of the population with its own frequencies.

Access obligations: 3.6-3.8 GHz

- Each winner of at least 80 MHz nationally in the 3.6-3.8 GHz band (or that reach this amount by adding up frequencies in the lower 3.4-3.6 GHz which they have any right or agreement to use) must provide access to other players not licensees in the bands up to 3.8 GHz (or licensees in 3.5 GHz but with frequencies covering less than 40% of the national population), e.g. other TLC operators or service providers.
- The access is provided on the following terms:
 - access is aimed at the development of 5G services and based on commercial agreement with fair and non-discriminatory conditions
 - the access agreement specifies the area of interest (that not necessarily includes areas where the holder has coverage obligations or in general intends to cover)
 - if the licensee does not cover the area where a player needs connectivity, the player can deploy the network, upon agreement or by leasing frequencies
- This obligation is also aimed at fostering verticals to develop innovative business cases, e.g. by exploiting high performance technologies (such as *Massive-MIMO* and *beamforming*) to offer future proof services

Access obligations: 26 GHz (1/2)

- **“Club use” model:** each licensee can dynamically use all the awarded spectrum (up to 1 GHz) in areas where frequencies are not used by other licensees.
 - To this aim, licensees can stipulate commercial reasonable and non-discriminatory agreements, proportionally sharing the costs
 - Each licence holder has the pre-emptive right in favour of its assigned lot (or lots)
 - Licensees can assign to a *trusted third party* the task of managing the uses to avoid harmful interference as well as the access scheduling

Access obligations: 26 GHz (2/2)

- Licensees must provide access (wholesale capacity) to other players (non TELCOs, e.g. service providers) for the development of 5G services
 - Where the requester asks for access in areas already covered, then the access is provided by the covering operator
 - Where the requester asks for access in areas not yet covered, licensees handle the request collectively or through the trusted third party; network deployment can be entrusted to a third party (the same or another)
 - The operator which is granted access cannot resell pure tlc services (save agreement with the licensees)
- In closed lands with public attendance (i.e. ports, airports, stadiums, arenas, cinemas, theatres, national parks, museums, metros, etc.), where the radio sites building must be authorised by the land owner/manager, the licensee(s) implementing coverage has to offer access to the other licensees
 - ...thus avoiding foreclosure mechanisms and duplication of investments
- In any moment AGCOM and MISE can intervene to regulate the guidelines that licensees must present within 180 days to handle the access requests, including by using a trusted third party, as well as to address the eventual disputes as in their remit

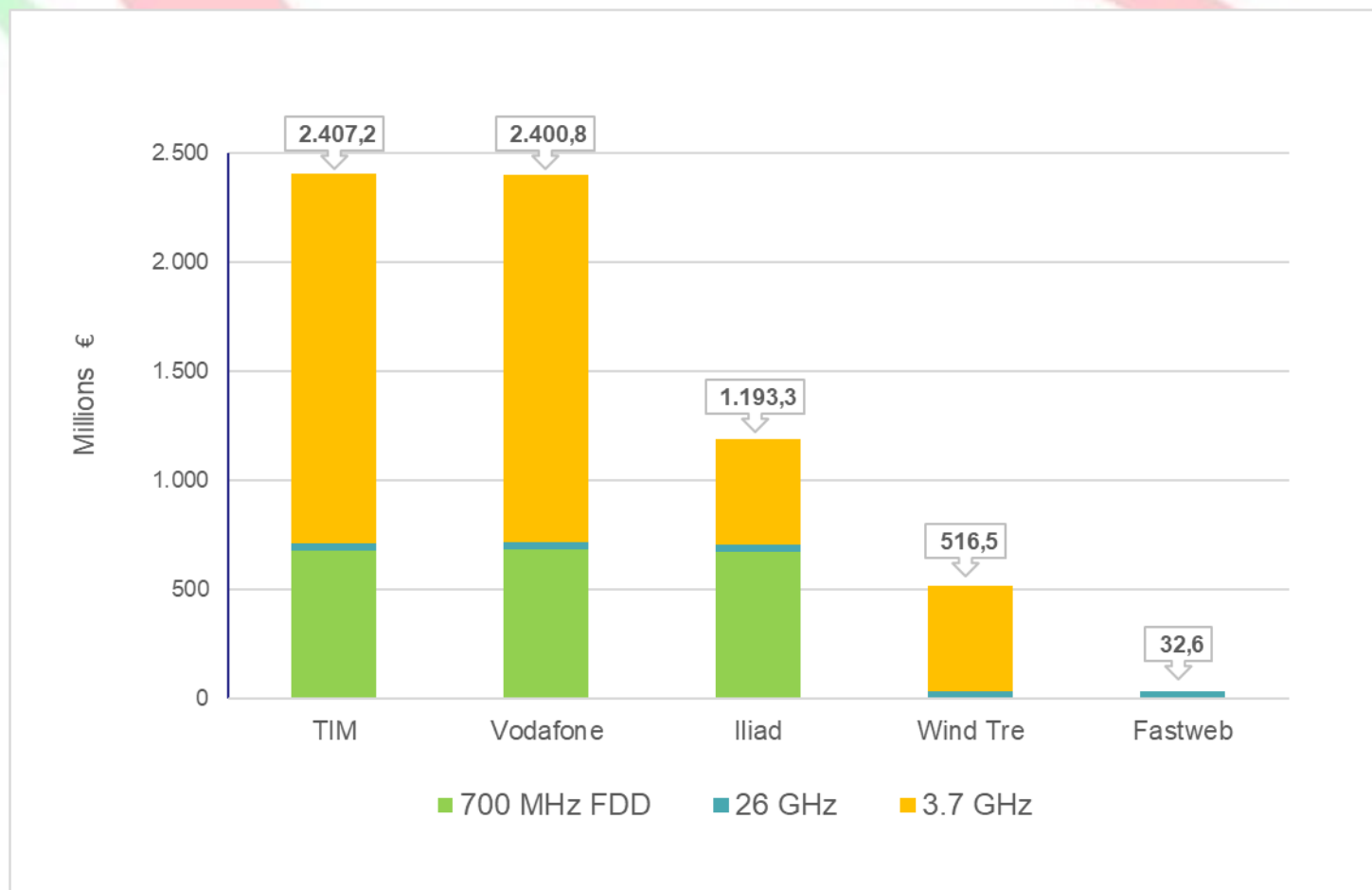
Timeline of Bands Award

- 23 May 2018: Agcom decision published
- 11 July 2018: The Ministry published the invitation to tender
- 6 August 2018: qualified bidders list approved
- 10 September 2018: first sealed irrevocable bids
- 13 September 2018: auction starts
- 2 October 2018: auction ends after 171 rounds
- 5 October 2018: tender ends with the selection of specific lots by winners

Final award prices

Band	Lot	Spectrum [MHz]	Winner	Price [€]	+% vs reserve price
700 MHz FDD	700_R	2x10	Iliad	676.472.792	0%
	700_FDD	2x5	Vodafone	345.000.000	2%
	700_FDD	2x5	Vodafone	338.236.396	0%
	700_FDD	2x5	TIM	340.100.000	0,6%
	700_FDD	2x5	TIM	340.100.000	0,6%
		2x30		2.039.909.188	0,52%
3.7 GHz	3700_C1	80	TIM	1.694.000.000	970%
	3700_C2	80	Vodafone	1.685.000.000	962%
	3700_C3	20	Wind Tre	483.920.000	1120%
	3700_C4	20	Iliad	483.900.000	1120%
		200		4.346.820.000	997%
26 GHz	26G	200	TIM	33.020.000	1,3%
	26G	200	Iliad	32.900.000	1,0%
	26G	200	Fastweb	32.600.000	0,04%
	26G	200	Wind Tre	32.586.535	0%
	26G	200	Vodafone	32.586.535	0%
		1000		163.693.070	0,5%
ALL		1260		6.550.422.258	162,0%

Final award prices per operator





Thank you for your attention

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