

# WRC-15

## Impact on Satellite Spectrum

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# CPM Report to WRC-15

Chapters	WRC-15 Agenda Items
1. Mobile & Amateur	<a href="#">1.1</a> , 1.2, 1.3, 1.4
2. Science	<a href="#">1.11</a> , <a href="#">1.12</a> , 1.13, 1.14, 9.2.1, 9.2.2
3. Aeronautical, Maritime, Radiolocation	1.5, 1.15, 1.16, 1.17, 1.18
4. Satellite services	
4.1 Fixed-satellite	<a href="#">1.6</a> , <a href="#">1.7</a> , 1.8, <a href="#">1.9.1</a>
4.2 Mobile-satellite	<a href="#">1.9.2</a> , <a href="#">1.10</a>
5. Satellite regulatory	7, 9.1.1, 9.1.2, 9.1.3, 9.1.5, 9.1.8, 9.3
6. General	2, 4, 9.1.4, 9.1.6, 9.1.7, <a href="#">10</a>
Annex 1	Global Flight Tracking

IMT

# IMT International Mobile Telecommunications

## Agenda Item 1.1

Additional spectrum allocations to mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications

# A11.1<sub>IMT</sub>

## Methods

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A	NOC
B	Allocation to MS on a primary basis (new or upgrade existing secondary allocation)
B (ToA)	.. in table of frequency allocation
B (FN)	.. in a footnote
C	Identify band for IMT in a new or existing footnote. Can be applied individually if there is already a primary mobile allocation or in conjunction with Method B

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# A11.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
1 - 470-694/698 MHz	A	A	A	A		A
2 – 1 350-1 400 MHz	A	A	C	A		A

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.

# A11.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
3 – 1 427-1 452 MHz	C	A	C	C	C	A
4 – 1 452-1 492 MHz		C	C	C	C	A
5 – 1 492-1 518 MHz	C	C	C	C	C	A
6 – 1 518-1 525 MHz	A	A		A		A

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.

# AI1.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
7 – 1 695-1 710 MHz	A	A	A	A		A
8 – 2 700-2 900 MHz	A	A			A	A
9 – 3 300-3 400 MHz		A		A		A

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.



# A11.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
10 – 3 400-3 600 MHz	A	B&C		B&C	B&C	A
11 – 3 600-3 700 MHz	A	A	A	B&C	A	A
12 – 3 700-3 800 MHz	A	A	A	B&C	A	A
13 – 3 800-4 200 MHz	A	A	A	A	A	A

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.

# A11.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
14 – 4 400-4 500 MHz		A	A	A		C
15 – 4 500-4 800 MHz	A	A	A	A	A	A
16 – 4 800-4 990 MHz		A		A		C

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.

# AI1.1 IMT



Frequency Band	APT	ASMG	ATU	CEPT	CITEL	RCC
17 – 5 350-5 470 MHz	A	A	A	A	A	A
18 – 5 725-5 850 MHz	A	A	A	A		A
19 – 5 925-6 425 MHz	A	A	A	A	A	C

A: NOC, B: Allocation to MS on a primary basis, C: Identify band for IMT in a new or existing footnote.

EESS

# EESS Earth Exploration-Satellite Service

## Agenda Item 1.11

Primary allocation for EESS (Earth-to-space) in the 7-8 GHz range

## Agenda Item 1.12

Extension of current worldwide allocation to EESS (active) service in 9 300-9 900 MHz by up to 600 MHz within 8 700-9 300 MHz and/or 9 900-10 500 MHz

# A11.11 Primary EESS 7-8 GHz

## Methods

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- |   |  |
|---|--|
| A | Add a global primary allocation to EESS (Earth-to-space) in the frequency band 7190-7250 MHz with different conditions establishing protection of currently allocated services |
| B | Similar to Method A, except operation of EESS systems in 7190-7235 MHz is subject to No. 9.21 with regard to SO  |
| C | NOC  |
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# A11.11 Primary EESS 7-8 GHz



Method	APT	ASMG	ATU	CEPT	CITEL	RCC
A – Alloc. without No. 9.21	Supports (MOD)		Supports	Supports	Supports	No objection
B – Alloc. with No. 9.21		Supports				
C - NOC						

# A11.12 Extension of EESS 9300-9900 MHz

Methods	Primary EESS (active) allocation
A	9 900-10 500 MHz with 2 options: Method A1 (with two sub-options) and Method A2 (PFD limits to protect FS)
B	9 200-9 300 MHz and 9 900-10 400 MHz with 2 options: Method B1 and Method B2 (PFD limits to protect FS)
C	9 200-9 300 MHz and 10 000-10 100 MHz, and secondary in 9 900-10 000 MHz
D	NOC



# A11.12 Extension of EESS 9300-9900 MHz



Method	APT	ASMG	ATU	CEPT	CITEL	RCC
A – 9 900-10 500 MHz (P)			Some Support (A2)		Supports (A1, Opt 2)	Supports (A2)
B – 9 200-9 300 MHz & 9 900- 10 400 (P)	Supports (B2)		Some Support (B1)	Supports (B1)		
C – 9200-9300 MHz & 10.0-10.1 GHz (P), 9900-10 000 MHz (s)						
D – NOC		Supports	Some Support			

FSS

# FSS Fixed-Satellite Service

## Agenda Item 1.6.1

Additional primary allocations to FSS (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 and 17 GHz in Region 1

## Agenda Item 1.6.2

Additional primary allocations to FSS (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13-17 GHz

## Agenda Item 1.9.1

New allocations to FSS in 7150-7250 MHz (space-to-Earth) and 8400-8500 MHz (Earth-to-space)

## Agenda Item 1.7

Review use of 5091-5150 MHz by FSS (Earth-to-space) (limited to feeder links of the NGSO mobile-satellite systems in MSS)

# A11.6.1 Primary FSS (up & down) in R1



Bands (GHz)	Methods	APT	ASMG	ATU	CEPT	CITEL	RCC
10.00-10.68 13.25-13.40	A↑ to DD↓	NOC	NOC	NOC	NOC	NOC	NOC
13.40-13.75	E↑	Oppose	NOC	NOC	Oppose	NOC	Oppose
	EE↓	Support 13.4-13.65	Support	-	Support 13.4-13.65	-	Support 13.4-13.65
14.50-14.80	F↑	-	NOC	NOC	[Support 14.5-14.75]	NOC	Support 14.5-14.75
	FF↓	Oppose	NOC	NOC	-	NOC	-
14.80-15.35	G↑	NOC	NOC	NOC	-	NOC	Oppose
	GG↓	NOC	NOC	NOC	-	NOC	Support 14.85-15.1
15.35-17.00	H↑ to KK↓	NOC	NOC	NOC	NOC	NOC	NOC

# A11.6.2 Primary FSS (up) in R2 & 3



Bands (GHz)	Methods	APT	ASMG	ATU	CEPT	CITEL	RCC
13.25-13.40	D↑	NOC	No constraints to R1	NOC	Oppose	NOC	NOC
13.40-13.75	E↑	-		-	Oppose	NOC	Oppose
14.50-14.80	F↑	-		-	3 Options	-	Support
14.80-15.35	G↑	NOC		-	-	-	Oppose
15.35-15.40	H↑	NOC		NOC	Oppose	-	-
15.40-17.00	I↑ to K↑	NOC		NOC	NOC	NOC	NOC

# A11.9.1 Allocation to FSS 7/8 GHz

Methods	Primary worldwide allocation
A	<b>7150-7250 (s-E) &amp; 8400-8 500 (E-s) MHz</b> Comply with EIRP spectral density mask Limited to specific transmit E/S (>3.5m) Shall not claim protection from SRS, SOS
B	Same as A, <b>7190-7250 (s-E) &amp; 8400-8 500MHz (E-s)</b>
C	NOC

# A11.9.1 Allocation to FSS 7/8 GHz



Method	APT	ASMG	ATU	CEPT	CITEL	RCC
A				Allocation		
B						
C	NOC	NOC	NOC	NOC	NOC	NOC

# AI1.7 5091-5150 MHz NGSO FSS FL

## Methods

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- Maintain 5091-5150 MHz as primary allocation for FSS FL to NGSO MSS
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MSS

# MSS Mobile-Satellite Service

## Agenda Item 1.10

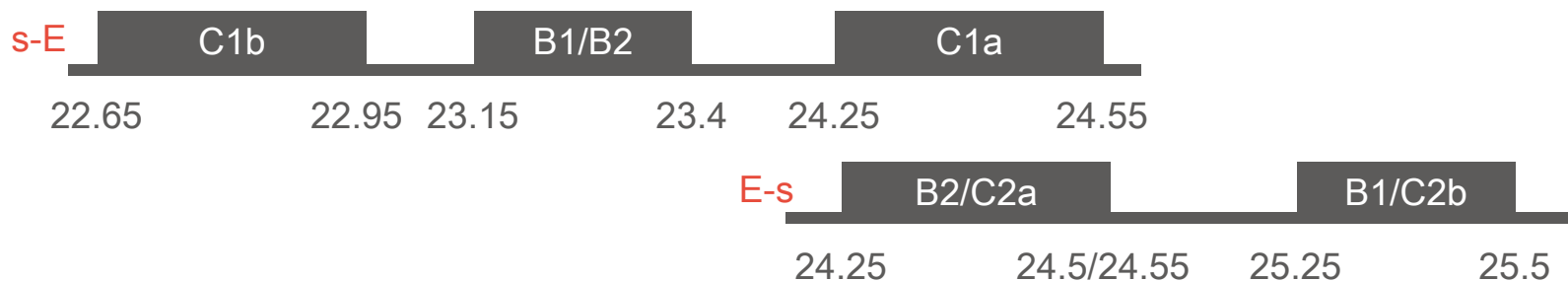
Additional spectrum allocations for MSS in Earth-to-space and space-to-Earth directions, including satellite component for broadband applications, including IMT, within 22 to 26 GHz

## Agenda Item 1.9.2

Allocating 7375-7 750 MHz and 8025-8 400 MHz to Maritime MSS

# AI1.10 Allocation to MSS 22-26 GHz

Methods	Allocation to GSO MSS (GHz)
A	NOC
B1	23.15-23.4 (s-E) & 25.25-25.5 (E-s)
B2	23.15-23.4 (s-E) & 24.25-24.5 (E-s)
C1	a: 24.25-24.55 (s-E) b: 22.65-22.95 (s-E)
C2	a: 24.25-24.55 (E-s) b: 25.25-25.5 (E-s)



# A11.10 Allocation to MSS 22-26 GHz



Method	APT	ASMG	ATU	CEPT	CITEL	RCC
A	NOC	NOC	NOC	NOC	NOC	
B1						
B2						
C1a						24.25-24.55 or 23.15-23.55
C1b						
C2a						24.25-24.55 or 25.25-25.50
C2b						

# A11.9.2 Allocation to Maritime MSS 7/8 GHz

Methods	Allocation to GSO MMSS (MHz)
A	NOC
B	7 375-7 750 (s-E) & 8 025-8 400 (E-s) Apply existing PFD limits to MMSS (s-E) Coordination under Nos. 9.21 & 9.21 for MMSS MMSS E/S: Nos. 9.21 & 9.17, 9.17A, 9.18 (Option A) or WRC Resolution (Option B)
C	7 375-7 750 (s-E) only MMSS does not claim protection from, nor constrain the use or development of incumbent terrestrial services Sharing with space services under Art.9

# A11.9.2 Allocation to Maritime MSS 7/8 GHz



Method	APT	ASMG	ATU	CEPT	CITEL	RCC
A	NOC	NOC	NOC		NOC	NOC
B	Oppose E-s					
C				Support		

# FUTURE AI

# AI10 Possible Future Agenda Items

## IMT

Spectrum requirements and potential identification for terrestrial component of IMT to facilitate mobile broadband applications in within [6-100 GHz]

## FSS

Additional primary allocation to FSS (E-s) in 51.4-52.4 GHz related to non-GSO FSS systems in 37.5-52.4 GHz (CEPT)

Use of 17.7-19.7 GHz and 27.5-29.5 GHz by ESOMPs communicating with GSO space stations in FSS (CEPT)

Additional allocations in 32.3-33 and 37.5-39.5 GHz to FSS for both GSO and non-GSO (CITEL)

## Small NGSO

Allocation to space operation in 137-960 MHz to accommodate the growing number of small NGSO satellites (CEPT)

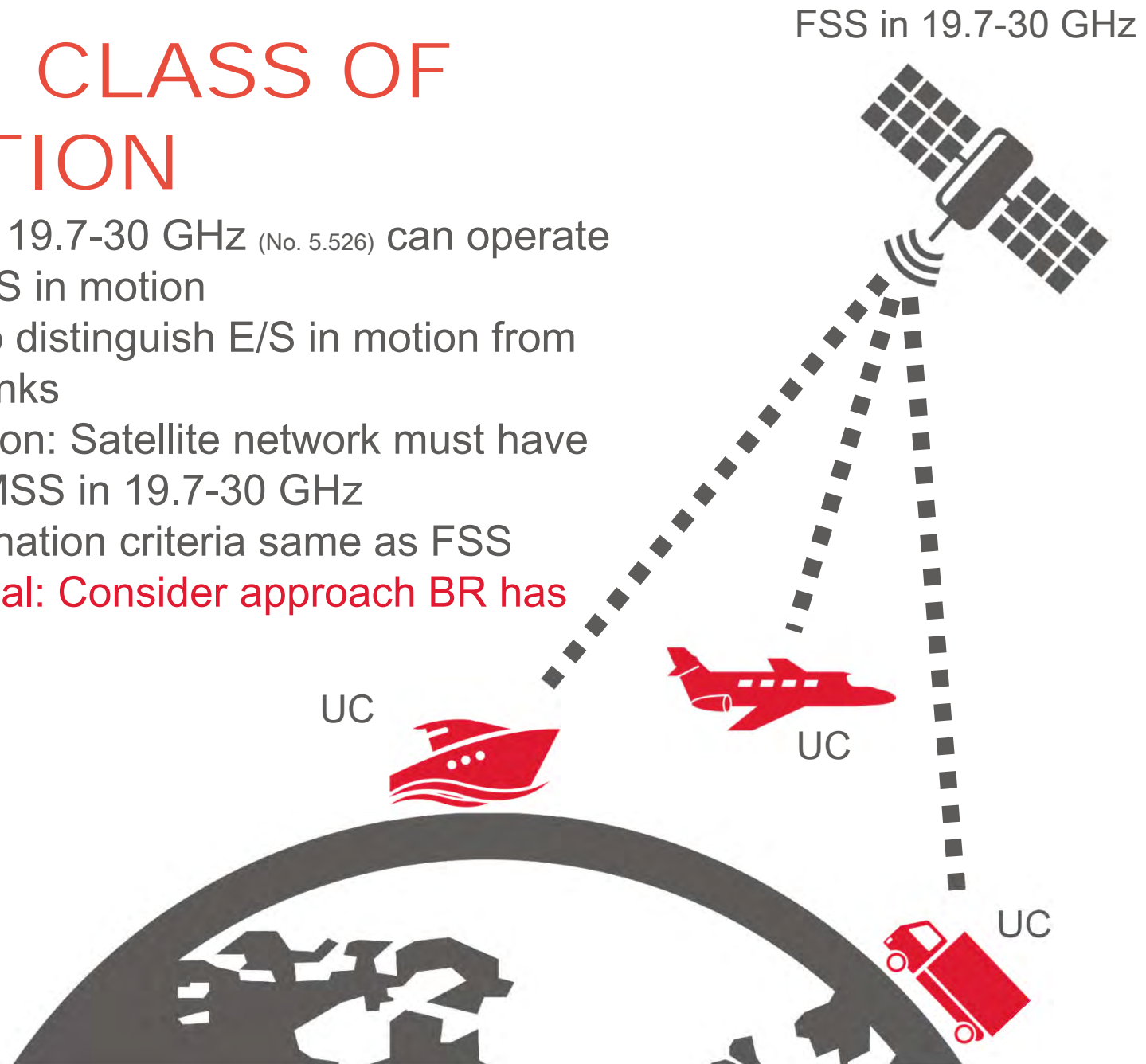


# EXTRACT

BR DIRECTOR'S REPORT TO WRC-15

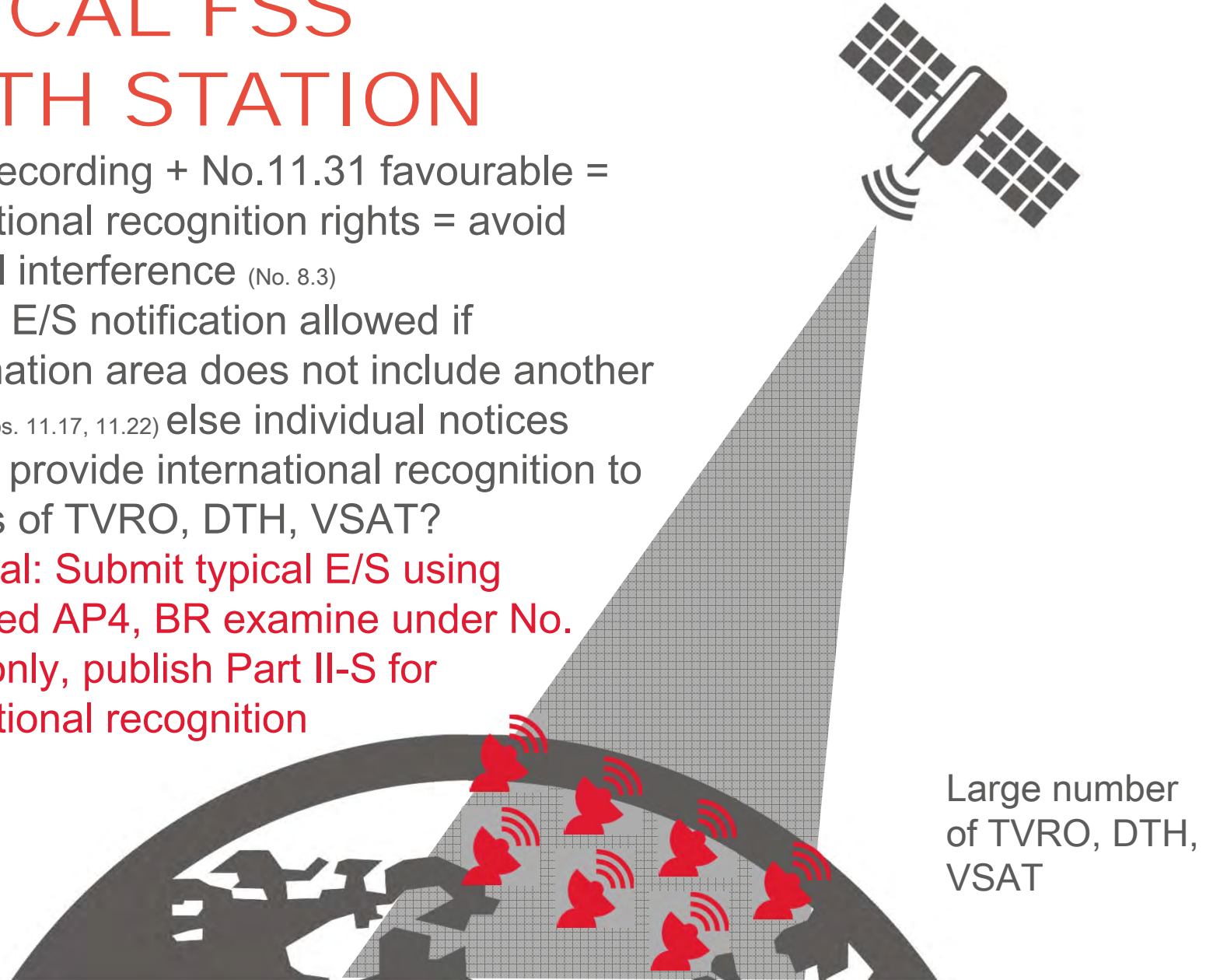
# "UC" CLASS OF STATION

- FSS in 19.7-30 GHz (No. 5.526) can operate with E/S in motion
- "UC" to distinguish E/S in motion from other links
- Condition: Satellite network must have FSS+MSS in 19.7-30 GHz
- Coordination criteria same as FSS
- **Proposal: Consider approach BR has taken**



# TYPICAL FSS EARTH STATION

- MIFR recording + No.11.31 favourable = international recognition rights = avoid harmful interference (No. 8.3)
- Typical E/S notification allowed if coordination area does not include another Adm (Nos. 11.17, 11.22) else individual notices
- How to provide international recognition to millions of TVRO, DTH, VSAT?
- **Proposal: Submit typical E/S using simplified AP4, BR examine under No. 11.31 only, publish Part II-S for international recognition**



# NGSO

Large number of frequency assignments / complex systems

- BR unable to establish findings in SRS database; results presented in a table instead
- BR software unable to cope; tools being upgraded
- BR could not comply with CR publication 4-month period
- BR requesting clarification on complex systems with no clear indication of configuration to implemented

# NGSO

Current bringing into use practice

- One NGSO satellite at one orbital plane
- Capable to transmit or receive frequency assignment
- 90 days of operation

To avoid spectrum warehousing / “paper satellites”, redefine BIU

- % of total number of satellites by end of 7 years
- Total deployment after [X] years
- Else cancellation and adjustment of notified information based on actual use

# WRC-15

## Impact on Satellite Spectrum

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