



GLOBAL UPDATE ON DIGITAL DIVIDEND

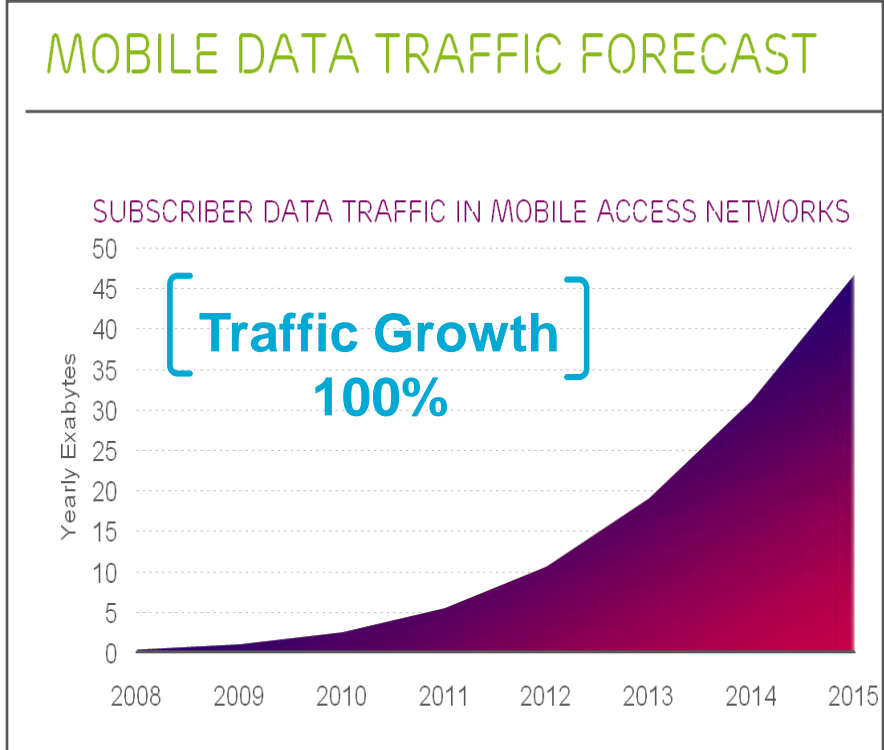
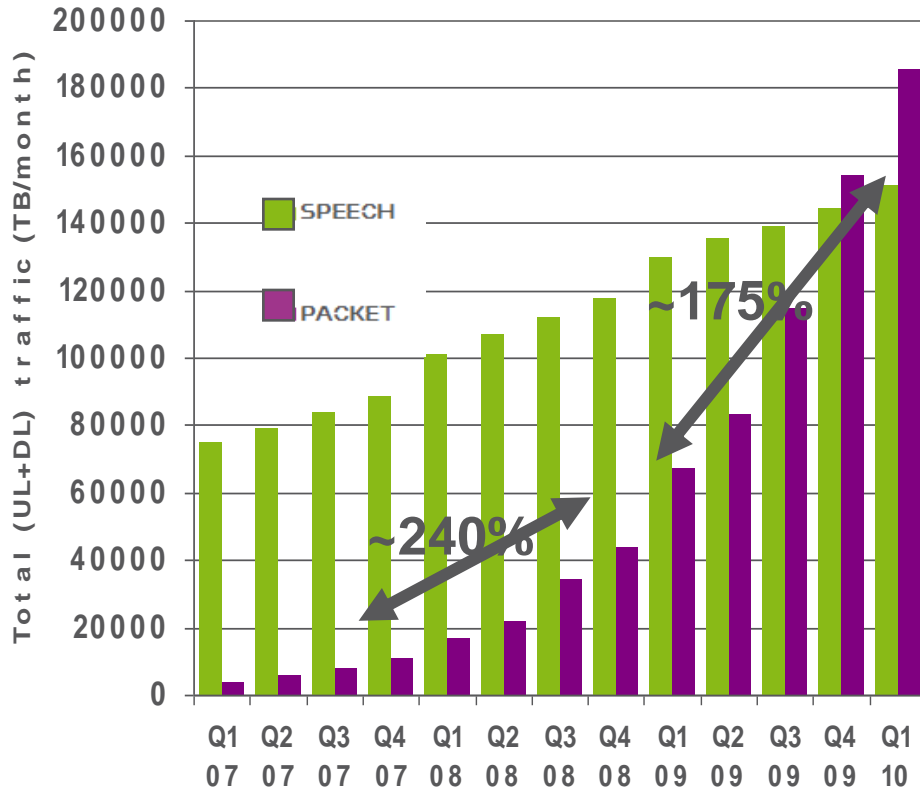
HÅKAN OHLSÉN
LASSE WIEWEG

GROUP FUNCTION
ERICSSON



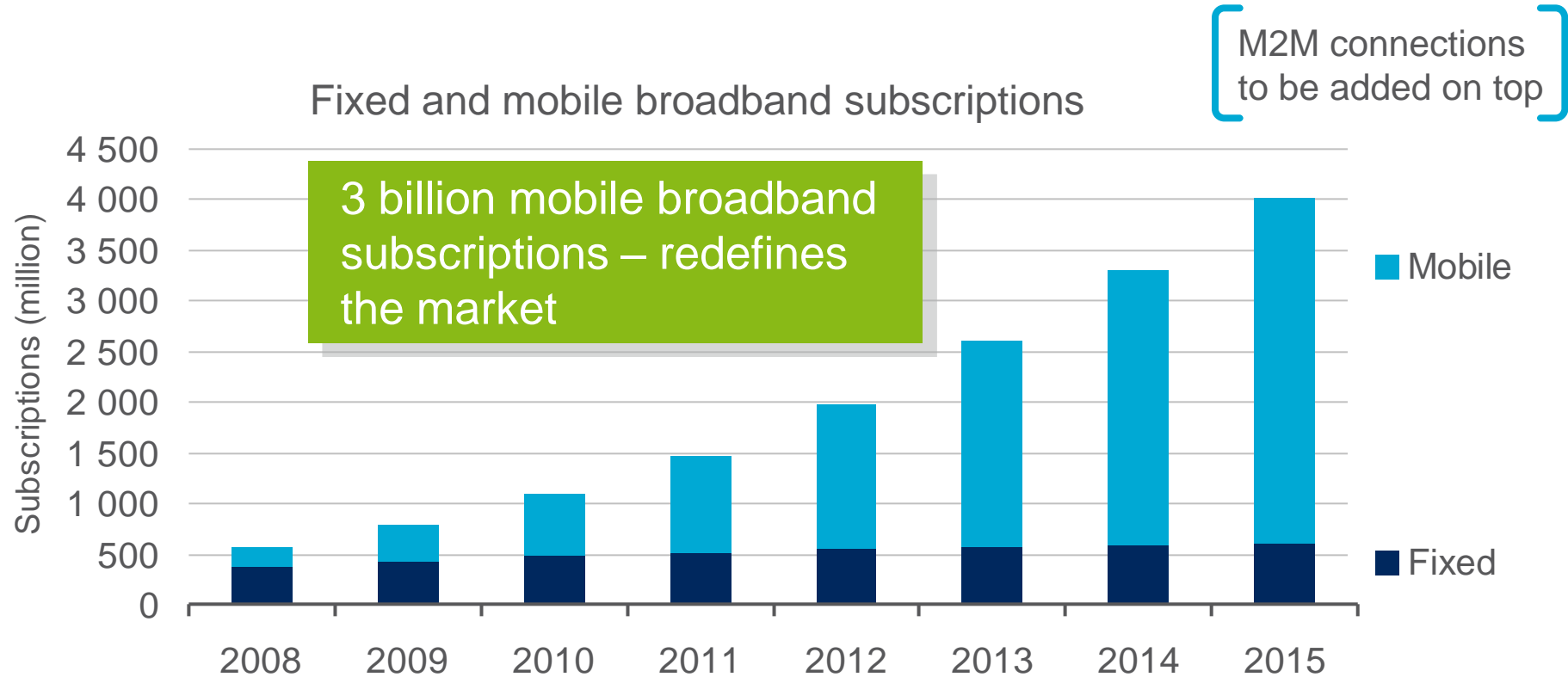
DA NANG, VIETNAM
JUNE 7-8, 2010

MEASURED MOBILE VOICE AND DATA TRAFFIC



Source: Ericsson Measurements in Global Networks
(DVB-H, Mobile WiMax, M2M and WiFi traffic not included)

BROADBAND SUBSCRIPTIONS



Source: Ericsson

Mobile Broadband includes: CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX & TDSCDMA. It includes handsets, USB dongles, embedded modules etc. The vast majority is handsets.

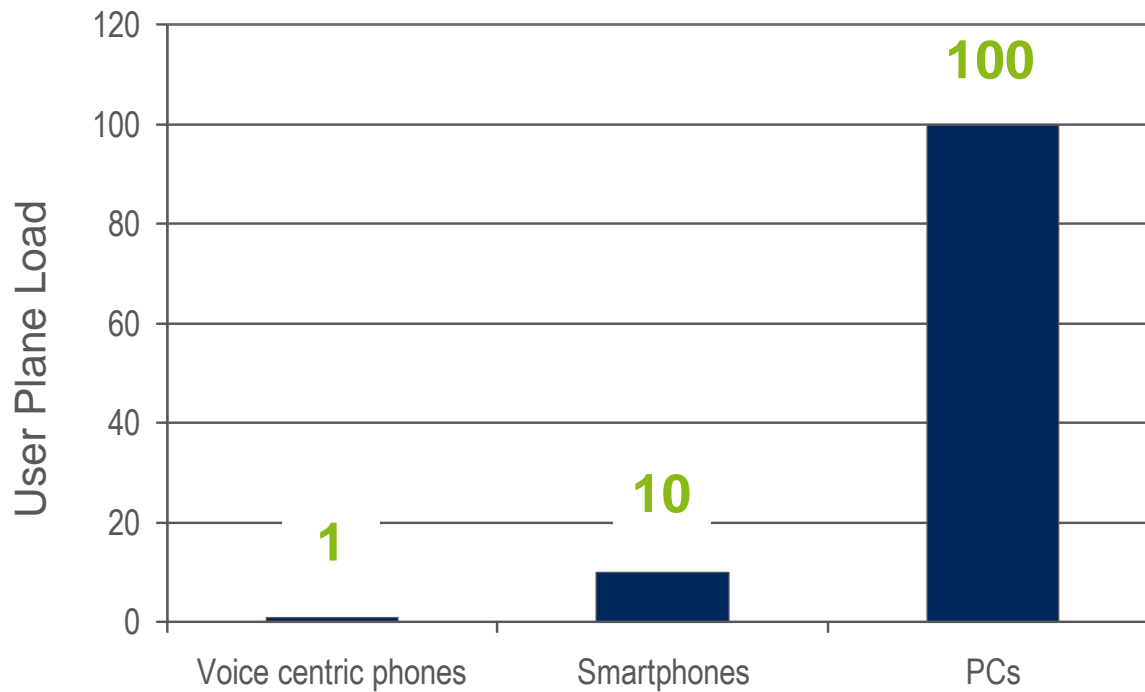
Please note that mobile broadband access could be used for fixed applications

Fixed broadband includes DSL, Cable and Fiber

This slide contains forward looking statements

TRAFFIC IMPACT PER DEVICE

RESULTS FROM LIVE MEASUREMENTS



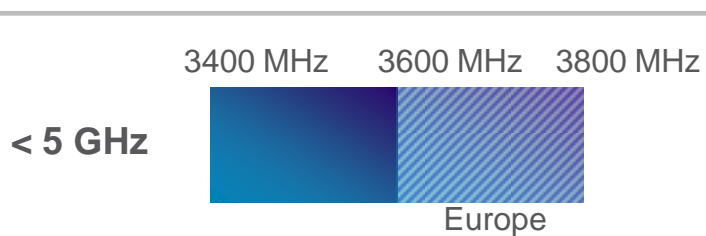
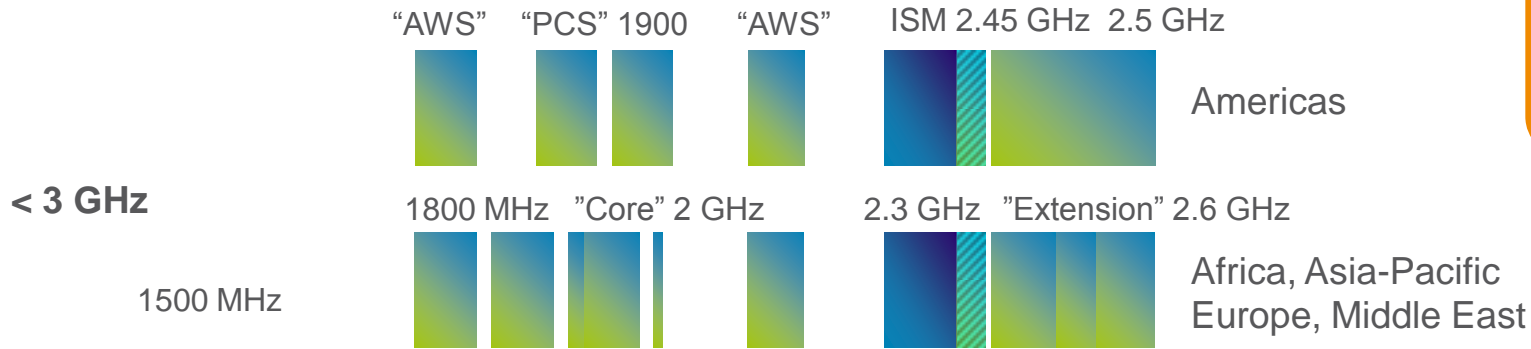
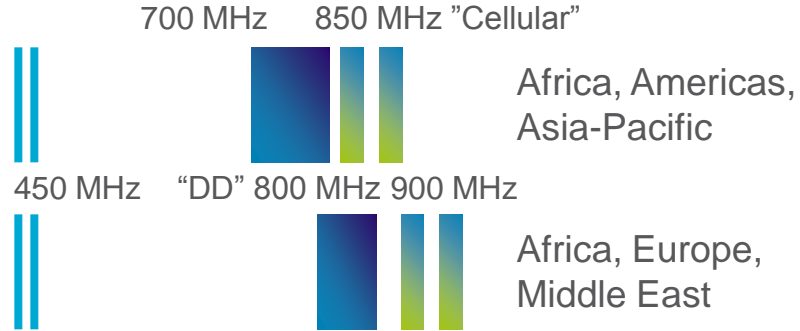
A PC CONSUME 10X MORE THAN A SMARTPHONE, BUT A MAJORITY OF THE TOTAL TRAFFIC WILL BE SMARTPHONE TRAFFIC

50 BILLION CONNECTIONS YEAR 2020



A combination of new CE devices and M2M applications

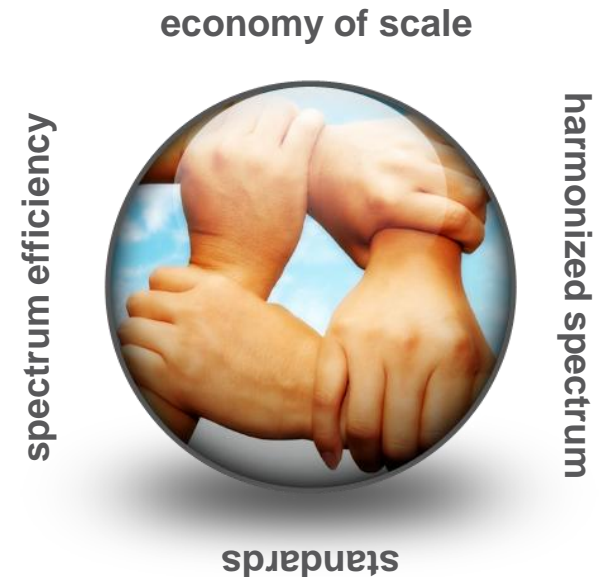
CURRENT IMT SPECTRUM MAP



HARMONIZED SPECTRUM AND STANDARDS

Harmonized spectrum is necessary and key for the public mobile broadband access developments; as for the industry to be able to successfully respond to national policy goals by providing standardized products

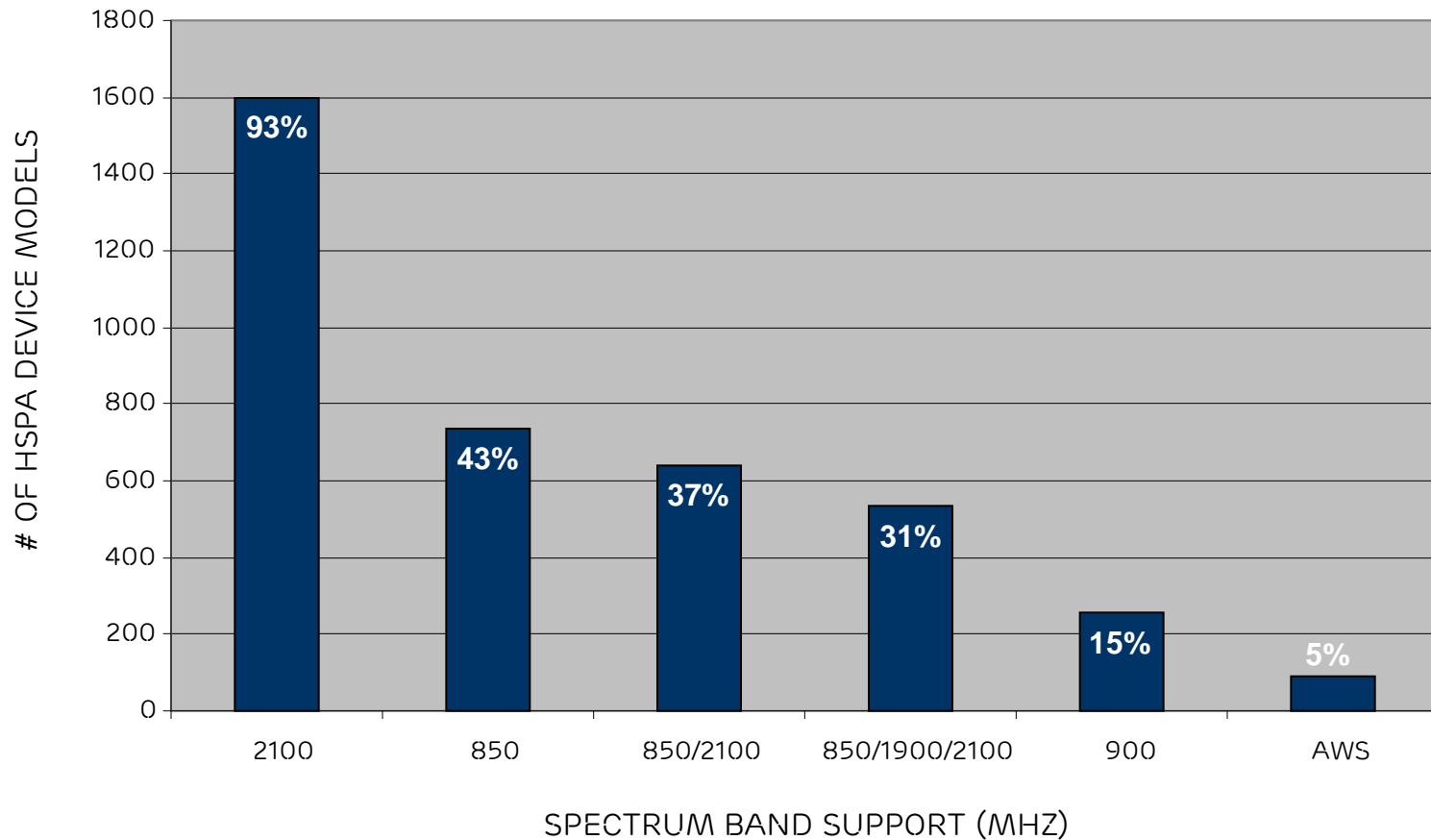
- › **economy of scale** (based on a mass market)
- › easy **cross-border coordination**
- › **cross-border operation** (between countries)
- › **global roaming** capabilities
- › **Interoperability** choice and convenience
- › **efficient use** of spectrum (also in border areas)



[PROVIDING AFFORDABLE SERVICES TO ALL]

MAINSTREAM BAND SELECTIONS ENABLE BROAD DEVICE OFFERINGS

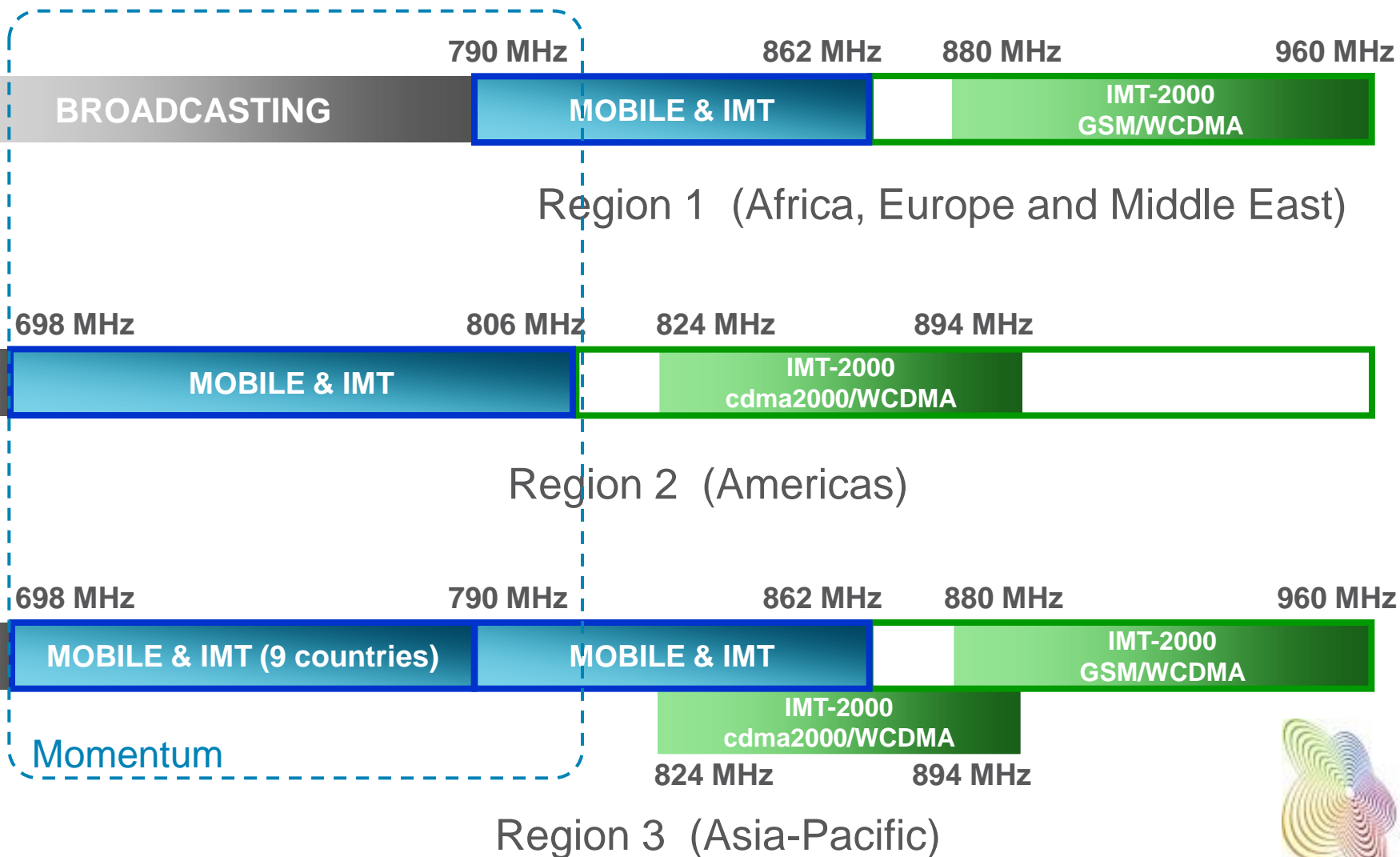
SPECTRUM BAND SUPPORT IN HSPA DEVICES



Source: GSA Dec 2009

THE RANGE 698 - 960 MHz IN ITU

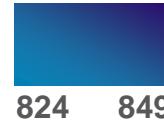
SUMMARY



ITU-R RECOMMENDATION M.1036

UHF-BAND

A1



A2

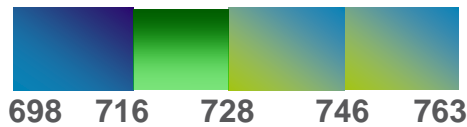


A3

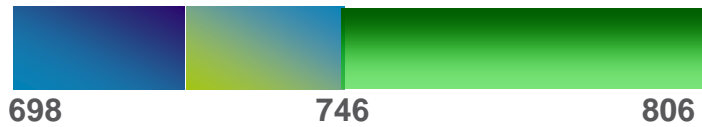
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A4



A5



A6

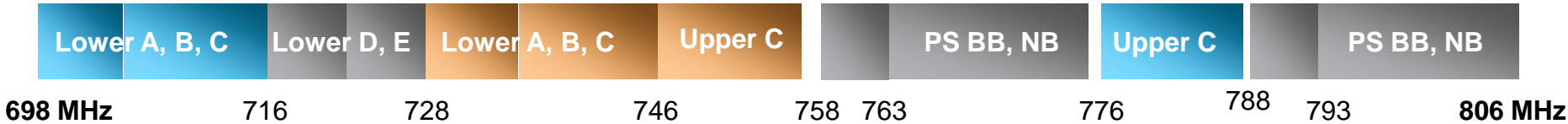
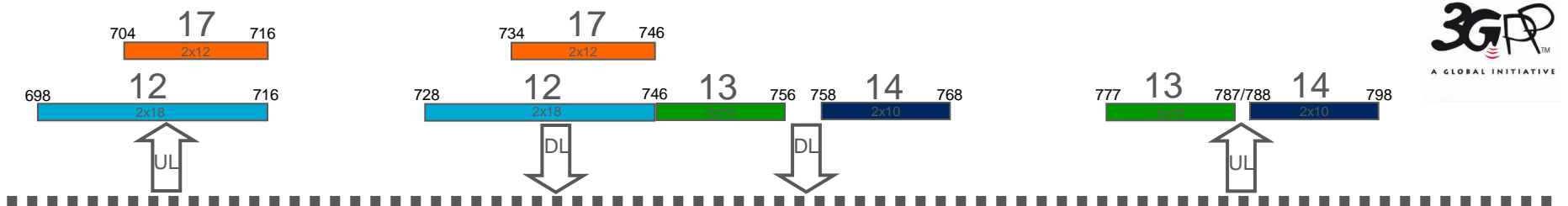


A7



US 700 MHz BAND PLAN

› Current implementation of 3GPP band#13 (Verizon) and band#17 (AT&T)



Lower A	698-704, 728-734	12 MHz	2 x 6 MHz (IMT)
Lower B	704-710, 734-740	12 MHz	2 x 6 MHz (IMT)
Lower C	710-716, 740-746	12 MHz	2 x 6 MHz
Lower D	716-722	6 MHz	unpaired (Mobile TV)
Lower E	722-728	6 MHz	unpaired (Mobile TV)
Upper C	746-757, 776-787	22 MHz	2 x 11 MHz (IMT)
Upper A	757-758, 787-788	2 MHz	2 x 1 MHz (GB)
Upper D	758-763, 788-793	10 MHz	2 x 5 MHz (IMT)
Upper E	763-775, 793-805	24 MHz	2 x 12 MHz (Public Safety)
Upper B	775-776, 805-806	2 MHz	2 x 1 MHz (GB)

ECC DECISION OF 30 OCTOBER 2009, ON HARMONISED CONDITIONS FOR MOBILE/FIXED COMMUNICATIONS NETWORKS OPERATING IN THE BAND 790-862 MHz

“Preferred Harmonised frequency arrangement”

791-796	796- 801	801-806	806- 811	811-816	816- 821	821 - 832	832- 837	837- 842	842- 847	847- 852	852- 857	857- 862
Downlink						Duplex gap	Uplink					
30 MHz (6 blocks of 5 MHz)						11 MHz	30 MHz (6 blocks of 5 MHz)					

Note 1: Guardband of 1 MHz between Broadcasting below 790 and mobile DL starting at 791 MHz

Note 2: Sweden, Germany, France; have announced auctions of the band during 2010-2011. Germany started...

“Guidance for administrations not implementing the preferred channelling arrangements”

790-797	797-802	802-807	807-812	812-817	817-822	822-827	827-832	832-837	837-842	842-847	847-852	852-857	857-862
Guard band	Unpaired												
7 MHz	65 MHz (13 blocks of 5 MHz)												

PT1 agreement April 29 ; ECC Decision June 2009 ; EC Decision March 2010

TOTAL NET VALUE OF THE DIGITAL DIVIDEND

SPECTRUM VALUE PARTNER REPORT, MAY 2008

Net value add (€bn)

Market Allocation	40 MHz	60 MHz	80 MHz	100 MHz	120 MHz	140 MHz	160 MHz	180 MHz	200 MHz
Scenario 1: 'Mobile makes headway'	160.0	165.1	163.3	159.1	152.3	141.3			
Scenario 2: 'Mobile broadband takes off'	76.6	84.5	94.2	94.5	93.2	87.9			
Scenario 3: 'Broadband is mobile'	62.6	84.8	127.1	135.3	140.9	144.8			

- The net value added of allocating some UHF to mobile instead of broadcasting is **between €63bn and €165bn**
- For each demand scenario, we have presented a **likely range of value maximisation**, since our results do not differ significantly between some allocations
 - **Scenario 1:** allocating 60 to 80MHz maximises value
 - **Scenario 2:** allocating 80 to 120MHz maximises value
 - **Scenario 3:** allocating 120 and 140MHz maximises value
- This suggests that **in the majority of plausible cases, a minimum of 80MHz would be most likely to maximise value** and that, with higher demand forecasts, 120MHz would be most likely to optimise the benefits for Europe

'EXPLOITING THE DIGITAL DIVIDEND: A EUROPEAN APPROACH'

- › EC appointed Analysys Mason, economics consultancy DotEcon and law firm Hogan & Hartson LLP, to undertake a [nine-month study](#) to ascertain what coordinated action is needed at the EU level in order to maximise the benefits from the digital dividend. www.analysysmason.com/EC_digital_dividend_study

SUMMARY of Recommended High-Level Actions;

- › All Member States should be [required by 2015 to clear the 790-862 MHz sub-band](#) and impose technical restrictions to prevent high-power cross-border interference
- › Member States should be encouraged to award spectrum on service- and technology-neutral basis
- › [Research should start now on a possible second sub-band or total clearance](#), particularly regarding the;
 - Size, frequency location and band plan
 - Cost and feasibility
 - Necessary platform upgrades to maintain universal free-to-view TV
- › A review in short to medium term to decide whether [action is warranted to prepare for further clearance](#), and consider actions to safeguard users of interleaved spectrum

GERMAN AUCTION – “THE BIG BANG”

Ende der Auktion

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
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0,8 GHz (gepaart)	0,8 GHz A	2x5 MHz konkret	To2 GER	616.595
	0,8 GHz B	2x5 MHz abstrakt	To2 GER	595.760
	0,8 GHz C	2x5 MHz abstrakt	Telekom D	570.849
	0,8 GHz D	2x5 MHz abstrakt	Telekom D	582.949
	0,8 GHz E	2x5 MHz abstrakt	Vodafone	583.005
	0,8 GHz F	2x5 MHz abstrakt	Vodafone	627.317

> 3 BILLION EURO

1,8 GHz (gepaart)	1,8 GHz A	2x5 MHz abstrakt	Telekom D	20.700
	1,8 GHz B	2x5 MHz abstrakt	Telekom D	20.700
	1,8 GHz C	2x5 MHz abstrakt	Telekom D	19.869
	1,8 GHz D	2x5 MHz konkret	E-Plus Grp	21.550
	1,8 GHz E	2x5 MHz konkret	E-Plus Grp	21.536

2,0 GHz (gepaart)	2,0 GHz A	2x4,95 MHz konkret	Vodafone	93.757
	2,0 GHz B	2x4,95 MHz konkret	E-Plus Grp	103.323
	2,0 GHz C	2x4,95 MHz konkret	E-Plus Grp	84.064
	2,0 GHz D	2x4,95 MHz konkret	To2 GER	66.931

2,0 GHz (ungepaart)	2,0 GHz E	1x5 MHz konkret	To2 GER	5.731
	2,0 GHz F	1x14,2 MHz konkret	To2 GER	5.715

Ausgeschiedene Bieter:

360 MHz IN TOTAL!

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
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2,6 GHz (gepaart)	2,6 GHz A	2x5 MHz abstrakt	Telekom D	19.096
	2,6 GHz B	2x5 MHz abstrakt	Telekom D	19.025
	2,6 GHz C	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz D	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz E	2x5 MHz abstrakt	Vodafone	18.948
	2,6 GHz F	2x5 MHz abstrakt	Vodafone	19.025
	2,6 GHz G	2x5 MHz abstrakt	Telekom D	19.069
	2,6 GHz H	2x5 MHz abstrakt	Telekom D	19.038
	2,6 GHz I	2x5 MHz abstrakt	To2 GER	18.948
	2,6 GHz J	2x5 MHz abstrakt	E-Plus Grp	18.931
	2,6 GHz K	2x5 MHz abstrakt	E-Plus Grp	17.739
	2,6 GHz L	2x5 MHz abstrakt	To2 GER	17.739
	2,6 GHz M	2x5 MHz abstrakt	Vodafone	17.739
	2,6 GHz N	2x5 MHz abstrakt	Vodafone	17.752

2,6 GHz (ungepaart)	2,6 GHz O	1x5 MHz abstrakt	Vodafone	9.130
	2,6 GHz P	1x5 MHz abstrakt	Vodafone	9.130
	2,6 GHz Q	1x5 MHz abstrakt	Telekom D	8.598
	2,6 GHz R	1x5 MHz abstrakt	Vodafone	8.598
	2,6 GHz S	1x5 MHz abstrakt	Vodafone	9.051
	2,6 GHz T	1x5 MHz abstrakt	Vodafone	9.051
	2,6 GHz U	1x5 MHz abstrakt	E-Plus Grp	8.273
	2,6 GHz V	1x5 MHz abstrakt	To2 GER	8.229
	2,6 GHz W	1x5 MHz abstrakt	To2 GER	8.229
	2,6 GHz X	1x5 MHz abstrakt	E-Plus Grp	8.229

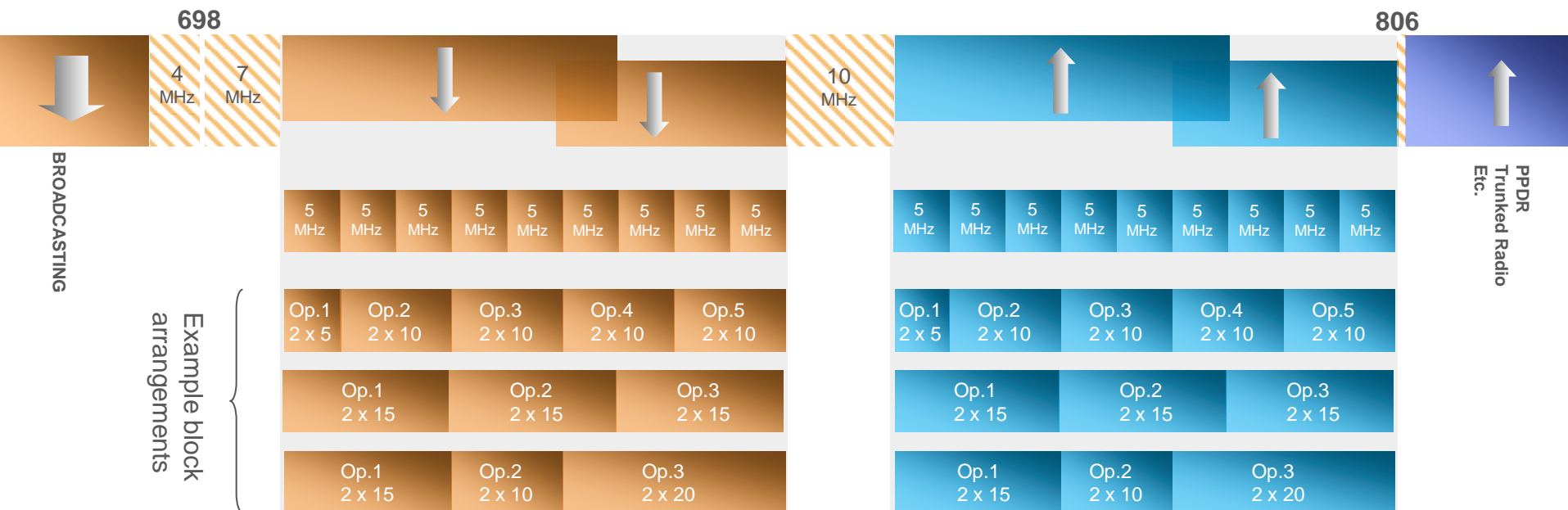
Summe aller gehaltenen Höchstgebote (€ in Tsd)	4.384.646
Zahlungsverpflichtung aufgrund zurückgenommener Höchstgebote (€ in Tsd)	0
Summe	4.384.646

THE UNIFIED APAC 700 MHz

FDD 2X45 MHz ARRANGEMENT BEING DEVELOPED IN APT/AWF

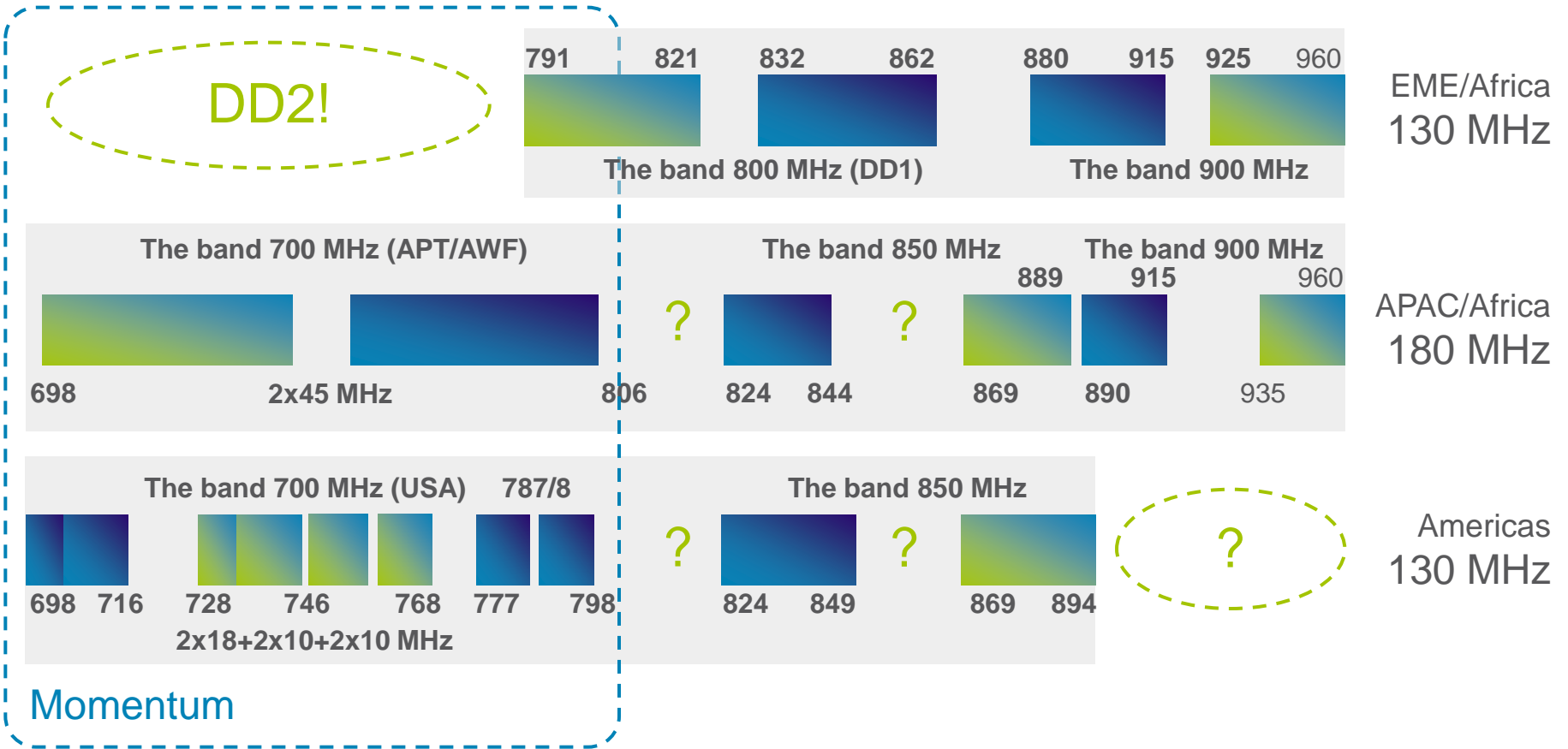
- › The 2x45 MHz agreement (with 10-11 MHz gap) was recognized by the APT/AWF as a major achievement in promoting regional harmonization
- › Remains to be decided are; FDD duplex direction, size of gap, size of guardbands, and the TDD arrangement to be included

EXAMPLE OF POSSIBLE DUAL-DUPLEXER SOLUTION IN REVERSED ARRANGEMENT



SPECTRUM AMOUNTS – THE UHF BAND

ON A REGIONAL BASIS FOR MOBILE BROADBAND



[STILL ROOM FOR IMPROVEMENTS OF THE AVAILABLE SPECTRUM AMOUNTS]

SUMMARY

- › Harmonization of spectrum for mobile broadband is the key for the success
- › Operators need several different bands
- › Implementation in USA and auctions started in Europe of the UHF-band
- › Work ongoing in APT/AWF to unify the band 698-806 MHz for APT countries
- › More spectrum needed in UHF-band to meet the demands for cost-efficient coverage solutions of future mobile broadband systems





ERICSSON