Vadim Belyavskiy
Board member

IA450
International 450 Association
www.450world.org

Coverage without limits

Capitalising upon the CDMA450 Opportunity

CDMA450 is the most widespread and established technology providing mobile and fixed communication services in low frequency band.

Agenda

History of 450

450 in the standards

Spectrum arrangements

Technical aspects of CDMA450

Network infrastructure

Terminals

Applications

Map of the 450 world

International 450 Association

CDMA450

A cost-effective solution to provide inexpensive and advanced telecommunication services to the users

450 history

- CDMA450 – one of three technologies initially submitted to the NMT MoU as candidate for upgrade of NMT450 networks;

- In October 1999 Plenary of NMT MoU accepted CDMA450 as one of technologies for migration;

- IS2000 is a part of Recommendation ITU-R M.1457 – one of the IMT2000 radio interfaces – IMT2000 CDMA Multi-Carrier - IMT MC (1998)

- Band Class 5 included in IS2000 to cover frequency arrangements in 450 MHz (1999)

- ITU WRC-07 has identified band 450-470 for IMT on the global basis (November 2007)

450 MHz band

- Great propagation characteristics of the band
- Bigger cells
- Less base stations required to be deployed to provide coverage
- Faster deployment
- Cost-effective coverage of wide areas

2100

900

450
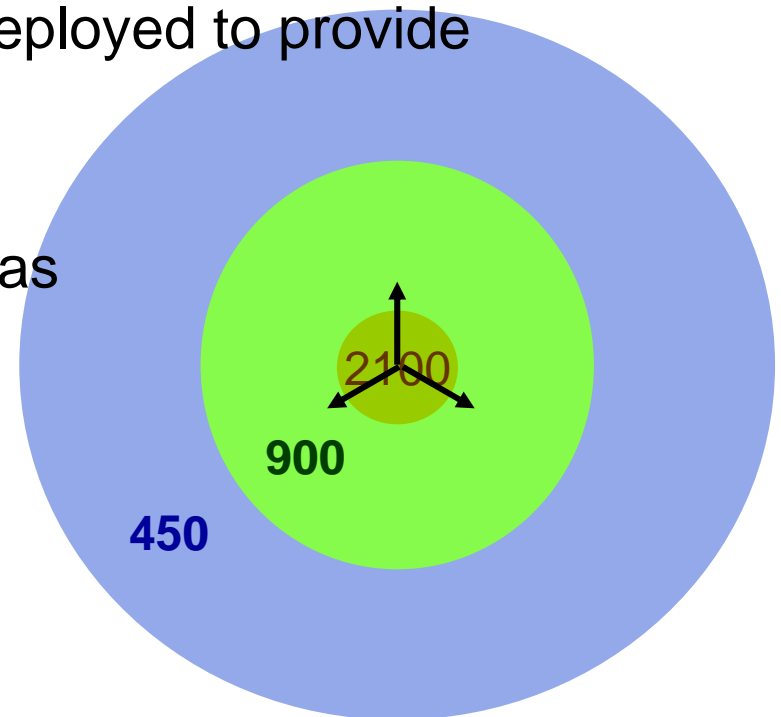
CDMA450 technology

It is cdma2000/1xEVDO in the 450MHz

High quality voice (even with background noise)

Soft handoff

High confidentiality

High speed packet data at 50-80 kbps average and 153,6 kbps peak data rates per user / EVDO 300-600 kbps average and 2,4 Mbps peak data rates per user

High spectrum efficiency

Low radiating power by user terminal (max. 200 mWatt)

Band Class 5

**3GPP2 C.S0002. Band Class 5 Block Frequency Correspondence and Band Subclasses**

Block Designator	Band Subclass	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
A	0	452.500–457.475	462.500–467.475
B	1	452.000–456.475	462.000–466.475
C	2	450.000–454.800	460.000–464.800
D	3	411.675–415.850	421.675–425.850
E	4	415.500–419.975	425.500–429.975
F	5	479.000–483.480	489.000–493.480
G	6	455.230–459.990	465.230–469.990
H	7	451.310–455.730	461.310–465.730

The use of block A is preferable :

most of the existing networks and subscriber terminals are using it

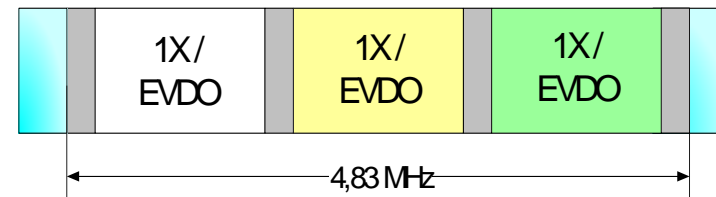# 450 MHz suggested spectrum arrangements

Coordinated use
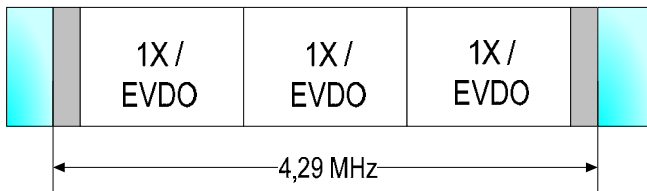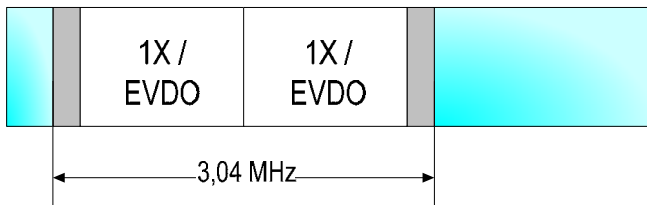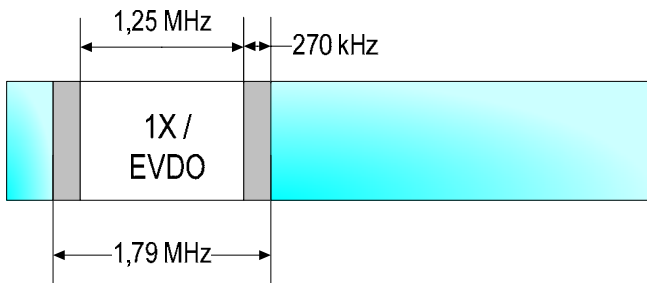
Uncoordinated use

Legend:
- Other users
- Guardband
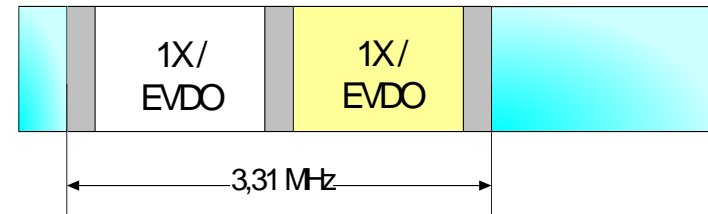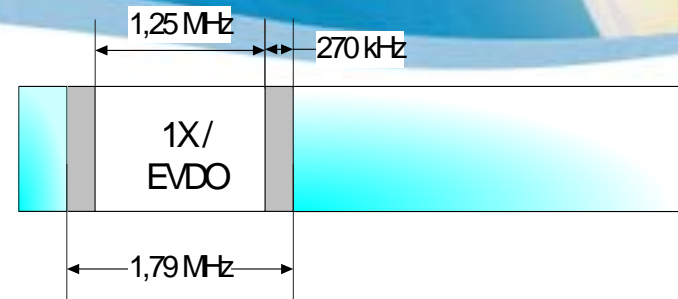
CDMA450 network diagram
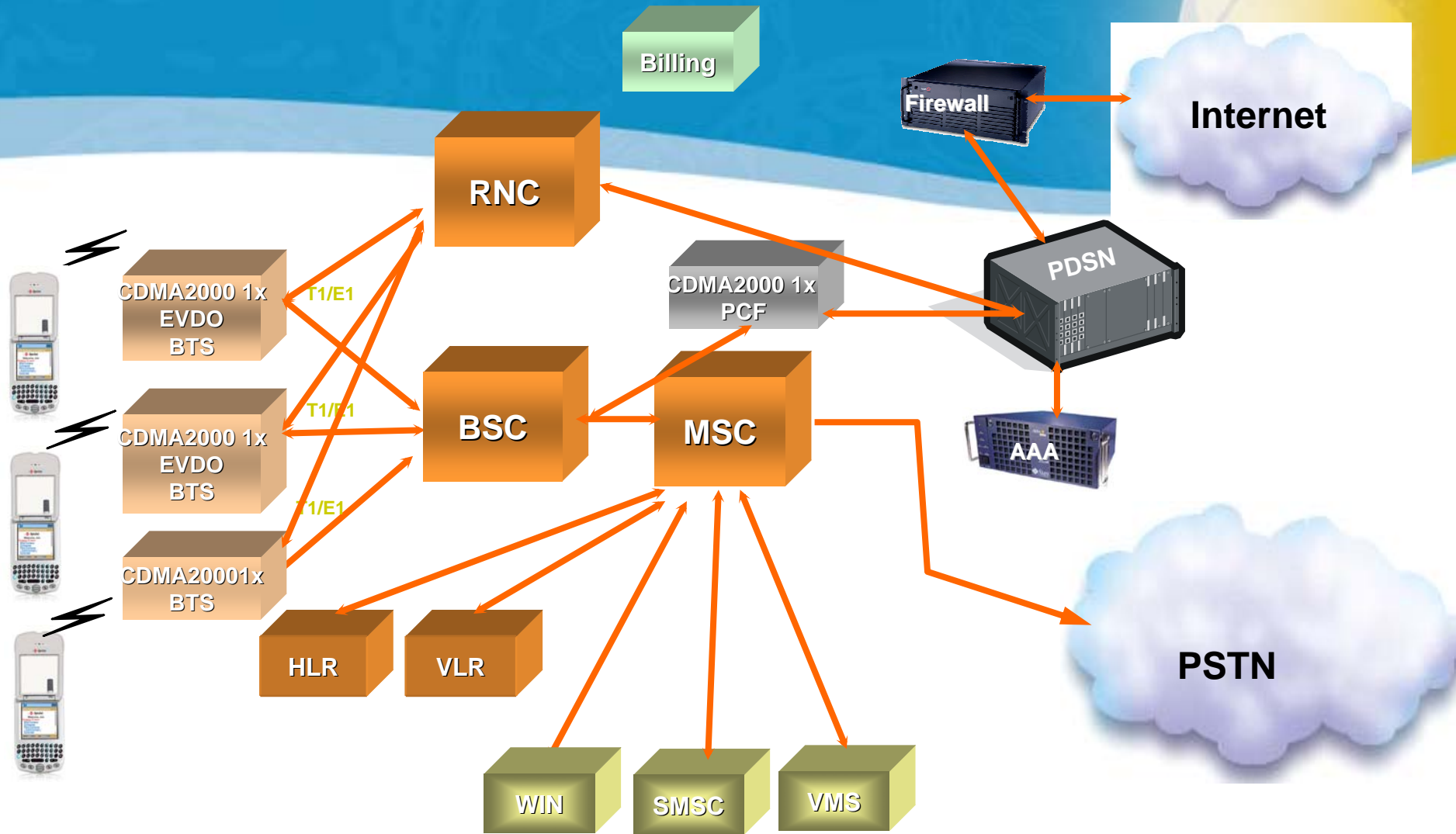
CDMA450 infrastructure vendors

Alcatel-Lucent

Huawei Technologies

ZTE Corporation

Nortel Networks

Amphenol

Cellvine Ltd

Kathrein

Andrew   **Airvana**

CDMA450 terminals vendors

CMOTech

AnyDATA
Wireless Data Solutions

TOPEX

COMPAL

Ubiquam Co Ltd

RWT

ZTE中兴

Axesstel

Zakang

WIDETelecom
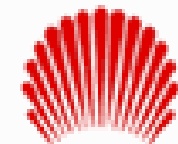
Huawei Technologies

VLE/LE

Mid tier

High tier

EV-DO Modems and WiFi Routers

FWP

Services

Voice services
   call forwarding
   call waiting
   CLIP/CLIR
   voicemail
   conference call
   …

   Other:

High speed packet data services
   Internet access
   VPN
   email
   Mobile portal
   Mobile content providers services
   Videostreaming services

SMS
MMS
Surveillance
Location Based Services
Closed user group
Push-to-Talk
Voice and packet data roaming
GSM roaming

CDMA450 Statistics

31 countries have commercially launched to date

Commercial networks 48

Commercial EV-DO networks 14

Planned launches 1X and DO 43

Total commercial and planned
CDMA450 networks 90+

Estimated active CDMA450
subscribers worldwide 14M+

Latin America CDMA450
Operator status

Country	Operator	Status	Technology
Peru	Valtron	C	1X
Argentina	CoTeCal	C	1X
Argentina	Cotel	C	1X
Venezuela	CVG	P	1X
Belize	BTL	L	
Bolivia		L	
Ecuador		L	
Mexico	Telmex	P	1X and DO
Guatemala			
Honduras	Conatel	P	
El Salvador			
Suriname			
Paraguay			
Jamaica			

Africa CDMA450
Operator status

Country	Operator	Status	Technology
Angola	Angola Telecom	C	1X
Benin	BBCOM	P	1X
Cameroon	Camtel	C	1X
Ethiopia	ETC	C	1X
Kenya	Telecom Kenya	C	1X
Madagascar	Telecom Malagasy	C	1X & DO
Mali	Sotema	C	1X & DO
Mauritania	Mauritel	C	1X
Mozambique	TDM	C	1X
Namibia	Telecom Namibia	P	1X & DO
Nigeria	Nigerian Telecom	P	1X
Nigeria	Globalcom	P	1X
Rwanda	Rwandatel	P	1X
Sierra Leone	Datatel	C	1X

Africa CDMA450
Operator status continued

Country	Operator	Status	Technology
South Africa	Telkom	P	1X
Sudan	Mobitel	C	1X
Tanzania	Benson Inform.	C	1X
Tanzania	Benson Inform.	P	DO
Tanzania	TTCL	P	1X & DO
Togo	Togo Telecom	P	1X
Tunisia	Tunis Telecom	P	1X
Uganda	UTL	C	1X
Uganda	UTL	P	DO
Zambia	Zamtel	C	1X
Zambia	Zamtel	P	DO
Zimbabwe	TelOne	P	1X

Europe CDMA450
Operator status

Country	Operator	Status	Technology
Armenia	Armentel	C	1X
Austria	Green Networks	P	1X & DO
Azerbaijan	Aztrank LLC	C	1X
Belarus	Belcel JV	C	1X & DO
Bulgaria	BTC	T	1X
Czech Rep.	Telefonica O2	C	DO revA
Czech Rep.	Mobilkom	C	DO
Denmark	Nordisk (NMT)	C	DO
Denmark	Nordisk (NMT)	P	1X
Estonia	Televorgu AS	P	1X & DO
Ireland	Nordisk (NMT)	P	1X & DO
Latvia	Telecom Baltja	C	1X & DO revA
Pridnestrovye	Interdnestrcom	C	1X
Moldova	Moldtelecom	C	1X & DO

Europe CDMA450
Operator status continued

Country	Operator	Status	Technology
Norway	Nordisk (NMT)	C	DO revA
Norway	Nordisk (NMT)	P	1X
Poland	Nprdisk Polska	P	1X & DO
Poland	PTK Centertel	T	1X & DO
Portugal	Radiomovel(Zapp)	C	1X & DO
Romania	Telemobil (Zapp)	C	1X & DO
Russia	Skylink	C	1X & DO
Russia	Wellcom	C	1X
Russia	BCC	C	1X & DO
Russia	I-Tell	C	1X
Russia	I-Tell	P	DO
Russia	U-Tell	C	1X
Russia	StriZh	C	1X
Serbia	Serbia Telecom	P	1X
Sweden	Nordisk (NMT)	C	DO
Sweden	Nordisk (NMT)	P	1X
Ukraine	UMC	C	DO

Asia CDMA450
Operator status

Country	Operator	Status	Technology
Bangladesh	NTC	P	1X
Bangladesh	PeopleTel	P	1X
Cambodia	Cambodia Shin.	C	1X
China	China T (Tibet)	C	1X
China	China T (Netcom)	T	1X
Indonesia	STI	C	1X
Indonesia	STI	P	DO
Kazakhstan	Kaznurtel	P	1X
Kurdistan	Ariafon	C	1X
Kyrgyzstan	WinLine	C	1X
Kyrgyzstan	Global Telecom	P	1X
Kyrgyzstan	Kyrgyz Telecom	P	1X
Laos	Lao Telecomm.	C	1X
Laos	Lao Telecomm.	P	DO
Malaysia	Malaysia Telecom	P	1X
Mongolia	G-Mobile	C	1X
Nepal			
Oman	Oman Telecomm.	P	1X & DO
Pakistan	DVCOM	P	1X & DO

Asia CDMA450
Operator status, continued

Country	Operator	Status	Technology
Pakistan	Great Bear Int.	C	1X
Pakistan	Great Bear Int.	P	DO
Pakistan	PTCL	C	1X
Pakistan	PTCL	P	DO
Pakistan	Telecard	P	1X
Pakistan	Worldcall	P	1X
Philippines	Innove	P	1X & DO
Philippines	Citadel	P	1X & DO
Saudi Arabia	Saudi Telecom	C	1X
Sri Lanka	DBN	P	1X
Sri Lanka	Tritel Services	P	1X
Tajikistan	SkyTel	C	1X
Tajikistan	MTEKO	C	1X
Thailand	TOT	C	1X
Turkmenistan	MCT	P	1X
Uzbekistan	Uzbek Telecom	C	1X
Vietnam	EVN Telecom	C	1X & DO

More than just a digital migration from NMT450

CDMA450 offers significant coverage advantage over systems operating at higher frequencies

- Significantly fewer base stations

- Rapid network deployment

- Reduced environmental impact

- Significantly reduced capex and opex

CDMA450 Business Opportunities

- Profitable business niche market (SOHO, SME)
- Rural connectivity and universal service
- Remote areas, small communities and areas with low-density population
- Affordable wireless broadband access
- Public safety services
- Ability for fixed line Operators to expand their coverage into rural areas

Market Growth and Operator needs in WLL

- Lower device costs

- Operator/vendor co-marketing

- Migration to mobility & data

- Common test standards

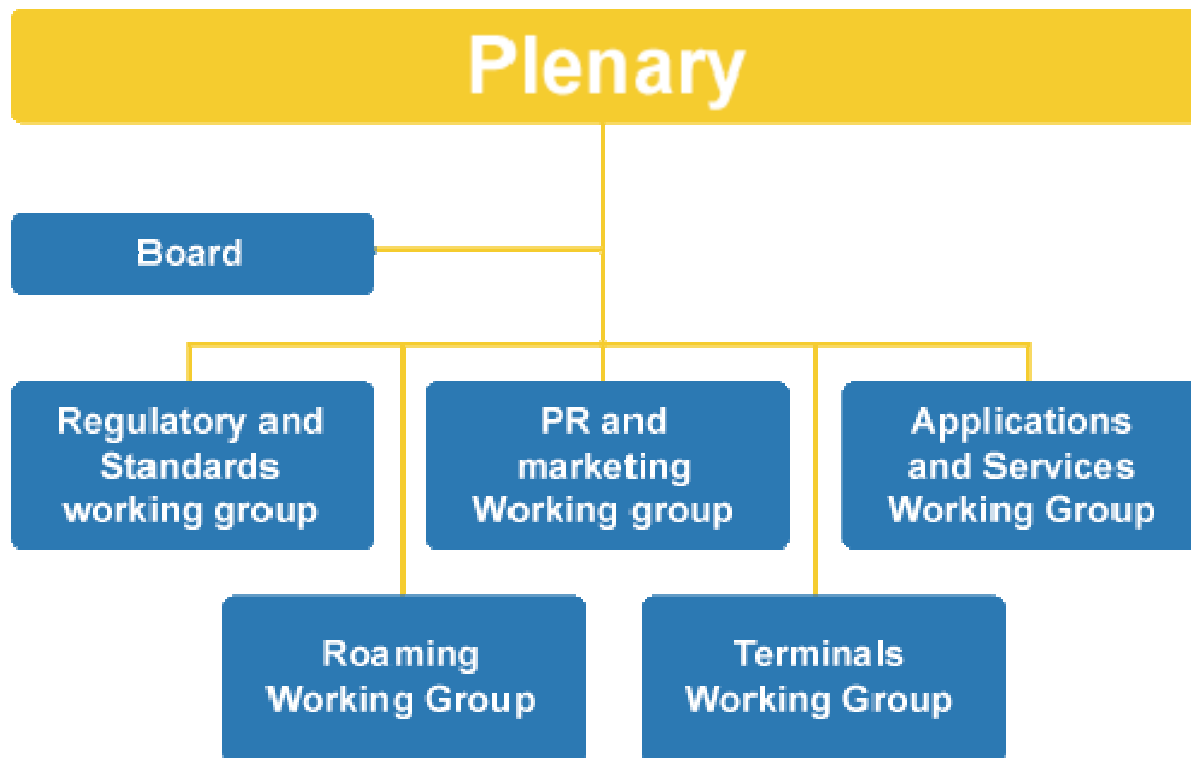- Technical forum for Operators to share network test results

IA 450 Mission Statement

- Support the members in developing their wireless business in the 450 MHz band

- Promote the use of 450 MHz band for CDMA450 on global basis

IA450 organizational structure

Chairman
Tina Radford
Telemobil SA (Zapp Romania)

Vice Chair
Colin Chandler
QUALCOMM

Secretary
Dorota Inkielman
PTK Centertel

International 450 Association Membership

Operator members

Belcel JV LTD (Belarus)
Benson Informatics Ltd. (Tanzania)
CJSC Skylink (Russia)
Cooperativ Telefonica de
Calafate Lim. CoTeCal (Argentina)
Hodutel (Honduras)
G-Mobile Co. Ltd. (Mongolia)
Great Bear Int. Serv. Lim.(Pakistan)
Interdnestrcom (Pridnestrovye)
Mobikom AS, (Czech Rep.)
MTT (Russia)
Nordisk Mobiltelefon AB (Sweden)
Pakistan Telecom
Comp. Ltd PTCL (Pakistan)

Peoples Telephone (Bangladesh)
PTK Centertel (Poland)
Radiomovel Telecom SA (Portugal)
Russian CDMA Association (Russia)
Sampoerna
Telekomunikasi STI (Indonesia)
Telecom Namibia (Namibia)
Telefonica O2 Praha, (Czech Rep.)
Telekom Baltija JSC, (Latvia)
Telmex (Mexico)
Telemobil SA (Romania)
UMC Ukrainian Mobile Com. (Ukraina)

International 450 Association Membership

Vendor members

Airvana	(USA)
Amphenol Antel Inc.	(USA)
Alcatel-Lucent Technologies	(USA)
Axesstel Inc.	(USA)
Huawei Technologies Co. Ltd.	(China)
Nortel Networks	(Canada)
Pantech&Curitel Telecom.	(S.Korea)
Qualcomm Europe SARL	(UK)
Sungil Telecom	(S. Korea)
Ubiquam Co. Ltd.	(S Korea)
UT Starcom	(USA)
Telular	(USA)
Woongjin Platinum Medio Co Ltd.	(S. Korea)
ZTE Cororation	(China)

Associated members

SAF Technika	(Latvia)
Zakang	(S. Korea)

IA450 Member benefits

- Provides guidance and support to Operators interested in deploying CDMA450 technology

- Supports members in approaching National Authorities about the use of 450Mhz band for CDMA450

- Market the use of 450Mhz band for CDMA450

- Standardisation of device specifications & volume aggregation initiatives

- Provide a technical forum for CDMA450 Operators to share information and experience

CDMA450 = 3G

CDMA450 is in the standard ITU-R M.1457

WRC-07 has identified the band 450-470 MHz for IMT on global basis

Contact Details

International 450 Association web site

www.450world.org

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Vice chair: Colin Chandler

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Secretary: Dorota Inkielman

dorota.inkielman@450world.org

International 450 Association

Thank you!

Vadim Belyavskiy

Board Member

IA450 Association

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