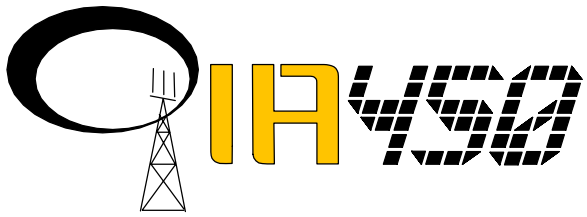


INTERNATIONAL 450 ASSOCIATION

Colin Chandler

Vice Chairman

International 450 Association



International 450 Association



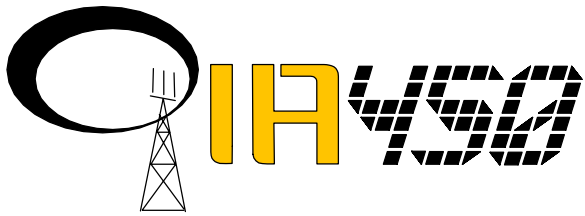
International 450 Association History

- NMT MoU was an operator only organization with the roles of maintaining the analog NMT Specifications and facilitate roaming between NMT operators
- In 1998 NMT MoU started the Digital Interest Group to consider future digital standards for use In the NMT frequency band
- Selected CDMA and GSM as the standards to develop at a memorable meeting in New York
- NMT Association formed in 1999 from membership of the NMT MoU, plus additional members from suppliers and other organizations interested in NMT
- IA 450 launched in St Petersburg in September 2003 focusing on digitalization of 450 MHz band



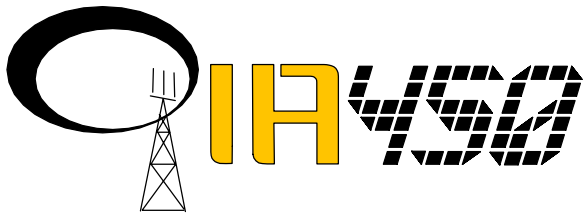
International 450 Association Membership

- Membership
 - Operator members,
CJSC Skylink, Delta Telecom, EuroTel Praha, Iberiatel, PTK Centertel, Mobisel, Moscow Cellular Communications, RTC MOBIKOM, Skylink, SOTEL, Telekom Baltija, Telemobil S.A., Telenor Mobile AS, Telia Sonera, Mobisel
 - Supplier members
Airvana, Axesstel, EMS Wireless, Ericsson Wireless Communications, Giga Telecom, Huawei Technologies Co. Ltd., Hyundai Syscomm Inc., IT Center, Lucent Technologies, MTT, Nokia Mobile Phones, Nortel Networks, Pantech and Curitel, QUALCOMM Europe, Synertec Inc., Wide Telecom, ZTE
 - Observers
Douglas C Lane and Associates



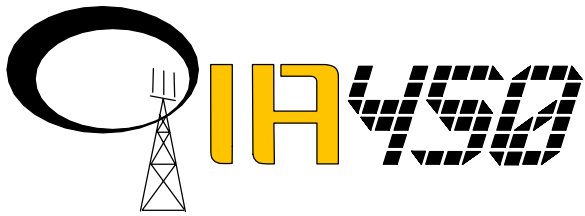
IA 450 Mission Statement

Support the members in developing their cellular business in the 450 MHz band including migration to the digital standard, and to maintain the analogue NMT Standard



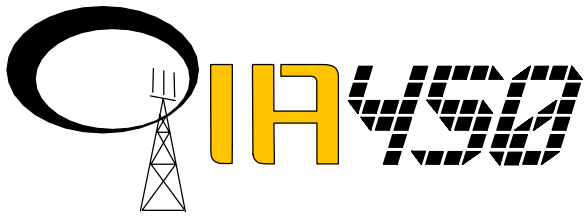
Regulatory

- Promote 450MHz band for cellular services
- Represent the IA 450 at ITU to ensure that CDMA 450 is considered in ITU committees
- Represent the IA 450 in CEPT on 450 MHz band
- Support members in influencing National Authorities for use of 450MHz band in Europe and worldwide for cellular applications



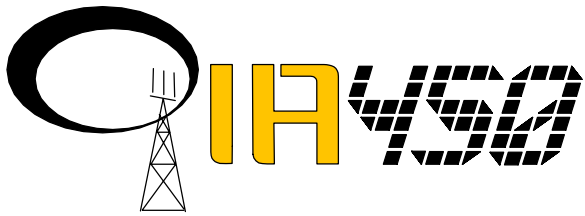
Technology

- Provide operators considering using CDMA with the technical information required to implement CDMA including migration from NMT
- Provide support to operators already using CDMA with additional technical information to improve CDMA 450 networks
- Encourage Network and Terminal vendors to develop, manufacture and market products for use with CDMA 450



Services

- NMT Association will support members in developing services including
 - Mobile telephony (voice)
 - Mobile data communications
 - PAMR Services
 - Wireless Local Loop



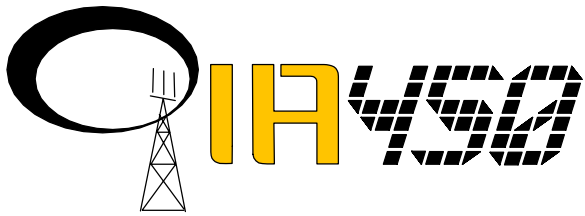
Public Relations

- Promote the continued use of cellular telephony in the 450 MHz band
- Cooperate with CDMA Development Group and other relevant industry groups
- Market the use of 450 MHz frequency band for CDMA 450



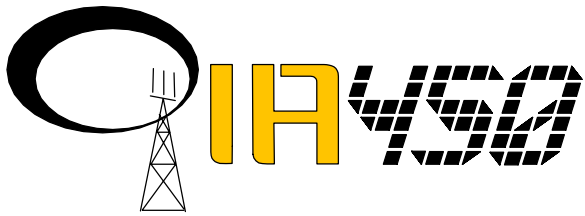
Operational considerations

- Ensure Roaming can be established between CDMA 450 Operators
- Ensure Roaming can be established between CDMA 450 and other technologies
- Ensure Roaming can be established with other frequency bands using CDMA
- Migration from Circuit switched to Packet switched protocols
- Prepare common recommendations for billing and customer care



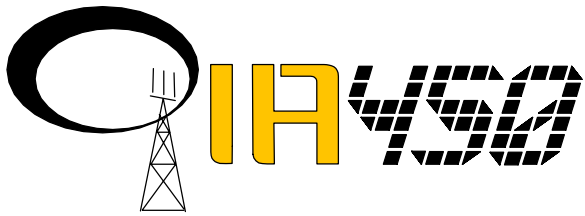
Business cases

- Provide current NMT operators and other operators using 400 to 500 MHz with a business case model for migrating to digital CDMA
- Provide new operators with a business case model for considering to use CDMA 450
- Assist network and terminal vendors to assess the market potential

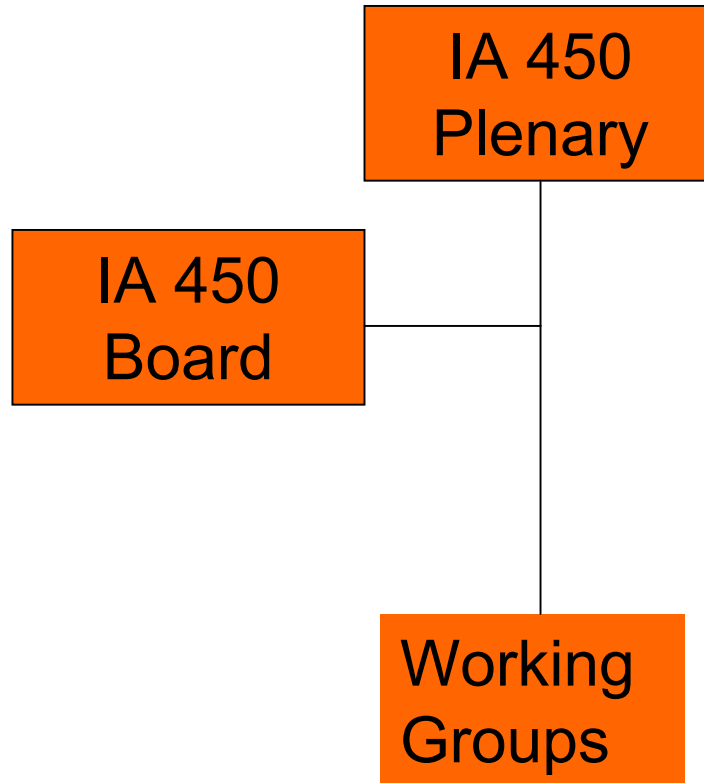


NMT Analogue

- Continue support of NMT Standard and Reference Documents including
 - NMT Specifications
 - Security
 - International Roaming
 - Numbering Plans
 - Billing



IA 450 Organisation



Chair: Kiril Barov, MCC

Vice Chair: Colin Chandler, QUALCOMM

Secretary: Dorota Inkielman, PTK Centertel

Regulatory and Standards Working Group

Marketing and PR Working Group

Roaming Working Group

Interoperability and Terminals

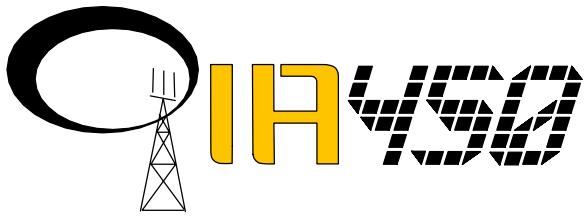
NMT Working Group



International 450 Association

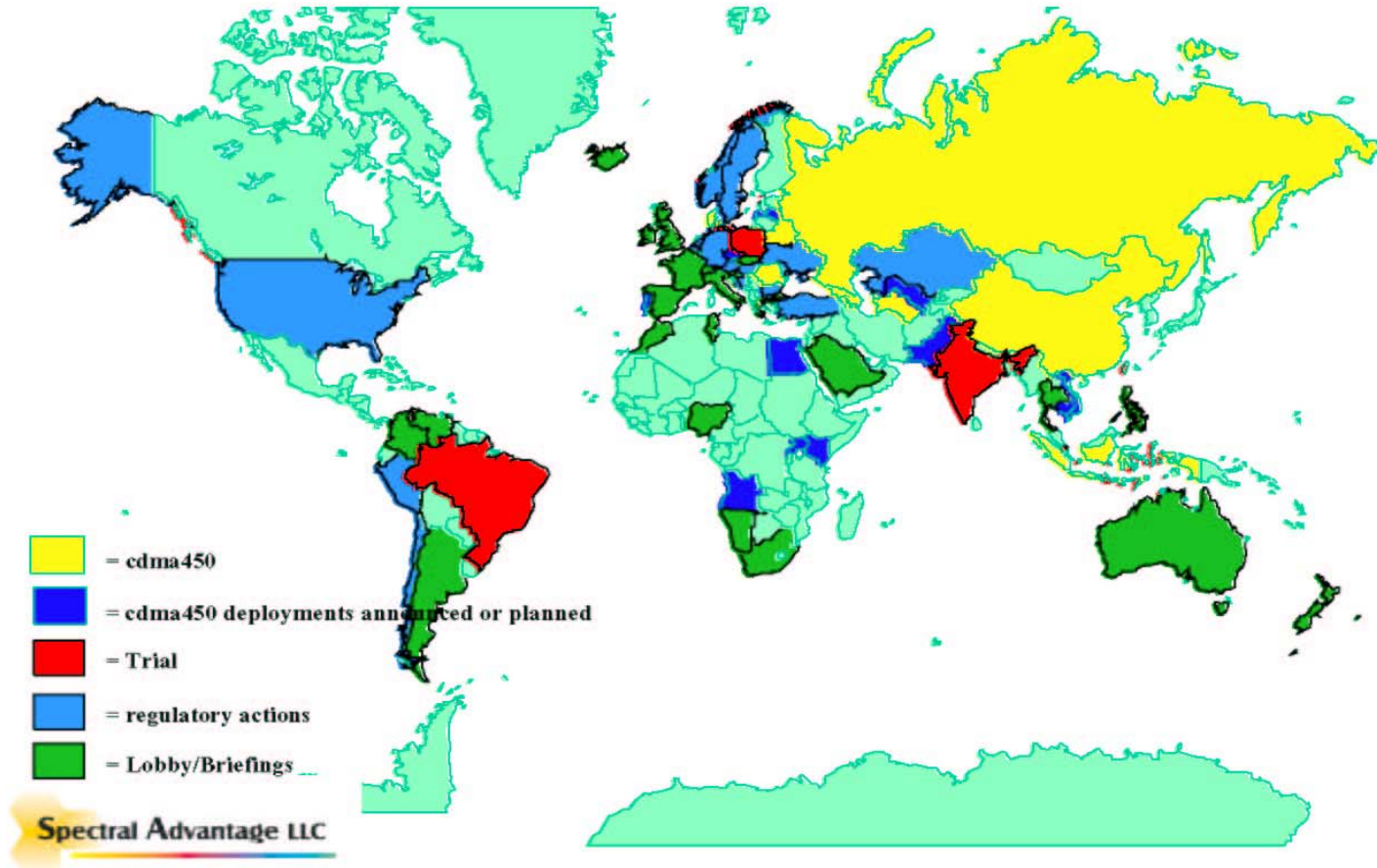
Contact details

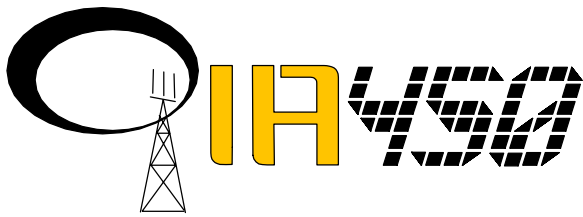
- For more information on the International 450 Association please visit the International 450 Association web site at www.450world.org
- For membership information contact the International 450 Association Secretary at dorota.inkielman@centertel.pl



Market Situation

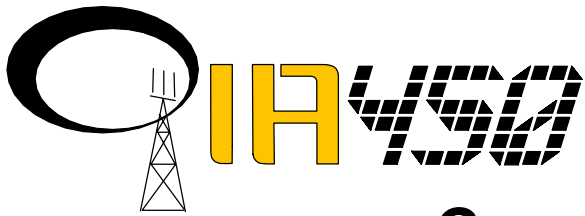
Cdma450 deployments, scheduled deployments and trials





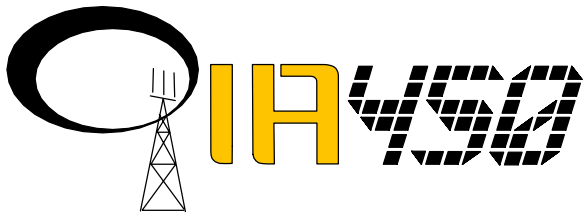
450MHz CDMA worldwide deployment

Country	Operator	2G/3G	Type of System
Belarus	BelCel JV	3G - CDMA2000 1x	Cellular, 450MHz
Brazil	NA	3G - CDMA2000 1x	WLL, 450MHz
Cambodia	Camshin	3G - CDMA2000 1x	WLL, 450MHz
Czech Rep	Eurotel	3G - CDMA2000 1x EV-DO	Cellular, 450MHz
Georgia	Iberiatel	3G - CDMA2000 1x	Cellular, 450MHz
Indonesia	Mobisel	3G - CDMA2000 1x	Cellular, 450MHz
Laos	LTC	3G - CDMA2000 1x	WLL, 450MHz
Pakistan	PTCL	3G - CDMA2000 1x	WLL, 450MHz
Portugal	Radiomovel	3G - CDMA2000 1x	Cellular, 450MHz
Romania	Telemobil - ZAPP	3G - CDMA2000 1x	Cellular, 450MHz
Russia	Delta Telecom	3G - CDMA2000 1x	Cellular, 450MHz
Russia	MCC	3G - CDMA2000 1x	Cellular, 450MHz
Russia	SOTEL- Video	3G - CDMA2000 1x	Cellular, 450MHz
Russia	UralWestcom	3G - CDMA2000 1x	Cellular, 450MHz
Russia	KCC	3G - CDMA2000 1x	Cellular, 450MHz
Saudi Arabia	Saudi Telecom	3G - CDMA2000 1x	WLL, 450MHz
Tajikistan	Tajikistan Telecom	3G - CDMA2000 1x	WLL, 450MHz
Uzbekistan	JSC Uzbektelecom	3G - CDMA2000 1x	Cellular, 450MHz
Vietnam	Electric Telecommunications Co	3G - CDMA2000 1x	WLL, 450MHz



Countries and Band Sub Classes

<u>Band subclass</u>	<u>Mobile Station</u>	<u>Base Station Freq.</u>	<u>Countries</u>
A (<i>Preferred band subclass</i>)	452.5-457.475	462.5-467.475	Bulgaria, China (Daging), Denmark, Estonia, Finland, Iceland, Indonesia, Latvia, Lithuania, Moldova, Norway, Poland, Portugal, Romania, Russia, Spain, Sweden, Tunisia, Ukraine
B	452-456.475	462-466.475	Malaysia,
C	450-454.8	460-464.8	France
D	411.675-415.850	421.675-425.850	Croatia, Slovenia
E	415.5-419.975	425.5-429.975	Turkey
F	479-483.48	489-493.48	Thailand
G	455.23-459.99	465.230-469.99	Hungary
H	451.310-455.730	461.31-465.73	Austria, Belgium, Czech Republic, Netherlands, Slovakia,



Summary

- CDMA 450 is a commercially and technically viable mainstream technology in operation today providing cellular voice data and WLL services in the 450MHz band
- IA 450 will be in the forefront of promoting the use of the 450MHz Band