



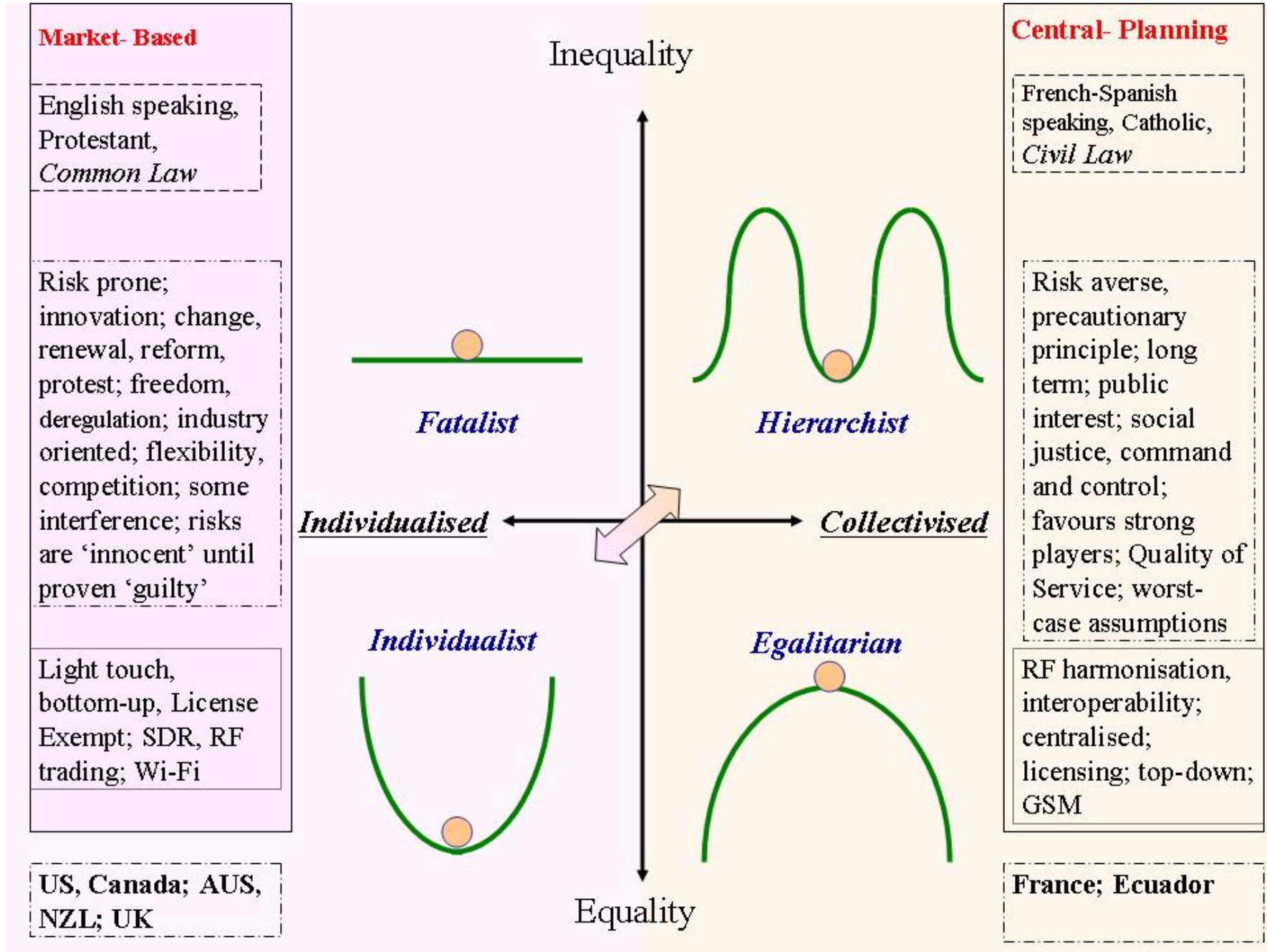
How Geography and Culture influence RF regulation - the ISR experience, the NZL case

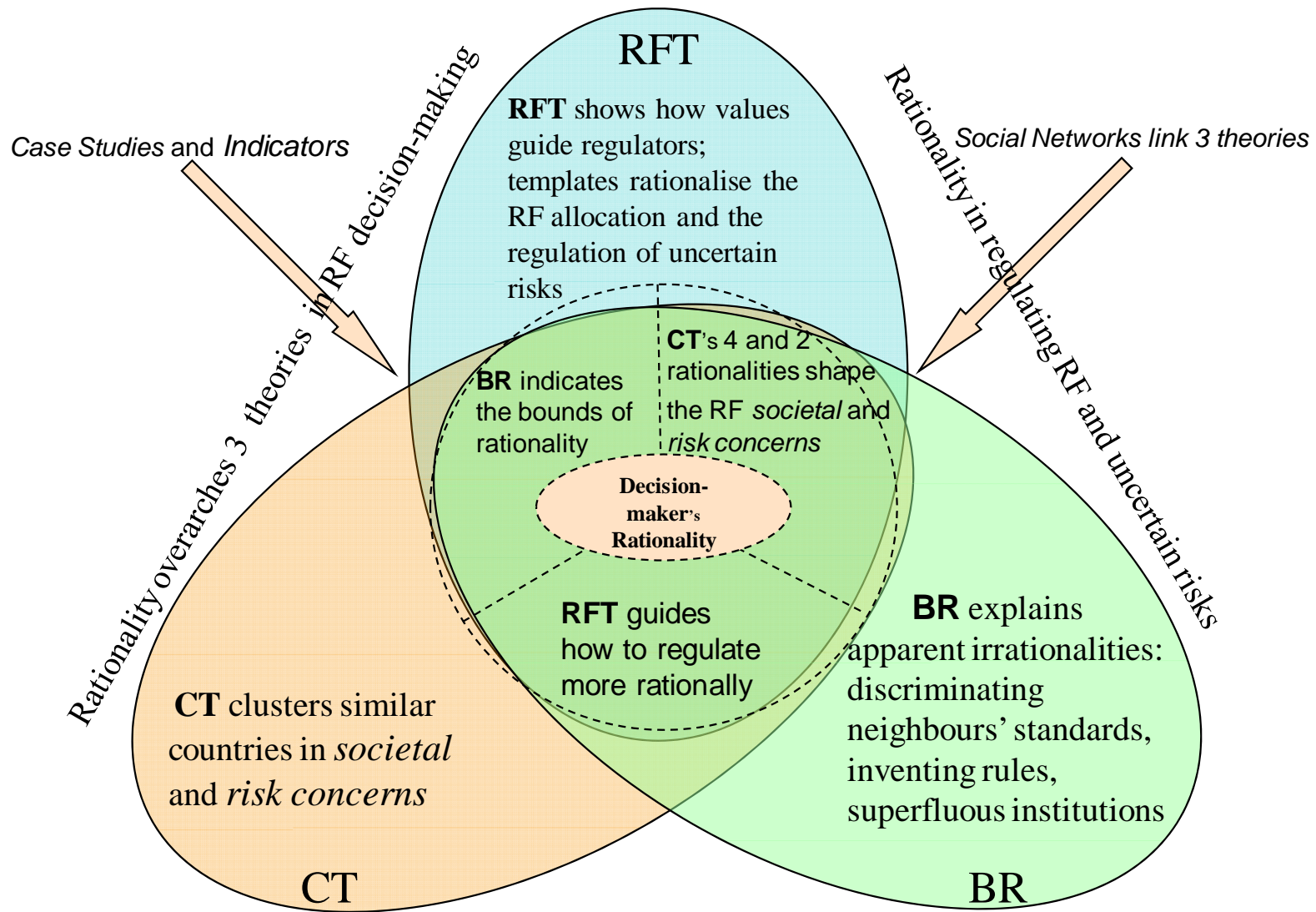
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Wellington NZL, 4 February 2010

Market-Based vs. Central-Planning





Three theories explore RF *societal and risk concerns* and explain the empirical results

The ITU-R Regions

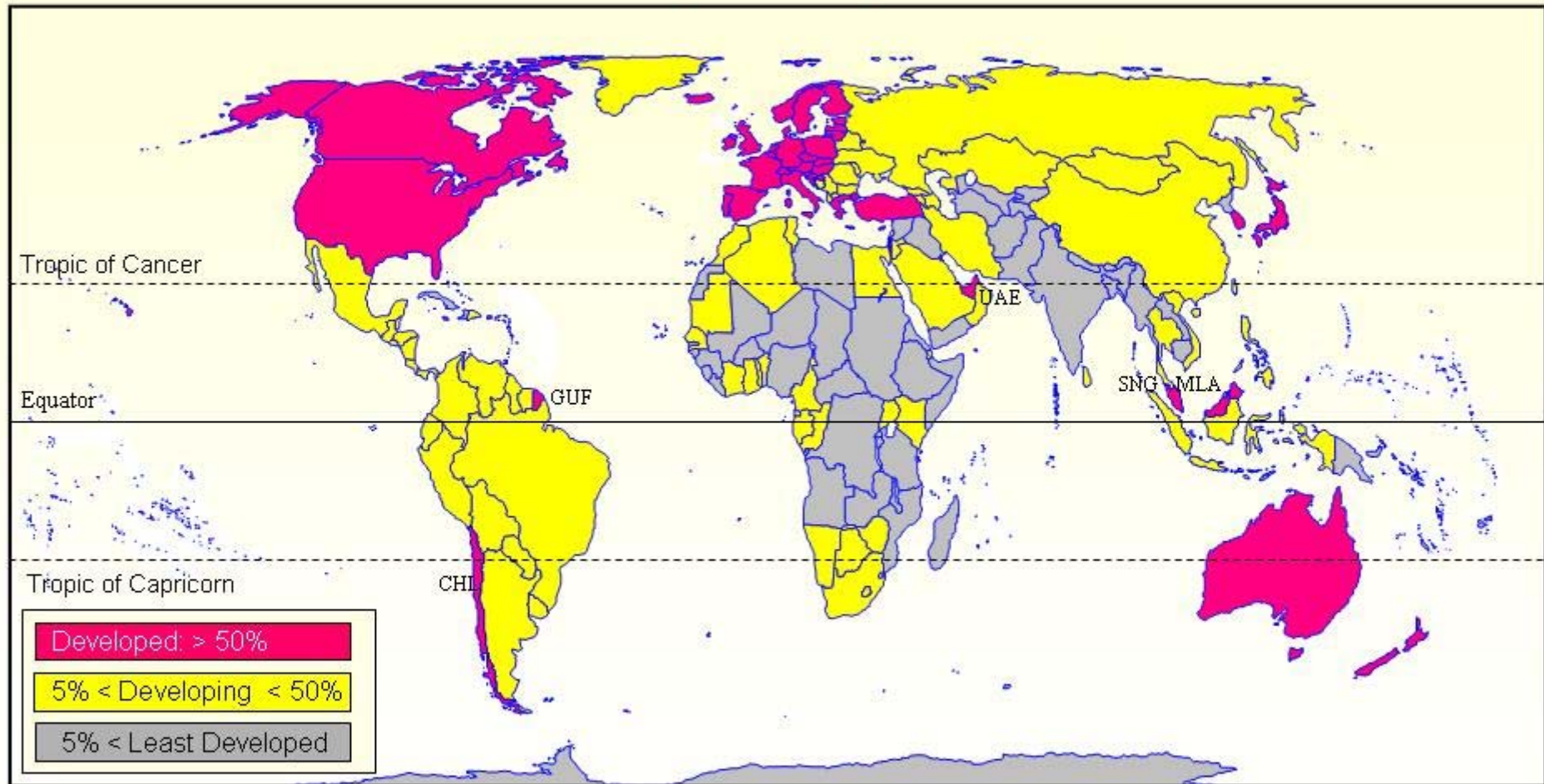
(geographical influence)



Cellular Penetration across the World

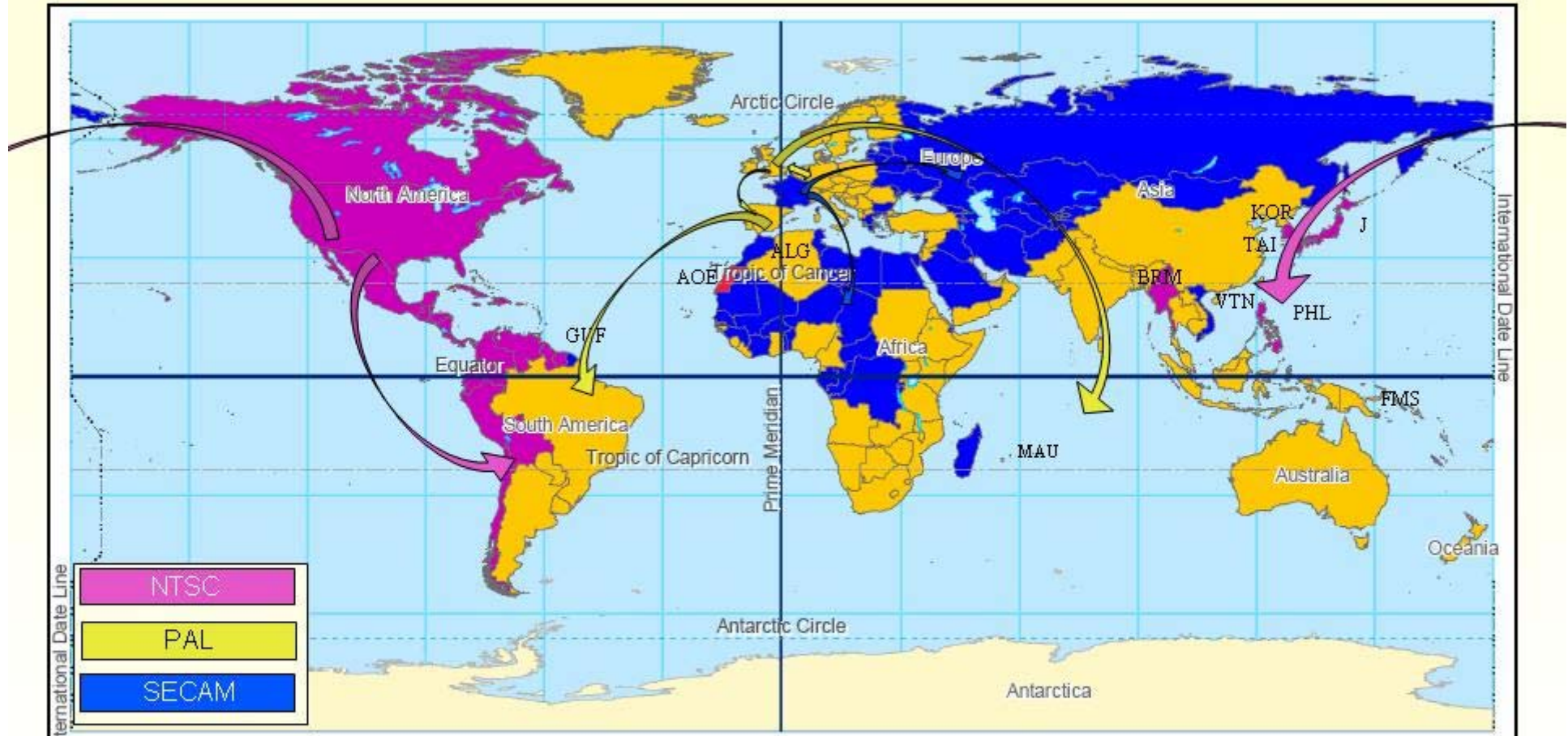
(*anomalies*)

2006

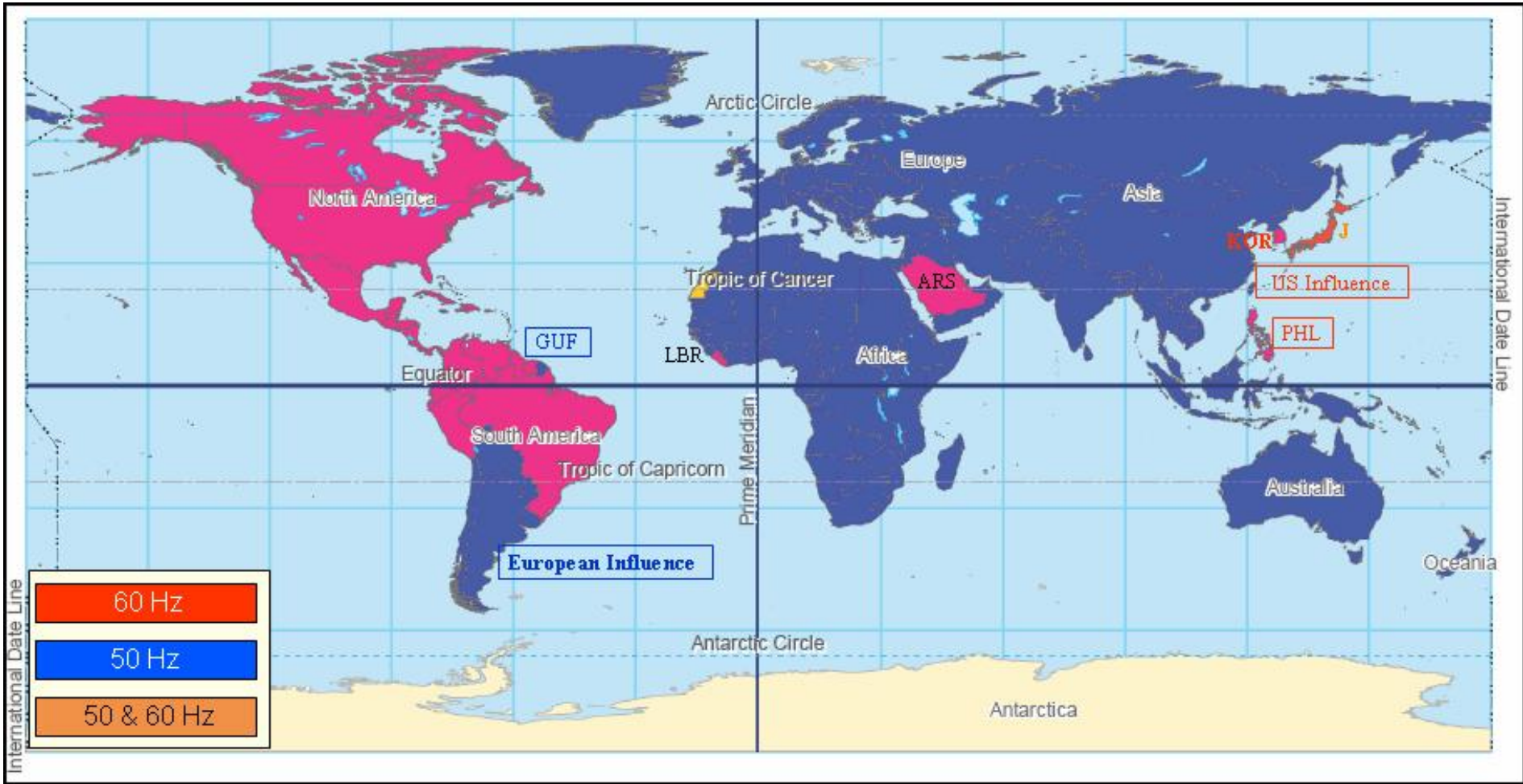


TV Colours: BR Exceptional Countries

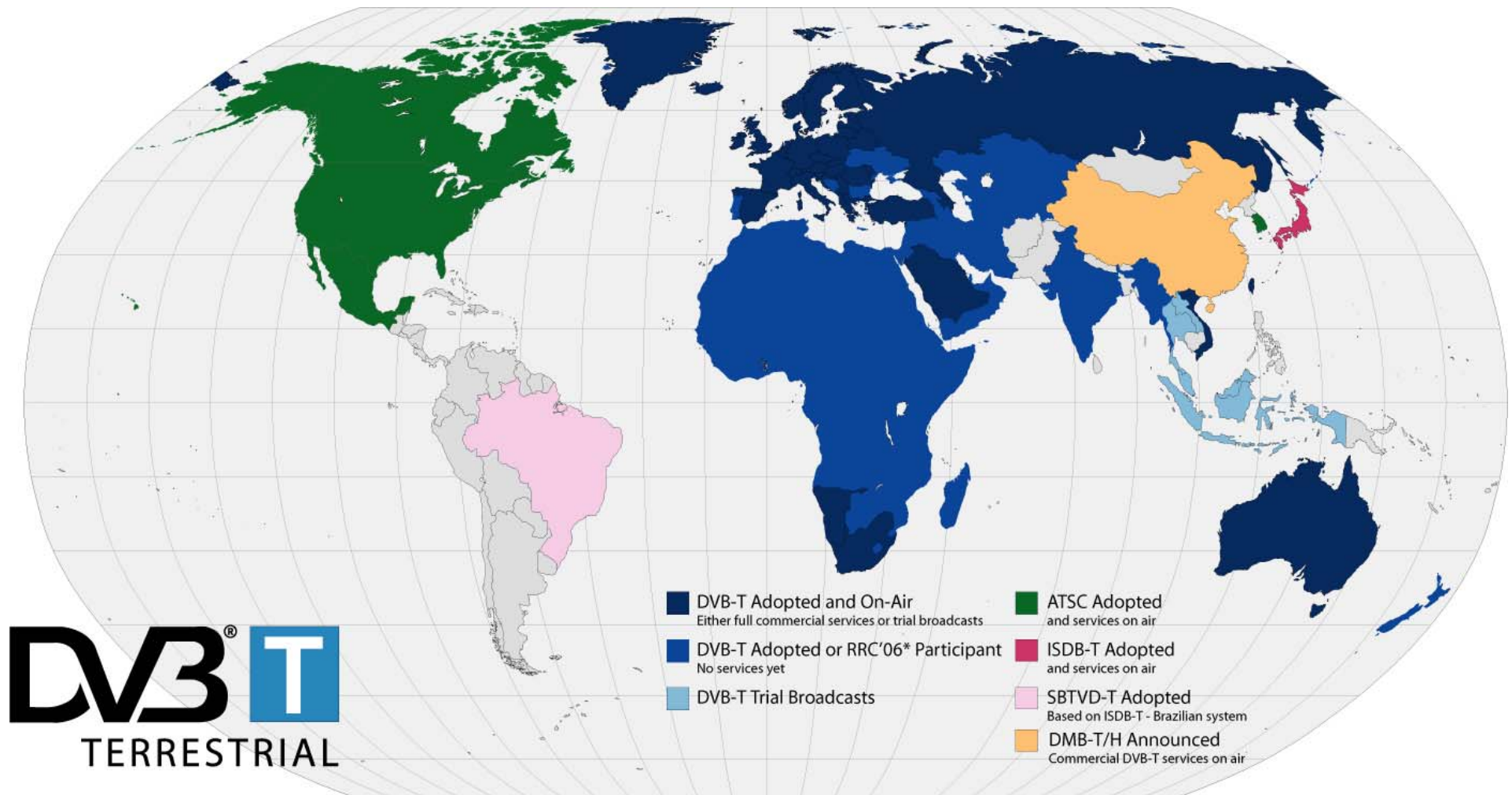
(colonial and geopolitical influence)



50-60 Hz electricity around the world



Digital TV around the World (2006)

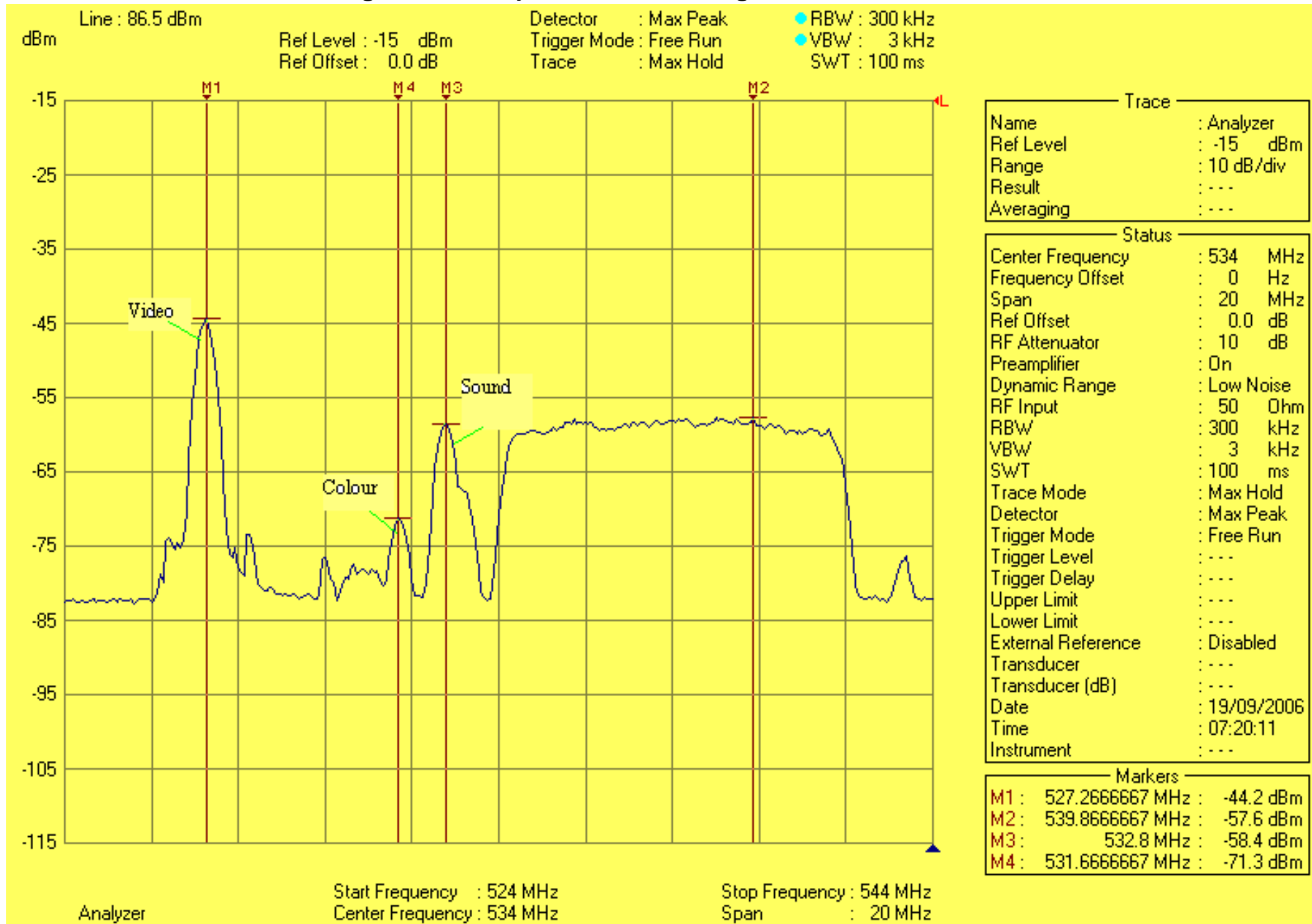


DVB and MHP are registered trademarks of the DVB Project

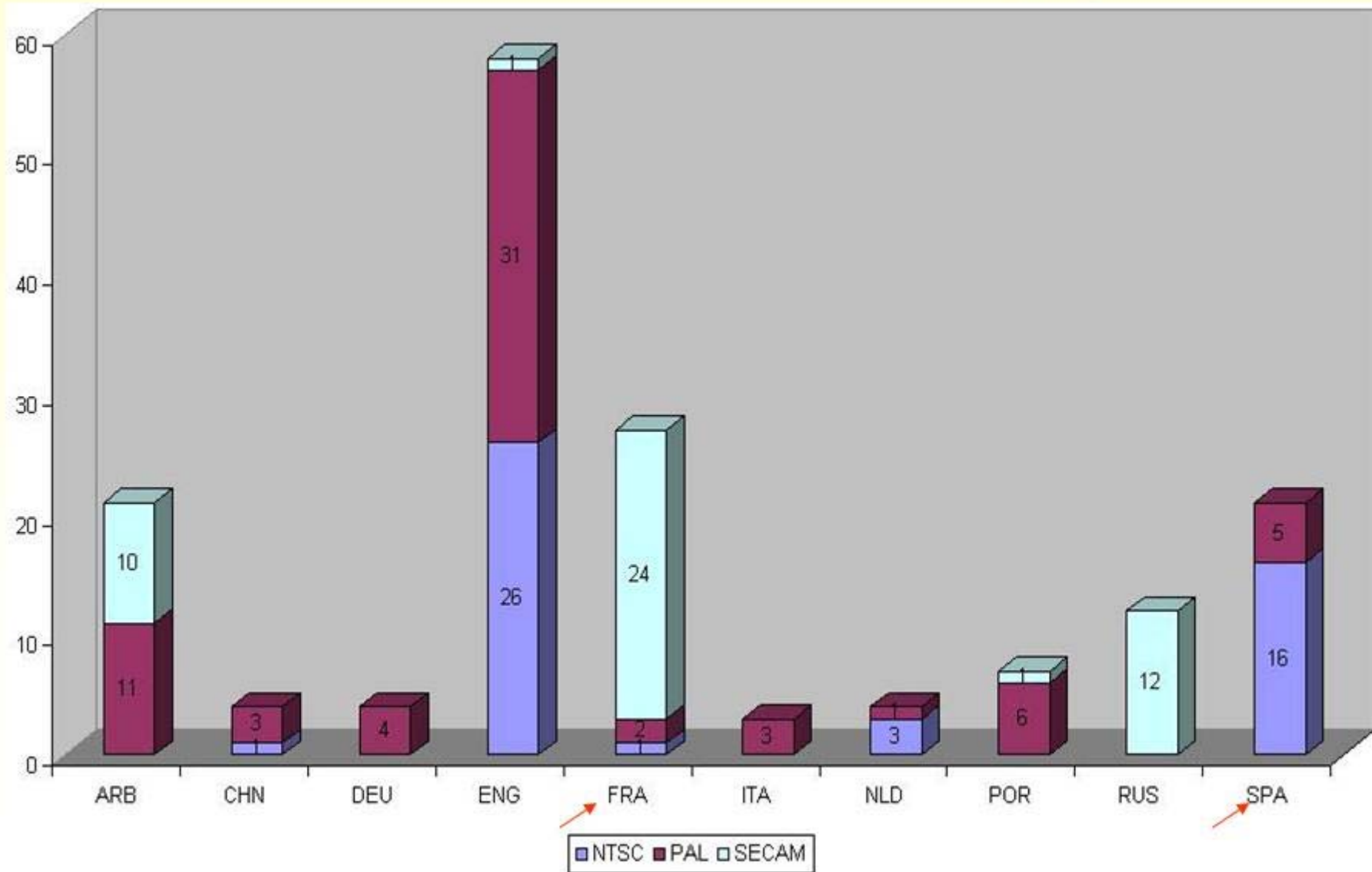
* RRC'06 created a frequency plan for an all-digital environment based exclusively on DVB-T

Updated September 2006

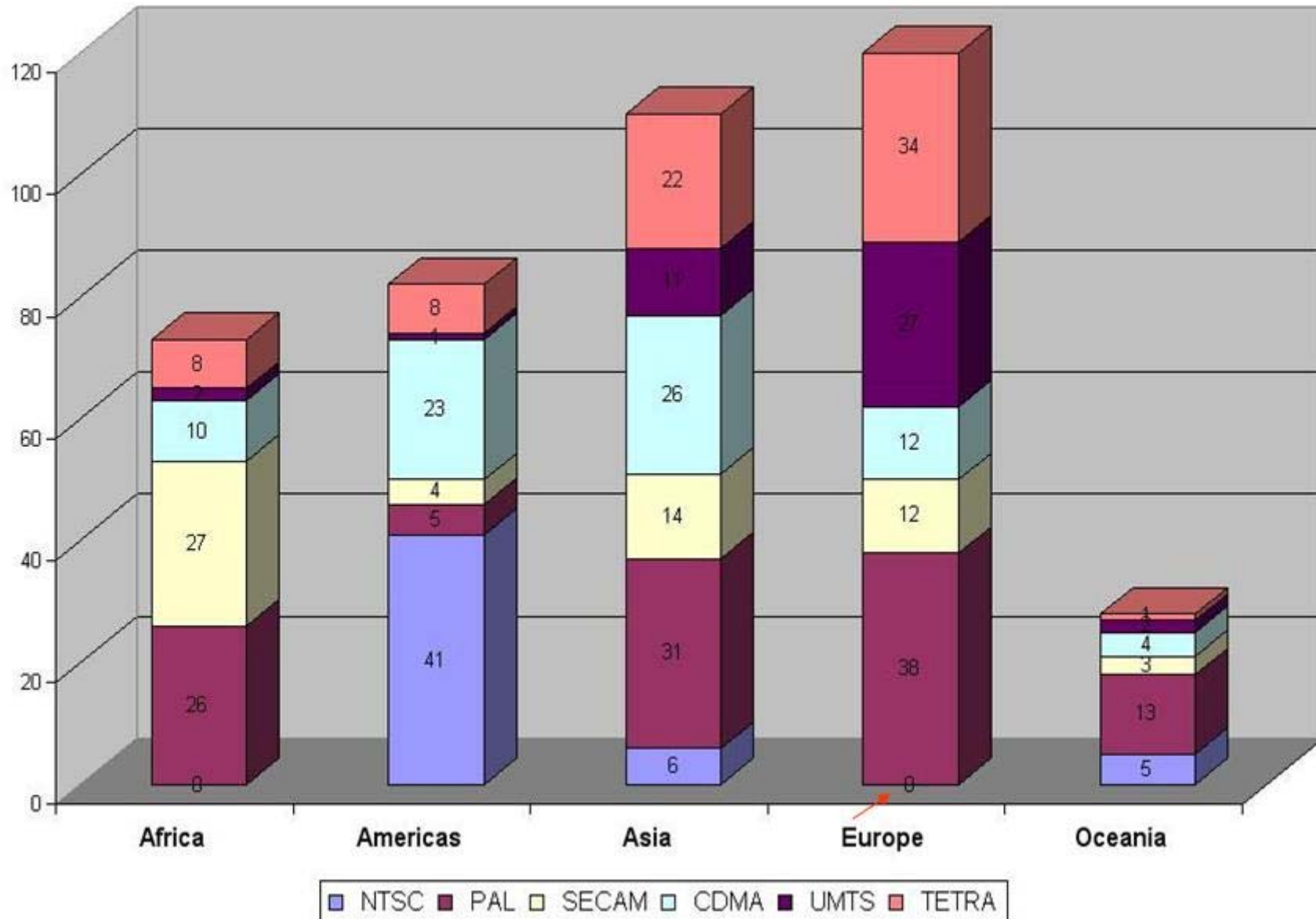
Digital TV adjacent to analog, measured by the author



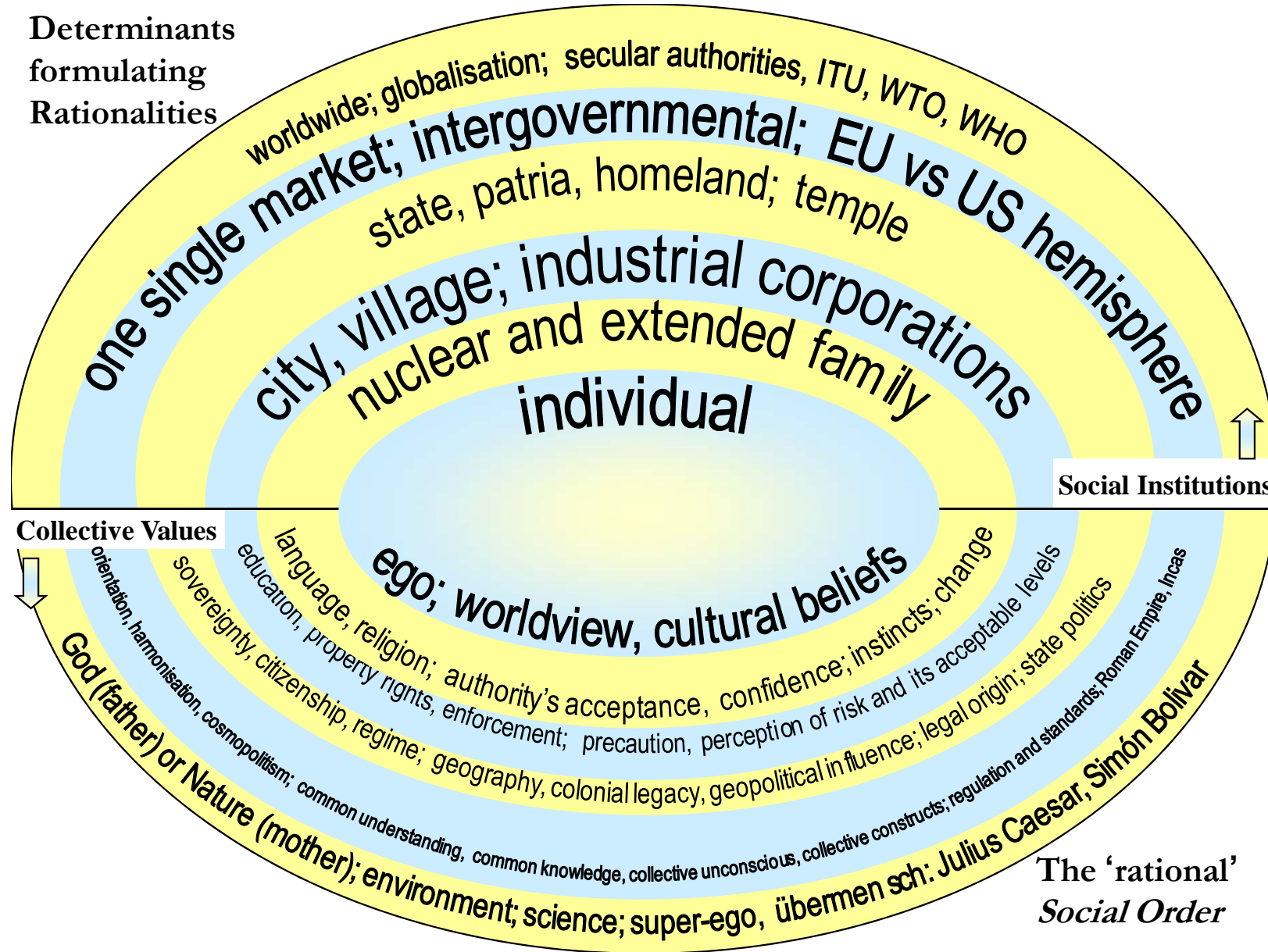
Colour TV of 243 Countries versus Languages



RF Standards across the Continents



Determinants
formulating
Rationalities



Tolerability to EM Risk, relative to ICNIRP 1998

- **US, Canada and Japan** are more tolerant of risk - **133%** ICNIRP
- Countries **less** tolerant of risk, with **more stringent** thresholds:

Country	<i>Power Density Relative to ICNIRP</i>
Switzerland	1%
Italy	2%- 20%
Poland	2%
Luxembourg	5%
China	8%
Israel	10%
Bulgaria	12%
Russia	20%
Belgium	25%
Greece	80%

ICNIRP (EC, NZL) Levels for RADHAZ

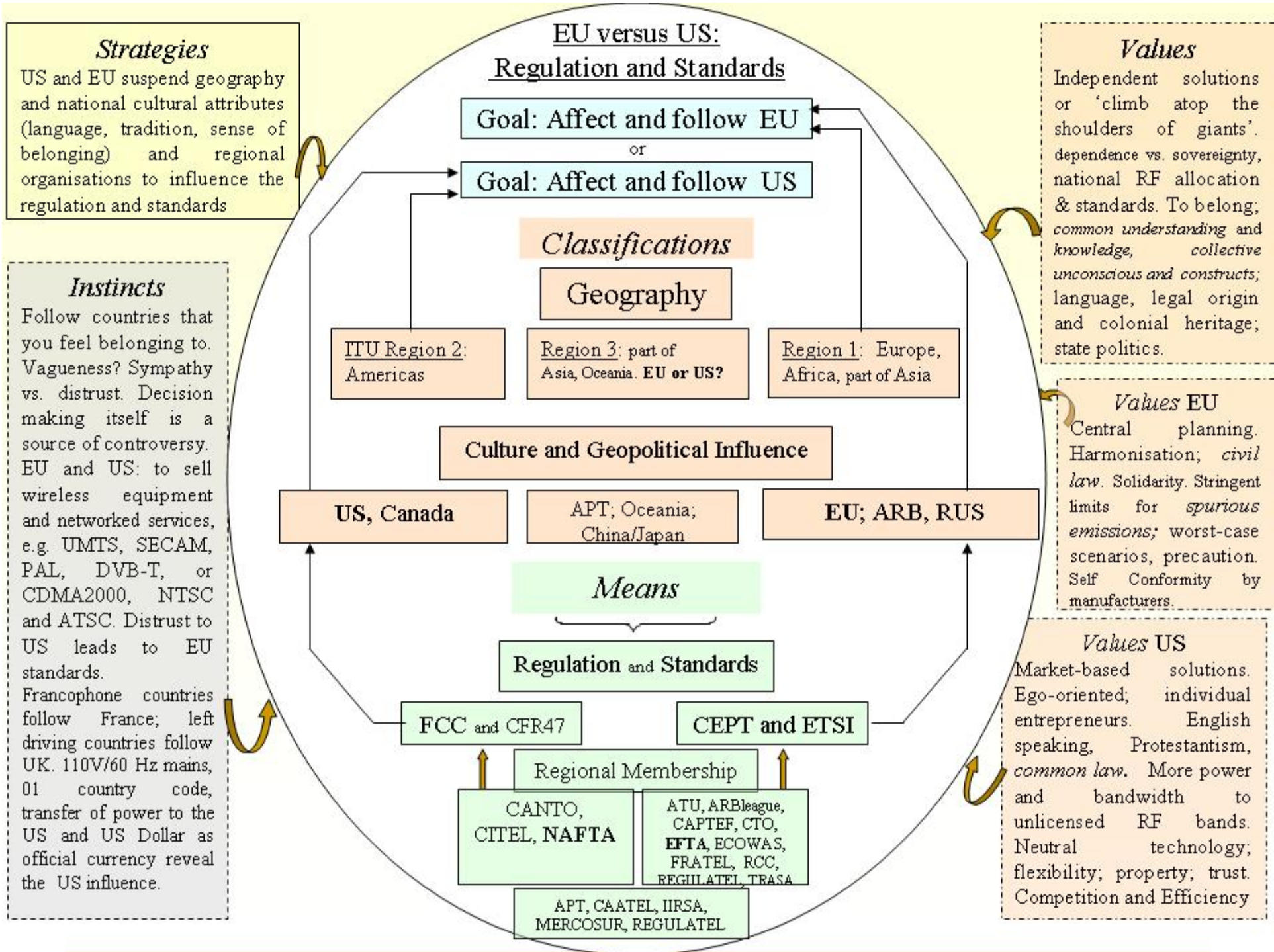
Frequency range	Equivalent plane wave power density S_{eq} (W/m^2)	Magnetic Flux Density (μT), B
25-800 Hz	-	5,000/f
400-2000 MHz	f/200	$0.0046 f^{1/2}$
2-300 GHz	10	0.2

Same formula adopted in Europe and North America:

100 μT for 50Hz Europe, and 83.3 μT for 60Hz North America.

Collectivised *central-planning* versus individualised *market-based*: **market-based individualist**

Ideology, Policy	Regulation	Worldviews, Values, Goals	Regulating Uncertain Risks	Network Services and Public Assets	Illustration
<p>Individualism, Freedom; natural selection; pluralism; the licensees should be trusted; human interaction; public consultation; feedback loops; look forward; <i>common law</i>: individual property rights, ownership; excellence; Industry; <i>laissez faire</i>, <i>laissez passer</i>.</p>	<p>Market mechanisms, light touch; simplification; deregulation, self regulation and self management; full liberalisation, bottom-up governance, technical neutrality; informality, transparency; flexibility, choice and diversity; favours small businesses; dynamic allocation; new technologies to end scarcity; local control; Liberal Market Economies; favour the citizen; fair-play; hurry.</p>	<p>Competition and Efficiency; ; incentives; 'inequity is normal, healthy and moral'; individual innovation; spontaneous; survival of the fittest; the regulator is the public servant, inspector-free; change; separation of Religion and State; 'Protestantism': Reformation, Predestination, own responsibility.</p>	<p>Risk prone ; spread risks; some amount of interference; specific evidence, Prudent Avoidance and science-based risk assessment; adaptation; more licence-exempt; <i>ex-post</i> (retroactive action, only if needed); growth, progress; economically viable solutions; short-term, present; technology-society; trust, 'innocent until proven guilty'; hypothetical 'phantom risk'.</p>	<p>Controlled by private-sector; free market; competitive; bottom-up technology; individual-driven; open network; allocation to the most economic; minimum price to the end-user; RF resource is a property; <i>a posteriori</i> ruling; secondary market trading (as a private good); low access barriers to scarce resources; consumer sovereignty and constrained optimisation; the view of the individual, entrepreneurs. The regulatee is involved in preparing the rules.</p>	<p>cowboy from the far-west, Bazaar; medieval cities; invisible hand, WTO spirit; free rider, Robinson Crusoe; Okham's Razor; Internet/ open-source, Wi-Fi; R&TTE; <i>liberum arbitrium</i> and <i>caveat emptor</i>; <i>homo aeconomicus</i>, and <i>homo mensura</i>; bottom line; economists; Australia, Canada, New Zealand, UK and USA (see next 2 chapters); <i>carpe diem</i> (seize the day), what's the use? <i>Que sera sera</i> (what will be will be); Capitalism, write-wing. Serve the citizen. Metropolis; <i>Habeas Corpus</i>.</p>



NZL- technical issues

- EU and US standards; problems at 850 MHz, as in ISR
- 806-960 MHz band re-planning proposals and options (similar to the ISR case);
- RF coexistence: Civilians and NZDF
- Due to geography and large spaces, rural comms is essential: UMTS 850, CDMA 450, WiMAX
- Four CDMA 1.26Mhz carriers with no guard band (as in ISR)
- Like NZL, ISR also operates American 1.25 MHz CDMA2000 adjacent to 5 MHz UMTS W-CDMA in the 824-835 (and 869-880) MHz RF band. ISR UMTS850 downlink interferes extended GSM 880-890 MHz UL. UL and DL are crossing, as in ISR

NZL Geography and Culture

- **Isolated vertical** island (UK, Japan); strength of isolation
- Isolated islands like Australia, Japan and New Zealand may apply a unique RF allocation (no-coordination is needed)
- NZL is influential in its own colonies: Cook Islands, Niue, Tokelau
- **Homogeneous** (similar to Japan); **Obedient**; Confidence
- Adventurers: wireless and satellites comms are essential (mountains and isolated villages)
- Innovation as 'necessity of survival' Alex Orange, 2003
- 'The State is the frame to make business easier and cheaper' Brian Miller, 2005
- The British settlers set up institutions and encouraged investment
- **Papa-Tuankuku** (**Mother-Earth**, in Maori)
- The importance of the Maori language (and heritage) in NZL

NZL a white dominion

- 5 allies: AUS, CAN, NZL, UK and US: - same Religion (Protestant, Beer and not Wine ☺), Legal System (common-law), Language (English); Individualism ('I' is capital letter only in English); non-tropical; state separated from religion
- RF auctions; neutral-technology
- All encourage technological innovation
- Like AUS: Commonwealth; electrical adaptor; short history (as US and Canada)
- Like UK: identified with, British empire, Queen, Union Jack, accent, settlers, drive left, Soccer and Rugby, metric system, fish & chips; PAL TV
- Like Europe: Sound and Video RF channel separations (AM, FM, V-UHF), DVBT, 220 V/ 50 Hz, SRD, ICNIRP level; GSM/UMTS (Leviathan and PHS failure); RFID frequencies (old CT2); TETRA
- Like US: dollar & decimals, WW2, 'cowboy from the far-west', Antarctica bases, Part15: 915-920 MHz, CDMA 1.26MHz; pioneering 'cognitive radio' and SDR

NZL- RULES and STANDARDS

- NZL is the first country to apply the Wireless Act in 1903 (one year before the UK);
- the first RF Auction in the world occurred there in 1989. Economy and Neo-liberal ideologues promoted structural adjustment program.
- UK implements European standards, but shares the 'North-American' liberal/individual view with its ex-colonies, the other Allied Countries (AUS, CAN, NZL, USA)
- AUS, ECA, Israel and NZL integrate EU and US influence
- Human Hazards: adopt ICNIRP
- Author's Proposal: Influence AUS regulation and follow their rules and standards. See how UK(France,Germany...) concedes its sovereignty (on ruling RF) to EC Directives and Decisions.

My PhD thesis is found at

<http://www.moc.gov.il/new/documents/frequencies/MazarThesisOct08.pdf>

You may get the book thru <http://www.amazon.com/Analysis-Regulatory-Frameworks-Wireless-Communications/dp/1599427109>

Many Thanks