



RTT TECHNOLOGY TOPIC
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Going Global - The American Way?

The announcement of the iPhone 5 and its limited band and technology support has prompted significant press comment but should not have been a surprise.

Apple have focused on US markets and US band/technology combinations with global roaming provided on core bands for example 1800 MHz but not on new LTE allocations such as Band 20 (LTE 800) and Band 7 (LTE 2600). There is also a lack of support for re farmed LTE other than at 1800 MHz (Band 3) or Band 1.

The table illustrates the 3GPP bands covered and **not covered** by the iPhone

Band (FDD)	Frequencies in MHz Lower duplex		Frequencies in MHz Upper duplex		iPhone
1 European 3G	1920	1980	2110	2170	Yes
2	1850	1910	1930	1990	
3 European 3G including LTE	1710	1785	1805	1880	Yes
4	1710	1755	2110	2155	
5 US 850 band	824	849	869	894	Yes
6	830	840	875	885	
7	2500	2570	2620	2690	
8	880	915	925	960	
9	1749.9	1784.9	1844.9	1879.9	
10 US AWS	1710	1770	2110	2170	Yes
11	1427.9	1447.9	1475.9	1495.9	
12	699	716	729	746	
13 US Verizon Reverse duplex	777	787	746	756	Yes
14	788	798	758	768	
15	Reserved		Reserved		
16	Reserved		Reserved		
17 US AT and T	704	716	734	746	Yes
18	815	830	860	875	
19	830	845	875	890	
20 (reverse duplex)	832	862	791	821	
21	1447.9	1462.9	1495.9	1510.9	
22	3410	3490	3510	3590	
23	2000	2020	2180	2200	
24 (reverse duplex)	1626.5	1660.5	1525	1559	
25 US PCS (Sprint)	1850	1915	1930	1995	Yes
26	814	849	859	894	
27	806	849	851	894	

TDD					
33	1900	1920	1900	1920	
34	2010	2025	2010	2025	
35	1850	1920	1850	1910	
36	1930	1990	1930	1990	
37	1910	1930	1910	1930	
38	2570	2620	2570	2620	
39	1880	1920	1880	1920	
40	2300	2400	2300	2400	
41	2496	2690	2496	2690	
42	3400	3600	3400	3600	
43	3600	3800	3600	3800	

However this band combination is in practice two phones.

The AT and T iPhone 5 includes GSM, dual carrier HSPA+ and LTE in the AWS band (Band 10, 1720 to 1770, 2110 to 2170 MHz) and 700 MHz Band 17.

The Verizon iPhone 5 also available to Sprint in the US and KDDI in Japan supports CDMA (EVDO), GSM, HSPA+ and LTE with LTE in five bands, European 3 G (Band 1), European 1800 MHz (Band 3), North American cellular (Band 5, 850 MHz) and US 700 MHz (Band 13 upper C block).

The lack of AWS support for the Verizon iPhone 5 is presumably temporary given their recently confirmed acquisition of AWS spectrum from Spectrum Co, Cox and Leap (for \$3.9 billion) to add to the spectrum acquired six years ago but to date unused.

Excluding Band 7 (2.6 GHz) is problematic for Clearwire struggling to overcome the legacy of a band and technology combination (2600 MHz and WiMax) that has prevented them from building meaningful smart phone related revenue streams. The exclusion of Band 12 at the bottom end of the 700 MHz band will have a similar impact on the ambitions of US Cellular to develop a market competitive smart phone service offer.

Implications for other markets

It also means that iPhone devices for other markets come with two different band/technology combinations that are specific to the US and generally not useful in other markets. Each additional 'unnecessary' band adds a dollar of cost and 1 dB of performance loss. This translates into a 12% reduction in cell size when networks are coverage limited and a 14% increase in the number of sites when networks are capacity limited with no associated user benefit apart from possibly enhanced performance when roaming in the US.

It means that the iPhone 5 can be used for LTE 1800, on the Everything Everywhere network in the UK for example but not for other re farmed spectrum including for Band 8 (European 900 MHz).

This would not matter or at least would matter less if other smart phones could be sourced to provide an alternative iPhone like experience. At present this is proving difficult partly because consumers remain loyal to Apple but also because other smart phone vendors share the real estate, cost and performance constraints of providing US specific band and technology support including LTE into small form factor low cost devices and have to divert R and D effort to meet US specific band and technology requirements.

It does not mean that the iPhone 5 cannot be sold into most overseas markets or that it cannot be range listed by most operators - it can and it will but it will not work as well as it could or should in terms of data rate and data range. This is a disadvantage for users and operators in non US markets.

Can Apple afford to ignore the world's largest markets by volume?

Whether Apple can continue to ignore the particular needs of the world's largest markets depends on future relative market size by volume and value. The US for example is now a relatively small market by volume and getting relatively smaller over time but remains one of the highest per subscriber by value.

It is hard to see the US market changing but other markets might. The telecoms industry still thinks nationally and regionally. The industry is regulated on a country by country basis and on a regional basis. Some operators have a dominantly domestic income base, AT and T and Verizon being two examples.

At the moment Apple can afford to do virtually anything and AT and T and Verizon are robustly valued but you might question whether this is partly due to the fact that Wall Street views the world through US centric rose tinted spectacles.

And while a US centric strategy might yield short term shareholder value, it may have a longer term cost.

The possible impact of operator consolidation - the pharmaceutical industry as a model.

At the moment it would be fair to say that AT and T and Verizon are largely influencing what gets included and what gets excluded from the iPhone in terms of band and technology combinations. A similar gravitational pull is exerted on other smart phone vendors whose market value remains disproportionately impacted by their success or lack of success in the US market.

Whether or for how long this remains the case depends partly on the future relative size and influence of other operators with a more international subscriber footprint.

Our colleagues at The Mobile World point out that the telecoms market remains remarkably fragmented with 60% of all connections divided between twenty operators and the remaining 40% spread over another two or three hundred entities.

To quote from recent TMW research

'Apart from China Mobile, none of the operators has more than 10% of all connections, while no operator has anywhere close to 10% of revenues. China Mobile is closest, with 7%, followed by Verizon, DoCoMo, Vodafone and AT&T, all of which are around the 5% mark. Compare this with the pharmaceutical industry. This is similar in scale, also global in reach and arguably, fundamentally more important; here, the twelve largest players control two thirds of the market and this concentration has not so much been permitted as actively encouraged'.

The rate at which operators with global market ambition are able or willing to invest in markets other than their home markets and products and services for these markets remains dependent on national and global competition policy and for the moment at least global competition remains influenced by national interest in many markets.

Whether this is good or bad is debatable. The degree of consolidation in the pharmaceutical industry has by and large driven supply chain efficiency. The benefits of this have not always been evenly distributed but that is a different issue.

Going global – the longer term ambition

And medicine and communication have more in common than we might at first assume.

Both have a major impact on GDP, the health and wealth of a nation. Both industries are highly regulated; both industries have a crucial role to play in emerging economies. Smart phones facilitate low cost financial transactions; smart phones provide low cost access to educational resources. Smart phones change the economic and social wealth of the world in the same way that medicines change the health of the world.

If we accept that more evenly distributed wealth and more evenly distributed health are preconditions for future global economic growth then global smart phone phones that work universally well in all or at least

most markets should remain as a fundamental ambition of the telecommunications industry.

Market and technology economics presently frustrate this ambition and it is not presently clear how or when this might change.

Potentially the multinational operators with the biggest exposure to developing markets outside of the US may be best placed to service these emerging market needs. This suggests this may not be a US led transition.

Similarly it is not inconceivable that vendors other than Apple begin to concentrate on optimizing products more specifically for non US markets. It is not inconceivable that non US markets including Europe and Africa in Region 1, Latin America in Region 2 and Asia and Australia in Region 3 support band plan/technology combinations that are more technically and commercially efficient than the US. This would mean that 5.5 billion subscribers would be going in one direction and 500 million subscribers would be left rather much on their own.

Apple could respond to this by offering regionally optimized versions of the iPhone but they would not have won many friends in the process.

Ends.

Global supply chain economics are one of the many topics addressed in RTT's latest book '[Making Telecoms Work- from technical innovation to commercial success](#)' available from the [RTT book shop](#).

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