

July 16, 2012



TV TechCheck



The Weekly NAB Newsletter for Television Broadcast Engineers

Future Wireless Band Plans Anticipate Intensive Spectrum Use

On Monday, July 16, at 9:30 a.m. EDT, the FCC will hold a forum on the Future of Wireless Band Plans which will explore the technological issues affecting wireless band plan design. The event will lead off with remarks from FCC Chairman Julius Genachowski and a keynote presentation by Martin Cooper, the recognized “father of the cell phone” and a frequent contributor in the ongoing discussions about future spectrum needs for mobile broadband service. More on Martin Cooper can be found at his [website](#). Broadcasters may be interested in some of his publications, including this 2010 paper titled “[The Myth of Spectrum Scarcity](#).”

Following the keynote, there will be three panels with technical experts on the following subjects:

- (1) Filter Technology and its Impact on Band Planning.
- (2) LTE Trends and their Implications on Band Planning.
- (3) Network Operator Perspectives on Band Plan Design.

The full forum agenda can be found [here](#). The workshop will be held in the Commission Meeting Room at the FCC’s headquarters in Washington, DC. It is free and open to the public, with seating available on a first-come, first-served basis. The forum will also be broadcast live over the Internet and can be viewed at <http://www.fcc.gov/live>. Questions from the Internet audience can be submitted via email to livequestions@fcc.gov.

For broadcasters, the prospects of LTE spectrum band planning encompass at least two areas of interest:

Meet your new neighbors: there are multiple band plans for LTE operations and broadcast services will live adjacent to some of them.

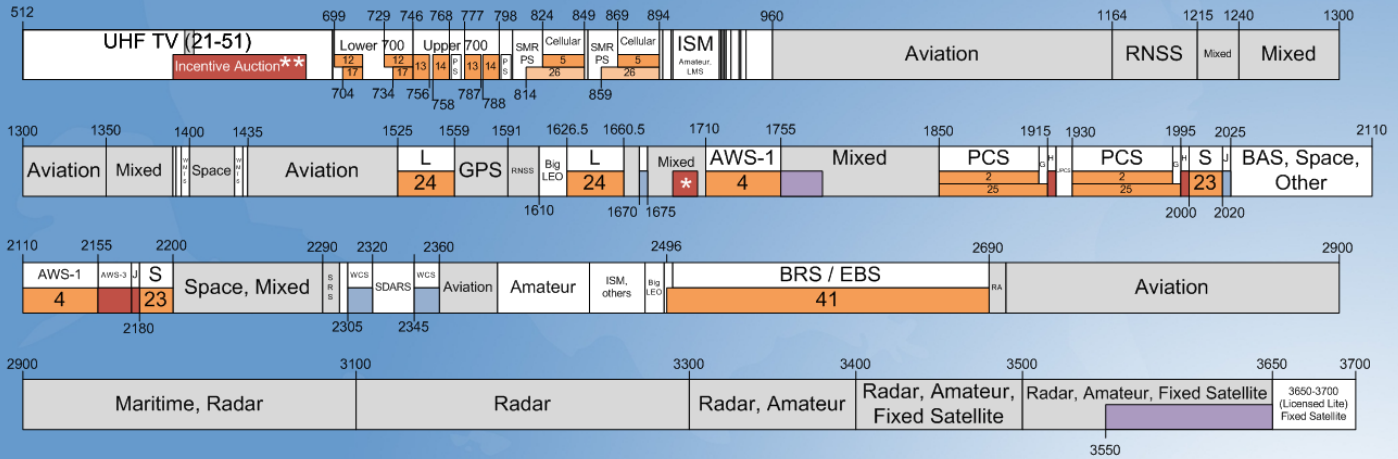
Filterpalooza: tuner complexity in LTE receivers is increasing rapidly to handle multiple band plans. New tuner architectures to handle complexity may be applicable to broadcast services.

To illustrate these points, below are the band plans currently defined for LTE around the world. Most are frequency division duplex (FDD) paired frequencies but there are several sets of time division duplex (TDD) bands as well:

LTE Bands	Uplink (MHz)	Downlink (MHz)	Duplex Spacing (MHz)	BW (MHz)	Duplex Mode	Deployment in the world
Band 1	1920 -1980	2110 -2170	190	60	FDD	China, Japan, EU, Asia, Australia
Band 2	1850 -1910	1930 -1990	80	60	FDD	North/South America
Band 3	1710 -1785	1805 -1880	95	75	FDD	EU, China, Asia, Australia, Africa
Band 4	1710 -1755	2110 -2155	400	45	FDD	North/South America
Band 5	824 -849	869 -894	45	25	FDD	North/South America, Australia, Asia, Africa
Band 6	830 -840	875 -885	45	10	FDD	Japan
Band 7	2500 -2570	2620 -2690	120	70	FDD	EU, South America, Asia, Africa, Australia
Band 8	880 -915	925 -960	45	35	FDD	EU, South America, Asia, Africa, Australia
Band 9	1749.9 -1784.9	1844.9 -1879.9	95	35	FDD	Japan
Band 10	1710 -1770	2110 -2170	400	60	FDD	North/South America
Band 11	1427.9 -1447.9	1475.9 -1495.9	48	35	FDD	Japan
Band 12	698 -716	728 -746	30	18	FDD	North America
Band 13	777 -787	746 -756	31	10	FDD	North America
Band 14	788 -798	758 -768	30	10	FDD	North America
Band 17	704 -716	734 -746	30	12	FDD	North America
Band 18	815 -830	860 -875	45	15	FDD	North/South America, Australia, Asia, Africa
Band 19	830 -845	875 -890	45	15	FDD	North/South America, Australia, Asia, Africa
Band 20	832 -862	791 -821	41	30	FDD	EU
Band 21	1447.9 -1462.9	1495.9 -1510.9	48	15	FDD	Japan
Band 22	3410 - 3500	3510 - 3600	100	90	FDD	
Band 24	1626.5 -1660.5	1525 -1559	101.5	34	FDD	
Band 33	1900 -1920		N/A	20	TDD	
Band 34	2010 -2025		N/A	15	TDD	China
Band 35	1850 -1910		N/A	60	TDD	
Band 36	1930 -1990		N/A	60	TDD	
Band 37	1910 -1930		N/A	20	TDD	
Band 38	2570 -2620		N/A	50	TDD	EU
Band 39	1880 -1920		N/A	40	TDD	China
Band 40	2300 -2400		N/A	100	TDD	China, Asia
Band 41	2496 -2690		N/A	194	TDD	
Band 42	3400 -3600		N/A	200	TDD	
Band 43	3600 -3800		N/A	200	TDD	

At the recent [FCC Technological Advisory Council \(TAC\) meeting](#) held on June 27, the Working Group on Multi-band Devices reinforced the spread-out nature of the spectrum bands being used. In the slide below from their presentation, the numbers in the orange bands refer to the LTE bands. Frequencies subject to incentive auctions, slated for part of the UHF television band, are shown in red.

US Current and Potential Future Flexible Use Bands

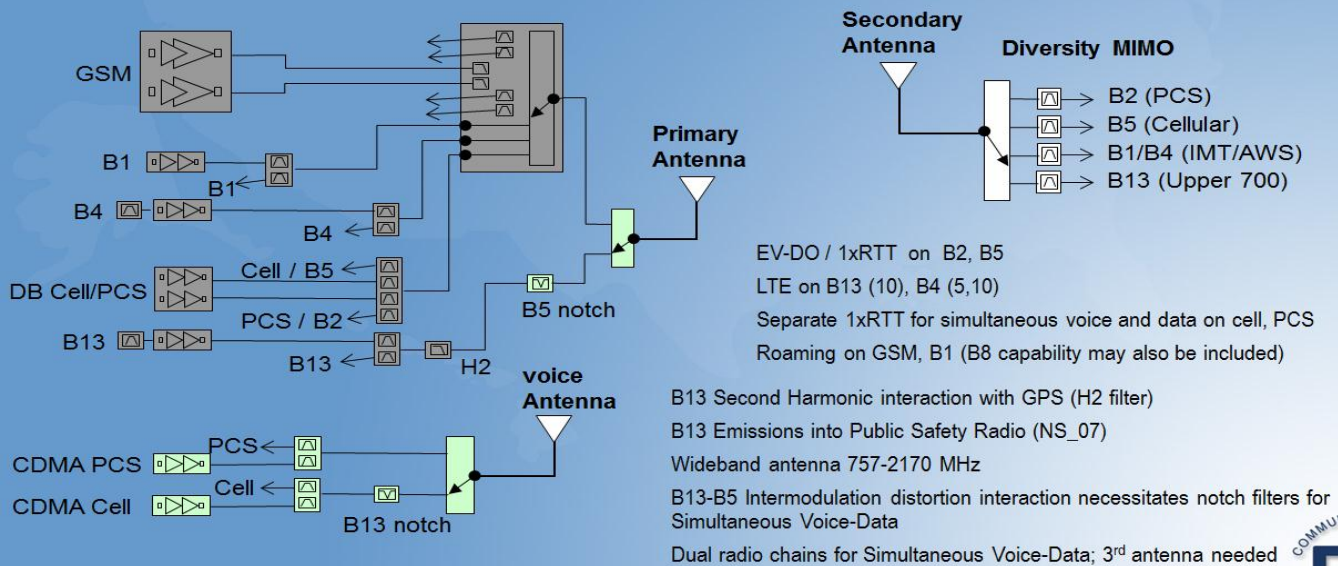


- 3GPP North American band
- 3GPP proposed North American band
- Other part 25 and 27 allocations
- Non-federal uses
- Federal uses
- Possible federal clearing or sharing
- Legislative mandate to auction
- * Legislation specifies 15 MHz between 1675 and 1710, frequencies not determined.
- ** Legislation specifies incentive auctions, specific frequencies depend on auction participation and FCC rules.



Also presented by the TAC Working Group were some block diagrams of typical handheld receivers showing the tuner components needed. For example, the receiver architecture below shows the arrangement of needed filters, amplifiers, switches and other components to enable a device with CDMA, GSM and LTE band access. The devices' complexity profile is of course even more complicated when additional radios for Bluetooth, Wi-Fi, NFC and broadcast radio are considered.

CDMA/GSM/LTE Architecture



The TAC Working Group had two general recommendations for the FCC:

- Policies that consider receiver performance and operation in a dynamic RF environment are appropriate for maximizing spectrum efficiency;
- Policies on research and accelerated development of software defined radio and downloadable applications should be encouraged.

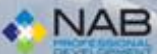
While it was recognized that software defined radio technology and adaptive front end tuner components make good theoretical solutions for the complexity problem, experts warn that these technologies may not be practical for some number of years. Those that tune in to the Monday FCC forum on the Future of Wireless Band Plans are likely to hear a good discussion on both sides of the issue.

All TV Stations Must Upload New Public File Documents Starting August 2 FCC to Host Webcast July 17 to Explain New Requirements and Demonstrate Database

Beginning August 2, all television broadcasters will be required to upload any new portions of their public file (not including the political file) to an online database hosted by the Federal Communications Commission (FCC). Additionally, all television stations affiliated with the top four broadcast networks (ABC, CBS, Fox and NBC) and in the top 50 markets must begin uploading their political files on August 2. TV Stations not affiliated with one of the four major networks and/or in a top 50 market will not be required to upload their political file until July 2014.

On Tuesday, July 17, 2012 at 10 a.m. EST the Federal Communications Commission (FCC) will host a public information session about the upcoming online public file requirements and will demonstrate of the database it has developed to host the online public inspection file documents. The event will be streamed live at www.fcc.gov/live. This session will also be archived on the Commission's website. Television members are strongly encouraged to watch the webcast to learn more about the design and content of the online file and how to upload documents to the database. Click [here](#) to read the Public Notice.

Although NAB has asked to stay enforcement of the political files requirement pending court review, there has been no ruling on that request yet. Stations must assume the ruling will go into effect. NAB will provide updated information on the litigation as it becomes available.

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