

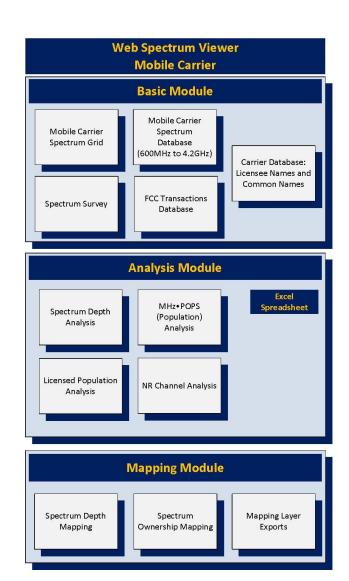
Spektrum Metrics

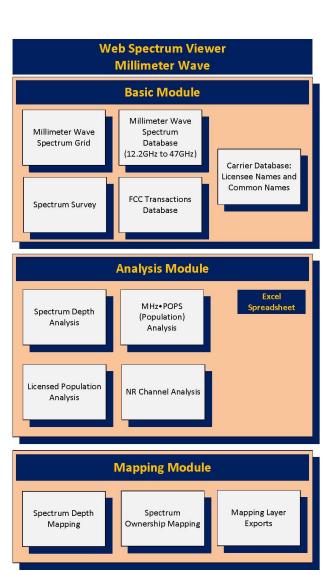
Global Spectrum Ownership Insights & Analytics

Spectrum Ownership Analysis Tool

The Spectrum Ownership Analysis Tool is an Excel product which allows users to visualize and analyze the current spectrum ownership for all of the mobile carrier and millimeter wave frequency bands at a county-level for all 50 states and US territories. The Spectrum Ownership Analysis Tool provides analysis for nearly 2,400 US carriers and spectrum licensees that own or lease these frequencies.

Modules







Spectrum Database

The Spectrum Ownership Analysis Tool includes 4 sources of data for analysis:

Source	Description
License Holdings (FCC)	Represents the current licensee for each block of spectrum.
Lease Holdings (Lease)	Reflects the carrier that is leasing a block of spectrum. Includes the Lease ID.
Current Holdings (Current)	Represents the current operator of each spectrum block including spectrum leases.
Future Holdings (Future)	Represents the proposed ownership or leasing changes that have been filed with the FCC.



The Spectrum Ownership Analysis Tool Database is updated monthly based upon filed FCC transactions.

Spectrum Bands

Mobile Carrier:

Bands	Frequency	Details
600 MHz	600 MHz	600MHz
700 MHz	700 MHz	700MHz
Cellular/SMR	850 MHz	Cellular/SMR
PCS	1900 MHz	Personal Communication Service
AWS 1/2/3/4	1700 MHz	Advaced Wireless Services
WCS	2.3 GHz	Wireless Communication Service
EBS/BRS	2.5 GHz	Educational Broadcast Service / Broadband Radio Service
3.45 GHz	3.45 GHz	3.45GHz Service
CBRS	3.5 GHz	Citizens Band Radio Service
C-Band	3.7 GHz	C-Band Satellite Service

Millimeter Wave:

Bands	Frequency	Details
12.2 GHz	12.2 - 12.7 GHz	Multichannel Video Distribution and Data Service
24 GHz	24.25 - 25.25 GHz	24 GHz
28 GHz	27.5 - 28.35 GHz	28 GHz - (LMDS A1)
28-31 GHz	28-31 GHz	LMDS (A2, B1, B2)
Lower 37 GHz	37 - 37.6 GHz	Lower 37 GHz
Upper 37 GHz	37.6 - 38.6 GHz	Upper 37 GHz
39 GHz	38.6 - 40 GHz	39 GHz
47 GHz	47.2 - 48.2 GHz	47 GHz



Spectrum Grid





Spectrum Grid Details

- The Spectrum Grid displays the primary spectrum holder for each block of spectrum at a county-level.
- Pull-down menu to select licensing data to display:
 FCC, Lease, Current, Future or Call Signs and
 Reserved Spectrum
- Includes the following reference information:
 - Alignment with LTE band classifications
 - Uplink/downlink spectrum allocation
 - Frequency start/stop, bandwidth
- Color-coded to carriers branding colors



Geographic Auto-Filters

Auto-Filters provide the selection of counties that are contained by individual geographic markets. The geographic markets included are:

- MTA # / MTA Name (Metropolitan Trading Area)
- BTA # / BTA Name (Base Trading Area)
- CMA # / CMA Name (Cellular Market Area)
- State / County
- PEA # / PEA Name (Partial Economic Area)
- BEA # / BEA Name (Base Economic Area)



Spectrum Depth NR Band Class

		Data Source	_						uture	11010	iiiga						_											_				4		
		ATT								Up														Dow	rn							1	TD	D
		AT&T	Band 12	Band 17	Band 13	Band 14	Band5	Band24	Band 4	Band 7.1	Band2	Band 25	Band 23	Band30	Band 66	Band70	Rand 12	ZT DIEG	Band 29	Band 13	Band 14	Band 26 Band 5	Band24	Band 4	Band71	Band 25	Band 66	Band23	Band 30	Band66	Band 70	Bsnd 40	Band38	Band 41
			-			-				-	_	-		+		_	-11-	+			-				_	+	_					╢╌	+	+
CI - CMA Name	* § *	County		۳	~	~	v v	¥	~	¥	~	¥	· ·		-	Ψ .		~	¥ ¥	-	~	¥ ¥	~	~	Ψ.	*	¥ ¥	-	-	¥	¥ ¥		¥ .	¥ 7
	NY-NJ/Nassau- NJ		12	12	0	10 12			0	0	15	15 1	0 0	10	10	0 0				0	10	12.5 12.5	0	0	0 1	5 1	5 10	0	10	10	0 0	30		
	NY-NJ/Nassau- NJ		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
	NY-NJ/Nassau- NJ		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
	NY-NJ/Nassau- NJ		12	12	0	10 12		0	0	0	15	15 1	0 0	10	10	0 0	1			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30	_	_
	NY-NJ/Nassau- NJ		12		0	10 12		0	0	0		15 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 1		5 10	0	10	10	0 0	30		
	NY-NJ/Nassau- NJ		12	12	0	10 12		0	0	0	15	15 1	0 0	10	10	0 0	1			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		_
	NY-NJ/Nassau- NJ		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 1	-		0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0	15	15 1	0 0	10	10	0 0	1			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30	_	_
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1	-	- 10	0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1		- 10	0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0	15	15 1	0 0	10	10	0 0				0	10	12.5 12.5	0	0	0 1		10	0	10	10	0 0	30	_	, ,
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1		5 10	0	10	10	0 0	30		
	NY-NJ/Nassau- NY		12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0	_			0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		
		Westchester County	12	12	0	10 12		0	0	0		15 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 1			0	10	10	0 0	30		, ,
		Los Angeles County	12		0	10 12		0	-	0		20 1		10	15	0 0				0		12.5 12.5	0		0 1			0	10	10	0 0	30		_
				12	0			0	5	0		20 1	5 0	10	15	0 0	_			0			0	5	0 2	-		0	10	10	0 0		_	
	s-Long Beach/A CA s-Long Beach/A CA		12 12	12	0	10 12 10 12		0	5	0		20 1	5 0	10	15	0 0	_			0		12.5 12.5 12.5 12.5	0	5	0 2	-		0	10	10	0 0	30		
		San Bernardino County	12		0	10 12		0	5	0			5 0	10						0		12.5 12.5	0	5	0 2			0	10	10		30		
				12	0			0	3	0		20 1	0	10	15 20	0 0			2 12	0			0	3	0 2		15	0	10	10	0 0	30		
3 Chicago, IL		Cook County	12	12				0	10	0		20 2	0 0	10			_		2 6	0		12.5 12.5	0	10				0	10	10		30	-	
3 Chicago, IL		DuPage County	12	12	0	10 12		0	10	0	20	20 2	0 0	10	20	0 0	_		2 6	0		12.5 12.5	0	10	0 2	-		0	10	10	0 0			
3 Chicago, IL		Kane County	12	12	0	10 12		0	10	0		20 2	0 0	10	20	0 0	_		2 6	0		12.5 12.5	0	10	0 2	0 2		0	10	10	0 0	30		, ,
3 Chicago, IL		Lake County	12	12	0	10 12 10 12		0	10	0		20 2	0 0	10	20	0 0			2 6	0		12.5 12.5 12.5 12.5	0	10	0 2			0	10	10				
3 Chicago, IL 3 Chicago, IL		McHenry County Will County	12 12	12	0	10 12		_	10	0		20 2	0 0	10	20	0 0				0		12.5 12.5 12.5 12.5	0	10	0 2			0	10	10	0 0	30		
4 Philadelphi		Burlington County	12	12	0	10 12		0	10		20	20 2	0 0	10	20	0 0				0		12.5 12.5	0	10	5 2			0	10	10	0 0	30	-	_
4 Philadelphi		Camden County			0	10 12		0	10	5		20 2	0 0	10	20	0 0				0		12.5 12.5	0	10	5 2	_		0	10	10	0 0	30		
			12 12	12	0	10 12		0	10	5		20 2	0 0	10	20	0 0	_			0		12.5 12.5	0	10	5 2	-		0	10	10	0 0	30		
		Gloucester County			0			0	10	5		20 2	0 0	10		0 0				0			0	10	5 2			0	10	10	0 0	30		
		Bucks County	12	12	-			0	10	5			0 0		20					0		12.5 12.5	0	10				0	10	10				
4 Philadelphi		Chester County	12		0	10 12		0	10	5		20 2	0 0	10	20					0		12.5 12.5	0	10	5 2			0	10	10	0 0	30		_
4 Philadelphi		Delaware County	12	12	0	10 12 10 12		0	10	5	20	20 2	0 0	10	20	0 0				0		12.5 12.5 12.5 12.5	0	10	5 2	0 2	20	0	10	10		30	-	
4 Philadelphi		Montgomery County	12	12	0			0	10	5	20	20 2	0 0		20	0 0			2 12	0			0	10	5 2	0 2	20	0	10	10	0 0		_	
4 Philadelphi		Philadelphia County	12	12	0	10 12		0	10	5		20 2	0 0	10	20	0 0		2 1	2 12	0		12.5 12.5	0	10	5 2	-		0	10	10	0 0	30		
5 Detroit/Ann		Lapeer County	12	12	0	10 12		0	0	0	20	20 1	0 0	10	10	0 0		2 1	2 6	0	10	12.5 12.5	0	0	0 2	0 2	- 10	0	10	10	0 0	30		, ,
5 Detroit/Ann		Livingston County	12	12	0	10 12		0	0	0		20 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 2			0	10	10	0 0	30	-	_
5 Detroit/Ann		Macomb County	12	12	0	10 12		0	0	0	20	20 1	0 0	10	10	0 0			2 6	0		12.5 12.5	0	0	0 2			0	10	10	0 0	30		
5 Detroit/Ann		Oakland County	12	12	0	10 12		0	0	0	20	20 1	0 0	10	10	0 0			2 6	0		12.5 12.5	0	0	0 2	0 2		0	10	10	0 0	30		_
5 Detroit/Ann		St. Clair County	12	12	0	10 12		0	0	0		20 1	0 0	10	10	0 0	_		2 6	0		12.5 12.5	0	0	0 2			0	10	10	0 0	30		
5 Detroit/Ann		Washtenaw County	12	12	0	10 12		0	0	0		20 1	0 0	10	10	0 0				0		12.5 12.5	0	0	0 2			0	10	10	0 0	30		
5 Detroit/Ann	n Arbor, MI MI	Wayne County	12	12	0	10 12	.5 12.5	0	0	0	20	20 1	0 0	10	10	0 0	1	2 1	2 6	0	10	12.5 12.5	0	0	0 2	0 2	10	0	10	10	0 0	30	0 0	0



Spectrum Depth NR Band - Details

- Displays how much spectrum a selected carrier controls for each LTE Band Classification e.g. NR Band Class 4, 41, 66
- Geographic Auto-filters



Spectrum Depth Channel Block

			Data Source				ru	tule	5 110	lulli	53			-				_		_	_	_			_					_			_	_	_		_	_	_			. —
			DSH	IJL				70	0 M	Hz			_	Cel	lular	/SMR	1	.4 GH	łz		LE	Band		A۱	NS3		A	WS1			А	WS3		\perp	_		PC	s			AWS4	w
			Dish	<	∢ 4	a (ے د	- u	IIPPFR	UPPERA	PSBB	PSNB	UPPERB	SMR	CELLA	CELLB	Unpaired	A	В	V	В	1610	1670	A1	B1	< α	ء د	0	ш	T.	ט ב	-	ń	∢	O	В	-	 (ی د	Ŧ	4	∢
			County	-	۳		_	_	_	-	_	۳	-	۳	_				۳	~	~	_	· ·			Ψ.		v v		_		v v	_	-	۳	_	_					
	New York, NY-NJ/Nassau-				0		0 0	0 0	0 0	0	0	0	0	0	0	0	0		0	0	_		0 0	5	10	0 0	0	0	0	0	10 1		0	0	0	0	0			10	40	0
	New York, NY-NJ/Nassau-		Essex County			0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0	5	10	0 0	0	0	0	0	10 1		0	0	0	0	0			10	40	0
	New York, NY-NJ/Nassau-			-		0 (0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (40	0
	New York, NY-NJ/Nassau-		Morris County			0 (0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (40	0
	New York, NY-NJ/Nassau-				0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 0		40	0
	New York, NY-NJ/Nassau-				0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 0		40	0
	New York, NY-NJ/Nassau-		Union County		0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 0		40	0
	New York, NY-NJ/Nassau-				0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	-	10	40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (10	40	0
	New York, NY-NJ/Nassau-				0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (10	40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (10	40	0
1	New York, NY-NJ/Nassau-	NY	Rockland County	(0	0 (0 (0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 (10	40	0
	New York, NY-NJ/Nassau-			(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 0	10	40	0
1	New York, NY-NJ/Nassau-	NY	Westchester County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 1	0 0	0	0	0	0	0	0	0 0	10	40	0
2	Los Angeles-Long Beach/A	CA	Los Angeles County		0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
2	Los Angeles-Long Beach/A	CA	Orange County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
	Los Angeles-Long Beach/A			(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
2	Los Angeles-Long Beach/A	CA	San Bernardino County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
		IL.	Cook County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 0	10	0	0	0	0	0	0	0 0	10	40	0
3	Chicago, IL	IL.	DuPage County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 (10	0	0	0	0	0	0	0 (10	40	0
3	Chicago, IL	IL	Kane County	(0	0 (0 (0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 (10	0	0	0	0	0	0	0 (10	40	0
		IL	Lake County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 (10	0	0	0	0	0	0	0 0	10	40	0
3			McHenry County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 (10	0	0	0	0	0	0	0 0	10	40	0
3	Chicago, IL	IL.	Will County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	0 (10	0	0	0	0	0	0	0 0	10	40	0
4	Philadelphia, PA	NJ	Burlington County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
4	Philadelphia, PA	NJ	Camden County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
			Gloucester County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
4			Bucks County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
4	Philadelphia, PA	PA	Chester County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
4	Philadelphia, PA	PA	Delaware County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
			Montgomery County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0 0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
4	Philadelphia, PA	PA	Philadelphia County	(0	0 (0 0	0 0	0 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	10	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5	Detroit/Ann Arbor, MI	MI	Lapeer County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5	Detroit/Ann Arbor, MI	MI	Livingston County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0 0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5	Detroit/Ann Arbor, MI	MI	Macomb County		0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5	Detroit/Ann Arbor, MI	MI	Oakland County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 (10	40	0
5	Detroit/Ann Arbor, MI	MI	St. Clair County	(0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5			Washtenaw County	0	0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0
5	Detroit/Ann Arbor, MI	MI	Wayne County	0	0	0 (0 0	0 6	5 0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0 0	5	0	0 0	0	0	0	0	10 (0	0	0	0	0	0	0	0 0	10	40	0



Spectrum Depth Channel Block - Details

- Displays the amount of spectrum a carrier controls for an individual channel block at a county-level
- Geographic Auto-Filters



Licensed Population

			ATT						700 MHz							Cellula	r/SMR		Low Band
			AT&T	<	8	v	Q	Э	UPPERC	UPPERA	PSBB	PSNB	UPPERB	Total	SMR	CELLA	CELLB	Total	Total
			% US Population	0.0%		94.0%	100.0%	23.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	65.9%	25.1%	83.5%	100.0%
			Licensed Population		287,360,392	303,282,820	322,792,146	74,295,151	1.0		322,792,146			322,792,146		212,703,443	81,081,490	269,427,897	322,792,146
CI -	CMA Name	5 +	County -	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146	322,792,146
1	New York, NY-NJ/Nassau-	NJ	Bergen County	12	933,572	933,572	933,572	933,572			933,572			933,572		933,572	2	933,572	933,572
1	New York, NY-NJ/Nassau-	NJ	Essex County		795,723	795,723	795,723	795,723			795,723			795,723	-	795,723		795,723	795,723
1	New York, NY-NJ/Nassau-	NJ	Hudson County		669,115	669,115	669,115	669,115			669,115			669,115	-	669,115		669,115	669,115
1	New York, NY-NJ/Nassau-	NJ	Morris County		499,727	499,727	499,727	499,727	*		499,727			499,727	×	499,727	*	499,727	499,727
1	New York, NY-NJ/Nassau-	NJ	Passaic County	12	508,856	508,856	508,856	508,856	¥	2	508,856	9	Ş.,	508,856	12	508,856		508,856	508,856
1	New York, NY-NJ/Nassau-	NJ	Somerset County	-	332,568	332,568	332,568	332,568	2		332,568	2	2	332,568		332,568	2	332,568	332,568
1	New York, NY-NJ/Nassau-	NJ	Union County	-	552,939	552,939	552,939	552,939	-		552,939	-		552,939	-	552,939	-	552,939	552,939
1	New York, NY-NJ/Nassau-	NY	Bronx County	- 85	1,438,159	1,438,159	1,438,159	1,438,159			1,438,159			1,438,159		1,438,159	*	1,438,159	1,438,159
1	New York, NY-NJ/Nassau-	NY	Kings County	194	2,621,793	2,621,793	2,621,793	2,621,793	*	+	2,621,793		- 4	2,621,793		2,621,793	20	2,621,793	2,621,793
1	New York, NY-NJ/Nassau-	NY	Nassau County	12	1,358,627	1,358,627	1,358,627	1,358,627	2	2	1,358,627	- 2		1,358,627	2	1,358,627		1,358,627	1,358,627
1	New York, NY-NJ/Nassau-	NY	New York County		1,636,268	1,636,268	1,636,268	1,636,268			1,636,268			1,636,268		1,636,268		1,635,268	1,636,268
1	New York, NY-NJ/Nassau-	NY	Putnam County		99,487	99,487	99,487	99,487			99,487			99,487		99,487		99,487	99,487
1	New York, NY-NJ/Nassau-	NY	Queens County	72	2,321,580	2,321,580	2,321,580	2,321,580		*	2,321,580		- 9	2,321,580	-	2,321,580	**	2,321,580	2,321,580
1	New York, NY-NJ/Nassau-	NY	Richmond County	72	473,279	473,279	473,279	473,279	2		473,279	2	- 3	473,279		473,279	2	473,279	473,279
1	New York, NY-NJ/Nassau-	NY	Rockland County		323,866	323,866	323,866	323,866			323,866		- 1	323,866	-	323,866		323,866	323,866
1	New York, NY-NJ/Nassau-	NY	Suffolk County		1,502,968	1,502,968	1,502,968	1,502,968			1,502,968			1,502,968	-	1,502,968		1,502,968	1,502,968
1	New York, NY-NJ/Nassau-	NY	Westchester County		972,634	972,634	972,634	972,634			972,634	- 8		972,634		972,634		972,634	972,634
2	Los Angeles-Long Beach/A	CA	Los Angeles County	19	10,116,705	10,116,705	10,116,705	10,116,705			10,116,705			10,116,705	14	10,116,705	23	10,116,705	10,116,705
2	Los Angeles-Long Beach/A	CA	Orange County	12	3,145,515	3,145,515	3,145,515	3,145,515	28		3,145,515	€		3,145,515	12	3,145,515	35	3,145,515	3,145,515
2	Los Angeles-Long Beach/A	CA	Riverside County		2,329,271	2,329,271	2,329,271	2,329,271		- 2	2,329,271		- 1	2,329,271		2,329,271		2,329,271	2,329,271
2	Los Angeles-Long Beach/A	CA	San Bernardino County		2,112,619	2,112,619	2,112,619	2,112,619			2,112,619			2,112,619		2,112,619		2,112,619	2,112,619
3	Chicago, IL	IL	Cook County		5,246,456	5,246,456	5,246,456		- 4		5,246,456			5,246,456	-	5,246,456		5,246,456	5,246,456
3	Chicago, IL	IL	DuPage County	84	932,708	932,708	932,708	40		2	932,708		:	932,708	19	932,708		932,708	932,708
3	Chicago, IL	IL	Kane County	- 2	527,306	527,306	527,306	2	2	0	527,306	2	12	527,306		527,306	2	527,306	527,306
3	Chicago, IL	IL	Lake County		705,186	705,186	705,186				705,186			705,186		705,186		705,186	705,186
3	Chicago, IL	IL	McHenry County		307,283	307,283	307,283				307,283			307,283	-	307,283		307,283	307,283
	Chicago, IL		Will County		685,419	685,419	685,419	- 2			685,419			685,419	-	685,419	¥	685,419	685,419
	Philadelphia, PA	NJ	Burlington County	12	449,722	449,722	449,722	449,722	2		449,722	- 4	- 4	449,722	34	449,722	2	449,722	449,722
4	Philadelphia, PA		Camden County		511,038	511,038	511,038	511,038			511,038	্র		511,038		511,038		511,038	511,038
4	Philadelphia, PA		Gloucester County		290,951	290,951	290,951	290,951			290,951			290,951		290,951		290,951	290,951
4	Philadelphia, PA		Bucks County		626,685	626,685	626,685	626,685			626,685			626,685		626,685		626,685	626,685
	Philadelphia, PA		Chester County		512,784	512,784	512,784	512,784			512,784			512,784		512,784	- 2	512,784	512,784

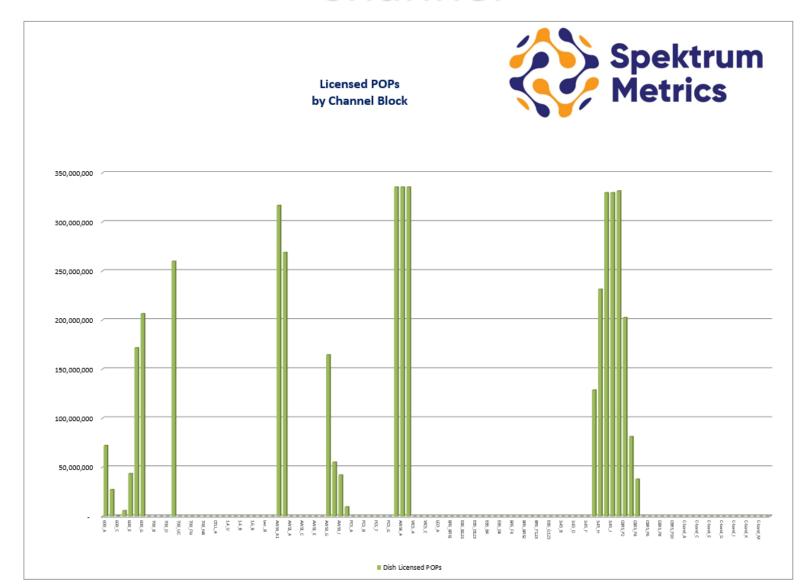


Licensed Population Details

- Displays the estimated licensed population that a carrier can serve with a specific channel (700-A), frequency band (700MHz), and band classification (low, lower mid, or upper mid).
- Display the estimated licensed population at a county-level or at the national-level.
- Geographic Auto-Filters

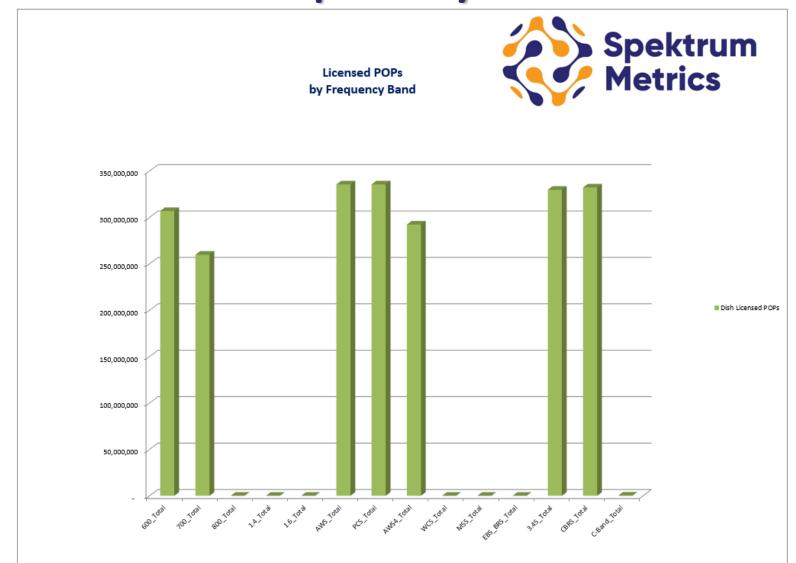


Licensed Population Channel



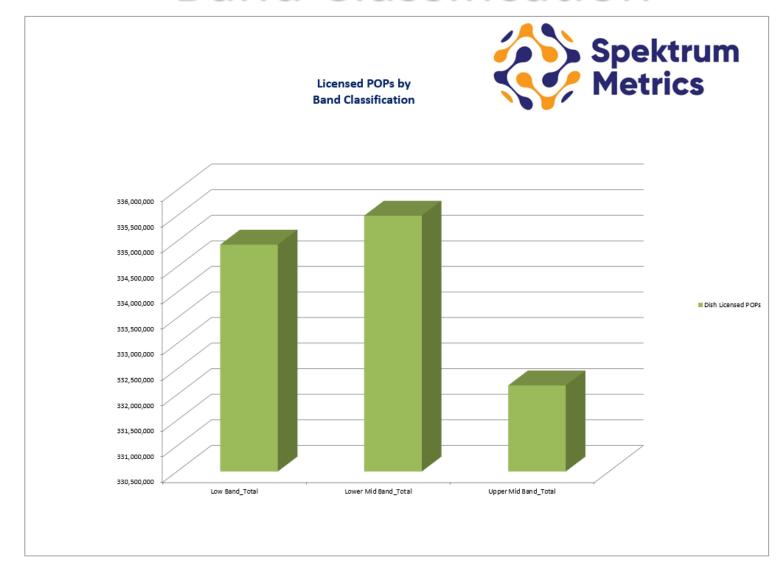


Licensed Population Frequency Band





Licensed Population Band Classification





Spectrum Depth County Comparison

		Data Source			Futu	re Hold	lings		- 9																												
				Т	otal Spec	ctrum Dep	oth (MHz)					Low	Band					N	tid Band	i		ΠГ		Hig	gh Band			Ш		500MHz					700MI	łz	
			rizon Wireless	TS.	Mobile	det	Cellular	mcast	J	rizon Wireless	&T Mobile	rint	5	Cellular	mcast C	rizon Wireless	8T	Mobile	jų 4	Cellular	mcast		rizon Wireless &T	Mobile	Ĭ 4	Cellular	mcast	rizon Wireless	&T Mobile	Ĭ 4	Cellular mcast	C	rizon Wireless	&T Mobile	ılııt	sh Cellular	meast
		Fator Confee Codes	> >	- 2	7710 6	S S	USC S	8	2	>	¥ 5	Sp	ă	5	8 2	>	Ā	ī	S io	5	S	의L	A Y	7 5	d 6	3	8 2	ا خ	14 F	o o	5 8	2	>	14 1-	Sp	5 5	8 8
	50.0	Enter Carrier Codes		ATT		SPR DSH			FCC		200 0						Ţ						VV				10 2	-	10.10		20 100						
→ CMA Nan	me 💌 S	* County	. 🔽		♥			×.	Ψ.	-	* *		-		* *		-	-	* *						*		* *		7 7	• •	* *	-		¥ ¥		*	
1 New York	k, NY-NJ/Nassau- N	J Bergen County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 8	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	J Essex County	127	161	102 1	99.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 8	5 0	0	10	0 30	0 14	46 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	J Hudson County	127	161	102 1	99.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 14	46 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	J Morris County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	U Passaic County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 83	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	J Somerset County	127	161	102	189 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 83	5 0	0	10	0 30	0 13	35 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Union County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 8	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Bronx County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Kings County	127	161	102 1	99.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 14	46 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Nassau County	127	161	102 1	93.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 14	40 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y New York County	127	161	102 1	99.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 8	5 0	0	10	0 30	0 14	46 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Putnam County	127	161	102	189 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 13	35 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Queens County	127	161	102 1	99.5 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 14	46 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Richmond County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0.	0 0
New York	k, NY-NJ/Nassau- N	Y Rockland County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Suffolk County	127	161	102	204 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 15	50 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
1 New York	k, NY-NJ/Nassau- N	Y Westchester County	127	161	102	177 12	25 0	10	10	47	81 3	2 14	40	0	10 0	80	50	70	40 85	5 0	0	10	0 30	0 12	23 0	0	0 0	0	0 20	0 40	0 10	0	22	56 12	0	0	0 0
2 Los Ange	eles-Long Beach/# C	A Los Angeles County	127	181	112	198 9	95 0	0	10	47	81 4	2 14	20	0	0 10	80	70	70	40 7	5 0	0	0	0 30	0 14	44 0	0	0 0	0	0 30	0 20	0 0	10	22	56 12	0	0	0 0
	eles-Long Beach/# C		127	181	112 1	81.5 9	95 0	0	10	47	81 4	2 14	20	0	0 10	80	3 70	70	40 75	5 0	0	0	0 30	0 12	28 0	0	0 0	0	0 30	0 20	0 0	10	22	56 12	0	0	0 0
2 Los Ange	eles-Long Beach/# C	A Riverside County	127	181	112	240 9	95 0	0	10	47	81 4	2 14	20	0	0 10	80	70	70	40 75	5 0	0	0	0 30	0 18	86 0	0	0 0	0	0 30	0 20	0 0	10	22	56 12	0	0	0 0
2 Los Ange	eles-Long Beach/A C	A San Bernardino County	127	181	112	240 9	95 0	0	10	47	81 4	2 14	20	0	0 10	80	70	70	40 7	5 0	0	0	0 30	0 18	86 0	0	0 0	0	0 30	0 20	0 0	10	22	56 12	0	0	0 0
3 Chicago,	IL II	L Cook County	97	185	102	238 9	0	10	20	47	75 4	2 14	16	0	10 0	50	80	60	50 75	5 0	0	20	0 30	0 17	74 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
3 Chicago,	IL II	L DuPage County	97	185	102	238 9	0	10	20	47	75 4	2 14	16	0	10 0	50	80	60	50 75	5 0	0	20	0 30	0 17	74 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
3 Chicago,	IL II	L Kane County	97	185	102	244 9	0	10	20	47	75 4	2 14	16	0	10 0	50	80	60	50 75	5 0	0	20	0 30	0 18	80 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
Chicago,	IL II	L Lake County	97	185	102	244 9	0	10	20	47	75 4	2 14	16	0	10 0	50	08 0	60	50 75	5 0	0	20	0 30	0 18	80 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
3 Chicago,	IL II	L McHenry County	97	185	102 2	27.5 9	0	10	20	47	75 4	2 14	16	0	10 0	50	80	60	50 75	5 0	0	20	0 30	0 16	54 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
3 Chicago,	IL II	L Will County	97	185	102	238 9	0	10	20	47	75 4	2 14	16	0	10 0	50	80	60	50 7	5 0	0	20	0 30	0 17	74 0	0	0 0	0	0 30	0 10	0 10	0	22	50 12	0	6	0 0
4 Philadelp	phia, PA N	J Burlington County	117	201	112	234 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 7	5 0	0	0	0 30	0 18	80 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp	phia, PA N	J Camden County	117	201	112	223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 75	5 0	0	0	0 30	0 16	69 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp	phia, PA N	U Gloucester County	117	201	112	223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 75	5 0	0	0	0 30	0 16	69 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp	phia, PA P.	A Bucks County	117	201	112	234 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 75	5 0	0	0	0 30	0 18	80 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp		A Chester County		201	112	223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 7	5 0	0	0	0 30	0 16	59 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp		A Delaware County	117	201	112	223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 7	5 0	0	0	0 30	0 16	69 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadelp		A Montgomery County		201		223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	08 0	70	40 75	5 0	0	0	0 30	0 16	69 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
4 Philadels		A Philadelphia County		201		223 9	95 0	10	0	47	91 4	2 14	20	0	10 0	70	80	70	40 75	5 0	0	0	0 30	0 16	69 0	0	0 0	0	10 30	0 20	0 10	0	22	56 12	0	0	0 0
		Lapeer County	127			177 9	0	10	0	47	75 4	2 14	26	0	10 0	80	60	80	40 65	5 0	0	0	0 30	0 12	23 0	0	0 0	0	0 30	0 20	0 10	0	22	50 12	0	6	0 0
		I Livingston County	127			99.5 9	0	10	0	47	75 4	2 14	26	0	10 0	80	60	80	40 65	5 0	0	0	0 30	0 14	46 0	0	0 0	0	0 30	0 20	0 10	0	22	50 12	0	6	0 0
		Macomb County			122	222 9	0	10	0	47	75 4	2 14	26	0	10 0	80	60	80	40 6	5 0	0	0	0 30	0 16	68 0	0	0 0	0	0 30	0 20	0 10	0	22	50 12	0	6	0 0



Spectrum Depth County Comparison - Details

- Compare county-level spectrum depth between 8 selected carriers.
- Included breakdowns:
 - Total Spectrum Depth
 - Low Band, Lower Mid-band, and Upper Mid-band Spectrum Depth
 - Frequency Band Spectrum Depth (700MHz, Cellular/SMR, AWS3..)
- Geographic Auto-Filters



Spectrum Depth Company Profile

				Total	Low Band		High Band	600MHz	700MHz	Cellular/SMR	AWS-1	PCS	AWS 4 / LBan	WCS	Total	Low Band	Mad Band	ндт Вапа	700MHz	Cellular/SMR	AWS-1	PG	AWS4/LBan	WCS EBS/BRS	Total	Low Band	Mad Band	600MHz	700MHz	Cellular/SMR AWS-1	AWS-3	AWS 4 / LBar	WCS	Total	Low Band	Mid Band	Недь Вапа	GOOMHZ	700MHz	AWS-1	AWS-3	PCS	AWS 4 / L Ban	WCS rec/ape
CM +1	CMA Name	ST	County	II.			٠	٠			v [•	1			v		*	v ,	ı v	v	₹ .				·	*	w 5		v	· ·			×			٠	×	×			٠	٠		
	New York, NY-I		Bergen County	12007	7 47		0 0	0 0	22	25	40	0 40	0 0	0	607.5	81		30 (0 56	25	0 2	0 30	0	30 (500.00	32		20	12	0 50	0	20 0	0	0 17		40	123	0	0 1	4 0	0	40		0 12
	New York, NY-I	M	Essex County		7 47		0	0	22	25	40	0 40	0 0	0	161		50	30 (2 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0	20 0	0	0 20		40	146	0	0 1	4 0	0	40		0 14
	New York, NY-I		Hudson County	9500	7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (200	32	70	20	12	0 50	0	20 0	0	0 20		40	146	0	0 1	4 0	0	40		0 14
	New York, NY-I		Morris County	10000	7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0	50 0	0	0 17		40	123	0	0 1	4 0	0	40		0 12
	New York, NY-I		Passaic County		7 47		0	0	22	25	40	0 40	3 0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0	20 0	0	2.0	7 14	40	123	0	0 1	4 0	0	40		0 12
1	New York, NY-I		Somerset County	100.00	7 47		0 0	0	22	25	40	0 40	0	0	0 161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	20 0	0	0 18	T- 17 (2)	40	135	0	0 1	4 0	0	40		0 13
1	New York, NY-I		Union County		7 47		0	0	22	25	40	0 40	0 0	0	161		50	30 (7 56	25	0 2	0 30	0	30 (1000		70	20	12	0 50	0 :	20 0	0	0 17		10000	123	0	0 1	4 0	0	40		0 12
1	New York, NY-1		Bronx County		7 47		0 0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0	20 0	0	0 17		1000	123	0	0 1	4 0	0	40		0 12
1	New York, NY-I		Kings County		7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	20 0	0	0 20			146	0	0 1	4 0	0	40		0 14
	New York, NY-I		Nassau County	5010	7 47		0	0	22	25	40	0 40	0	0	161		50	30 (56	25	0 2	0 30	0	30 (32	70	20	12	0 50	0 ;	20 0	0	0 19		40	140	0	0 1	4 0	0	40		0 14
	New York, NY-I		New York County		7 47		0	0	22	25	40	0 40	0	0	161		50	30 (56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	50 0	0	0 20		40	146	0	0 1	4 0	0	40		0 14
1	New York, NY-I		Putnam County		7 47		0	0	22	25	40	0 40	0 0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (32	70	20	12	0 50	0 :	20 0	0	0 18		40	135	0	0 1	4 0	0	40		0 13
1	New York, NY-I		Queens County	20.63	7 47		0 0	0	22	25	40	0 40	0 0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0	20 0	0	0 20		40	146	0	0 1	4 0	0	40		0 14
1	New York, NY-1		Richmond County	17 4 7 4	7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	50 0	0	0 17			123	0	0 1	4 0	0	40		0 12
1	New York, NY-I		Rockland County	25.00	7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	20 0	0	0 17		40	123	0	0 1	4 0	0	40		0 12
1	New York, NY-I		Suffolk County		7 47		0	0	22	25	40	0 40	0	0	161		50 .	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 7	20 0	0	0 20		40	150	0	0 1	4 0	0	40		0 15
1	New York, NY-I		Westchester County		7 47		0	0	22	25	40	0 40	0	0	161		50	30 (0 56	25	0 2	0 30	0	30 (102		70	20	12	0 50	0 :	20 0	0	0 17	D. 7755	40	123	0	0 1	4 0	0	40		0 12
	Los Angeles-Lo		Los Angeles County		7 47		0 0	0	22	25	40 2	0 20	0	0	181		70	30 (0 56	25	10 2	0 40	0	30 (112		70	30	12	0 40	0	30 0	0	0 19		40	144	0	0 1	4 0	0	40		0 14
	Los Angeles-La		Orange County	1000	7 47		0 0	0	22	25	40 2	0 20	0 0	0	181		70 .	30 (0 56	25	10 2	0 40	0	30 (100	42	70	30	12	0 40	0	30 0	0	0 18	2 14	40	128	0	0 1	4 0	0	40		0 12
2	Los Angeles-Lo				7 47		0 0	0	22	25	40 2	0 20	0 0	0	181	75.0	70 .	30 (0 56	25	10 2	0 40	0	30 (1000	42	70	30	12	0 40	0	30 0	0	0 24	0 14	40	186	0	0 1	4 0	0	40		0 18
2	Los Angeles-Lo		San Bernardino County		7 47		0	0	22	25	40 2	0 20	0 0	0	181		70	30 (0 56	25	10 2	0 40	0	30 (42	70	0 30	12	0 40	0	30 0	0	0 24	0 14	40	186	0	0 1	4 0	0	40		0 18
3	Chicago, IL	IL	Cook County	1153	7 47) 0	0	22	25	40	0 10	0	0	185		80 .	30 (0 50	25	20 2	0 40	0	30 (102		60	30	12	0 30	0	30 0	0	0 23		50	174	0	0 1	4 0	0	50		0 17
3	Chicago, IL		DuPage County		7 47			0	22	25	40	0 10	0 0	0	185		80	30 (0 50	25	20 2	0 40	0	30 (102		60	0 30	12	0 30	0	30 0	0	0 23		50	174	0	0 1	4 0	0	50		0 17
3	Chicago, IL		Kane County		7 47		0	0	22	25	40	0 10	0	0	185	75	80	30 (0 50	25	20 2	0 40	0	30 (102		60	30	12	0 30	0	30 0	0	0 24		50	180	0	0 1	4 0	0	50		0 18
	Chicago, IL	IL.	Lake County		7 47		0 0	0	22	25	40	0 10	0 0	0	185	75	80	30 (0 50	25	20 2	0 40	0	30 (102	177000	60	0 30	12	0 30	0	30 0	0	0 24		50	180	0	0 1	4 0	0	50		0 18
3	Chicago, IL	IL.	McHenry County	- 11	17 47		0 0	0	22	25	40	0 10	0 0	0	185		80	30 (0 50	25	20 2	0 40	0	30 (102		60	30	12	0 30	0	30 0	0	0 22		50	164	0	0 1	4 0	0	50	0	0 16
3	Chicago, IL	IL	Will County		7 47		0 0	0	22	25	40	0 10	0 0	0	185		80	30 (0 50	25	20 2	0 40	0	30 (102		60	30	12	0 30	0	30 0	0	0 23	- 5	50	174	0	0 1	4 0	0	50		0 17
4	Philadelphia, F		Burlington County		7 47		0 0	0	22	25	30 2	0 20	0	0	201		80	30 1	0 56	25	20 2	0 40	0	30 (1000	42	70	30	12	0 40	0	30 0	0	0 23		40	180	0	0 1	4 0	0	40		0 18
4	Philadelphia, F		Camden County	1000	7 47		0 0	0	22	25	30 2	0 20	0	0	201		80	30 1	0 56	25	20 2	0 40	0	30 (112	577233	70	30	12	0 40	0	30 0	0	0 22	5 707	40	169	0	0 1	4 0	0	40	mag.	0 16
4	Philadelphia, F		Gloucester County		7 47			0	22	25	30 2	0 20	0	0	201	91	80	30 1	3 56	25	20 2	0 40	0	30 (112		70	30	12	0 40	0	30 0	0	0 22		40	169	0	0 1	4 0	0	40		0 16
4	Philadelphia, F		Bucks County	10000	7 47			0	22	25	30 2	0 20	0 0	0	201	91	80	30 10	0 56	25	20 2	0 40	0	30 (112		70	0 30	12	0 40	0	30 0	0	0 23		40	180	0	0 1	4 0	0	40		0 18
4	Philadelphia, F		Chester County		7 47			0	22	25	30 2	0 20	0 0	0	201		80	30 1	56	25	20 2	0 40	0	30 (112		70	30	12	0 40	0	30 0	0	0 22		40	169	0	0 1	4 0	0	40		0 16
4	Philadelphia, F		Delaware County		7 47		0	0	22	25	30 2	0 20	0 0	0	201	91	80	30 1	0 56	25	20 2	0 40	0	30 (112		70	0 30	12	0 40	0	30 0	0	0 22		40	169	0	0 1	4 0	0	40		0 16
4	Philadelphia, F		Montgomery County		7 47		0 0	0	22	25	30 2	0 20	0 0	0	201	91	80	30 10	0 56	25	20 2	0 40	0	30 (112		70	30	12	0 40	0	30 0	0	0 22		40	169	0	0 1	4 0	0	40		0 16
4	Philadelphia, F		Philadelphia County		7 47		0	0	22	25	30 2	0 20	0 0	0	201		80 .	30 1	0 56	25	20 2	0 40	0	30 (1000	42	70	0 30	12	0 40	0	30 0	0		3 14	40	169	0	0 1	4 0	0	40		0 16
5	Detroit/Ann Ar		Lapeer County		7 47		0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (122		80	0 30	12	0 50	0	30 0	0	0 17		40	123	0	0 1	4 0	0	40		0 12
5	Detroit/Ann Ar		Livingston County		7 47		0 0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (42	80	0 30	12	0 50	0	30 0	0	0 20	7	40	146	0	0 1	4 0	0	40	0.000	0 14
5	Detroit/Ann Ar		Macomb County	1000	7 47		0 0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (122		80	30	12	0 50	0	30 0	0	0 22		40	168	0	0 1	4 0	0	40		0 16
5	Detroit/Ann Ar		Oakland County		7 47		0 0	0 0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (122		80	0 30	12	0 50	0	30 0	0	0 22			168	0	0 1	4 0	0	40		0 16
5	Detroit/Ann Ar		St. Clair County		7 47		0 0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (10000	42	80	0 30	12	0 50	0	30 0	0	0 20	0 14	40	146	0	0 1	4 0	0	40	0	0 14
5	Detroit/Ann Ar		Washtenaw County		7 47		0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	10000	30 (122		80	30	12	0 50	0	30 0	0	0 20		The state of	146	0	0 1	4 0	0	40		0 14
	Detroit/Ann Ar		Wayne County		7 47		0	0	22	25	40 2	0 20	0 0	0	165		60	30 (0 50	25	0 2	0 40	0	30 (122		80	30	12	0 50	0	30 0	0	0 22			168	0	0 1	4 0	0	40		0 16
6	Boston-Lowell	MA	Essex County	11	7 47	7 70	0 0	0	22	25	40	0 30	0 0	0	0 166	81	60 .	25 (0 56	25	0 2	0 40	0 :	25 (102	32	70	20	12	0 50	0 :	20 0	0	0 21	6 14	40	162	0	0 1	4 0	0	40	0	0 16



Spectrum Depth Company Profile - Details

- This analysis module provides a complete picture of a carrier's spectrum assets at a county-level.
- Included breakdowns:
 - Total Spectrum Depth
 - Low Band, Lower Mid-band, and Upper Midband Spectrum Depth
 - Frequency Band Spectrum Depth (700MHz, Cellular/SMR, AWS3..)
- Spectrum profiles for 8 selected carriers are displayed.
- Geographic Auto-Filters



Spectrum Depth Market Report

		Name and Address of the Owner, which we have a second	Future																															
		Data Source:	Holdings											+ 1																				
		Instructions: The carriers																																
		for this table are selected as																	- 1															
		the first eight carriers on																	- 1															
		the County Analysis			w										v2				- 1	10					65					w				
		worksheet. The spectrum			8				E	<u>g</u>					8				- 1	8					8					8				
		depth data reflects the FCC,			Wireless			_	3	Š			2		Wire			_	- 1	2					5					ž.			-	
		Current, or Proposed setting	s e		2	elle		ula	1	2	ele		ula		2	elle		ula		ç	e			ast	5		e .	- 5	ast	2	e		e n	3ST
		from the Spectrum Grid			Verizon	Al & i	ji.	E S E	, .	1 1 N	Vot.	4	Se E	0	ıżo	Aok	무	3 E	U	rizo	Aok	i i	- 8	EU	l sz	N.	Aok int	£ 3	EU	rizo	Aot Aot	i ii	- 3	EU
		Worksheet.			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	A F	8	USC Com	2 3	AT	7	8 8	So	5 5	20	AT& T-Mc	S S	5 0	5	A A	-	8 2	So	8 5	20	AT	F 8	SO S	9 5	>	AT AT	8 2	US US	3 2
							Total				Lov	v Band				٨	Aid Ban	d		367	Н	igh Ban	d		1		600	MHz			7	100MH	łz	
CMA Rank	CMA -	MARKET NAME	Sq Miles -	2014 POPS -										1 13						- 11 -	11:11					-					• •			
1	2	Los Angeles-Anaheim, CA	33,109	17,704,110	127 18	31 112	205 9	95 0 0 1	0 4	7 81	42	14 20	0 (0 10	107/25/00	70 70			0 0	0 30	0	151	0 0	0 0	0	0	30 0	20 0	0 10	(V) (V)	56 12		0 0 (0 0
2	1	New York-Newark, NY-NJ	5,768	17,041,161	127 16	102	192 1	25 0 10 1	0 4	7 81	32	14 40	0 10	0 0	80	50 70	40 85	0 (0 10	0 30	0	138	0 0	0 (0	0	20 0	40 (10 0	22 !	56 12	0 0	0 0 (0 0
3	3	Chicago, IL	5,324	8,404,358	97 18	35 102	238	0 10 2	0 4	7 75	42	14 16	0 10	0 0	50	80 60	50 75	0 0	0 20	0 30	0	174	0 0	0 0	0	0	30 0	10 (10 0	22 !	50 12	0 6	6 0 (0 0
4	9	Dallas-Fort Worth, TX	8,561	6,857,143	112 20	00 122	231 10	01 0 0	0 2	2 130	32	14 26	0 (0 0	90	40 90	40 75	0 0	0 0	0 30	0	177	0 0	0 0	0	30	20 0	20 (0 0	22 5	50 12	0 6	6 0 (0 0
5	10	Houston, TX	7,033	6,108,723	107 19	95 112	211	91 0 10	0 4	7 75	32 :	14 16	0 10	0 0	60	90 80	30 75	0 (0 0	0 30	0	167	0 0	0 (0	0	20 0	10 (10 0	22 !	50 12	0 6	6 0 (0 0
6	4	Philadelphia, PA	3,587	5,331,294	117 20	1112	225 9	95 0 10	0 4	7 91	42 :	14 20	0 1	0 0	70	80 70	40 75	0 0	0 0	0 30	0	171	0 0	0 0	0	10	30 0	20 0	10 0	22 !	56 12	0 0	0 0 0	0 0
7	8	Washington, DC-MD-VA	3,055	5,168,021			198 9	0 10	0 4	7 85	42	14 26	0 10	0 0	80	80 60	40 65	0 (0 0	0 30		144	0 0	0 (0	10	30 0	20 (10 0	22 !	50 12	0 6	6 0 (0 0
8	17	Atlanta, GA	4,383	4,943,920	127 17	5 122	229 10	01 0 10	1 4	7 85	32	13 26	0 10	0 1	80	60 90	30 75	0 (0 0	0 30	0	186	0 0	0 (0	10	20 0	20 0	10 0	22 !	50 12	0 6	600	0 0
9	5	Detroit-Ann Arbor, MI	4,958	4,653,485		55 122	218	0 10	0 4	7 75	42	14 26	0 10	0 0	80	60 80	40 65	0 (0 0	0 30	0	164	0 0	0 (0	0	30 0	20 0	10 0	22 :	50 12	0 6	6 0 (0 0
10	6	Boston-Brockton-Lowell, MA	The second secon	4,606,557	117 16	66 103	220 10	00 0 10 1	0 4	7 81	33	14 20	0 10	0 0	70	60 70	40 80	0 0	0 10	0 25	0	166	0 0	0 (0	0	21 0	20 (10 0	22 !	56 12	0 0	0 0 0	0 0
11	7	San Francisco-Oakland, CA	3,424	4,594,060	127 19	1112	197 10	05 0 10	0 4	7 91	32	14 30	0 1	0 0	80	70 80	30 75	0 (0 0	0 30	0	153	0 0	0 (0	10	20 0	30 0	10 0	22 5	56 12	0 0	0 0 (0 0
12	12	Miami-Fort Lauderdale, FL	3,751	4,532,109	92 19	0 142	188 10	01 0 10	0 2	2 100	42	14 36	0 10	0 0	70	60 ##	30 65	0 (0 0	0 30	0	144	0 0	0 (0	0	30 0	30 (10 0	22 !	50 12	0 6	6 0 (0 0
13	26	Phoenix, AZ	9,224	4,087,191	132 18	30 112	226	0 0	2 7	2 60	32	12 26	0 (0 2	60	90 80	40 65	0 (0 0	0 30	0	174	0 0	0 (0	10	20 0	20 0	0 0	22 !	50 12	0 6	6 0 (0 0
14	18	San Diego, CA	4,526	3,263,431	127 18	35 112	228	0 0 0 7	0 4	7 75	42	14 26	0 (0 20	80	80 70	40 65	0 0	0 0	0 30	0	174	0 0	0 (0	0	30 0	20 0	0 20	22 :	50 12	0 6	6 0 (0 0
15	15	Minneapolis-St. Paul, MN-W		3,256,107	108 18	34 122	224 1	11 0 10	0 4	8 84	42	14 26	0 10	0 0	60	70 80	30 85	0 0	0 0	0 30	0	180	0 0	0 (0 0	10	30 0	20 (10 0	22 !	50 12	0 6	600	0 0
16	19	Denver-Boulder, CO	4,681	3,017,864			222 10	01 0 10	0 4	7 75	42	14 26	0 10	0 0	60	90 70	40 75	0 (0 0	0 30	0	168	0 0	0 (0	0	30 0	20 0	10 0	22 !	50 12	0 6	6 0 (0 0
17	20	Seattle-Everett, WA	4,503	2,839,550	127 17	5 122	218 10	01 0 10	0 4	7 85	42	14 26	0 10	0 0	80	60 80	40 75	0 (0 0	0 30	0	164	0 0	0 (0	10	30 0	20 (10 0	22 !	50 12	0 6	6 0 (0 0
18	22	Tampa-St. Petersburg, FL	2,742	2,739,727	127 17	75 117	235	91 0 0 1	0 4	7 85	32	14 26	0 (0 0	80	60 85	35 65	0 (0 10	0 30	0	186	0 0	0 (0	10	20 0	20 0	0 0	22 !	50 12	0 6	6 0 (0 0
19	14	Baltimore, MD	2,595	2,737,070	EDAN CESTA	5 102	224 9	0 10	0 4	7 85	42	14 26	0 10	0 0	90	80 60	30 65	0 0	0 0	0 30	0	180	0 0	0 (0	10	30 0	20 (10 0	22 :	50 12	0 6	6 0 (0 0
20	11	St. Louis, MO-IL	5,092	2,627,456	107 20	02 91	239 10	00 12 0	2 4	7 93	31	14 25	12 (0 2	60	79 60	50 75	0 0	0 0	0 30	0	175	0 0	0 (0	18	31 0	19 (0 2	22 !	50 0	0 6	6 12 (0 0
21	30	Portland, OR-WA	3,727	2,185,690	117 18	35 102	216 10	01 0 10	0 4	7 75	32	14 26	0 1	0 0	70	80 70	40 75	0 0	0 0	0 30	0	162	0 0	0 (0	0	20 0	20 0	10 0	22 !	50 12	0 6	60 (0 0
22	33	San Antonio, TX	2,545	2,126,810			239 9	91 0 0	0 2	2 100	42	14 26	0 (0 0		80 80	40 65	0 (0 0	0 30		185	0 0	0 (0	0	30 0	20 (0 0		50 12	0 6	6 0 (0 0
23	93	Las Vegas, NV	8,091	2,069,681	107 19	5 122	206 10	01 0 0	0 4	7 85	42	14 26	0 (0 0	60	80 80	40 75	0 (0 0	0 30	0	152	0 0	0 (0	10	30 0	20 0	0 0	22 !	50 12	0 6	6 0 (0 0
24	35	Sacramento, CA	3,521	2,061,310	117 18	35 112	206	0 10	0 4	7 75	32	14 26	0 10	0 0	70	80 80	30 65	0 0	0 0	0 30	0	162	0 0	0 (0	0	20 0	20 0	10 0	22 5	50 12	0 6	6 0 (0 0
25	91	San Juan-Caguas, PR	1,499	2,038,404			154	0 0	2	0 63	50	0 26	0 (0 2	0	## 65	30 65	0 (0 0	0 30	0	124	0 0	0 (0	0	50 0	20 0	0 0	0 :	38 0	0 6	6 0 (0 0
26	60	Orlando, FL	2,855	2,005,728	112 17	0 122	234	0 10	0 2	2 100	32	14 26	0 10	0 0	90	40 90	40 65	0 0	0 0	0 30	0	180	0 0	0 0	0	0	20 0	20 0	10 0	22 !	50 12	0 6	6 0 (0 0
27	13	Pittsburgh, PA	3,086	1,968,154	107 19		230 10	01 0 10 1		7 75	32	14 26	0 10	0 0	60		30 75	0 0	0 10	0 30	0	186	0 0	0 (0	0	20 0	20 (10 0	22 !		0 6	6 0 (0 0
28	27	San Jose, CA	1,304	1,894,605		1 122		05 0 10	0 4	7 91	32	14 30	0 10	MODEL OF THE REAL PROPERTY.	10000000		30 75		0 0	0 30	0	168	0 0	0 (0	10	20 0	30 (10 0	22 !			0 0 (0 0
29	24	Kansas City, MO-KS	3,365	1,871,407		35 122				7 75		14 26	0 10	50 M3	1773 Today	80 80			0 0	0 30	0	174	0 0	0 (10000		30 0	20 0			50 12			0 0
30	75	Austin, TX	2,837	1,825,420	92 2	10 122	238	91 0 0	0 2	2 100	42	14 26	0 (0 0	70	80 80	40 65	0 0	0 0	0 30	0	184	0 0	0 (0	0	30 0	20 0	0 0	22 !	50 12	0 6	6 0 (0 0

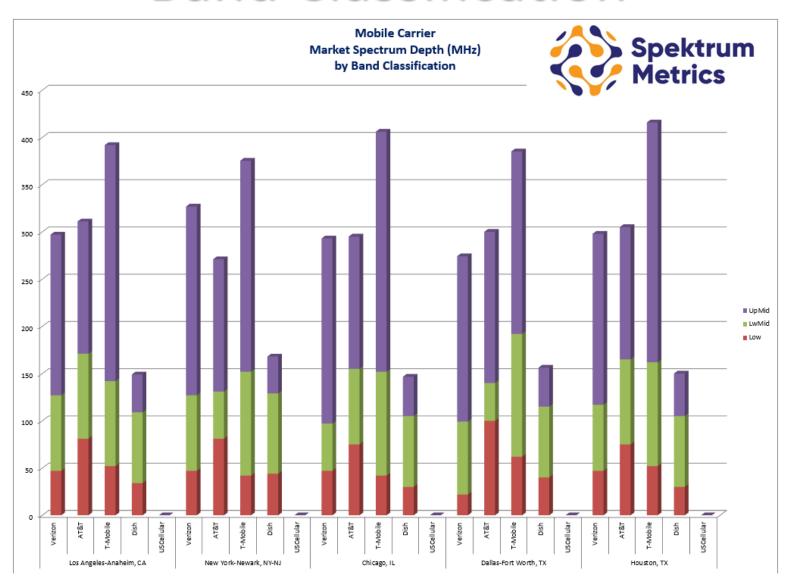


Spectrum Depth Market Reports – Details

- Available Market Reports
 - Cellular Market Areas (CMA)
 - Economic Areas (EA)
 - Partial Economic Areas (PEA)
- Included Breakdowns
 - Total Spectrum Depth
 - Low Band, Mid Band, and High Band Spectrum Depth
 - Frequency Band Spectrum Depth



Market Spectrum Depth Band Classification



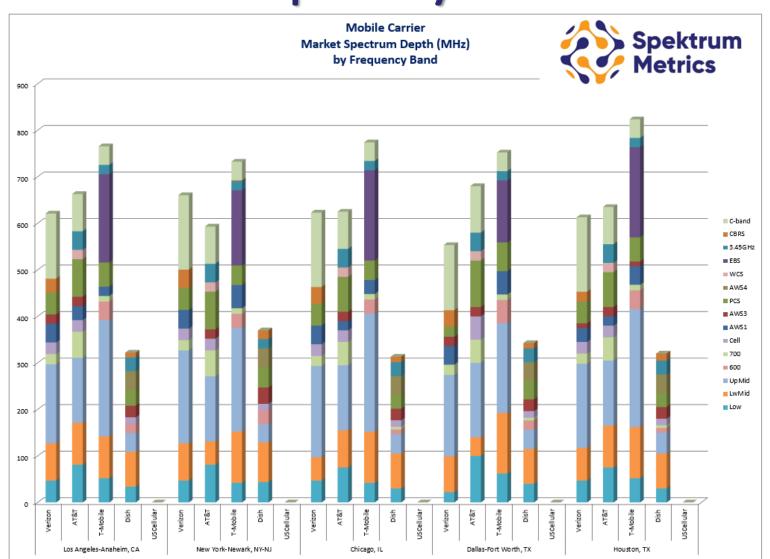


Market Spectrum Depth Charts Details

- 5 Markets (CMA) are displayed
- 5 Selected Carriers are displayed
- Visually highlight the market spectrum depth differences between carriers
 - By Band Classification
 - By Frequency Band



Market Spectrum Depth Frequency Band





Spectrum Depth State and National

Data Source:		ture																		Т																	П					
Instructions: The carriers for this table are selected as the first eight carriers on the <u>County Analysis</u> , worksheet. The spectrum depth dareflects the FCC, Current, or Proposed setting from the <u>Spectrum Grid</u> Worksheet.				USCellular	CSpire	Comcast Bluegrass Cellular	NEColorado	SpeedConnect Smith Bagley	S Wreless	USCellular CSpire	Comost	Bluegrass Cellular pu NE Colorado	SpeedConnect	Smith Bagley Si Wireless	USCellular	C Spire Comcast	pi Bluegrass Cellular	NE Colorado SpeedConnect	Smith Bagley	Si Wireless	UScellular CSpire	Comcast	Bluegrass Cellular as NF Colorado	SpeedConnect	Smith Bagley Si Wireless	UScellular	CSpire	Comcast 8 Bluegrass Cellular	H NE Colorado	SpeedConnect	Si Wireless	UScellular	Comcast	Moograss Cellular	SpeedConnect	Smith Bagley Si Wireless	UScelular	CSpire	Comcast negrass cellular	NE Colorado	SpeedConnect Smith Bagley	Si Wireless
State	- ST - Sq	Miles v S	2014 POPS +	PI v		. 11 .	11 - 11	- 11 -	H . H		H . H	- 11 - 1	H - H	. 11 .	W - 10		H - H	- 111 -	11.1	. 100		11.1	- H -	H - 1	- 11 -	NIII - I	1 - 10	- III -	10 - 10				- 11 -	1.11	- H -	H.H.	, IIII .	. 11 . 11	- 11 -	11 - 11	. 11 .	H.
National		3,800,039	322,792,146	- 10		_	-	2 0	0	4 4		0 0	0	0 0		1 1		0 0		0	0 1		0	0 2	0 0		0 5	5 0	0	0 0	0	2	0 0	0	0 0	0 0	2	-	0 0	0	0 0	0
Alaska	AK	663,267	733,496	_	0	0 0	0	2 0	0	0 0		0 0	0	0 0	0	0 (0 0	0 0	0	0	0 1	0 0	0	0 2	0 0	- 2	0 1	, 0	0	0 0	0	2	0 0	0	0 0	0 0	-		0 0	0	0 0	0
Alabama	AL	52,419	4,849,377		15	0 0		0 0	0	0 0		0 0	0	0 0	0		0 0	0 0		0	0 0		0	0 0	0 0	0	0 0		0	0 0	0	0	3 0	0	0 0	0 0		0	0 0	0	0 0	0
Arkansas	AR	53,179	4,849,377 2,966,369	2		0 0		0 0	0	2 3	0	0 0	0	0 0	0	11 (0 0	0 0		0	0 1		0	0 0	0 0	0	0 (0	0	0 0	0	0	1 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Arkansas American Samoa	AS	111	2,900,309	- 77.	0	0 0		0 70	0	0 1		0 0	0	50 0		0 1	0 0	0 0	20	0	0 (0 0	0	0 0	0 0	2	0 0		0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Arizona	AZ	113,998	6,731,484	0	0	0 0		7 70	0	0 0		0 0		1 0	0	0 0	0 0	0 0	20	,	0 0			0 0	0 0	0	0		0	0 30	,	0	0 0		0 0	0 0		0	0 0	0	0 0	0
California	CA	163,696	38,802,500	1	0	4 0		0 0	0			0 0	0	0 0	0	0	0 0	0 0		0	0 0		0	0 0	0 0		0		0	0 0	0	0	0 0	0	0 0	0 0		0	0 0	0	0 0	0
Colorado	CO	104,094	5,355,866	1	0	4 0		0 0	0	1 (0 0	0	0 0	0	0 0	0 0	0 0		0	0 0	0 0	0	0 0	0 0	0	0 4		0	0 0	0	0	0 0	0		0 0		0	0 0	0	0 0	0
Connecticut	CT	5,543	3,596,677	0	0	0 0		0 1	0	0 0		0 2		0 0	0	0 (0 0	4 0	1	0	0 (0 0	0	0 0	0 0	0	0 0		1	0 0	0	0	0 0		1 0	0 0		0	0 0	0	0 0	0
District of Columbia	DC	5,343	658,893	0		10 0		0 0		0 0	10	0 0	0	0 0	0	0 1	0 0	0 0		0	0 (0	0 0	0 0	0	0 1	0 0	0	0 0	0	0	0 0		0 0	0 0		0	0 0	0	0 0	0
		2,489		0	0	10 0	0	0 0	0	0 0	10	0 0	0	0 0	0	0 0	0 0	0 0		0	0 (0 0	0	0 0	0 0	0	0 1	0 0	0	0 0	0	0	0 0		0 0	0 0		0	0 0	0	0 0	0
Delaware	DE		935,614	- 2	0	10 0	0	0 0	0	0 0	10	0 0	0	0 0	0	0 0	0 0	0 0	0	0	0 0	0 0	0	0 0	0 0	0	0 1	0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Florida	FL	65,755	19,893,297	0	2	8 0	0	0 0	0	0 0	8	0 0	0	0 0	0	1 (0 0	0 0	0	0	0 (0 0	0	0 0	0 0	0	0 8	8 0	0	0 0	0	0	0 0	0	0 0	0 0	9	0	0 0	0	0 0	0
Georgia	GA	59,425	10,097,343	0	0	7 0	0	0 0	0	0 0	, ,	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 (0 0	0	0 0	0 0	0	0	7 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Guam	GU	210	154,805	0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 0	0 0	0	0 0	0 0	0	0 0	0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Hawaii	HI	10,931	1,419,561	0	- 33	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0 0	0 0	0	0	0 (0 0	0	0 0	0 0	0	0 0	0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
lowa	IA	56,272	3,107,126	91		0 0	0	39 0	0	68 0	0	0 0	0	0 0	23	0 0	0 0	0 0	0	0	0 (0 0	0	0 39	0 0	20	0 0	0 0	0	0 0	0	26	0 0	0	0 0	0 0	22	0 2	0 0	0	0 0	0
Idaho	ID	83,570	1,634,464	0	1000	0 0	0	44 0	0	0 (0	0 0	0	0 0	0	0 0	0 0	0 0	0	0	0 (0 0	0	0 44	0 0	0	0 (0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Illinois	IL.	57,914	12,880,580	14		8 0	0	2 0	0	10 (8	0 0	0	0 0	4	0 (0 0	0 0	0	0	0 0	0 0	0	0 2	0 0	2	0 8	8 0	0	0 0	0	5	0 0	0	0 0	0 0	3	0	0 0	0	0 0	0
Indiana	IN	36,418	6,596,855	10000	0	9 0	0	0 0	0	6 (9	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 0	0 0	0	0 0	0 0	0	0 5	9 0	0	0 0	0	5	0 0	0	0 0	0 0	1	0	0 0	0	0 0	0
Kansas	KS	82,277	2,904,021	26		2 0	3	0 0	0	24 0	2	0 1	0	0 0	3	0 (0 0	2 0	0	0	0 (0 0	0	0 0	0 0	3	0 2	2 0	1	0 0	0	14	0 0	0	0 0	0 0	3	0	0 0	0	0 0	0
Kentucky	KY	40,409	4,413,457		0	2 22	0	0 0	1	0 0	2	15 0	0	0 0	0	0 0	0 6	0 0	0	1	0 (0 0	0	0 0	0 0	0	0 2	2 3	0	0 0	0	0	0 0	7	0 0	0 0	0	0	0 5	0	0 0	0
Louisiana	LA	51,840	4,649,676	0		1 0	0	0 0	0	0 0	1	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 1	1 0	0	0 0	0 0	0	0 1	1 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Massachusetts	MA	10,555	6,745,408	0		9 0	0	0 0	0	0 (9	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 (0 0	0	0 0	0 0	0	0 5	9 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Maryland	MD	12,407	5,976,407	3		9 0	0	0 0	0	3 (9	0 0	0	0 0	0	0 0	0 0	0 0	0	0	0 (0 0	0	0 0	0 0	2	0 9	9 0	0	0 0	0	1	0 0	0	0 0	0 0	1	0	0 0	0	0 0	0
Maine	ME	35,385	1,330,089	85		0 0	0	0 0	0	63 (0	0 0	0	0 0	22	0 0	0 0	0 0	0	0	0 (0 0	0	0 0	0 0	20	0 0	0 0	0	0 0	0	28	0 0	0	0 0	0 0	15	0	0 0	0	0 0	0
Michigan	MI	96,716	9,909,877	1		5 0	0	13 0	0	1 (5	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 (0 0	0	0 13	0 0	0	0 5	5 0	0	0 0	0	1	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Minnesota	MN	86,939	5,457,173	2		6 0	0	0 0	0	1 0	6	0 0	0	0 0	0	0 0	0 0	0 0	0 0	0	0 0	0 0	0	0 0	0 0	1	0 6	5 0	0	0 0	0	1	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Missouri	MO	69,704	6,063,589	29		2 0	0	0 0	0	23 (2	0 0	0	0 0	5	0 0	0 0	0 0	0	0	0 (0 0	0	0 0	0 0	5	0 2	2 0	0	0 0	0	13	0 0	0	0 0	0 0	5	0	0 0	0	0 0	0
Northern Marianas	MP	179	69,221	0		0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 (0 0	0 0	0	0	0 (0 0	0	0 0	0 0	0	0 0	0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Mississippi	MS	48,430	2,994,079	070	186	2 0	0	0 0	0	0 46	2	0 0	0	0 0	0	39 (0 0	0 0	0 0	0	0 101	1 0	0	0 0	0 0	0	18 2	2 0	0	0 0	0	0	17 0	0	0 0	0 0	0	11	0 0	0	0 0	0
Montana	MT	147,042	1,023,579	0	77	0 0	0	61 0	0	0 0	0	0 0	0	0 0	0	0 0	0 0	0 0	0 0	0	0 (0 0	0	0 61	0 0	0	0 0	0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
North Carolina	NC	53,819	9,943,964	33		0 0	0	0 0	0	29 (0	0 0	0	0 0	4	0 (0 0	0 0	0	0	0 (0 0	0	0 0	0 0	8	0 0	0 0	0	0 0	0	11	0 0	0	0 0	0 0	10	0	0 0	0	0 0	0
North Dakota	ND	70,700	739,482	0		0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 (0 0	0 0	0 (0	0 (0 0	0	0 0	0 0	0	0 0	0 0	0	0 0	0	0	0 0	0	0 0	0 0	0	0	0 0	0	0 0	0
Nebraska	NE	77,354	1,881,503	80		0 0	34	19 0	0	52 0	0	0 3	0	0 0	27	0 0	0 0	31 0	0 (0	0 (0 0	0	0 19	0 0	18	0 (0 0	2	0 0	0	24	0 0	0	1 0	0 0	10	0	0 0	0	0 0	0
New Hampshire	NH	9,350	1,326,813	28		8 0	0	0 0	0	26 0	8	0 0	0	0 0	2	0 0	0 0	0 0	0 0	0	0 (0 0	0	0 0	0 0	4	0 8	8 0	0	0 0	0	5	0 0	0	0 0	0 0	17	7 0	0 0	0	0 0	0
New Jersey	NJ	8.721	8.938.175	0	0	10 0	0	0 0	0	0 0	10	0 0	. 0	0 0	0	0 0	0 0	0 0	0 0	0	0 0	0 0	0	0 0	0 0	0	0 1	0 0	0	0 0	0	0	0 0	0	0 0	0 0	. 0	0	0 0	0	0 0	0



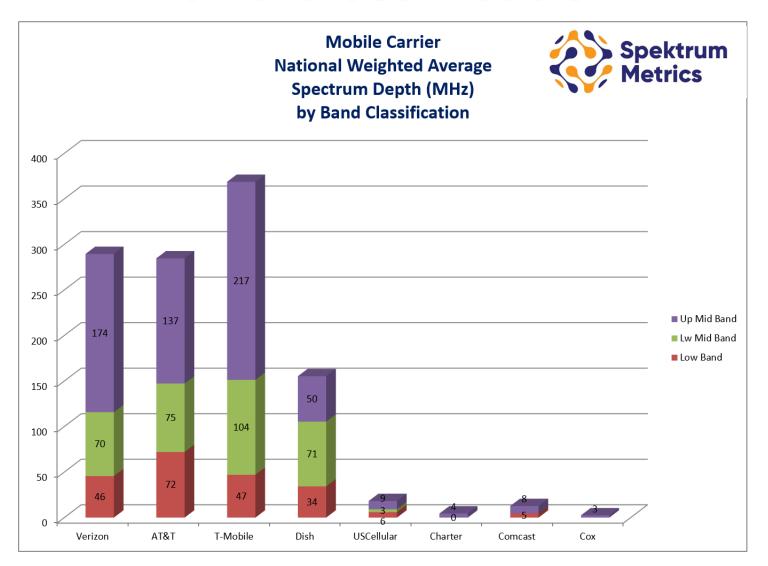
Spectrum Depth State and National - Details

- Included Breakdowns
 - Total Spectrum Depth
 - Low Band, Lower Mid-band, and Upper Mid-band
 Spectrum Depth
 - Frequency Band Spectrum Depth

National Population Weighted Average (MHz)	Verizon	АТ&Т	T-Mobile	Dish	USCellular	Charter	Comcast	Cox
Total	290	285	369	155	18	4	13	3
600MHz	0	0	36	16	2	0	5	0
700MHz	21	50	10	5	2	0	0	0
Cellular/SMR	24	22	0	14	2	0	0	0
AWS-1	37	17	35	0	1	0	0	0
AWS-3	12	21	3	21	1	0	0	0
PCS	22	38	66	10	1	0	0	0
AWS 4 / L Band	0	0	0	40	0	0	0	0
WCS	0	20	0	0	0	0	0	0
EBS/BRS 3.45GHz	0	39	179 12	30	0	0	0	0
CBRS	16	39	12	19	4	0	0	0
C-Band	158	79	27	0	5	0	8	0
C-barid	150	75	27	Ü	3	0	0	0
National Population Weighted Average (MHz)	Verizon	АТ&Т	T-Mobile	Dish	USCellular	Charter	Comcast	Cox
Total	290		369	155	18	4	13	3
Low Band	46	72	47	34	6	0	5	0
Lw Mid Band	70	<i>7</i> 5	104	71	3	0	0	0
Up Mid Band	174	137	217	50	9	4	8	3



National Spectrum Depth Chart Band Classification



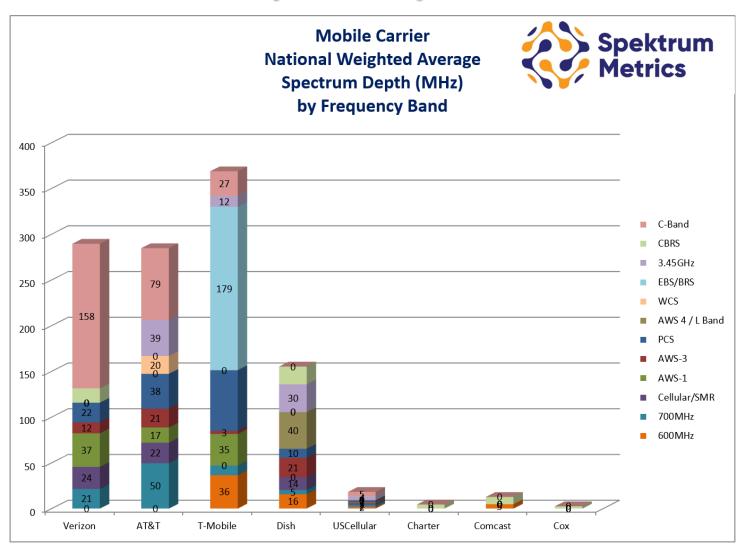


National Spectrum Depth Charts Details

- 8 Selected Carriers are displayed
- Visually highlight the National Population Weighted Average spectrum depth differences between carriers
 - By Band Classification
 - By Frequency Band



National Spectrum Depth Chart Frequency Band





Contiguous Spectrum Analysis

Carrier Selection				•						Cont	ię	gious Spectrum	Blocks (MHz)									
ATT											E											
					FDE) - Downlink						Time Divis	ion Duplex					FDD - Uplink	L			
AT&T	600MHz	700MHz (ABC)	700MHz (DE)	700MHz (UC)	700MHz (UD)	Cellular	PCS	AWS-4	AWS	wcs		EBS/BRS	CBRS/C-Band	600MHz	700MHz (ABC)	700MHz (UC)	700MHz (UD)	Cellular	PCS	AWS-4	AWS	wcs
Future Holdings	n71	n12	n29	n13	n14	n26	n25	n70	n66	n30		n41	n77	n71	n12	n13	n14	n26	n25	n70	n66	n30
Channel Bandwidth (MHz)	1st 2nd 3rd 4th	1st 2nd 3rd	1st 2nd	151	1st 2nd	1st 2nd 3rd 4th	1st 2nd 3rd 4th	1st 2nd	1st 2nd 3rd 4th	1st 2nd	1	1st 2nd 3rd 4th 5th 6th 7th 8th 9th	11st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th	1st 2nd 3rd 4th	1st 2nd 3rd	1st	1st 2nd	1st 2nd 3rd 4th	1st 2nd 3rd 4th	1st 2nd	1st 2nd 3rd 4th	1st 2nd
Kings County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Queens County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
New York County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Suffolk County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Nassau County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Bronx County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Westchester County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Bergen County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Essex County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Hudson County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Union County	0000	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Passaic County	0000	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Morris County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Richmond County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Somerset County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Rockland County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Putnam County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	10 5 0 0	0 0	10 0 0 0	0 10 0
Los Angeles County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	0 10 0
Orange County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	0 10 0
Riverside County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	0 10 0
San Bernardino County	0 0 0 0	12 0 0	12 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 5 0	10 0		0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0			20 0 0 0			0 10 0
Cook County	0 0 0 0	12 0 0	6 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 0 0	10 0	1	0 0 0 0 0 0 0 0 0 0	80 40 0 0 0 0 0 0 0 0	0 0 0 0	12 0 0	0	10 0	11 1.5 0 0	20 0 0 0	0 0	10 10 0 0	J 10 0



Contiguous Spectrum Analysis Details

- Determines the size of each of the contiguous blocks of spectrum for a selected carrier in each NR band
- Supplemental Uplink and Downlink channels are included
- Geographic Auto-Filters



NR Band Channel Analysis

Carrier Selection - Contigious Spectrum Analysis Tah												NR Cha	nnels									
AT&T							FDD - Dowr	ılink				Time Divi	sion Duplex					FDD - Up	link			
Data Source:		600MHz	700MHz (ABC)	700MHz (DE)	700MHz (UC)	700MHz (UD)	Cellular	PCS	AWS-4	AWS	wcs	EBS/BRS	3.45GHz/CBRS/C-Band	600MHz	700MHz (ABC)	700MHz (UC)	700MHz (UD)	Cellular	PCS	AWS-4	AWS	wcs
Future Holdings		n71	n12	n29	n13	n14	n26	n25	n70	n66	n30	n41	n77	n71	n12	n13	n14	n26	n25	n70	n66	n30
Channel Bandwidth (MHz	Max (MHz)	Max (MHz) 20 15 10	Max (MHz) 15 10	Max (MHz) 10 5	Max (MHz) 10	Max (MHz) 10	Mæx (MHz) 20 15	20 20 15 10	Mask (MH2)	Max (MHz) 40 20 15 10 5	Max (MHz) 10 5	Max (MH2) 900 90 80 60 50 50 40 20 15 15	Max (MHz) 100 90 80 60 60 50 40 20 15	Mæx (MH2) 20 15 10 5	Max (MHz) 15 10 5	Max (MHz) 10 5	Max (MH2) 10 5	Max (MHz) 20 15 10 5	Max (MHz) 20 15 10 5	Max (MHz) 15 10 5	Max (MH2) 40 20 15 10 5	Max (MHz) 10 5
▼ County		V	V		V	V	V			* * * * * *	V	V	- -	V	V	w	w		*	w	*	w
▼ County		V	V		w	w	V				w	V		-	w	w	w	V	w	V	v	w
NY Kings County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Queens County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY New York County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Suffolk County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Nassau County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Bronx County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Westchester County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Bergen County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Essex County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Hudson County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Union County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Passaic County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Morris County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Richmond County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NJ Somerset County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Rockland County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
NY Putnam County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 10 0 0 1	1 0 0 0 0 0 0	10 0 0 0 2 0	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	10 0 0 1 1	0 0 0 0	10 0 0 0 2 0	10 1 0
CA Los Angeles County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 20 1 0 0	0 0 0 0 0 0	10 0 0 0 3 1	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	20 1 0 0 0	0 0 0 0	10 0 0 0 3 1	10 1 0
CA Orange County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 20 1 0 0	0 0 0 0 0 0	10 0 0 0 3 1	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	20 1 0 0 0	0 0 0 0	10 0 0 0 3 1	10 1 0
CA Riverside County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 20 1 0 0	0 0 0 0 0 0	10 0 0 0 3 1	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	20 1 0 0 0	0 0 0 0	10 0 0 0 3 1	10 1 0
CA San Bernardino County	0	0 0 0 0 0	10 0 1 0	10 1 0	0 0 0	10 1 0	10 0 0 1	0 20 1 0 0	0 0 0 0 0 0	10 0 0 0 3 1	10 1 0	0 0 0 0 0 0 0 0 0 0 0	80 0 0 1 0 0 1 0 0 0	0 0 0 0 0	10 0 1 0	0 0 0	10 1 0	10 0 0 1 0	20 1 0 0 0	0 0 0 0	10 0 0 0 3 1	10 1 0



NR Band Channel Analysis Details

- Determines the NR channels by size that are available to a selected carrier in each NR band
- Supplemental Uplink and Downlink channels are included
- Geographic Auto-Filters



Throughput Analysis

Carrier Selection - Contigiou Spectrum Analysis Tab	IS .																											Thr	oug	hput	by	Cha	nne	ı																																																		
AT&T	1														FDD - Downlink													FDE) - Upli	ink																																																						
Data Source:			600MF			700MHz (ABC)		OMHz DE)	700N (UC						ellular		PCS			AWS-4		T	AWS1/3		wcs		600MHz		T	700MHz (ABC)		700MH (UC)		700MHz (UD)	Cellular				PCS				AWS4				AW	VS1/3			wcs																																	
Future Holdings			n71 n:		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12		n12			129	n1	3	n14		n	26			n25				n	70				n66			n30			n71			n1	2	n13		n14		n2	6			n25			r	n70			n	166			n30
Channel Bandwidth (MHz)	5	0.7	15	10	2	15	10	10	5	10	5	10	5 20	15	10	5	20	IS	10	2	25	2 2	G 5	10	40	20	15	10	5	10	n (50	15	2 4	15	1 01	LO.	10	2	10	20	15	10	2	20	£ :	10	ıs ţ	15	10	2	40	20	9 5	8 .	2 2	ro.																											
▼ County	-	¥	~	¥	~	¥	~	¥ 4	¥	~	~	~	¥ .		~	~	~	¥	~	¥	Ψ.	v	¥	¥	¥	¥ 7		۳	~	~	~	~	Ψ.	₩	Ψ.	~	¥ ¥	Ψ.	~	~	~	~	~	w	~	~	~	~	Ψ.	~	~	~	~	~	~	Ψ.	~																											
▼ County	-	-	-	-	-	-	-	v v	-	-	-	-	₩ .		-	-	-	-	-	-	T	-	v	-	-	¥ .		-	-	-	- I	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-																											
NY Kings County	1.	٠.			-	- :	205 -	205	-	-	-	205 -	-	-	205	-		2	05	94 -		-	-		-	-	-	651		205 -	1				-	22	20 -		. 2	20 -	-	-	220	-	-	- 2	220 1	101 -			-				696 -	. 2	20 -																											
NY Queens County	١.	٠.			_	_	205 -	205			_	205 -			205	_		2	05	94 -		-		-	-	-	-	651		205 -	1.					22	20 -		. 2	220 -		-	220		-	- 2	220 1	101 -						. /	696 -		20 -																											
NY New York County	_				_		205 -	205		_		205 -		1	205			2	05	94 -		٠.			٠.		1.	651		205 -	Π.				٠.	22	0 -		. 2	220 -	-		220		.	- 2	220 1	101 -							696 -	- 2																												
NY Suffolk County	١.	٠.					205 -	205												94 -		٠.	٠.		٠.		٠.	651		205 -						22	0 -	I	. 2	220 -	_	-	220	.	_	- 2	220 1	101 -			_				696 -	- 2																												
Y Nassau County							205 -	205	-	-		205 -		-	205					94 -						-		651		205 -	_											-			-			101 -			-				696 -																													
IY Bronx County	١.				_	- :	205 -	205	-	-	- :	205 -		-	205	_		2	05	94 -		-	_	-	_	-	-	651		205 -						22	0 -		- 2	20 -	-	-	220	-	-	- 2	220 1	101 -			-			. /	696 -	- 2	0 -																											
IY Westchester County	١.	٠.					205 -	205				205 -			205			2	05	94 -		٠.		-	٠.		٠.	651		205 -	1.				-	22	0 -	I	. 2	220 -	_	-	220	-	-	- 2	220 1	101 -		_	_			/	696 -	- 2	20 -																											
NJ Bergen County	_						205 -	205	_	_		205 -			205	_				94 -		Τ.	Τ.		٠.		1.	651		205 -	_					22				220 -			220		-			101 -			_				696 -		20 -																											
IJ Essex County	_						205 -	205				205 -			205					94 -								651		205 -	1.					22				220 -			220	_				101 -			_				696 -	- 2																												
NJ Hudson County	_						205 -	205	-	-		205 -	- 1	-:-	205	-				94 -	•			- 1		-	+-	651		205 -					-	22				220 -		-	220					101 -		-		-			696 -		20 -																											
Union County	_				-		205 -	205	-	-		205 -		-	205	-			05	94 -		-	-	-	-	-	-	651		205 -						22				20 -	-	-	220	-	-			101 -			-	•			696 -	- 2																												
	_				-		205 -	205	-	-			-	-		-				04 -		-	-	-	-	-	-			205 -						22				20 -	-	-	220	-	-			101 -			-	- -			696 -		20 -																											
NJ Passaic County NJ Morris County					-		205 -	205	-	-		205 -	-	-	205	-			05	94 -		-	-	-	-	-	-	651		205 -	-10				-	22				220 -	-	-	220	-	-			101 -	-		-				696 -		20 -																											
Y Richmond County					-		205 -	205	-	-		205 -	- 1		205	-				94 -		- 1	- 1				+1	651		205 -						22				220 -	-	-	220	-	-			101 -	-	-	-				696 -		20 -																											
IJ Somerset County					-		205 -	205	-	-	-	205 -	-	-	205					94 -		-	-	-	-	-	-	651		205 -				-	-	22	20 -		- 2	220 -	-	-	220	-	-	- 2	220 1	101 -	_	-	-			. 1	696 -	- 2	20 -																											
IY Rockland County	١.	-			-	-	205 -	205	-	-	-	205 -	-	-	205	-		2	05	94 -		-	-	-	-	-	-	651		205 -		-		-	-	22	20 -			220 -	-	-	220	-	-			101 -		-	-				696 -	- 2	20 -																											
NY Putnam County	-	-			-		205 -	205	-	-	- 3	205 -	-	-	205	-		2	05	94 -		-	-	-	-	-	-	651		205 -		-		-	-	22				220 -	-	-	220	-	-	- 2	220 1	101 -		-	-				696 -		20 -																											
CA Los Angeles County	-	-			-		205 -	205	-	-	- 1	205 -	- -	-	205	-	437 -	-	-	-		-	-	-	-	-	-	976		205 -				-	-	22				220 -	-	-	220	-	467					-	-					220 2																												
CA Orange County					-		205 -	205	-	-	- 1	205 -	-	-	205	-	437 -		-	-	-	-	-	-	-	-	-	976		205 -		-		-	-	22				220 -	-	-	220	-	467					-	-			1,15		20 2																												
CA Riverside County					-		205 -	205	-	-	- :	205 -	-	-	205	-	437 -	-	-	-		-	-	-	-	-	-	976		205 -	_	-		-	-	22				220 -	-	-	220 220	-	467		-				-		-			20 2																												
CA San Bernardino County L Cook County					-		205 -	205	- 04	-	-	205 -	-	-	205	-	437 -	-	-	-	- -	-	-	-	-	-	-	976 976	205	205 -	-1-			-	-	22		1 .		20 -	-	-	220	-	467				-	-	-				044 2 044 -		20 -																											
IL DuPage County					-		205 -	-	94		- 1	205 -	- 1	-	205	-	437 - 437 -	-	-	-		-	-	-	-	-	-	976		205 -					-	22		+ - + -		20 -	-	-	220	-	467		-				-				044 -		20 -																											
L Lake County	_				-		205 -		94	-	- 1	205 -	- 1	-	205	-	437 -						-			-	-	976		205 -	-10				- 1	22		1 - 1		20 -	-	-	220	-	467	_ = = :	_	_ + -	. – "		-	- 1	_ + :		044 -		20 -																											
L Will County	_				-		205 -		94		- 1	205 -	- 1	1	205	-	437 -				. 1	- 1	-	- 1			+-	976		205 -					-	22				220 -	-	-	220	-	467					-	-				044 -		20 -																											
IL Kane County					-		205 -	-	94	-	- 1	205 -	-	1	205	-	437 -					-	-	-	-	-	-	976		205 -					-	22	20 -			220 -	-	-	220	-	467					-	-			1/	044 -	- 2	.0 -																											
IL McHenry County					-		205 -	-	94	-			-	-	205	-	437 -	-		-		-	-	-	-	-	-	976		205 -		-		-	-	22	20 -		- 2	220 -	-	-	220	-	467				- 1	-	-			1,/	044 -	- 2	20 -																											



Throughput Analysis Details

- Associates an estimate throughput (data speed) value with each NR channel
- Estimates are based on:
 - 4x4 MIMO Antennas
 - 256 QAM
- Supplemental Uplink and Downlink channels are included
- Geographic Auto-Filters



Throughput Summary

Carrier Selection - Contigious																											
Spectrum Analysis Tab															Th	roughp	ut by NF	Band									
AT&T										FI	DD - Throug	hput												TDD - The	oughput		
Data Source: Future Holdings	500MHz	700MHz(ABC)	700MHz(DE)	700MHz(UC)	700MHz(UD)	Cellular	PCS	AWS-4	AWS1/3	WCS	ownlink Total (Mbps)	600MHz	700MHz(ABC)	700MHz(UC)	700MHz(UD)	Cellular	PCS	AWS4	AWS1/3	WCS	Uplink Total (Mbps)	EBS/8PS	3.45GHz/CBRS/C-Band	ownlink Total (Mbps)	EBS/8FS	3.45GHz/CBRS/C-Band	Downlink Total (Mbps)
Channel Bandwidth (MHz)	17n	n12	r29	713	4년	1756	125	07u	n66	n30	FDD Do	n71	n12	n13	n14	n26	125	0Zu	n66	n30	QQ	141	77"	FDD Do	n41	7 <u>7</u> u	700 A
▼ County ▼	~	~	~	~	~	~	₩	~	₩	~	~	₩	~	~	~	₩	~	~	¥								
▼ County	-	-	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-								İ
NY Kings County		205	205	-	205	205	300		651	205	1,977	_	220		220	220	321		696	220	1,896	<u> </u>	2,054	2,054	_	676	676
NY Queens County	H	205	205	-	205	205	300	_	651	205	1,977	-	220	_	220	220	321	-	696	220	1,896	<u>-</u>	2,054	2,054	-	676	676
	-			-				-				-		-				-									
NY New York County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NY Suffolk County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NY Nassau County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NY Bronx County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NY Westchester County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NJ Bergen County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NJ Essex County	-	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NJ Hudson County		205	205		205	205	300	-	651	205	1,977		220		220	220	321	-	696	220	1,896	-	2,054	2,054		676	676
NJ Union County		205	205	_	205	205	300	_	651	205	1,977		220		220	220	321	_	696	220	1.896	_	2,054	2,054		676	676
NJ Passaic County		205	205	_	205	205	300		651	205	1,977		220		220	220	321		696	220	1,896		2,054	2,054	_	676	676
NJ Morris County	H	205	205		205	205	300	-	651	205	1,977	-	220	÷	220	220	321	-	696	220	1,896		2,054	2,054	-	676	676
NY Richmond County	H:	205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896		2,054	2,054		676	676
NJ Somerset County		205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	_	696	220	1,896		2,054	2,054	-	676	676
NY Rockland County		205	205	-	205	205	300	-	651	205	1,977	-	220	-	220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
NY Putnam County	-	205	205	-	205	205	300	-	651	205	1,977		220		220	220	321	-	696	220	1,896	-	2,054	2,054	-	676	676
CA Los Angeles County		205	205	-	205	205	437	-	1,181	205	2,645	-	220	-	220	220	467	-	1,264	220	2,610	-	2,054	2,054	-	676	676
CA Orange County	-	205	205	-	205	205	437	-	1,181	205	2,645	-	220	-	220	220	467	-	1,264	220	2,610	-	2,054	2,054	-	676	676
CA Riverside County	-	205	205	-	205	205	437	-	1,181	205	2,645	-	220	-	220	220	467	-	1,264	220	2,610	-	2,054	2,054	-	676	676
CA San Bernardino County	-	205	205	-	205	205	437	-	1,181	205	2,645	-	220	-	220	220	467	-	1,264	220	2,610	-	2,054	2,054	-	676	676
IL Cook County	-	205	94	-	205	205	437	-	976	205	2,328	-	220	-	220	220	467	-	1,044	220	2,390	-	2,054	2,054	-	676	676
IL DuPage County	-	205	94	-	205	205	437	-	976	205	2,328	-	220	-	220	220	467	-	1,044	220	2,390	-	2,054	2,054	-	676	676
IL Lake County	-	205	94	-	205	205	437	-	976	205	2,328	-	220	-	220	220	467	-	1,044	220	2,390	-	2,054	2,054	-	676	676
IL Will County	-	205	94	-	205	205	437	-	976	205	2,328	-	220	-	220	220	467	-	1,044	220	2,390	-	2,054	2,054	-	676	676
IL Kane County	-	205	94	-	205	205	437	-	976	205	2,328	-	220	-	220	220	467	-	1,044	220	2,390	-	2,054	2,054	-	676	676



Throughput Summary Details

- Provides Throughput Totals by NR band along with FDD and TDD downlink and uplink totals
- Estimates are based on:
 - 4x4 MIMO Antennas
 - 256 QAM
- Supplemental Uplink and Downlink channels are included
- Geographic Auto-Filters



Uplink and Downlink Spectrum Depth

	Future Holdings						ı	Dov	wn	link											Divis plex									Up	linl	<					
	Channel Bandwidth (MHz)		Total	Low Band	Lw Mid Band	Up Mid Band	n71	n12	n29	n13	n14	n26	n25	n70	n66	n30		Total	Low Band	Lw Mid Band	Up Mid Band	n41	77u		Total	Low Band	Lw Mid Band	Up Mid Band	n71	n12	n13	n14	n26	n25	n70	n66	n30
ST	County	-	+	*	~	*	~	~	~	~	+	+	-	7	7	*	*	*	+	7	*	-	~	~	T	*	~	*	~	+	~	~	*	*	~	~	~
NY	Kings County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		210	0	0	210	150	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Queens County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		215	0	0	215	155	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	New York County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		210	0	0	210	150	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Suffolk County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		250	0	0	250	190	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Bronx County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		190	0	0	190	120	70		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Nassau County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		215	0	0	215	155	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Westchester County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		185	0	0	185	125	60		115	40	75	0	15	5	0	0	20	30	0	45	0
l NJ	Bergen County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		180	0	0	180	120	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Essex County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		220	0	0	220	150	70		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Hudson County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		220	0	0	220	150	70		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Union County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		180	0	0	180	120	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Passaic County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		215	0	0	215	155	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Morris County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		185	0	0	185	125	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Richmond County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		180	0	0	180	120	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NJ	Somerset County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		190	0	0	190	130	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Rockland County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		175	0	0	175	115	60		115	40	75	0	15	5	0	0	20	30	0	45	0
NY	Putnam County		90	20	70	0	15	5	0	0	0	0	25	0	45	0		190	0	0	190	130	60		115	40	75	0	15	5	0	0	20	30	0	45	0
CA	Los Angeles County		50	25	25	0	20	5	0	0	0	0	15	0	10	0		250	0	0	250	190	60		90	45	45	0	20	5	0	0	20	35	0	10	0
CA	Orange County		50	25	25	0	20	5	0	0	0	0	15	0	10	0		220	0	0	220	160	60		90	45	45	0	20	5	0	0	20	35	0	10	0
CA	Riverside County		50	25	25	0	20	5	0	0	0	0	15	0	10	0		250	0	0	250	190	60		90	45	45	0	20	5	0	0	20	35	0	10	0
CA	San Bernardino County		50	25	25	0	20	5	0	0	0	0	15	0	10	0		250	0	0	250	190	60		90	45	45	0	20	5	0	0	20	35	0	10	0
IL	Cook County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
IL	DuPage County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
IL	Lake County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
IL	Will County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
IL	Kane County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
IL	McHenry County		65	20	45	0	15	5	0	0	0	0	10	20	15	0		250	0	0	250	190	60		95	40	55	0	15	5	0	0	20	40	0	15	0
PA	Philadelphia County		80	25	55	0	20	5	0	0	0	0	15	0	40	0		240	0	0	240	180	60		120	45	75	0	20	5	0	0	20	35	0	40	0
PA	Montgomery County		80	25	55	0	20	5	0	0	0	0	15	0	40	0		240	0	0	240	180	60		120	45	75	0	20	5	0	0	20	35	0	40	0
PA	Bucks County		80	25	55	0	20	5	0	0	0	0	15	0	40	0		240	0	0	240	180	60		120	45	75	0	20	5	0	0	20	35	0	40	0



Uplink and Downlink Spectrum Depth - Details

- Displays the amount of spectrum that can be deployed by county based upon the NR Band Channel Analysis. Spectrum that is used as guard band or undeployable is not included in this spectrum depth analysis.
- Details and Uplink / Downlink imbalances
- Included Breakdowns
 - Total Spectrum Depth
 - Low Band, Lower Mid-band, and Upper Mid-band Spectrum Depth
 - Frequency Band Spectrum Depth
- Geographic Auto-Filters



MHz-POPs Analysis

				קי	g							75				
				Bai	Bai			¥.				Ban				
			p _u ,	Nid.	Zi.	N	и	/S				7		ħ		_
		otal	/ Ba	ler.	ser	₹	ΣΗΣ	<u>a</u>	S-1	ς. Υ		4	y)	564	S	anc
		Tot	TON	700	140	009	700	<u> </u>	A W	₩ W	মূ	A W	8	3.4	CBRS	ů Ö
NY	Kings County	863,624,004	124,129,444	211,284,160	528,210,400	-	58,103,144	66,026,300	105,642,080	-	105,642,080	-	-	-	105,642,080	422,568,320
NY	Queens County	762,283,761	109,563,721	186,491,440	466,228,600	-	51,285,146	58,278,575	93,245,720	-	93,245,720	-	-	-	93,245,720	372,982,880
NY	New York County	515,638,452	74,113,172	126,150,080	315,375,200	-	34,691,272	39,421,900	63,075,040	-	63,075,040	-	-	-	63,075,040	252,300,160
NY	Suffolk County	499,114,488	71,738,168	122,107,520	305,268,800	-	33,579,568	38,158,600	61,053,760	-	61,053,760	-	-	-	61,053,760	244,215,040
NY	Bronx County	465,957,996	66,972,556	113,995,840	284,989,600	-	31,348,856	35,623,700	56,997,920	-	56,997,920	-	-	-	56,997,920	227,991,680
NY	Nassau County	454,826,589	65,372,629	111,272,560	278,181,400	-	30,599,954	34,772,675	55,636,280	-	55,636,280	-	-	-	55,636,280	222,545,120
NY	Westchester County	326,311,665	46,901,065	79,831,600	199,579,000	-	21,953,690	24,947,375	39,915,800	-	39,915,800	-	-	-	39,915,800	159,663,200
NJ	Bergen County	311,898,813	44,829,493	76,305,520	190,763,800	-	20,984,018	23,845,475	38,152,760	-	38,152,760	-	-	-	38,152,760	152,611,040
NJ	Essex County	279,557,859	40,181,099	68,393,360	170,983,400	-	18,808,174	21,372,925	34,196,680	-	34,196,680	-	-	-	34,196,680	136,786,720
NJ	Hudson County	229,705,401	33,015,761	56,197,040	140,492,600	-	15,454,186	17,561,575	28,098,520	-	28,098,520	-	-	-	28,098,520	112,394,080
NJ	Union County	187,081,278	26,889,358	45,769,120	114,422,800	-	12,586,508	14,302,850	22,884,560	-	22,884,560	-	-	-	22,884,560	91,538,240
NJ	Passaic County	169,424,259	24,351,499	41,449,360	103,623,400	-	11,398,574	12,952,925	20,724,680	-	20,724,680	-	-	-	20,724,680	82,898,720
NJ	Morris County	167,090,787	24,016,107	40,878,480	102,196,200	-	11,241,582	12,774,525	20,439,240	-	20,439,240	-	-	-	20,439,240	81,756,960
NY	Richmond County	161,372,538	23,194,218	39,479,520	98,698,800	-	10,856,868	12,337,350	19,739,760	-	19,739,760	-	-	-	19,739,760	78,959,040
NJ	Somerset County	113,026,569	16,245,409	27,651,760	69,129,400	-	7,604,234	8,641,175	13,825,880	-	13,825,880	-	-	-	13,825,880	55,303,520
NY	Rockland County	110,927,229	15,943,669	27,138,160	67,845,400	-	7,462,994	8,480,675	13,569,080	-	13,569,080	-	-	-	13,569,080	54,276,320
NY	Putnam County	28,107,632	4,602,992	7,834,880	15,669,760	-	2,154,592	2,448,400	3,917,440	-	3,917,440	-	-	-	-	15,669,760
CA	Los Angeles County	2,919,374,568	461,988,568	786,363,520	1,671,022,480	-	216,249,968	245,738,600	393,181,760	196,590,880	196,590,880	-	-	-	294,886,320	1,376,136,160
CA	Orange County	940,839,273	148,887,023	253,424,720	538,527,530	-	69,691,798	79,195,225	126,712,360	63,356,180	63,356,180	-	-	-	95,034,270	443,493,260
CA	Riverside County	730,143,315	115,544,565	196,671,600	417,927,150	-	54,084,690	61,459,875	98,335,800	49,167,900	49,167,900	•	-	-	73,751,850	344,175,300
CA	San Bernardino County	651,828,870	103,151,370	175,576,800	373,100,700	-	48,283,620	54,867,750	87,788,400	43,894,200	43,894,200	-	-	-	65,841,300	307,259,400
IL	Cook County	1,536,424,362	243,137,862	258,657,300	1,034,629,200	-	113,809,212	129,328,650	206,925,840	-	51,731,460	-	-	-	206,925,840	827,703,360
IL.	DuPage County	274,690,845	43,469,595	46,244,250	184,977,000	-	20,347,470	23,122,125	36,995,400	-	9,248,850	-	-	-	36,995,400	147,981,600
IL.	Lake County	211,237,983	33,428,233	35,561,950	142,247,800	-	15,647,258	17,780,975	28,449,560	-	7,112,390	-	-	-	28,449,560	113,798,240
IL.	Will County	207,083,844	32,770,844	34,862,600	139,450,400	-	15,339,544	17,431,300	27,890,080	-	6,972,520	-	-	-	27,890,080	111,560,320
IL.	Kane County	132,506,116	24,232,636	25,779,400	82,494,080	-	11,342,936	12,889,700	20,623,520	-	5,155,880	-	-	-	-	82,494,080
IL.	McHenry County	79,958,354	14,622,734	15,556,100	49,779,520	-	6,844,684	7,778,050	12,444,880		3,111,220	-	-	-	-	49,779,520
PA	Philadelphia County	483,909,057	74,083,797	110,337,570	299,487,690	-	34,677,522	39,406,275	47,287,530	31,525,020	31,525,020	-	-	-	47,287,530	252,200,160
PA	Montgomery County	264,197,446	40,447,166	60,240,460	163,509,820	-	18,932,716	21,514,450	25,817,340	17,211,560	17,211,560		-	-	25,817,340	137,692,480
PA	Bucks County	198,352,086	30,366,606	45,226,860	122,758,620	-	14,214,156	16,152,450	19,382,940	12,921,960	12,921,960	-	-	-	19,382,940	103,375,680
PA	Delaware County	176,171,643	26,970,903	40,169,430	109,031,310	-	12,624,678	14,346,225	17,215,470	11,476,980	11,476,980	-	-	-	17,215,470	91,815,840
PA	Chester County	149,205,773	25,316,503	37,705,430	86,183,840	-	11,850,278	13,466,225	16,159,470	10,772,980	10,772,980	•	-	-		86,183,840
NJ	Camden County	160,797,697	24,617,237	36,663,970	99,516,490	-	11,522,962	13,094,275	15,713,130	10,475,420	10,475,420	-	-	-	15,713,130	83,803,360
NJ	Burlington County	128,602,513	21,820,643	32,498,830	74,283,040	=	10,213,918	11,606,725	13,928,070	9,285,380	9,285,380	-	-	-	-	74,283,040
NJ	Gloucester County	84,340,129	14,310,419	21,313,390	48,716,320	-	6,698,494	7,611,925	9,134,310	6,089,540	6,089,540	•	-	-		48,716,320
MI	Wayne County	562,616,672	83,416,352	141,985,280	337,215,040	-	39,045,952	44,370,400	70,992,640	35,496,320	35,496,320	-	-	-	53,244,480	283,970,560
MI	Oakland County	402,595,389	59,690,799	101,601,360	241,303,230	=	27,940,374	31,750,425	50,800,680	25,400,340	25,400,340	-	-	-	38,100,510	203,202,720
MI	Macomb County	277,943,064	41,209,224	70,143,360	166,590,480	-	19,289,424	21,919,800	35,071,680	17,535,840	17,535,840	-	-	-	26,303,760	140,286,720



MHz-POPs Details

- Provides estimated MHz-POPs for 8 selected carriers
 - By County
 - By Nation
- Included Breakdowns
 - Total Spectrum Depth
 - Low Band, Mid Band, and High Band Spectrum Depth
 - Frequency Band Spectrum Depth
- Geographic Auto-Filters

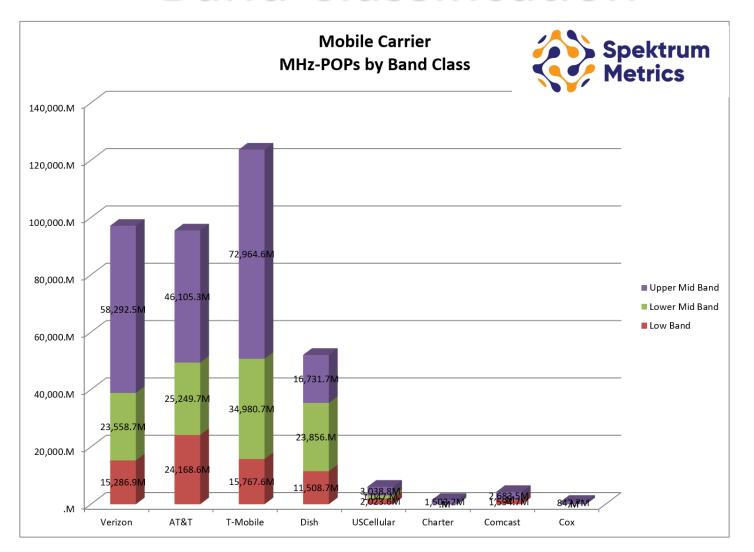


National MHz-POPs

(MHz-POPs)	Verizon	АТ&Т	T-Mobile	Dish	USCellular	Charter	Comcast	Cox	Other	Total Allocation
Total	97,138M	95,524M	123,713M	52,096M	6,109M	1,503M	4,278M	848M	32,464M	413,674M
Low Band	15,287M	24,169M	15,768M	11,509M	2,024M	М	1,595M	М	4,802M	75,152M
600MHz	16M	2M	12,238M	5,270M	585M	M	1,595M	М	3,779M	23,485M
700MHz	7,170M	16,618M	3,518M	1,559M	775M	М	М	М	556M	30,195M
Cellular/SMR	8,101M	7,548M	11M	4,680M	664M	М	М	М	468M	21,472M
Lower Mid Band	23,559M	25,250M	34,981M	23,856M	1,047M	М	М	М	3,701M	112,393M
AWS-1	12,324M	5,582M	11,605M	M	231M	M	M	М	453M	30,195M
AWS-3	4,002M	6,910M	1,105M	7,081M	359M	M	M	М	2,350M	21,808M
PCS	7,232M	12,757M	22,270M	3,355M	458M	M	M	М	898M	46,970M
AWS-4	М	М	M	13,420M	М	M	М	М	М	13,420M
Upper Mid Band	58,292M	46,105M	72,965M	16,732M	3,039M	1,503M	2,684M	848M	23,961M	226,128M
WCS	М	6,559M	М	M	М	M	М	М	3,506M	10,065M
EBS/BRS	2M	М	59,964M	M	73M	М	М	М	5,049M	65,087M
EBS	2M	M	36,301M	M	47M	M	M	М	2,735M	39,086M
BRS	М	М	23,662M	М	26M	М	М	М	2,314M	26,001M
3.45GHz	М	13,189M	3,947M	10,195M	1,249M	М	М	М	4,970M	33,550M
CBRS	5,287M	М	51M	6,532M	78M	1,503M	2,684M	848M	6,502M	23,485M
C-Band	53,003M	26,357M	9,003M	4M	1,639M	M	М	М	3,935M	93,941M



MHz-POPs Band Classification



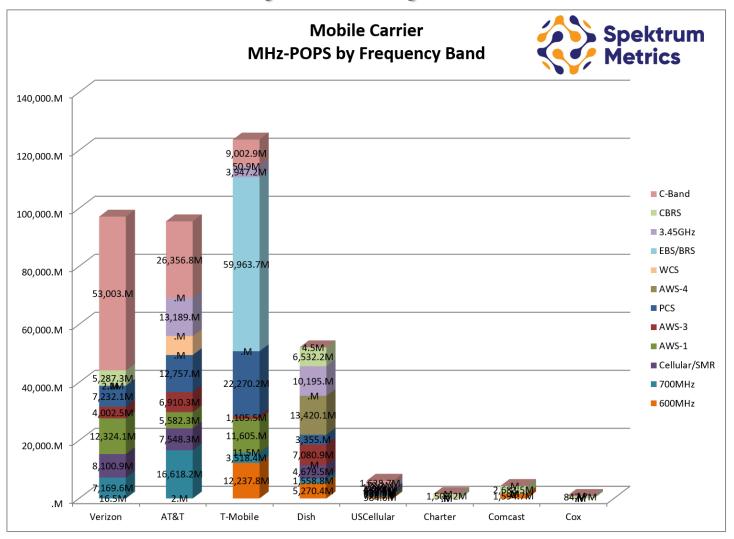


MHz-POPs Charts Details

- Provides estimated MHz-POPs for 8 selected carriers
 - By County
 - By Nation
- Included Breakdowns
 - Total Spectrum Depth
 - Low Band, Mid Band, and High Band Spectrum Depth
 - Frequency Band Spectrum Depth
- Geographic Auto-Filters



MHz-POPs Frequency Band





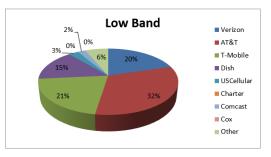
National Band Ownership Charts

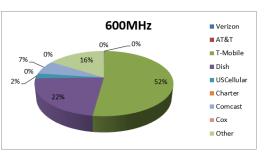
Mobile Carrier Frequency Band Ownership

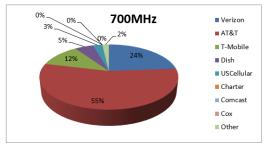
Based on National MHz-POPs

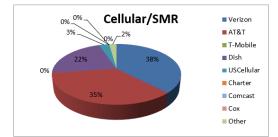


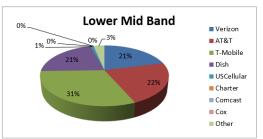
Mobile Carrier - Spectrum Ownership Analysis Tool - October 2023

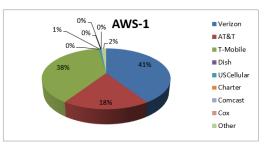


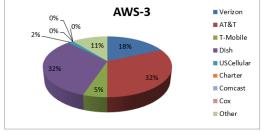


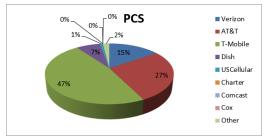


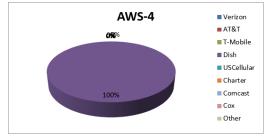


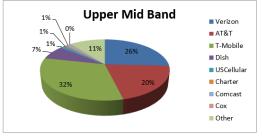


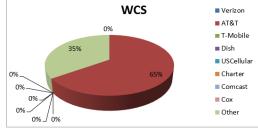














National Band Ownership Details

- Displays the percentage of Spectrum Held by any eight selected carriers in each Mobile Carrier frequency band and band classification along with the remaining spectrum in an Others category
- Percentages based upon each carriers MHz-POPs in each frequency band compared to the total allocated MHz-POPs



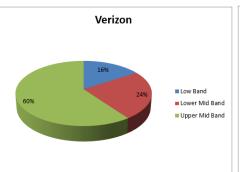
Carrier Spectrum Distribution Charts

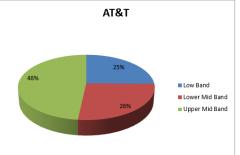


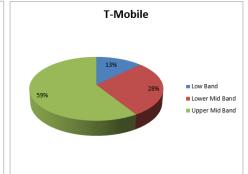
Based on MHz-POPs

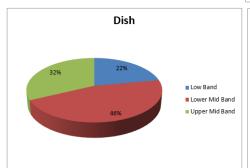


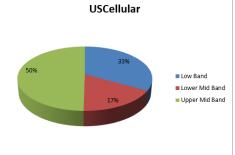
Mobile Carrier - Spectrum Ownership Analysis Tool - October 2023

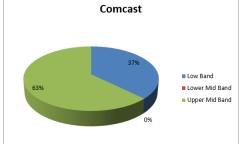


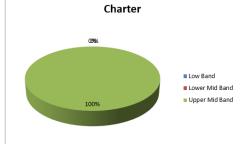


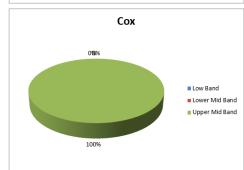


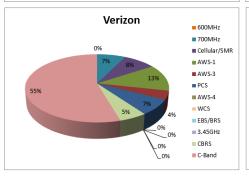


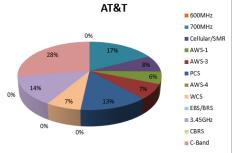


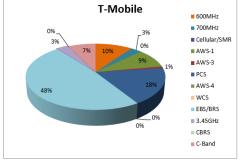














Carrier Spectrum Distribution Details

- Displays the breakdown of spectrum held by each of the selected wireless carriers
- Detailed by band classification (low, lower mid, upper mid) or frequency band

