

A1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD

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2   INSTITUTO
UNIVERSITÁRIO
DE LISBOA

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Excel Template For IoT Modeling

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9 Este excel é um Template para criar Modelos de IoT Dimensioning.

10 Funciona através da macro 'CreateTablesFromInput' que usa instruções de inputs, definidas na folha 'Model Configurator'* , e cria tabelas.

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13 *(se o nome desta folha for alterado a macro não irá funcionar. Caso se queira alterar o seu nome é preciso alterar código também)

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Cover User Guide [Configurator >>](#) Model Configurator [Inputs 1 >>](#) Study Years Regions Verticals_Sectors Network Parameters Base Stations Sites [Inputs 2 >>](#) Base Stations Profiles Throughput Formulas Base Station ... + :

Ready Accessibility: Investigate

1 | Input | Model Configuration

2 This sheet allows building multiple tables with some inputs

MODEL CONFIGURATOR

B11		X	✓	fx																		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
1	Input Study Years																					
2	Study Years																					
3																						
5																						
6		STUDY YEARS																				
7																						
8		2023																				
9		2025																				
10		2030																				
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E9	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Input Regions																				
2	Regions																				
3																					
5																					
6					REGIONS																
7																					
8	Central Coast																				
9	Cessnock																				
10	Dungog																				
11	Lake Macquarie																				
12	Maitland																				
13	Muswellbrook																				
14	Newcastle																				
15	Port Stephens																				
16	Singleton																				
17	UpperHunter																				
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1 Input | Verticals/Sectors

VERTICALS/SECTORS

- Agriculture, forestry, fishing, and hunting, mining, quarrying, and oil and gas extraction
- Utilities
- Construction
- Manufacturing
- Wholesale trade & Retail trade
- Transportation and warehousing
- Finance and insurance & Real estate and rental and leasing services
- Professional, scientific, and technical services
- Management of companies and enterprises & Administrative and support services, waste management and remediation services
- Educational services
- Health care and social assistance
- Arts, entertainment, and recreation & Information and cultural industries
- Accommodation and food services
- Other services (excluding public administration)
- Public administration
- Households & Consumer Goods
- Visitor Demand

Input | Network Parameters

Network Parameters

NETWORK PARAMETERS

Peak Concurrent Devices Traffic (Busy Hours) [Mbps]	0.2
Busy Hour/Contention Ratio [Mbps]	60
+ Headroom Extra Capacity	20%



B24	▼	✖ ✓ fx ▼	Standalone 4G Site - 1 Sector															
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Input Base Stations Sites																	
2	Base Stations Sites																	
3																		
5																		
6	BASE STATIONS SITES																	
7																		
8																		
9																		
10																		
11	Sites																	
12																		
13	Standalone 5G Site - 3 Sectors - Auto																	
14	Standalone 5G Site - 3 Sectors																	
15	Standalone 5G Site - 2 Sectors - Auto																	
16	Standalone 5G Site - 2 Sectors																	
17	Standalone 5G Site - 1 Sector - Auto																	
18	Standalone 5G Site - 1 Sector																	
19	Standalone 4G Site - 3 Sectors - Auto																	
20	Standalone 4G Site - 3 Sectors																	
21	Standalone 4G Site - 2 Sectors - Auto																	
22	Standalone 4G Site - 2 Sectors																	
23	Standalone 4G Site - 1 Sector - Auto																	
24	Standalone 4G Site - 1 Sector																	
25	Total																	
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1 | Input | Base Stations Profile

Base Stations Profiles

BASE STATIONS PROFILE

U52	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
35	Maximum Throughput for Downlink per Site		5000	Manual																					
36																									
37																									
38	Standalone 4G Site - 3 Sectors - Auto	Data																							
39	Maximum Simultaneously Active Users per Site		1500																						
40	Maximum Throughput for Downlink per Site	2000	Auto																						
41																									
42																									
43	Standalone 4G Site - 3 Sectors	Data																							
44	Maximum Simultaneously Active Users per Site		1500																						
45	Maximum Throughput for Downlink per Site	2000	Manual																						
46																									
47																									
48	Standalone 4G Site - 2 Sectors - Auto	Data																							
49	Maximum Simultaneously Active Users per Site		800																						
50	Maximum Throughput for Downlink per Site	1200	Auto																						
51																									
52																									
53	Standalone 4G Site - 2 Sectors	Data																							
54	Maximum Simultaneously Active Users per Site		800																						
55	Maximum Throughput for Downlink per Site	1200	Manual																						
56																									
57																									
58	Standalone 4G Site - 1 Sector - Auto	Data																							
59	Maximum Simultaneously Active Users per Site		400																						
60	Maximum Throughput for Downlink per Site	300	Auto																						
61																									
62																									
63	Standalone 4G Site - 1 Sector	Data																							
64	Maximum Simultaneously Active Users per Site		400																						
65	Maximum Throughput for Downlink per Site	300	Manual																						
66																									
67																									

1 Input | Throughput Formulas

2 Throughput Formulas

TROUGHPUT FORMULA

Verticals/ Sectors	Devices	Throughput [Mbps]								Average Throughput per Device [Mbps]	Peak Concurrent Devices Traffic (Busy Hours) [Mbps]	Busy Hour/Contention Ratio [Mbps]	+ Headroom Extra Capacity
		0.5	1	2	5	10	50	100	1000				
Agriculture, forestry, fishing, and hunting, mining, quarrying, and oil and gas extraction										=SUMPRODUCT(\$E\$9:\$L\$9;E11:L11)	=SUMPRODUCT(\$E\$9:\$L\$9;E11:L11))*\$N\$9*D11	=N11/\$O\$9	=O11*(1+\$P\$9)
Utilities										0.0	0.0	0	0
Construction										0.0	0.0	0	0
Manufacturing										0.0	0.0	0	0
Wholesale trade & Retail trade										0.0	0.0	0	0
Transportation and warehousing										0.0	0.0	0	0
Finance and insurance & Real estate and rental and leasing services										0.0	0.0	0	0
Professional, scientific, and technical services										0.0	0.0	0	0
Management of companies and enterprises & Administrative and support services, waste management and remediation services										0.0	0.0	0	0
Educational services										0.0	0.0	0	0
Health care and social assistance										0.0	0.0	0	0
Arts, entertainment, and recreation & Information and cultural industries										0.0	0.0	0	0
Accommodation and food services										0.0	0.0	0	0
Other services (excluding public administration)										0.0	0.0	0	0
Public administration										0.0	0.0	0	0
Households & Consumer Goods										0.0	0.0	0	0
Visitor Demand										0.0	0.0	0	0
Total		=SUM(D11:D27)								=SUM(N11:N27)	=N28/\$O\$9	=O28*(1+\$P\$9)	

A6	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Input Base Stations Parameters												
2	Base Stations Parameters												
3													
4													
5													
6	BASE STATIONS PARAMETERS												
7													
8	Sites	Cost per site	Calculated Throughput (Mbps)	Throughput Calculation					SNR Calculation				
9				Bandwidth (MHz)	Sectors	MIMO Layers	Overhead η	SNR	Signal Power (dBm)	Noise Power (dBm)	Interference margin (dB)	Transmit power (dBm)	Ant
10	Standalone 5G Site - 3 Sectors - Auto	175 000 €	=G10*F10*H10*LOG(1+J10;2)*\$I10	100	3	8	0.75	=10^((K10-L10-\$M10)/10)	=N10+O10-P10-Q10	-87	8	43	
11	Standalone 5G Site - 3 Sectors	175 000 €	1578.86	100	3	8	0.75	0.84	-79.77	-87	8	43	
12	Standalone 5G Site - 2 Sectors - Auto	145 000 €	1052.57	100	2	8	0.75	0.84	-79.77	-87	8	43	
13	Standalone 5G Site - 2 Sectors	145 000 €	1052.57	100	2	8	0.75	0.84	-79.77	-87	8	43	
14	Standalone 5G Site - 1 Sector - Auto	100 000 €	526.29	100	1	8	0.75	0.84	-79.77	-87	8	43	
15	Standalone 5G Site - 1 Sector	100 000 €	526.29	100	1	8	0.75	0.84	-79.77	-87	8	43	
16	Standalone 4G Site - 3 Sectors - Auto	95 000 €	254.56	20	3	4	0.75	1.67	-83.79	-94	8	40	
17	Standalone 4G Site - 3 Sectors	95 000 €	254.56	20	3	4	0.75	1.67	-83.79	-94	8	40	
18	Standalone 4G Site - 2 Sectors - Auto	80 000 €	169.71	20	2	4	0.75	1.67	-83.79	-94	8	40	
19	Standalone 4G Site - 2 Sectors	80 000 €	169.71	20	2	4	0.75	1.67	-83.79	-94	8	40	
20	Standalone 4G Site - 1 Sector - Auto	60 000 €	84.85	20	1	4	0.75	1.67	-83.79	-94	8	40	
21	Standalone 4G Site - 1 Sector	60 000 €	84.85	20	1	4	0.75	1.67	-83.79	-94	8	40	
22													
23													
24													
25													
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A6	K	L	M	N	O	P	Q	R	S	T	U
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7											
8	SNR Calculation			Signal Power Calculation					Path Loss Calculation		
9	Signal Power (dBm)	Noise Power (dBm)	Interference margin (dB)	Transmit power (dBm)	Antenna Gains (dBi)	Path Loss (dB)		Other Losses (dB)	Carrier frequency (GHz)	Base station height (m)	Distance between antennas (m)
10	=N10+O10-P10-Q10	-87	8	43	24	=MAX(13.54+39.08*LOG10(T10)+20*LOG10(R10)-0.6*(S10-1.5);28+22*LOG10(T10)+20*LOG10(R10))		23	3.5	25	800
11	-79.77	-87	8	43	24	123.77		23	3.5	25	800
12	-79.77	-87	8	43	24	123.77		23	3.5	25	800
13	-79.77	-87	8	43	24	123.77		23	3.5	25	800
14	-79.77	-87	8	43	24	123.77		23	3.5	25	800
15	-79.77	-87	8	43	24	123.77		23	3.5	25	800
16	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
17	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
18	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
19	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
20	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
21	-83.79	-94	8	40	18	118.79		23	1.8	30	1000
22											
23											
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A6	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Input Sites per Region																				
2	Sites per Region																				#NUM!
3																					
4																					
5																					
6	SITES PER REGION																				
7																					
8	Sites	Central Coast	Cessnock	Dungog	Lake Macquarie	Maitland	Muswellbrook	Newcastle	Port Stephens	Singleton	UpperHunter										
9	Standalone 5G Site - 3 Sectors - Auto	317	43		12	163	104	19	162	27	32	40									
10	Standalone 5G Site - 3 Sectors	317	43		12	163	104	19	162	27	32	40									
11	Standalone 5G Site - 2 Sectors - Auto	316	44		15	91	82	30	154	45	26	26									
12	Standalone 5G Site - 2 Sectors	316	44		15	91	82	30	154	45	26	26									
13	Standalone 5G Site - 1 Sector - Auto	351	31		12	68	76	29	66	39	33	35									
14	Standalone 5G Site - 1 Sector	351	31		12	68	76	29	66	39	33	35									
15	Standalone 4G Site - 3 Sectors - Auto	341	45		9	196	114	32	109	38	43	36									
16	Standalone 4G Site - 3 Sectors	341	45		9	196	114	32	109	38	43	36									
17	Standalone 4G Site - 2 Sectors - Auto	311	30		5	186	92	31	154	33	27	35									
18	Standalone 4G Site - 2 Sectors	311	30		5	186	92	31	154	33	27	35									
19	Standalone 4G Site - 1 Sector - Auto	328	48		10	99	103	20	128	39	44	40									
20	Standalone 4G Site - 1 Sector	328	48		10	99	103	20	128	39	44	40									
21																					
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40																					
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43																					

1	Input Throughput													1				
2	Throughput													2				
3														3				
4	TROUGHPUT																	
5																		
6	2023																	
7	Central Coast																	
8	Verticals/ Sectors	Devices		Throughput [Mbps]							Average Throughput per Device [Mbps]		Peak Concurrent Devices Traffic (Busy Hours) [Mbps]	Busy Hour/Contention Ratio [Mbps]	+ Headroom Extra Capacity			
9		0.5		1	2	5	10	50	100	1000	0.2		60	20%				
10	2025																	
11	Central Coast																	
12	Verticals/ Sectors	Devices		Throughput [Mbps]							0.5		0.5					
13		32 046		30%	30%	25%	5%	5%	2%	2%	30%		30%					
14	Agriculture, forestry, fishing, and hunting, mining, quarrying, and oil and gas extraction	23 815	30%	30%	25%	5%	5%	2%	2%	1.0%	14.7	70 017	1 167	1 400				
15	Utilities	18 319	30%	30%	20%	5%	10%	2%	2%	1.0%	15.1	55 325	922	1 106				
16	Construction	210 673	5%	15%	15%	25%	22%	10%	5%	3.0%	43.9	1 850 764	30 846	37 015				
17	Manufacturing	108 085	20%	25%	30%	15%	5%	2%	2%	1.0%	15.2	328 577	5 476	6 572				
18	Wholesale trade & Retail trade	227 161	5%	15%	20%	24%	15%	15%	5%	1.0%	25.8	1 171 013	19 517	23 420				
19	Transportation and warehousing	67 782	12%	10%	10%	20%	30%	10%	5%	3.0%	44.4	601 360	10 023	12 027				
20	Finance and insurance & Real estate and rental and leasing services	89 765	5%	20%	30%	15%	14%	10%	5%	1.0%	23.0	412 471	6 875	8 249				
21	Professional, scientific, and technical services	109 916	5%	10%	10%	15%	25%	16%	15%	4.0%	66.6	1 463 538	24 392	29 271				
22	Management of companies and enterprises & Administrative and support services, waste management and remediation services	60 454	30%	25%	25%	10%	5%	2%	2%	1.0%	14.9	180 153	3 003	3 603				
23	Educational services	150 219	10%	12%	12%	10%	18%	20%	15%	3.0%	57.7	1 733 829	28 897	34 677				
24	Health care and social assistance	326 085	10%	15%	20%	18%	15%	10%	10%	2.0%	38.0	2 478 250	41 304	49 565				
25	Arts, entertainment, and recreation & Information and cultural industries	54 958	25%	20%	17%	15%	10%	10%	2%	1.0%	19.4	213 403	3 557	4 268				
26	Accommodation and food services	128 236	30%	27%	20%	5%	10%	5%	2%	1.0%	16.6	424 974	7 083	8 499				
27	Other services (excluding public administration)	69 614	10%	14%	15%	20%	25%	10%	5%	1.0%	24.0	334 007	5 567	6 680				
28	Public administration	111 748	10%	15%	20%	22%	20%	10%	2%	1.0%	20.7	462 638	7 711	9 253				
29	Households & Consumer Goods	1 448 001	5%	5%	10%	10%	15%	20%	25%	10.0%	137.3	39 754 872	662 581	795 097				
30	Visitor Demand	60 135	5%	13%	20%	25%	20%	10%	5%	2.0%	33.8	406 574	6 776	8 131				
31	Total	3 264 968									51 941 763	865 696.06	1 038 835.27					
32											15.90881418	0.265146903	0.318176284					
33	2025 <th data-kind="ghost"></th>																	
34	Cessnock																	
35	Verticals/ Sectors	Devices		Throughput [Mbps]							Average Throughput per Device [Mbps]		Peak Concurrent Devices Traffic (Busy Hours) [Mbps]	Busy Hour/Contention Ratio [Mbps]	+ Headroom Extra Capacity			
36		0.5		1	2	5	10	50	100	1000	0.2		60	20%				
37	2023																	
38	Cessnock																	
39	Verticals/ Sectors	Devices		Throughput [Mbps]							Average Throughput per Device [Mbps]		Peak Concurrent Devices Traffic (Busy Hours) [Mbps]	Busy Hour/Contention Ratio [Mbps]	+ Headroom Extra Capacity			
40		0.5		1	2	5	10	50	100	1000	0.2		60	20%				
41	Agriculture, forestry, fishing, and hunting, mining, quarrying, and oil and gas extraction	34 536	30%	30%	25%	5%	5%	2%	2%	1.0%	14.7	101 535	1 692	2 031				
42	Utilities	4 490	30%	30%	20%	5%	10%	2%	2%	1.0%	15.1	13 559	226	271				
43	Construction	31 773	5%	15%	15%	25%	22%	10%	5%	3.0%	43.9	279 124	4 652	5 582				
44	Manufacturing	25 902	20%	25%	30%	15%	5%	2%	2%	1.0%	15.2	78 741	1 312	1 575				
45	Wholesale trade & Retail trade	41 788	5%	15%	20%	24%	15%	15%	5%	1.0%	25.8	215 418	3 590	4 308				
46	Transportation and warehousing	14 160	12%	10%	10%	20%	30%	10%	5%	3.0%	44.4	125 624	2 094	2 512				
47	Total	46 471	30%	30%	25%	5%	5%	2%	2%	1.0%	14.7	1 038 835.27	0.318176284					

1 Input | Output Formulas

2 Output Formulas

6 OUTPUT FORMULAS

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Central

Sites	Percentages	Total per Percentage		Units	Capacity Per Site	
		Active Users	Throughput (Mbps)		Active Users	
Standalone 5G Site - 3 Sectors - Auto	15.0%	=ROUNDDOWN(LET(data;INDIRECT("Troughput'!\$B:\$ZZ");yearRow;INDEX(data;8:);colSite;INDEX(data;;1);colC;INDEX(data;;2);startCol;MATCH(C\$8;yearRow;0);rowRegion;MATCH(C\$9;colC;0);VLOOKUP("Total";DROP(data;rowRegion;startCol-2);3;0)*D13;0))	=LET(data;INDIRECT("Troughput'!\$B:\$ZZ");yearRow;INDEX(data;8:);colSite;INDEX(data;;1);colC;INDEX(data;;2);colData;INDEX(data;;15);startCol;MATCH(C\$8;yearRow;0);rowRegion;MATCH(C\$9;colC;0);VLOOKUP("Total";DROP(data;rowRegion;startCol-2);15;0)*D13)	=INDEX('Sites per Region'!\$A:\$Z;MATCH(B13;'Sites per Region'!\$B:\$B;0);MATCH(C\$9;'Sites per Region'!\$8:\$8;0))	=LET(data;'Base Stations Profiles'!\$B:\$E;colSite;INDEX(data;;1);colData;INDEX(data;;2);rowRegion;MATCH(B13;colSite;0);rowUser;MATCH("Maximum Simultaneously Active Users per Site";DROP(colSite;rowRegion;0);INDEX(colData;rowRegion+rowUser)))	=0
Standalone 5G Site - 3 Sectors	15.0%	489745	155825.29	317		2500
Standalone 5G Site - 2 Sectors - Auto	15.0%	489745	155825.29	316		1500
Standalone 5G Site - 2 Sectors	15.0%	489745	155825.29	316		1500
Standalone 5G Site - 1 Sector - Auto	7.5%	244872	77912.64	351		750
Standalone 5G Site - 1 Sector	7.5%	244872	77912.64	351		750
Standalone 4G Site - 3 Sectors - Auto	5.0%	163248	51941.76	341		1500
Standalone 4G Site - 3 Sectors	5.0%	163248	51941.76	341		1500
Standalone 4G Site - 2 Sectors - Auto	5.0%	163248	51941.76	311		800
Standalone 4G Site - 2 Sectors	5.0%	163248	51941.76	311		800
Standalone 4G Site - 1 Sector - Auto	2.5%	81624	25970.88	328		400
Standalone 4G Site - 1 Sector	2.5%	81624	25970.88	328		400
Total	100.0%	2775219	883009.98			

A6		X	✓	fx					
1	H	I	J	K	L	M	N	O	U
2									
3									
5									
6									
7									
8									
9									
10									
11	Capacity Per Site			Saturation		Cost			
12	Active Users		Throughput (Mbps)	Active Users	Throughput (Mbps)	One Site Cost (€)	Sites to Cover	Cost to Cover (€)	
	<pre>=LET(data;'Base Stations Profiles'!\$B:\$E; colSite;INDEX(data;1); colData;INDEX(data;;2); rowRegion;MATCH(B13;colSite;0); rowUser;MATCH("Maximum Simultaneously Active Users per Site";DROP(colSite;rowRegion);0); INDEX(colData;rowRegion+rowUser))</pre>								
13									
14	2 500	17 000.00	62%	3%	175 000 €	0	-	€	
15	1 500	1 052.57	103%	47%	145 000 €	11	1595 000 €		
16	1 500	12 000.00	103%	4%	145 000 €	11	1595 000 €		
17	750	526.29	93%	42%	100 000 €	0	-	€	
18	750	5 000.00	93%	4%	100 000 €	0	-	€	
19	1 500	254.56	32%	60%	95 000 €	0	-	€	
20	1 500	2 000.00	32%	8%	95 000 €	0	-	€	
21	800	169.71	66%	99%	80 000 €	0	-	€	
22	800	1 200.00	66%	14%	80 000 €	0	-	€	
23	400	84.85	62%	93%	60 000 €	0	-	€	
24	400	300.00	62%	26%	60 000 €	0	-	€	
25						22	3 190 000 €		
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A B C D E F G H I J K L M N O P Q R S T U

		Model Output															
5	6													7	8		
7	8	2023												9	10		
8	9	Central Coast												Central Coast			
9	10	Sites	Percentages	Total per Percentage		Units	Capacity Per Site		Saturation		Cost			Sites	Percentages	Total per Percentage	
10	11			Active Users	Throughput (Mbps)		Active Users	Throughput (Mbps)	Active Users	Throughput (Mbps)	One Site Cost (€)	Sites to Cover	Cost to Cover (€)			Active Users	Throughput (Mbps)
11	12	Standalone 5G Site - 3 Sectors - Auto	15.0%	489 745	155 825.29	317	2 500	17 000.00	62%	3%	175 000	1	- 1	Standalone 5G Site - 3 Sectors - Auto	15.0%	588 341	171825.81
12	13	Standalone 5G Site - 3 Sectors	15.0%	489 745	155 825.29	317	2 500	17 000.00	62%	3%	145 000	1	- 1	Standalone 5G Site - 3 Sectors	15.0%	588 341	171825.81
13	14	Standalone 5G Site - 2 Sectors - Auto	15.0%	489 745	155 825.29	316	1 500	12 000.00	103%	4%	145 000	11	1595 000	Standalone 5G Site - 2 Sectors - Auto	15.0%	588 341	171825.81
14	15	Standalone 5G Site - 2 Sectors	15.0%	489 745	155 825.29	316	1 500	12 000.00	103%	4%	100 000	11	1100 000	Standalone 5G Site - 2 Sectors	15.0%	588 341	171825.81
15	16	Standalone 5G Site - 1 Sector - Auto	7.5%	244 872	77 912.64	351	750	5 000.00	93%	4%	100 000	0	- 1	Standalone 5G Site - 1 Sector - Auto	7.5%	294 170	85 912.91
16	17	Standalone 5G Site - 1 Sector	7.5%	244 872	77 912.64	351	750	5 000.00	93%	4%	95 000	0	- 1	Standalone 5G Site - 1 Sector	7.5%	294 170	85 912.91
17	18	Standalone 4G Site - 3 Sectors - Auto	5.0%	163 248	51 941.76	341	1 500	2 000.00	32%	8%	95 000	0	- 1	Standalone 4G Site - 3 Sectors - Auto	5.0%	196 113	57 275.27
18	19	Standalone 4G Site - 3 Sectors	5.0%	163 248	51 941.76	341	1 500	2 000.00	32%	8%	80 000	0	- 1	Standalone 4G Site - 3 Sectors	5.0%	196 113	57 275.27
19	20	Standalone 4G Site - 2 Sectors - Auto	5.0%	163 248	51 941.76	311	800	1 200.00	66%	14%	80 000	0	- 1	Standalone 4G Site - 2 Sectors - Auto	5.0%	196 113	57 275.27
20	21	Standalone 4G Site - 2 Sectors	5.0%	163 248	51 941.76	311	800	1 200.00	66%	14%	60 000	0	- 1	Standalone 4G Site - 2 Sectors	5.0%	196 113	57 275.27
21	22	Standalone 4G Site - 1 Sector - Auto	2.5%	81624	25 970.88	328	400	300.00	62%	26%	60 000	0	- 1	Standalone 4G Site - 1 Sector - Auto	2.5%	98 056	28 637.64
22	23	Standalone 4G Site - 1 Sector	2.5%	81624	25 970.88	328	400	300.00	62%	26%	- 1	0	- 1	Standalone 4G Site - 1 Sector	2.5%	98 056	28 637.64
23	24	Total	100.0%	3 264 964	1038 835.27						22	2 685 000		Total	100.0%	3 922 268	1145 505.40
24	25	2023												2025			
25	26	Cessnock												Cessnock			
26	27	Sites	Percentages	Total per Percentage		Units	Capacity Per Site		Saturation		Cost			Sites	Percentages	Total per Percentage	
27	28			Active Users	Throughput (Mbps)		Active Users	Throughput (Mbps)	Active Users	Throughput (Mbps)	One Site Cost (€)	Sites to Cover	Cost to Cover (€)			Active Users	Throughput (Mbps)
28	29	Standalone 5G Site - 3 Sectors - Auto	15.0%	92 319	28 602.43	43	2 500	17 000.00	86%	4%	175 000	0	- 1	Standalone 5G Site - 3 Sectors - Auto	15.0%	110 880	31348.13
29	30	Standalone 5G Site - 3 Sectors	15.0%	92 319	28 602.43	43	2 500	17 000.00	86%	4%	145 000	0	- 1	Standalone 5G Site - 3 Sectors	15.0%	110 880	31348.13
30	31	Standalone 5G Site - 2 Sectors - Auto	15.0%	92 319	28 602.43	44	1 500	12 000.00	140%	5%	145 000	18	2 610 000	Standalone 5G Site - 2 Sectors - Auto	15.0%	110 880	31348.13
31	32	Standalone 5G Site - 2 Sectors	15.0%	92 319	28 602.43	44	1 500	12 000.00	140%	5%	100 000	18	1 800 000	Standalone 5G Site - 2 Sectors	15.0%	110 880	31348.13
32	33	Standalone 5G Site - 1 Sector - Auto	7.5%	46 159	14 301.21	31	750	5 000.00	199%	9%	100 000	31	3 100 000	Standalone 5G Site - 1 Sector - Auto	7.5%	55 440	15 674.07
33	34	Standalone 5G Site - 1 Sector	7.5%	46 159	14 301.21	31	750	5 000.00	199%	9%	95 000	31	2 945 000	Standalone 5G Site - 1 Sector	7.5%	55 440	15 674.07
34	35	Standalone 4G Site - 3 Sectors - Auto	5.0%	30 773	9 534.14	45	1 500	2 000.00	46%	11%	95 000	0	- 1	Standalone 4G Site - 3 Sectors - Auto	5.0%	36 960	10 449.38
35	36	Standalone 4G Site - 3 Sectors	5.0%	30 773	9 534.14	45	1 500	2 000.00	46%	11%	80 000	0	- 1	Standalone 4G Site - 3 Sectors	5.0%	36 960	10 449.38
36	37	Standalone 4G Site - 2 Sectors - Auto	5.0%	30 773	9 534.14	30	800	1 200.00	130%	27%	80 000	9	720 000	Standalone 4G Site - 2 Sectors - Auto	5.0%	36 960	10 449.38
37	38	Standalone 4G Site - 2 Sectors	5.0%	30 773	9 534.14	30	800	1 200.00	130%	27%	60 000	9	540 000	Standalone 4G Site - 2 Sectors	5.0%	36 960	10 449.38
38	39	Standalone 4G Site - 1 Sector - Auto	2.5%	15 386	4 767.07	48	400	300.00	80%	33%	60 000	0	- 1	Standalone 4G Site - 1 Sector - Auto	2.5%	18 480	5 224.69
39	40	Standalone 4G Site - 1 Sector	2.5%	15 386	4 767.07	48	400	300.00	80%	33%	- 1	0	- 1	Standalone 4G Site - 1 Sector	2.5%	18 480	5 224.69
40	41	Total	100.0%	615 458	190 682.83						116	11 715 000		Total	100.0%	739 200	208 987.56
41	42	2023												2025			
42	43	Dungog												Dungog			
43	44	Sites	Percentages	Total per Percentage		Units	Capacity Per Site		Saturation		Cost			Sites	Percentages	Total per Percentage	
44	45			Active Users	Throughput (Mbps)		Active Users	Throughput (Mbps)	Active Users	Throughput (Mbps)	One Site Cost (€)	Sites to Cover	Cost to Cover (€)			Active Users	Throughput (Mbps)
45	46	Standalone 5G Site - 3 Sectors - Auto	15.0%	13 722	4 299.07	12	2 500	17 000.00	46%	2%	175 000	0	- 1	Standalone 5G Site - 3 Sectors - Auto	15.0%	16 472	4 728.18
46	47	Standalone 5G Site - 3 Sectors	15.0%	13 722	4 299.07	12	2 500	17 000.00	46%	2%	145 000	0	- 1	Standalone 5G Site - 3 Sectors	15.0%	16 472	4 728.18
47	48	Standalone 5G Site - 2 Sectors - Auto	15.0%	13 722	4 299.07	15	1 500	12 000.00	61%	2%	145 000	0	- 1	Standalone 5G Site - 2 Sectors - Auto	15.0%	16 472	4 728.18
48	49	Standalone 5G Site - 2 Sectors	15.0%	13 722	4 299.07	15	1 500	12 000.00	61%	2%	100 000	0	- 1	Standalone 5G Site - 2 Sectors	15.0%	16 472	4 728.18
49	50	Standalone 5G Site - 1 Sector - Auto	7.5%	6 861	2 149.54	12	750	5 000.00	76%	4%	100 000	0	- 1	Standalone 5G Site - 1 Sector - Auto	7.5%	8 236	2 364.09
50																	