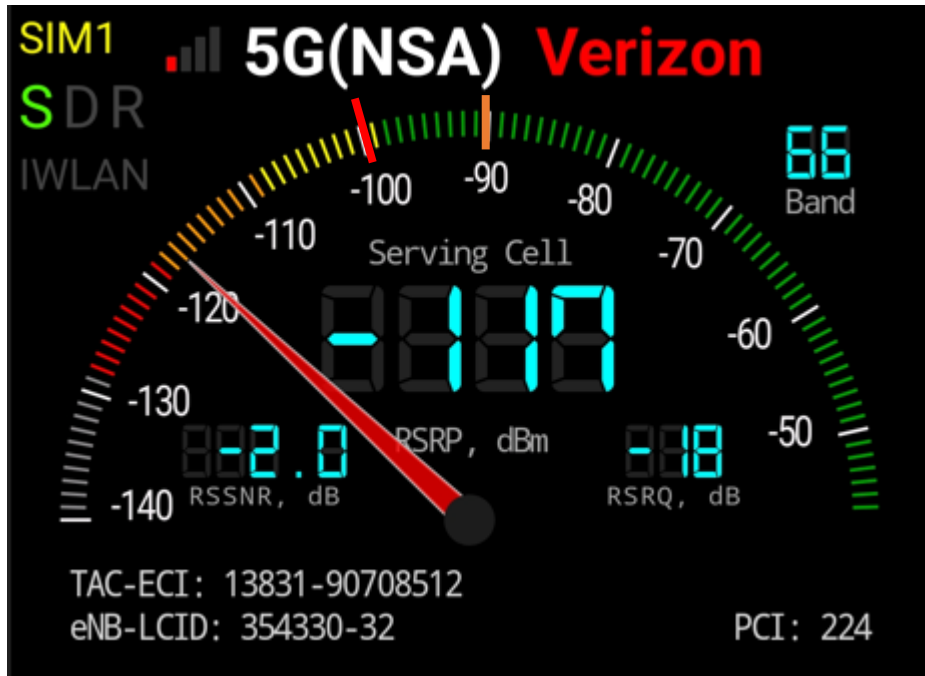




Cellular Signal DAS Installation Class A Office San Diego, CA



Understanding Cellular Signal - RSRP



- RSRP = Received Signal Strength
- Manufacturer “- 100 DBm make, receive and hold calls
- OCNS RSRP target is – 90 DBm or better = no customer complaints
- Above – 100 DBm = Unusable Signal cannot make, receive or hold calls

OCNS goal post-installation = Achieve – 90 DBm RSRP signal strength for customer to be able to: Make, Receive and Hold Calls

Existing Cellular Signal – Donor Signal

This chart defines what values are considered good/bad for some LTE parameters:

		RSSI (dBm)	RSRP (dBm)
RF Conditions	Technology	LTE & 3G	LTE Only
	Excellent	> -65	> -84
	Good	-65 to -75	-85 to -102
	Fair	-75 to -85	-103 to -111
	Poor	< -85	< -111

Cel-Fi COMPASS Full Signal Report		
7/25/2023		
12:41:09 PM		
WAVE PRO: 1.6.6		
COMPASS: 700N036-064-004		
	AT&T (4G)	
PCI	460	261
Band	2	4
Bandwidth (MHz)	undefined	undefined
PLMN ID	310410	310410
EARFCN	700	2200
DL Center Freq. (MHz)	1940	2135
UL Center Freq. (MHz)	1860	1735
RSSI (dBm)	-77	-80
RSRP (dBm)	-119	-127
RSRQ (dB)	-19	-19
eNodeB	314465	313263
Cell ID	11	22

	T-Mobile (4G)	
PCI	398	205
Band	4	2
Bandwidth (MHz)	undefined	undefined
PLMN ID	310260	310260
EARFCN	2050	875
DL Center Freq. (MHz)	2120	1957.5
UL Center Freq. (MHz)	1720	1877.5
RSSI (dBm)	-77	-85
RSRP (dBm)	-120	-117
RSRQ (dB)	-19	-13
eNodeB	88040	87362
Cell ID	1	13

	Verizon (4G)			
PCI	52	52	245	52
Band	2	13	4	5
Bandwidth (MHz)	undefined	undefined	undefined	undefined
PLMN ID	311480	311480	311480	311480
EARFCN	1000	5255	2325	2560
DL Center Freq. (MHz)	1970	753.5	2147.5	885
UL Center Freq. (MHz)	1890	784.5	1747.5	840
RSSI (dBm)	-78	-78	-80	-82
RSRP (dBm)	-110	-114	-116	-110
RSRQ (dB)	-15	-19	-17	-11
eNodeB	354023	54023	54851	54023
Cell ID	24	2	32	29



Off-Air Donor Signal Antennas



Donor Signal Antennas – Carrier Labeled



Donor Signal Antennas – Carrier Labeled at Booster location MPOE 2nd Floor



Before After Signal Comparisons – ATT

Before Install

Cel-Fi COMPASS Full Signal Report		
7/25/2023		
12:41:09 PM		
WAVE PRO: 1.6.6		
COMPASS: 700N036-064-004		
AT&T (4G)		
PCI	460	261
Band	2	4
Bandwidth (MHz)	undefined	undefined
PLMN ID	310410	310410
EARFCN	700	2200
DL Center Freq. (MHz)	1940	2135
UL Center Freq. (MHz)	1860	1735
RSSI (dBm)	-77	-80
RSRP (dBm)	-119	-127
RSRQ (dB)	-19	-19
eNodeB	314465	313263
Cell ID	11	22

Unusable AT&T Signal

Post Install

Cel-Fi COMPASS Full Signal Report			
7/25/2023			
12:46:17 PM			
WAVE PRO: 1.6.6			
COMPASS: 700N036-064-004			
AT&T (4G)			
PCI	110	261	326
Band	12	4	14
Bandwidth (MHz)	undefined	undefined	undefined
PLMN ID	310410	310410	310410
EARFCN	5110	2200	5330
DL Center Freq. (MHz)	739	2135	763
UL Center Freq. (MHz)	709	1735	793
RSSI (dBm)	-47	-70	-77
RSRP (dBm)	-84	-116	-114
RSRQ (dB)	-19	-19	-19
eNodeB	310465	313263	311633
Cell ID	15	22	176

Show improvement from best old signal to new best signal

- ✓ 35 DB Signal Improvement for AT&T
- ✓ New AT&T Tower # 110 with – 84 RSRP
- ✓ 11 DB improvement on Tower 261



Before After Signal Comparisons - T-Mobile

Before Install

	T-Mobile (4G)	
PCI	398	205
Band	4	2
Bandwidth (MHz)	undefined	undefined
PLMN ID	310260	310260
EARFCN	2050	875
DL Center Freq. (MHz)	2120	1957.5
UL Center Freq. (MHz)	1720	1877.5
RSSI (dBm)	-77	-85
RSRP (dBm)	-120	-117
RSRQ (dB)	-19	-13
eNodeB	88040	87362
Cell ID	1	13

Unusable T-Mobile Signal

Post Install

	T-Mobile (4G)		
PCI	398	313	57
Band	4	12	2
Bandwidth (MHz)	undefined	undefined	undefined
PLMN ID	310260	310260	310260
EARFCN	2050	5035	875
DL Center Freq. (MHz)	2120	731.5	1957.5
UL Center Freq. (MHz)	1720	701.5	1877.5
RSSI (dBm)	-43	-76	-77
RSRP (dBm)	-79	-112	-118
RSRQ (dB)	-16	-19	-19
eNodeB	88040	884263	90755
Cell ID	1	22	12

Show improvement from best old signal to new best signal

- ✓ 38 DB Signal Improvement for T-Mobile
- ✓ Two New T-Mobile Towers with improved signal strength
- ✓ 41 DB improvement on Tower 398

Before After Signal Comparisons - Verizon

Before Install

	Verizon (4G)			
PCI	52	52	245	52
Band	2	13	4	5
Bandwidth (MHz)	undefined	undefined	undefined	undefined
PLMN ID	311480	311480	311480	311480
EARFCN	1000	5255	2325	2560
DL Center Freq. (MHz)	1970	753.5	2147.5	885
UL Center Freq. (MHz)	1890	784.5	1747.5	840
RSSI (dBm)	-78	-78	-80	-82
RSRP (dBm)	-110	-114	-116	-110
RSRQ (dB)	-15	-19	-17	-11
eNodeB	354023	54023	54851	54023
Cell ID	24	2	32	29

Unusable Verizon Signal

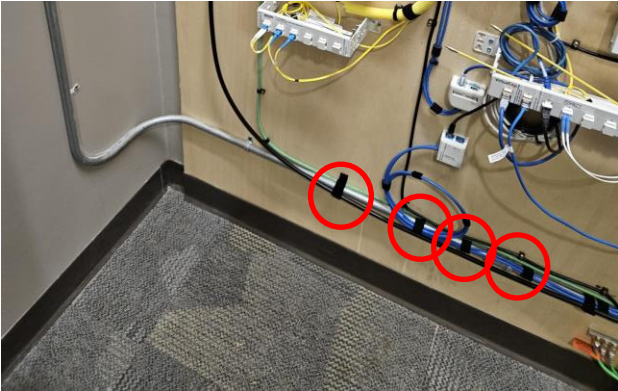
Post Install

	Verizon (4G)			
PCI	224	224	52	52
Band	4	2	13	5
Bandwidth (MHz)	undefined	undefined	undefined	undefined
PLMN ID	311480	311480	311480	311480
EARFCN	2325	1000	5255	2560
DL Center Freq. (MHz)	2147.5	1970	753.5	885
UL Center Freq. (MHz)	1747.5	1890	784.5	840
RSSI (dBm)	-55	-60	-78	-80
RSRP (dBm)	-89	-87	-113	-106
RSRQ (dB)	-15	-10	-19	-9
eNodeB	354330	354330	54023	54023
Cell ID	32	34	2	29

Show improvement from best old signal to new best signal

- ✓ 23 DB Signal Improvement for Verizon
- ✓ New Verizon Tower # 224 with – 87 RSRP
- ✓ 11 DB improvement on Tower 261

Cable Management



OCNS Cleanup Existing Debris MPOE 2nd Floor

