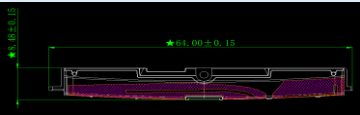


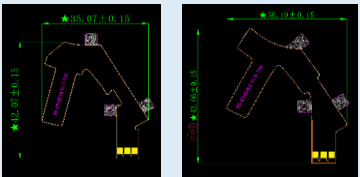
Antenna manufacturer Kun Shan Innowave Communication Technology Co.,L

Antenna design

Main antenna:



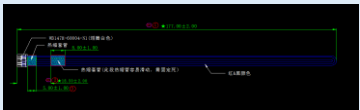
Diversity antenna:



Three in one antenna:



NFC antenna:



Ref.	Antenna size
Main antenna(LDS)	64*8.48mm
GPS/BT/WIFI antenna	35.77*11.94mm
Scan code version Diversity antenna	35.07*42.07mm
non - scan code version Diversity antenna	36.19*43.66mm
NFC	71.26*57.4mm

Form of antenna:

Main antenna: LDS (Loop cabling)

Diversity antenna: FPC (Monopole cabling)

Three in one antenna: FPC+cable (Monopole cabling)

NFC antenna: Winding of wire (Loop cabling)

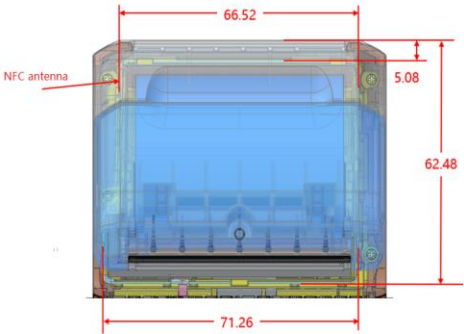
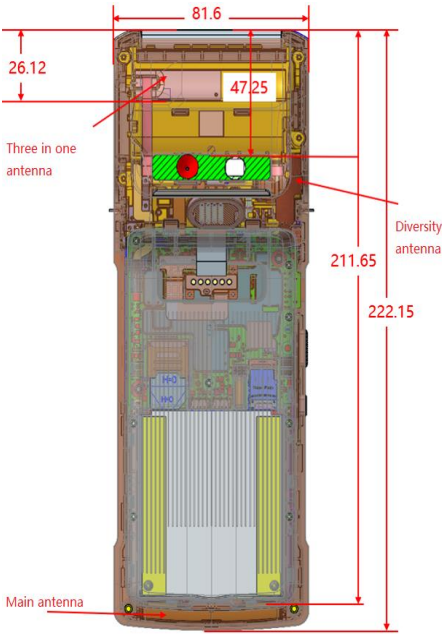
Impedance of antenna:

Main antenna: 50Ω

Diversity antenna: 50Ω

Three in one antenna: 50Ω

NFC antenna: 20Ω



Frequency range

and gain:

Main antenna

Freq[MHz]	G850 824-849	G900 880-915	G1800 1710-1785	G1900 1850-1910												
AVG Gain[dB]	-9.3	-7.5	1.6	-0.2												
Peak Gain[dB]	-3.2	-2.7	3.7	-0.7												
Freq[MHz]	W1 1920-1980	W2 1850-1910	W4 1710-1755	W5 824-849	W8 880-915											
AVG Gain[dB]	-4.6	-0.2	2.1	-9.3	-7.5											
Peak Gain[dB]	1.1	-0.7	3.6	-3.2	-2.7											
Freq[MHz]	B1 1920-1980	B2 1850-1910	B3 1710-1785	B4 1710-1755	B5 824-849	B7 2500-2570	B12 699-716	B17 704-716	B19 830-845	B25 1850-1915	B26 814-849	B28 703-748	B38 2570-2620	B41 2496-2690	B66 1710-1780	
AVG Gain[dB]	-4.6	-0.2	1.6	2.1	-9.3	-2.8	-9.5	-9.5	-9.3	-0.2	-9.3	-9.5	-2.9	-3.1	2.1	
Peak Gain[dB]	1.1	-0.7	3.7	3.6	-3.2	2.0	-2.7	-2.7	-3.2	-0.7	-3.2	-2.7	1.4	2.2	3.6	

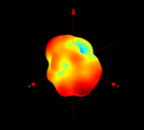
Frequency[MHz]	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency[MHz]	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency[MHz]	Efficiency(%)	Efficiency (dB)	Gain (dBi)
700	11.8	-9.3	-2.7	1710	35.2	-4.5	2.1	2190	35.2	-4.5	0.7
710	11.1	-9.6	-2.8	1730	33.9	-4.7	3.6	2210	36.7	-4.4	0.7
720	11.1	-9.5	-2.7	1750	33.8	-4.7	1.6	2230	38.7	-4.1	0.5
730	11.1	-9.5	-3.5	1770	33.7	-4.7	3.7	2250	36.4	-4.4	-0.3
740	10.9	-9.7	-3.2	1790	34.6	-4.6	-0.1	2270	36.1	-4.4	0.0
750	10.9	-9.6	-3.2	1810	34.5	-4.6	-0.7	2290	33.9	-4.7	-0.2
760	10.2	-9.9	-2.6	1830	33.4	-4.8	-1.1	2310	38.0	-4.2	0.3
770	9.6	-10.2	-3.0	1850	33.5	-4.8	-0.9	2330	42.9	-3.7	1.1
780	8.5	-10.7	-3.4	1870	33.0	-4.8	-0.7	2350	45.0	-3.5	1.0
790	9.2	-10.4	-3.2	1890	34.3	-4.7	-0.8	2370	47.5	-3.2	1.9
800	9.8	-10.1	-3.1	1910	34.0	-4.7	0.9	2390	47.4	-3.2	2.2
810	10.3	-9.9	-3.5	1930	34.3	-4.7	0.2	2410	48.2	-3.2	2.2
820	10.8	-9.7	-3.4	1950	34.7	-4.6	1.1	2430	51.3	-2.9	2.4
830	11.7	-9.3	-3.3	1970	30.6	-5.2	0.3	2450	49.1	-3.1	2.4
840	11.8	-9.3	-3.2	1990	28.7	-5.4	-0.9	2470	47.2	-3.3	2.3
850	11.9	-9.2	-3.7	2010	30.5	-5.2	-0.8	2490	45.9	-3.4	2.0
860	11.7	-9.3	-4.3	2030	35.7	-4.5	0.4	2510	49.1	-3.1	1.9
870	12.2	-9.1	-4.4	2050	39.4	-4.0	1.1	2530	52.0	-2.8	1.9
880	14.1	-8.5	-3.7	2070	45.6	-3.4	1.6	2550	56.1	-2.5	1.8
890	16.2	-7.9	-3.3	2090	45.7	-3.4	1.2	2570	53.3	-2.7	1.3
900	17.9	-7.5	-2.7	2110	50.6	-3.0	1.7	2590	52.5	-2.8	1.4
910	20.1	-7.0	-2.7	2130	49.5	-3.1	2.2	2610	51.0	-2.9	1.2
920	21.8	-6.6	-2.8	2150	41.7	-3.8	1.3	2630	49.3	-3.1	1.2
930	23.4	-6.3	-1.0	2170	36.6	-4.4	0.7	2650	42.4	-3.7	2.2
940	26.3	-5.8	-0.2					2670	42.3	-3.7	0.8
950	26.0	-5.9	0.1					2690	44.0	-3.6	1.1
960	24.5	-6.1	0.1					2700	43.8	-3.6	1.1

Scanning version diversity antenna

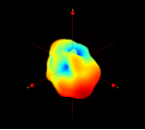
Freq[MHz]	G850 869-894	G900 925-960	G1800 1805-1880	G1900 1930-1990												
AVG Gain[dB]	-6.8	-7.2	-7.2	-3.4												
Peak Gain[dB]	-1.1	-1.7	-2.1	3.0												
Freq[MHz]	W1 2110-2170	W2 1930-1990	W4 2110-2155	W5 869-894	W8 925-960											
AVG Gain[dB]	-4.2	-3.4	-4.3	-6.8	-7.2											
Peak Gain[dB]	4.1	3.0	4.1	-1.1	-1.7											
Freq[MHz]	B1 2110-2170	B2 1930-1990	B3 1805-1880	B4 2110-2155	B5 869-894	B7 2620-2690	B12 729-746	B17 734-746	B19 875-890	B25 1930-1995	B26 859-894	B28 758-803	B38 2570-2620	B41 2496-2690	B66 2110-2180	
AVG Gain[dB]	-4.2	-3.4	-7.2	-4.3	-6.8	-5.5	-7.6	-7.6	-6.8	-3.4	-7.6	-8.4	-4.6	-7.2	-4.3	
Peak Gain[dB]	4.1	3.0	-2.1	4.1	-1.1	-0.6	-2.6	-2.6	-1.1	3.0	-1.1	-3.2	0.3	1.7	4.1	

Main antenna

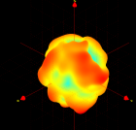
LTE1/W1(Frequency=1950MHz)



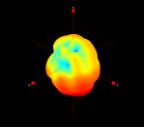
LTE2/25/W2/G1900(Frequency=1880MHz)



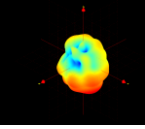
LTE38/41(Frequency=2600MHz)



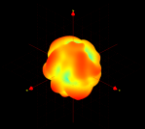
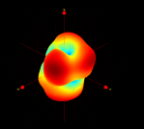
LTE3/G1800(Frequency=1750MHz)



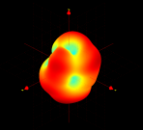
LTE4/66/W4(Frequency=1730MHz)



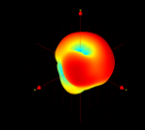
LTE5/19/26/W5/G850(Frequency=840MHz) LTE7(Frequency=2630MHz)



G900W8(Frequency=900MHz)

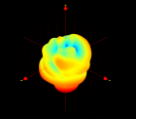


LTE 12/17/28(Frequency=710MHz)

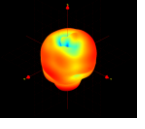


Scanning version diversity antenna

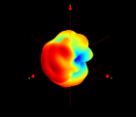
LTE1/4/66/W1/4(Frequency=2130MHz)



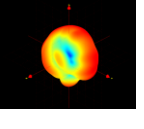
LTE2/25/G1900/W2(Frequency=1950MHz)



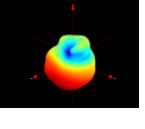
LTE38/41(Frequency=2600MHz)



LTE3/G1800(Frequency=1830MHz)



LTE5/19/26/G850/W5(Frequency=880MHz)



Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)
700	12.2	-8.0	-4.7	1770	4.9	-13.1	-8.8	2300	23.3	-6.3	0.2
710	13.5	-8.2	-4.1	1780	5.3	-12.8	-7.9	2320	25.5	-5.9	0.5
720	14.8	-8.3	-3.5	1790	6.1	-12.2	-6.6	2340	26.8	-5.7	0.7
730	16.5	-7.8	-3.0	1770	7.6	-11.2	-5.1	2360	28.0	-5.5	1.0
740	17.5	-7.6	-2.6	1790	9.7	-10.1	-2.4	2380	28.7	-5.4	0.5
750	18.4	-7.3	-2.3	1810	13.3	-8.8	2.4	2400	30.2	-5.2	0.2
760	18.0	-7.5	-3.6	1830	18.9	-7.2	-2.1	2420	33.4	-4.8	0.6
770	16.8	-7.7	-3.7	1850	27.0	-5.7	-2.6	2440	36.5	-4.4	1.3
780	14.6	-8.4	-3.2	1870	34.1	-4.7	-2.5	2460	37.0	-4.3	1.6
790	13.4	-8.7	-3.6	1890	41.0	-3.9	-2.8	2480	35.7	-4.5	1.3
800	13.0	-8.9	-3.8	1910	43.8	-3.6	1.8	2500	36.7	-4.4	1.7
810	13.8	-8.6	-3.6	1930	45.3	-3.4	2.4	2520	35.5	-4.5	1.0
820	14.8	-8.3	-3.4	1950	45.7	-3.4	3.0	2540	37.4	-4.3	0.9
830	16.4	-7.9	-3.0	1970	43.7	-3.6	2.5	2560	39.8	-4.0	0.2
840	17.2	-7.6	-3.0	1990	43.0	-3.7	2.2	2580	37.4	-4.3	0.2
850	17.6	-7.6	-3.0	2010	44.5	-3.5	4.4	2600	34.3	-4.6	0.3
860	18.5	-7.3	-1.2	2030	45.6	-3.4	5.0	2620	31.3	-5.0	-0.8
870	20.0	-7.0	-1.3	2050	45.4	-3.5	5.3	2640	28.1	-5.4	-0.6
880	20.7	-6.8	-1.1	2070	45.1	-3.5	5.0	2660	28.1	-5.5	-0.6
890	20.4	-6.9	-1.1	2090	43.5	-3.6	4.7	2680	26.5	-5.8	-1.3
900	19.2	-7.2	-1.7	2110	42.8	-3.7	3.8	2700	26.9	-5.7	-1.2
910	17.9	-7.5	-1.5	2130	37.7	-4.2	4.1				
920	17.4	-7.6	-1.9	2150	32.0	-5.0	3.3				
930	18.1	-7.4	-1.9	2170	28.1	-5.5	4.1				
940	19.2	-7.2	-1.7								
950	20.0	-7.0	-1.8								
960	20.7	-6.8	-2.0								

Non-Scanning version diversity antenna

Freq[MHz]	G850 869-894	G900 925-960	G1800 1805-1880	G1900 1930-1990											
AVG Gain[dBi]	-4.3	-7.0	-3.8	-3.4											
Peak Gain[dBi]	-7.0	-2.3	2.0	2.8											
Freq[MHz]	W1 2110-2170	W2 1930-1990	W4 2110-2155	W5 869-894	W8 925-960										
AVG Gain[dBi]	-5.3	-3.4	-5.5	-4.3	-7.0										
Peak Gain[dBi]	1.1	2.8	1.1	-7.0	-2.3										
Freq[MHz]	B1 2110-2170	B2 1930-1990	B3 1805-1880	B4 2110-2155	B5 869-894	B7 2620-2690	B12 729-746	B17 734-746	B18 875-890	B25 1930-1995	B26 859-894	B28 758-803	B38 2570-2620	B41 2496-2690	B56 2110-2180
AVG Gain[dBi]	-5.3	-3.4	-3.8	-5.5	-4.3	-5.8	-7.9	-7.9	-4.3	-3.4	-4.3	-7.5	-5.1	-4.9	-5.5
Peak Gain[dBi]	1.1	2.8	2.0	1.1	-7.0	-0.6	-3.2	-3.2	-7.0	2.8	-7.0	-3.2	-0.3	2.1	1.1

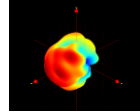
Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)
700	15.7	-8.1	-3.7	1770	5.4	-12.8	-7.9	2300	27.1	-5.9	0.5
710	15.7	-8.1	-3.7	1790	31.4	-5.0	-0.2	2320	35.9	-4.5	2.5
720	15.5	-8.1	-3.6	1750	37.3	-4.3	1.1	2340	37.8	-4.2	2.5
730	15.9	-8.0	-3.3	1770	40.6	-3.9	1.7	2360	39.4	-4.1	2.4
740	15.9	-8.0	-3.2	1790	42.1	-3.8	2.0	2380	39.8	-4.0	2.3
750	16.4	-7.8	-3.2	1810	41.9	-3.8	2.0	2400	39.6	-4.0	2.1
760	16.8	-7.7	-3.3	1830	41.8	-3.8	2.0	2420	41.6	-3.8	2.1
770	17.5	-7.6	-3.6	1850	42.4	-3.7	1.9	2440	43.5	-3.6	2.2
780	17.6	-7.5	-3.2	1870	43.1	-3.7	1.7	2460	43.6	-3.6	2.2
790	18.4	-7.3	-3.3	1890	45.6	-3.4	1.8	2480	41.4	-3.8	1.8
800	18.8	-7.3	-3.5	1910	46.6	-3.3	2.1	2500	42.1	-3.8	2.1
810	19.9	-7.0	-3.3	1930	47.2	-3.3	2.2	2520	39.7	-4.0	1.6
820	22.6	-6.5	-2.5	1950	46.2	-3.4	2.8	2540	39.3	-4.1	1.3
830	27.0	-5.7	-1.8	1970	43.1	-3.7	2.8	2560	39.4	-4.0	-1.3
840	30.6	-5.2	-1.3	1990	40.7	-3.9	2.1	2580	35.5	-4.5	-0.9
850	33.9	-4.7	-0.2	2010	40.9	-3.9	3.1	2600	30.7	-5.1	-0.3
860	34.9	-4.6	-7.6	2030	41.9	-3.8	3.7	2620	27.3	-5.6	-0.8
870	35.8	-4.5	-8.2	2050	41.3	-3.8	3.9	2640	25.4	-6.0	-0.7
880	37.0	-4.3	-8.3	2070	39.1	-4.1	3.4	2660	26.2	-5.8	-0.6
890	36.1	-4.4	-7.0	2090	27.3	-5.6	0.8	2680	27.5	-5.6	-0.8
900	32.4	-4.9	-7.4	2110	27.0	-5.7	0.4	2700	32.2	-4.9	-0.7
910	26.5	-5.8	0.1	2130	29.7	-5.3	1.1				
920	21.9	-6.6	-2.4	2150	28.0	-5.5	1.0				
930	20.0	-7.0	-2.5	2170	26.5	-5.8	0.6				
940	19.8	-7.0	-2.3								
950	20.1	-7.0	-2.7								
960	20.6	-6.9	-2.7								

Three in one antenna

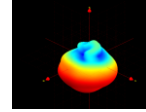
Freq[MHz]	GPS 1575	WIFI 2.4G 2400	WIFI 2.4G 2500	WIFI 5G 5200	WIFI 5G 5800	WIFI 5G 5800
AVG Gain[dBi]	-3.3	-2.3	-1.9	-2.6	-2.9	-2.4
Peak Gain[dBi]	2.1	2.6	2.6	2.5	2.3	2.6

Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)	Frequency(MHz)	Efficiency(%)	Efficiency (dB)	Gain (dBi)
1550	52.2	-2.8	1.9	2400	58.7	-2.3	2.6	5150	50.9	-2.9	2.8
1555	52.0	-2.8	2.1	2410	60.7	-2.2	2.6	5200	54.5	-2.6	2.5
1560	51.6	-2.7	2.2	2420	62.2	-2.1	2.7	5250	51.0	-2.9	2.5
1565	50.8	-2.9	2.2	2430	65.6	-1.8	2.8	5300	45.0	-3.5	0.6

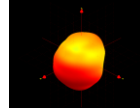
LTE7(Frequency=2660MHz)



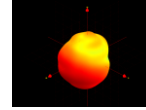
G900/W8(Frequency=940MHz)



LTE12/17

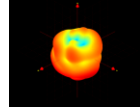


LTE28(Frequency=780MHz)

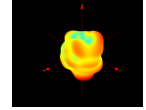


Non-Scanning version diversity antenna

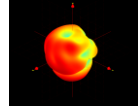
LTE1/4/68/W1/4(Frequency=2130MHz)



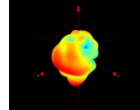
LTE2/25/G1900/W2(Frequency=1950MHz)



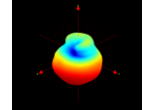
LTE3/8/41(Frequency=2600MHz)



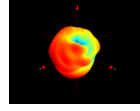
LTE3/G1800(Frequency=1830MHz)



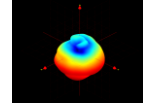
LTE5/19/26/G850/W5(Frequency=880MHz)



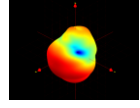
LTE7(Frequency=2660MHz)



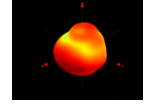
G900/W8(Frequency=940MHz)



LTE12/17(Frequency=740MHz)

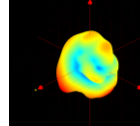


LTE28(Frequency=780MHz)

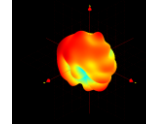


Three in one antenna

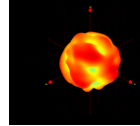
GPS(Frequency=1575MHz)



2.4G(Frequency=2400MHz)



5G(Frequency=5000MHz)



1570	49.1	-3.1	2.2	2440	65.9	-1.8	2.9	5350	40.9	-3.9	0.3
1575	47.0	-3.3	2.1	2450	64.1	-1.9	2.8	5400	44.4	-3.5	1.1
1580	45.4	-3.4	1.8	2460	64.4	-1.9	2.7	5450	45.7	-3.4	1.9
1585	44.0	-3.6	1.6	2470	63.4	-2.0	2.4	5500	47.5	-3.2	1.6
1590	41.2	-3.9	1.3	2480	65.1	-1.9	2.4	5550	47.3	-3.3	1.0
1595	35.9	-4.5	0.7	2490	62.0	-2.1	2.4	5600	50.9	-2.9	2.3
1600	34.9	-4.6	0.6	2500	64.7	-1.9	2.6	5650	50.7	-3.0	1.5
								5700	46.8	-3.3	1.4
								5750	48.6	-3.1	1.4
								5800	57.6	-2.4	2.6
								5850	50.6	-3.0	1.5

