

Antenna specification for approval

Customer name	Lightcomm Technology Co., Ltd		
Model	WIFI&BT&5Gwifi Antenna		
Antenna frequency	2. 4GHZ&5GHz		
Antenna function	WIFI&BT&5Gwifi Antenna		
Antenna material	FFC		
model	SF2299A-1B2-A		
Material number	SF2299A-1B2-A		
Customer Part Number			
Ward accepted the signature		Client acknowledges signature	
structure		Purchase	
Document control		structure	
radio frequency		engineering	
To examine		QC	
Responsible Tingting Li		To examine	
date 2024. 12. 07	Seal area	date 2024. 12. 07	Seal area

No.	Authentication No.	Material type	issue Date	Remarks
1	A2230173541101001E	tinned copper wire	2024-04-24	one year
2	CANEC2227657302	halogen	2024-12-28	one year
3	CANEC2227657303	back adhesive	2024-12-28	one year
4	SHAEC23000346911	FEP sheath	2024-01-13	one year
5	SHAEC22004639301	FEPinsulation	2024-12-15	one year
6	SZXEC23001647204	tin wire	2024-07-28	one year
7	SZXEC23001647208	tin bar	2024-07-28	one year
8	ETR23701480	printing ink	2024-07-13	one year
9	A2230173918101001E	base material	2024-04-18	one year
10	CANEC2227574118	EVA foam	2024-01-03	one year
11	A2230383826101003	conductive cloth	2024-08-04	one year
12	CANEC23002609908	gold plating	2024-05-11	one year

List

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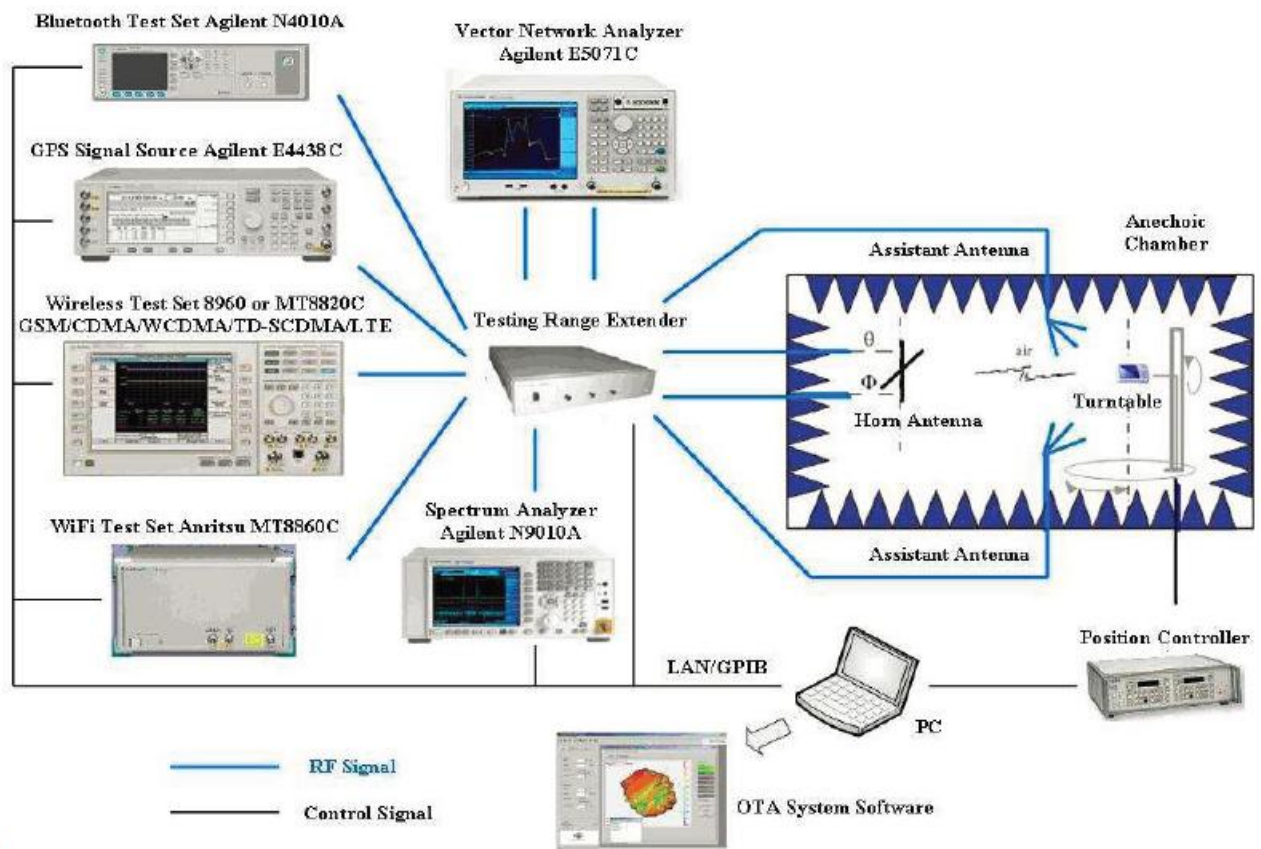
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一: Device support & testable antenna type



二:Overview.

(1)Antenna performance

- 1.This approval sheet supports for CAR Car Multimedia Player project. FFC antennas include in this project. This report is for the performance of WIFI&BT antenna.
- 2.Antenna shape size: Meet the requirement of CAR Car Multimedia Player
- 3.Antenna band: 2.4GHz~5GHz
- 4.Antenna material: Antenna material meet the requirement of CAR Car Multimedia Player
- 5.Adhesive performance: Adhesive performance meet the requirement of CAR Car Multimedia Player
- 6.Antenna performance meet the spec below:

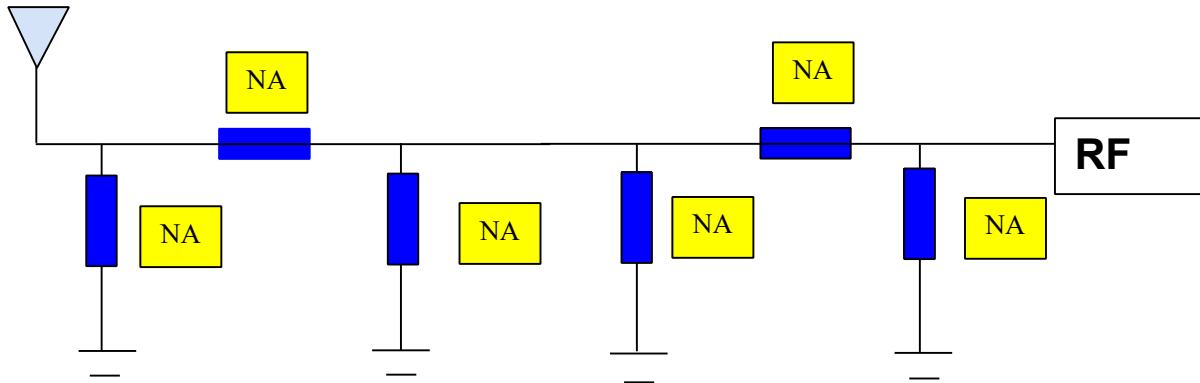
Description	2.4GHz~5GHz	Units
VSWR	≤ 2.0	
Average Antenna Gain	≥ -4.5	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2)Mechanical Information

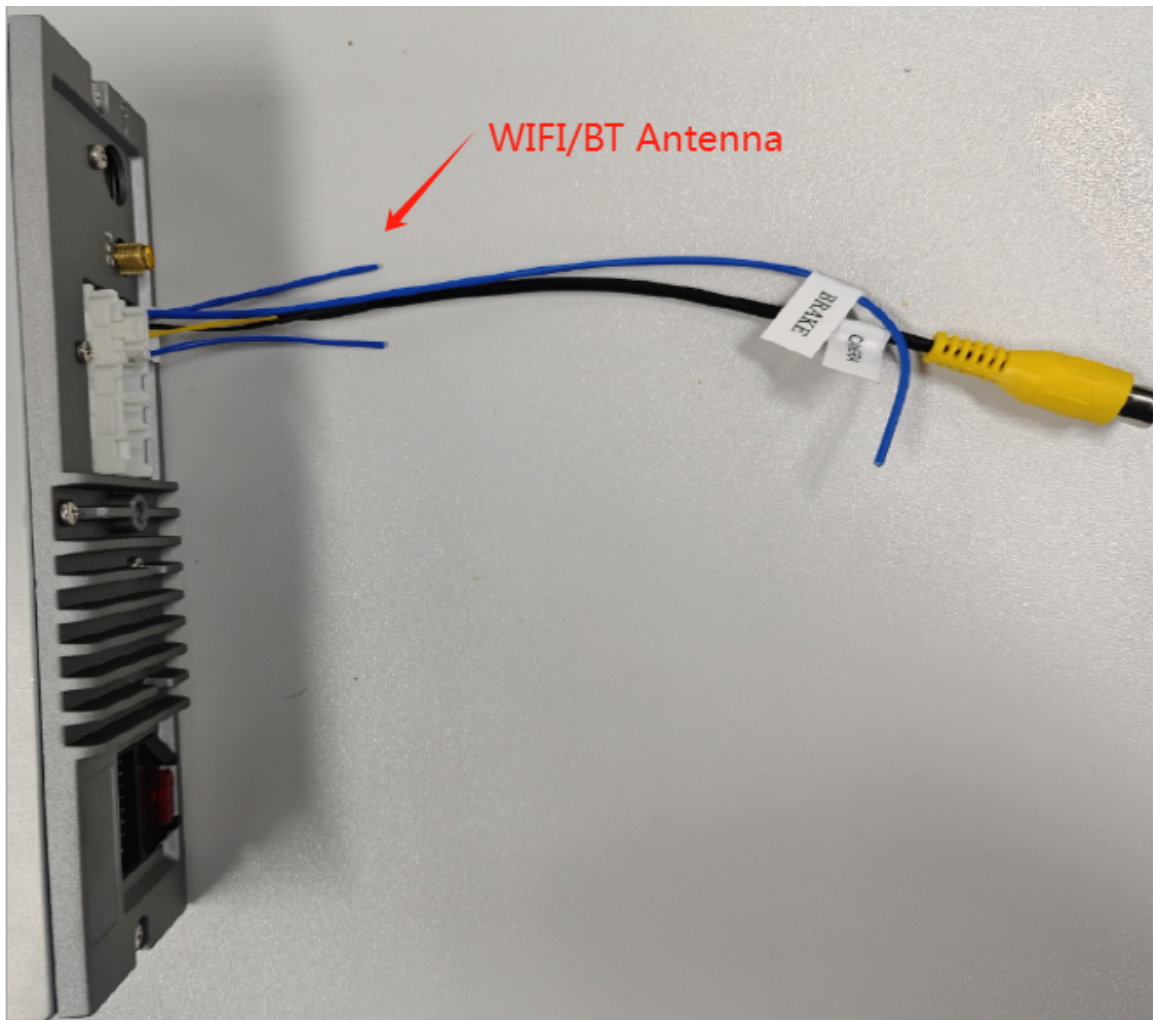
Mechanical Dimension	
Cable Length	NA
Description	WIFI&BT antenna
Material	FFC
Coaxial Cable	NA
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

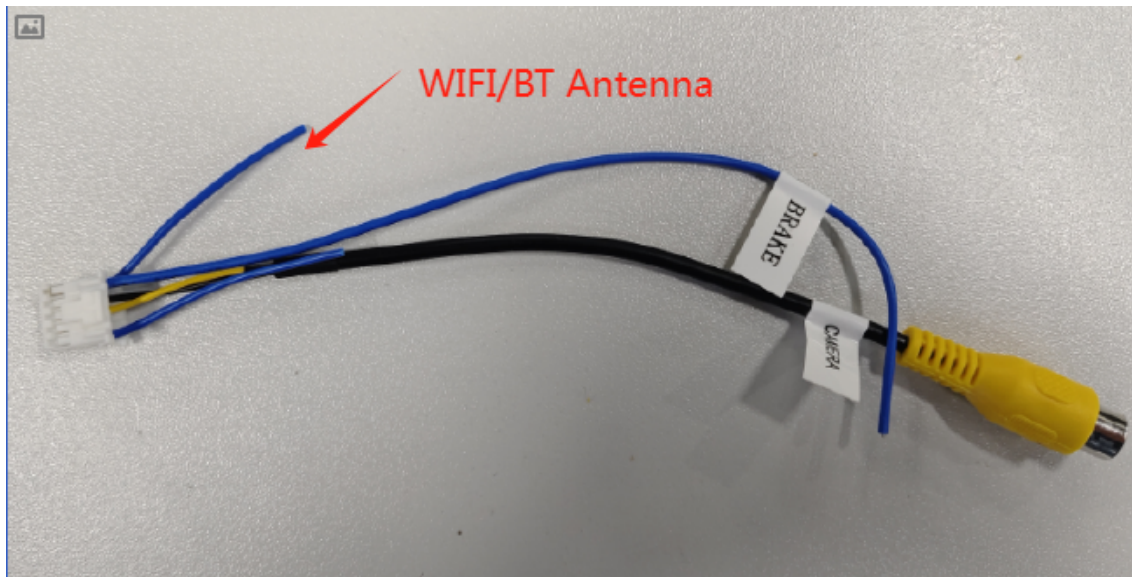
三: Matching circuit diagram&machine picture&antenna picture

(1) Matching circuit diagram

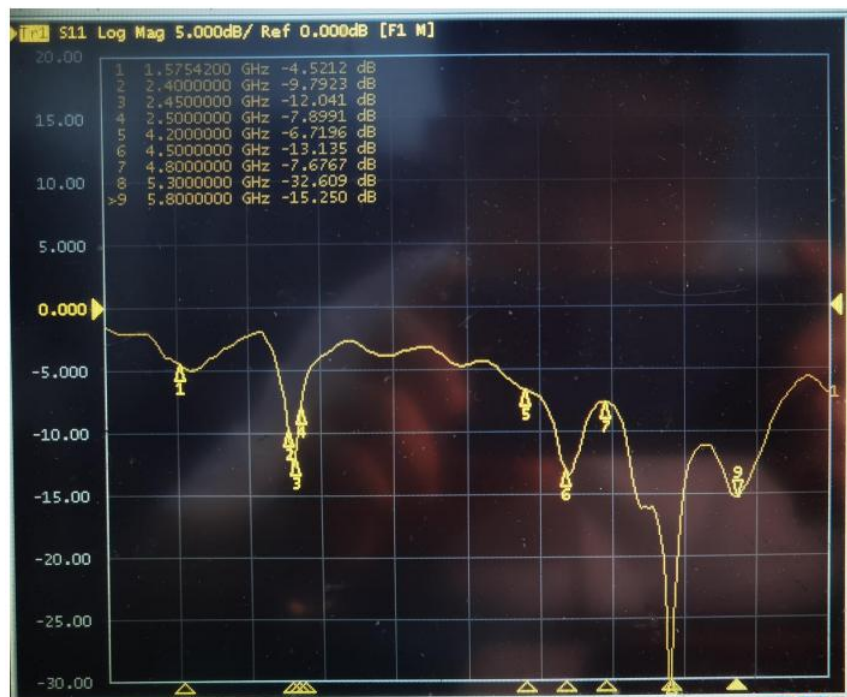


(2) machine picture&antenna picture





四:Antenna standing wave ratio&antenna efficiency



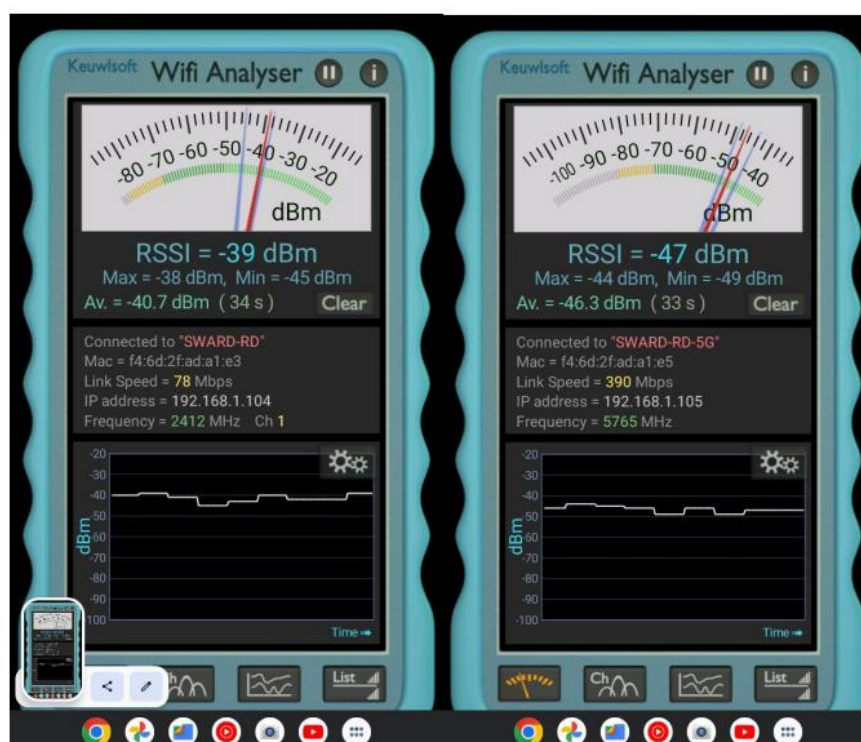
Passive Test For 2.4G												
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)	Directivity (dBi)	Beamwidth (3dB)	AttH (dB)	AttV (dB)
2400	11.26	-9.49	-5.21	-3.36	4.694	6.562	-5.21	-16.2	4.28	60	46.77	47.04
2410	11.46	-9.41	-5.12	-3.27	4.824	6.637	-5.12	-16.24	4.29	60	46.94	47.16
2420	13.82	-8.59	-4.48	-1.63	5.903	7.917	-4.48	-15.69	4.11	60	47.02	47.39
2430	16.03	-7.95	-3.77	-2.92	6.903	9.126	-3.77	-14.54	4.18	60	47.31	47.67
2440	14.68	-8.33	-4.22	-1.37	6.345	8.338	-4.22	-14.74	4.11	60	47.68	47.91
2450	13.92	-8.56	-4.43	-0.8	5.973	7.951	-4.43	-14.84	4.14	60	47.98	48.27
2460	13.94	-8.56	-4.45	-2.6	6	7.94	-4.45	-14.12	4.11	60	47.79	48.02
2470	14.34	-8.44	-4.44	-2.59	6.144	8.193	-4.44	-13.84	4	60	47.6	47.7
2480	16.13	-7.92	-4.1	-2.25	6.909	9.225	-4.1	-13.49	3.82	60	47.93	48.05
2490	18.72	-7.28	-3.46	-2.61	7.969	10.753	-3.46	-13.02	3.81	60	48.1	47.95
2500	20.86	-6.81	-3.04	-1.19	8.822	12.036	-3.04	-12.74	3.77	60	48.13	48.09

Passive Test For 5G												
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)	Directivity (dBi)	Beamwidth (3dB)	AttH (dB)	AttV (dB)
5050	25.7	-5.9	0.45	-2.7	16.321	9.377	0.45	-13.79	6.35	30	57.87	57.75
5150	30.19	-5.2	1.58	-1.57	19.324	10.861	1.58	-16.9	6.78	30	57.03	57.26
5250	27.36	-5.63	0.83	-2.32	17.24	10.119	0.83	-19.54	6.46	60	56.42	56.34
5350	27.35	-5.63	1.86	-1.29	14.374	12.975	1.86	-19.65	7.49	90	56.72	56.77
5450	32.72	-4.85	3.31	-1.16	13.748	18.97	3.31	-19.22	8.16	90	56.86	57.62
5550	39.5	-4.03	3.63	-1	15.724	23.772	3.63	-21.31	7.66	90	58.37	59.35
5650	33.96	-4.69	2.06	-2.09	15.499	18.46	2.06	-18.96	6.75	90	59	59.74
5750	30.2	-5.2	0.49	-2.66	16.923	13.279	0.49	-15.02	5.69	90	59.01	59.89
5850	30.88	-5.1	0.37	-2.78	18.951	11.926	0.37	-14.95	5.47	60	60.11	60.72
5950	37.73	-4.23	2.61	-1.46	23.888	13.837	2.61	-21.79	6.85	90	61.2	62.61

WIFI Active data

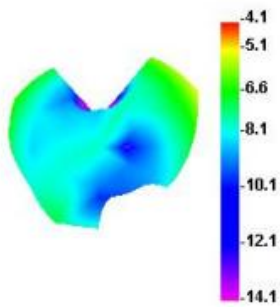
Test	802.11b : 11Mbps					
Result	1	7	13			
Frequency (MHz)	2412	2442	2472			
TRP (dBm)	11.16	12.25	12.38			
TIS (dBm)	-81.37	-82.12	-82.32			
Test	802.11g : 54Mbps			802.11a : 54Mbps		
Result	1	7	13	36	64	165
Frequency (MHz)	2412	2442	2472	5180	5320	5825
TRP (dBm)	10.5	10.27	10.58	12.21	11.05	12.62
TIS (dBm)	-69.56	-70.34	-69.51	-71.87	-72.21	-73.72
Test	802.11n : MCS7			802.11n : MCS7		
Result	1	7	13	36	64	165
Frequency (MHz)	2412	2442	2472	5180	5320	5825
TRP (dBm)	10.35	11.12	10.19	12.34	11.28	12.7
TIS (dBm)	-65.21	-66.59	-65.11	-69.38	-69.66	-69.17

五: Signal measurement:

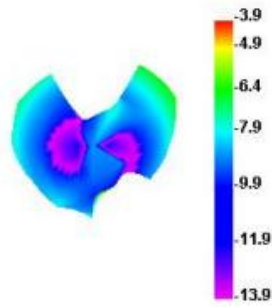


六:3D pattern

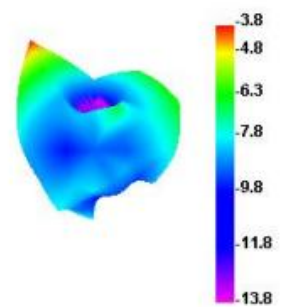
2400.000MHz



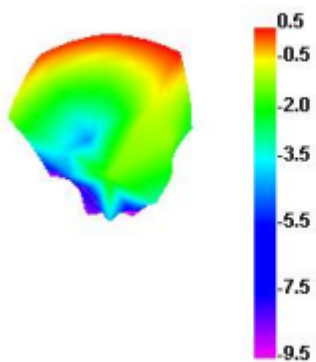
2450.000MHz



2500.000MHz



5050.000MHz



5550.000MHz

