

# JPro project



## Antenna RF System Development Report

+ RF Chen  
edition: 20230314 V3.0



Project development environment

Introduction to Project Development

Report Version Summary

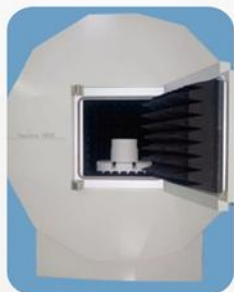
Antenna matching circuit, passive parameters and active data

Report Summary

Additional notes

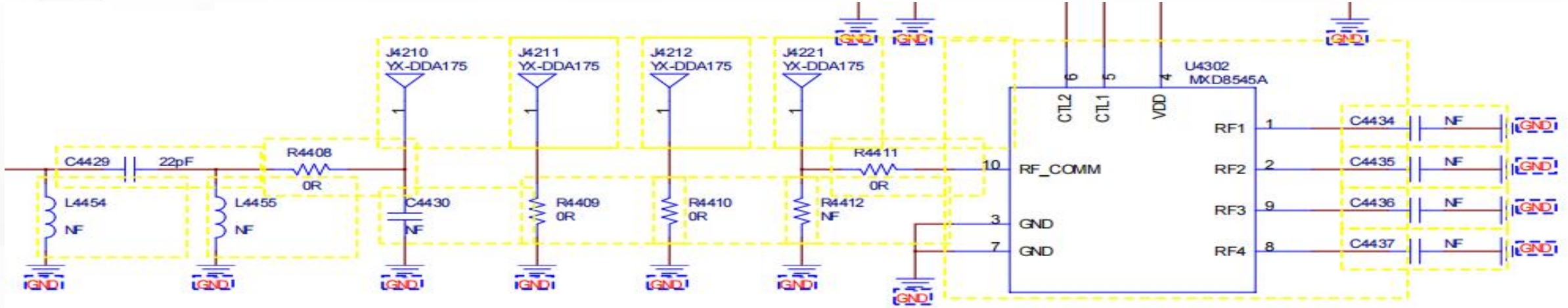


# Project development environment



	frequency range		Antenna status	Antenna form	Design area	Match Changes
Main antenna	2G	G850/1900	LDS	PIFA	Middle shell bracket	YES
	3G	B2/4/5				
	4G	B2/4/5/12/13/25/26/41/66/71				
Other antennas	BT/WIFI	2.4GHz	LDS	MOLO	Middle shell bracket	No
	分集	B2/4/5/12/13/25/26/41/66/71	LDS	MOLO	Middle shell bracket	YES
	GPS	1.575GHz	LDS	MOLO	Middle shell bracket	No
Prototype status	Active debugging prototype		Environmental treatment	YES		

# Main antenna matching circuit

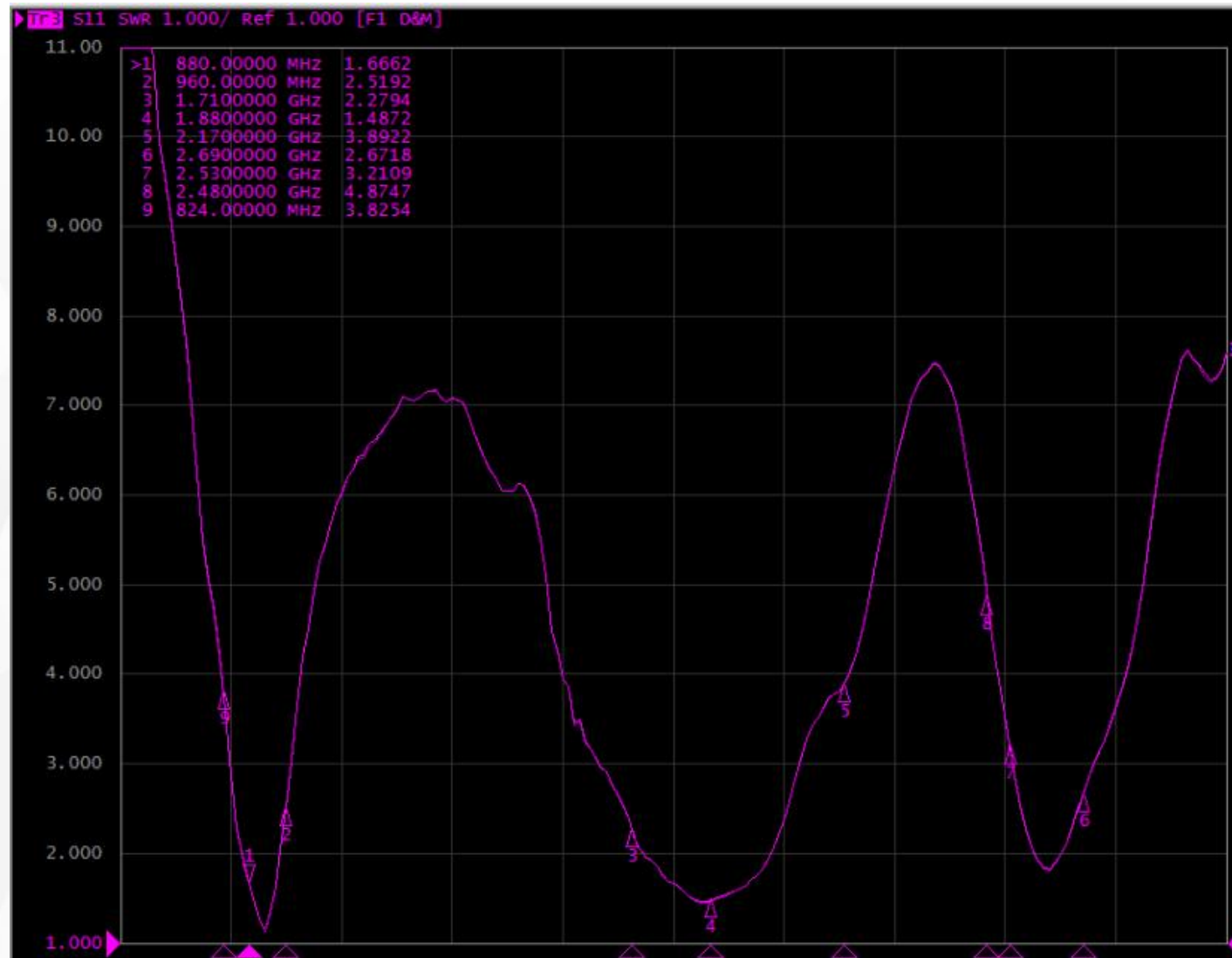


主路			
Element	Value	Element	Value
J4210	reserve	C4429	0Ω
J4211	N/A	L4455	18nH
J4212	N/A	R4408	2.0nH
J4221	reserve	C4430	1.2pF
L4454	N/A		

开关馈脚			
Route	Number	Value	Band
N/A	R4412	N/A	-
N/A	R4411	0Ω	-
RF1	C4434	15pF	G-900 W-B8
RF2	C4435	2.4nH	G-850/1800/1900 W-B1/2/4/5 LTE-B1/2/4/5/25/26/41/66
RF3	C4436	10nH	LTE-B12/13
RF4	C4437	18nH	LTE-B71

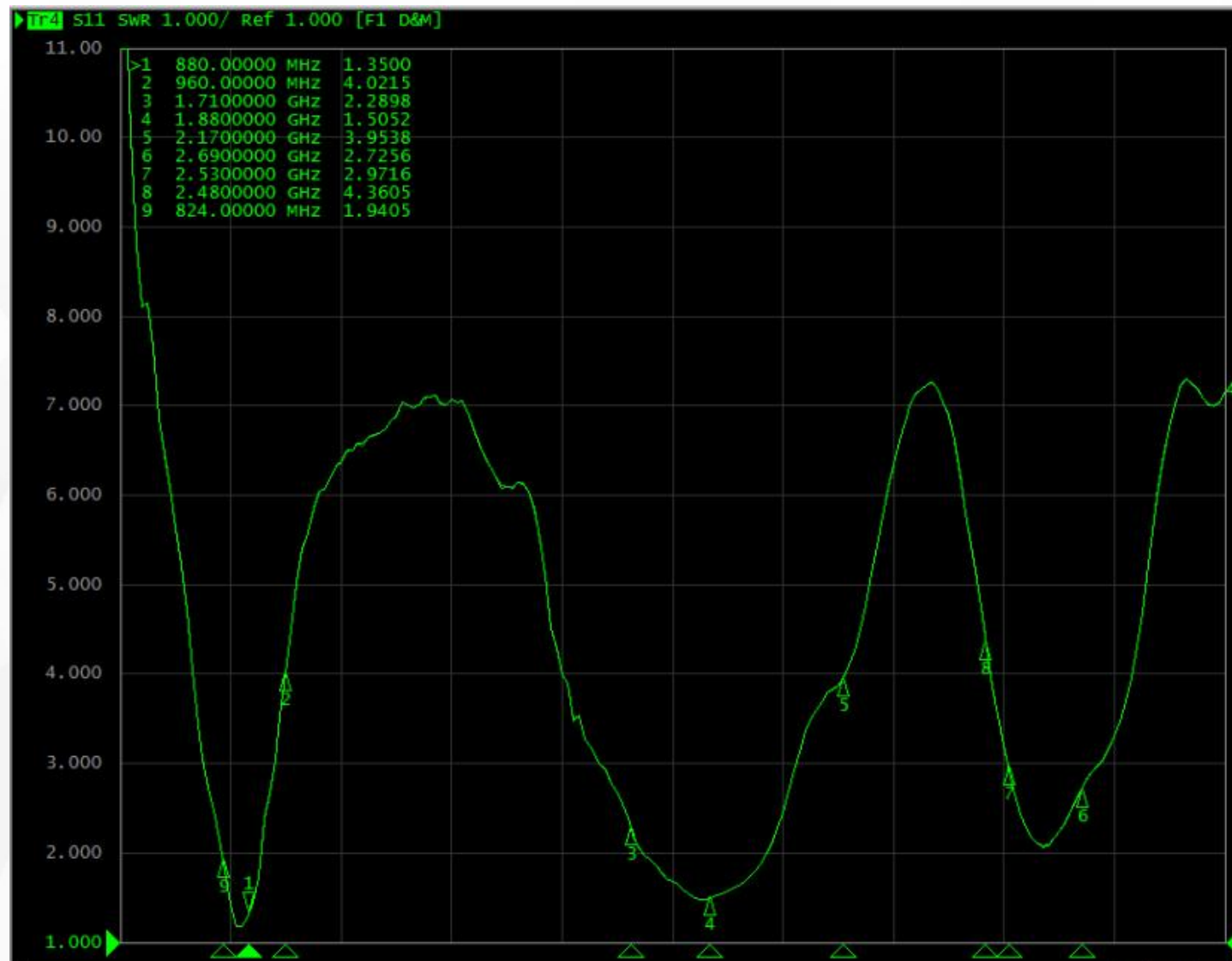
Note: The antenna matching has been modified. Note that the switch logic has been changed.

# Main antenna S11



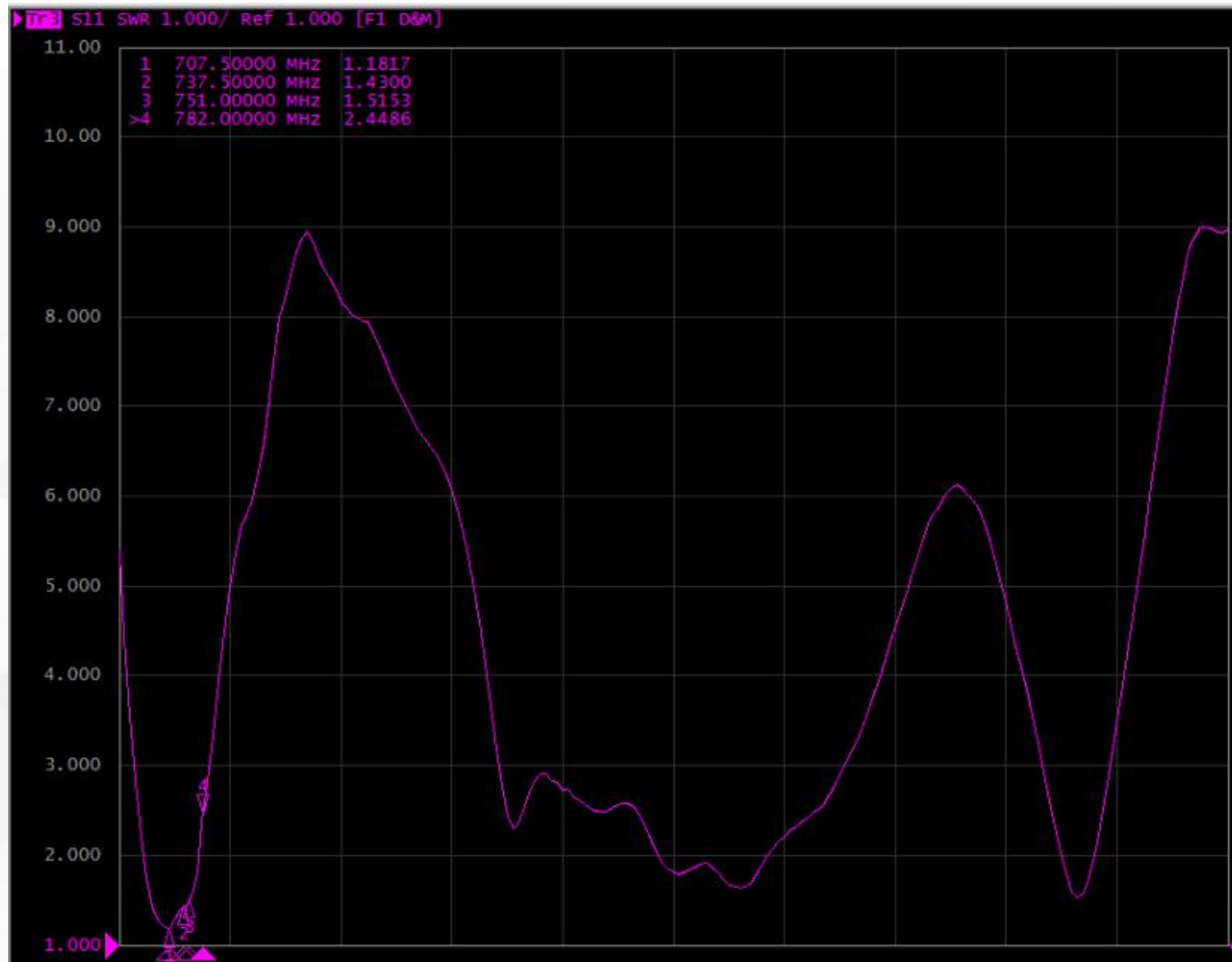
RF1:  
G-900 W-B8

# Main antenna S11



RF2:  
G-850/1800/1900  
W-B1/2/4/5  
LTE-B2/4/5/25/26/41/66

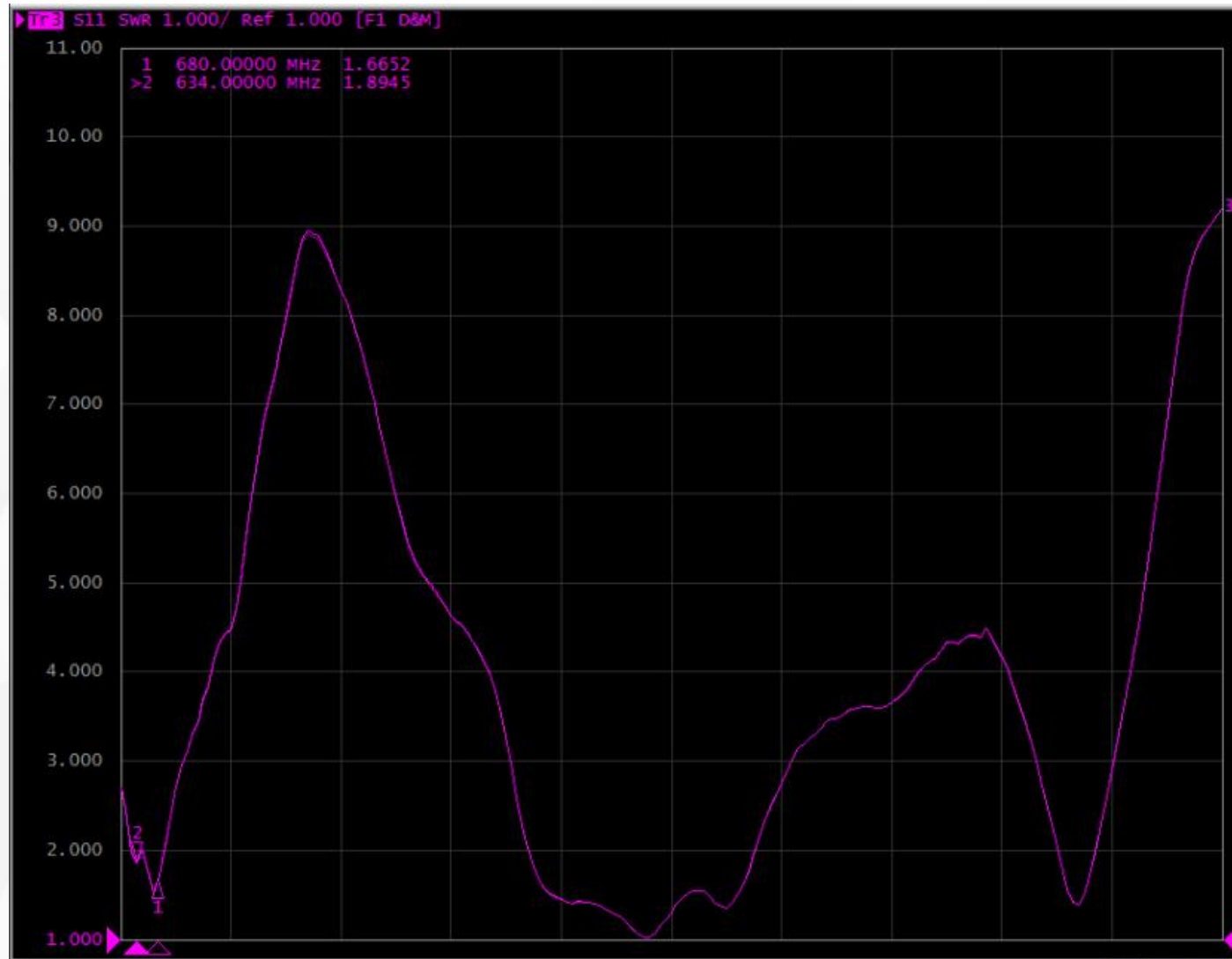
# Main antenna S11



RF3:  
LTE-B12/13

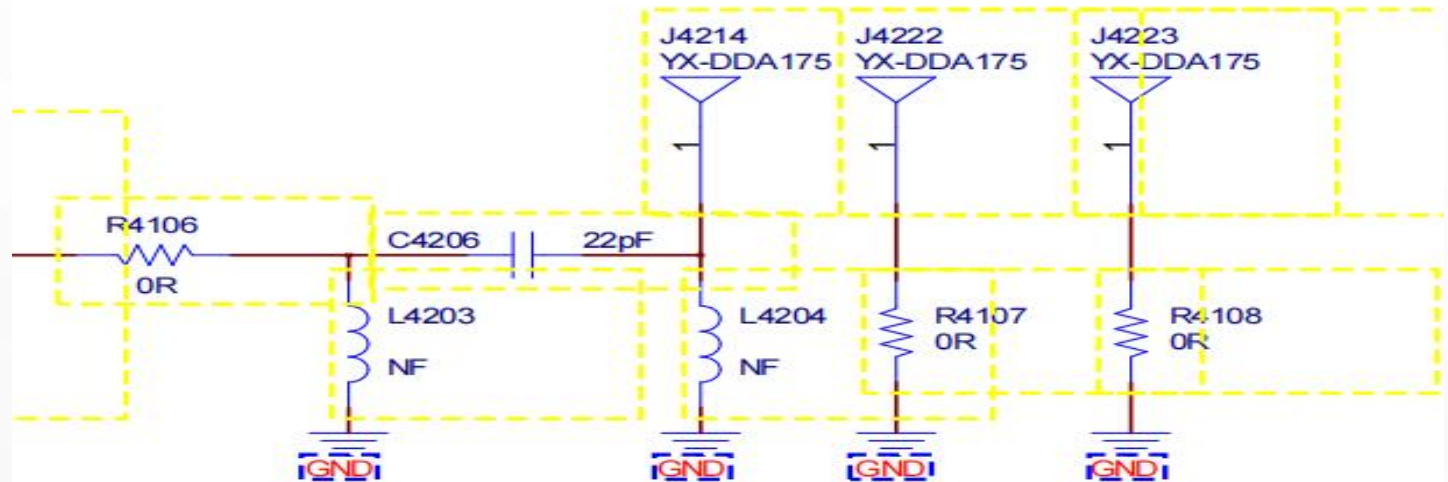


# Main antenna S11



RF3:  
LTE-B71

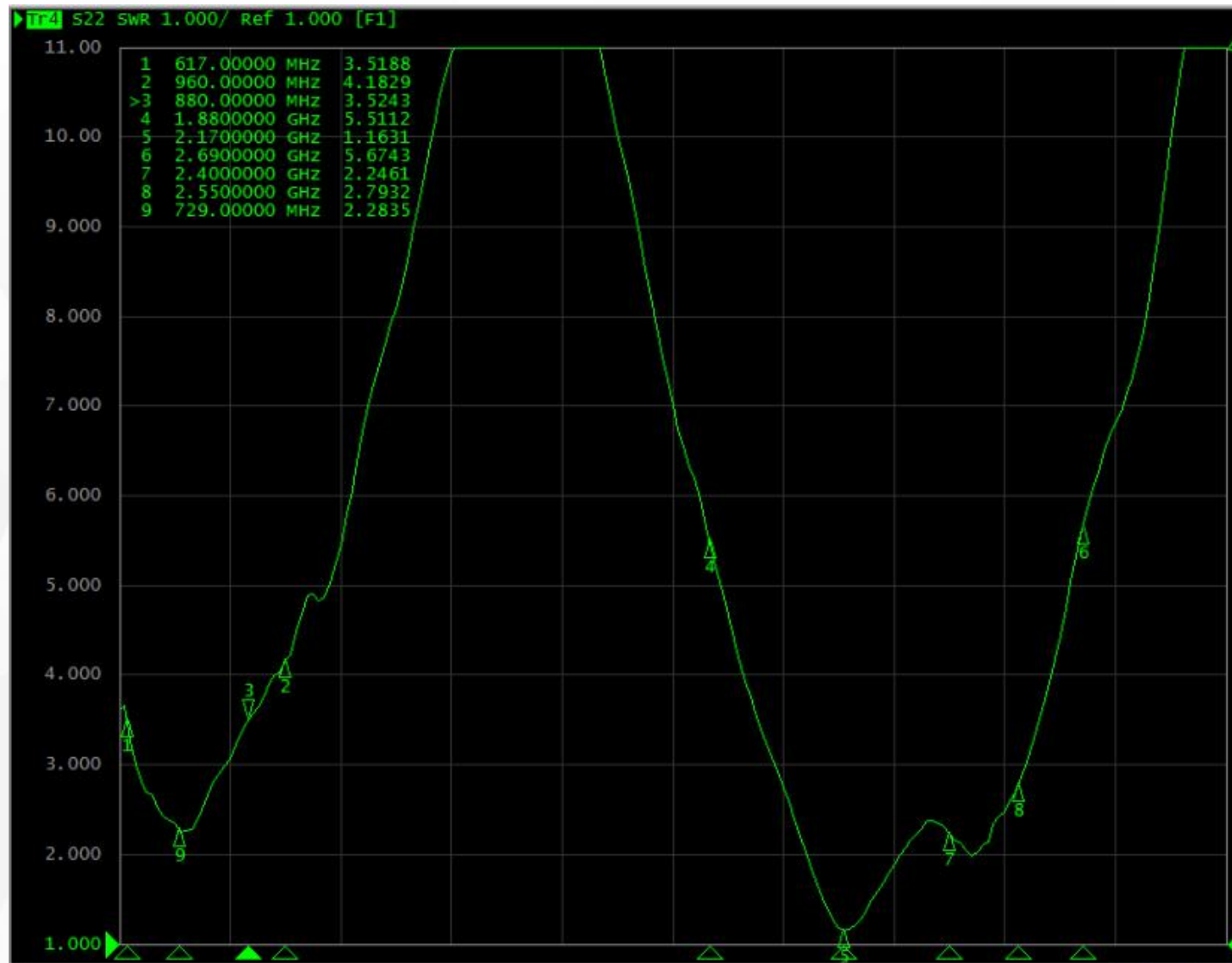
# Diversity antenna matching circuit



Element	Value	Element	Value
J4214	reserve	L4203	N/A
J4222	N/A	R4106	0Ω
J4223	N/A	R4107	N/A
L4204	1.0pF	R4108	N/A
C4206	3.6nH		

Note: The antenna matching has been modified. Please pay attention to import later.

# Diversity antenna S11





# Main antenna conduction test data

传导	Channel	功率 (dBm)	电平	灵敏度 (dBm)	传导	Channel	功率 (dBm)	灵敏度 (dBm)	传导	Channel	功率 (dBm)	灵敏度 (dBm)	
GSM850	CH 128	31.9	51.0	-109.0	FDD B1 (10M)	CH 18050	22.9	-98.0	FDD B71 (10M)	CH132172	23.7	-99.5	
	CH 190	32.2	50.0	-108.0		CH 18300	22.9	-97.5		CH132297	23.8	-99.5	
	CH 251	32.3	50.0	-108.0		CH 18550	22.8	-97.5		CH132422	23.7	-99.0	
PGSM	CH 1	32.1	50.0	-109.5	FDD B2 (10M)	CH 18650	23.4	-98.0	TDD (B41) 20M	CH 40340	23.3	-94.0	
	CH 62	32.1	50.0	-109.0		CH 18900	23.4	-98.0		CH 40620	23.4	-94.0	
	CH 124	32.1	50.0	-109.0		CH 19150	23.2	-97.5		CH 41140	22.8	-92.5	
DCS	CH 512	28.5	50.0	-108.5	FDD B4 (10M)	CH 20000	22.9	-98.0					
	CH 698	28.5	50.0	-108.5		CH 20175	23.1	-97.5					
	CH 885	28.5	49.0	-108.0		CH 20350	22.8	-97.5					
PCS	CH 512	29.7	51.0	-108.0	FDD B5 (10M)	CH 20450	23.5	-99.5					
	CH 661	30.1	51.0	-108.0		CH 20525	23.5	-99.0					
	CH 810	29.7	50.0	-108.0		CH 20600	23.6	-99.0					
W850	CH 4357	22.2	/	-111.0	FDD B12 (5M)	CH 23035	22.9	-101.0					
	CH 4408	22.1	/	-111.0		CH 23095	23.1	-101.0					
	CH 4458	22.1	/	-111.0		CH 23155	22.9	-101.0					
W900	CH 2712	21.9	/	-110.0	FDD B13 (10M)	CH 23230	23.7	-100.0					
	CH 2787	21.7	/	-110.0		CH 23230							
	CH 2863	21.7	/	-110.0		CH 23230							
W1700 B4	CH 1312	21.6	/	-109.5	FDD B25 (10M)	CH 26165	23.5	-98.5					
	CH 1412	21.6	/	-109.5		CH 26365	23.6	-98.0					
	CH 1513	21.5	/	-109.5		CH 26565	23.7	-98.0					
W1900 B2	CH 9662	21.8	/	-109.5	FDD B26 (10M)	CH 26815	24.2	-99.5					
	CH 9800	21.8	/	-109.5		CH 26865	24.0	-99.0					
	CH 9938	21.8	/	-109.5		CH 26915	24.1	-98.5					
W2100 B1	CH 9662	22.0	/	-109.0	FDD B66 (10M)	CH132022	22.8	-97.0					
	CH 9800	21.8	/	-109.0		CH132322	23.3	-97.0					
	CH 9938	21.5	/	-108.0		CH132622	23.1	-96.5					

Line loss: 1dB at low frequency and 1.5dB at high frequency.

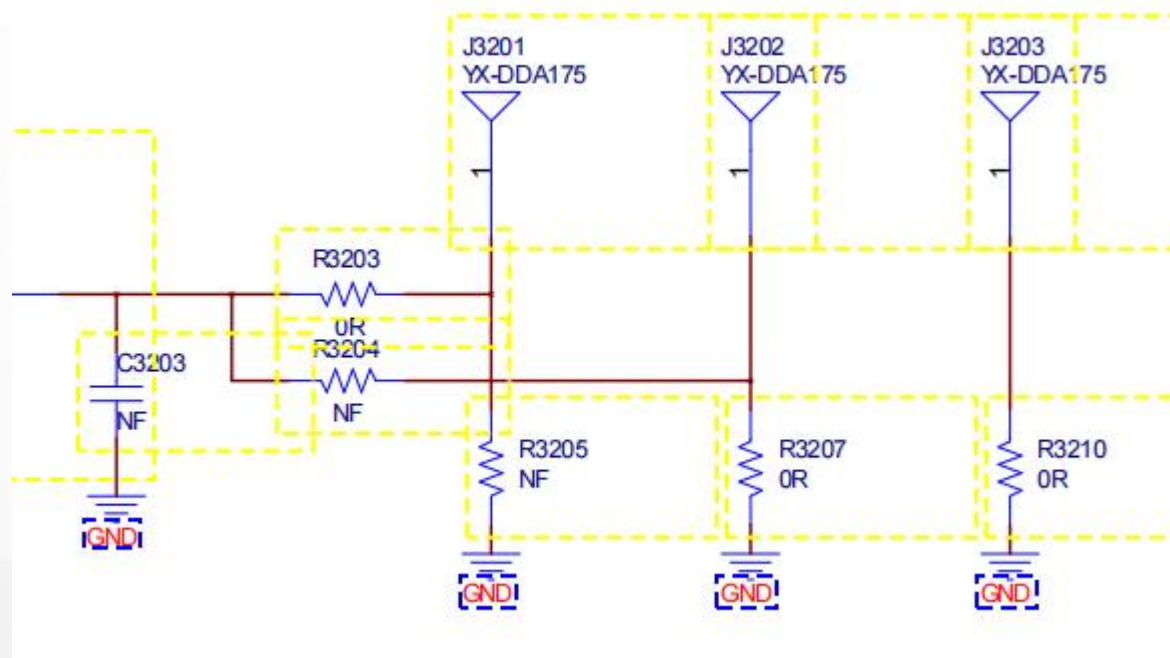


# Active test data of main antenna

OTA	Channel	TRP (dBm)	TIS (dBm)	OTA	Channel	TRP (dBm)	TIS (dBm)	OTA	Channel	TRP (dBm)	TIS (dBm)
GSM850	CH 128	26.0		FDD B1 (10M)	CH 18050	20.2		FDD B71 (10M)	CH132172	19.6	
	CH 190	26.6			CH 18300	20.0			CH132297	19.4	
	CH 251	27.4	-103.3		CH 18550	19.4	-94.2		CH132422	18.3	-90.0
PGSM	CH 1	27.2		FDD B2 (10M)	CH 18650	20.5		TDD(B41) (20M)	CH 40340	18.3	
	CH 62	28.3			CH 18900	20.6			CH 40620	19.0	
	CH 124	29.8	-103.9		CH 19150	20.7	-94.1		CH 41140	19.5	-90.0
DCS	CH 512	26.3		FDD B4 (10M)	CH 20000	19.2					
	CH 698	26.1			CH 20175	19.3					
	CH 885	26.1	-104.6		CH 20350	19.3	-94.0				
PCS	CH 512	26.5		FDD B5 (10M)	CH 20450	19.5					
	CH 661	27.2			CH 20525	19.5					
	CH 810	27.2	-104.1		CH 20600	20.0	-93.6				
W850	CH 4357	18.6		FDD B12 (5M)	CH 23035	17.3					
	CH 4408	18.5			CH 23095	17.2					
	CH 4458	19.5	-104.7		CH 23155	17.8	-97.6				
W900	CH 2712	18.3		FDD B13 (10M)	CH 23230	19.6					
	CH 2787	19.3			CH 23230	19.4					
	CH 2863	19.6	-104.4		CH 23230	19.4	-94.6				
W1700 B4	CH 1312	18.3		FDD B25 (10M)	CH 26165	20.1					
	CH 1412	18.1			CH 26365	20.3					
	CH 1513	18.1	-103.5		CH 26565	20.9	-98.6				
W1900 B2	CH 9662	19.9		FDD B26 (10M)	CH 26815	19.2					
	CH 9800	20.2			CH 26865	19.6					
	CH 9938	20.4	-104.6		CH 26915	20.3	-98.2				
W2100 B1	CH 9662	19.5		FDD B66 (10M)	CH132022	19.2					
	CH 9800	19.8			CH132322	19.5					
	CH 9938	18.8	-103.5		CH132622	19.6	-93.8				

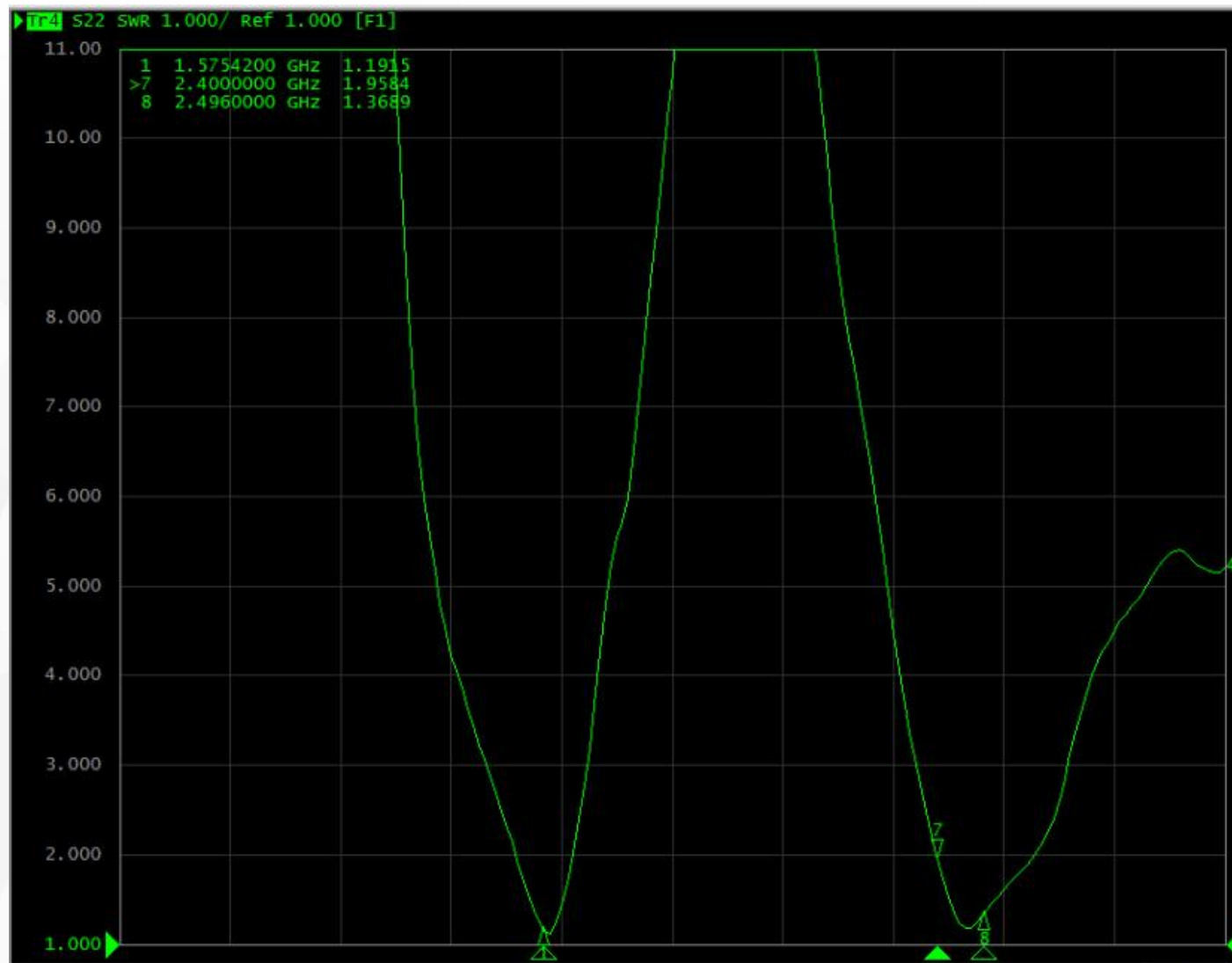
# WiFi antenna matching circuit

Element	Value
J3201	reserve
J3202	reserve
R3205(0201)	N/A
R3203(0201)	0Ω
C3203(0201)	N/A
R3207(0201)	0Ω
R3204(0201)	N/A



Note: Antenna matching has not been modified.

# Three-in-one antenna S11





# Passive test data of three-in-one antenna

GPS 1570-1580 MHz			
Freq.	Eff. %	Eff. dB	Gain
1570	58.9%	-2.3	1.3
1571	58.6%	-2.3	1.2
1572	58.4%	-2.3	1.2
1573	58.2%	-2.4	1.1
1574	58.0%	-2.4	1.1
1575	57.8%	-2.4	1.0
1576	57.6%	-2.4	1.0
1577	57.5%	-2.4	1.0
1578	57.3%	-2.4	1.0
1579	57.2%	-2.4	0.9
1580	57.1%	-2.4	0.9
Average	58.0%	-2.4	1.1

WIFI/BT 2400-2480 MHz			
Freq.	Eff. %	Eff. dB	Gain
2400	49.7%	-3.0	1.7
2410	47.9%	-3.2	1.6
2420	48.7%	-3.1	1.7
2430	46.9%	-3.3	1.7
2440	45.5%	-3.4	1.5
2450	47.2%	-3.3	1.8
2460	46.7%	-3.3	1.8
2470	46.0%	-3.4	1.7
2480	45.8%	-3.4	1.8
Average	47.2%	-3.3	1.7



# WIFI active test data

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	Channel	TRP (dBm)	TIS (dBm)
WIFI B	CH 1	13.8	-83.1
	CH 6	13.5	-83.4
	CH 11	13.7	-83.0
	Channel	TRP (dBm)	TIS (dBm)
WIFI G	CH 1	13.2	-69.2
	CH 6	13.4	-69.1
	CH 11	13.5	-69.5

# GPS test data

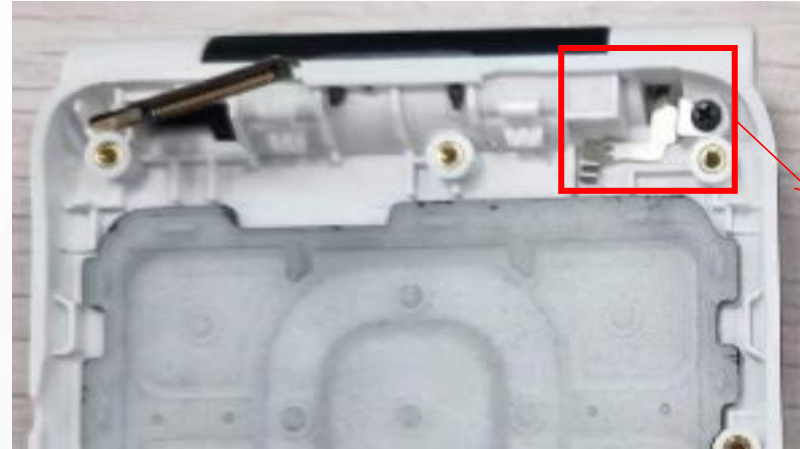


Test items	Test result
Total number of search stars	28
In use satellites	19
Maximum SNR value	43
SNR≥40	4

	TIS (dBm)
GPS	-146.1

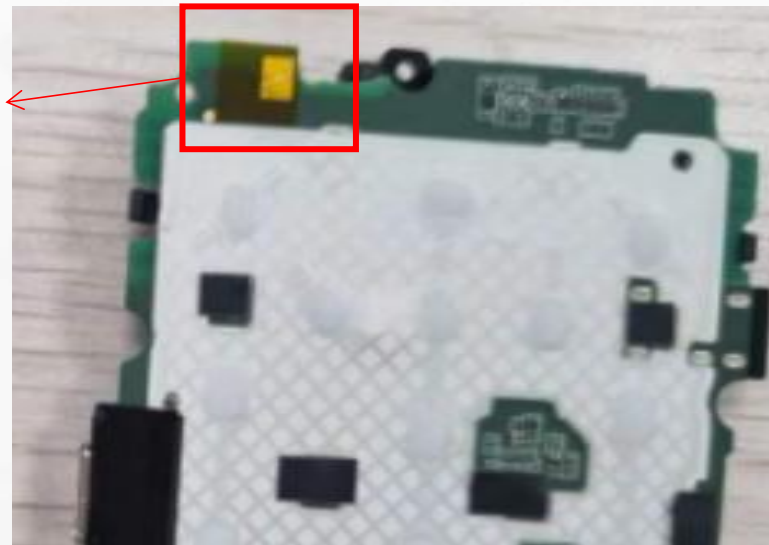
Test result remark: GPS data ok.

# Environmental treatment



The rotating shaft needs to be properly treated, and the shrapnel should be retained.

The exposed copper area of the main board is covered with insulating adhesive. Avoid contact with other rotating shaft shrapnel.



1. Most frequency band data of the main antenna and GPS/WIFI antenna data are OK, please confirm the relevant data;;
2. Adjust the main antenna matching and pay attention to the subsequent introduction;

- 1、 Please carefully confirm whether the matching circuit mentioned in the report has been modified and whether environmental processing has been imported, which will directly affect antenna performance.
- 2、 The parameters provided in the report are only those provided by the customer to our company for debugging and testing the prototype, and do not represent the final mass production status of your company's final project.
- 3、 If your company has the latest prototype for trial production or update status (material replacement, software update, environment change, etc.), please submit it to our company for verification as soon as possible to confirm whether the antenna performance is affected.
- 4、 If your company needs to send it to a third party for retest or to a customer for testing, please be sure to submit the machine to be tested to our company for testing and confirmation, as factors such as the consistency of the motherboard, the consistency of the assembly, and antenna assembly differences can lead to deviations in antenna parameters.

THE END