Appendix E

Dipole Antenna self-calibration

Table of Contents

1. Calibration Date

Calibration Date Oct.21,2024, Due to Jan.25,2025

2. Calibration Items

Dipole Antenna self-calibration

1、 Calibration Method

Immediate re-calibration is required for the following conditions.

1) According to KDB 865664 D01, When the most recent return-loss result, measured at least annually, deviates by more than 20% from the previous measurement (i.e. value in dB × 0.2) or not meeting the required 20 dB minimum return-loss requirement.

2) When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

3）When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions; i.e., the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system.

2、 Calibration Purpose

Demonstrate that SAR target, the impedance and return loss of the dipole remain stable as required

3、 Test The Product

Manufacturer	Speag
Name	2450MHz Dipole antenna
Model number	D2450V2
Environment temperature	23.0℃
Look pictures	As shown in figure 1

Manufacturer	Speag
Name	5GHz Dipole antenna
Model numbe	D5GHZV2
Environment temperature	23.0℃
Look pictures	As shown in figure 2

Figure 1 Test signal source

Figure 2 Test signal source

3. Standards

This antenna calibration is conducted according to KDB 865664 D01

4. Laboratory

The following personnel participated in this laboratory:

Table 1： Participate in the measurement laboratory

Laboratory Name	Temp℃	Test person
Guangdong Dongdian Testing Service Co., Ltd.	23.0℃	Johnson Huang

5. Calibration Results

The quality control test results are shown in Table 2 and Table 3, and the detailed test data is in the Appendix.

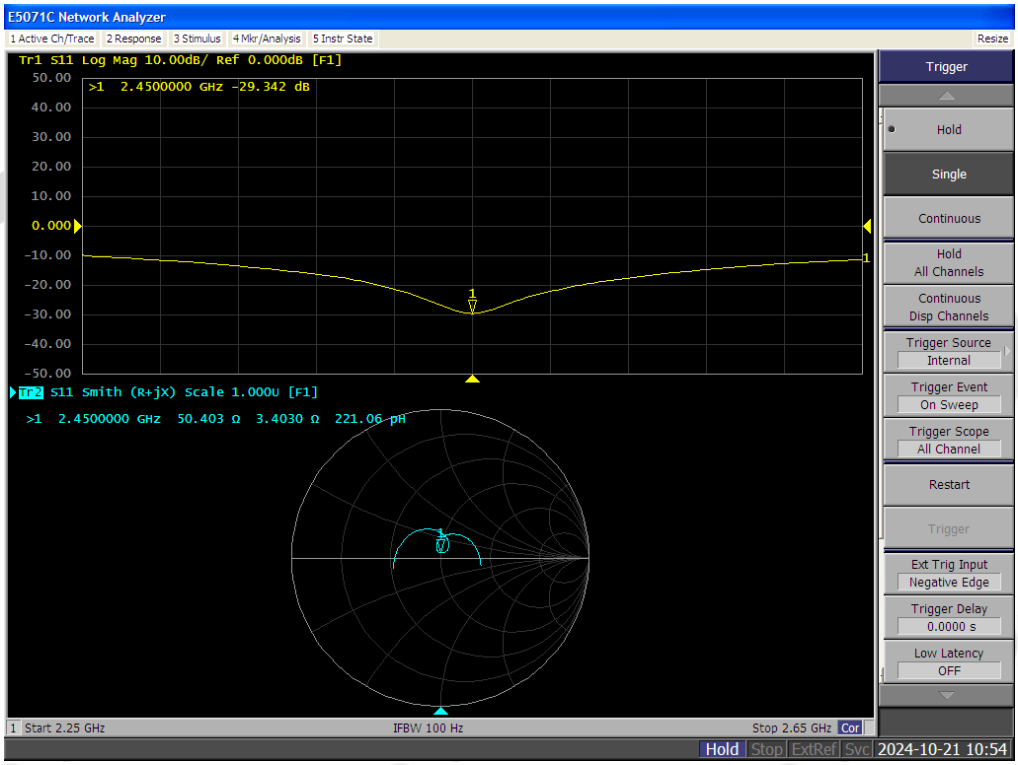
Table 2

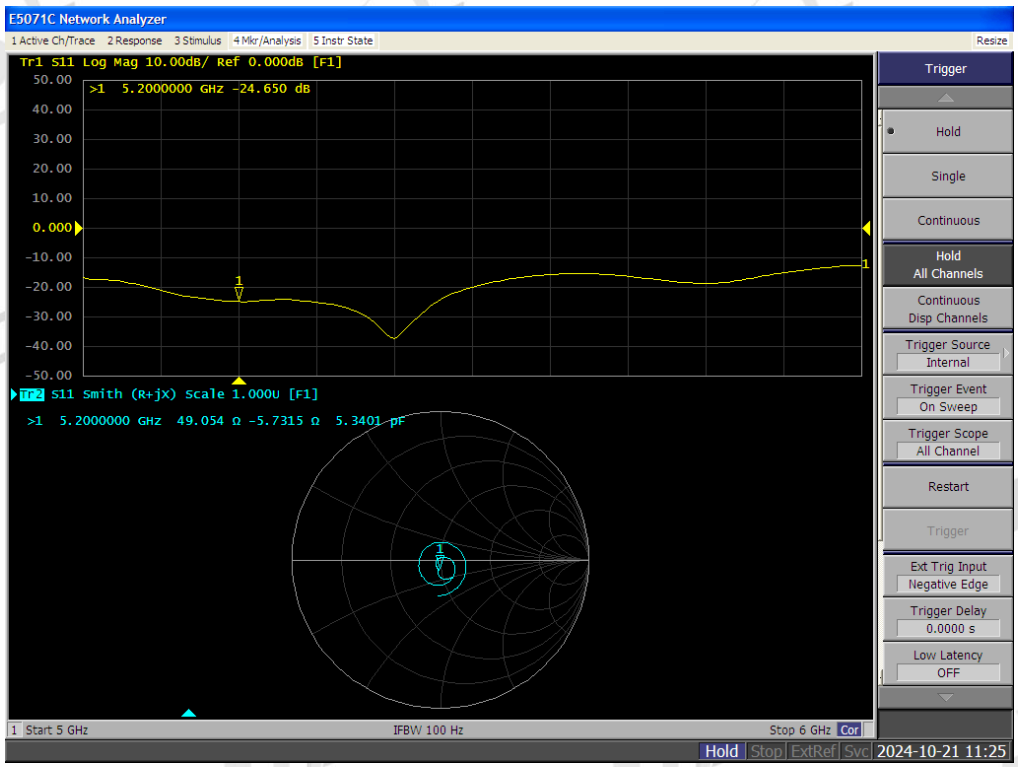
Calibrated Antenna	Target Return loss	Test Return loss	Deviation	Result
2450	-28.825	-29.342	1.79%	Pass
5200	-24.780	-24.650	0.52%	Pass
5300	-24.151	-23.222	3.85%	Pass
5500	-23.082	-20.299	12.06%	Pass
5600	-22.239	-25.623	15.22%	Pass

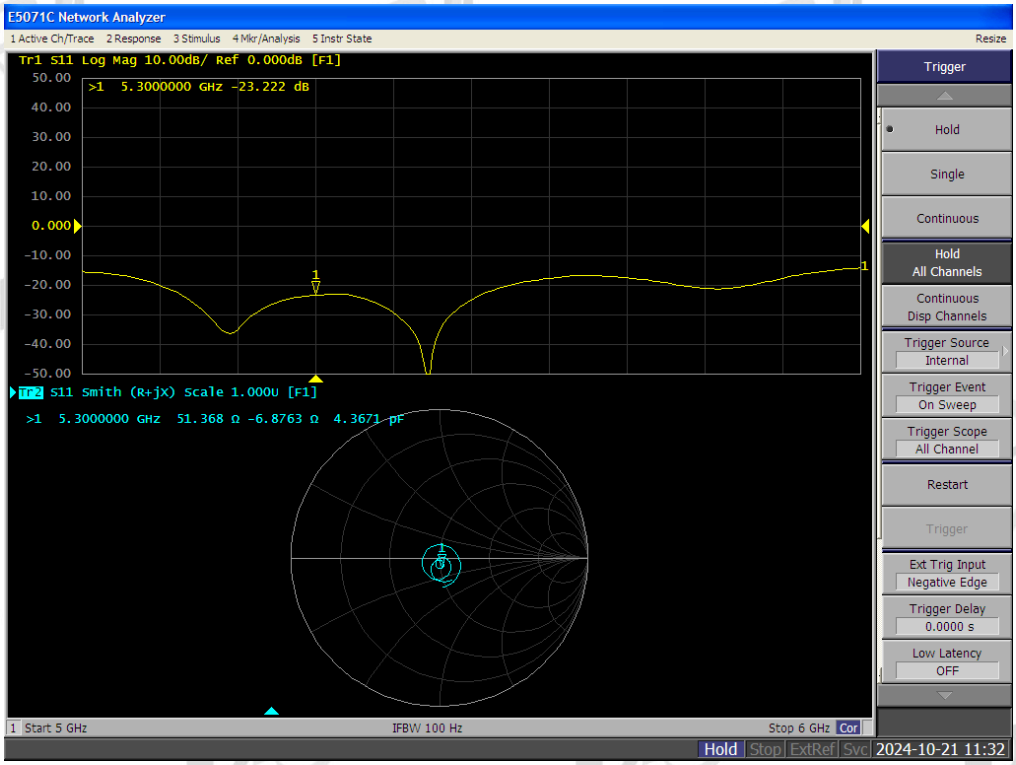
Table 3

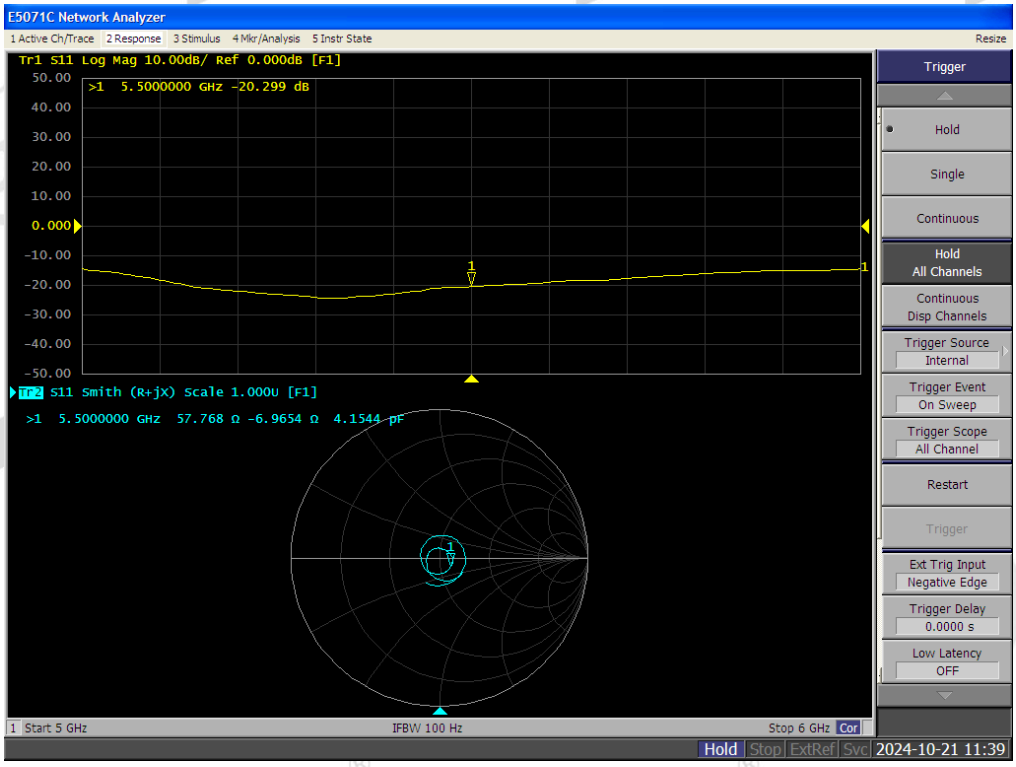
Calibrated Antenna	Target Impedance （Real）	Target Impedance （Imaginary	Test Impedance （Real）	Test Impedance （Imaginary）	Deviation （Real）	Deviation （Imaginary）	Result
2450	53.391	1.586	50.403	3.4030	2.988	1.817	Pass
5200	49.477	-8.009	49.054	-5.7315	0.423	2.2775	Pass
5300	54.645	-5.723	51.368	-6.8763	3.277	1.1533	Pass
5500	56.887	-4.538	57.768	-6.9654	0.881	2.4274	Pass
5600	56.214	-5.378	52.912	-4.5378	3.302	0.8402	Pass

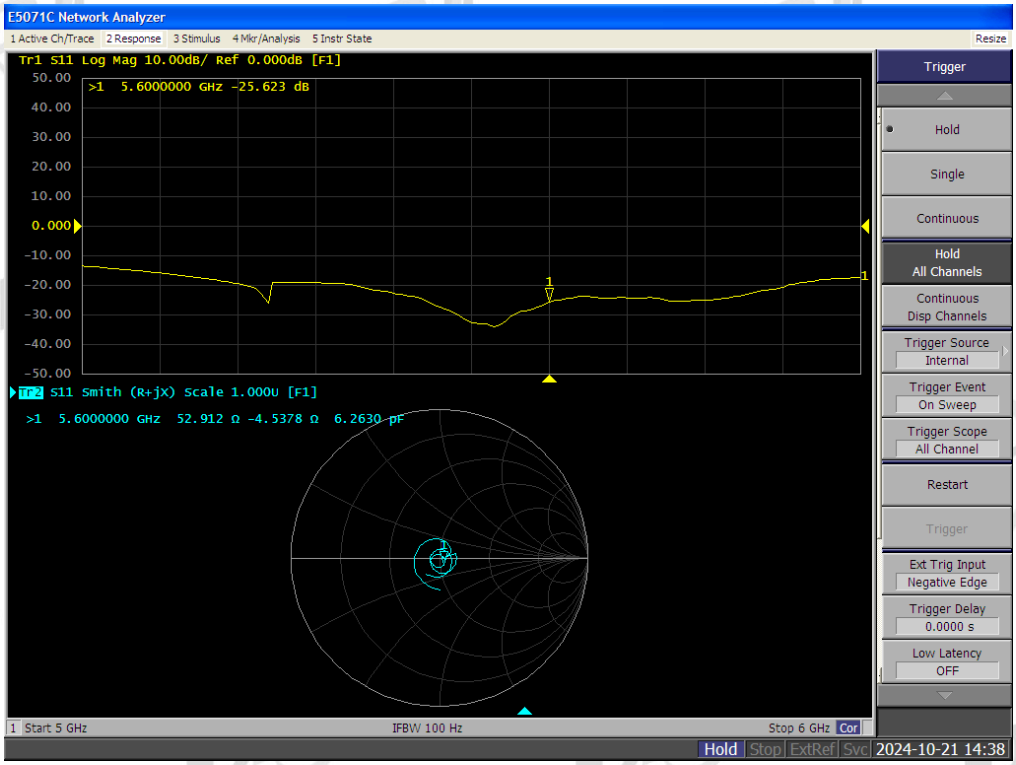
6. Appendix


E5071C Network Analyzer
1 Active Ch/Trace
2 Response
3 Stimulus
4 Mkr/Analysis
5 Instr State
Resize
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]
>1 2.4500000 GHz -29.342 dB
Tr2 S11 Smith (R+jX) Scale 1.000U [F1]
>1 2.4500000 GHz 50.403 Ω 3.4030 Ω 221.06 pH
1 Start 2.25 GHz
IFBW 100 Hz
Stop 2.65 GHz
Cor
Hold
Stop
ExtRef
Svc
2024-10-21 10:54
Trigger
Hold
Single
Continuous
Hold All Channels
Continuous Disp Channels
Trigger Source Internal
Trigger Event On Sweep
Trigger Scope All Channel
Restart
Trigger
Ext Trig Input Negative Edge
Trigger Delay 0.0000 s
Low Latency OFF


E5071C Network Analyzer
1 Active Ch/Trace
2 Response
3 Stimulus
4 Mkr/Analysis
5 Instr State
Resize
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]
>1 5.2000000 GHz -24.650 dB
Tr2 S11 Smith (R+jX) Scale 1.000U [F1]
>1 5.2000000 GHz 49.054 Ω -5.7315 Ω 5.3401 pF
1 Start 5 GHz
IFBW 100 Hz
Stop 6 GHz
Cor
Hold
Stop
ExtRef
Svc
2024-10-21 11:25
Trigger
Hold
Single
Continuous
Hold All Channels
Continuous Disp Channels
Trigger Source Internal
Trigger Event On Sweep
Trigger Scope All Channel
Restart
Trigger
Ext Trig Input Negative Edge
Trigger Delay 0.0000 s
Low Latency OFF


E5071C Network Analyzer
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Resize
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]
>1 5.3000000 GHz -23.222 dB
Tr2 S11 Smith (R+jX) Scale 1.000U [F1]
>1 5.3000000 GHz 51.368 Ω -6.8763 Ω 4.3671 pF
1 Start 5 GHz
IFBW 100 Hz
Stop 6 GHz
Cor
Hold Stop ExtRef Svc 2024-10-21 11:32
Trigger
Hold
Single
Continuous
Hold All Channels
Continuous Disp Channels
Trigger Source Internal
Trigger Event On Sweep
Trigger Scope All Channel
Restart
Trigger
Ext Trig Input Negative Edge
Trigger Delay 0.0000 s
Low Latency OFF


E5071C Network Analyzer
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Resize
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]
>1 5.5000000 GHz -20.299 dB
Tr2 S11 Smith (R+jX) Scale 1.000U [F1]
>1 5.5000000 GHz 57.768 Ω -6.9654 Ω 4.1544 pF
1 Start 5 GHz
IFBW 100 Hz
Stop 6 GHz
Cor
Hold Stop ExtRef Svc 2024-10-21 11:39
Trigger
Hold
Single
Continuous
Hold All Channels
Continuous Disp Channels
Trigger Source Internal
Trigger Event On Sweep
Trigger Scope All Channel
Restart
Trigger
Ext Trig Input Negative Edge
Trigger Delay 0.0000 s
Low Latency OFF


E5071C Network Analyzer
1 Active Ch/Trace
2 Response
3 Stimulus
4 Mkr/Analysis
5 Instr State
Resize
Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB [F1]
>1 5.6000000 GHz -25.623 dB
50.00
40.00
30.00
20.00
10.00
0.000
-10.00
-20.00
-30.00
-40.00
-50.00
Tr2 S11 Smith (R+jX) Scale 1.000U [F1]
>1 5.6000000 GHz 52.912 Ω -4.5378 Ω 6.2630 pF
1 Start 5 GHz
IFBW 100 Hz
Stop 6 GHz
Cor
Hold
Stop
ExtRef
Svc
2024-10-21 14:38
Trigger
Hold
Single
Continuous
Hold All Channels
Continuous Disp Channels
Trigger Source Internal
Trigger Event On Sweep
Trigger Scope All Channel
Restart
Trigger
Ext Trig Input Negative Edge
Trigger Delay 0.0000 s
Low Latency OFF