

PSA

PASSIVE SYSTEM ALLIANCE
WALSIN TECHNOLOGY CORPORATION

Alpha Networks _CS-9202 (DVT2.2 Original Matching)

Presented by

Angus

Walsin Technology Corporation

2020 / 02 / 07

Version	Date	Description	Author
V01	2019/09/24	EVT1 PCBA + EVT1 Housing	Angus
V02	2019/09/27	EVT2 PCBA + EVT1 Housing	Angus
V03	2019/10/21	With mockup ANT1 & ANT2 – test report provided	Angus
V04	2019/10/23	Efficiency discrepancy pointed out by customer, cause located and report provided	Angus
V05	2019/11/19	3 final cases received, and antenna characteristics tested (consistency tested)	Angus
V06	2019/11/22	ANT1 Modified	Angus
V07	2019/11/25	ANT2 report added	Angus
V08	2019/11/27	Modified ANT1 Mockup sample report	Angus
V09	2019/11/29	Antenna consistency tested	Angus
V10	2019/12/04	The width of metal plate hand-trimmed by Alpha Networks	Angus
V11	2019/12/06	Trimmed metal plate retested	Angus

Version	Date	Description	Author
V12	2019/12/09	Metal plate is redesign by two pieces	Angus
V13	2019/12/11	Metal plate is redesign by two pieces,final matching	Angus
V14	2019/12/11	Metal plate is redesign by two pieces,re-matching	Angus
V15	2019/12/12	Metal plate is redesign by two pieces,final matching	Angus
V16	2019/12/23	Updated metal plate provided by AlphaNetworks, antennas tested	Angus
V17	2020/1/6	DVT2 Antennas tested	Angus
V18	2020/1/9	DVT1 Absorber added, Antennas tested	Angus
V19	2020/01/13	DVT2 One-piece Metal Plate, Antennas tested	Angus
V20	2020/01/16	3 Cases for DVT2.2, Antennas tested	Angus
V21	2020/02/06	DVT2.2 (ANT2 Original Matching, Antennas tested)	Angus
V22	2020/02/07	3 Cases for DVT2.2 (ANT2 Original Matching, Antennas tested)	Angus

OUTLINE

1. Measurement Information

1.1 Experimental Setup

1.2 Antenna Solution Detail

2. Antenna Characteristics

2.1 Return Loss & Isolation

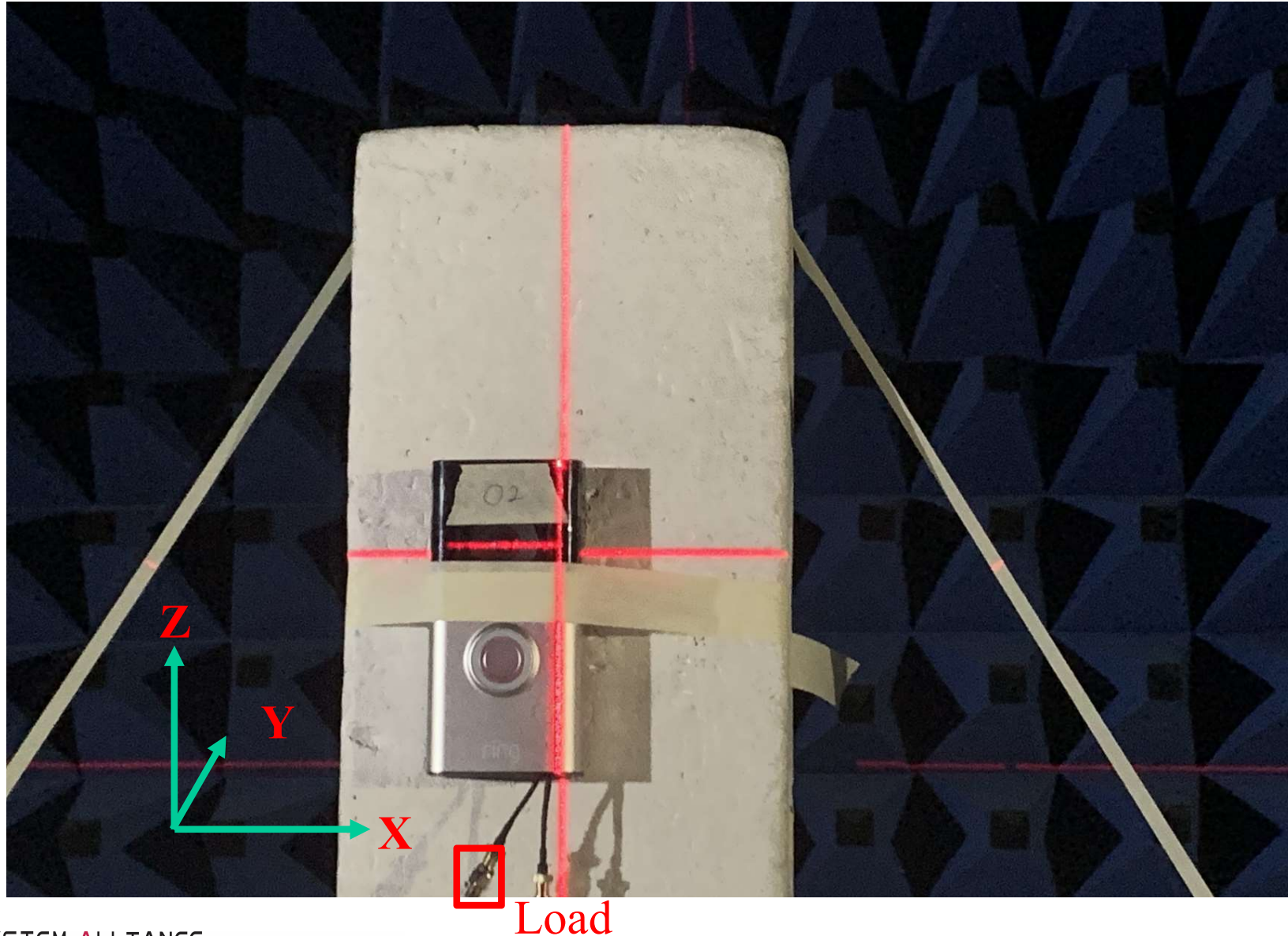
2.2 Antenna Efficiency and Peak Gain

2.3 3 views of antenna & 2D Radiation Patterns

3. Summary

1. Measurement Information

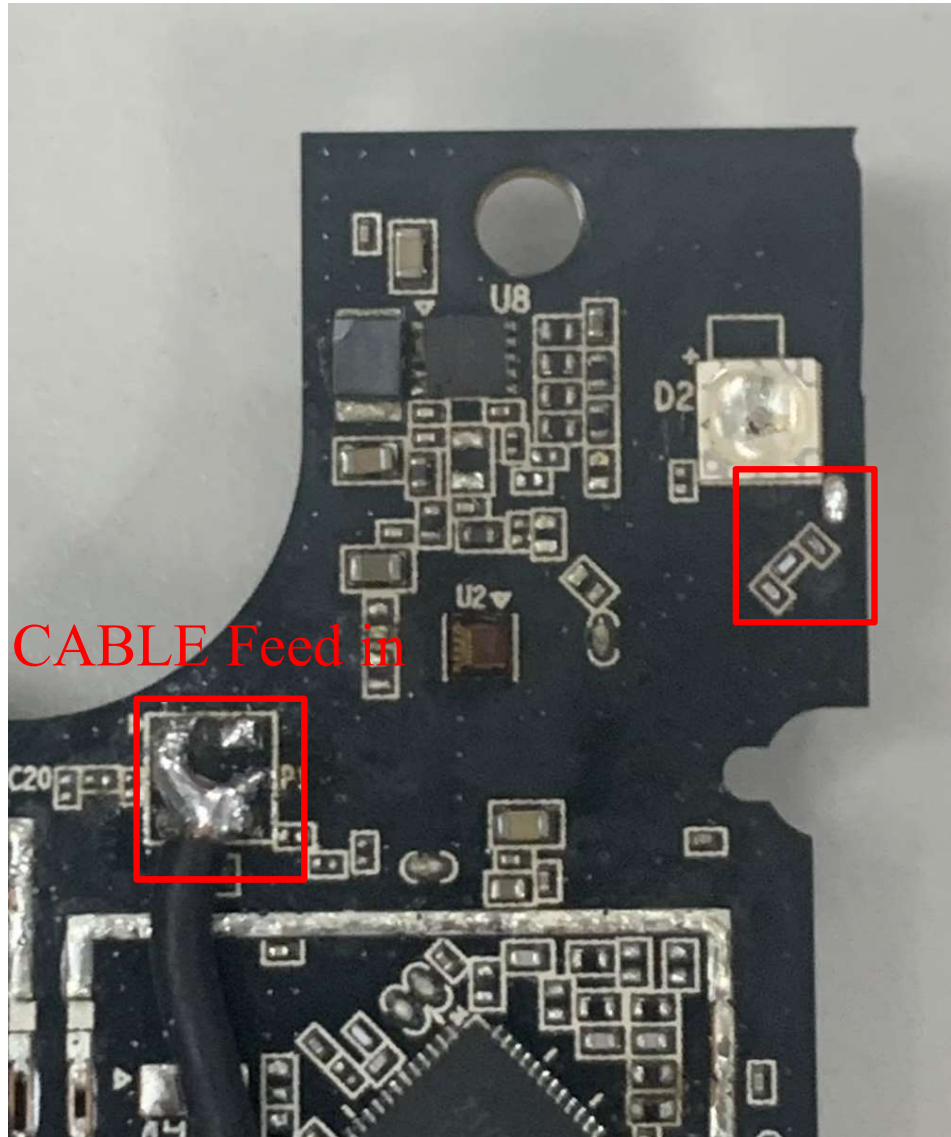
1.1 Experimental Setup



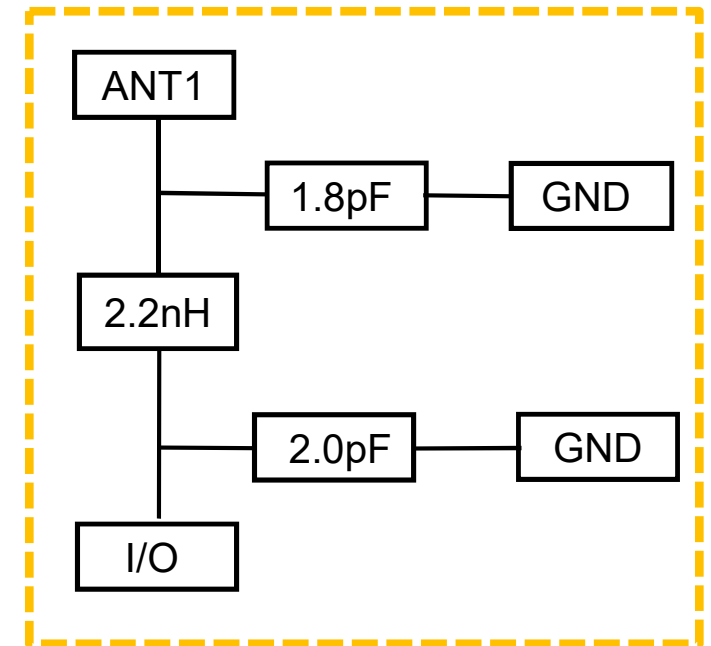
1. Measurement Information

ANT1

1.2 Antenna Solution Detail



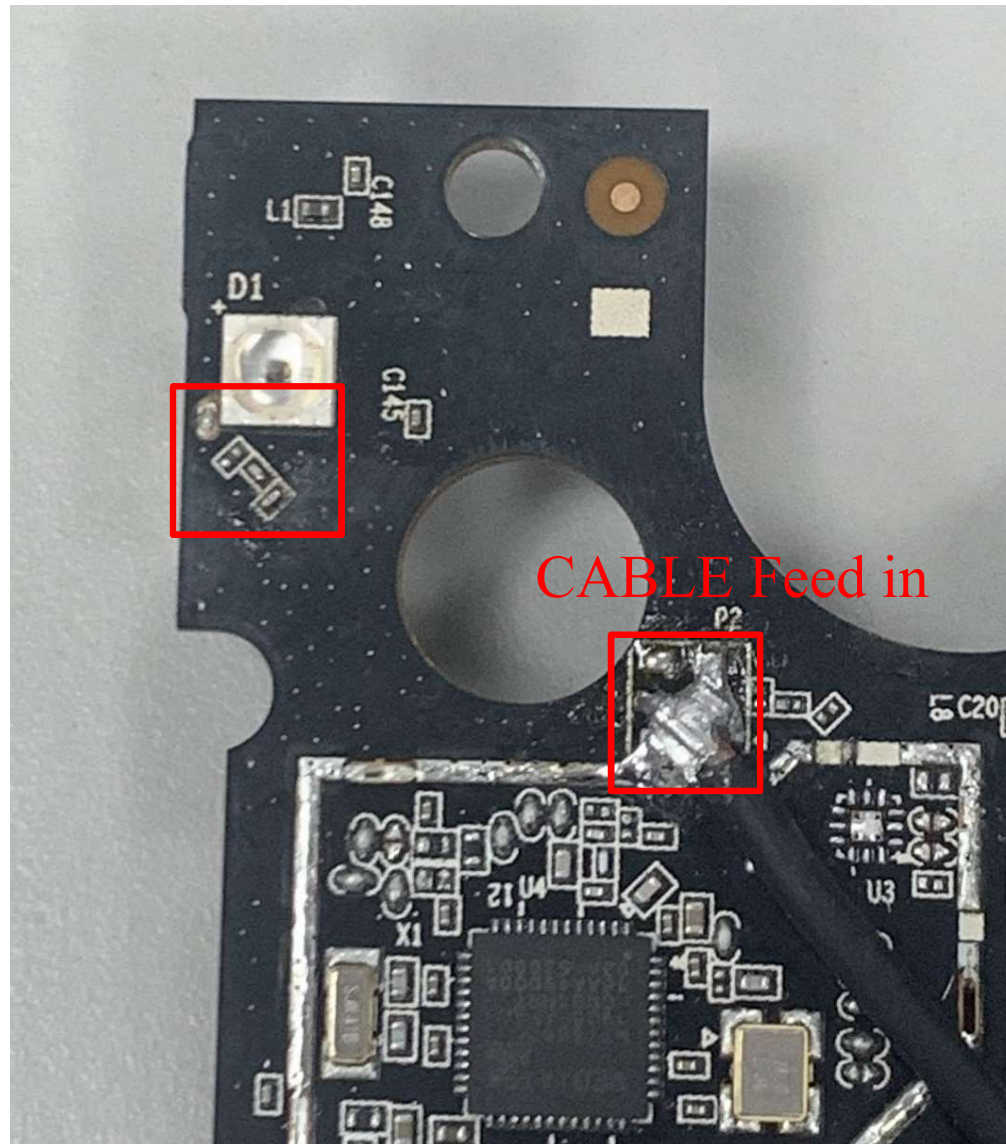
Matching values



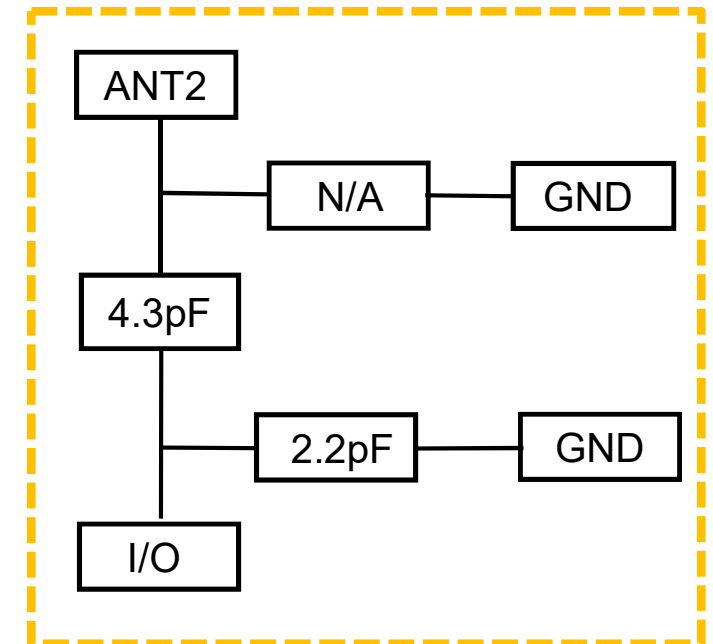
1. Measurement Information

ANT2

1.2 Antenna Solution Detail



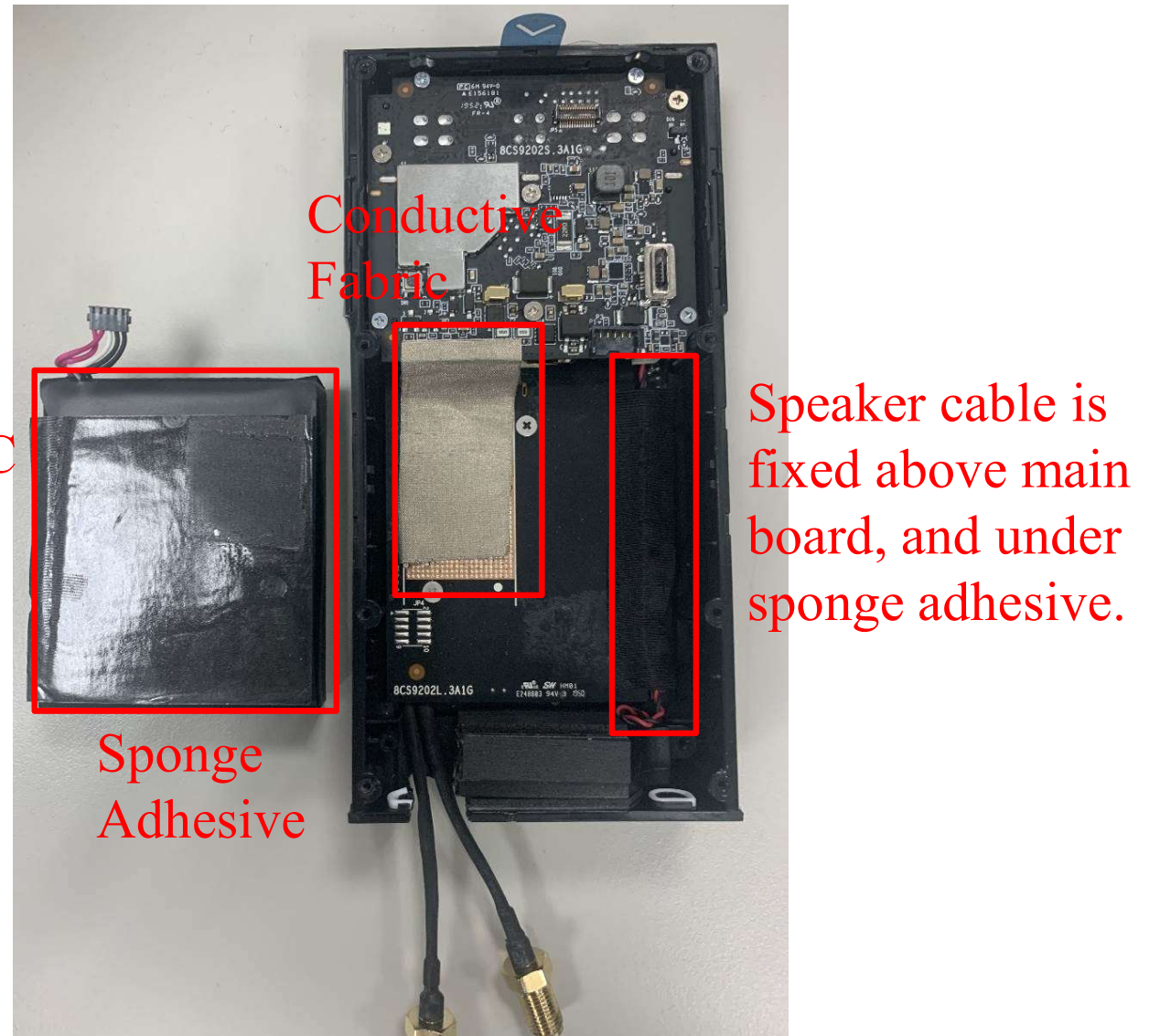
Matching values



1. Measurement Information

DUT1 Sample Case Photos

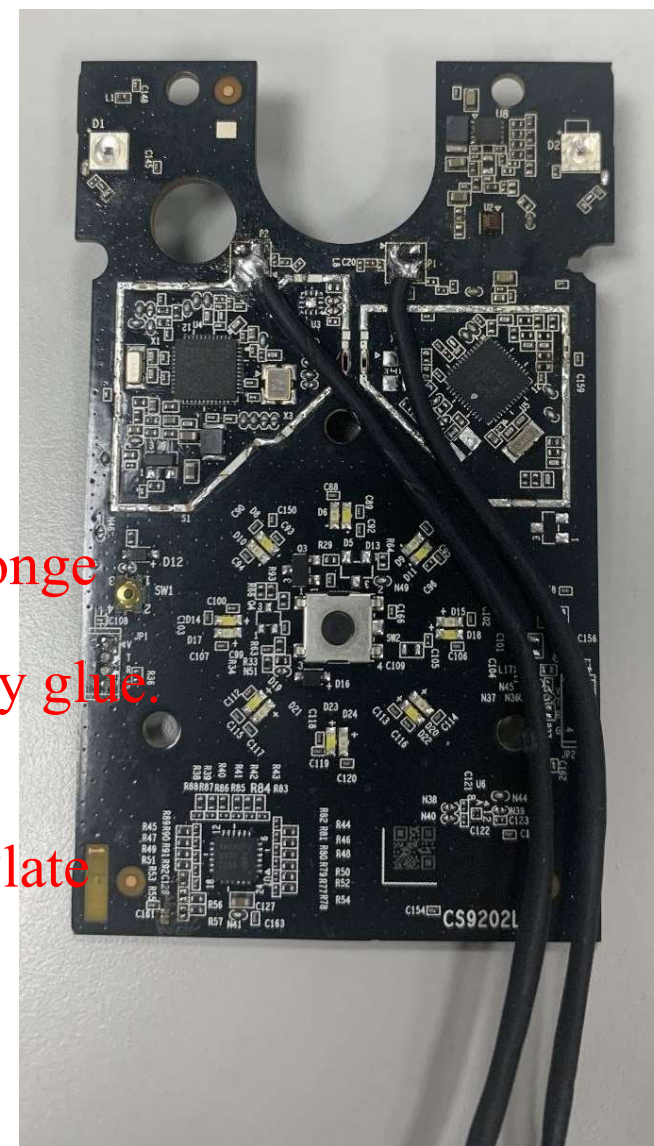
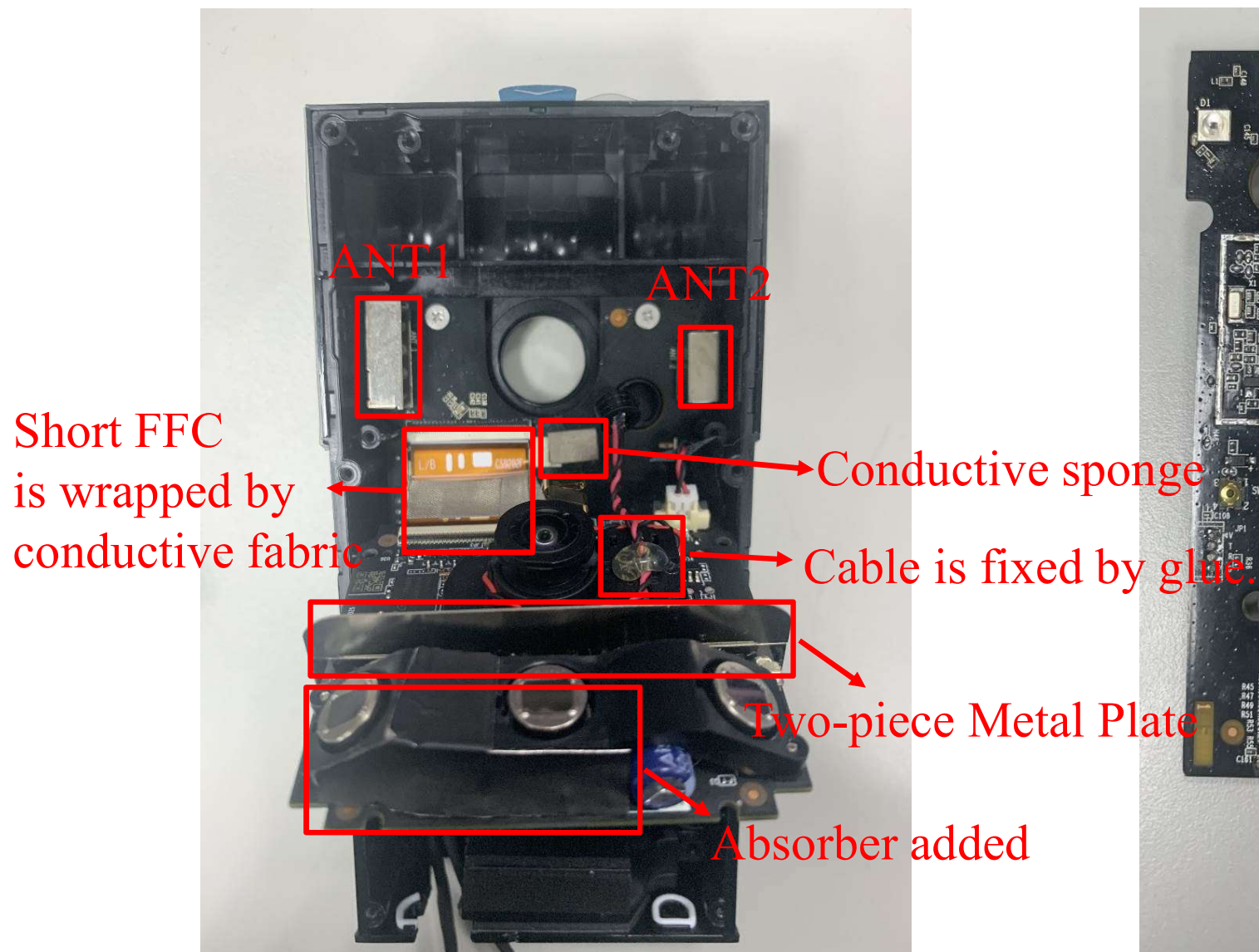
1.2 Antenna Solution Detail



1. Measurement Information

DUT1 Sample Case Photos

1.2 Antenna Solution Detail



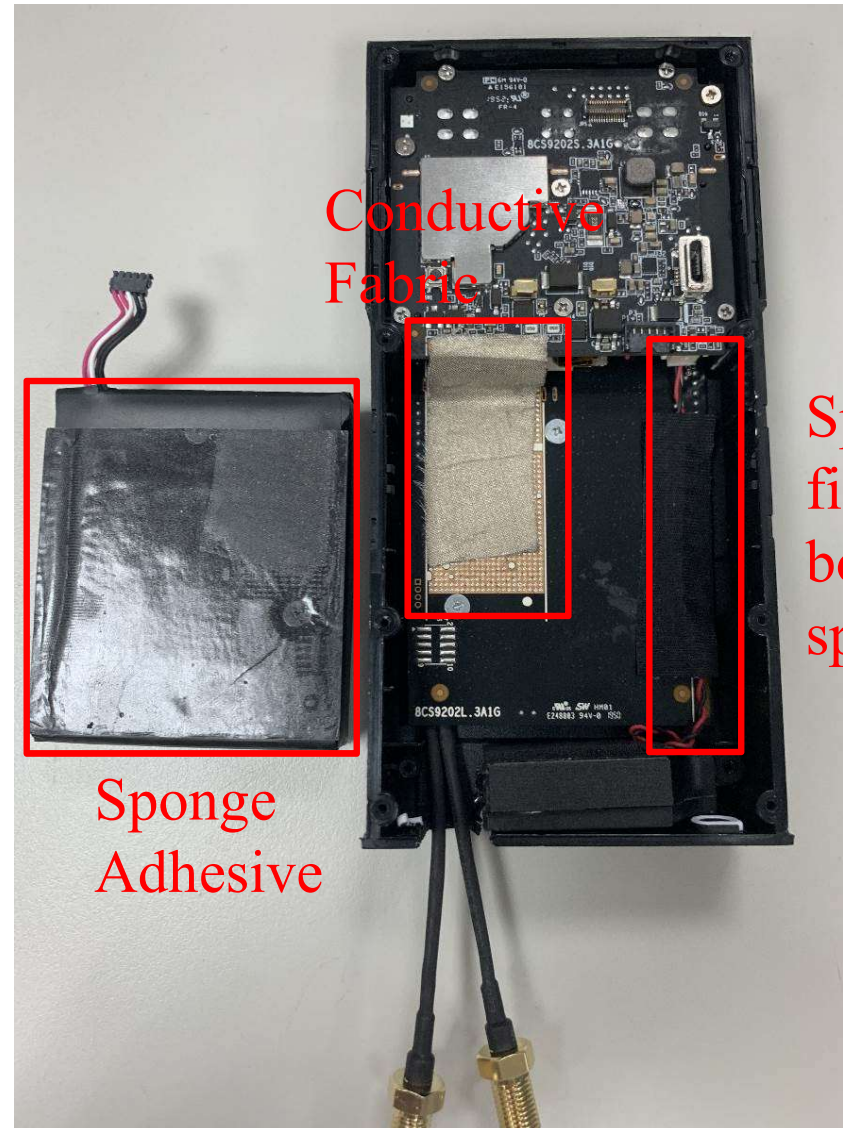
1. Measurement Information

DUT2 Sample Case Photos

1.2 Antenna Solution Detail



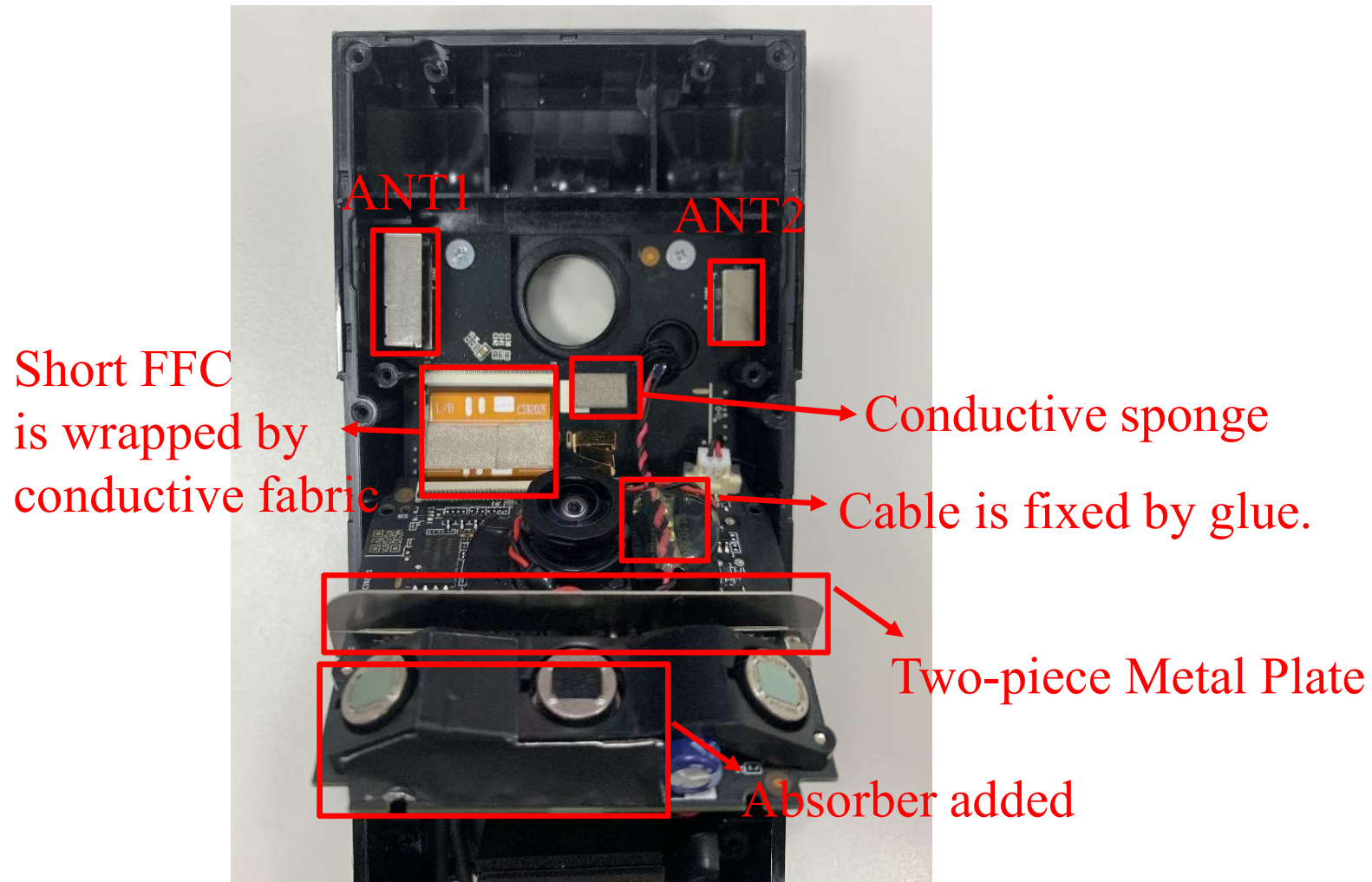
Battery FFC
Connector



1. Measurement Information

DUT2 Sample Case Photos

1.2 Antenna Solution Detail



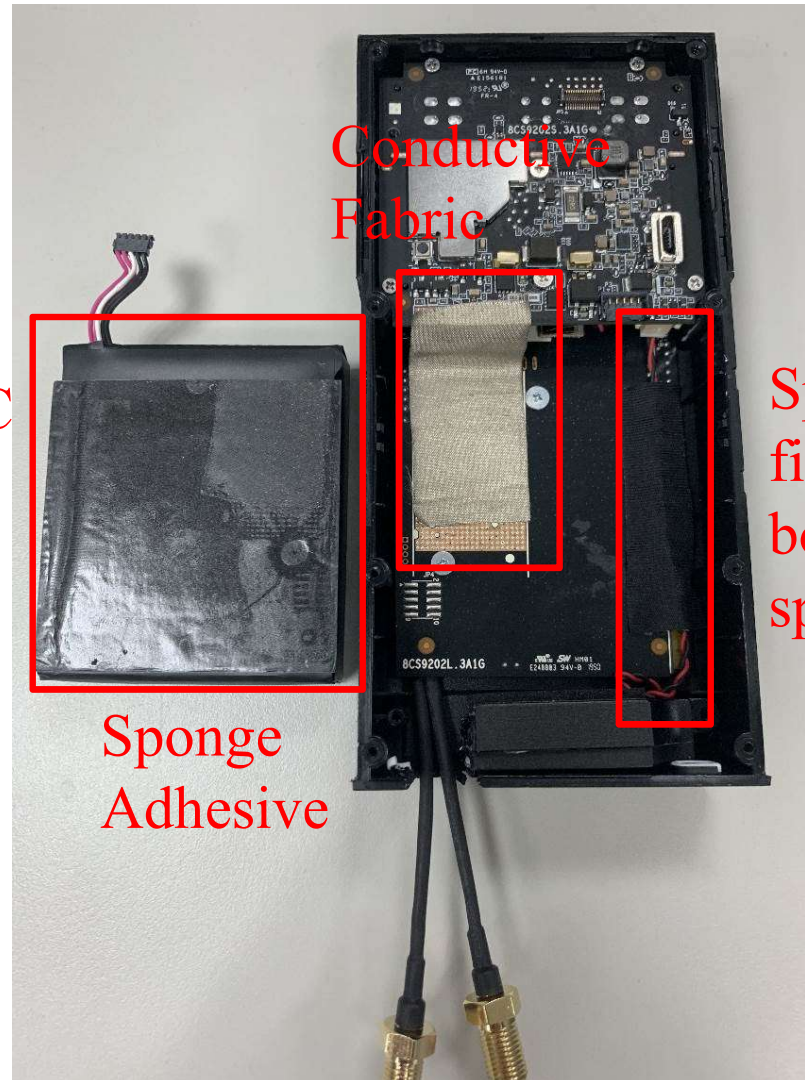
1. Measurement Information

DUT3 Sample Case Photos

1.2 Antenna Solution Detail



Battery FFC
Connector



Conductive
Fabric

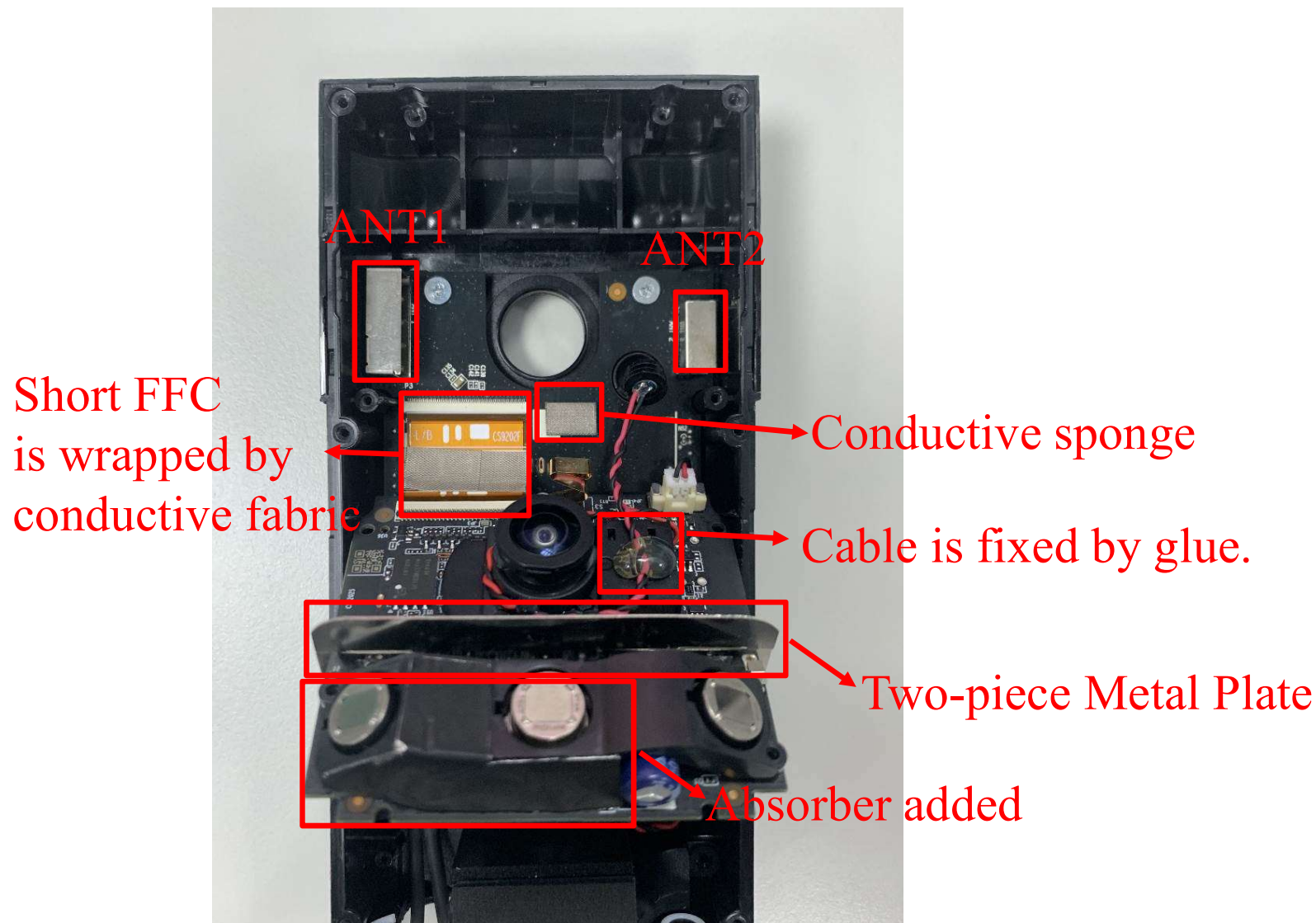
Sponge
Adhesive

Speaker cable is
fixed above main
board, and under
sponge adhesive.

1. Measurement Information

DUT3 Sample Case Photos

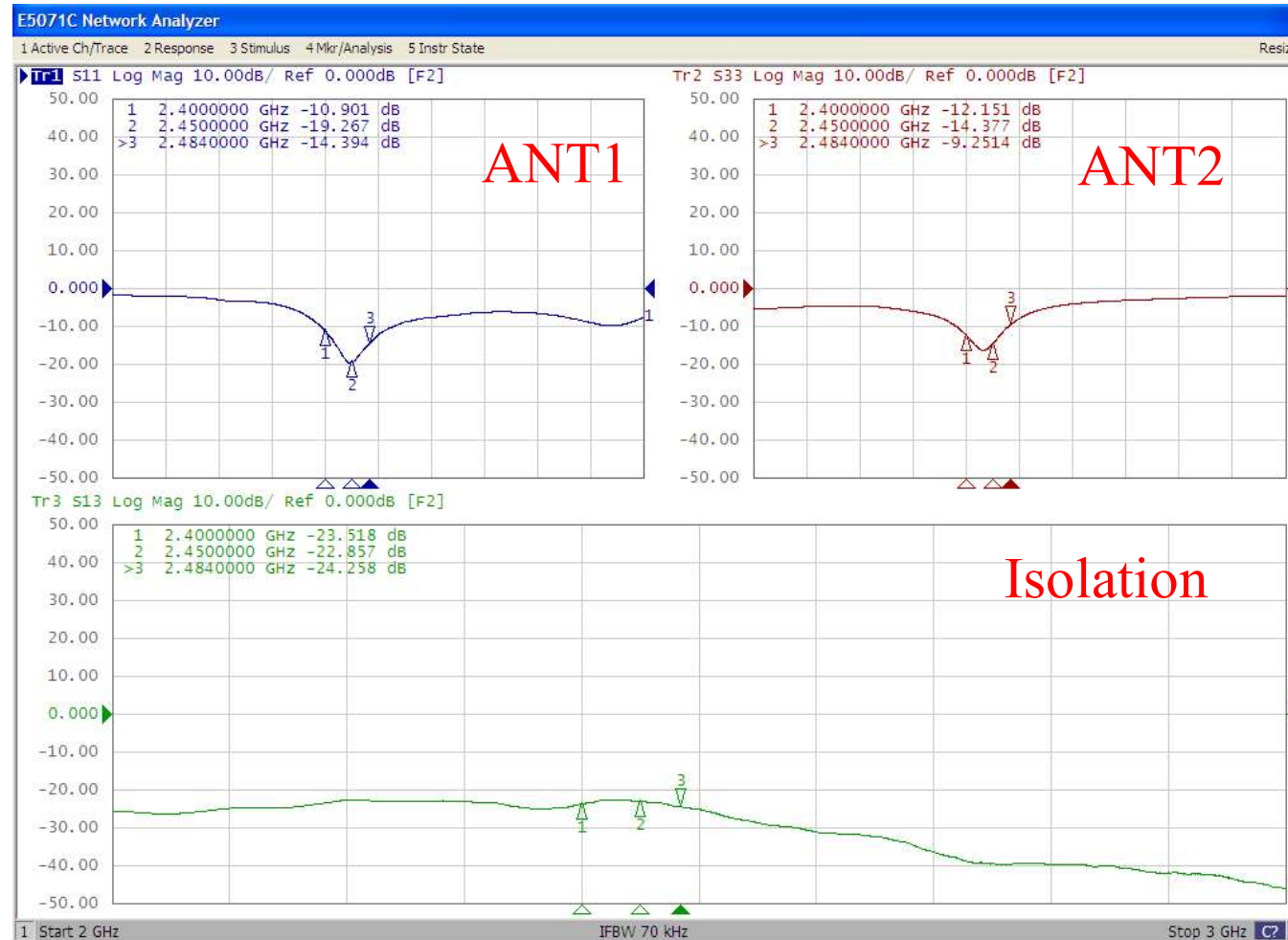
1.2 Antenna Solution Detail



2. Antenna Characteristics

DUT1

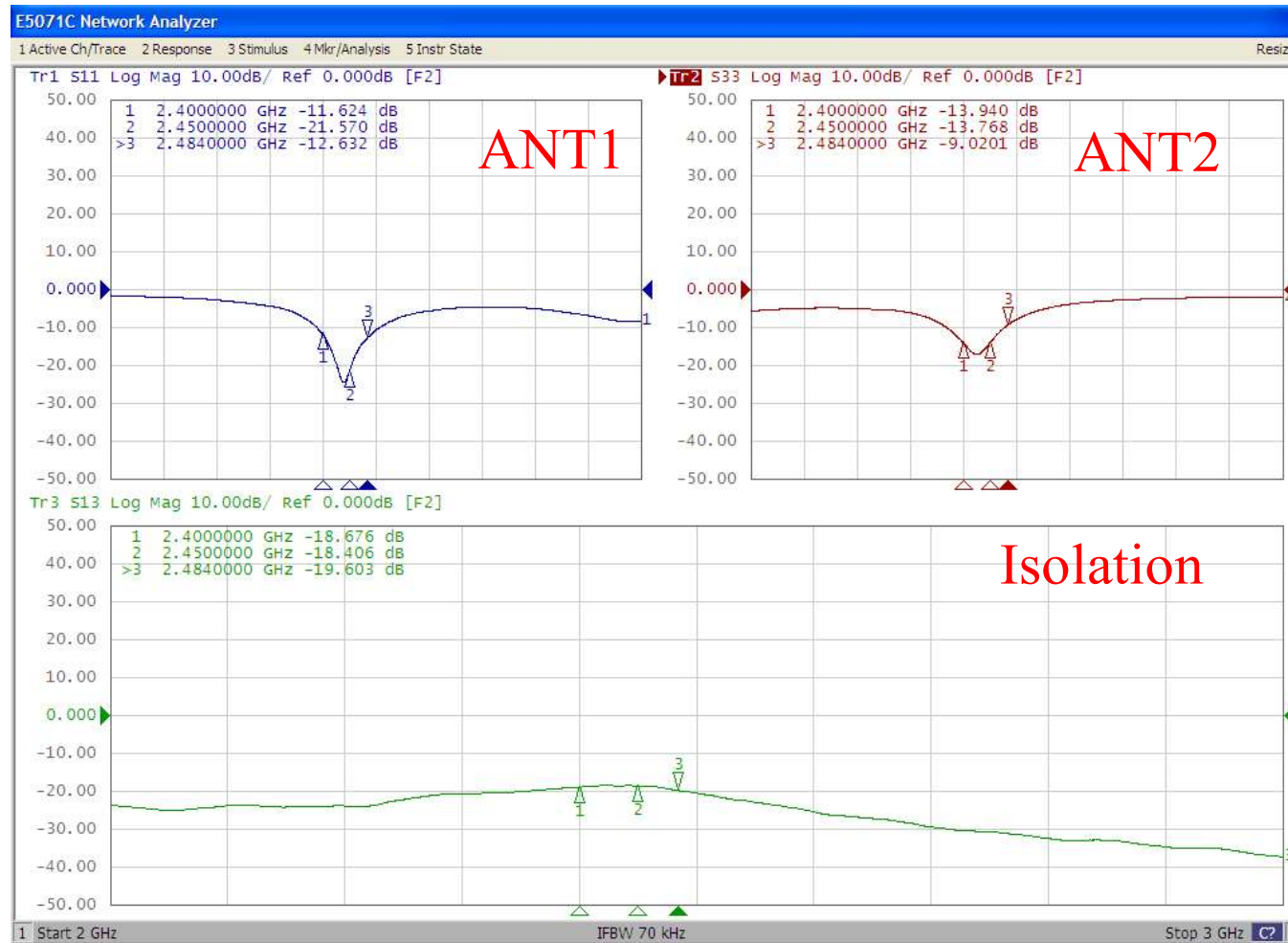
2.1 Return Loss & Isolation



2. Antenna Characteristics

DUT2

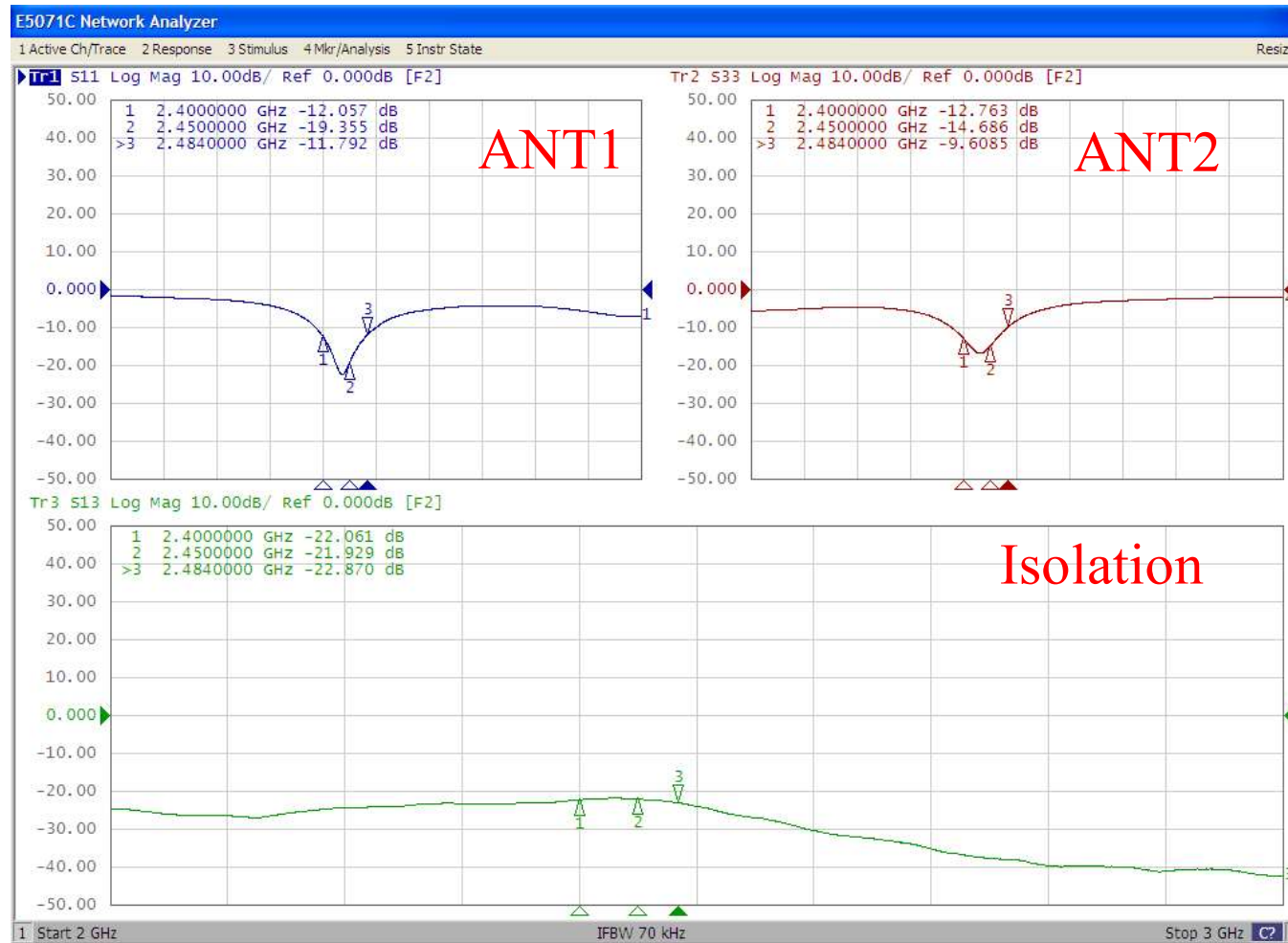
2.1 Return Loss & Isolation



2. Antenna Characteristics

DUT3

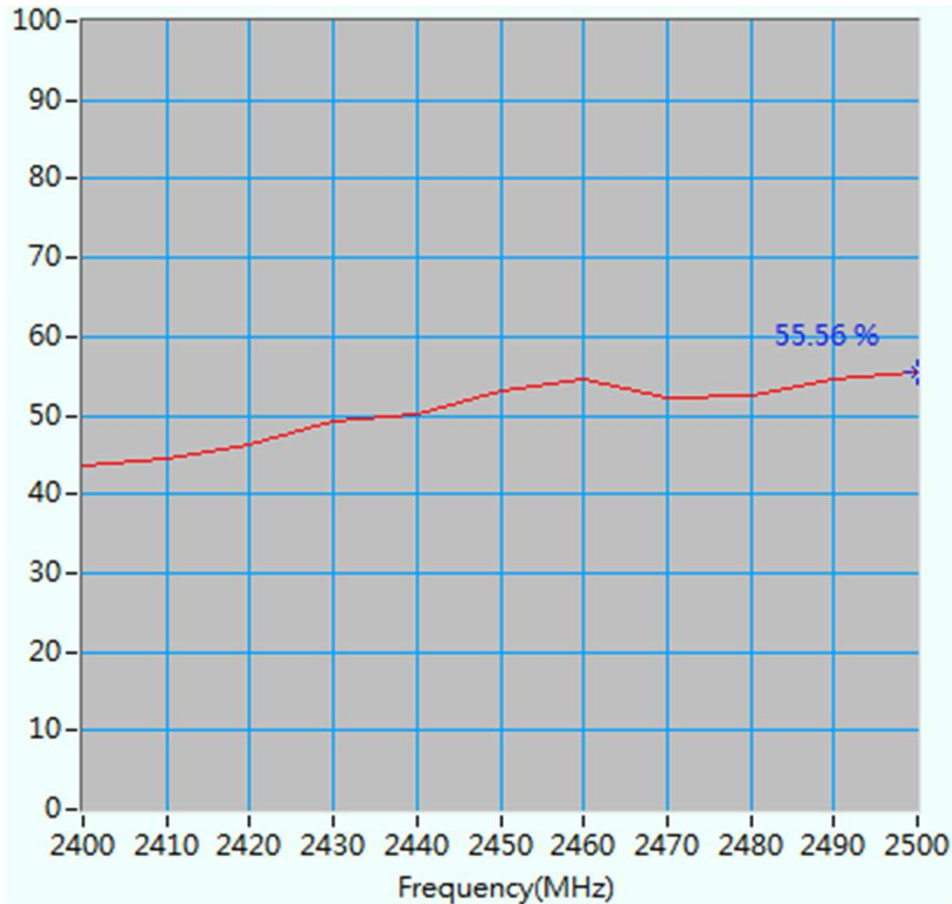
2.1 Return Loss & Isolation



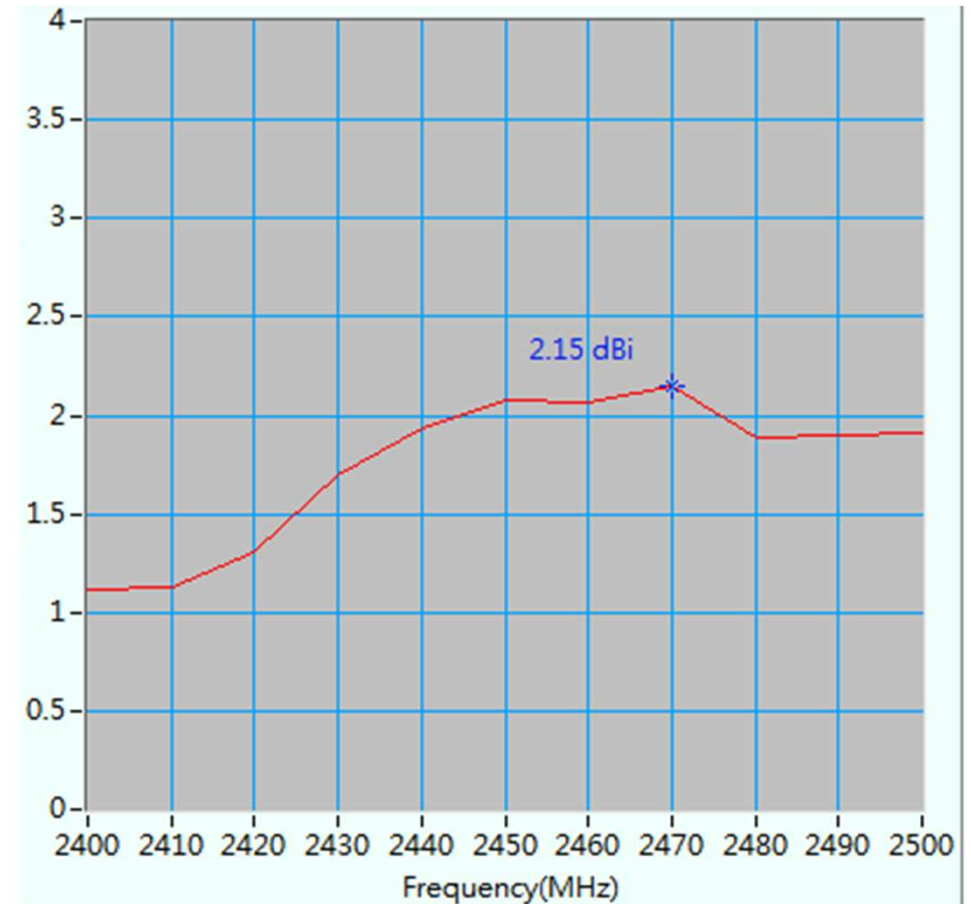
2. Antenna Characteristics

DUT1-ANT1

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2500 MHz : 55.56 %

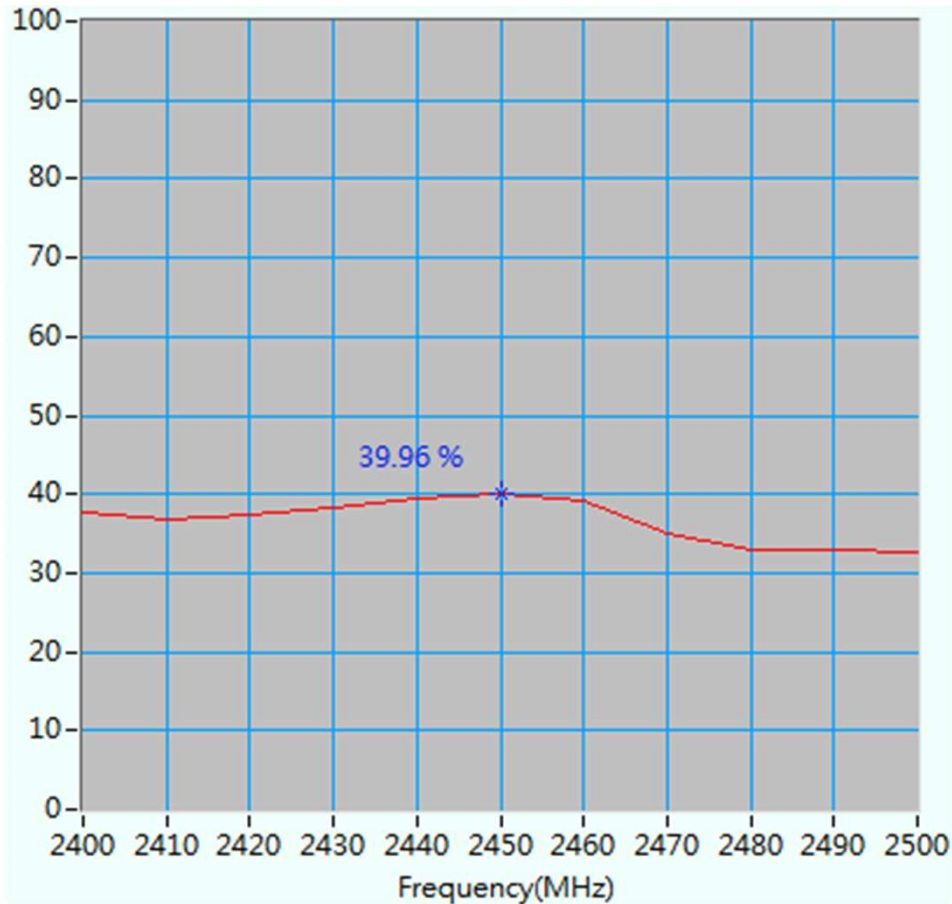


Maximum Peak Gain at 2470 MHz : 2.15 dBi

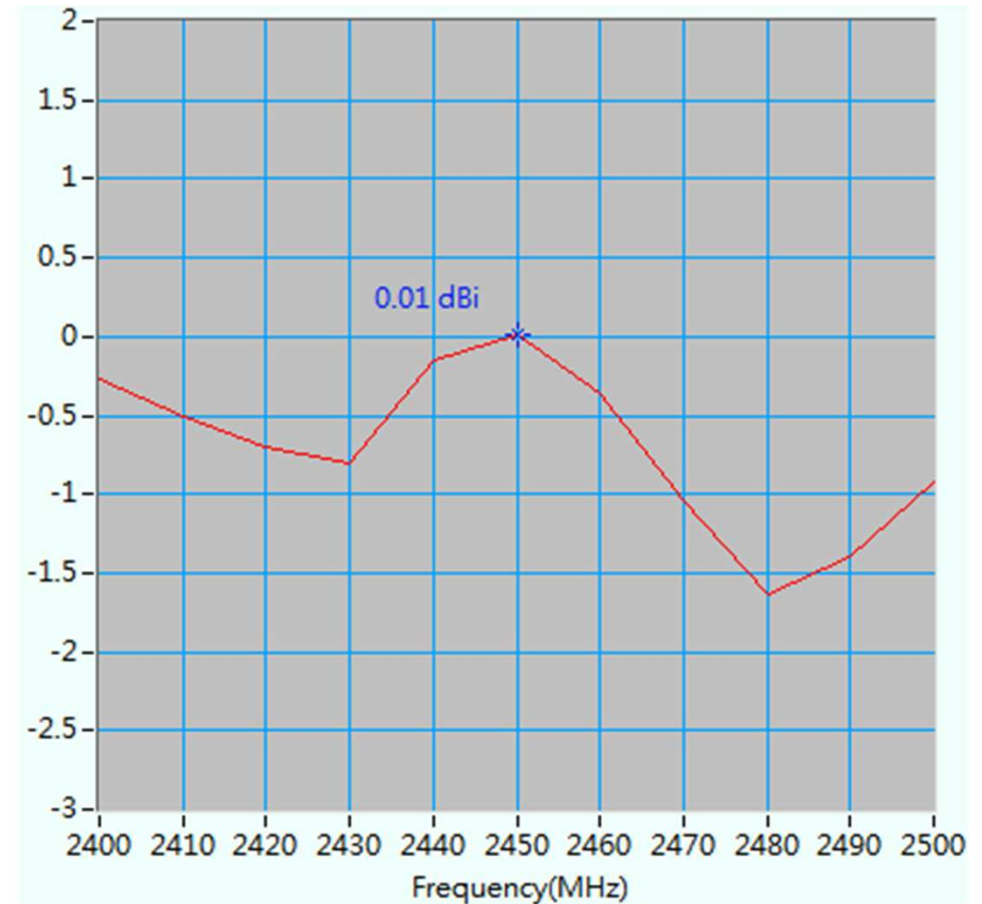
2. Antenna Characteristics

DUT1-ANT2

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2450 MHz : 39.96 %

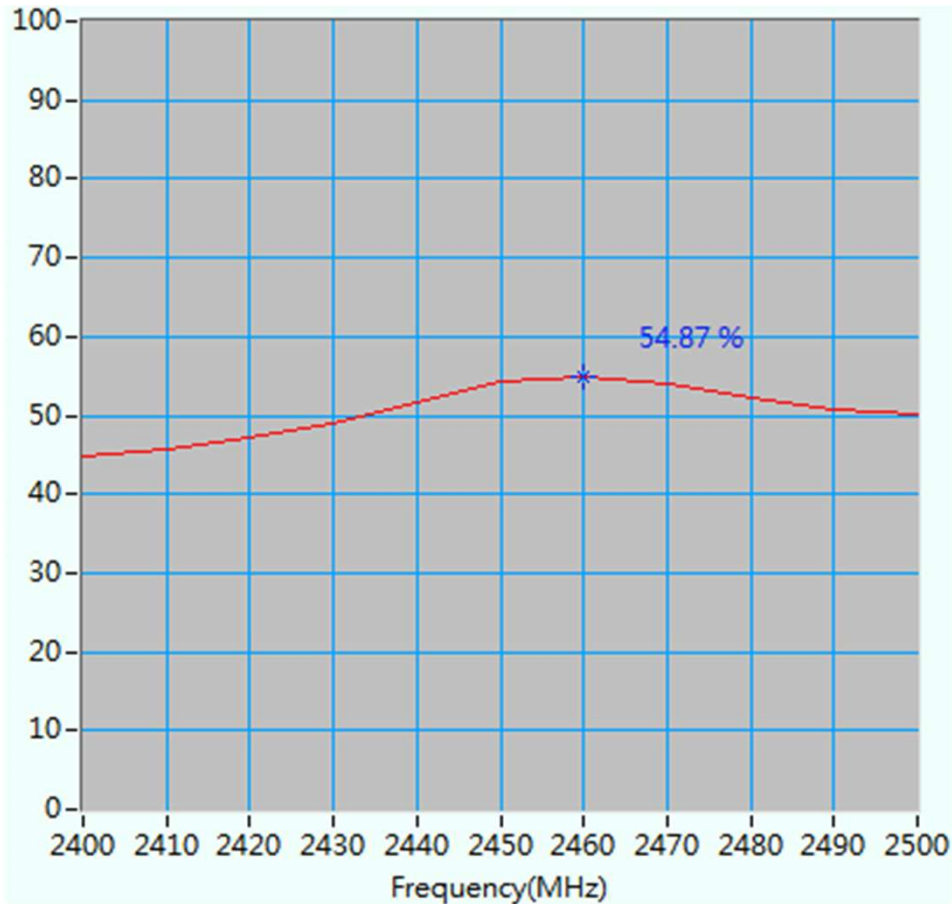


Maximum Peak Gain at 2450 MHz : 0.01 dBi

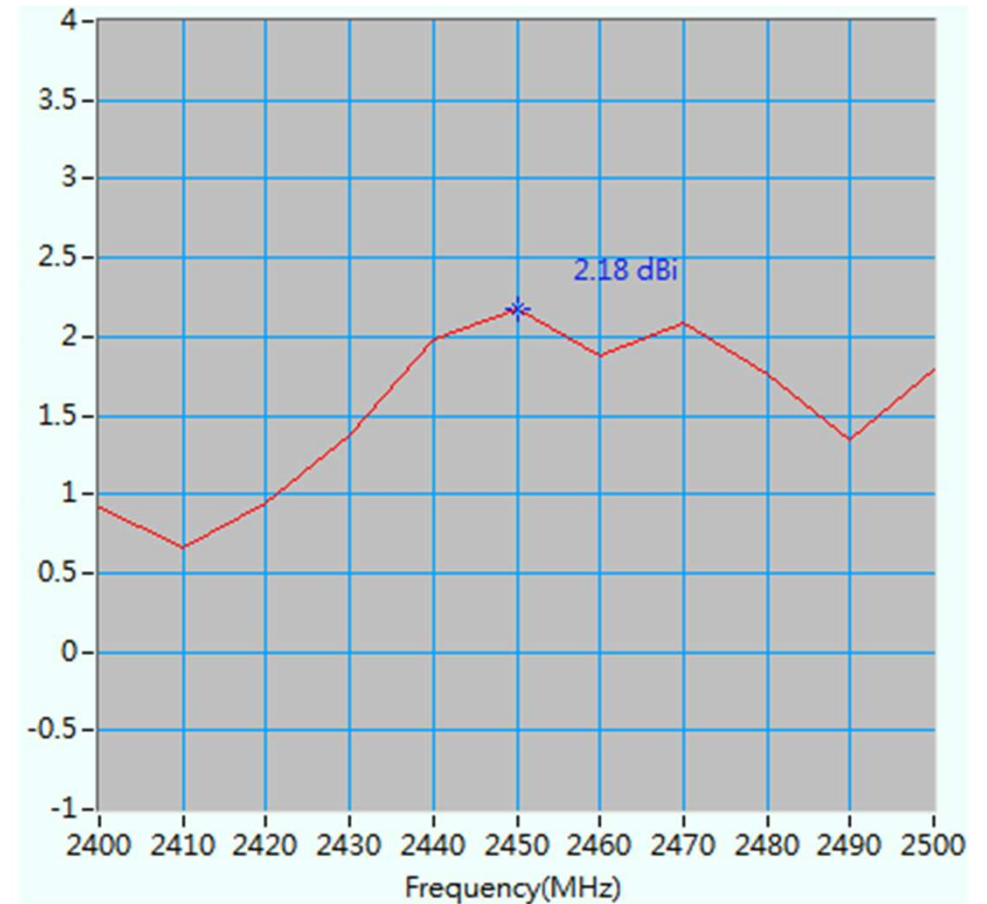
2. Antenna Characteristics

DUT2-ANT1

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2460 MHz : 54.87 %

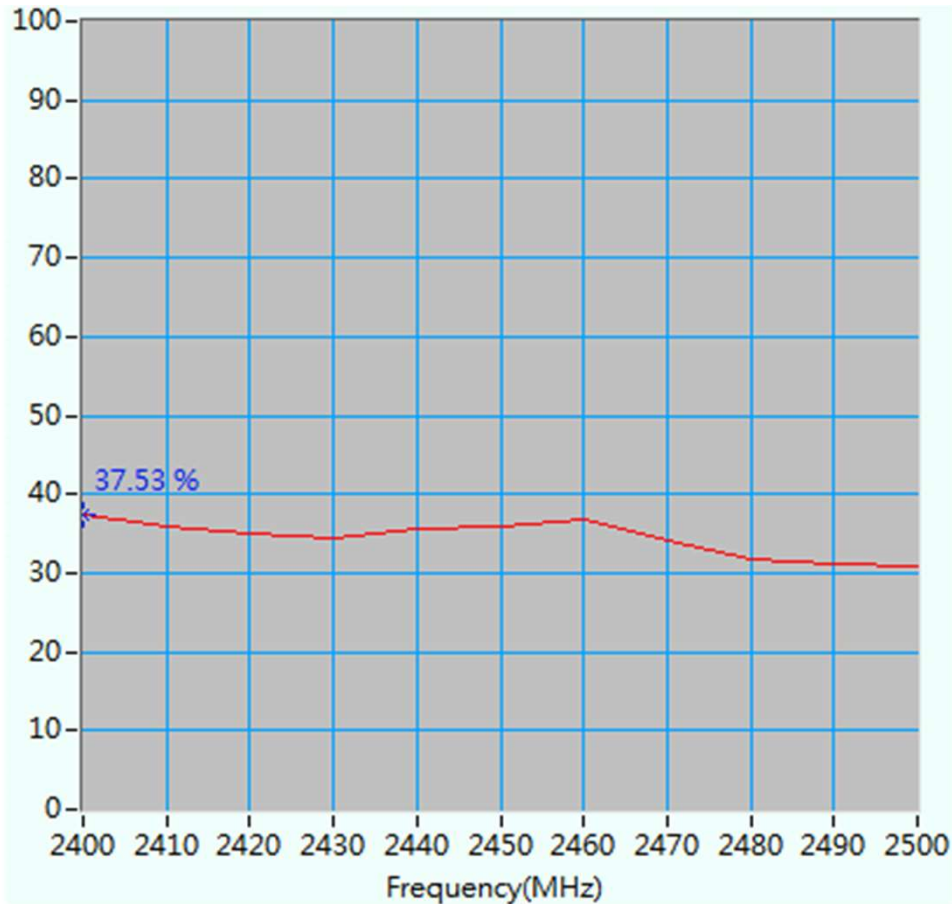


Maximum Peak Gain at 2450 MHz : 2.18 dBi

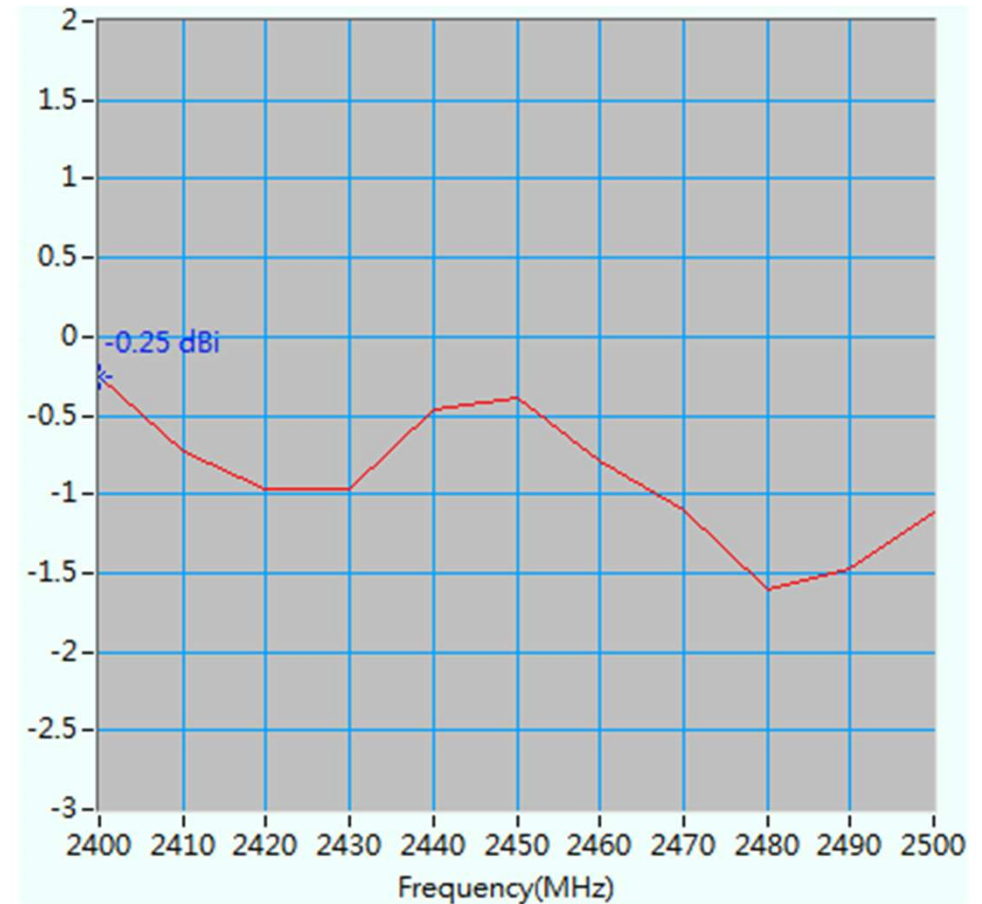
2. Antenna Characteristics

DUT2-ANT2

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2400 MHz : 37.53 %

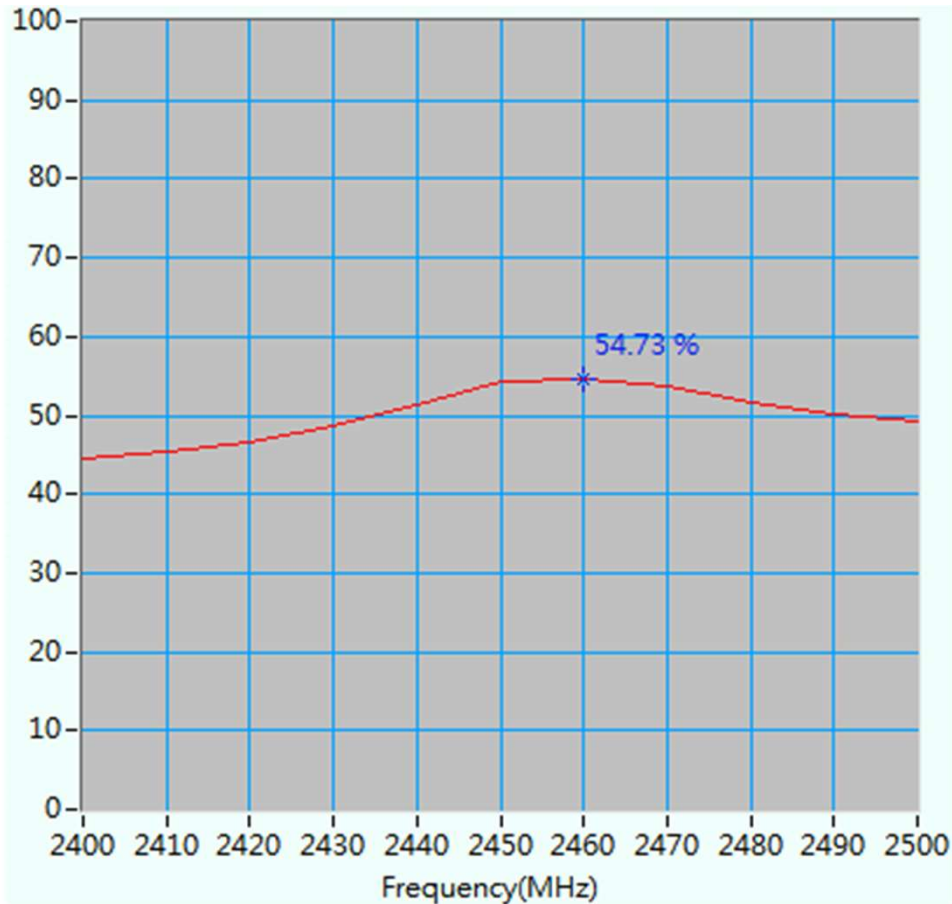


Maximum Peak Gain at 2400 MHz : -0.25 dBi

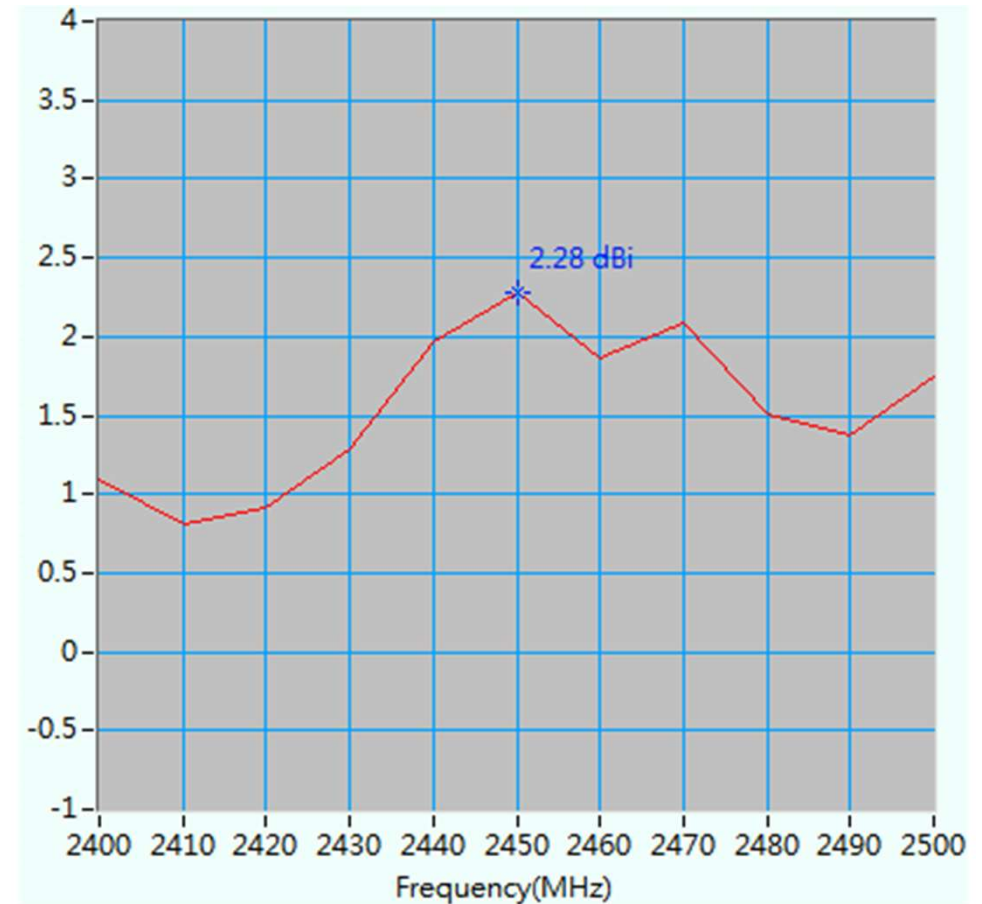
2. Antenna Characteristics

DUT3-ANT1

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2460 MHz : 54.73 %

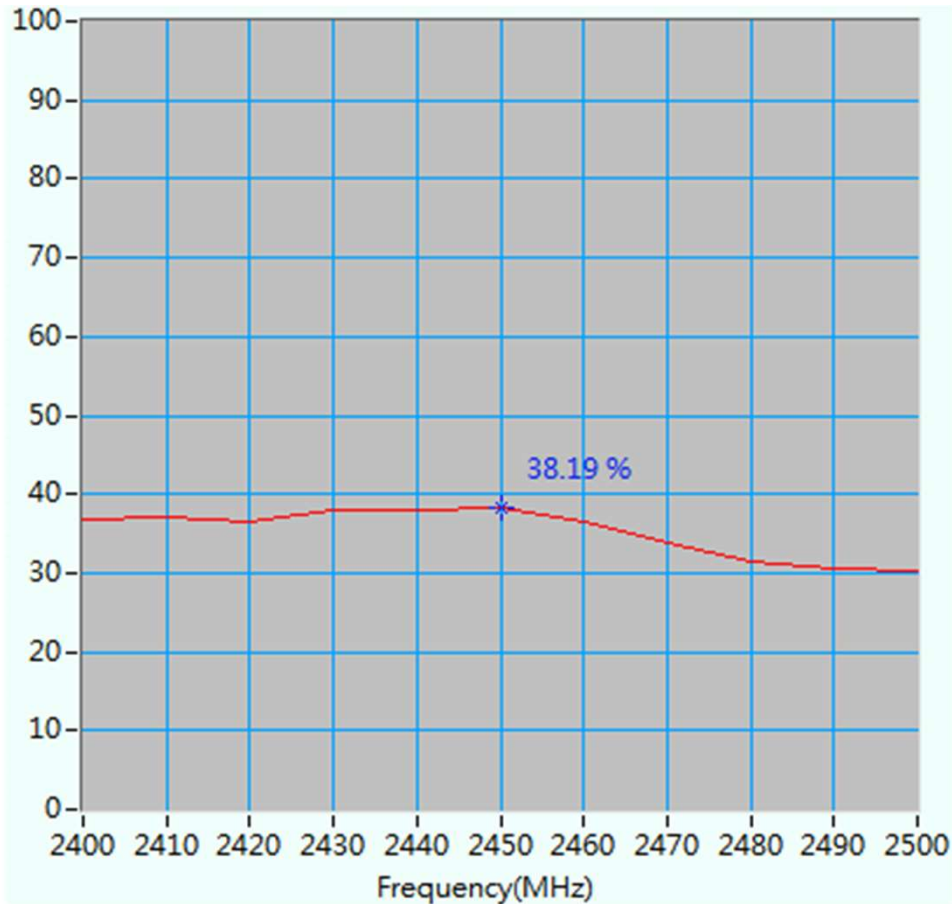


Maximum Peak Gain at 2450 MHz : 2.28 dBi

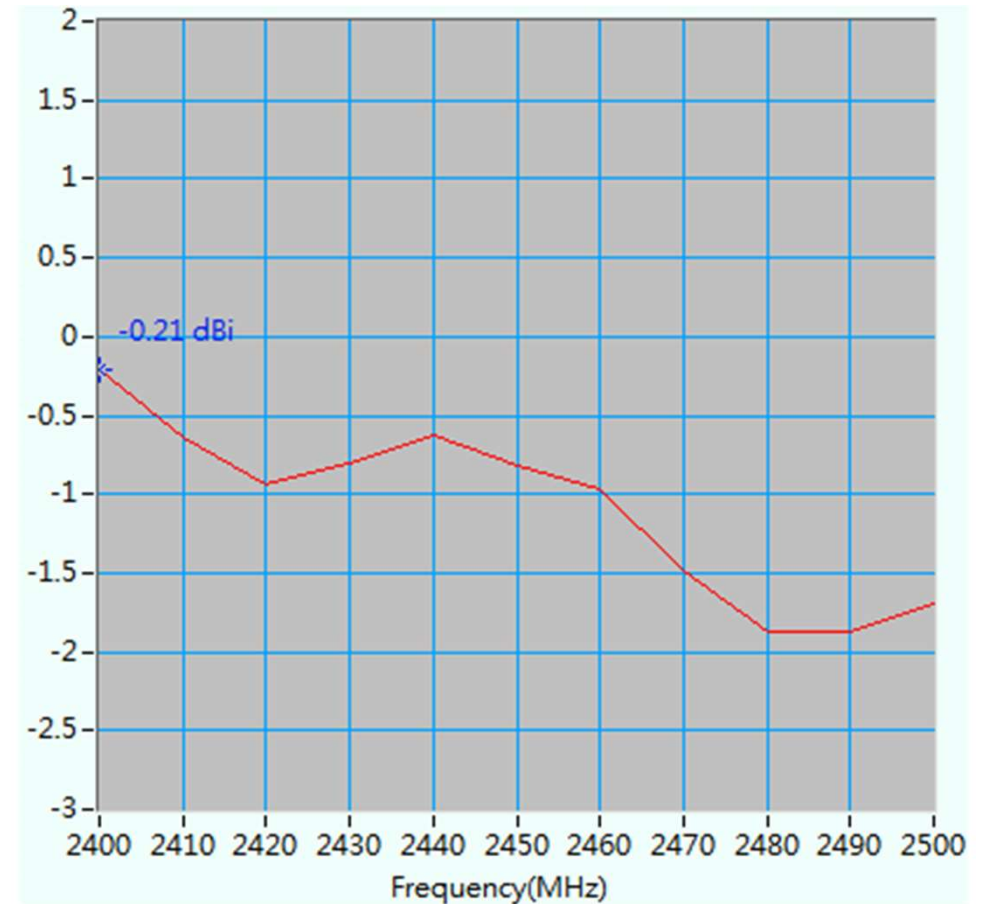
2. Antenna Characteristics

DUT3-ANT2

2.2 Antenna Efficiency and Peak Gain



Maximum Efficiency at 2450 MHz : 38.19 %



Maximum Peak Gain at 2400 MHz : -0.21 dBi

2. Antenna Characteristics

ANT1

2.2 Antenna Efficiency and Peak Gain

ANT1	DUT1		DUT2		DUT3	
Frequency (GHz)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)
2.4	43.74	1.12	44.84	0.91	44.38	1.10
2.45	53.17	2.08	54.27	2.18	54.43	2.28
2.5	55.56	1.92	50.17	1.80	49.33	1.75

2. Antenna Characteristics

ANT2

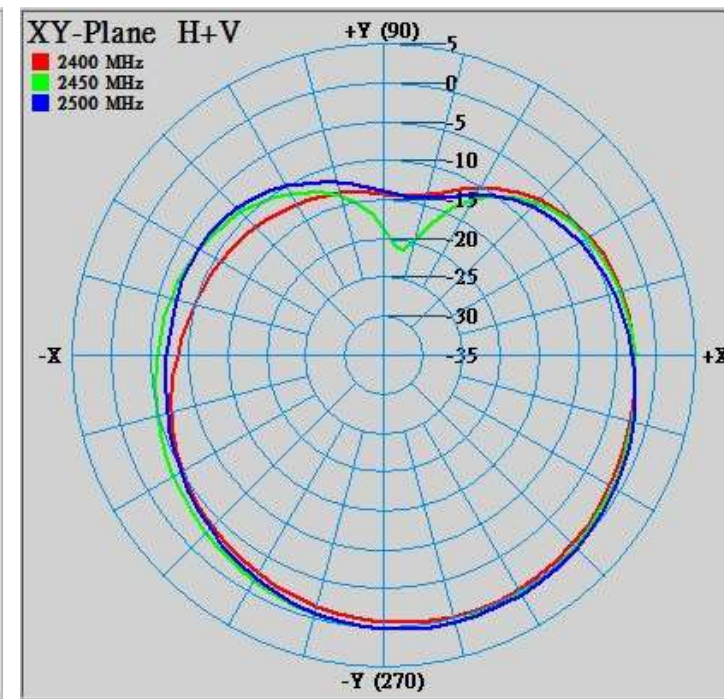
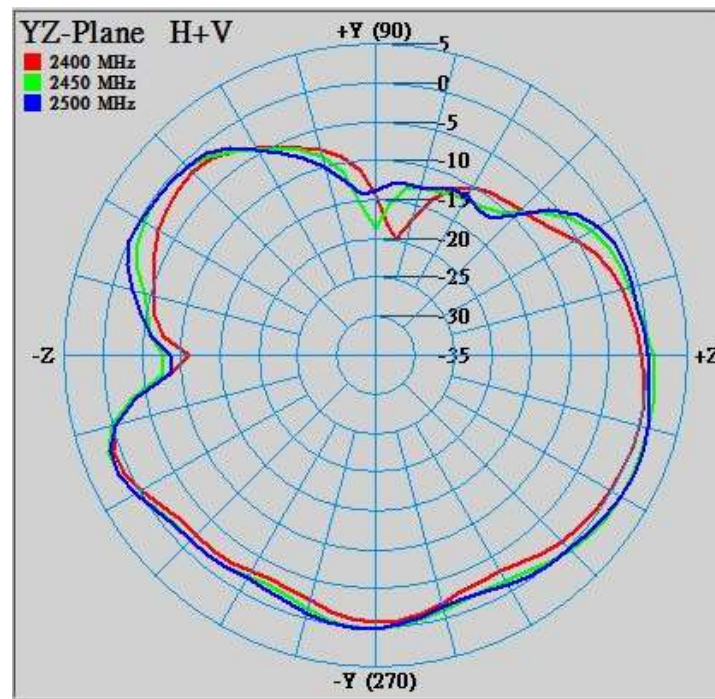
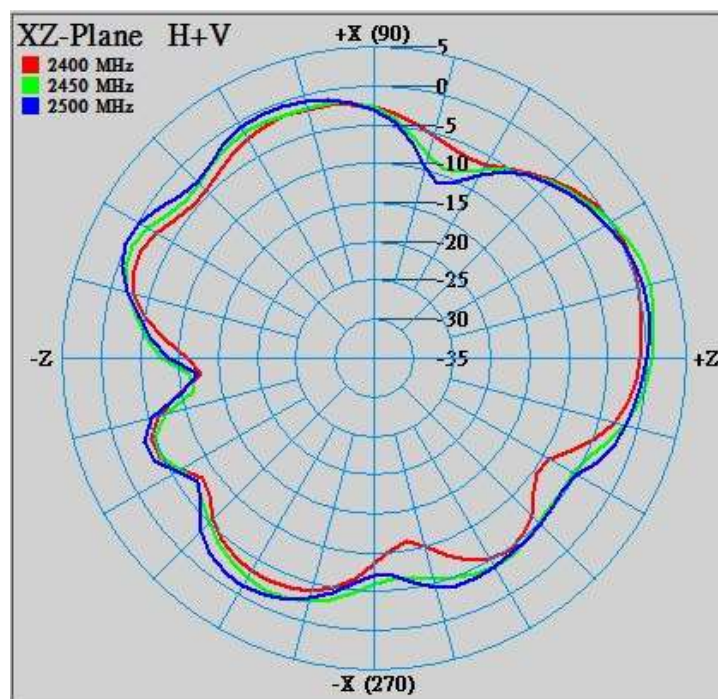
2.2 Antenna Efficiency and Peak Gain

ANT2	DUT1		DUT2		DUT3	
Frequency (GHz)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)	Efficiency (%)	Peak gain (dBi)
2.4	37.58	-0.27	37.53	-0.25	36.92	-0.21
2.45	39.96	0.01	35.76	-0.38	38.19	-0.83
2.5	32.78	-0.93	30.98	-1.11	30.27	-1.70

2. Antenna Characteristics

DUT1-ANT1

2.3 2D Radiation Patterns

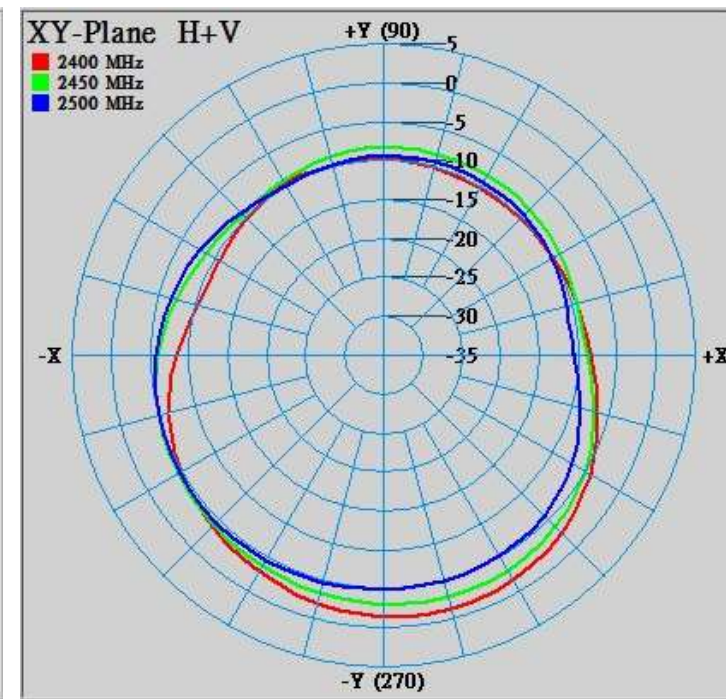
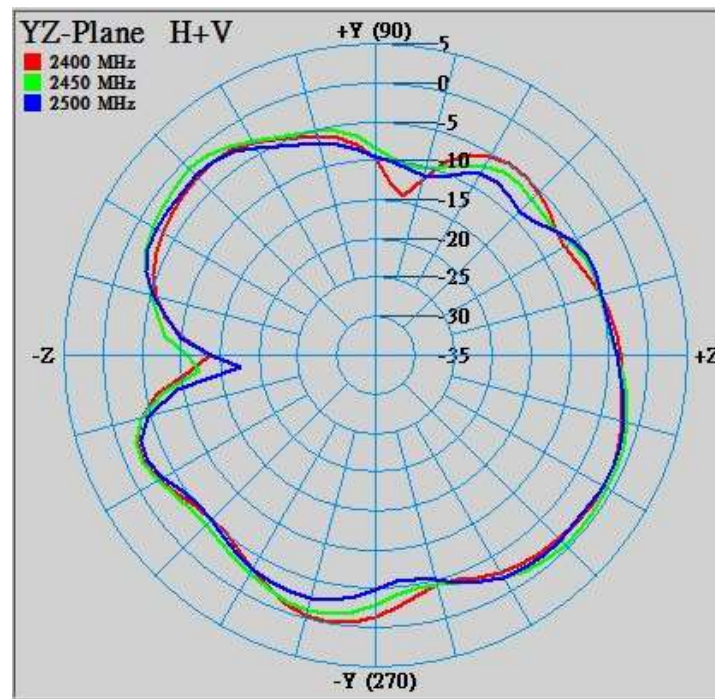
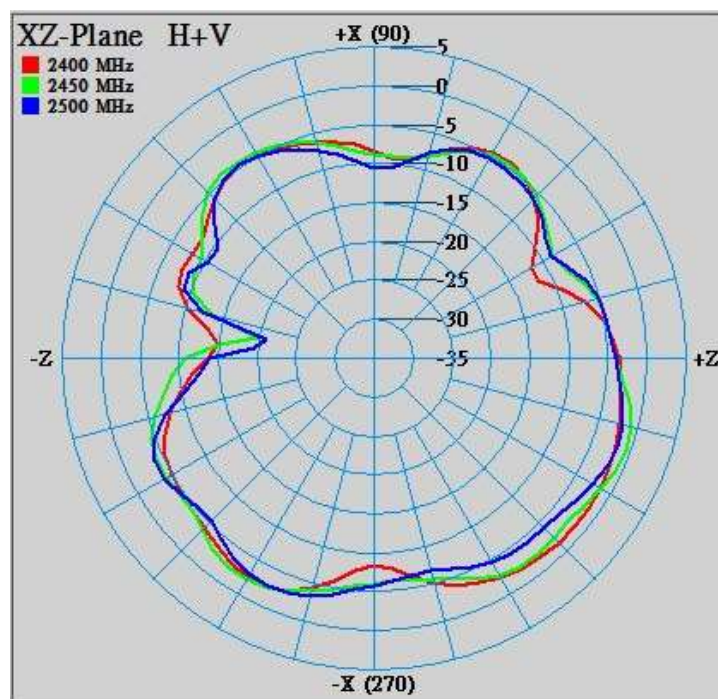


	ZX plane		ZY plane		XY plane	
Frequency [MHz]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	0.38	-3.79	0.93	-2.89	-0.19	-4.15
2450	1.64	-2.92	1.58	-1.80	0.42	-3.47
2500	0.82	-2.79	1.56	-1.70	0.52	-3.58

2. Antenna Characteristics

DUT1-ANT2

2.3 2D Radiation Patterns

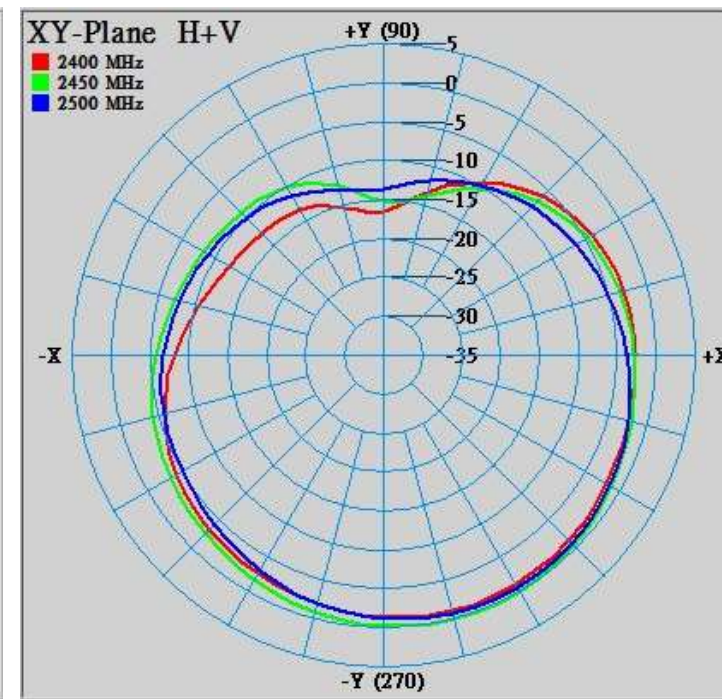
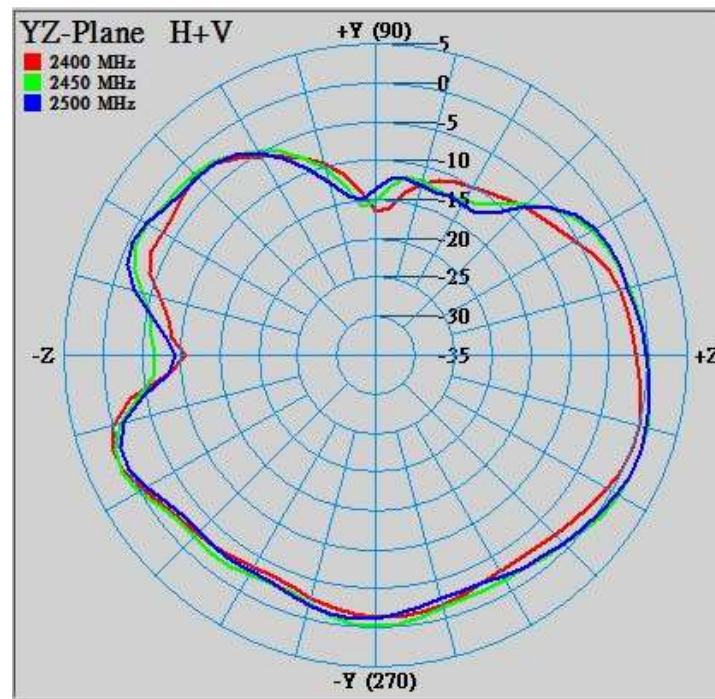
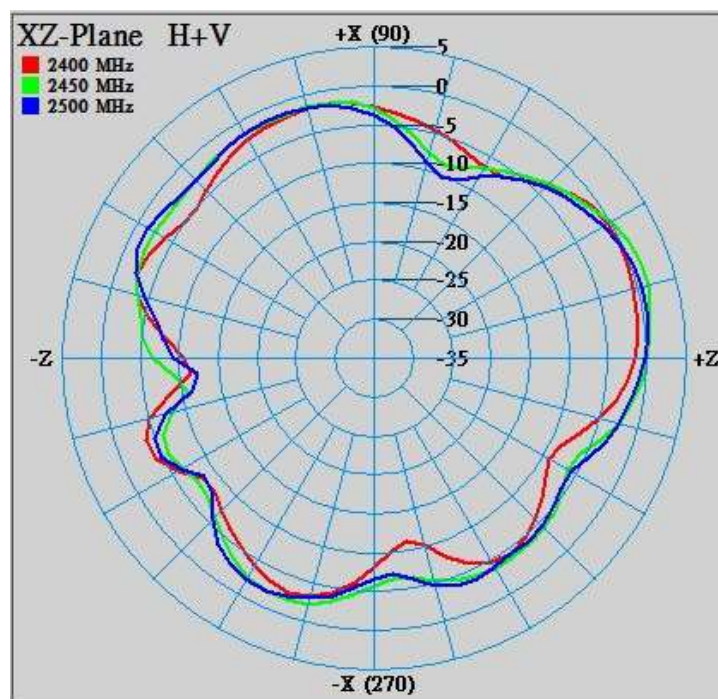


	ZX plane		ZY plane		XY plane	
Frequency [MHz]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-1.35	-5.08	-0.27	-3.85	-1.25	-5.51
2450	-0.51	-4.74	-0.45	-3.50	-2.85	-5.83
2500	-1.89	-5.53	-1.28	-4.29	-4.54	-6.91

2. Antenna Characteristics

DUT2-ANT1

2.3 2D Radiation Patterns

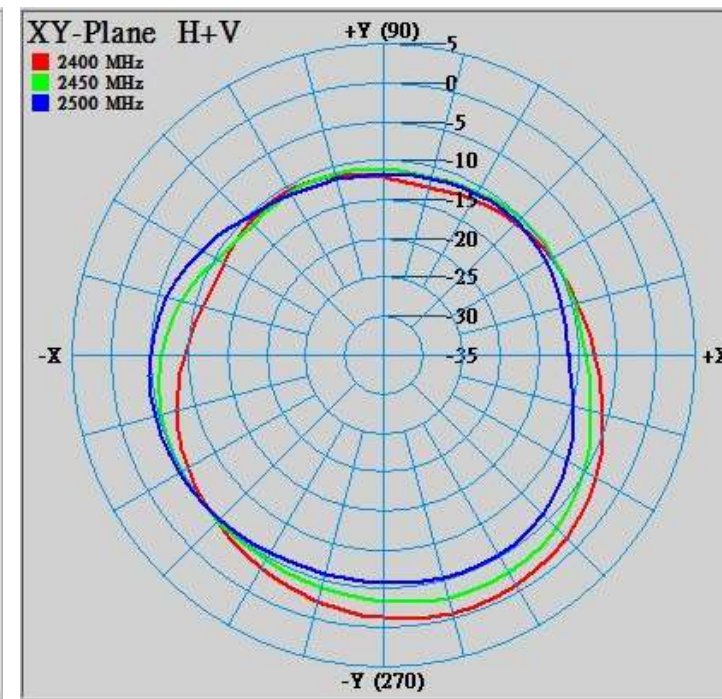
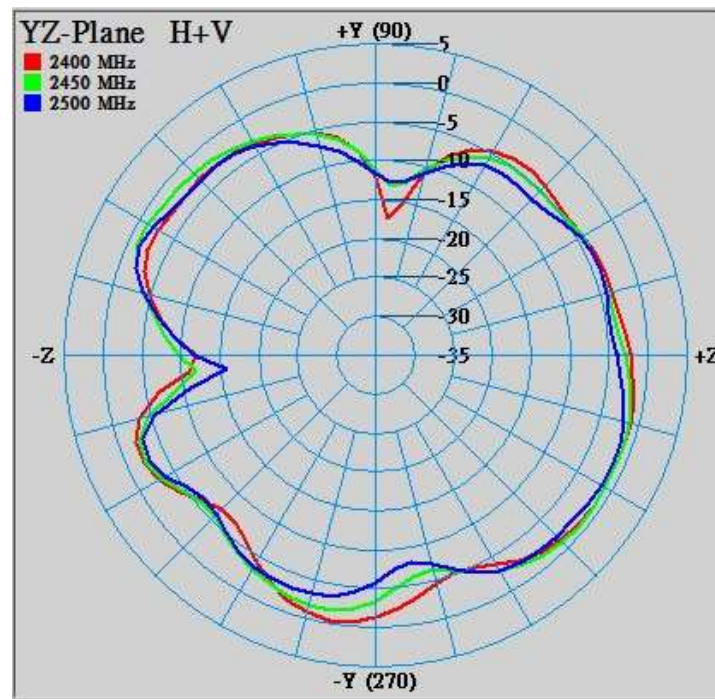
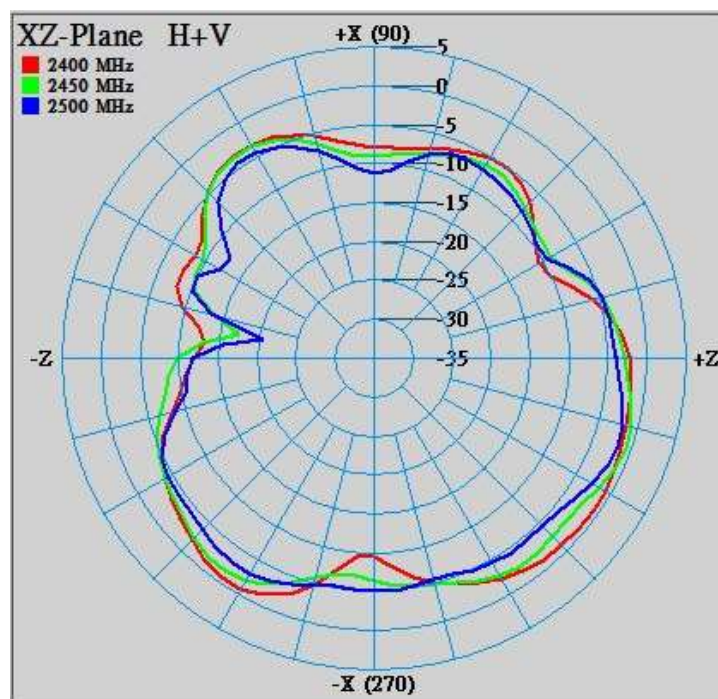


	ZX plane		ZY plane		XY plane	
Frequency [MHz]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-0.27	-4.11	0.83	-3.28	-0.95	-4.37
2450	1.42	-3.14	1.28	-2.25	0.08	-3.55
2500	0.60	-3.40	1.24	-2.60	-0.53	-4.39

2. Antenna Characteristics

DUT2-ANT2

2.3 2D Radiation Patterns

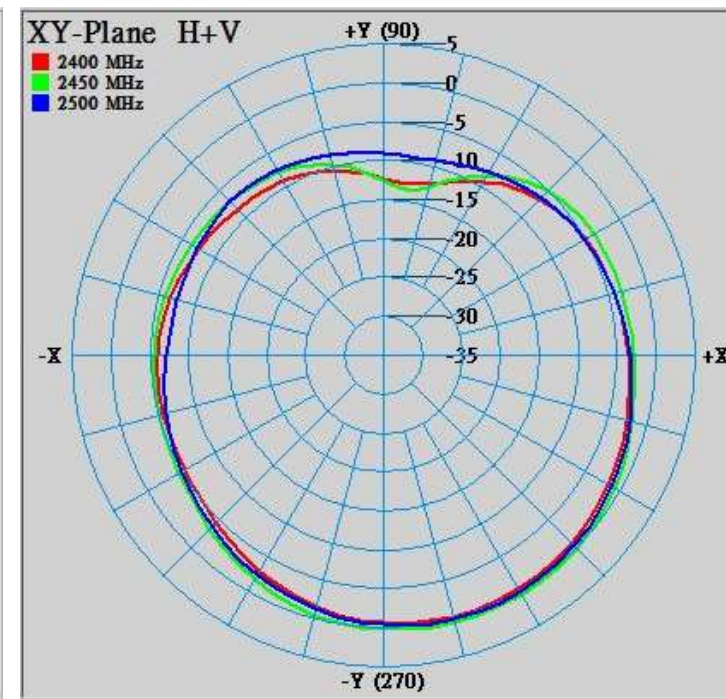
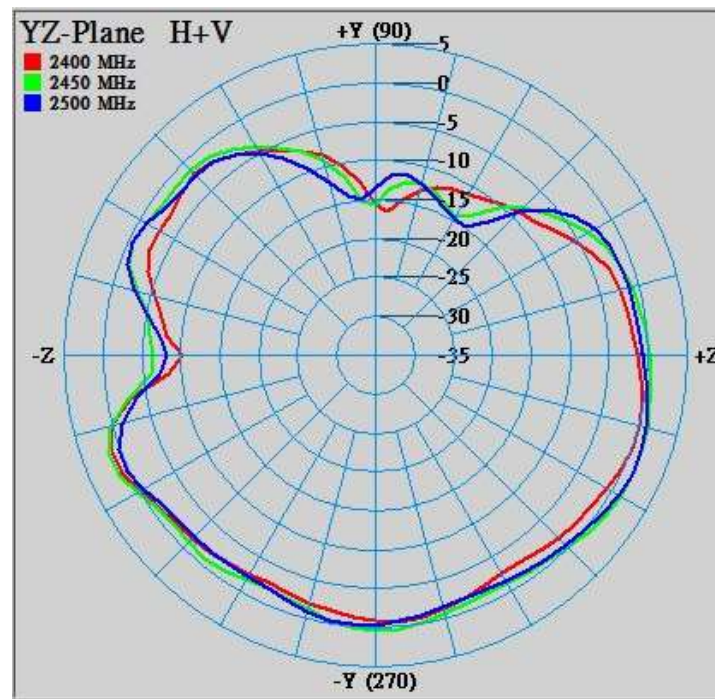
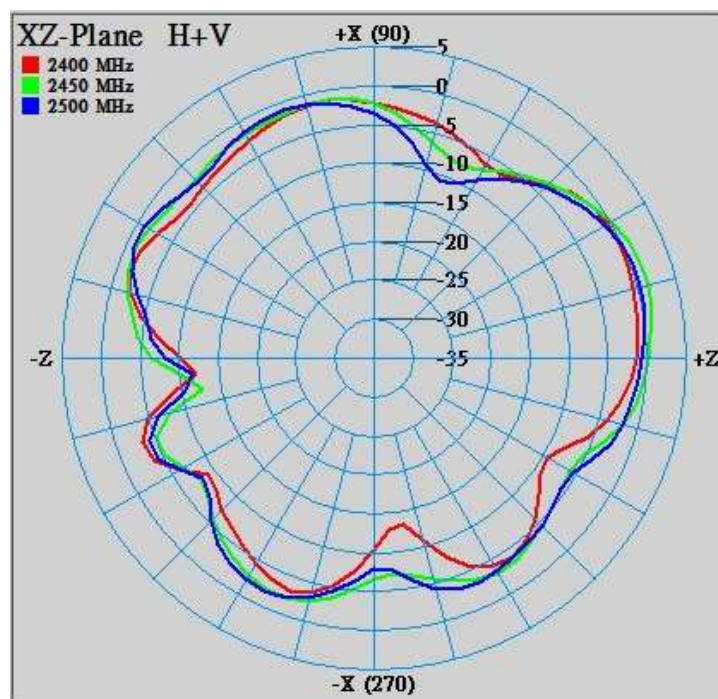


	ZX plane		ZY plane		XY plane	
Frequency [MHz]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-0.69	-4.33	-0.50	-3.62	-0.71	-5.53
2450	-0.72	-4.72	-0.87	-3.67	-2.69	-6.45
2500	-1.85	-5.66	-1.44	-4.49	-4.64	-7.44

2. Antenna Characteristics

DUT3-ANT1

2.3 2D Radiation Patterns

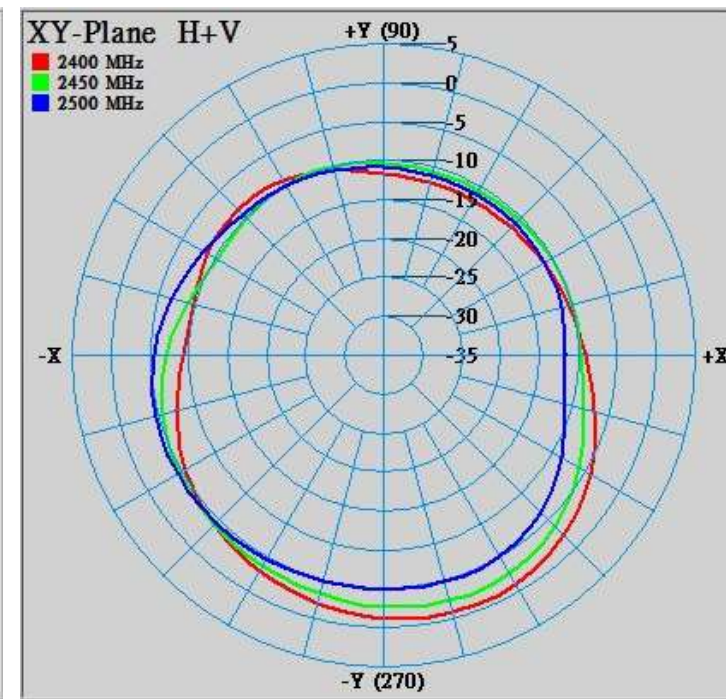
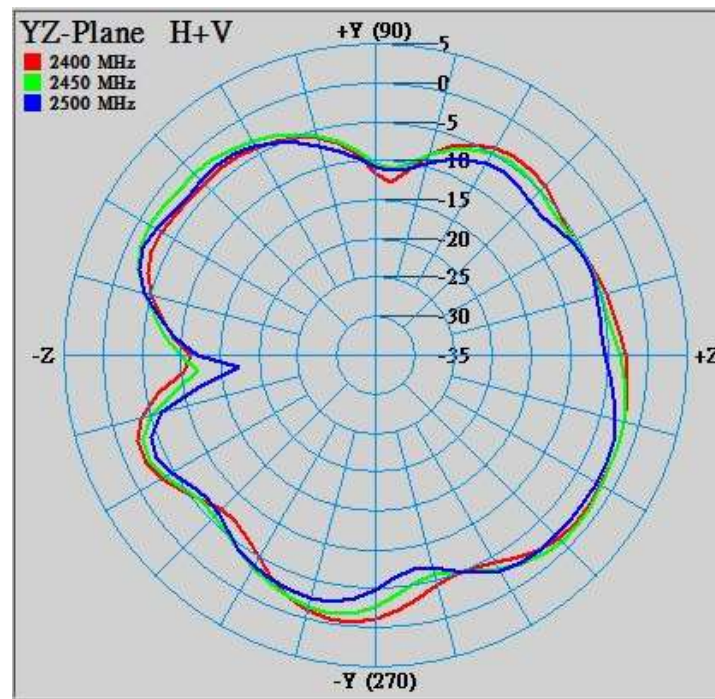
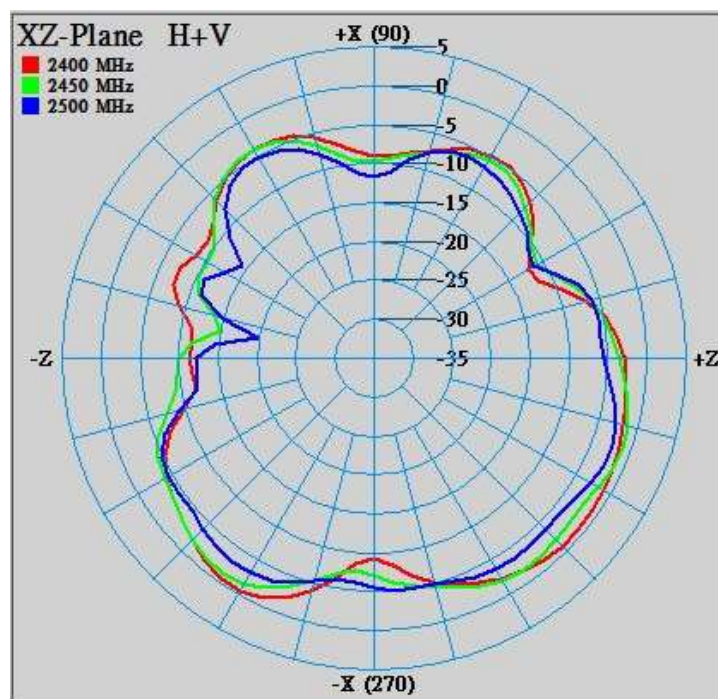


Frequency [MHz]	ZX plane		ZY plane		XY plane	
	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-0.26	-3.89	1.05	-2.92	-0.26	-4.06
2450	1.40	-2.93	1.59	-1.77	0.50	-3.18
2500	0.33	-3.28	1.33	-2.26	0.19	-3.65

2. Antenna Characteristics

DUT3-ANT2

2.3 2D Radiation Patterns



Frequency [MHz]	ZX plane		ZY plane		XY plane	
	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-0.50	-4.52	-0.60	-3.96	-0.79	-5.53
2450	-1.16	-4.82	-1.14	-3.86	-2.35	-6.23
2500	-2.35	-5.97	-2.13	-4.80	-4.48	-7.23

3. Summary

- The performance of antennas is shown in table

ANT1	DUT1	DUT2	DUT3
Maximum Efficiency (%)	55.56	54.87	54.73
Maximum Gain (dBi)	2.15	2.18	2.28

ANT2	DUT1	DUT2	DUT3
Maximum Efficiency (%)	39.96	37.53	38.19
Maximum Gain (dBi)	0.01	-0.25	-0.21

3. Summary

- Cable loss compensated: 0.65dB
- Because capacitor for ANT2 changes to 2.2pF, it affects impedance and the frequency is slightly low.

Thank you

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