

HX-CSX111A Survey GNSS Antenna Performance Test Report

1. Antenna Characteristics

The antenna indicator test items are shown as below

The antenna indicator test

Test	Request
GNSS Antenna Max Gain	L2 \geq 5.0dBi L1 \geq 6.0dBi
Axial Ratio	\leq 3dB
Output Standing Wave	\leq 2.0
BT/WIFI Antenna Max Gain	0 dBi
BT/WIFI Antenna V.S.W.R	\leq 2.0

1. 1 GNSS Antenna Gain/ Axial Ratio

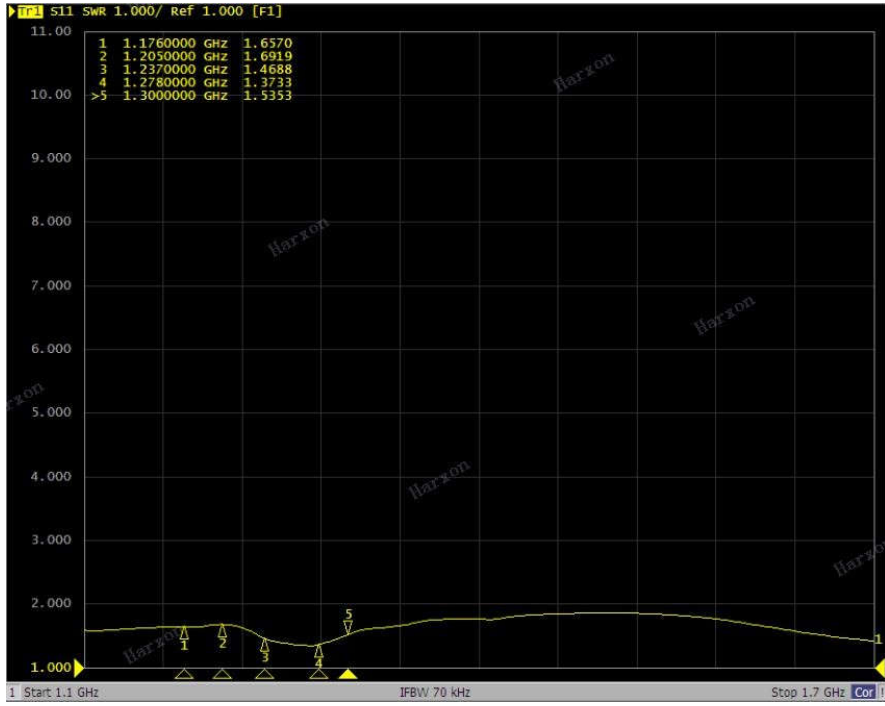
Frequency (MHz)	1176	1205	1230	1240	1255	1280	1300	1520	1560	1575	1590	1612
Gain (dBi)	1.7	4.1	4.9	5.1	4.7	3.9	3.0	3.5	5.3	5.9	6.1	5.9
Axial Ratio (dB)	2.2	1.5	0.8	1.5	0.7	0.9	0.9	0.4	0.2	0.2	0.1	0.1
VSWR	1.6	1.7	1.4	1.5	1.4	1.4	1.5	1.3	1.2	1.3	1.2	1.2

1. 2 BT/WIFI Antenna Gain/Axial Ratio

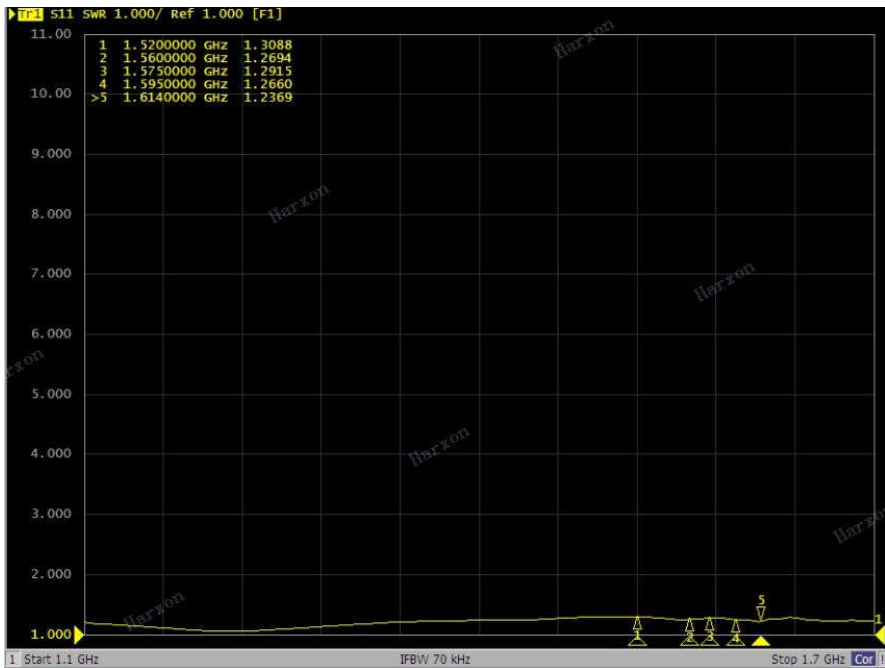
Frequency (MHz)	2400	2420	2440	2460	2480
Gain (dBi)	0	0	0	-0.2	0
Voltage V.S.W.R	1.9	1.5	1.2	1.6	1.9

1. 3 Antenna Pattern

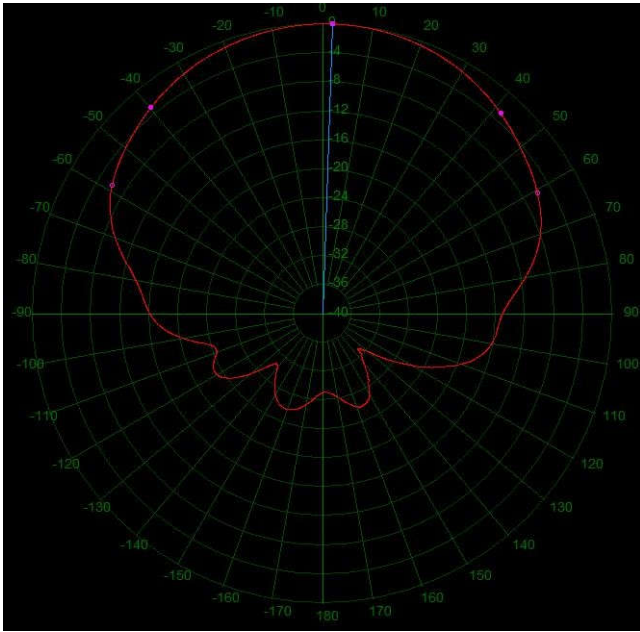
1. 3. 1 GNSS Antenna V.S.W.R/GNSS Antenna Pattern



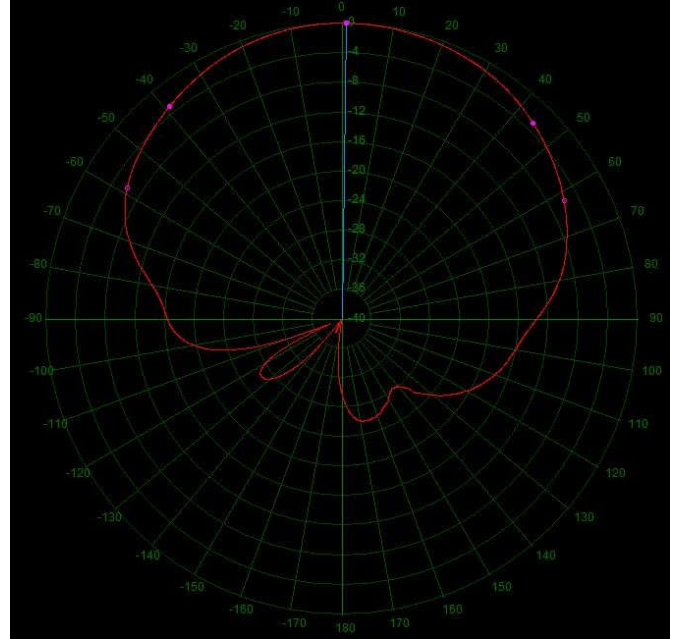
L2 Frequency band voltage V.S.W.R



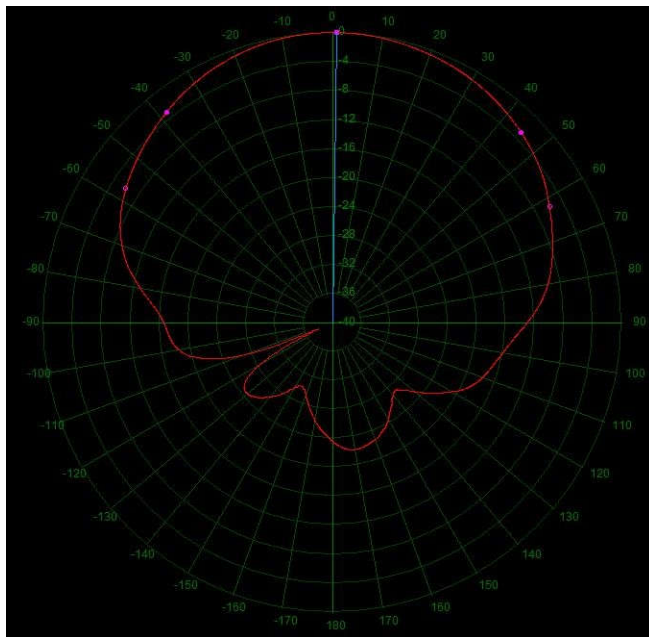
L1 Frequency band voltage V.S.W.R



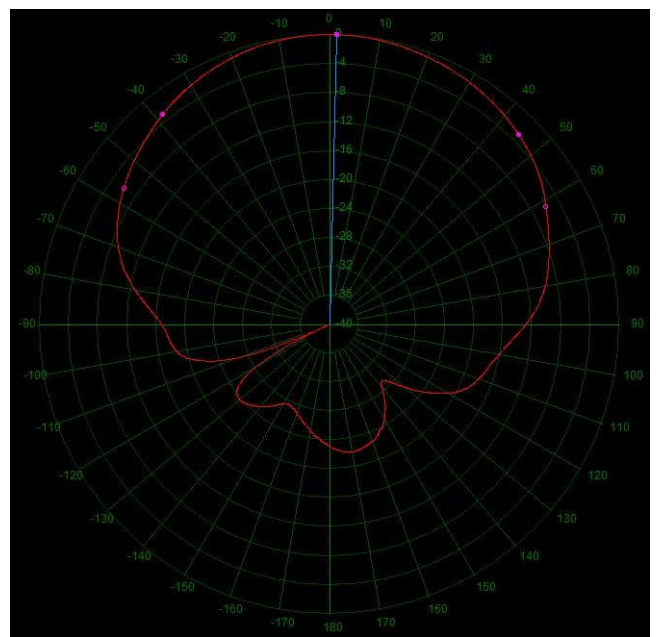
1176MHz



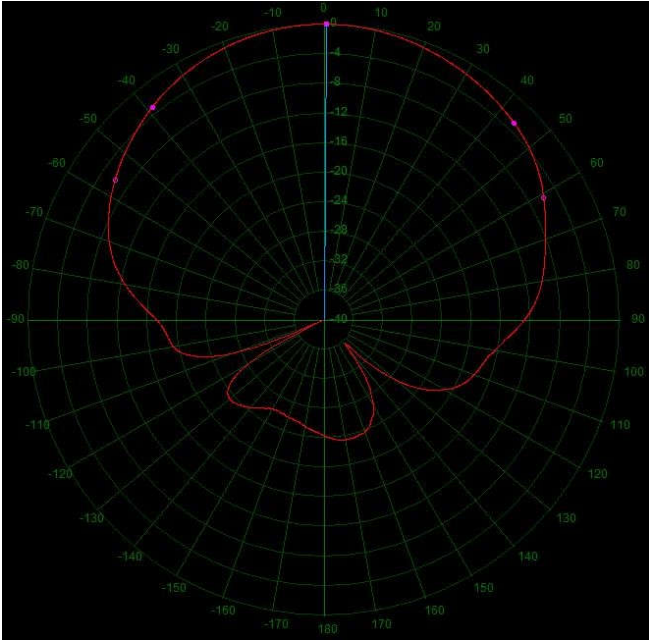
1205 MHz



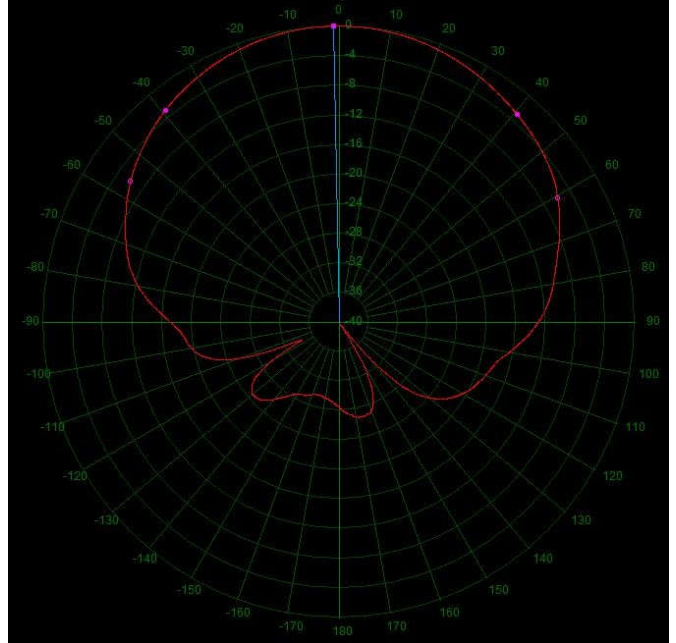
1230MHz



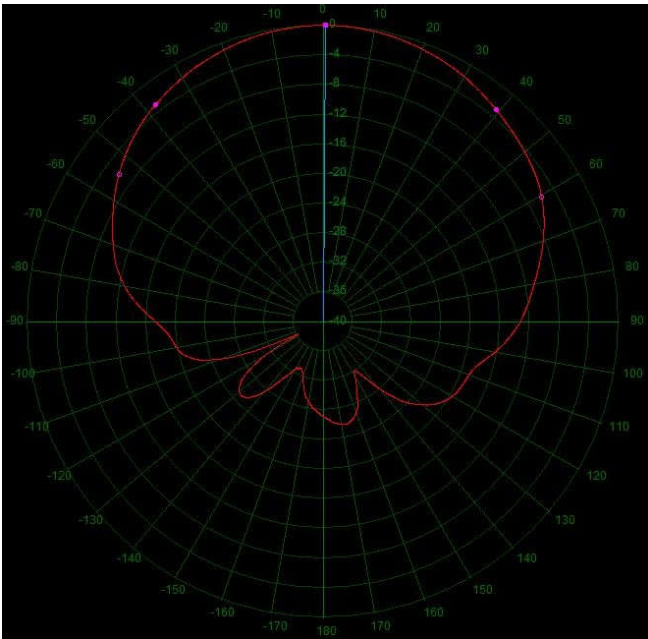
1240MHz



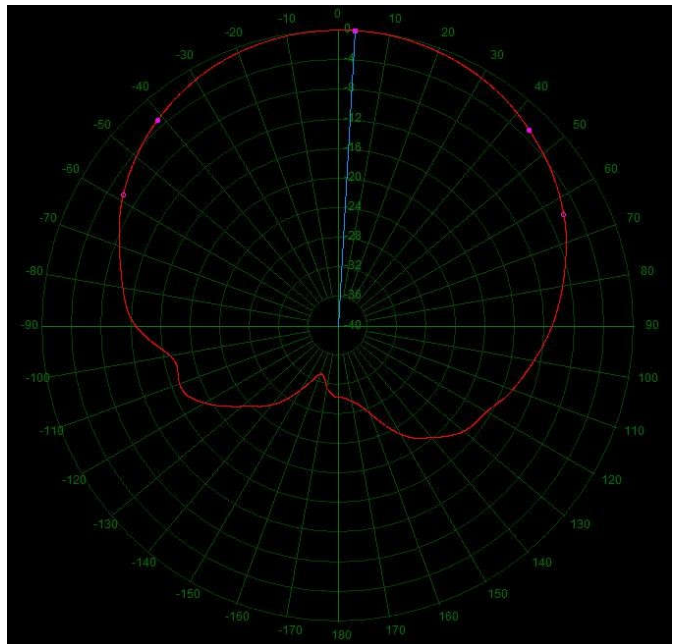
1255MHz



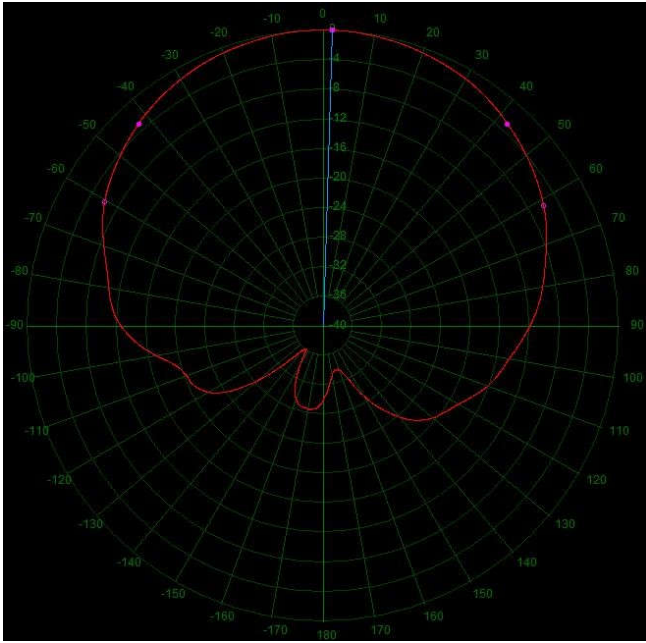
1280MHz



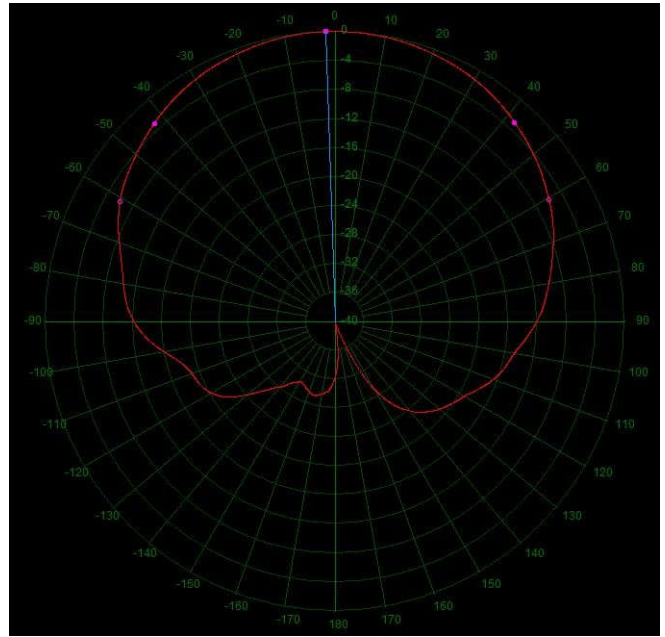
1300MHz



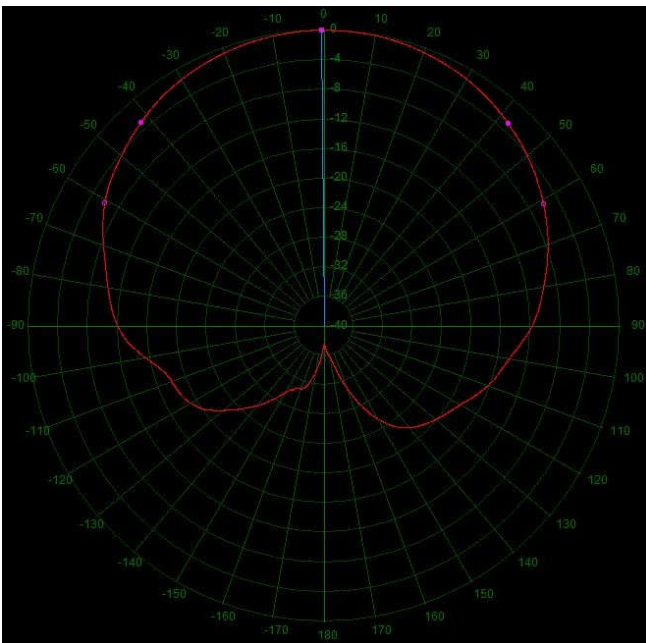
1520MHz



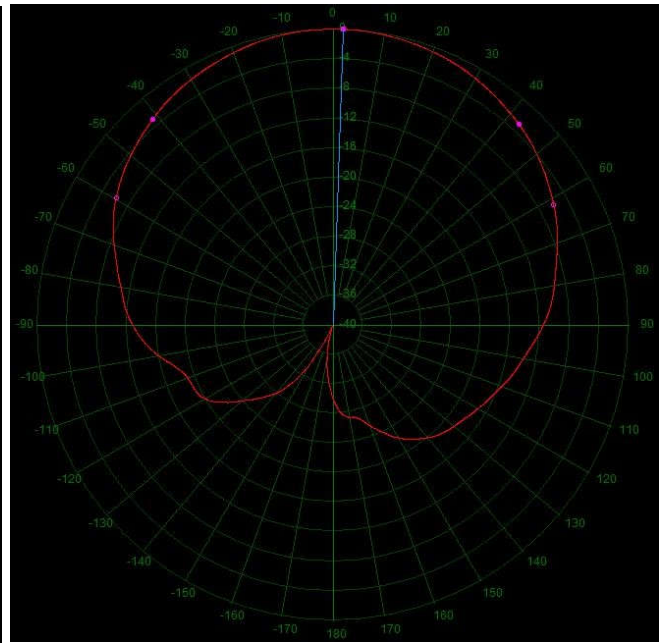
1560MHz



1575MHz

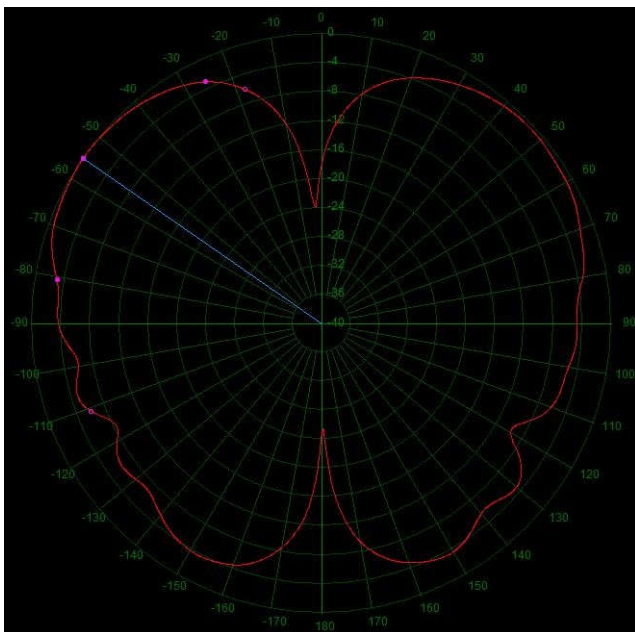
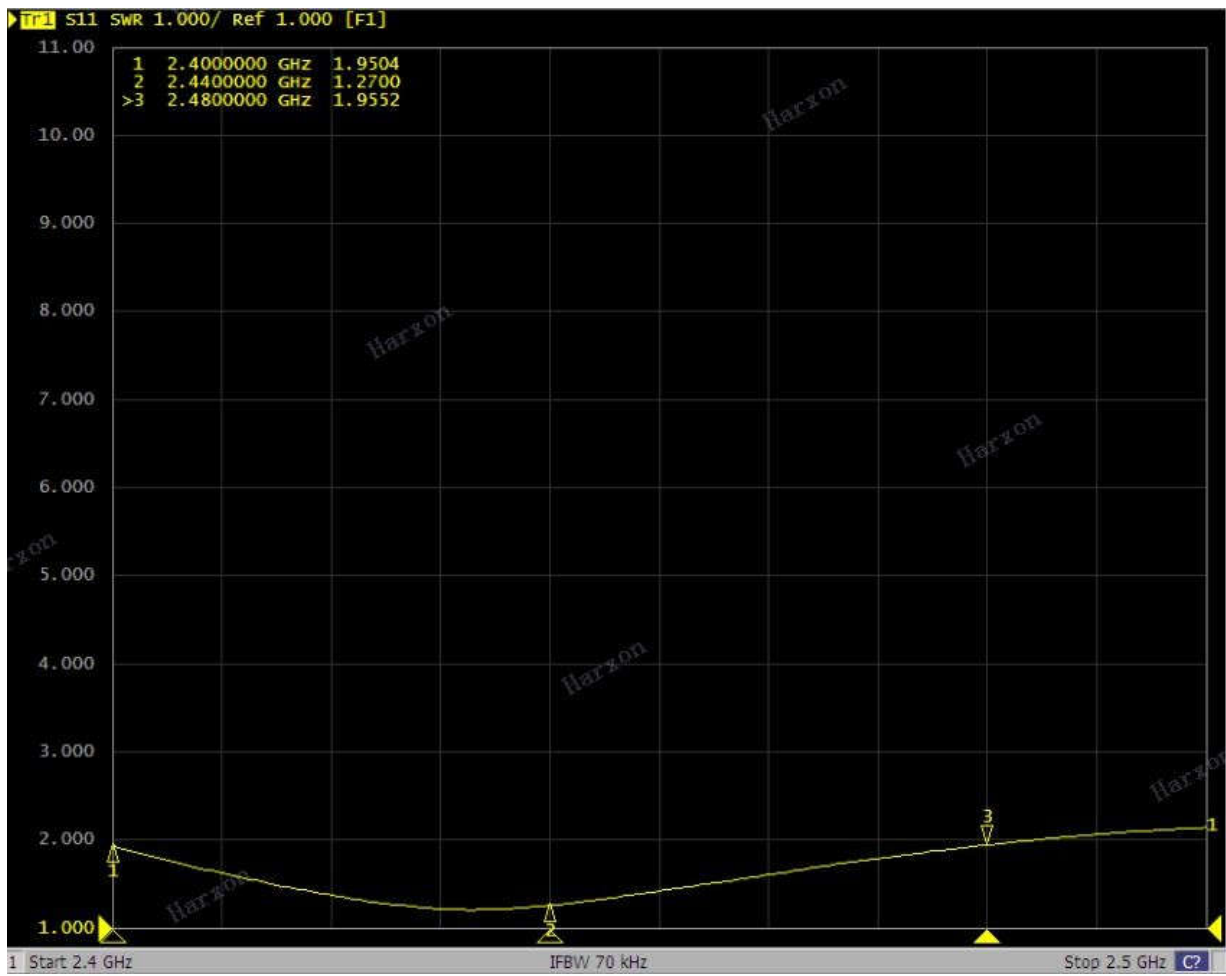


1590MHz

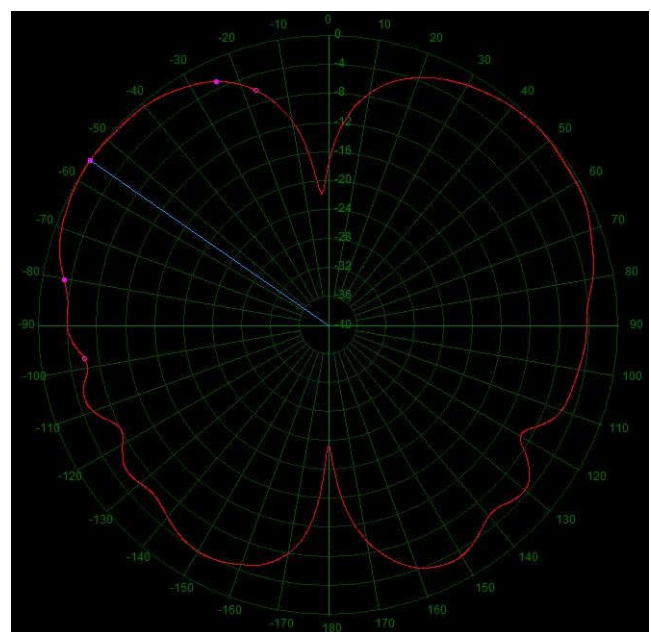


1615MHz

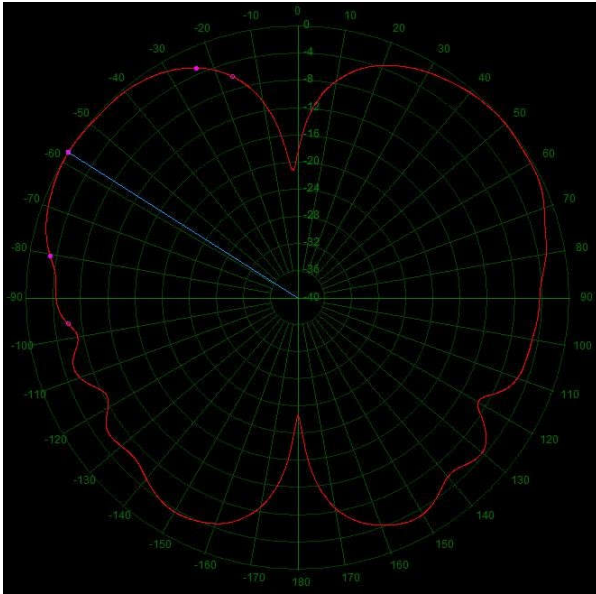
1. 3. 2 BT/WIFI Antenna Axial Ratio/BT/WIFI Antenna Pattern



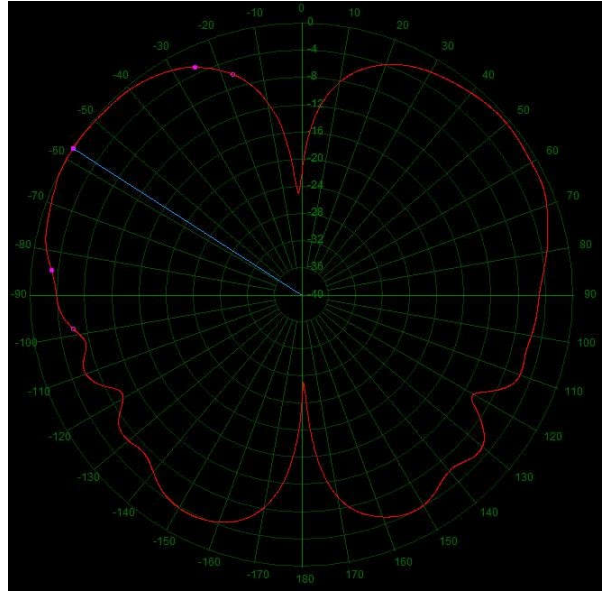
2400MHz



2420MHz



2440MHz



2480MHz

1.5 Antenna Index Compliance Comparison Table

Comparison Table of Antenna Index Test Results

Test items	request	Test Results	Compliance	Remarks
GNSS Antenna Max Gain	L2 ≥ 5.0dBi L1 ≥ 6.0dBi	L2 : 5.1dBi L1 : 6.1dBi	Yes	
Axial Ratio	≤ 3dB	≤ 2.2dB	Yes	
Output Standing Wave	≤ 2.0	≤ 1.7	Yes	
BT/WIFI Antenna Gain	≥ 0dBi	0dBi	Yes	
BT/WIFI Antenna V.S.W.R	≤ 2.0	≤ 1.9	Yes	

2 Low Noise Circuit

2.1 Test items

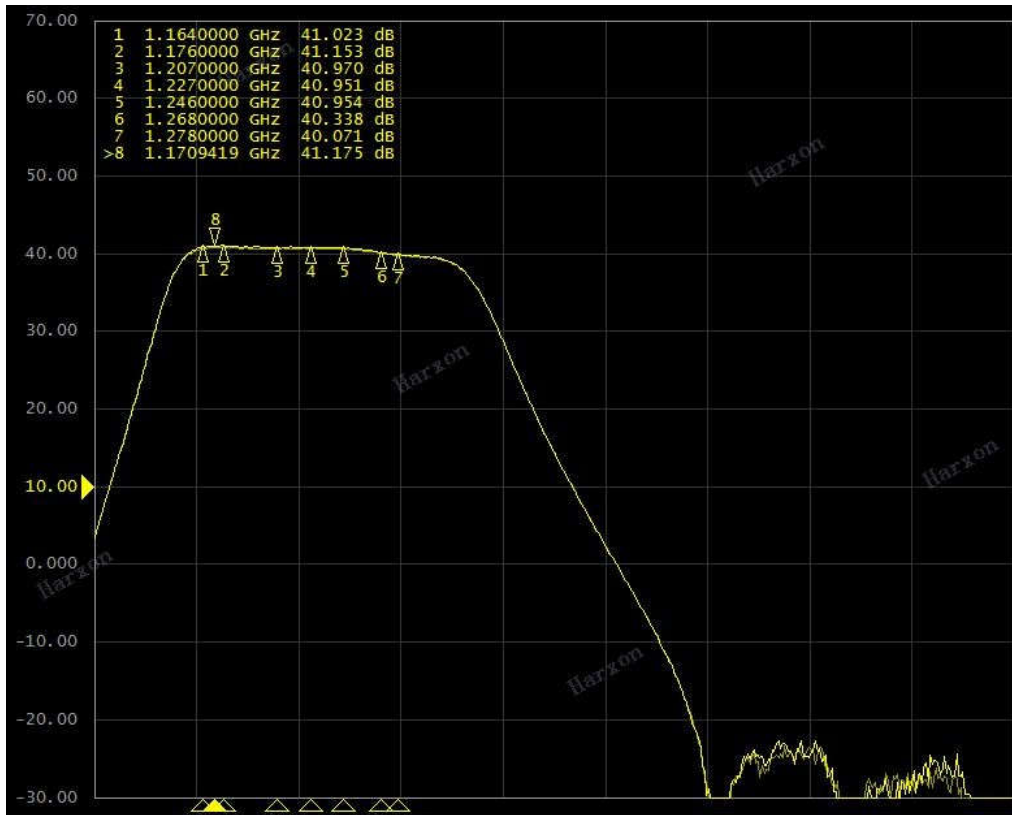
Low noise test items are as follows

Low noise test items

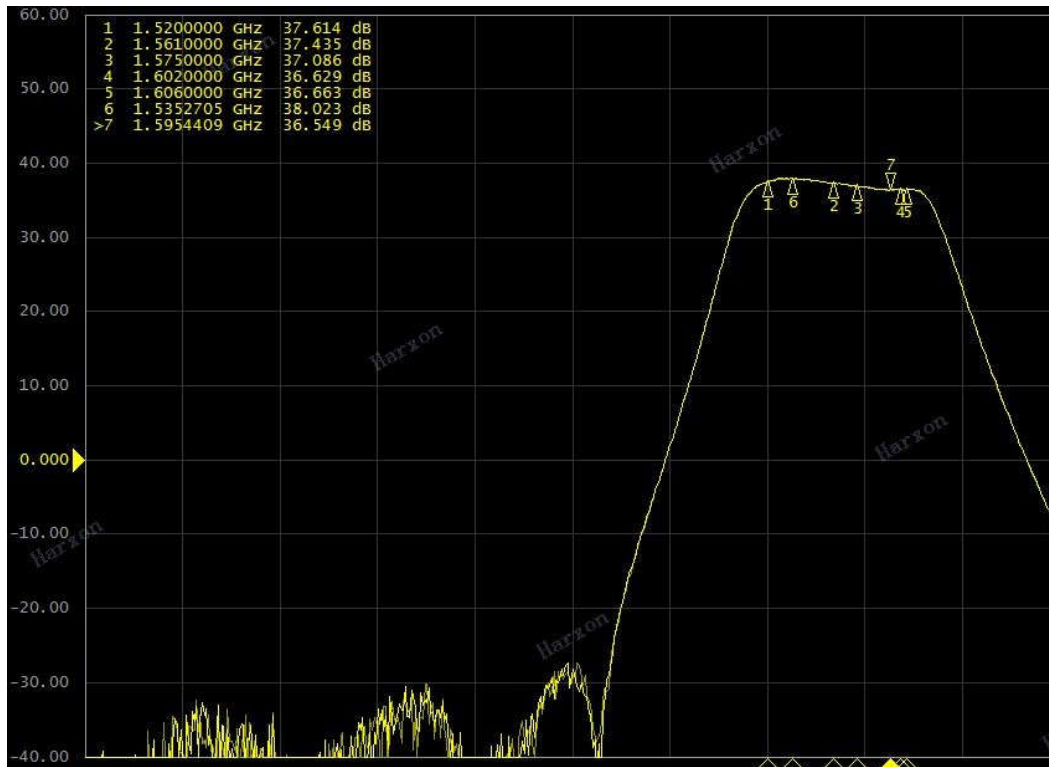
Test Items	Requist
Gain	L2 : 40 ± 2dB L1 : 38 ± 2dB
Noise Figure	≤ 1.8dB
Output Standing Wave	≤ 2.0
In-band Flatness	± 1dB
Operating Voltage	+3.3 ~ +12VDC
Working Current	≤ 45mA
Differential Propagation Delay	≤ 5ns

2. 2 Test Data and Results

2. 2. 1 Gain and Flatness



2.1 L2 Gain and Flatness



2.2 L1 Gain and Flatness

1. 1. 1 Noise Figure

Freq	NoiseFig dB	Gain
1.164000 GHz	1.415	41.244
1.172286 GHz	1.322	40.974
1.180571 GHz	1.296	40.781
1.188857 GHz	1.183	40.648
1.197143 GHz	1.190	40.581
1.205429 GHz	1.166	40.712
1.213714 GHz	1.213	40.721
1.222000 GHz	1.149	40.835
1.230286 GHz	1.134	40.918
1.238571 GHz	1.090	41.027
1.246857 GHz	1.179	40.991
1.255143 GHz	1.166	40.718
1.263429 GHz	1.163	40.266
1.271714 GHz	1.132	39.861
1.280000 GHz	1.119	39.427

1.16400 GHz BW 4 MHz Points 15 Stop 1.2600
306.04 K Avgs Off Att 0 dB Loss Off

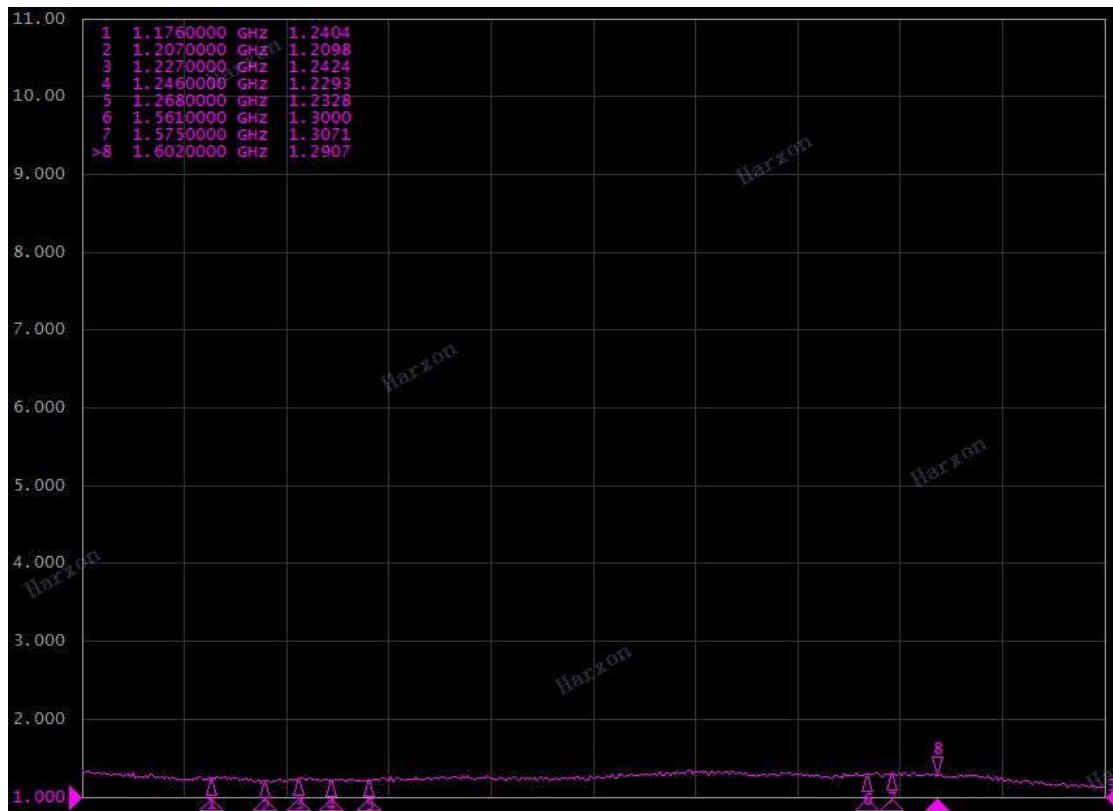
2.3 L2 Band Noise Figure

Freq	NoiseFig dB	Gain dB
1.500000 GHz	1.851	31.362
1.508429 GHz	1.523	35.944
1.516857 GHz	1.375	37.694
1.525286 GHz	1.370	38.039
1.533714 GHz	1.328	38.098
1.542143 GHz	1.263	38.120
1.550571 GHz	1.197	38.029
1.559000 GHz	1.289	37.912
1.567429 GHz	1.176	37.941
1.575857 GHz	1.212	37.889
1.584286 GHz	1.235	37.689
1.592714 GHz	1.233	37.448
1.601143 GHz	1.314	37.380
1.609571 GHz	1.295	30.500

Start 1.50000 GHz BW 4 MHz Points 15
Cold 304.00 K Avgs Off Att 0 dB

2.4 L1 Band Noise Figure

1. 1. 2 Output Standing Wave



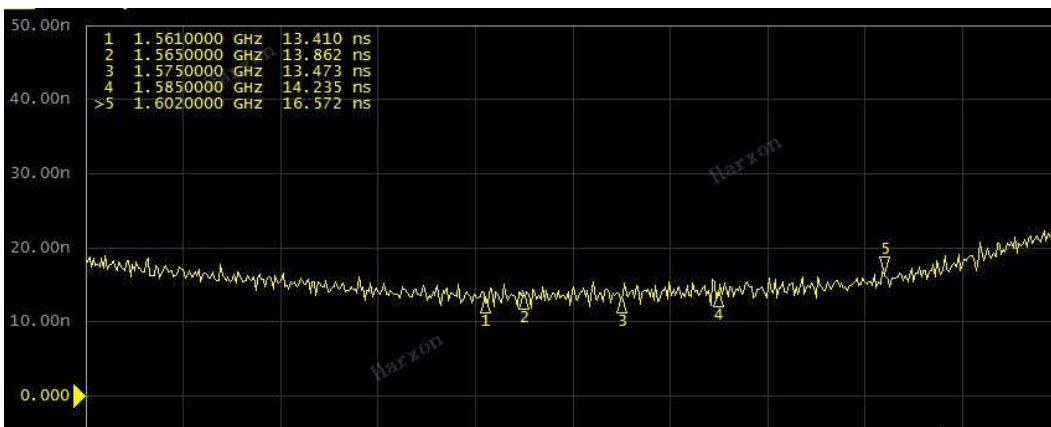
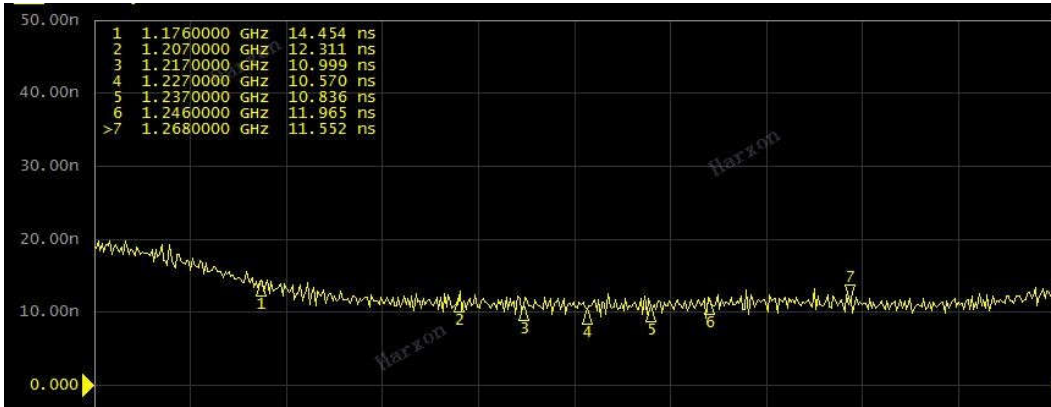
2.5 Output Standing Wave

1. 1. 3 Operating Voltage and Working Current



2.6 Operating Voltage and Working Current

1. 1. 4 Check Transmission Delay



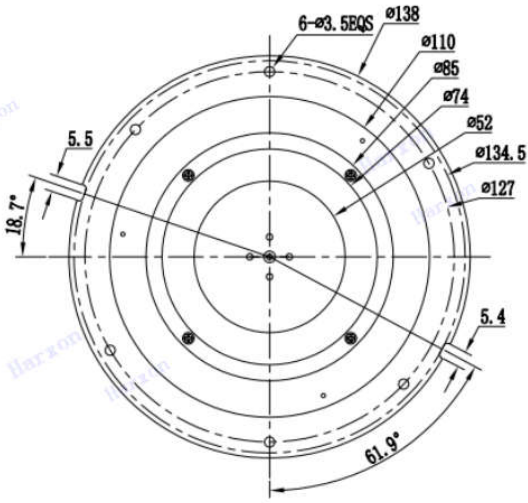
2.7 Check Transmission Delay

1. 1. 5 Low Noise Test Results

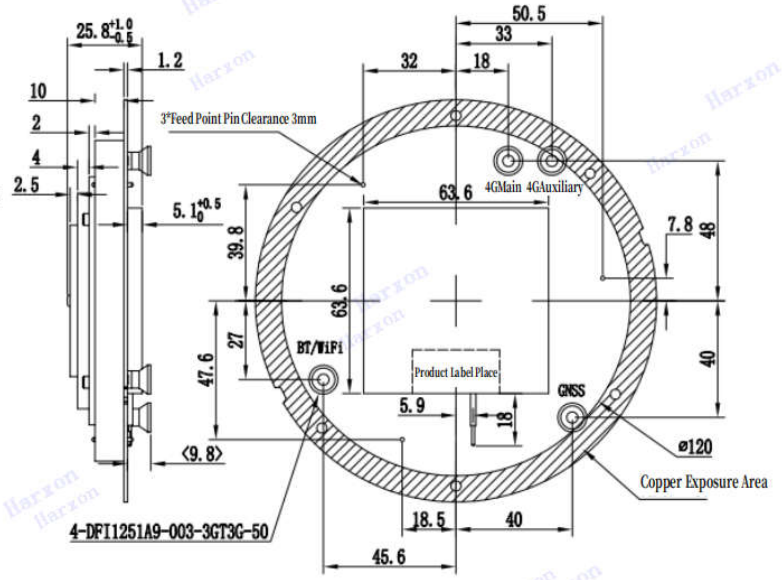
Comparison of the test results of the noise floor index

Test items	Requist	Test Results	Compliance	Remarks
Gain	L2 : 40±2dB L1 : 38±2dB	L2 : 40.07~41.17dB L1 : 36.55~38.02dB	YES	
Noise Figure	≤1.8dB	L2 :1.09~1.41dB L1 : 1.17~1.37dB	YES	
Output Standing Wave	≤2.0	≤1.5	YES	
In-band Flatness	±1dB	L2 : ±0.53dB L1 : ±0.74dB	YES	
Operating Voltage	+3.3 ~ +12VDC	+3.3 ~ +12VDC	YES	
Working current	≤45mA	36~40mA	YES	
Differential Propagation Delay	≤5ns	≤4ns	YES	

Dimension:



TOP VIEW



SIDE VIEW

BOTTOM VIEW