

APRIL 7, 2022

NT1191GEAE3S

GNSS Wideband Low Noise Amplifier

S-parameter, noise parameter simulation data Standard Condition ver.0

- S-parameter simulation data
- Max gain, NFmin simulation data
- Gain circle simulation data (Source/Load impedance)
- NF circle simulation data
- Simulation condition
- Simulation circuit
- s2p file
 - s2p file at $V_{DD} = 3.3\text{ V}$: NT1191SP_3r3V.s2p
 - s2p file at $V_{DD} = 1.8\text{ V}$: NT1191SP_1r8V.s2p

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Electronic Devices Business Headquarters
Technology Development Division
RF Product Development Department
RFIC Design Section



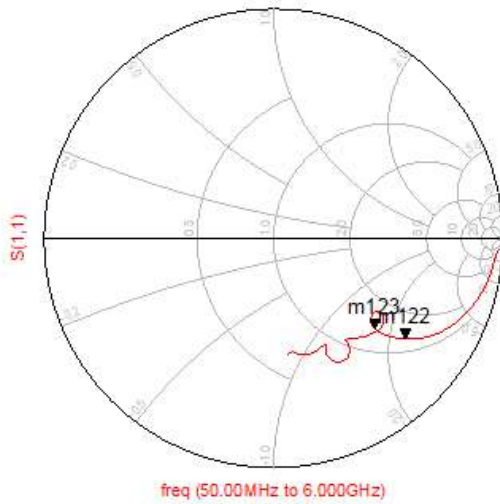
■ REVISION HISTORY

REVISION	DATE	DESCRIPTION
0	7 Apl. 2022	Initial version.



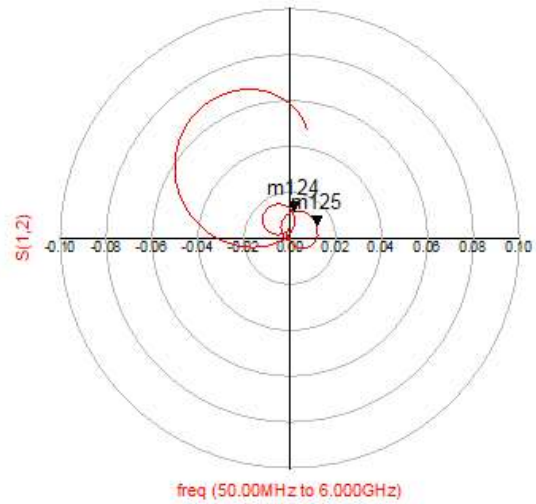
■ S-parameter simulation data 1

Condition: $f = 50 \text{ MHz} \sim 6 \text{ GHz}$, $V_{DD} = 3.3 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$



m122 freq=1.176GHz S(1,1)=0.722 / -37.259 impedance = $Z_0 * (1.288 - j2.349)$	m123 freq=1.575GHz S(1,1)=0.591 / -41.717 impedance = $Z_0 * (1.393 - j1.685)$
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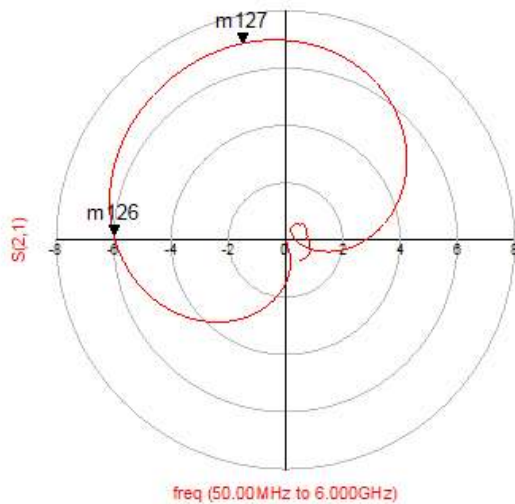
S11



m124 freq=1.176GHz S(1,2)=0.012 / 81.364	m125 freq=1.575GHz S(1,2)=0.013 / 25.401
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S12

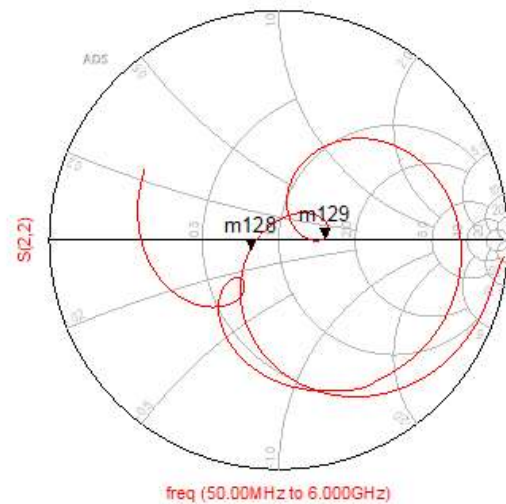
(unit: 0.1)



m126 freq=1.176GHz S(2,1)=5.986 / 178.416	m127 freq=1.575GHz S(2,1)=7.013 / 102.344
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S21

(unit: 8)

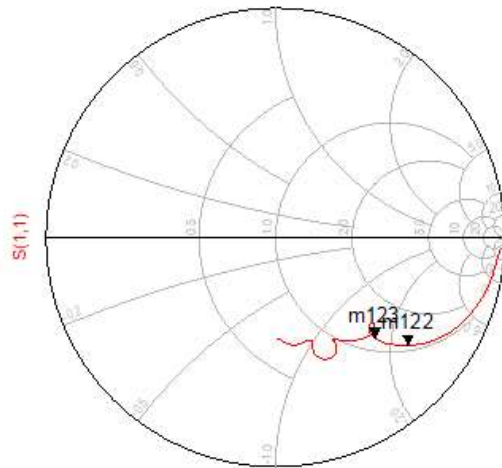


m128 freq=1.176GHz S(2,2)=0.128 / -163.165 impedance = $Z_0 * (0.780 - j0.059)$	m129 freq=1.575GHz S(2,2)=0.201 / 2.957 impedance = $Z_0 * (1.503 + j0.033)$
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S22

■ S-parameter simulation data 2

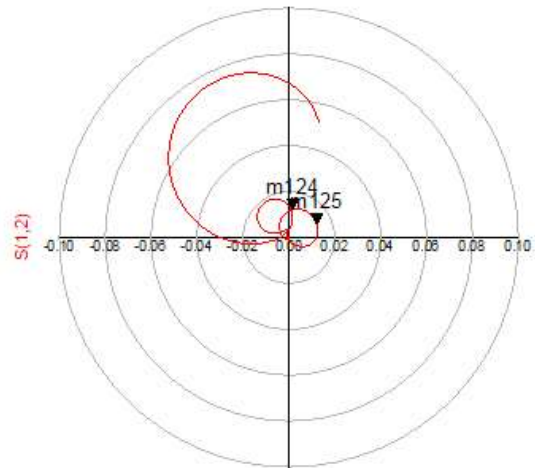
Condition: $f = 50 \text{ MHz} \sim 6 \text{ GHz}$, $V_{DD} = 1.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$



freq (50.00MHz to 6.000GHz)

m122 freq=1.176GHz S(1,1)=0.744 / -39.071 impedance = $Z_0 * (1.121 - j2.355)$	m123 freq=1.575GHz S(1,1)=0.614 / -45.423 impedance = $Z_0 * (1.209 - j1.700)$
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S11

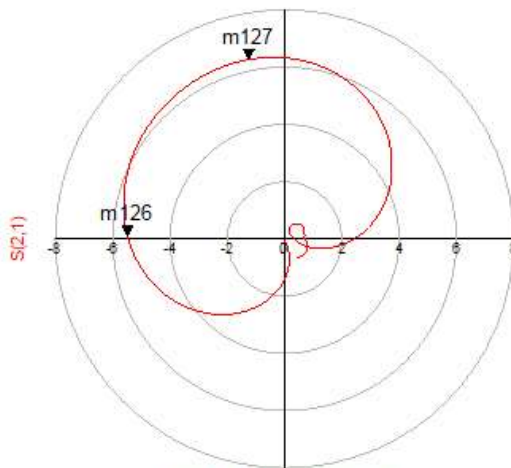


freq (50.00MHz to 6.000GHz)

m124 freq=1.176GHz S(1,2)=0.012 / 82.002	m125 freq=1.575GHz S(1,2)=0.014 / 25.525
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S12

(unit: 0.1)

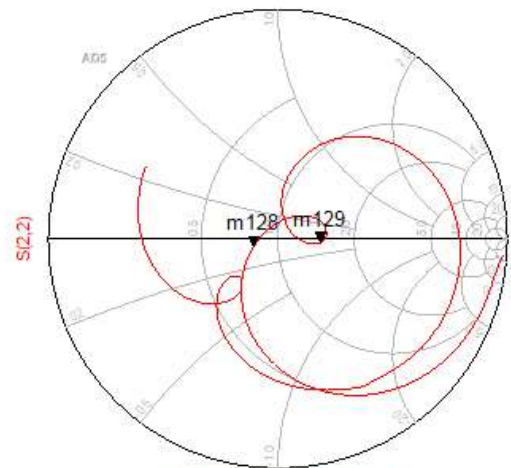


freq (50.00MHz to 6.000GHz)

m126 freq=1.176GHz S(2,1)=5.475 / 178.864	m127 freq=1.575GHz S(2,1)=6.380 / 101.325
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S21

(unit: 8)



freq (50.00MHz to 6.000GHz)

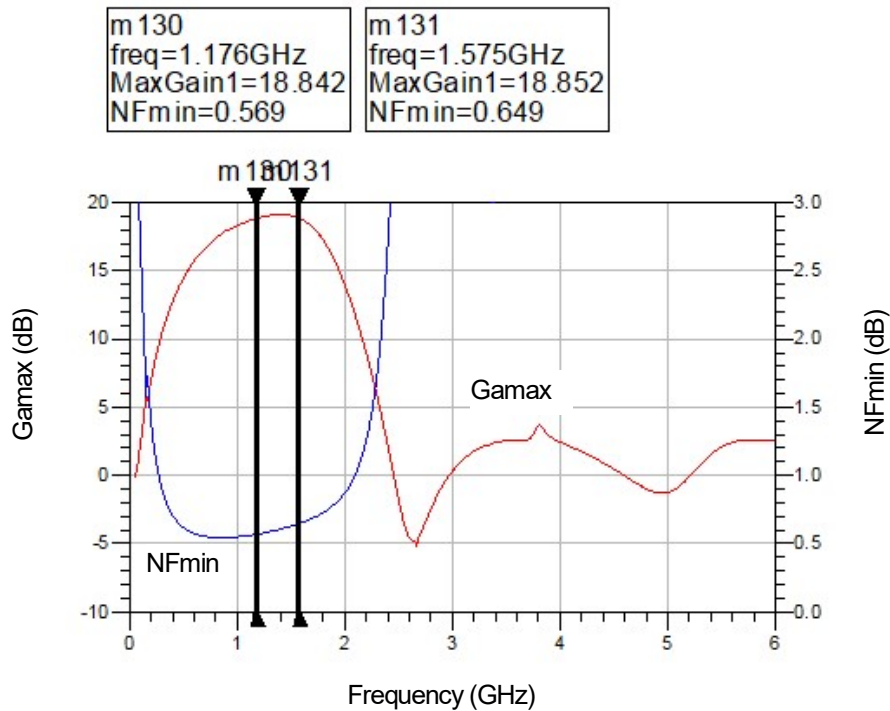
m128 freq=1.176GHz S(2,2)=0.111 / -163.178 impedance = $Z_0 * (0.807 - j0.052)$	m129 freq=1.575GHz S(2,2)=0.186 / -4.611 impedance = $Z_0 * (1.454 - j0.045)$
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S22

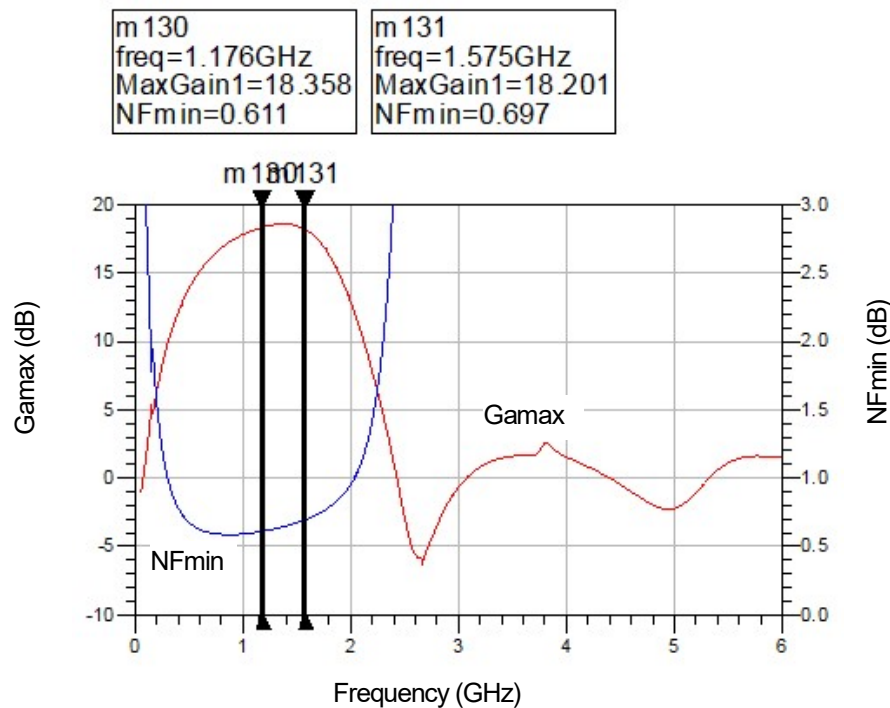


■ Max gain, NFmin simulation data

Condition: $f = 50 \text{ MHz} \sim 6 \text{ GHz}$, $V_{DD} = 3.3 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

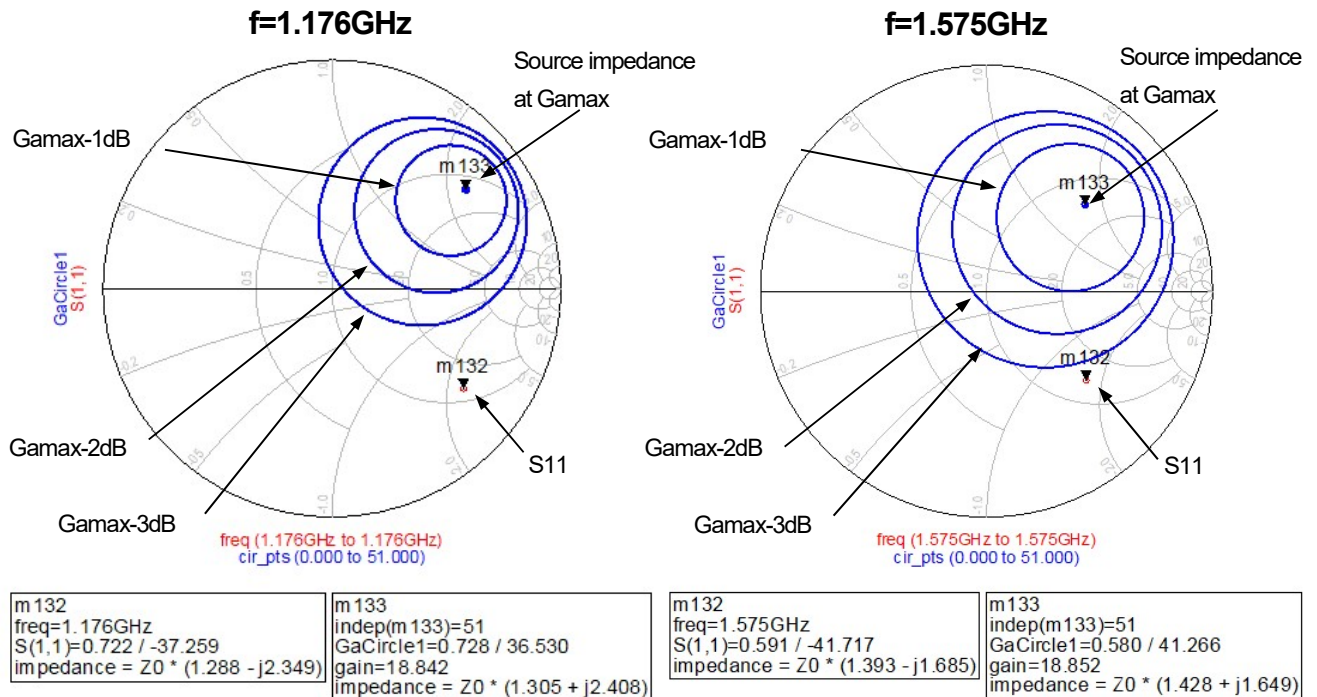


Condition: $f = 50 \text{ MHz} \sim 6 \text{ GHz}$, $V_{DD} = 1.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

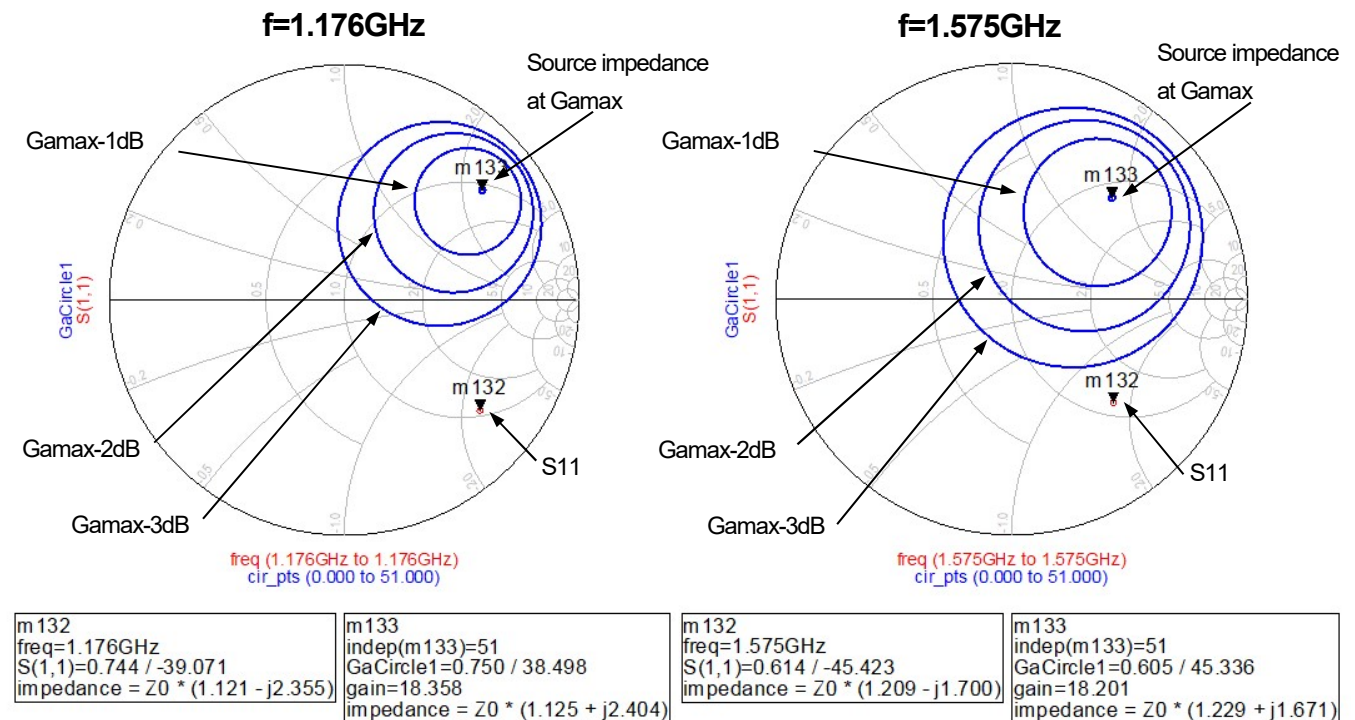


■ Gain circle simulation data (Source impedance)

Condition: $V_{DD} = 3.3\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ohm}$

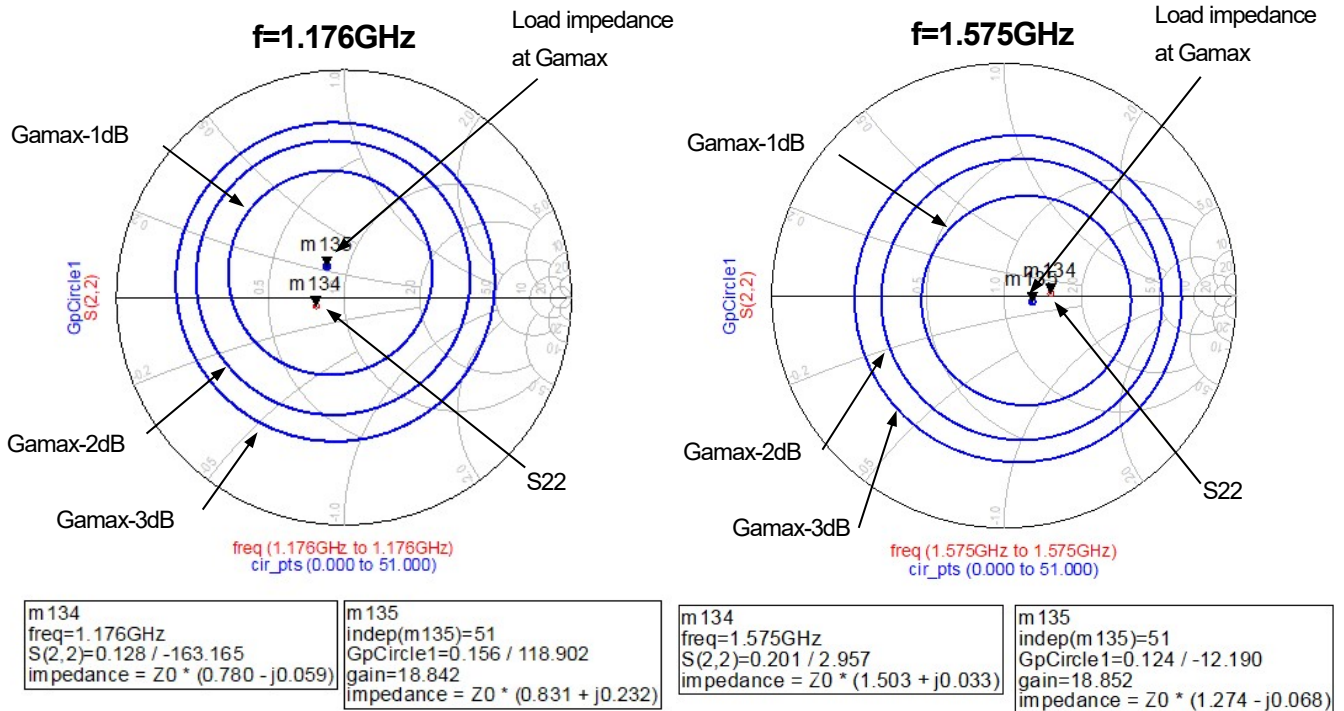


Condition: $V_{DD} = 1.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ohm}$

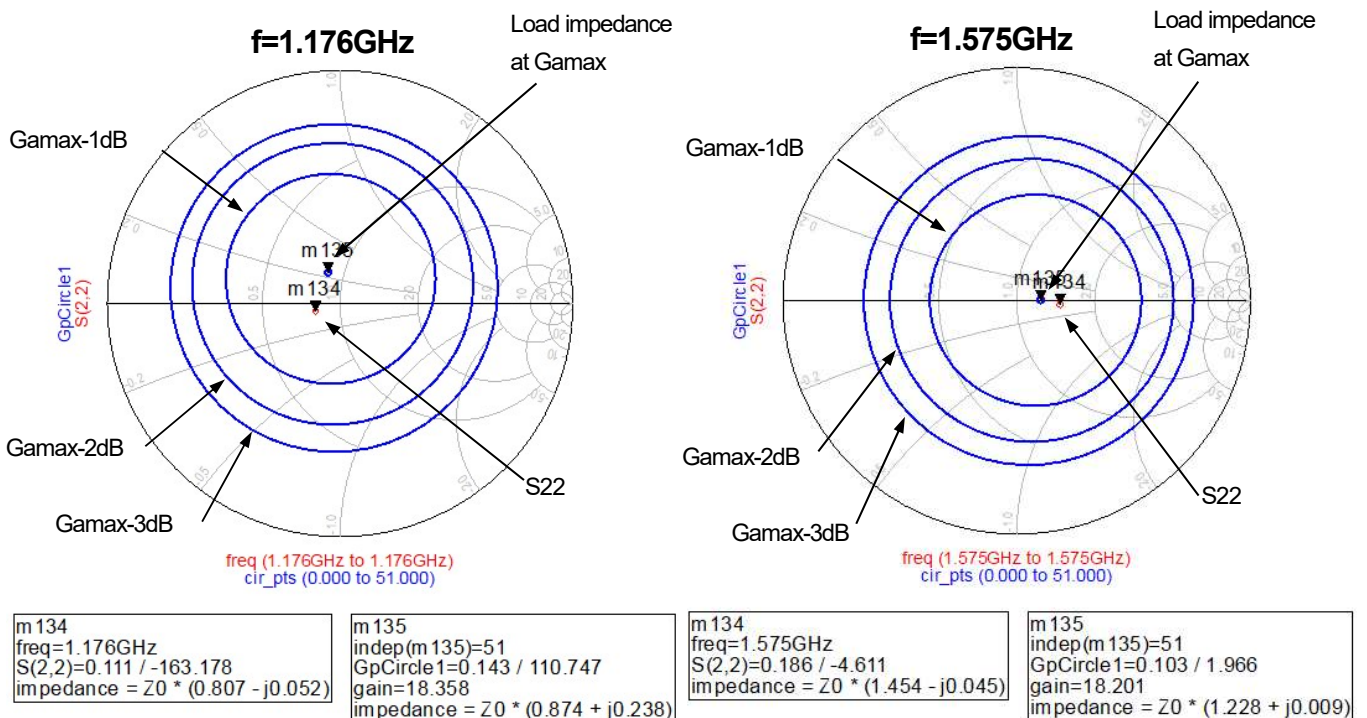


■ Gain circle simulation data (Load impedance)

Condition: $V_{DD} = 3.3\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$

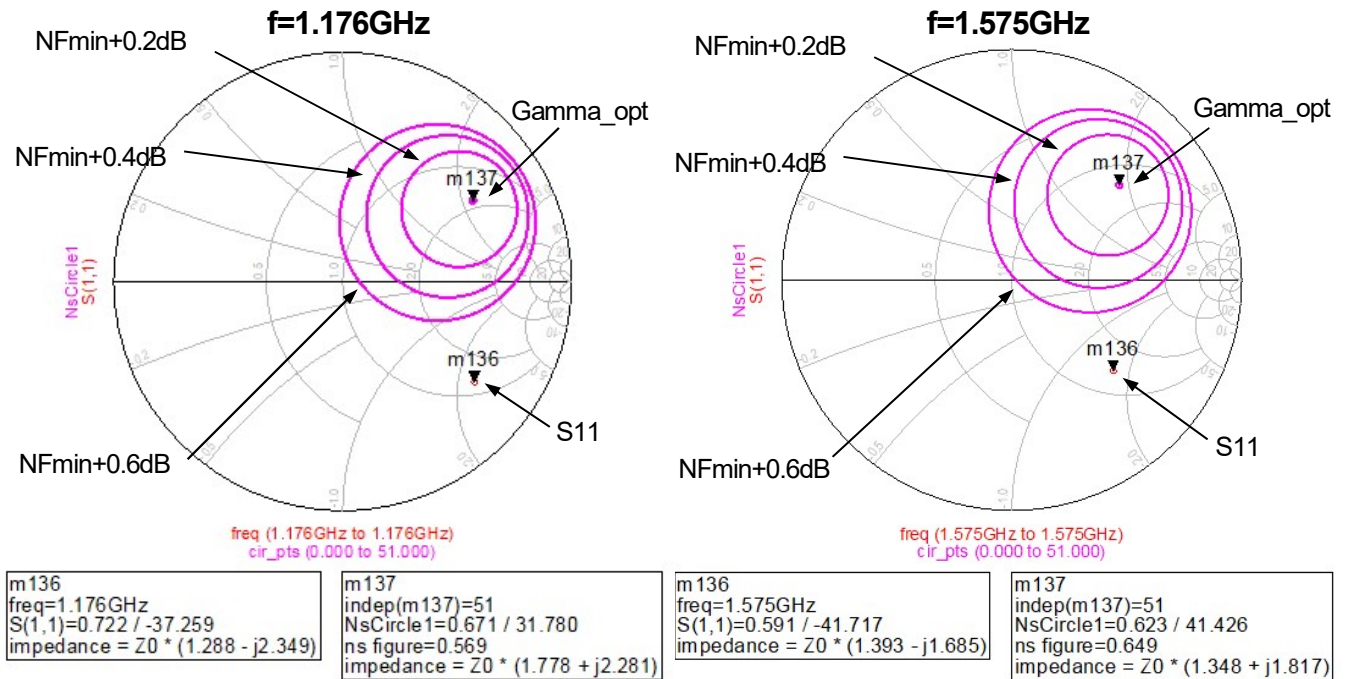


Condition: $V_{DD} = 1.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$

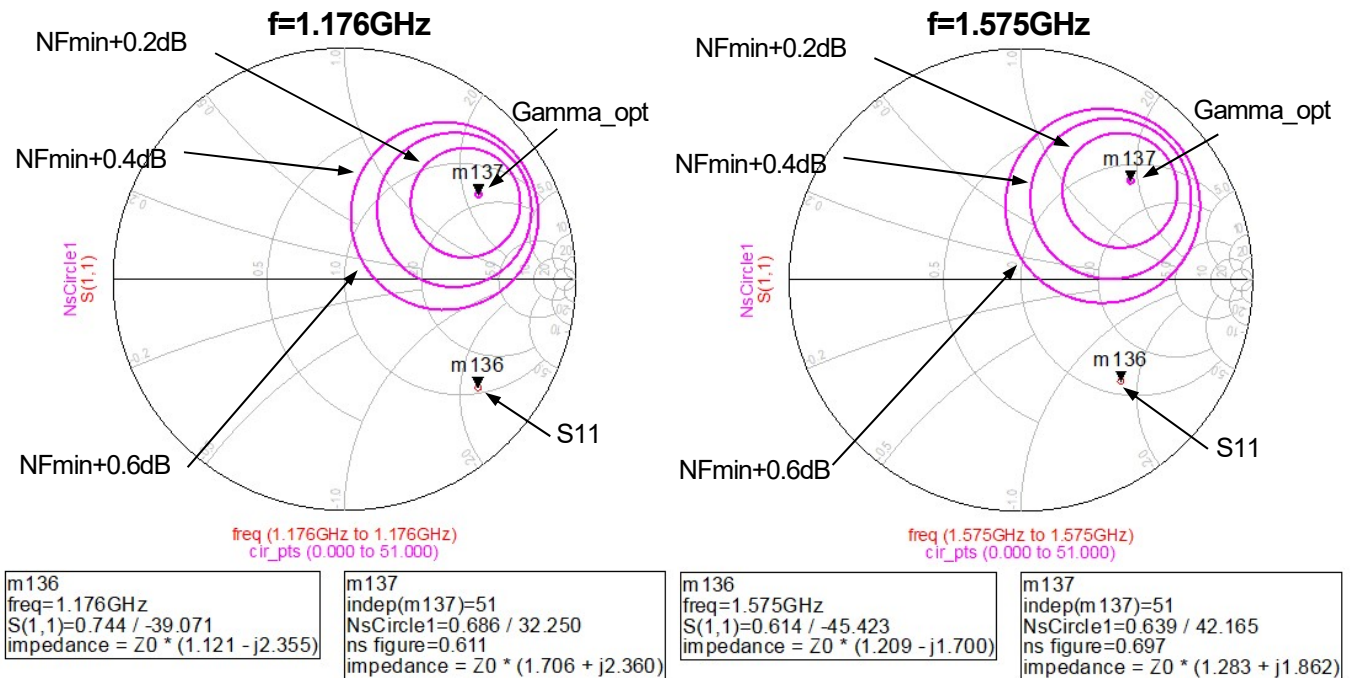


■ NF circle simulation data

Condition: $V_{DD} = 3.3\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$



Condition: $f = 1.575\text{ GHz}$, $V_{DD} = 1.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$



■ **Simulation condition**

$f = 50 \text{ MHz to } 6\text{GHz}$, Step = 5 MHz

$T_a = +25^\circ\text{C}$,

$Z_s = Z_l = 50 \text{ ohm}$

s2p file at $V_{DD} = 3.3 \text{ V}$: NT1191SP_3r3V.s2p

s2p file at $V_{DD} = 1.8 \text{ V}$: NT1191SP_1r8V.s2p

■ **Simulation circuit**

