

April 2, 2024

NT1193FAAE2S GNSS Wideband Low Noise Amplifier

S-parameter, noise parameter simulation data Ver.1

- S-parameter simulation data
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- s2p file
 - s2p file at $V_{DD} = 2.8 \text{ V}$: NT1193FAAE2S_2r8v_v1.s2p
 - s2p file at $V_{DD} = 1.8 \text{ V}$: NT1193FAAE2S_1r8v_v1.s2p

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Approved by Susumu Takagi

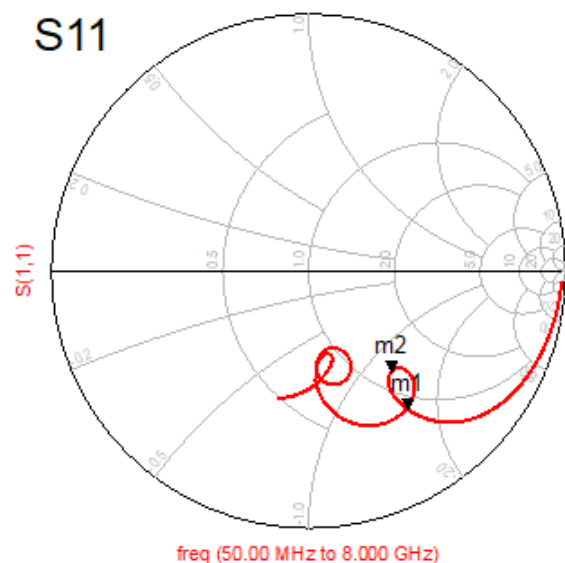
Nisshinbo Micro Devices Inc.

Technology Development Division
RF Product Development Department
RFIC Design Section

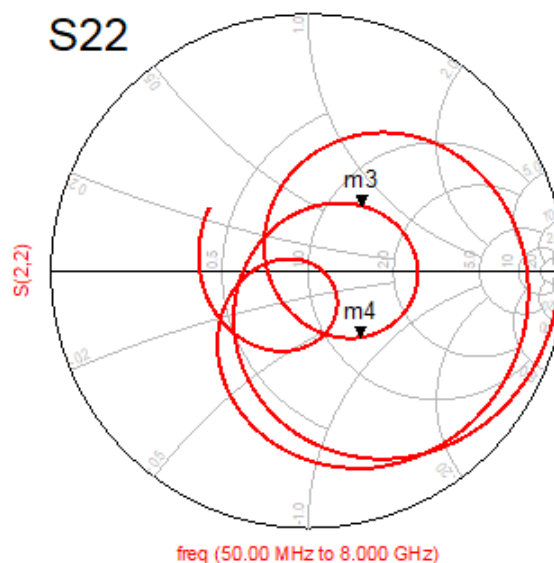


■ S-parameter simulation data 1

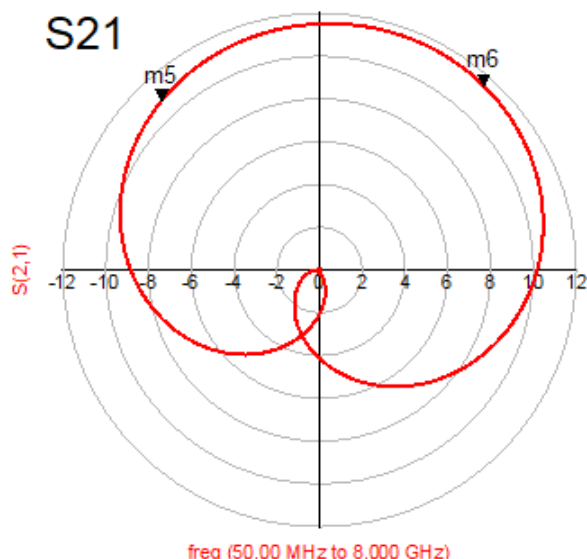
Condition: $f = 50 \text{ MHz} \sim 8 \text{ GHz}$, $V_{DD} = 2.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$



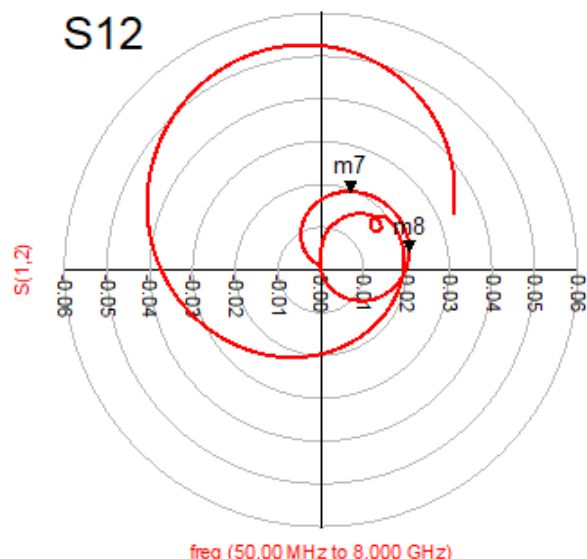
m1
freq=1.175 GHz
S(1,1)=0.663 / -54.305
impedance = $Z_0 * (0.841 - j1.618)$
m2
freq=1.575 GHz
S(1,1)=0.507 / -50.351
impedance = $Z_0 * (1.218 - j1.280)$



m3
freq=1.175 GHz
S(2,2)=0.329 / 50.624
impedance = $Z_0 * (1.291 + j0.735)$
m4
freq=1.575 GHz
S(2,2)=0.329 / -51.740
impedance = $Z_0 * (1.272 - j0.736)$



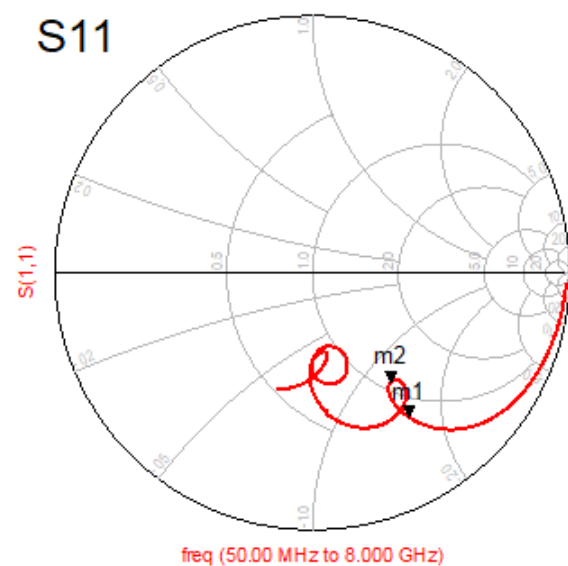
m5
freq=1.175 GHz
S(2,1)=10.799 / 133.022
m6
freq=1.575 GHz
S(2,1)=11.517 / 48.287



m7
freq=1.175 GHz
S(1,2)=0.020 / 69.327
m8
freq=1.575 GHz
S(1,2)=0.021 / 11.541

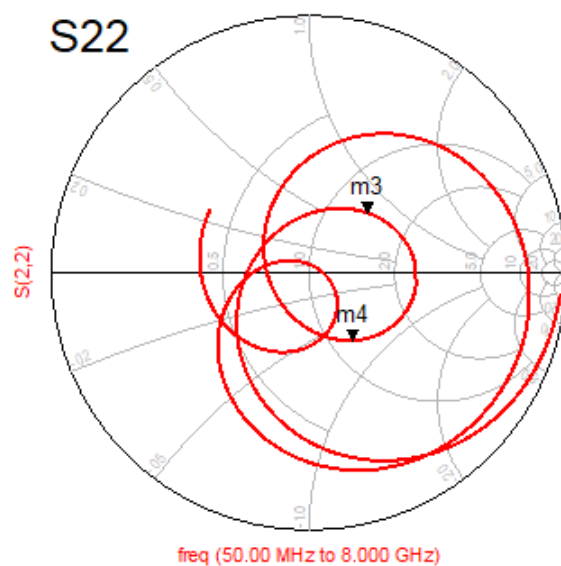
■ S-parameter simulation data 2

Condition: $f = 50 \text{ MHz} \sim 8 \text{ GHz}$, $V_{DD} = 1.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$



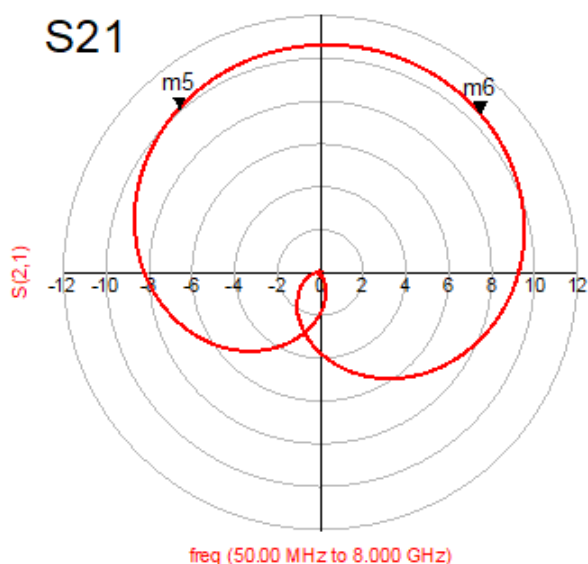
m1
freq=1.175 GHz
S(1,1)=0.674 / -56.247
impedance = $Z_0 * (0.774 - j1.589)$

m2
freq=1.575 GHz
S(1,1)=0.522 / -54.228
impedance = $Z_0 * (1.099 - j1.279)$



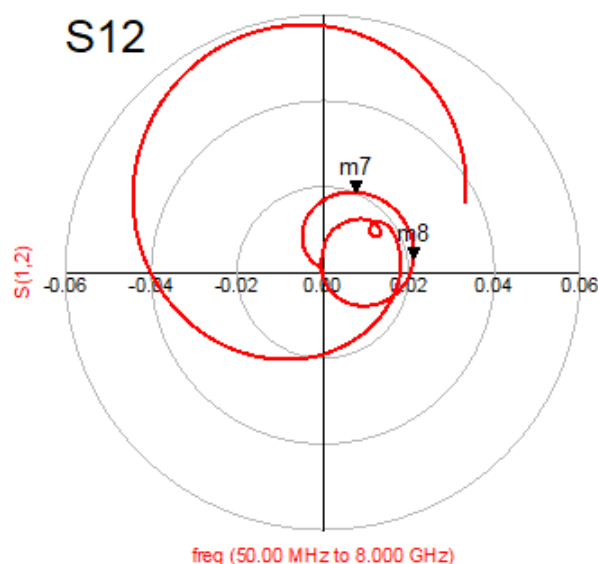
m3
freq=1.175 GHz
S(2,2)=0.325 / 45.832
impedance = $Z_0 * (1.370 + j0.714)$

m4
freq=1.575 GHz
S(2,2)=0.313 / -57.230
impedance = $Z_0 * (1.188 - j0.692)$



m5
freq=1.175 GHz
S(2,1)=10.090 / 130.636

m6
freq=1.575 GHz
S(2,1)=10.501 / 44.914

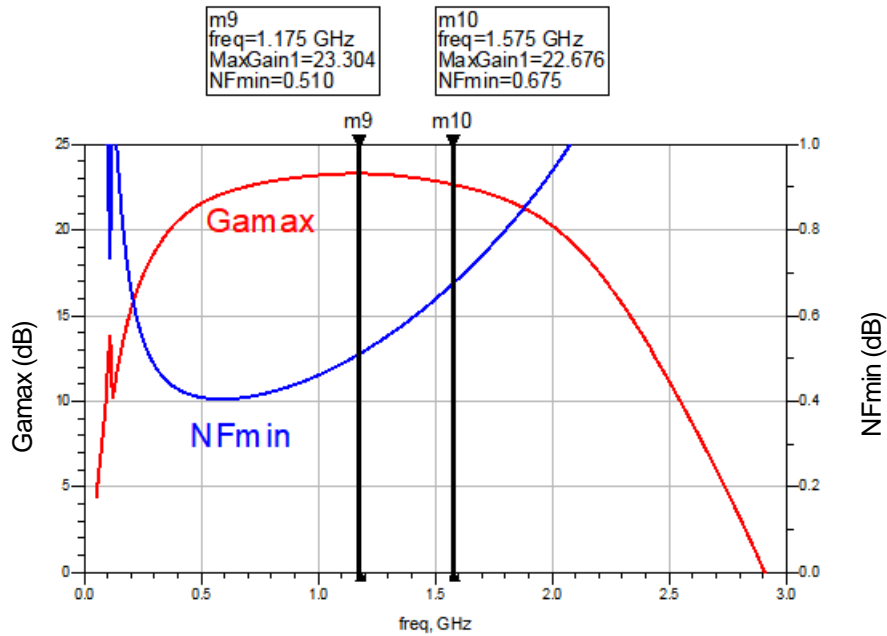


m7
freq=1.175 GHz
S(1,2)=0.020 / 67.468

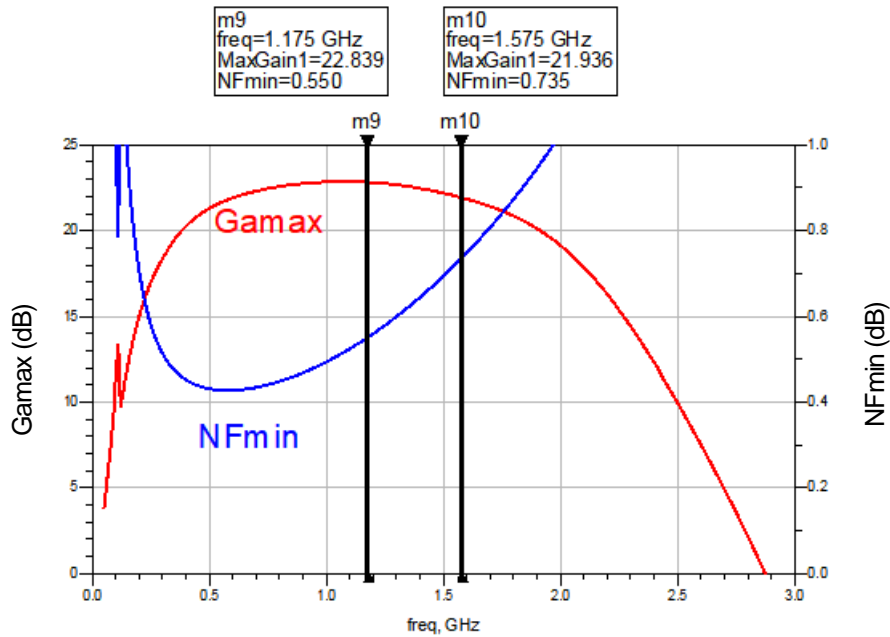
m8
freq=1.575 GHz
S(1,2)=0.021 / 8.433

■ Max gain, NFmin simulation data

Condition: $f = 50 \text{ MHz} \sim 3 \text{ GHz}$, $V_{DD} = 2.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

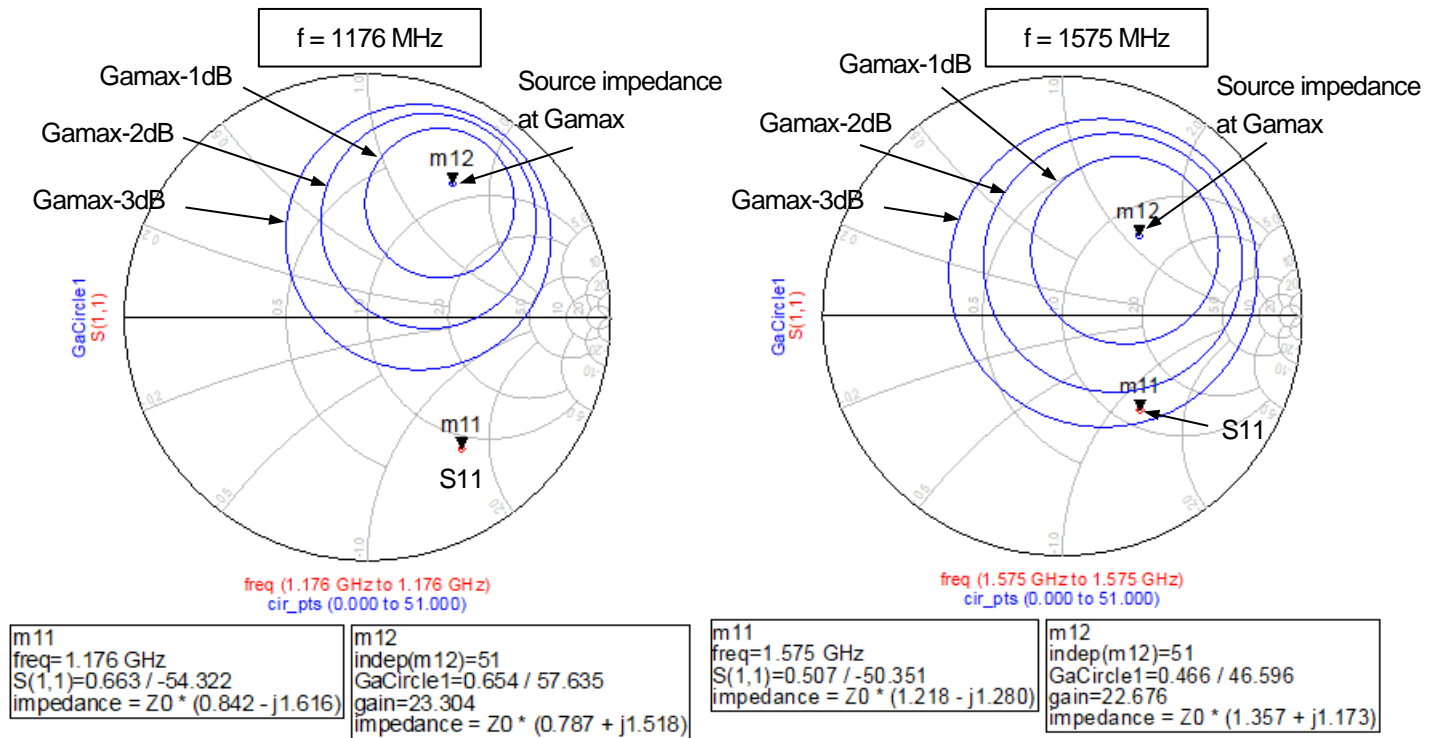


Condition: $f = 50 \text{ MHz} \sim 3 \text{ GHz}$, $V_{DD} = 1.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

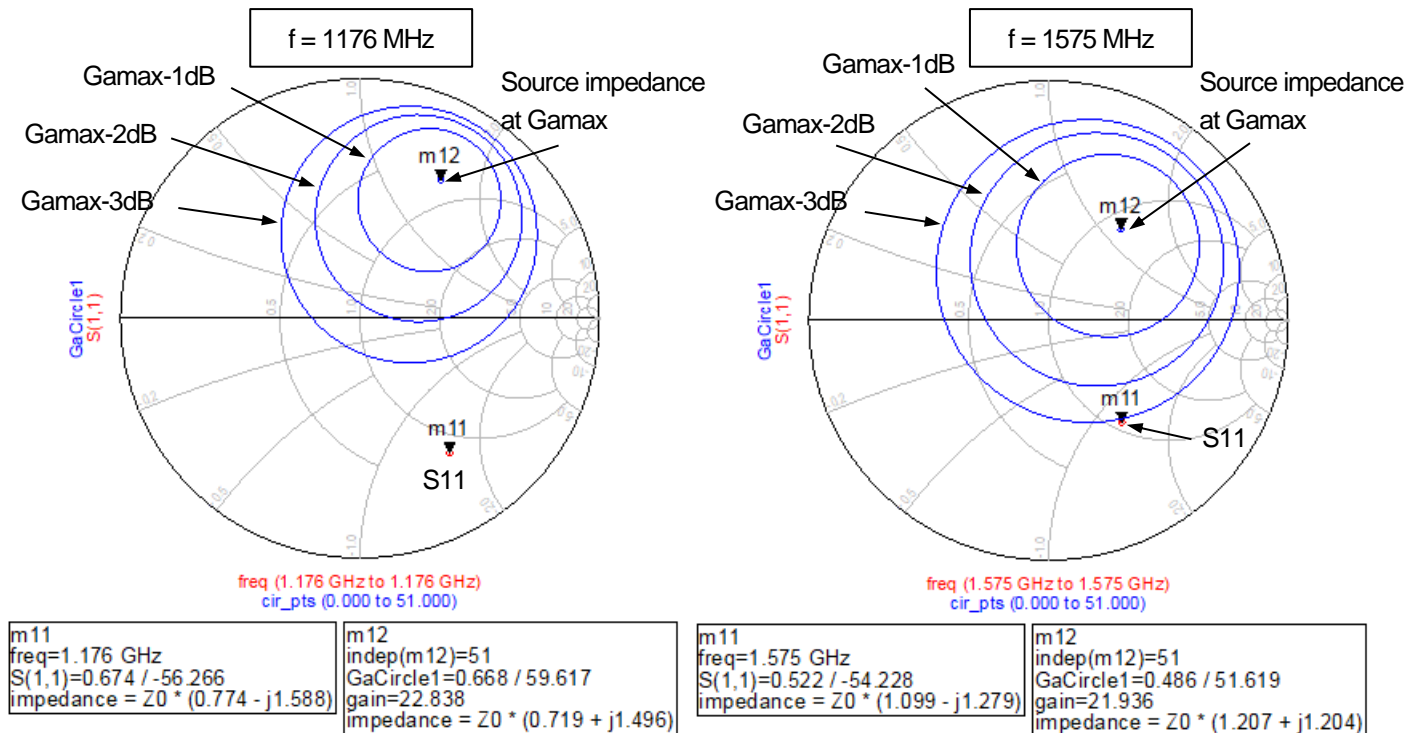


■ Gain circle simulation data (Source impedance)

Condition: $V_{DD} = 2.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

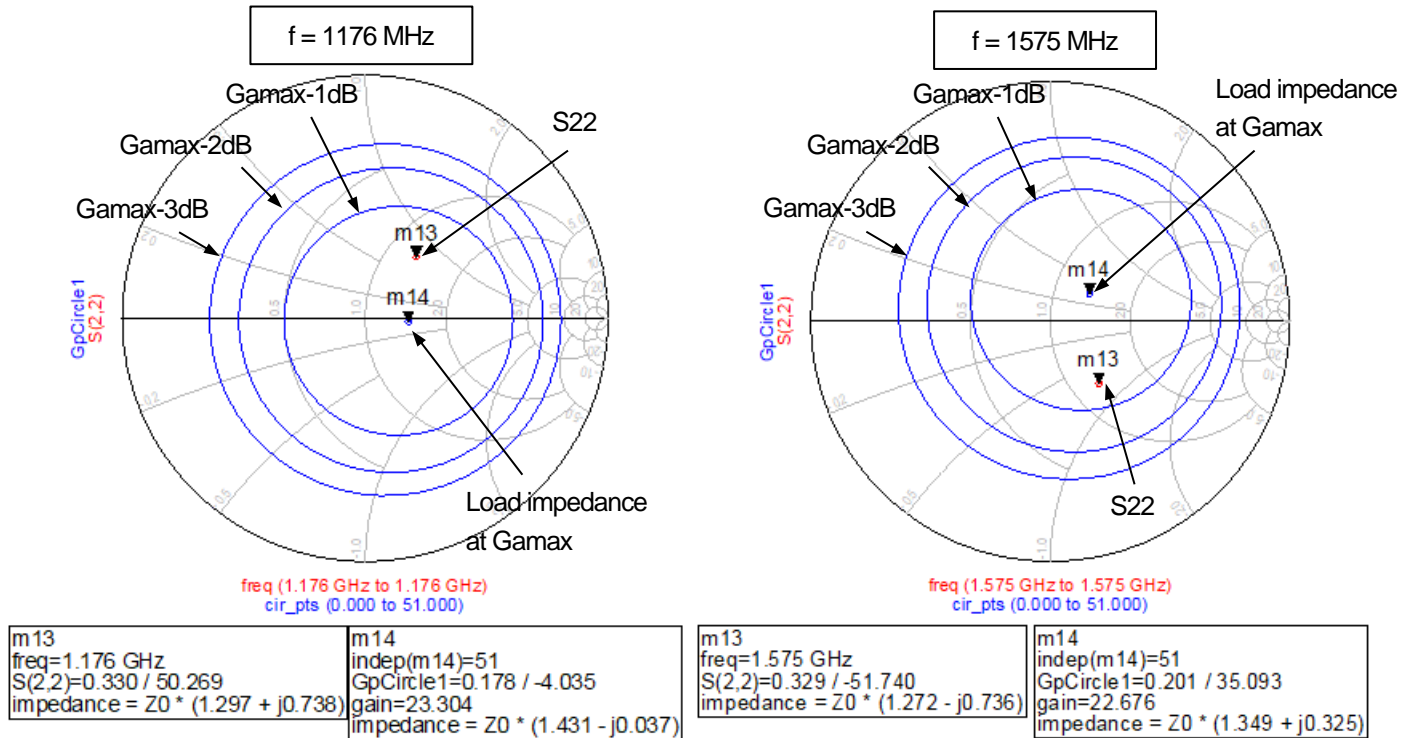


Condition: $V_{DD} = 1.8 \text{ V}$, $V_{CTL} = 1.8 \text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50 \text{ ohm}$

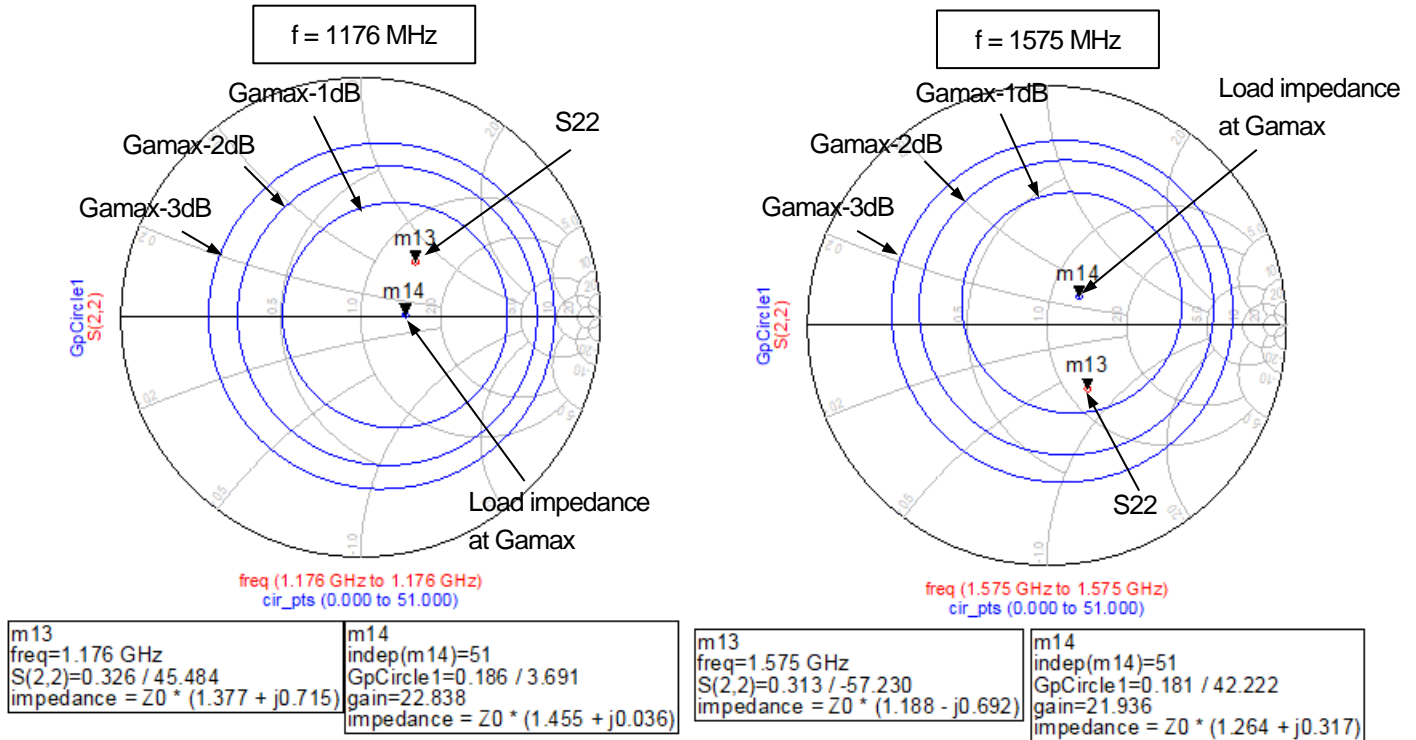


■ **Gain circle simulation data (Load impedance)**

Condition: $V_{DD} = 2.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$

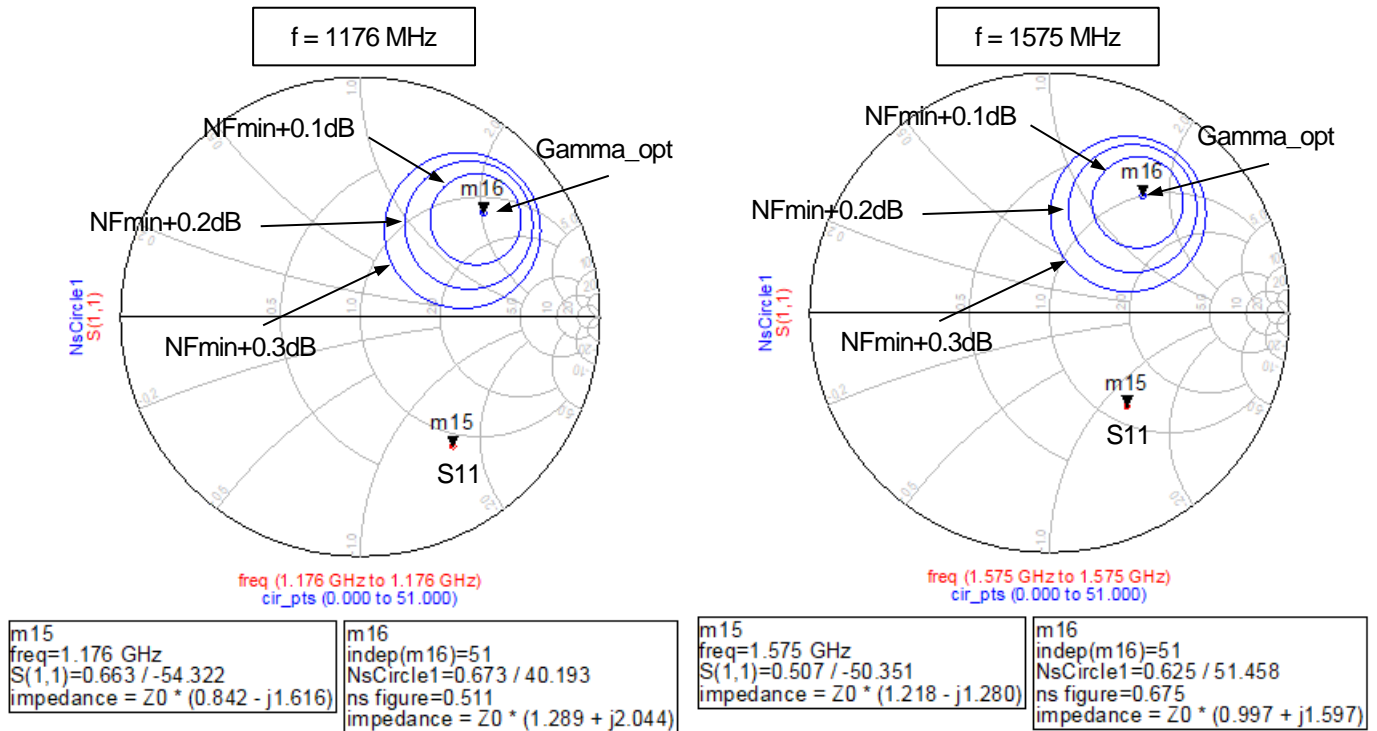


Condition: $V_{DD} = 1.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$

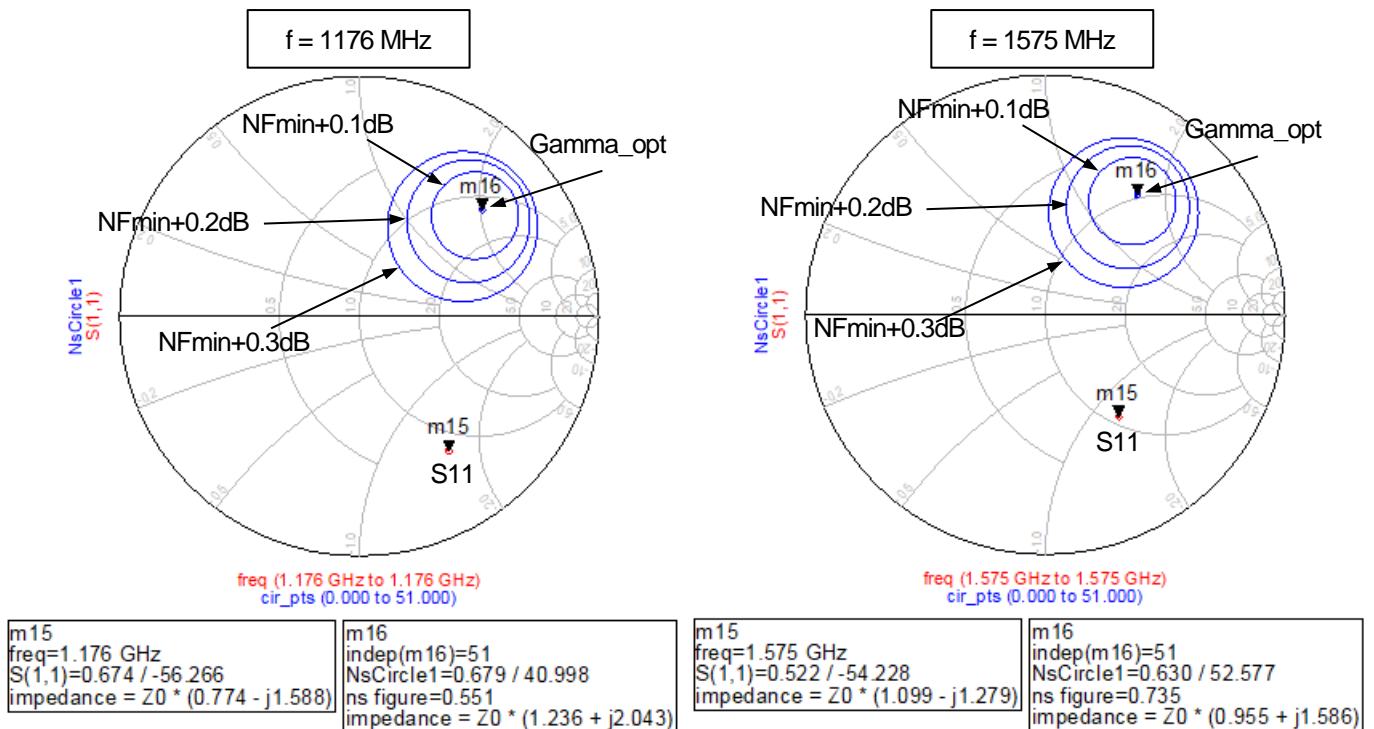


■ NF circle simulation data

Condition: $V_{DD} = 2.8\text{ V}$, $V_{CTL} = 1.8\text{ V}$, $T_a = +25^\circ\text{C}$, $Z_s = Z_l = 50\text{ ohm}$



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



■ **Simulation condition**

$f = 50 \text{ MHz to } 8\text{GHz}$, Step = 10 MHz (1100 MHz to 1700 MHz, Step = 5 MHz)

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

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

s2p file at $V_{DD}=2.8\text{V}$: NT1193FAAE2S_2r8v_v1.s2p

s2p file at $V_{DD}=1.8\text{V}$: NT1193FAAE2S_1r8v_v1.s2p

■ **Simulation circuit**

