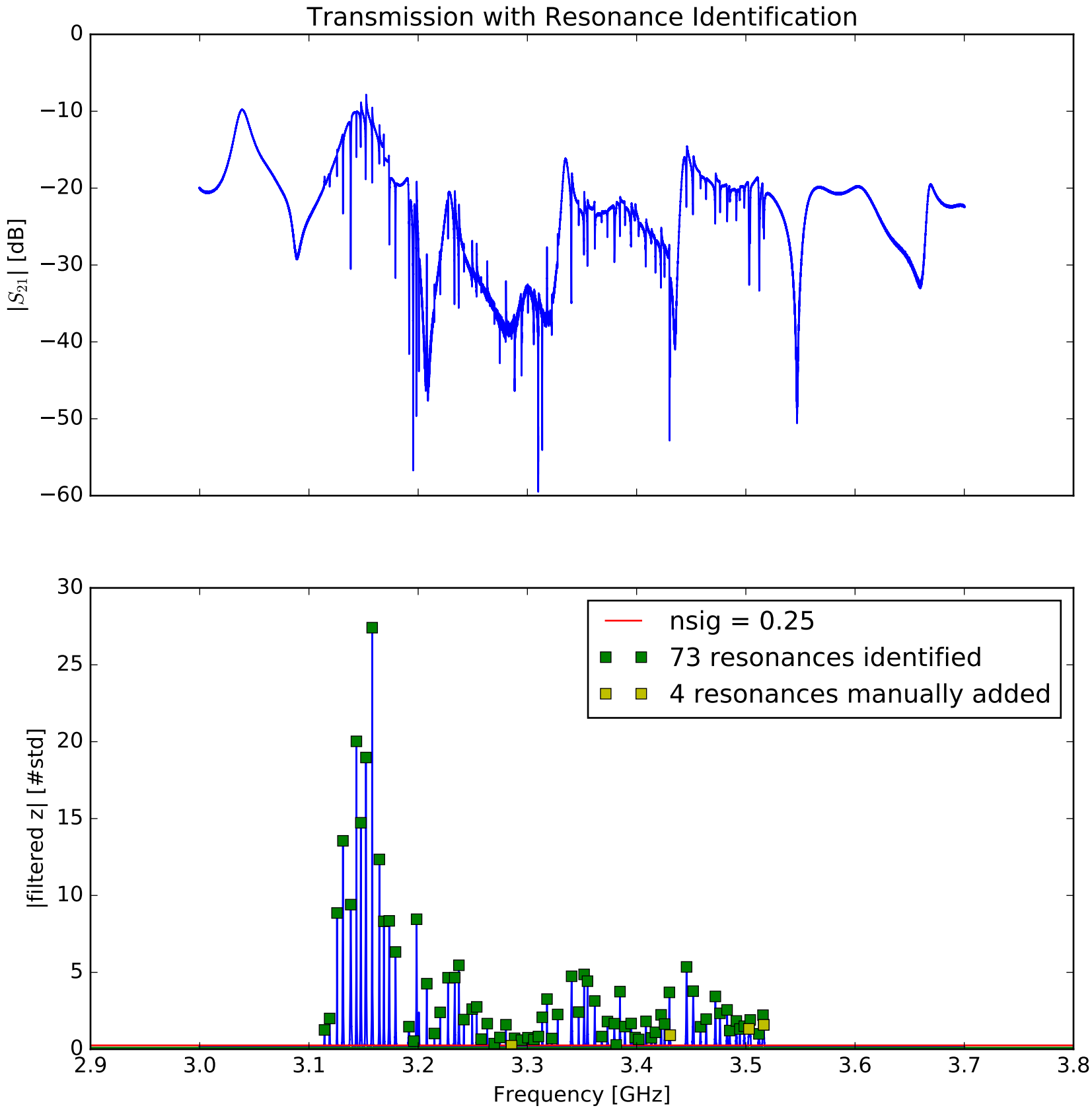
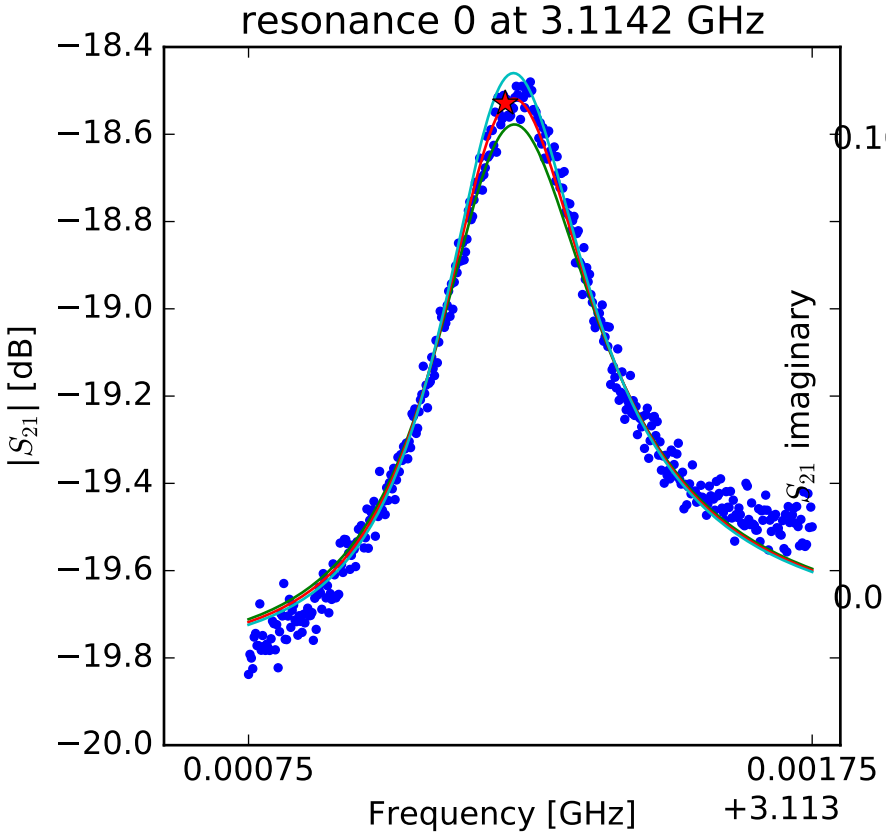
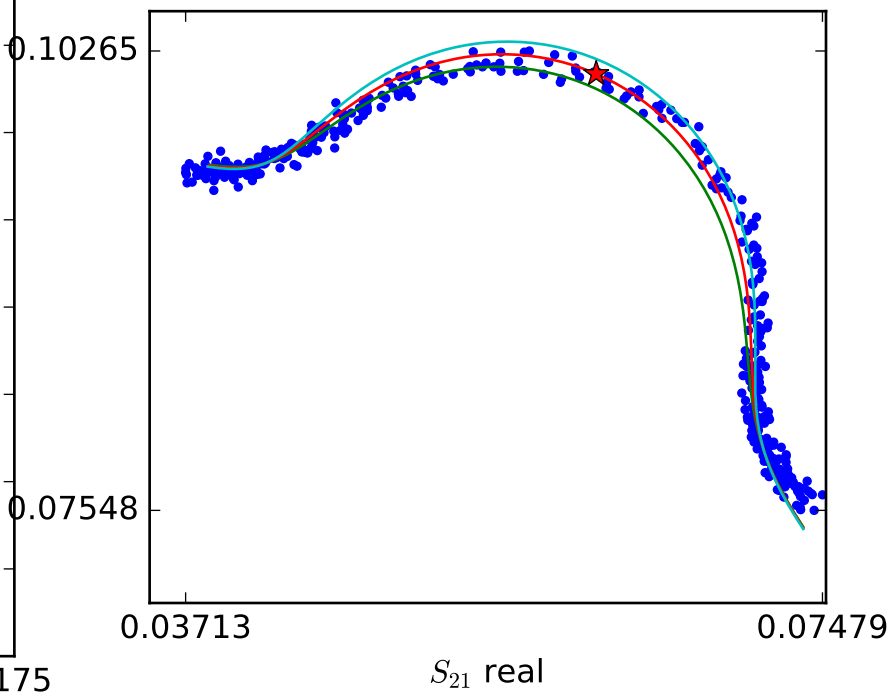
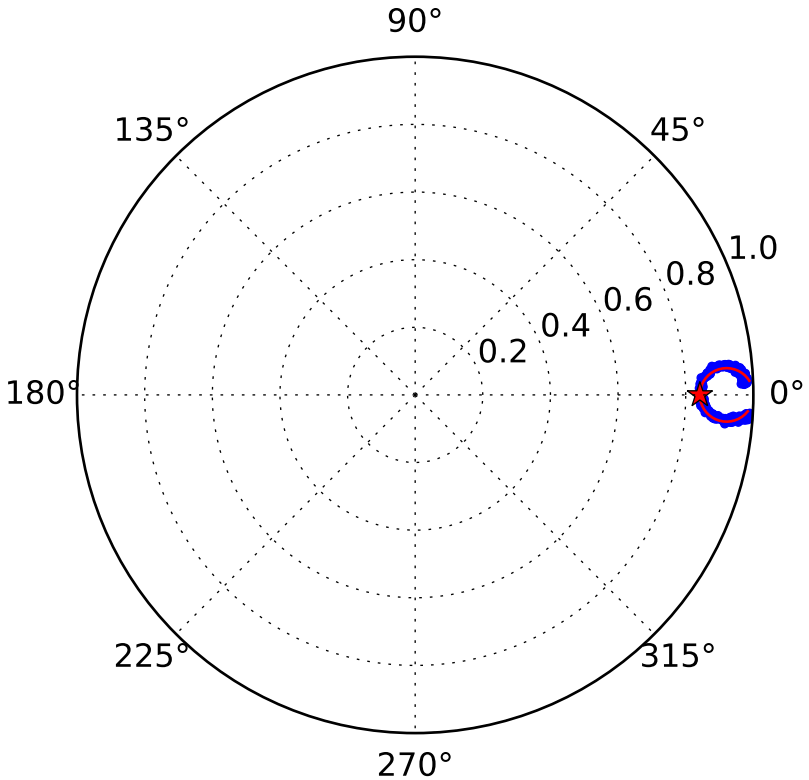
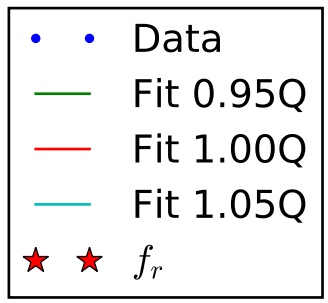

Transmission with Resonance Identification
$|S_{21}|$ [dB]
0
−10
−20
−30
−40
−50
−60
|filtered z| [#std]
30
25
20
15
10
5
0
nsig = 0.25
73 resonances identified
4 resonances manually added
2.9
3.0
3.1
3.2
3.3
3.4
3.5
3.6
3.7
3.8
Frequency [GHz]



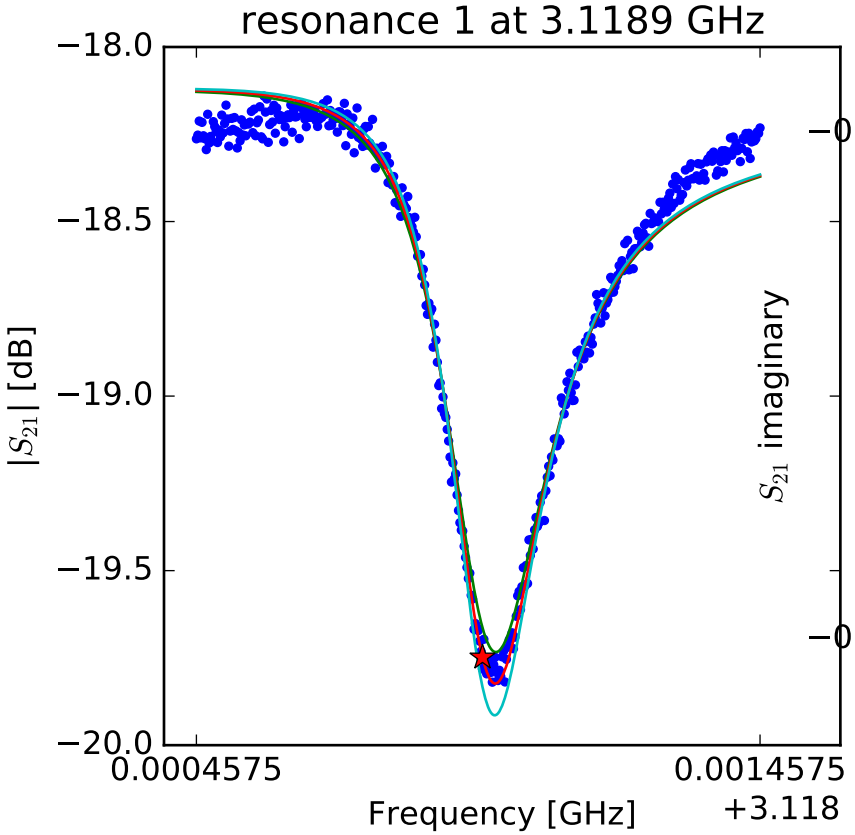


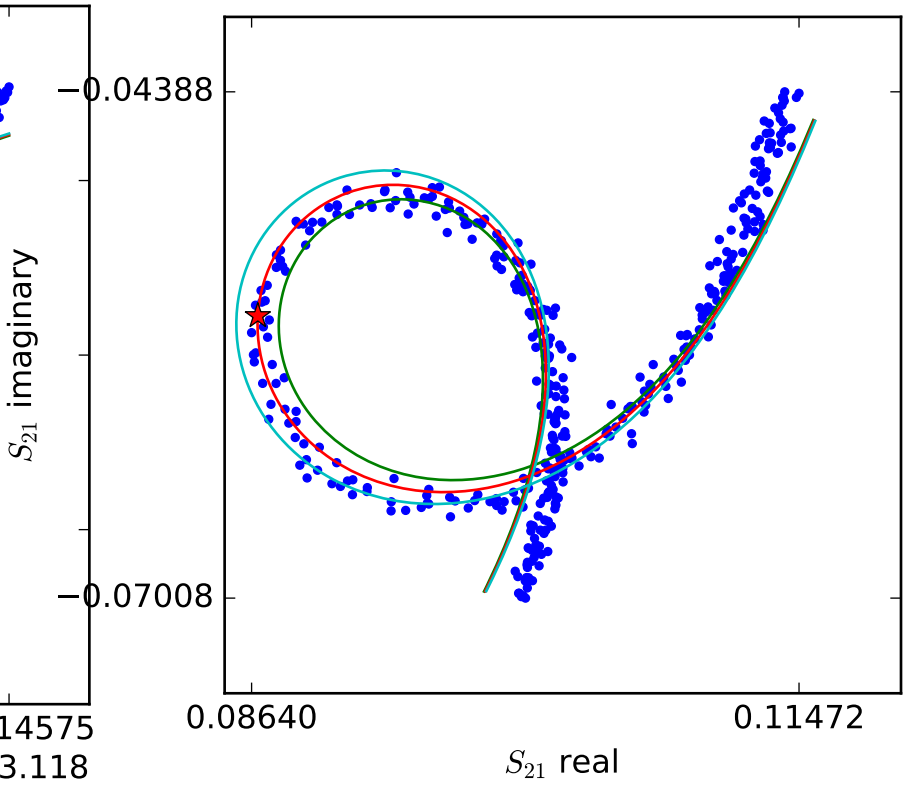


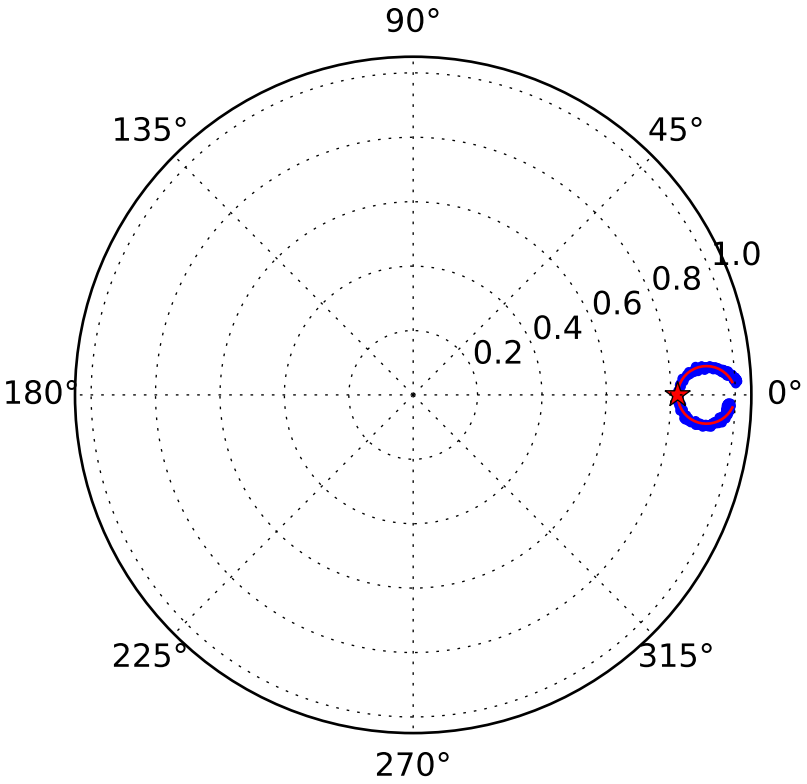


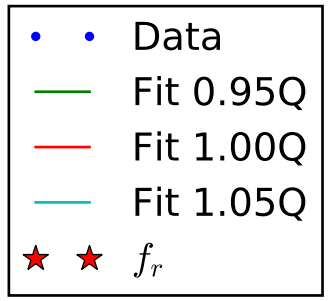
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.11420552382
Q_r = 9967.45181647
Q_c = 62984.9864817
Q_i = 11841.3619547
a = (0.0138843189887-0.101594002697j)
ϕ_0 = -2.93113911278
τ = 49.3265172851



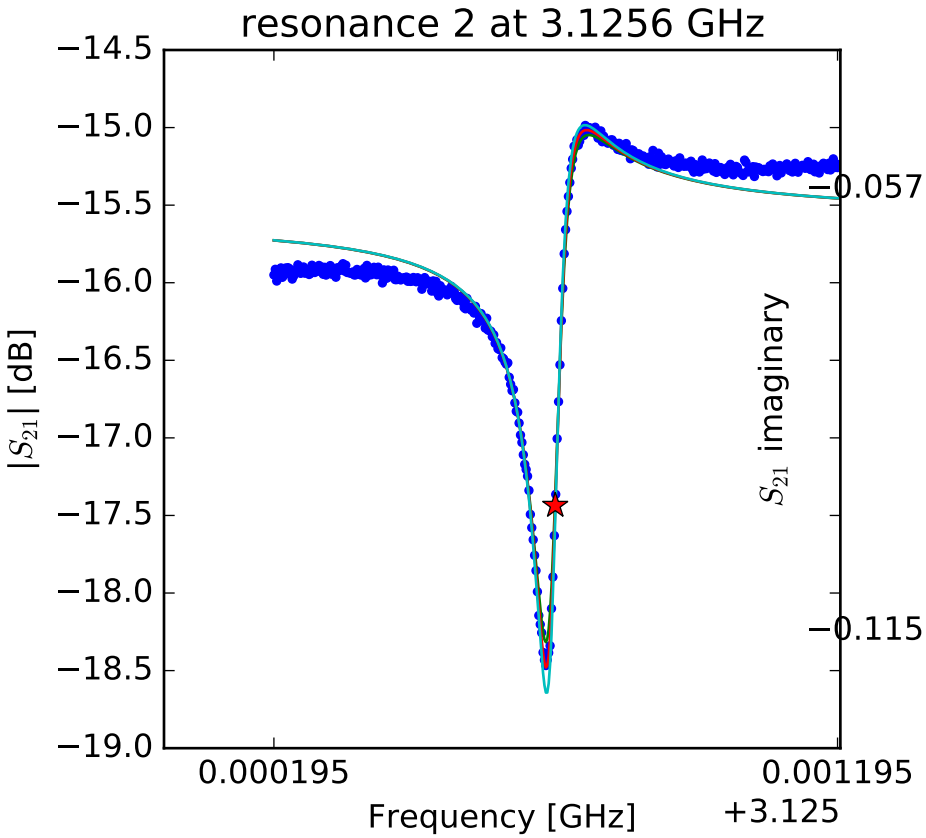


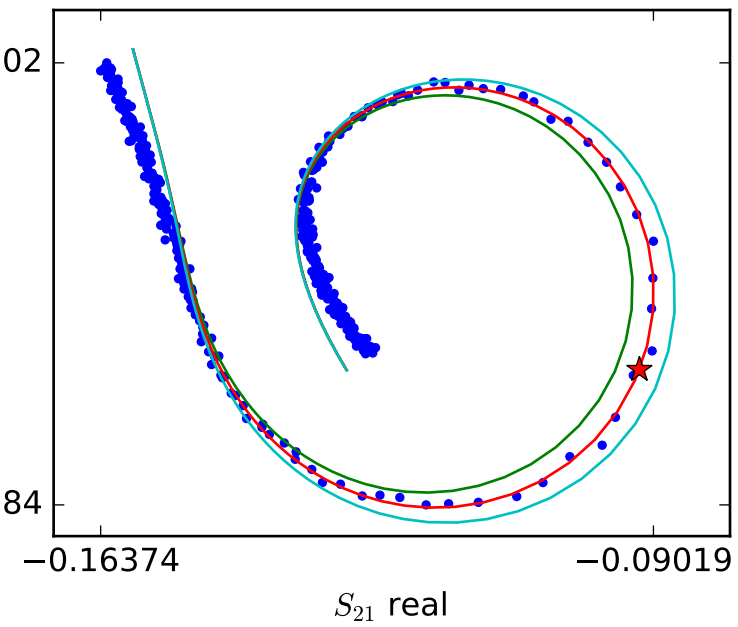


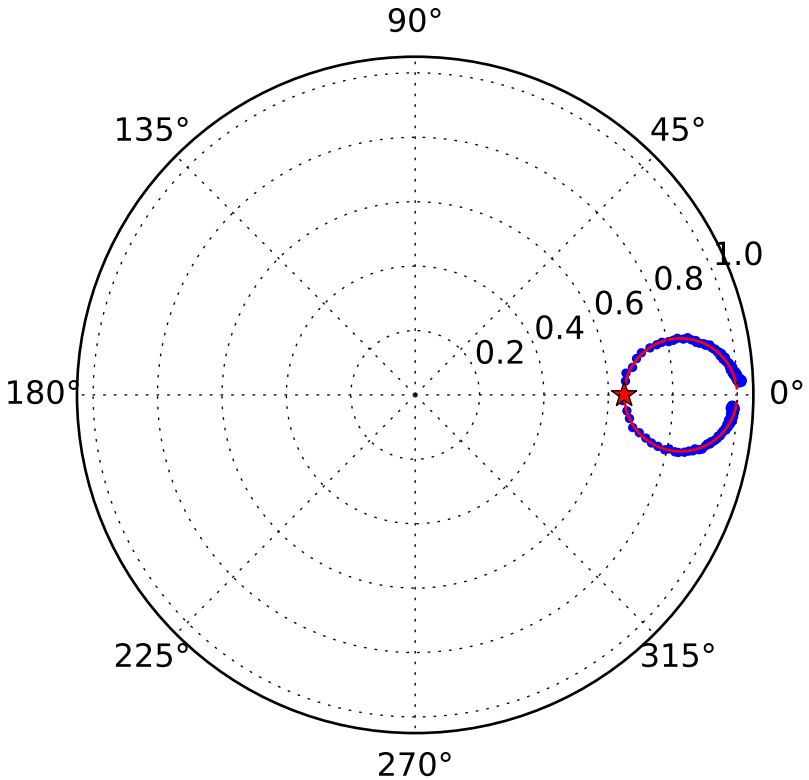


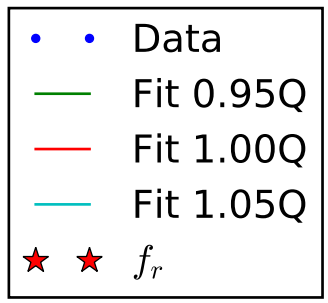
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.11896507341
Q_r = 13386.5621218
Q_c = 74836.8379753
Q_i = 16302.7417964
a = (0.121473110958+0.0216579496506j)
ϕ_0 = 0.350721192989
τ = 50.3714899835



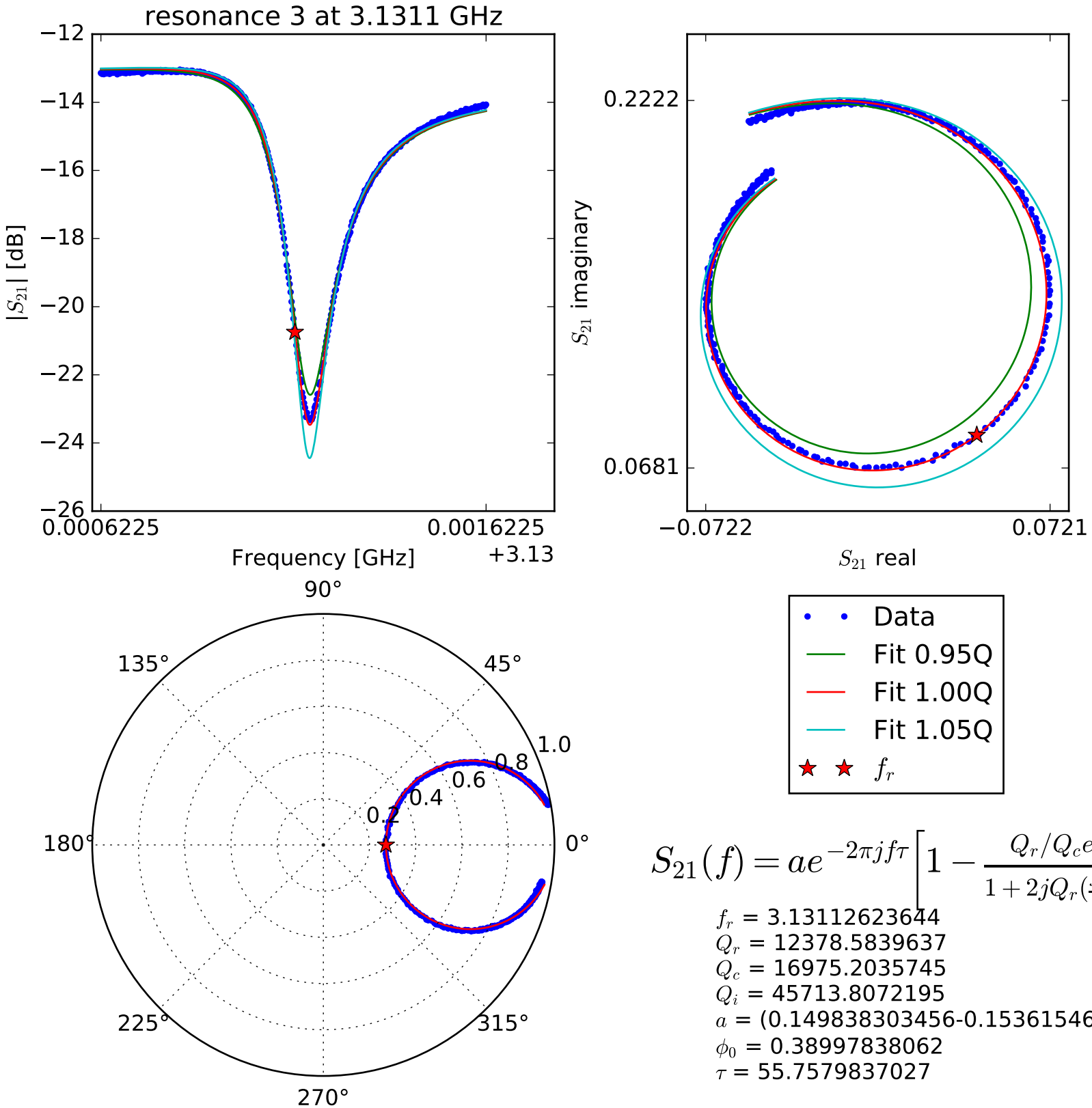






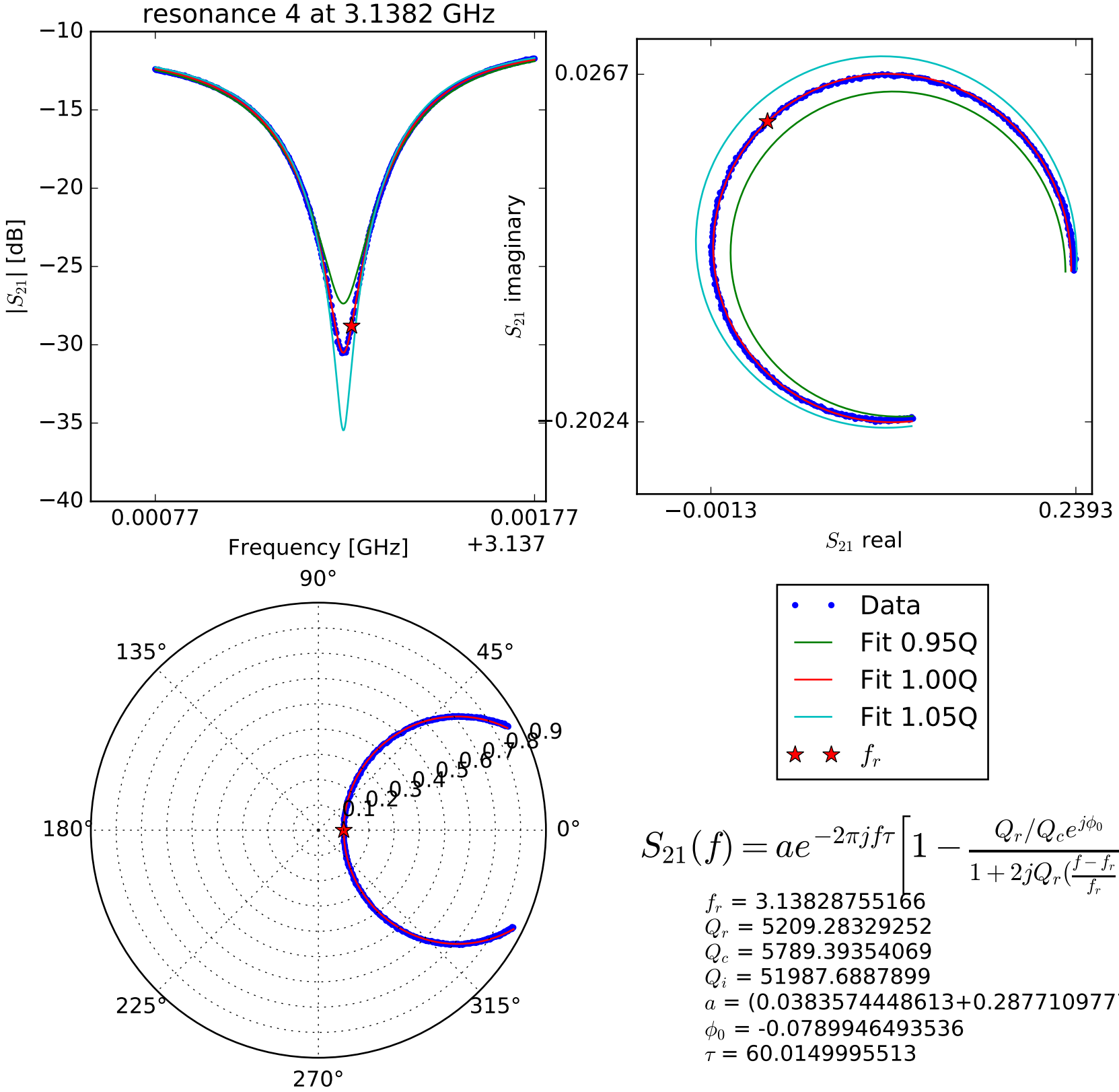
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.12569419502
Q_r = 52180.8330188
Q_c = 148575.320801
Q_i = 80427.6695049
a = (0.125592917441-0.108963279354j)
ϕ_0 = -0.836637305376
τ = 53.5268969673



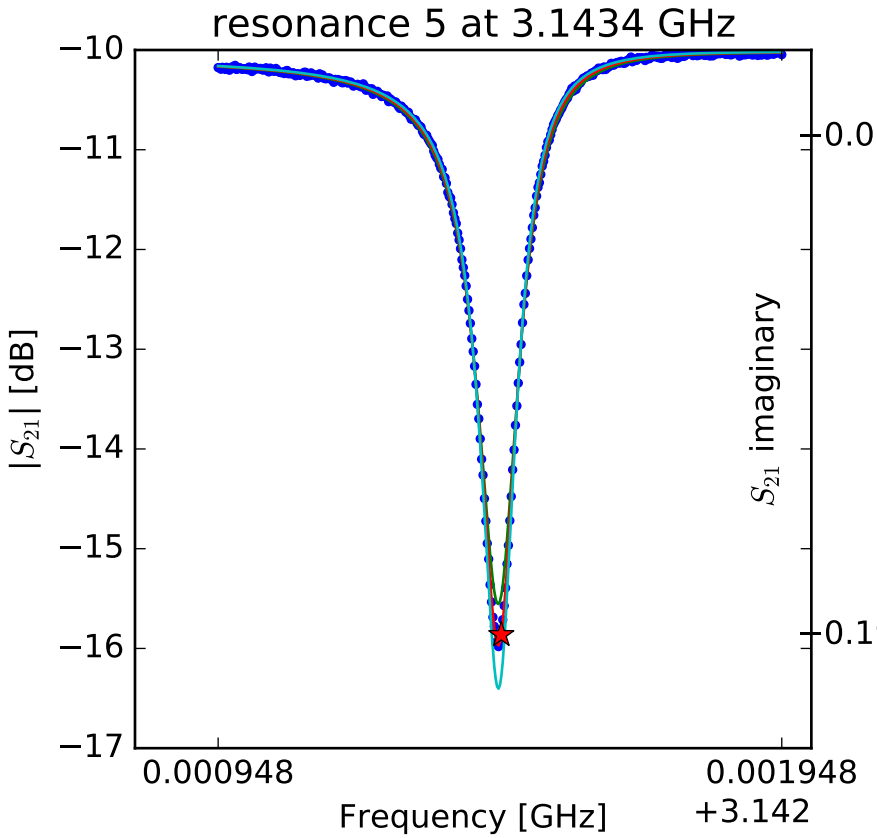
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

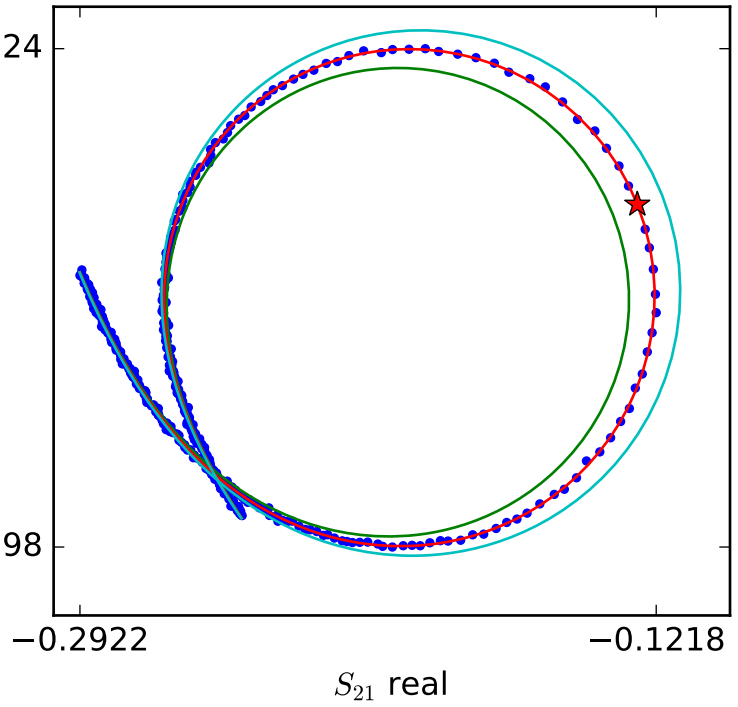
f_r = 3.13112623644
Q_r = 12378.5839637
Q_c = 16975.2035745
Q_i = 45713.8072195
a = (0.149838303456-0.153615468816j)
ϕ_0 = 0.38997838062
τ = 55.7579837027

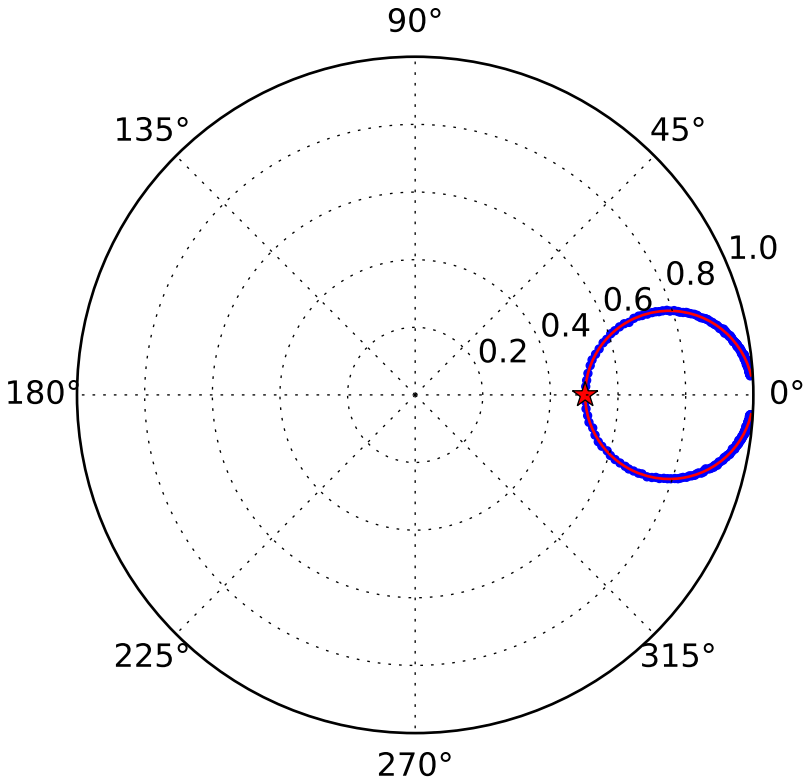


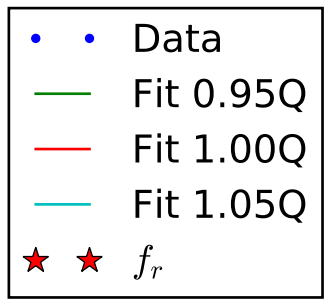
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.13828755166
Q_r = 5209.28329252
Q_c = 5789.39354069
Q_i = 51987.6887899
a = (0.0383574448613+0.287710977726j)
ϕ_0 = -0.0789946493536
τ = 60.0149995513



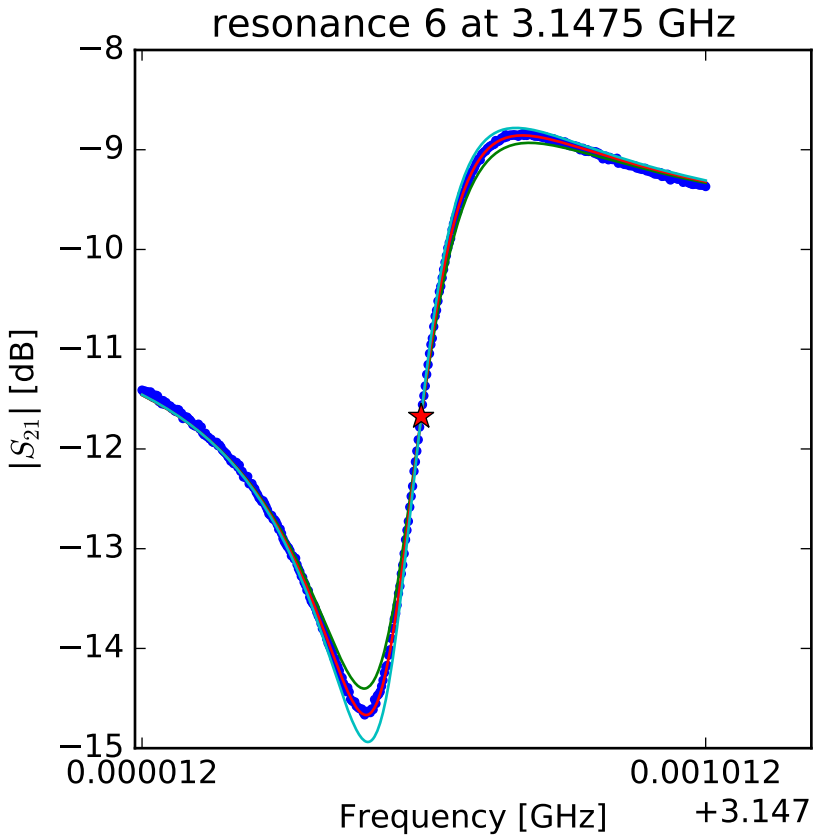


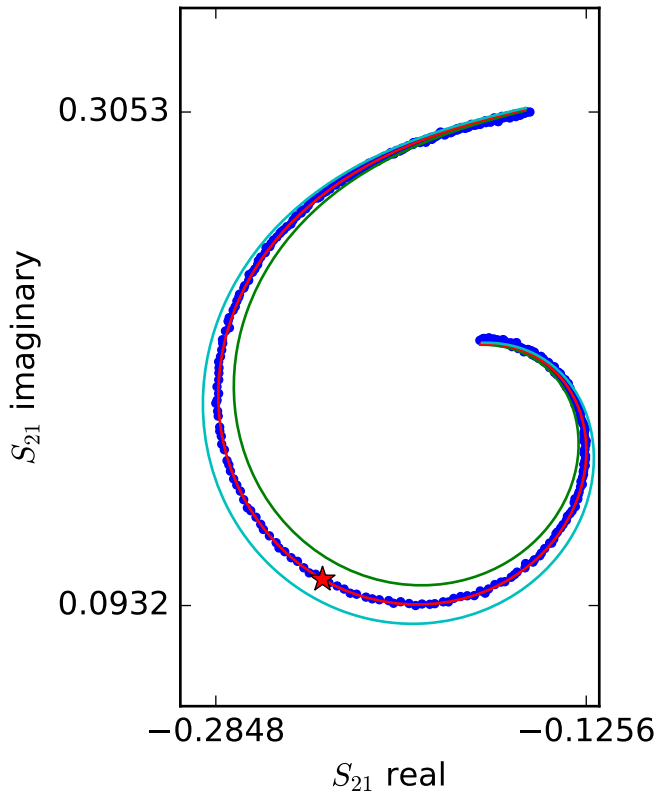


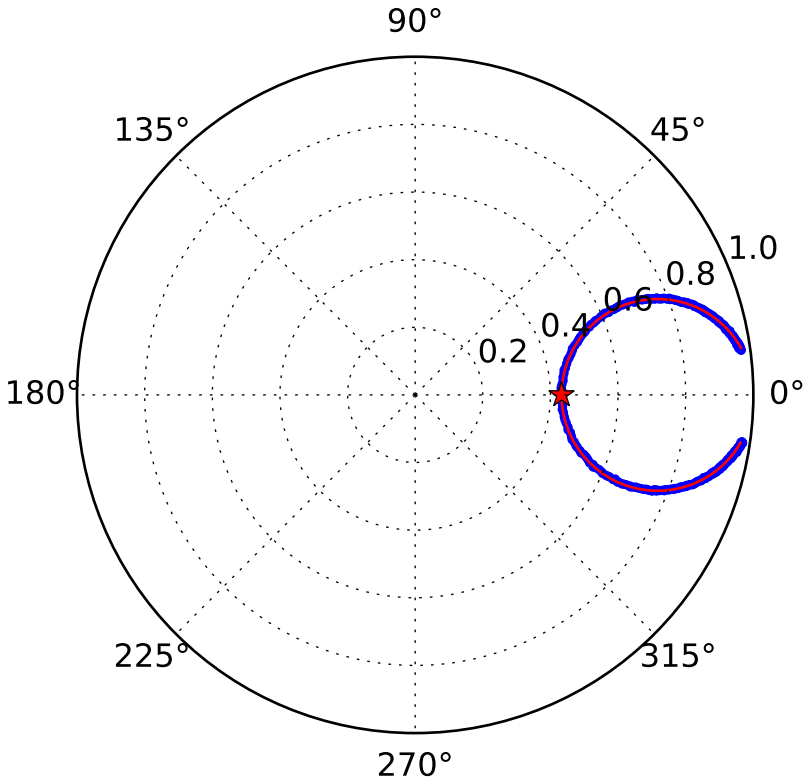


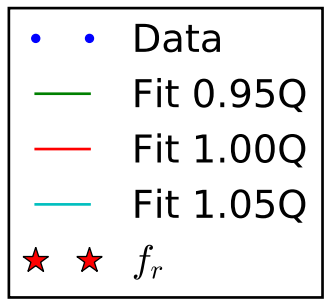
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.14344995253
Q_r = 26668.7973336
Q_c = 53614.6749135
Q_i = 53063.3635937
a = (-0.236508819768-0.20722800948j)
ϕ_0 = -0.138970735118
τ = 62.679953021



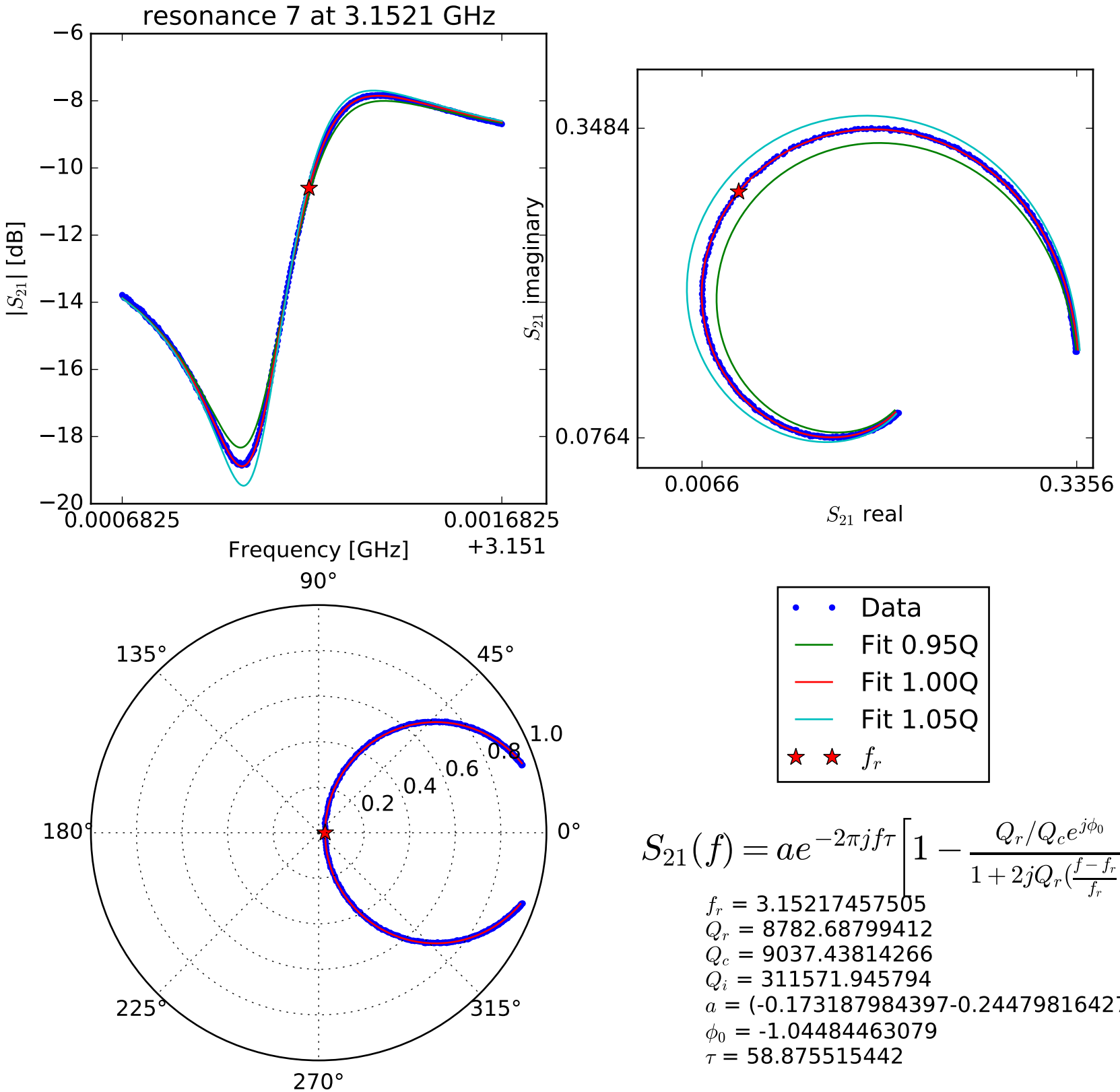






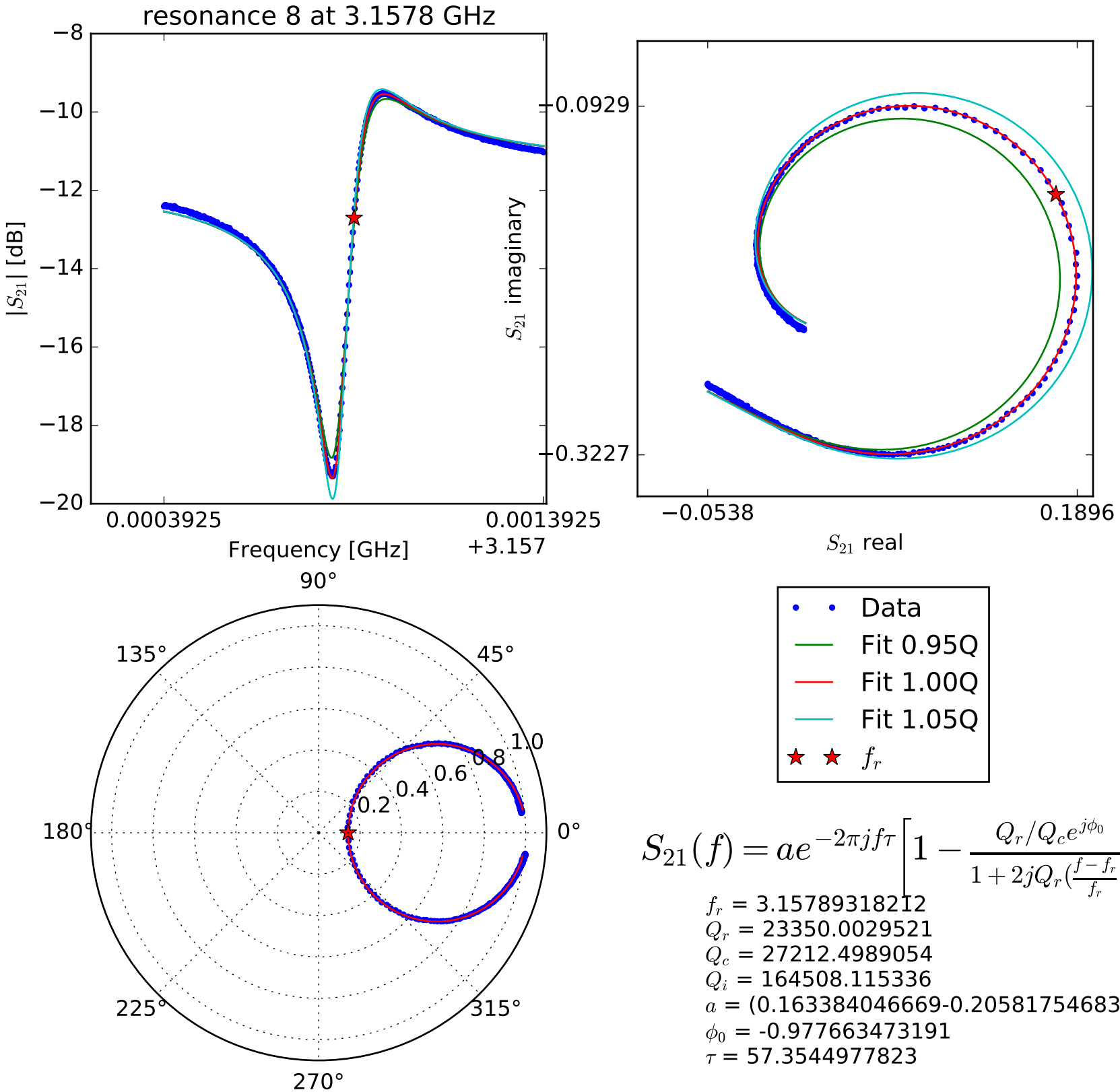
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.14750780843
Q_r = 11878.1397506
Q_c = 20943.5676987
Q_i = 27441.6856464
a = (-0.305121033685-0.0561980490773j)
ϕ_0 = -0.997557715496
τ = 60.7434706768



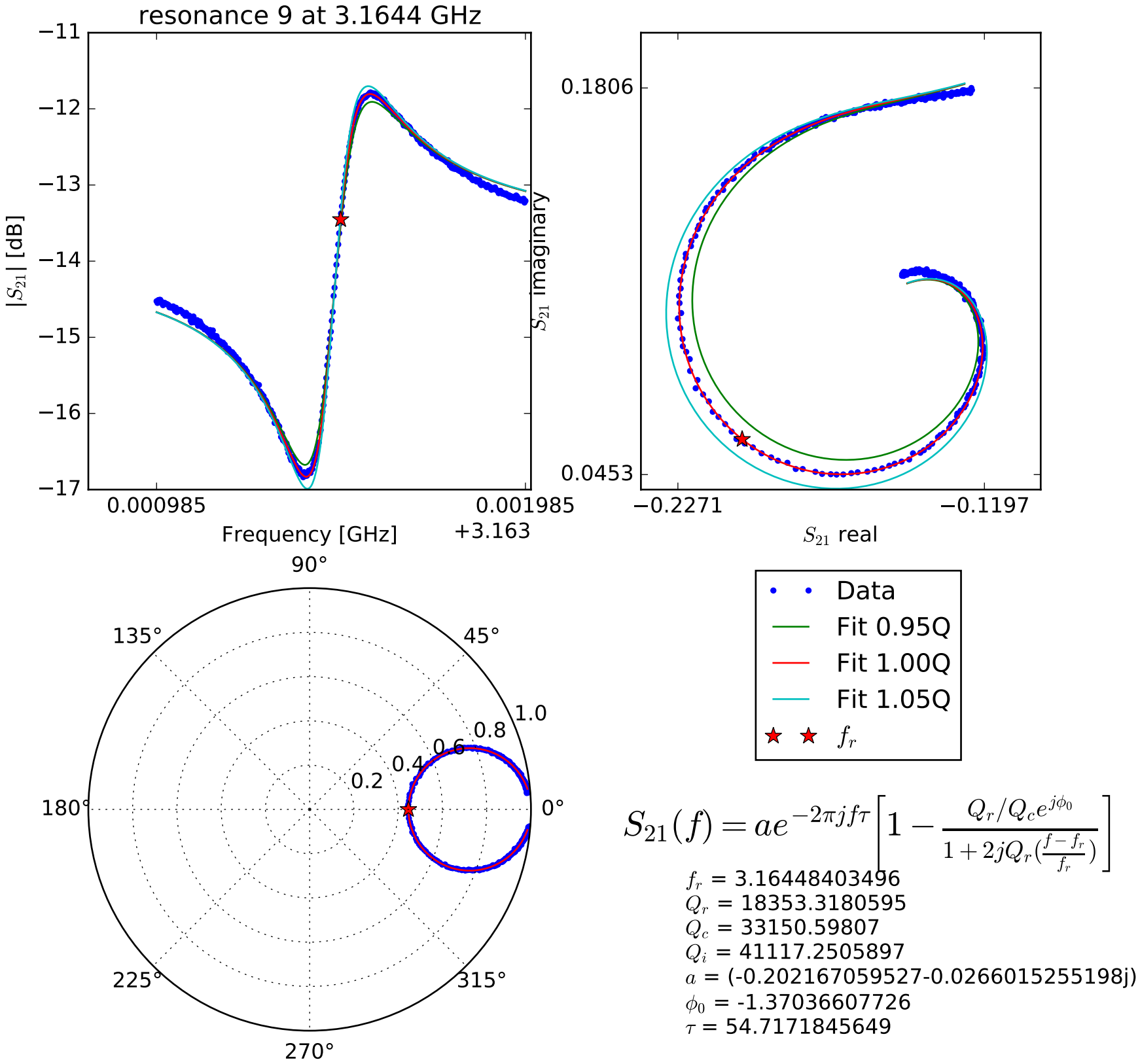
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.15217457505
Q_r = 8782.68799412
Q_c = 9037.43814266
Q_i = 311571.945794
a = (-0.173187984397-0.24479816427j)
ϕ_0 = -1.04484463079
τ = 58.875515442



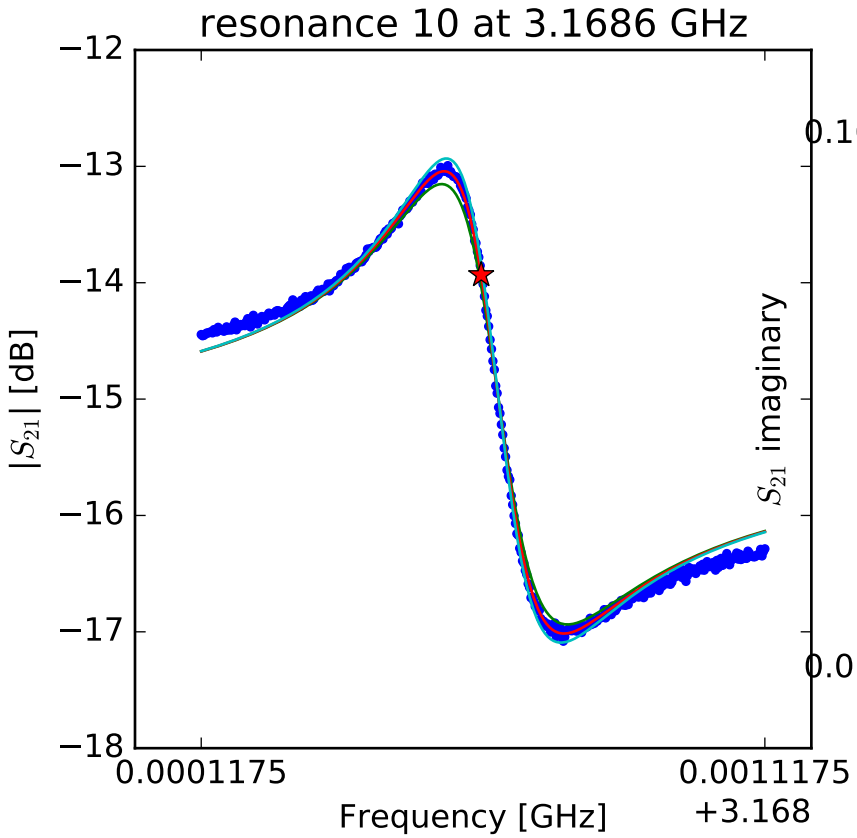
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

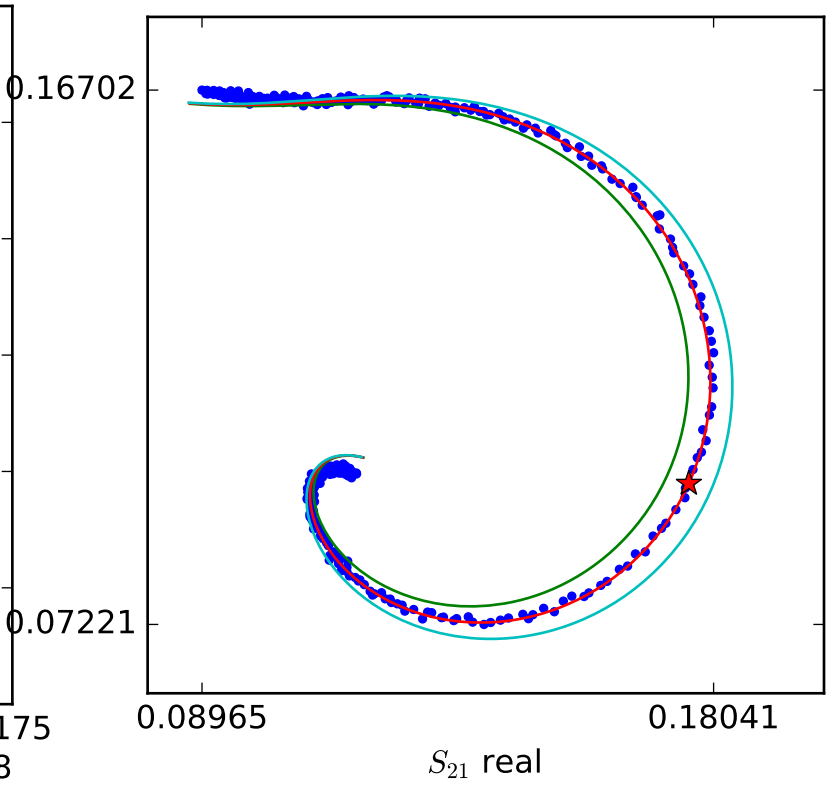
f_r = 3.15789318212
Q_r = 23350.0029521
Q_c = 27212.4989054
Q_i = 164508.115336
a = (0.163384046669-0.205817546832j)
ϕ_0 = -0.977663473191
τ = 57.3544977823

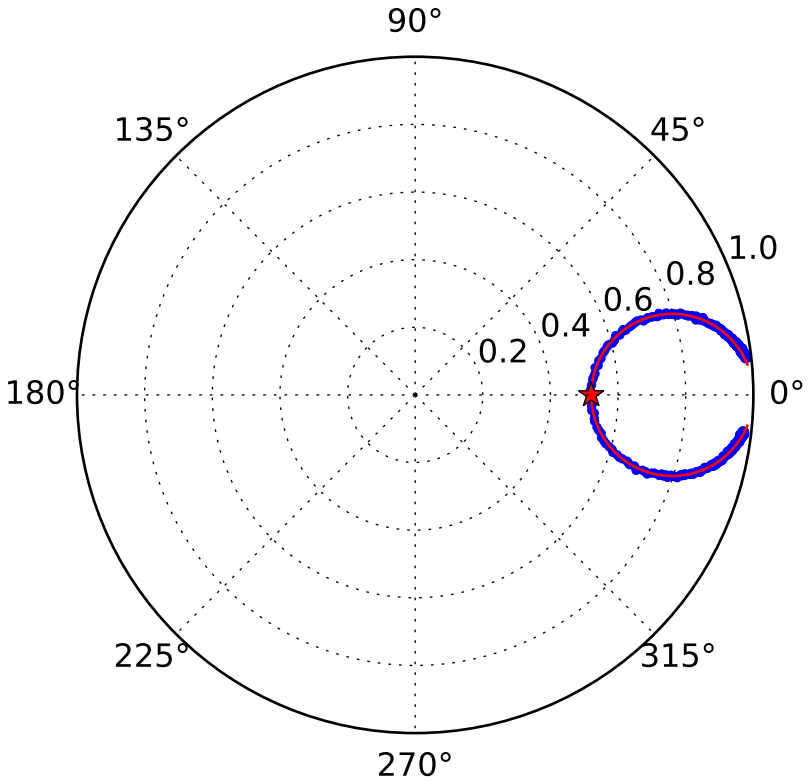


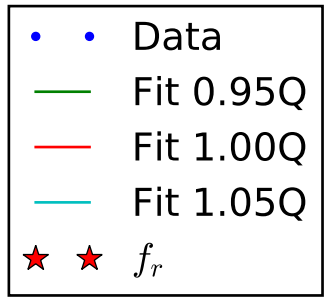
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.16448403496
Q_r = 18353.3180595
Q_c = 33150.59807
Q_i = 41117.2505897
a = (-0.202167059527-0.0266015255198j)
ϕ_0 = -1.37036607726
τ = 54.7171845649



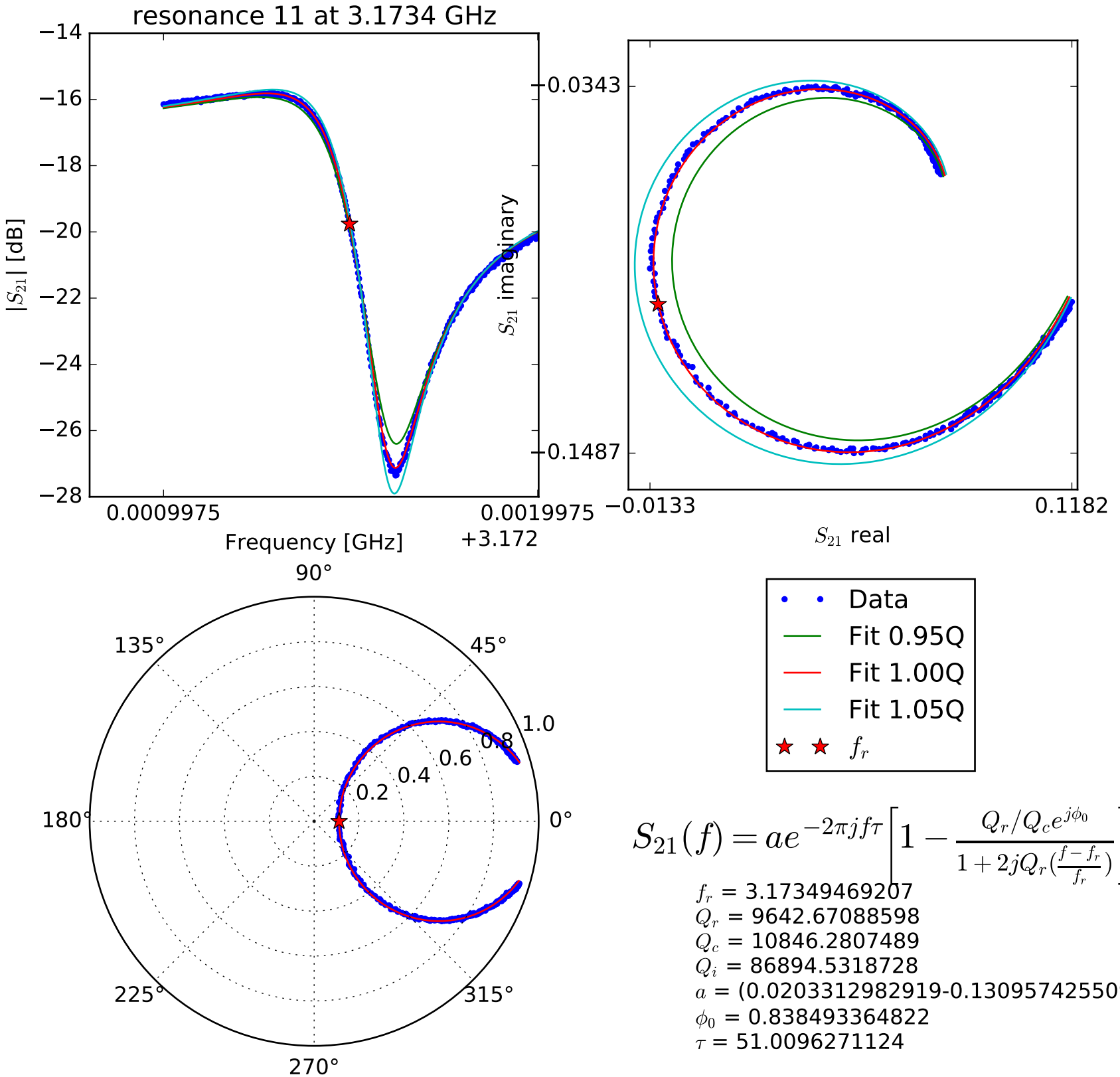






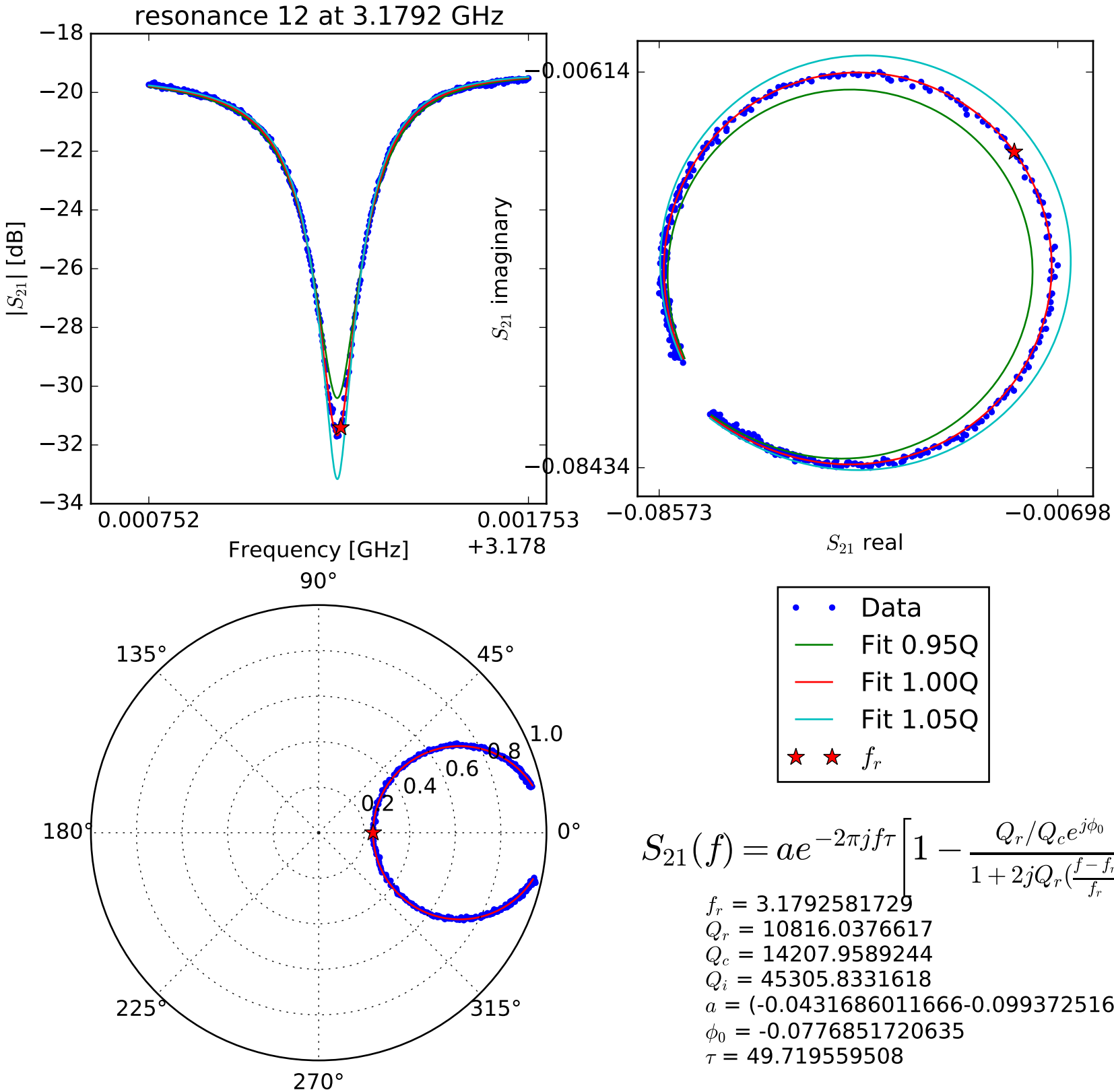
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.16861423827
Q_r = 16100.3202981
Q_c = 33574.9406963
Q_i = 30934.4230022
a = (-0.0588558655996-0.160079129821j)
ϕ_0 = 1.73839246616
τ = 53.8241392827



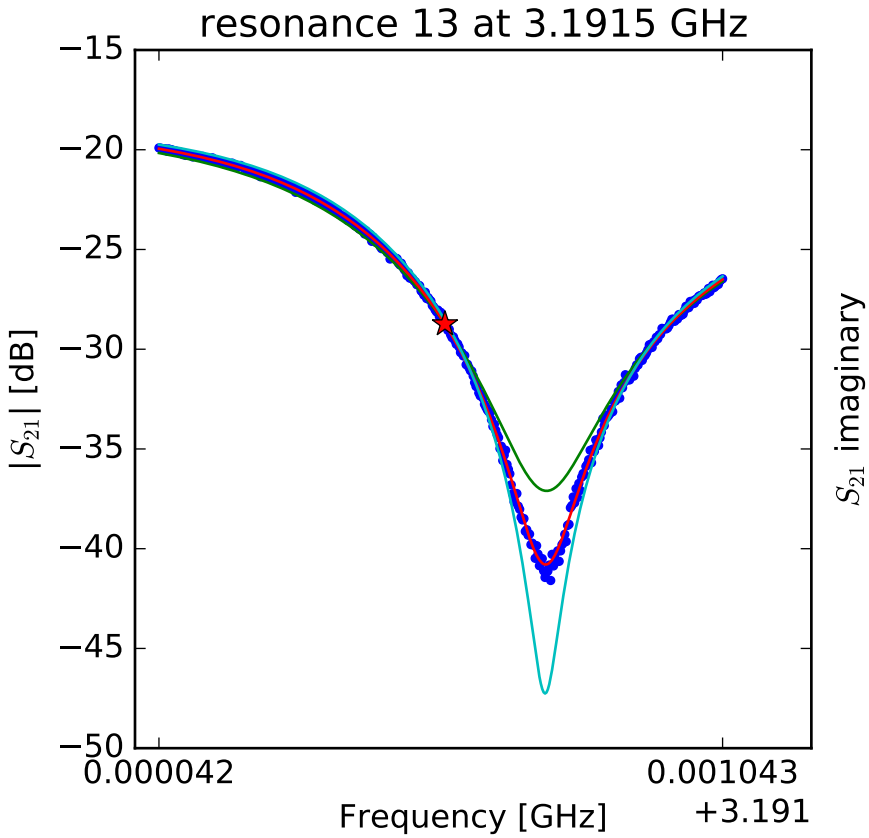
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

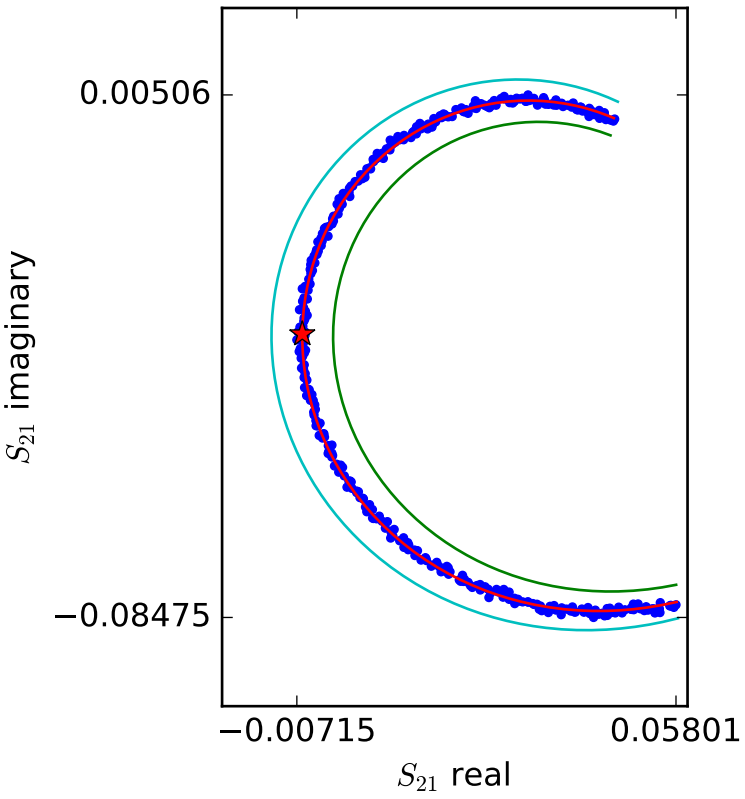
f_r = 3.17349469207
Q_r = 9642.67088598
Q_c = 10846.2807489
Q_i = 86894.5318728
a = (0.0203312982919-0.130957425509j)
ϕ_0 = 0.838493364822
τ = 51.0096271124

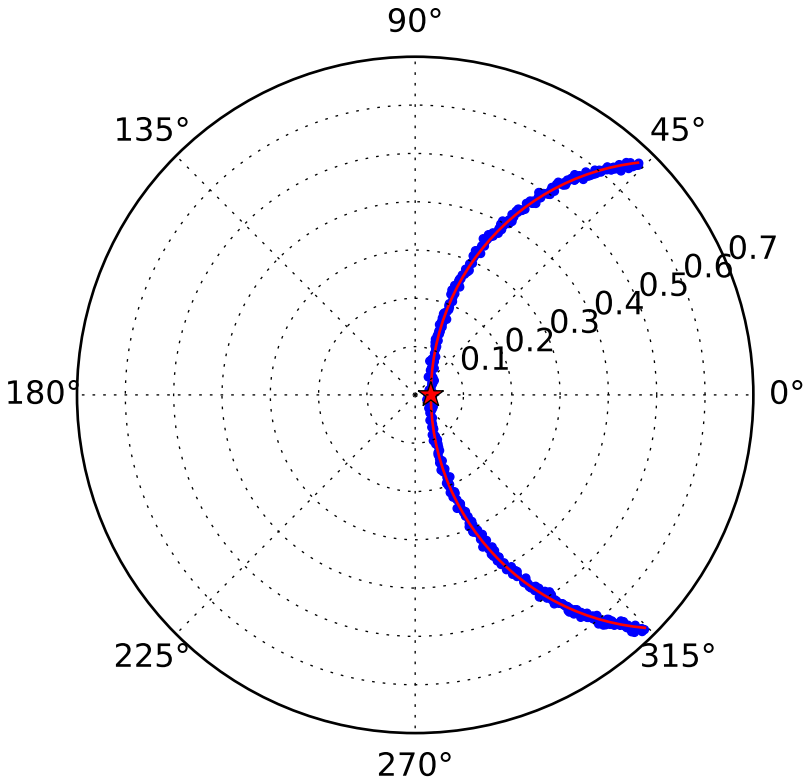


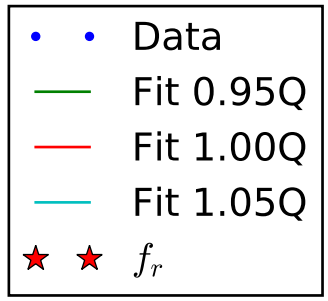
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.1792581729
Q_r = 10816.0376617
Q_c = 14207.9589244
Q_i = 45305.8331618
a = (-0.0431686011666-0.0993725160807j)
ϕ_0 = -0.0776851720635
τ = 49.719559508



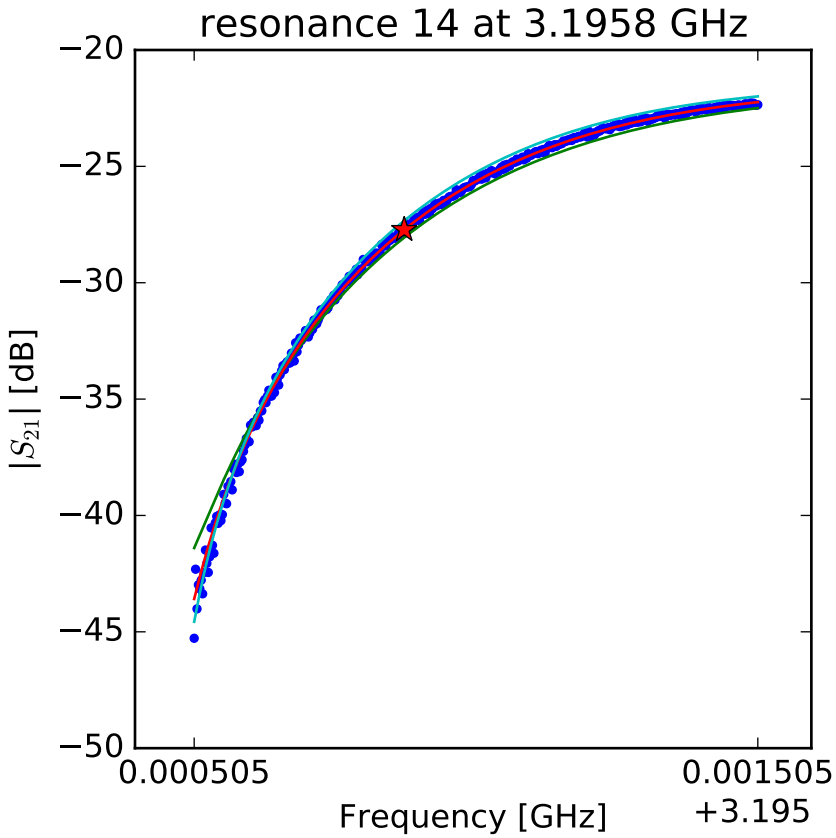


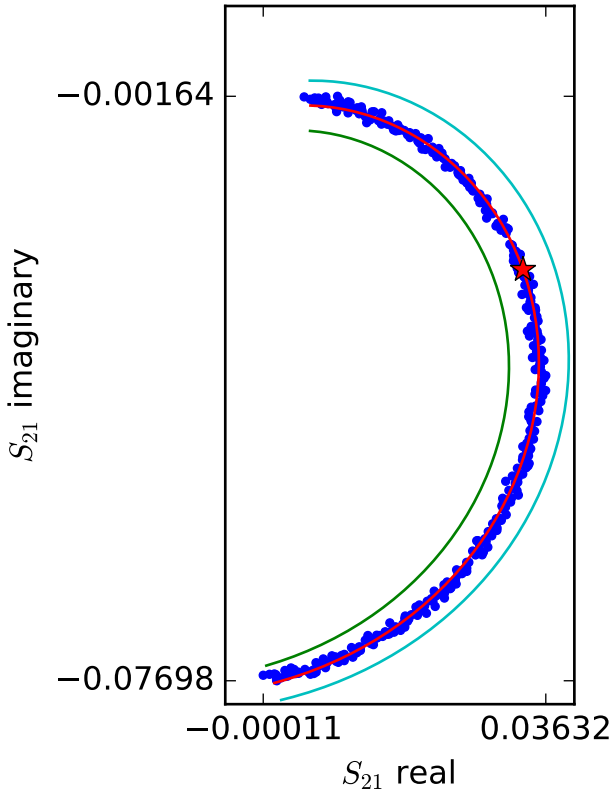


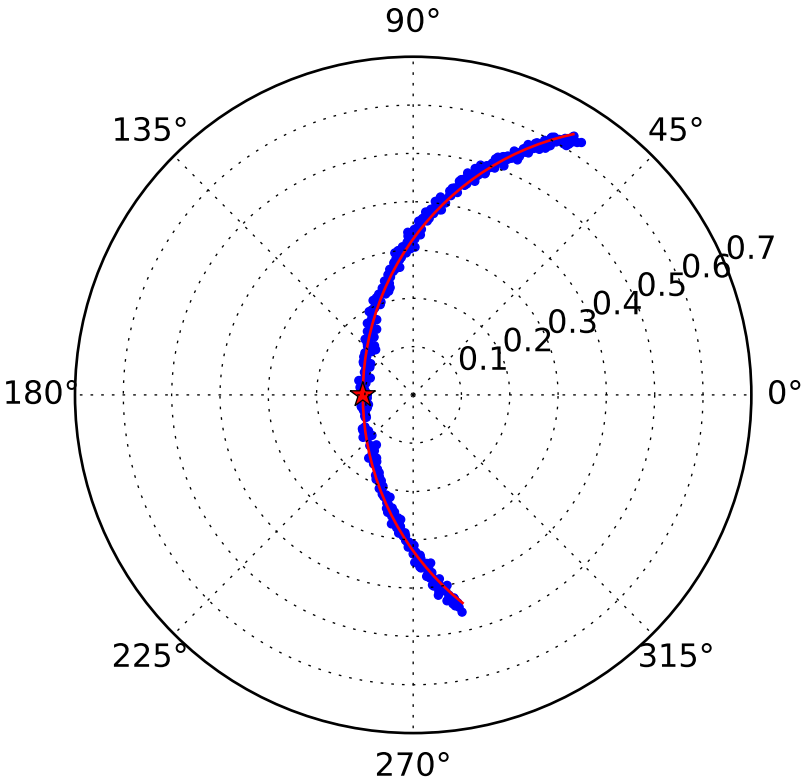


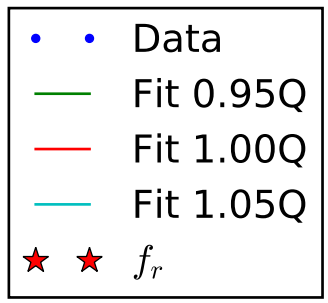
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.1915499357
Q_r = 2889.32510678
Q_c = 2986.08408639
Q_i = 89167.6178973
a = (0.109128795824+0.0128580564602j)
ϕ_0 = 0.338391244073
τ = 74.9128380617



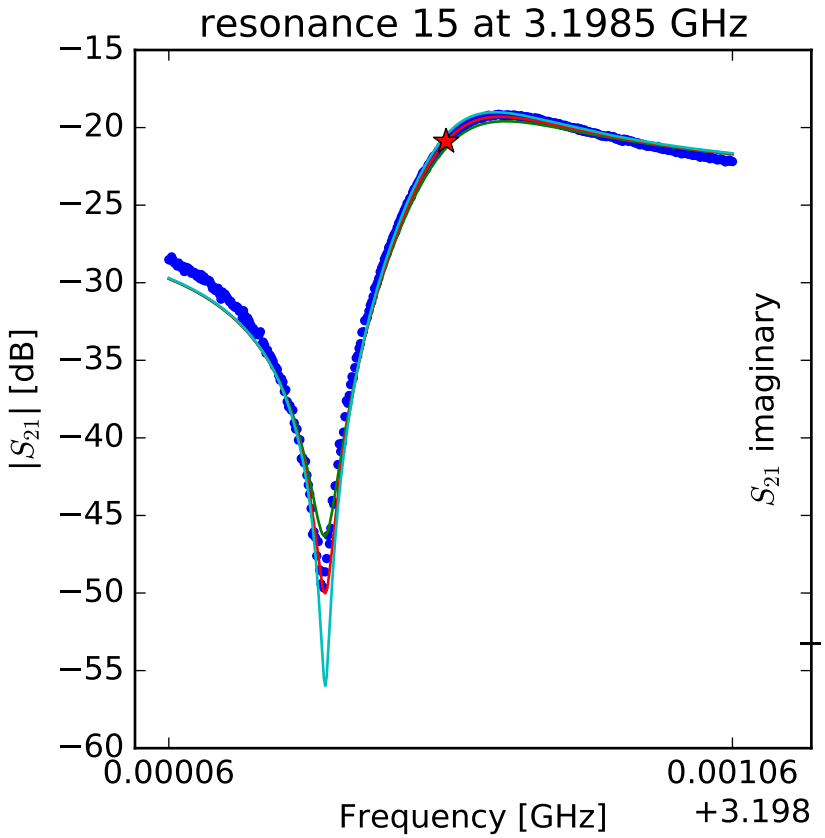


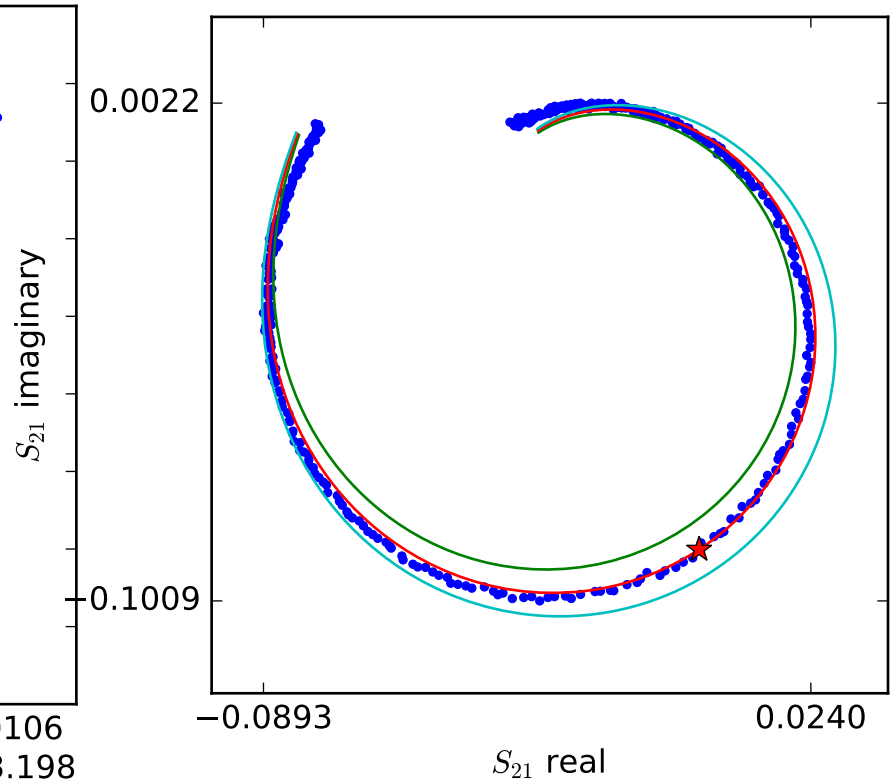


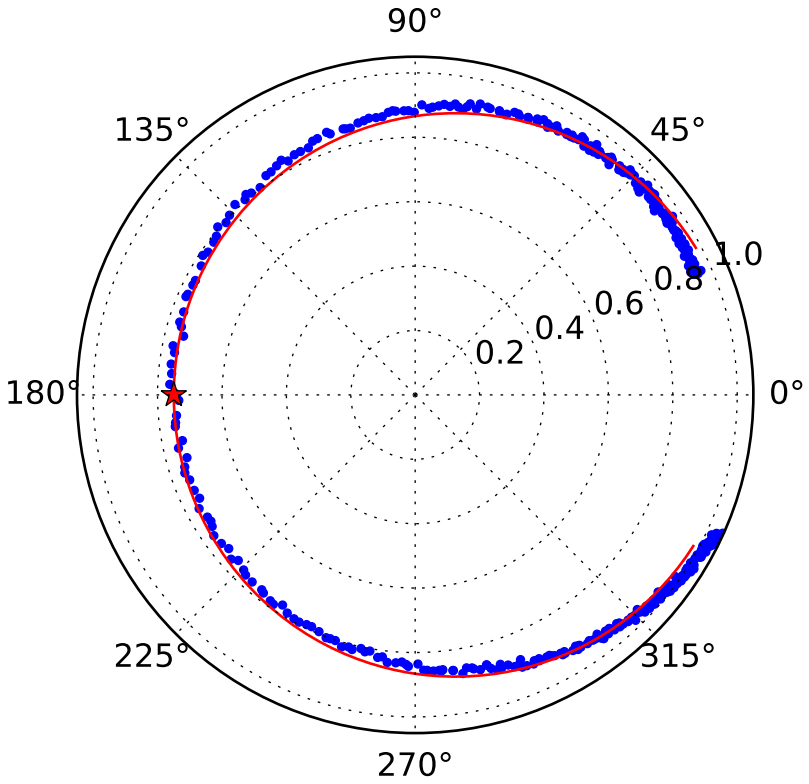


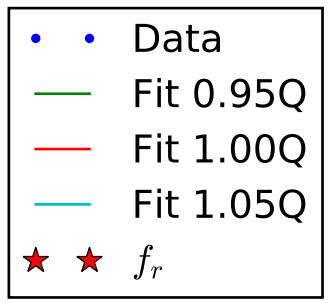
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.19587764316
Q_r = 2056.39157577
Q_c = 1862.17666452
Q_i = -19717.1493216
a = (0.0124957370293+0.071137912068j)
ϕ_0 = -0.538878262879
τ = 77.4613061073



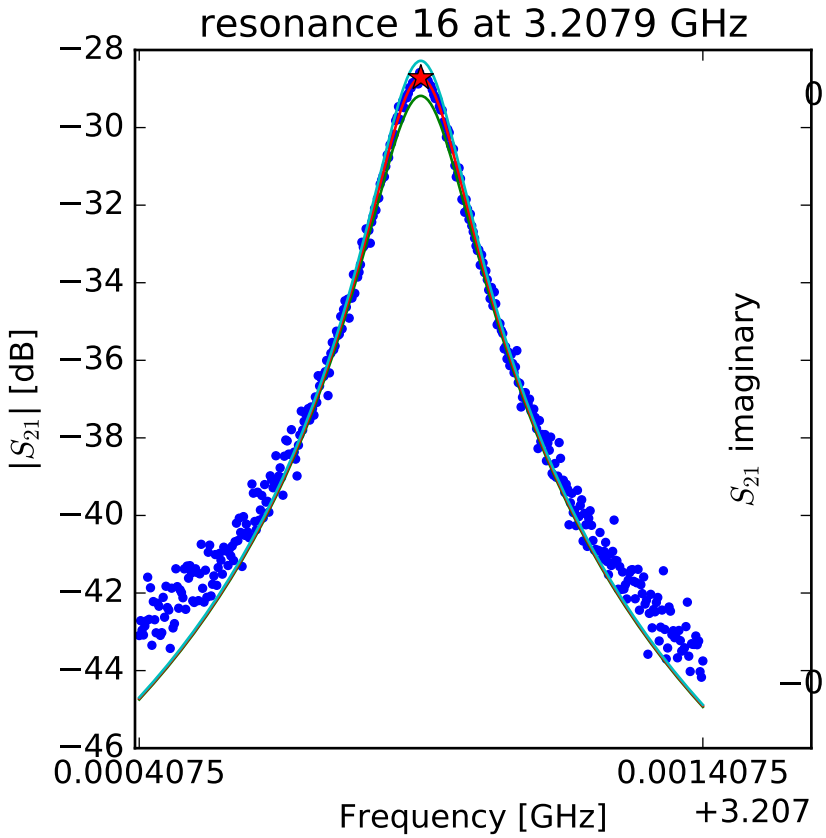


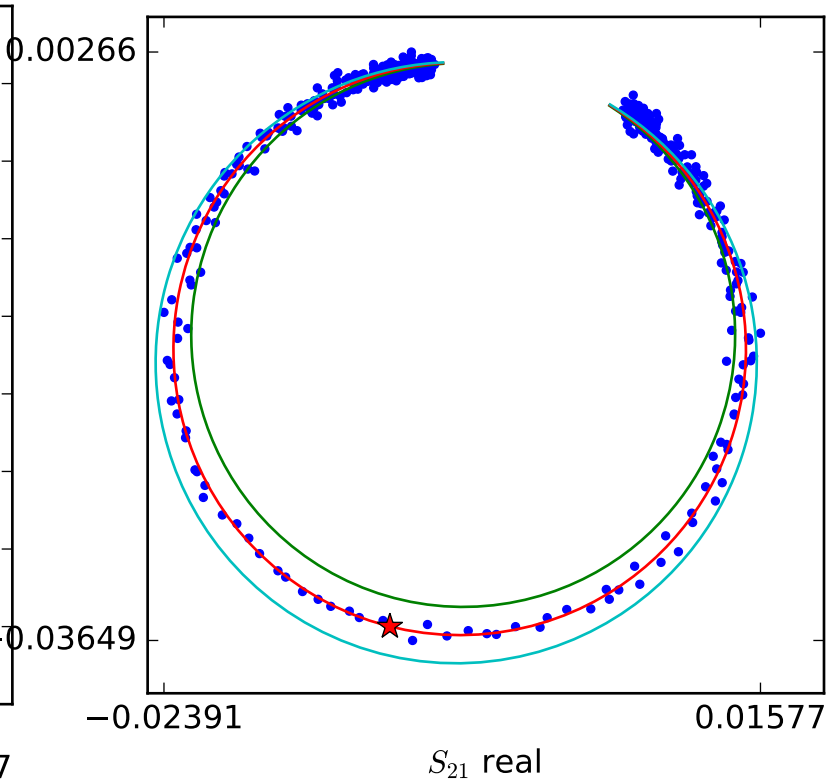


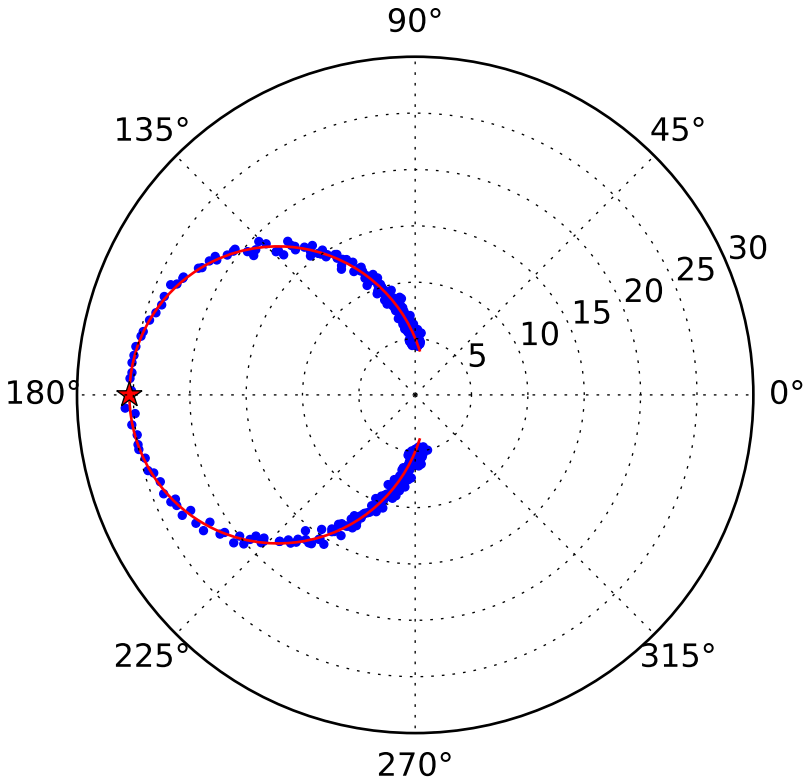


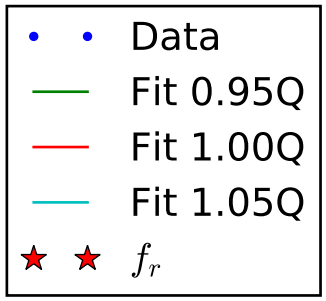
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.19855196001
Q_r = 11171.3430406
Q_c = 6385.36433455
Q_i = -14904.5994146
a = (0.0570970353009+0.0189540070527j)
ϕ_0 = -1.02676407176
τ = 87.0829577652



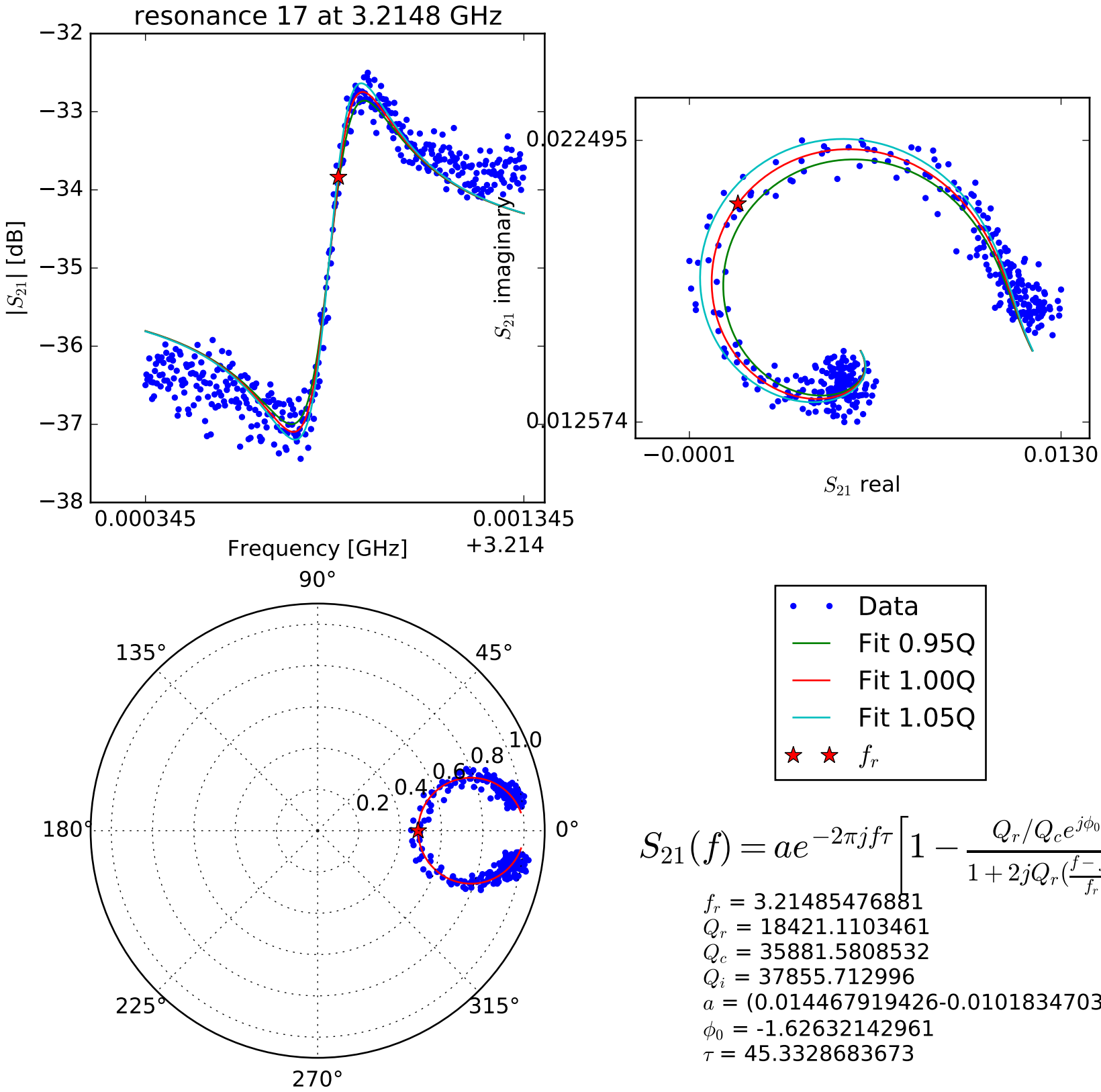






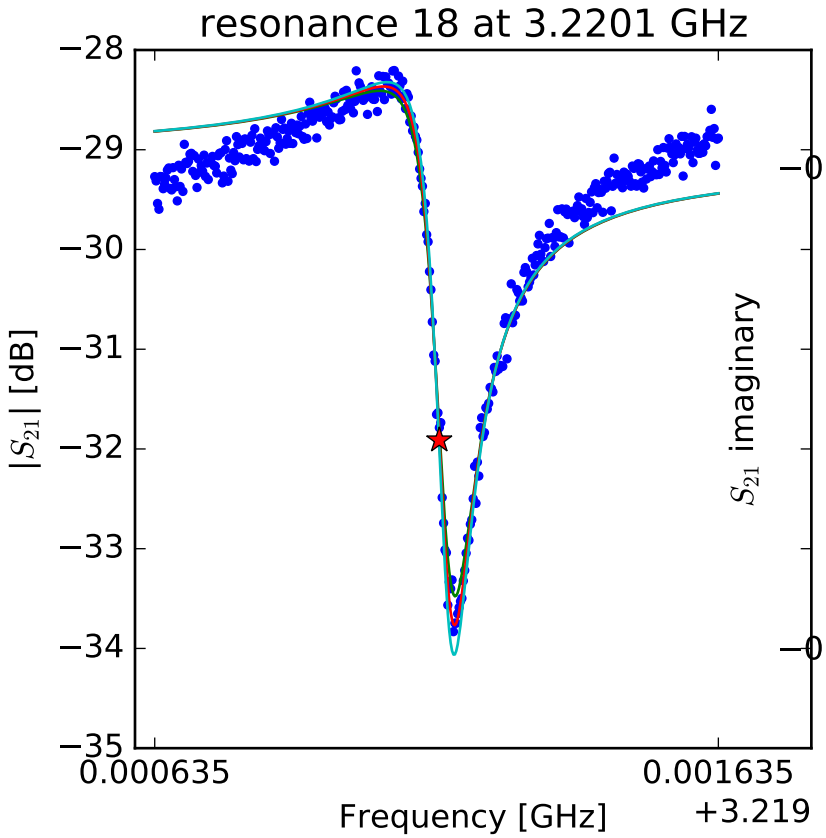
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

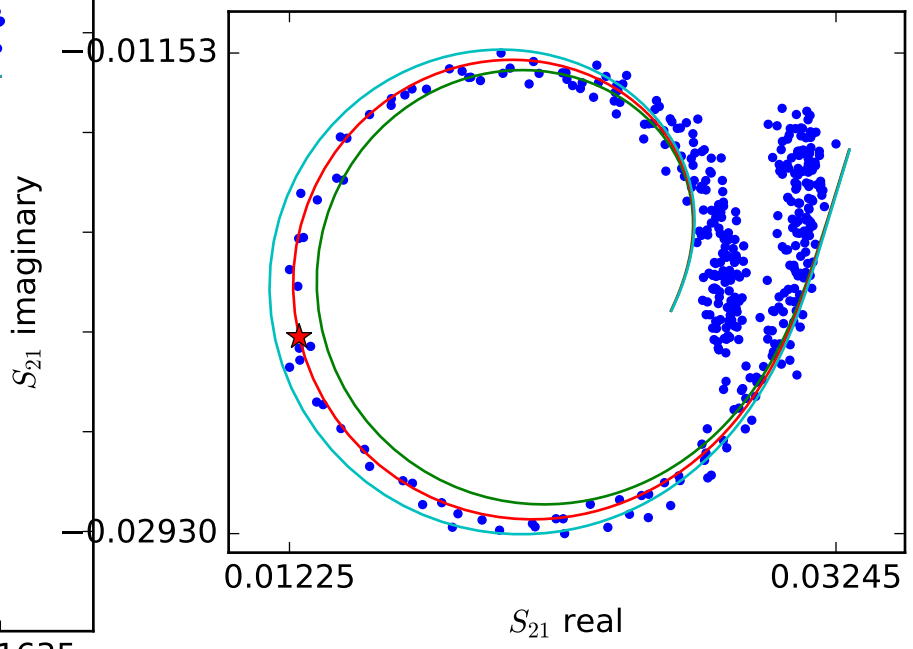
f_r = 3.20790712268
Q_r = 20876.3230992
Q_c = 792.128016123
Q_i = -823.369835441
a = (0.000409617452995+0.00138618933961j)
ϕ_0 = 0.0408570929344
τ = 4.19033196e-14

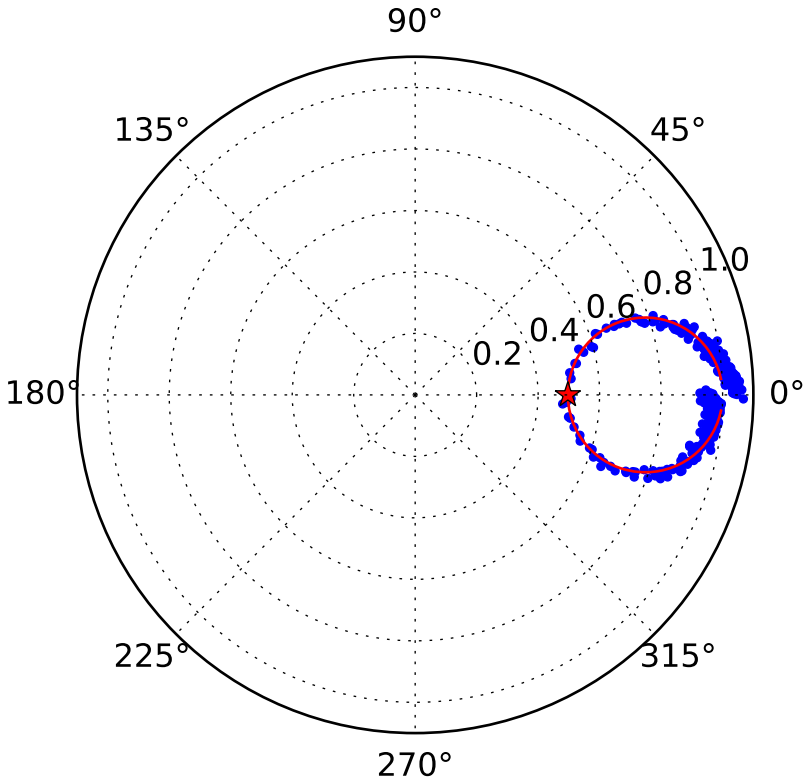


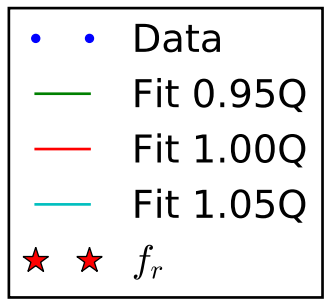
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.21485476881
Q_r = 18421.1103461
Q_c = 35881.5808532
Q_i = 37855.712996
a = (0.014467919426-0.0101834703482j)
ϕ_0 = -1.62632142961
τ = 45.3328683673



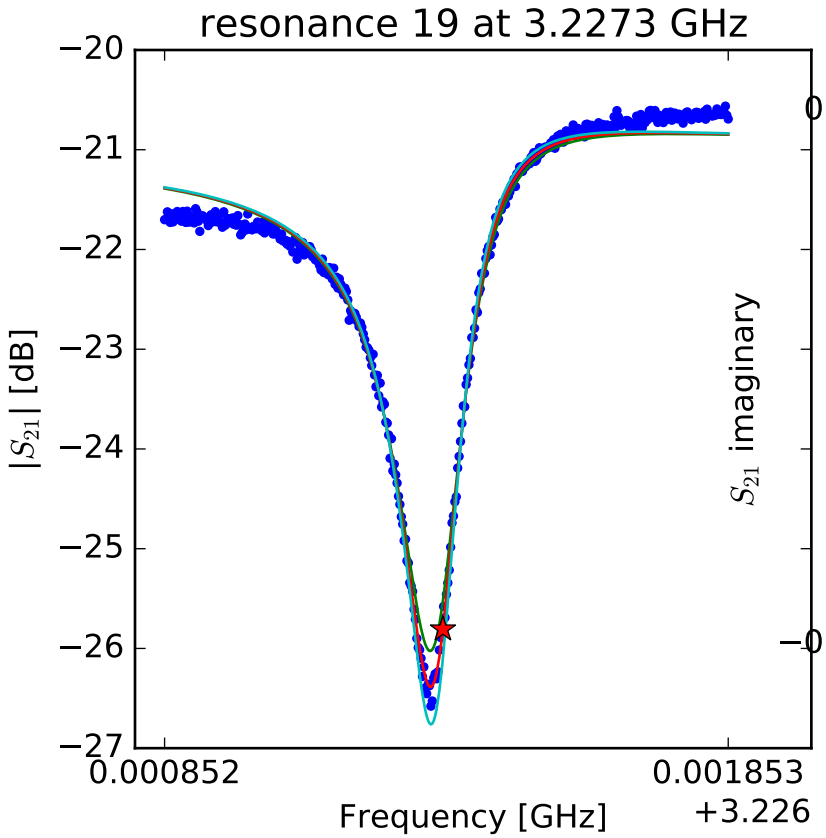


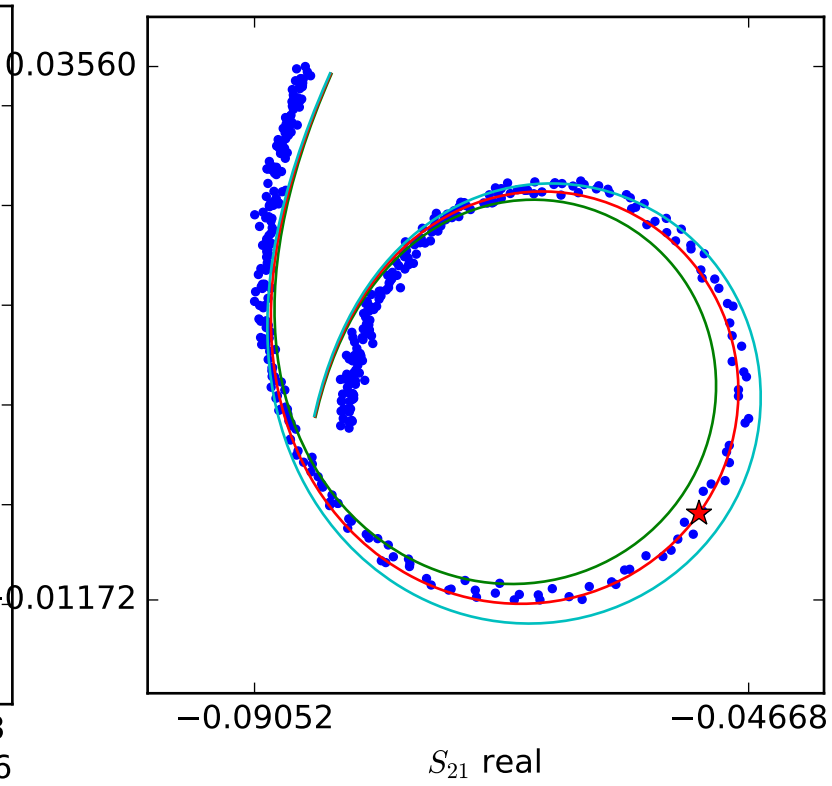


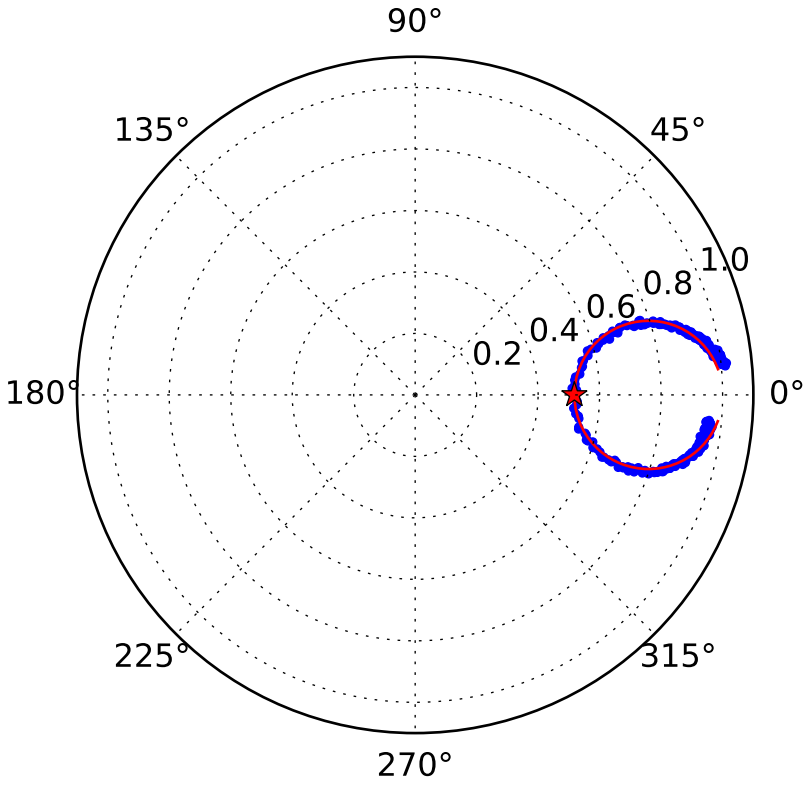


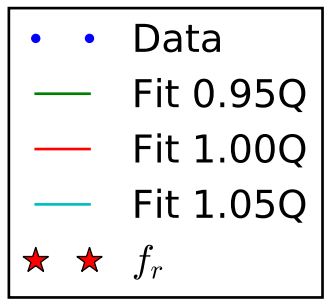
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.22013985091
Q_r = 31035.4873081
Q_c = 61651.4245751
Q_i = 62496.2740237
a = (-0.0268730974838+0.0226012769479j)
ϕ_0 = 0.757968676253
τ = 50.7668912343



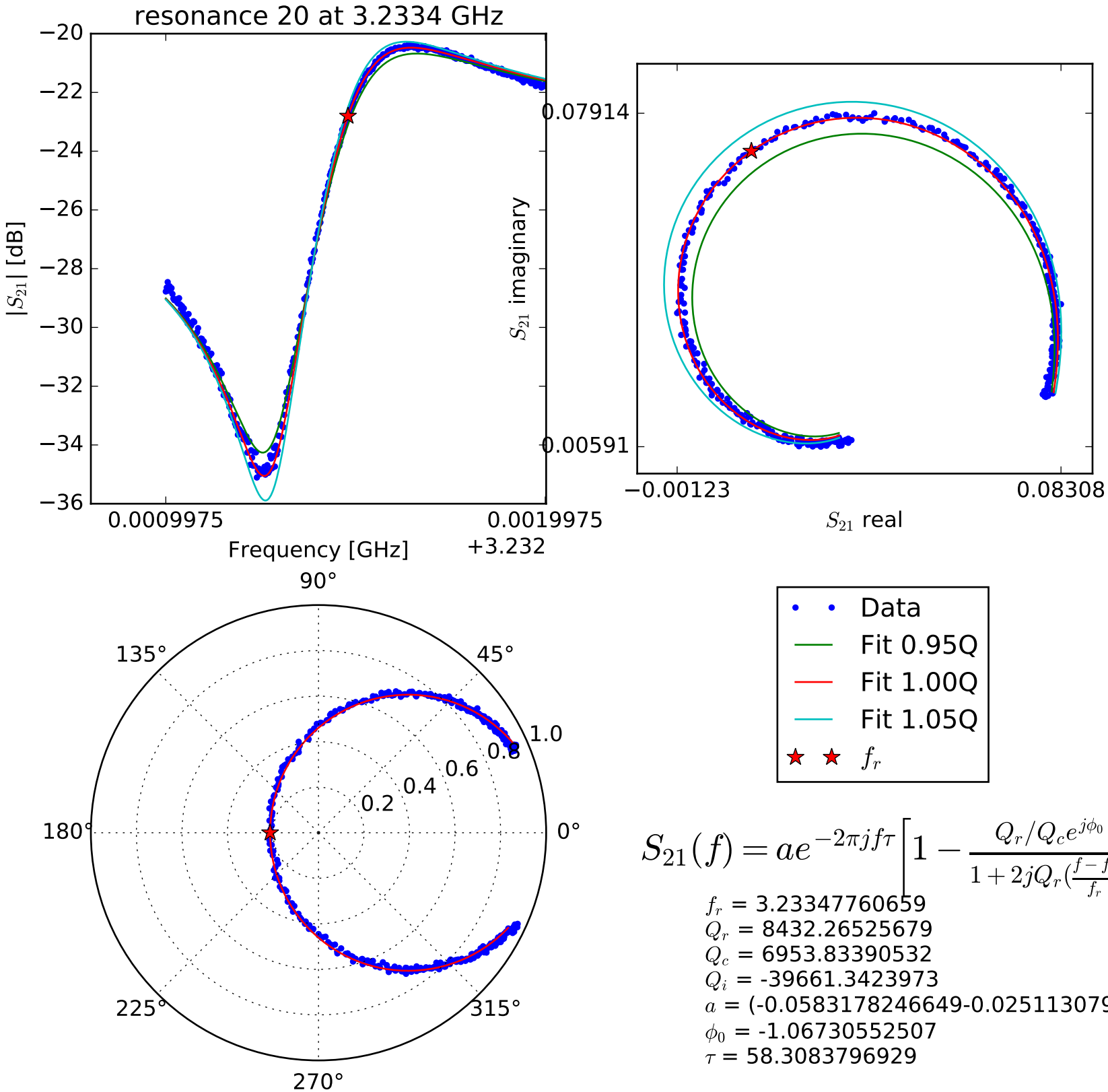






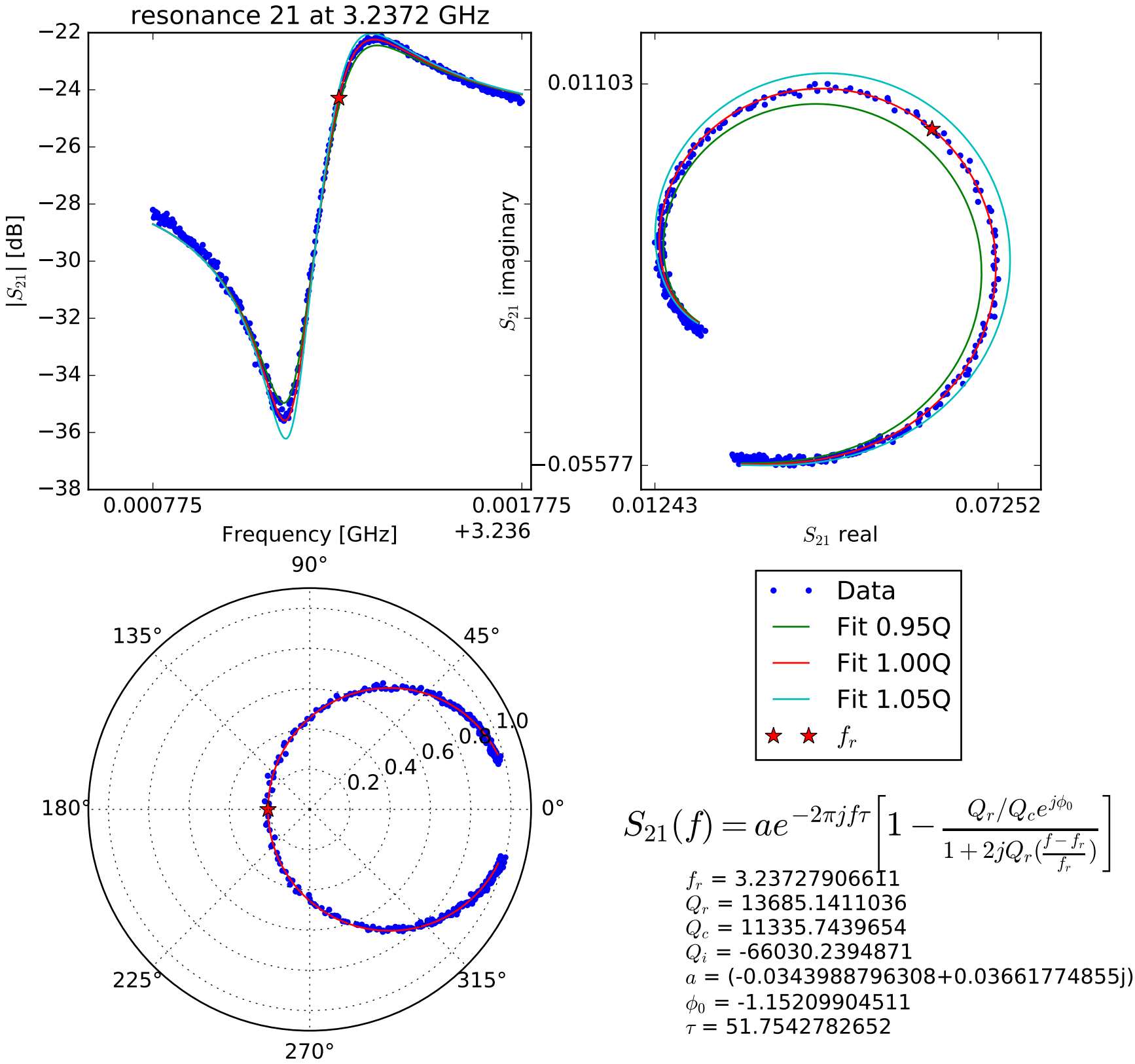
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.22734635912
Q_r = 17775.306699
Q_c = 36864.5893267
Q_i = 34327.0826042
a = (-0.0095162587077+0.0885448224457j)
ϕ_0 = -0.363435691206
τ = 79.880681439



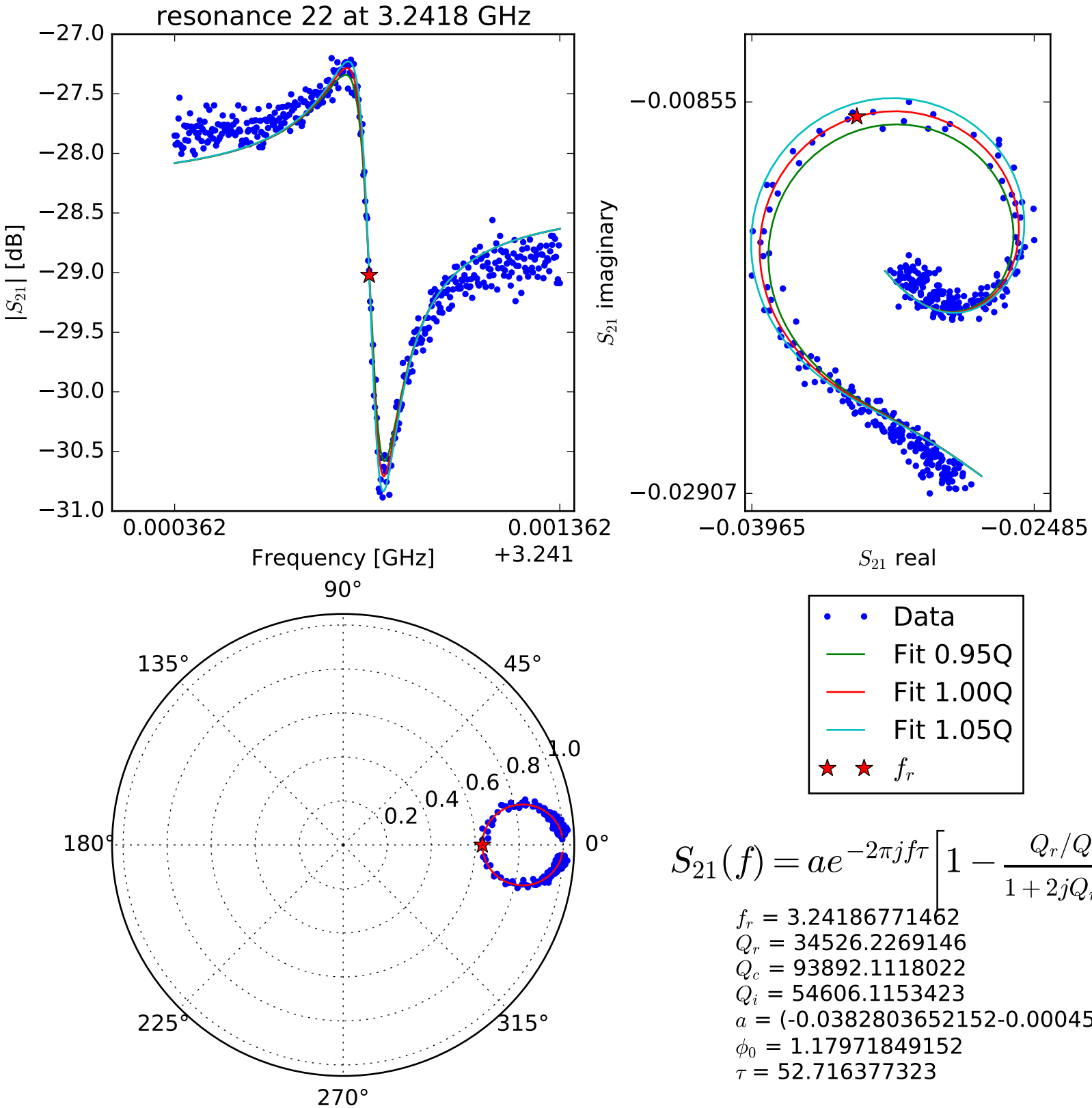
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.23347760659
Q_r = 8432.26525679
Q_c = 6953.83390532
Q_i = -39661.3423973
a = (-0.0583178246649-0.0251130792754j)
ϕ_0 = -1.06730552507
τ = 58.3083796929



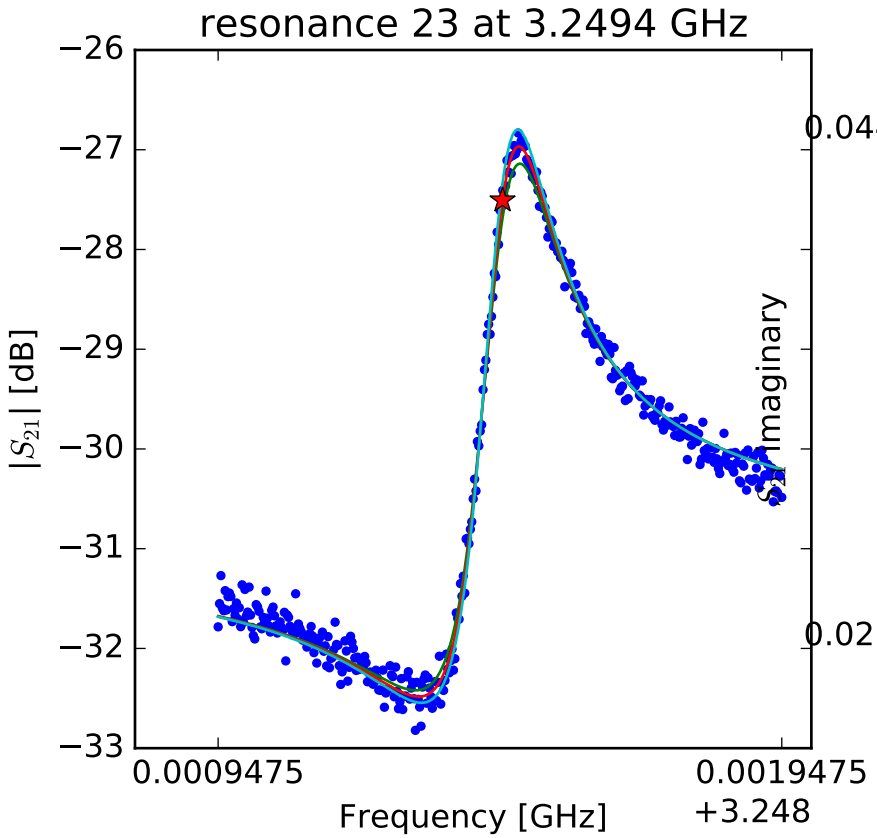
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

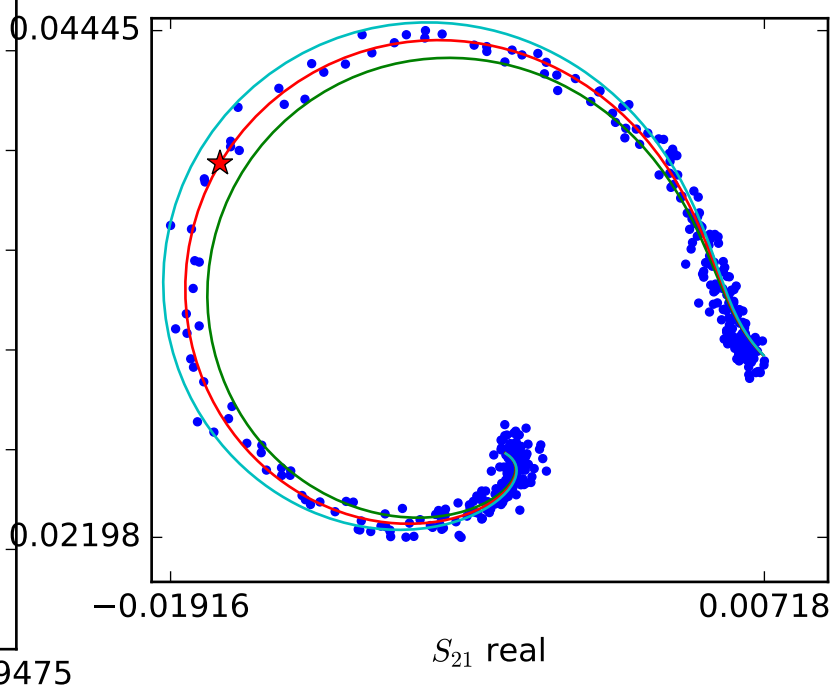
f_r = 3.23727906611
Q_r = 13685.1411036
Q_c = 11335.7439654
Q_i = -66030.2394871
a = (-0.0343988796308+0.03661774855j)
ϕ_0 = -1.15209904511
τ = 51.7542782652

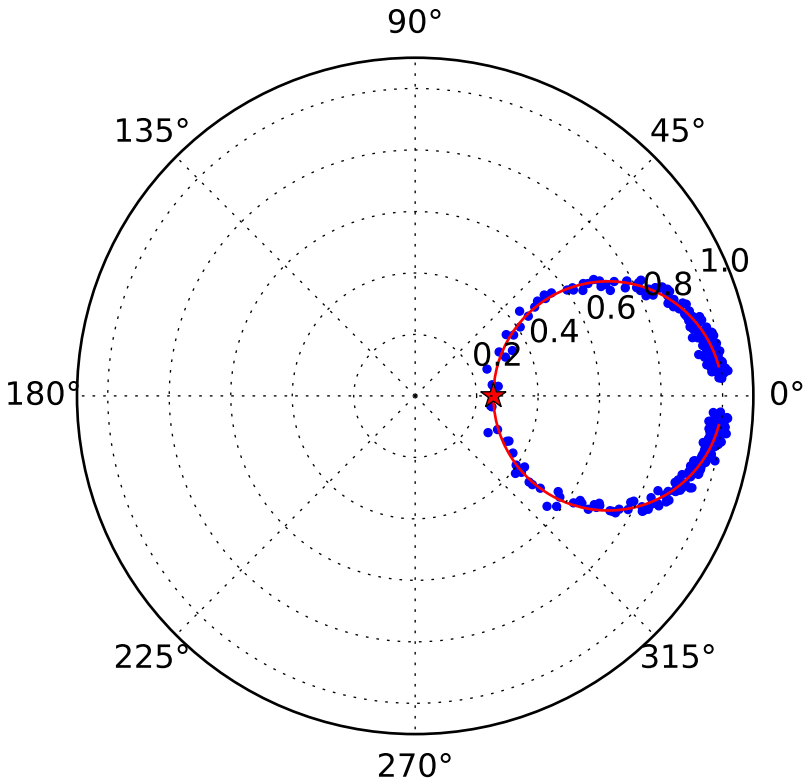


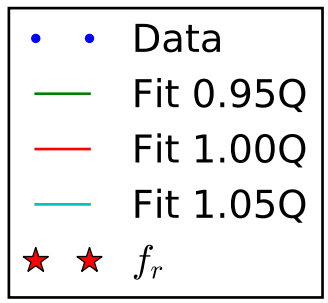
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.24186771462
Q_r = 34526.2269146
Q_c = 93892.1118022
Q_i = 54606.1153423
a = (-0.0382803652152-0.000455035407427j)
ϕ_0 = 1.17971849152
τ = 52.716377323



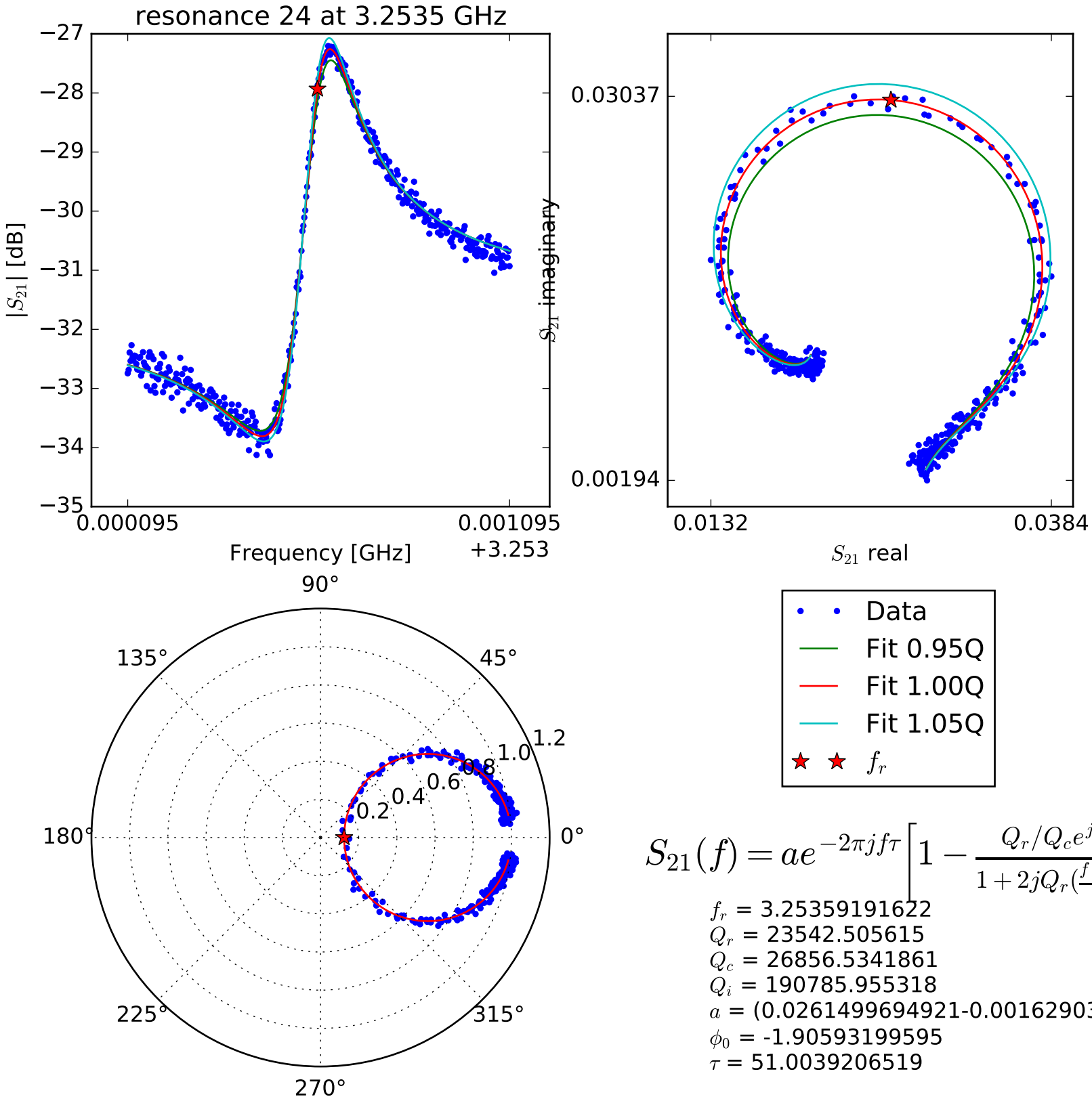






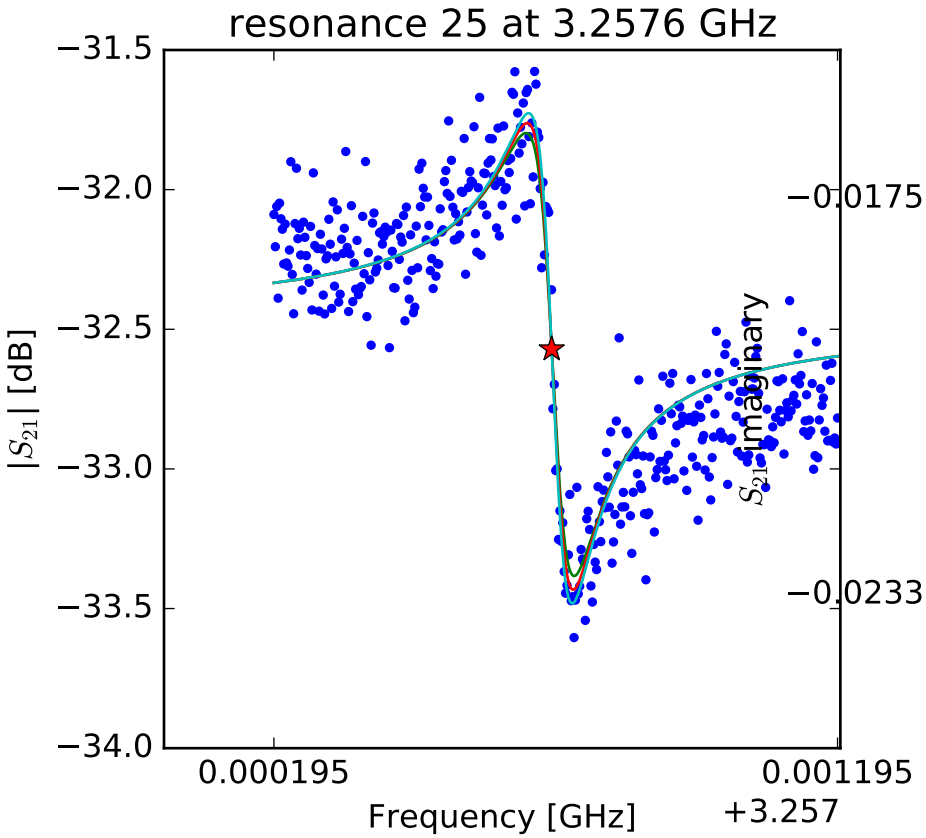
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

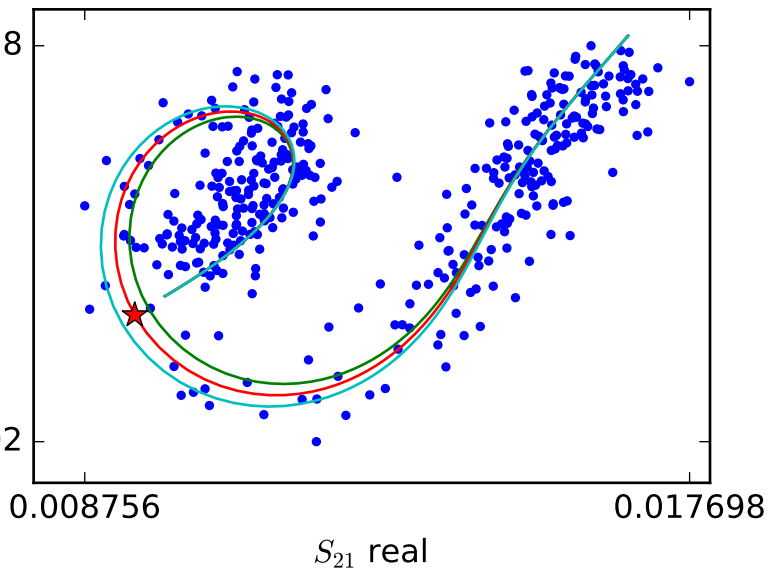
f_r = 3.24945210899
Q_r = 24820.5202315
Q_c = 33285.9232698
Q_i = 97594.1639409
a = (-0.0242245314396+0.0145660465895j)
ϕ_0 = -2.03416792309
τ = 49.5996562306

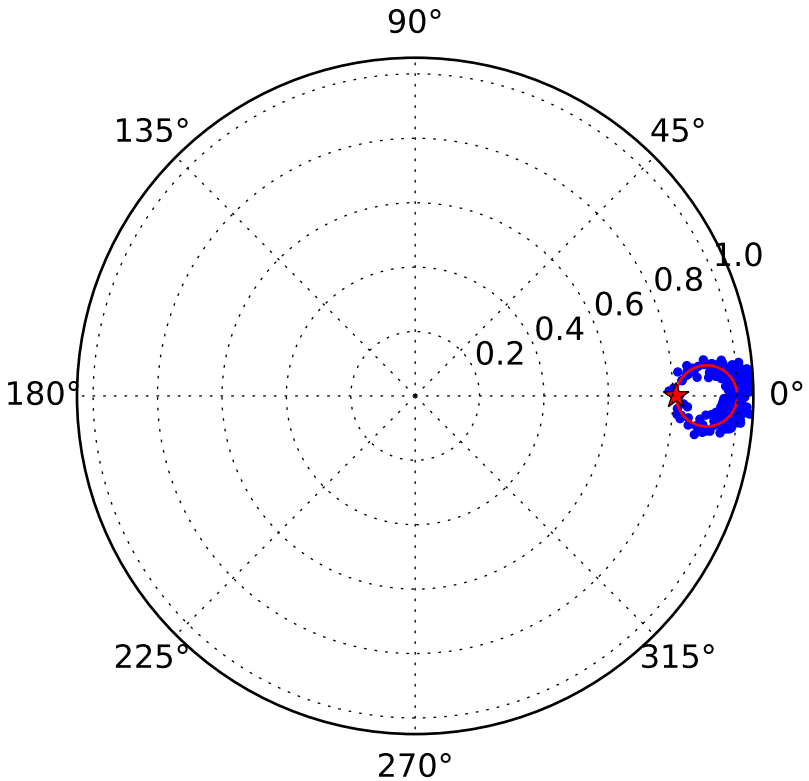


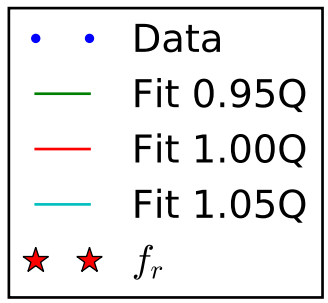
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.25359191622
Q_r = 23542.505615
Q_c = 26856.5341861
Q_i = 190785.955318
a = (0.0261499694921-0.00162903083775j)
ϕ_0 = -1.90593199595
τ = 51.0039206519



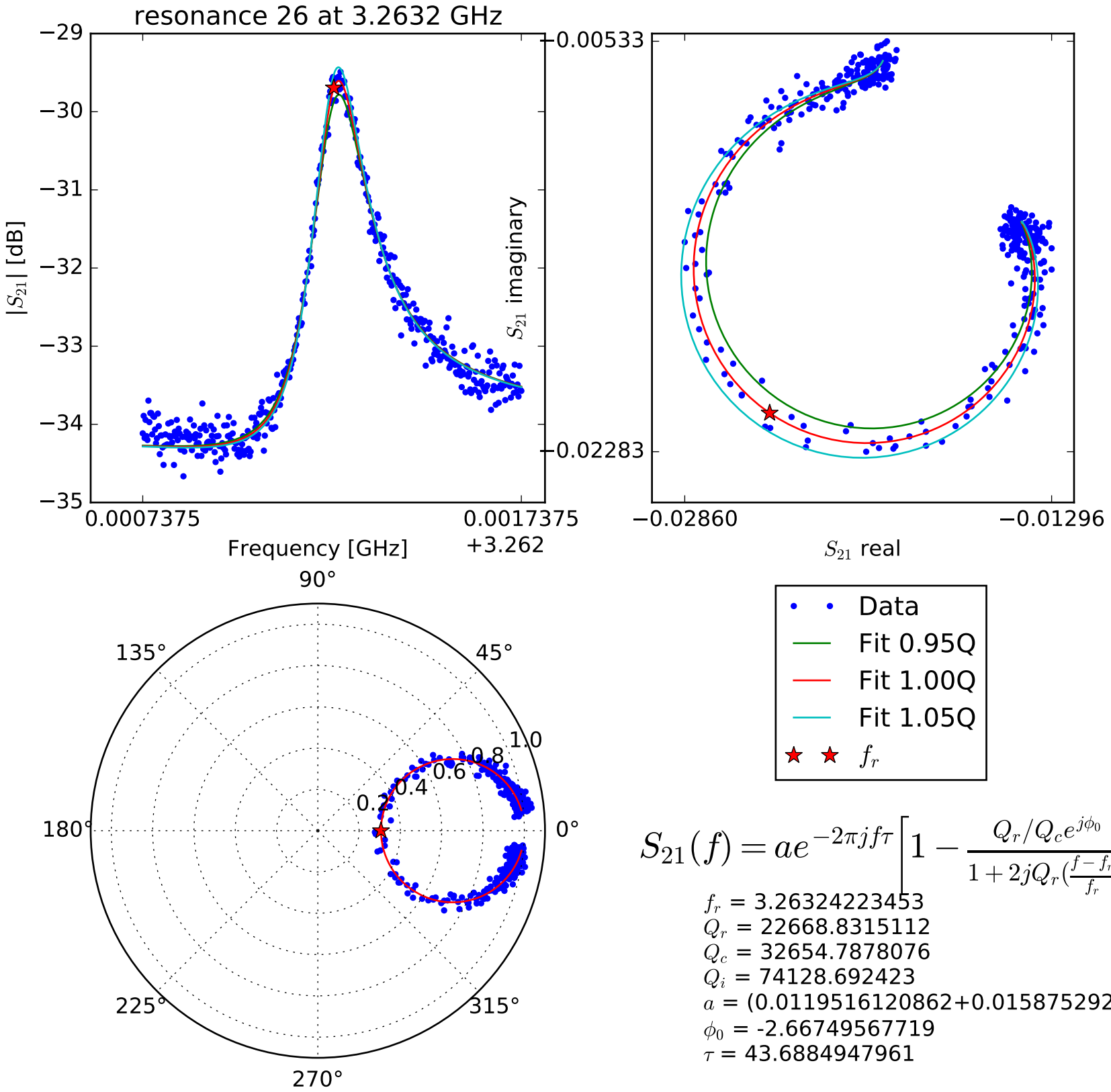






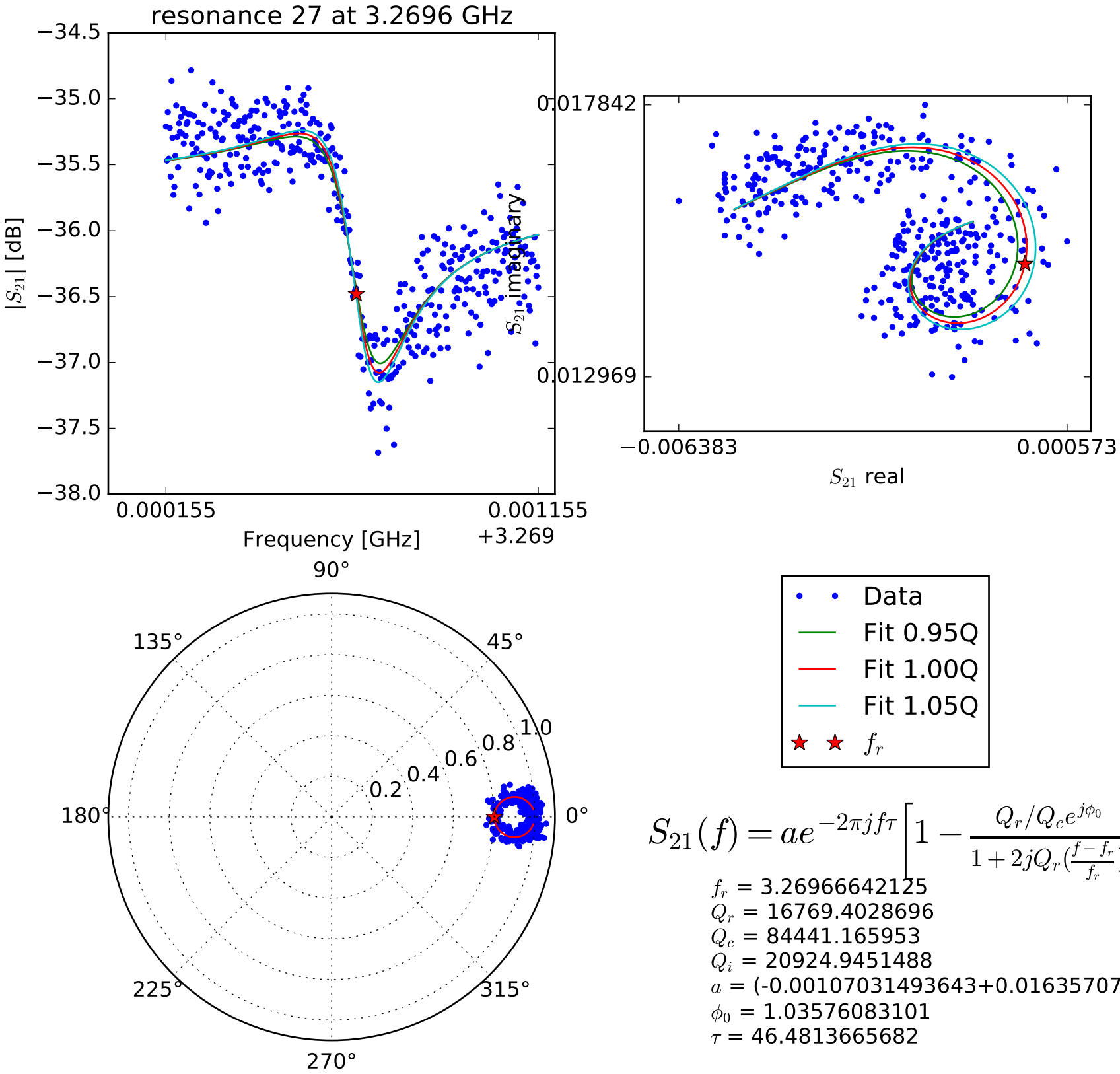
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.25768785379
Q_r = 40096.5402309
Q_c = 211294.555363
Q_i = 49487.6101989
a = (-0.0236664700237-0.00262218234489j)
ϕ_0 = 1.41129364832
τ = 53.3111411544



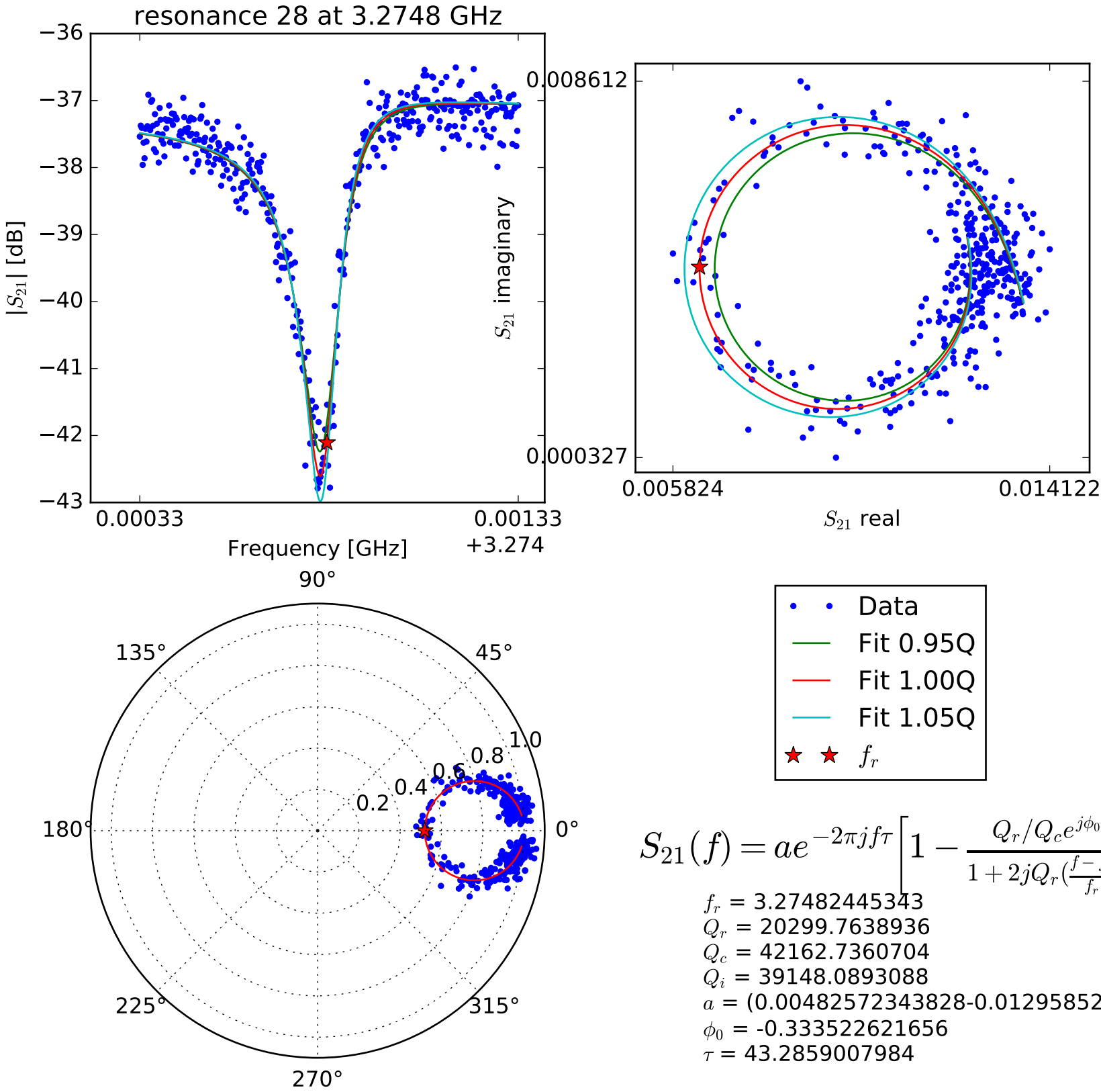
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.26324223453
Q_r = 22668.8315112
Q_c = 32654.7878076
Q_i = 74128.692423
a = (0.0119516120862+0.015875292273j)
ϕ_0 = -2.66749567719
τ = 43.6884947961



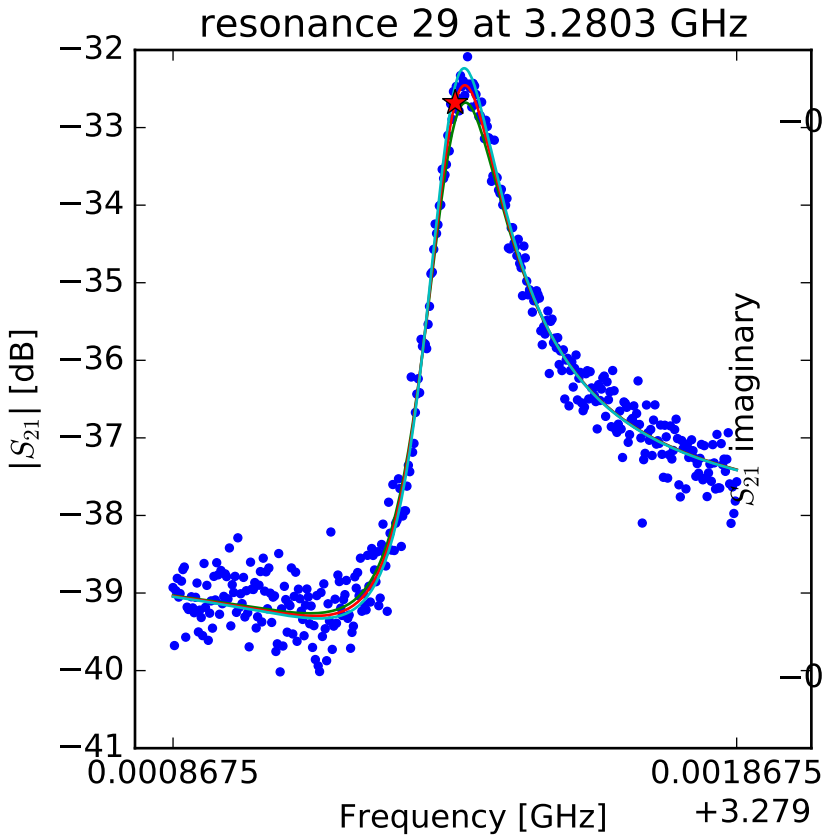
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

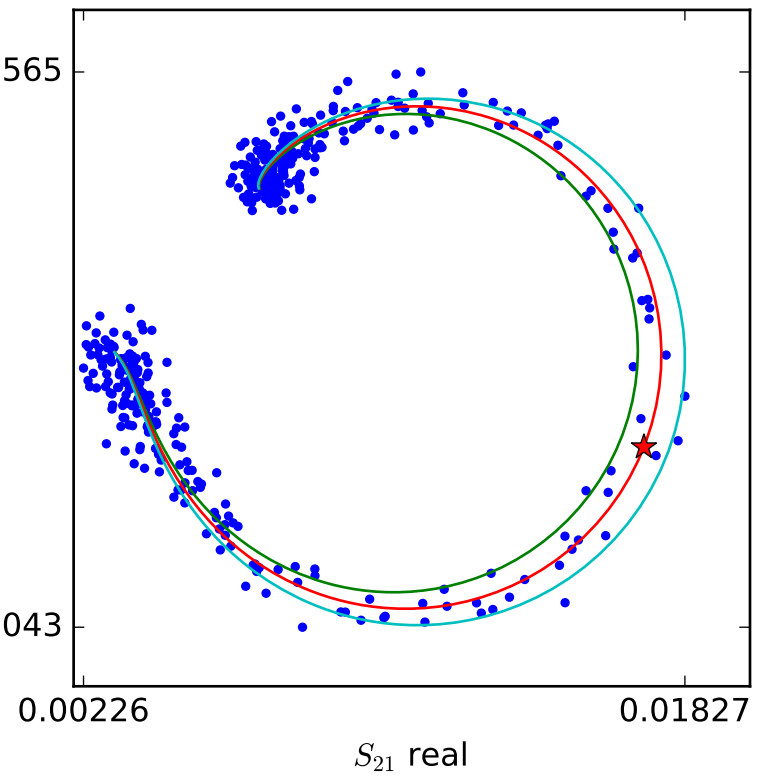
f_r = 3.26966642125
Q_r = 16769.4028696
Q_c = 84441.165953
Q_i = 20924.9451488
a = (-0.00107031493643+0.0163570704862j)
ϕ_0 = 1.03576083101
τ = 46.4813665682

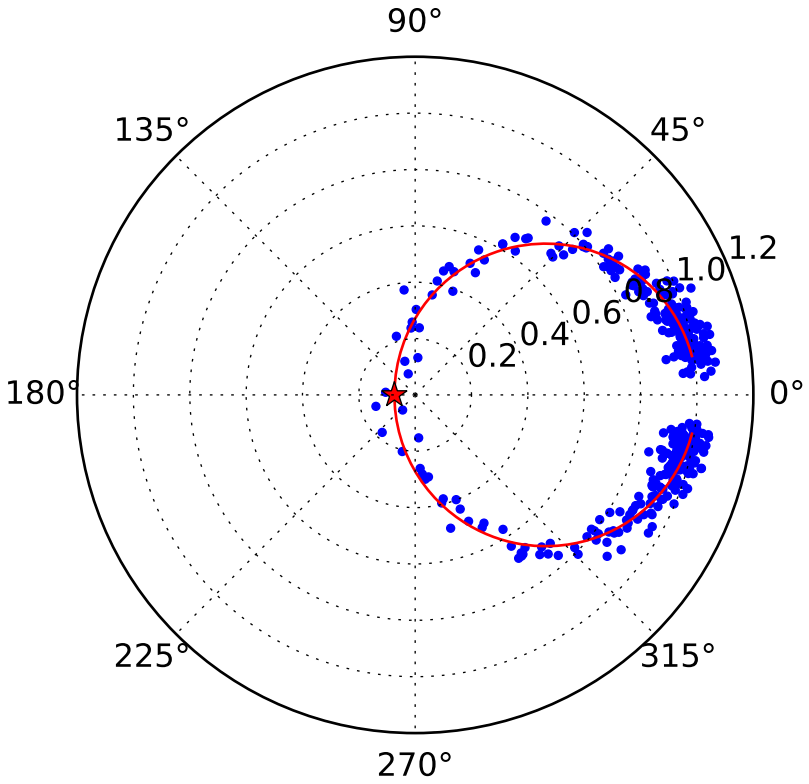


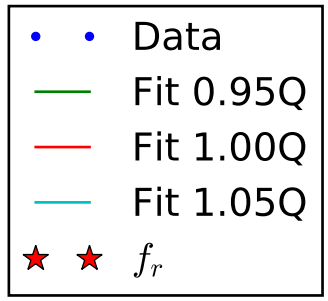
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.27482445343
Q_r = 20299.7638936
Q_c = 42162.7360704
Q_i = 39148.0893088
a = (0.00482572343828-0.012958520756j)
ϕ_0 = -0.333522621656
τ = 43.2859007984



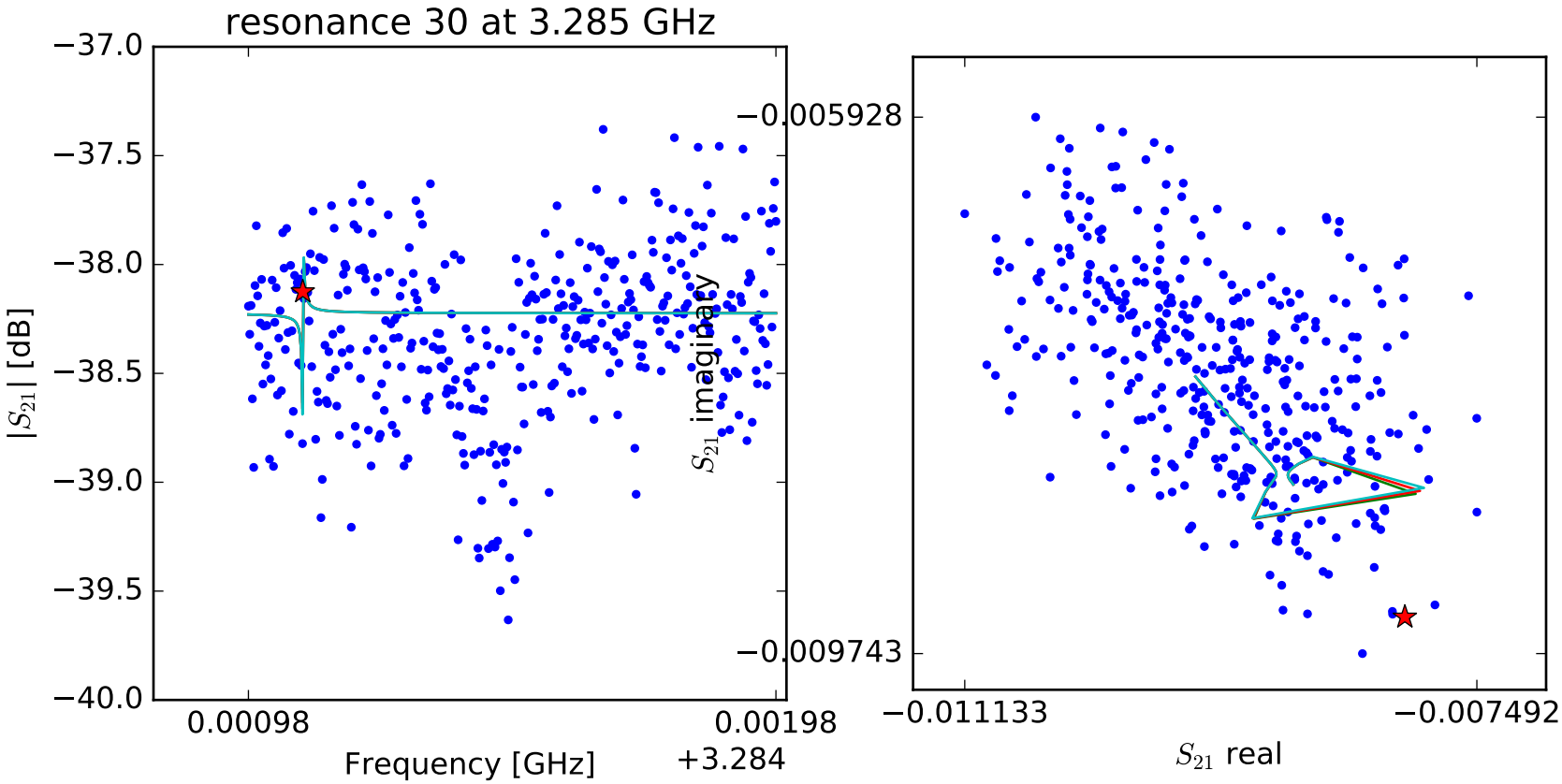


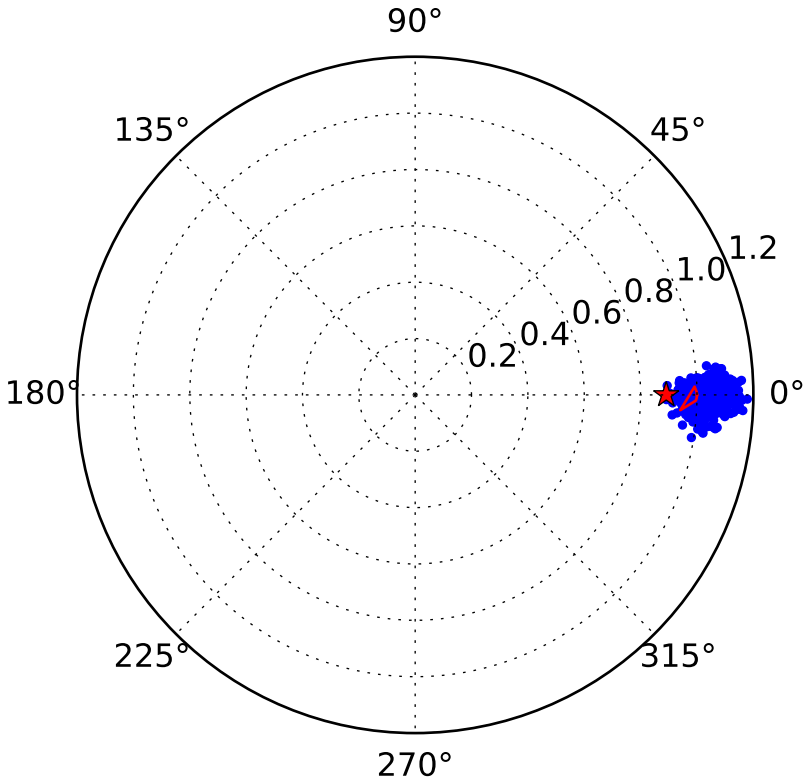


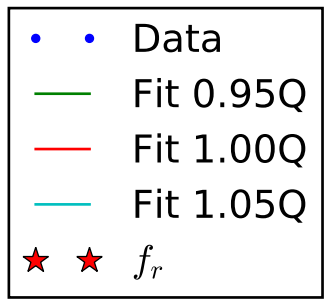


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.28036810416
Q_r = 25114.5060799
Q_c = 23388.1997912
Q_i = -340254.269891
a = (-0.00705626941979-0.00983205291641j)
ϕ_0 = -2.36397418759
τ = 38.3593077622

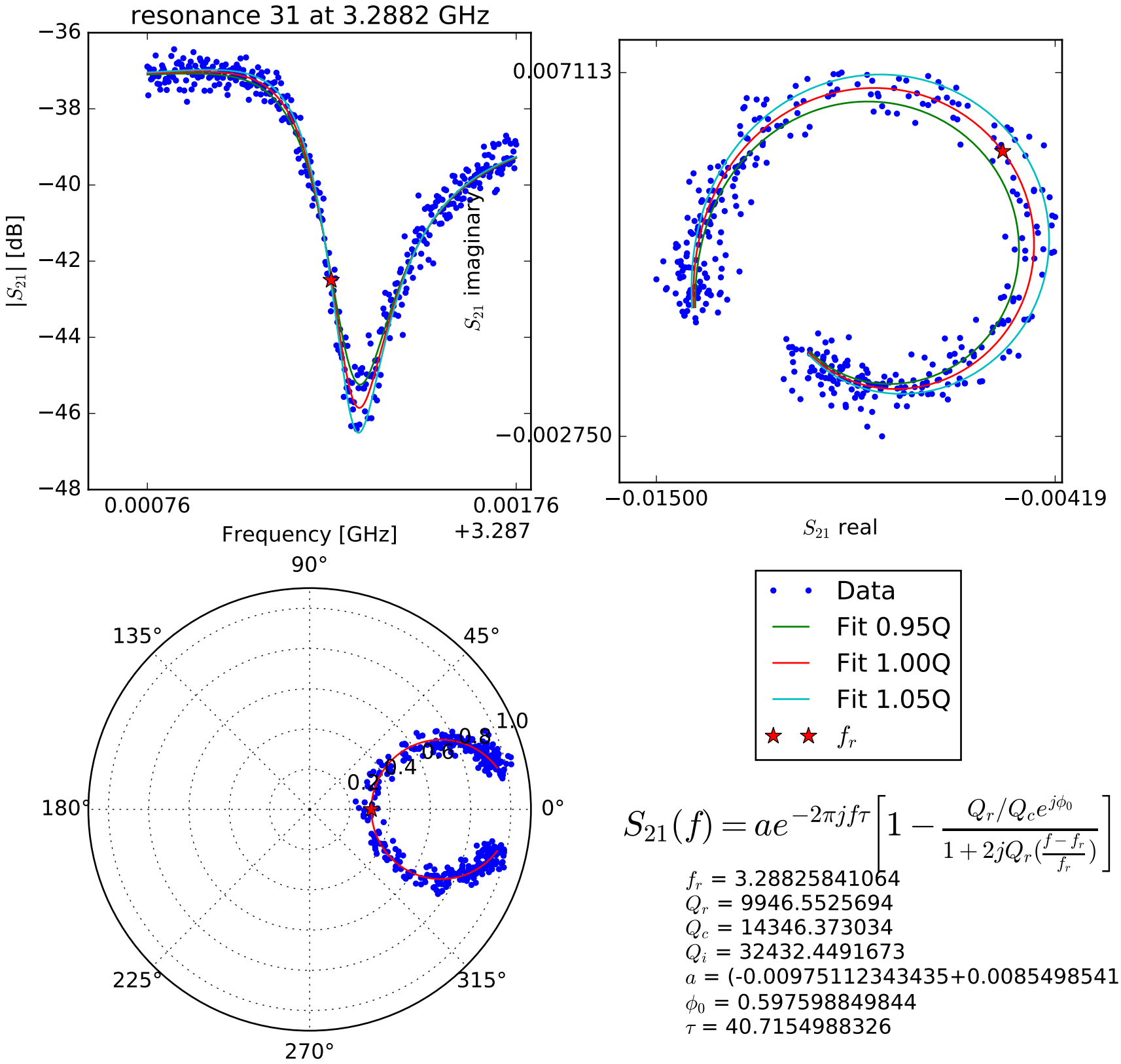






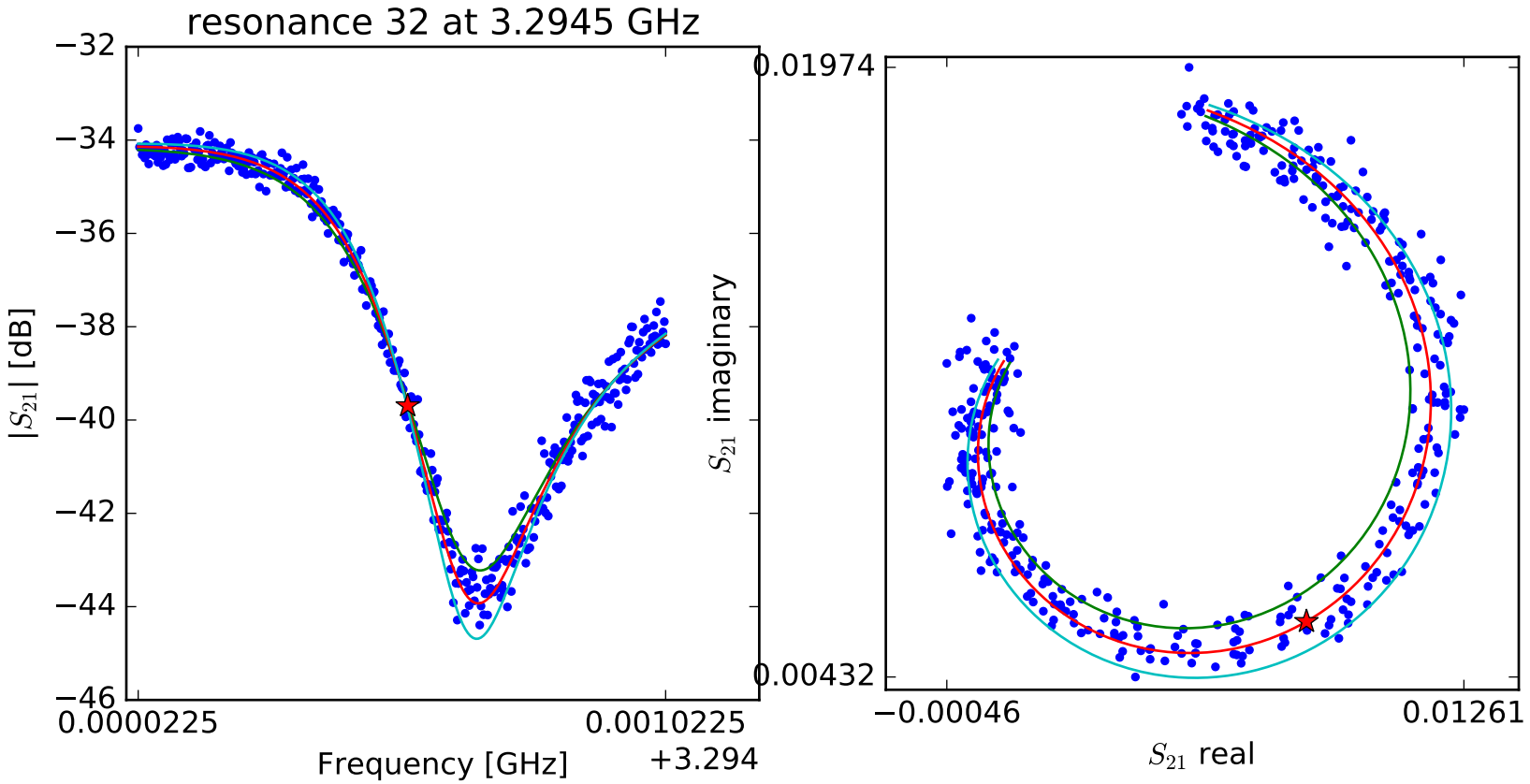
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

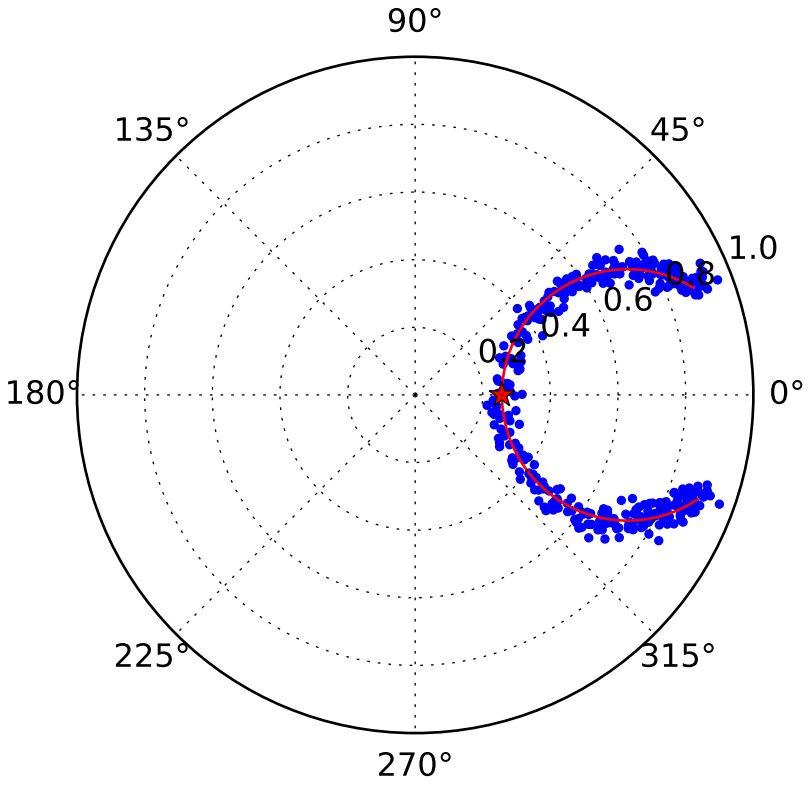
f_r = 3.28508302791
Q_r = 2849388.34053
Q_c = 26114823.8839
Q_i = 3198361.55876
a = (-0.000598862472527-0.0122535989291j)
ϕ_0 = -1.62223255111
τ = 13.4307038136

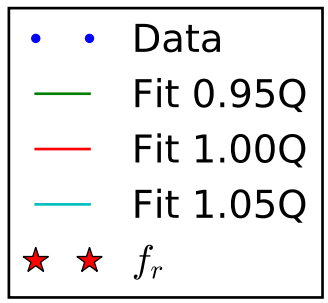


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.28825841064
Q_r = 9946.5525694
Q_c = 14346.373034
Q_i = 32432.4491673
a = (-0.00975112343435+0.00854985418515j)
ϕ_0 = 0.597598849844
τ = 40.7154988326

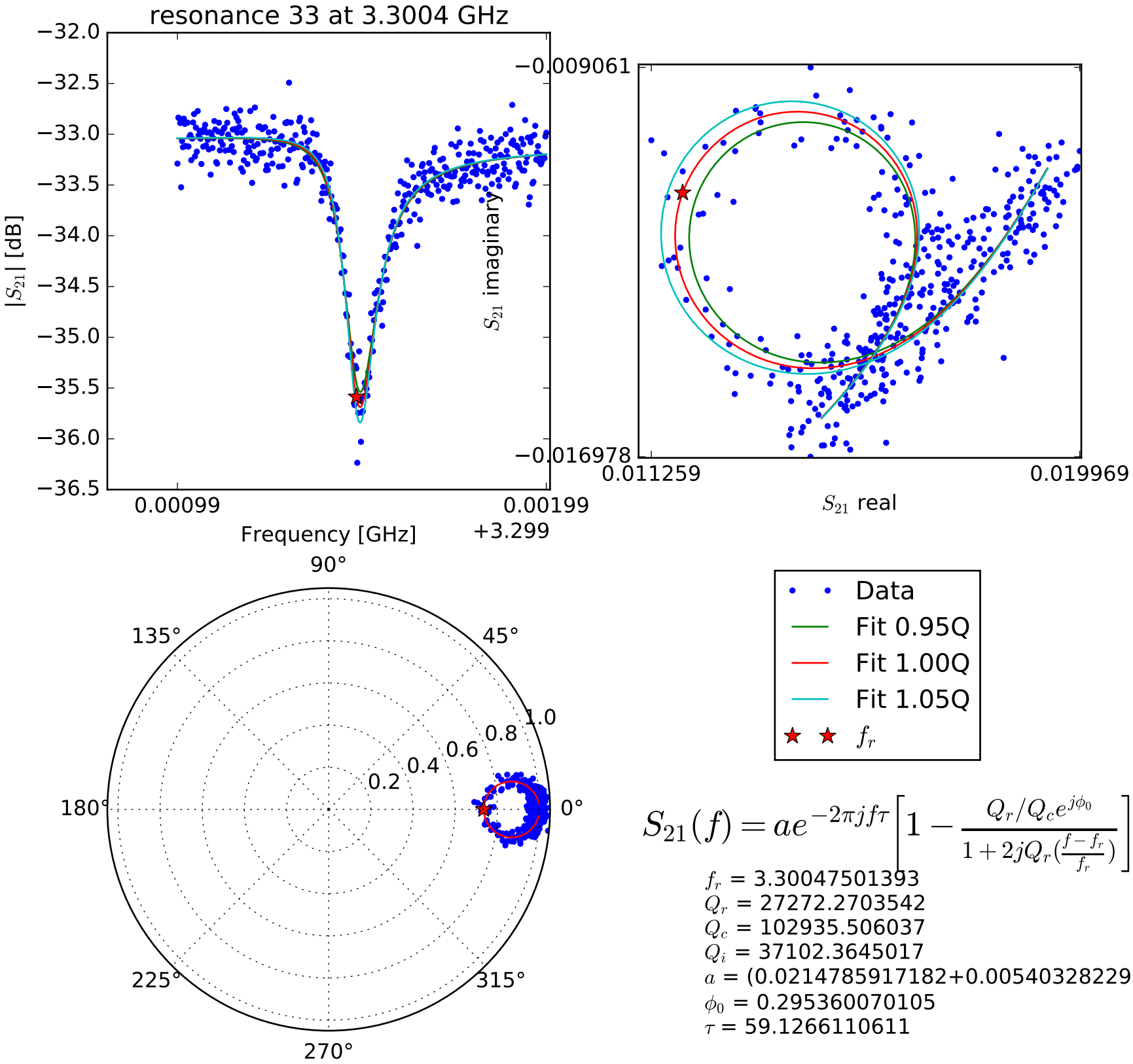






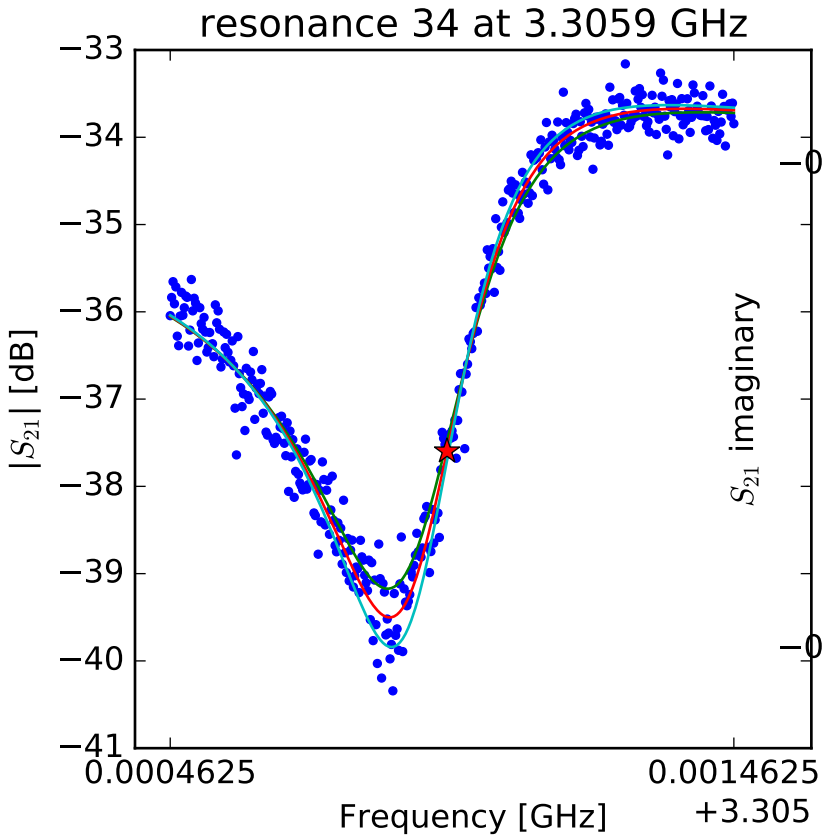
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

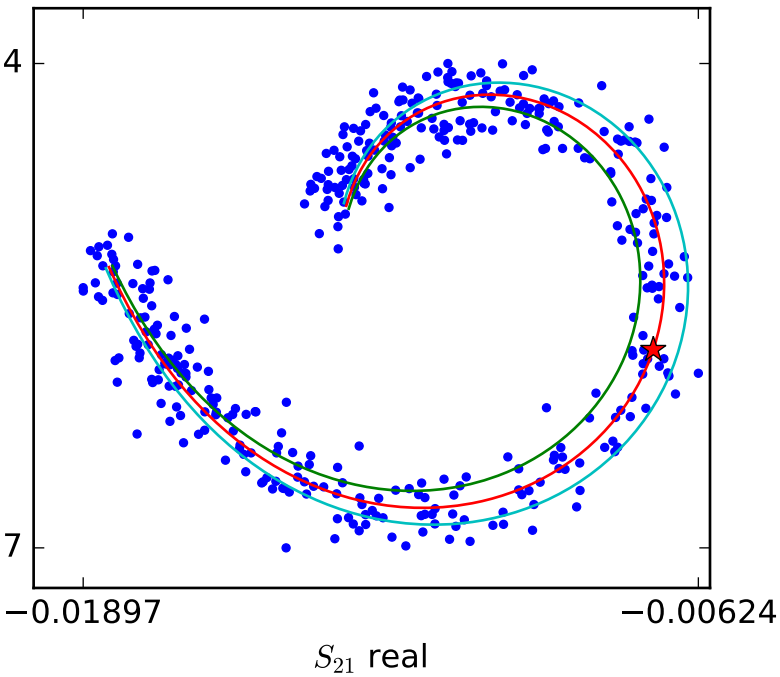
f_r = 3.2945333794
Q_r = 6025.87799537
Q_c = 8102.55677147
Q_i = 23511.1077926
a = (-0.0176448689464+0.00277140608029j)
ϕ_0 = 0.612878179767
τ = 49.8553109542

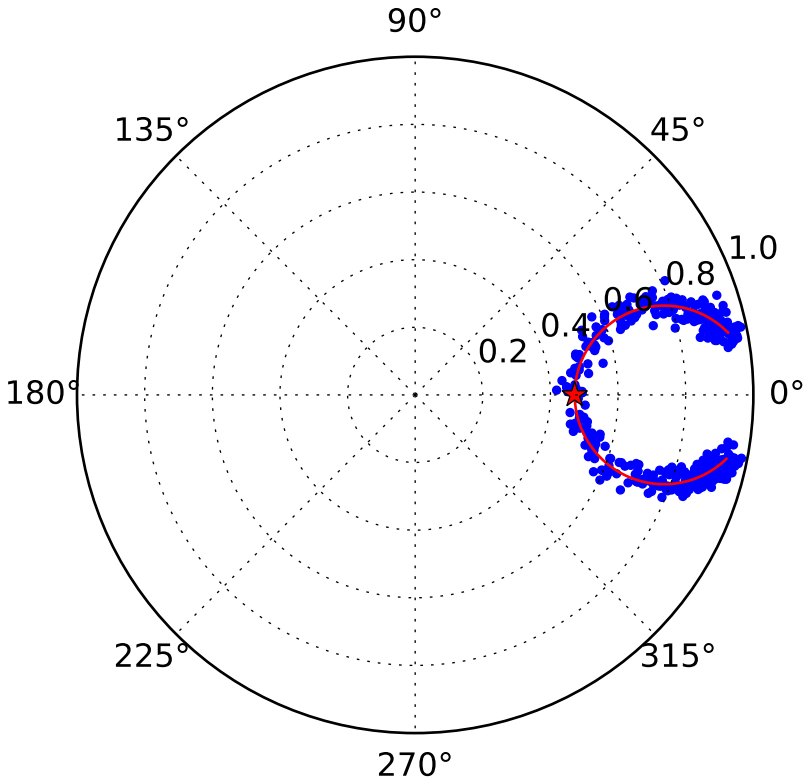


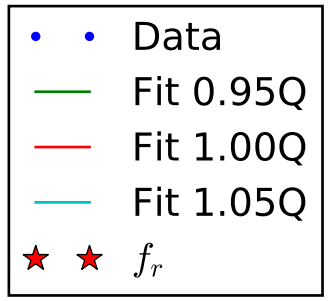
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.30047501393
Q_r = 27272.2703542
Q_c = 102935.506037
Q_i = 37102.3645017
a = (0.0214785917182+0.0054032822996j)
ϕ_0 = 0.295360070105
τ = 59.1266110611



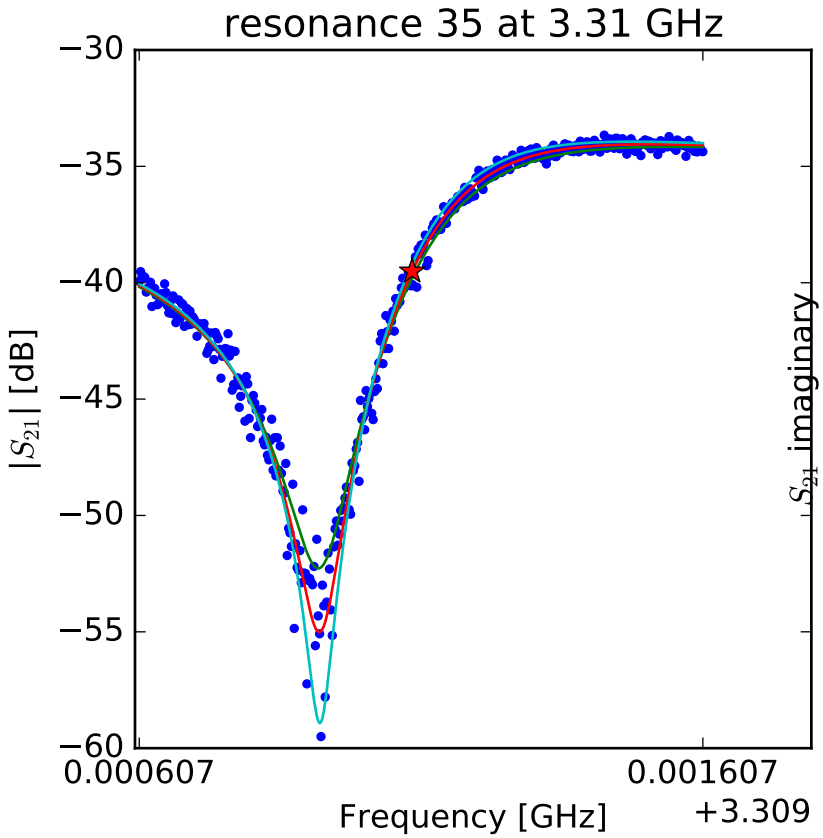


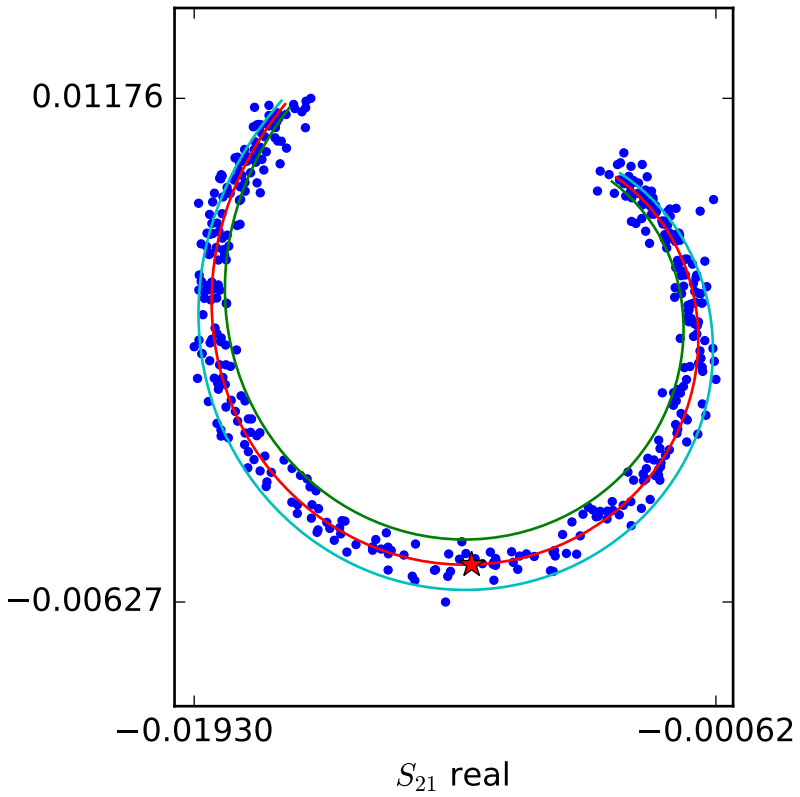


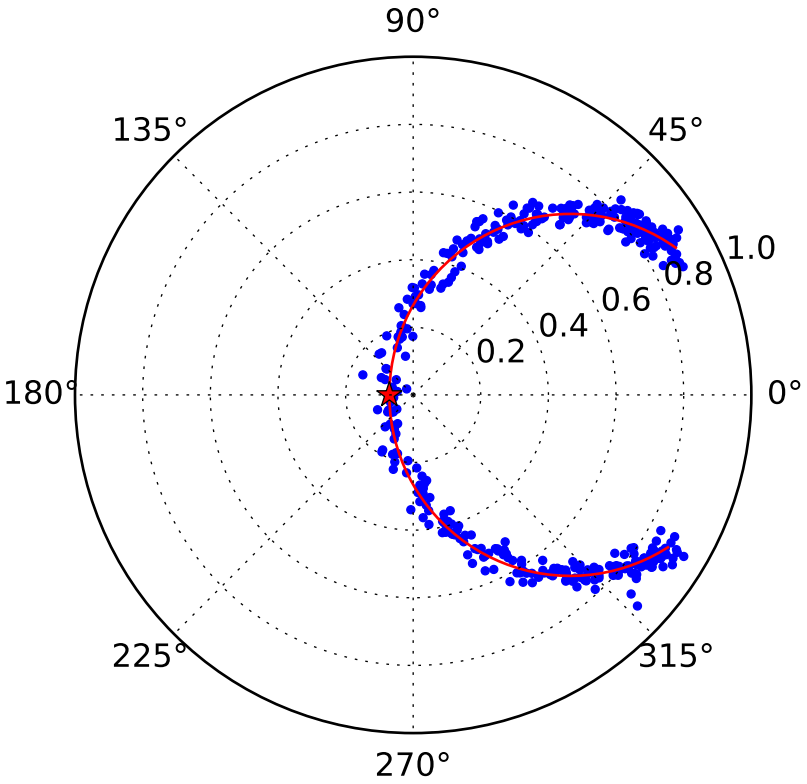


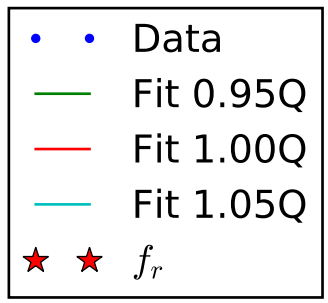
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.3059536003
Q_r = 7990.17301852
Q_c = 15123.6427811
Q_i = 16939.936176
a = (0.0171038909662+0.00865611557013j)
ϕ_0 = -0.703376295032
τ = 57.0179907887



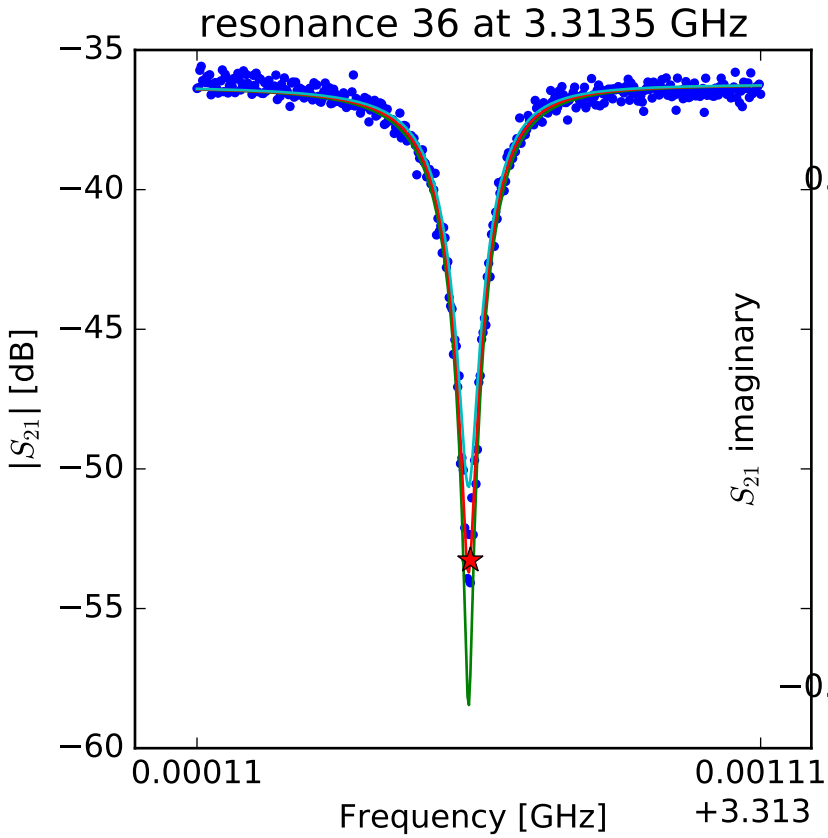


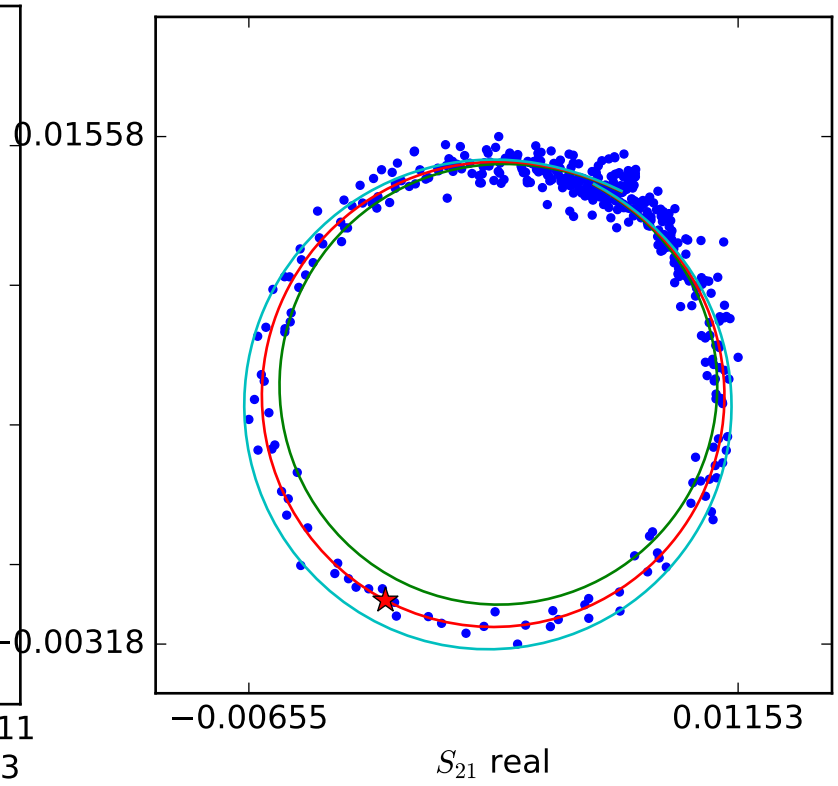


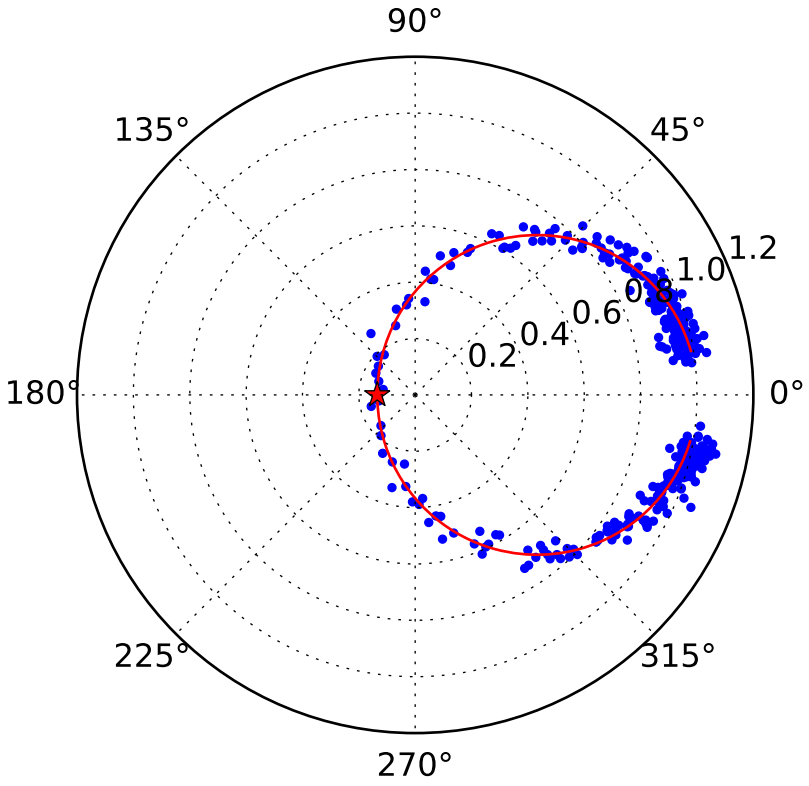


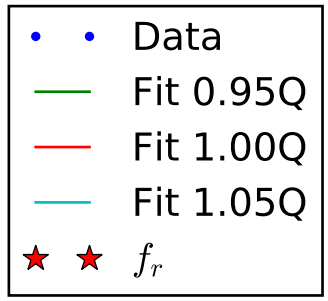
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.31009174433
Q_r = 6243.29086134
Q_c = 5832.0855705
Q_i = -88548.0010996
a = (-0.00459916498784+0.0162316809111j)
ϕ_0 = -0.611883679712
τ = 50.4321865425



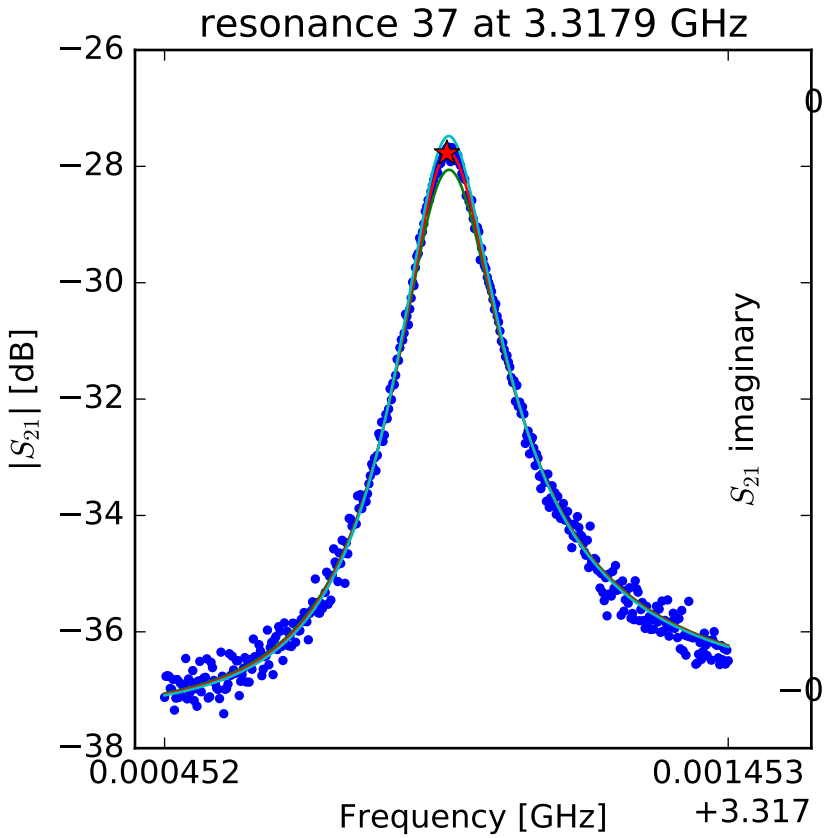


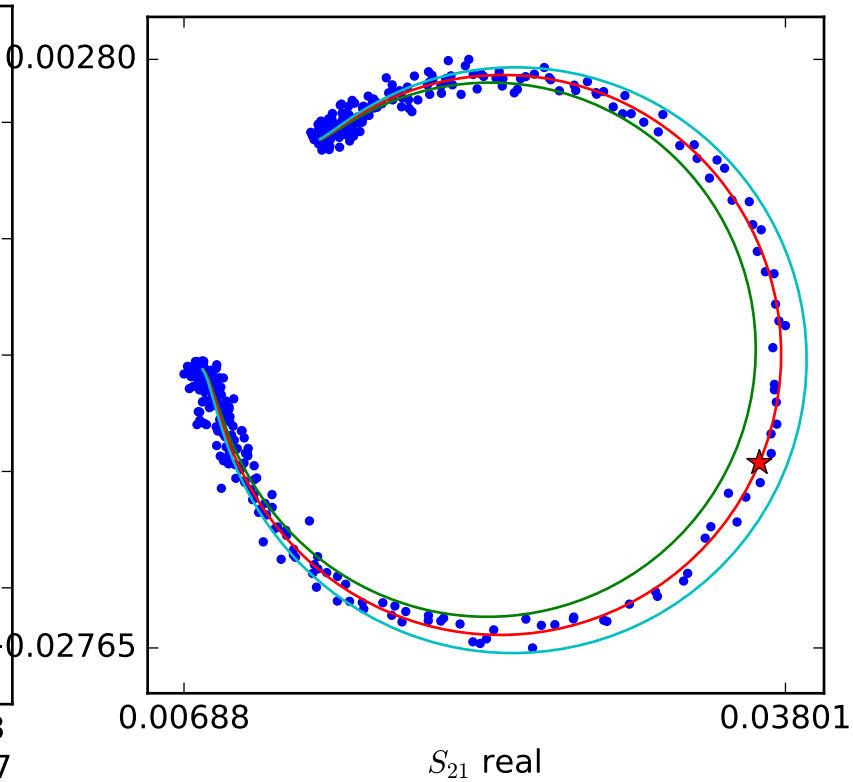


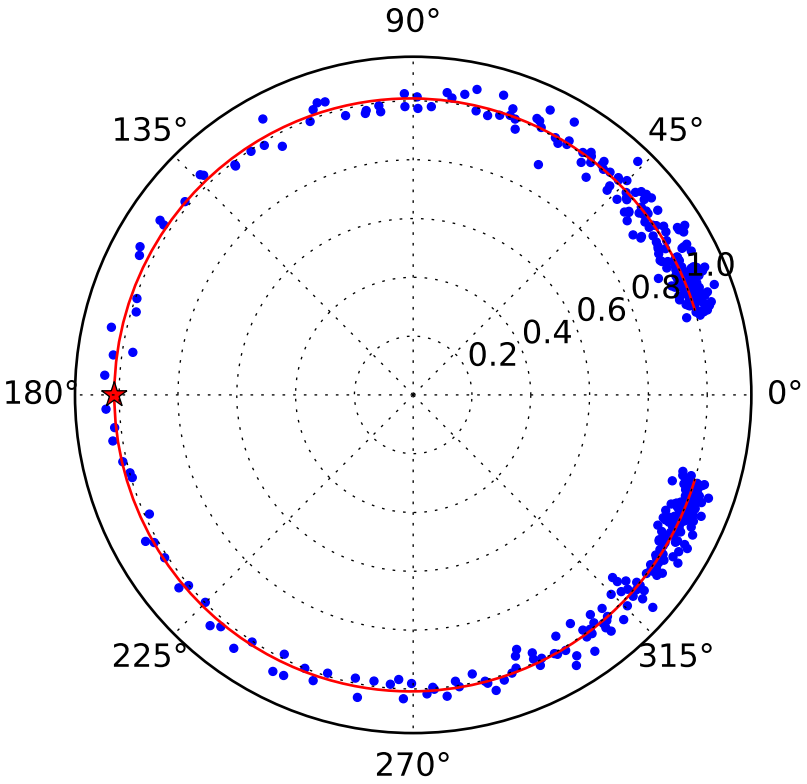


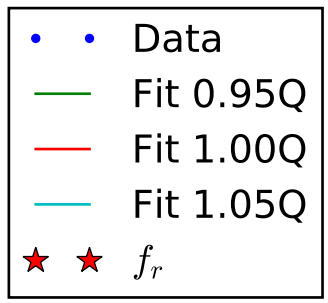
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.31359499567
Q_r = 22945.5137248
Q_c = 20223.7941679
Q_i = -170497.120271
a = (-0.015321525239+0.00157495914005j)
ϕ_0 = -0.0392635653938
τ = 62.5618047442



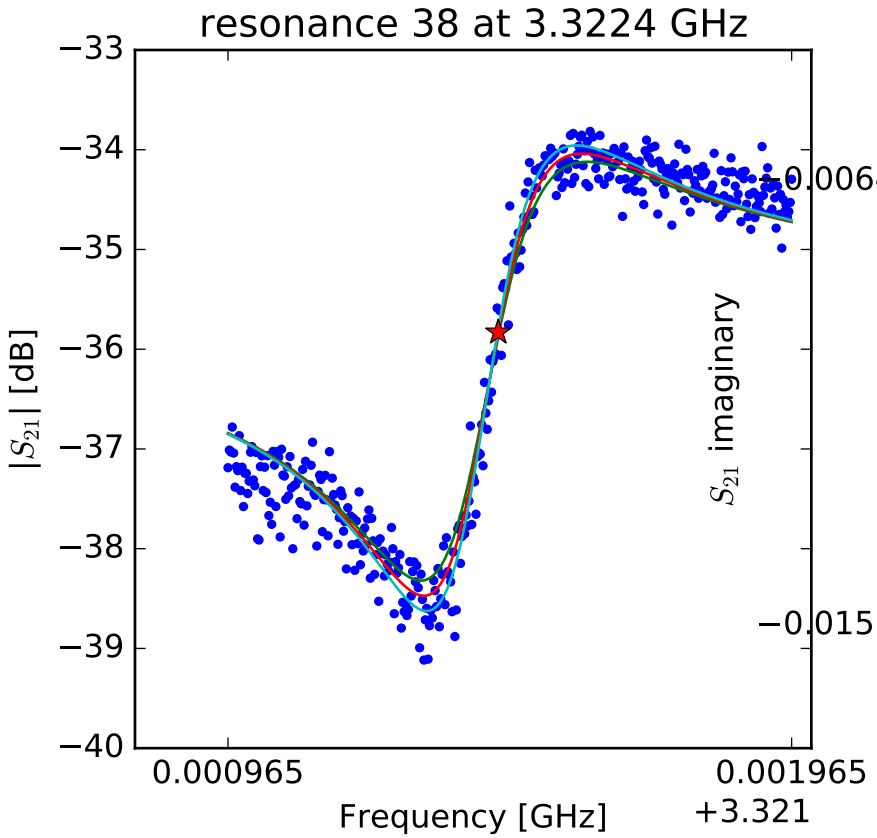


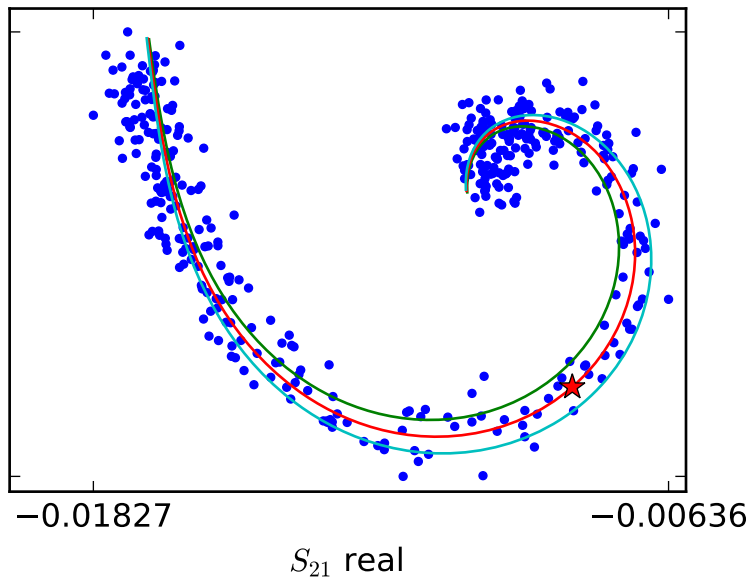


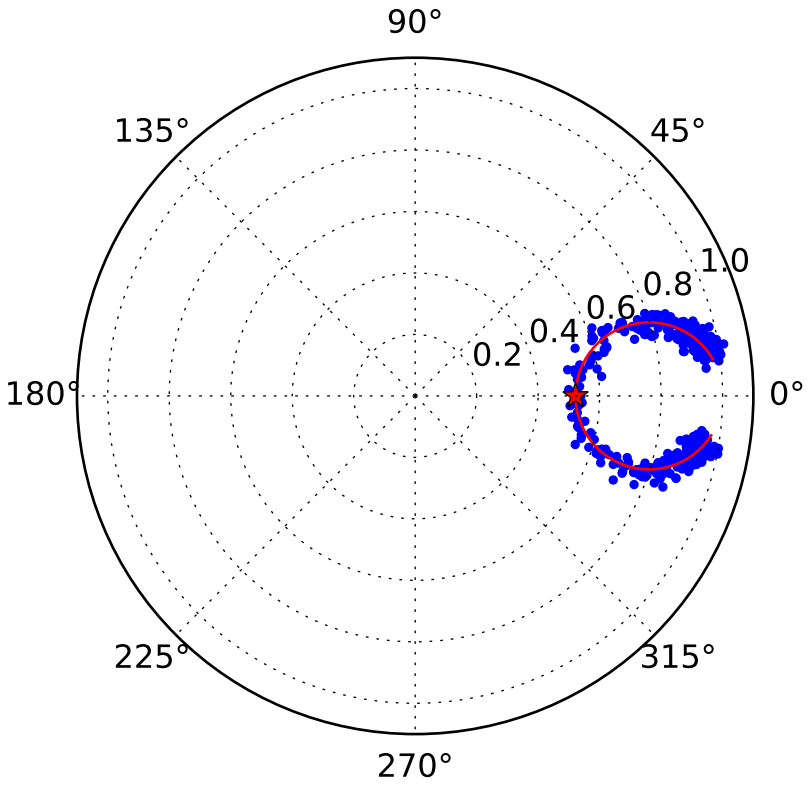


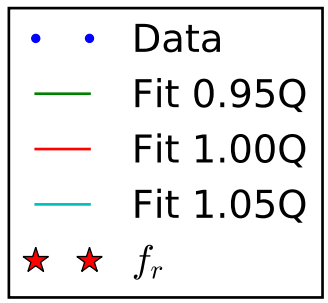
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.31795337891
Q_r = 22515.2662346
Q_c = 11165.706891
Q_i = -22150.5395706
a = (0.00535238385172+0.0125063269031j)
ϕ_0 = -2.94989022409
τ = 63.9788766421



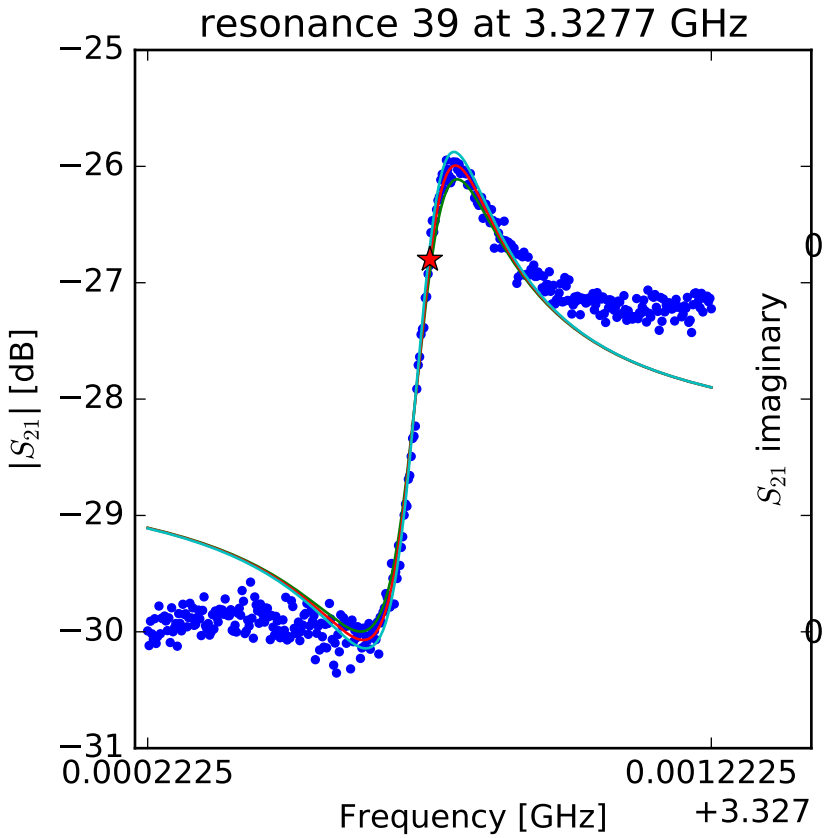


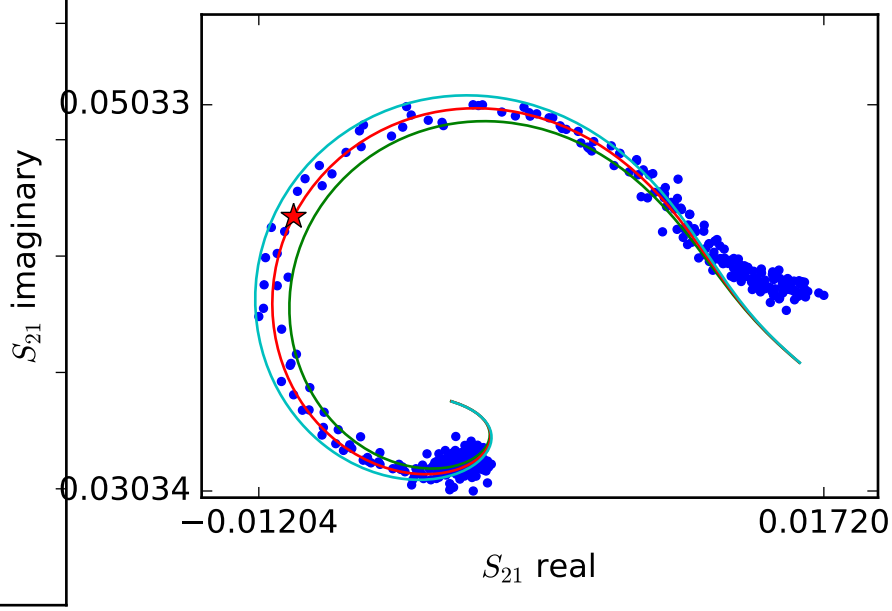


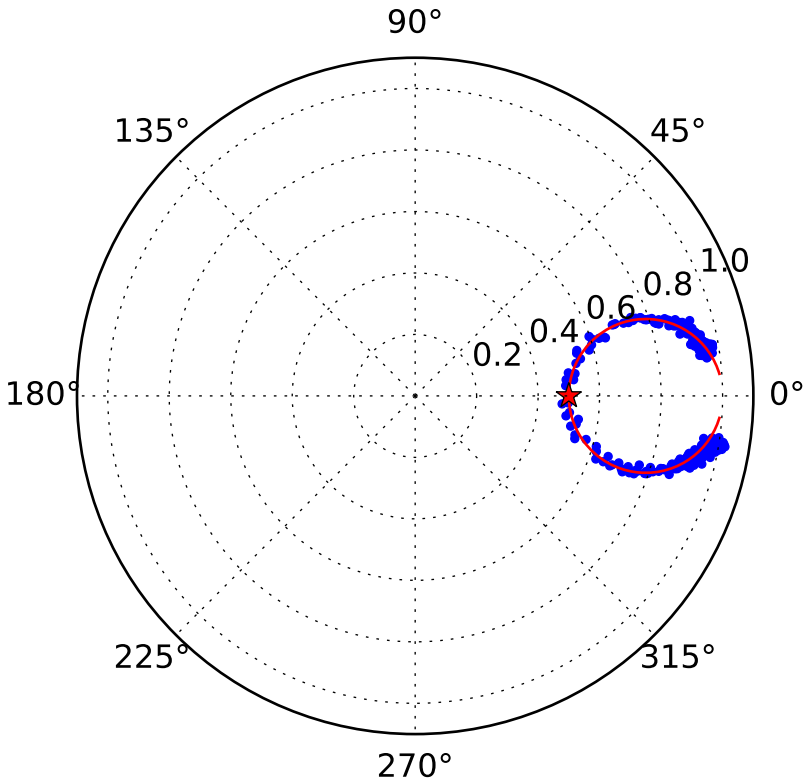


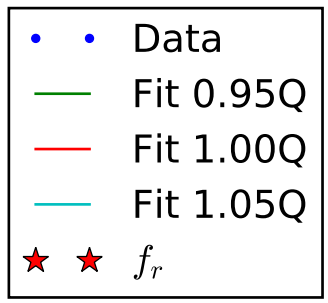
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.32244450506
Q_r = 11883.3206332
Q_c = 24839.9187138
Q_i = 22782.270218
a = (-0.0165891779057-0.000555826198706j)
ϕ_0 = -1.27293003022
τ = 70.1048887252



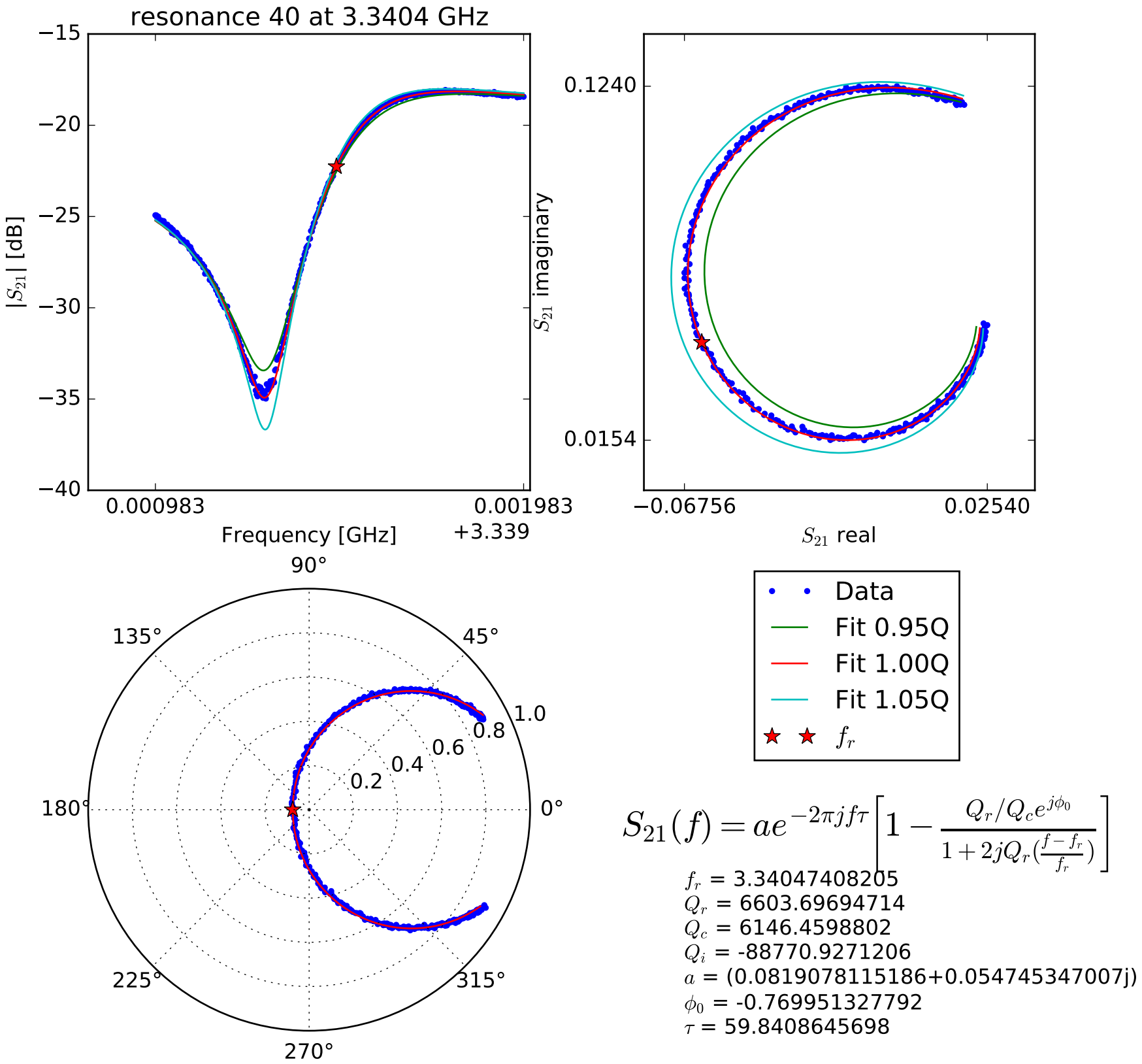






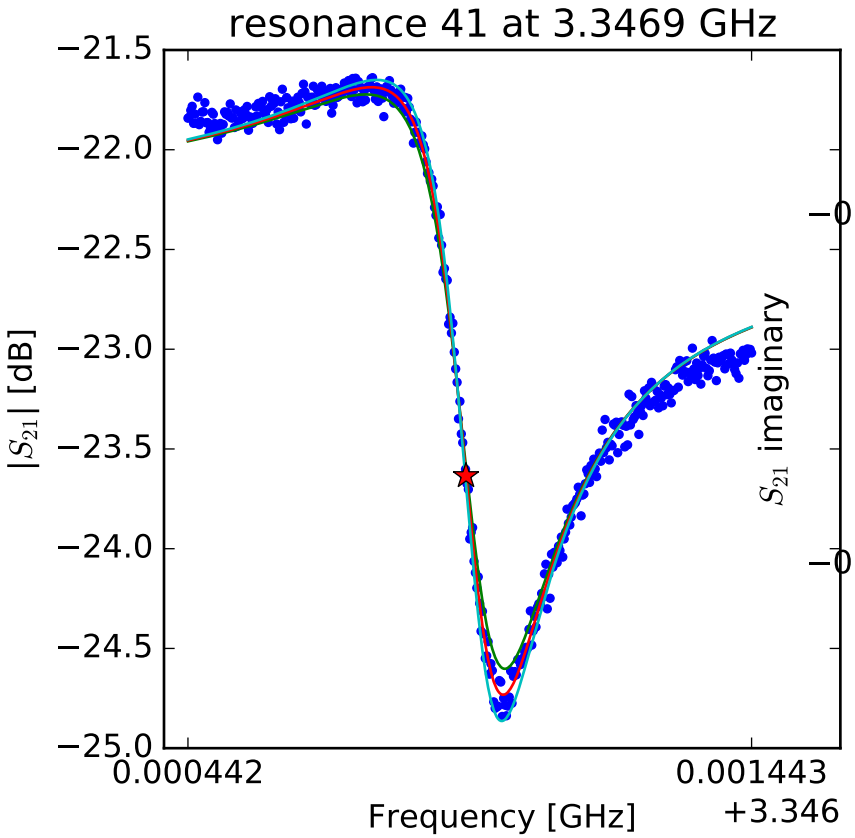
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

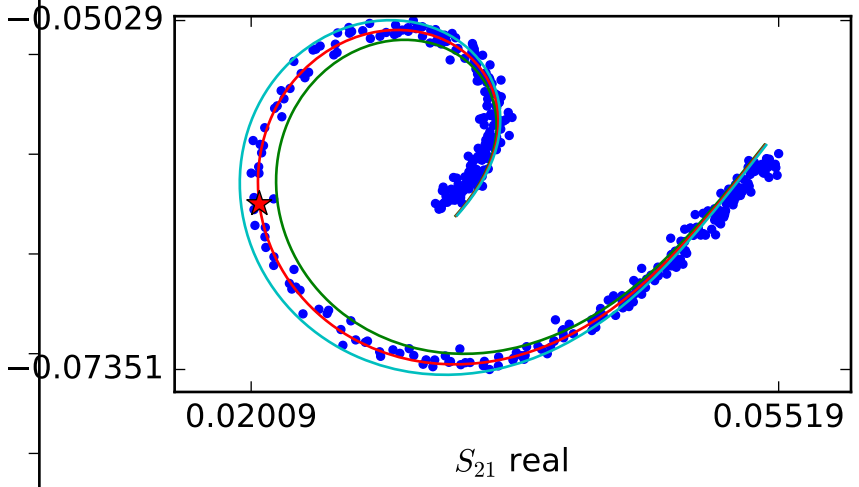
f_r = 3.327723089
Q_r = 22700.391801
Q_c = 45367.3328499
Q_i = 45434.283719
a = (-0.0185092094557-0.03267880081j)
ϕ_0 = -1.80360067107
τ = 68.6497980993

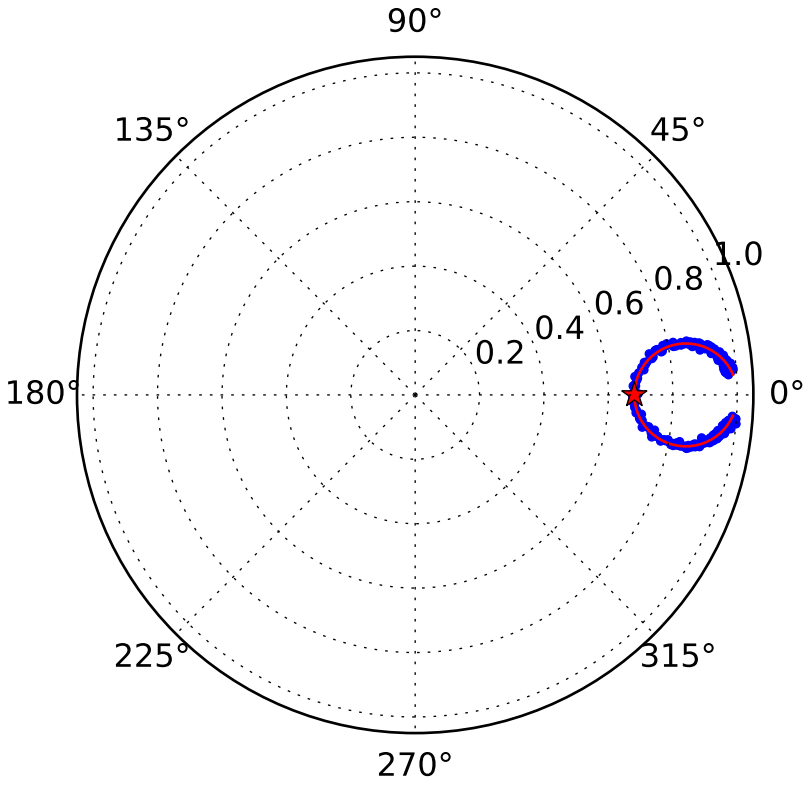


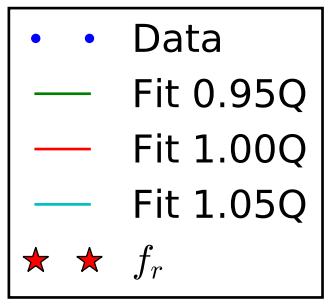
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.34047408205
Q_r = 6603.69694714
Q_c = 6146.4598802
Q_i = -88770.9271206
a = (0.0819078115186+0.054745347007j)
ϕ_0 = -0.769951327792
τ = 59.8408645698



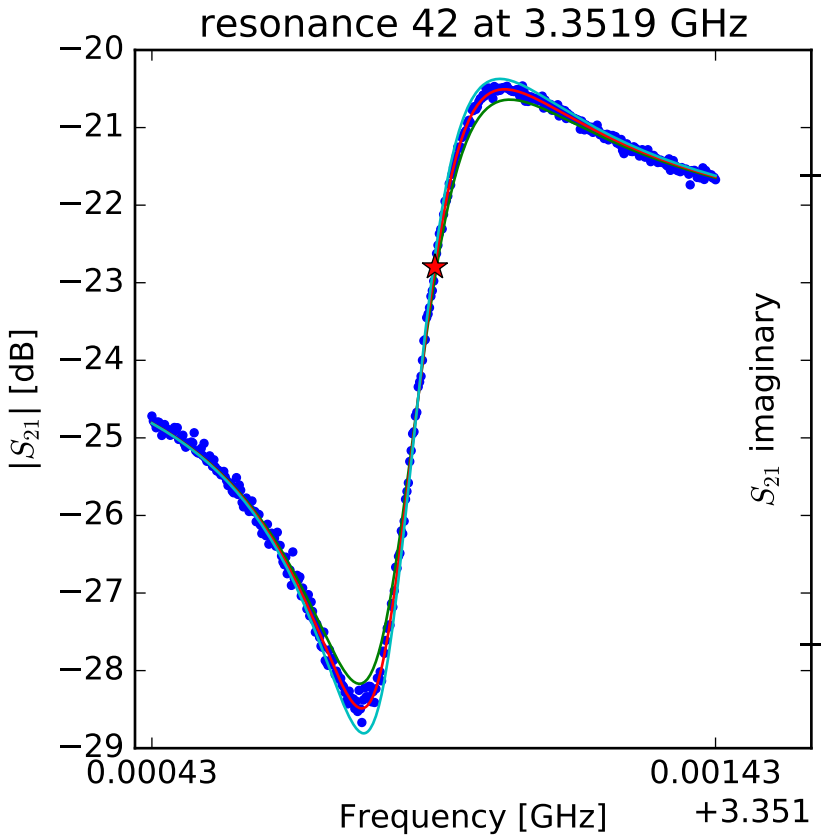


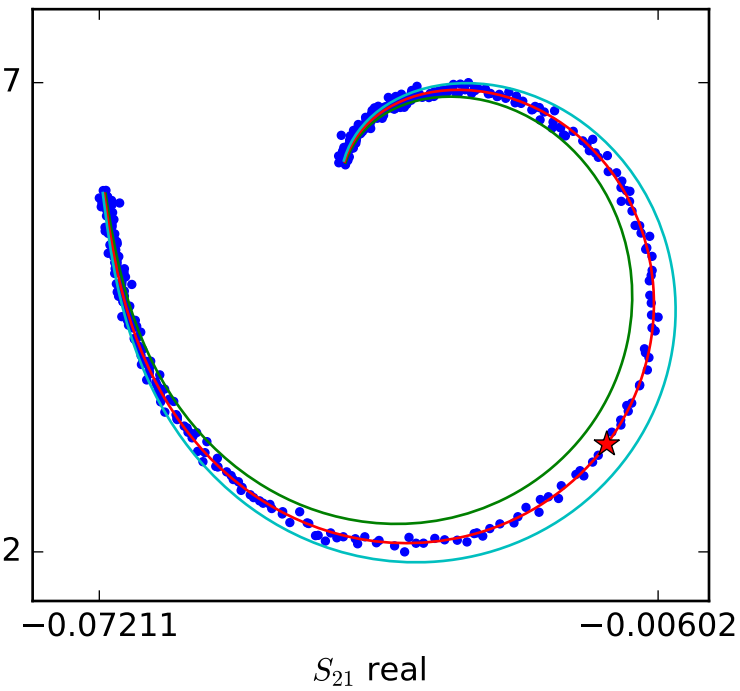


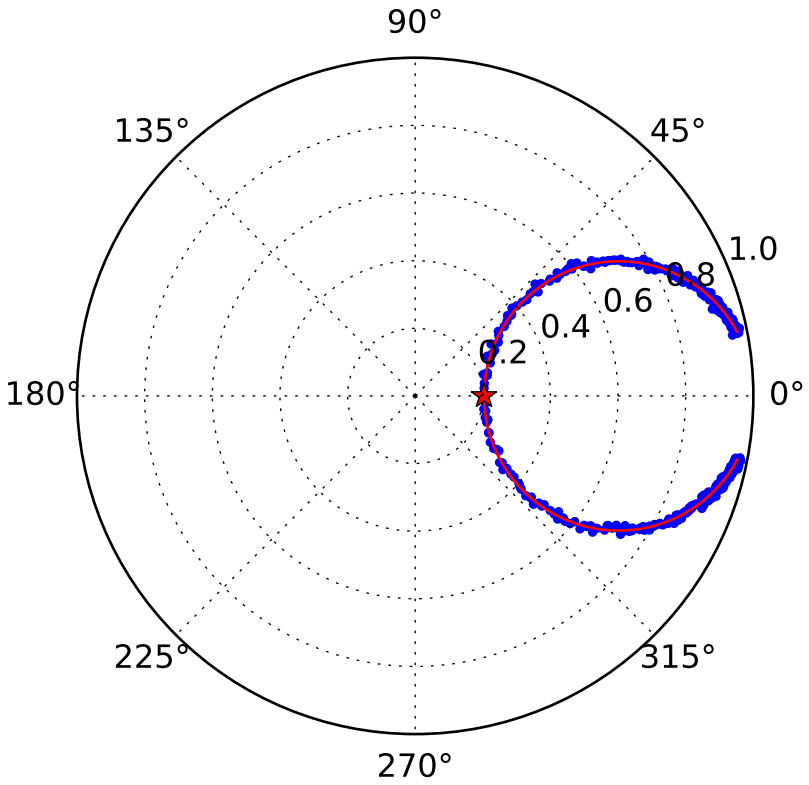


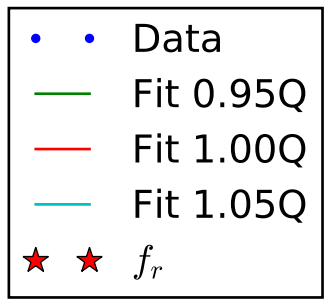
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.34693577654
Q_r = 15912.5309376
Q_c = 49814.3047801
Q_i = 23381.421563
a = (-0.0748841661218+0.0144028943921j)
ϕ_0 = 0.977119673432
τ = 52.4716837635



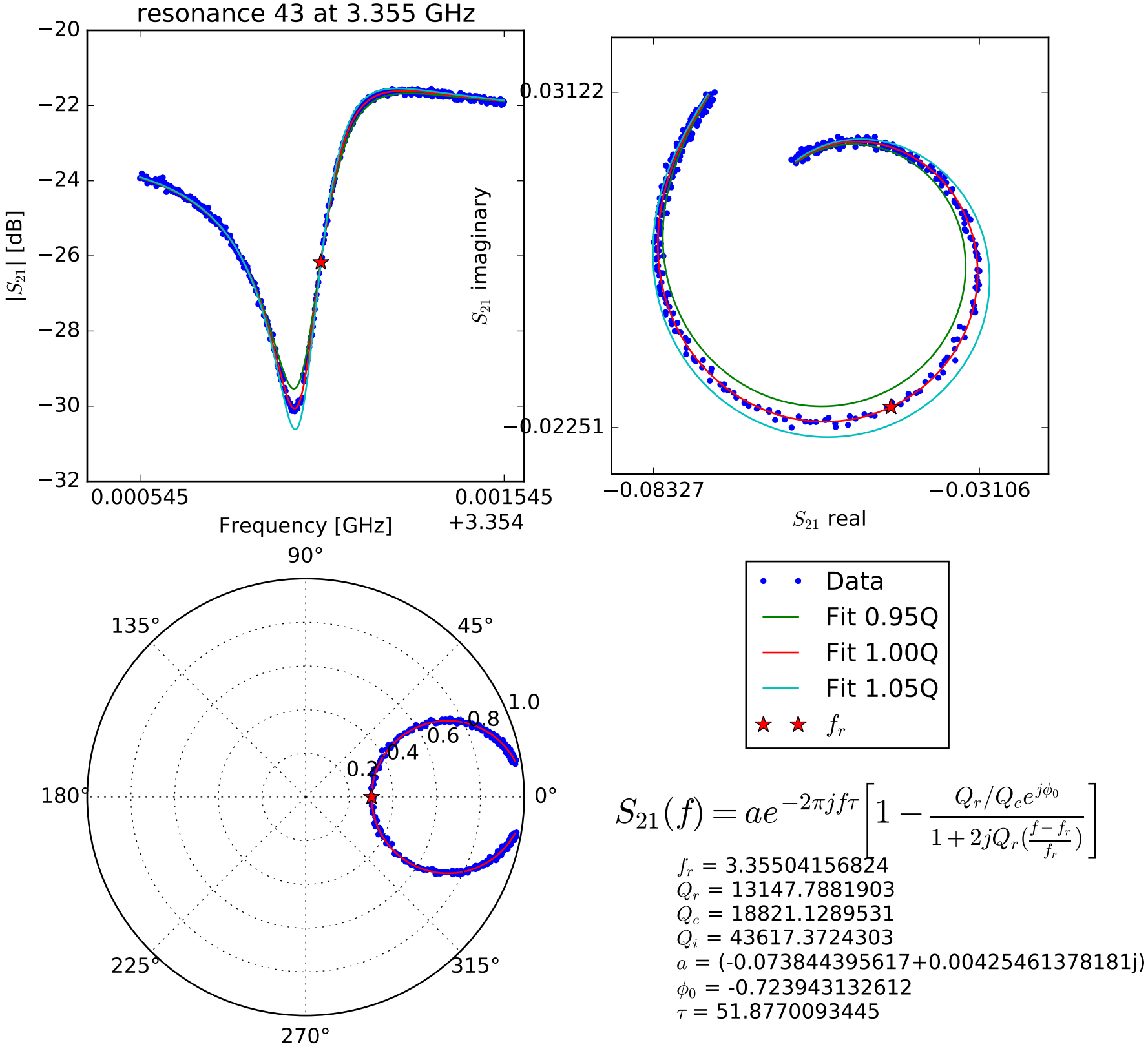






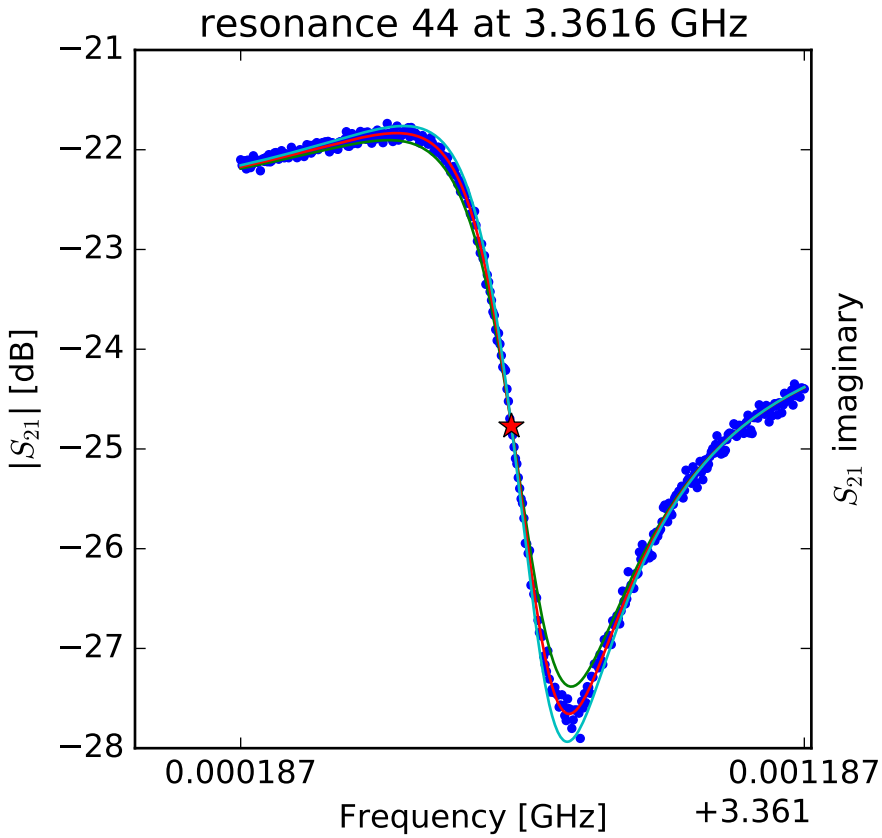
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

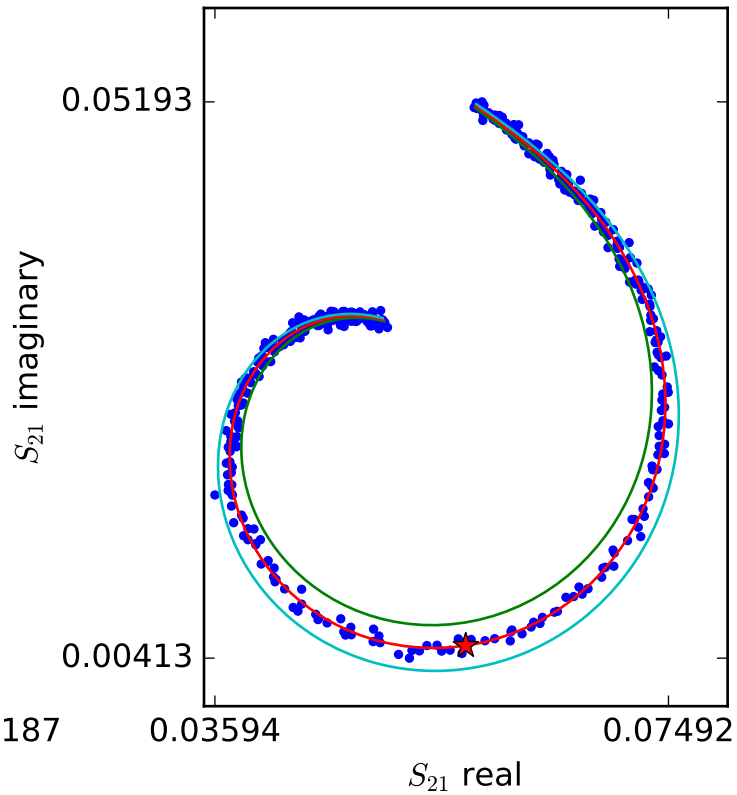
f_r = 3.35193210671
Q_r = 13231.1898367
Q_c = 16609.4296714
Q_i = 65052.3727772
a = (-0.0515675654384+0.0490605106058j)
ϕ_0 = -1.18586222123
τ = 52.1444899097

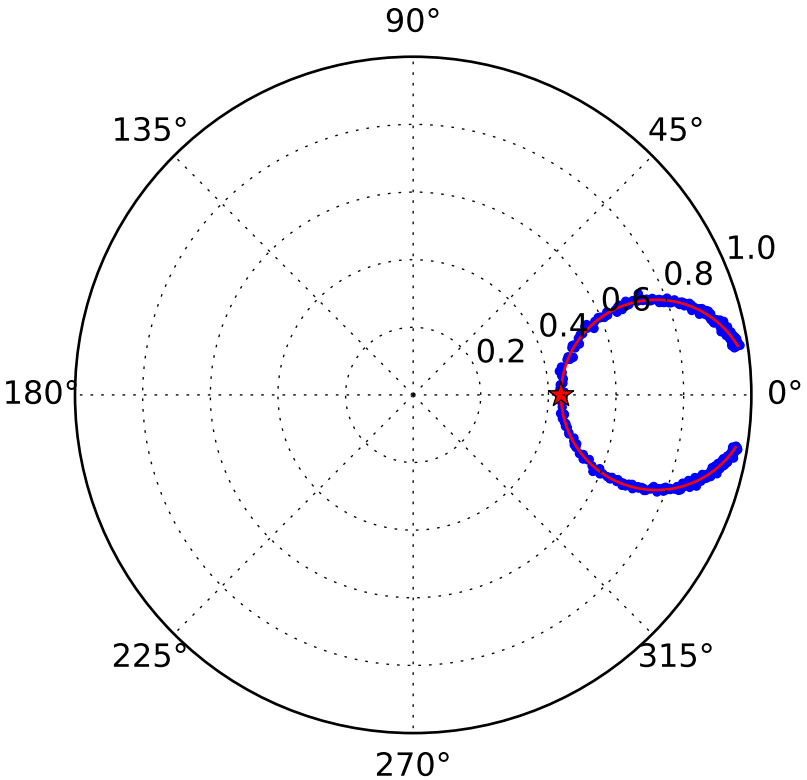


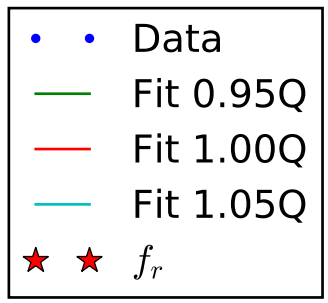
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.35504156824
Q_r = 13147.7881903
Q_c = 18821.1289531
Q_i = 43617.3724303
a = (-0.073844395617+0.00425461378181j)
ϕ_0 = -0.723943132612
τ = 51.8770093445



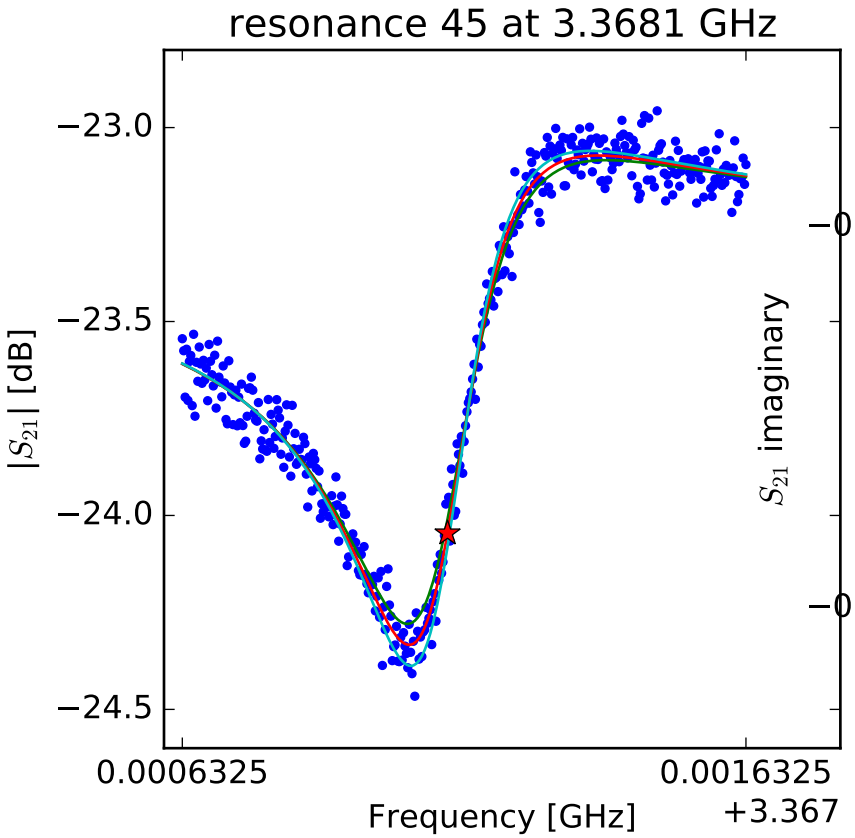


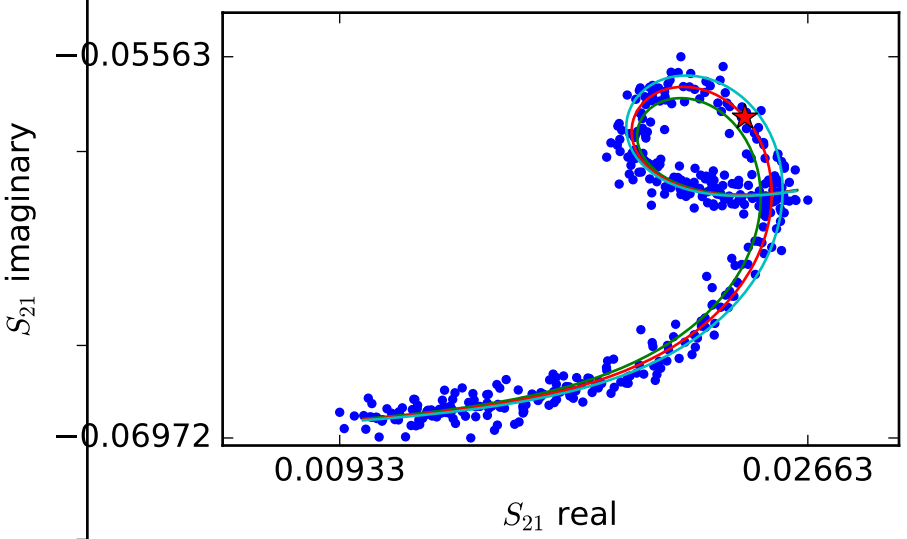


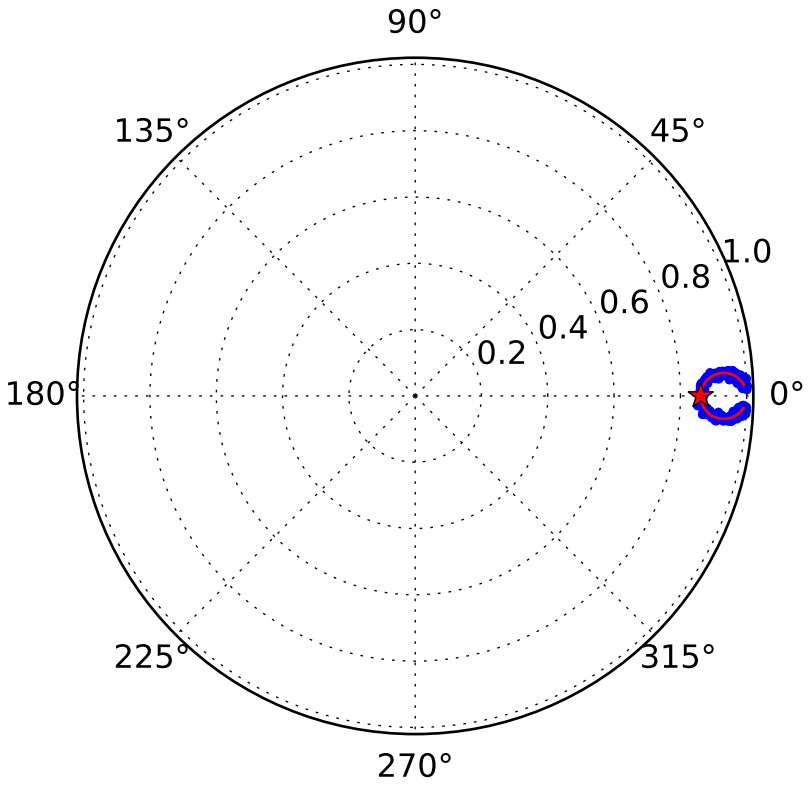


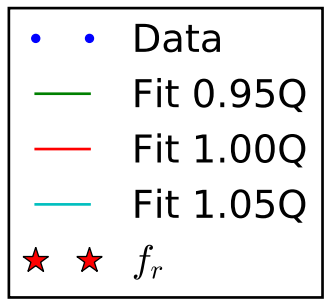
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.36166787255
Q_r = 11633.6860686
Q_c = 20669.7263292
Q_i = 26611.7790873
a = (0.0473636941016+0.0519241512508j)
ϕ_0 = 0.963773995333
τ = 49.9819772029



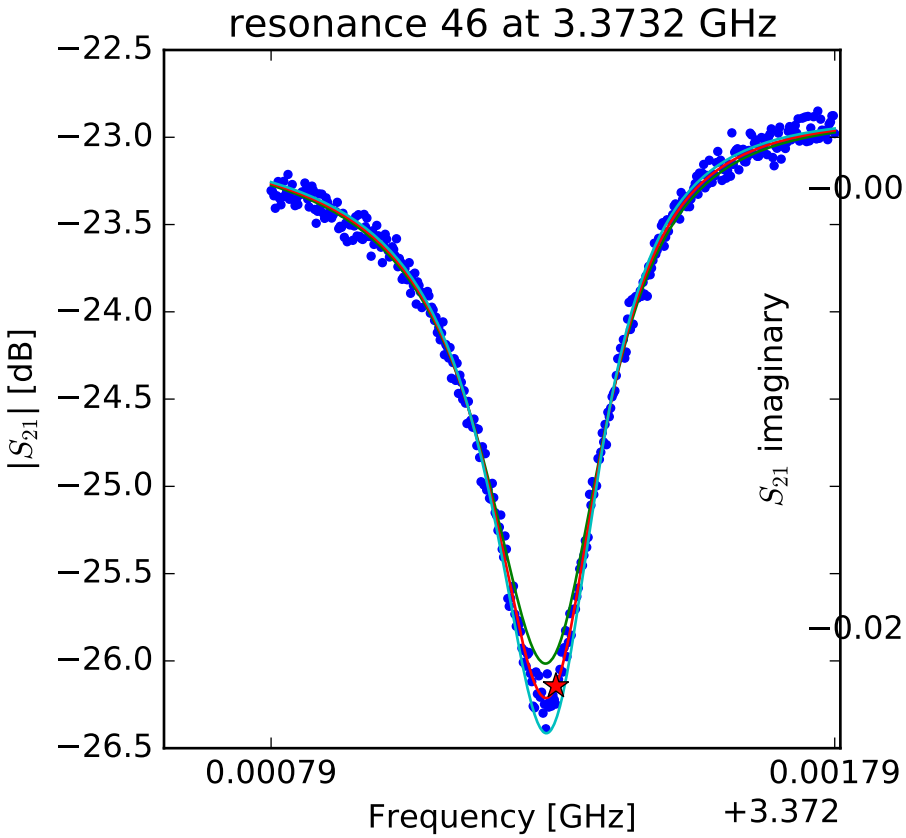


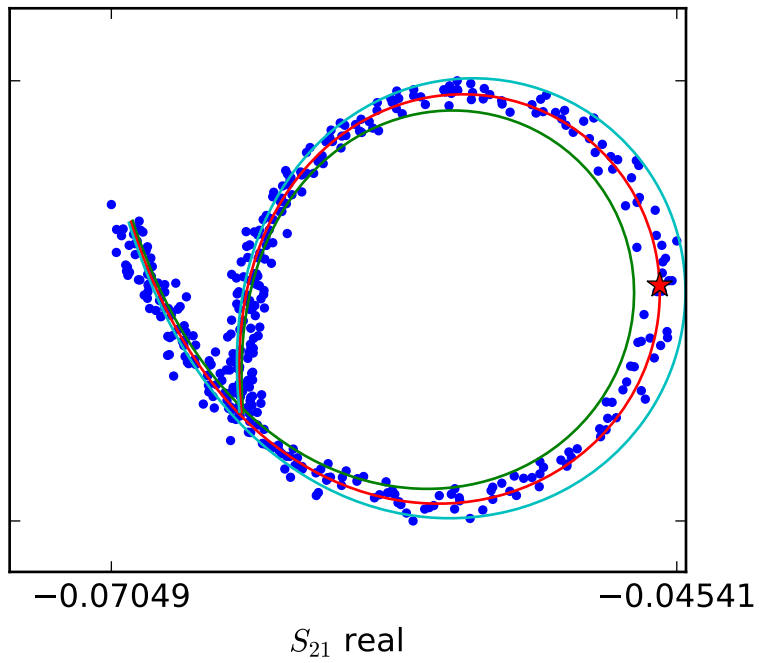


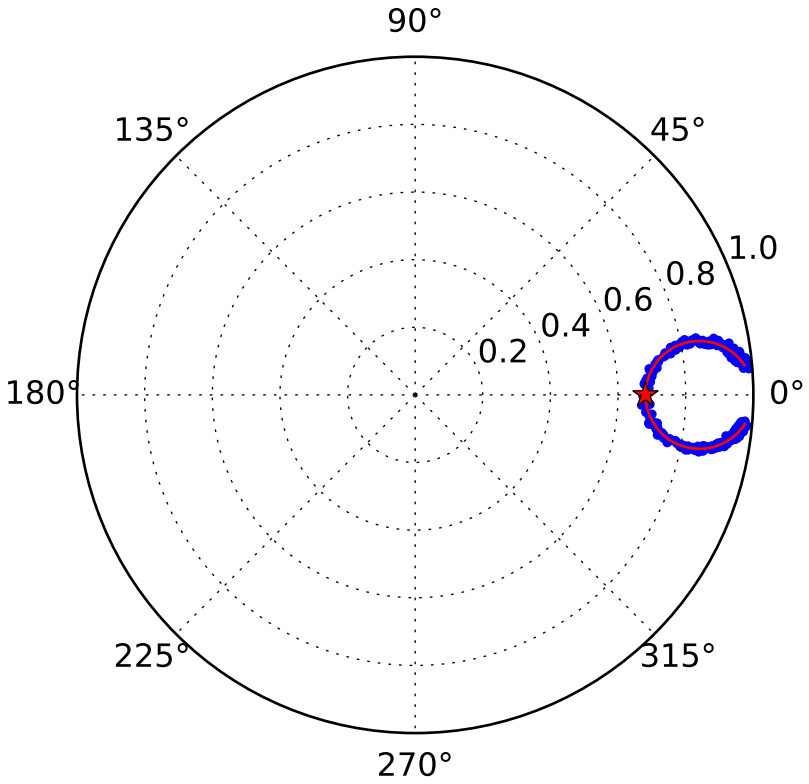


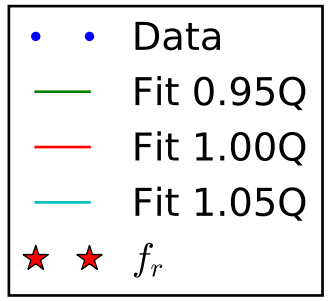
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.36810303542
Q_r = 12502.0020252
Q_c = 90067.0524059
Q_i = 14517.0855437
a = (0.057309348494+0.0366589889304j)
ϕ_0 = -0.879785787354
τ = 48.4828847613



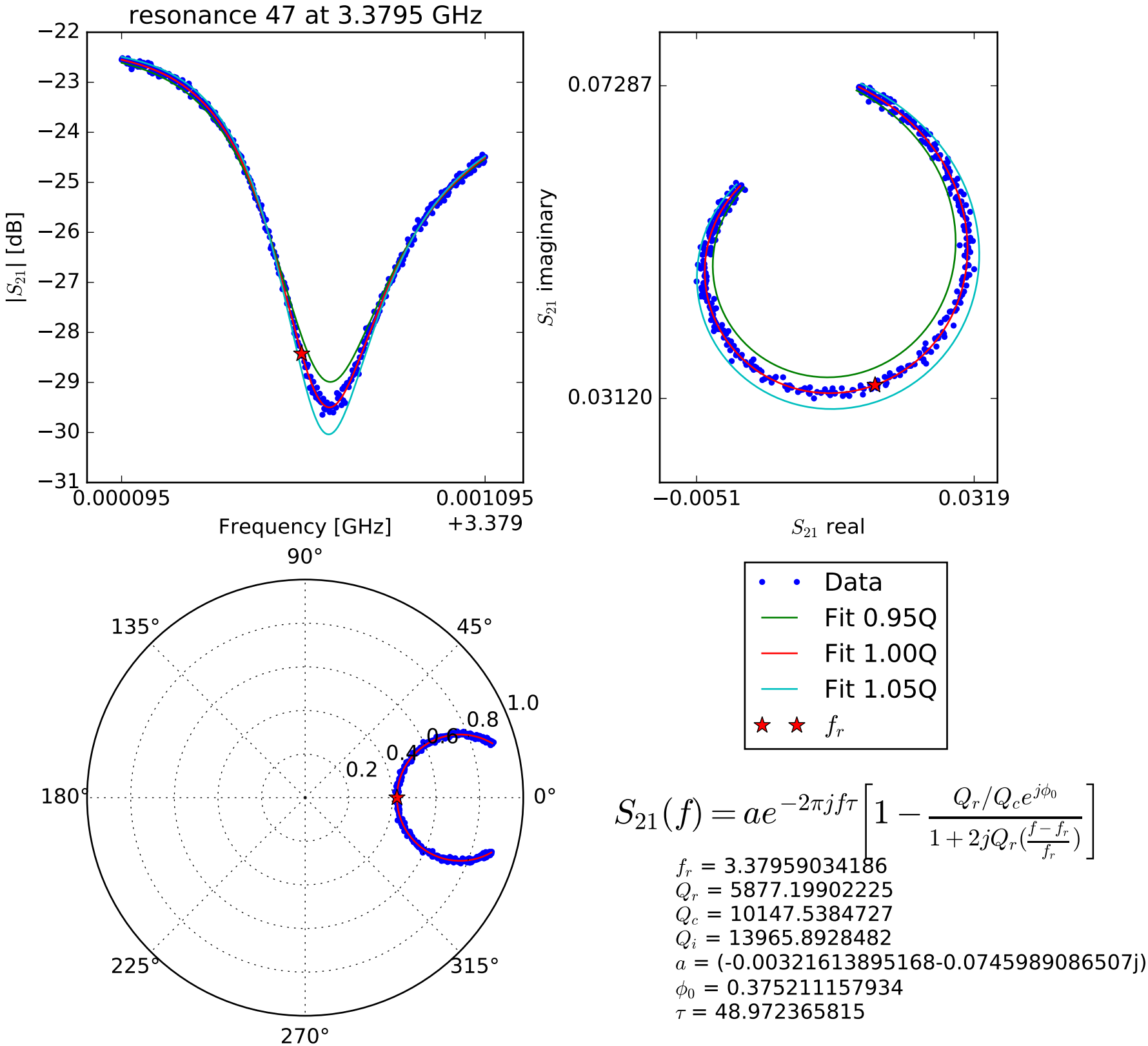






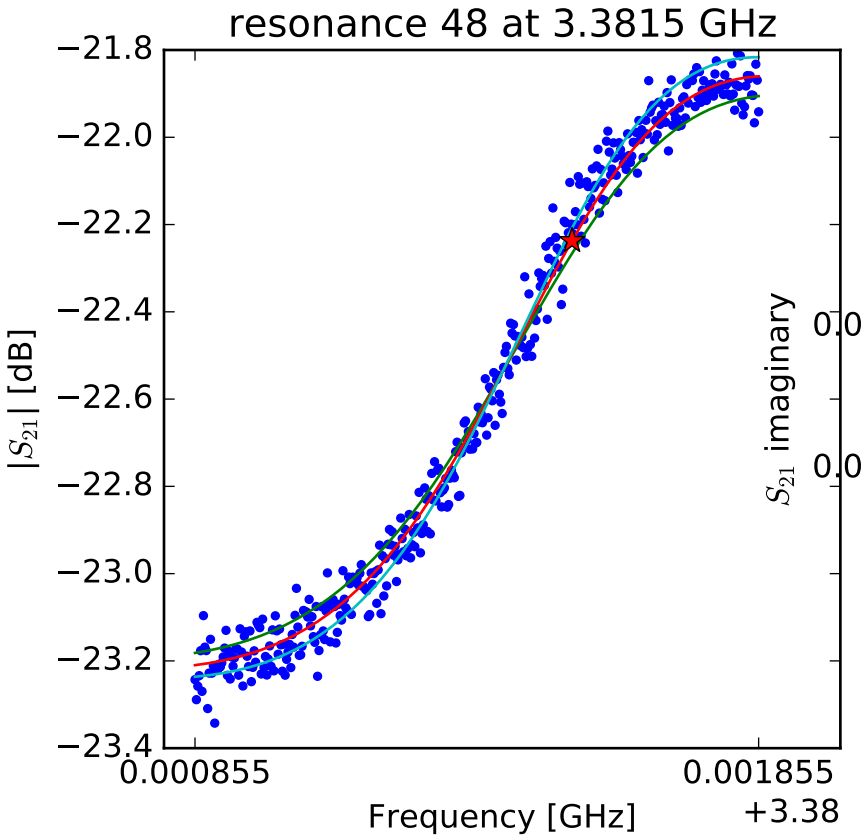
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

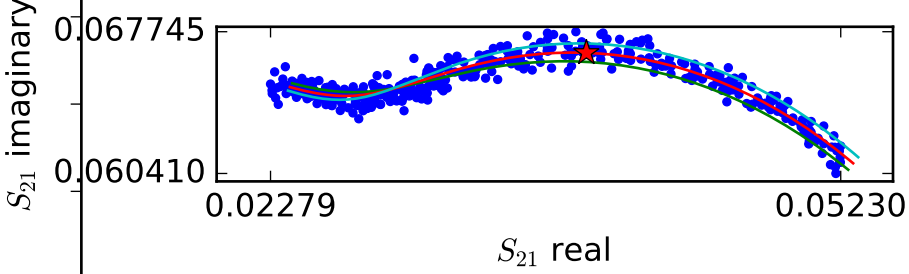
f_r = 3.37329530793
Q_r = 11373.8024403
Q_c = 35656.6525173
Q_i = 16701.1582302
a = (0.0395141500052-0.0594924808147j)
ϕ_0 = -0.199576062056
τ = 49.2992406967

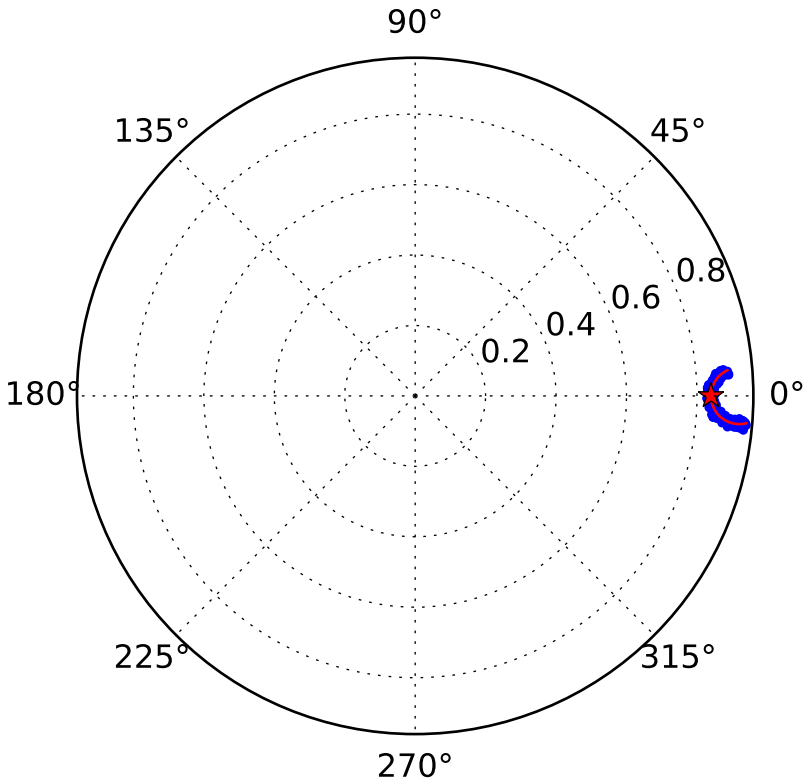


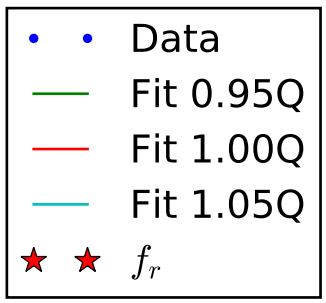
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.37959034186
Q_r = 5877.19902225
Q_c = 10147.5384727
Q_i = 13965.8928482
a = (-0.00321613895168-0.0745989086507j)
ϕ_0 = 0.375211157934
τ = 48.972365815



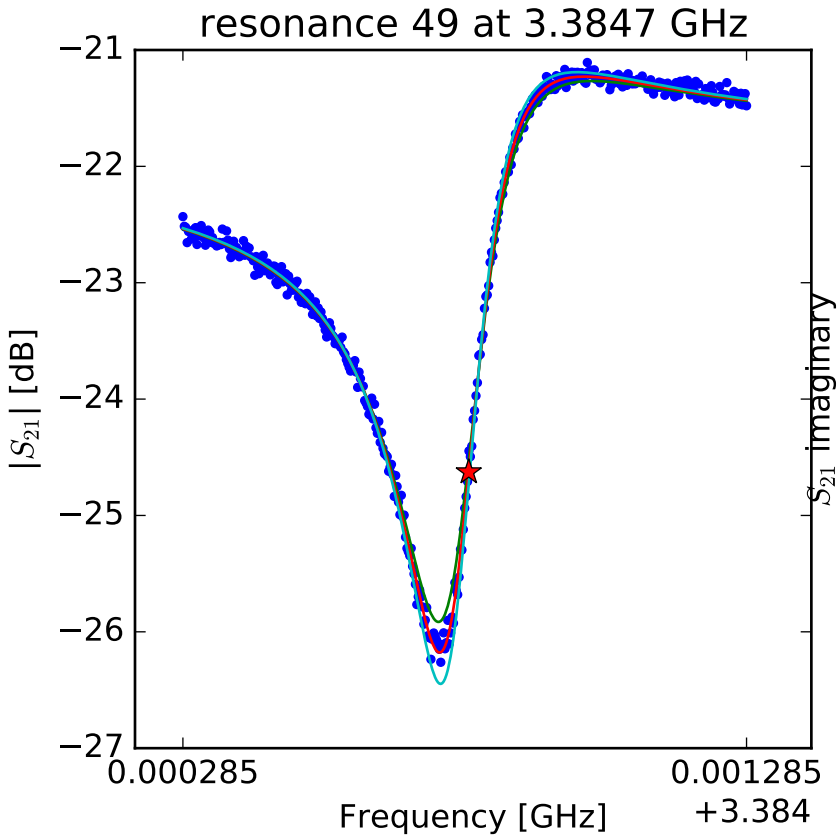


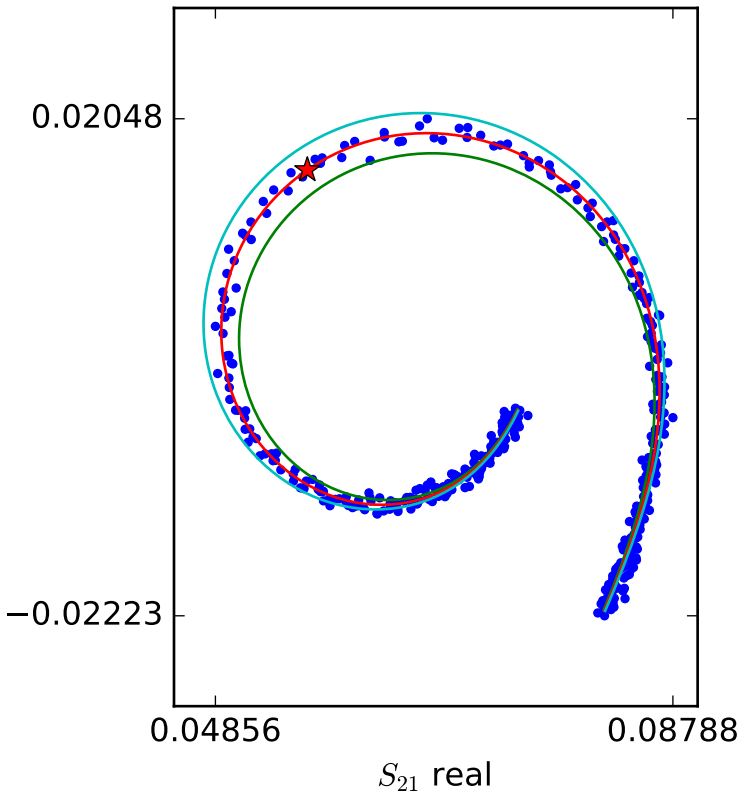


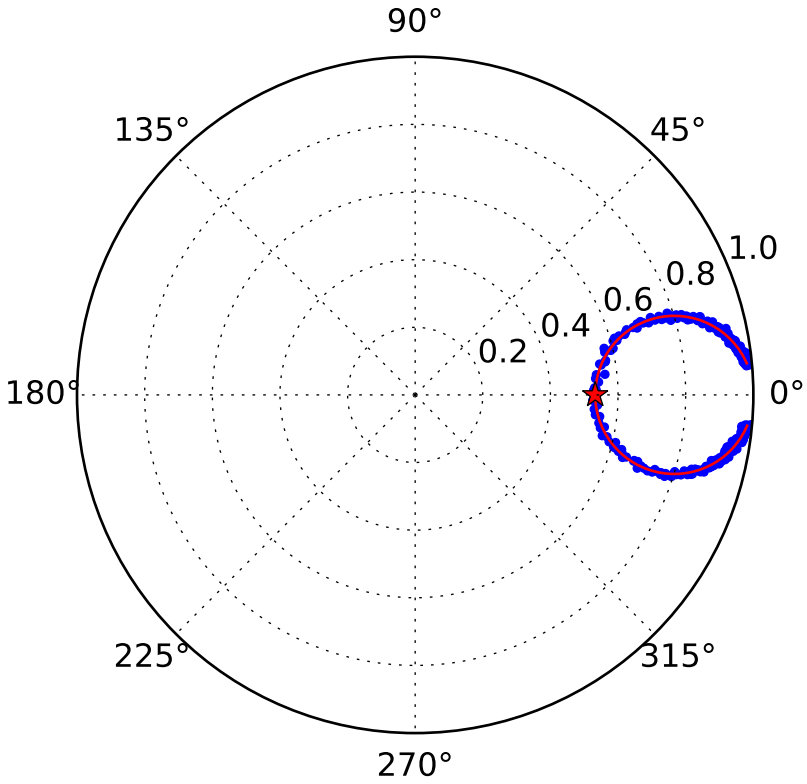


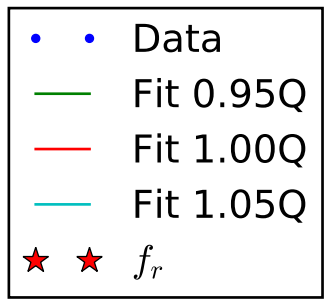
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.38152385943
Q_r = 3256.68755058
Q_c = 20315.7293658
Q_i = 3878.41143853
a = (-0.0602390404042+0.0409999458657j)
ϕ_0 = -1.8861177511
τ = 56.5609887592



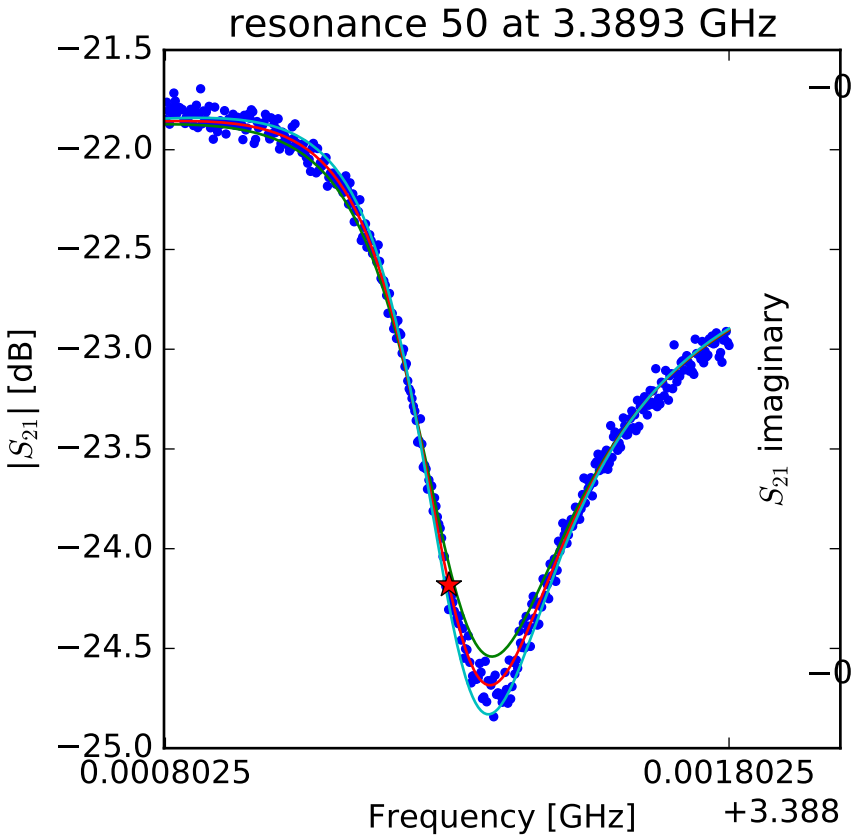


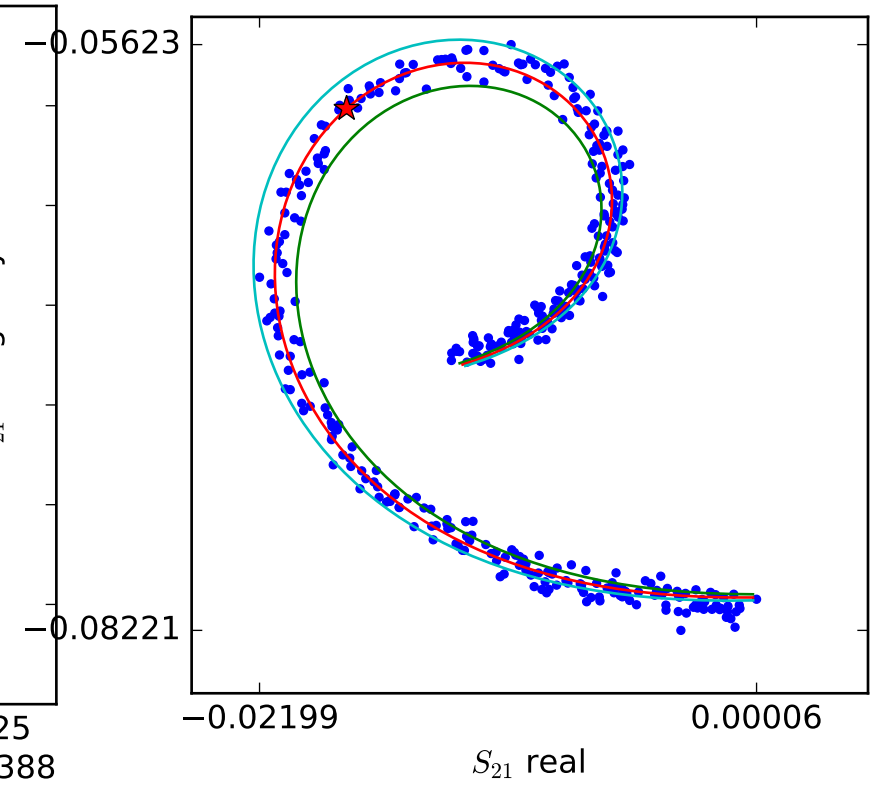


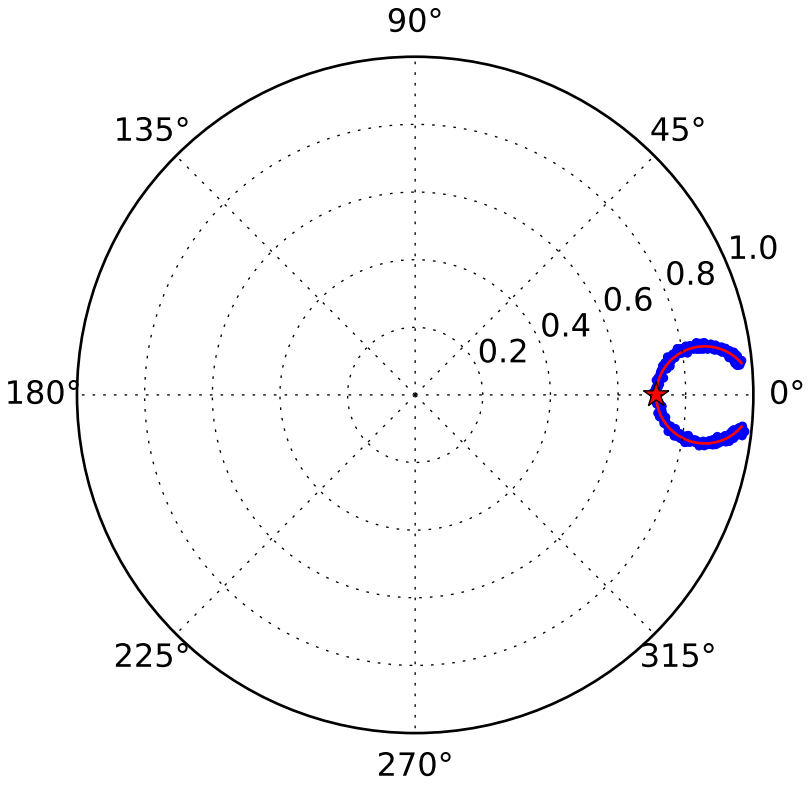


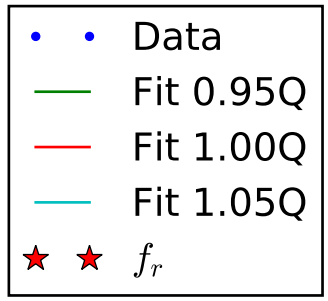
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.38479214234
Q_r = 16441.7238771
Q_c = 35154.2716027
Q_i = 30888.1951975
a = (-0.00123641522322-0.0806172051263j)
ϕ_0 = -0.743372947258
τ = 53.4079989414



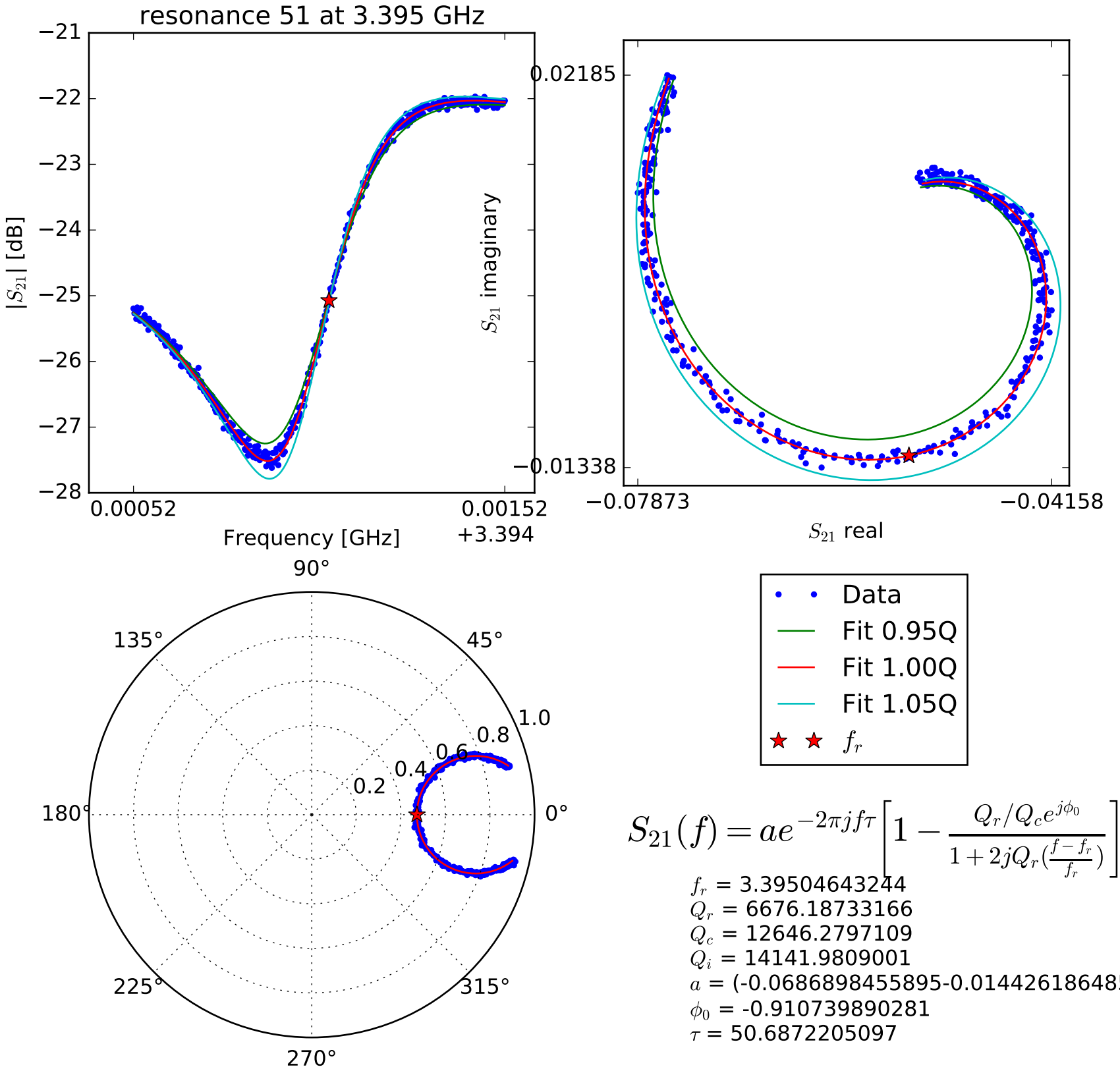






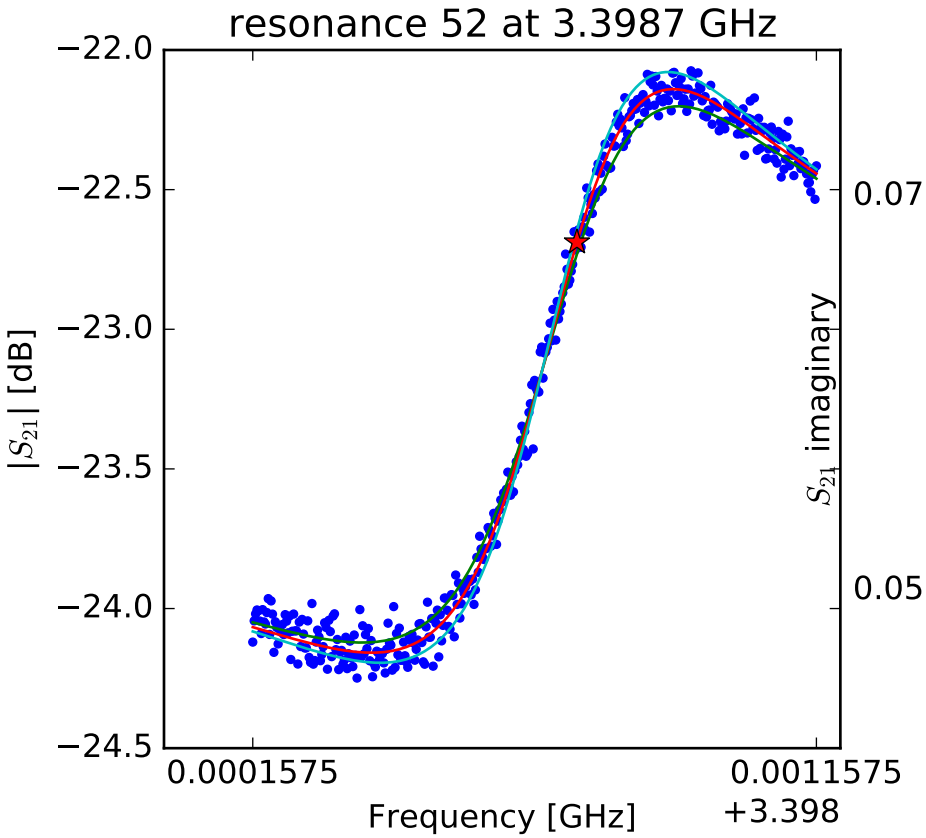
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

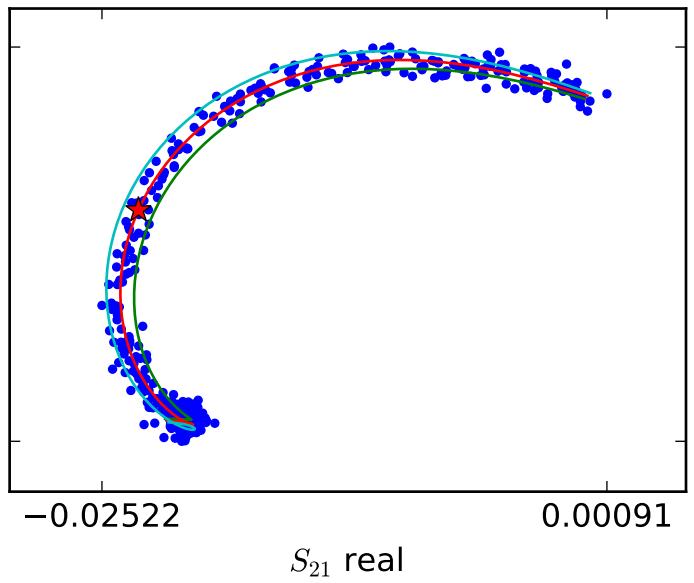
f_r = 3.38930553877
Q_r = 9120.33925051
Q_c = 31747.52912
Q_i = 12796.4735175
a = (-0.00446477515824-0.0780068224281j)
ϕ_0 = 0.650455289885
τ = 52.8140605918

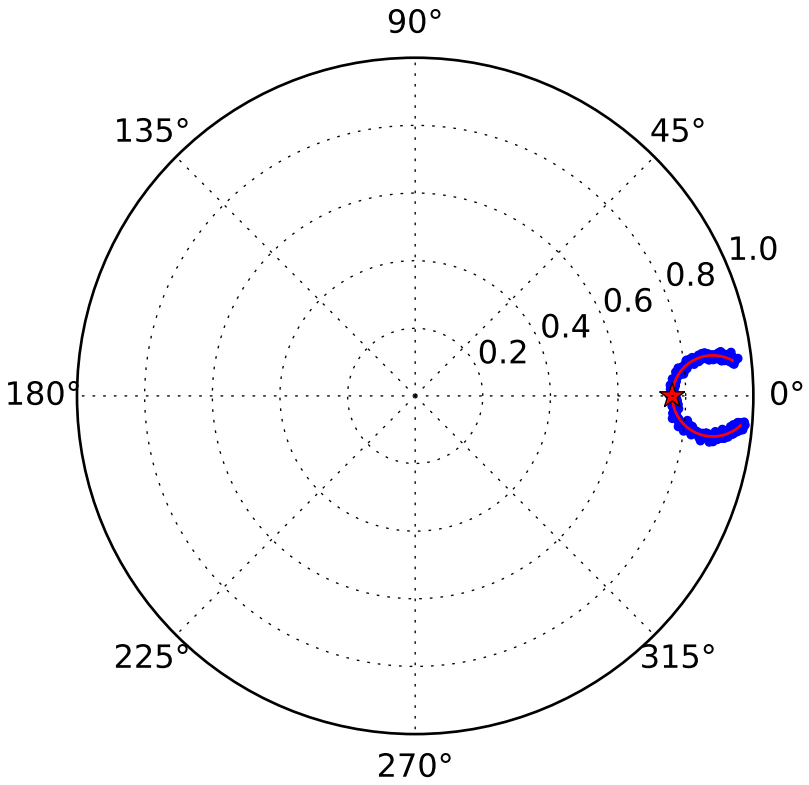


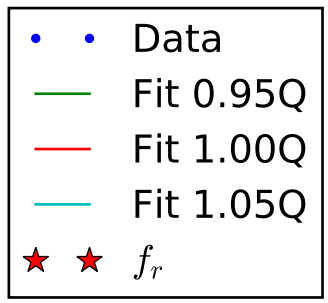
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.39504643244
Q_r = 6676.18733166
Q_c = 12646.2797109
Q_i = 14141.9809001
a = (-0.0686898455895-0.0144261864852j)
ϕ_0 = -0.910739890281
τ = 50.6872205097



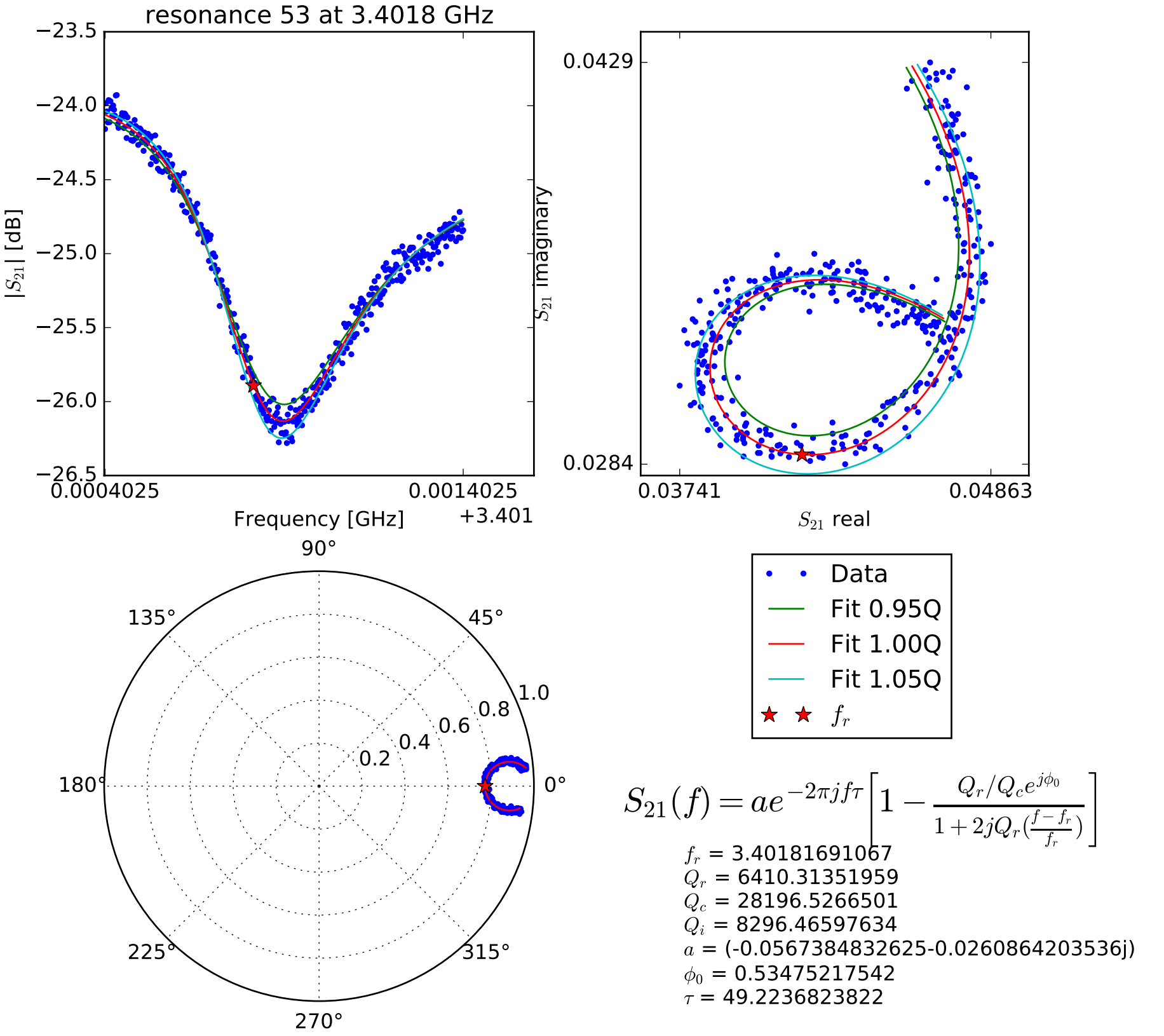






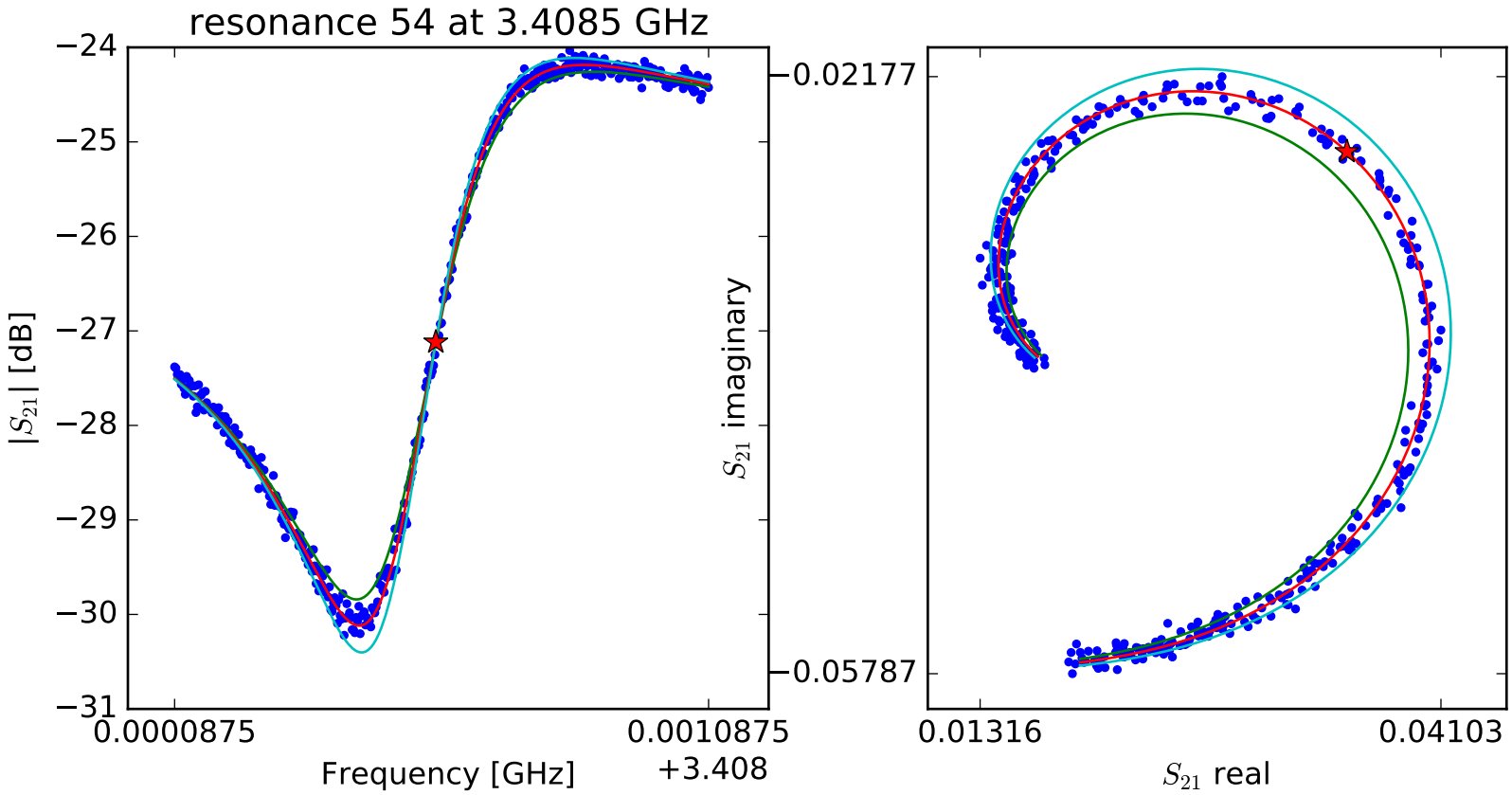
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

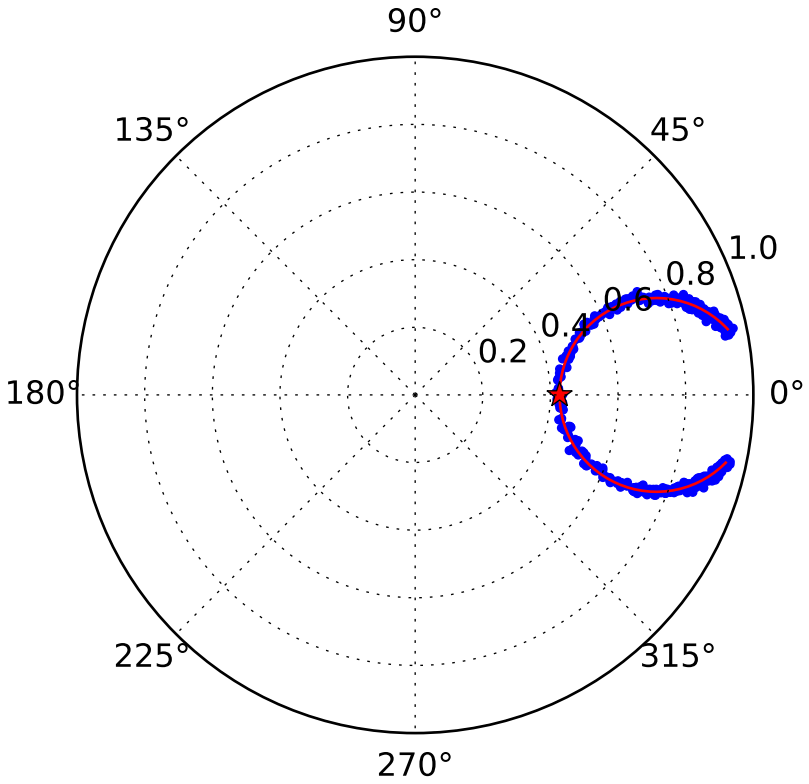
f_r = 3.39873258056
Q_r = 6812.97938155
Q_c = 28398.93978
Q_i = 8963.29779206
a = (0.00632347296608-0.0672537192942j)
ϕ_0 = -1.8291508691
τ = 51.0477532559

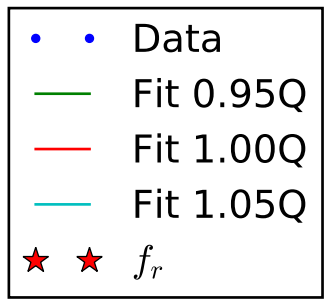


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.40181691067
Q_r = 6410.31351959
Q_c = 28196.5266501
Q_i = 8296.46597634
a = (-0.0567384832625-0.0260864203536j)
ϕ_0 = 0.53475217542
τ = 49.2236823822

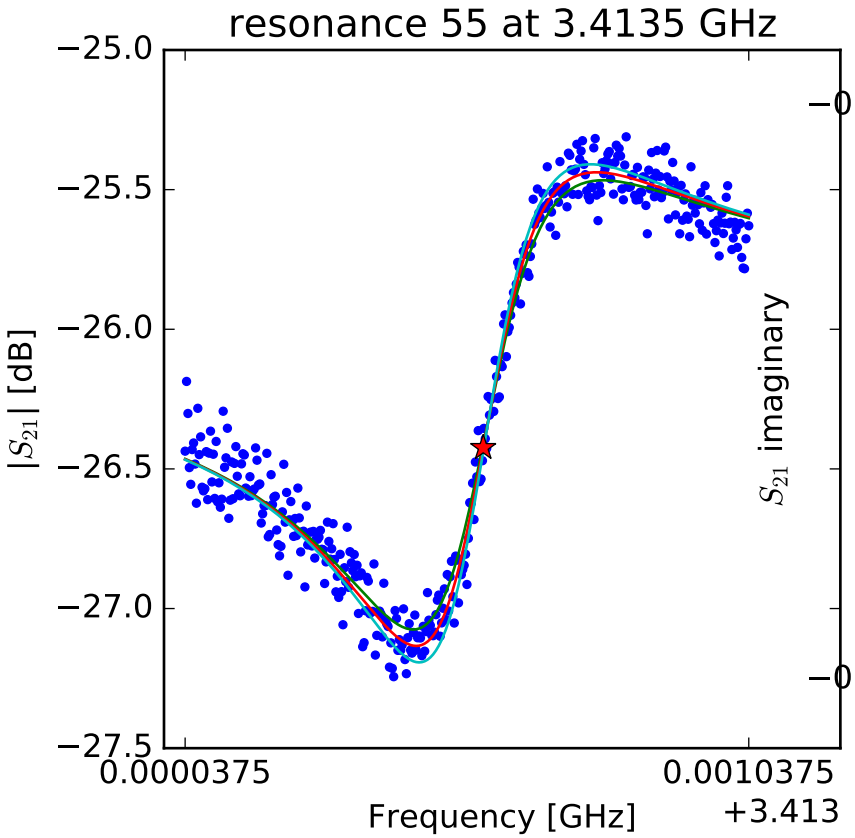


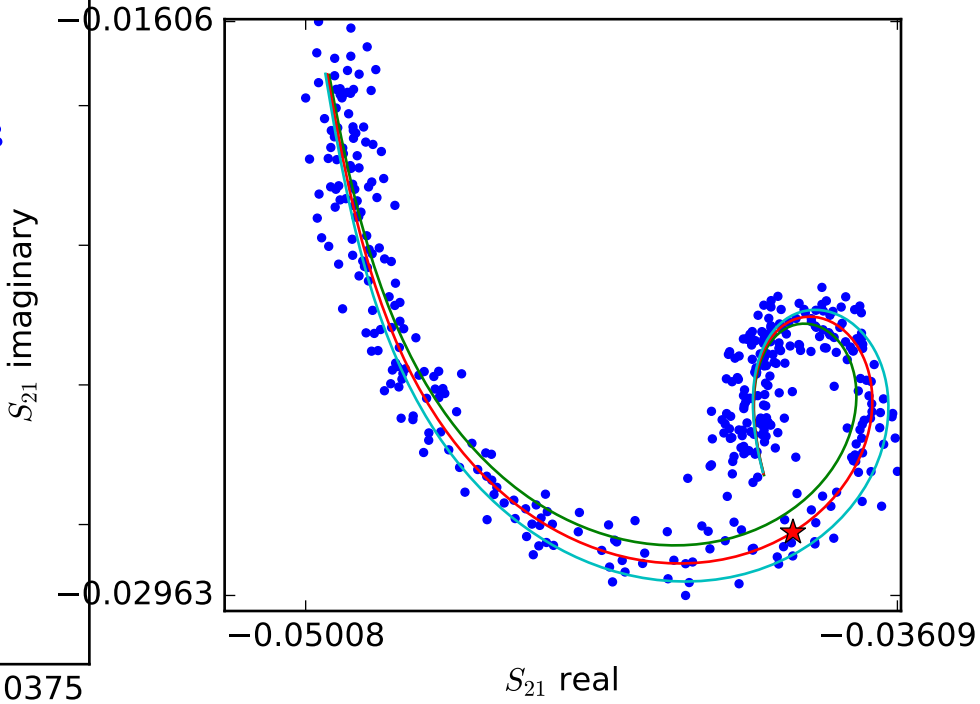


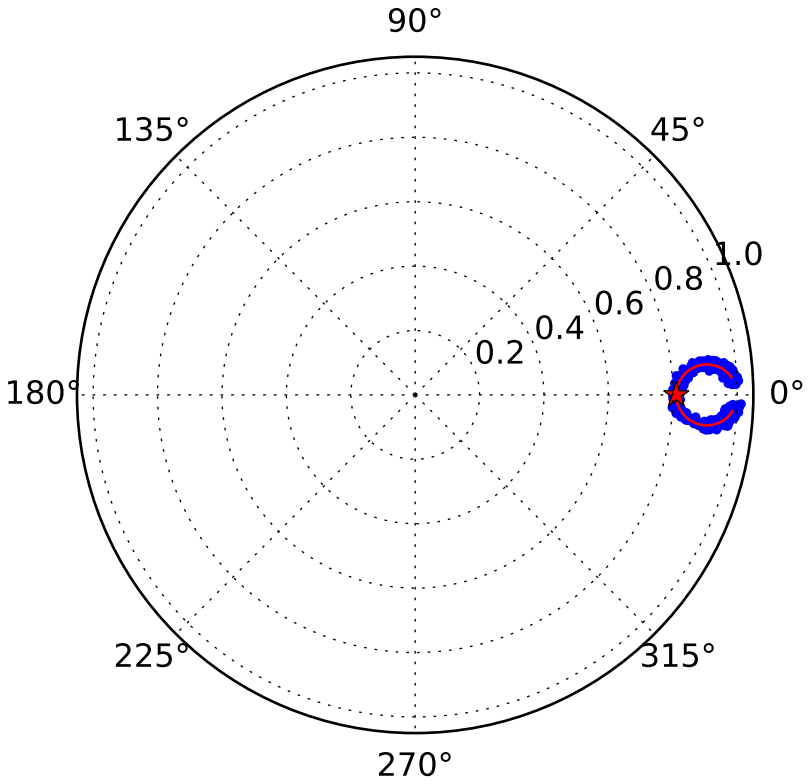


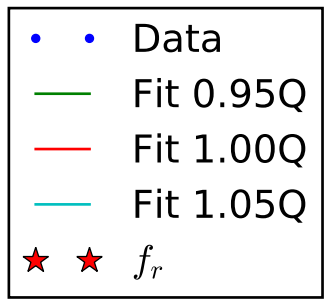
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.40857667751
Q_r = 8541.06709099
Q_c = 14904.8878516
Q_i = 20004.2791764
a = (-0.0423272857249-0.0324761816385j)
ϕ_0 = -0.971691531472
τ = 46.5892686799



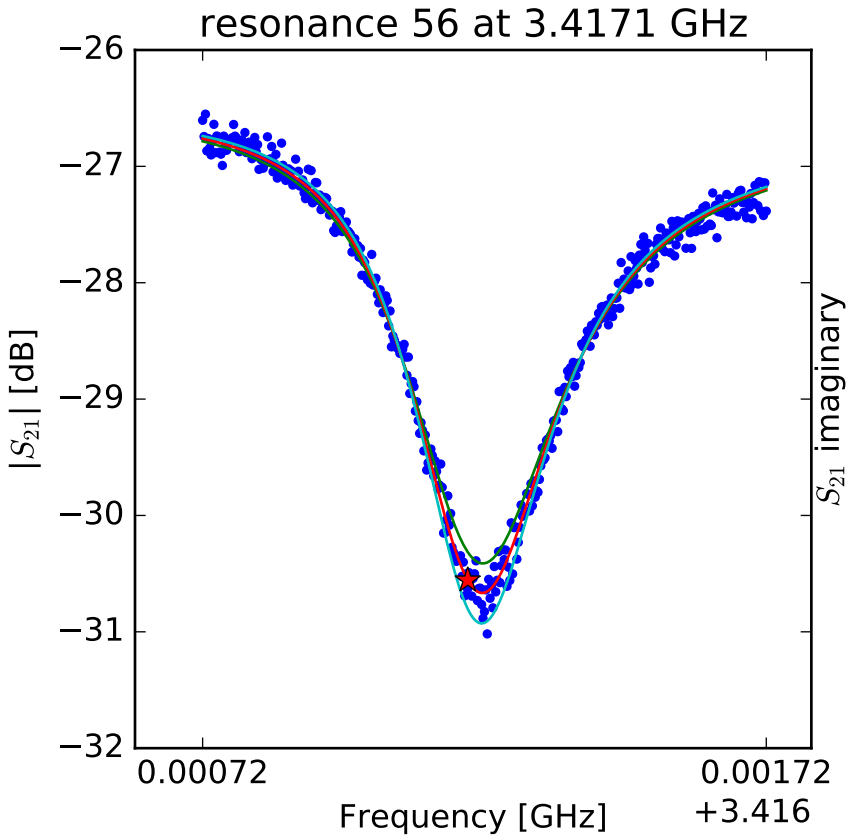


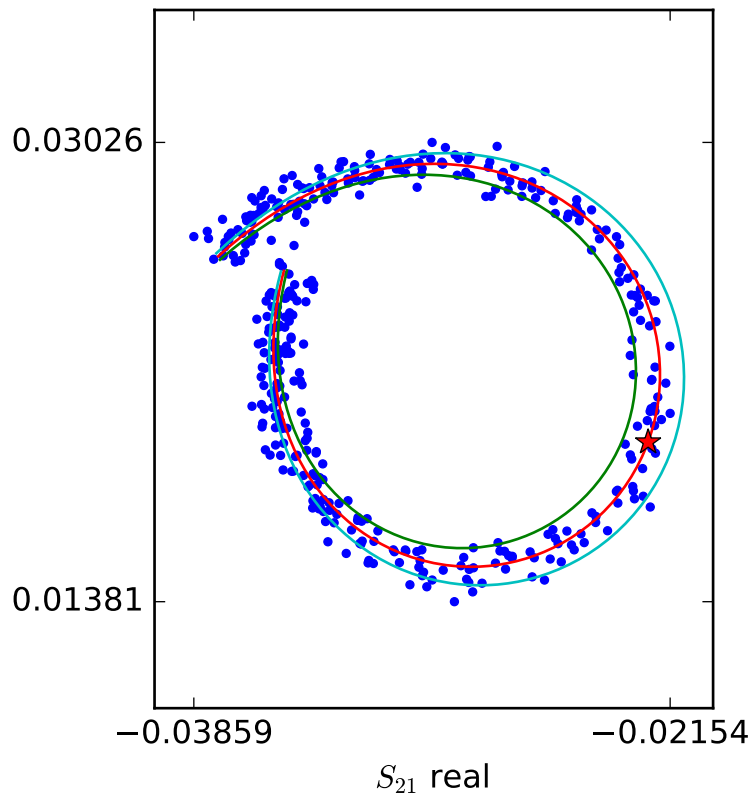


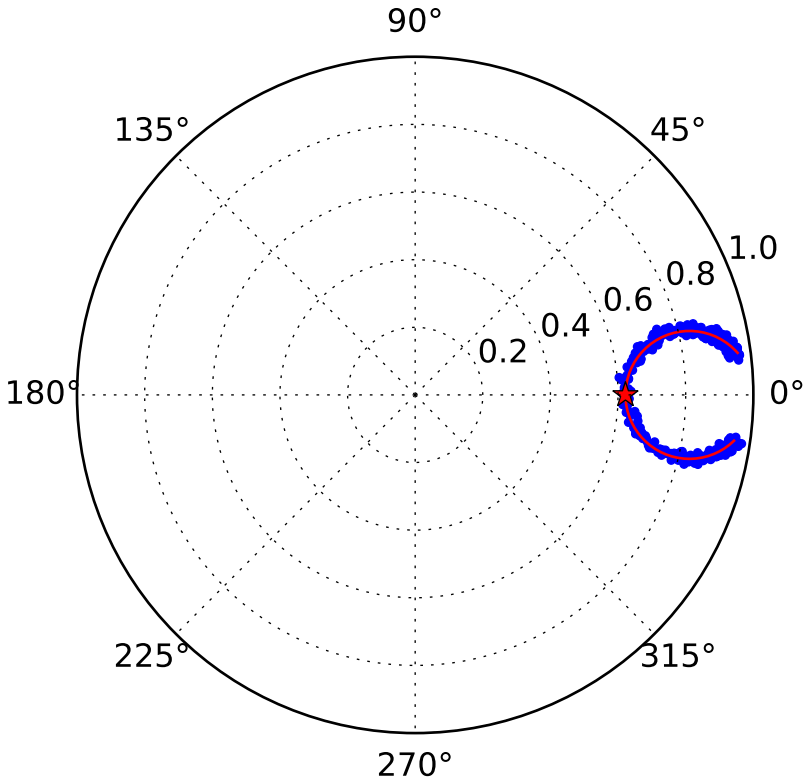


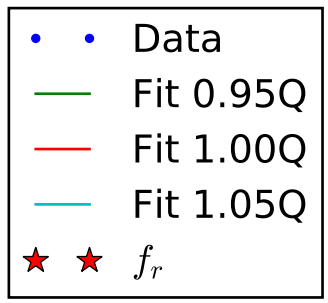
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.41356640313
Q_r = 11045.9365849
Q_c = 58409.11249
Q_i = 13622.0458239
a = (0.0500593700705+0.00309572069534j)
ϕ_0 = -1.21962050004
τ = 47.8793581369



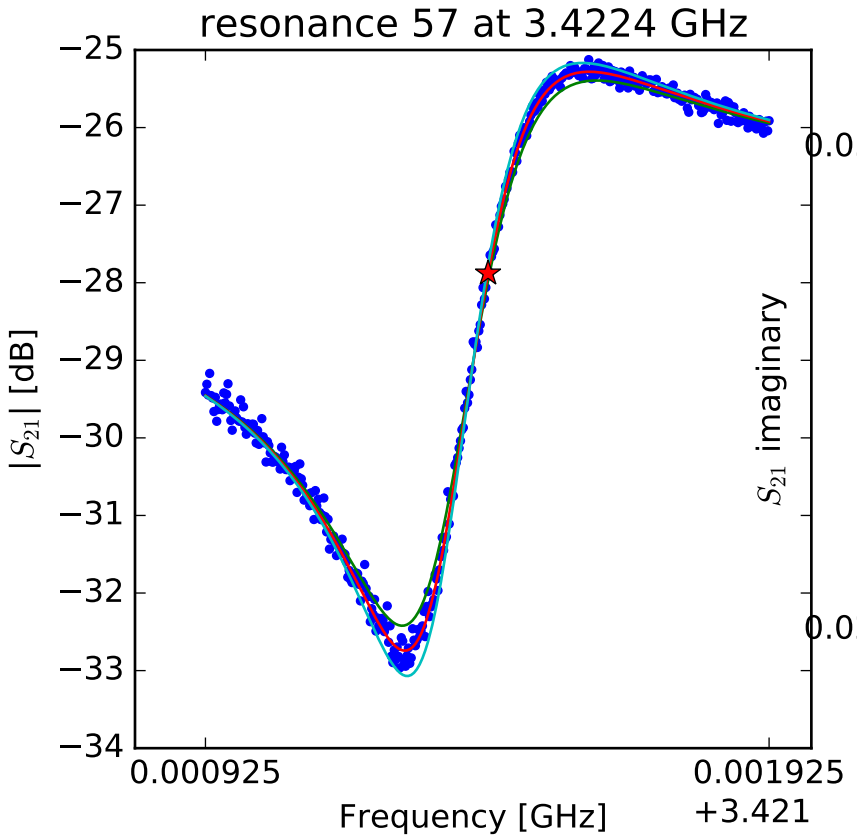


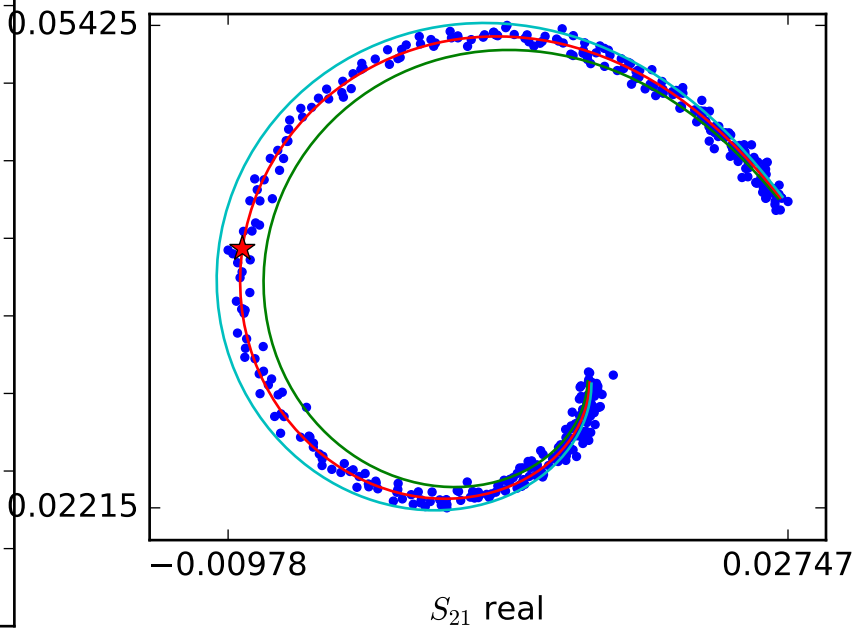


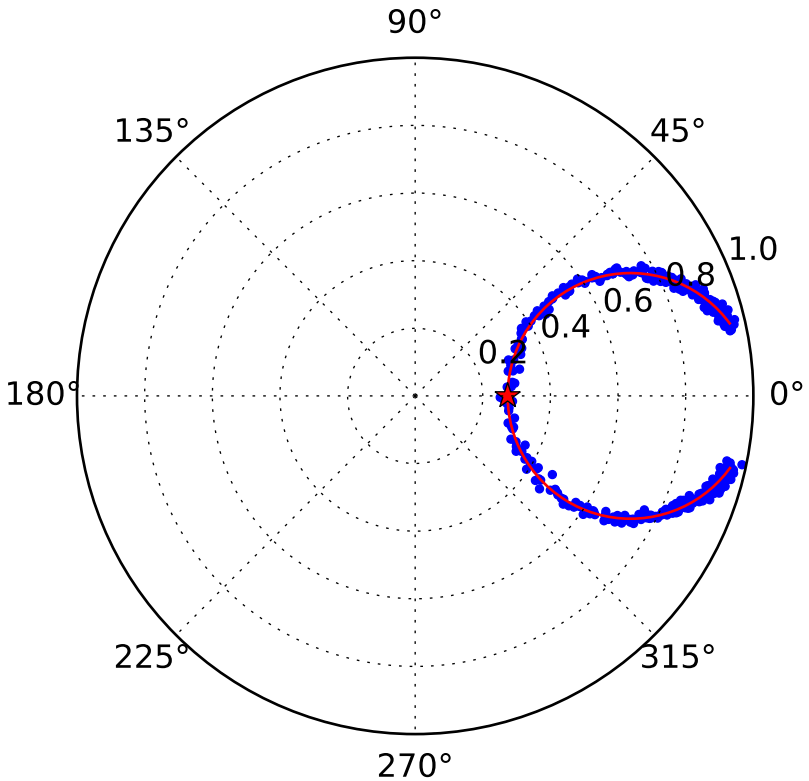


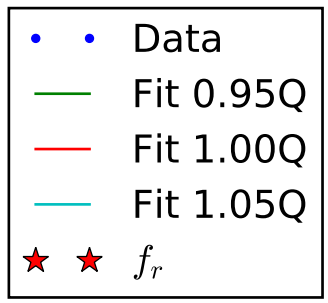
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.41719032296
Q_r = 8594.24892909
Q_c = 22722.2120893
Q_i = 13822.2576532
a = (-0.0282462318161+0.0372169090511j)
ϕ_0 = 0.208912304538
τ = 45.9289563449



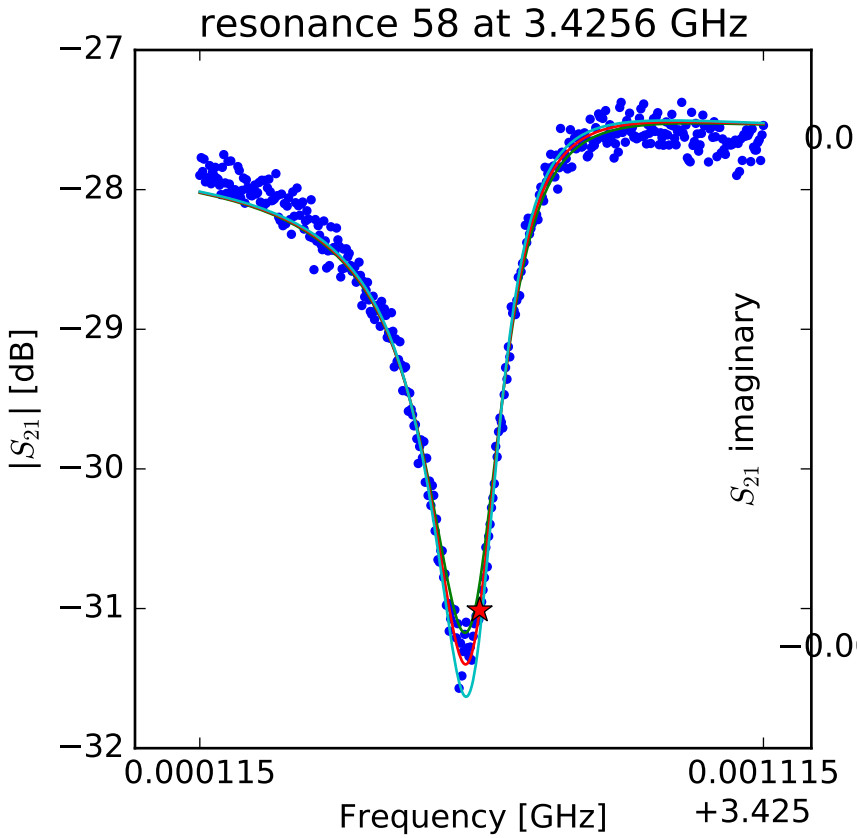


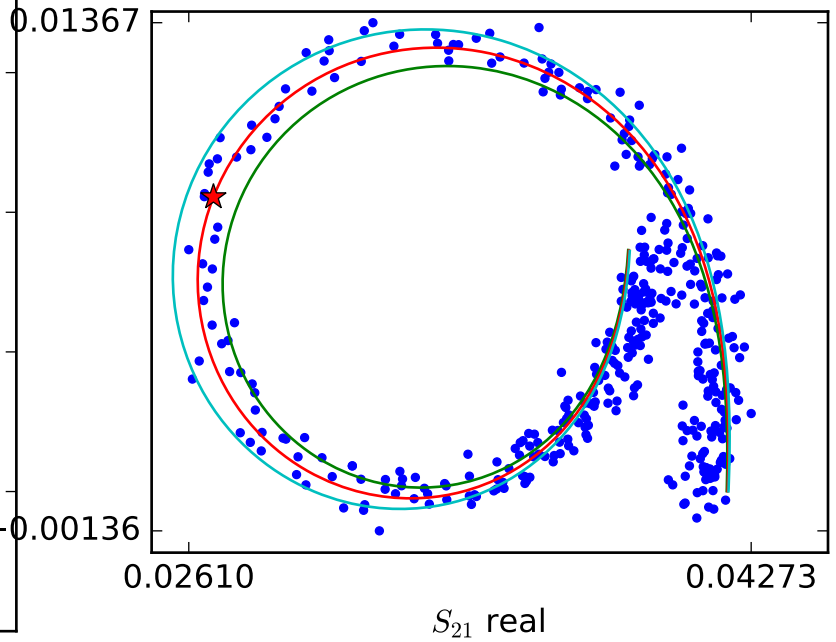


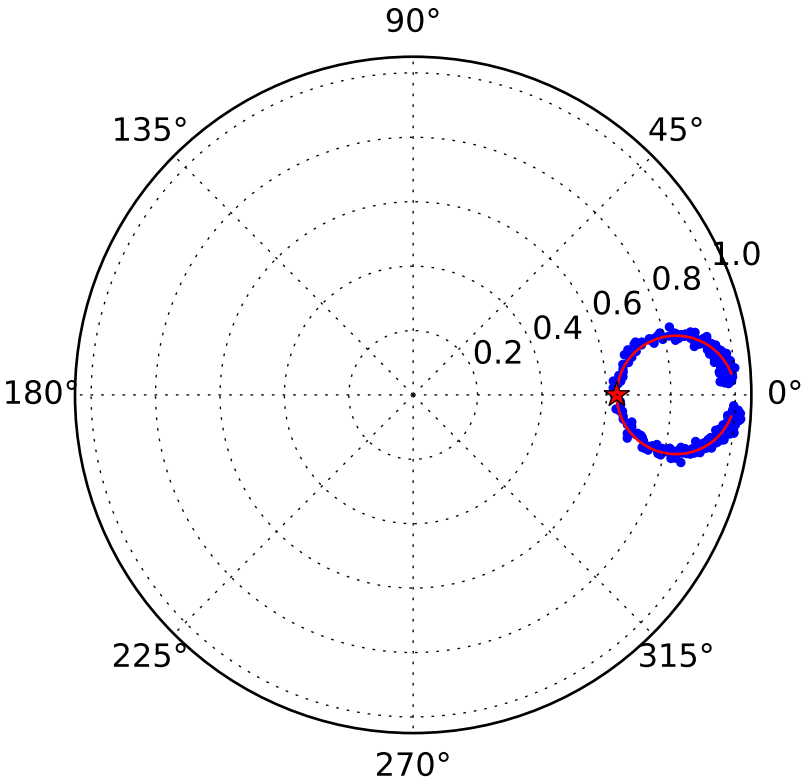


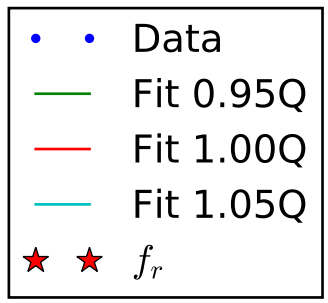
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.42242641012
Q_r = 10513.7077638
Q_c = 14469.851265
Q_i = 38454.5675702
a = (0.0370223825756+0.0222625039577j)
ϕ_0 = -1.10360383245
τ = 48.48115321



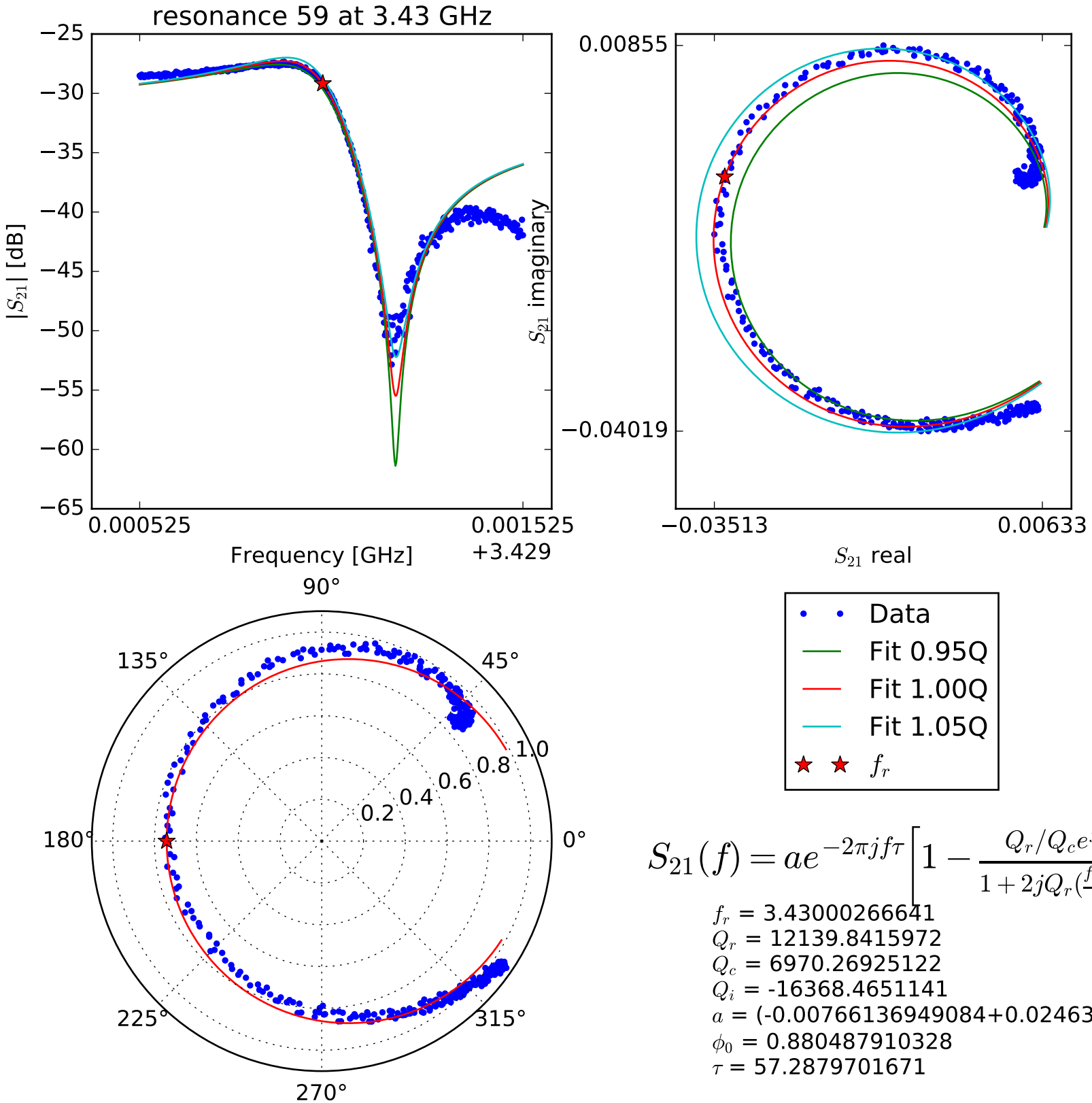






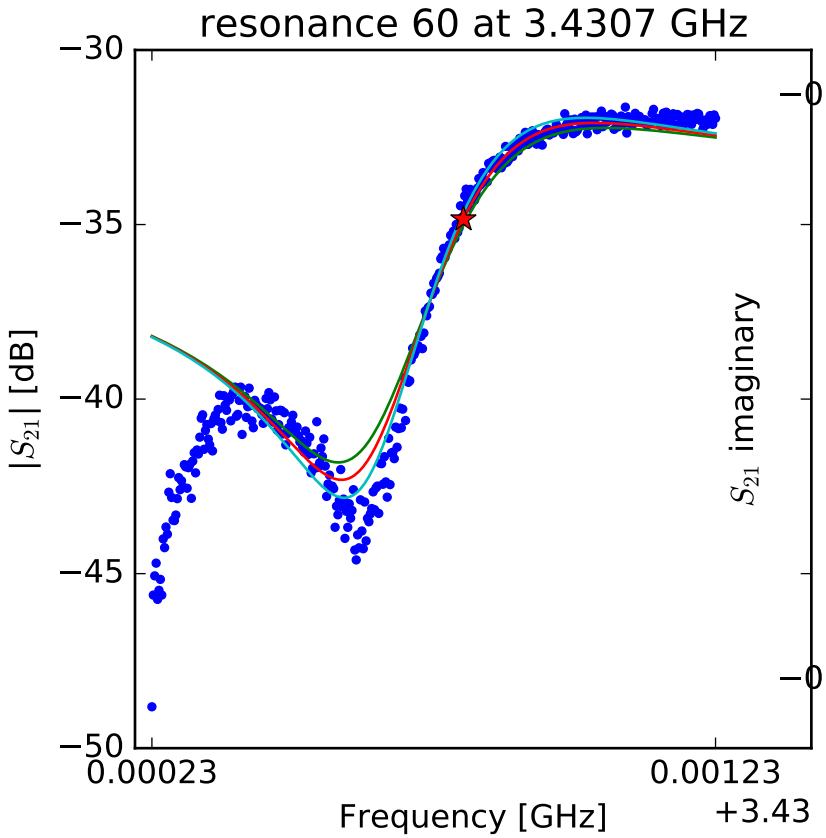
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

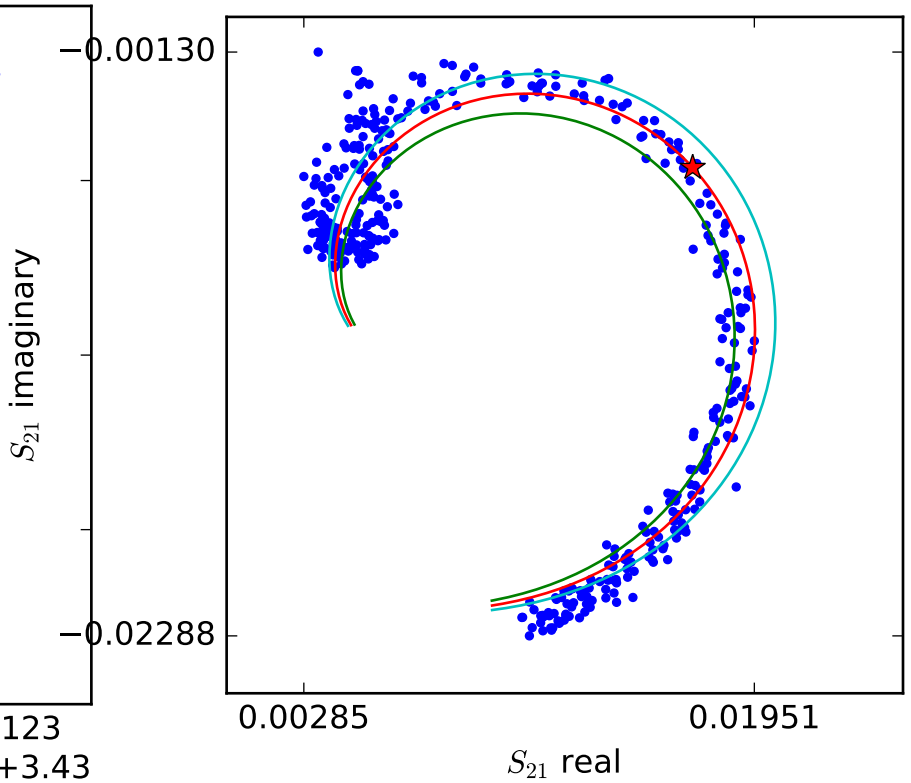
f_r = 3.42561135522
Q_r = 18181.89588
Q_c = 49433.3196274
Q_i = 28760.0167509
a = (0.0397479556504+0.0111558486887j)
ϕ_0 = -0.424096587184
τ = 48.1754165141

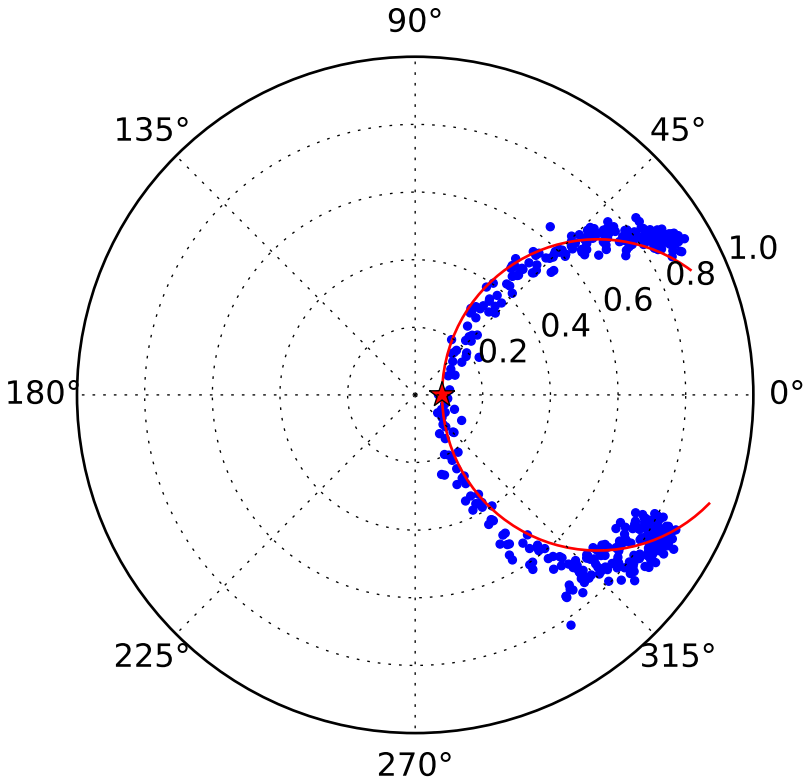


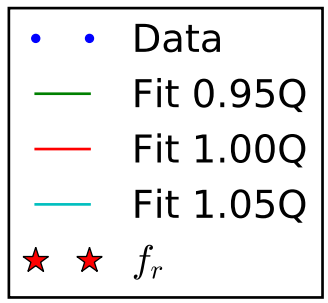
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.43000266641
Q_r = 12139.8415972
Q_c = 6970.26925122
Q_i = -16368.4651141
a = (-0.00766136949084+0.0246343977795j)
ϕ_0 = 0.880487910328
τ = 57.2879701671



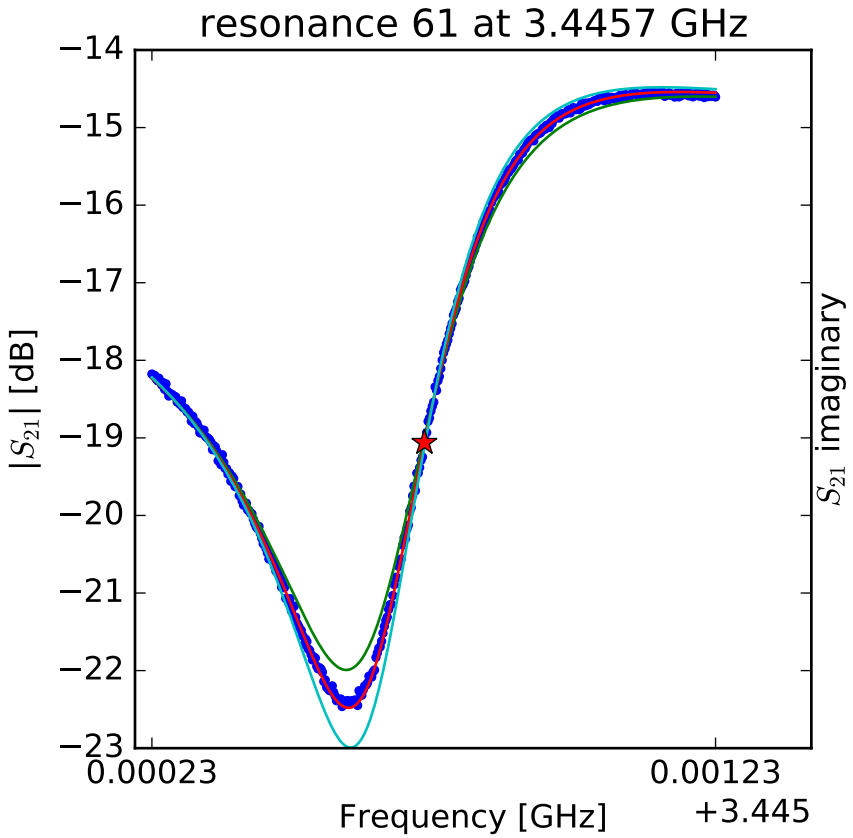


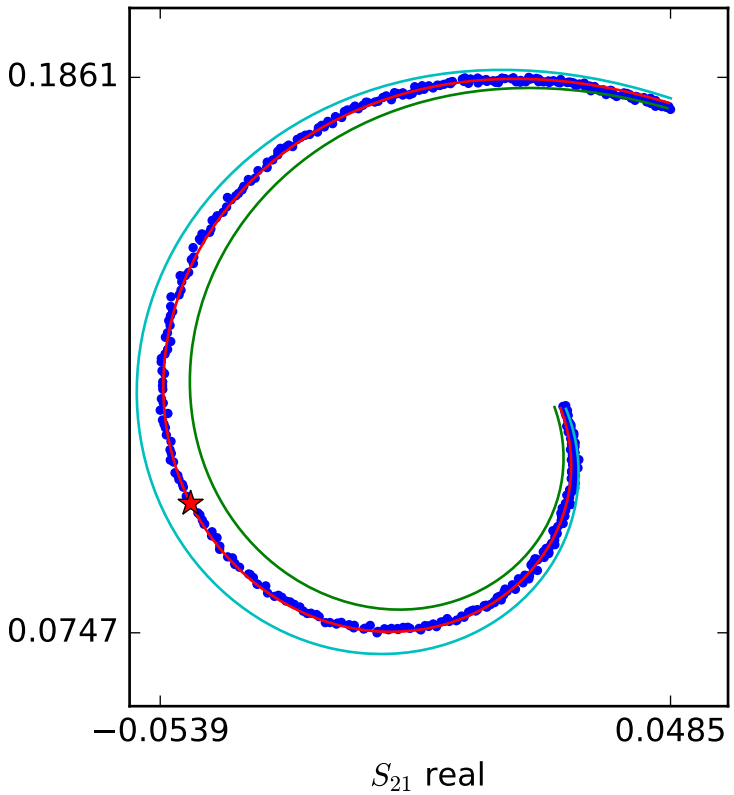


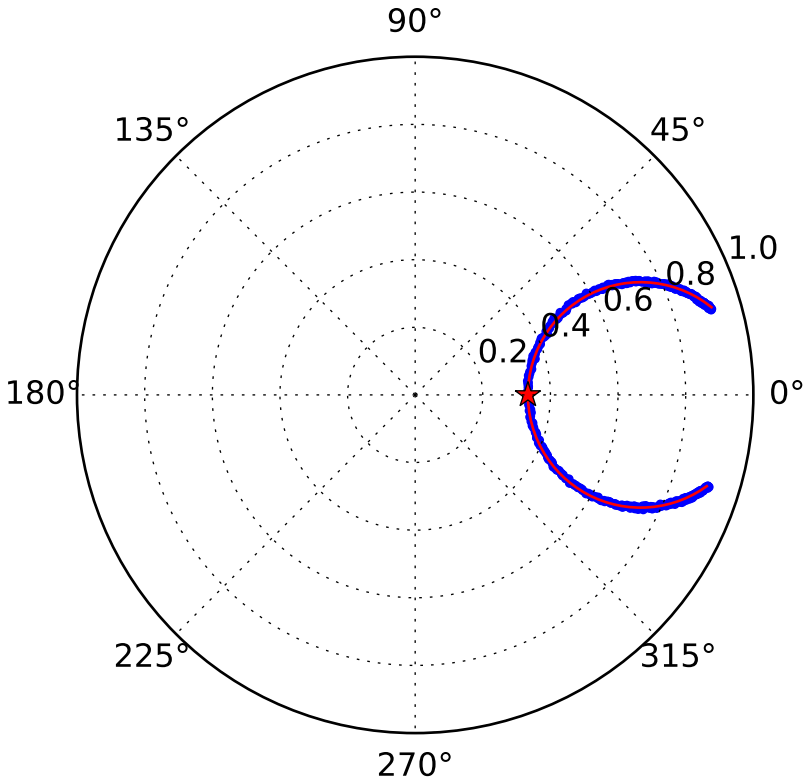


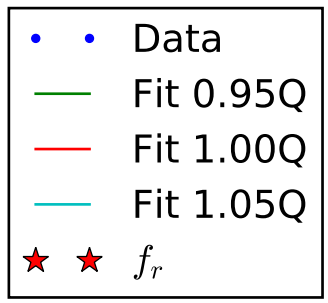
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.43078267471
Q_r = 7620.31291419
Q_c = 8278.33023198
Q_i = 95869.0068933
a = (-0.0149978688239+0.0111565248583j)
ϕ_0 = -1.05414754548
τ = 47.9781991523



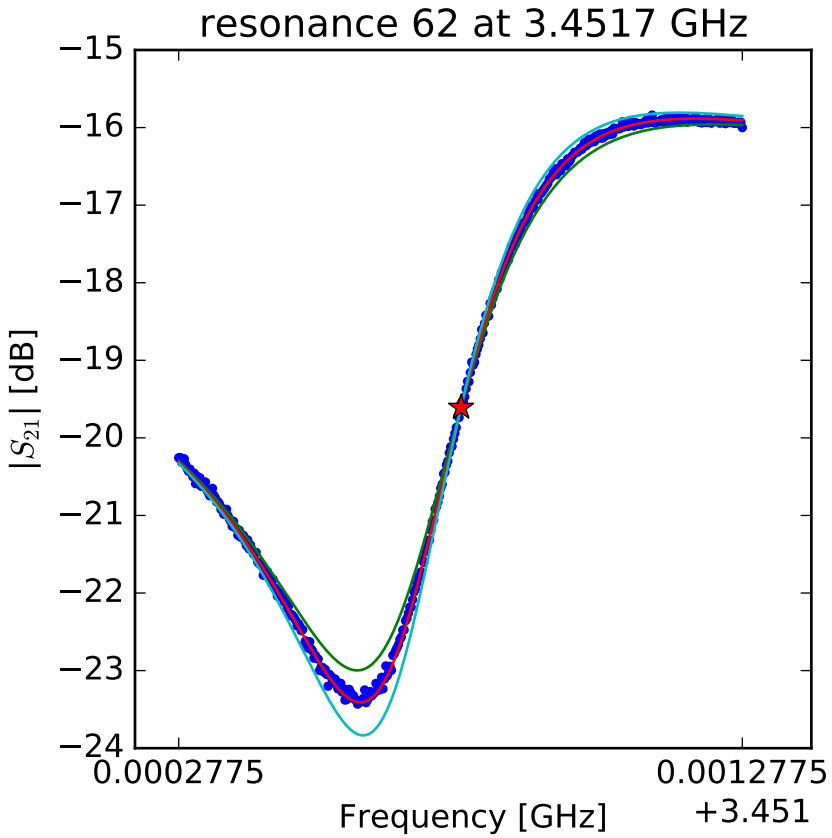


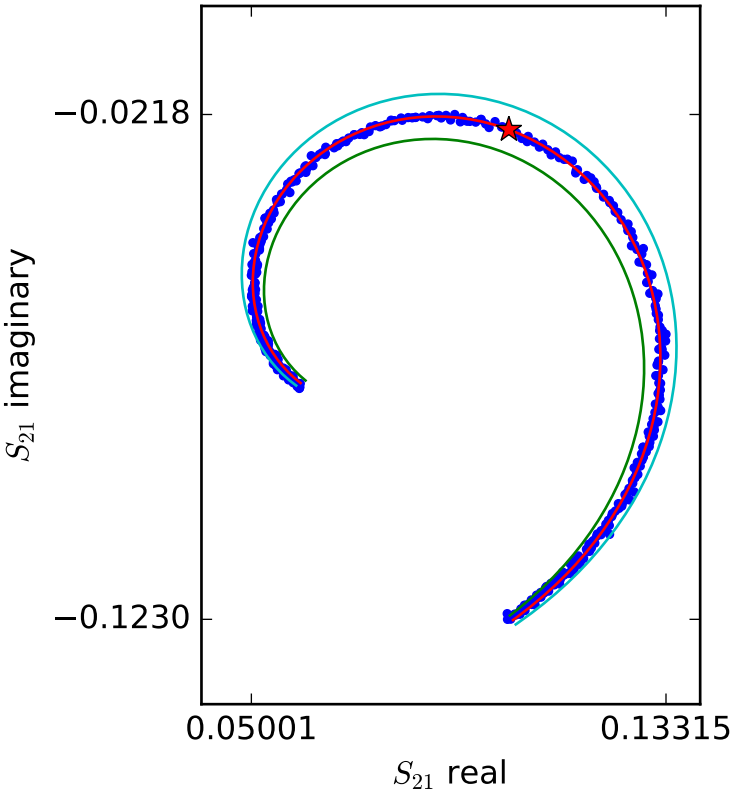


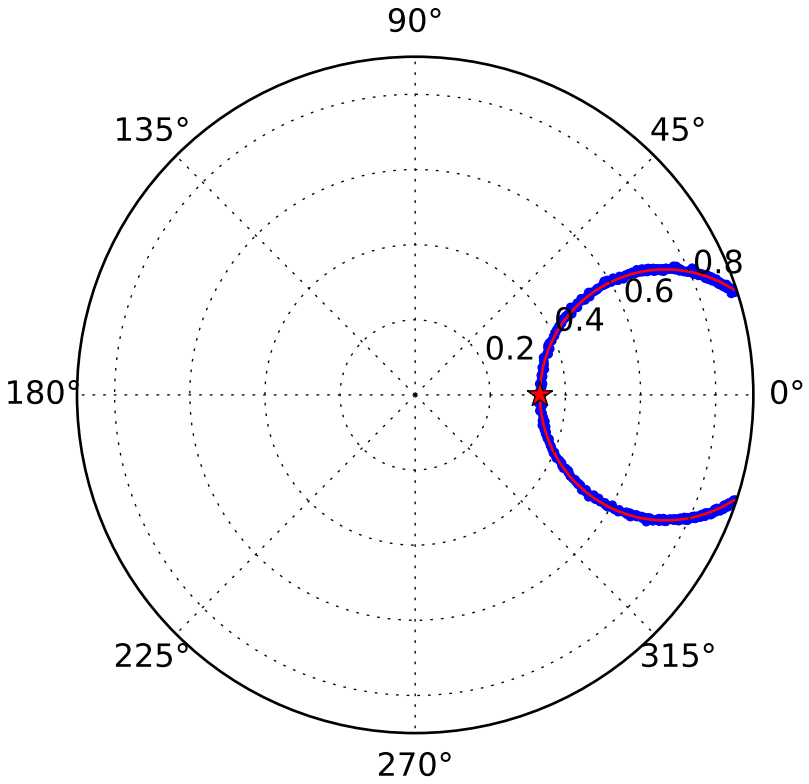


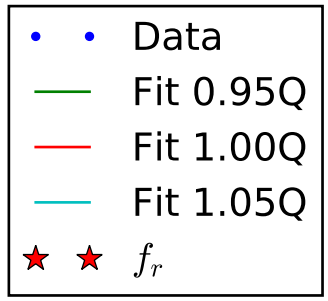
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.4457135157
Q_r = 6981.34912272
Q_c = 10471.1348152
Q_i = 20947.6037494
a = (0.168463344094+0.00194357585616j)
ϕ_0 = -0.714669870963
τ = 71.9143356297



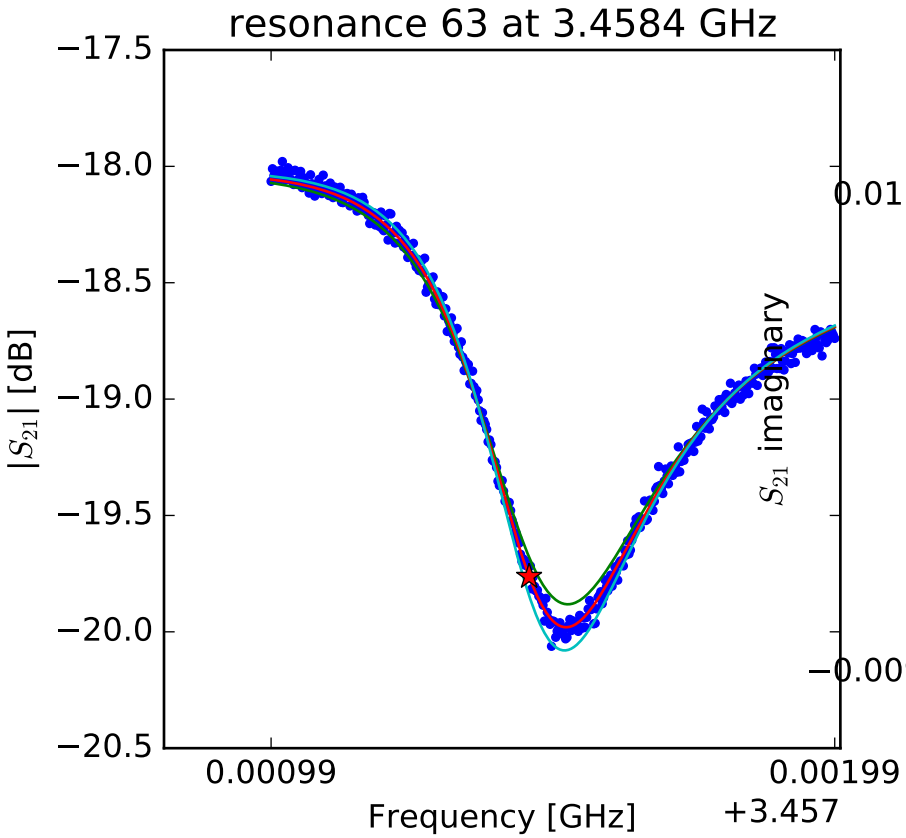


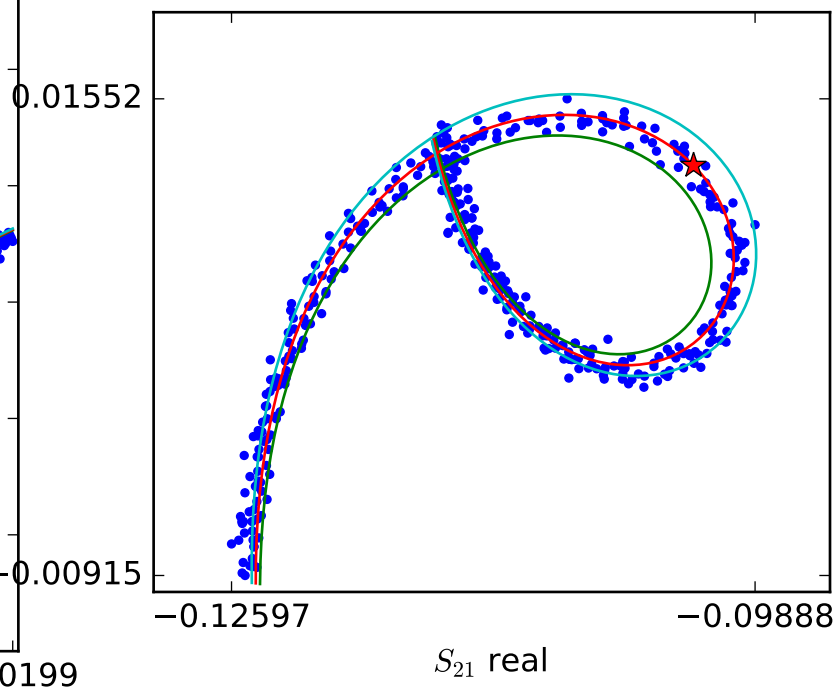


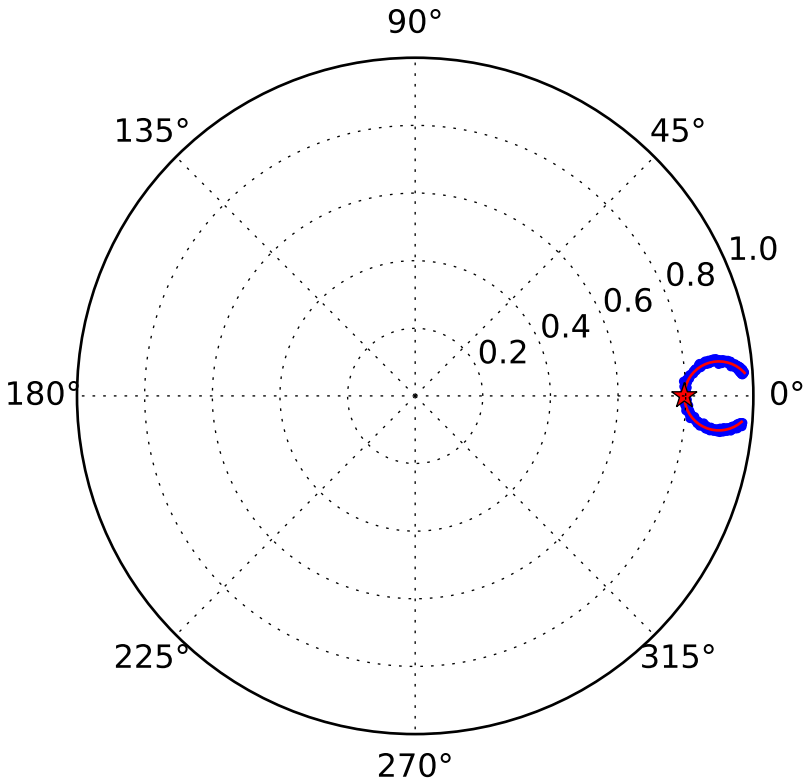


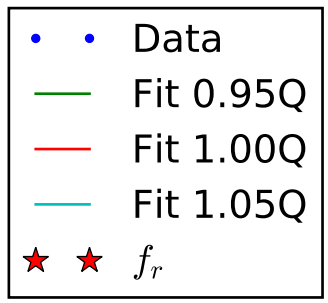
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.45177858062
Q_r = 6327.17843608
Q_c = 9471.50788121
Q_i = 19059.0462828
a = (-0.0452003046655+0.131802640455j)
ϕ_0 = -0.849236313403
τ = 54.5970871249



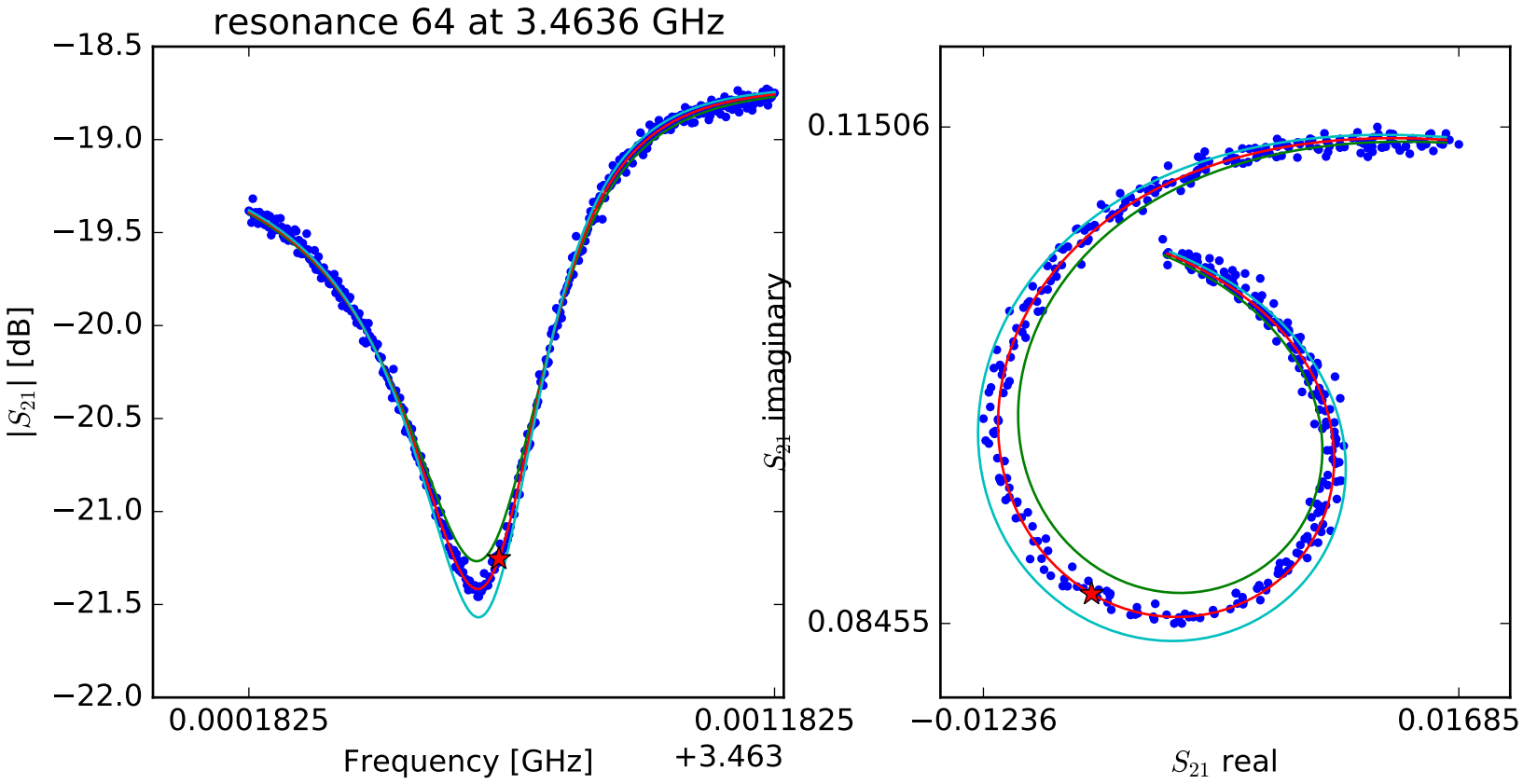


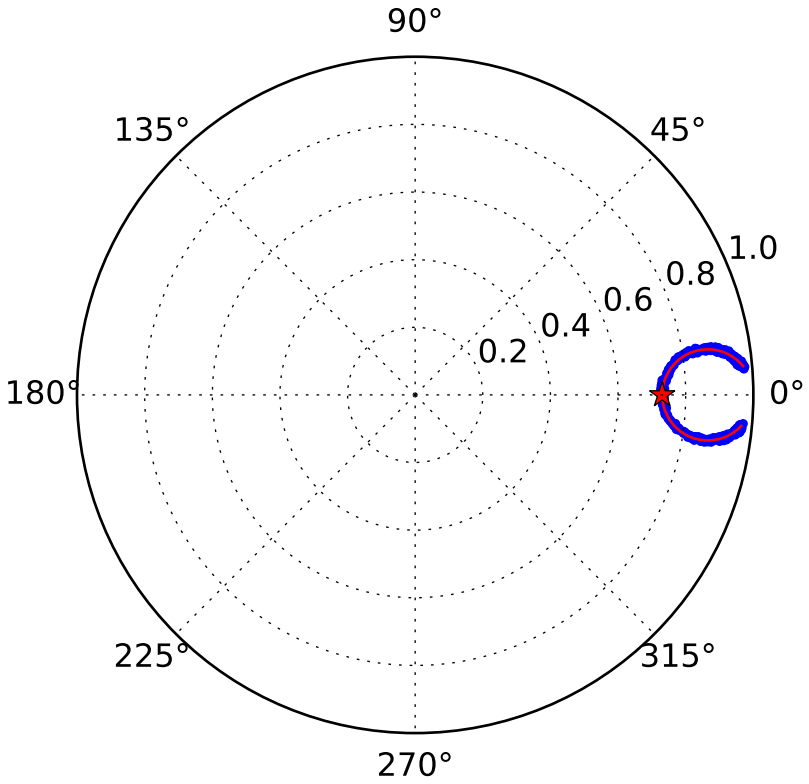


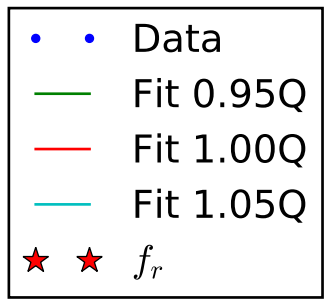


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.45844787059
Q_r = 8350.26266902
Q_c = 40910.1541077
Q_i = 10491.7589567
a = (-0.122849743928-0.0107449753319j)
ϕ_0 = 0.554136116575
τ = 51.1825122581

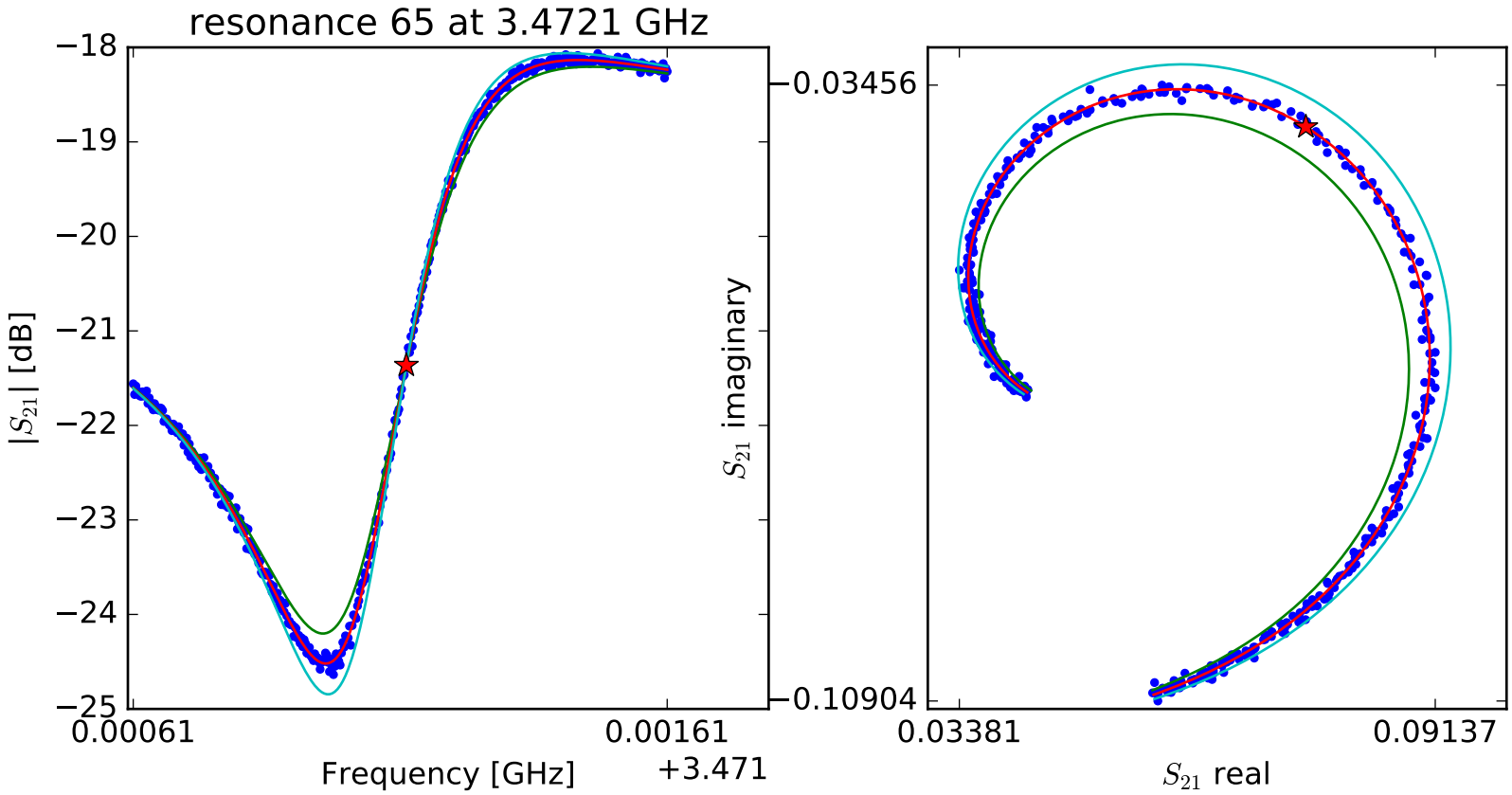


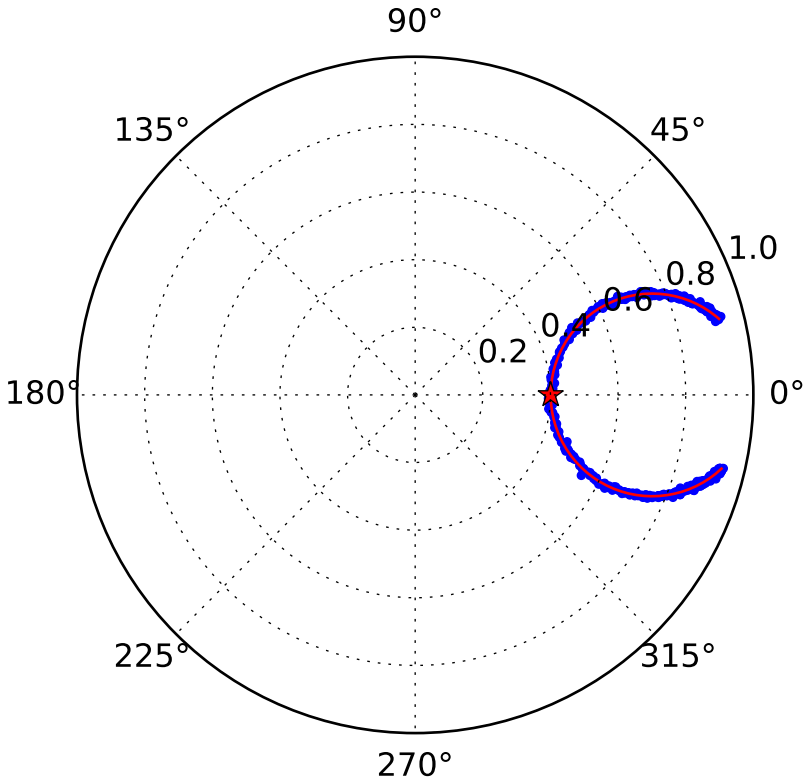


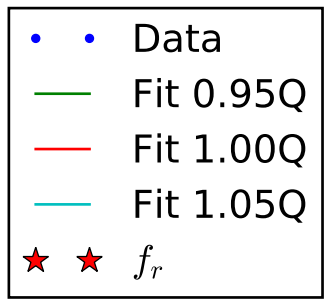


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.46365815597
Q_r = 9245.53182275
Q_c = 34304.250573
Q_i = 12656.7141556
a = (0.0773195789478+0.0846430571j)
ϕ_0 = -0.37018072047
τ = 50.4935170608

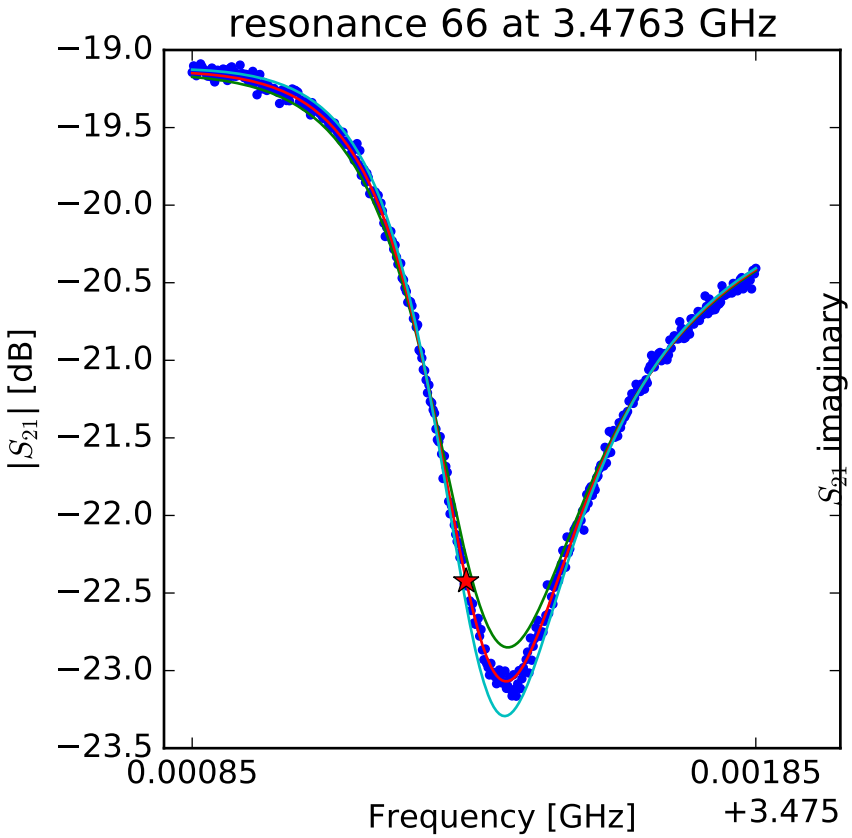


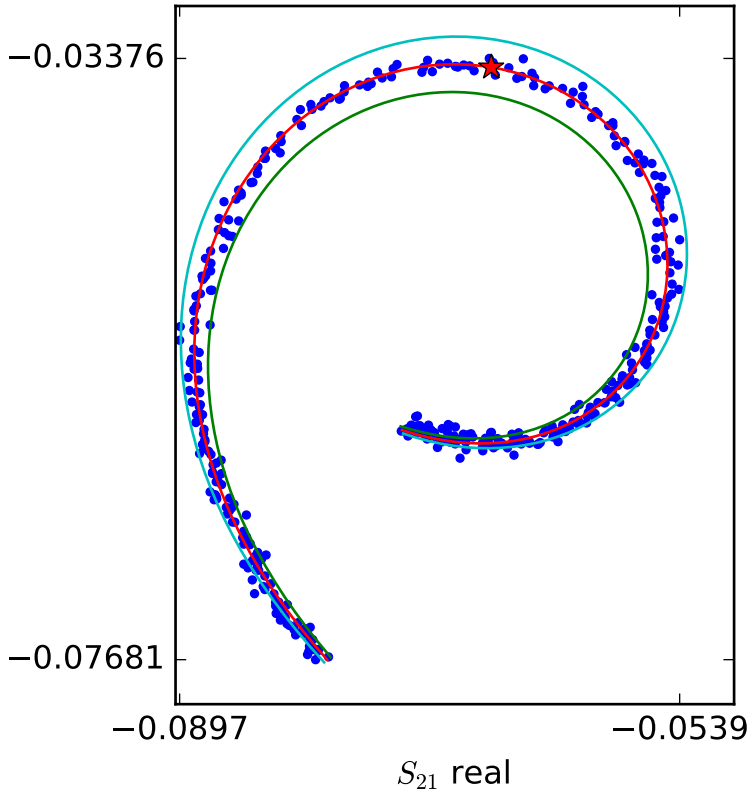


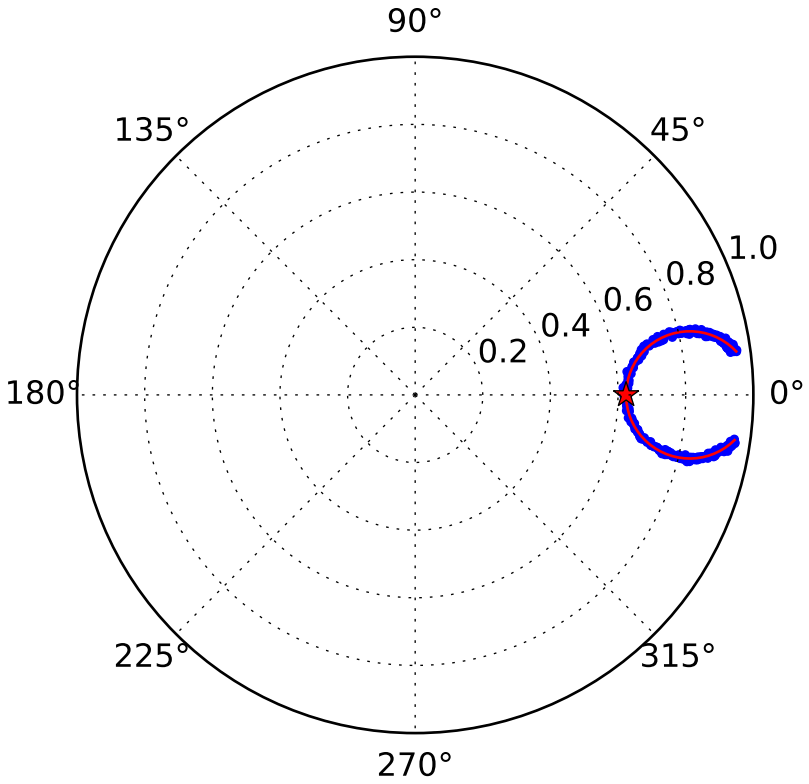


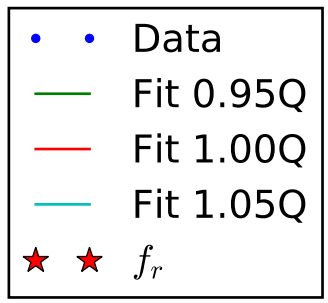
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.4721214327
Q_r = 7862.63687669
Q_c = 13119.3132731
Q_i = 19623.1208769
a = (-0.0942261312406-0.0521503200365j)
ϕ_0 = -0.916507206808
τ = 49.4681521638



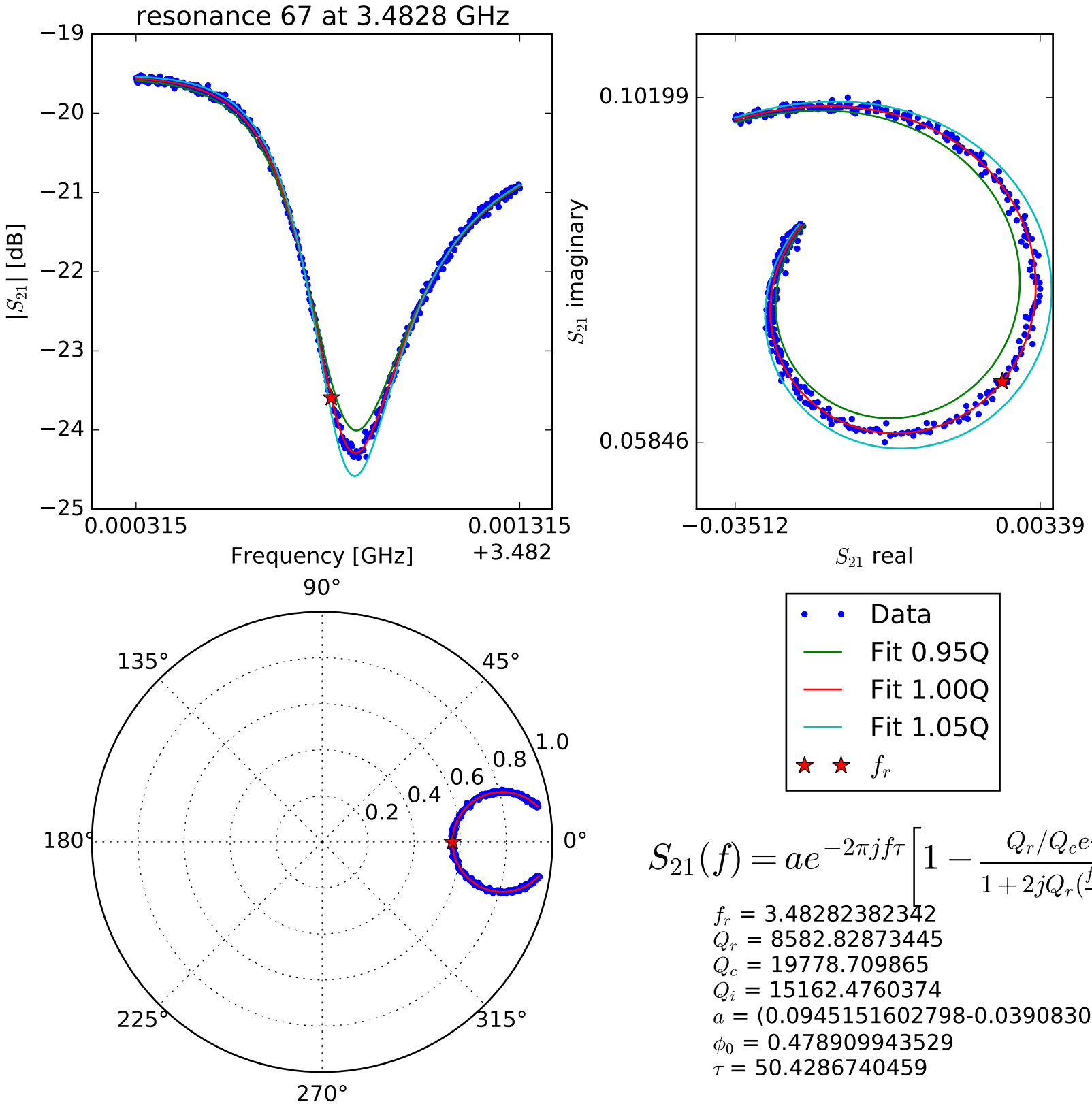






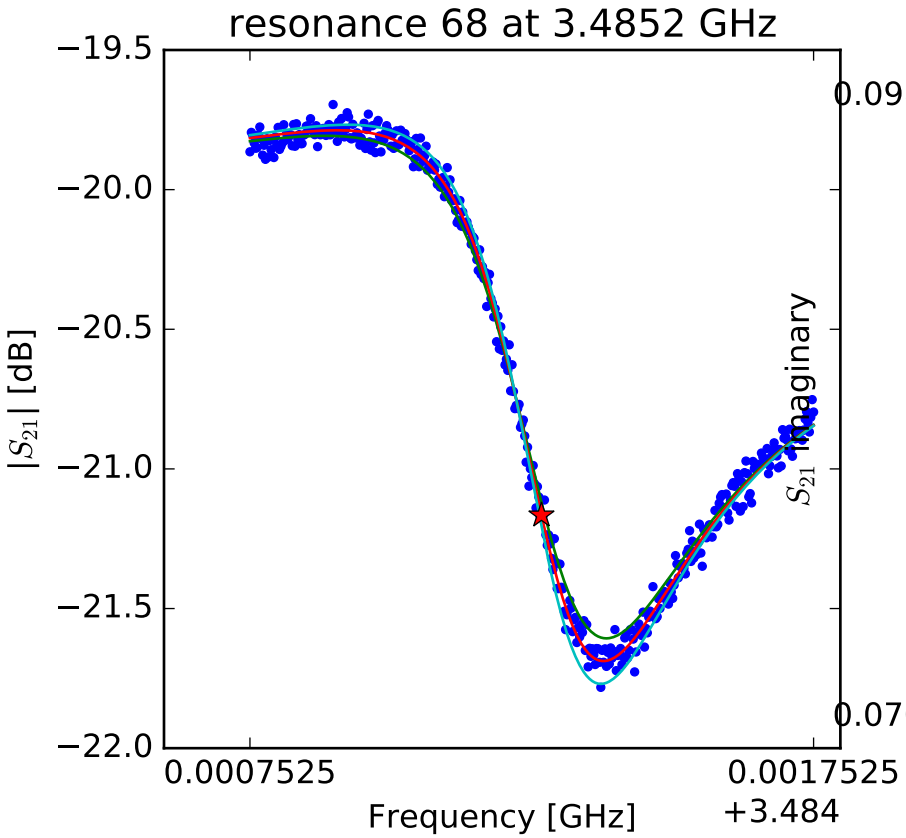
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

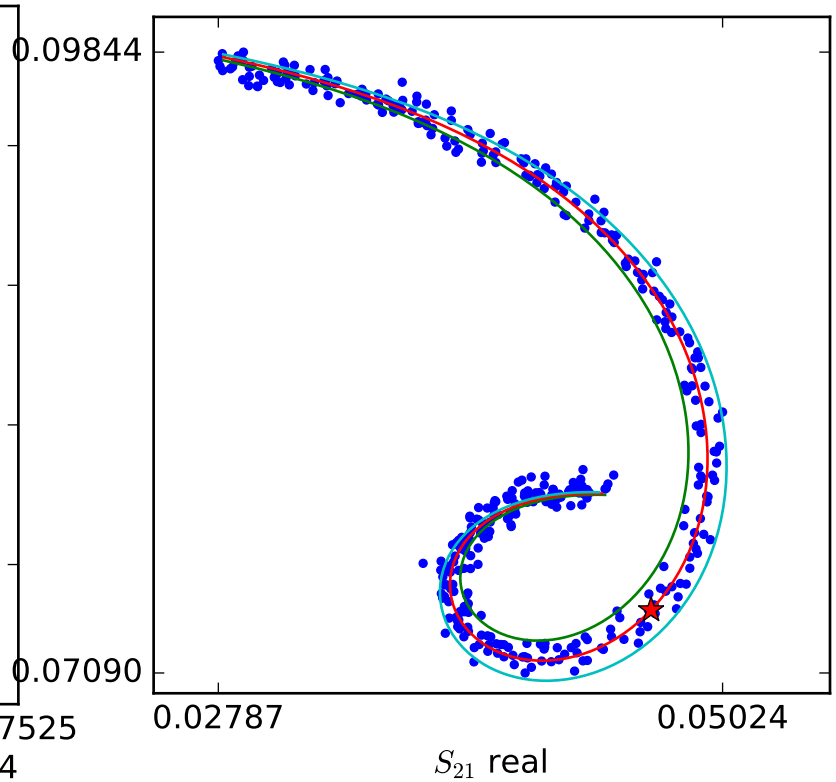
f_r = 3.47633614815
Q_r = 8573.11991515
Q_c = 22781.3869452
Q_i = 13746.0509225
a = (-0.106596357744-0.00589400323414j)
ϕ_0 = 0.555676242832
τ = 50.3082844159

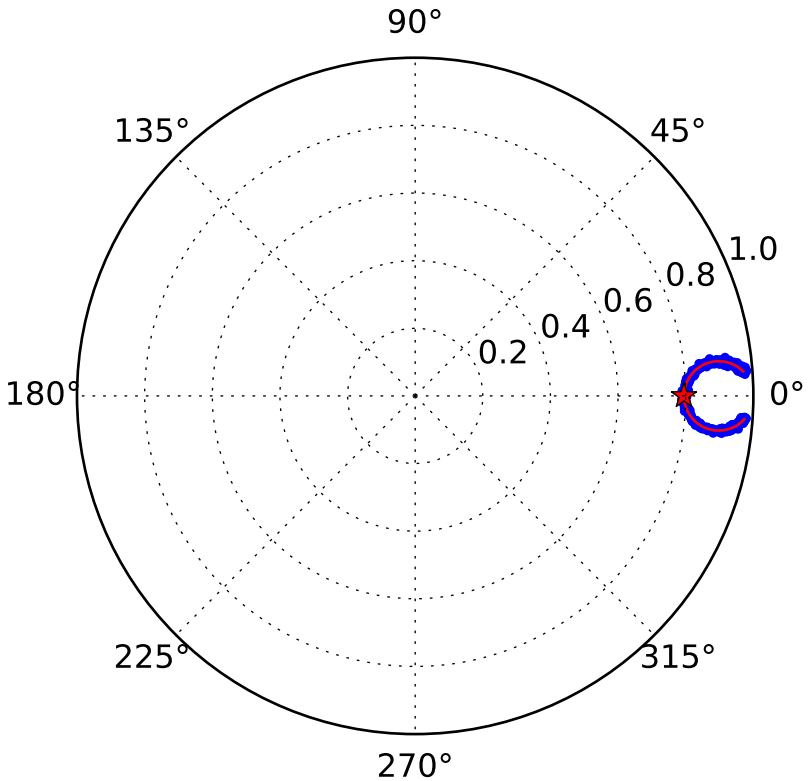


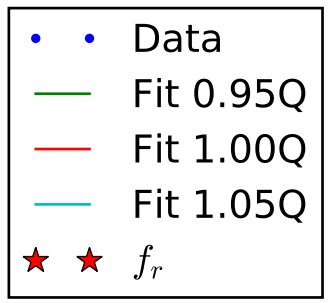
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.48282382342
Q_r = 8582.82873445
Q_c = 19778.709865
Q_i = 15162.4760374
a = (0.0945151602798-0.0390830261851j)
ϕ_0 = 0.478909943529
τ = 50.4286740459



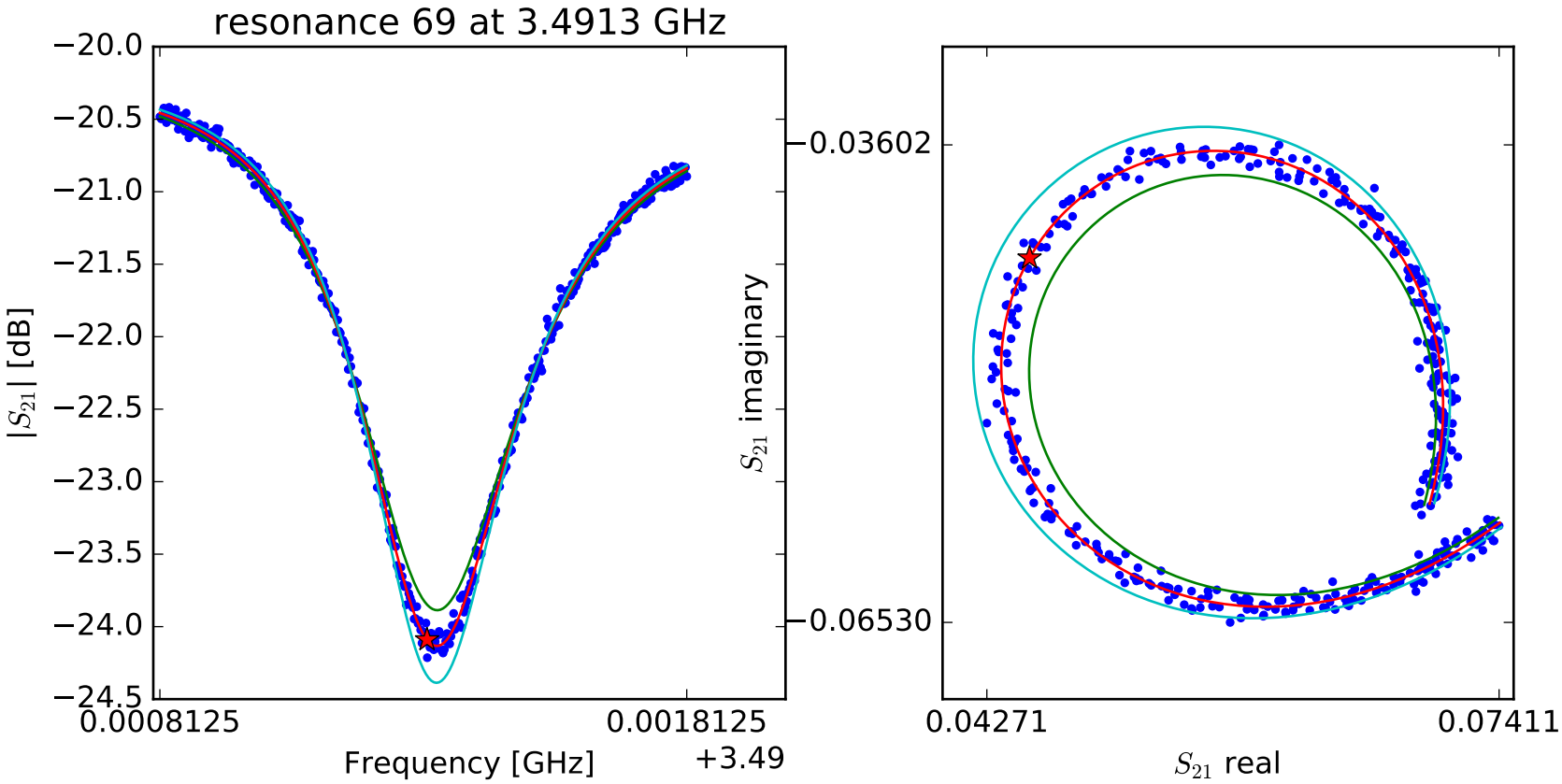


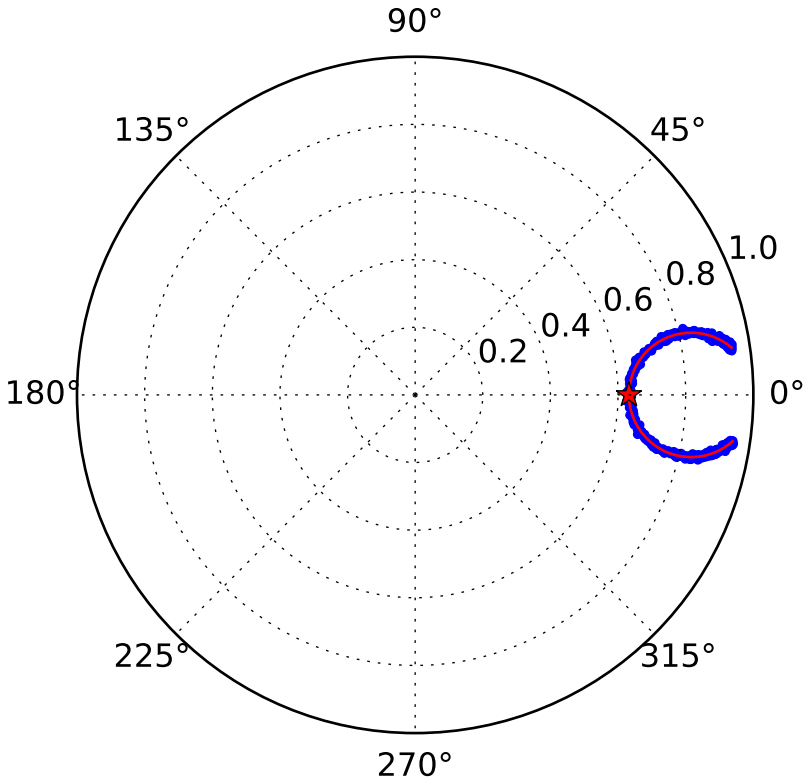


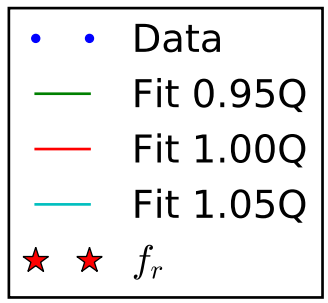


$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.48526969536
Q_r = 8721.27110708
Q_c = 42505.279613
Q_i = 10972.6489952
a = (-0.0502177500086+0.0843431477445j)
ϕ_0 = 0.919950180061
τ = 51.1141498667

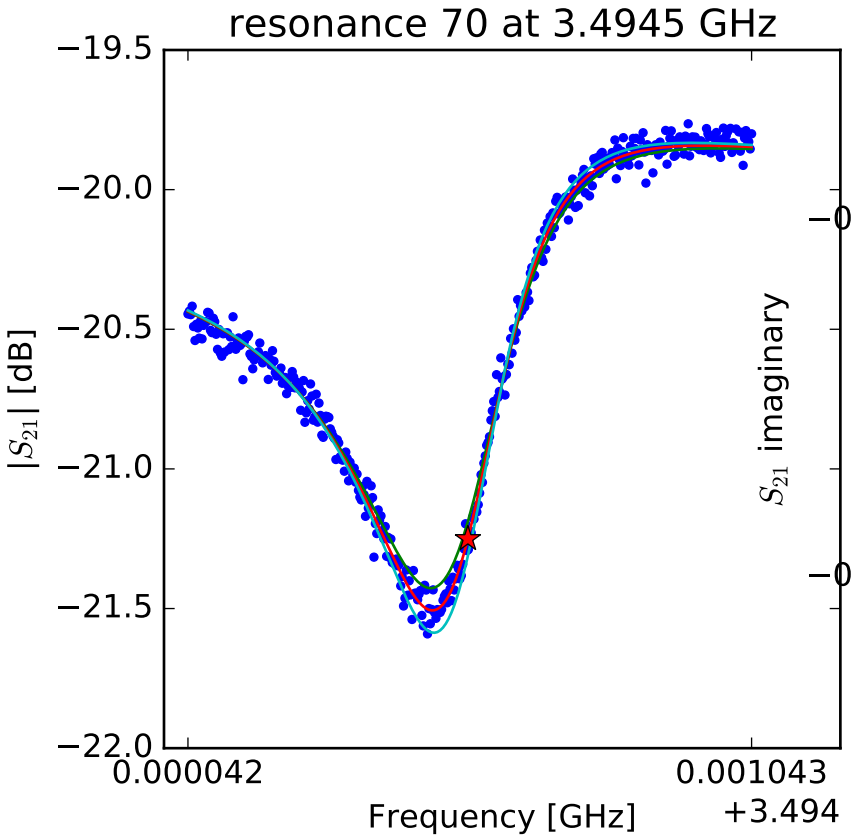


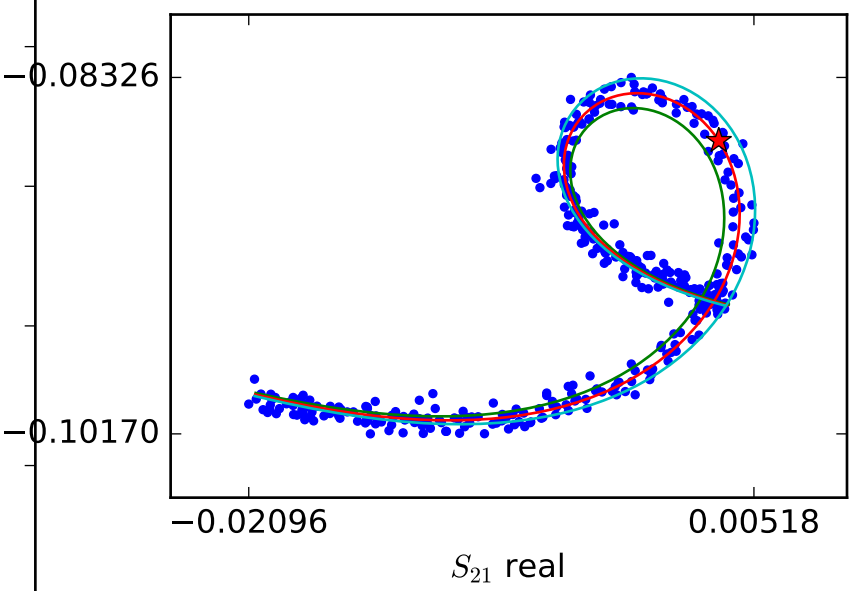


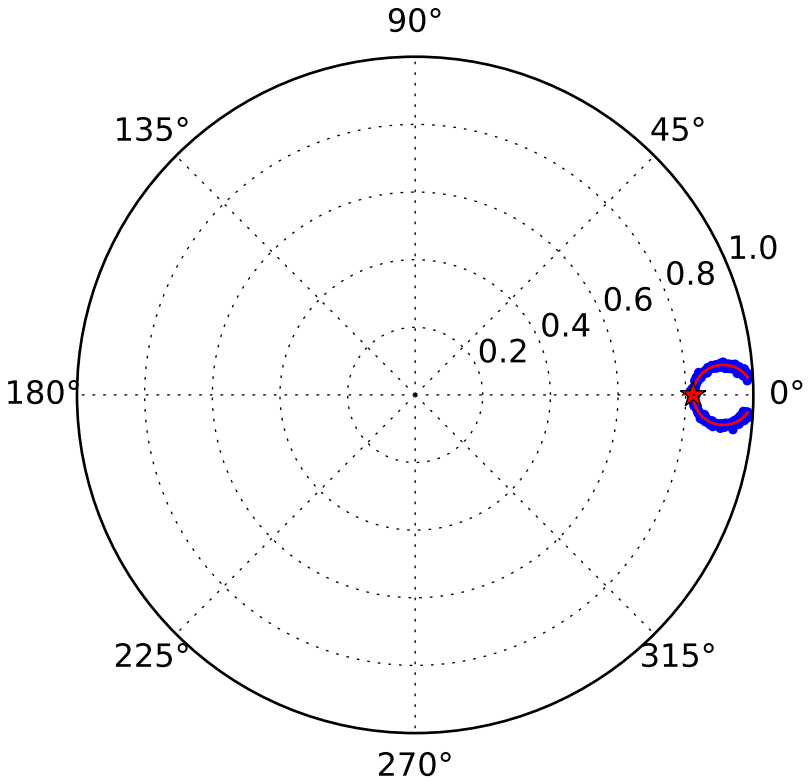


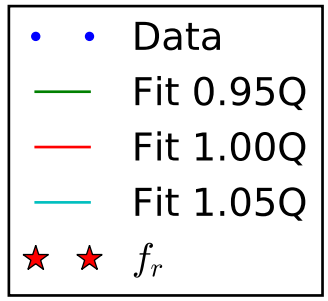
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.49131952141
Q_r = 7688.83457962
Q_c = 20896.1600067
Q_i = 12165.0002893
a = (0.0925756294993+0.0321241886939j)
ϕ_0 = 0.134156626295
τ = 49.3113160873



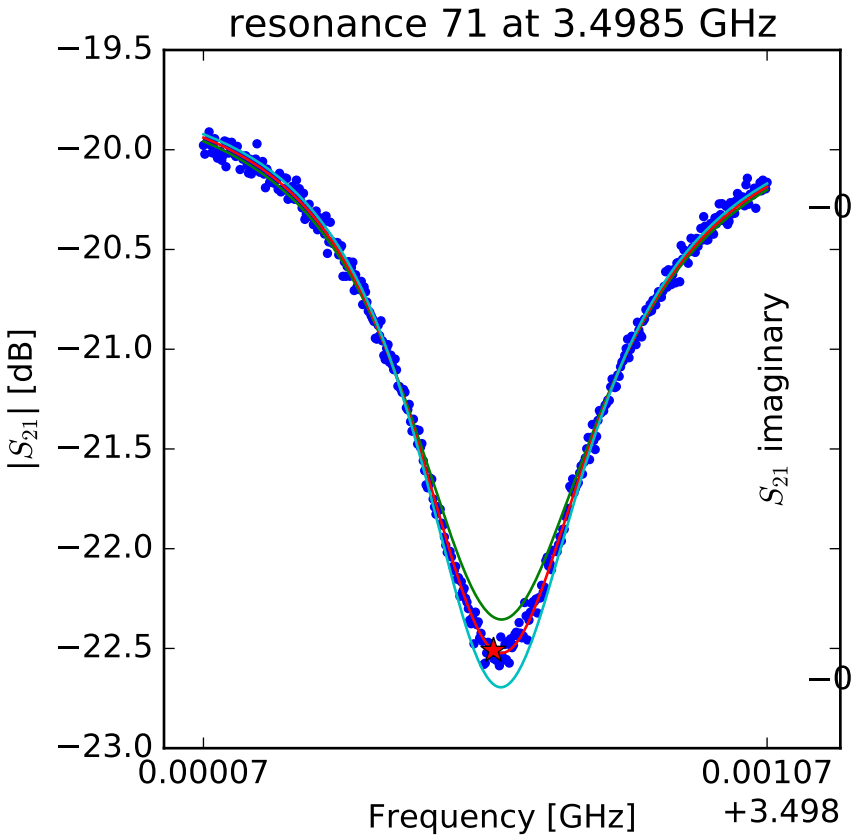


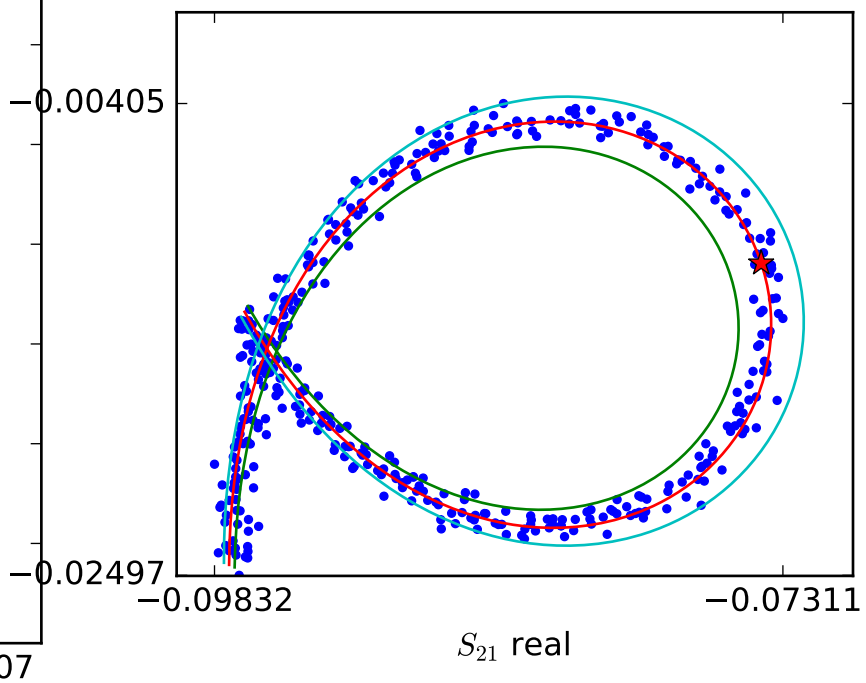


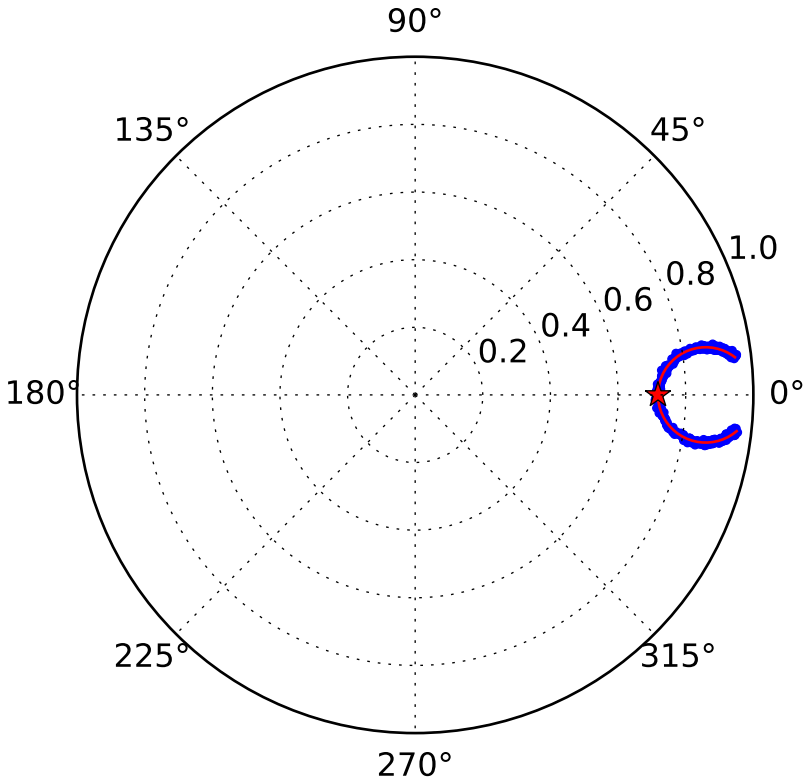


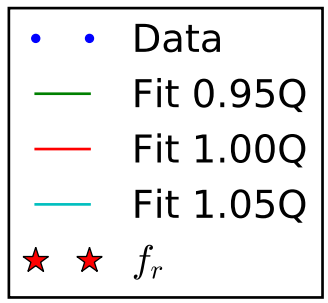
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.49453912198
Q_r = 10756.0071882
Q_c = 60390.7989311
Q_i = 13086.8659783
a = (0.0496178317667-0.086474235836j)
ϕ_0 = -0.678433612312
τ = 51.8229321251



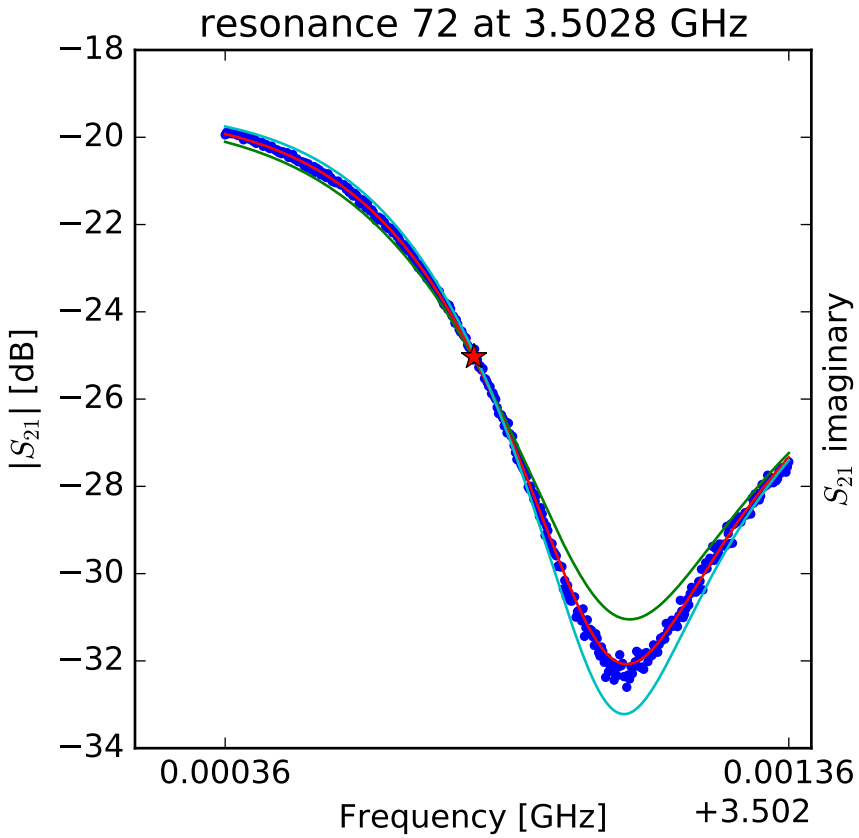


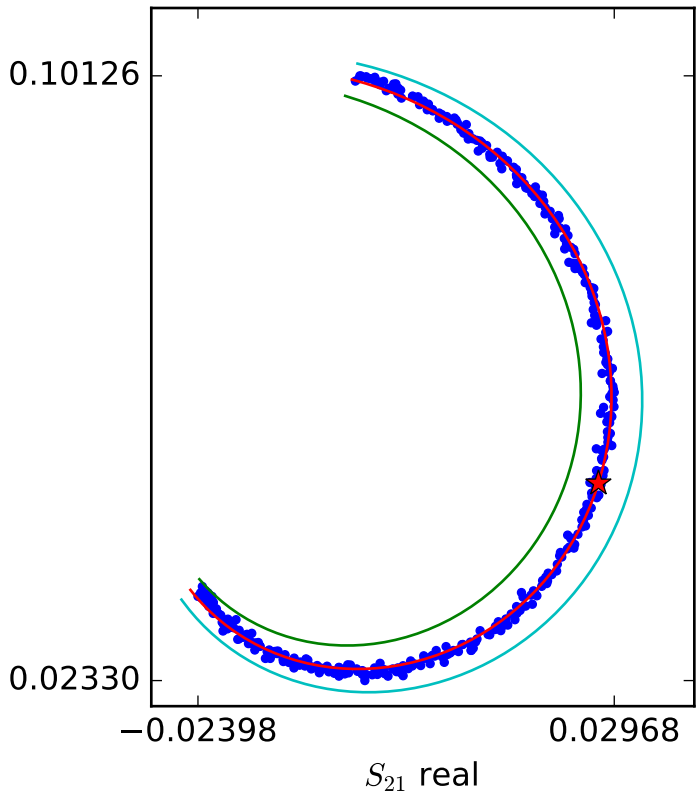


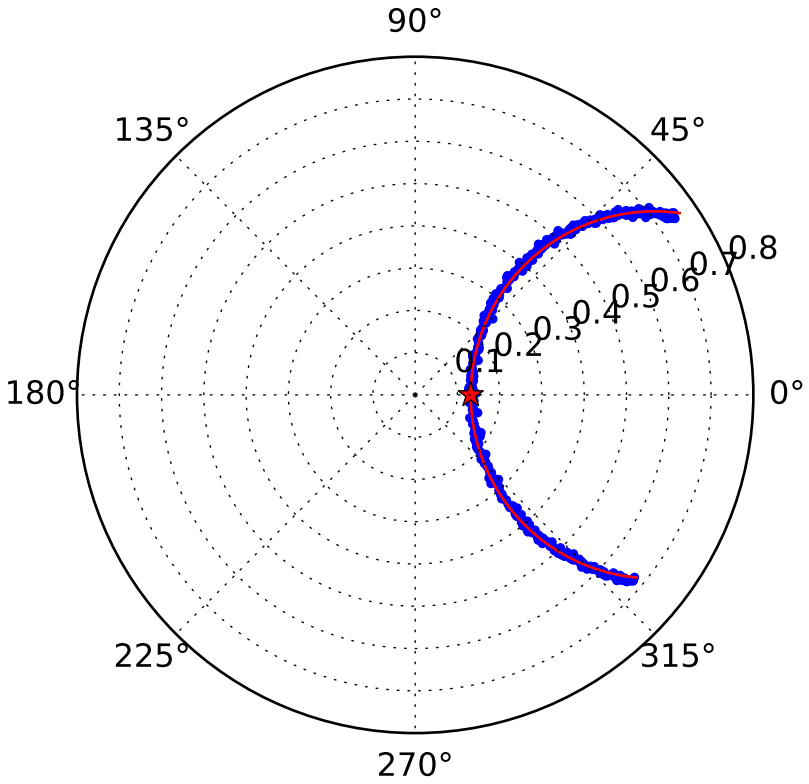


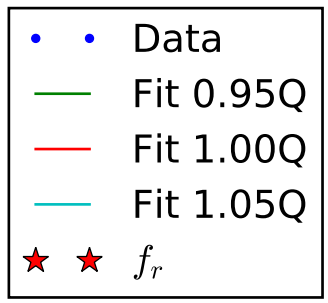
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.49858458508
Q_r = 7367.33628049
Q_c = 26119.1998175
Q_i = 10261.8562711
a = (-0.100582922026-0.0266578914123j)
ϕ_0 = 0.0986186900539
τ = 53.7392617936



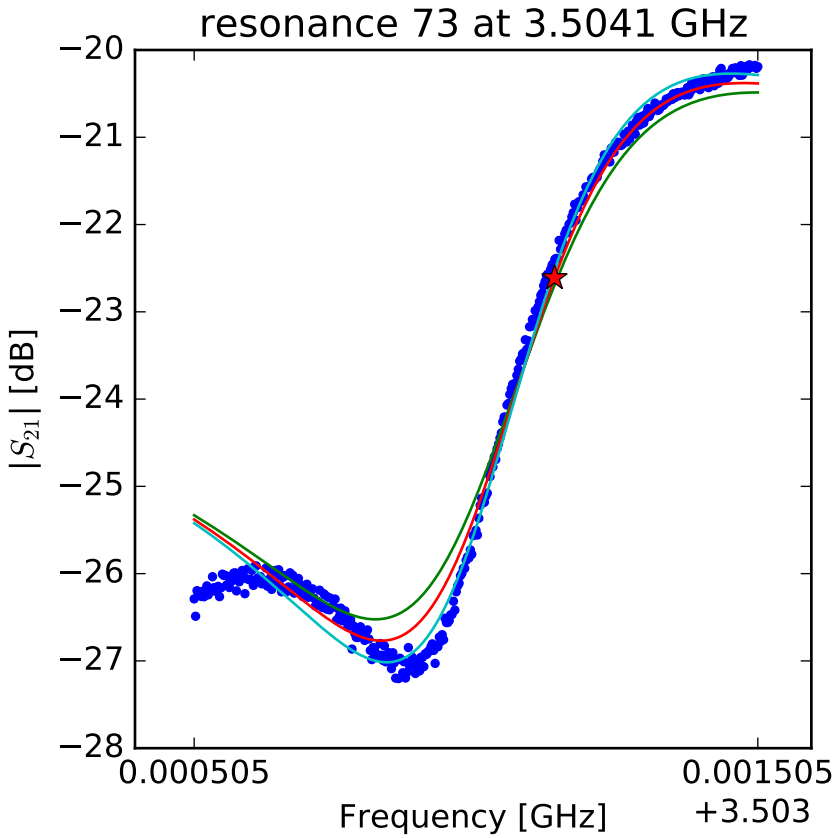


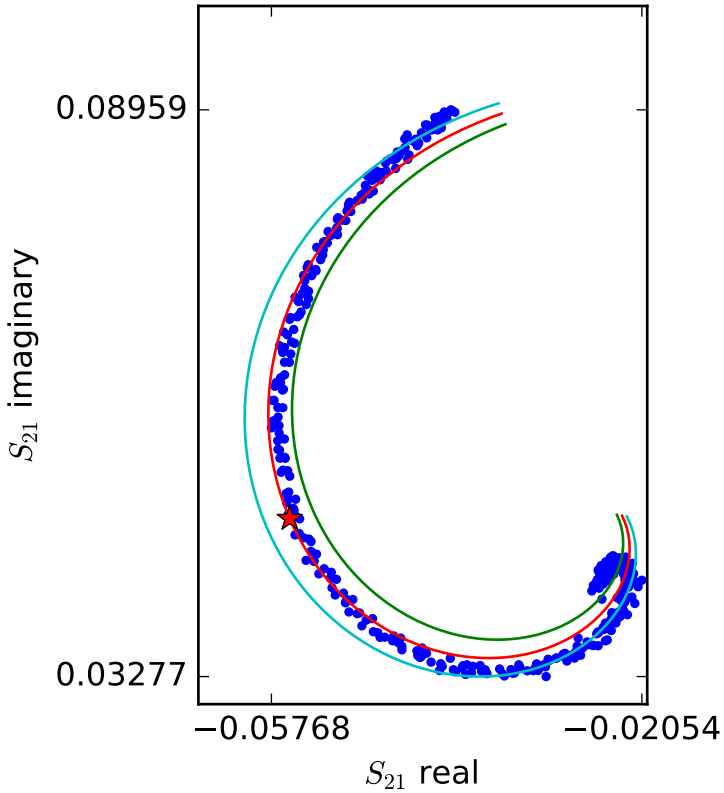


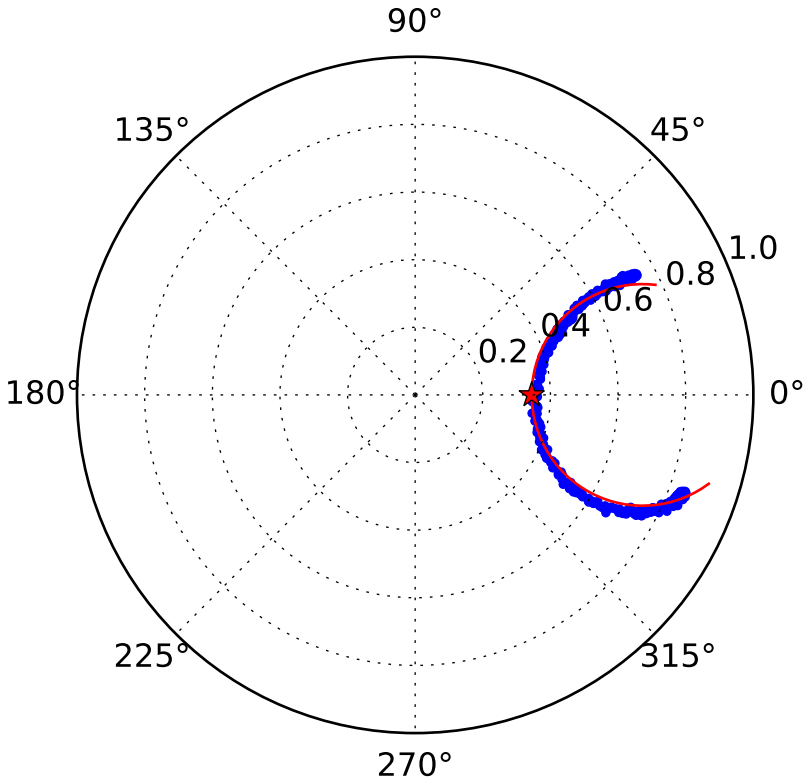


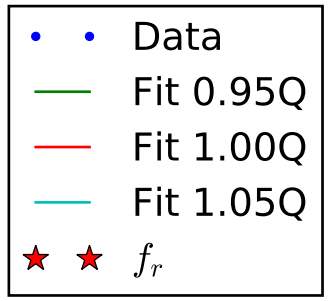
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.50280150756
Q_r = 3602.96642759
Q_c = 4147.90536986
Q_i = 27424.6573937
a = (-0.0331630283404+0.0874136212653j)
ϕ_0 = 0.638143716495
τ = 50.2380637723



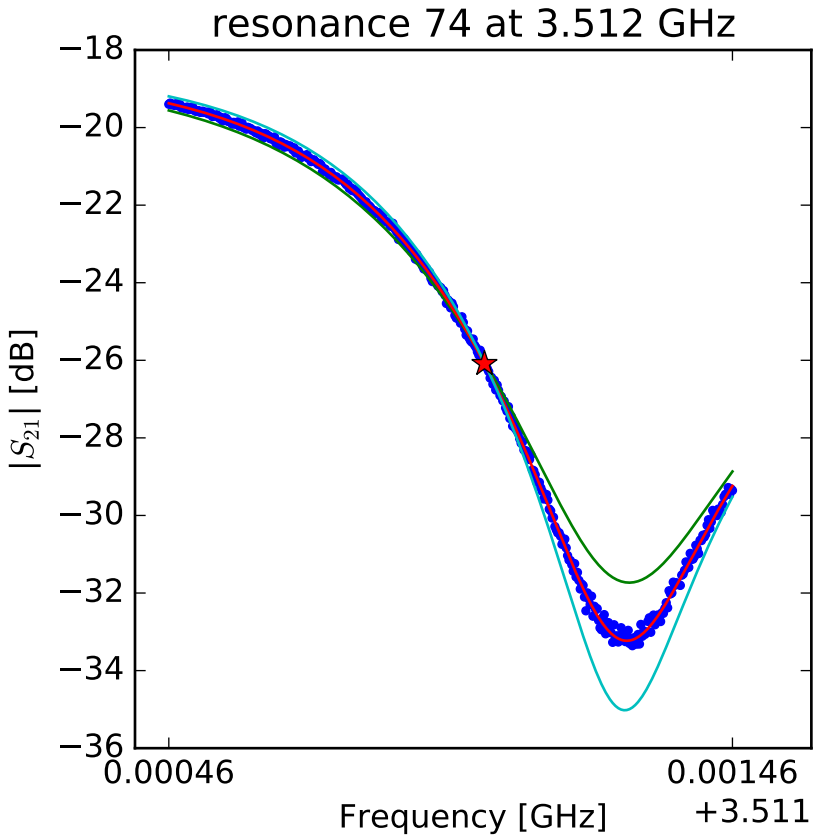


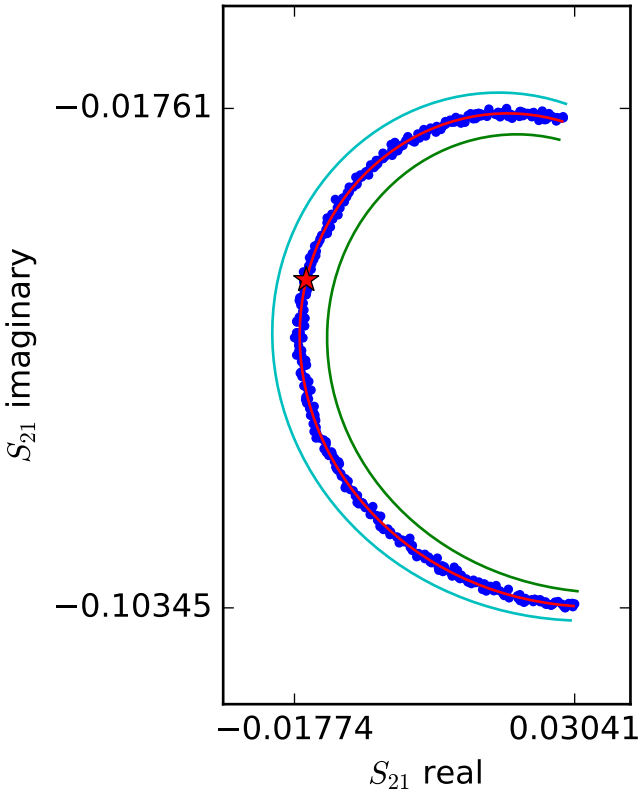


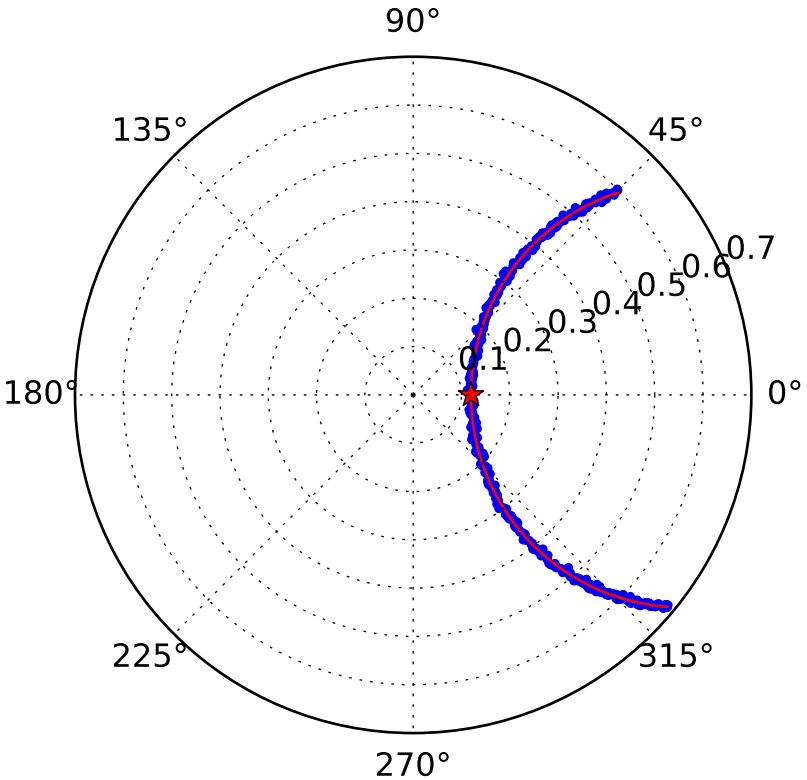


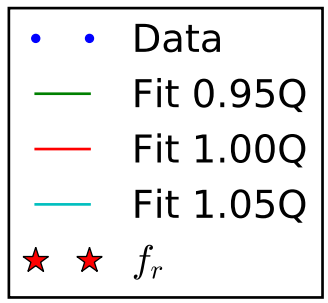
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.50414433558
Q_r = 5458.38398861
Q_c = 8328.21060217
Q_i = 15840.180445
a = (-0.0193066000478-0.0735869905179j)
ϕ_0 = -1.19388939948
τ = 54.0590888466



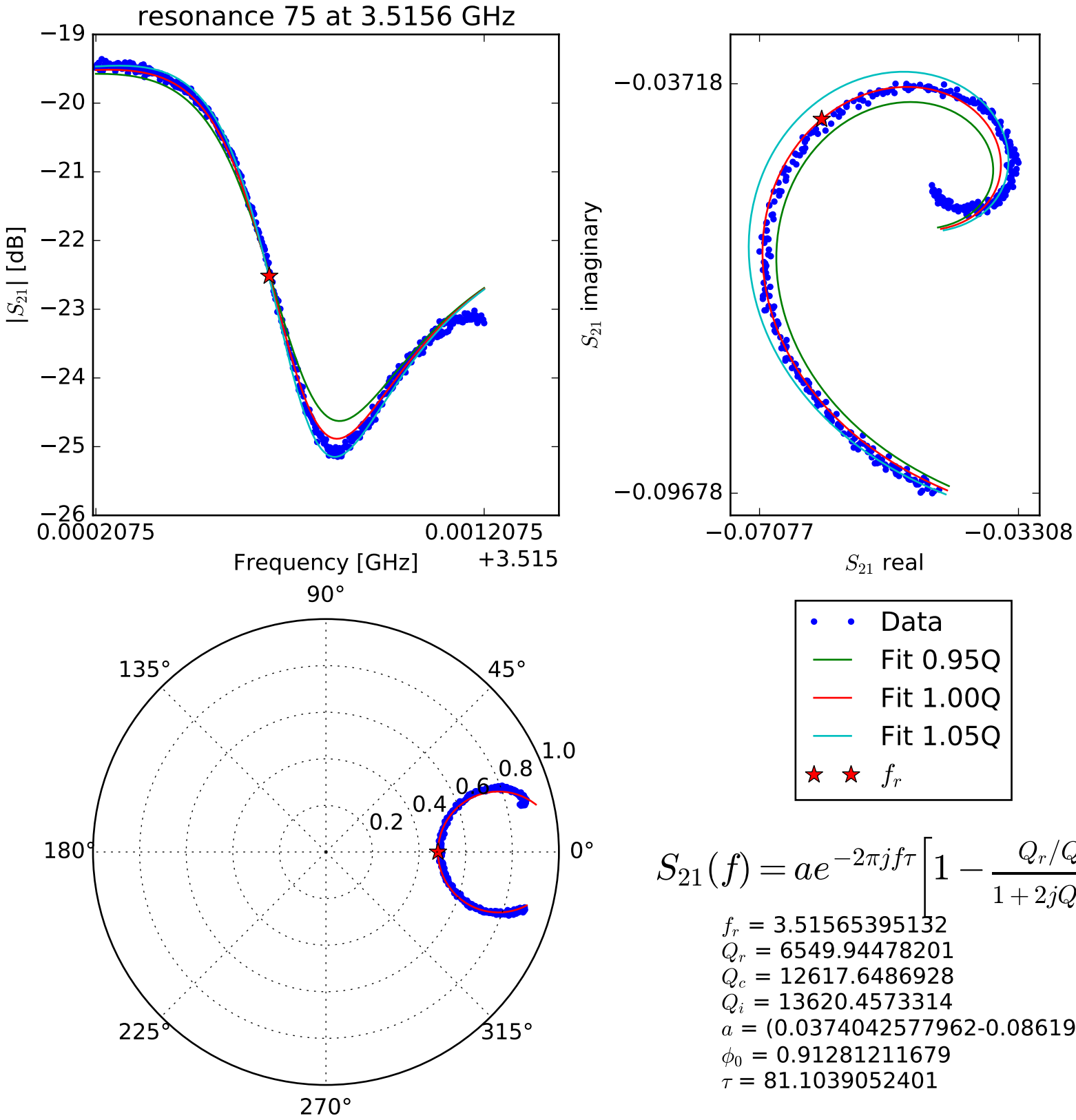






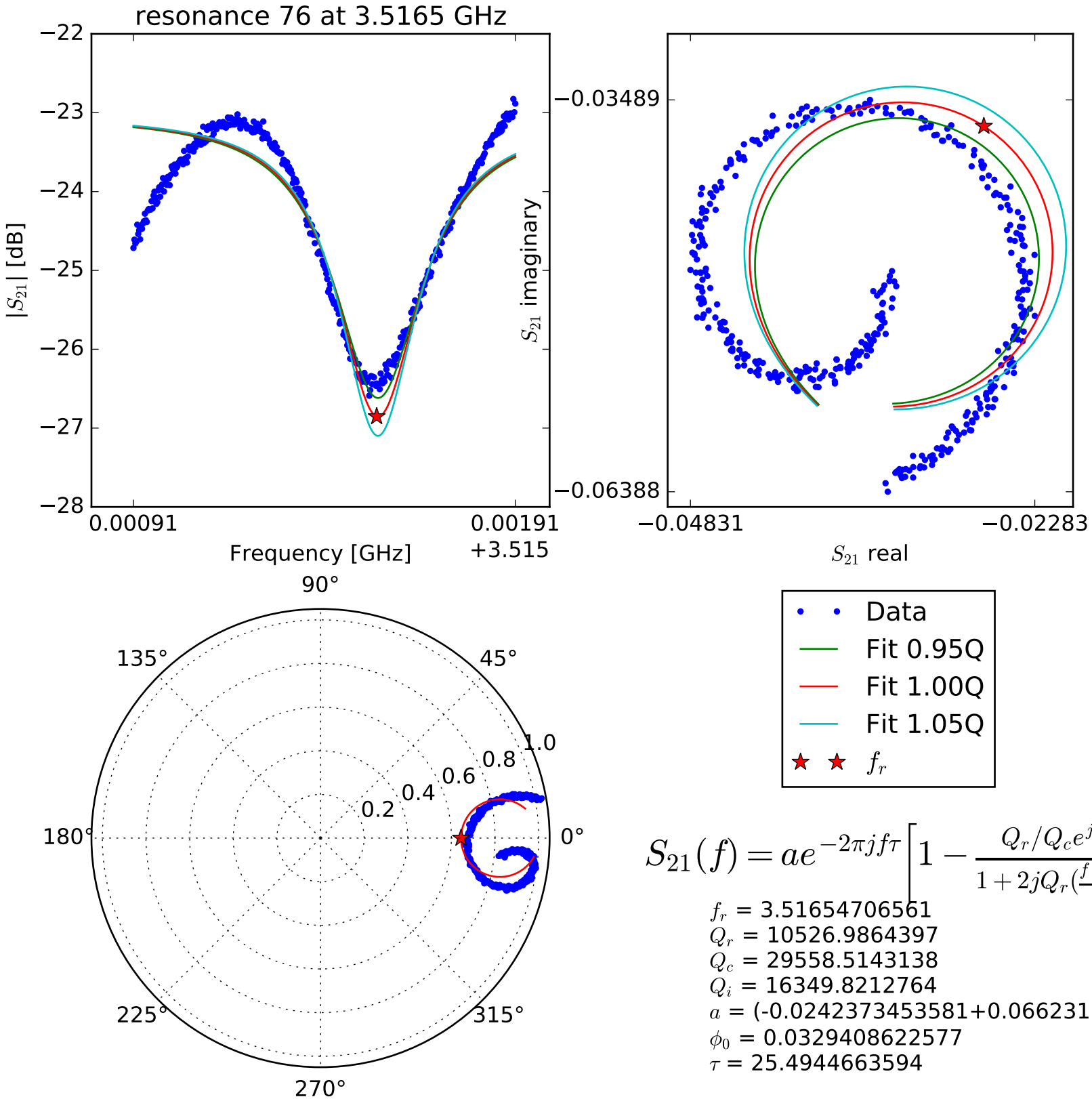
$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.51202002924
Q_r = 2904.27802362
Q_c = 3298.96772612
Q_i = 24275.068255
a = (0.104095360197-0.0321723061826j)
ϕ_0 = 0.472695511878
τ = 54.9775704363



$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.51565395132
Q_r = 6549.94478201
Q_c = 12617.6486928
Q_i = 13620.4573314
a = (0.0374042577962-0.0861934308361j)
ϕ_0 = 0.91281211679
τ = 81.1039052401



$$S_{21}(f) = ae^{-2\pi jf\tau}\left[1 - \frac{Q_r/Q_c e^{j\phi_0}}{1 + 2jQ_r(\frac{f-f_r}{f_r})}\right]$$

f_r = 3.51654706561
Q_r = 10526.9864397
Q_c = 29558.5143138
Q_i = 16349.8212764
a = (-0.0242373453581+0.066231131913j)
ϕ_0 = 0.0329408622577
τ = 25.4944663594