AN214802

Load-pull Measurements, Bluetooth Transmitter, Class 1

Associated Part Family: CYW20710-A1

This document describes the load-pull results of the CYW20710-A1 in Class 1 mode.

Contents

1 Introduction

This document describes the load-pull results of the BCM20710A1 in Class 1 mode. Data was collected on a typical device at room temperature at three frequencies: 2402 MHz, 2441 MHz and 2480 MHz.

The second and third harmonics of the transmit frequencies were also tested.

1.1 Cypress Part Numbering Scheme

Cypress is converting the acquired IoT part numbers from Broadcom to the Cypress part numbering scheme. Due to this conversion, there is no change in form, fit, or function as a result of offering the device with Cypress part number marking. The table provides Cypress ordering part number that matches an existing IoT part number.

Table 1. Mapping Table for Part Number between Broadcom and Cypress

Broadcom Part Number	Cypress Part Number
BCM20710A1	CYW20710A1

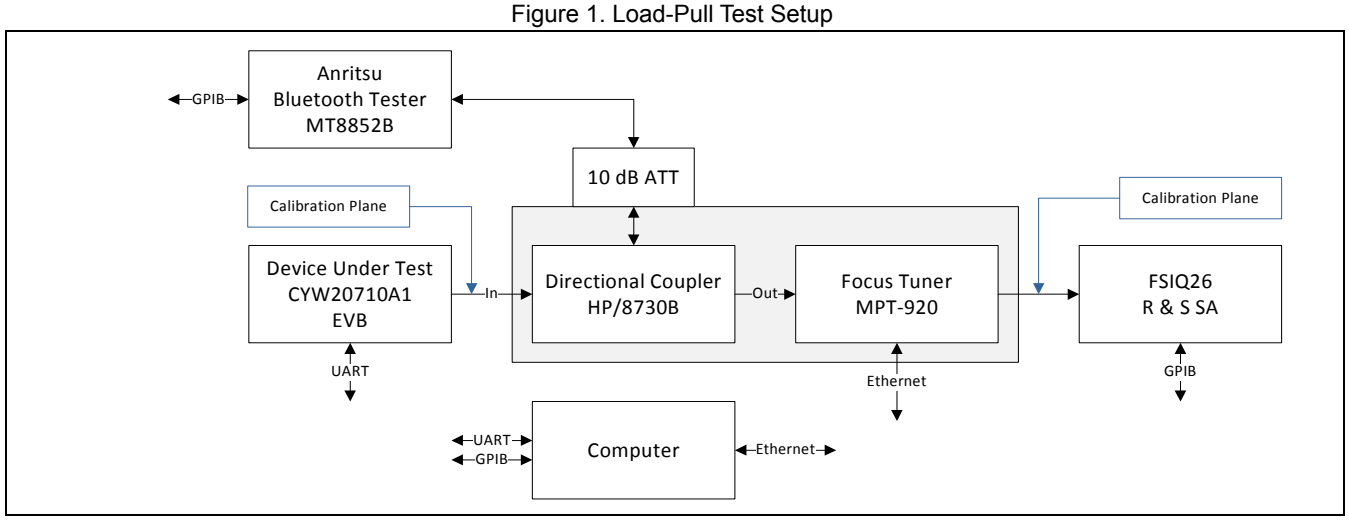
2 IoT Resources

Cypress provides a wealth of data at http://www.cypress.com/internet-things-iot to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Cypress provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates. Customers can acquire technical documentation and software from the Cypress Support Community website (http://community.cypress.com/).

3 Test Setup

The test setup is shown in Figure 1.

Figure 1. Load-Pull Test Setup



4 Test Results

4.1 VSWR Measurements at Bluetooth Fundamental Frequencies

Figure 3, Figure 4, and Figure 5 show transmit power variation as a function of phase and VSWR with an unmodulated signal in Bluetooth Class 1 for the specified frequency.

Figure 2. Legend for Figure 3, Figure 4, and Figure 5

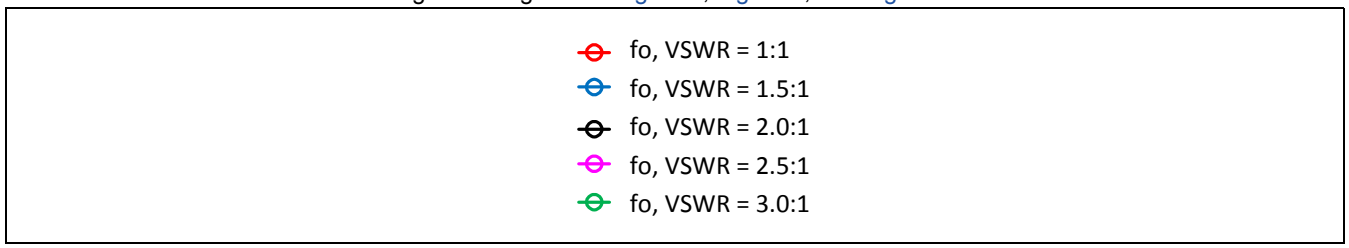


Figure 3. 2402 MHz, Transmit Power Variation as a Function of Phase and VSWR

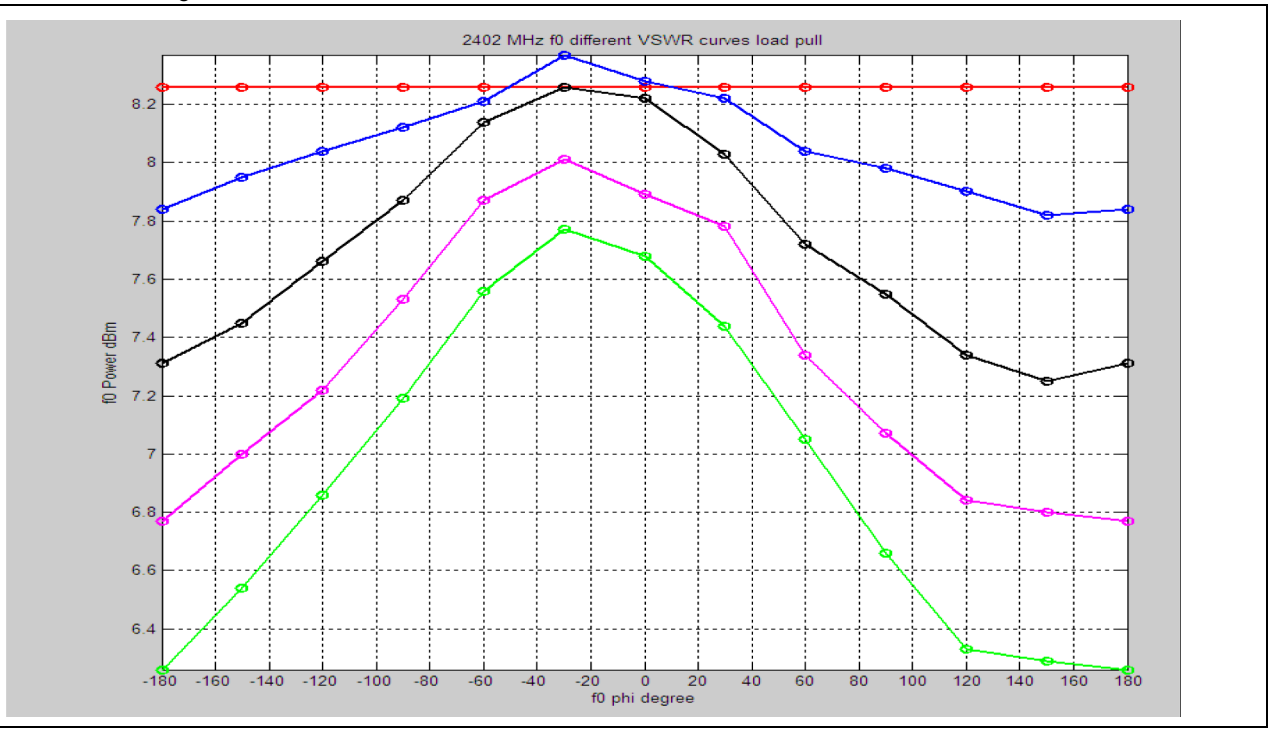


Figure 4. 2441 MHz, Transmit Power Variation as a Function of Phase and VSWR

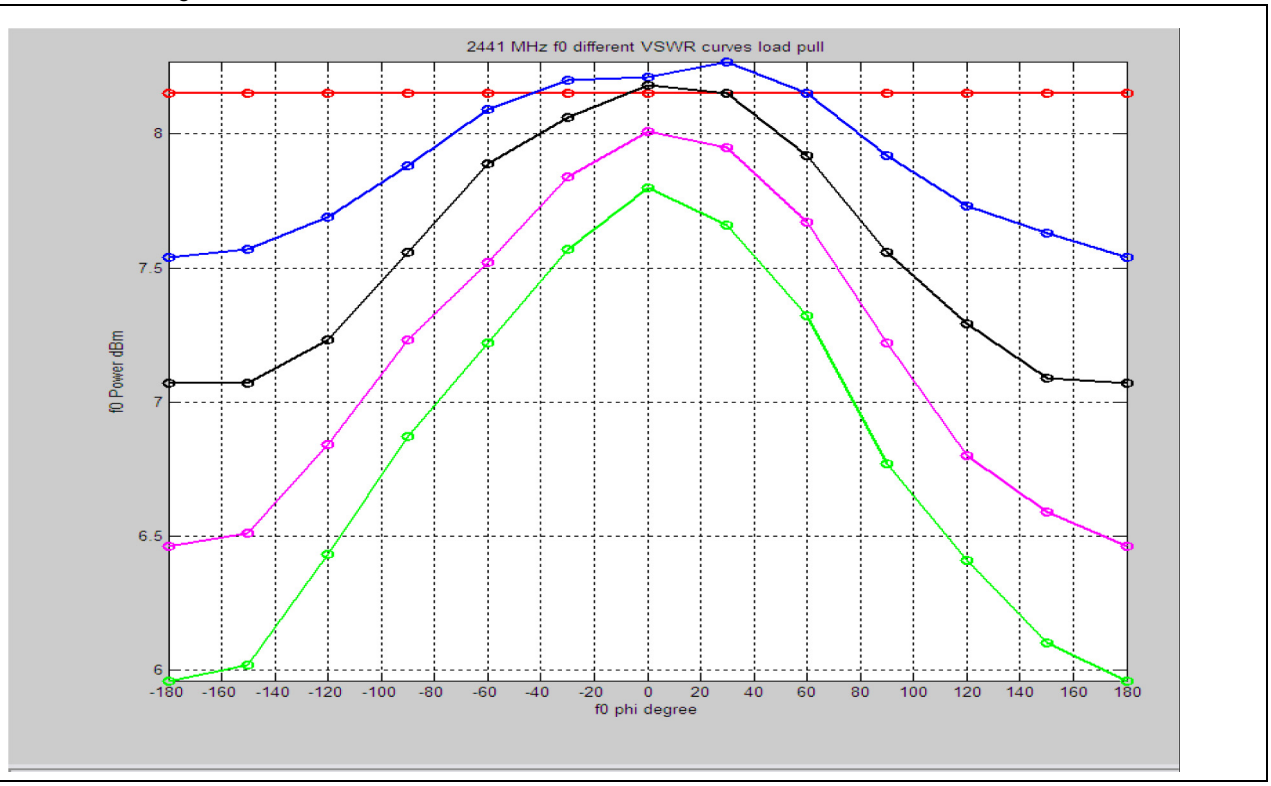
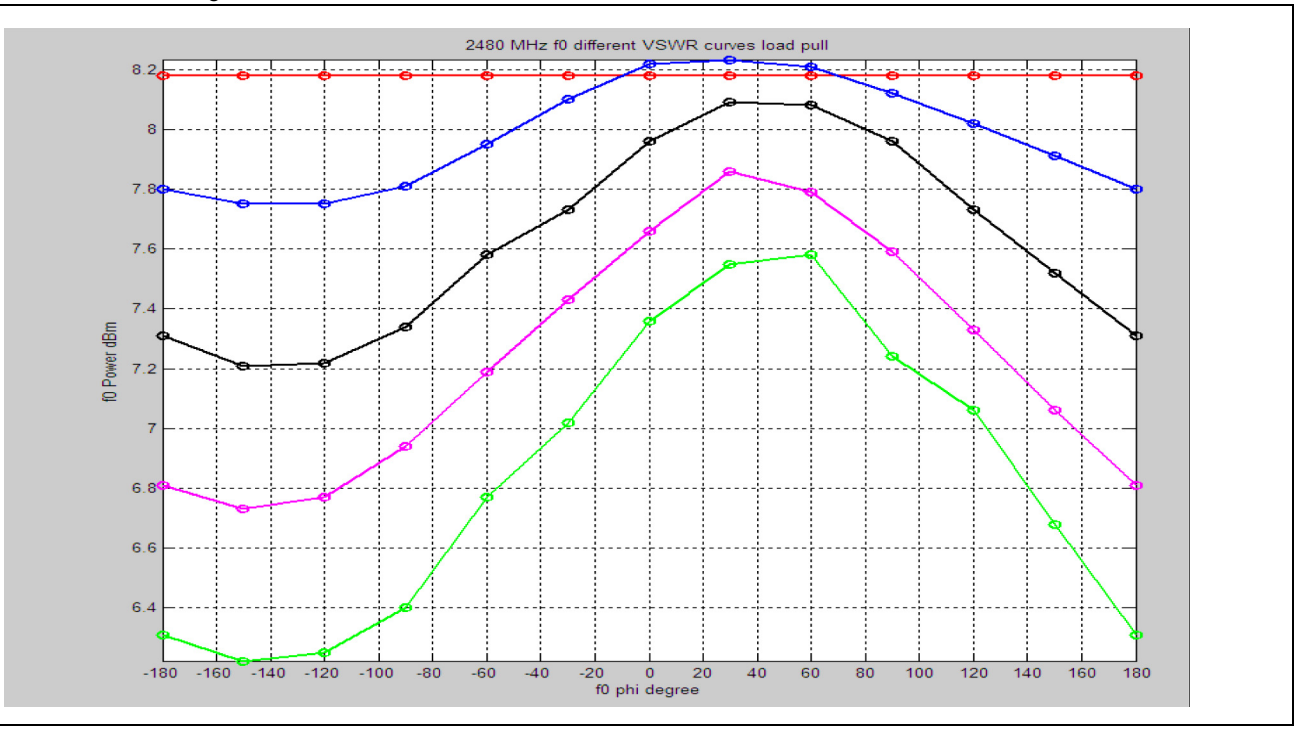


Figure 5. 2480 MHz, Transmit Power Variation as a Function of Phase and VSWR



4.2 Load-Pull Contour for VSWR<=3 (at Bluetooth Fundamental Frequencies)

Figure 6, Figure 7, and Figure 8 show the load-pull contour for VSWR less than or equal to 3 for the specified frequency (f0).

Figure 6. 2402 MHz, Load-Pull Contour for VSWR <=3

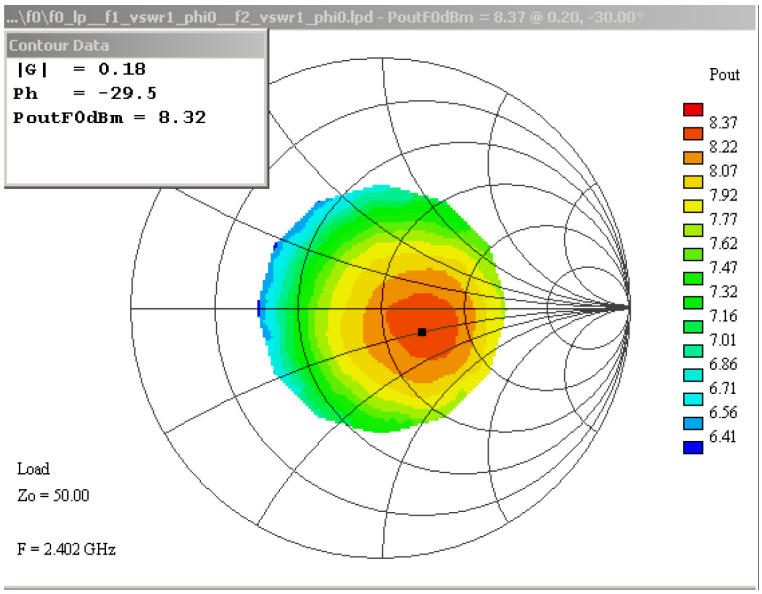


Figure 7. 2441 MHz, Load-Pull Contour for VSWR <=3

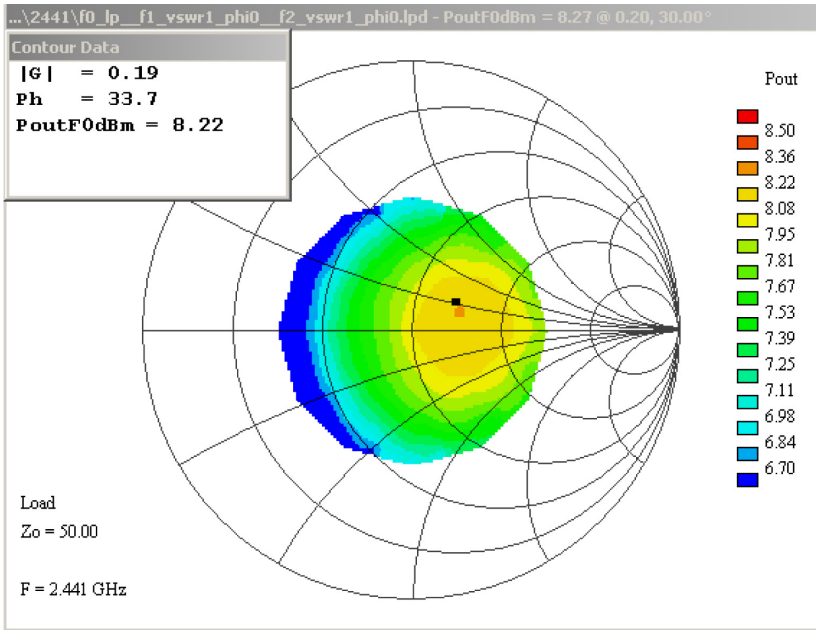
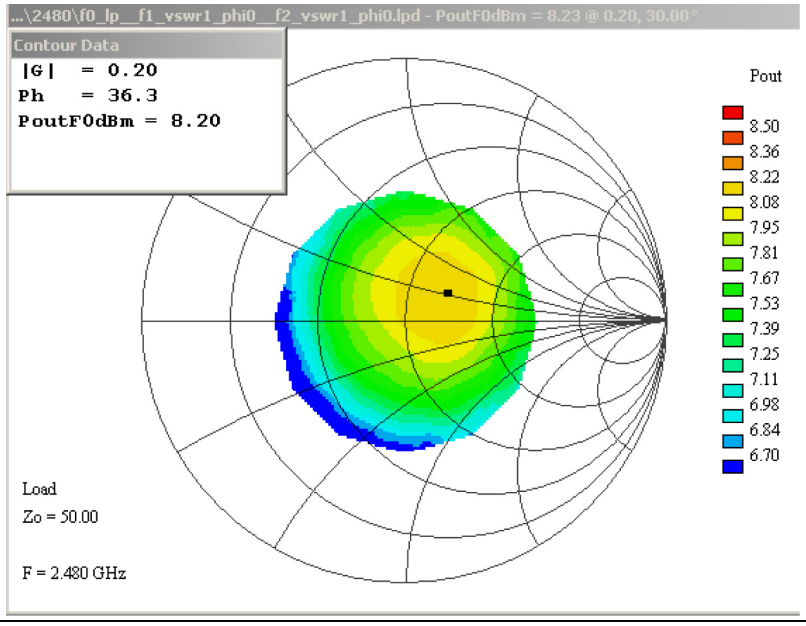


Figure 8. 2480 MHz, Load-Pull Contour for VSWR <=3



4.3 VSWR Measurements at Bluetooth Harmonics

The figures in this section show the VSWR measurements at the Bluetooth harmonics (f1 = 2f0 and f2 = 3f0) for Class 1 for the specified frequency.

Output power results were measured at different VSWRs and phases with an un-modulated signal in Bluetooth Class 1.

Figure 9. Legend for Figure 10, Figure 11, and Figure 12

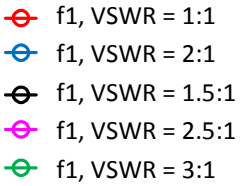


Figure 10. f1 = 2f0 (f0 = 2402 MHz), Output Power vs. Phase at Different VSWRs

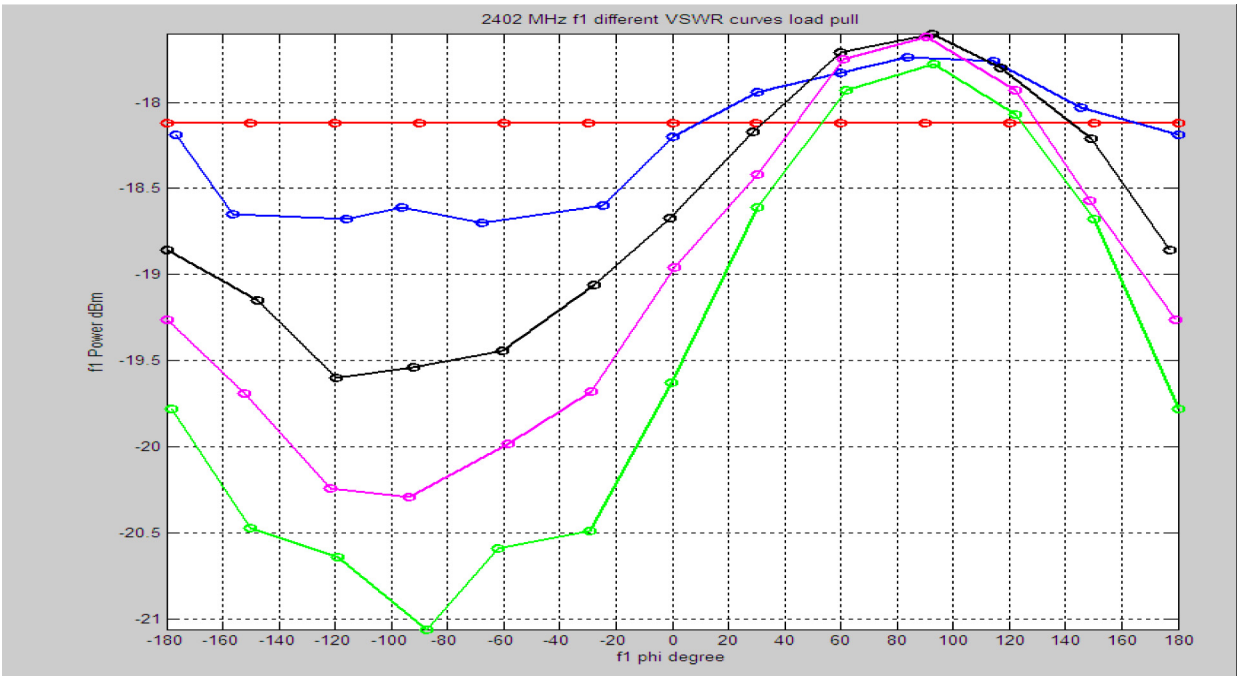


Figure 11. f1 = 2f0 (f0 = 2441 MHz), Output Power vs. Phase at Different VSWRs

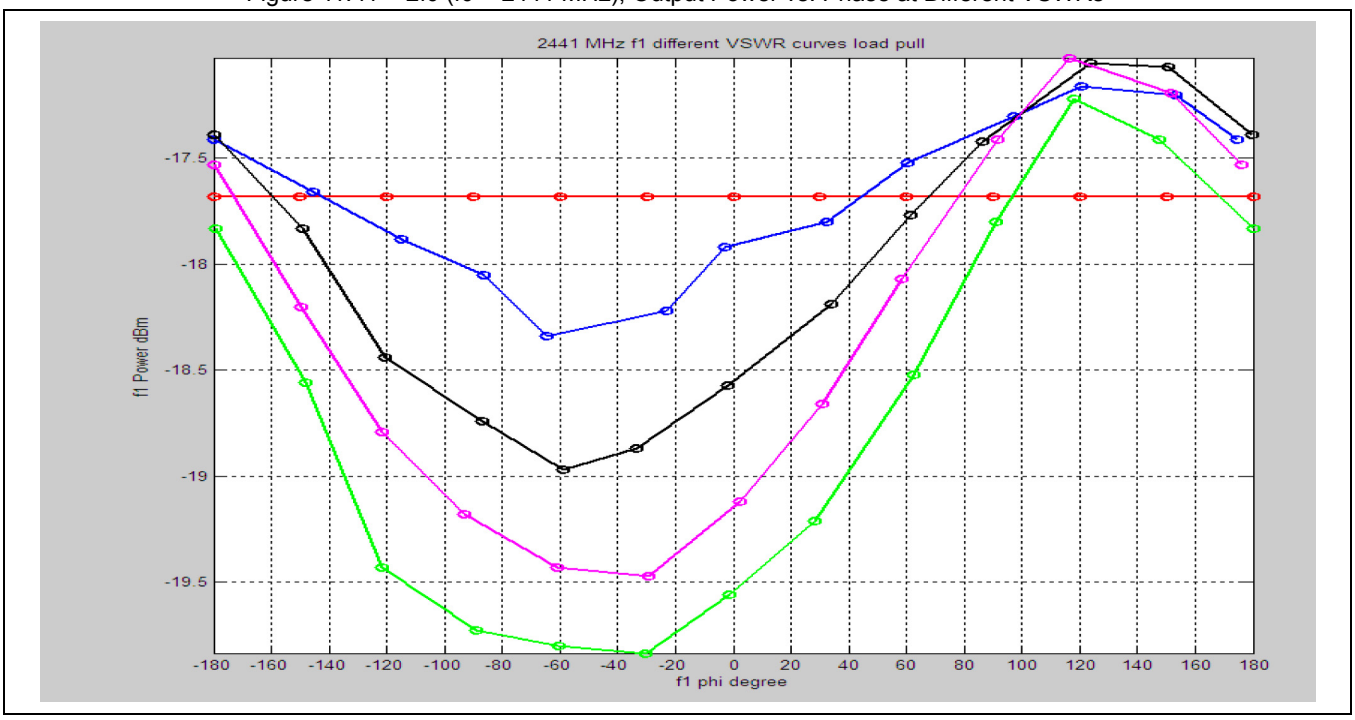


Figure 12. f1 = 2f0 (f0 = 2480 MHz) , Output Power vs. Phase at Different VSWRs

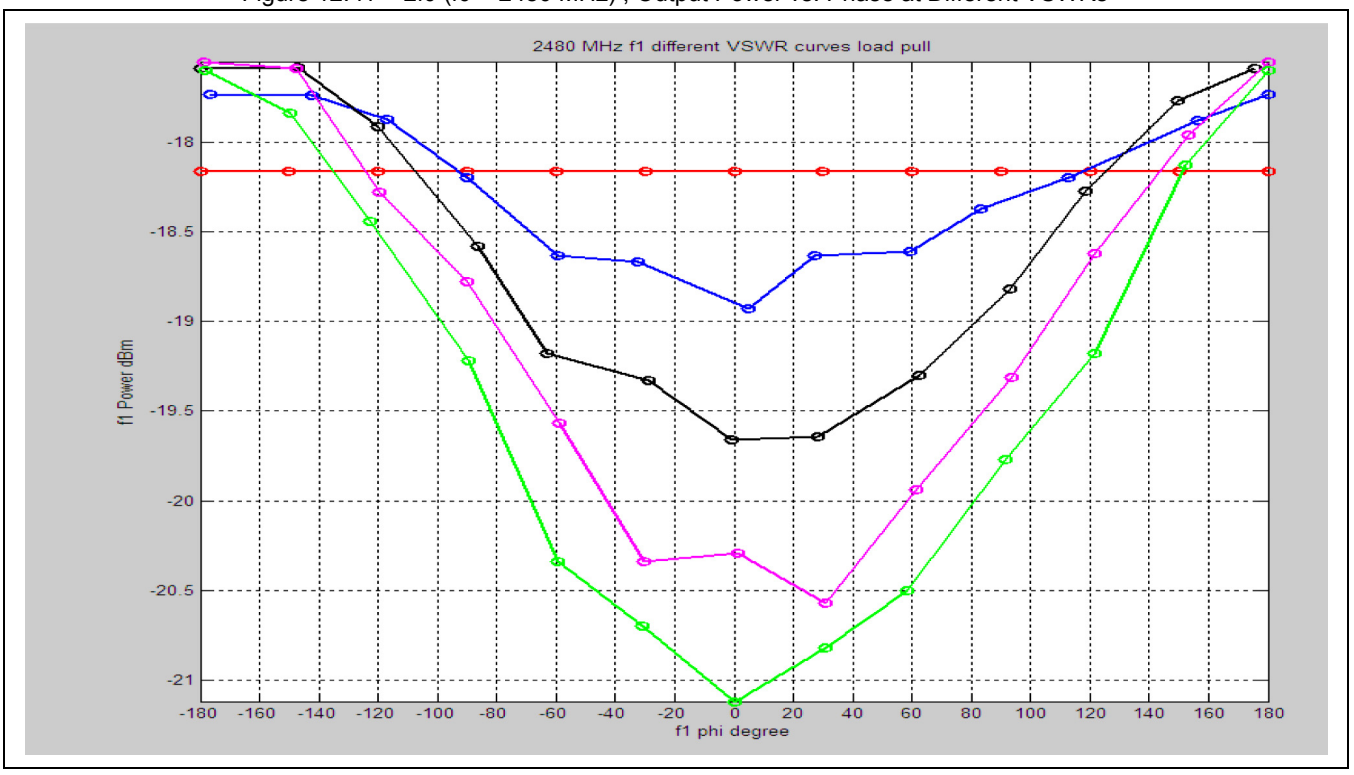


Figure 13. Legend for Figure 14, Figure 15, and Figure 16

f2, VSWR = 1:1
f2, VSWR = 2:1
f2, VSWR = 1.5:1
f2, VSWR = 2.5:1
f2, VSWR = 3:1

Figure 14. f2 = 3f0 (f0 = 2402 MHz) , Output Power vs. Phase at Different VSWRs

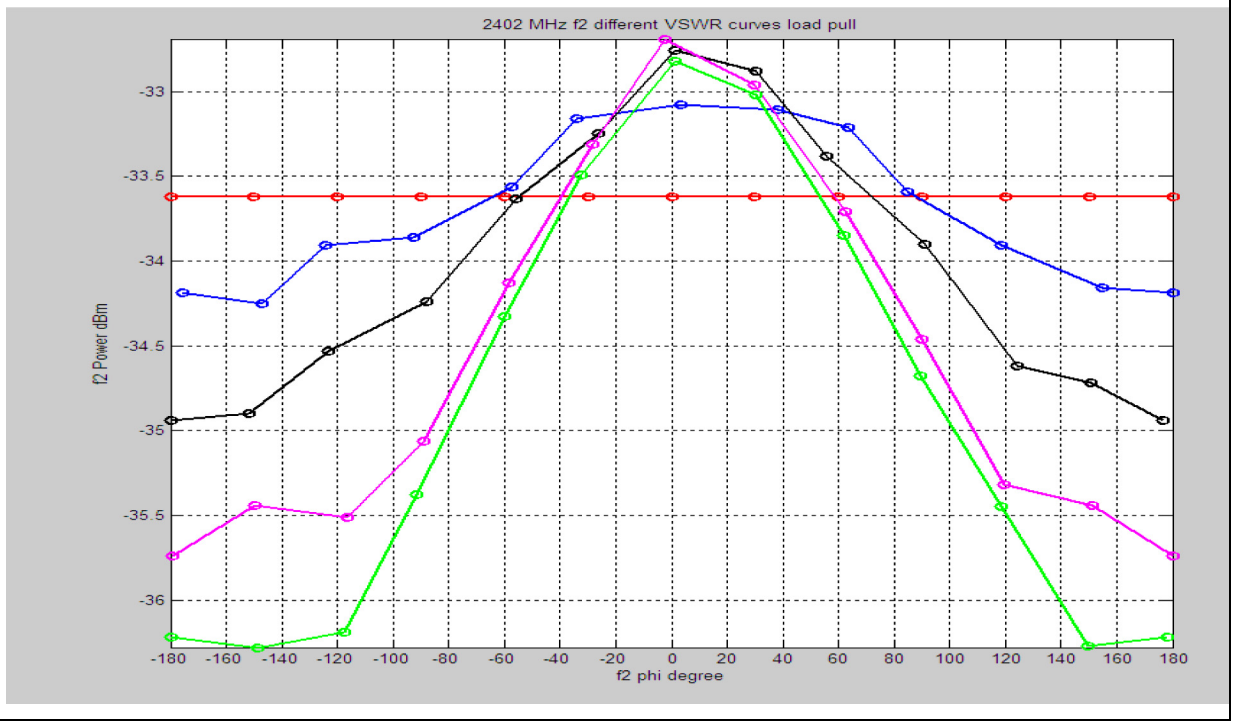


Figure 15. f2 = 3f0 (f0 = 2441 MHz) , Output Power vs. Phase at Different VSWRs

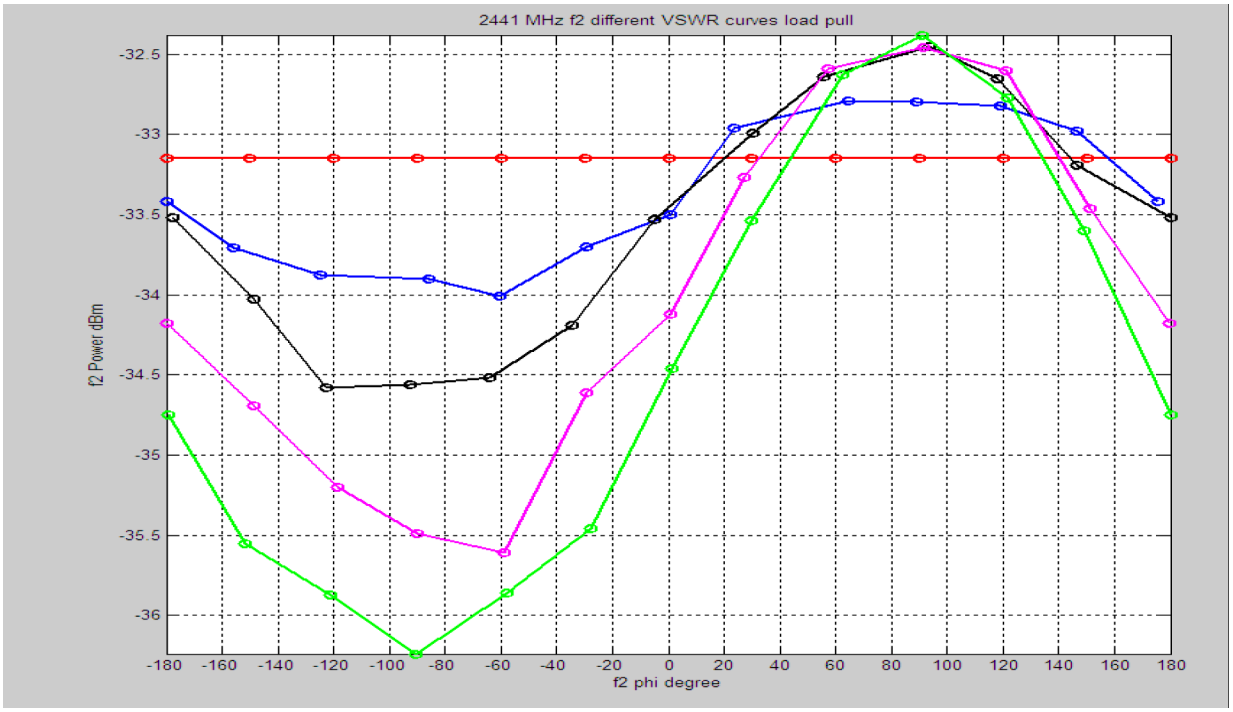
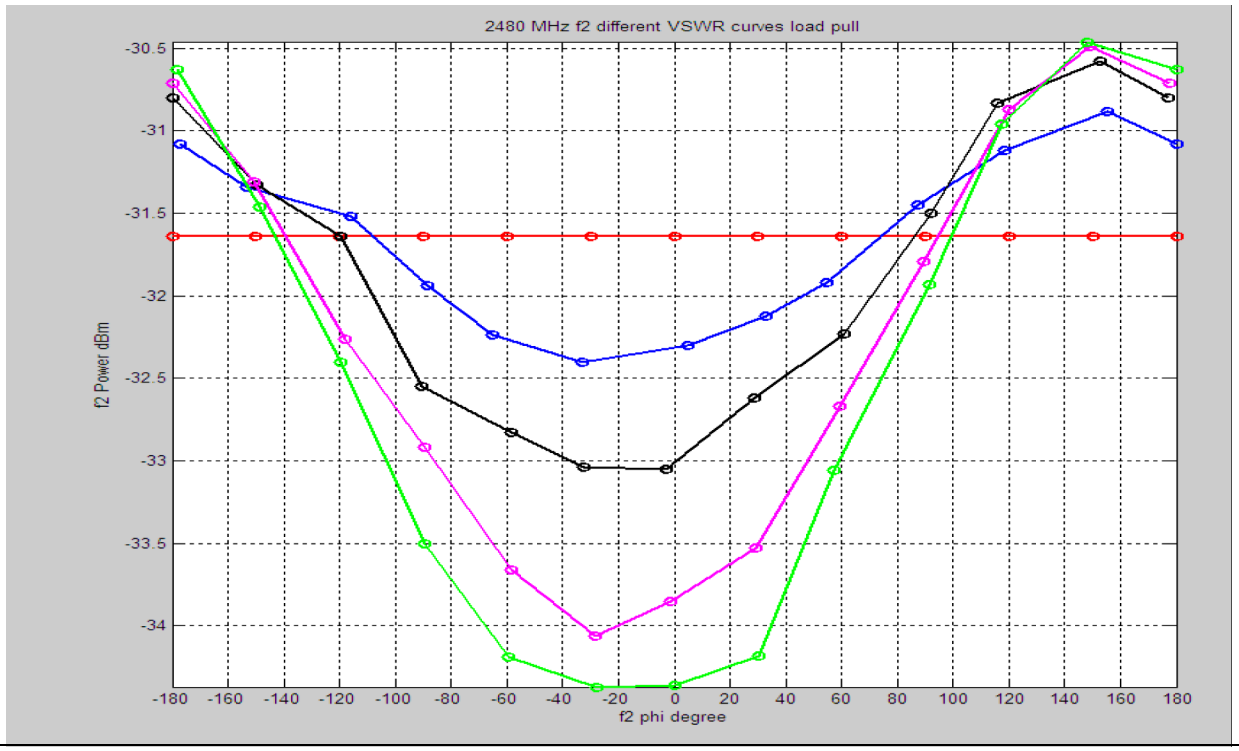


Figure 16. f2 = 3f0 (f0 = 2480 MHz) , Output Power vs. Phase at Different VSWRs



4.4 Load-Pull Contour for VSWR<=3 (at Bluetooth Harmonics)

Figure 17. 2f0 Load-Pull Contour (f0 = 2402 MHz)

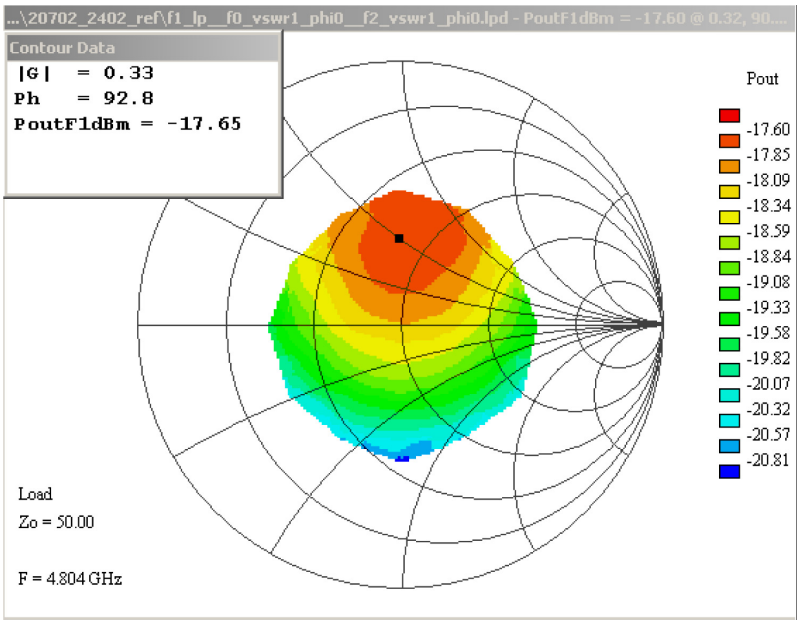


Figure 18. 2f0 Load-Pull Contour (f0 = 2441 MHz)

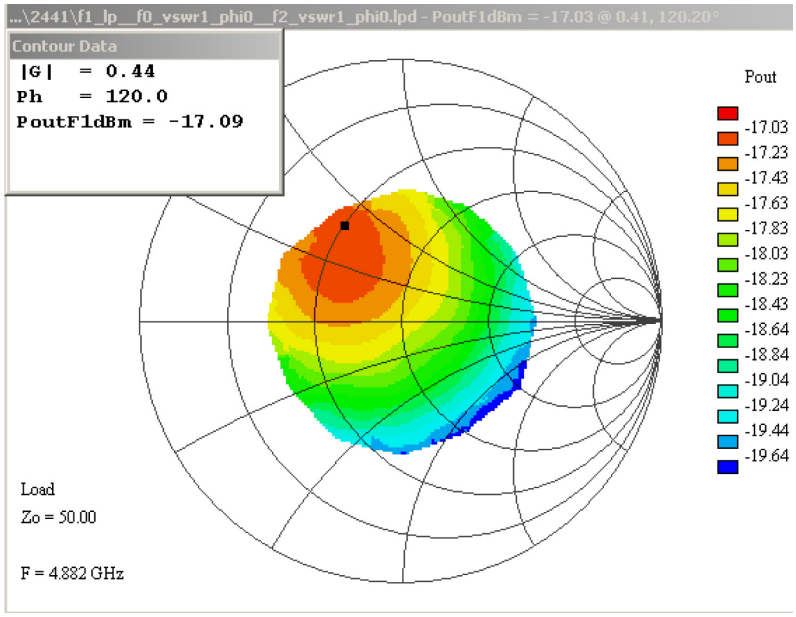


Figure 19. 2f0 Load-Pull Contour (f0 = 2480 MHz)

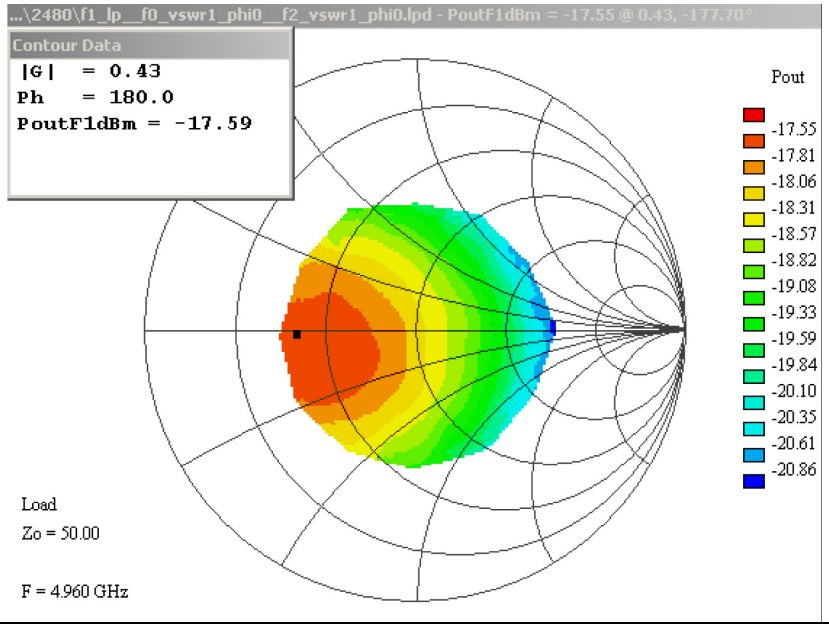


Figure 20. 3f0 Load-Pull Contour (f0 = 2402 MHz)

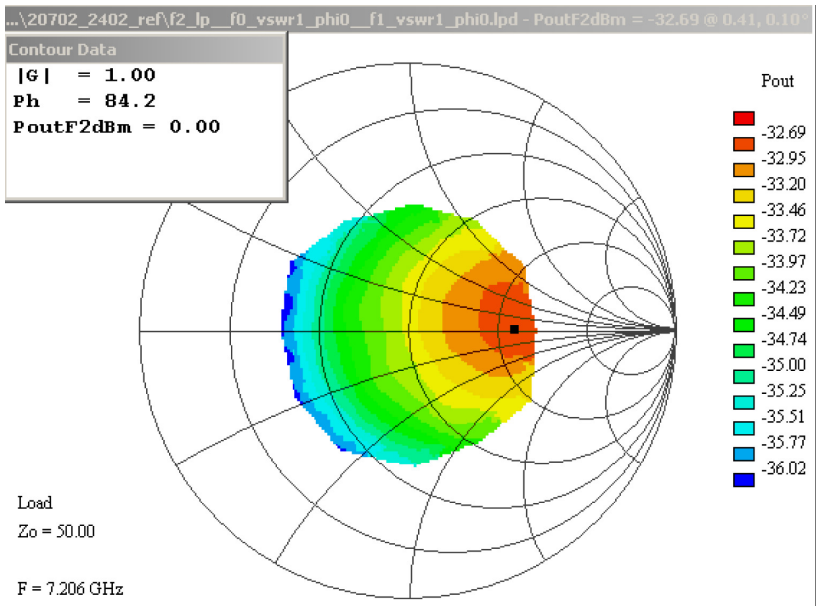


Figure 21. 3f0 Load-Pull Contour (f0 = 2441 MHz)

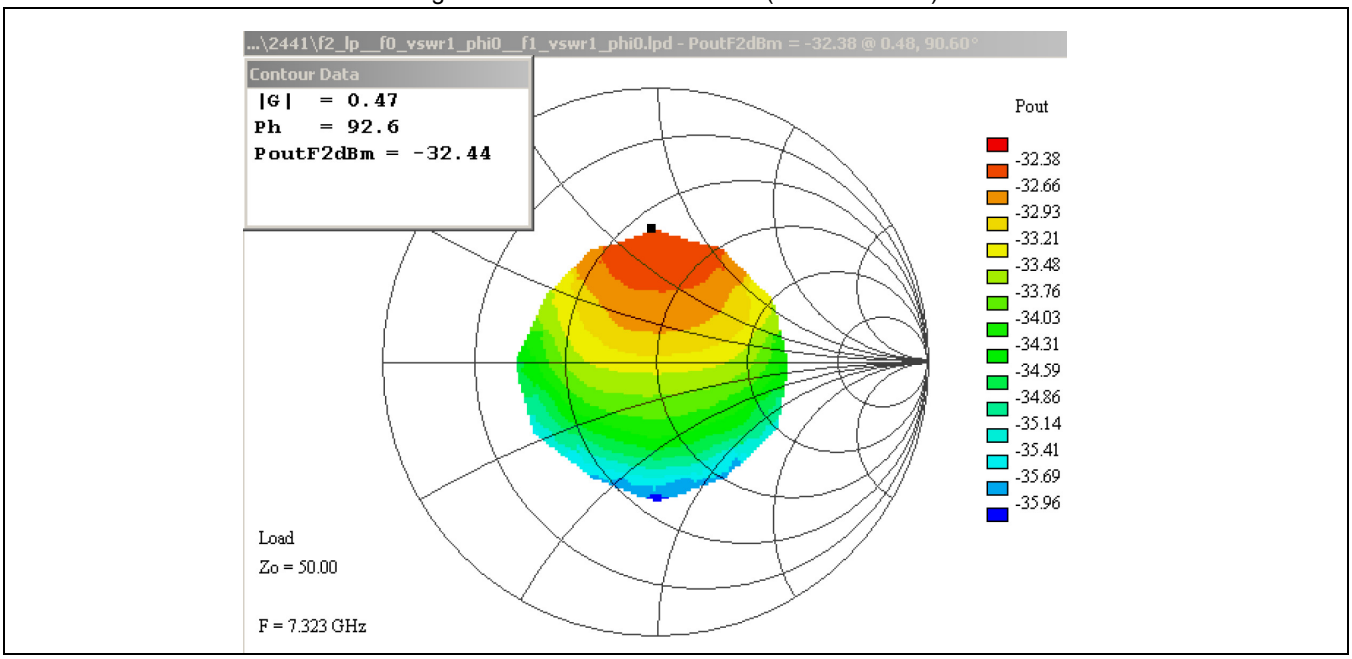
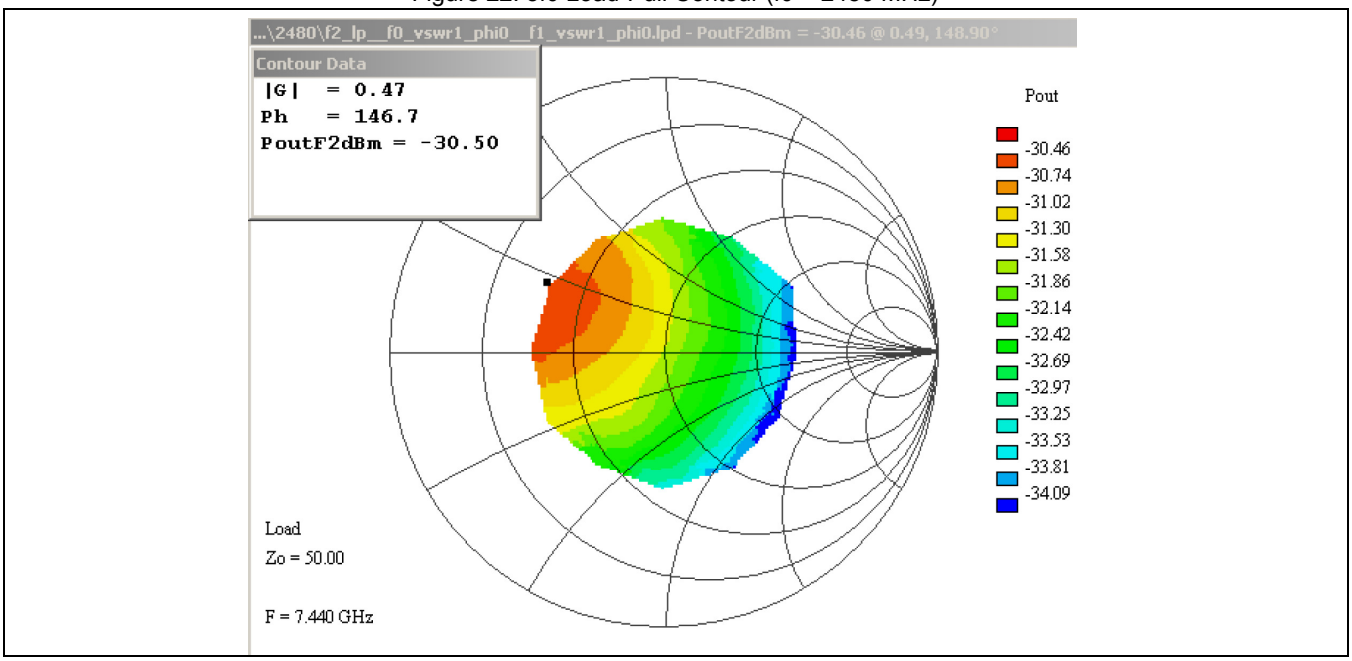


Figure 22. 3f0 Load-Pull Contour (f0 = 2480 MHz)



5 Acronyms and Abbreviations

In most cases, acronyms and abbreviations are defined on first use.

For a comprehensive list of acronyms and other terms used in Cypress documents, go to: http://www.cypress.com/glossary

Document History Page

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Rev.	**ECN No.**	**Orig. of Change**	**Submission Date**	**Description of Change**
**	–	–	06/09/2011	20710-AN300-R Initial release
*A	5464908	UTSV	10/06/2016	Updated in Cypress template. Added Cypress Part Numbering Scheme.
*B	5879633	AESATMP8	09/11/2017	Updated logo and Copyright.

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