

# RF Test Report

**Product Name: Smart Phone**

**Product Model: HUAWEI MT1-U06, MT1-U06**

**Report Number: SYBH(Z-RF)001022013-2002**

**FCC ID: QISMT1-U06N**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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## Notice

1. The laboratory has Passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-2.
5. The laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers of test site No.1 are R-2364, G-415, C-2583, and T-256, and the accreditation numbers of test site No.2 are R-3760, G-485, C-4210 and T-1237.
6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
7. The test report is invalid if there is any evidence of erasure and/or falsification.
8. The test report is only valid for the test samples.
9. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.



**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** Administration Building, Headquarters of Huawei Technologies Co., Ltd.,  
Bantian, Longgang District, Shenzhen, 518129, P.R.C  
**Product Name:** Smart Phone  
**Product Model:** HUAWEI MT1-U06, MT1-U06

**Date of Receipt Sample:** 2013-02-03  
**Start Date of Test:** 2013-02-05  
**End Date of Test:** 2013-02-16

**Test Result:** Pass

**Approved by Senior**

**Engineer:**

2013-03-21

Dai Linjun

Date

Name

Signature

**Prepared by:**

2013-03-21

Zhong Yaning

Date

Name

Signature



### Modification Record

| No. | Last Report No. | Modification Description |
|-----|-----------------|--------------------------|
|     |                 | First report             |
|     |                 |                          |
|     |                 |                          |
|     |                 |                          |



## CONTENT

|     |                                                     |    |
|-----|-----------------------------------------------------|----|
| 1   | General Information .....                           | 6  |
| 1.1 | Applied Standard .....                              | 6  |
| 1.2 | Test Location .....                                 | 6  |
| 1.3 | Test Environment Condition .....                    | 6  |
| 2   | Test Summary .....                                  | 7  |
| 3   | Description of the Equipment under Test (EUT) ..... | 8  |
| 3.1 | General Description .....                           | 8  |
| 3.2 | EUT Identity .....                                  | 8  |
| 3.3 | Technical Description .....                         | 10 |
| 4   | General Test Conditions / Configurations .....      | 11 |
| 4.1 | EUT Configurations .....                            | 11 |
| 4.2 | Test Environments .....                             | 12 |
| 4.3 | Test Setups .....                                   | 13 |
| 4.4 | Test Conditions .....                               | 16 |
| 5   | Main Test Instruments .....                         | 18 |



## 1 General Information

### 1.1 Applied Standard

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applied Rules: | 47 CFR FCC Part 2, Subpart J (2012Edition)<br>47 CFR FCC Part 15, Subpart C (2012 Edition)                                                                                                                                                                                                                                                                                                                                                    |
| Test Method:   | FCC PUBLIC NOTICE DA 00-705 Filing and Measurement Guidelines for<br>Frequency Hopping Spread Spectrum Systems (Released March 30, 2000)<br><br>ANSI C63.4-2003/-2009, American National Standard for Methods of<br>Measurement of Radio-Noise Emissions from Low-Voltage Electrical and<br>Electronic Equipment in the Range of 9 kHz to 40 GHz.<br>ANSI C63.10-2009, American National Standard for Testing Unlicensed<br>Wireless Devices. |

### 1.2 Test Location

|                  |                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Test Location 1: | Reliability Laboratory of Huawei Technologies Co., Ltd.                                                                        |
| Address:         | Administration Building, Headquarters of Huawei Technologies Co., Ltd.,<br>Bantian, Longgang District, Shenzhen, 518129, P.R.C |

### 1.3 Test Environment Condition

|                            |                |
|----------------------------|----------------|
| Ambient Temperature:       | 19.5 to 25 °C  |
| Ambient Relative Humidity: | 45 to 55 %     |
| Atmospheric Pressure:      | Not applicable |

## 2 Test Summary

| Test Item                                                                                  | FCC Part No.        | Requirements                                                                                                                      | Test Result | Verdict (NOTE) |
|--------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------|----------------|
| 20dB Emission Bandwidth (EBW)                                                              | 15.247(a)(1)        | No limit.                                                                                                                         | Appendix A  | Pass           |
| Carrier Frequency Separation                                                               | 15.247(a)(1)        | $\geq \text{MAX} \{25\text{kHz}, \text{IIF}\{\text{output power} \leq 125\text{mW}, 2/3 * 20\text{dB EBW}, 20\text{dB EBW}\}\}$ . | Appendix B  | Pass           |
| Number of Hopping Channel                                                                  | 15.247(a)(1)(iii)   | $\geq 15$ channels.                                                                                                               | Appendix C  | Pass           |
| Time of Occupancy (Dwell Time)                                                             | 15.247(a)(1)(iii)   | $< 0.4\text{s}$ within a period of $(0.4\text{s} * \text{hopping number})$ .                                                      | Appendix D  | Pass           |
| Maximum Peak Conducted Output Power                                                        | 15.247(b)(1)        | $< 1\text{ W}$ if using $\geq 75$ non-overlapping channels.                                                                       | Appendix E  | Pass           |
| Band edge spurious emission                                                                | 15.247(d)           | $< -20\text{ dBm}/100\text{ kHz}$ if total peak power $\leq$ power limit.                                                         | Appendix F  | Pass           |
| Conducted RF Spurious Emission                                                             |                     |                                                                                                                                   | Appendix G  | Pass           |
| Radiated Emissions in the Restricted Bands                                                 | 15.247(d)<br>15.209 | FCC Part 15.209 field strength limit;<br>RSS-Gen 7.2.5 field strength limit.                                                      | Appendix H  | Pass           |
| AC Power Line Conducted Emissions                                                          | 15.207              | FCC Part 15.207 conducted limit;<br>RSS-Gen, 7.2.4 conducted limit.                                                               | Appendix I  | Pass           |
| NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested". |                     |                                                                                                                                   |             |                |

### 3 Description of the Equipment under Test (EUT)

#### 3.1 General Description

HUAWEI MT1-U06, MT1-U06 is subscriber equipment in the UMTS/GSM system. The HSUPA/HSDPA/UMTS frequency band is Band I, Band II, Band IV, Band V and Band VIII. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, UMTS/GSM protocol processing, voice, video, MMS service, GPS, AGPS, NFC and WIFI etc. Externally it provides earphone port (to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

There are two different types of HUAWEI MT1-U06, MT1-U06. One is with NFC function, its FCC ID is QISMT1-U06N, the other is without NFC function, its FCC ID is QISMT1-U06. The others are the same, including circuit design, PCB board, structure. With the consideration of the identities and differences list above, all the RF tests were conducted to the EUT with NFC function.

**NOTE: Only Bluetooth test data included in this report.**

#### 3.2 EUT Identity

**NOTE:** Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

##### 3.2.1 Board

| Board            |                            |                            |
|------------------|----------------------------|----------------------------|
| Hardware Version | Serial Number              | Description                |
| HD1U9900M        | MT1-U06V100R001C00B104SP03 | Main board of Mobile Phone |

##### 3.2.2 Sub-Assembly

| Sub-Assembly      |                  |                                     |                                                                                                                                                                         |
|-------------------|------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-Assembly Name | Model            | Manufacturer                        | Description                                                                                                                                                             |
| AC/DC Adapter     | HW-050200<br>A3W | Huawei<br>Technologies<br>Co., Ltd. | Input voltage: ~100-240V 50/60Hz 0.5A<br>Output voltage: 5V  2A<br>Rated Power: 10W |

| Sub-Assembly      |                  |                                     |                                                                                                                                                                         |
|-------------------|------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-Assembly Name | Model            | Manufacturer                        | Description                                                                                                                                                             |
| AC/DC Adapter     | HW-050200<br>B3W | Huawei<br>Technologies<br>Co., Ltd. | Input voltage: ~100-240V 50/60Hz 0.5A<br>Output voltage: 5V  2A<br>Rated Power: 10W |



| Sub-Assembly      |                  |                               |                                                                                                                                                                       |
|-------------------|------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-Assembly Name | Model            | Manufacturer                  | Description                                                                                                                                                           |
| AC/DC Adapter     | HW-050200<br>E3W | Huawei Technologies Co., Ltd. | Input voltage: ~100-240V 50/60Hz 0.5A<br>Output voltage: 5V  2A<br>Rated Power: 10W |

| Sub-Assembly      |                  |                               |                                                                                                                                                                       |
|-------------------|------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-Assembly Name | Model            | Manufacturer                  | Description                                                                                                                                                           |
| AC/DC Adapter     | HW-050200<br>U3W | Huawei Technologies Co., Ltd. | Input voltage: ~100-240V 50/60Hz 0.5A<br>Output voltage: 5V  2A<br>Rated Power: 10W |

### 3.3 Technical Description

| Characteristics       | Description             |                                                                                                                                                                                                                                   |
|-----------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TX/RX Operating Range | 2400-2483.5 MHz band    | $f_c = 2402 \text{ MHz} + N * 1 \text{ MHz}$ , where: <ul style="list-style-type: none"><li>- <math>f_c</math> = "Operating Frequency" in MHz,</li><li>- <math>N</math> = "Channel Number" with the range from 0 to 78.</li></ul> |
|                       | Carrier                 | Frequency Hopping Spread Spectrum (FHSS)                                                                                                                                                                                          |
| Modulation Type       | Digital                 | GFSK, $\pi/4$ -DQPSK, 8DPSK                                                                                                                                                                                                       |
|                       | Emission Designator     |                                                                                                                                                                                                                                   |
| Emission Designator   | GFSK: 0M86GXD           |                                                                                                                                                                                                                                   |
|                       | $\pi/4$ -DQPSK: 1M28GXD |                                                                                                                                                                                                                                   |
|                       | 8DPSK: 1M29GXD          |                                                                                                                                                                                                                                   |
| Bluetooth Power Class | Class 1                 |                                                                                                                                                                                                                                   |

## 4 General Test Conditions / Configurations

### 4.1 EUT Configurations

#### 4.1.1 General Configurations

| Configuration       | Description                                                                                                                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Antenna Ports  | Until otherwise specified, <ul style="list-style-type: none"><li>- All TX tests are performed at all TX antenna ports of the EUT, and</li><li>- All RX tests are performed at all RX antenna ports of the EUT.</li></ul> |
| Multiple RF Sources | Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.                                                                                                             |

#### 4.1.2 Customized Configurations

| # EUT Conf.   | Signal Description                                         | Operating Frequency  |
|---------------|------------------------------------------------------------|----------------------|
| TM1_DH5_Hop   | GFSK modulation, package type DH5, hopping on.             | ---                  |
| TM1_DH5_Ch0   | GFSK modulation, package type DH5, hopping off.            | Ch No. 0 / 2402 MHz  |
| TM1_DH5_Ch39  | GFSK modulation, package type DH5, hopping off.            | Ch No. 39 / 2441 MHz |
| TM1_DH5_Ch78  | GFSK modulation, package type DH5, hopping off.            | Ch No. 78 / 2480 MHz |
| TM2_2DH5_Hop  | $\pi/4$ -DQPSK modulation, package type 2DH5, hopping on.  | ---                  |
| TM2_2DH5_Ch0  | $\pi/4$ -DQPSK modulation, package type 2DH5, hopping off. | Ch No. 0 / 2402 MHz  |
| TM2_2DH5_Ch39 | $\pi/4$ -DQPSK modulation, package type 2DH5, hopping off. | Ch No. 39 / 2441 MHz |
| TM2_2DH5_Ch78 | $\pi/4$ -DQPSK modulation, package type 2DH5, hopping off. | Ch No. 78 / 2480 MHz |
| TM3_3DH5_Hop  | 8DPSK modulation, package type 3DH5, hopping on.           | ---                  |
| TM3_3DH5_Ch0  | 8DPSK modulation, package type 3DH5, hopping off.          | Ch No. 0 / 2402 MHz  |
| TM3_3DH5_Ch39 | 8DPSK modulation, package type 3DH5, hopping off.          | Ch No. 39 / 2441 MHz |
| TM3_3DH5_Ch78 | 8DPSK modulation, package type 3DH5, hopping off.          | Ch No. 78 / 2480 MHz |



## 4.2 Test Environments

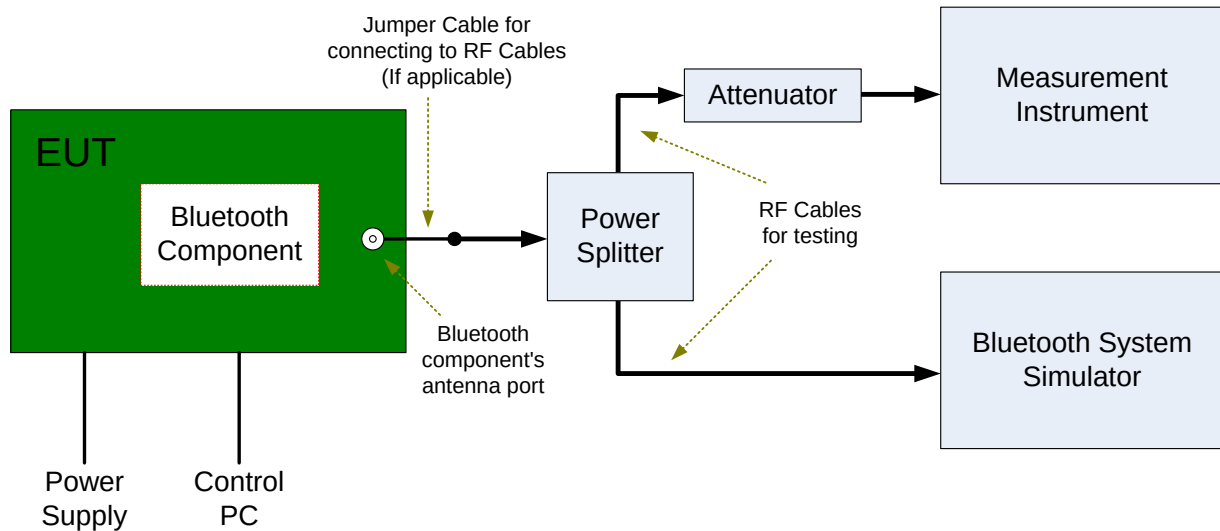
NOTE: The values used in the test report may be stringent than the declared.

| Environment Parameter | Selected Values During Tests |         |                   |
|-----------------------|------------------------------|---------|-------------------|
|                       | Temperature                  | Voltage | Relative Humidity |
| NTNV                  | Ambient                      | 3.8 VDC | Ambient           |

## 4.3 Test Setups

### 4.3.1 Test Setup 1

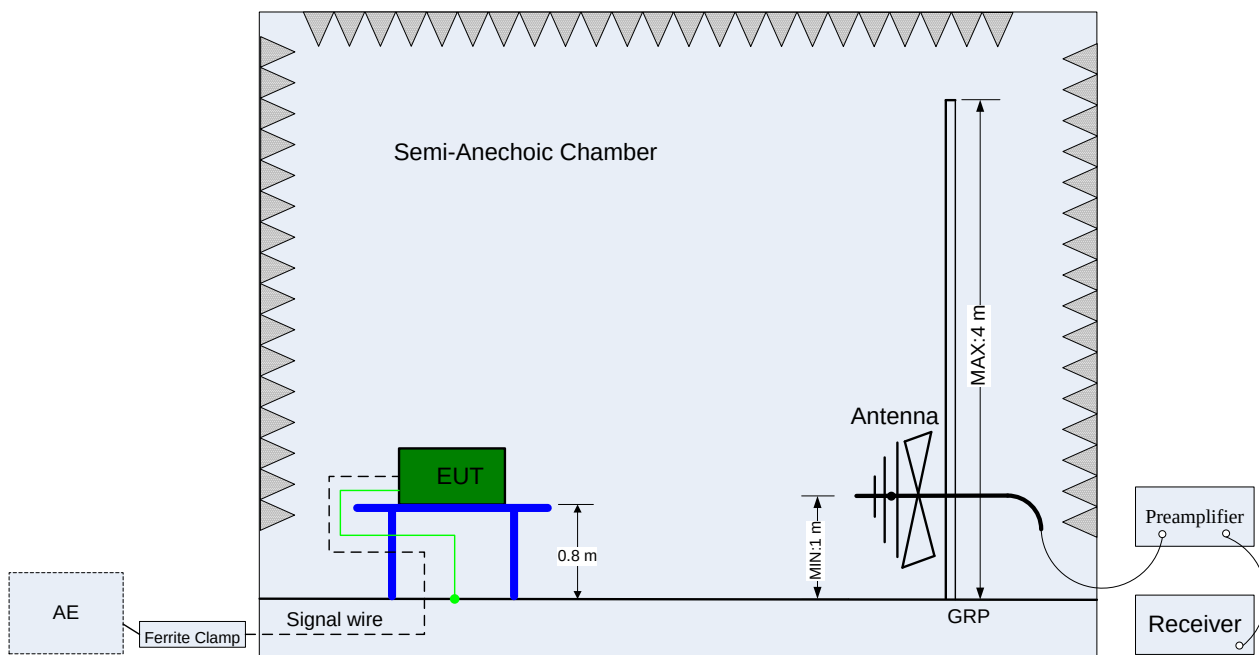
The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by Bluetooth System Simulator and/or PC/software to emit the specified signals for the purpose of measurements.



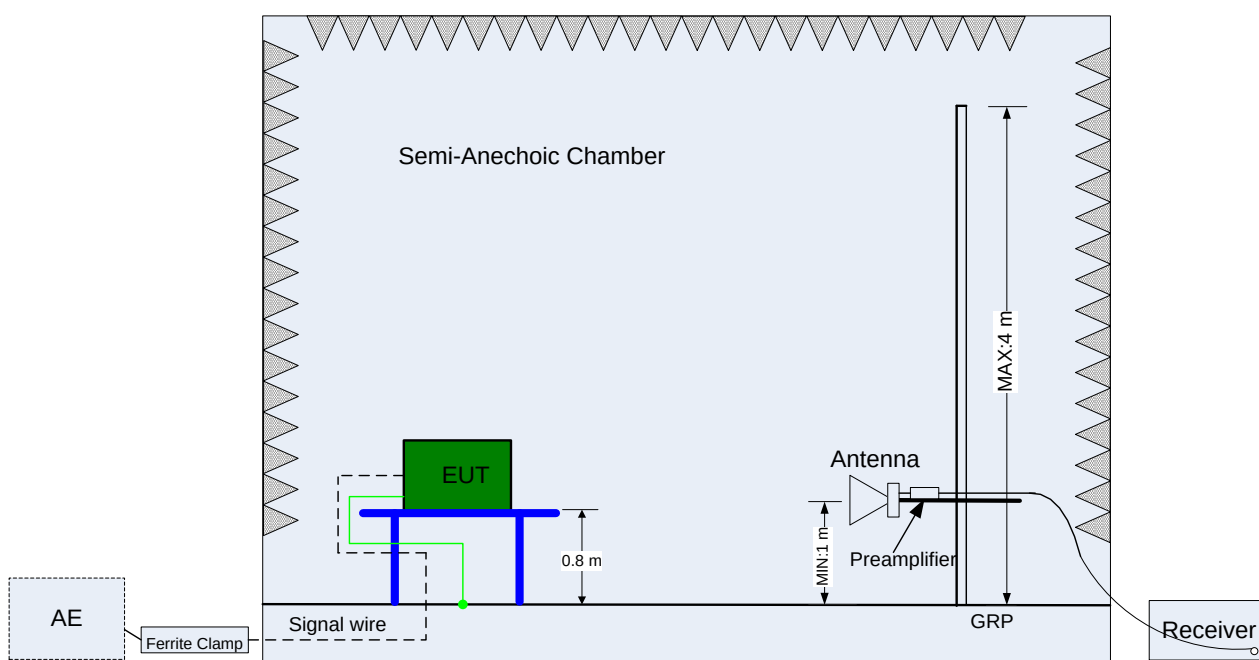
### 4.3.2 Test Setup 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



(Below 1 GHz)

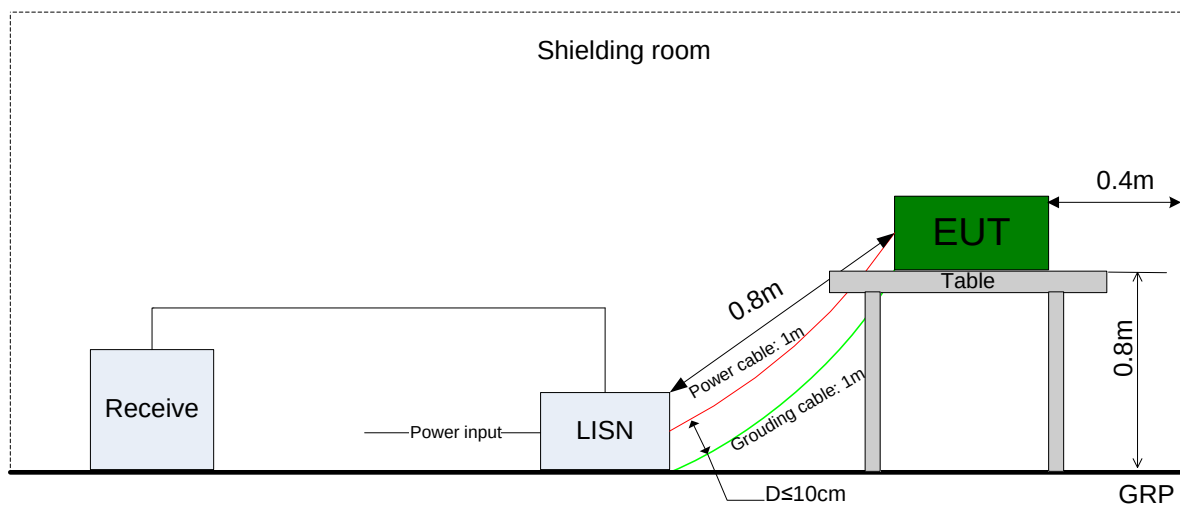


(Above 1 GHz)

### 4.3.3 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



#### 4.4 Test Conditions

| Test Case                                 | Test Conditions |                                                                                                                                  |
|-------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
|                                           | Configuration   | Description                                                                                                                      |
| 20dB Emission<br>Bandwidth (EBW)          | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78,<br>TM2_DH5_Ch0, TM2_DH5_Ch39, TM2_DH5_Ch78,<br>TM3_DH5_Ch0, TM3_DH5_Ch39, TM3_DH5_Ch78, |
| Carrier Frequency<br>Separation           | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Hop,<br>TM2_DH5_Hop,<br>TM3_DH5_Hop,                                                                                     |
| Number of Hopping<br>Channel              | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Hop,<br>TM2_DH5_Hop,<br>TM3_DH5_Hop,                                                                                     |
| Time of Occupancy<br>(Dwell Time)         | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Ch39,<br>TM2_DH5_Ch39,<br>TM3_DH5_Ch39.                                                                                  |
| Maximum Peak<br>Conducted Output<br>Power | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78,<br>TM2_DH5_Ch0, TM2_DH5_Ch39, TM2_DH5_Ch78,<br>TM3_DH5_Ch0, TM3_DH5_Ch39, TM3_DH5_Ch78, |
| Band edge spurious<br>emission            | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |
|                                           | Test Setup      | Test Setup 1                                                                                                                     |
|                                           | EUT Conf.       | TM1_DH5_Ch0, TM1_DH5_Ch78,<br>TM2_2DH5_Ch0, TM2_2DH5_Ch78,<br>TM3_3DH5_Ch0, TM3_3DH5_Ch78.                                       |
| Conducted RF<br>Spurious Emission         | Meas. Method    | DA 00-705                                                                                                                        |
|                                           | Test Env.       | NTNV                                                                                                                             |

| Test Case                                        | Test Conditions |                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                  |  |
|--------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--|
|                                                  | Configuration   | Description                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                  |  |
|                                                  | Test Setup      | Test Setup 1                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                  |  |
|                                                  | EUT Conf.       | TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78,<br>TM2_DH5_Ch0, TM2_DH5_Ch39, TM2_DH5_Ch78,<br>TM3_DH5_Ch0, TM3_DH5_Ch39, TM3_DH5_Ch78.                                                                                                                                                                                                                                                                   |                                                                                                                                  |  |
| Radiated Emissions<br>in the Restricted<br>Bands | Meas. Method    | DA 00-705, C63.4, C63.10.<br>(1) 30 MHz to 1 GHz:<br>Pre:           RBW = 100 kHz; VBW = 300 kHz; Det. = Peak.<br>Final:        RBW = 120 kHz; Det. = CISPR Quasi-Peak.<br>(2) 1 GHz to 26.5 GHz:<br>Average:    RBW = 1 MHz; VBW = 10 Hz; Det. = Peak; Sweep-time = Auto;<br>Trace = Single.<br>Peak:        RBW = 1 MHz; VBW = 3 MHz; Det. = Peak; Sweep-time = Auto;<br>Trace ≥ Max Hold * 100. |                                                                                                                                  |  |
|                                                  | Test Env.       | NTNV                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                  |  |
|                                                  | Test Setup      | Test Setup 2                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                  |  |
|                                                  | EUT Conf.       | 30 MHz -1 GHz                                                                                                                                                                                                                                                                                                                                                                                      | TM1_DH5_Ch0 (Worst Conf.).                                                                                                       |  |
|                                                  |                 | 1-3 GHz                                                                                                                                                                                                                                                                                                                                                                                            | TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78,<br>TM2_DH5_Ch0, TM2_DH5_Ch39, TM2_DH5_Ch78,<br>TM3_DH5_Ch0, TM3_DH5_Ch39, TM3_DH5_Ch78. |  |
|                                                  |                 | 3-18 GHz                                                                                                                                                                                                                                                                                                                                                                                           | TM1_DH5_Ch0 (Worse Conf.),<br>TM1_DH5_Ch39 (Worse Conf.),<br>TM1_DH5_Ch78 (Worse Conf.).                                         |  |
|                                                  |                 | 18-26.5 GHz                                                                                                                                                                                                                                                                                                                                                                                        | TM1_DH5_Ch0 (Worst Conf.).                                                                                                       |  |
| AC Power Line<br>Conducted<br>Emissions          | Meas. Method    | AC mains conducted.<br>Pre:           RBW = 10 kHz; Det. = Peak.<br>Final:        RBW = 9 kHz; Det. = CISPR Quasi-Peak & Average.                                                                                                                                                                                                                                                                  |                                                                                                                                  |  |
|                                                  | Test Env.       | NTNV                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                  |  |
|                                                  | Test Setup      | Test Setup 3                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                  |  |
|                                                  | EUT Conf.       | TM1_DH5_Ch39.                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                  |  |

## 5 Main Test Instruments

NOTE: Unless otherwise specified, the calibration intervals for test instruments were Annual (per year). The other intervals, if applicable, are marked with (##y), which denotes ## years calibration interval.

| Equipment Name                                  | Manufacturer | Model     | Serial Number | Cal Date   | Cal. Due   |
|-------------------------------------------------|--------------|-----------|---------------|------------|------------|
| Power supply                                    | KEITHLEY     | 2303      | 1288003       | 2012-11-09 | 2013-11-08 |
| Wireless Communication Test set                 | Agilent      | N4010A    | MY49081592    | 2012-11-09 | 2013-11-08 |
| Spectrum Analyzer                               | Agilent      | E4440A    | MY48250119    | 2012-07-18 | 2013-07-17 |
| Signal Analyzer                                 | R&S          | FSQ31     | 200021        | 2012-11-09 | 2013-11-08 |
| Spectrum Analyzer                               | Agilent      | N9030A    | MY49431698    | 2012-11-09 | 2013-11-08 |
| Temperature Chamber                             | WEISS        | WKL64     | 24600294      | 2013-01-29 | 2014-01-28 |
| Signal generator                                | Agilent      | E8257D    | MY49281095    | 2012-07-10 | 2013-07-09 |
| Test receiver                                   | R&S          | ESU26     | 100150        | 2012-09-30 | 2013-09-29 |
| Spectrum analyzer                               | R&S          | FSU3      | 200474        | 2012-03-06 | 2013-03-05 |
| Spectrum analyzer                               | R&S          | FSU43     | 100144        | 2012-03-06 | 2013-03-05 |
| Double-Ridged Waveguide Horn Antenna (1G~18GHz) | R&S          | HF907     | 100304        | 2012-04-06 | 2013-04-05 |
| Double-Ridged Waveguide Horn Antenna (1G~18GHz) | R&S          | HF907     | 100391        | 2012-10-12 | 2013-10-11 |
| Trilog Broadband Antenna (30M~3GHz)             | SCHWARZBECK  | VULB 9163 | 9163-521      | 2012-12-09 | 2013-12-08 |
| Pyramidal Horn Antenna(26GHz-40GHz)             | ETS-Lindgren | 3160-10   | 00123940      | 2013-02-28 | 2014-02-27 |
| Pyramidal Horn Antenna(18GHz-26.5GHz)           | ETS-Lindgren | 3160-09   | 00125912      | 2013-02-28 | 2014-02-27 |

END



# **Appendix A: 20dB Emission Bandwidth (EBW)**

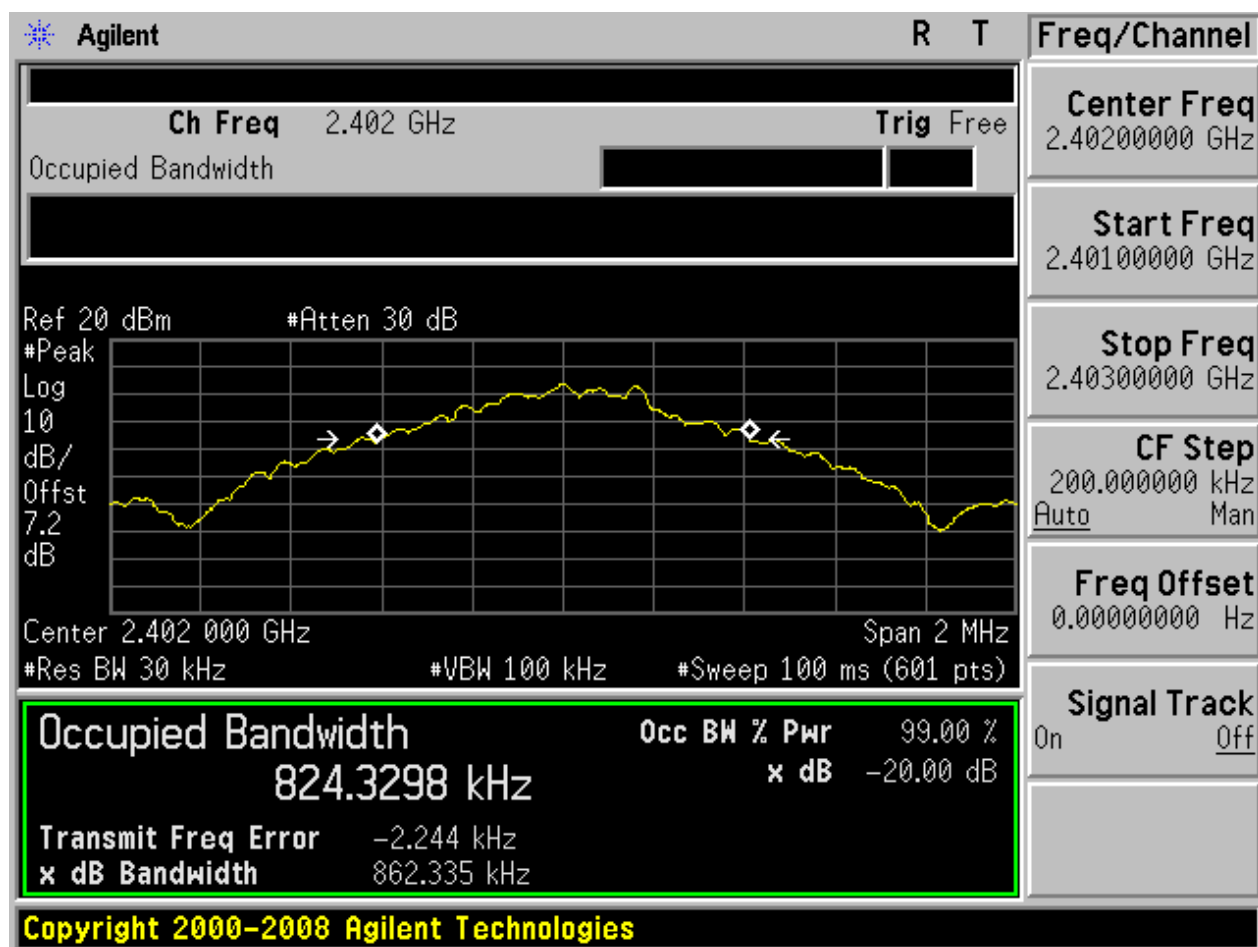


## 1 Result Table

| EUT Conf.     | EBW [MHz] | Verdict |
|---------------|-----------|---------|
| TM1_DH5_Ch0   | 0.862     | Pass    |
| TM1_DH5_Ch39  | 0.864     | Pass    |
| TM1_DH5_Ch78  | 0.862     | Pass    |
| TM2_2DH5_Ch0  | 1.280     | Pass    |
| TM2_2DH5_Ch39 | 1.280     | Pass    |
| TM2_2DH5_Ch78 | 1.278     | Pass    |
| TM3_3DH5_Ch0  | 1.279     | Pass    |
| TM3_3DH5_Ch39 | 1.281     | Pass    |
| TM3_3DH5_Ch78 | 1.276     | Pass    |

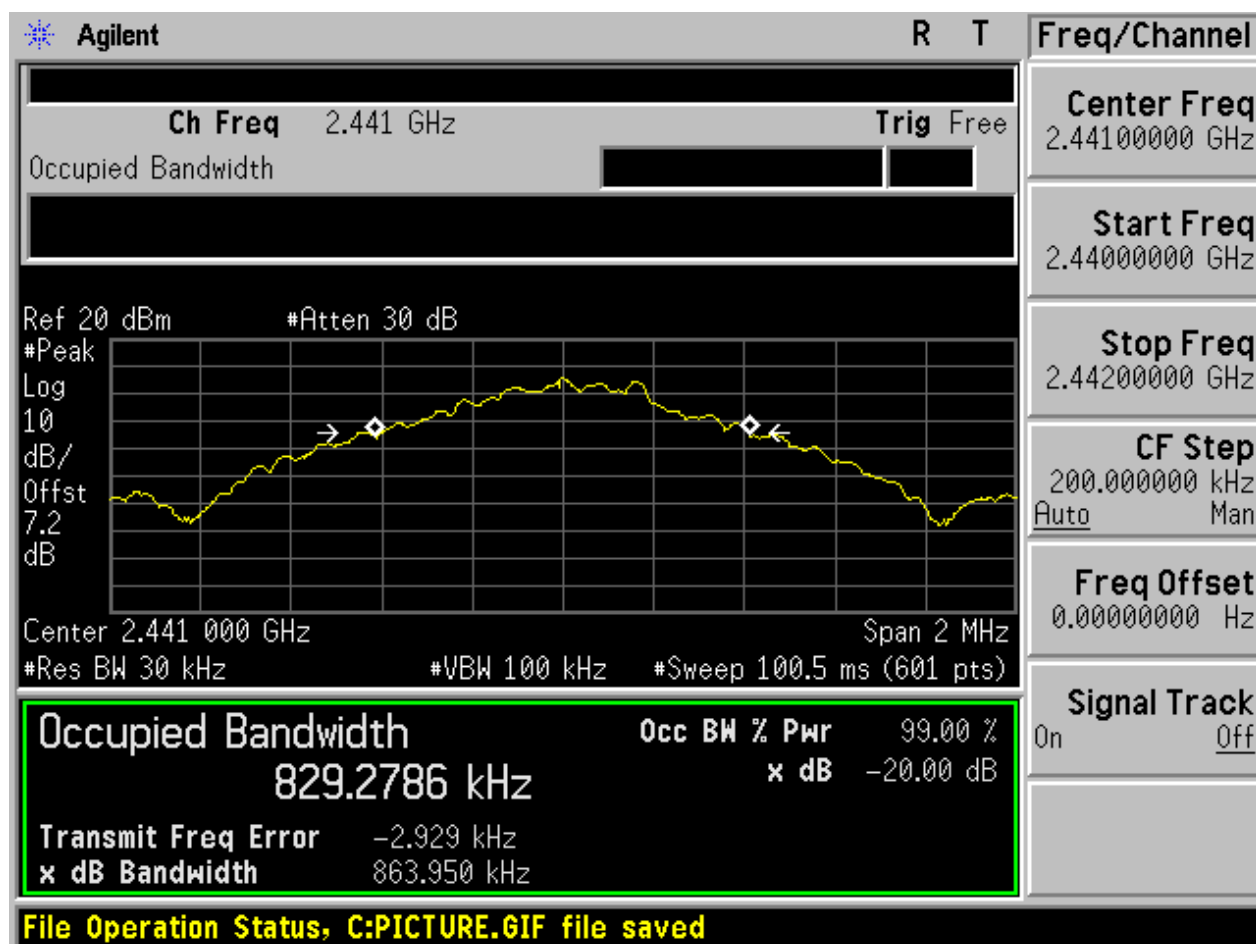


## 2.1 TM1\_DH5\_Ch0



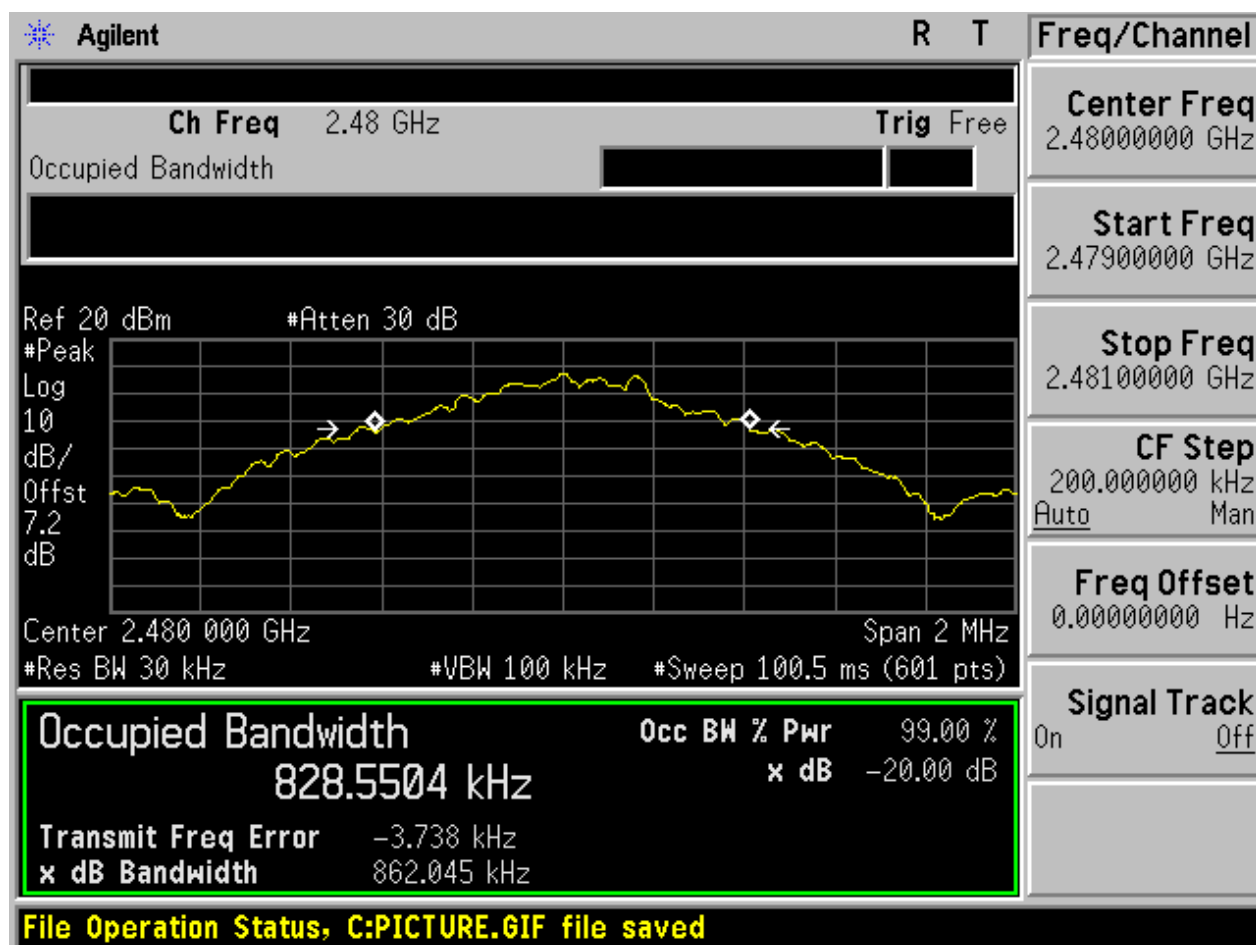


## 2.2 TM1\_DH5\_Ch39



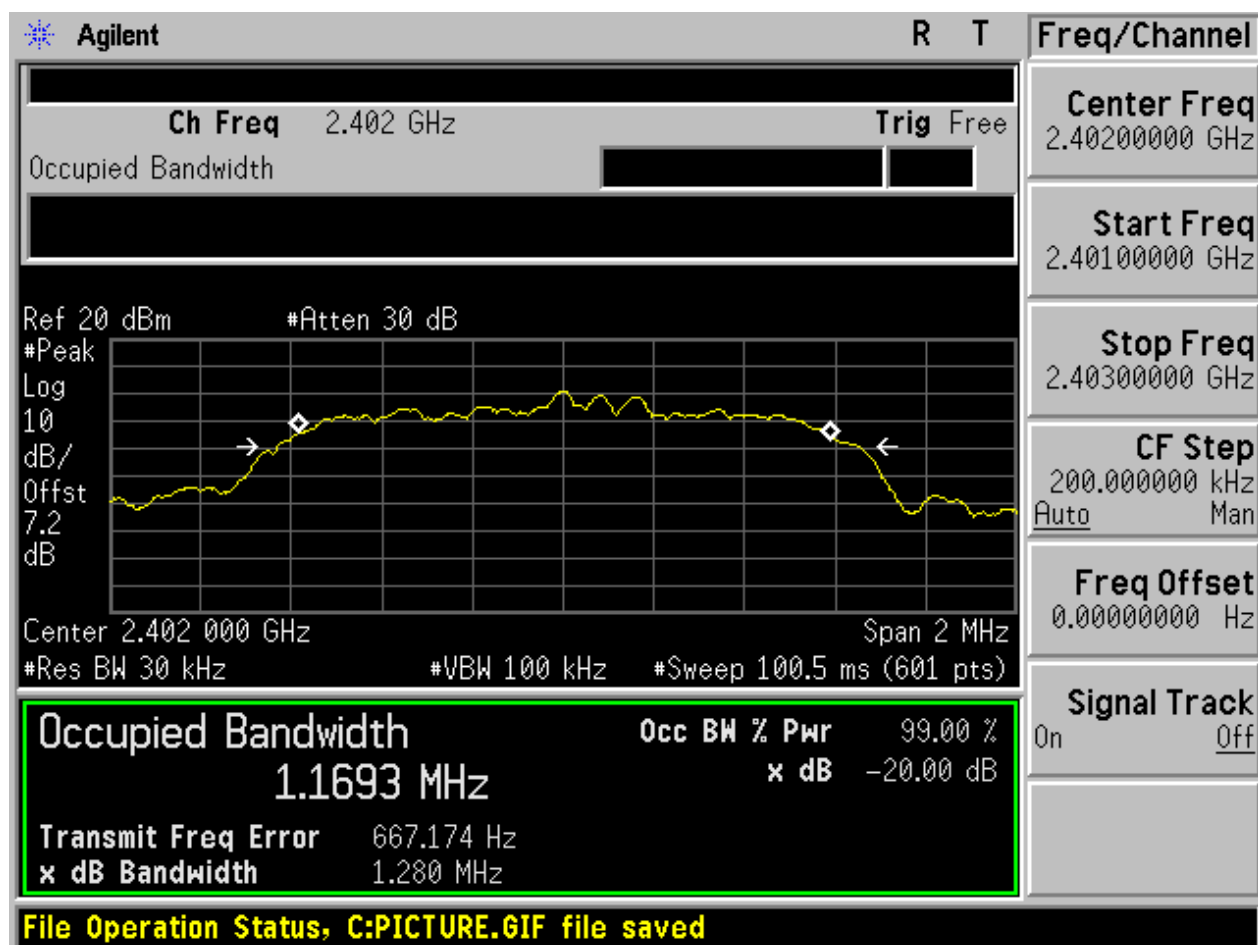


## 2.3 TM1\_DH5\_Ch78



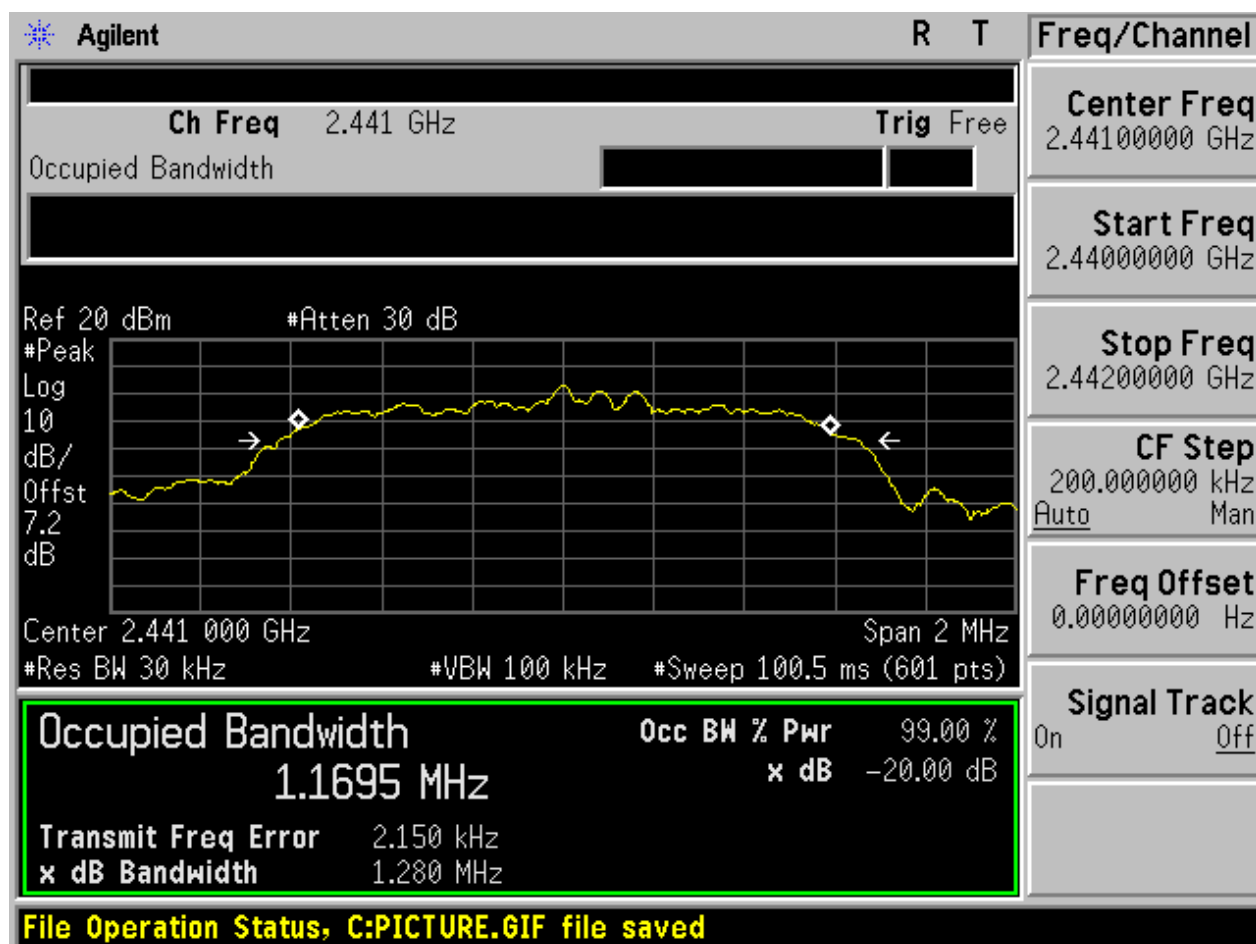


## 2.4 TM2\_2DH5\_Ch0



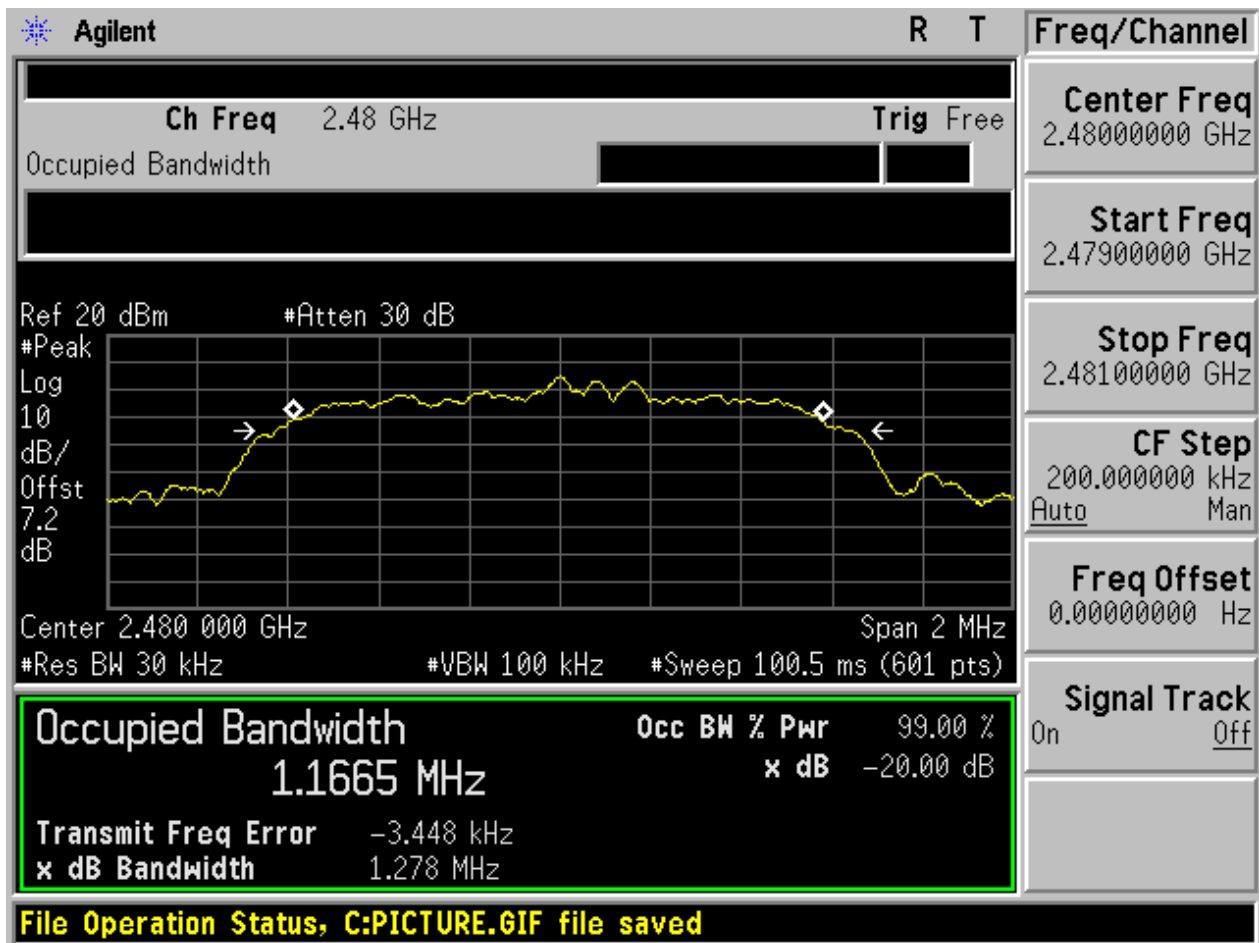


## 2.5 TM2\_2DH5\_Ch39



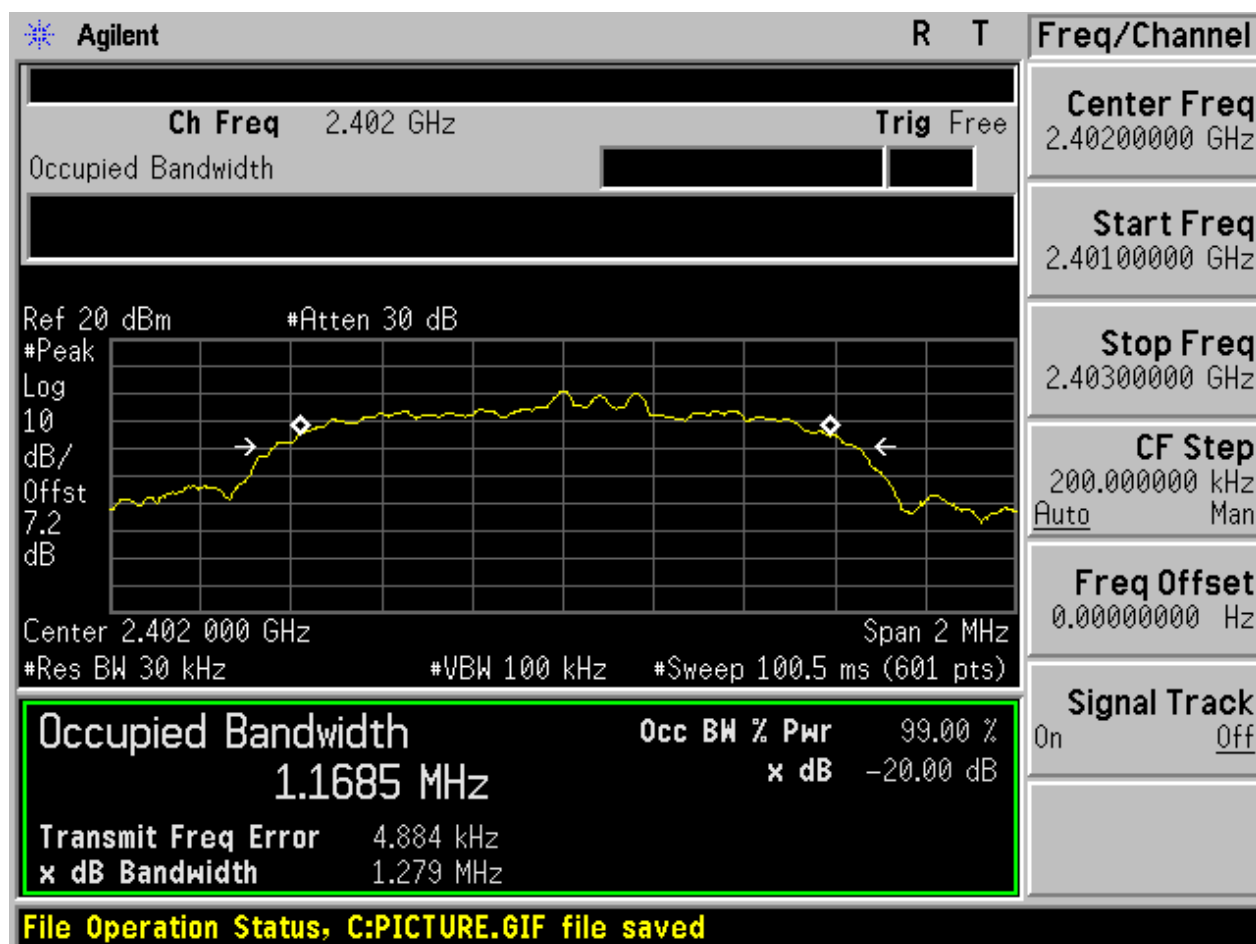


## 2.6 TM2\_2DH5\_Ch78



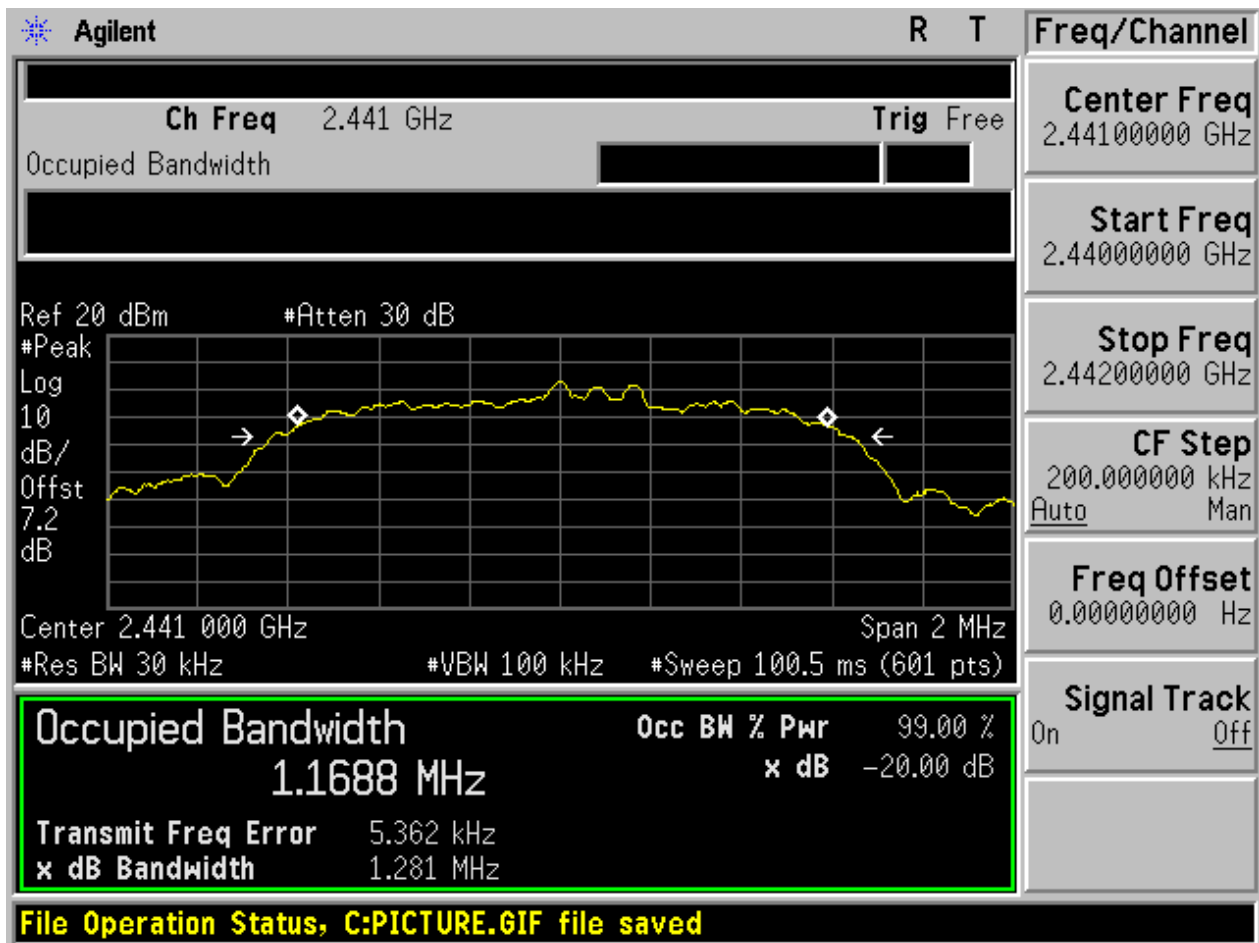


## 2.7 TM3\_3DH5\_Ch0



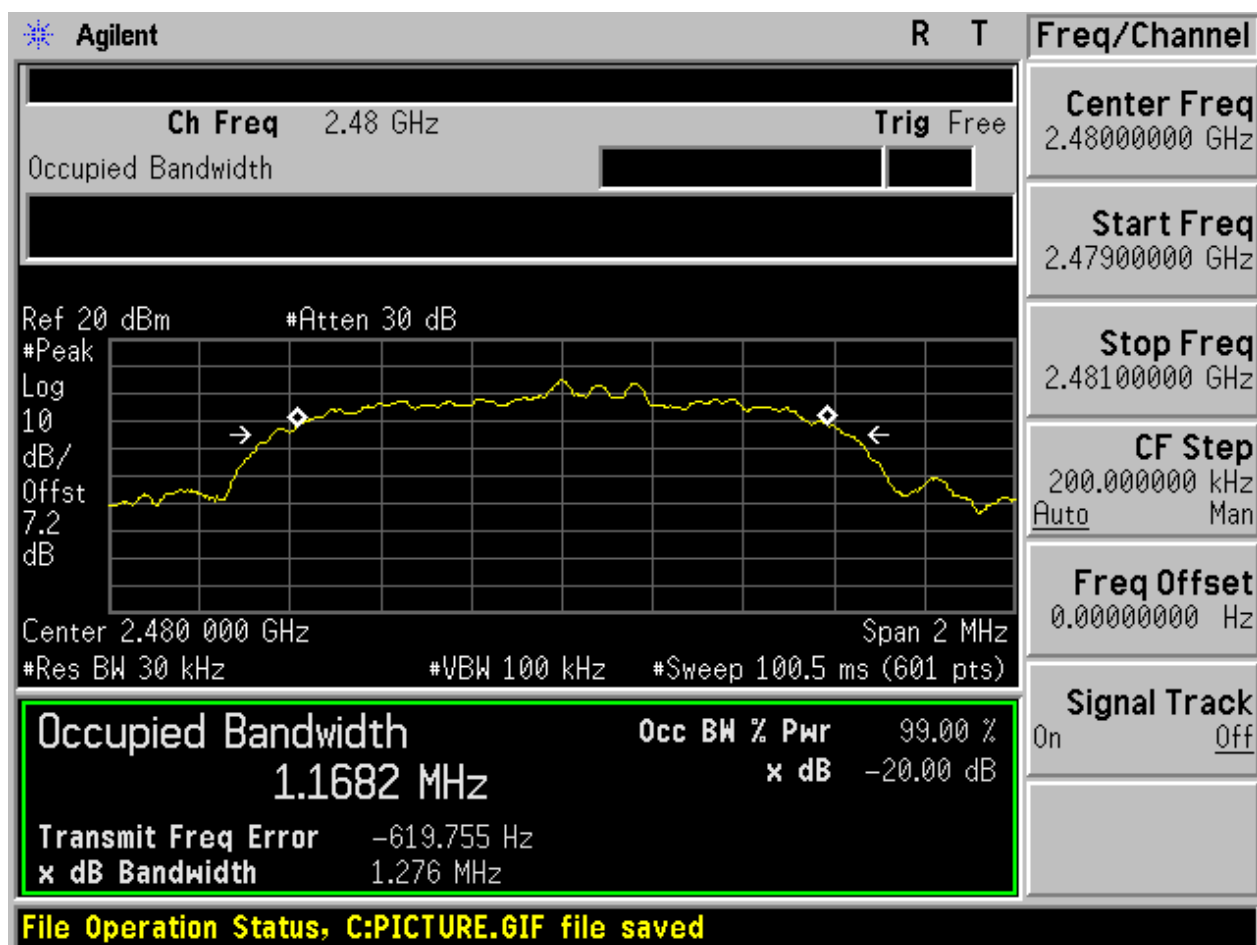


## 2.8 TM3\_3DH5\_Ch39





## 2.9 TM3\_3DH5\_Ch78





## **Appendix B: Carrier Frequency Separation**



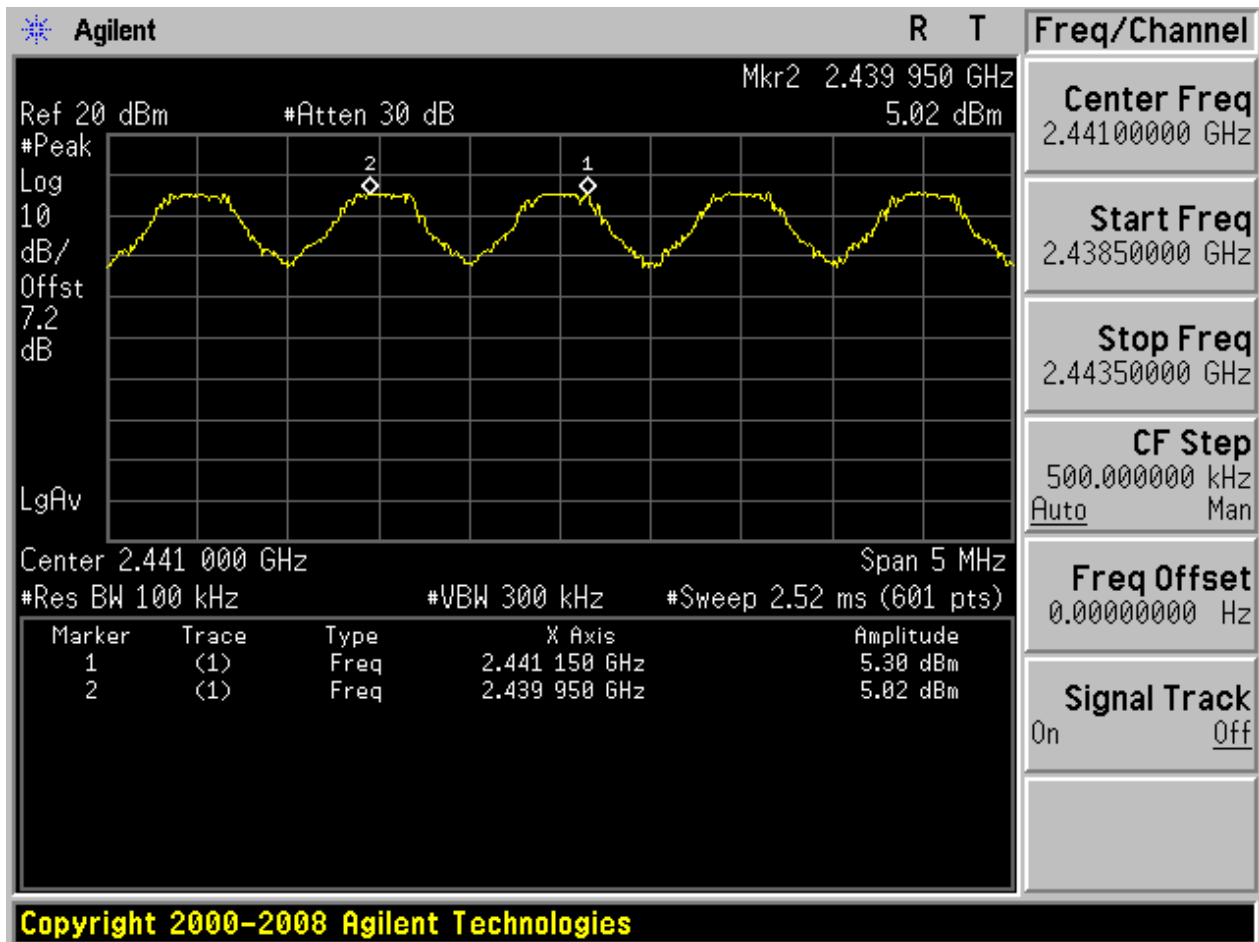
## 1 Result Table

| EUT Conf.    | Carrier Frequency Separation [MHz] | Verdict |
|--------------|------------------------------------|---------|
| TM1_DH5_Hop  | 1.200                              | Pass    |
| TM2_2DH5_Hop | 1.150                              | Pass    |
| TM3_3DH5_Hop | 1.000                              | Pass    |



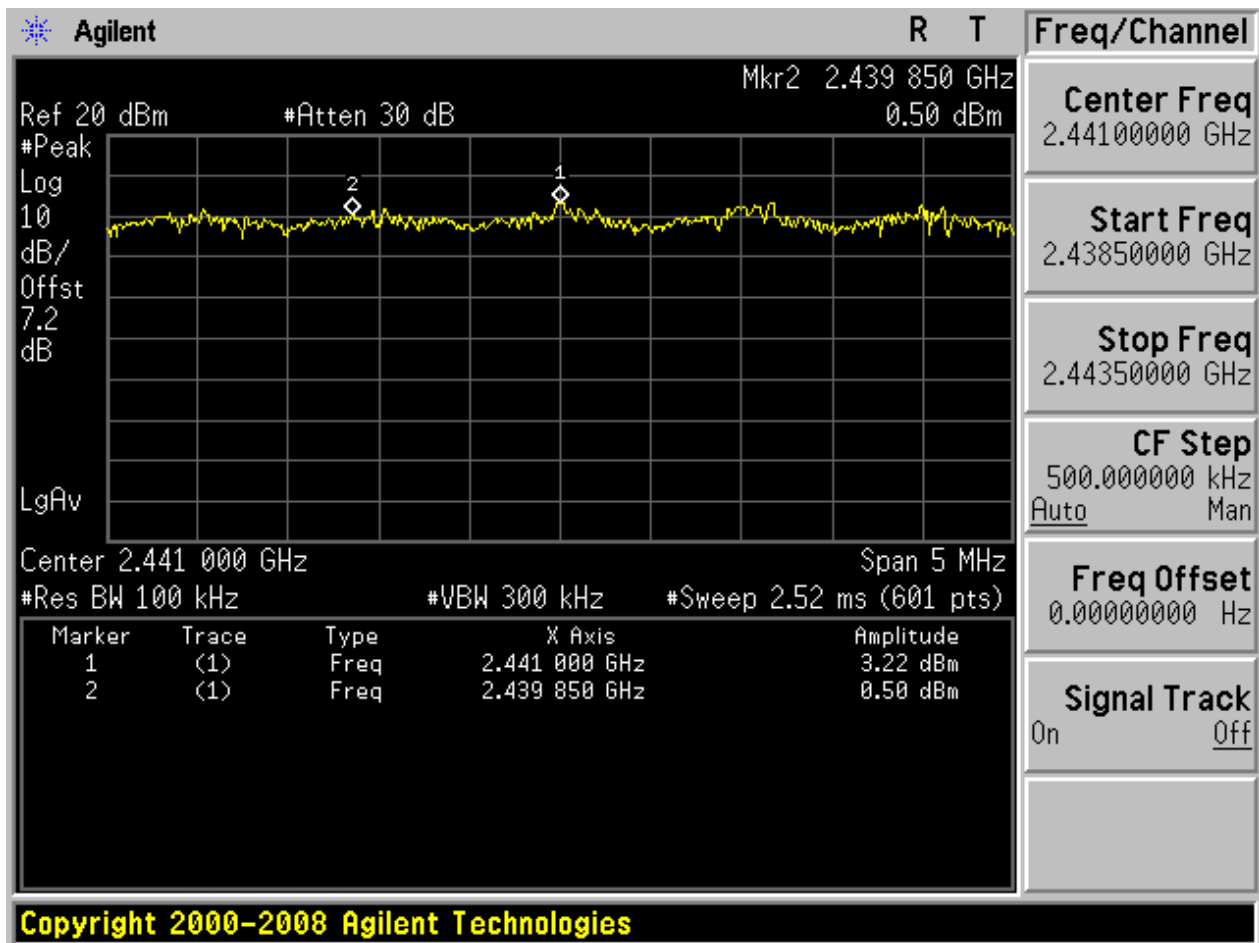
## 2 Test Plot

### 2.1 TM1\_DH5\_Hop



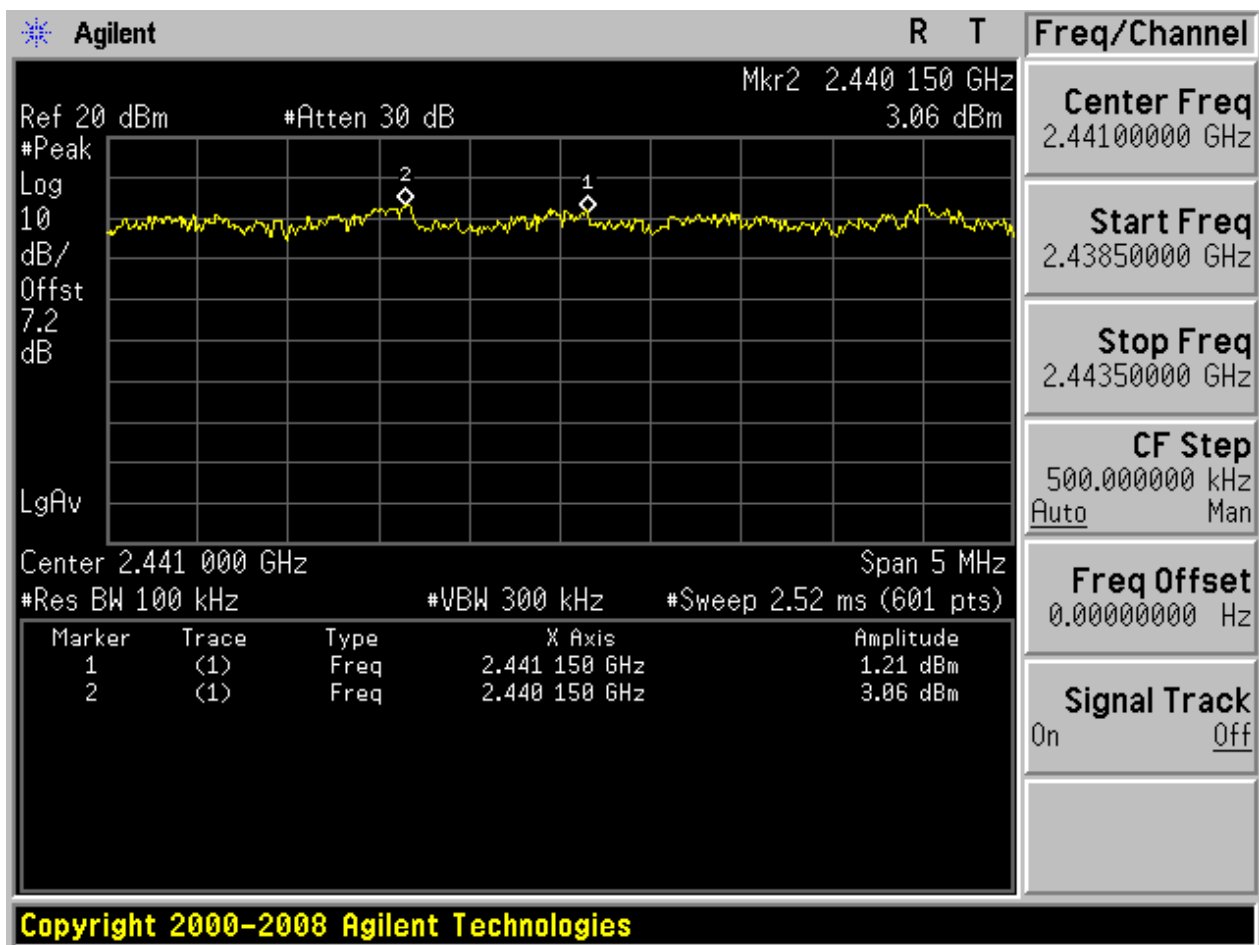


## 2.2 TM2\_2DH5\_Hop





## 2.3 TM3\_3DH5\_Hop





## Appendix C: Number of Hopping Channel



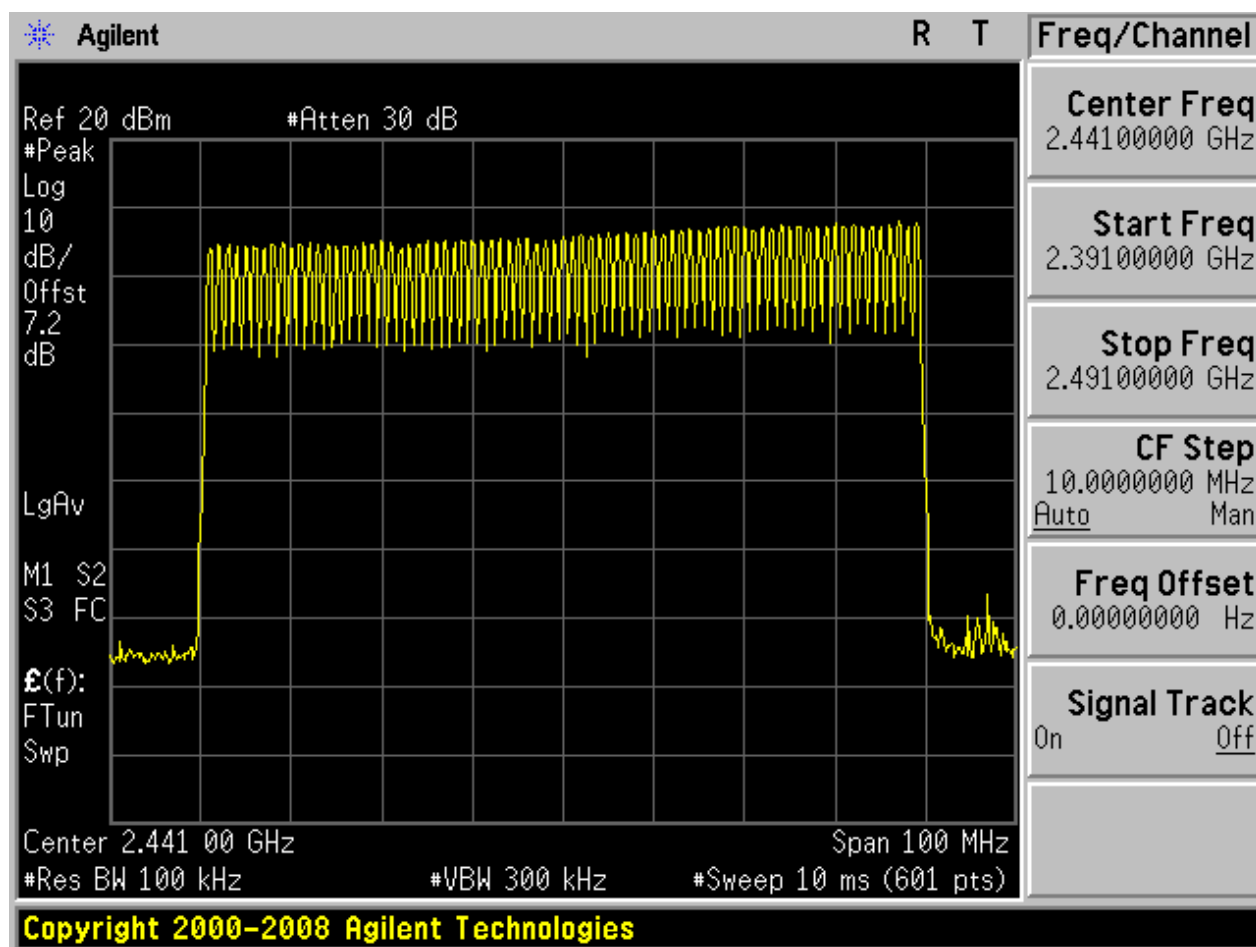
## 1 Result Table

| EUT Conf.    | Number of Hopping Channel | Verdict |
|--------------|---------------------------|---------|
| TM1_DH5_Hop  | 79                        | Pass    |
| TM2_2DH5_Hop | 79                        | Pass    |
| TM3_3DH5_Hop | 79                        | Pass    |



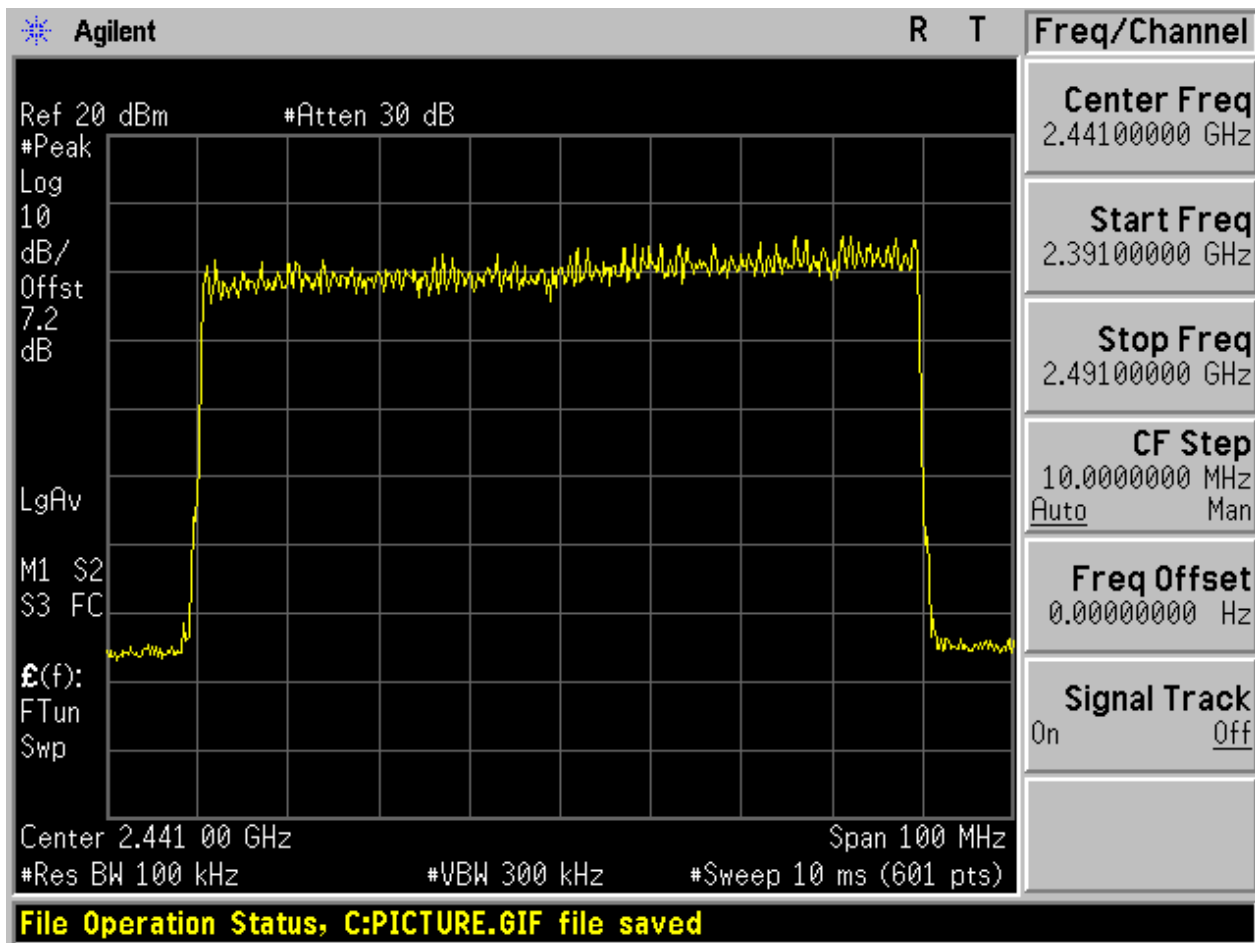
## 2 Test Plot

### 2.1 TM1\_DH5\_Hop



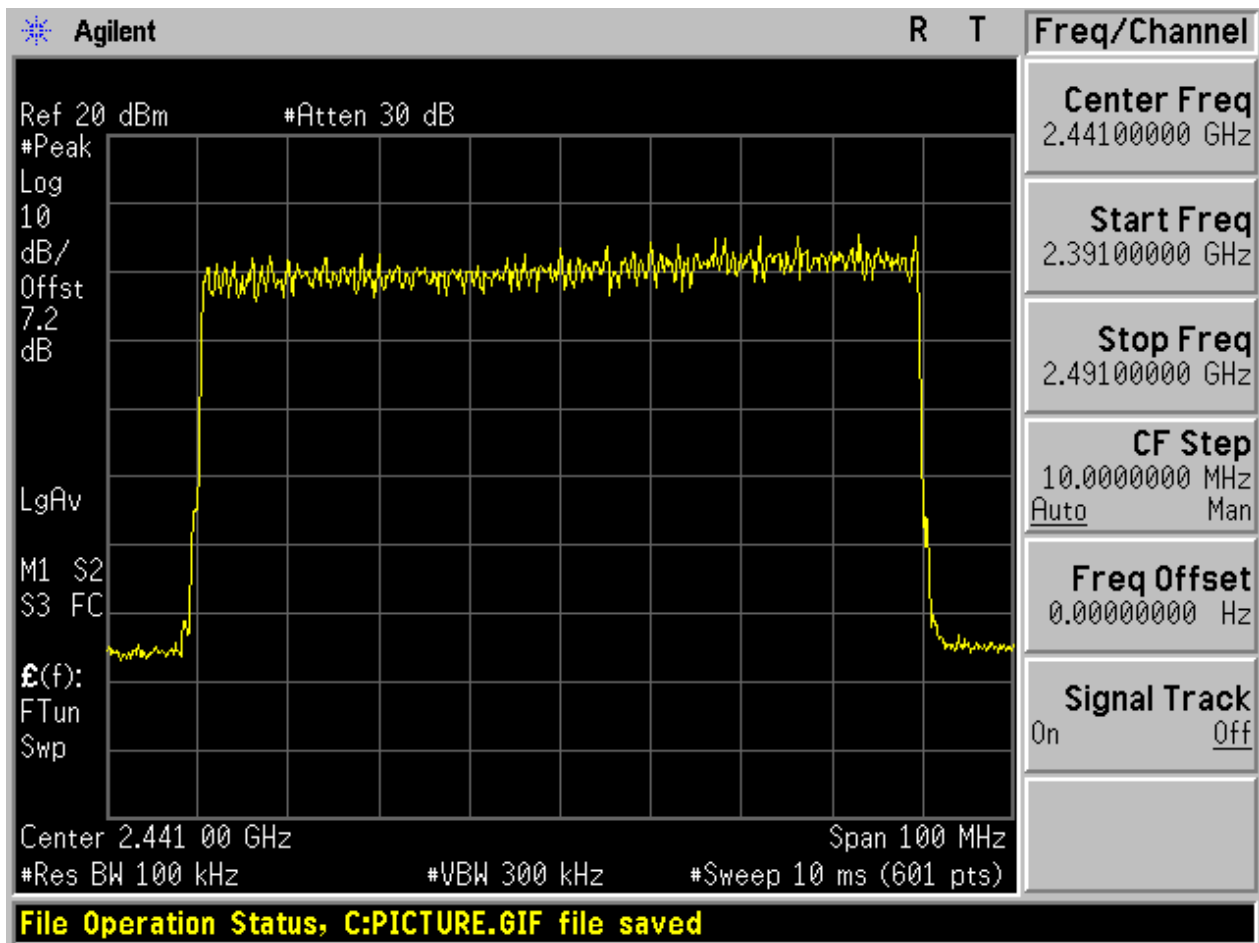


## 2.2 TM2\_2DH5\_Hop





## 2.3 TM3\_3DH5\_Hop





## **Appendix D: Time of Occupancy (Dwell Time)**

## 1 Result Table

The Dwell Time = Burst Width \* Total Hops. The detailed calculations are showed as follows:

- The duration for dwell time calculation:  $0.4 \text{ [s]} * \text{hopping number} = 0.4 \text{ [s]} * 79 \text{ [ch]} = 31.6 \text{ [s*ch]}$ ;
- The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop.
- The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600 [ch\*hop/s] for all channels. So the final hopping rate for all channels is  $1600 / 6 = 266.67 \text{ [ch*hop/s]}$ ;
- The hops per second on one channel:  $266.67 \text{ [ch*hop/s]} / 79 \text{ [ch]} = 3.38 \text{ [hop/s]}$ ;
- The total hops for all channels within the dwell time calculation duration:  $3.38 \text{ [hop/s]} * 31.6 \text{ [s*ch]} = 106.67 \text{ [hop*ch]}$ ;
- The dwell time for all channels hopping:  $106.67 \text{ [hop*ch]} * \text{Burst Width [ms/hop/ch]}$ .

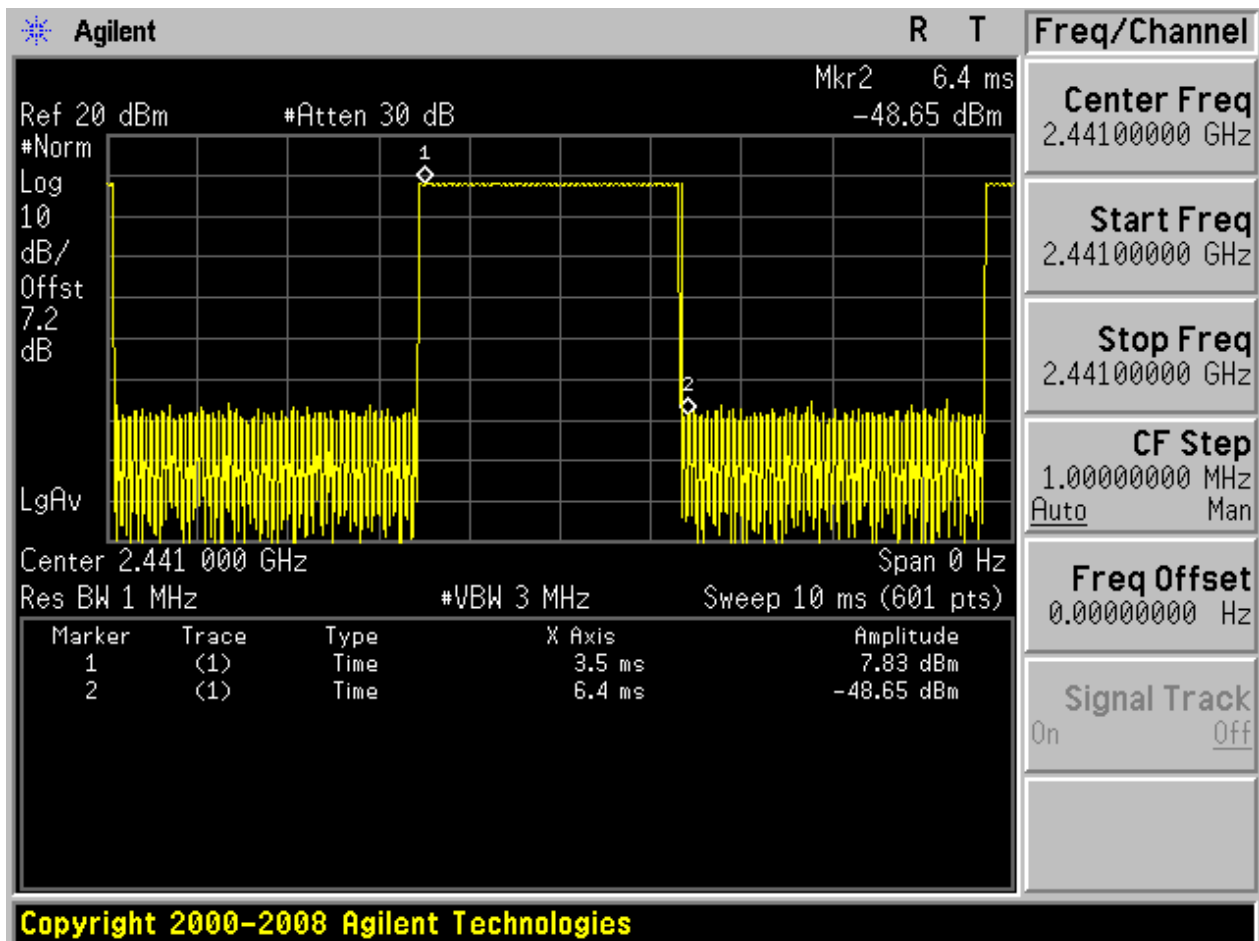
| EUT Conf.     | Burst Width [ms/hop/ch] | Total Hops [hop*ch] | Dwell Time [s] | Verdict |
|---------------|-------------------------|---------------------|----------------|---------|
| TM1_DH5_Ch39  | 2.900                   | 106.67              | 0.309          | Pass    |
| TM2_2DH5_Ch39 | 3.000                   | 106.67              | 0.320          | Pass    |
| TM3_3DH5_Ch39 | 3.000                   | 106.67              | 0.320          | Pass    |



## 2 Test Plot

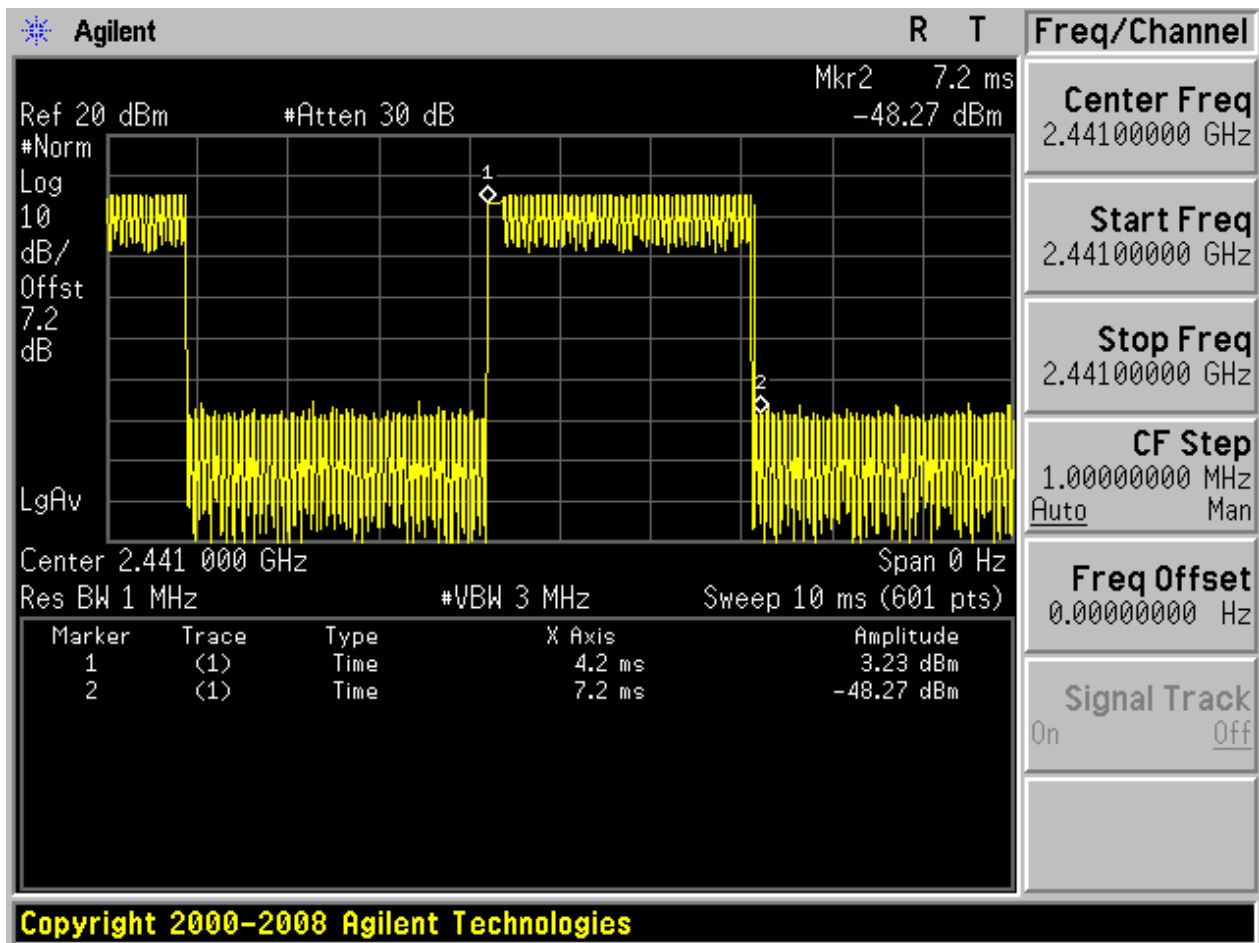
NOTE: The test plots are only for Burst Width measurements.

### 2.1 TM1\_DH5\_Ch39



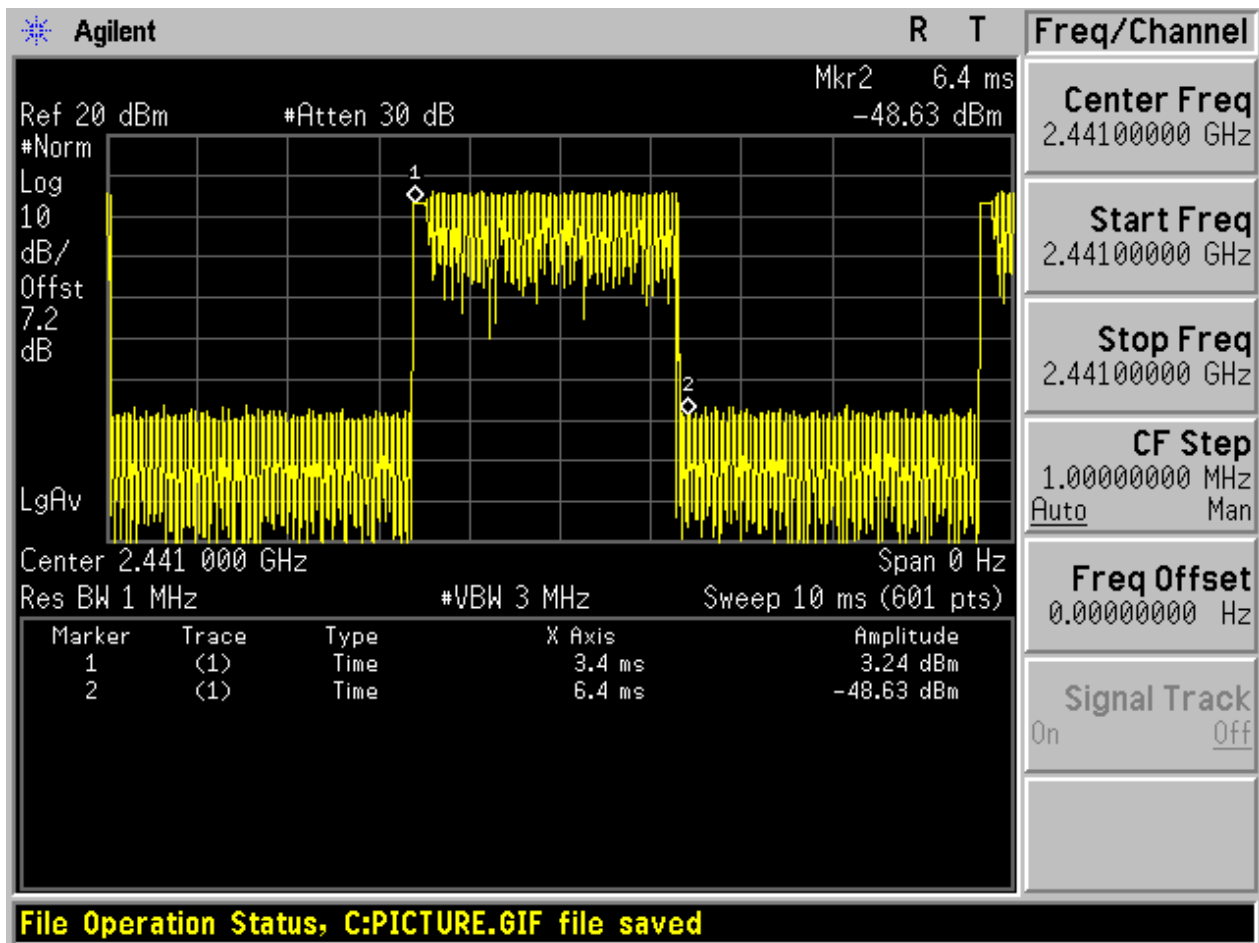


## 2.2 TM2\_2DH5\_Ch39





## 2.3 TM3\_3DH5\_Ch39





## **Appendix E: Maximum Peak Conducted Output Power**



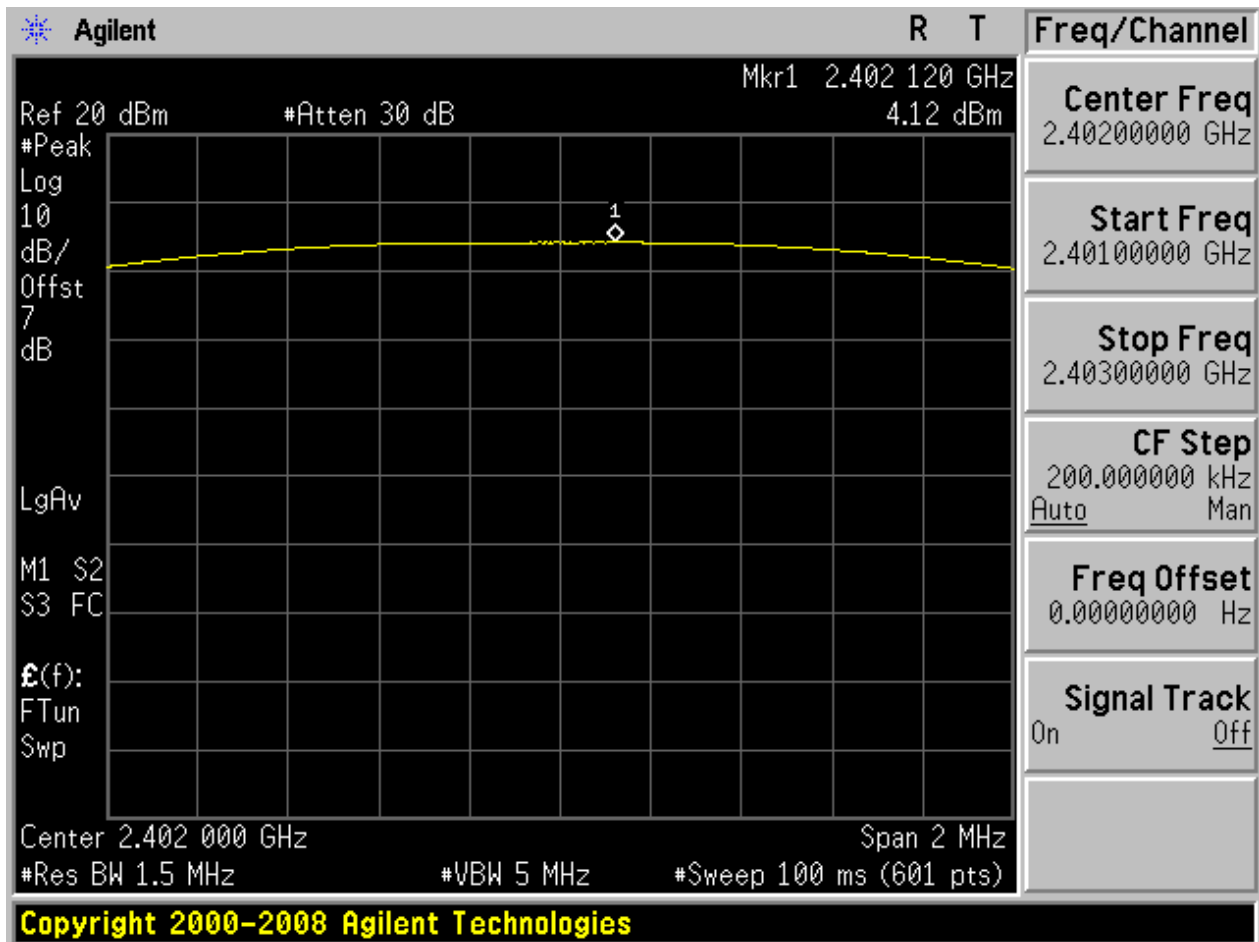
## 1 Result Table

| EUT Conf.     | Max. Peak Power [dBm] | Verdict |
|---------------|-----------------------|---------|
| TM1_DH5_Ch0   | 4.12                  | Pass    |
| TM1_DH5_Ch39  | 5.95                  | Pass    |
| TM1_DH5_Ch78  | 7.68                  | Pass    |
| TM2_2DH5_Ch0  | 3.82                  | Pass    |
| TM2_2DH5_Ch39 | 5.64                  | Pass    |
| TM2_2DH5_Ch78 | 7.42                  | Pass    |
| TM3_3DH5_Ch0  | 4.55                  | Pass    |
| TM3_3DH5_Ch39 | 6.33                  | Pass    |
| TM3_3DH5_Ch78 | 8.01                  | Pass    |



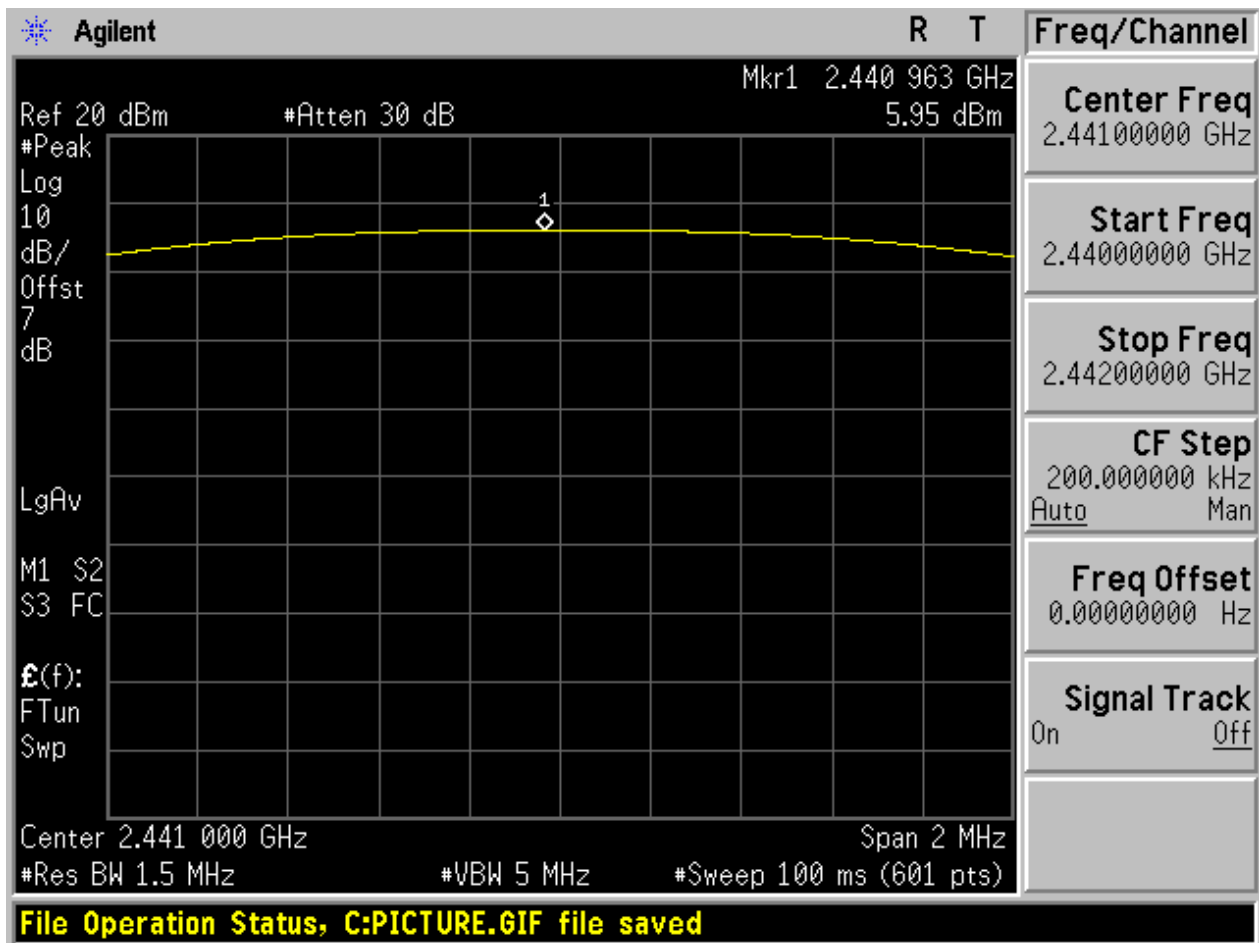
## 2 Test Plot

### 2.1 TM1\_DH5\_Ch0



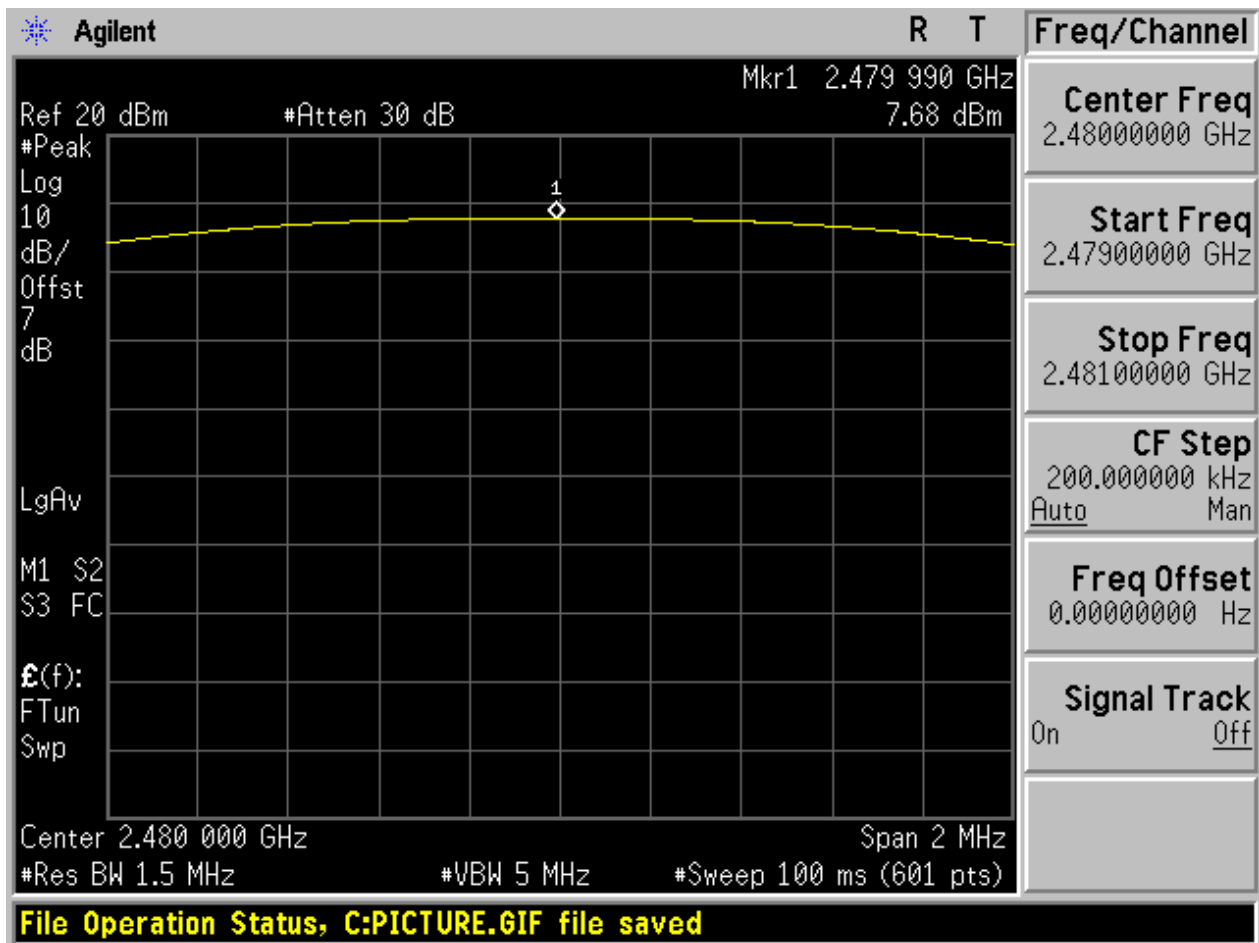


## 2.2 TM1\_DH5\_Ch39



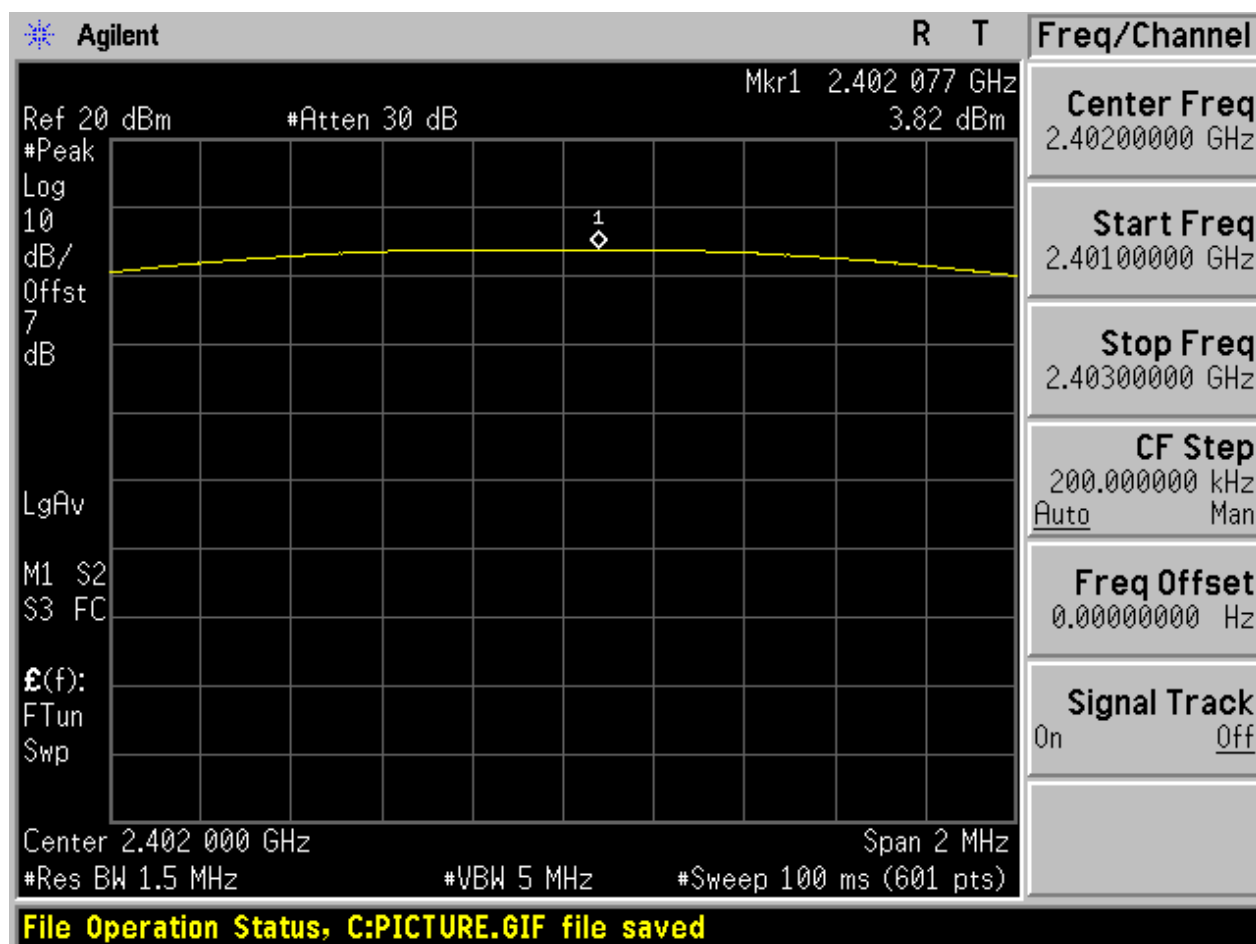


## 2.3 TM1\_DH5\_Ch78



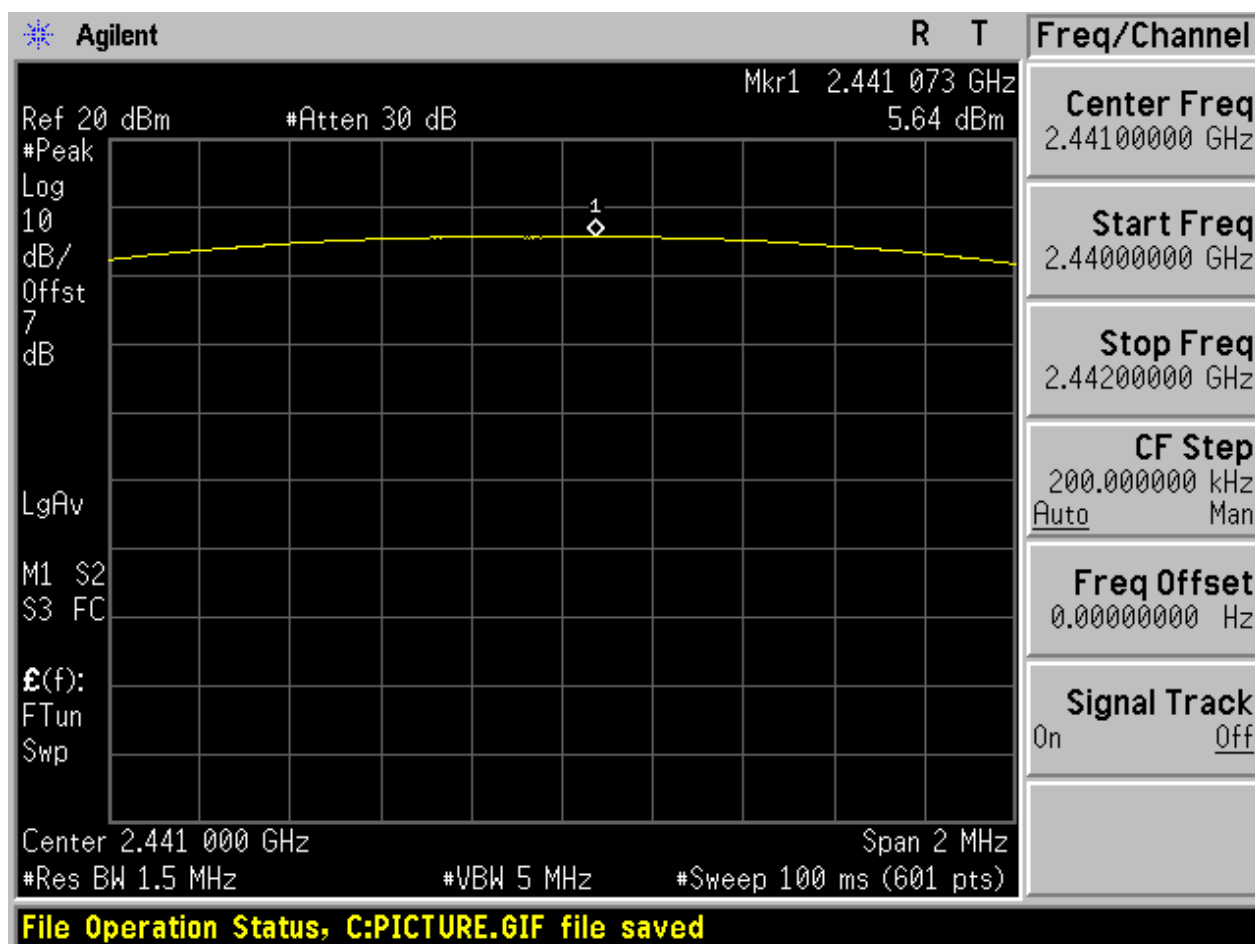


## 2.4 TM2\_2DH5\_Ch0



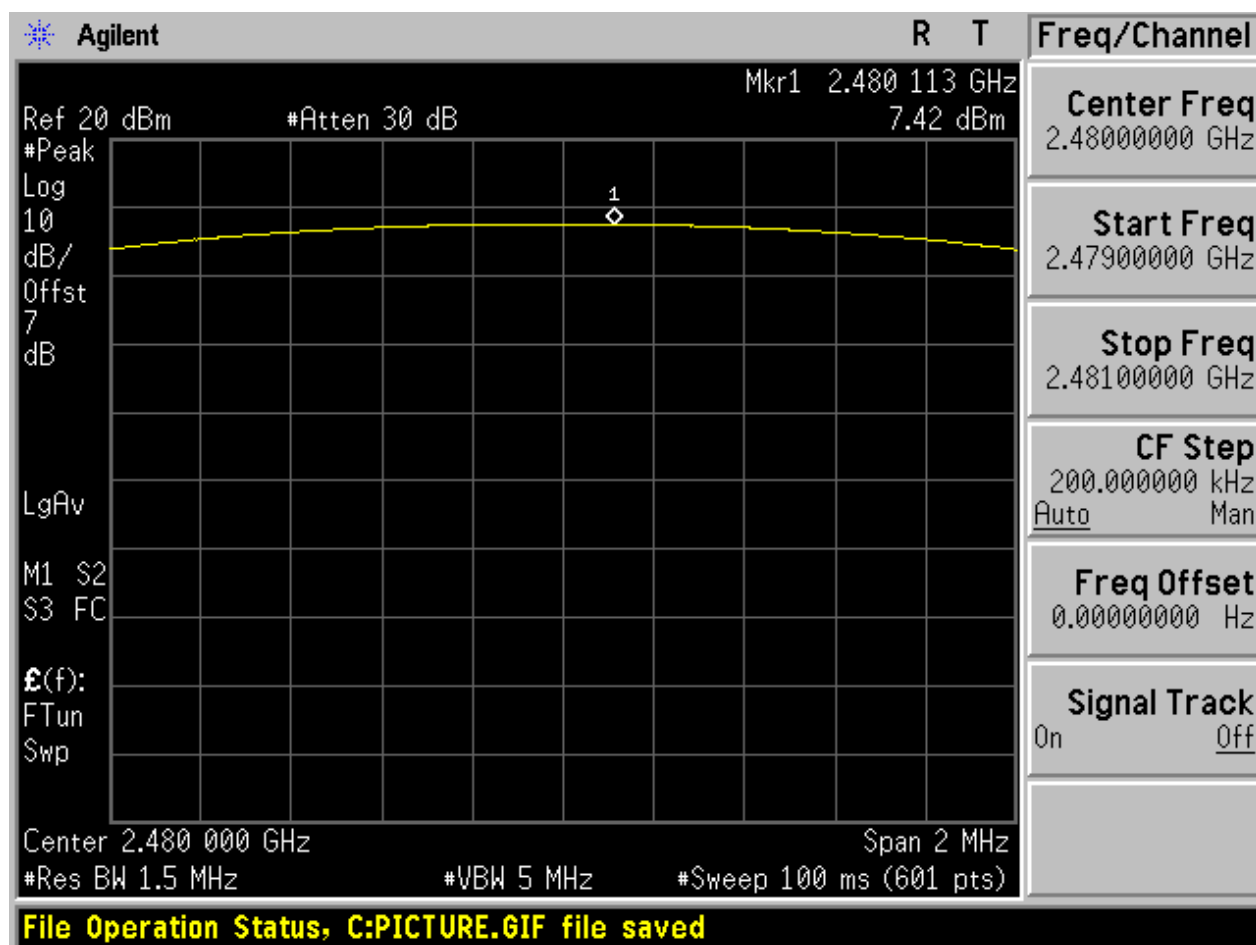


## 2.5 TM2\_2DH5\_Ch39



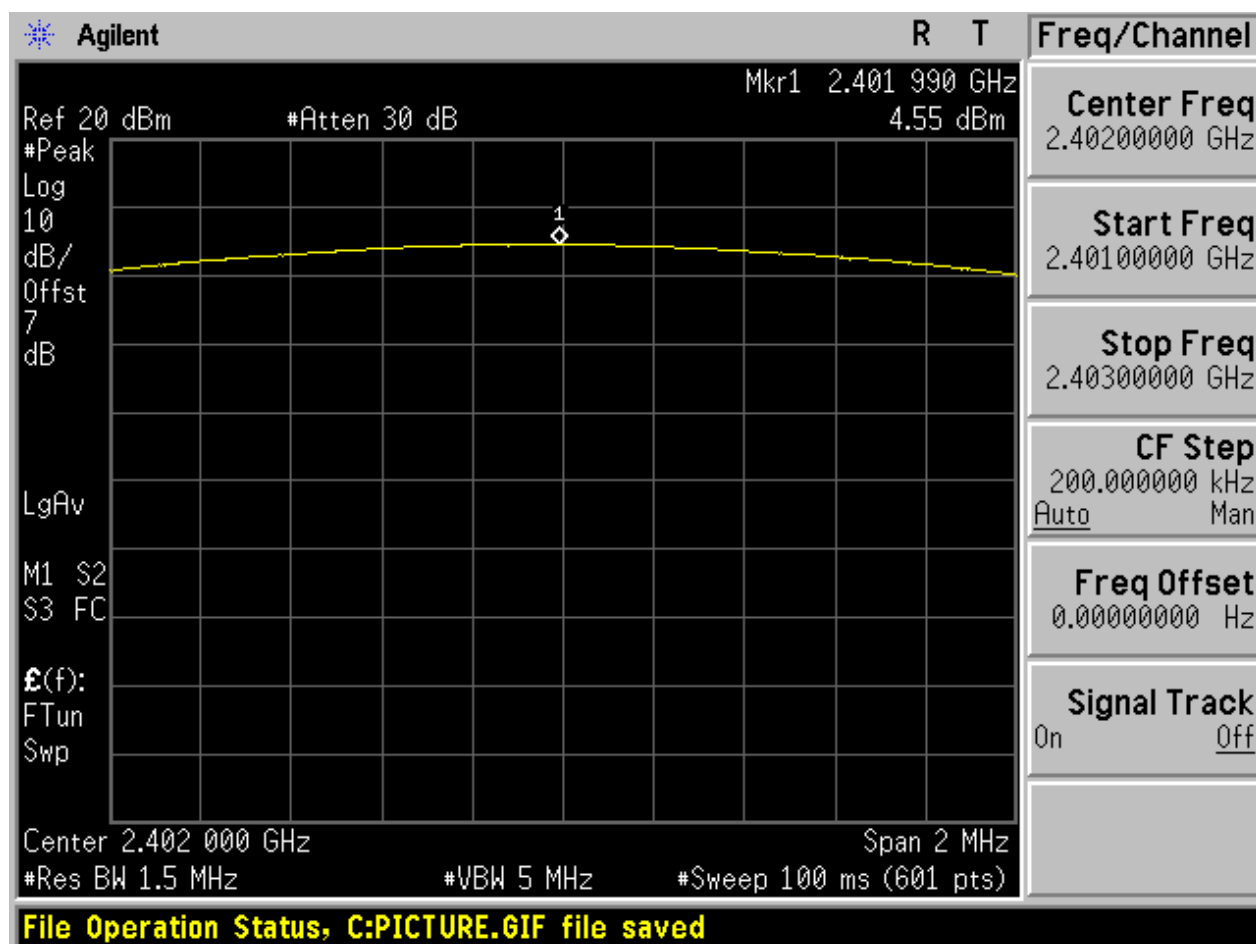


## 2.6 TM2\_2DH5\_Ch78



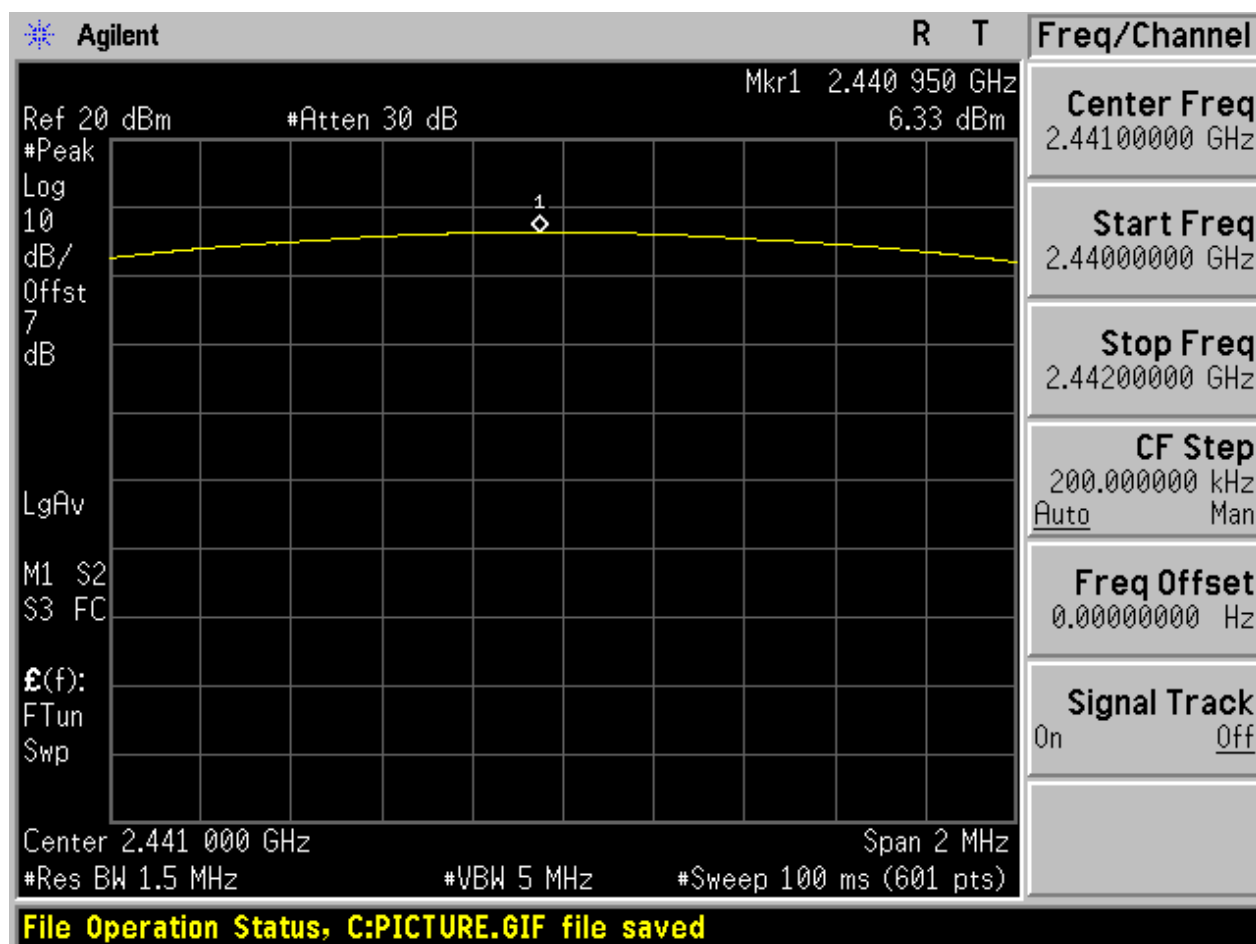


## 2.7 TM3\_3DH5\_Ch0



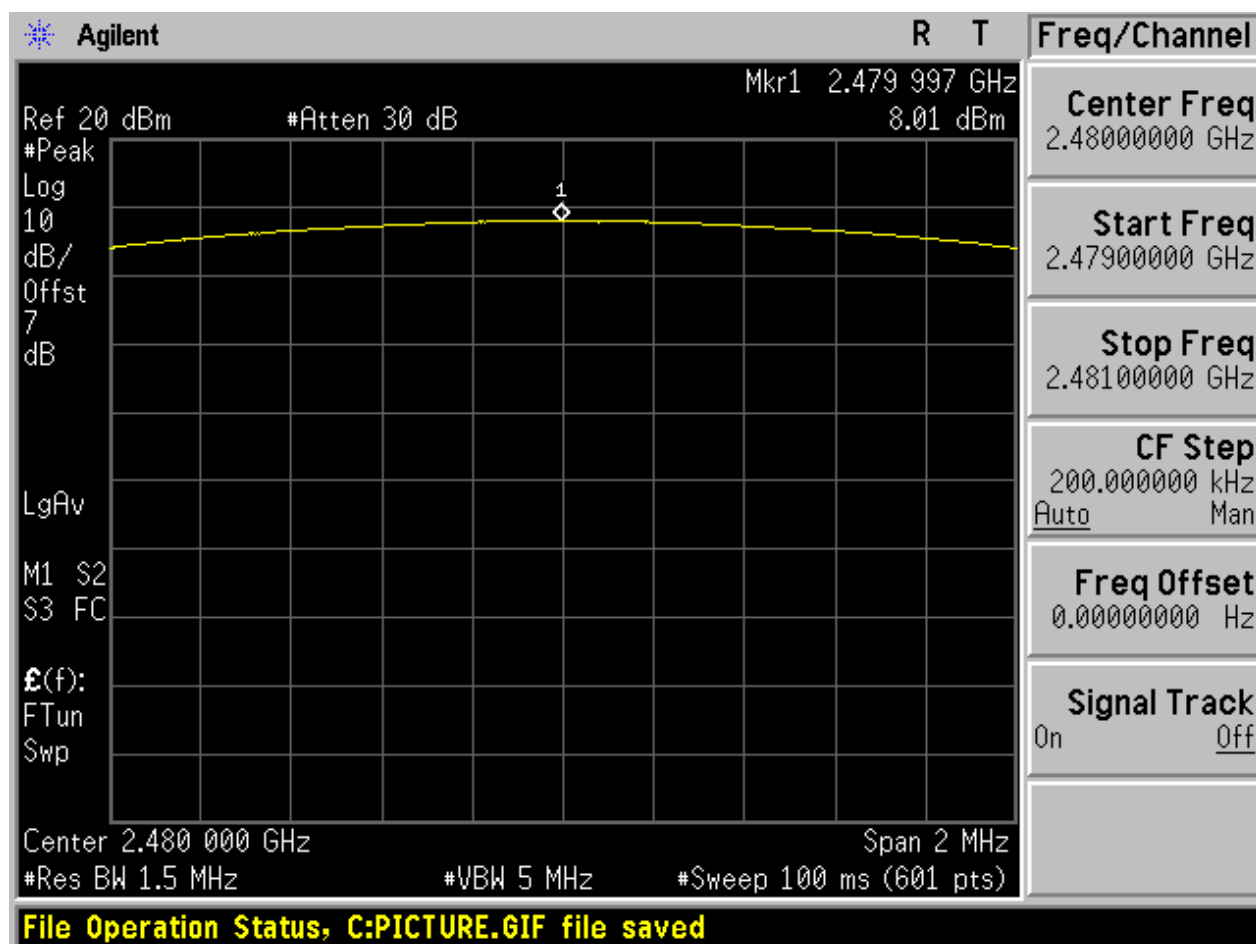


## 2.8 TM3\_3DH5\_Ch39





## 2.9 TM3\_3DH5\_Ch78





## **Appendix F: Band edge spurious emission**

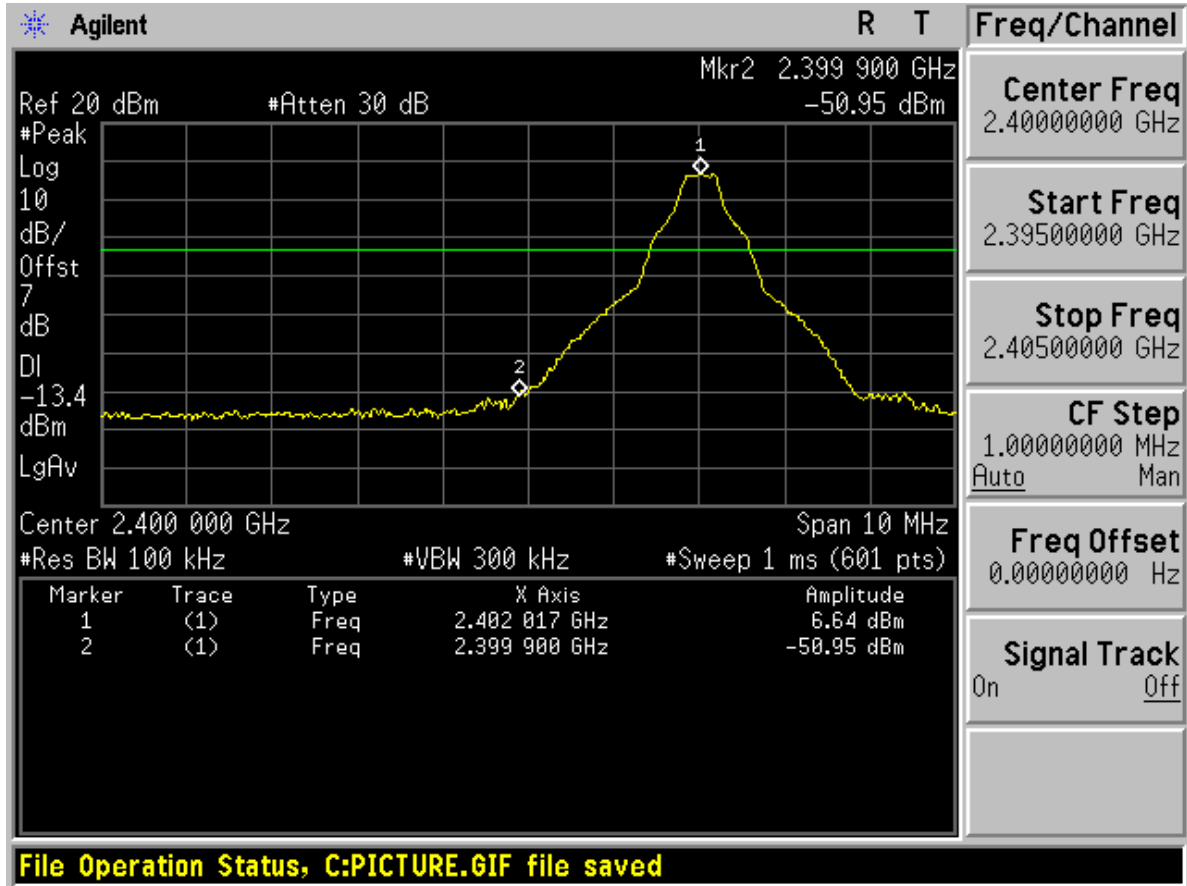
## 1 Result Table

| EUT Conf.      | Channel No. | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max. Spurious Level [dBm] | Limit [dBm] | Result |
|----------------|-------------|-------------------------|---------------------|-------------------|---------------------------|-------------|--------|
| TM1_DH5_Ch0    | 0           | 2402                    | 6.64                | Off               | -50.95                    | -13.36      | Pass   |
|                | -           | -                       | 6.13                | On                | -54.30                    | -13.87      | Pass   |
| TM1_DH5_Ch78   | 78          | 2480                    | 7.77                | Off               | -54.17                    | -12.23      | Pass   |
|                | -           | -                       | 7.58                | On                | -54.13                    | -12.42      | Pass   |
| TM2_2DH_5_Ch0  | 0           | 2402                    | 1.40                | Off               | -50.84                    | -18.60      | Pass   |
|                | -           | -                       | 1.58                | On                | -53.07                    | -18.42      | Pass   |
| TM2_2DH_5_Ch78 | 78          | 2480                    | 5.24                | Off               | -51.90                    | -14.76      | Pass   |
|                | -           | -                       | 4.06                | On                | -48.98                    | -15.94      | Pass   |
| TM3_3DH_5_Ch0  | 0           | 2402                    | 1.39                | Off               | -50.22                    | -18.61      | Pass   |
|                | -           | -                       | 1.43                | On                | -52.12                    | -18.57      | Pass   |
| TM3_3DH_5_Ch78 | 78          | 2480                    | 5.33                | Off               | -50.20                    | -14.66      | Pass   |
|                | -           | -                       | 3.39                | On                | -53.58                    | -16.61      | Pass   |

## 2 Test Plot

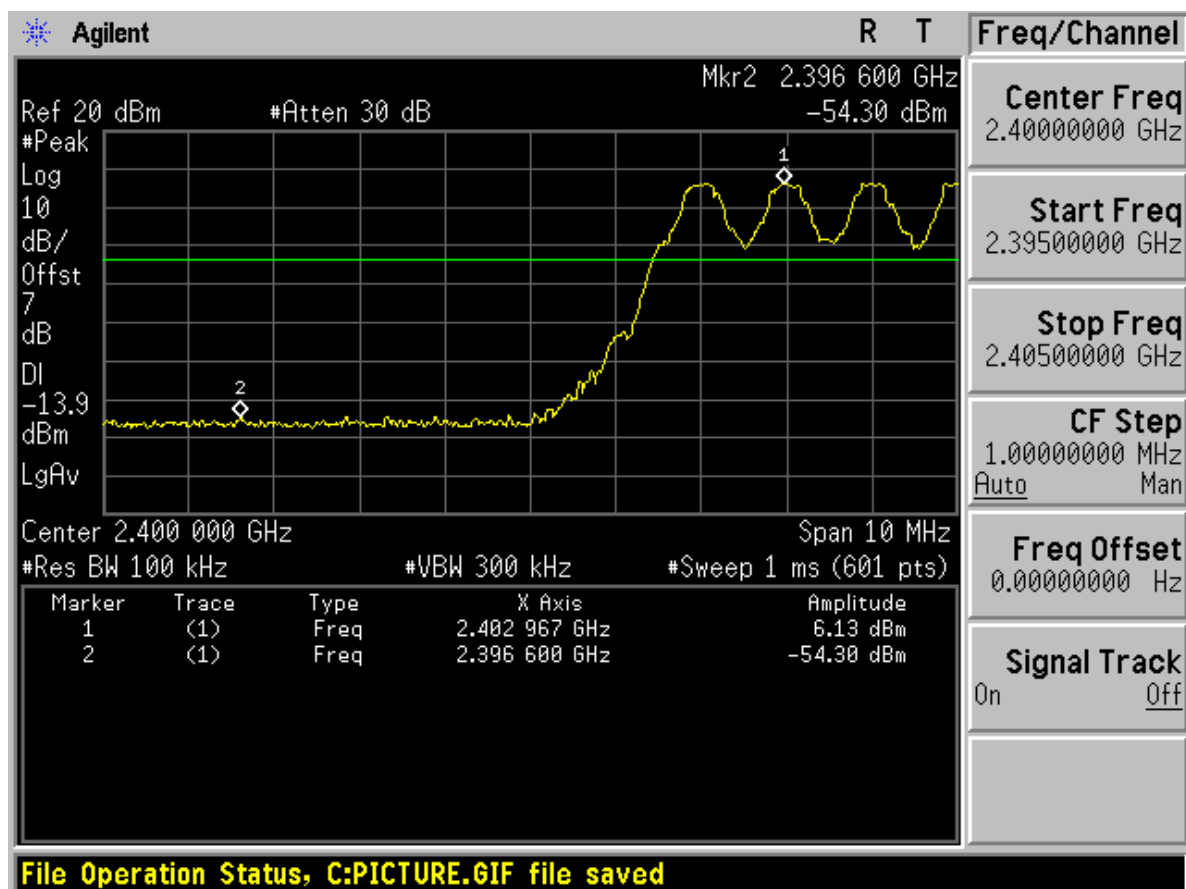
### 2.1 TM1\_DH5\_Ch0

No hopping





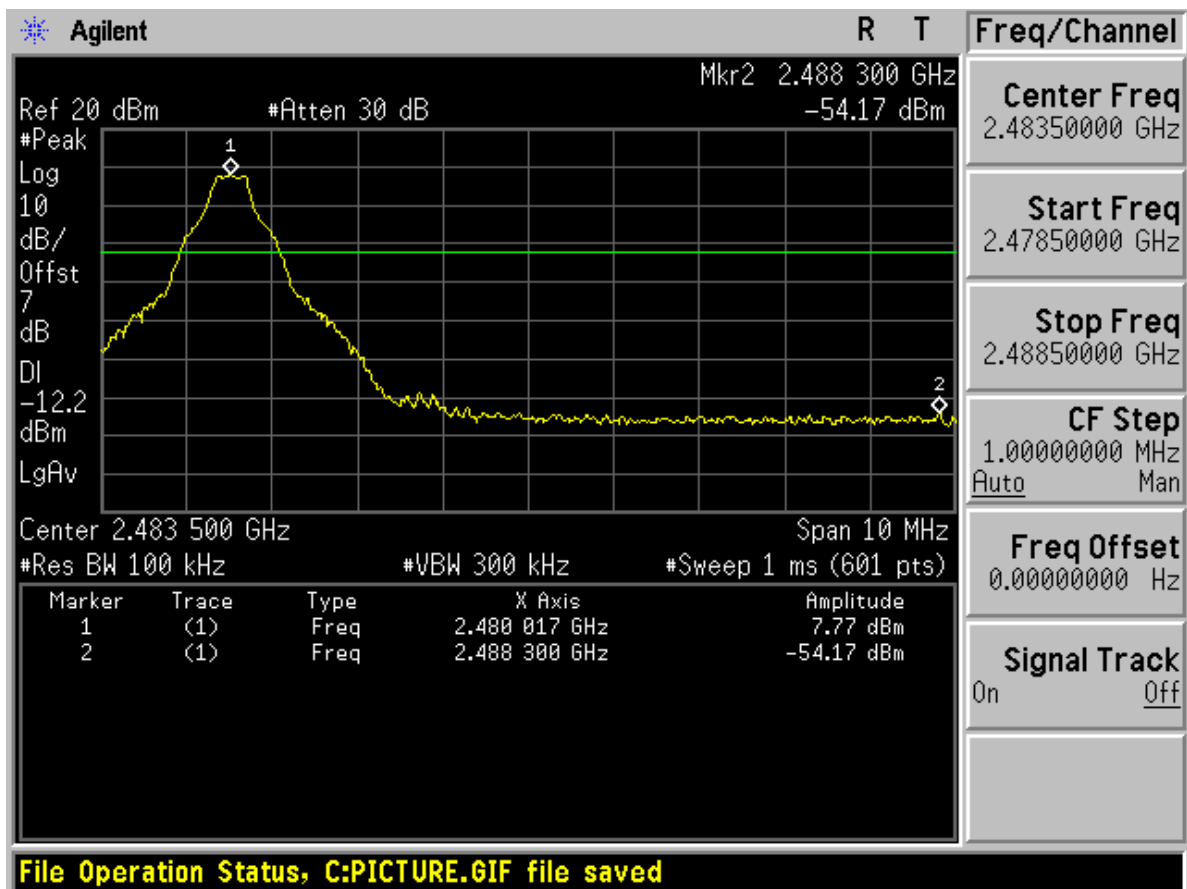
With hopping





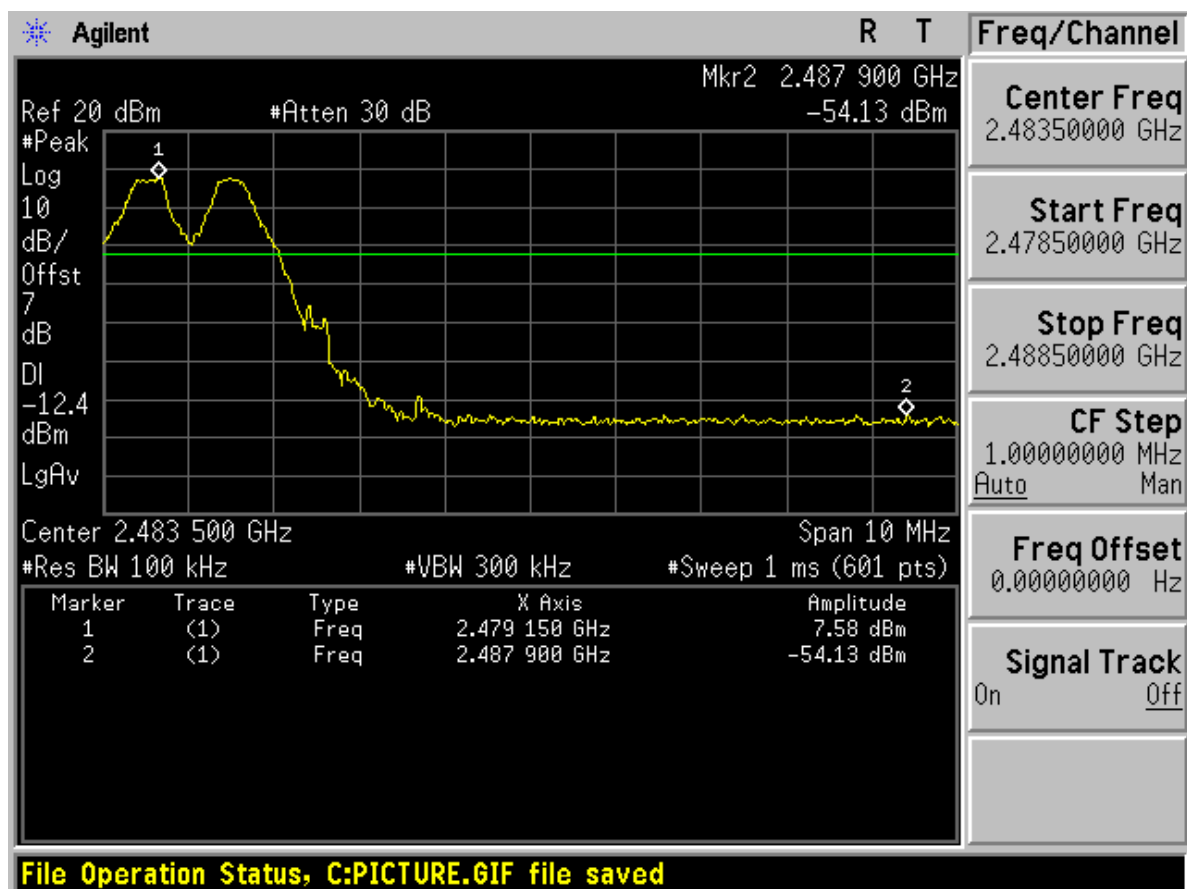
## 2.2 TM1\_DH5\_Ch78

No hopping



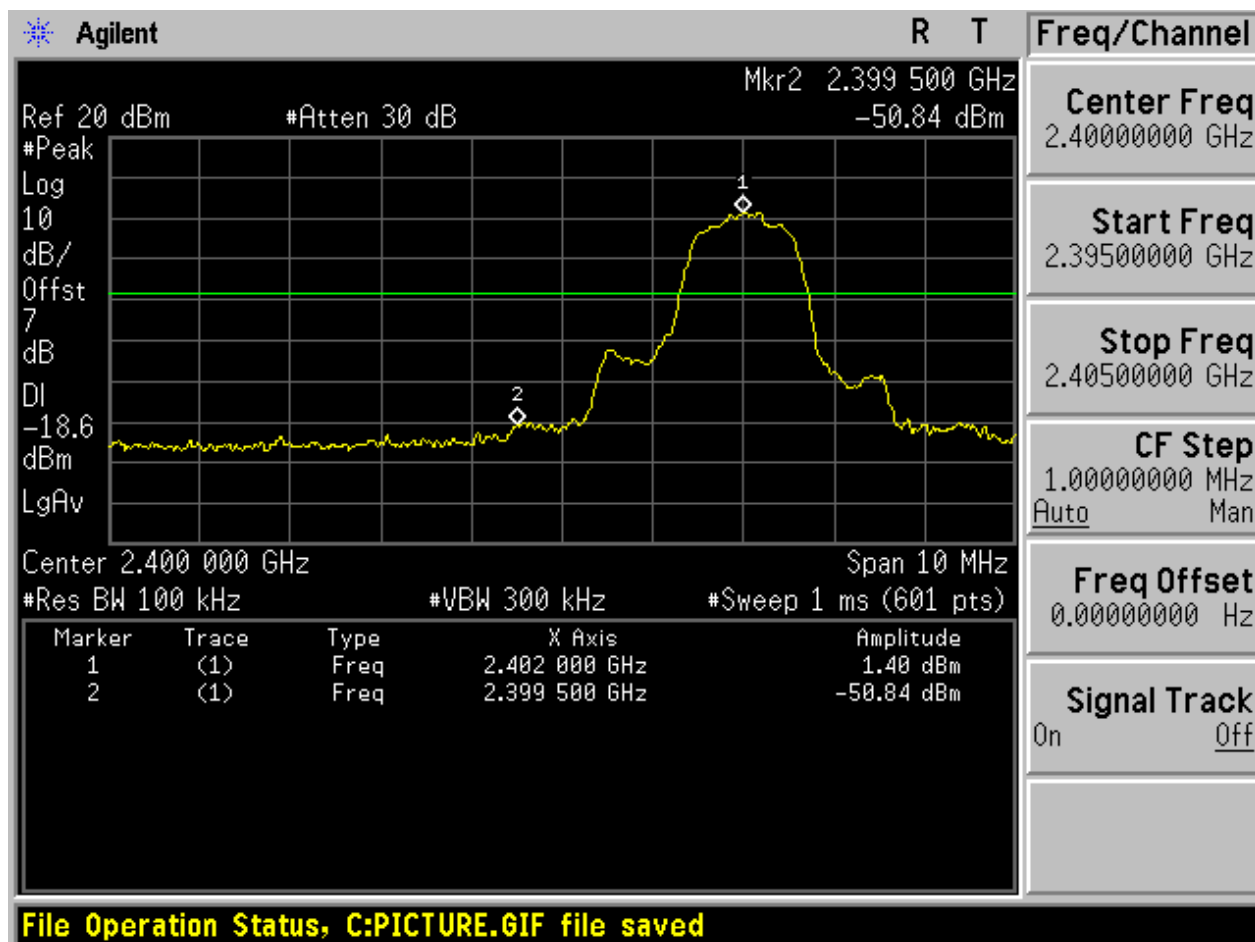


With hopping



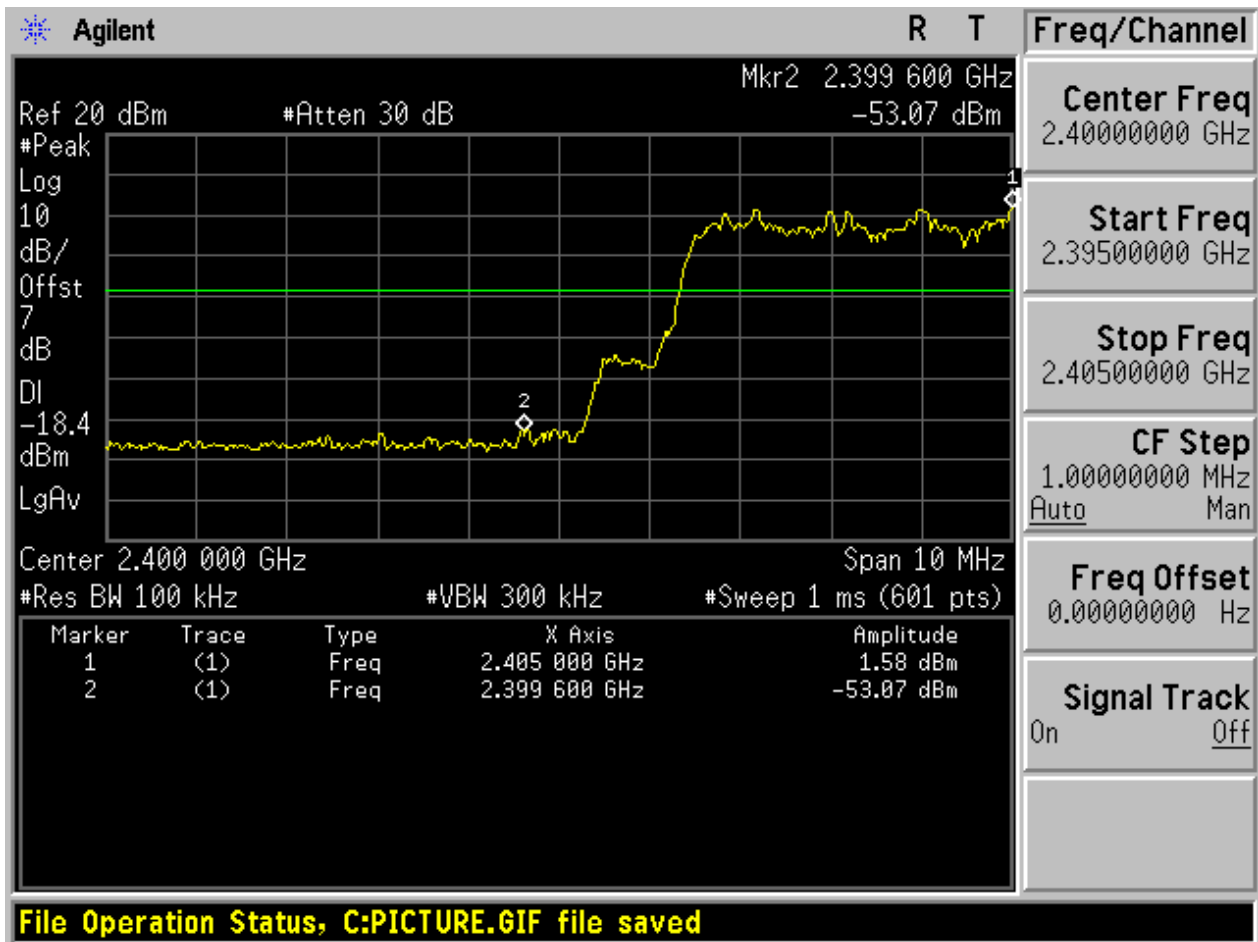
## 2.3 TM2\_2DH5\_Ch0

No hopping





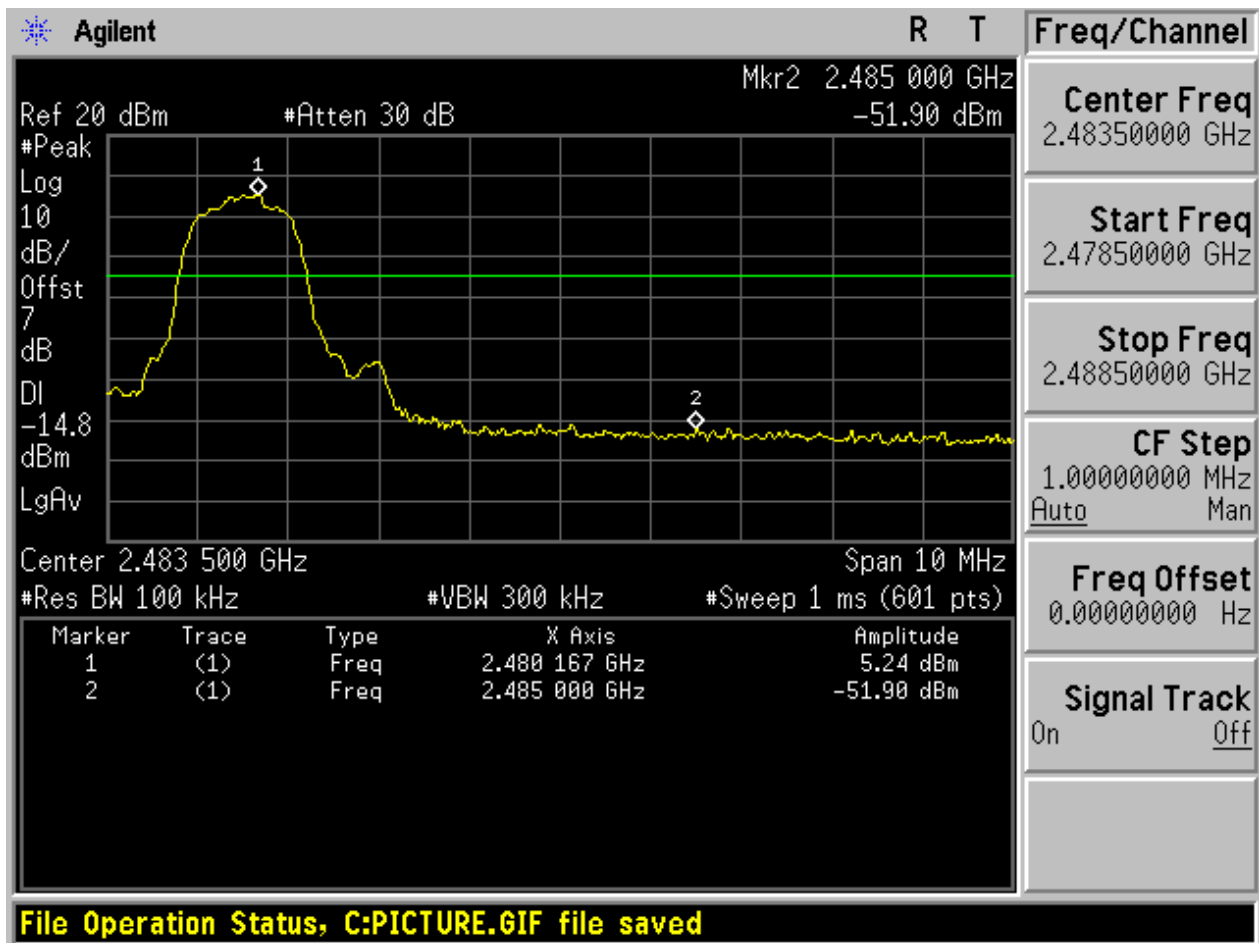
With hopping





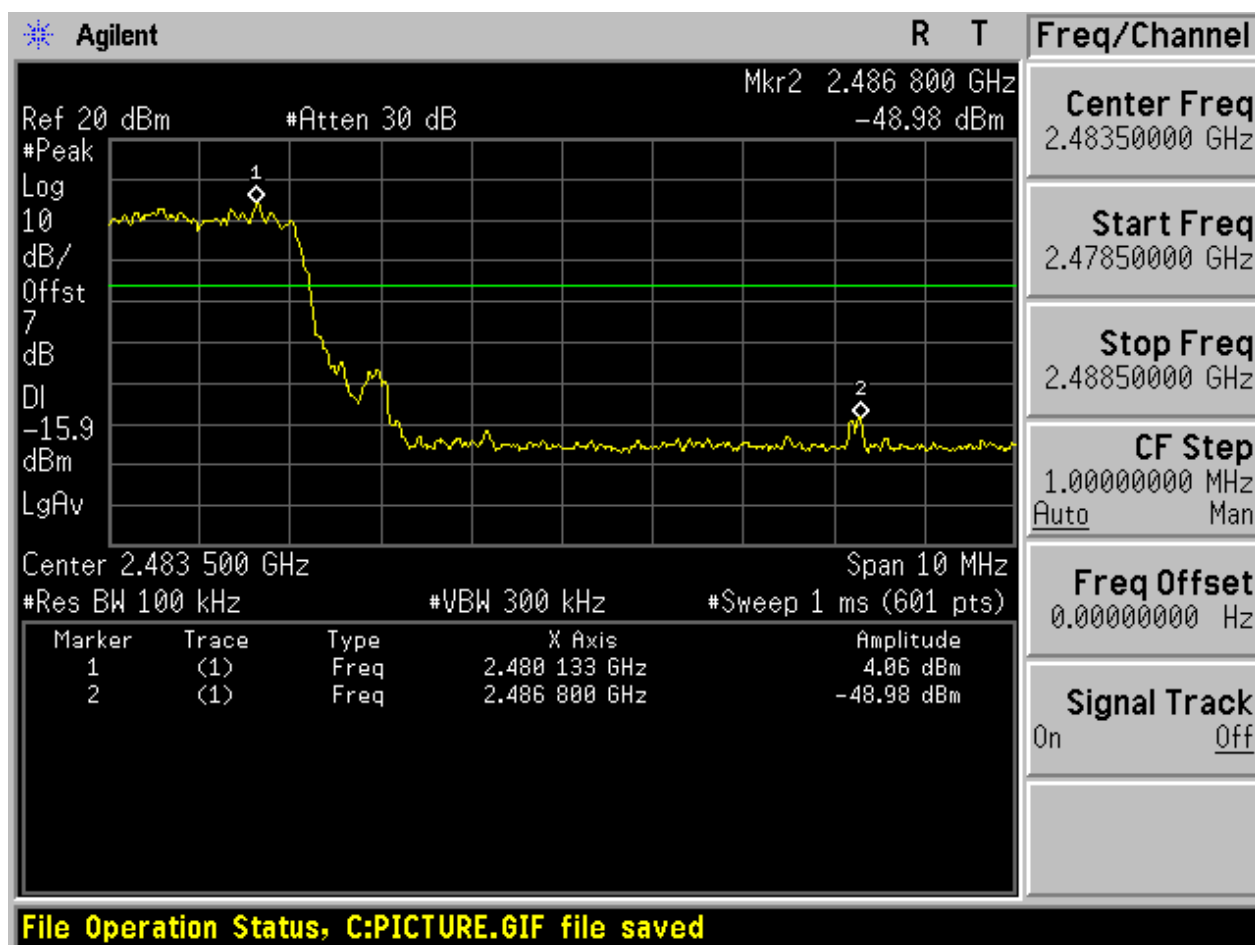
## 2.4 TM2\_2DH5\_Ch78

No hopping





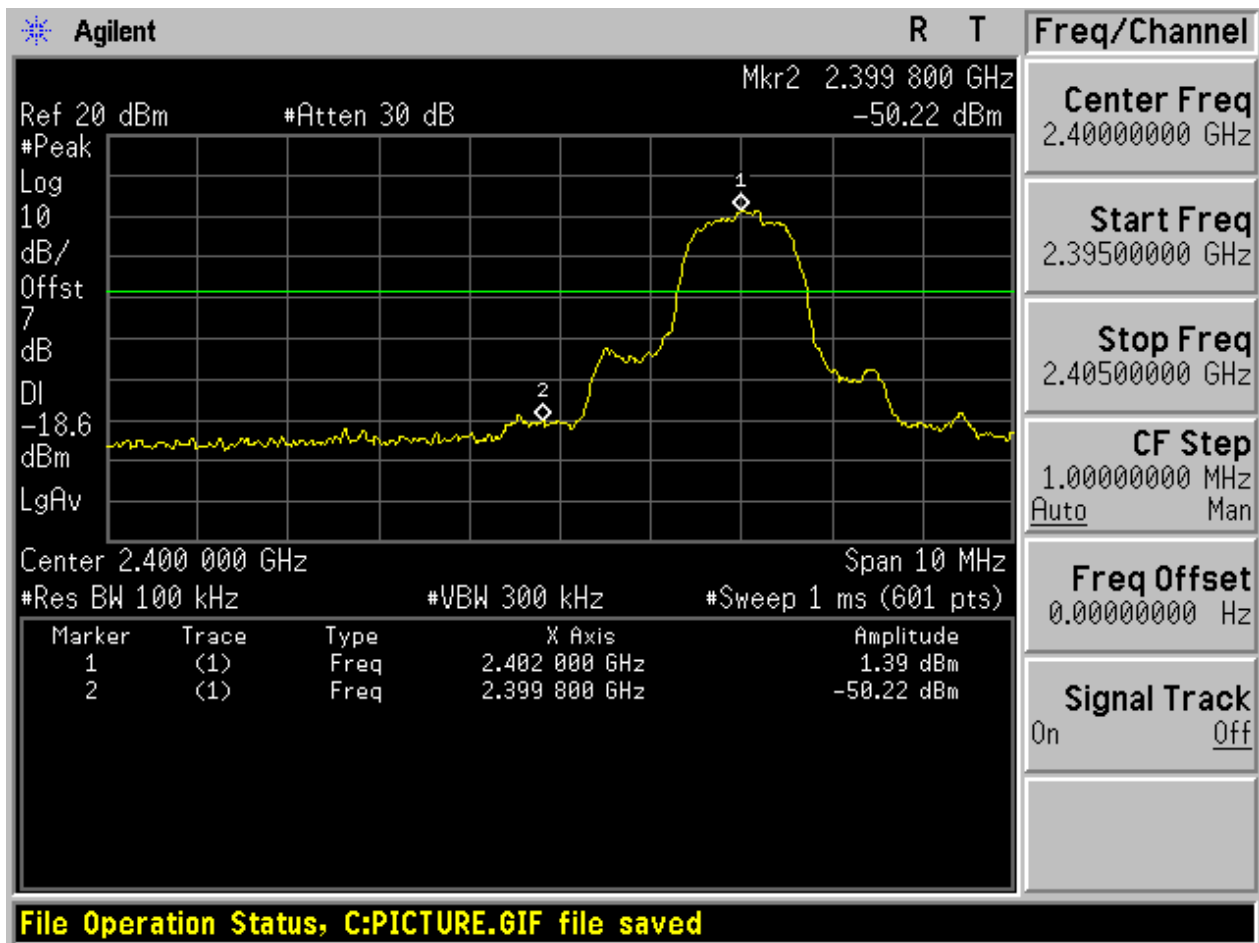
With hopping



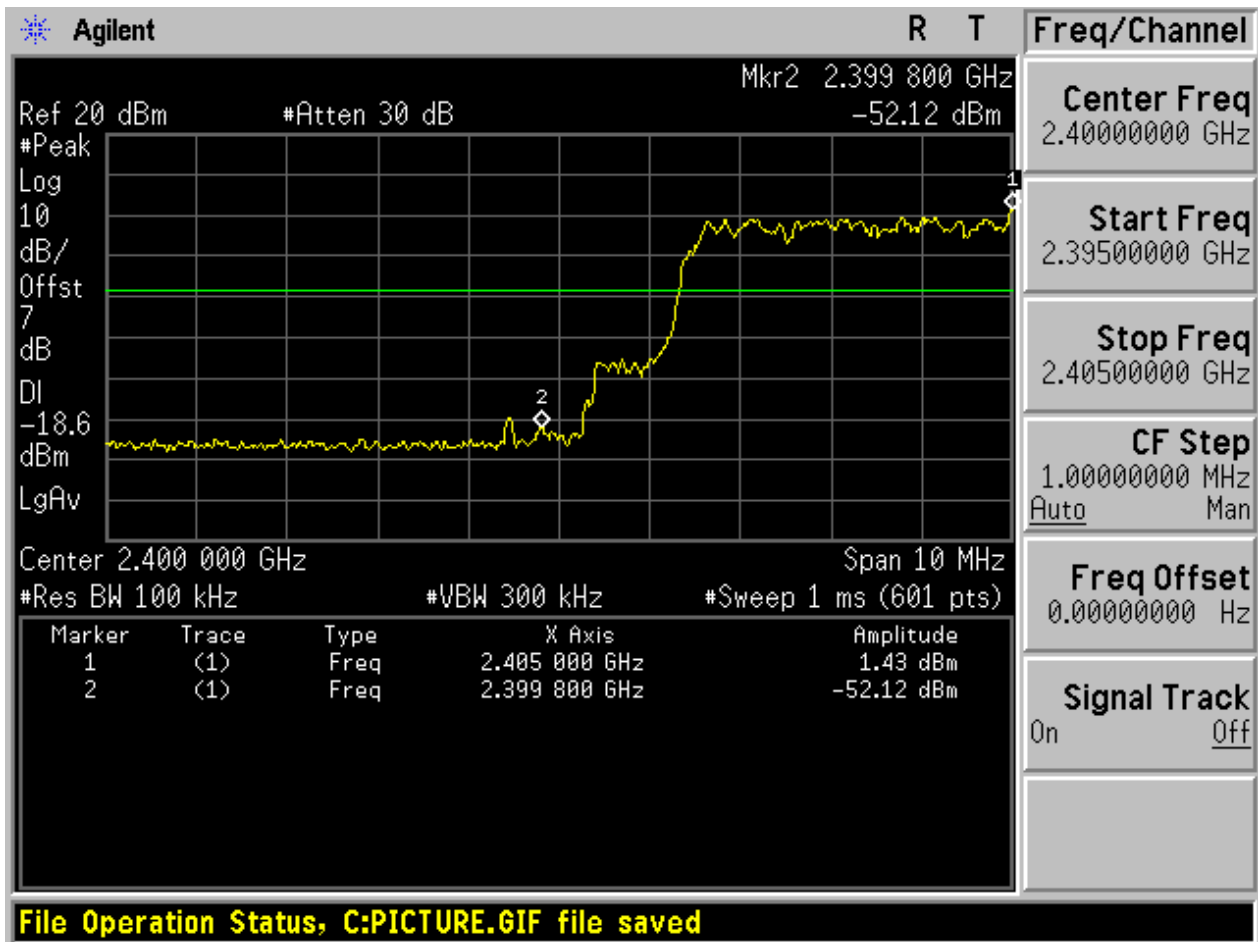


## 2.5 TM3\_3DH5\_Ch0

No hopping



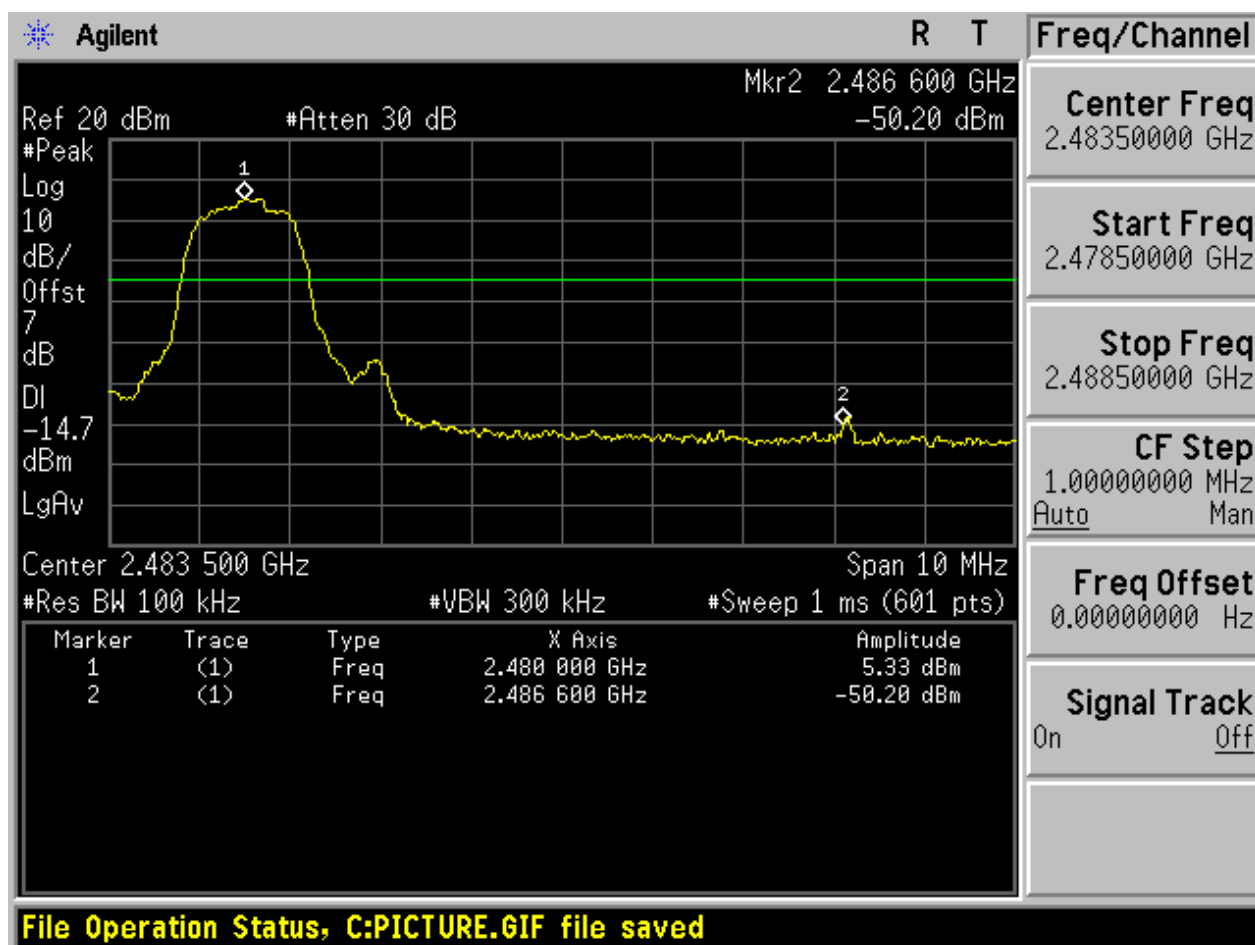
With hopping



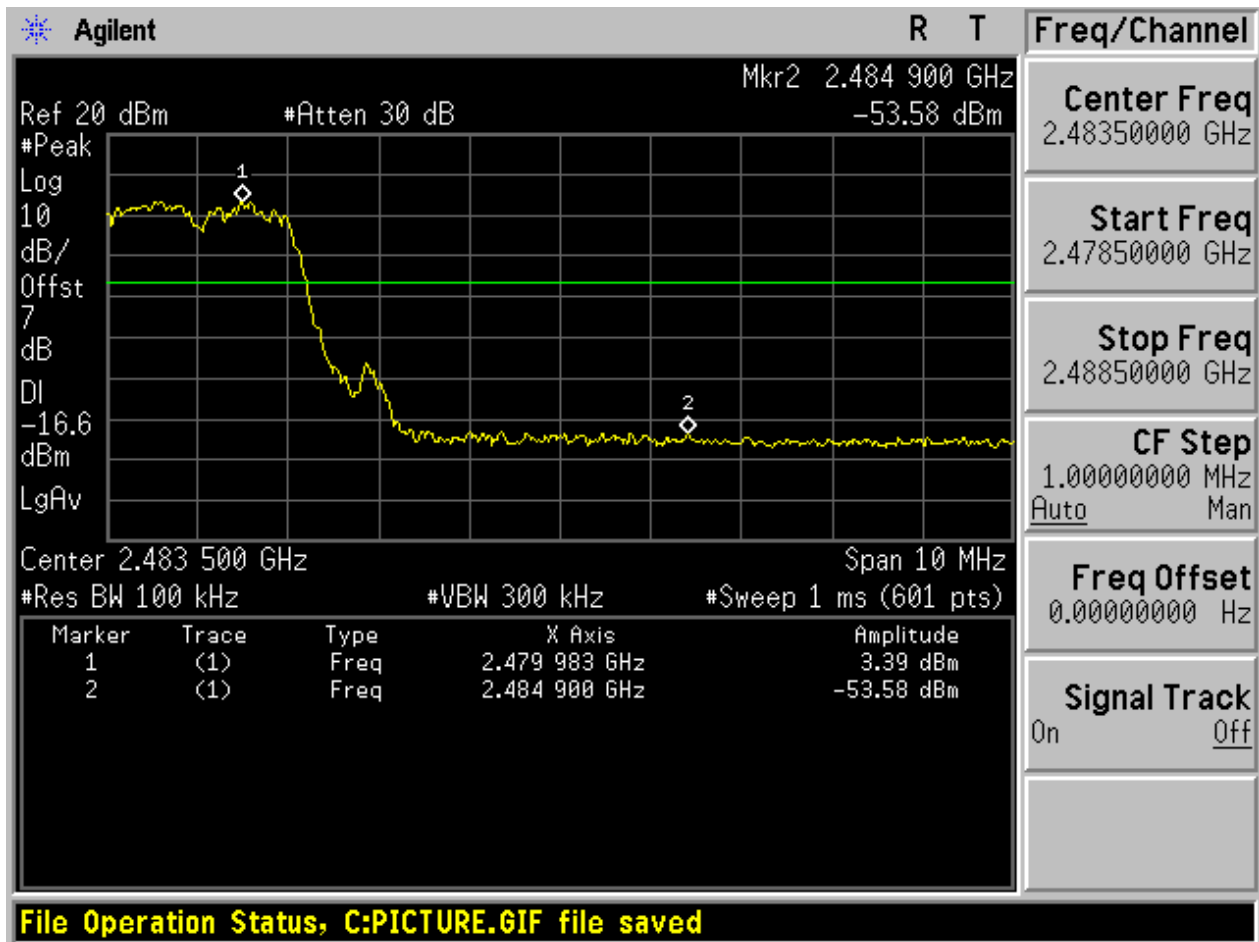


## 2.6 TM3\_3DH5\_Ch78

No hopping



With hopping





## **Appendix G: Conducted RF Spurious Emission**

## 1 Result Table

In this Appendix, the “Pref” refers to the peak power level in any 100 kHz bandwidth within the fundamental emission which is used as the reference level, the “Puw” refers to the maximum emission power in 100 kHz band segments outside of the authorized frequency band.

Considering that the higher ratio of RBW to the span for the frequency ranges below 30 MHz makes the results determination be complicated, a narrower RBW other than 100 kHz is used for these ranges. The measured value should add a RBW correction factor (RBWCF) where  $RBWCF [dB] = 10 \times \lg(100 [kHz]/\text{narrower RBW [kHz]})$ . As to this Appendix, the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

In the result table, the “< Limit” denotes that “The Puw [dBm] is less than Pref [dBm] - 20 [dB], see test plots for detailed”.

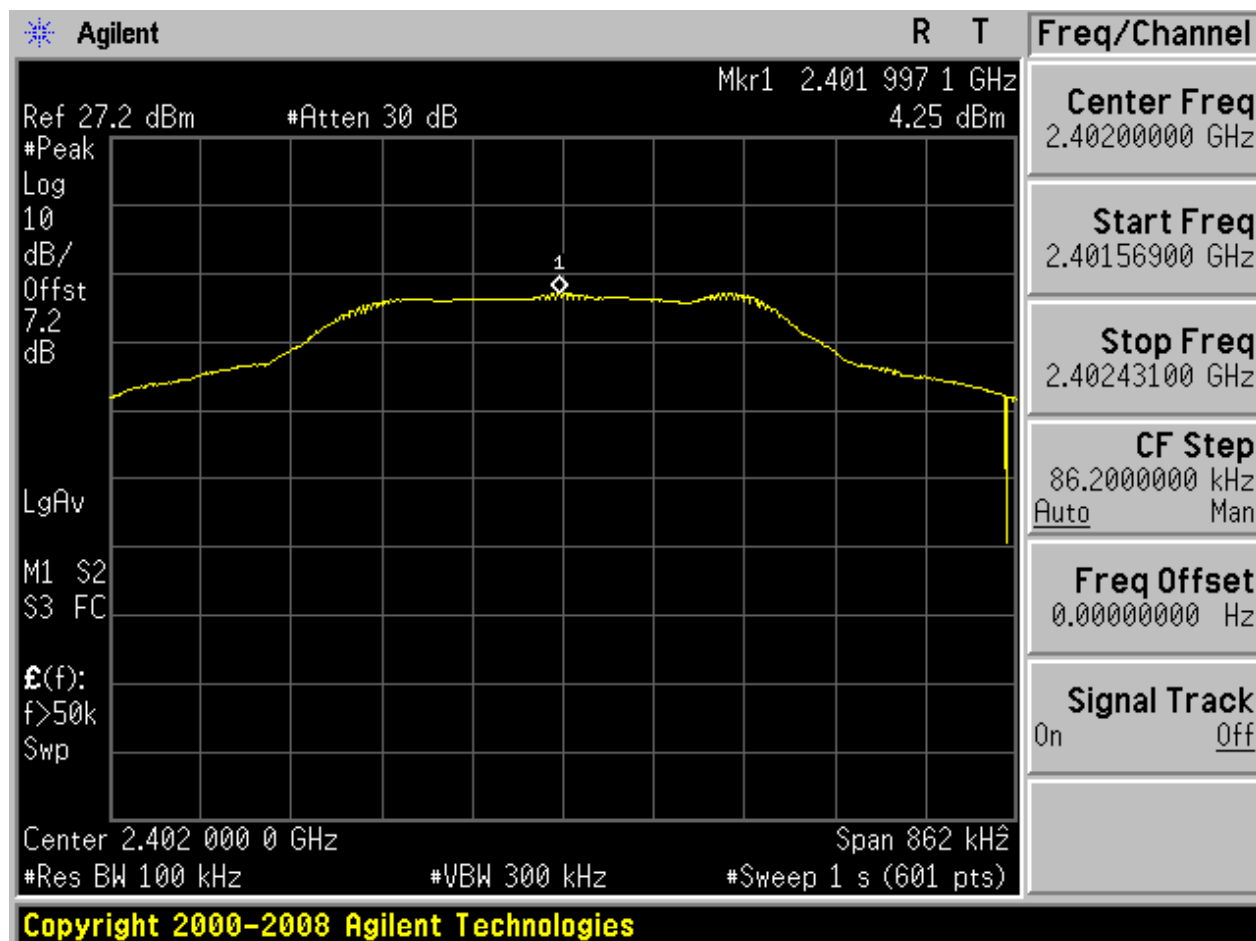
| EUT Conf.     | Pref [dBm/100 kHz] | Puw [dBm/100 kHz] | Verdict |
|---------------|--------------------|-------------------|---------|
| TM1_DH5_Ch0   | 4.25               | < Limit           | Pass    |
| TM1_DH5_Ch39  | 6.05               | < Limit           | Pass    |
| TM1_DH5_Ch78  | 7.81               | < Limit           | Pass    |
| TM2_2DH5_Ch0  | 1.46               | < Limit           | Pass    |
| TM2_2DH5_Ch39 | 3.22               | < Limit           | Pass    |
| TM2_2DH5_Ch78 | 5.28               | < Limit           | Pass    |
| TM3_3DH5_Ch0  | 1.43               | < Limit           | Pass    |
| TM3_3DH5_Ch39 | 3.23               | < Limit           | Pass    |
| TM3_3DH5_Ch78 | 5.28               | < Limit           | Pass    |



## 2 Test Plot

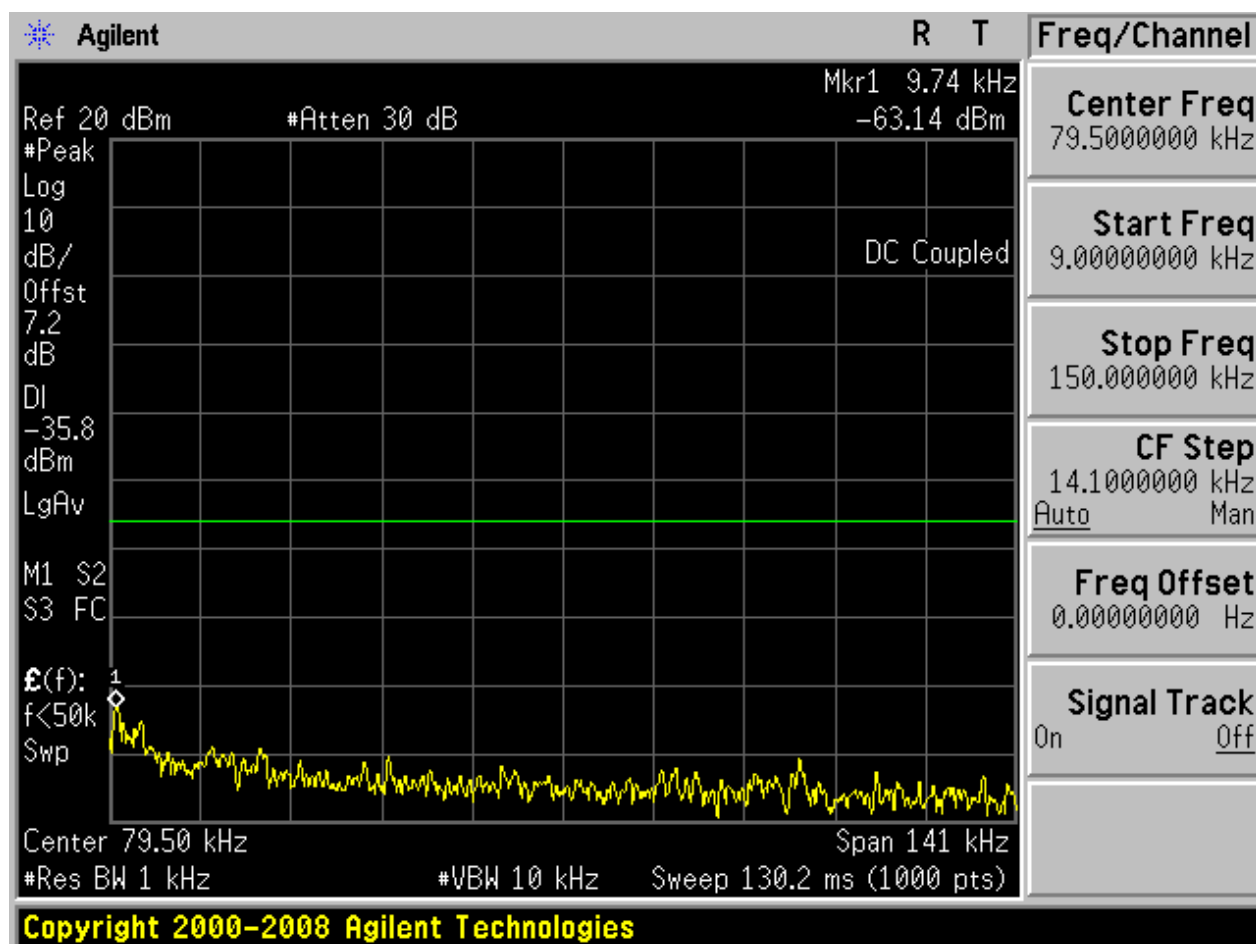
### 2.1 TM1\_DH5\_Ch0

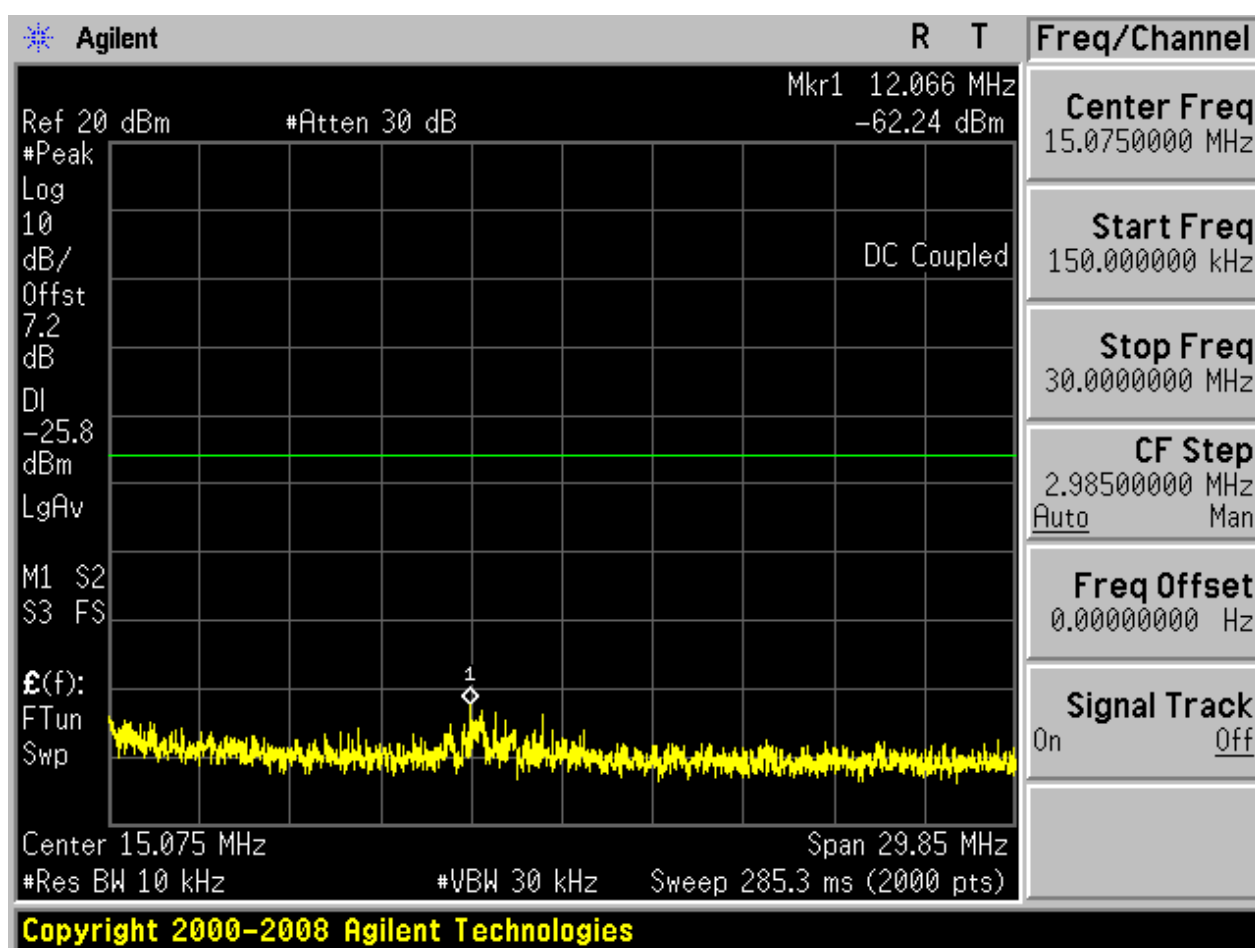
#### 2.1.1 Pref

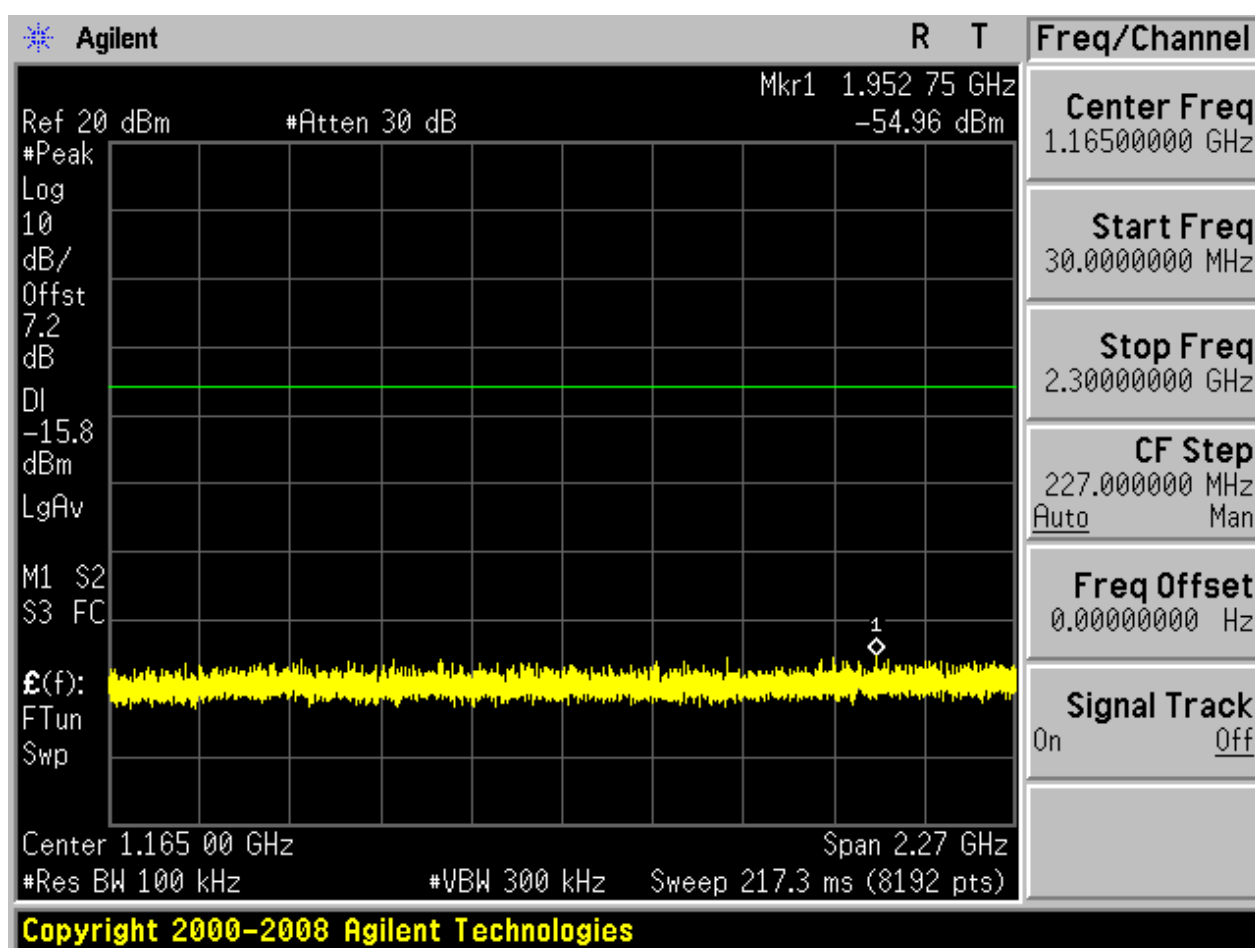


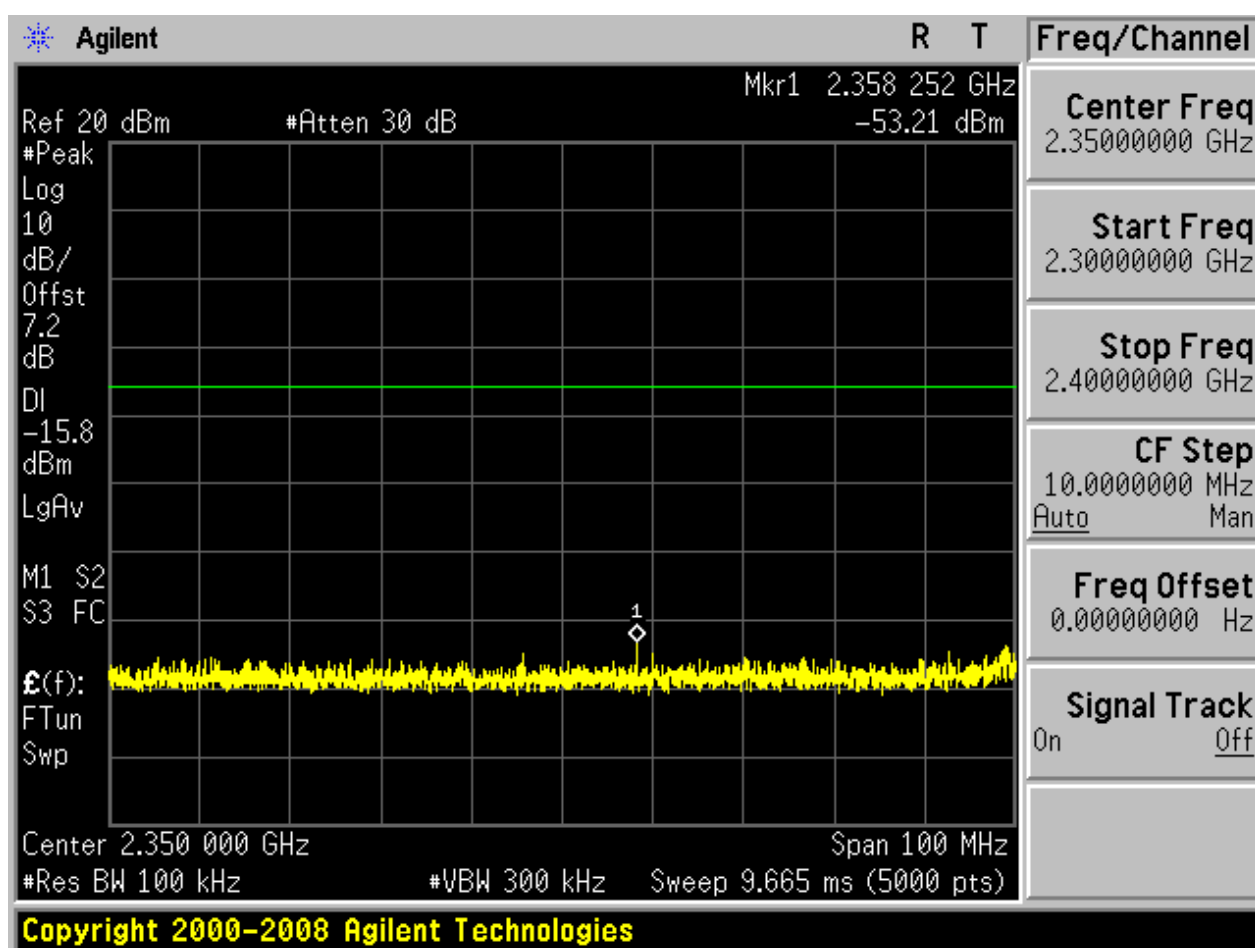


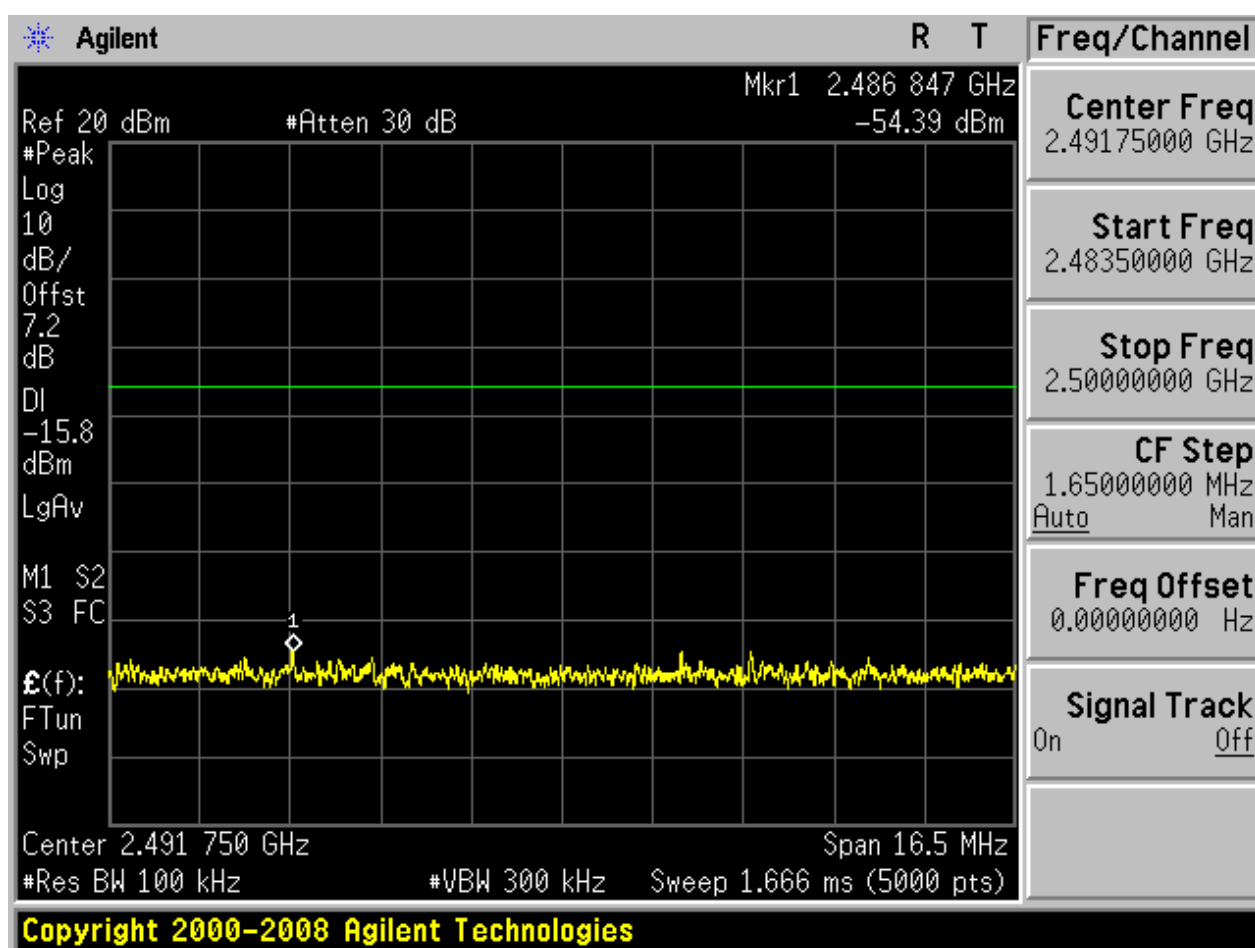
## 2.1.2 Puw

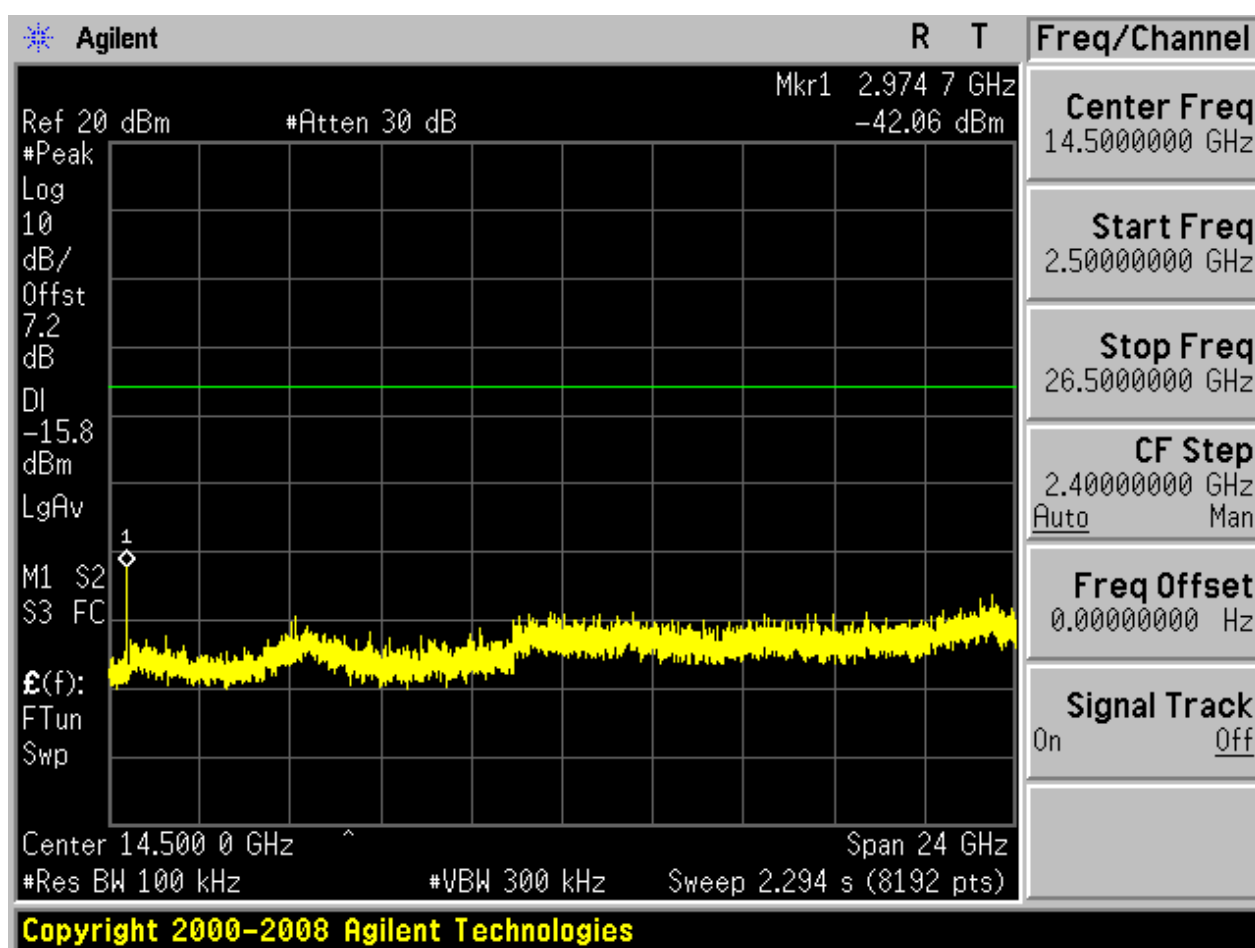








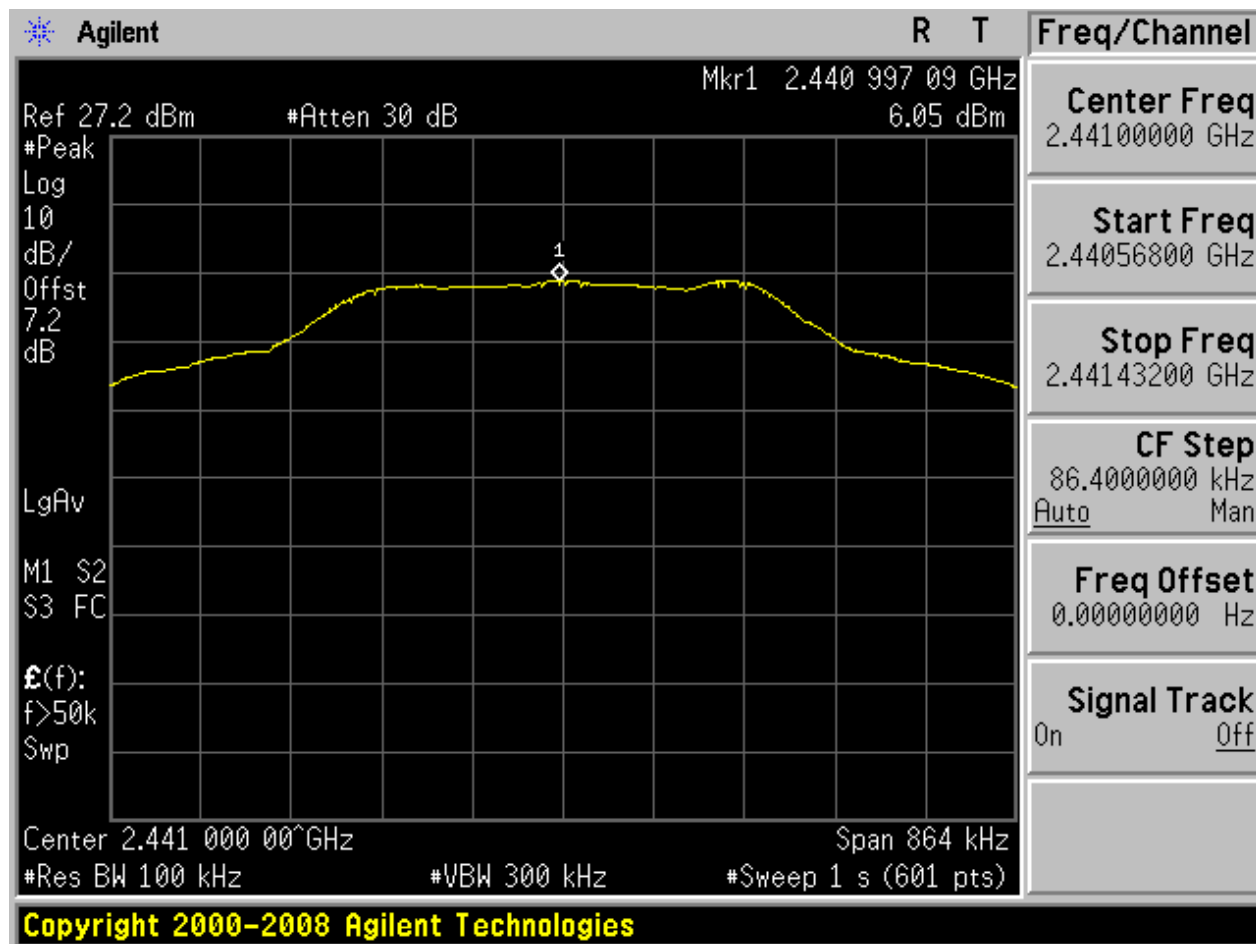






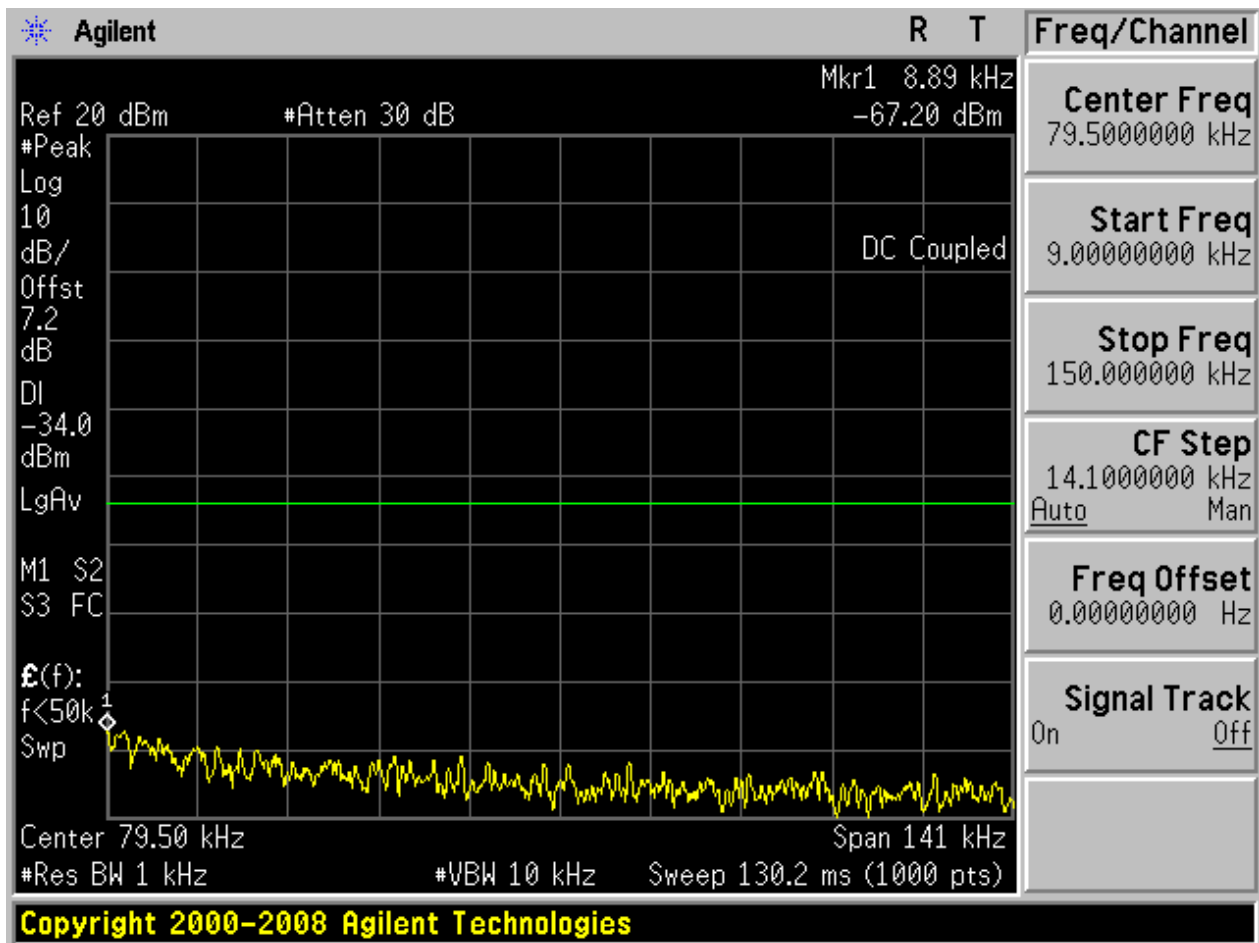
## 2.2 TM1\_DH5\_Ch39

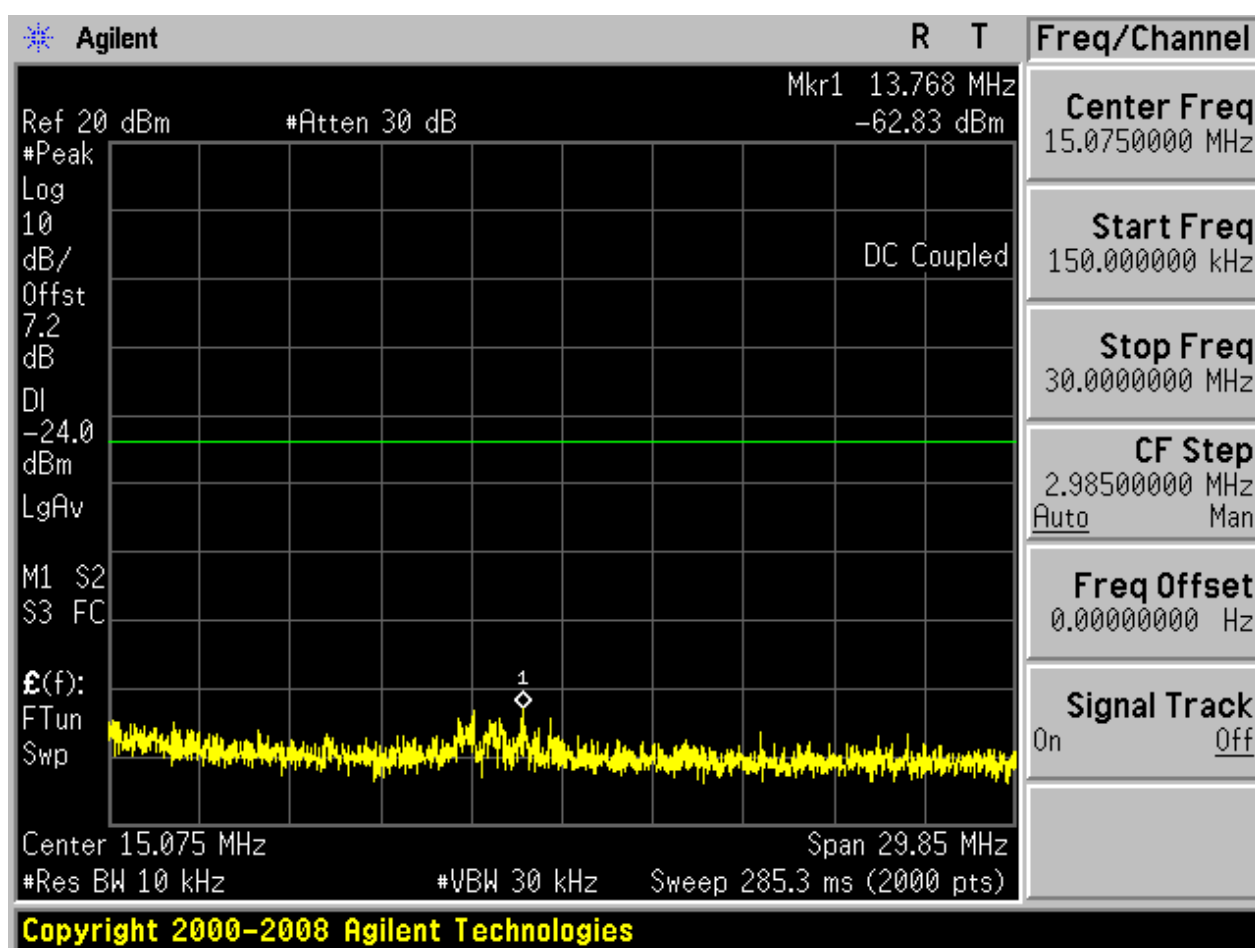
### 2.2.1 Pref

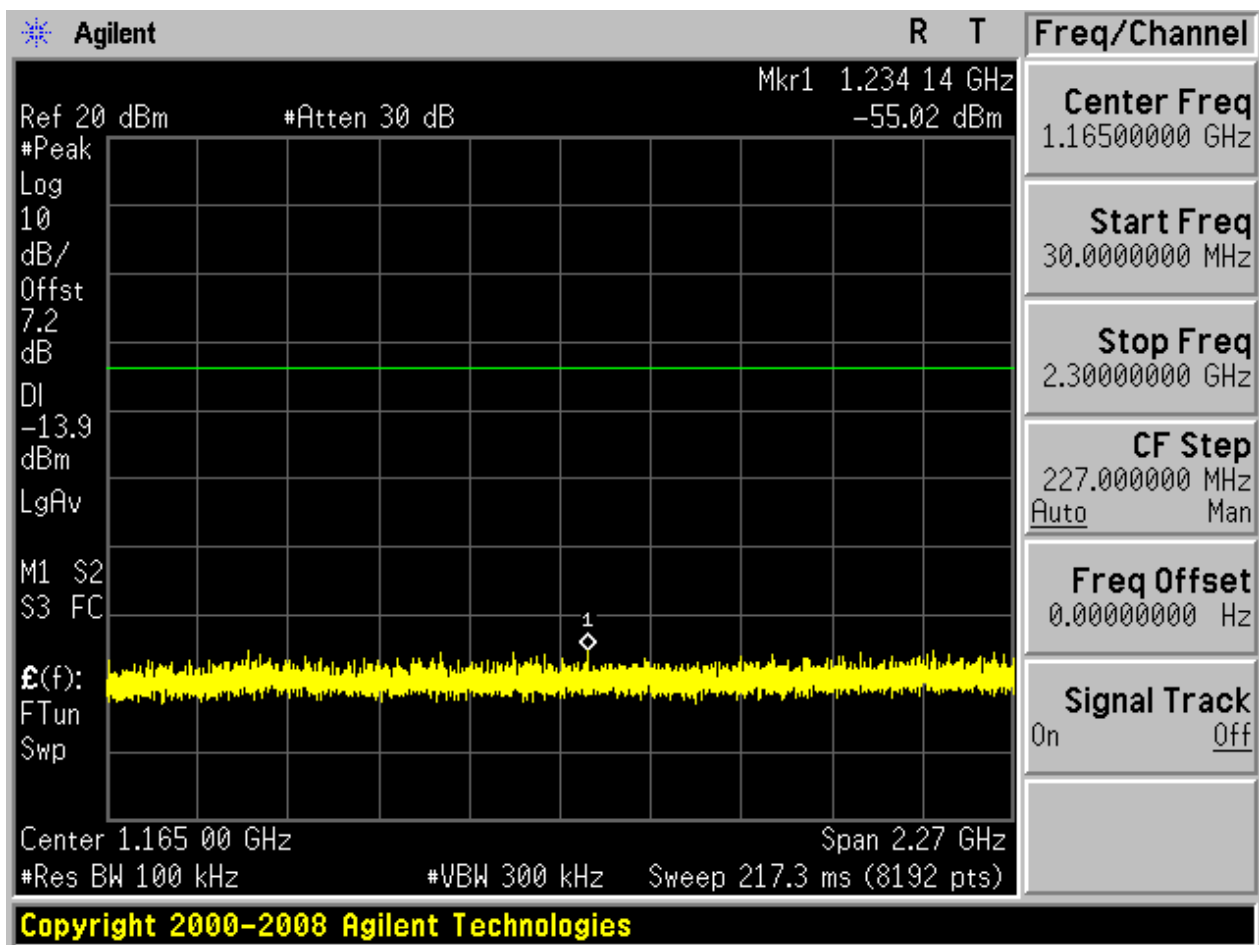


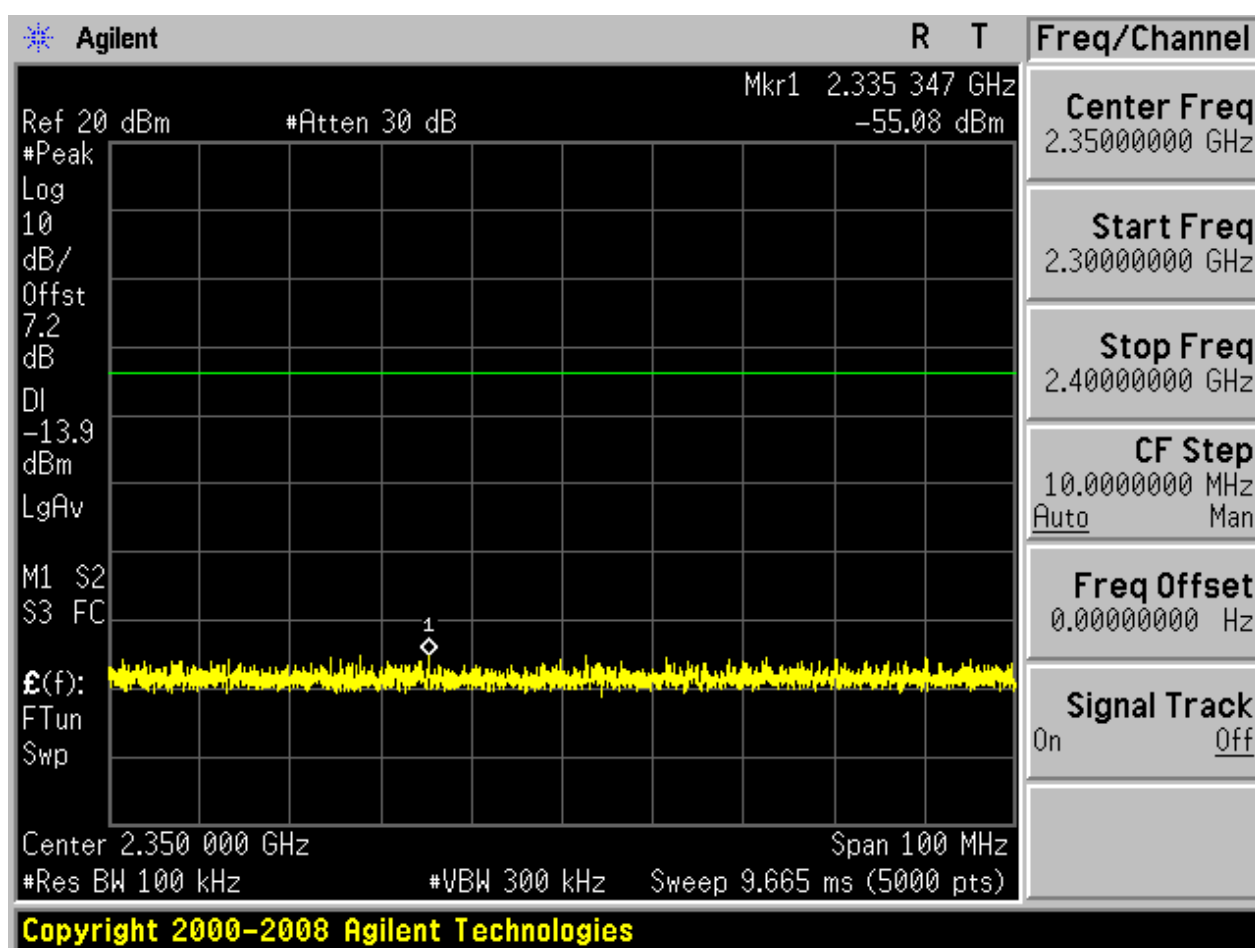


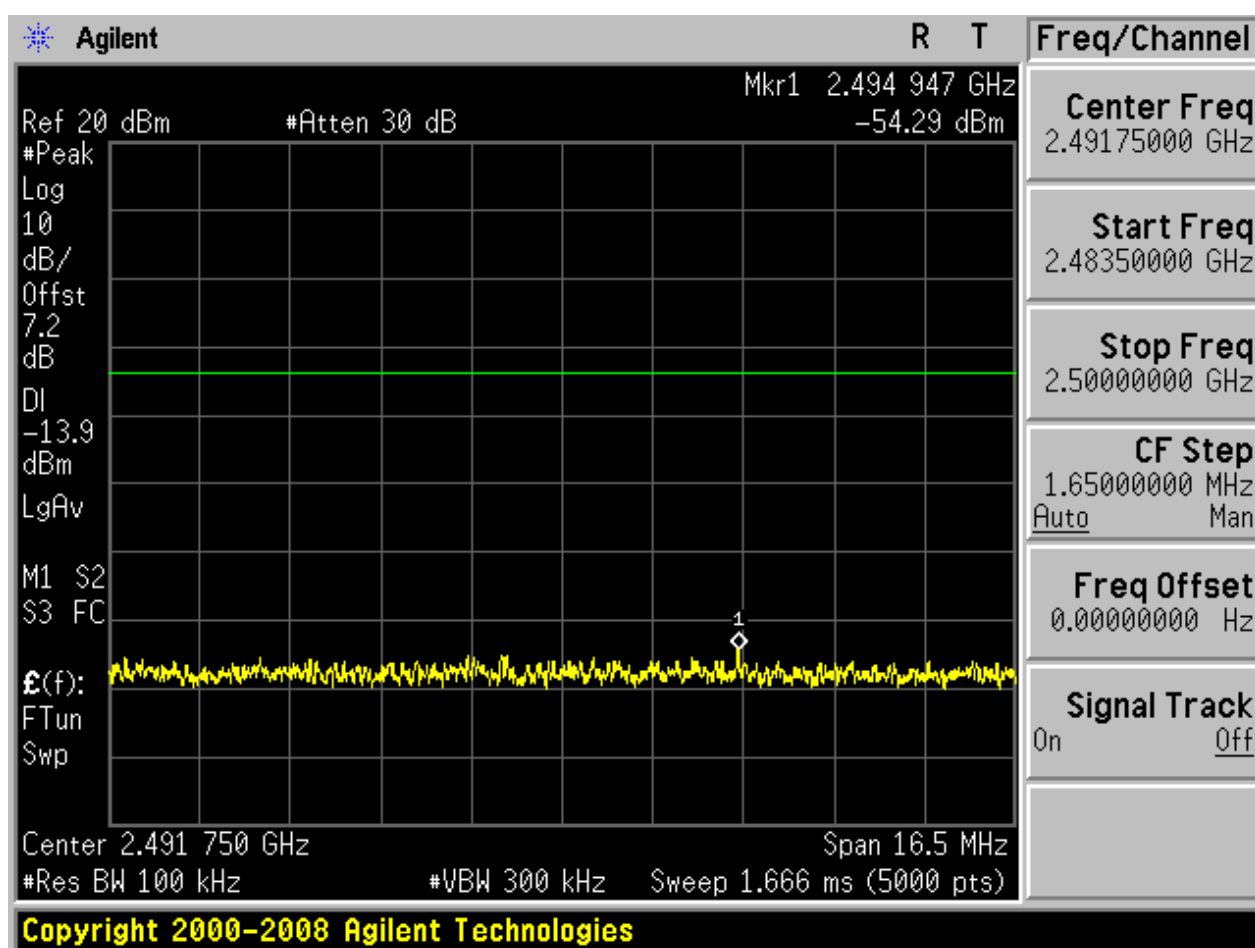
## 2.2.2 Puw

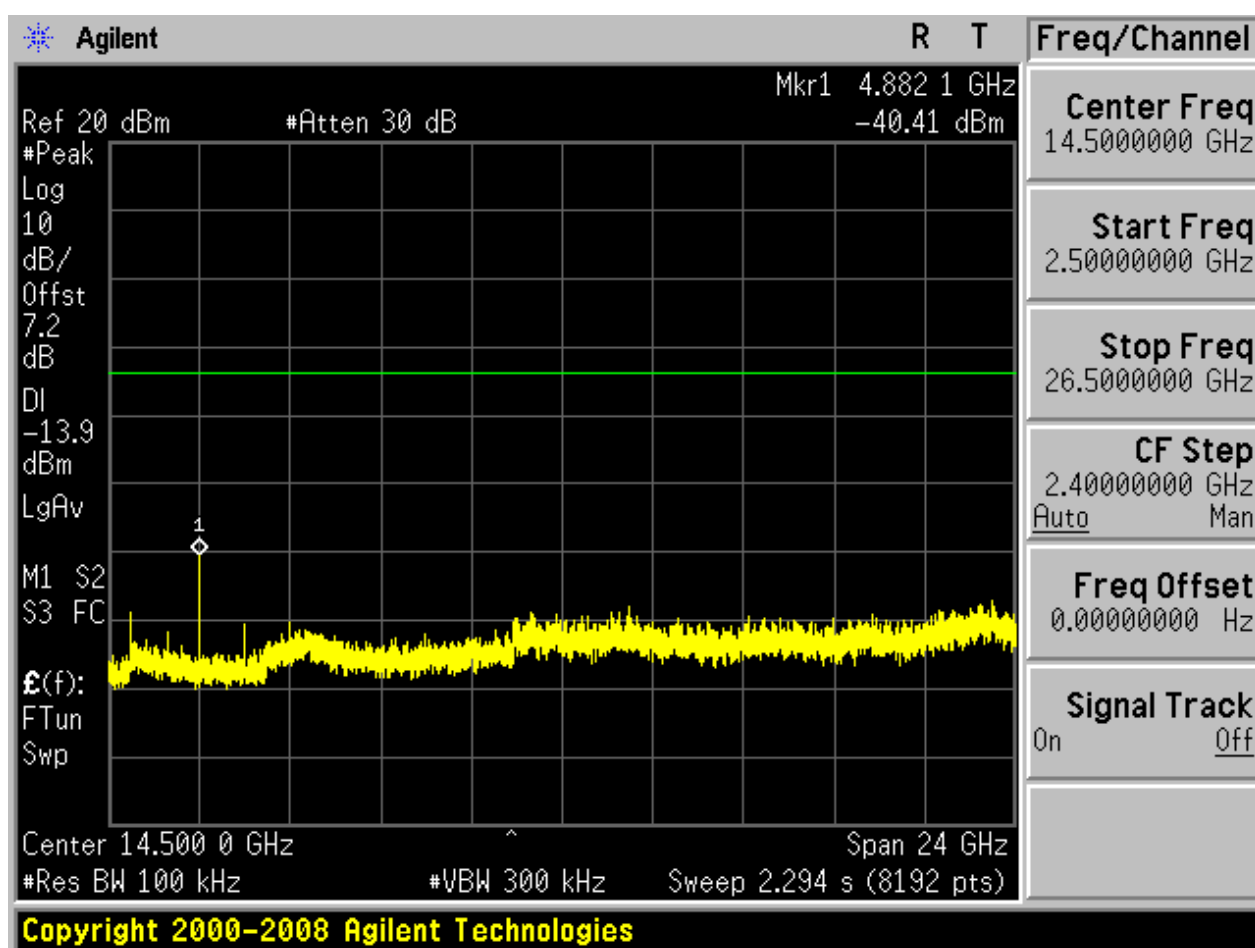








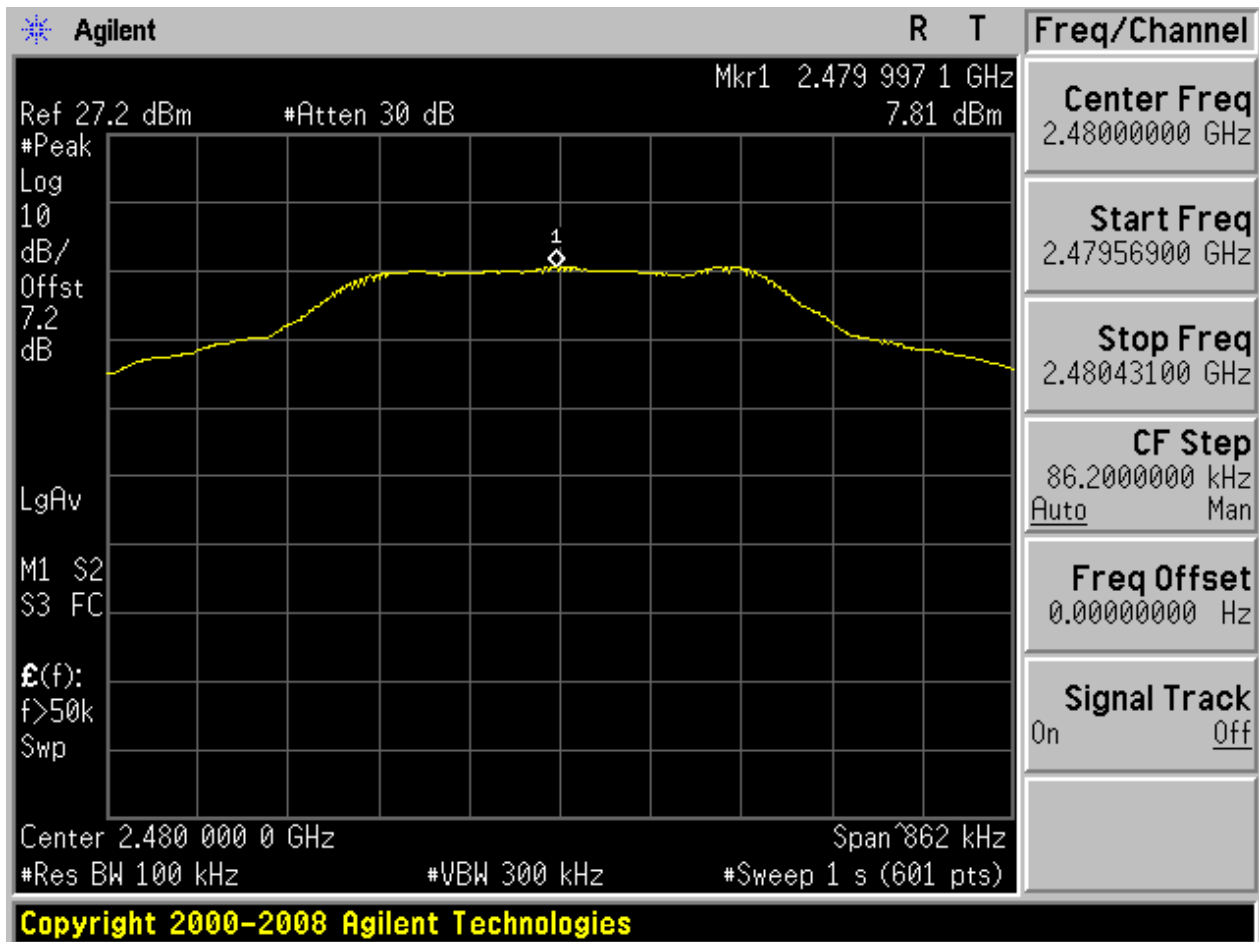






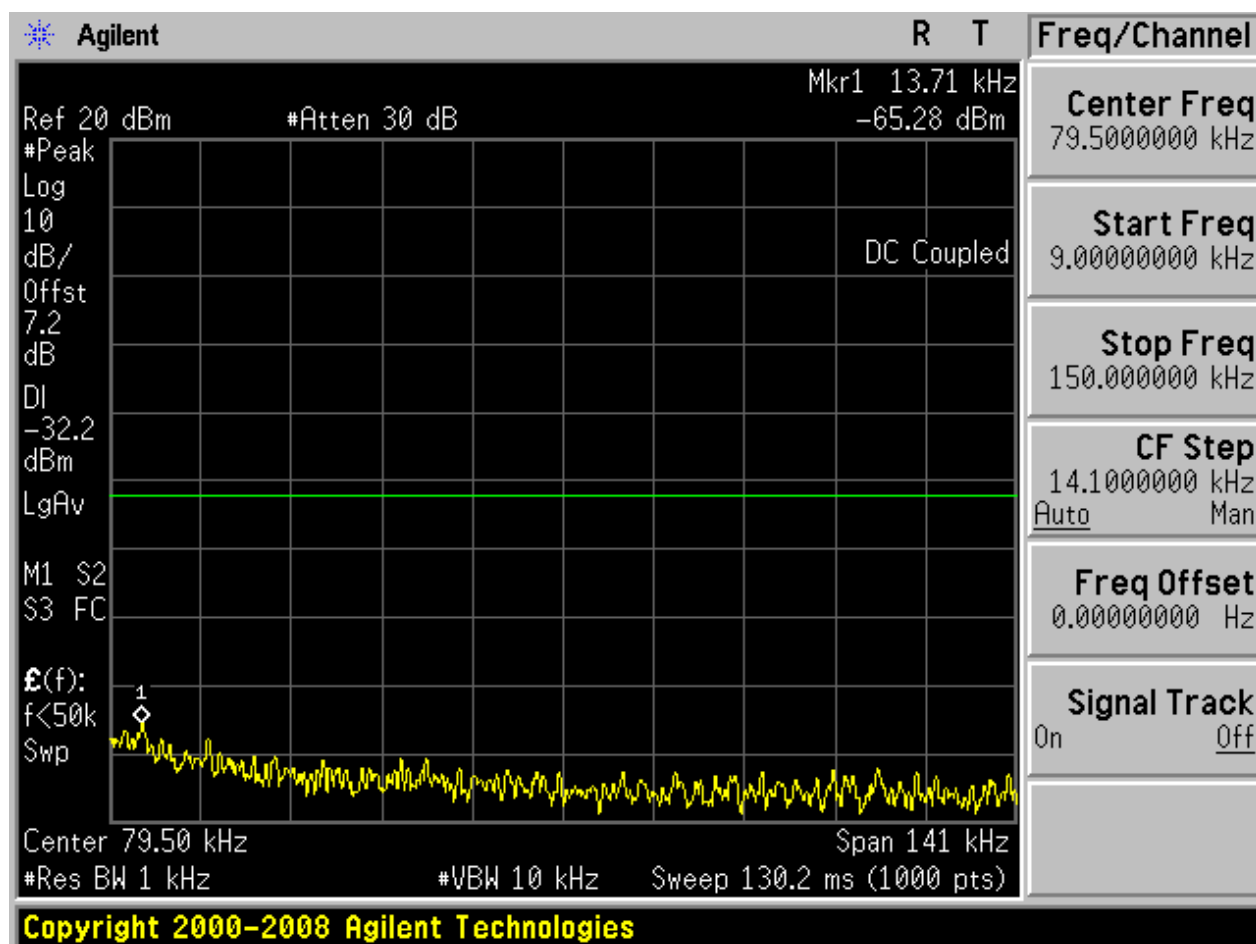
## 2.3 TM1\_DH5\_Ch78

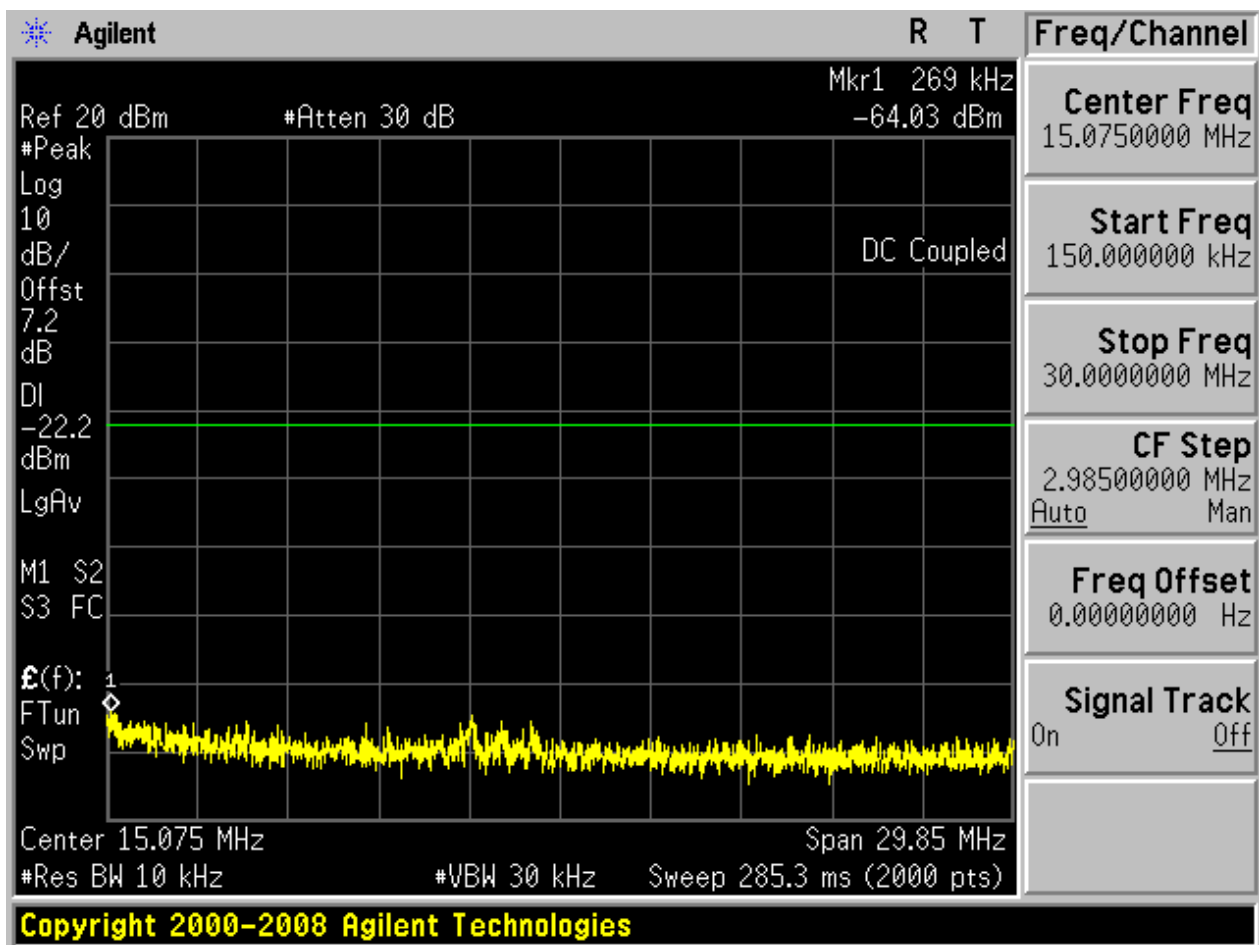
### 2.3.1 Pref

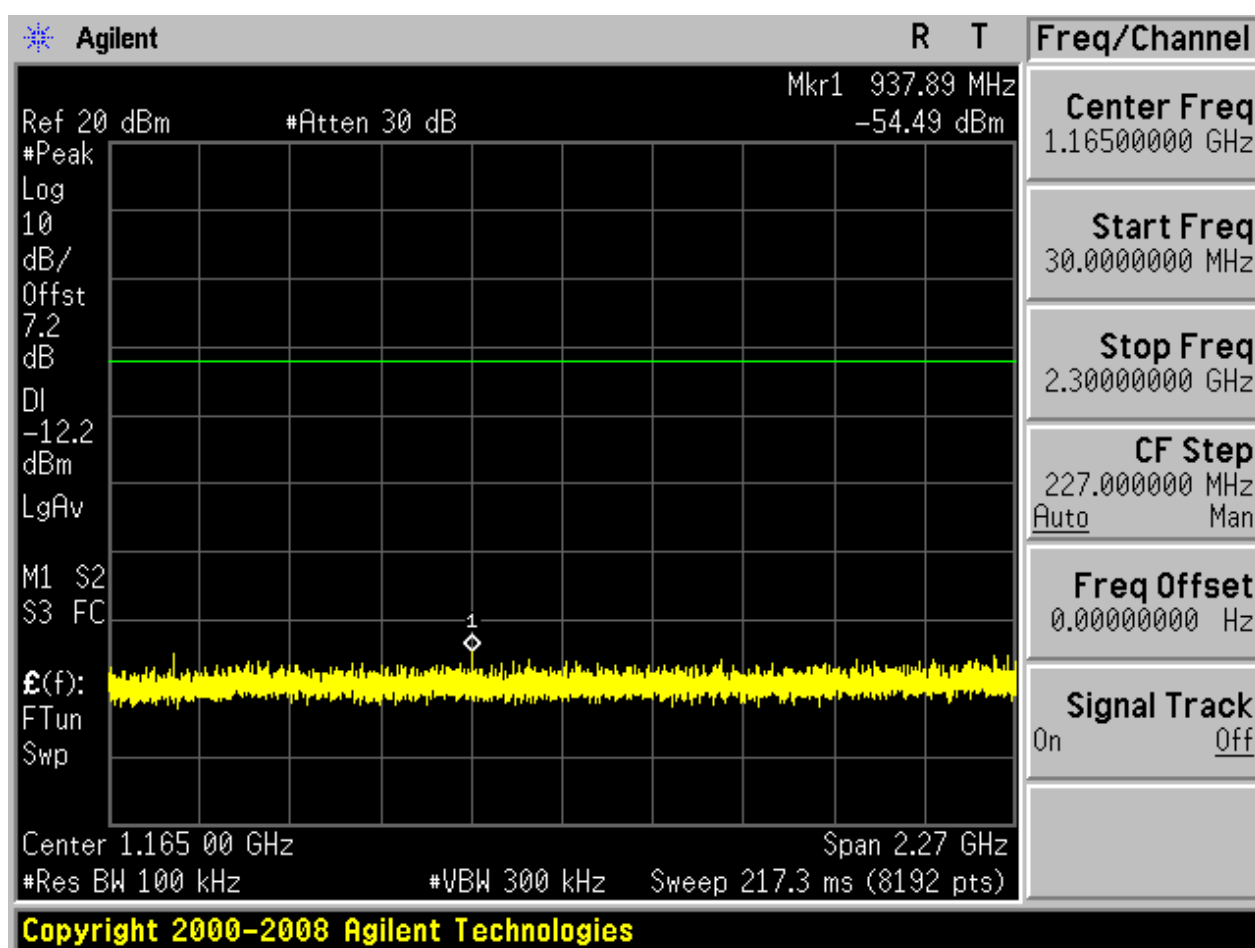


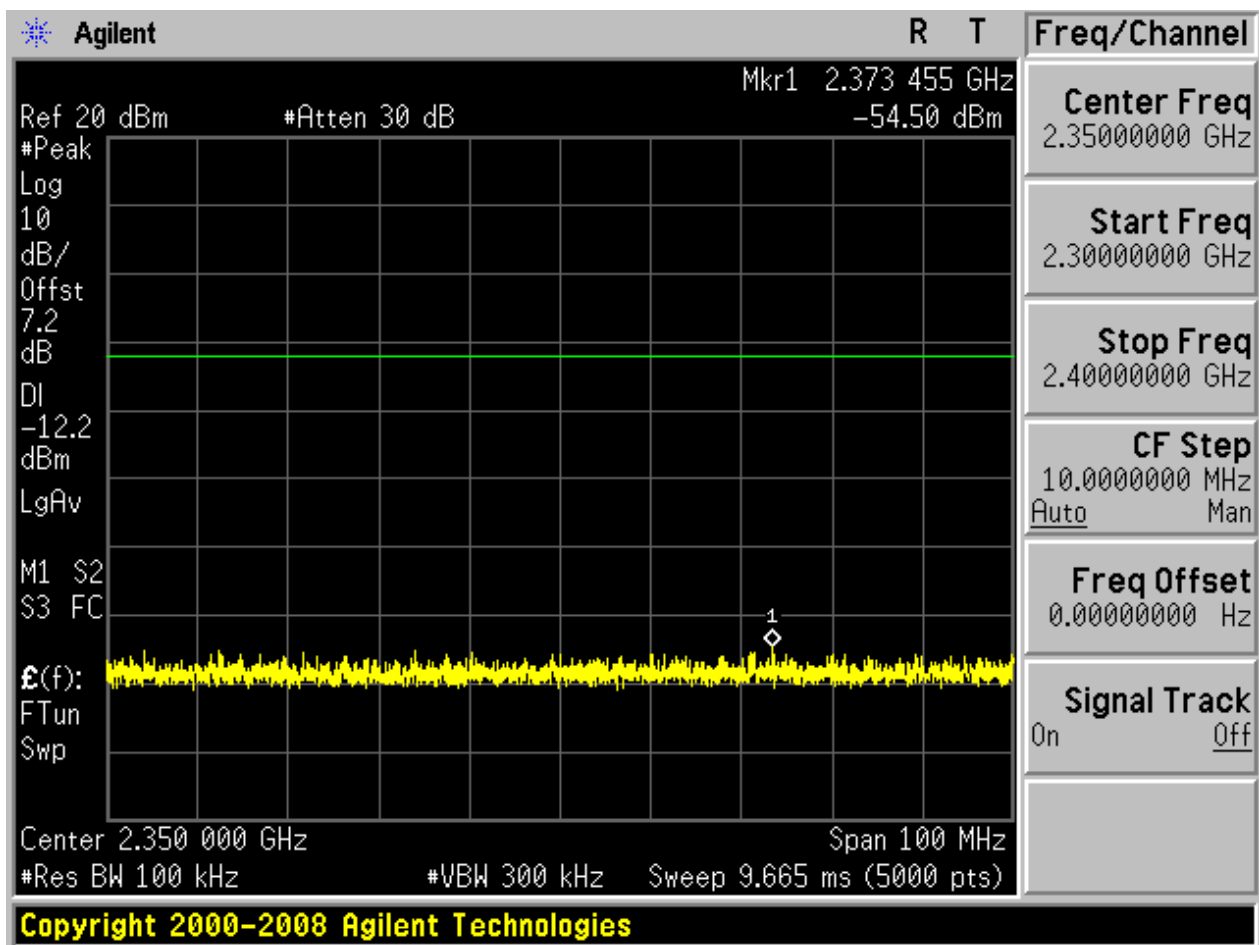


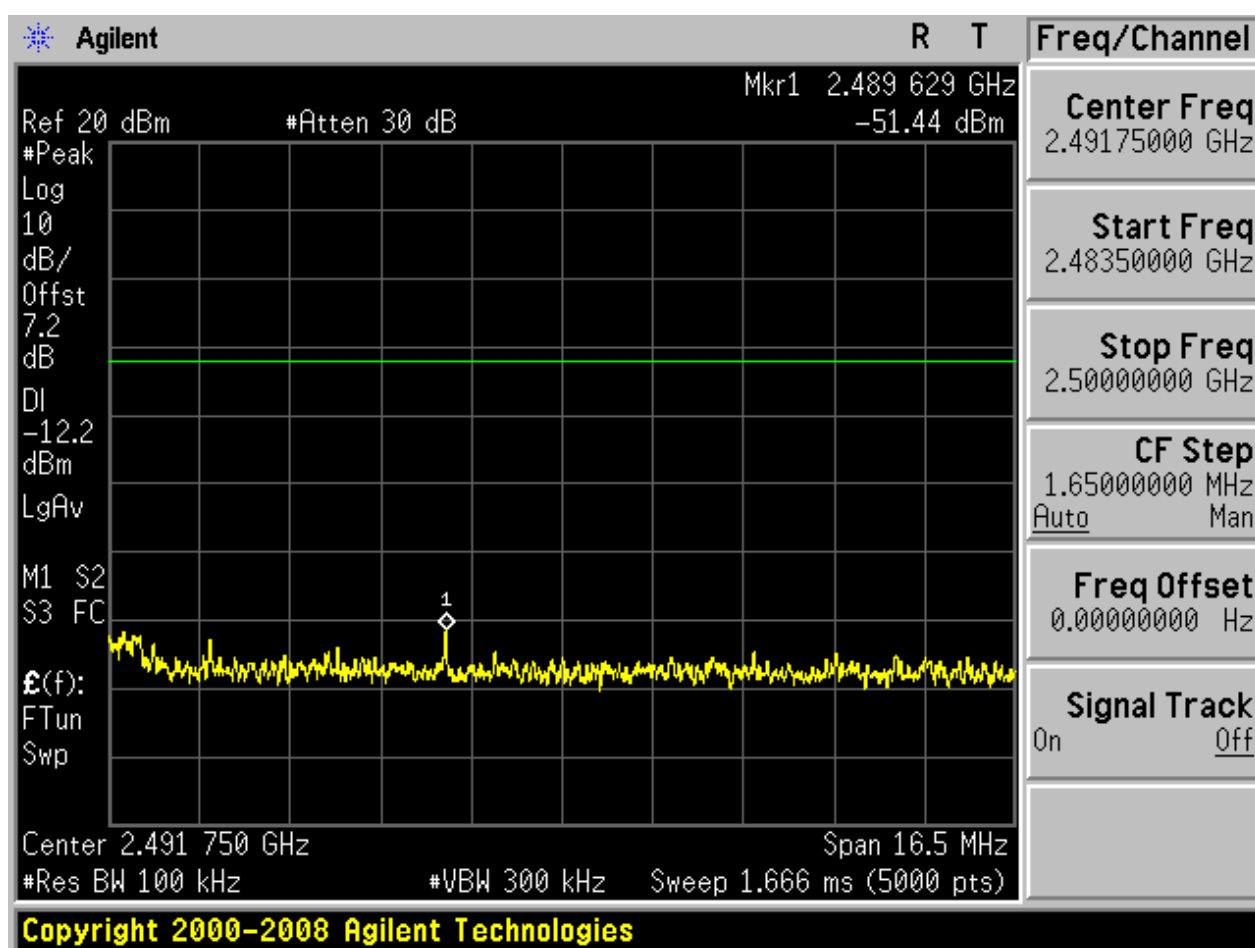
### 2.3.2 Puw

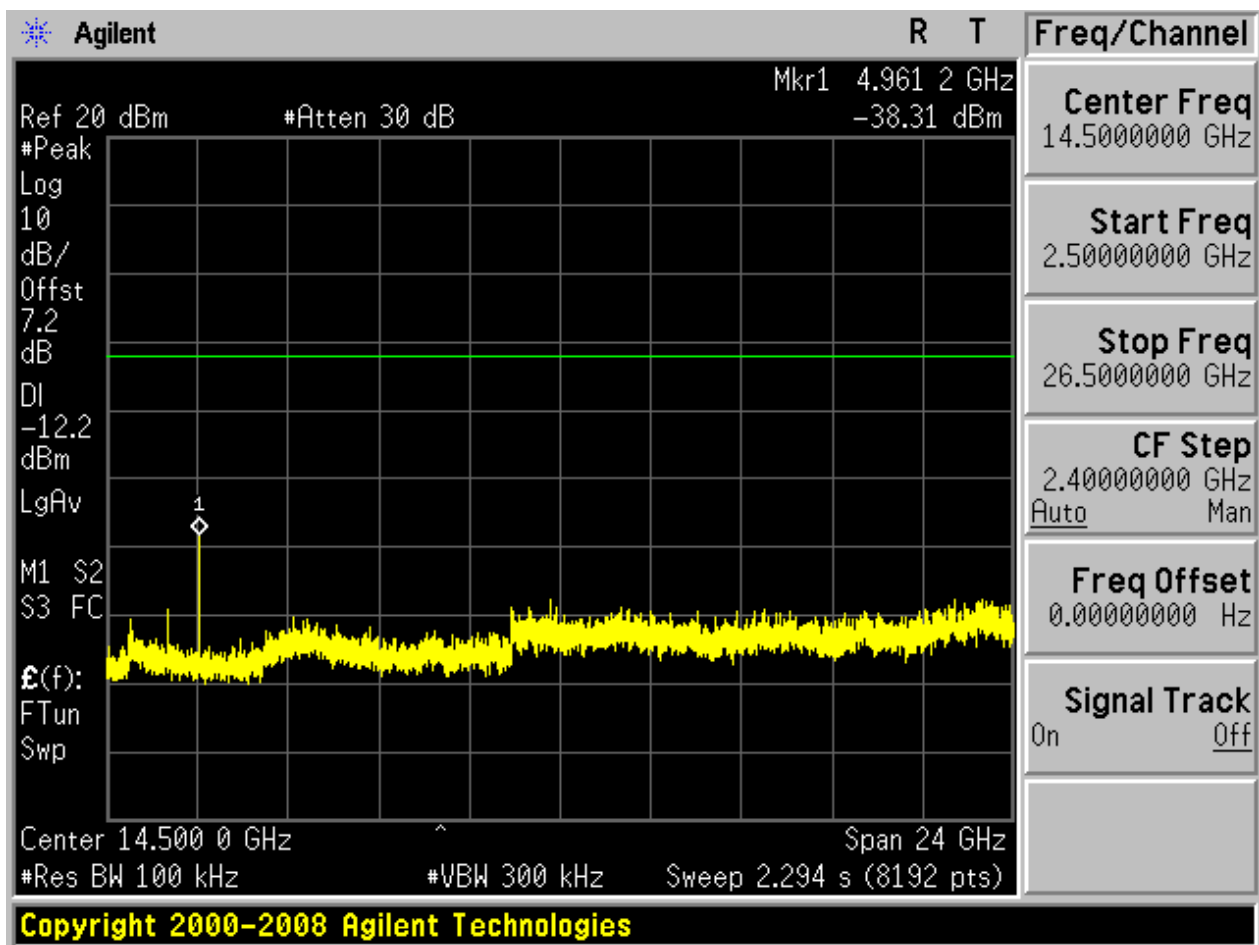








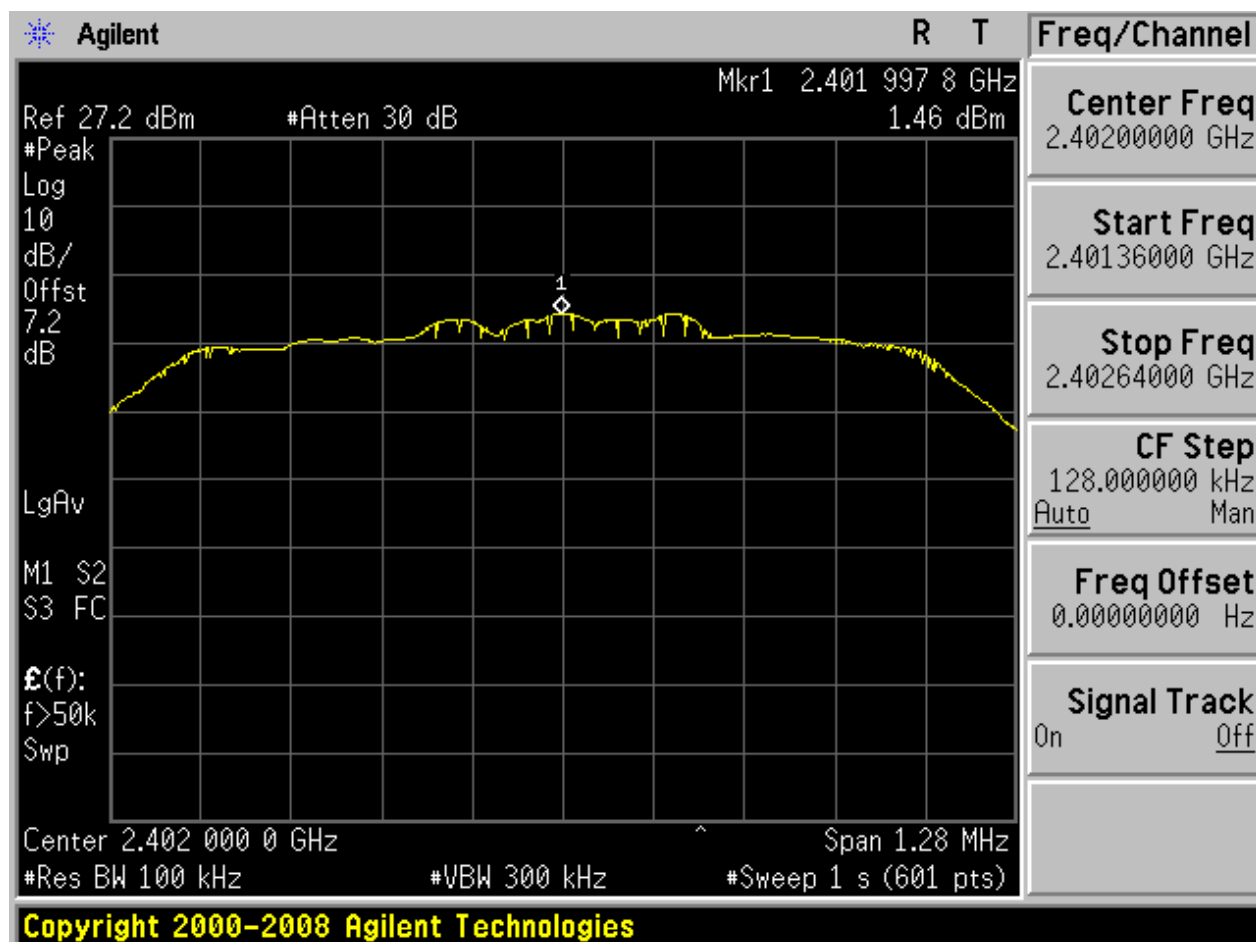






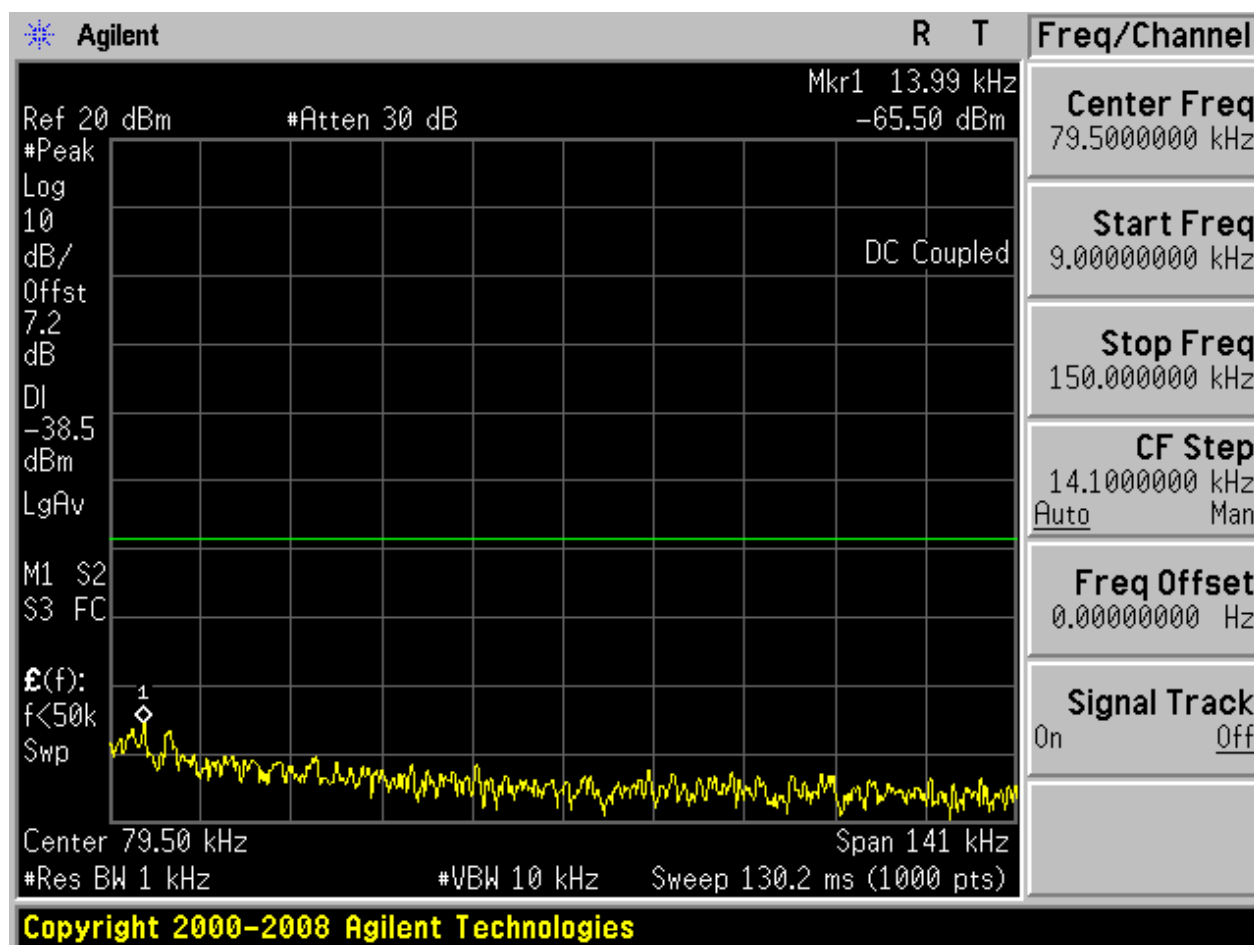
## 2.4 TM2\_2DH5\_Ch0

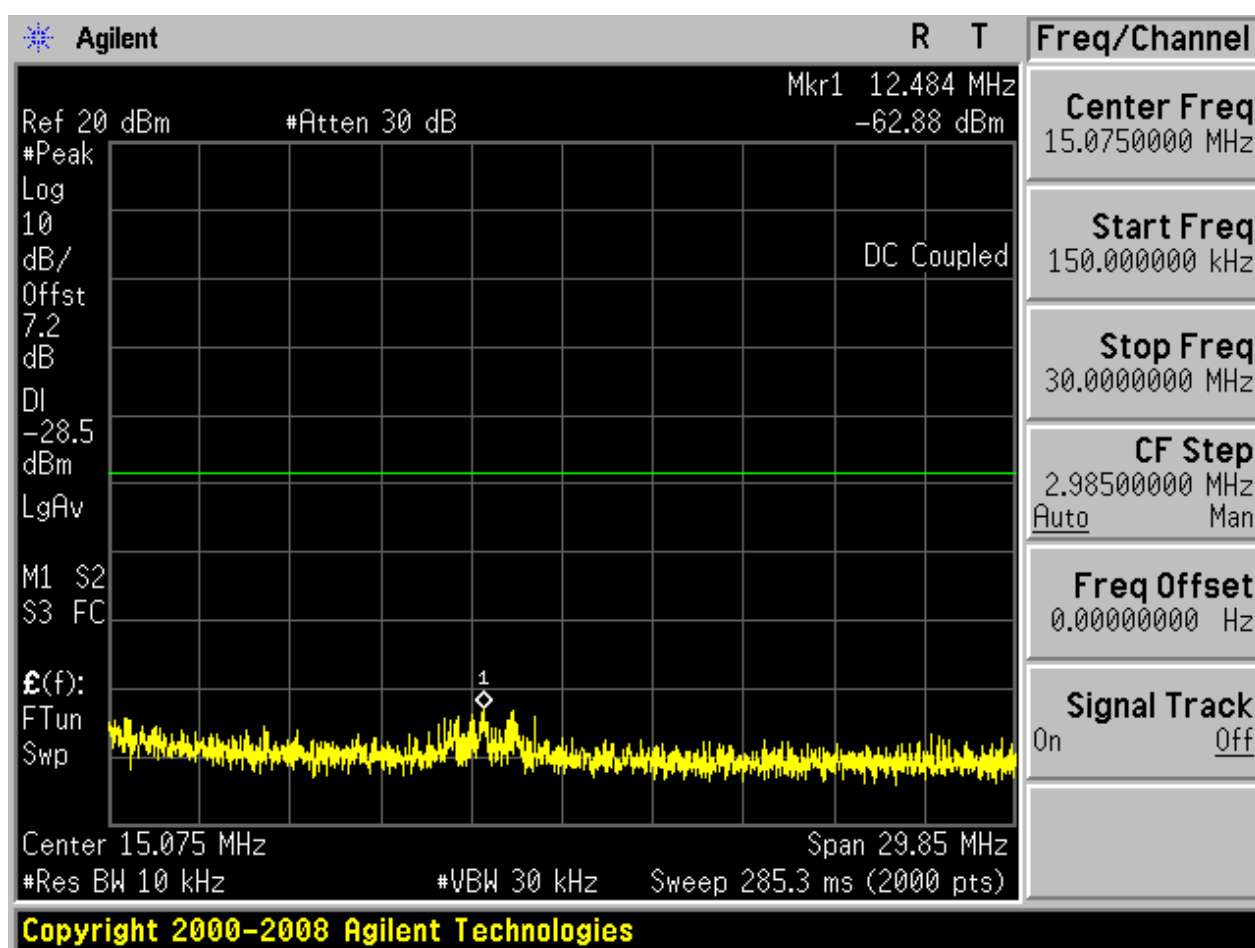
### 2.4.1 Pref

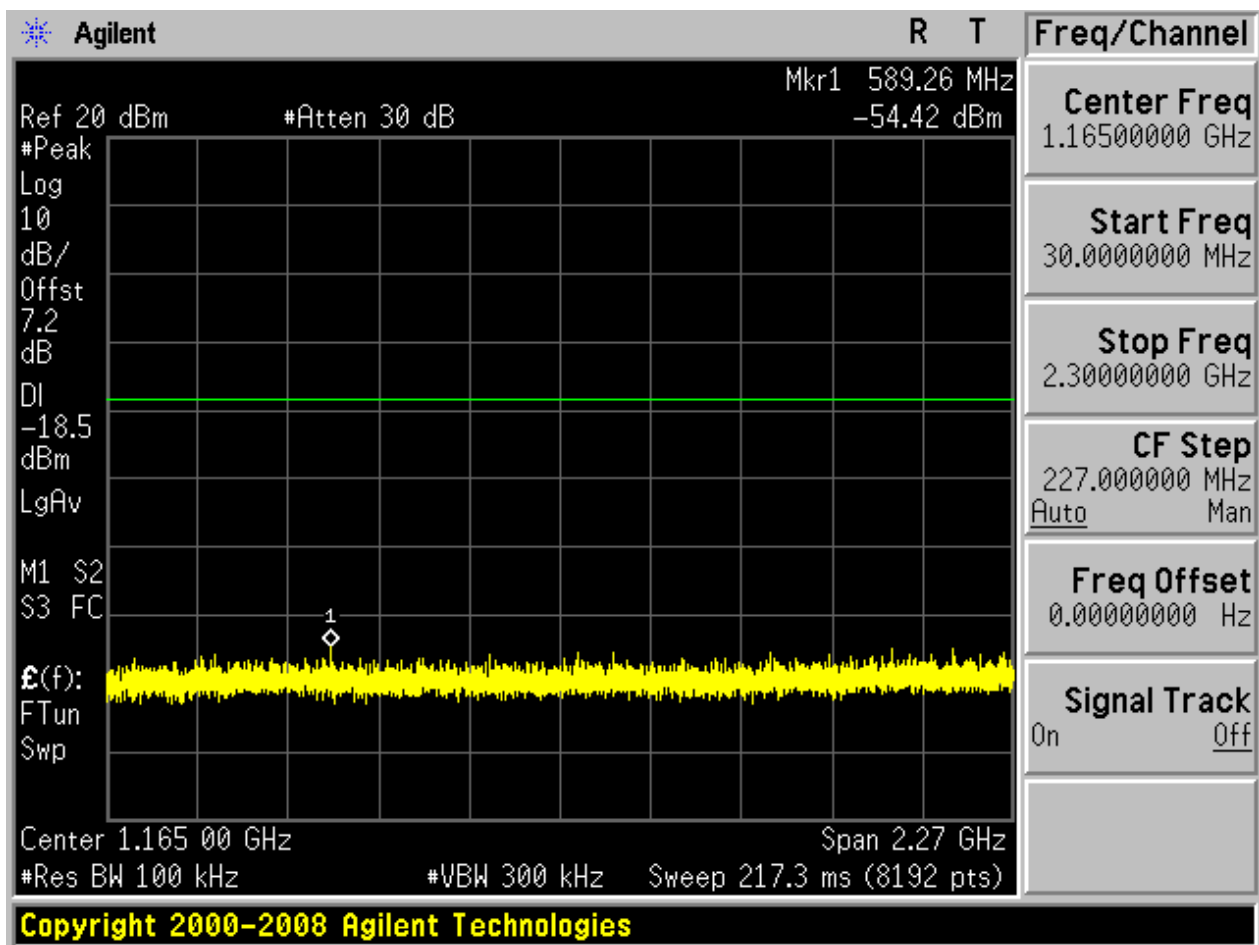


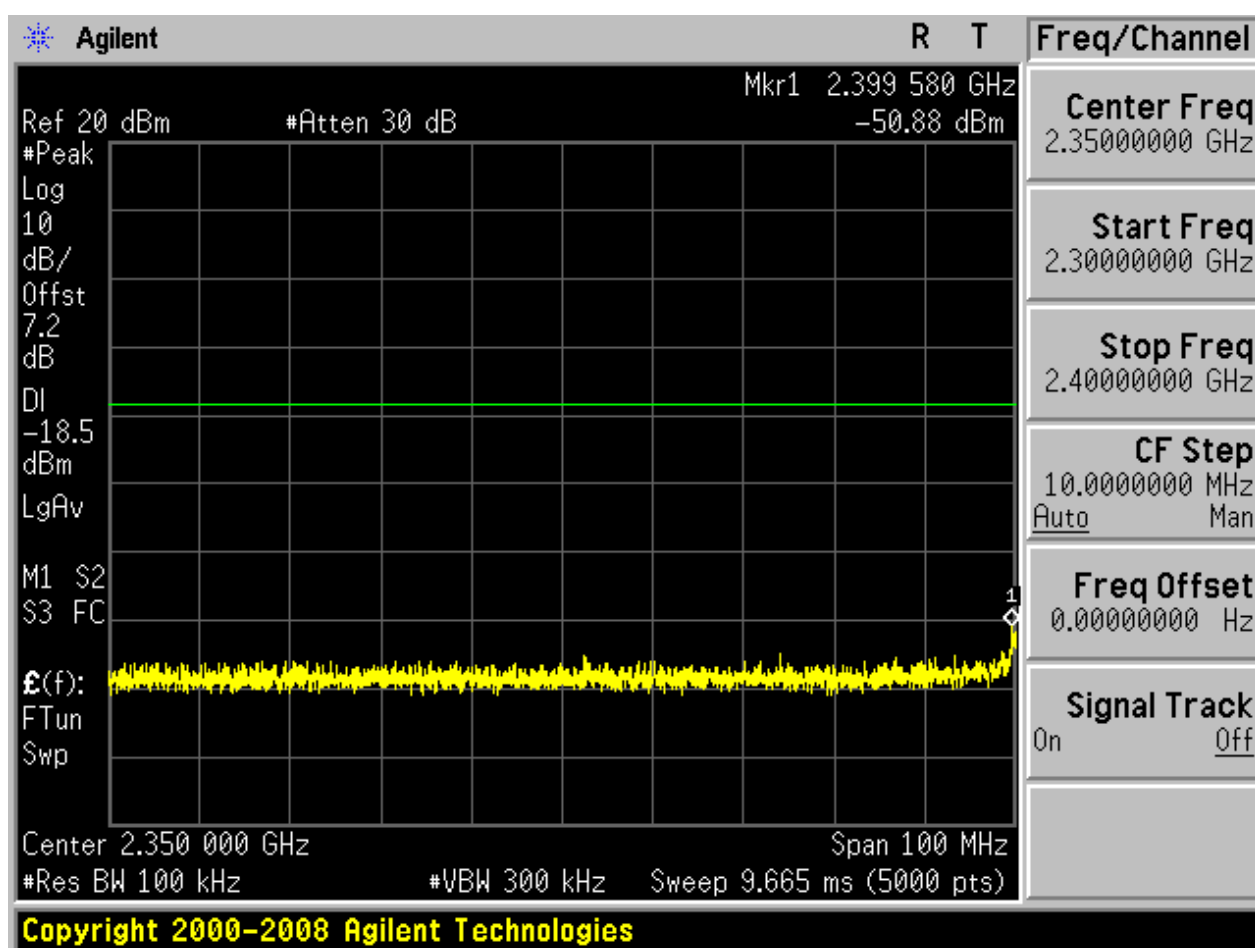


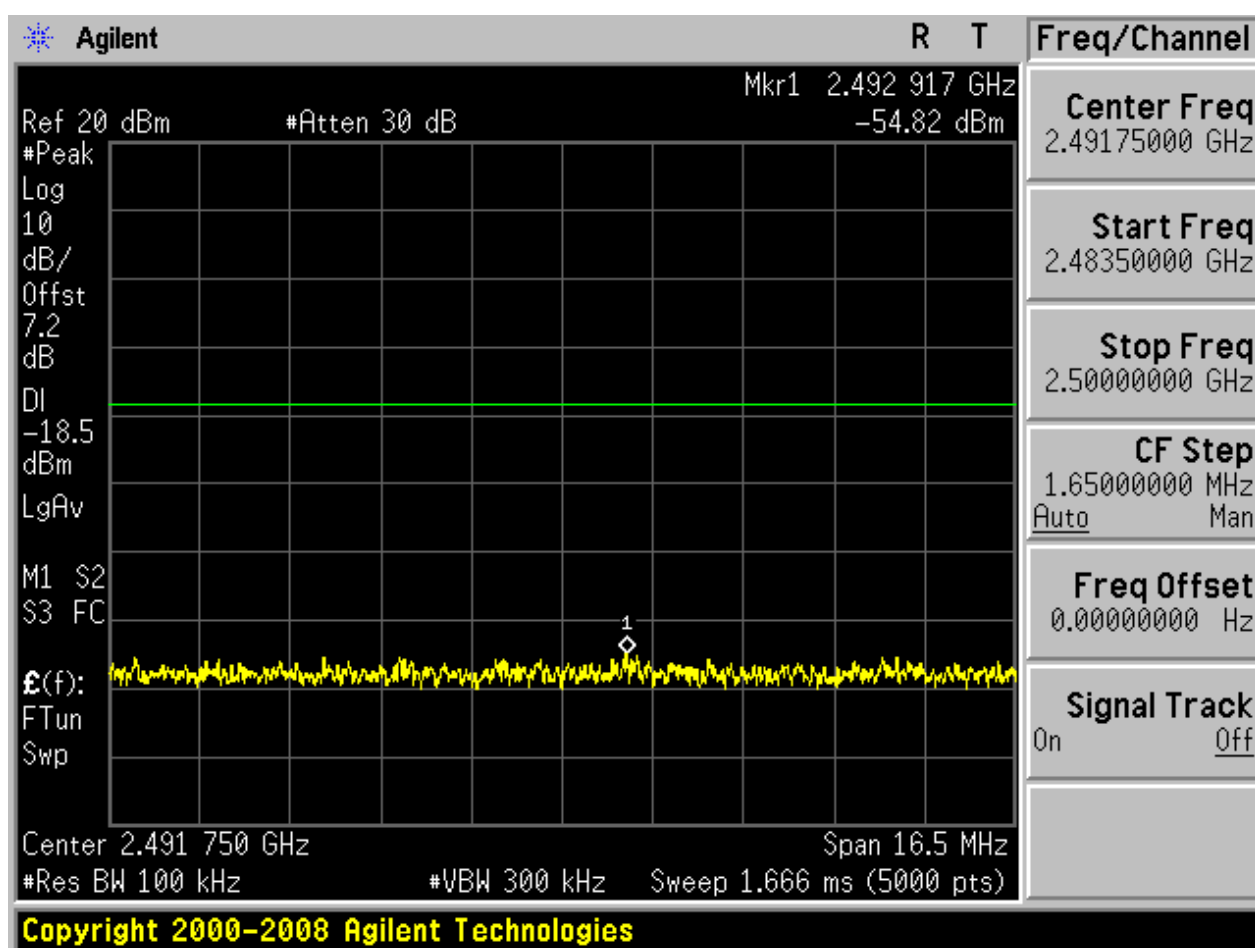
## 2.4.2 Puw

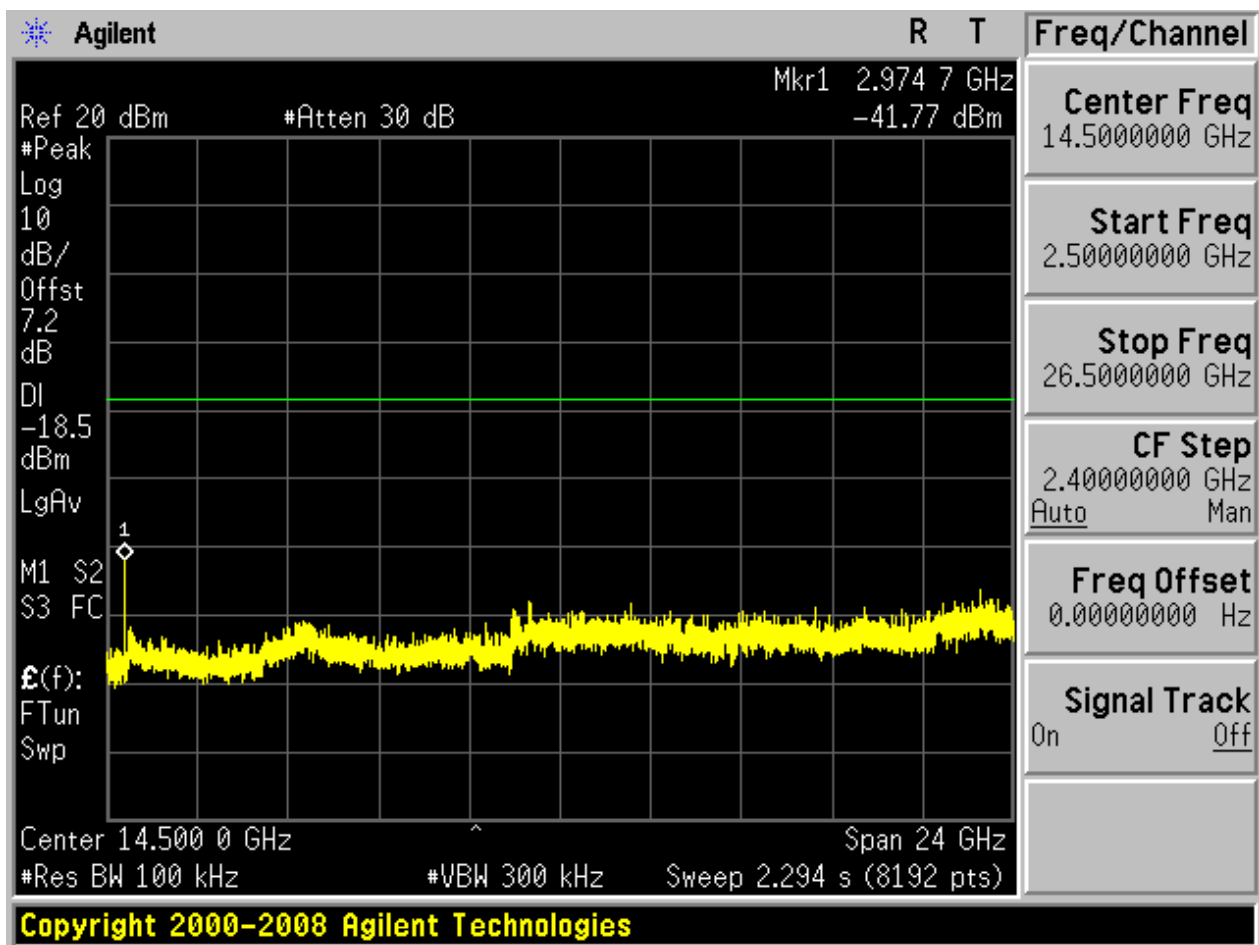








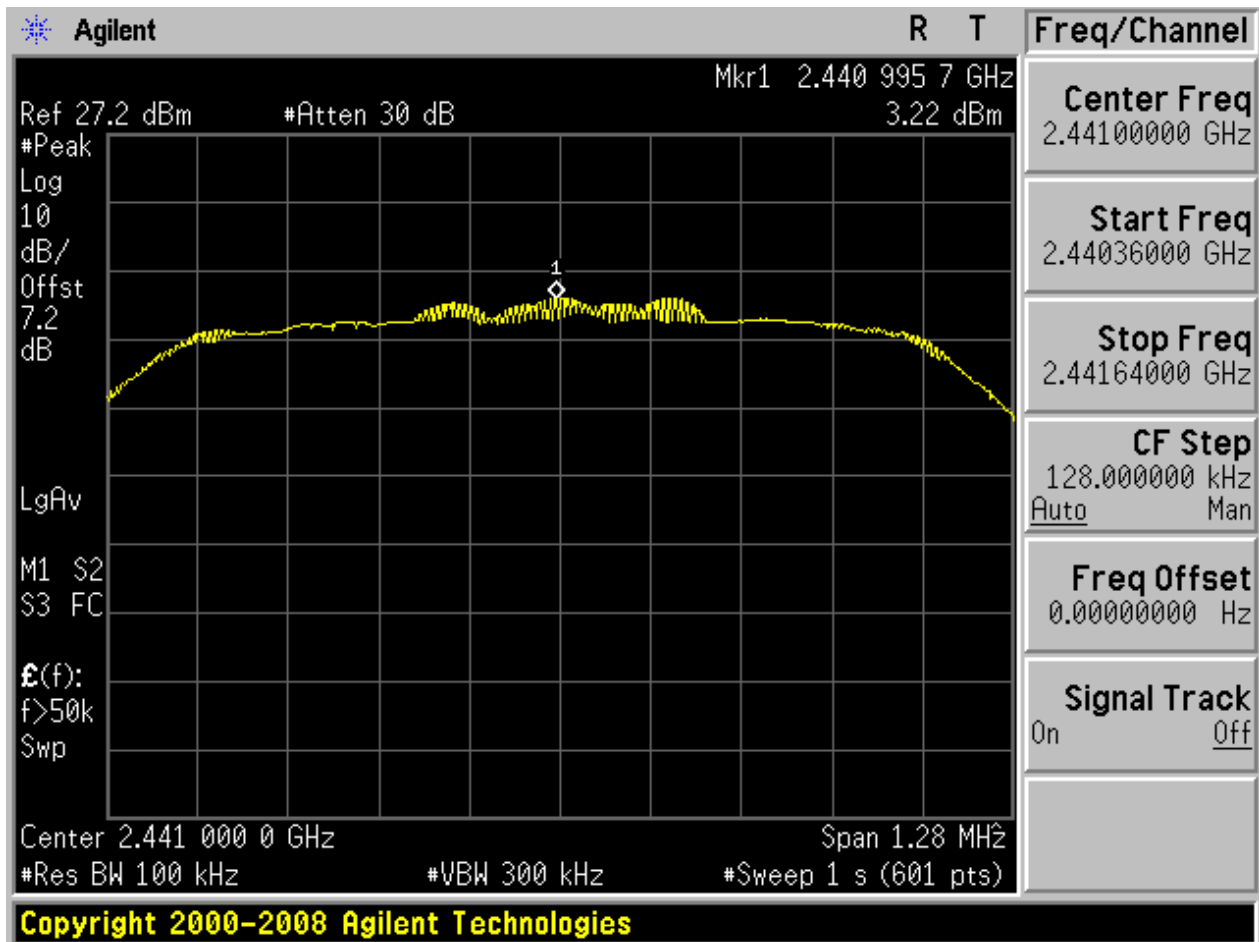






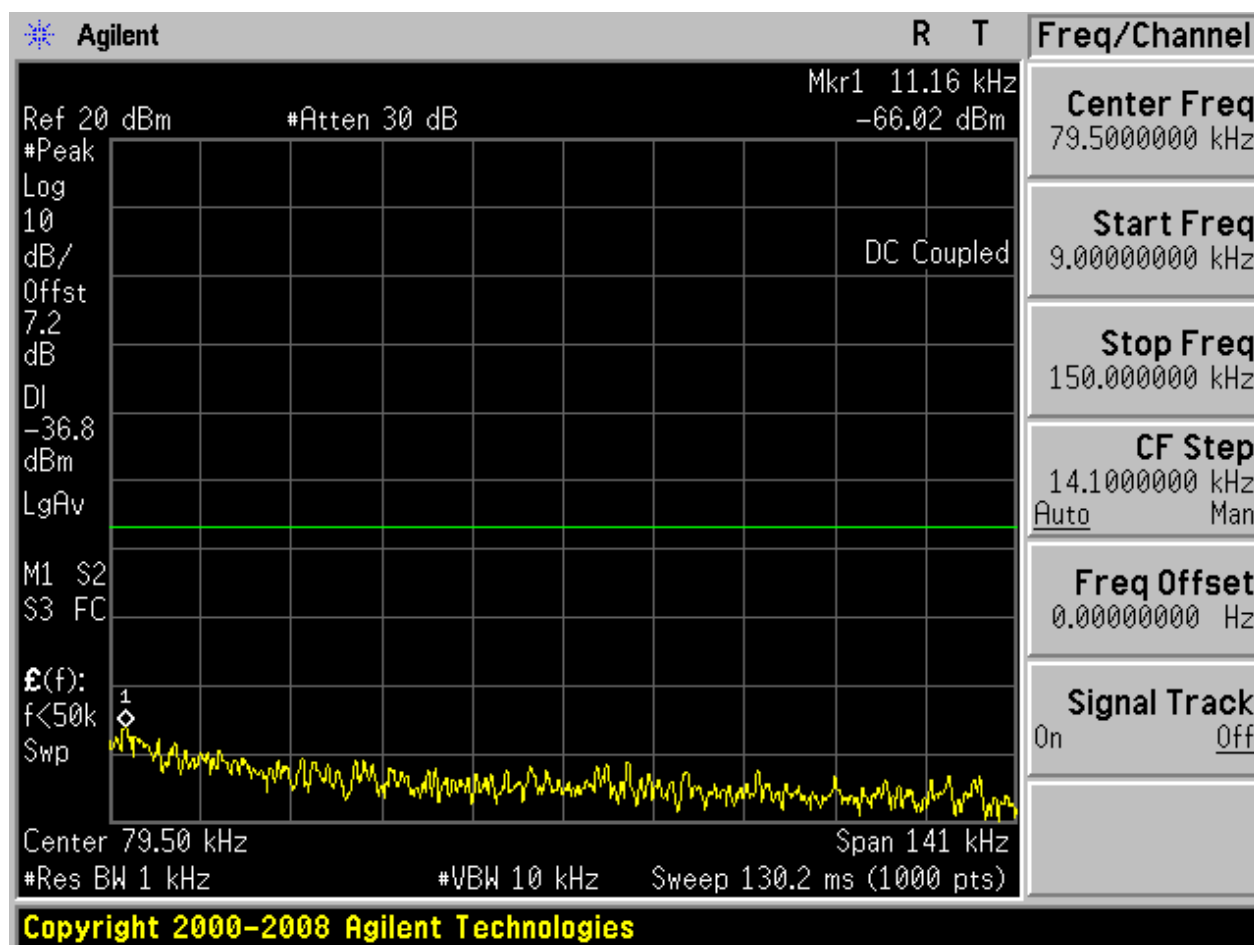
## 2.5 TM2\_2DH5\_Ch39

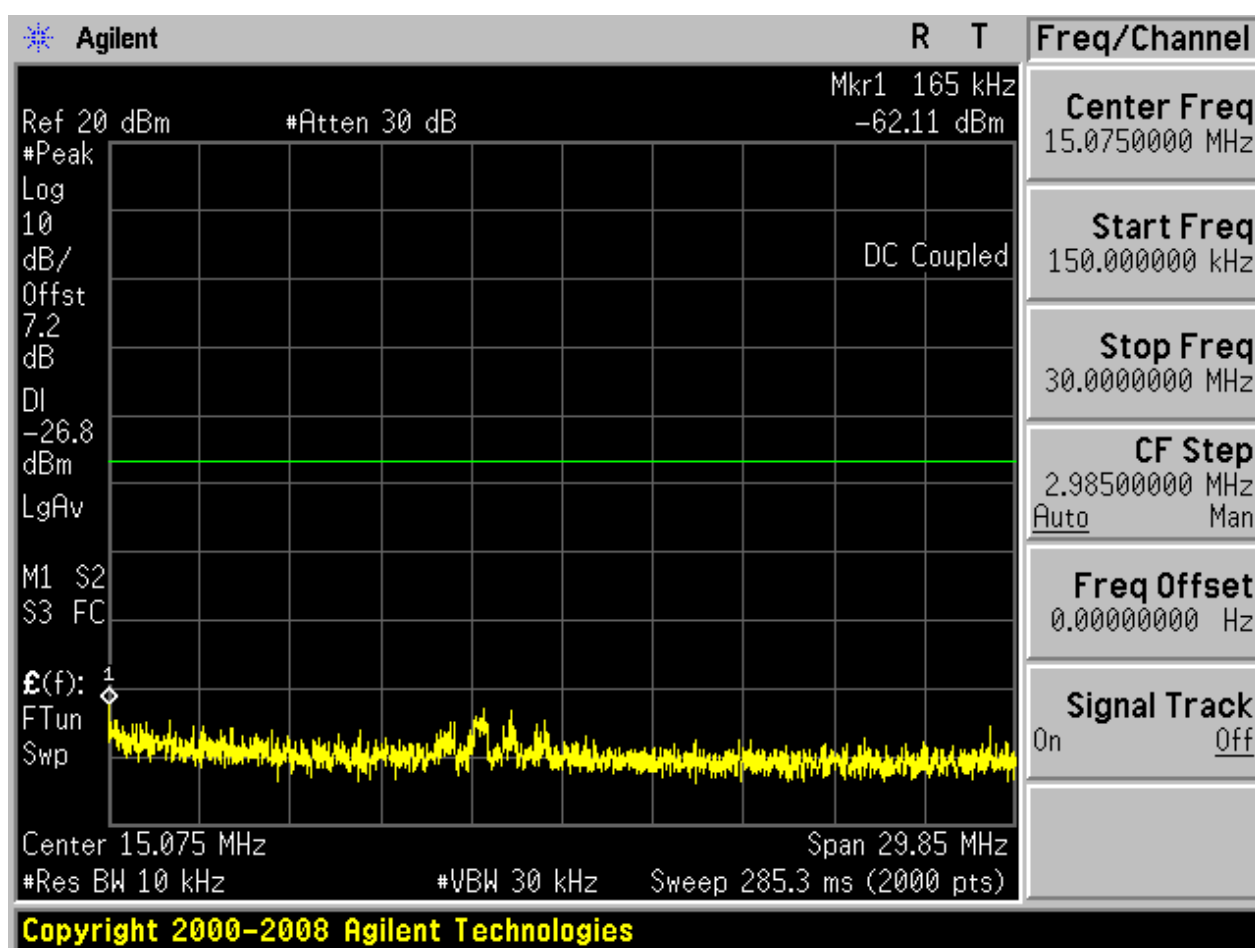
### 2.5.1 Pref

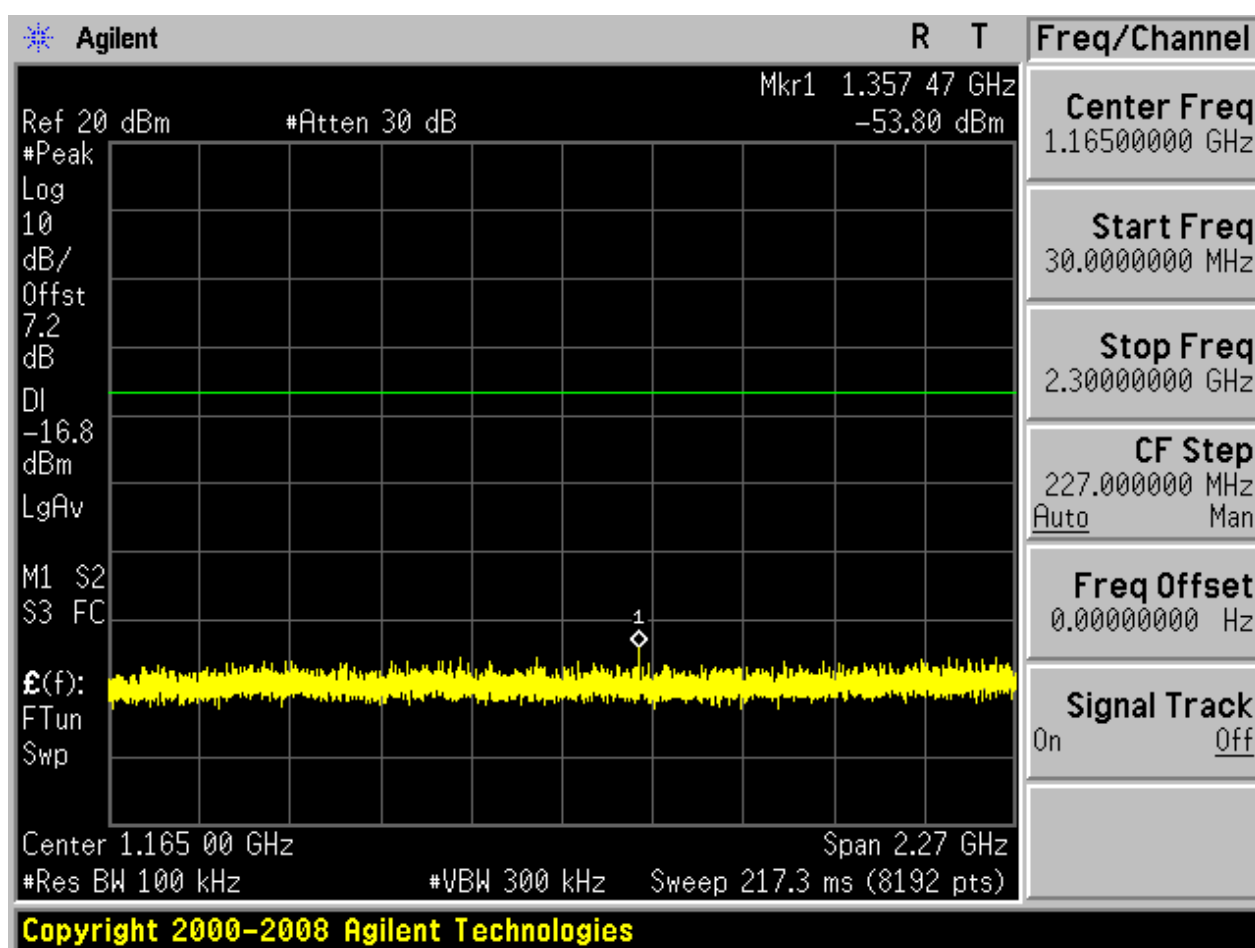


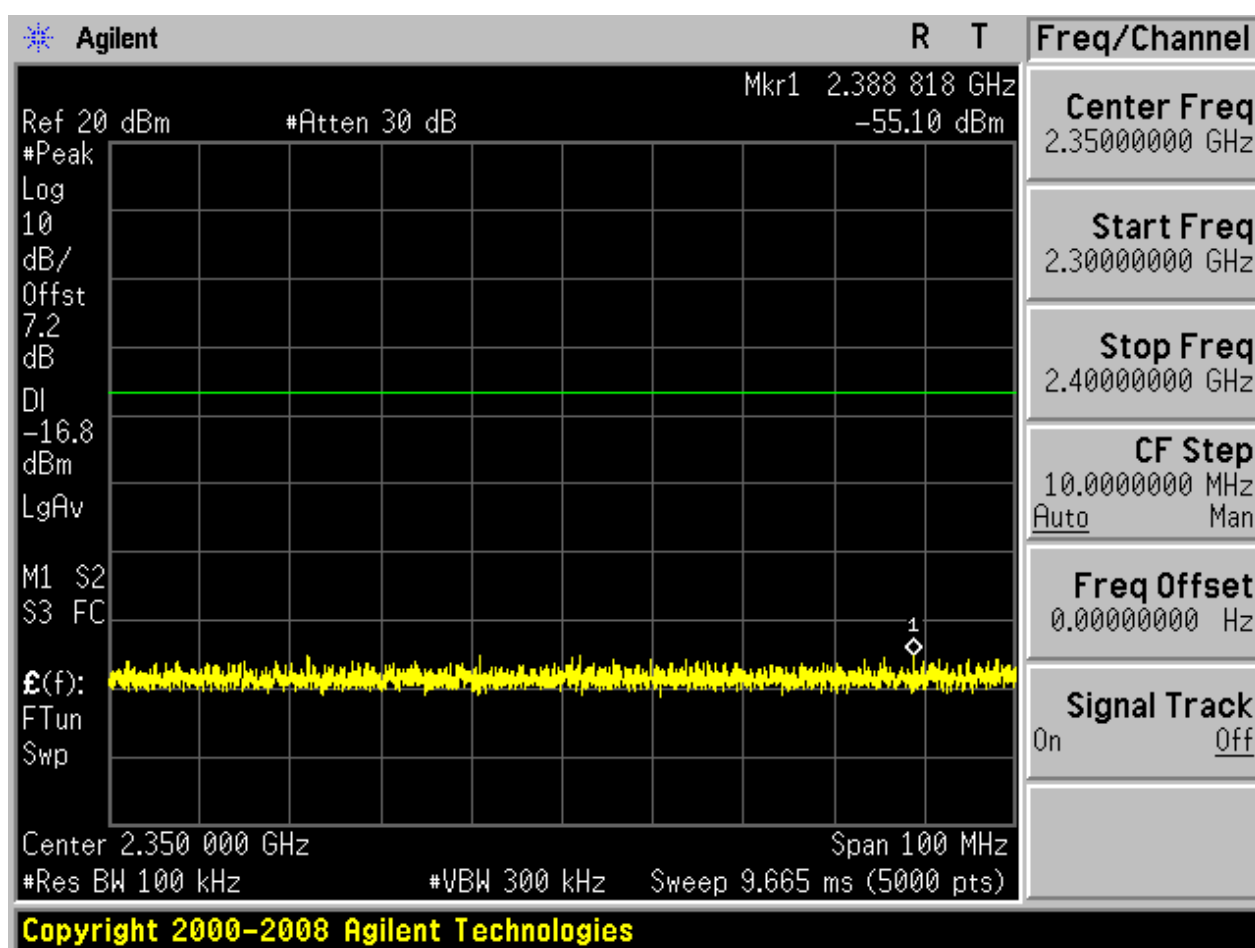


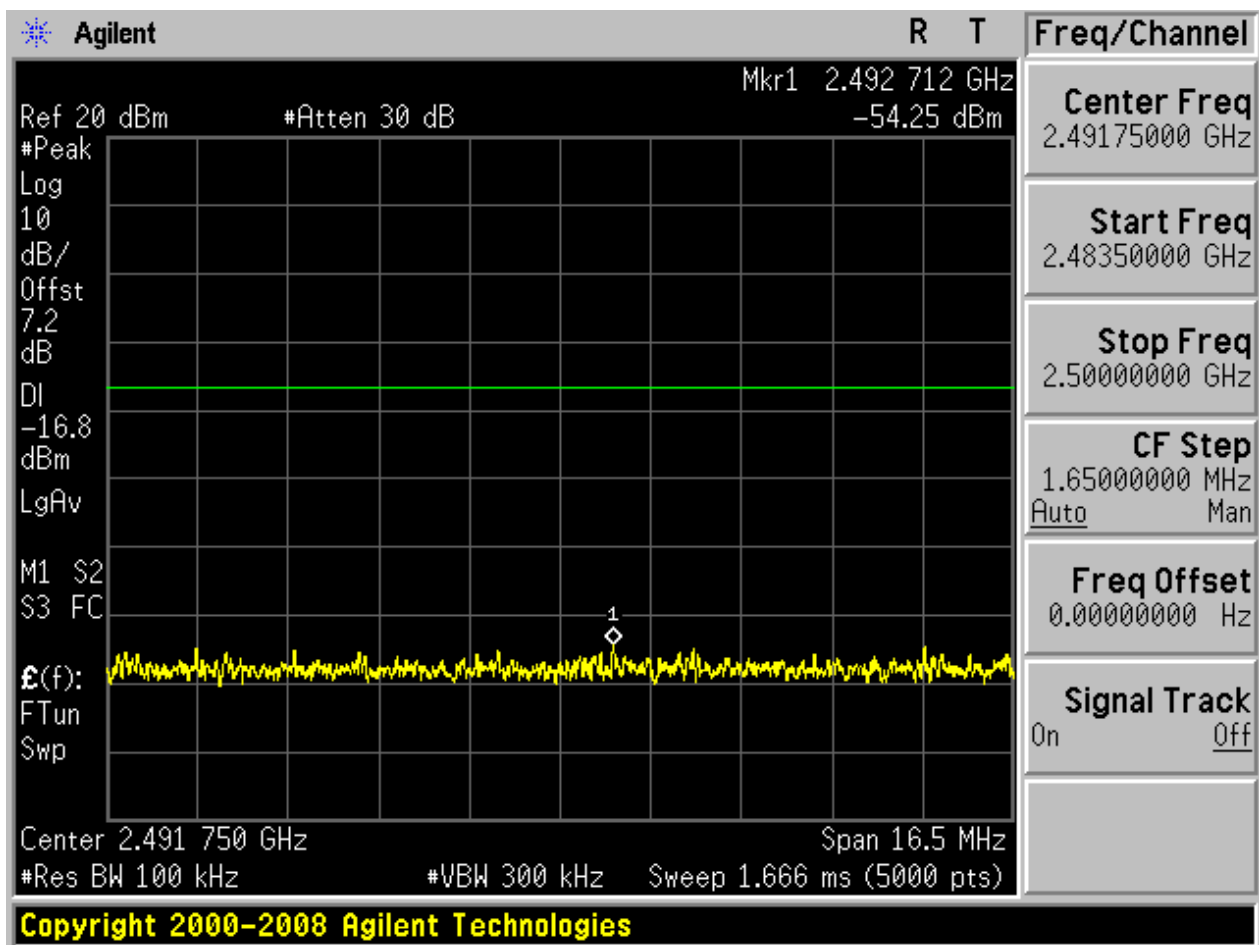
## 2.5.2 Puw

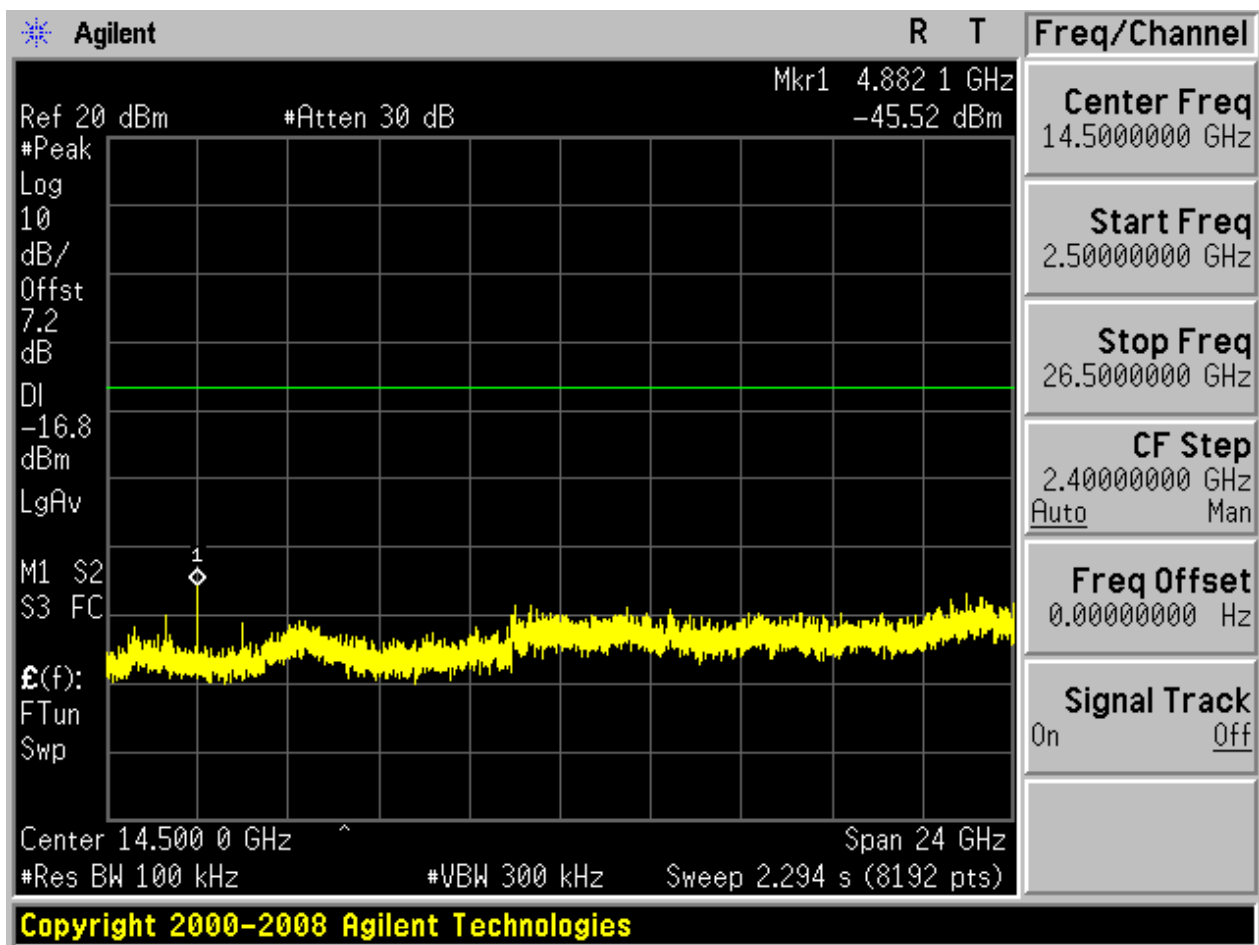








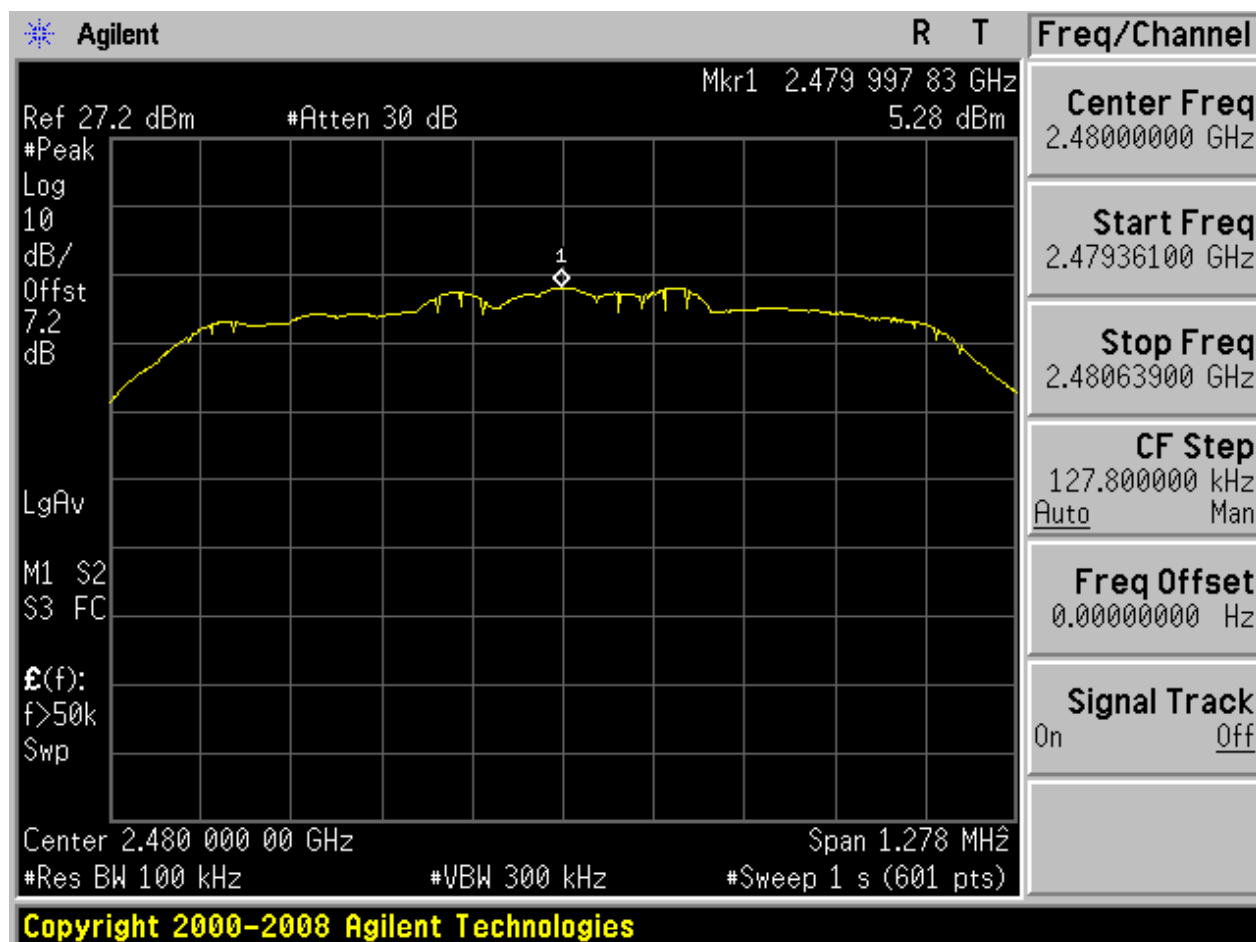






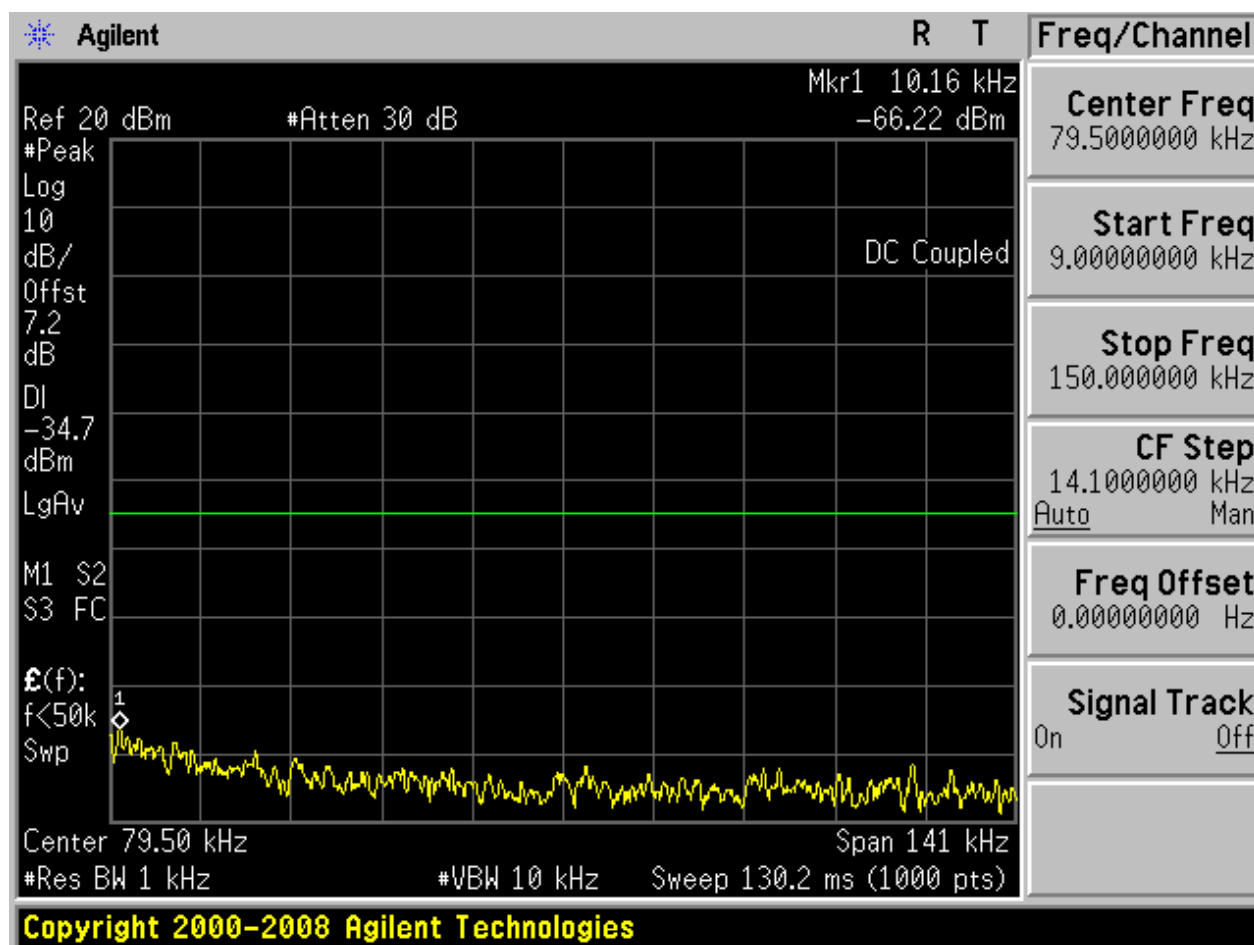
## 2.6 TM2\_2DH5\_Ch78

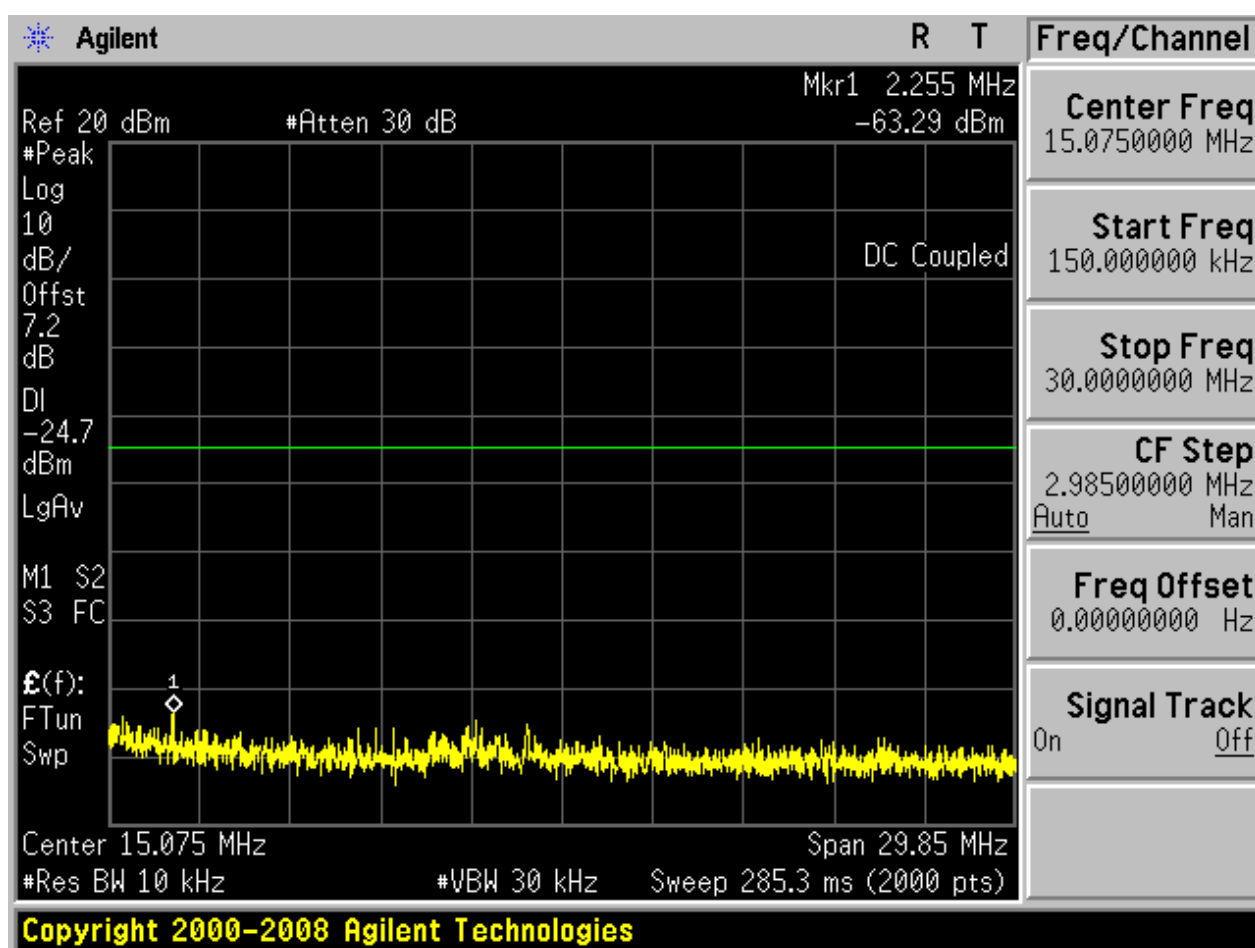
### 2.6.1 Pref

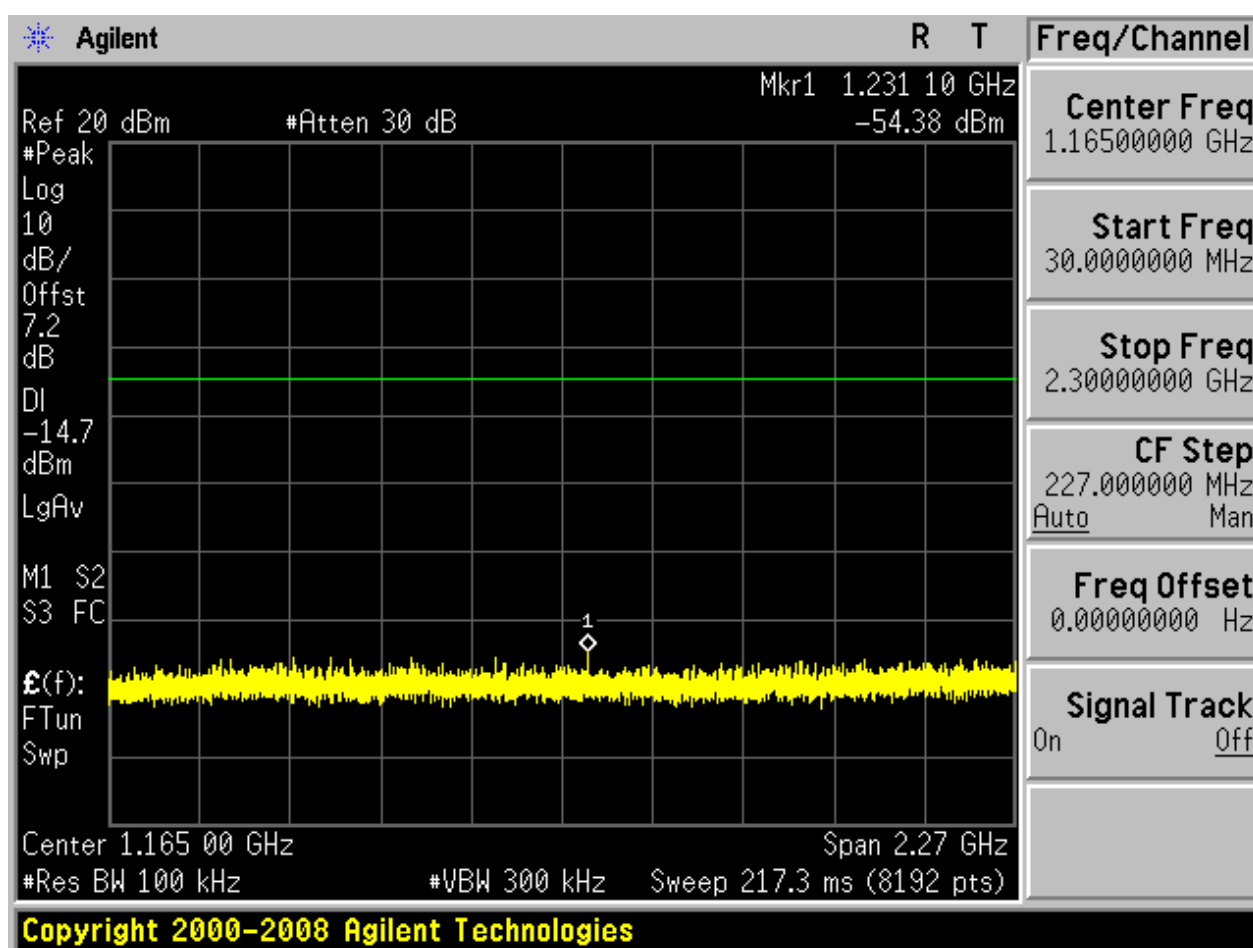


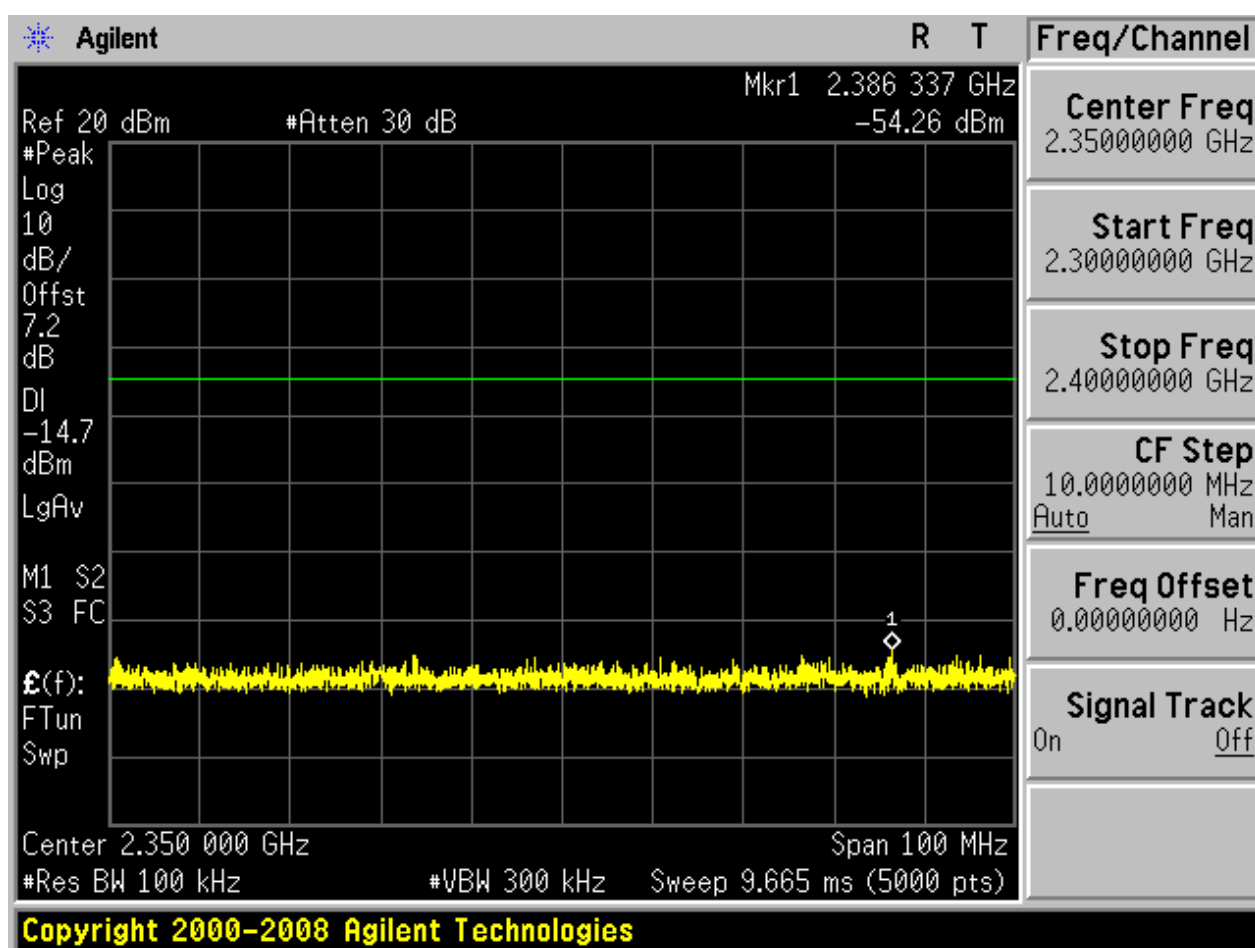


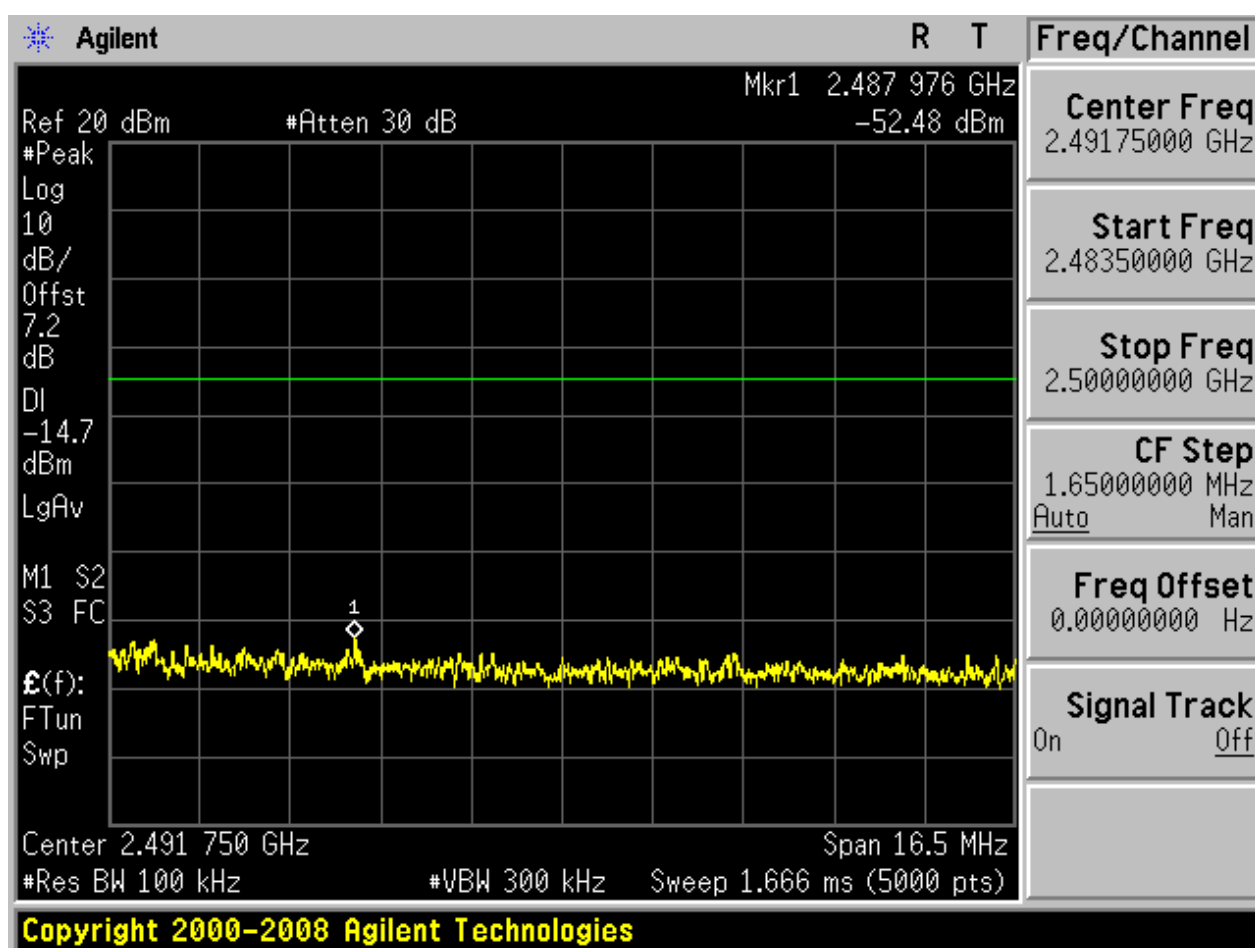
## 2.6.2 Puw

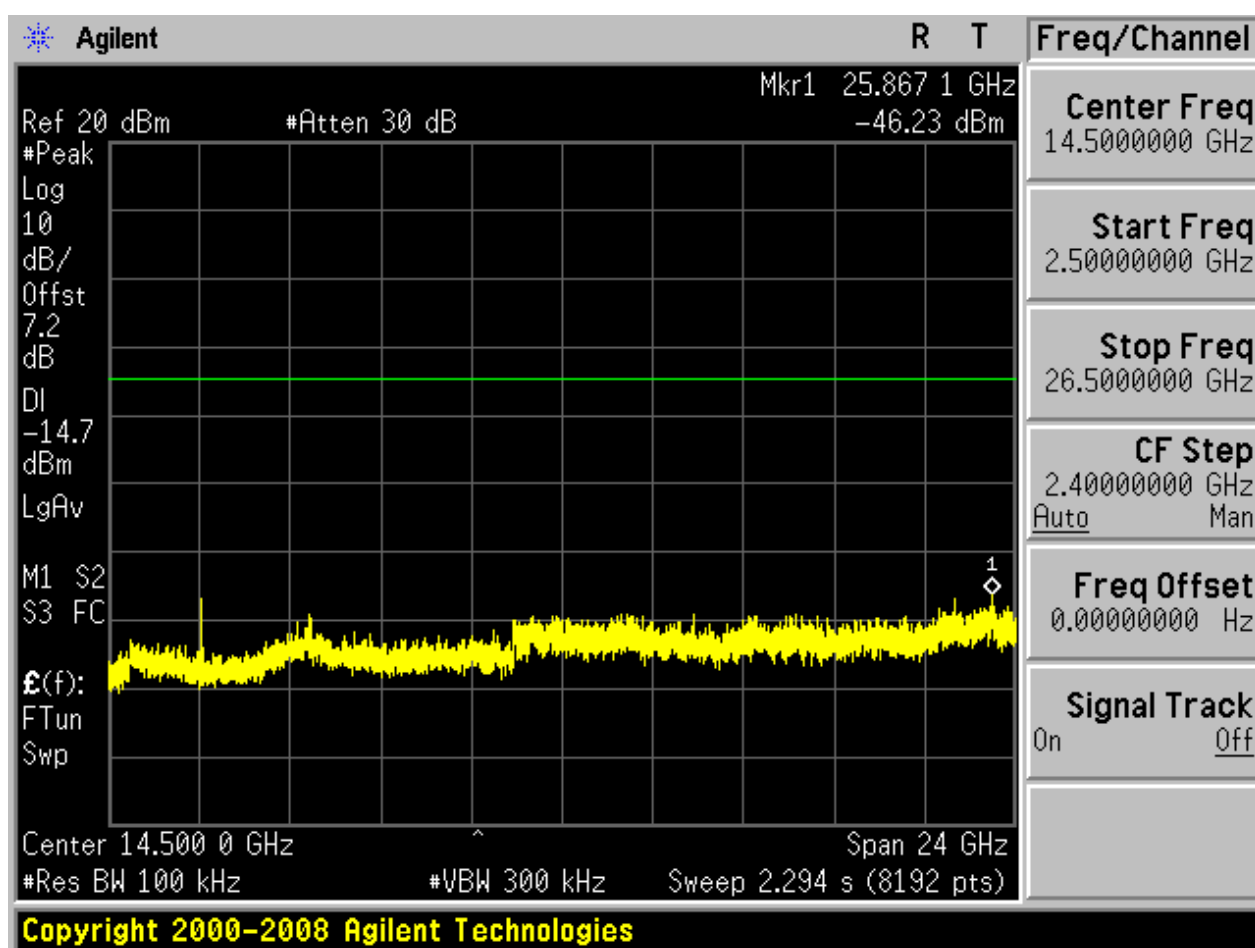








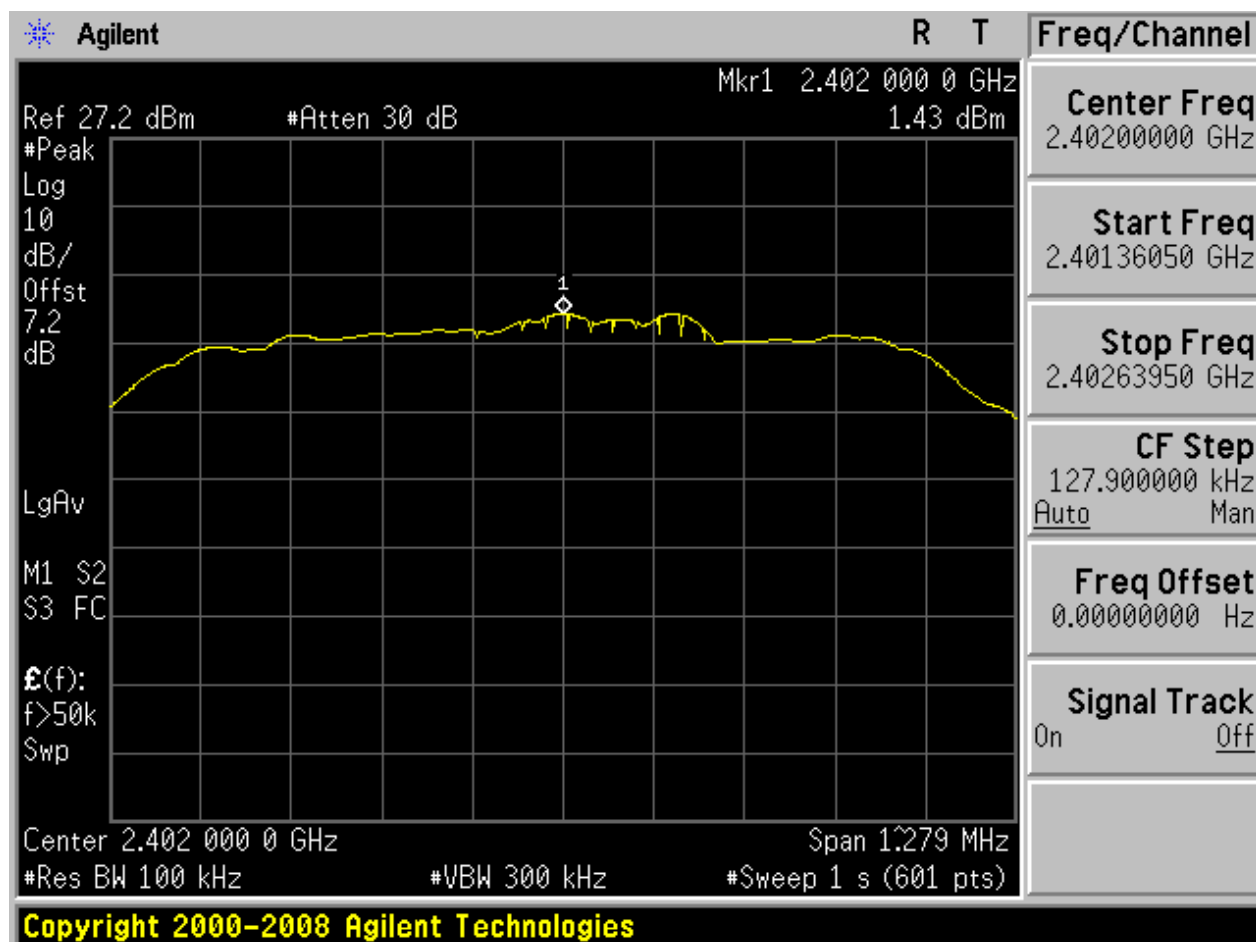






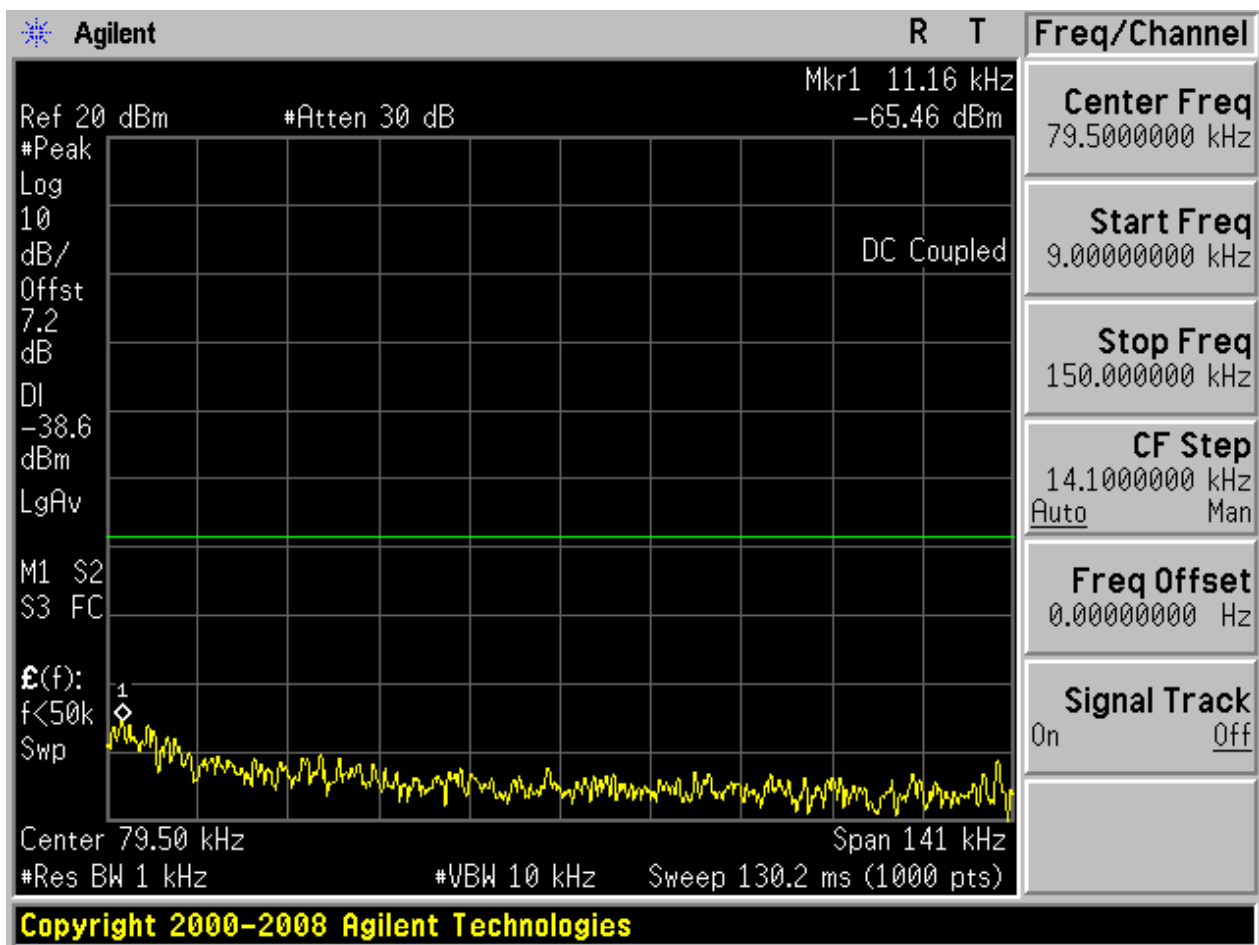
## 2.7 TM3\_3DH5\_Ch0

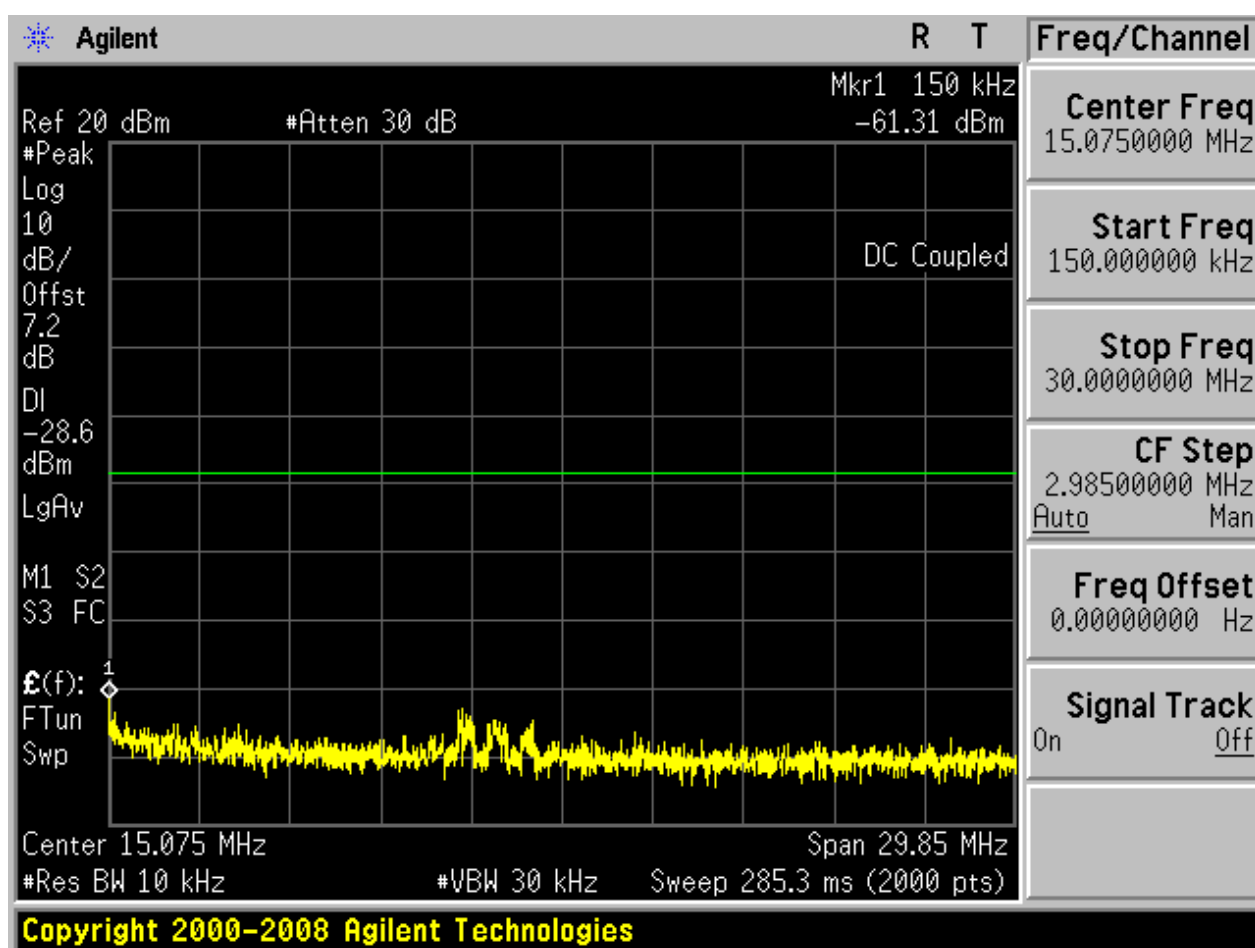
### 2.7.1 Pref

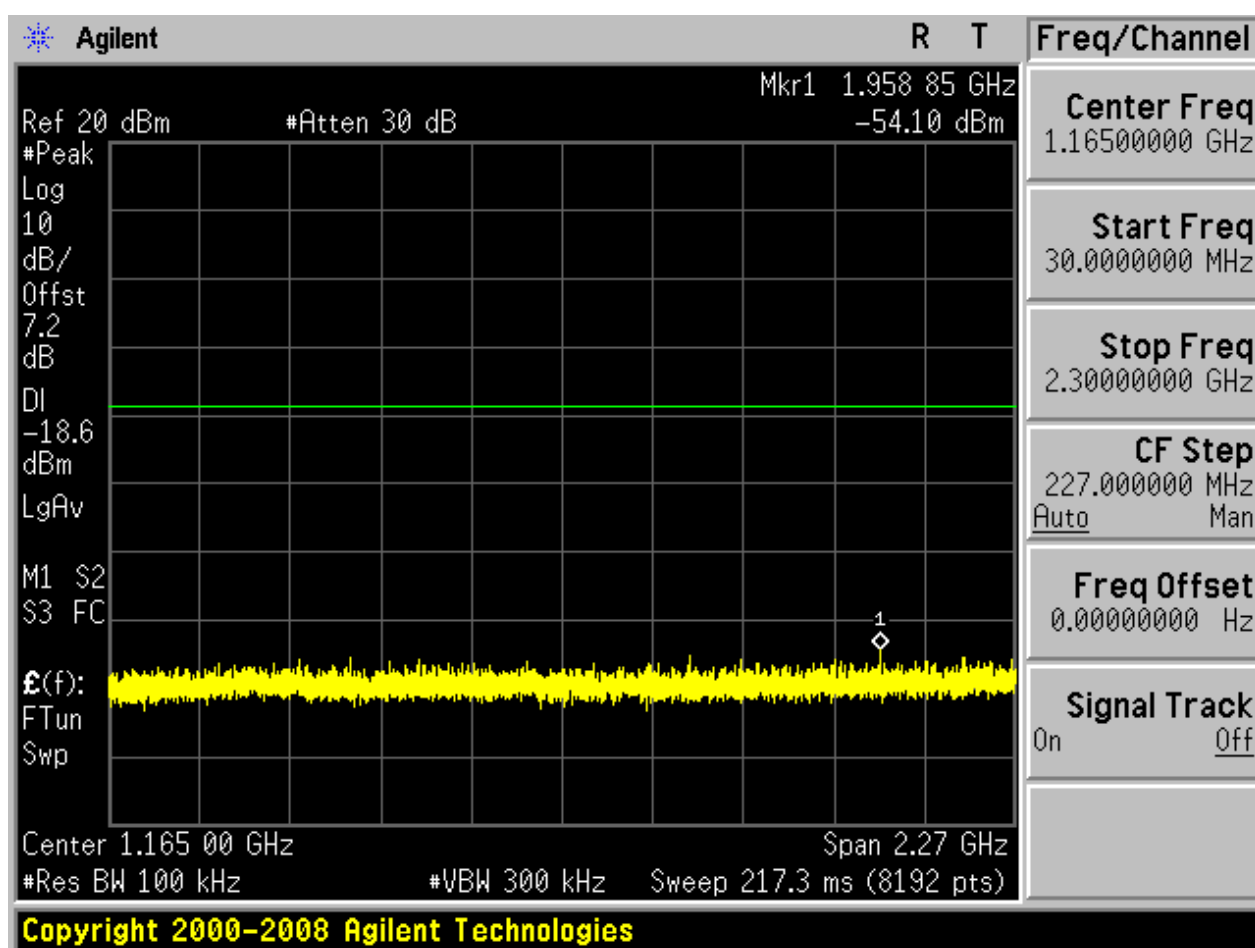


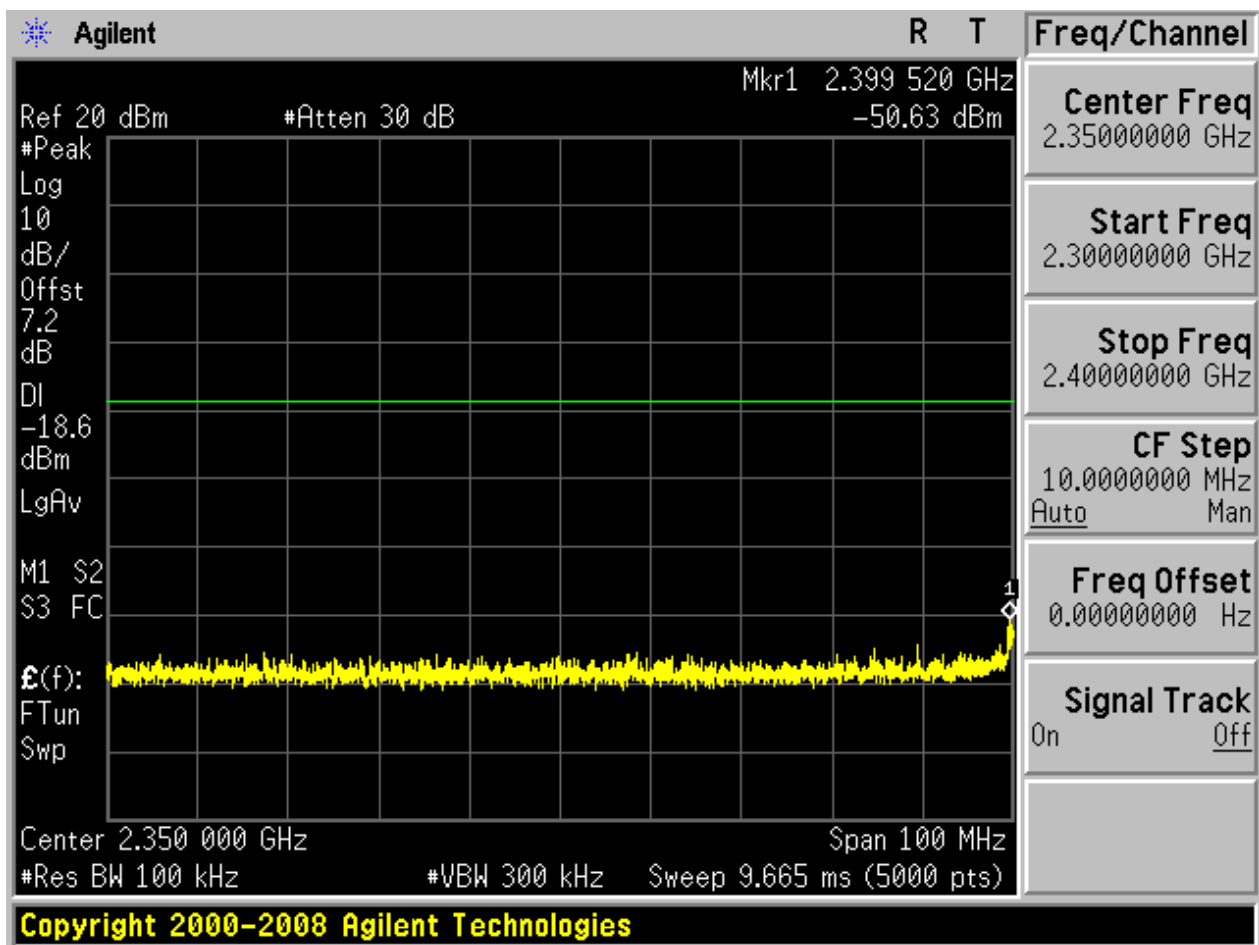


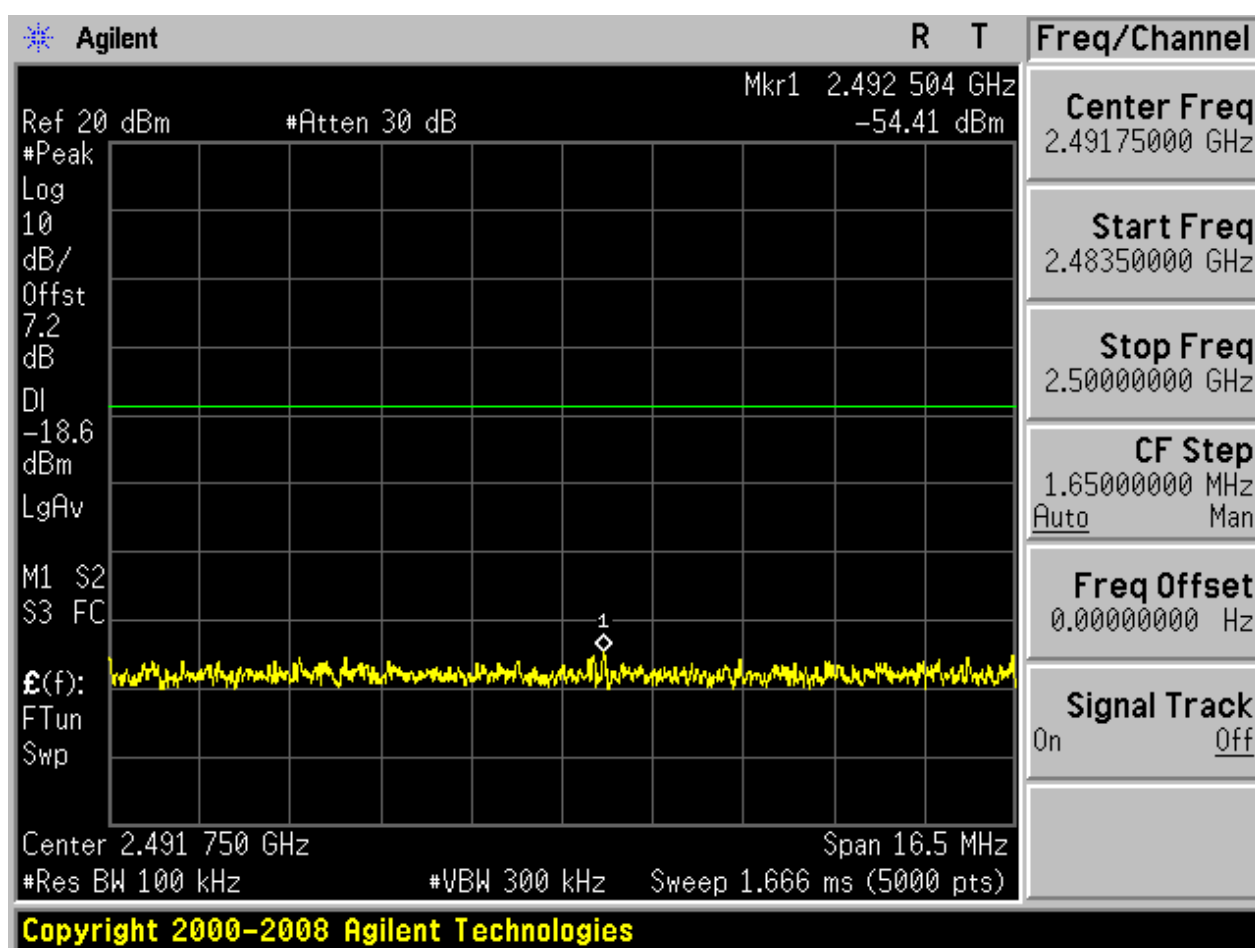
## 2.7.2 Puw

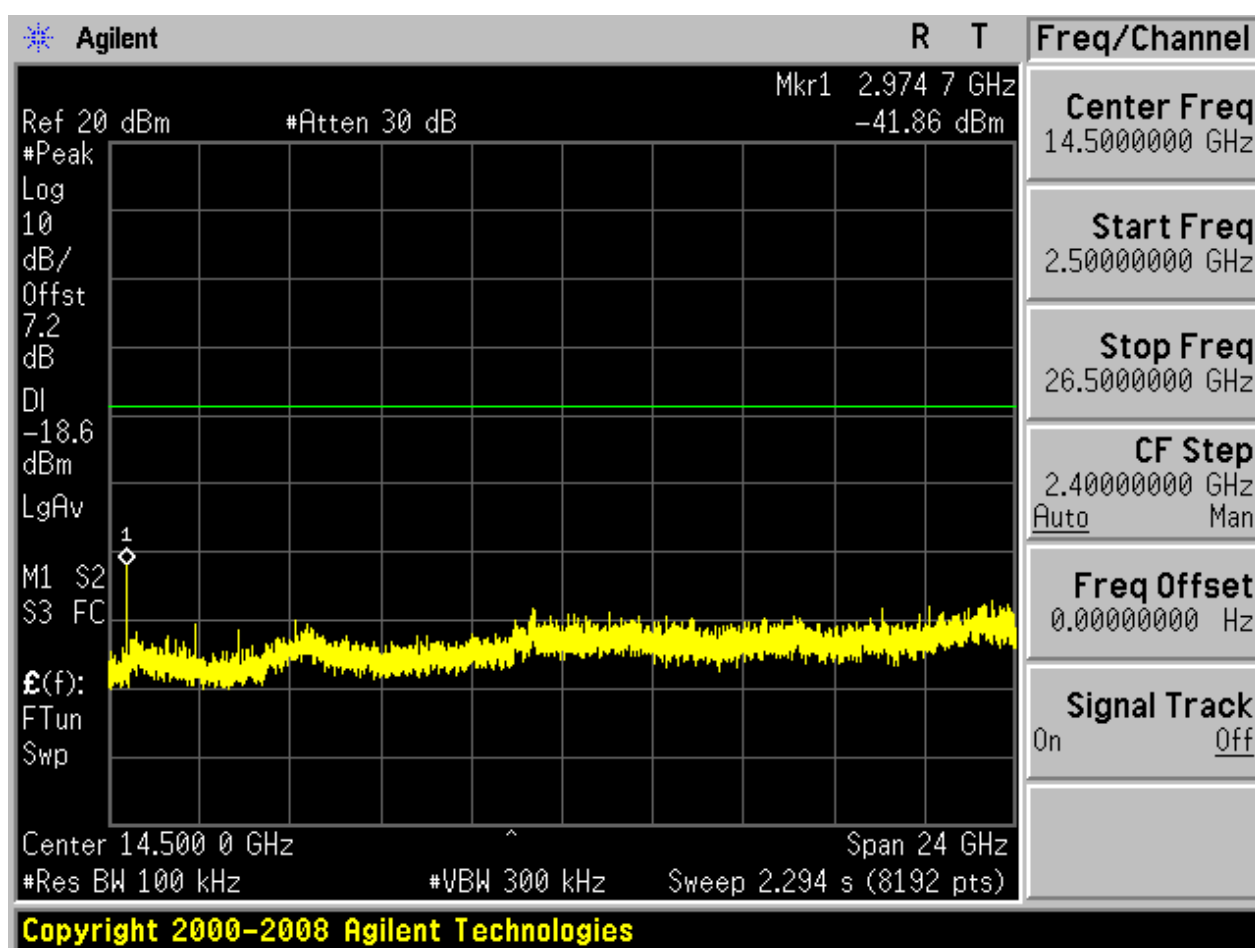








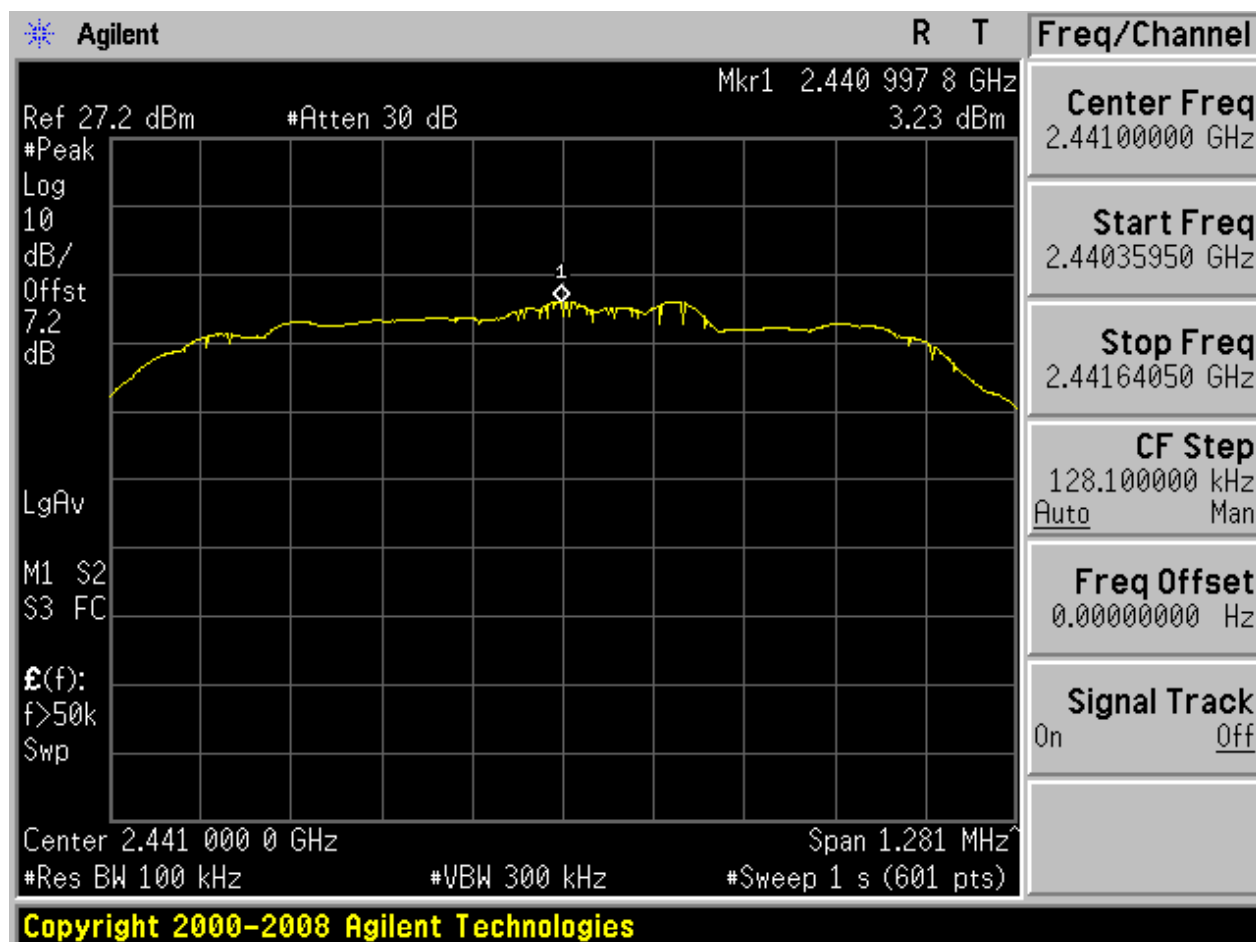






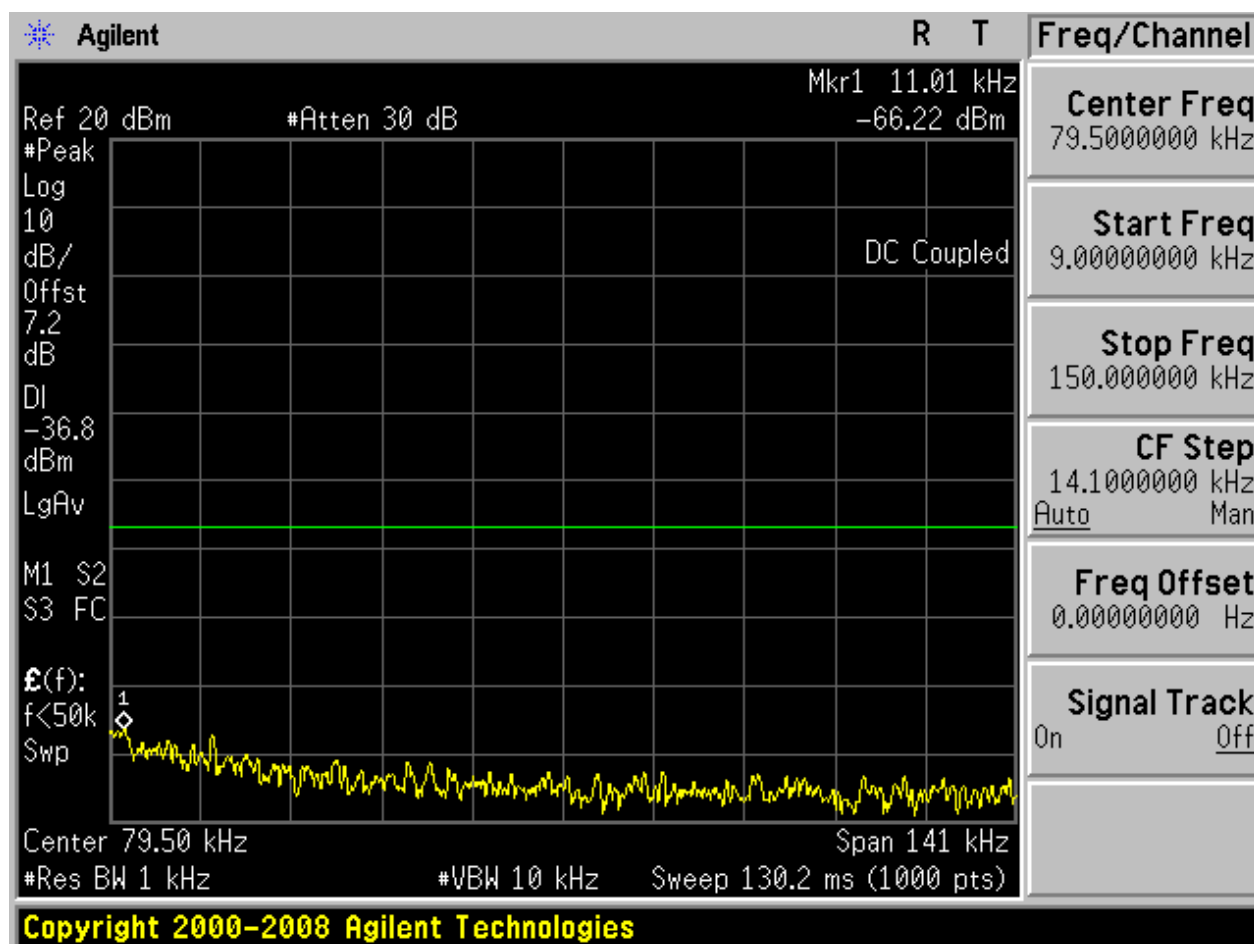
## 2.8 TM3\_3DH5\_Ch39

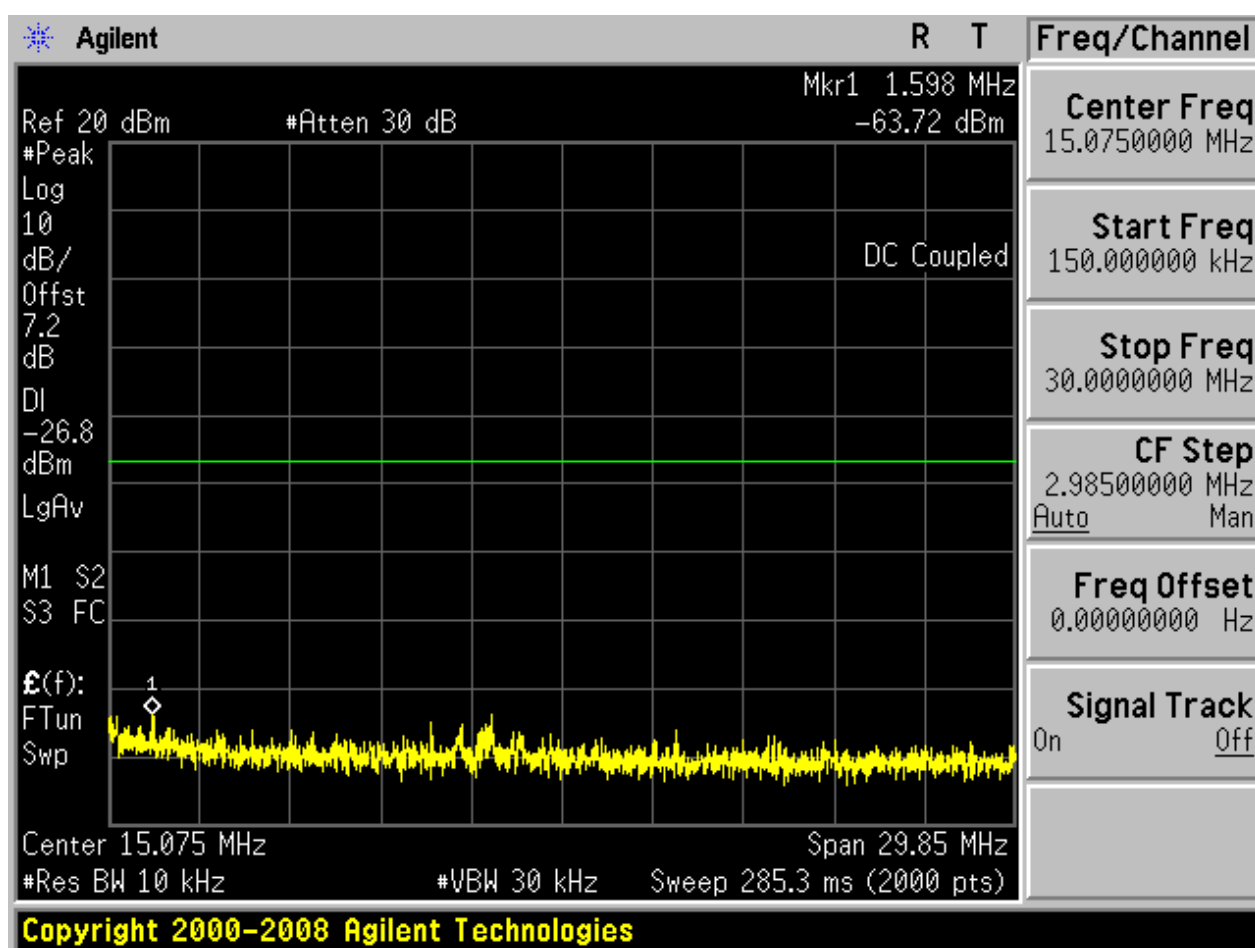
### 2.8.1 Pref

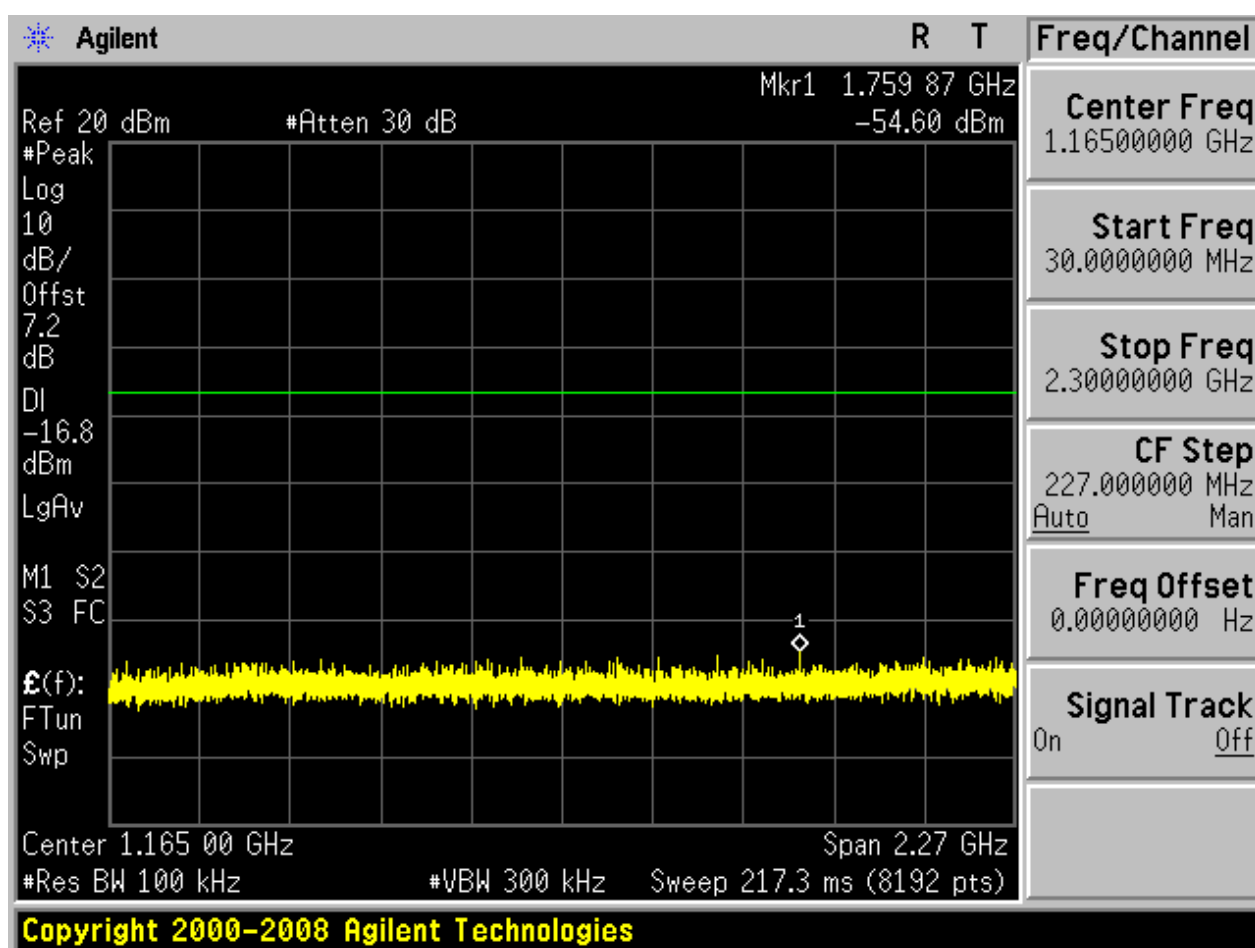


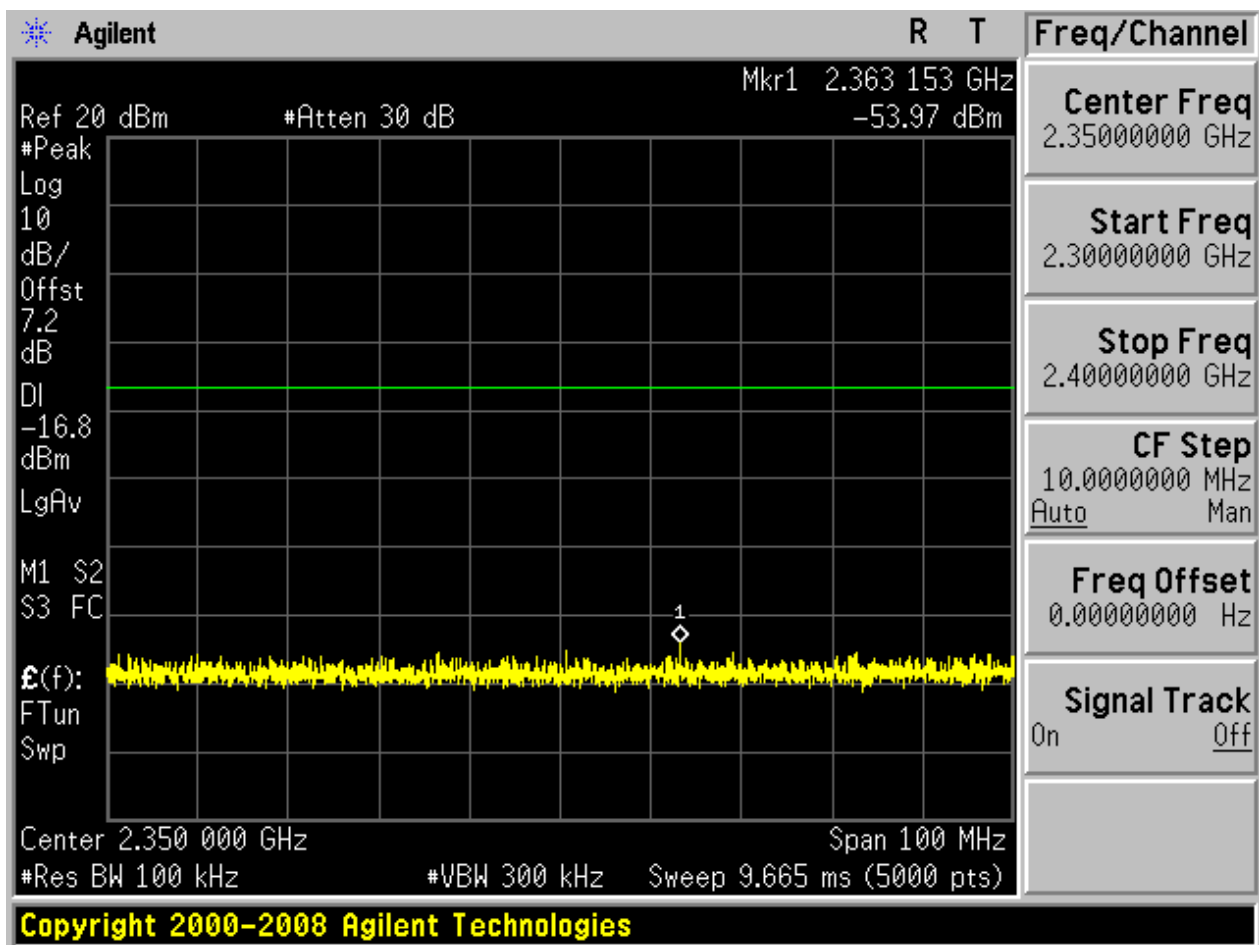


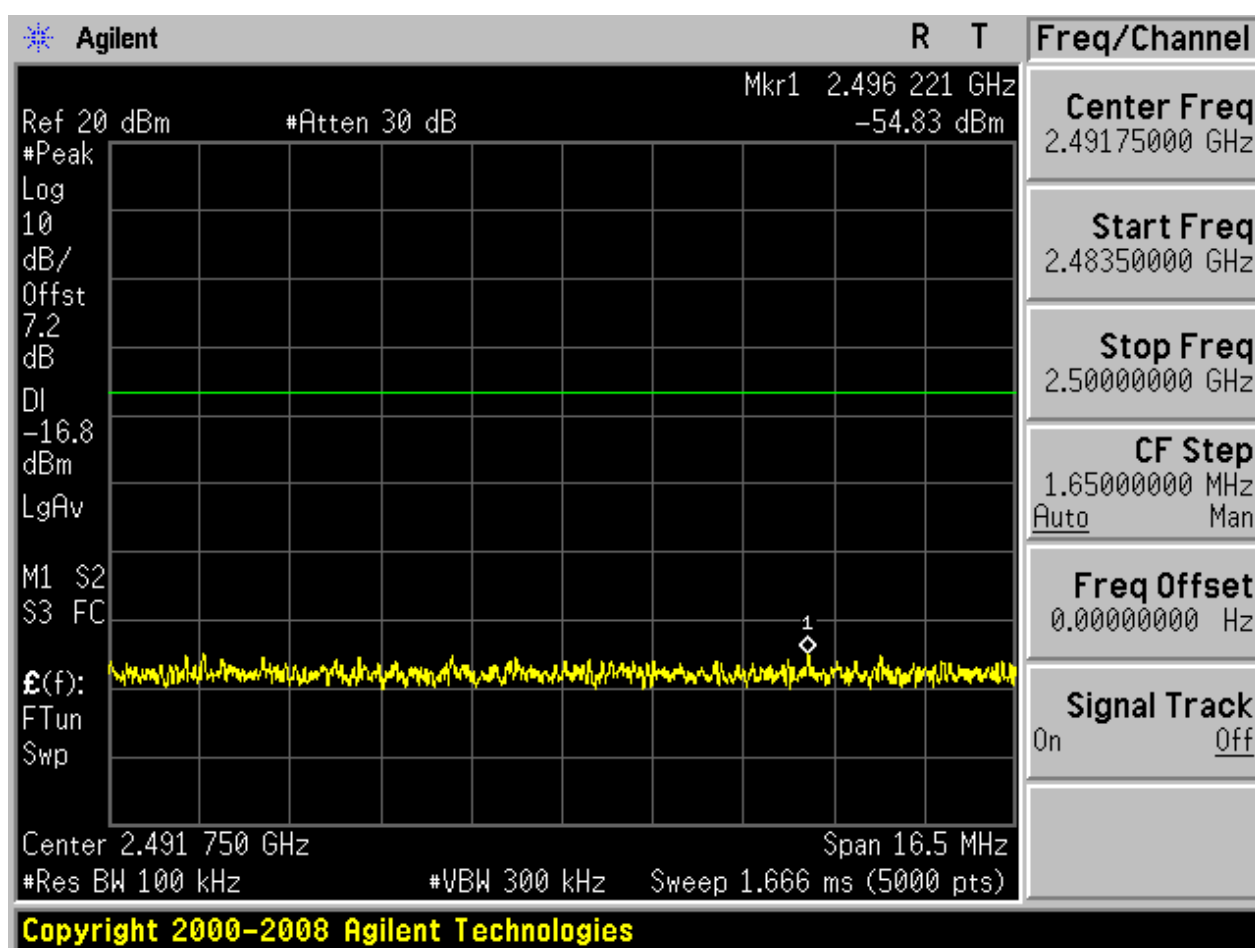
## 2.8.2 Puw

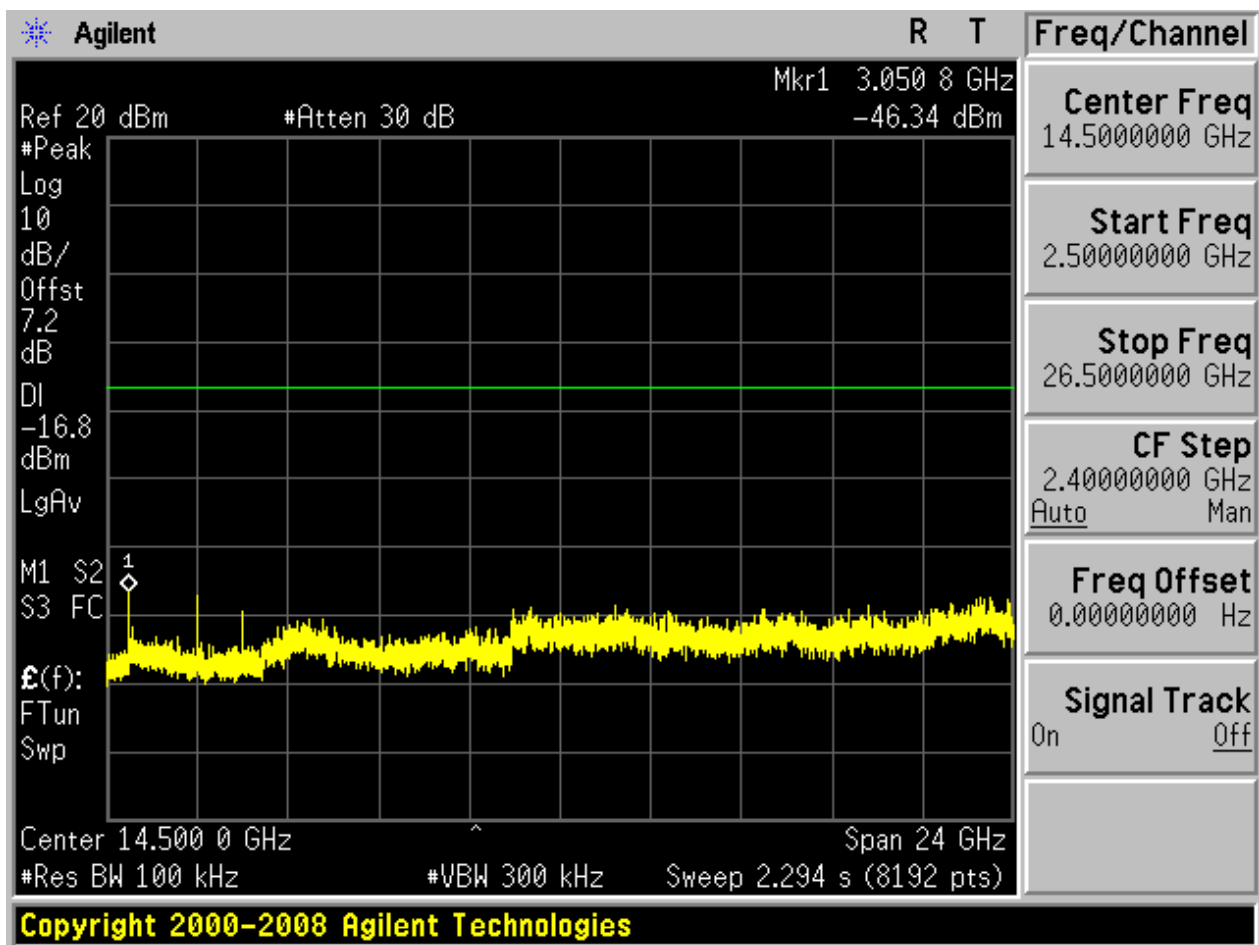








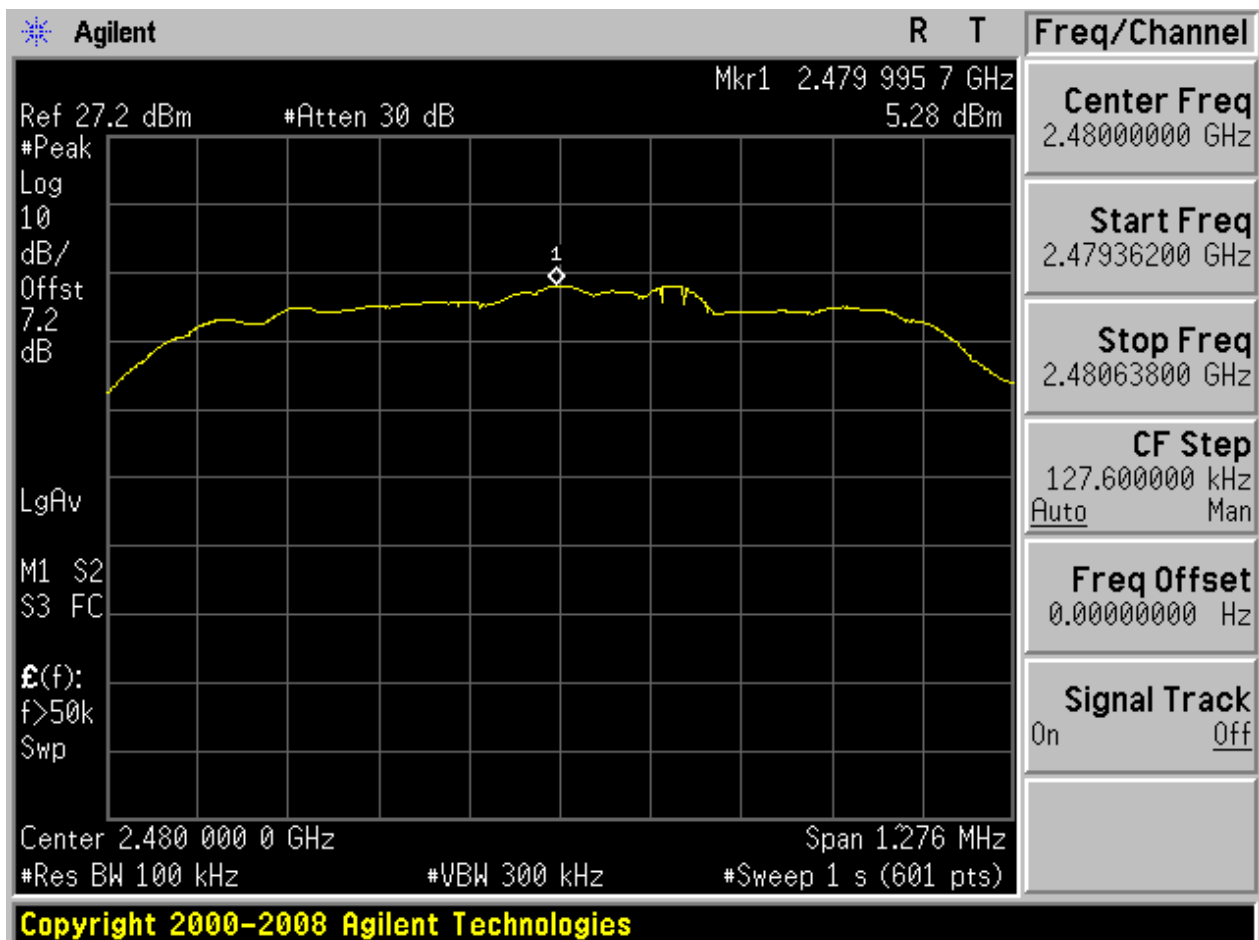






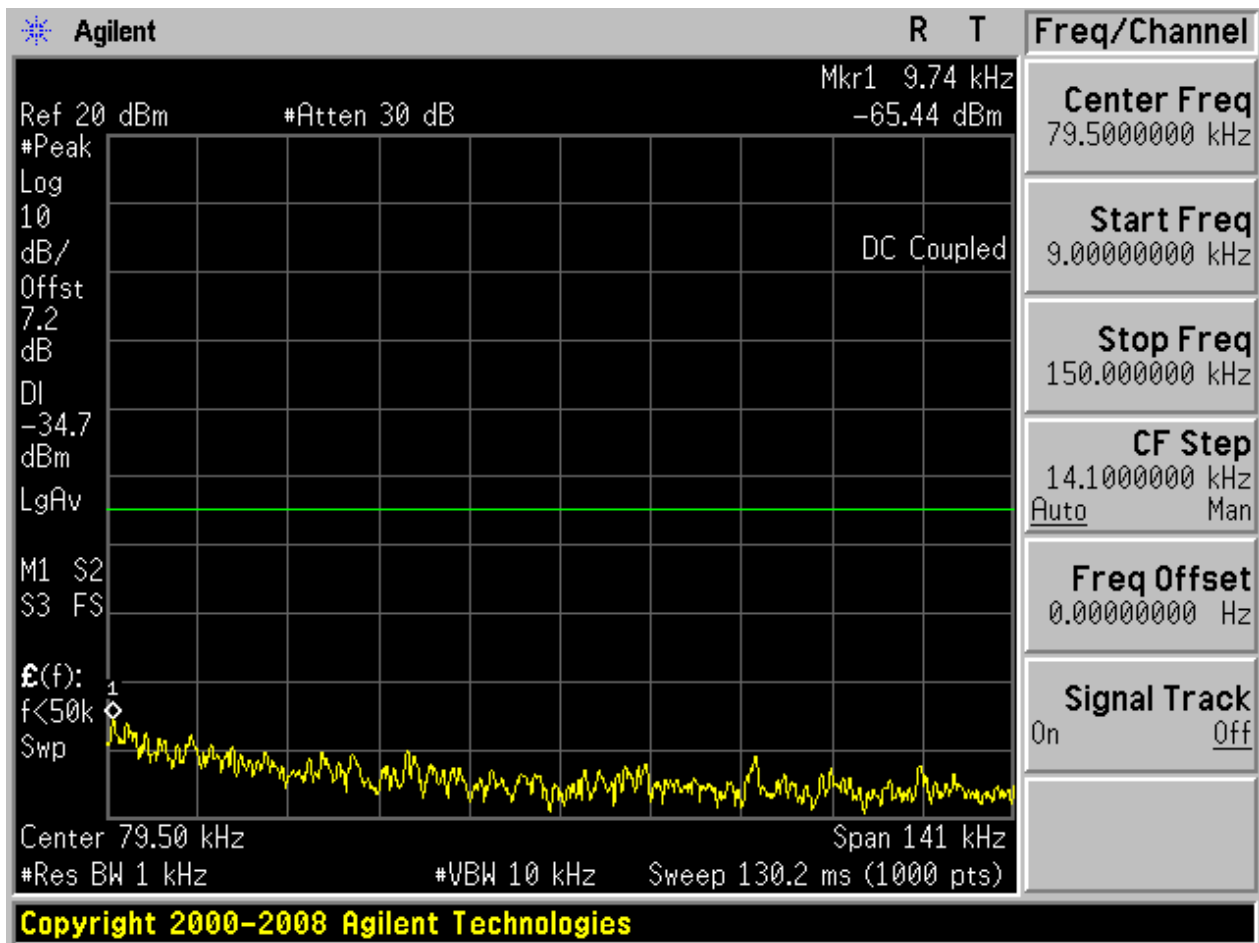
## 2.9 TM3\_3DH5\_Ch78

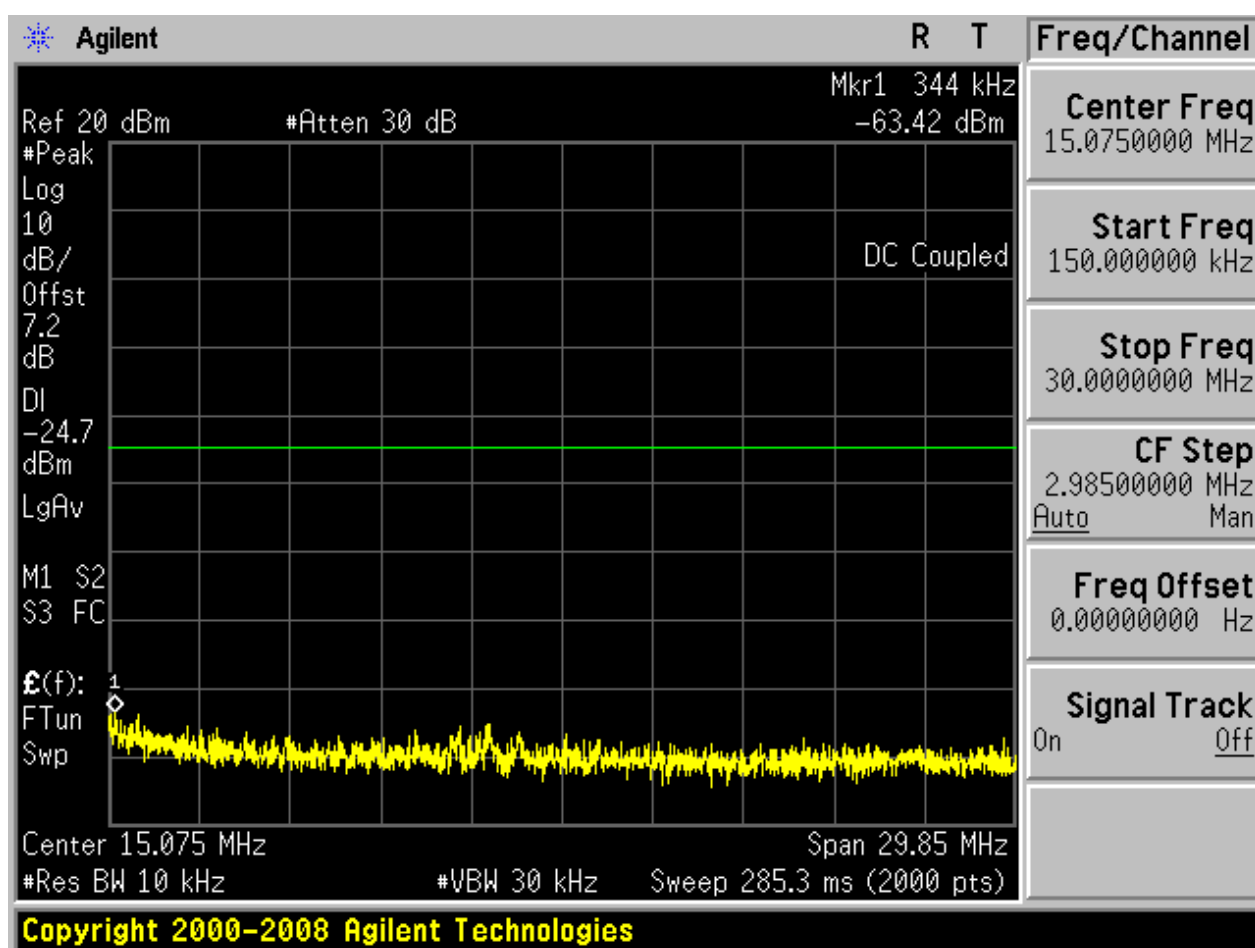
### 2.9.1 Pref

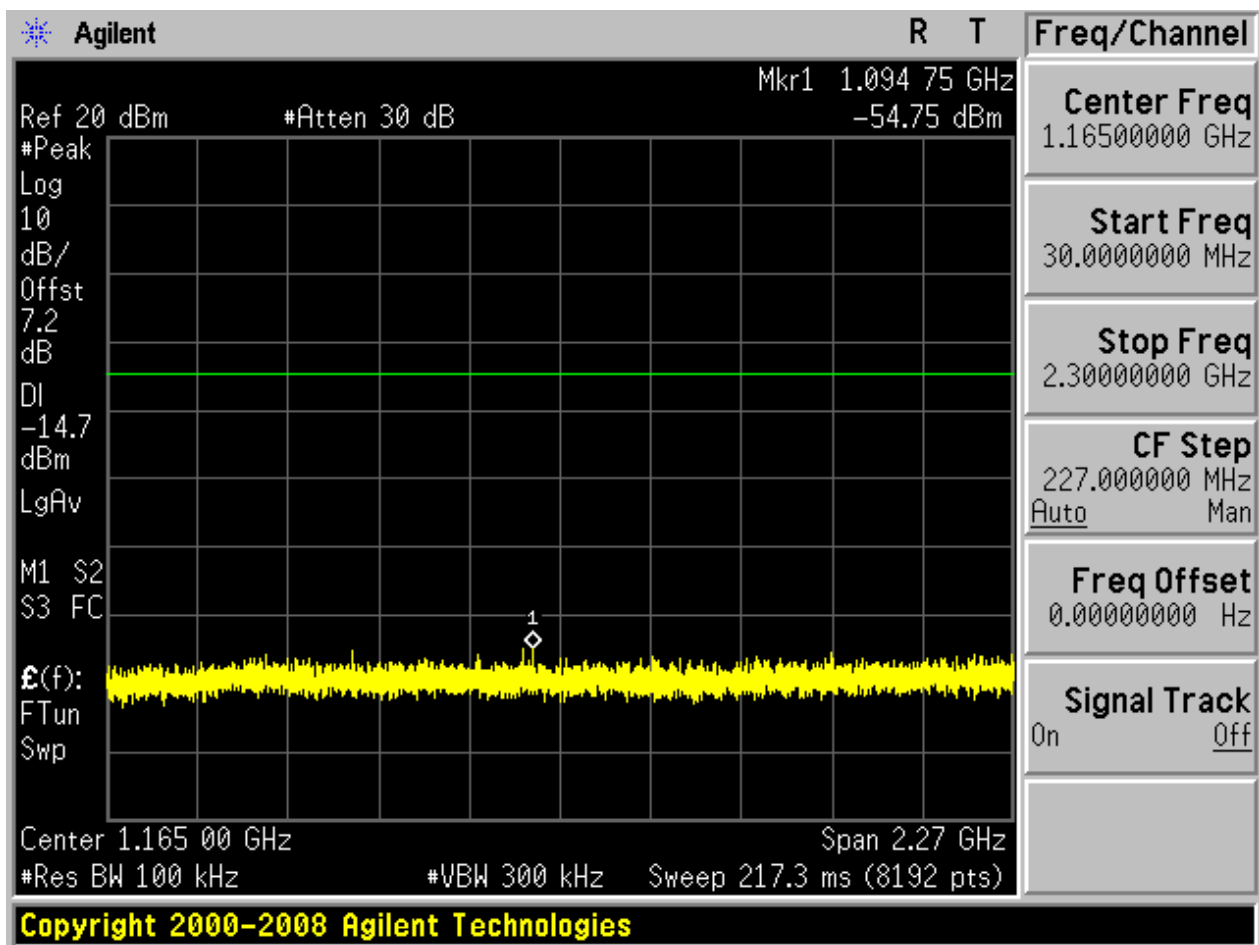


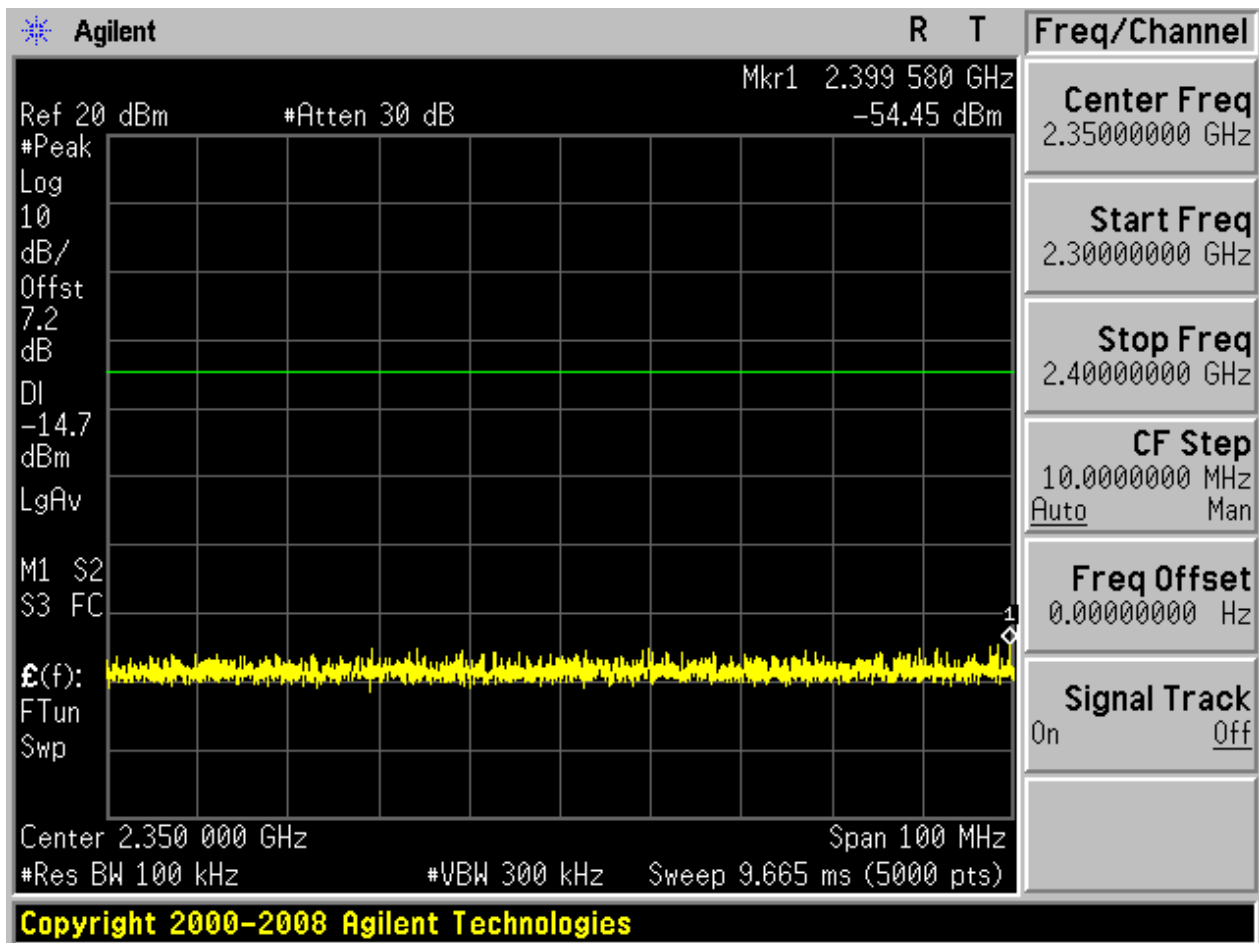


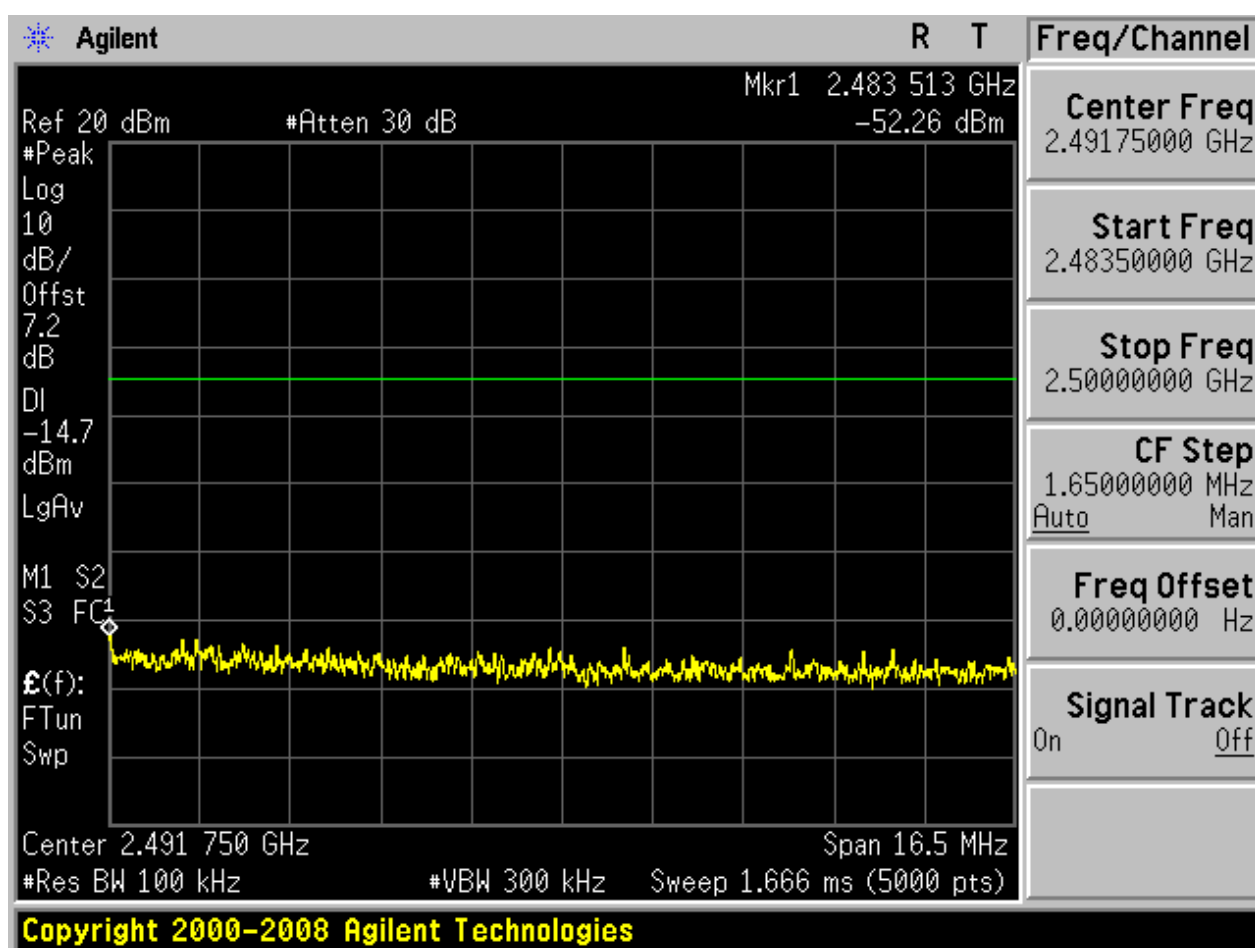
## 2.9.2 Puw

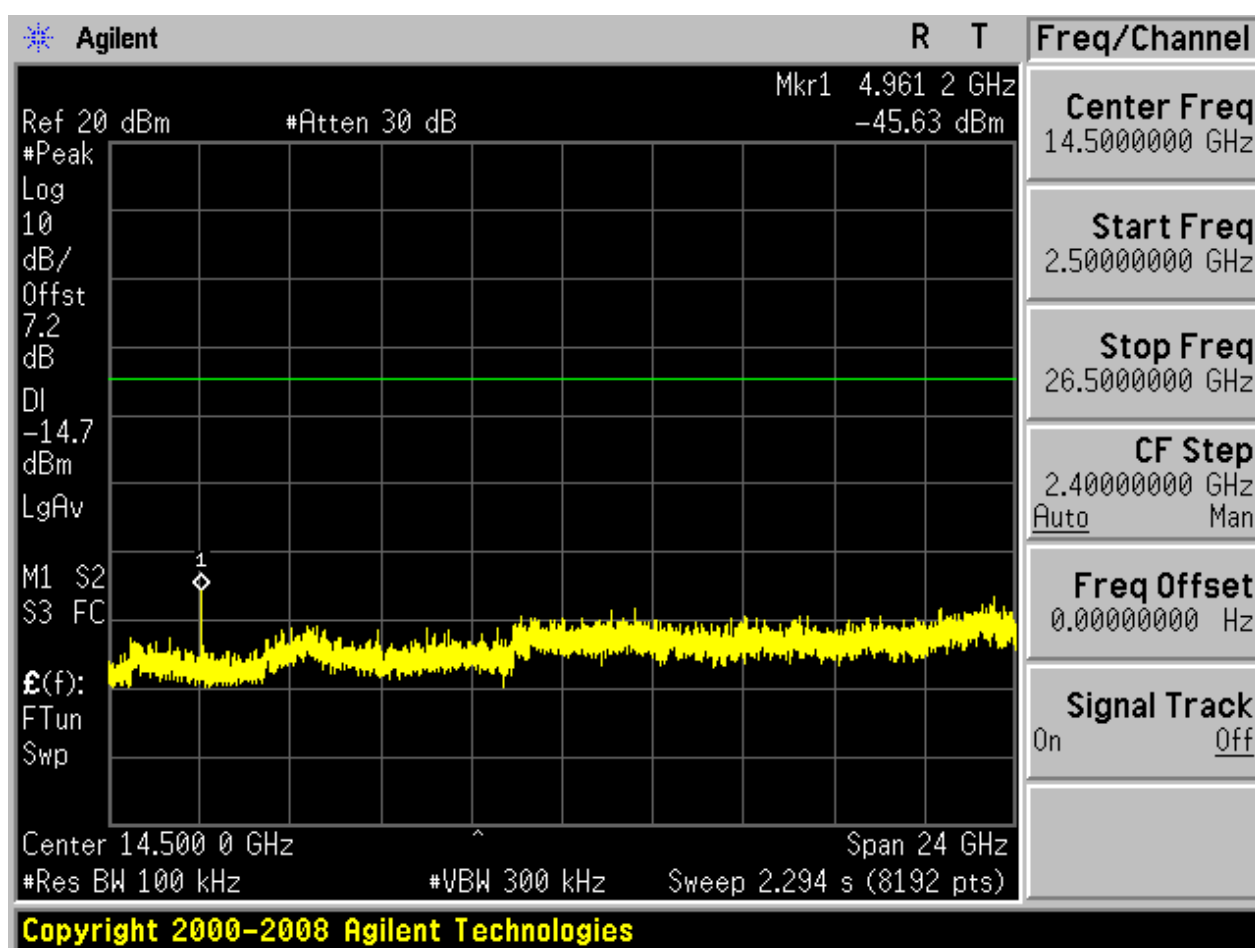










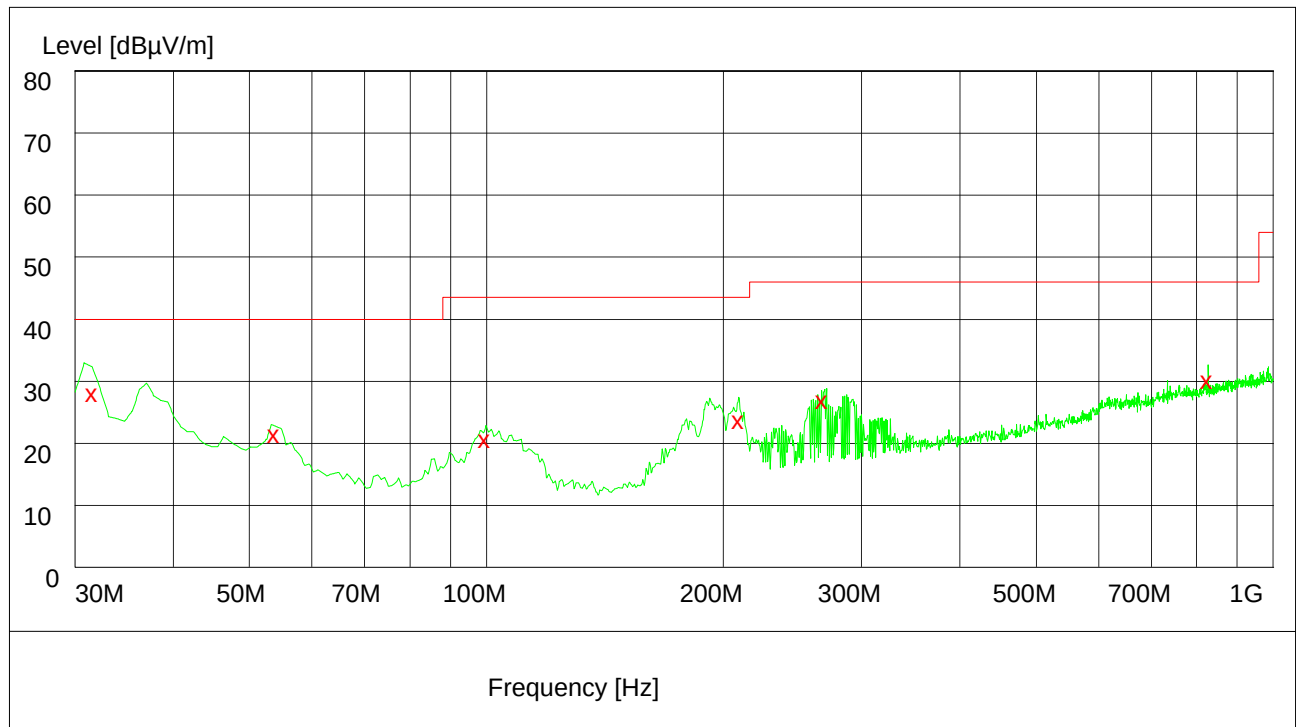




## **Appendix H: Radiated Emissions in the Restricted Bands**

## Part 1: Testing Range of “30 MHz to 1 GHz”

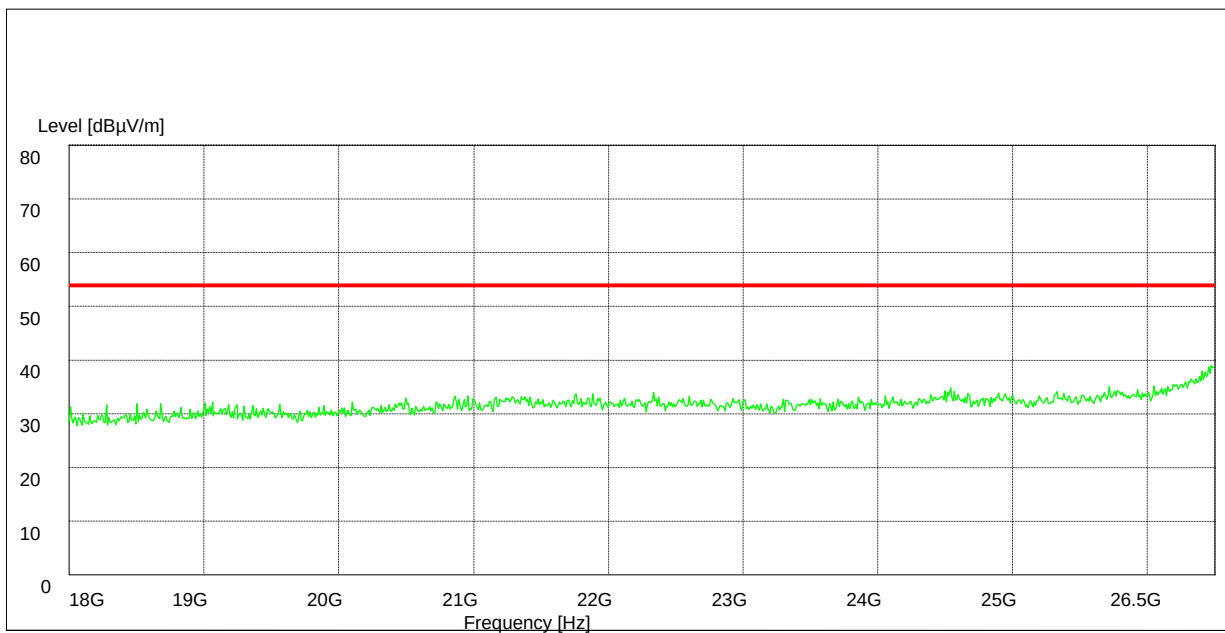
- Note 1: The test results and plot for testing range of “30 MHz to 1 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.
- Note 2: The emissions in this range are mainly from the Platform Device (Notepad PC and its ancillary components).



| Frequency MHz | Level dBμV/m | Transd dB | Limit dBμV/m | Margin dB | Height cm | Azimuth deg | Plarization |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|-------------|
| 31.620000     | 29.70        | 14.7      | 40.0         | 10.3      | 100.0     | 259.00      | VERTICAL    |
| 53.880000     | 23.20        | 14.7      | 40.0         | 16.8      | 100.0     | 289.00      | VERTICAL    |
| 99.840000     | 22.30        | 13.4      | 43.5         | 21.2      | 100.0     | 150.00      | VERTICAL    |
| 209.700000    | 25.40        | 12.5      | 43.5         | 18.1      | 168.0     | 321.00      | HORIZONTAL  |
| 267.960000    | 28.70        | 14.3      | 46.0         | 17.3      | 132.0     | 0.00        | HORIZONTAL  |
| 827.580000    | 31.90        | 24.1      | 46.0         | 14.1      | 128.0     | 91.00       | HORIZONTAL  |

**Part 2: Testing Range of “18 GHz to 26.5 GHz”**

Note: No peak found in pre- test.

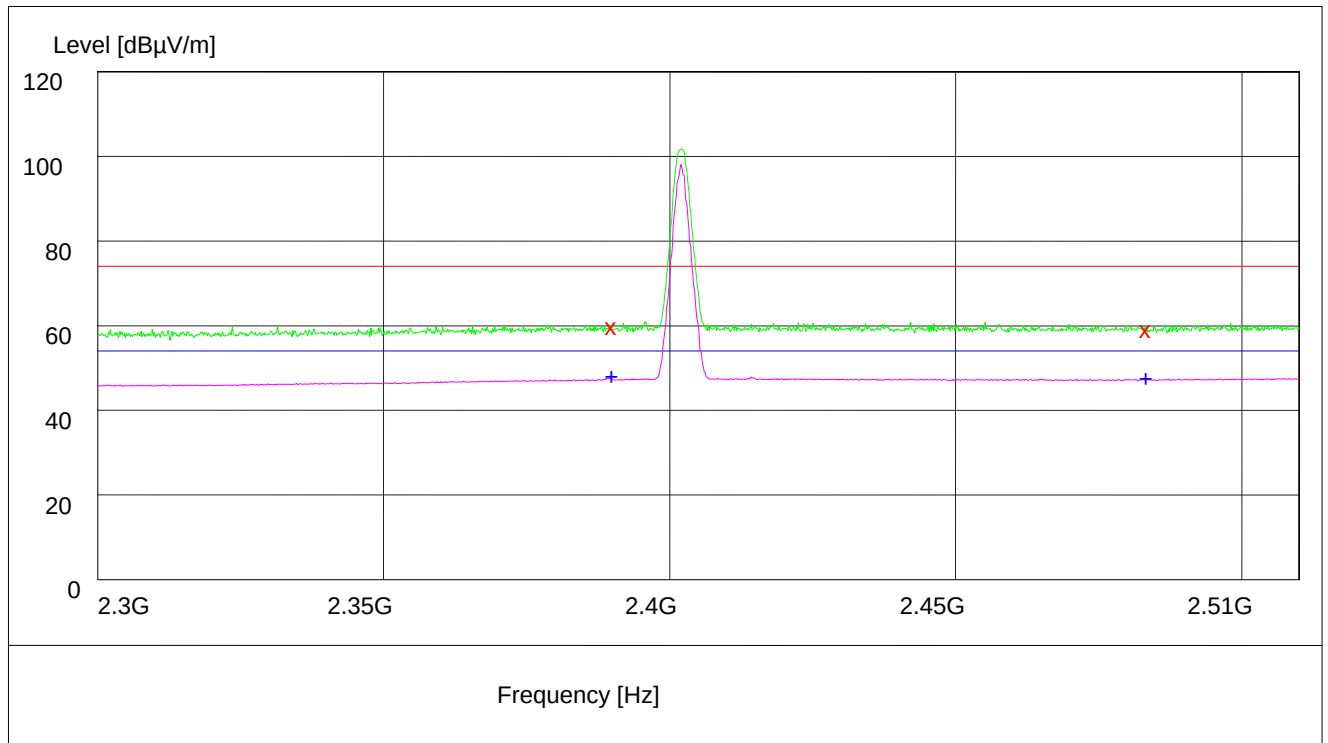


### Part 3: Testing Range of “2.3GHz to 2.5GHz”

- Note 1: The testing range of “2.3 GHz to 2.5 GHz” is for checking radiated emissions located in restricted bands near the EUT operating bands.
- Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).
- Note 3: The peak spike exceeds the limit line is EUT's operating frequency.

### 3 Test Mode:

#### 3.1 Channel 0



Note: The peak exceeds the limit line is carrier frequency.

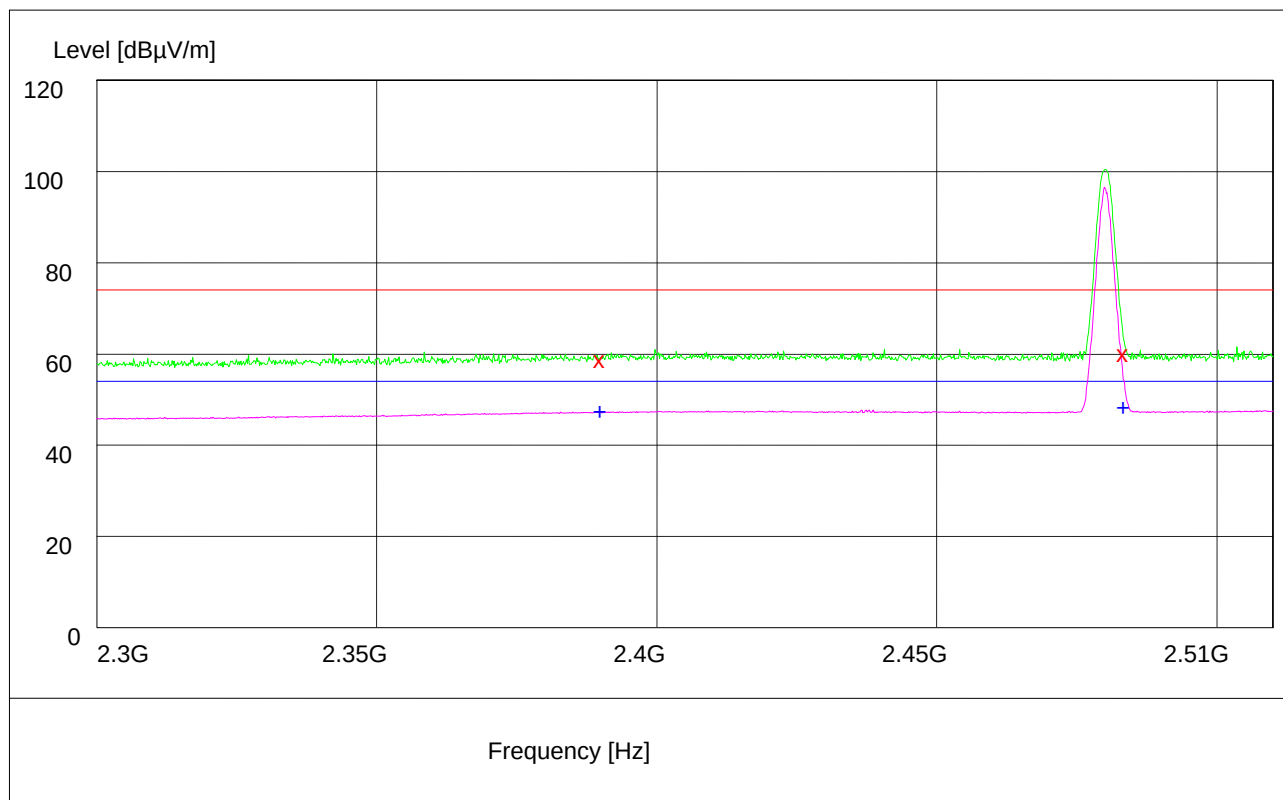
#### MEASUREMENT RESULT: PK Detector

| Frequency<br>MHz | Level<br>dB $\mu$ V/m | Transd<br>dB | Limit<br>dB $\mu$ V/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|--------------|----------------|--------------|
| 2390.000000      | 59.80                 | 34.8         | 74.0                  | 14.2         | 136.0        | 5.00           | HORIZONTAL   |
| 2483.500000      | 59.30                 | 35.1         | 74.0                  | 14.7         | 150.0        | 292.00         | HORIZONTAL   |

#### MEASUREMENT RESULT: AVDetector

| Frequency<br>MHz | Level<br>dB $\mu$ V/m | Transd<br>dB | Limit<br>dB $\mu$ V/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|--------------|----------------|--------------|
| 2390.000000      | 48.10                 | 34.8         | 54.0                  | 5.9          | 118.0        | 325.00         | HORIZONTAL   |
| 2483.500000      | 47.70                 | 35.1         | 54.0                  | 6.3          | 118.0        | 136.00         | HORIZONTAL   |

### 3.2 Channel 78



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

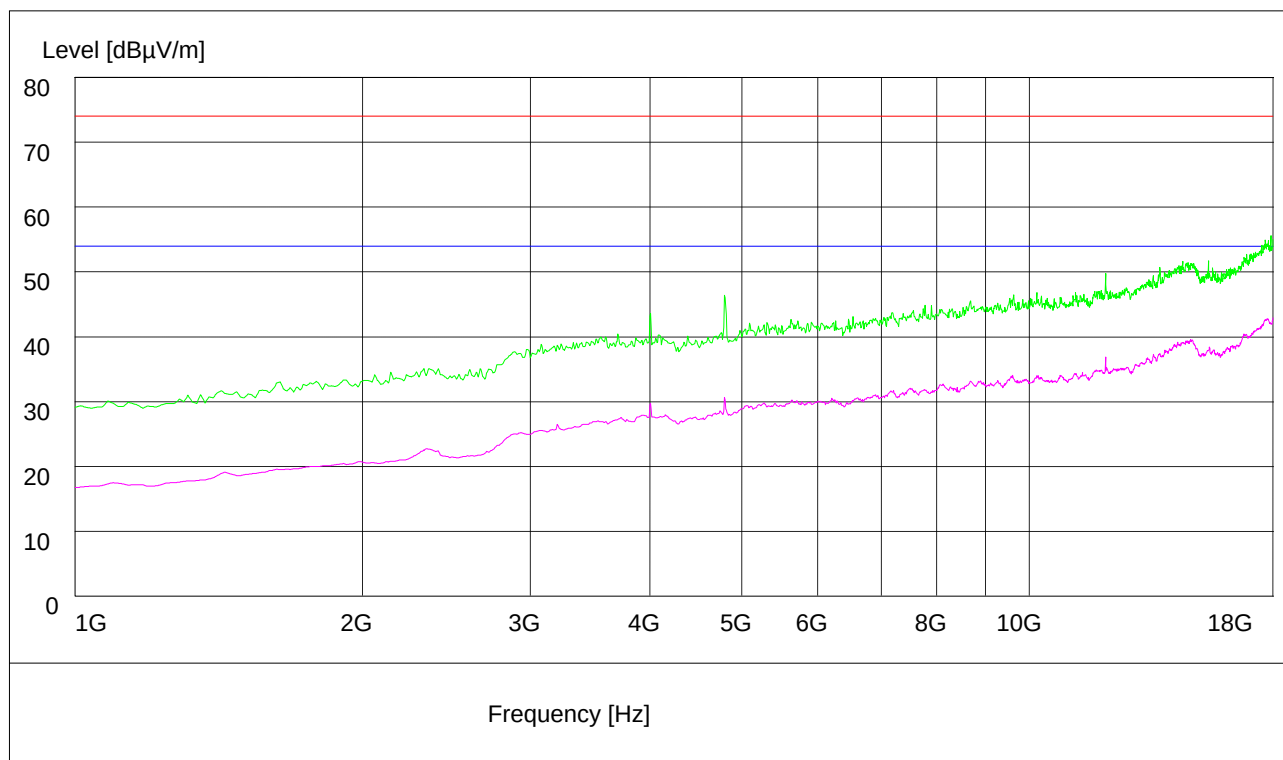
| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|--------------|----------------|--------------|
| 2390.000000      | 59.30           | 34.8         | 74.0            | 14.7         | 150.0        | 5.00           | VERTICAL     |
| 2483.500000      | 60.60           | 35.1         | 74.0            | 13.4         | 136.0        | 351.00         | HORIZONTAL   |

MEASUREMENT RESULT: AVDetector

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|--------------|----------------|--------------|
| 2390.000000      | 47.80           | 34.8         | 54.0            | 6.2          | 100.0        | 207.00         | VERTICAL     |
| 2483.500000      | 48.70           | 35.1         | 54.0            | 5.3          | 119.0        | 254.00         | HORIZONTAL   |

#### Part 4: Testing Range of “1 GHz to 18 GHz”

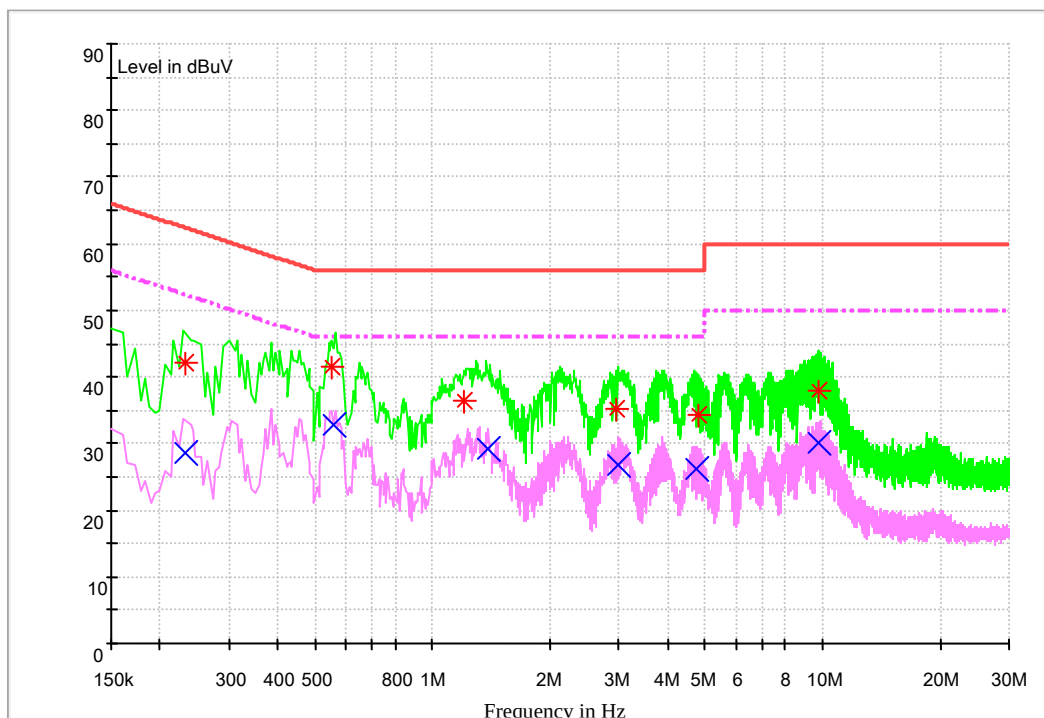
- Note 1: The test results and plot for testing range of “1 GHz to 18 GHz” showed as below is the WORST case for all Test Modes and Channels. This range will not be presented for each Test Mode and each Channel.
- Note 2: The testing range of “1 GHz to 18 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.
- Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).





# Appendix I: AC Power Line Conducted Emissions

## Channel 40



### MEASUREMENT RESULT: QP Detector

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.627578         | 46.1          | 9.7          | 56.0          | 9.9          | N    | FLO |
| 0.628928         | 45.6          | 9.7          | 56.0          | 10.4         | N    | FLO |
| 1.348286         | 42.8          | 9.7          | 56.0          | 13.2         | N    | FLO |
| 3.431816         | 42.9          | 9.7          | 56.0          | 13.1         | N    | FLO |
| 5.229457         | 40.5          | 9.8          | 60.0          | 19.5         | N    | FLO |
| 9.877800         | 50.3          | 9.9          | 60.0          | 9.7          | N    | FLO |

### MEASUREMENT RESULT: AV Detector

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.463084         | 38.9          | 9.7          | 46.6          | 7.7          | L1   | FLO |
| 0.630705         | 33.4          | 9.7          | 46.0          | 12.6         | N    | FLO |
| 1.347792         | 33.1          | 9.7          | 46.0          | 12.9         | N    | FLO |
| 1.642373         | 33.7          | 9.7          | 46.0          | 12.3         | N    | FLO |
| 3.387232         | 34.9          | 9.7          | 46.0          | 11.1         | N    | FLO |
| 9.842392         | 42.3          | 9.9          | 50.0          | 7.7          | N    | FLO |

END