**FCC CFR47 PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+**

**MODEL NUMBER: SCV32**

**FCC ID: A3LSCV32**

**REPORT NUMBER: 15I21858-E2V2**

**ISSUE DATE: NOVEMBER 13, 2015**

*Prepared for*

**SAMSUNG ELECTRONICS CO., LTD.**
**129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,**
**GYEONGGI-DO, 443-742, KOREA**

*Prepared by*

**UL VERIFICATION SERVICES INC.**
**47173 BENICIA STREET**
**FREMONT, CA 94538, U.S.A.**
**TEL: (510) 771-1000**
**FAX: (510) 661-0888**

NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| -- | 11/11/15 | Initial issue | P. Zhang |
| V2 | 11/13/15 | Updated Section 5.1 and 5.3 | C. Vergonio |




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# TABLE OF CONTENTS

**1. ATTESTATION OF TEST RESULTS ..... 5**

**2. TEST METHODOLOGY ..... 6**

**3. FACILITIES AND ACCREDITATION ..... 6**

**4. CALIBRATION AND UNCERTAINTY ..... 7**

*4.1. MEASURING INSTRUMENT CALIBRATION ..... 7*

*4.2. SAMPLE CALCULATION ..... 7*

*4.3. MEASUREMENT UNCERTAINTY ..... 7*

**5. EQUIPMENT UNDER TEST ..... 8**

*5.1. DESCRIPTION OF EUT ..... 8*

*5.2. MAXIMUM OUTPUT POWER ..... 9*

*5.3. DESCRIPTION OF AVAILABLE ANTENNAS ..... 9*

*5.4. WORST-CASE CONFIGURATION AND MODE ..... 10*

*5.5. DESCRIPTION OF TEST SETUP ..... 11*

**6. TEST AND MEASUREMENT EQUIPMENT ..... 13**

**7. SUMMARY TABLE ..... 14**

**8. ANTENNA PORT TEST RESULTS ..... 15**

*8.1. 20 dB AND 99% BANDWIDTH ..... 15*

8.1.1. BASIC DATA RATE GFSK MODULATION ..... 15

8.1.2. ENHANCED DATA RATE 8PSK MODULATION ..... 15

8.1.3. 20 dB AND 99% BANDWIDTH PLOTS ..... 16

*8.2. HOPPING FREQUENCY SEPARATION ..... 28*

*8.3. NUMBER OF HOPPING CHANNELS ..... 30*

*8.4. AVERAGE TIME OF OCCUPANCY ..... 35*

*8.5. OUTPUT POWER ..... 43*

8.5.1. BASIC DATA RATE GFSK MODULATION ..... 43

8.5.2. ENHANCED DATA RATE 8PSK MODULATION ..... 43

8.5.3. OUTPUT POWER PLOTS ..... 44

*8.6. AVERAGE POWER ..... 50*

8.6.1. BASIC DATA RATE GFSK MODULATION ..... 51

8.6.2. DATA RATE PI/4-DQPSK MODULATION ..... 51

8.6.3. ENHANCED DATA RATE 8PSK MODULATION ..... 51

*8.7. CONDUCTED SPURIOUS EMISSIONS ..... 52*

8.7.1. BASIC DATA RATE GFSK MODULATION ..... 53


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

8.7.2. ENHANCED DATA RATE 8PSK MODULATION .....61

**9. RADIATED TEST RESULTS .....69**

*9.1. LIMITS AND PROCEDURE .....69*

*9.2. TRANSMITTER ABOVE 1 GHz .....70*
9.2.1. BASIC DATA RATE GFSK MODULATION .....70
9.2.2. ENHANCED DATA RATE 8PSK MODULATION .....83

*9.3. WORST-CASE BELOW 1 GHz .....96*

**10. AC POWER LINE CONDUCTED EMISSIONS .....99**

**11. SETUP PHOTOS .....104**

**END OF REPORT .....105**




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 1. ATTESTATION OF TEST RESULTS

| | |
|---|---|
| **COMPANY NAME:** | SAMSUNG ELECTRONICS CO., LTD. |
| **EUT DESCRIPTION:** | GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+ |
| **MODEL:** | SCV32 |
| **SERIAL NUMBER:** | 2138045 (Conducted), 2140998 (Radiated) |
| **DATE TESTED:** | JUNE 8 -18, 2015 |

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| CFR 47 Part 15 Subpart C | Pass |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For

UL Verification Services Inc. By:

PENG ZHANG
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL VERIFICATION SERVICES INC

Tested By:

JONATHAN HSU
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL VERIFICATION SERVICES INC




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013 for FCC, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street | 47266 Benicia Street |
|---|---|
| ☒ Chamber A(IC: 2324B-1) | ☐ Chamber D(IC: 2324B-4) |
| ☐ Chamber B(IC: 2324B-2) | ☐ Chamber E(IC: 2324B-5) |
| ☐ Chamber C(IC: 2324B-3) | ☐ Chamber F(IC: 2324B-6) |
| | ☐ Chamber G(IC: 2324B-7) |
| | ☐ Chamber H(IC: 2324B-8) |

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB |
| Radiated Disturbance, 30 to 18000 MHz | 4.94 dB |

Uncertainty figures are valid to a confidence level of 95%.


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+

The model FCC ID: A3LSCV32 shares the same enclosure and circuit board as mode FCC ID: A3LSMA800S. The DTS & Bluetooth circuitry and layout, including antenna, are almost identical between the two units. The DTS & Bluetooth antenna and surrounding circuitry is the same between these two units.

After confirming through preliminary radiated emissions that the performance of the A3LSCV32 DTS & Bluetooth data remains representative of this model (FCC ID: A3LSMA800S). Test data for FCC ID: A3LSMA800S is being submitted for this application.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|---|---|---|---|
| 2402 - 2480 | Basic GFSK | 9.21 | 8.34 |
| 2402 - 2480 | Enhanced 8PSK | 8.07 | 6.41 |

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 8.6.

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -3.02 dBi.


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 5.5. DESCRIPTION OF TEST SETUP

**SUPPORT EQUIPMENT**

| Support Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| AC Adapter | Samsung | ETA0U83KWK | DK1FB05HS | N/A |
| Earphone | Samsung | N/A | N/A | N/A |

**I/O CABLES**

| I/O Cable List | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No** | **Port** | **# of identical ports** | **Connector Type** | **Cable Type** | **Cable Length (m)** | **Remarks** |
| 1 | DC Power | 1 | Mini-USB | Shielded | 1.2m | N/A |
| 2 | Audio | 1 | Mini-Jack | Unshielded | 1m | N/A |

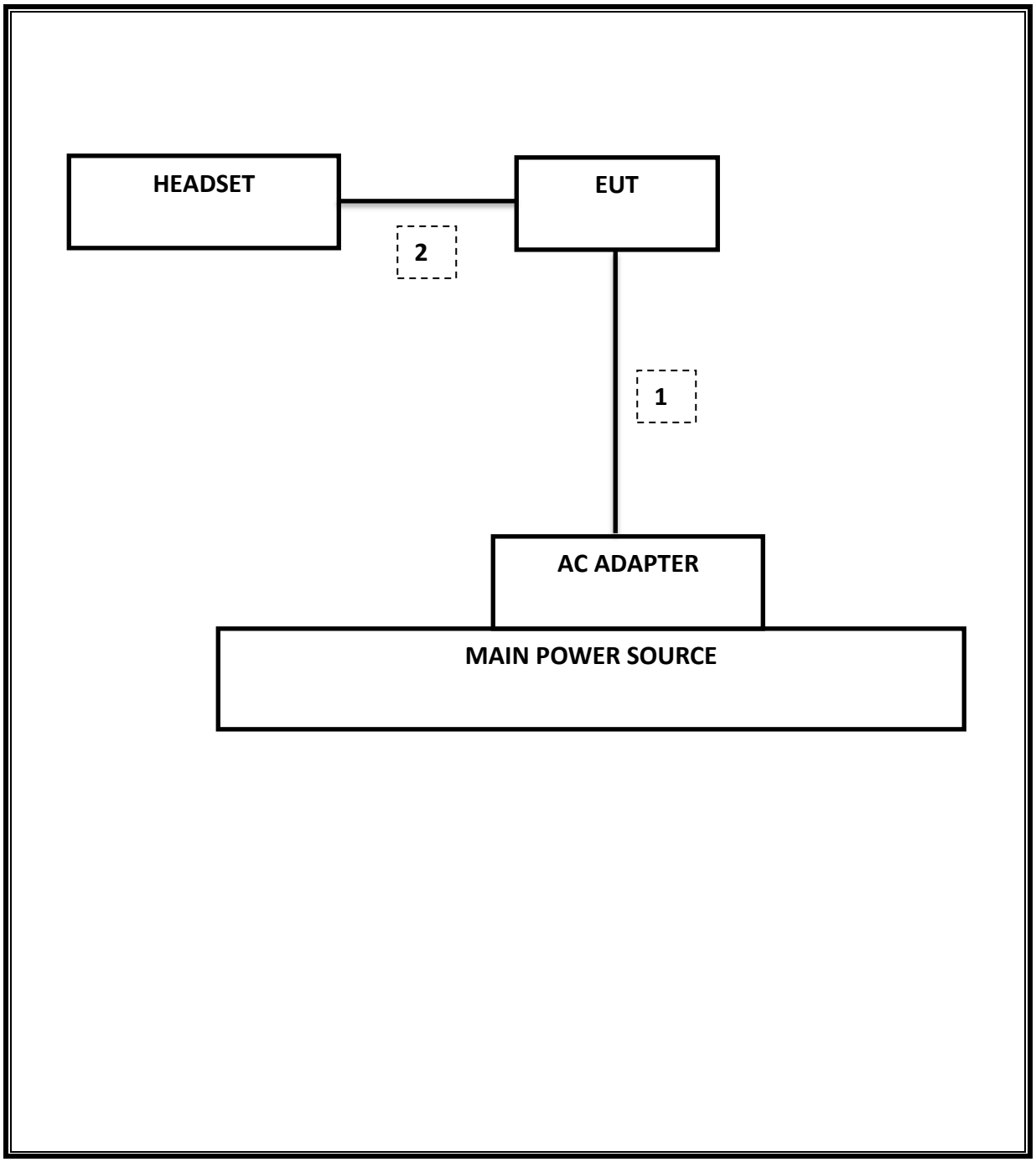
**TEST SETUP**

The EUT is continuously communicating to the Bluetooth tester during the tests.

EUT was set in the Hidden menu mode to enable BT communications.


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SETUP DIAGRAM FOR TESTS**







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| Test Equipment List | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Asset** | **Cal Due** |
| Antenna, Biconolog, 30MHz-1 GHz | Sunol Sciences | JB1 | C01171 | 02/13/16 |
| Antenna, Horn, 18GHz | EMCO | 3115 | C00783 | 10/25/15 |
| Antenna, Horn, 26.5 GHz | ARA | MWH-1826/B | C00980 | 11/14/15 |
| RF Preamplifier, 100KHz -> 1300MHz | HP | TBD | C00825 | 06/01/16 |
| RF Preamplifier, 1GHz - 18GHz | Miteq | NSP4000-SP2 | 924343 | 03/23/16 |
| RF Preamplifier, 1GHz - 26.5GHz | HP | 8449B | F00351 | 06/27/15 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | E4446A | C01069 | 12/20/15 |
| CBT Bluetooth Tester | R & S | CBT | None | 07/12/15 |
| Peak Power Meter | Agilent / HP | E4416A | C00963 | 12/13/15 |
| Peak / Average Power Sensor | Agilent / HP | E9327A | C00964 | 12/13/15 |
| LISN, 30 MHz | FCC | 50/250-25-2 | C00626 | 01/14/16 |
| Reject Filter, 2.4GHz | Micro-Tronics | BRM50702 | N02684 | CNR |
| Radiated Software | UL | UL EMC | Ver 9.5, July 22, 2014 | |
| Conducted Software | UL | UL EMC | Ver 9.5, May 17 2012 | |
| CLT Software | UL | UL RF | Ver 1.0, Feb 2 2015 | |
| Antenna Port Software | UL | UL RF | Ver 2.1.1.1, Jan 20 2015 | |
| | | | | |


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 7. SUMMARY TABLE

| FCC Part Section | RSS Section(s) | Test Description | Test Limit | Test Condition | Test Result | Worst Case |
|---|---|---|---|---|---|---|
| 2.1049 | RSS-GEN 4.6 | Occupied Band width (99%) | N/A | Conducted | Pass | 1.078 MHz |
| 2.1051, 15.247 (d) | RSS-247 5.5 | Band Edge / Conducted Spurious Emission | -20dBc | | Pass | -46.64 dBm |
| 15.247 (b)(1) | RSS-247 5.4.2 | TX conducted output power | <21dBm | | Pass | 9.21 dBm |
| 15.247 (a)(1) | RSS-247 5.1.2 | Hopping frequency separation | > 25KHz | | Pass | 1 MHz |
| 15.247 (a)(1)(iii) | RSS-247 5.1.4 | Number of Hopping channels | More than 15 non-overlapping channels | | Pass | 79 channels |
| 15.247 (a)(1)(iii) | RSS-247 5.1.4 | Avg Time of Occupancy | < 0.4sec | | Pass | 0.37 s |
| 15.207 (a) | RSS-GEN 8.8 | AC Power Line conducted emissions | Section 10 | Radiated | Pass | 38.14dBuV (AV) |
| 15.205, 15.209 | RSS-GEN 8.9/7 | Radiated Spurious Emission | < 54dBuV/m | | Pass | 49.99 dBuV/m |




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 8. ANTENNA PORT TEST RESULTS

## 8.1. 20 dB AND 99% BANDWIDTH

**LIMIT**

None; for reporting purposes only.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

**RESULTS**

### 8.1.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|---|---|---|---|
| Low | 2402 | 1.016 | 1.0018 |
| Middle | 2441 | 1.015 | 1.0068 |
| High | 2480 | 1.015 | 0.9155 |
| Worst | | 1.016 | 1.0068 |

### 8.1.2. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|---|---|---|---|
| Low | 2402 | 1.093 | 1.0787 |
| Middle | 2441 | 1.107 | 1.0438 |
| High | 2480 | 1.101 | 1.021 |
| Worst | | 1.107 | 1.0787 |

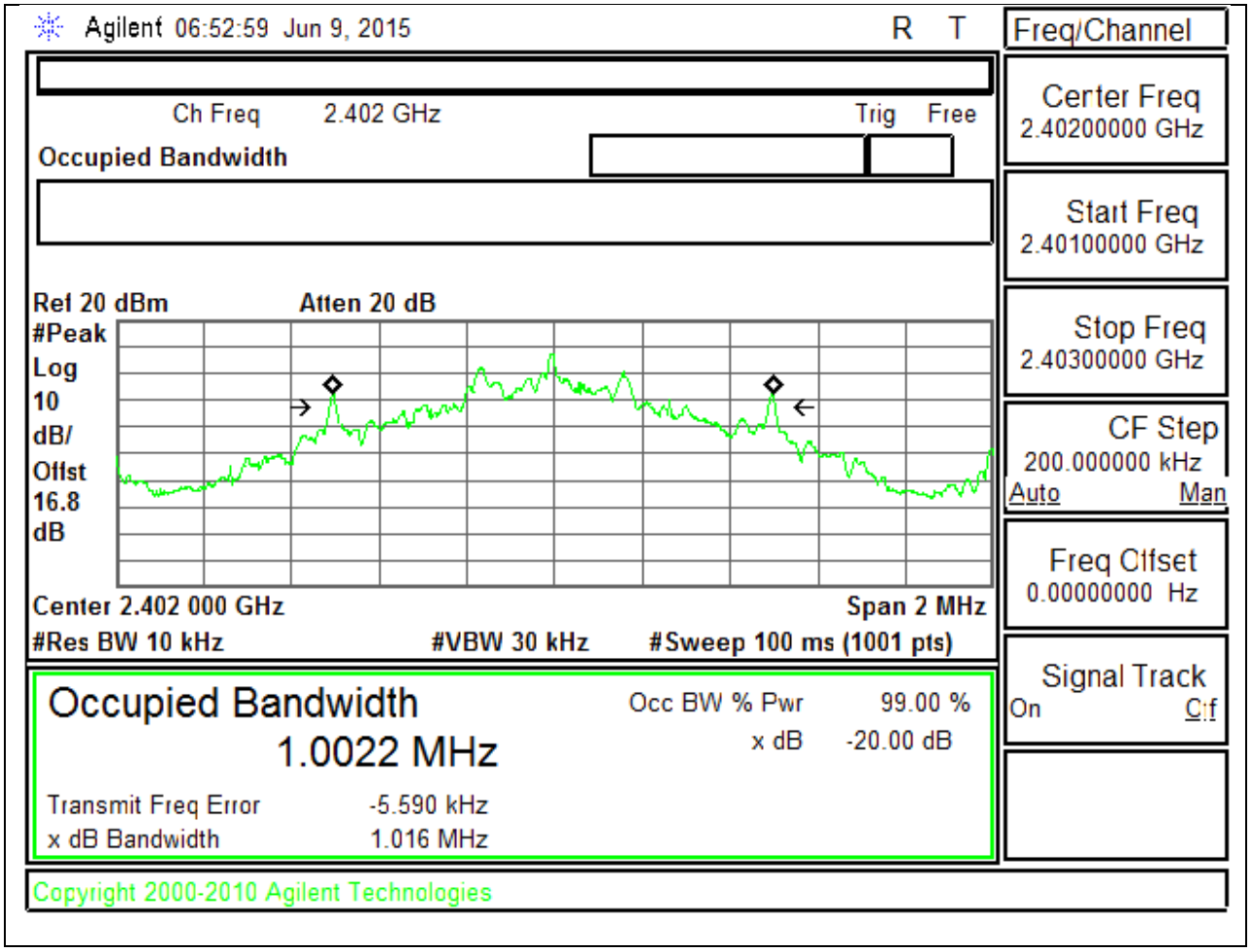



*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.1.3. 20 dB AND 99% BANDWIDTH PLOTS

**GFSK 20 dB BANDWIDTH**

**LOW CHANNEL**

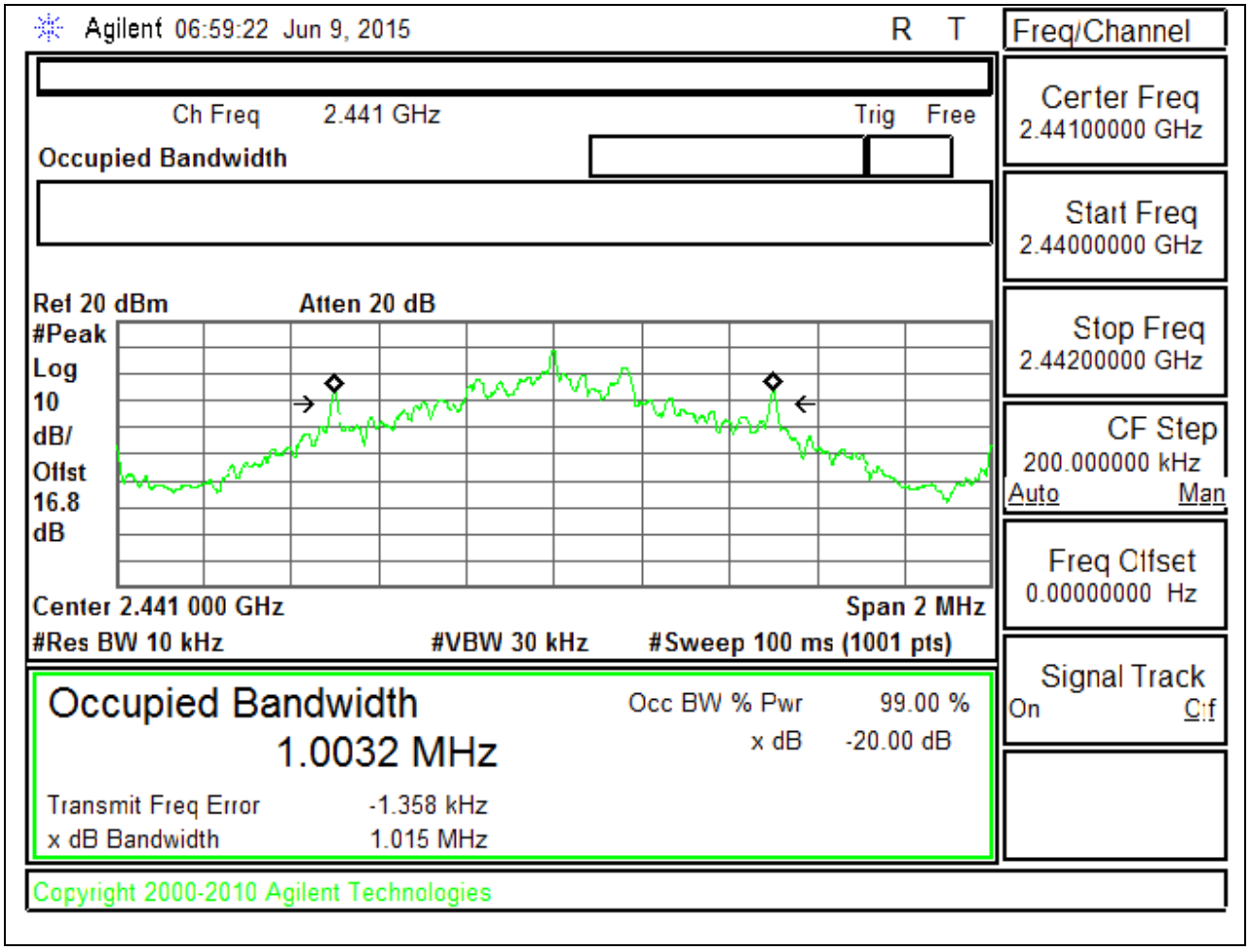






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL**

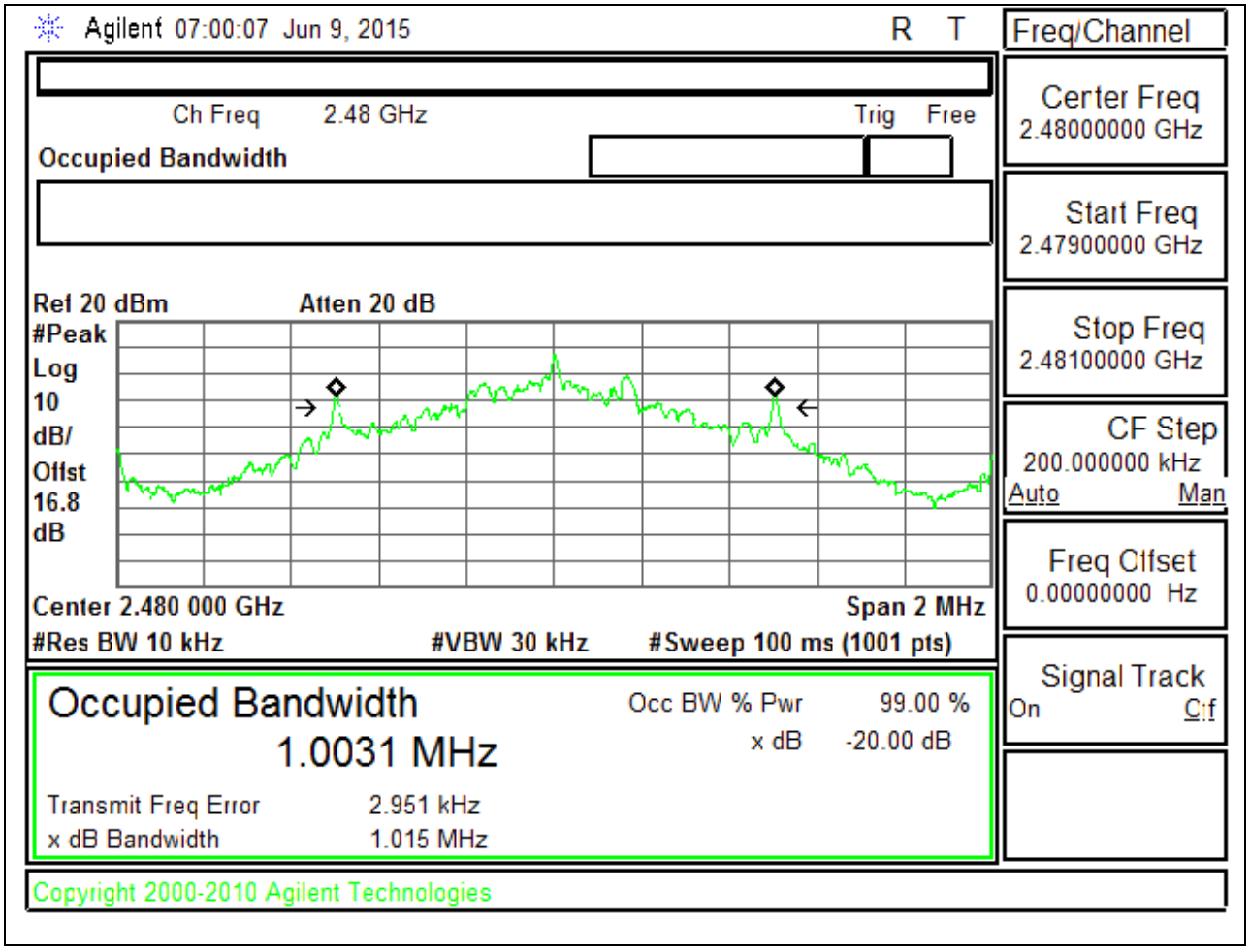






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL**



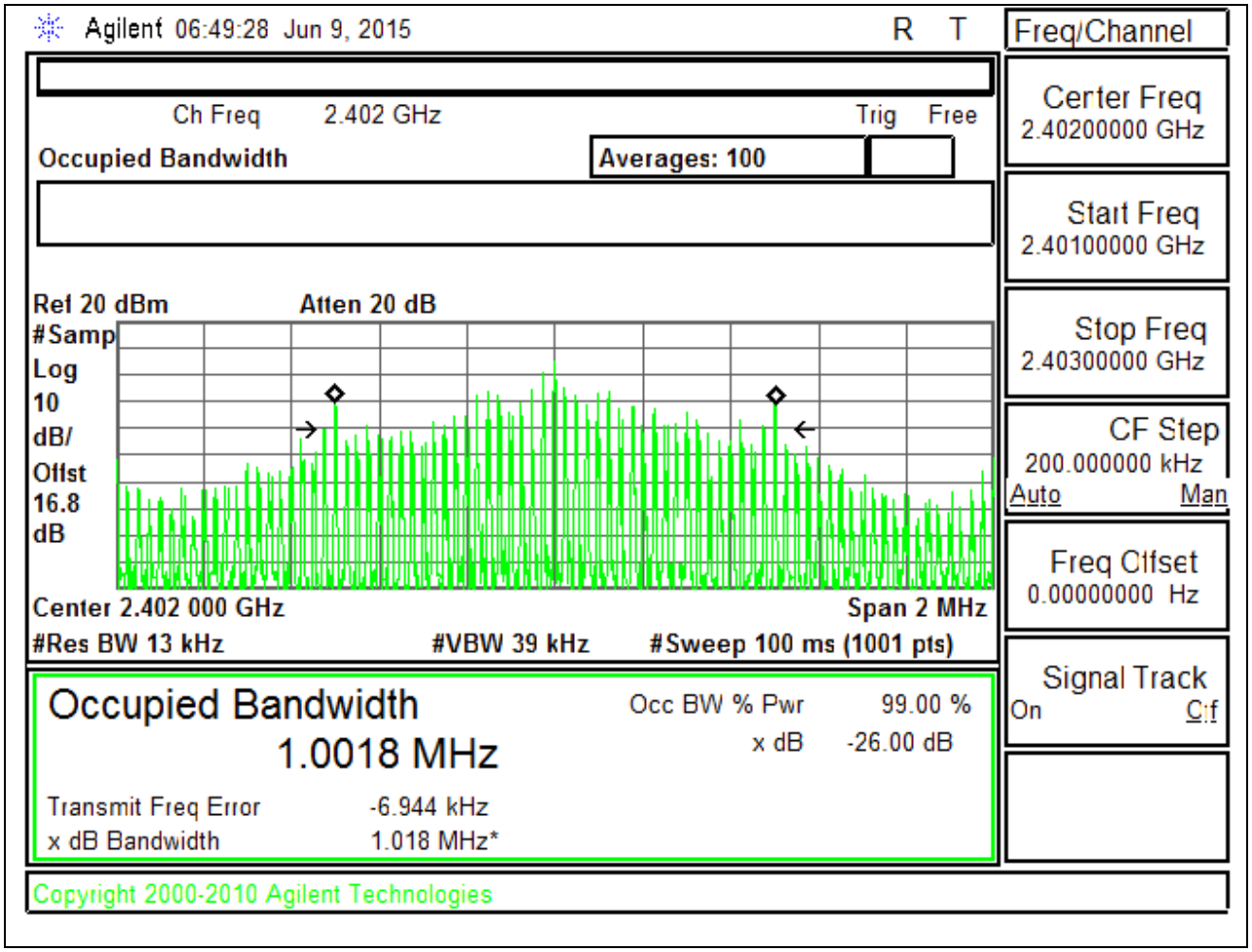




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**GFSK 99% BANDWIDTH**

**LOW CHANNEL**

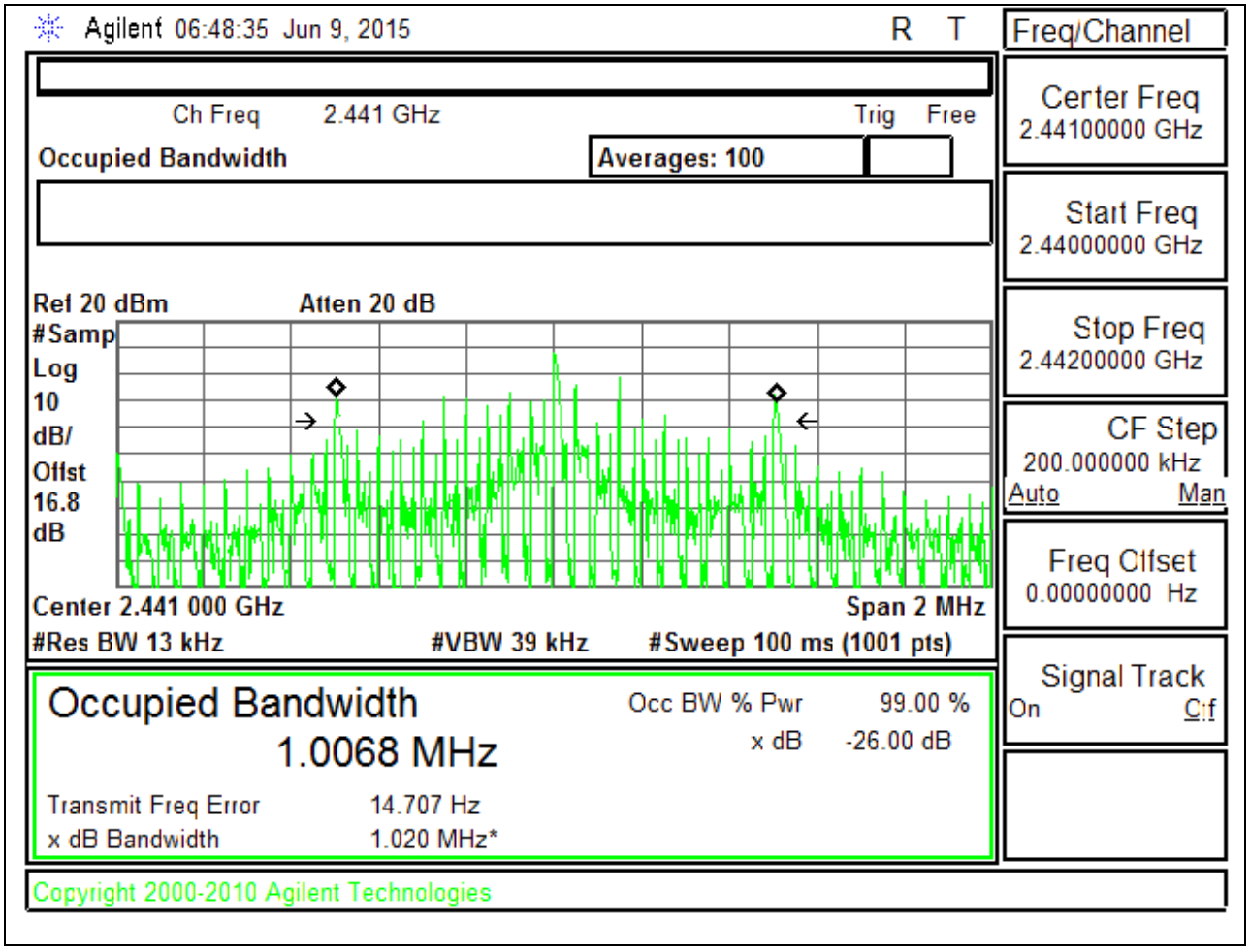






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL**

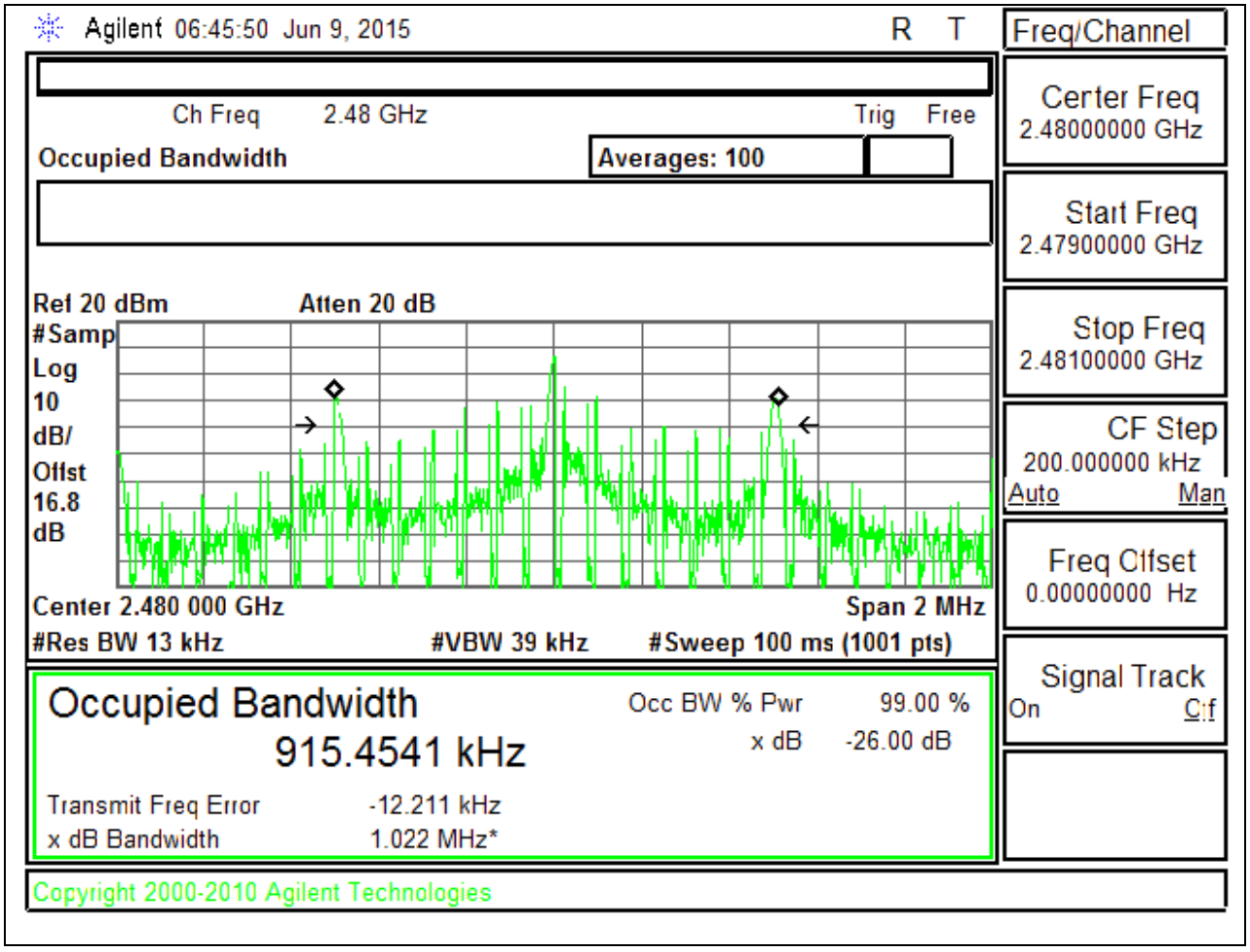






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL**



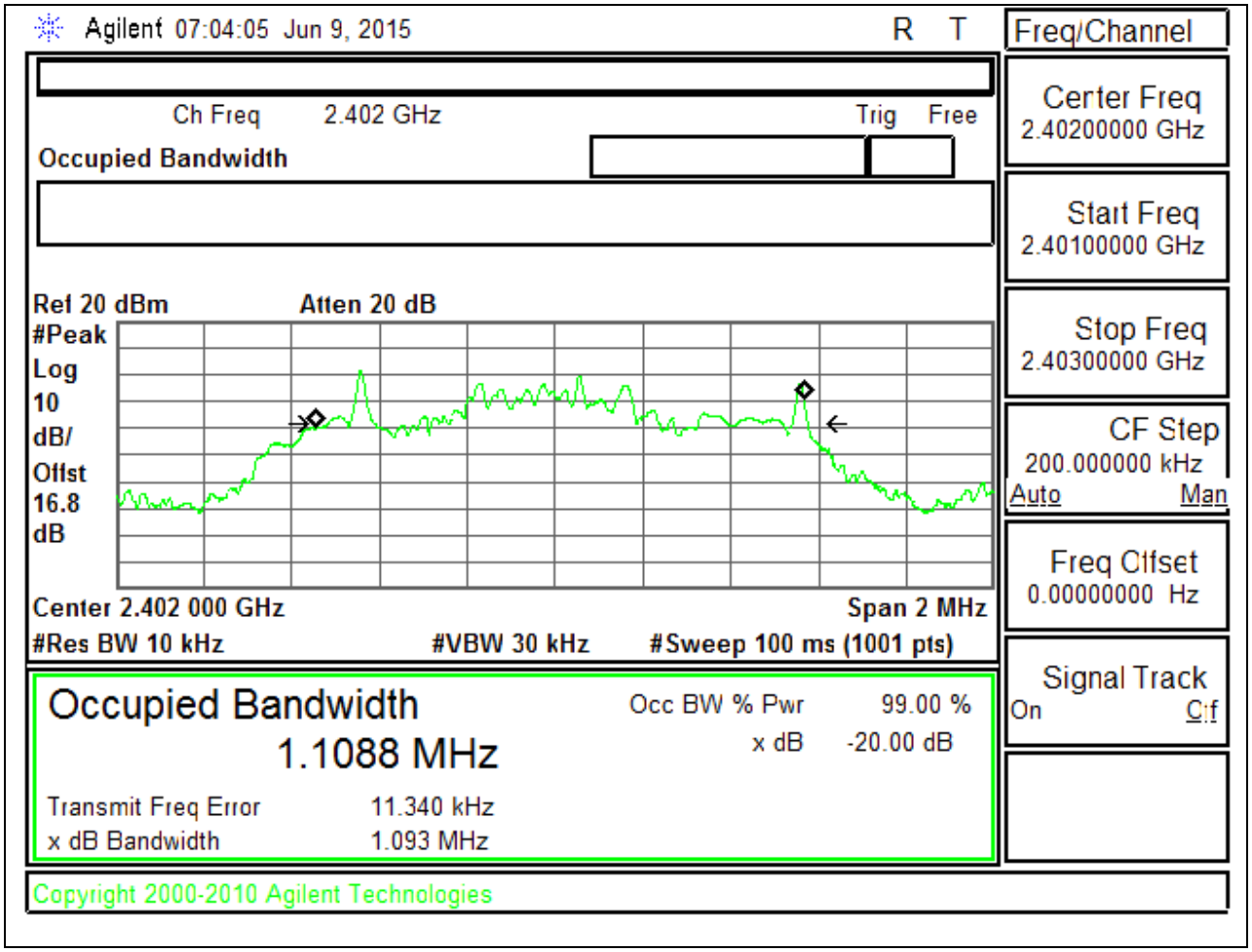




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**8PSK 20 dB BANDWIDTH**

**LOW CHANNEL**

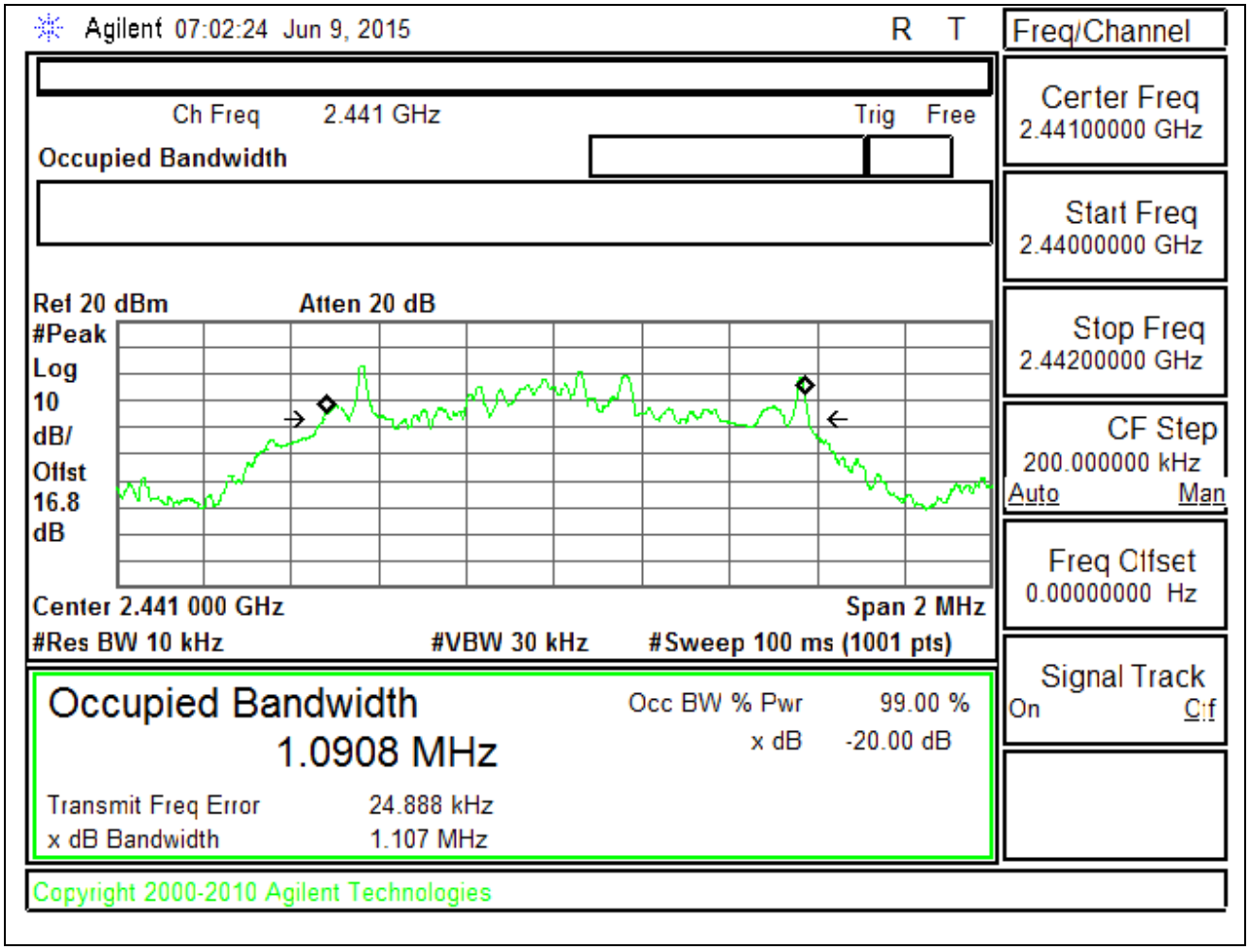






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL**

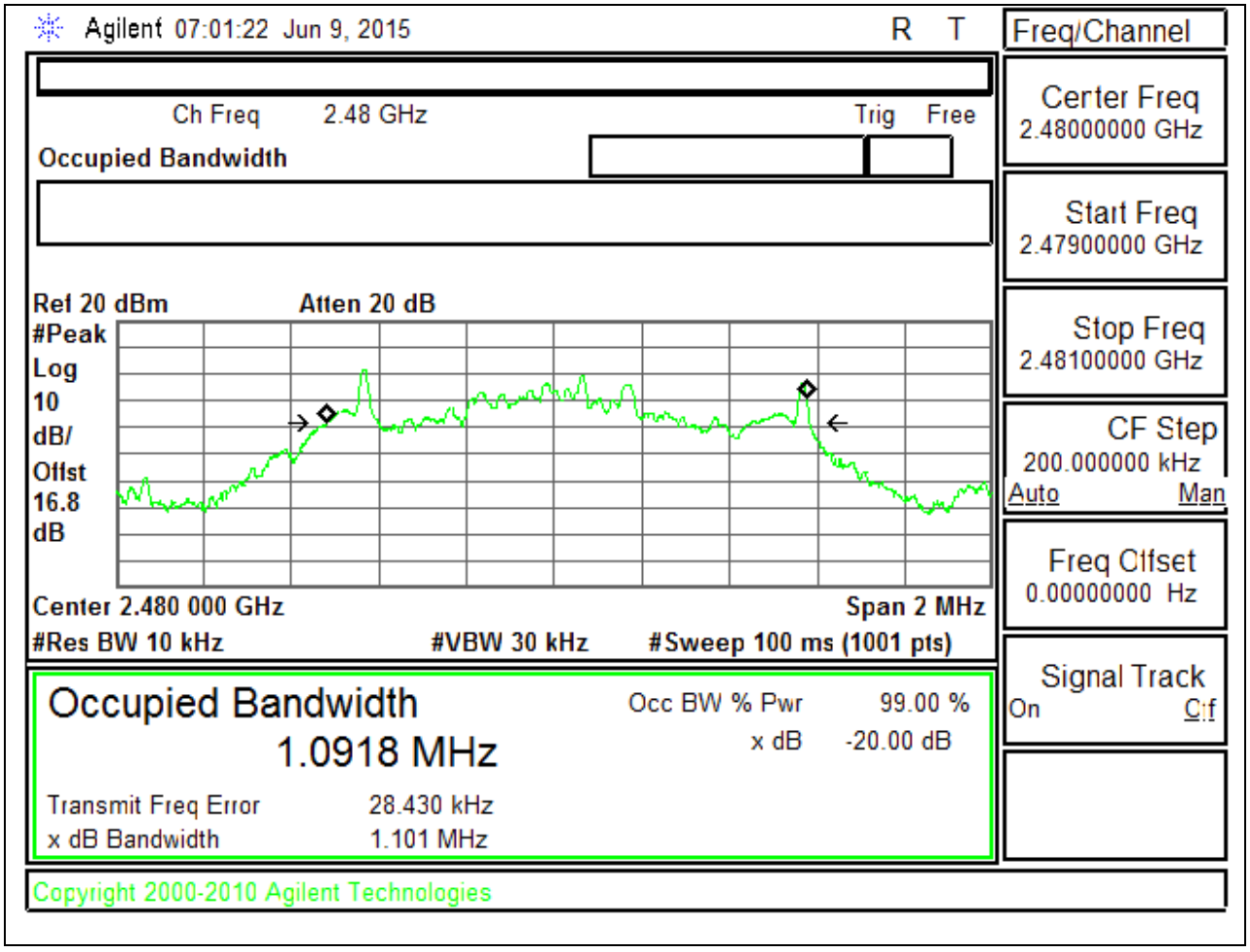






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL**



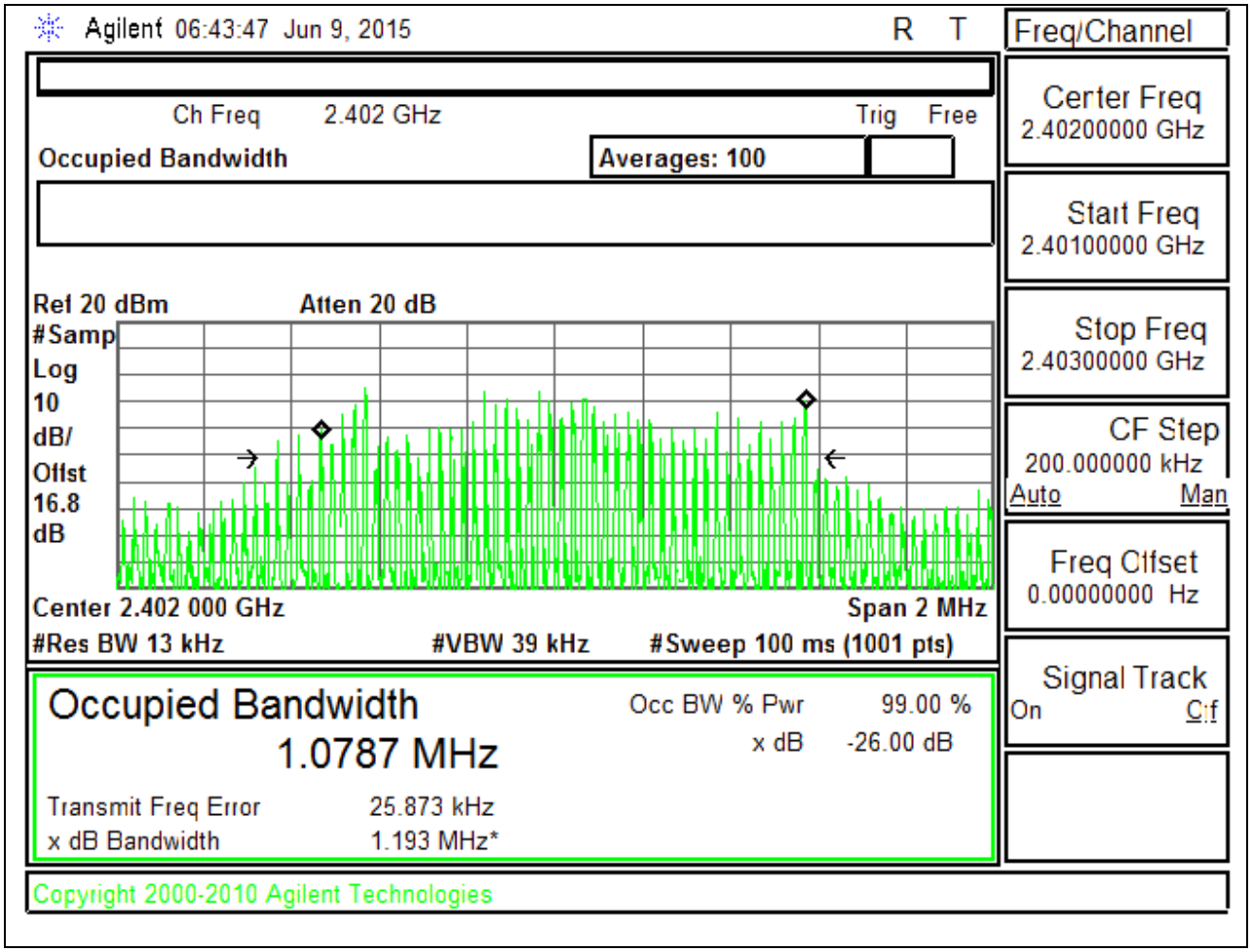




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**8PSK 99% BANDWIDTH**

**LOW CHANNEL**

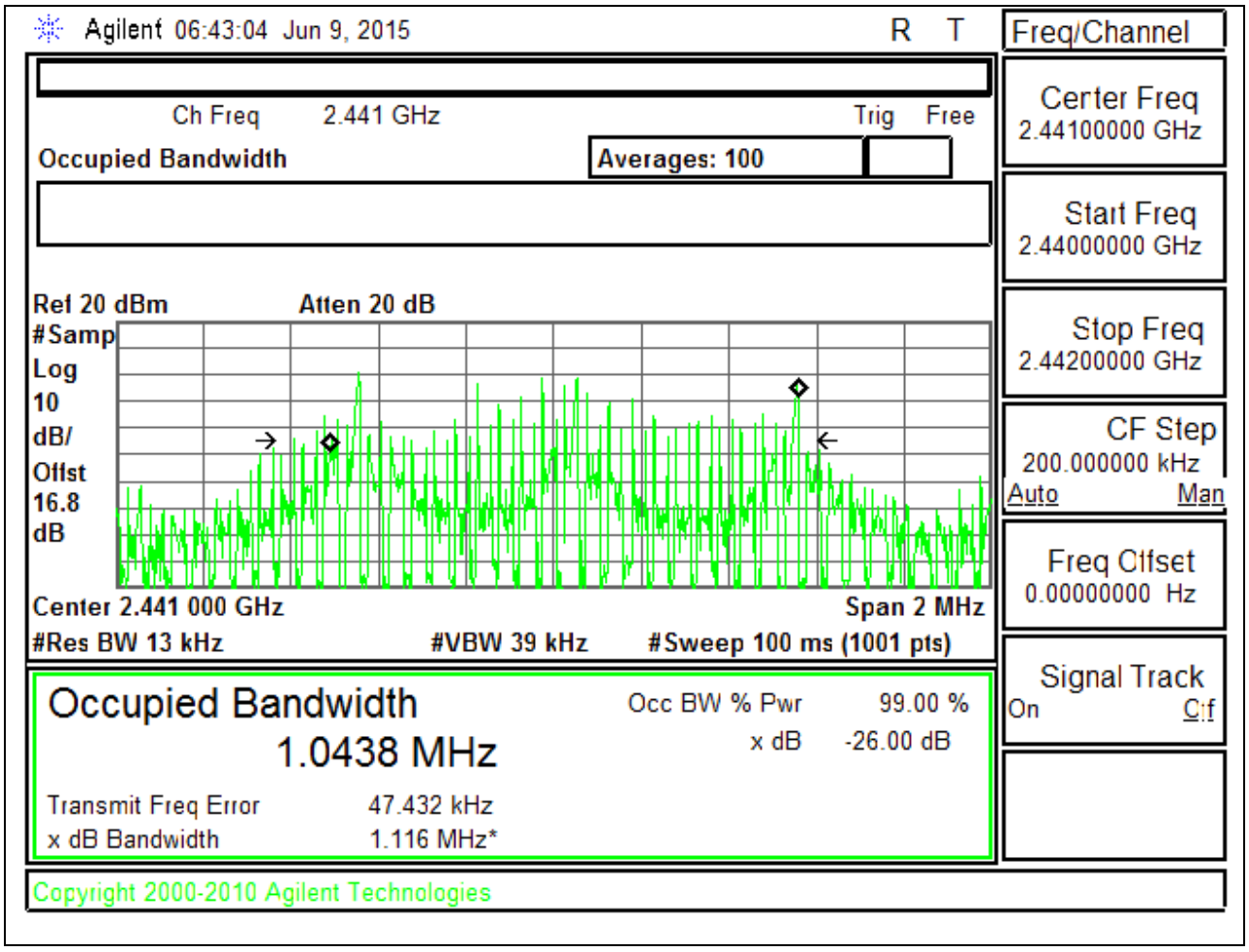






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL**

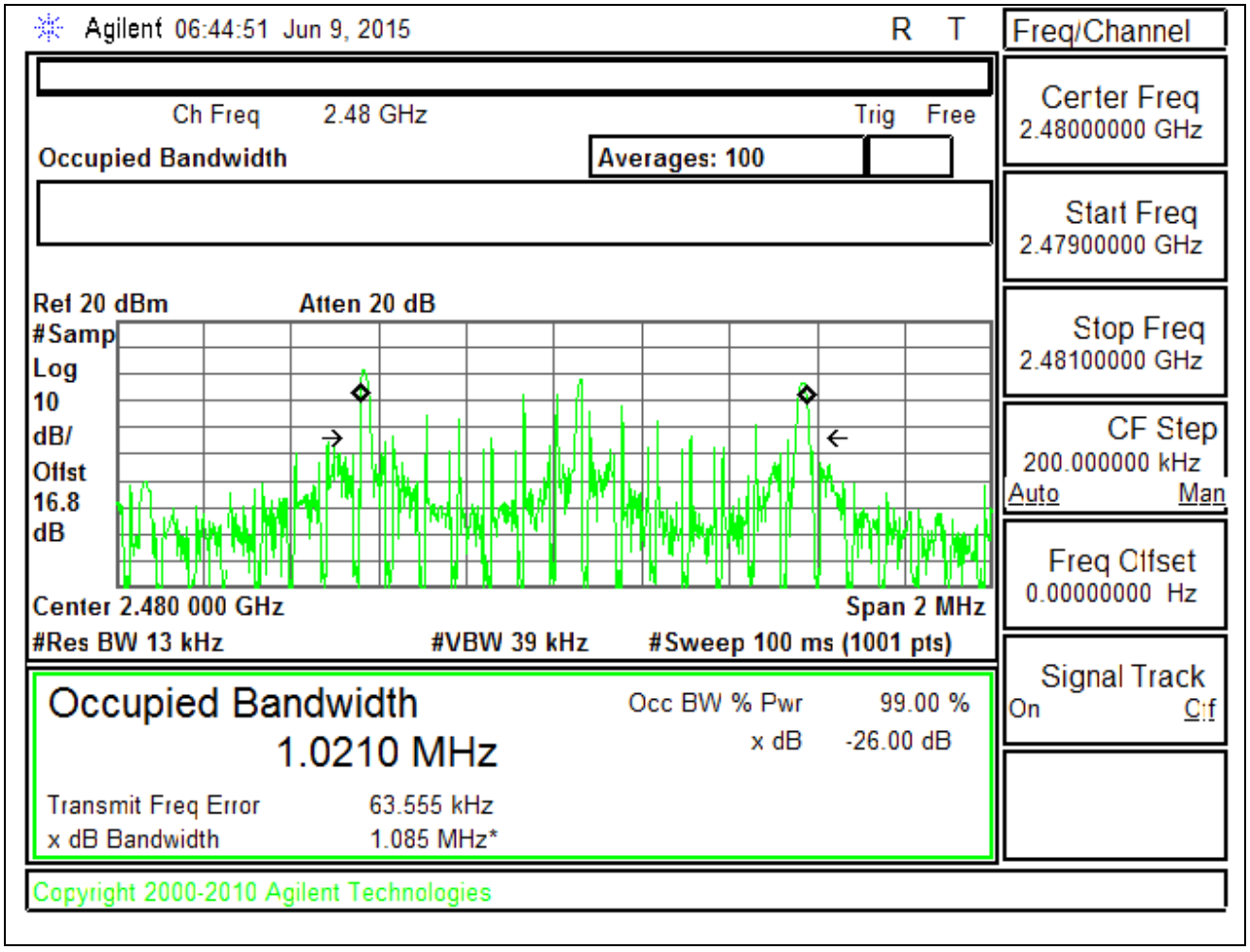






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL**







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.2. HOPPING FREQUENCY SEPARATION

**LIMIT**

FCC §15.247 (a) (1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**TEST PROCEDURE**

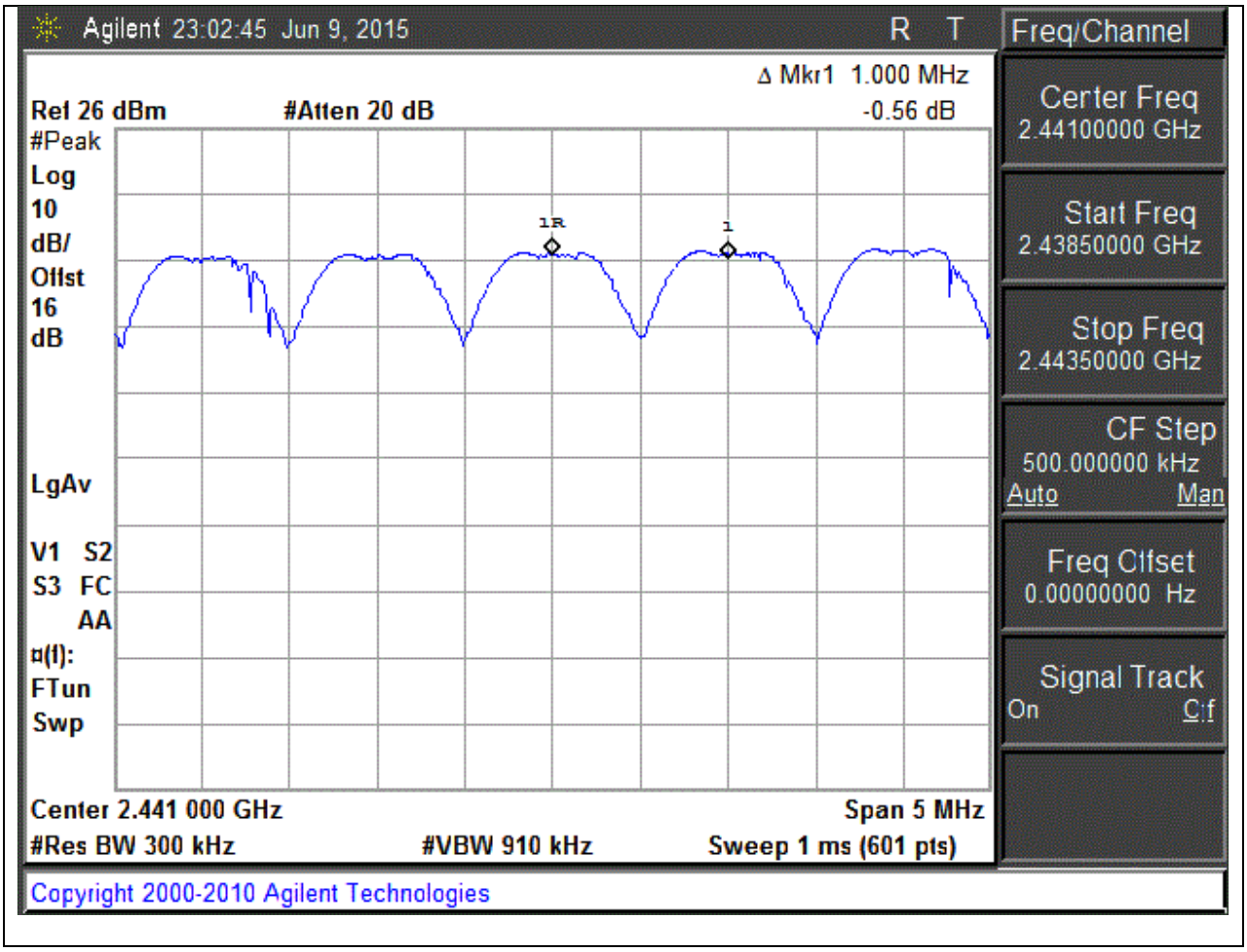
DA 00-705: The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

**RESULTS**




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HOPPING FREQUENCY SEPARATION PLOT**







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.3. NUMBER OF HOPPING CHANNELS

**LIMIT**

FCC §15.247 (a) (1) (iii)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

**RESULTS**

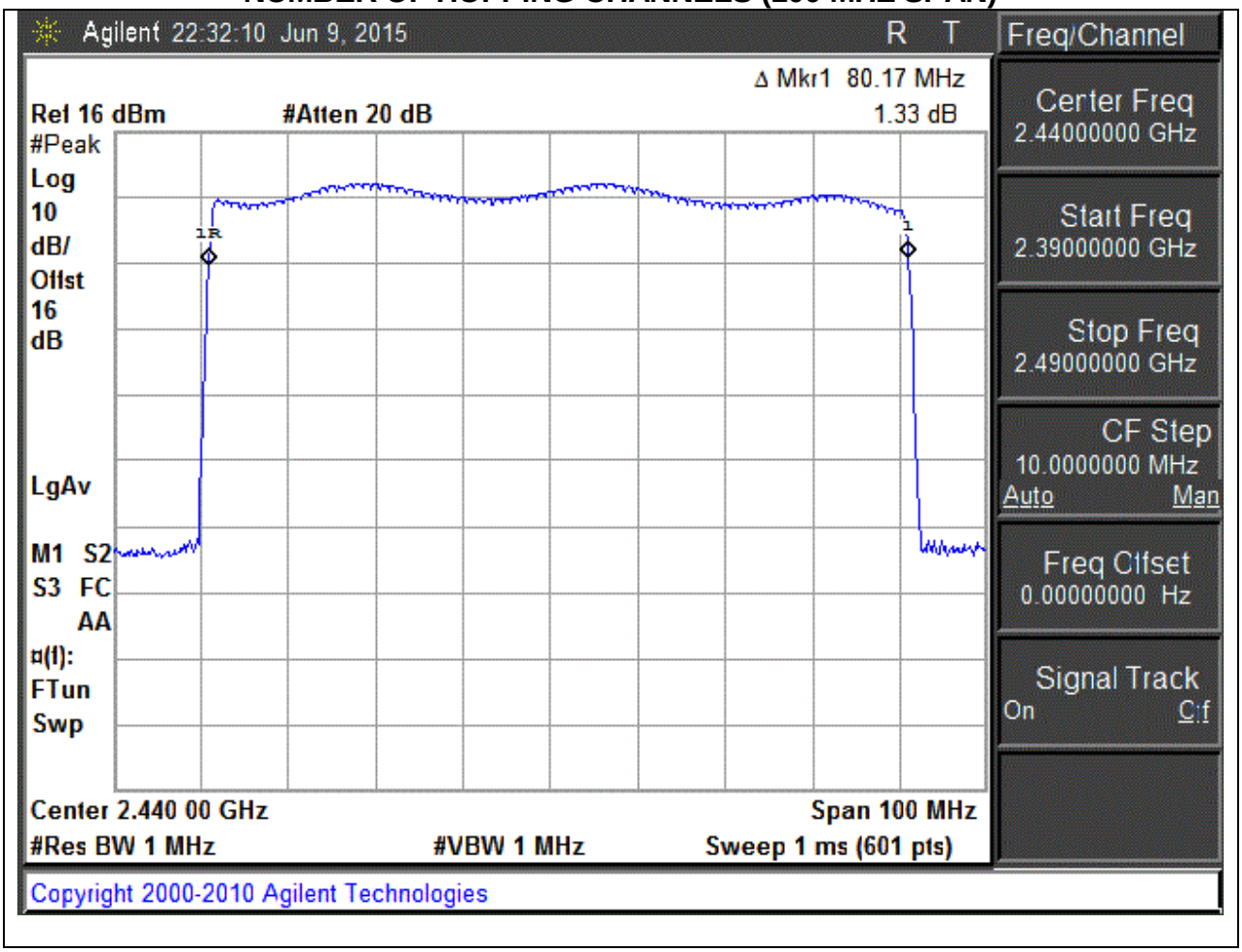
Normal Mode: 79 Channels observed.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**NUMBER OF HOPPING CHANNELS PLOTS**

## NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)

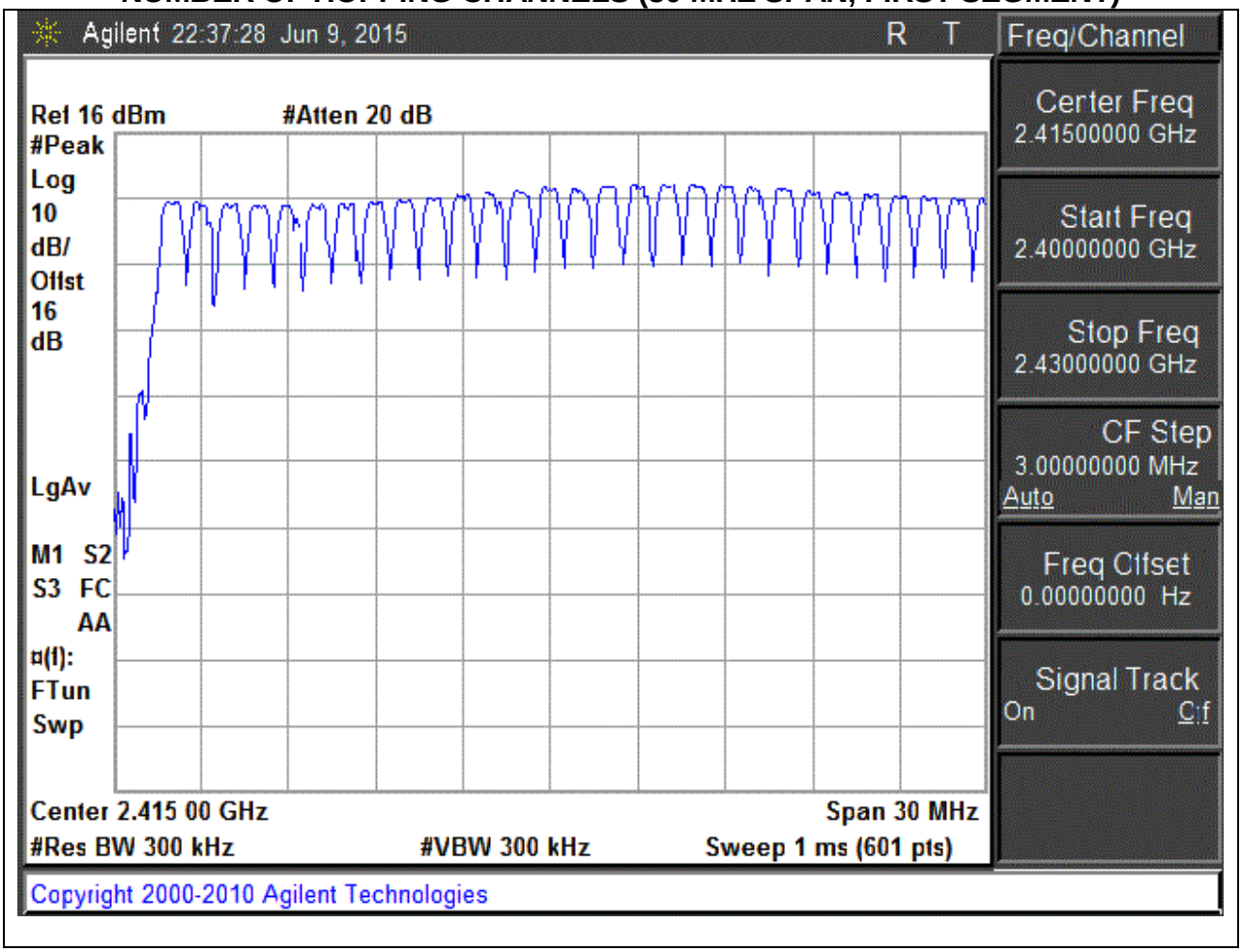






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)

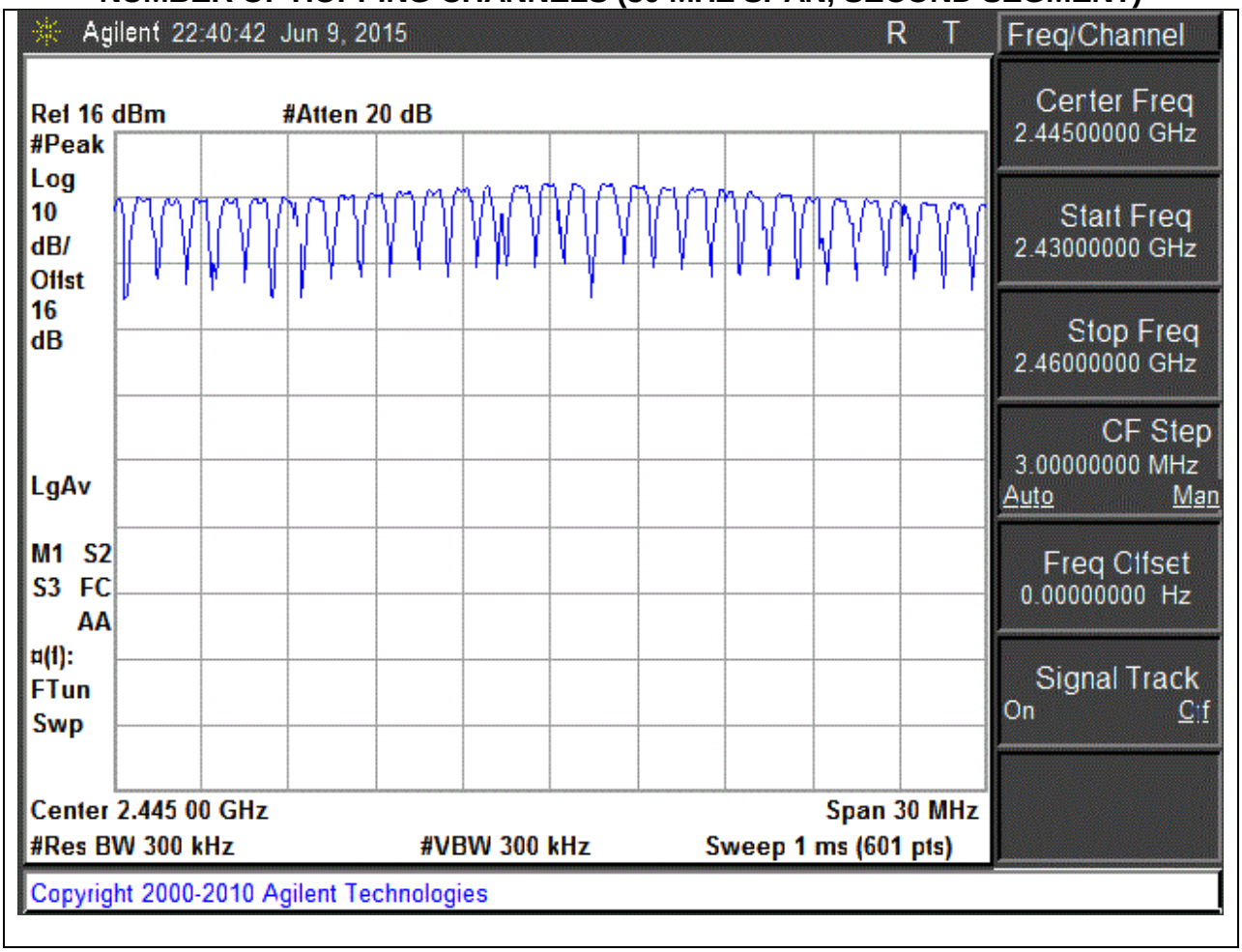






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)

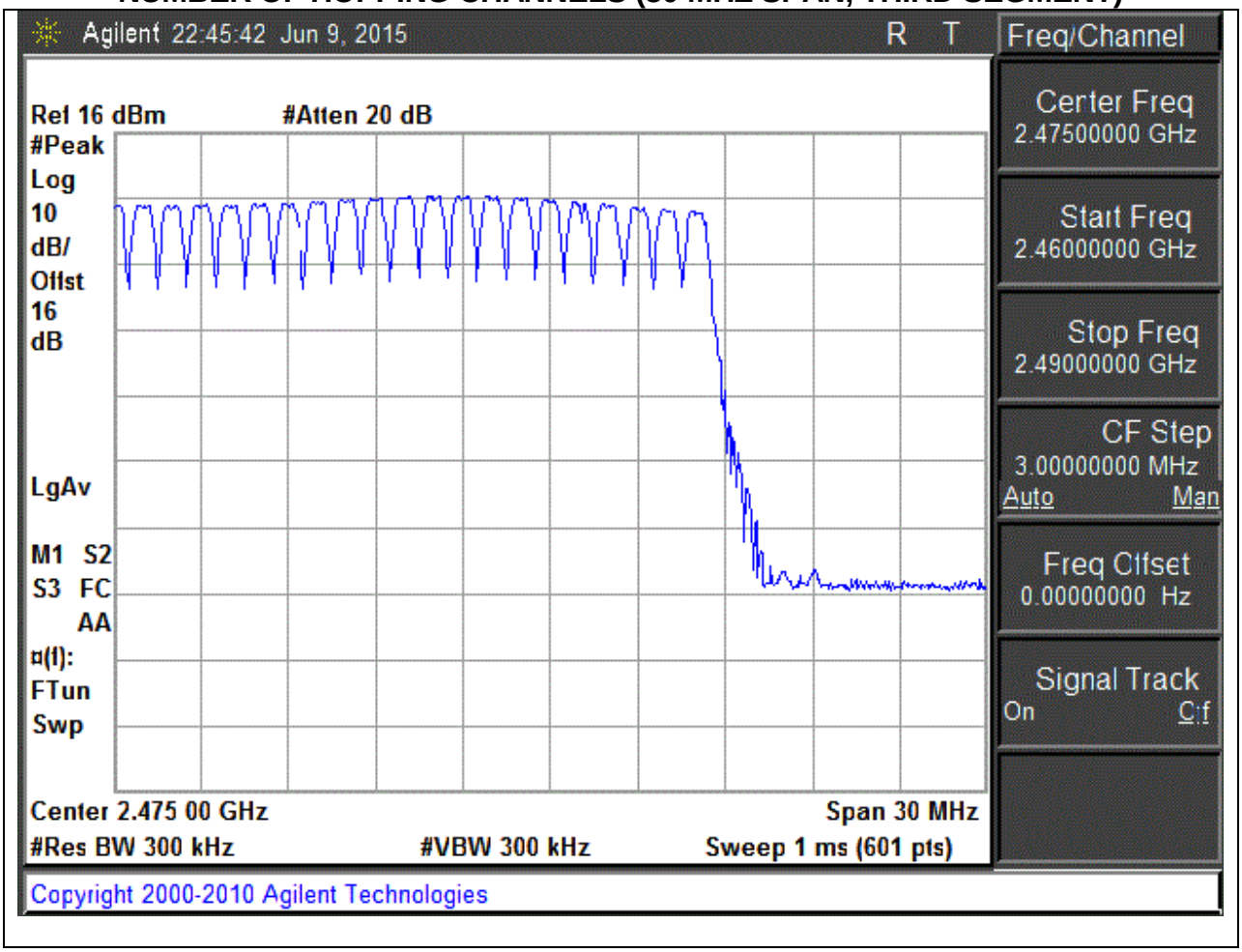






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.4. AVERAGE TIME OF OCCUPANCY

**LIMIT**

FCC §15.247 (a) (1) (iii)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to 10 * (# of pulses in 0.8 s) * pulse width.

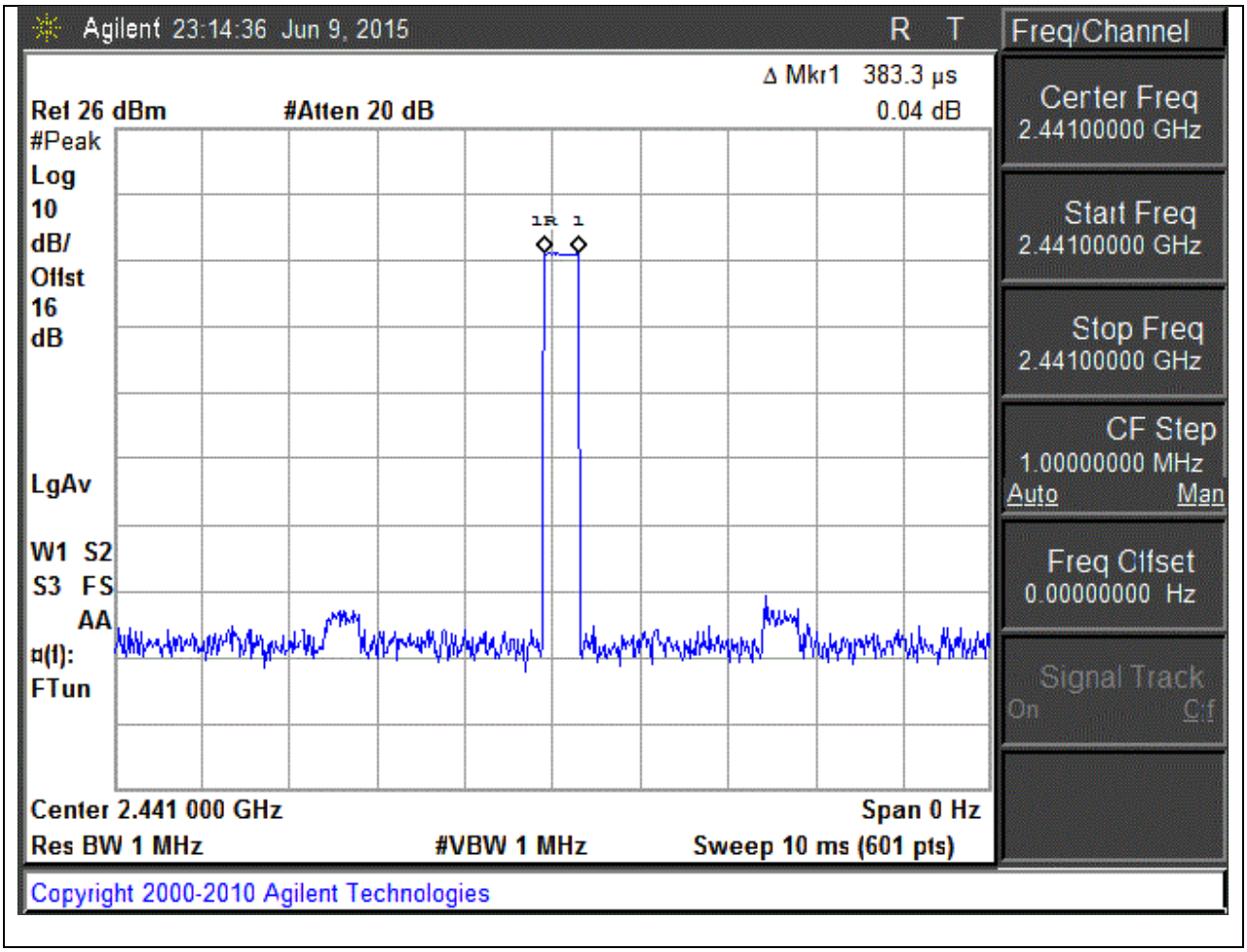

*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**RESULTS**

| DH Packet | Pulse Width (msec) | Number of Pulses in 3.16 seconds | Average Time of Occupancy (sec) | Limit (sec) | Margin (sec) |
|---|---|---|---|---|---|
| GFSK Normal Mode | | | | | |
| DH1 | 32 | 0.3833 | 0.122656 | 0.4 | -0.27734 |
| DH3 | 16 | 1.633 | 0.26128 | 0.4 | -0.13872 |
| DH5 | 13 | 2.867 | 0.37271 | 0.4 | -0.02729 |
| | | | | | |
| DH Packet | Pulse Width (msec) | Number of Pulses in 0.8 seconds | Average Time of Occupancy (sec) | Limit (sec) | Margin (sec) |
| GFSK AFH Mode | | | | | |
| DH1 | 32 | 0.095825 | 0.030664 | 0.4 | -0.36934 |
| DH3 | 16 | 0.40825 | 0.06532 | 0.4 | -0.33468 |
| DH5 | 13 | 0.71675 | 0.0931775 | 0.4 | -0.30682 |


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## PULSE WIDTH - DH1

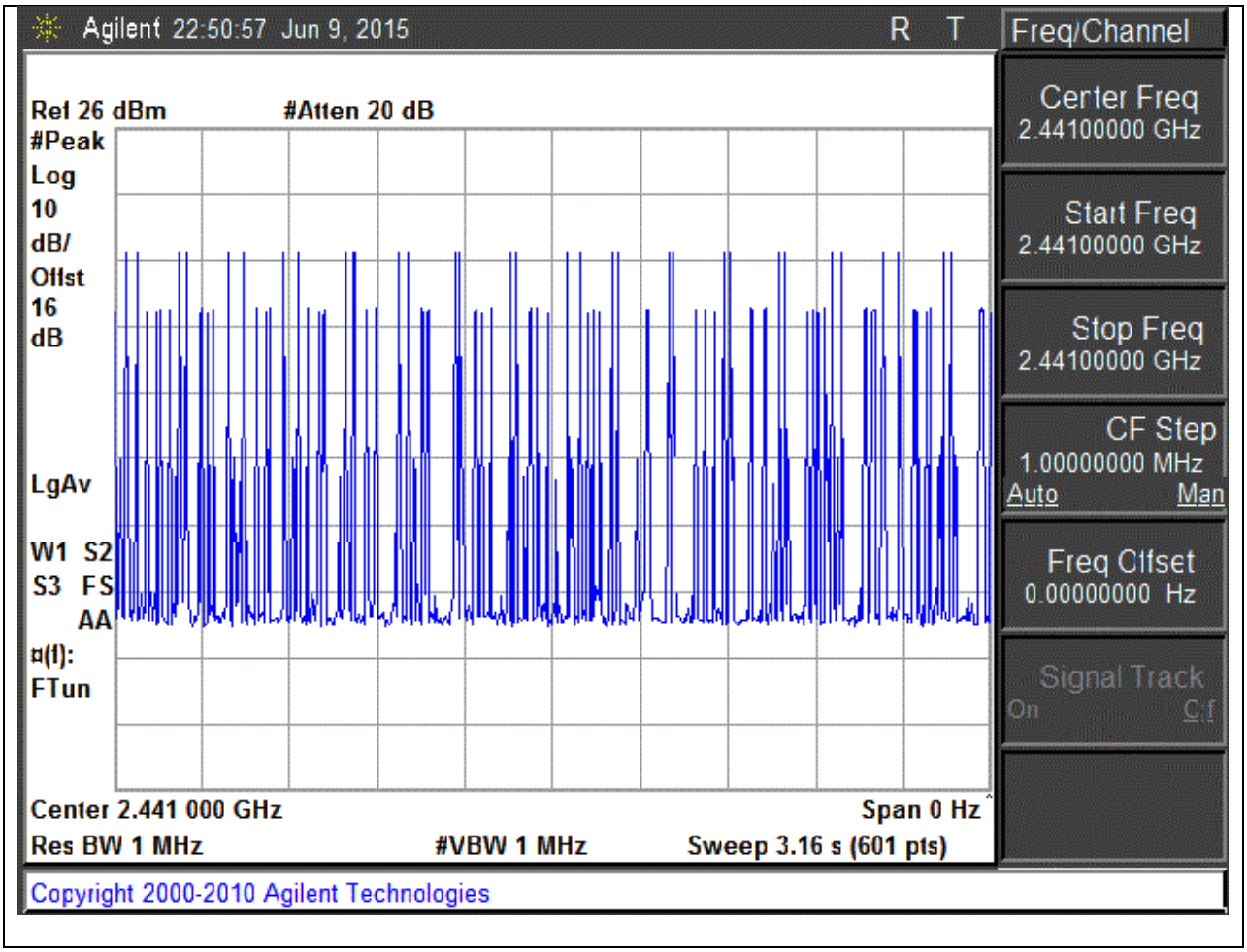






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1

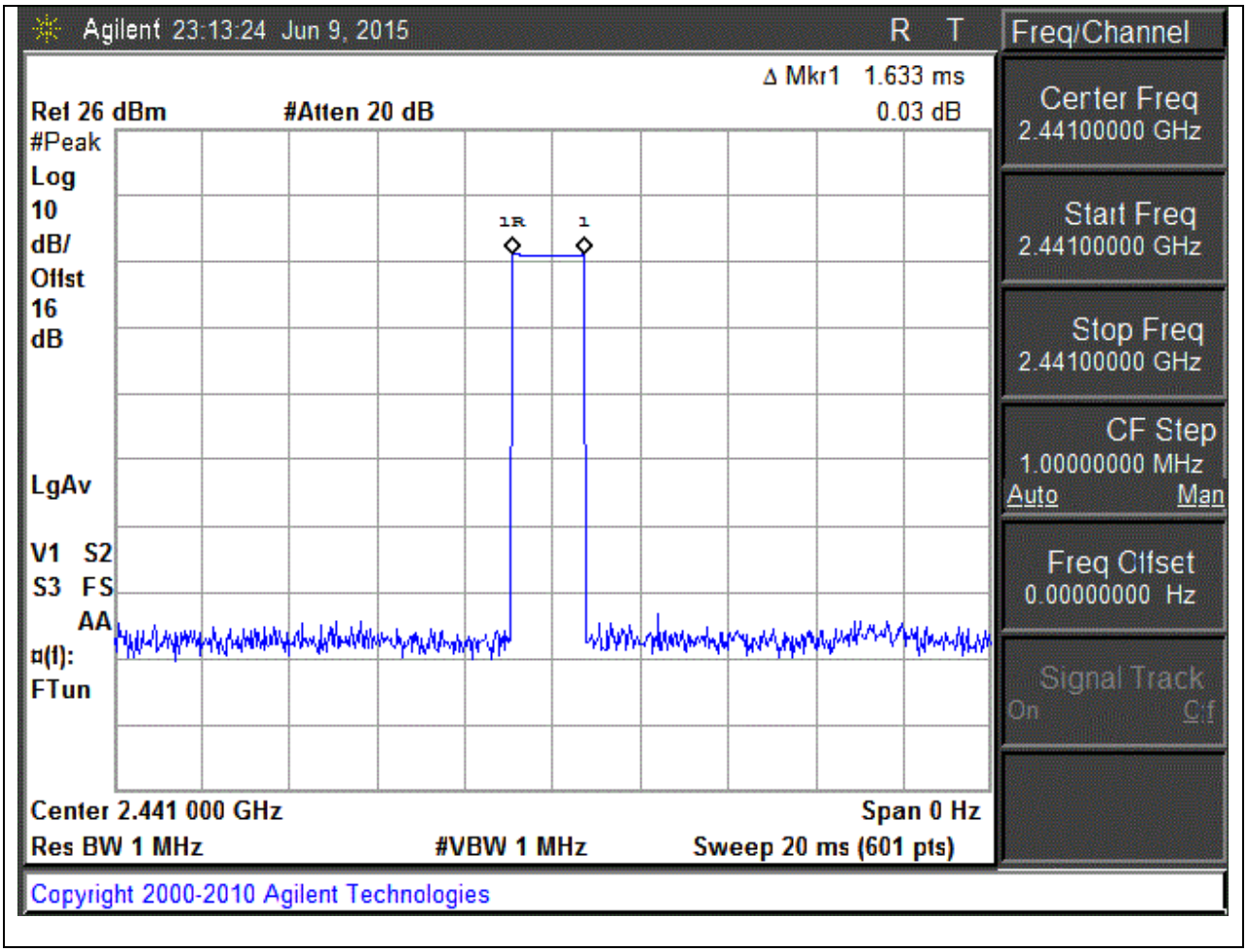






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## PULSE WIDTH - DH3

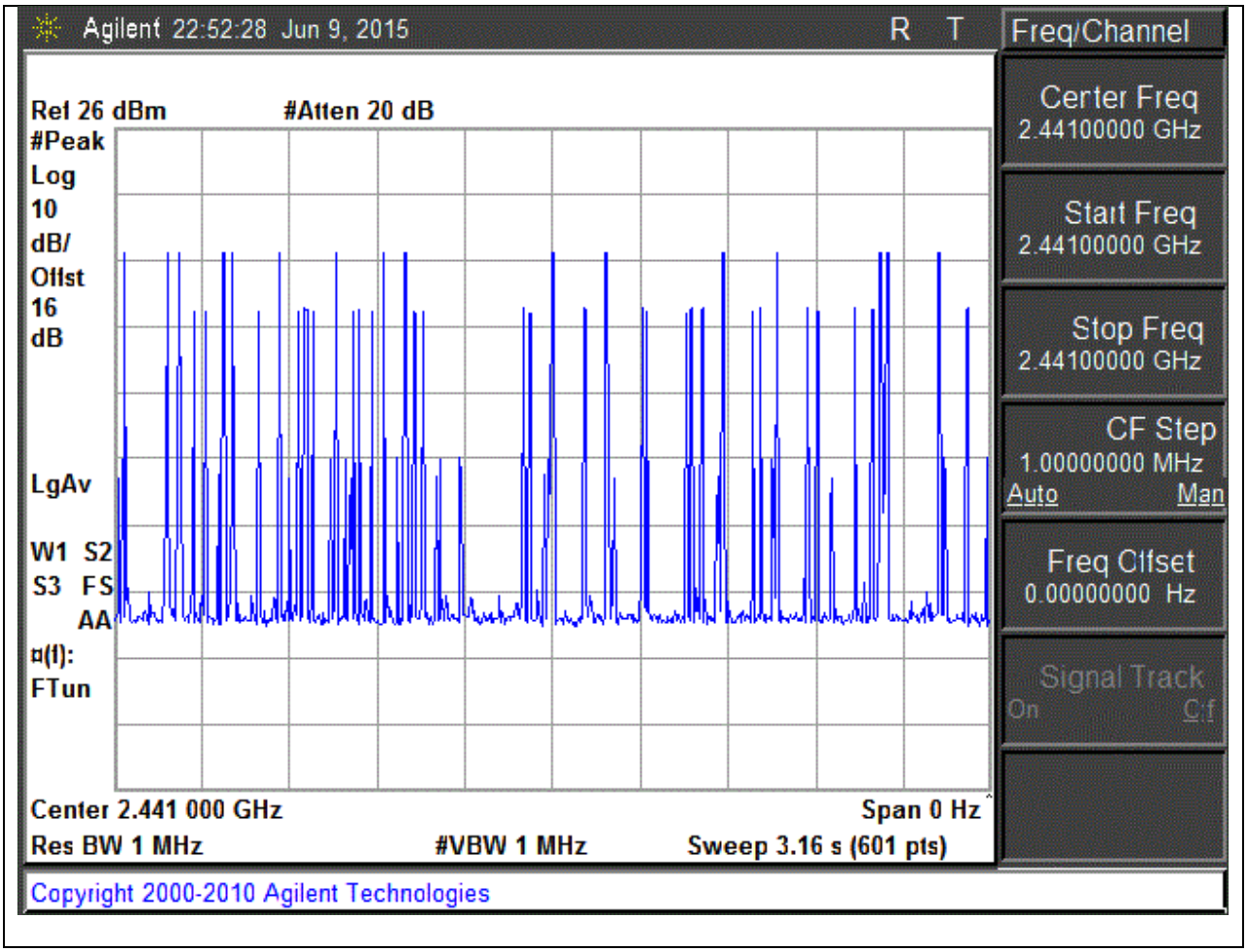






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH3

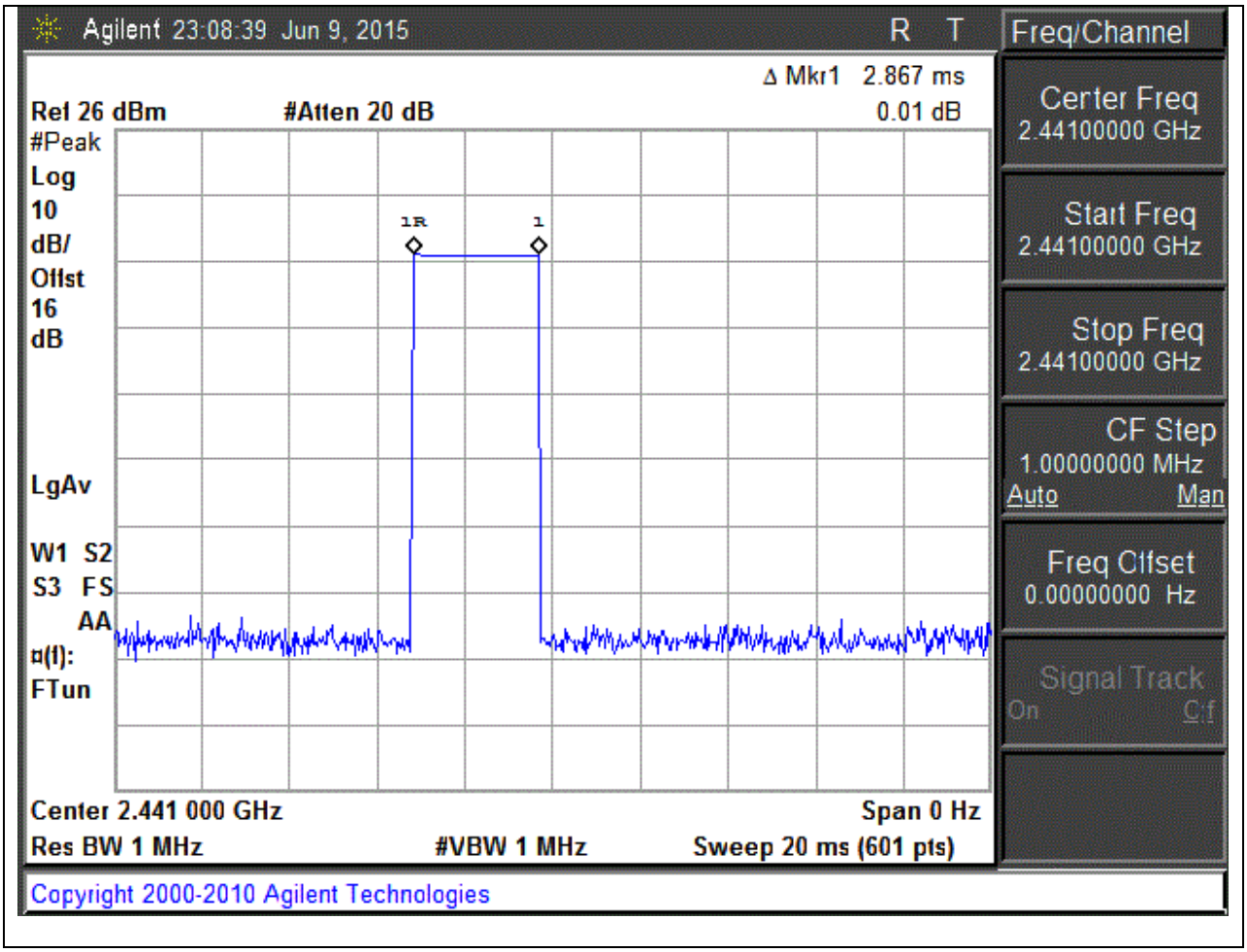






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## PULSE WIDTH - DH5

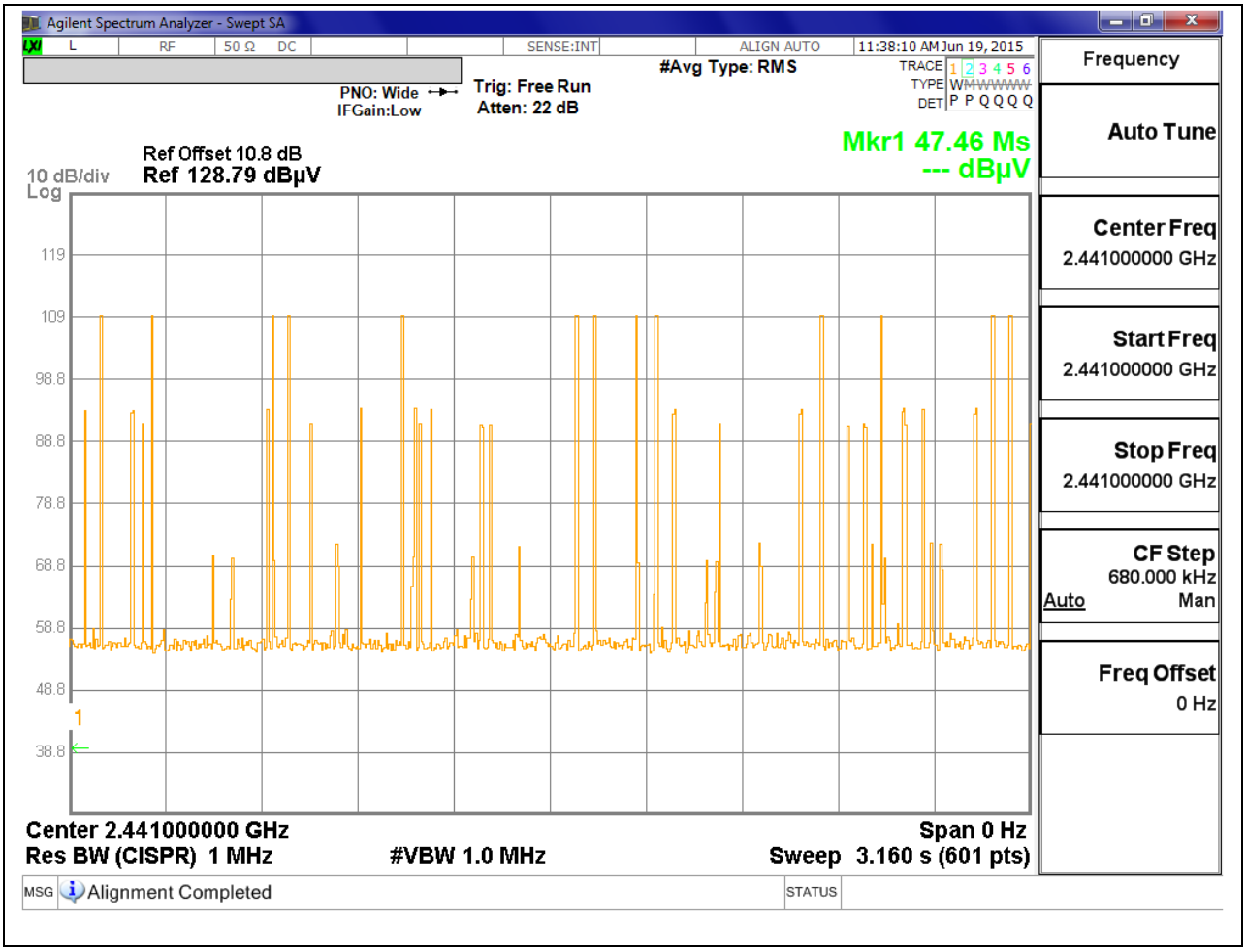






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH5







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.5. OUTPUT POWER

**LIMIT**

§15.247 (b) (1)

The maximum antenna gain is less than 6 dBi, therefore the limit is 21 dBm.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

**RESULTS**

### 8.5.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2402 | 7.74 | 21 | -13.26 |
| Middle | 2441 | 9.21 | 21 | -11.79 |
| High | 2480 | 7.08 | 21 | -13.92 |
| Worst | | 9.21 | | -11.79 |

### 8.5.2. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 2402 | 6.28 | 21 | -14.72 |
| Middle | 2441 | 8.07 | 21 | -12.93 |
| High | 2480 | 6.26 | 21 | -14.74 |
| Worst | | 8.07 | | -12.93 |

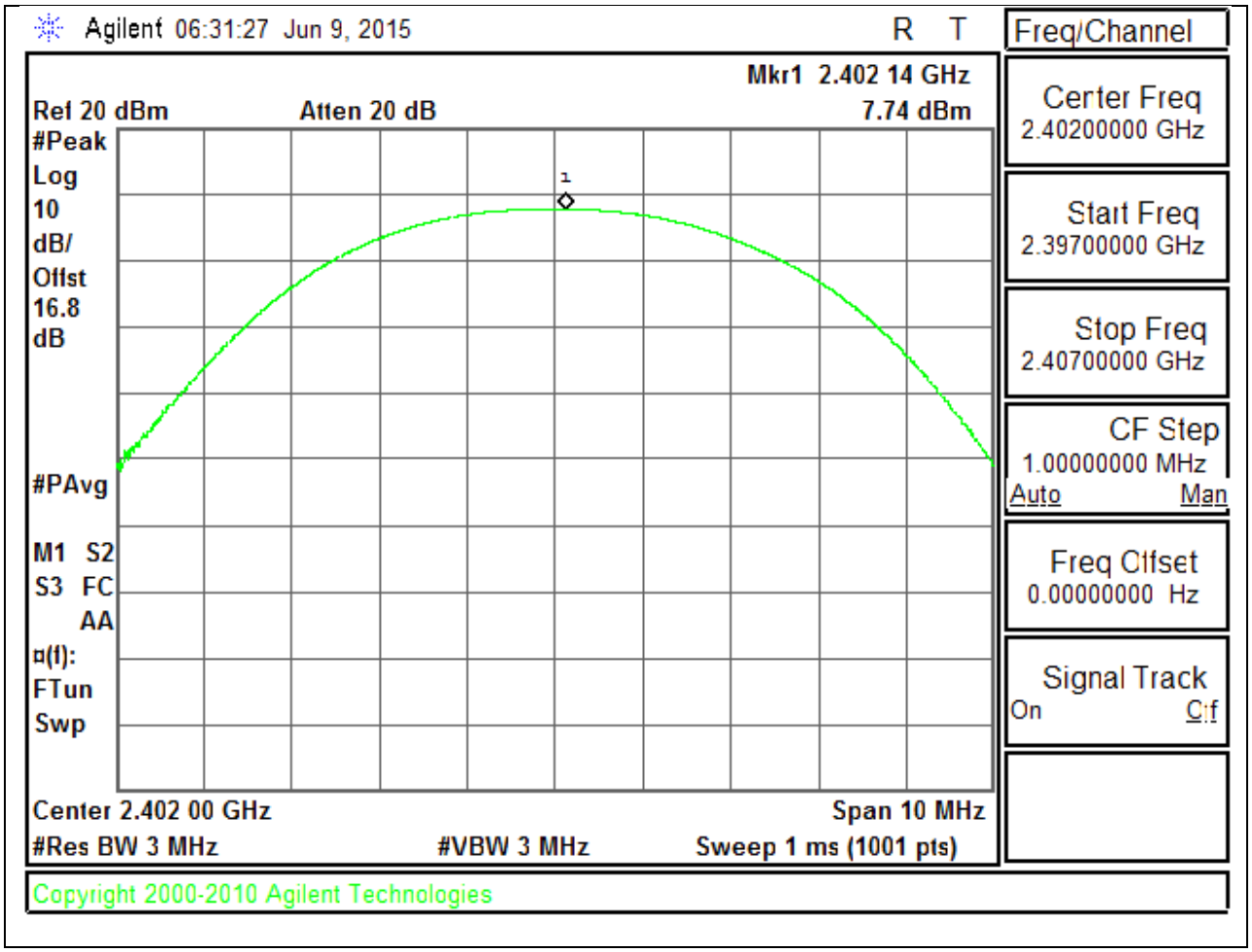



*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.5.3. OUTPUT POWER PLOTS

**GFSK OUTPUT POWER**

**LOW CHANNEL**

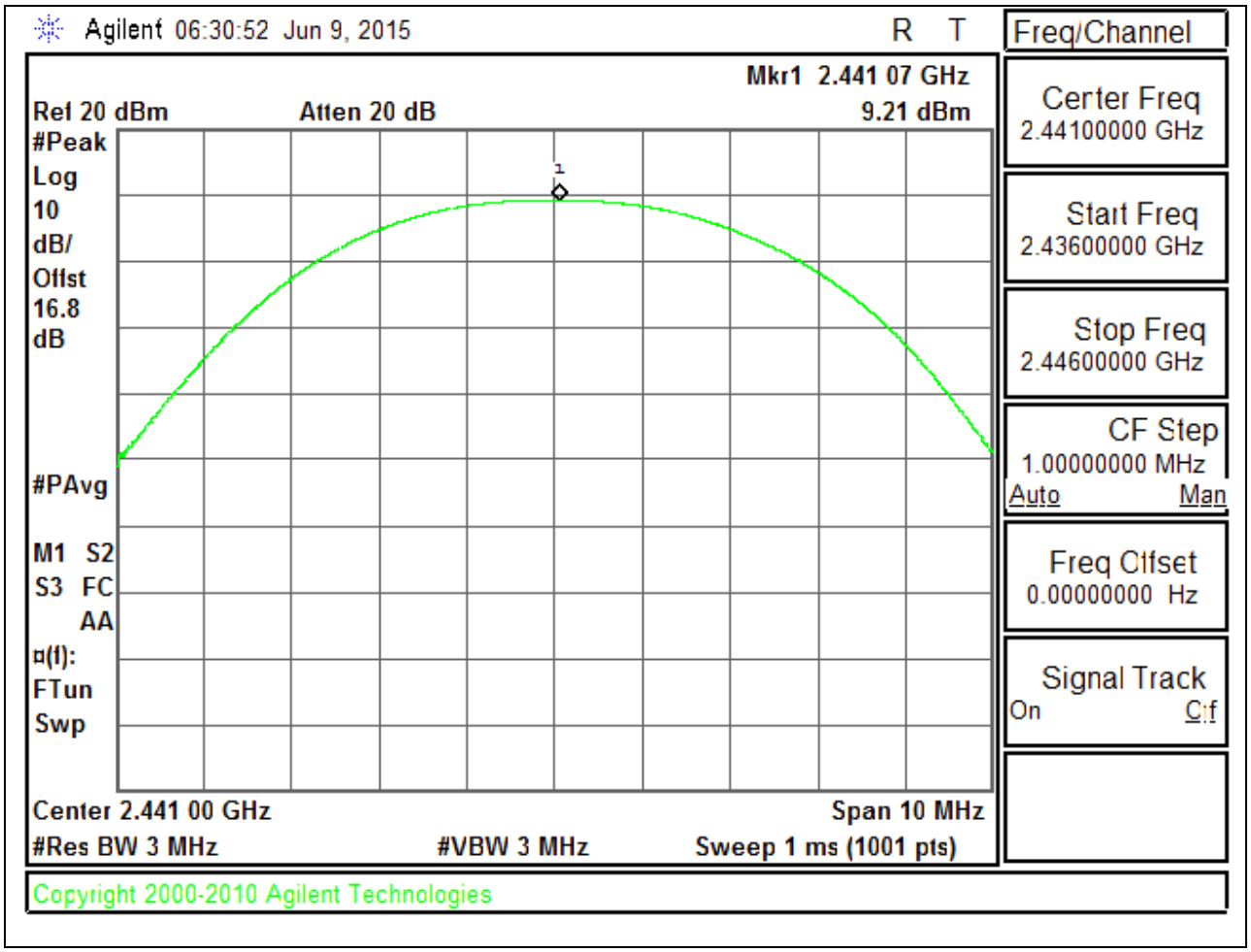






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL

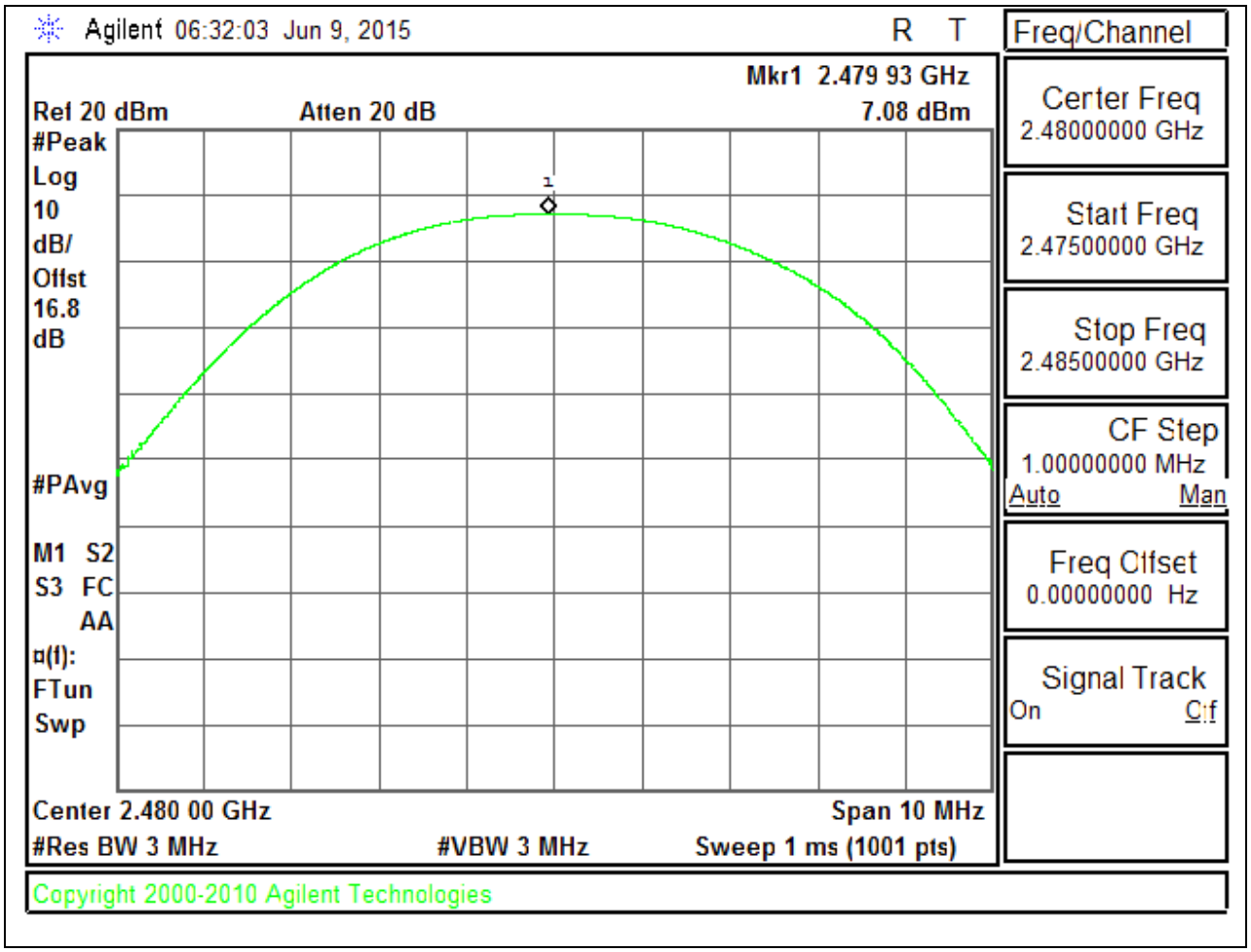






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH CHANNEL



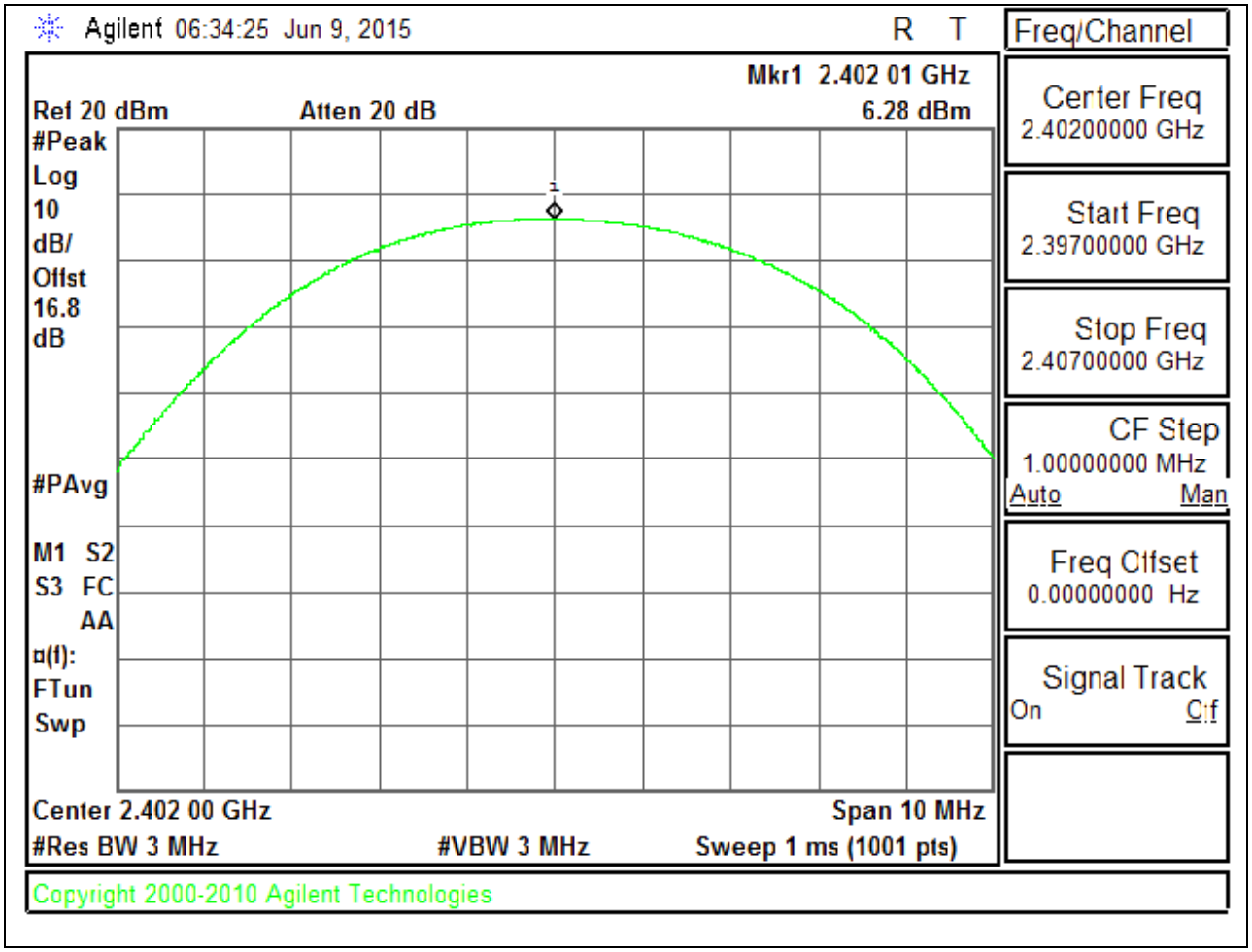




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**8PSK OUTPUT POWER**

**LOW CHANNEL**

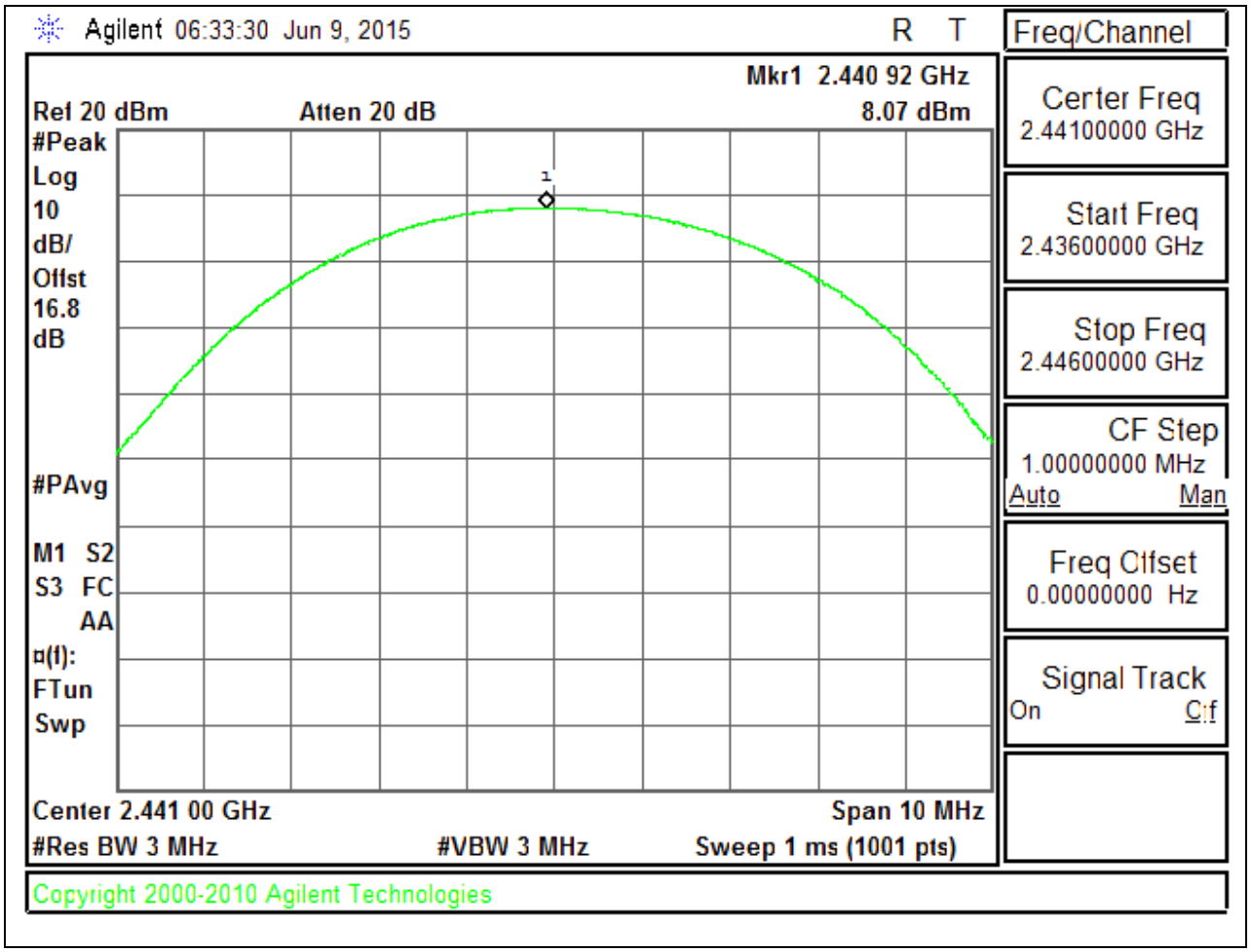






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL

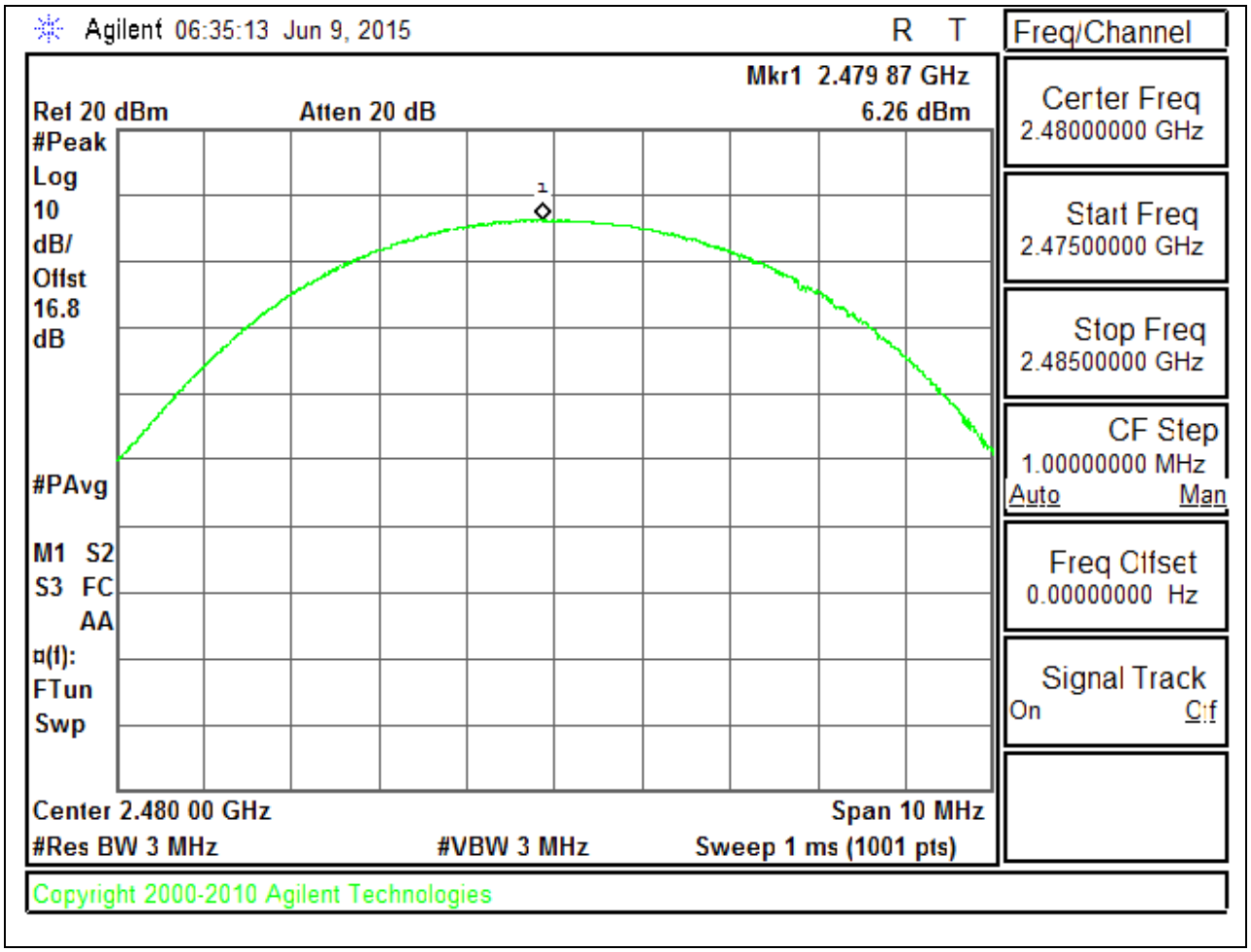






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL**







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.6. AVERAGE POWER

**LIMIT**

None; for reporting purposes only.

**TEST PROCEDURE**

DA 00-705: The transmitter output is connected to a power meter.

**RESULTS**

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

### 8.6.1. BASIC DATA RATE GFSK MODULATION

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2402 | 7.3 |
| Middle | 2441 | 8.3 |
| High | 2480 | 6.7 |
| Worst | | 8.3 |

### 8.6.2. DATA RATE PI/4-DQPSK MODULATION

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2402 | 3.7 |
| Middle | 2441 | 5.3 |
| High | 2480 | 3.9 |
| Worst | | 5.3 |

### 8.6.3. ENHANCED DATA RATE 8PSK MODULATION

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2402 | 3.7 |
| Middle | 2441 | 5.3 |
| High | 2480 | 3.9 |
| Worst | | 5.3 |


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 8.7. CONDUCTED SPURIOUS EMISSIONS

**LIMITS**

FCC §15.247 (d)

Limit = -20 dBc

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

**RESULTS**

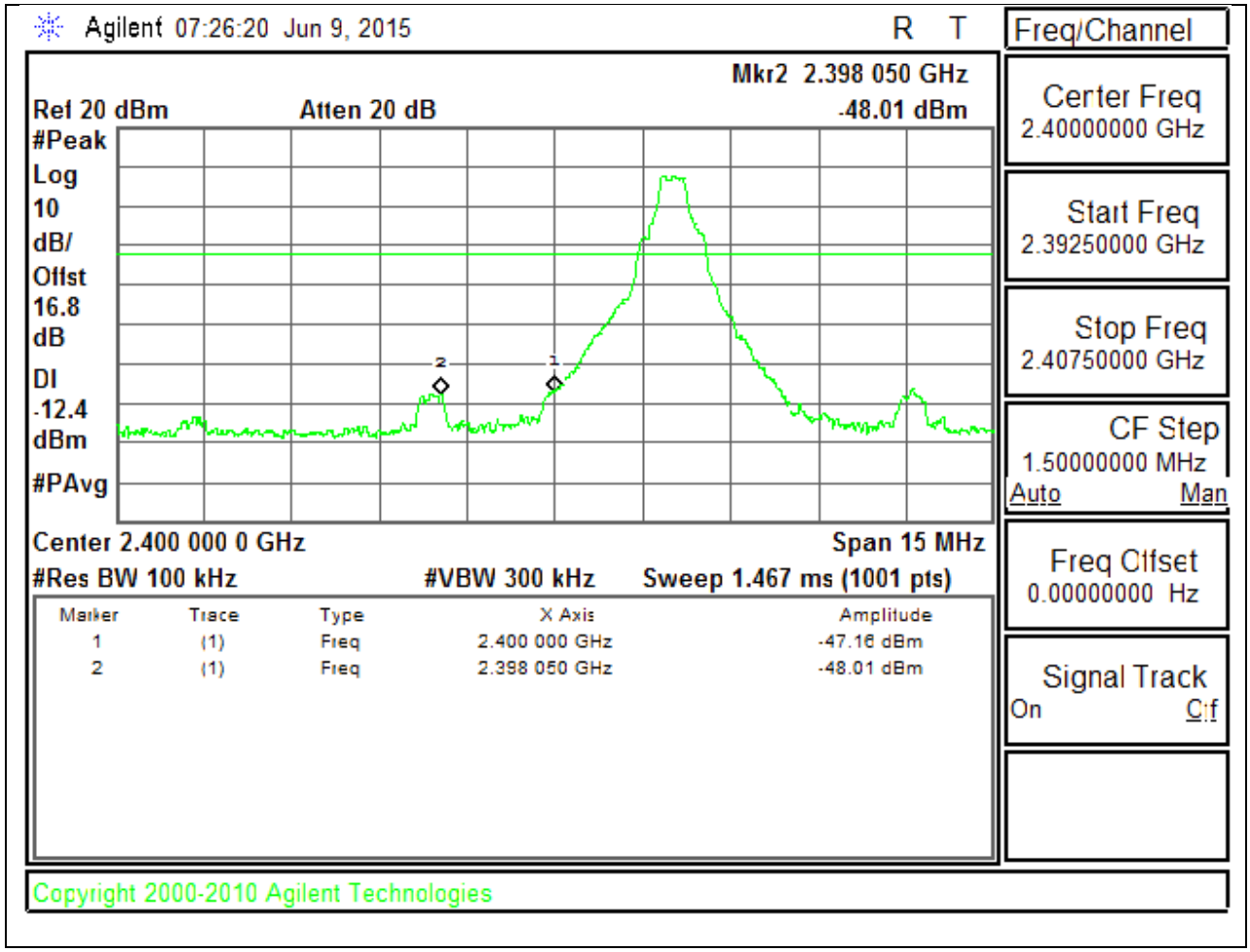



*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.7.1. BASIC DATA RATE GFSK MODULATION

**SPURIOUS EMISSIONS, LOW CHANNEL**

**LOW CHANNEL BANDEDGE**

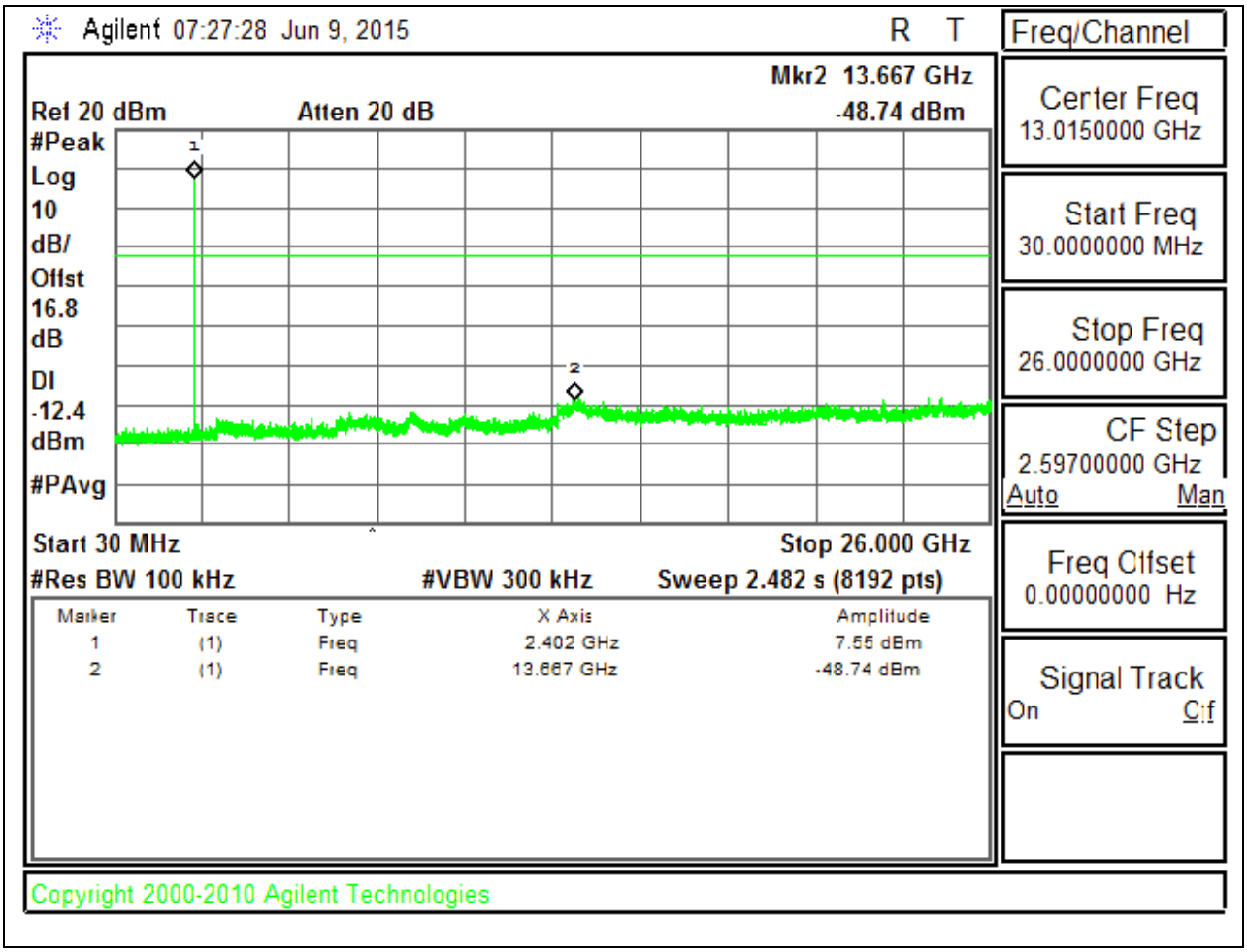






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## LOW CHANNEL SPURIOUS



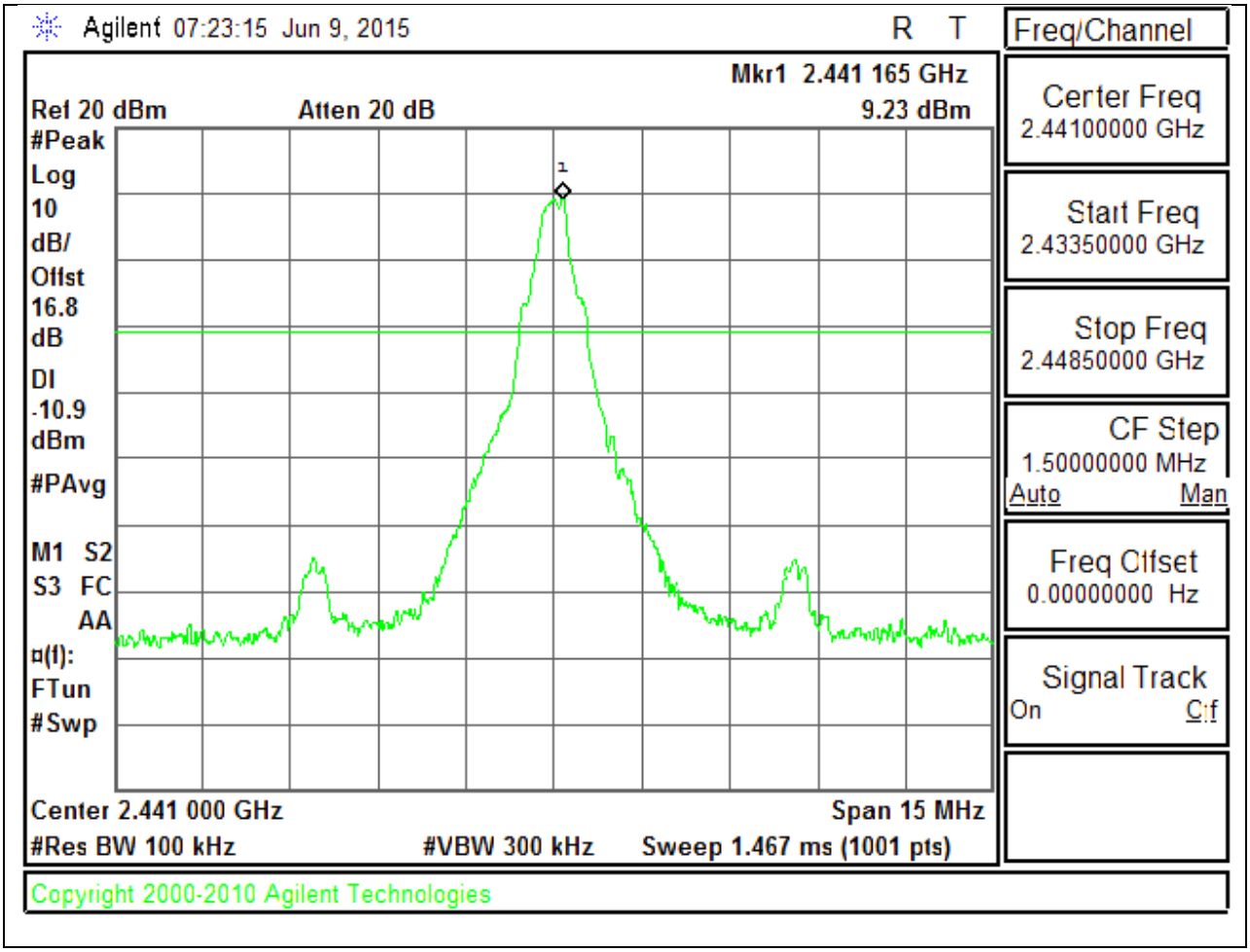




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS EMISSIONS, MID CHANNEL**

## MID CHANNEL BANDEDGE

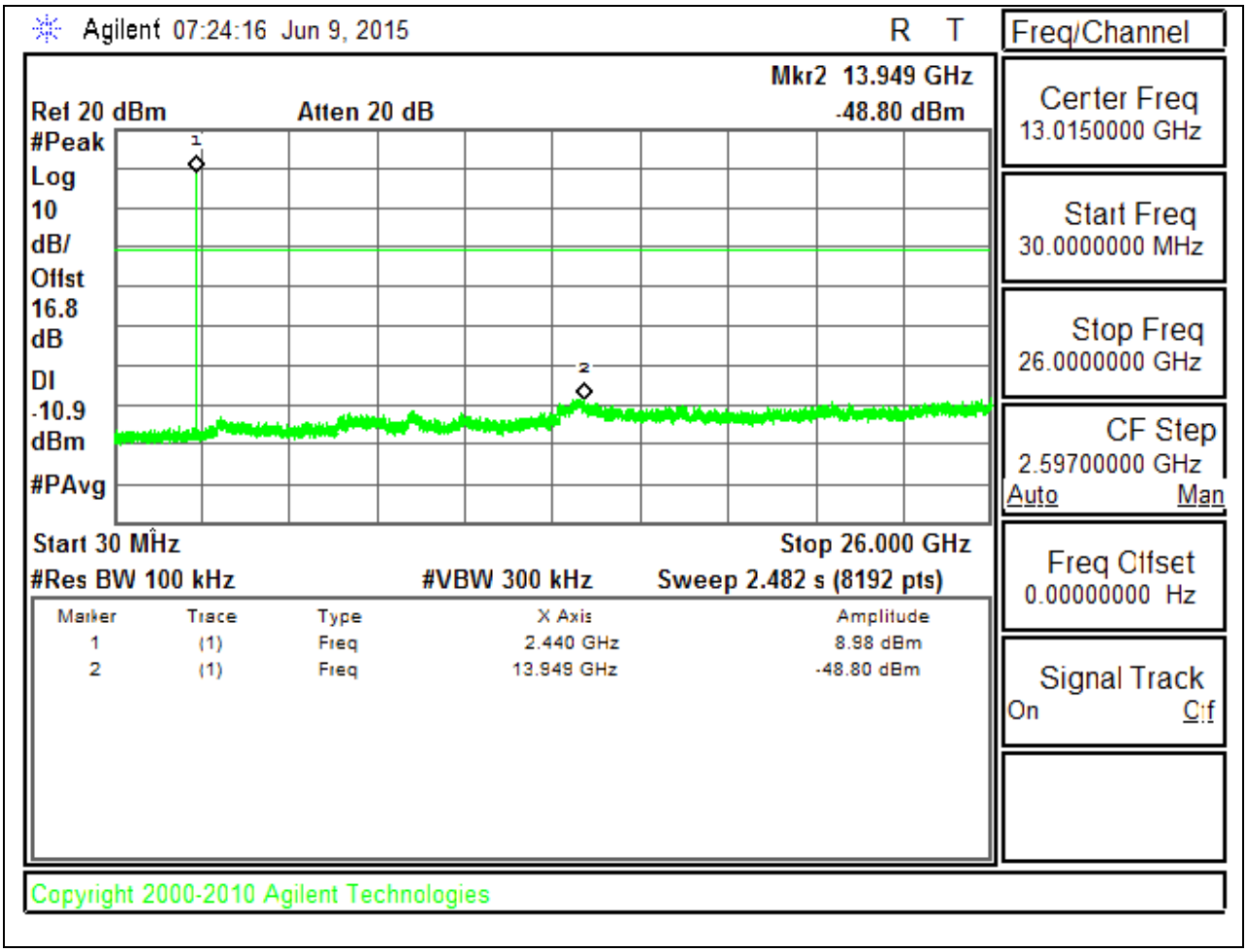






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL SPURIOUS



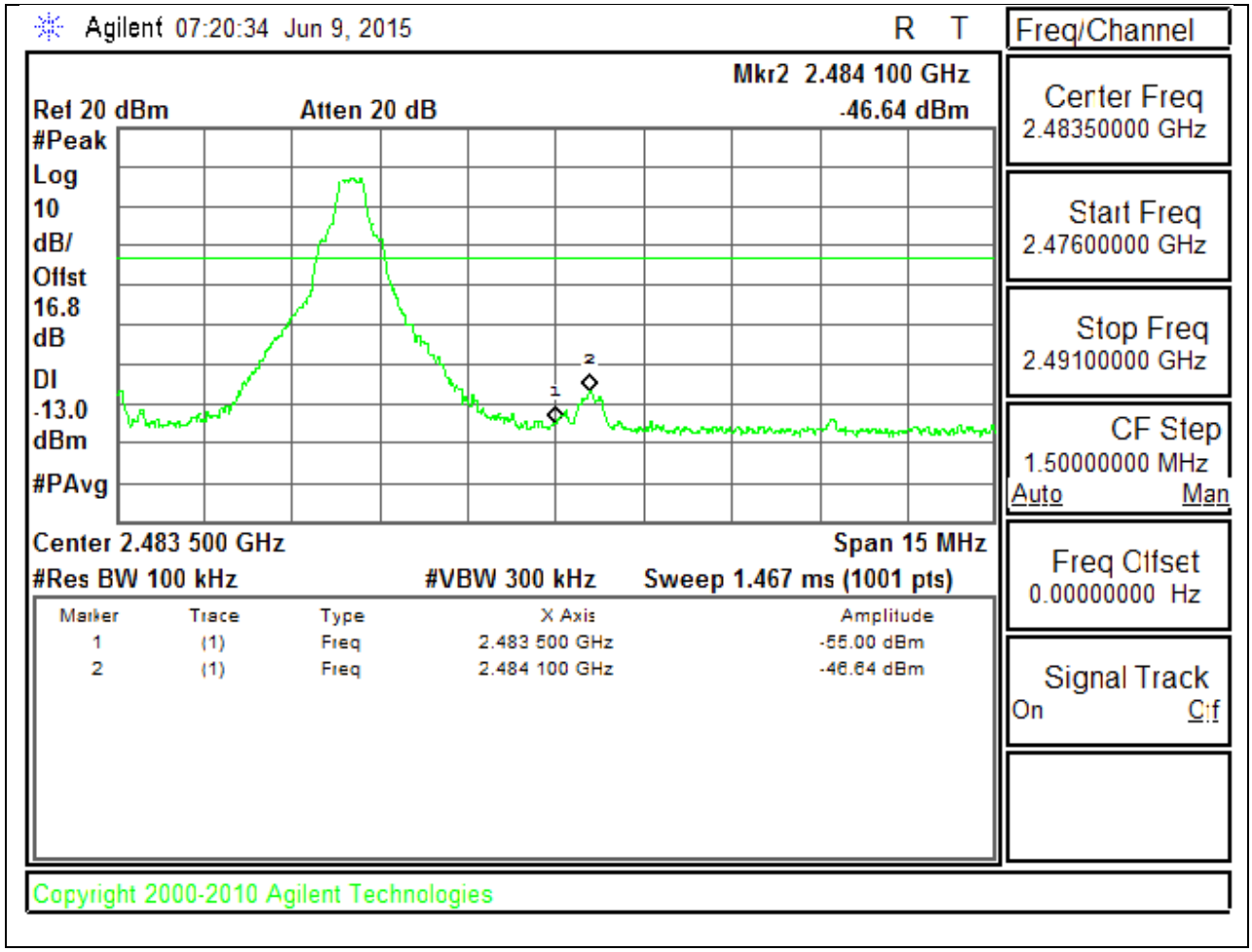




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS EMISSIONS, HIGH CHANNEL**

## HIGH CHANNEL BANDEDGE

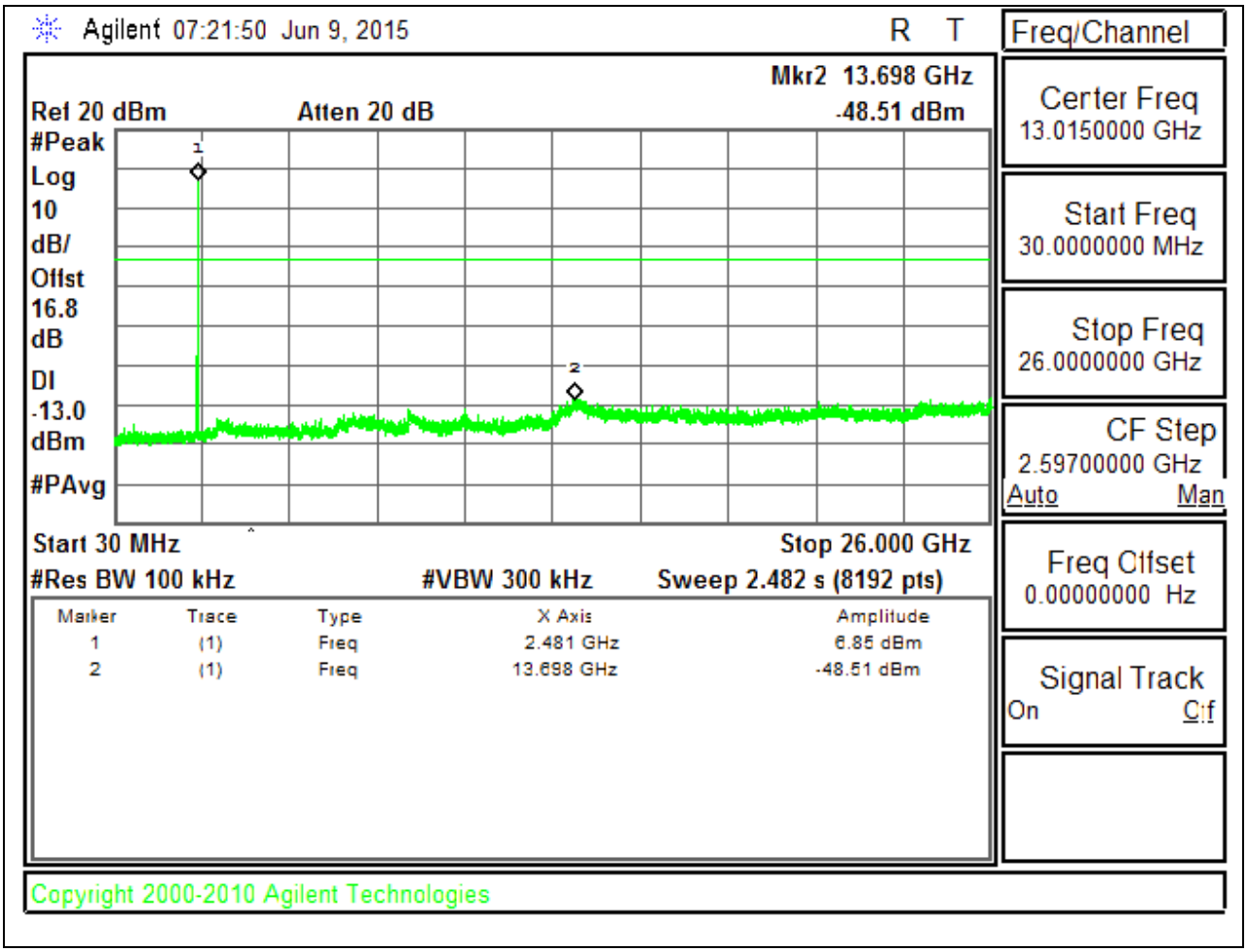






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH CHANNEL SPURIOUS



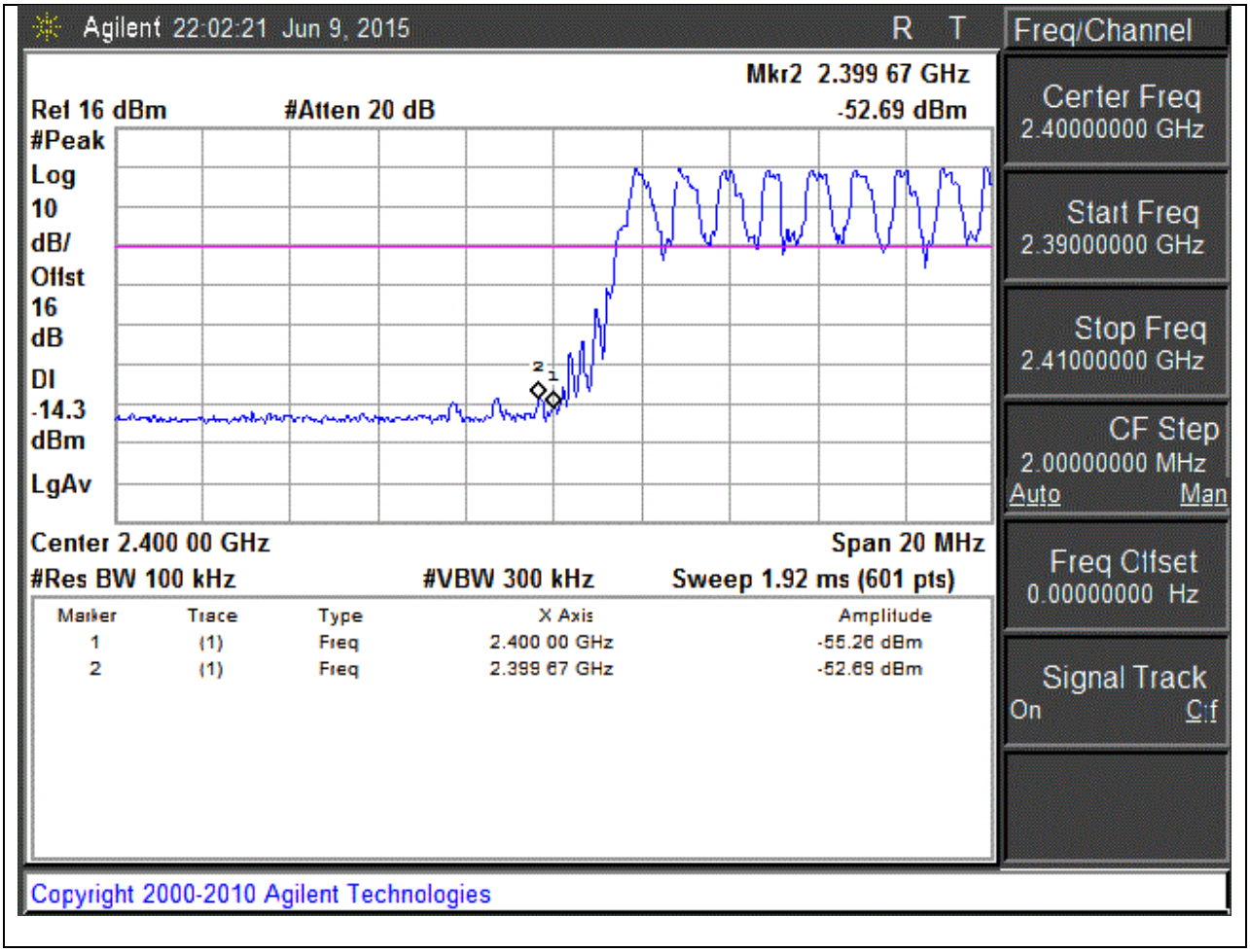




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

## LOW BANDEDGE WITH HOPPING ON

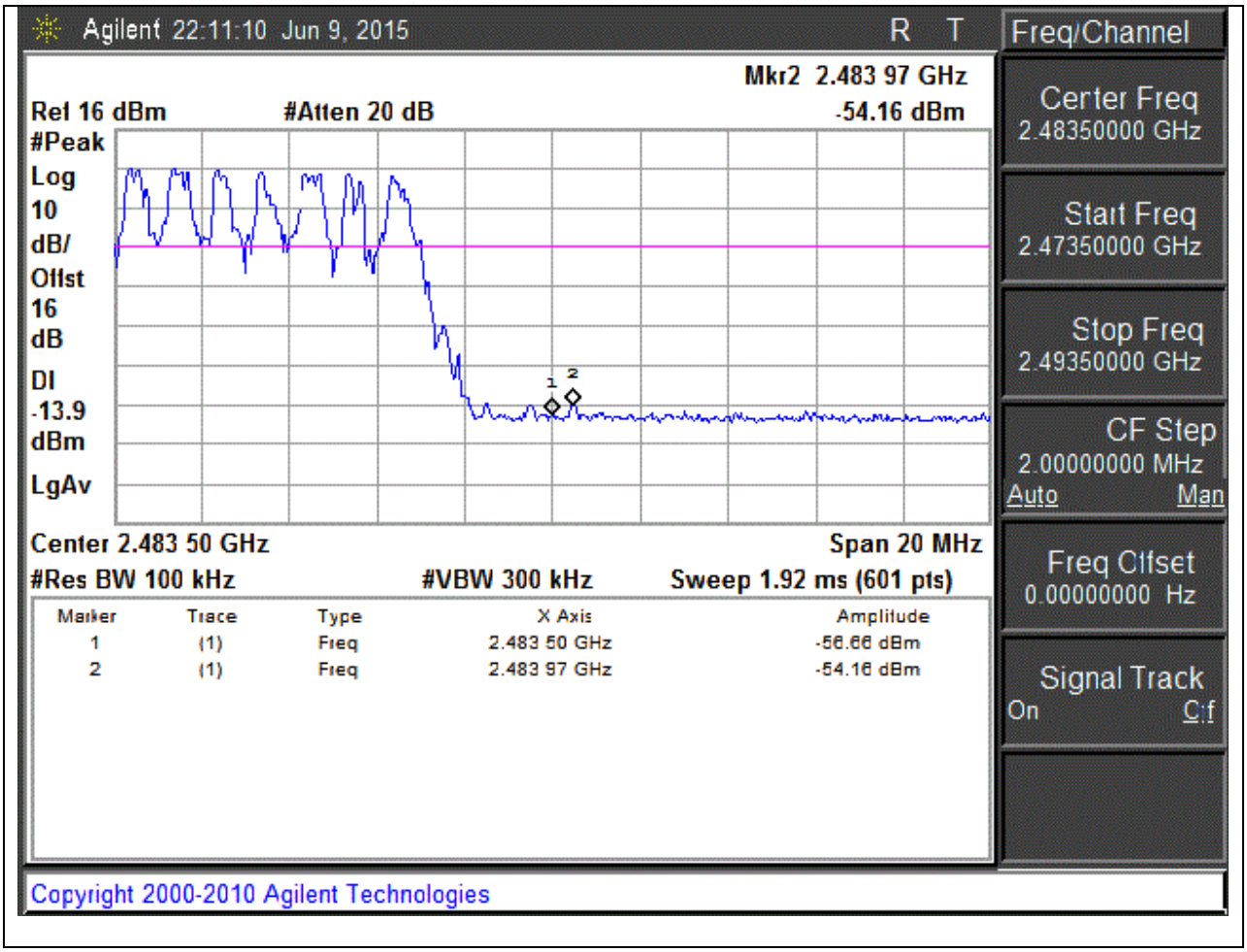






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH BANDEDGE WITH HOPPING ON





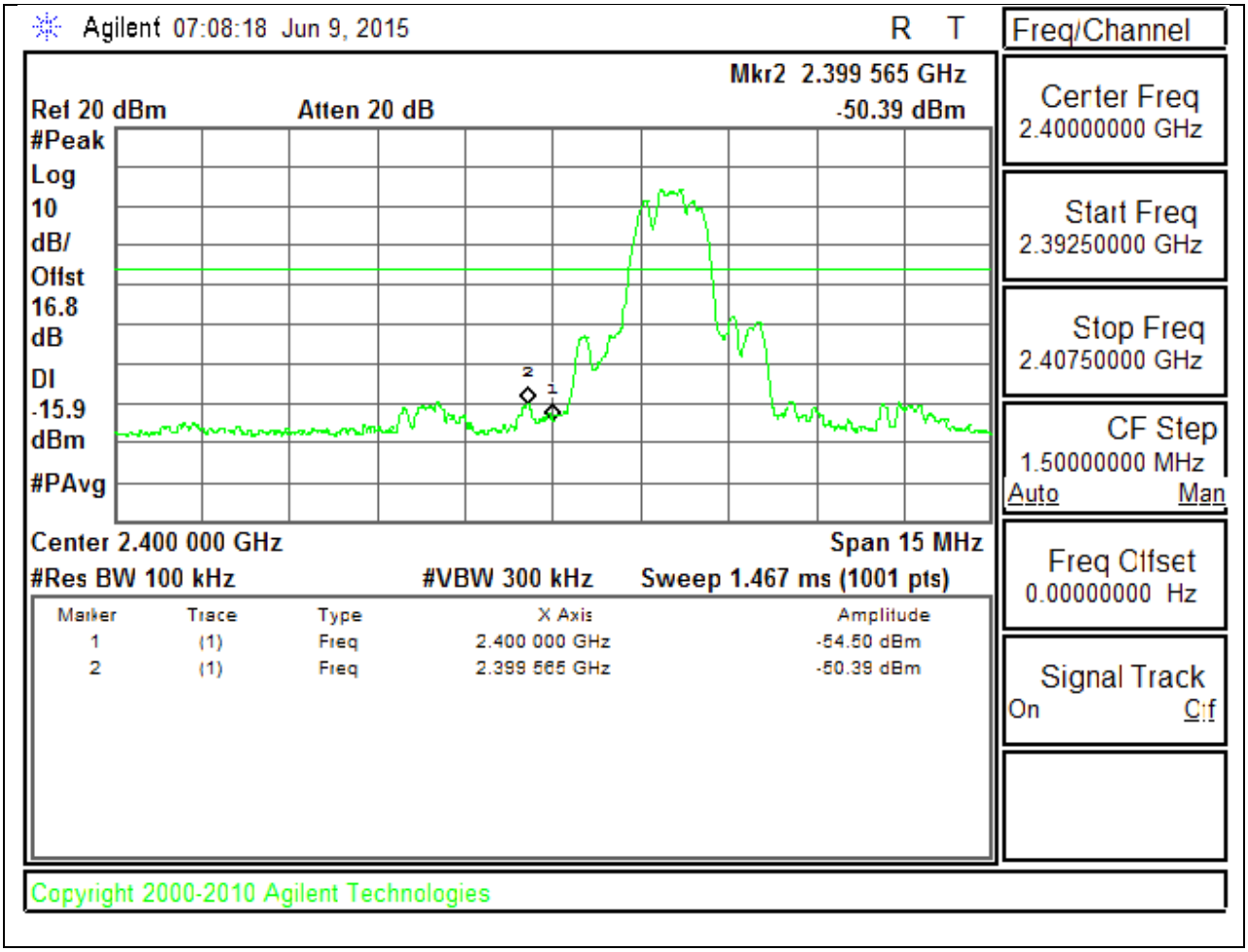


*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 8.7.2. ENHANCED DATA RATE 8PSK MODULATION

**SPURIOUS EMISSIONS, LOW CHANNEL**

### LOW CHANNEL BANDEDGE

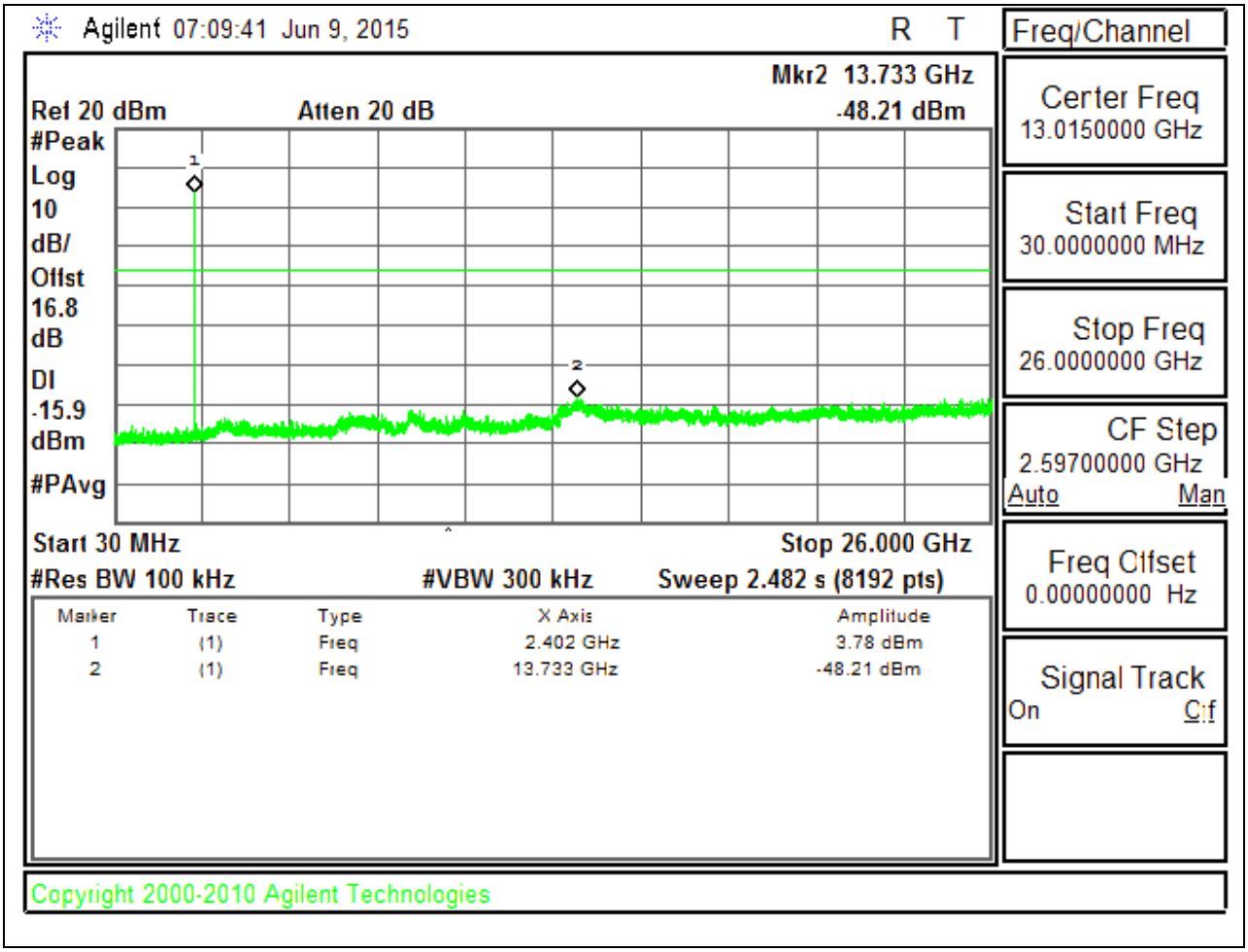






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## LOW CHANNEL SPURIOUS



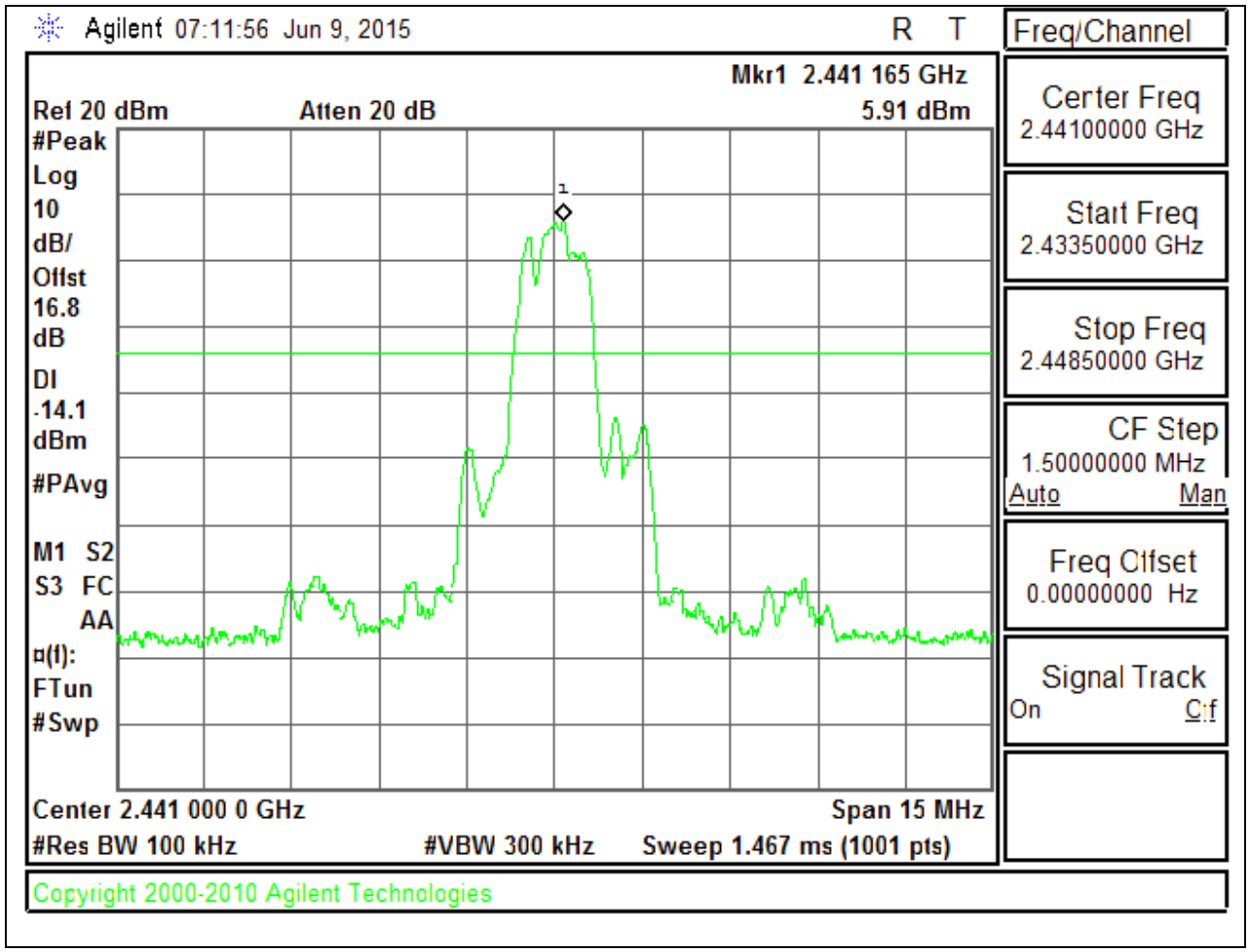




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS EMISSIONS, MID CHANNEL**

## MID CHANNEL BANDEDGE

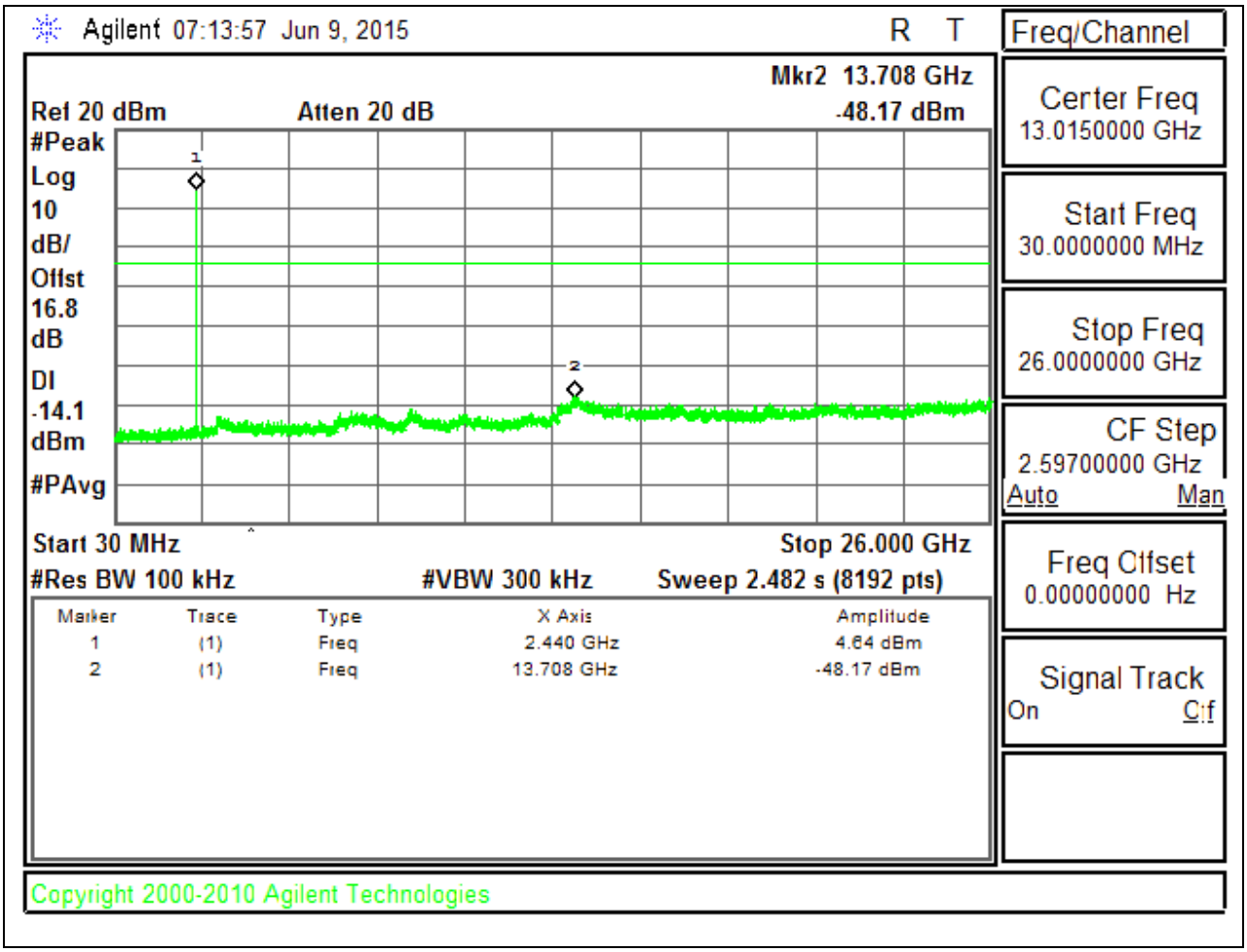






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL SPURIOUS



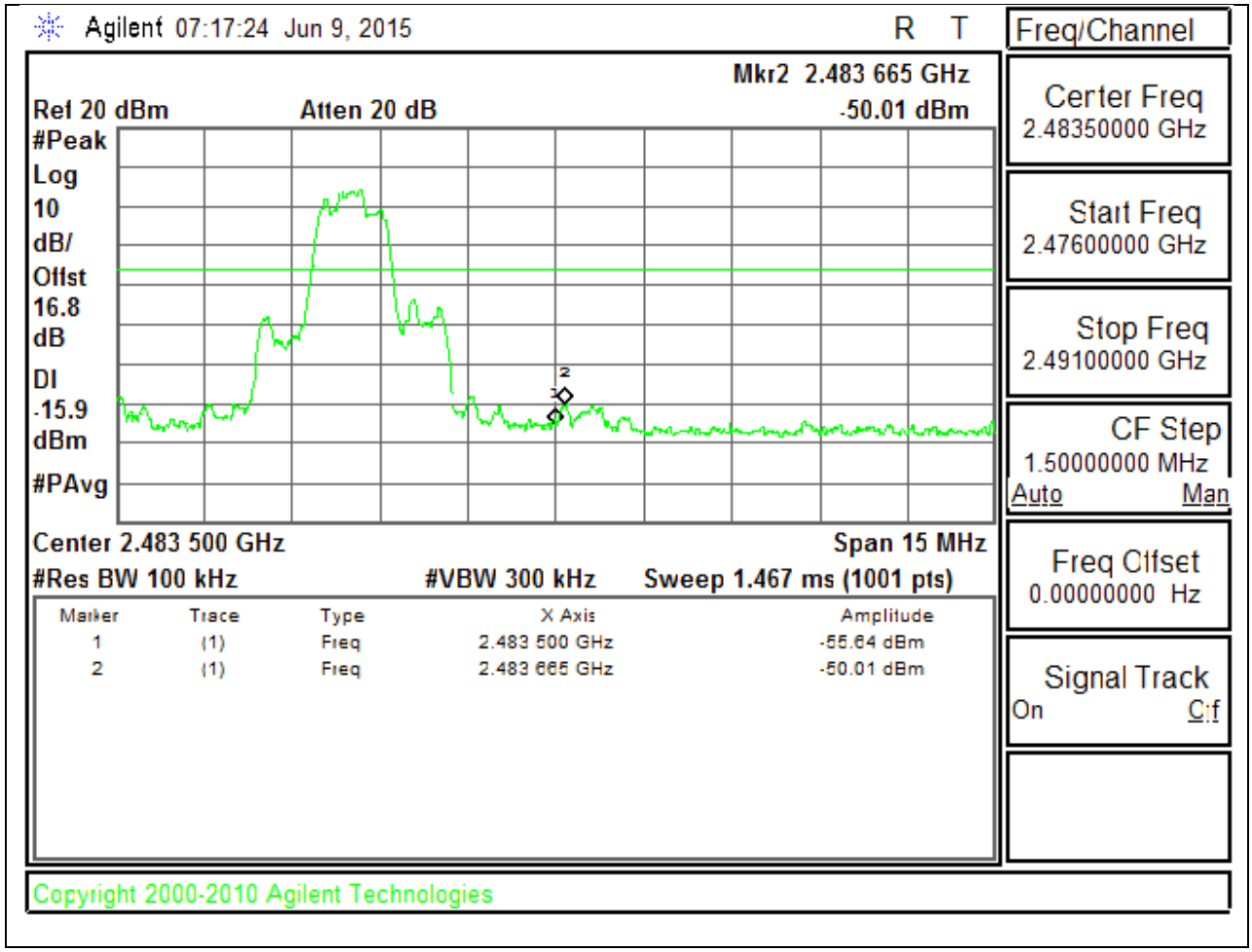




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS EMISSIONS, HIGH CHANNEL**

## HIGH CHANNEL BANDEDGE

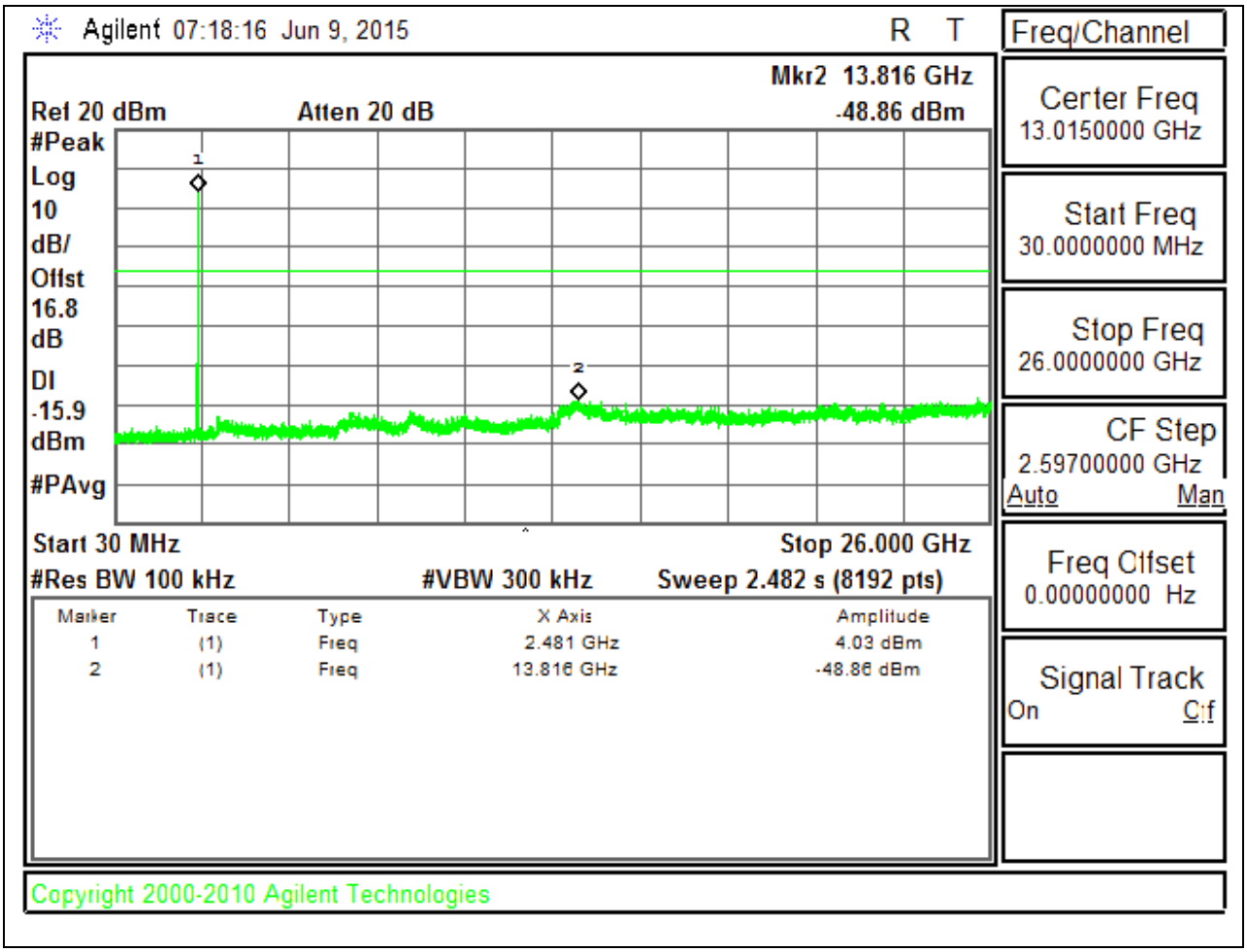






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH CHANNEL SPURIOUS



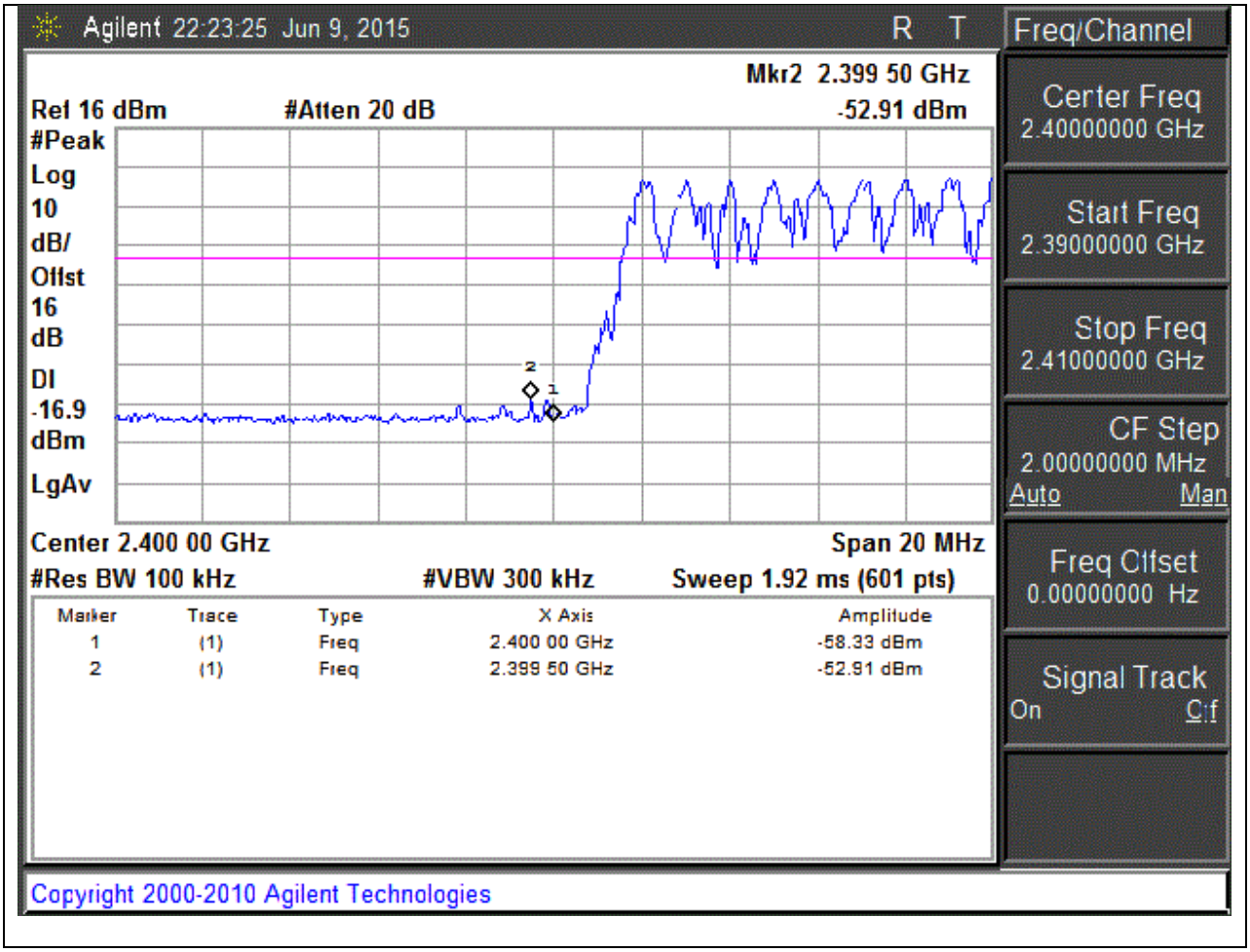




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

## LOW BANDEDGE WITH HOPPING ON

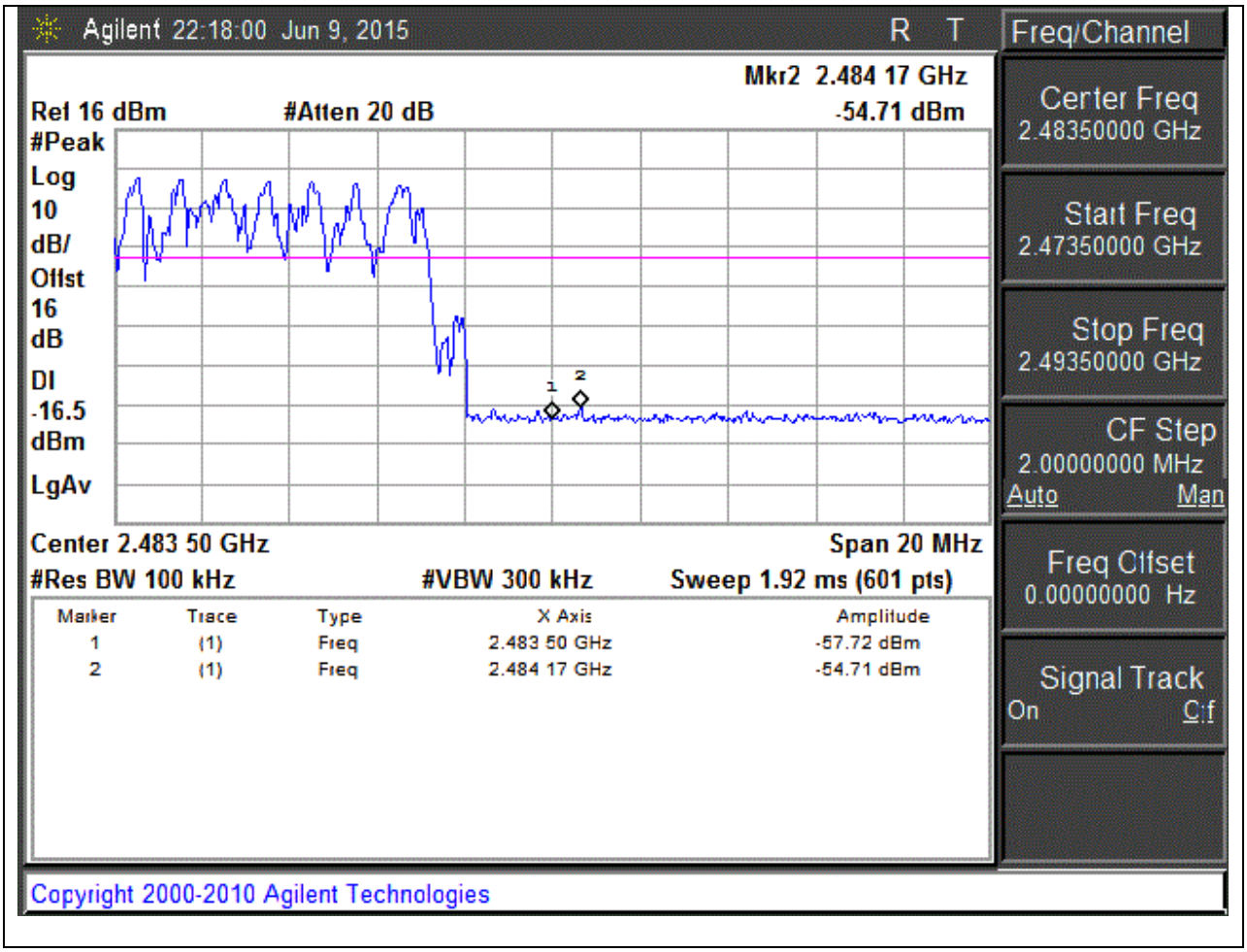






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH BANDEDGE WITH HOPPING ON







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 9. RADIATED TEST RESULTS

## 9.1. LIMITS AND PROCEDURE

**LIMITS**

FCC §15.205 and §15.209

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|---|---|---|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For band edge measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 1/T (on time) for average measurement.
GFSK = 1/T = 1 / 0.001632S = 620Hz.

The spectrum from 1GHzHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.



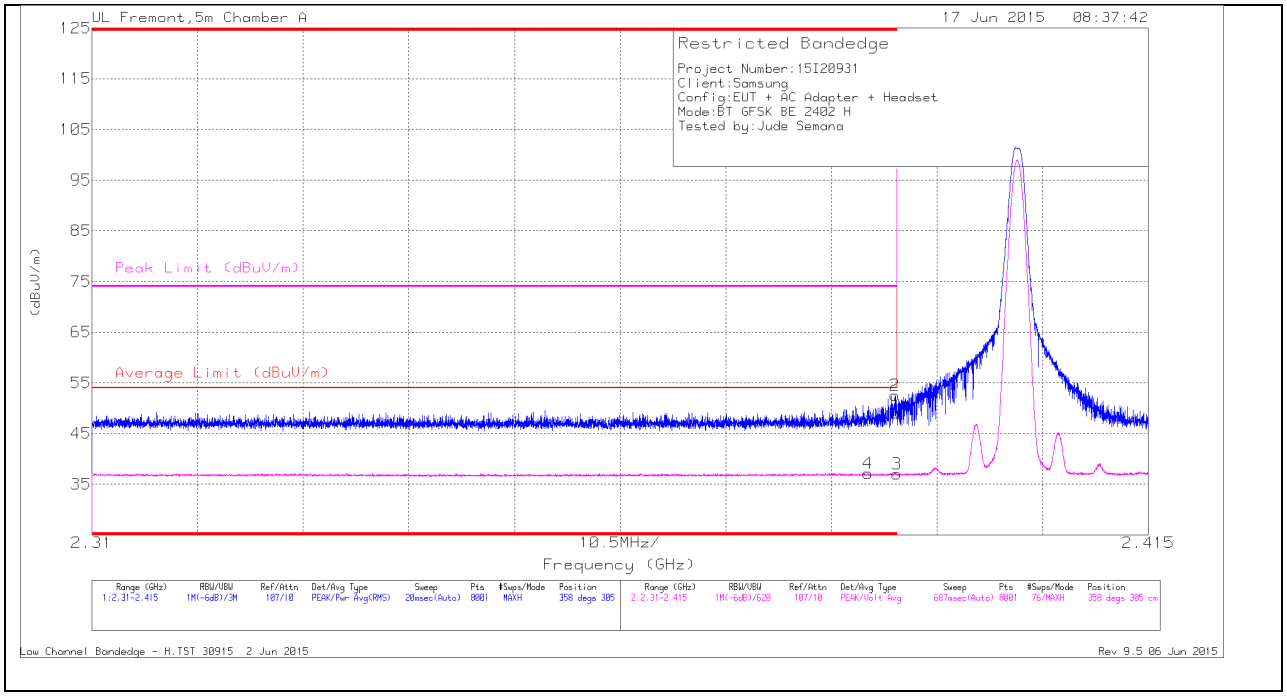

*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 9.2. TRANSMITTER ABOVE 1 GHz

## 9.2.1. BASIC DATA RATE GFSK MODULATION

## RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 42 | Pk | 32 | -24.9 | 49.1 | - | - | 74 | -24.9 | 358 | 305 | H |
| 2 | * 2.39 | 45.42 | Pk | 32 | -24.9 | 52.52 | - | - | 74 | -21.48 | 358 | 305 | H |
| 3 | * 2.39 | 29.85 | V1TV | 32 | -24.9 | 36.95 | 54 | -17.05 | - | - | 358 | 305 | H |
| 4 | * 2.387 | 30.08 | V1TV | 32 | -24.9 | 37.18 | 54 | -16.82 | - | - | 358 | 305 | H |

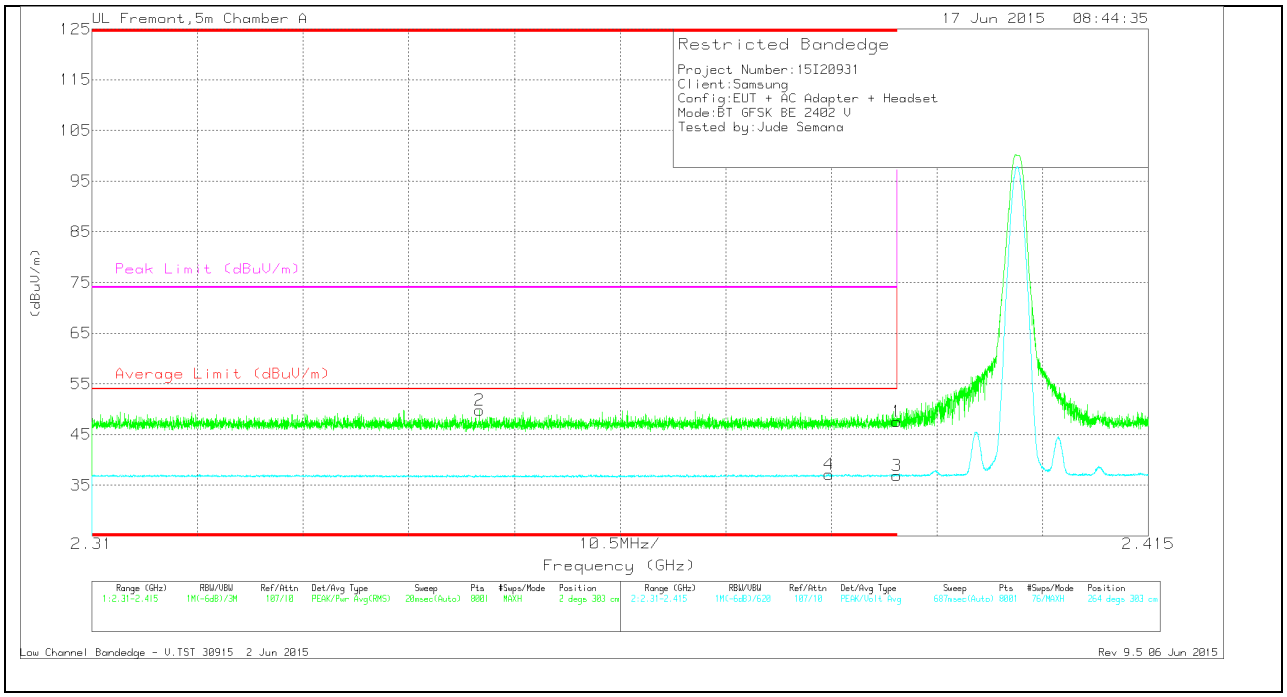
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.39 | 40.43 | Pk | 32 | -24.9 | 47.53 | - | - | 74 | -26.47 | 2 | 303 | V |
| 2 | * 2.349 | 42.8 | Pk | 31.9 | -24.9 | 49.8 | - | - | 74 | -24.2 | 2 | 303 | V |
| 3 | * 2.39 | 29.76 | V1TV | 32 | -24.9 | 36.86 | 54 | -17.14 | - | - | 264 | 303 | V |
| 4 | * 2.383 | 30.15 | V1TV | 31.9 | -24.9 | 37.15 | 54 | -16.85 | - | - | 264 | 303 | V |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

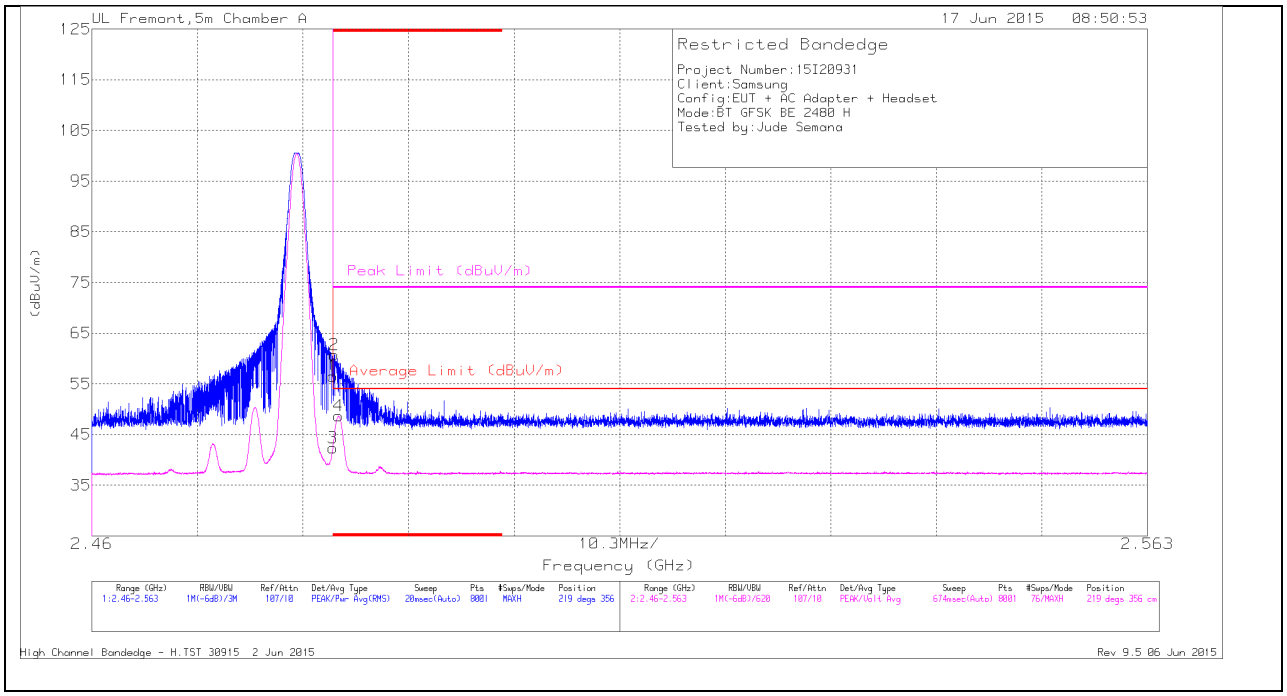
Pk - Peak detector




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# AUTHORIZED BANDEDGE (HIGH CHANNEL)

## HORIZONTAL PEAK AND AVERAGE PLOT




## HORIZONTAL DATA

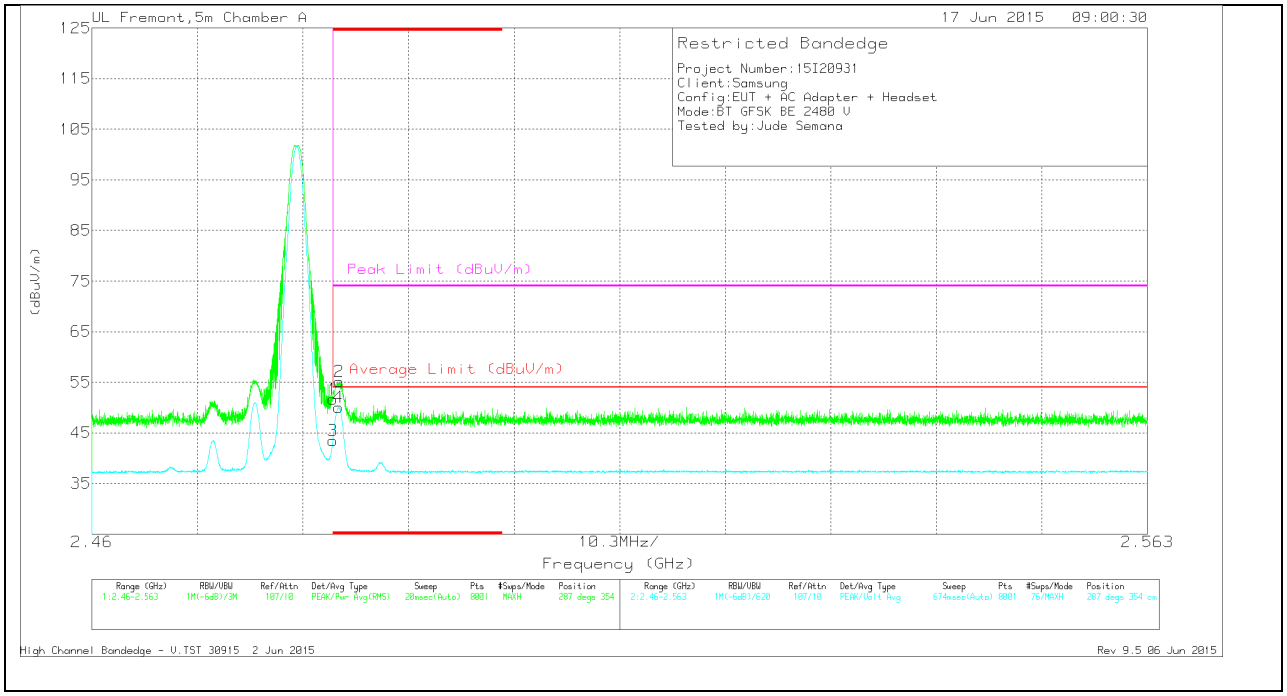
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 49.22 | Pk | 32.1 | -24.8 | 56.52 | - | - | 74 | -17.48 | 219 | 356 | H |
| 2 | * 2.484 | 53.44 | Pk | 32.1 | -24.8 | 60.74 | - | - | 74 | -13.26 | 219 | 356 | H |
| 3 | * 2.484 | 34.99 | V1TV | 32.1 | -24.8 | 42.29 | 54 | -11.71 | - | - | 219 | 356 | H |
| 4 | * 2.484 | 41.33 | V1TV | 32.1 | -24.8 | 48.63 | 54 | -5.37 | - | - | 219 | 356 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 44.36 | Pk | 32.1 | -24.8 | 51.66 | - | - | 74 | -22.34 | 287 | 354 | V |
| 2 | * 2.484 | 47.81 | Pk | 32.1 | -24.8 | 55.11 | - | - | 74 | -18.89 | 287 | 354 | V |
| 3 | * 2.484 | 36.11 | V1TV | 32.1 | -24.8 | 43.41 | 54 | -10.59 | - | - | 287 | 354 | V |
| 4 | * 2.484 | 42.69 | V1TV | 32.1 | -24.8 | 49.99 | 54 | -4.01 | - | - | 287 | 354 | V |

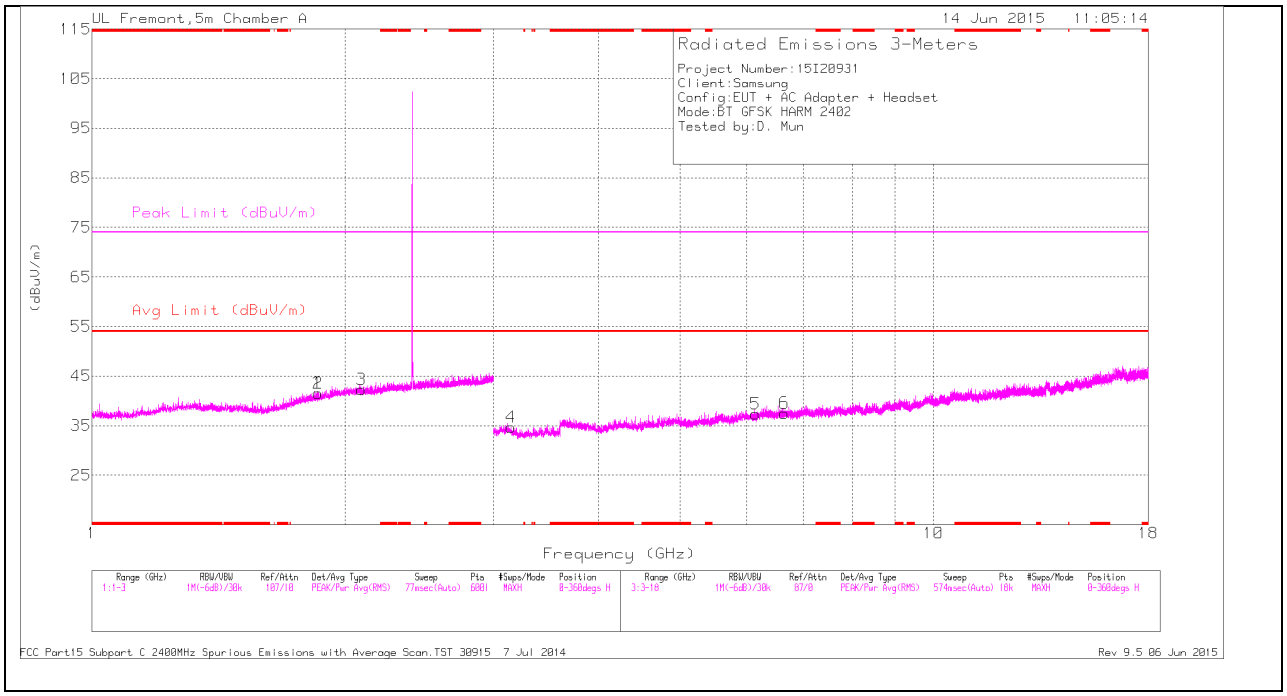
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL HORIZONTAL

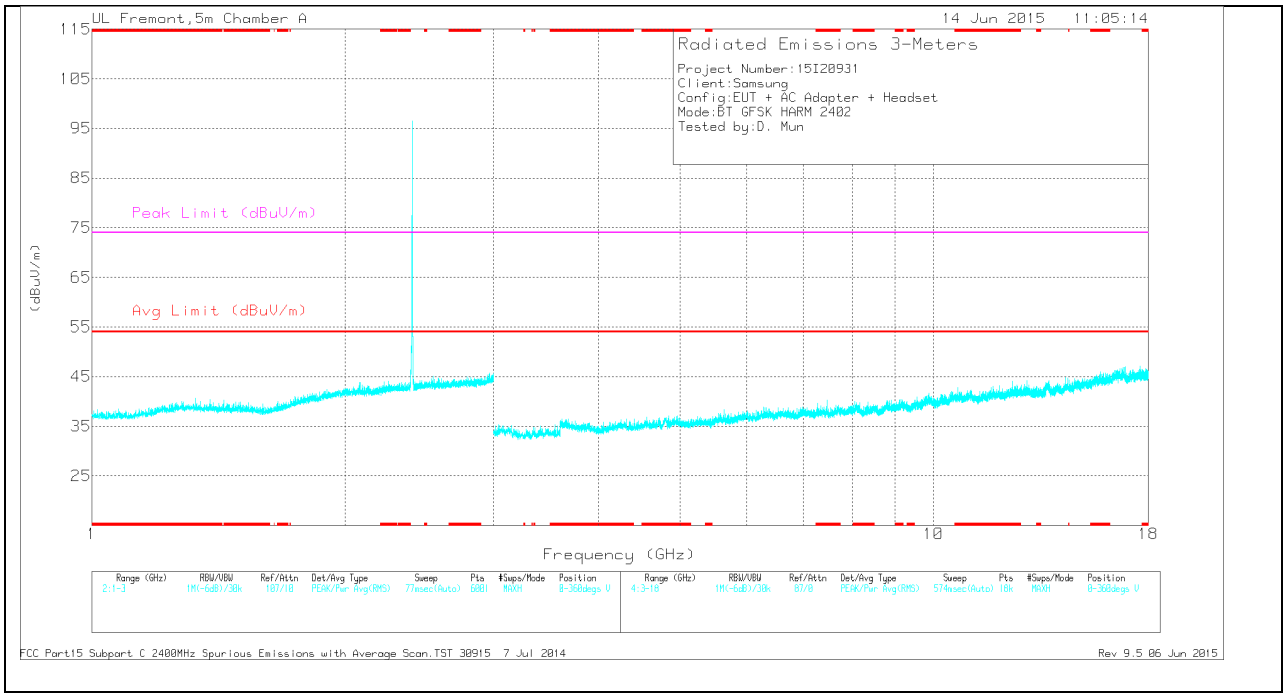



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**LOW CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## LOW CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.858 | 36.55 | Pk | 30.5 | -25.5 | 41.55 | - | - | 74 | -32.45 | 0-360 | 100 | H |
| 2 | 1.858 | 36.55 | Pk | 30.5 | -25.5 | 41.55 | - | - | 74 | -32.45 | 0-360 | 100 | H |
| 3 | 2.089 | 36.25 | Pk | 31.4 | -25.3 | 42.35 | - | - | 74 | -31.65 | 0-360 | 201 | H |
| 4 | 3.147 | 34.03 | Pk | 32.8 | -32.2 | 34.63 | - | - | 74 | -39.37 | 0-360 | 100 | H |
| 5 | 6.14 | 31.2 | Pk | 35.4 | -29.3 | 37.3 | - | - | 74 | -36.7 | 0-360 | 100 | H |
| 6 | 6.648 | 29.34 | Pk | 35.6 | -27.4 | 37.54 | - | - | 74 | -36.46 | 0-360 | 201 | H |

PK - Peak detector

*RADIATED EMISSIONS*

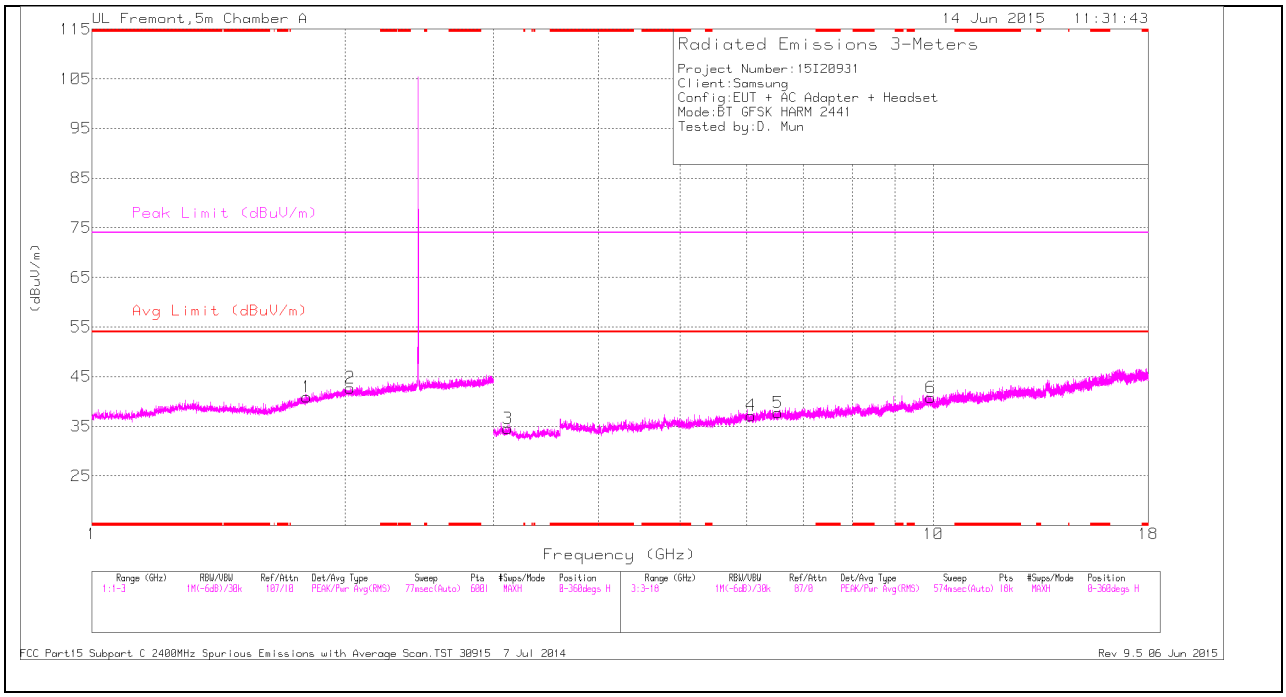
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.857 | 44.26 | PK2 | 30.5 | -25.5 | 49.26 | - | - | 74 | -24.74 | 1 | 100 | H |
| 1.857 | 44.75 | PK2 | 30.5 | -25.5 | 49.75 | - | - | 74 | -24.25 | 1 | 100 | H |
| 1.859 | 32.76 | V1TV | 30.5 | -25.5 | 37.76 | 54 | -16.24 | - | - | 1 | 100 | H |
| 1.859 | 32.79 | V1TV | 30.5 | -25.5 | 37.79 | 54 | -16.21 | - | - | 1 | 100 | H |
| 2.087 | 32.73 | V1TV | 31.4 | -25.3 | 38.83 | 54 | -15.17 | - | - | 1 | 202 | H |
| 2.09 | 44.51 | PK2 | 31.4 | -25.3 | 50.61 | - | - | 74 | -23.39 | 1 | 202 | H |
| 3.148 | 42.21 | PK2 | 32.8 | -32.3 | 42.71 | - | - | 74 | -31.29 | 1 | 100 | H |
| 3.148 | 30.89 | V1TV | 32.8 | -32.2 | 31.49 | 54 | -22.51 | - | - | 1 | 100 | H |
| 6.138 | 28.02 | V1TV | 35.4 | -29.3 | 34.12 | 54 | -19.88 | - | - | 1 | 100 | H |
| 6.139 | 39.21 | PK2 | 35.4 | -29.3 | 45.31 | - | - | 74 | -28.69 | 1 | 100 | H |
| 6.649 | 37.74 | PK2 | 35.6 | -27.4 | 45.94 | - | - | 74 | -28.06 | 1 | 202 | H |
| 6.65 | 26.55 | V1TV | 35.6 | -27.4 | 34.75 | 54 | -19.25 | - | - | 1 | 202 | H |

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL HORIZONTAL**

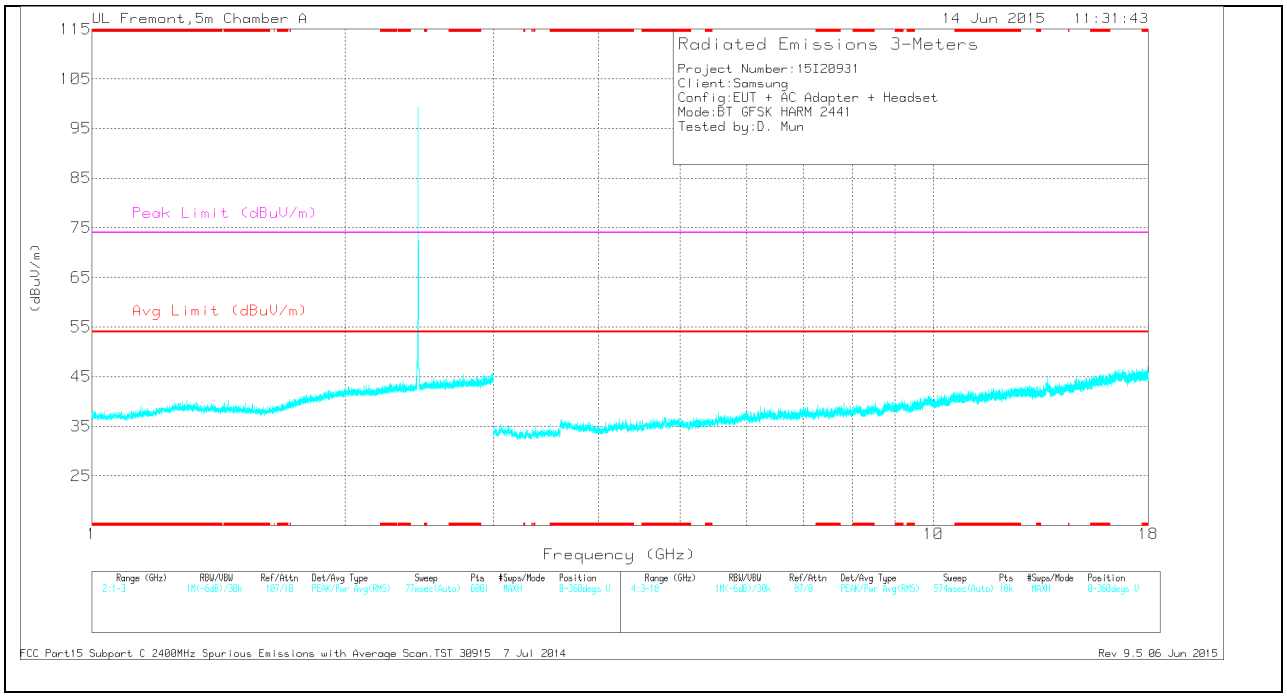



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.801 | 36.41 | Pk | 30 | -25.5 | 40.91 | - | - | 74 | -33.09 | 0-360 | 100 | H |
| 2 | 2.028 | 36.84 | Pk | 31.2 | -25.3 | 42.74 | - | - | 74 | -31.26 | 0-360 | 100 | H |
| 3 | 3.119 | 33.51 | Pk | 32.9 | -31.9 | 34.51 | - | - | 74 | -39.49 | 0-360 | 201 | H |
| 4 | 6.067 | 30.96 | Pk | 35.4 | -29.2 | 37.16 | - | - | 74 | -36.84 | 0-360 | 100 | H |
| 5 | 6.541 | 30.37 | Pk | 35.6 | -28.2 | 37.77 | - | - | 74 | -36.23 | 0-360 | 100 | H |
| 6 | 9.923 | 27.23 | Pk | 37 | -23.4 | 40.83 | - | - | 74 | -33.17 | 0-360 | 201 | H |

PK - Peak detector

*RADIATED EMISSIONS*

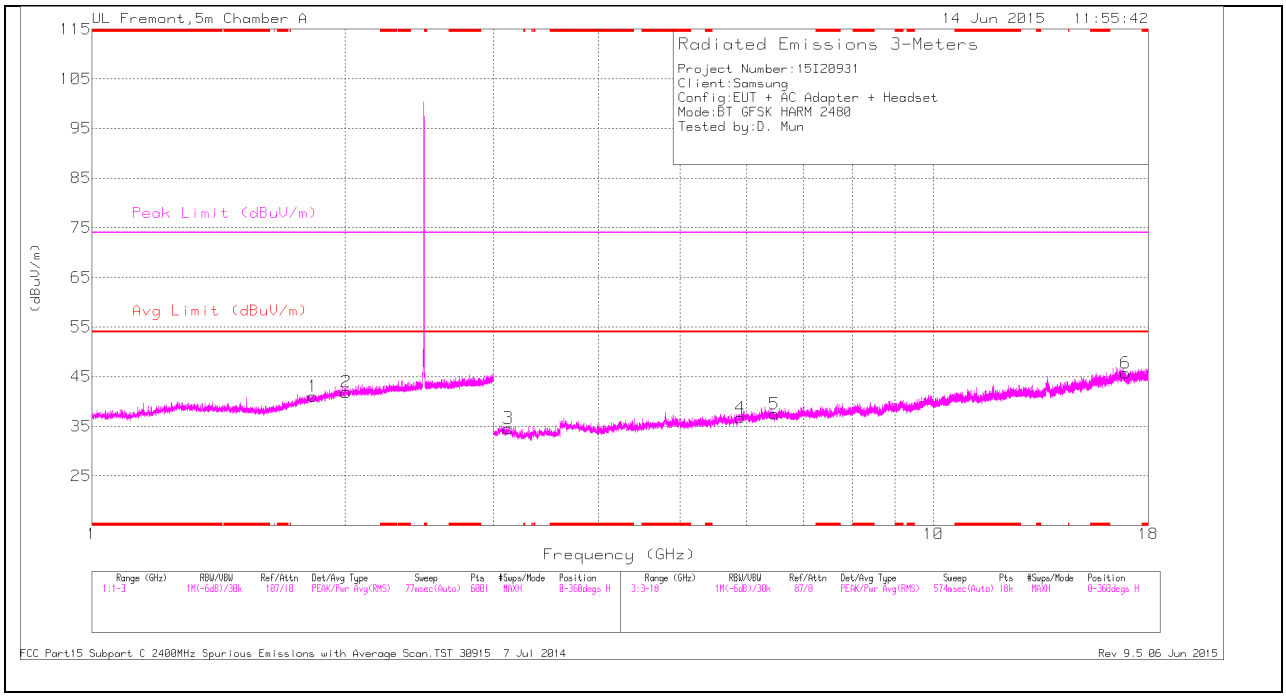
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.8 | 32.98 | V1TV | 30 | -25.5 | 37.48 | 54 | -16.52 | - | - | 1 | 100 | H |
| 1.802 | 45.04 | PK2 | 30 | -25.5 | 49.54 | - | - | 74 | -24.46 | 1 | 100 | H |
| 2.027 | 32.97 | V1TV | 31.2 | -25.3 | 38.87 | 54 | -15.13 | - | - | 1 | 100 | H |
| 2.028 | 44.56 | PK2 | 31.2 | -25.3 | 50.46 | - | - | 74 | -23.54 | 1 | 100 | H |
| 3.118 | 42.24 | PK2 | 32.9 | -31.9 | 43.24 | - | - | 74 | -30.76 | 1 | 202 | H |
| 3.121 | 30.79 | V1TV | 32.9 | -31.9 | 31.79 | 54 | -22.21 | - | - | 1 | 202 | H |
| 6.067 | 39.07 | PK2 | 35.4 | -29.2 | 45.27 | - | - | 74 | -28.73 | 1 | 100 | H |
| 6.068 | 28.17 | V1TV | 35.4 | -29.2 | 34.37 | 54 | -19.63 | - | - | 1 | 100 | H |
| 6.539 | 27.82 | V1TV | 35.6 | -28.3 | 35.12 | 54 | -18.88 | - | - | 1 | 100 | H |
| 6.541 | 39.21 | PK2 | 35.6 | -28.2 | 46.61 | - | - | 74 | -27.39 | 1 | 100 | H |
| 9.923 | 35.39 | PK2 | 37 | -23.4 | 48.99 | - | - | 74 | -25.01 | 1 | 202 | H |
| 9.925 | 23.91 | V1TV | 37 | -23.4 | 37.51 | 54 | -16.49 | - | - | 1 | 202 | H |

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL HORIZONTAL**

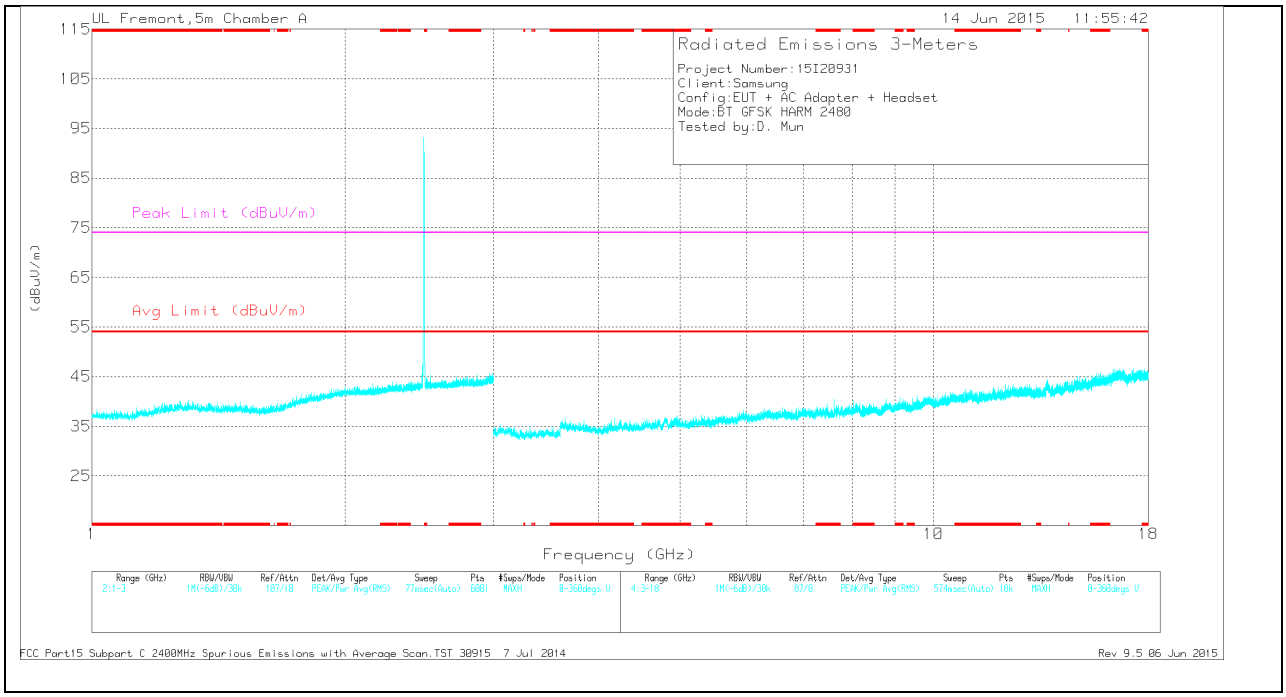



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.83 | 36.31 | Pk | 30.2 | -25.5 | 41.01 | - | - | 74 | -32.99 | 0-360 | 100 | H |
| 2 | 2.004 | 36.06 | Pk | 31.1 | -25.3 | 41.86 | - | - | 74 | -32.14 | 0-360 | 100 | H |
| 3 | 3.123 | 33.62 | Pk | 32.9 | -31.9 | 34.62 | - | - | 74 | -39.38 | 0-360 | 100 | H |
| 4 | 5.899 | 30.43 | Pk | 35.2 | -28.9 | 36.73 | - | - | 74 | -37.27 | 0-360 | 201 | H |
| 5 | 6.473 | 30.72 | Pk | 35.5 | -28.8 | 37.42 | - | - | 74 | -36.58 | 0-360 | 100 | H |
| 6 | 16.915 | 27.3 | Pk | 41.4 | -23 | 45.7 | - | - | 74 | -28.3 | 0-360 | 100 | H |

PK - Peak detector

*RADIATED EMISSIONS*

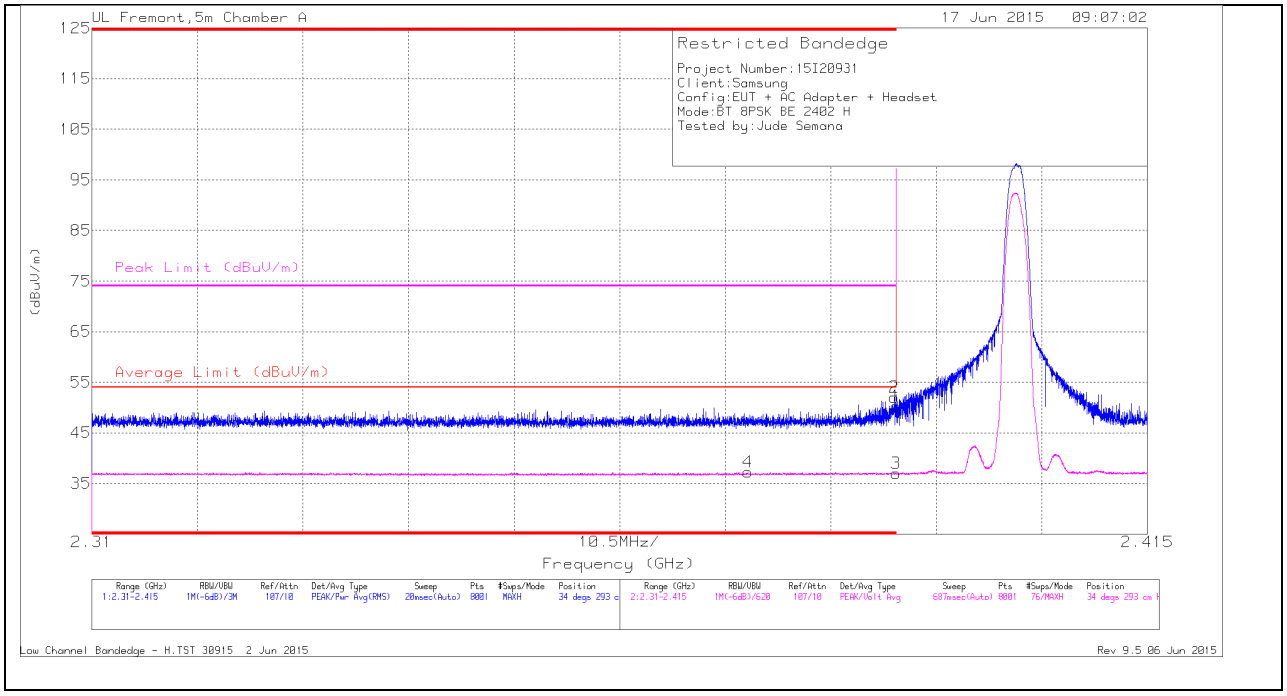
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.828 | 44.33 | PK2 | 30.2 | -25.5 | 49.03 | - | - | 74 | -24.97 | 1 | 100 | H |
| 1.828 | 32.96 | V1TV | 30.2 | -25.5 | 37.66 | 54 | -16.34 | - | - | 1 | 100 | H |
| 2.005 | 44.87 | PK2 | 31.2 | -25.3 | 50.77 | - | - | 74 | -23.23 | 1 | 100 | H |
| 2.005 | 33.06 | V1TV | 31.1 | -25.3 | 38.86 | 54 | -15.14 | - | - | 1 | 100 | H |
| 3.124 | 30.99 | V1TV | 32.9 | -31.9 | 31.99 | 54 | -22.01 | - | - | 1 | 100 | H |
| 3.125 | 42.45 | PK2 | 32.9 | -31.9 | 43.45 | - | - | 74 | -30.55 | 1 | 100 | H |
| 5.898 | 39.35 | PK2 | 35.2 | -28.9 | 45.65 | - | - | 74 | -28.35 | 1 | 202 | H |
| 5.899 | 28.02 | V1TV | 35.2 | -28.9 | 34.32 | 54 | -19.68 | - | - | 1 | 202 | H |
| 6.471 | 27.96 | V1TV | 35.5 | -28.8 | 34.66 | 54 | -19.34 | - | - | 1 | 100 | H |
| 6.475 | 39.83 | PK2 | 35.5 | -28.8 | 46.53 | - | - | 74 | -27.47 | 1 | 100 | H |
| 16.913 | 24.31 | V1TV | 41.4 | -23 | 42.71 | 54 | -11.29 | - | - | 1 | 100 | H |
| 16.914 | 35.48 | PK2 | 41.4 | -23 | 53.88 | - | - | 74 | -20.12 | 1 | 100 | H |




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 9.2.2. ENHANCED DATA RATE 8PSK MODULATION
## RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT




### HORIZONTAL DATA

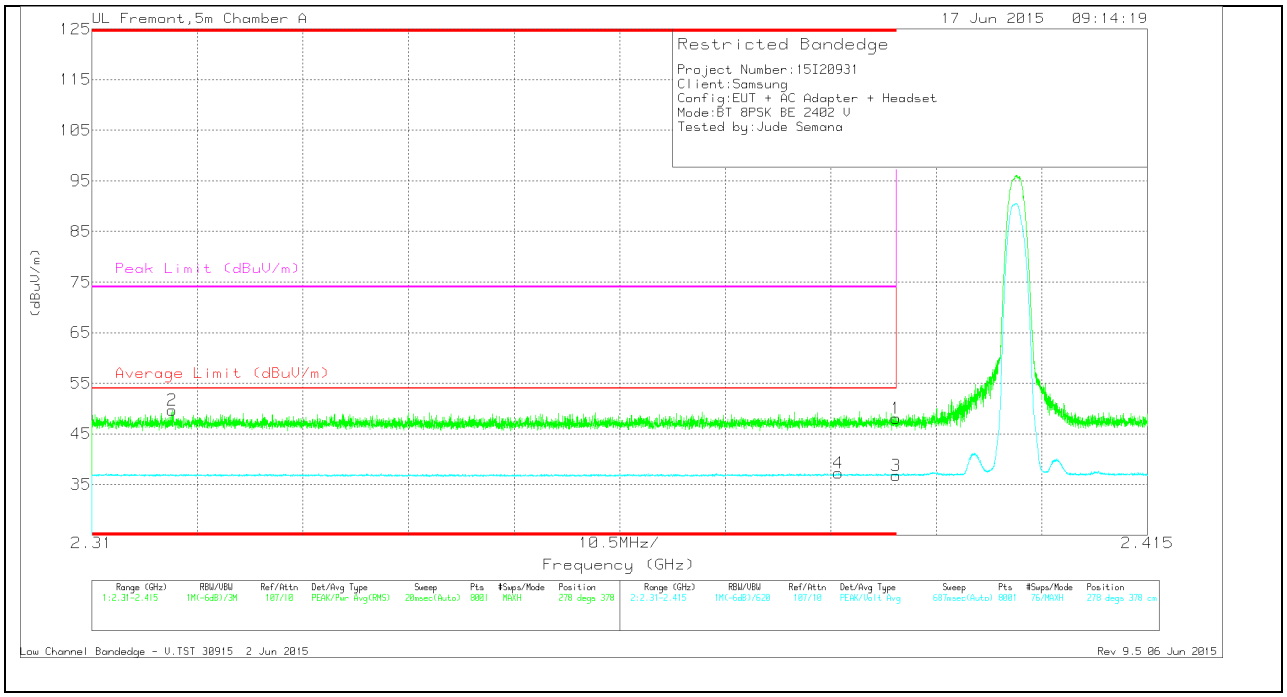
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | * 2.375 | 30.3 | V1TV | 31.9 | -24.9 | 37.3 | 54 | -16.7 | - | - | 34 | 293 | H |
| 1 | * 2.39 | 43.22 | Pk | 32 | -24.9 | 50.32 | - | - | 74 | -23.68 | 34 | 293 | H |
| 2 | * 2.39 | 44.92 | Pk | 32 | -24.9 | 52.02 | - | - | 74 | -21.98 | 34 | 293 | H |
| 3 | * 2.39 | 29.86 | V1TV | 32 | -24.9 | 36.96 | 54 | -17.04 | - | - | 34 | 293 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | * 2.318 | 42.62 | Pk | 31.9 | -24.9 | 49.62 | - | - | 74 | -24.38 | 278 | 378 | V |
| 4 | * 2.384 | 30.21 | V1TV | 31.9 | -24.9 | 37.21 | 54 | -16.79 | - | - | 278 | 378 | V |
| 1 | * 2.39 | 40.94 | Pk | 32 | -24.9 | 48.04 | - | - | 74 | -25.96 | 278 | 378 | V |
| 3 | * 2.39 | 29.67 | V1TV | 32 | -24.9 | 36.77 | 54 | -17.23 | - | - | 278 | 378 | V |

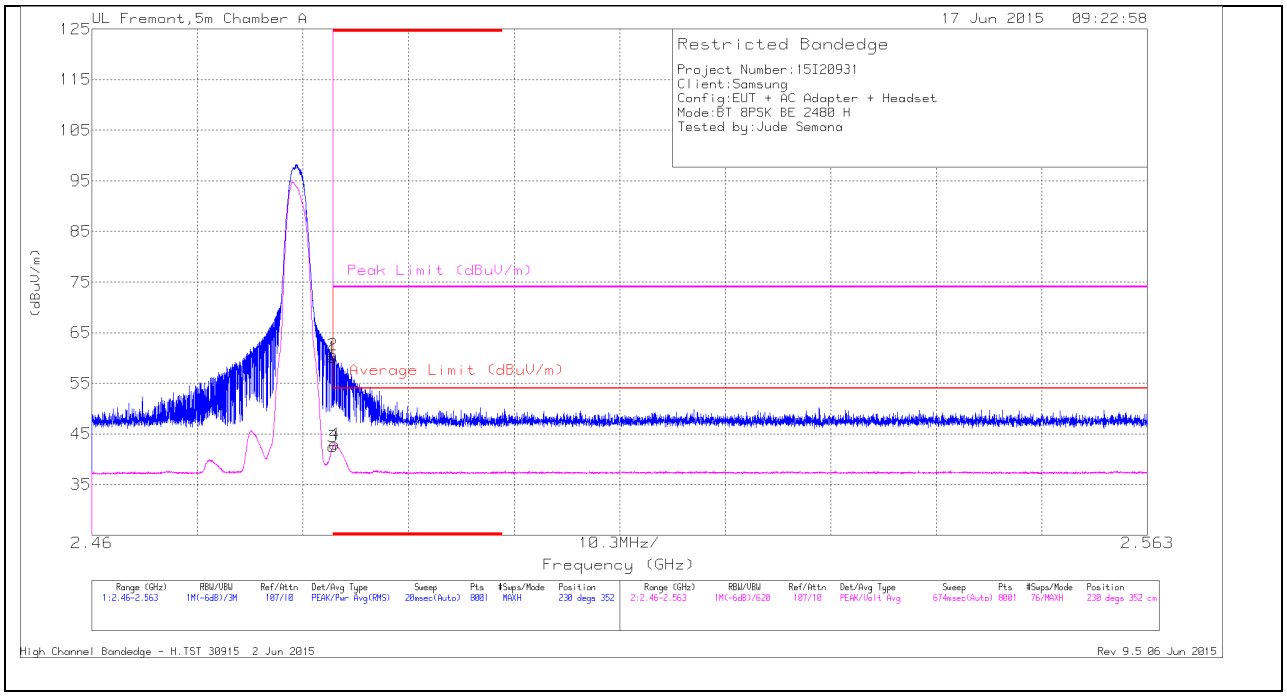
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# AUTHORIZED BANDEDGE (HIGH CHANNEL)

## HORIZONTAL PEAK AND AVERAGE PLOT




## HORIZONTAL DATA

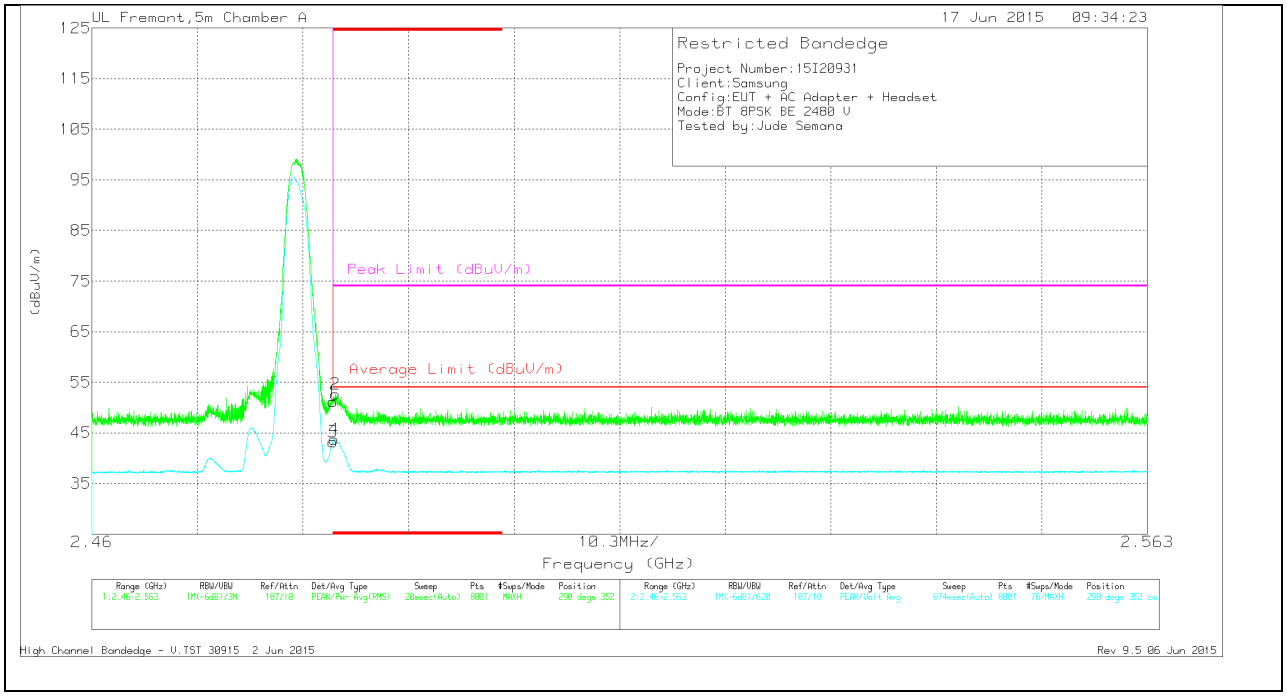
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 52.79 | Pk | 32.1 | -24.8 | 60.09 | - | - | 74 | -13.91 | 230 | 352 | H |
| 2 | * 2.484 | 53.24 | Pk | 32.1 | -24.8 | 60.54 | - | - | 74 | -13.46 | 230 | 352 | H |
| 3 | * 2.484 | 35.16 | V1TV | 32.1 | -24.8 | 42.46 | 54 | -11.54 | - | - | 230 | 352 | H |
| 4 | * 2.484 | 35.64 | V1TV | 32.1 | -24.8 | 42.94 | 54 | -11.06 | - | - | 230 | 352 | H |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## VERTICAL PEAK AND AVERAGE PLOT




## VERTICAL DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.484 | 43.82 | Pk | 32.1 | -24.8 | 51.12 | - | - | 74 | -22.88 | 290 | 352 | V |
| 2 | * 2.484 | 45.35 | Pk | 32.1 | -24.8 | 52.65 | - | - | 74 | -21.35 | 290 | 352 | V |
| 3 | * 2.484 | 35.94 | V1TV | 32.1 | -24.8 | 43.24 | 54 | -10.74 | - | - | 290 | 352 | V |
| 4 | * 2.484 | 36.42 | V1TV | 32.1 | -24.8 | 43.72 | 54 | -10.28 | - | - | 290 | 352 | V |

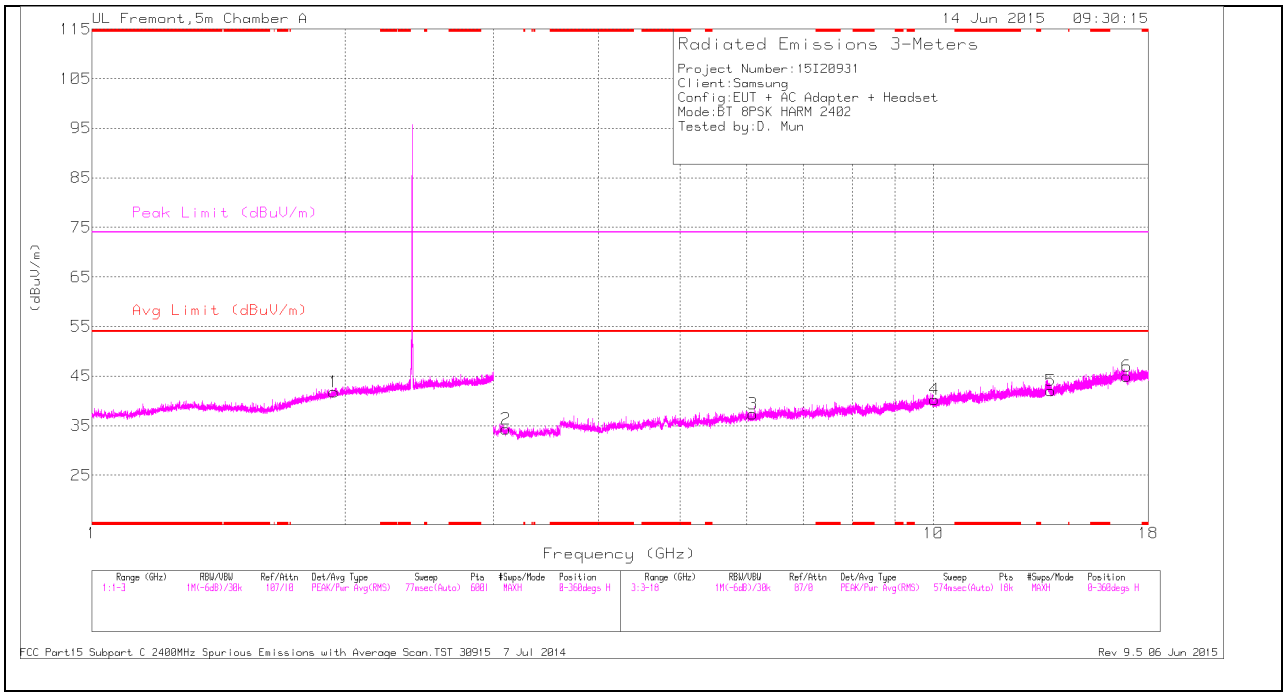
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL HORIZONTAL

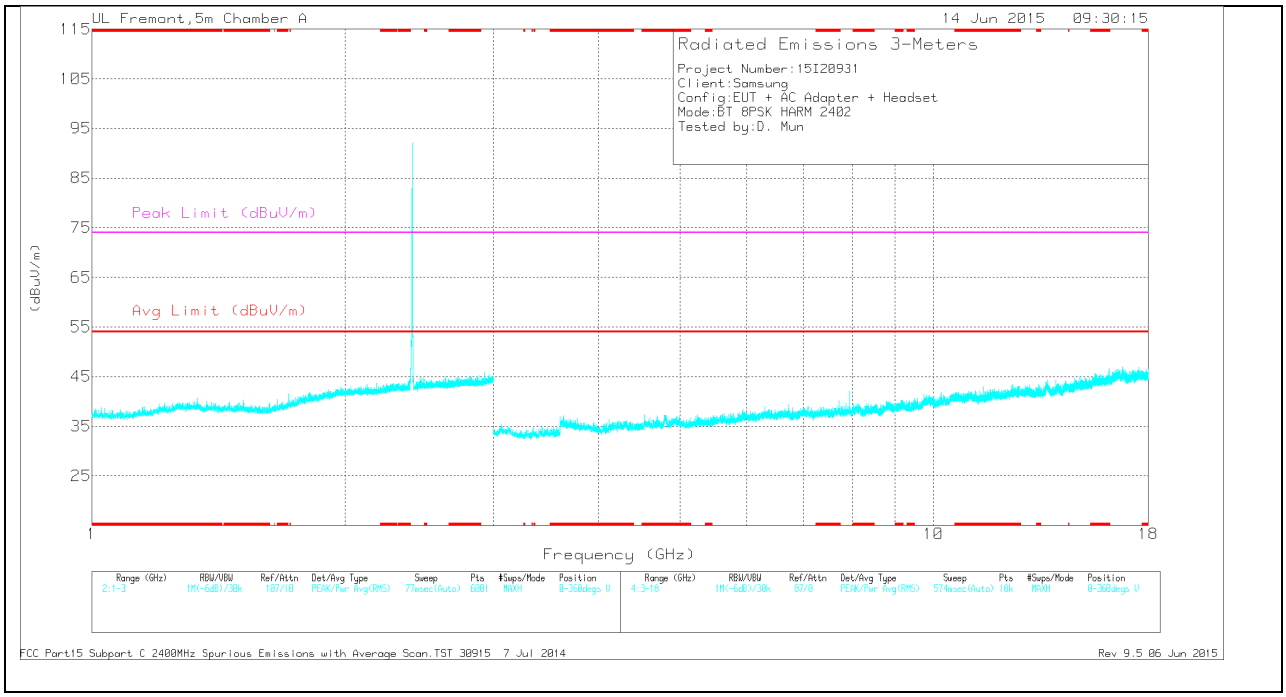



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**LOW CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## LOW CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.94 | 36.3 | Pk | 30.9 | -25.4 | 41.8 | - | - | 74 | -32.2 | 0-360 | 201 | H |
| 2 | 3.102 | 33.46 | Pk | 32.9 | -32 | 34.36 | - | - | 74 | -39.64 | 0-360 | 201 | H |
| 3 | 6.098 | 31.21 | Pk | 35.4 | -29.3 | 37.31 | - | - | 74 | -36.69 | 0-360 | 100 | H |
| 4 | 10.031 | 27.32 | Pk | 37.1 | -24.1 | 40.32 | - | - | 74 | -33.68 | 0-360 | 100 | H |
| 5 | 13.786 | 27.02 | Pk | 38.7 | -23.7 | 42.02 | - | - | 74 | -31.98 | 0-360 | 201 | H |
| 6 | 16.971 | 27.21 | Pk | 41.4 | -23.7 | 44.91 | - | - | 74 | -29.09 | 0-360 | 100 | H |

PK - Peak detector

*RADIATED EMISSIONS*

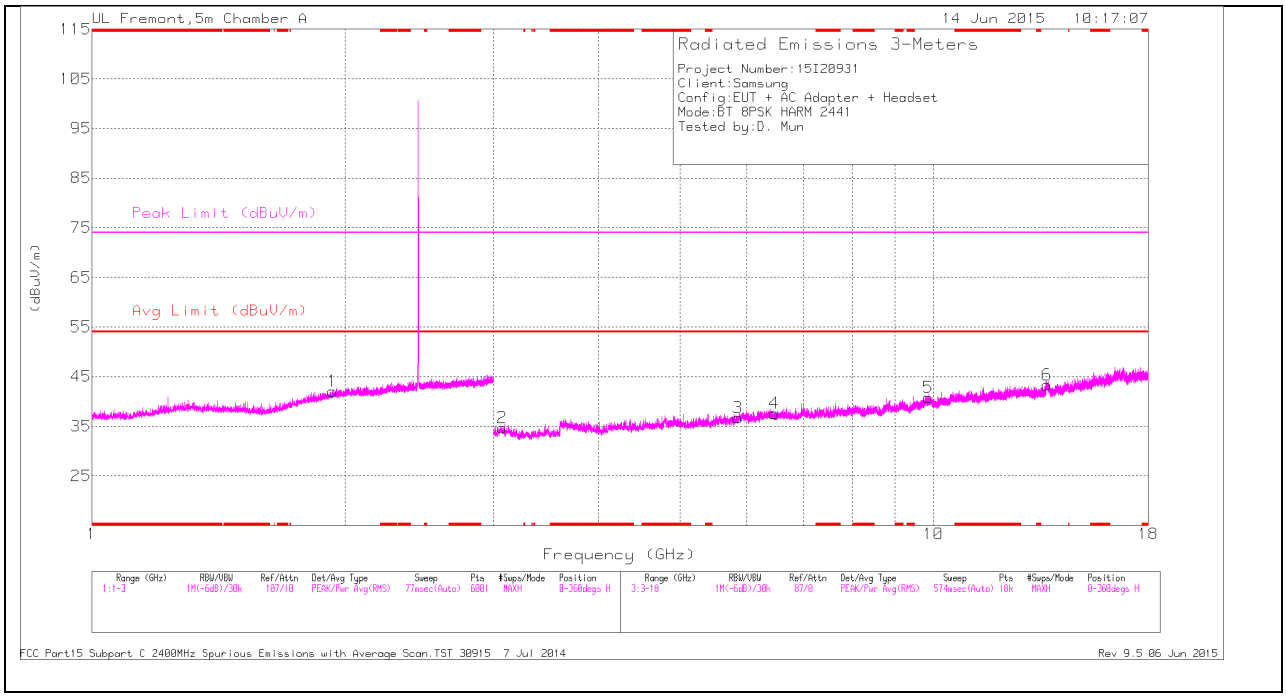
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.939 | 32.97 | V1TV | 30.9 | -25.4 | 38.47 | 54 | -15.53 | - | - | 0 | 202 | H |
| 1.941 | 44.88 | PK2 | 30.9 | -25.4 | 50.38 | - | - | 74 | -23.62 | 0 | 202 | H |
| 3.102 | 41.99 | PK2 | 32.9 | -32 | 42.89 | - | - | 74 | -31.11 | 0 | 202 | H |
| 3.102 | 30.47 | V1TV | 32.9 | -32 | 31.37 | 54 | -22.63 | - | - | 0 | 202 | H |
| 6.096 | 40.11 | PK2 | 35.4 | -29.3 | 46.21 | - | - | 74 | -27.79 | 0 | 100 | H |
| 6.1 | 28.12 | V1TV | 35.4 | -29.3 | 34.22 | 54 | -19.78 | - | - | 0 | 100 | H |
| 10.03 | 35.13 | PK2 | 37.1 | -24.1 | 48.13 | - | - | 74 | -25.87 | 0 | 100 | H |
| 10.03 | 23.94 | V1TV | 37.1 | -24.1 | 36.94 | 54 | -17.06 | - | - | 0 | 100 | H |
| 13.785 | 35.08 | PK2 | 38.7 | -23.7 | 50.08 | - | - | 74 | -23.92 | 0 | 202 | H |
| 13.785 | 24.06 | V1TV | 38.7 | -23.7 | 39.06 | 54 | -14.94 | - | - | 0 | 202 | H |
| 16.969 | 36.48 | PK2 | 41.4 | -23.7 | 54.18 | - | - | 74 | -19.82 | 0 | 100 | H |
| 16.971 | 24.63 | V1TV | 41.4 | -23.7 | 42.33 | 54 | -11.67 | - | - | 0 | 100 | H |

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL HORIZONTAL**

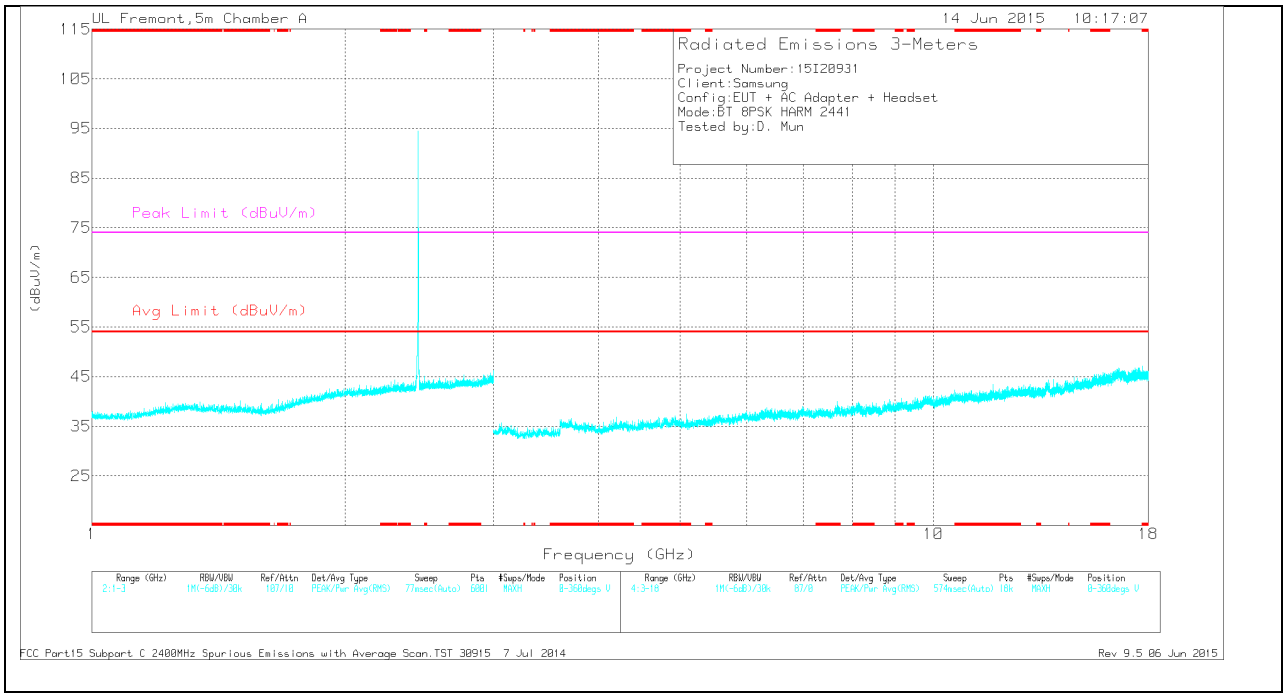



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**MID CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## MID CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.932 | 36.54 | Pk | 30.9 | -25.4 | 42.04 | - | - | 74 | -31.96 | 0-360 | 100 | H |
| 2 | 3.071 | 33.76 | Pk | 32.9 | -32 | 34.66 | - | - | 74 | -39.34 | 0-360 | 201 | H |
| 3 | 5.856 | 31.07 | Pk | 35.1 | -29.5 | 36.67 | - | - | 74 | -37.33 | 0-360 | 201 | H |
| 4 | 6.468 | 30.88 | Pk | 35.5 | -28.8 | 37.58 | - | - | 74 | -36.42 | 0-360 | 201 | H |
| 5 | 9.862 | 27.18 | Pk | 37 | -23.4 | 40.78 | - | - | 74 | -33.22 | 0-360 | 201 | H |
| 6 | 13.64 | 27.24 | Pk | 38.8 | -22.7 | 43.34 | - | - | 74 | -30.66 | 0-360 | 201 | H |

PK - Peak detector

*RADIATED EMISSIONS*

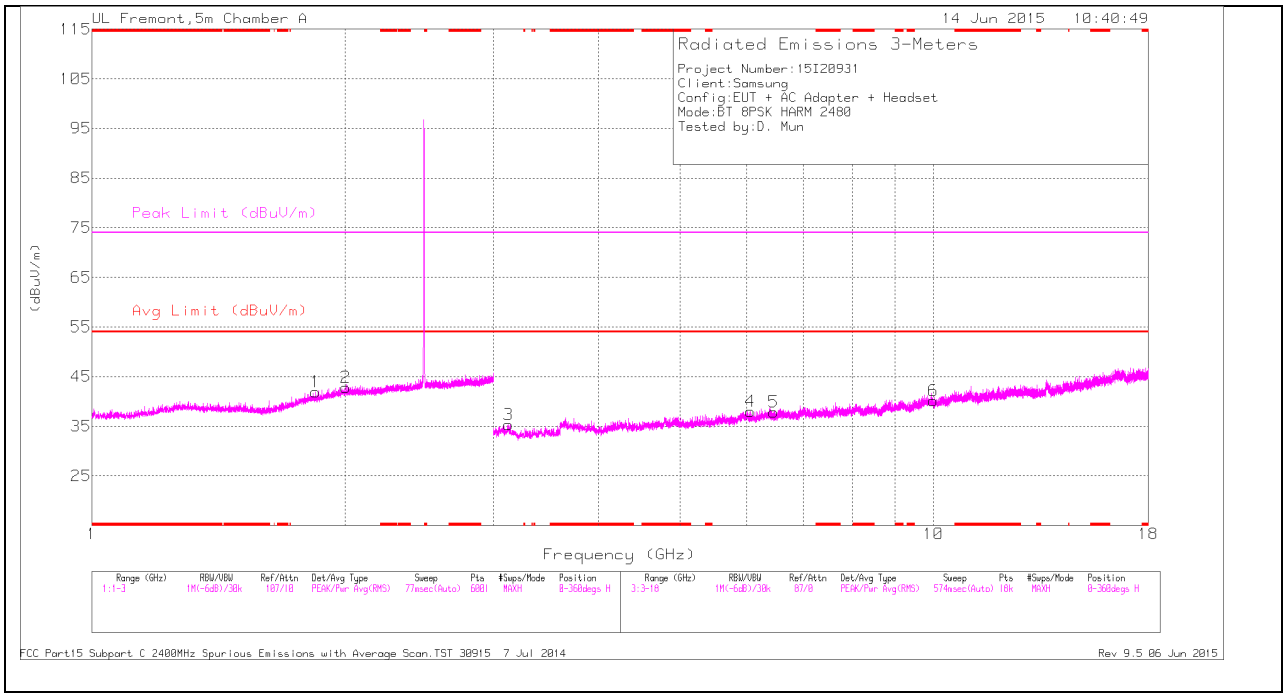
| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.931 | 45.87 | PK2 | 30.9 | -25.4 | 51.37 | - | - | 74 | -22.63 | 1 | 100 | H |
| 1.933 | 32.97 | V1TV | 30.9 | -25.4 | 38.47 | 54 | -15.53 | - | - | 1 | 100 | H |
| 3.07 | 30.96 | V1TV | 32.9 | -32 | 31.86 | 54 | -22.14 | - | - | 1 | 202 | H |
| 3.071 | 42.18 | PK2 | 32.9 | -32 | 43.08 | - | - | 74 | -30.92 | 1 | 202 | H |
| 5.855 | 28.62 | V1TV | 35.1 | -29.5 | 34.22 | 54 | -19.78 | - | - | 1 | 202 | H |
| 5.857 | 39.66 | PK2 | 35.1 | -29.5 | 45.26 | - | - | 74 | -28.74 | 1 | 202 | H |
| 6.468 | 27.97 | V1TV | 35.5 | -28.8 | 34.67 | 54 | -19.33 | - | - | 1 | 202 | H |
| 6.469 | 39.6 | PK2 | 35.5 | -28.8 | 46.3 | - | - | 74 | -27.7 | 1 | 202 | H |
| 9.861 | 35.21 | PK2 | 37 | -23.4 | 48.81 | - | - | 74 | -25.19 | 1 | 202 | H |
| 9.861 | 24.1 | V1TV | 37 | -23.4 | 37.7 | 54 | -16.3 | - | - | 1 | 202 | H |
| 13.641 | 35.18 | PK2 | 38.8 | -22.7 | 51.28 | - | - | 74 | -22.72 | 1 | 202 | H |
| 13.641 | 24.35 | V1TV | 38.8 | -22.7 | 40.45 | 54 | -13.55 | - | - | 1 | 202 | H |

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL HORIZONTAL**

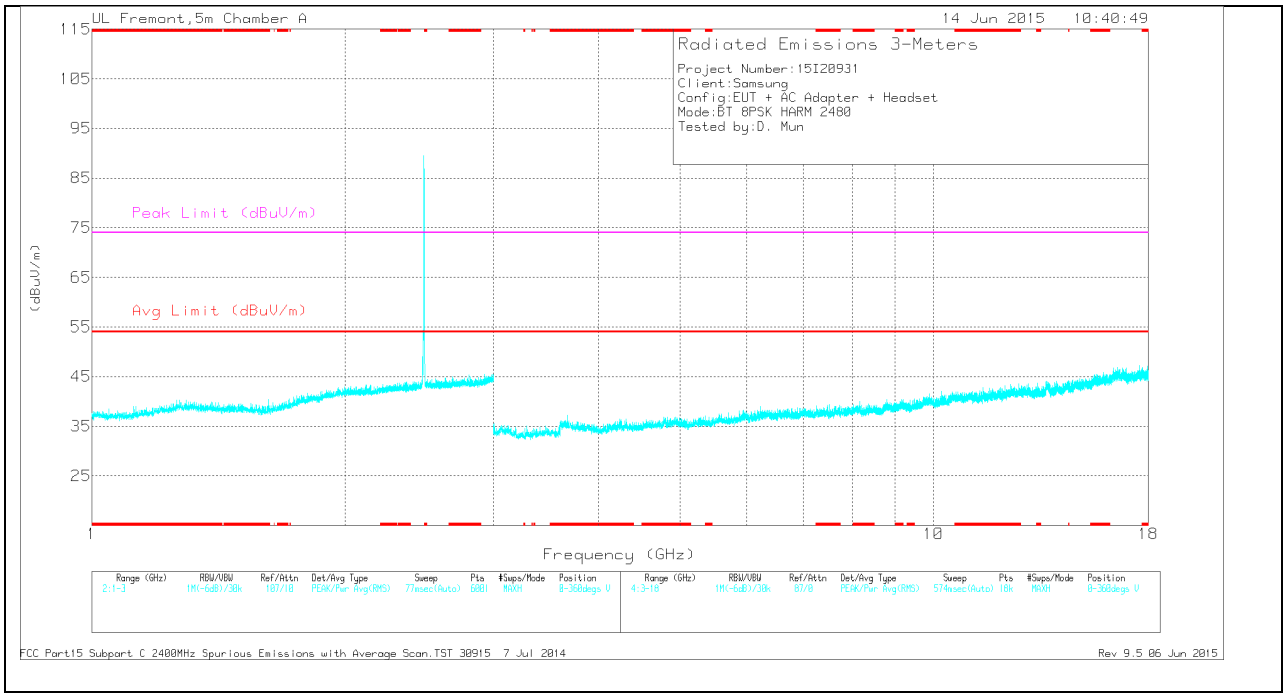



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

**HIGH CHANNEL VERTICAL**




Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## HIGH CHANNEL DATA

*TRACE MARKERS*

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.843 | 37.14 | Pk | 30.3 | -25.5 | 41.94 | - | - | 74 | -32.06 | 0-360 | 201 | H |
| 2 | 2.001 | 36.96 | Pk | 31.1 | -25.3 | 42.76 | - | - | 74 | -31.24 | 0-360 | 100 | H |
| 3 | 3.125 | 34.34 | Pk | 32.9 | -31.9 | 35.34 | - | - | 74 | -38.66 | 0-360 | 201 | H |
| 4 | 6.062 | 31.75 | Pk | 35.4 | -29.2 | 37.95 | - | - | 74 | -36.05 | 0-360 | 100 | H |
| 5 | 6.461 | 31.15 | Pk | 35.5 | -28.8 | 37.85 | - | - | 74 | -36.15 | 0-360 | 100 | H |
| 6 | 9.992 | 26.9 | Pk | 37 | -23.8 | 40.1 | - | - | 74 | -33.9 | 0-360 | 201 | H |

PK - Peak detector

*RADIATED EMISSIONS*

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T136 (dB/m) | Amp/Cbl/ Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.842 | 44.42 | PK2 | 30.3 | -25.5 | 49.22 | - | - | 74 | -24.78 | 1 | 202 | H |
| 1.843 | 32.81 | V1TV | 30.3 | -25.5 | 37.61 | 54 | -16.39 | - | - | 1 | 202 | H |
| 1.999 | 45.53 | PK2 | 31.1 | -25.3 | 51.33 | - | - | 74 | -22.67 | 1 | 100 | H |
| 2.001 | 33.18 | V1TV | 31.1 | -25.3 | 38.98 | 54 | -15.02 | - | - | 1 | 100 | H |
| 3.126 | 30.85 | V1TV | 32.9 | -31.9 | 31.85 | 54 | -22.15 | - | - | 1 | 202 | H |
| 3.127 | 42.18 | PK2 | 32.9 | -31.9 | 43.18 | - | - | 74 | -30.82 | 1 | 202 | H |
| 6.061 | 28.16 | V1TV | 35.4 | -29.2 | 34.36 | 54 | -19.64 | - | - | 1 | 100 | H |
| 6.061 | 28.18 | V1TV | 35.4 | -29.2 | 34.38 | 54 | -19.62 | - | - | 1 | 100 | H |
| 6.062 | 39.33 | PK2 | 35.4 | -29.2 | 45.53 | - | - | 74 | -28.47 | 1 | 100 | H |
| 6.064 | 38.95 | PK2 | 35.4 | -29.2 | 45.15 | - | - | 74 | -28.85 | 1 | 100 | H |
| 9.991 | 34.87 | PK2 | 37 | -23.8 | 48.07 | - | - | 74 | -25.93 | 1 | 202 | H |
| 9.991 | 23.81 | V1TV | 37 | -23.8 | 37.01 | 54 | -16.99 | - | - | 1 | 202 | H |

FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

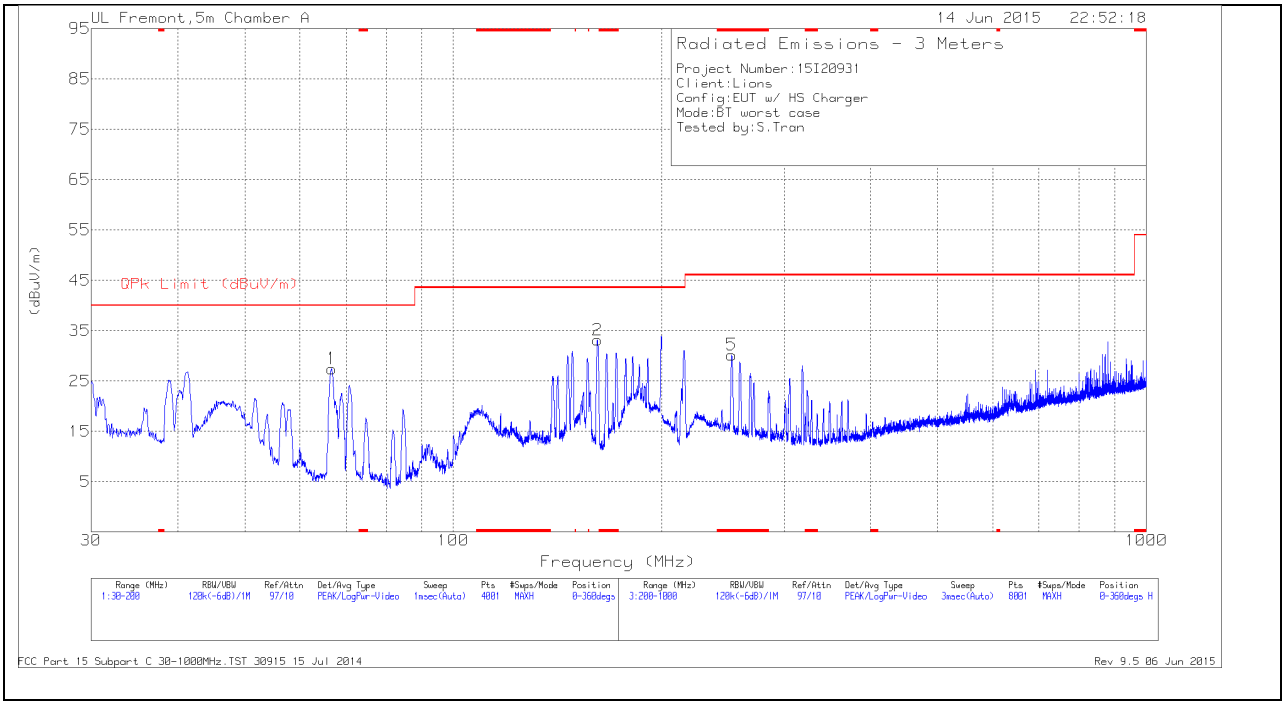



*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 9.3. WORST-CASE BELOW 1 GHz

**GFSK SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**

### HORIZONTAL PLOT

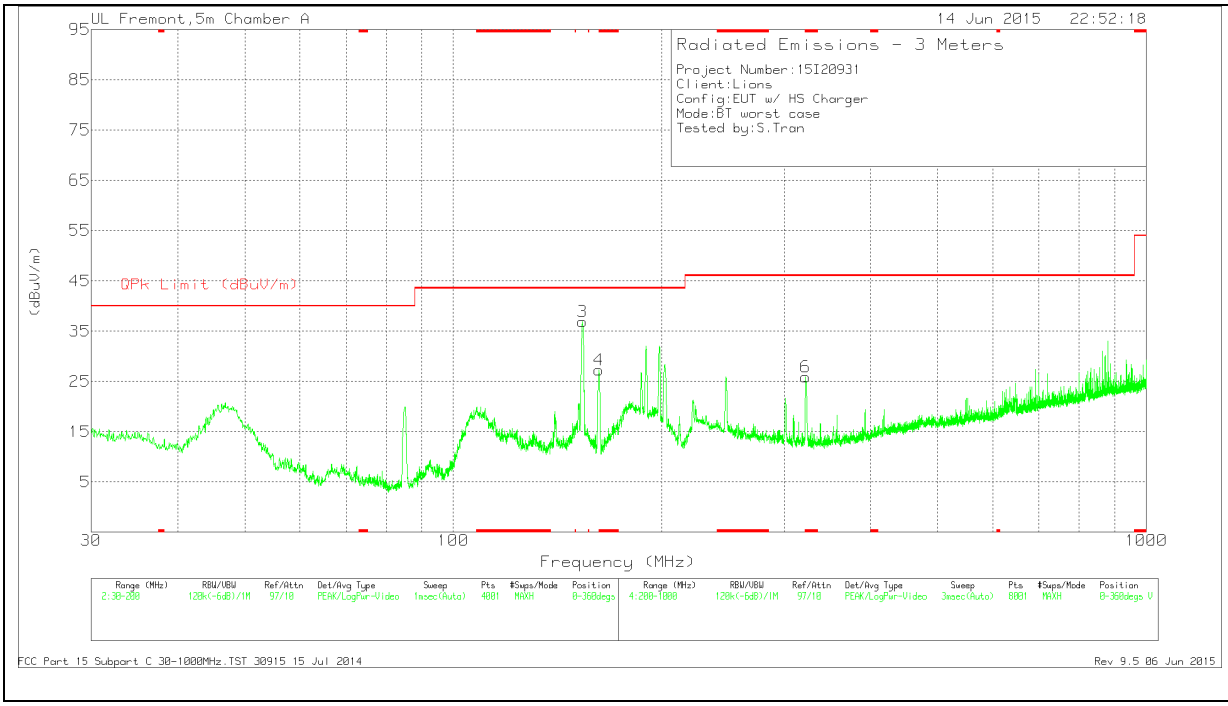






*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## VERTICAL PLOT







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## BELOW 1 GHz TABLE

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T130 (dB/m) | Amp/Cbl (dB/m) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|---|---|---|---|---|---|---|---|---|---|
| 4 | * 162.2175 | 45.58 | Pk | 11.9 | -30.2 | 27.28 | 43.52 | -16.24 | 0-360 |
| 5 | * 252.2 | 48.3 | Pk | 11.5 | -29.6 | 30.2 | 46.02 | -15.82 | 0-360 |
| 6 | * 322.6 | 41.08 | Pk | 14 | -29.2 | 25.88 | 46.02 | -20.14 | 0-360 |
| 1 | 66.72 | 50.23 | Pk | 8.1 | -30.9 | 27.43 | 40 | -12.57 | 0-360 |
| 3 | 153.59 | 54.66 | Pk | 12.4 | -30.2 | 36.86 | 43.52 | -6.66 | 0-360 |
| 2 | 161.41 | 51.33 | Pk | 11.9 | -30.1 | 33.13 | 43.52 | -10.39 | 0-360 |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

Radiated Emissions

| Frequency (MHz) | Meter Reading (dBuV) | Det | AF T130 (dB/m) | Amp/Cbl (dB/m) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|---|---|---|---|---|---|---|---|---|
| 153.607 | 23.71 | Qp | 12.4 | -30.2 | 5.91 | 43.52 | -37.61 | 1 |

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Qp - Quasi-Peak detector




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# 10. AC POWER LINE CONDUCTED EMISSIONS

## LIMITS

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

## TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

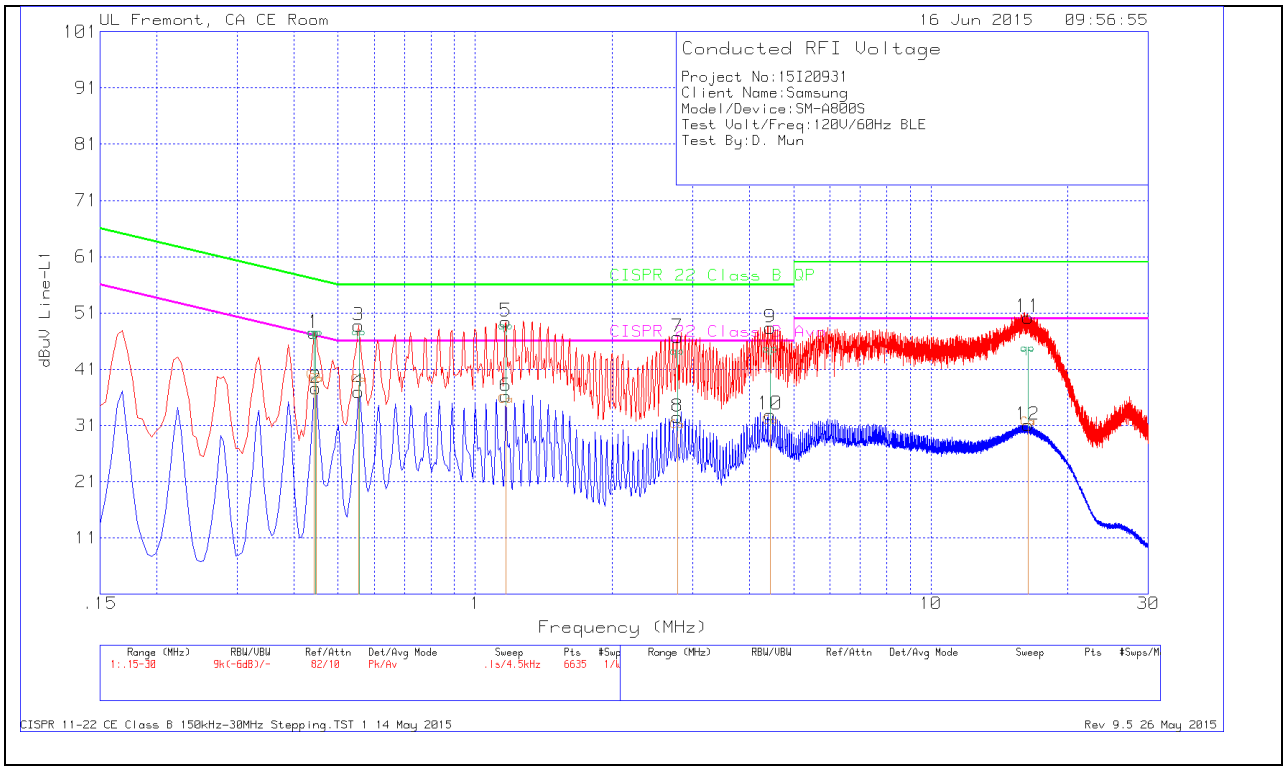
## RESULTS




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## 6 WORST EMISSIONS

# LINE 1 PLOT







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L1 | LC Cables 1&3 | Corrected Reading dBuV | CISPR 22 Class B QP | Margin (dB) | CISPR 22 Class B Avg | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .44363 | 38.48 | Ca | .4 | 0 | 38.88 | - | - | 46.99 | -8.11 |
| .44588 | 37.84 | Ca | .4 | 0 | 38.24 | - | - | 46.95 | -8.71 |
| .55568 | 37.84 | Ca | .3 | 0 | 38.14 | - | - | 46 | -7.86 |
| 1.16768 | 34.24 | Ca | .2 | .1 | 34.54 | - | - | 46 | -11.46 |
| 2.77913 | 29.7 | Ca | .2 | .1 | 30 | - | - | 46 | -16 |
| 4.44413 | 30.5 | Ca | .2 | .1 | 30.8 | - | - | 46 | -15.2 |
| 16.3444 | 30.02 | Ca | .3 | .2 | 30.52 | - | - | 50 | -19.48 |
| 16.3408 | 30.03 | Ca | .3 | .2 | 30.53 | - | - | 50 | -19.47 |

Ca - CISPR average detection

Range 1: Line-L1 .15 - 30MHz

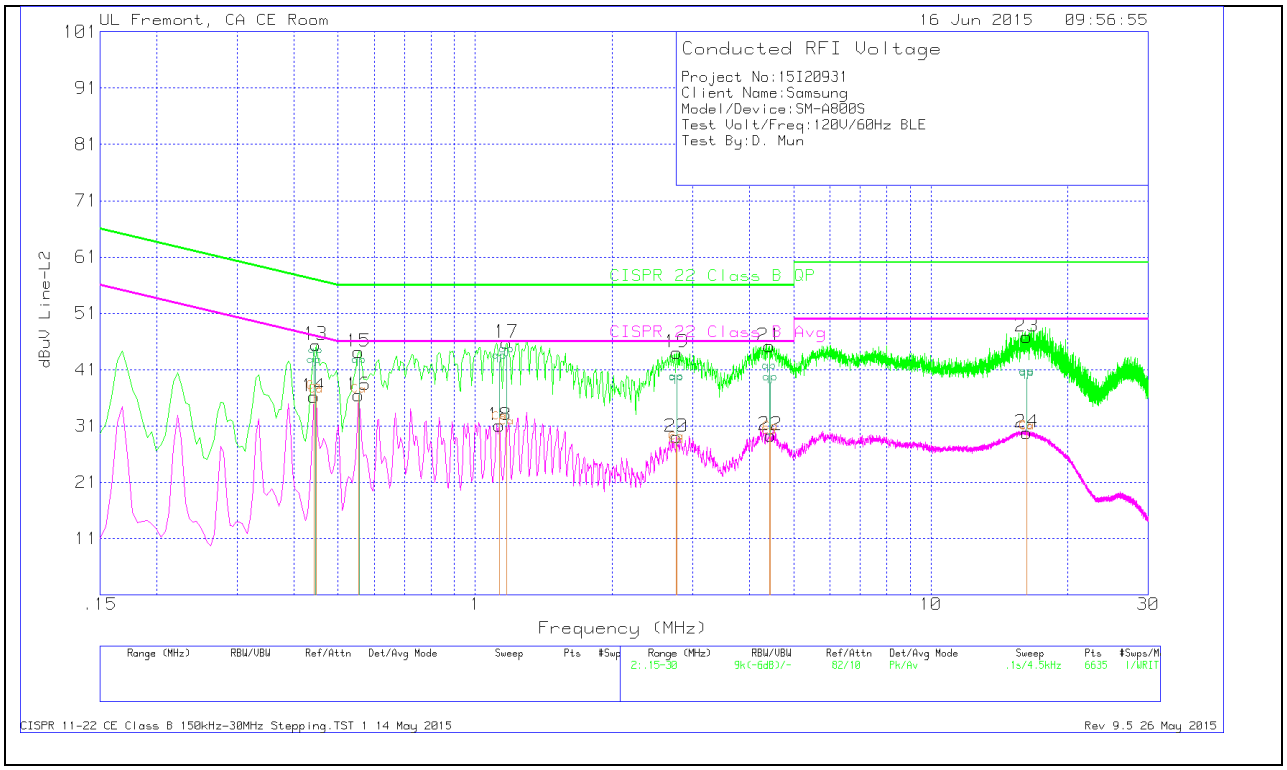
| Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L1 | LC Cables 1&3 | Corrected Reading dBuV | CISPR 22 Class B QP | Margin (dB) | CISPR 22 Class B Avg | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .44363 | 46.03 | Qp | .4 | 0 | 46.43 | 56.99 | -10.56 | - | - |
| .44588 | 45.99 | Qp | .4 | 0 | 46.39 | 56.95 | -10.56 | - | - |
| .55568 | 46.16 | Qp | .3 | 0 | 46.46 | 56 | -9.54 | - | - |
| 1.16768 | 47.27 | Qp | .2 | .1 | 47.57 | 56 | -8.43 | - | - |
| 2.77913 | 42.73 | Qp | .2 | .1 | 43.03 | 56 | -12.97 | - | - |
| 4.44413 | 43.17 | Qp | .2 | .1 | 43.47 | 56 | -12.53 | - | - |
| 16.3444 | 43.09 | Qp | .3 | .2 | 43.59 | 60 | -16.41 | - | - |
| 16.3408 | 43.15 | Qp | .3 | .2 | 43.65 | 60 | -16.35 | - | - |

Qp - Quasi-Peak detector




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

# LINE 2 PLOT







*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*

## LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L2 | LC Cables 2&3 | Corrected Reading dBuV | CISPR 22 Class B QP | Margin (dB) | CISPR 22 Class B Avg | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .44678 | 36.05 | Ca | .4 | 0 | 36.45 | - | - | 46.93 | -10.48 |
| .44363 | 36.65 | Ca | .4 | 0 | 37.05 | - | - | 46.99 | -9.94 |
| .55613 | 36.15 | Ca | .3 | 0 | 36.45 | - | - | 46 | -9.55 |
| 1.17263 | 30.32 | Ca | .3 | .1 | 30.72 | - | - | 46 | -15.28 |
| 1.13168 | 31.24 | Ca | .3 | .1 | 31.64 | - | - | 46 | -14.36 |
| 2.76788 | 27.15 | Ca | .2 | .1 | 27.45 | - | - | 46 | -18.55 |
| 2.76563 | 27.73 | Ca | .2 | .1 | 28.03 | - | - | 46 | -17.97 |
| 4.41938 | 28.77 | Ca | .2 | .1 | 29.07 | - | - | 46 | -16.93 |
| 4.44638 | 29.57 | Ca | .2 | .1 | 29.87 | - | - | 46 | -16.13 |
| 16.2409 | 29.49 | Ca | .3 | .2 | 29.99 | - | - | 50 | -20.01 |
| 16.2553 | 29.34 | Ca | .3 | .2 | 29.84 | - | - | 50 | -20.16 |

Ca - CISPR average detection

Range 2: Line-L2 .15 - 30MHz

| Frequency (MHz) | Meter Reading (dBuV) | Det | T24 IL L2 | LC Cables 2&3 | Corrected Reading dBuV | CISPR 22 Class B QP | Margin (dB) | CISPR 22 Class B Avg | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| .44678 | 42.98 | Qp | .4 | 0 | 43.38 | 56.93 | -13.55 | - | - |
| .44363 | 41.28 | Qp | .4 | 0 | 41.68 | 56.99 | -15.31 | - | - |
| .55613 | 41.41 | Qp | .3 | 0 | 41.71 | 56 | -14.29 | - | - |
| 1.17263 | 43.18 | Qp | .3 | .1 | 43.58 | 56 | -12.42 | - | - |
| 1.13168 | 42 | Qp | .3 | .1 | 42.4 | 56 | -13.6 | - | - |
| 2.76788 | 38.29 | Qp | .2 | .1 | 38.59 | 56 | -17.41 | - | - |
| 2.76563 | 38.42 | Qp | .2 | .1 | 38.72 | 56 | -17.28 | - | - |
| 4.41938 | 40.31 | Qp | .2 | .1 | 40.61 | 56 | -15.39 | - | - |
| 4.44638 | 38.31 | Qp | .2 | .1 | 38.61 | 56 | -17.39 | - | - |
| 16.2409 | 39.08 | Qp | .3 | .2 | 39.58 | 60 | -20.42 | - | - |
| 16.2553 | 38.89 | Qp | .3 | .2 | 39.39 | 60 | -20.61 | - | - |

Qp - Quasi-Peak detector




*This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.*