FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE TABLET + Bluetooth + DTS/UNII a/b/g/n and ANT+

MODEL NUMBER: SM-P355; SM-T355Y

FCC ID: A3LSMP355

REPORT NUMBER: 15I19962-E2

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
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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 8

5.3. DESCRIPTION OF AVAILABLE ANTENNAS 8

5.4. WORST-CASE CONFIGURATION AND MODE 9

5.5. DESCRIPTION OF TEST SETUP 10

6. TEST AND MEASUREMENT EQUIPMENT 12

7. SUMMARY TABLE 13

8. ANTENNA PORT TEST RESULTS 14

8.1. 20 dB AND 99% BANDWIDTH 14

8.1.1. BASIC DATA RATE GFSK MODULATION 14

8.1.2. ENHANCED DATA RATE 8PSK MODULATION 14

20 dB AND 99% BANDWIDTH PLOTS 15

8.2. HOPPING FREQUENCY SEPARATION 27

8.3. NUMBER OF HOPPING CHANNELS 29

8.4. AVERAGE TIME OF OCCUPANCY 34

8.5. OUTPUT POWER 42

8.5.1. BASIC DATA RATE GFSK MODULATION 42

8.5.2. ENHANCED DATA RATE 8PSK MODULATION 42

8.5.3. OUTPUT POWER PLOTS 43

8.6. AVERAGE POWER 49

8.6.1. BASIC DATA RATE GFSK MODULATION 49

8.6.2. DATA RATE PI/4-DQPSK MODULATION 50

8.6.3. ENHANCED DATA RATE 8PSK MODULATION 50

8.7. CONDUCTED SPURIOUS EMISSIONS 51

8.7.1. BASIC DATA RATE GFSK MODULATION 52

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ENHANCED DATA RATE 8PSK MODULATION 60

9. RADIATED TEST RESULTS 68

9.1. LIMITS AND PROCEDURE 68

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

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**SAMSUNG ELECTRONICS CO., LTD.**
EUT DESCRIPTION:	**GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n and ANT+**
MODEL:	**SM-P355; SM-T355Y**
SERIAL NUMBER:	**R32G102MK2R (Radiated), R32G102MKSF (Conducted)**
DATE TESTED:	**FEBRUARY 4-12, 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.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, 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)

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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 26000 MHz	4.94 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n and ANT+

SM-P355 and SM-T355Y all the parts are the same and only difference is SM-P355 support WACOM while SM-T355Y not. Also WACOM parts being removed from SM-T355Y.

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	9.85	9.66
2402 - 2480	Enhanced 8PSK	10.09	10.21

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 -0.5 dBi.

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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.

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	SAMSUNG	ETA0U83EWE	N/A	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.

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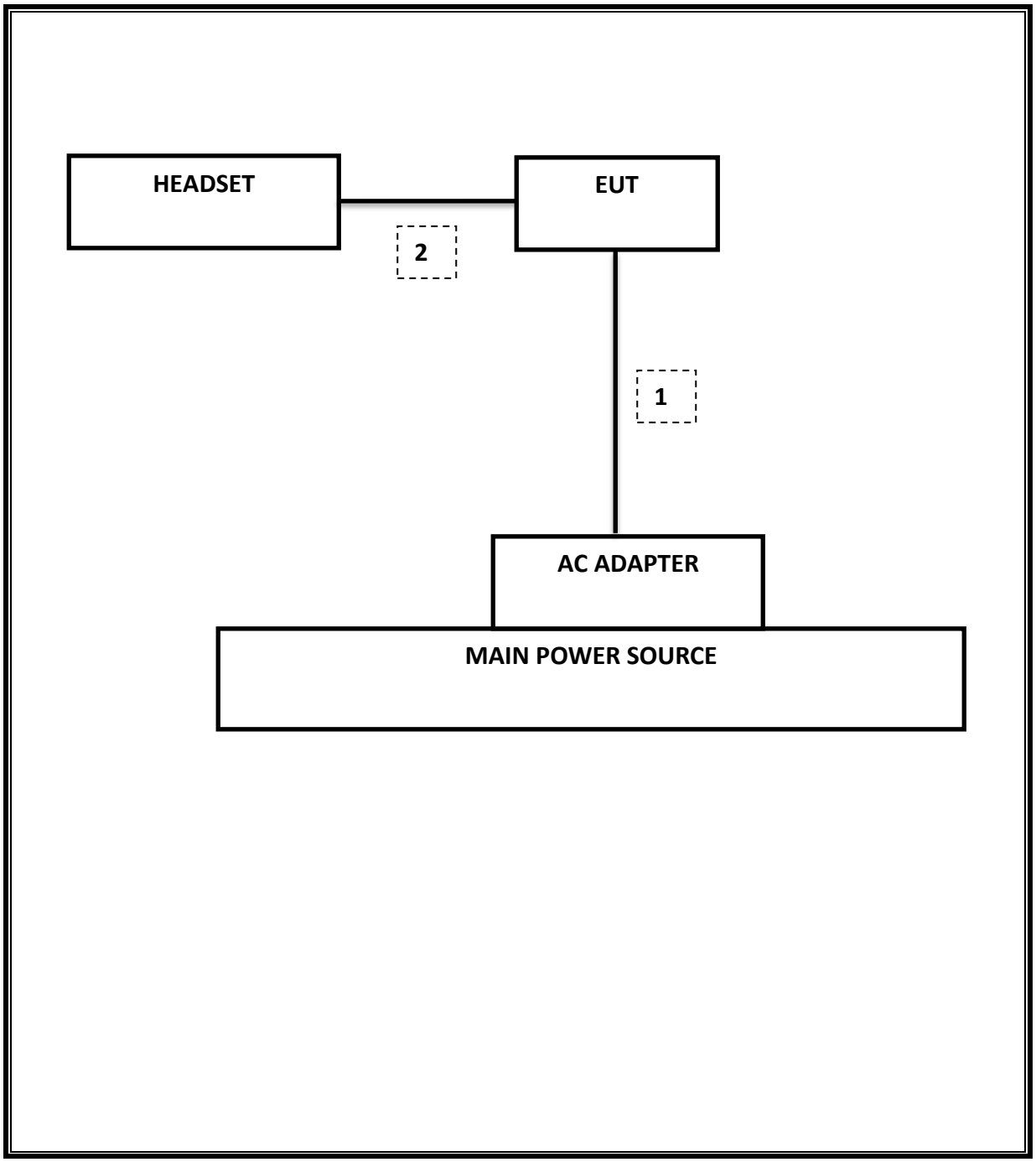
SETUP DIAGRAM FOR TESTS



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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	02/13/15
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	06/01/15
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/15
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
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15

Test Equipment List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

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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	1.17dBm
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-48.41dBm
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	10.09dBm
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	1MHz
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	79
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	0.3731s
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	45.04dBuV(PK)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	40.75dBuV/m

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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 (kHz)	99% Bandwidth (kHz)
Low	2402	923.55	898.4
Middle	2441	923.98	909.42
High	2480	923.88	891.68
Worst		923.98	909.42

8.1.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.209	1.1627
Middle	2441	1.266	1.17
High	2480	1.262	1.161
Worst		1.266	1.17

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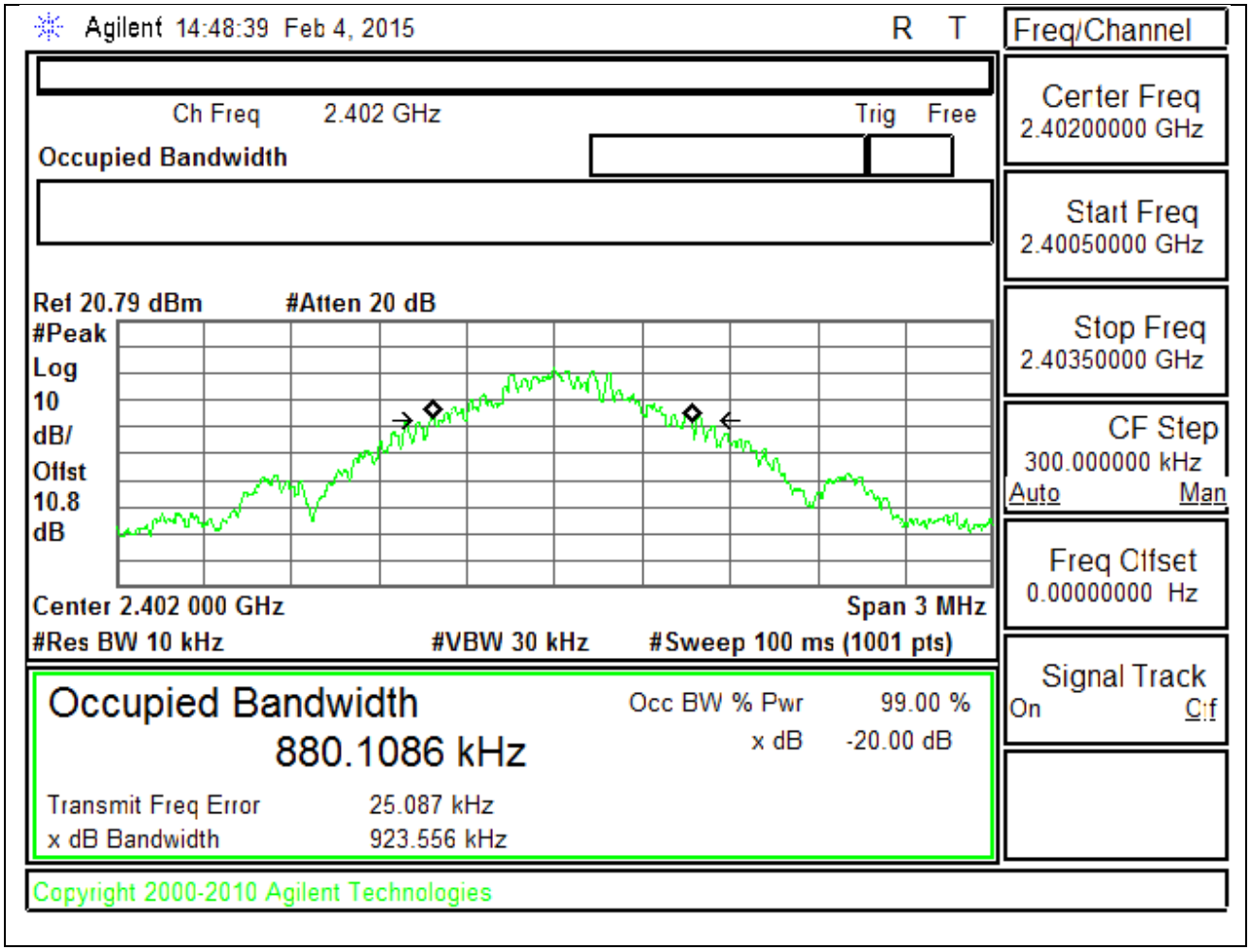
20 dB AND 99% BANDWIDTH PLOTS

GFSK 20 dB BANDWIDTH

LOW CHANNEL



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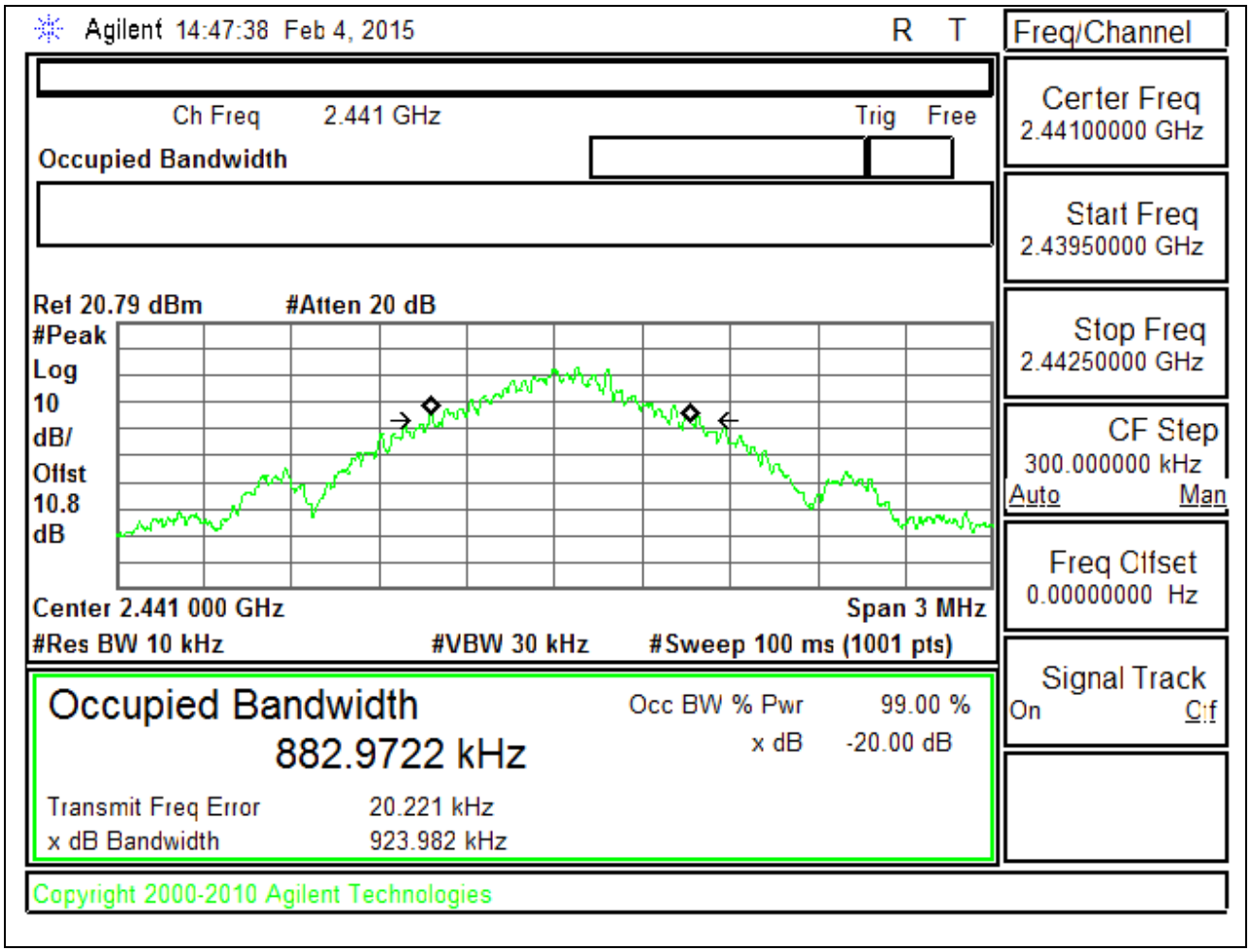
MID CHANNEL



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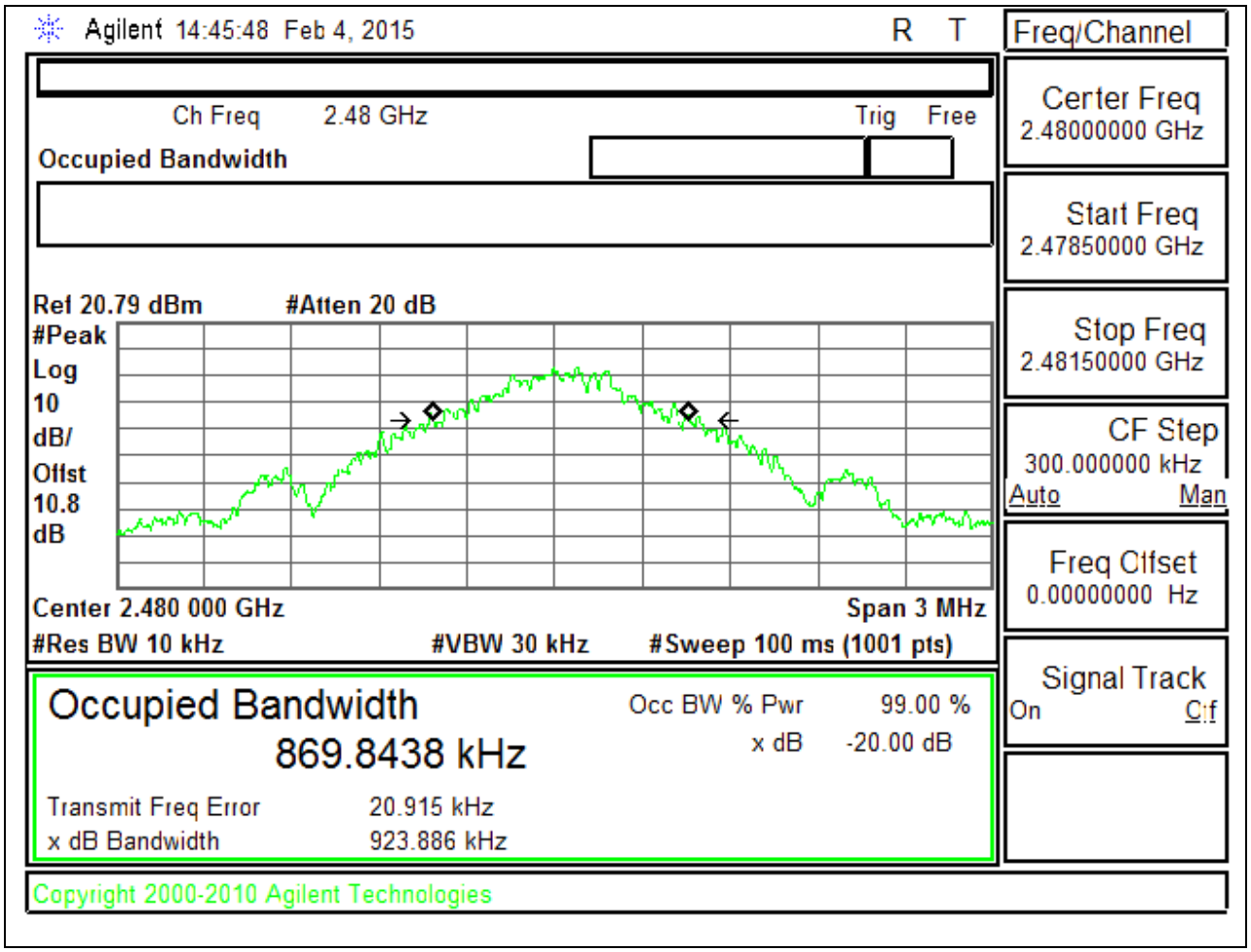
HIGH CHANNEL



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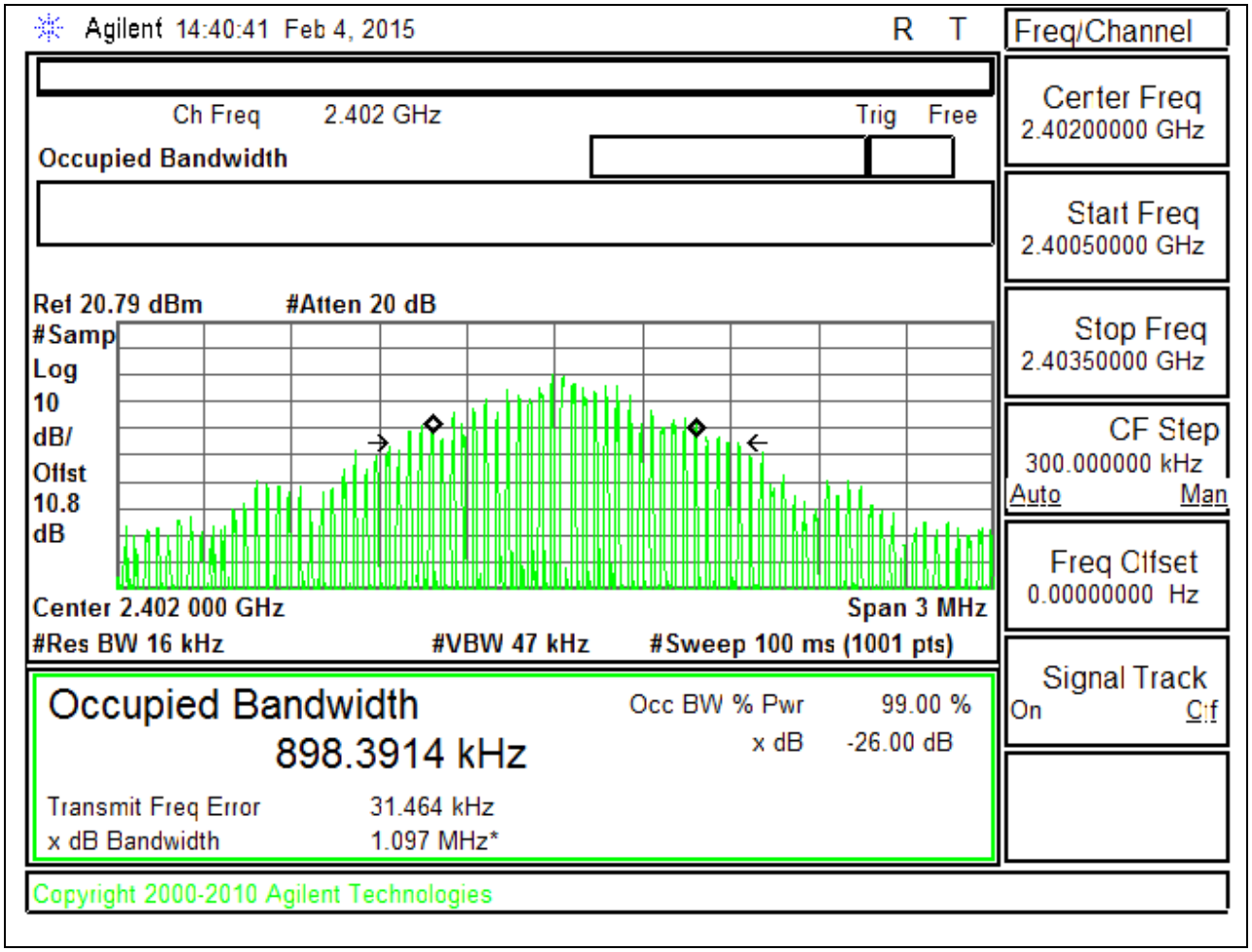
GFSK 99% BANDWIDTH

LOW CHANNEL



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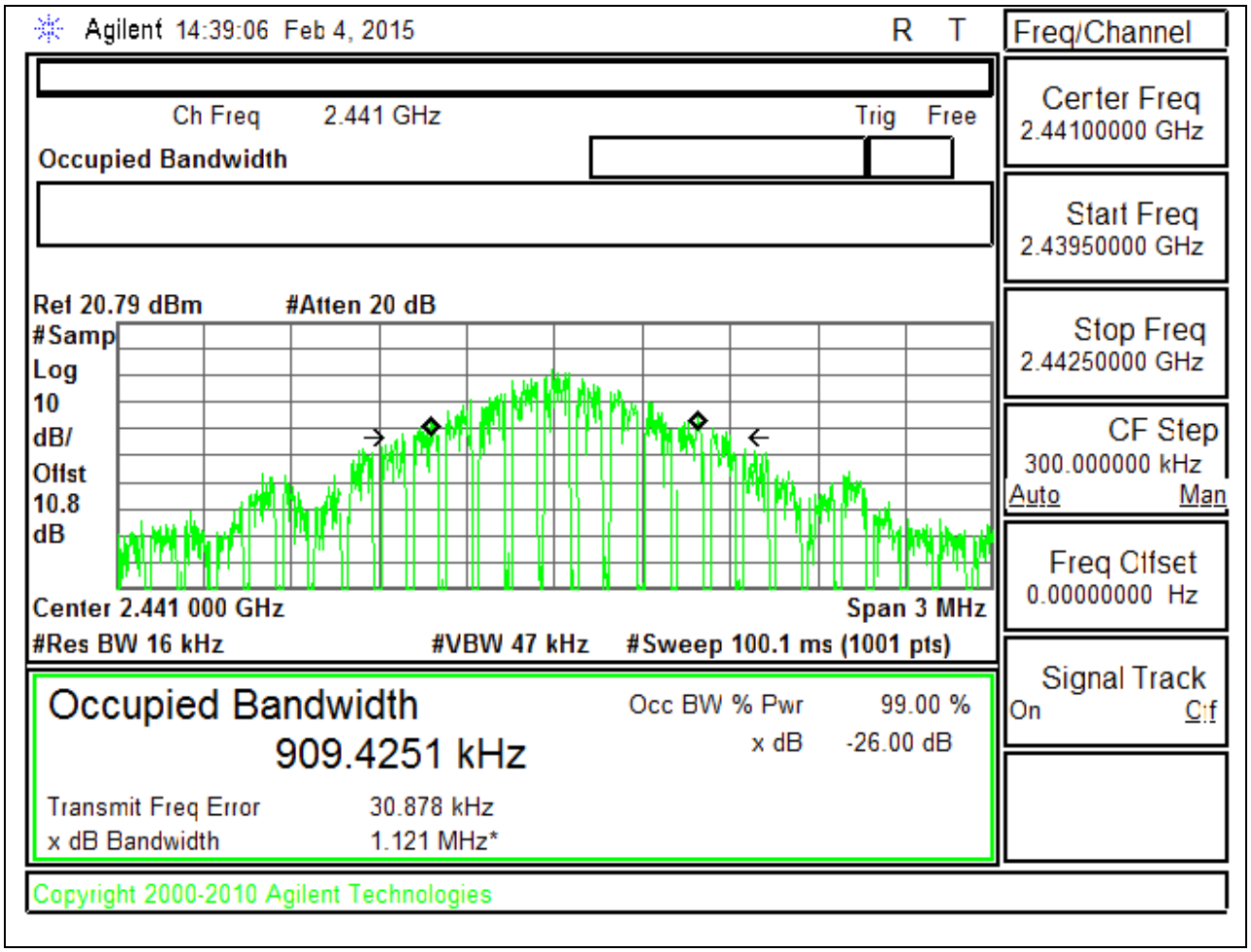
MID CHANNEL



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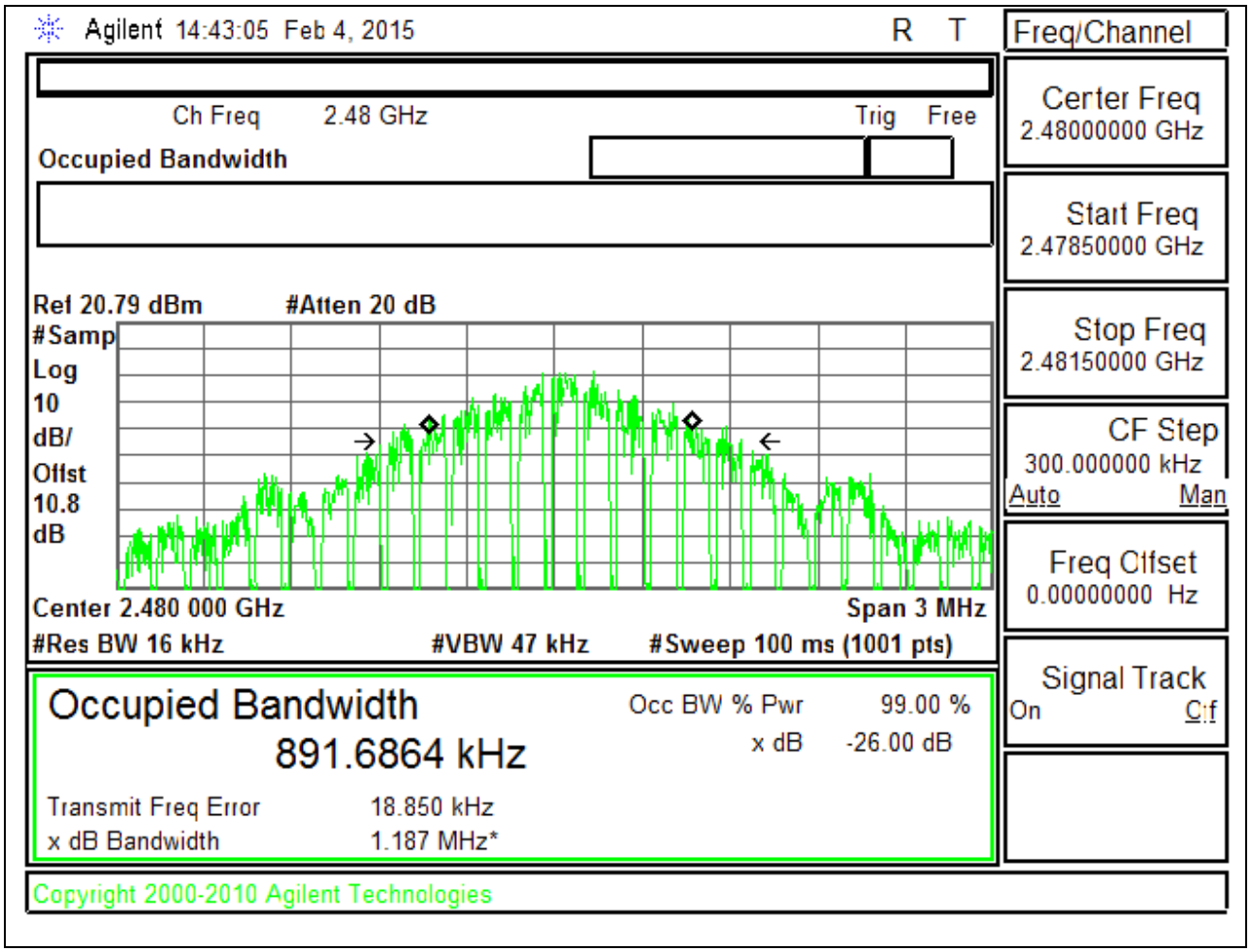
HIGH CHANNEL



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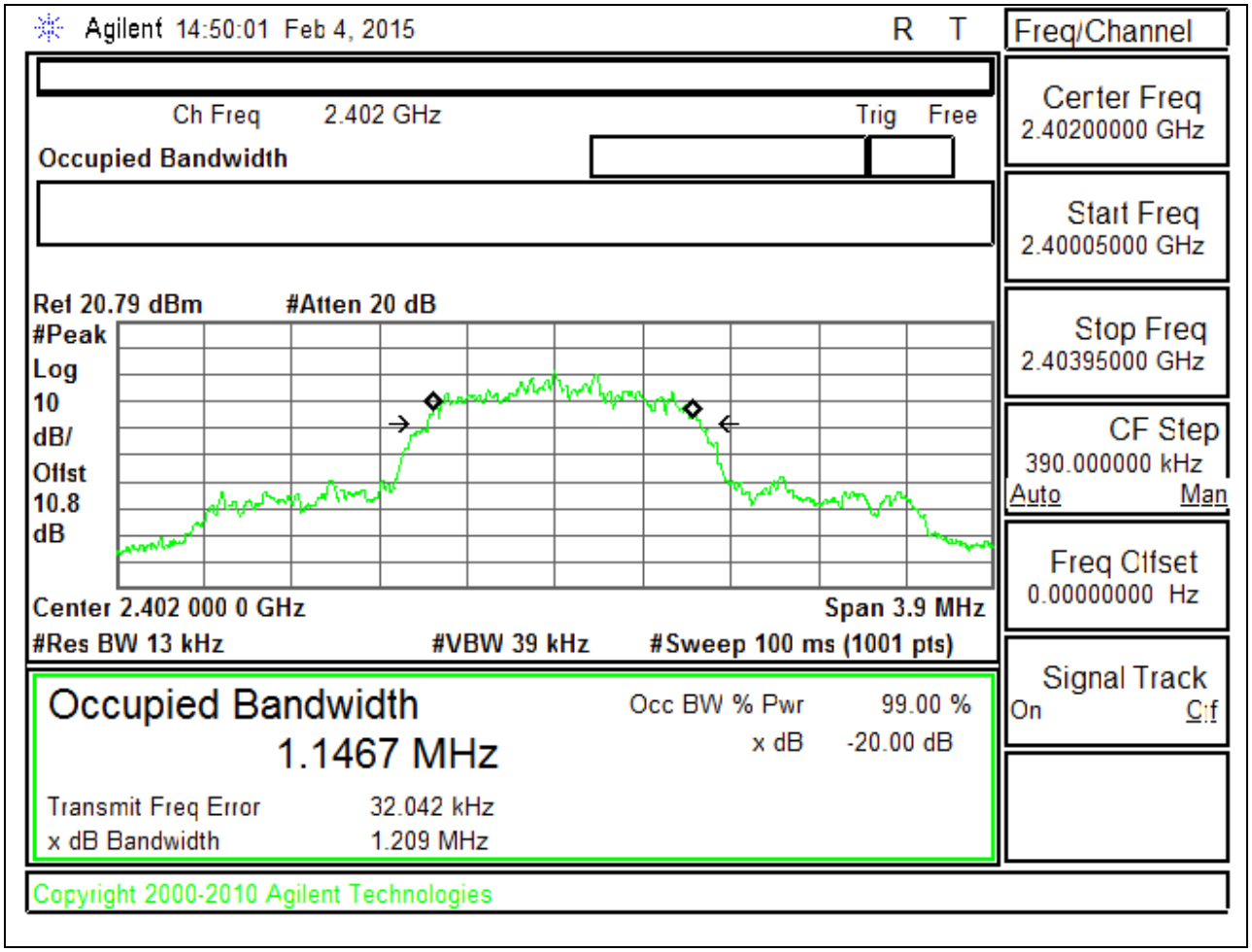
8PSK 20 dB BANDWIDTH

LOW CHANNEL



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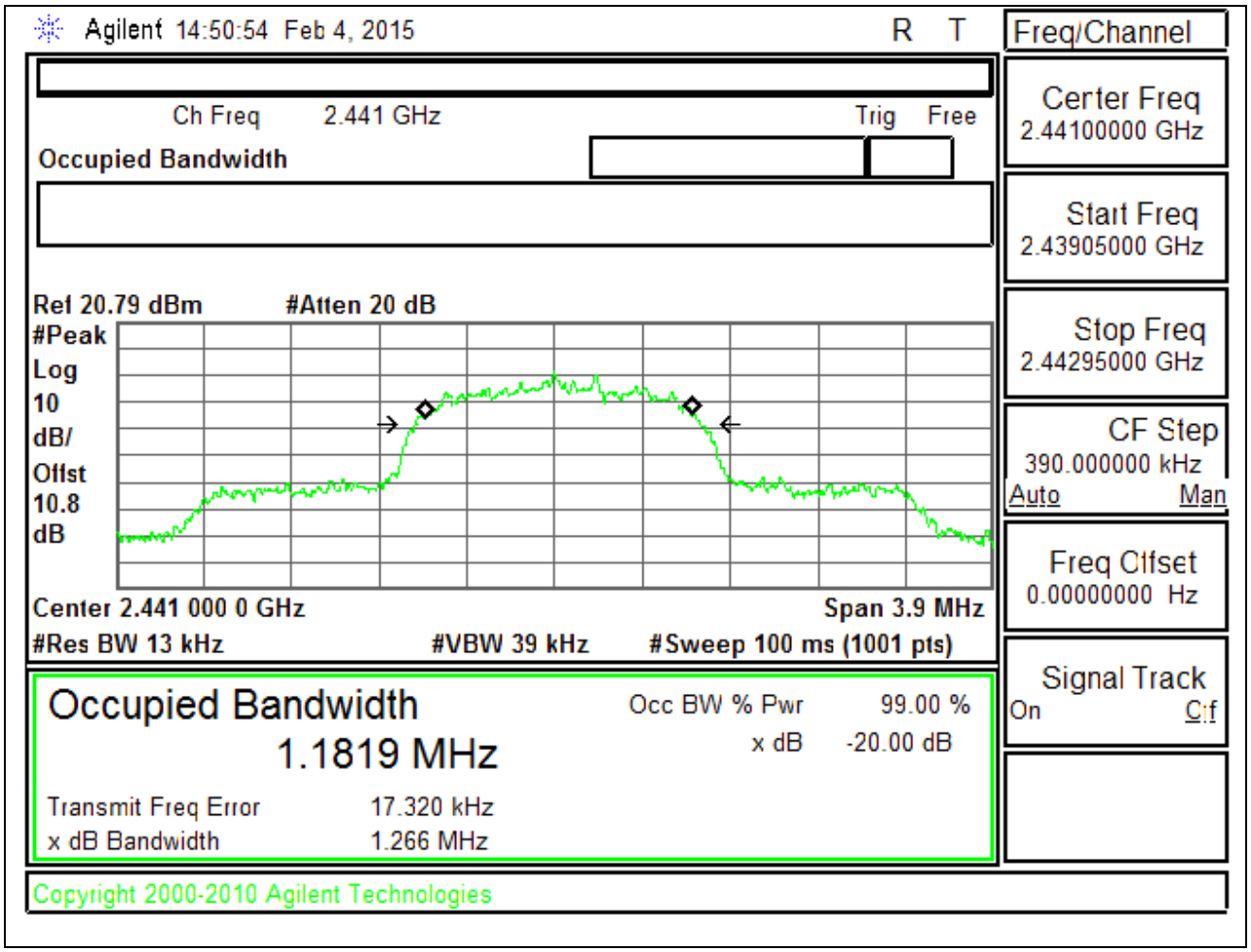
MID CHANNEL



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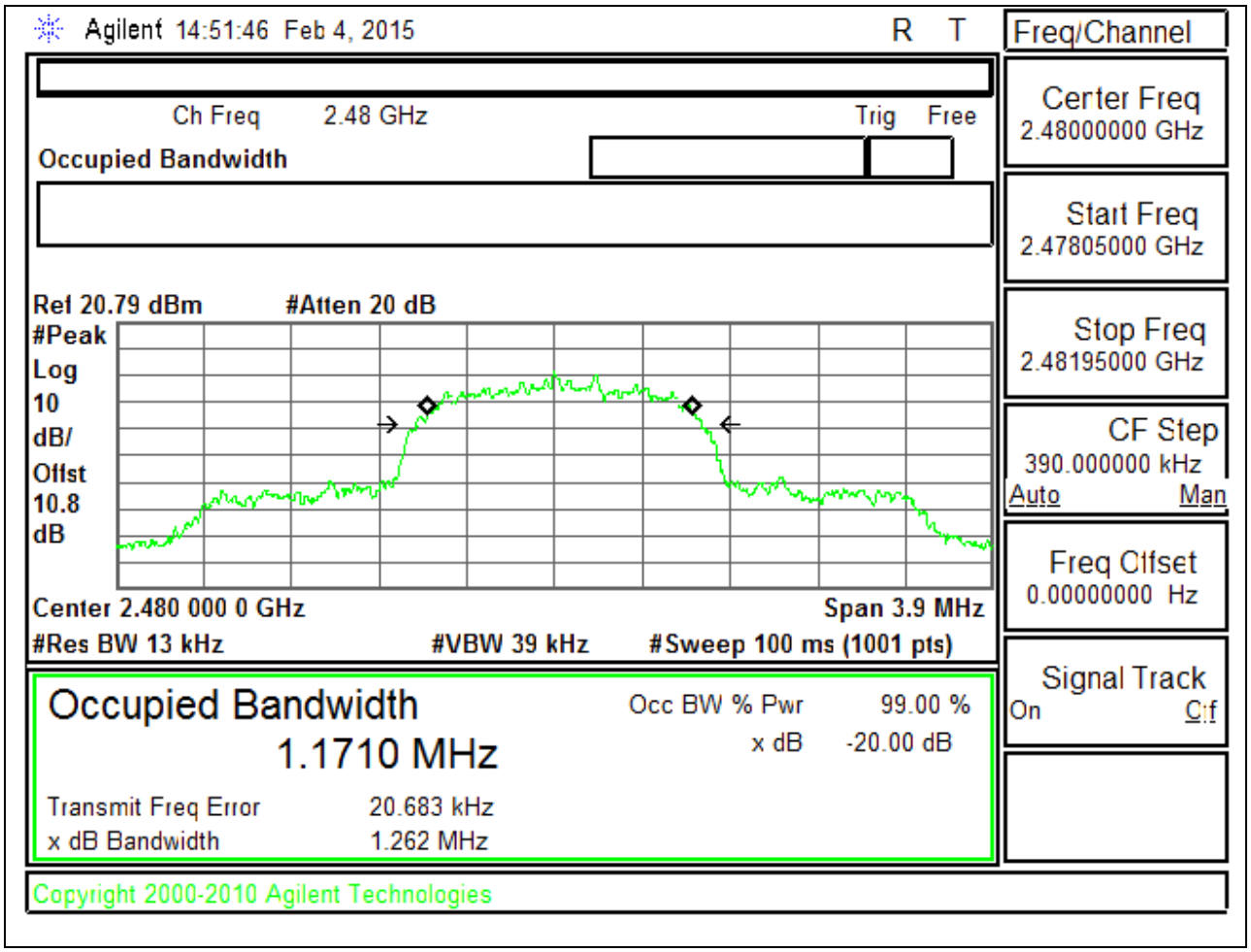
HIGH CHANNEL



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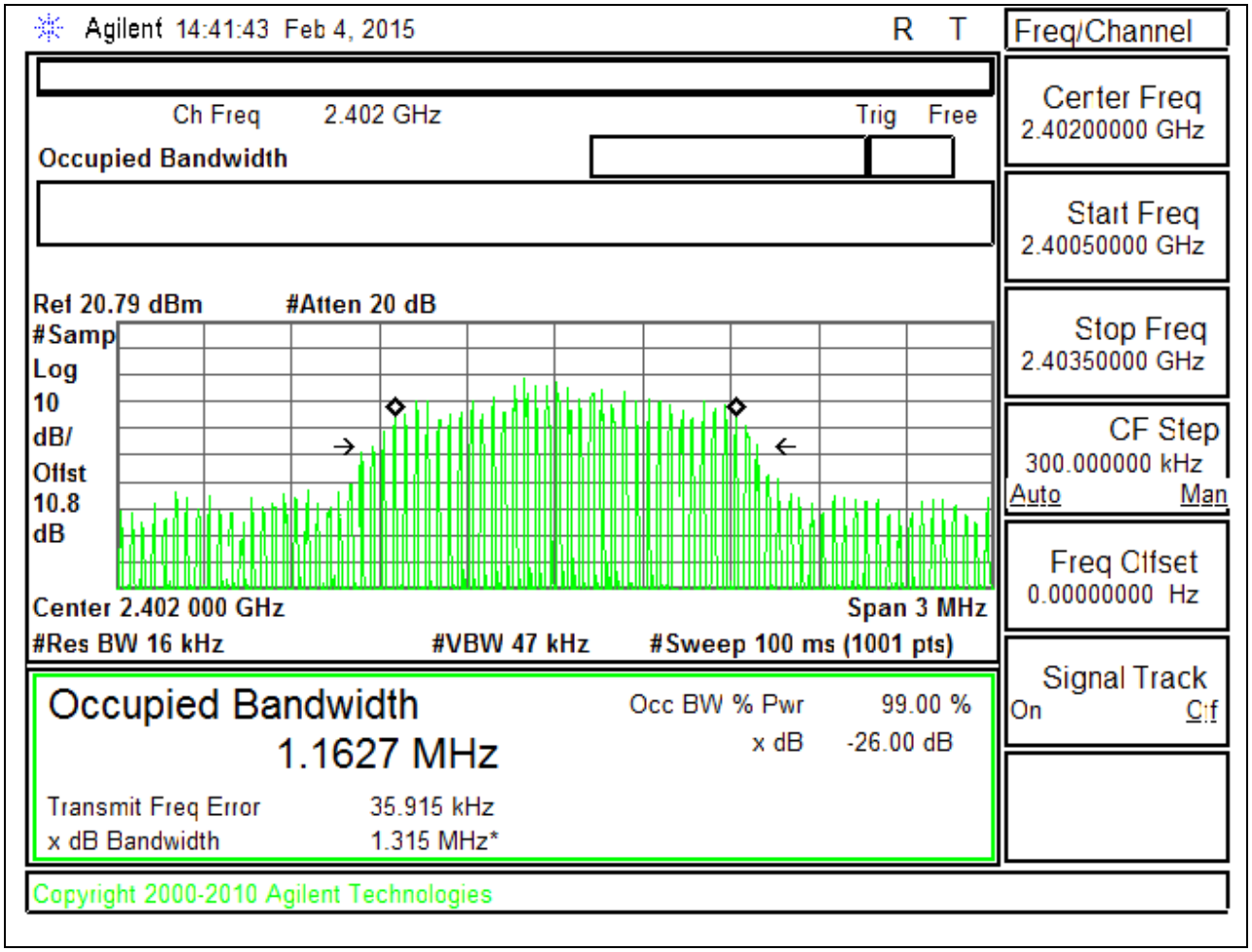
8PSK 99% BANDWIDTH

LOW CHANNEL



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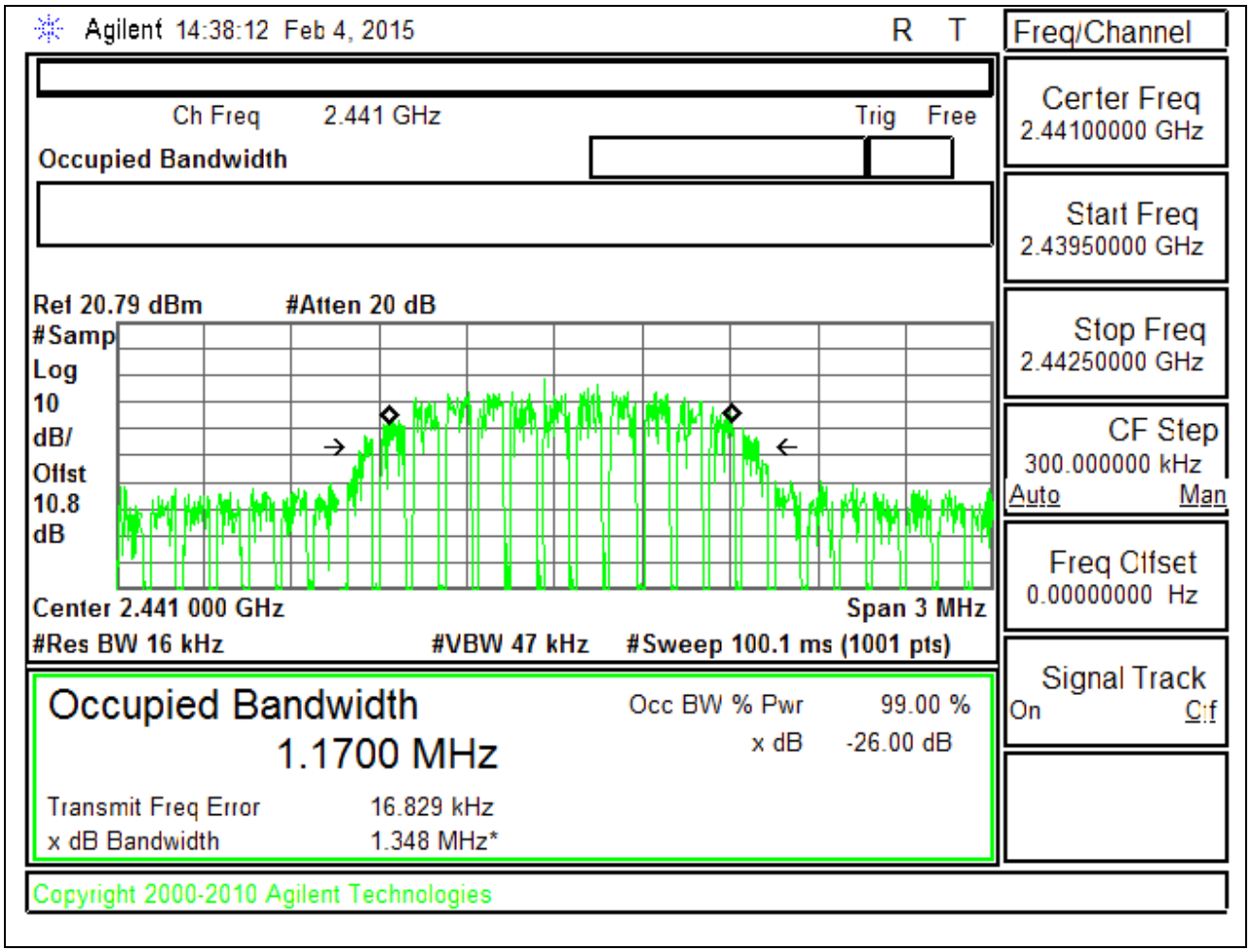
MID CHANNEL



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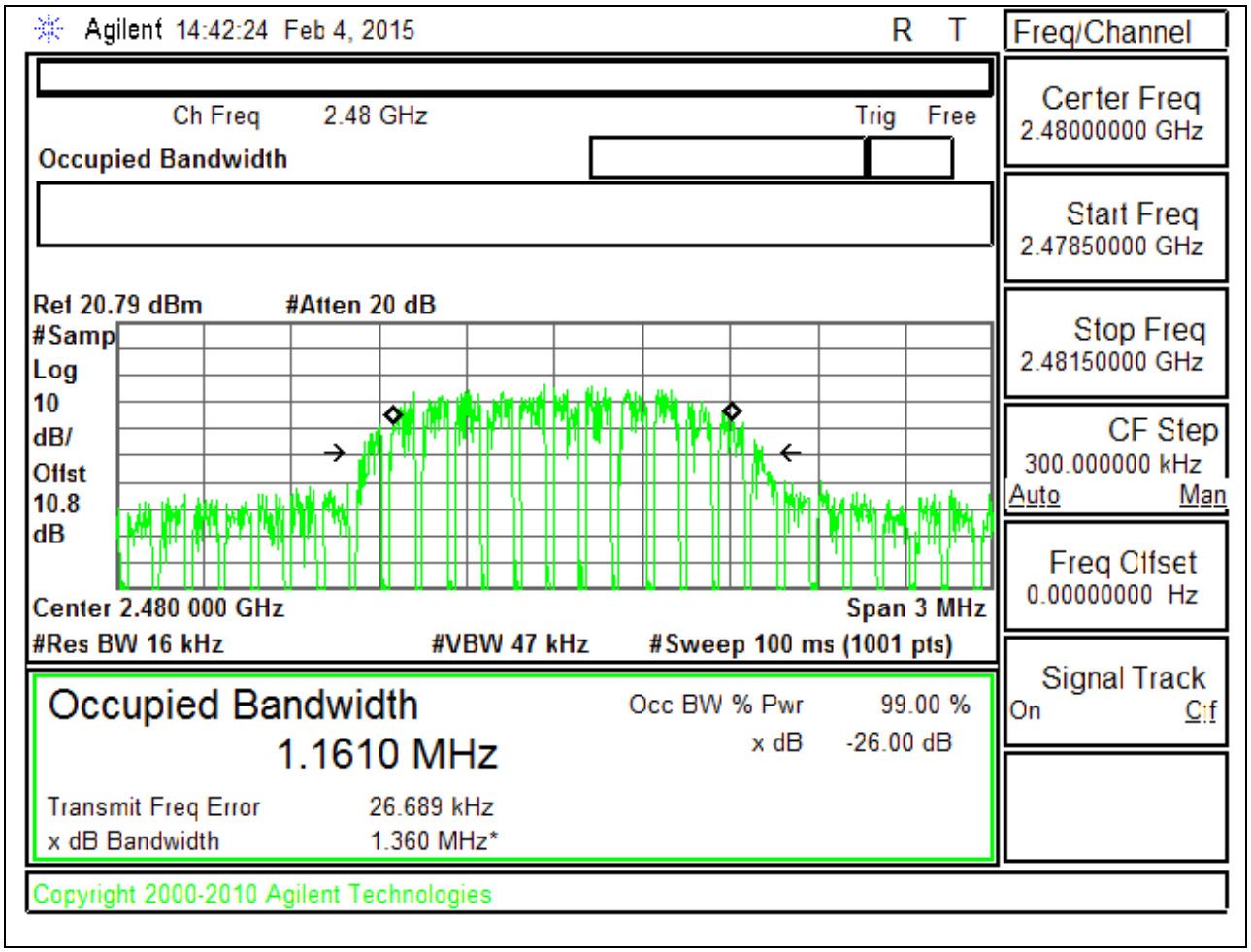
HIGH CHANNEL



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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

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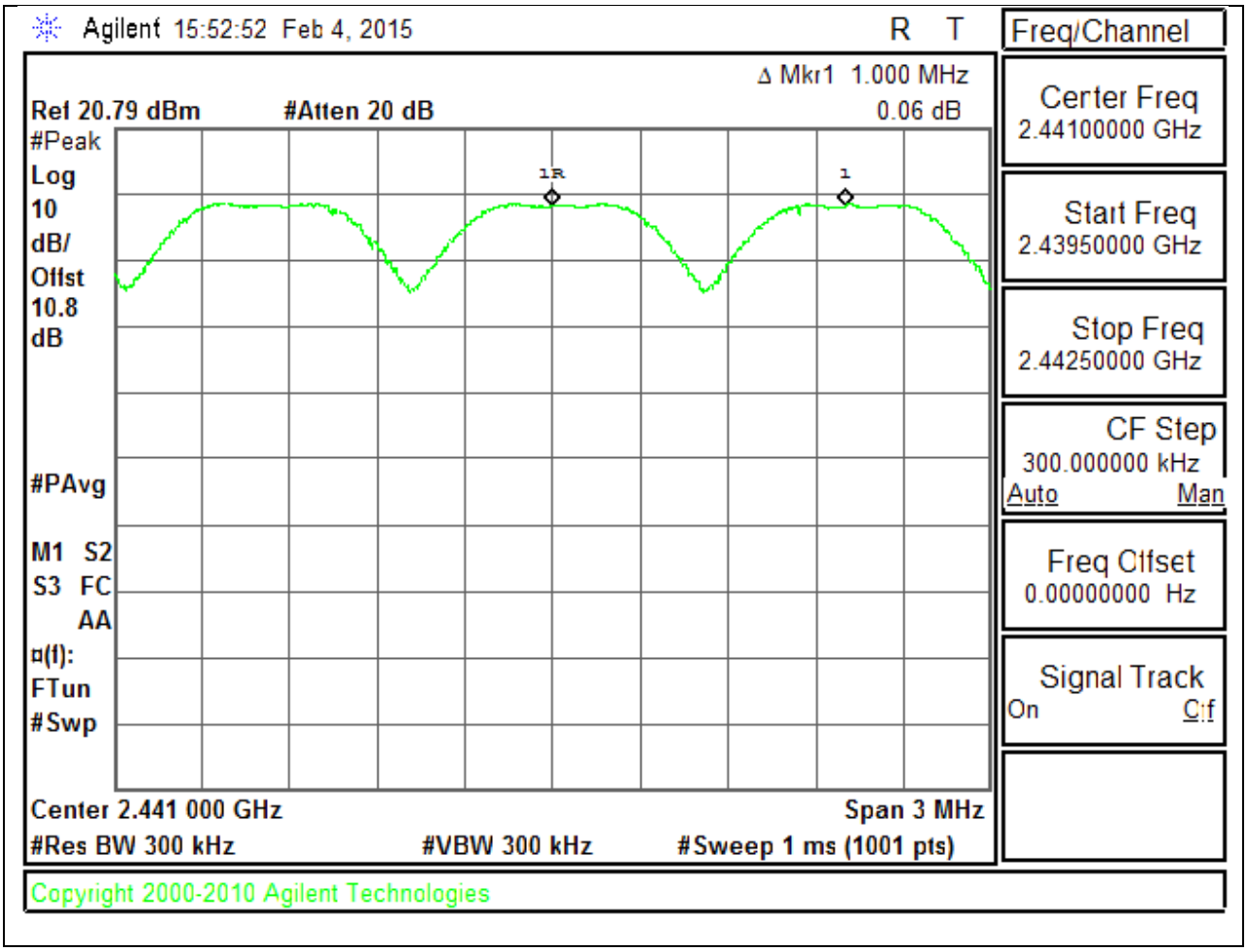
HOPPING FREQUENCY SEPARATION PLOT



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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.

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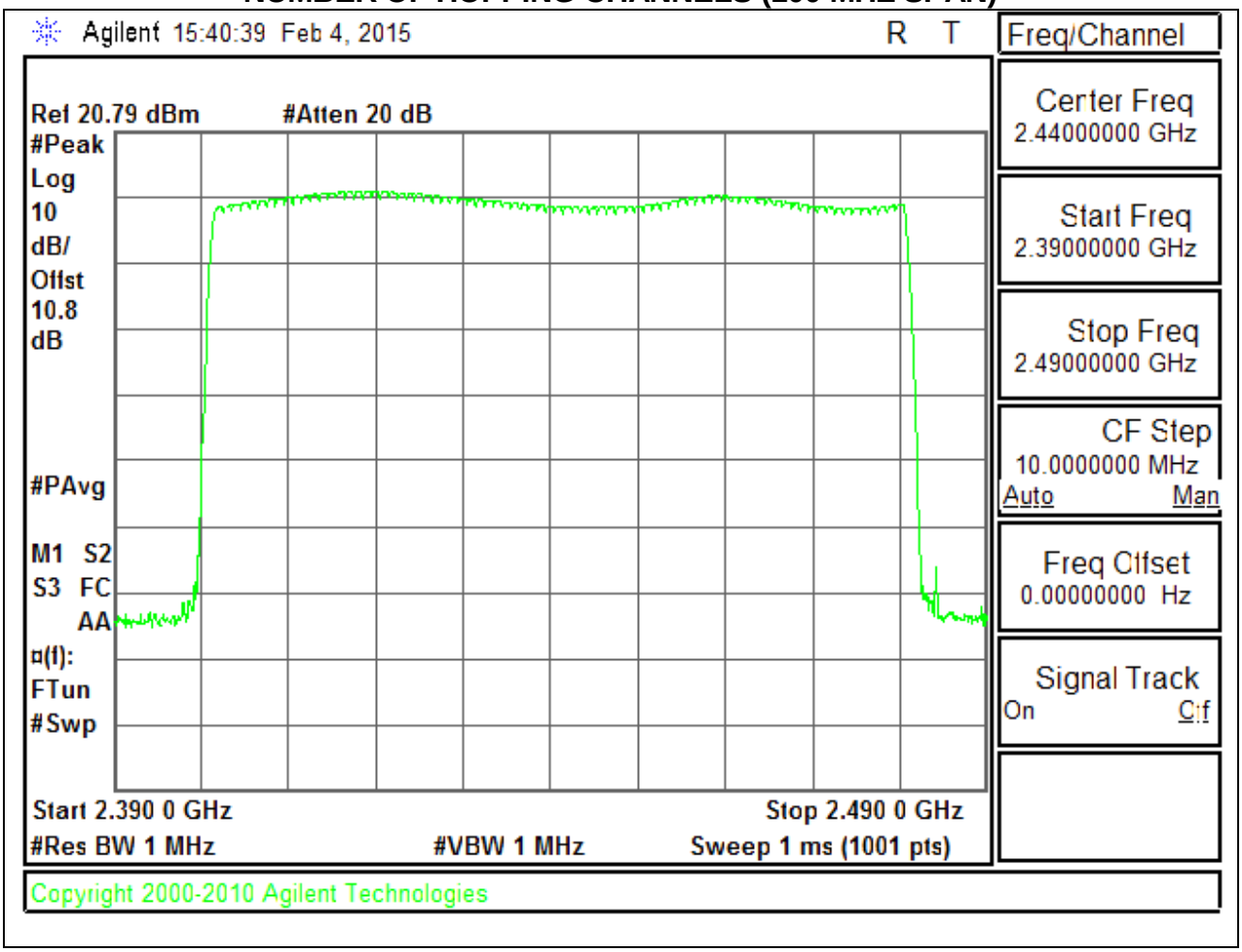
NUMBER OF HOPPING CHANNELS PLOTS

NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



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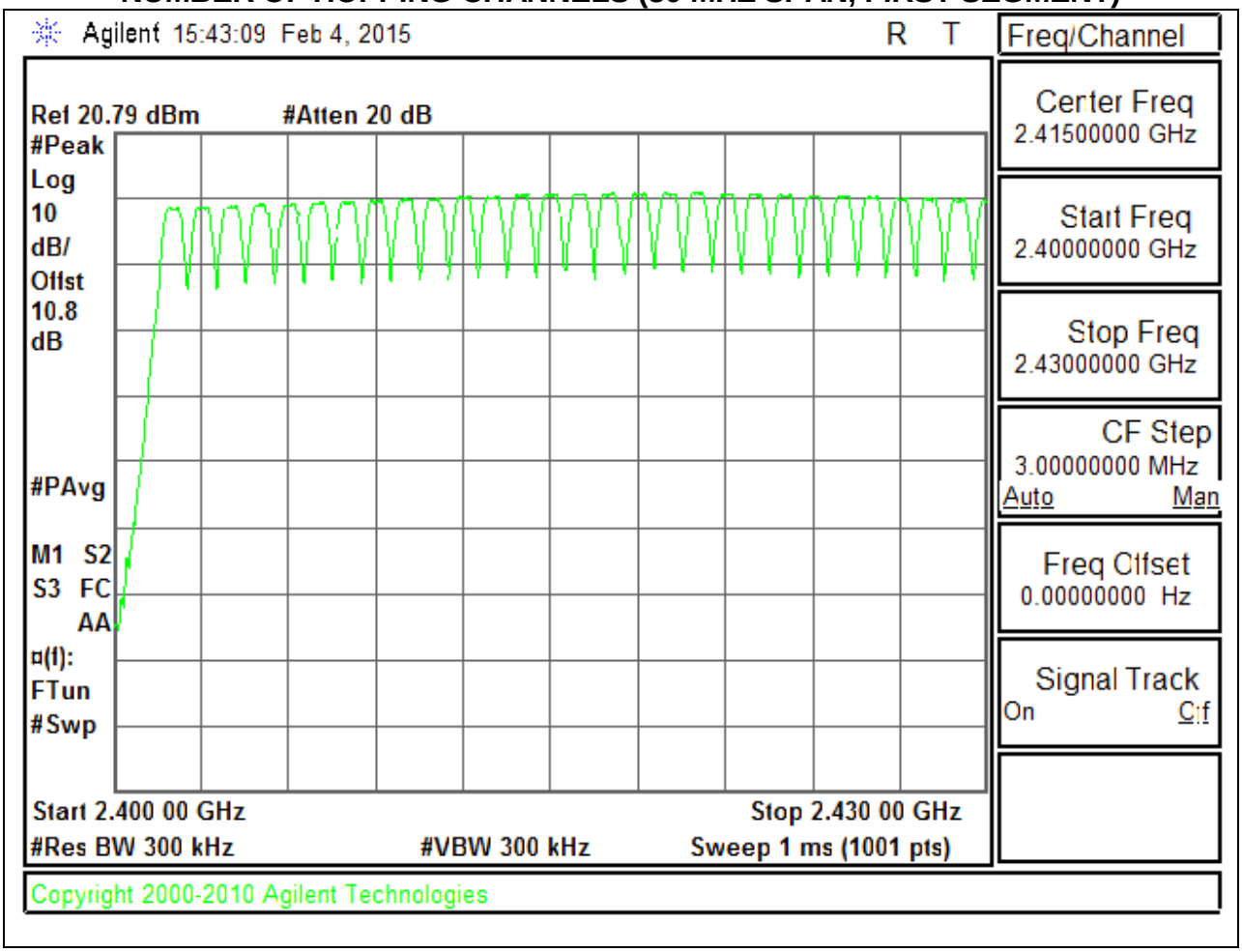
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



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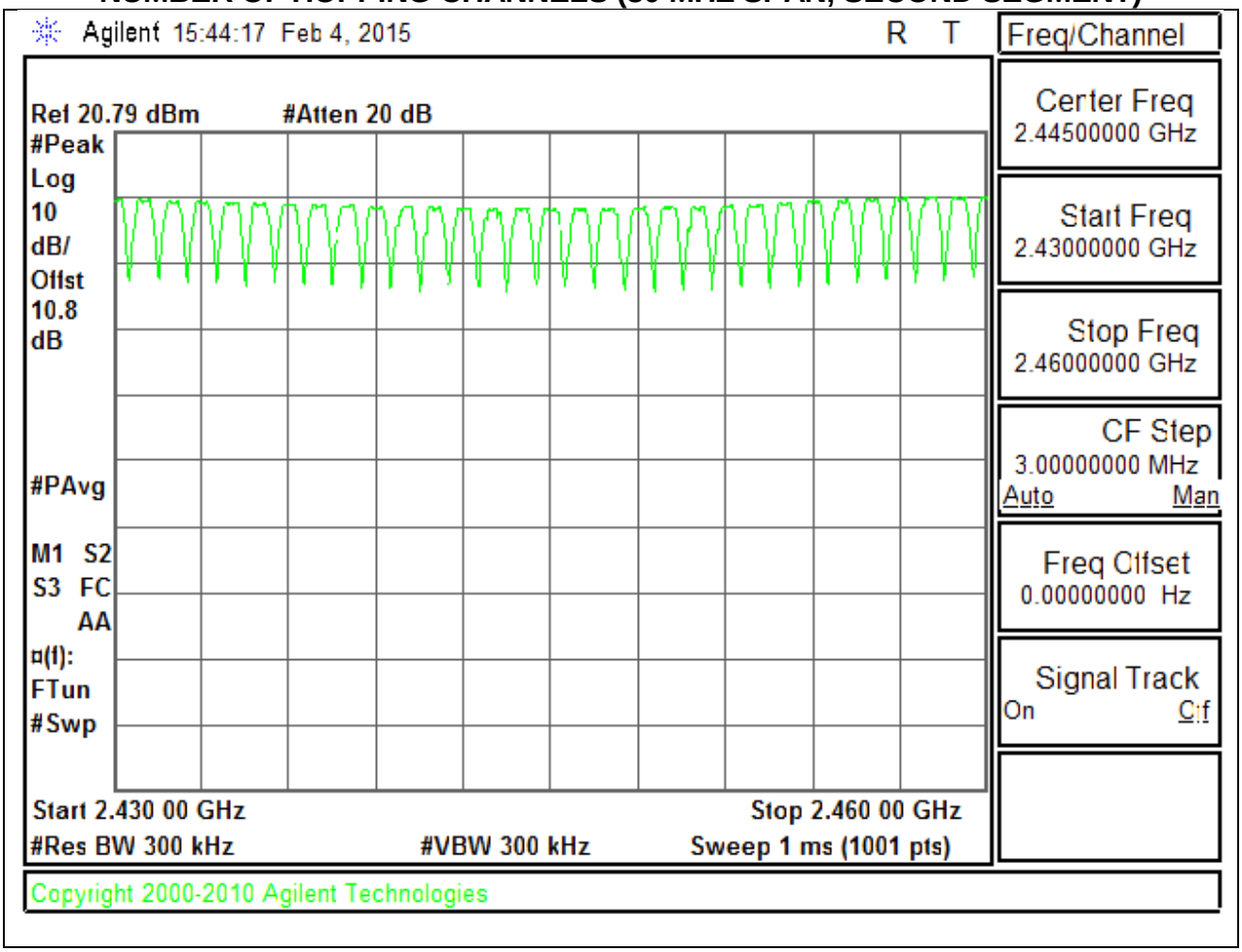
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



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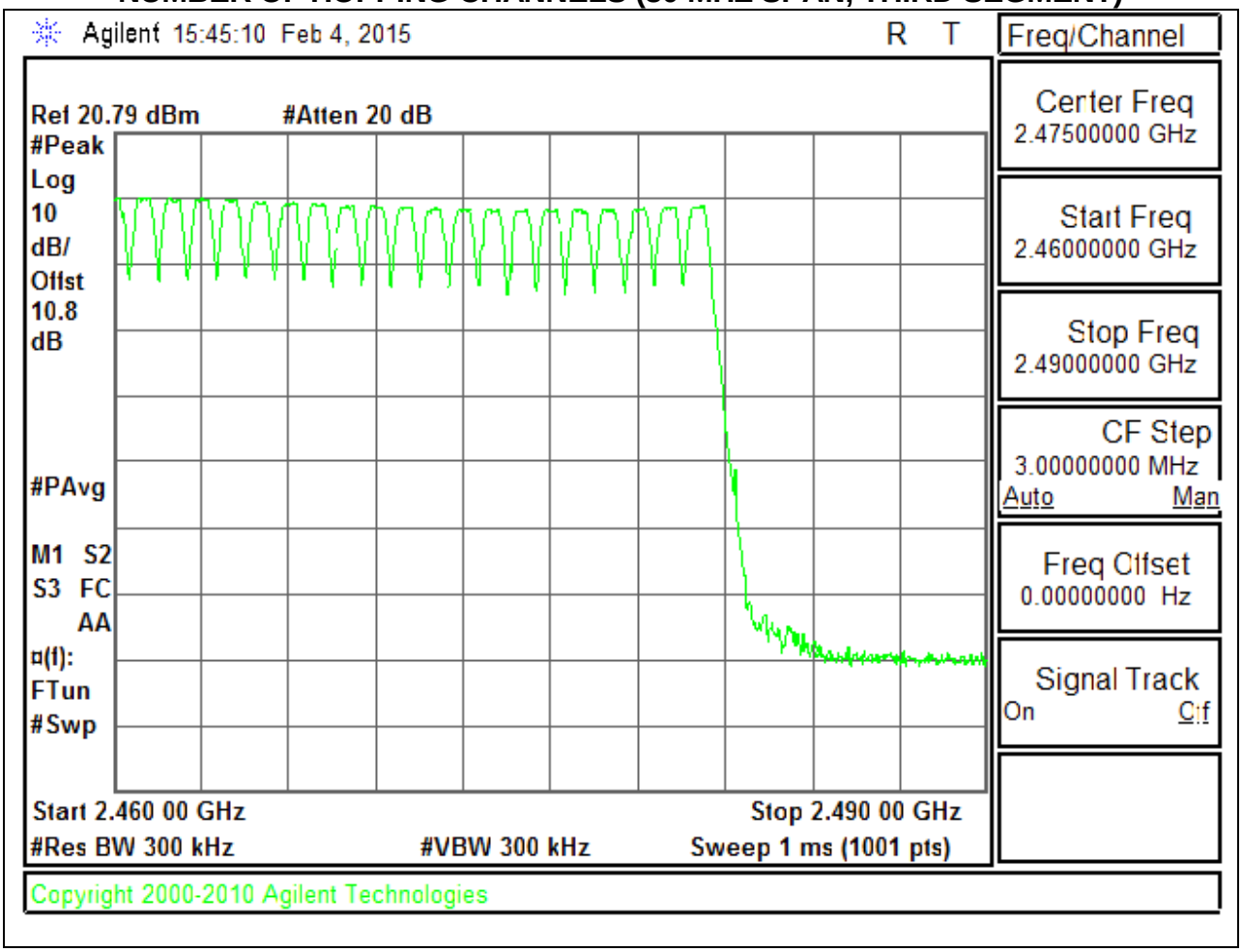
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



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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.

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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	0.38	31	0.1178	0.4	-0.2822
DH3	1.615	13	0.20995	0.4	-0.19005
DH5	2.87	13	0.3731	0.4	-0.0269
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	0.38	7.75	0.02945	0.4	-0.37055
DH3	1.615	3.25	0.0524875	0.4	-0.34751
DH5	2.87	3.25	0.093275	0.4	-0.30673

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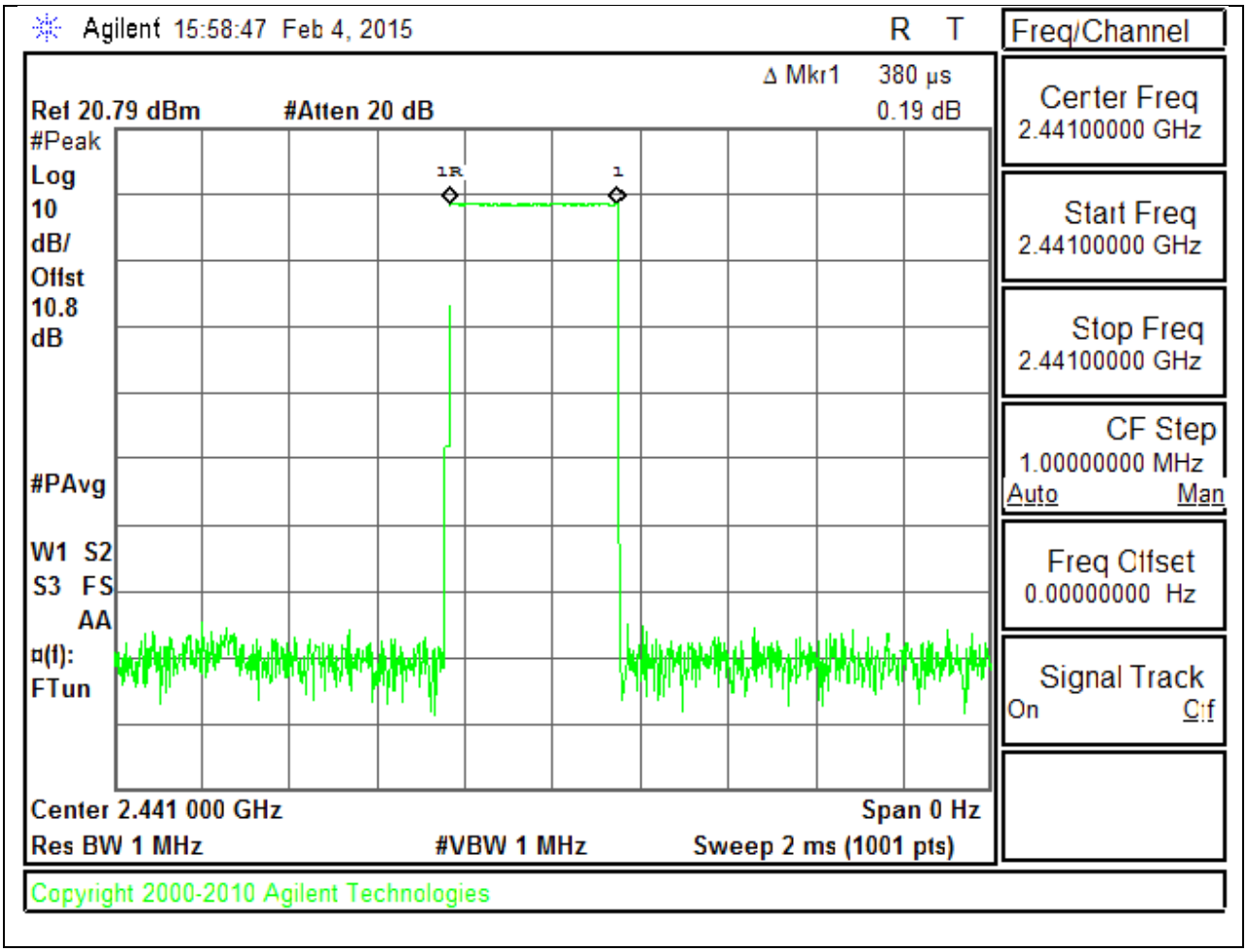
PULSE WIDTH - DH1



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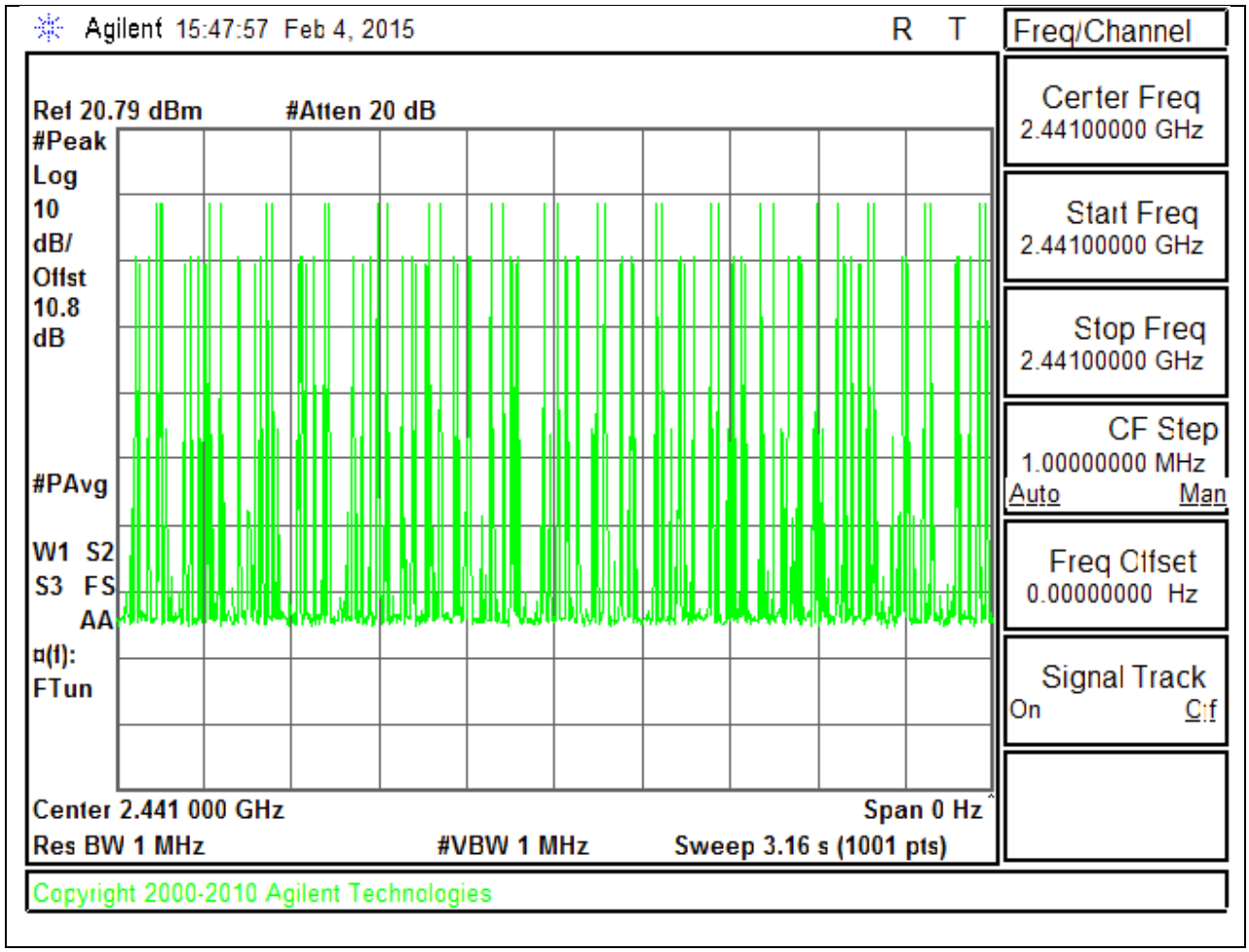
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1



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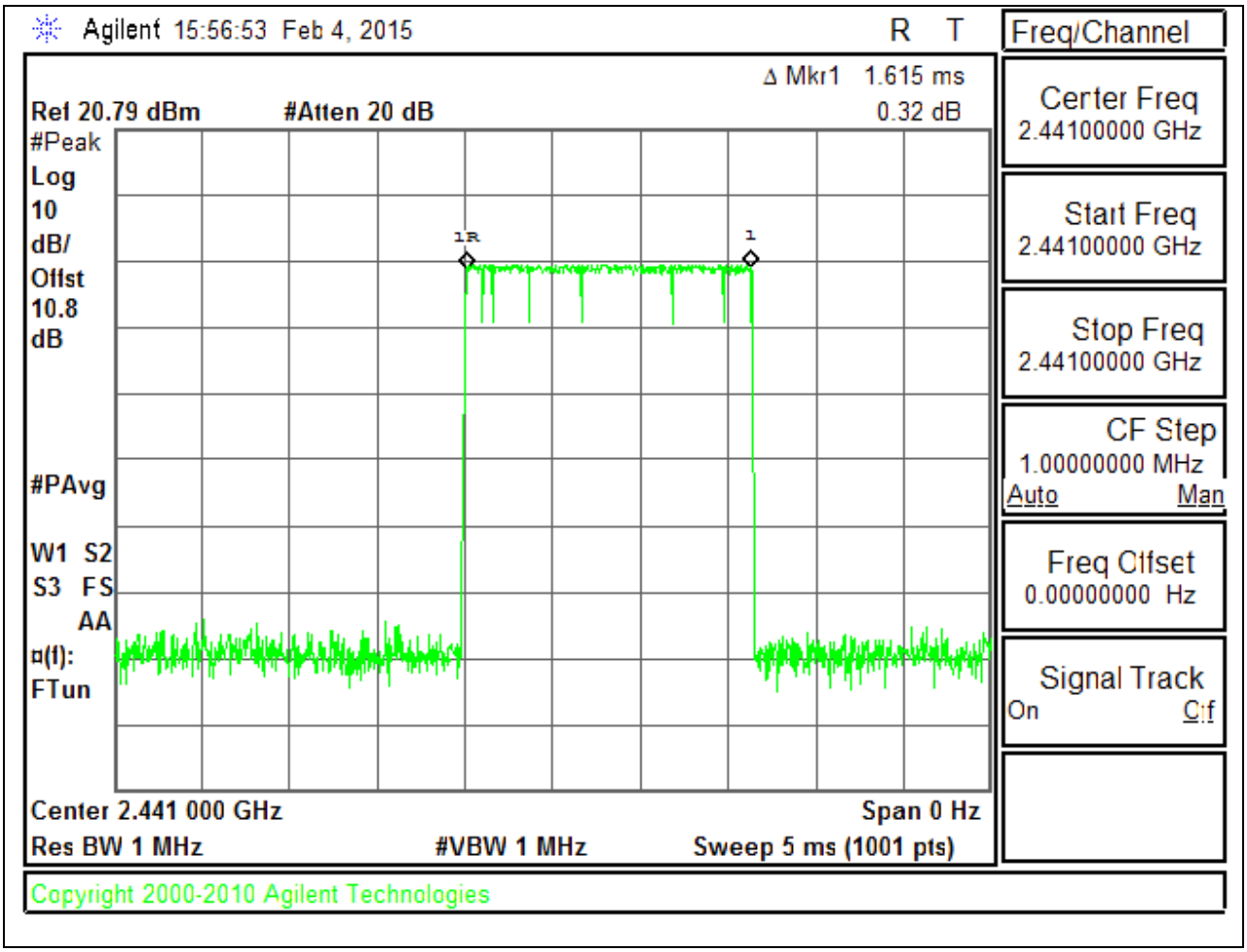
PULSE WIDTH - DH3



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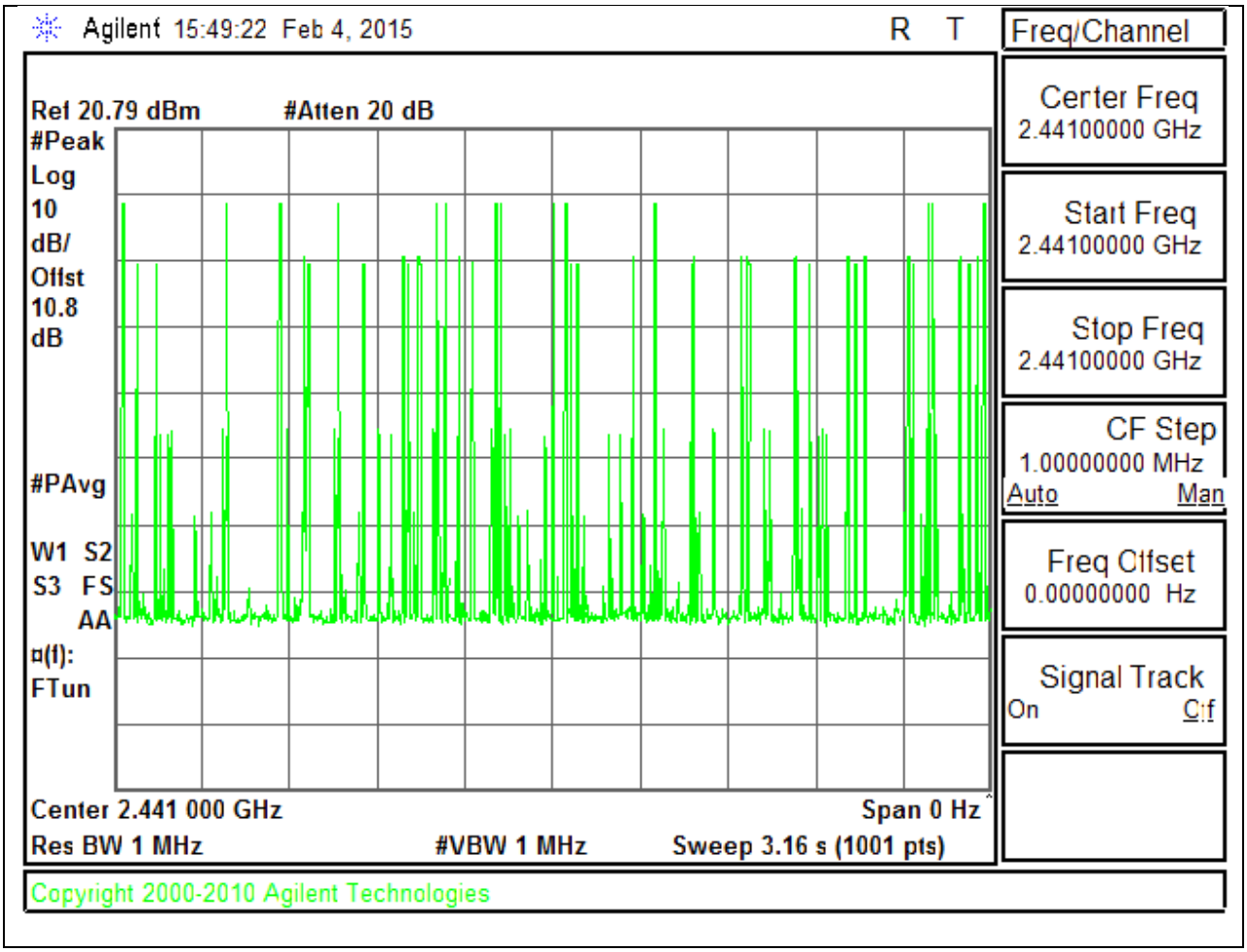
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH3



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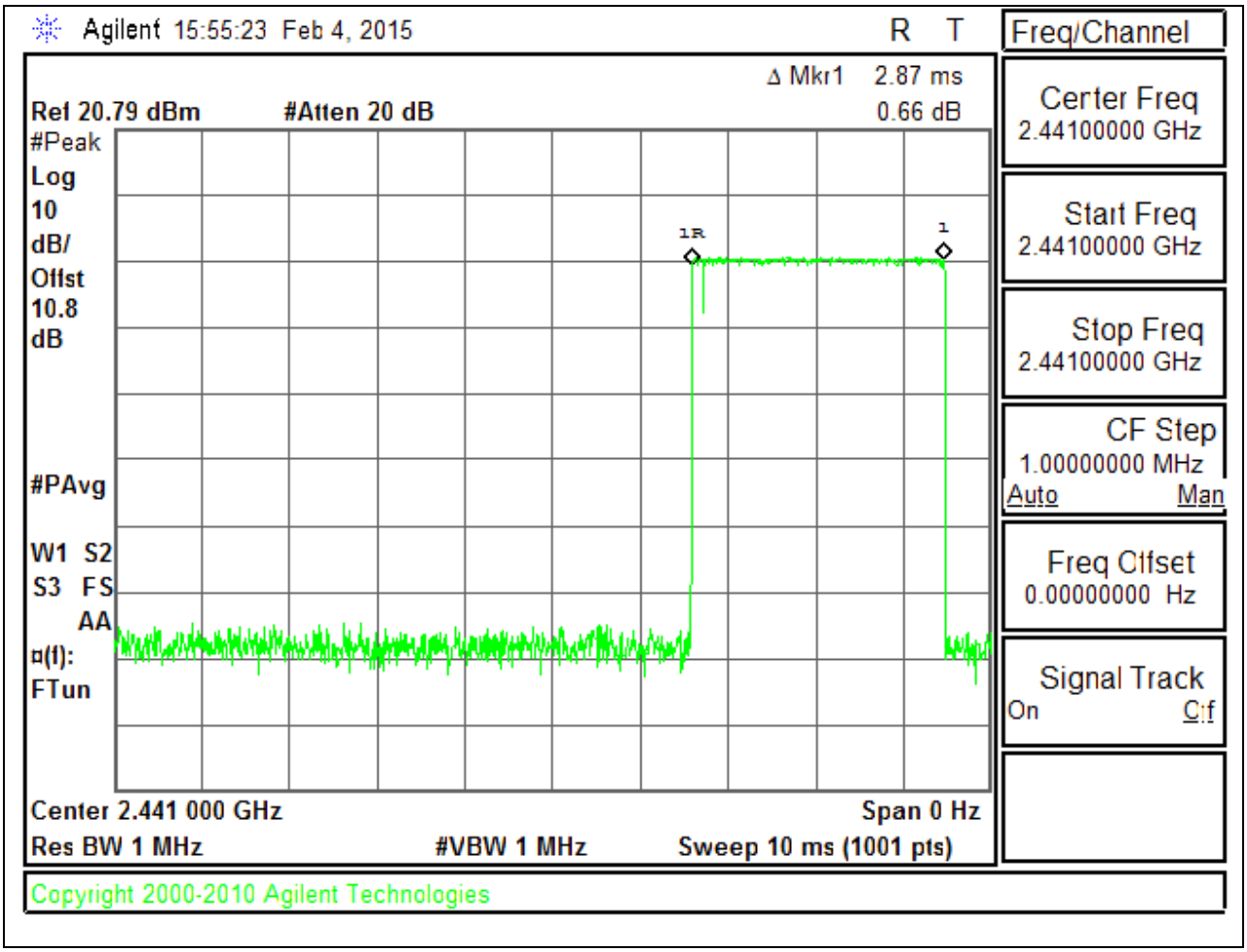
PULSE WIDTH - DH5



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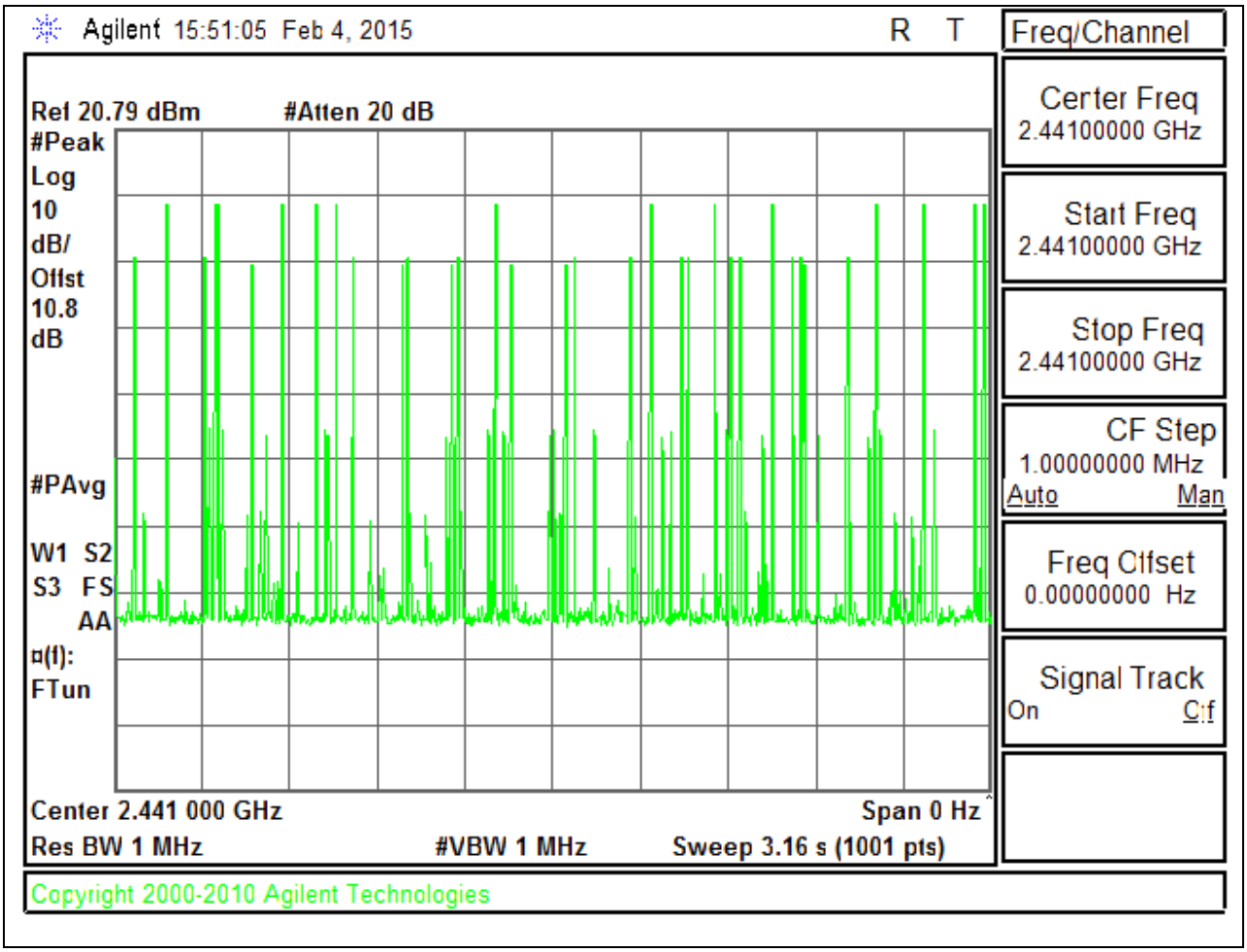
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH5



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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	9.5	21	-11.5
Middle	2441	9.46	21	-11.54
High	2480	9.85	21	-11.15
Worst		9.85		-11.15

8.5.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.86	21	-11.14
Middle	2441	9.8	21	-11.2
High	2480	10.09	21	-10.91
Worst		10.09		-10.91

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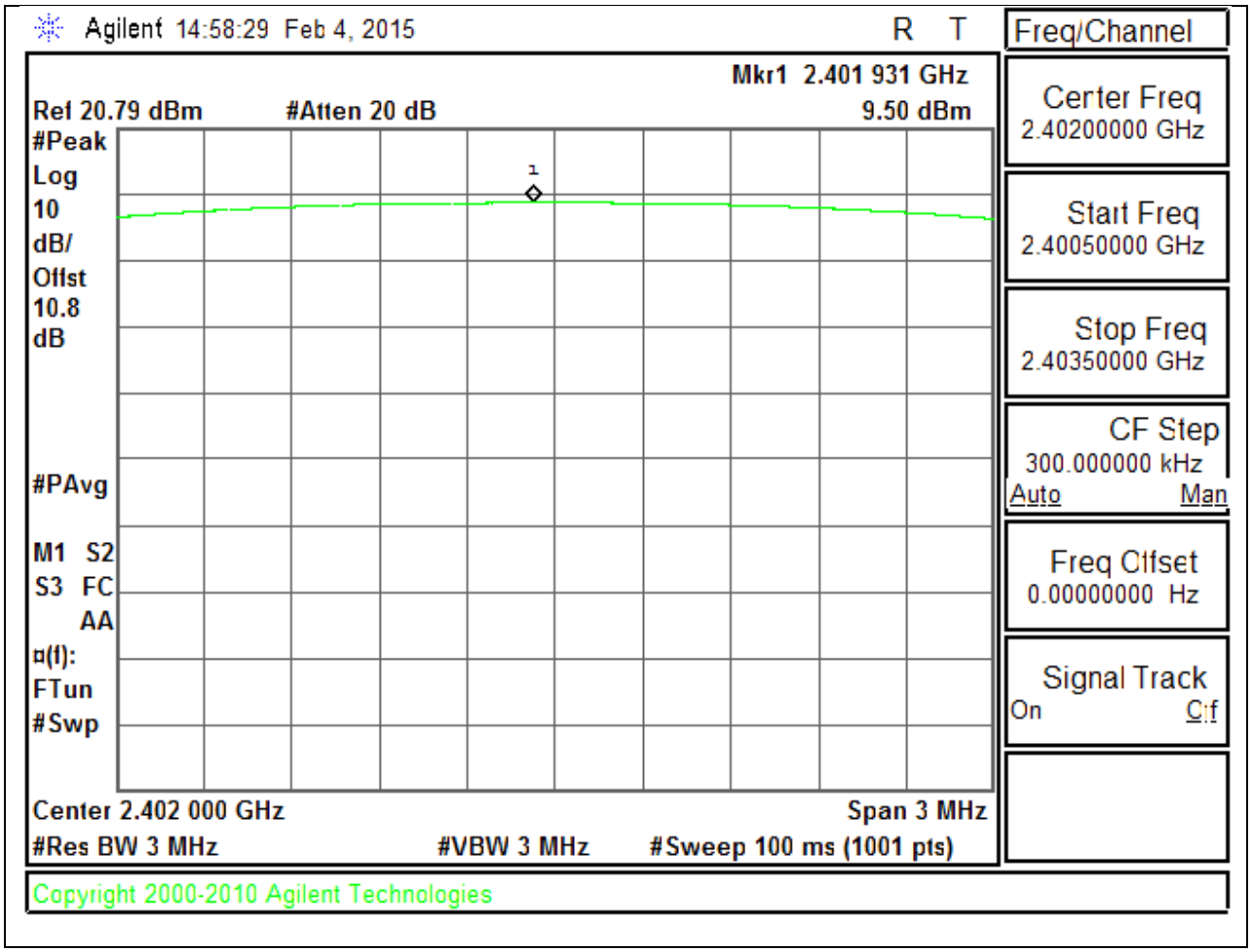
8.5.3. OUTPUT POWER PLOTS

GFSK OUTPUT POWER

LOW CHANNEL



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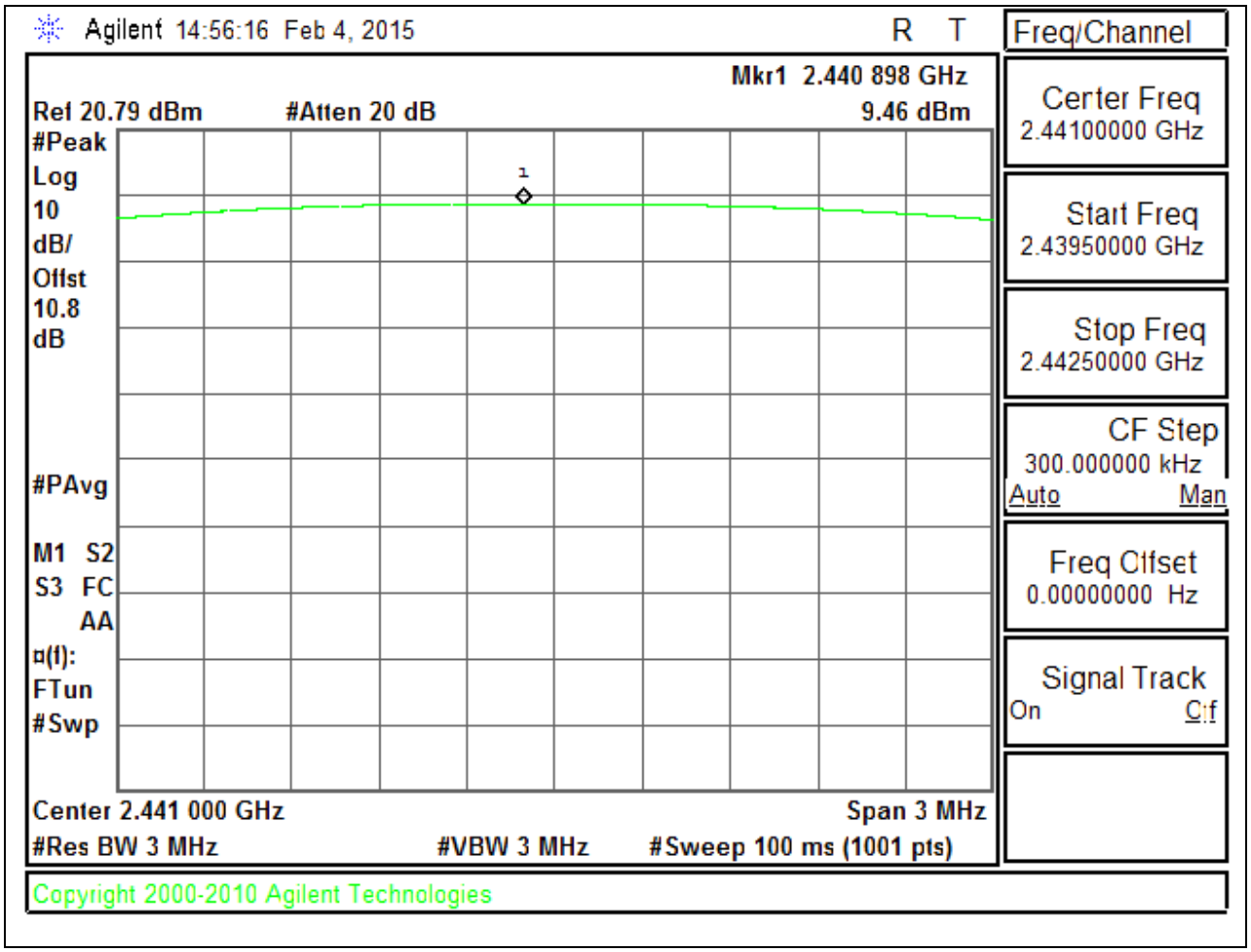
MID CHANNEL



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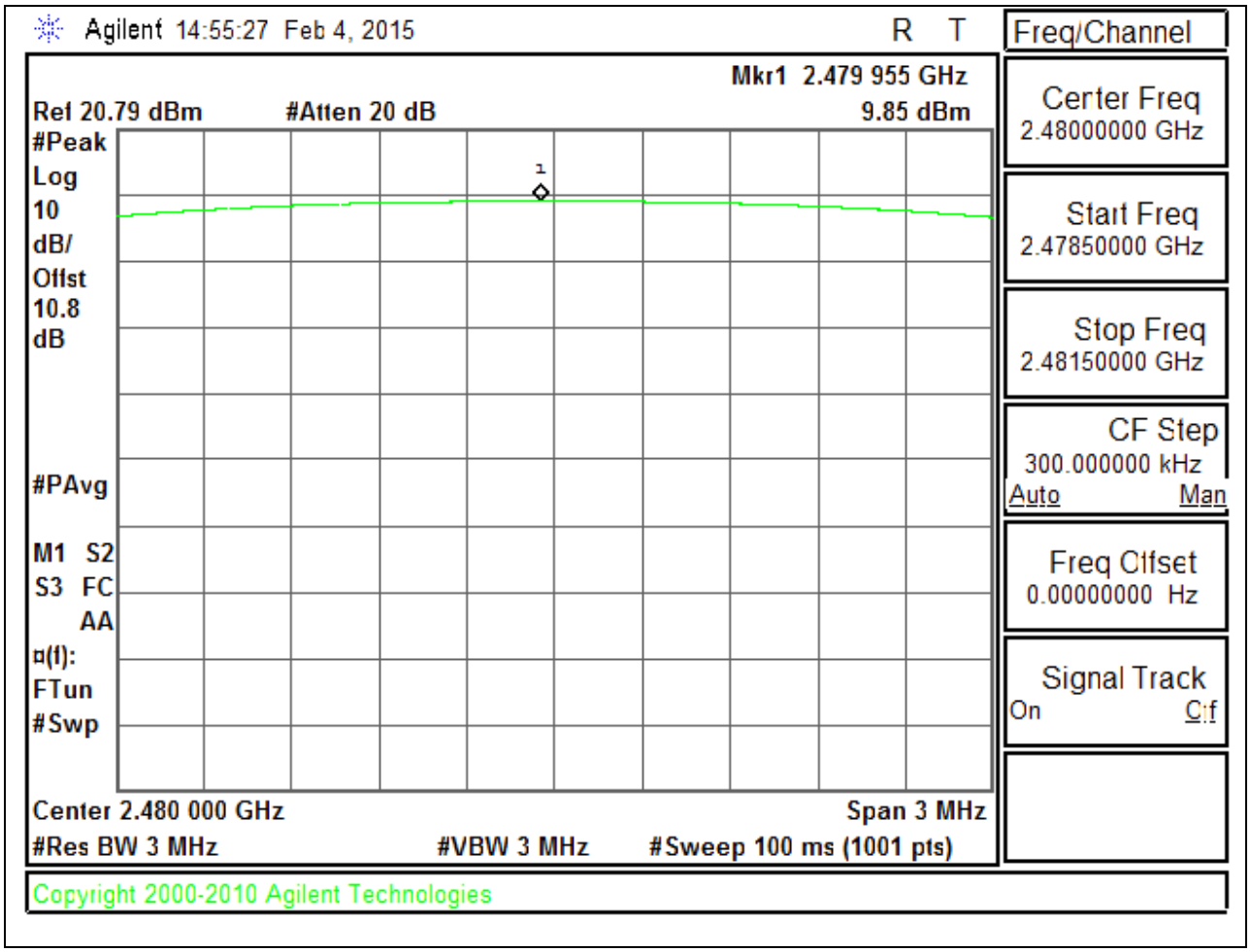
HIGH CHANNEL



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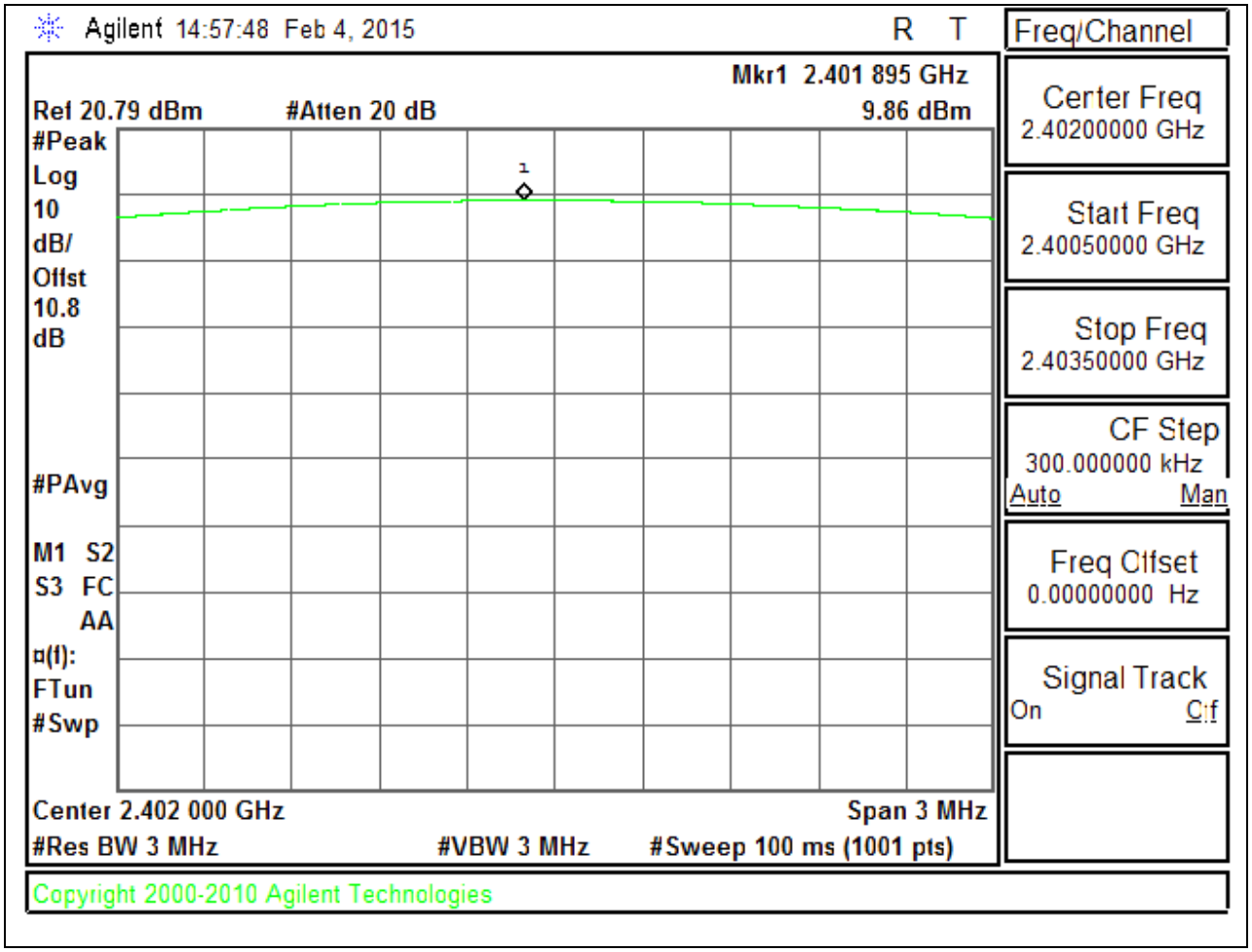
8PSK OUTPUT POWER

LOW CHANNEL



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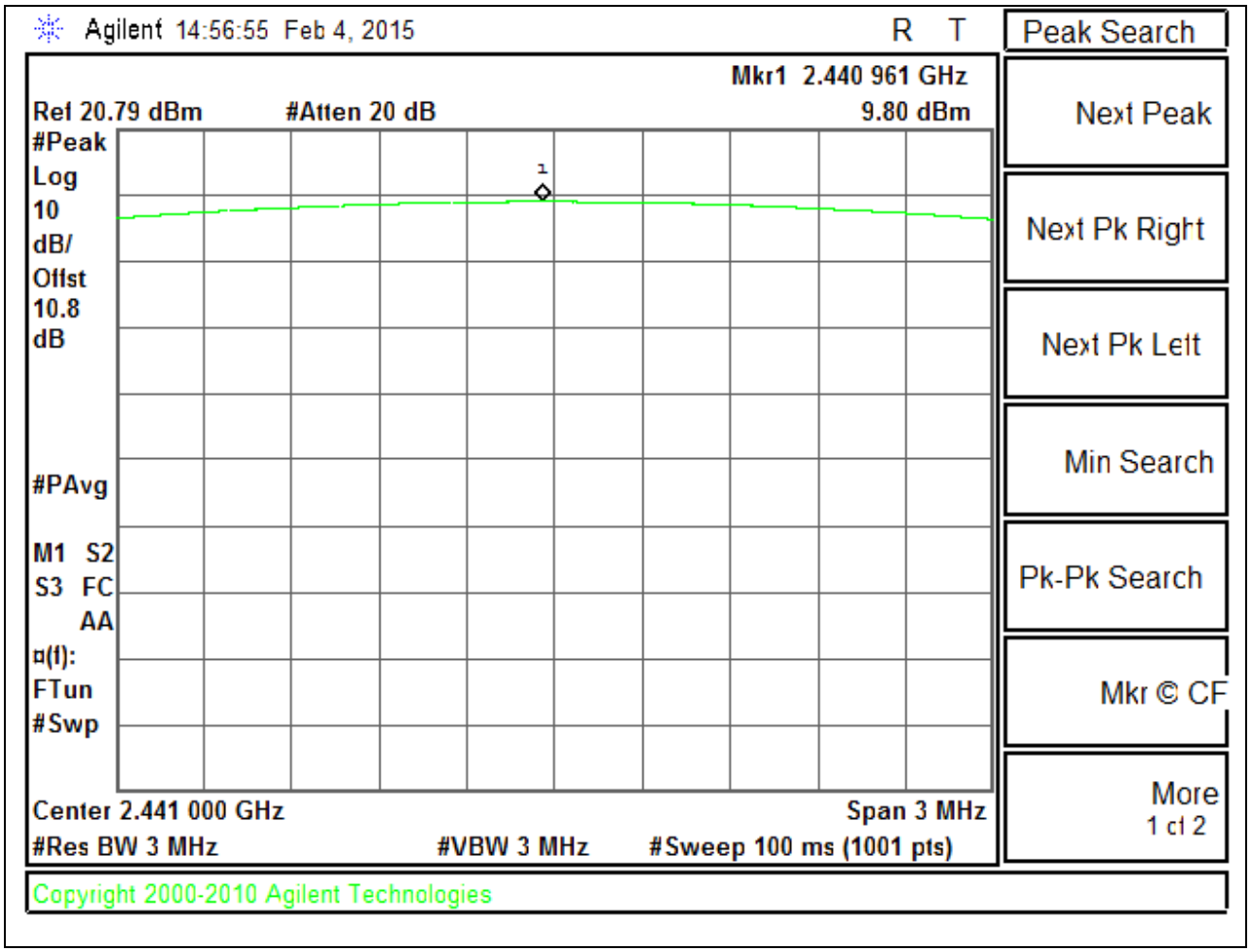
MID CHANNEL



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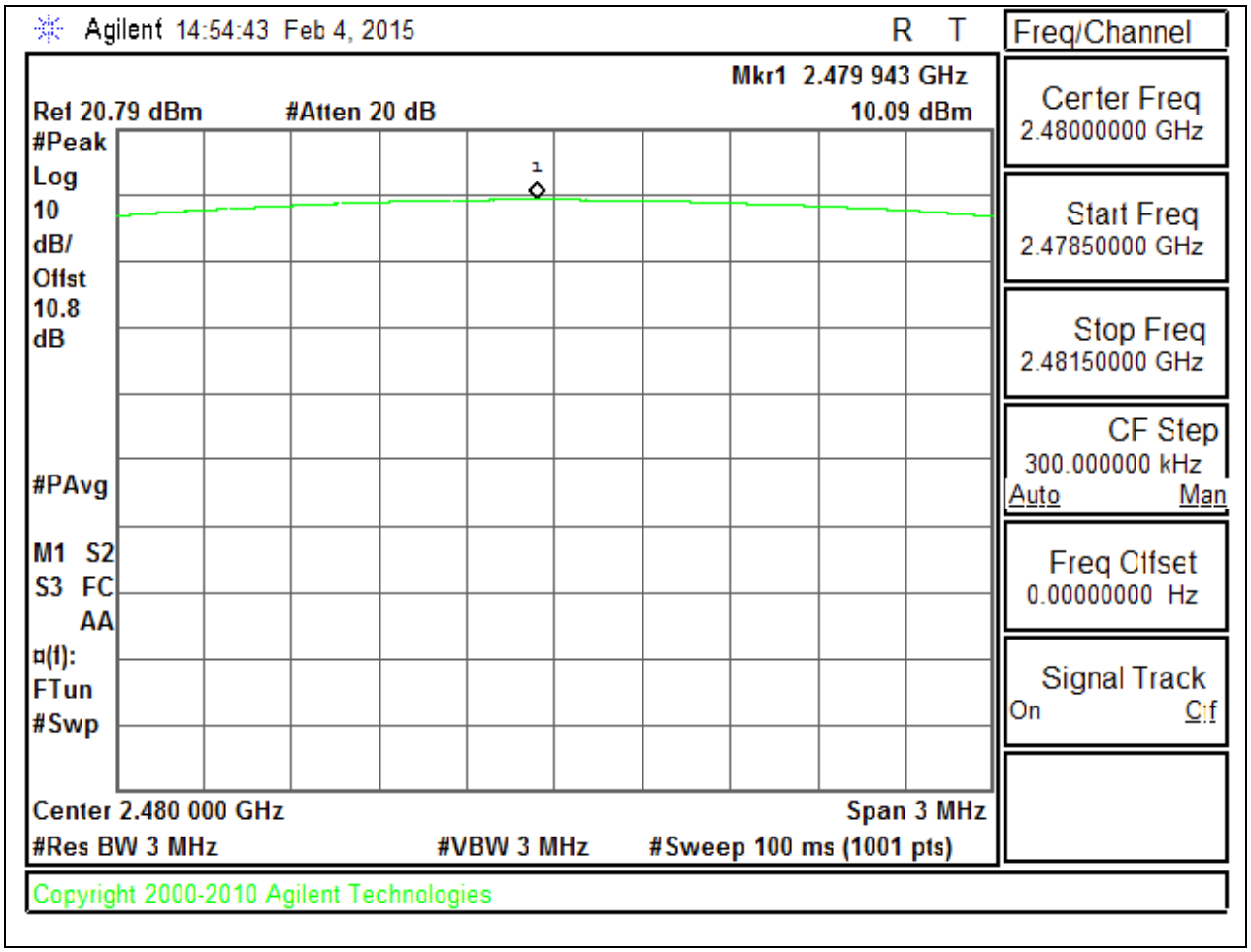
HIGH CHANNEL



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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.

8.6.1. BASIC DATA RATE GFSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	9.5
Middle	2441	9.4
High	2480	9.8
Worst		9.8

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8.6.2. DATA RATE PI/4-DQPSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.03
Middle	2441	6.31
High	2480	6.76
Worst		6.76

8.6.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.17
Middle	2441	6.31
High	2480	6.92
Worst		6.92

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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

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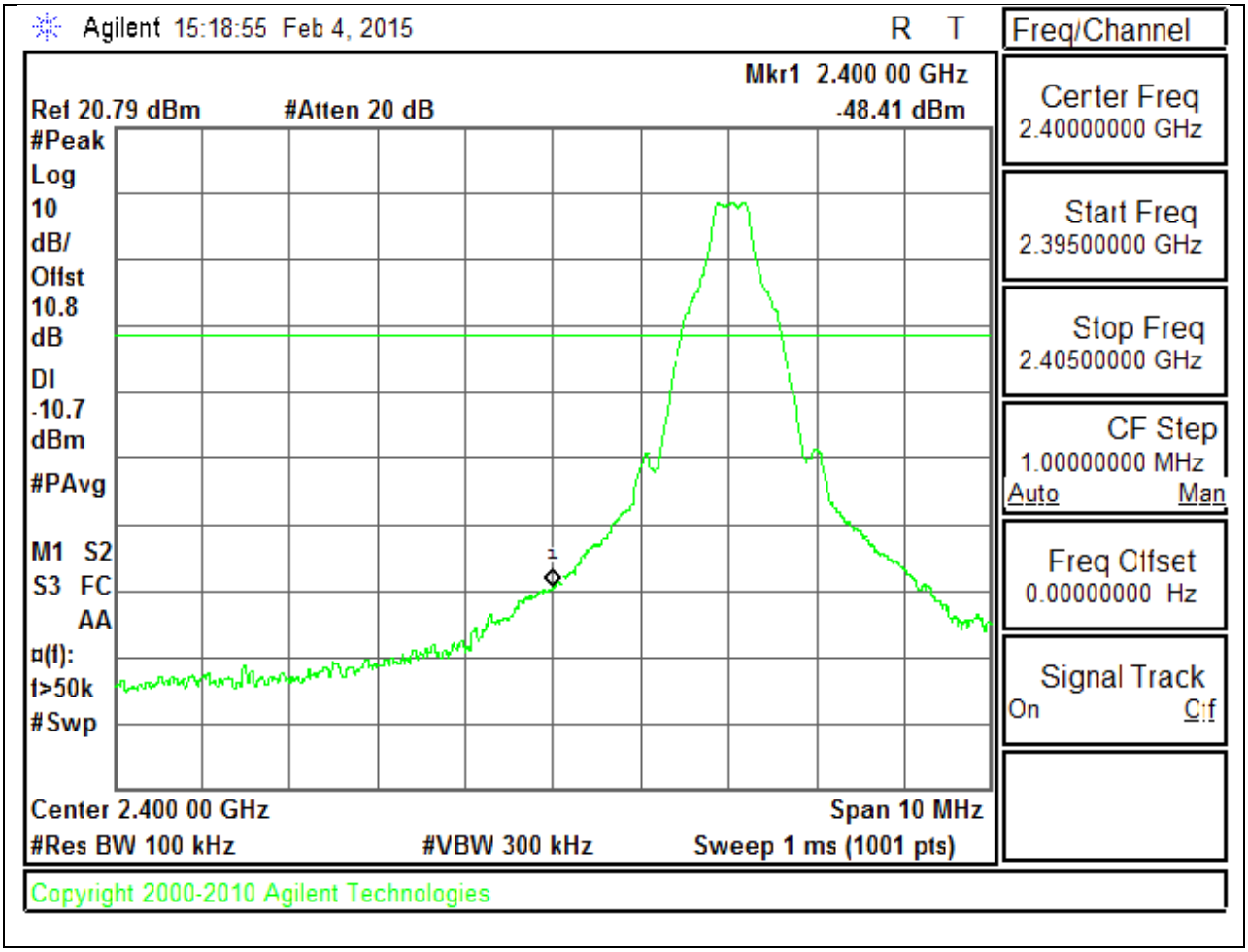
8.7.1. BASIC DATA RATE GFSK MODULATION

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



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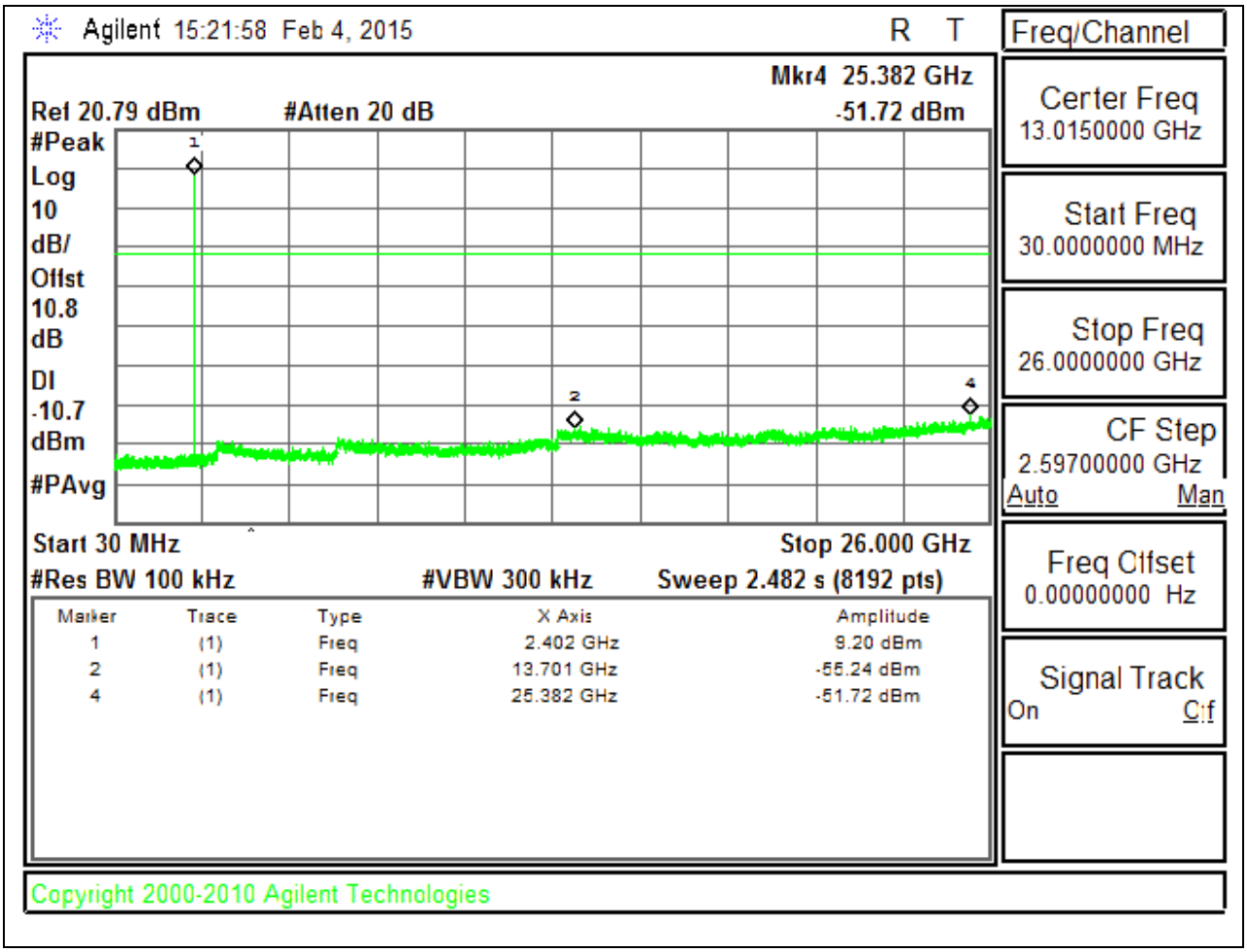
LOW CHANNEL SPURIOUS



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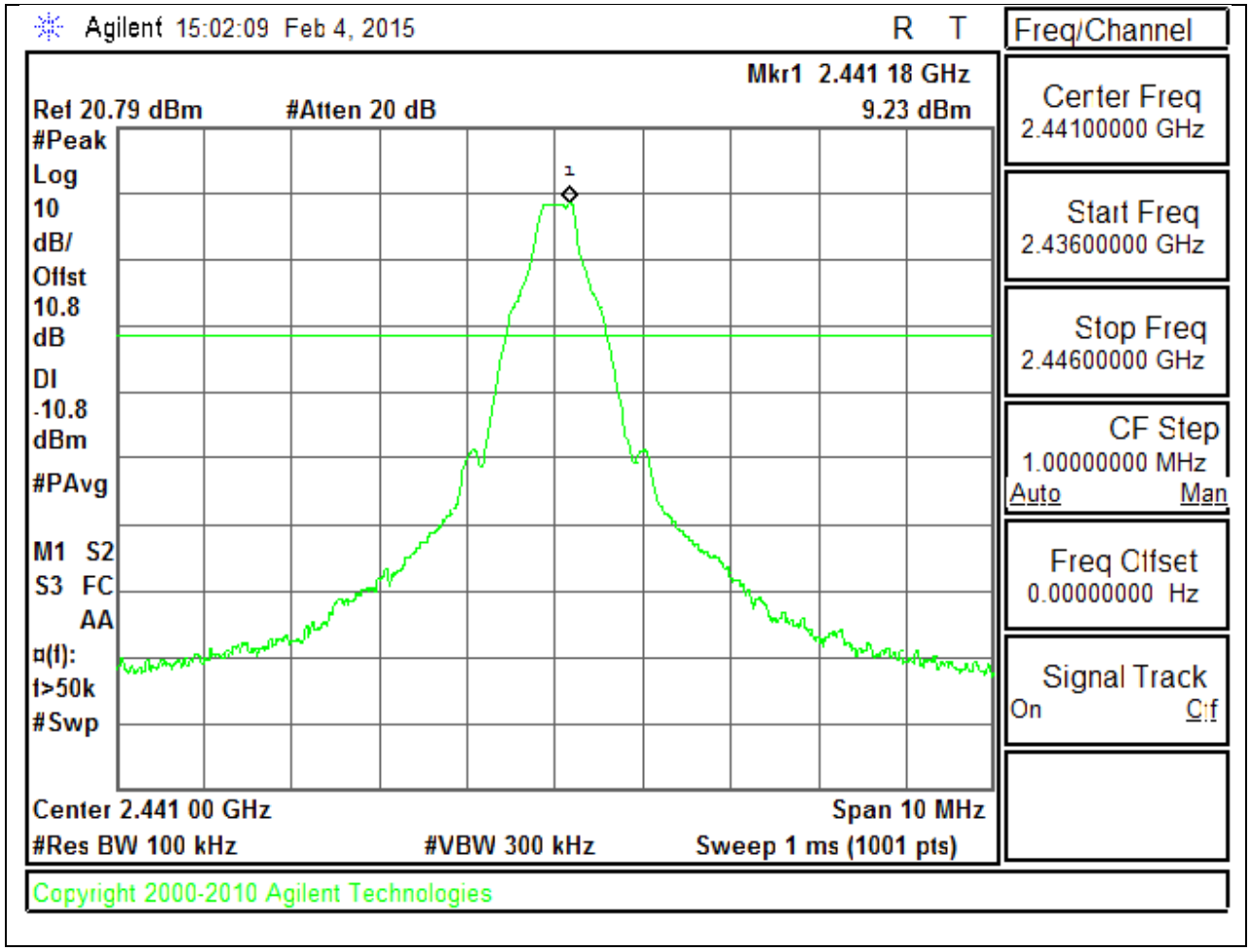
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL BANDEDGE



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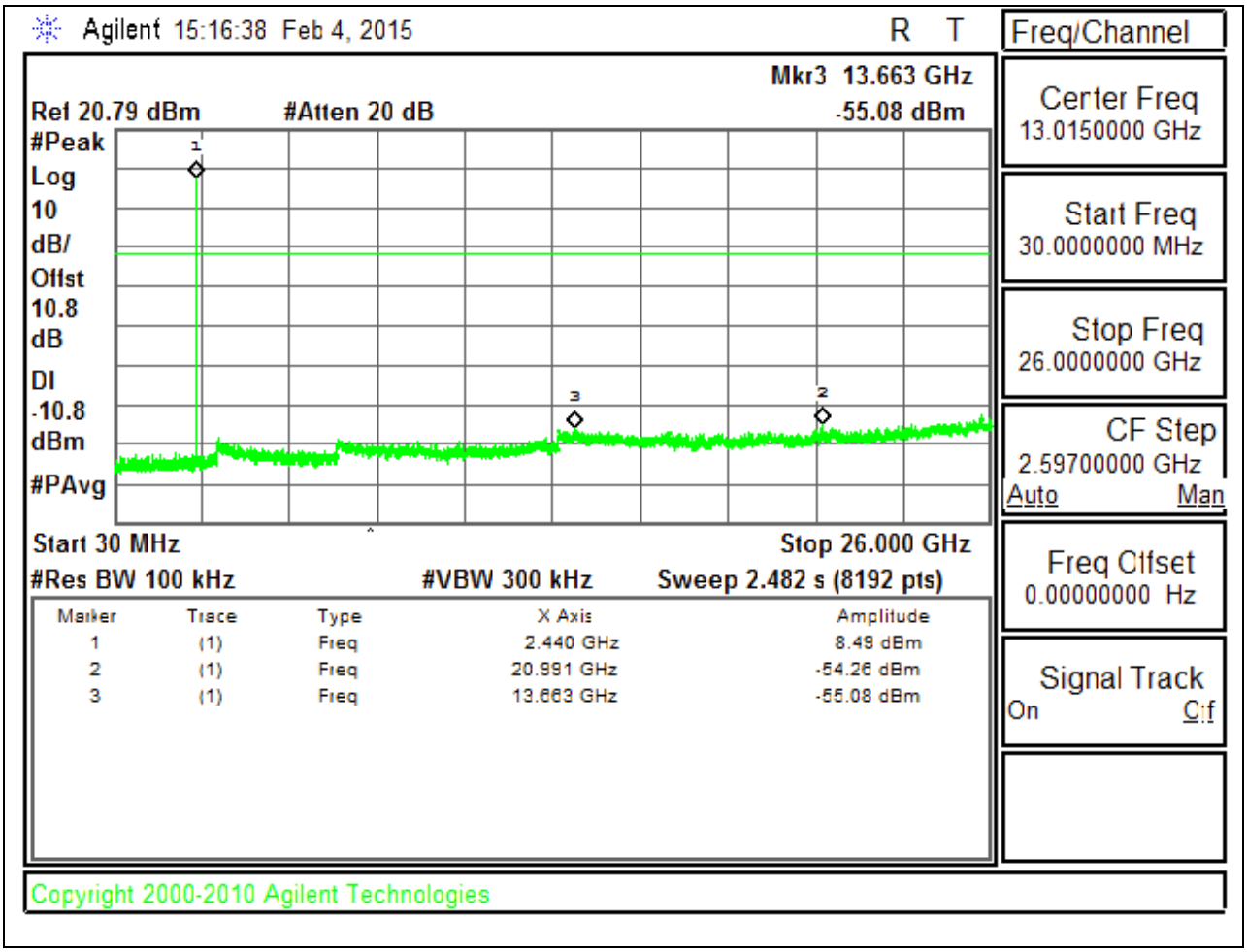
MID CHANNEL SPURIOUS



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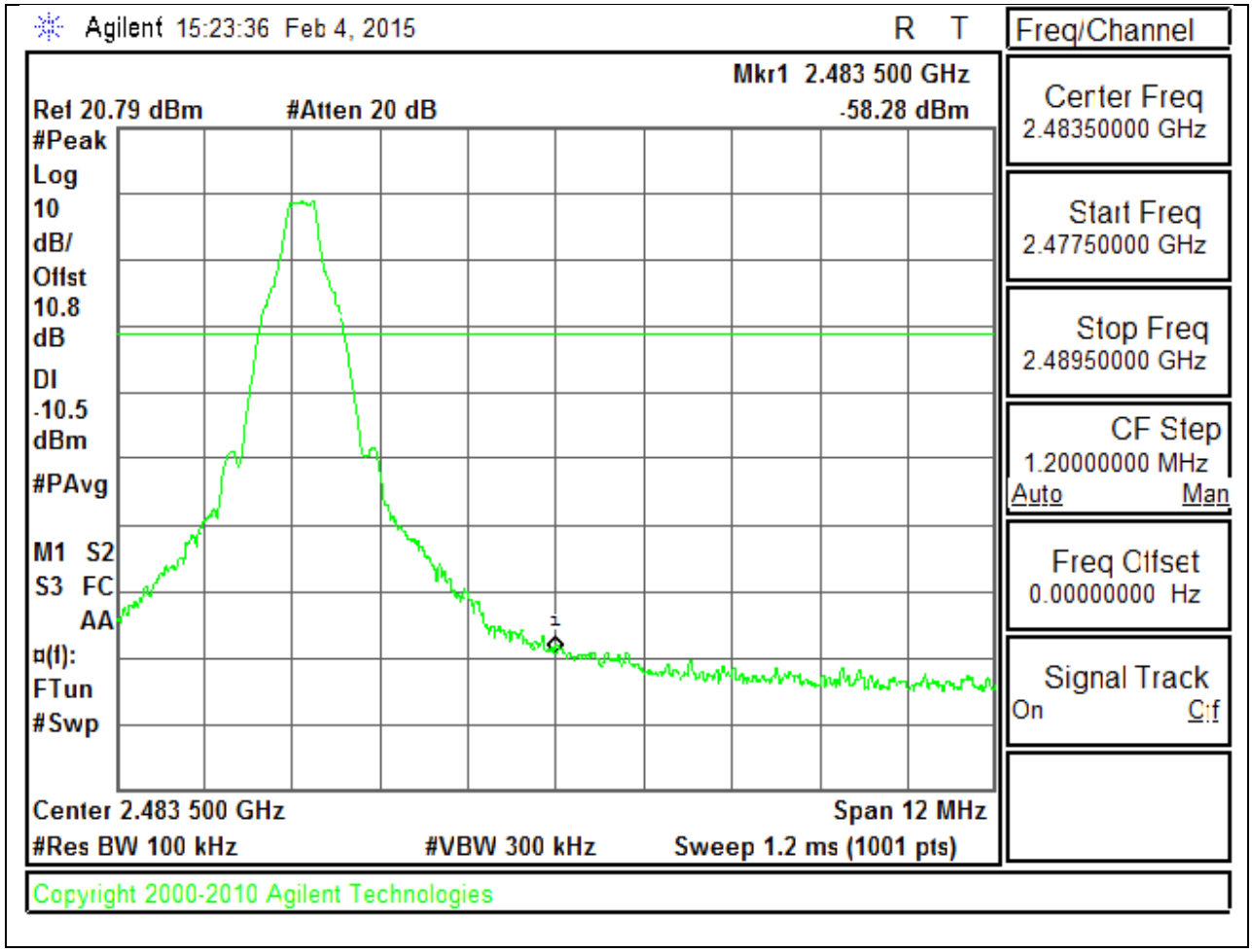
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



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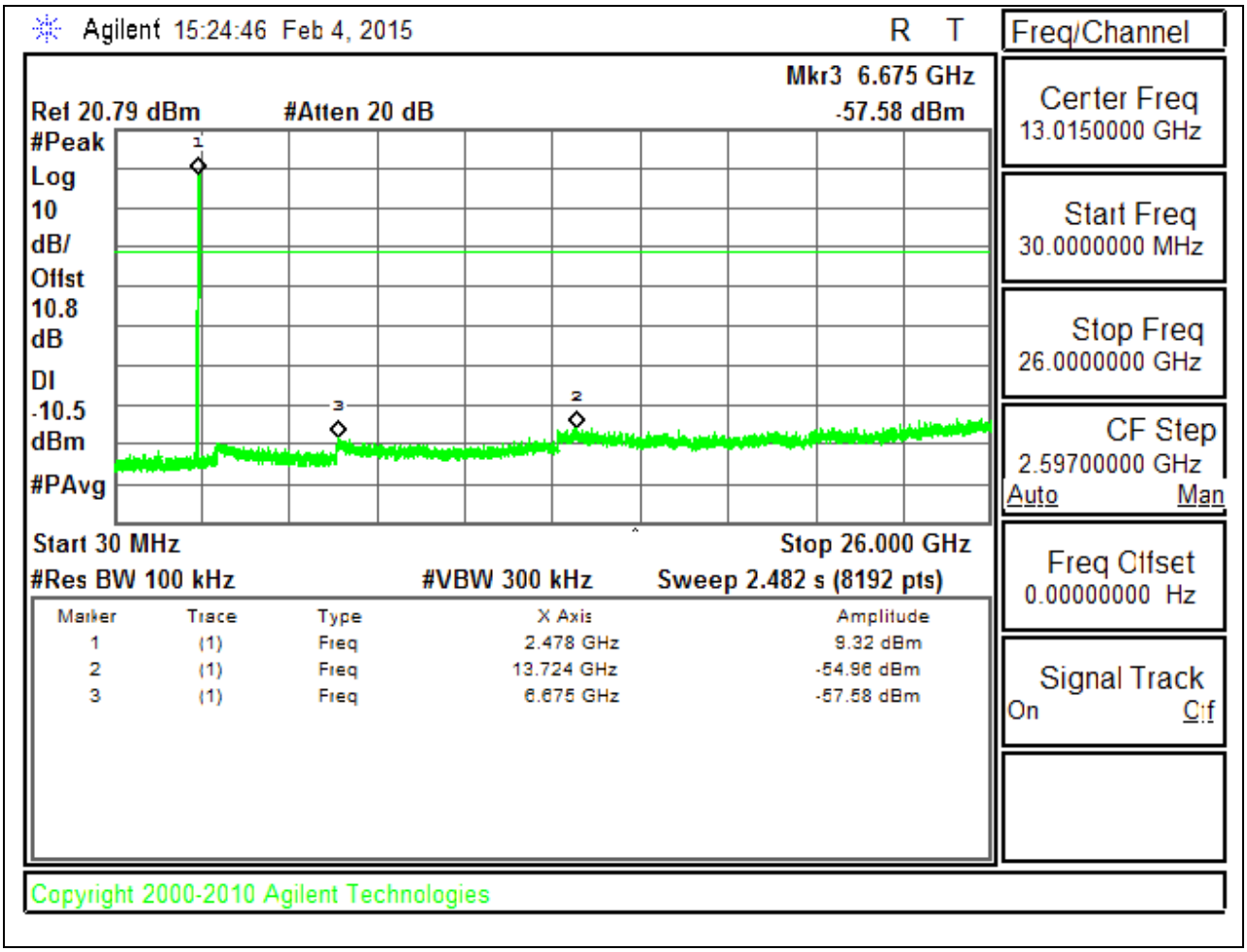
HIGH CHANNEL SPURIOUS



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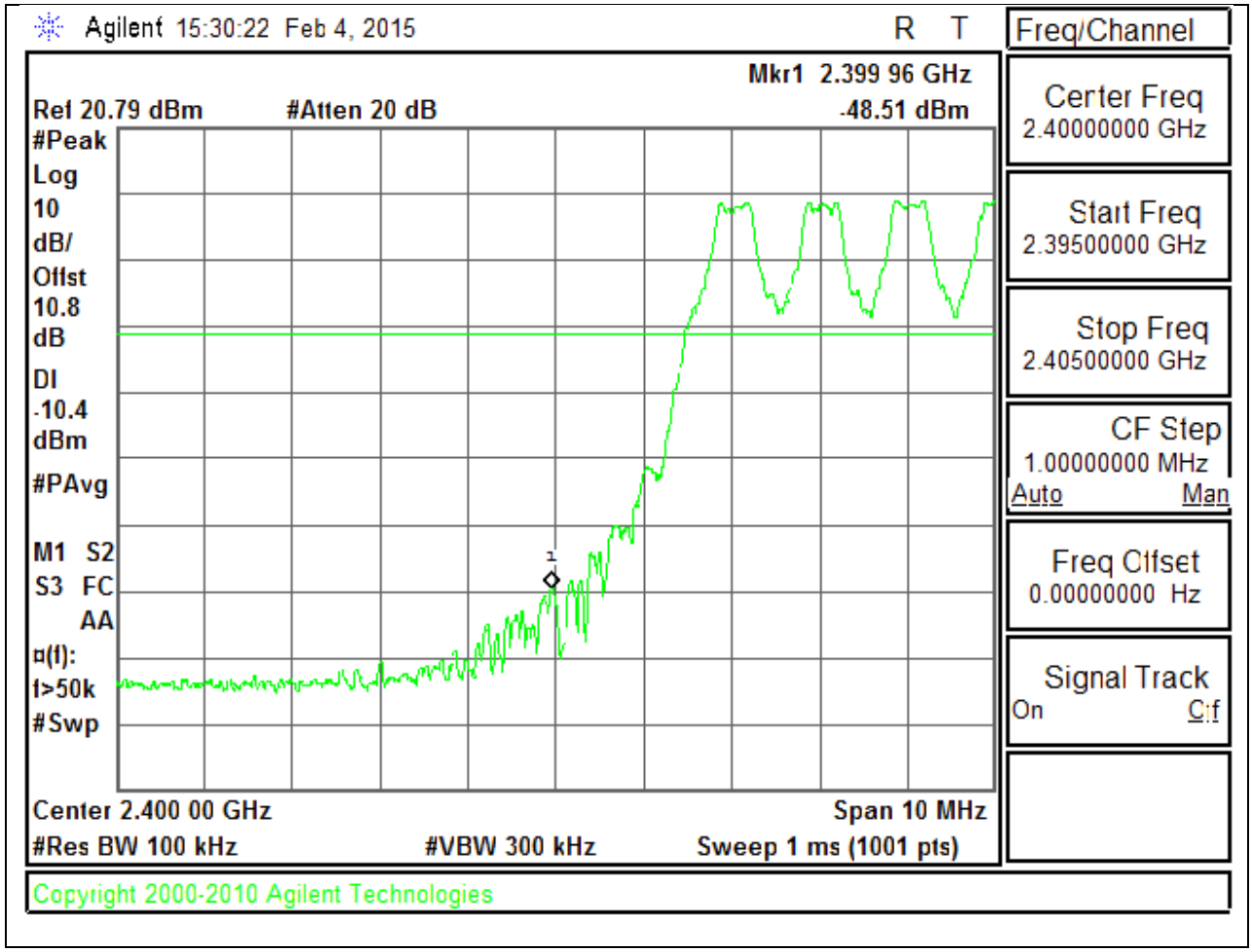
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



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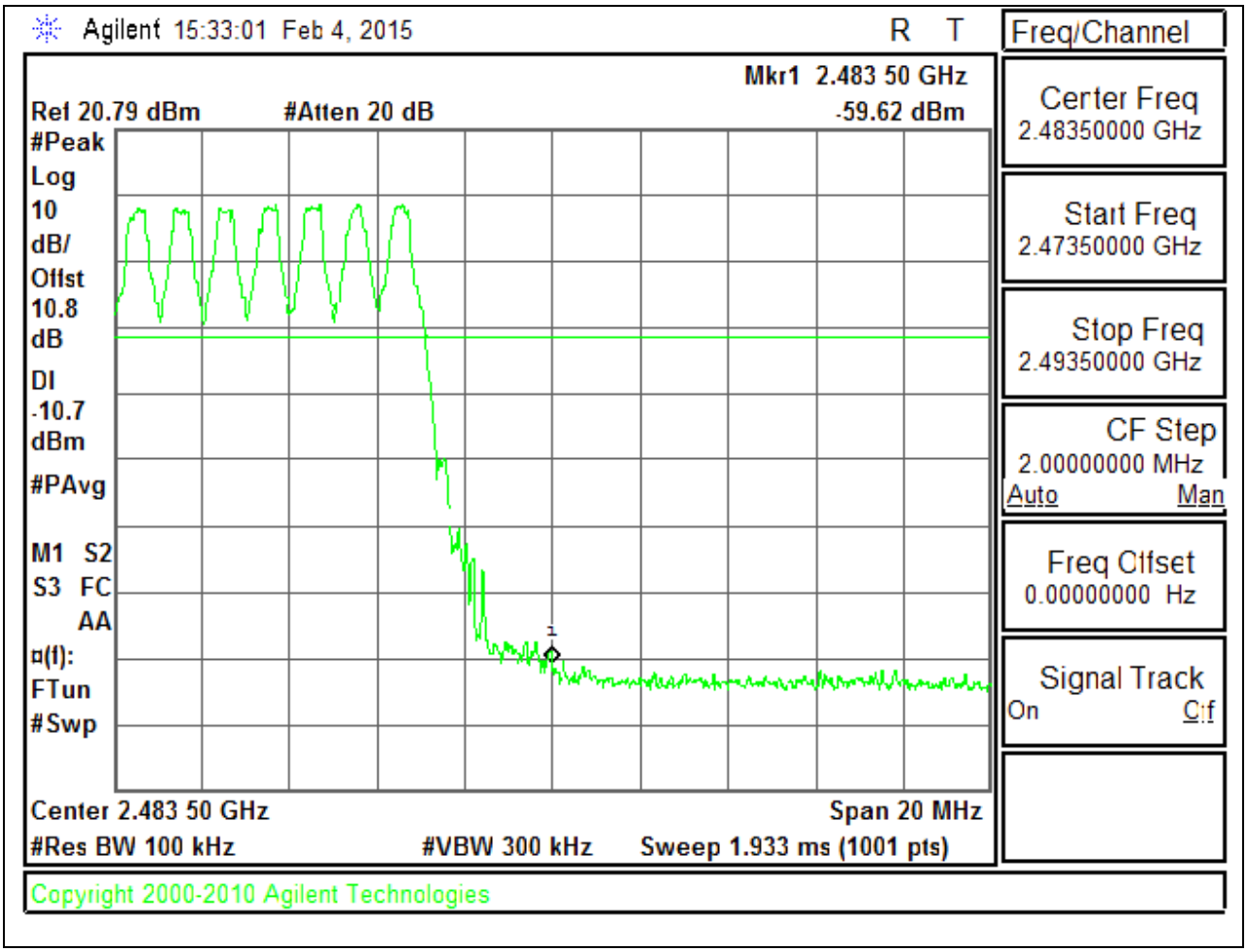
HIGH BANDEDGE WITH HOPPING ON



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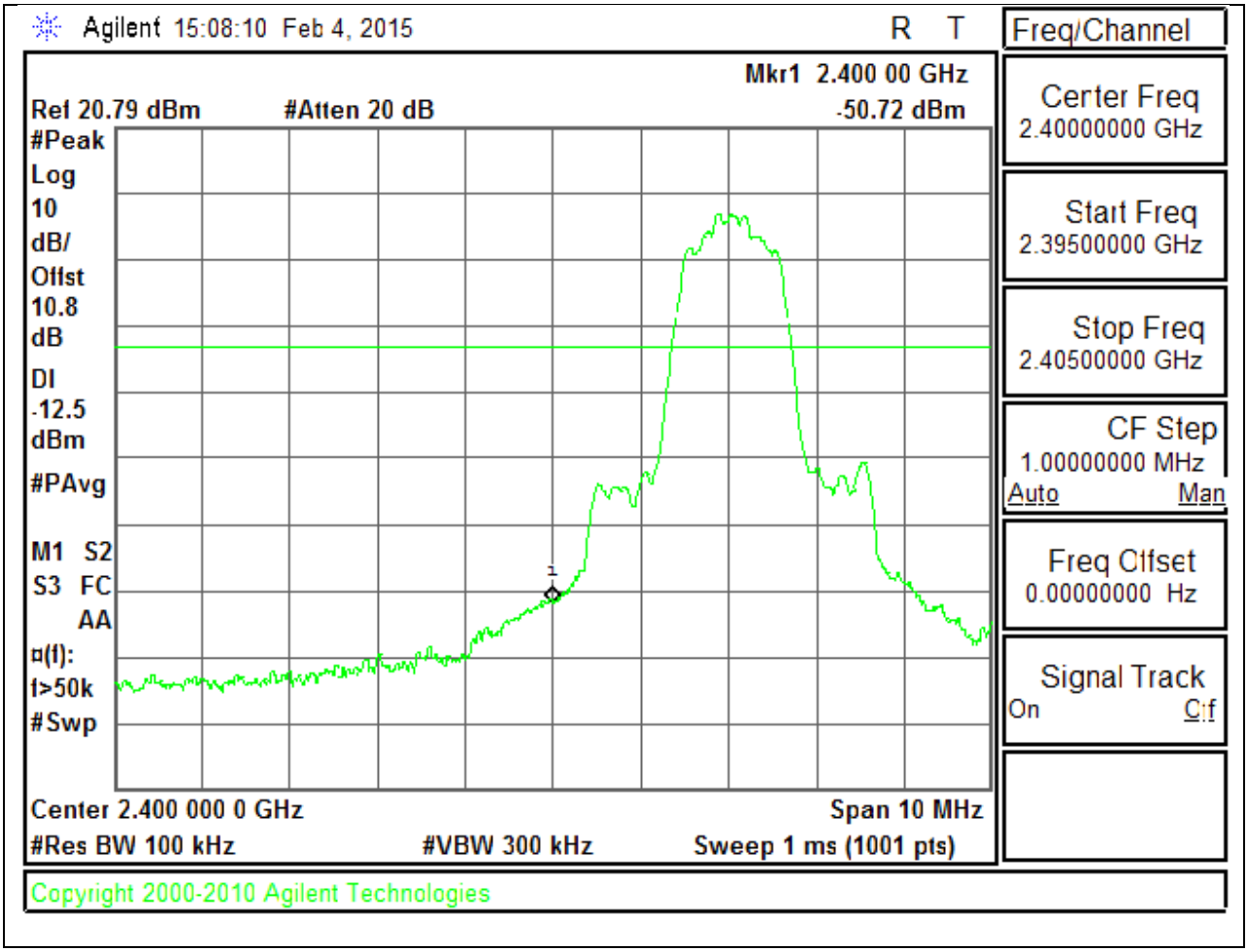
ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



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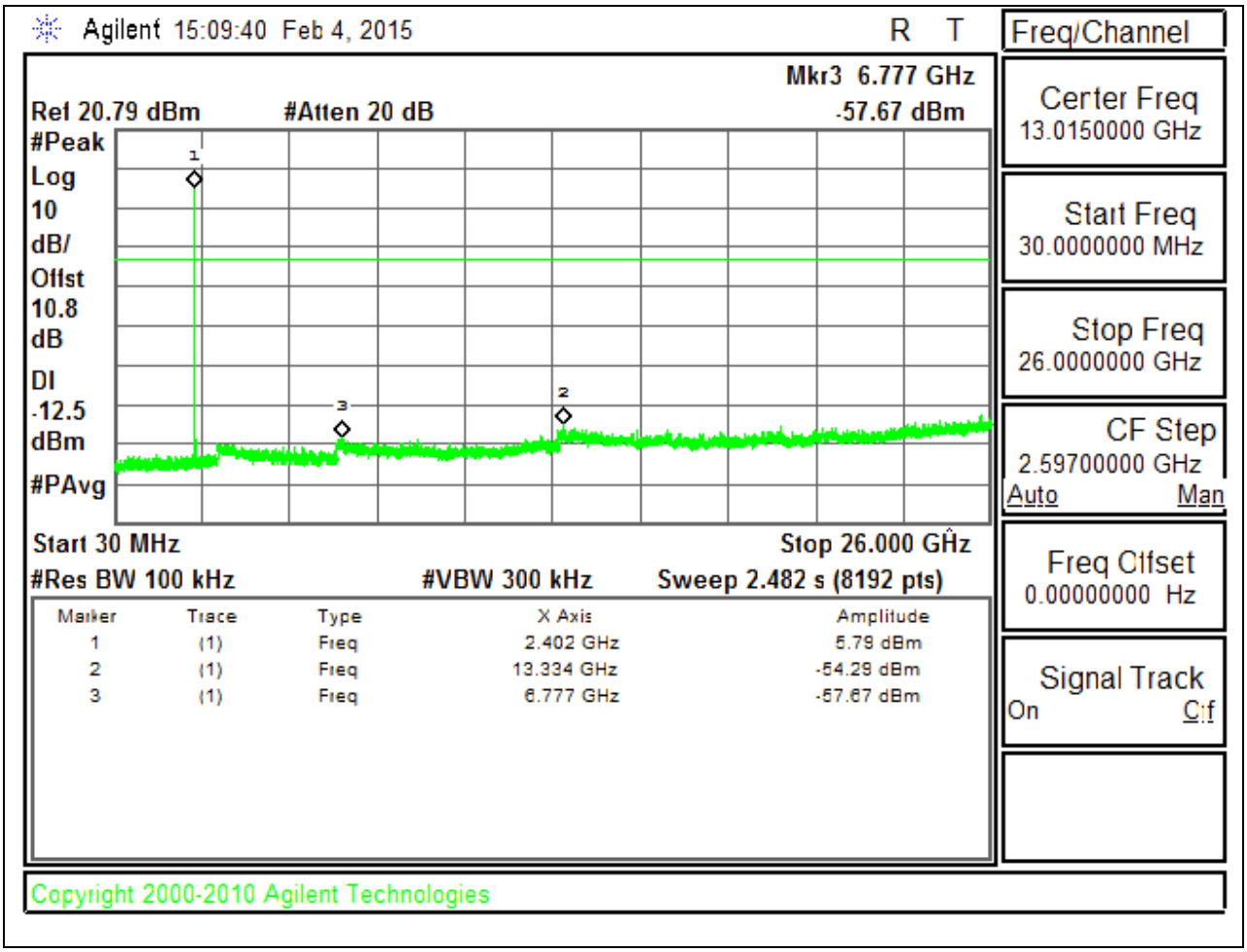
LOW CHANNEL SPURIOUS



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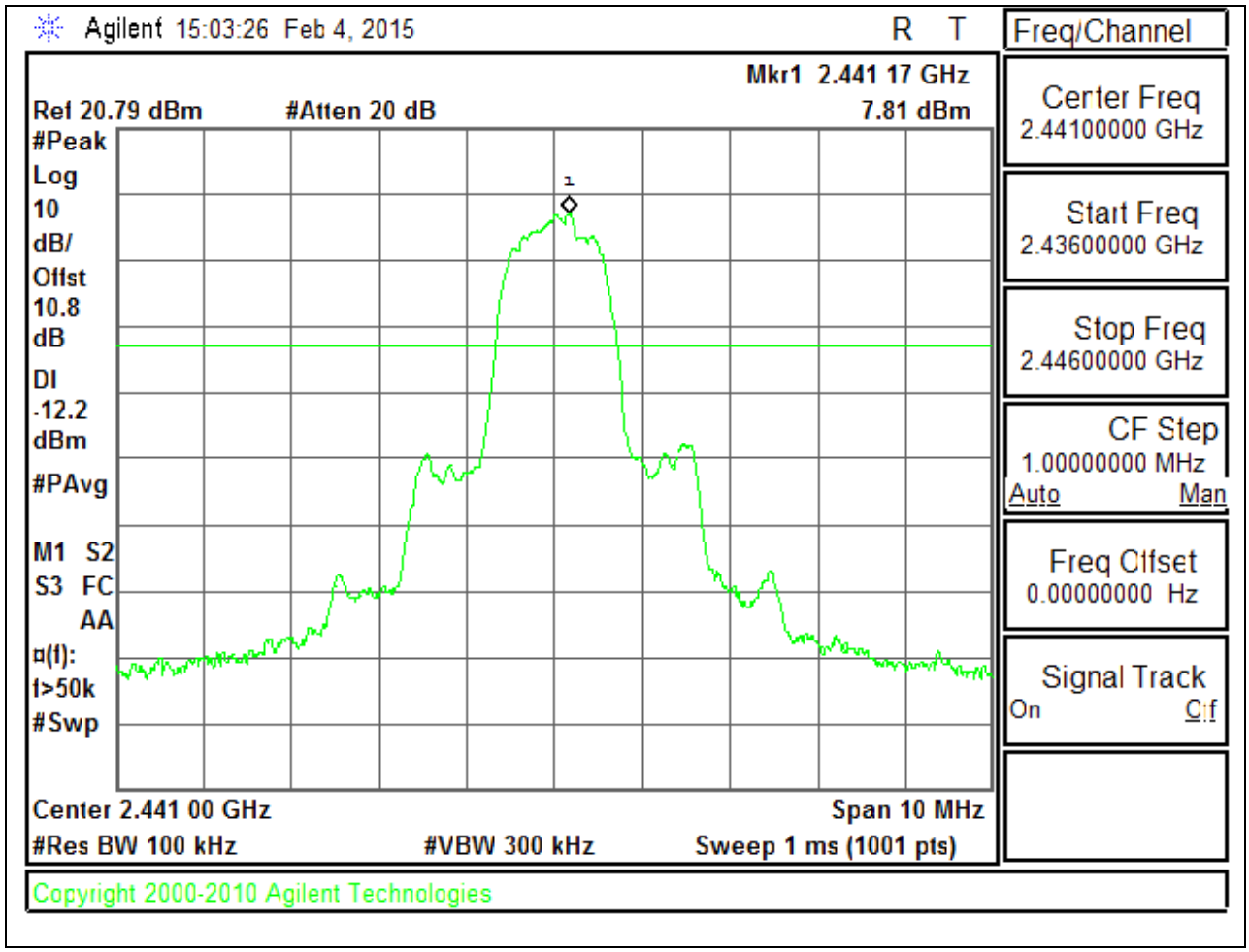
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL BANDEDGE



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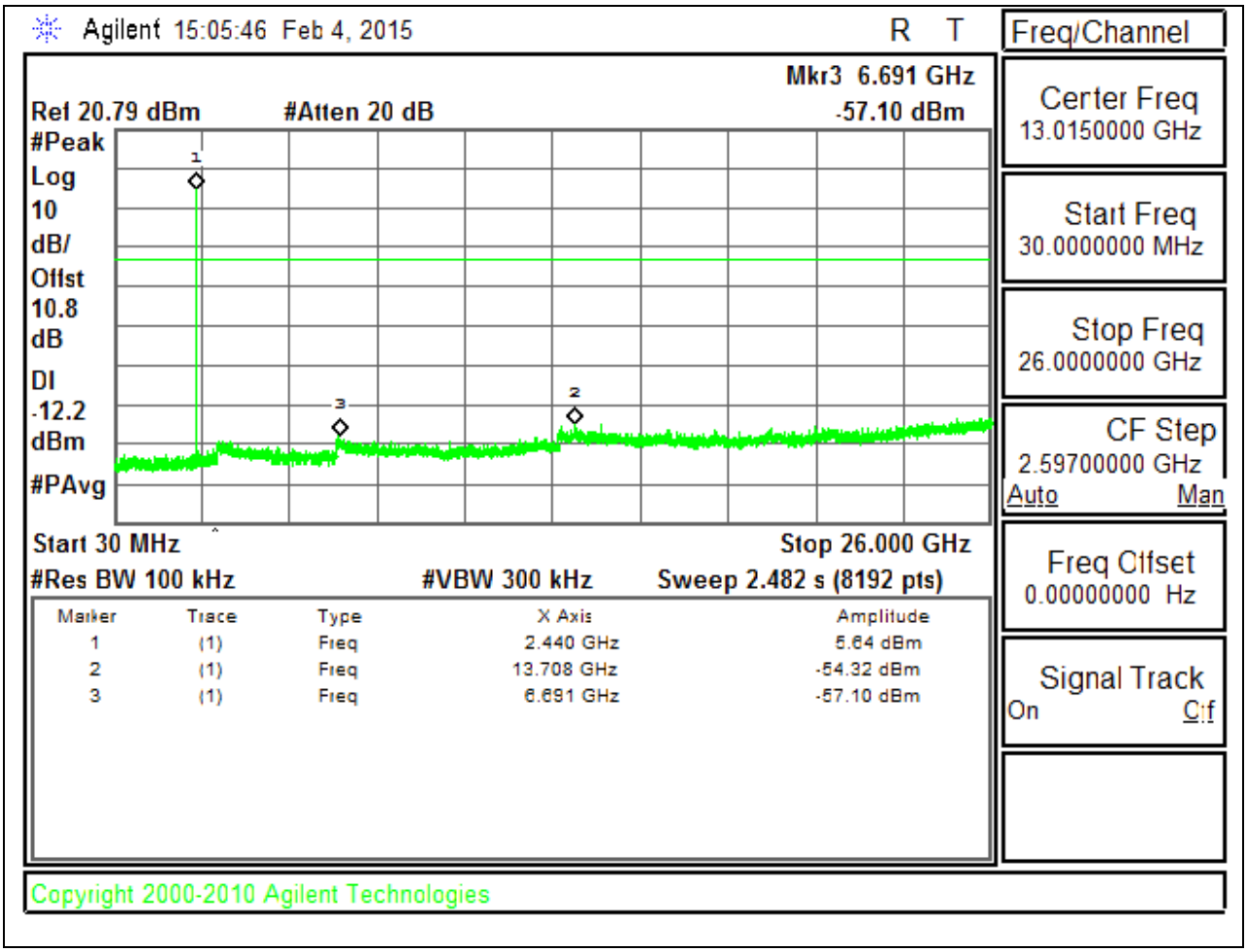
MID CHANNEL SPURIOUS



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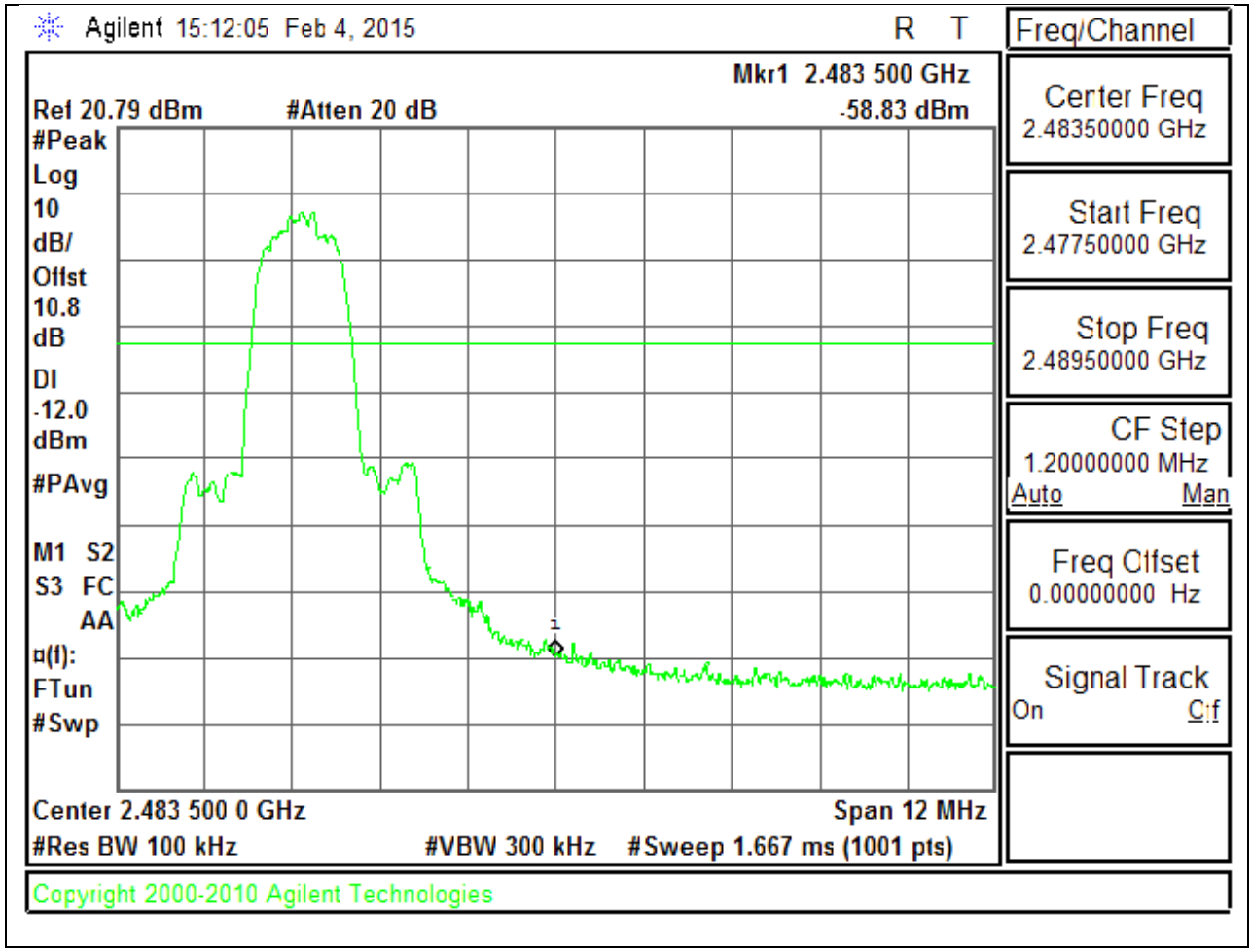
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



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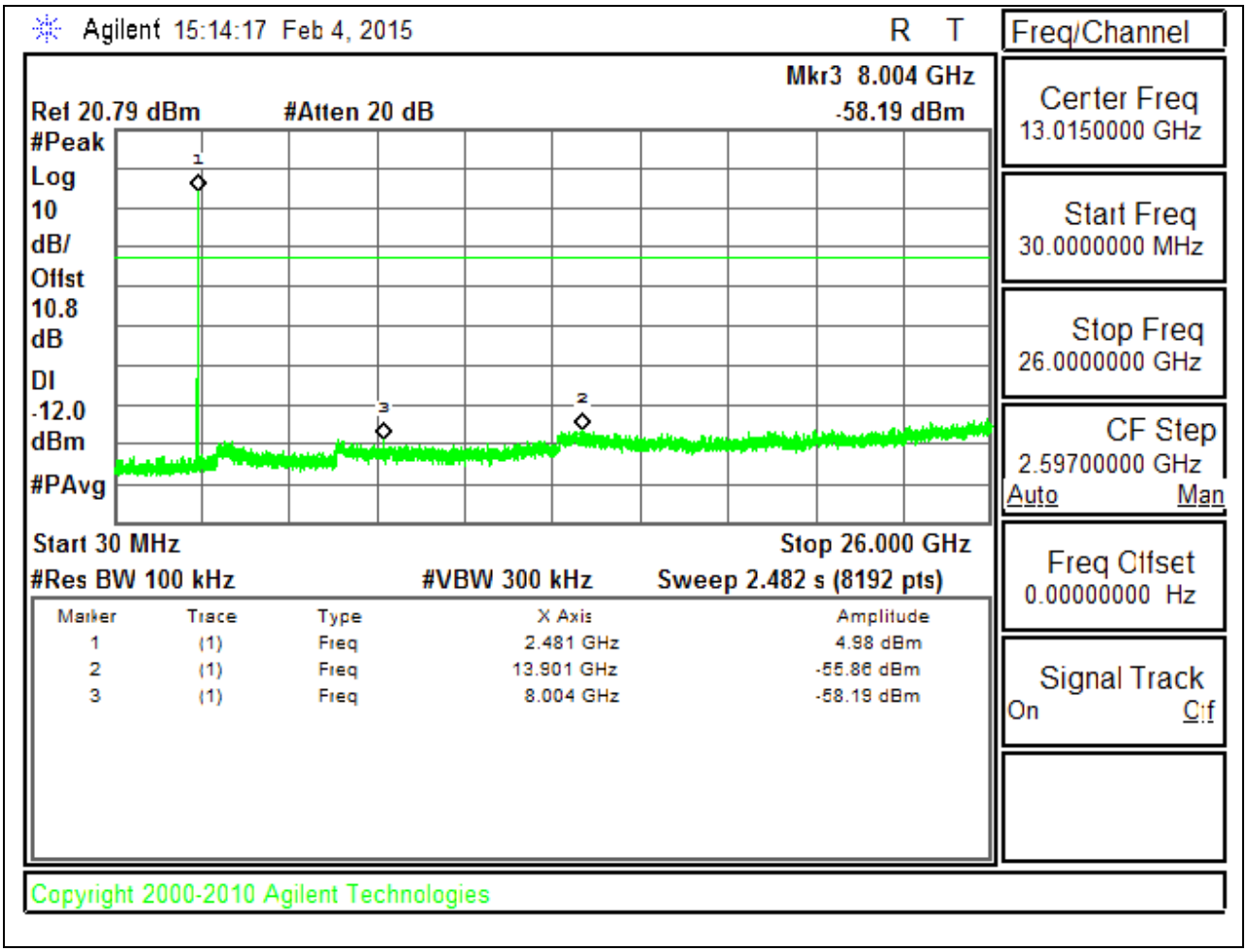
HIGH CHANNEL SPURIOUS



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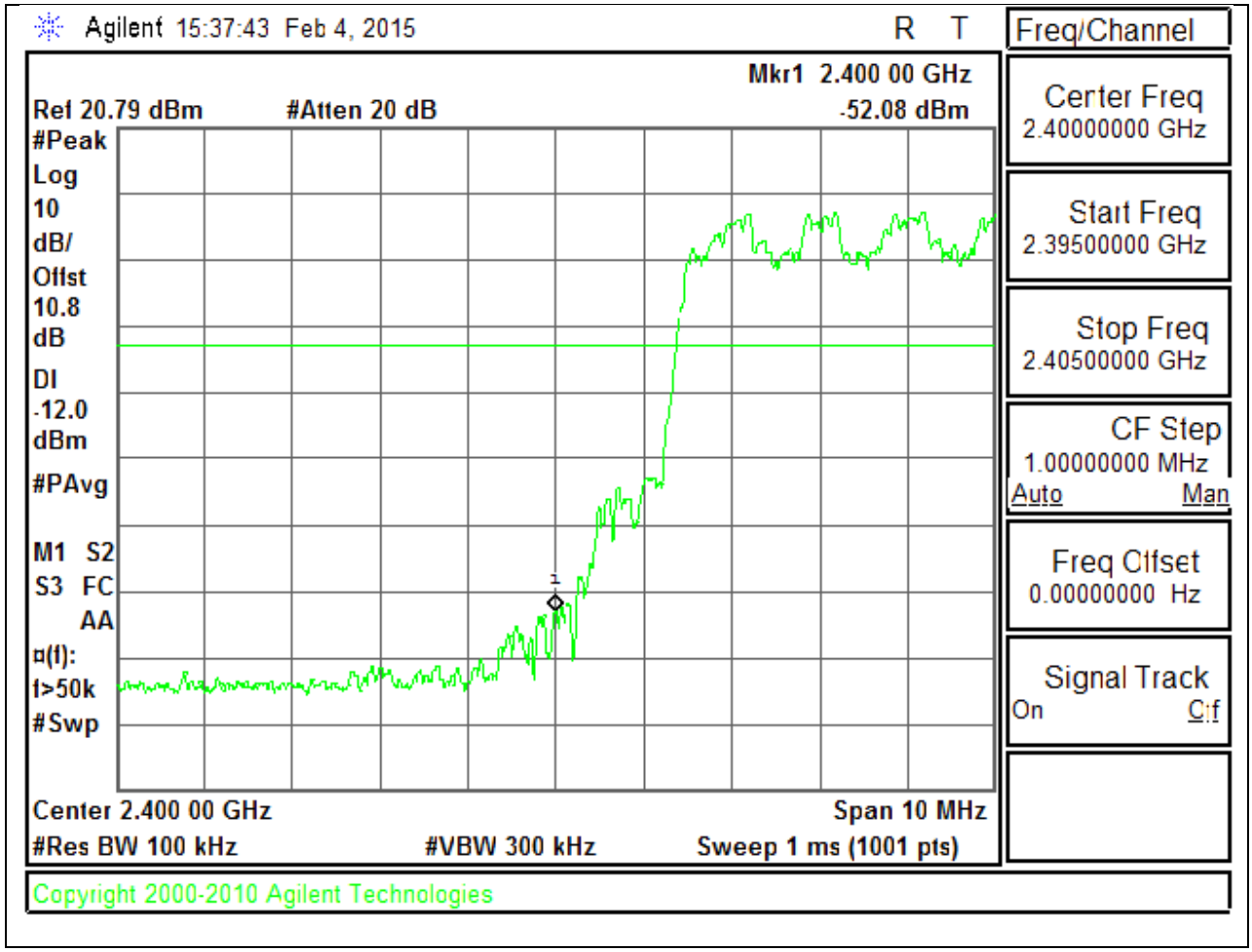
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



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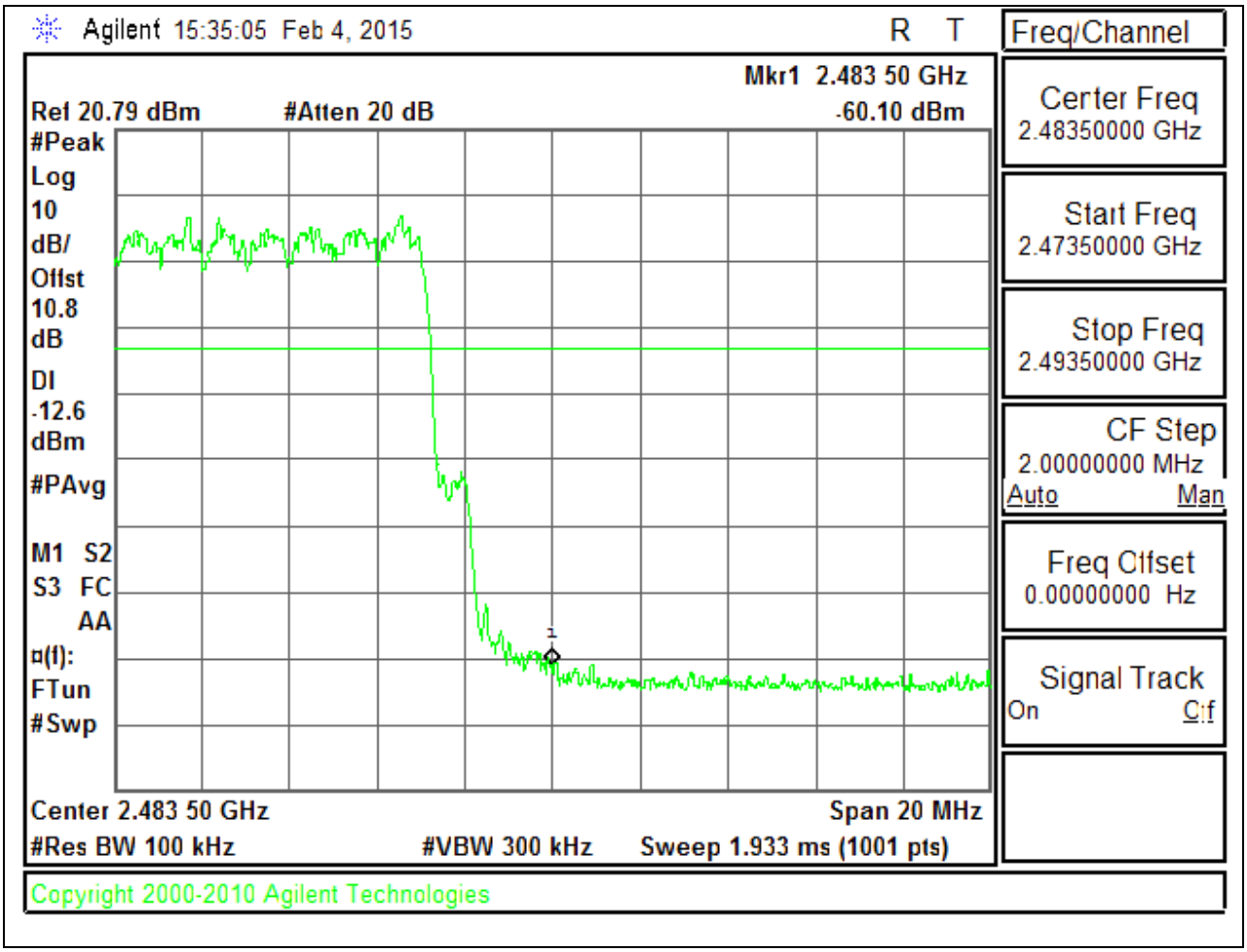
HIGH BANDEDGE WITH HOPPING ON



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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. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. 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 / 0.002865S = 349.04Hz.

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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.

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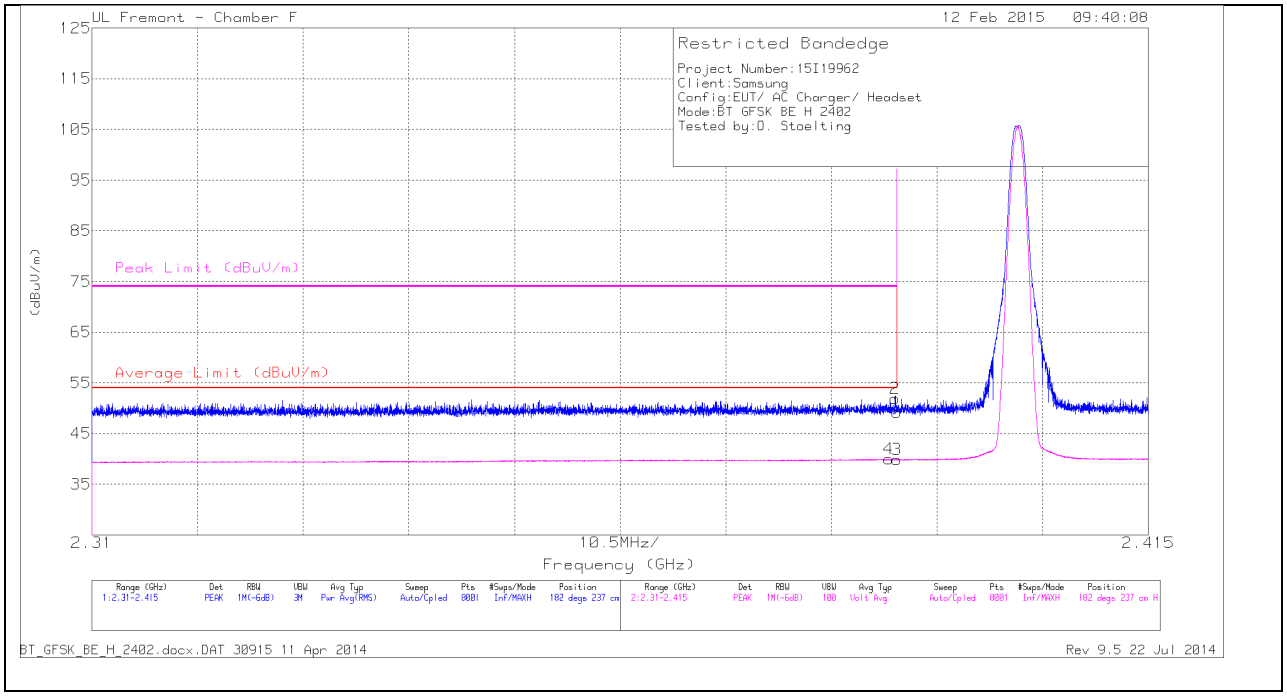
9.2. TRANSMITTER ABOVE 1 GHz

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 T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	37.86	PK	32.2	-20.9	0	49.16	-	-	74	-24.84	182	237	H
2	* 2.39	40.61	PK	32.2	-20.9	0	51.91	-	-	74	-22.09	182	237	H
3	* 2.39	28.56	VB1T	32.2	-20.9	0	39.86	54	-14.14	-	-	182	237	H
4	* 2.389	28.66	VB1T	32.2	-20.9	0	39.96	54	-14.04	-	-	182	237	H

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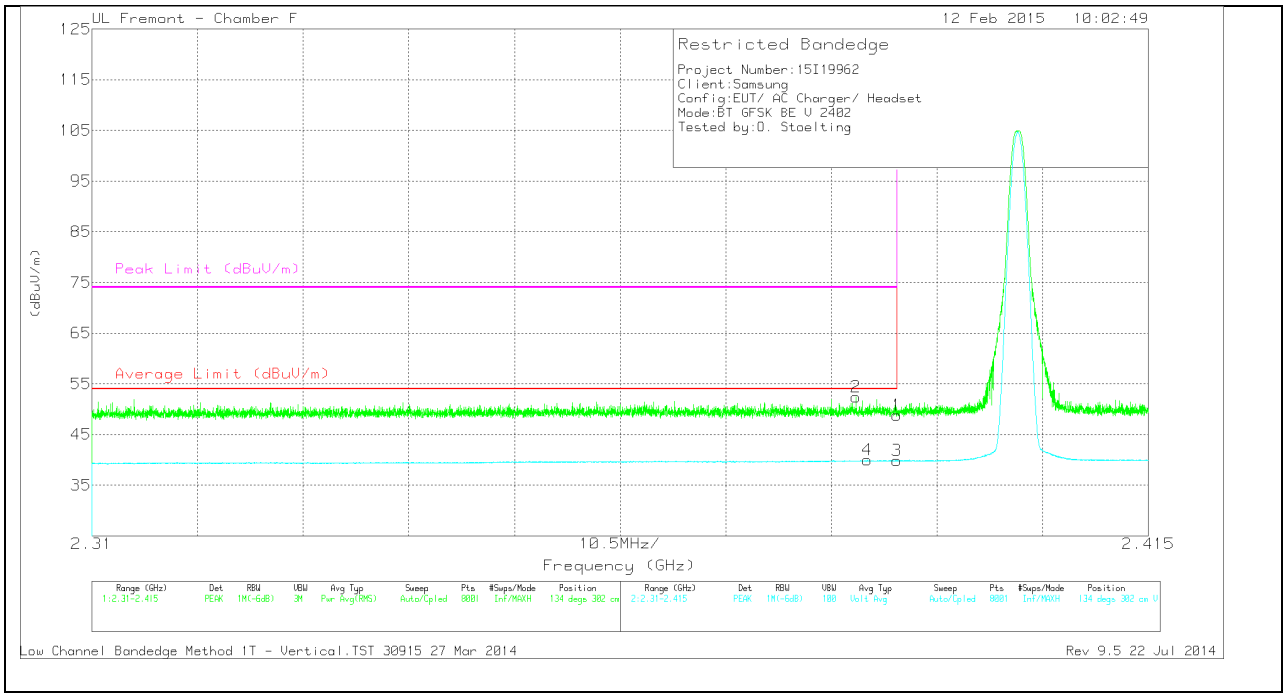
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	37.49	PK	32.2	-20.9	0	48.79	-	-	74	-25.21	134	302	V
2	* 2.386	41.17	PK	32.1	-20.9	0	52.37	-	-	74	-21.63	134	302	V
3	* 2.39	28.54	VB1T	32.2	-20.9	0	39.84	54	-14.16	-	-	134	302	V
4	* 2.387	28.64	VB1T	32.2	-20.9	0	39.94	54	-14.06	-	-	134	302	V

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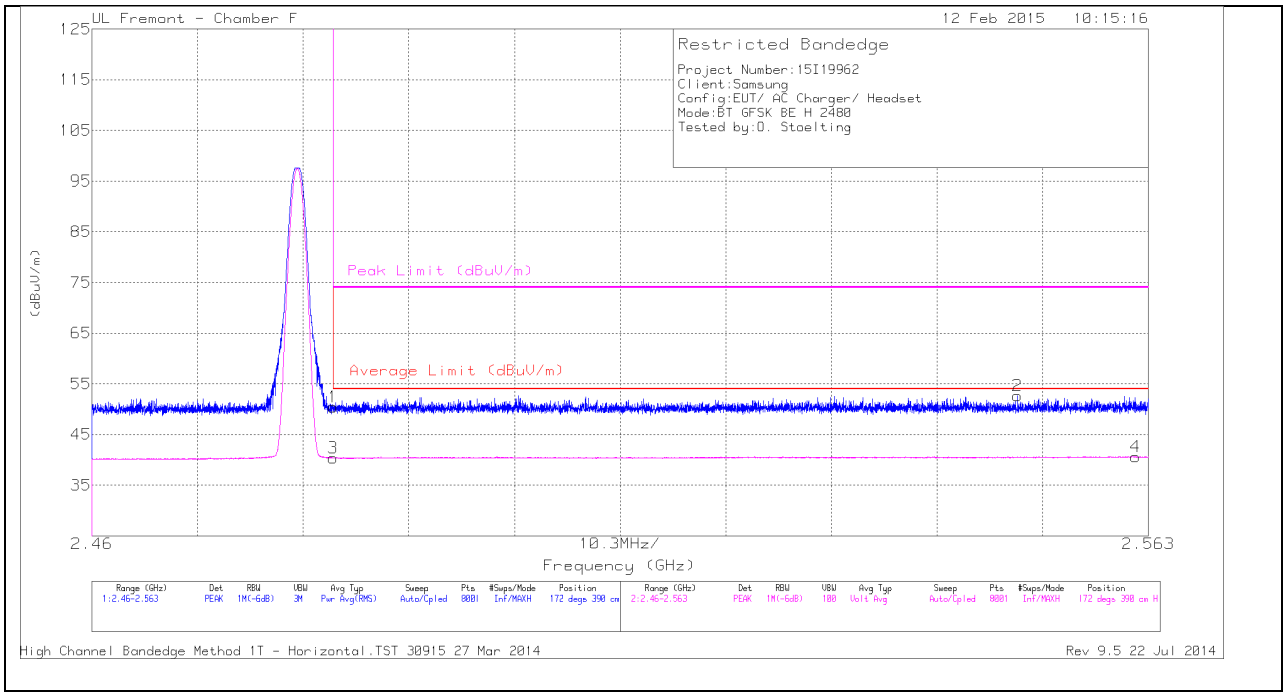
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	38.66	PK	32.6	-20.9	0	50.36	-	-	74	-23.64	172	390	H
2	2.55	40.87	PK	32.7	-20.9	0	52.67	-	-	74	-21.33	172	390	H
3	* 2.484	28.7	VB1T	32.6	-20.9	0	40.4	54	-13.6	-	-	172	390	H
4	2.562	28.73	VB1T	32.7	-20.8	0	40.63	54	-13.37	-	-	172	390	H

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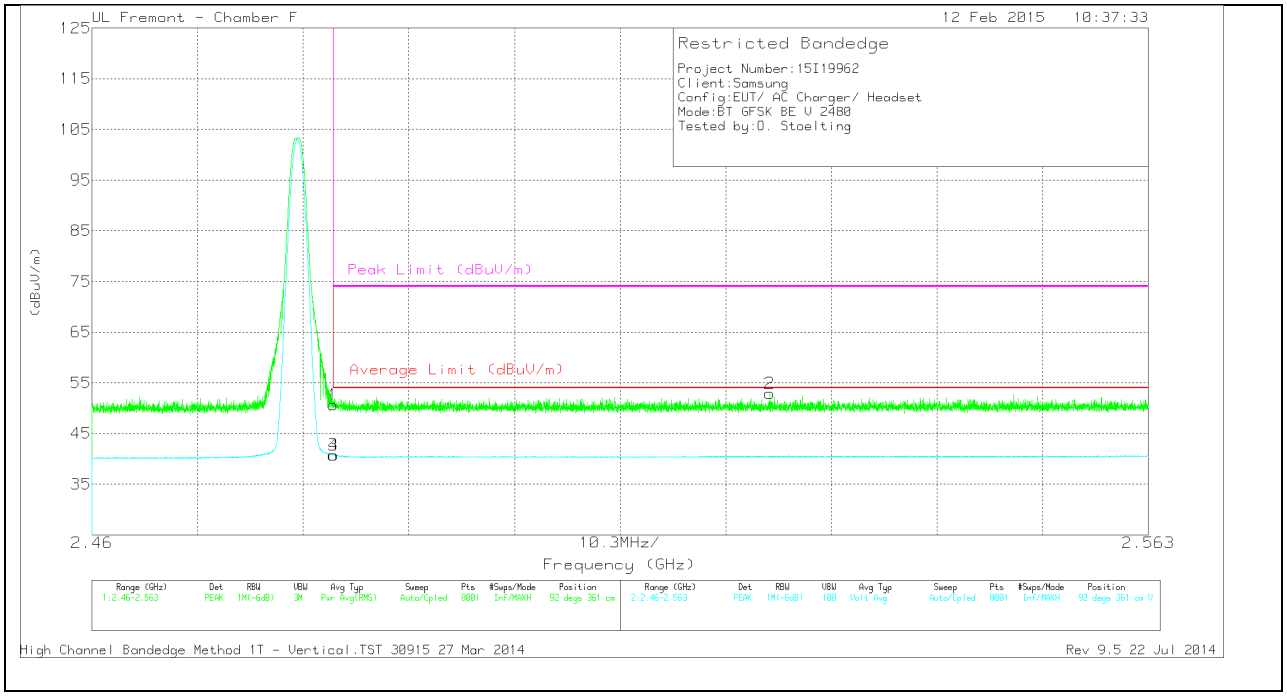
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	39	PK	32.6	-20.9	0	50.7	-	-	74	-23.3	92	361	V
2	2.526	41.07	PK	32.7	-20.9	0	52.87	-	-	74	-21.13	92	361	V
3	* 2.484	29.03	VB1T	32.6	-20.9	0	40.73	54	-13.27	-	-	92	361	V
4	* 2.484	29.05	VB1T	32.6	-20.9	0	40.75	54	-13.25	-	-	92	361	V

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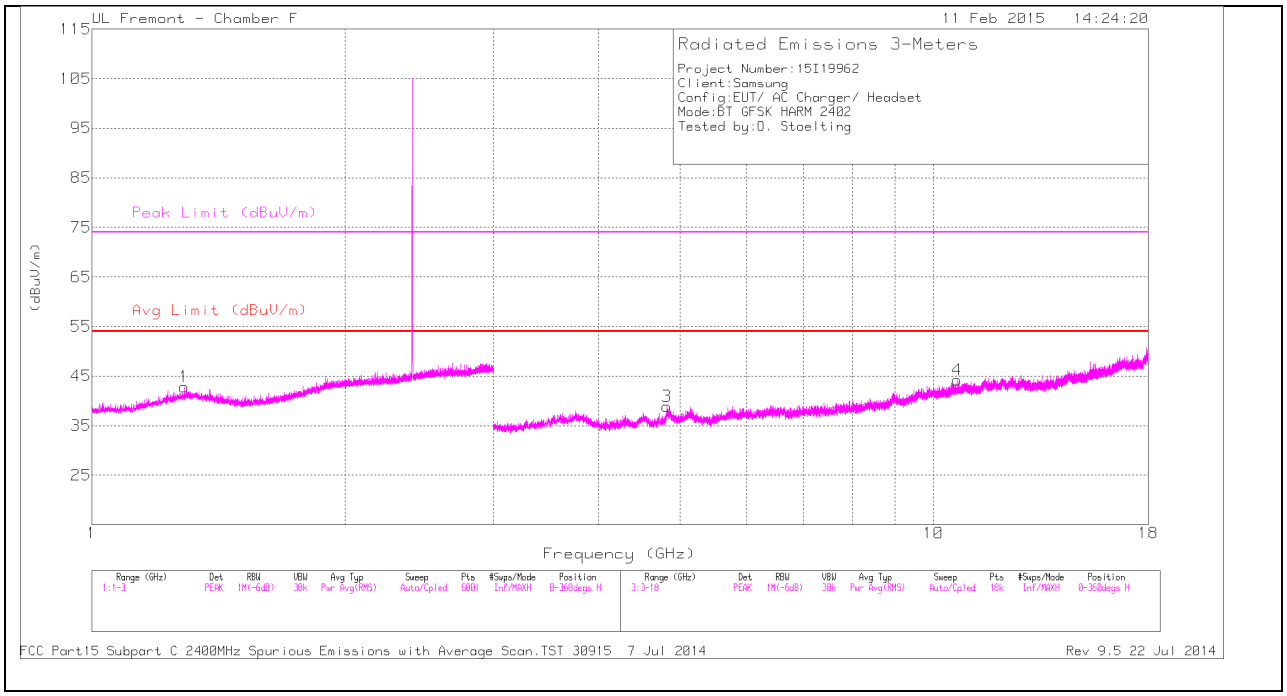
HARMONICS AND SPURIOUS EMISSIONS

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.

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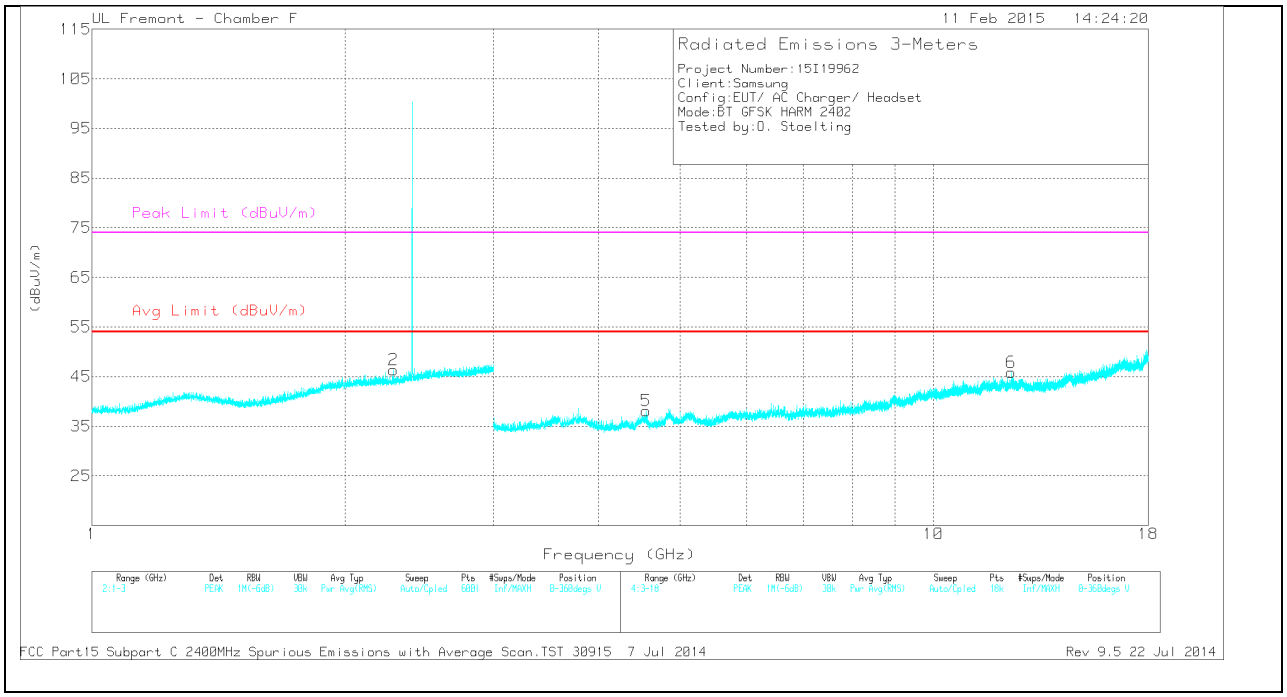
LOW CHANNEL VERTICAL



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

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LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.288	35.07	PK	29.9	-22.2	0	42.77	-	-	74	-31.23	0-360	100	H
2	* 2.282	35.6	PK	31.8	-21	0	46.4	-	-	74	-27.6	0-360	101	V
3	* 4.822	32.38	PK	34.1	-27.6	0	38.88	-	-	74	-35.12	0-360	100	H
4	* 10.667	28.15	PK	38	-22	0	44.15	-	-	74	-29.85	0-360	201	H
5	* 4.559	31.97	PK	34	-27.9	0	38.07	-	-	74	-35.93	0-360	201	V
6	* 12.373	28.9	PK	38.9	-21.9	0	45.9	-	-	74	-28.1	0-360	201	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.282	41.76	PK3	31.8	-21	0	52.56	-	-	74	-21.44	322	200	V
* 2.282	29.02	VB1T	31.8	-21	0	39.82	54	-14.18	-	-	322	200	V

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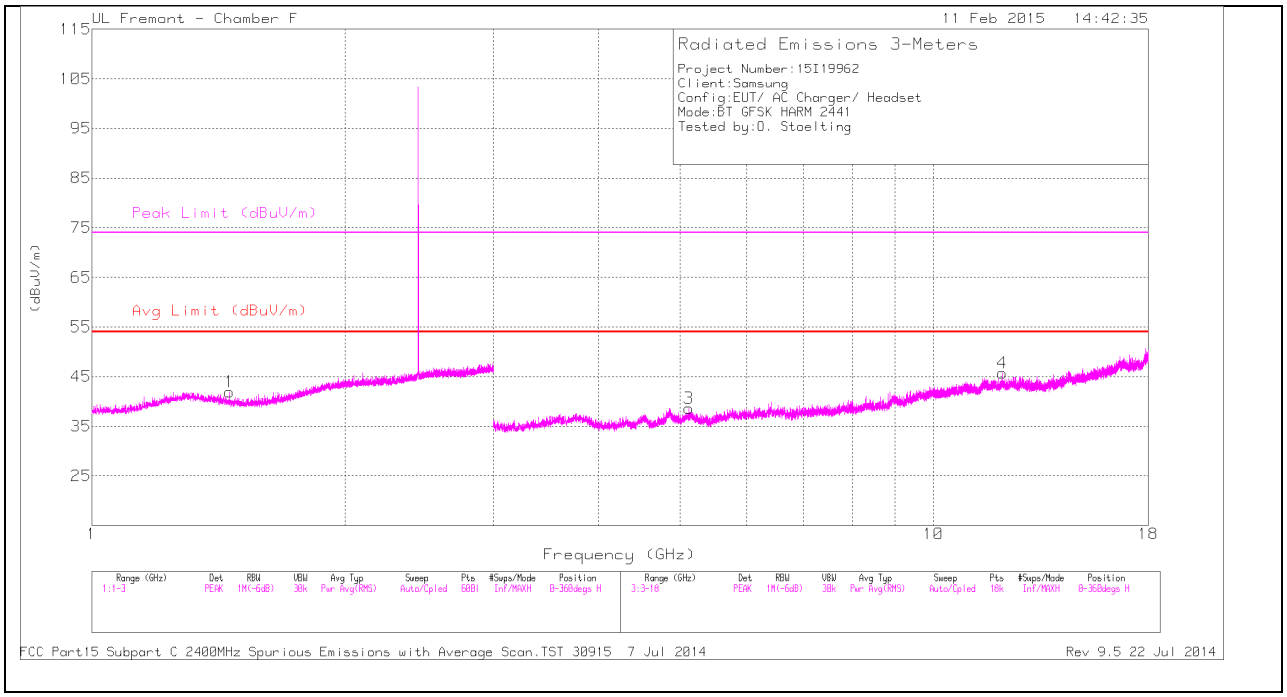
MID CHANNEL HORIZONTAL



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

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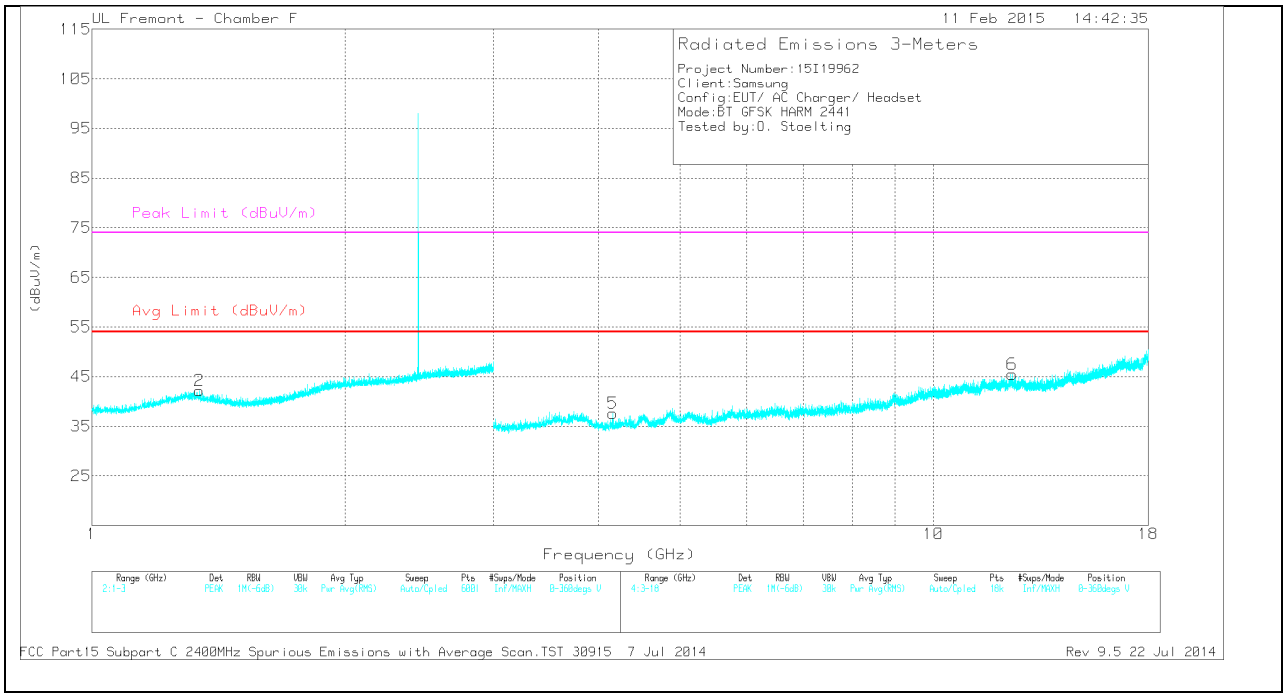
MID CHANNEL VERTICAL



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

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MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.456	35.18	PK	28.7	-22	0	41.88	-	-	74	-32.12	0-360	201	H
2	* 1.342	34.71	PK	29.7	-22.2	0	42.21	-	-	74	-31.79	0-360	101	V
3	* 5.122	30.95	PK	34.4	-26.7	0	38.65	-	-	74	-35.35	0-360	201	H
4	* 12.069	28.52	PK	39	-21.8	0	45.72	-	-	74	-28.28	0-360	201	H
5	* 4.156	32.1	PK	33.7	-28.2	0	37.6	-	-	74	-36.4	0-360	101	V
6	* 12.402	28.74	PK	38.9	-22.2	0	45.44	-	-	74	-28.56	0-360	201	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (db)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 12.069	35.4	PK3	39	-21.8	0	52.6	-	-	74	-21.4	189	357	H
* 12.069	23.01	VB1T	39	-21.8	0	40.21	54	-13.79	-	-	189	357	H

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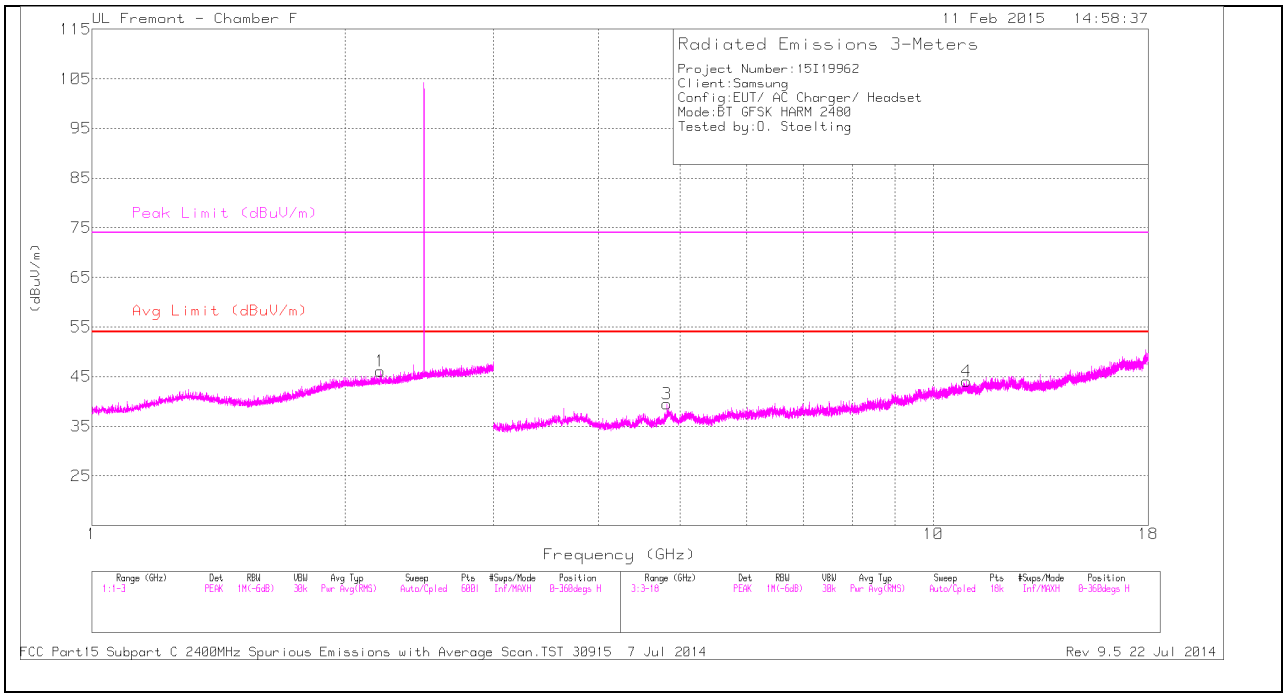
HIGH CHANNEL HORIZONTAL



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

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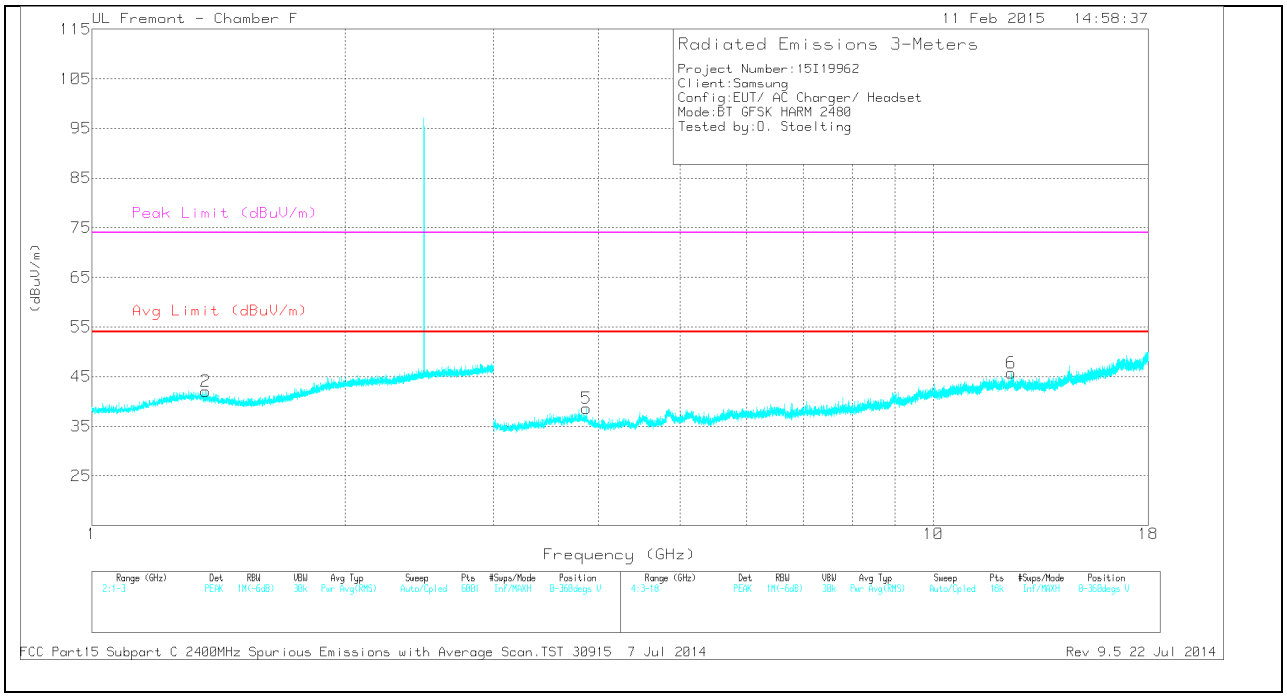
HIGH CHANNEL VERTICAL



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

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HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.2	35.4	PK	31.8	-21.1	0	46.1	-	-	-	-	0-360	201	H
2	* 1.365	34.59	PK	29.5	-22.1	0	41.99	-	-	74	-32.01	0-360	101	V
3	* 4.824	33.05	PK	34.1	-27.6	0	39.55	-	-	74	-34.45	0-360	201	H
4	* 10.944	27.47	PK	38.1	-21.5	0	44.07	-	-	74	-29.93	0-360	101	H
5	* 3.87	33.27	PK	34.1	-28.7	0	38.67	-	-	74	-35.33	0-360	101	V
6	* 12.372	28.74	PK	38.9	-21.9	0	45.74	-	-	74	-28.26	0-360	101	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (db)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 12.371	36.85	PK3	38.9	-21.9	0	53.85	-	-	74	-20.15	306	367	V
* 12.372	23.21	VB1T	38.9	-21.9	0	40.21	54	-13.79	-	-	306	367	V

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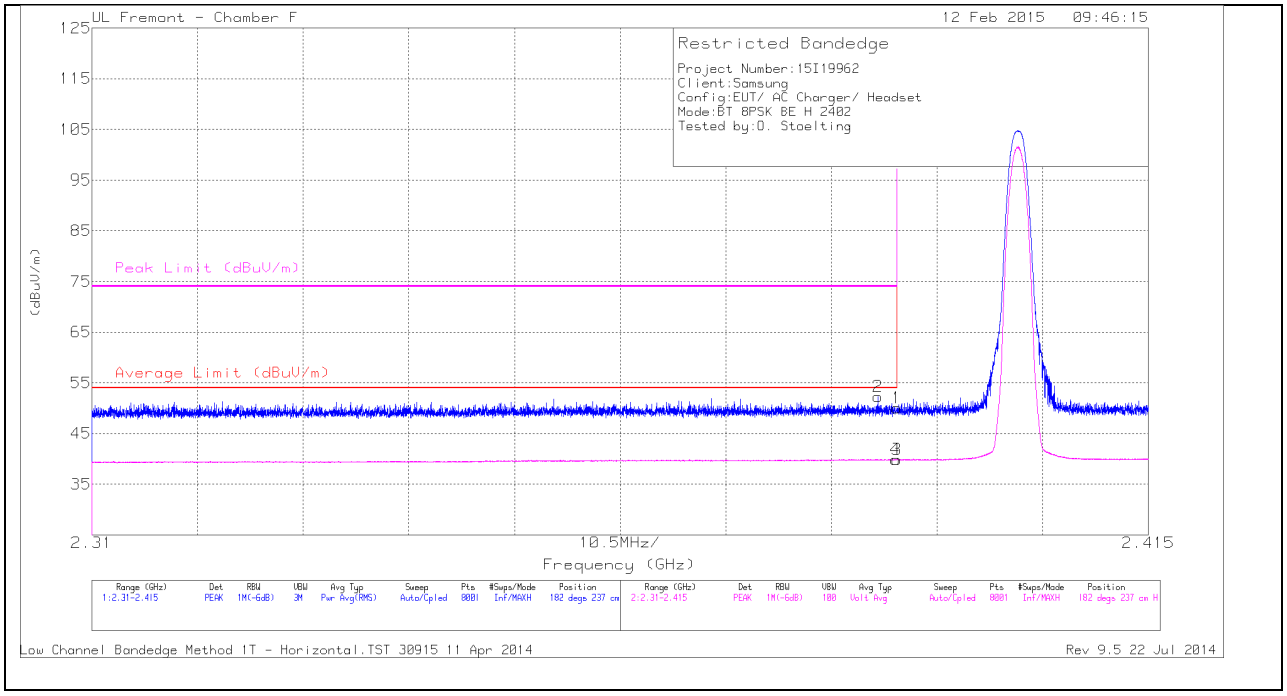
9.2.2. ENHANCED DATA RATE 8PSK MODULATION RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	38.69	PK	32.2	-20.9	0	49.99	-	-	74	-24.01	182	237	H
2	* 2.388	40.93	PK	32.2	-20.9	0	52.23	-	-	74	-21.77	182	237	H
3	* 2.39	28.59	VB1T	32.2	-20.9	0	39.89	54	-14.11	-	-	182	237	H
4	* 2.39	28.59	VB1T	32.2	-20.9	0	39.89	54	-14.11	-	-	182	237	H

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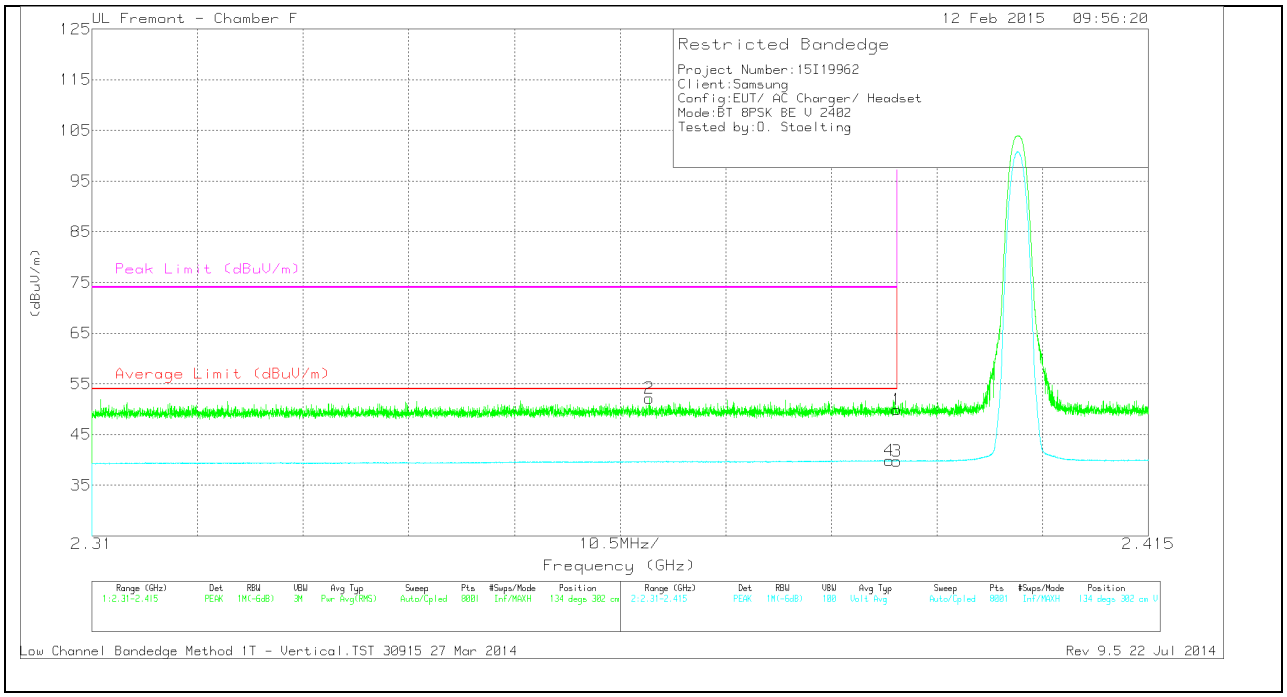
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	38.62	PK	32.2	-20.9	0	49.92	-	-	74	-24.08	134	302	V
2	* 2.365	40.97	PK	32.1	-20.9	0	52.17	-	-	74	-21.83	134	302	V
3	* 2.39	28.49	VB1T	32.2	-20.9	0	39.79	54	-14.21	-	-	134	302	V
4	* 2.389	28.6	VB1T	32.2	-20.9	0	39.9	54	-14.1	-	-	134	302	V

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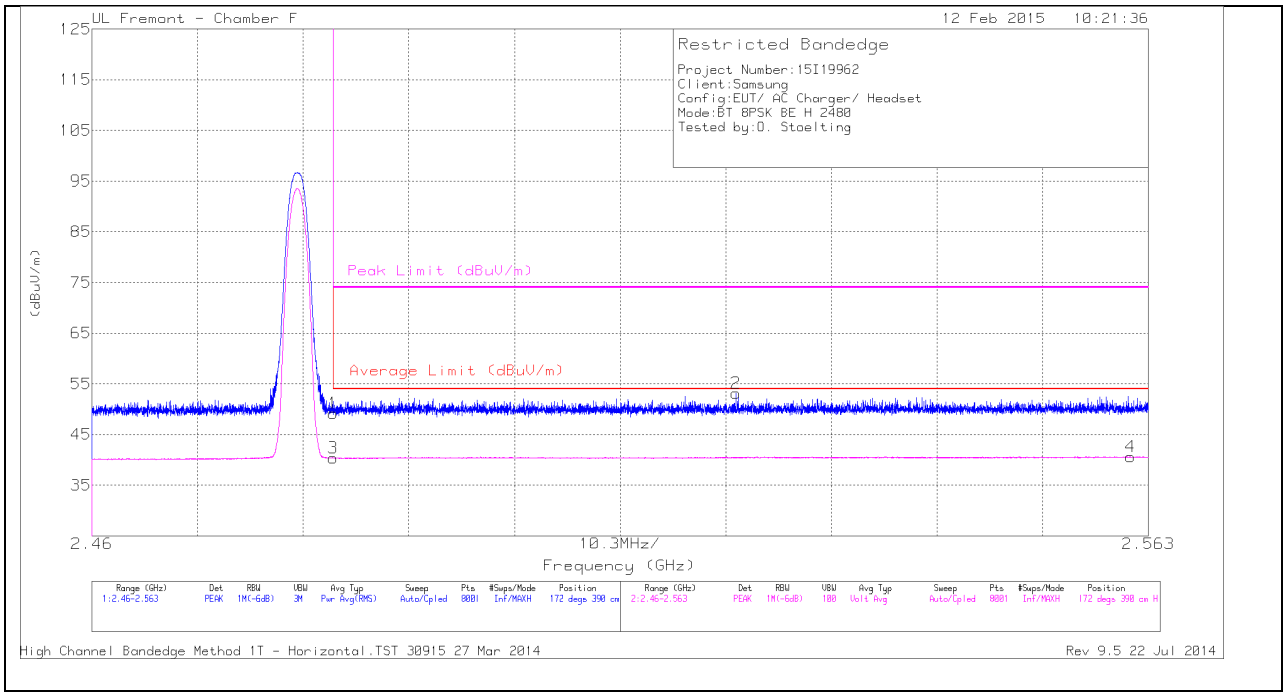
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (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	37.47	PK	32.6	-20.9	0	49.17	-	-	74	-24.83	172	390	H
2	2.523	41.31	PK	32.7	-20.9	0	53.11	-	-	74	-20.89	172	390	H
3	* 2.484	28.62	VB1T	32.6	-20.9	0	40.32	54	-13.68	-	-	172	390	H
4	2.561	28.76	VB1T	32.7	-20.8	0	40.66	54	-13.34	-	-	172	390	H

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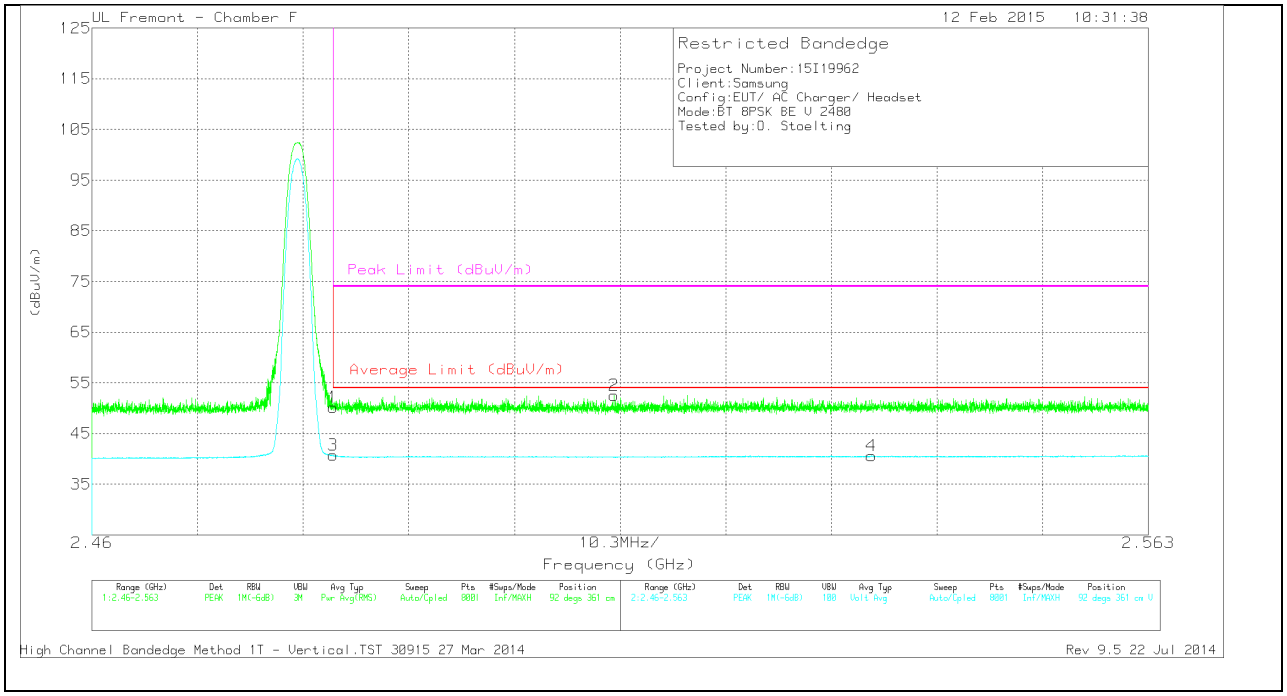
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	38.5	PK	32.6	-20.9	0	50.2	-	-	74	-23.8	92	361	V
2	2.511	40.84	PK	32.7	-21	0	52.54	-	-	74	-21.46	92	361	V
3	* 2.484	29	VB1T	32.6	-20.9	0	40.7	54	-13.3	-	-	92	361	V
4	2.536	28.85	VB1T	32.7	-20.9	0	40.65	54	-13.35	-	-	92	361	V

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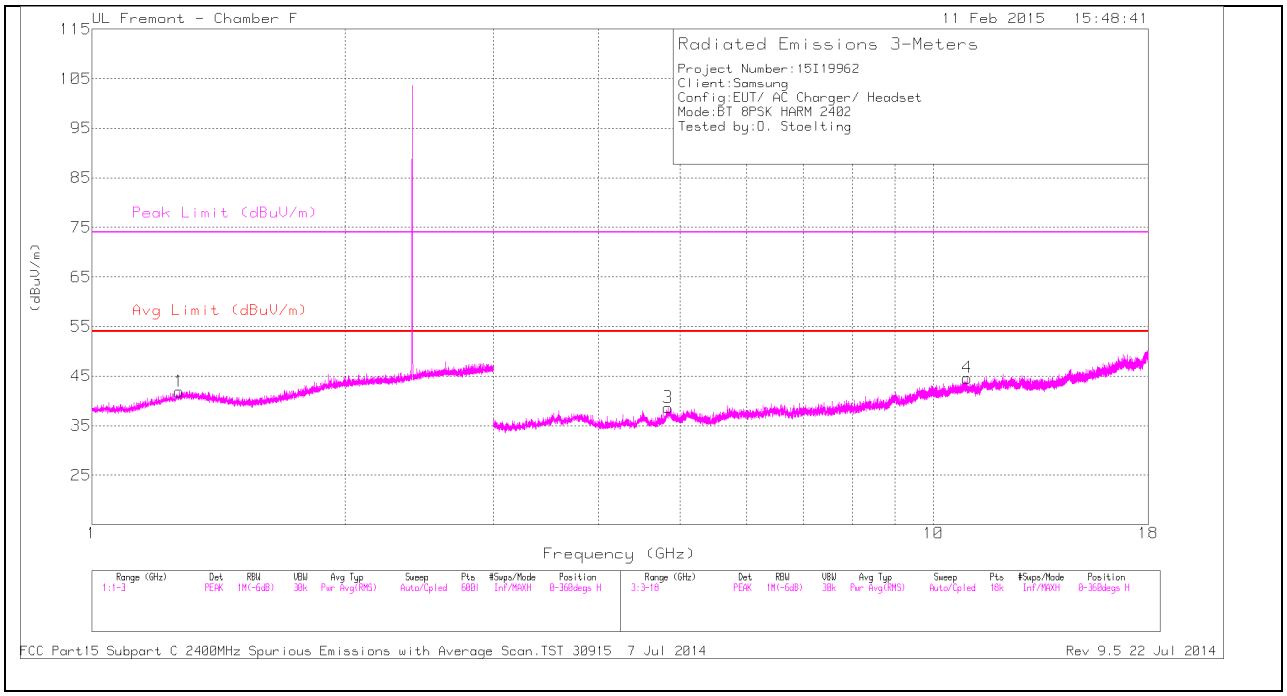
HARMONICS AND SPURIOUS EMISSIONS

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.

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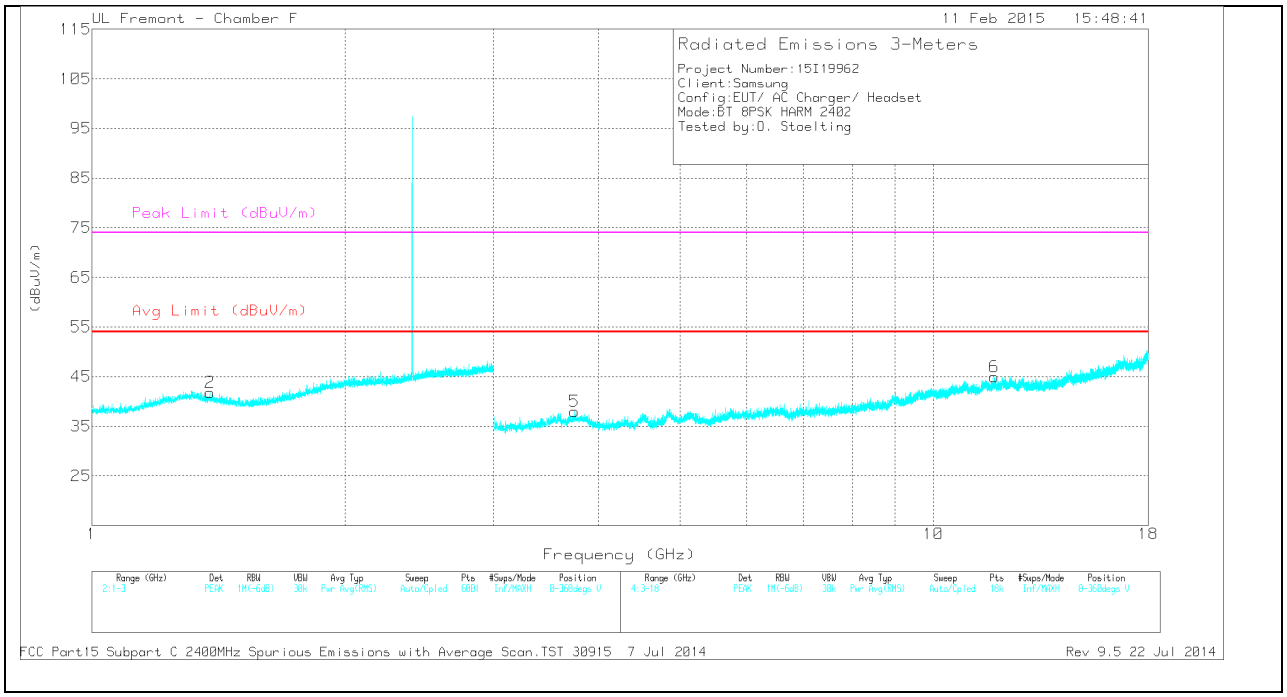
LOW CHANNEL VERTICAL



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

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LOW CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.271	34.46	PK	29.7	-22.3	0	41.86	-	-	74	-32.14	0-360	201	H
2	* 1.382	34.54	PK	29.4	-22.1	0	41.84	-	-	74	-32.16	0-360	101	V
3	* 4.835	32.28	PK	34.1	-27.7	0	38.68	-	-	74	-35.32	0-360	100	H
4	* 10.975	28.75	PK	38.1	-22.2	0	44.65	-	-	74	-29.35	0-360	100	H
5	* 3.744	32.5	PK	34.6	-29.1	0	38	-	-	74	-36	0-360	201	V
6	* 11.8	28.4	PK	38.7	-22.1	0	45	-	-	74	-29	0-360	101	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (db)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.801	34.96	PK3	38.7	-22.1	0	51.56	-	-	74	-22.44	278	157	V
* 11.798	22.87	VB1T	38.7	-22.1	0	39.47	54	-14.53	-	-	278	157	V

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

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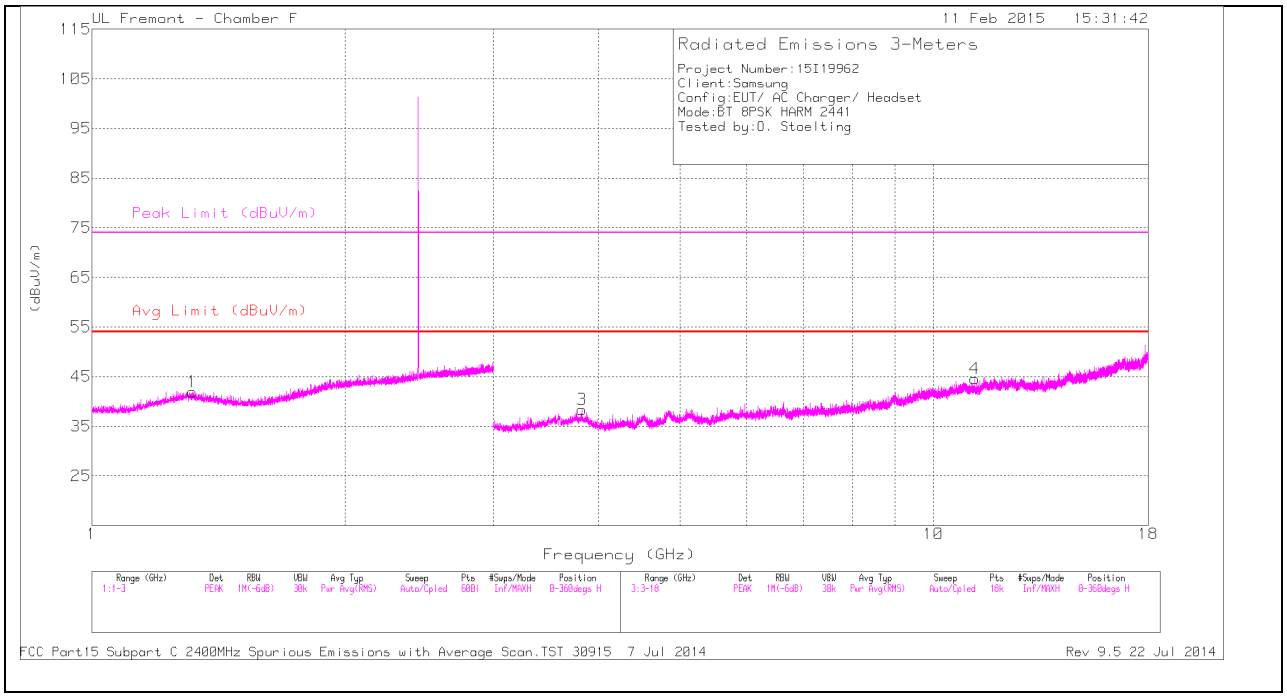
MID CHANNEL HORIZONTAL



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

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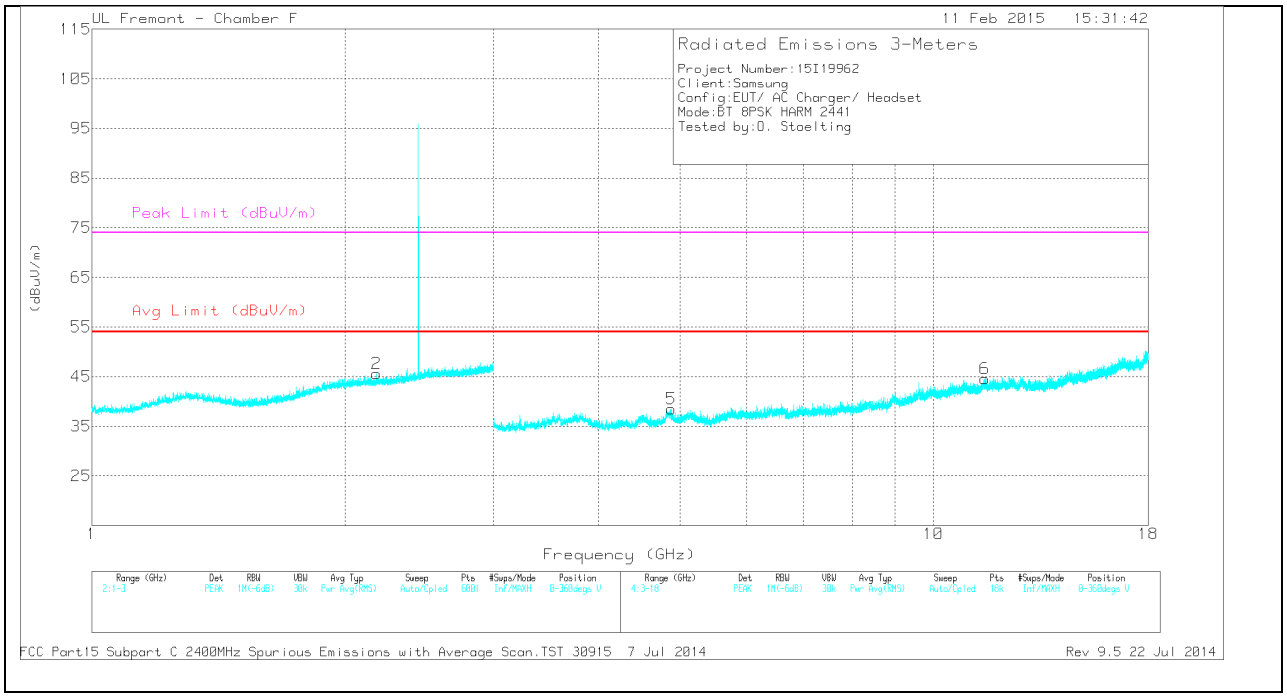
MID CHANNEL VERTICAL



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

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MID CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.317	34.25	PK	29.9	-22.2	0	41.95	-	-	74	-32.05	0-360	101	H
2	2.179	34.94	PK	31.8	-21.1	0	45.64	-	-	-	-	0-360	201	V
3	* 3.82	32.64	PK	34.3	-28.6	0	38.34	-	-	74	-35.66	0-360	201	H
4	* 11.197	28.46	PK	38.1	-22	0	44.56	-	-	74	-29.44	0-360	101	H
5	* 4.876	32.12	PK	34.2	-27.8	0	38.52	-	-	74	-35.48	0-360	201	V
6	* 11.515	27.74	PK	38.4	-21.5	0	44.64	-	-	74	-29.36	0-360	201	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (db)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 11.514	35.77	PK3	38.4	-21.6	0	52.57	-	-	74	-21.43	69	398	V
* 11.514	22.75	VB1T	38.4	-21.6	0	39.55	54	-14.45	-	-	69	398	V

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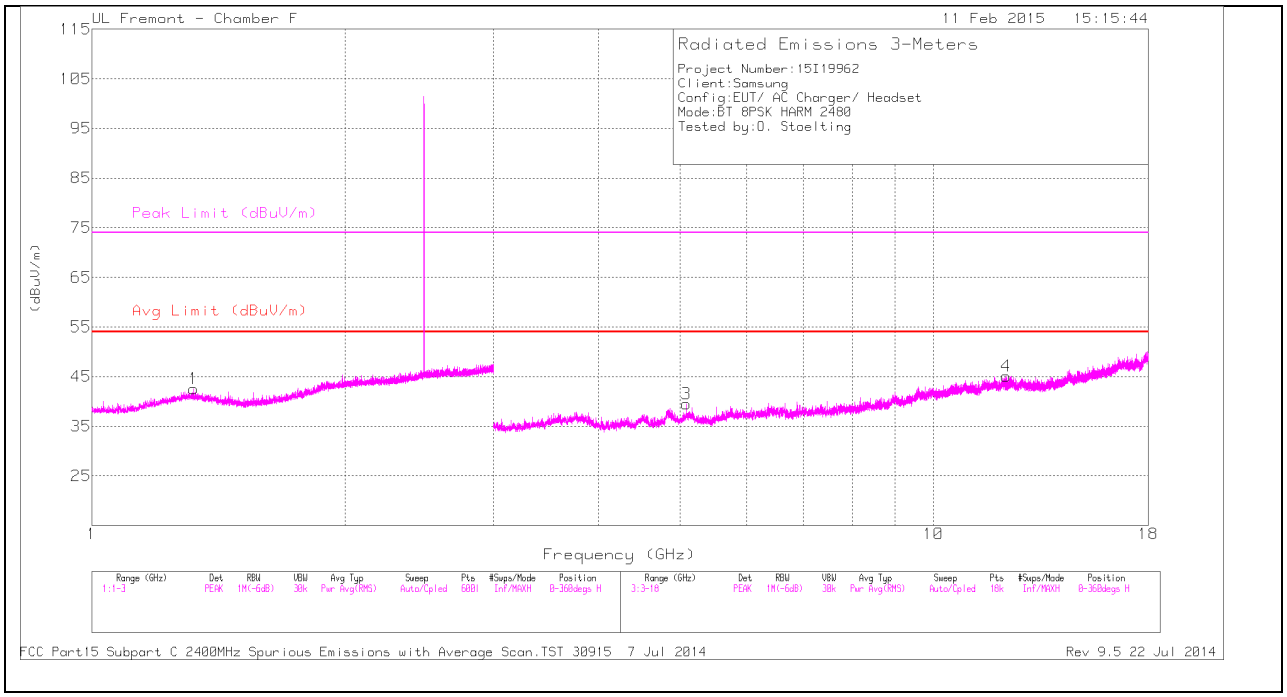
HIGH CHANNEL HORIZONTAL



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

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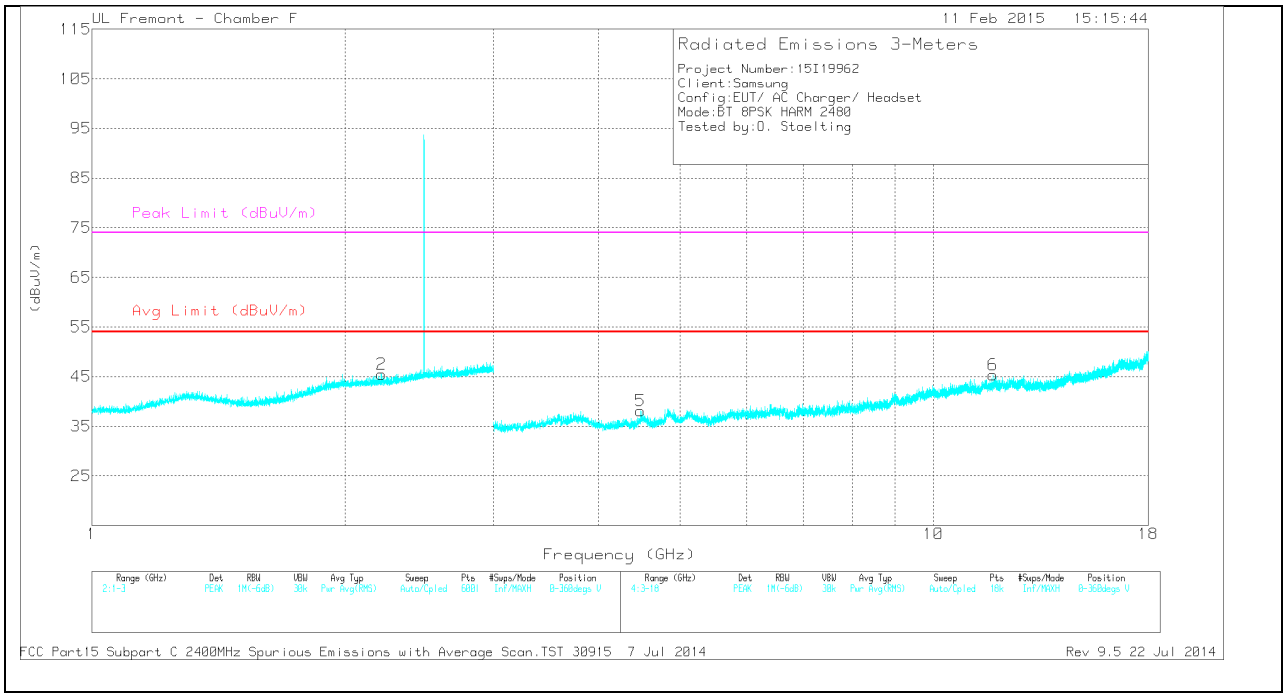
HIGH CHANNEL VERTICAL



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

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HIGH CHANNEL DATA

TRACE MARKERS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.321	34.8	PK	29.9	-22.2	0	42.5	-	-	74	-31.5	0-360	201	H
2	* 2.207	34.72	PK	31.8	-21	0	45.52	-	-	74	-28.48	0-360	101	V
3	* 5.083	32.44	PK	34.3	-27.2	0	39.54	-	-	74	-34.46	0-360	201	H
4	* 12.208	28.85	PK	38.9	-22.7	0	45.05	-	-	74	-28.95	0-360	201	H
5	4.483	32.38	PK	33.9	-28.2	0	38.08	-	-	-	-	0-360	201	V
6	* 11.777	28.76	PK	38.7	-22.1	0	45.36	-	-	74	-28.64	0-360	201	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.206	41.8	PK3	31.8	-21	0	52.6	-	-	74	-21.4	12	391	V
* 2.205	28.96	VB1T	31.8	-21	0	39.76	54	-14.24	-	-	12	391	V

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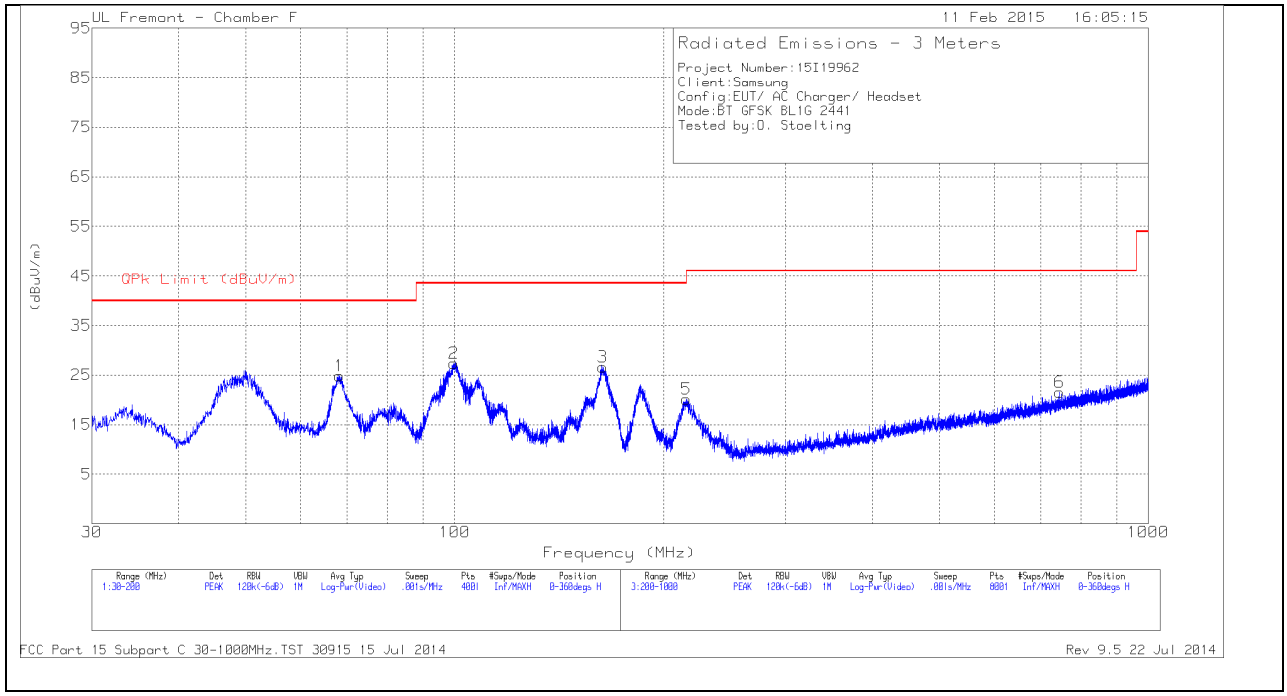
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



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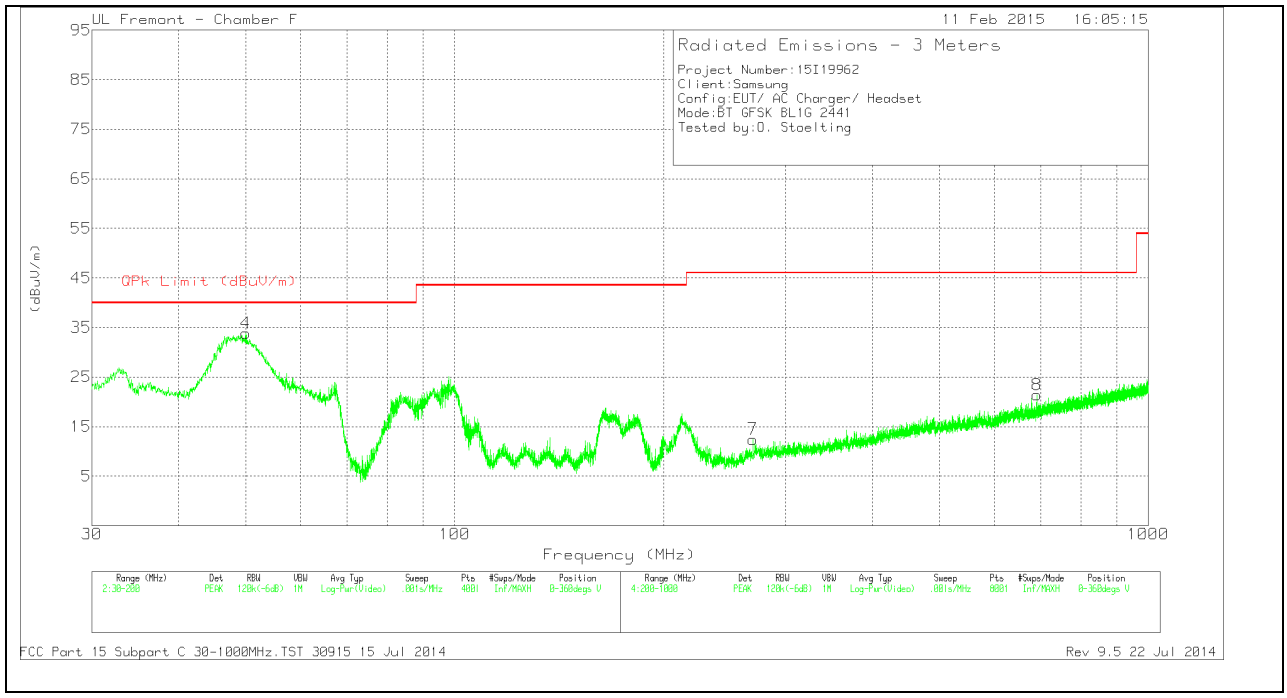
VERTICAL PLOT



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BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	68.25	48.34	PK	8.1	-31.6	24.84	40	-15.16	0-360	401	H
2	99.785	48.69	PK	10.2	-31.5	27.39	43.52	-16.13	0-360	301	H
3	* 163.6625	45.7	PK	12.1	-31.2	26.6	43.52	-16.92	0-360	201	H
4	49.975	57.78	PK	7.9	-31.8	33.88	40	-6.12	0-360	100	V
5	215.6	40.59	PK	10.6	-31	20.19	43.52	-23.33	0-360	201	H
6	744.4	30.41	PK	20.7	-29.6	21.51	46.02	-24.51	0-360	100	H
7	* 269.1	30.06	PK	13.2	-30.8	12.46	46.02	-33.56	0-360	201	V
8	691.7	31.12	PK	20	-29.7	21.42	46.02	-24.6	0-360	201	V

PK - Peak detector

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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 C63.4.

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.

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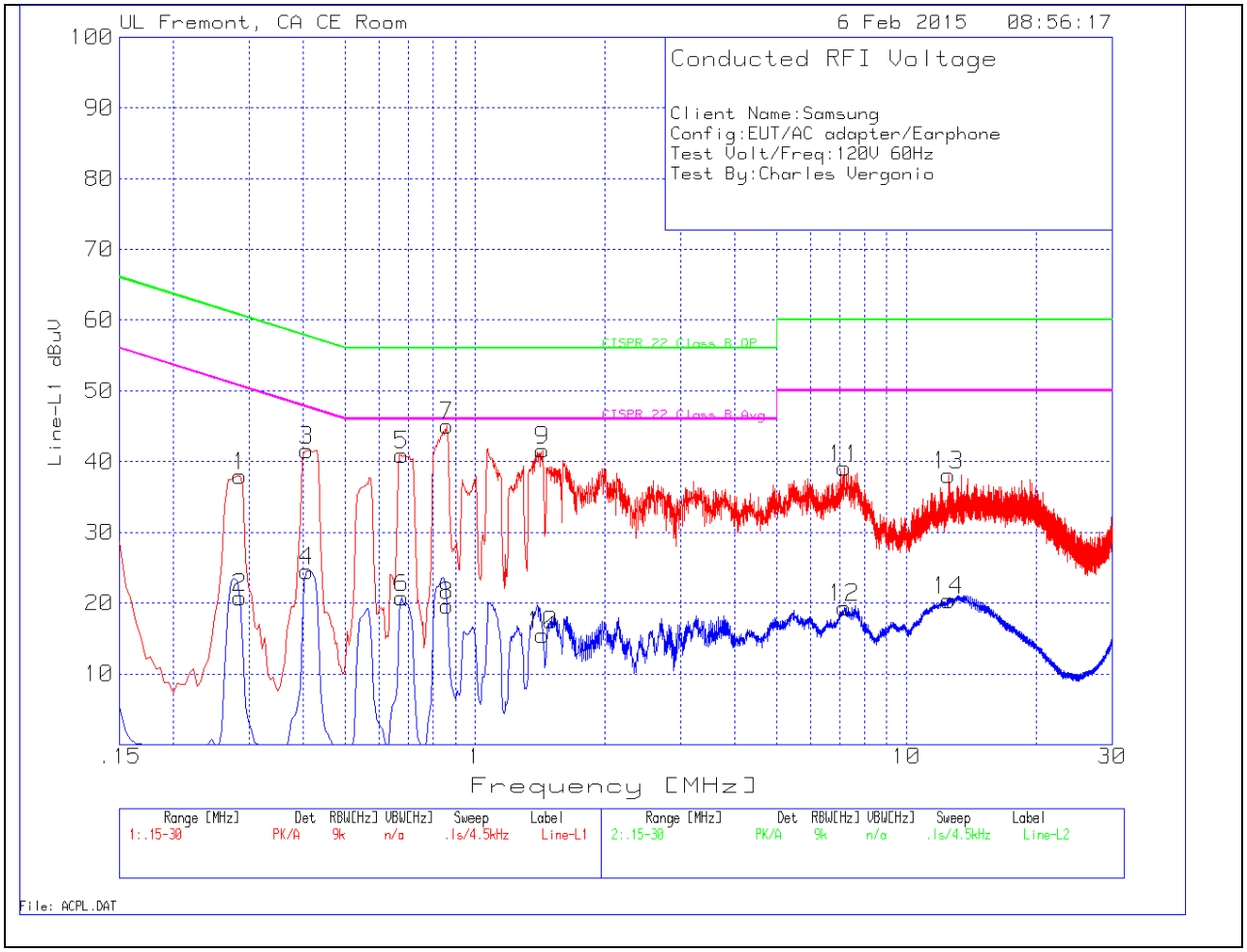
RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



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LINE 1 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.285	37.4	PK	.6	0	38	60.7	-22.7	-	-
2	.285	20.17	Av	.6	0	20.77	-	-	50.7	-29.93
3	.4065	41.24	PK	.4	0	41.64	57.7	-16.06	-	-
4	.4065	24.18	Av	.4	0	24.58	-	-	47.7	-23.12
5	.6765	40.69	PK	.3	0	40.99	56	-15.01	-	-
6	.6765	20.44	Av	.3	0	20.74	-	-	46	-25.26
7	.861	44.74	PK	.3	0	45.04	56	-10.96	-	-
8	.861	19.34	Av	.3	0	19.64	-	-	46	-26.36
9	1.437	41.35	PK	.2	.1	41.65	56	-14.35	-	-
10	1.437	15.16	Av	.2	.1	15.46	-	-	46	-30.54
11	7.17	38.78	PK	.2	.1	39.08	60	-20.92	-	-
12	7.17	19.05	Av	.2	.1	19.35	-	-	50	-30.65
13	12.543	37.73	PK	.2	.2	38.13	60	-21.87	-	-
14	12.543	20	Av	.2	.2	20.4	-	-	50	-29.6

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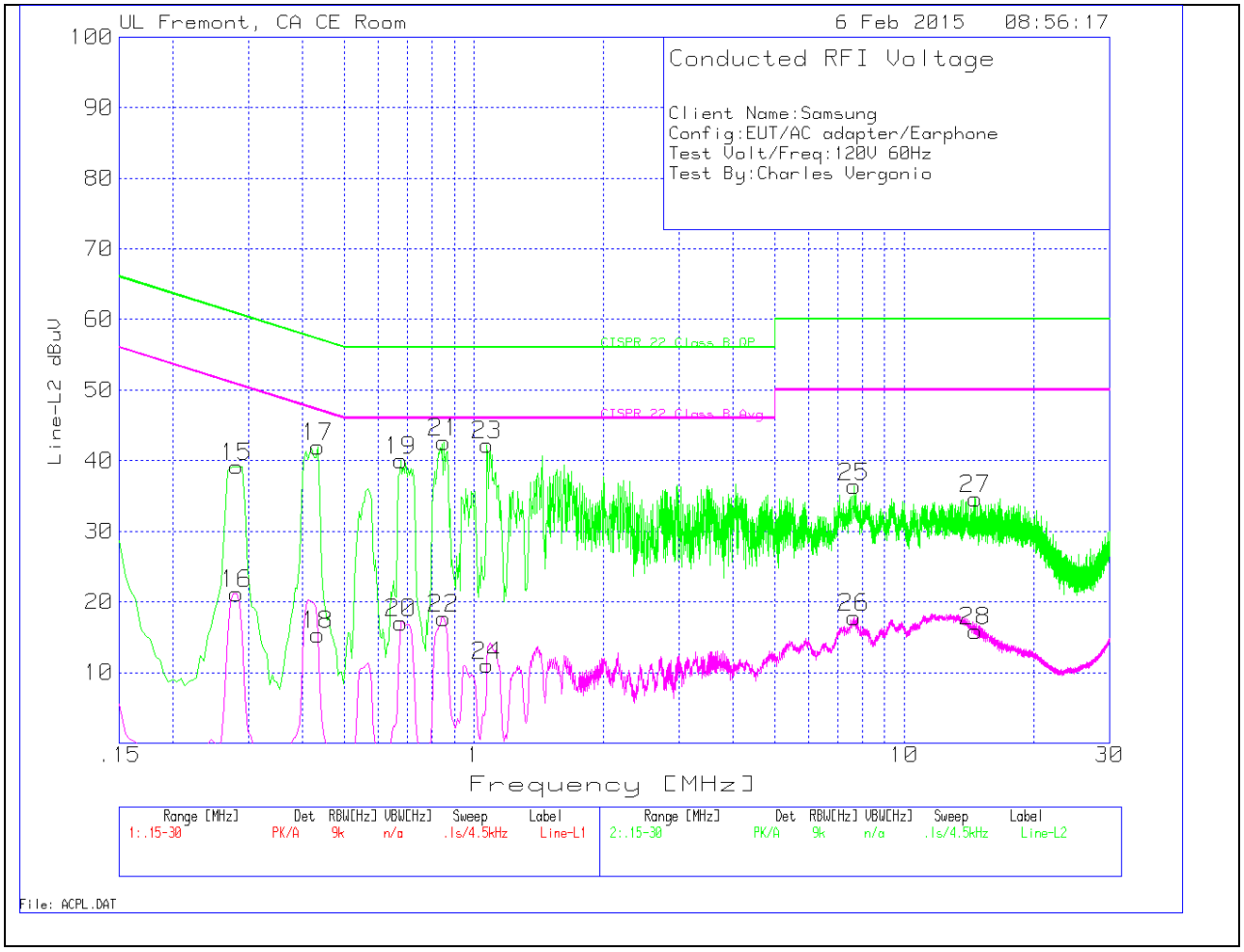
LINE 2 PLOT



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LINE 2 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
15	.2805	38.6	PK	.6	0	39.2	60.8	-21.6	-	-
16	.2805	20.55	Av	.6	0	21.15	-	-	50.8	-29.65
17	.4335	41.58	PK	.4	0	41.98	57.2	-15.22	-	-
18	.4335	14.94	Av	.4	0	15.34	-	-	47.2	-31.86
19	.6765	39.76	PK	.3	0	40.06	56	-15.94	-	-
20	.6765	16.72	Av	.3	0	17.02	-	-	46	-28.98
21	.852	42.38	PK	.3	0	42.68	56	-13.32	-	-
22	.852	17.37	Av	.3	0	17.67	-	-	46	-28.33
23	1.0725	41.85	PK	.3	.1	42.25	56	-13.75	-	-
24	1.0725	10.64	Av	.3	.1	11.04	-	-	46	-34.96
25	7.638	36.06	PK	.2	.1	36.36	60	-23.64	-	-
26	7.638	17.57	Av	.2	.1	17.87	-	-	50	-32.13
27	14.649	34.17	PK	.2	.2	34.57	60	-25.43	-	-
28	14.649	15.53	Av	.2	.2	15.93	-	-	50	-34.07

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