FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

CDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n

MODEL NUMBER: LG-US550, LGLUS550, US550

FCC ID: ZNFUS550

REPORT NUMBER: 14I19592-E2

ISSUE DATE: December 26, 2014

Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	12/26/14	Initial Issue	D. Coronia

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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:	LG ELECTRONICS MOBILECOMM U.S.A., INC
EUT DESCRIPTION:	CDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n
MODEL:	LG-US550, LGUS550, US550
SERIAL NUMBER:	411KPPB000040, 411KPJP000036
DATE TESTED:	DECEMBER 8-16, 2014

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 RSS-GEN Issue 3, and RSS-210 Issue 8.

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.

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

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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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a CDMA/LTE PHONE + BLUETOOTH & 2.4GHz DTS b/g/n

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	9.57	9.06
2402 - 2480	Enhanced 8PSK	9.95	9.89

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 -3.1 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	LG	MCS-01WR	RD4X0891946	N/A
Earphone	LG	LG-US550	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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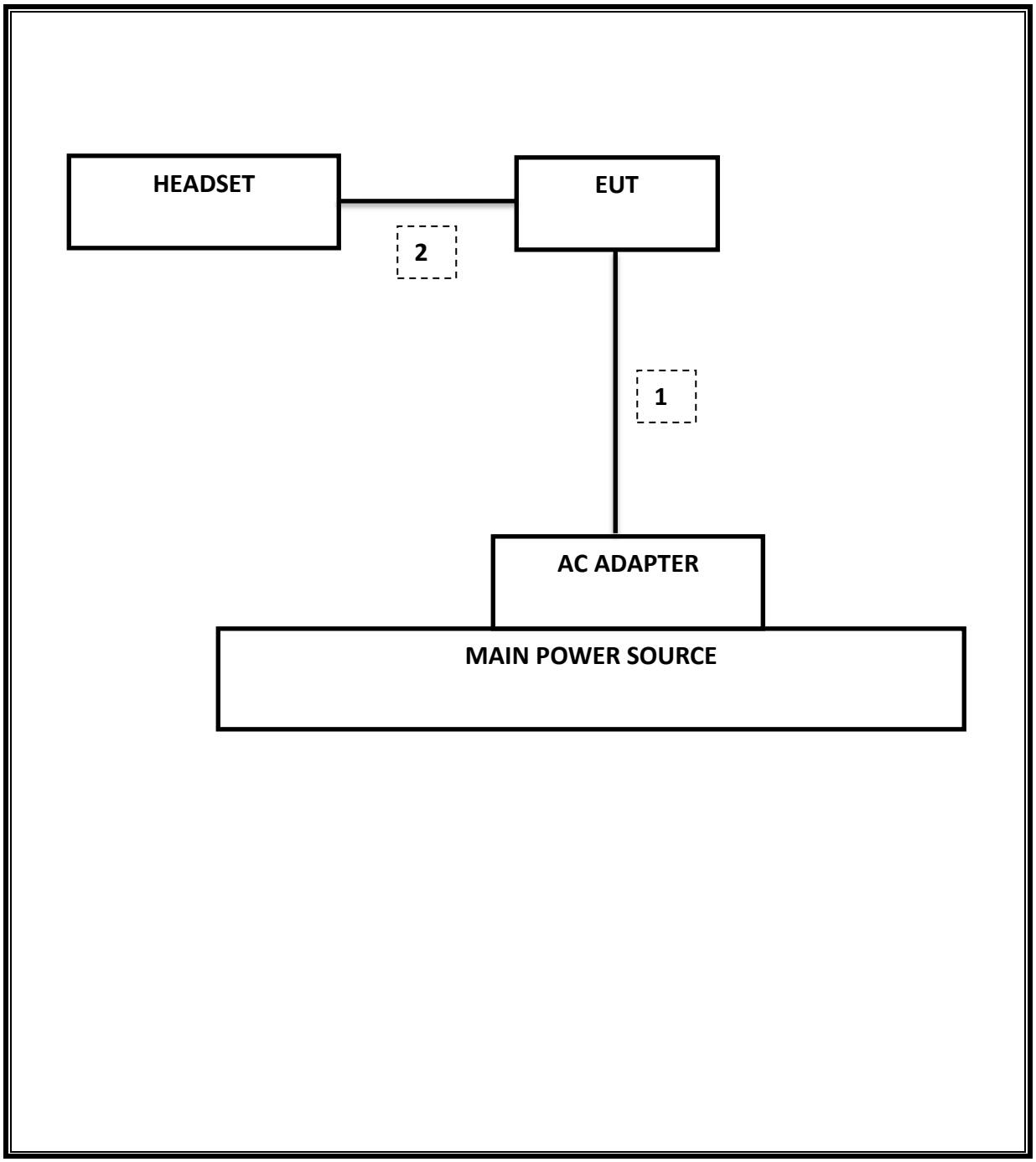
SETUP DIAGRAM FOR TESTS



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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
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/15
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	01/14/15
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

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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	1.1992 MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-42.35 dBm
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	9.95 dBm
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	1 MHz
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	79 ch
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	0.23 s
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	46.89 dBuV(AV)
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	35.13 dBuV/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 (MHz)	99% Bandwidth (MHz)
Low	2402	0.92527	0.87547
Middle	2441	0.92567	0.89819
High	2480	0.92515	0.90435
Worst		0.92567	0.90435

8.1.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.264	1.1992
Middle	2441	1.262	1.1640
High	2480	1.263	1.1982
Worst		1.264	1.1992

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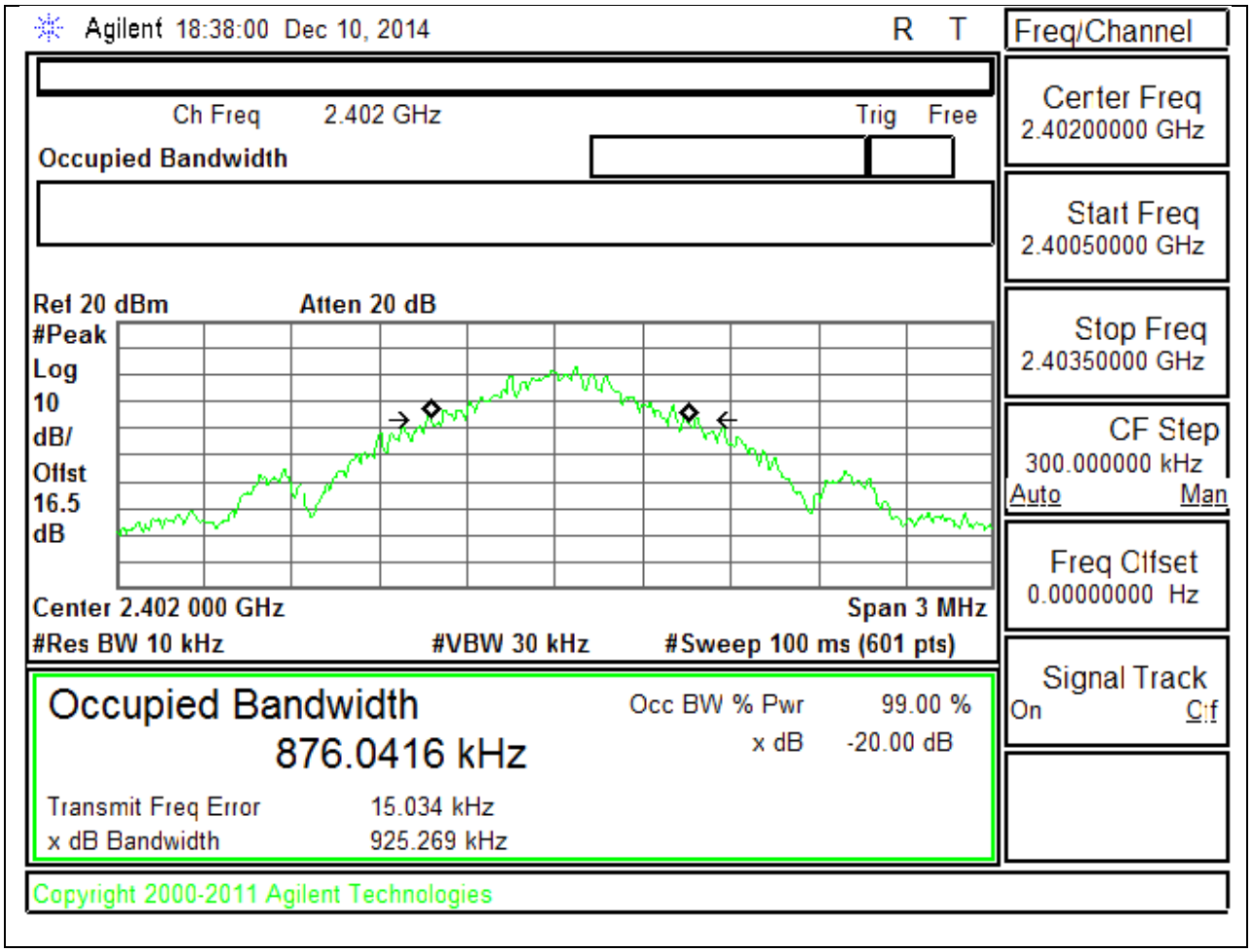
20 dB AND 99% BANDWIDTH PLOTS

GFSK 20 dB BANDWIDTH

LOW CHANNEL



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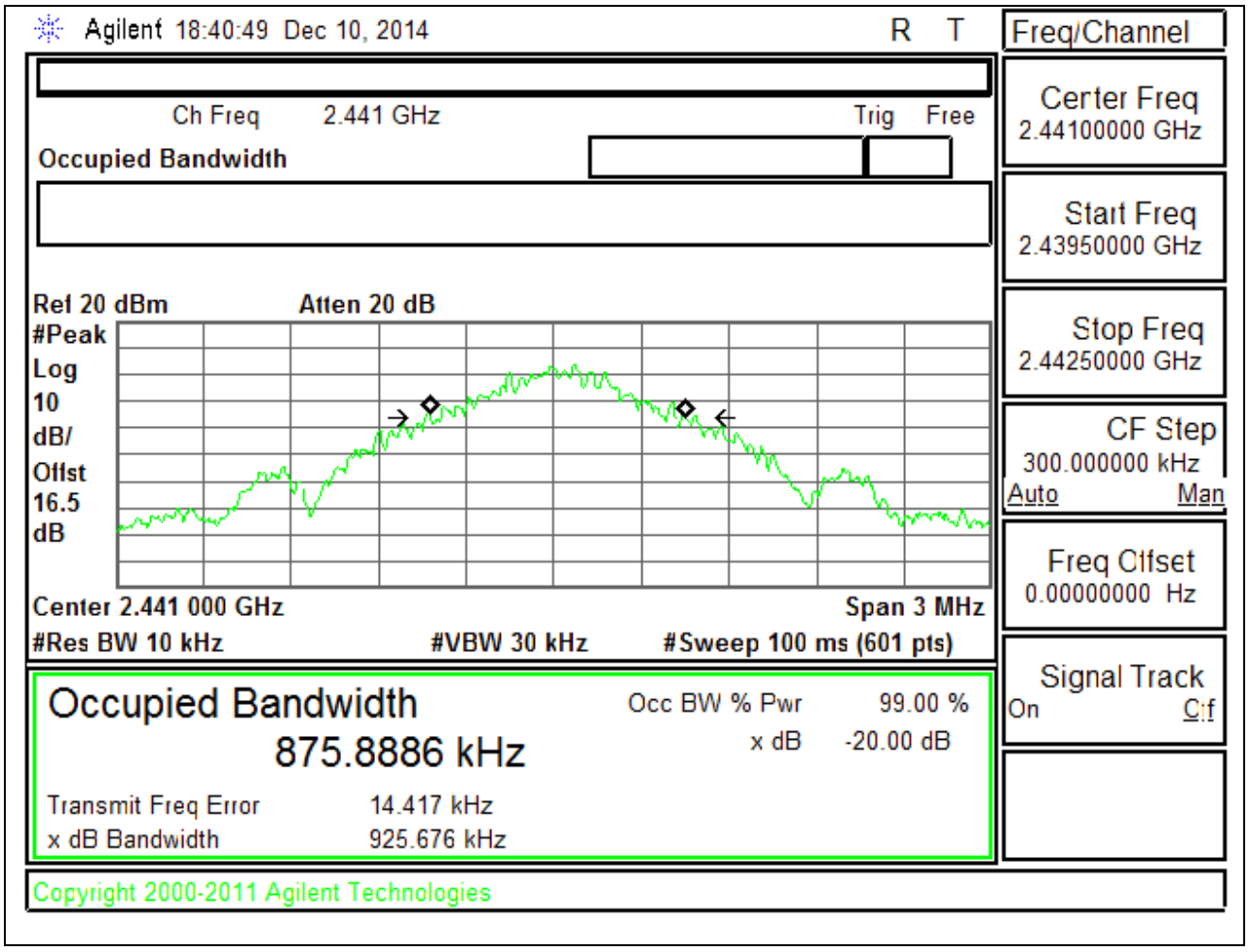
MID CHANNEL



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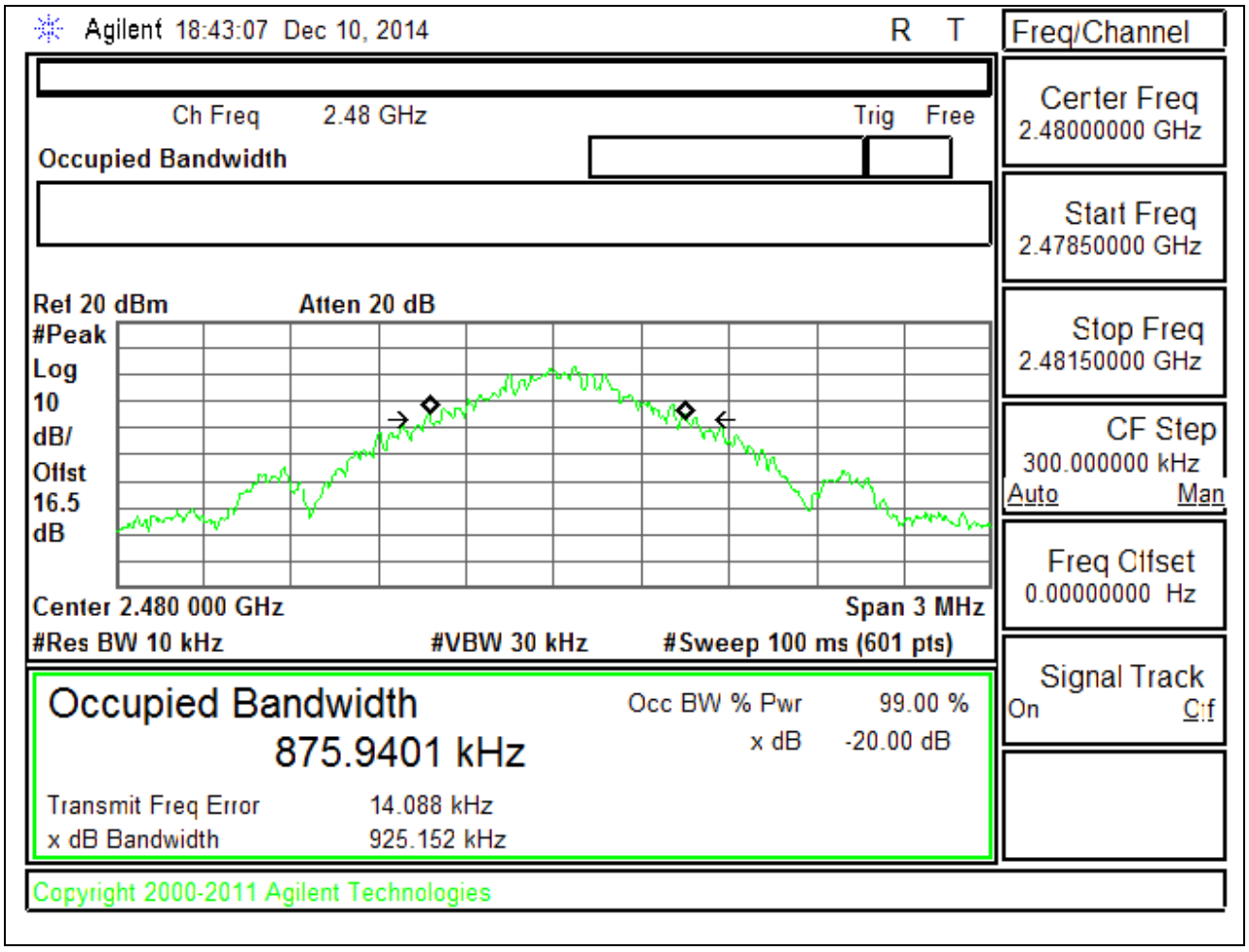
HIGH CHANNEL



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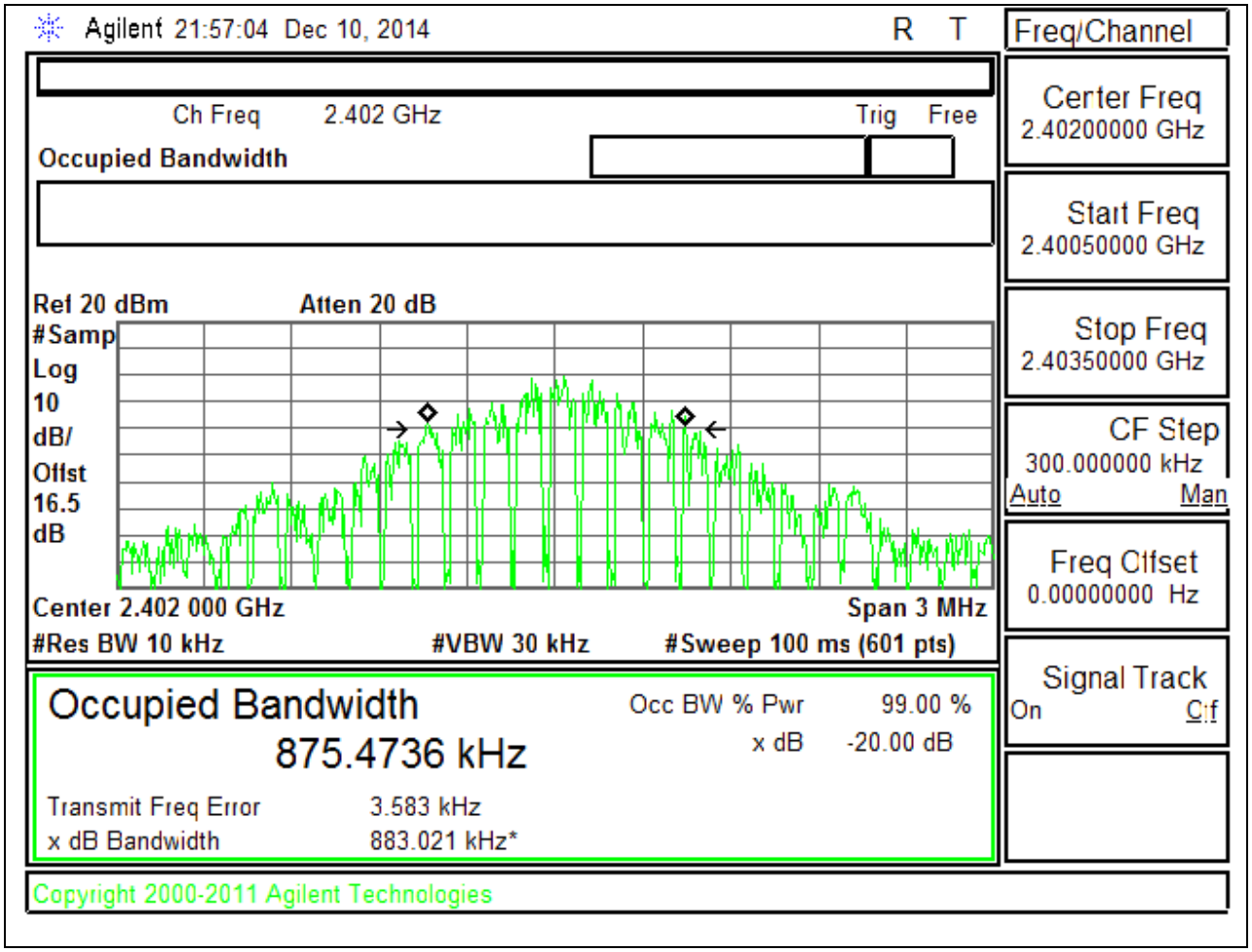
GFSK 99% BANDWIDTH

LOW CHANNEL



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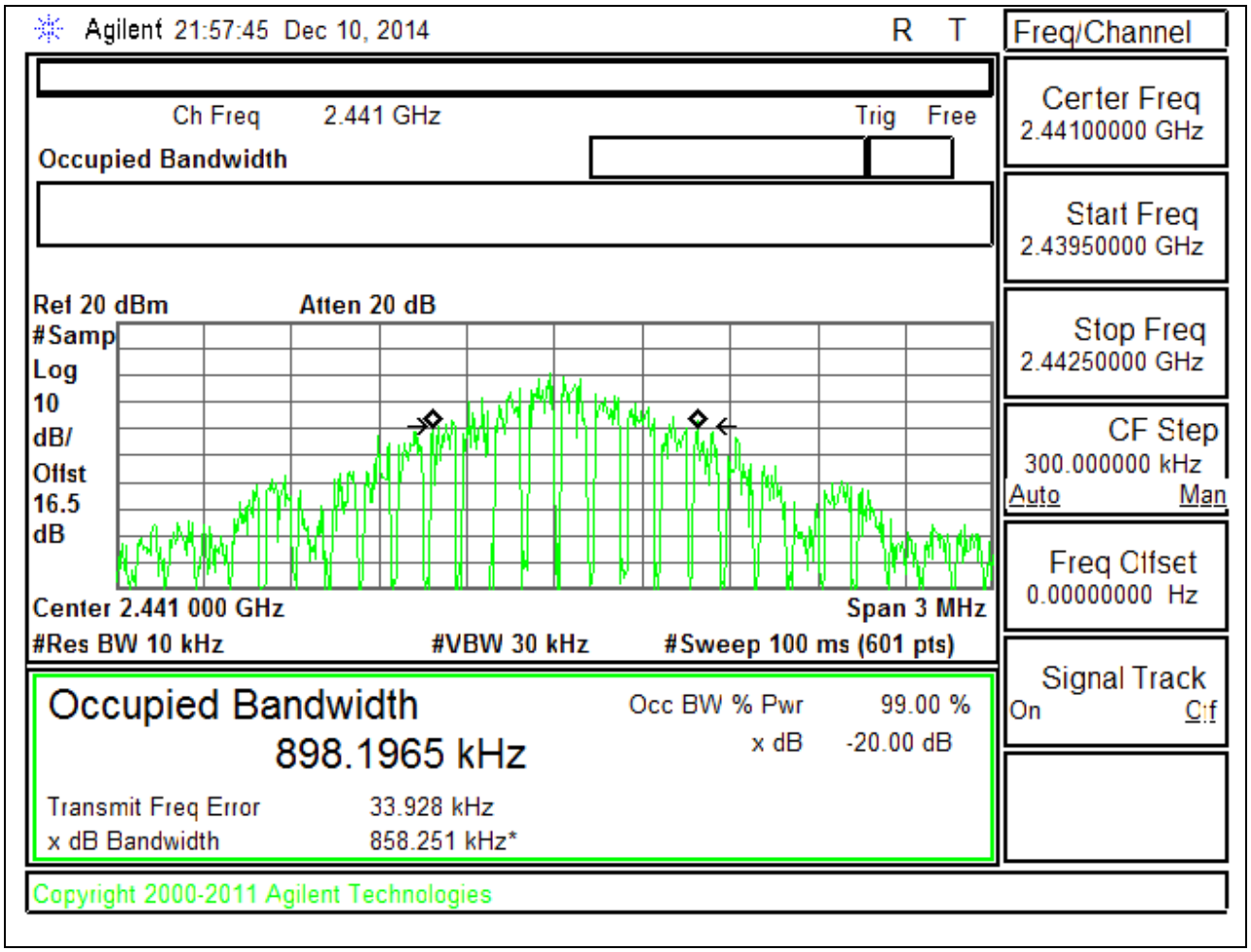
MID CHANNEL



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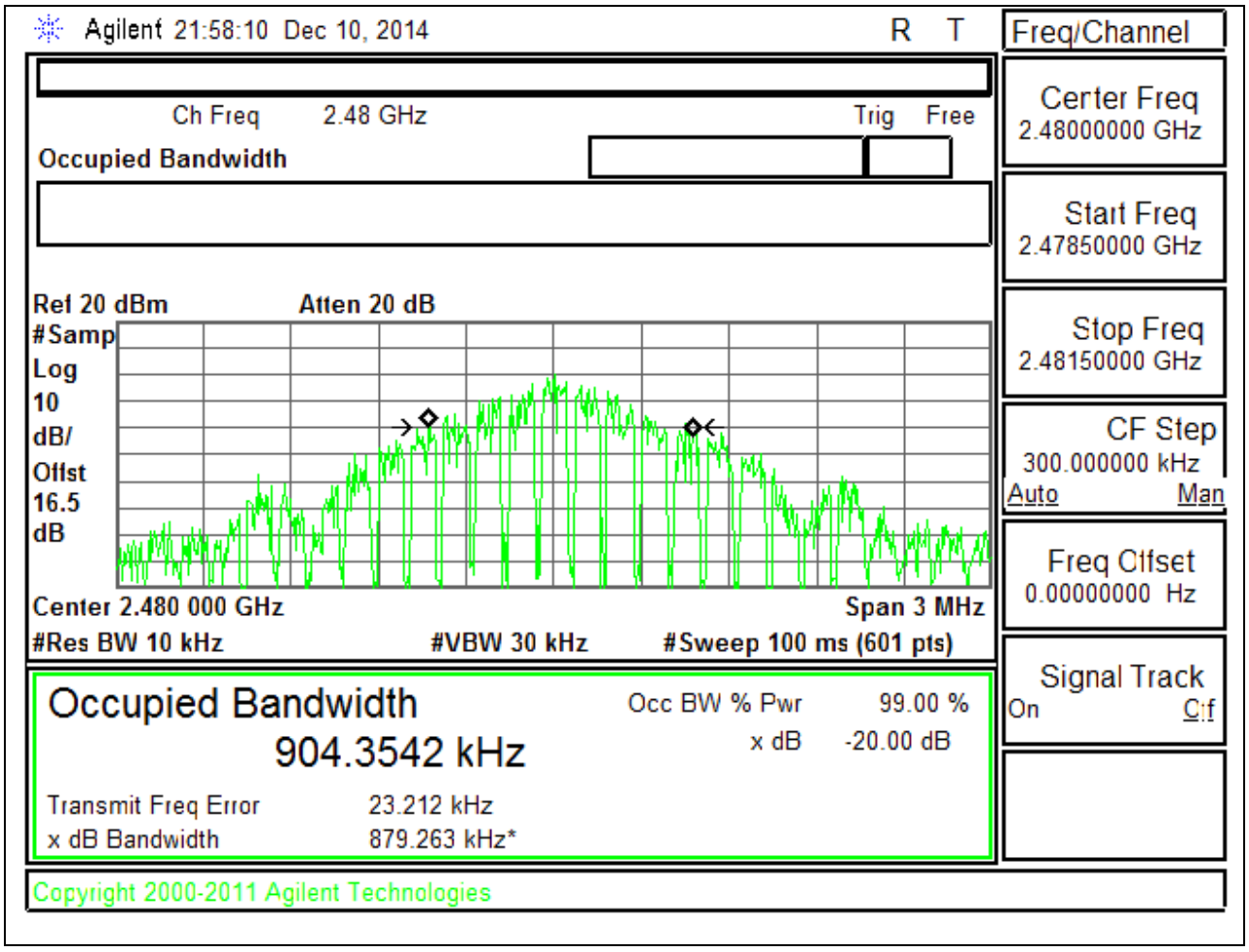
HIGH CHANNEL



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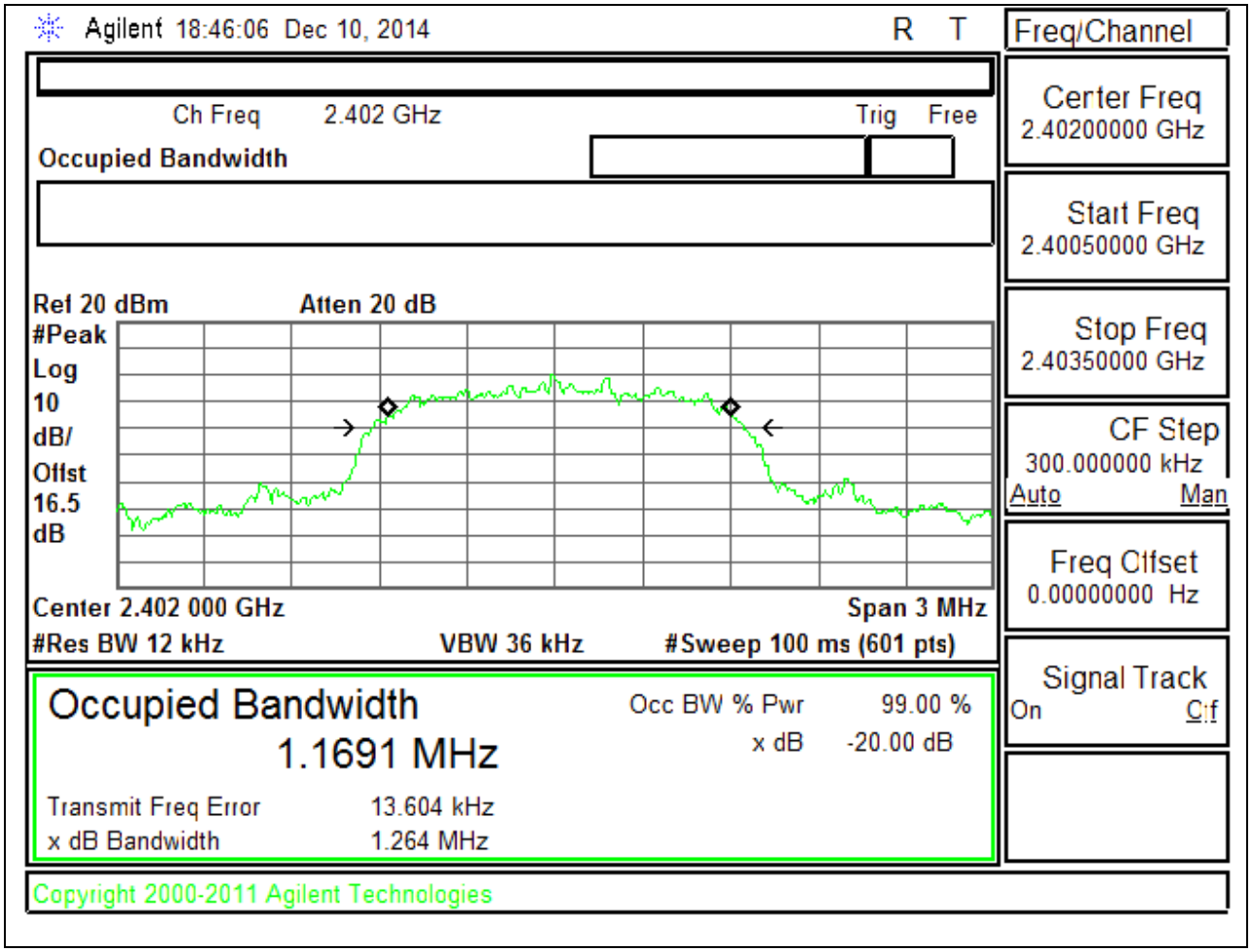
8PSK 20 dB BANDWIDTH

LOW CHANNEL



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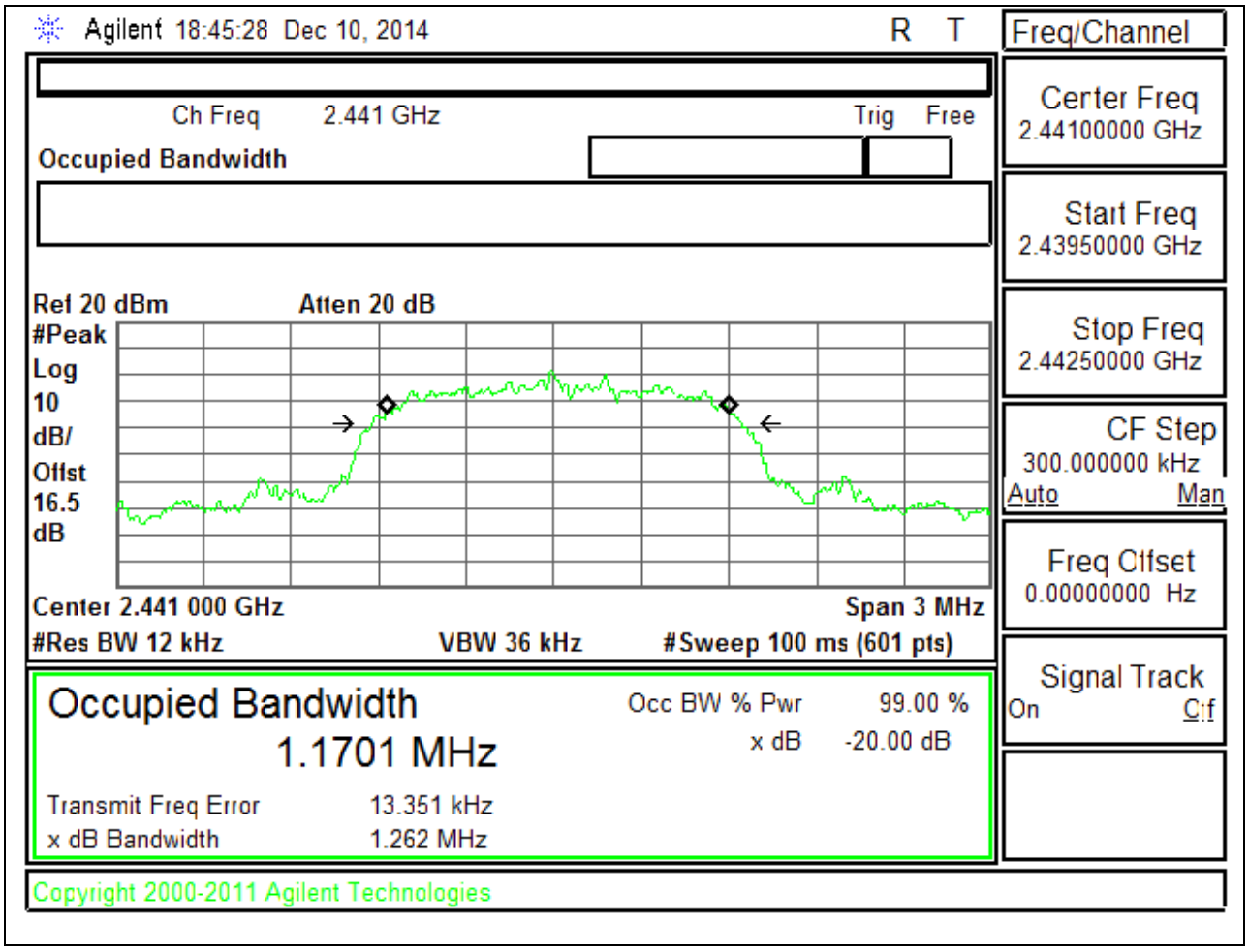

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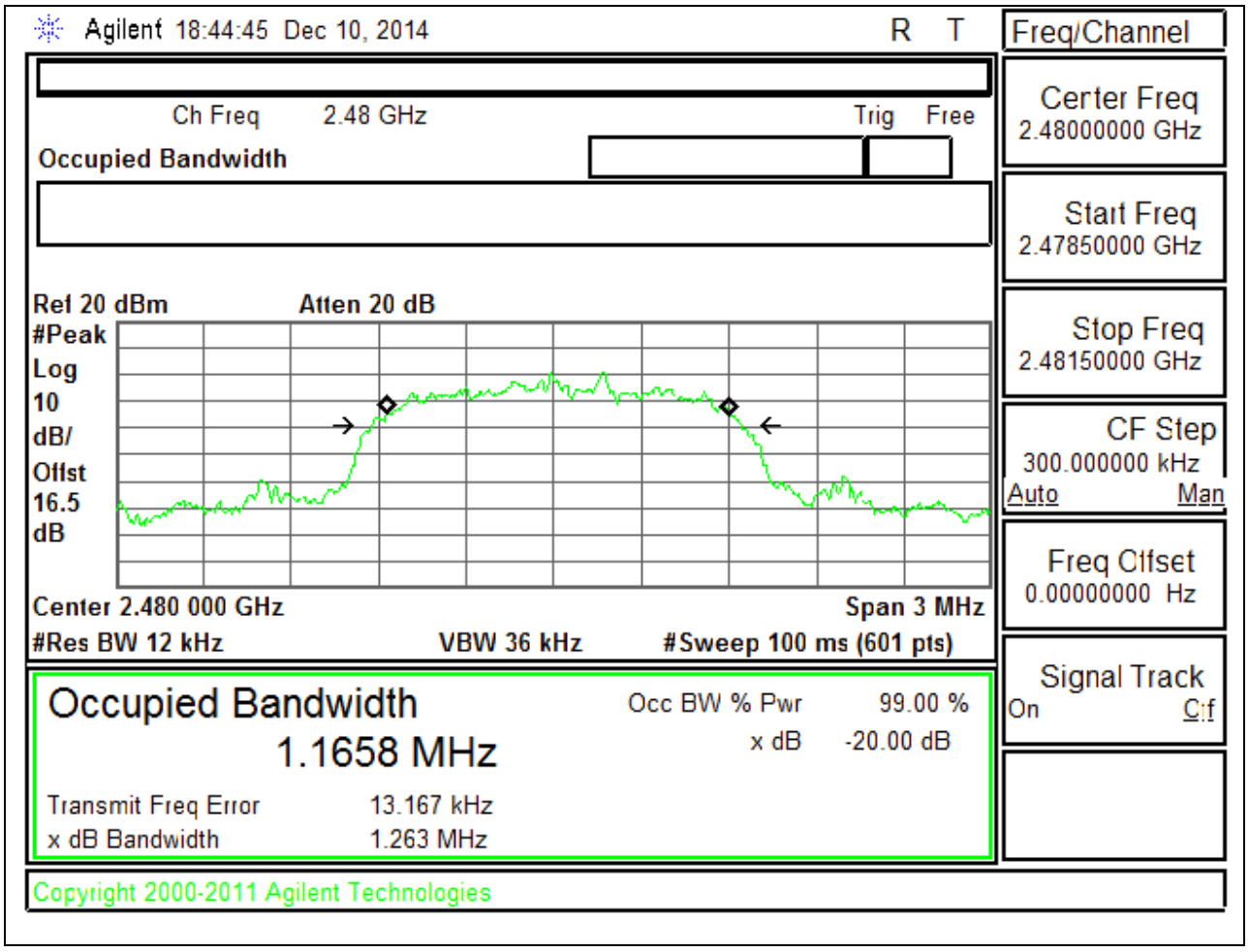
HIGH CHANNEL



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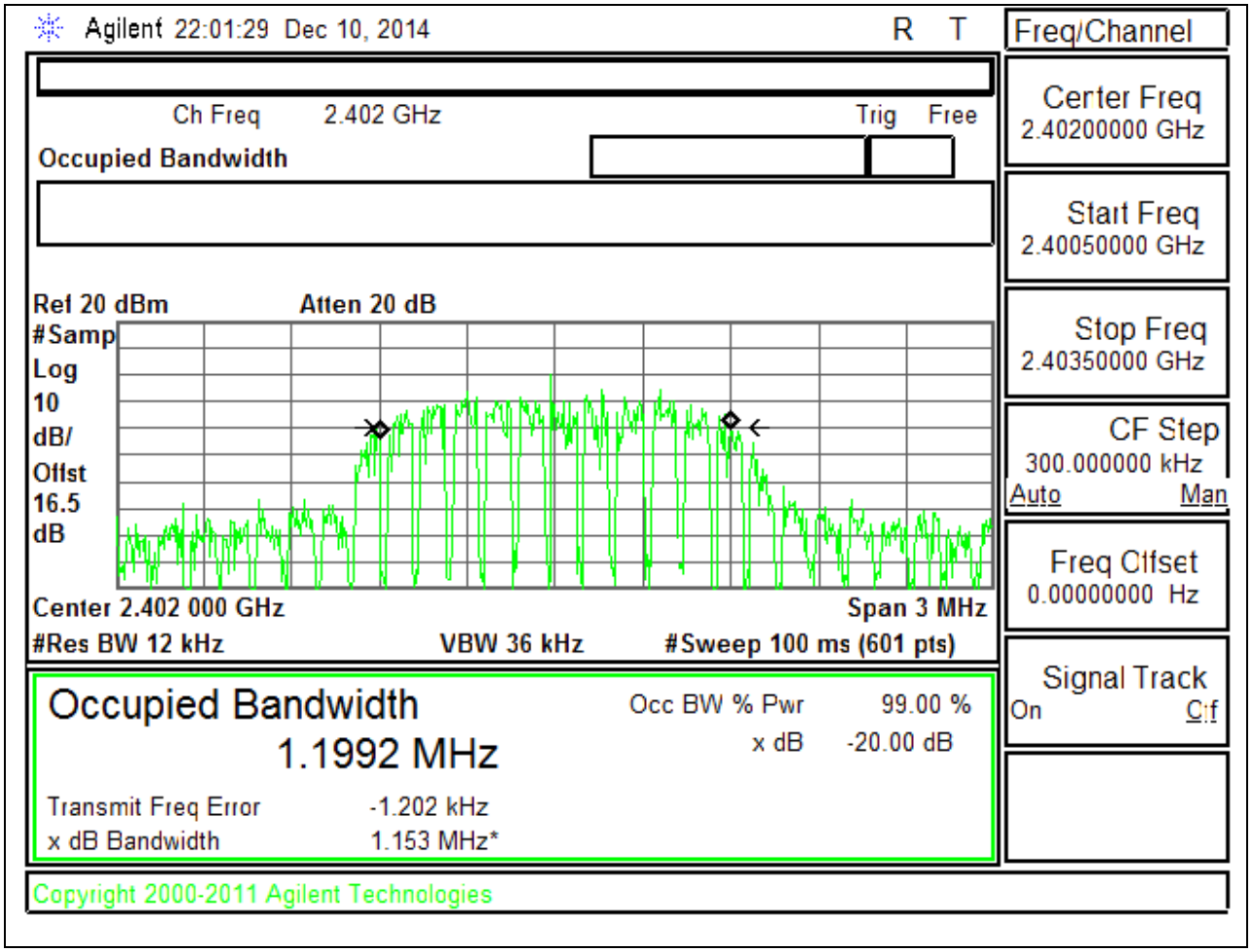
8PSK 99% BANDWIDTH

LOW CHANNEL



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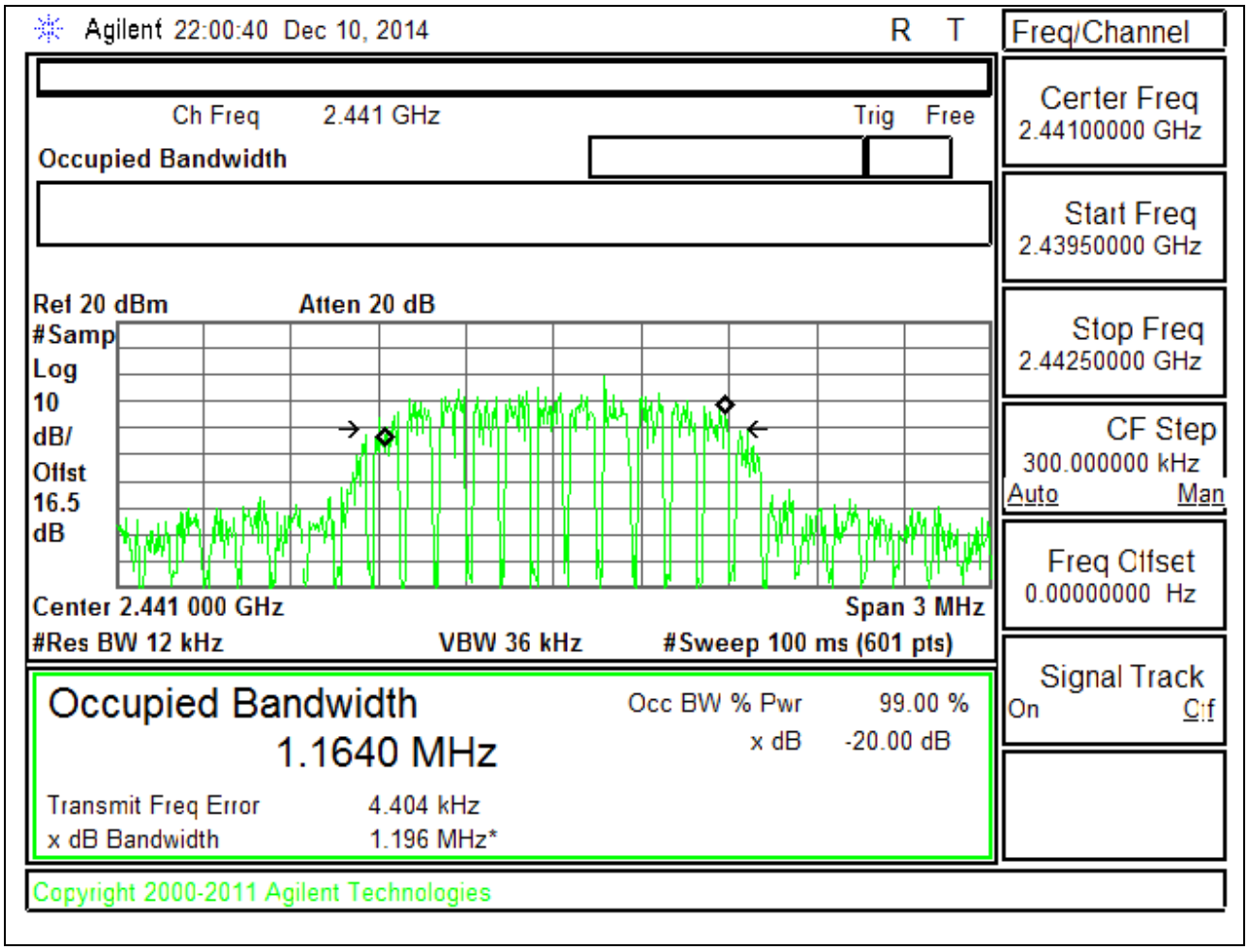
MID CHANNEL



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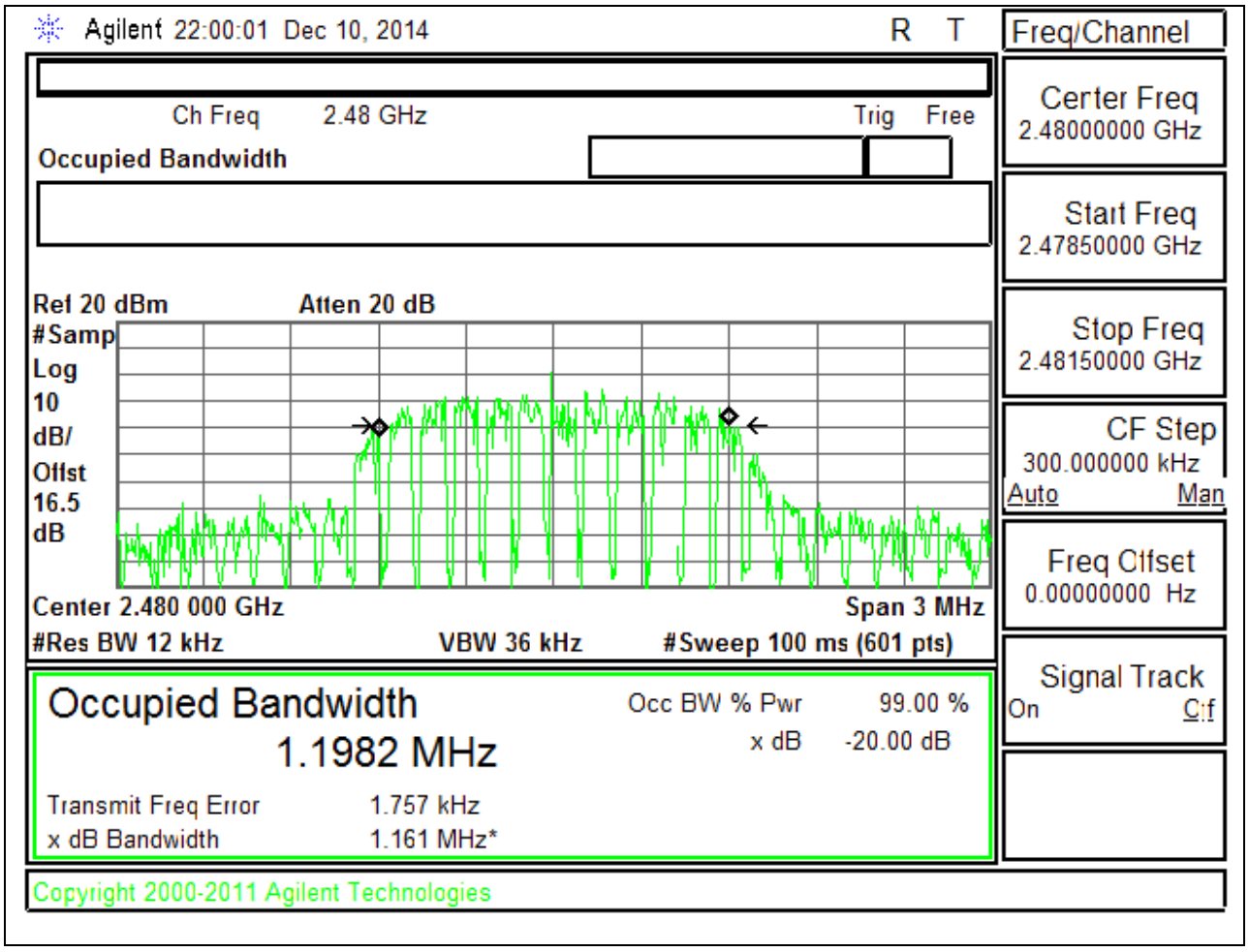
HIGH CHANNEL



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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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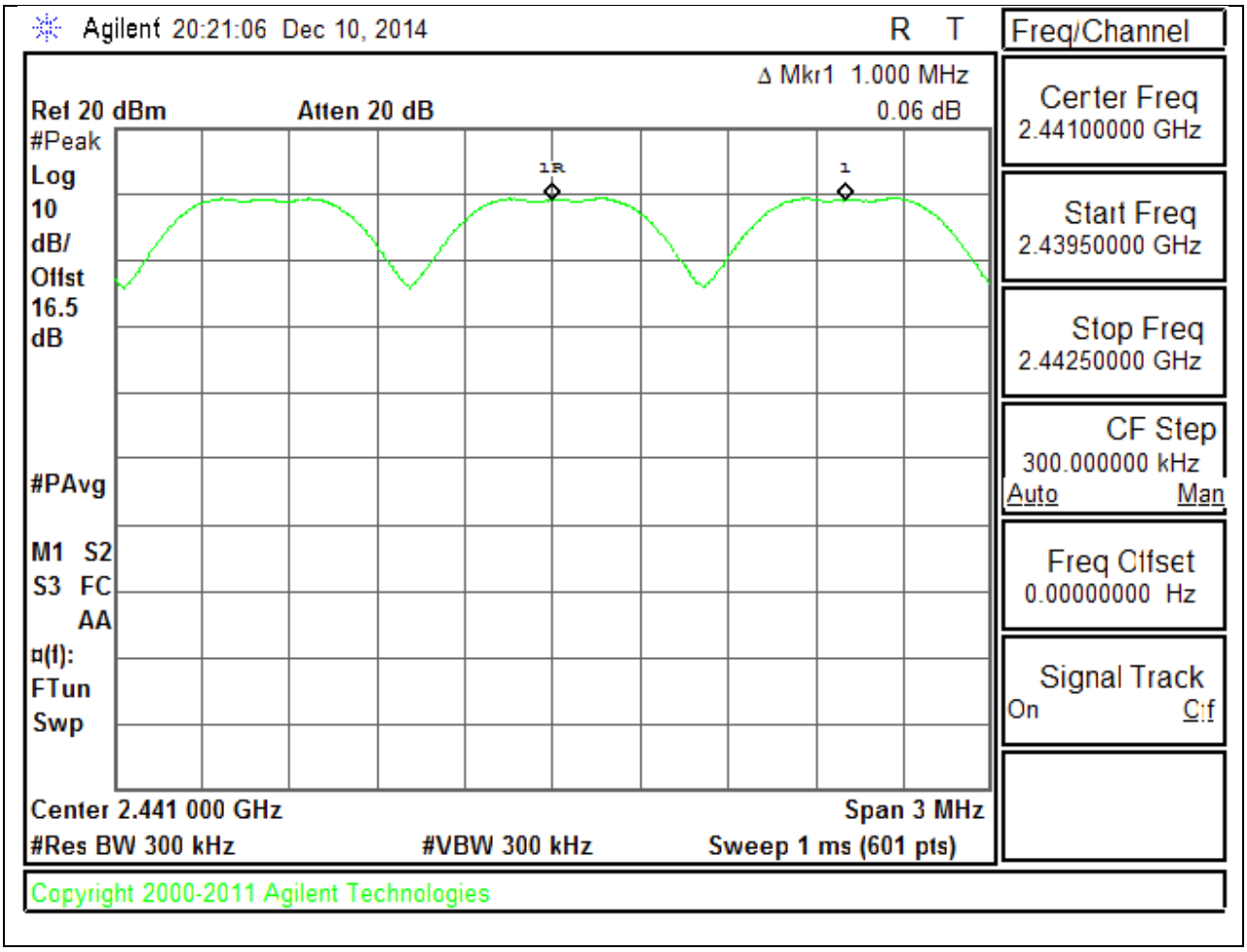
HOPPING FREQUENCY SEPARATION PLOT



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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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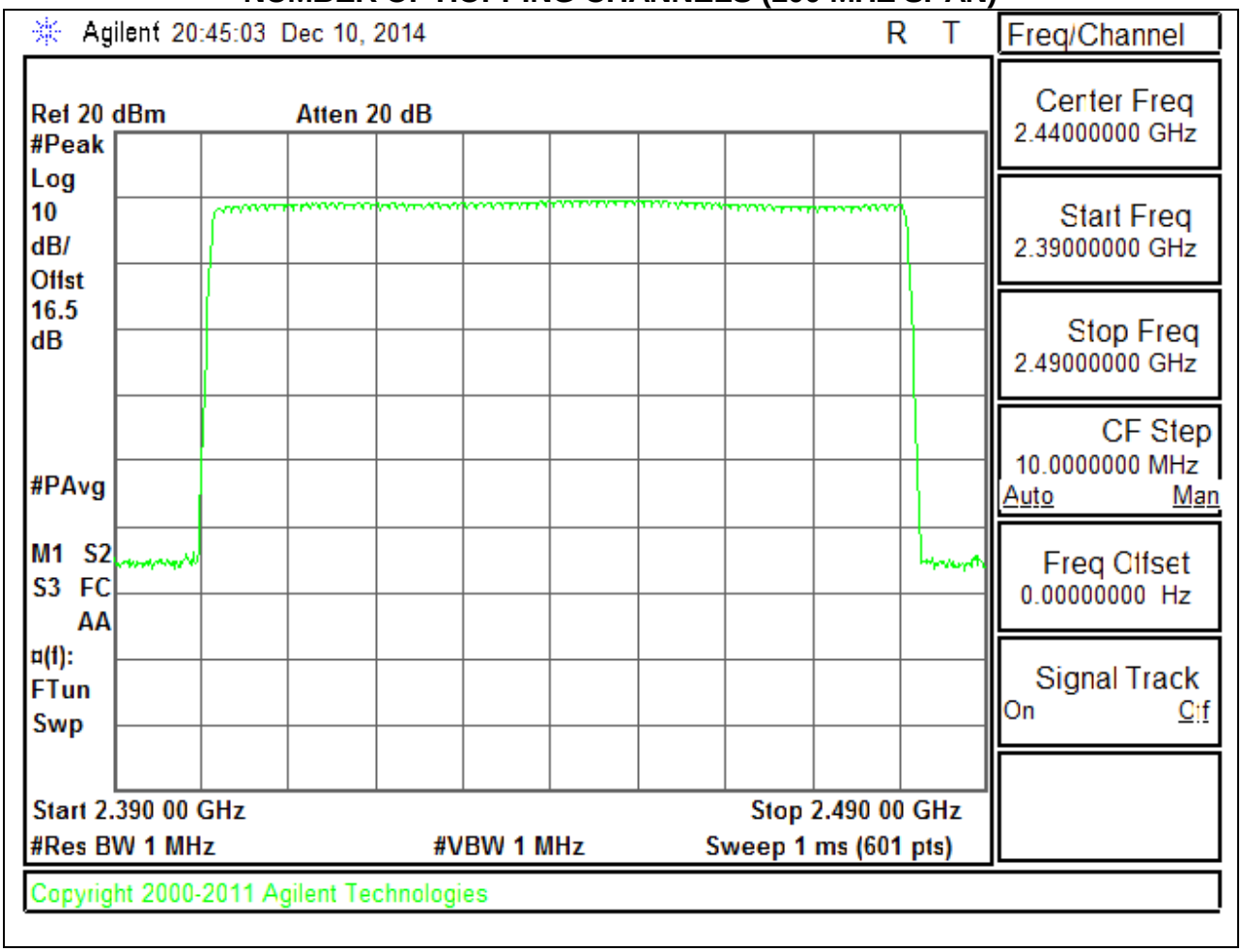
NUMBER OF HOPPING CHANNELS PLOTS

NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



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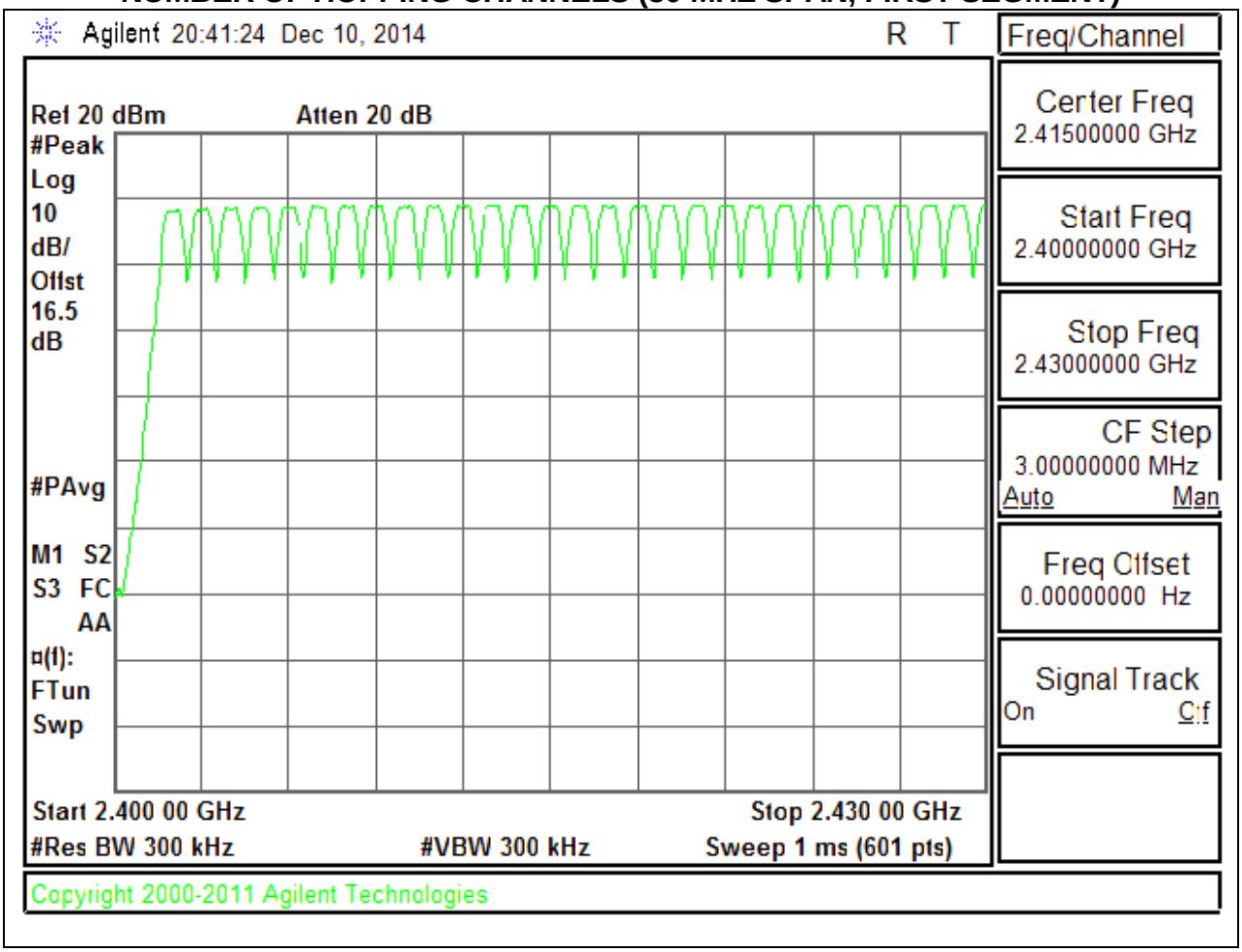
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



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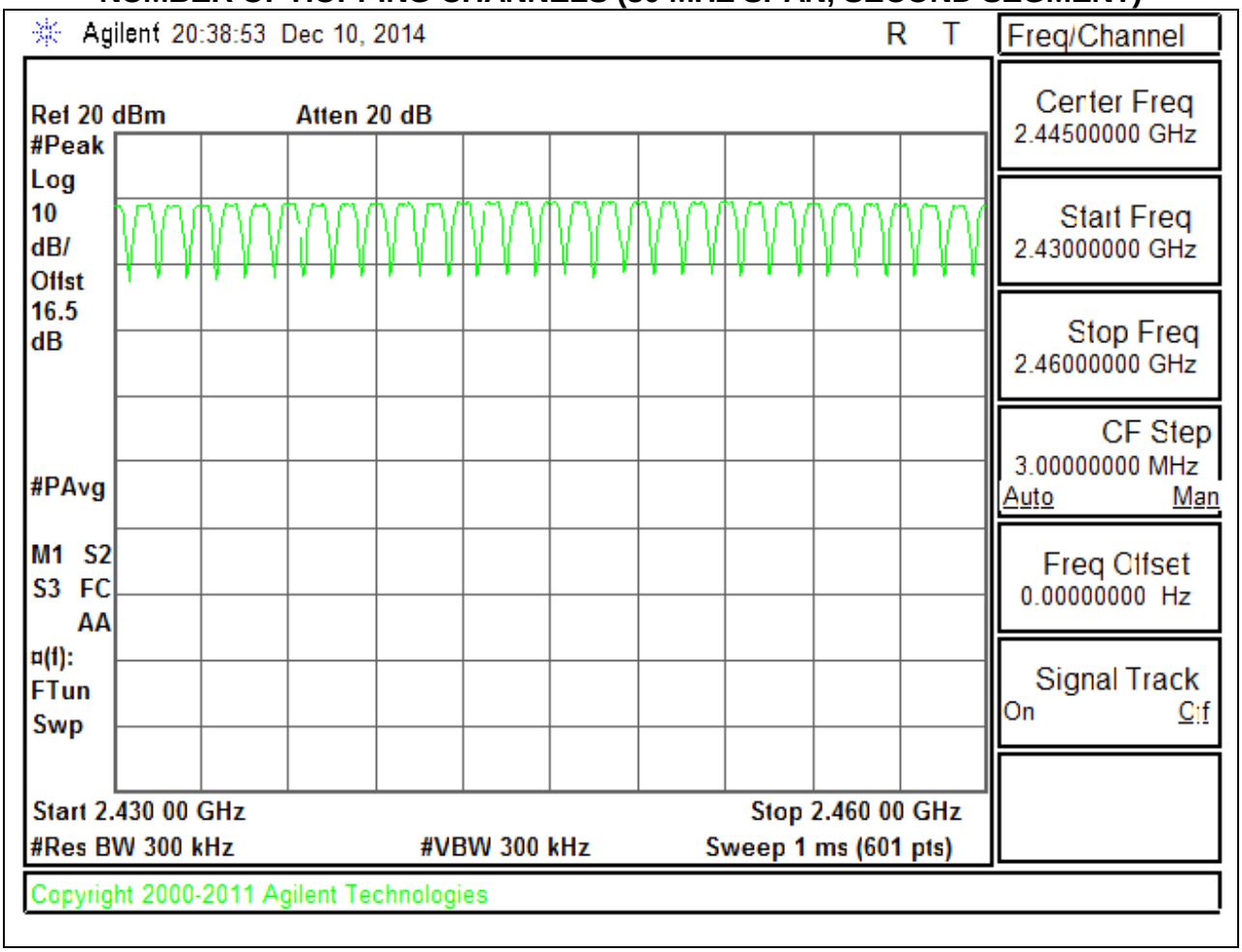
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



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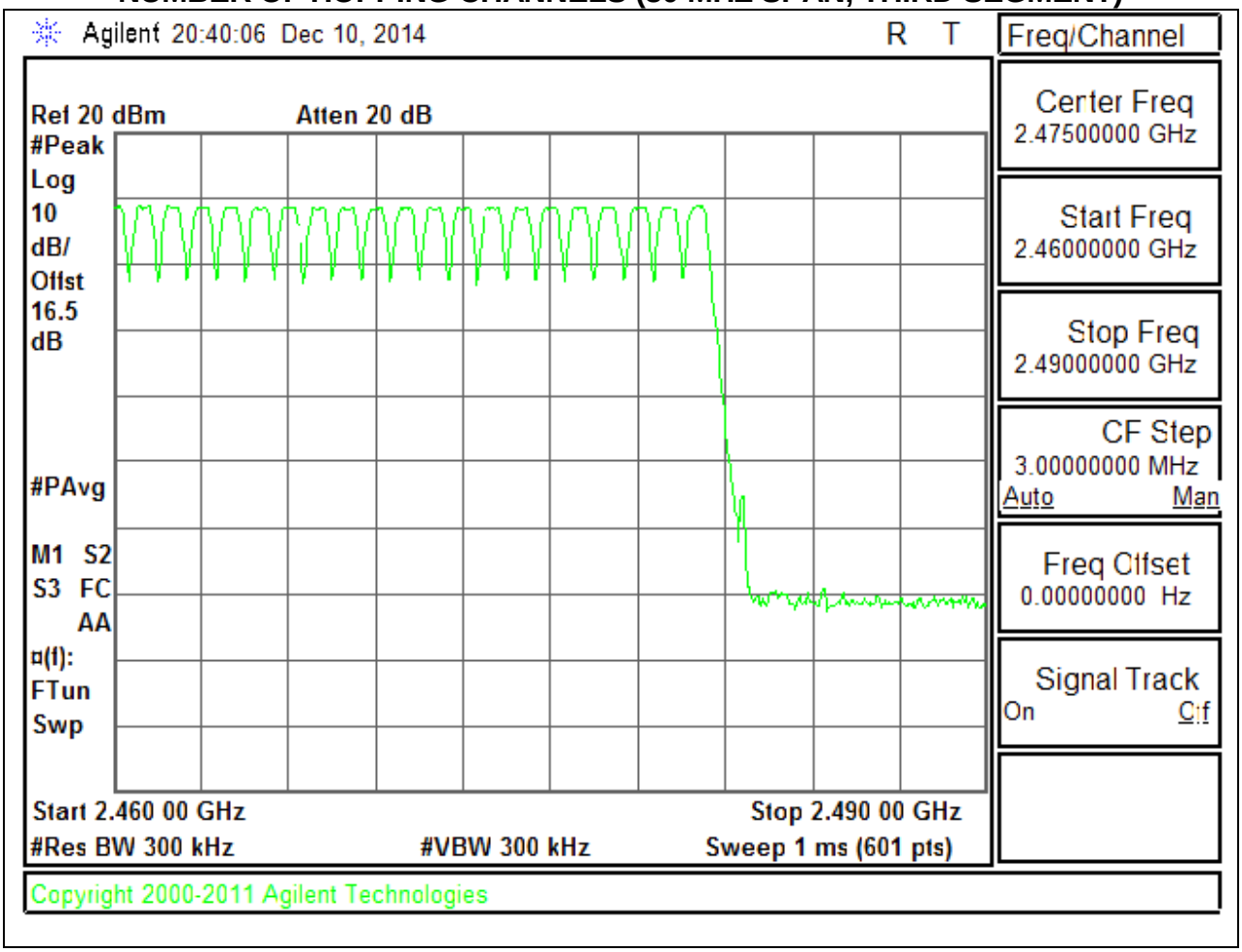
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



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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.

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	0.383	30	0.11499	0.4	-0.28501
DH3	1.633	14	0.22862	0.4	-0.17138
DH5	2.883	8	0.23064	0.4	-0.16936
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	0.3833	7.5	0.0287475	0.4	-0.37125
DH3	1.633	3.5	0.057155	0.4	-0.34285
DH5	2.883	2	0.05766	0.4	-0.34234

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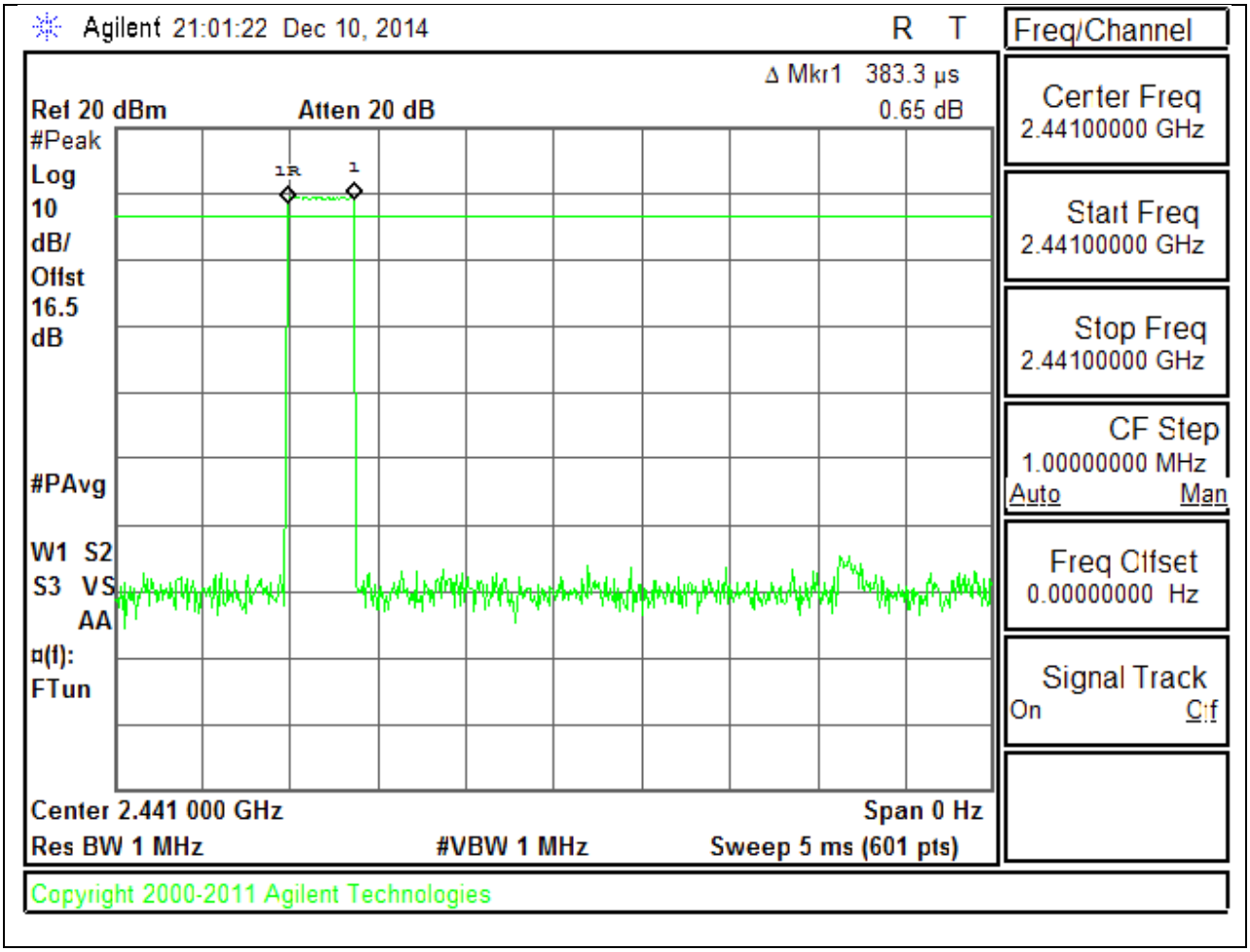
PULSE WIDTH - DH1



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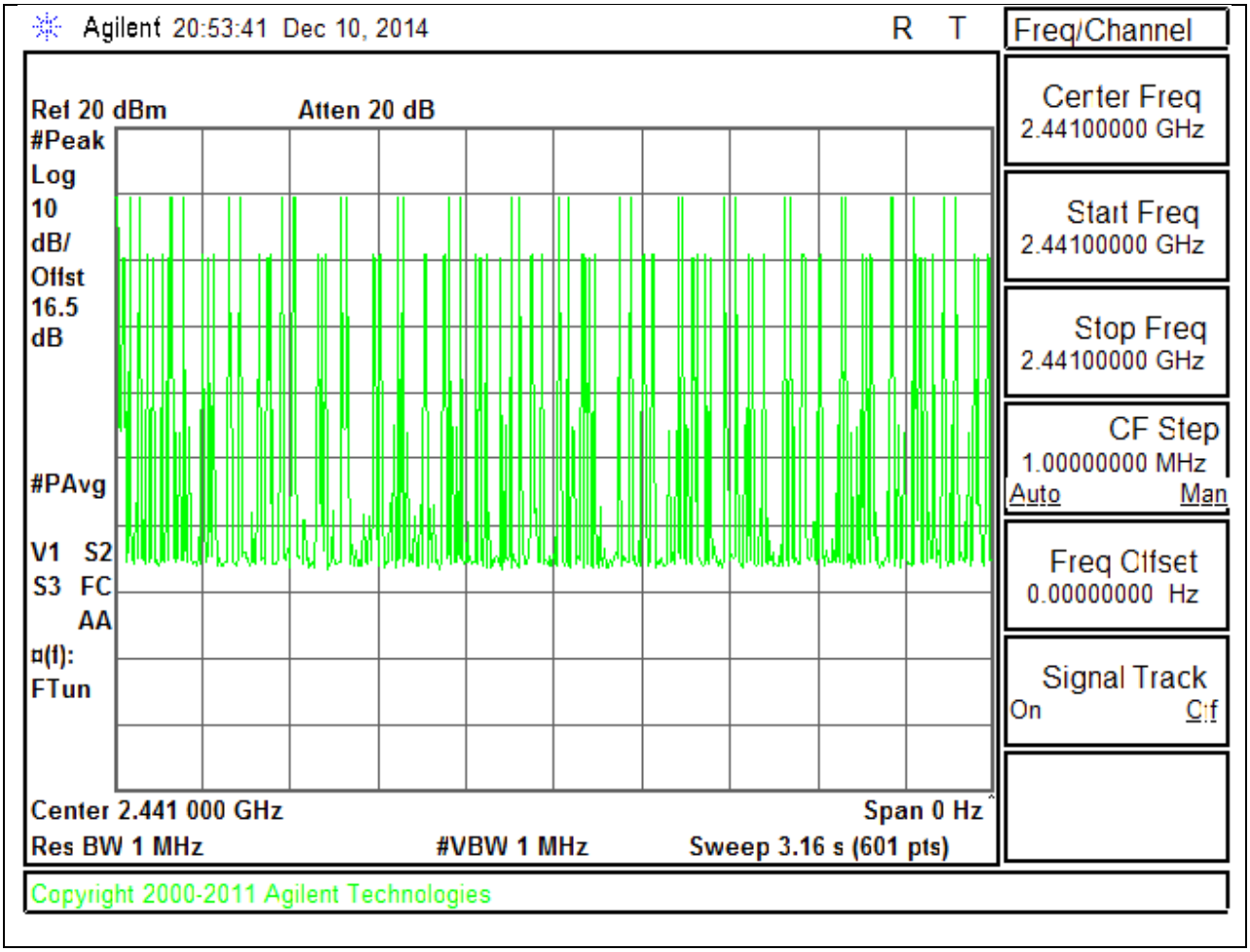
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH1



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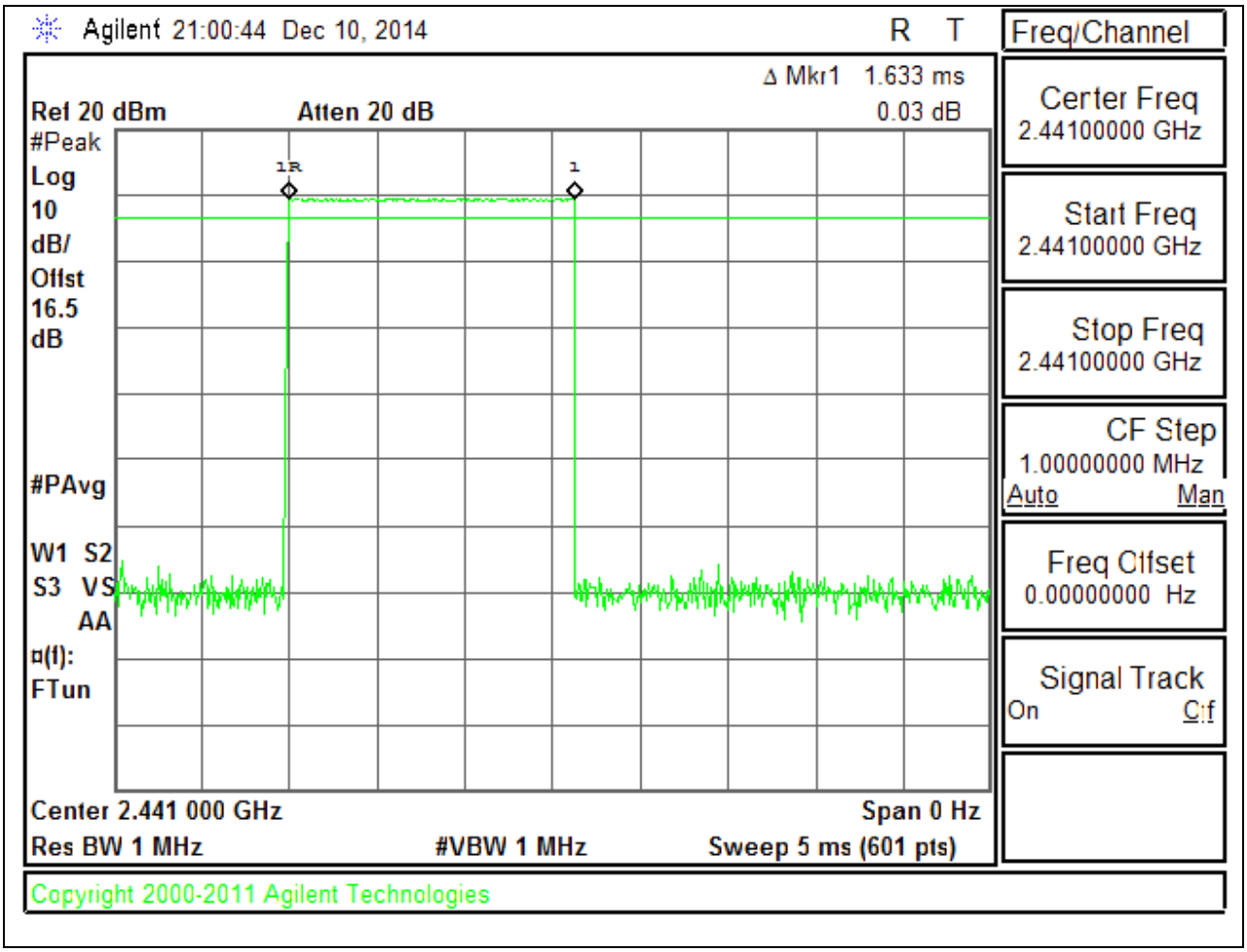
PULSE WIDTH - DH3



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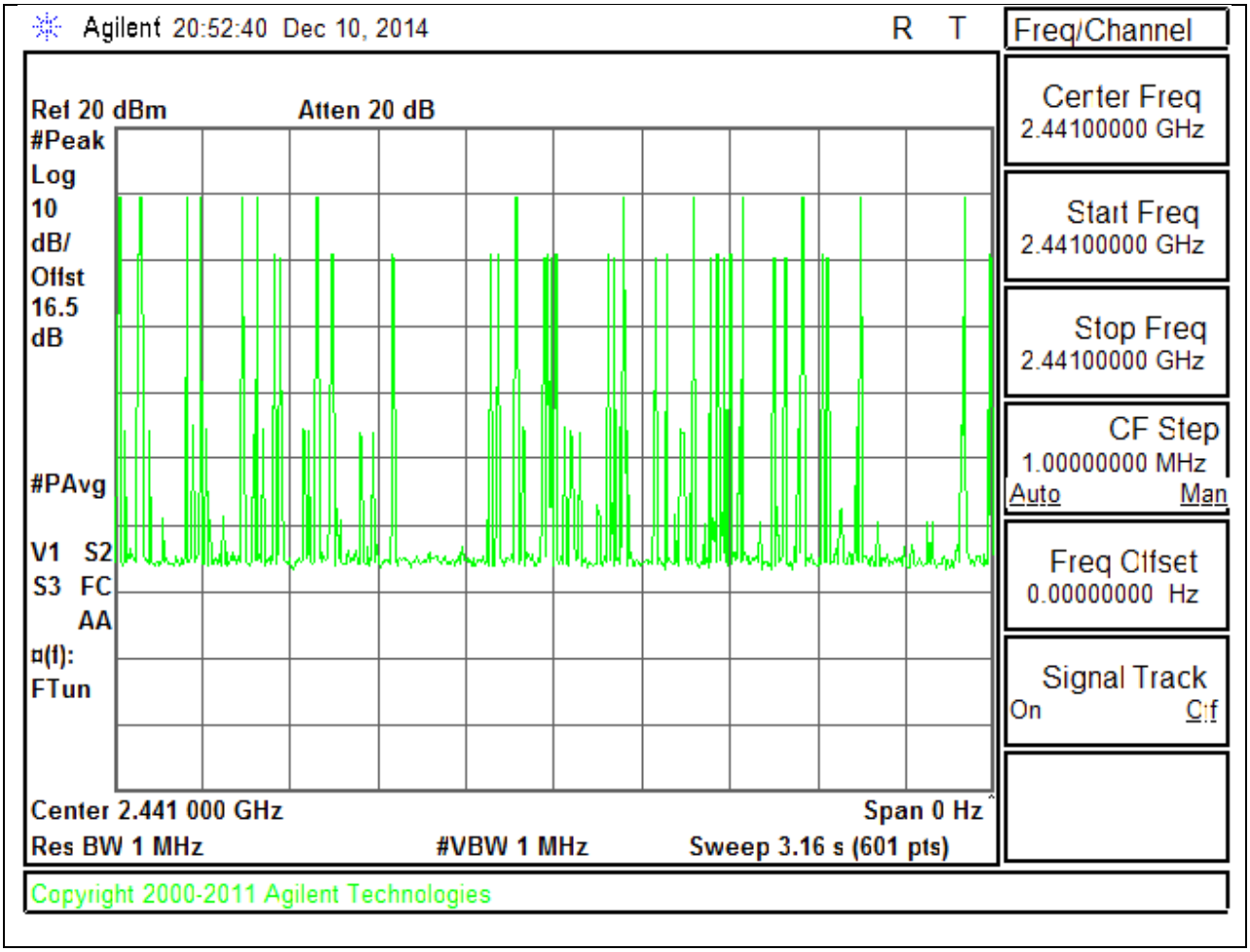
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH3



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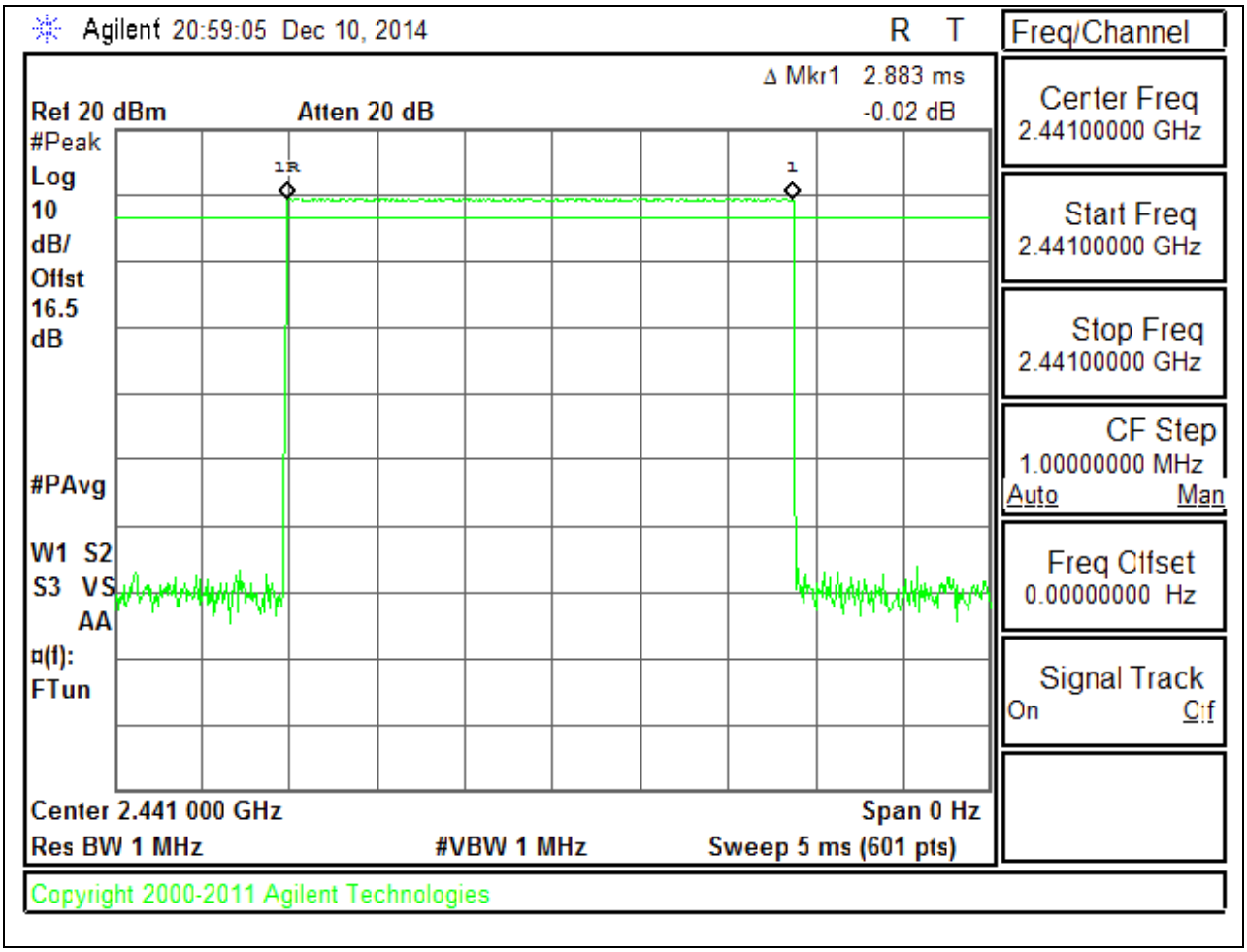
PULSE WIDTH - DH5



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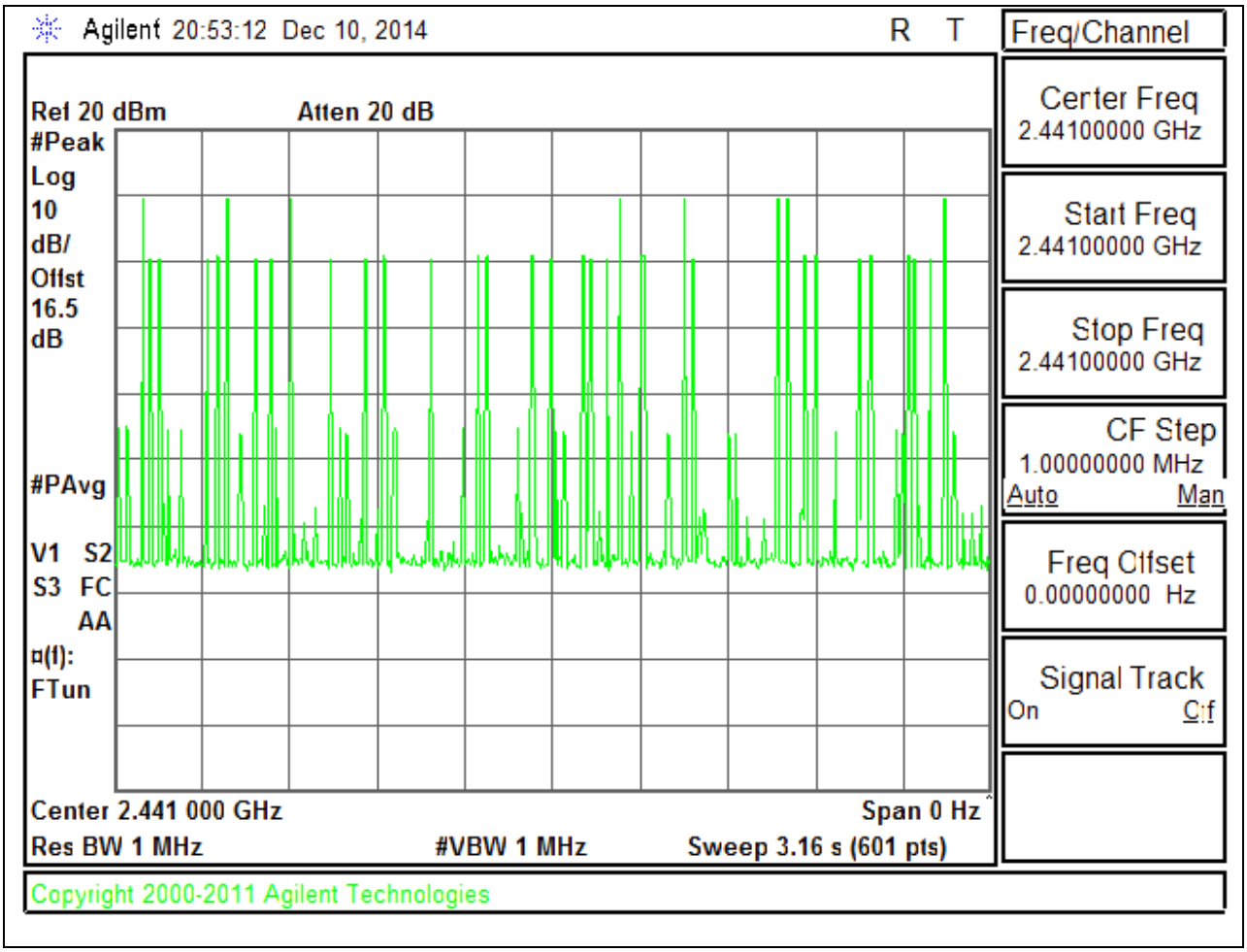
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD - DH5



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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	8.47	21	-12.53
Middle	2441	9.57	21	-11.43
High	2480	8.99	21	-12.01
Worst		9.57		-11.43

8.5.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	8.87	21	-12.13
Middle	2441	9.95	21	-11.05
High	2480	9.34	21	-11.66
Worst		9.95		-11.05

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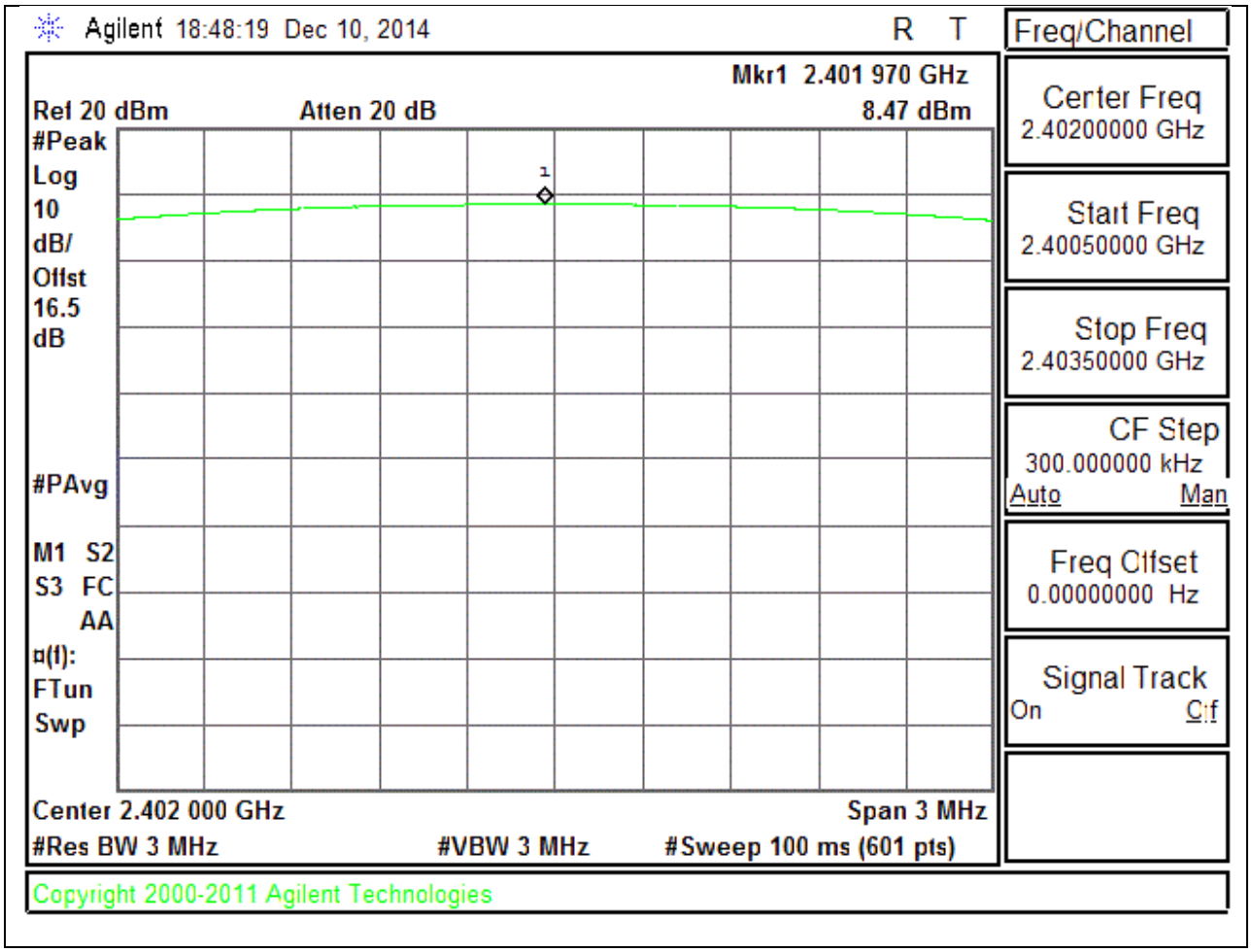
8.5.3. OUTPUT POWER PLOTS

GFSK OUTPUT POWER

LOW CHANNEL



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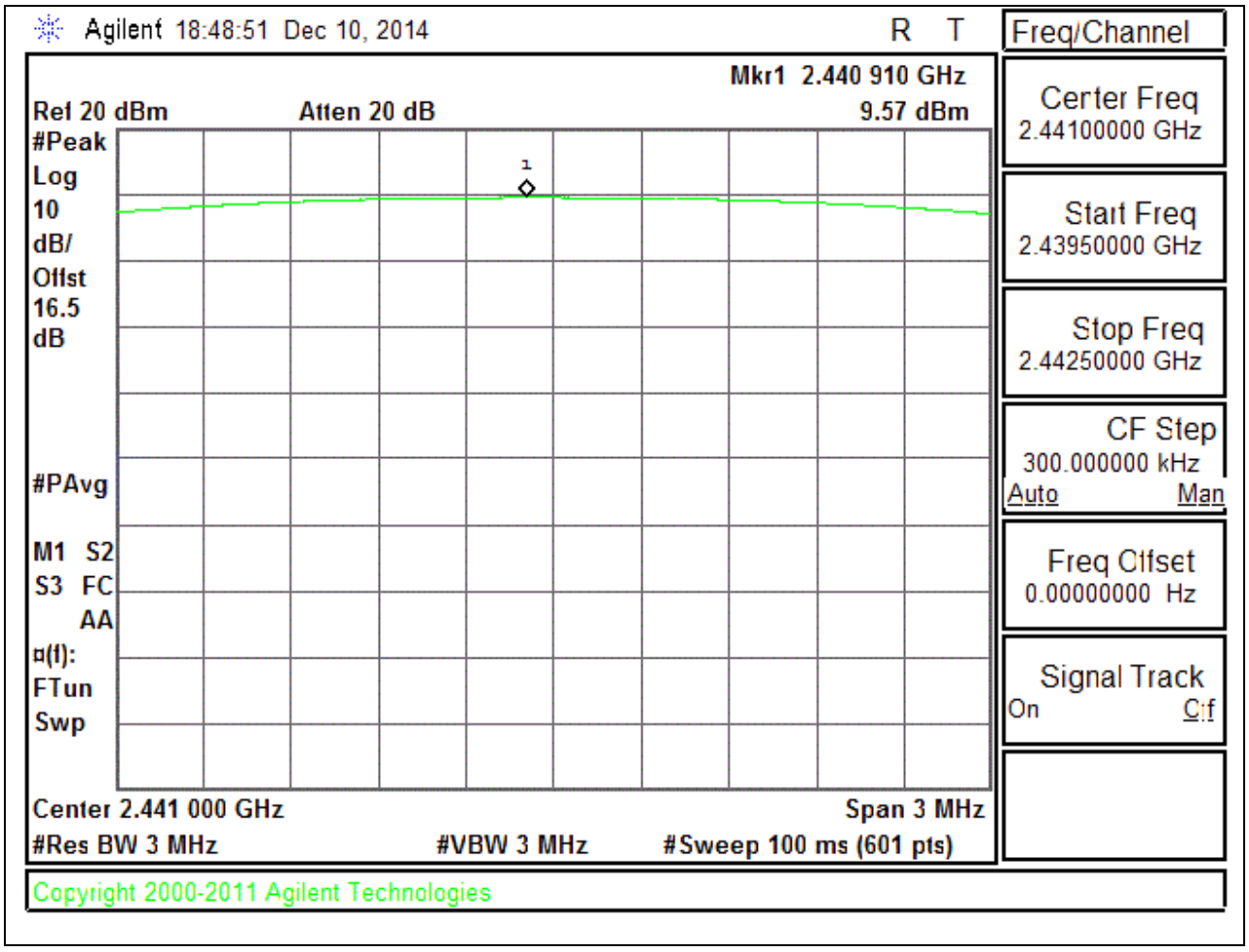
MID CHANNEL



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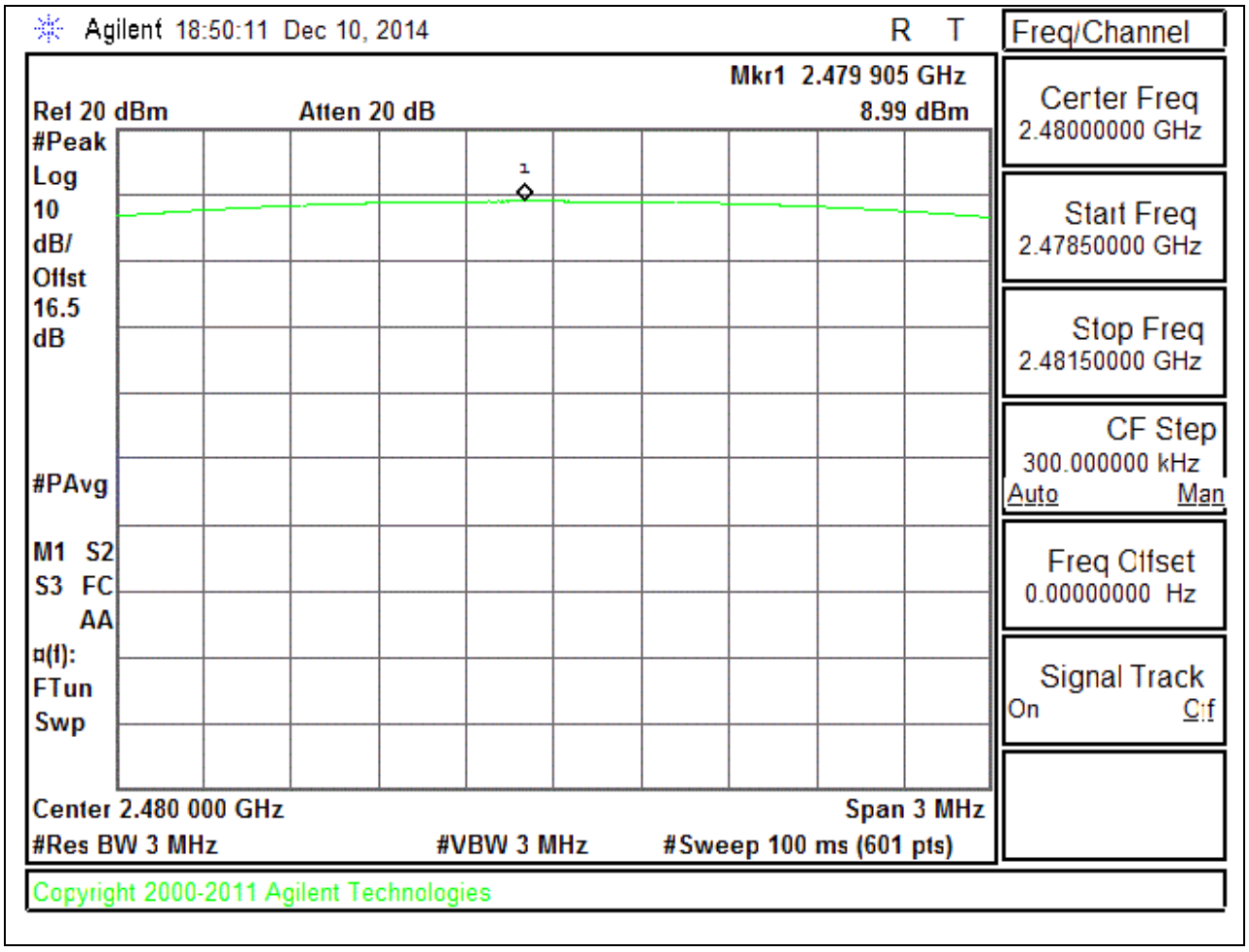
HIGH CHANNEL



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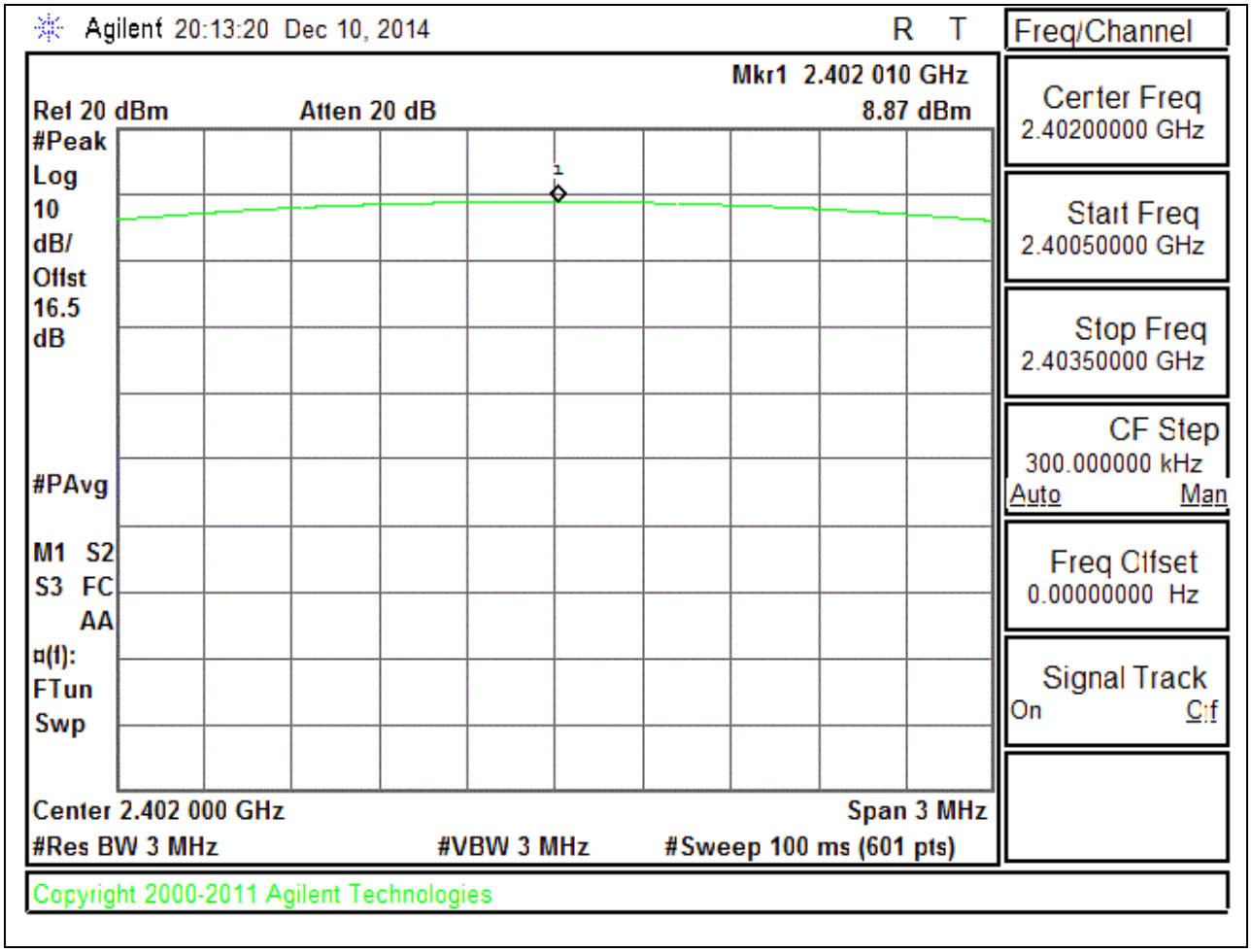
8PSK OUTPUT POWER

LOW CHANNEL



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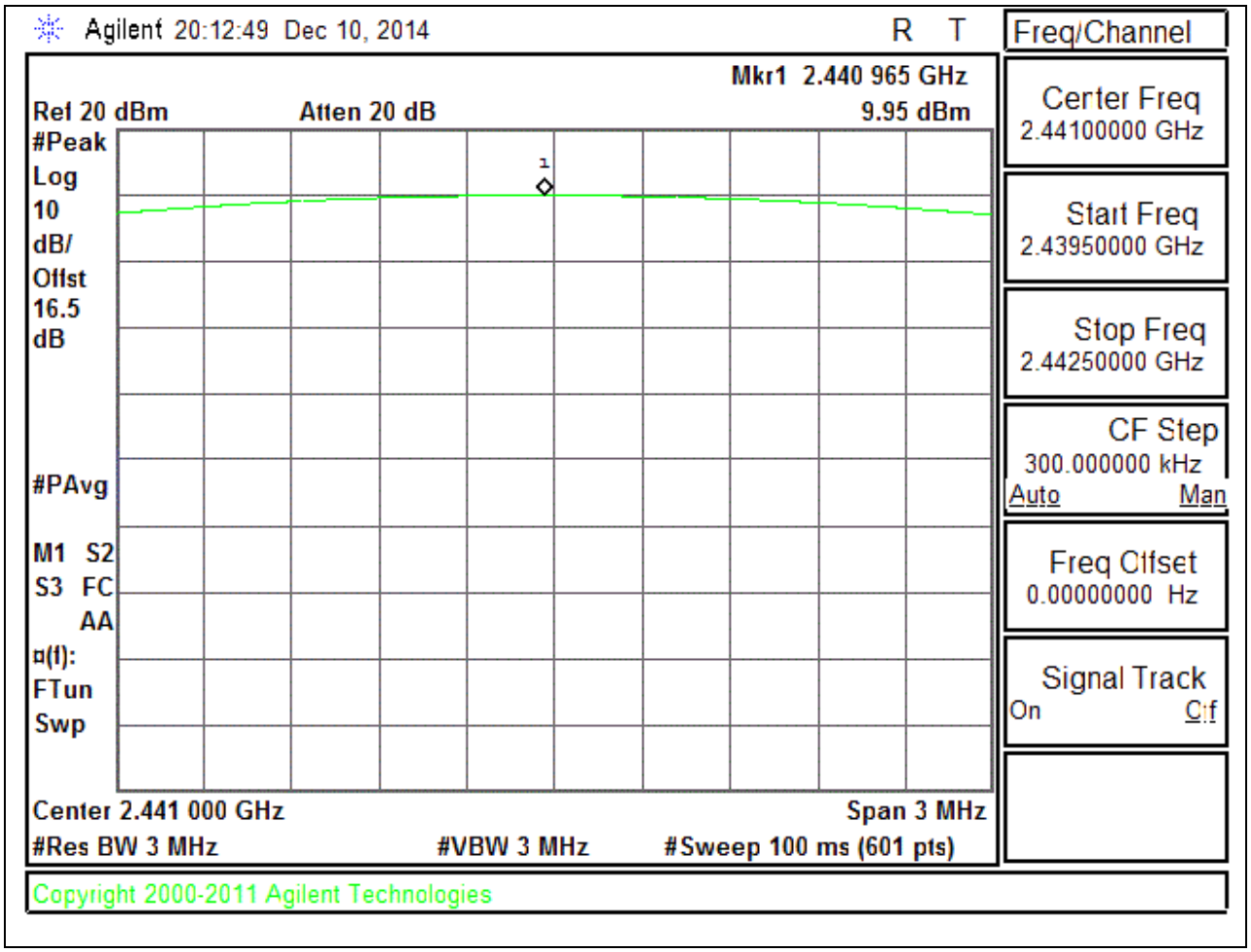
MID CHANNEL



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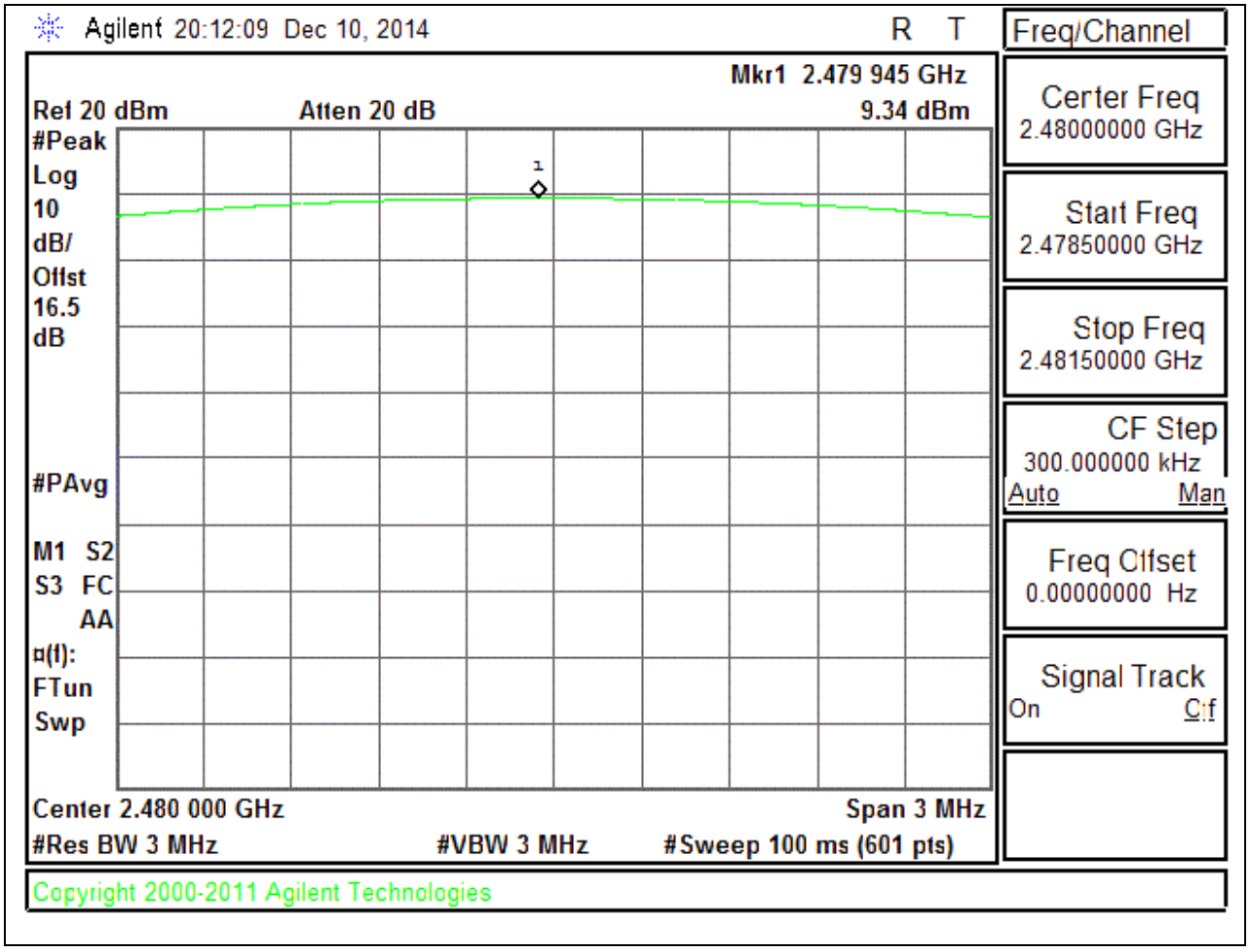
HIGH CHANNEL



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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	8.5
Middle	2441	9.3
High	2480	8.5
Worst		9.3

8.6.2. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	5.8
Middle	2441	6.9
High	2480	6.1
Worst		6.9

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8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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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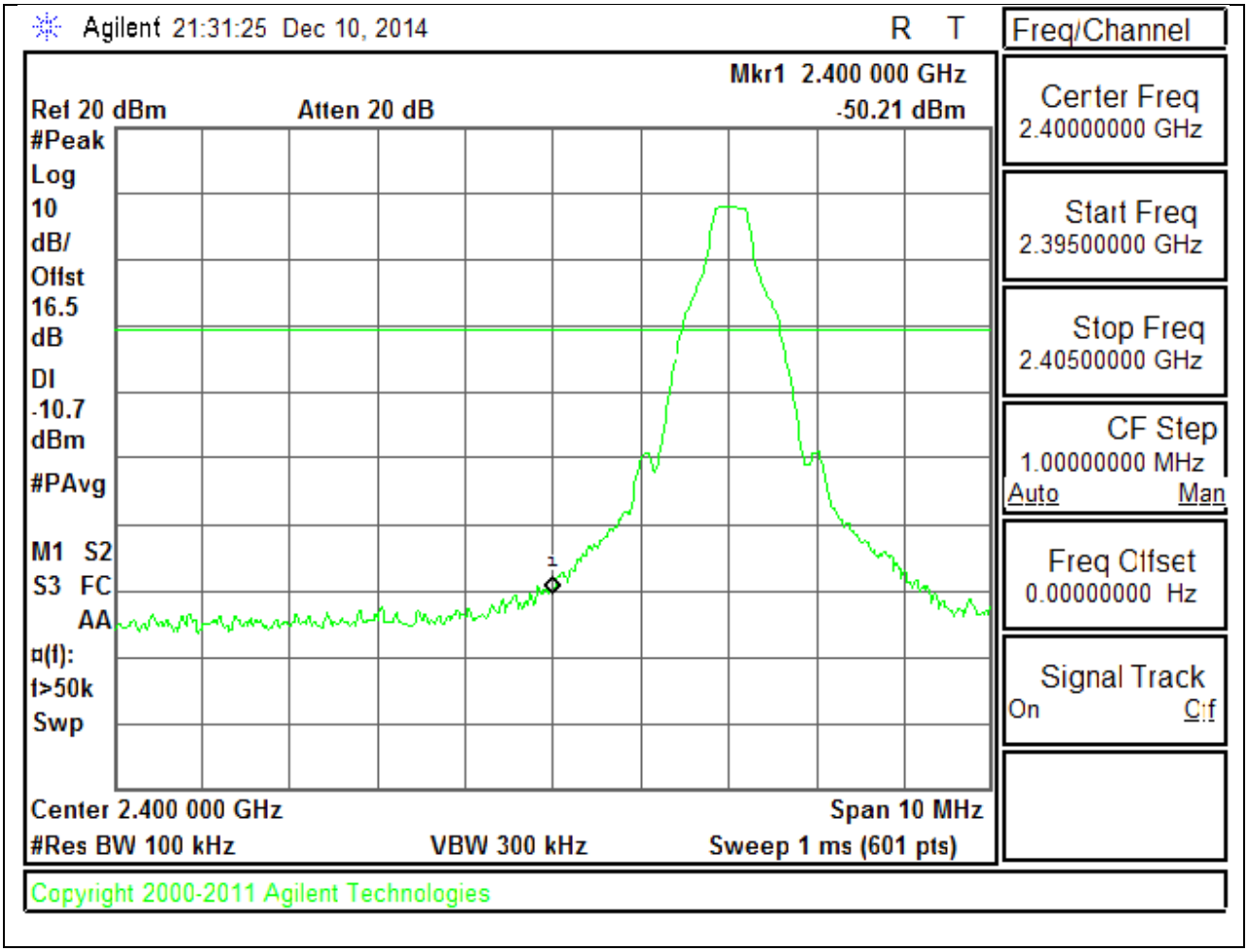
8.7.1. BASIC DATA RATE GFSK MODULATION

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



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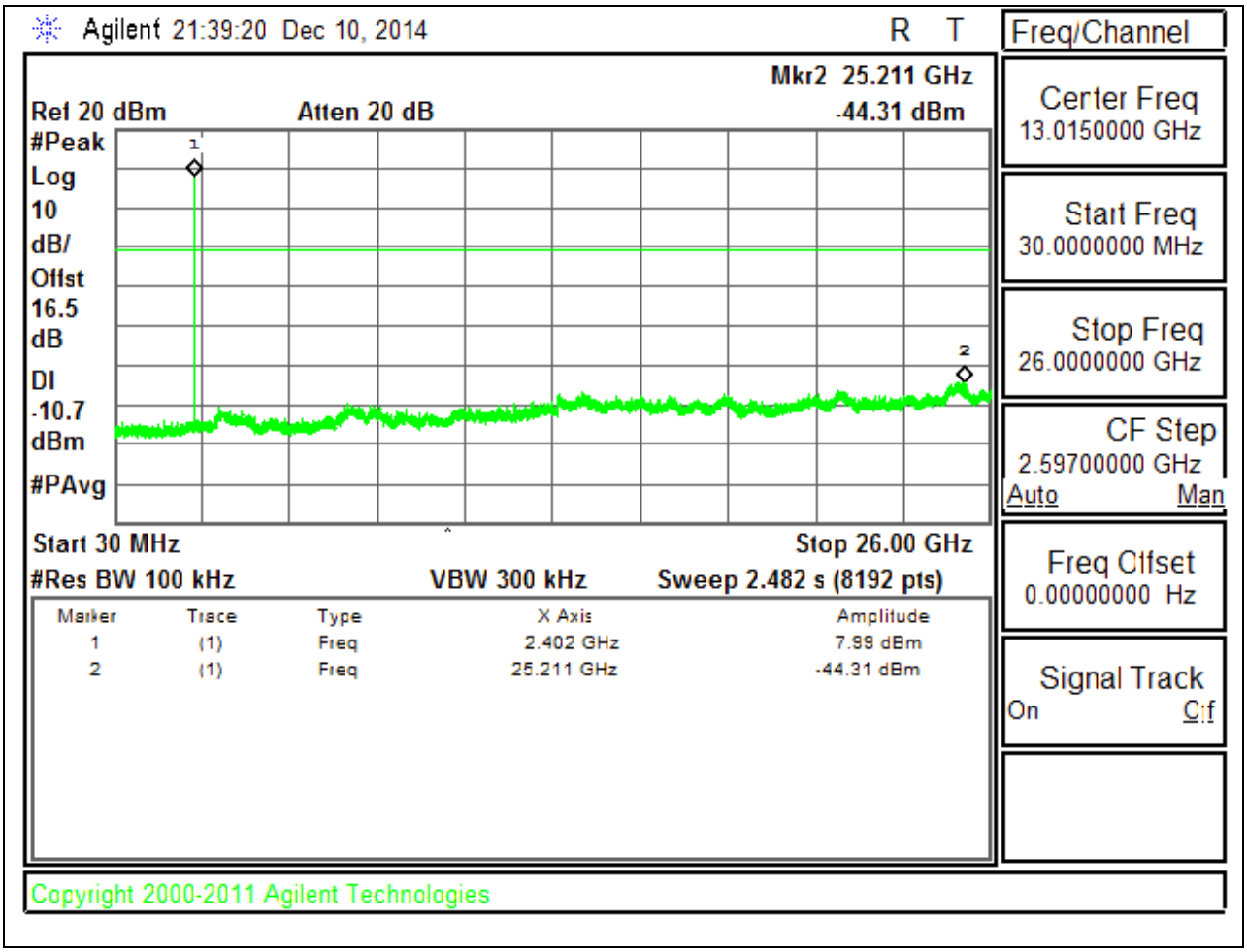
LOW CHANNEL SPURIOUS



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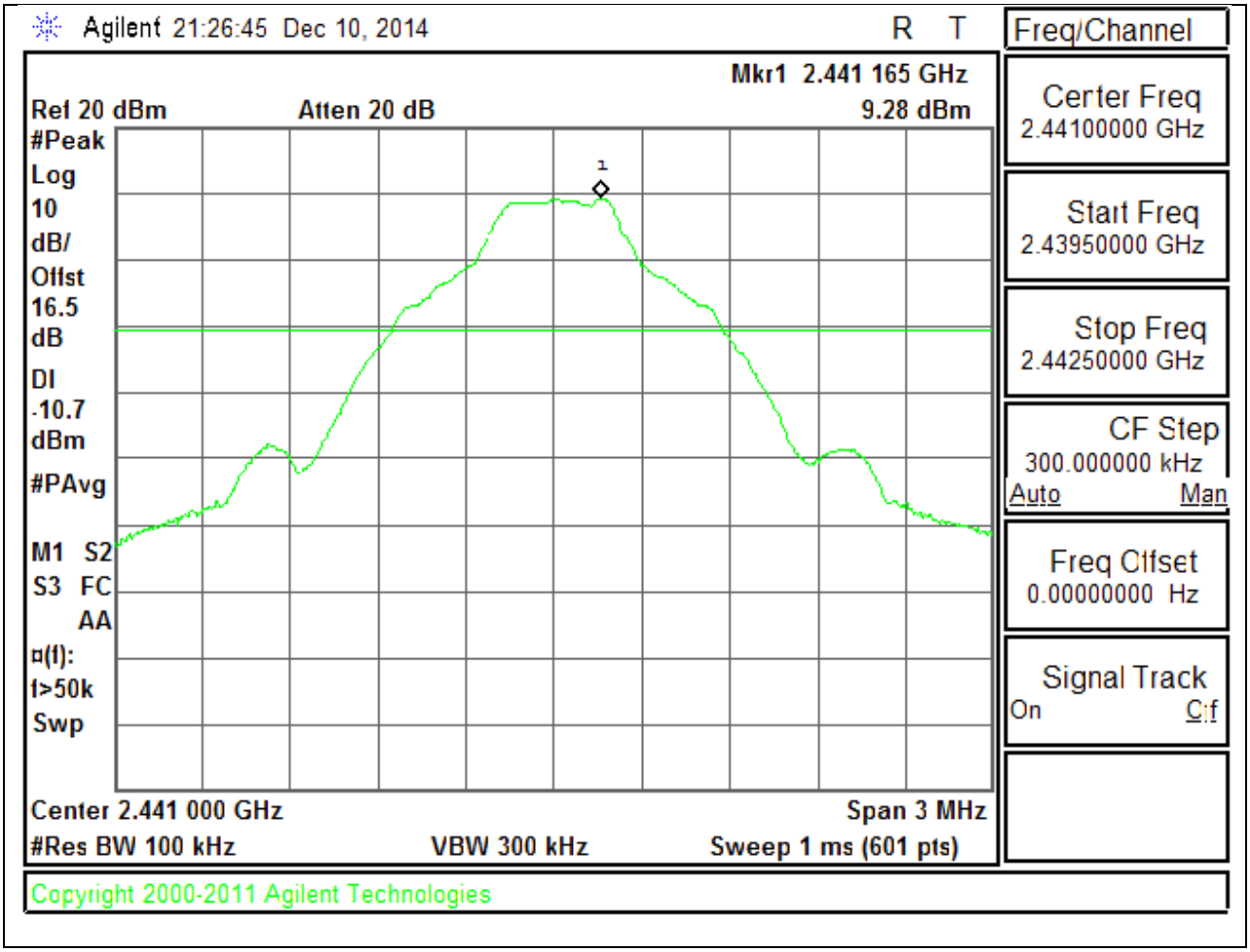
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL BANDEDGE



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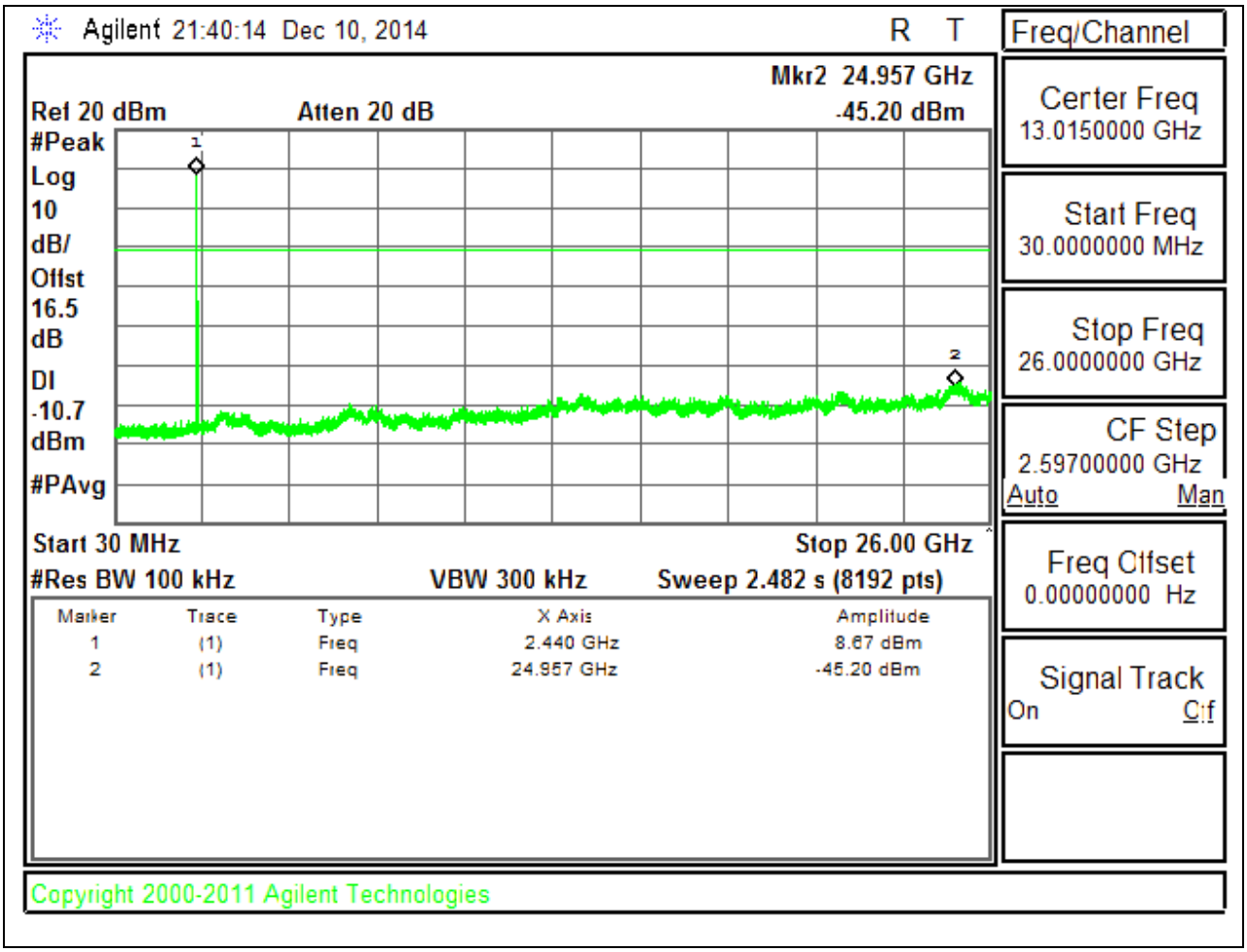
MID CHANNEL SPURIOUS



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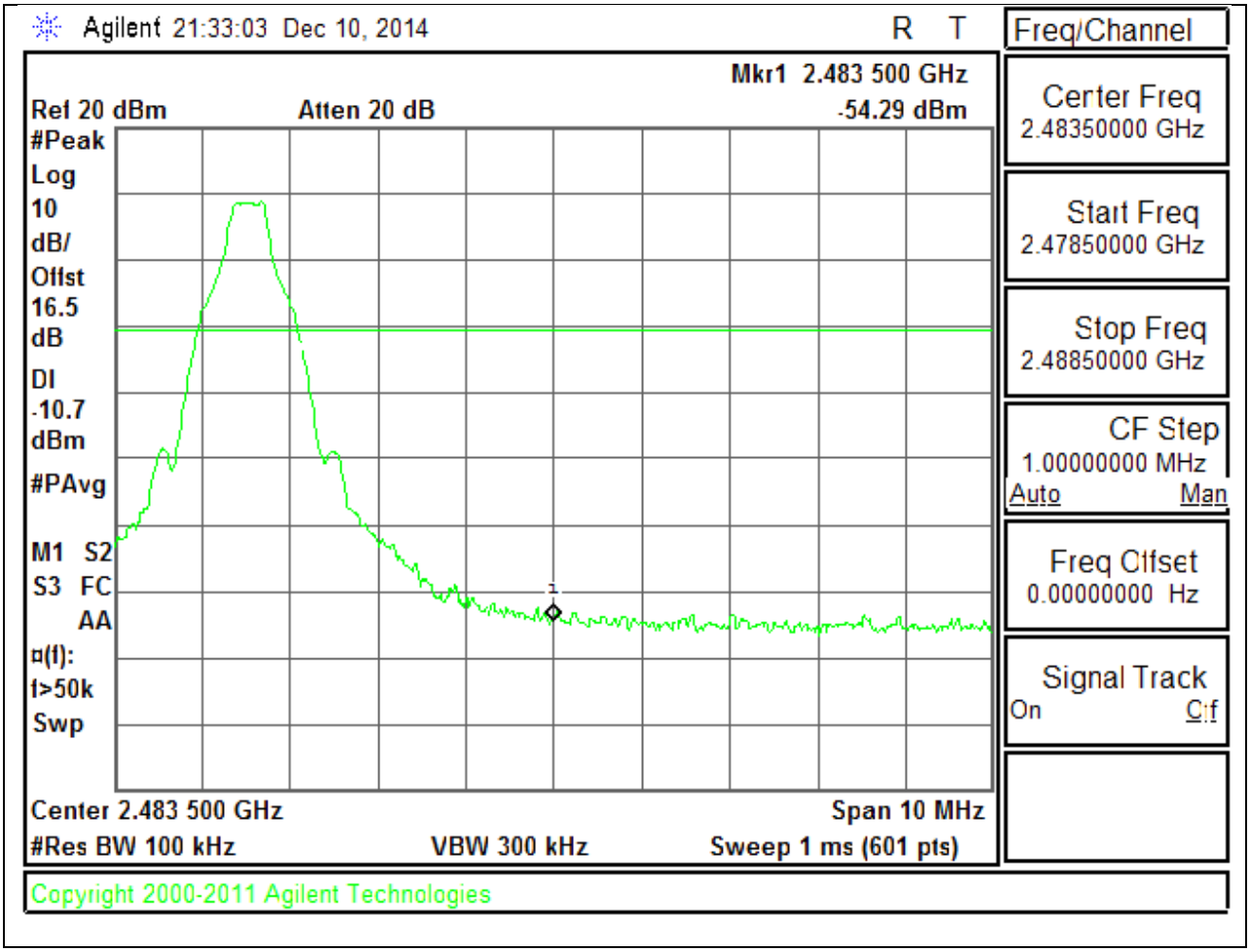
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



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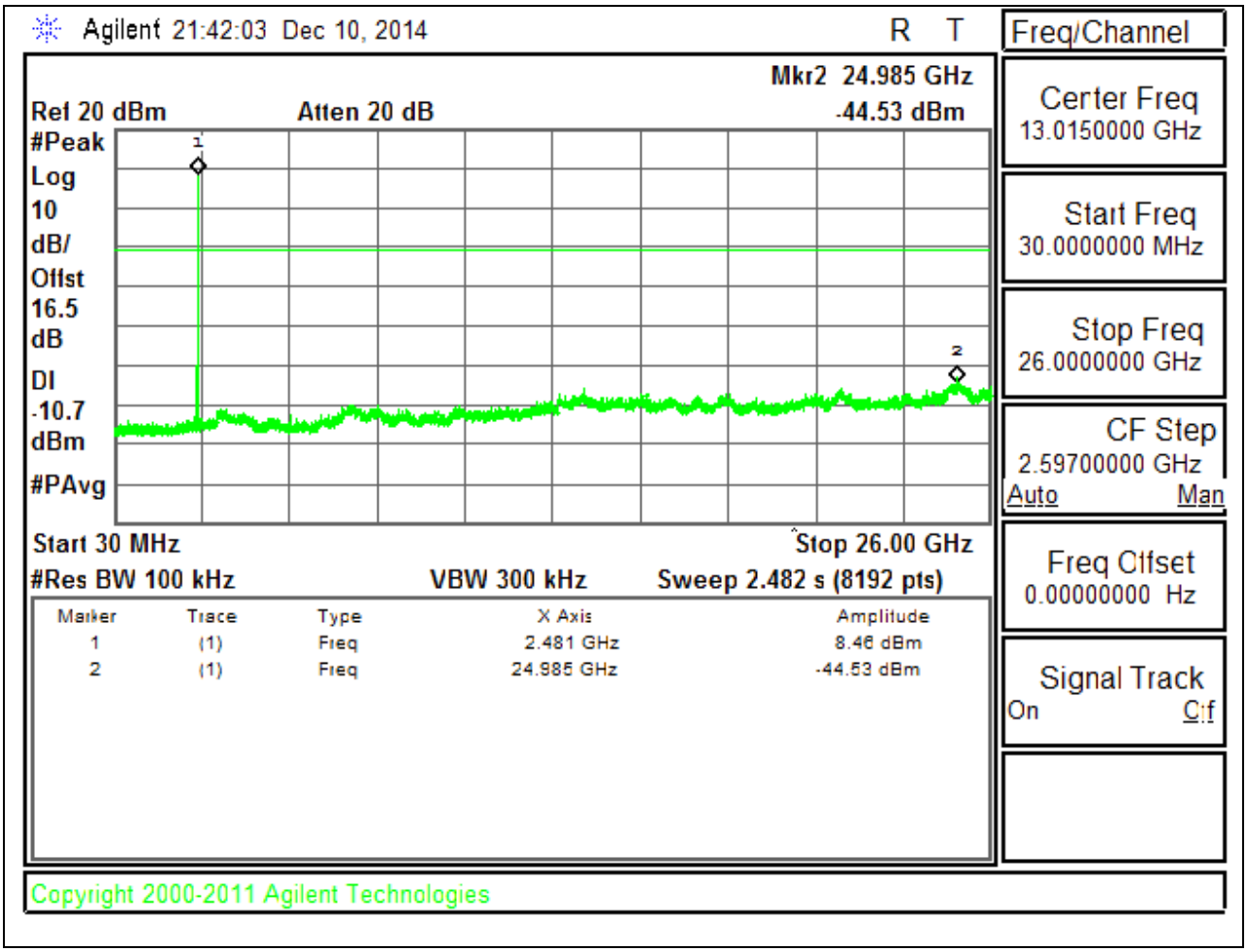
HIGH CHANNEL SPURIOUS



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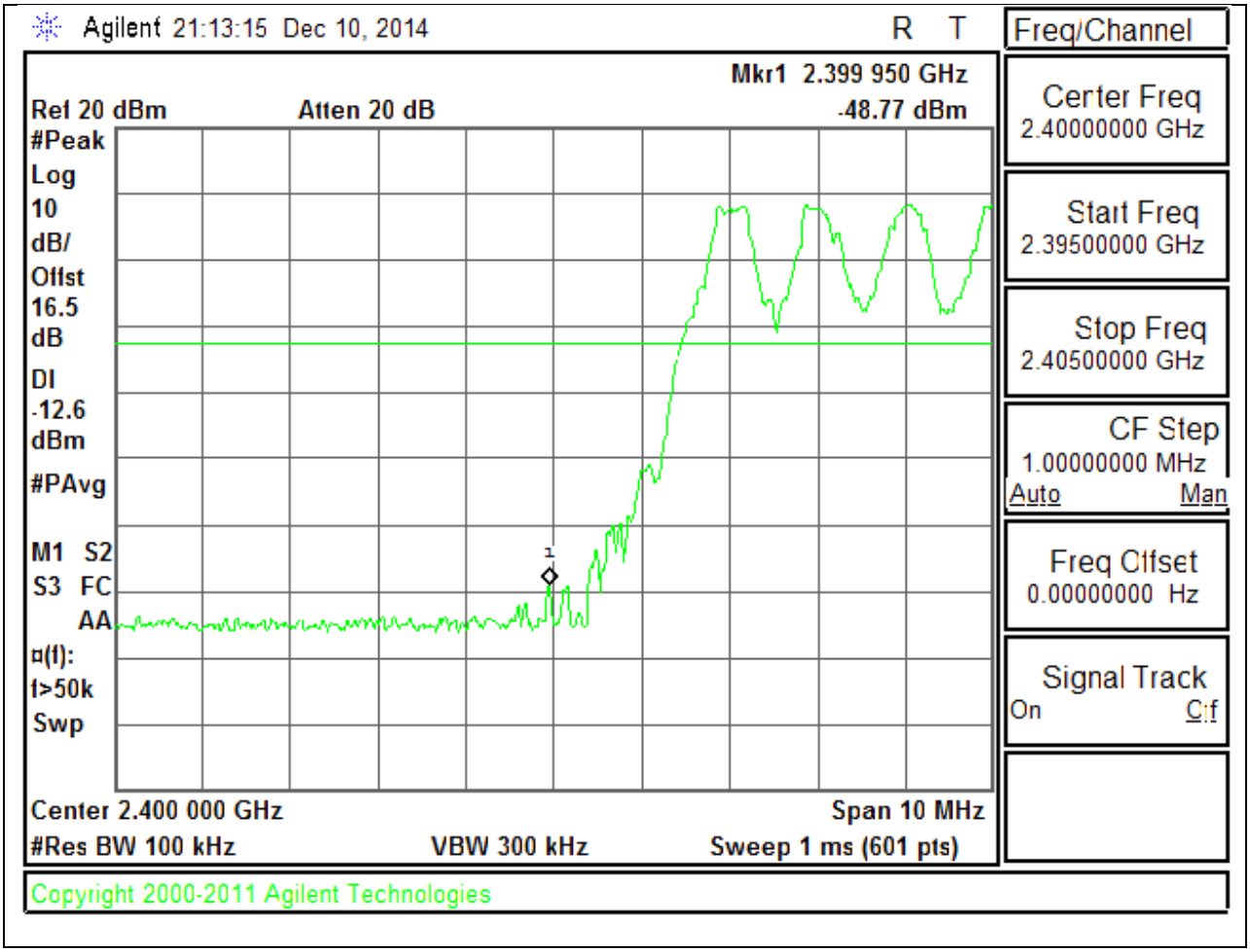
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



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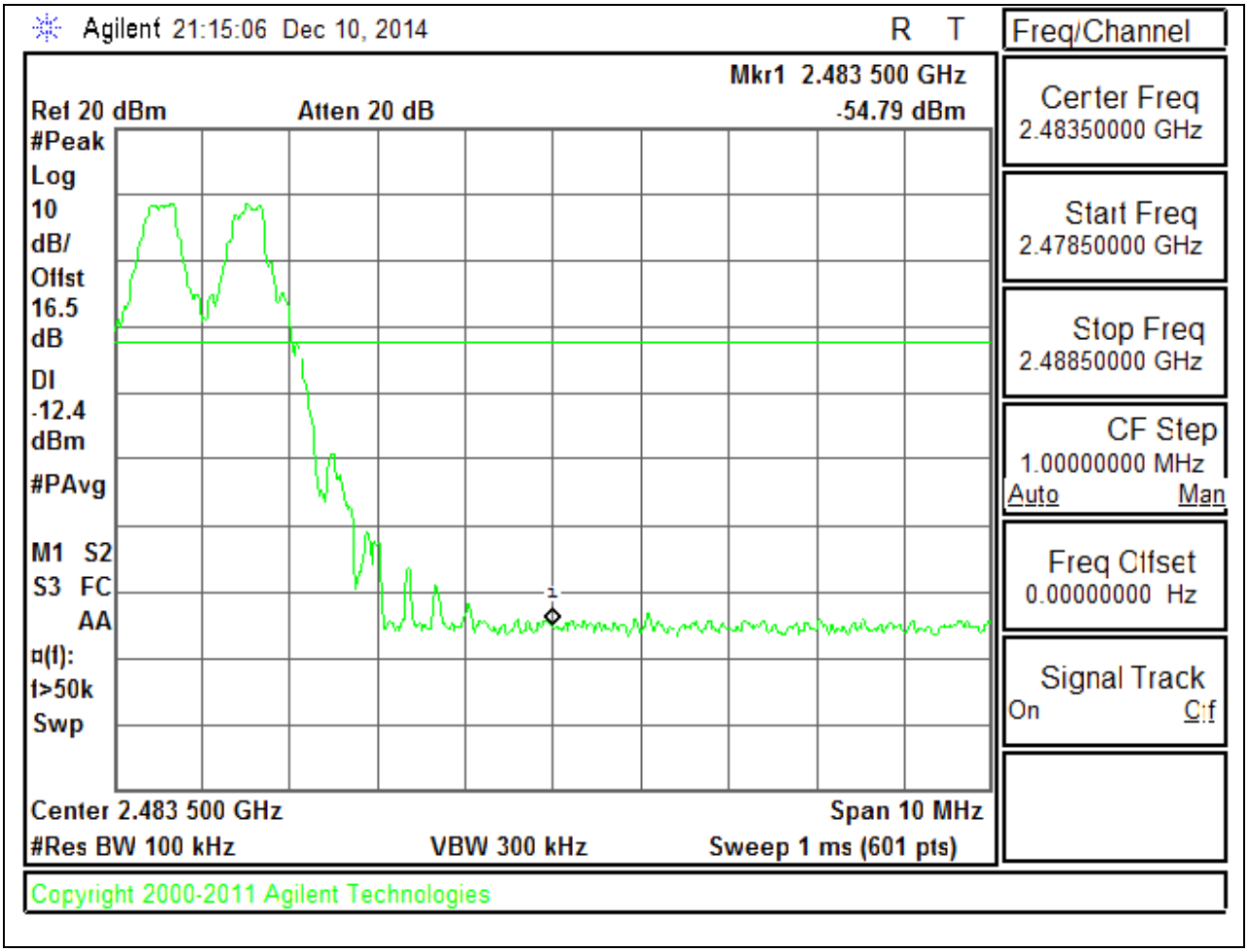
HIGH BANDEDGE WITH HOPPING ON



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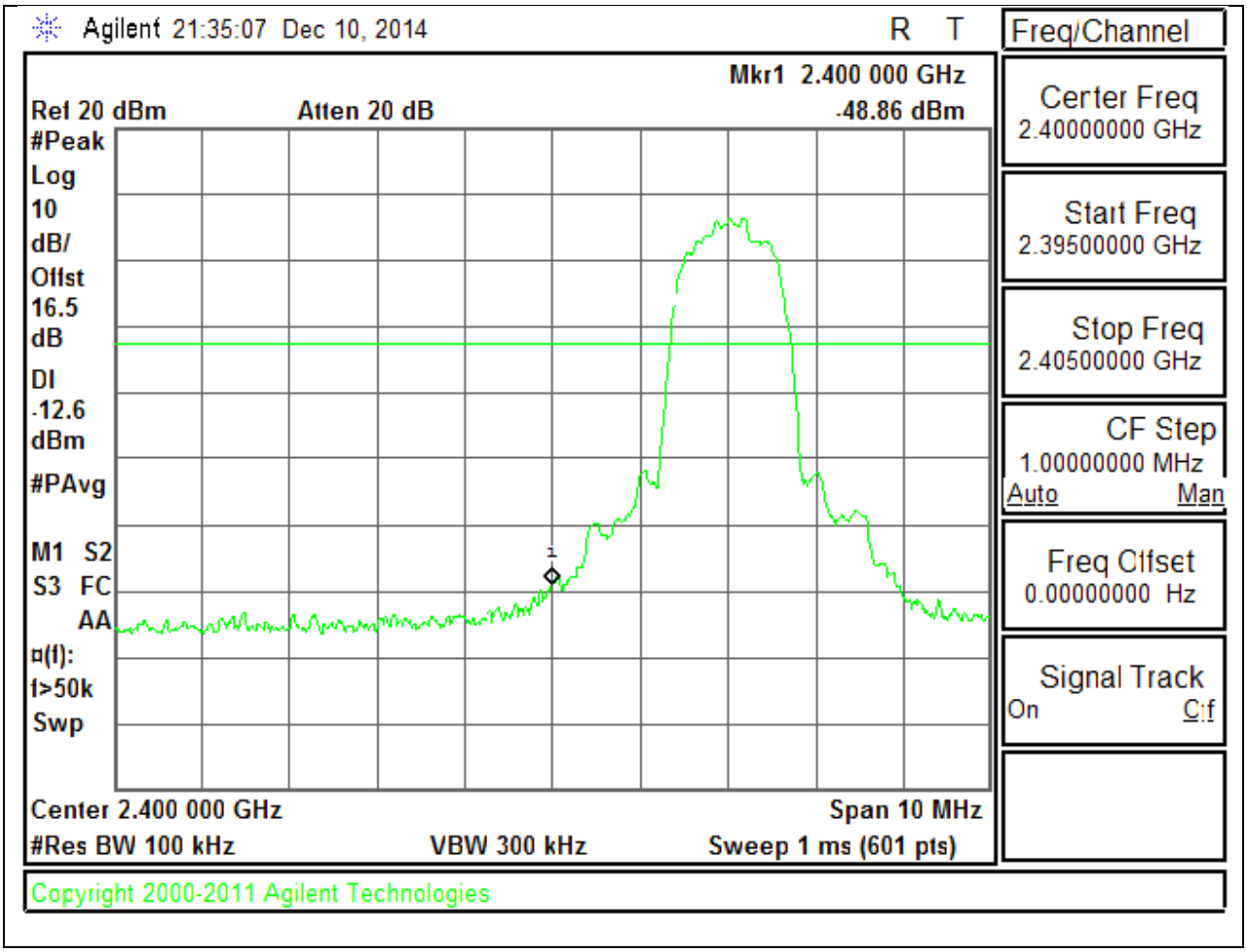
ENHANCED DATA RATE 8PSK MODULATION

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



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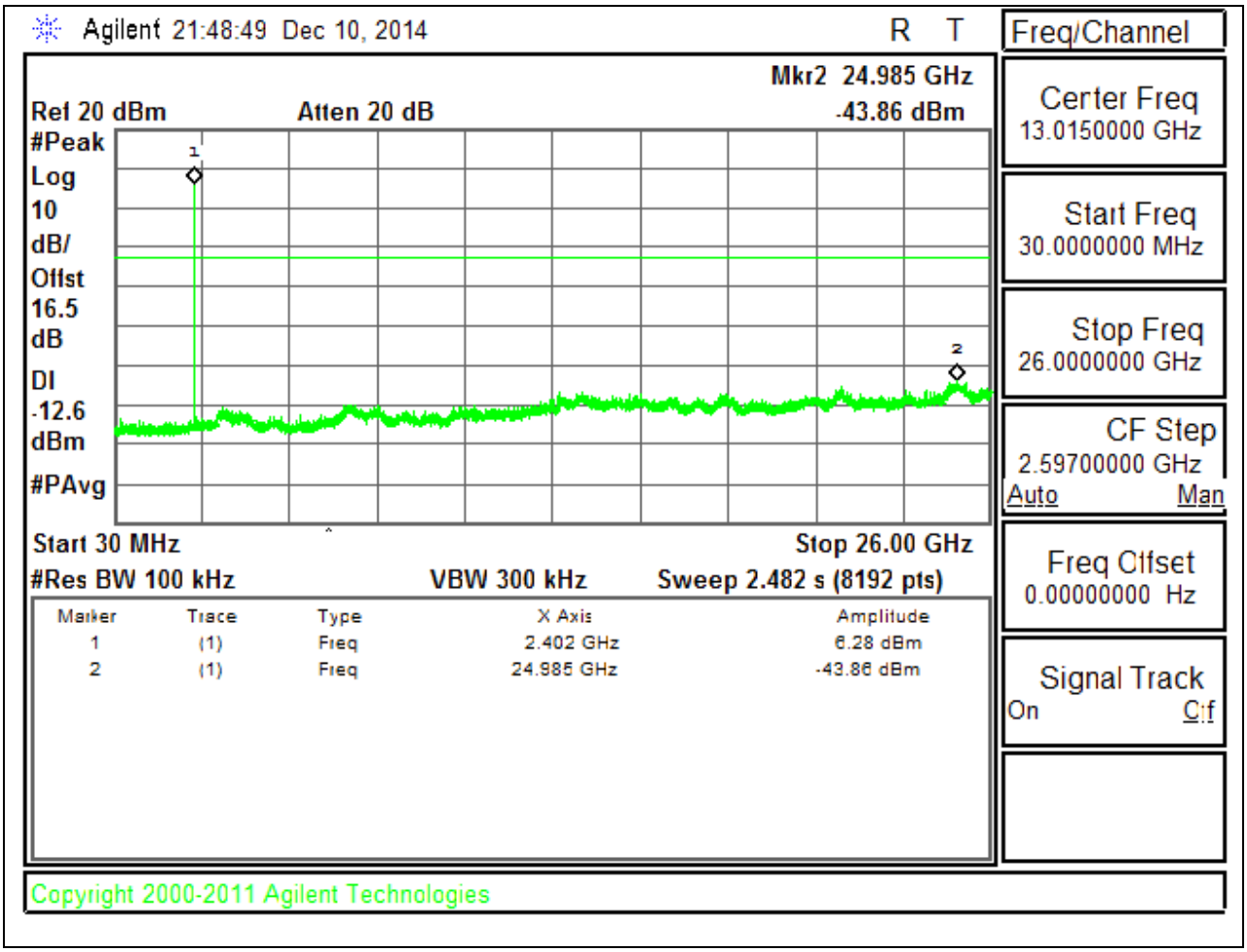
LOW CHANNEL SPURIOUS



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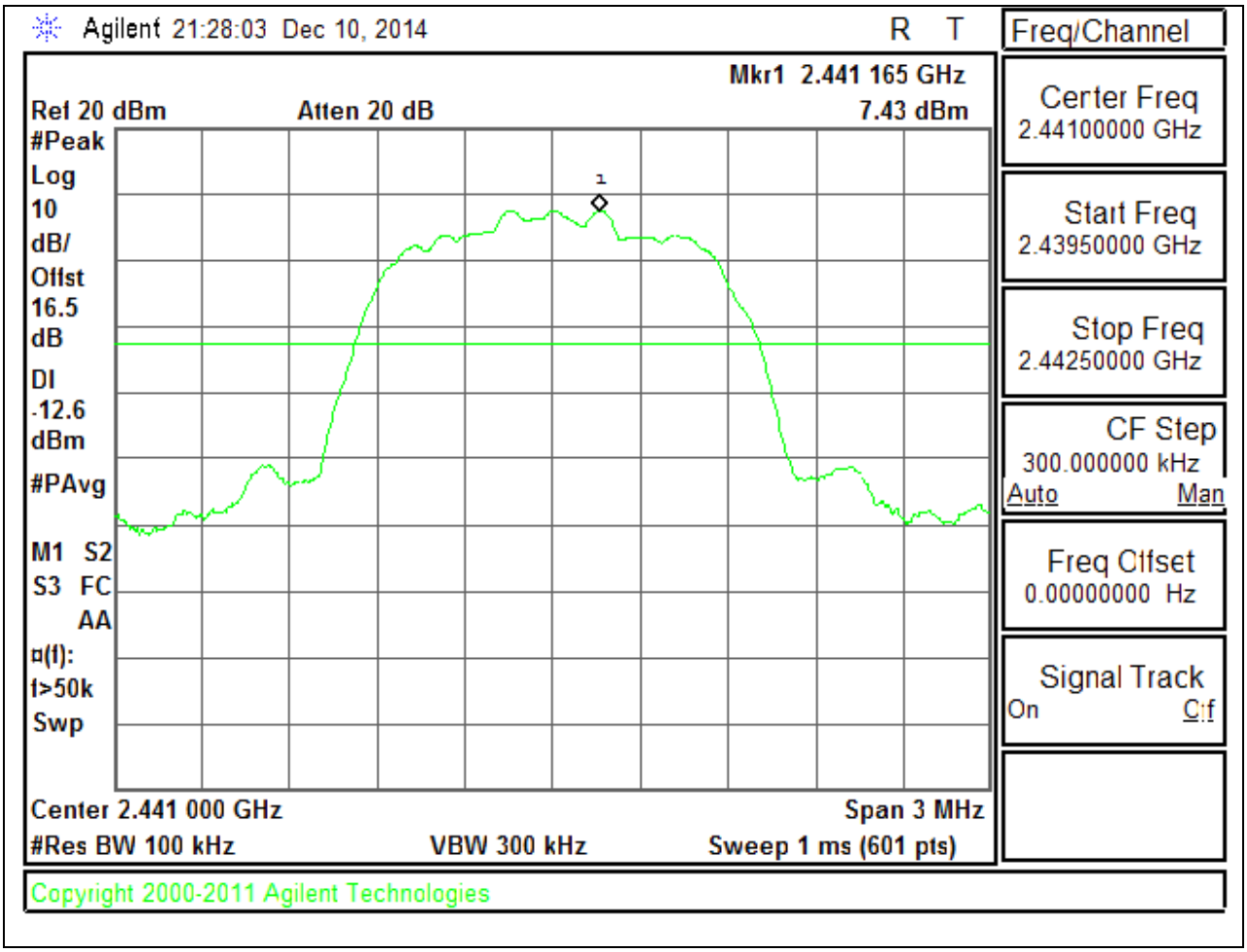
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL BANDEDGE



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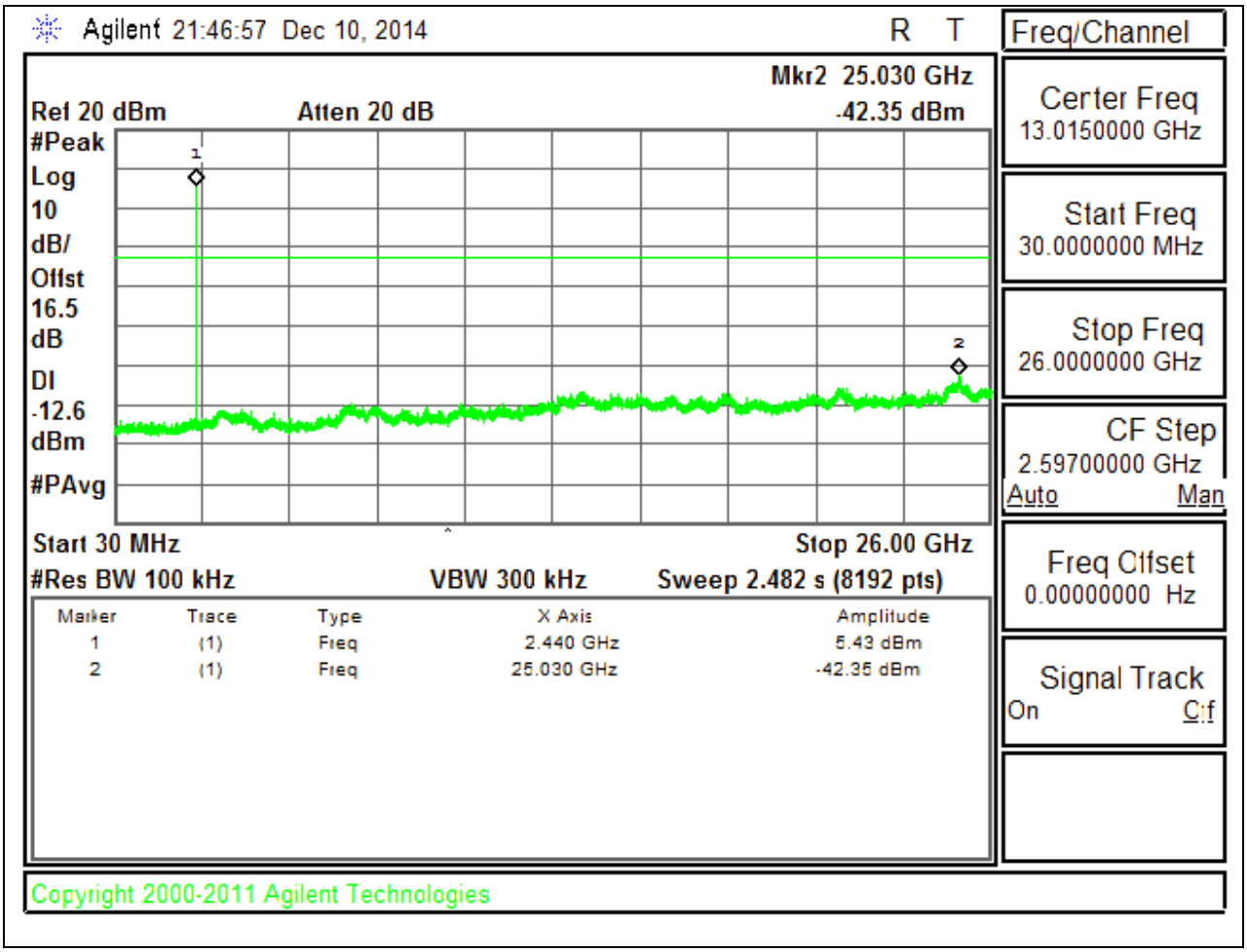
MID CHANNEL SPURIOUS



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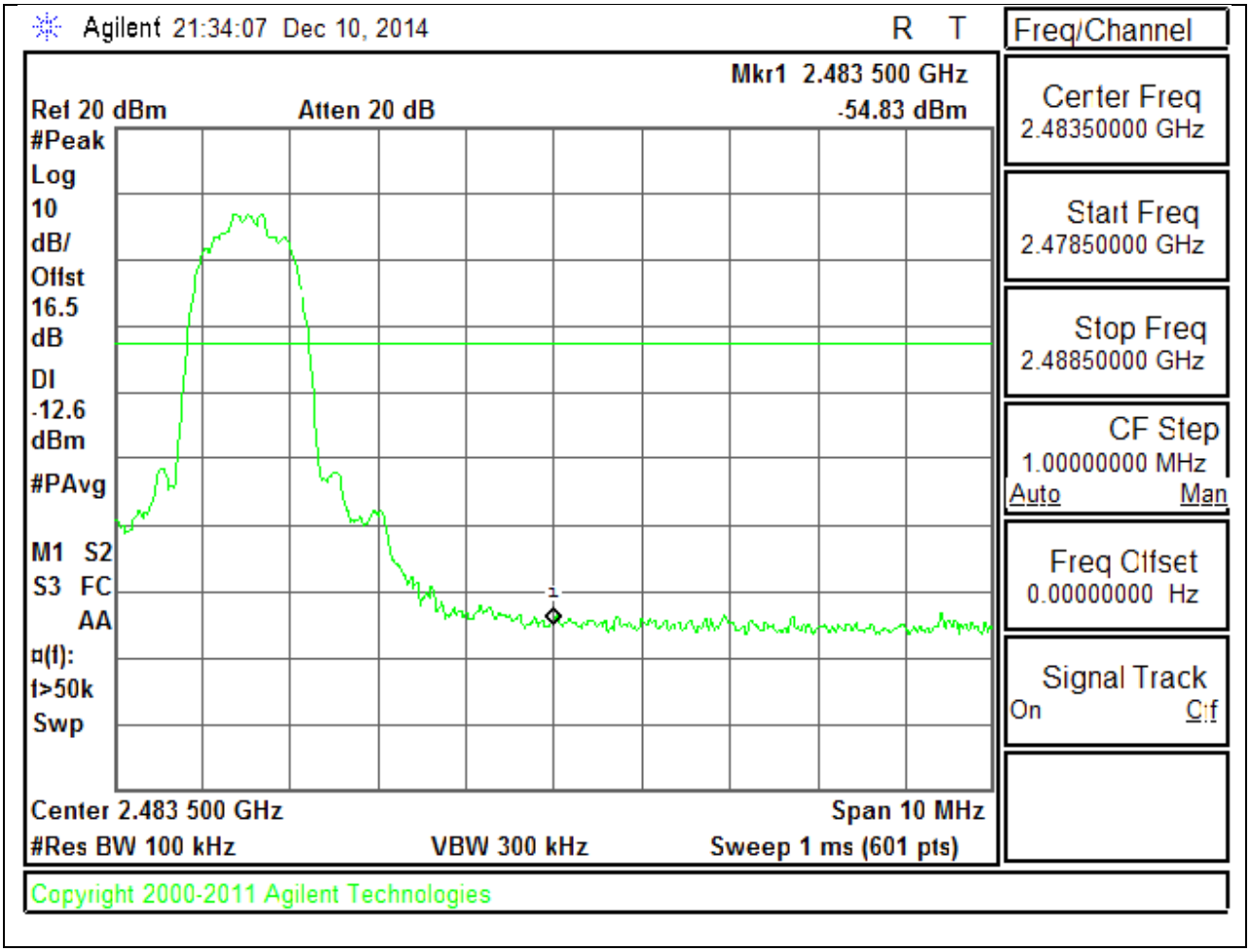
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



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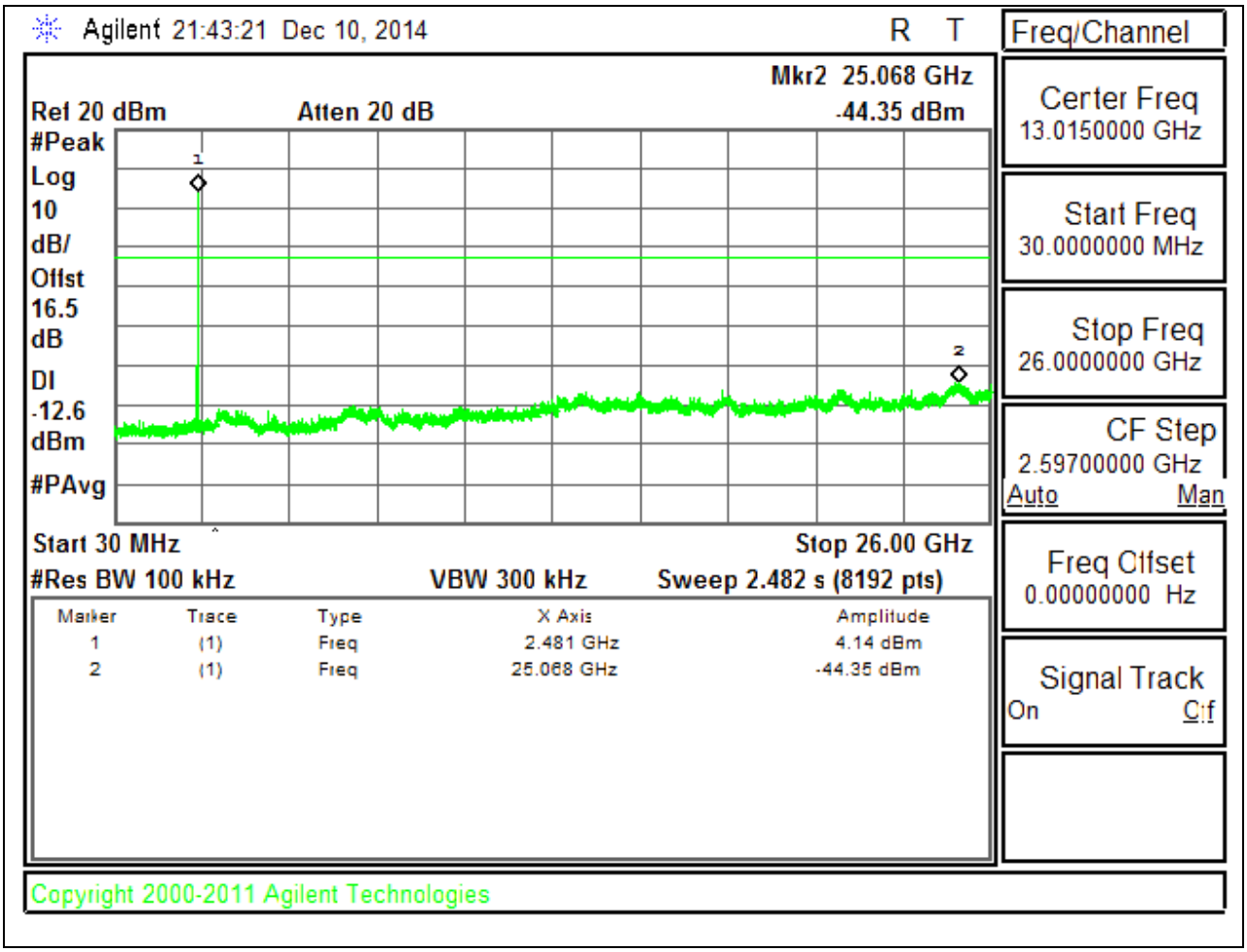
HIGH CHANNEL SPURIOUS



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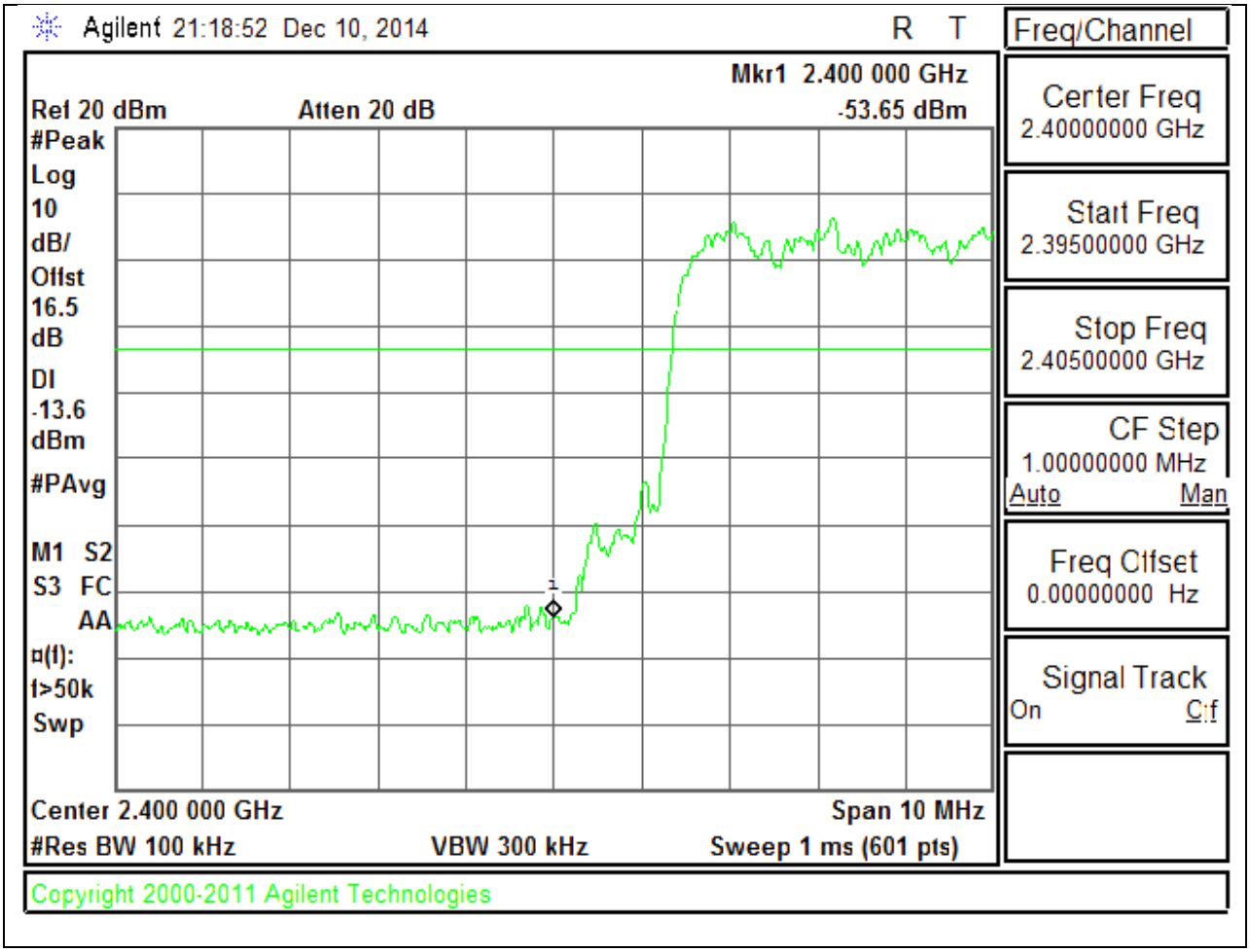
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



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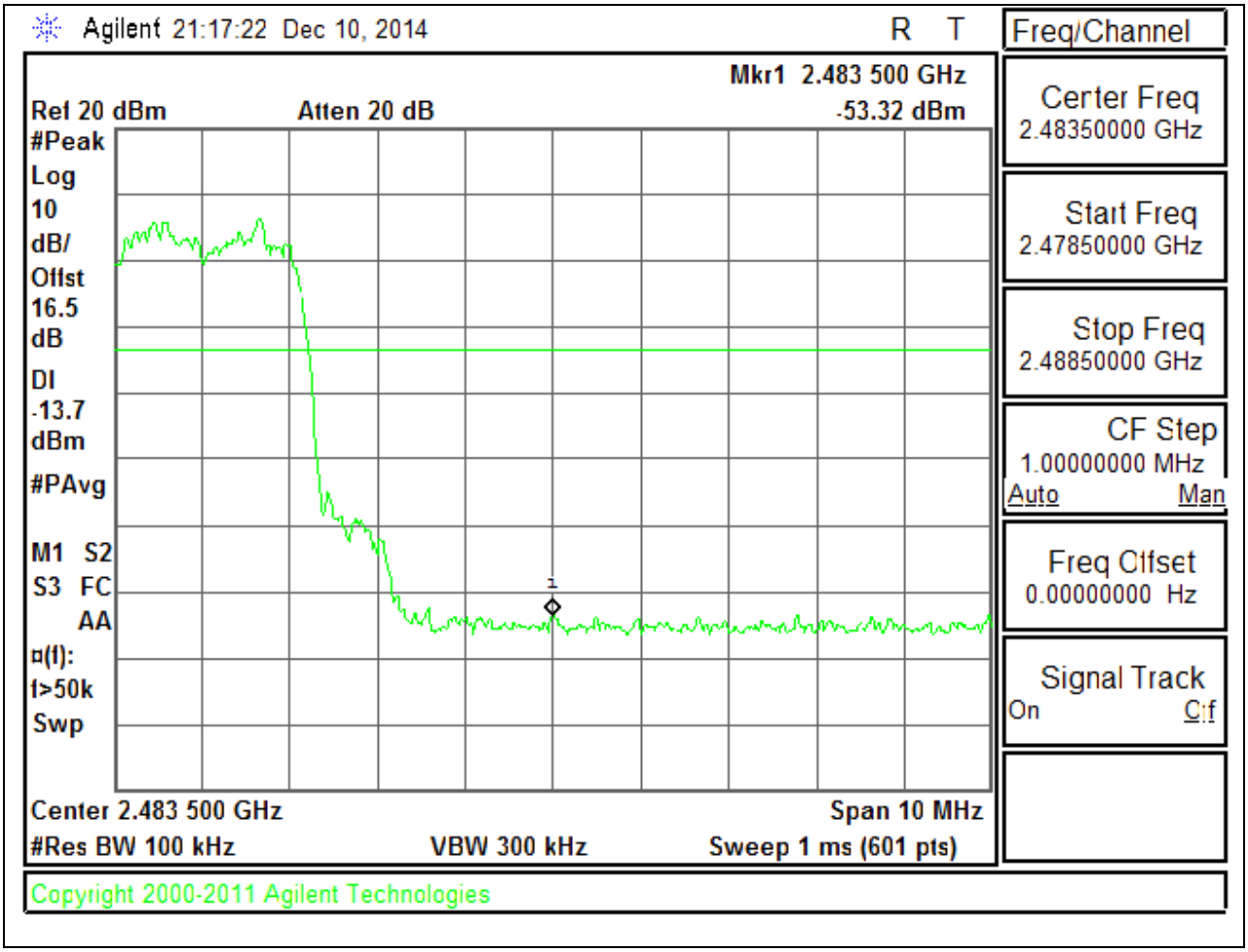
HIGH BANDEDGE WITH HOPPING ON



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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 / 0.0038S = 260Hz.

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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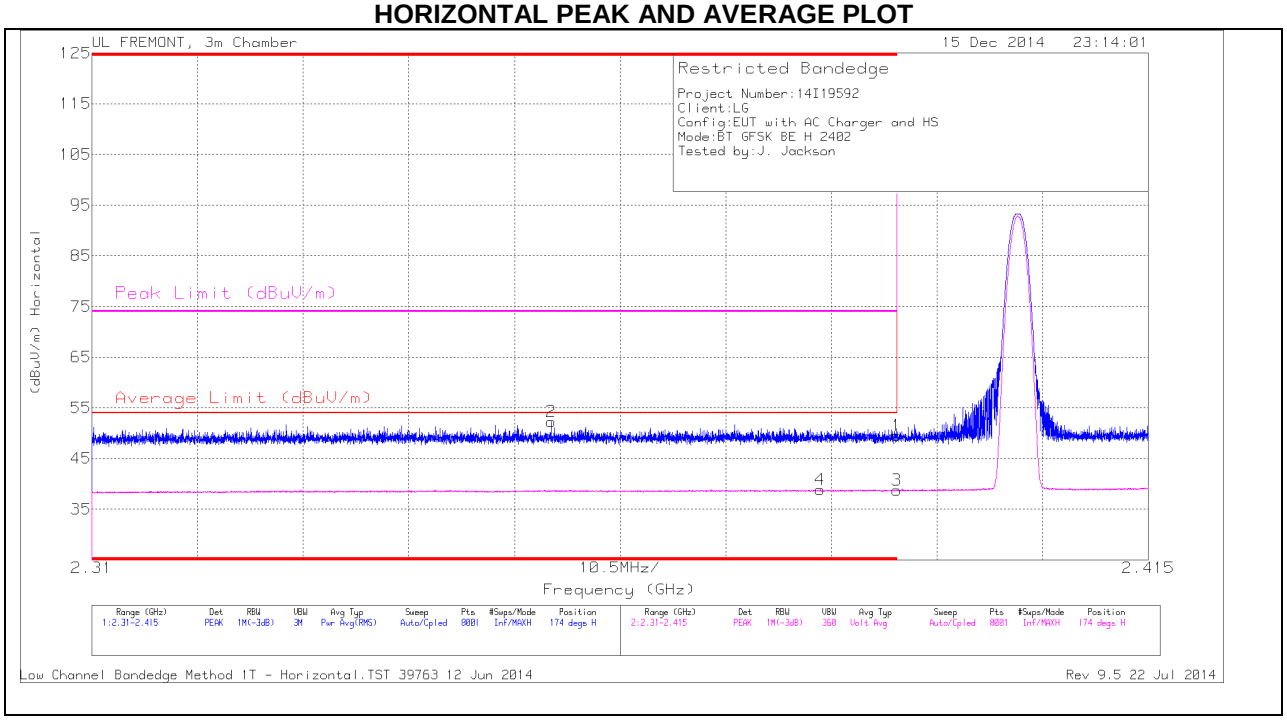
9.2. TRANSMITTER ABOVE 1 GHz

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 T119 (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	40.55	PK	32.1	-23.1	49.55	-	-	74	-24.45	174	266	H
2	* 2.356	43.41	PK	32	-23.1	52.31	-	-	74	-21.69	174	266	H
3	* 2.39	29.77	VB1T	32.1	-23.1	38.77	54	-15.23	-	-	174	266	H
4	* 2.382	29.92	VB1T	32.1	-23.1	38.92	54	-15.08	-	-	174	266	H

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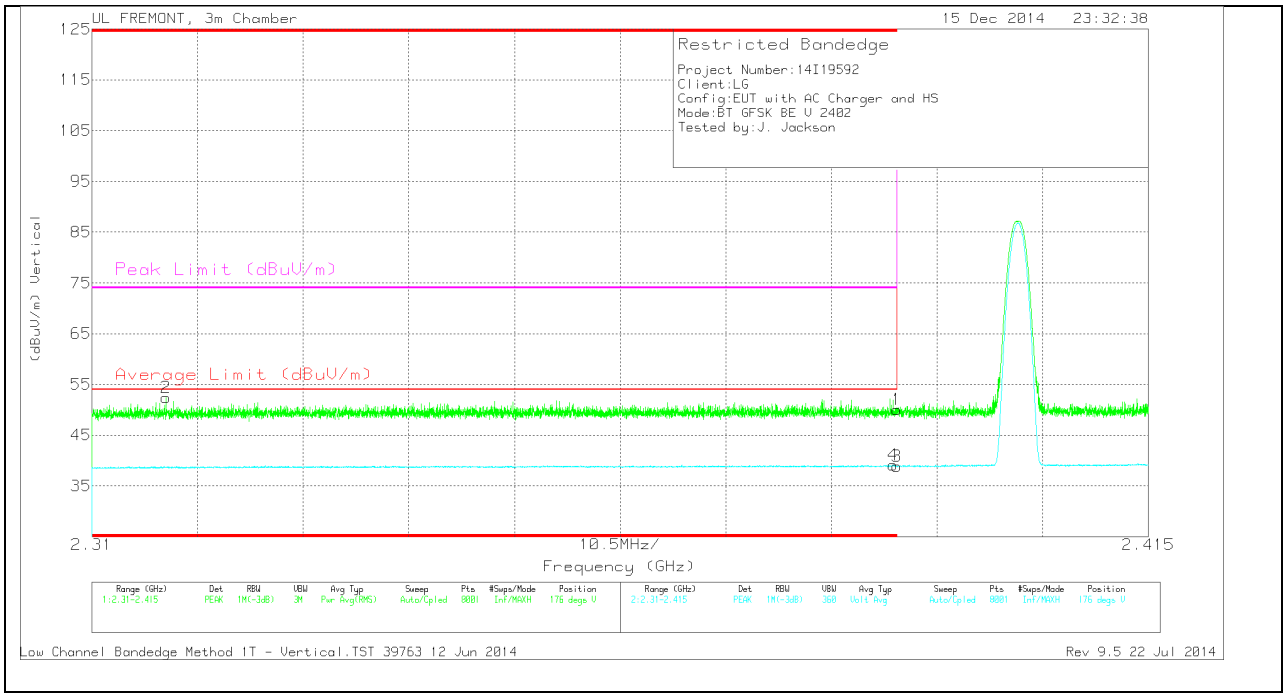
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	41.04	PK	32.1	-23.1	50.04	-	-	74	-23.96	176	399	V
2	* 2.317	43.64	PK	31.9	-23.1	52.44	-	-	74	-21.56	176	399	V
3	* 2.39	29.84	VB1T	32.1	-23.1	38.84	54	-15.16	-	-	176	399	V
4	* 2.39	30.15	VB1T	32.1	-23.1	39.15	54	-14.85	-	-	176	399	V

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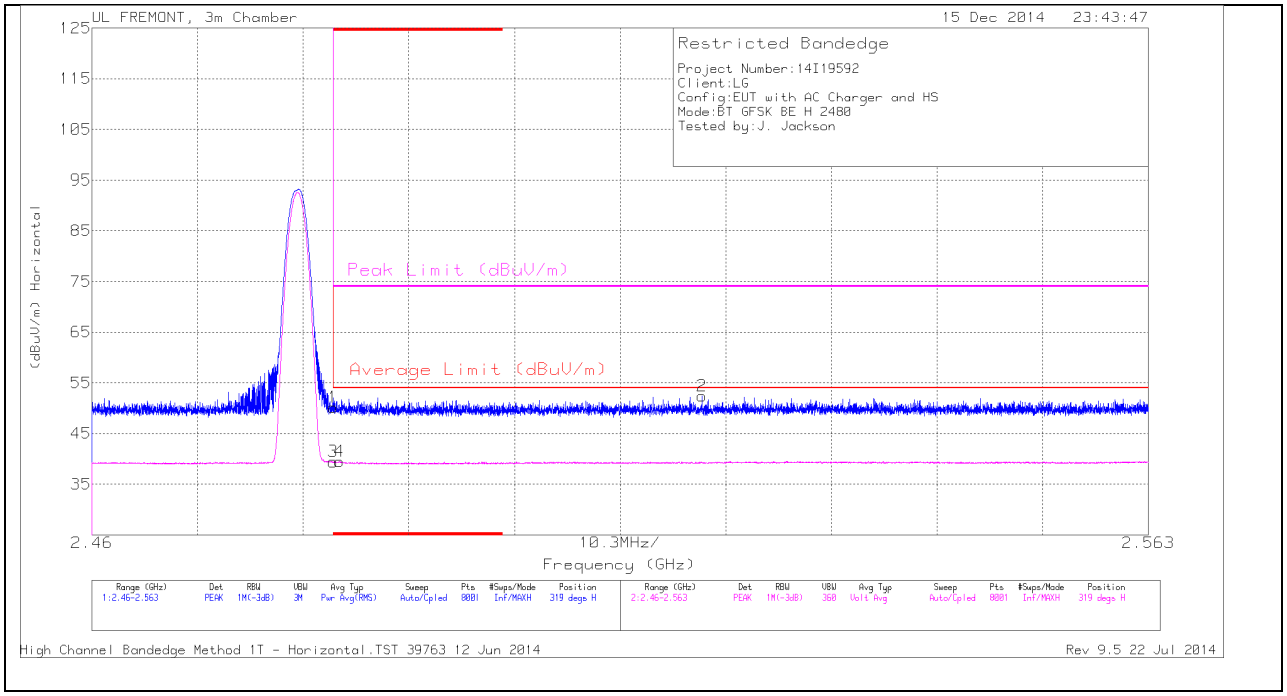
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.64	PK	32.3	-22.8	50.14	-	-	74	-23.86	319	122	H
3	* 2.484	29.93	VB1T	32.3	-22.8	39.43	54	-14.57	-	-	319	122	H
4	* 2.484	30.04	VB1T	32.3	-22.8	39.54	54	-14.46	-	-	319	122	H
2	2.519	42.75	PK	32.4	-22.8	52.35	-	-	74	-21.65	319	122	H

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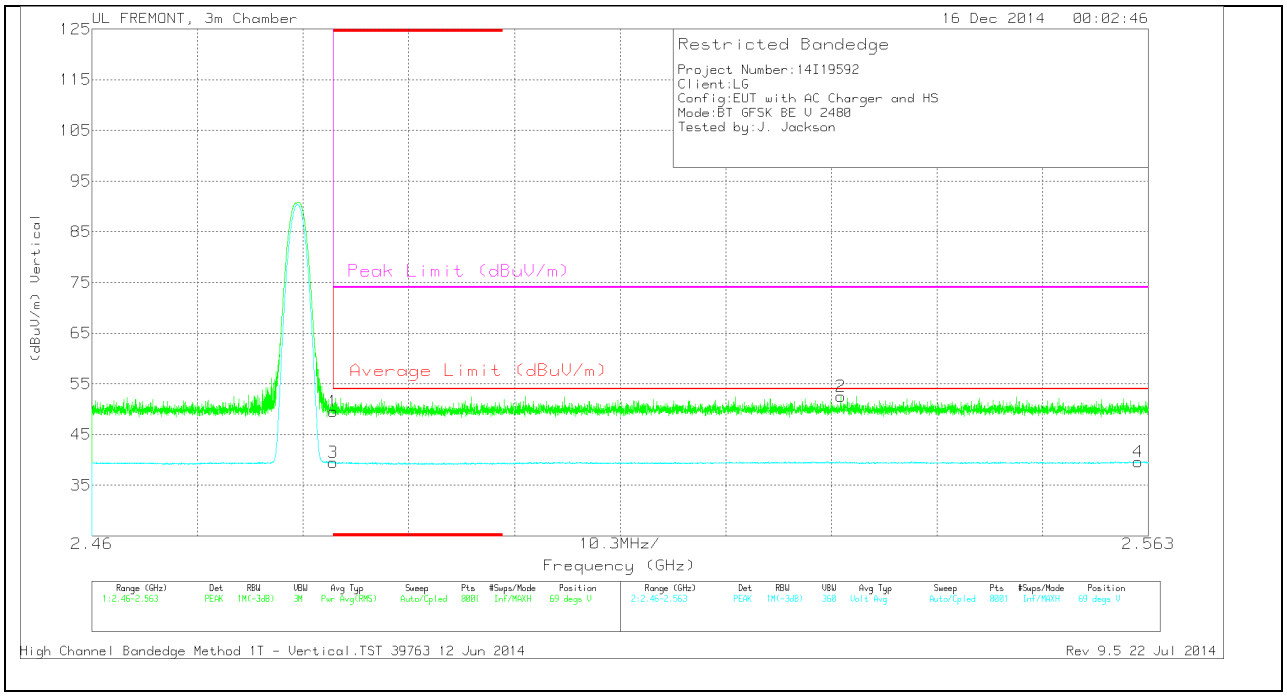
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.1	PK	32.3	-22.8	49.6	-	-	74	-24.4	69	348	V
3	* 2.484	29.96	VB1T	32.3	-22.8	39.46	54	-14.54	-	-	69	348	V
2	2.533	42.84	PK	32.4	-22.7	52.54	-	-	74	-21.46	69	348	V
4	2.562	29.95	VB1T	32.4	-22.7	39.65	54	-14.35	-	-	69	348	V

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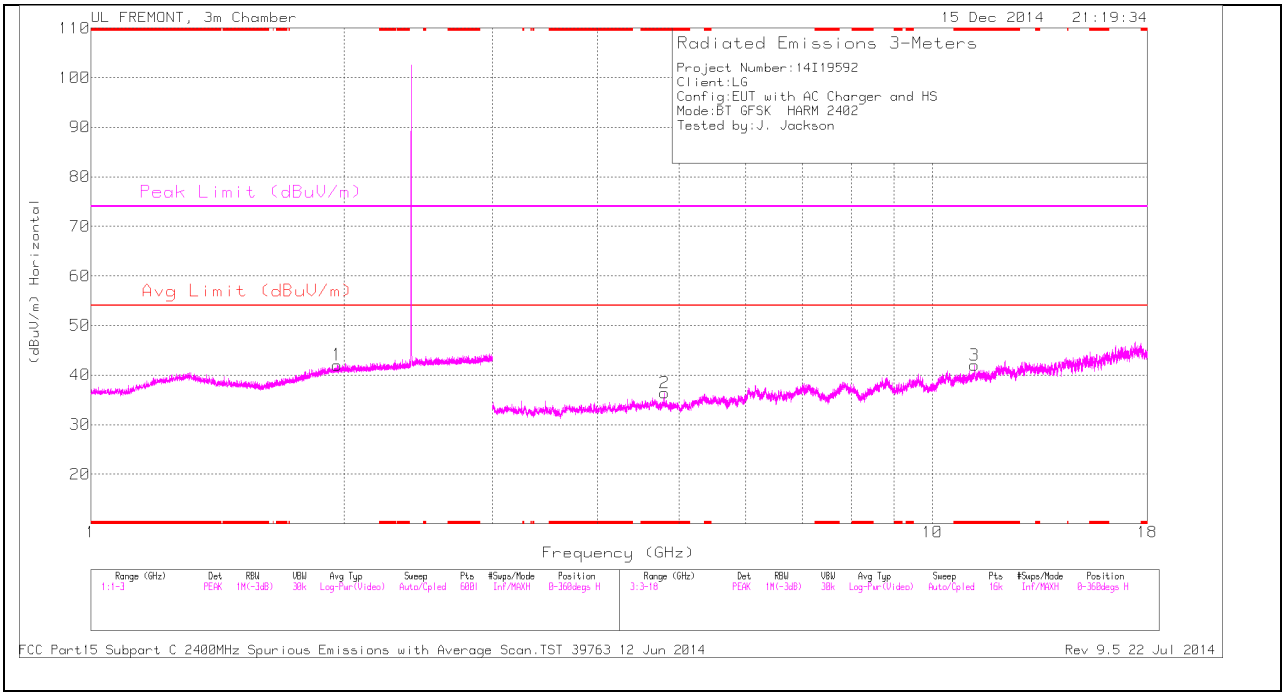
HARMONICS AND SPURIOUS EMISSIONS

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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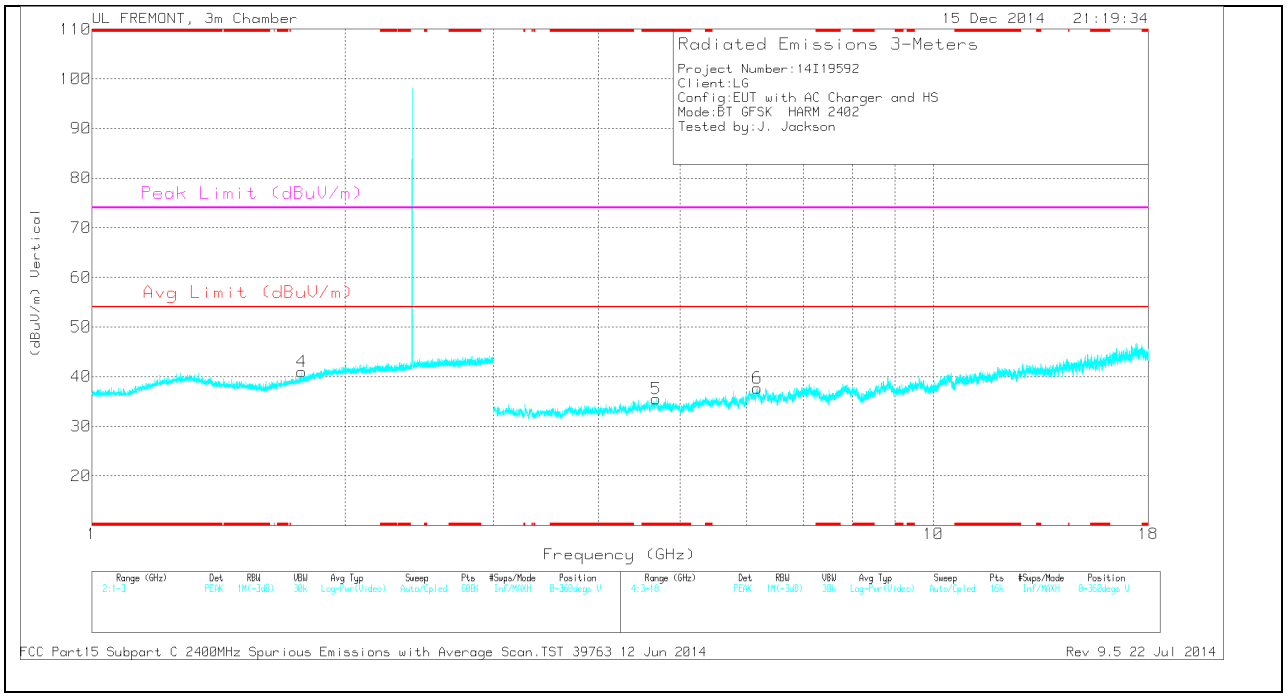
LOW CHANNEL VERTICAL



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 T119 (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
2	* 4.804	32.58	PK	34.1	-30.3	36.38	-	-	74	-37.62	0-360	200	H
3	* 11.212	29.12	PK	37.9	-25	42.02	-	-	74	-31.98	0-360	100	H
5	* 4.682	32.09	PK	34.1	-30.7	35.49	-	-	74	-38.51	0-360	200	V
4	1.774	34.33	PK	29.9	-23.3	40.93	-	-	-	-	0-360	100	V
1	1.961	33.86	PK	31.5	-23.3	42.06	-	-	-	-	0-360	100	H
6	6.174	32.43	PK	35.3	-30	37.73	-	-	-	-	0-360	200	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.804	42.07	PK3	34.1	-30.3	45.87	-	-	74	-28.13	334	200	H
* 11.21	22.23	Avg	37.9	-25	35.13	54	-18.87	-	-	244	100	H
* 4.681	41.29	PK3	34.1	-30.7	44.69	-	-	74	-29.31	244	200	V

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

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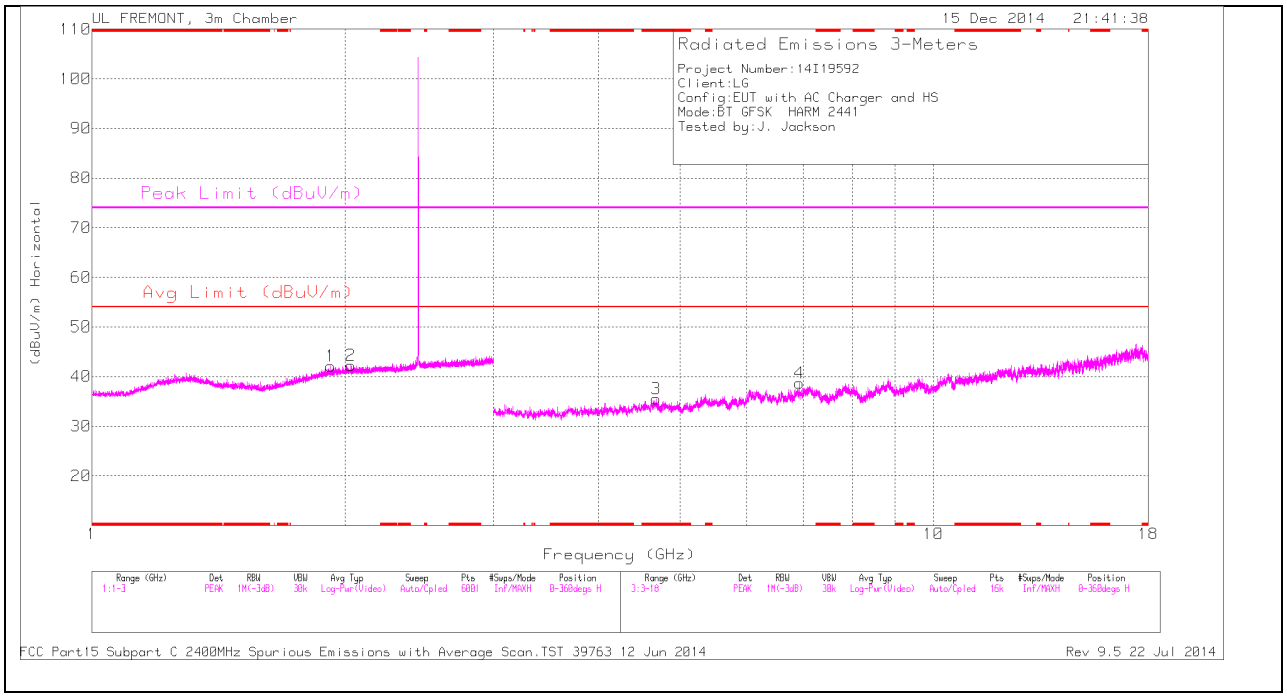
MID CHANNEL HORIZONTAL



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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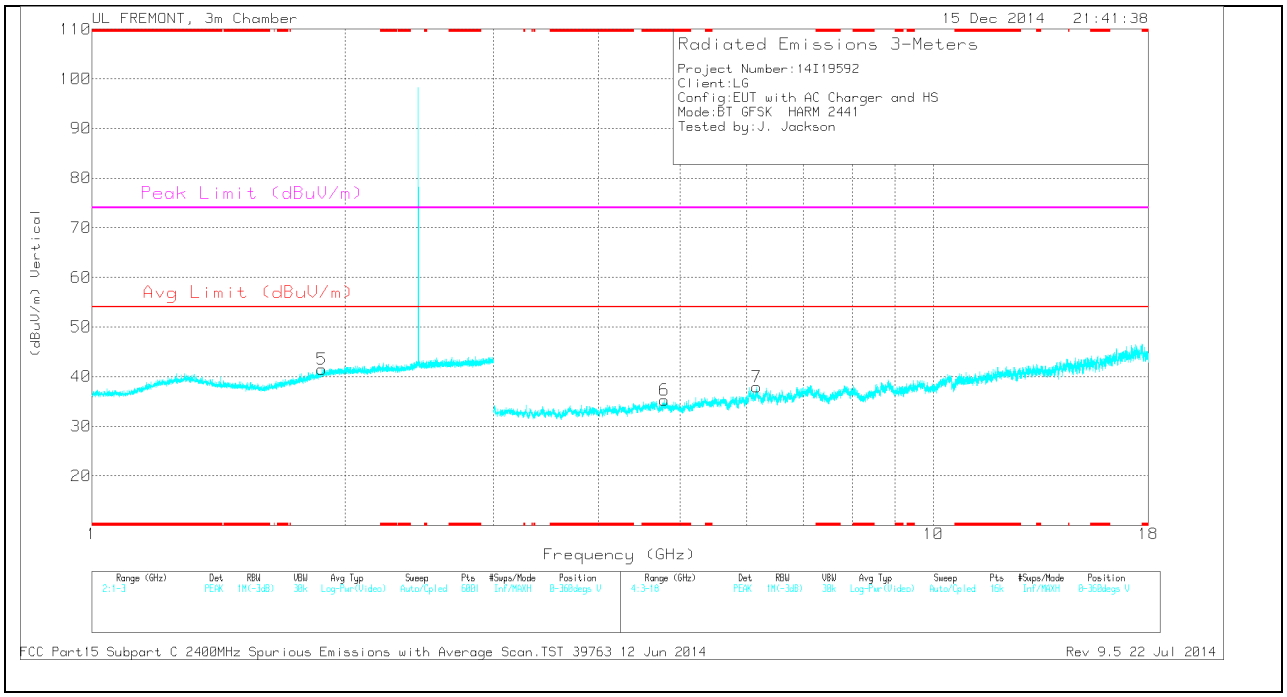
MID CHANNEL VERTICAL



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 T119 (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
3	* 4.682	32.12	PK	34.1	-30.7	35.52	-	-	74	-38.48	0-360	200	H
6	* 4.791	31.45	PK	34.1	-30.3	35.25	-	-	74	-38.75	0-360	100	V
5	1.877	33.7	PK	31	-23.2	41.5	-	-	-	-	0-360	100	V
1	1.923	34.02	PK	31.3	-23.2	42.12	-	-	-	-	0-360	200	H
2	2.032	33.84	PK	31.6	-23.2	42.24	-	-	-	-	0-360	200	H
7	6.16	32.38	PK	35.3	-29.7	37.98	-	-	-	-	0-360	100	V
4	6.932	31.95	PK	35.6	-28.9	38.65	-	-	-	-	0-360	100	H

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.68	41.25	PK3	34.1	-30.7	44.65	-	-	74	-29.35	360	200	H
* 4.79	40.8	PK3	34.1	-30.3	44.6	-	-	74	-29.4	360	100	V

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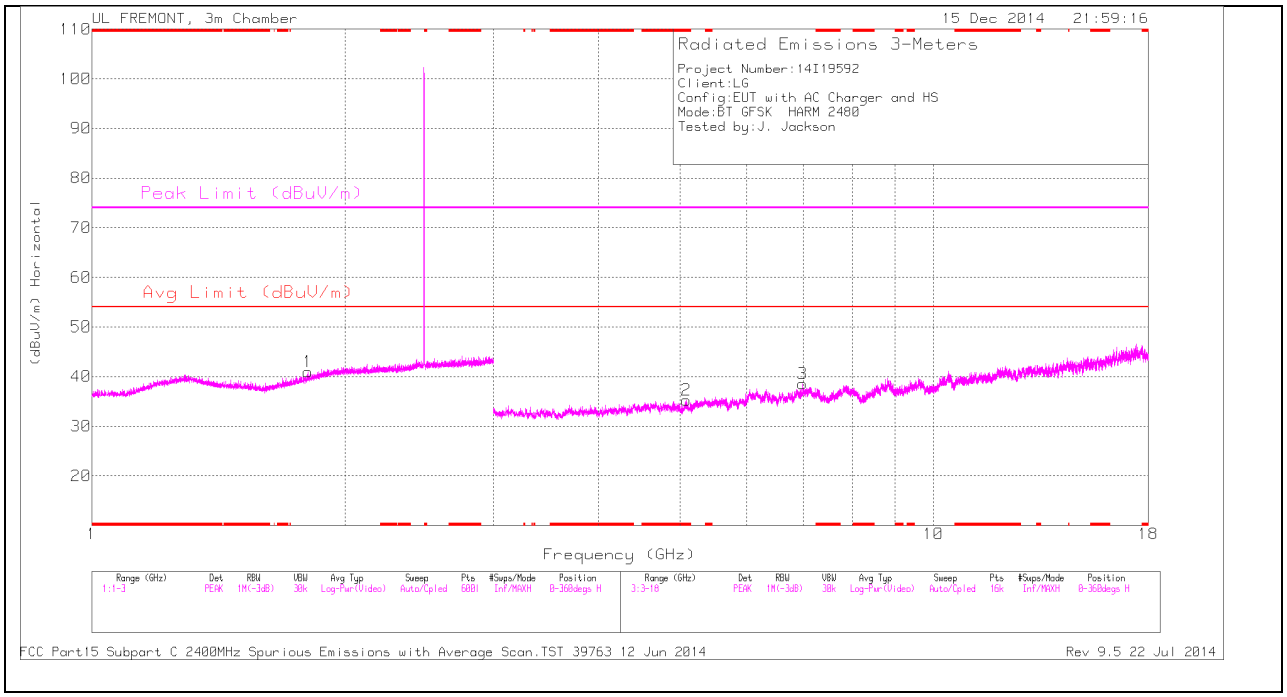
HIGH CHANNEL HORIZONTAL



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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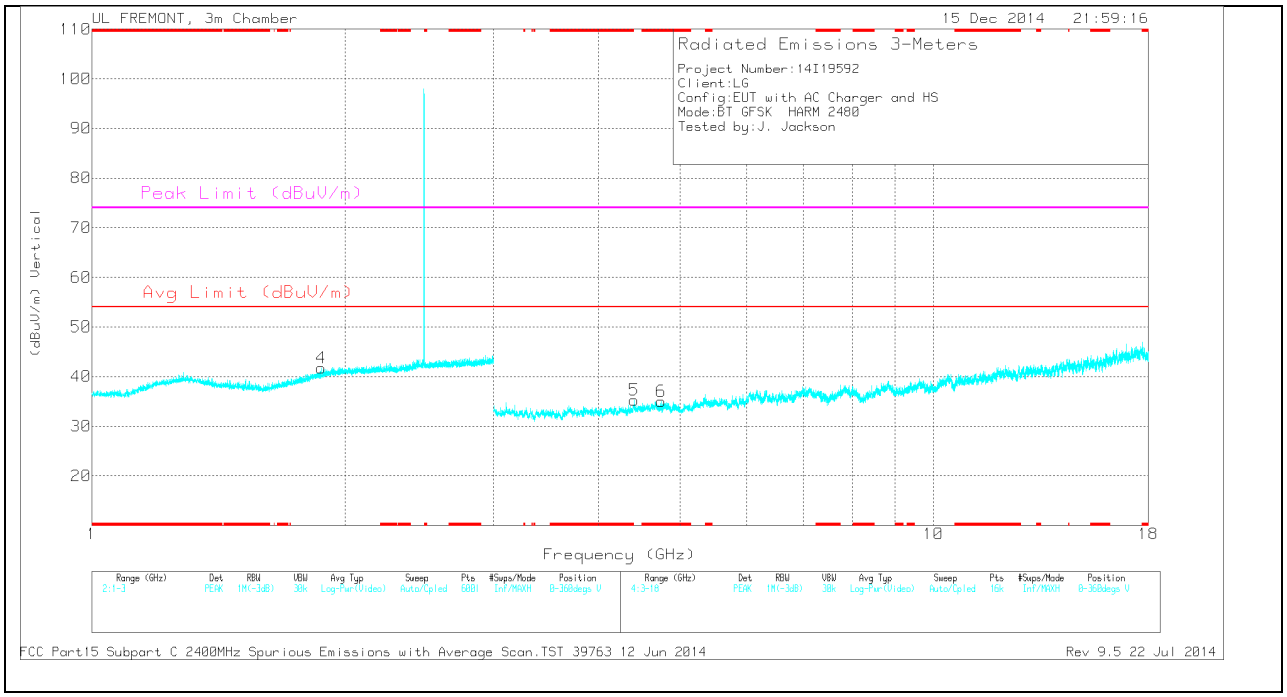
HIGH CHANNEL VERTICAL



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 T119 (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
2	* 5.083	31.06	PK	34.1	-29.9	35.26	-	-	74	-38.74	0-360	100	H
6	* 4.744	31.7	PK	34.1	-30.8	35	-	-	74	-39	0-360	200	V
1	1.805	34.17	PK	30.2	-23.4	40.97	-	-	-	-	0-360	100	H
4	1.872	34.09	PK	30.9	-23.3	41.69	-	-	-	-	0-360	200	V
5	4.407	31.81	PK	33.7	-30.2	35.31	-	-	-	-	0-360	200	V
3	6.992	32.41	PK	35.6	-29.4	38.61	-	-	-	-	0-360	100	H

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 5.083	40.47	PK3	34.1	-29.9	44.67	-	-	74	-29.33	360	100	H
* 4.742	41.2	PK3	34.1	-30.9	44.4	-	-	74	-29.6	360	200	V

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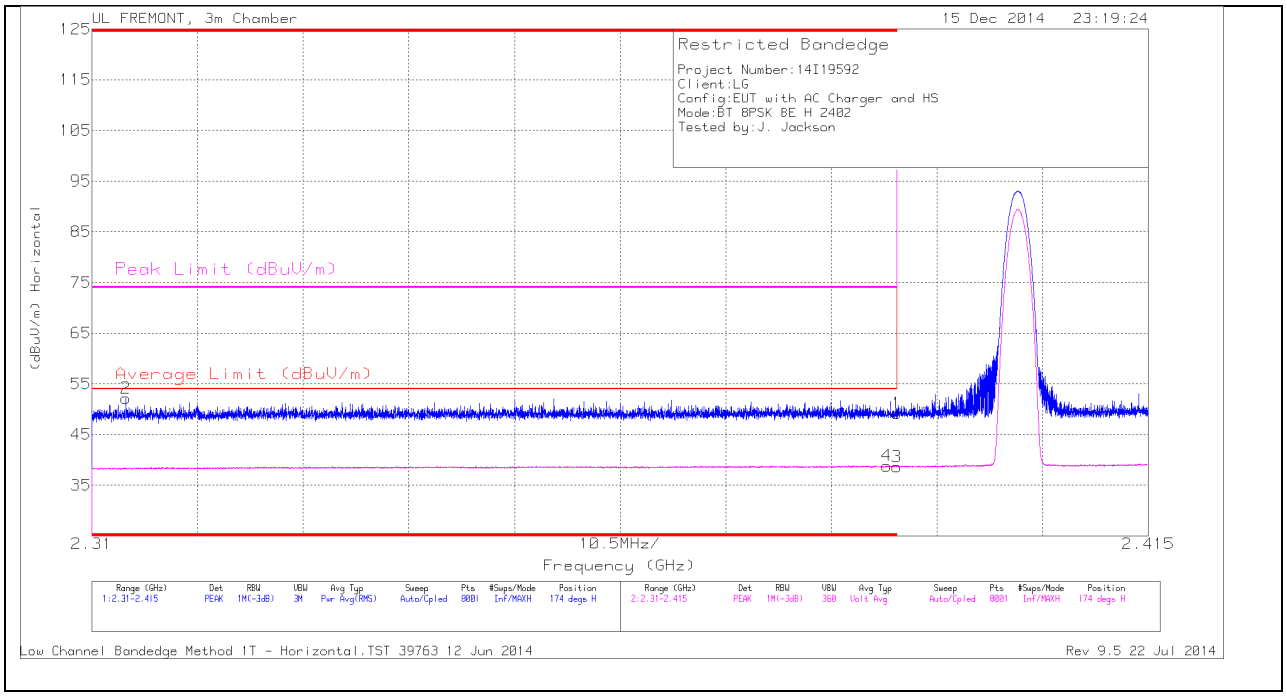
9.2.2. ENHANCED DATA RATE 8PSK MODULATION
RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.23	PK	32.1	-23.1	49.23	-	-	74	-24.77	174	266	H
2	* 2.313	43.36	PK	31.9	-23.1	52.16	-	-	74	-21.84	174	266	H
3	* 2.39	29.64	VB1T	32.1	-23.1	38.64	54	-15.36	-	-	174	266	H
4	* 2.389	29.81	VB1T	32.1	-23.1	38.81	54	-15.19	-	-	174	266	H

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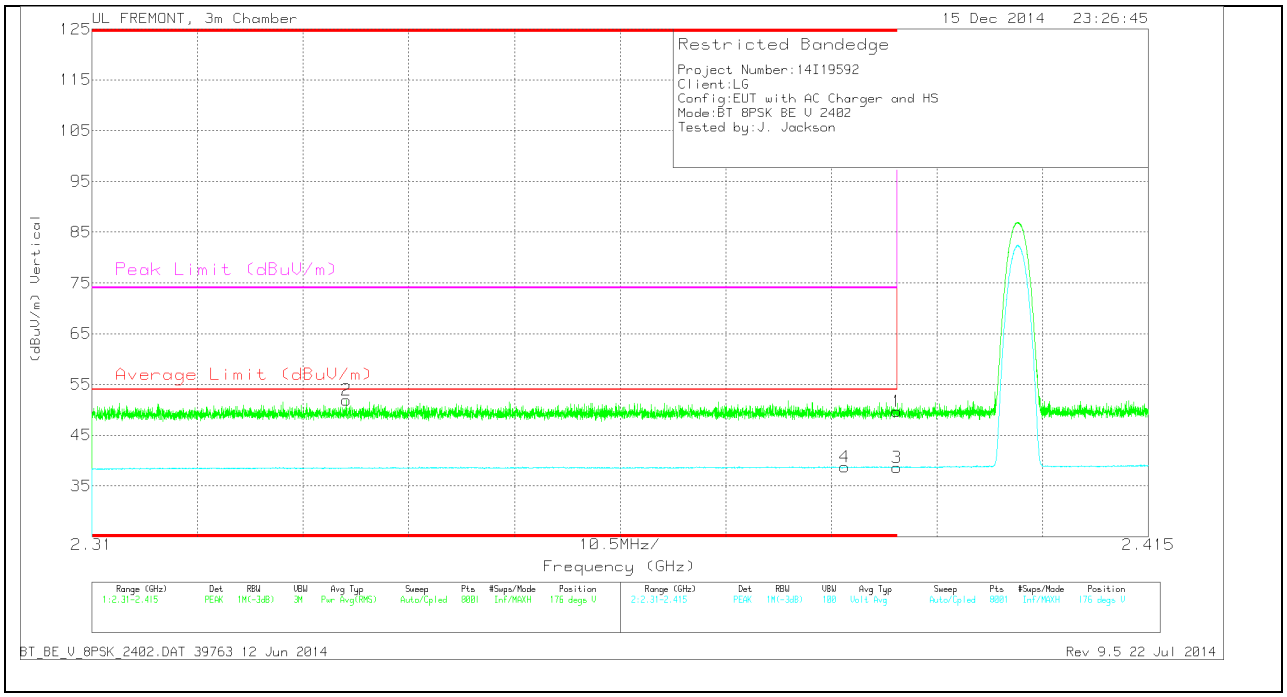
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.64	PK	32.1	-23.1	49.64	-	-	74	-24.36	176	399	V
2	* 2.335	43.15	PK	31.9	-23.1	51.95	-	-	74	-22.05	176	399	V
3	* 2.39	29.67	VB1T	32.1	-23.1	38.67	54	-15.33	-	-	176	399	V
4	* 2.385	29.77	VB1T	32.1	-23.1	38.77	54	-15.23	-	-	176	399	V

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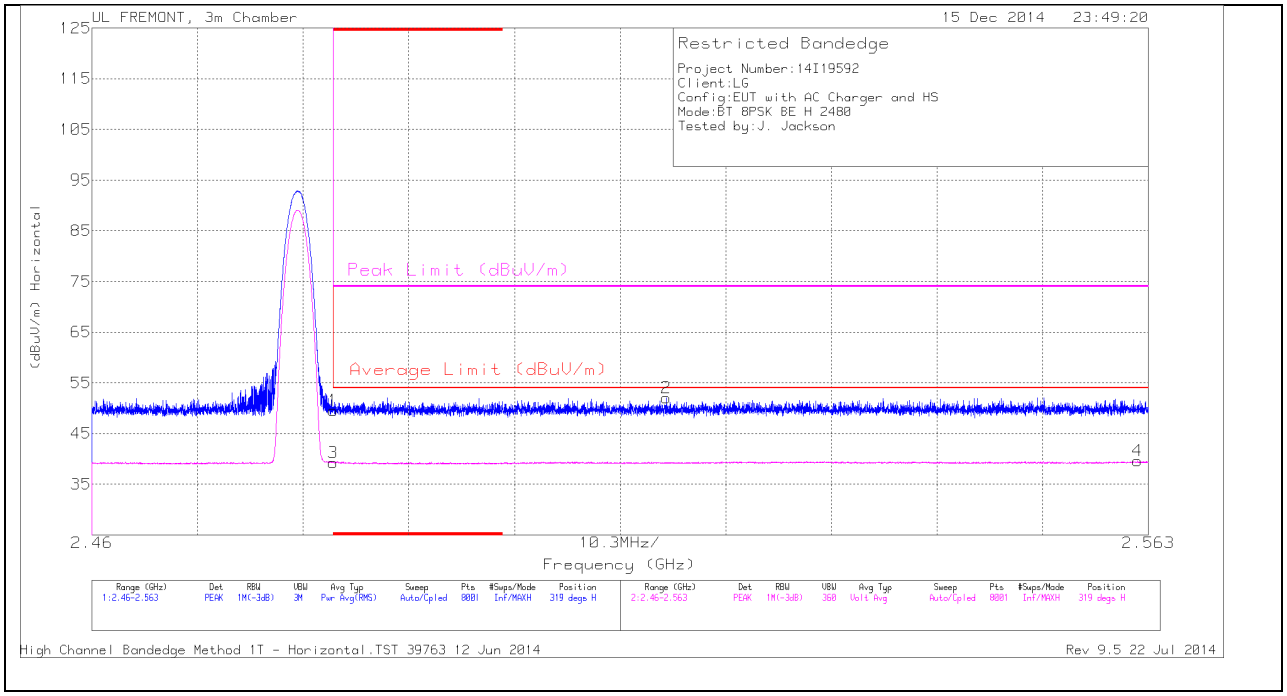
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.06	PK	32.3	-22.8	49.56	-	-	74	-24.44	319	122	H
3	* 2.484	29.78	VB1T	32.3	-22.8	39.28	54	-14.72	-	-	319	122	H
2	2.516	42.46	PK	32.4	-22.8	52.06	-	-	74	-21.94	319	122	H
4	2.562	29.9	VB1T	32.4	-22.7	39.6	54	-14.4	-	-	319	122	H

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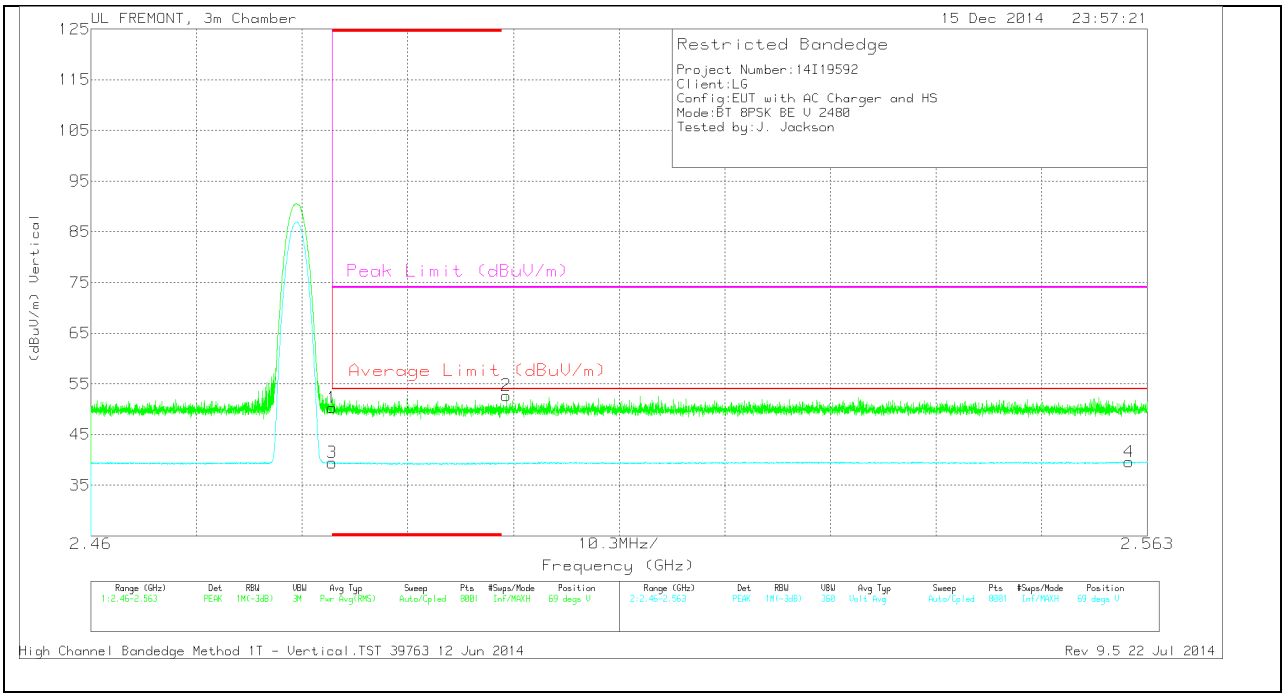
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.77	PK	32.3	-22.8	50.27	-	-	74	-23.73	69	348	V
3	* 2.484	29.93	VB1T	32.3	-22.8	39.43	54	-14.57	-	-	69	348	V
2	2.5	43.11	PK	32.3	-22.7	52.71	-	-	74	-21.29	69	348	V
4	2.561	29.94	VB1T	32.4	-22.7	39.64	54	-14.36	-	-	69	348	V

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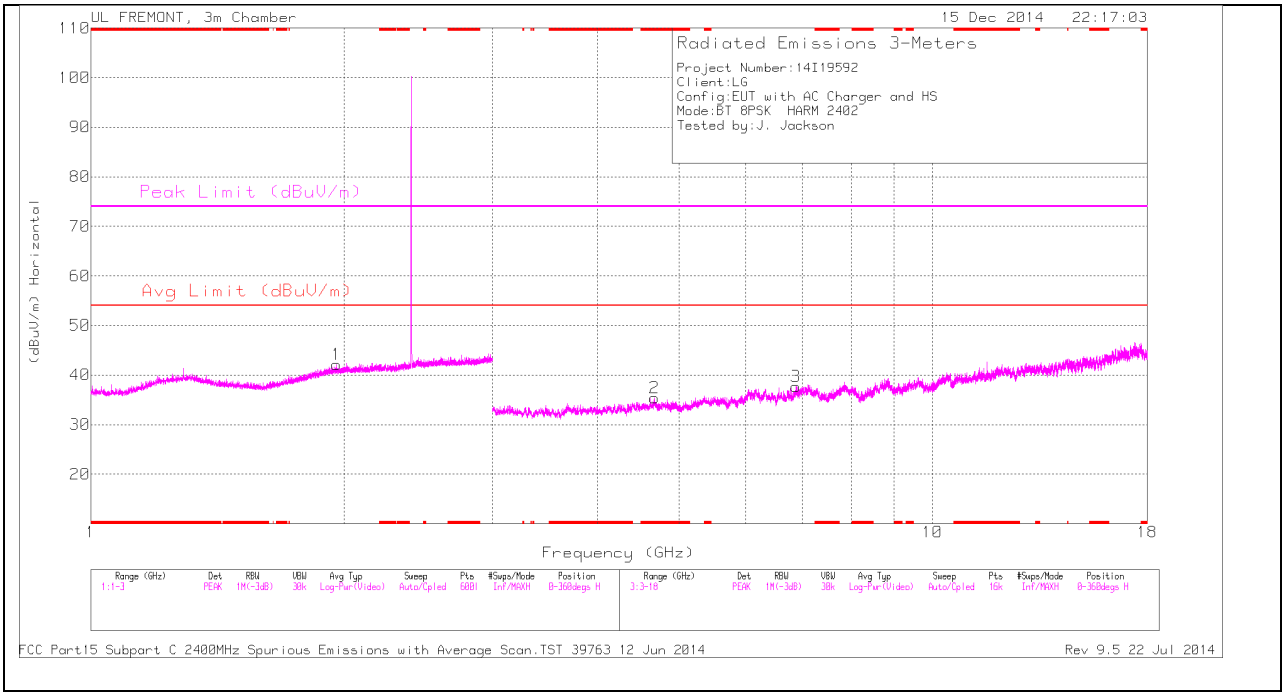
HARMONICS AND SPURIOUS EMISSIONS

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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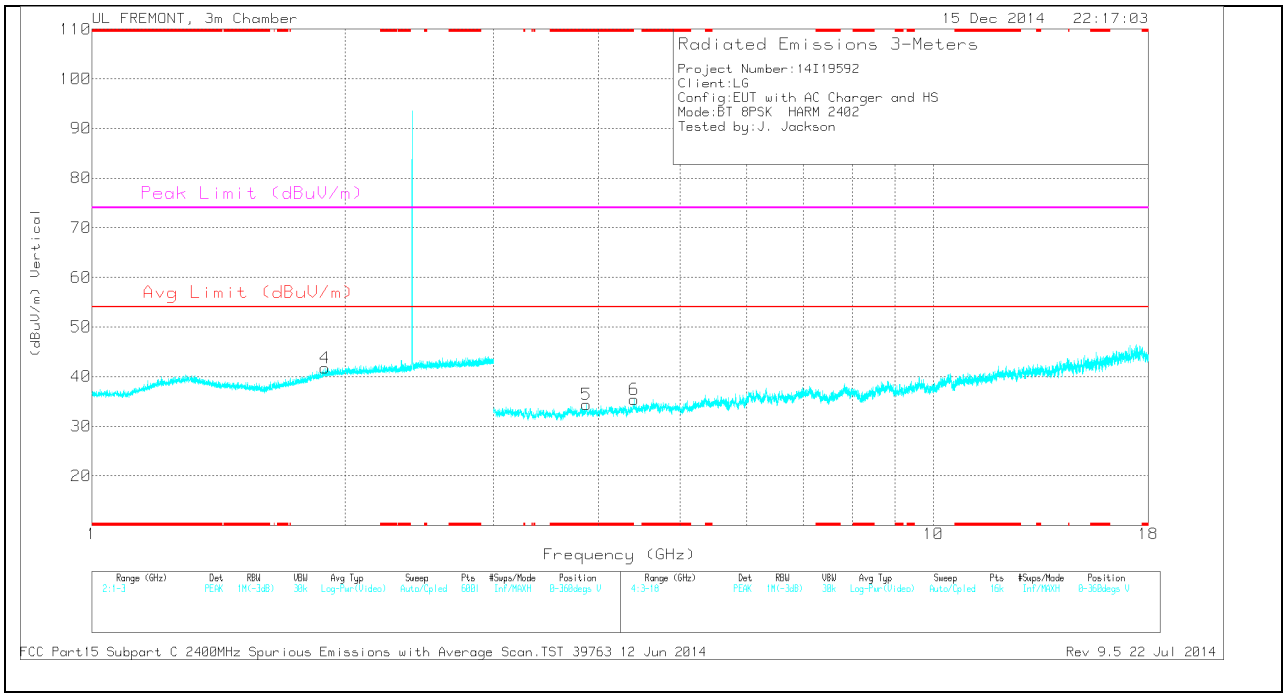
LOW CHANNEL VERTICAL



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 T119 (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
2	* 4.675	32.02	PK	34.1	-30.7	35.42	-	-	74	-38.58	0-360	200	H
5	* 3.868	32.47	PK	33.2	-31.3	34.37	-	-	74	-39.63	0-360	200	V
4	1.894	33.88	PK	31.2	-23.3	41.78	-	-	-	-	0-360	200	V
1	1.958	33.87	PK	31.4	-23.2	42.07	-	-	-	-	0-360	200	H
6	4.408	31.84	PK	33.7	-30.2	35.34	-	-	-	-	0-360	200	V
3	6.884	30.7	PK	35.6	-28.6	37.7	-	-	-	-	0-360	200	H

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.676	40.47	PK3	34.1	-30.7	43.87	-	-	74	-30.13	360	200	H
* 3.868	41.55	PK3	33.2	-31.3	43.45	-	-	74	-30.55	360	200	V

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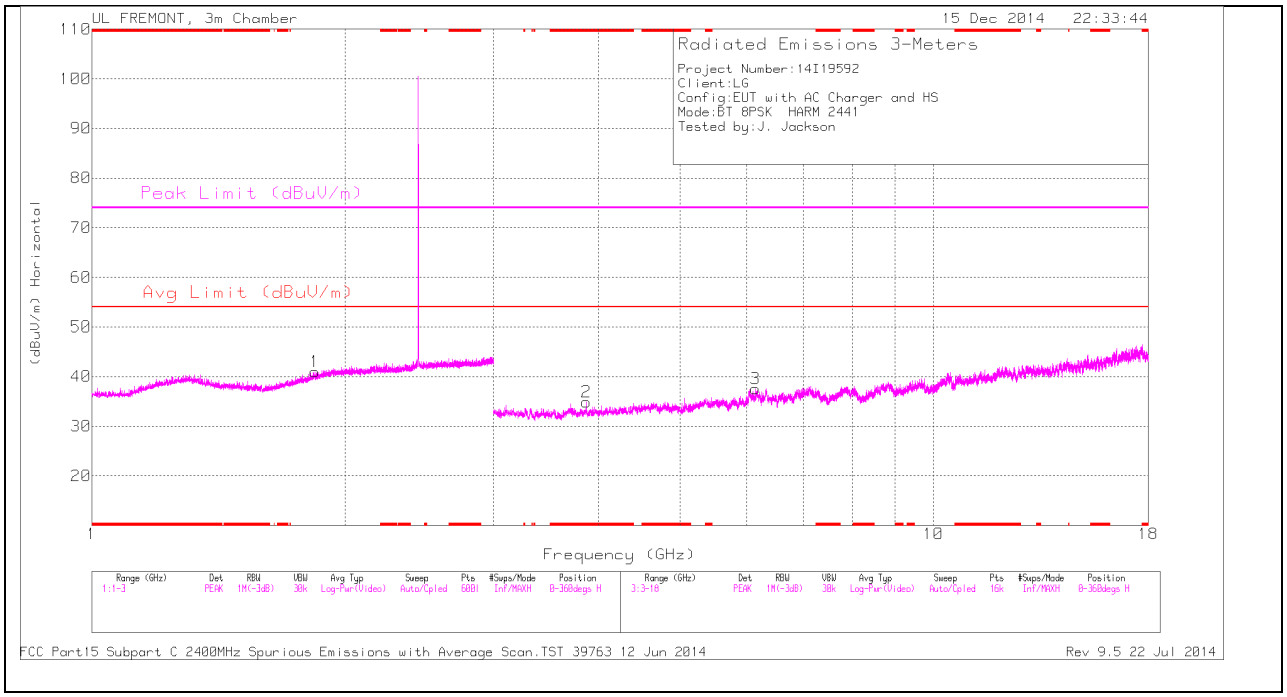
MID CHANNEL HORIZONTAL



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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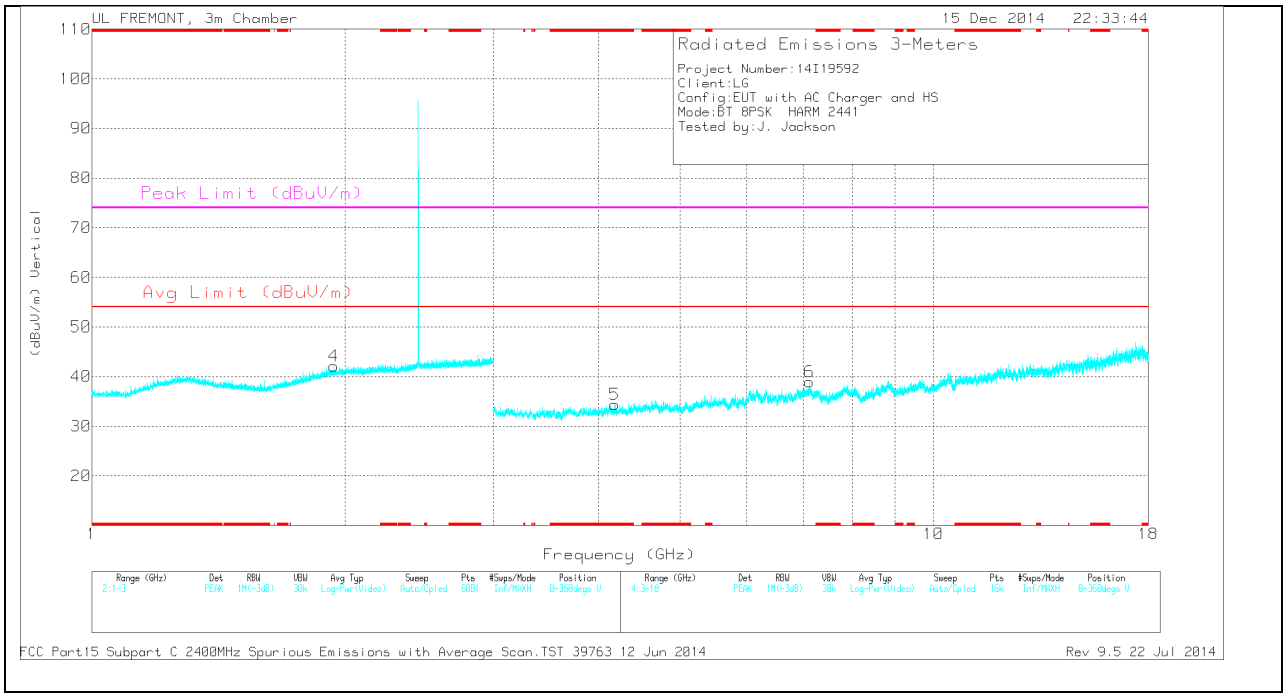
MID CHANNEL VERTICAL



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 T119 (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
2	* 3.868	33.03	PK	33.2	-31.3	34.93	-	-	74	-39.07	0-360	200	H
5	* 4.183	31.18	PK	33.5	-30.3	34.38	-	-	74	-39.62	0-360	200	V
1	1.84	33.74	PK	30.6	-23.3	41.04	-	-	-	-	0-360	100	H
4	1.94	33.9	PK	31.4	-23.2	42.1	-	-	-	-	0-360	100	V
3	6.145	31.9	PK	35.3	-29.6	37.6	-	-	-	-	0-360	100	H
6	7.118	31.31	PK	35.6	-28	38.91	-	-	-	-	0-360	100	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 3.868	41.55	PK3	33.2	-31.3	43.45	-	-	74	-30.55	360	200	H
* 4.186	41.18	PK3	33.5	-30.5	44.18	-	-	74	-29.82	360	200	V

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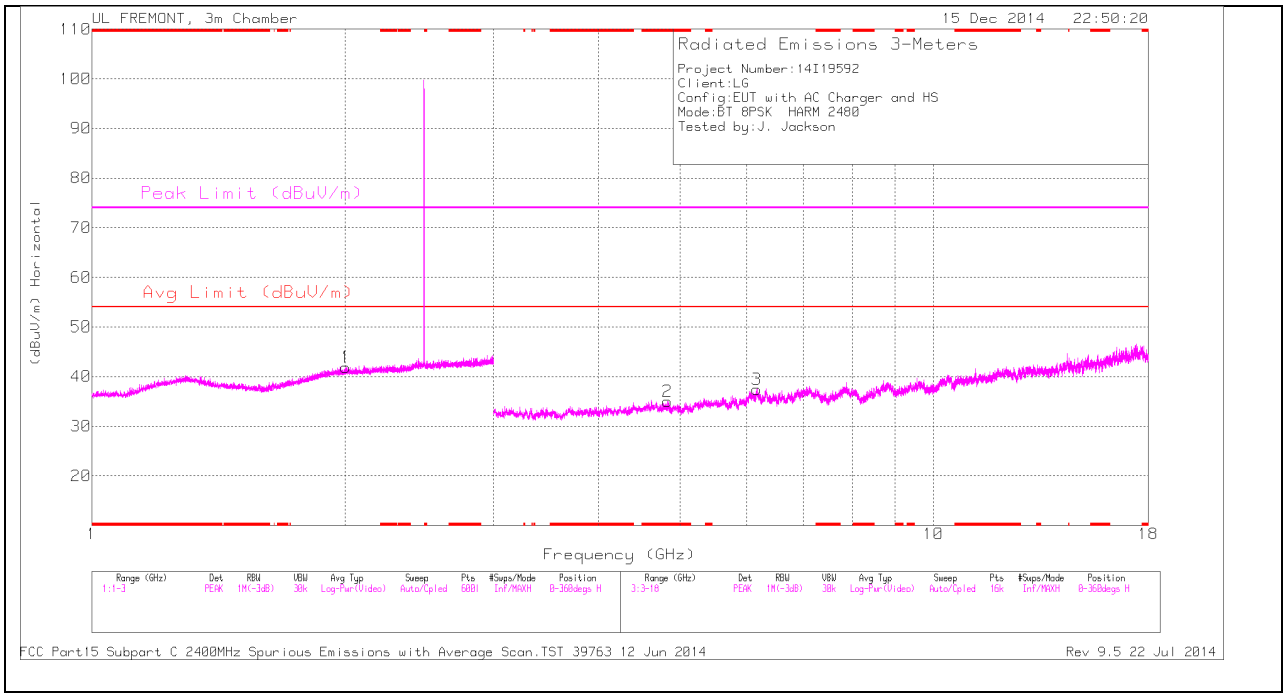
HIGH CHANNEL HORIZONTAL



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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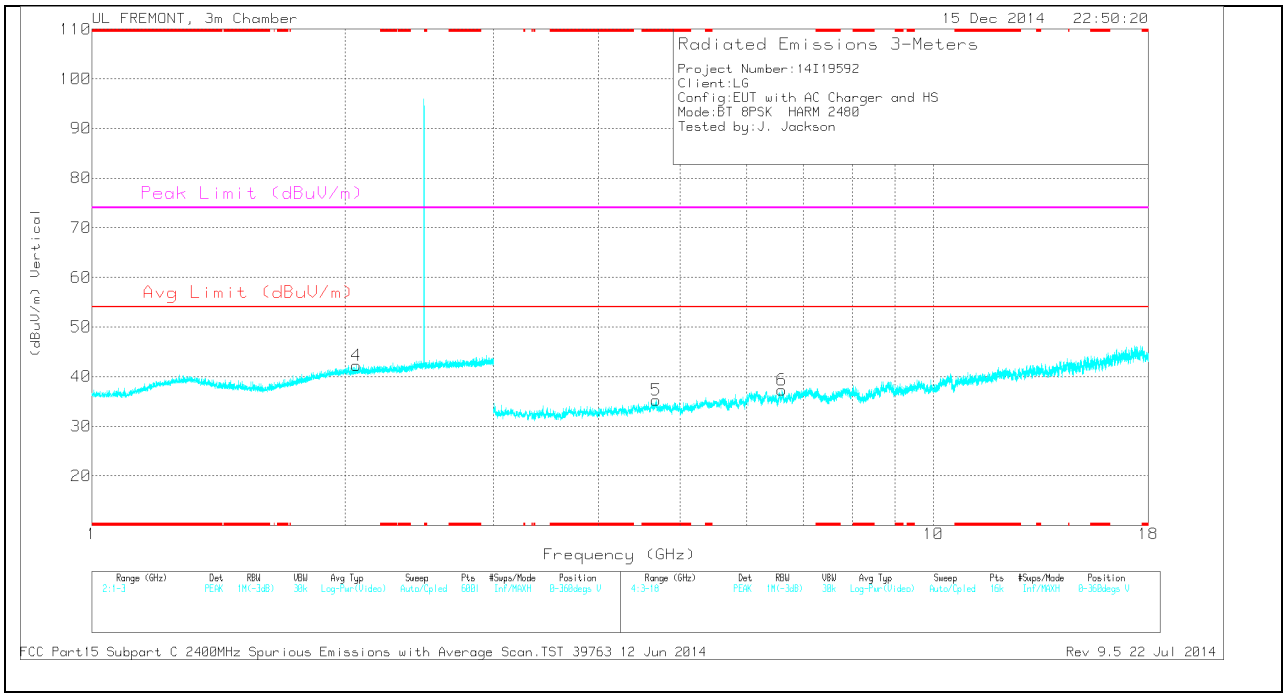
HIGH CHANNEL VERTICAL



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 T119 (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
2	* 4.831	30.94	PK	34	-29.9	35.04	-	-	74	-38.96	0-360	200	H
5	* 4.683	31.86	PK	34.1	-30.7	35.26	-	-	74	-38.74	0-360	200	V
1	2.002	33.5	PK	31.6	-23.2	41.9	-	-	-	-	0-360	100	H
4	2.062	33.78	PK	31.6	-23.1	42.28	-	-	-	-	0-360	100	V
3	6.166	31.96	PK	35.3	-29.8	37.46	-	-	-	-	0-360	100	H
6	6.602	30.08	PK	35.6	-28.4	37.28	-	-	-	-	0-360	200	V

PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.829	40.92	PK3	34	-30	44.92	-	-	74	-29.08	360	200	H
* 4.681	41.01	PK3	34.1	-30.7	44.41	-	-	74	-29.59	360	200	V

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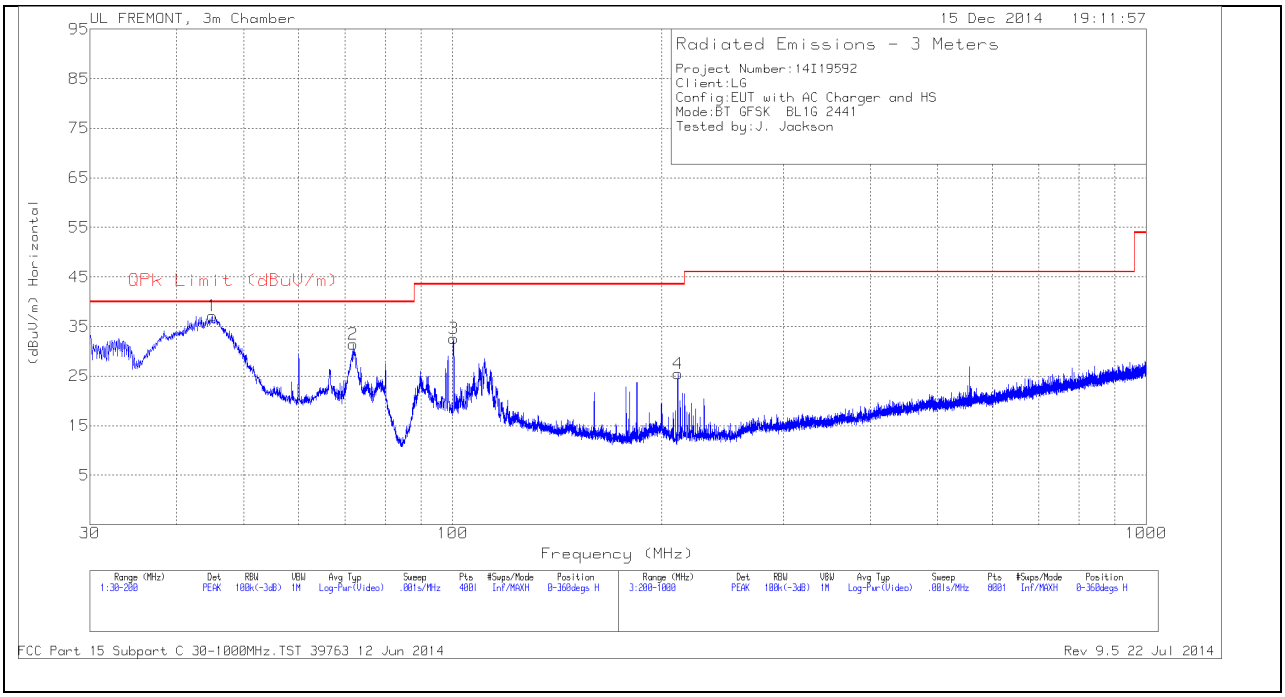
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



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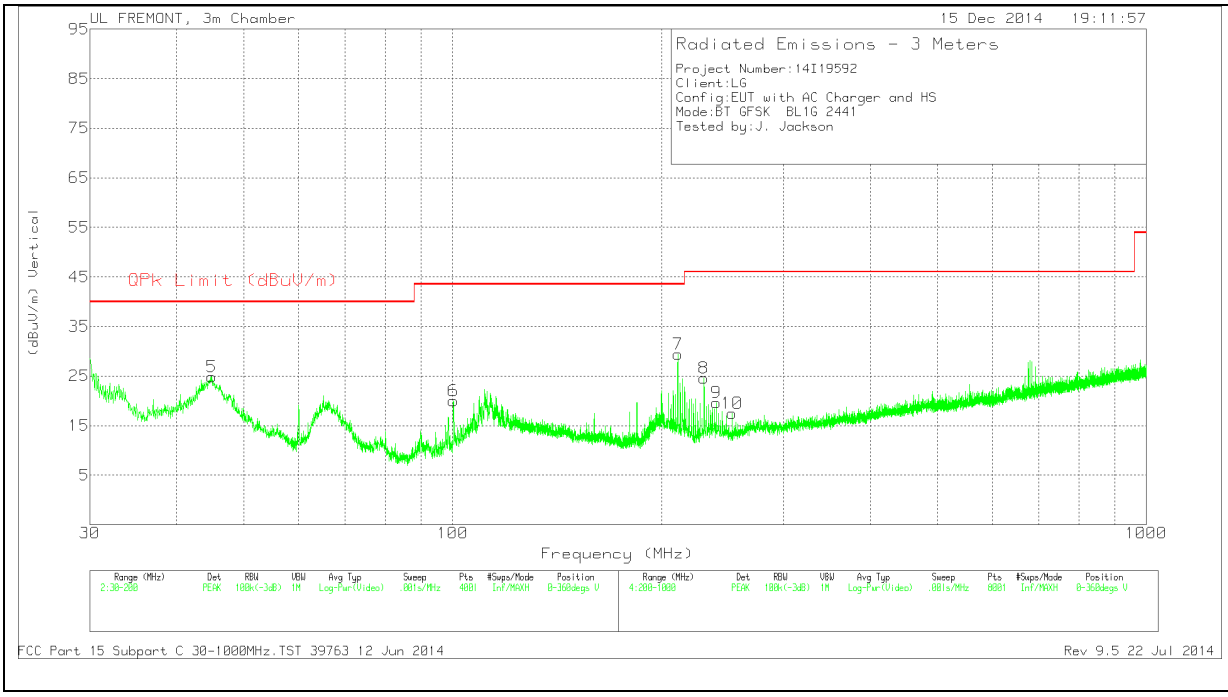
VERTICAL PLOT



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BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	44.9175	42.05	PK	10.1	-27.3	24.85	40	-15.15	0-360	100	V
1	45.045	54.4	PK	10.1	-27.3	37.2	40	-2.8	0-360	100	H
2	71.905	50.44	PK	8.1	-27.1	31.44	40	-8.56	0-360	400	H
6	100.2525	36.8	PK	10	-26.8	20	43.52	-23.52	0-360	100	V
3	100.295	49.42	PK	10	-26.8	32.62	43.52	-10.9	0-360	300	H
4	211.2	40.83	PK	10.3	-25.7	25.43	43.52	-18.09	0-360	200	H
7	211.2	44.78	PK	10.3	-25.7	29.38	43.52	-14.14	0-360	200	V
8	230.4	39	PK	11.1	-25.5	24.6	46.02	-21.42	0-360	200	V
9	240	33.34	PK	11.7	-25.4	19.64	46.02	-26.38	0-360	100	V
10	252.8	31.32	PK	11.5	-25.3	17.52	46.02	-28.5	0-360	100	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.

RESULTS

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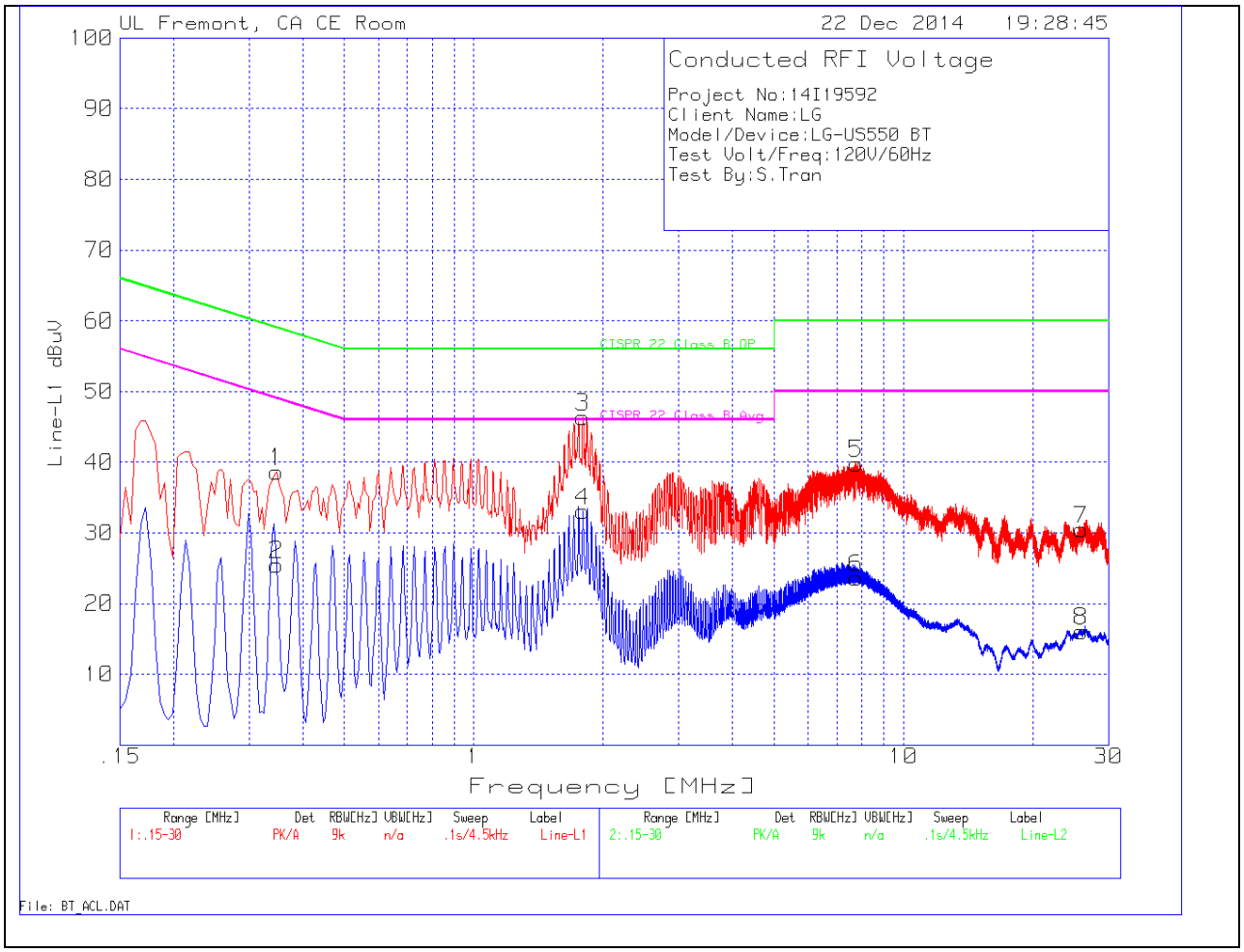
6 WORST EMISSIONS

LINE 1 PLOT



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LINE 1 RESULTS

Line-L1 .15 - 30MHz

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	.348	38.08	PK	.5	0	38.58	59	-20.42	-	-
2	.348	24.93	Av	.5	0	25.43	-	-	49	-23.57
3	1.7925	46.09	PK	.2	.1	46.39	56	-9.61	-	-
4	1.7925	32.73	Av	.2	.1	33.03	-	-	46	-12.97
5	7.7505	39.49	PK	.2	.1	39.79	60	-20.21	-	-
6	7.7505	23.32	Av	.2	.1	23.62	-	-	50	-26.38
7	25.89	29.85	PK	.3	.3	30.45	60	-29.55	-	-
8	25.89	15.44	Av	.3	.3	16.04	-	-	50	-33.96

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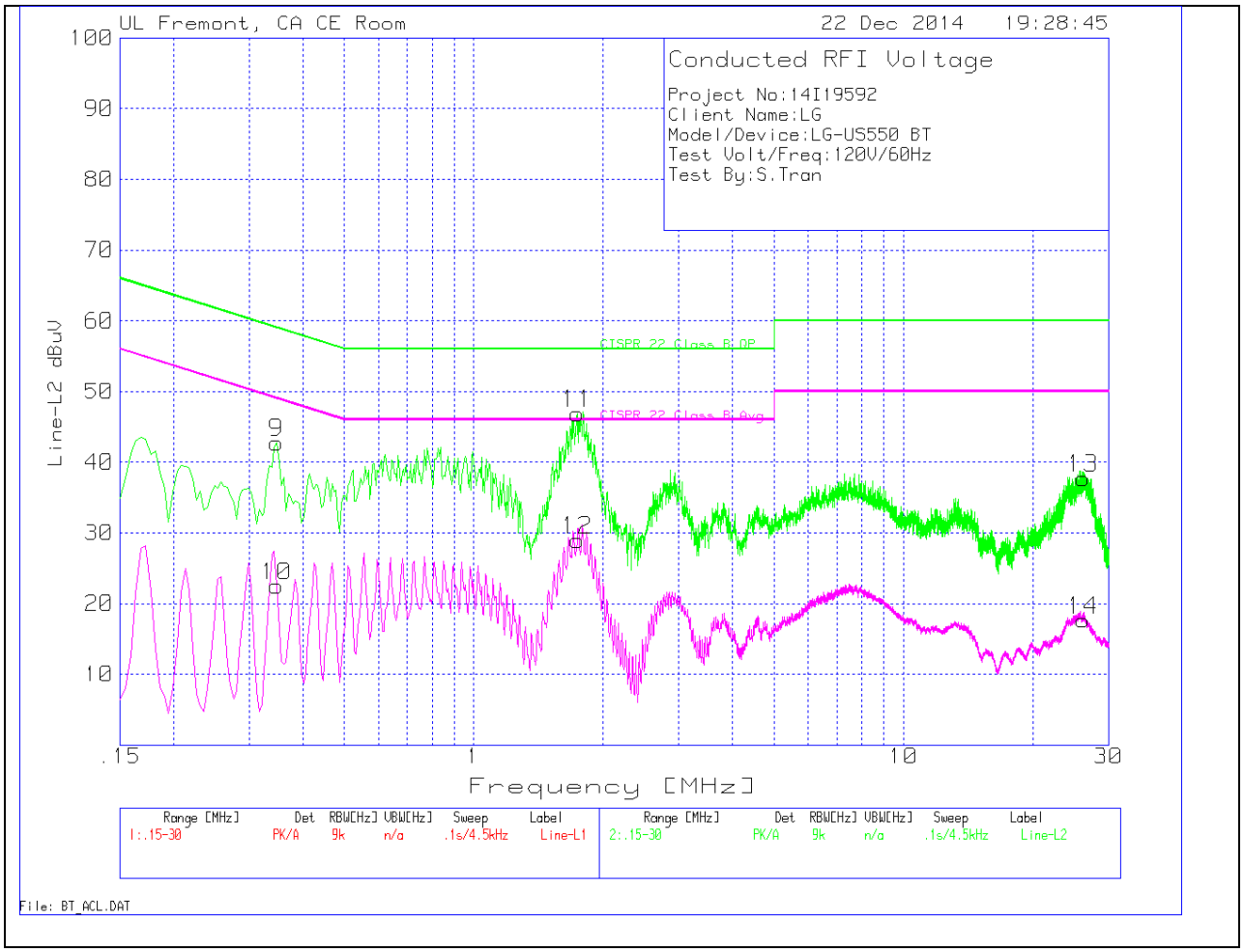
LINE 2 PLOT



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LINE 2 RESULTS

Line-L2 .15 - 30MHz

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)
9	.348	42.31	PK	.5	0	42.81	59	-16.19	-	-
10	.348	21.96	Av	.5	0	22.46	-	-	49	-26.54
11	1.7385	46.59	PK	.2	.1	46.89	56	-9.11	-	-
12	1.7385	28.62	Av	.2	.1	28.92	-	-	46	-17.08
13	26.151	37.17	PK	.3	.3	37.77	60	-22.23	-	-
14	26.151	17.08	Av	.3	.3	17.68	-	-	50	-32.32

PK - Peak detector

Av - average detection

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