FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

CDMA/ LTE Phone + Bluetooth, and DTS b/g/n

MODEL NUMBER: LG-LS660, LGLS660, LS660

FCC ID: ZNFLS660

REPORT NUMBER: 14U18147-2

ISSUE DATE: JUNE 25, 2014

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	06/25/14	Initial Issue	P. Zhang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.

EUT DESCRIPTION: CDMA/LTE Phone + Bluetooth, and DTS b/g/n.

MODEL: LG-LS660, LGLS660, LS660

SERIAL NUMBER: 1BYFL (Conducted), 1BYFM (Radiated)

DATE TESTED: JUNE 23 - 25, 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.

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	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F

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

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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a CDMA//LTE Phone + Bluetooth, 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	9.89	9.75
2402 - 2480	Enhanced 8PSK	10.35	10.84

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 -2.45 dBi.

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.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	LG	STA-U34WRI	N/A	N/A
AC Adapter	LG	MCS-02WR	N/A	N/A
AC Adapter	LG	MCS-02WD	N/A	N/A
Earphone	LG	N/A	N/A	N/A

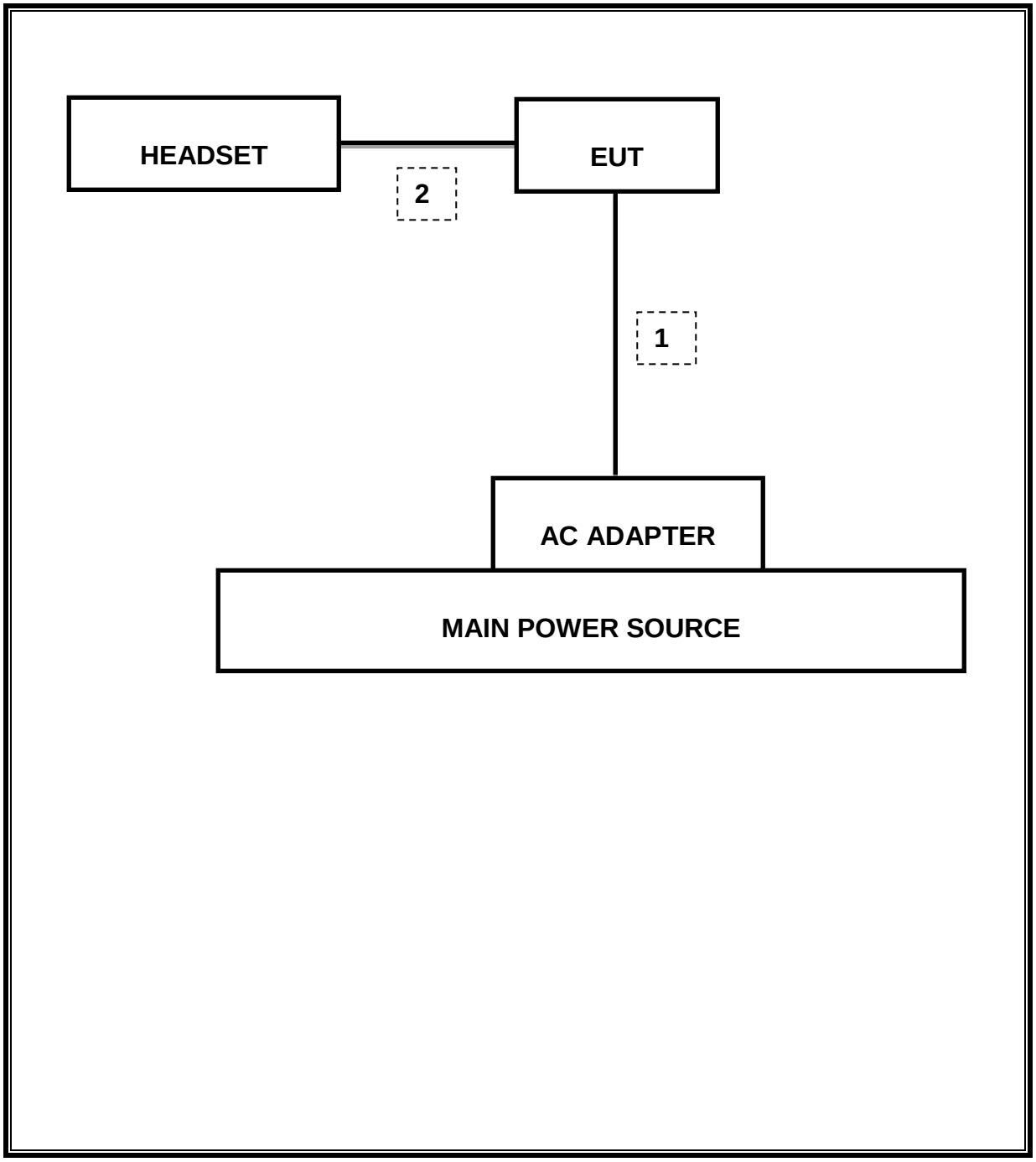
I/O CABLES

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.

SETUP DIAGRAM FOR TESTS



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	10/25/14
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
CBT Bluetooth Tester	R & S	CBT	None	07/12/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14
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	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14

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	1.1699MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-38.53dBm
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	10.35dBm
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	1.005 MHz
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	0.288sec
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	49.71dBuV
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	40.36dBuV/m

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

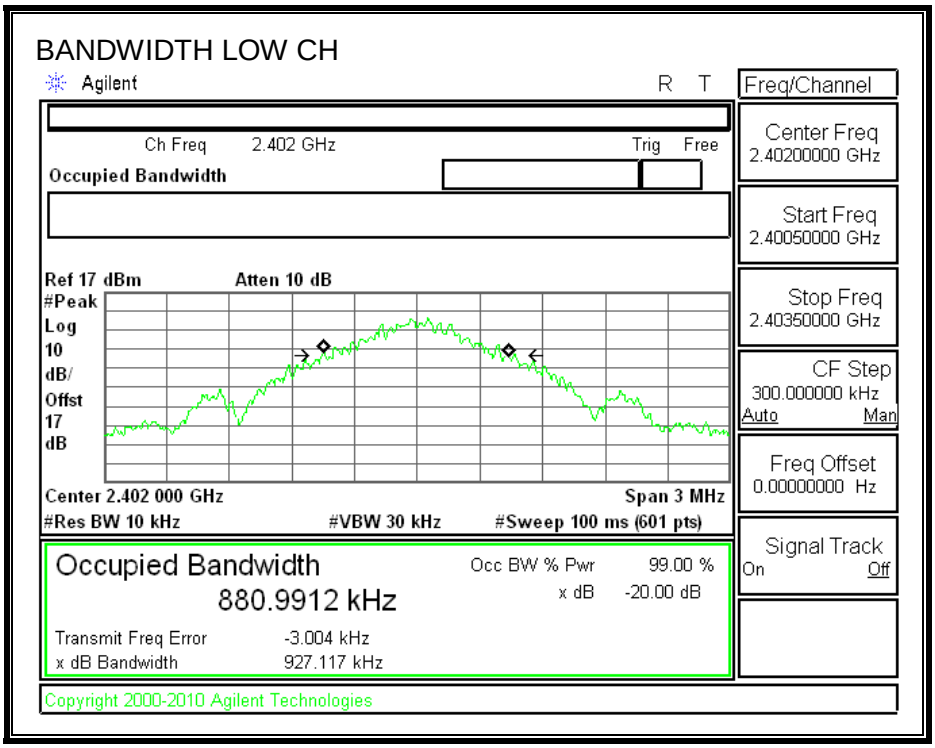
8.1.1. BASIC DATA RATE GFSK MODULATION

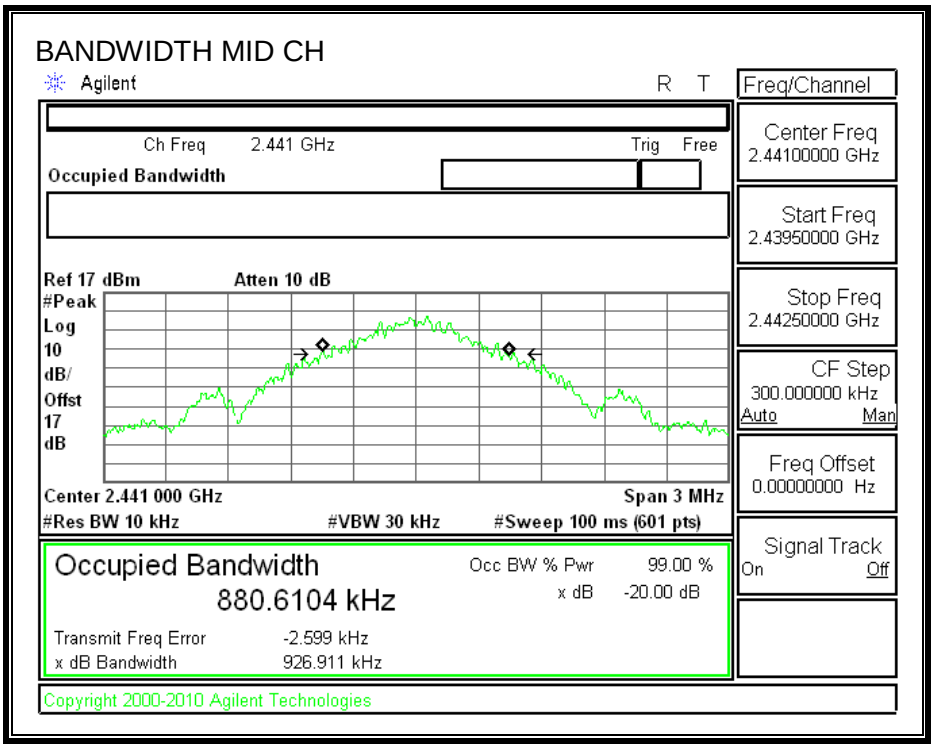
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.9271	0.915
Middle	2441	0.9269	0.8255
High	2480	0.9269	0.8922
Worst		0.9271	0.915

8.1.1. ENHANCED DATA RATE 8PSK MODULATION

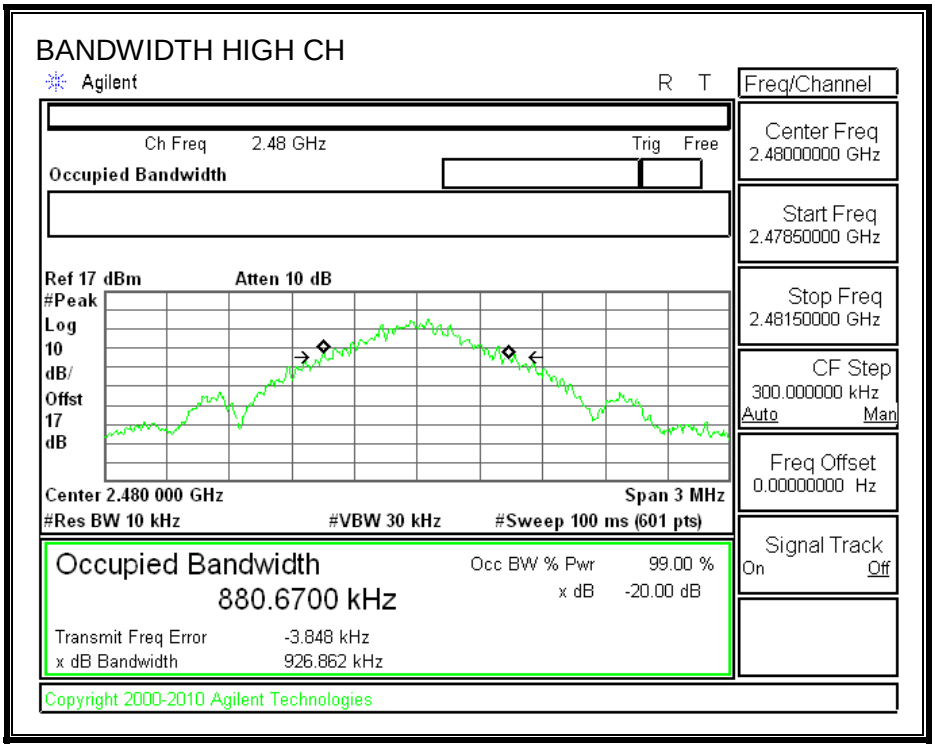
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.267	1.1698
Middle	2441	1.266	1.1522
High	2480	1.268	1.1699
Worst		1.268	1.1699

GFSK 20 dB BANDWIDTH

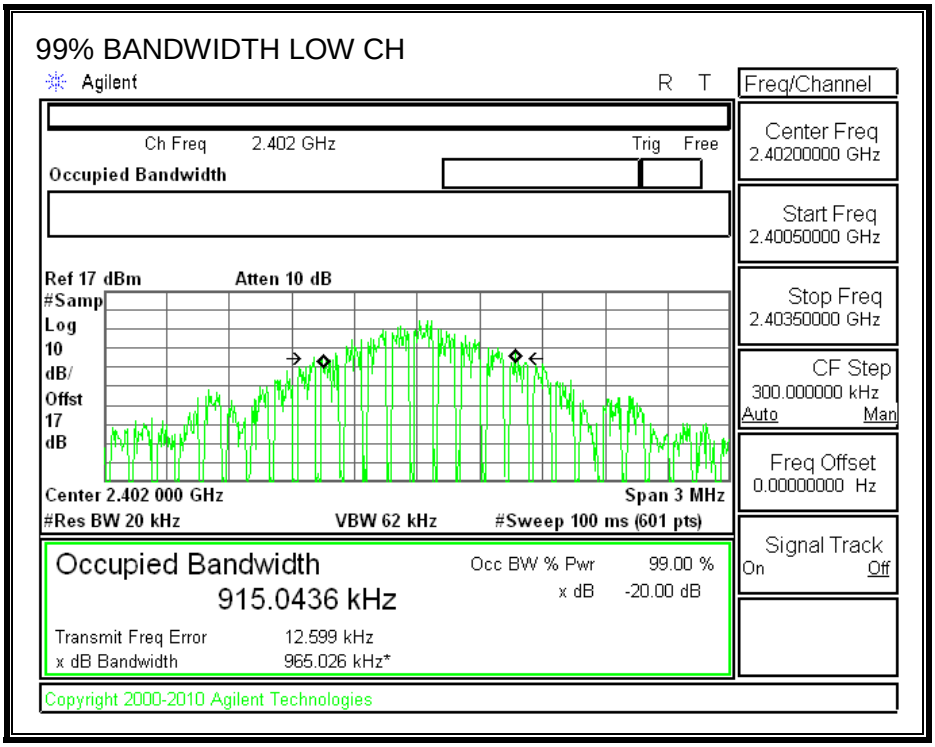


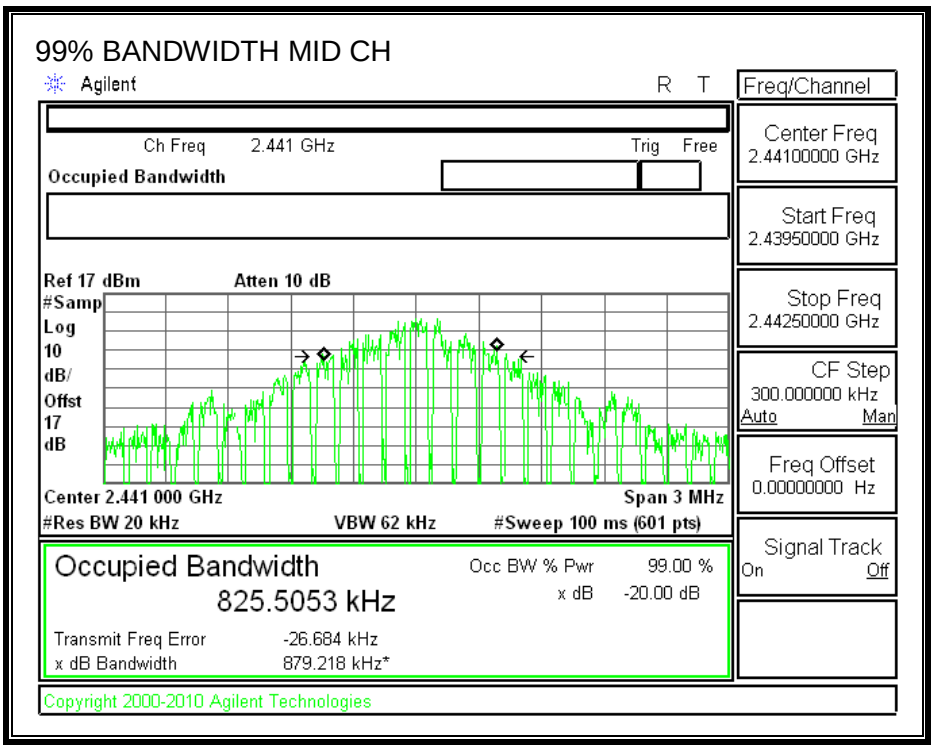


BANDWIDTH HIGH CH

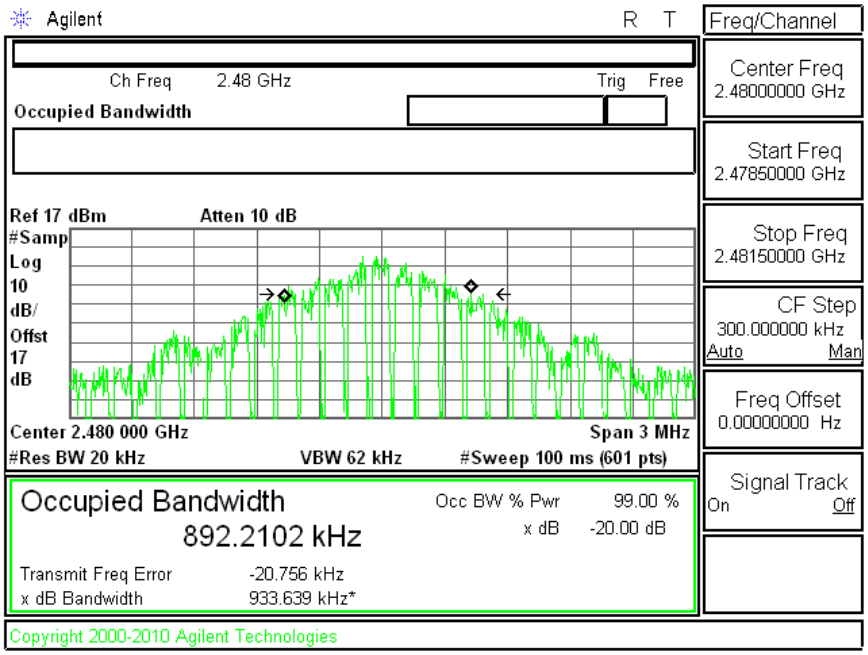


GFSK 99% BANDWIDTH

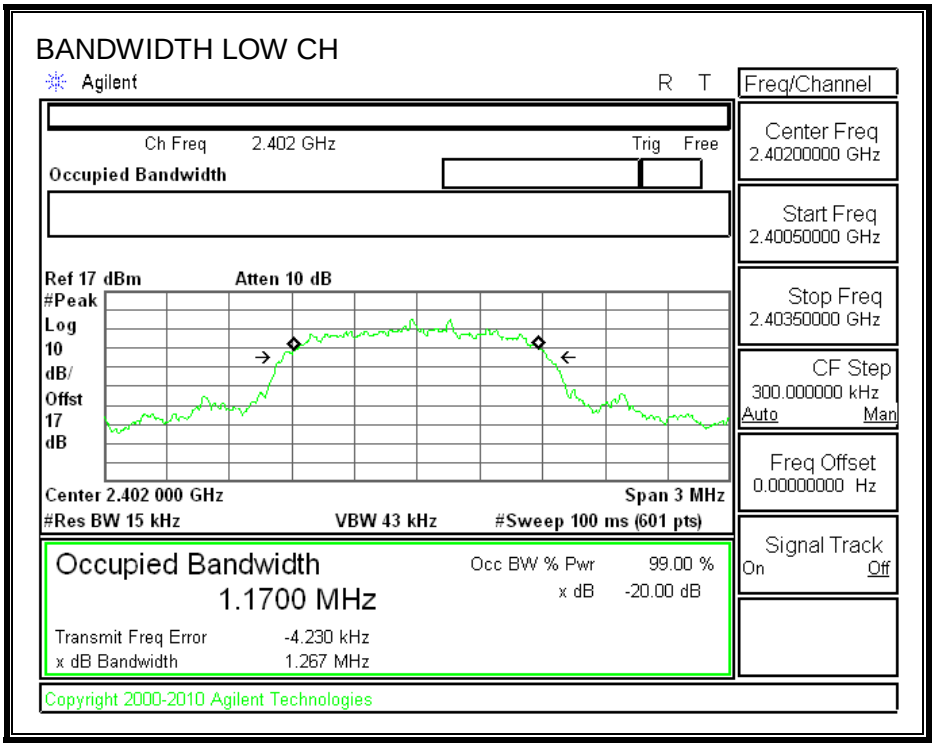


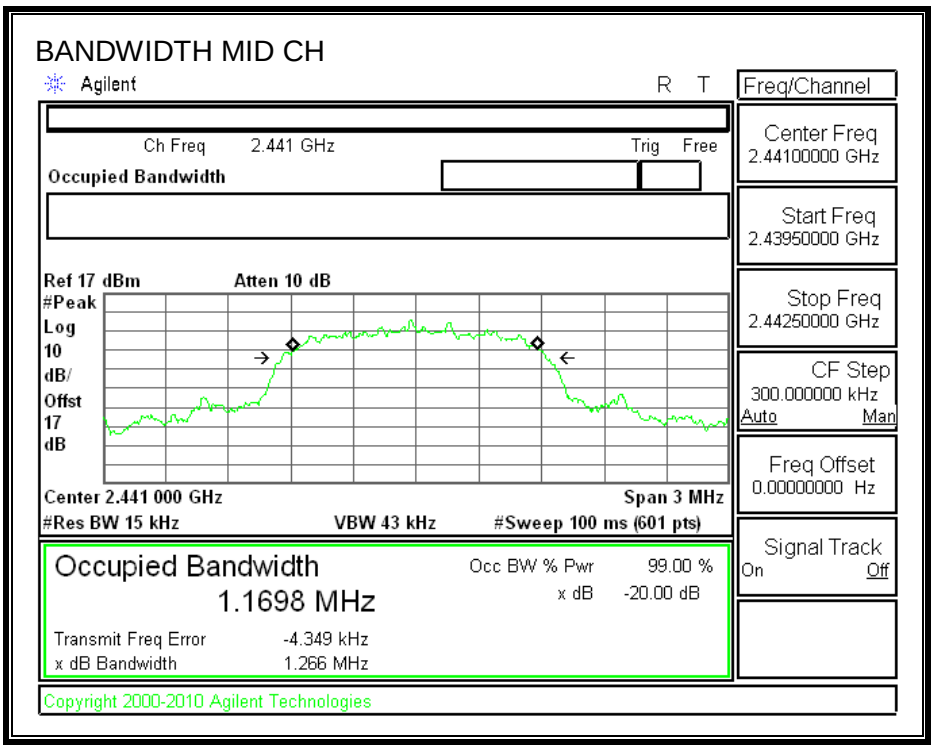


99% BANDWIDTH HIGH CH

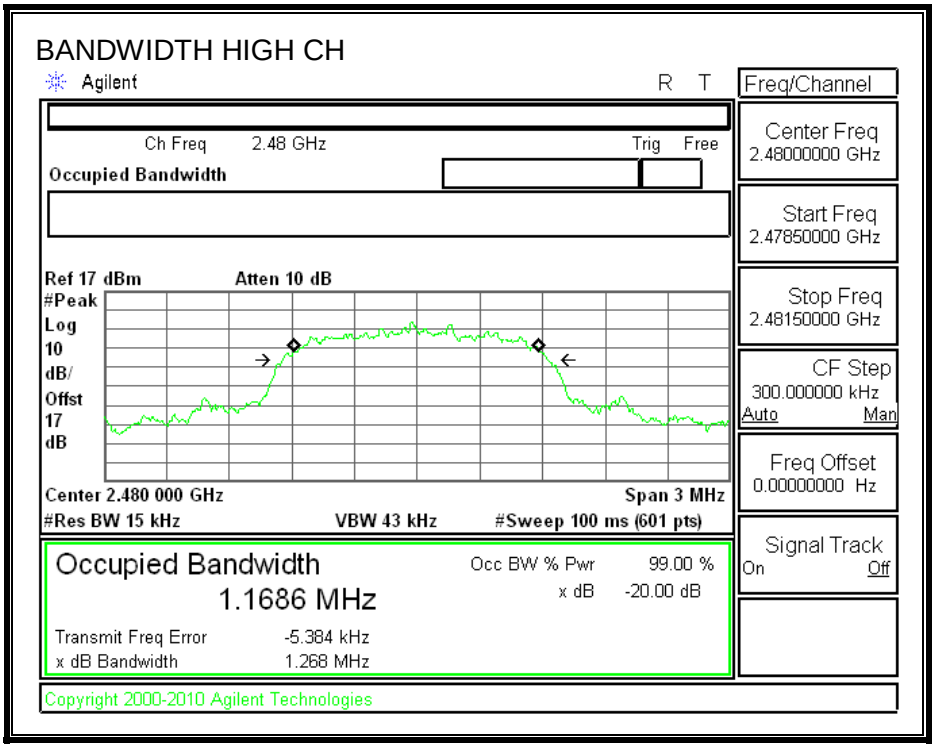


8PSK 20 dB BANDWIDTH

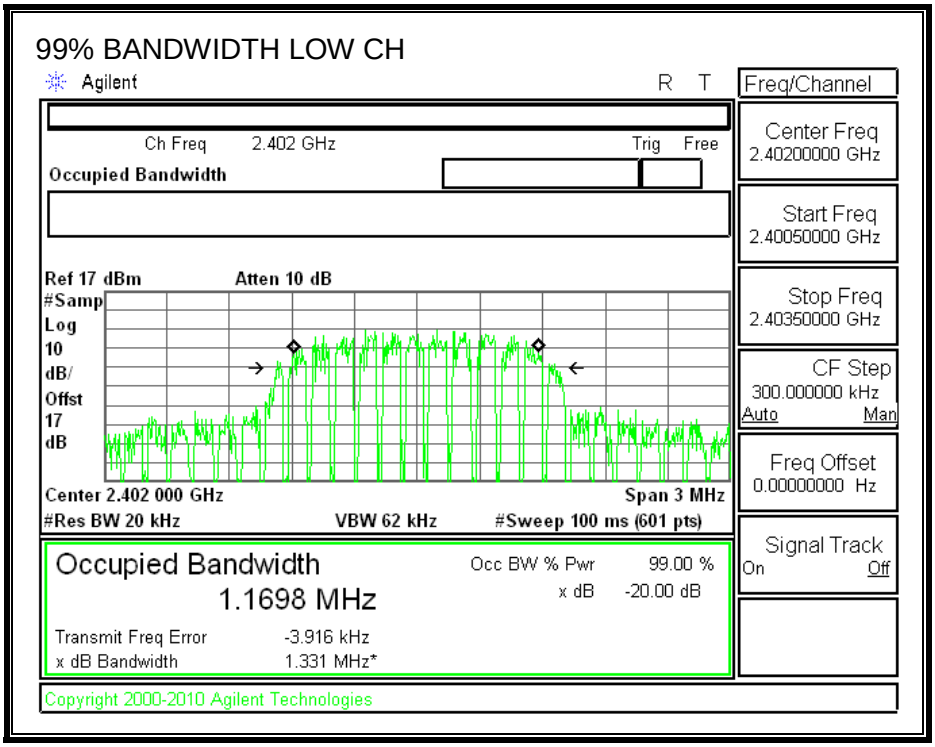


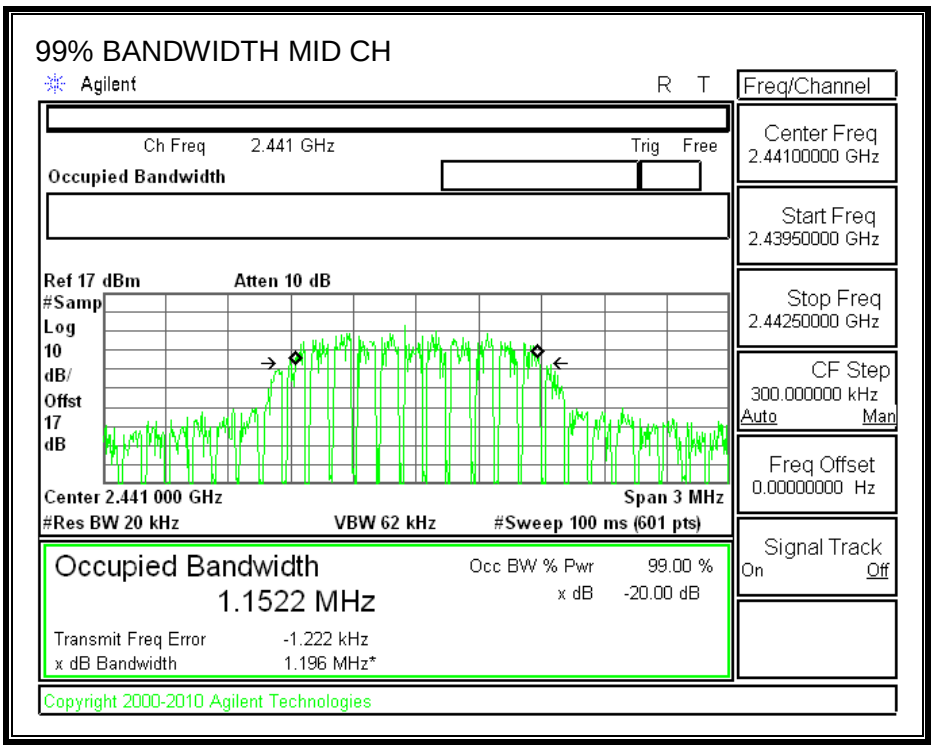


BANDWIDTH HIGH CH

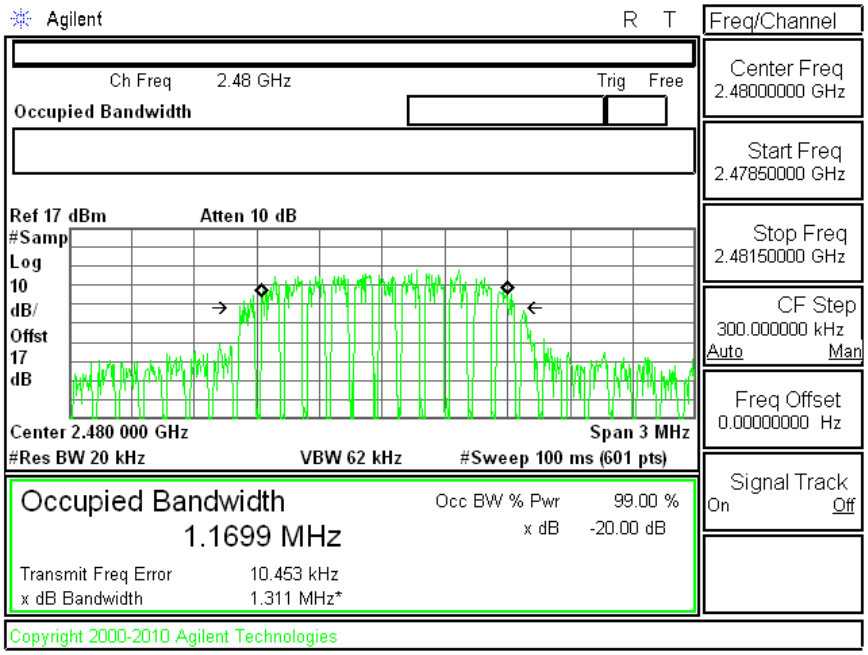


8PSK 99% BANDWIDTH





99% BANDWIDTH HIGH CH



8.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

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.

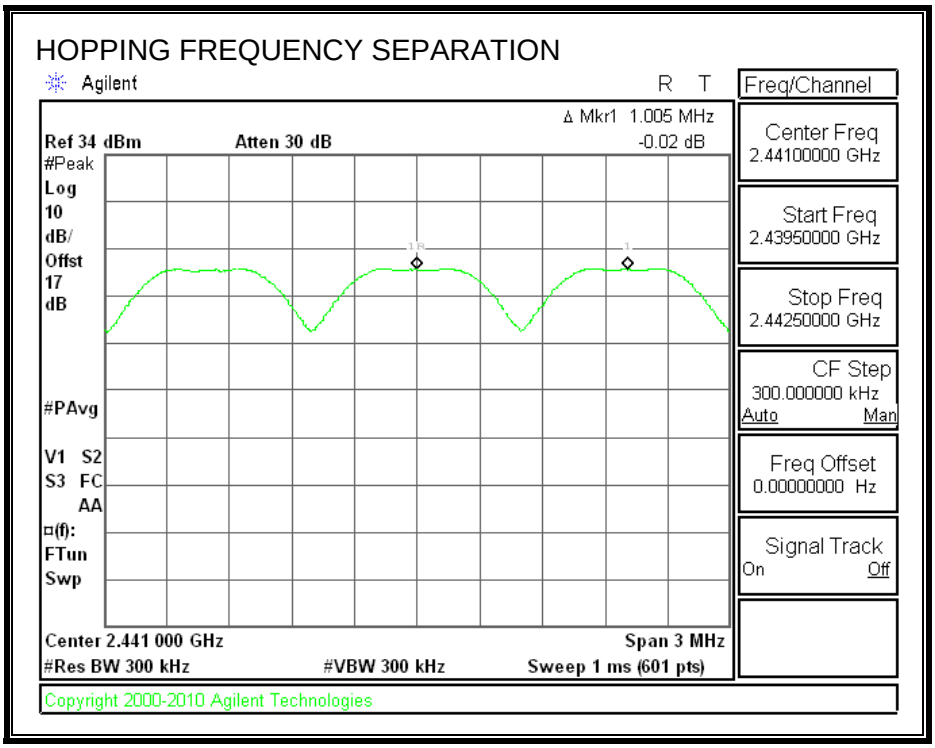
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

HOPPING FREQUENCY SEPARATION



8.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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

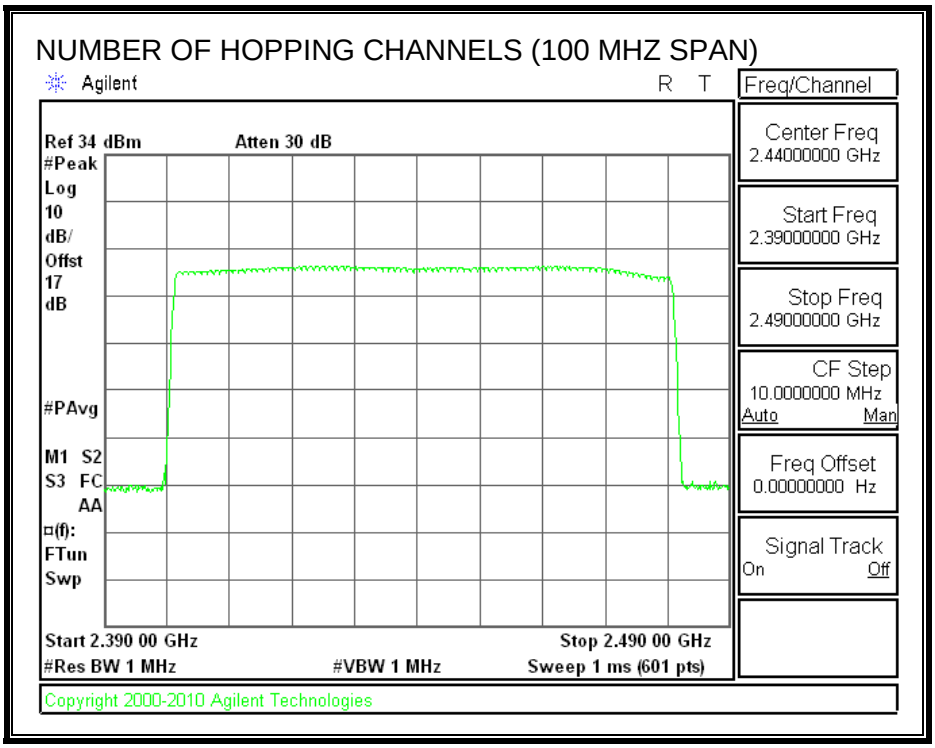
TEST PROCEDURE

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.

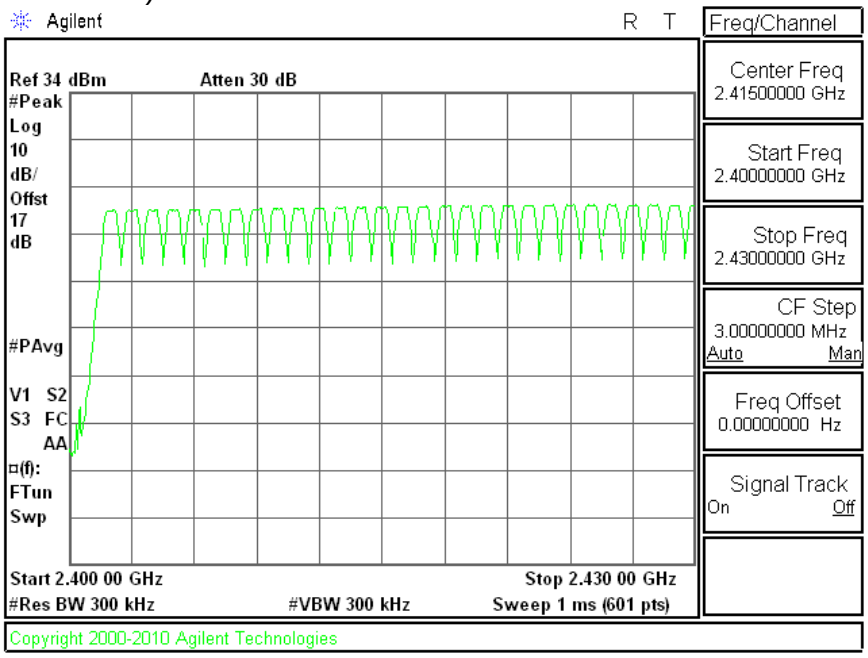
RESULTS

Normal Mode: 79 Channels observed.

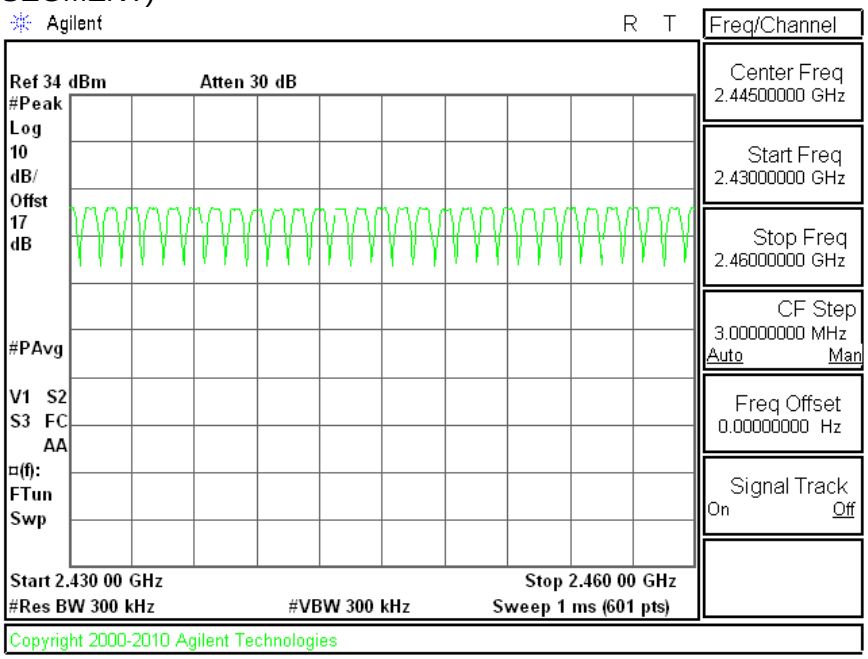
NUMBER OF HOPPING CHANNELS



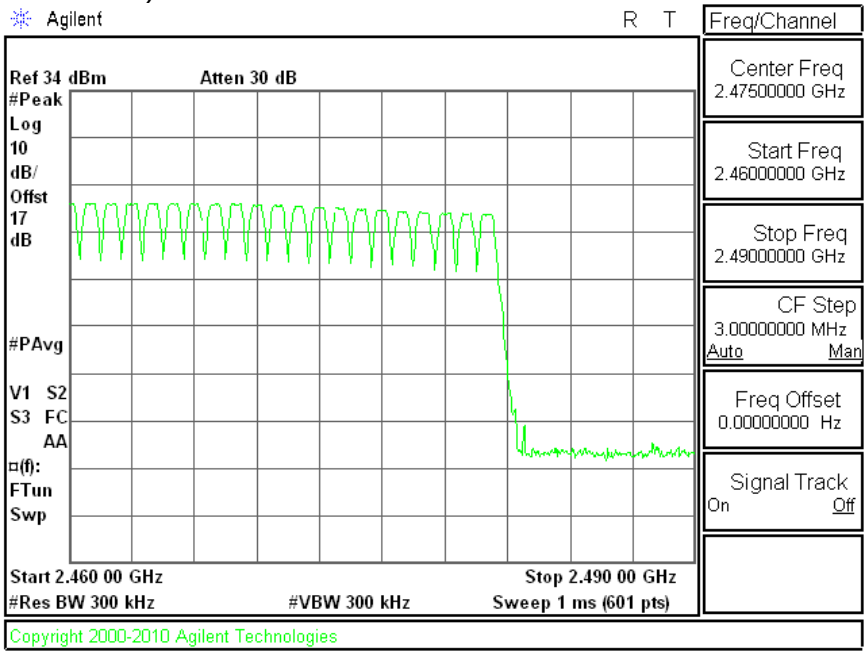
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



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



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



8.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

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.

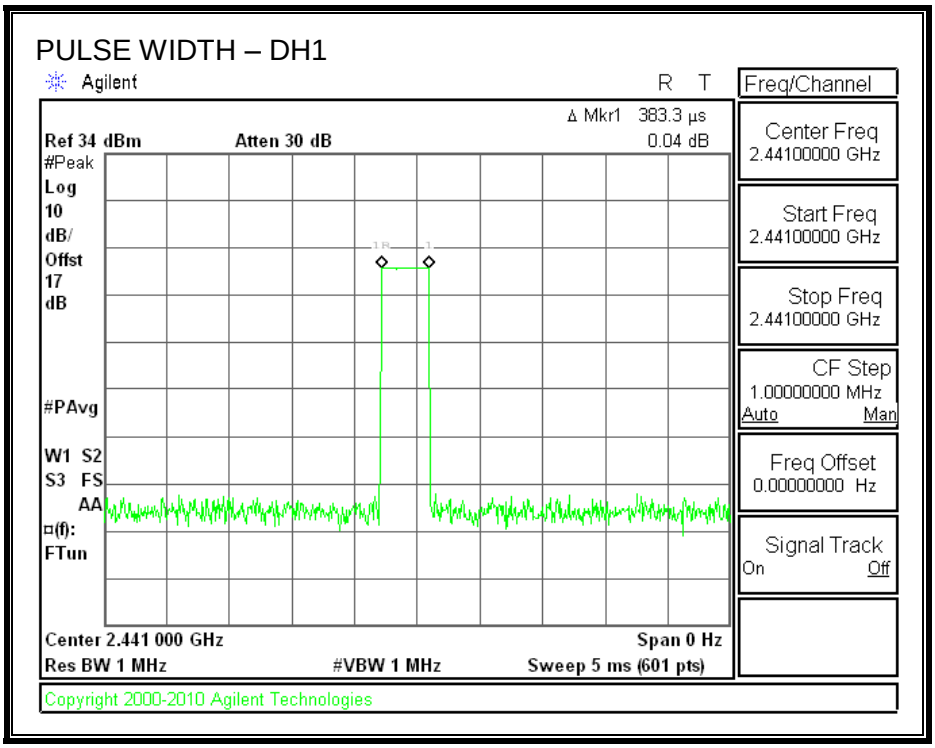
The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

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.

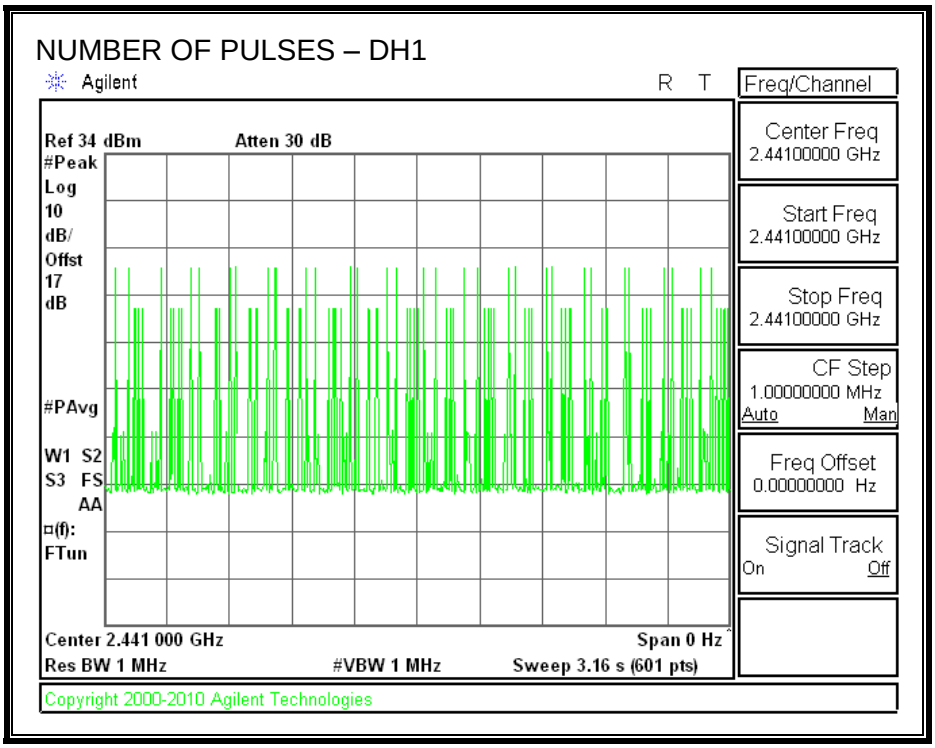
RESULTS

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	0.3833	31	0.119	0.4	-0.281
DH3	1.608	17	0.273	0.4	-0.127
DH5	2.883	10	0.288	0.4	-0.112
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	8	0.031	0.4	-0.369
DH3	1.608	5	0.080	0.4	-0.320
DH5	2.883	3	0.086	0.4	-0.314

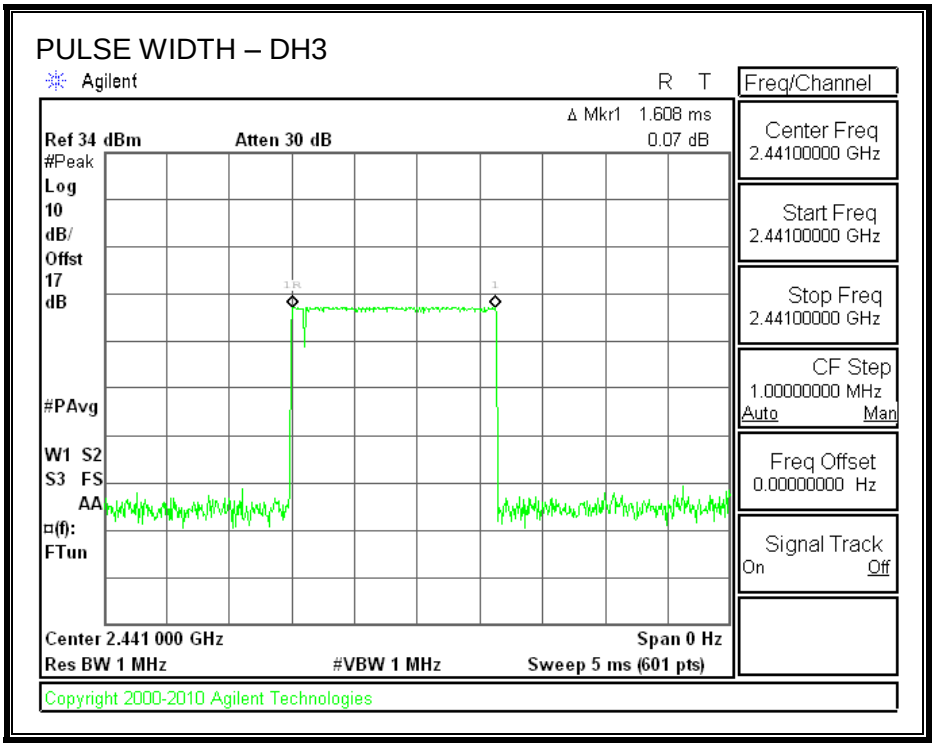
PULSE WIDTH - DH1



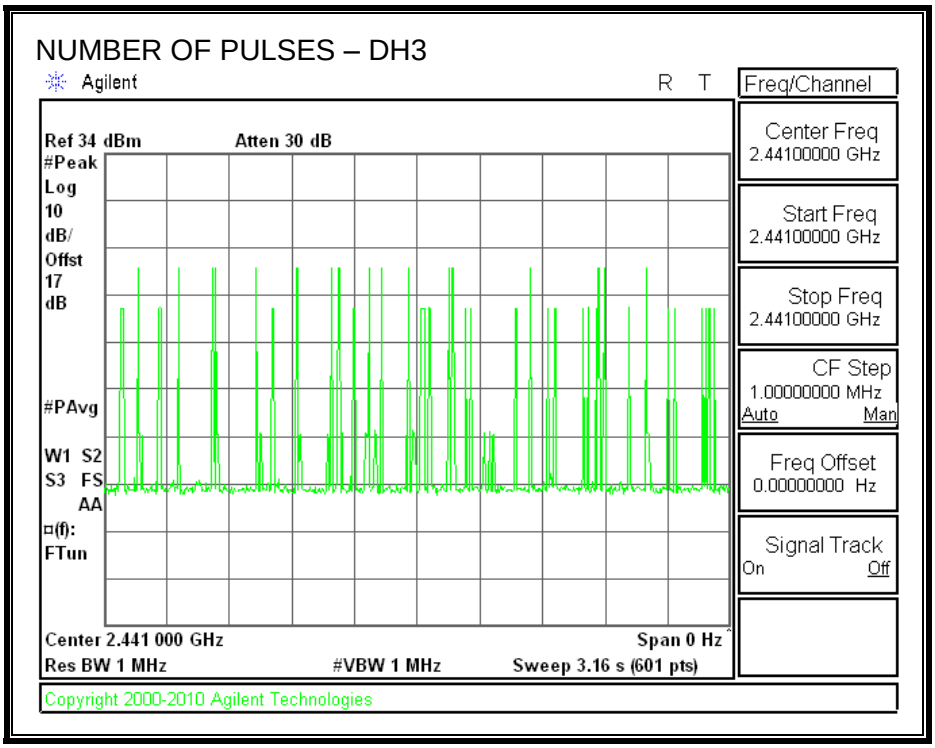
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



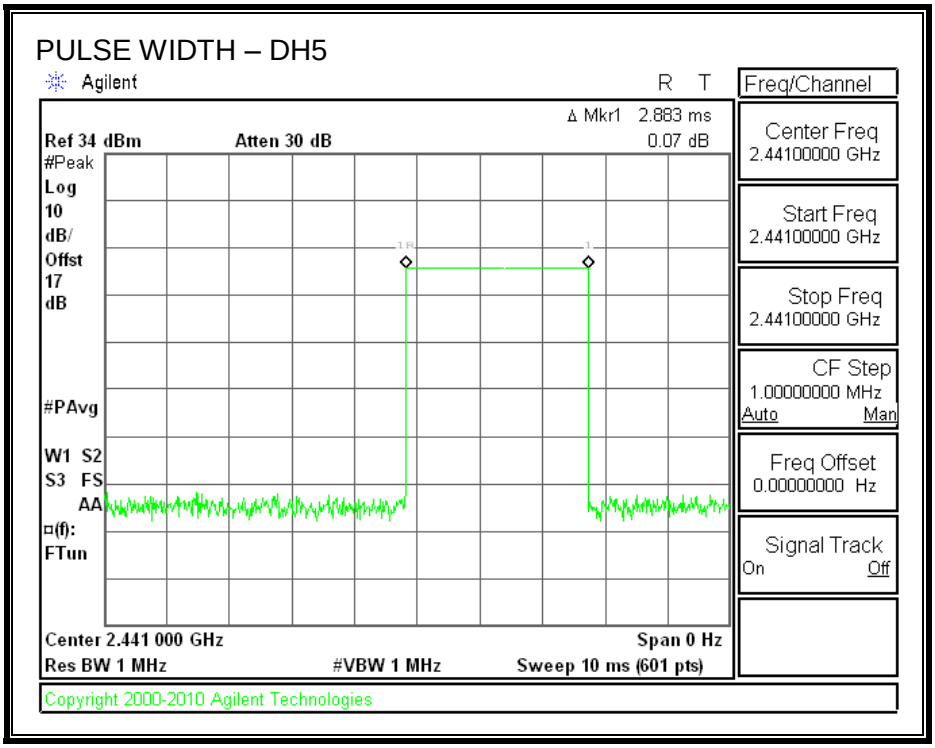
PULSE WIDTH – DH3



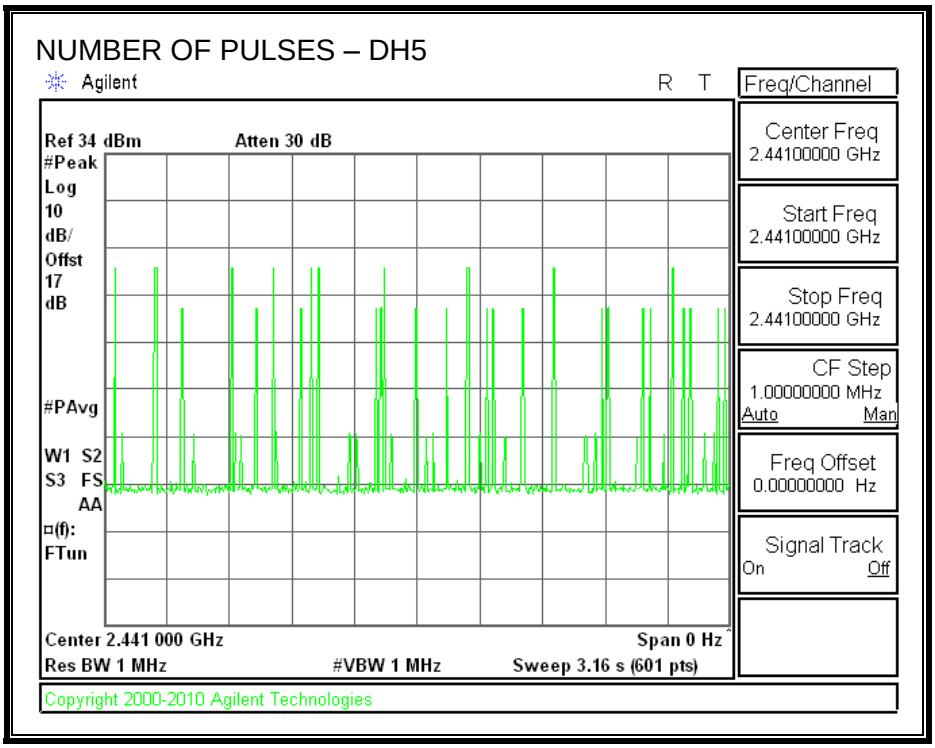
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5



8.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

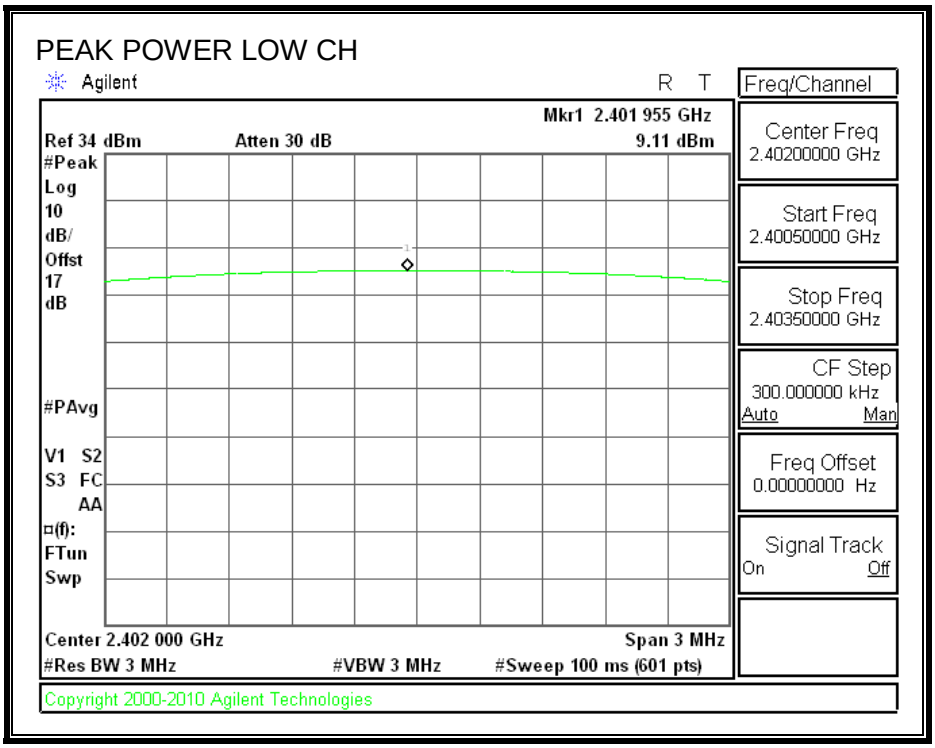
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.11	21	-11.89
Middle	2441	9.89	21	-11.11
High	2480	7.97	21	-13.03
Worst		9.89		-11.11

8.5.2. ENHANCED DATA RATE 8PSK MODULATION

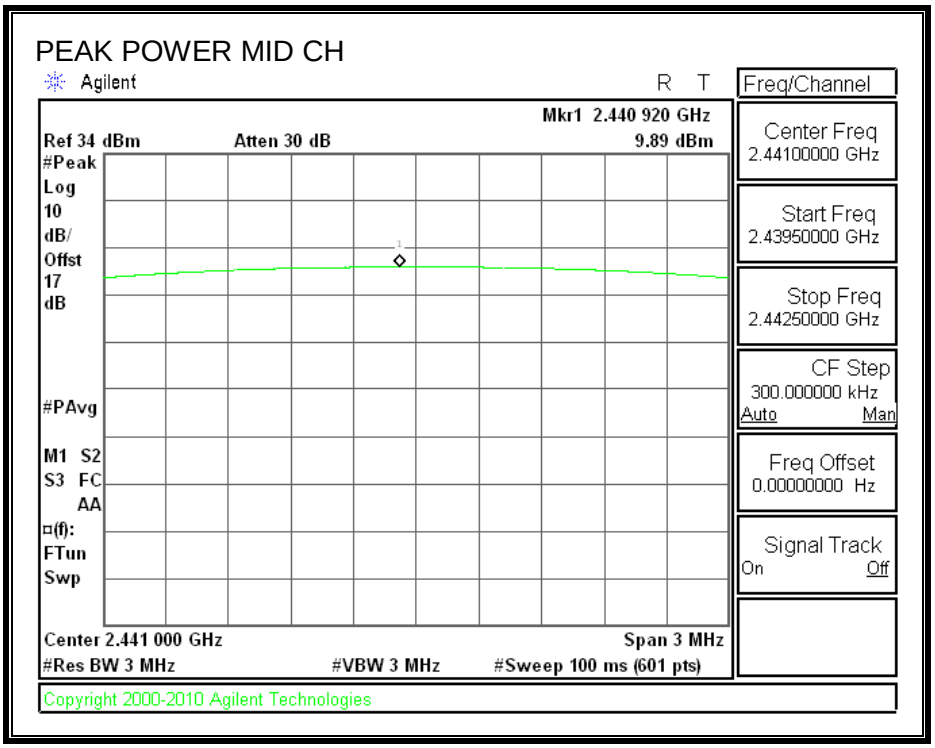
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.59	21	-11.41
Middle	2441	10.35	21	-10.65
High	2480	8.44	21	-12.56
Worst		10.35		-10.65

GFSK OUTPUT POWER

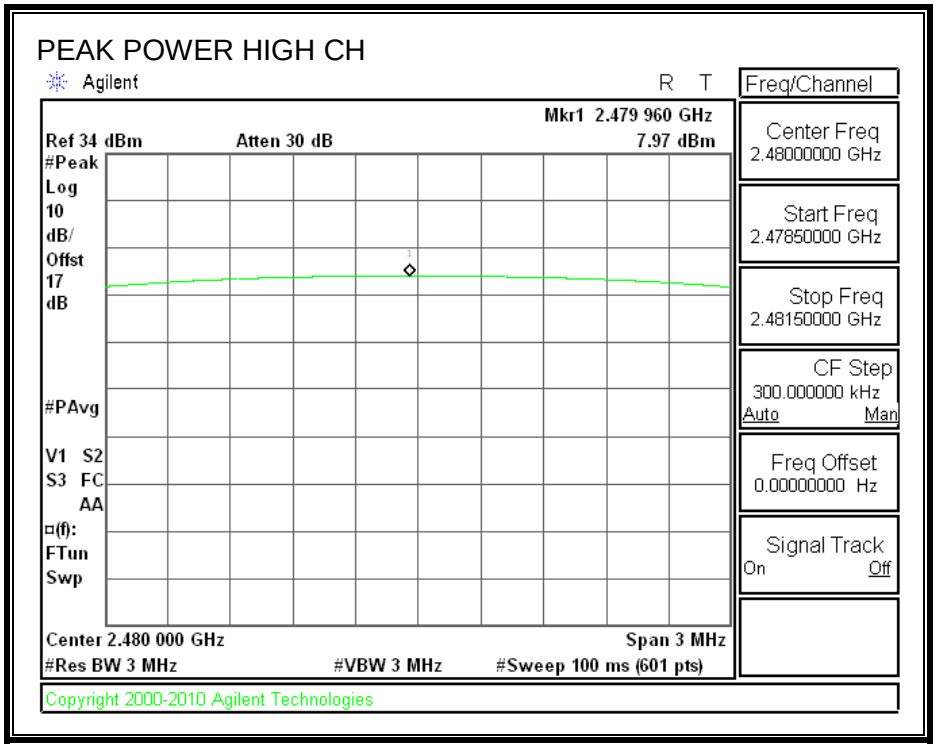
PEAK POWER LOW CH



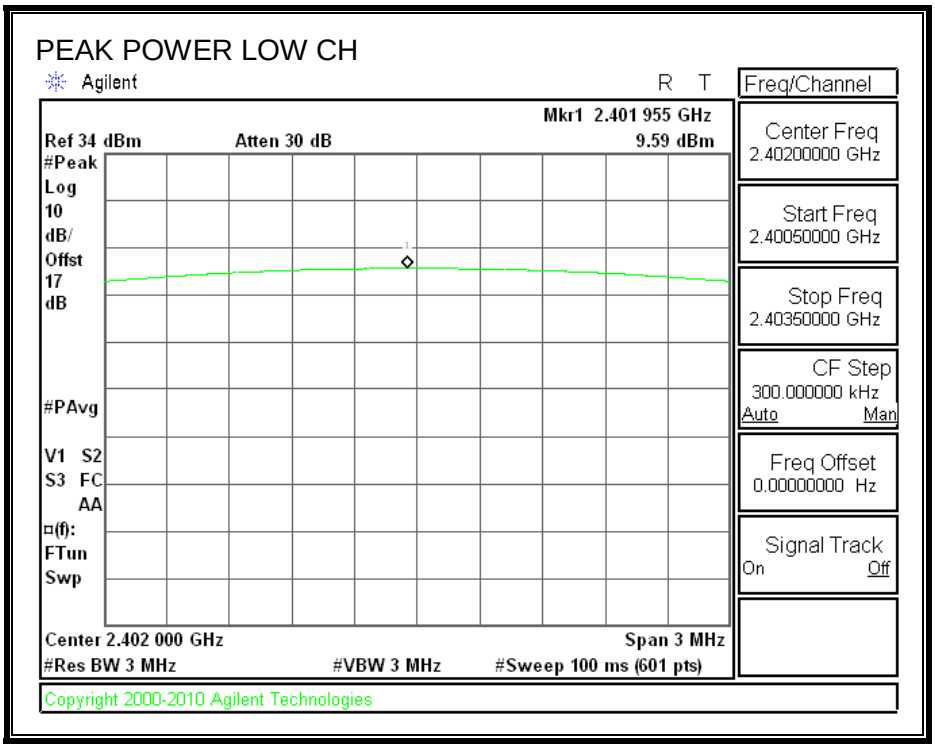
PEAK POWER MID CH

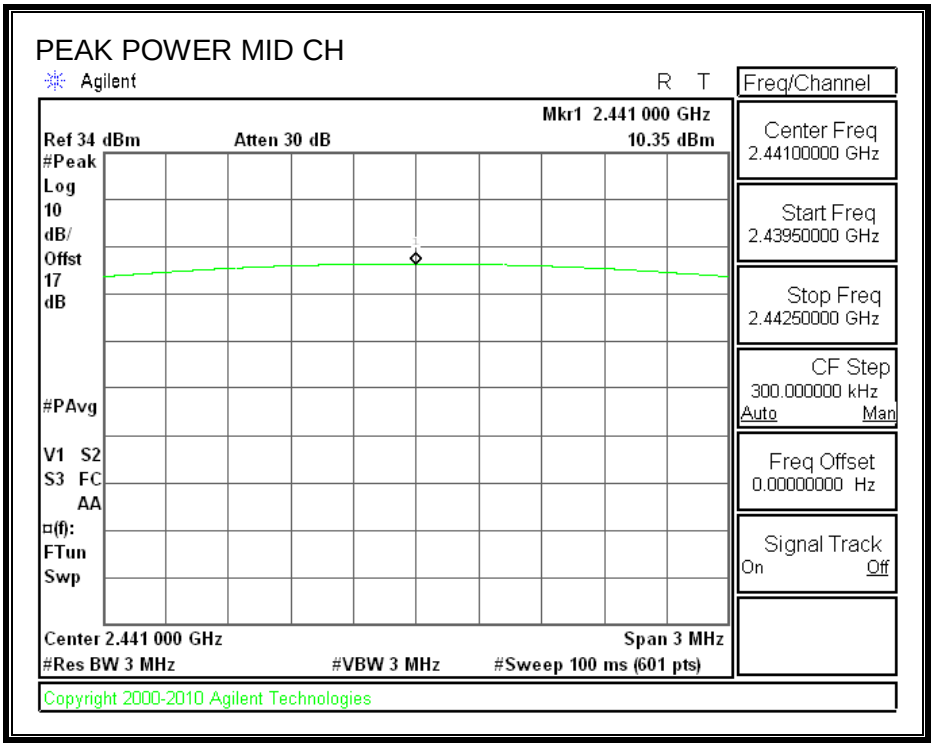


PEAK POWER HIGH CH

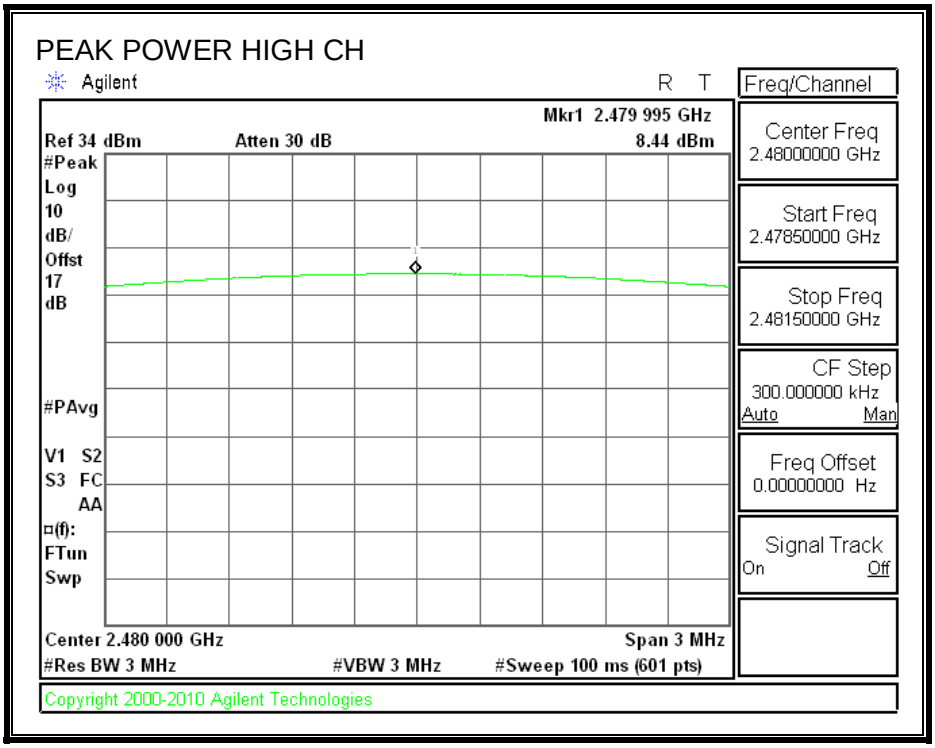


8PSK OUTPUT POWER





PEAK POWER HIGH CH



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	8.70
Middle	2441	9.50
High	2480	7.30
Worst		9.50

8.6.2. DATA RATE PI/4-DQPSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.40
Middle	2441	7.20
High	2480	5.10
Worst		7.20

8.6.3. ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	6.40
Middle	2441	7.20
High	2480	5.10
Worst		7.20

8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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.

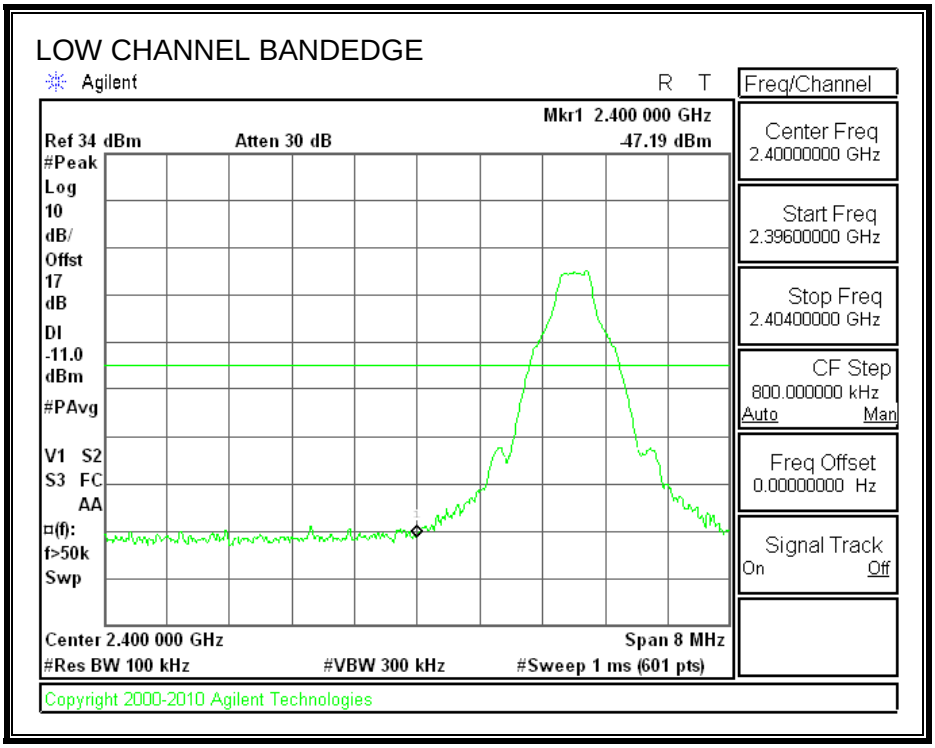
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

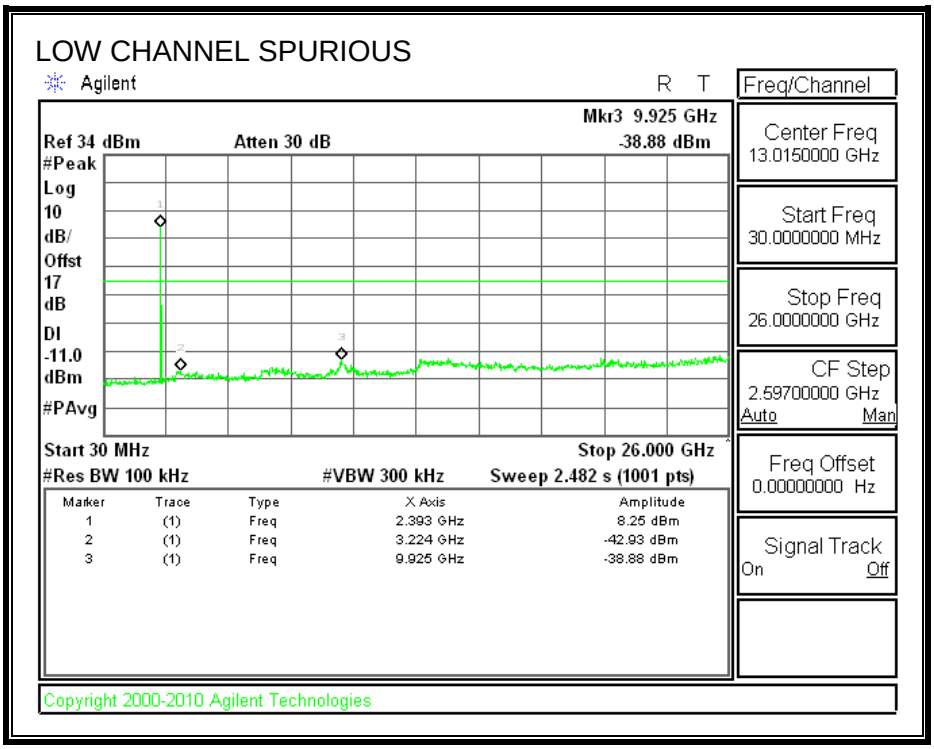
RESULTS

8.7.1. BASIC DATA RATE GFSK MODULATION

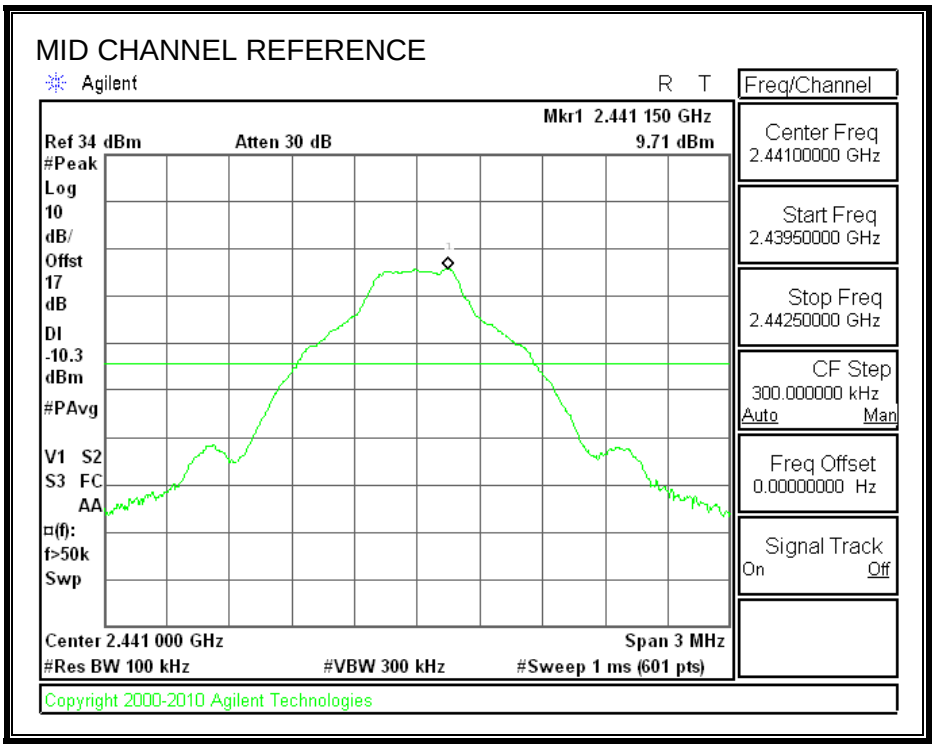
SPURIOUS EMISSIONS, LOW CHANNEL



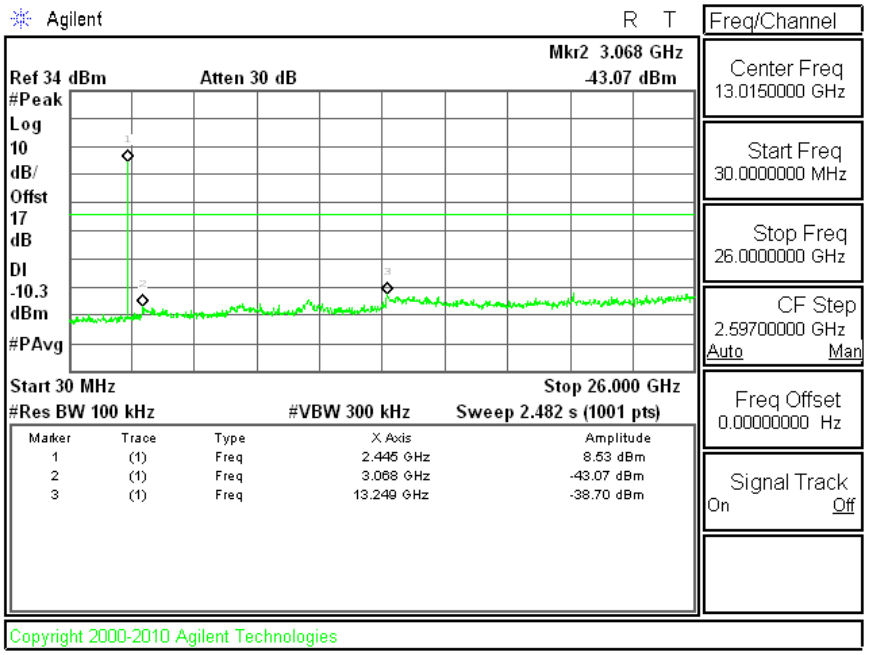
LOW CHANNEL SPURIOUS



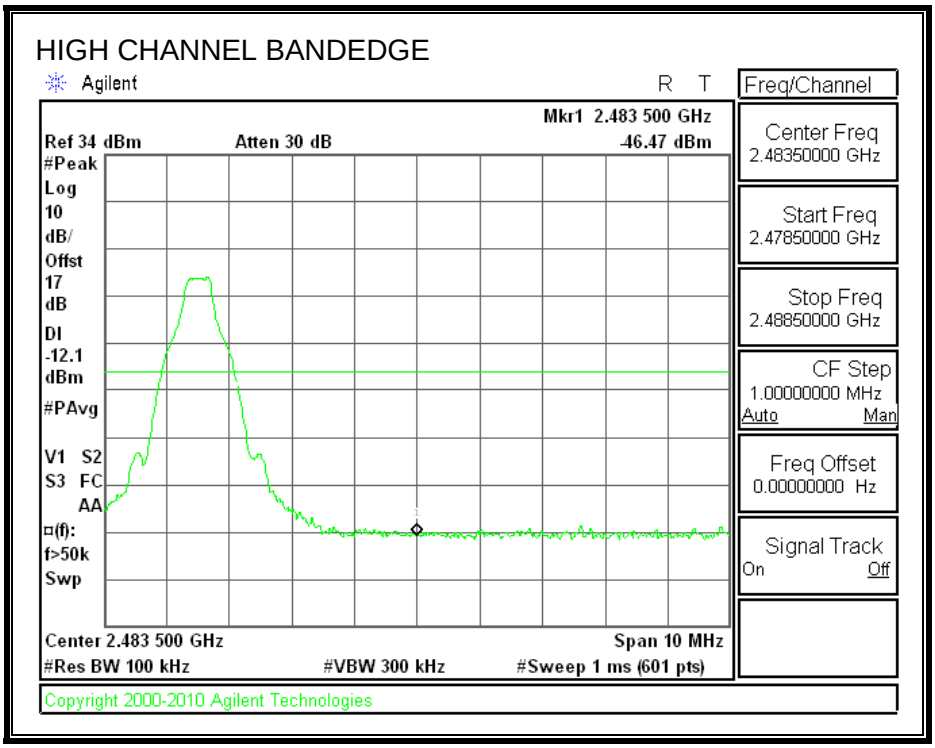
SPURIOUS EMISSIONS, MID CHANNEL



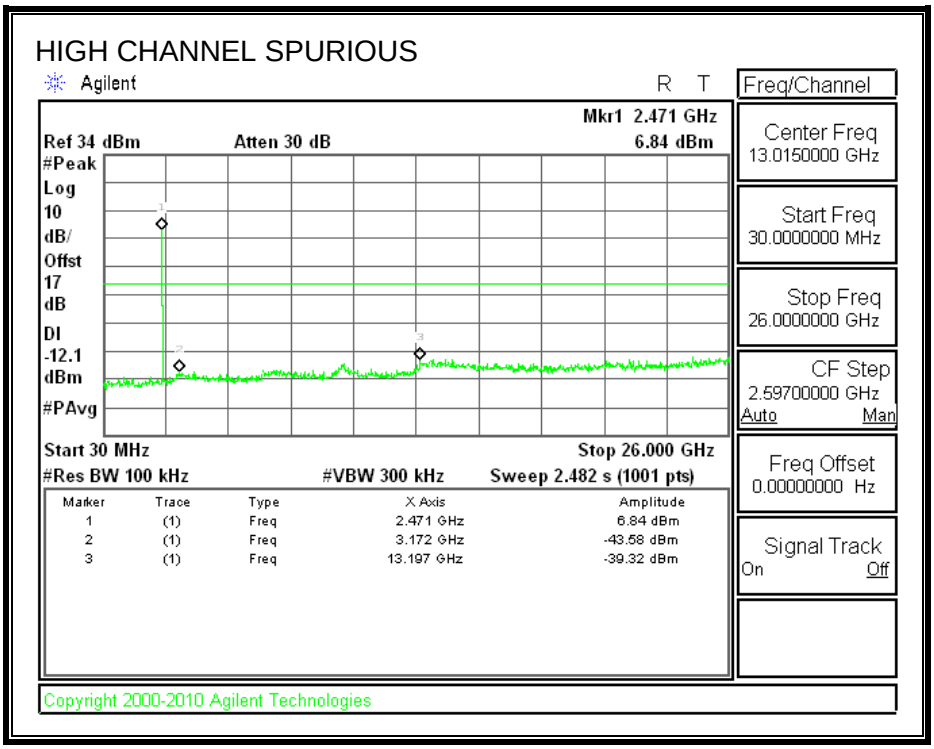
MID CHANNEL SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL

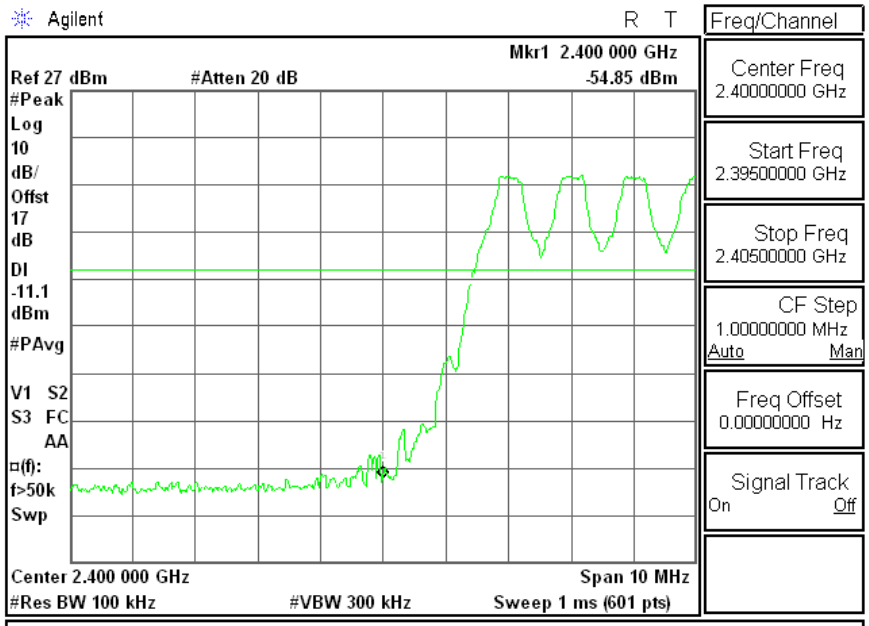


HIGH CHANNEL SPURIOUS

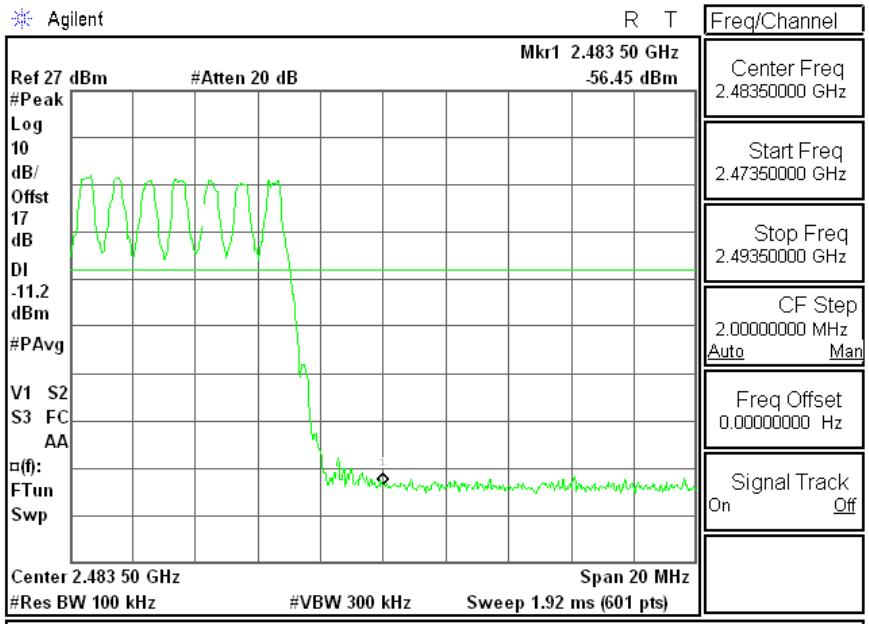


SPURIOUS BANDEDGE EMISSIONS WITH GFSK HOPPING ON

LOW BANDEDGE WITH HOPPING ON

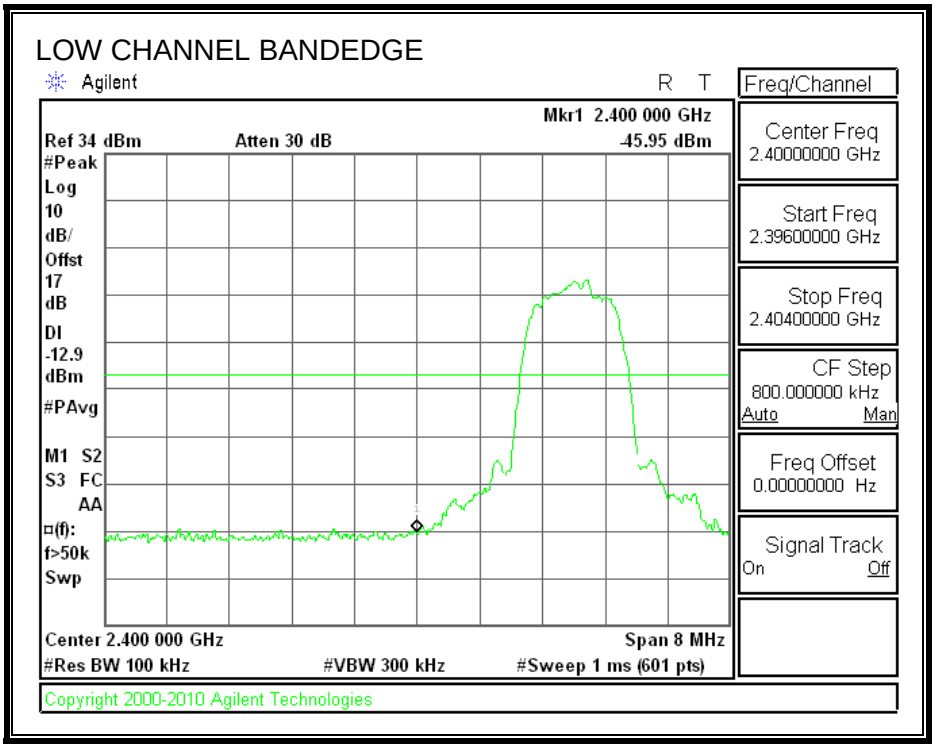


HIGH BANDEDGE WITH HOPPING ON

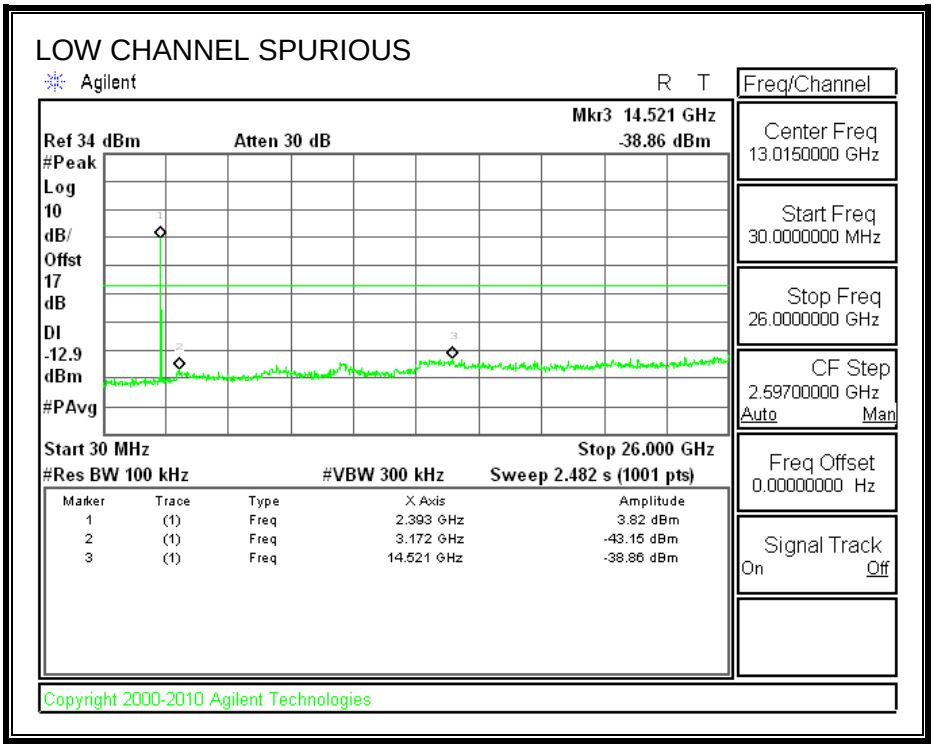


8.7.1. ENHANCED DATA RATE 8PSK MODULATION

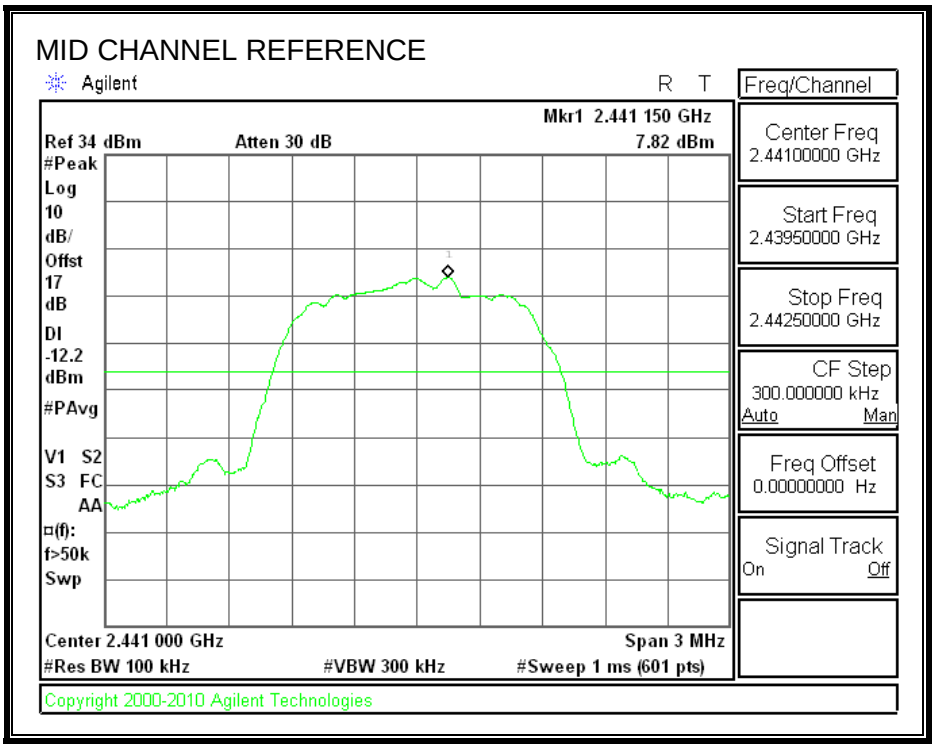
SPURIOUS EMISSIONS, LOW CHANNEL



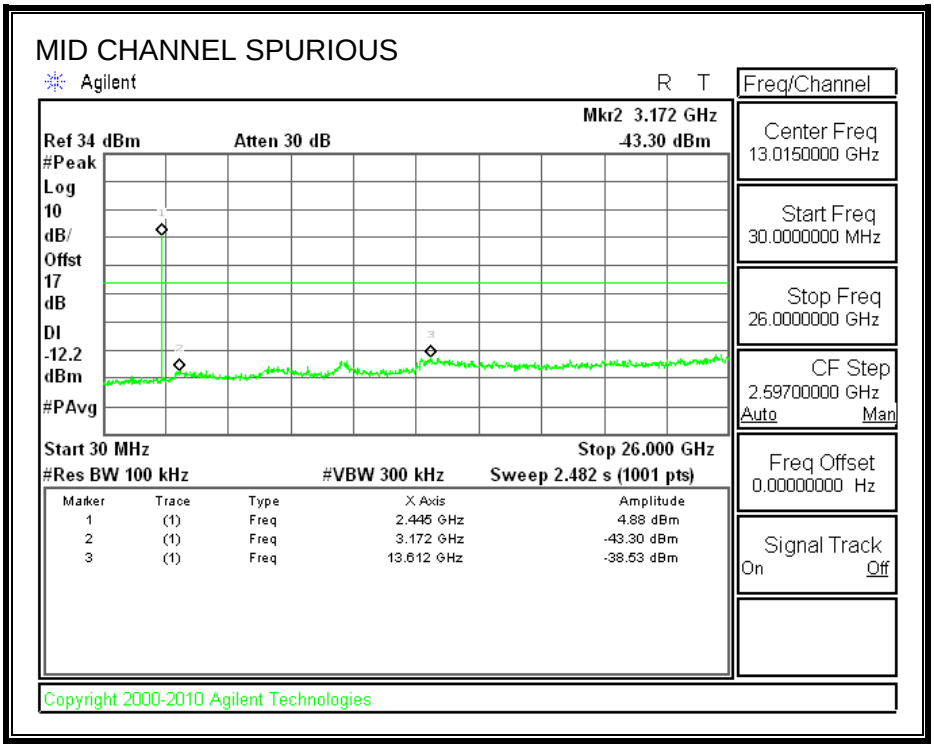
LOW CHANNEL SPURIOUS



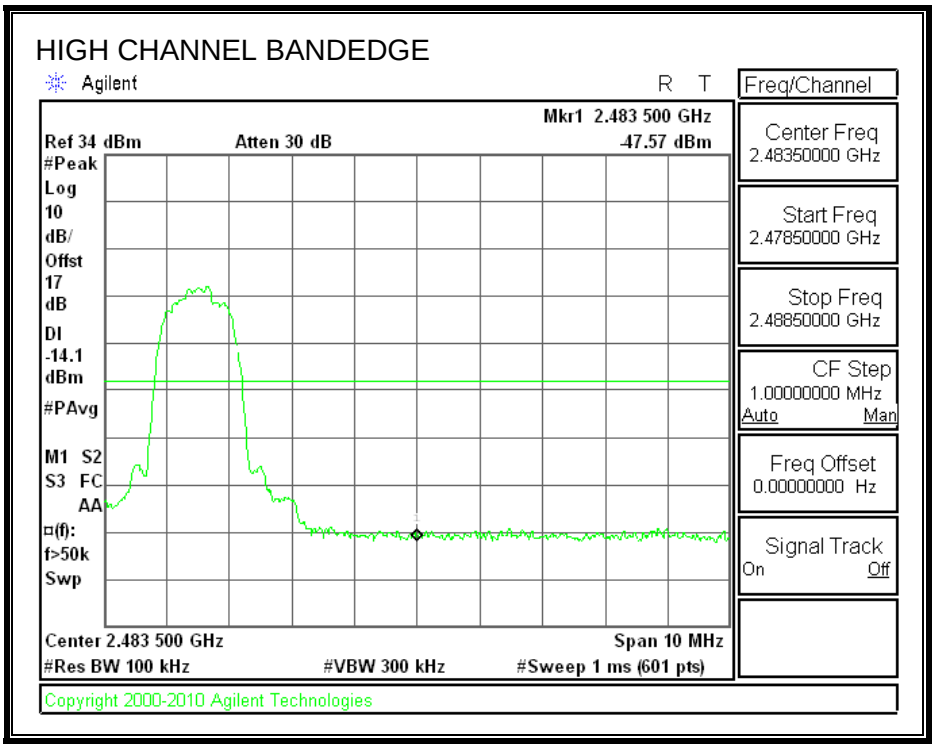
SPURIOUS EMISSIONS, MID CHANNEL



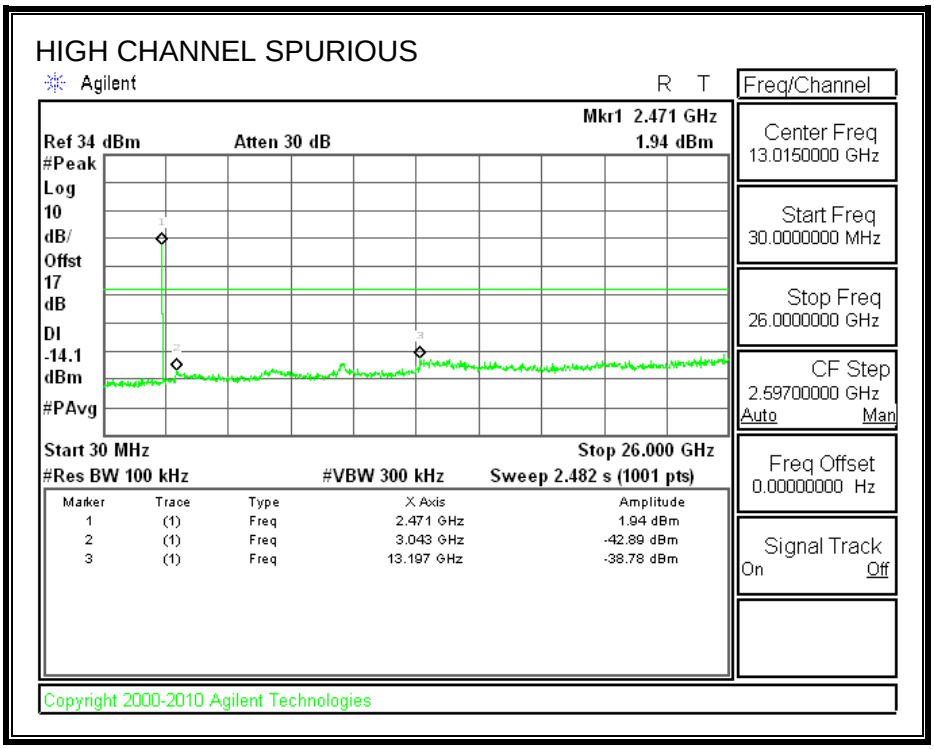
MID CHANNEL SPURIOUS



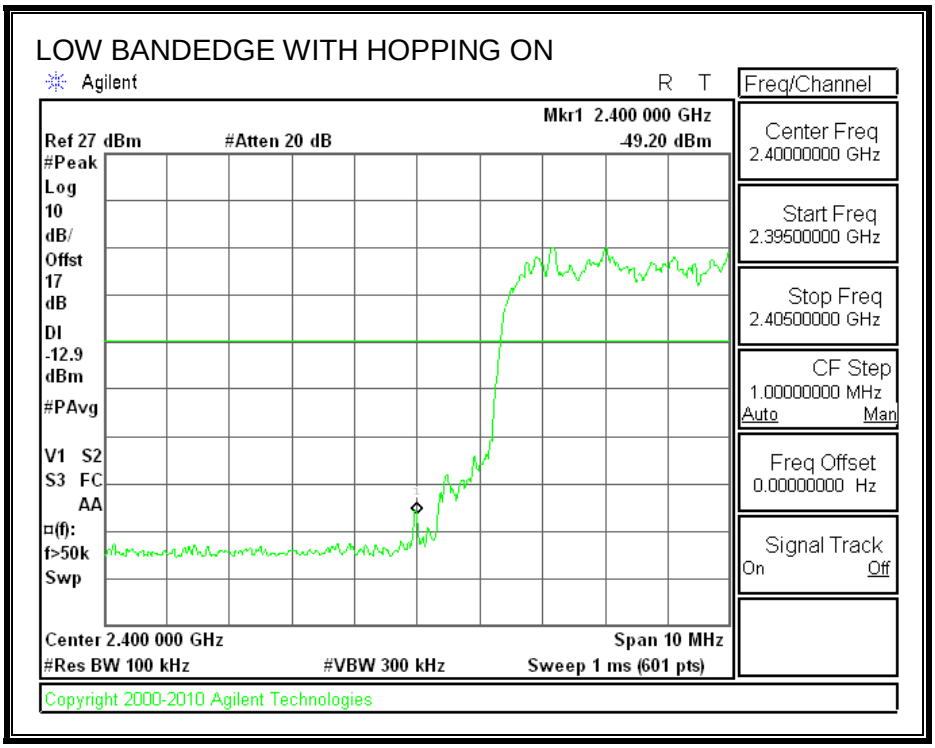
SPURIOUS EMISSIONS, HIGH CHANNEL

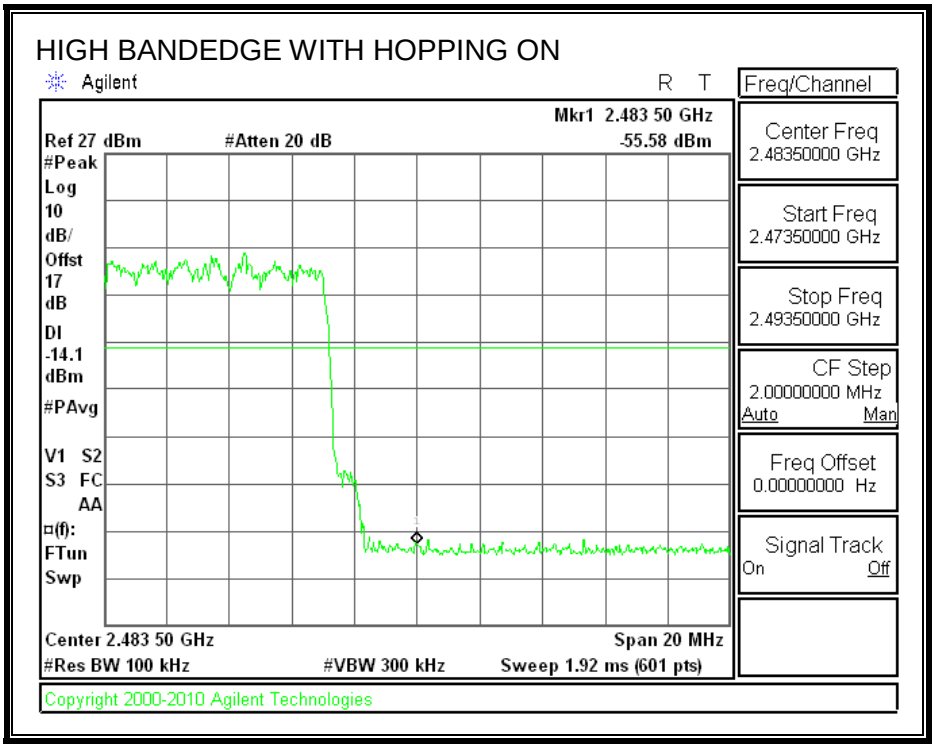


HIGH CHANNEL SPURIOUS



SPURIOUS BANDEDGE EMISSIONS WITH 8PSK HOPPING ON





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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 / 0.00288S = 360Hz.

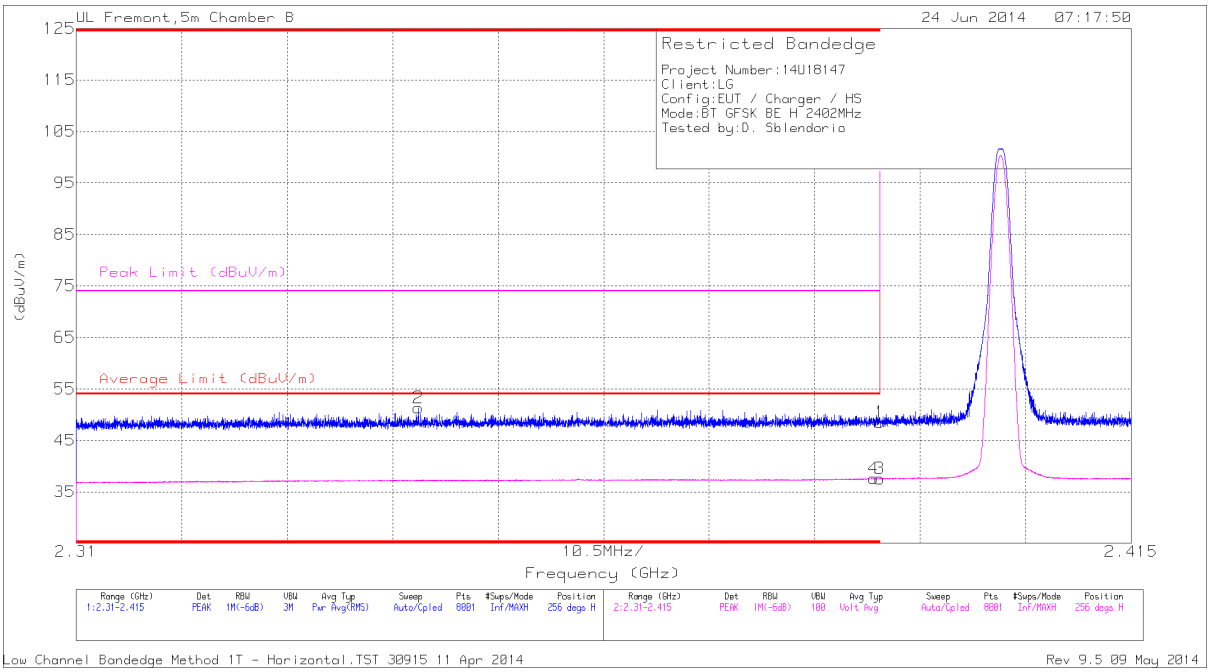
The spectrum from 1GHzHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



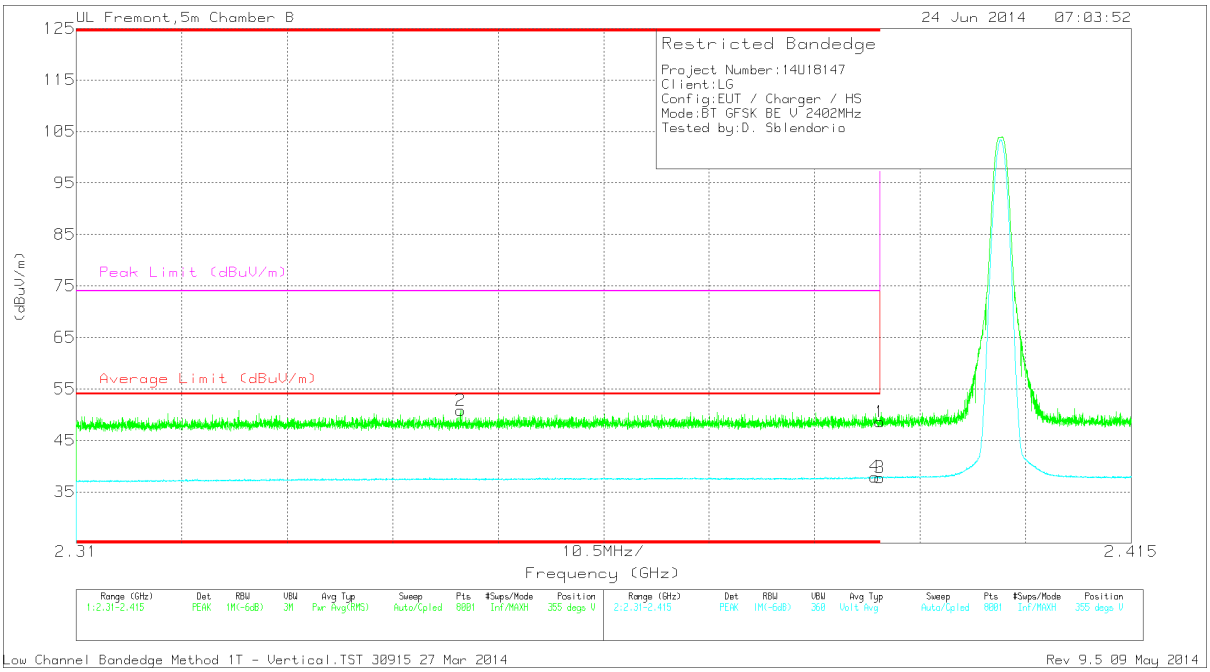
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.21	PK	32.1	-22.8	48.51	-	-	74	-25.49	256	186	H
2	* 2.344	42.33	PK	31.9	-22.9	51.33	-	-	74	-22.67	256	186	H
3	* 2.39	28.27	VB1T	32.1	-22.8	37.57	54	-16.43	-	-	256	186	H
4	* 2.389	28.3	VB1T	32.1	-22.8	37.6	54	-16.4	-	-	256	186	H

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



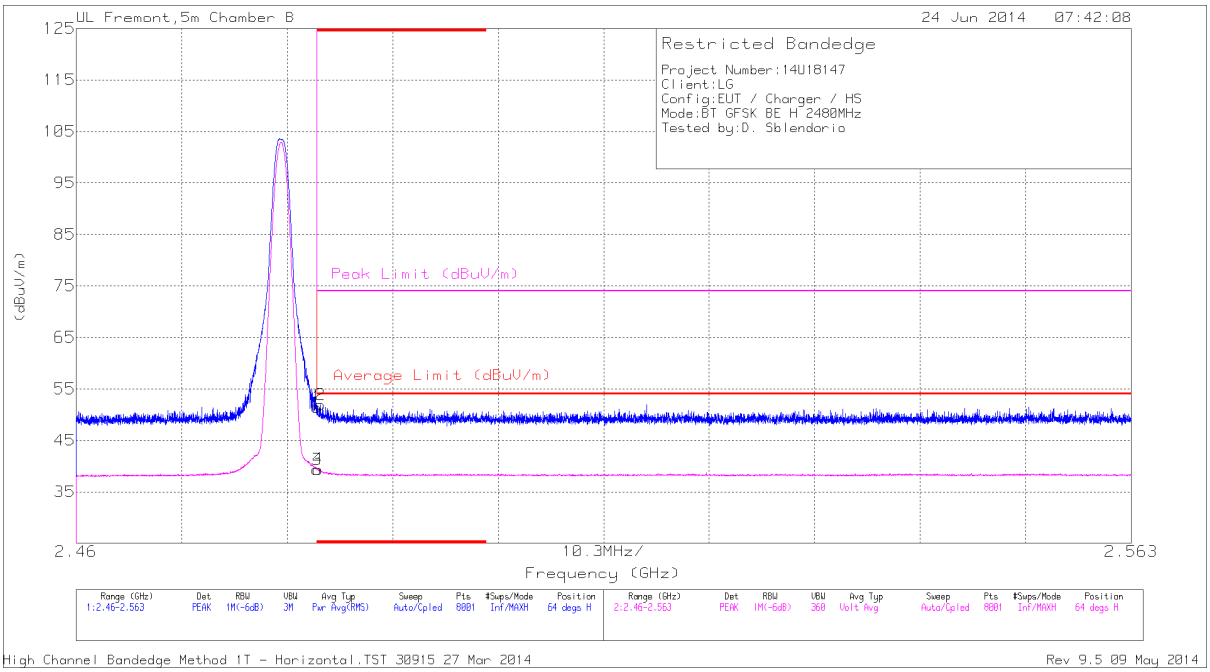
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.32	PK	32.1	-22.8	48.62	-	-	74	-25.38	355	102	V
2	* 2.348	41.8	PK	31.9	-22.9	50.8	-	-	74	-23.2	355	102	V
3	* 2.39	28.46	VB1T	32.1	-22.8	37.76	54	-16.24	-	-	355	102	V
4	* 2.389	28.63	VB1T	32.1	-22.8	37.93	54	-16.07	-	-	355	102	V

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



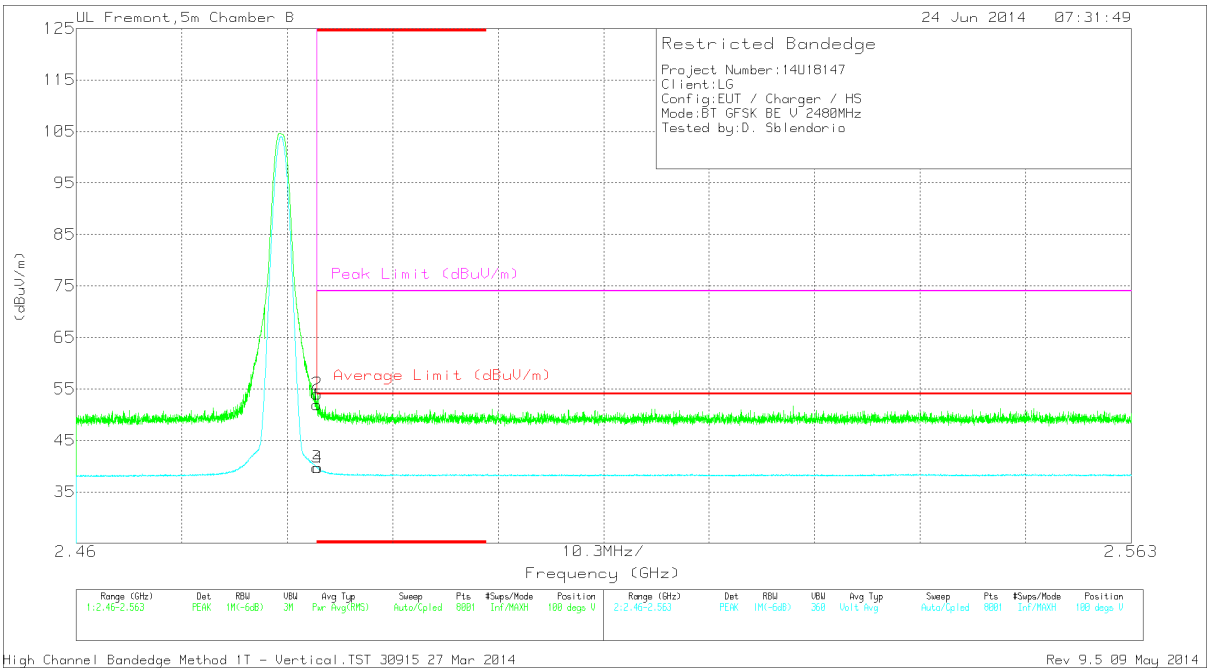
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.75	PK	32.4	-22.7	51.45	-	-	74	-22.55	64	231	H
2	* 2.484	42.22	PK	32.4	-22.7	51.92	-	-	74	-22.08	64	231	H
3	* 2.484	29.64	VB1T	32.4	-22.7	39.34	54	-14.66	-	-	64	231	H
4	* 2.484	29.69	VB1T	32.4	-22.7	39.39	54	-14.61	-	-	64	231	H

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	42.22	PK	32.4	-22.7	51.92	-	-	74	-22.08	100	289	V
2	* 2.484	44.32	PK	32.4	-22.7	54.02	-	-	74	-19.98	100	289	V
3	* 2.484	30.06	VB1T	32.4	-22.7	39.76	54	-14.24	-	-	100	289	V
4	* 2.484	29.99	VB1T	32.4	-22.7	39.69	54	-14.31	-	-	100	289	V

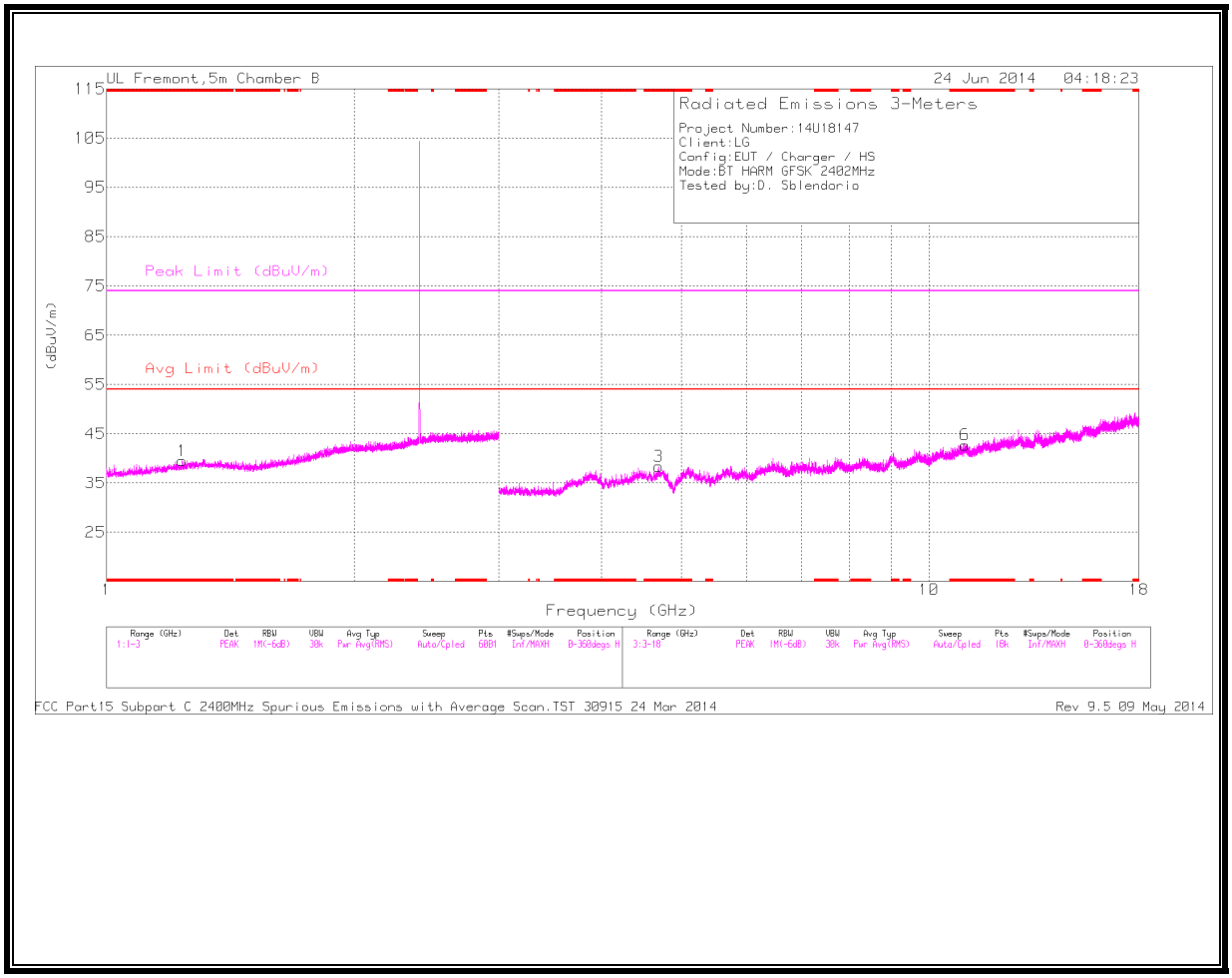
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

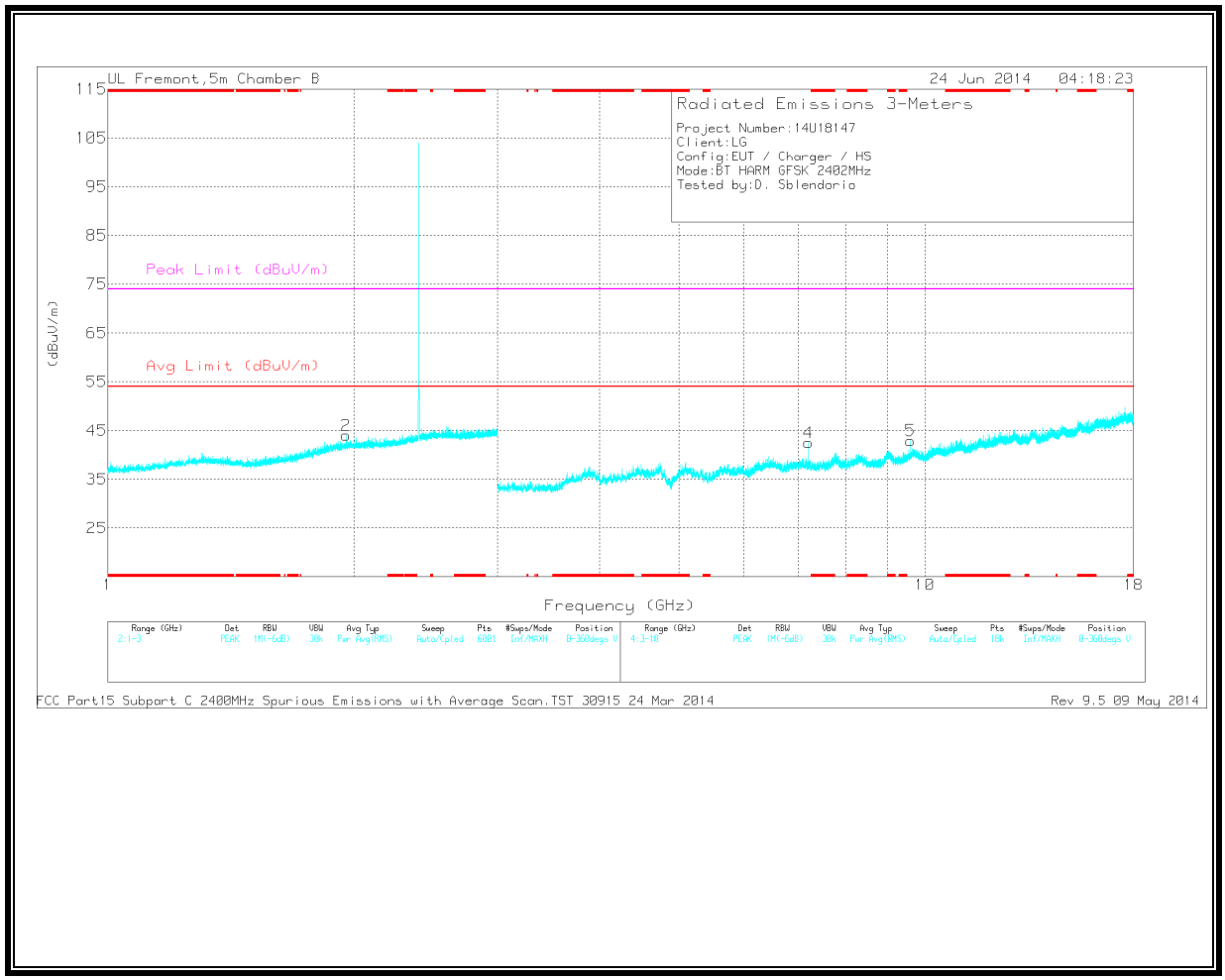
HARMONICS AND SPURIOUS EMISSIONS

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.

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.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.236	35.73	PK	28.4	-24.6	39.53	-	-	74	-34.47	0-360	402	H
3	* 4.691	34.05	PK	34.2	-29.9	38.35	-	-	74	-35.65	0-360	99	H
6	* 11.06	26.72	PK	37.8	-21.8	42.72	-	-	74	-31.28	0-360	99	H
2	1.956	36.3	PK	31.2	-23.5	44	-	-	-	-	0-360	203	V
4	7.206	34.04	PK	35.5	-27	42.54	-	-	-	-	0-360	99	V
5	9.608	30.25	PK	36.8	-24.1	42.95	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

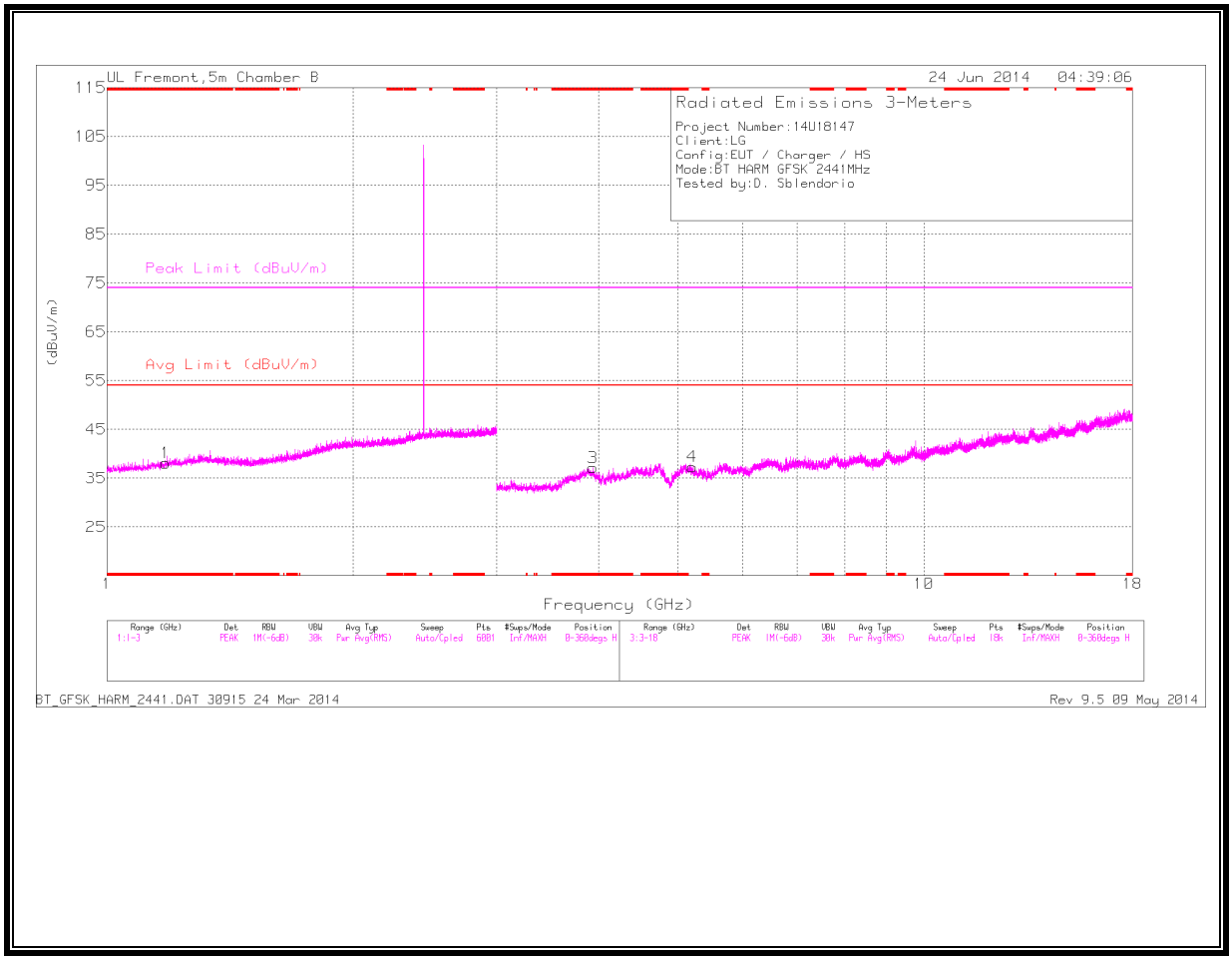
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.235	43.31	PK3	28.4	-24.6	47.11	-	-	74	-26.89	359	400	H
* 1.234	30.82	VB1T	28.4	-24.6	34.62	54	-19.38	-	-	359	400	H

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

PK3 - FHSS Method: Maximum Peak

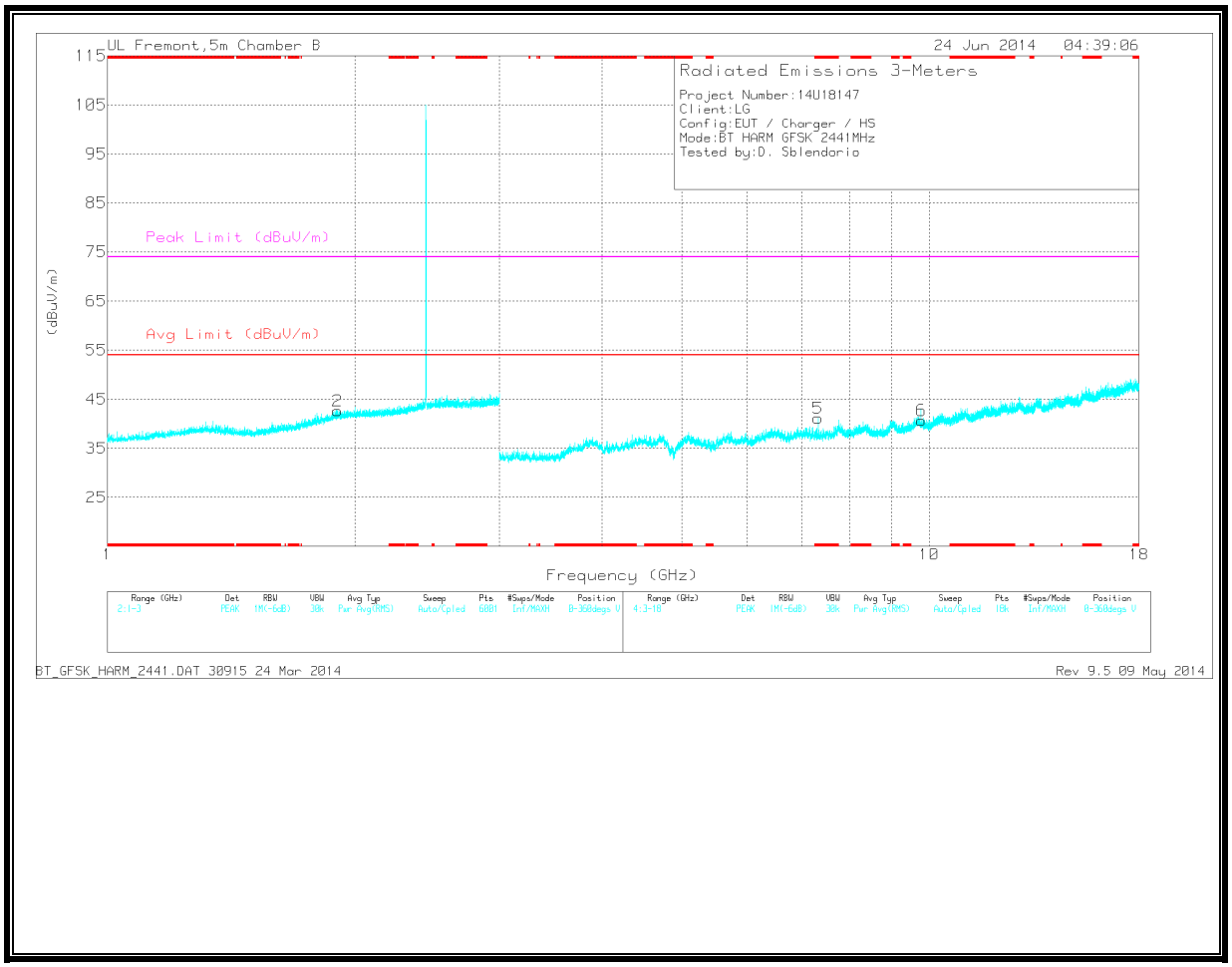
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

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.

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.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.181	34.8	PK	28	-24.7	38.1	-	-	74	-35.9	0-360	402	H
3	* 3.933	33.97	PK	33.7	-30.5	37.17	-	-	74	-36.83	0-360	99	H
5	* 7.322	33.62	PK	35.6	-28.1	41.12	-	-	74	-32.88	0-360	99	V
2	1.906	35.14	PK	31.1	-23.6	42.64	-	-	-	-	0-360	205	V
4	5.207	33.54	PK	34.4	-30.6	37.34	-	-	-	-	0-360	200	H
6	9.779	27.5	PK	36.9	-23.7	40.7	-	-	-	-	0-360	200	V

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

PK - Peak detector

Radiated Emissions

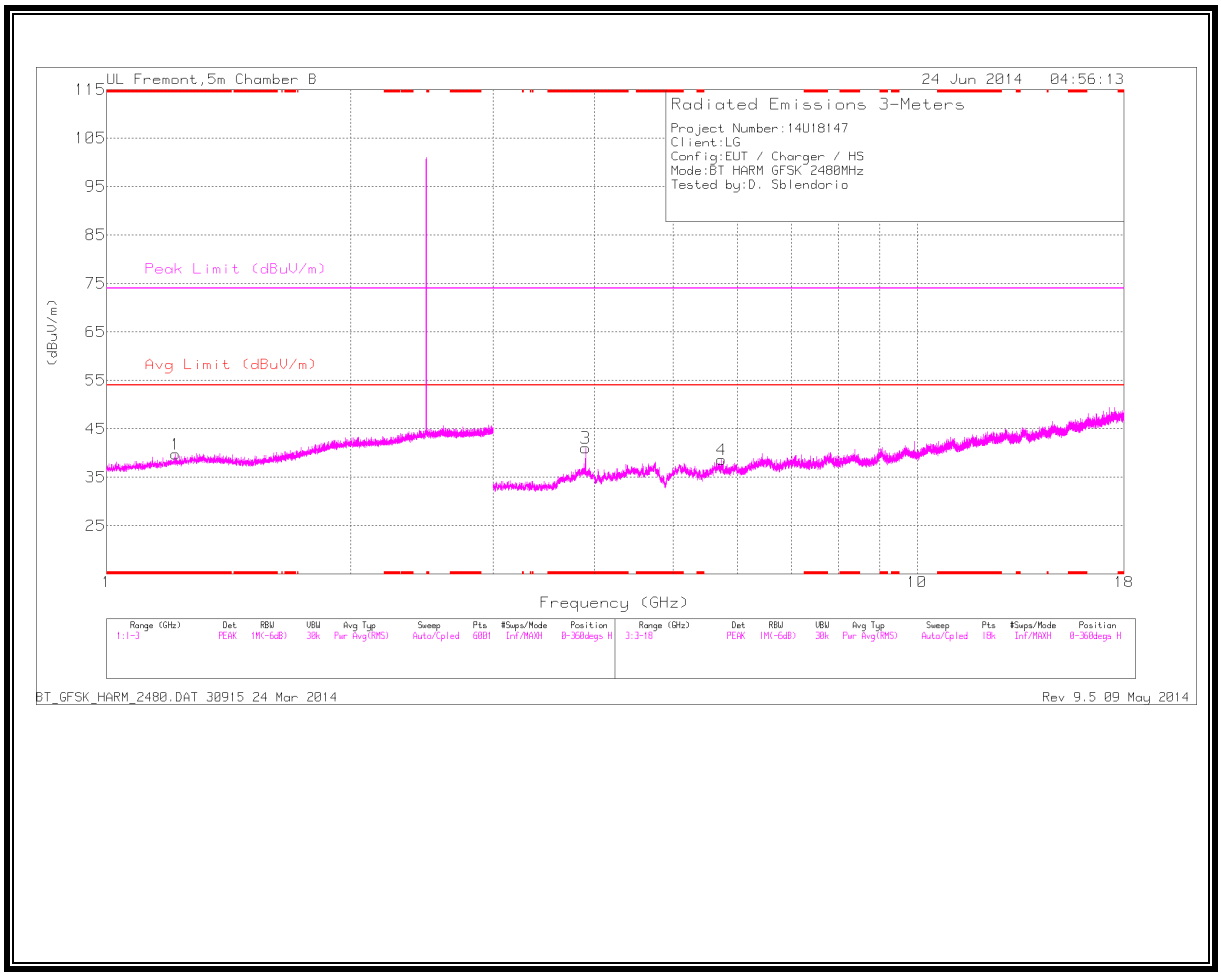
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.181	44.13	PK3	28	-24.7	47.43	-	-	74	-26.57	359	398	H
* 1.181	30.76	VB1T	28	-24.7	34.06	54	-19.94	-	-	359	398	H

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

PK3 - FHSS Method: Maximum Peak

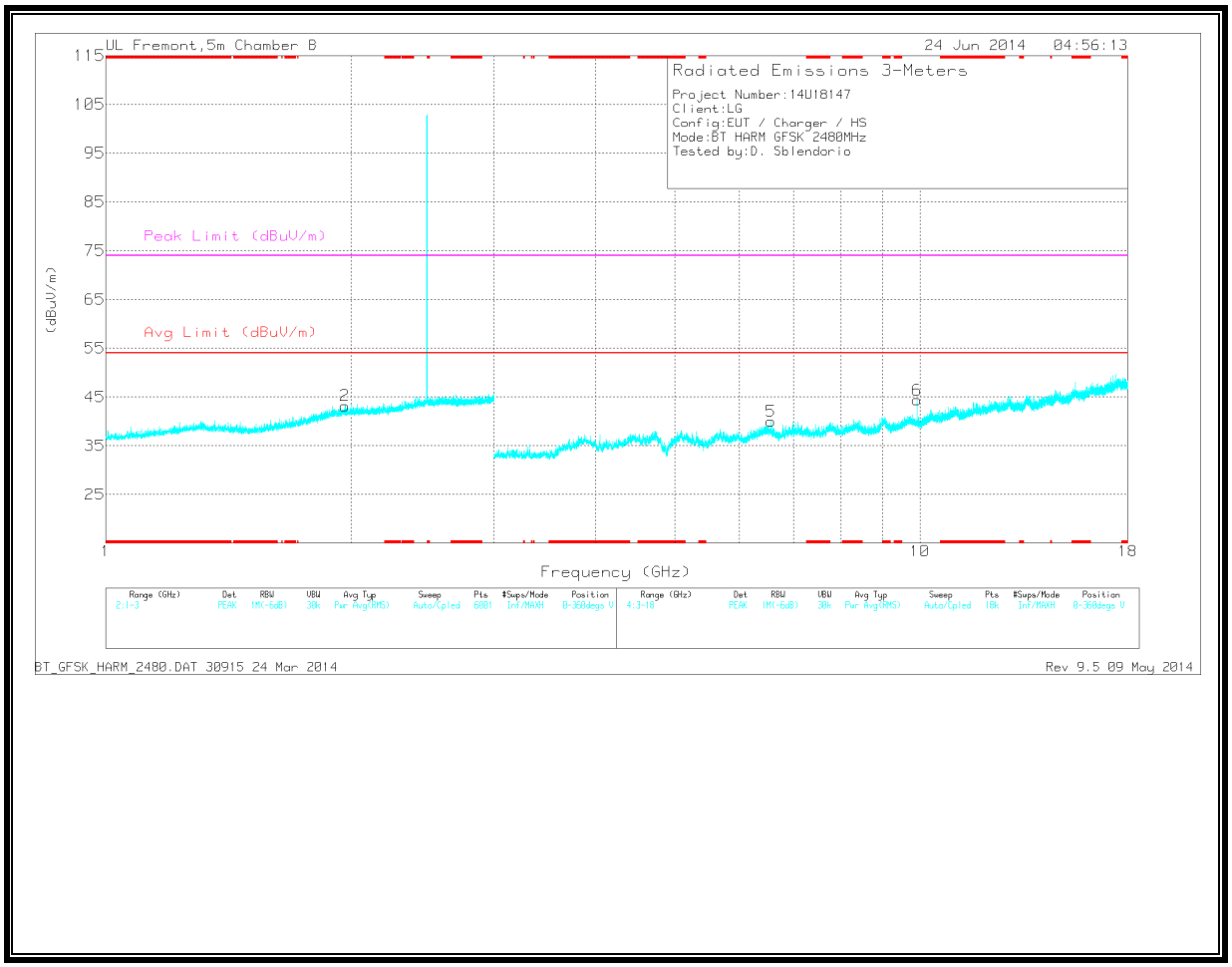
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

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.

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.

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.217	36.05	PK	28.3	-24.6	39.75	-	-	74	-34.25	0-360	101	H
3	* 3.9	37.55	PK	33.8	-30.3	41.05	-	-	74	-32.95	0-360	200	H
2	1.967	35.31	PK	31.3	-23.4	43.21	-	-	-	-	0-360	203	V
4	5.741	33.47	PK	34.6	-29.4	38.67	-	-	-	-	0-360	99	H
5	6.56	32.14	PK	35.7	-27.8	40.04	-	-	-	-	0-360	200	V
6	9.92	30.9	PK	37	-23.5	44.4	-	-	-	-	0-360	99	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.215	43.64	PK3	28.3	-24.6	47.34	-	-	74	-26.66	359	101	H
* 1.217	30.78	VB1T	28.3	-24.6	34.48	54	-19.52	-	-	359	101	H

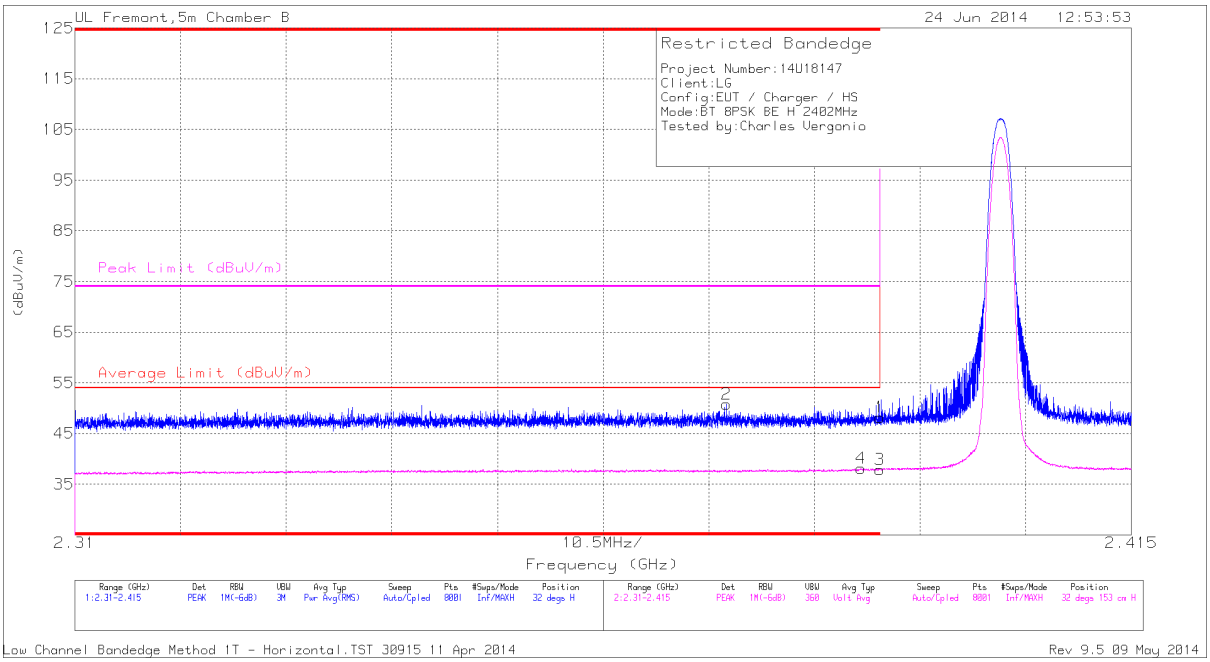
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

9.2.2. ENHANCED DATA RATE 8PSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



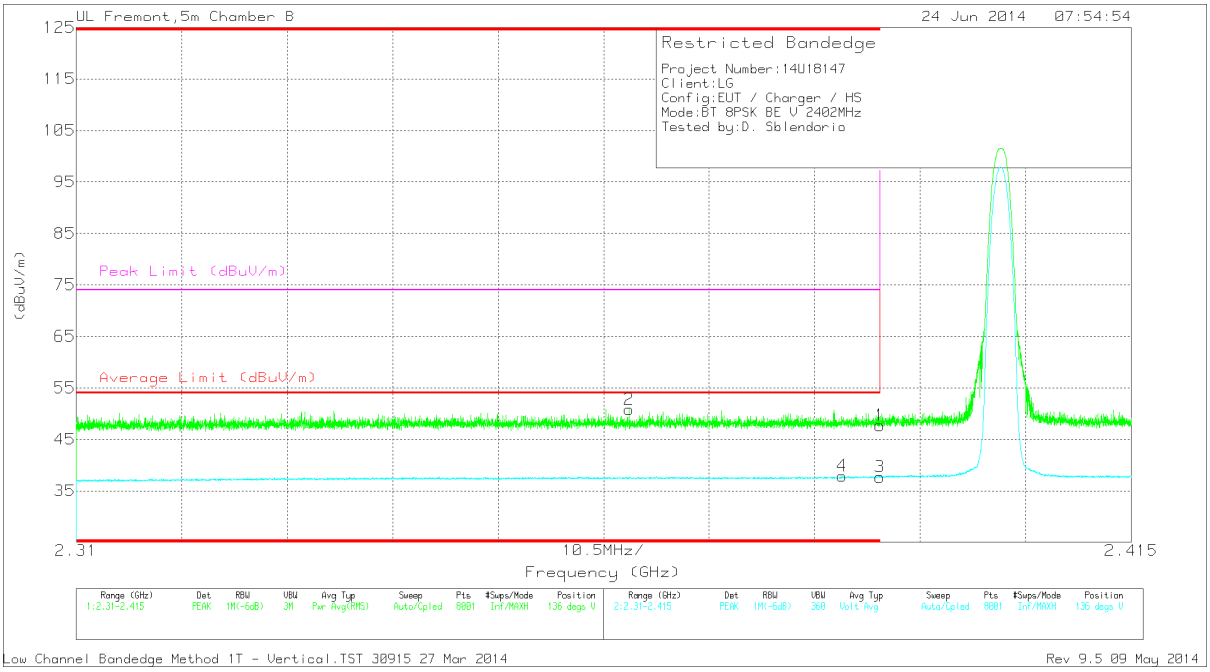
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.89	PK	32.1	-22.8	0	48.19	-	-	74	-25.81	32	153	H
2	* 2.375	41.74	PK	32	-22.9	0	50.84	-	-	74	-23.16	32	153	H
3	* 2.39	28.58	VB1T	32.1	-22.8	0	37.88	54	-16.12	-	-	32	153	H
4	* 2.388	28.77	VB1T	32.1	-22.8	0	38.07	54	-15.93	-	-	32	153	H

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



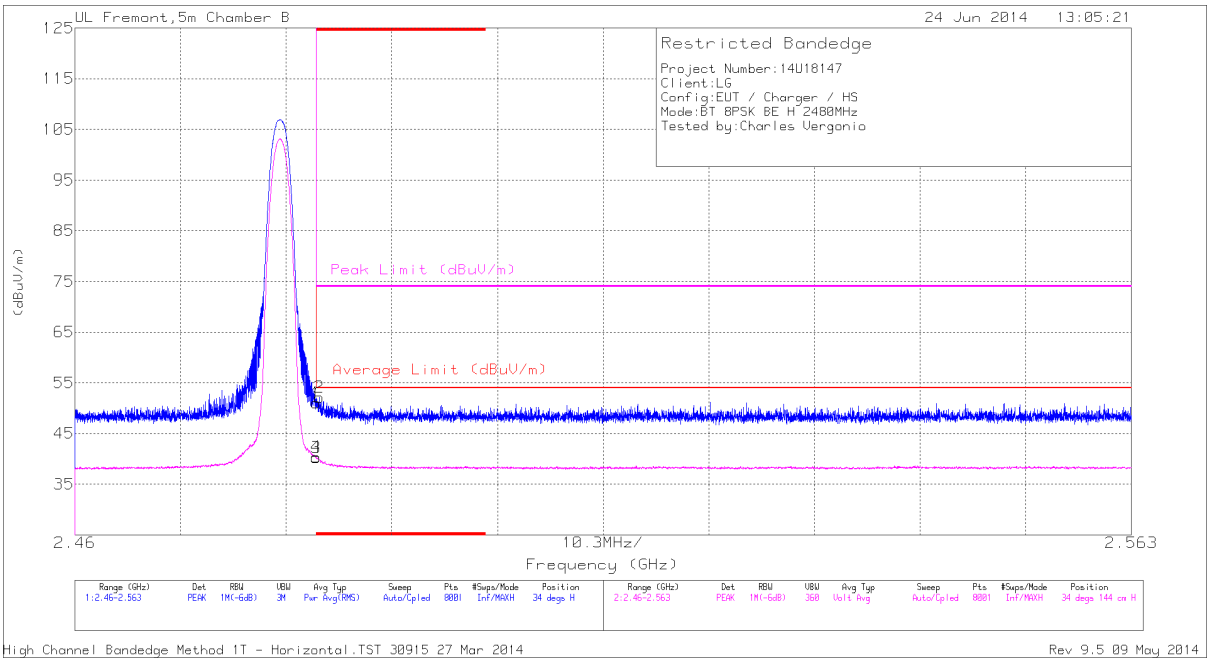
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.42	PK	32.1	-22.8	47.72	-	-	74	-26.28	136	306	V
2	* 2.365	41.61	PK	32	-22.8	50.81	-	-	74	-23.19	136	306	V
3	* 2.39	28.39	VB1T	32.1	-22.8	37.69	54	-16.31	-	-	136	306	V
4	* 2.386	28.68	VB1T	32.1	-22.9	37.88	54	-16.12	-	-	136	306	V

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



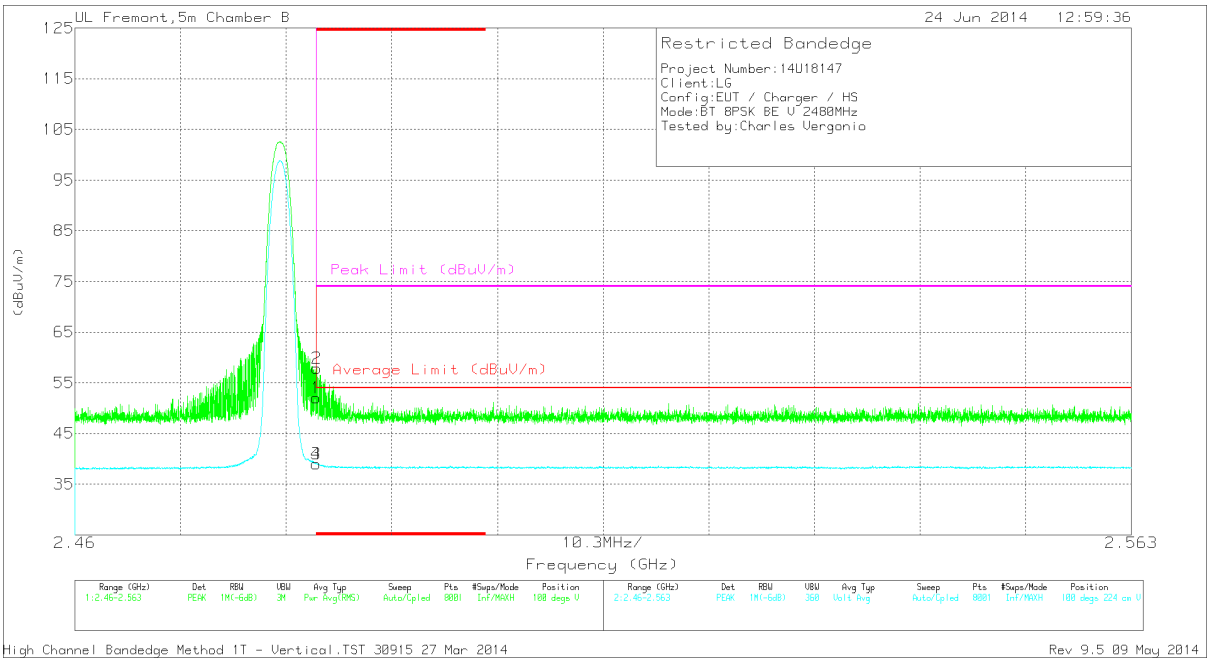
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.29	PK	32.4	-22.7	0	50.99	-	-	74	-23.01	34	144	H
2	* 2.484	42.44	PK	32.4	-22.7	0	52.14	-	-	74	-21.86	34	144	H
3	* 2.484	30.53	VB1T	32.4	-22.7	0	40.23	54	-13.77	-	-	34	144	H
4	* 2.484	30.66	VB1T	32.4	-22.7	0	40.36	54	-13.64	-	-	34	144	H

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

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (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	42.31	PK	32.4	-22.7	0	52.01	-	-	74	-21.99	100	224	V
2	* 2.484	48.19	PK	32.4	-22.7	0	57.89	-	-	74	-16.11	100	224	V
3	* 2.484	29.32	VB1T	32.4	-22.7	0	39.02	54	-14.98	-	-	100	224	V
4	* 2.484	29.33	VB1T	32.4	-22.7	0	39.03	54	-14.97	-	-	100	224	V

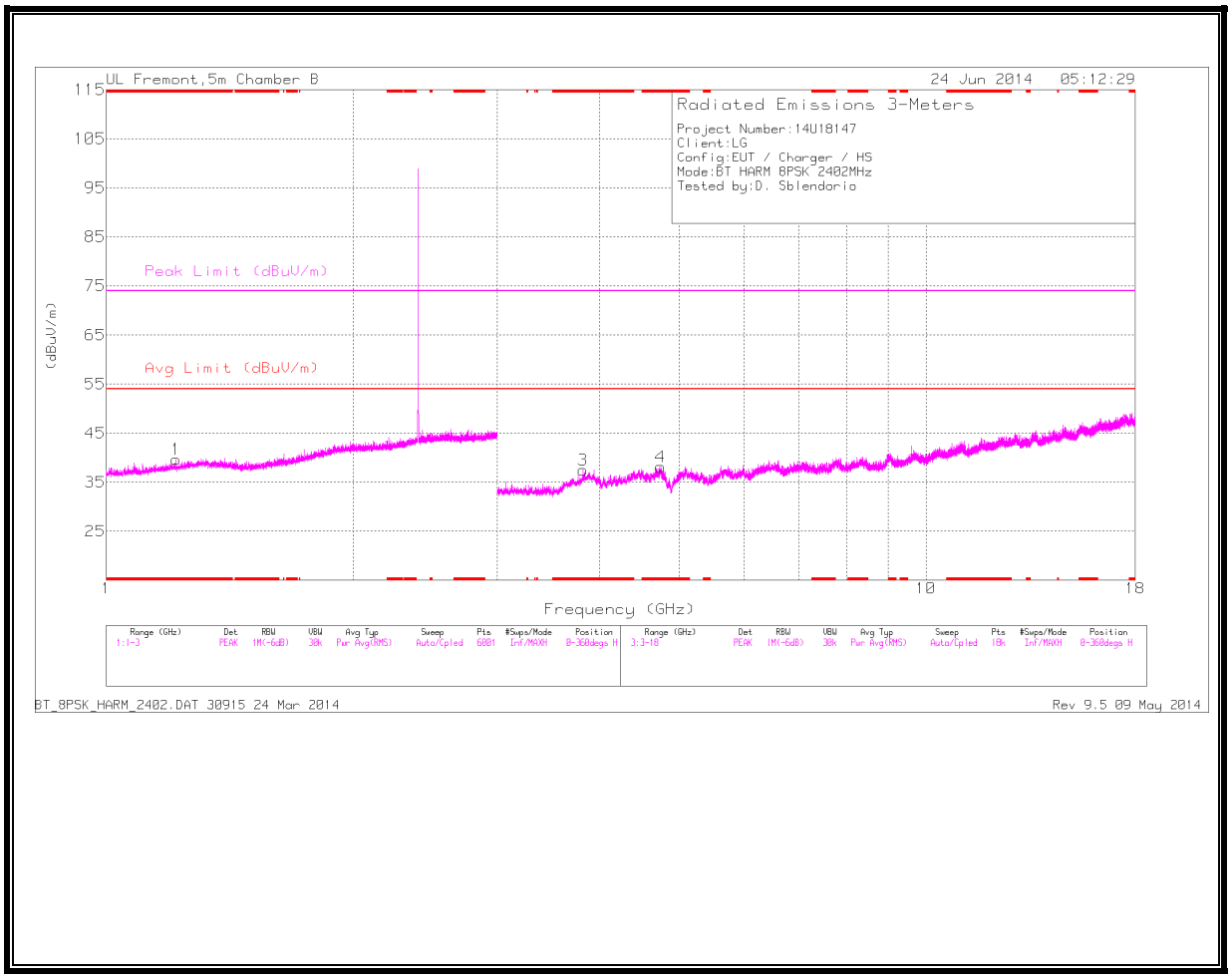
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

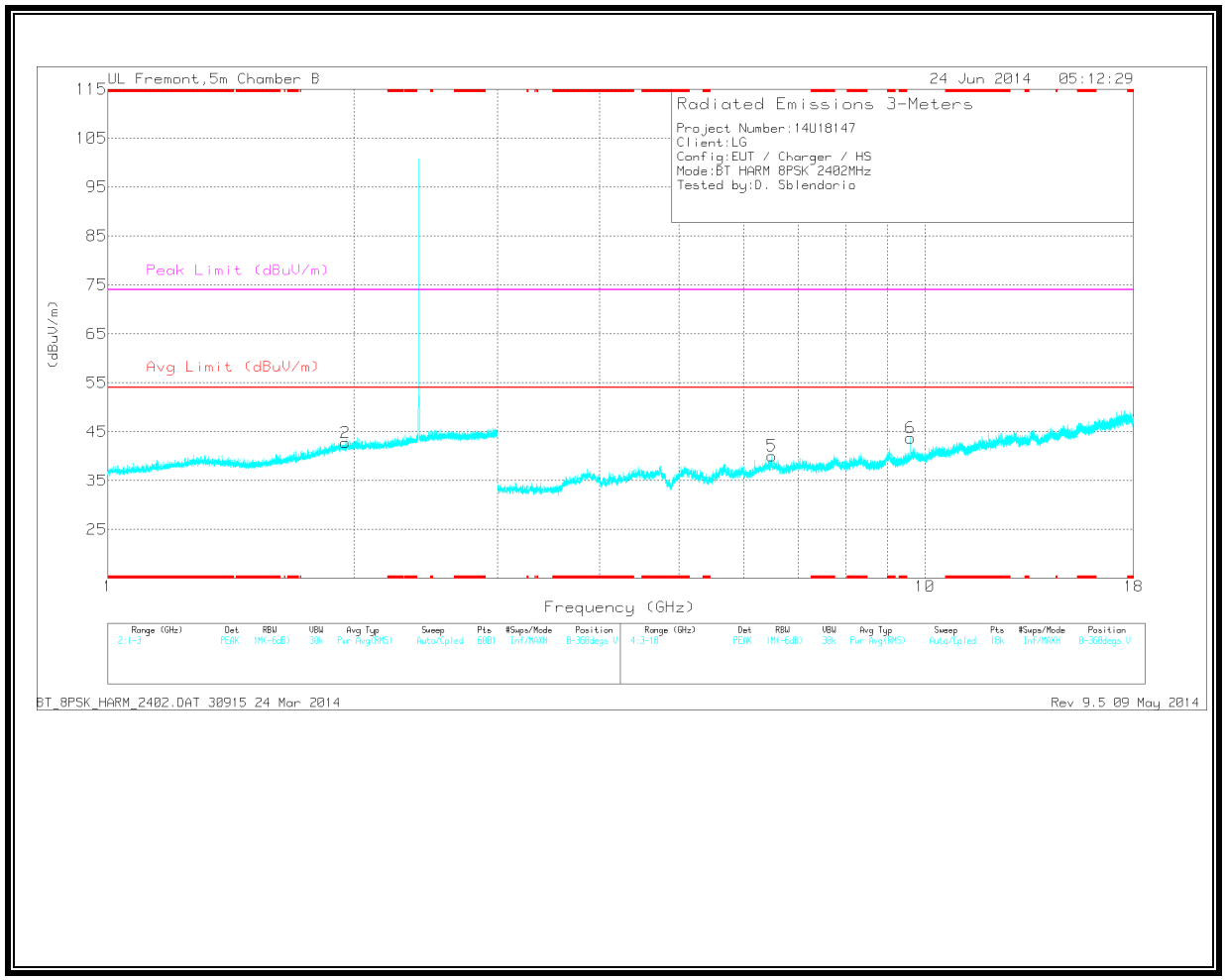
HARMONICS AND SPURIOUS EMISSIONS

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.

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.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.217	35.97	PK	28.3	-24.6	39.67	-	-	74	-34.33	0-360	99	H
3	* 3.818	34.39	PK	33.7	-30.6	37.49	-	-	74	-36.51	0-360	201	H
4	* 4.745	33.24	PK	34.2	-29.3	38.14	-	-	74	-35.86	0-360	201	H
2	1.955	35.06	PK	31.2	-23.5	42.76	-	-	-	-	0-360	99	V
5	6.501	32.98	PK	35.7	-28.6	40.08	-	-	-	-	0-360	201	V
6	9.608	31.03	PK	36.8	-24.1	43.73	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

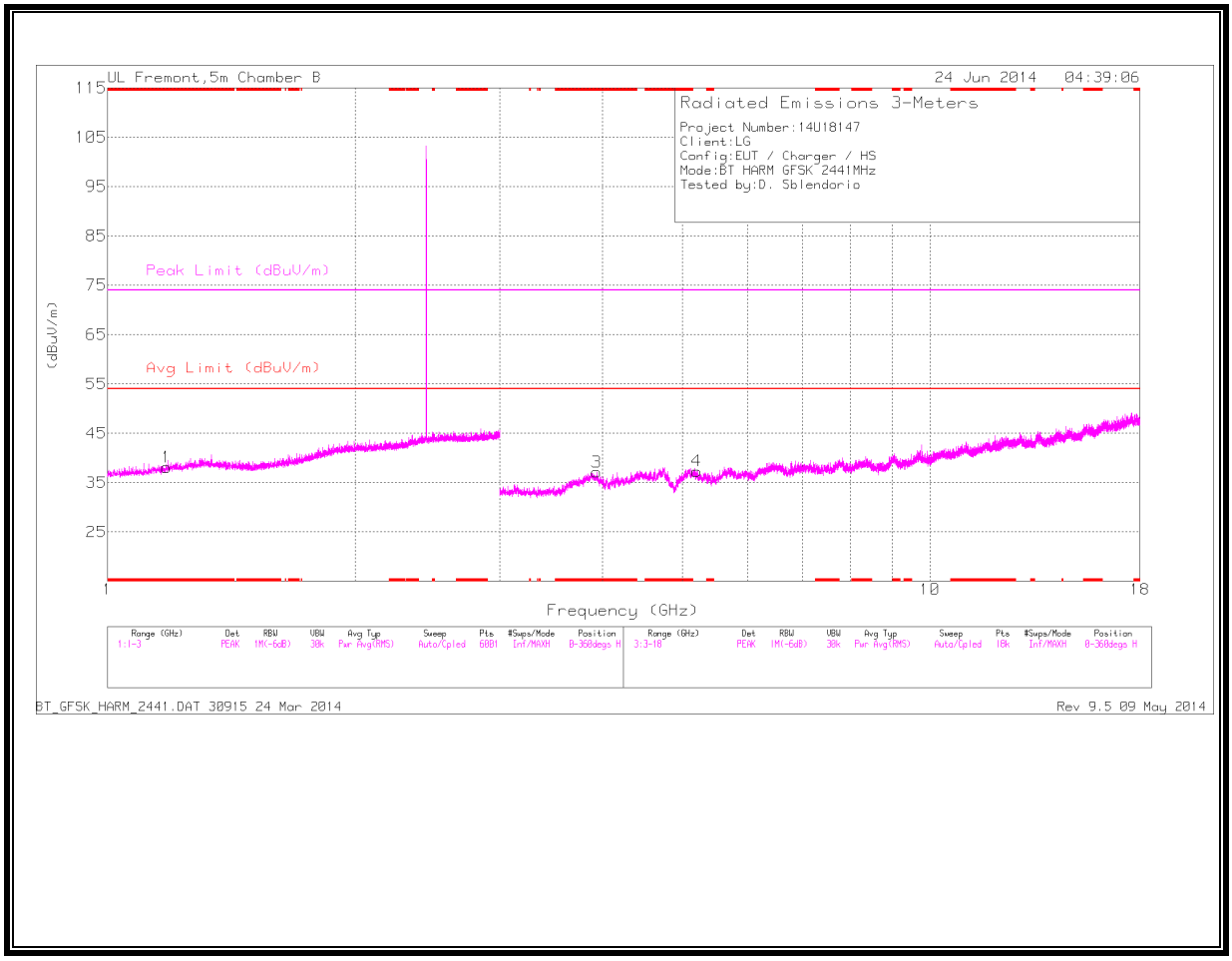
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.215	43.44	PK3	28.3	-24.6	47.14	-	-	74	-26.86	359	100	H
* 1.215	30.8	VB1T	28.3	-24.6	34.5	54	-19.5	-	-	359	100	H

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

PK3 - FHSS Method: Maximum Peak

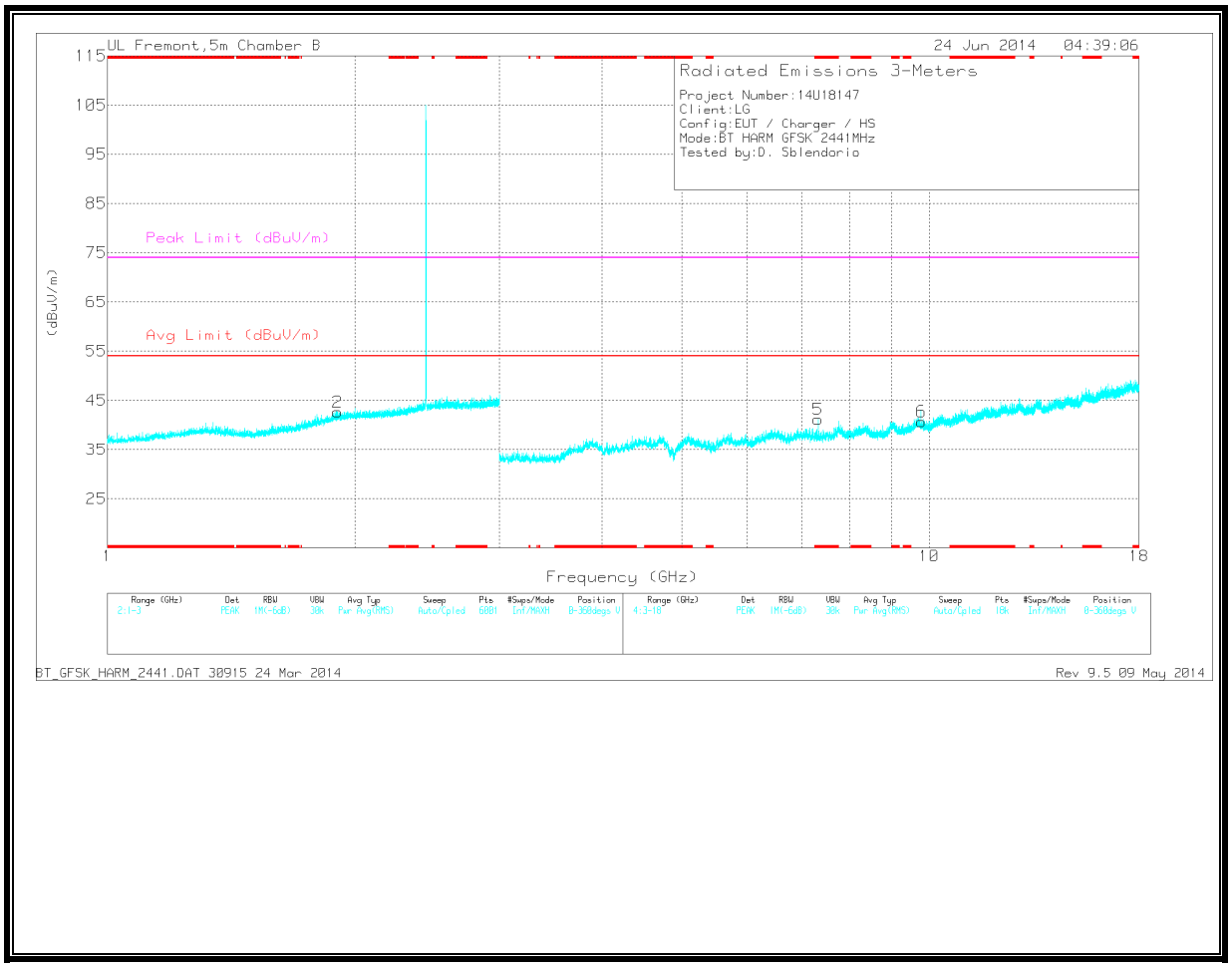
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

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.

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.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.181	34.8	PK	28	-24.7	38.1	-	-	74	-35.9	0-360	402	H
3	* 3.933	33.97	PK	33.7	-30.5	37.17	-	-	74	-36.83	0-360	99	H
5	* 7.322	33.62	PK	35.6	-28.1	41.12	-	-	74	-32.88	0-360	99	V
2	1.906	35.14	PK	31.1	-23.6	42.64	-	-	-	-	0-360	205	V
4	5.207	33.54	PK	34.4	-30.6	37.34	-	-	-	-	0-360	200	H
6	9.779	27.5	PK	36.9	-23.7	40.7	-	-	-	-	0-360	200	V

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

PK - Peak detector

Radiated Emissions

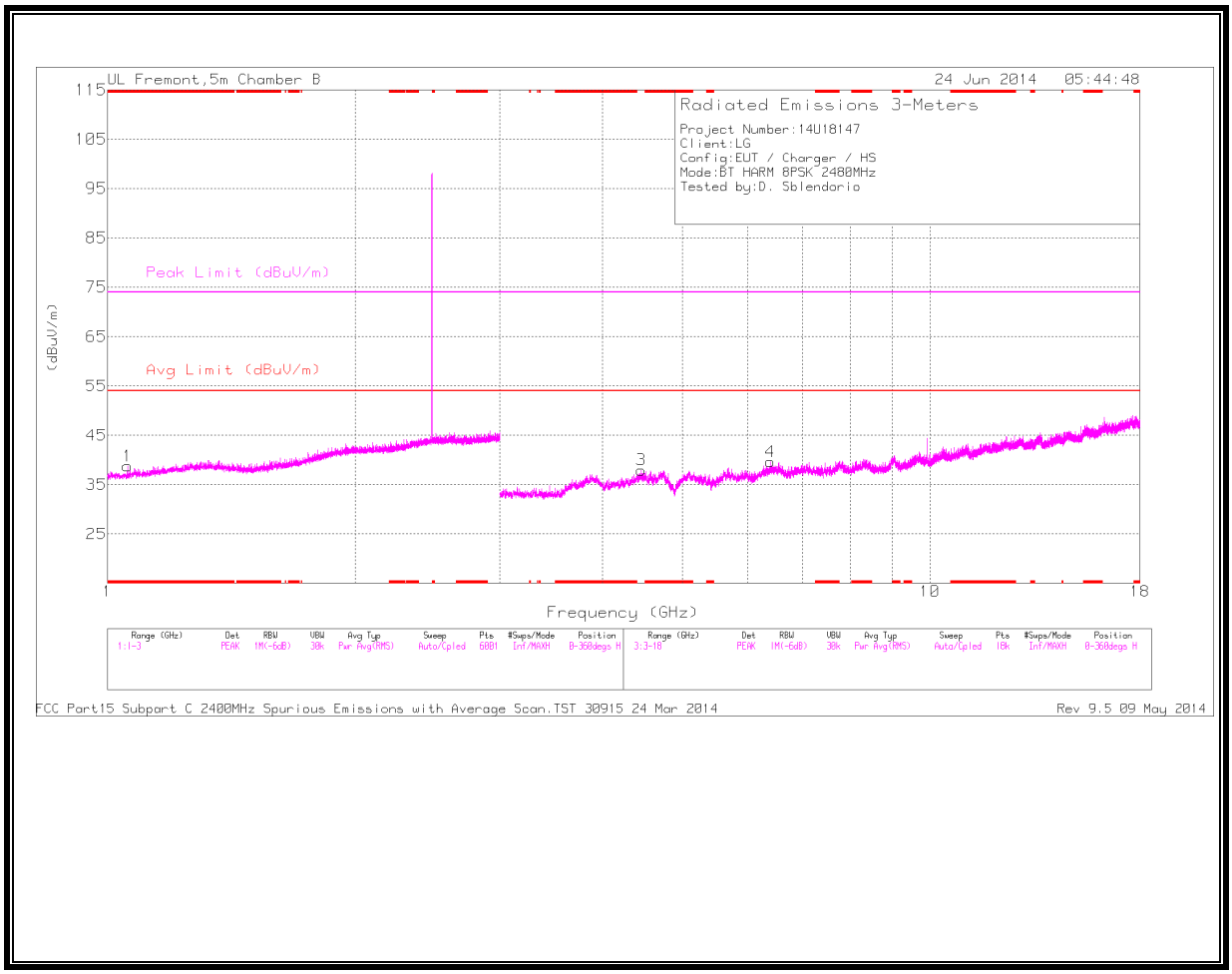
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.25	43.41	PK3	28.5	-24.6	47.31	-	-	74	-26.69	359	101	H
* 1.25	30.85	VB1T	28.5	-24.6	34.75	54	-19.25	-	-	359	101	H

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

PK3 - FHSS Method: Maximum Peak

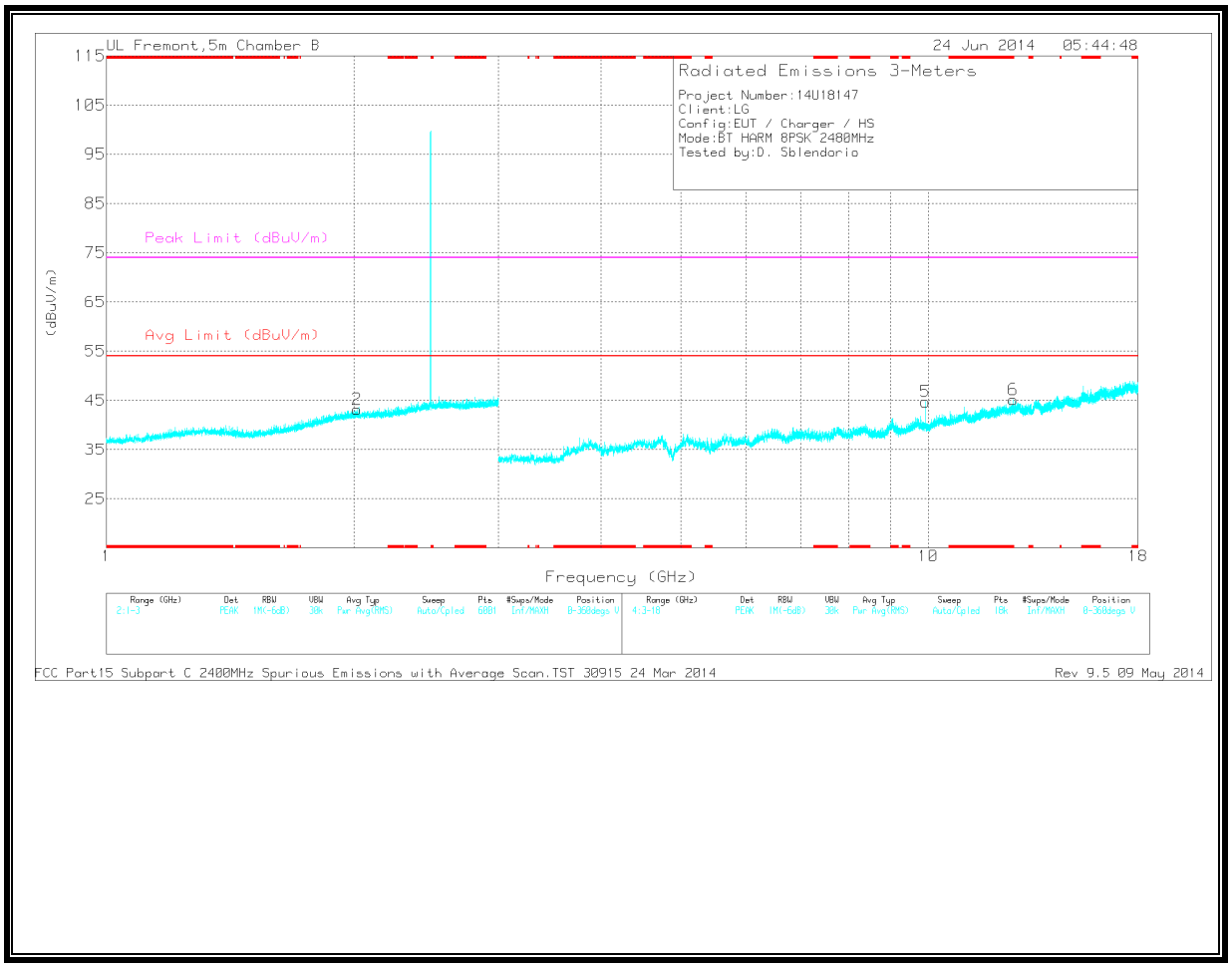
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

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.

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.

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.058	36.35	PK	27.2	-24.8	38.75	-	-	74	-35.25	0-360	101	H
6	* 12.695	27.28	PK	39.2	-21.3	45.18	-	-	74	-28.82	0-360	201	V
2	2.02	35.39	PK	31.3	-23.5	43.19	-	-	-	-	0-360	99	V
3	4.453	33.27	PK	33.9	-29.2	37.97	-	-	-	-	0-360	99	H
4	6.398	33.04	PK	35.6	-29	39.64	-	-	-	-	0-360	201	H
5	9.92	31.24	PK	37	-23.5	44.74	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.06	43.63	PK3	27.2	-24.7	46.13	-	-	74	-27.87	359	101	H
* 1.057	30.85	VB1T	27.2	-24.8	33.25	54	-20.75	-	-	359	101	H

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

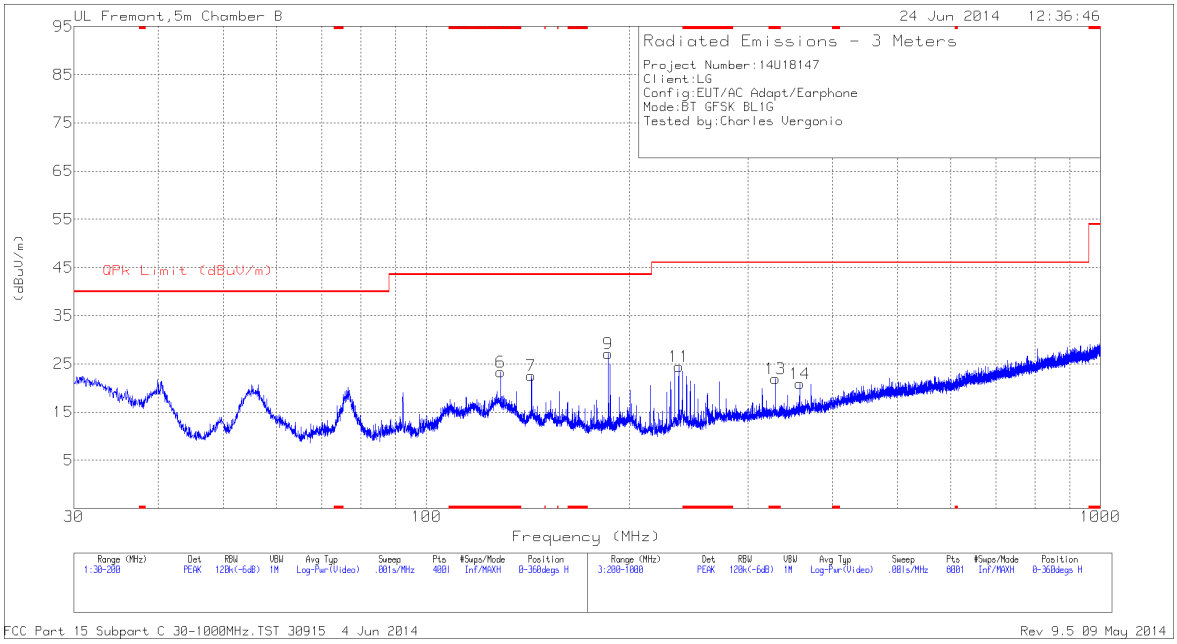
PK3 - FHSS Method: Maximum Peak

VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

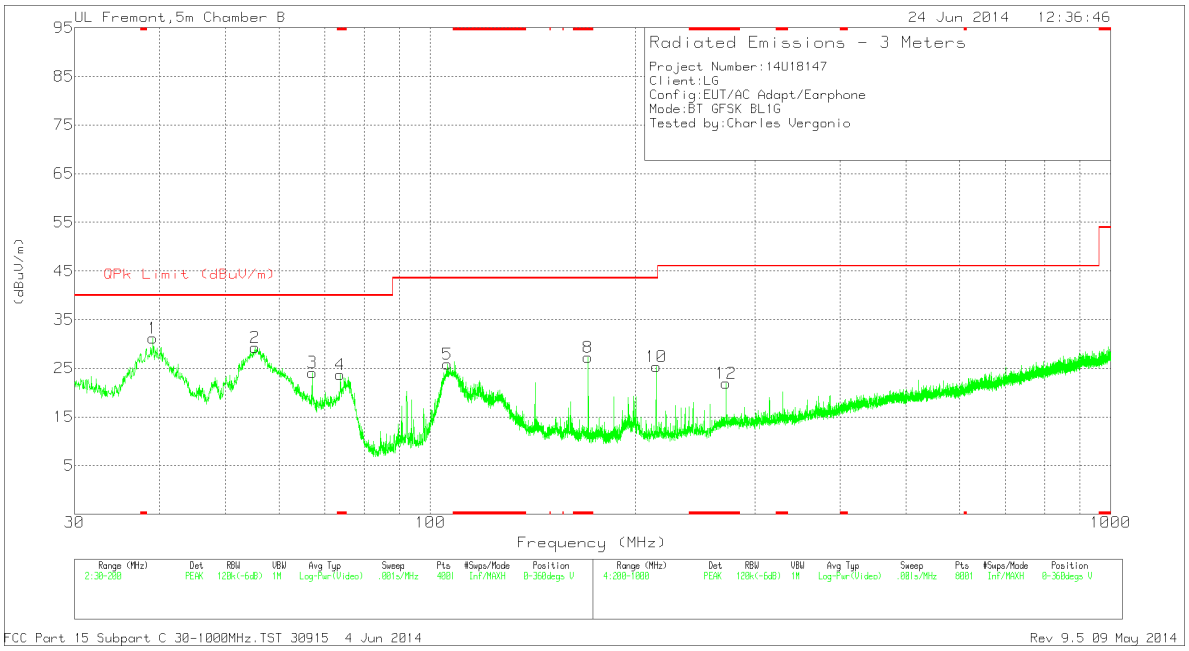
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 128.8975	37.07	PK	14	-27.7	23.37	43.52	-20.15	0-360	200	H
4	* 73.7325	43.93	PK	8.1	-28.3	23.73	40	-16.27	0-360	101	V
8	* 170.3775	42.99	PK	11.5	-27.2	27.29	43.52	-16.23	0-360	101	V
13	* 329.3	33.68	PK	14	-25.8	21.88	46.02	-24.14	0-360	200	H
12	* 272	34.81	PK	13.3	-26.2	21.91	46.02	-24.11	0-360	200	V
1	39.095	45.24	PK	14.6	-28.7	31.14	40	-8.86	0-360	101	V
2	55.245	50.55	PK	7.2	-28.5	29.25	40	-10.75	0-360	101	V
3	67.06	44.54	PK	8	-28.4	24.14	40	-15.86	0-360	101	V
5	105.9475	42.08	PK	11.8	-28	25.88	43.52	-17.64	0-360	101	V
7	143.1775	37.39	PK	12.7	-27.5	22.59	43.52	-20.93	0-360	200	H
9	186.145	43.17	PK	10.9	-27	27.07	43.52	-16.45	0-360	100	H
10	214.8	41.5	PK	10.6	-26.8	25.3	43.52	-18.22	0-360	200	V
11	236.8	39.6	PK	11.5	-26.6	24.5	46.02	-21.52	0-360	101	H
14	357.9	32.1	PK	14.6	-25.8	20.9	46.02	-25.12	0-360	300	H

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

PK - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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.

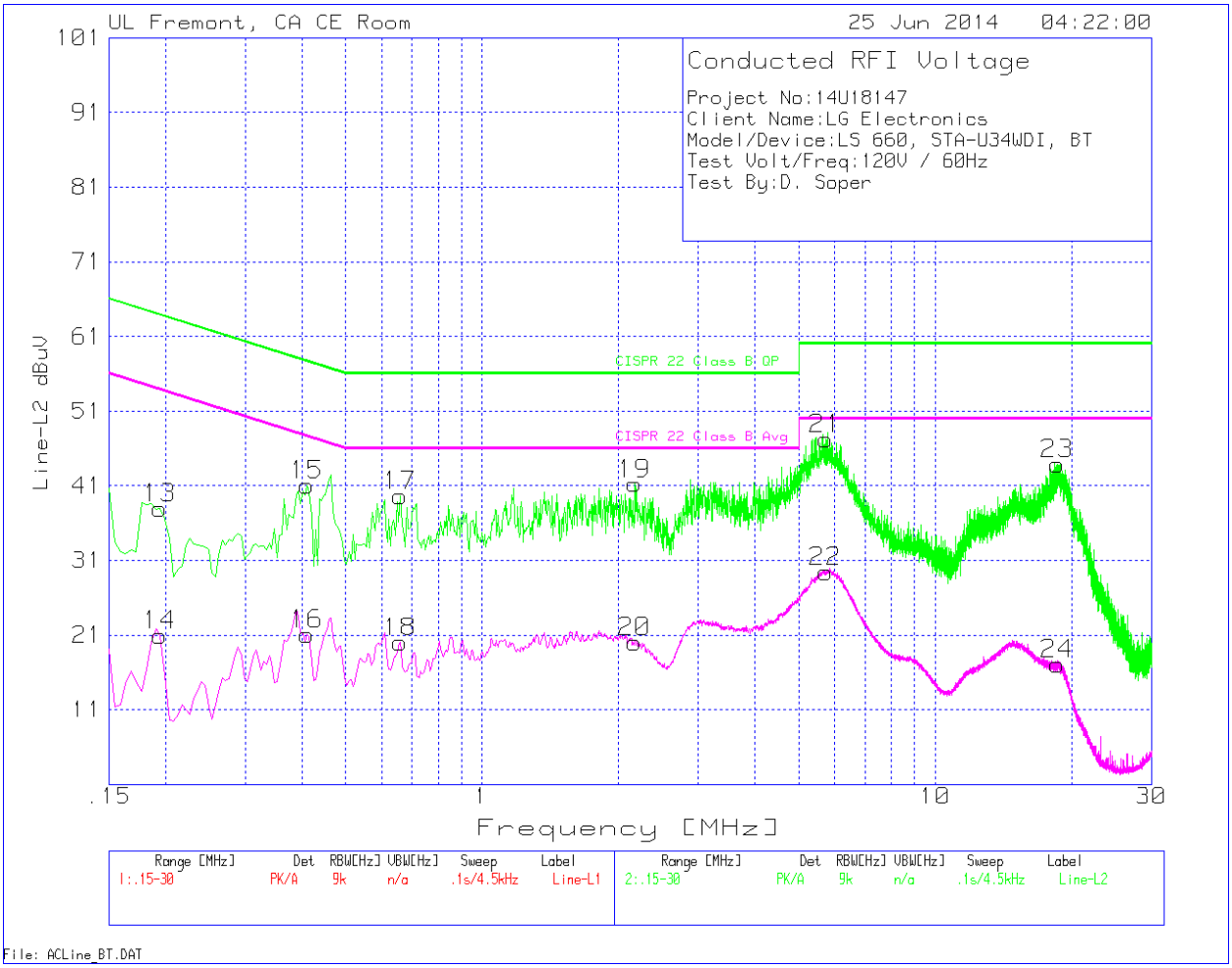
RESULTS

6 WORST EMISSIONS WITH WORST CONFIGRATION U34WDI CHARGER

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	.1815	37.42	PK	1.1	0	38.52	64.4	-25.88	-	-
2	.1815	17.03	Av	1.1	0	18.13	-	-	54.4	-36.27
3	.4605	37.46	PK	.4	0	37.86	56.7	-18.84	-	-
4	.4605	26.33	Av	.4	0	26.73	-	-	46.7	-19.97
5	1.0455	36.8	PK	.2	0	37	56	-19	-	-
6	1.0455	21.08	Av	.2	0	21.28	-	-	46	-24.72
7	1.752	38.96	PK	.2	.1	39.26	56	-16.74	-	-
8	1.752	21.54	Av	.2	.1	21.84	-	-	46	-24.16
9	5.667	49.41	PK	.2	.1	49.71	60	-10.29	-	-
10	5.667	31.89	Av	.2	.1	32.19	-	-	50	-17.81
11	18.798	40.54	PK	.3	.2	41.04	60	-18.96	-	-
12	18.798	14.18	Av	.3	.2	14.68	-	-	50	-35.32



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)
13	.195	36.97	PK	1	0	37.97	63.8	-25.83	-	-
14	.195	19.9	Av	1	0	20.9	-	-	53.8	-32.9
15	.411	40.62	PK	.4	0	41.02	57.6	-16.58	-	-
16	.411	20.65	Av	.4	0	21.05	-	-	47.6	-26.55
17	.6585	39.37	PK	.3	0	39.67	56	-16.33	-	-
18	.6585	19.68	Av	.3	0	19.98	-	-	46	-26.02
19	2.175	40.94	PK	.2	.1	41.24	56	-14.76	-	-
20	2.175	19.71	Av	.2	.1	20.01	-	-	46	-25.99
21	5.721	46.88	PK	.2	.1	47.18	60	-12.82	-	-
22	5.721	29.18	Av	.2	.1	29.48	-	-	50	-20.52
23	18.6315	43.37	PK	.3	.2	43.87	60	-16.13	-	-
24	18.6315	16.57	Av	.3	.2	17.07	-	-	50	-32.93

PK - Peak detector
Av - average detection