Compliance Testing, LLC
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.ComplianceTesting.com
info@ComplianceTesting.com

FCC CFR47 Part 15.247
Test Report

Prepared for: Vocera Communications Inc

Model: B3000

Description:
The Vocera B3000 is a hands-free VOIP communication device using 802.11b/g and bluetooth

To

Federal Communications Commission

Rule Part(s) 15.247

Date of Issue: August 16, 2011

On the behalf of the applicant:	**Vocera Communications Inc** **525 Race Street** **Suite 150** **San Jose, CA 95126**
Attention of:	**Ken Peters, Director of Badge Engineering** **Ph: (408) 882-5100** **E-mail: kpeters@vocera.com**

Prepared by
Compliance Testing, LLC
3356 N San Marcos Pl, Suite 107
Chandler, AZ 85225-7176
(866) 311-3268 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1160004

John Erhard
Project Test Engineer

This report may not be reproduced, except in full, without written permission from Compliance Testing
All results of this test report relate only to the item(s) there were tested

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	August 16, 2011	John Erhard	Original Document
2.0	September 20, 2011	John Erhard	Add RSS-210 annex to OCC BW test results header

Table of Contents

Description	Page
Test Report Revision History	2
Standard Test Conditions Engineering Practices	6
Test Reports Summary	7
Time of Occupancy	8
Channel Spacing	10
Number of Hopping Channels	11
Peak Output Power	13
Conducted Spurious Emission	14
Radiated Spurious Emissions	24
Emissions at Band Edges	27
Restricted Band Test Setup	31
Occupied Bandwidth	38
Transmitter Power Spectral Density (PSD)	50
Receiver Spurious Emissions	57
Test Equipment Utilized	60

ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted in the table below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

FCC OATS Reg, #933597

IC Reg. #2044A-1

Non-accredited tests contained in this report:

N/A

The applicant has been cautioned as to the following:

15.21 - Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) - Special Accessories

Equipment marked to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI C63.10-2009 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature	**Humidity**	**Pressure**
25.10	42.40	967.70

EUT Description:

The EUT us a body work communication badge utilizing both Bluetooth and standard Wi-Fi signaling.

EUT Operation during Tests:

The EUT was tested in a normal hardware configuration while using test software.

Accessories:

Qty	Type	Make, Model	S/N
	None		

Cables:

Qty	Type	Length (m)	Shield	Shielded Hood	Ferrite
	None				

Test Reports Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.247(a)	Time of Occupancy	Pass	
15.247(a)	Channel Spacing	Pass	
15.247(a)	Total number of hopping channels	Pass	
15.247(b)	Peak Output Power	Pass	
15.247(b)	Conducted Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Emissions At Band Edges	Pass	
15.247(a)(2)	Occupied Bandwidth	Pass	
15.247(e)	Transmitter Power Spectral Density	Pass	
15.207	A/C Powerline Conducted Emissions	N/A	The EUT does not connect to the AC Mains
RSS GEN6(b)	Receiver Spurious Emissions	Pass	

15.203: Antenna Requirement:

X The antenna is permanently attached to the EUT

____ The antenna uses a unique coupling

____ The EUT must be professionally installed

____ The antenna requirement does not apply

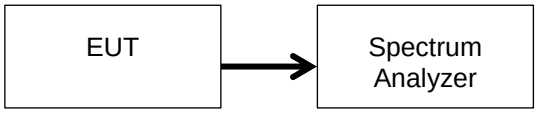
Time of Occupancy

Name of Test:	Time of Occupancy		
Specification:	15.247(a)	**Engineer:**	John Erhard
Test Equipment Utilized:	i00379	**Test Date:**	8/10/2011

Test Procedure

The EUT was connected directly to a spectrum analyzer.
The EUT was set to hopping mode with the spectrum analyzer set to a 0 span.
A single transmit ion was captured and the dwell time was verified.

Test Setup

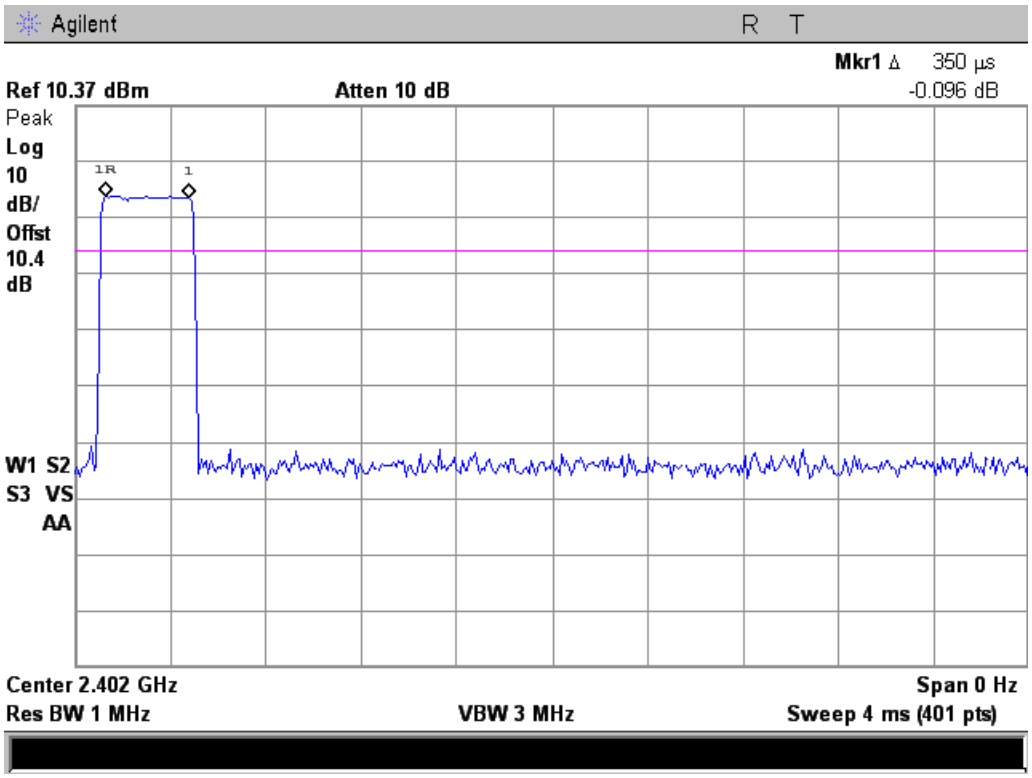


Dwell Time

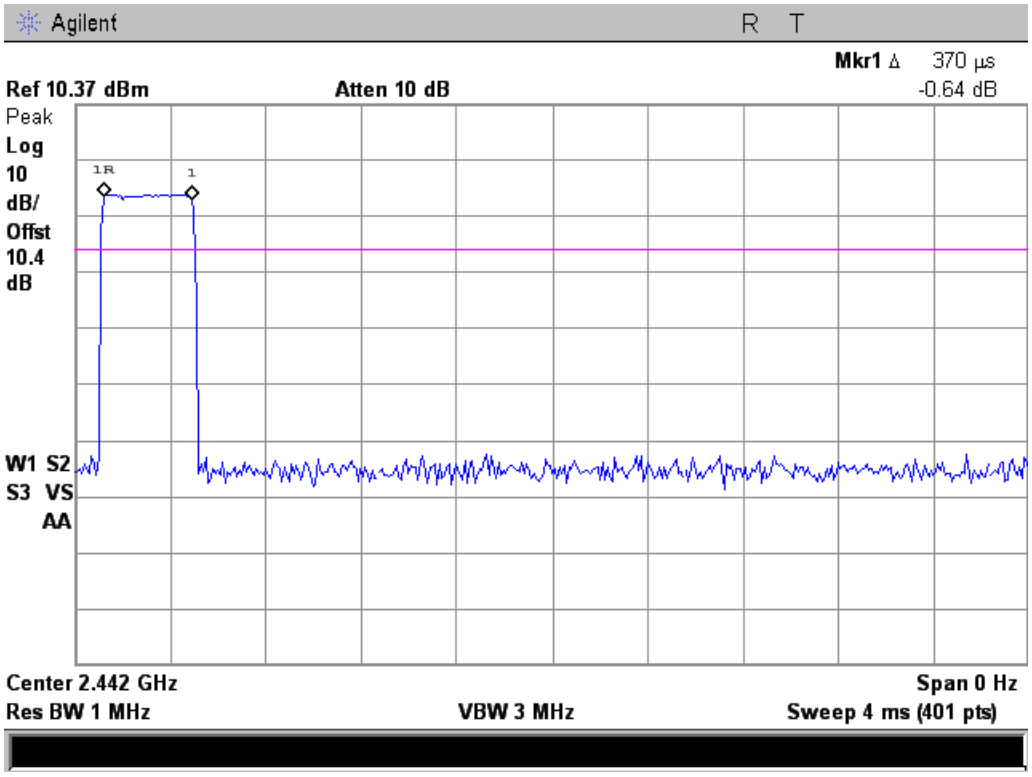
Dwell Time = ON Time * Number of hopping channels (79)

CH 1 Dwell time = 0.02765 Seconds
CH 1 Dwell time = 0.02923 Seconds
CH 1 Dwell time = 0.02765 Seconds

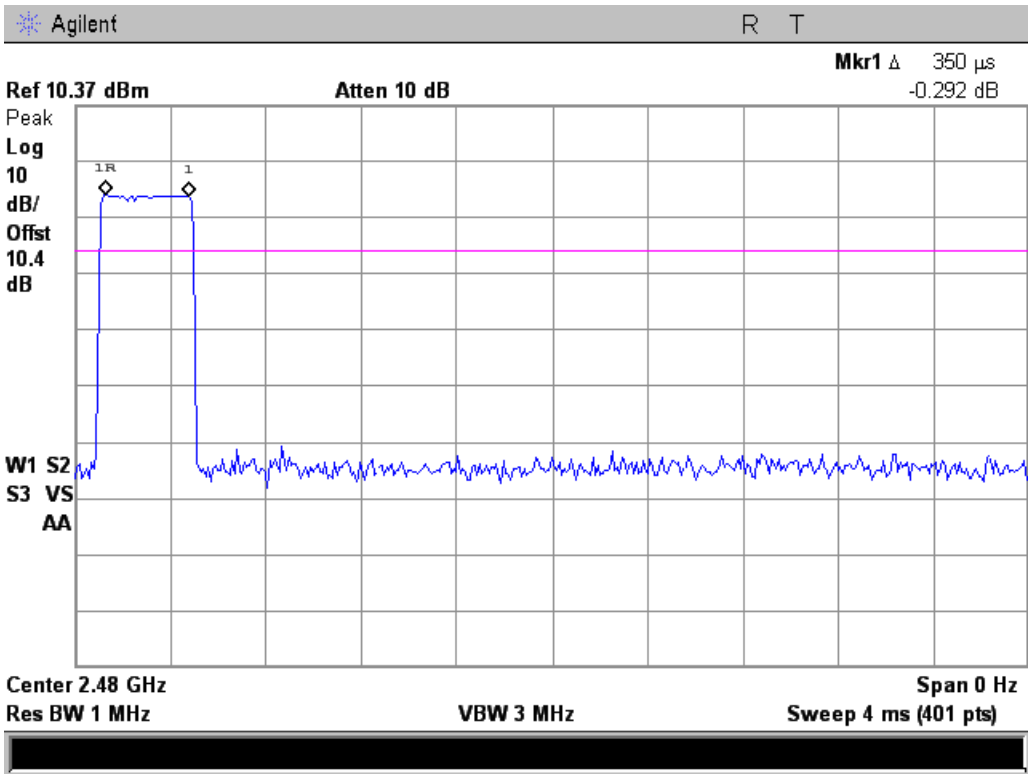
2402 MHz



2442 MHz



2480 MHz



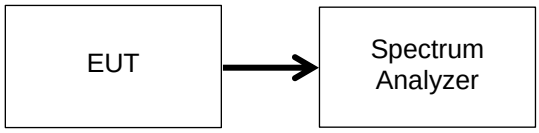
Channel Spacing

Name of Test:	Channel Spacing		
Specification:	15.247(a)	**Engineer:**	John Erhard
Test Equipment Utilized:	i00379	**Test Date:**	8/10/2011

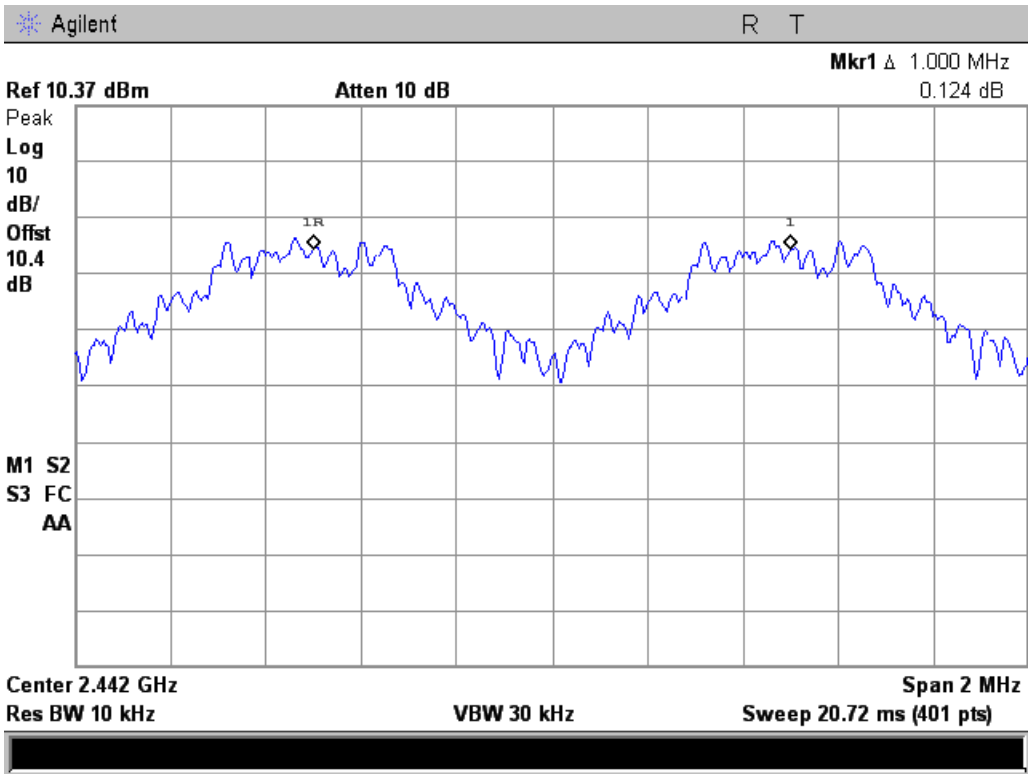
Test Procedure

The EUT was connected directly to a spectrum analyzer. The Span was set to the specified band end points. The EUT was then set to operate in hopping mode. The MAX HOLD function of the spectrum analyzer was utilized to verify the cannel spacing. Markers were placed in the center of each channel.

Test Setup



Channel Spacing = 1 MHz



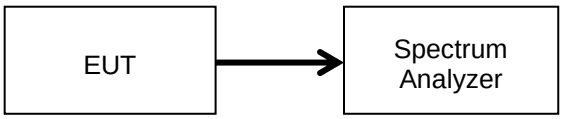
Number of Hopping Channels

Name of Test:	Number of Hopping Channels		
Specification:	15.247(a)	**Engineer:**	John Erhard
Test Equipment Utilized:	i00379	**Test Date:**	8/10/2011

Test Procedure

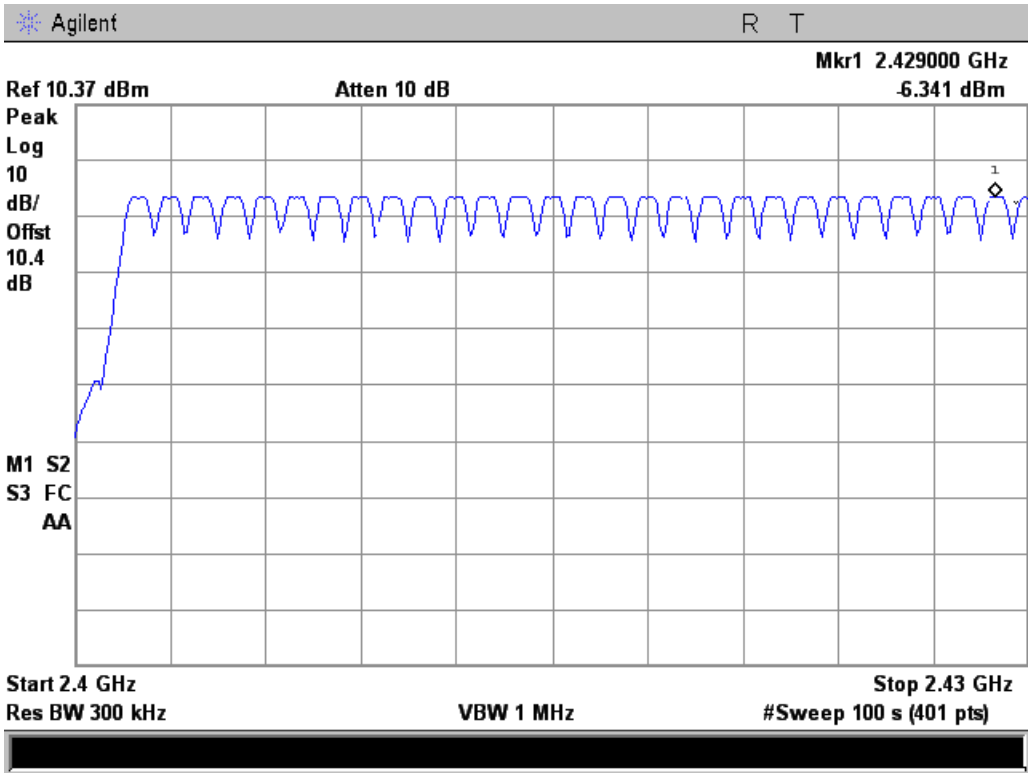
The EUT was connected directly to a spectrum analyzer. The Span was set to the specified band end points. The EUT was then set to operate in hopping mode. The MAX HOLD function of the spectrum analyzer was utilized to verify the number of hopping cannels. Markers were placed on the plots as a reference to enable ease of counting over multiple plots.

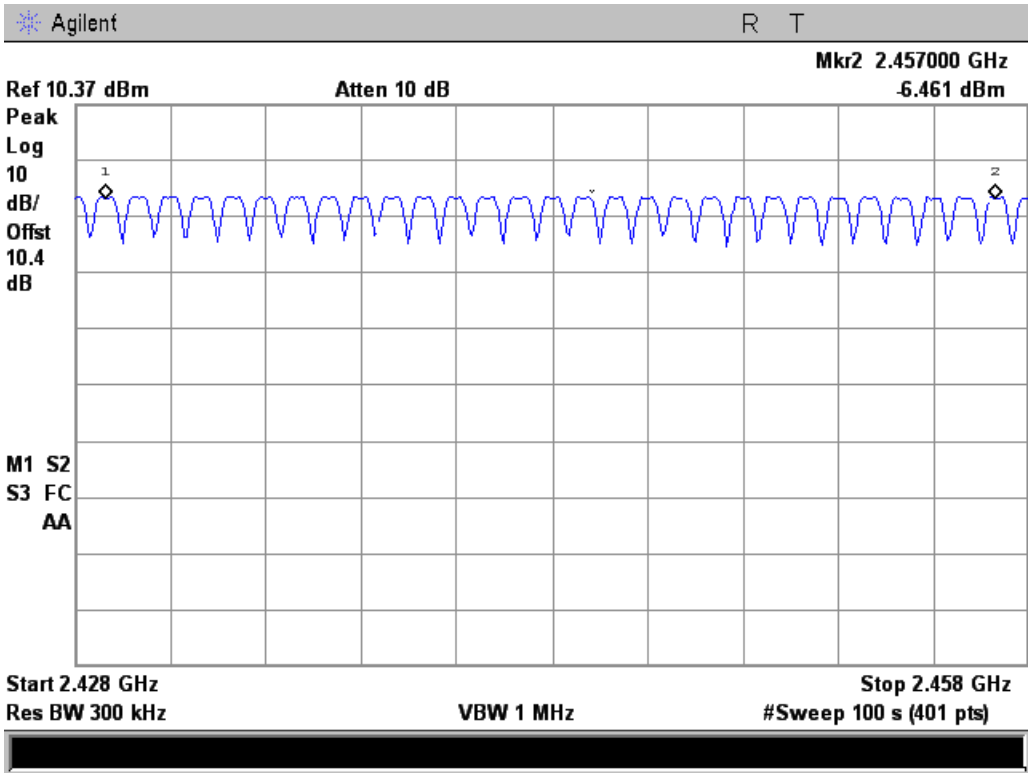
Test Setup

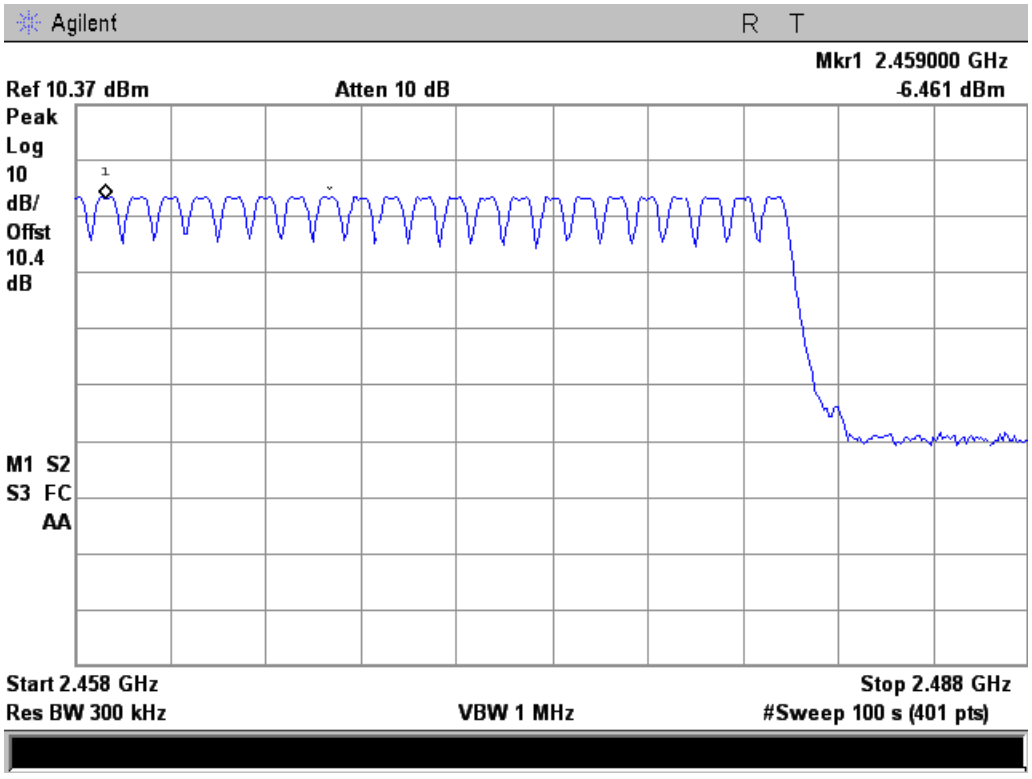


Number of Hopping Channels

Total number of channels = 79




Agilent
R T
Mkr2 2.457000 GHz
Ref 10.37 dBm
Atten 10 dB
-6.461 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Start 2.428 GHz
Stop 2.458 GHz
Res BW 300 kHz
VBW 1 MHz
#Sweep 100 s (401 pts)


Agilent
R T
Mkr1 2.459000 GHz
Ref 10.37 dBm
Atten 10 dB
-6.461 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Start 2.458 GHz
Stop 2.488 GHz
Res BW 300 kHz
VBW 1 MHz
#Sweep 100 s (401 pts)

Peak Output Power

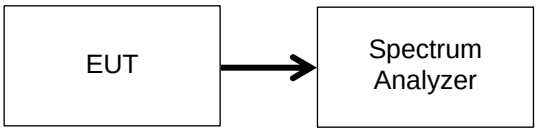
Name of Test: Peak Output Power
Specification: 15.247(b) **Engineer:** John Erhard
Test Equipment Utilized: i00379, TEW-A1070B, N4010A **Test Date:** 8/5/2011 and 8/16/2011

Test Procedure

The EUT was connected directly to a Spectrum analyzer input. The peak readings were taken and the result was then compared to the limit. All cable losses and bandwidth integration factors were input into the spectrum analyzer as a reference level offset to ensure accurate measurements were obtained. The following RBW settings were used.

11 MB DTS = 1 MHZ RBW
54 MB DTS = 100 KHz RBW
FHSS = 1 MHz

Test Setup



11 MB DTS Transmitter Peak Output Power

Tuned Frequency MHz	Measured Value dBm	Specification Limit	Result
2412	28.95	1 W (30 dBm)	Pass
2437	29.0	1 W (30 dBm)	Pass
2772	28.85	1 W (30 dBm)	Pass

54 MB DTS Transmitter Peak Output Power

Tuned Frequency MHz	Measured Value dBm	Specification Limit	Result
2412	28.2	1 W (30 dBm)	Pass
2437	28.02	1 W (30 dBm)	Pass
2462	28.55	1 W (30 dBm)	Pass

FHSS Transmitter Peak Output Power

Tuned Frequency MHz	Measured Value dBm	Specification Limit	Result
2402	-0.899	1 W (30 dBm)	Pass
2442	-3.04	1 W (30 dBm)	Pass
2480	-5.05	1 W (30 dBm)	Pass

Conducted Spurious Emission

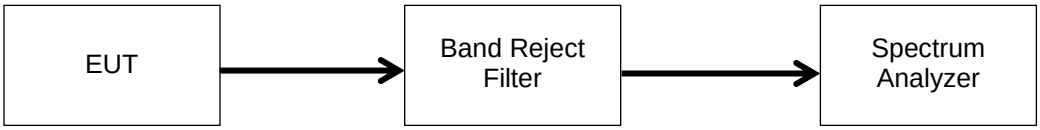
Name of Test: Conducted Spurious Emissions
Specification: 15.247(d) **Engineer:** John Erhard
Test Equipment Utilized: i00379 **Test Date:** 8/9/2011 – 8/10/2011

Test Procedure

The EUT was connected to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions.
The frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was observed.
Only detectable spurious emissions were recorded and plotted.
The peak output power is added to the recorded measurement to provide the corrected spurious level dBc.

Only the worst case is recorded in the Conducted Spurious Emissions Summary Test Table.

Test Setup



11 MB DTS Conducted Spurious Emissions Summary Test Table

Tuned Frequency MHz	Emission Frequency MHz	Measured Value dBm	Peak Power dBm	Corrected Value dBc	Specification Limit dBc	Result
2412	1660	-47.71	28.95	-76.66	-20	Pass
2437	1660	-47.97	29.0	-76.97	-20	Pass
2772	1660	-47.00	28.85	-75.85	-20	Pass

54 MB DTS Conducted Spurious Emissions Summary Test Table

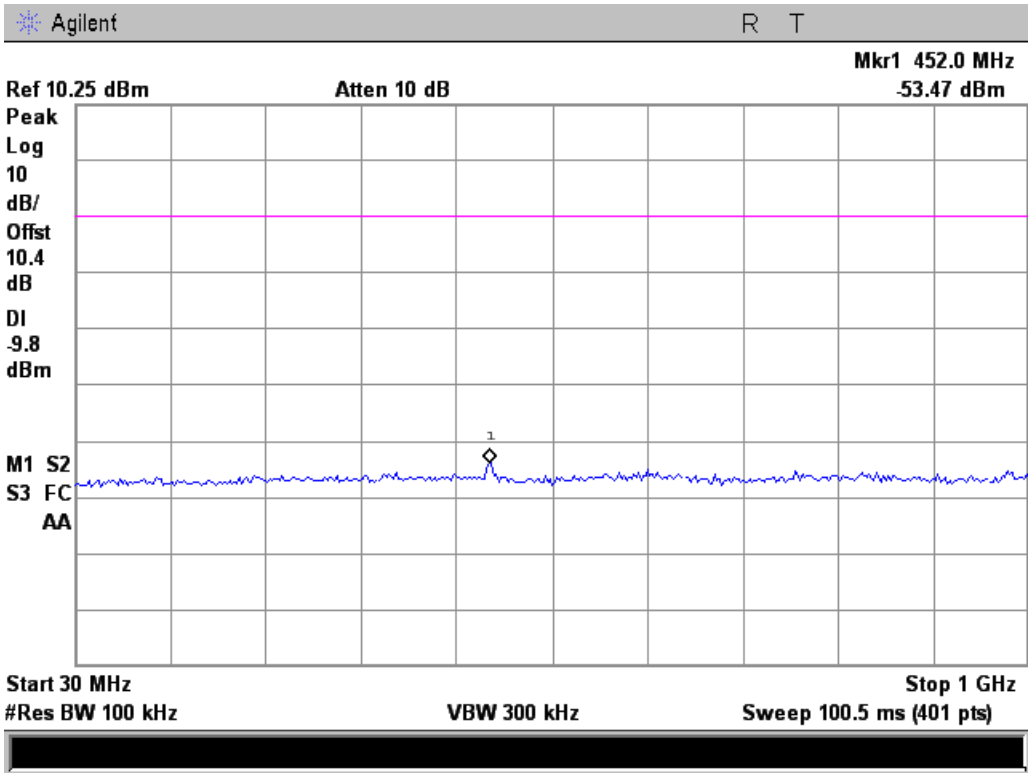
Tuned Frequency MHz	Emission Frequency MHz	Measured Value dBm	Peak Power dBm	Corrected Value dBc	Specification Limit dBc	Result
2412	1660	-48.26	28.2	-76.46	-20	Pass
2437	1600	-49.10	28.02	-77.12	-20	Pass
2762	1660	-48.07	28.55	-76.62	-20	Pass

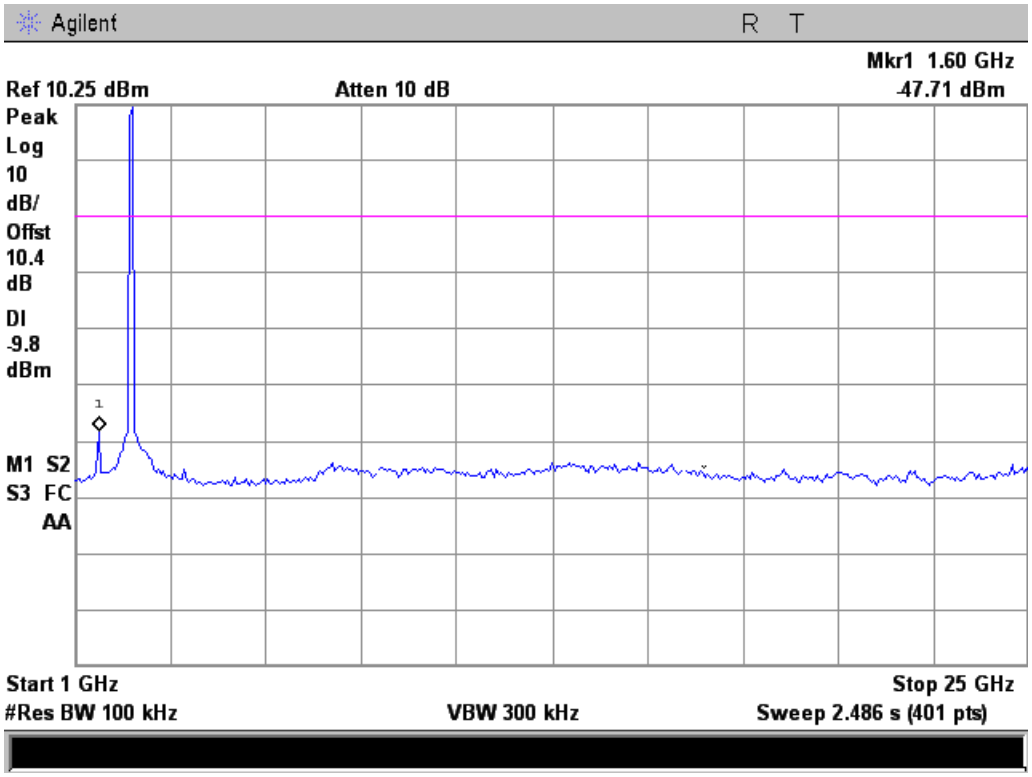
FHSS Conducted Spurious Emissions Summary Test Table

Tuned Frequency MHz	Emission Frequency MHz	Measured Value dBm	Peak Power dBm	Corrected Value dBc	Specification Limit dBc	Result
2402	15460	-67.75	-0.899	-66.86	-20	Pass
2442	20740	-66.75	-3.04	-63.71	-20	Pass
2480	14140	-67.79	-5.05	-62.74	-20	Pass

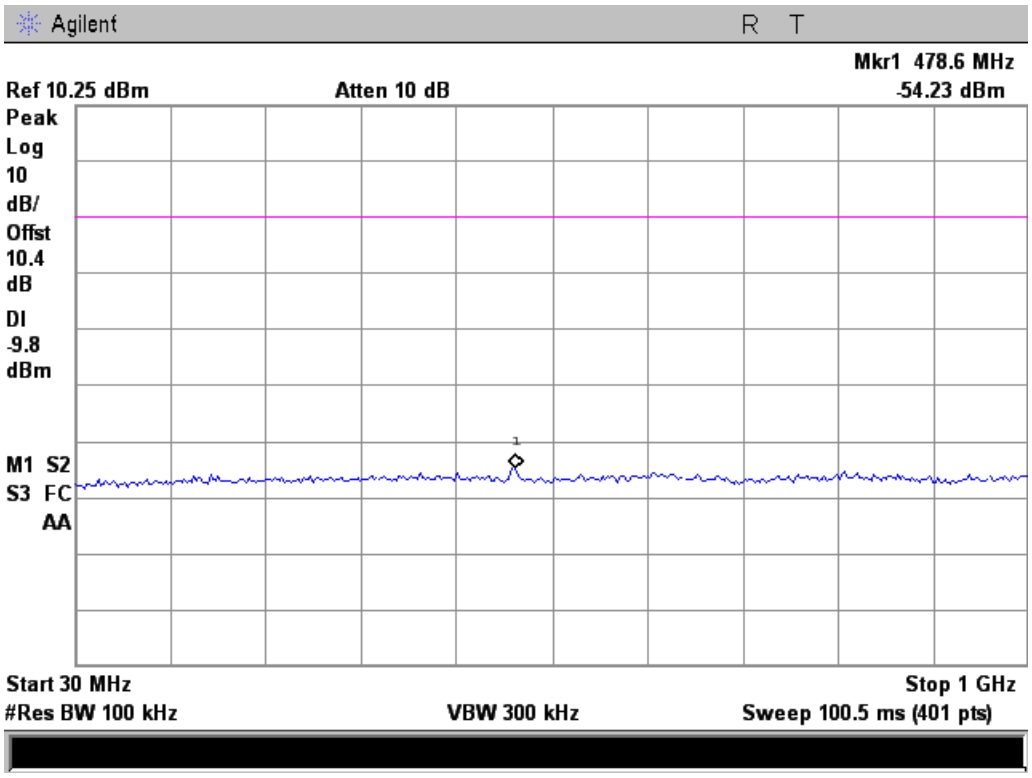
11 MB DTS Conducted Spurious Emissions

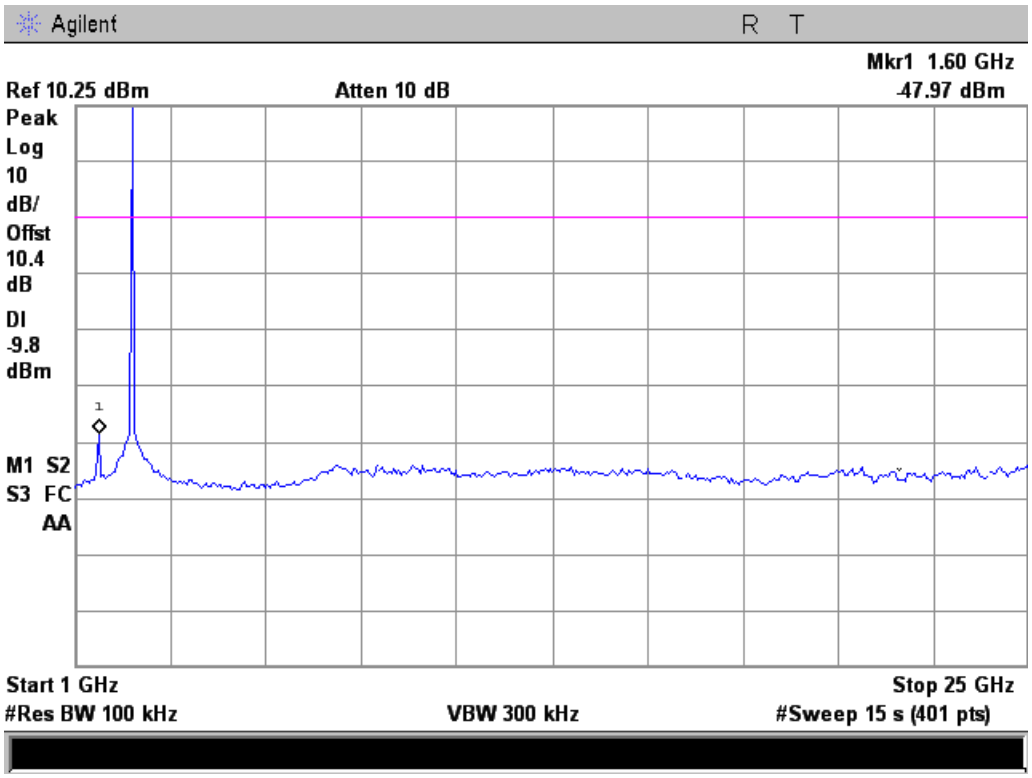
2412 MHz



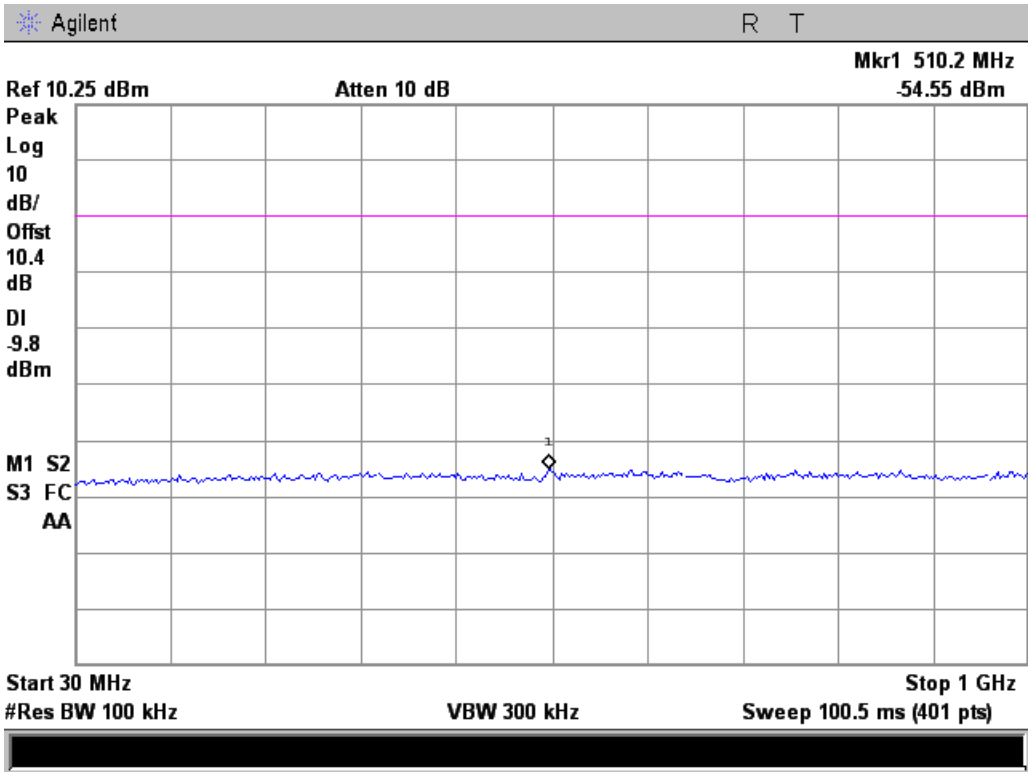


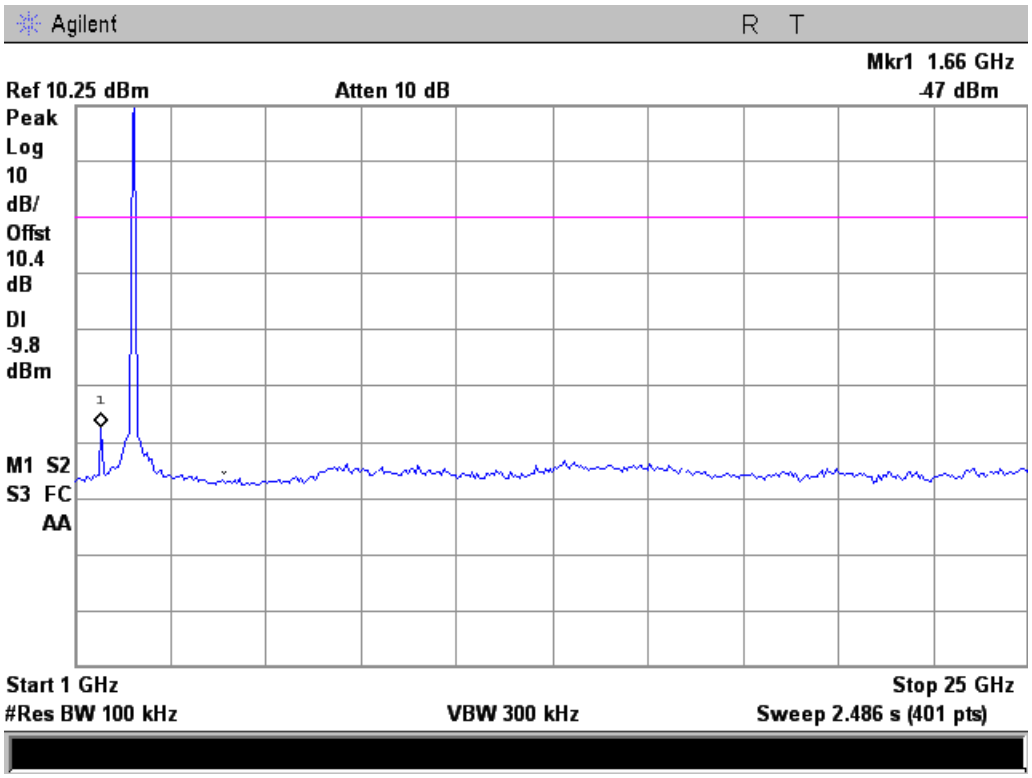
2437 MHz


Agilent
R T
Mkr1 478.6 MHz
Ref 10.25 dBm
Atten 10 dB
-54.23 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-9.8
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 1.60 GHz
Ref 10.25 dBm
Atten 10 dB
-47.97 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-9.8
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
#Sweep 15 s (401 pts)

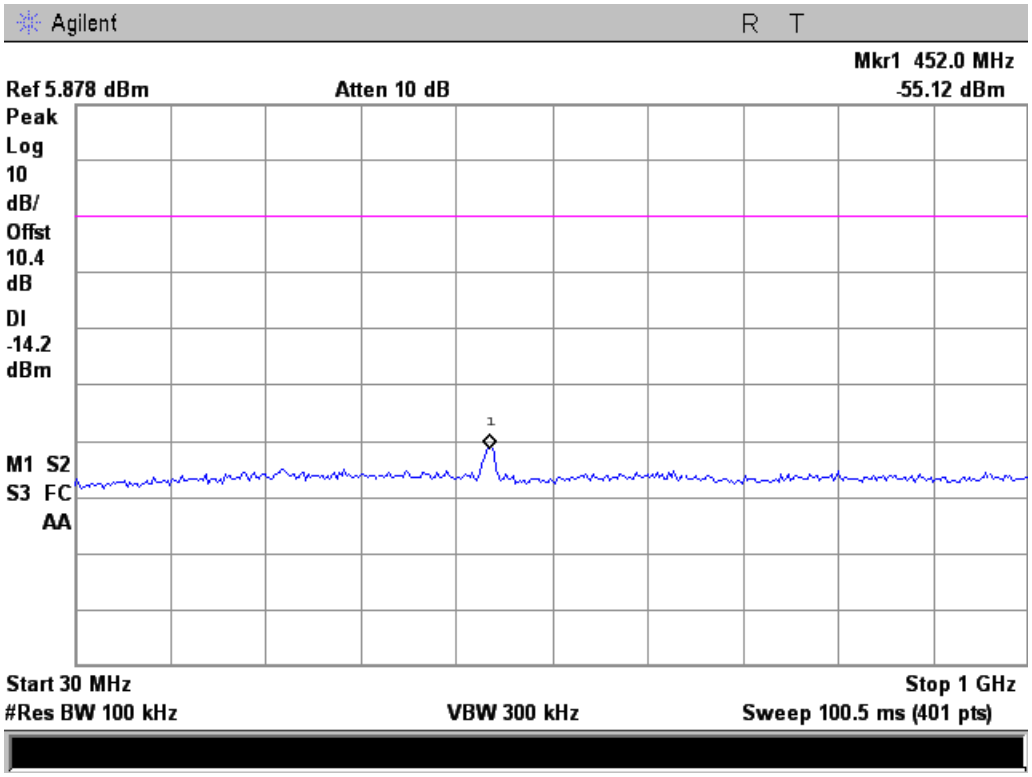
2472 MHz

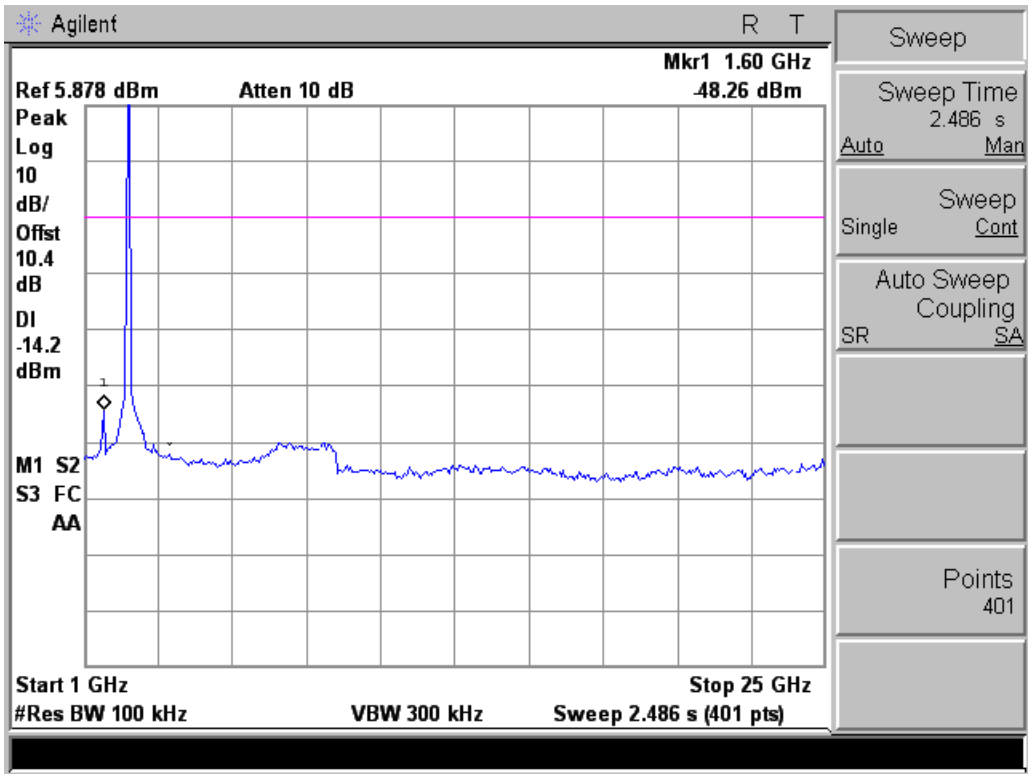

Agilent
R T
Mkr1 510.2 MHz
Ref 10.25 dBm
Atten 10 dB
-54.55 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-9.8
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 1.66 GHz
Ref 10.25 dBm
Atten 10 dB
-47 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-9.8
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 2.486 s (401 pts)

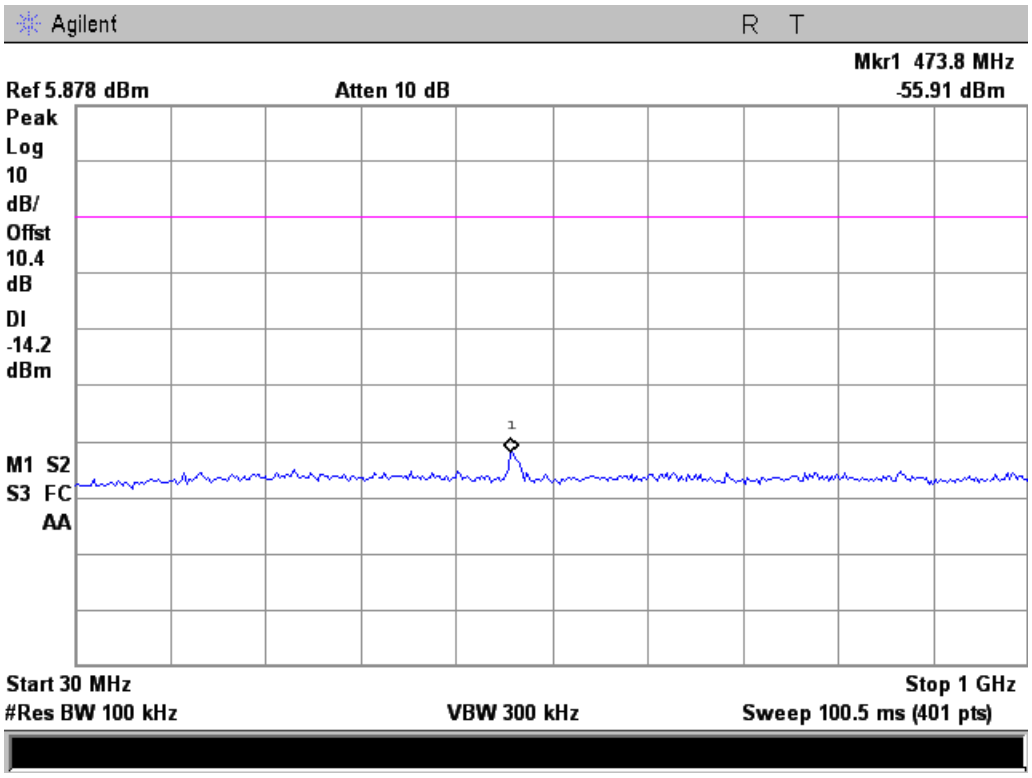
54 MB DTS Conducted Spurious Emissions

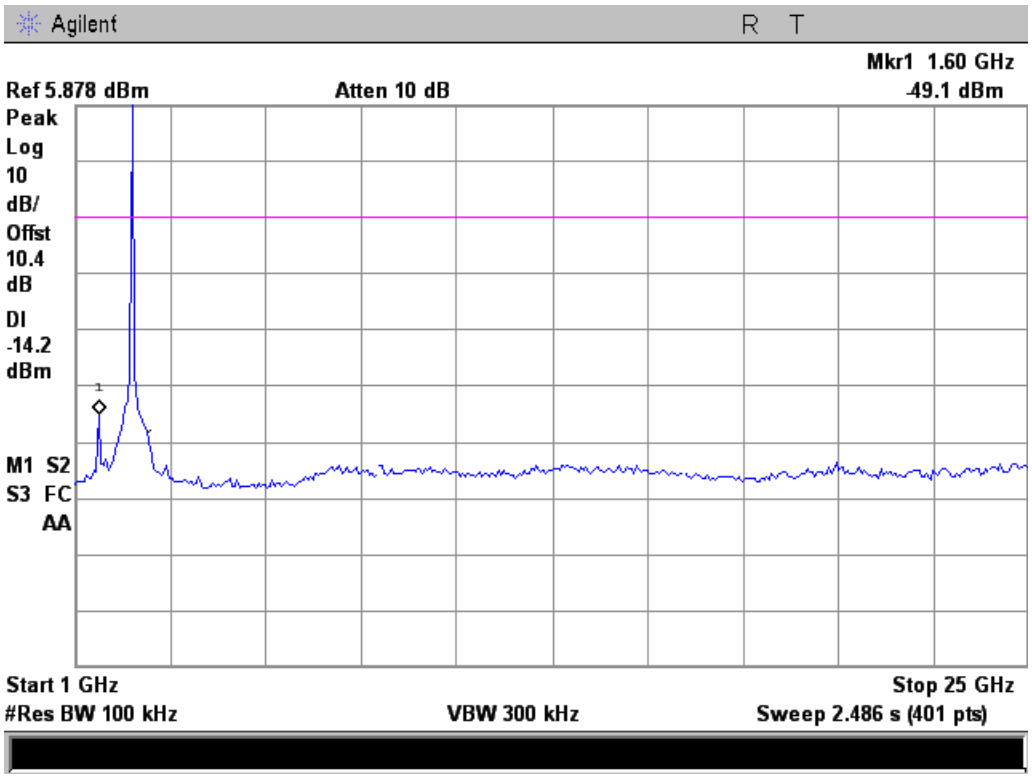
2412 MHz



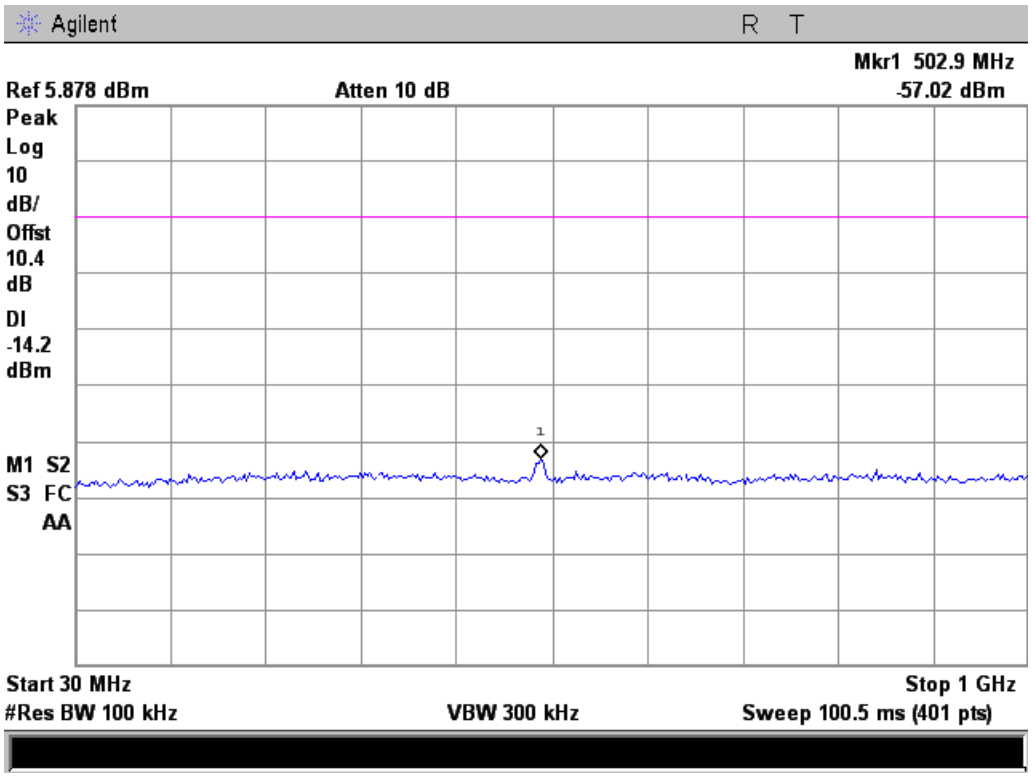


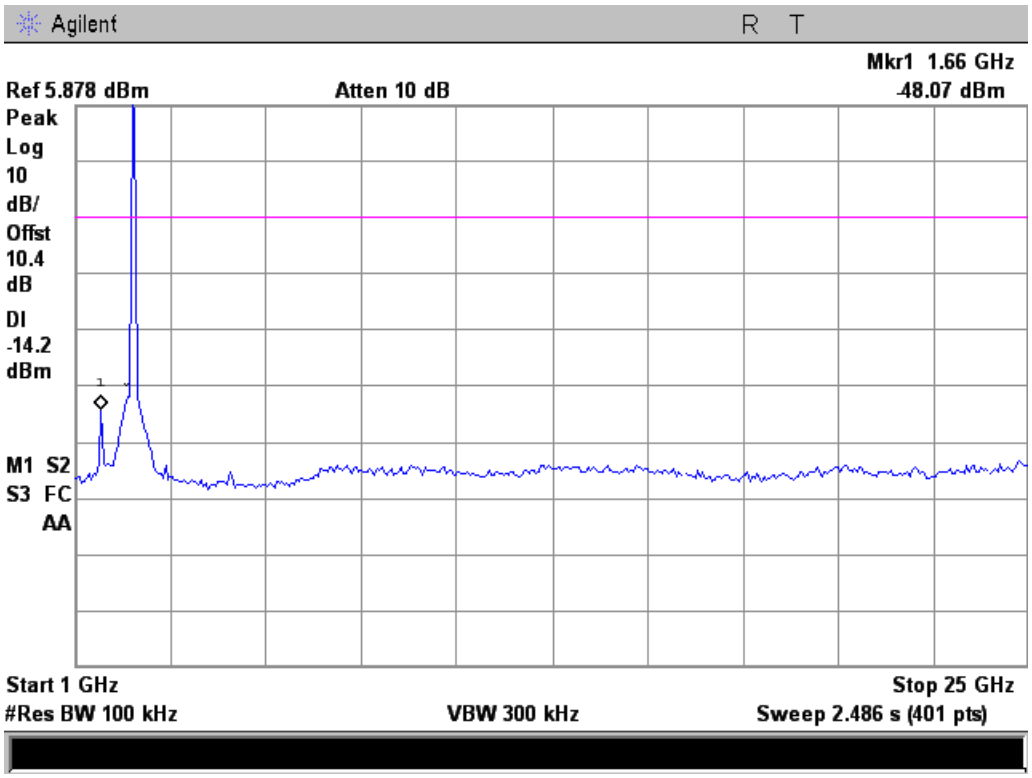
2437 MHz


Agilent
R T
Mkr1 473.8 MHz
Ref 5.878 dBm
Atten 10 dB
-55.91 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-14.2
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 1.60 GHz
Ref 5.878 dBm
Atten 10 dB
-49.1 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-14.2
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 2.486 s (401 pts)

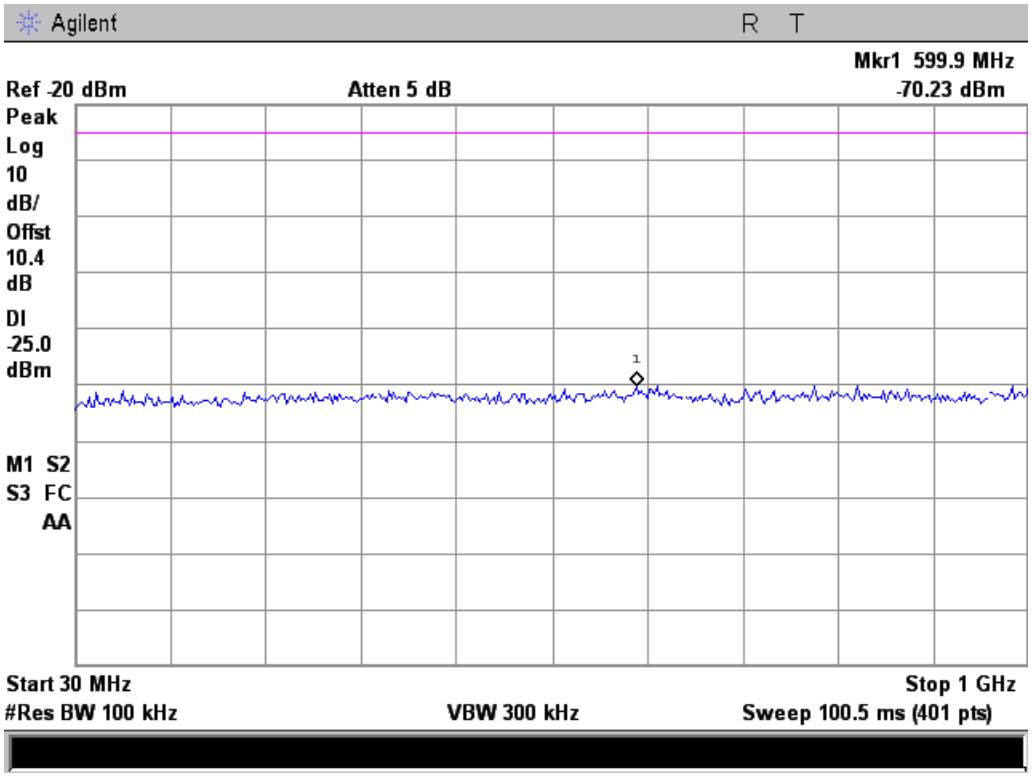
2462 MHz

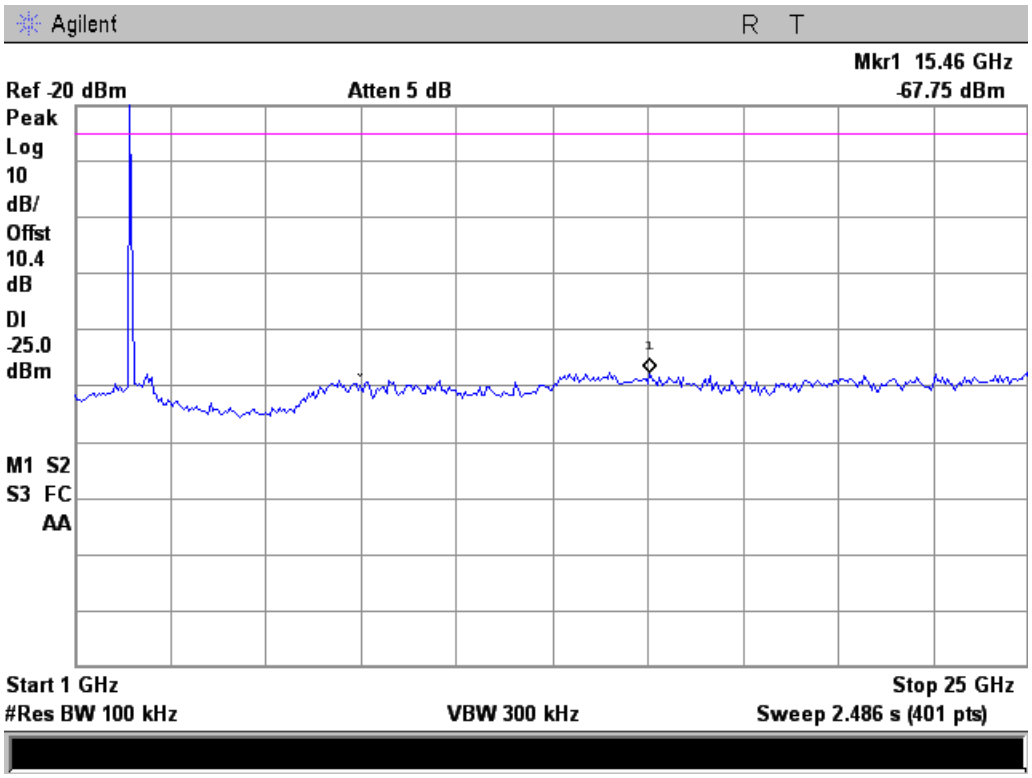

Agilent
R T
Mkr1 502.9 MHz
Ref 5.878 dBm
Atten 10 dB
-57.02 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-14.2
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 1.66 GHz
Ref 5.878 dBm
Atten 10 dB
-48.07 dBm
Peak
Log
10
dB/
Offst
10.4
dB
DI
-14.2
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 2.486 s (401 pts)

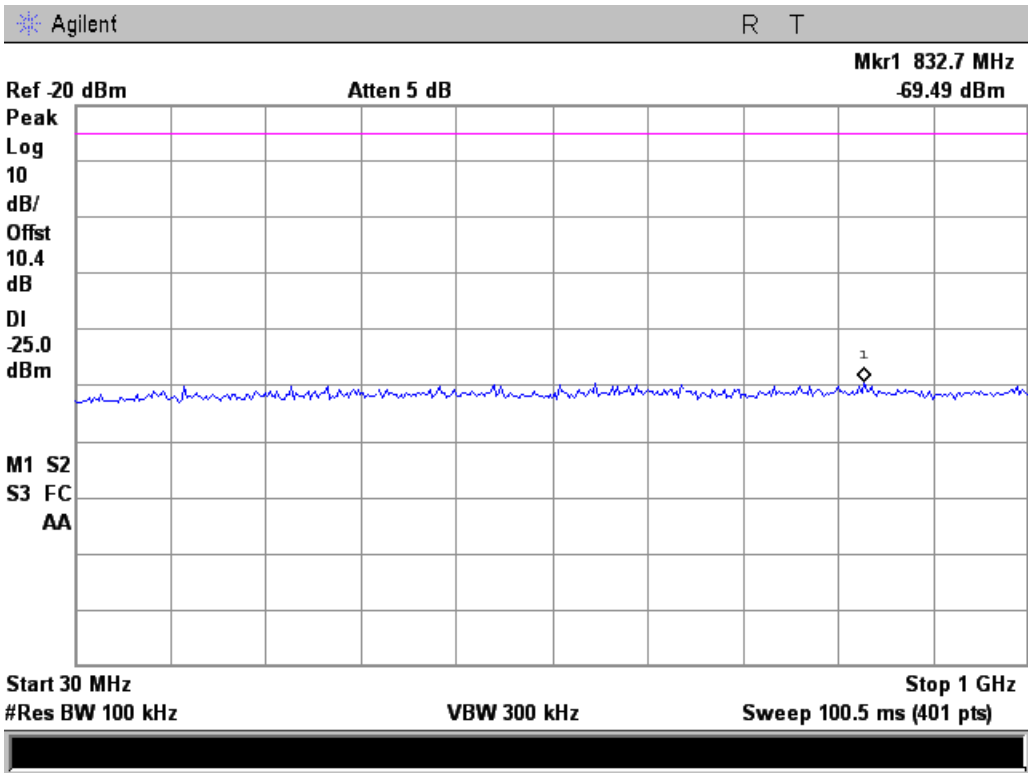
FHSS Conducted Spurious Emissions

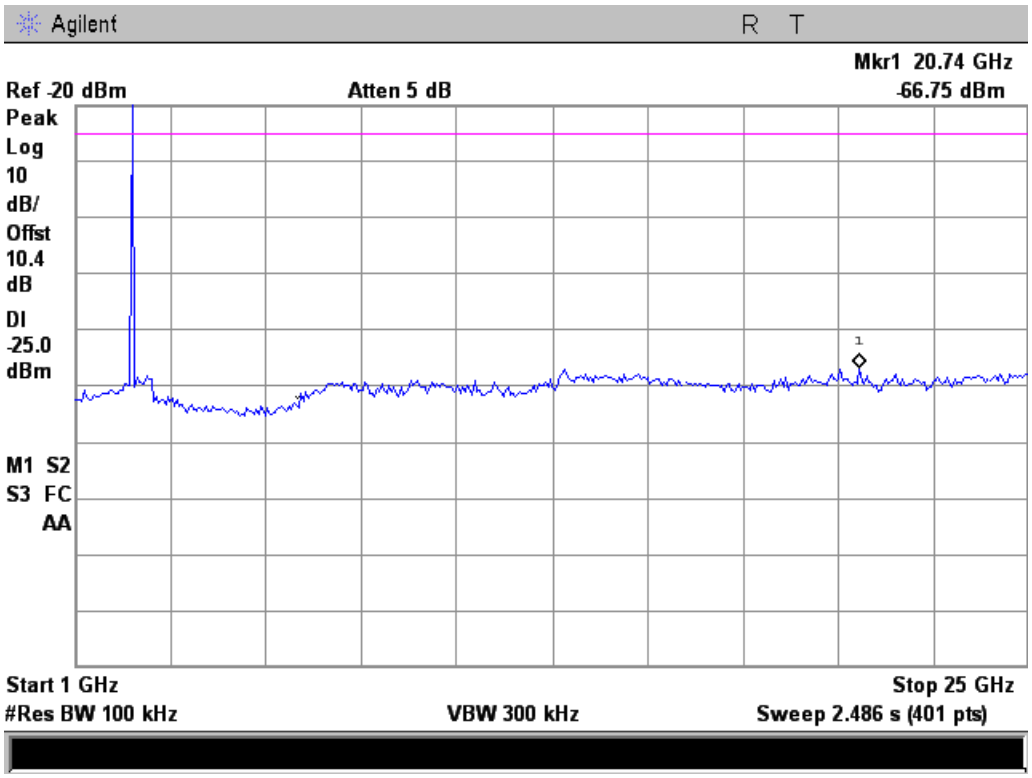
2402 MHz



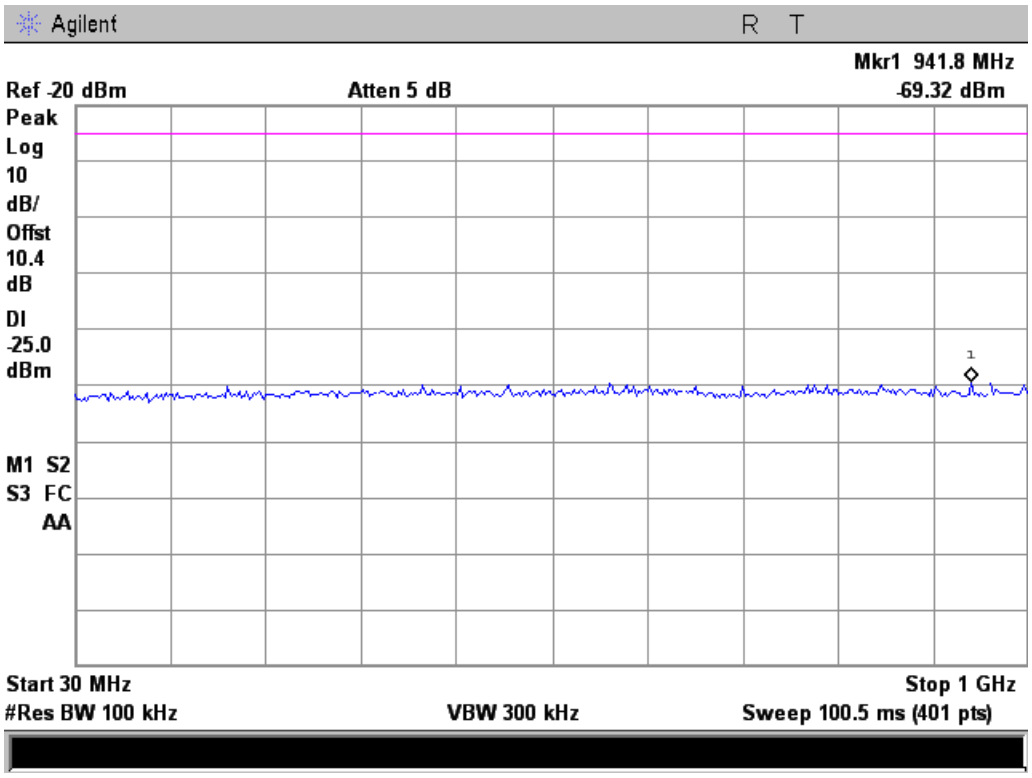


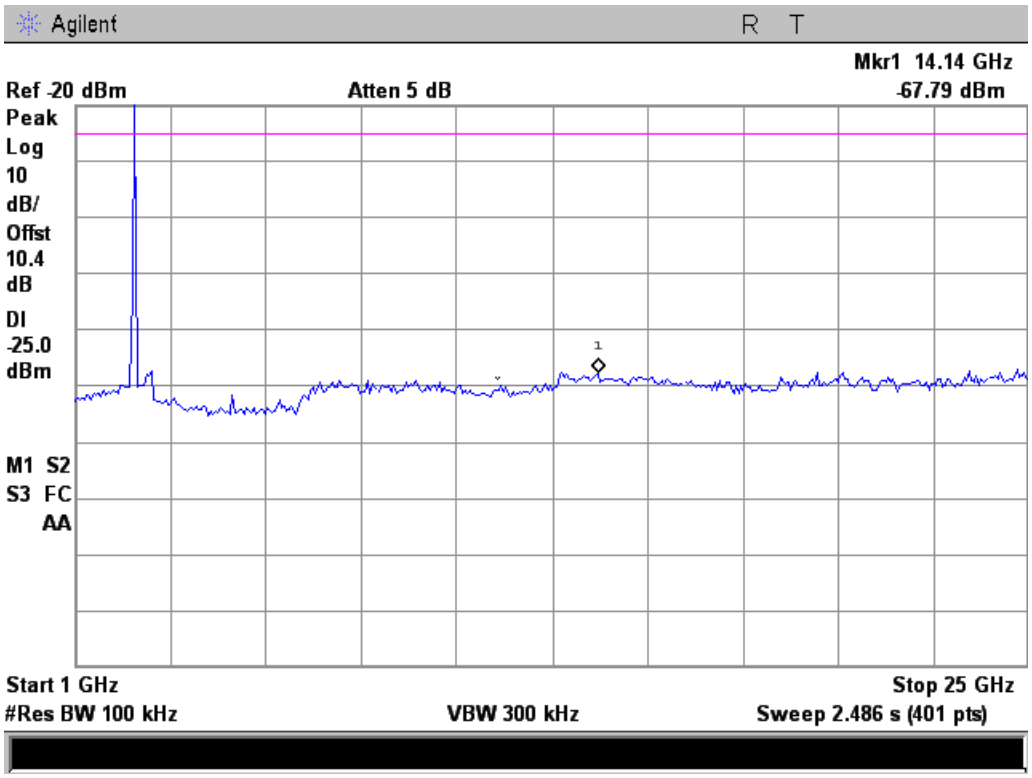
2437 MHz


Agilent
R T
Mkr1 832.7 MHz
Ref -20 dBm
Atten 5 dB
-69.49 dBm
Peak
Log
10
dB/
Offst
10.4
dB
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 20.74 GHz
Ref -20 dBm
Atten 5 dB
-66.75 dBm
Peak
Log
10
dB/
Offst
10.4
dB
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 2.486 s (401 pts)

2462 MHz


Agilent
R T
Mkr1 941.8 MHz
Ref -20 dBm
Atten 5 dB
-69.32 dBm
Peak
Log
10
dB/
Offst
10.4
dB
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
Stop 1 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 100.5 ms (401 pts)


Agilent
R T
Mkr1 14.14 GHz
Ref -20 dBm
Atten 5 dB
-67.79 dBm
Peak
Log
10
dB/
Offst
10.4
dB
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
Stop 25 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 2.486 s (401 pts)

Radiated Spurious Emissions

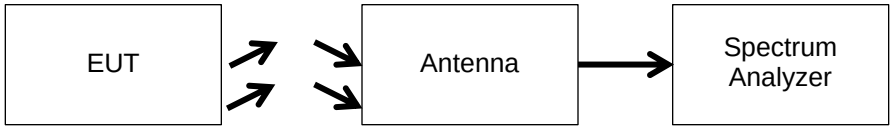
Name of Test:	Radiated Spurious Emissions	
Specification:	15.247(d), 15.209(a), 15.205	**Engineer:** John Erhard
Test Equipment Utilized:	i00028, i00033,i00103, i00267, i00379,	**Test Date:** 8/12/2011

Test Procedure
Radiated Spurious Emissions: 30 – 1000 MHz

The EUT was tested in an Open Area Test Site (OATS) set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized. All emissions from 30 MHz to the 10th harmonic were examined.
Measured Level includes antenna and receiver cable correction factors.
Correction factors were input into the spectrum analyzer before recording "Measured Level".

RBW = 100 KHz,
VBW = 300 KHz
Detector – Quasi Peak

Test Setup



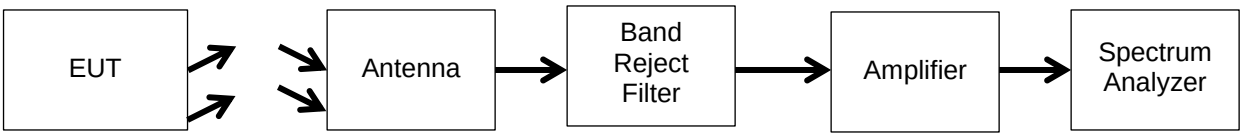
Worst case Radiated Spurious Emissions 30 MHz – 1 GHz

Emission Frequency (MHz)	Measured Value (dBuV/m)	Correction Factor (dB)	Corrected Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
37.300	9.050	16.313	25.363	40.000	-14.637
226.450	5.900	12.074	17.974	46.000	-28.026
369.000	9.750	17.222	26.972	46.000	-19.028
565.033	5.010	21.453	26.463	46.000	-19.537
654.000	5.400	22.551	27.951	46.000	-18.049
791.150	6.220	24.530	30.750	46.000	-15.250

Radiated Spurious Emissions above 1 GHz

The EUT was tested on an Open Area Test Site (OATS) set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna, band reject filter, amplifier and cable correction factors were input into the spectrum analyzer before recording the Measured Level to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10th harmonic.

Test Setup



Detector Settings	RBW	VBW	Span
Peak	1 MHz	3 MHz	As necessary
Average	1 MHz	3 MHz	As necessary

11 MB DTS Radiated Spurious Emissions

Tuned Freq (MHz)	Emission Freq (MHz)	Peak Measured Value (dBuV/m)	Peak Limit (dBuV/m)	Average Measured Value (dBuV/m)	Average Limit (dBuV/m)	Result
2412	4824	53.77	74.0	46.71	54.0	Pass
2412	7236	59.9	74.0	51.57	54.0	Pass
2412	9648	58.58	74.0	52.51	54.0	Pass
2437	4874	46.16	74.0	40.90	54.0	Pass
2437	7311	48.7	74.0	43.58	54.0	Pass
2437	9748	57.1	74.0	52.56	54.0	Pass
2472	4944	51.22	74.0	40.47	54.0	Pass
2472	7416	48.89	74.0	43.75	54.0	Pass
2472	9888	53.72	74.0	50.81	54.0	Pass

54 MB DTS Radiated Spurious Emissions

Tuned Freq (MHz)	Emission Freq (MHz)	Peak Measured Value (dBuV/m)	Peak Limit (dBuV/m)	Average Measured Value (dBuV/m)	Average Limit (dBuV/m)	Result
2412	4824	46.39	74.0	41.9	54.0	Pass
2412	7236	47.43	74.0	43.39	54.0	Pass
2412	9648	56.79	74.0	50.37	54.0	Pass
2437	4874	47.0	74.0	41.83	54.0	Pass
2437	7311	48.8	74.0	42.11	54.0	Pass
2437	9748	57.08	74.0	49.78	54.0	Pass
2462	4924	54.54	74.0	40.34	54.0	Pass
2462	7386	47.97	74.0	43.13	54.0	Pass
2462	9848	55.96	74.0	48.99	54.0	Pass

FHSS Radiated Spurious Emissions

Tuned Freq (MHz)	Emission Freq (MHz)	Peak Measured Value (dBuV/m)	Peak Limit (dBuV/m)	Average Measured Value (dBuV/m)	Average Limit (dBuV/m)	Result
2402	4804	47.97	74.0	40.31	54.0	Pass
2402	7206	49.24	74.0	42.78	54.0	Pass
2402	9608	55.91	74.0	51.76	54.0	Pass
2442	4884	45.53	74.0	41.44	54.0	Pass
2442	7326	51.51	74.0	43.79	54.0	Pass
2442	9768	54.21	74.0	51.08	54.0	Pass
2480	4960	47.78	74.0	43.09	54.0	Pass
2480	7440	48.59	74.0	43.36	54.0	Pass
2480	9920	57.17	74.0	51.84	54.0	Pass

No other emissions were detectable. All emissions were greater than -20 dBc.

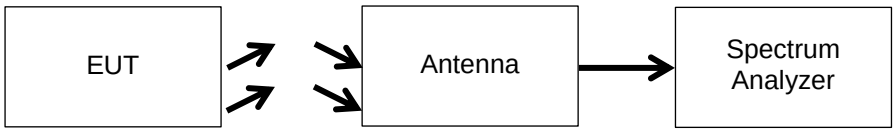
Emissions at Band Edges

Name of Test:	Emissions At Band Edges		
Specification:	15.247(d), 15.209(a), 15.205	**Engineer:** John Erhard	
Test Equipment Utilized:	i00028, i00103, i00379, i00385	**Test date:** 8/12/2011	

Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for band edge and restricted band for both peak and average measurements. The cable and antenna correction factors were input into the analyzer as a reference level offset to ensure accurate readings were obtained. For the restricted band the amplifier and band reject filter correction factors were also input to the spectrum analyzer.

Band Edge Test Setup



11 MB DTS Band Edge Emissions Summary

Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBc)	Detector	Limit (dBc)	Result
2412	2400	39.59	Peak	-20 dBc	Pass
2472	2483.5	39.81	Peak	-20dBc	Pass

54 MB DTS Band Edge Emissions Summary

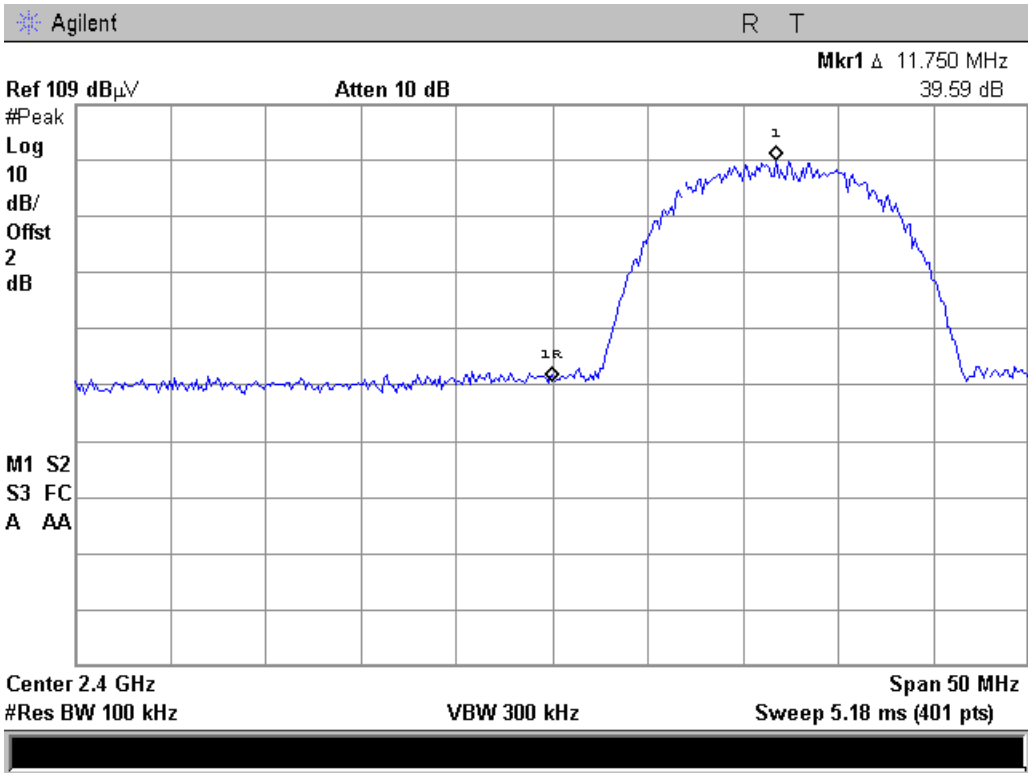
Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBc)	Detector	Limit (dBc)	Result
2412	2400	30.63	Peak	-20 dBc	Pass
2462	2483.5	35.17	Peak	-20dBc	Pass

FHSS Band Edge Emissions Summary

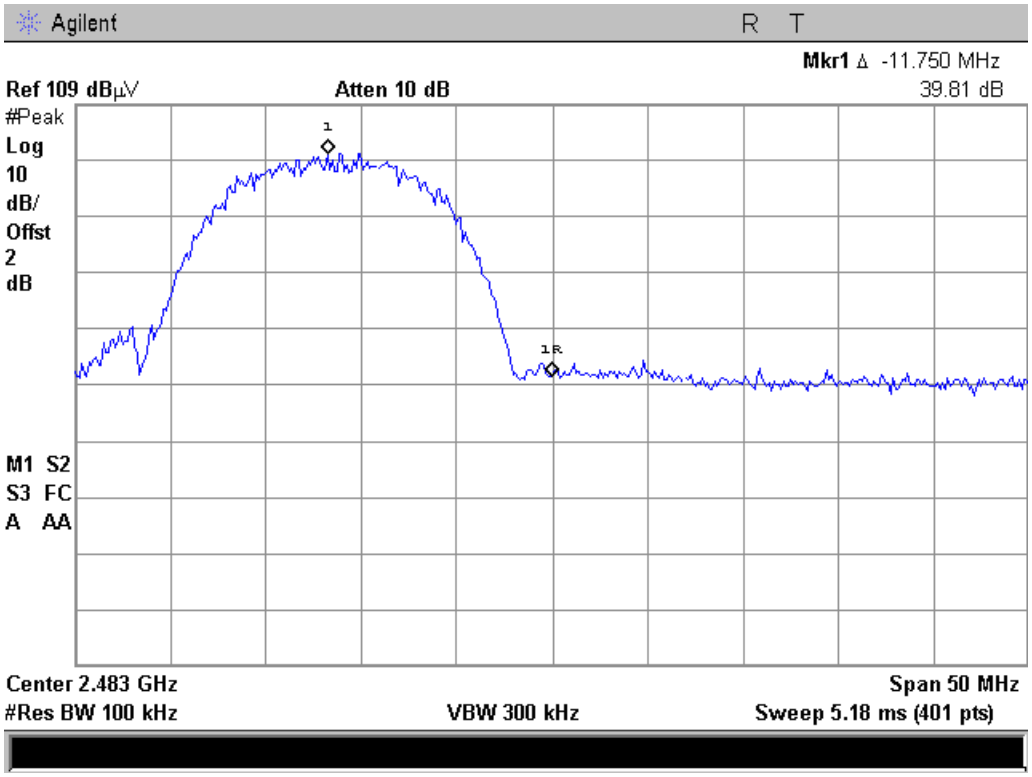
Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBc)	Detector	Limit (dBc)	Result
2402	2400	28.72	Peak	-20 dBc	Pass
2480	2483.5	28.98	Peak	-20dBc	Pass

11 MB DTS Band Edge

2400 MHz

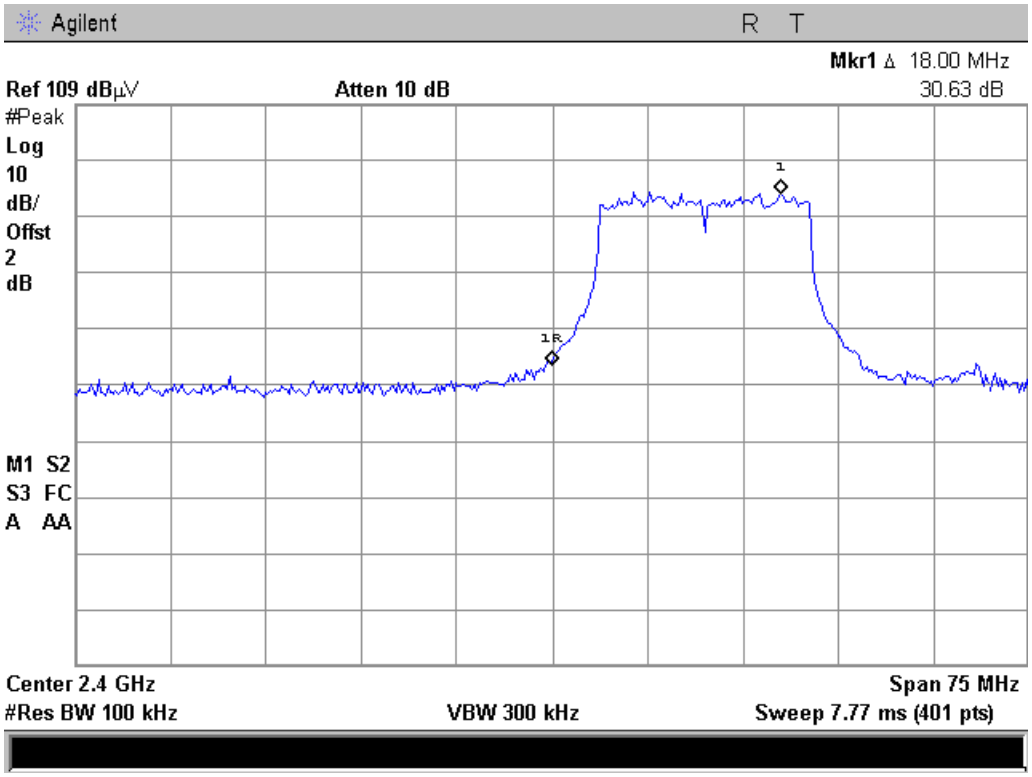


2483.5 MHz

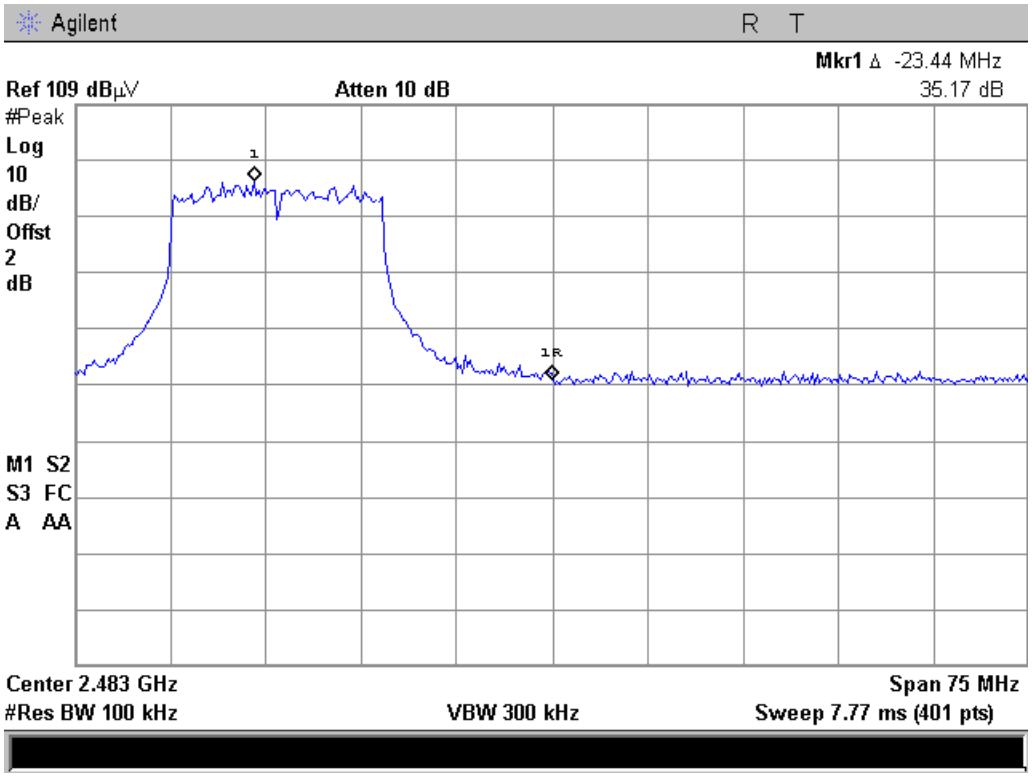


54 MB DTS Band Edge

2400 MHz

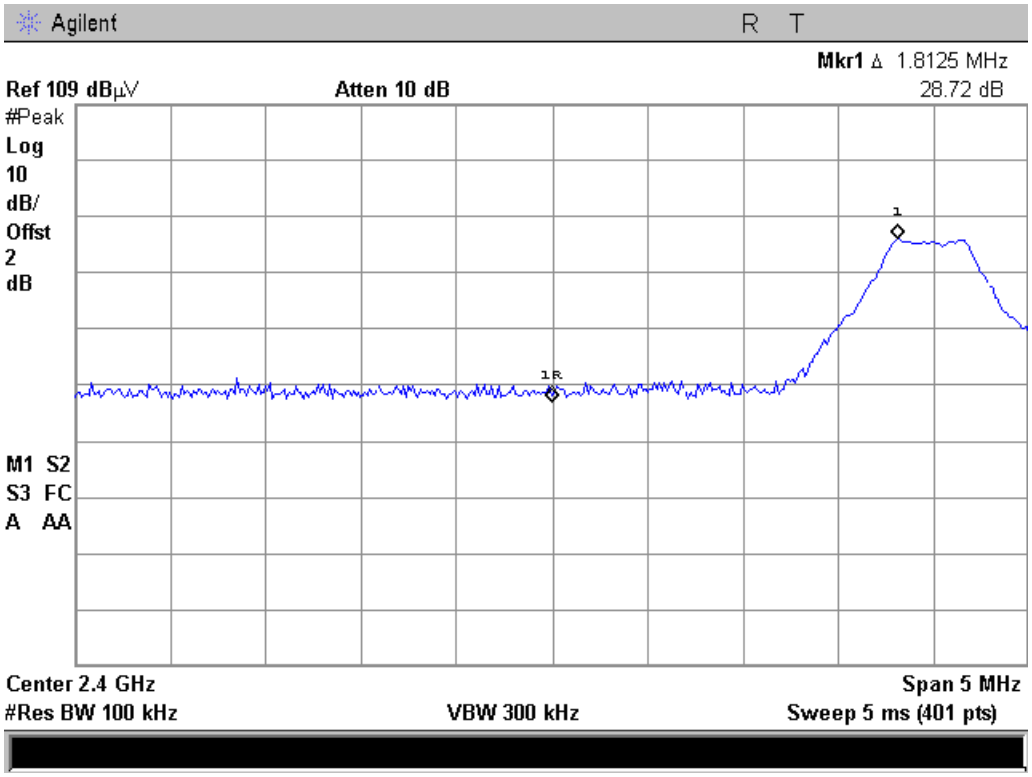


2483.5 MHz

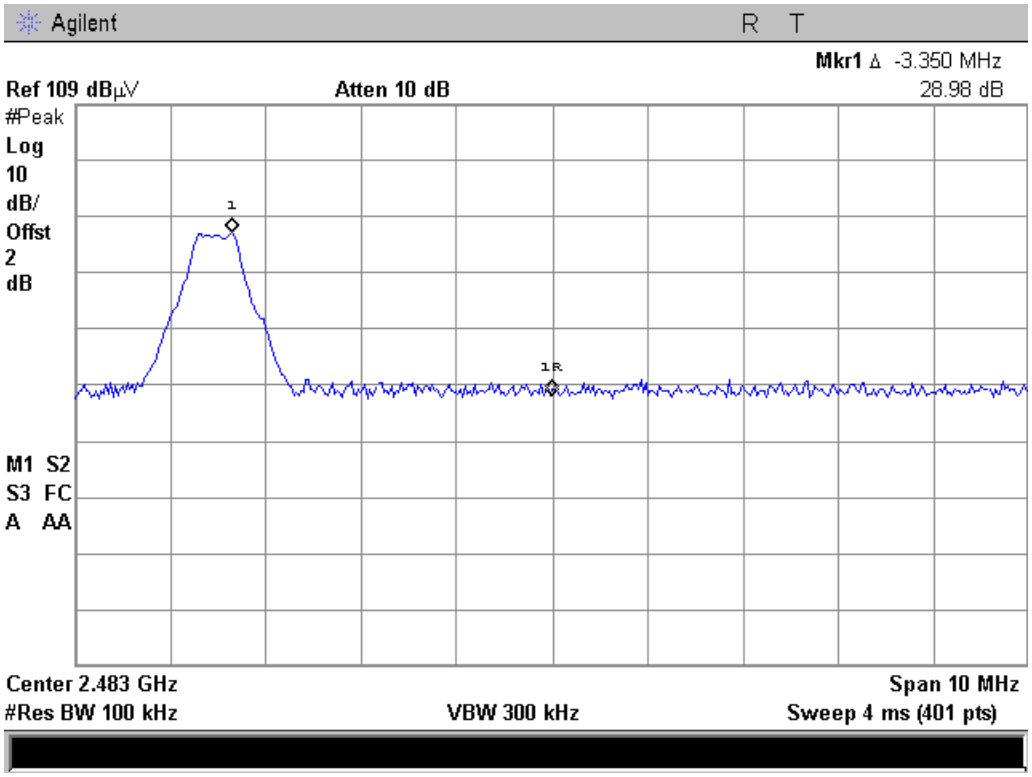


FHSS Band Edge

2400 MHz



2483.5 MHz



Restricted Band Test Setup

11 MB DTS Restricted Band Emissions Summary

Restricted Band (MHz)	Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBuV/m)	Detector	Limit (dBuV/m)	Result
2300 – 2390	2412	2337.99	52.04	Peak	74	Pass
2300 – 2390	2412	2377.89	45.4	Average	54	Pass
2483.5 - 2500	2472	2881.5	59.45	Peak	74	Pass
2483.5 - 2500	2472	2488.075	53.21	Average	54	Pass

54 MB DTS Restricted Band Emissions Summary

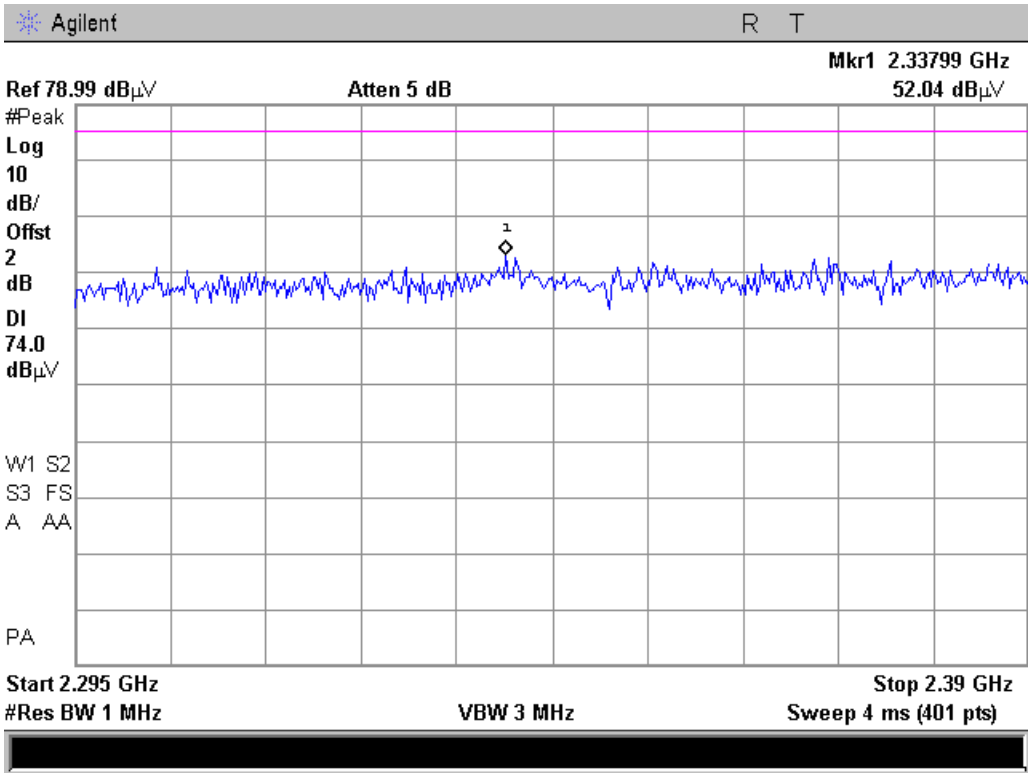
Restricted Band (MHz)	Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBuV/m)	Detector	Limit (dBuV/m)	Result
2300 – 2390	2412	2378.84	53.37	Peak	74	Pass
2300 – 2390	2412	2388.34	47.01	Average	54	Pass
2483.5 - 2500	2462	2484.325	61.31	Peak	74	Pass
2483.5 - 2500	2462	2483.5	51.22	Average	54	Pass

FHSS Restricted Band Emissions Summary

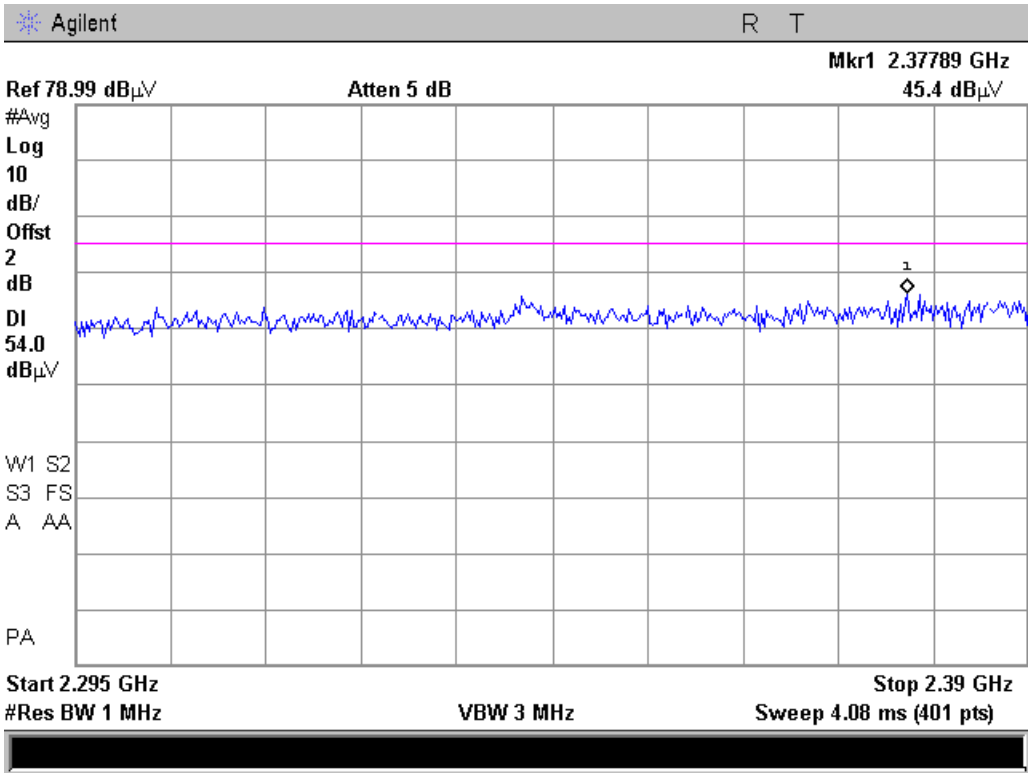
Restricted Band (MHz)	Tuned Freq (MHz)	Emission Freq (MHz)	Measured Value (dBuV/m)	Detector	Limit (dBuV/m)	Result
2300 – 2390	2402	2336.80	50.61	Peak	74	Pass
2300 – 2390	2402	2336.56	44.59	Average	54	Pass
2483.5 - 2500	2480	2483.5	50.5	Peak	74	Pass
2483.5 - 2500	2480	2483.5	43.81	Average	54	Pass

11 MB DTS Restricted Band

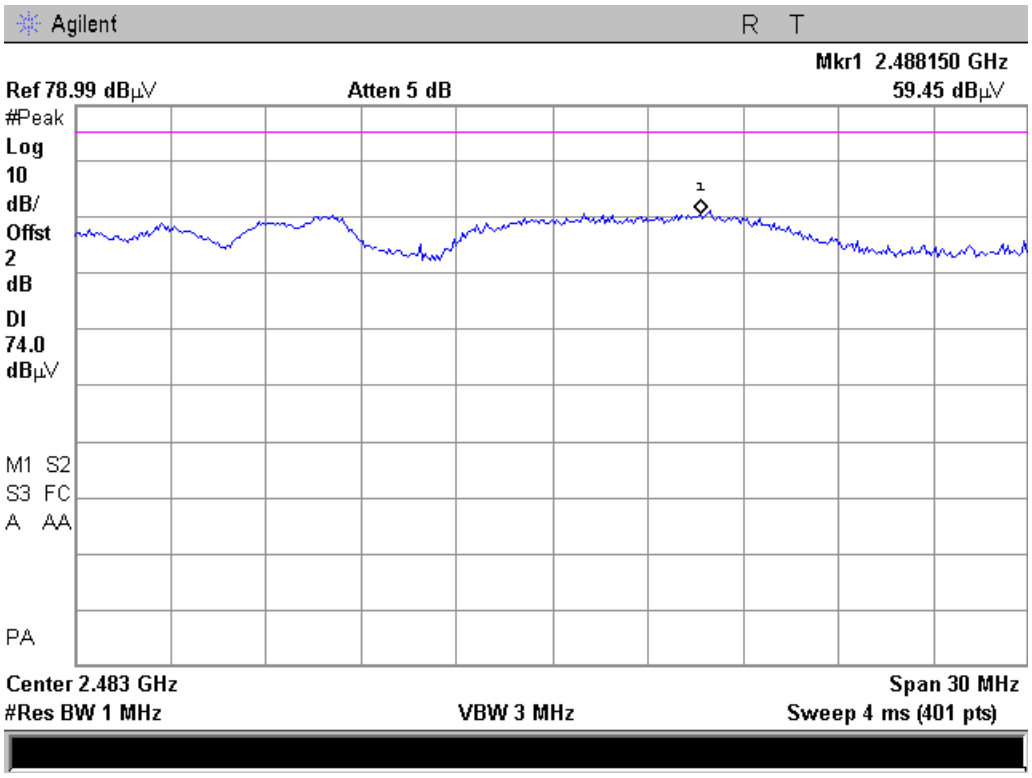
2300 – 2390 MHz – Peak



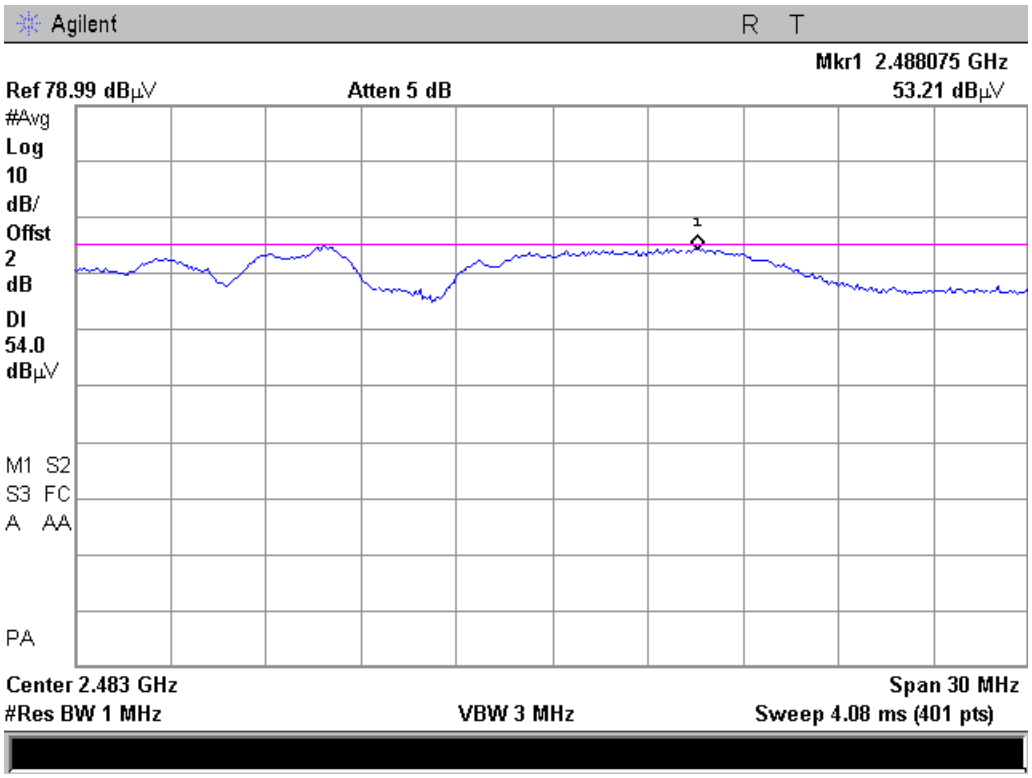
2300 – 2390 MHz – Avg



2483.5 – 2500 MHz – Peak

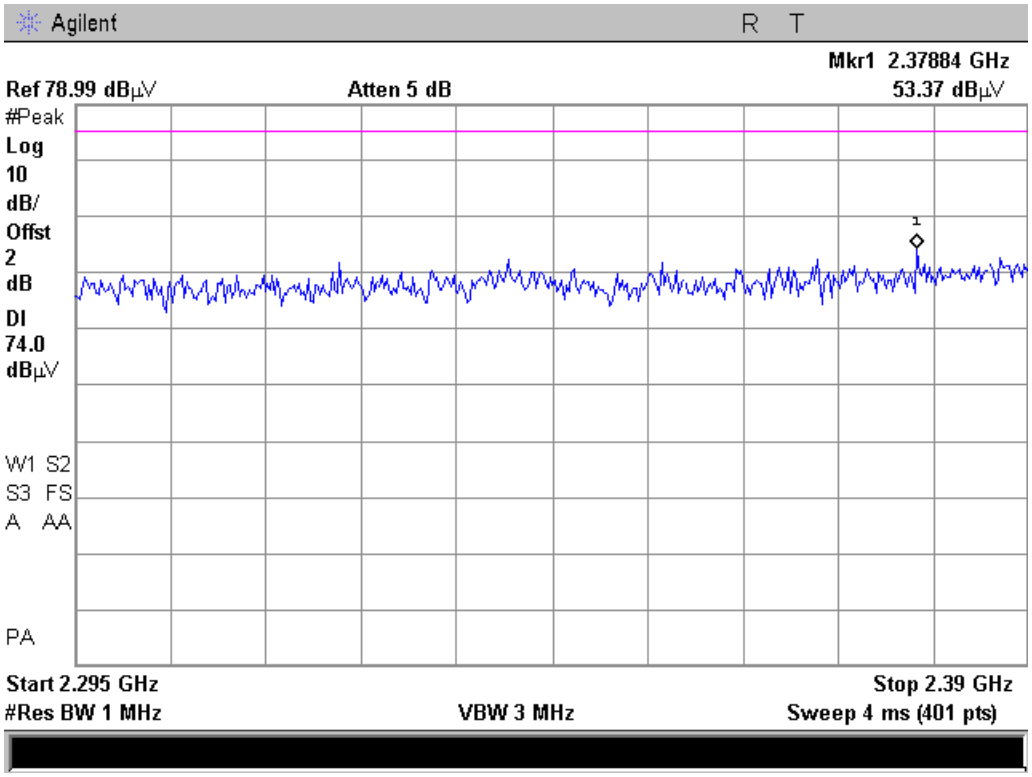


2483.5 – 2500 MHz – Avg

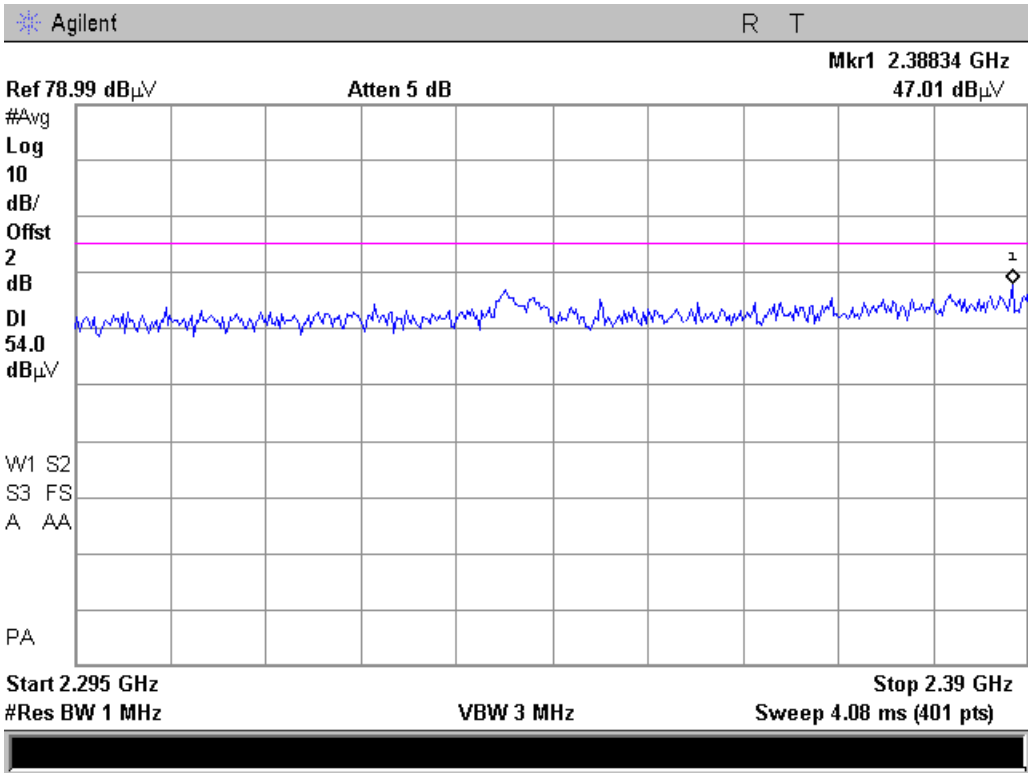


54 MB DTS Restricted Band

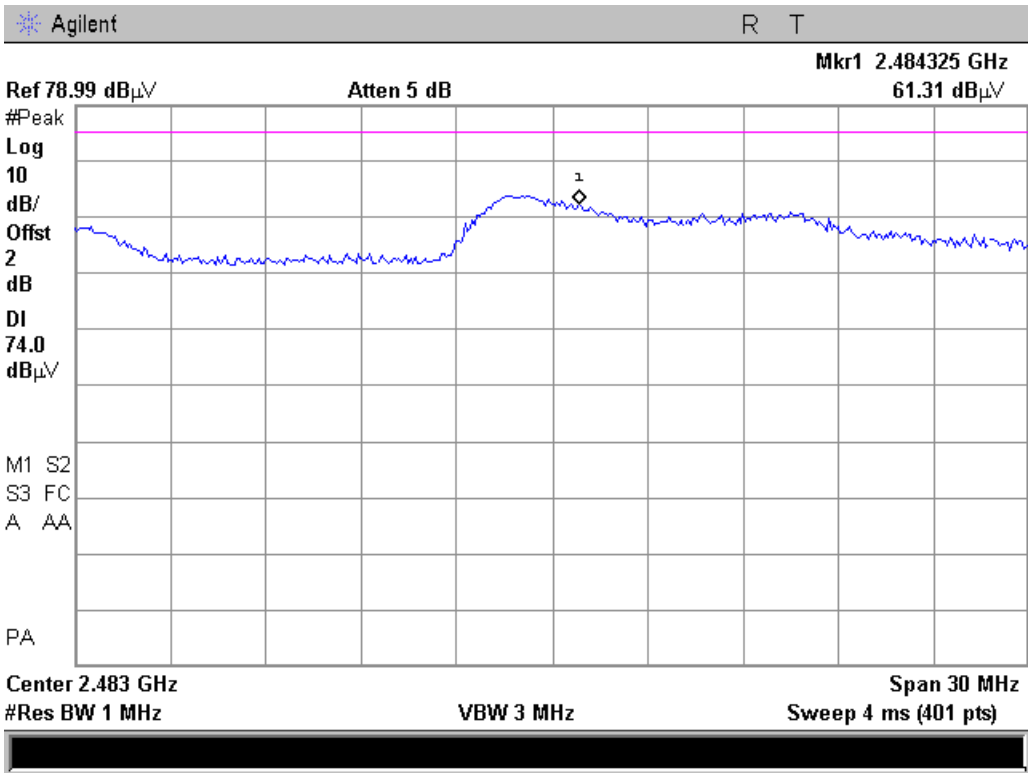
2300 – 2390 MHz – Peak



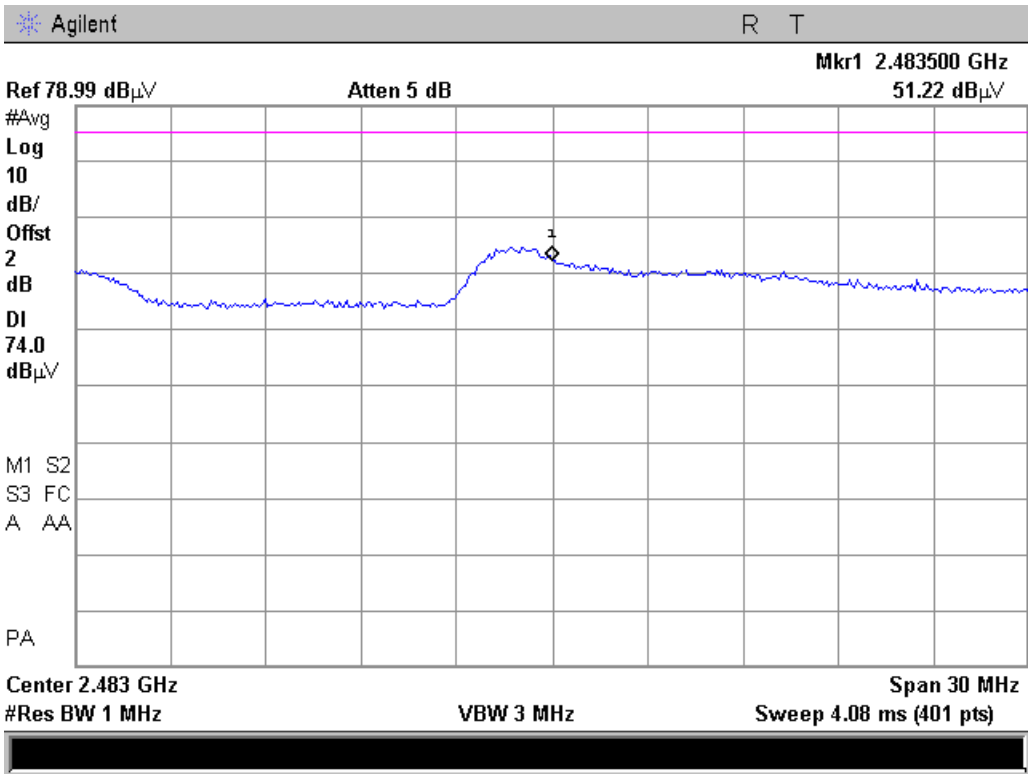
2300 – 2390 MHz – Avg



2483.5 – 2500 MHz – Peak

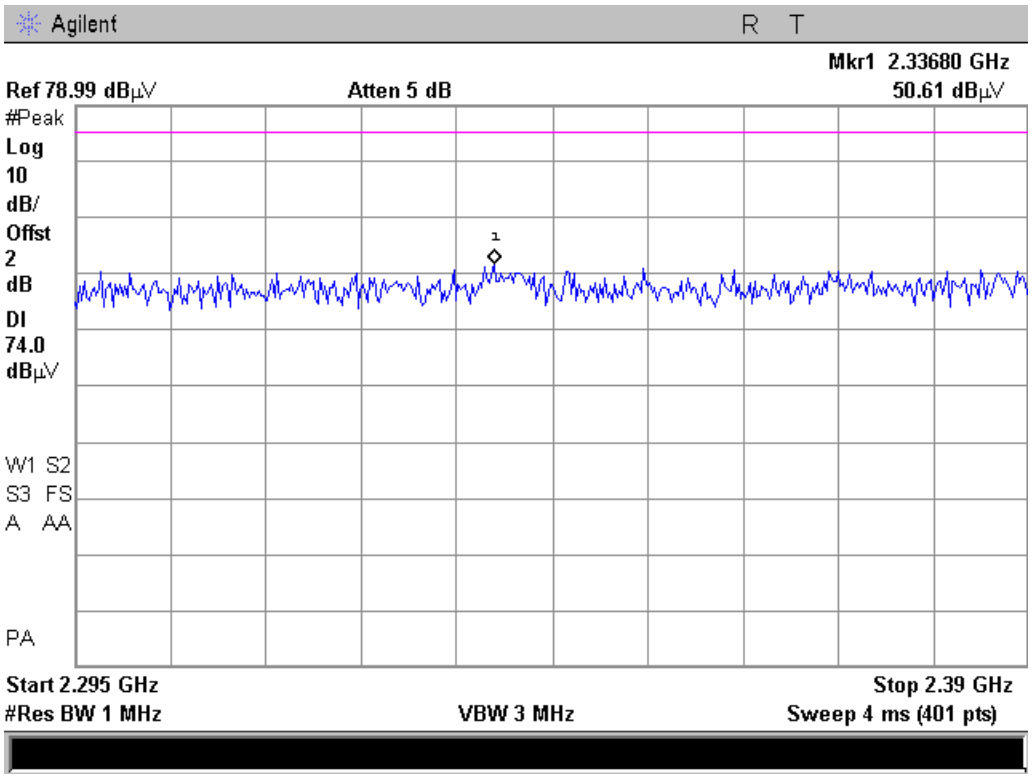


2483.5 – 2500 MHz – Avg

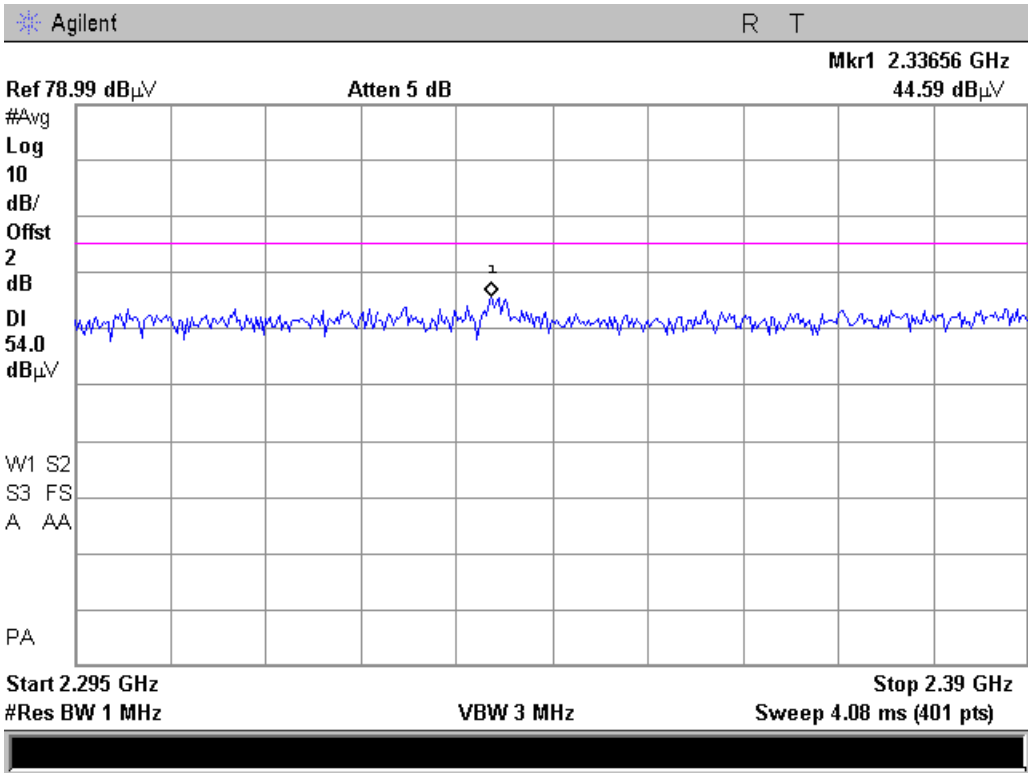


FHSS Restricted Band

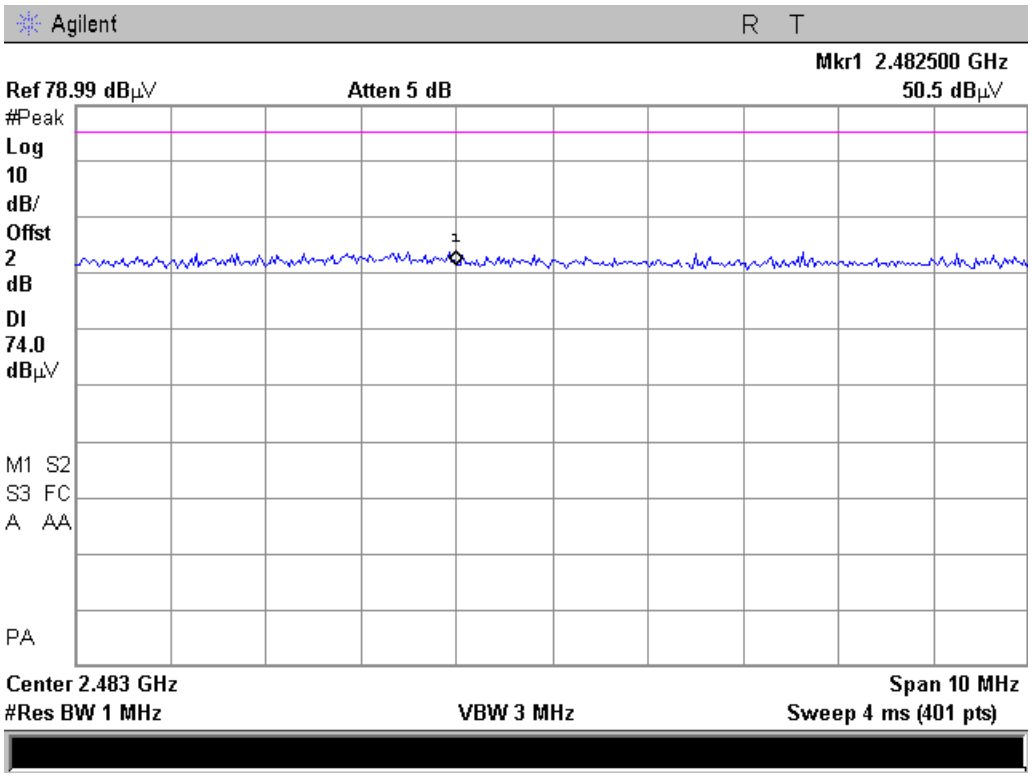
2300 – 2390 MHz – Peak



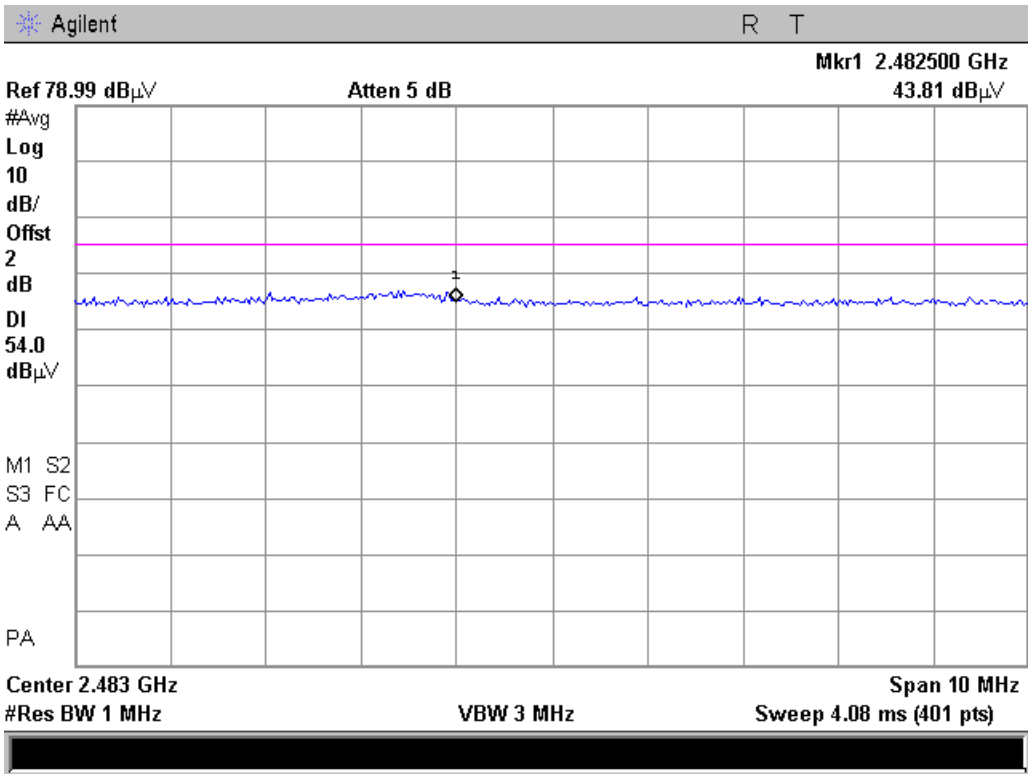
2300 – 2390 MHz – Avg



2483.5 – 2500 MHz – Peak



2483.5 – 2500 MHz – Avg



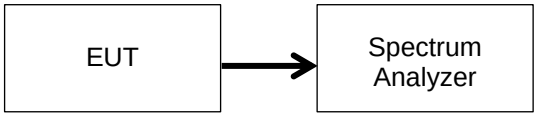
Occupied Bandwidth

Name of Test: Occupied Bandwidth
Specification: 15.247(a)(2), RSS-210 A8.1 **Engineer:** John Erhard
Test Equipment Utilized: i00331 **Test Date:** 8/10/2011

Test Procedure

The EUT was connected directly to a spectrum analyzer. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span.
The analyzer was set to max hold and when the entire spectrum was captured the 6dB and 99% bandwidths were measured to verify the bandwidth met the specification.

Test Setup



FCC 11 MB DTS 6 dB Occupied Bandwidth Summary

Frequency MHz	Measured Bandwidth MHz	Specification Limit kHz	Result
2412	13.5842	≥ 500	Pass
2437	13.5844	≥ 500	Pass
2472	13.5926	≥ 500	Pass

FCC 54 MB DTS 6 dB Occupied Bandwidth Summary

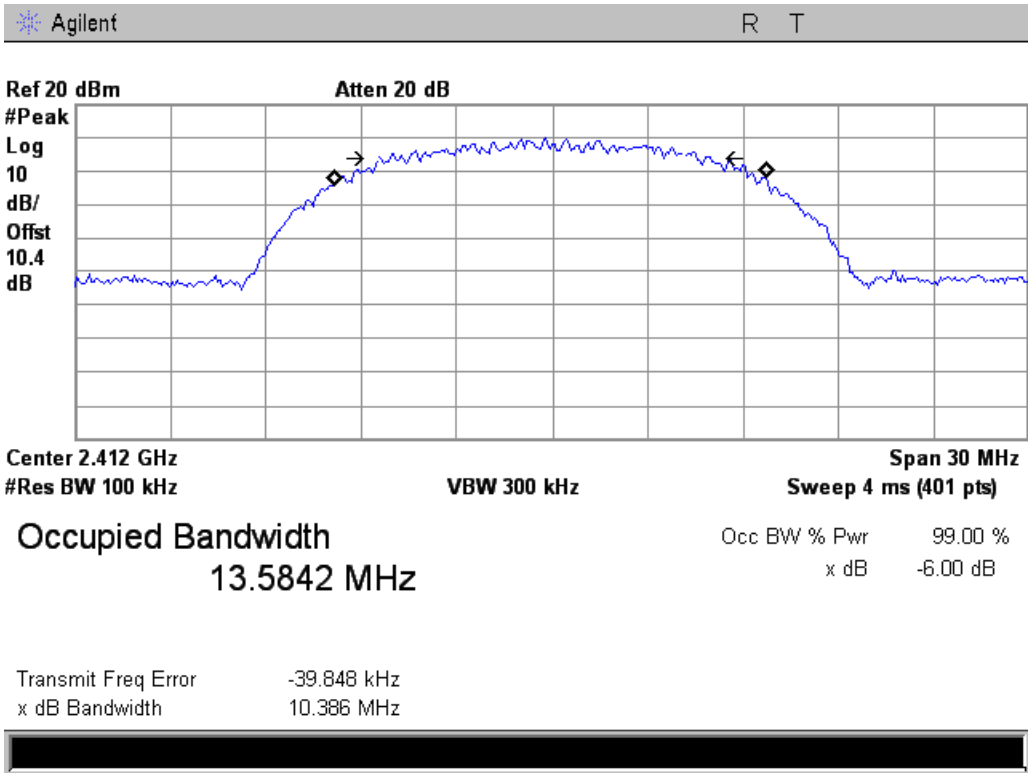
Frequency MHz	Measured Bandwidth MHz	Specification Limit kHz	Result
2412	16.4891	≥ 500	Pass
2437	16.4829	≥ 500	Pass
2462	16.5063	≥ 500	Pass

FCC FHSS 20 dB Occupied Bandwidth Summary

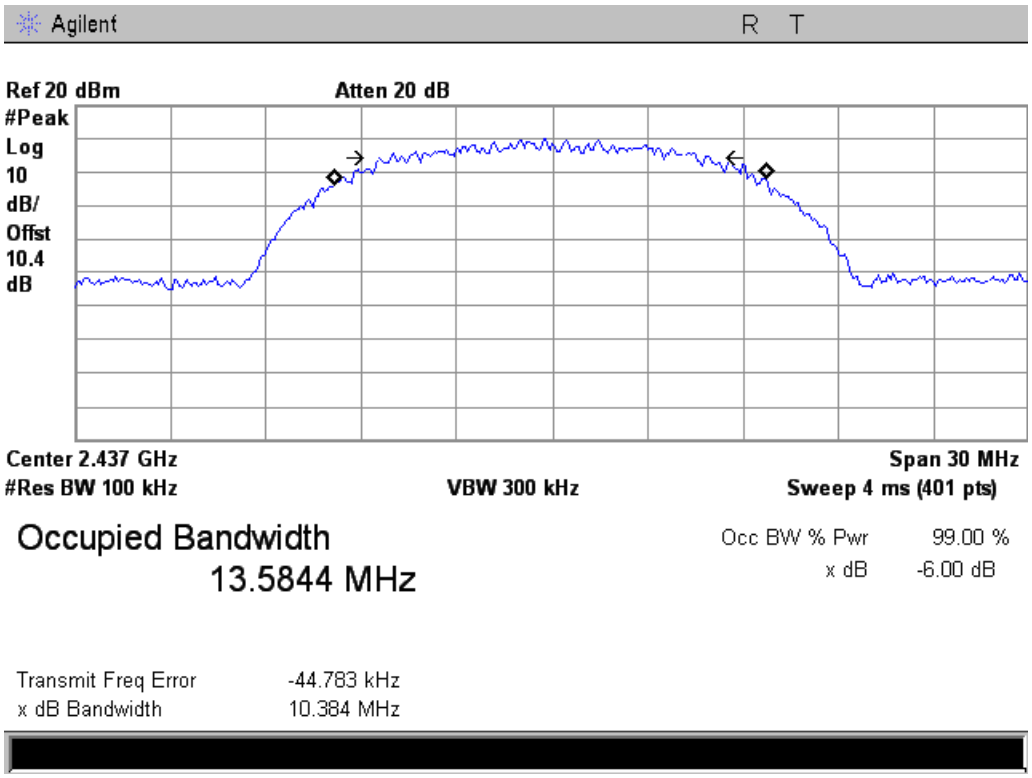
Frequency MHz	Measured Bandwidth kHz	Result
2402	956.0456	Pass
2442	957.2998	Pass
2480	947.0491	Pass

11 MB DTS Occupied Bandwidth Plots

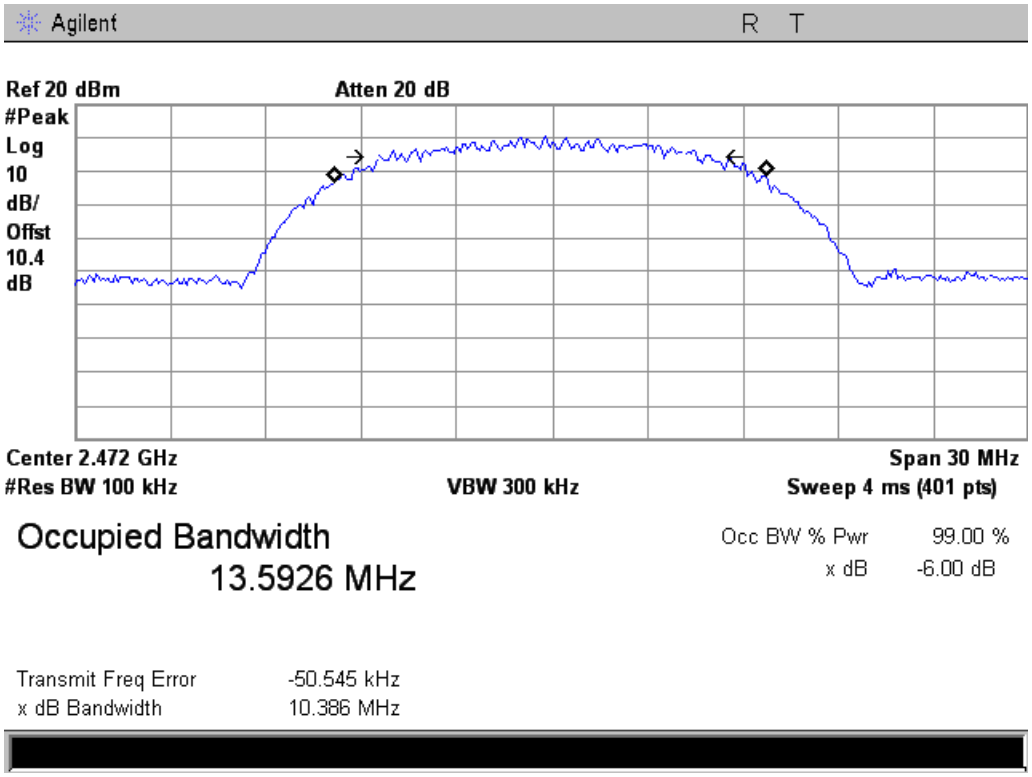
2412 MHz



2437 MHz

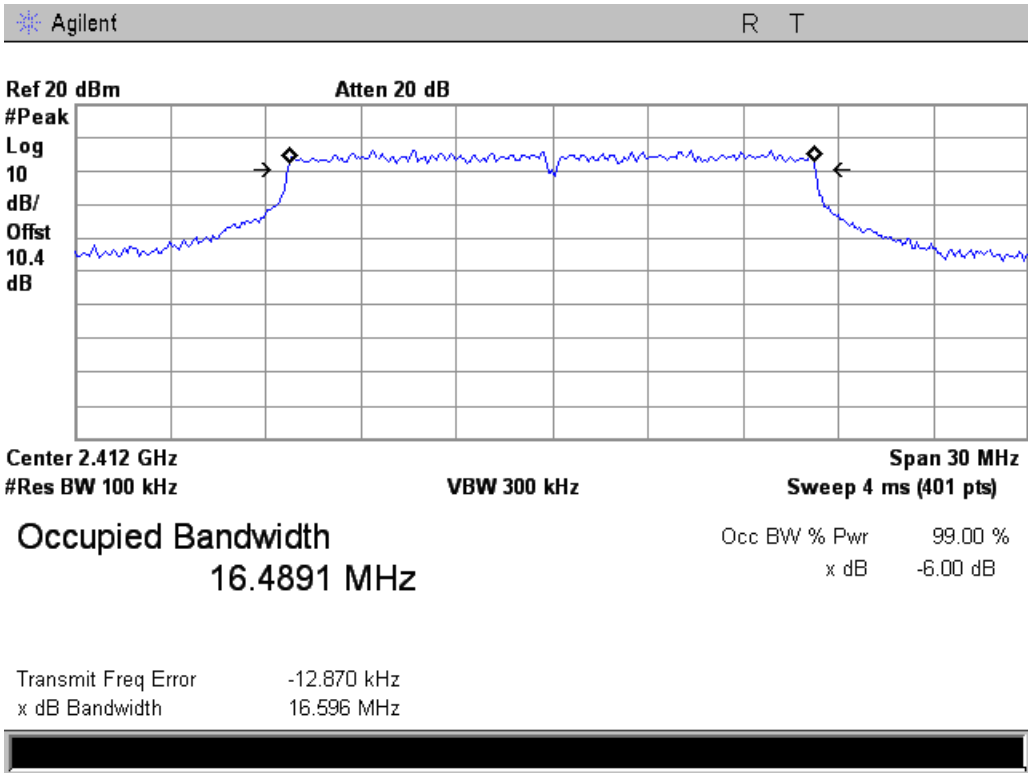


2472 MHz

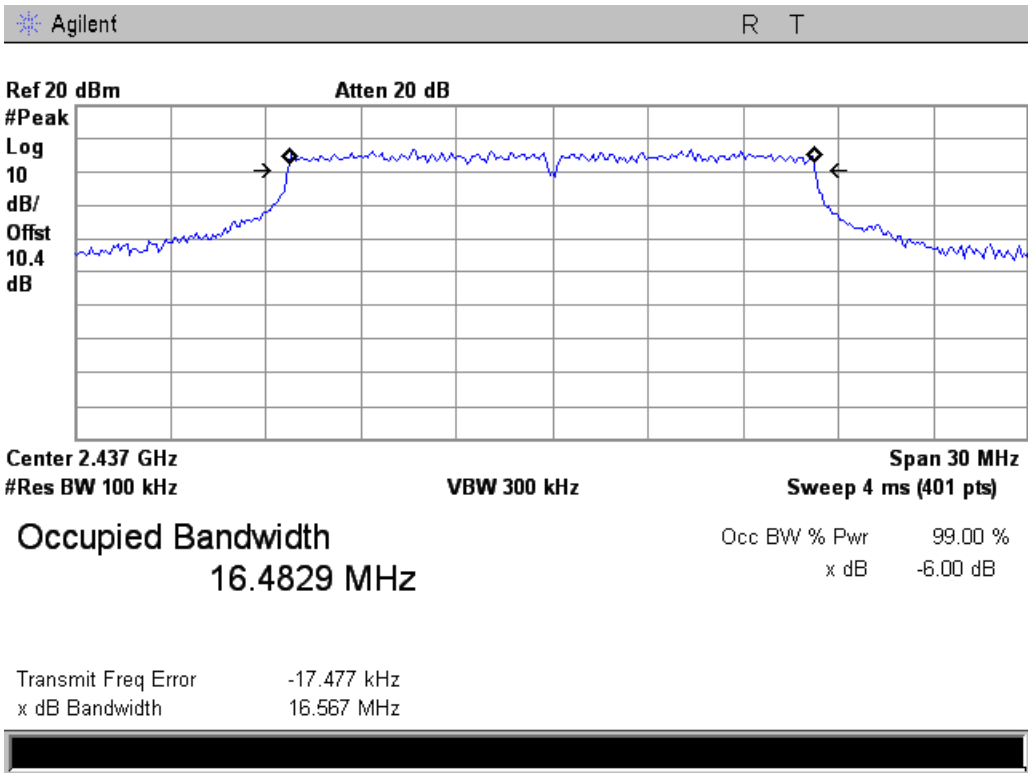


54 MB DTS Occupied Bandwidth Plots

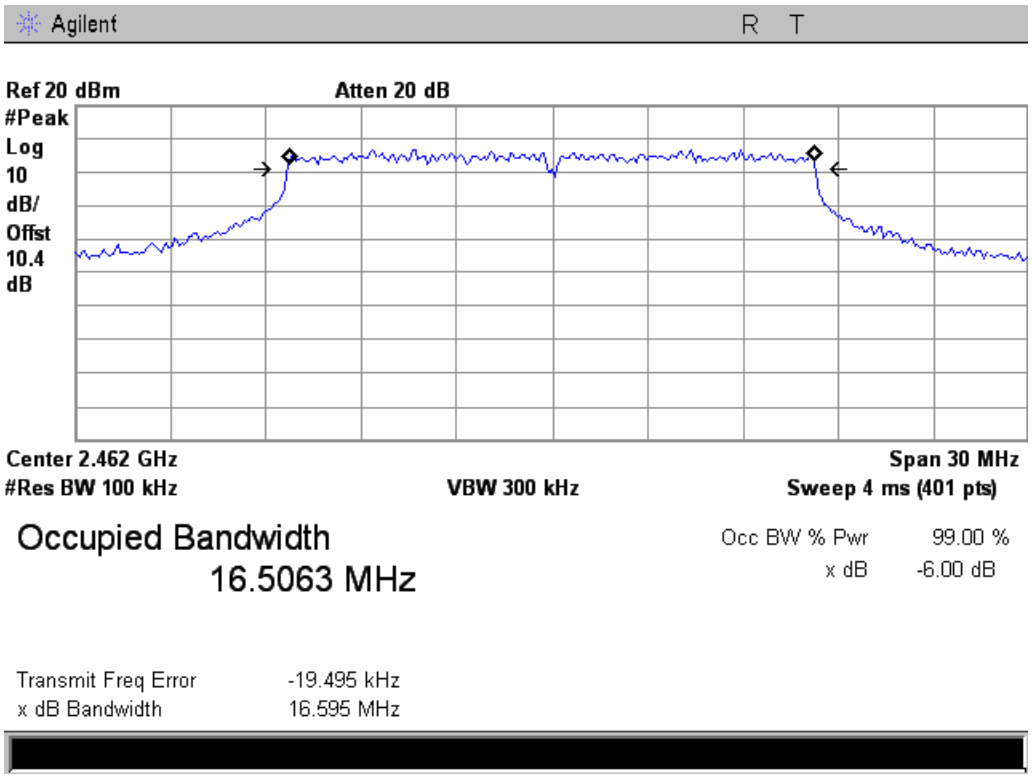
2412 MHz



2437 MHz

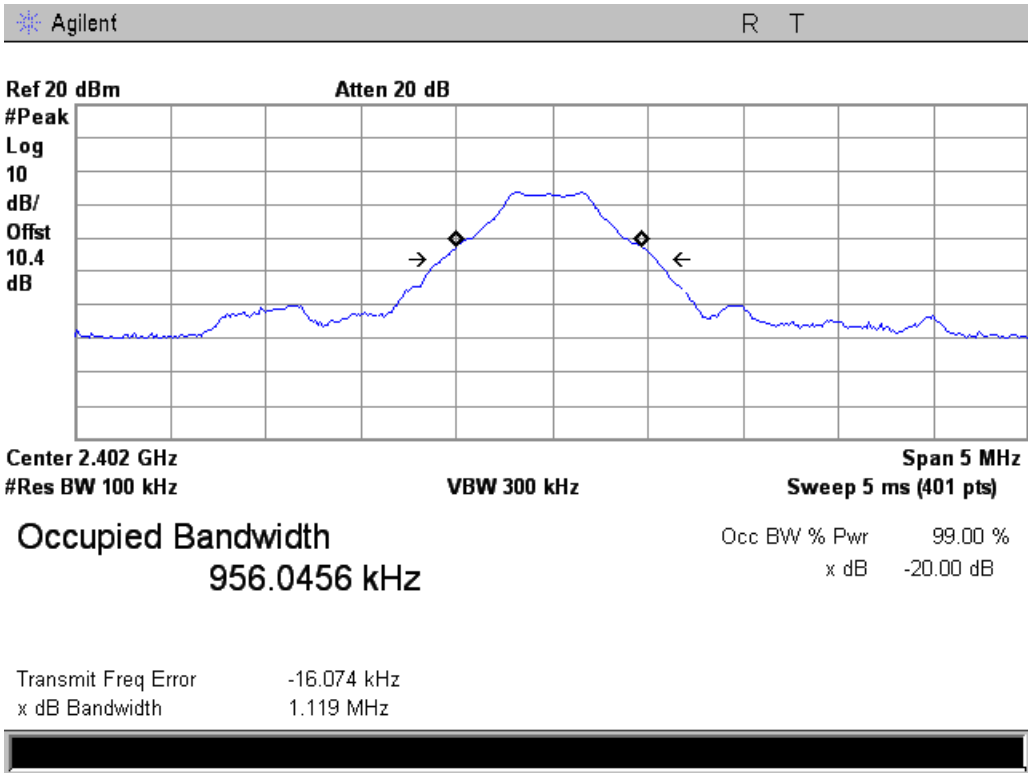


2462 MHz

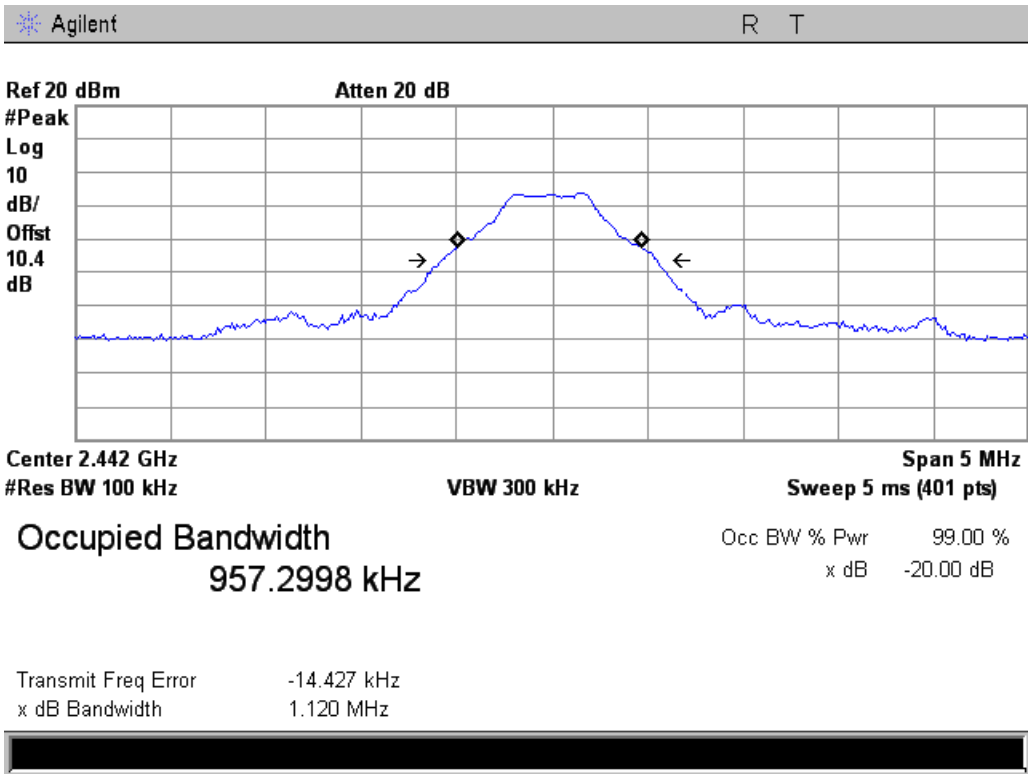


FHSS Occupied Bandwidth Plots

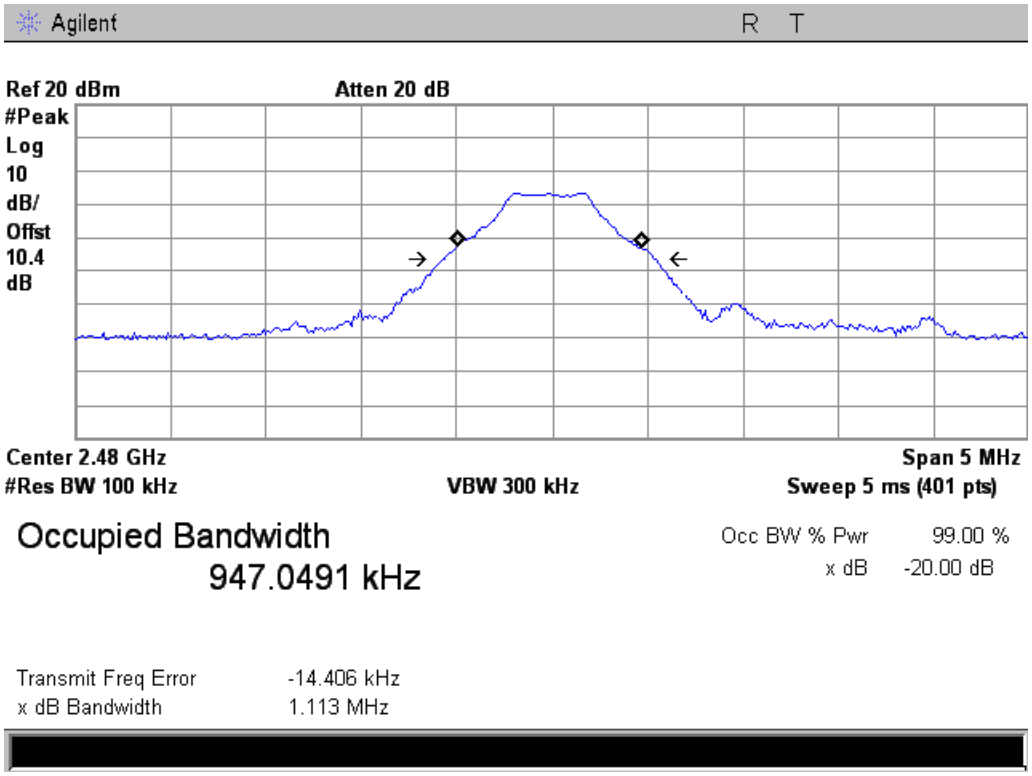
2402 MHz



2442 MHz



2480 MHz


Agilent
R T
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
10.4
dB
Center 2.48 GHz
Span 5 MHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
947.0491 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -14.406 kHz
x dB Bandwidth 1.113 MHz

IC 11 MB DTS 6 dB Occupied Bandwidth Summary

Frequency MHz	Measured Bandwidth KHz	Specification Limit kHz	Result
2412	13636.8	≥ 500	Pass
2437	13625.2	≥ 500	Pass
2472	13645.5	≥ 500	Pass

IC 54 MB DTS 6 dB Occupied Bandwidth Summary

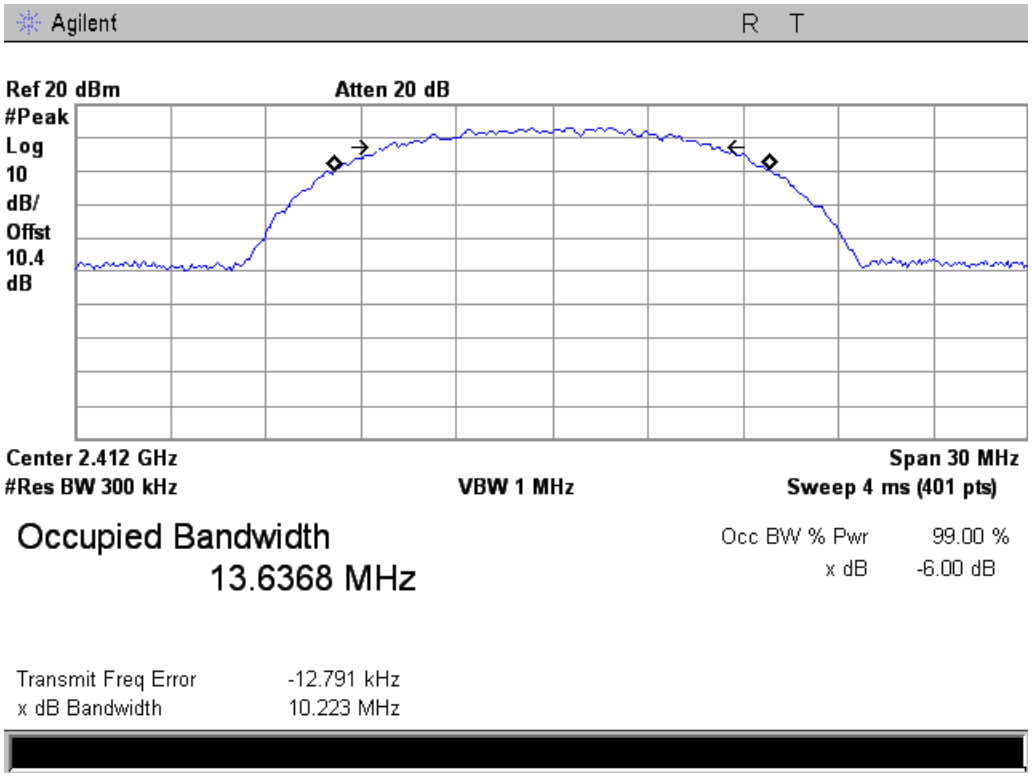
Frequency MHz	Measured Bandwidth kHz	Specification Limit kHz	Result
2412	16927.3	≥ 500	Pass
2437	16873.9	≥ 500	Pass
2462	16880.5	≥ 500	Pass

IC FHSS 20 dB Occupied Bandwidth Summary

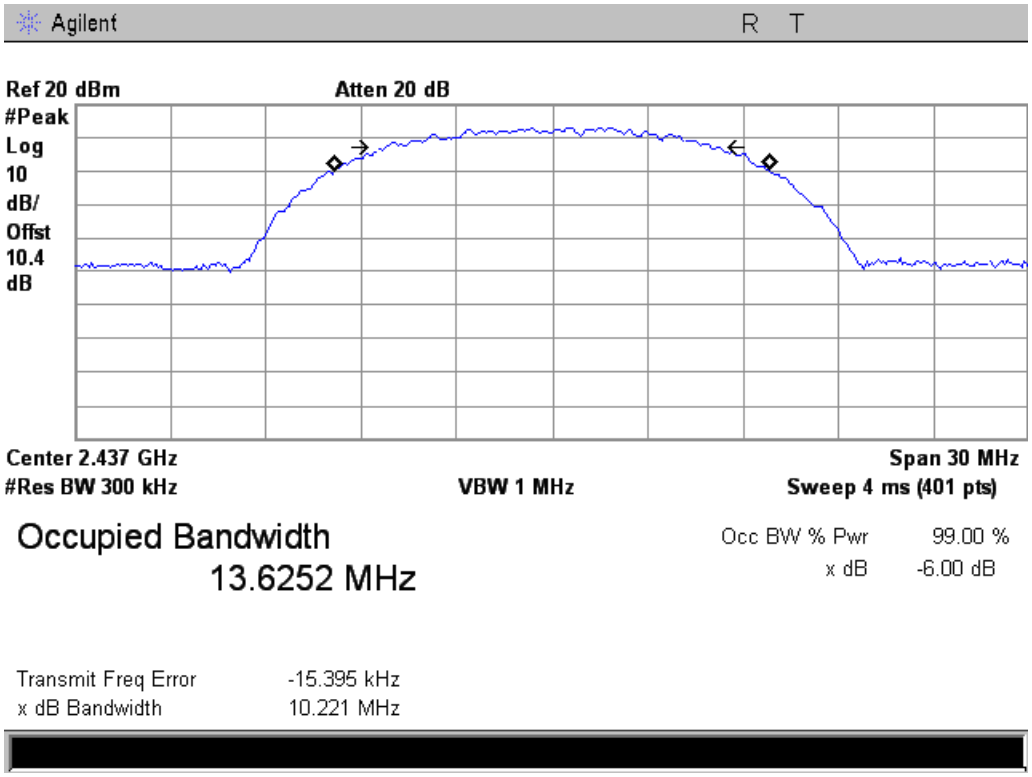
Frequency MHz	Measured Bandwidth kHz	Result
2402	965.0456	Pass
2442	957.2998	Pass
2480	947.0491	Pass

11 MB DTS Occupied Bandwidth Plots

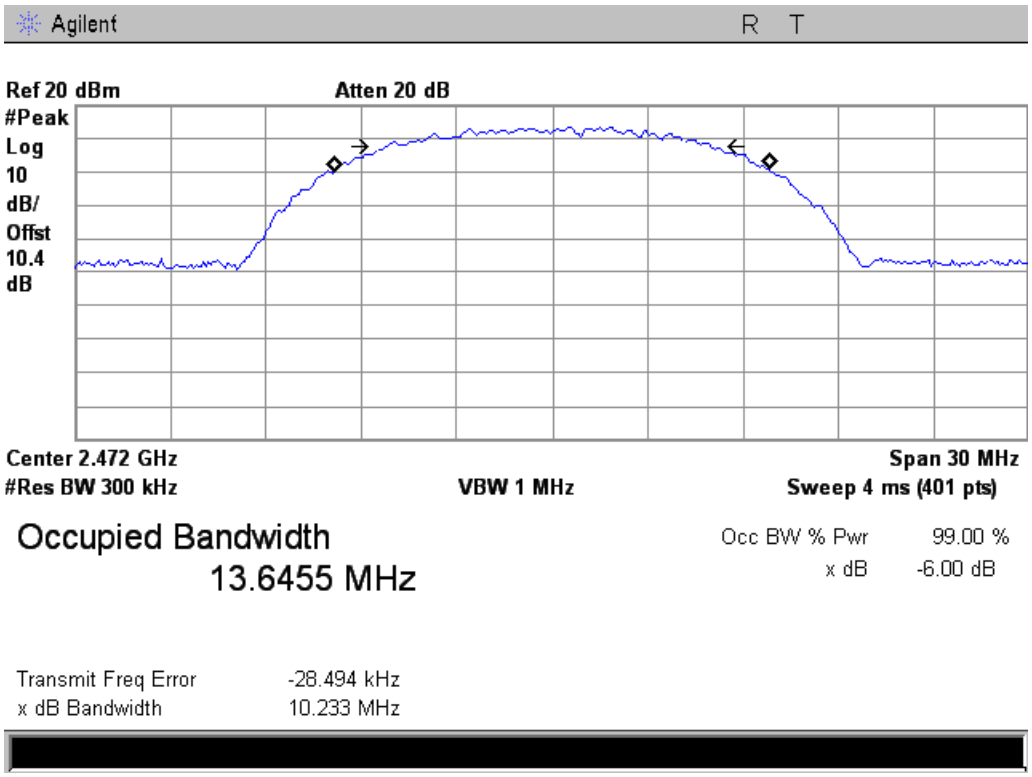
2412 MHz



2437 MHz

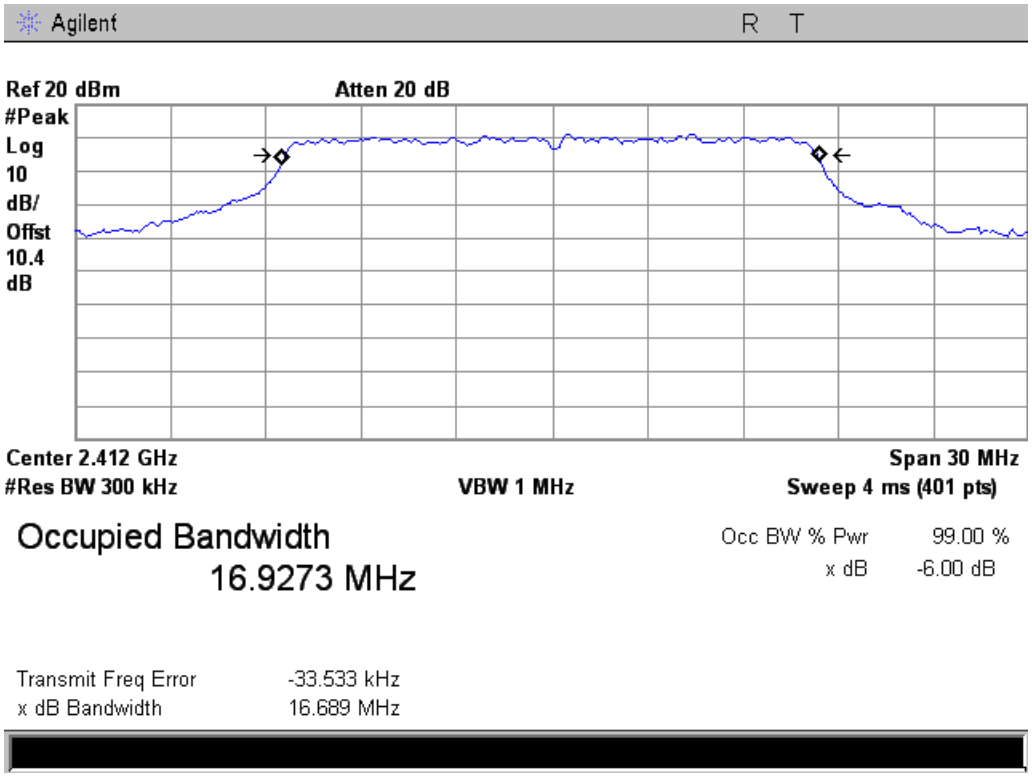


2472 MHz

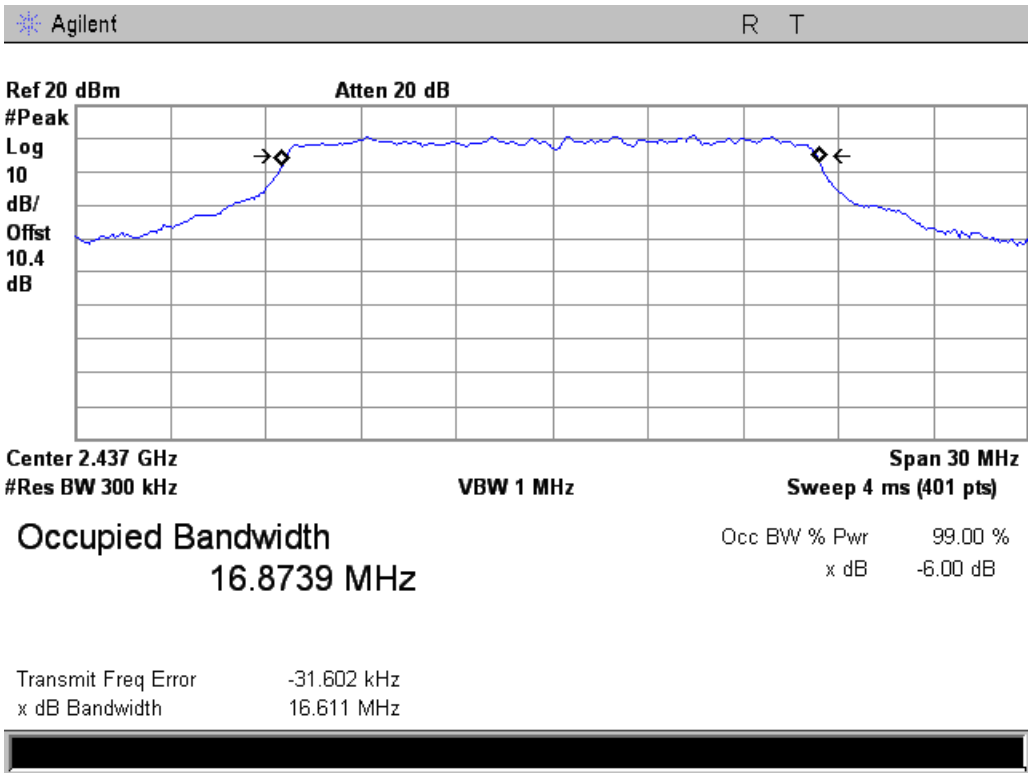


54 MB DTS Occupied Bandwidth Plots

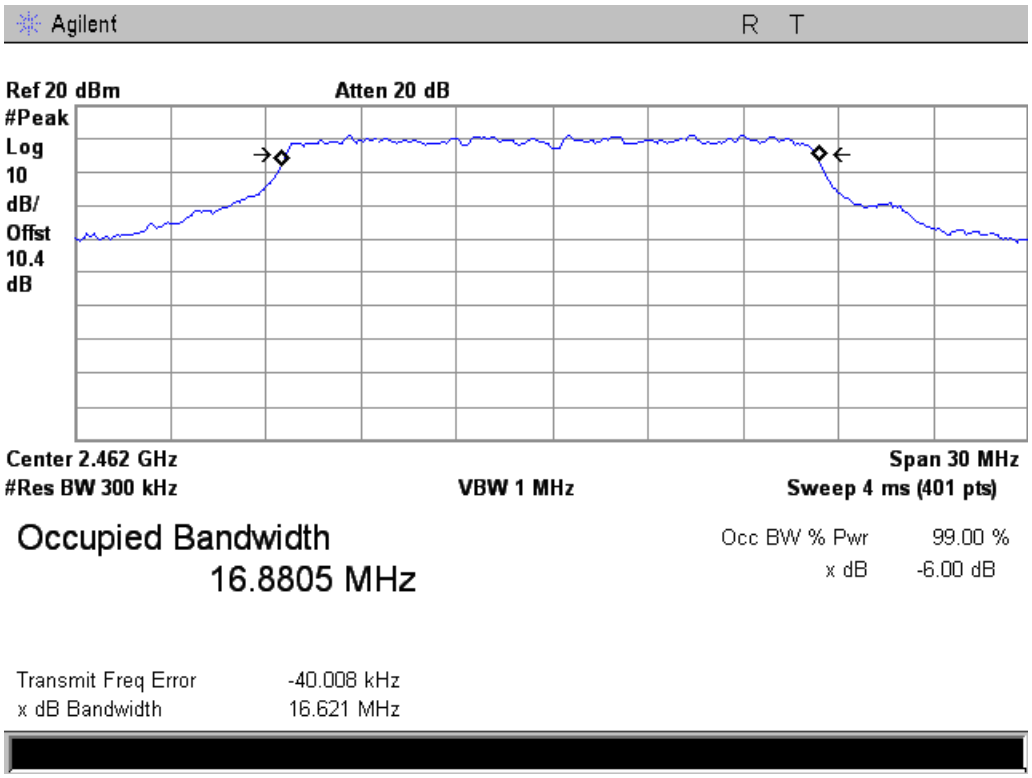
2412 MHz



2437 MHz

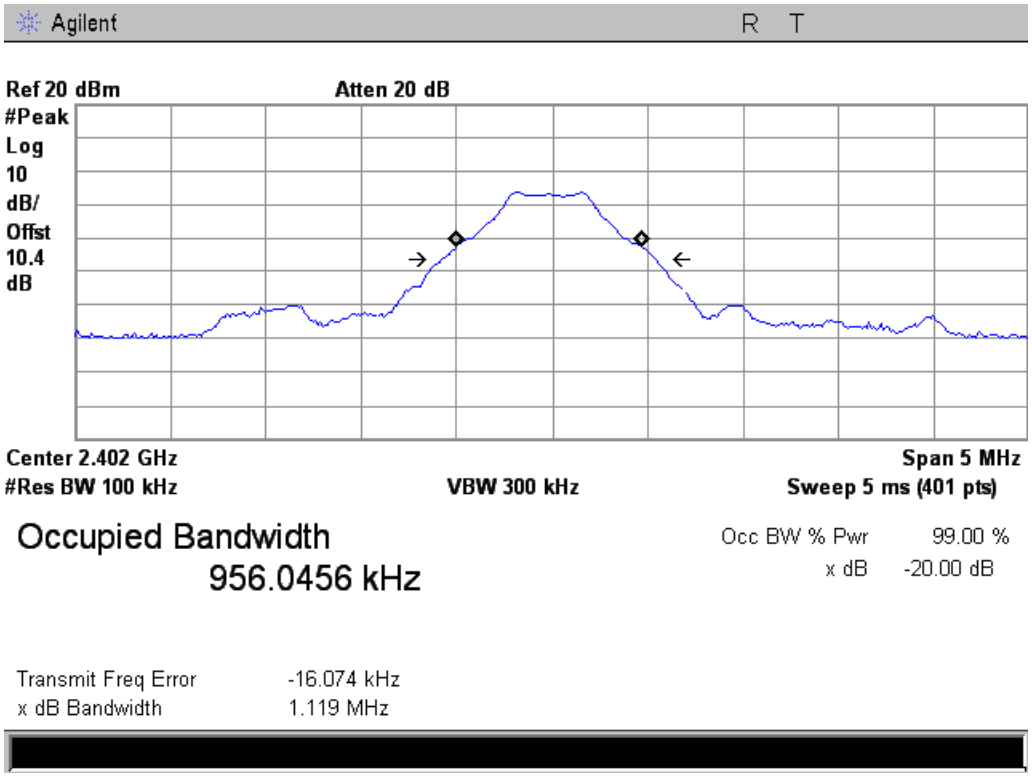


2462 MHz

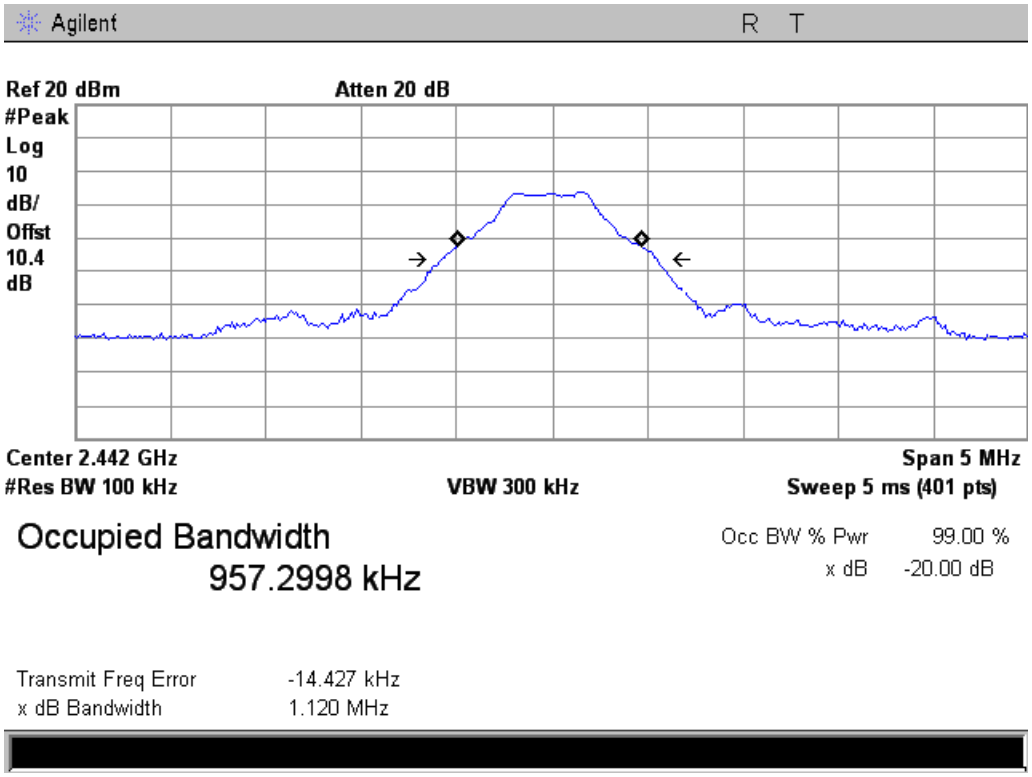


FHSS Occupied Bandwidth Plots

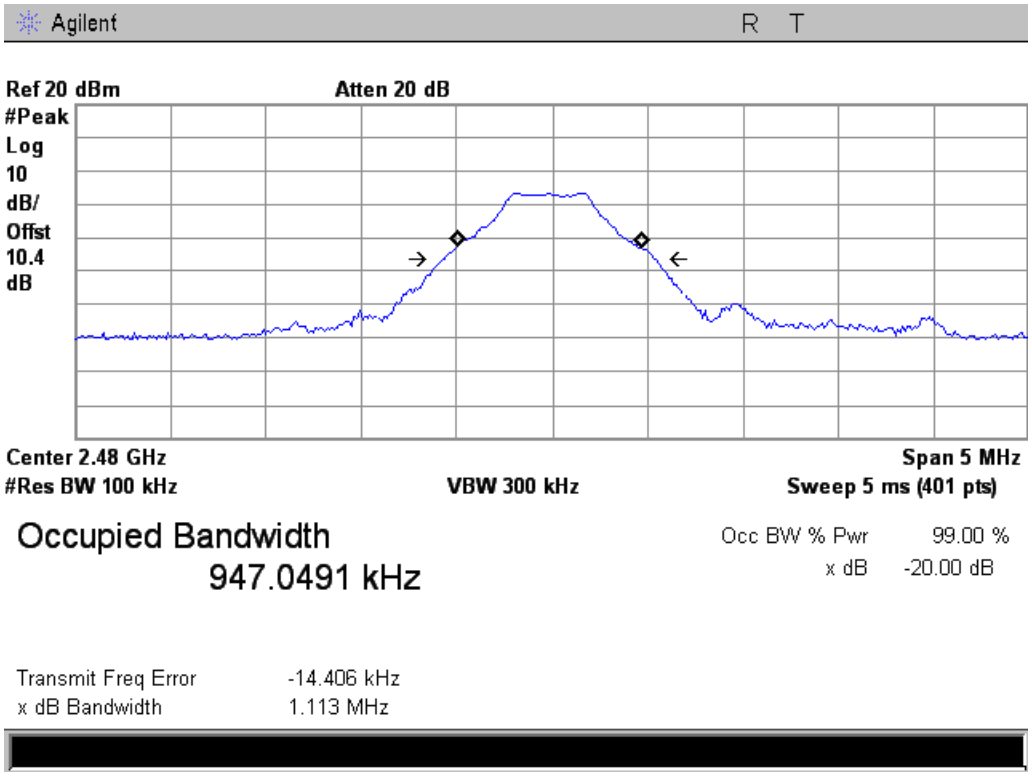
2402 MHz



2442 MHz



2480 MHz


Agilent
R T
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
10.4
dB
Center 2.48 GHz
Span 5 MHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
947.0491 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -14.406 kHz
x dB Bandwidth 1.113 MHz

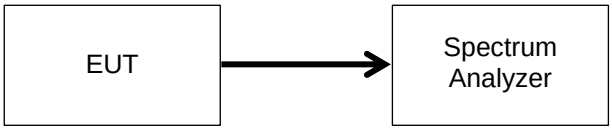
Transmitter Power Spectral Density (PSD)

Name of Test: Transmitter Power Spectral Density (PSD)
Specification: 15.247(e) **Engineer:** John Erhard
Test Equipment Utilized: i00379 **Test Date:** 8/9/2011

Test Procedure

The EUT was connected directly to a spectrum analyzer.
The test was performed per section 6.11.2.3 of C63.10 - 2009 "Procedure for determining PSD for DTS devices".

Test Setup



11 MB DTS PSD Summary

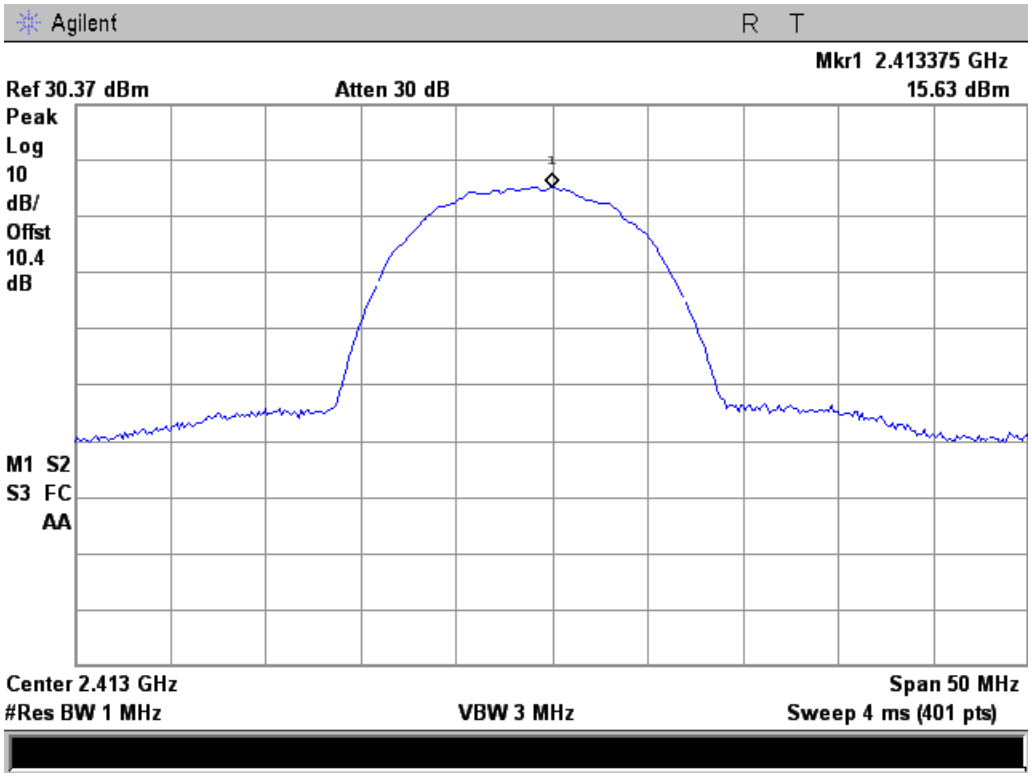
Frequency MHz	Measured Data dBm	Specification Limit dBm	Result
2412	-5.791	8	Pass
2137	-4.687	8	Pass
2472	-4.226	8	Pass

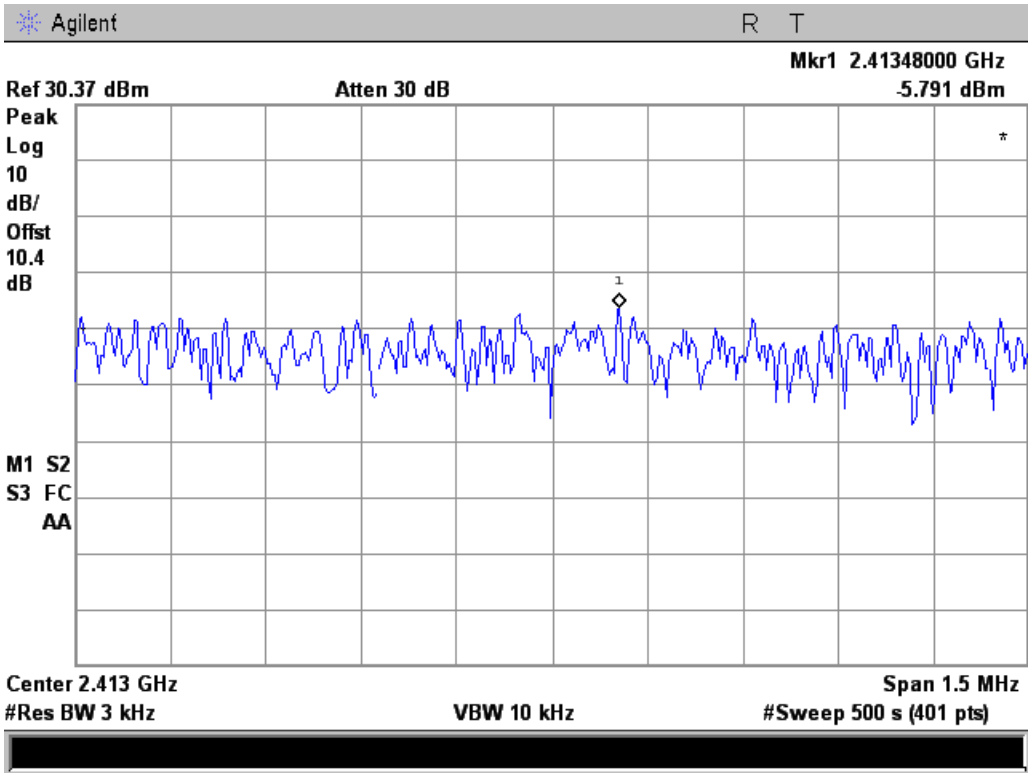
54 MB DTS PSD Summary

Frequency MHz	Measured Data dBm	Specification Limit dBm	Result
2412	-8.962	8	Pass
2437	-9.165	8	Pass
2462	-9.164	8	Pass

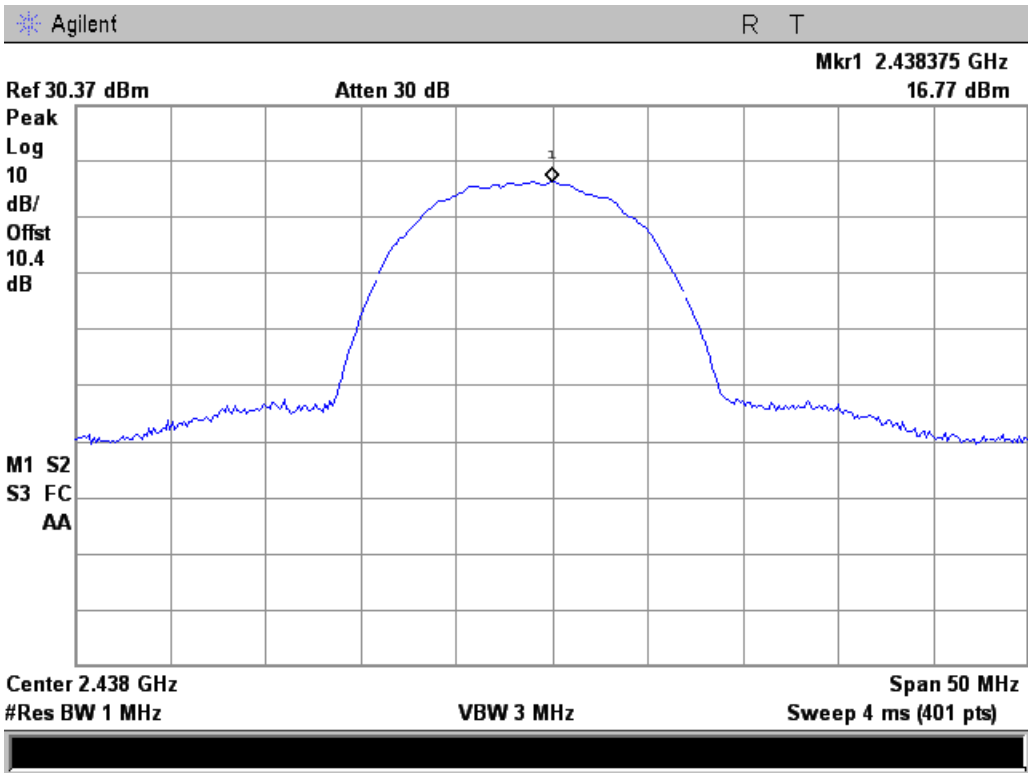
11 MB DTS PSD Plots

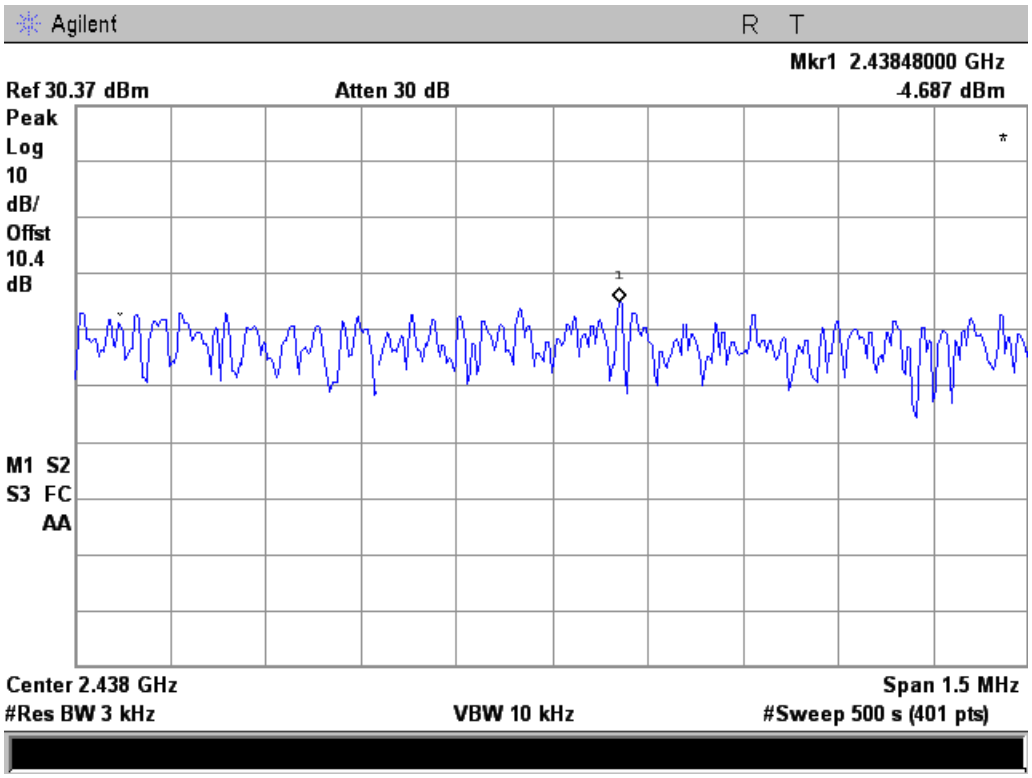
2412 MHz



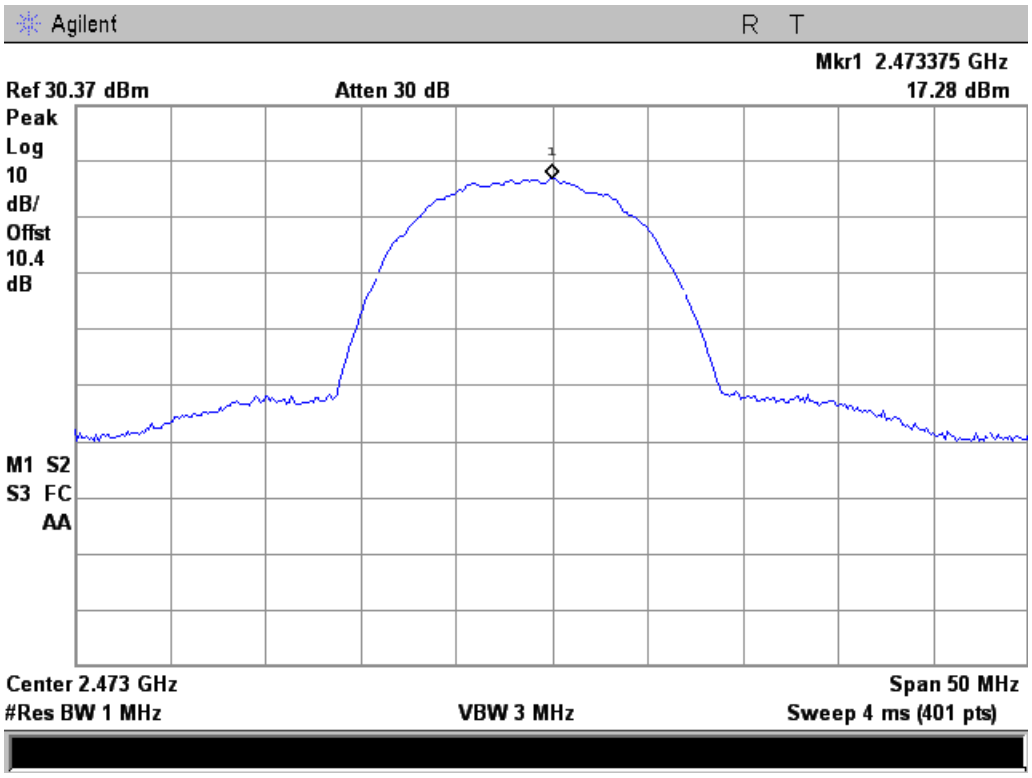


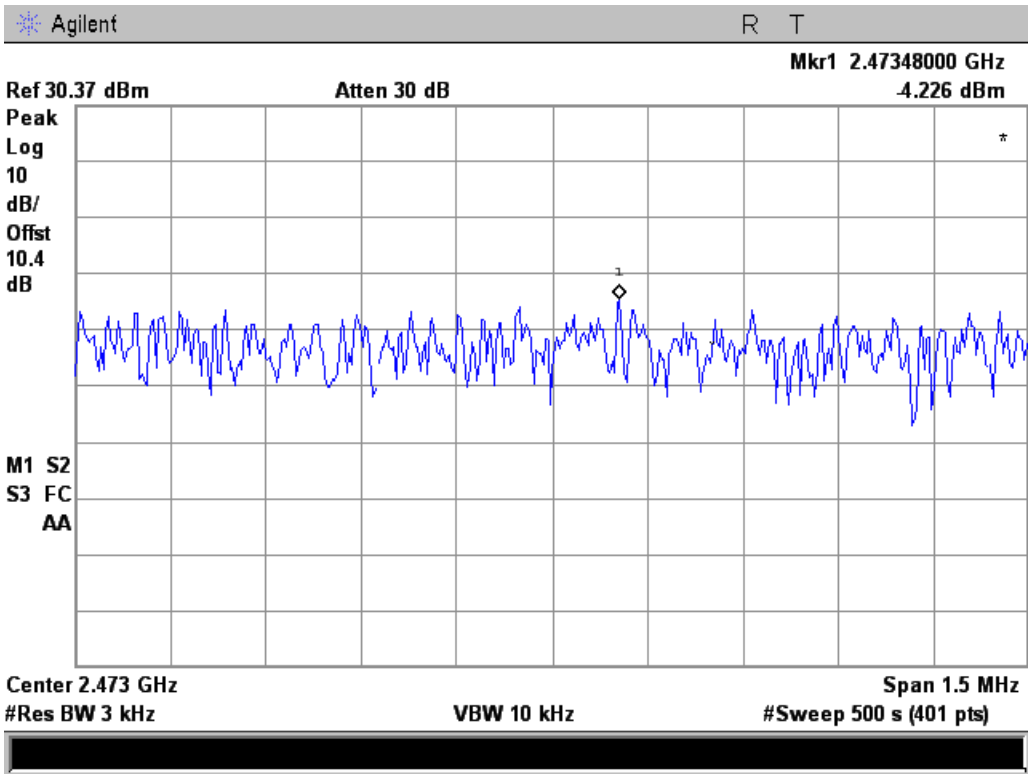
2437 MHz


Agilent
R T
Mkr1 2.438375 GHz
Ref 30.37 dBm
Atten 30 dB
16.77 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.438 GHz
Span 50 MHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (401 pts)


Agilent
R T
Mkr1 2.43848000 GHz
Ref 30.37 dBm
Atten 30 dB
-4.687 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.438 GHz
Span 1.5 MHz
#Res BW 3 kHz
VBW 10 kHz
#Sweep 500 s (401 pts)

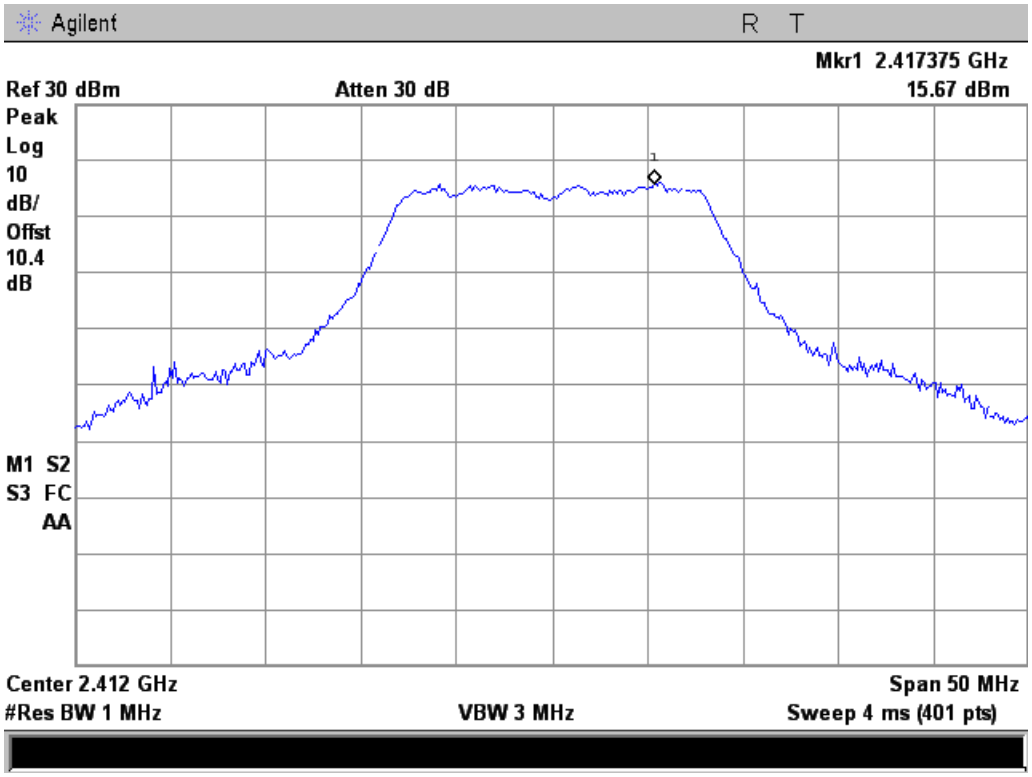
2472 MHz

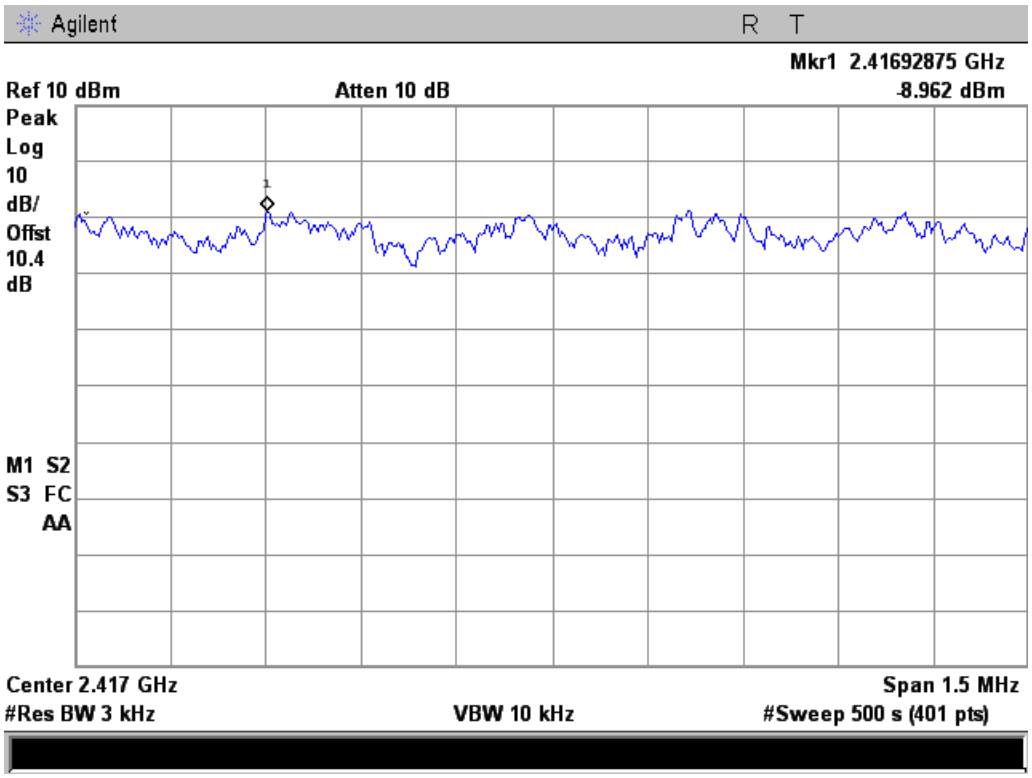

Agilent
R T
Mkr1 2.473375 GHz
Ref 30.37 dBm
Atten 30 dB
17.28 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.473 GHz
Span 50 MHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (401 pts)


Agilent
R T
Mkr1 2.47348000 GHz
Ref 30.37 dBm
Atten 30 dB
-4.226 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.473 GHz
Span 1.5 MHz
#Res BW 3 kHz
VBW 10 kHz
#Sweep 500 s (401 pts)

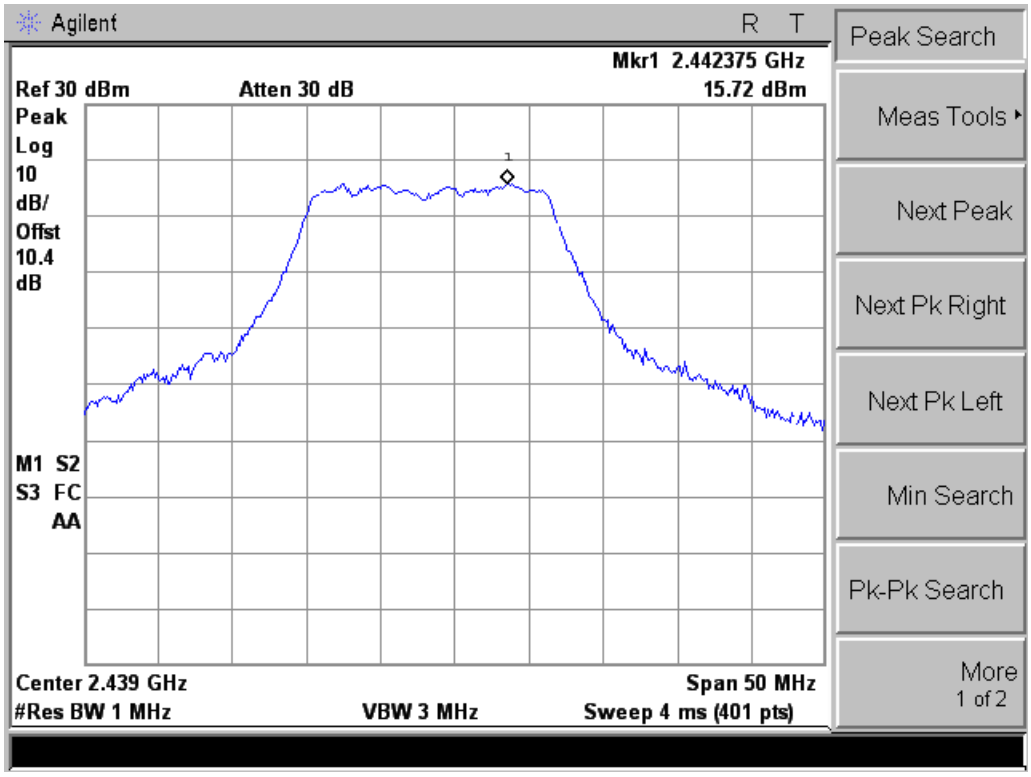
54 MB DTS PSD Plots

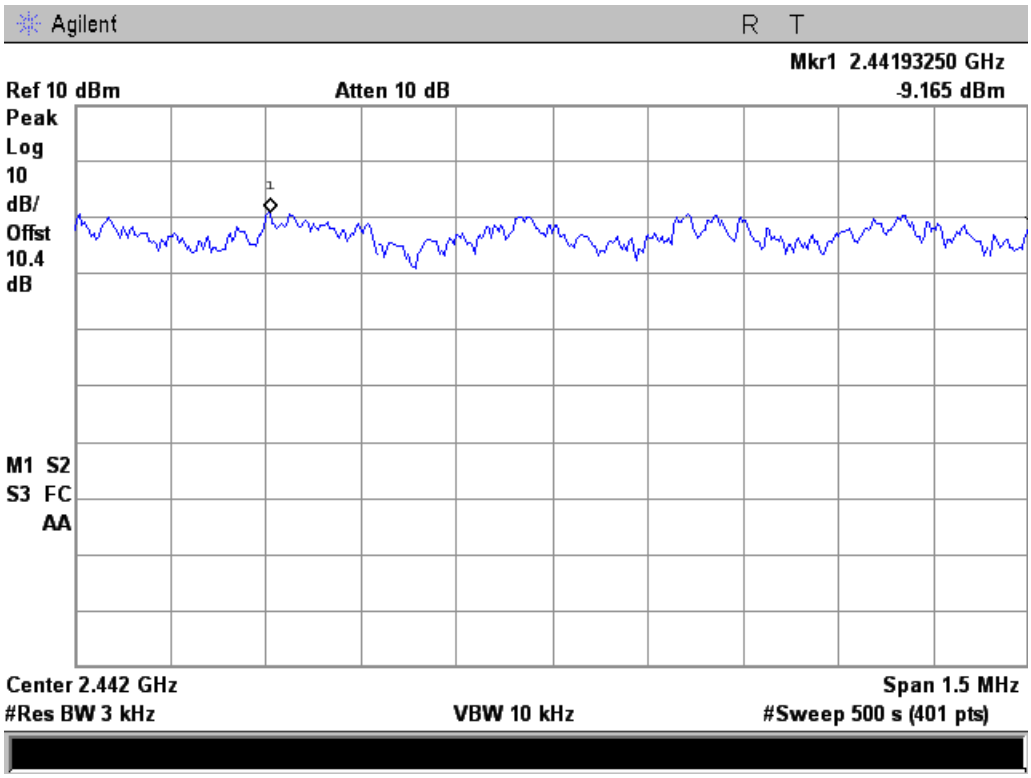
2412 MHz



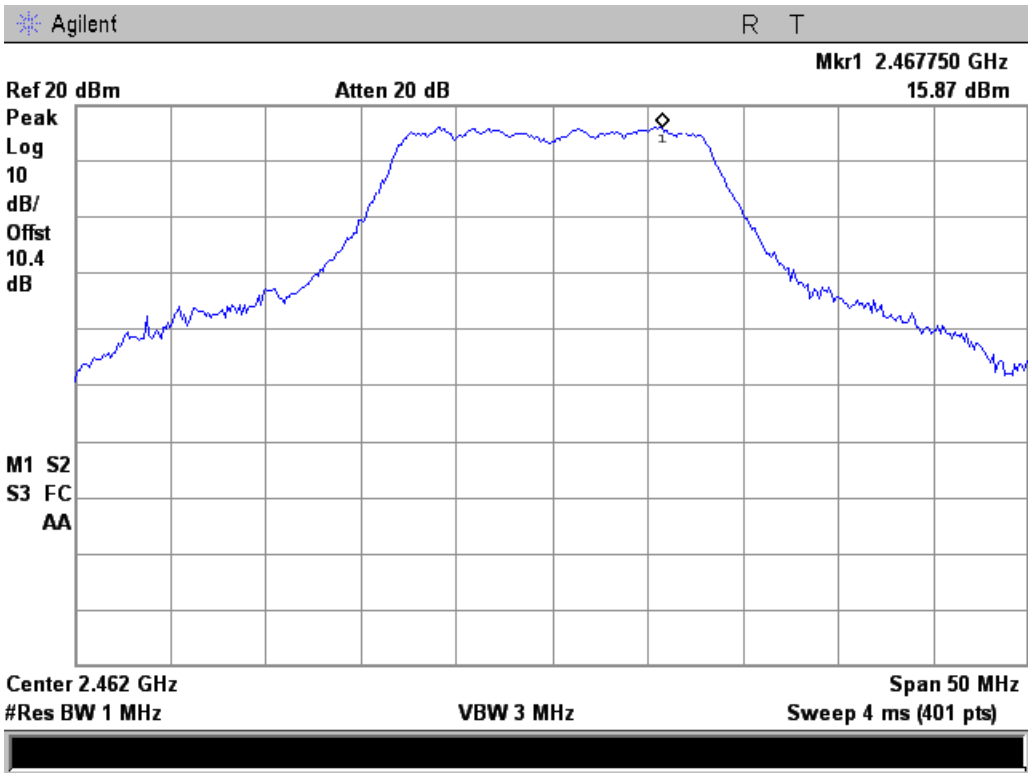


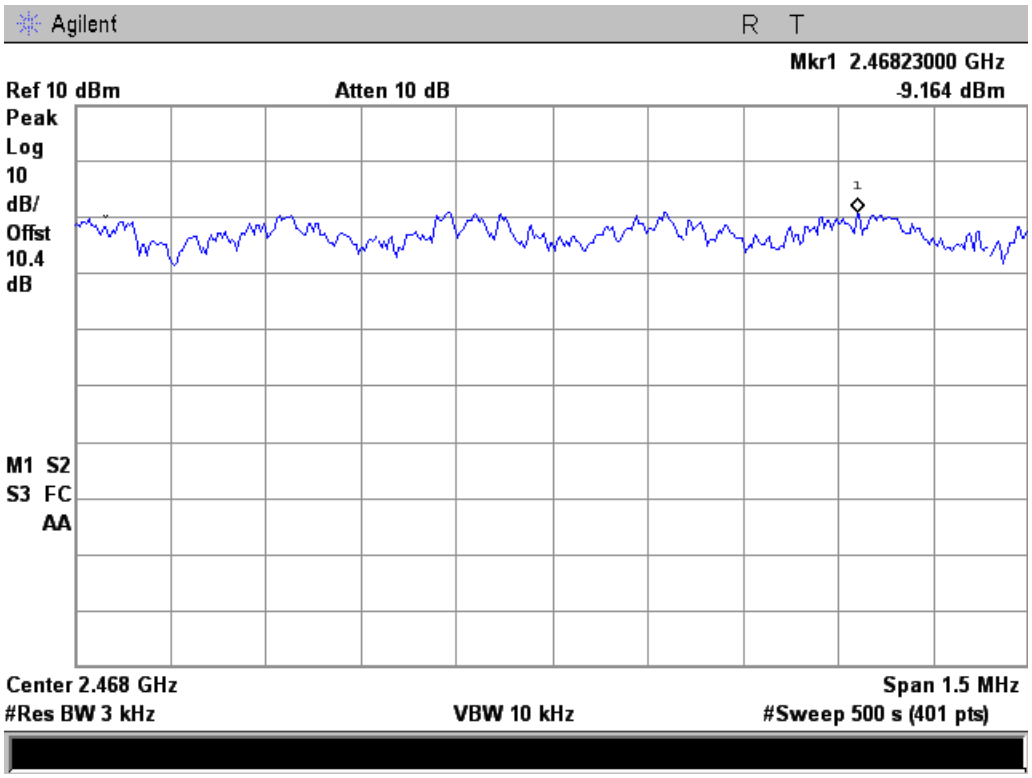
2437 MHz


Agilent
R T
Mkr1 2.442375 GHz
Ref 30 dBm
Atten 30 dB
15.72 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.439 GHz
Span 50 MHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2


Agilent
R T
Mkr1 2.44193250 GHz
Ref 10 dBm
Atten 10 dB
-9.165 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.442 GHz
Span 1.5 MHz
#Res BW 3 kHz
VBW 10 kHz
#Sweep 500 s (401 pts)

2462 MHz


Agilent
R T
Mkr1 2.467750 GHz
Ref 20 dBm
Atten 20 dB
15.87 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.462 GHz
Span 50 MHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (401 pts)


Agilent
R T
Mkr1 2.46823000 GHz
Ref 10 dBm
Atten 10 dB
-9.164 dBm
Peak
Log
10
dB/
Offst
10.4
dB
M1 S2
S3 FC
AA
Center 2.468 GHz
Span 1.5 MHz
#Res BW 3 kHz
VBW 10 kHz
#Sweep 500 s (401 pts)

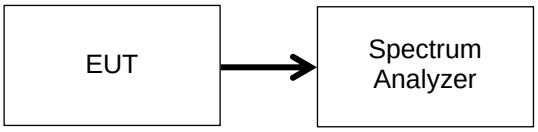
Receiver Spurious Emissions

Name of Test:	Receiver Spurious Emissions		
Specification:	RSS-GEN-6(b)	**Engineer:** John Erhard	
Test Equipment Utilized:	i00379	**Test Date:** 8/9/2011 – 8/10/2011	

Test Procedure

The EUT was connected directly to a spectrum analyzer. The receiver spurious emissions were measured from 30 MHz to greater than 3 times the highest tunable frequency.

Test Setup



DTS Receiver Spurious Emissions Summary

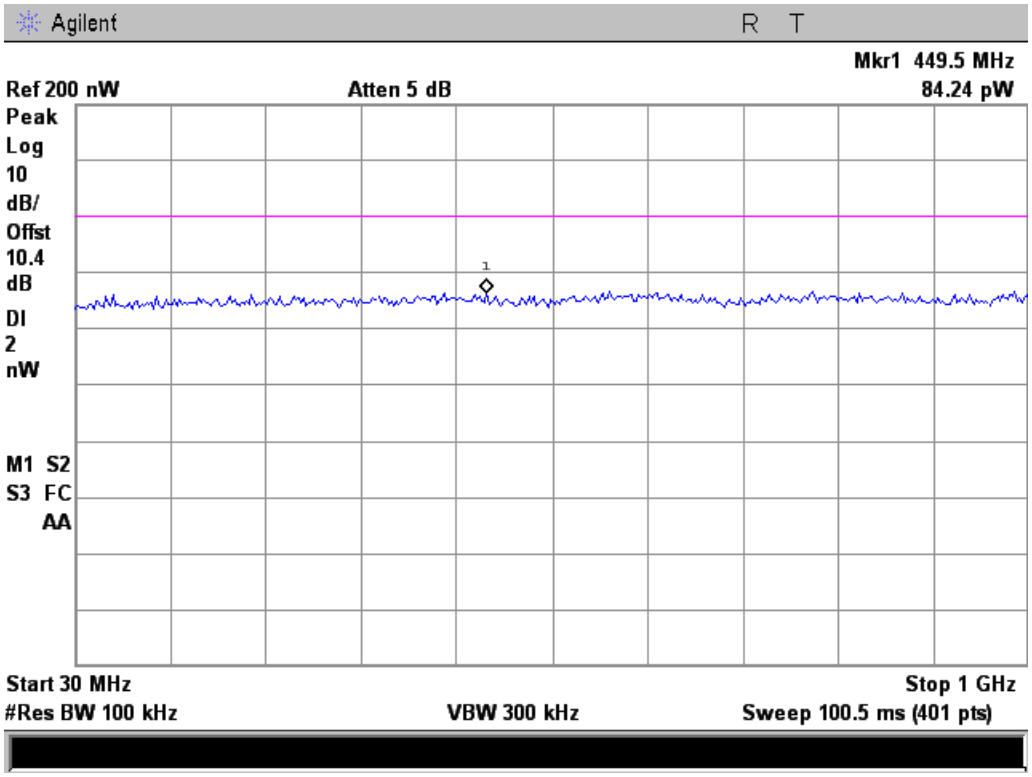
Frequency Range MHz	Recorded Measurement	Specification Limit	Result
30 – 1000	82.24 pW	2 nW (-57dBm)	Pass
1000 - 8000	1.676 nW	5 nW (-57dBm)	Pass

FHSS Receiver Spurious Emissions Summary

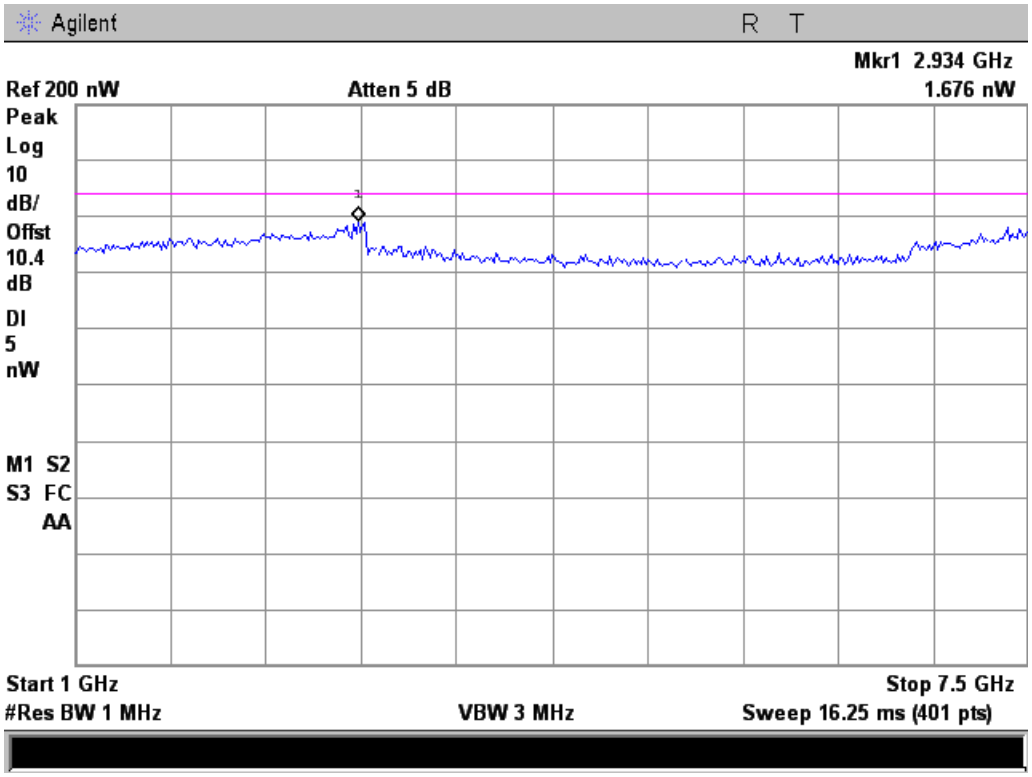
Frequency Range MHz	Recorded Measurement	Specification Limit	Result
30 – 1000	94.15 pW	2 nW (-57dBm)	Pass
1000 - 8000	1.708 nW	5 nW (-57dBm)	Pass

DTS Receiver Spurious Emissions

30 MHz – 1 GHz

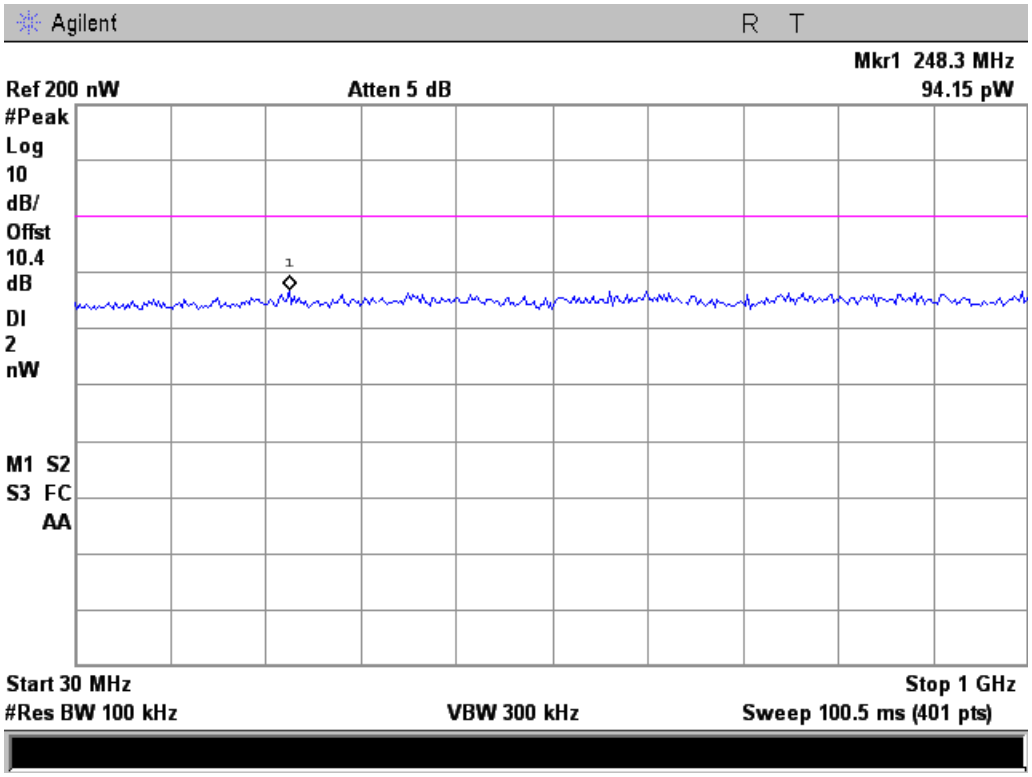


1 GHz – 7.5 GHz

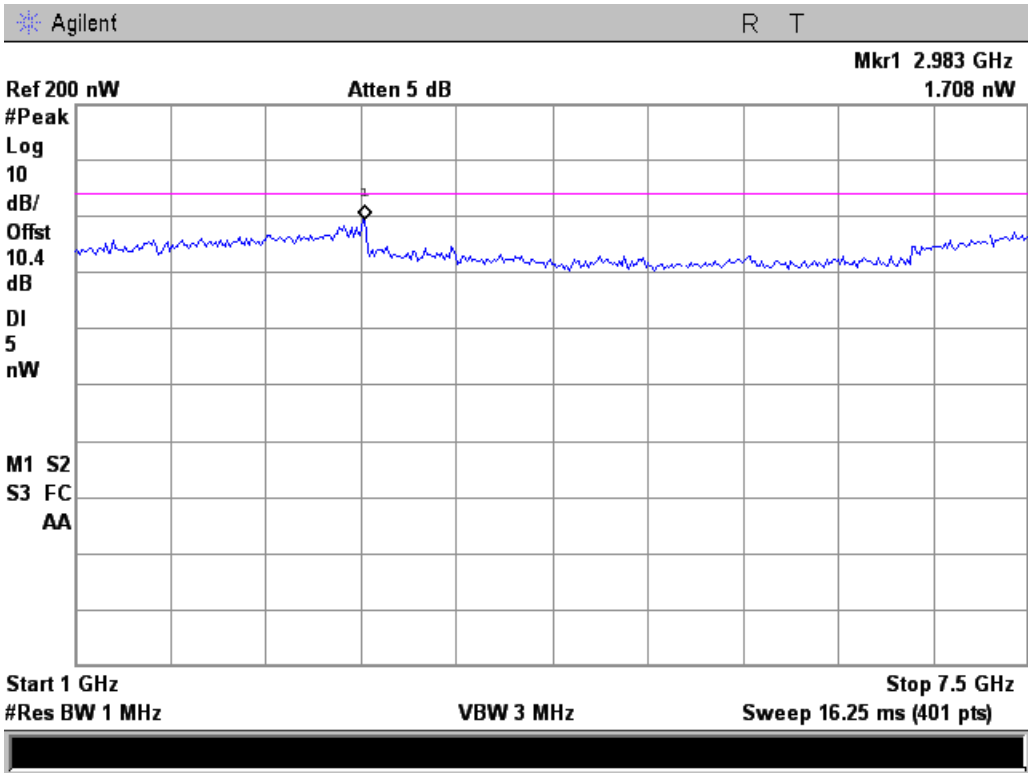


FHSS Receiver Spurious Emissions

30 MHz – 1 GHz



1 GHz – 7.5 GHz



Test Equipment Utilized

Description	MFG	Model Number	CT Asset Number	Last Cal Date	Cal Due Dates
RF Pre-Amplifier	HP	8449	i00028	9/17/2010	9/17/2011
Spectrum Analyzer	HP	8546A	i00033	10/3/2010	10/3/2011
Horn Antenna	EMCO	3115	i00103	11/5/2010	11/5/2012
Bilog Antenna	Schaffner	CBL6111C	i00267	11/21/2009	11/21/2011
LISN	FCC	FCC-LISN-50-32-2-01	i00270	9/30/2010	9/30/2012
Spectrum Analyzer	Agilent	4407B	i00331	5/24/2011	5/24/2012
Spectrum Analyzer	Agilent	7405A	i00379	11/22/2011	11/22/2012
Band Reject Filter	Wainwright	WRCTF 2402/2480-2399/2483-35/12+9EE	i00385	NCR	NCR

Non CT Test Equipment Used

Description	MFG	Model Number	SN	Last Cal Date	Cal Due Dates
Bluetooth Call Box	Agilent	N4010A	GB46170472	11/12/2011	11/12/2012
Wi-Fi Antenna	Trendnet	TEW-A1070B	RA11020700347	NCR	NCR

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT