CURTIS-STRAUS

Test Report

Report No	EI0852-1
Client	Onset Computer Corp. Glenn Greenough
Address	470 MacArthur Blvd. Bourne, MA 02532
Phone	508-759-950
Items tested FCC ID	W-RCVR Receiver WXFRECEIVER
Standards	FCC 47 CFR Part 15.247, RSS-GEN, RSS-210- Issue 7
Test Dates	August 26 - September 17, 2008
Results	As detailed within this report
Prepared by	Kyle Neffendorf – Test Engineer
Authorized by	Mairaj Hussain – EMC Supervisor
Issue Date	11/03/08
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 27 of this report.

Contents

Form Final Report REV 8-18-08 (DW)

Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247. The product is the W-RCVR Receiver. It is a transmitter which operates in the range 2400-2483.5MHz.

The W-RCVR Receiver contains an on board antenna connector with a 5 dBi removable omni-directional antenna MN: ACH2-AT-DP003 by DPAC Technologies.

Spurious emissions were maximized in Horizontal and Vertical orientation of EUT.

AC Conducted emissions tests were performed on the AC side of the support laptop supply.

The digital portion of this device is subject to DoC as a computer peripheral and has been issued a separate DoC report.

Test Methodology

Testing was performed according to ANSI C63.4-2003. Radiated emissions were maximized by rotating the device around its vertical axis, as well as varying the test antenna's height and polarity. Fresh batteries were used for all testing.

Frequency range investigated: 30MHz – 25GHz

Measurement distance for Radiated Emissions: 3m and 1m

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	December 11, 2008

Product Tested - Configuration Documentation

EUT Configuration

Work Order: I0852
Company: Onset Computer Corp.
Company Address: 470 MacArthur Boulevard
Bourne, MA 02532
Contact: Glenn Greenough

	MN	PN	SN
EUT:	W-RCVR		10000

EUT Description: Receiver
TX Frequency: 2405-2480MHz
EUT Max Frequency: 16MHz

Support Equipment:	**MN**	**SN**
Dell Laptop	---	---

EUT Ports:

Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason
USB	USB	1	1	USB	N	N	2ft	10ft		N/A

Software / Operating Mode Description:

EUT transmits and receives data to and from sensors

Performance Criteria:

Green LED's shall continue to flash, indicating a connection to the sensors. The laptop shall show no lost connection error.

Compliance Statement

RSS-GEN	RSS-210	47CFR PART #	TEST LEVEL / LIMIT	COMMENTS
5.3		15.15(b)	-	The product contains no user accessible controls that increase transmission power above allowable levels.
5.2		15.19	-	The label is shown in the label exhibit.
7.1.5		15.21	-	Information to the user is shown in the instruction manual exhibit.
		15.27	-	No special accessories are required for compliance
		15.31(e)	+/- 15%	Battery powered equipment.
7.1.4		15.203	-	Unique antenna type.
7.1.4		15.204	-	See attached documentation describing the antenna.
7.2.2		15.207	FCC Class A limits	Test not performed, device is battery powered.
	A8.2	15.247(a)	-	EUT is digitally modulated.
4.6.2	A8.2(a)	15.247(a)(2)	500KHz	Minimum 6dB BW is > 500KHz
	A8.4(4)	15.247(b)(3)	1W or 30dBm	EUT meets POP at the antenna port.

RSS-GEN	RSS-210	47CFR PART #	TEST LEVEL / LIMIT	COMMENTS
		15.247(b)(4)	6dBi	Antenna gain used wit EUT is < 6dBi.
7.2.3	A8.5	15.247 (d)		EUT meets the spurious emissions requirements.
	A9.2	15.247(e)	8dBm	EUT meets PSD requirements at the antenna port.
4.6.1	-	-	-	OCC BW measured for the radio.

Test Results

AC Conducted Emissions

Limit: FCC Class B

Measurement:

AC Mains Conducted Emissions — *Curtis-Straus LLC*

Date: 11-Dec-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Receiver **Test Site:** EMI2
Notes:
Measurement Device: Silver LISN **EUT Operating Voltage/Frequency:** 230V 50Hz
Range: 0.15-30MHz **Spectrum Analyzer:** Green

Frequency	Q.P. Readings		Ave. Readings		Impedance Factor	FCC/CISPR B		FCC/CISPR B		Overall Result
	QP1	QP2	AV1	AV2		qp Limit	qp Margin	AVE Limit	AVE Margin	
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dBµV)	dB	(dBµV)	dB	(Pass/Fail)
0.32	20.4	19.7	12.9	21.9	20.1	59.8	-19.3	49.8	-7.8	Pass
0.46	19.8	19.9	14.6	12.2	20.1	56.8	-16.8	46.8	-12.1	Pass
0.60	19.3	18.9	12.2	8.8	20.0	56.0	-16.7	46.0	-13.8	Pass
0.77	17.6	17.4	12.2	10.3	20.0	56.0	-18.4	46.0	-13.8	Pass
0.78	20.5	19.9	11.8	9.9	20.0	56.0	-15.5	46.0	-14.2	Pass
0.91	23.7	23.8	15.3	14.8	20.0	56.0	-12.2	46.0	-10.7	Pass

Table Result: Pass by -7.80 dB ***Worst Freq:*** 0.32 MHz

Spurious Radiated Emissions

Limit: Worst-case limits were used. (15.209(a))

Measurement: Quasi-peak readings were taken below 1000MHz, Peak readings were taken above 1000MHz

Adjusted Reading Sample Calculation:

Adjusted Reading = Reading – preamp factor + cable loss + antenna factor

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 27-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Receiver and Repeater **EUT Operating Voltage/Frequency:** 3VDC
Frequency Range: 30-1000MHz **Measurement Distance:** 3 m
Notes: Tx Mode Channel 18 Max power output **EUT Max Freq:** 2475MHz

Antenna Polarization	Frequency	Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Reading	---			FCC Class B		
							Limit	Margin	Result	Limit	Margin	Result
(H / V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
V	144.0	43.2	22.6	13.1	2.1	35.8	---	---	---	43.5	-7.7	Pass
V	168.0	47.6	22.7	12.2	2.3	39.4	---	---	---	43.5	-4.1	Pass
V	192.0	43.2	22.7	11.8	2.6	34.9	---	---	---	43.5	-8.6	Pass
V	216.0	41.2	22.6	11.3	2.8	32.7	---	---	---	43.5	-10.8	Pass
V	240.0	48.4	22.6	12.2	3.0	41.0	---	---	---	46.0	-5.0	Pass
V	288.0	38.2	22.6	13.8	3.3	32.7	---	---	---	46.0	-13.3	Pass
V	312.0	39.3	22.5	14.3	3.7	34.8	---	---	---	46.0	-11.2	Pass

Table Result: Pass by -4.1 dB ***Worst Freq:*** 168.0 MHz

Test Site: "F" **Pre-Amp:** Blue **Cable:** EMIR-18 **Analyzer:** Blue **Antenna:** Red-White

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 27-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Receiver **EUT Operating Voltage/Frequency:**
Frequency Range: 1-18GHz **Measurement Distance:** 3 m
Notes: Tx Mode Channel 18 Max power output. **EUT Max Freq:**

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
Vpk	4881.1	39.0	17.9	33.6	3.0	57.7	---	---	---	74.0	-16.3	Pass
Vav	4881.1	28.6	17.9	33.6	3.0	47.3	---	---	---	54.0	-6.7	Pass

Table Result: Pass by -6.7 dB ***Worst Freq:*** 4881.1 MHz

Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-11 **Analyzer:** Gold **Antenna:** Black Horn

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 27-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Repeater and Receiver **EUT Operating Voltage/Frequency:** 3VDC
Frequency Range: 18-25GHz **Measurement Distance:** 3 m
Notes: Tx Mode Channel 18. **EUT Max Freq:** 2475MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
No Emissions Found			---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-11 **Analyzer:** Gold **Antenna:** Black Horn

Note: No additional emissions were found while testing receive mode.

Fundamental Reading

Limit: 30dBm

Measurement:
Conducted readings were taken with a 20dB attenuator in place.

Peak Output Power Table — *Curtis-Straus LLC*

Date: 27-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Receiver **EUT Operating Voltage/Frequency:** 3V
Frequency Range: 2400-2483.5MHz **Measurement Distance:** Conducted
Notes: RBW: 3MHz
VBW: 3MHz

Transmit Mode	Frequency (MHz)	Reading (dBµV)	Reading (dBm)	Attenuator Factor (dB)	Adjusted Reading (dBm)	---	---	---	FCC 15.247 Limit (dBm)	FCC 15.247 Margin (dB)	FCC 15.247 Result (Pass/Fail)
Packets	2405.7	91.6	-15.4	20.0	4.6		---	---	30.0	-25.4	Pass
Packets	2440.5	91.5	-15.5	20.0	4.5		---	---	30.0	-25.5	Pass
Packets	2475.5	91.4	-15.6	20.0	4.4		---	---	30.0	-25.6	Pass

Table Result: Pass by -25.4 dBm ***Worst Freq:*** 2405.7 MHz

Test Site: EMC2 **Analyzer:** Gold

Band Edge

Limit: Any emissions on or outside of the band edge must comply with the limits specified in 15.209.

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 27-Aug-08 **Company:** Onset **Work Order:** I0852
Engineer: Kyle Neffendorf **EUT Desc:** Receiver **EUT Operating Voltage/Frequency:** 3VDC
Frequency Range: 2390-2483.5MHz **Measurement Distance:** 3 m
Notes: RBW:1MHz VBW: 3MHz **EUT Max Freq:** 2475MHz

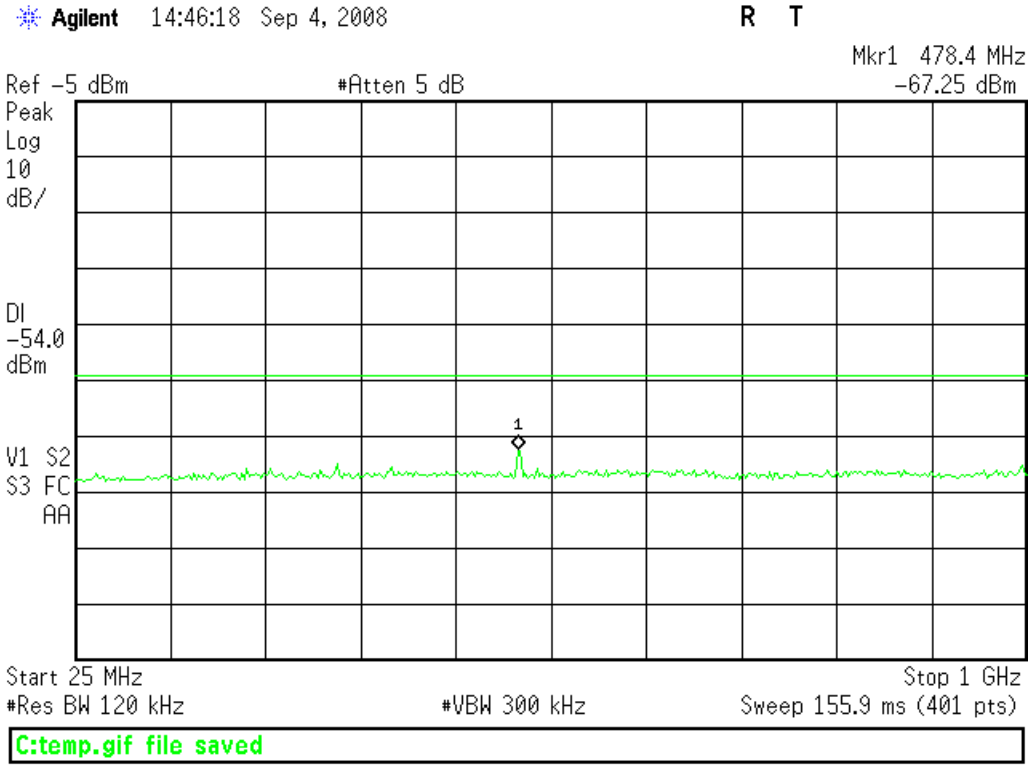
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	--- Limit (dBµV/m)	--- Margin (dB)	--- Result (Pass/Fail)	FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
Vpk	2390.0	40.9	18.4	28.9	2.0	53.4	---	---	---	74.0	-20.6	Pass
Vav	2390.0	30.5	18.4	28.9	2.0	43.0	---	---	---	54.0	-11.0	Pass
Vpk	2483.5	47.3	18.6	29.1	2.0	59.8	---	---	---	74.0	-14.2	Pass
Vav	2483.5	36.9	18.6	29.1	2.0	49.4	---	---	---	54.0	-4.6	Pass

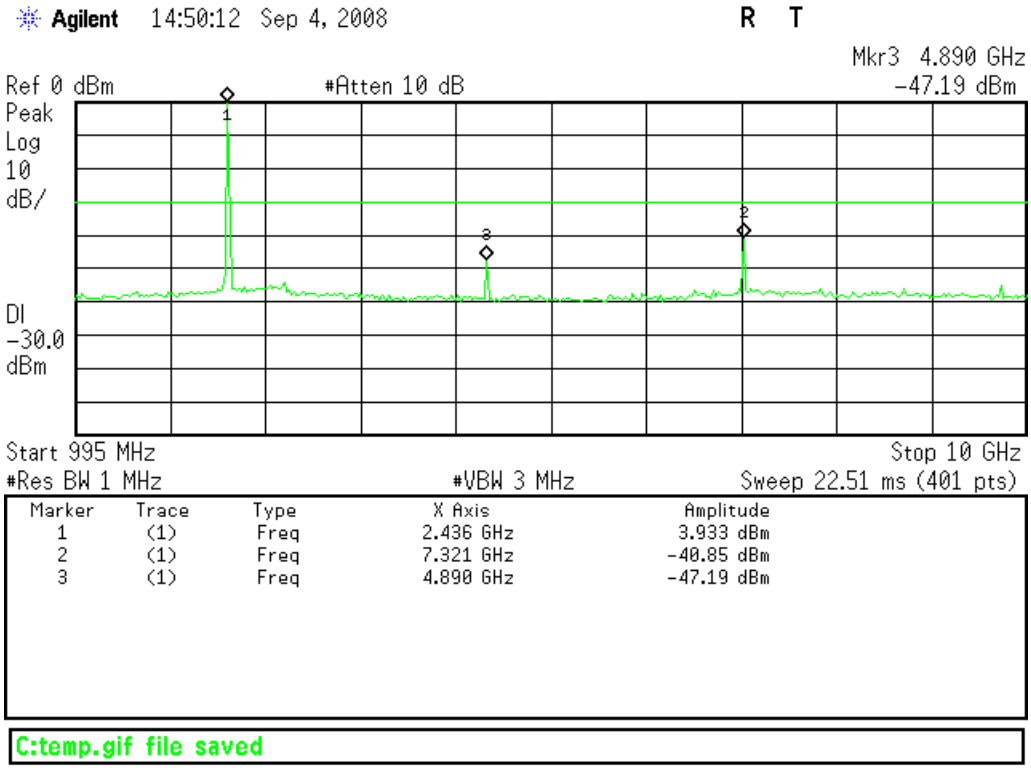
Table Result: Pass by -4.6 dB ***Worst Freq:*** 2483.5 MHz

Test Site: "F" **Pre-Amp:** White **Cable:** EMIR-HIGH-11 **Analyzer:** Gold **Antenna:** Black Horn

Conducted Spurious Emissions

Limit: The limit is 20dBm below the peak of the Fundamental. 3.933dBm–20dBm= -16.067dBm
Measurement: Conducted Readings were taken without an attenuator.

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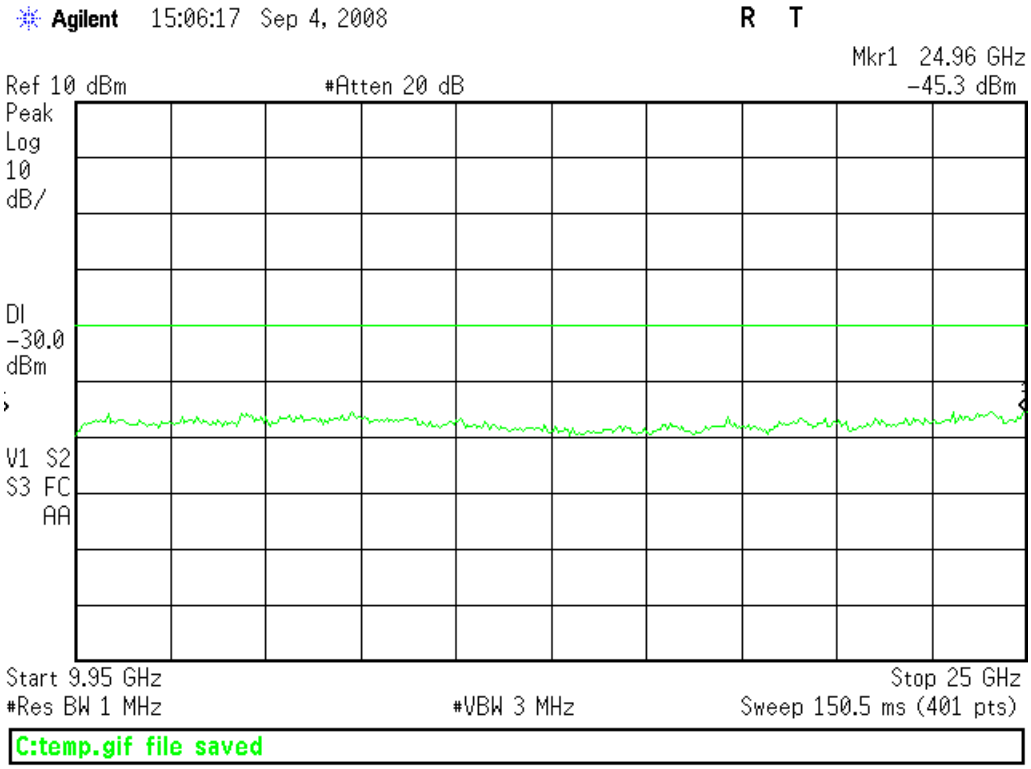
R T
Mkr3 4.890 GHz
-47.19 dBm
Ref 0 dBm
#Atten 10 dB
Peak
Log
10
dB/
DI
-30.0
dBm
Start 995 MHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 10 GHz
Sweep 22.51 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.436 GHz 3.933 dBm
2 (1) Freq 7.321 GHz -40.85 dBm
3 (1) Freq 4.890 GHz -47.19 dBm
C:temp.gif file saved


Agilent 15:06:17 Sep 4, 2008
R T
Mkr1 24.96 GHz
-45.3 dBm
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
DI
-30.0
dBm
V1 S2
S3 FC
AA
Start 9.95 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 25 GHz
Sweep 150.5 ms (401 pts)
C:temp.gif file saved

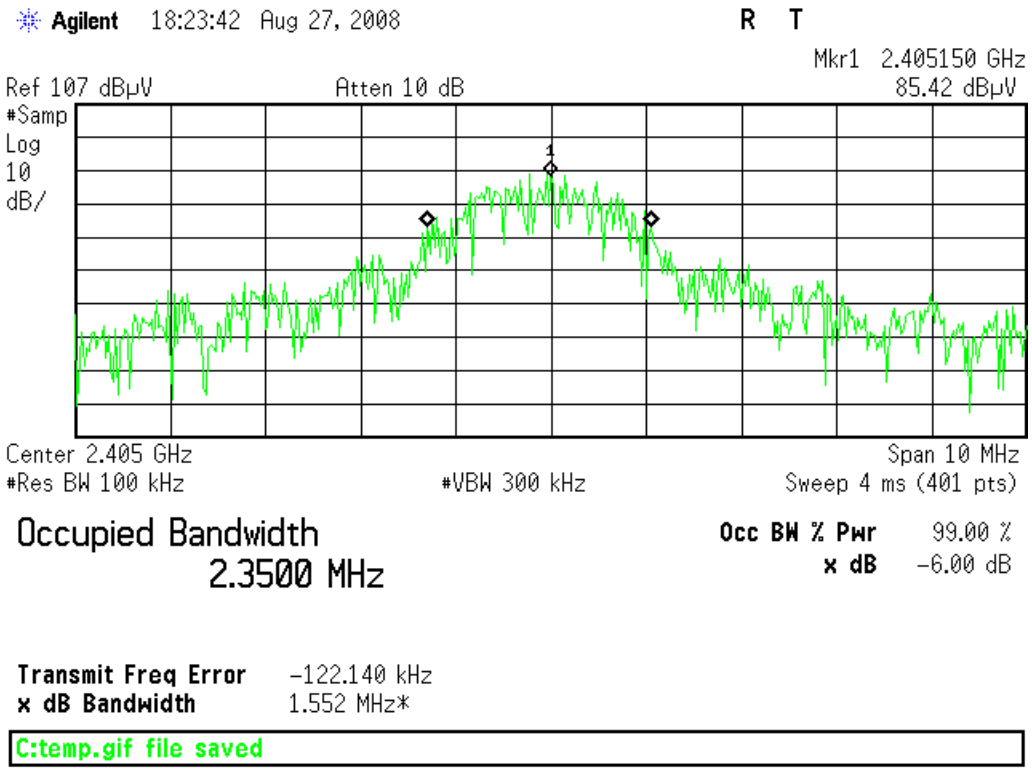
Occupied Bandwidth

6dB Bandwidth

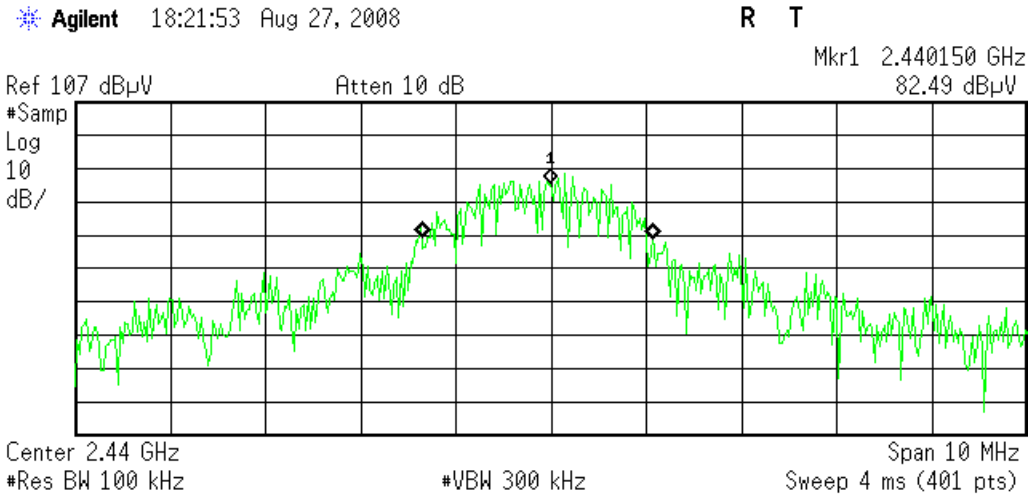
Limit: The minimum 6dB Bandwidth shall be at least 500kHz.

Measurement: Conducted Readings were taken at three channels. A 20dB attenuator was used for all conducted readings.

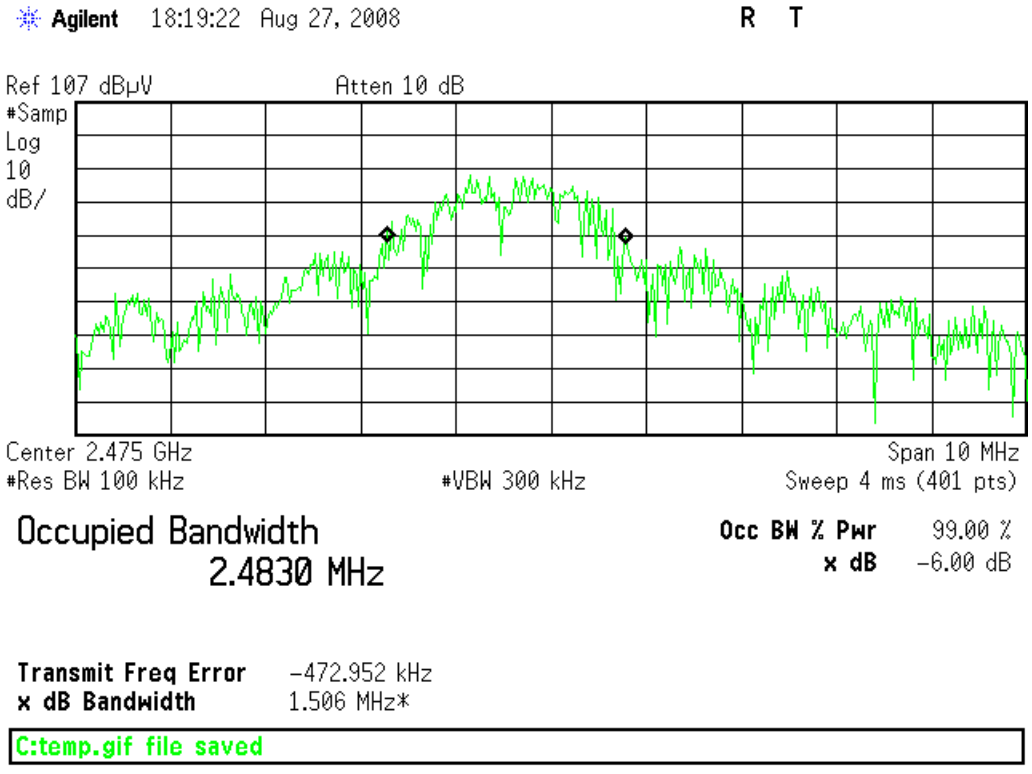
Channel 11



Channel 18



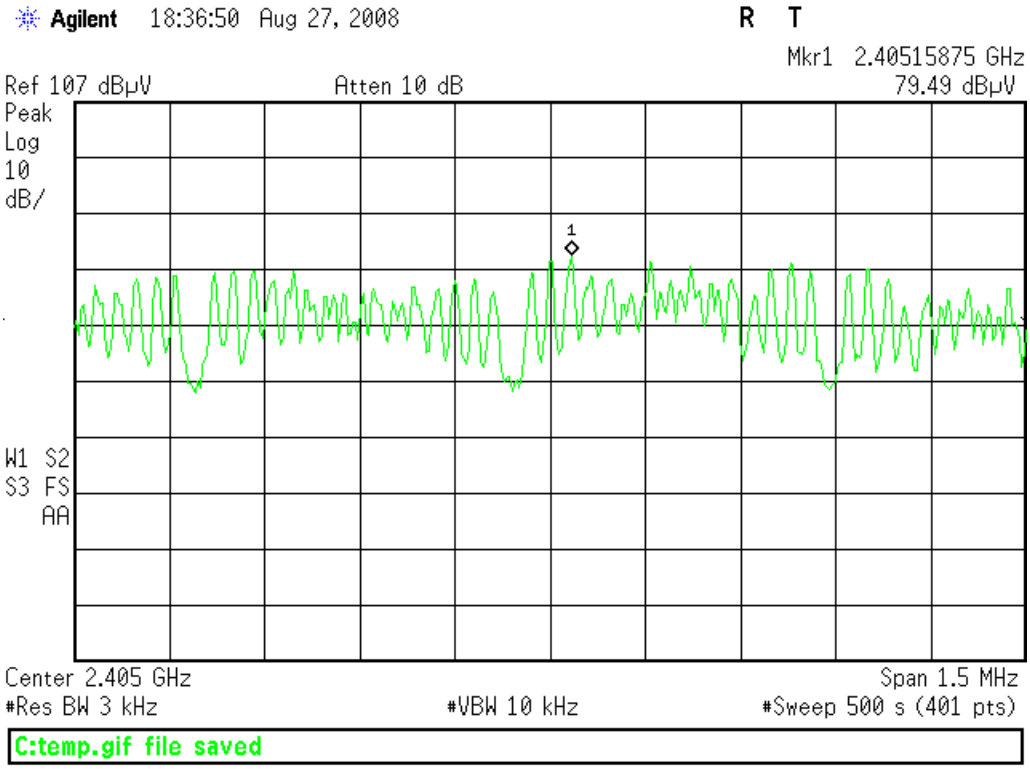
Channel 25

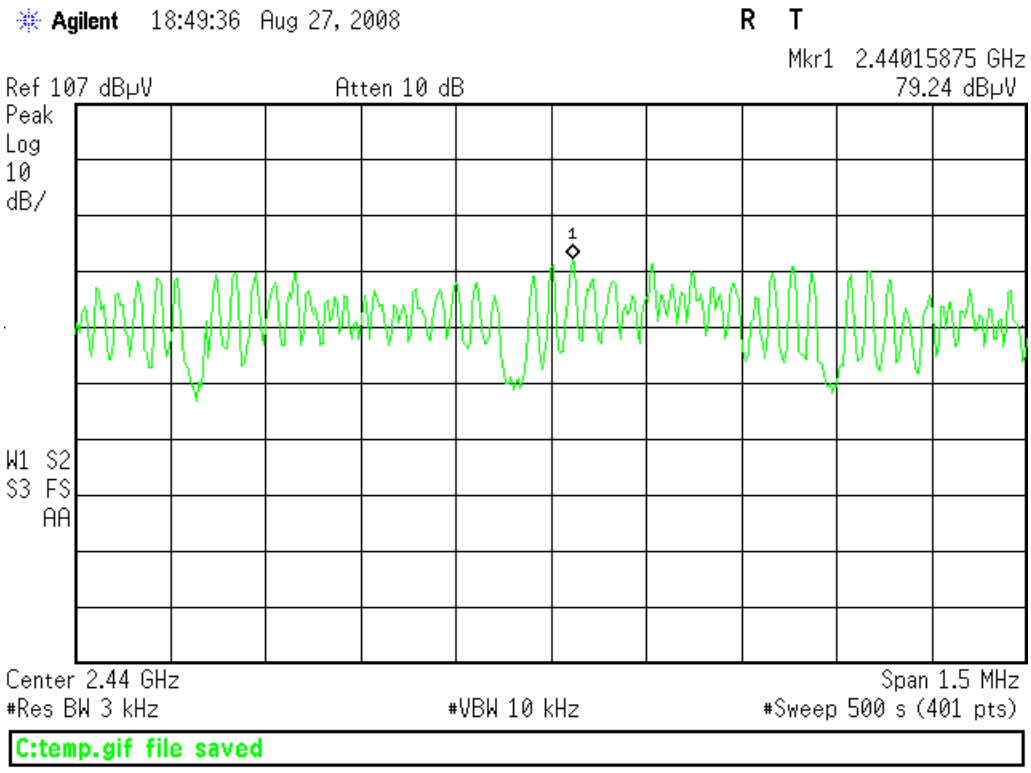


Power Spectral Density

Limit: 8dBm
Measurement: Conducted Readings were taken at three channels. A 20dB attenuator was used for all conducted readings.

Adjusted Reading: Reading(dBuV) – 107(dBm) + 20dB(Attenuator)
79.49 – 107 + 20 = -7.51dBm

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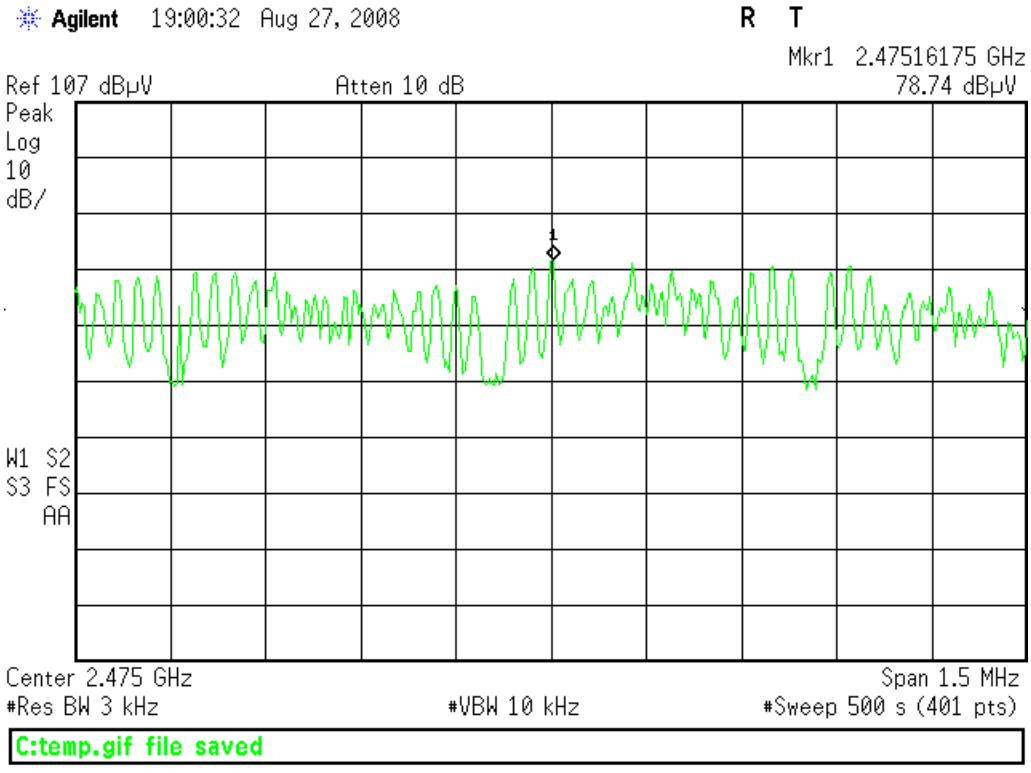
R T
Mkr1 2.44015875 GHz
79.24 dBµV
Ref 107 dBµV
Atten 10 dB
Peak
Log
10
dB/
1
W1 S2
S3 FS
AA
Center 2.44 GHz
Span 1.5 MHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 500 s (401 pts)
C:temp.gif file saved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R T
Mkr1 2.47516175 GHz
78.74 dBµV
Ref 107 dBµV
Atten 10 dB
Peak
Log
10
dB/
1
W1 S2
S3 FS
AA
Center 2.475 GHz
Span 1.5 MHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 500 s (401 pts)
C:temp.gif file saved