

Zelfy  
FCC ID: YHWPLF01  
IC: 9041A-PLF01

Report No. 10PRO019REV1

**FCC CFR47 PART 15/ INDUSTRY CANADA RSS-210**

**Test Report**

**2.4 GHz Transceiver**

**Model Number: ZE10C**

**FCC ID: YRIPLC01  
IC: 9041A - PLC01**

**Report Number: 10PRO019 REV1**

**Issue Date: 15 August 2010**

**Prepared for**

**Zelfy  
4655 Old Ironsides Dr #200  
Santa Clara, CA 95054**

Prepared by  
**T.N. Cokenias Consulting  
P.O. Box 1086  
El Granada CA 94018**

## EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

### I. GENERAL INFORMATION

Requirement: FCC, IC  
Test Requirements: FCC Part 15, RSS-210, RSS-Gen

Applicant: Zelfy  
4655 Old Ironsides Dr #200  
Santa Clara, CA 95054

**FCC ID:** YRIPLF01  
**IC:** 9041A - PLF01  
**Model No.:** ZE10C

### II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Zelfy Node product contains a 2.4 GHz radio and is used as part of a system to control and program entertainment devices remotely via internet and cell phone.

### III. TEST DATES AND TEST LOCATION

Testing was performed 11-12 August 2010. All tests were performed at

Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538



T.N. Cokenias  
EMC Consultant/Agent for Zelfy

15 August 2010

### **15.203 Antenna connector requirement**

The EUT uses a custom permanently attached internal monopole antenna

Antenna description	Mfr.	Model No.	Gain
pcb antenna	Zelfy	n/a	0 dBi maximum

## **TEST PROCEDURES**

All tests were performed in accordance with the applicable procedures called out in the following documents, unless otherwise noted:

FCC 47CFR15

RSS-210 Issue 7: Low power license exempt radio frequency devices (July 2007)

RSS-212: Test Facilities and Test Methods for Radio Equipment

ANSI C63.4 – 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

KDB Publication Number: 558074 - DTS measurement procedures.

For each radio, tests were performed at three frequencies:

Channel 11 (LOW) – 2405.8 MHz

Channel 18 (MID) – 2440.8 MHz

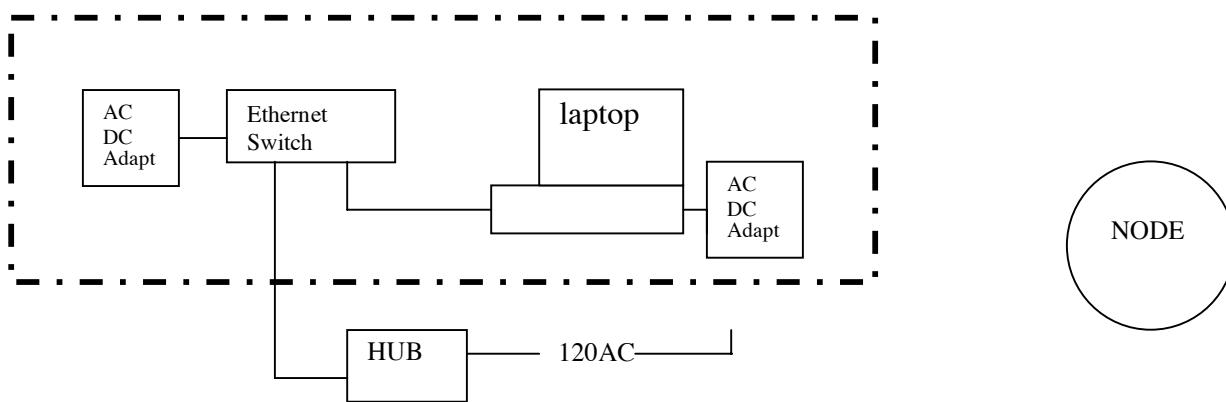
Channel 26 (HIGH) – 2480.9 MHz

## Test Equipment

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
PSA Series Spectrum Analyzer	Sunol Sciences	JB1	C01011	01/14/09	12/18/10
Antenna, Bilog, 2 GHz		Agilent / HP	C00885	03/31/09	12/19/10
Preamplifier, 1300 MHz		Agilent / HP	C01069	01/05/10	04/05/11
Power Meter	HP	438A	C01068	12/06/09	06/16/11
Power sensor	HP	8482A	2349A08568	04/14/09	04/14/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/09	12/18/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/05/09	12/17/10
LISN, 30 MHz	FCC	LISN-50/250-25-2 8012-50-R-24-	N02625	10/29/09	10/29/10
LISN, 10 kHz ~ 30 MHz	Solar	BNC	N02481	10/29/09	10/29/10
EMI Receiver	R & S	ESHS 20	N02396	06/08/09	05/06/11

## Test Set-up Diagram

shielded box housing hub support equipment



## Support Equipment

Equipment	Mfr	Model	Asset No.
Laptop PC	HP	Pavillion	X11-45371
AC/DC adapter	HP	DC359A	Q031514
Ethernet switch	Netgear	FS105	1D5178937048A
Ethernet Switch AC/DC	Netgear	DSA-9R-05-AUS	

Test control software: ZELFY guiHubNodeTest-FCC

## TEST RESULTS

### Radiated Test Set-up, 30-25 GHz

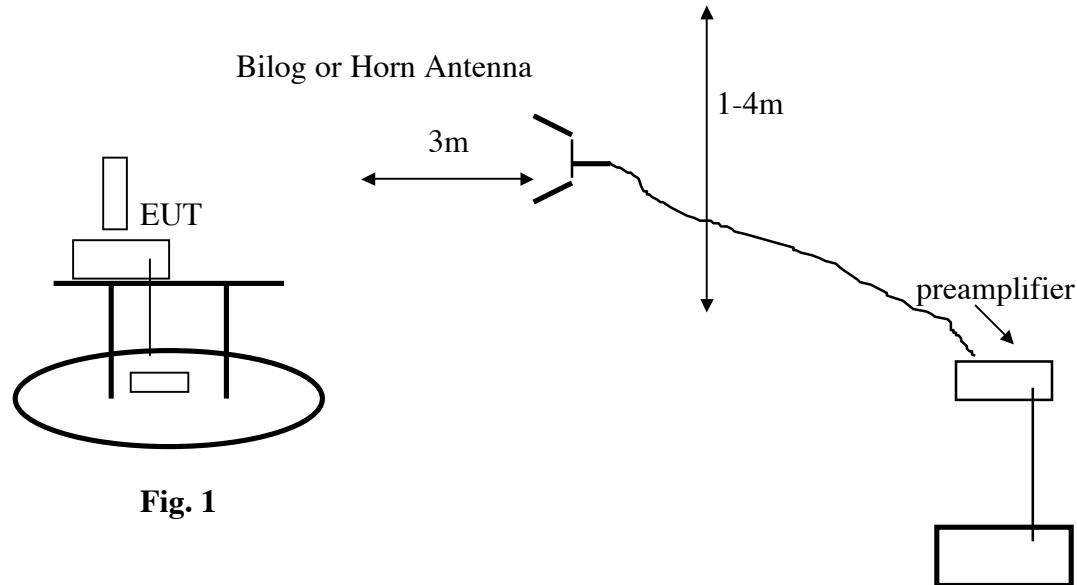


Fig. 1

### Test Procedures

Radiated emissions generated by the transmitter portion of the EUT were measured. Pre-test results in X, Y, and Z planes showed worst-case when EUT was on its flat side (X) as shown in test set-up photographs below.

1. The EUT was placed on a wooden table resting on a turntable on the test site. The search antenna was placed 3m from the EUT. The EUT antenna was mounted in the with the EUT TX antenna pointed directly to the search antenna.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.
3. Emissions were investigated to the 10<sup>th</sup> harmonic of the fundamental.
4. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

**Test Results:** Worst-case results are presented. Refer to data sheets below. Restricted band emissions meet 54 dBuV/m. Other undesired emissions from the transmitter meet the -20 dBc requirement in 15.247(d).

### 15.205 Restricted Frequency Bands

<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>GHz</b>
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505 (1)	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

### 15.209 General Field Strength Limits

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

Industry Canada RSS-210 Restricted Bands and General Field Strength Limits

Table 1: Restricted Frequency Bands <sup>(Note)</sup>

MHz	MHz	MHz
0.090-0.110	73-74.6	7250-7750
2.1735-2.1905	74.8-75.2	8025-8500
3.020-3.026	108-138	
4.125-4.128	156.52475-156.52525	
4.17725-4.17775	156.7-156.9	
4.20725-4.20775	240-285	
5.677-5.683	322-335.4	
6.215-6.218	399.9-410	
6.26775-6.26825	608-614	
6.31175-6.31225	960-1427	
8.291-8.294	1435-1626.5	
8.362-8.366	1645.5-1646.5	
8.37625-8.38675	1660-1710	
8.41425-8.41475	1718.8-1722.2	
12.29-12.293	2200-2300	
12.51975-12.52025	2310-2390	
12.57675-12.57725	2655-2900	
13.36-13.41	3260-3267	
16.42-16.423	3332-3339	
16.69475-16.69525	3345.8-3358	
16.80425-16.80475	3500-4400	
25.5-25.67	4500-5150	
37.5-38.25	5350-5460	
		GHz
		9.0-9.2
		9.3-9.5
		10.6-12.7
		13.25-13.4
		14.47-14.5
		15.35-16.2
		17.7-21.4
		22.01-23.12
		23.6-24.0
		31.2-31.8
		36.43-36.5
		Above 38.6

**Note:** Certain frequency bands listed in Table 1 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as in RSS-310.

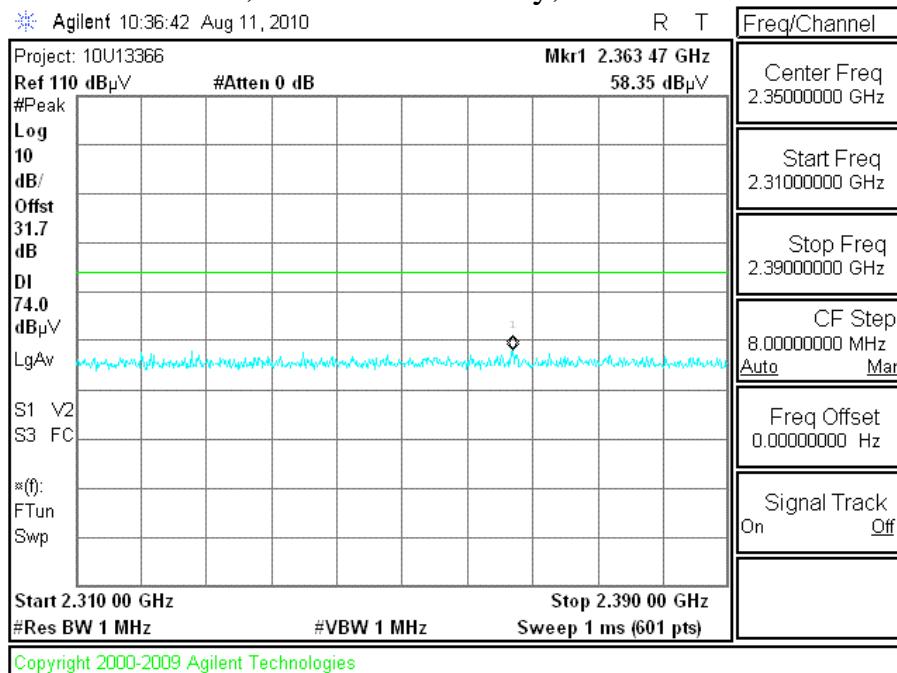
Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz <sup>(Note)</sup>

Frequency (MHz)	Field Strength	
	microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

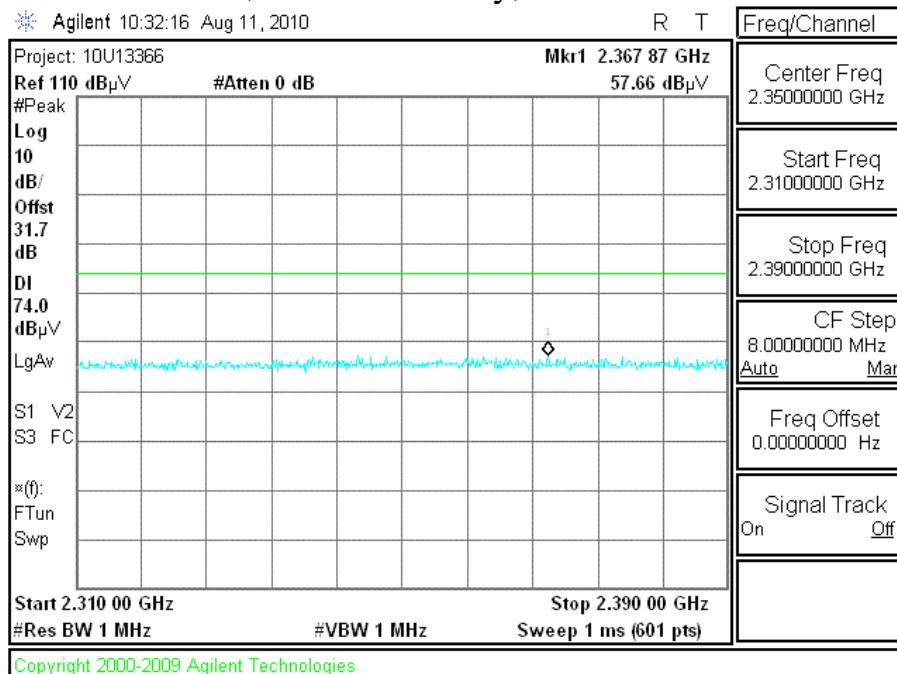
**Note:** Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

**Radiated Band edge Emissions in Restricted Bands**

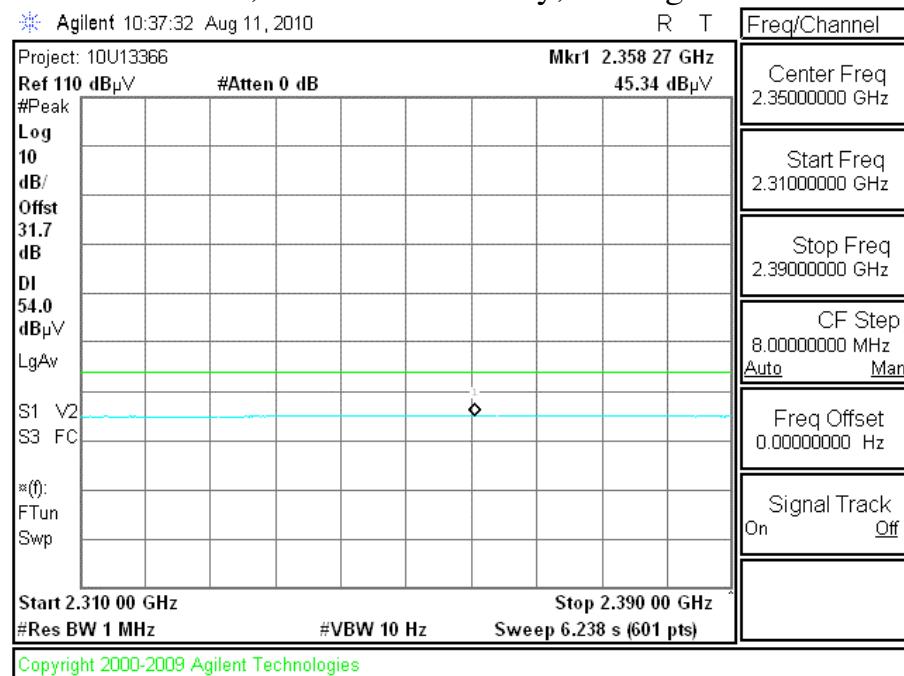
**Low channel 11, Horizontal Polarity, Peak detector**



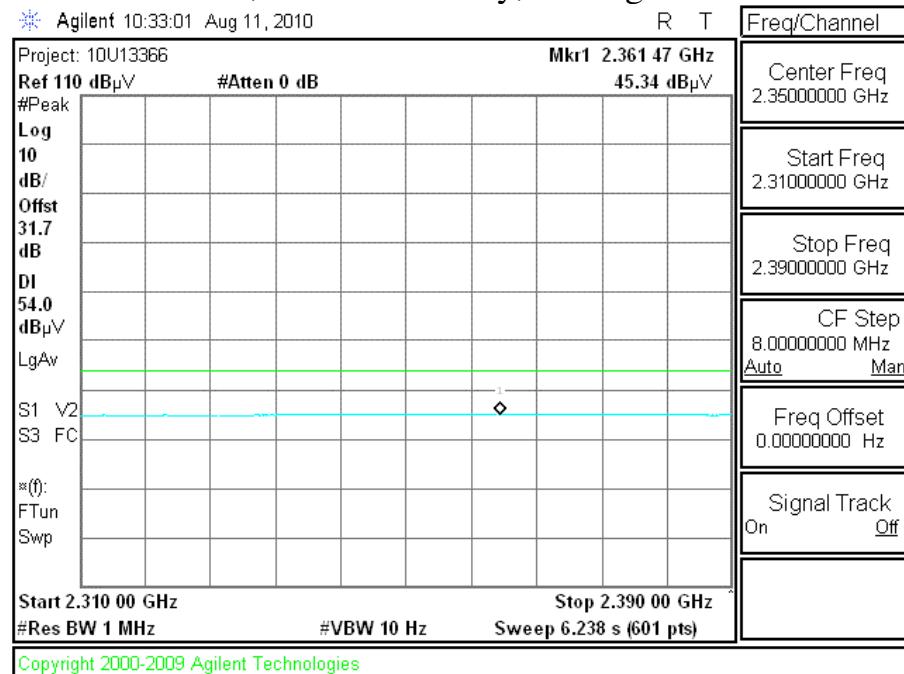
**Low channel 11, Vertical Polarity, Peak detector**



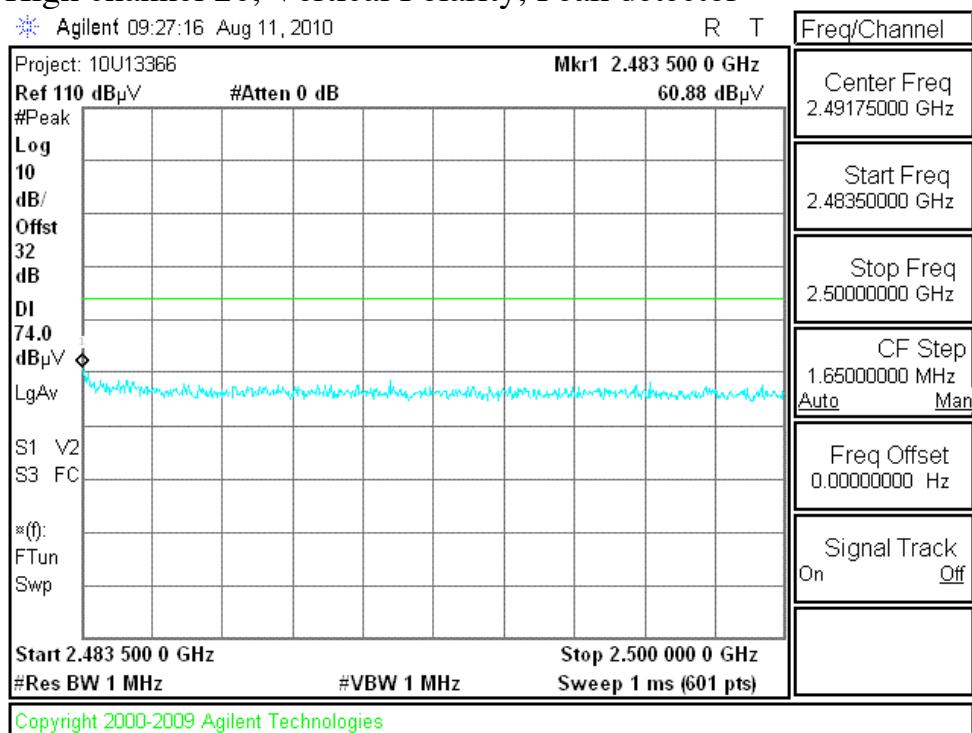
## Low channel 11, Horizontal Polarity, Average detector



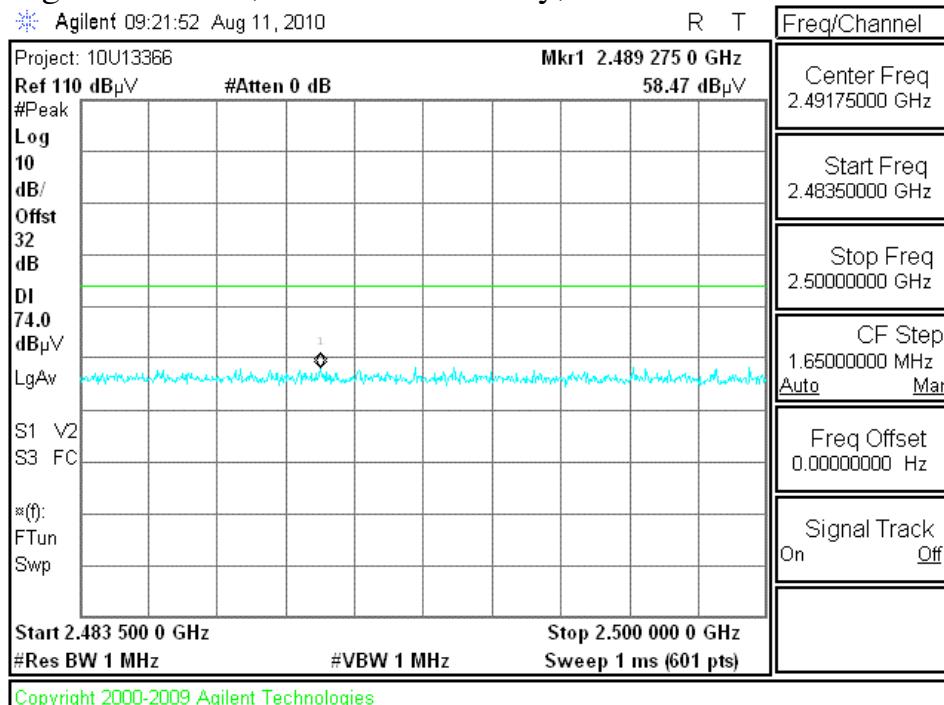
## Low channel 11, Vertical Polarity, Average detector



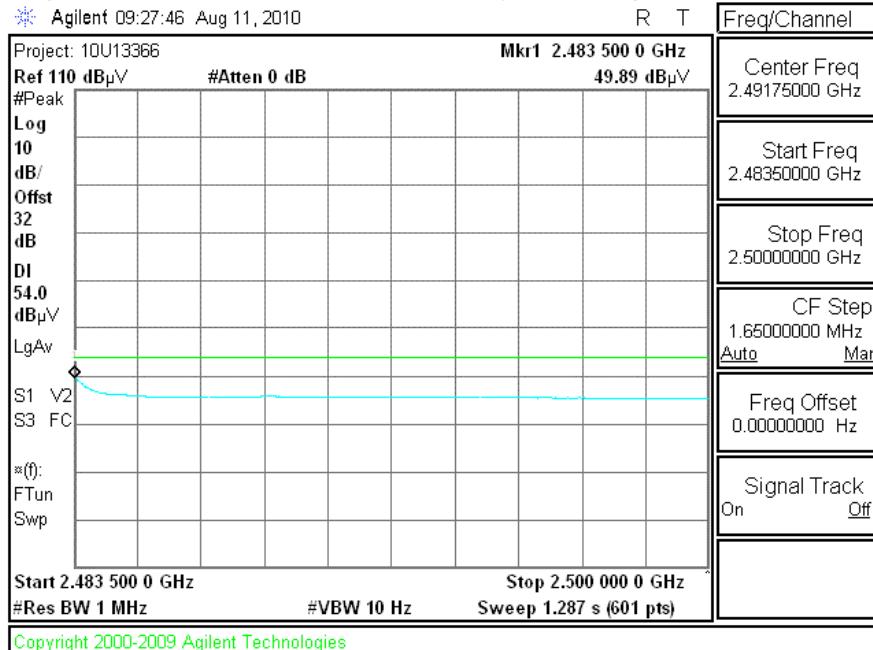
## High channel 26, Vertical Polarity, Peak detector



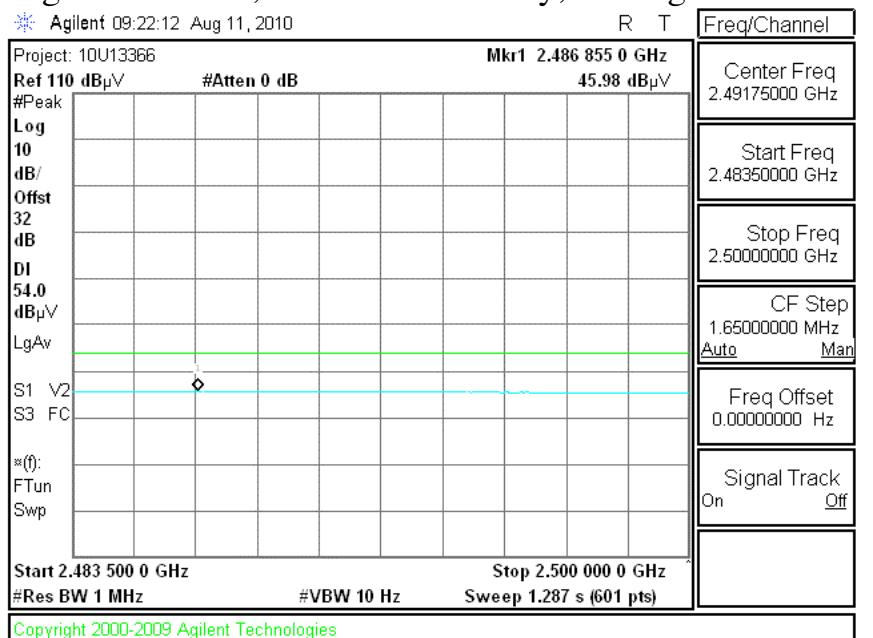
## High channel 26, Horizontal Polarity, Peak detector



## High channel 26, Vertical Polarity, Average detector



## High channel 26, Horizontal Polarity, Average detector



## 1-25 GHz TX Radiated Spurious

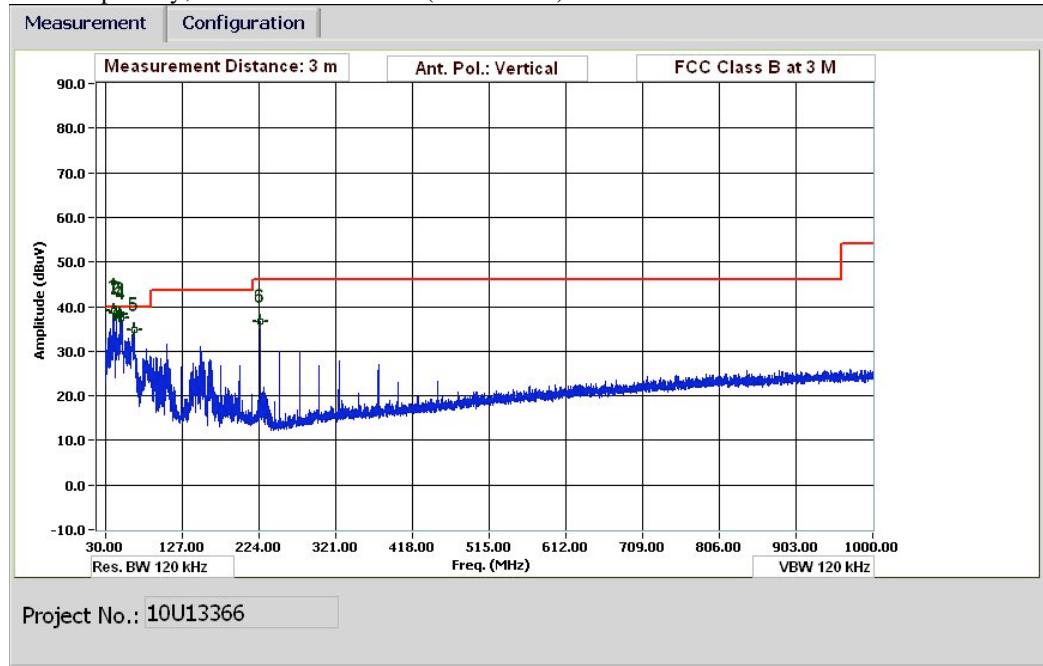
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
<b>Company:</b> Zelphy <b>Project #:</b> 10U13366 <b>Date:</b> 8/11/10 <b>Test Engineer:</b> Thanh Nguyen <b>Configuration:</b> Node only <b>Mode:</b> Transmit Normal															
<b>Test Equipment:</b>															
<b>Horn 1-18GHz</b>			<b>Pre-amplifier 1-26GHz</b>			<b>Pre-amplifier 26-40GHz</b>			<b>Horn &gt; 18GHz</b>						
T73; S/N: 6717 @3m			T144 Miteq 3008A00931												
Hi Frequency Cables															
<b>3' cable 22807700</b>			<b>12' cable 22807600</b>			<b>20' cable 22807500</b>			<b>HPF</b>			<b>Reject Filter</b>			
3' cable 22807700			12' cable 22807600			20' cable 22807500									
FCC 15.209															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch 11, 2405MHz															
4.810	3.0	47.5	38.3	33.0	5.8	-36.5	0.0	0.0	49.8	40.6	74	54	-24.2	-13.4	V
4.810	3.0	43.1	34.9	33.0	5.8	-36.5	0.0	0.0	45.4	37.2	74	54	-28.6	-16.8	H
7.215	3.0	47.2	34.7	35.2	7.2	-36.2	0.0	0.0	53.3	40.9	74	54	-20.7	-13.1	H
7.215	3.0	43.5	32.0	35.2	7.2	-36.2	0.0	0.0	49.6	38.1	74	54	-24.4	-15.9	H
Mid ch 18, 2440MHz															
4.880	3.0	46.5	40.3	33.1	5.8	-36.5	0.0	0.0	49.0	42.8	74	54	-25.0	-11.2	V
4.880	3.0	44.3	34.8	33.1	5.8	-36.5	0.0	0.0	46.8	37.3	74	54	-27.2	-16.7	H
High Ch 26, 2480MHz															
4.960	3.0	46.1	37.2	33.2	5.9	-36.5	0.0	0.0	48.7	39.8	74	54	-25.3	-14.2	V
4.960	3.0	45.7	35.8	33.2	5.9	-36.5	0.0	0.0	48.3	38.4	74	54	-25.7	-15.6	H
No other emissions above noise floor															
Rev. 07.22.09															
<b>f</b> Measurement Frequency <b>Dist</b> Distance to Antenna <b>Read</b> Analyzer Reading <b>AF</b> Antenna Factor <b>CL</b> Cable Loss															
<b>Amp</b> Preamp Gain <b>D Corr</b> Distance Correct to 3 meters <b>Avg</b> Average Field Strength @ 3 m <b>Peak</b> Calculated Peak Field Strength <b>HPF</b> High Pass Filter															
<b>Avg Lim</b> Average Field Strength Limit <b>Pk Lim</b> Peak Field Strength Limit <b>Avg Mar</b> Margin vs. Average Limit <b>Pk Mar</b> Margin vs. Peak Limit															

## RX Emissions

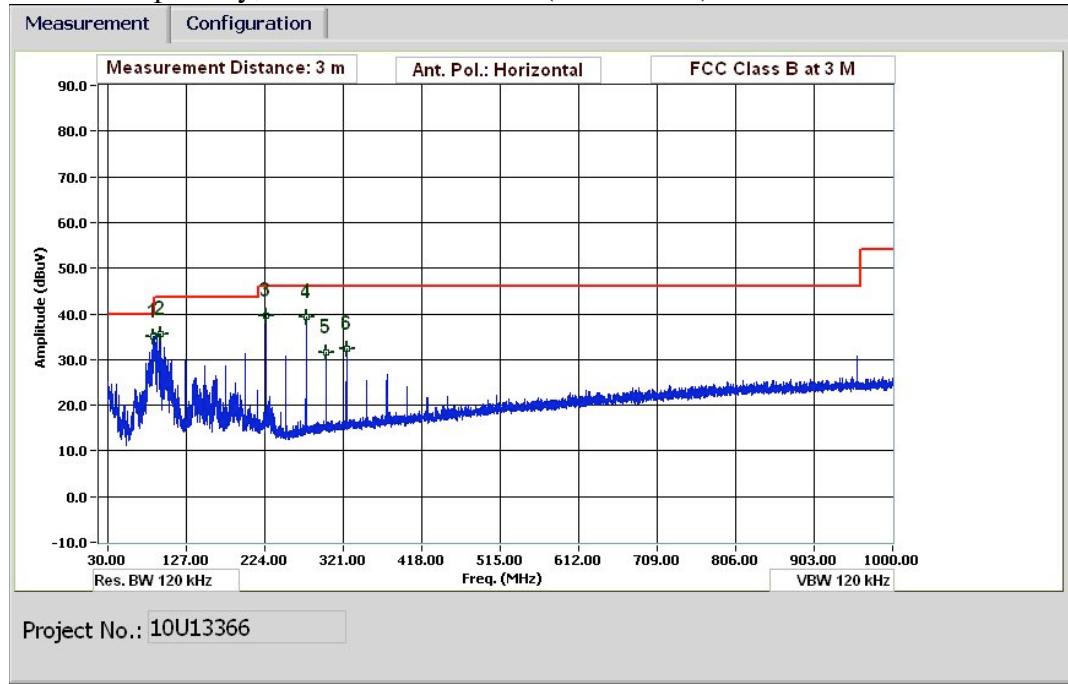
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company:	Zelfy														
Project #:	10U13366														
Date:	8/11/10														
Test Engineer:	Thanh Nguyen														
Configuration:	Node only														
Mode:	Receive mode														
<b>Test Equipment:</b>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz						
T73; S/N: 6717 @3m			T144 Miteq 3008A00931											RX RSS 210	
Hi Frequency Cables															
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz		
3' cable 22807700			12' cable 22807600			20' cable 22807500							Average Measurements RBW=1MHz ; VBW=10Hz		
<b>Peak Measurements</b>															
RBW=VBW=1MHz															
Average Measurements															
RBW=1MHz ; VBW=10Hz															
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.050	3.0	46.0	36.8	24.0	2.4	-39.4	0.0	0.0	33.0	23.9	74	54	-41.0	-30.1	V
1.350	3.0	45.2	35.3	25.0	2.8	-39.0	0.0	0.0	34.0	24.1	74	54	-40.0	-29.9	V
2.407	3.0	47.2	36.8	28.2	3.8	-37.5	0.0	0.0	41.8	31.4	74	54	-32.2	-22.6	V
3.210	3.0	39.9	33.2	30.5	4.5	-37.2	0.0	0.0	37.7	31.0	74	54	-36.3	-23.0	V
7.780	3.0	38.1	29.2	36.0	7.5	-36.2	0.0	0.0	45.5	36.6	74	54	-28.5	-17.4	H
No other emissions above noise floor															
Rev. 07.22.09															
f	Measurement Frequency			Amp	Preamp Gain			Avg Lim	Average Field Strength Limit						
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Pk Lim	Peak Field Strength Limit						
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Avg Mar	Margin vs. Average Limit						
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Pk Mar	Margin vs. Peak Limit						
CL	Cable Loss			HPF	High Pass Filter										

### TX and RX Radiated Emissions 30-1000 MHz

Note: No difference detected between TX and RX emissions below 1 GHz  
Vertical polarity, Worst-case emission (Channel 11)



### Horizontal polarity, Worst-case emission (Channel 11)



**30-1000MHz Frequency Measurement**  
**Compliance Certification Services, Fremont 5m Chamber**

**Test Engr:**

**Date:** 02/12/09  
**Project #:** 10U13366

**Company:**

**EUT Description:**

**EUT M/N:**

**Test Target:**

**Mode Oper:**

	f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit
	Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		
	Read	Analyzer Reading	Filter	Filter Insert Loss		
	AF	Antenna Factor	Corr.	Calculated Field Strength		
	CL	Cable Loss	Limit	Field Strength Limit		

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP
<b>Hub external Power, add ferrites at remote support Hub</b>												
40.320	3.0	53.2	13.7	0.6	28.4	0.0	0.0	39.1	40.0	-0.9	V	P
40.320	3.0	51.4	13.7	0.6	28.4	0.0	0.0	37.0	40.0	-3.0	V	QP
43.441	3.0	54.5	11.8	0.6	28.4	0.0	0.0	38.5	40.0	-1.5	V	P
43.441	3.0	52.3	11.8	0.6	28.4	0.0	0.0	36.2	40.0	-3.8	V	QP
48.001	3.0	56.7	9.3	0.6	28.4	0.0	0.0	38.3	40.0	-1.7	V	P
48.001	3.0	54.7	9.3	0.6	28.4	0.0	0.0	36.2	40.0	-3.8	V	QP
50.401	3.0	56.7	8.4	0.6	28.4	0.0	0.0	37.4	40.0	-2.6	V	P
50.401	3.0	54.3	8.4	0.6	28.4	0.0	0.0	35.3	40.0	-4.8	V	QP
66.361	3.0	54.3	8.0	0.7	28.4	0.0	0.0	34.7	40.0	-5.3	V	P
225.008	3.0	51.7	11.9	1.3	28.2	0.0	0.0	36.6	46.0	-9.4	V	P
86.042	3.0	55.0	7.5	0.8	28.3	0.0	0.0	35.0	40.0	-5.0	H	P
94.443	3.0	54.5	8.6	0.9	28.3	0.0	0.0	35.6	43.5	-7.9	H	P
225.008	3.0	54.5	11.9	1.3	28.2	0.0	0.0	39.5	46.0	-6.5	H	P
274.930	3.0	53.3	12.6	1.4	28.2	0.0	0.0	39.2	46.0	-6.8	H	P
300.011	3.0	44.8	13.4	1.5	28.1	0.0	0.0	31.7	46.0	-14.3	H	P
324.972	3.0	45.0	13.8	1.6	28.1	0.0	0.0	32.3	46.0	-13.7	H	P

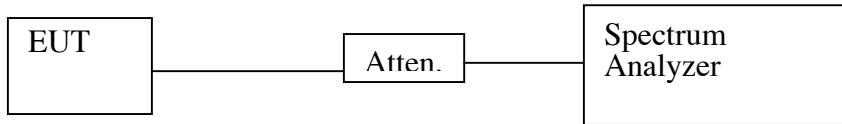
Rev. 1.27.09

Note: No other emissions were detected above the system noise floor.

### 6dB Bandwidth for DTS

**Test Requirement: FCC: 15.247 (a) 2**  
**IC: RSS-210 Sec. 6.2.2(o)(iv)**

### Test Set-up



### Test Procedures

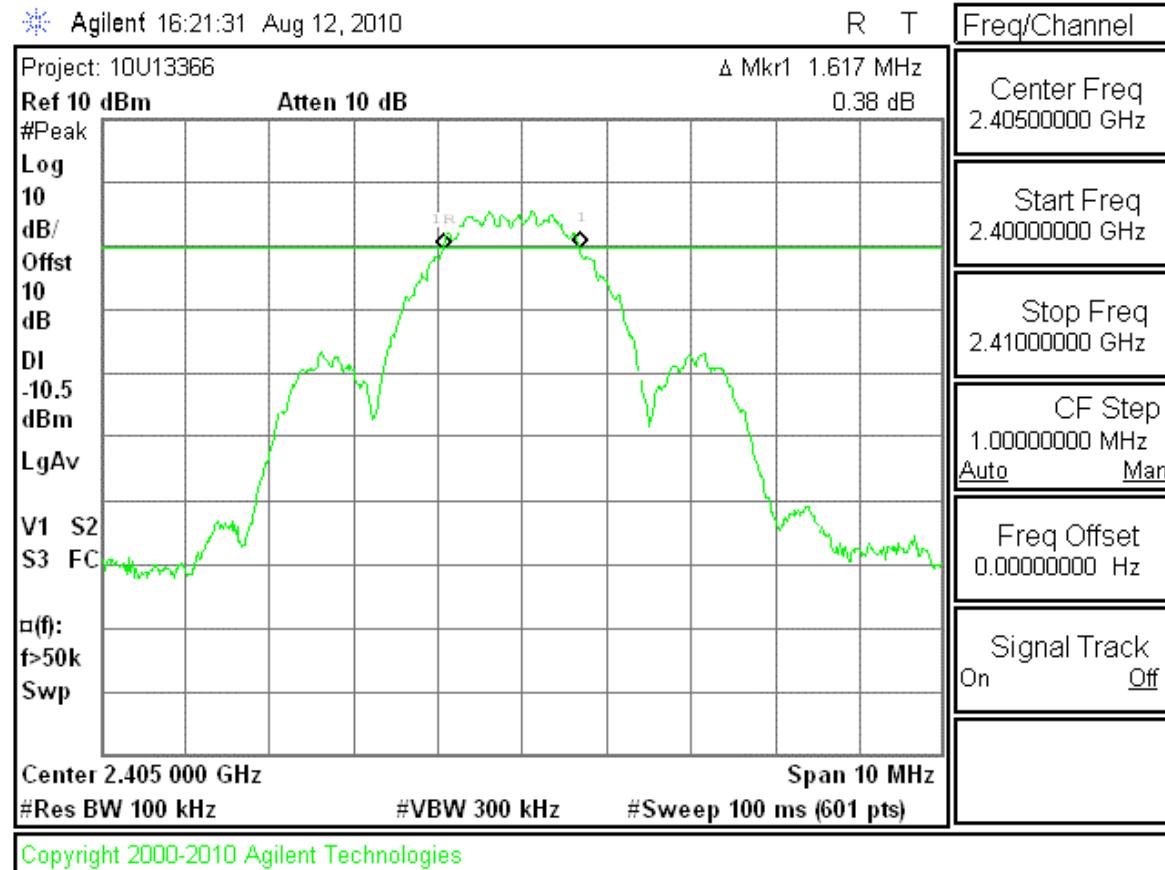
A modified EUT with a coaxial cable attached to the radio antenna port was configured on a test bench. The cable's SMA connector was connected to the spectrum analyzer. The EUT transmission was continuous at the LOW channel. While the transmitter broadcast a steady stream of digital data, the analyzer OCCUPIED BW function was activated to measure 6 dB BW and 99% BW.

Test was repeated for MID and HIGH channels.

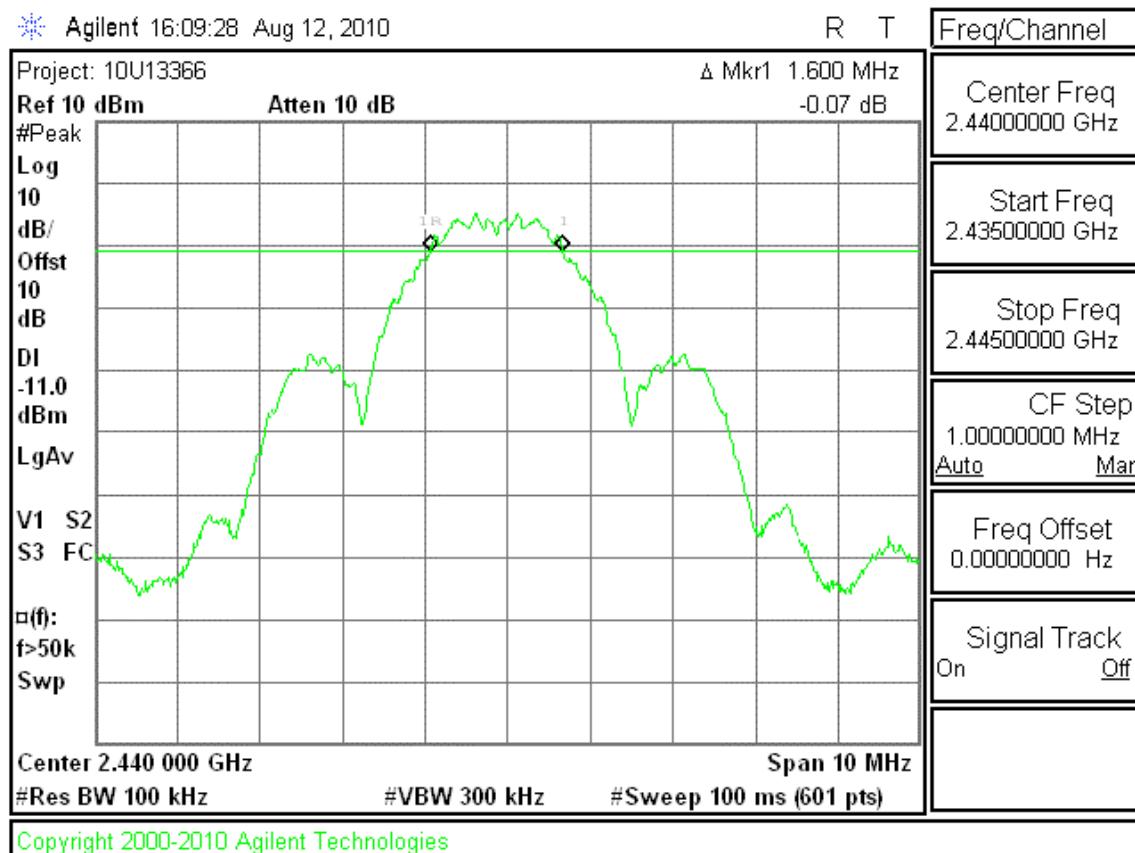
**Test Results.** No non-compliance noted. Refer to data sheets below.

Minimum 6 dB BW: 1.617 MHz  
Minimum Required: 500 kHz

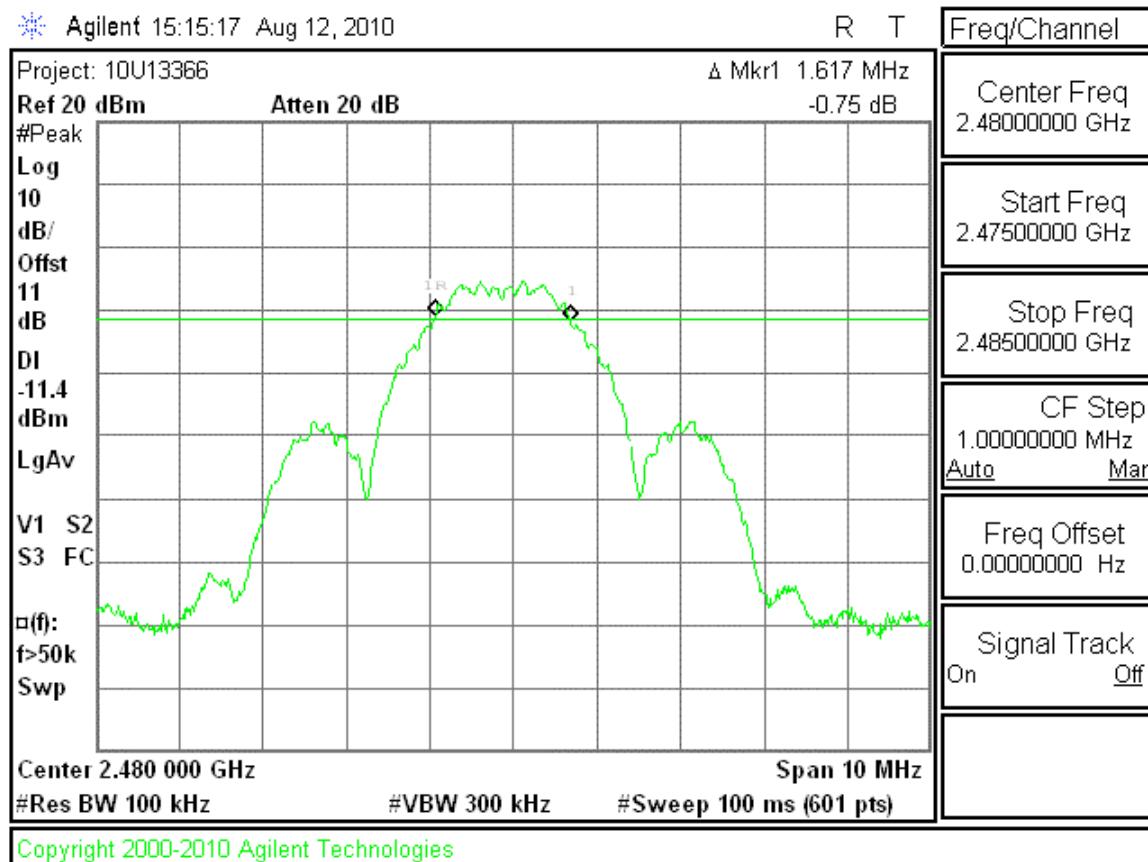
## 6dB Bandwidth LOW Channel 11



## 6 dB BW, MID Channel 18

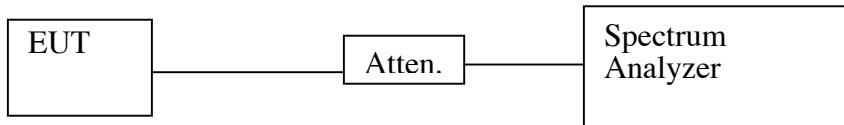


## 6 dB BW, HIGH Channel 26



### **99% Bandwidth**

#### **Test Setup**



Limit

None: for reporting purposes only.

#### **Test Procedure**

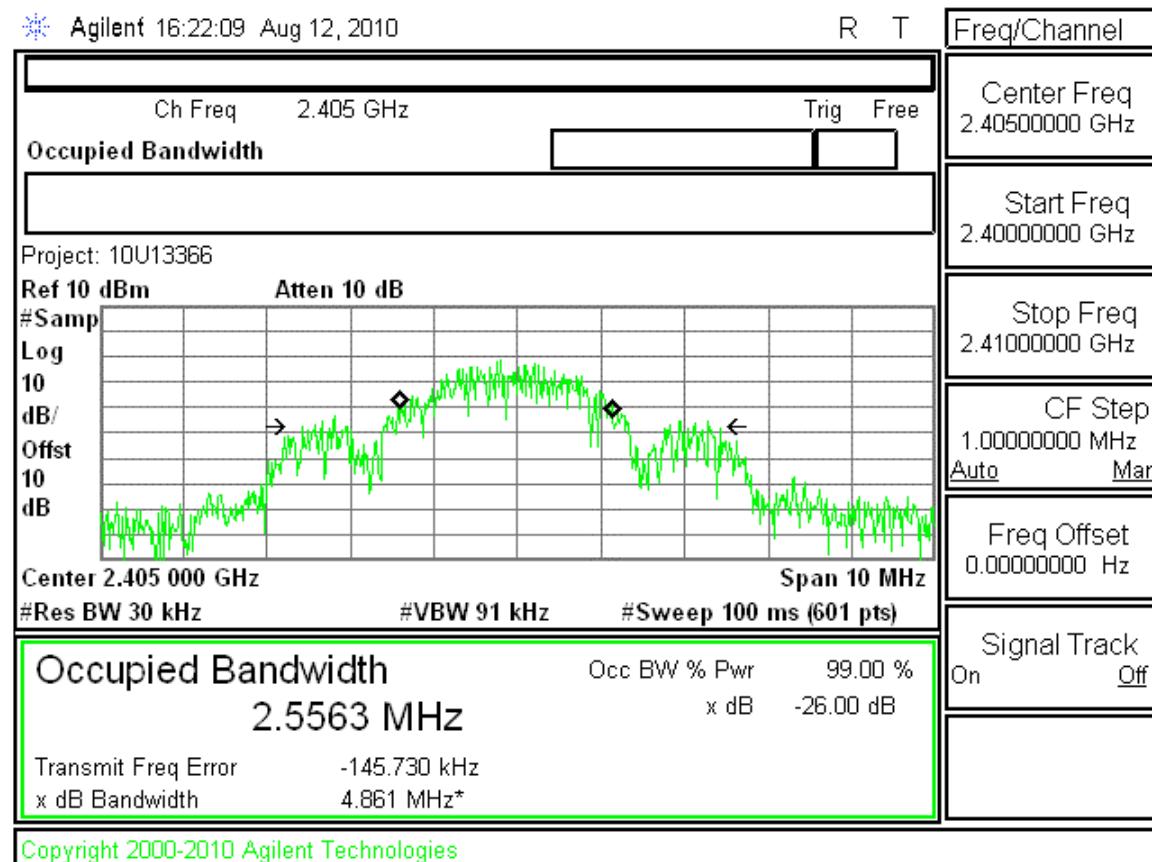
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal OCCUPIED BW function was utilized.

#### **Test Results**

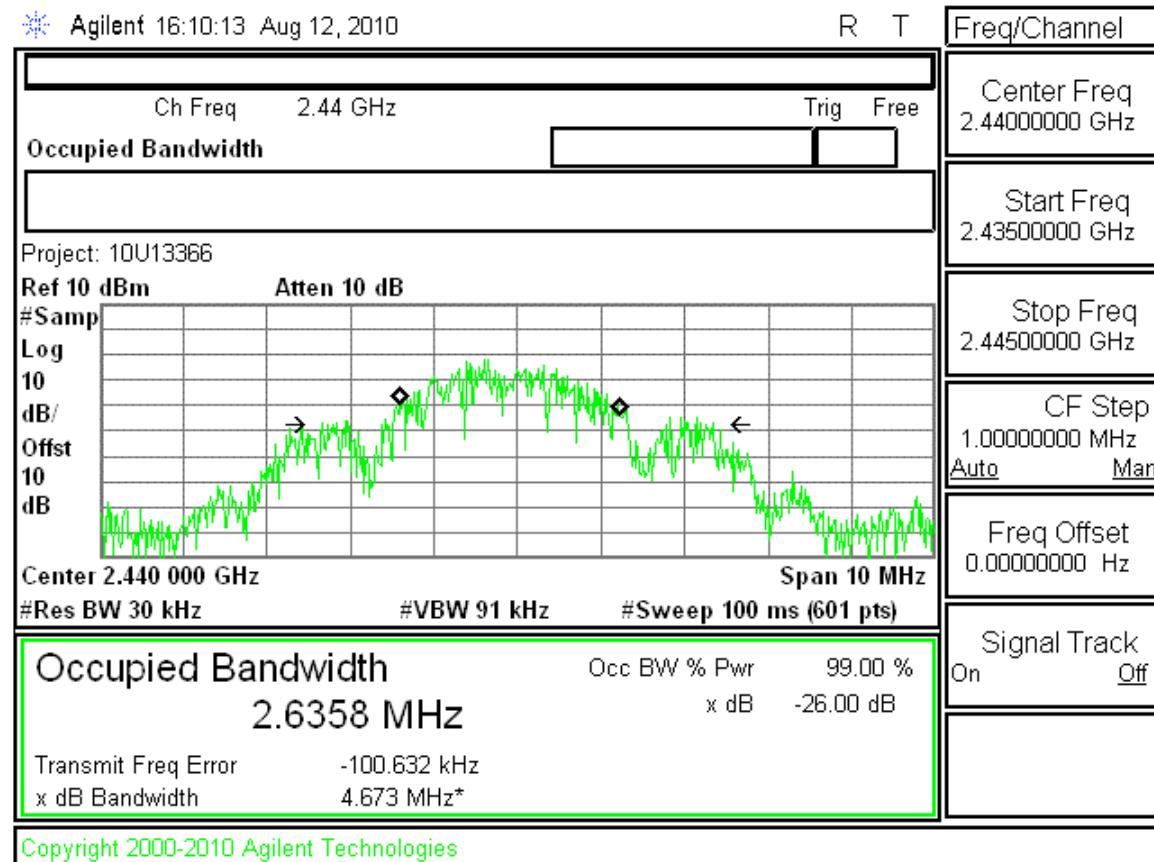
Refer to spectrum analyzer charts below. 99% bandwidth is approximately 2.63 MHz.

Emission Designator: 2M63G1D

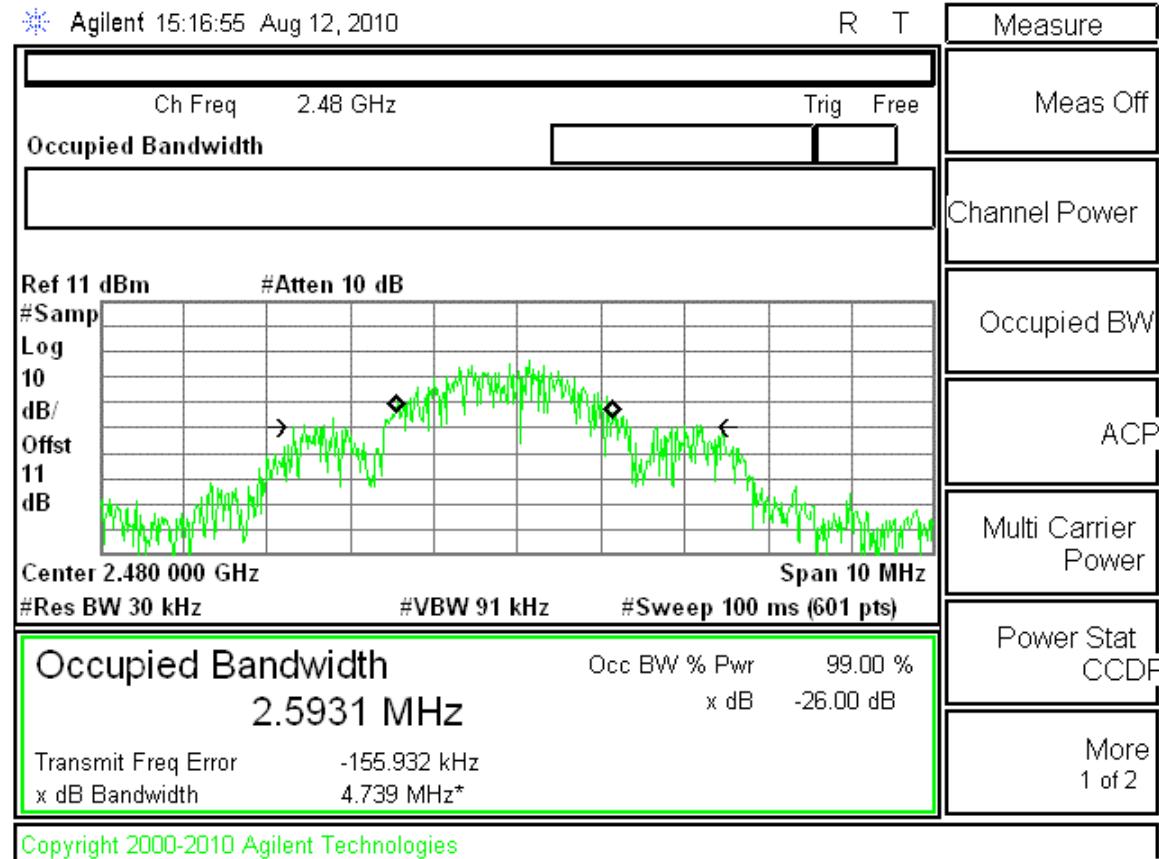
**99% Bandwidth LOW Channel 11**



**99% Bandwidth MID Channel 18**



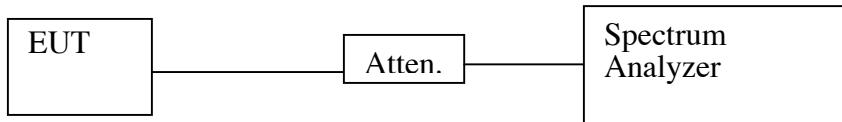
**99% Bandwidth HIGH Channel 26**



### RF Power Output

**Test Requirement:** FCC: 15.247(b)  
IC: RSS-210 Sec. 6.2.2(o)(iv)

### Test Setup



### Test Procedures

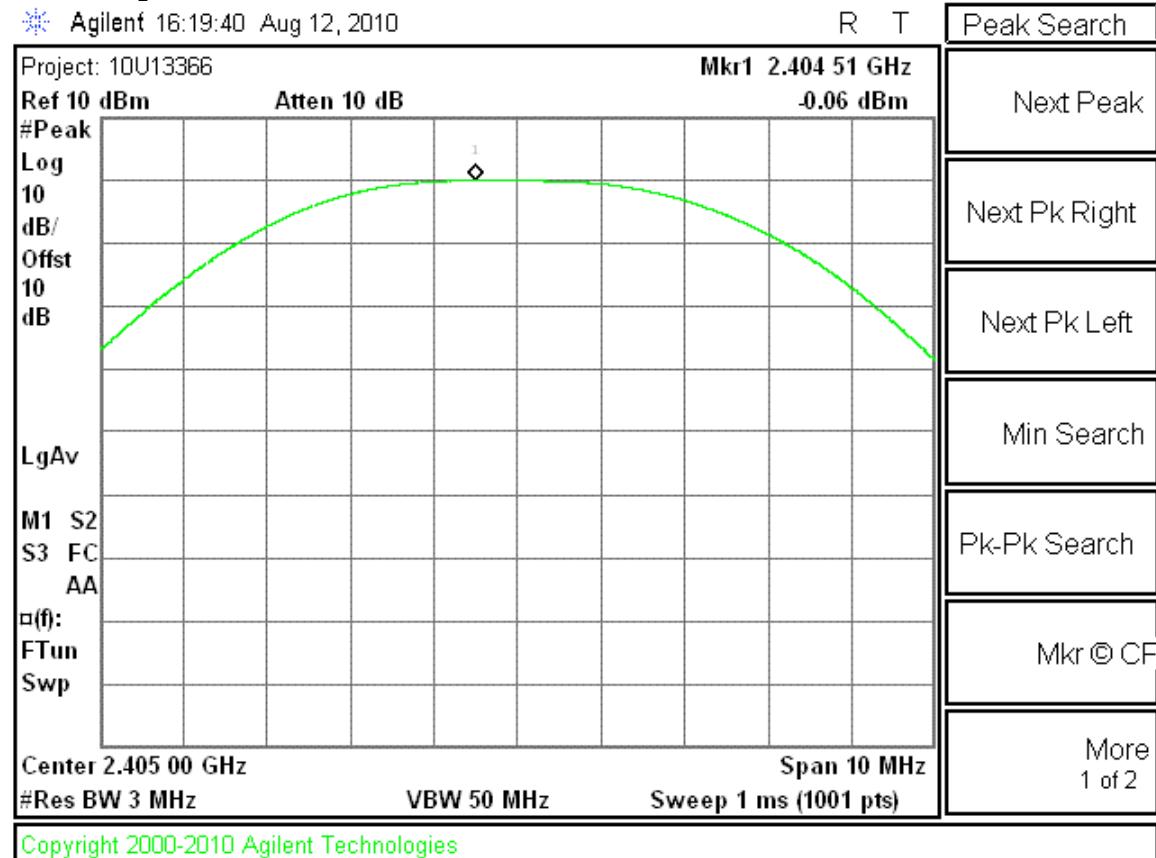
1. The EUT was configured on a test bench. RBW was set to a value higher than the 2.7 MHz 99% band width: RBW=3 MHz, VBW=5 MHz
2. The spectrum analyzer detector was set to PEAK and the highest value was recorded using the analyzer PEAK SEARCH function.

### Test Results

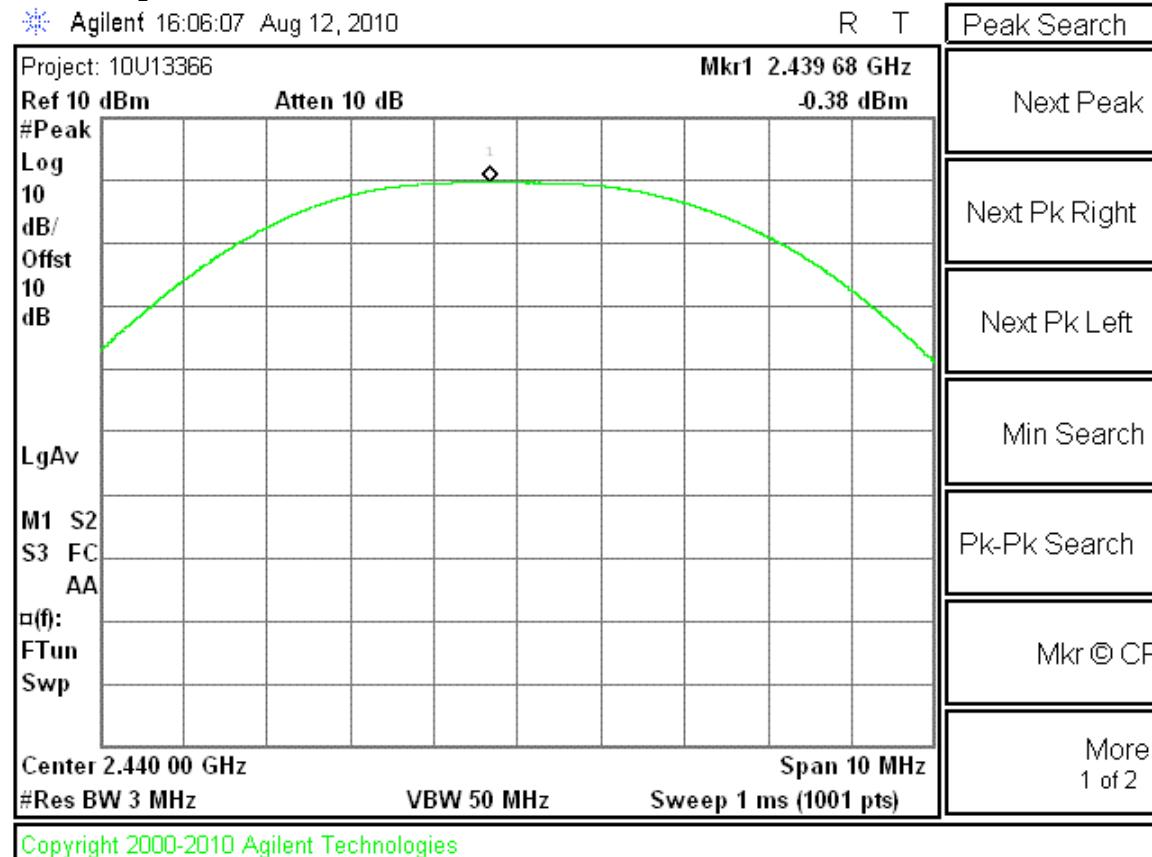
Refer to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm
Low	2405.8	-0.06
Mid	2440.8	-0.38
High	2480.9	0.18

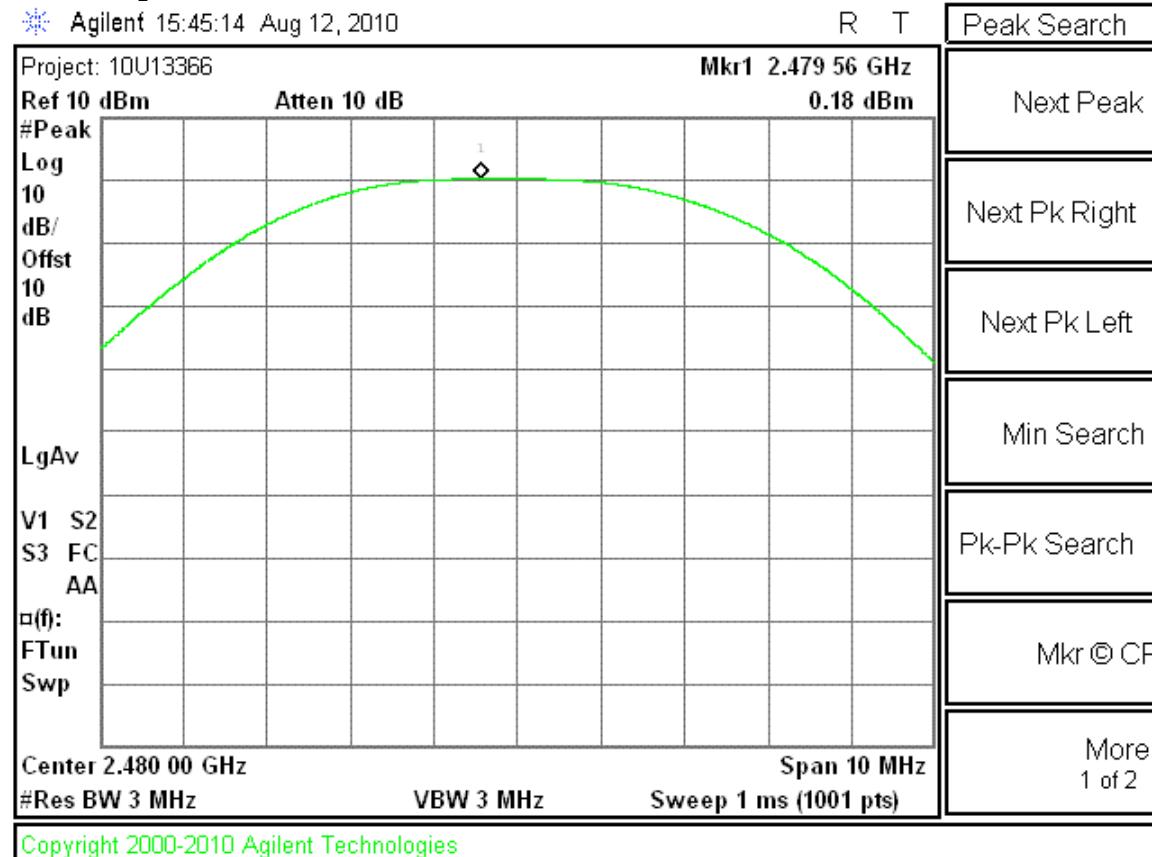
## Peak Output Power LOW Channel 11



## Peak Output Power MID Channel 18



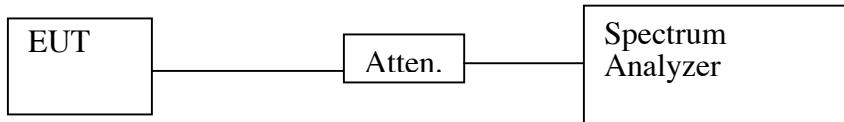
**Peak Output Power HIGH Channel 26**



### Spurious Emissions, Conducted

**Test Requirement: FCC: 15.247(d)**  
**IC: RSS-210 Sec. 6.2.2(o)(e1)**

### Test Setup



### Test Procedure

1. The EUT was configured on a test bench. The cable was connected between the EUT antenna port and the spectrum analyzer input port.

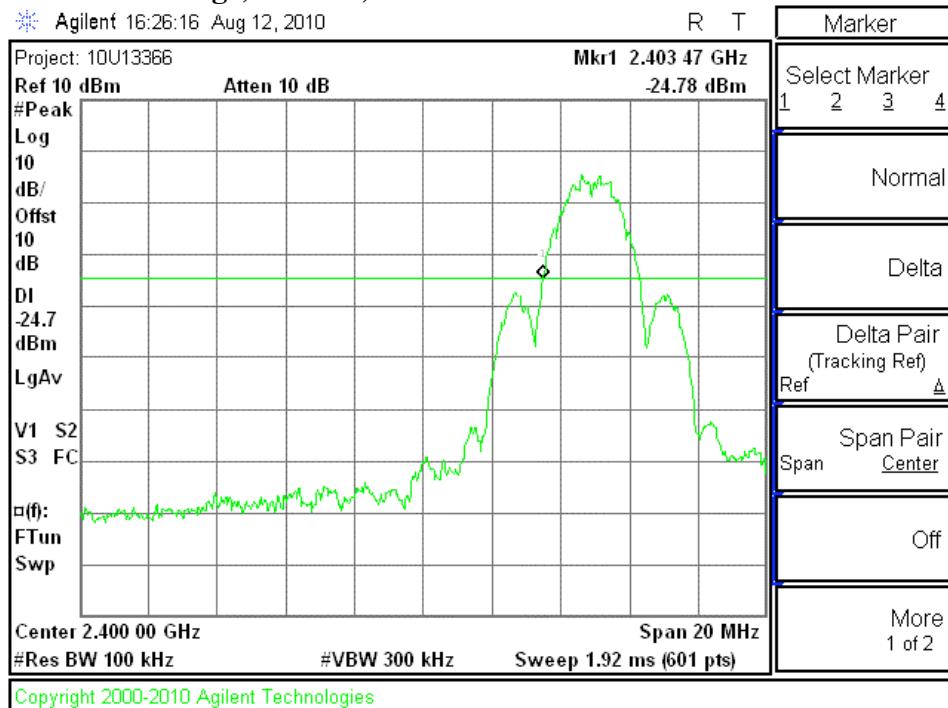
Spectrum analyzer RES BW was set to 100 kHz. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Readings were taken out to 10fo.

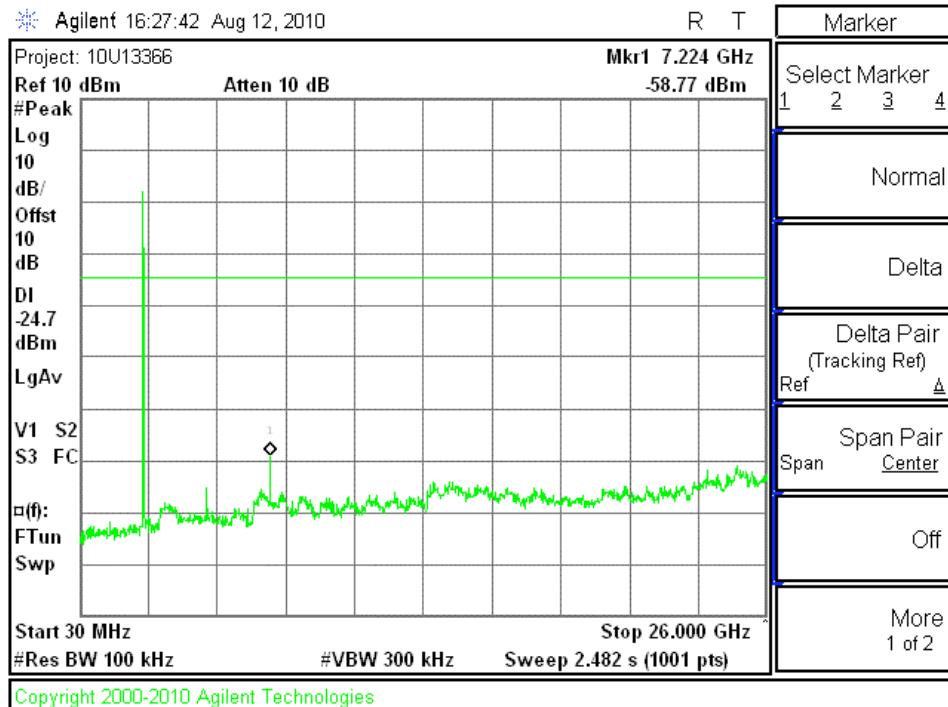
### Test Results

Refer to spectrum analyzer plots. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

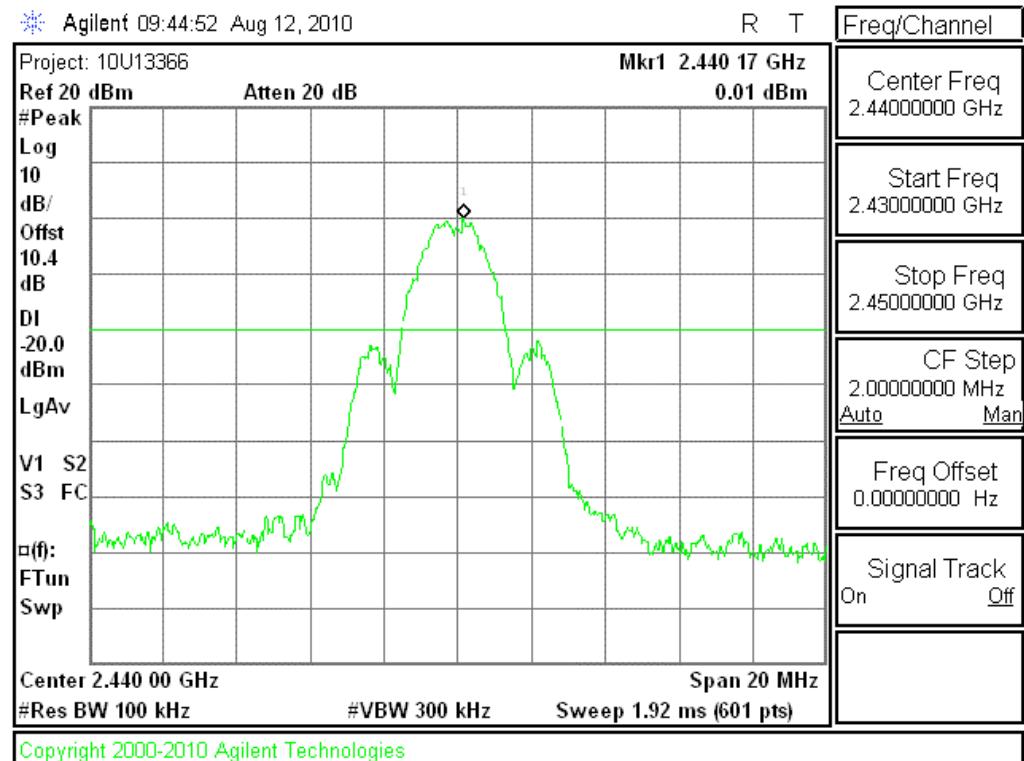
### Lower band edge, -20 dBc, LOW Channel



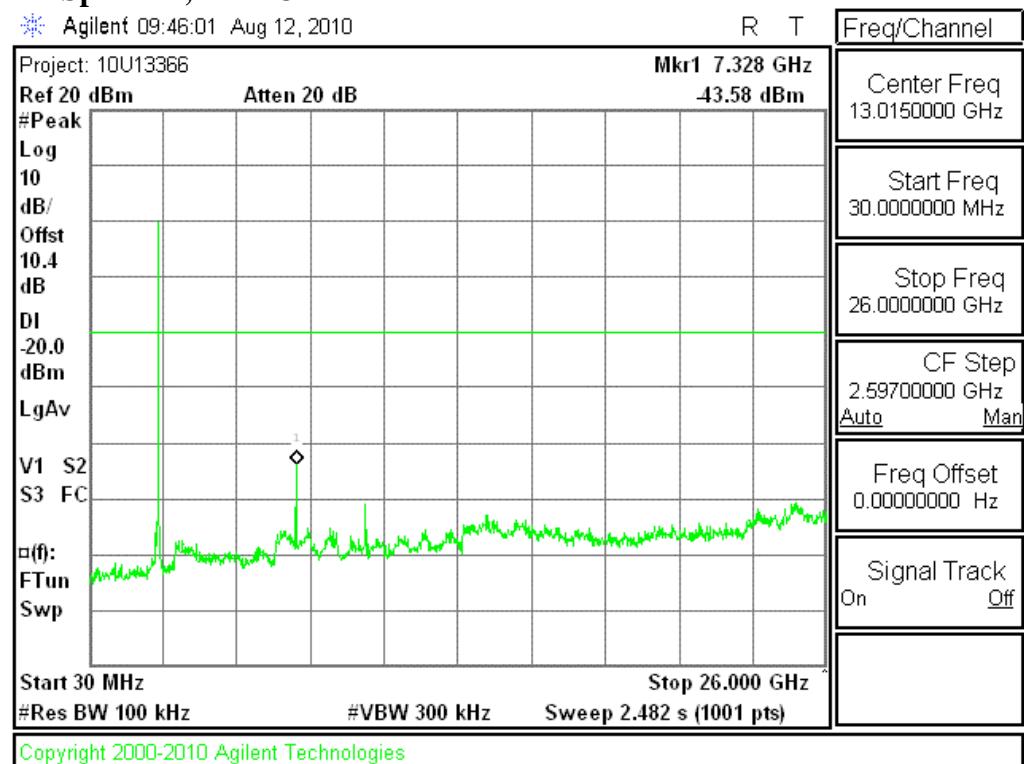
### TX Spurious Emissions LOW Channel



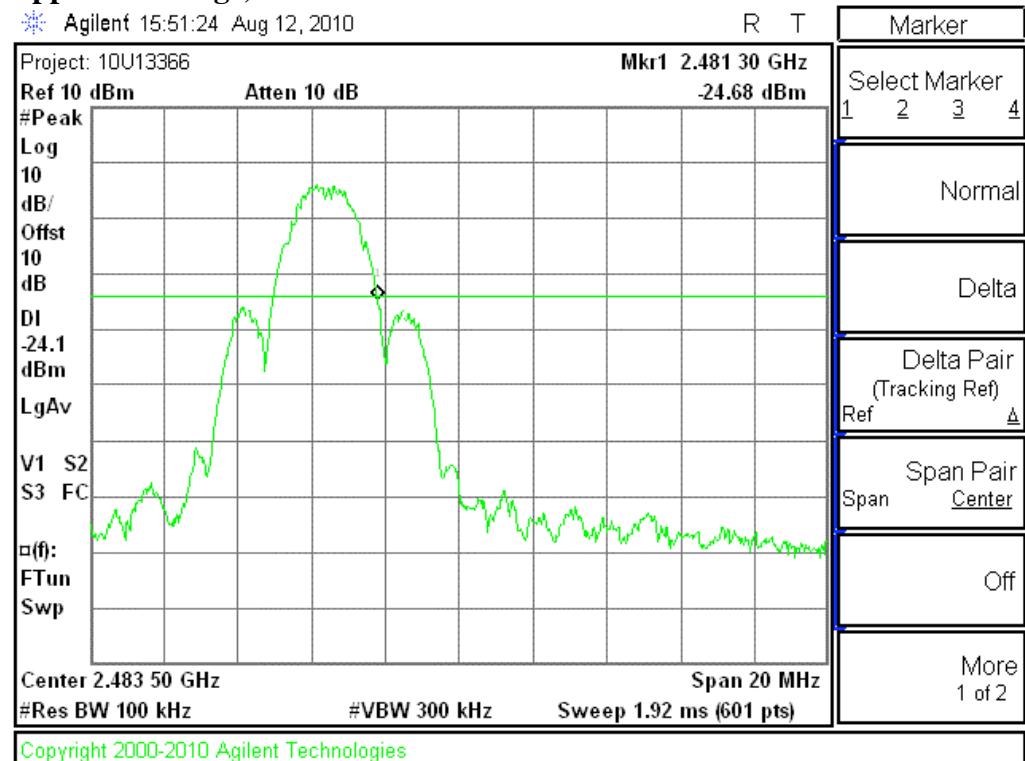
## -20 dBc MID Channel Reference



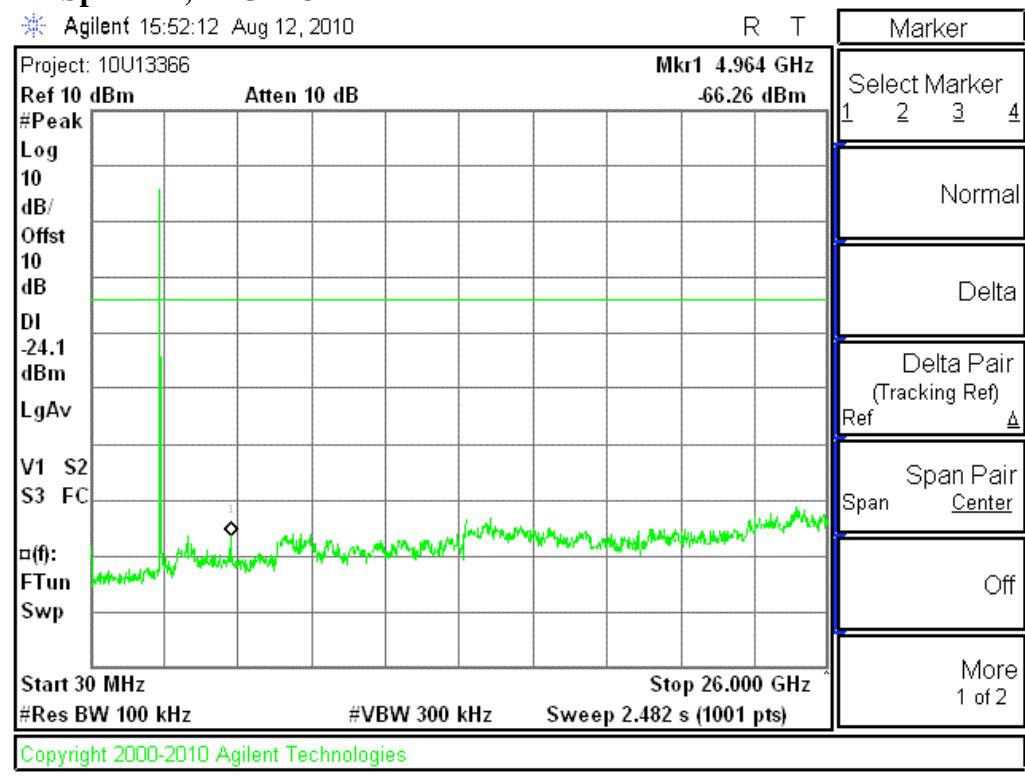
## TX Spurious, MID Channel



### Upper band edge, -20 dBc HIGH Channel



### TX Spurious, HIGH Channel

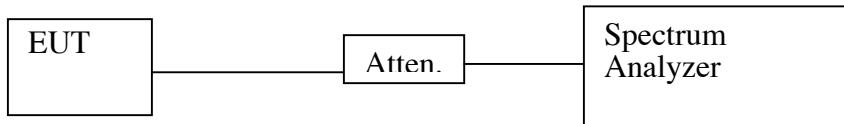


### Power Spectral Density

**Test Requirement: 15.247(e)**

**RSS-210 Sec. 6.2.2(o)(iv)**

### Test Setup



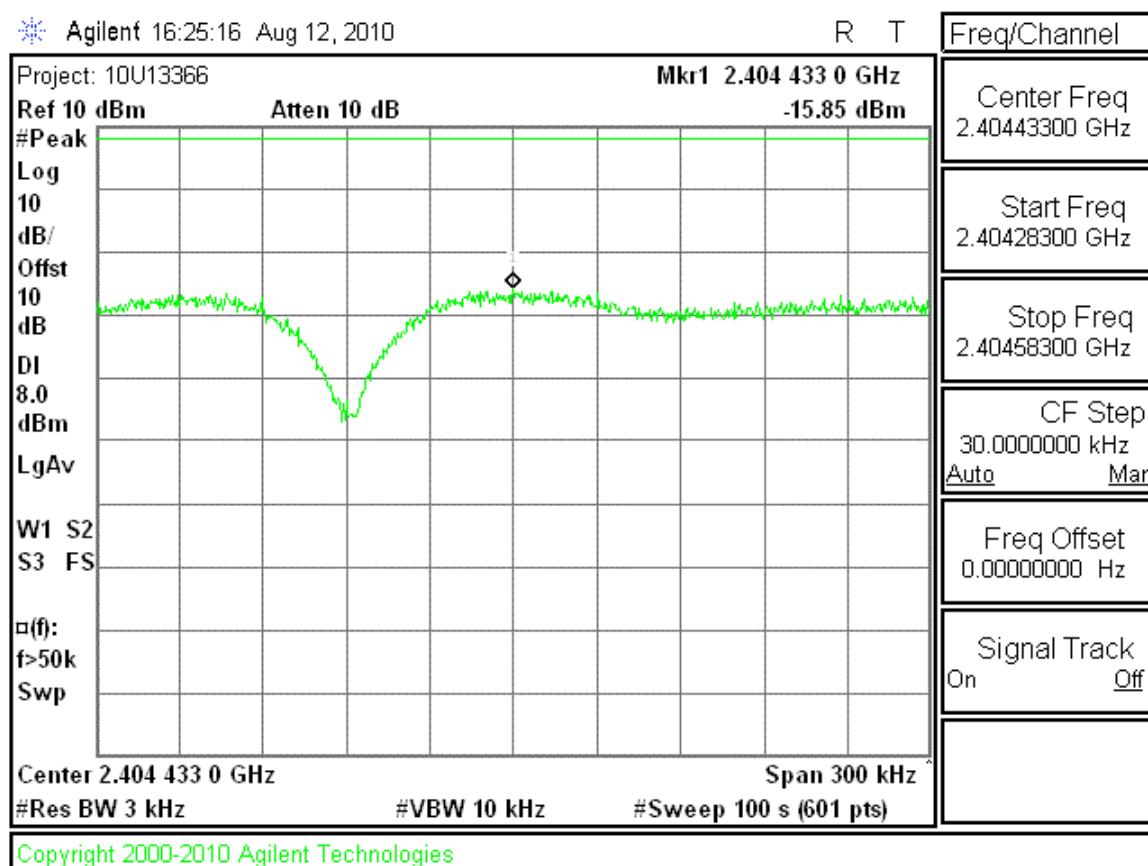
### Test Procedure

1. Determine frequency at which maximum emission occurs during pre-scan.
2. Reduce SPAN to 300 kHz, while adjusting tuning frequency so that peak remains at center of screen.
3. Set RES BW = 3 kHz, VID BW = 10 kHz, SWEEP = 100 sec.
4. Record highest reading and compare to 8 dBm limit.

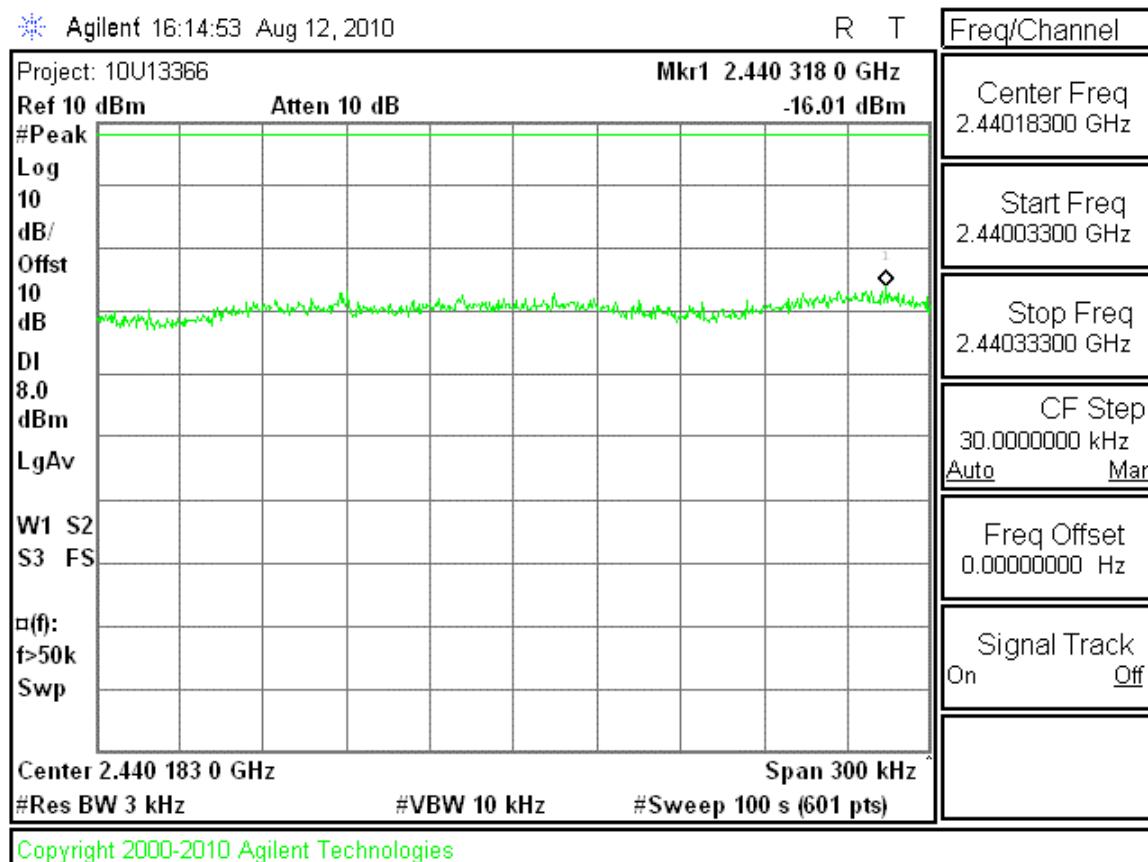
### Test Results

Maximum PSD was -16 dBm. Refer to attached spectrum analyzer chart.

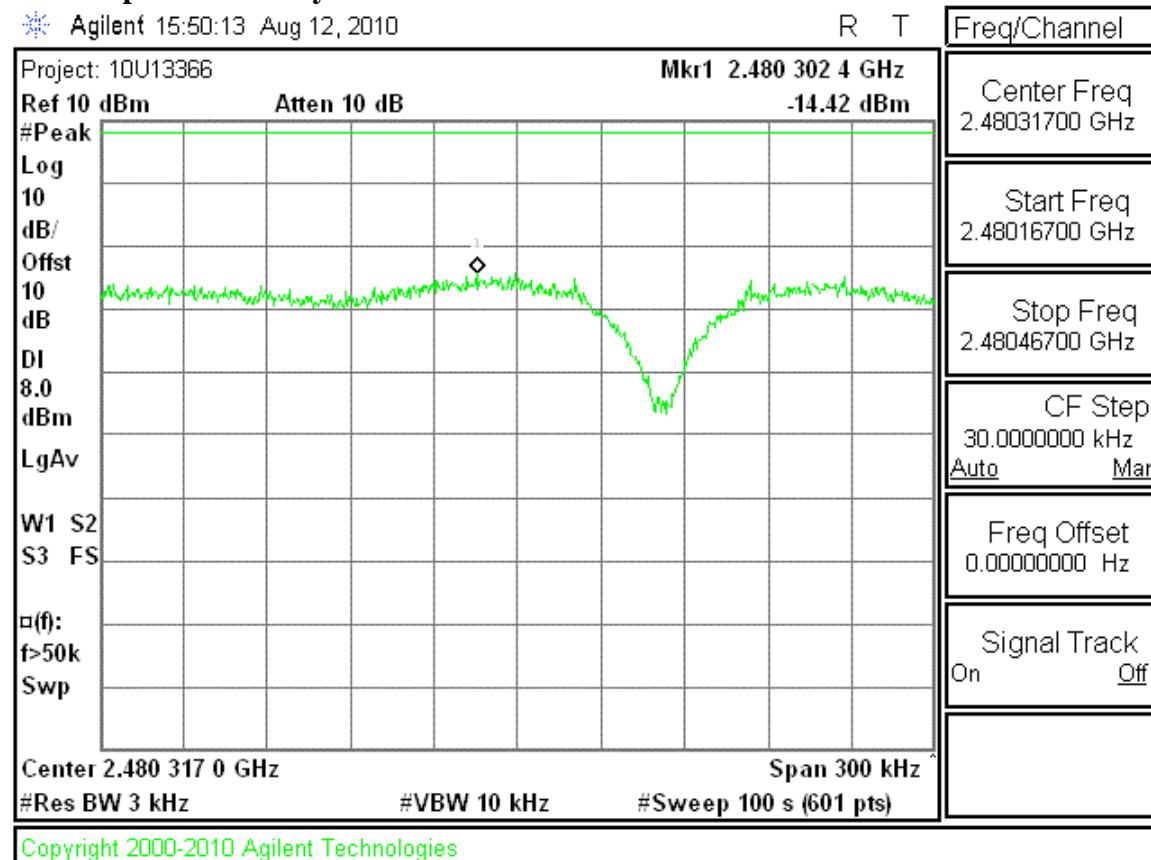
## Power Spectral Density LOW Channel



## Power Spectral Density MID Channel



## Power Spectral Density HIGH Channel



## RF Exposure (MPE) Calculations

## POWERLINE CONDUCTED EMISSIONS

**LIMIT:** FCC 15.207(a), IC RSS-Gen 7.7.2

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> 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 resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

## RESULTS

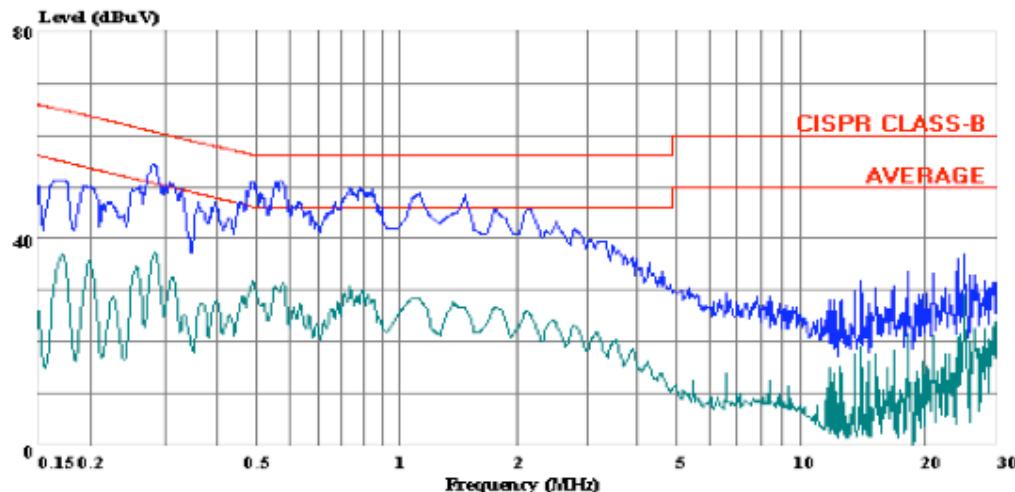
No non-compliance detected. Refer to analyzer plots and tabular data below.

**Line One**



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 21 File#: 10U13366LC.EMI Date: 08-11-2010 Time: 16:21:15



Trace: 19

Ref Trace:

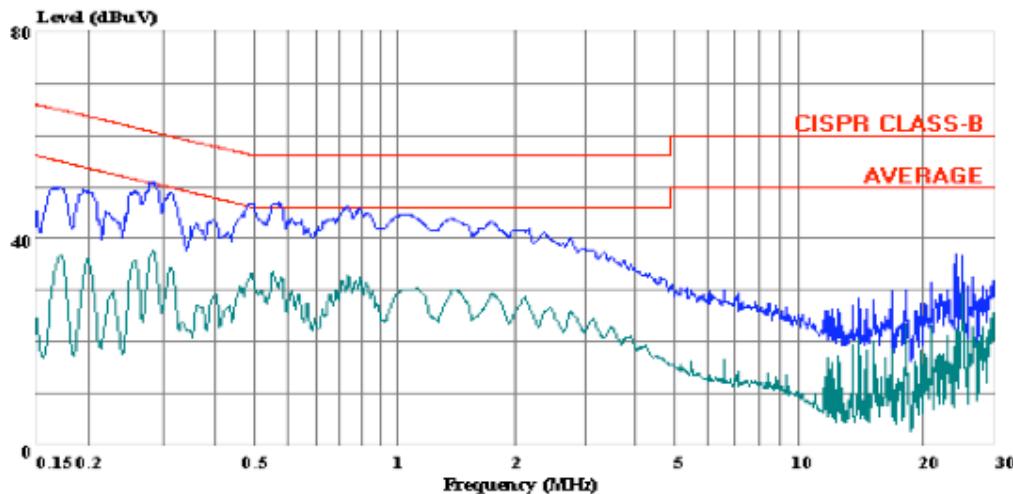
Condition: CISPR CLASS-B  
Test Operator: : Thanh Nguyen  
Project #: : 10U13366  
Company: : Zelfy  
EUT Description: : 2.4GHz Transceiver HUB  
Configuration: : EUT with External Power, remote support  
: equipment.  
Mode: : Transmit normal  
Target: : FCC Class B  
Voltage: : 115V/ 60Hz  
: Line 1: Peak (Blue), Average (Green)

Line 2



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 28 File#: 10U13366LC.EMI Date: 08-11-2010 Time: 16:29:28



Trace: 26

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: : Thanh Nguyen  
Project #: : 10U13366  
Company: : Zelfy  
EUT Description: 2.4GHz Transceiver HUB  
Configuration: : EUT with External Power, remote support  
: equipment.  
Mode: : Transmit normal  
Target: : FCC Class B  
Voltage: : 115V/ 60Hz  
: Line 2: Peak (Blue), Average (Green)

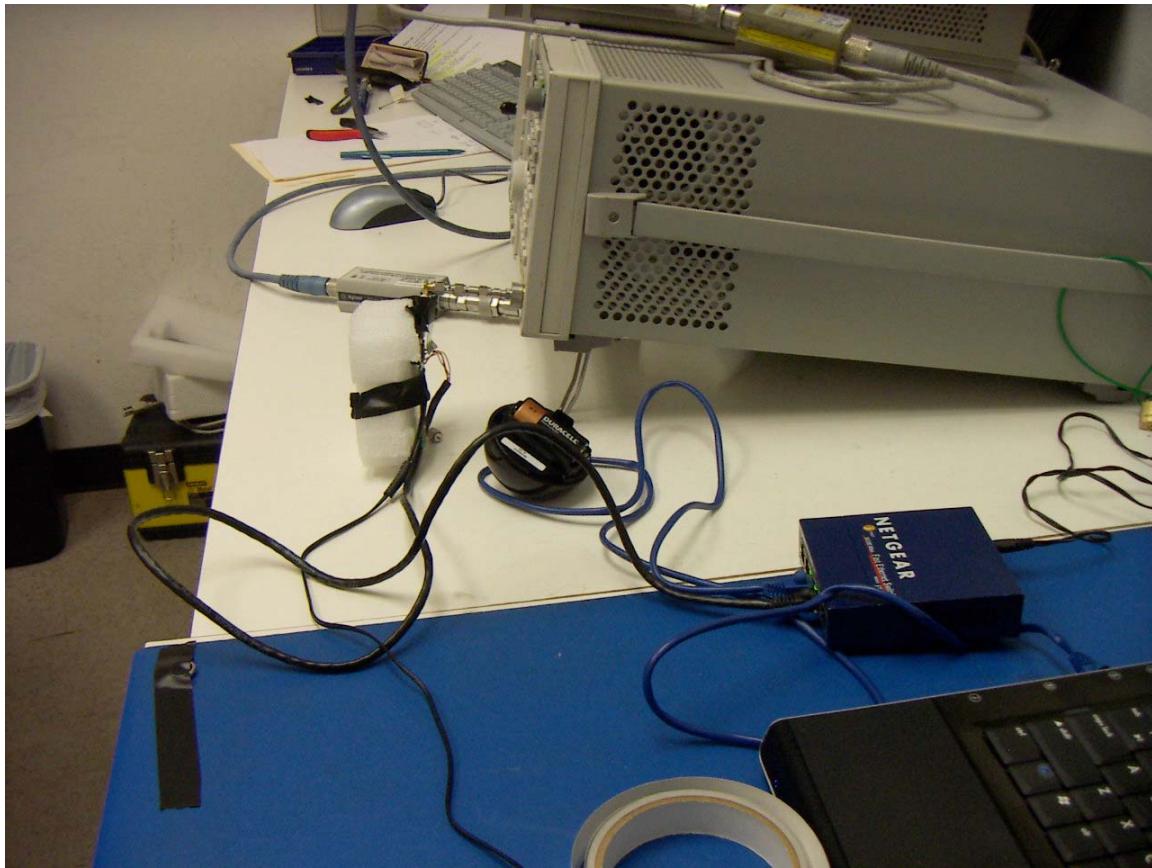
Conducted Immunity Tabulated Test Results

**HUB EXTERNAL POWER**

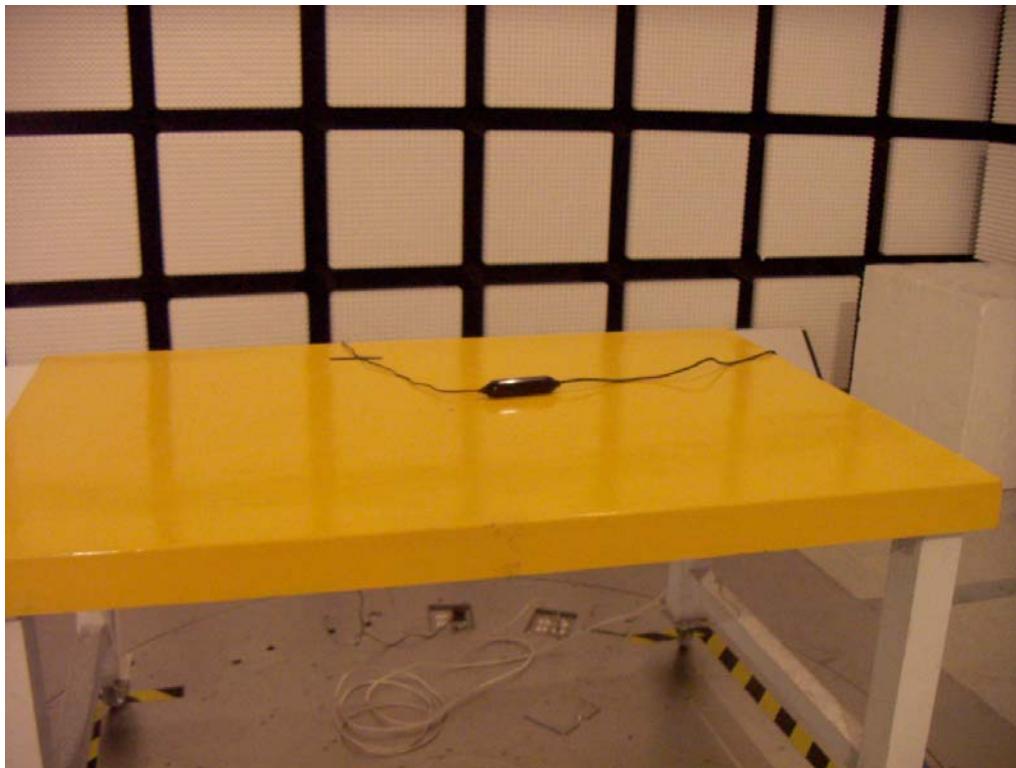
CONDUCTED EMISSIONS DATA (115VAC 60Hz)								EXTERNAL POWER	
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN_B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.28	54.38	--	37.24	0.00	60.76	50.76	-6.38	-13.52	L1
0.57	51.33	--	31.69	0.00	56.00	46.00	-4.67	-14.31	L1
0.89	49.98	--	30.29	0.00	56.00	46.00	-6.02	-15.71	L1
0.28	50.89	--	37.86	0.00	60.85	50.85	-9.96	-12.99	L2
0.57	46.99	--	33.52	0.00	56.00	46.00	-9.01	-12.48	L2
0.83	46.48	--	33.02	0.00	56.00	46.00	-9.52	-12.98	L2
6 Worst Data									

**SETUP PHOTOS**

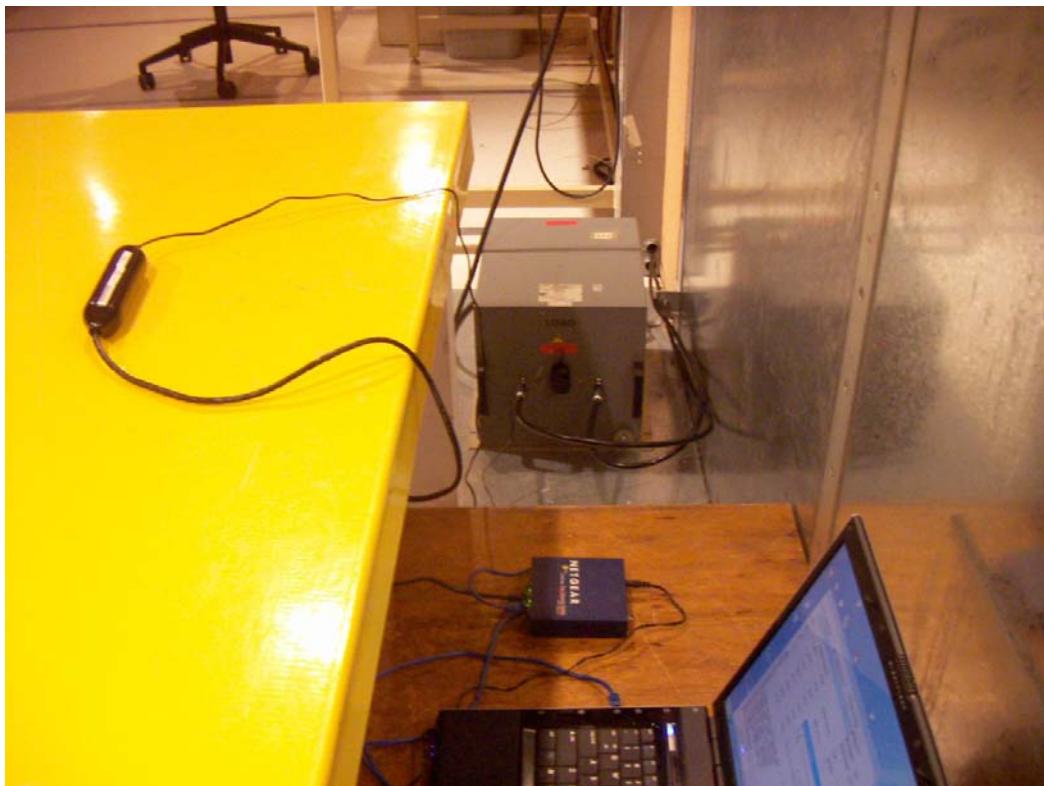
**ANTENNA PORT CONDUCTED TESTS**



**RADIATED RF MEASUREMENT SETUP**



**AC LINE CONDUCTED TEST SETUP**



## END OF REPORT

### Report Revision History

Revision No.	Revision Description	Pages Revised	Revised by	Date
-	Original Issue		T. Cokenias	08/15/10
1	Change grantee code references to YRI Add KDB reference re DTS testing Clarify EUT orientation direction during radiated emissions test	All	T. Cokenias	09/01/10