



Product Service

## FCC - TEST REPORT

Report Number	: <b>68.950.12.118.01</b>	Date of Issue: <b>10 August 2012</b>
Model	: <b>USB2</b>	
Product Type	: USB Dongle	
Applicant	: Dayton Industrial Co., Ltd.	
Address	: 2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong	
Production Facility	: Kendy Electronics (Dongguan) Ltd.	
Address	: Xingsi Huangtang Village, Hengli Town, Dongguan City, Guangdong Province, P.R.China	
Test Result	: <b>■ Positive</b> <b>□ Negative</b>	
Total pages including Appendices	: <u>30</u>	

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: Jiangsu TÜV Product Service Ltd. – Shenzhen Branch  
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Century Craftwork Culture Square,  
No. 4001, Fuqiang Road,  
Futian District 518048,  
Shenzhen, P.R.C.

Telephone: 86 755 8828 6998  
Fax: 86 755 8828 5299

#### Test Site 2

Company name: Audix Technology (Shenzhen) Co., Ltd  
Block Shenzhen, Science & Industry Park,  
Nantou, Shenzhen  
Guangdong  
China

Telephone: 86 755 2663 9496  
Fax: 86 755 2663 2877

### 3 Description of the Equipment Under Test

#### Description of the Equipment Under Test

Product: USB Dongle  
Model no.: USB2  
Brand Name: NIL  
Options and accessories: NIL  
Rating: DC 5V from PC via USB Port

RF Transmission  
Frequency: 2403MHz-2480MHz  
Description of the EUT: NIL

#### Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
PC	Lenovo	T400	--



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## 4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2011 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

## 5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C		Pages	Test Site	Test Result		
Test Condition				Pass	Fail	N/A
15.207 Conducted Emission AC Power Port		8	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.249(d) Band edge compliance of RF emissions		12	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.205(a), 15.209(a), 15.249(a), 15.249(c), 15.35 Radiated Emissions		22	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.215(c) 20dB bandwidth		26	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: O4GUSB2 complies with Section 15.207, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

### SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

### The Equipment Under Test

- **Fulfills** the general approval requirements.

- **Does not** fulfill the general approval requirements.

Sample Received Date: 19 May 2012

Testing Start Date: 20 May 2012

Testing End Date: 1 August 2012

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

Reviewed by:



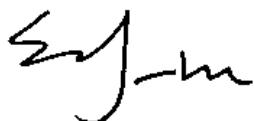
Phoebe Hu  
EMC Project Manager

Prepared by:



Felix Li  
EMC Project Engineer

Tested by:



Sunny Lu  
Test Engineer

## 7 Technical Requirement

### 7.1 Conducted Emission

#### Test Method

- 1 The EUT was placed on a table, which is 0.8m above ground plane
- 2 The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3 Maximum procedure was performed to ensure EUT compliance
- 4 A EMI test receiver is used to test the emissions from both sides of AC line

#### Limit

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

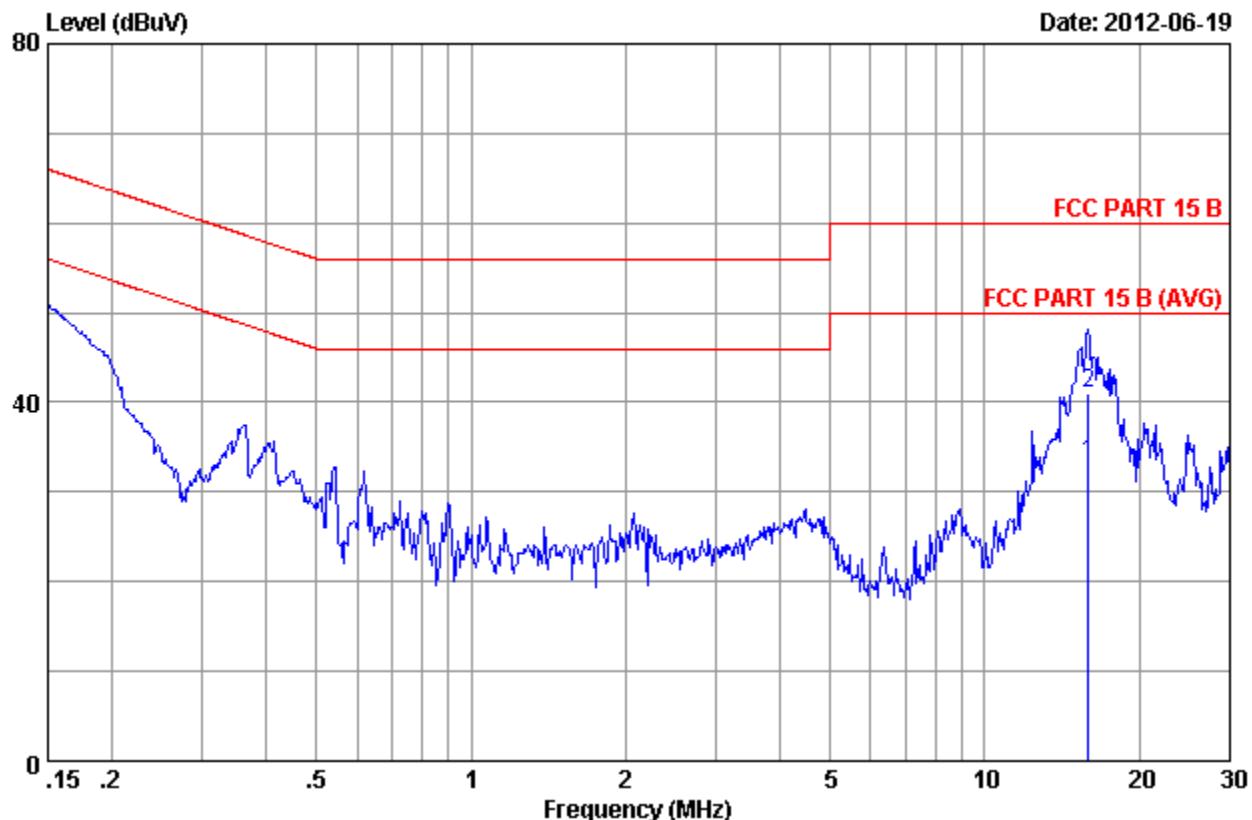
Remark: This test was carried out in all the test modes, here only the worst test result was shown.

## Conducted Emission

EUT: USB Dongle M/N: USB2

Operating Condition: Transmitting (Connect with PC, 5VDC from PC via USB port)

Test Specification: Power Line, Live (tested on PC power line)



No	Freq (MHz)	Current Clamp		Emission			Margin (dBuA)	Remark
		Factor (dB)	Reading (dBuA)	Level (dBuA)	Limits (dBuA)			
1	15.887	0.43	22.80	33.23	50.00	16.77	Average	
2	15.887	0.43	30.50	40.93	60.00	19.07	QP	

Remarks: 1. Emission Level=Current Clamp Factor+Reading.

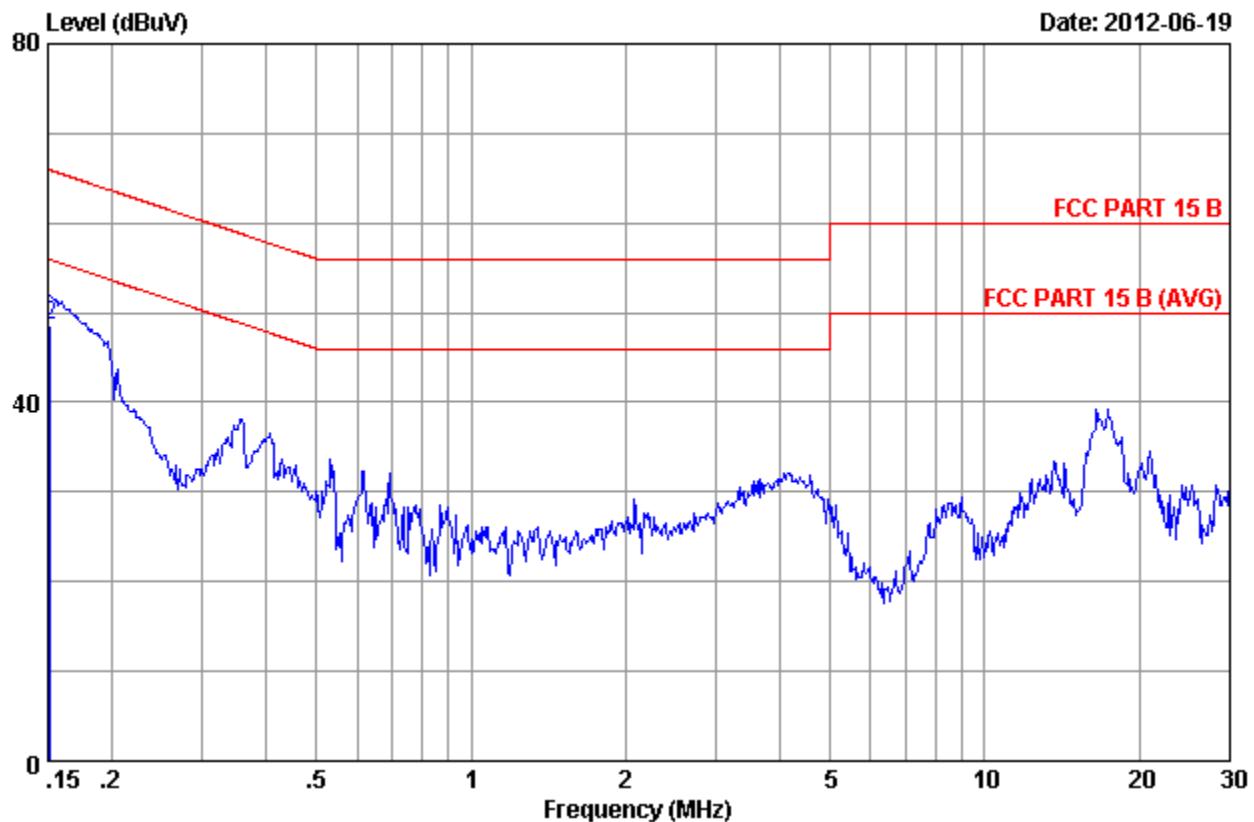
2. If the average limit is met when using a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

## Conducted Emission

EUT: USB Dongle M/N: USB2

Operating Condition: Transmitting (Connect with PC, 5VDC from PC via USB port)

Test Specification: Power Line, Neutral (tested on PC power line)



No	Freq (MHz)	Current Clamp Factor (dB)	Emission					Remark
			Reading (dBuA)	Level (dBuA)	Limits (dBuA)	Margin (dBuA)		
1	0.15200	0.14	18.71	28.79	55.89	27.10	Average	
2	0.15200	0.14	38.51	48.59	65.89	17.30	QP	

Remarks: 1. Emission Level=Current Clamp Factor+Reading.

2. If the average limit is met when using a quasi-peak detector.  
the EUT shall be deemed to meet both limits and measurement  
with average detector is unnecessary.



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## Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Dec.17, 2012
L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Mar.29, 2013
L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.07, 2013
Terminator	Hubersuhner	50Ω	No. 1	May.07, 2013
Terminator	Hubersuhner	50Ω	No. 2	May.07, 2013
RF Cable	Fujikura	3D-2W	LISN Cable 1#	May.07, 2013
Coaxial Switch	Anritsu	MP59B	M55367	May.07, 2013
Passive Probe	Rohde & Schwarz	ESH2-Z3	299.7810.52	May.07, 2013
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.07, 2013

## 7.2 Band edge compliance of RF emissions

### Test Method

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBW to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100kHz, to measure the conducted peak band edge.

### Limits

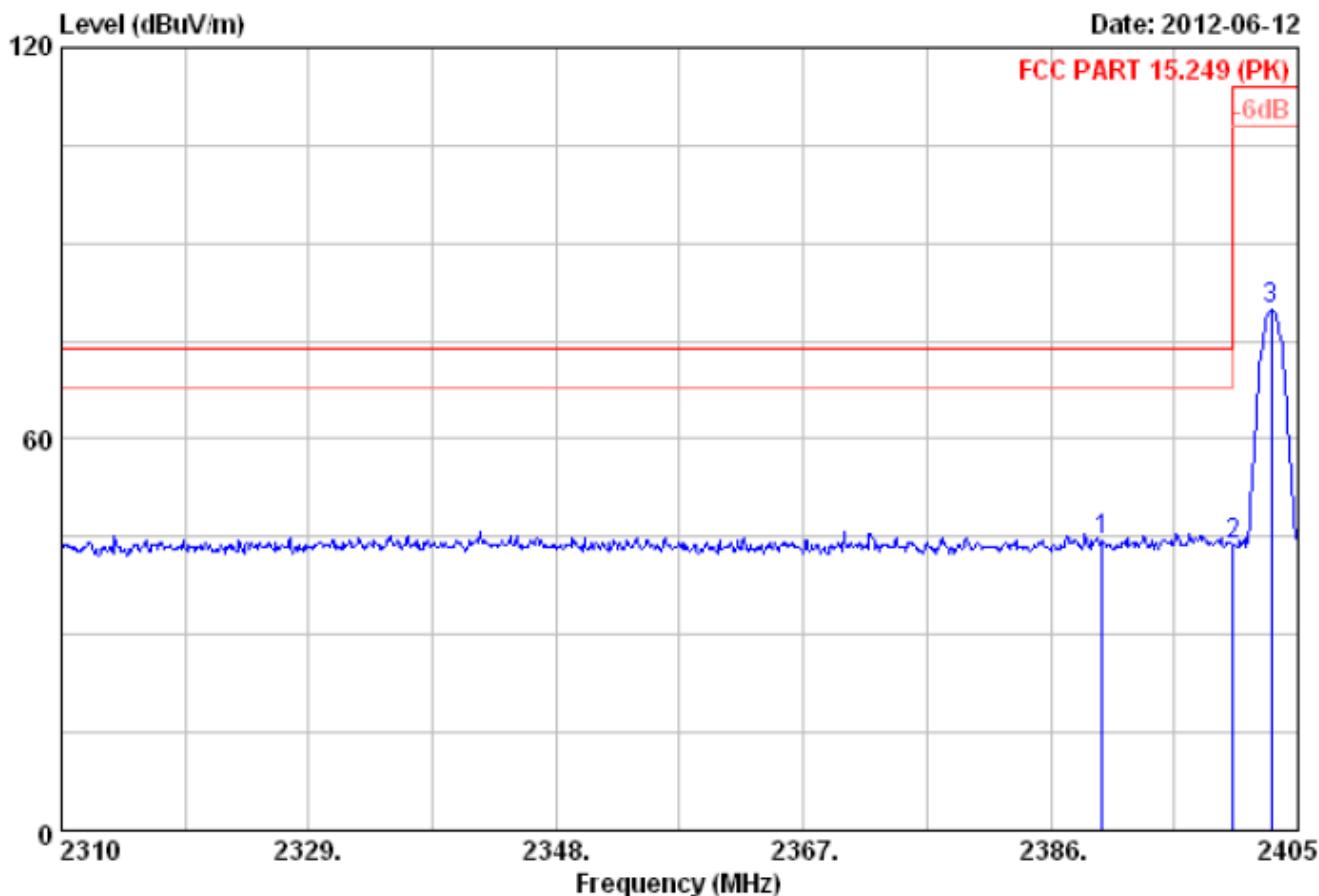
According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency MHz	Limit Average dBuV/m	Limit Peak dBuV/m
Below 2390 Above 2483.5	54	74

## Band edge compliance of RF emissions

Lower edge Peak Plot:

EUT: USB Dongle M/N: USB2  
 Operating Condition: Tx, 2403MHz  
 Ant. Polarity: Vertical



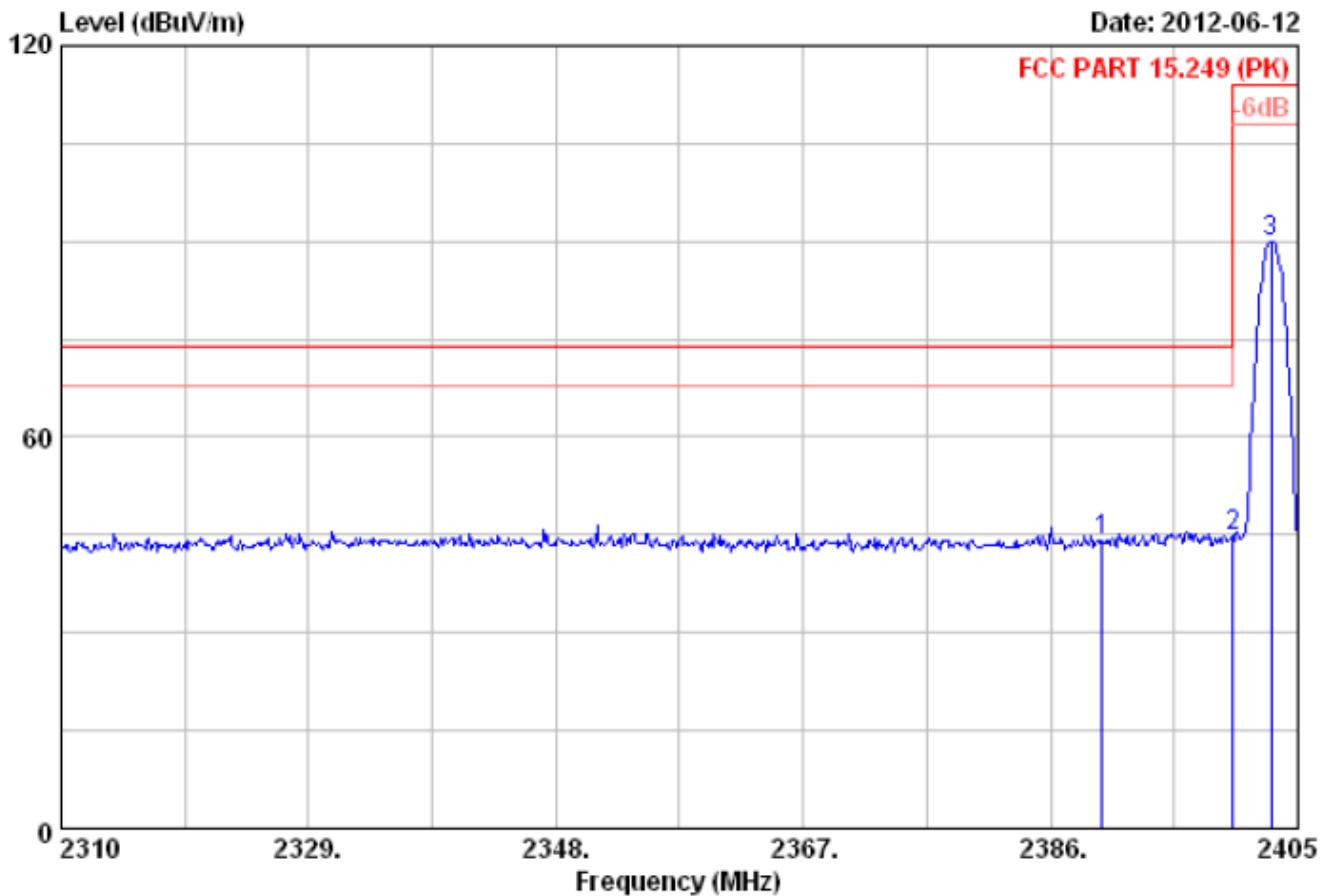
Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2390.000	45.05	27.96	6.01	34.33	44.58	74	29.42	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

## Band edge compliance of RF emissions

Lower edge Peak Plot:

EUT: USB Dongle M/N: USB2  
 Operating Condition: Tx, 2403MHz  
 Ant. Polarity: Horizontal



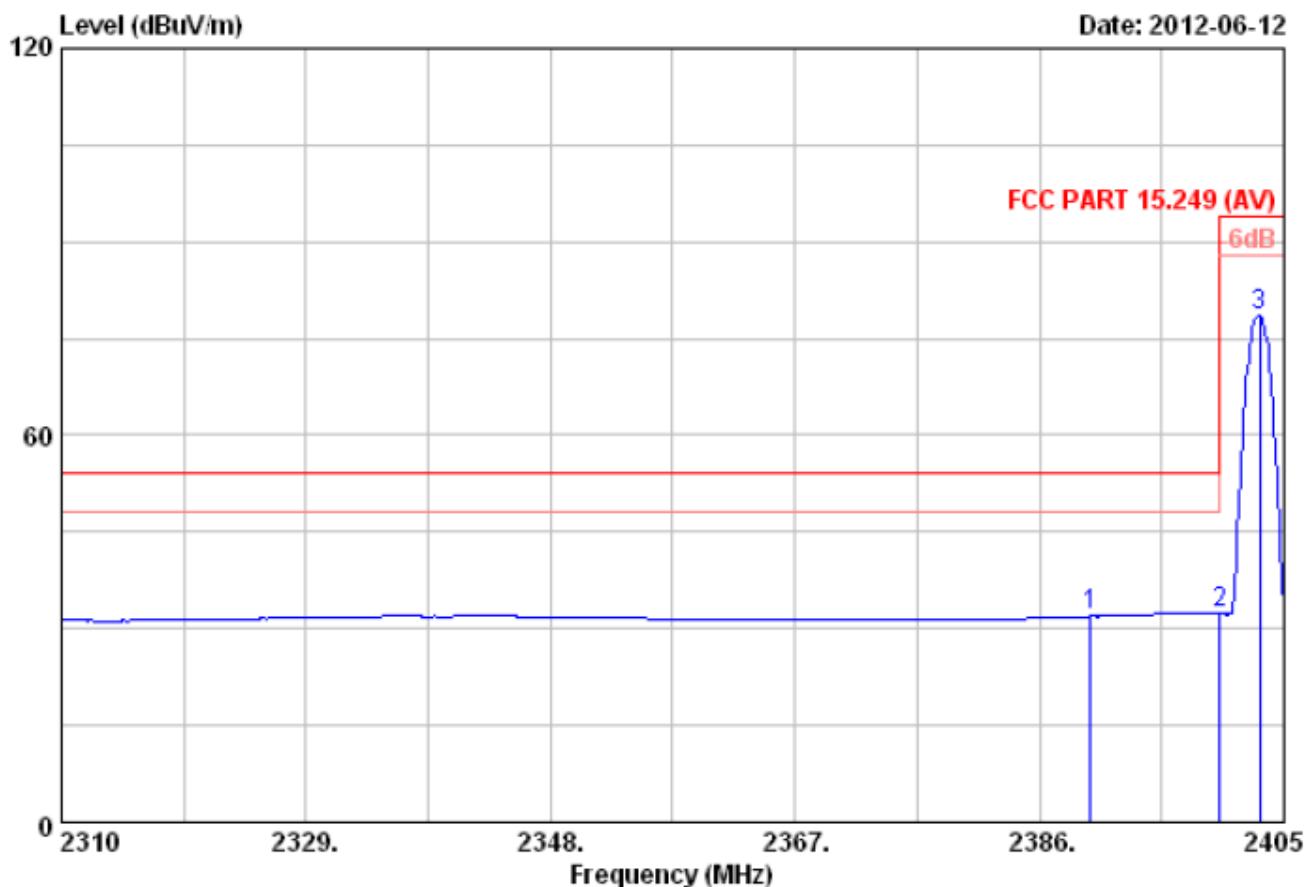
Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2390.000	44.51	27.96	6.01	34.44	44.04	74	29.96	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

## Band edge compliance of RF emissions

Lower edge AV Plot:

EUT: USB Dongle M/N: USB2  
 Operating Condition: Tx, 2403MHz  
 Ant. Polarity: Vertical



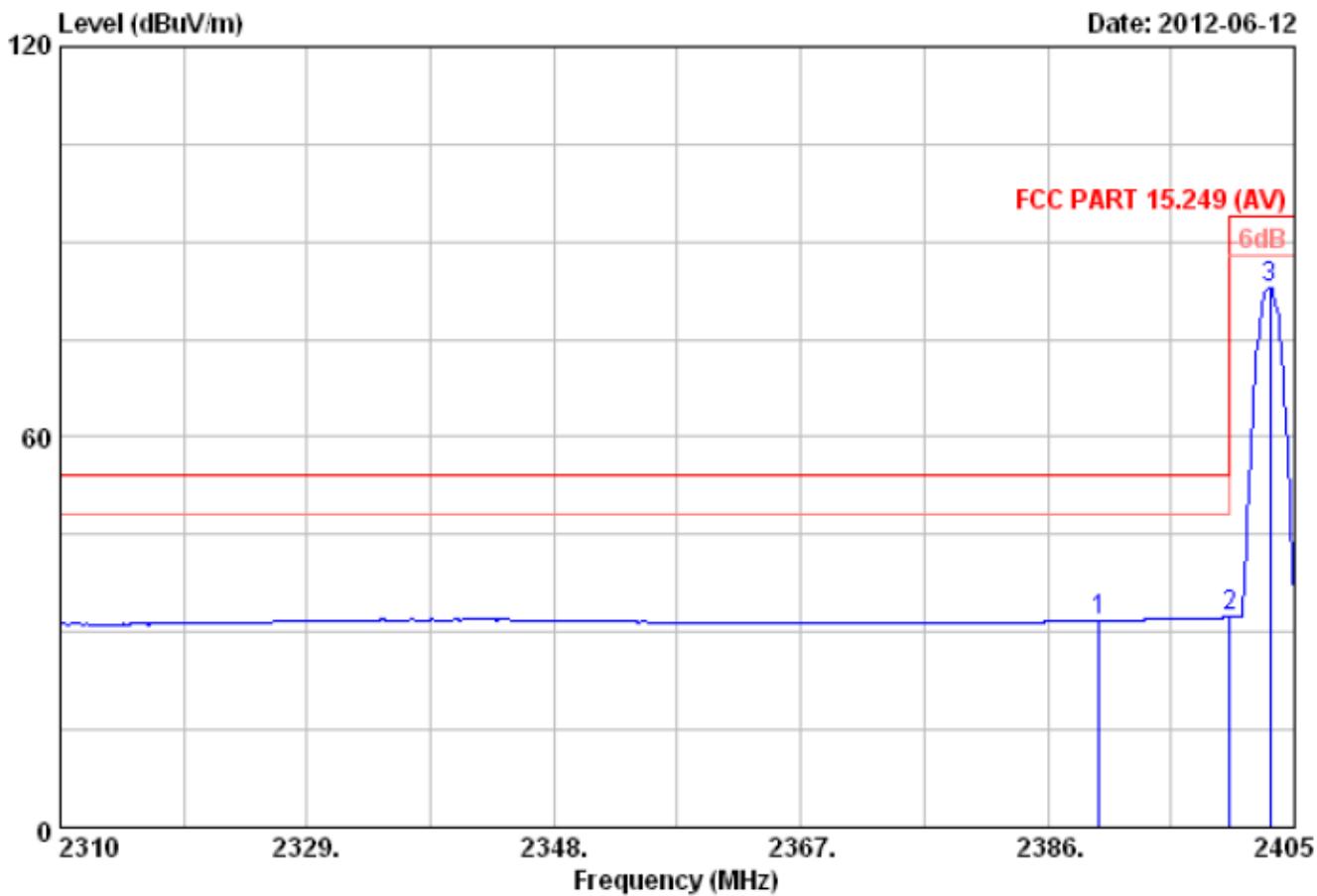
Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2390.000	32.40	27.96	6.01	34.44	31.93	54	22.07	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

## Band edge compliance of RF emissions

Lower edge AV Plot:

EUT: USB Dongle M/N: USB2  
 Operating Condition: Tx, 2403MHz  
 Ant. Polarity: Horizontal



Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2390.000	32.29	27.96	6.01	34.44	31.82	54	22.18	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

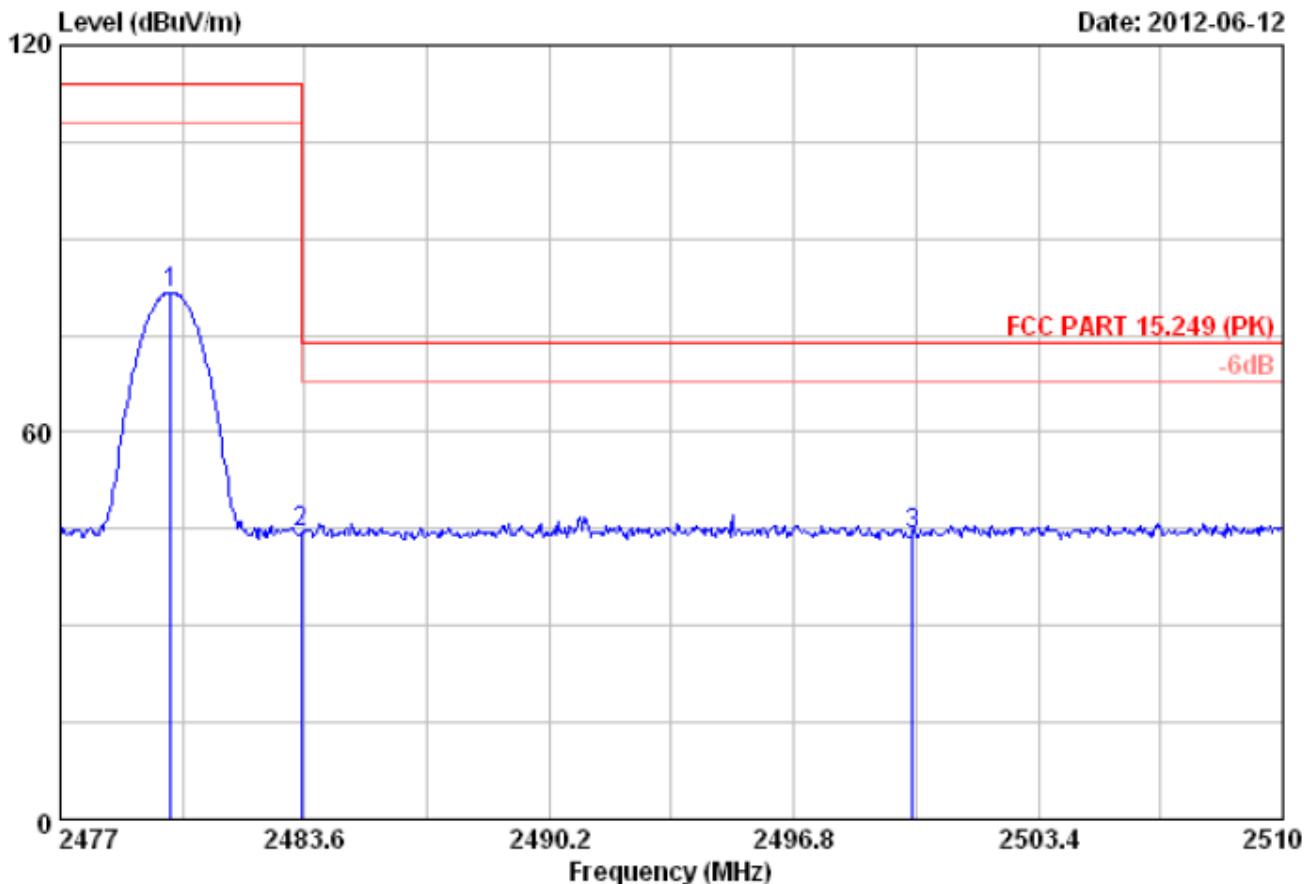
## Band edge compliance of RF emissions

Upper edge Peak Plot:

EUT: USB Dongle M/N: USB2

Operating Condition: Tx, 2480MHz

Ant. Polarity: Vertical



Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	44.56	28.08	6.15	34.45	44.34	74	29.66	Pass
2500.000	44.15	28.10	6.18	34.45	43.98	74	30.02	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

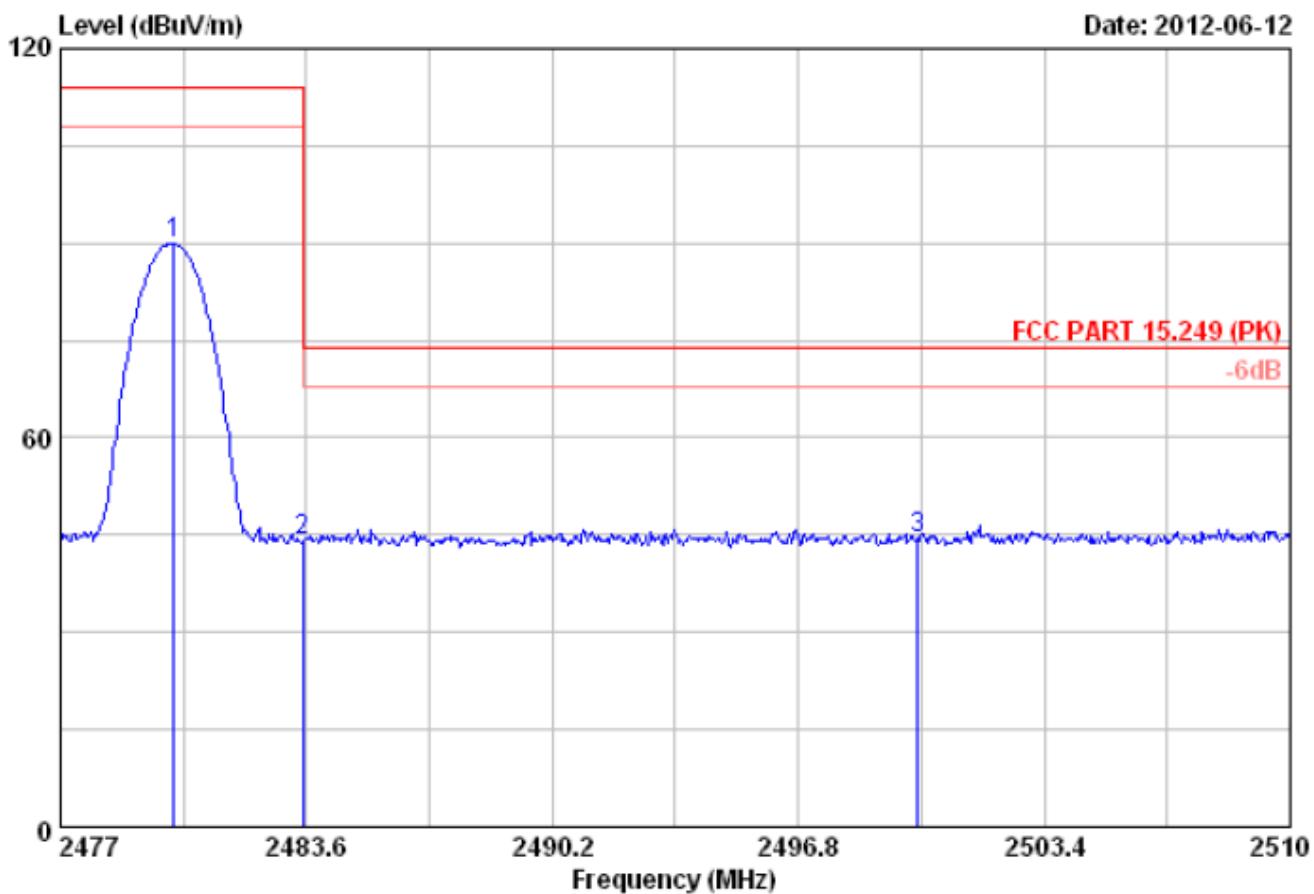
## Band edge compliance of RF emissions

Upper edge Peak Plot:

EUT: USB Dongle M/N: USB2

Operating Condition: Tx, 2480MHz

Ant. Polarity: Horizontal



Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	44.33	28.08	6.15	34.45	44.11	74	29.89	Pass
2500.000	44.58	28.10	6.18	34.45	44.41	74	29.59	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

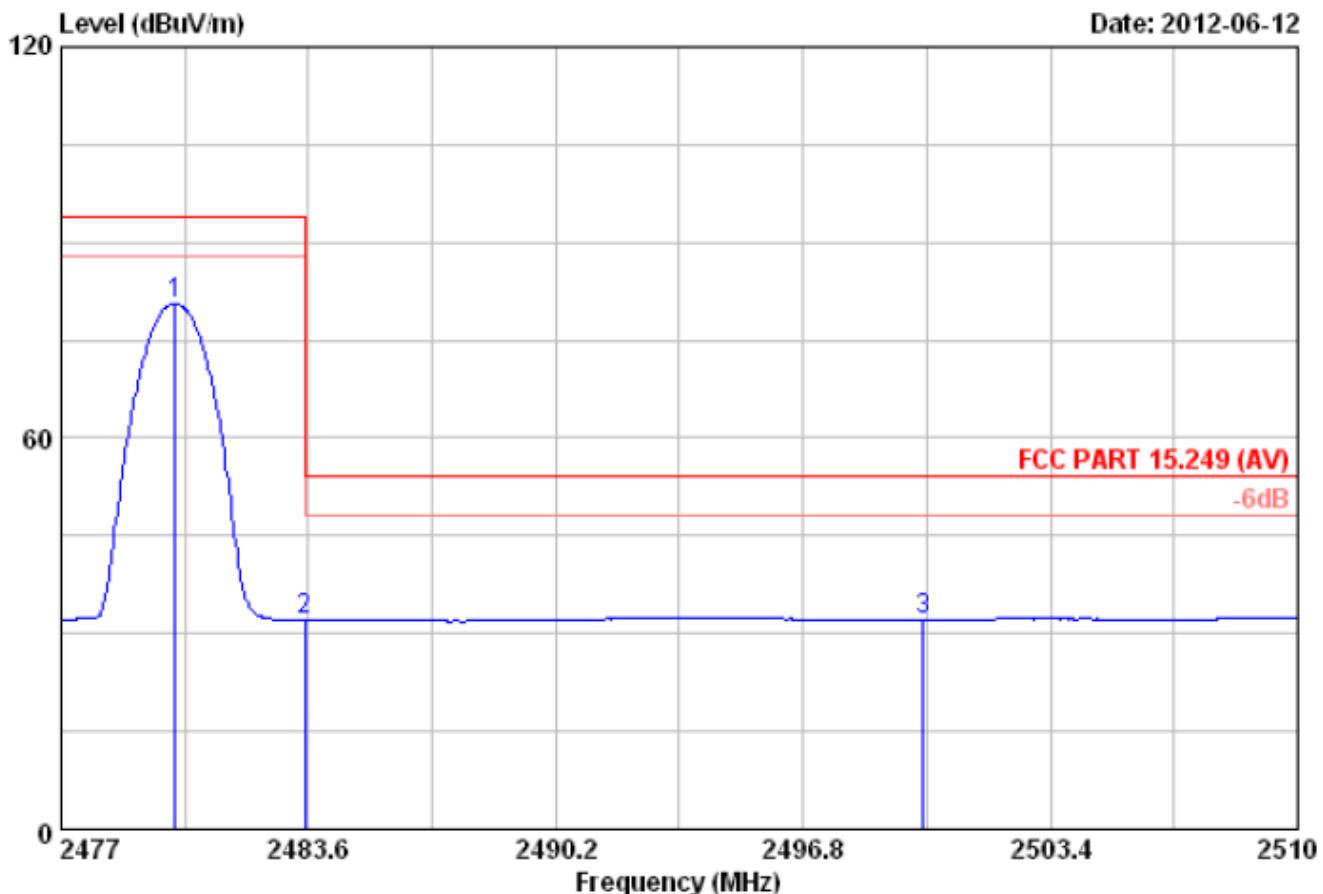
## Band edge compliance of RF emissions

Upper edge AV Plot:

EUT: USB Dongle M/N: USB2

Operating Condition: Tx, 2480MHz

Ant. Polarity: Vertical



Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	32.35	28.08	6.15	34.45	32.13	54	21.87	Pass
2500.000	32.30	28.10	6.18	34.45	32.13	54	21.87	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor

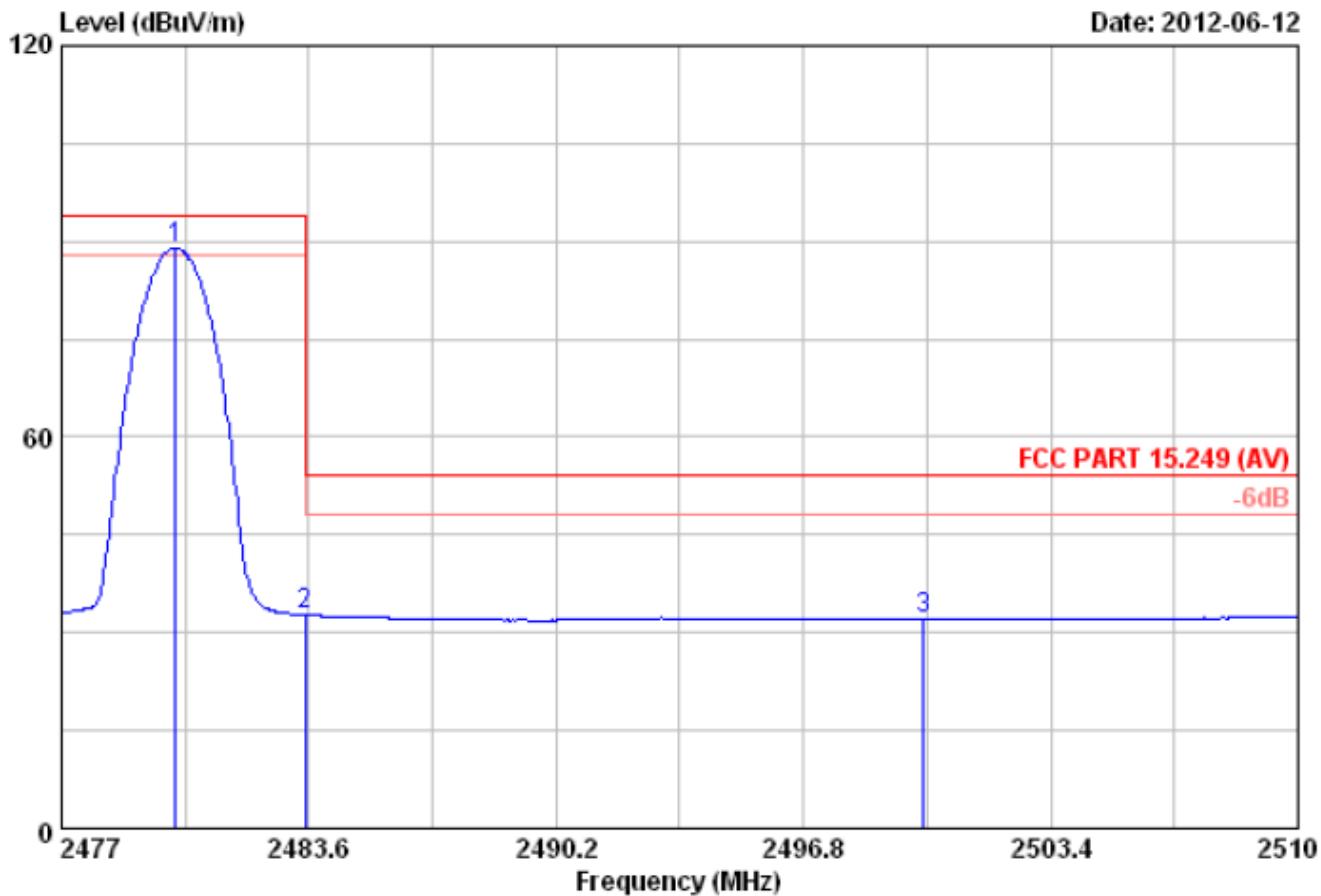
## Band edge compliance of RF emissions

Upper edge AV Plot:

EUT: USB Dongle M/N: USB2

Operating Condition: Tx, 2480MHz

Ant. Polarity: Horizontal



Indicated		Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2483.500	32.92	28.08	6.15	34.45	32.70	54	21.30	Pass
2500.000	32.25	28.10	6.18	34.45	32.08	54	21.92	Pass

Note: Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor



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## Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May.07, 2013
Amp	HP	8449B	3008A02495	May.07, 2013
Antenna	EMCO	3115	9607-4877	May.07, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.13, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May.07, 2013

## 7.3 Radiated Emissions

### Test Method

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 Maximum procedures were performed on the six highest emissions to ensure EUT compliance.
- 5 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

### Limit

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency MHz	Field Strength uV/m	Field Strength dB $\mu$ V/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Fundamental and harmonics Emissions Limits:

Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m@3m	dB $\mu$ V/m@3m	uV/m@3m	dB $\mu$ V/m@3m
2400-2483.5	50	94.0 (AV) 114.0 (PK)	500	54.0 (AV) 74.0 (PK)

## Radiated Emission

### Test Result

Radiated Emission Measurement Result (below 1GHz):

Indicated		Detector (PK/QP)	Polar (H/V)	Factor		FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
Low CH (2403 MHz)									
34.850	7.20	QP	H	16.01	0.51	23.72	40	16.28	Pass
403.450	13.61	QP	H	16.69	1.56	31.86	46	14.14	Pass
398.600	14.22	QP	V	16.66	1.56	32.44	46	13.56	Pass
694.450	5.84	QP	V	21.34	2.40	29.58	46	16.42	Pass
Middle CH (2442 MHz)									
47.460	14.95	QP	H	9.64	0.57	25.16	40	14.84	Pass
251.160	14.74	QP	H	12.78	1.18	28.70	46	17.30	Pass
403.450	12.81	QP	V	16.69	1.56	31.06	46	14.94	Pass
694.450	6.31	QP	V	21.34	2.40	30.05	46	15.95	Pass
High CH (2480 MHz)									
30.000	8.23	QP	V	18.74	0.45	27.42	40	12.58	Pass
398.600	13.20	QP	V	16.66	1.56	31.42	46	14.58	Pass
398.600	12.81	QP	H	16.66	1.56	31.03	46	14.97	Pass
707.060	7.32	QP	H	21.37	2.44	31.13	46	14.87	Pass

Remark:

1. Emission Level= Reading +Cable Loss+ Antenna Factor
2. Measuring frequencies from 30 MHz to the 1000MHz .
3. Radiated emissions measured in frequency range from 30MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 4 Data of measurement within this frequency range shown “-- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1000MHz.

## Radiated Emission

### Test Result

Radiated Emission Measurement Result (above 1GHz):

Indicated		Detector (PK/AV)	Polar (H/V)	Factor			FCC Part 15.249/15.209			
Frequency (MHz)	Receiver Reading (dB $\mu$ V/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
Low CH (2403 MHz)										
1201.400	54.66	PK	H	24.42	4.13	34.80	48.41	74	25.59	Pass
1201.400	51.66	AV	H	24.42	4.13	34.80	45.41	54	8.59	Pass
2403.000	90.23	PK	H	27.98	6.03	34.44	89.90	114	24.20	Pass
2403.000	89.39	AV	H	27.98	6.03	34.44	88.96	94	5.04	Pass
2403.000	80.47	PK	V	27.98	6.03	34.44	80.04	114	33.96	Pass
2403.000	79.72	AV	V	27.98	6.03	34.44	79.29	94	14.71	Pass
Middle CH (2442 MHz)										
1221.000	55.72	PK	H	24.47	4.16	34.79	49.56	74	24.44	Pass
1221.000	52.65	AV	H	24.47	4.16	34.79	46.49	54	7.51	Pass
2442.000	89.71	PK	H	28.03	6.09	34.44	89.39	114	24.61	Pass
2442.000	89.17	AV	H	28.03	6.09	34.44	88.85	94	5.15	Pass
2442.000	79.76	PK	V	28.03	6.09	34.44	79.44	114	34.56	Pass
2442.000	79.73	AV	V	28.03	6.09	34.44	79.41	94	14.59	Pass
High CH (2480 MHz)										
1239.780	51.00	PK	H	24.52	4.19	34.78	44.93	74	29.07	Pass
1239.780	43.39	AV	H	24.52	4.19	34.78	37.32	54	16.68	Pass
2480.000	91.75	PK	H	28.08	6.15	34.45	91.53	114	22.47	Pass
2480.000	91.71	AV	H	28.08	6.15	34.45	91.49	94	2.51	Pass
2480.000	83.31	PK	V	28.08	6.15	34.45	83.09	114	30.91	Pass
2480.000	82.58	AV	V	28.08	6.15	34.45	82.36	94	11.64	Pass

#### Remark

1. Emission Level= Reading +Cable Loss+ Antenna Factor - Amplifier factor
- 2 Measuring frequencies from 1GHz to the 25 GHz .
- 3 Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of spectrum analyzer was 1 MHz for measuring above 1 GHz



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## Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May.07, 2013
Amp	HP	8449B	3008A02495	May.07, 2013
Antenna	EMCO	3115	9607-4877	May.16, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.13, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May.07, 2013

## 7.4 20 dB bandwidth

### Test Method

- 1 Place the EUT on the table and set it in the transmitting mode.
- 2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3 Mark the peak frequency and -20dB (upper and lower) frequency.

### Limit

Limit [kHz]

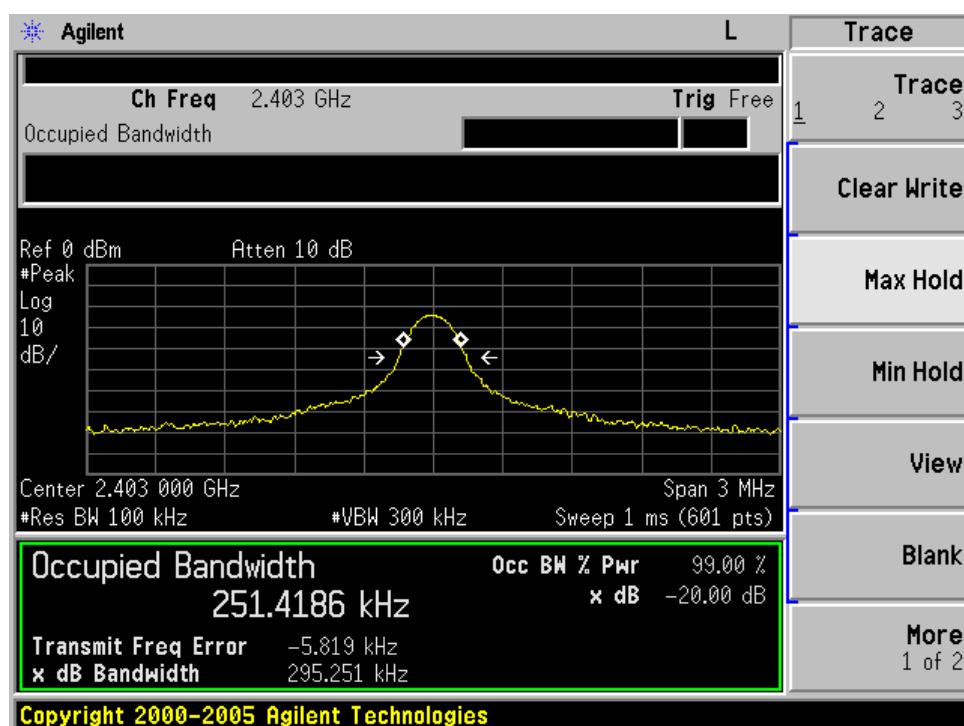
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N/A

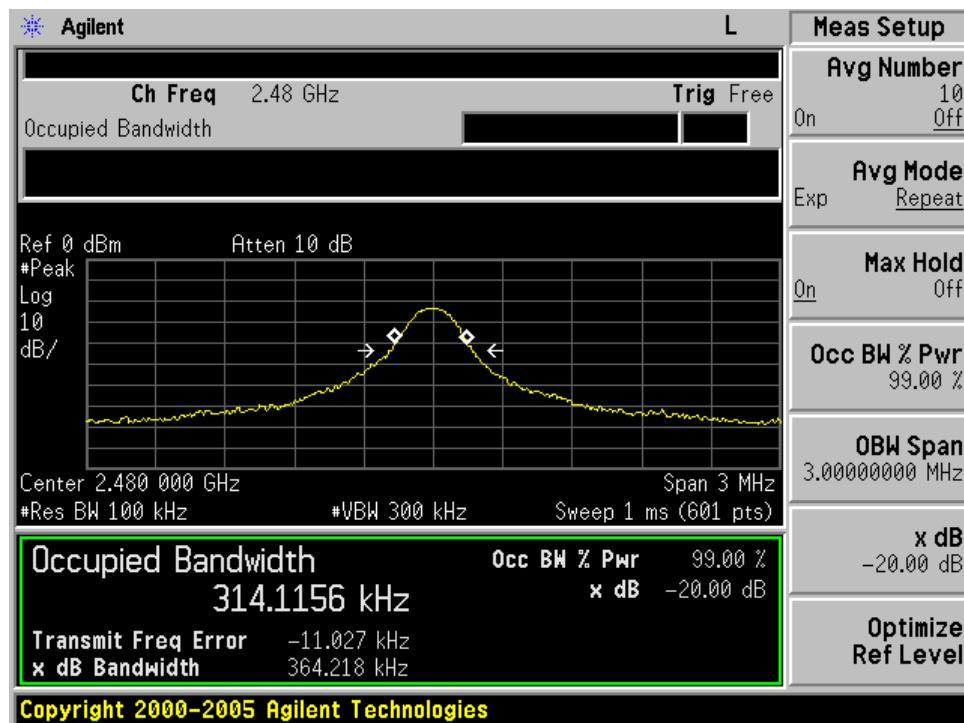
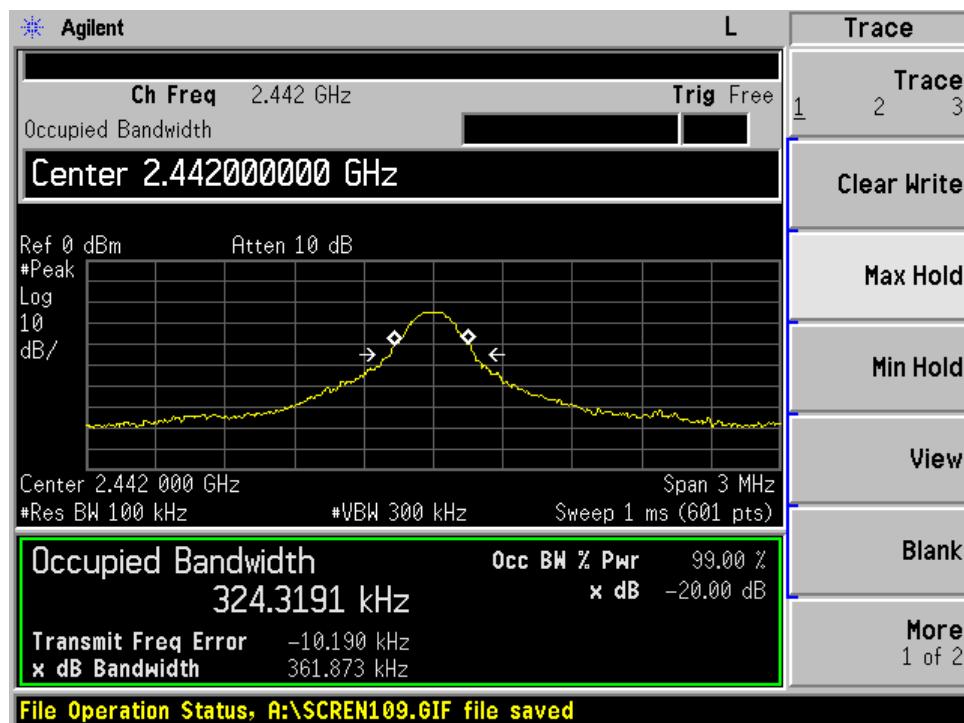
## 20 dB bandwidth

### Test result

Frequency MHz	Bandwidth KHz	Result
2403	295.251	Pass
2442	361.873	Pass
2480	364.218	Pass



## 20 dB bandwidth





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## Test Equipment

### 20 dB bandwidth Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 07, 2013

## 8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

**System Measurement Uncertainty**

<b>Items</b>		<b>Extended Uncertainty</b>
RE	Field strength (dB $\mu$ V/m)	U=4.32dB (30MHz-25GHz)
CE	Disturbance Voltage (dB $\mu$ V)	U=2.4dB