

## 6. Emissions In Non-Restricted Frequency Bands

### 6.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.247(d)	
Channel number	1、6、11	

### 6.2 Limit for emissions in non-restricted frequency bands

The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

### 6.3 Measuring instruments setting

#### Reference level measurement

Spectrum analyzer settings	
Spectrum Analyzer function	Setting
Detector	Peak
RBW	$\geq 100$ kHz
VBW	$\geq 3 \times$ RBW
Sweep	Auto couple
Trace	Max hold
Span	$\geq 1.5$ time 6dB bandwidth
Attenuation	Auto

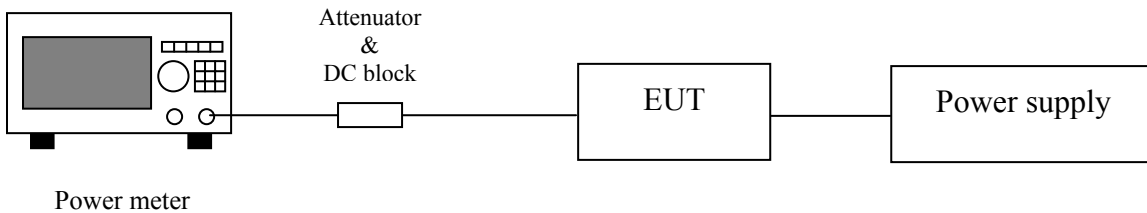
**Emission level measurement**

Spectrum analyzer settings	
Spectrum Analyzer function	Setting
Detector	Peak
RBW	$\geq 100$ kHz
VBW	$\geq 3 \times$ RBW
Sweep	Auto couple
Trace	Max hold
Attenuation	Auto

**6.4 Test procedure**

1. The procedure was used in antenna-port conducted and connected to the spectrum analyzer.
2. Set instrument center frequency to center frequency
3. Use the parameter configured in clause 6.3 to measure
4. Use the peak marker function to determine the maximum amplitude level.

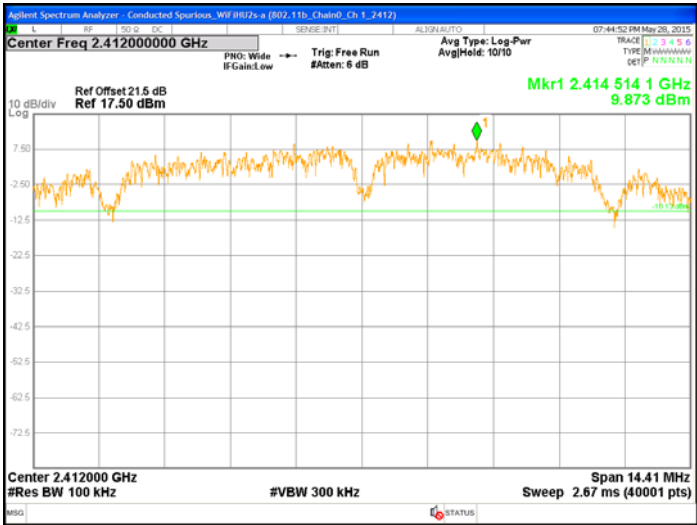
**6.5 Test diagram**



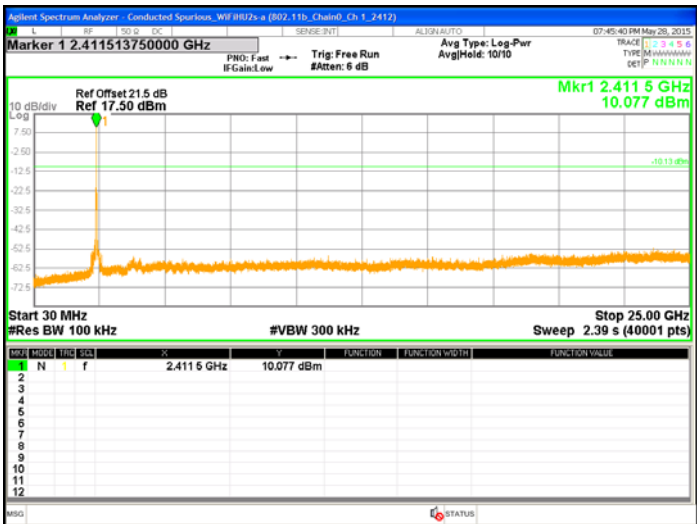


6.6 Test results  
For WiFiHU2s-a:

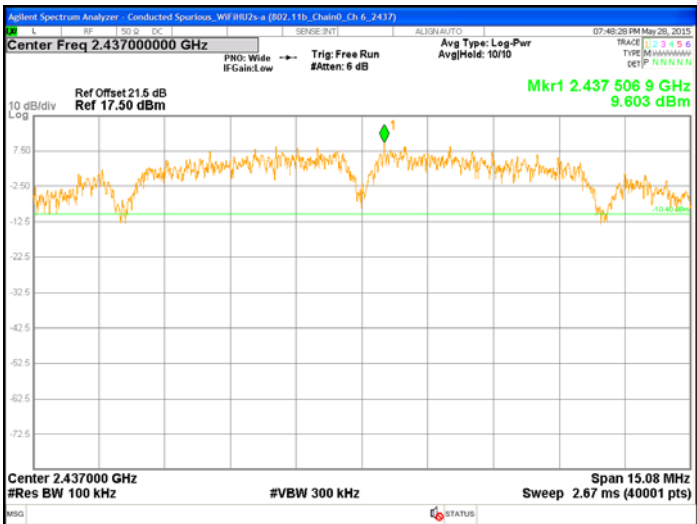
Chain0 : Conducted Spurious @ 802.11b mode Ch 1



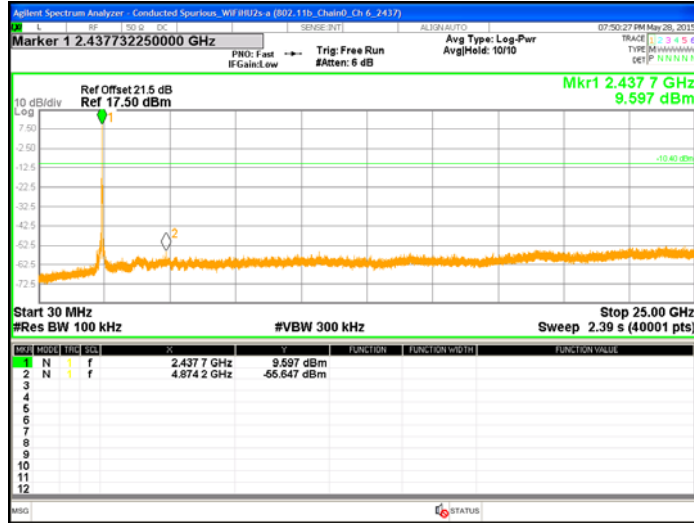
Chain0 : Conducted Spurious @ 802.11b mode Ch 1



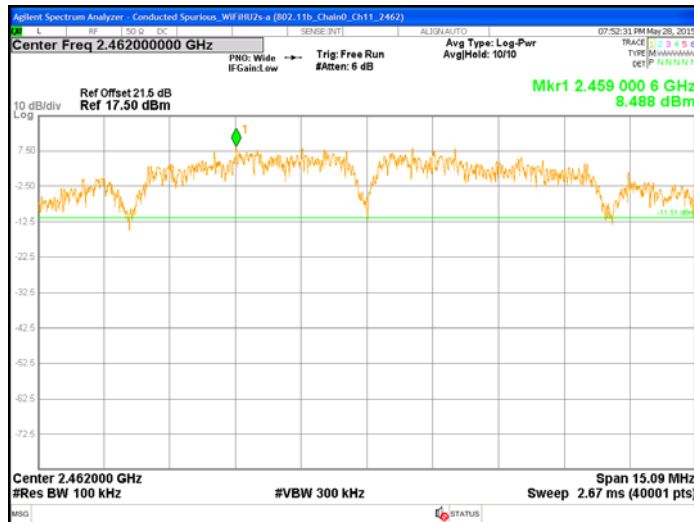
Chain0 : Conducted Spurious @ 802.11b mode Ch 1



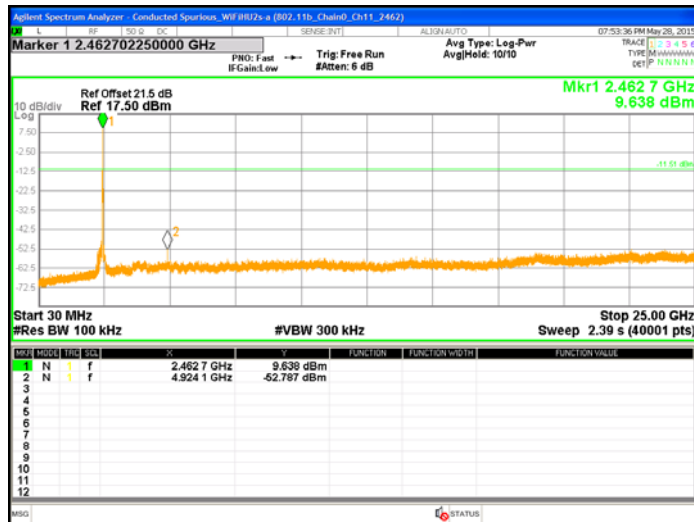
Chain0 : Conducted Spurious @ 802.11b mode Ch 6



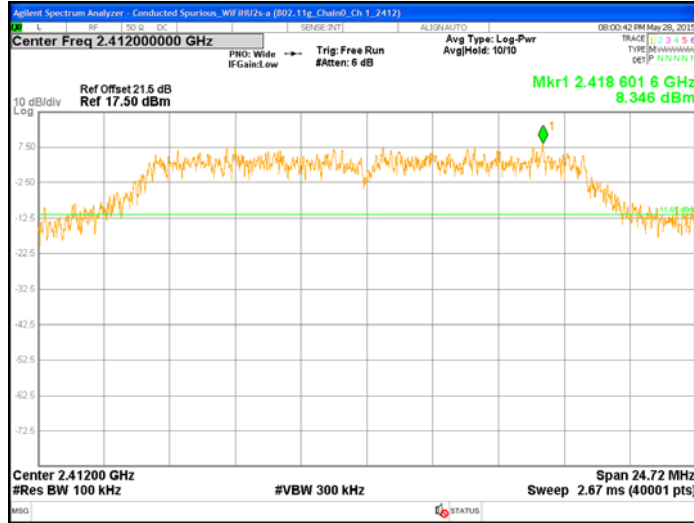
Chain0 : Conducted Spurious @ 802.11b mode Ch11



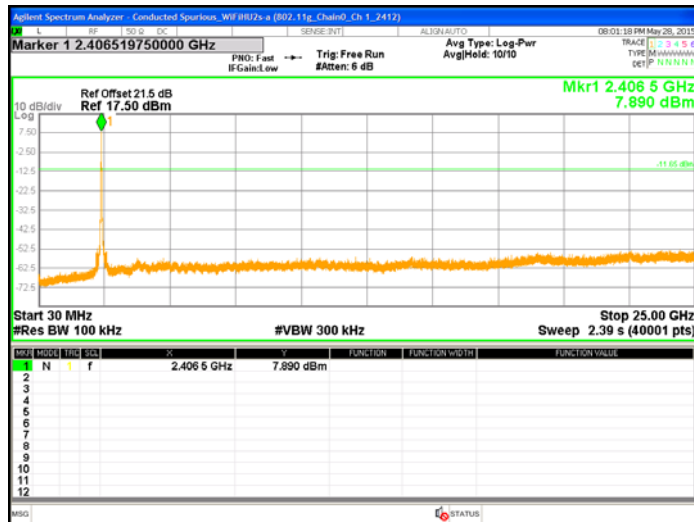
Chain0 : Conducted Spurious @ 802.11b mode Ch11



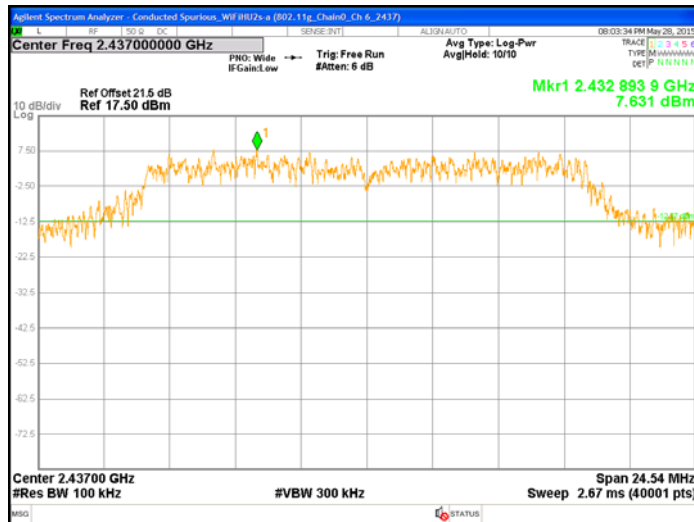
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



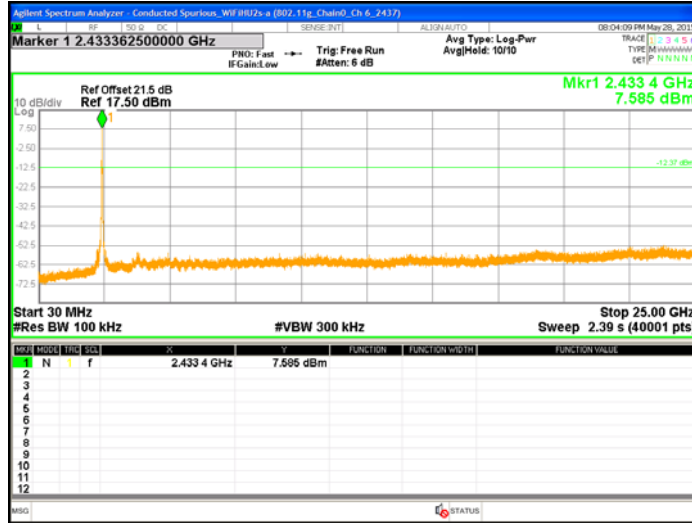
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



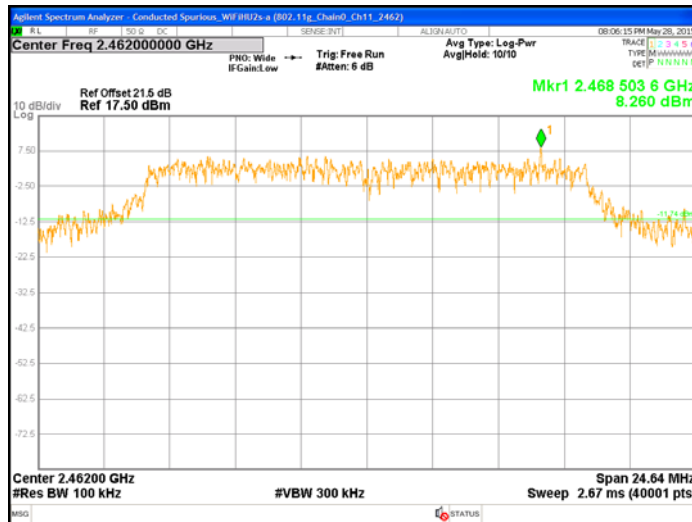
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



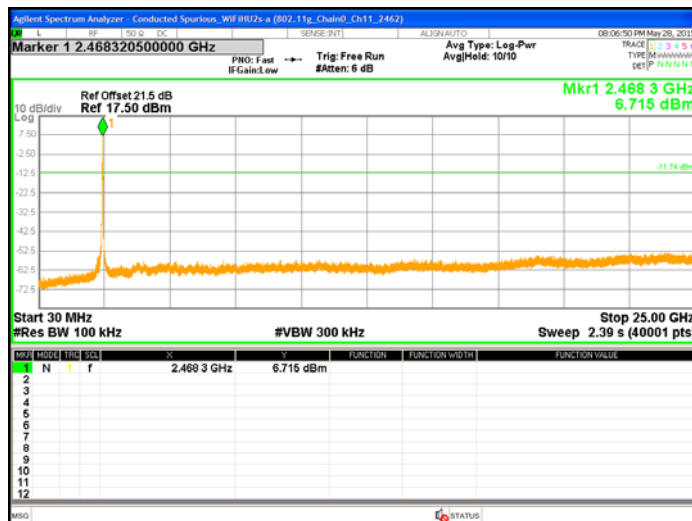
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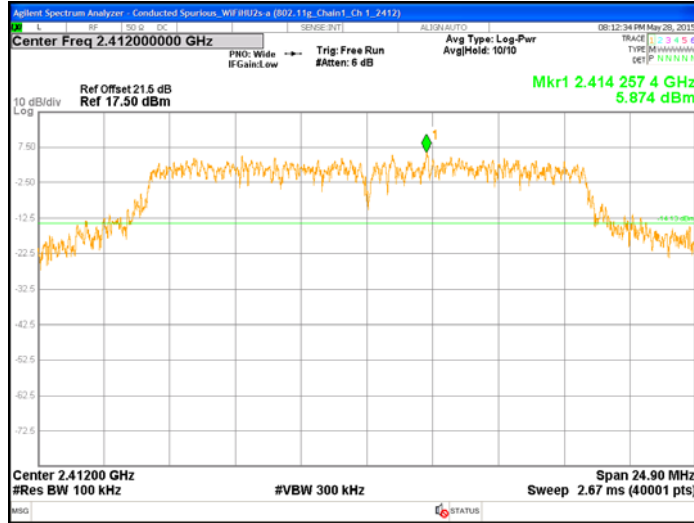
Chain0 : Conducted Spurious @ 802.11g mode Ch11



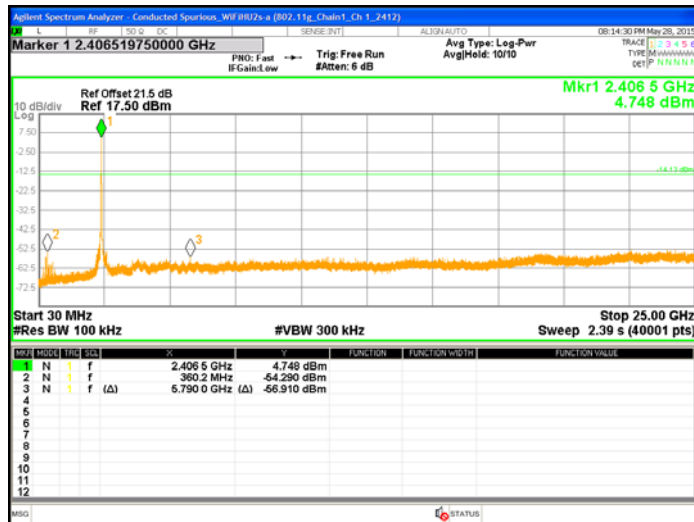
Chain0 : Conducted Spurious @ 802.11g mode Ch11



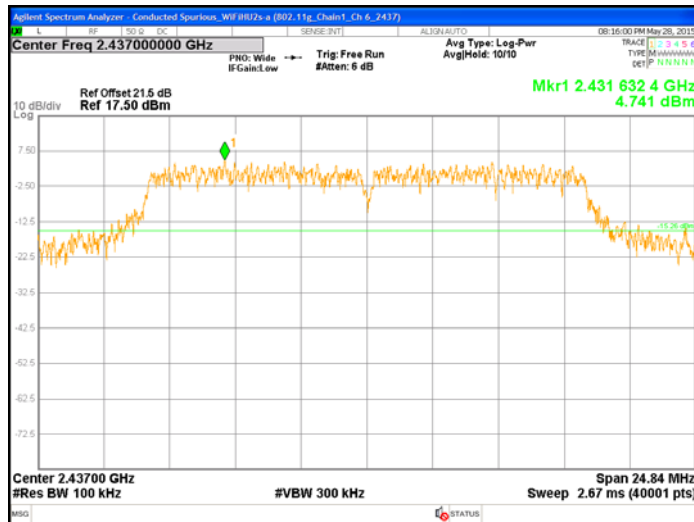
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



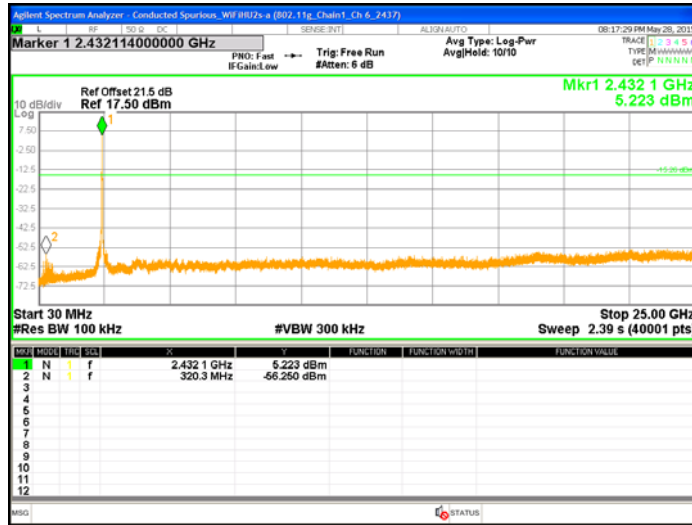
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



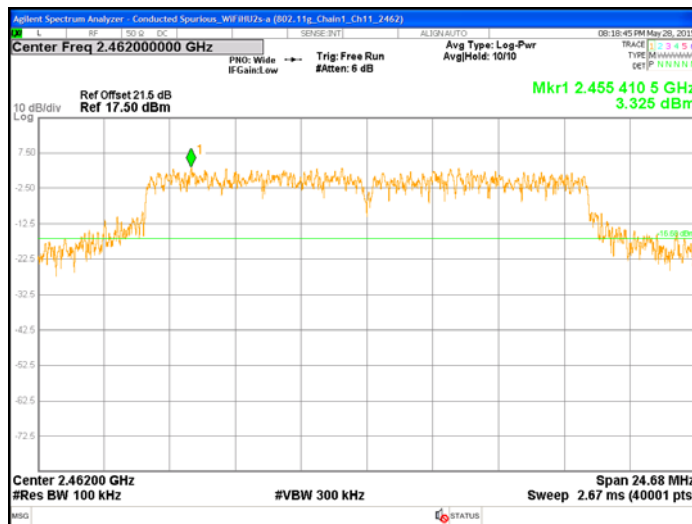
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



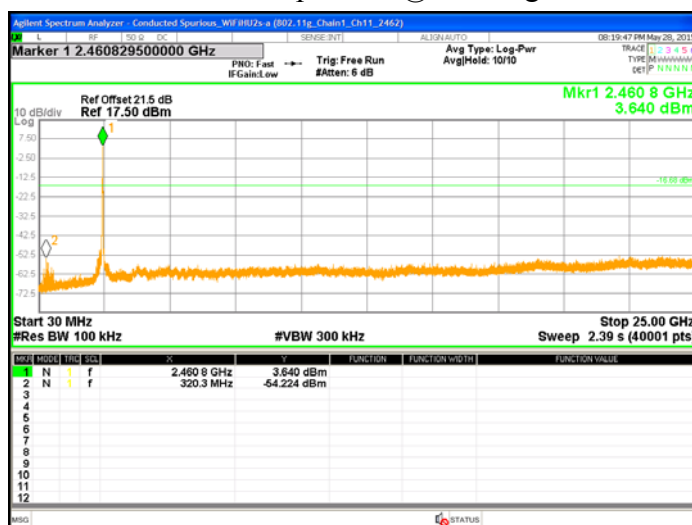
Chain1 : Conducted Spurious @ 802.11g mode Ch 6



Chain1 : Conducted Spurious @ 802.11g mode Ch11

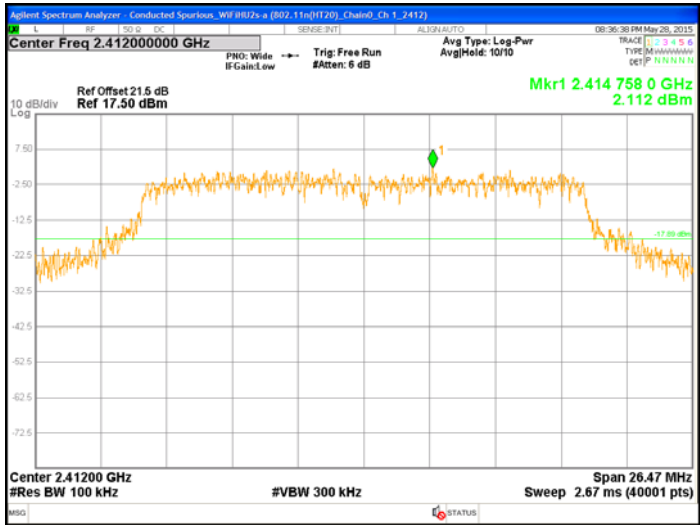


Chain1 : Conducted Spurious @ 802.11g mode Ch11

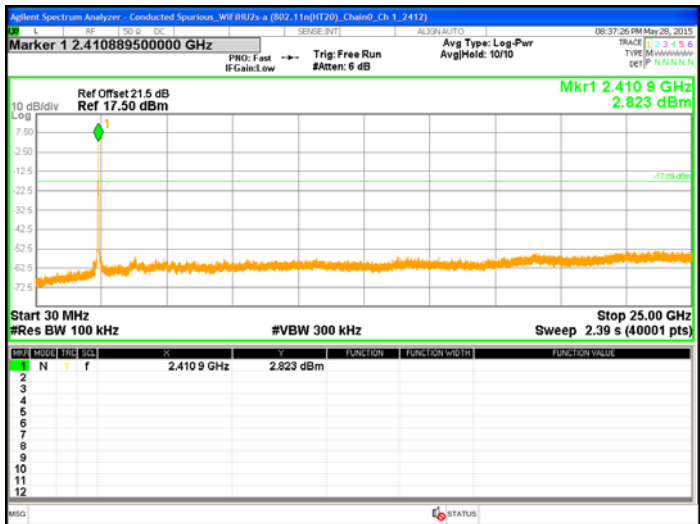




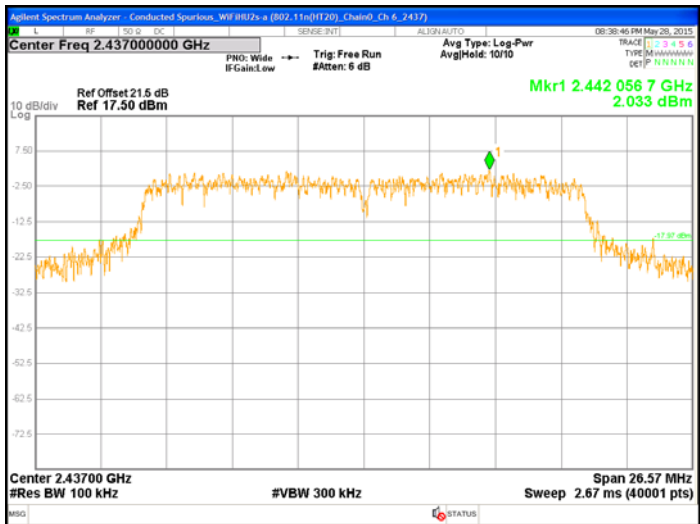
Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



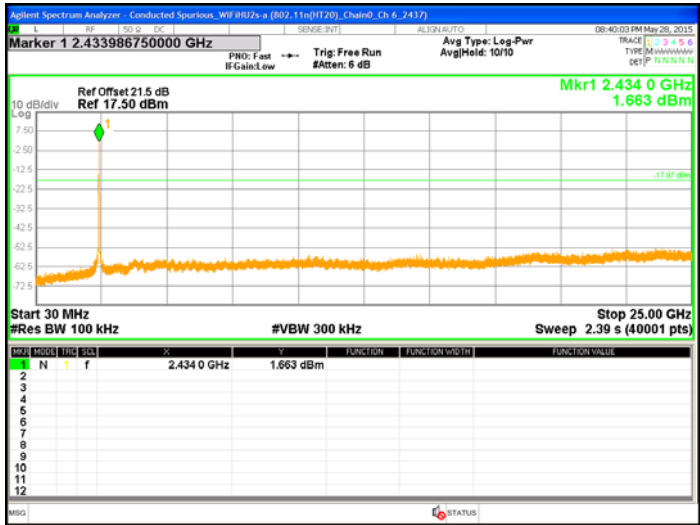
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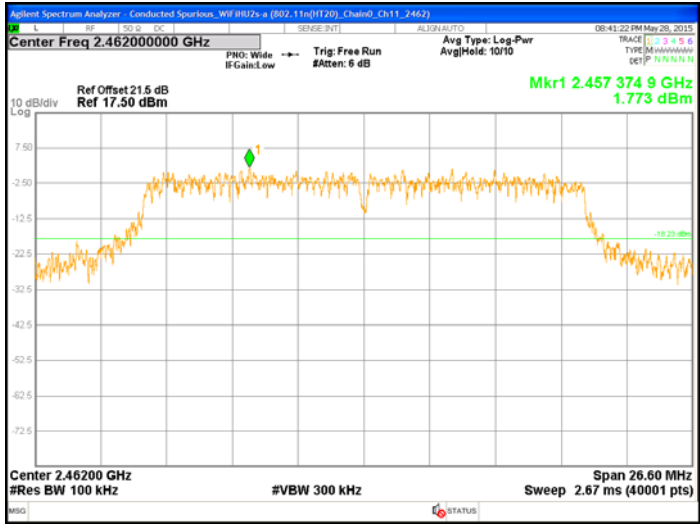
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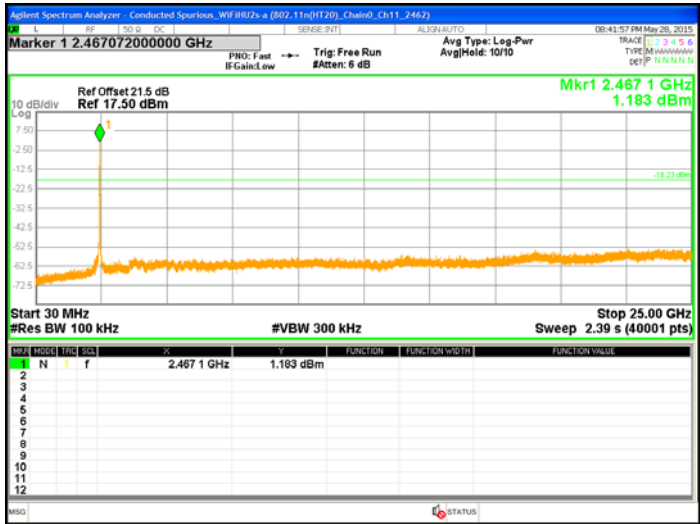
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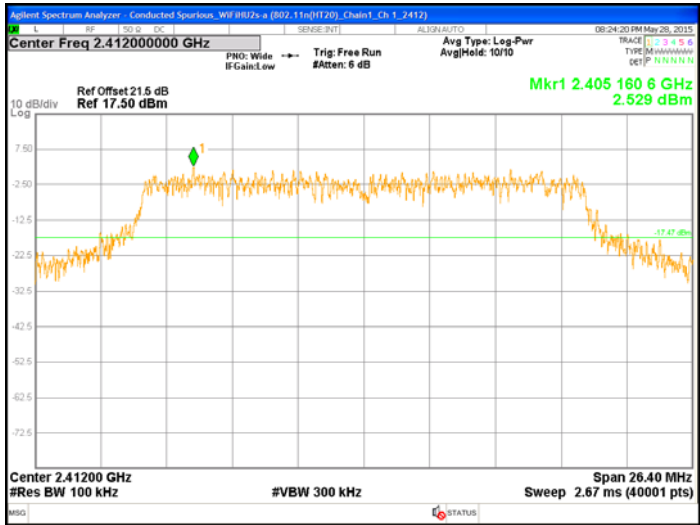
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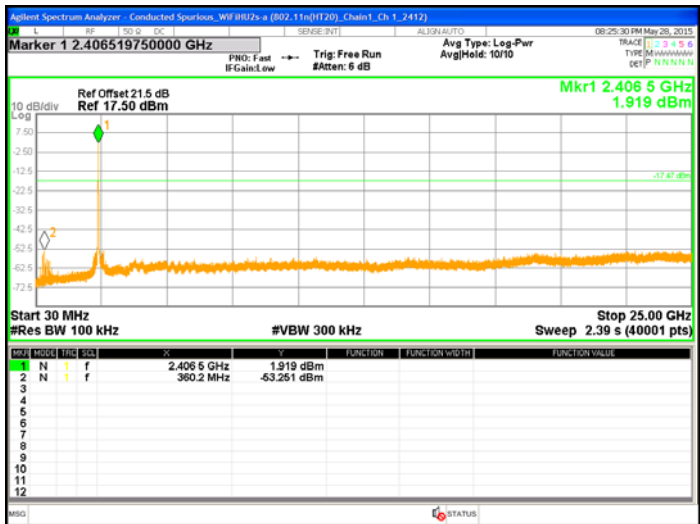
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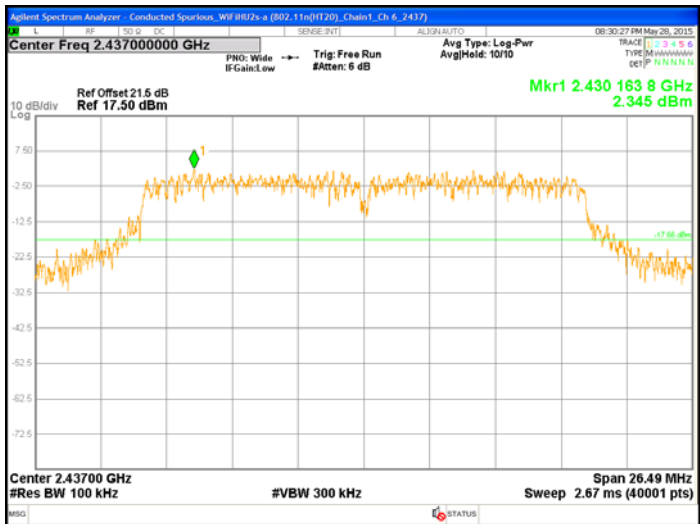
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



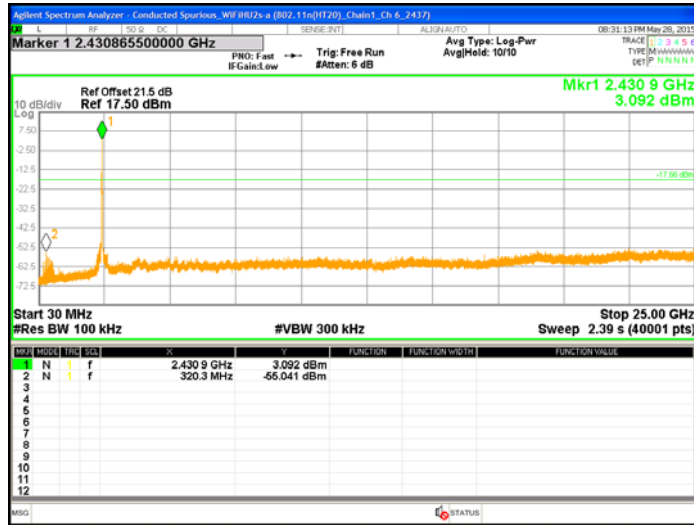
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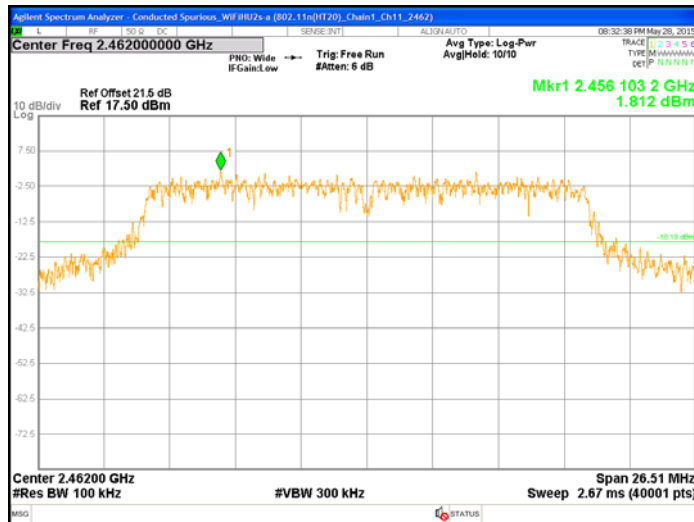
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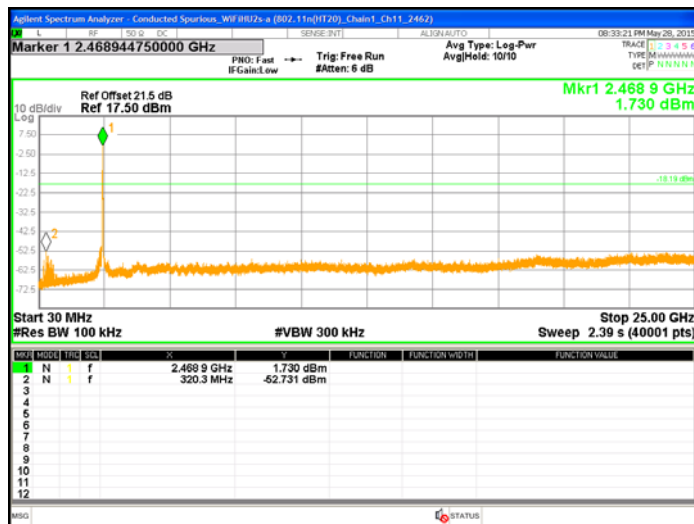
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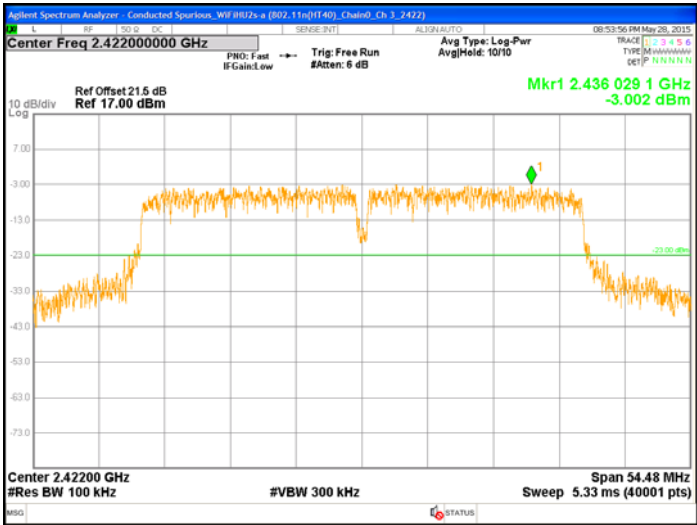
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch11



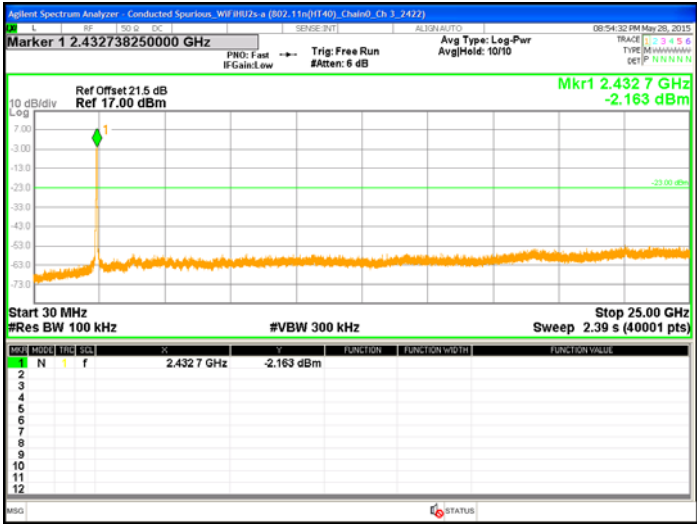
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch11



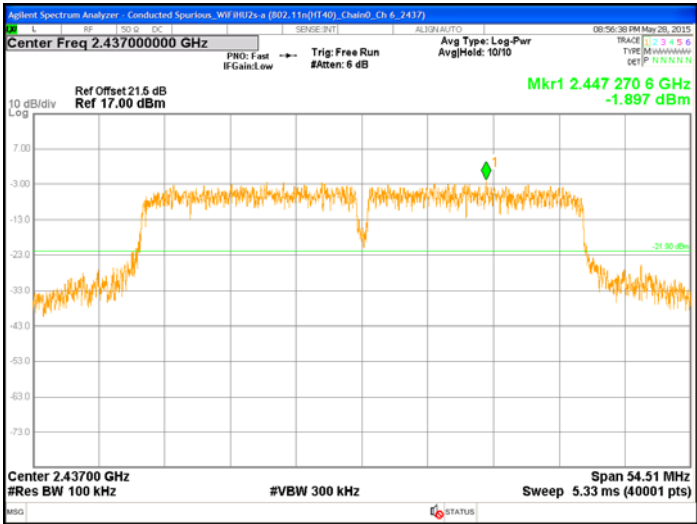
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



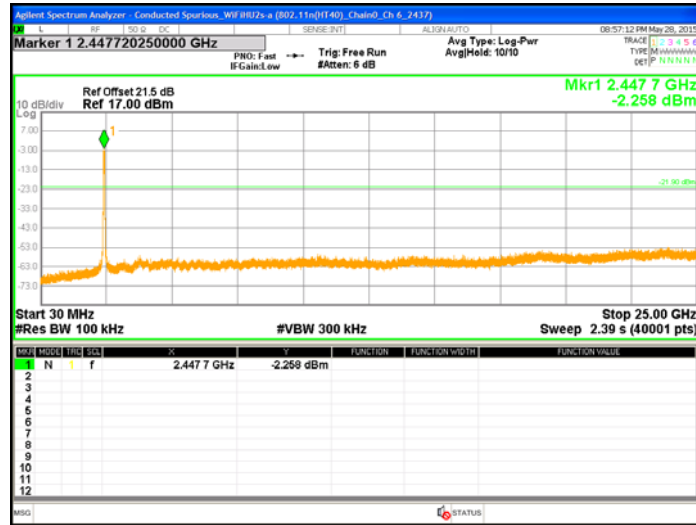
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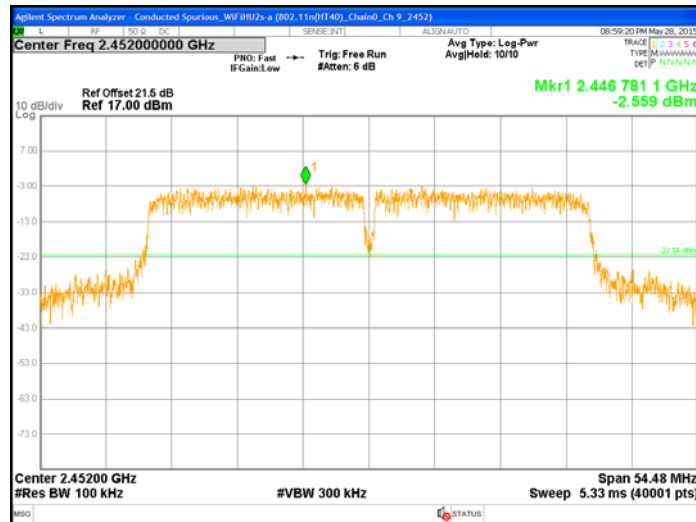
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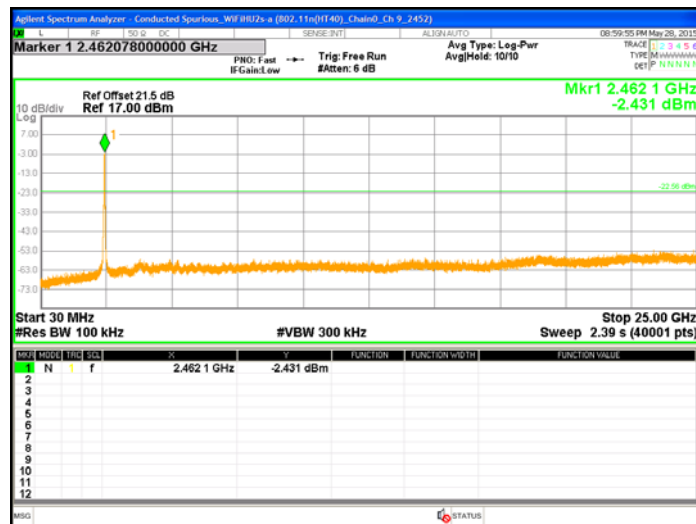
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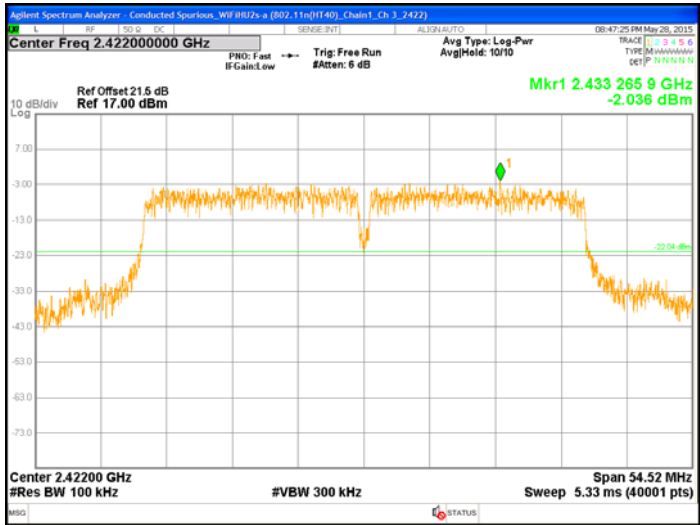
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



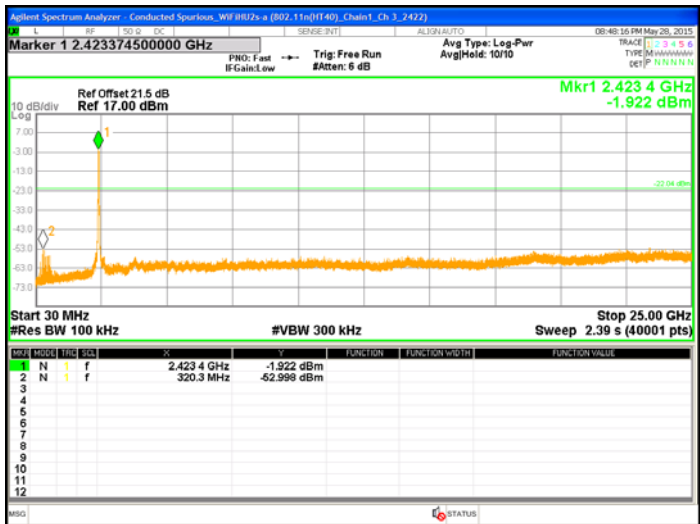
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



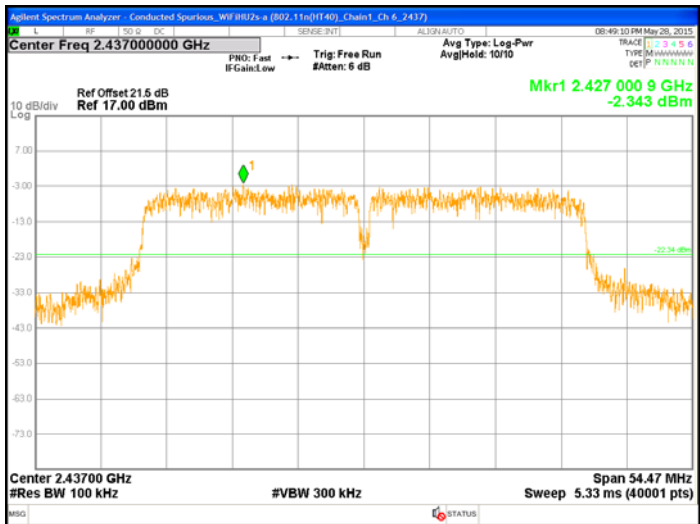
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



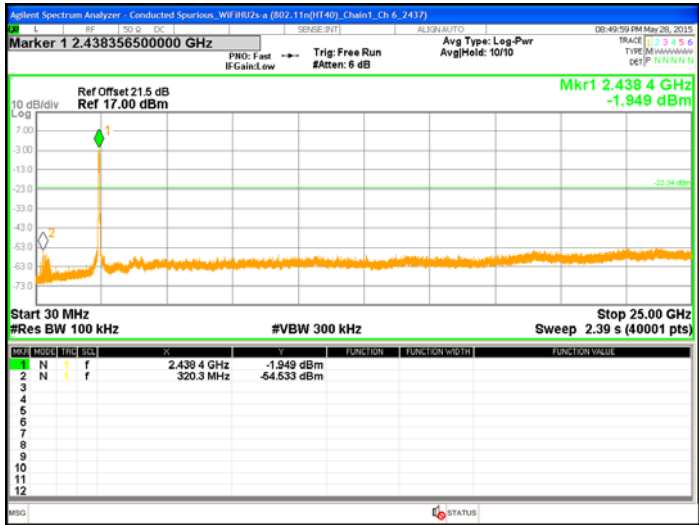
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



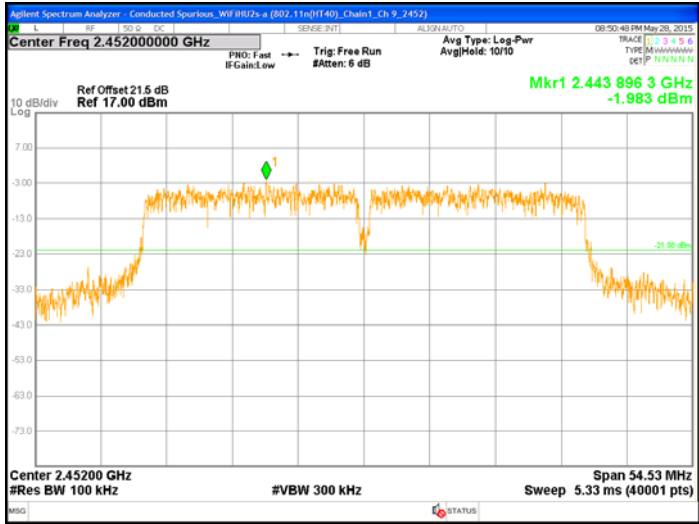
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



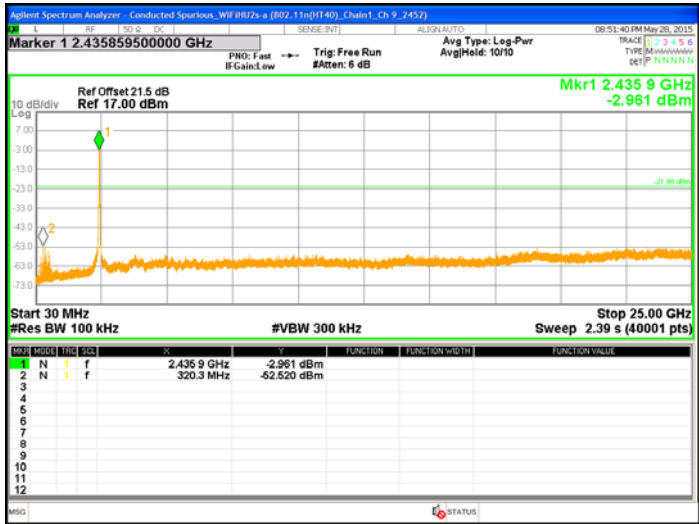
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 9

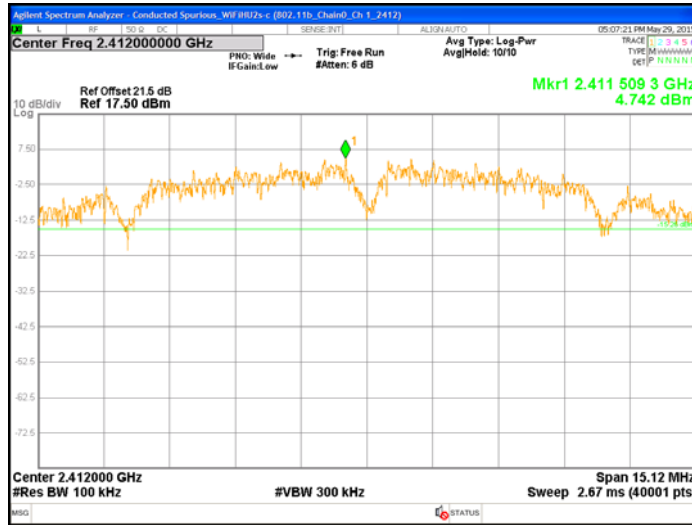




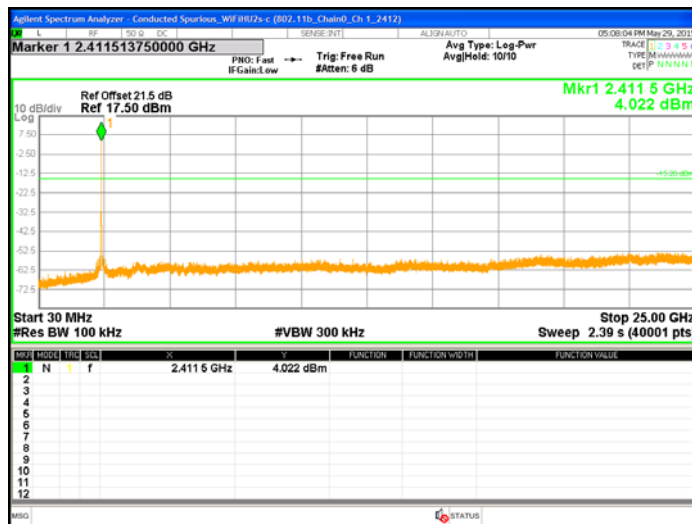


For WiFiHU2s-c:

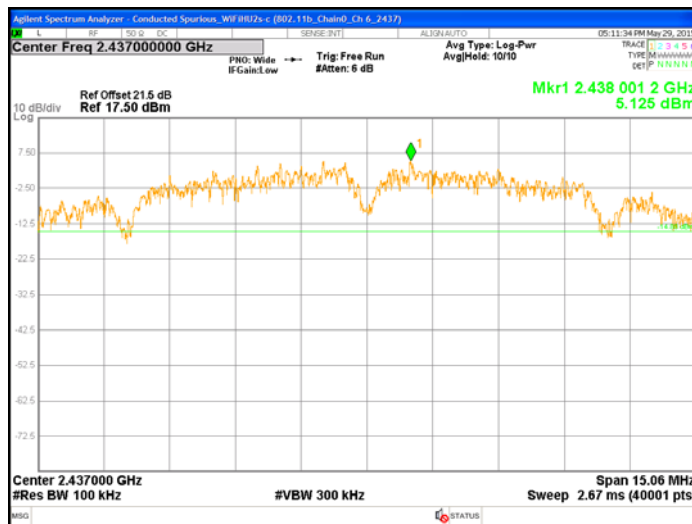
### Chain0 : Conducted Spurious @ 802.11b mode Ch 1



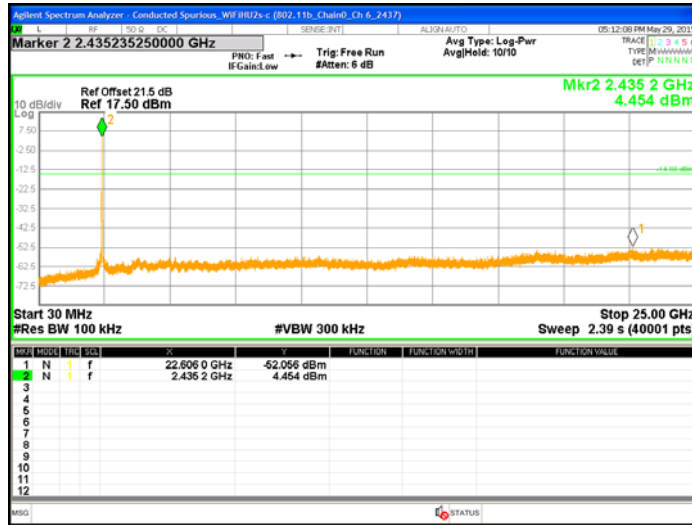
### Chain0 : Conducted Spurious @ 802.11b mode Ch 1



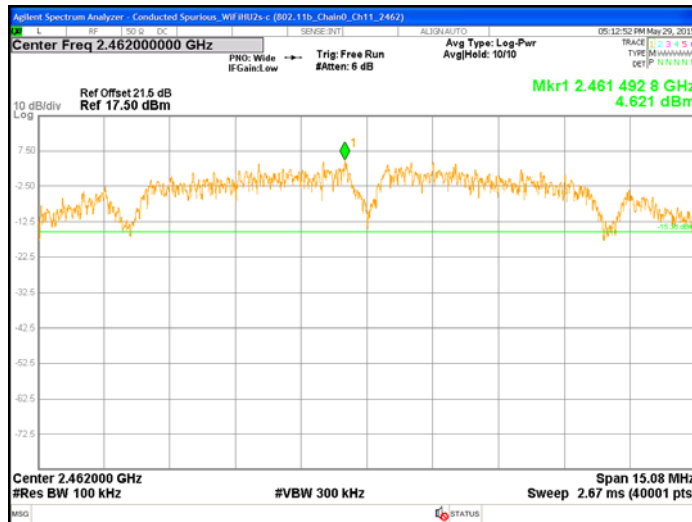
### Chain0 : Conducted Spurious @ 802.11b mode Ch 6



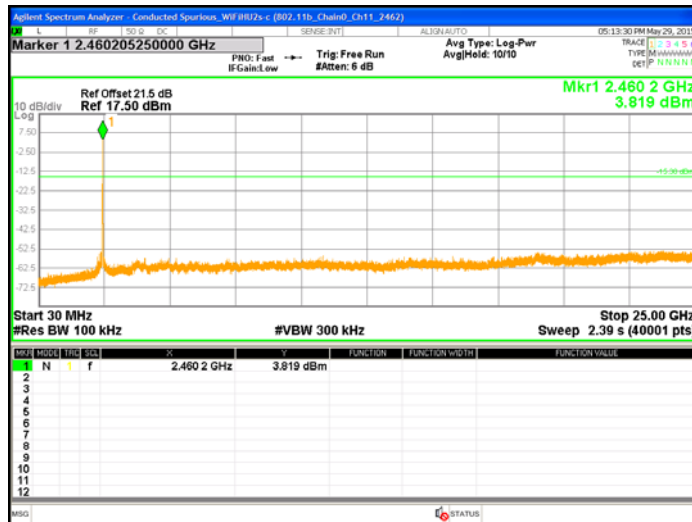
Chain0 : Conducted Spurious @ 802.11b mode Ch 6



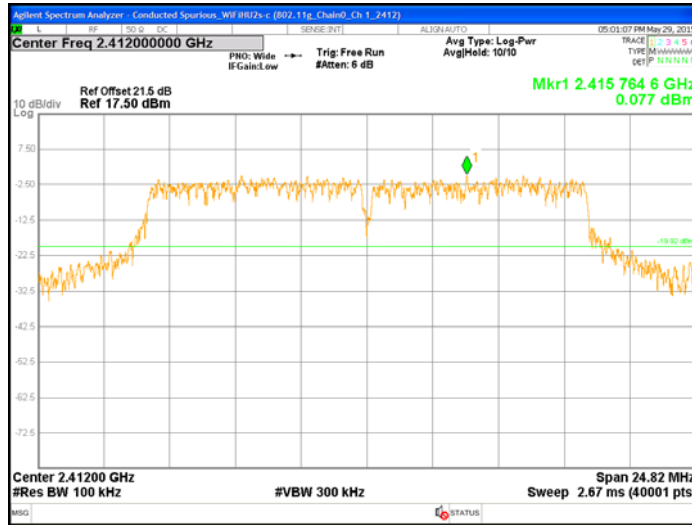
Chain0 : Conducted Spurious @ 802.11b mode Ch11



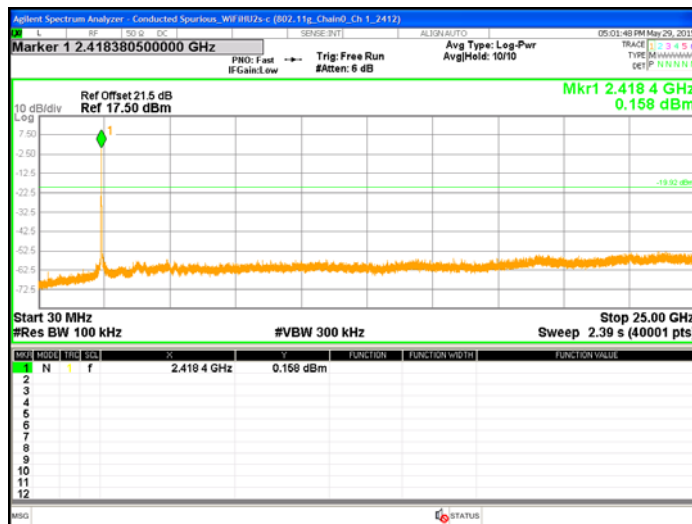
Chain0 : Conducted Spurious @ 802.11b mode Ch11



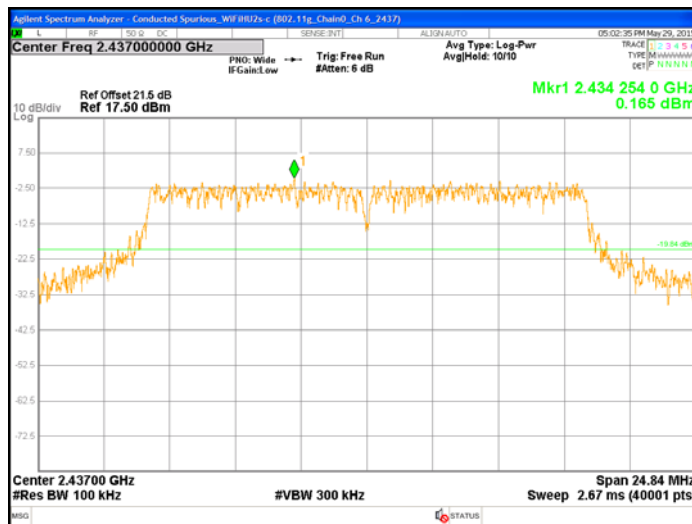
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



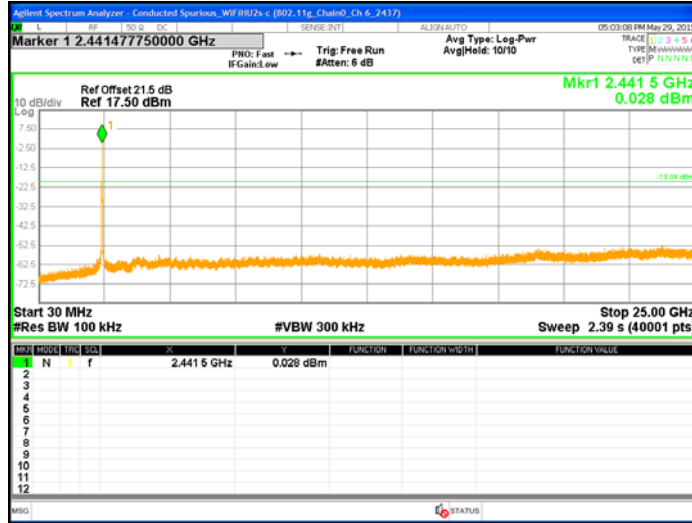
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



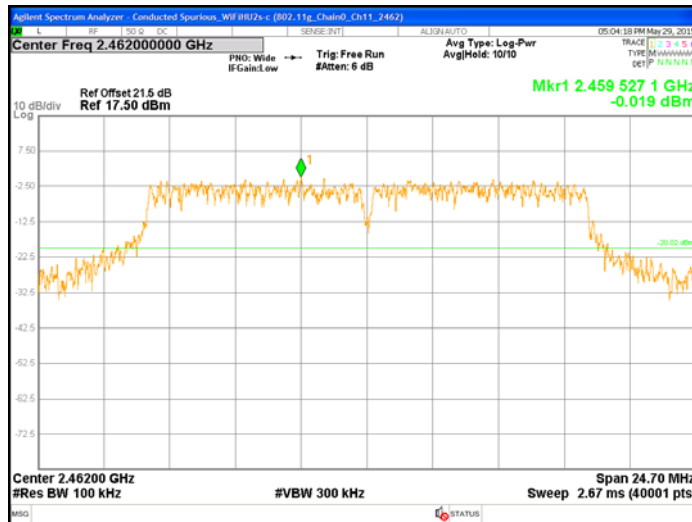
Chain0 : Conducted Spurious @ 802.11g mode Ch 1



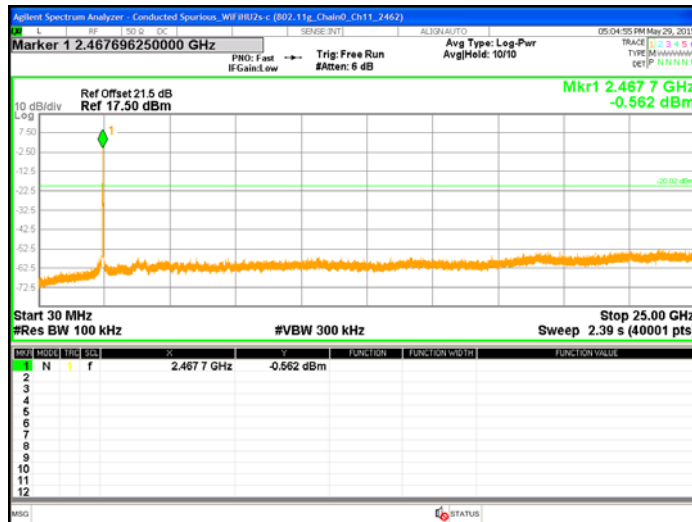
Chain0 : Conducted Spurious @ 802.11g mode Ch 6



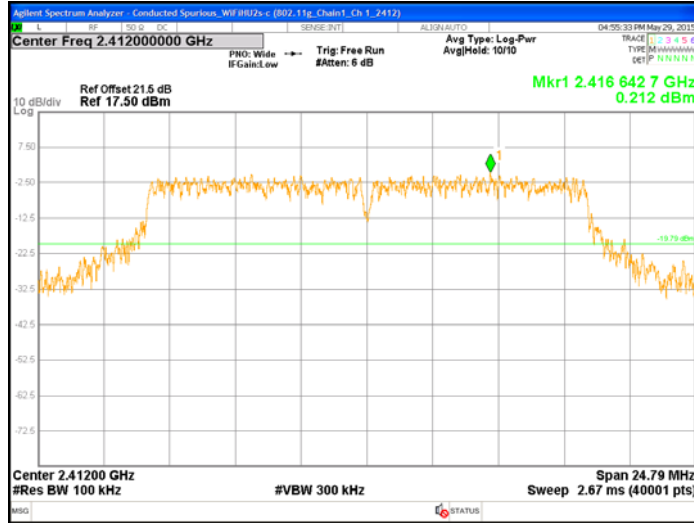
Chain0 : Conducted Spurious @ 802.11g mode Ch11



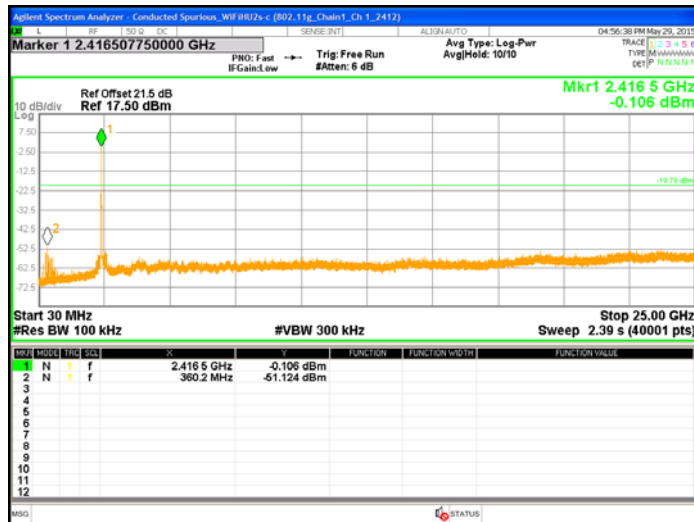
Chain0 : Conducted Spurious @ 802.11g mode Ch11



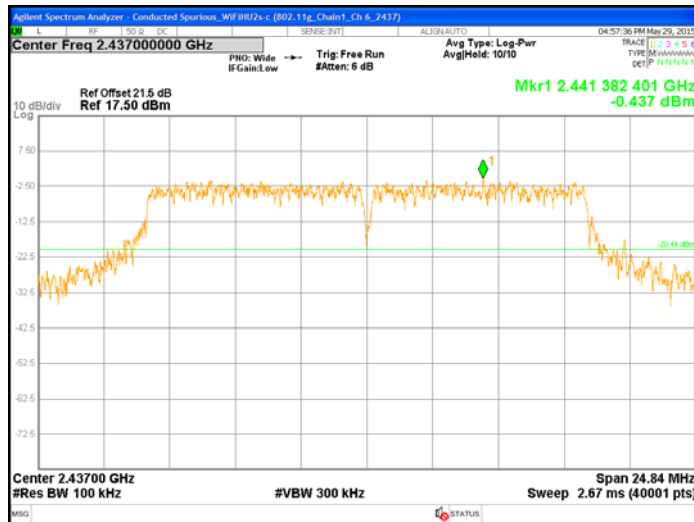
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



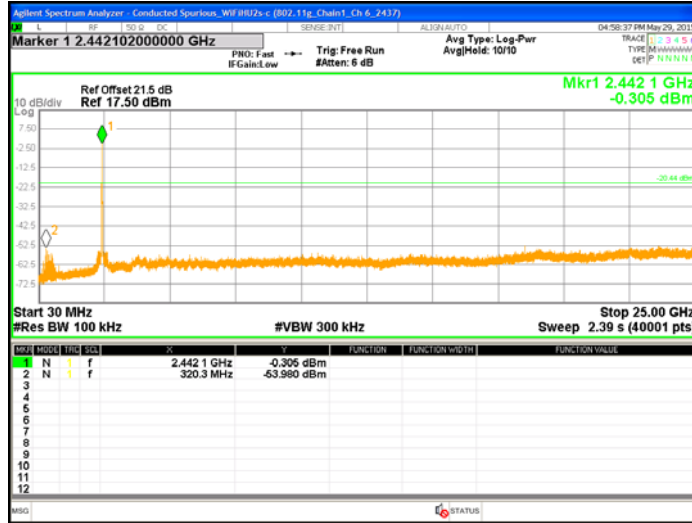
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



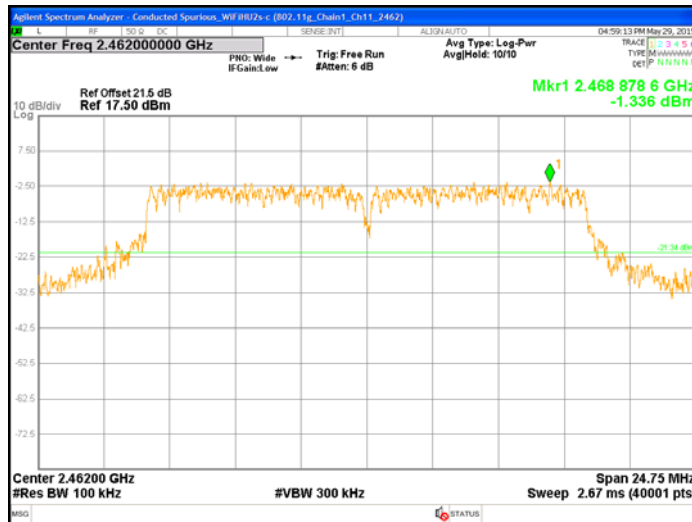
Chain1 : Conducted Spurious @ 802.11g mode Ch 1



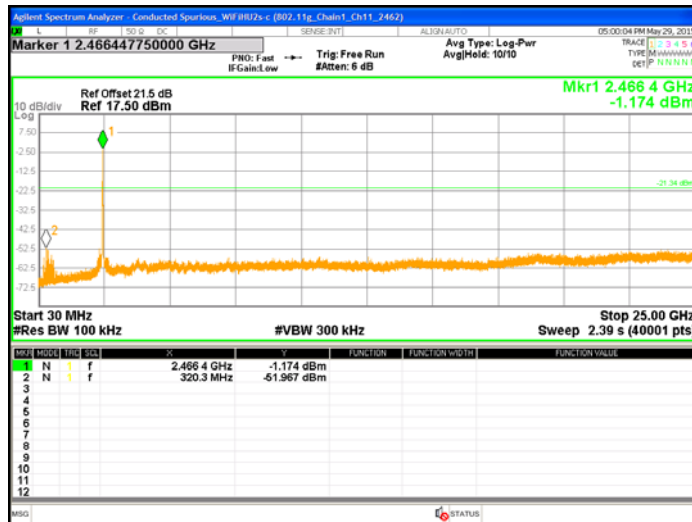
Chain1 : Conducted Spurious @ 802.11g mode Ch 6



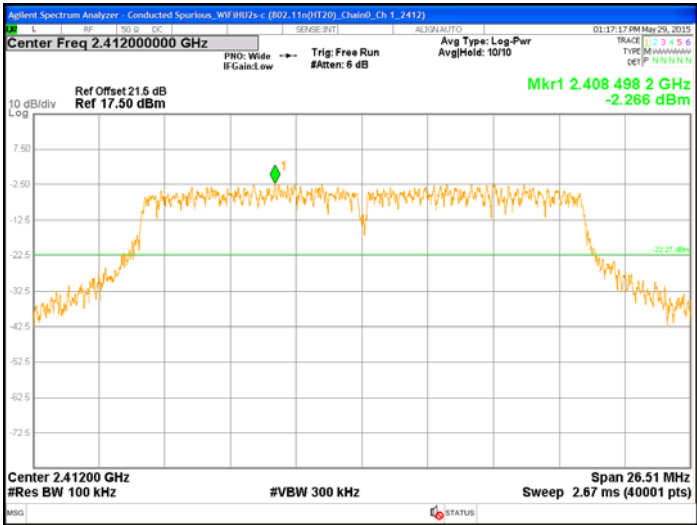
Chain1 : Conducted Spurious @ 802.11g mode Ch11



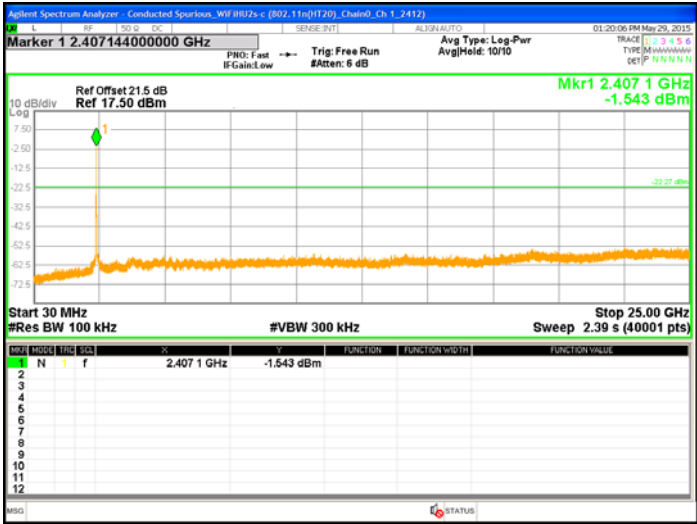
Chain1 : Conducted Spurious @ 802.11g mode Ch11



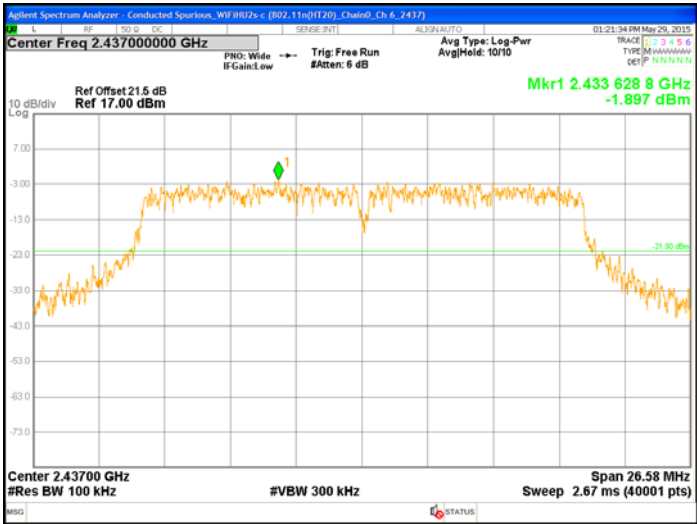
Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



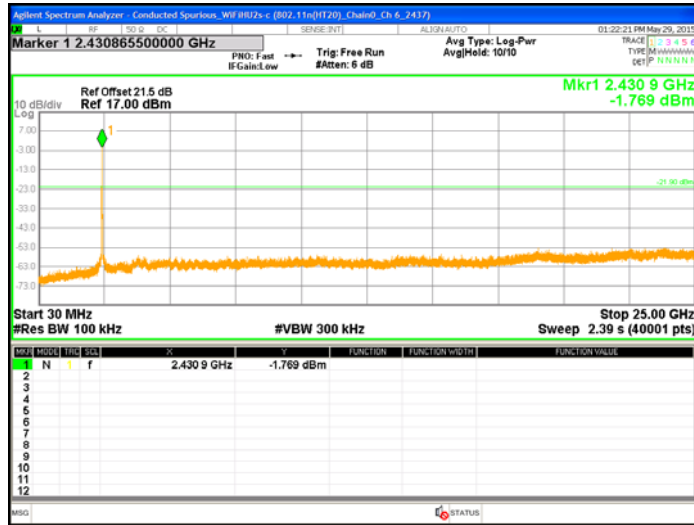
Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



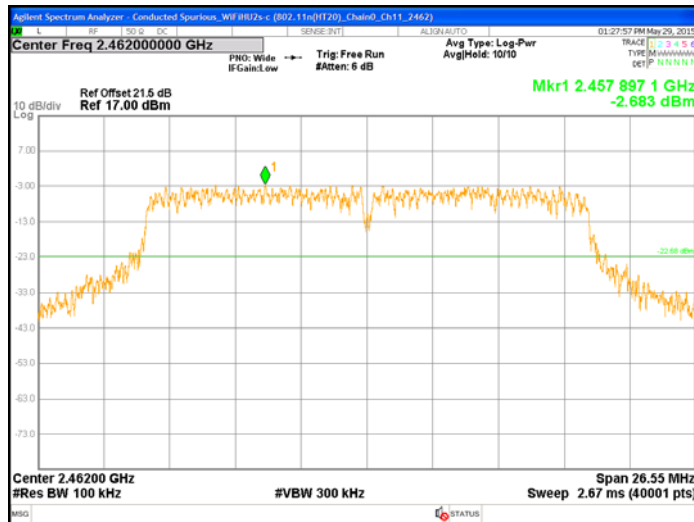
Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch 6



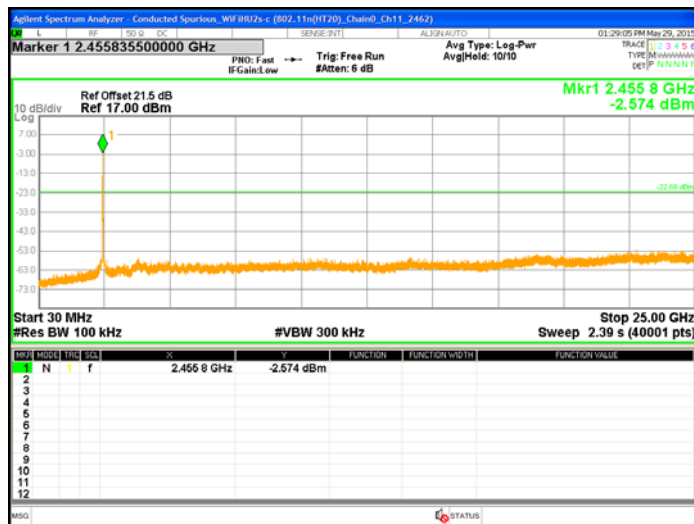
Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch 6



Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch11

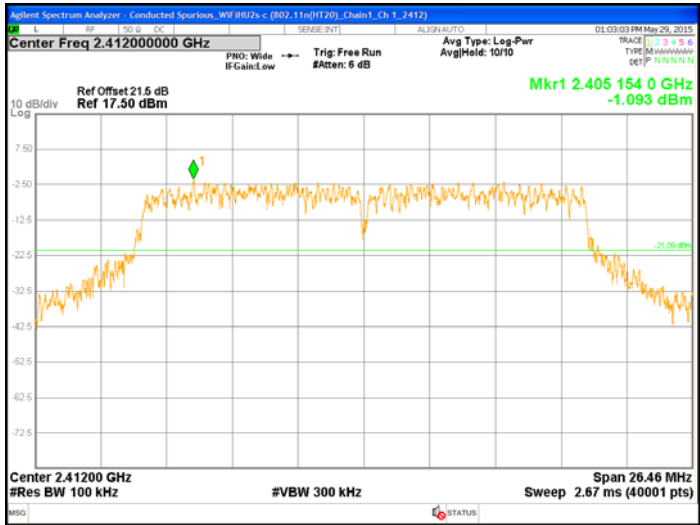


Chain0 : Conducted Spurious @ 802.11n(HT20) mode Ch11

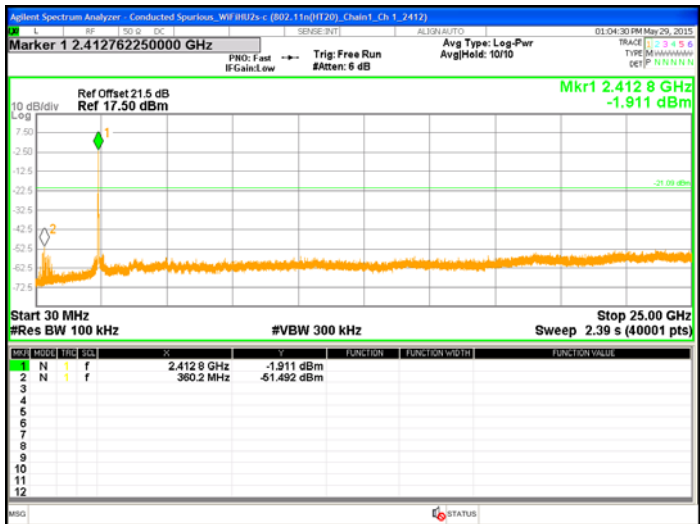




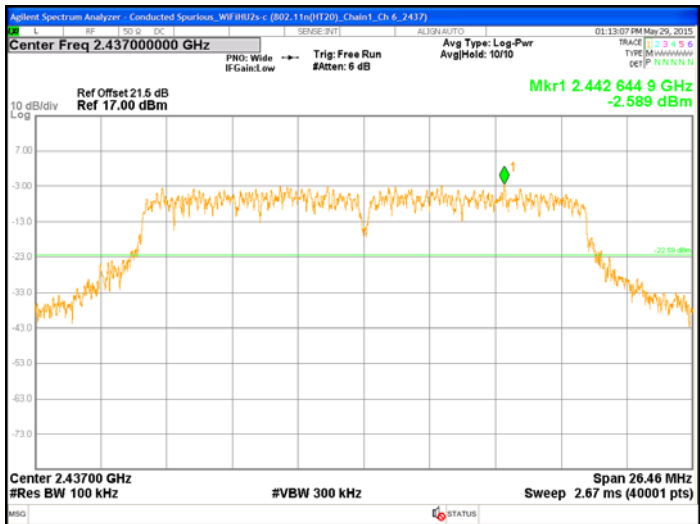
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



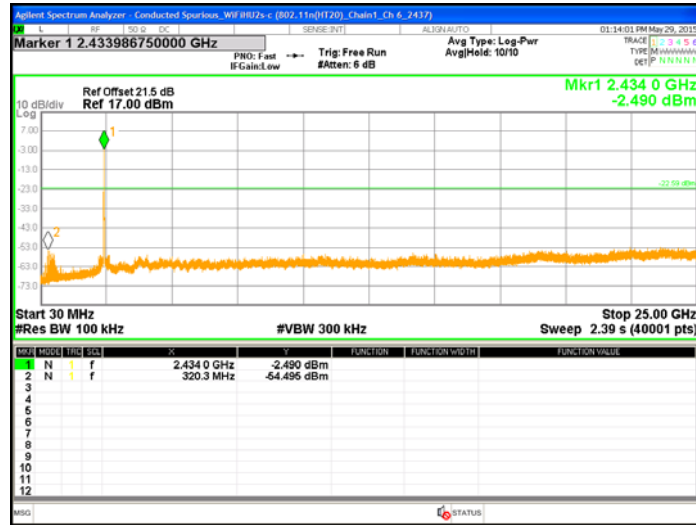
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch 1



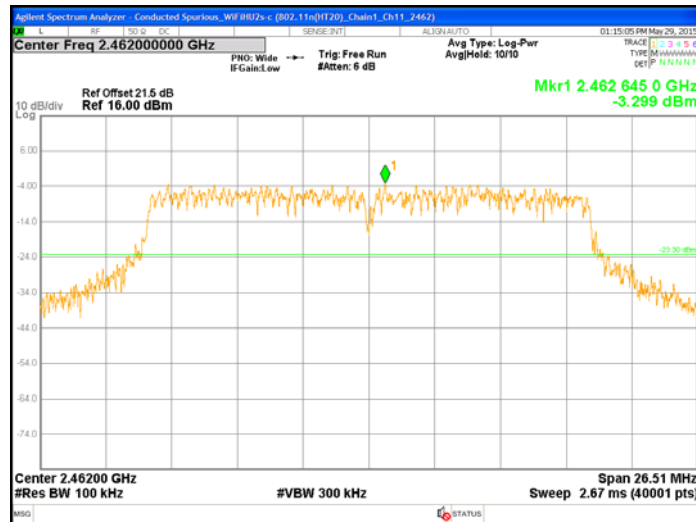
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch 6



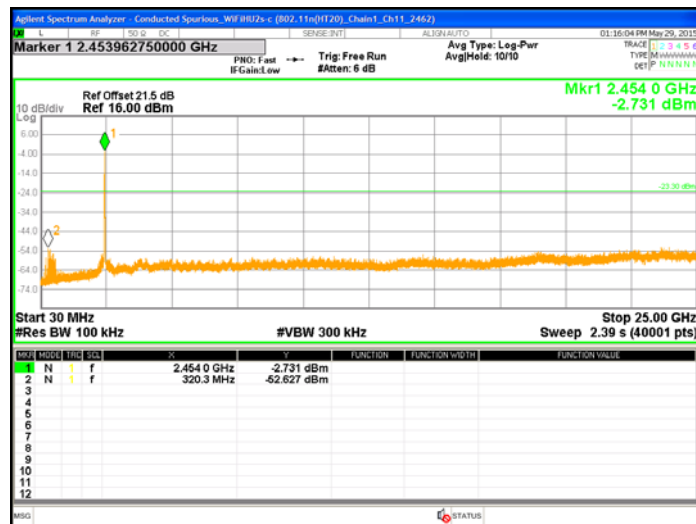
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch 6



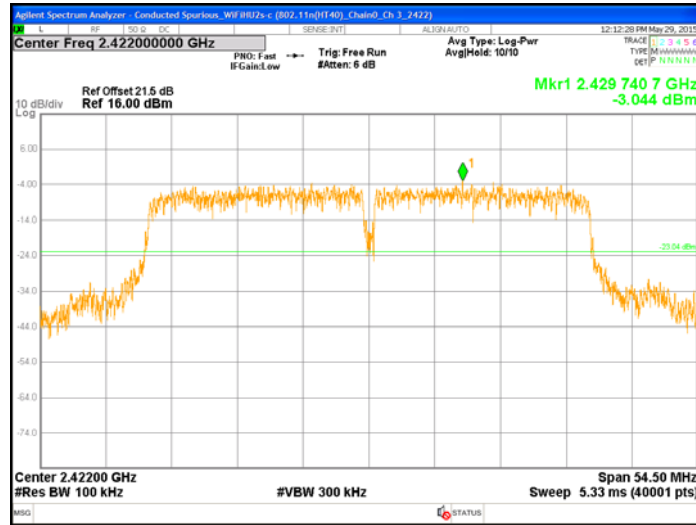
Chain1 : Conducted Spurious @ 802.11n(HT20) mode Ch11



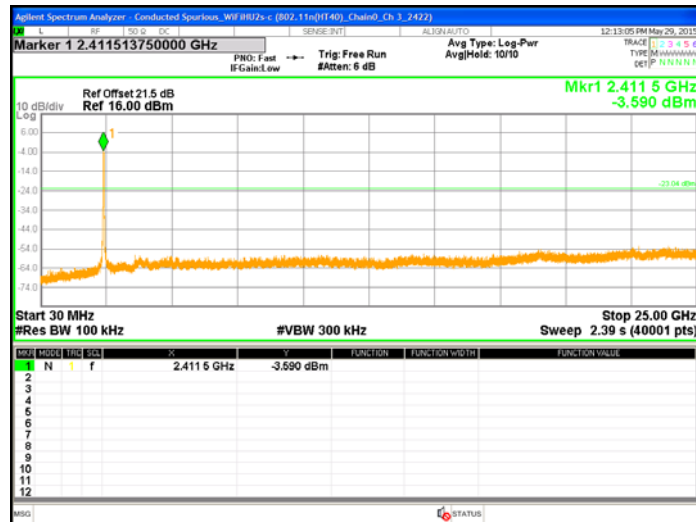
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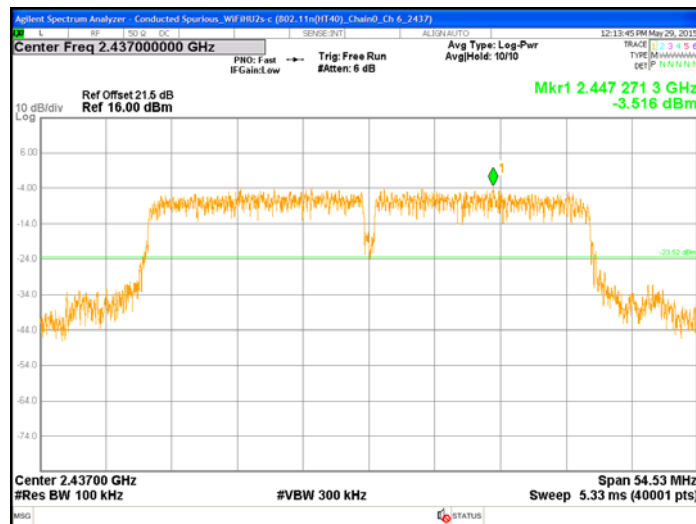
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



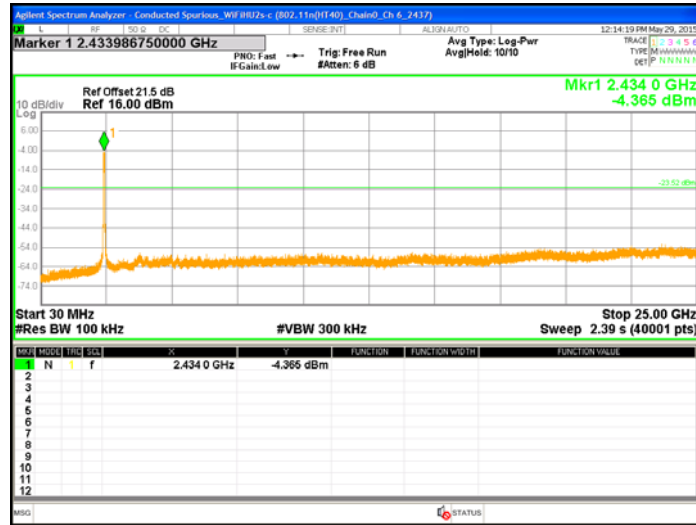
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



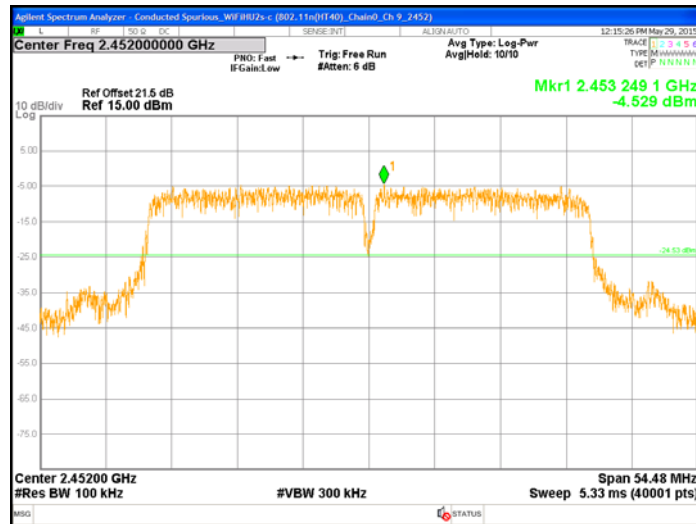
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



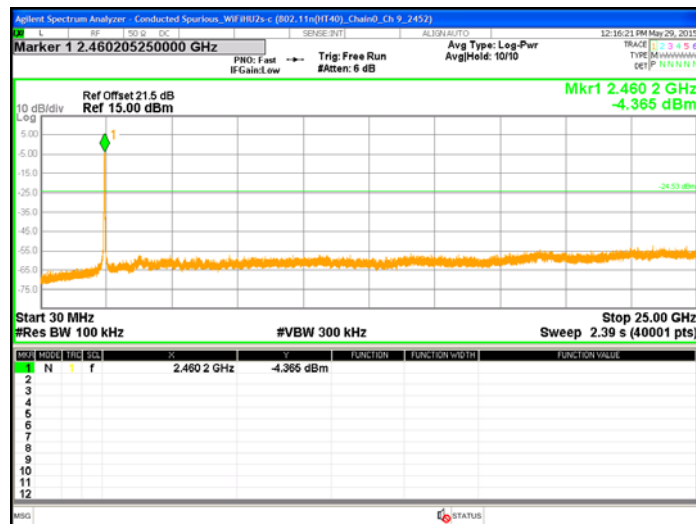
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



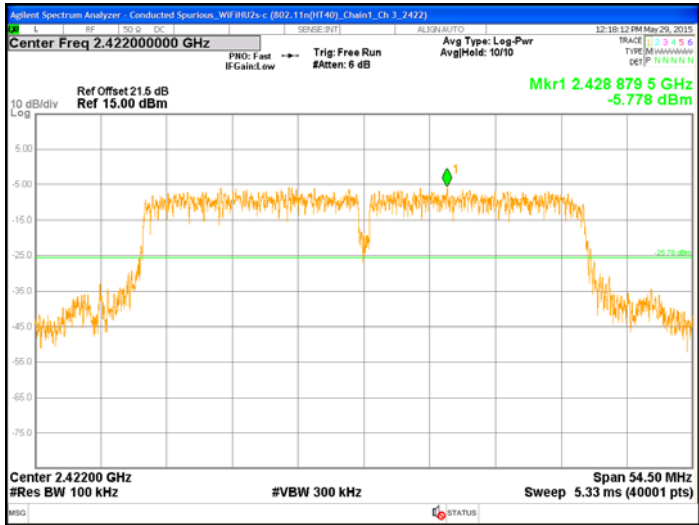
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



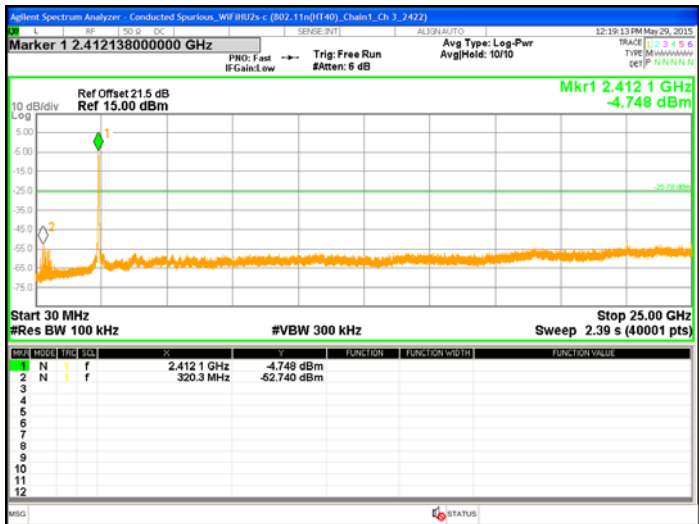
Chain0 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



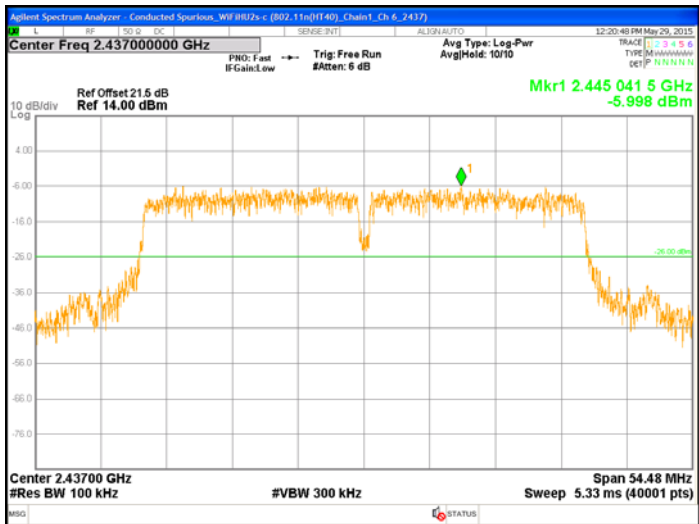
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



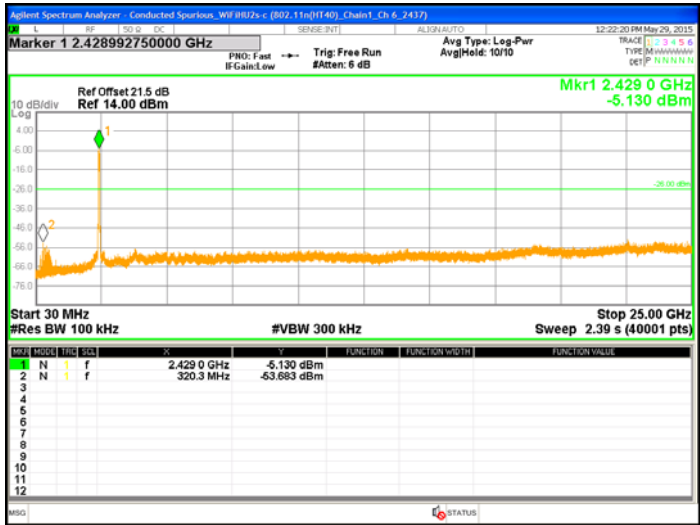
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 3



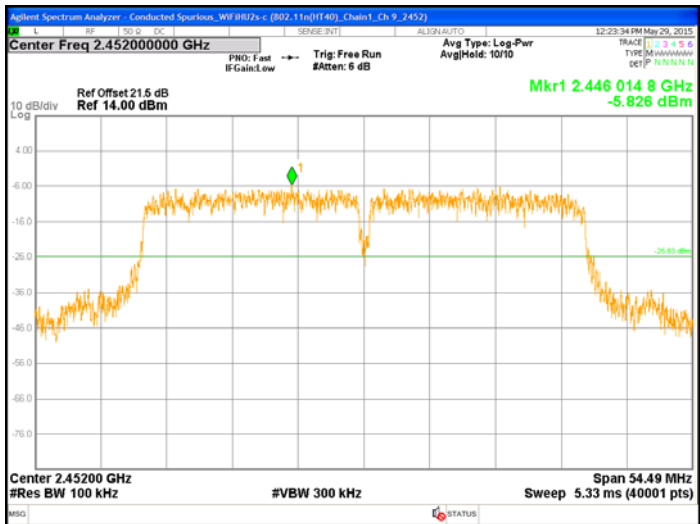
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



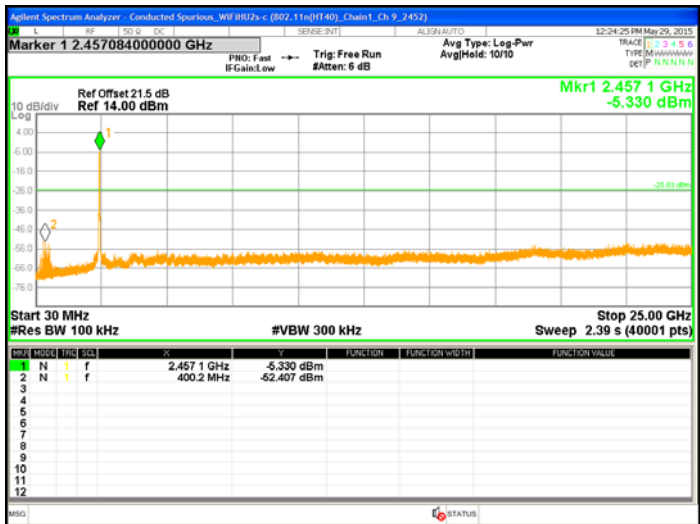
Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 6



Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



Chain1 : Conducted Spurious @ 802.11n(HT40) mode Ch 9



## 7. Emissions In Restricted Frequency Bands (Radiated emission measurements)

### 7.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.247(d), 15.205, 15.209	

### 7.2 Limit for emission in restricted frequency bands (Radiated emission measurement)

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

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

### 7.3 Measuring instrument setting

#### Below 1GHz measurement

Receiver settings	
Receiver function	Setting
Detector	QP
RBW	30-1000 MHz; 100-120 kHz
VBW	$\geq 3 \times$ RBW
Sweep	Auto couple
Attenuation	Auto

#### Above 1GHz measurement

Spectrum analyzer settings	
Spectrum Analyzer function	Setting
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Start Frequency	1GHz
Stop Frequency	Tenth harmonic
Attenuation	Auto



#### 7.4 Test procedure

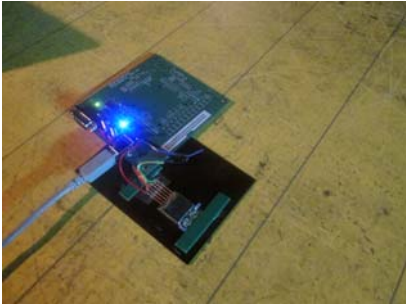
1. The EUT was placed on the top of the turntable 0.8 meter above ground. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level.
3. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization
4. If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading.
5. Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.

**7.5 Test diagram**

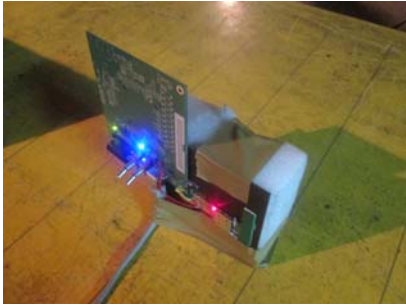
The signal is maximized through rotation and placement in the three orthogonal axes.

For WiFiHU2s-a:

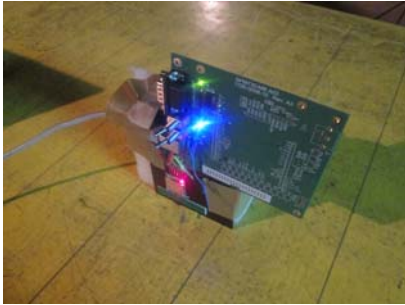
X- axis



Y- axis

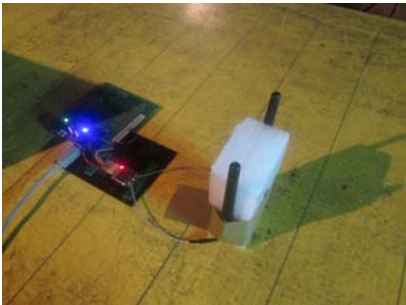


Z- axis

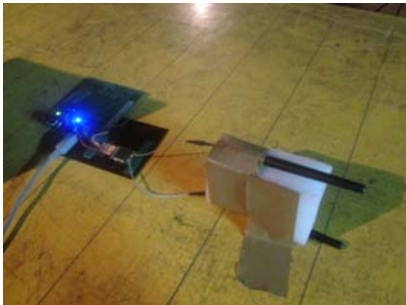


For WiFiHU2s-c:

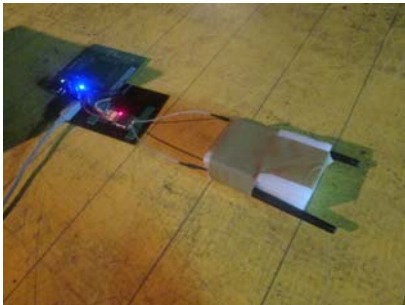
X- axis



Y- axis



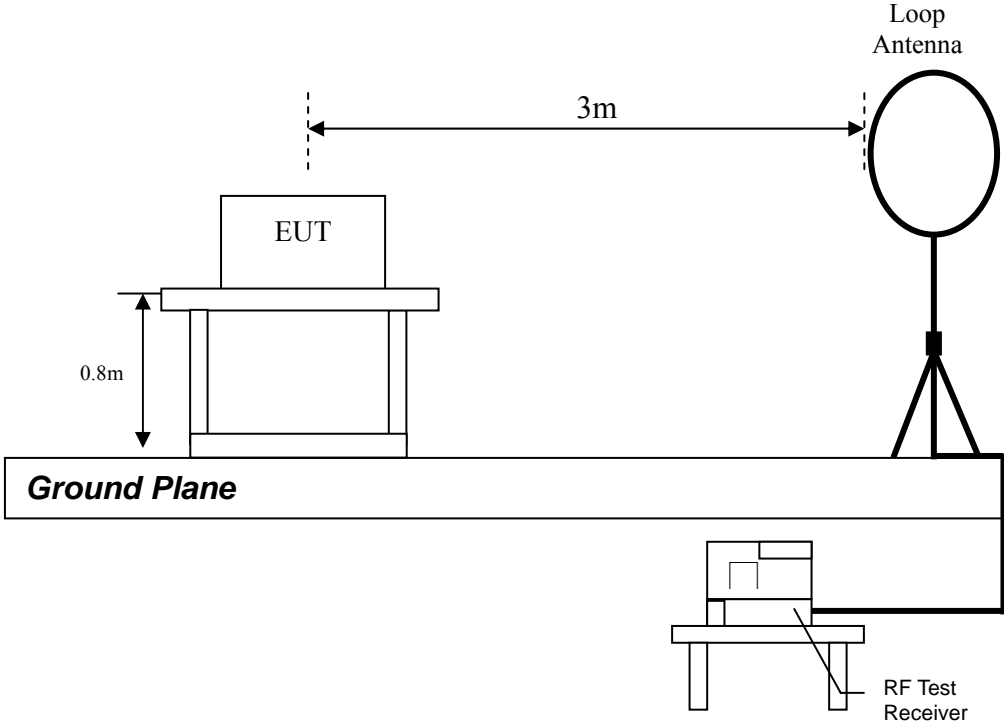
Z- axis



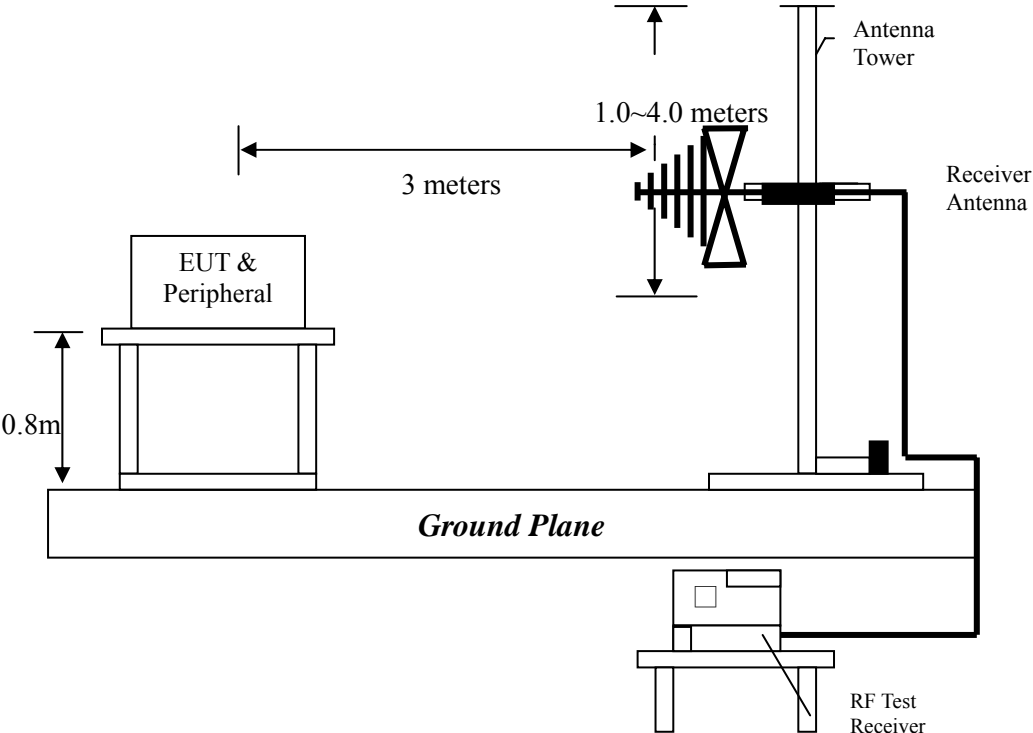
After verifying three axes, we found the maximum electromagnetic field was occurred at X-axis configuration. The final test data was executed under this configuration.

**7.6 Test configuration**

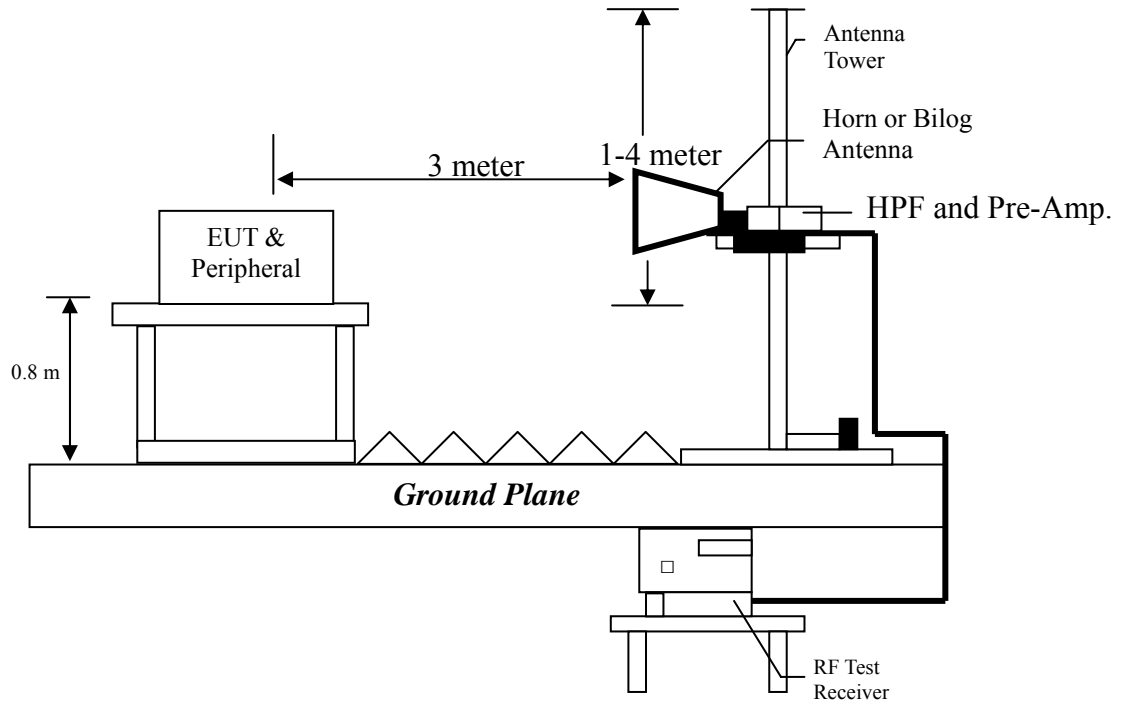
Radiated emission from 9kHz to 30MHz uses Loop Antenna:



Radiated emission below 1GHz using Bilog Antenna



Radiated emission above 1GHz using Horn Antenna



## 7.7 Test result

### 7.7.1 Measurement results: frequencies 9kHz to 30MHz

EUT : WiFiHU2s-a

Polarity (circle)	Frequency (MHz)	Detection value	factor (dB/m)	Reading (dBμV)	value (dBμV/m)	Limit @ 3m (dBμV/m)	Tolerance (dB)
Plane	2.15	QP	18.17	28.12	46.29	69.54	-23.25
Plane	16.36	QP	7.15	22.00	29.15	69.54	-40.39
Plane	20.00	QP	6.60	17.94	24.54	69.54	-45.00
Coaxial	2.06	QP	18.58	25.56	44.14	69.54	-25.40
Coaxial	14.48	QP	7.44	18.91	26.35	69.54	-43.19
Coaxial	21.10	QP	6.57	14.89	21.46	69.54	-48.08

Remark: Corr. Factor = Antenna Factor + Cable Loss - PreAmplifier Gain

EUT : WiFiHU2s-c

Polarity (circle)	Frequency (MHz)	Detection value	factor (dB/m)	Reading (dBμV)	value (dBμV/m)	Limit @ 3m (dBμV/m)	Tolerance (dB)
Plane	2.15	QP	18.17	27.45	45.62	69.54	-23.92
Plane	16.36	QP	7.15	21.36	28.51	69.54	-41.03
Plane	20.00	QP	6.60	18.33	24.93	69.54	-44.61
Coaxial	2.06	QP	18.58	22.53	41.11	69.54	-28.43
Coaxial	14.48	QP	7.44	18.03	25.47	69.54	-44.07
Coaxial	21.10	QP	6.57	14.85	21.42	69.54	-48.12

Remark: Corr. Factor = Antenna Factor + Cable Loss - PreAmplifier Gain

### 7.7.2 Measurement results: frequencies below 1 GHz

The test was performed on EUT under 802.11b/g/n continuously transmitting mode. The worst case occurred at chain 0: 802.11g channel 1 Chain1.

EUT : WiFiHU2s-a  
Worst Case : 802.11g channel 1 Chain1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBμV)	Corrected Level (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Vertical	258.35	QP	16.04	16.92	32.96	46.00	-13.04
Vertical	431.96	QP	20.73	23.00	33.23	46.00	-12.77
Vertical	499.90	QP	22.03	23.00	35.64	46.00	-10.36
Vertical	518.77	QP	22.40	23.00	35.70	46.00	-10.30
Vertical	565.95	QP	23.42	23.00	36.14	46.00	-9.86
Vertical	798.07	QP	27.28	23.00	37.71	46.00	-8.29
Horizontal	258.36	QP	17.18	23.00	33.83	46.00	-12.17
Horizontal	388.56	QP	19.46	23.00	32.80	46.00	-13.20
Horizontal	481.03	QP	21.09	23.00	36.74	46.00	-9.26
Horizontal	565.95	QP	22.57	23.00	36.31	46.00	-9.69
Horizontal	699.94	QP	24.92	23.00	37.58	46.00	-8.42
Horizontal	799.96	QP	26.68	21.00	38.69	46.00	-7.31

Remark: Corr. Factor = Antenna Factor + Cable Loss

EUT : WiFiHU2s-c  
Worst Case : 802.11g channel 1 Chain1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBμV)	Corrected Level (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Vertical	365.91	QP	19.11	9.61	28.72	46.00	-17.28
Vertical	431.96	QP	20.73	23.00	33.08	46.00	-12.92
Vertical	499.90	QP	22.03	23.00	35.74	46.00	-10.26
Vertical	565.95	QP	23.42	23.00	38.98	46.00	-7.02
Vertical	632.00	QP	24.55	23.00	37.64	46.00	-8.36
Vertical	698.05	QP	25.66	23.00	37.87	46.00	-8.13
Horizontal	365.91	QP	19.07	23.00	38.85	46.00	-7.15
Horizontal	431.96	QP	20.22	23.00	34.54	46.00	-11.46
Horizontal	499.90	QP	21.42	23.00	34.12	46.00	-11.88
Horizontal	564.07	QP	22.54	23.00	35.66	46.00	-10.34
Horizontal	632.00	QP	23.73	23.00	36.95	46.00	-9.05
Horizontal	698.05	QP	24.89	21.00	38.06	46.00	-7.94

Remark: Corr. Factor = Antenna Factor + Cable Loss

### 7.7.3 Measurement results: frequency above 1GHz

EUT : WiFiHU2s-a

Mode	Frequency	Spectrum	Ant.	Preamp.	Correction	Reading	Corrected	Limit	Margin
	(MHz)	Analyzer Detector	Pol. (H/V)	Gain (dB)	Factor (dB/m)	(dBμV)	Reading (dBμV/m)	@ 3 m (dBμV/m)	
802.11b, Ch1,2412MHz	4824	PK	V	40.10	-0.04	54.74	54.70	74.00	-19.30
	4824	AV	V	40.10	-0.04	52.94	52.90	54.00	-1.10
	4824	PK	H	40.10	-0.04	48.24	48.20	74.00	-25.80
802.11b, Ch6,2437MHz	4874	PK	V	40.00	0.13	53.88	54.01	74.00	-19.99
	4874	AV	V	40.00	0.13	51.98	52.11	54.00	-1.89
	4874	PK	H	40.00	0.13	46.75	46.88	74.00	-27.12
802.11b, Ch11,2462MHz	4924	PK	V	39.91	0.30	52.63	52.93	74.00	-21.07
	4924	PK	H	39.91	0.30	47.33	47.63	74.00	-26.37
802.11g, Ch1,2412MHz, chain0	4824	PK	V	40.10	-0.04	53.98	53.94	74.00	-20.06
	4824	AV	V	40.10	-0.04	43.42	43.38	54.00	-10.62
	4824	PK	H	40.10	-0.04	47.91	47.87	74.00	-26.13
802.11g, Ch6,2437MHz, chain0	4874	PK	V	40.00	0.13	54.73	54.86	74.00	-19.14
	4874	AV	V	40.00	0.13	44.79	44.92	54.00	-9.08
	4874	PK	H	40.00	0.13	46.59	46.72	74.00	-27.28
802.11g, Ch11,2462MHz, chain0	4924	PK	V	39.91	0.30	54.55	54.85	74.00	-19.15
	4924	AV	V	39.91	0.30	44.78	45.08	54.00	-8.92
	4924	PK	H	39.91	0.30	46.42	46.72	74.00	-27.28
802.11g, Ch1,2412MHz, chain1	4824	PK	V	40.10	-0.04	50.61	50.57	74.00	-23.43
	7236	PK	V	38.08	8.19	51.00	59.19	74.00	-14.81
	7236	AV	V	38.08	8.19	38.36	46.55	54.00	-7.45
	4824	PK	H	40.10	-0.04	45.92	45.88	74.00	-28.12
	7236	PK	H	38.08	8.19	47.15	55.34	74.00	-18.66
	7236	AV	H	38.08	8.19	34.38	42.57	54.00	-11.43
802.11g, Ch6,2437MHz, chain1	4874	PK	V	40.00	0.13	51.49	51.62	74.00	-22.38
	7311	PK	V	38.02	8.42	48.48	56.90	74.00	-17.10
	7311	AV	V	38.02	8.42	35.83	44.25	54.00	-9.75
	4874	PK	H	40.00	0.13	47.18	47.31	74.00	-26.69



Mode	Frequency	Spectrum	Ant.	Preamp.	Correction	Reading	Corrected	Limit	Margin
	(MHz)	Analyzer Detector	Pol. (H/V)	Gain (dB)	Factor (dB/m)	(dBμV)	Reading (dBμV/m)	@ 3 m (dBμV/m)	(dB)
802.11g, Ch11,2462MHz, chain1	4924	PK	V	39.91	0.30	51.50	51.80	74.00	-22.20
	7386	PK	V	37.96	8.66	49.22	57.88	74.00	-16.12
	7386	AV	V	37.96	8.66	36.45	45.11	54.00	-8.89
	4924	PK	H	39.91	0.30	46.67	46.97	74.00	-27.03
802.11n (HT20), Ch1,2412MHz	4824	PK	V	40.10	-0.04	50.71	50.67	74.00	-23.33
	7236	PK	V	38.08	8.19	47.20	55.39	74.00	-18.61
	7236	AV	V	38.08	8.19	36.37	44.56	54.00	-9.44
	4824	PK	H	40.10	-0.04	45.72	45.68	74.00	-28.32
802.11n (HT20), Ch6,2437MHz	4874	PK	V	40.00	0.13	48.82	48.95	74.00	-25.05
	7311	PK	V	38.02	8.42	48.12	56.54	74.00	-17.46
	7311	AV	V	38.02	8.42	37.30	45.72	54.00	-8.28
	4874	PK	H	40.00	0.13	45.00	45.13	74.00	-28.87
802.11n (HT20), Ch11,2462MHz	4924	PK	V	39.91	0.30	49.55	49.85	74.00	-24.15
	4924	PK	H	39.91	0.30	45.41	45.71	74.00	-28.29
802.11n(HT40) , Ch 3, 2422MHz	4844	PK	V	40.06	0.03	46.00	46.03	74.00	-27.97
	4844	PK	H	40.06	0.03	44.59	44.62	74.00	-29.38
802.11n(HT40), Ch 6, 2437MHz	4874	PK	V	40.00	0.13	45.61	45.74	74.00	-28.26
	4874	PK	H	40.00	0.13	44.17	44.30	74.00	-29.70
802.11n(HT40), Ch 9, 2452MHz	4904	PK	V	39.95	0.23	46.09	46.32	74.00	-27.68
	4904	PK	H	39.95	0.23	45.06	45.29	74.00	-28.71

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre\_Amplifier Gain

EUT : WiFiHU2s-c

Mode	Freq.	Spectrum	Ant.	Preamp.	Correction	Reading	Corrected	Limit	Margin
	(MHz)	Analyzer Detector	Pol. (H/V)	Gain (dB)	Factor (dB/m)	(dBμV)	Reading (dBμV/m)	@ 3 m (dBμV/m)	(dB)
802.11b, Ch1, 2412MHz	4824	PK	V	40.10	-0.04	55.11	55.07	74.00	-18.93
	4824	AV	V	40.10	-0.04	52.52	52.48	54.00	-1.52
	4824	PK	H	40.10	-0.04	48.90	48.86	74.00	-25.14
802.11b, Ch6,2437MHz	4874	PK	V	40.00	0.13	55.19	55.32	74.00	-18.68
	4874	AV	V	40.00	0.13	52.02	52.15	54.00	-1.85
	4874	PK	H	40.00	0.13	48.88	49.01	74.00	-24.99
802.11b, Ch11,2462MHz	4924	PK	V	39.91	0.30	55.04	55.34	74.00	-18.66
	4924	AV	V	39.91	0.30	52.48	52.78	54.00	-1.22
	4924	PK	H	39.91	0.30	47.20	47.50	74.00	-26.50
802.11g, Ch1, 2412MHz, chain0	4824	PK	V	40.10	-0.04	51.66	51.62	74.00	-22.38
	4824	PK	H	40.10	-0.04	46.16	46.12	74.00	-27.88
802.11g, Ch6, 2437MHz, chain0	4874	PK	V	40.00	0.13	52.61	52.74	74.00	-21.26
	4874	PK	H	40.00	0.13	46.39	46.52	74.00	-27.48
802.11g, Ch11, 2462MHz, chain0	4924	PK	V	39.91	0.30	52.54	52.84	74.00	-21.16
	4924	PK	H	39.91	0.30	47.32	47.62	74.00	-26.38
802.11g, Ch1, 2412MHz, chain1	4824	PK	V	40.10	-0.04	49.03	48.99	74.00	-25.01
	4824	PK	H	40.10	-0.04	46.57	46.53	74.00	-27.47
802.11g, Ch6, 2437MHz, chain1	4874	PK	V	40.00	0.13	49.04	49.17	74.00	-24.83
	4874	PK	H	40.00	0.13	45.78	45.91	74.00	-28.09
802.11g, Ch11, 2462MHz, chain1	4924	PK	V	39.91	0.30	50.18	50.48	74.00	-23.52
	4924	PK	H	39.91	0.30	45.57	45.87	74.00	-28.13
802.11n (HT20), Ch1,2412MHz	4824	PK	V	40.10	-0.04	47.33	47.29	74.00	-26.71
	4824	PK	H	40.10	-0.04	45.80	45.76	74.00	-28.24
802.11n (HT20), Ch6,2437MHz	4874	PK	V	40.00	0.13	48.89	49.02	74.00	-24.98
	4874	PK	H	40.00	0.13	46.16	46.29	74.00	-27.71
802.11n (HT20), Ch11,2462MHz	4924	PK	V	39.91	0.30	49.71	50.01	74.00	-23.99
	4924	PK	H	39.91	0.30	46.57	46.87	74.00	-27.13

Mode	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11n(HT40) , Ch 3, 2422MHz	4844	PK	V	40.06	0.03	47.16	47.19	74.00	-26.81
	4844	PK	H	40.06	0.03	46.40	46.43	74.00	-27.57
802.11n(HT40), Ch 6, 2437MHz	4874	PK	V	40.00	0.13	45.37	45.50	74.00	-28.50
	4874	PK	H	40.00	0.13	44.37	44.50	74.00	-29.50
802.11n(HT40), Ch 9, 2452MHz	4904	PK	V	39.95	0.23	46.89	47.12	74.00	-26.88
	4904	PK	H	39.95	0.23	46.45	46.68	74.00	-27.32

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss -  
 Pre\_Amplifier Gain

## 8. Emission On Band Edge

### 8.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.247(d), 15.205,	

### 8.2 Measuring instrument setting

Spectrum analyzer settings	
Spectrum Analyzer function	Setting
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Restrict bands	2310~2390MHz
	2483.5 ~2500MHz
Attenuation	Auto

### 8.3 Test procedure

The test procedure is the same as clause 7.4

### 8.4 Test results

For WiFiHU2s-a:

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11b	2387.76	PK	V	33.84	25.94	59.78	74	-14.22	2310~2390
	2390.00	AV	V	33.85	12.50	46.35	54	-7.65	
	2489.84	PK	V	34.33	25.47	59.80	74	-14.20	2483.5~2500
	2483.50	AV	V	34.30	12.45	46.75	54	-7.25	
802.11g, chain0	2390.00	PK	V	33.85	38.29	72.14	74	-1.86	2310~2390
	2390.00	AV	V	33.85	18.68	52.53	54	-1.47	
	2483.50	PK	V	34.30	34.46	68.76	74	-5.24	2483.5~2500
	2483.50	AV	V	34.30	18.34	52.64	54	-1.36	
802.11g, chain1	2390.00	PK	V	33.85	38.79	72.64	74	-1.36	2310~2390
	2390.00	AV	V	33.85	19.03	52.88	54	-1.12	
	2483.62	PK	V	34.30	35.81	70.11	74	-3.89	2483.5~2500
	2483.50	AV	V	34.30	18.32	52.62	54	-1.38	
802.11n (HT20)	2390.00	PK	V	33.85	33.49	67.34	74	-6.66	2310~2390
	2390.00	AV	V	33.85	18.59	52.44	54	-1.56	
	2484.58	PK	V	34.31	33.77	68.08	74	-5.92	2483.5~2500
	2483.50	AV	V	34.30	18.30	52.60	54	-1.40	
802.11n (HT40)	2483.84	PK	V	34.30	32.01	66.31	74	-7.69	2310~2390
	2390.00	AV	V	33.85	17.65	51.50	54	-2.50	
	2488.10	PK	V	34.32	26.96	61.28	74	-12.72	2483.5~2500
	2483.50	AV	V	34.30	13.92	48.22	54	-5.78	

For WiFiHU2s-c:

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11b	2332.08	PK	V	33.57	27.01	60.58	74	-13.42	2310~2390
	2390.00	AV	V	33.85	12.82	46.67	54	-7.33	
	2484.82	PK	V	34.31	26.18	60.49	74	-13.51	2483.5~2500
	2483.50	AV	V	34.30	13.34	47.64	54	-6.36	
802.11g, chain0	2390.00	PK	V	33.85	32.63	66.48	74	-7.52	2310~2390
	2390.00	AV	V	33.85	15.54	49.39	54	-4.61	
	2484.10	PK	V	34.30	34.12	68.42	74	-5.58	2483.5~2500
	2483.50	AV	V	34.30	17.00	51.30	54	-2.70	
802.11g, chain1	2389.74	PK	V	33.85	36.91	70.76	74	-3.24	2310~2390
	2390.00	AV	V	33.85	18.08	51.93	54	-2.07	
	2483.98	PK	V	34.30	35.33	69.63	74	-4.37	2483.5~2500
	2483.50	AV	V	34.30	18.34	52.64	54	-1.36	
802.11n (HT20)	2390.00	PK	V	33.85	27.93	61.78	74	-12.22	2310~2390
	2390.00	AV	V	33.85	14.02	47.87	54	-6.13	
	2483.98	PK	V	34.30	33.68	67.98	74	-6.02	2483.5~2500
	2483.50	AV	V	34.30	18.03	52.33	54	-1.67	
802.11n (HT40)	2388.30	PK	V	33.84	29.19	63.03	74	-10.97	2310~2390
	2390.00	AV	V	33.85	15.31	49.16	54	-4.84	
	2483.78	PK	V	34.30	33.36	67.66	74	-6.34	2483.5~2500
	2483.50	AV	V	34.30	18.15	52.45	54	-1.55	

## 9. AC Power Line Conducted Emission

### 9.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Test Voltage	120V, 60Hz	
Requirement	15.207	
Date of test	Jun. 01, 2015	

### 9.2 Limit for AC power line conducted emission

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

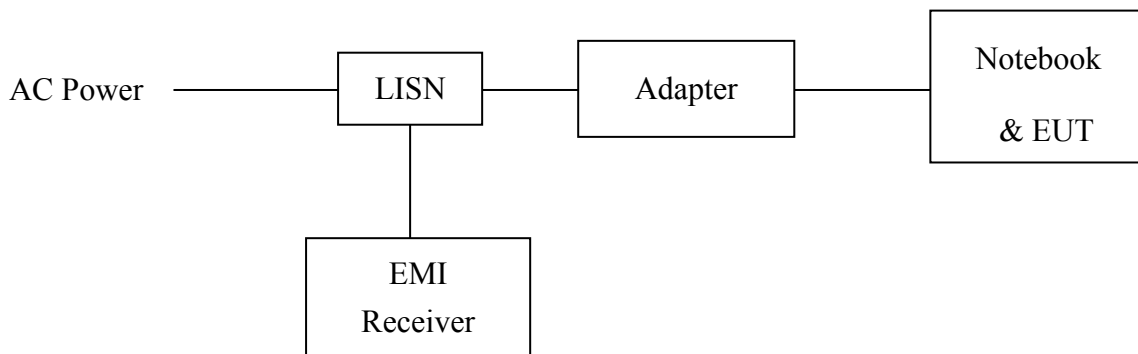
### 9.3 Measuring instrument setting

Receiver settings	
Receiver function	Setting
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

#### 9.4 Test procedure

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
3. All the companion devices are connected to the other LISN. The LISN should provide 50U<sub>h</sub>/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30MHz was searched
5. Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
6. The measurement has to be done between each power line and ground at the power terminal.

#### 9.5 Test diagram



**Note:** The EUT was tested while in normal communication mode.



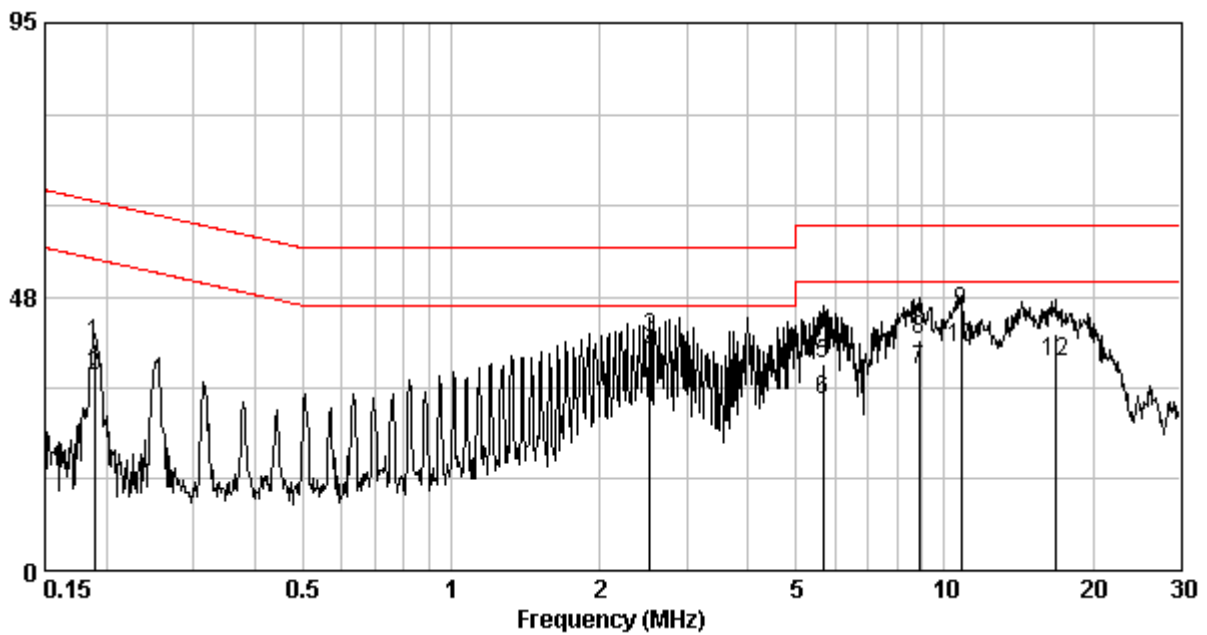
## 9.6 Test results

Phase : Line  
EUT : WiFiHU2s-a

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit Qp (dB)	Over Limit Av (dB)
0.189	9.74	39.37	64.06	33.71	54.06	-24.69	-20.35
2.527	9.85	40.37	56.00	37.59	46.00	-15.63	-8.41
5.683	9.87	35.95	60.00	29.54	50.00	-24.05	-20.46
8.869	9.89	39.89	60.00	34.64	50.00	-20.11	-15.36
10.790	9.90	45.03	60.00	38.79	50.00	-14.97	-11.21
16.839	9.88	41.22	60.00	36.04	50.00	-18.78	-13.96

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

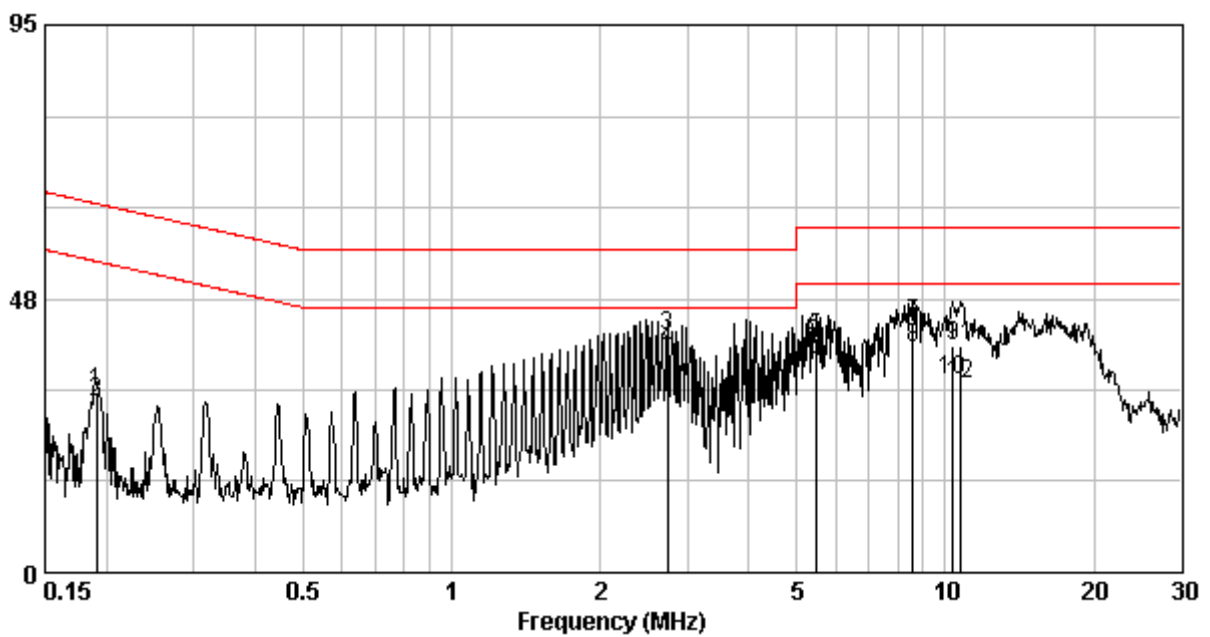


Phase : Neutral  
EUT : WiFiHU2s-a

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB)	
						Qp	Av
0.190	9.74	31.42	64.02	29.42	54.02	-32.60	-24.60
2.736	9.85	40.91	56.00	38.75	46.00	-15.09	-7.25
5.476	9.88	40.78	60.00	36.92	50.00	-19.22	-13.08
8.592	9.92	43.26	60.00	38.89	50.00	-16.74	-11.11
10.342	9.93	39.49	60.00	33.53	50.00	-20.51	-16.47
10.733	9.93	39.48	60.00	32.65	50.00	-20.52	-17.35

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

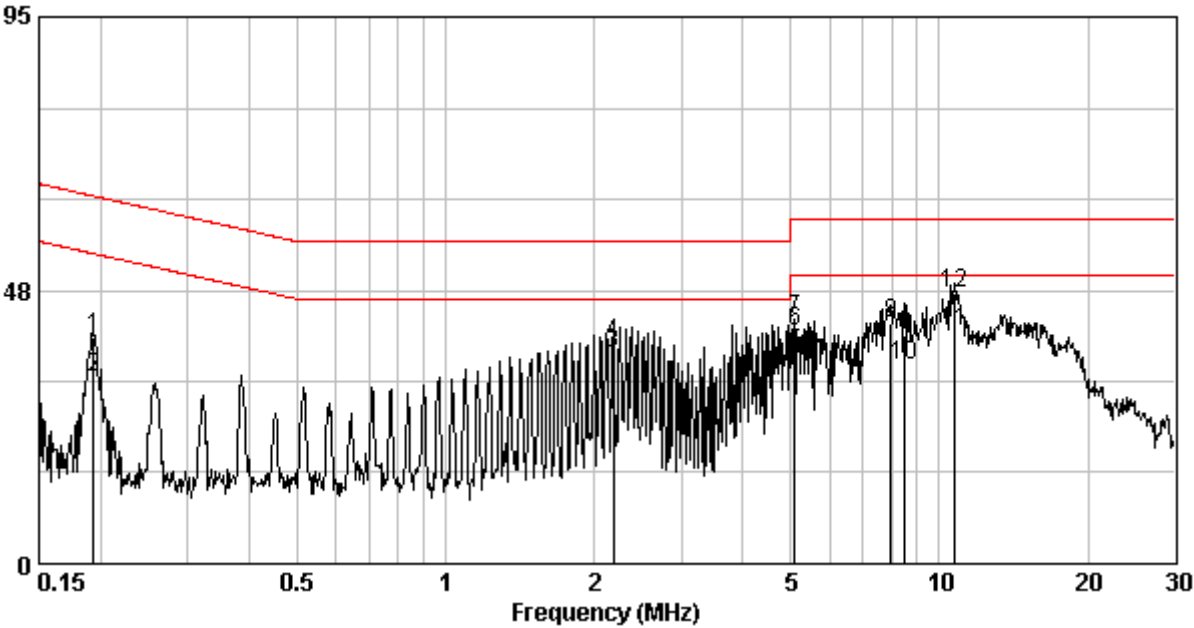


Phase : Line  
 EUT : WiFiHU2s-c

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit Qp (dB)	Over Limit Av (dB)
0.193	9.74	39.45	63.89	32.29	53.89	-24.43	-21.60
2.190	9.85	38.41	56.00	36.41	46.00	-17.59	-9.59
5.085	9.86	40.34	60.00	36.58	50.00	-19.66	-13.42
5.085	9.86	0.00	0.00	0.00	0.00	0.00	0.00
7.977	9.89	41.70	60.00	0.00	0.00	-18.30	0.00
8.501	9.89	39.51	60.00	34.38	50.00	-20.49	-15.62
10.733	9.90	46.88	60.00	40.51	50.00	-13.12	-9.49

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

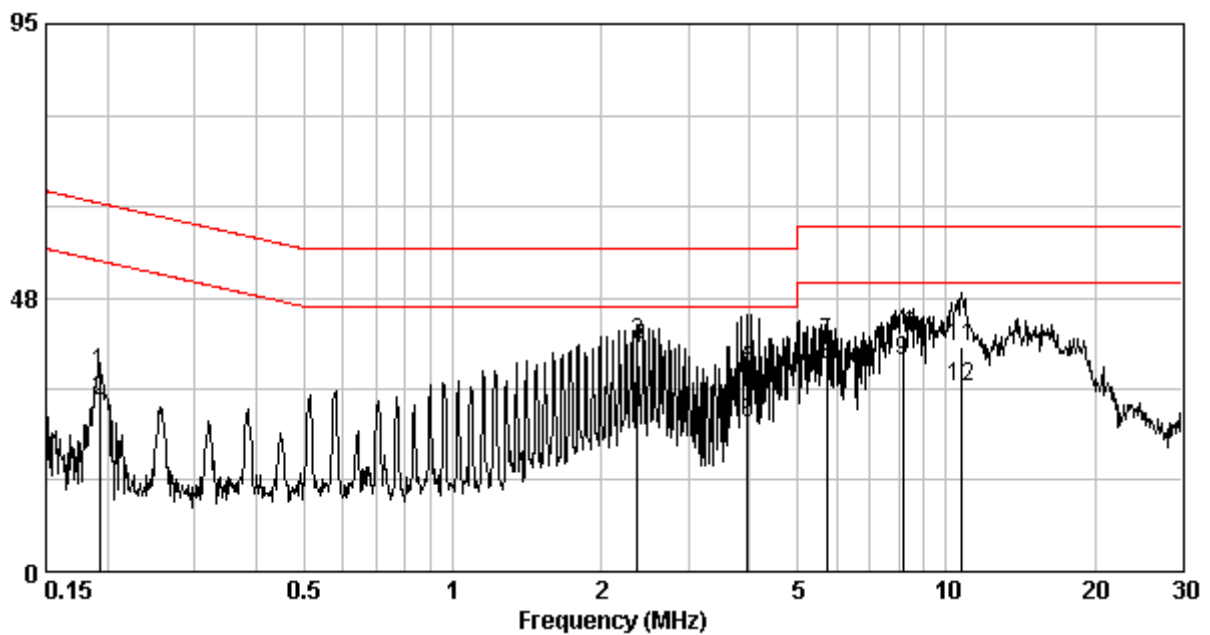


Phase : Neutral  
EUT : WiFiHU2s-c

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit Qp (dB)	Over Limit Av (dB)
0.192	9.74	34.55	63.93	29.71	53.93	-29.38	-24.22
2.371	9.85	39.71	56.00	38.56	46.00	-16.29	-7.44
3.964	9.86	34.74	56.00	25.67	46.00	-21.26	-20.33
5.713	9.89	39.77	60.00	35.83	50.00	-20.23	-14.17
8.148	9.91	40.55	60.00	36.46	50.00	-19.45	-13.54
10.733	9.93	38.91	60.00	32.03	50.00	-21.09	-17.97

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)



## Appendix A: Test equipment list

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2014/12/02	2015/12/01
Spectrum Analyzer	Rohde & Schwarz	FSP30	100137	2014/6/16	2015/06/15
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100186	2015/1/13	2016/01/13
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2014/08/29	2017/08/27
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2014/09/16	2017/09/14
Broadband Antenna	Schwarzbeck	VULB 9168	9168-172	2013/08/08	2015/08/07
Loop Antenna	RolfHeine	LA-285	02/10033	2014/3/18	2016/03/16
Pre-Amplifier	MITEQ	JS4-26004000--2 7-8A	828825	2014/09/15	2015/09/14
Power Meter	Anritsu	ML2495A	0844001	2014/11/12	2015/11/11
Power Sensor	Anritsu	MA2411B	0738452	2014/11/12	2015/11/11
Temperature & Humidity Test Chamber	TERCHY	MHU-225LRU (SA)	950838	2014/6/12	2015/06/11
Two-Line V-Network	Rohde & Schwarz	ESH3-Z5	838979/014	2014/10/05	2015/10/04
Signal Analyzer	Agilent	N9030A	MY51380492	2014/09/19	2015/09/18
966-2 (A) Cable	SUHNER	SMA / EX 100	N/A	2015/05/06	2016/05/04
966-2 (B) Cable	JUNFLON	SMA / J12J100880-00	AUG-26-08-002	2015/05/06	2016/05/04
RF Cable	SUHNER	SUCOFLEX 102	CB0006	2015/05/06	2016/05/04

## Appendix B: Measurement Uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of  $k=2$ .

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.15 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.23 dB
Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Vertically polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.19 dB
Horizontally polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	4.3 dB
Conducted Output power	0.86 dB
Radiated electromagnetic disturbances in the frequency range from 9kHz to 30MHz	2.92 dB
Conducted disturbance measurements at a mains port from 9 kHz to 30 MHz using a 50 $\Omega$ /50 $\mu$ H +5 $\Omega$ artificial mains network (AMN)	2.5dB