

## 6.4 Power Spectral Density

§15.247(e)

### Test Overview and Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

*The maximum permissible power spectral density is 8 dBm in any 3 kHz band.*

### Test Procedure Used

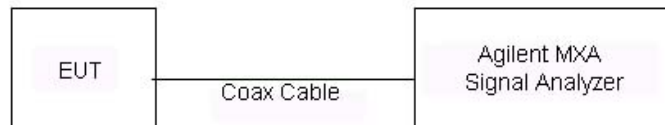
KDB 558074 v03r02 – Section 10.2 Method PKPSD  
 KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique

### Test Settings

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 10kHz
4. VBW = 1MHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-3. Test Instrument & Measurement Setup**

### Test Notes



None

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 42 of 121	

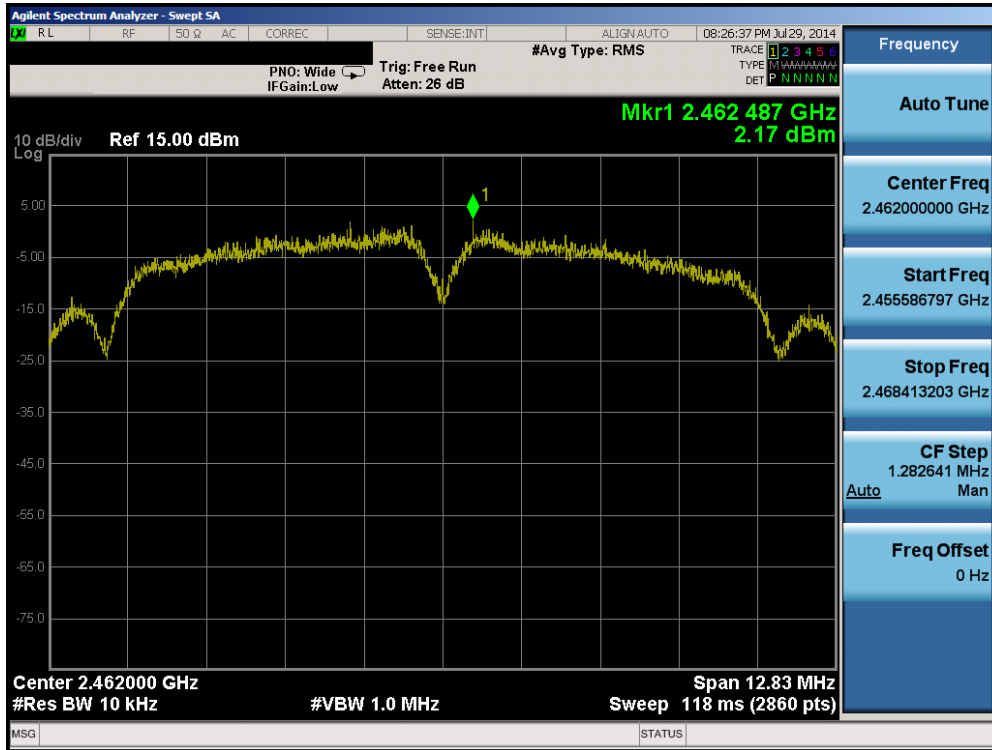
### Antenna-1 Power Spectral Density Measurements

Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	2.62	8.00	-5.38	Pass
2437	6	b	1	0.20	8.00	-7.80	Pass
2462	11	b	1	2.17	8.00	-5.83	Pass
2412	1	g	6	-7.24	8.00	-15.24	Pass
2437	6	g	6	-6.41	8.00	-14.41	Pass
2462	11	g	6	-5.79	8.00	-13.79	Pass
2412	1	n	6.5/7.2 (MCS0)	-7.90	8.00	-15.90	Pass
2437	6	n	6.5/7.2 (MCS0)	-5.71	8.00	-13.71	Pass
2462	11	n	6.5/7.2 (MCS0)	-4.95	8.00	-12.95	Pass
5745	149	a	6	-10.92	8.00	-18.92	Pass
5785	157	a	6	-10.06	8.00	-18.06	Pass
5825	165	a	6	-10.90	8.00	-18.90	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-11.31	8.00	-19.31	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-10.56	8.00	-18.56	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-9.79	8.00	-17.79	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	-12.67	8.00	-20.67	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	-12.29	8.00	-20.29	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-16.75	8.00	-24.75	Pass

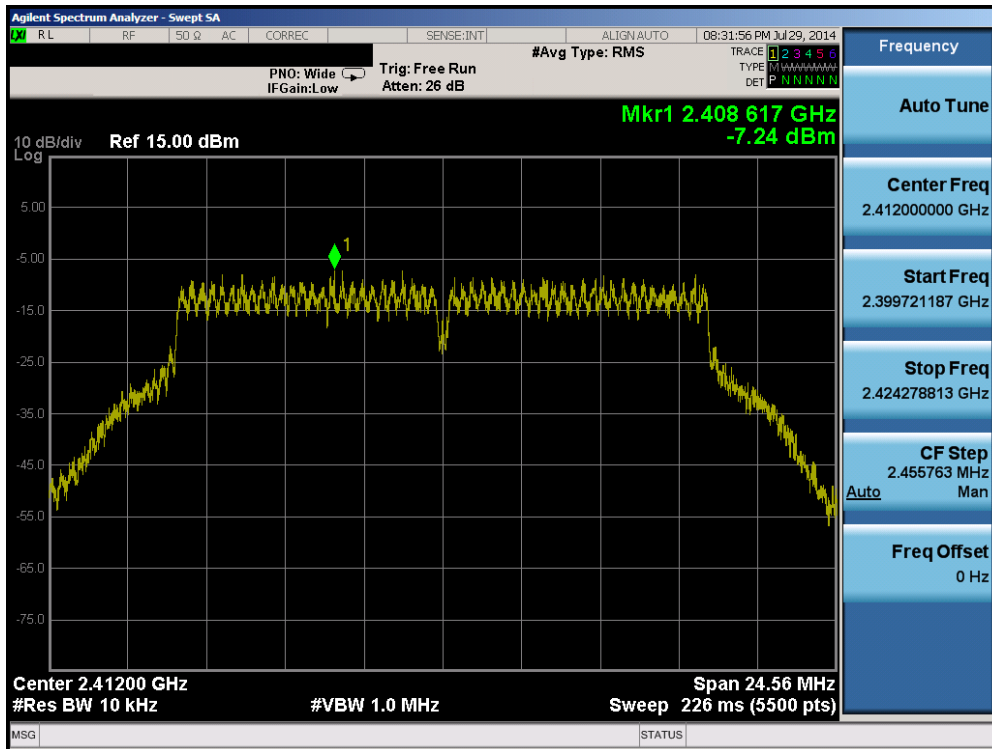
**Table 6-28. Conducted Power Density Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 43 of 121	







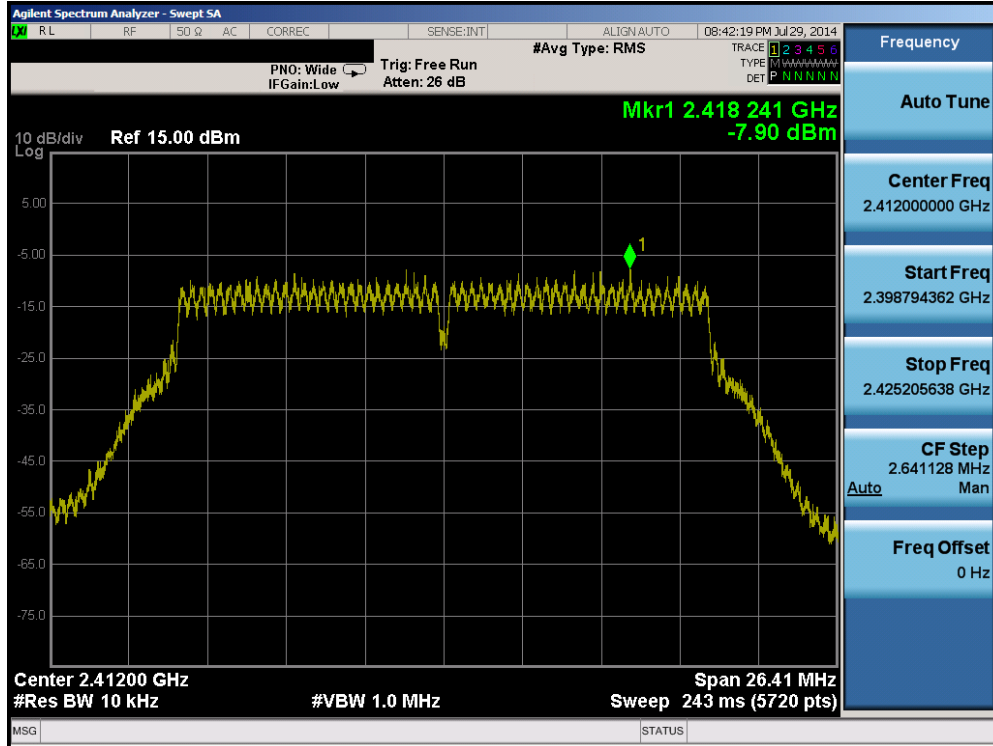
Plot 6-39. Power Spectral Density Plot (802.11b – Ch. 11)



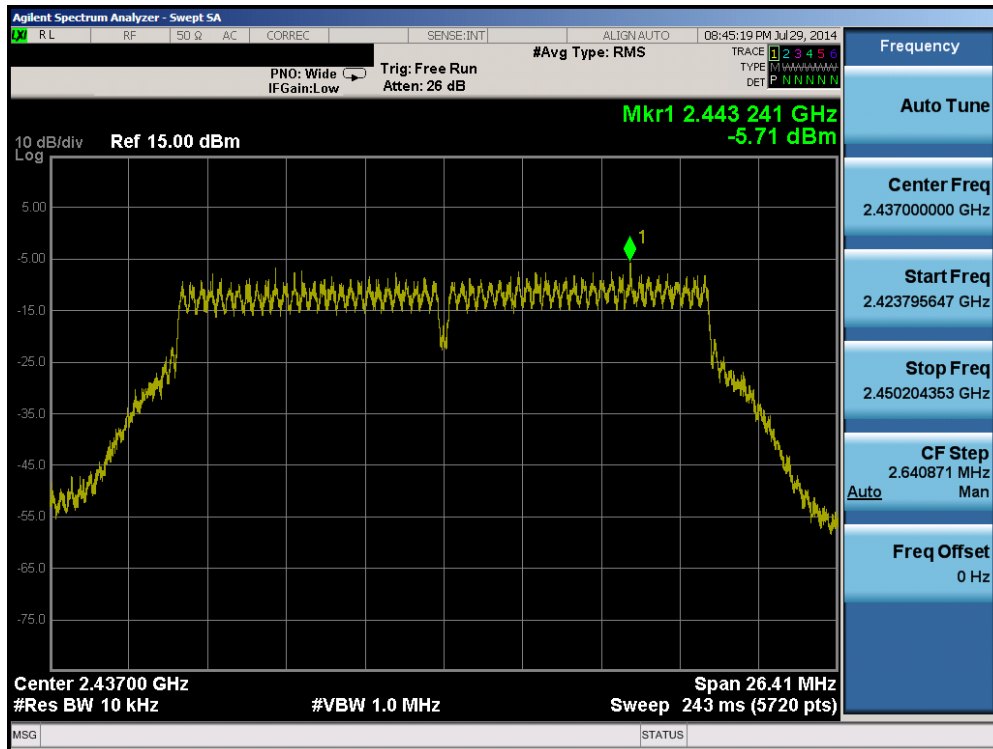
Plot 6-40. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 45 of 121



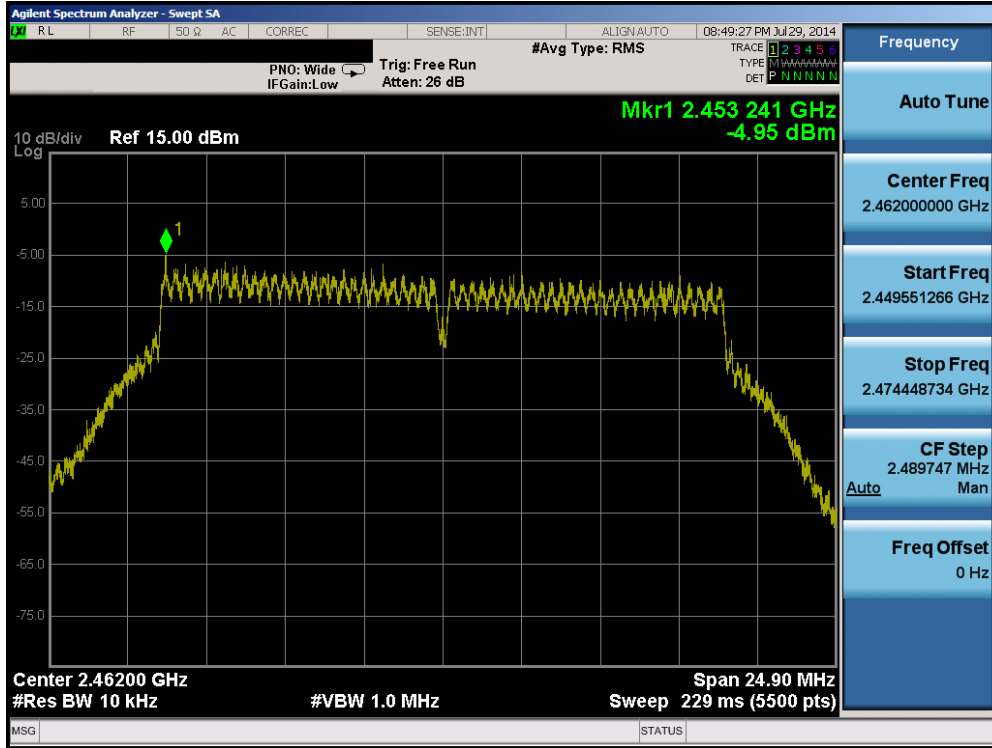


Plot 6-43. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)

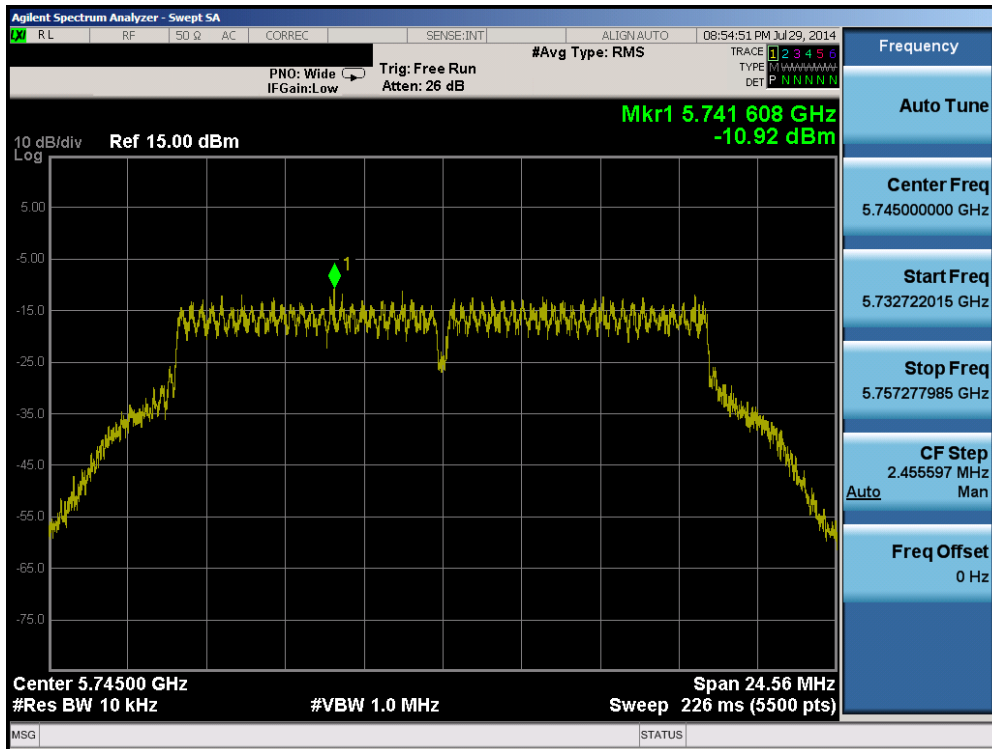


Plot 6-44. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 47 of 121

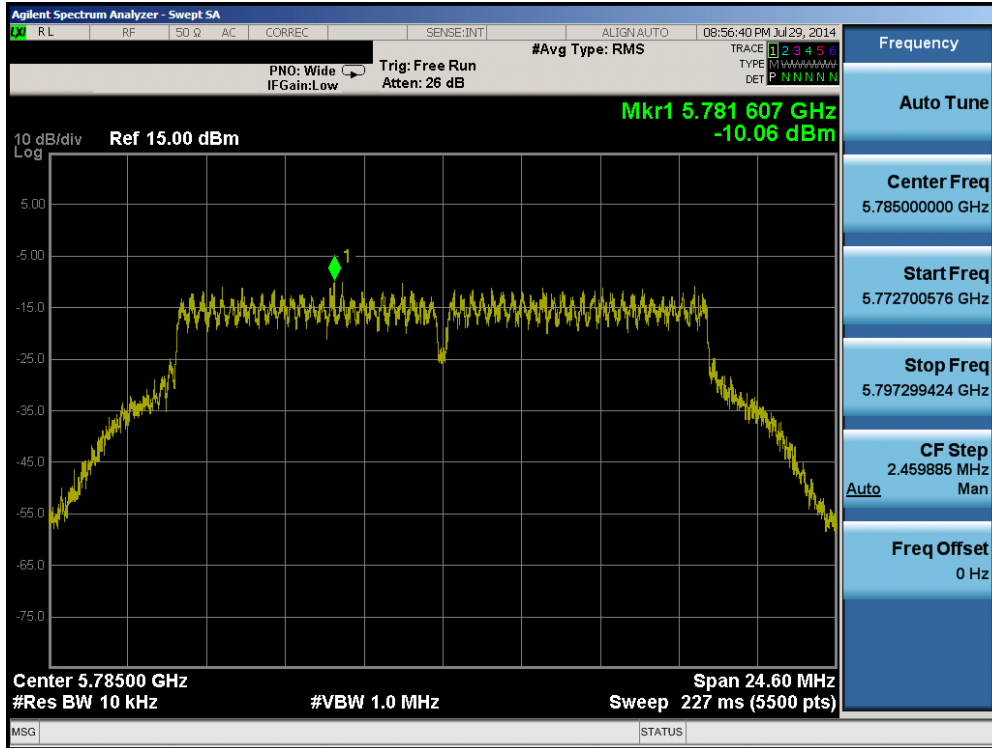


Plot 6-45. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)

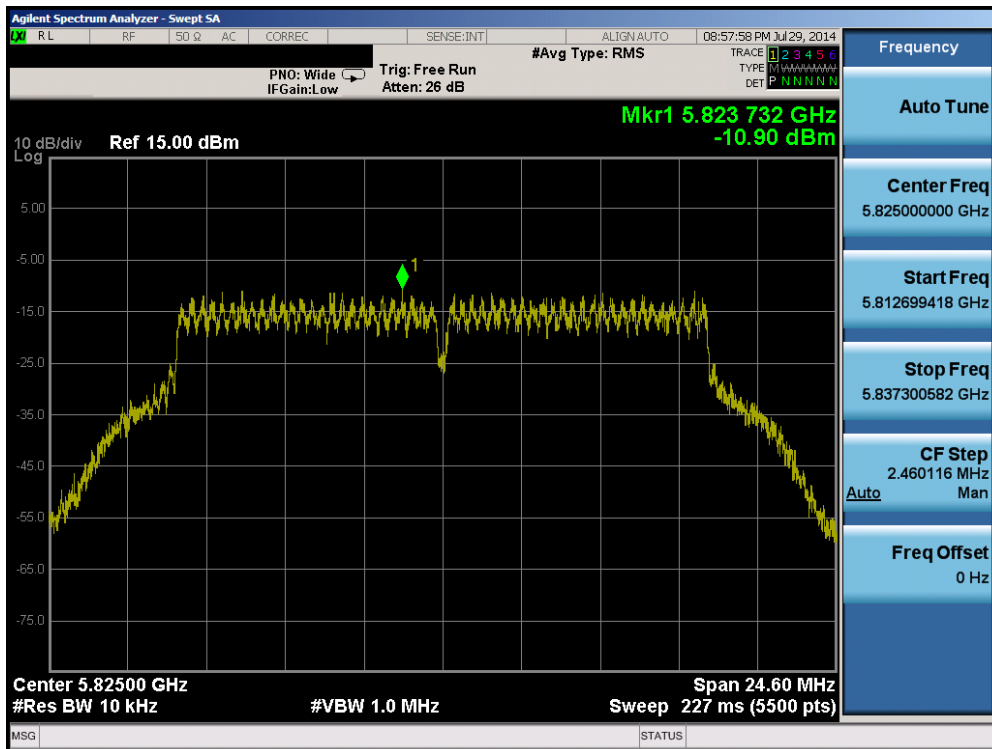


Plot 6-46. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 48 of 121



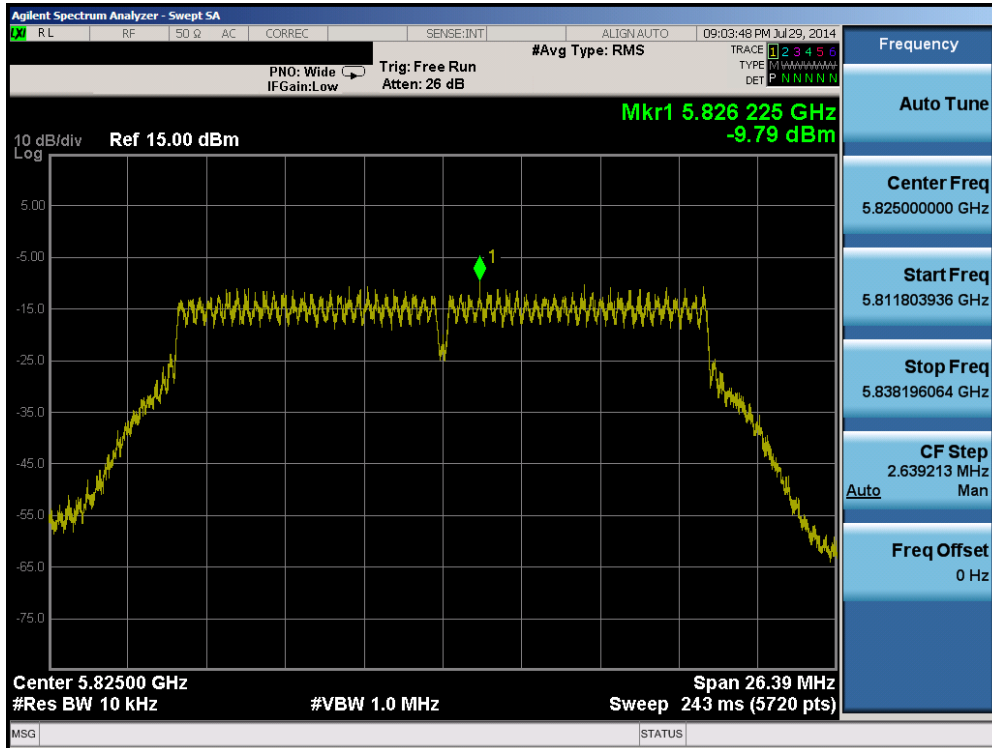
Plot 6-47. Power Spectral Density Plot (802.11a – Ch. 157)



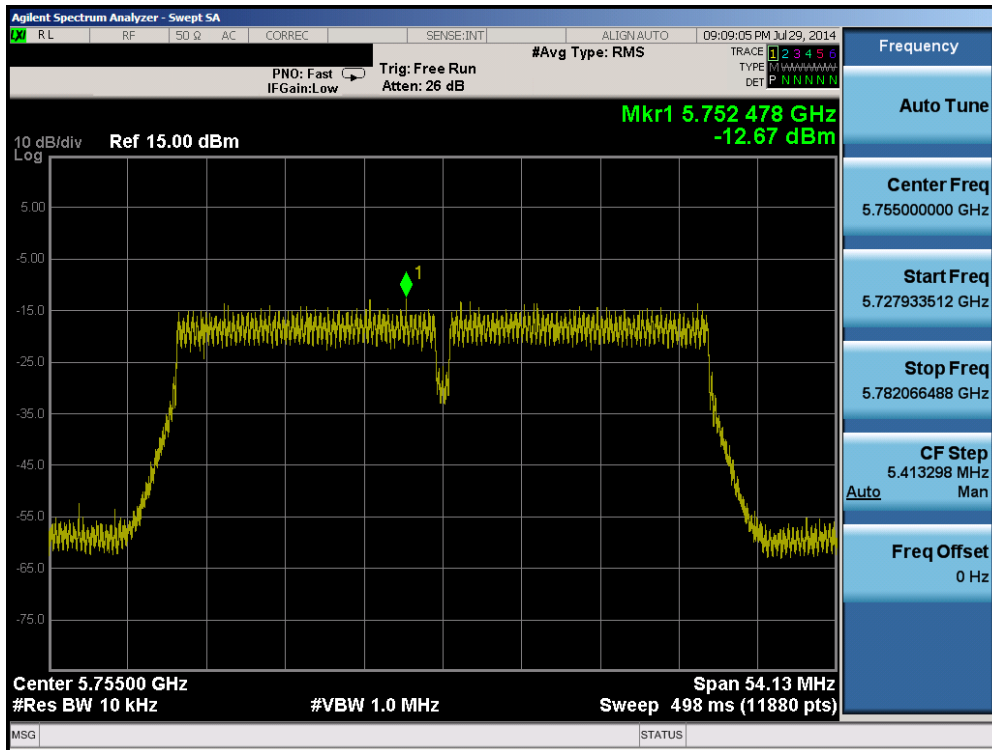
Plot 6-48. Power Spectral Density Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 49 of 121



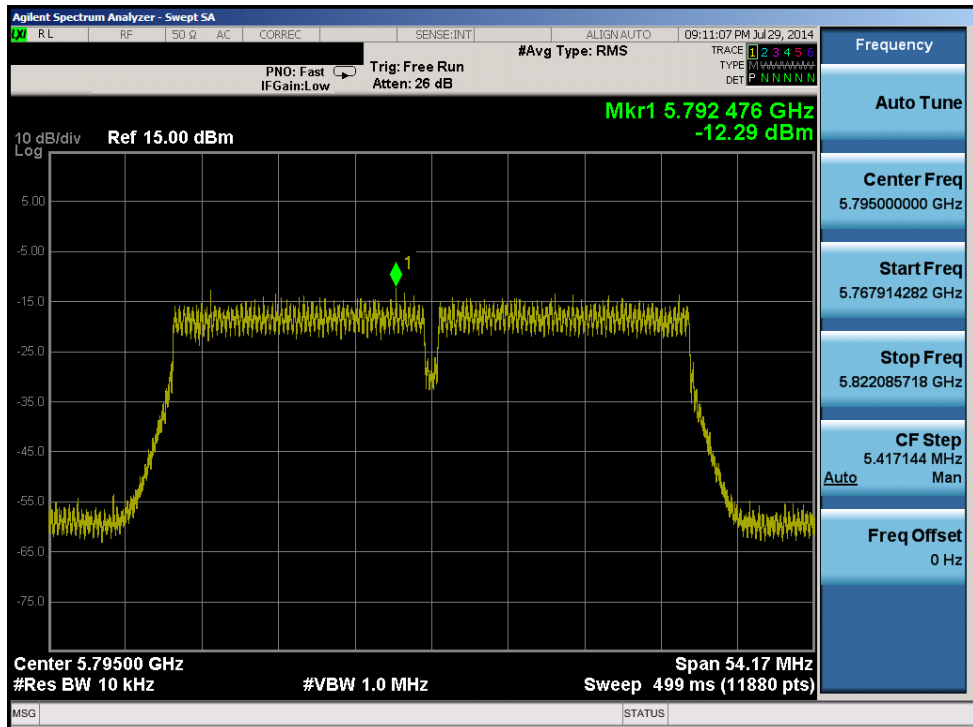


Plot 6-51. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

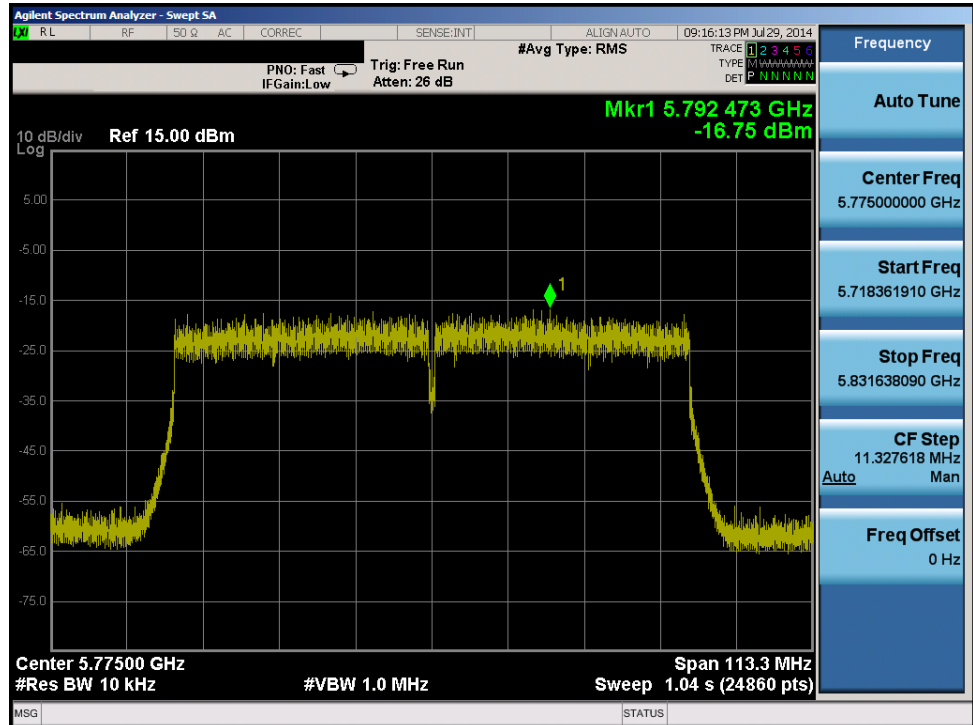


Plot 6-52. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 51 of 121



Plot 6-53. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)





Plot 6-54. Power Spectral Density Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

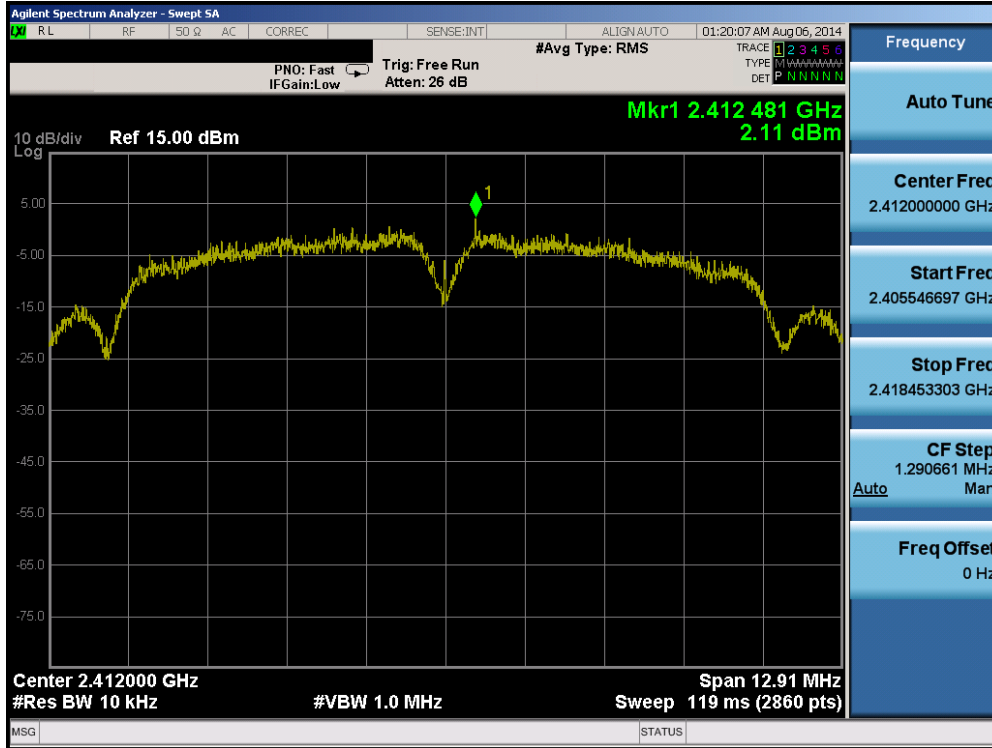
FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 52 of 121

## Antenna-2 Power Spectral Density Measurements

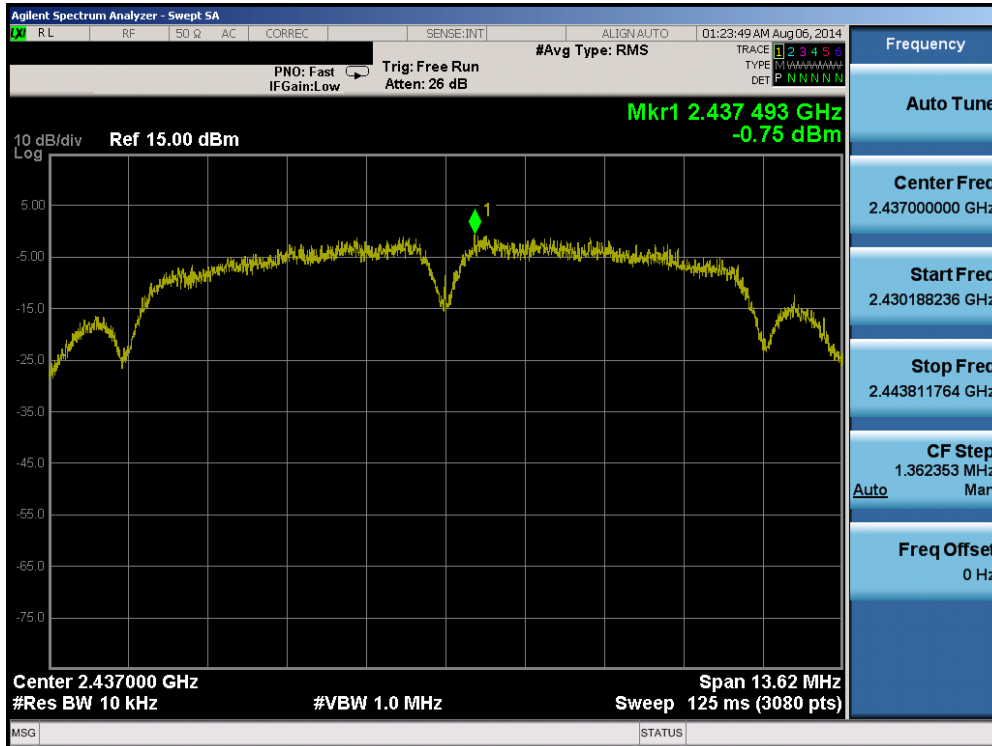
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	2.11	8.00	-5.90	Pass
2437	6	b	1	-0.75	8.00	-8.75	Pass
2462	11	b	1	-0.13	8.00	-8.13	Pass
2412	1	g	6	-6.82	8.00	-14.82	Pass
2437	6	g	6	-6.46	8.00	-14.46	Pass
2462	11	g	6	-6.59	8.00	-14.59	Pass
2412	1	n	6.5/7.2 (MCS0)	-7.25	8.00	-15.25	Pass
2437	6	n	6.5/7.2 (MCS0)	-7.08	8.00	-15.08	Pass
2462	11	n	6.5/7.2 (MCS0)	-7.70	8.00	-15.70	Pass
5745	149	a	6	-8.16	8.00	-16.16	Pass
5785	157	a	6	-8.05	8.00	-16.05	Pass
5825	165	a	6	-8.25	8.00	-16.25	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-7.46	8.00	-15.46	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-7.55	8.00	-15.55	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-8.86	8.00	-16.86	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	-10.14	8.00	-18.14	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	-9.37	8.00	-17.37	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-14.29	8.00	-22.29	Pass

**Table 6-29. Conducted Power Density Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 53 of 121	

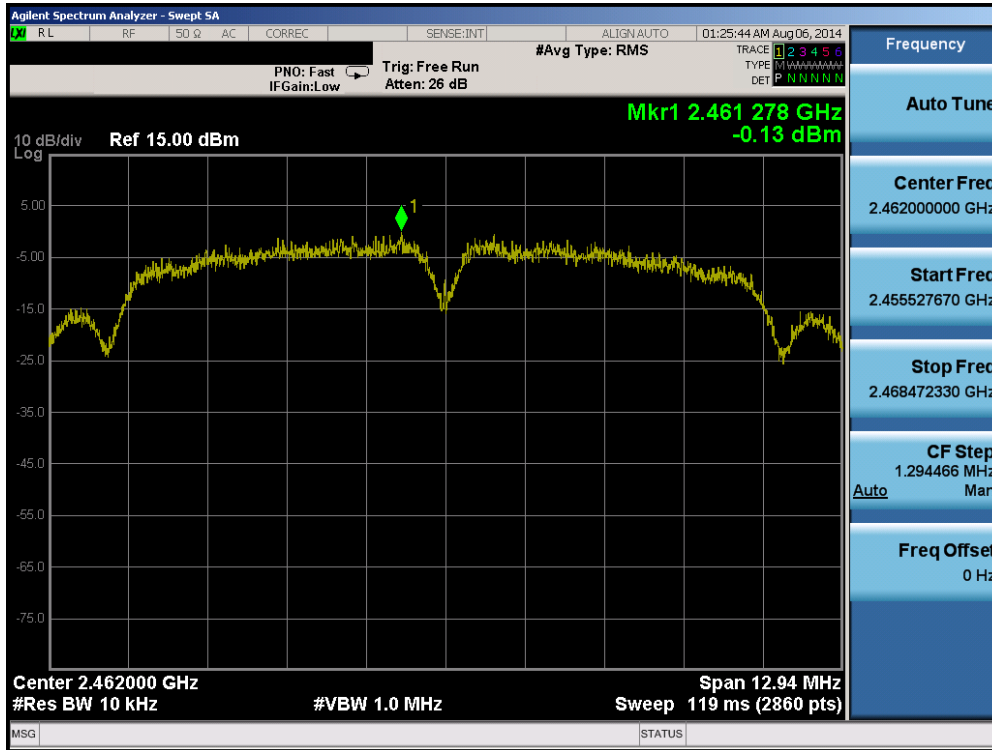


Plot 6-55. Power Spectral Density Plot (802.11b – Ch. 1)

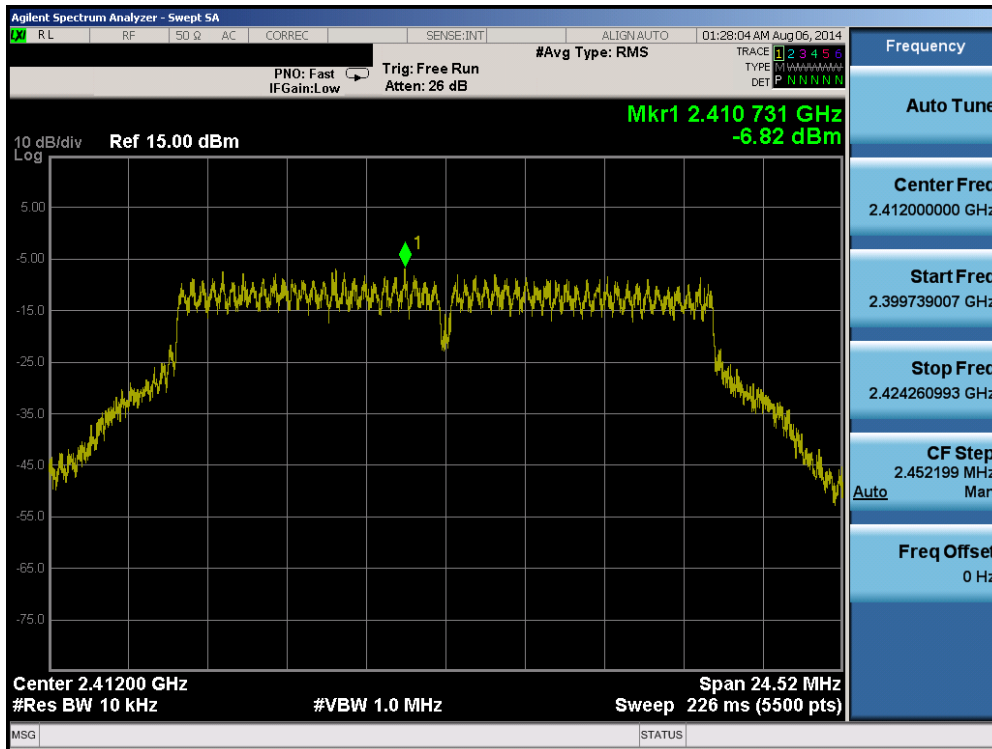


Plot 6-56. Power Spectral Density Plot (802.11b – Ch. 6)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 54 of 121

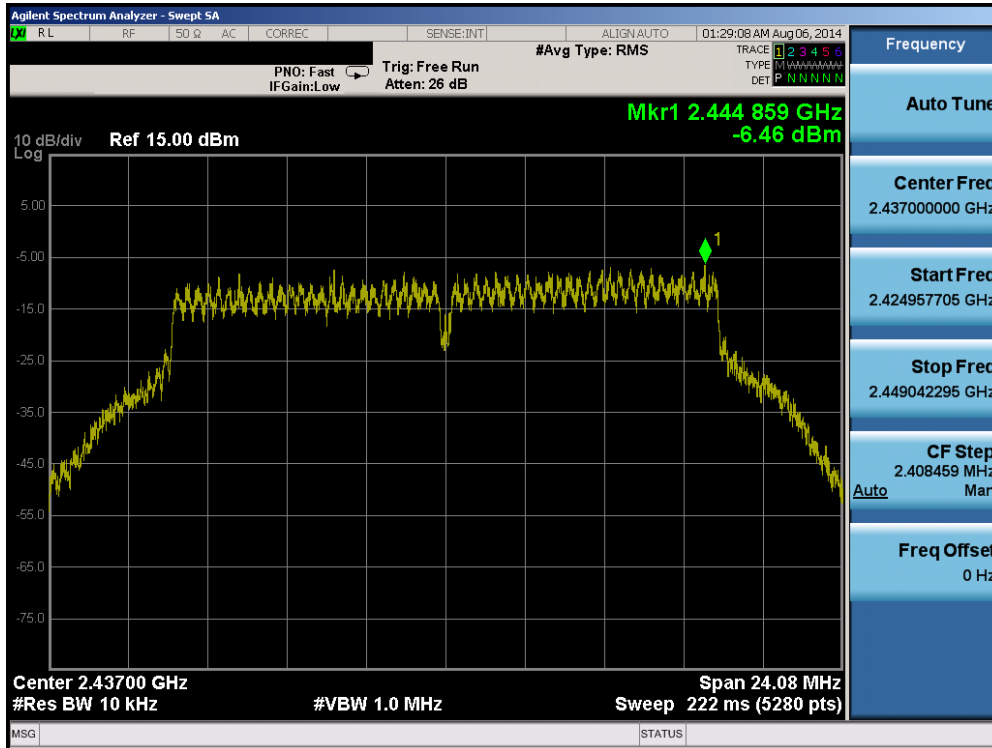


Plot 6-57. Power Spectral Density Plot (802.11b – Ch. 11)

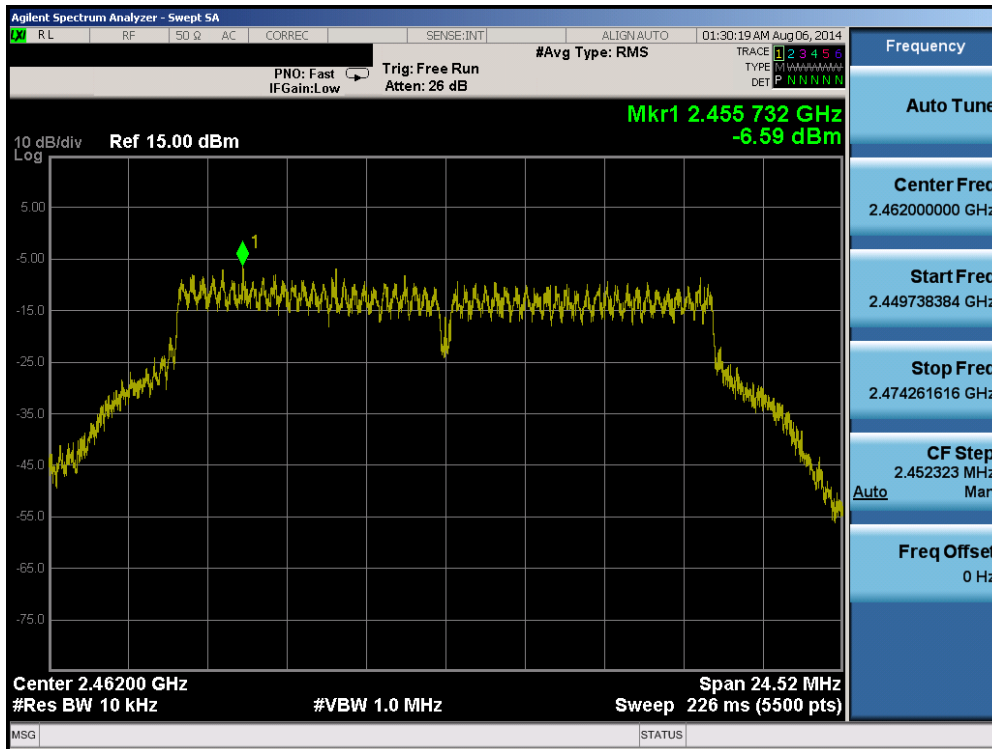


Plot 6-58. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 55 of 121

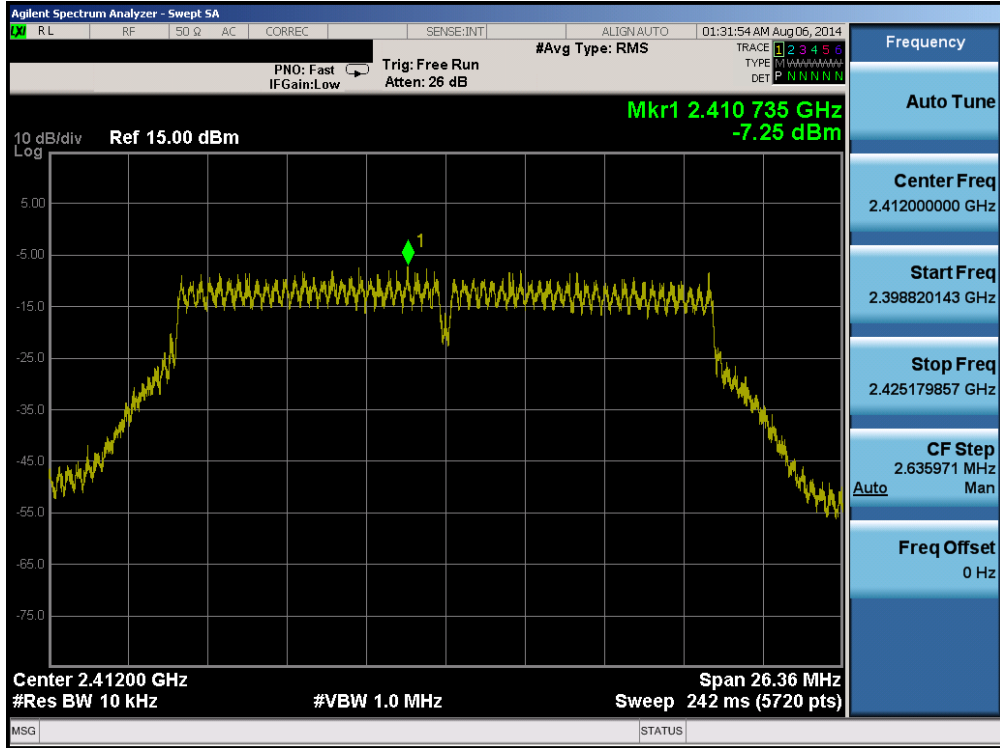


Plot 6-59. Power Spectral Density Plot (802.11g – Ch. 6)

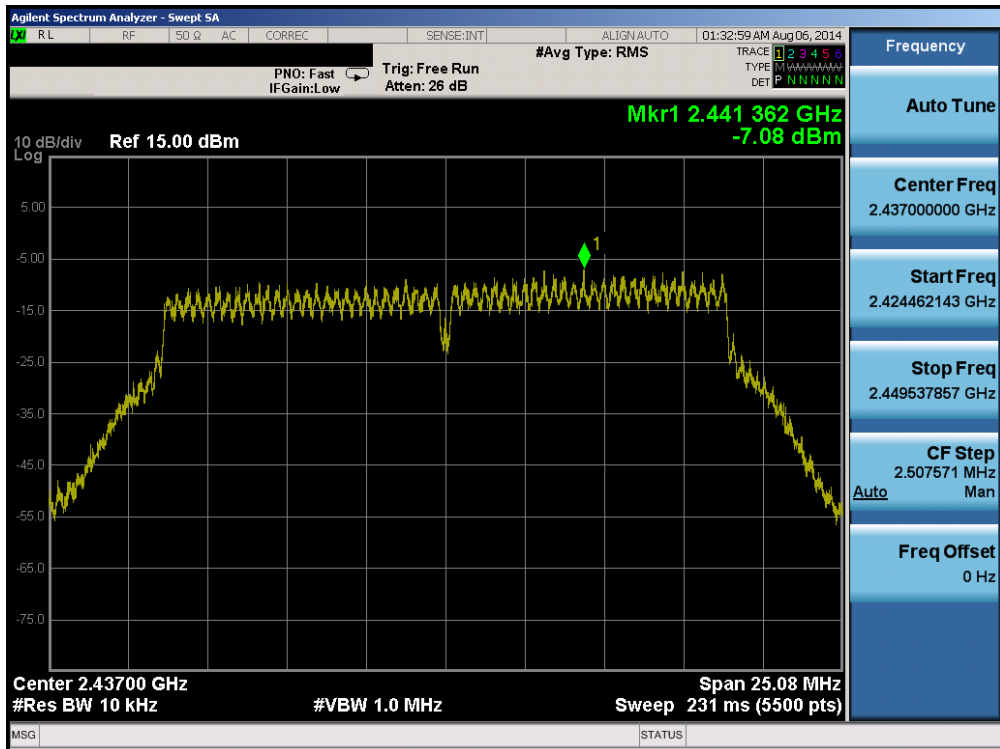


Plot 6-60. Power Spectral Density Plot (802.11g – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 56 of 121

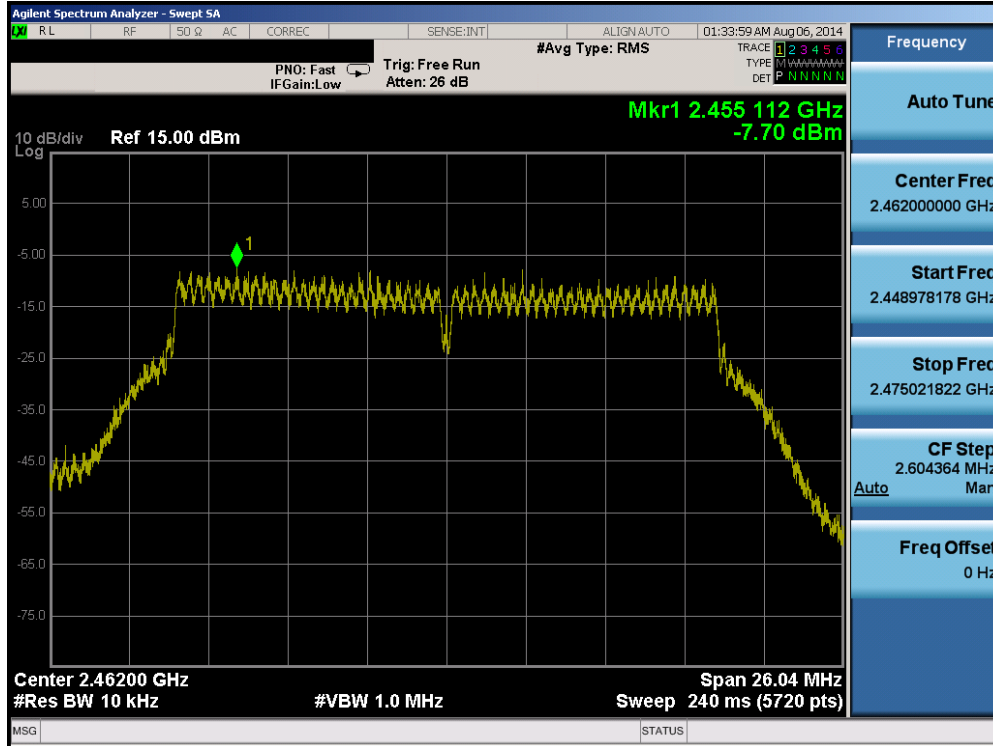


Plot 6-61. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)

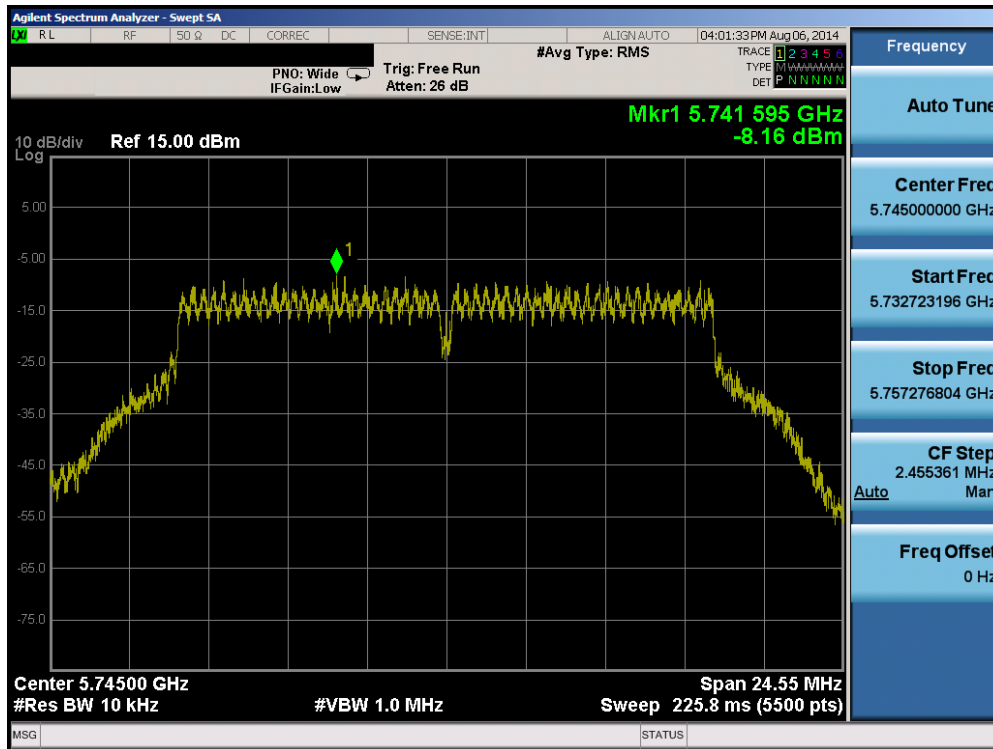


Plot 6-62. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 57 of 121



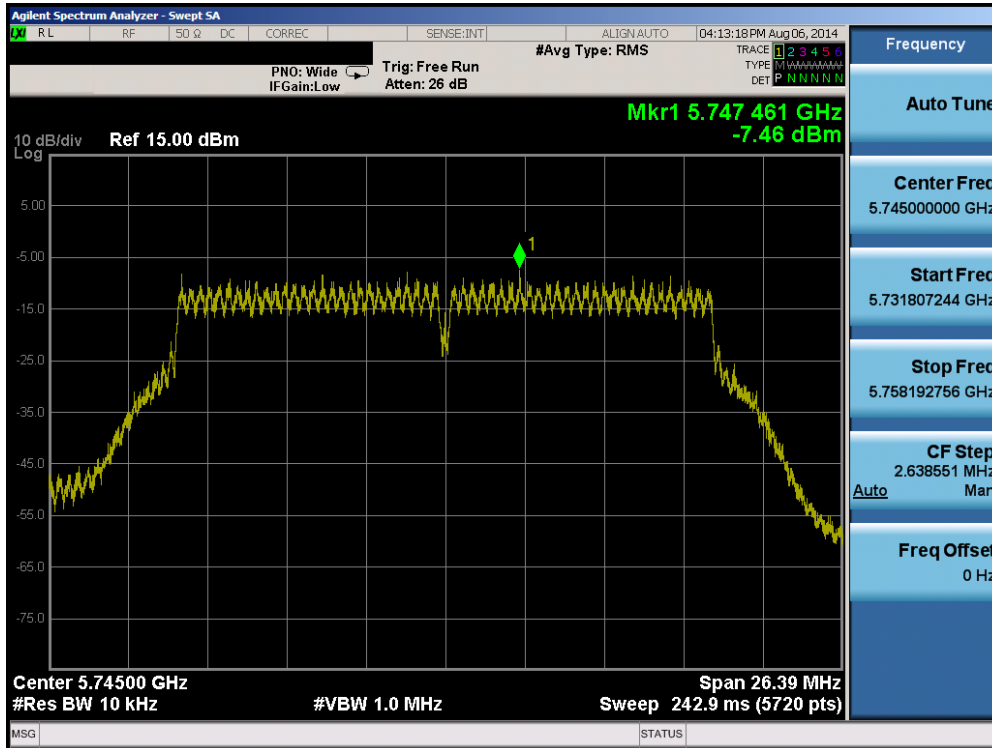
Plot 6-63. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)



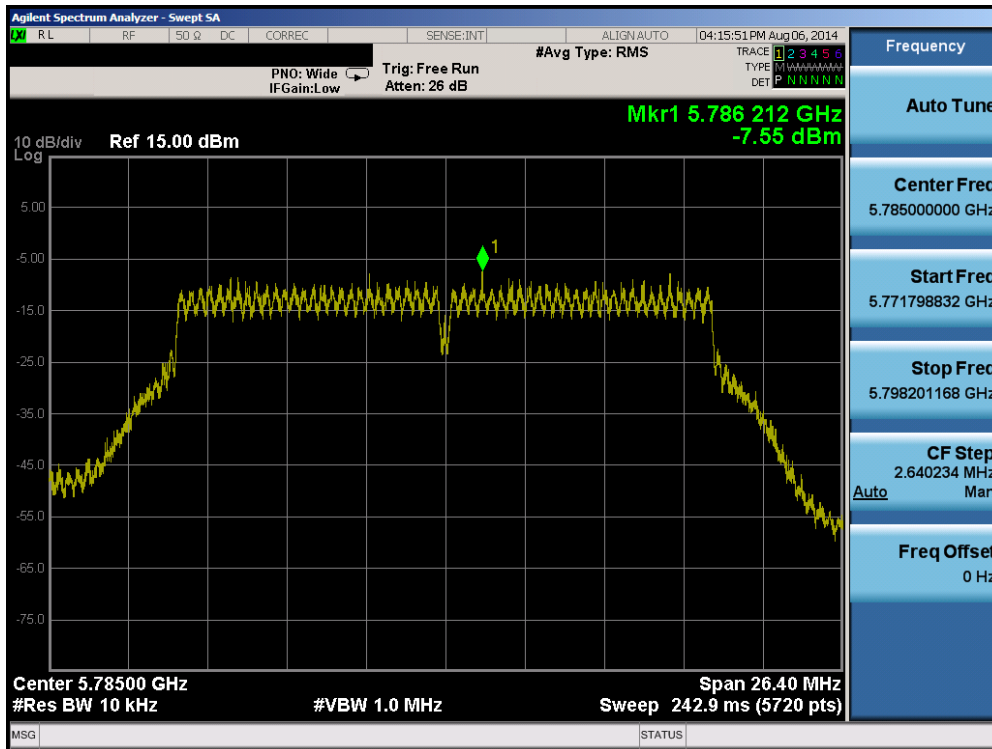
Plot 6-64. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 58 of 121



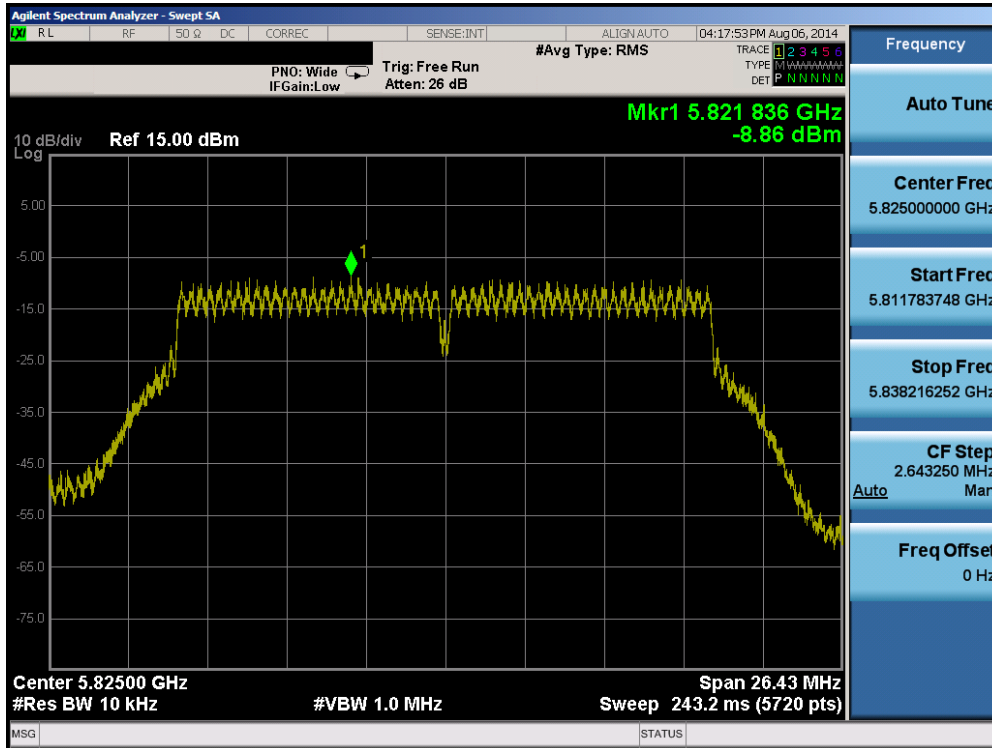


Plot 6-67. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

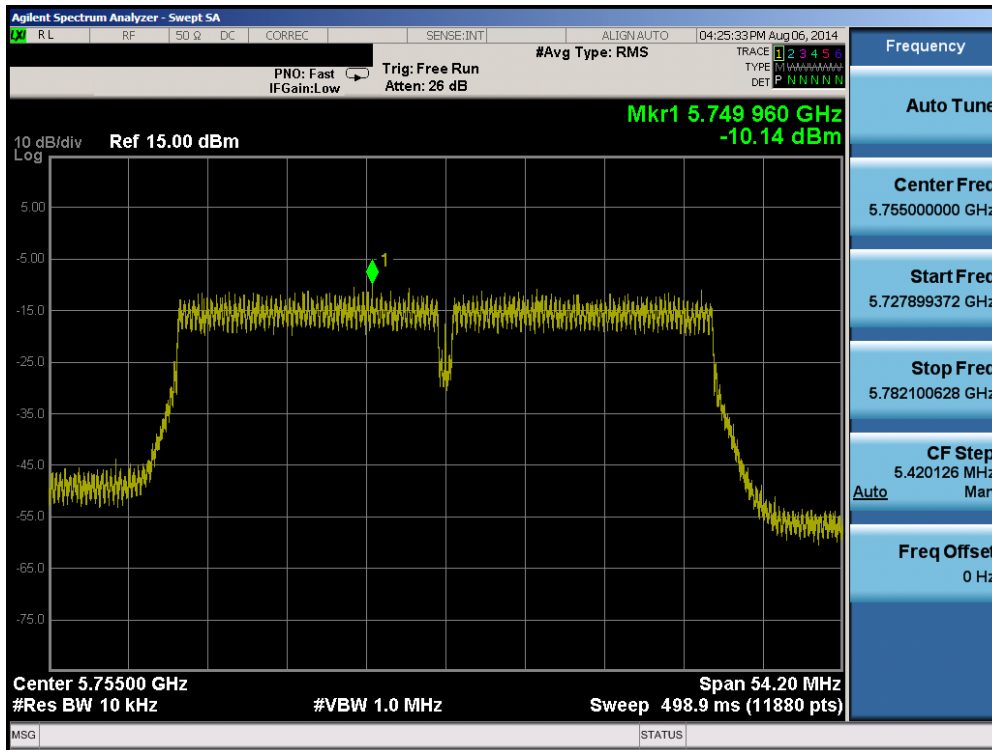


Plot 6-68. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 60 of 121

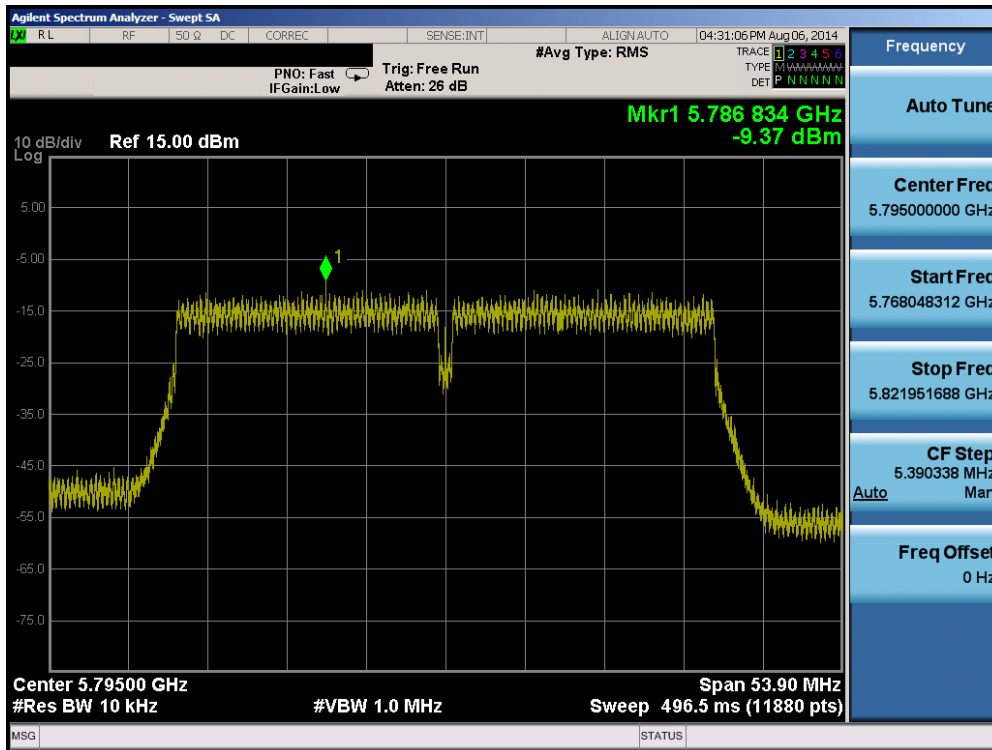


Plot 6-69. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

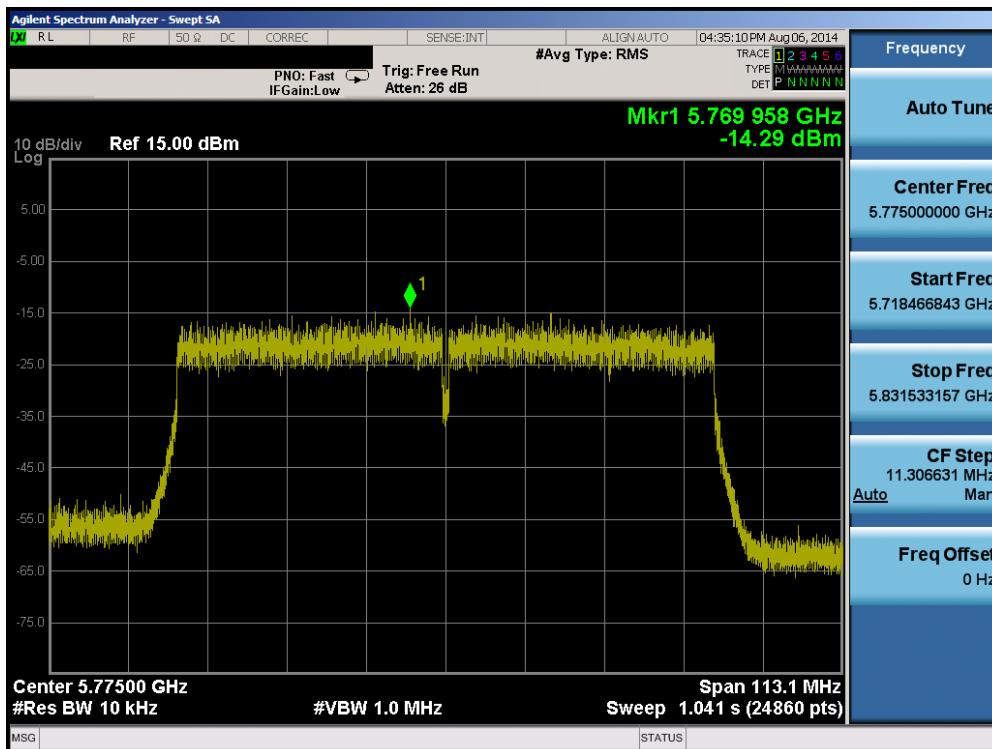


Plot 6-70. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 61 of 121



Plot 6-71. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)



Plot 6-72. Power Spectral Density Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 62 of 121

## MIMO Power Spectral Density Measurements

Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	ANT 1 Power Spectral Density [dBm]	ANT 2 Power Spectral Density [dBm]	Summed MIMO Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	n	6.5/7.2 (MCS0)	-7.90	-7.25	-4.56	8.00	-12.56	Pass
2437	6	n	6.5/7.2 (MCS0)	-5.71	-7.08	-3.33	8.00	-11.33	Pass
2462	11	n	6.5/7.2 (MCS0)	-4.95	-7.70	-3.10	8.00	-11.10	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-11.31	-7.46	-5.96	8.00	-13.96	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-10.56	-7.55	-5.79	8.00	-13.79	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-9.79	-8.86	-6.29	8.00	-14.29	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	-12.67	-10.14	-8.21	8.00	-16.21	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	-12.29	-9.37	-7.57	8.00	-15.57	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-16.75	-14.29	-12.34	8.00	-20.34	Pass

**Table 6-30.MIMO Conducted Power Density Measurements**

**Note:**



Per KDB 662911 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

**Sample MIMO Calculation:**

At 2412MHz the average conducted power spectral density was measured to be -7.90 dBm for Antenna-1 and -7.25 dBm for Antenna-2.

$$\text{Antenna 1} + \text{Antenna 2} = \text{MIMO}$$

$$(-7.90 \text{ dBm} + -7.25 \text{ dBm}) = (0.16 \text{ mW} + 0.19 \text{ mW}) = 0.35 \text{ mW} = -4.56 \text{ dBm}$$

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 63 of 121	

## 6.5 Conducted Emissions at the Band Edge

§15.247(d)

### Test Overview and Limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots at the band edge, the EUT was set at a data rate of 1Mbps for “b” mode, 6 Mbps for “g” mode, 6 Mbps for “a” mode, 6.5/7.2Mbps for 20MHz BW “n” mode, 13.5/15Mbps for 40MHz “n”, and 29.3/32.5Mbps for 80MHz “ac” mode as these settings produced the worst-case emissions.

***The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure (Section 9.1).***

### Test Procedure Used

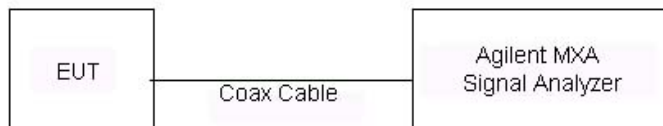
KDB 558074 v03r02 – Section 11.3

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 100kHz
4. VBW = 1MHz
5. Detector = Peak
6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



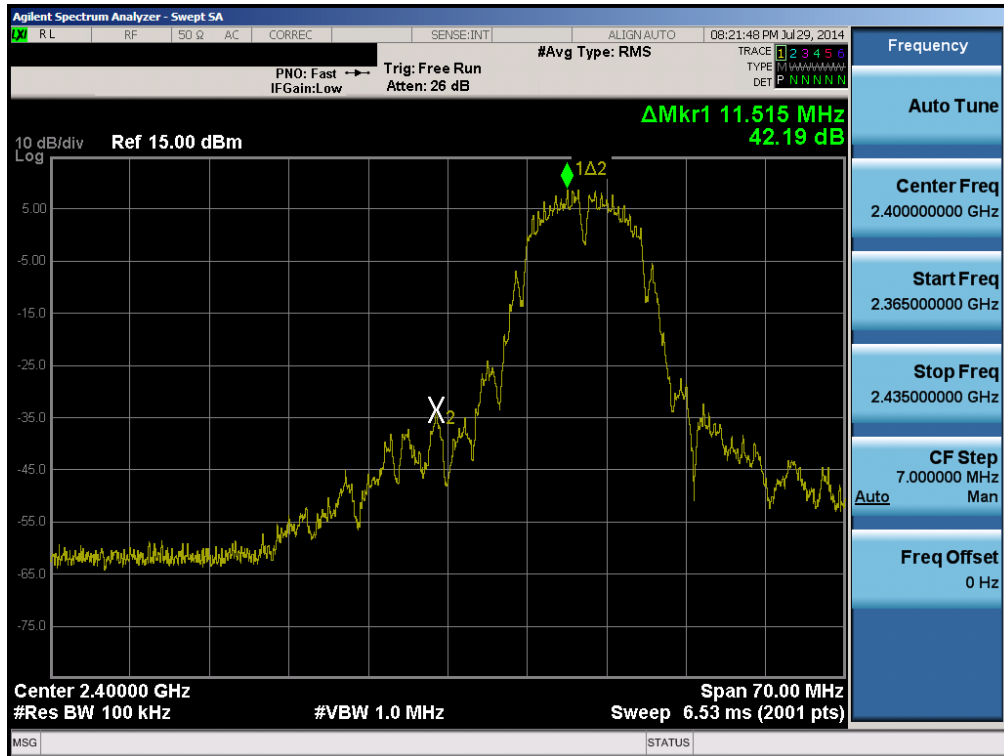
**Figure 6-4. Test Instrument & Measurement Setup**

### Test Notes

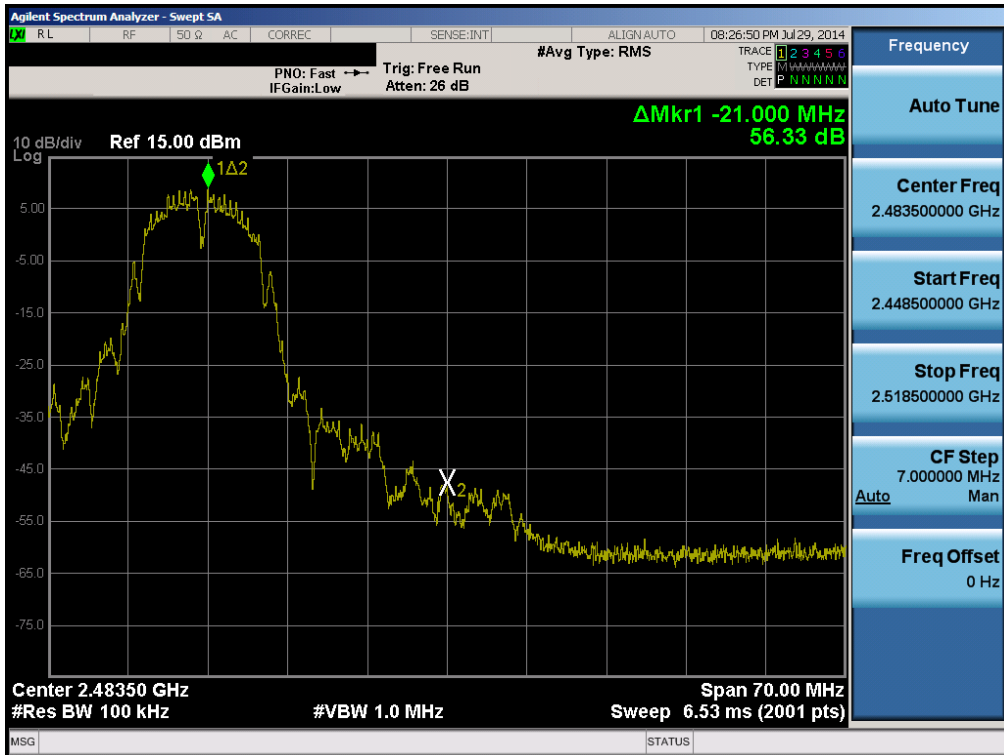
None

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 64 of 121	

## Antenna-1 Conducted Emissions at the Band Edge

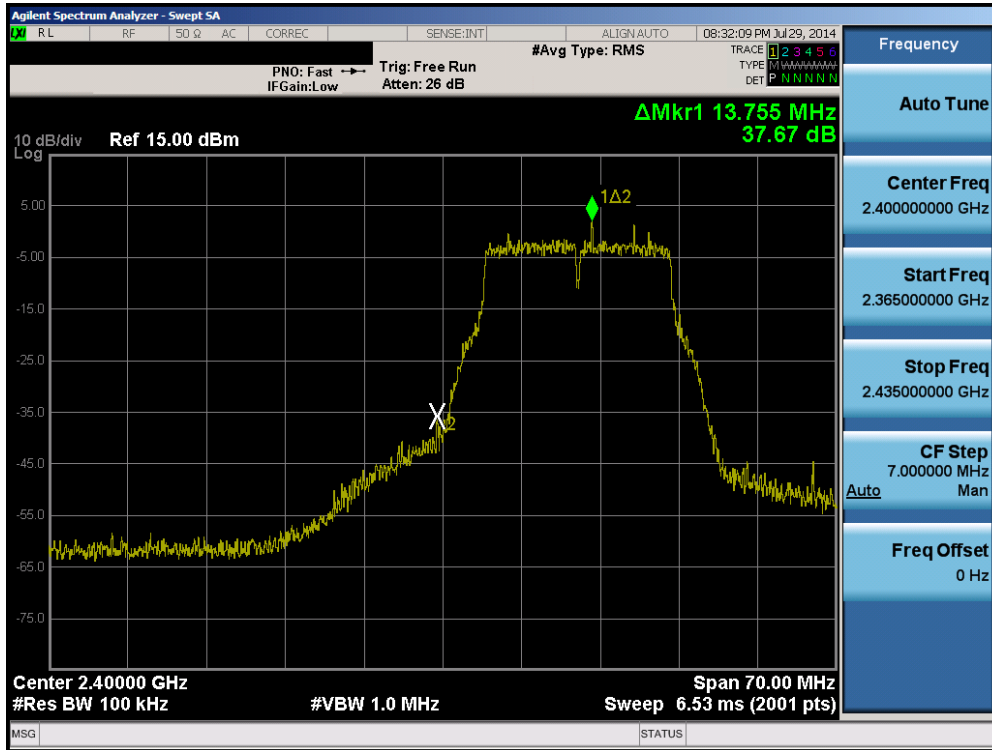


Plot 6-73. Band Edge Plot (802.11b – Ch. 1)

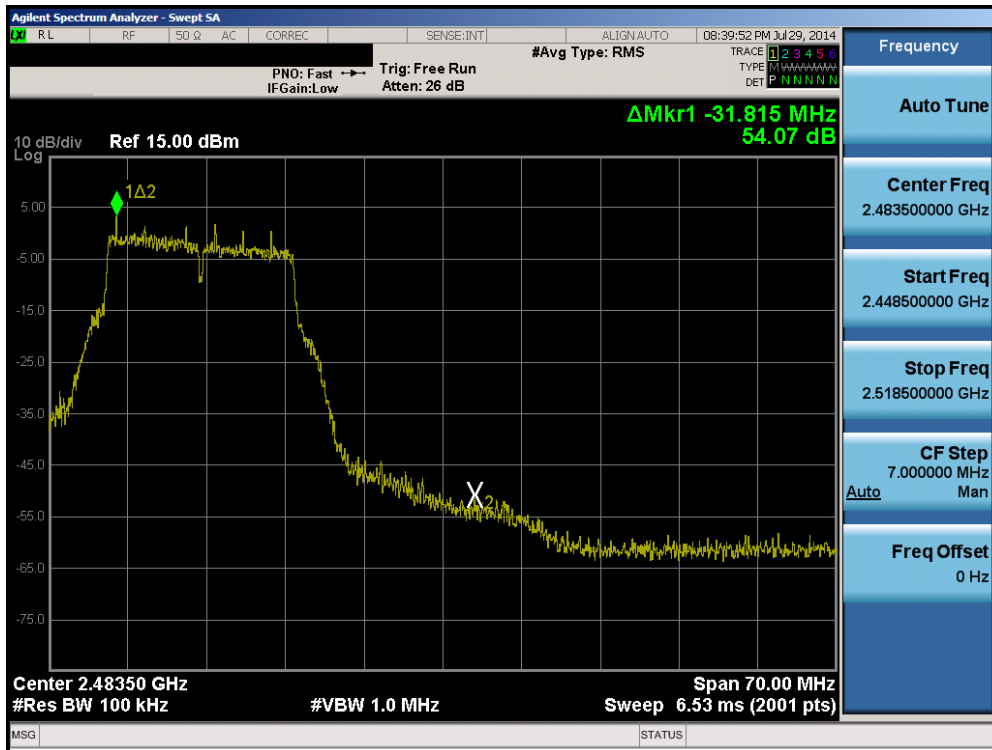


Plot 6-74. Band Edge Plot (802.11b – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 65 of 121

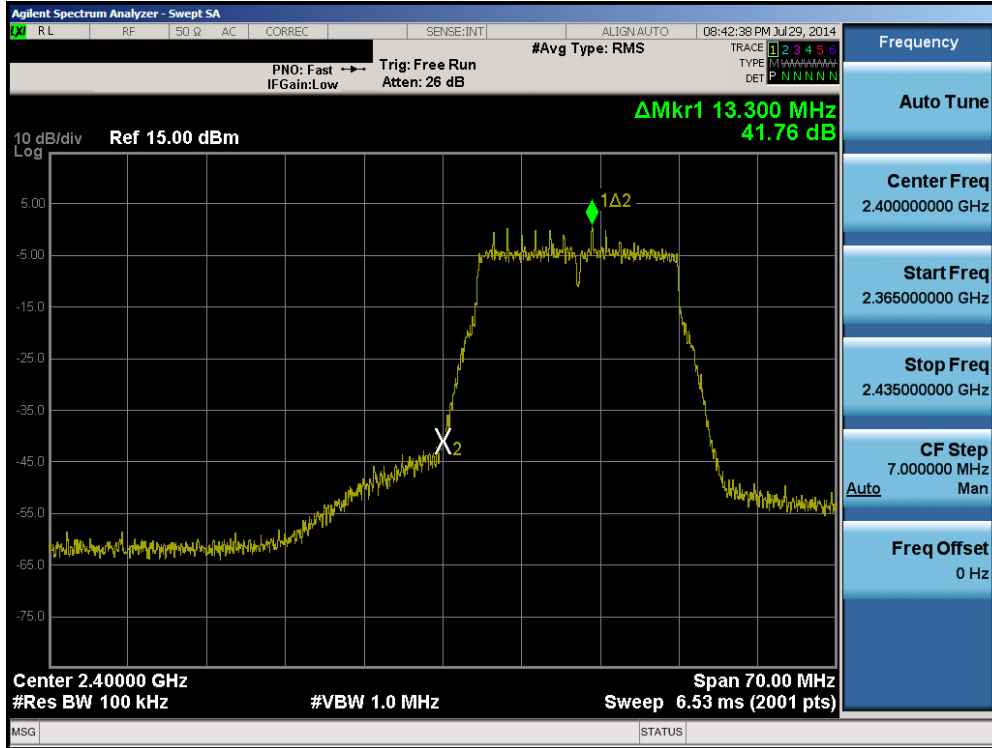


Plot 6-75. Band Edge Plot (802.11g– Ch. 1)

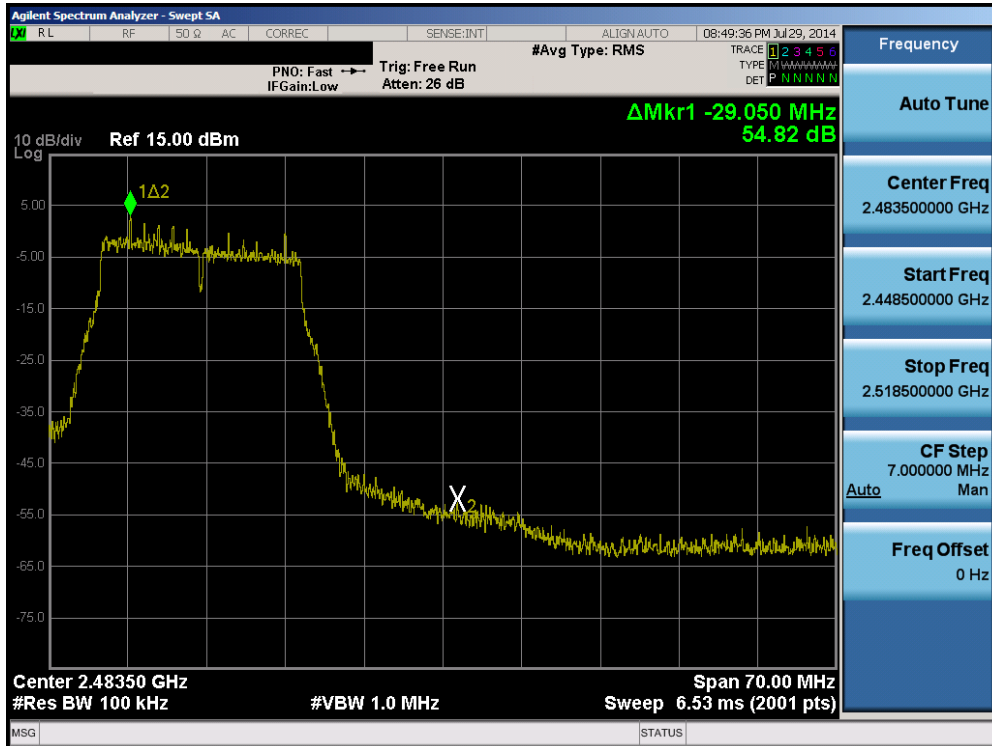


Plot 6-76. Band Edge Plot (802.11g – Ch. 1)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 66 of 121

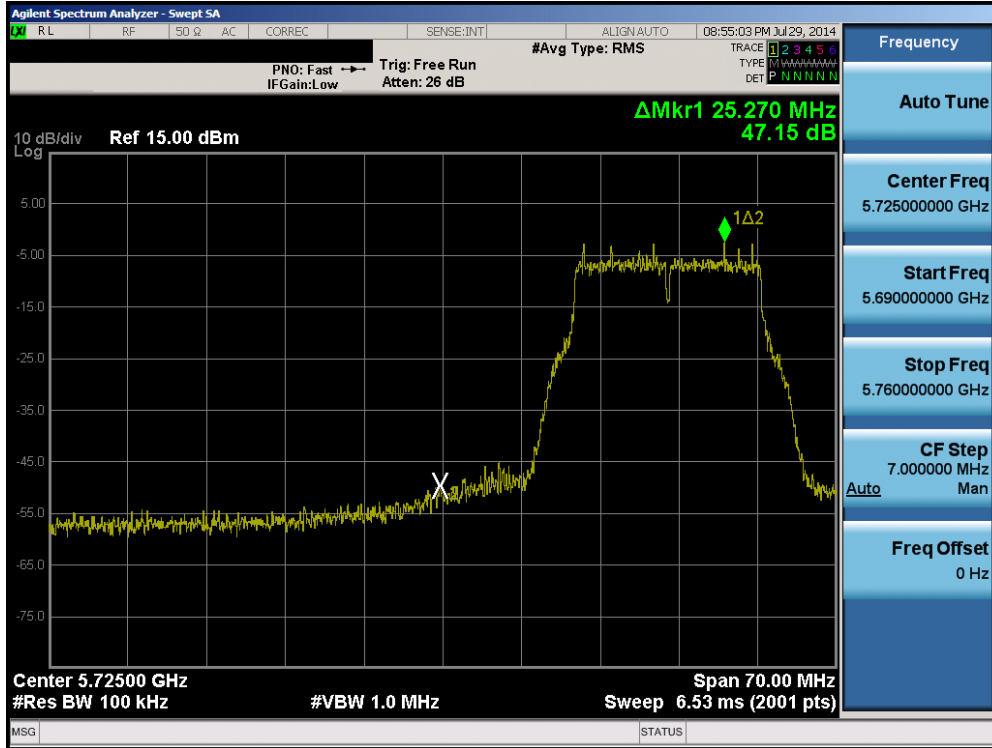


Plot 6-77. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)

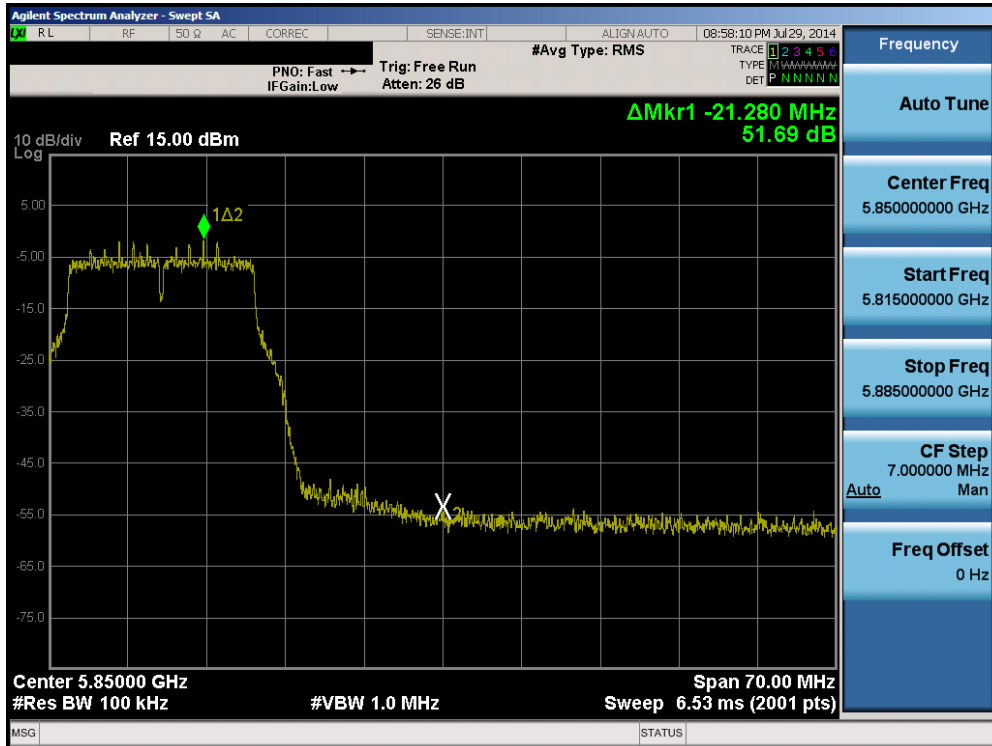


Plot 6-78. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 67 of 121

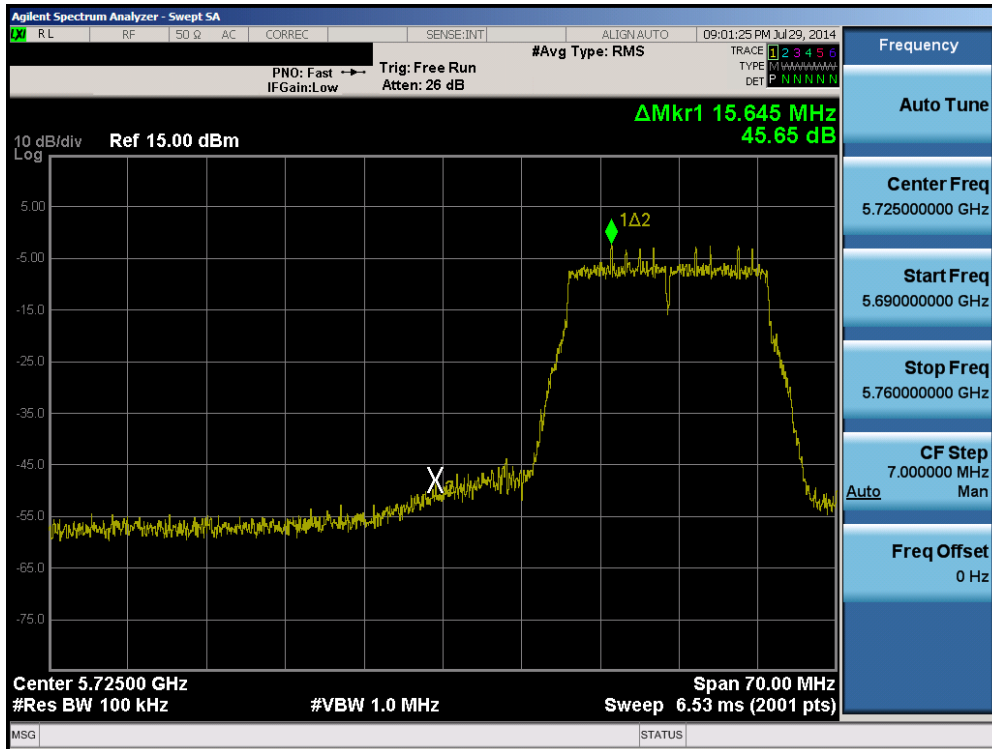


Plot 6-79. Band Edge Plot (802.11a – Ch. 149)

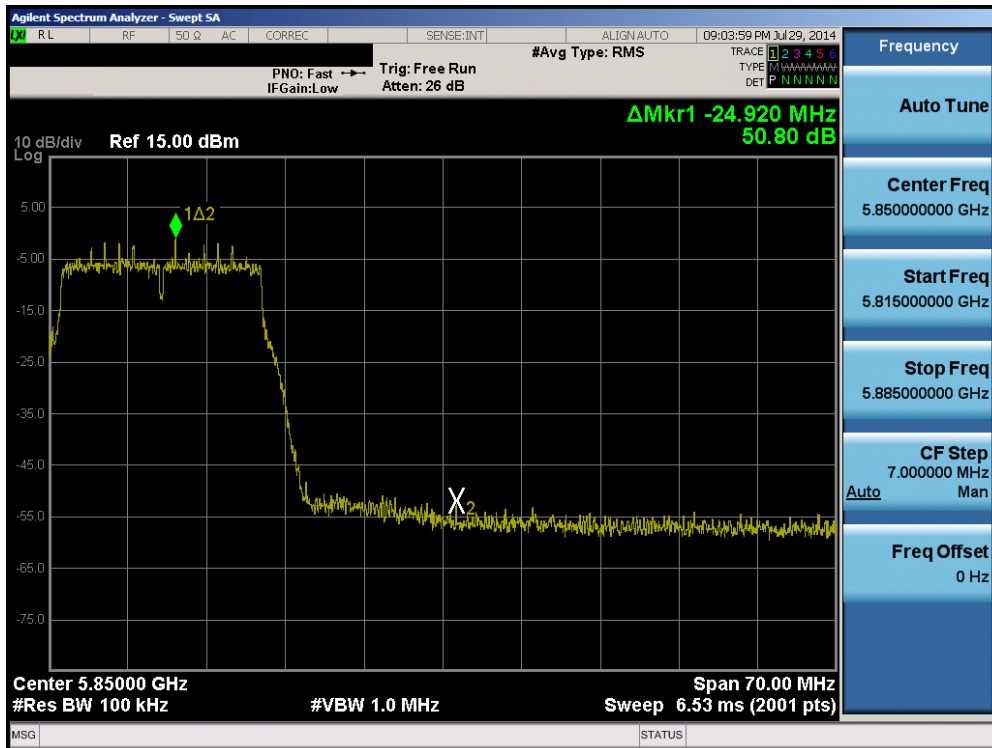


Plot 6-80. Band Edge Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 68 of 121

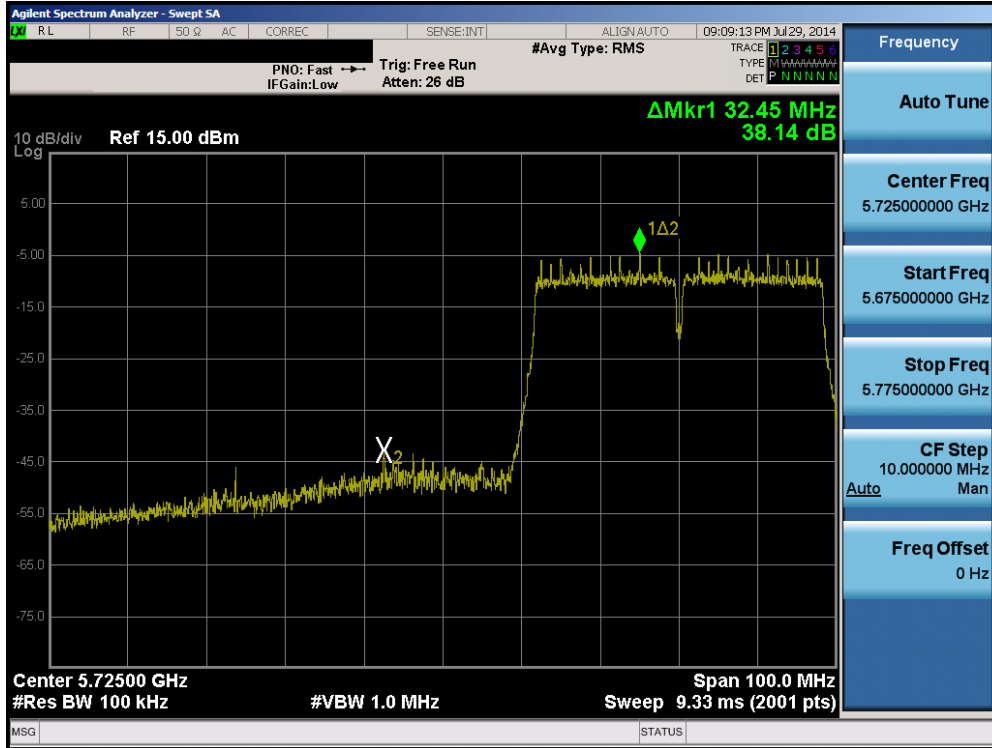


Plot 6-81. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

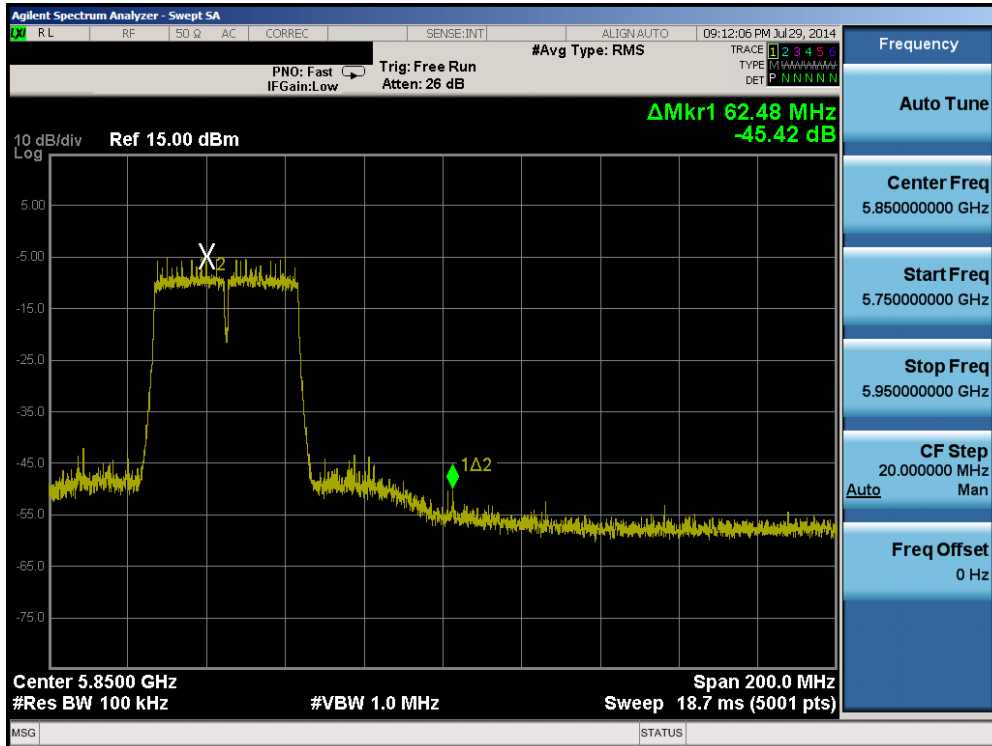


Plot 6-82. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 69 of 121



Plot 6-83. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

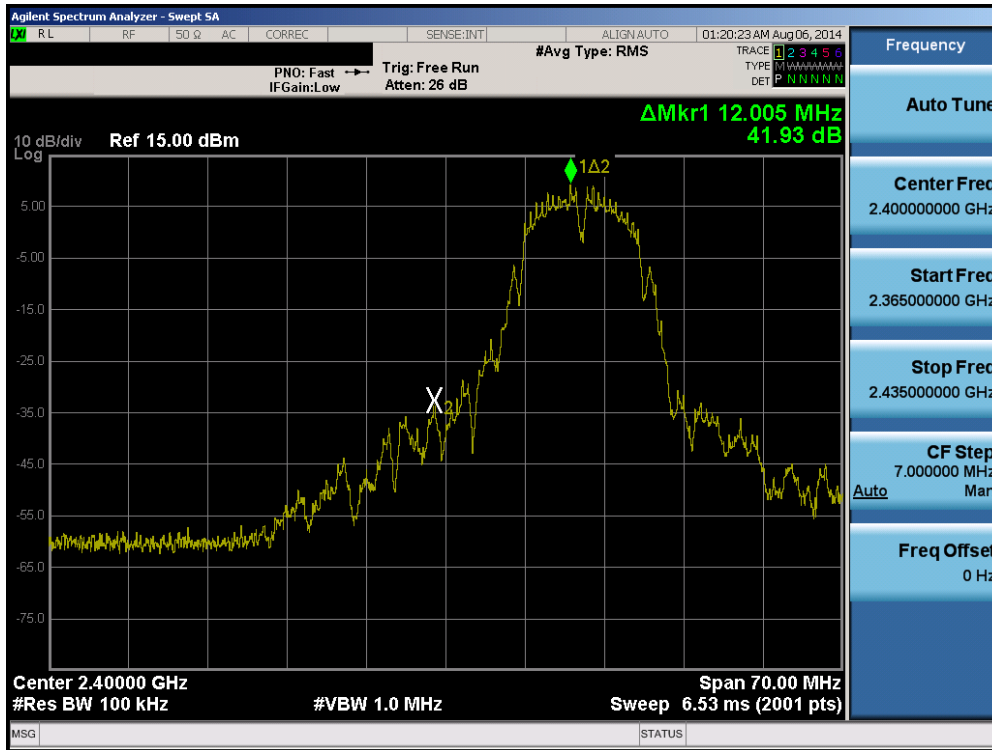


Plot 6-84. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

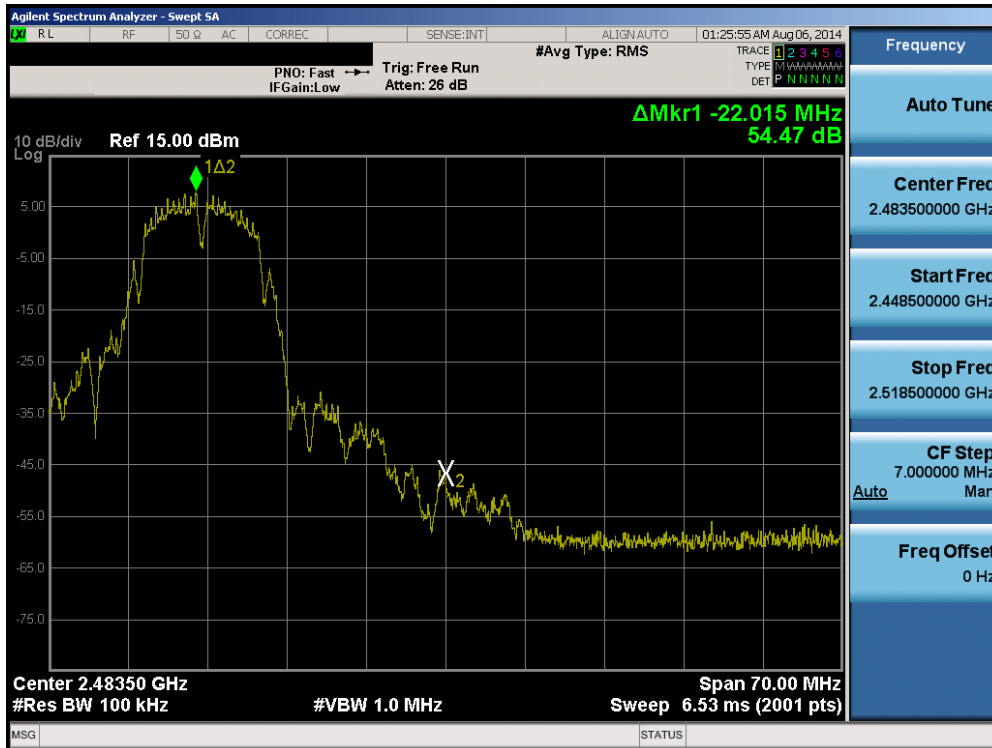
FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 70 of 121



## Antenna-2 Conducted Emissions at the Band Edge



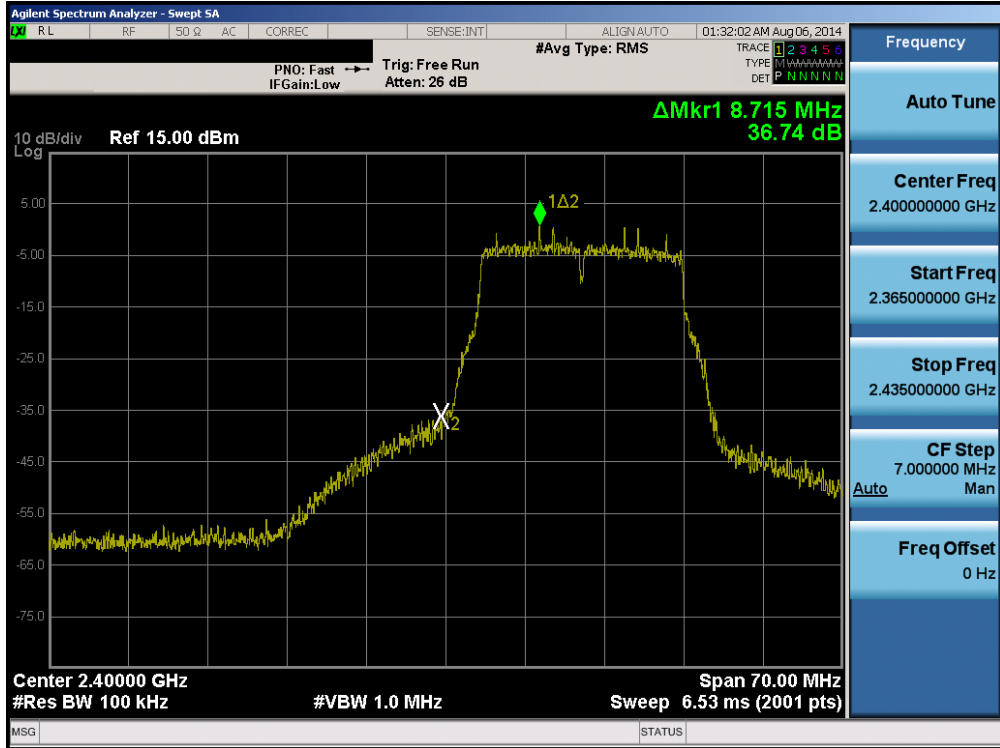
Plot 6-87. Band Edge Plot (802.11b – Ch. 1)



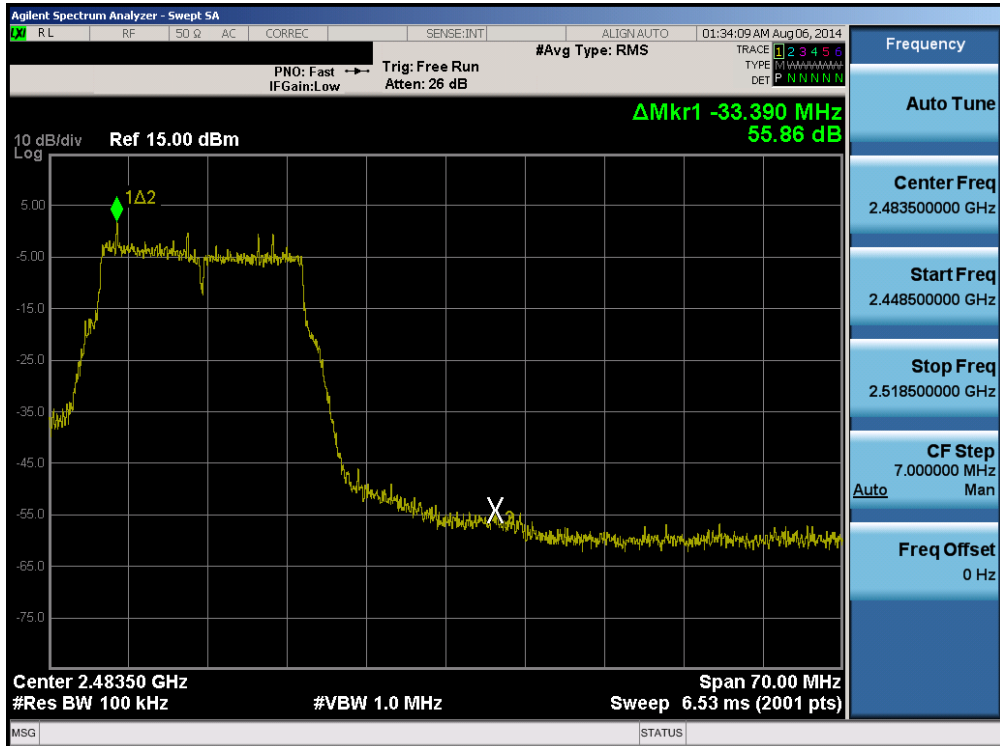
Plot 6-88. Band Edge Plot (802.11b – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 72 of 121



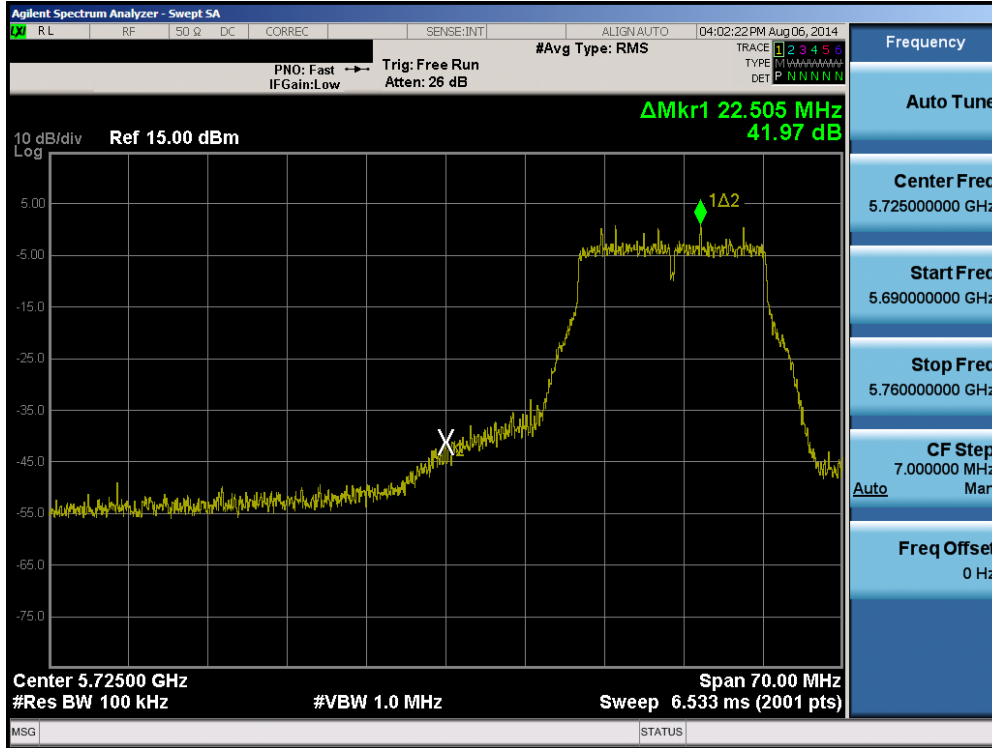


Plot 6-91. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)

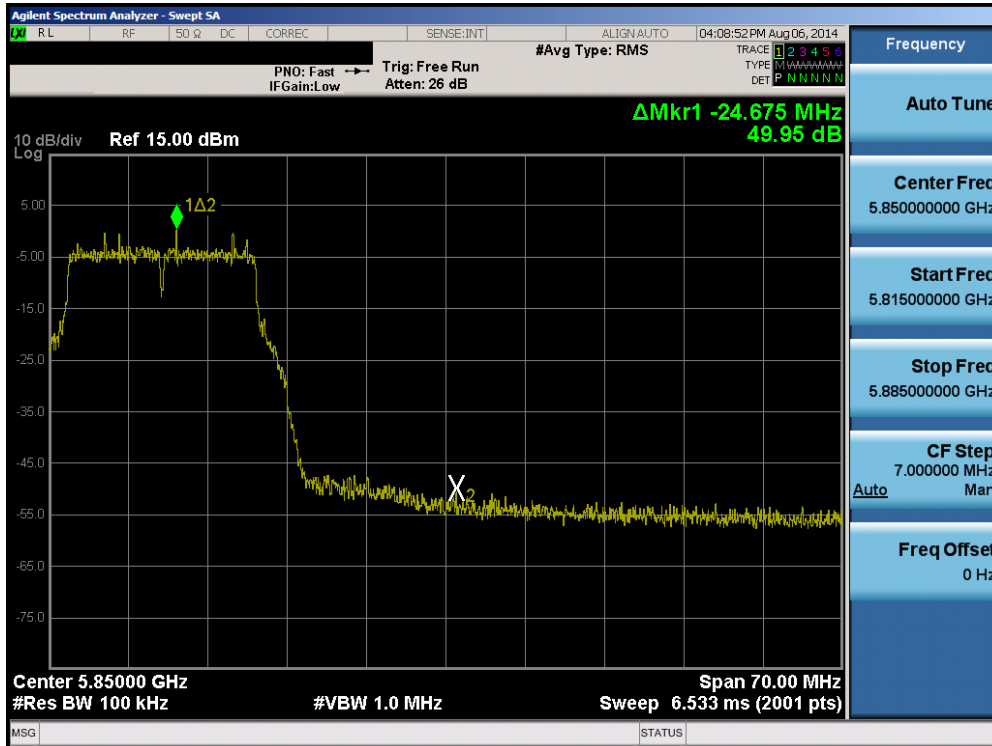


Plot 6-92. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 74 of 121



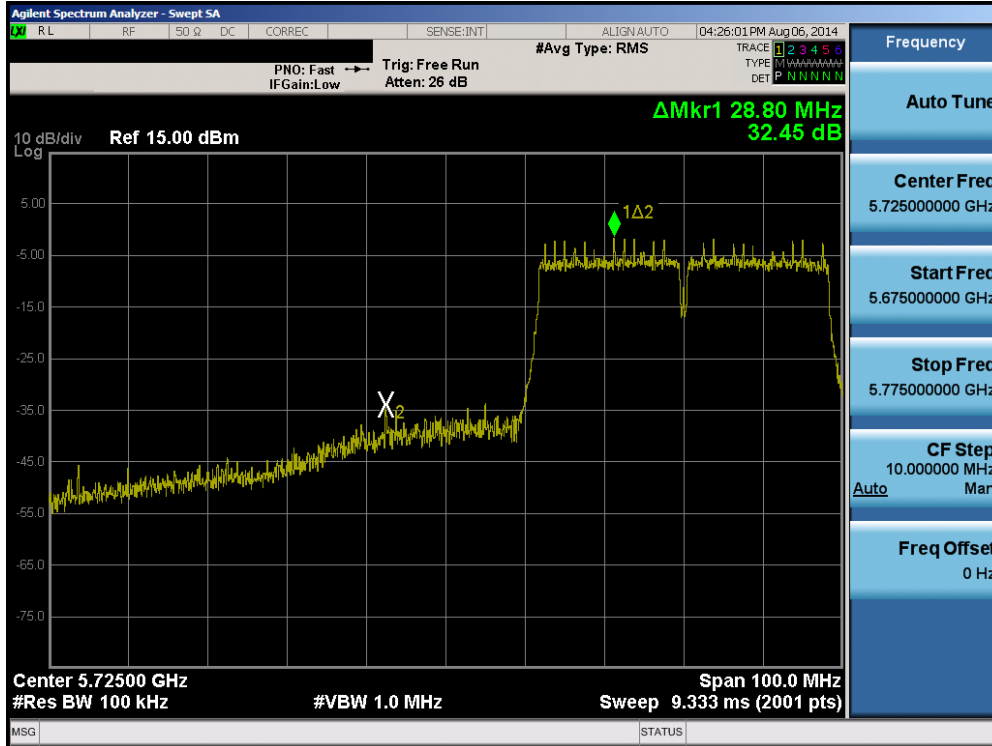
Plot 6-93. Band Edge Plot (802.11a – Ch. 149)



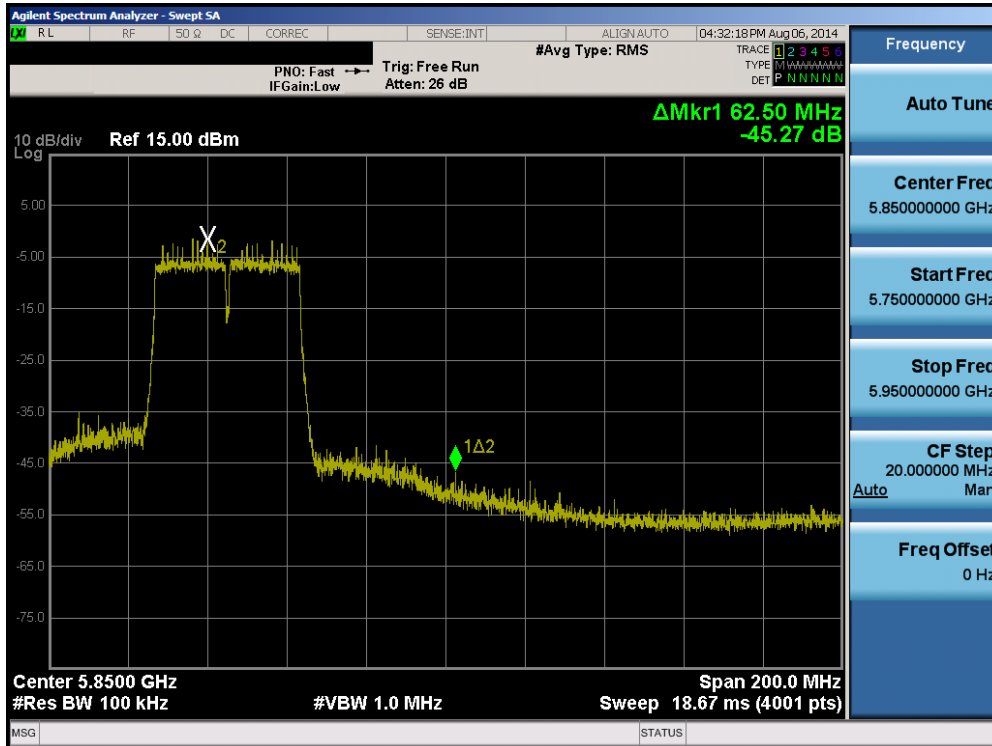
Plot 6-94. Band Edge Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 75 of 121



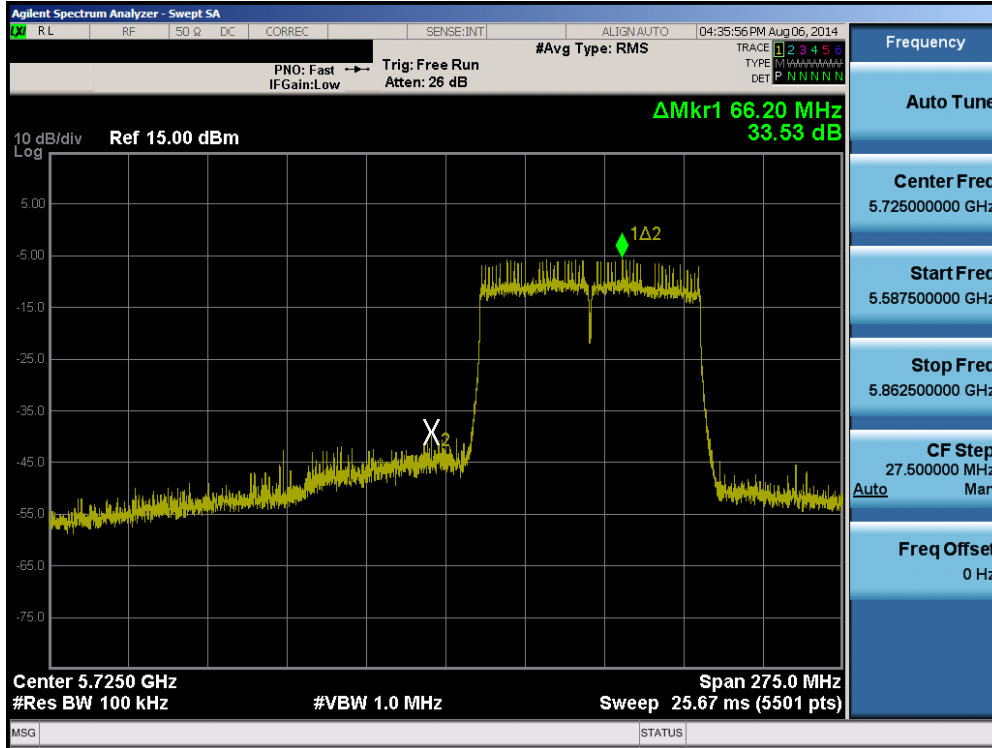


Plot 6-97. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

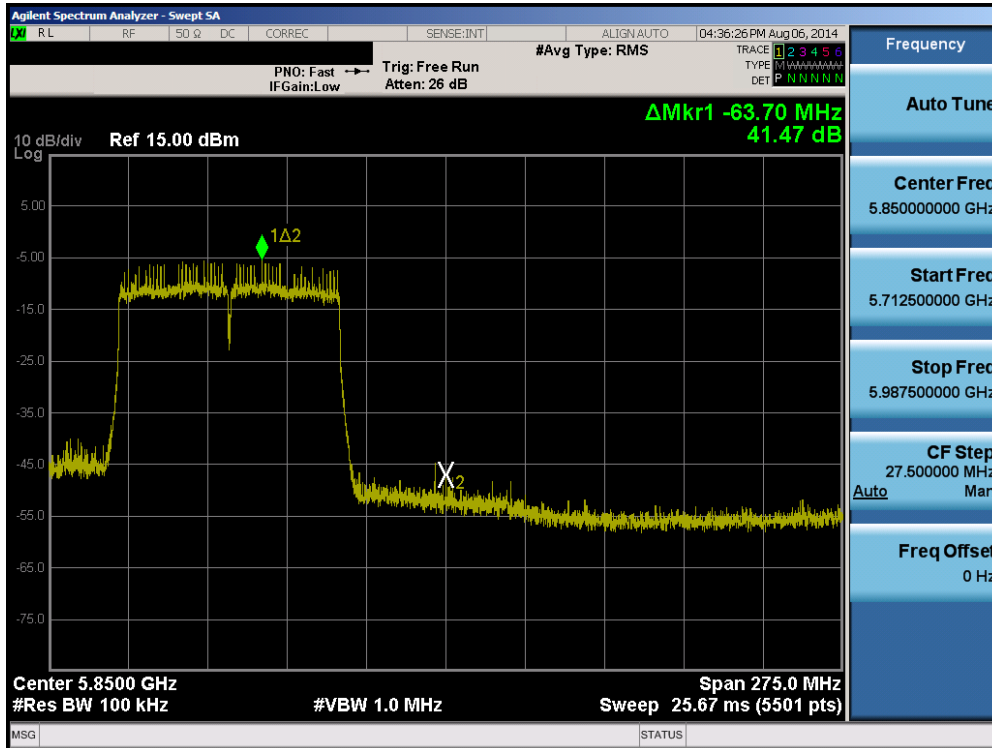


Plot 6-98. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 77 of 121



Plot 6-99. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)



Plot 6-100. Band Edge Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 78 of 121

## 6.6 Conducted Spurious Emissions

### §15.247(d)

#### Test Overview and Limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. For the following out of band conducted spurious emissions plots, the EUT was investigated in all available data rates for “b”, “g”, “a”, “n”, and “ac” modes. The worst case spurious emissions for the 2.4GHz band were found while transmitting in “b” mode at 1 Mbps and are shown in the plots below. The worst case spurious emissions for the 5.8GHz band were found while transmitting in “a” mode at 6 Mbps and are shown in the plots below.

***The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the procedure in Section 11.1 of KDB 558074 v03r02.***

#### Test Procedure Used

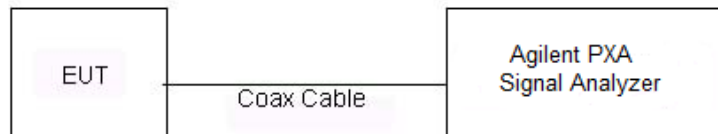
KDB 558074 v03r02 – Section 11.3  
KDB 662911 v02r01 – Section E)3)b)

#### Test Settings



1. Start frequency was set to 30MHz and stop frequency was set to 25GHz for 2.4GHz frequencies and 40GHz for 5GHz frequencies (separated into two plots per channel)
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.





**Figure 6-5. Test Instrument & Measurement Setup**

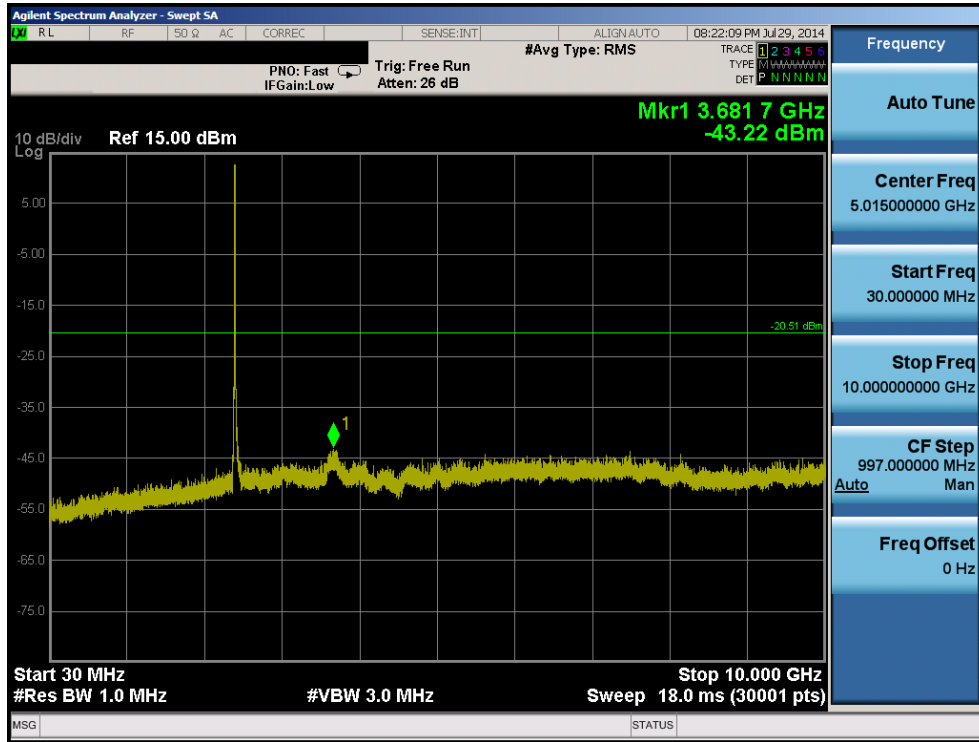
FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 79 of 121	

**Test Notes**

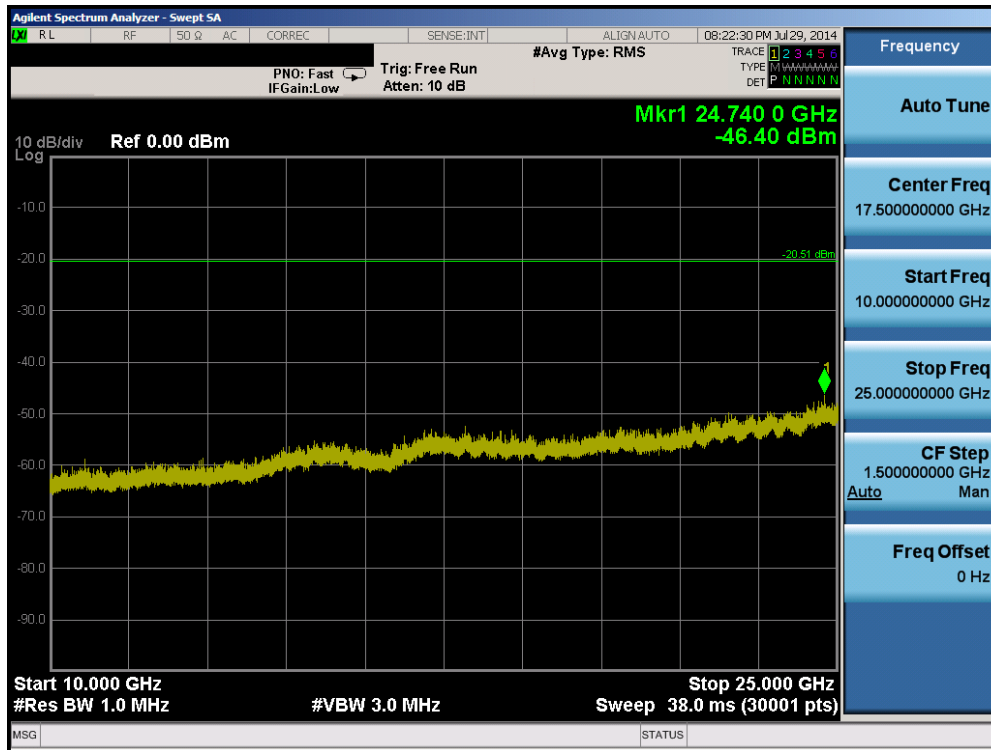
1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 30dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1MHz bandwidth.
3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.
4. The conducted spurious emissions were measured to relative limits. Therefore, in accordance with KDB 662911 v02r01 Section E)3)b), it was unnecessary to show compliance through the summation of test results of the individual outputs.

<b>FCC ID:</b> A3LSWDSC02G		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1407251482.A3L	<b>Test Dates:</b> 7/29 - 8/8/2014	<b>EUT Type:</b> Portable Handset	Page 80 of 121	

# Antenna-1 Conducted Spurious Emissions

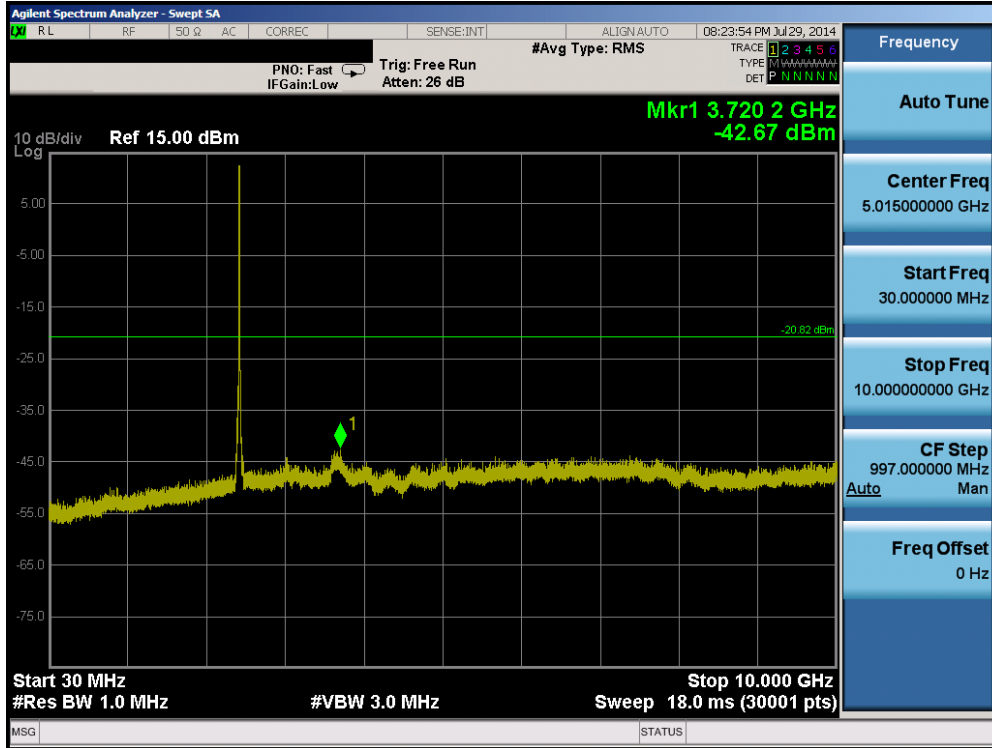


Plot 6-101. Conducted Spurious Plot (802.11b – Ch. 1)

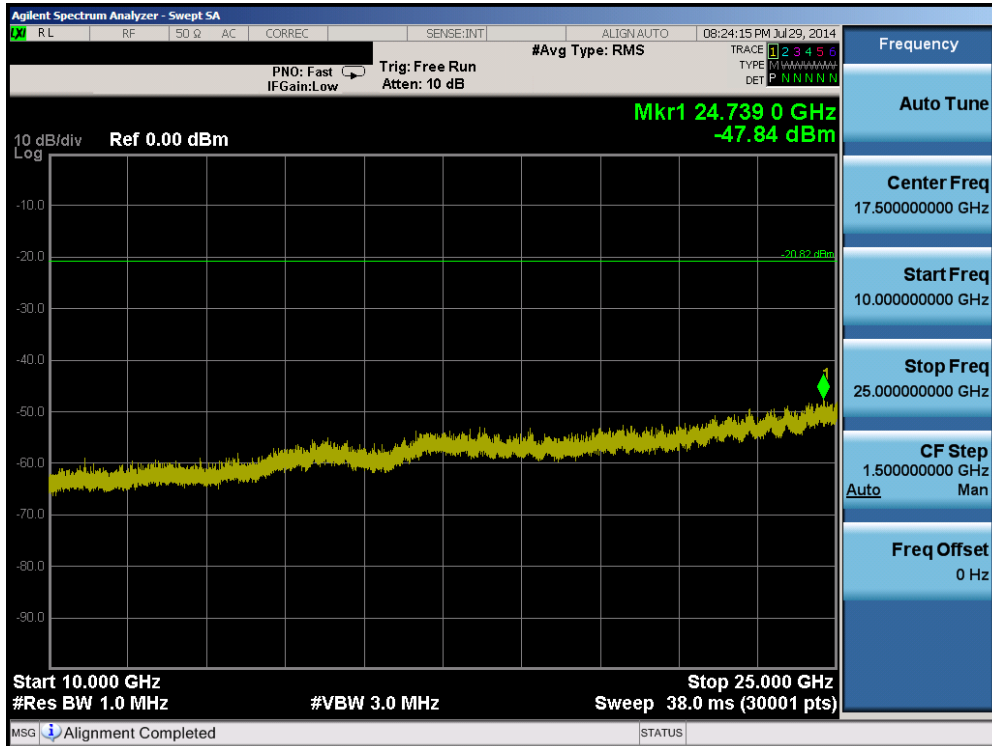


Plot 6-102. Conducted Spurious Plot (802.11b – Ch. 1)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 81 of 121



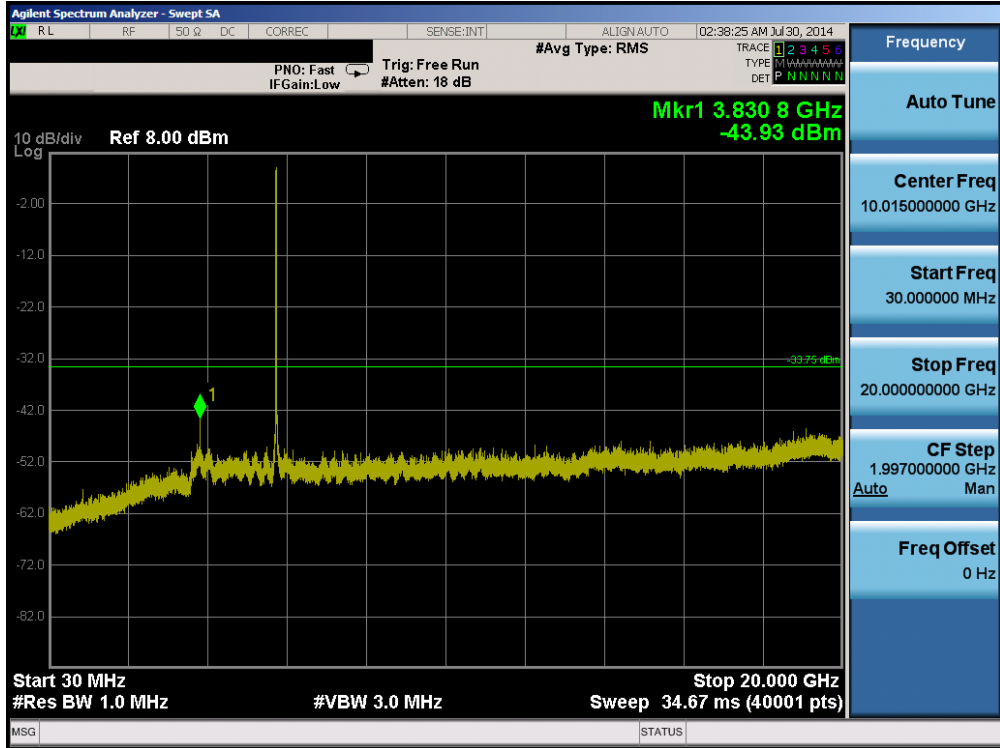
Plot 6-103. Conducted Spurious Plot (802.11b – Ch. 6)



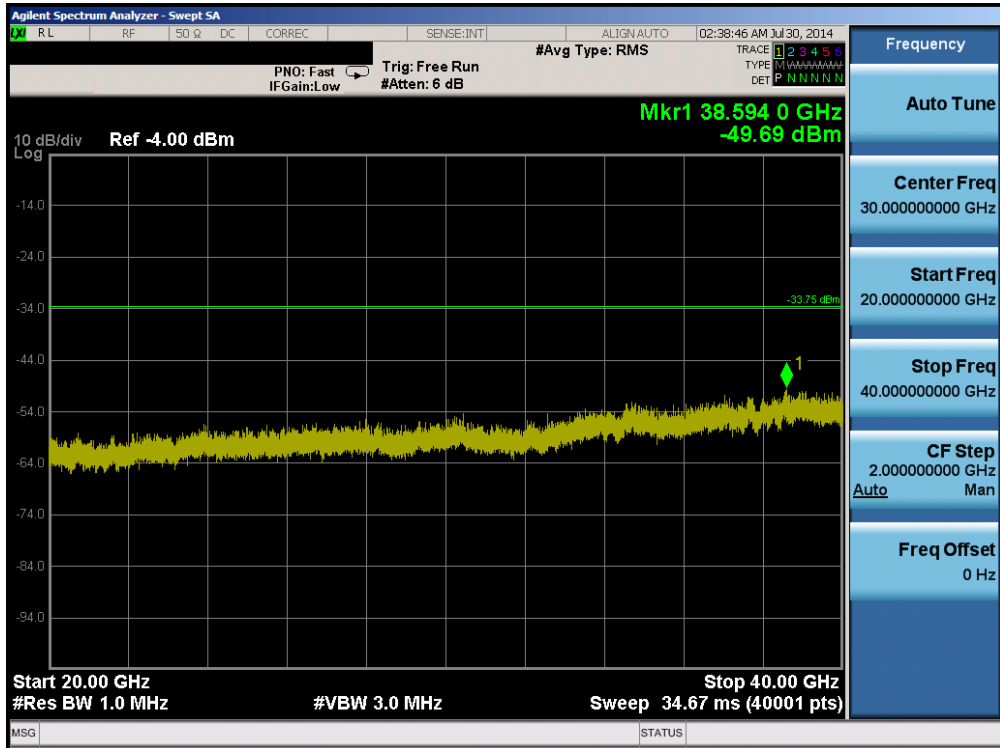
Plot 6-104. Conducted Spurious Plot (802.11b – Ch. 6)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 82 of 121





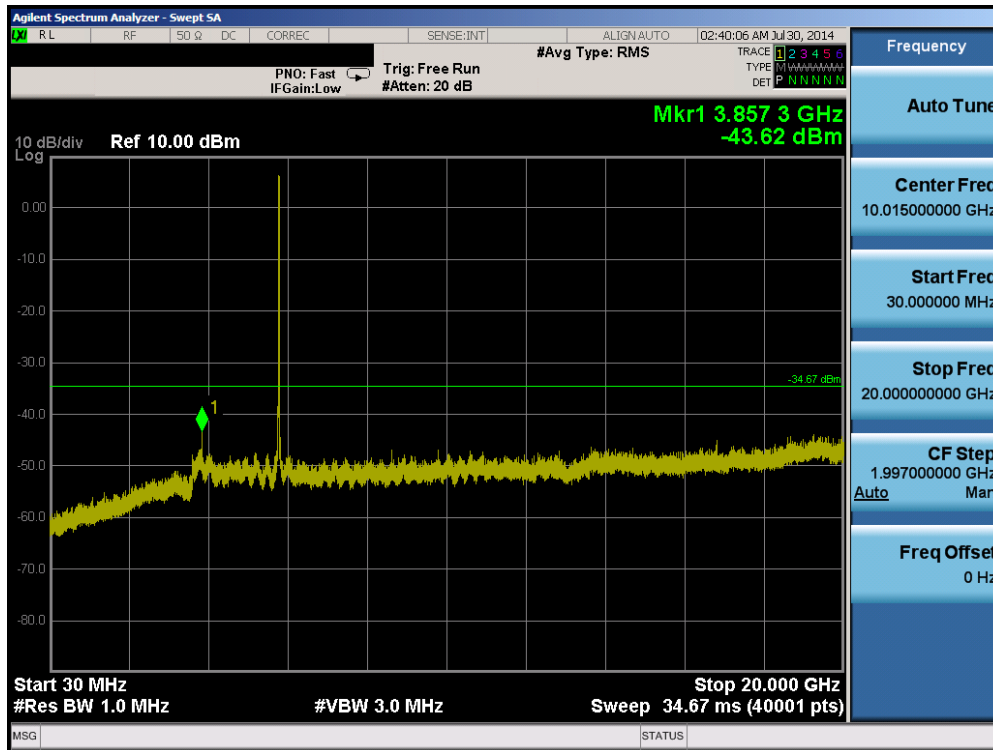


Plot 6-107. Conducted Spurious Plot (802.11a – Ch. 149)

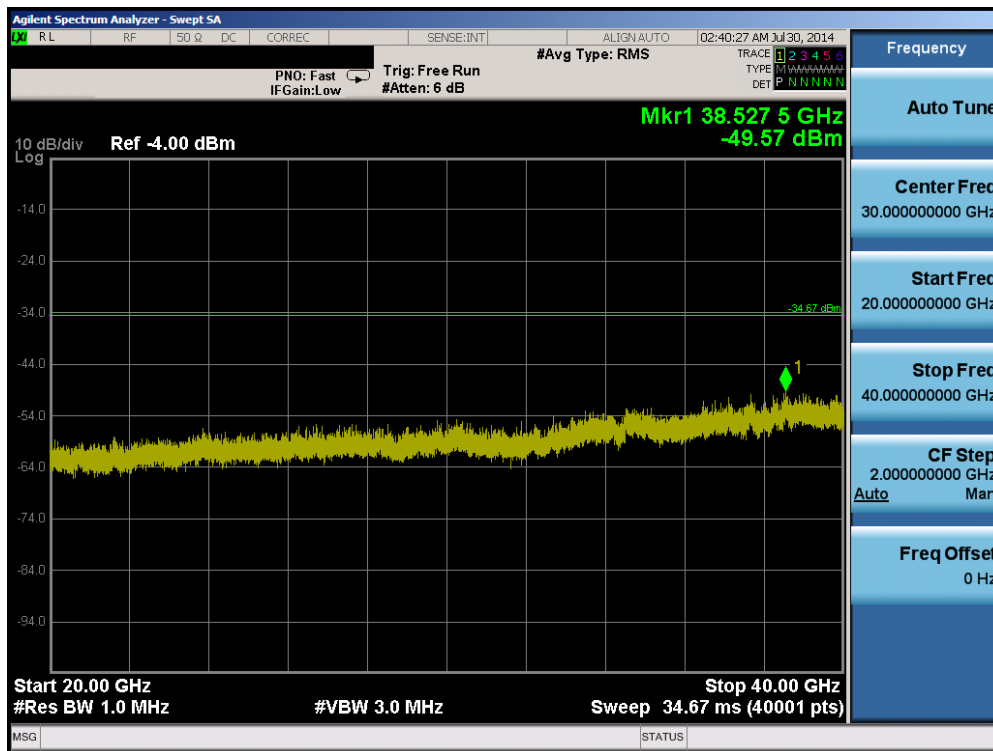


Plot 6-108. Conducted Spurious Plot (802.11a – Ch. 149)



FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 84 of 121

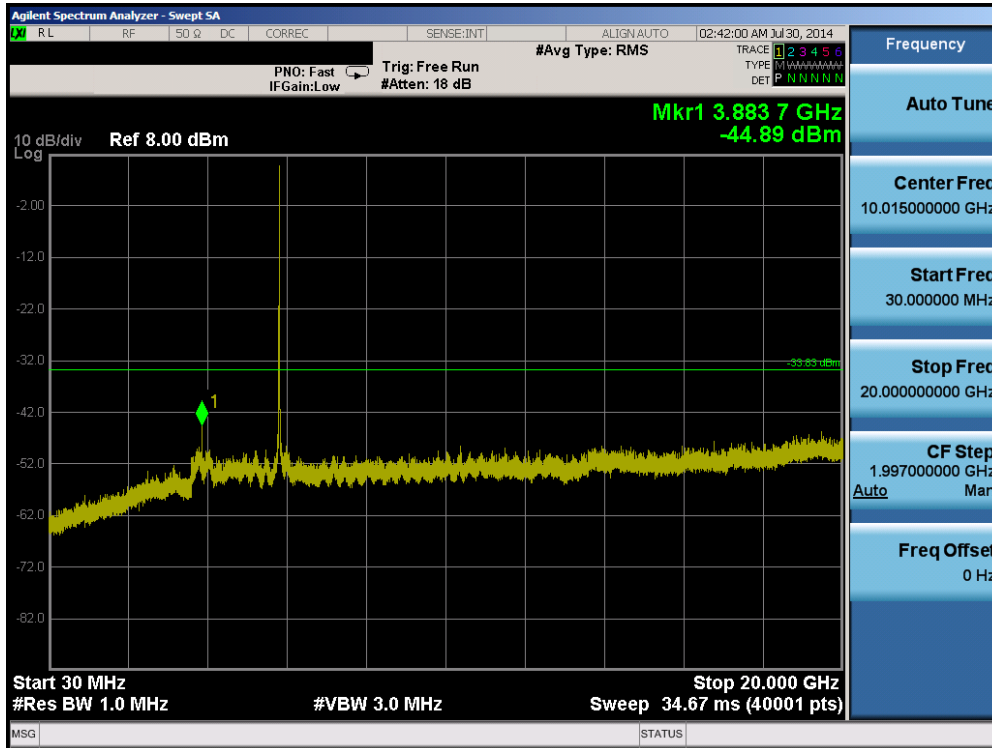


Plot 6-109. Conducted Spurious Plot (802.11a – Ch. 157)

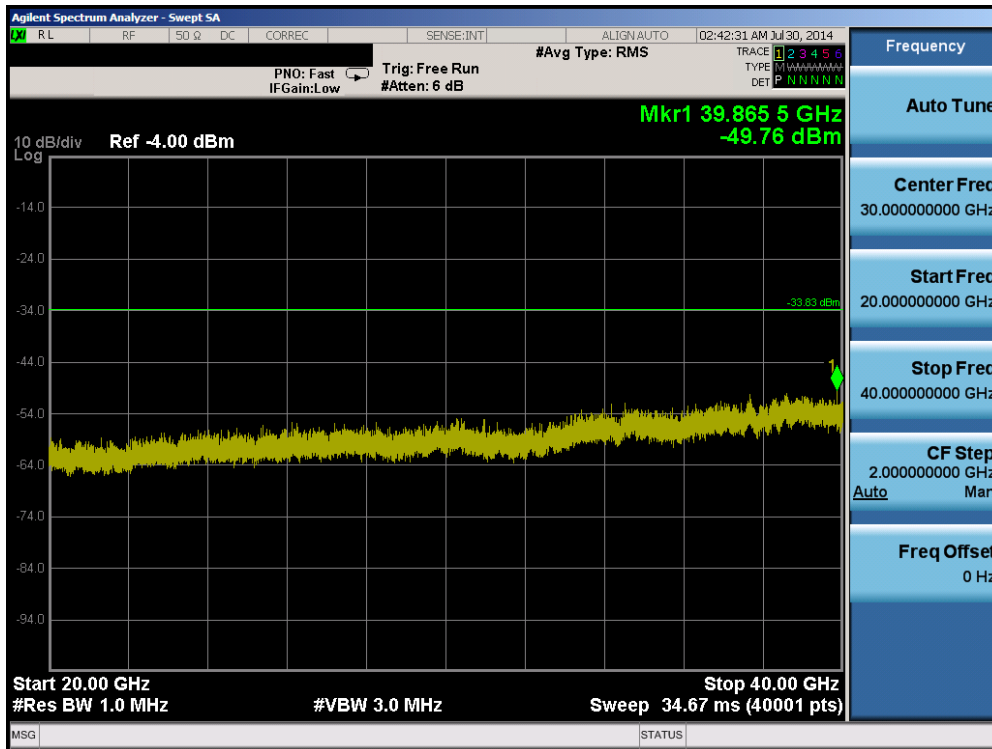


Plot 6-110. Conducted Spurious Plot (802.11a – Ch. 157)



FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 85 of 121



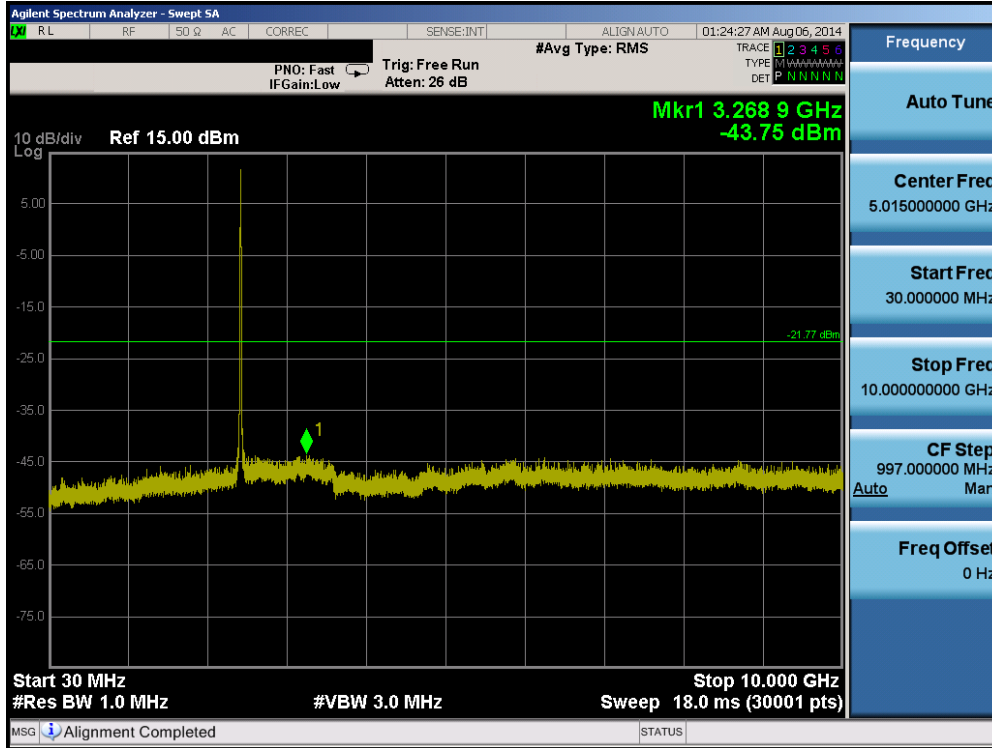
Plot 6-111. Conducted Spurious Plot (802.11a – Ch. 165)



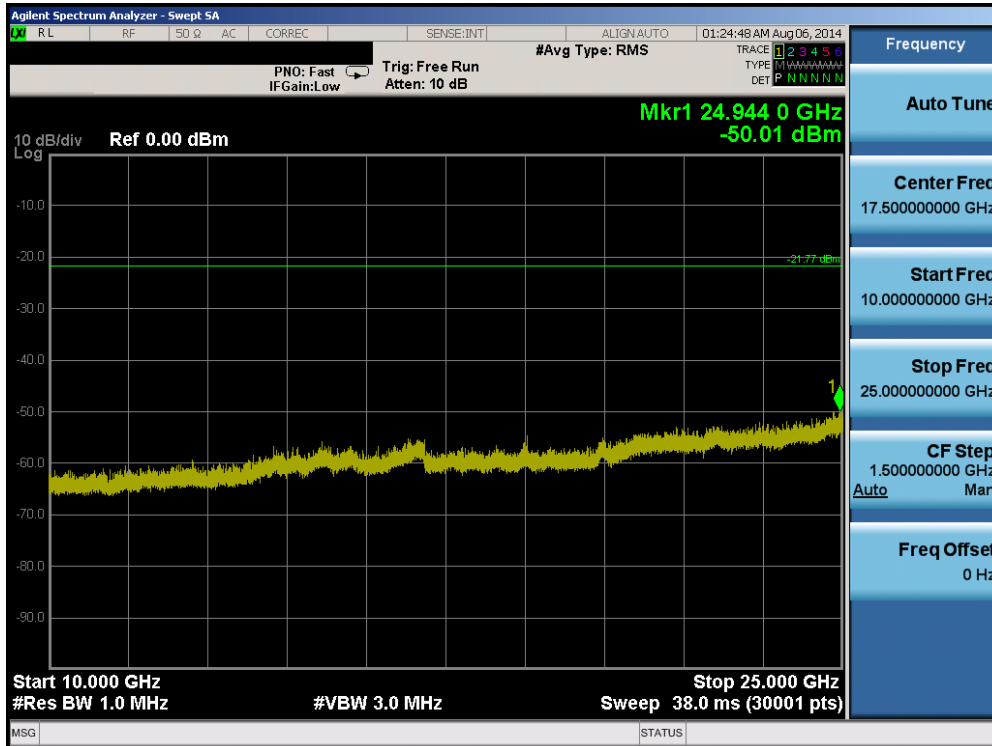
Plot 6-112. Conducted Spurious Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 86 of 121



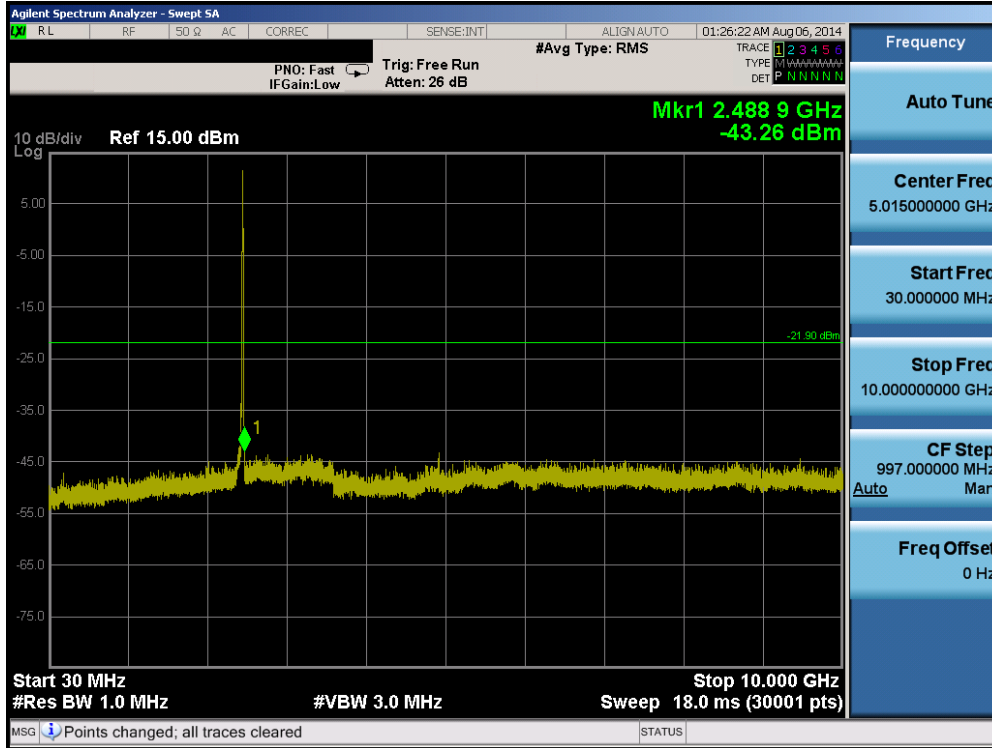


Plot 6-115. Conducted Spurious Plot (802.11b – Ch. 6)

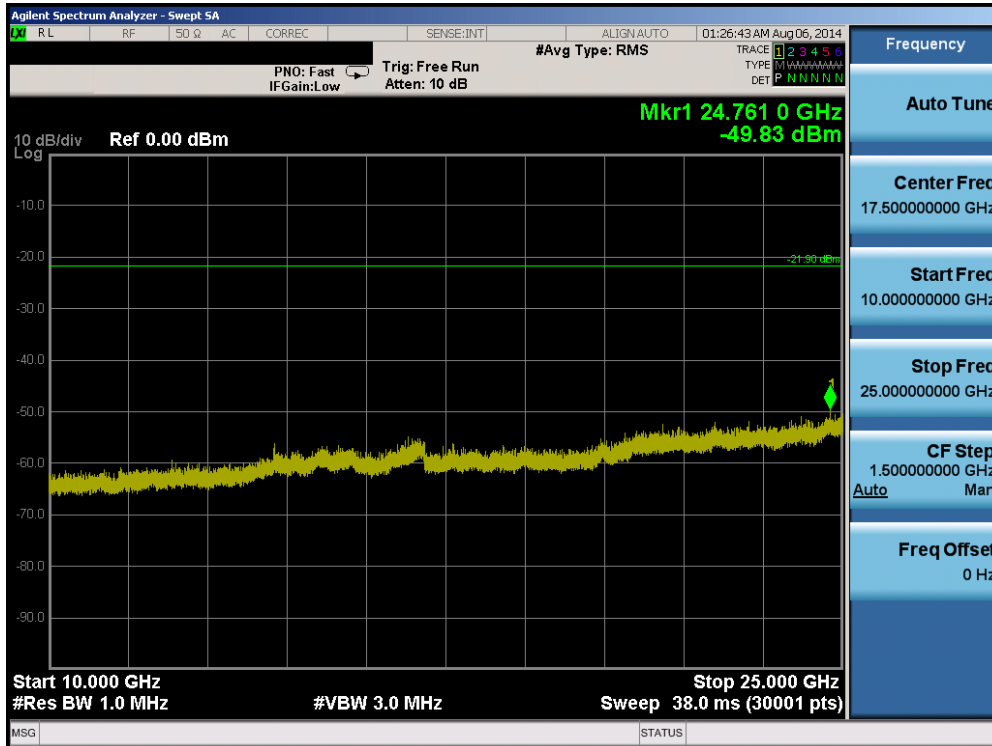


Plot 6-116. Conducted Spurious Plot (802.11b – Ch. 6)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 88 of 121



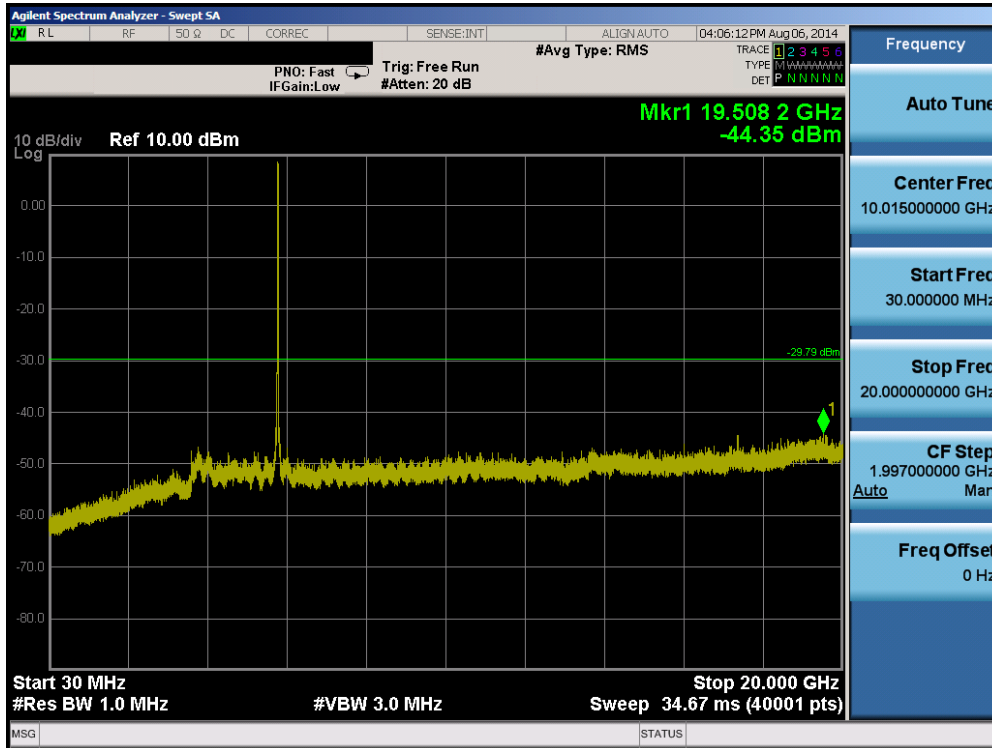
Plot 6-117. Conducted Spurious Plot (802.11b – Ch. 11)



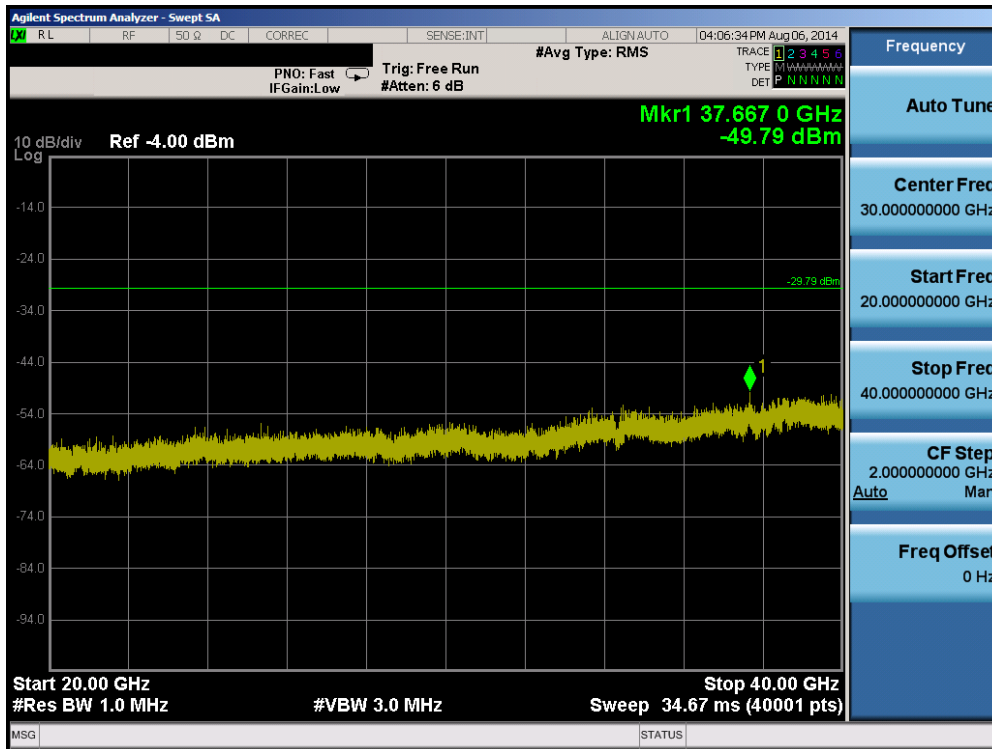
Plot 6-118. Conducted Spurious Plot (802.11b – Ch. 11)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 89 of 121





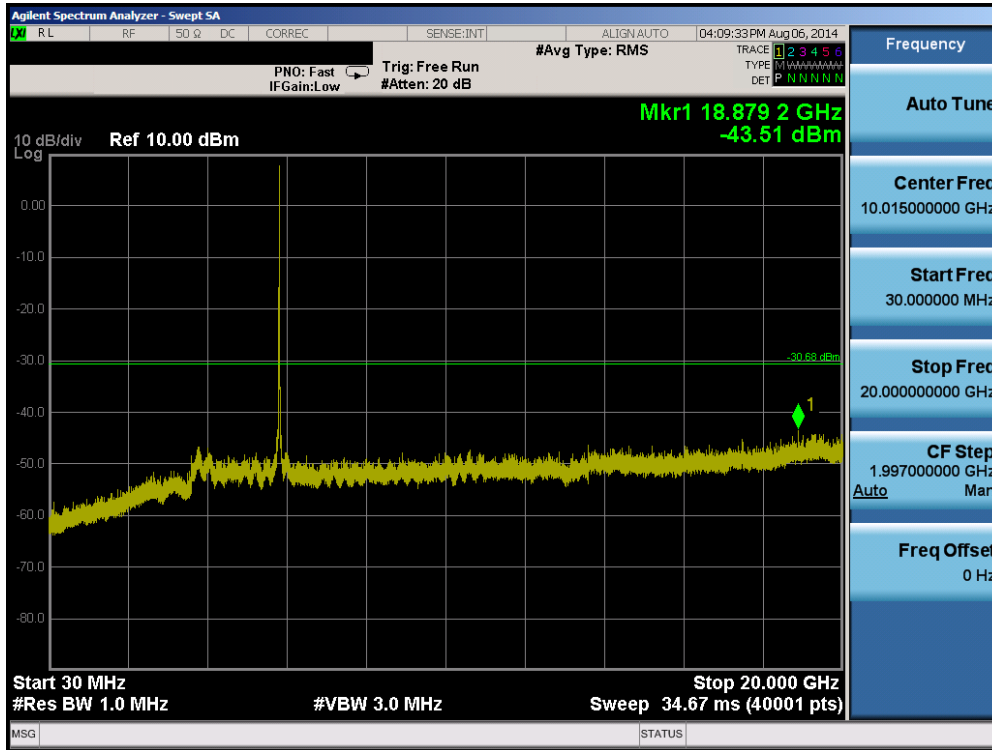


Plot 6-121. Conducted Spurious Plot (802.11a – Ch. 157)

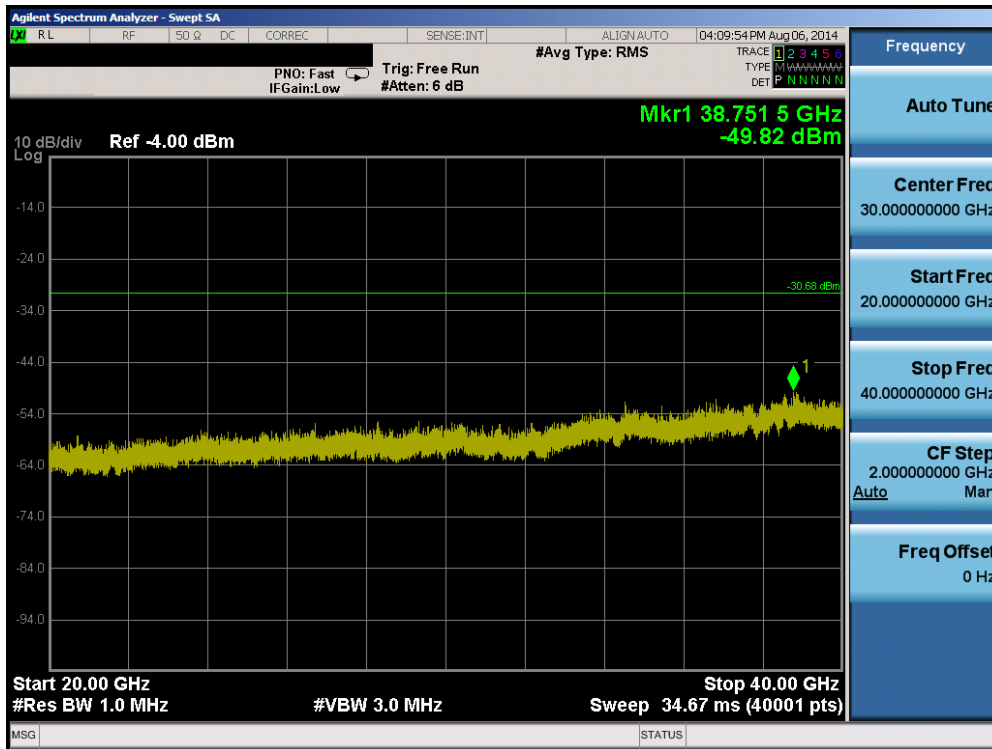


Plot 6-122. Conducted Spurious Plot (802.11a – Ch. 157)



FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 91 of 121



Plot 6-123. Conducted Spurious Plot (802.11a – Ch. 165)



Plot 6-124. Conducted Spurious Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 92 of 121

## 6.7 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

**All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-31 per Section 15.209.**

Frequency	Field Strength [ $\mu\text{V/m}$ ]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

**Table 6-31. Radiated Limits**



### Test Procedures Used

KDB 558074 v03r02 – Section 12.1, 12.2.7

### Test Settings

#### Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 v03r02

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be  $\geq 2 \times \text{span/RBW}$ )
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces

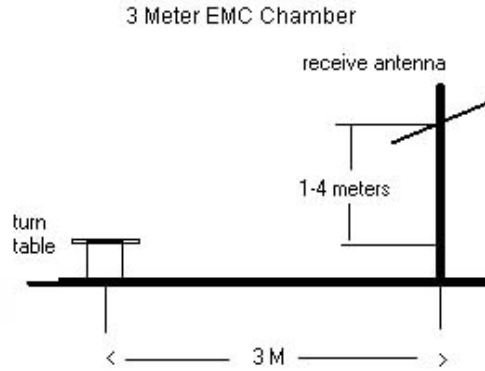
FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 93 of 121	

**Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 v03r02**



1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Test Setup**

The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-6. Test Instrument & Measurement Setup**

<b>FCC ID:</b> A3LSWDSC02G		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1407251482.A3L	<b>Test Dates:</b> 7/29 - 8/8/2014	<b>EUT Type:</b> Portable Handset	Page 94 of 121	

## Test Notes

1. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 v03r02 were not used to evaluate this device for compliance to radiated limits. All radiated spurious emissions levels were measured in a radiated test setup.
2. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-10.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The battery used with this device for testing (Model: EB-BG870BBD) contains an embedded NFC antenna.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
6. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

## Sample Calculations



### Determining Spurious Emissions Levels

- Field Strength Level  $_{[dB_{\mu V/m}]}$  = Analyzer Level  $_{[dBm]} + 107 + AFCL_{[dB/m]}$
- AFCL  $_{[dB/m]} = \text{Antenna Factor}_{[dB/m]} + \text{Cable Loss}_{[dB]}$
- Margin  $_{[dB]} = \text{Field Strength Level}_{[dB_{\mu V/m}]} - \text{Limit}_{[dB_{\mu V/m}]}$

### Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 6.8 was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain}$$

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## Antenna-1 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2412MHz  
 Channel: 01



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	-100.80	Avg	H	H	40.41	46.61	53.98	-7.37
4824.00	-94.39	Peak	H	H	40.41	53.02	73.98	-20.96
12060.00	-111.84	Avg	H	H	48.58	43.75	53.98	-10.23
12060.00	-99.84	Peak	H	H	48.58	55.75	73.98	-18.23

Table 6-32. Radiated Measurements

Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2437MHz  
 Channel: 06

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	-101.03	Avg	H	H	40.75	46.72	53.98	-7.26
4874.00	-95.64	Peak	H	H	40.75	52.11	73.98	-21.87
7311.00	-107.56	Avg	H	H	44.00	43.43	53.98	-10.55
7311.00	-98.14	Peak	H	H	44.00	52.85	73.98	-21.13
12185.00	-112.02	Avg	H	H	48.11	43.10	53.98	-10.88
12185.00	-99.94	Peak	H	H	48.11	55.18	73.98	-18.80

Table 6-33. Radiated Measurements

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2462MHz  
 Channel: 11



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4924.00	-102.68	Avg	H	H	41.08	45.39	53.98	-8.59
4924.00	-97.69	Peak	H	H	41.08	50.38	73.98	-23.60
7386.00	-104.78	Avg	H	H	44.12	46.34	53.98	-7.64
7386.00	-97.28	Peak	H	H	44.12	53.84	73.98	-20.14
12310.00	-117.35	Avg	H	H	47.98	37.63	53.98	-16.35
12310.00	-105.67	Peak	H	H	47.98	49.31	73.98	-24.67

**Table 6-34. Radiated Measurements**

Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5745MHz  
 Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
11490.00	-114.98	Avg	H	H	47.54	0.00	39.57	53.98	-14.41
11490.00	-103.52	Peak	H	H	47.54	0.00	51.03	73.98	-22.95
22980.00	-91.05	Avg	H	H	44.60	-9.54	51.00	53.98	-2.98
22980.00	-84.40	Peak	H	H	44.60	-9.54	57.65	73.98	-16.33

**Table 6-35. Radiated Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5785MHz  
 Channel: 157



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
11570.00	-115.97	Avg	H	H	47.89	0.00	38.92	53.98	-15.06
11570.00	-104.50	Peak	H	H	47.89	0.00	50.39	73.98	-23.59

**Table 6-36. Radiated Measurements**

Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5825MHz  
 Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
11650.00	-116.19	Avg	H	H	48.18	0.00	38.99	53.98	-14.99
11650.00	-104.52	Peak	H	H	48.18	0.00	50.66	73.98	-23.32

**Table 6-37. Radiated Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## Antenna-2 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2412MHz  
 Channel: 01



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	-96.54	Avg	H	H	40.41	50.87	53.98	-3.11
4824.00	-92.77	Peak	H	H	40.41	54.64	73.98	-19.34
12060.00	-114.89	Avg	H	H	48.58	40.70	53.98	-13.28
12060.00	-103.13	Peak	H	H	48.58	52.46	73.98	-21.52

Table 6-38. Radiated Measurements

Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2437MHz  
 Channel: 06

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	-96.77	Avg	H	H	40.75	50.98	53.98	-3.00
4874.00	-92.71	Peak	H	H	40.75	55.04	73.98	-18.94
7311.00	-114.68	Avg	H	H	44.00	36.31	53.98	-17.67
7311.00	-104.03	Peak	H	H	44.00	46.96	73.98	-27.02
12185.00	-114.95	Avg	H	H	48.11	40.17	53.98	-13.81
12185.00	-103.92	Peak	H	H	48.11	51.20	73.98	-22.78

Table 6-39. Radiated Measurements

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11b  
 Worst Case Transfer Rate: 1 Mbps  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2462MHz  
 Channel: 11



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-97.27	Avg	H	H	41.08	50.80	53.98	-3.18
4924.00	-91.64	Peak	H	H	41.08	56.43	73.98	-17.55
7386.00	-111.04	Avg	H	H	44.12	40.08	53.98	-13.90
7386.00	-100.44	Peak	H	H	44.12	50.68	73.98	-23.30
12310.00	-111.74	Avg	H	H	47.98	43.24	53.98	-10.74
12310.00	-100.24	Peak	H	H	47.98	54.74	73.98	-19.24

**Table 6-40. Radiated Measurements**

Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5745MHz  
 Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11490.00	-111.91	Avg	H	H	47.54	0.00	42.64	53.98	-11.34
11490.00	-100.53	Peak	H	H	47.54	0.00	54.02	73.98	-19.96
22980.00	-103.41	Avg	H	H	44.60	-9.54	38.64	53.98	-15.34
22980.00	-96.55	Peak	H	H	44.60	-9.54	45.50	73.98	-28.48

**Table 6-41. Radiated Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5785MHz  
 Channel: 157

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11570.00	-111.84	Avg	H	H	47.89	0.00	43.05	53.98	-10.93
11570.00	-100.14	Peak	H	H	47.89	0.00	54.75	73.98	-19.23

**Table 6-42. Radiated Measurements**

Worst Case Mode: 802.11a  
 Worst Case Transfer Rate: 6 Mbps  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5825MHz  
 Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11650.00	-111.79	Avg	H	H	48.18	0.00	43.39	53.98	-10.59
11650.00	-100.49	Peak	H	H	48.18	0.00	54.69	73.98	-19.29

**Table 6-43. Radiated Measurements**

## MIMO Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2412MHz  
 Channel: 01



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4824.00	-105.14	Avg	H	H	40.41	42.27	53.98	-11.71
4824.00	-93.20	Peak	H	H	40.41	54.21	73.98	-19.77
12060.00	-111.86	Avg	H	H	48.58	43.73	53.98	-10.25
12060.00	-100.79	Peak	H	H	48.58	54.80	73.98	-19.18

Table 6-44. Radiated Measurements

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2437MHz  
 Channel: 06

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4874.00	-106.22	Avg	H	H	40.75	41.53	53.98	-12.45
4874.00	-94.51	Peak	H	H	40.75	53.24	73.98	-20.74
7311.00	-110.44	Avg	H	H	44.00	40.55	53.98	-13.43
7311.00	-98.92	Peak	H	H	44.00	52.07	73.98	-21.91
12185.00	-111.82	Avg	H	H	48.11	43.30	53.98	-10.68
12185.00	-100.14	Peak	H	H	48.11	54.98	73.98	-19.00

Table 6-45. Radiated Measurements

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 3 Meters  
 Operating Frequency: 2462MHz  
 Channel: 11



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4924.00	-104.66	Avg	H	H	41.08	43.41	53.98	-10.57
4924.00	-92.18	Peak	H	H	41.08	55.89	73.98	-18.09
7386.00	-107.45	Avg	H	H	44.12	43.67	53.98	-10.31
7386.00	-95.88	Peak	H	H	44.12	55.24	73.98	-18.74
12310.00	-111.66	Avg	H	H	47.98	43.32	53.98	-10.66
12310.00	-100.49	Peak	H	H	47.98	54.49	73.98	-19.49

**Table 6-46. Radiated Measurements**

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5745MHz  
 Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
11490.00	-111.89	Avg	H	H	47.54	0.00	42.66	53.98	-11.32
11490.00	-99.94	Peak	H	H	47.54	0.00	54.61	73.98	-19.37
22980.00	-99.09	Avg	H	H	44.60	-9.54	42.96	53.98	-11.02
22980.00	-94.93	Peak	H	H	44.60	-9.54	47.12	73.98	-26.86

**Table 6-47. Radiated Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5785MHz  
 Channel: 157



Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11570.00	-111.80	Avg	H	H	47.89	0.00	43.09	53.98	-10.89
11570.00	-100.11	Peak	H	H	47.89	0.00	54.78	73.98	-19.20

**Table 6-48. Radiated Measurements**

Worst Case Mode: 802.11n  
 Worst Case Transfer Rate: MCS8  
 Distance of Measurements: 1 & 3 Meters  
 Operating Frequency: 5825MHz  
 Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11650.00	-111.79	Avg	H	H	48.18	0.00	43.39	53.98	-10.59
11650.00	-99.62	Peak	H	H	48.18	0.00	55.56	73.98	-18.42

**Table 6-49. Radiated Measurements**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 104 of 121	

## 6.8 Antenna-1 Radiated Restricted Band Edge Measurements

~~§15.205~~ §15.209

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

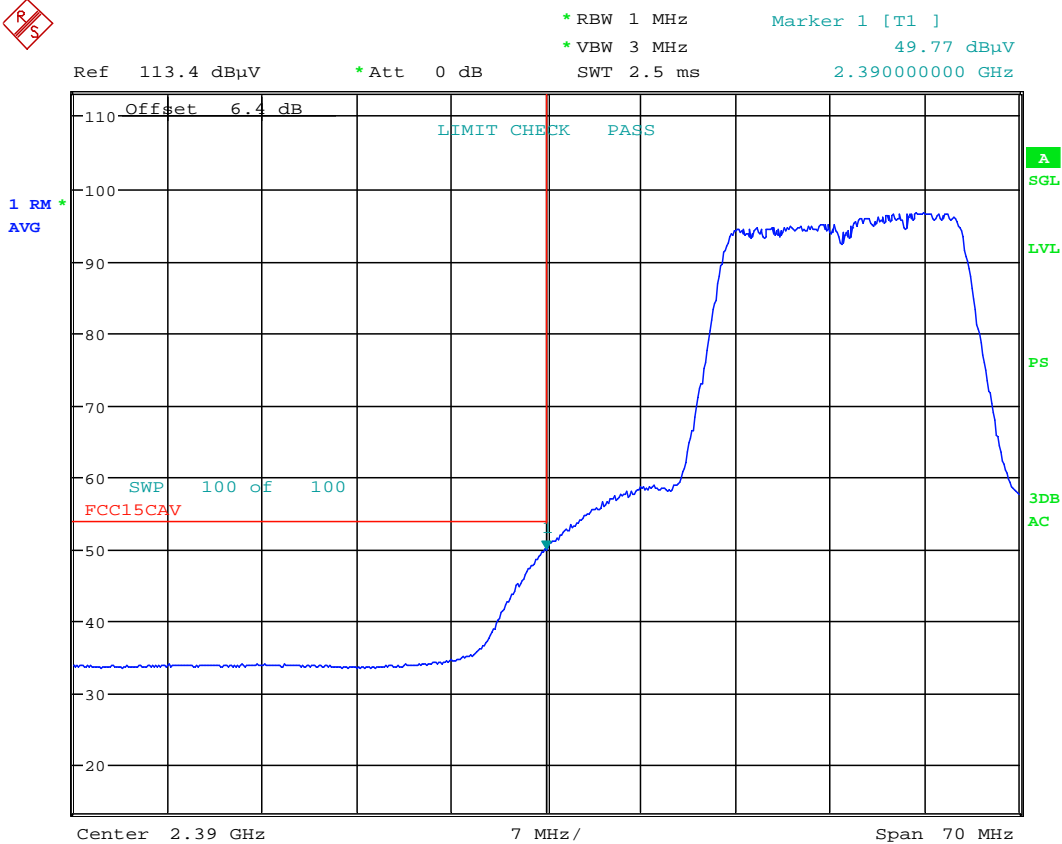
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1

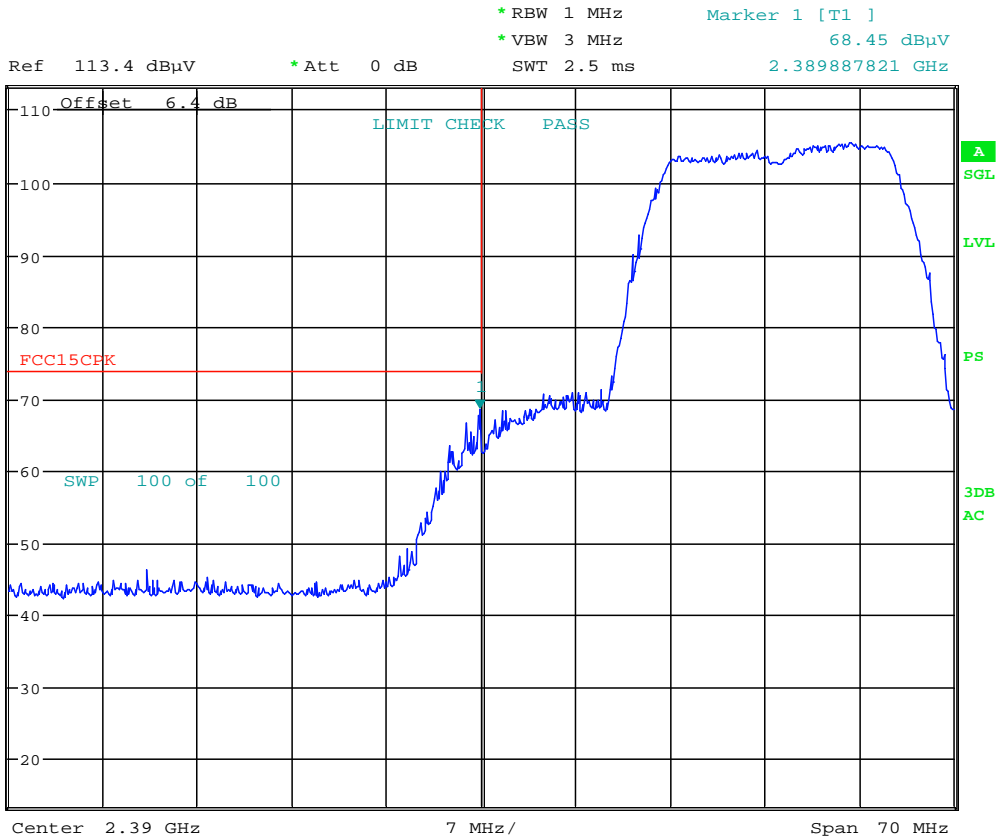


Date: 29.JUL.2014 19:56:28

**Plot 6-125. Radiated Restricted Lower Band Edge Measurement (Average)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Radiated Restricted Band Edge Measurements**  
**§15.205 §15.209**



Date: 29.JUL.2014 19:58:30

**Plot 6-126. Radiated Restricted Lower Band Edge Measurement (Peak)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 106 of 121	

# Radiated Restricted Band Edge Measurements

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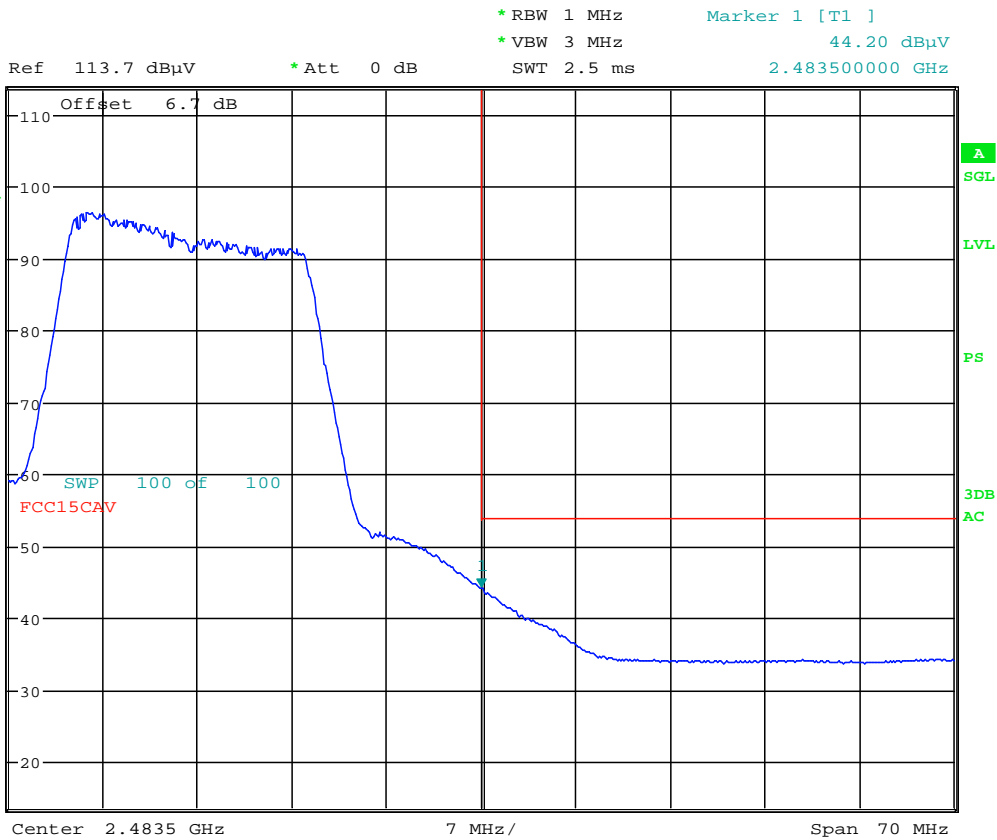
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11

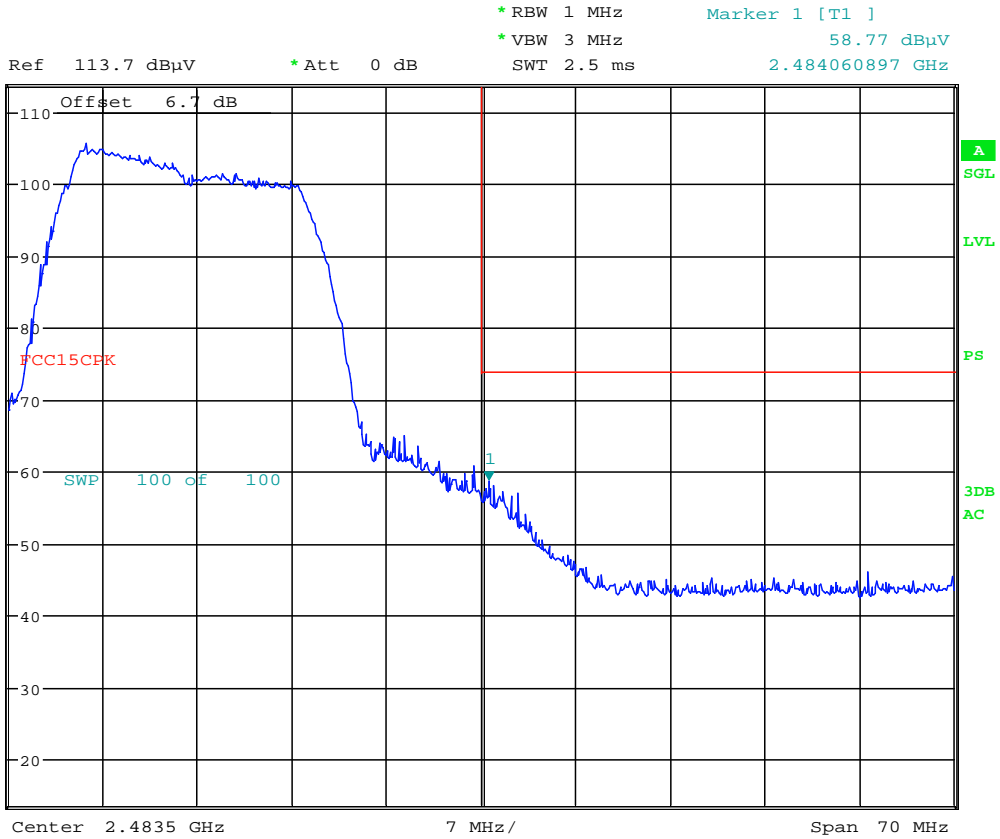


Date: 29.JUL.2014 20:08:01

**Plot 6-127. Radiated Restricted Upper Band Edge Measurement (Average)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 107 of 121	

**Radiated Restricted Band Edge Measurements**  
**§15.205 §15.209**



Date: 29.JUL.2014 20:09:00

**Plot 6-128. Radiated Restricted Upper Band Edge Measurement (Peak)**

<b>FCC ID:</b> A3LSWDSC02G		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1407251482.A3L	<b>Test Dates:</b> 7/29 - 8/8/2014	<b>EUT Type:</b> Portable Handset	Page 108 of 121	

## 6.9 Antenna-2 Radiated Restricted Band Edge Measurements

~~§15.205~~ §15.209

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

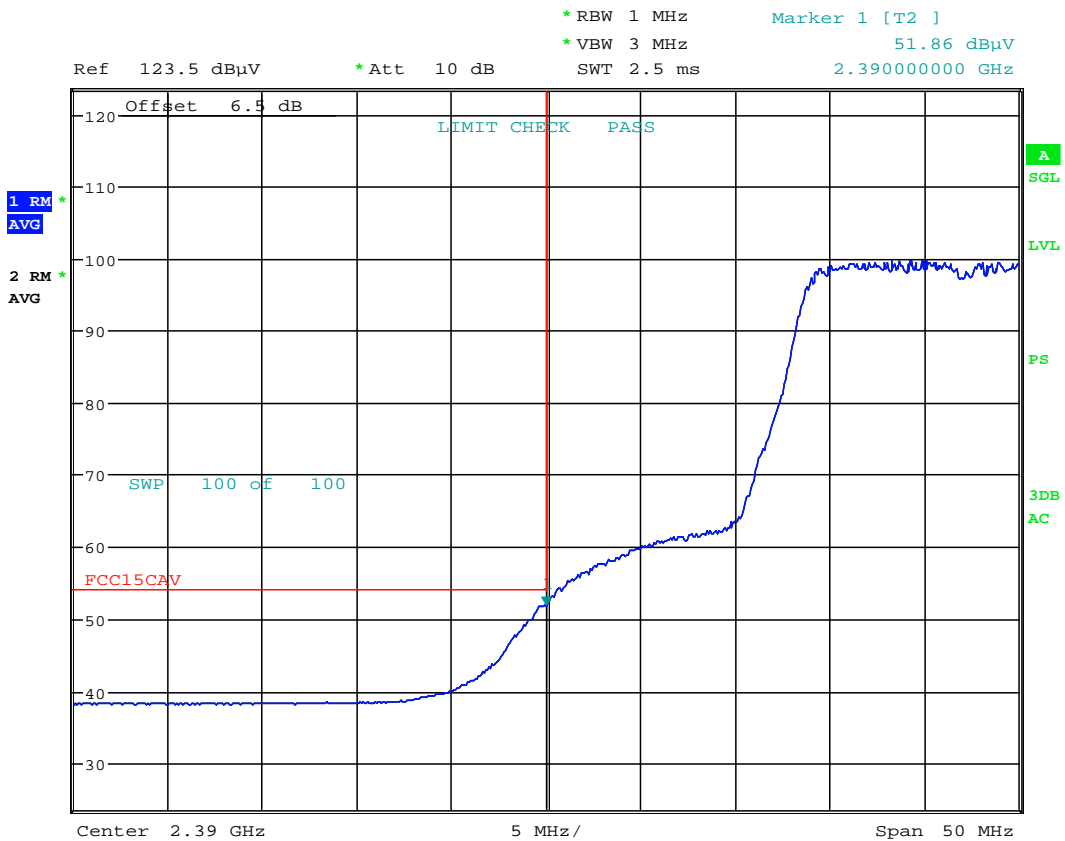
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1



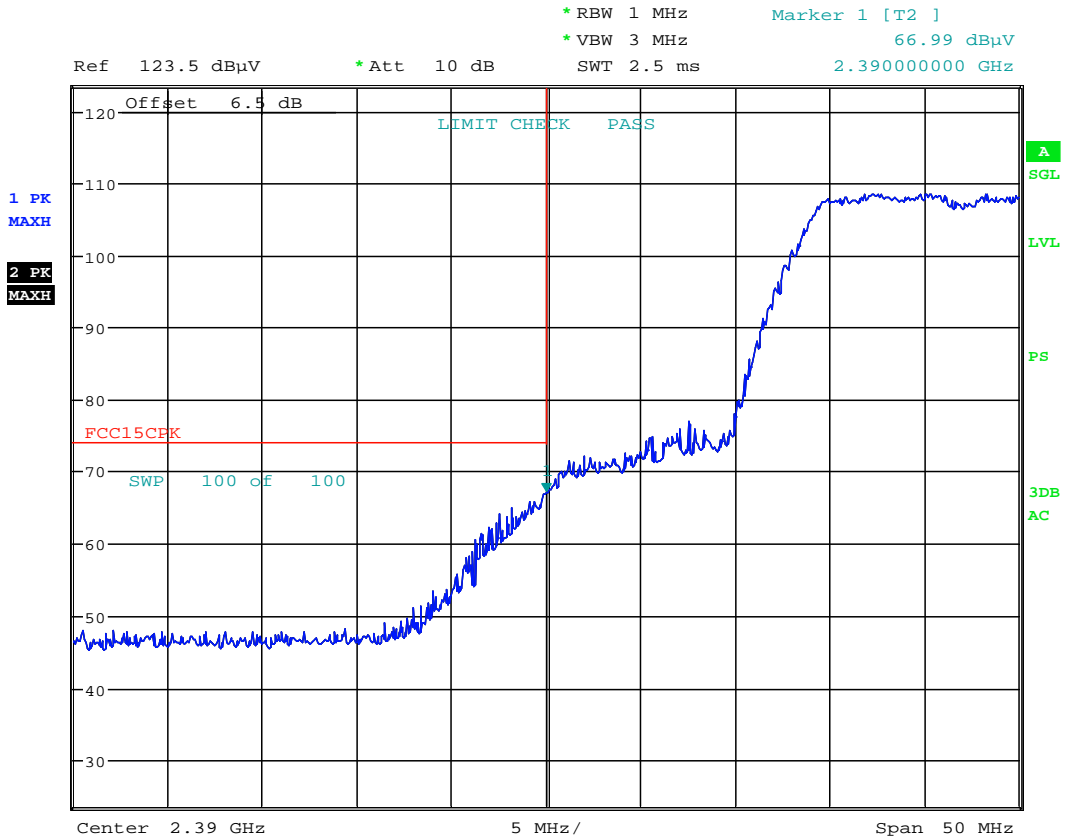
Date: 5.AUG.2014 22:04:23

**Plot 6-129. Radiated Restricted Lower Band Edge Measurement (Average)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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# Radiated Restricted Band Edge Measurements

## §15.205 §15.209



Date: 5.AUG.2014 22:05:20

**Plot 6-130. Radiated Restricted Lower Band Edge Measurement (Peak)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 110 of 121	

# Radiated Restricted Band Edge Measurements

§15.205 §15.209

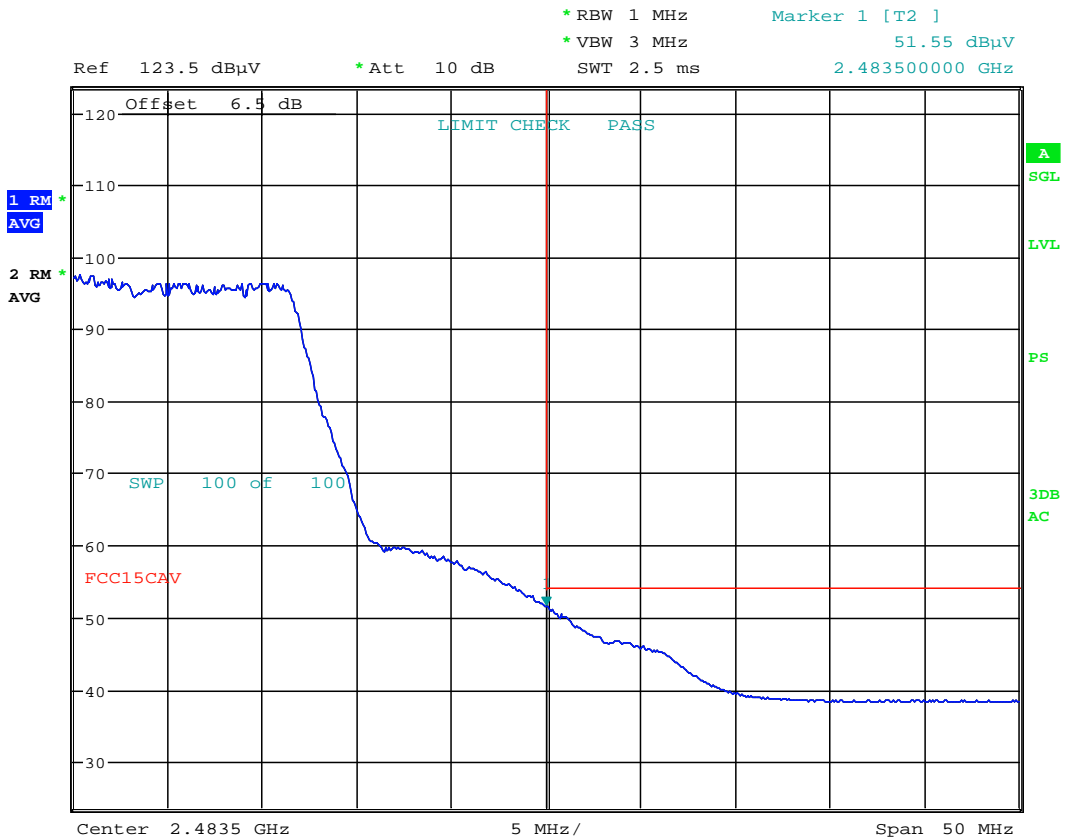
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



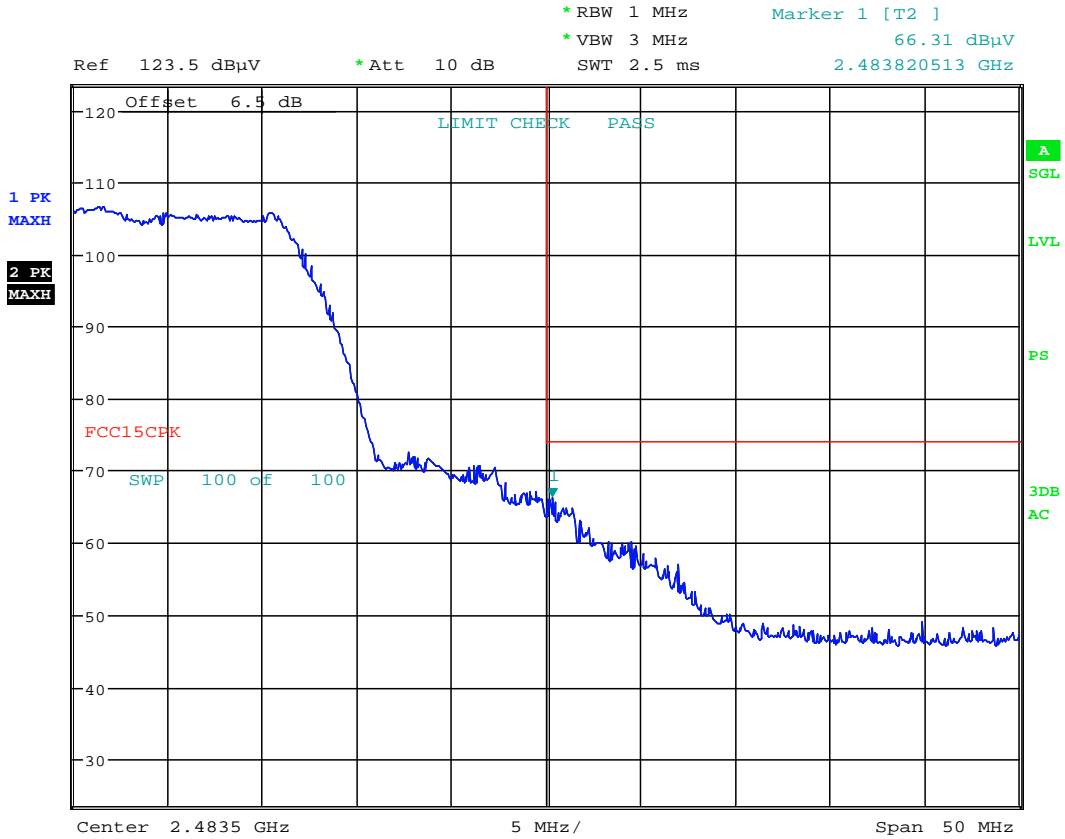
Date: 5.AUG.2014 22:13:59

**Plot 6-131. Radiated Restricted Upper Band Edge Measurement (Average)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 111 of 121	



# Radiated Restricted Band Edge Measurements

§15.205 §15.209



Date: 5.AUG.2014 22:15:16

**Plot 6-132. Radiated Restricted Upper Band Edge Measurement (Peak)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 112 of 121	

## 6.10 MIMO Radiated Restricted Band Edge Measurements

### §15.205 §15.209

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

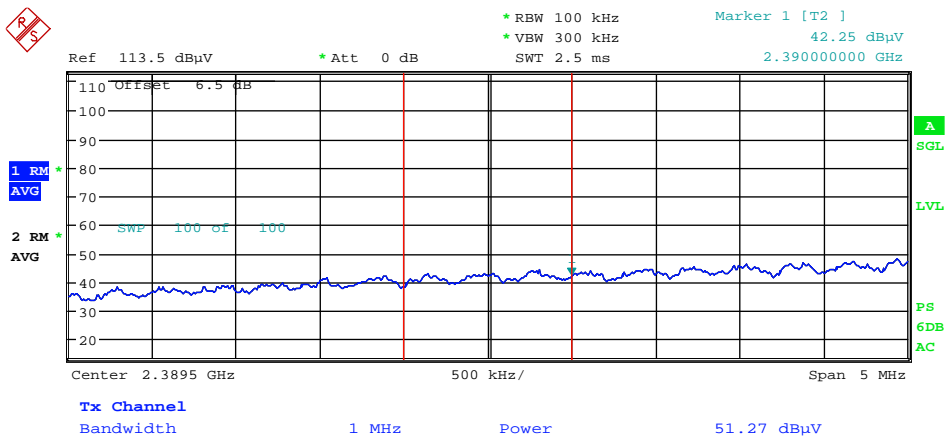
Worst Case Mode: 802.11n

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1



Date: 6.AUG.2014 02:36:04

### Plot 6-133. Radiated Restricted Lower Band Edge Measurement (Average)

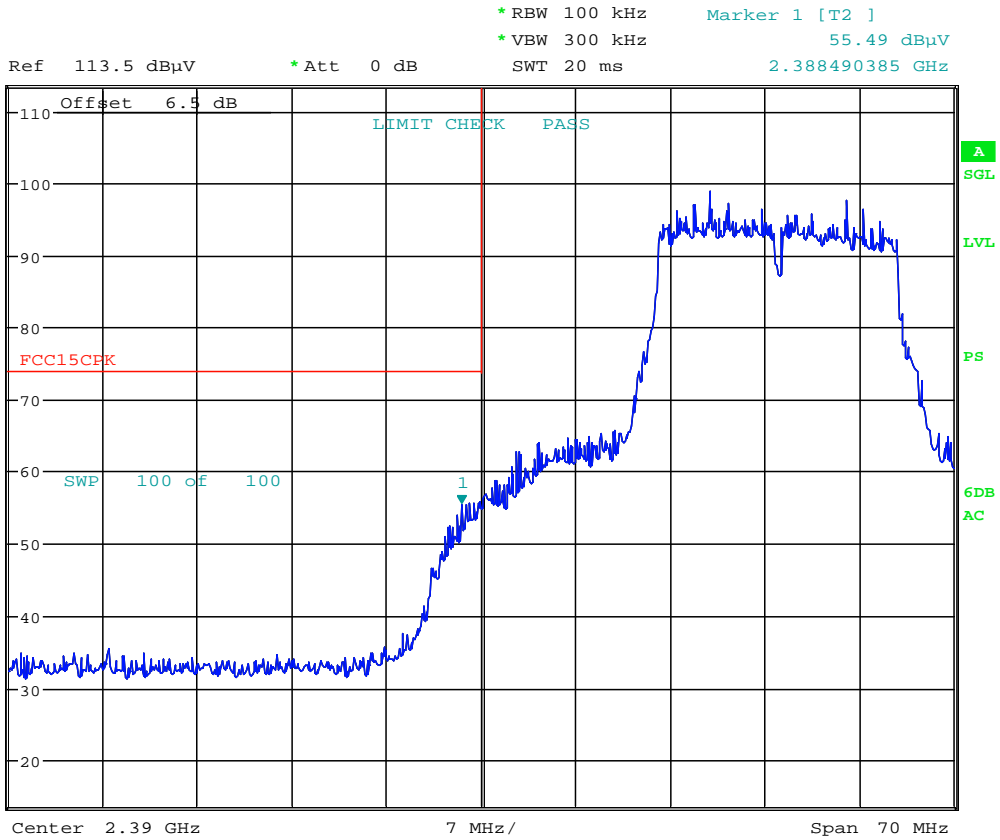
**Note:**

A channel integration method was used to determine compliance with the out of band average radiated spurious emissions limit in the 2310 – 2390MHz band. Per KDB 558074 Section 13.3.3, a measurement was performed using a RBW of 100kHz at the 2390MHz band edge. The results were integrated up to the 1MHz reference bandwidth to show compliance with the 15.209 radiated limit for emissions greater than 1GHz.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 113 of 121	

# Radiated Restricted Band Edge Measurements

## §15.205 §15.209



Date: 6.AUG.2014 02:37:13

**Plot 6-134. Radiated Restricted Lower Band Edge Measurement (Peak)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 114 of 121

# Radiated Restricted Band Edge Measurements

## §15.205 §15.209

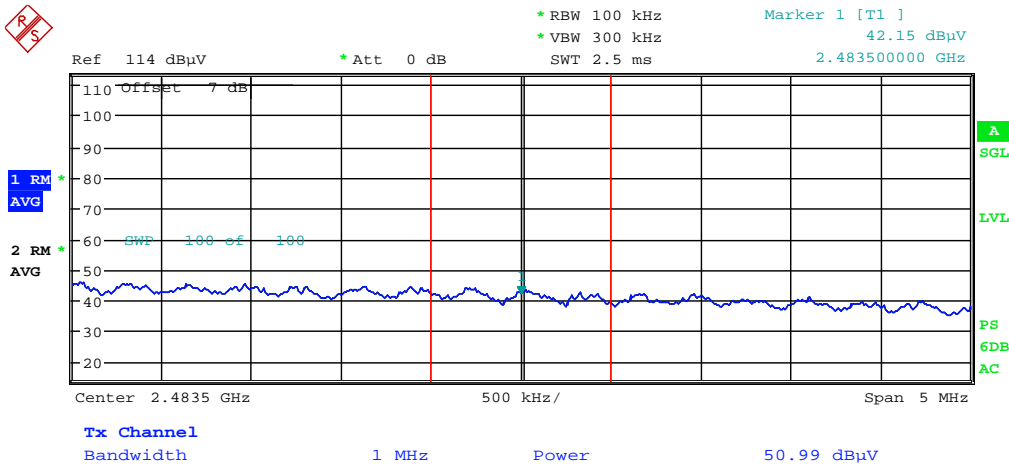
Worst Case Mode: 802.11n

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



Date: 6.AUG.2014 02:44:53

**Plot 6-135. Radiated Restricted Upper Band Edge Measurement (Average)**

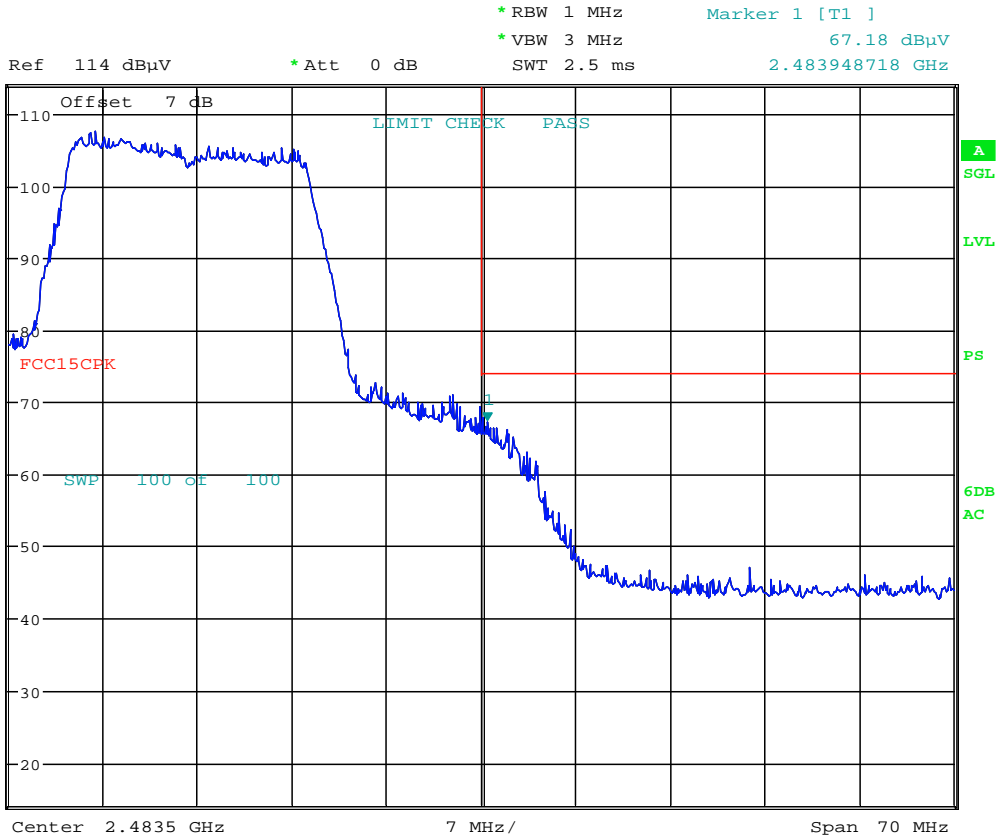
**Note:**

A channel integration method was used to determine compliance with the out of band average radiated spurious emissions limit in the 2483.5 – 2500MHz band. Per KDB 558074 Section 13.3.3, a measurement was performed using a RBW of 100kHz at the 2483.5MHz band edge. The results were integrated up to the 1MHz reference bandwidth to show compliance with the 15.209 radiated limit for emissions greater than 1GHz.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 115 of 121	

# Radiated Restricted Band Edge Measurements

§15.205 §15.209



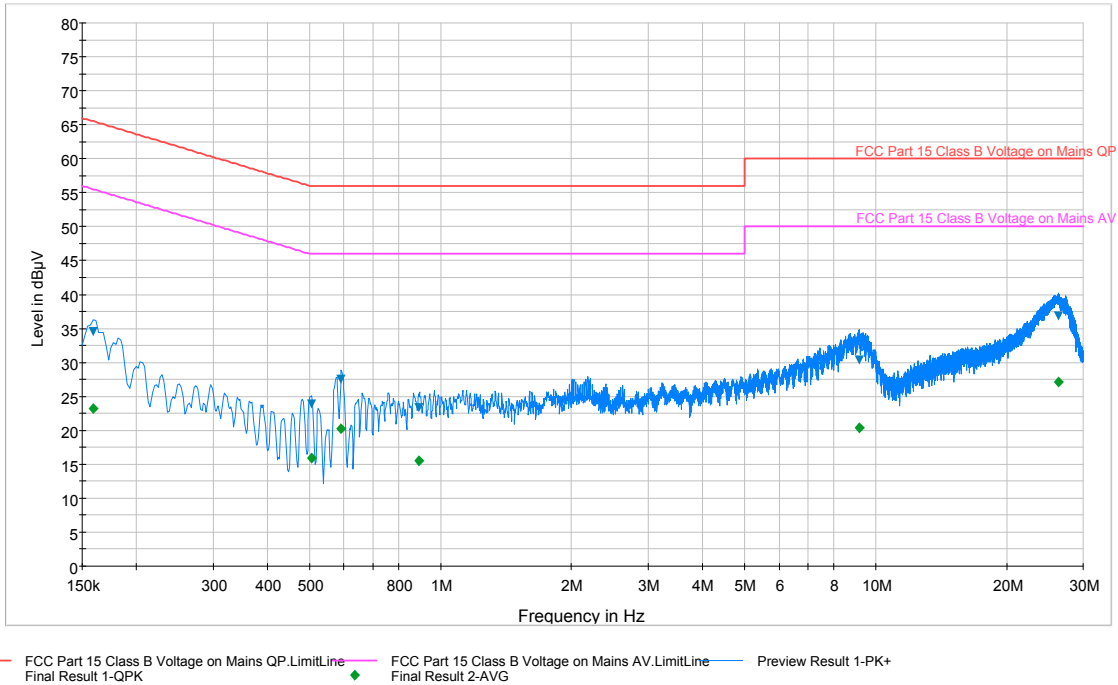
Date: 6.AUG.2014 02:43:22

**Plot 6-136. Radiated Restricted Upper Band Edge Measurement (Peak)**

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset	Page 116 of 121	

## 6.11 Line-Conducted Test Data

### \$15.207



**Plot 6-137. Line Conducted Plot with 802.11b (L1)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.159	L1	0.2	34.50	65.50	31.00	23.20	55.50	32.40
0.506	L1	0.1	23.90	56.00	32.10	16.00	46.00	30.00
0.591	L1	0.1	27.50	56.00	28.50	20.20	46.00	25.80
0.893	L1	0.1	23.40	56.00	32.60	15.50	46.00	30.50
9.175	L1	0.3	30.30	60.00	29.70	20.30	50.00	29.70
26.261	L1	0.8	36.80	60.00	23.20	27.10	50.00	22.90

**Table 6-50. Line Conducted Data with 802.11b (L1)**

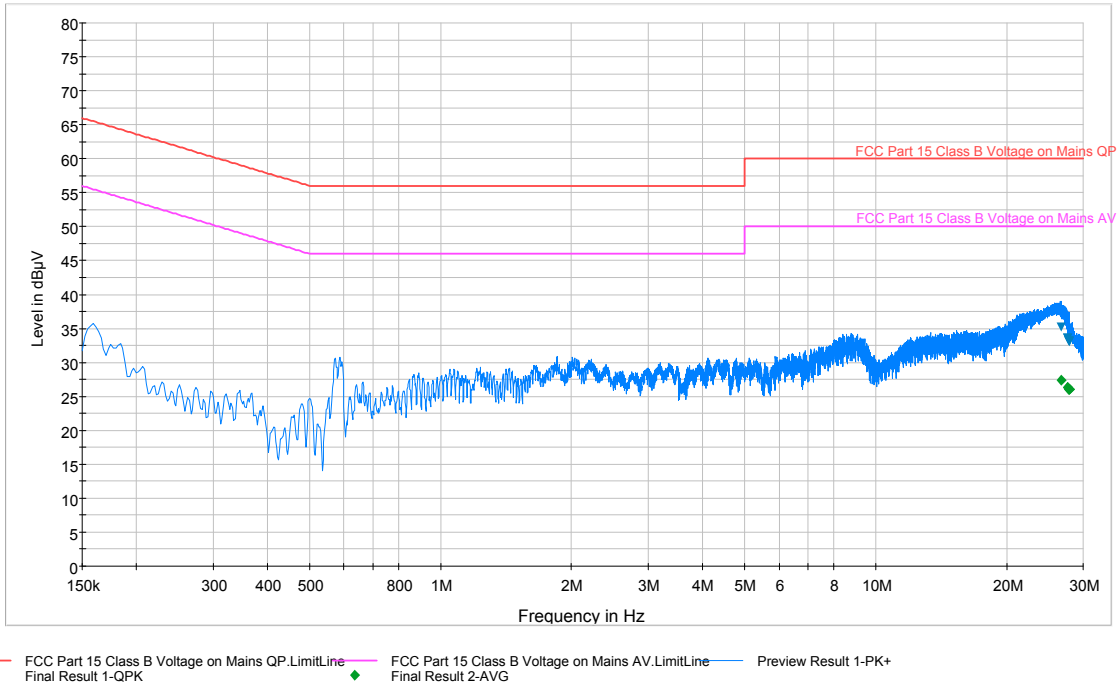
**Notes:**

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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# Line-Conducted Test Data

## §15.207



**Plot 6-138. Line Conducted Plot with 802.11b (N)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
26.662	N	0.8	35.30	60.00	24.70	27.30	50.00	22.70
27.620	N	0.9	33.60	60.00	26.40	26.30	50.00	23.70
27.643	N	0.9	33.70	60.00	26.30	26.30	50.00	23.70
27.809	N	0.9	33.20	60.00	26.80	26.10	50.00	23.90
27.832	N	0.9	33.20	60.00	26.80	26.10	50.00	23.90
27.850	N	0.9	33.10	60.00	26.90	26.10	50.00	23.90

**Table 6-51. Line Conducted Data with 802.11b (N)**

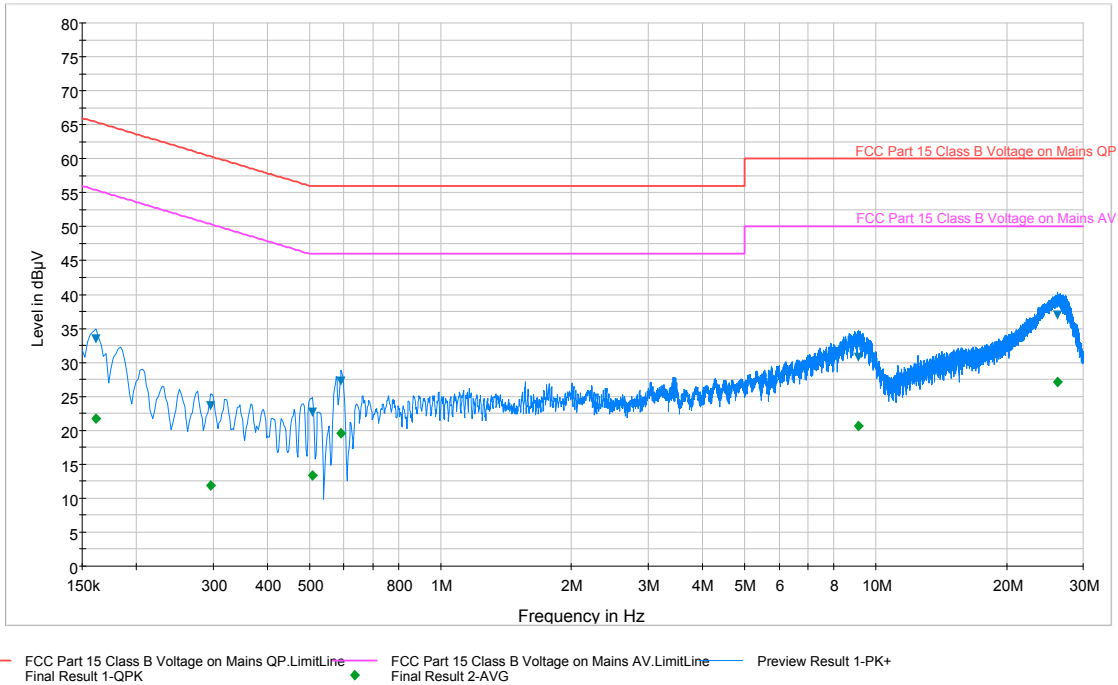
**Notes:**

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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# Line-Conducted Test Data

## §15.207



**Plot 6-139. Line Conducted Plot with 802.11a (L1)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.161	L1	0.2	33.50	65.40	31.90	21.70	55.40	33.70
0.296	L1	0.1	23.70	60.30	36.70	11.90	50.30	38.50
0.508	L1	0.1	22.60	56.00	33.40	13.30	46.00	32.70
0.591	L1	0.1	27.30	56.00	28.70	19.50	46.00	26.50
9.107	L1	0.3	30.80	60.00	29.20	20.60	50.00	29.40
26.192	L1	0.8	36.90	60.00	23.10	27.20	50.00	22.80

**Table 6-52. Line Conducted Data with 802.11a (L1)**

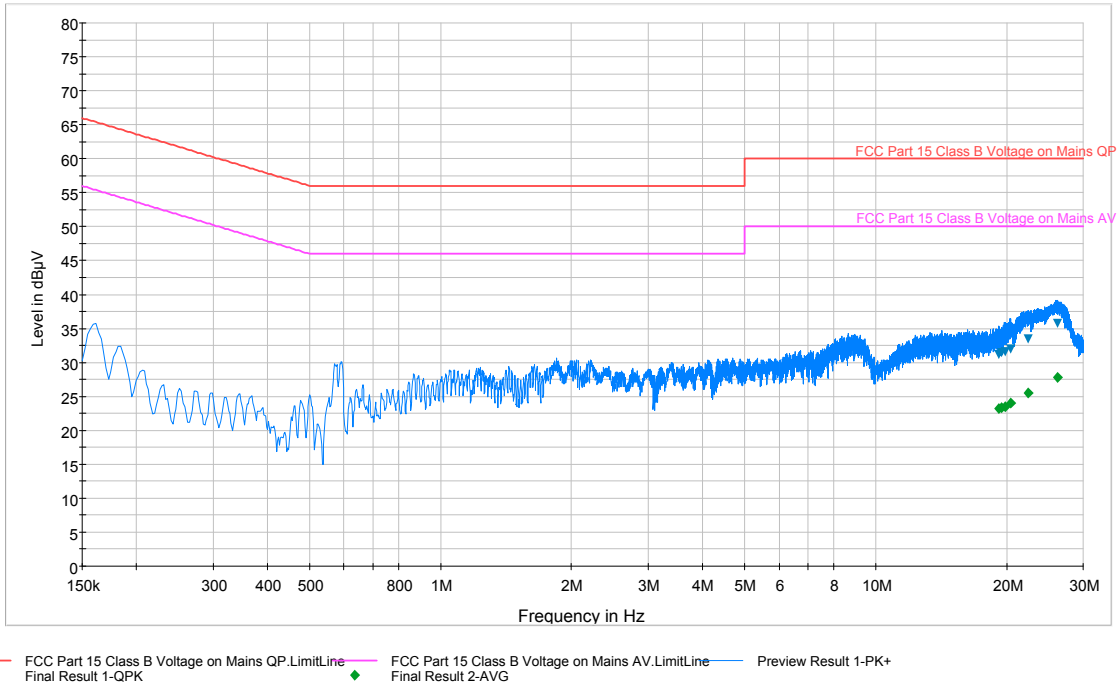
**Notes:**

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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# Line-Conducted Test Data

## §15.207



**Plot 6-140. Line Conducted Plot with 802.11a (N)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
19.205	N	0.7	31.20	60.00	28.80	23.20	50.00	26.80
19.446	N	0.7	31.40	60.00	28.60	23.30	50.00	26.70
19.815	N	0.7	31.50	60.00	28.50	23.40	50.00	26.60
20.400	N	0.7	31.90	60.00	28.10	24.00	50.00	26.00
22.423	N	0.8	33.50	60.00	26.50	25.60	50.00	24.40
26.185	N	0.8	35.80	60.00	24.20	27.70	50.00	22.30

**Table 6-53. Line Conducted Data with 802.11a (N)**



**Notes:**

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

FCC ID: A3LSWDSC02G		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1407251482.A3L	Test Dates: 7/29 - 8/8/2014	EUT Type: Portable Handset		Page 120 of 121

## 7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSWDSC02G** is in compliance with Part 15C of the FCC Rules.

<b>FCC ID:</b> A3LSWDSC02G		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1407251482.A3L	<b>Test Dates:</b> 7/29 - 8/8/2014	<b>EUT Type:</b> Portable Handset	Page 121 of 121	