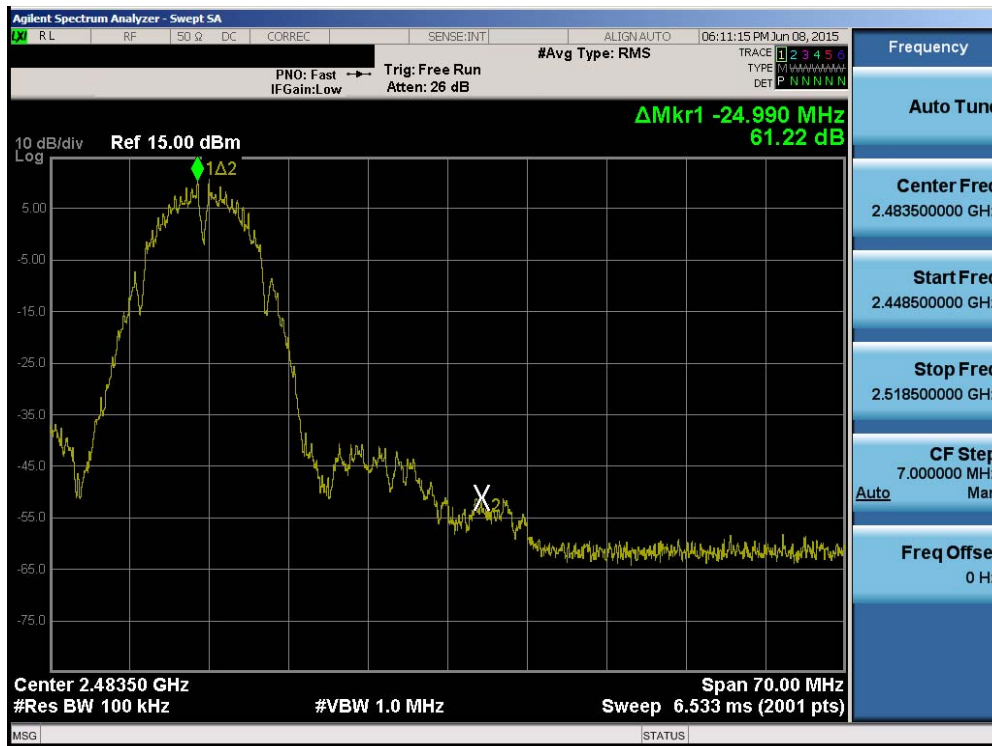


Antenna-2 Conducted Emissions at the Band Edge

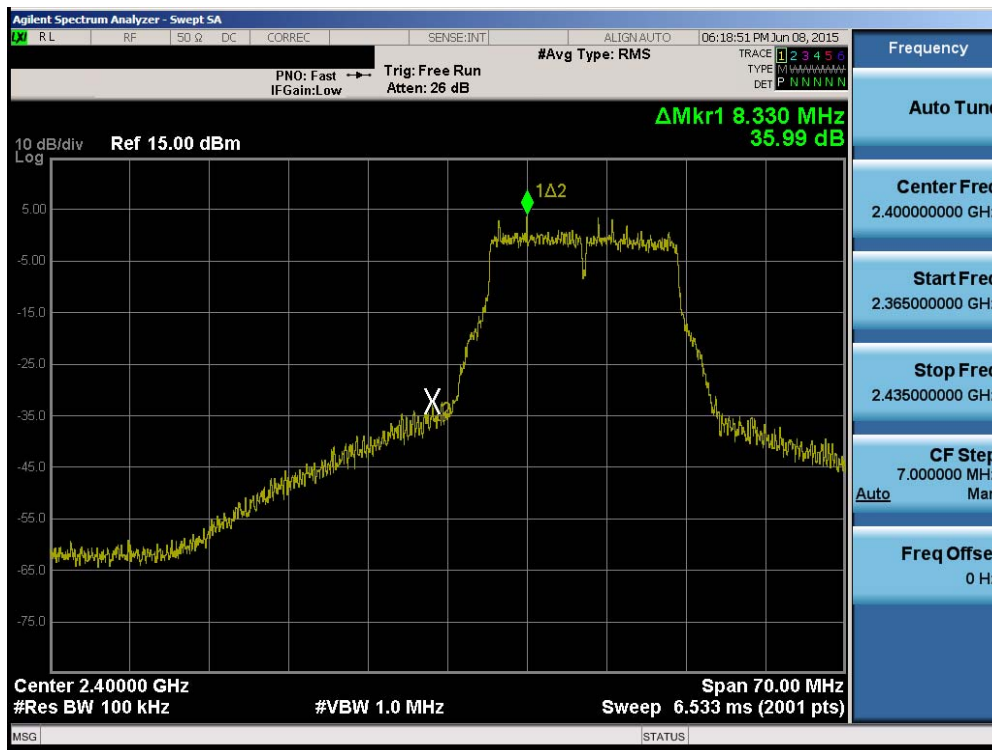


Plot 6-43. Band Edge Plot (802.11b – Ch. 1)

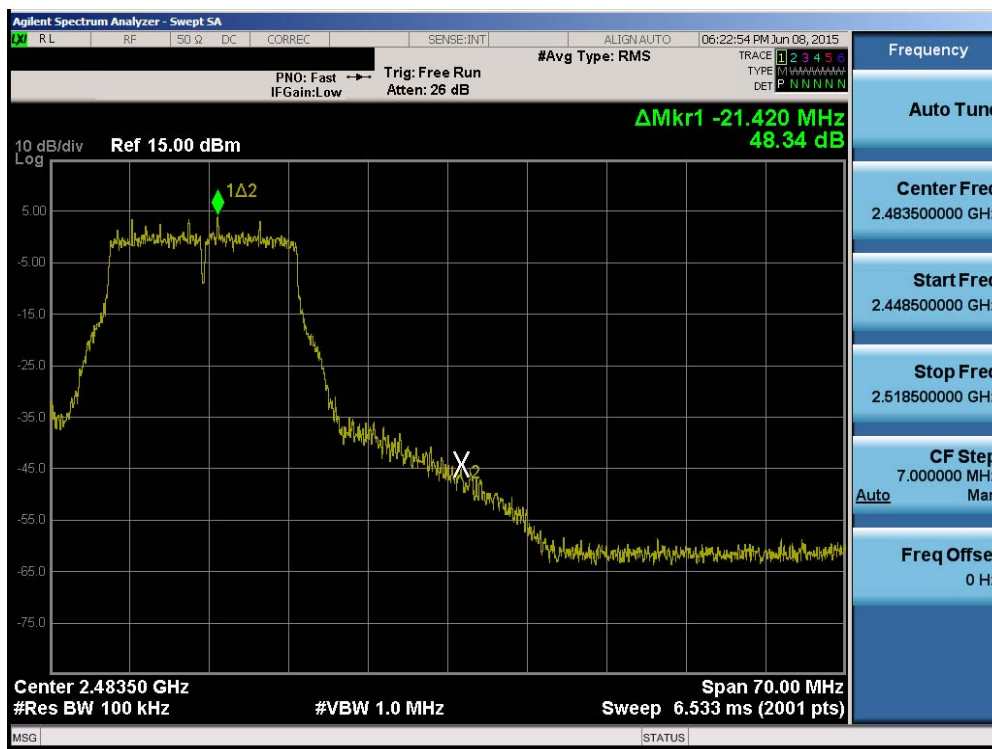


Plot 6-44. Band Edge Plot (802.11b – Ch. 11)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 41 of 82

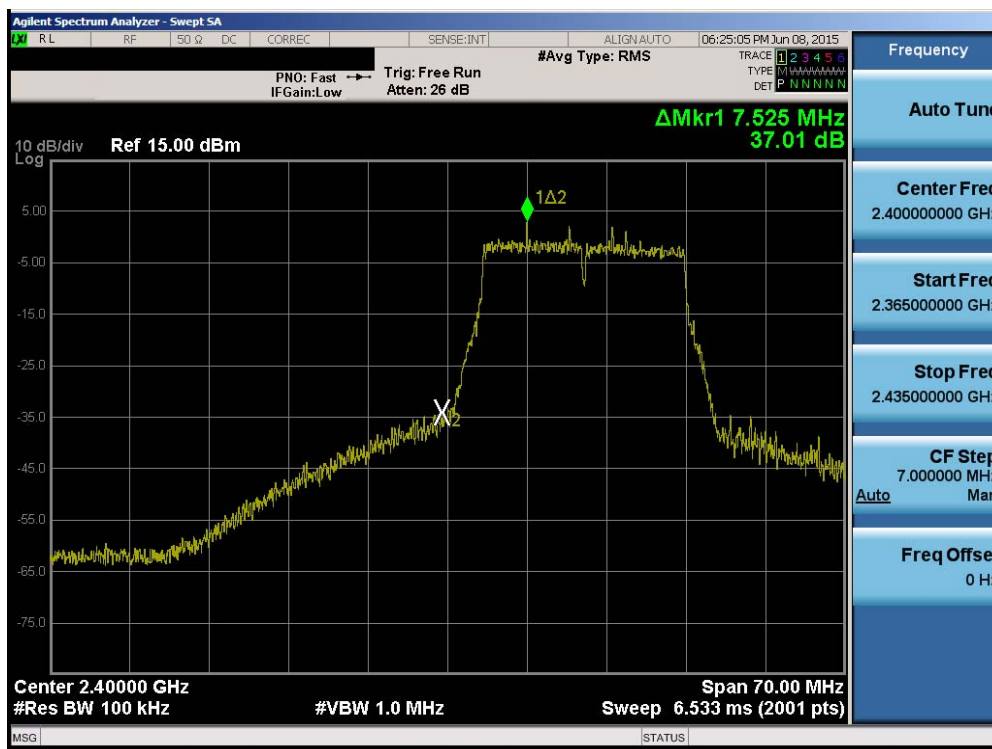


Plot 6-45. Band Edge Plot (802.11g– Ch. 1)

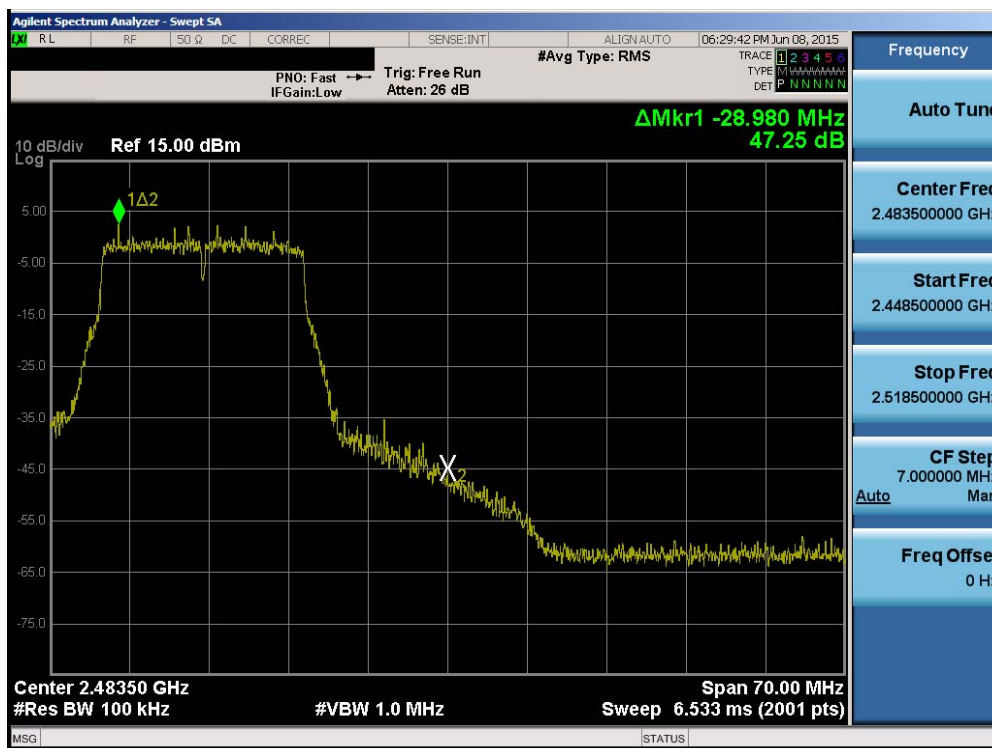


Plot 6-46. Band Edge Plot (802.11g – Ch. 11)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-47. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)



Plot 6-48. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)

FCC ID: A3LSMN920V	 FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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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”, and “n” 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 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 v03r03.

Test Procedure Used

KDB 558074 v03r03 – 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 (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.

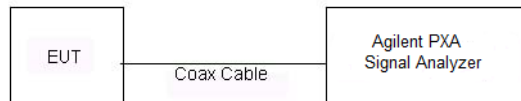


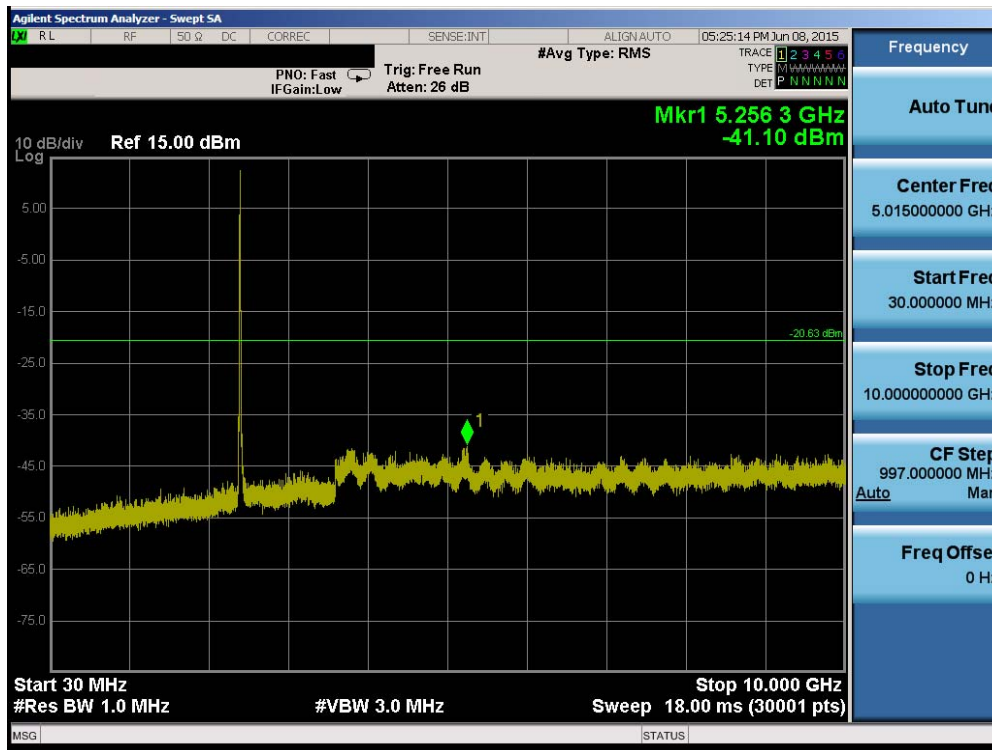
Figure 6-5. Test Instrument & Measurement Setup

Test Notes

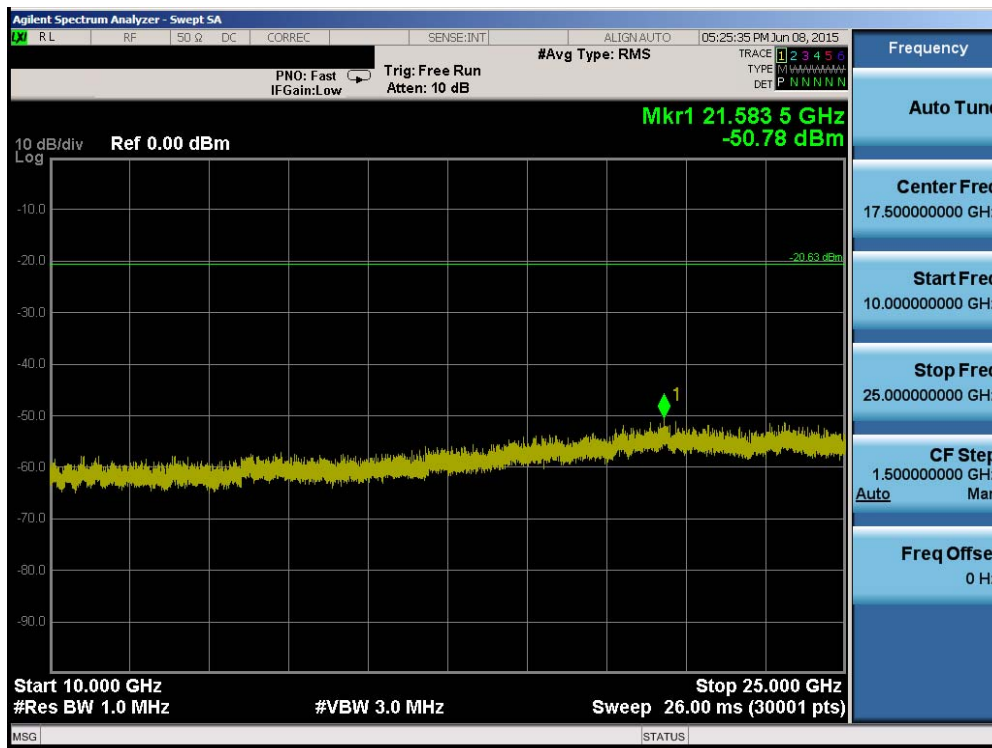
1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 30dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz 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.

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Antenna-1 Conducted Spurious Emission

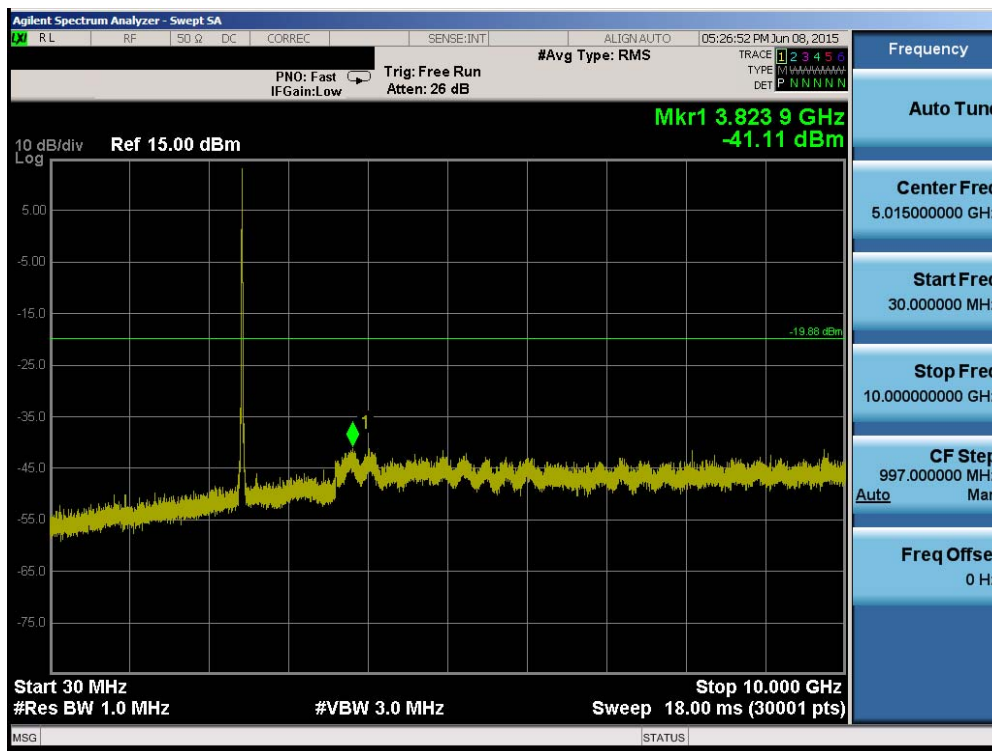


Plot 6-49. Conducted Spurious Plot (802.11b – Ch. 1)

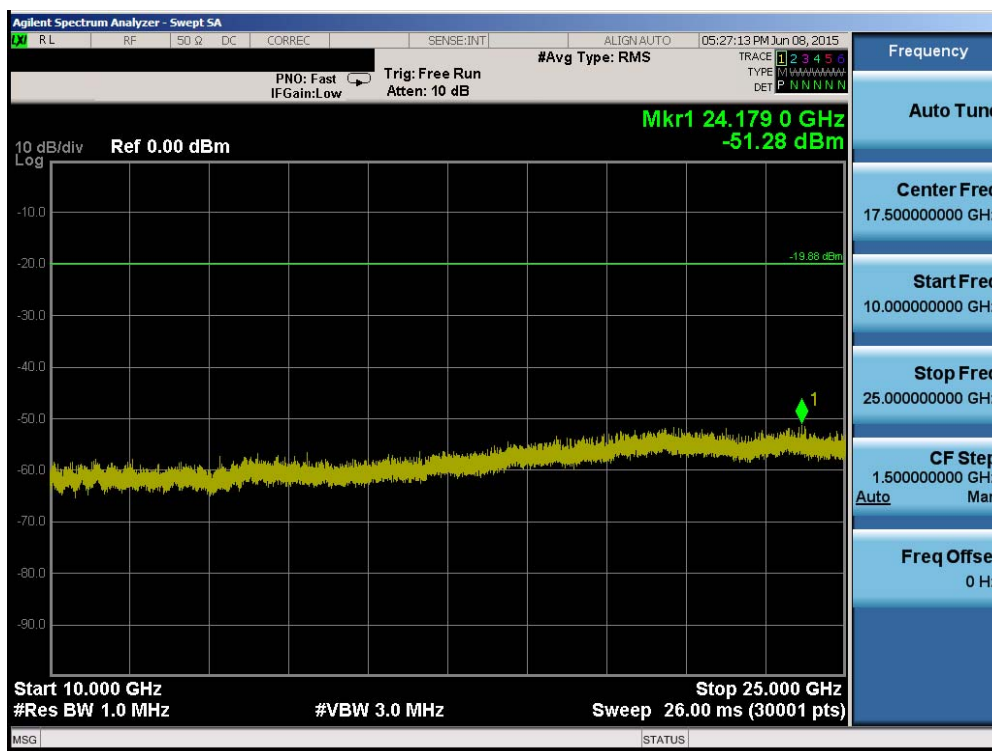


Plot 6-50. Conducted Spurious Plot (802.11b – Ch. 1)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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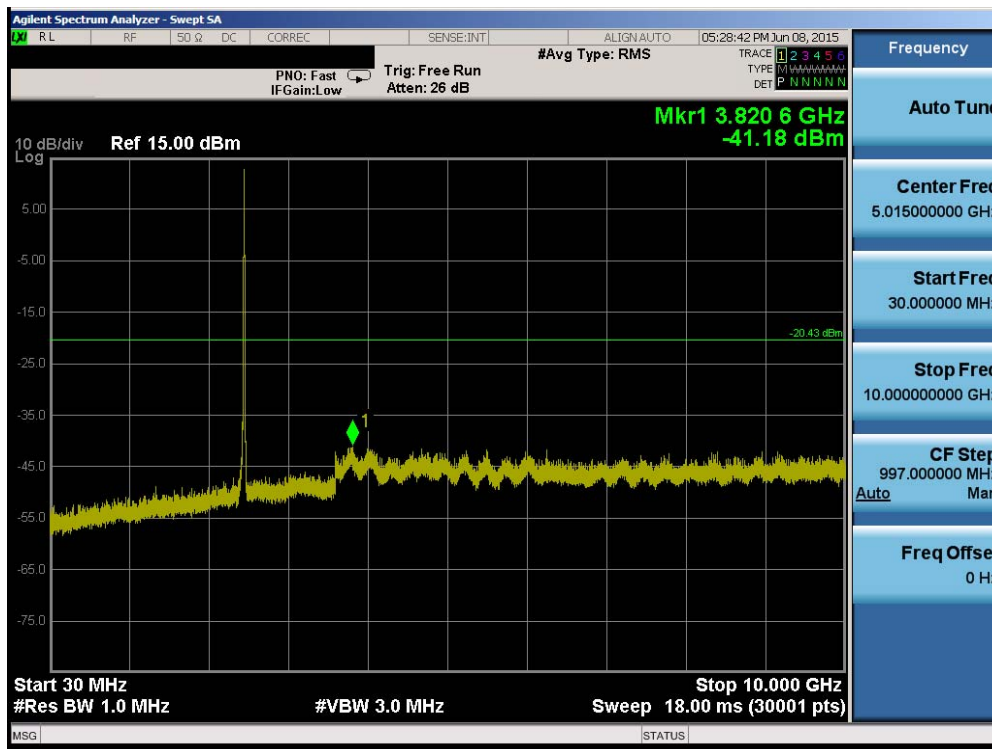


Plot 6-51. Conducted Spurious Plot (802.11b – Ch. 6)

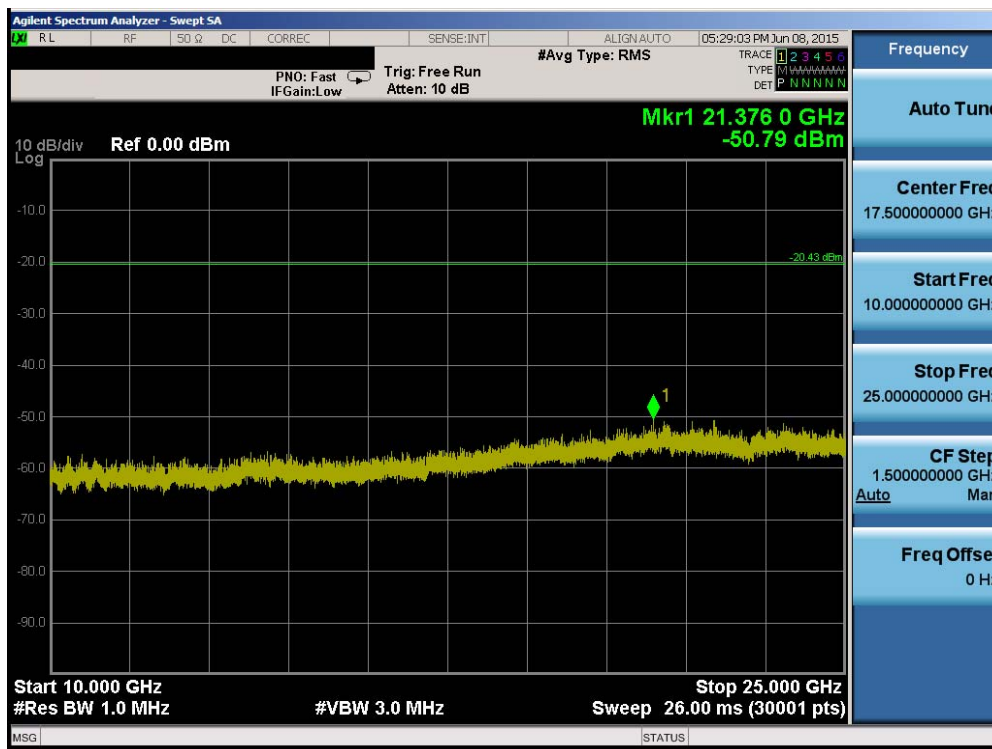


Plot 6-52. Conducted Spurious Plot (802.11b – Ch. 6)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 46 of 82



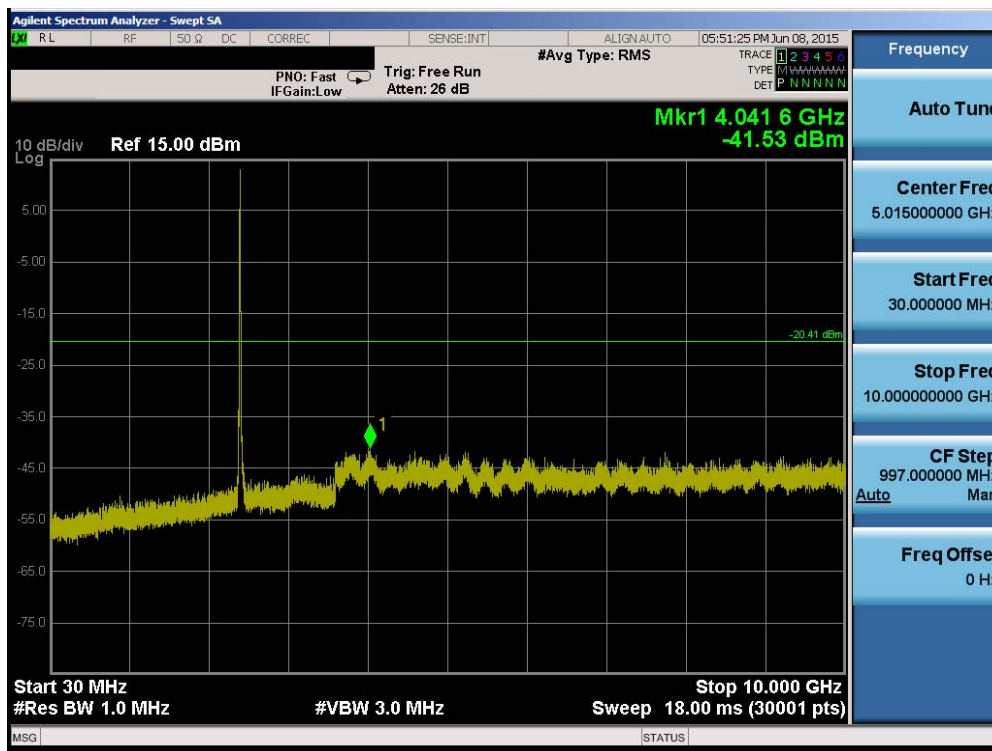
Plot 6-53. Conducted Spurious Plot (802.11b – Ch. 11)



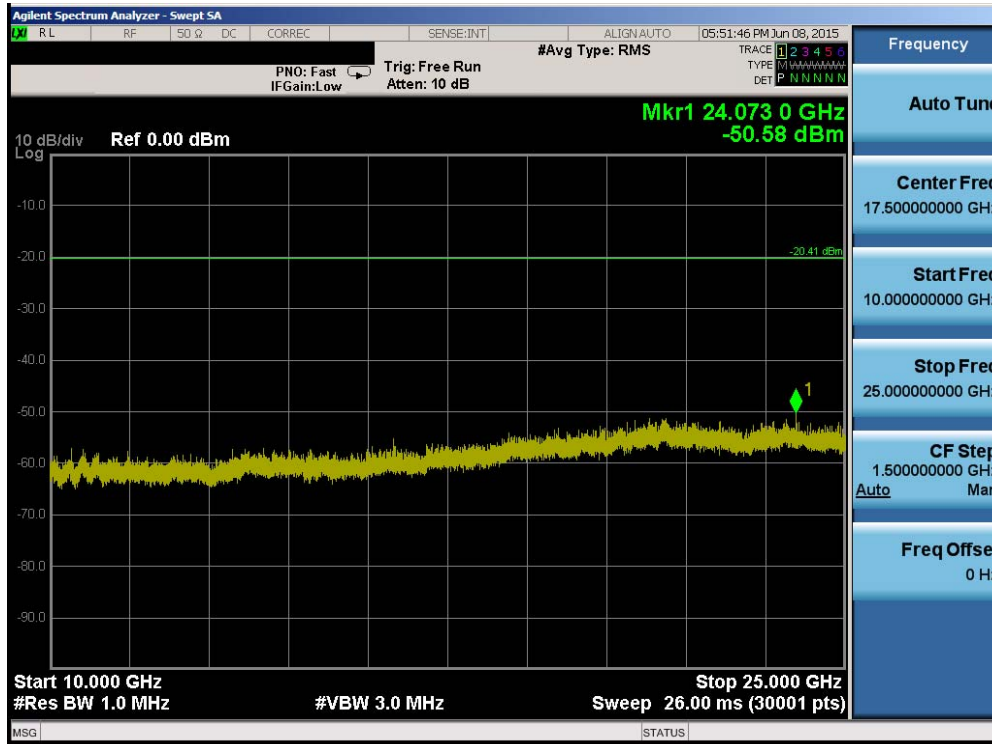
Plot 6-54. Conducted Spurious Plot (802.11b – Ch. 11)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 47 of 82

Antenna-2 Conducted Spurious Emissions

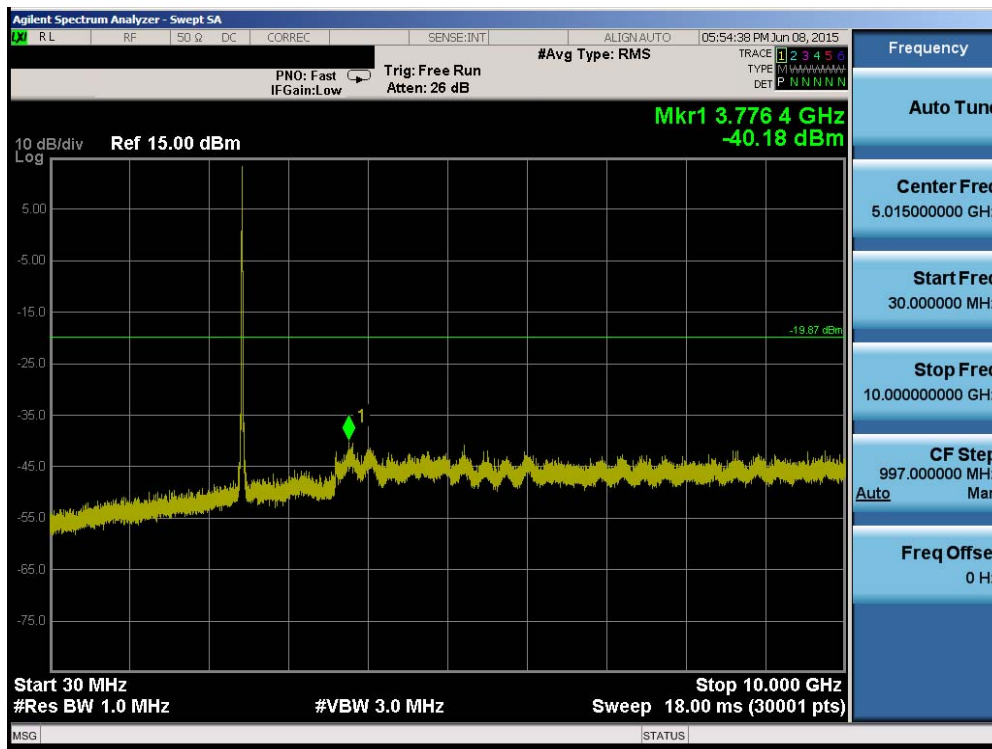


Plot 6-55. Conducted Spurious Plot (802.11b – Ch. 1)

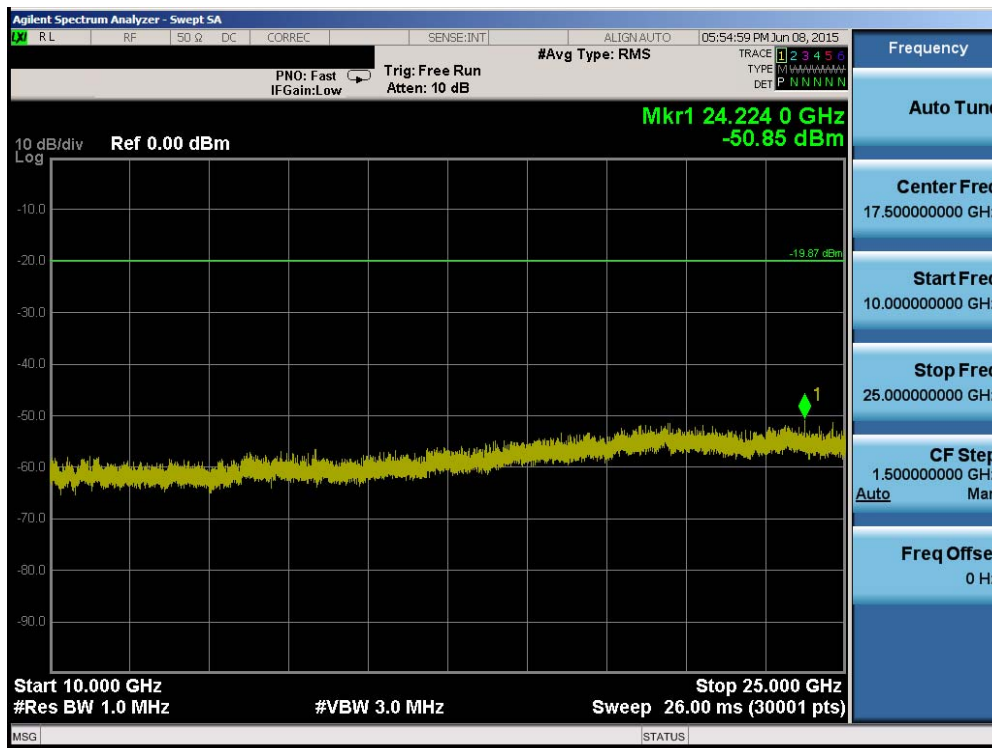


Plot 6-56. Conducted Spurious Plot (802.11b – Ch. 1)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 48 of 82

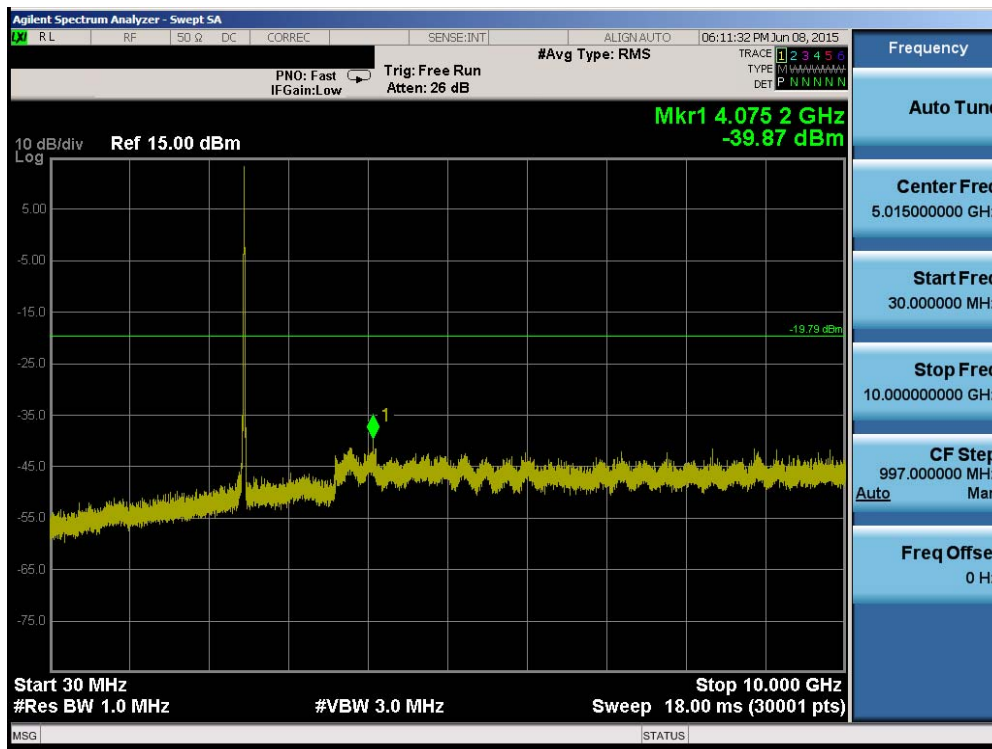


Plot 6-57. Conducted Spurious Plot (802.11b – Ch. 6)

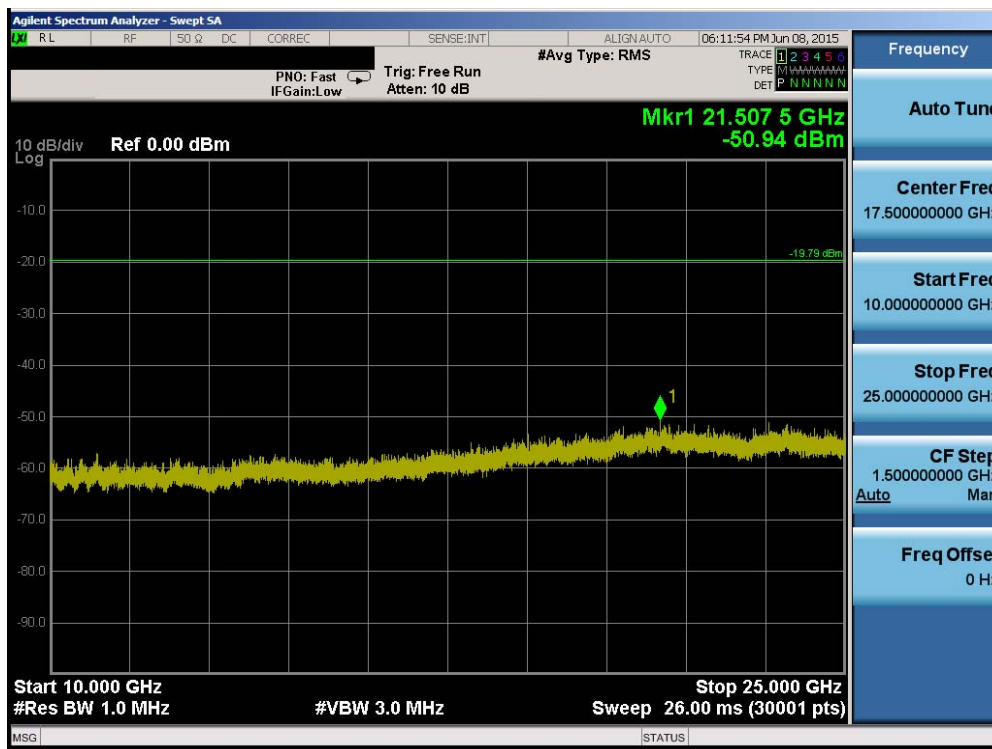


Plot 6-58. Conducted Spurious Plot (802.11b – Ch. 6)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 49 of 82



Plot 6-59. Conducted Spurious Plot (802.11b – Ch. 11)



Plot 6-60. Conducted Spurious Plot (802.11b – Ch. 11)

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Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 50 of 82

6.7 Radiated Spurious Emission Measurements – Above 1 GHz

§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 6-10 per Section 15.209.

Frequency	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 6-10. Radiated Limits

Test Procedures Used

KDB 558074 v03r03 – Section 12.1, 12.2.7

Test Settings

Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 v03r03

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

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 v03r03

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

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Test Setup

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

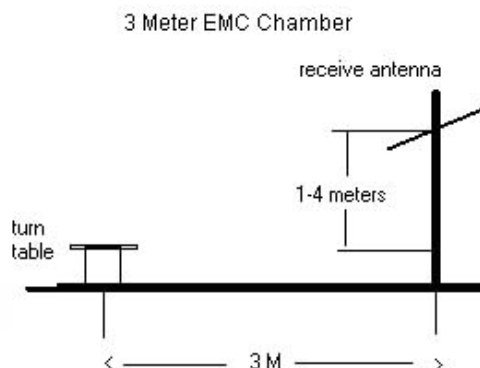


Figure 6-6. Test Instrument & Measurement Setup

Test Notes

1. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 v03r03 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 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.
5. 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.
6. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section. Rohde & Schwarz EMC32, Version 9.15.00 automated test software was used to perform the Radiated Spurious Emissions Pre-Scan testing.
8. This unit was tested with its standard battery.

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Sample Calculations

Determining Spurious Emissions Levels

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

Radiated Band Edge Measurement Offset

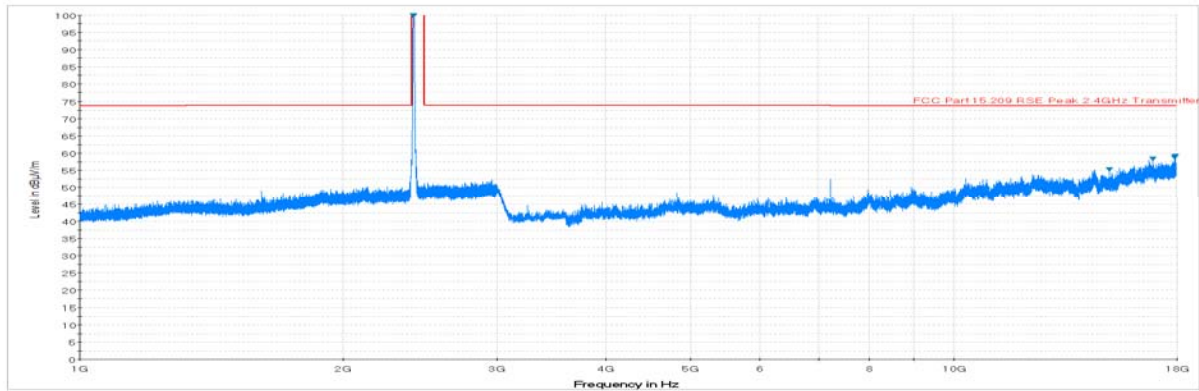
- o The amplitude offset shown in the radiated restricted band edge plots in Section 6.8 was calculated using the formula:

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

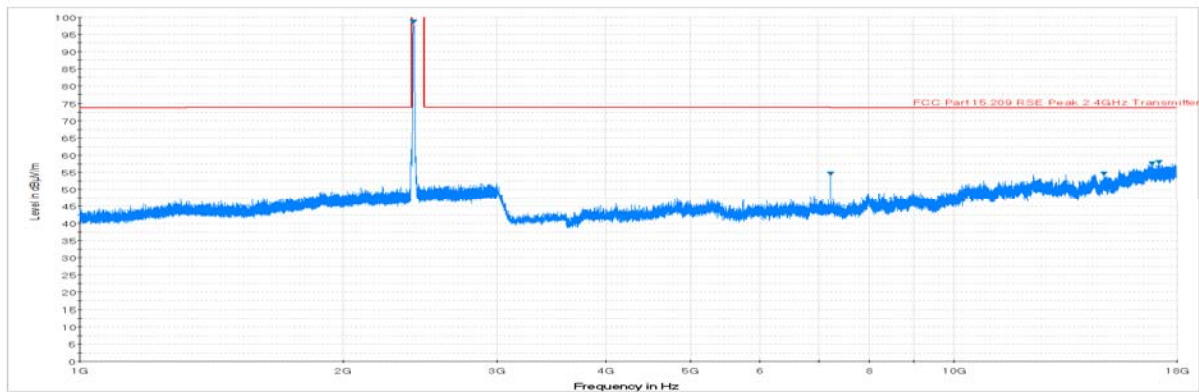
FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset	Page 53 of 82	

6.7.1 Antenna-1 Radiated Spurious Emission Measurements

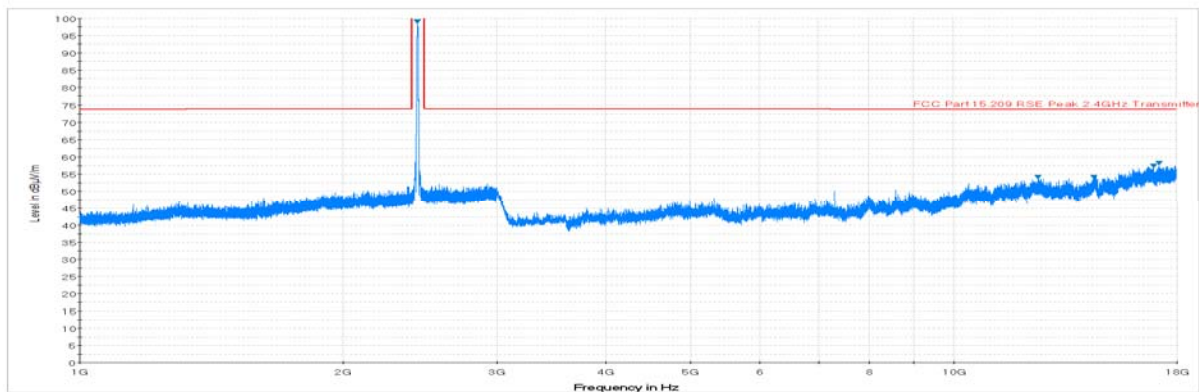
§15.247(d) §15.205 & §15.209



Plot 6-61. Radiated Spurious Plot above 1GHz (802.11b – Ch. 1, Ant. Pol. H)

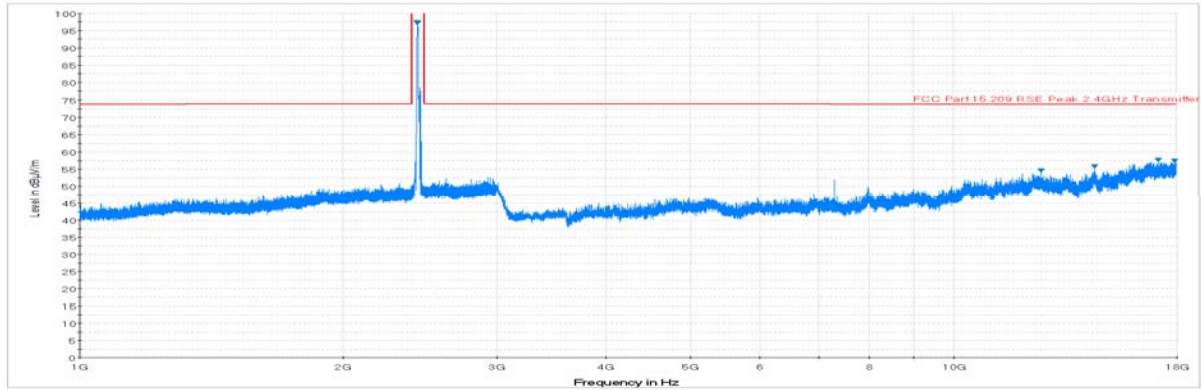


Plot 6-62. Radiated Spurious Plot above 1GHz (802.11b – Ch. 1, Ant. Pol. V)

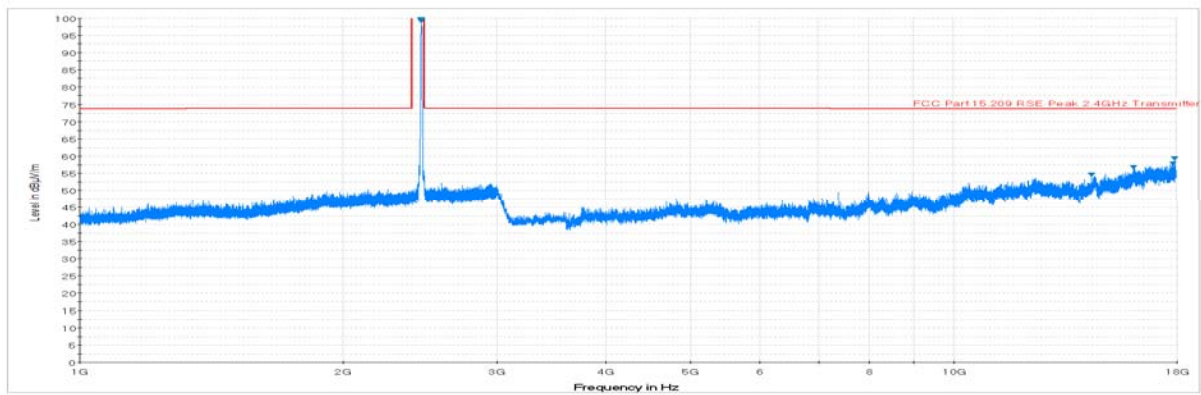


Plot 6-63. Radiated Spurious Plot above 1GHz (802.11b – Ch. 6, Ant. Pol. H)

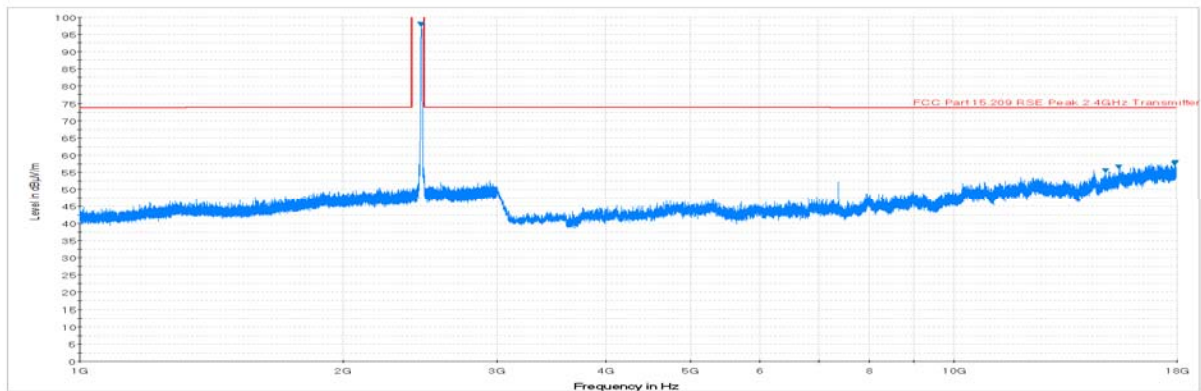
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-64. Radiated Spurious Plot above 1GHz (802.11b – Ch. 6, Ant. Pol. V)



Plot 6-65. Radiated Spurious Plot above 1GHz (802.11b – Ch. 11, Ant. Pol. H)

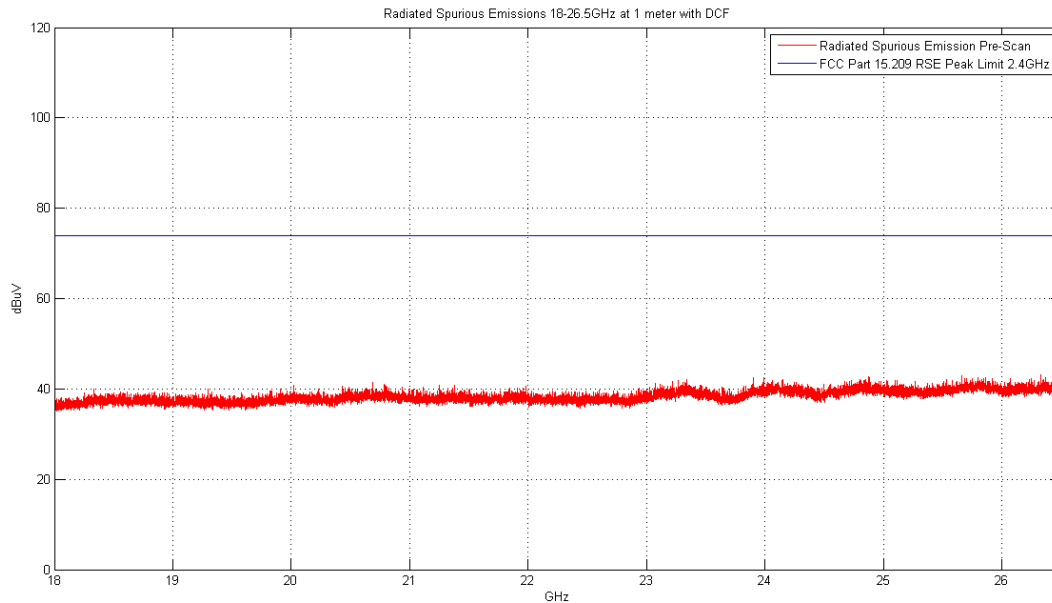


Plot 6-66. Radiated Spurious Plot above 1GHz (802.11b – Ch. 11, Ant. Pol. V)

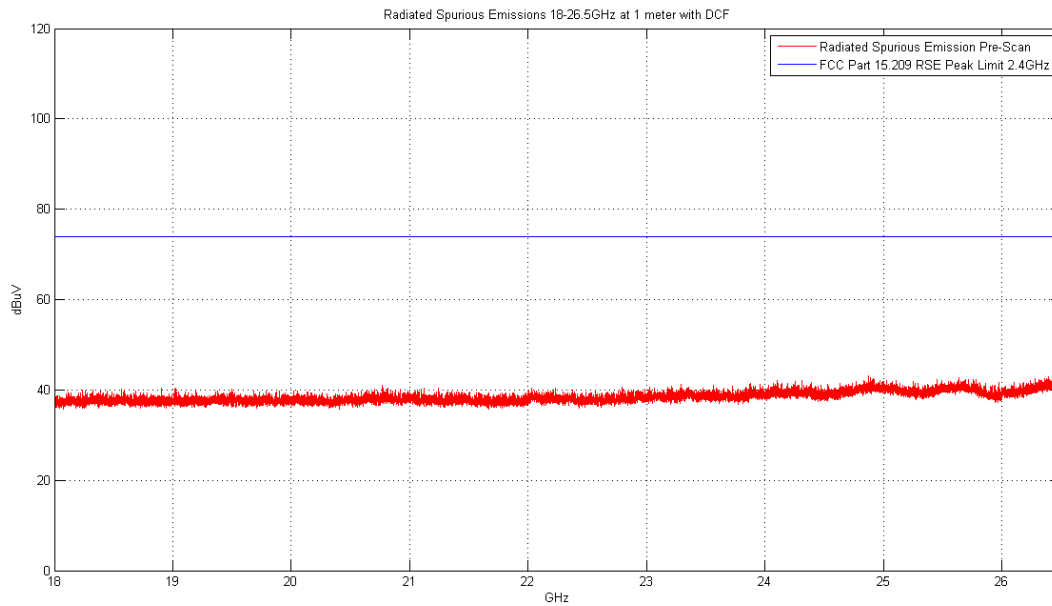
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Antenna-1 Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209



Plot 6-67. Radiated Spurious Plot above 18GHz (Pol. H)



Plot 6-68. Radiated Spurious Plot above 18GHz (Pol. V)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4824.00	-110.42	Avg	H	40.94	37.52	53.98	-16.46
4824.00	-98.22	Peak	H	40.94	49.72	73.98	-24.26
12060.00	-110.80	Avg	H	49.18	45.38	53.98	-8.60
12060.00	-98.64	Peak	H	49.18	57.54	73.98	-16.44

Table 6-11. 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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4874.00	-109.67	Avg	H	41.03	38.36	53.98	-15.62
4874.00	-95.68	Peak	H	41.03	52.35	73.98	-21.63
7311.00	-110.84	Avg	H	44.39	40.55	53.98	-13.43
7311.00	-98.52	Peak	H	44.39	52.87	73.98	-21.11
12185.00	-110.92	Avg	H	50.01	46.09	53.98	-7.89
12185.00	-98.47	Peak	H	50.01	58.54	73.98	-15.44

Table 6-12. Radiated Measurements

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n 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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-110.95	Avg	H	41.05	37.09	53.98	-16.89
4924.00	-97.91	Peak	H	41.05	50.13	73.98	-23.85
7386.00	-111.16	Avg	H	44.82	40.66	53.98	-13.32
7386.00	-98.64	Peak	H	44.82	53.18	73.98	-20.80
12310.00	-110.99	Avg	H	50.20	46.21	53.98	-7.77
12310.00	-98.41	Peak	H	50.20	58.79	73.98	-15.19

Table 6-13. Radiated Measurements

Worst Case Mode: 802.11b
 Worst Case Transfer Rate: 1 Mbps
 Distance of Measurements: 3 Meters
 Operating Frequency: 2462MHz
 Channel: 11

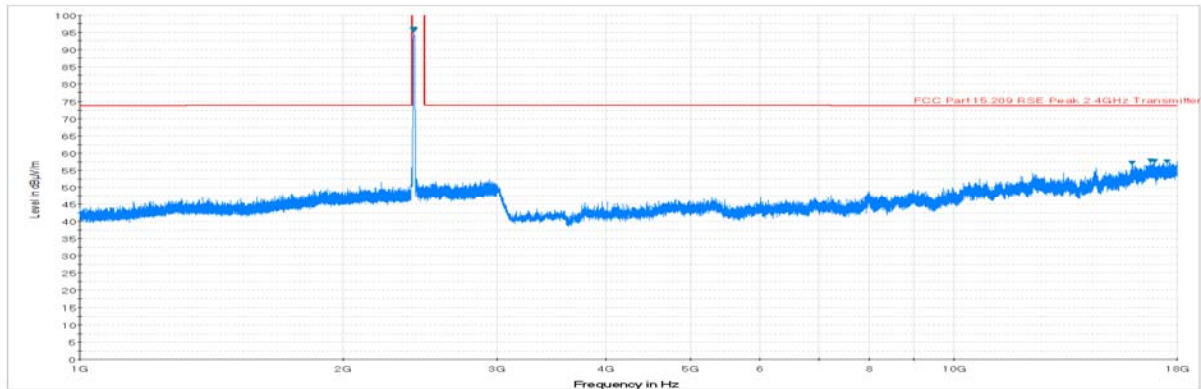
Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-107.76	Avg	H	41.05	40.28	53.98	-13.70
4924.00	-97.54	Peak	H	41.05	50.50	73.98	-23.48
7386.00	-107.37	Avg	H	44.82	44.45	53.98	-9.53
7386.00	-96.99	Peak	H	44.82	54.83	73.98	-19.15
12310.00	-110.86	Avg	H	50.20	46.34	53.98	-7.64
12310.00	-98.95	Peak	H	50.20	58.25	73.98	-15.73

Table 6-14. Radiated Measurements with WCP

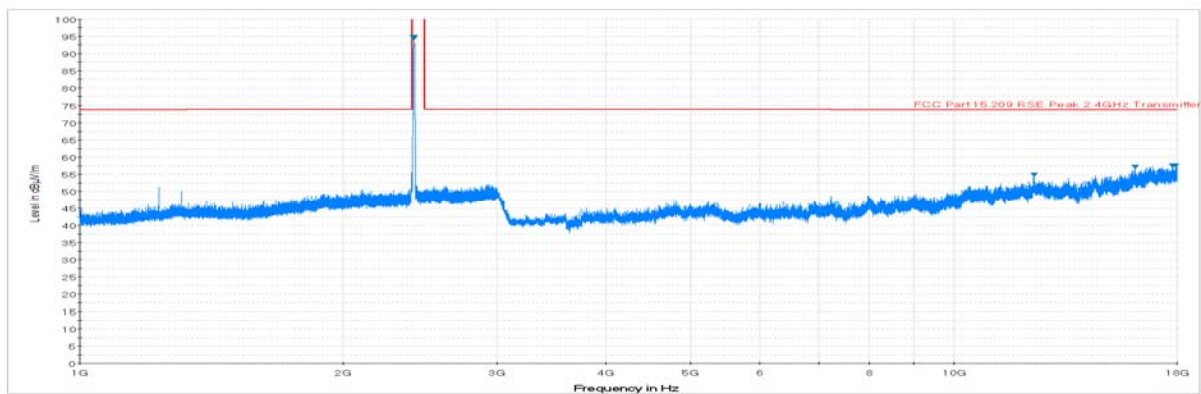
FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 58 of 82

6.7.2 Antenna-2 Radiated Spurious Emission Measurements

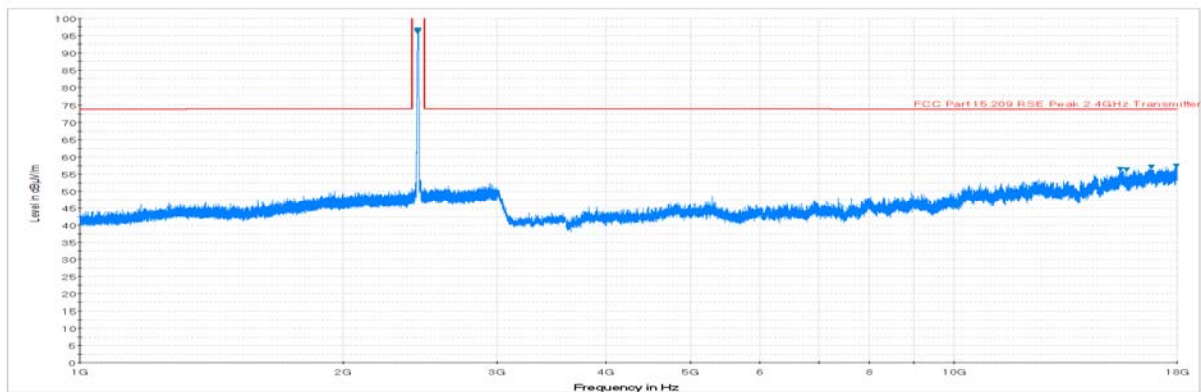
§15.247(d) §15.205 & §15.209



Plot 6-69. Radiated Spurious Plot above 1GHz (802.11b – Ch. 1, Ant. Pol. H)

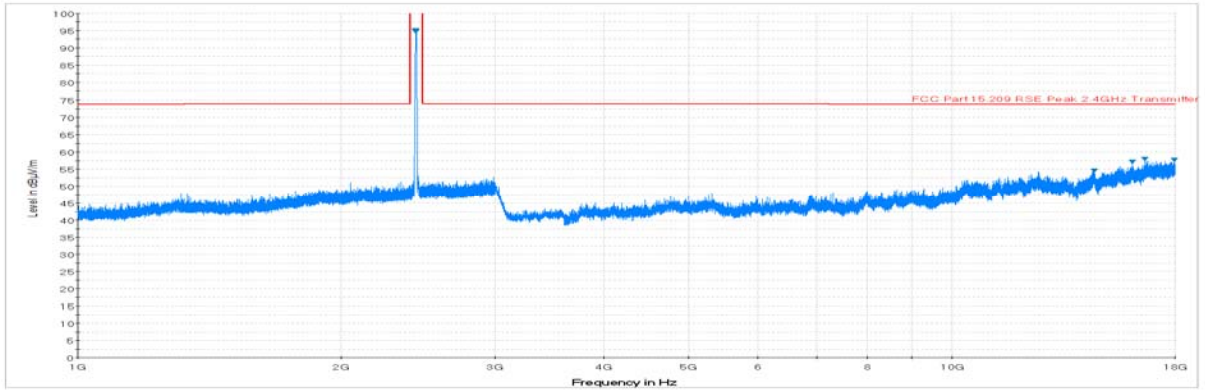


Plot 6-70. Radiated Spurious Plot above 1GHz (802.11b – Ch. 1, Ant. Pol. V)

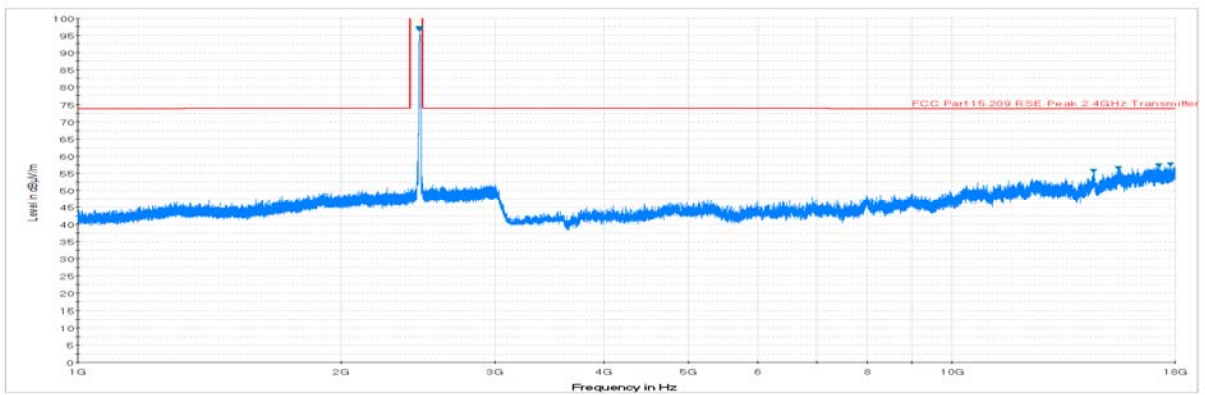


Plot 6-71. Radiated Spurious Plot above 1GHz (802.11b – Ch. 6, Ant. Pol. H)

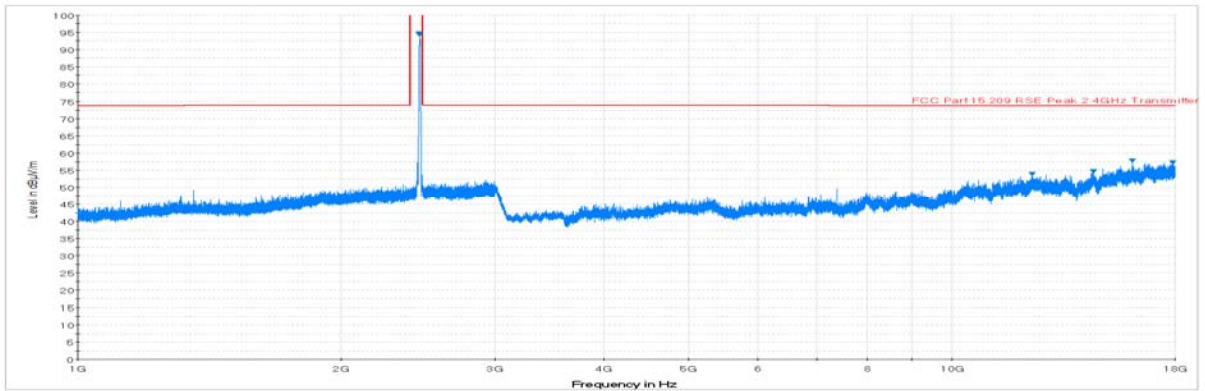
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 59 of 82



Plot 6-72. Radiated Spurious Plot above 1GHz (802.11b – Ch. 6, Ant. Pol. V)



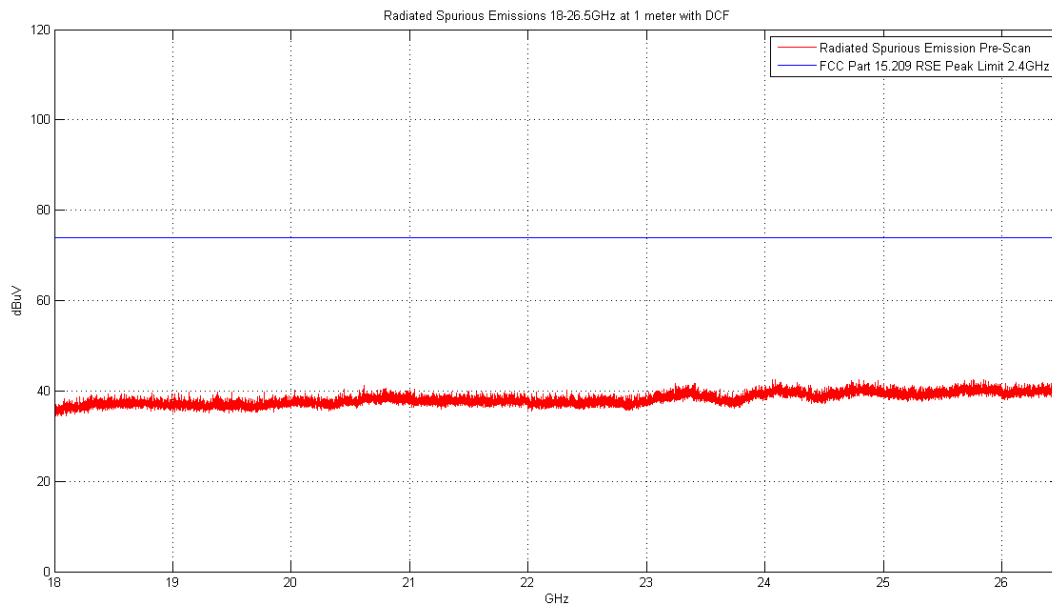
Plot 6-73. Radiated Spurious Plot above 1GHz (802.11b – Ch. 11, Ant. Pol. H)



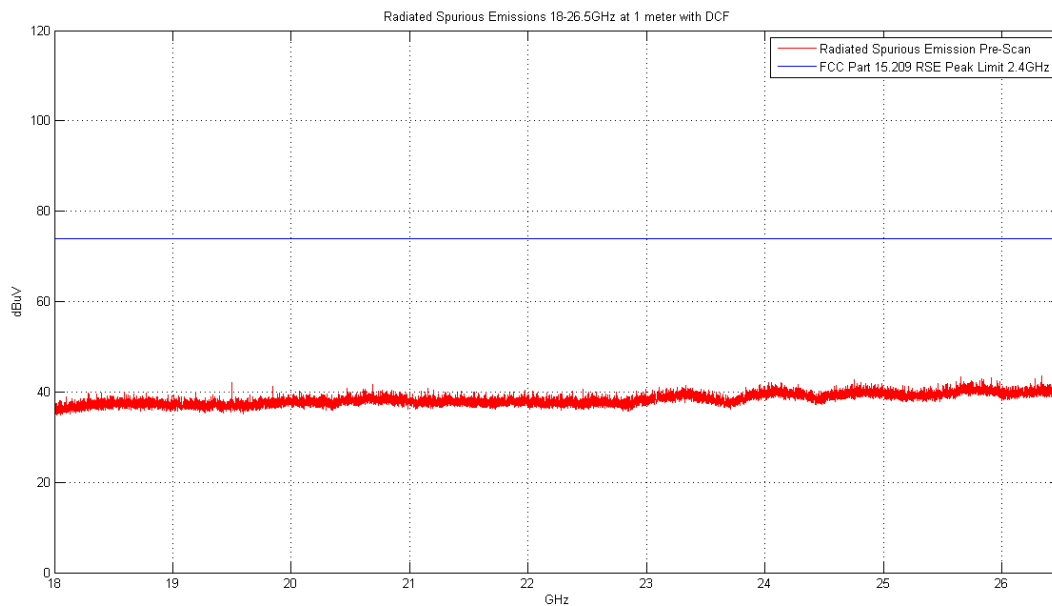
Plot 6-74. Radiated Spurious Plot above 1GHz (802.11b – Ch. 11, Ant. Pol. V)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 60 of 82

Antenna-2 Radiated Spurious Emissions Measurements (Above 18GHz) §15.209



Plot 6-75. Radiated Spurious Plot above 18GHz (Pol. H)



Plot 6-76. Radiated Spurious Plot above 18GHz (Pol. V)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 61 of 82

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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4824.00	-110.58	Avg	H	40.94	37.36	53.98	-16.62
4824.00	-97.32	Peak	H	40.94	50.62	73.98	-23.36
12060.00	-110.89	Avg	H	49.18	45.29	53.98	-8.69
12060.00	-98.21	Peak	H	49.18	57.97	73.98	-16.01

Table 6-15. 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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4874.00	-110.36	Avg	H	41.03	37.67	53.98	-16.31
4874.00	-98.47	Peak	H	41.03	49.56	73.98	-24.42
7311.00	-111.03	Avg	H	44.39	40.36	53.98	-13.62
7311.00	-98.20	Peak	H	44.39	53.19	73.98	-20.79
12185.00	-110.99	Avg	H	50.01	46.02	53.98	-7.96
12185.00	-98.33	Peak	H	50.01	58.68	73.98	-15.30

Table 6-16. Radiated Measurements

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)					Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset				Page 62 of 82	

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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-110.96	Avg	H	41.05	37.08	53.98	-16.90
4924.00	-98.54	Peak	H	41.05	49.50	73.98	-24.48
7386.00	-111.12	Avg	H	44.82	40.70	53.98	-13.28
7386.00	-98.41	Peak	H	44.82	53.41	73.98	-20.57
12310.00	-110.99	Avg	H	50.20	46.21	53.98	-7.77
12310.00	-98.63	Peak	H	50.20	58.57	73.98	-15.41

Table 6-17. Radiated Measurements

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]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-107.61	Avg	H	41.05	40.43	53.98	-13.55
4924.00	-97.45	Peak	H	41.05	50.59	73.98	-23.39
7386.00	-110.15	Avg	H	44.82	41.67	53.98	-12.31
7386.00	-99.30	Peak	H	44.82	52.52	73.98	-21.46
12310.00	-111.86	Avg	H	50.20	45.34	53.98	-8.64
12310.00	-99.36	Peak	H	50.20	57.84	73.98	-16.14

Table 6-18. Radiated Measurements with WCP

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 63 of 82

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.

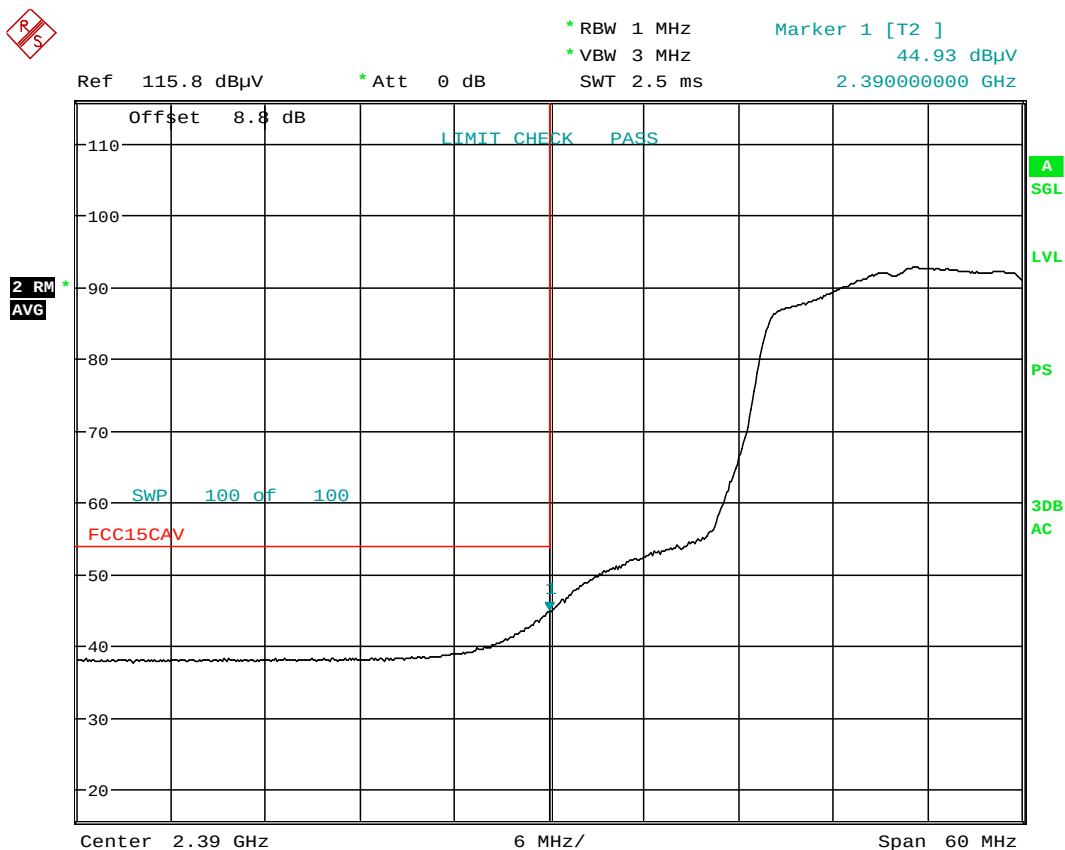
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1



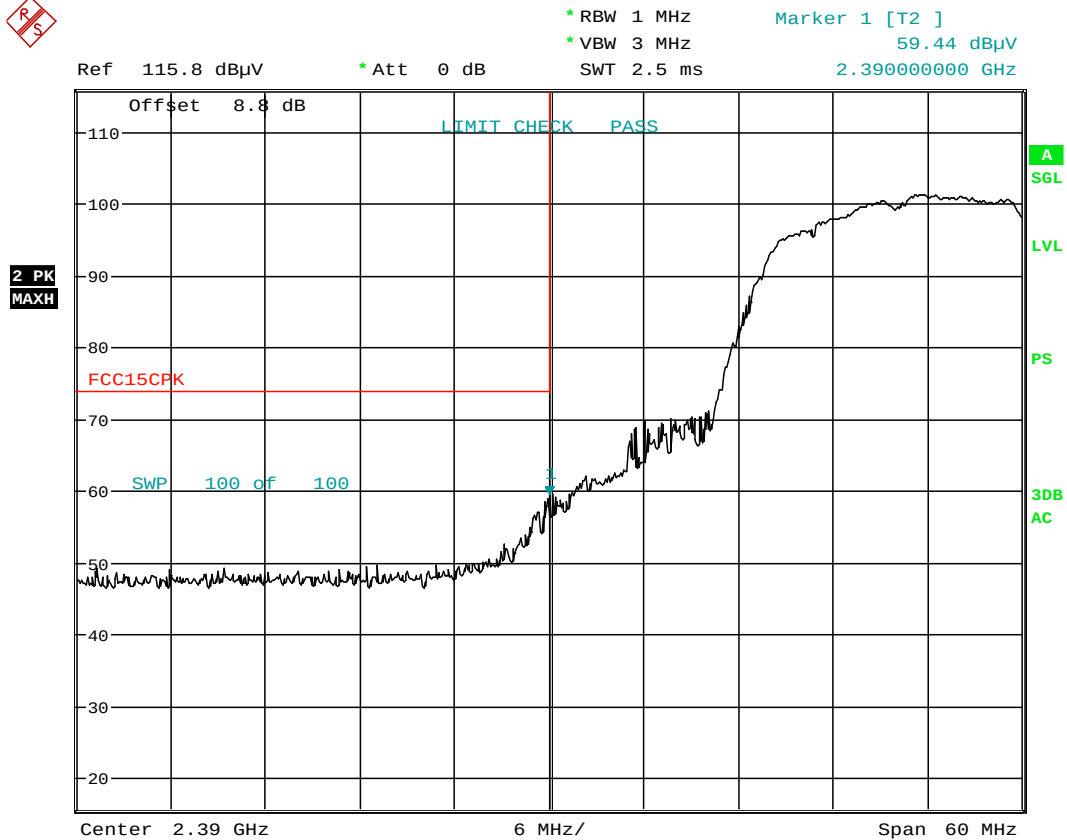
Date: 8.JUN.2015 22:27:21

Plot 6-77. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 64 of 82

Antenna-1 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 8.JUN.2015 22:28:37

Plot 6-78. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 65 of 82

Antenna-1 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209

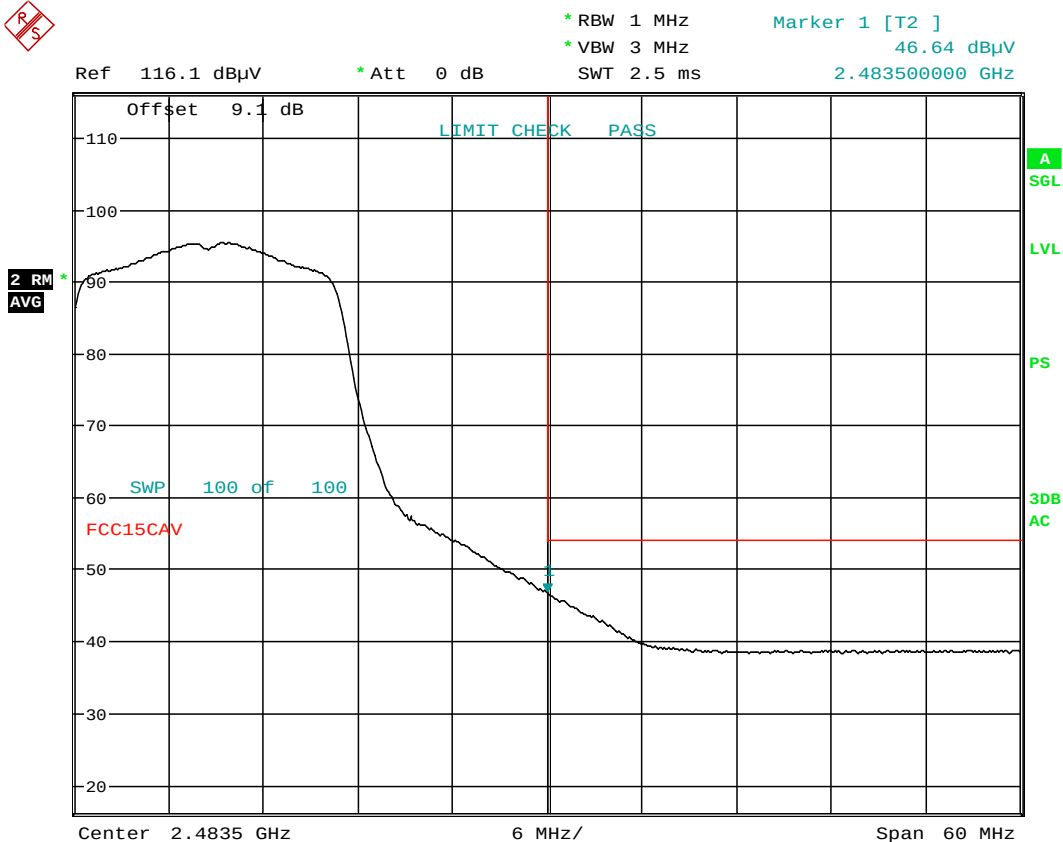
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



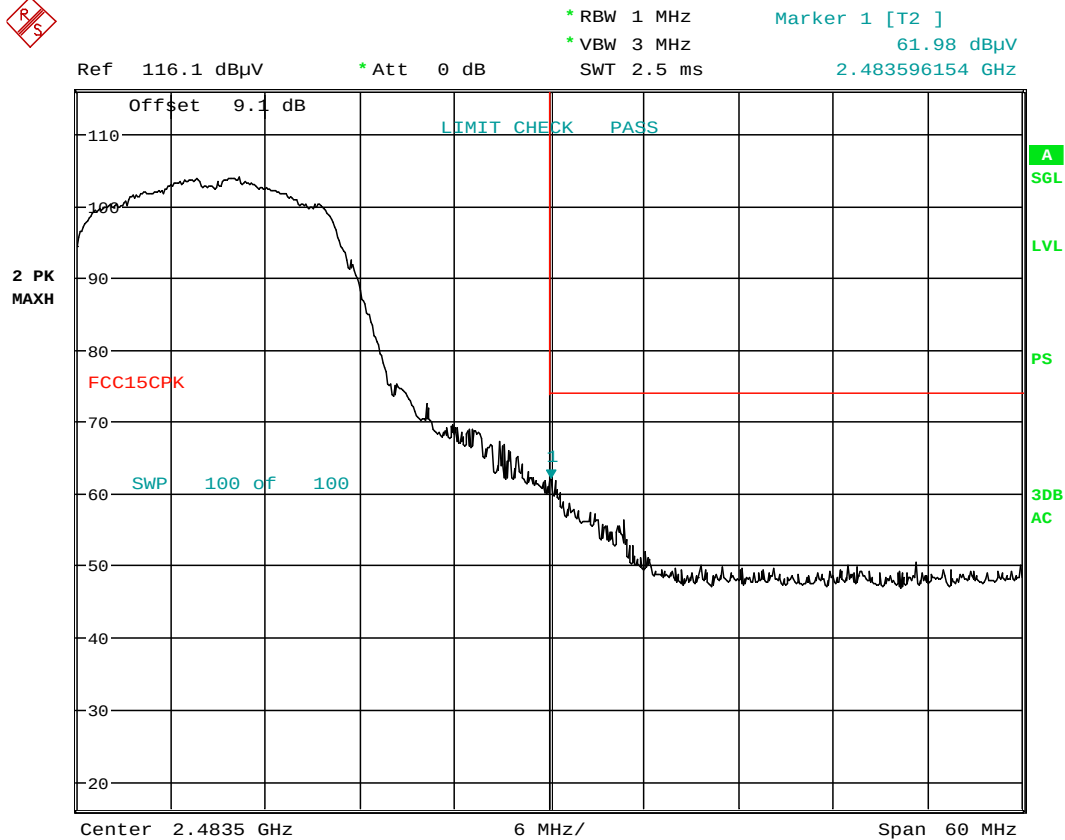
Date: 8.JUN.2015 22:48:00

Plot 6-79. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 66 of 82

Antenna-1 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 8.JUN.2015 22:47:19

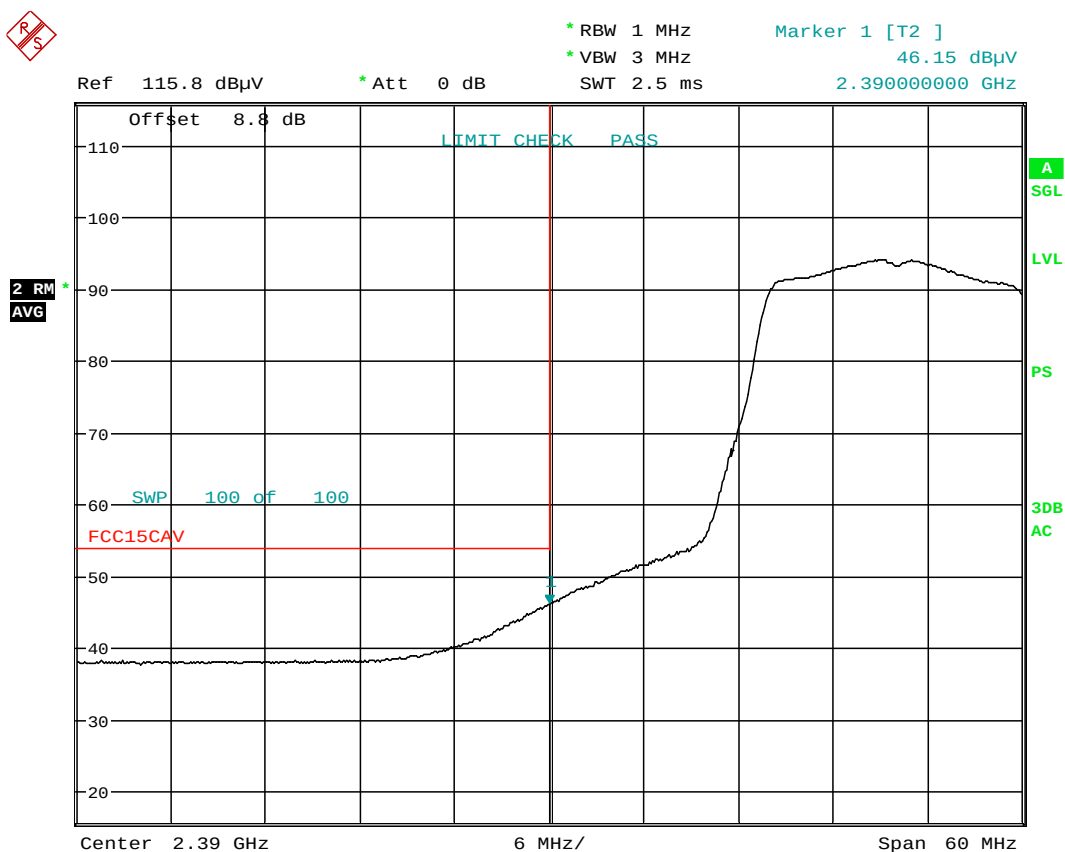
Plot 6-80. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 67 of 82

6.7.3 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



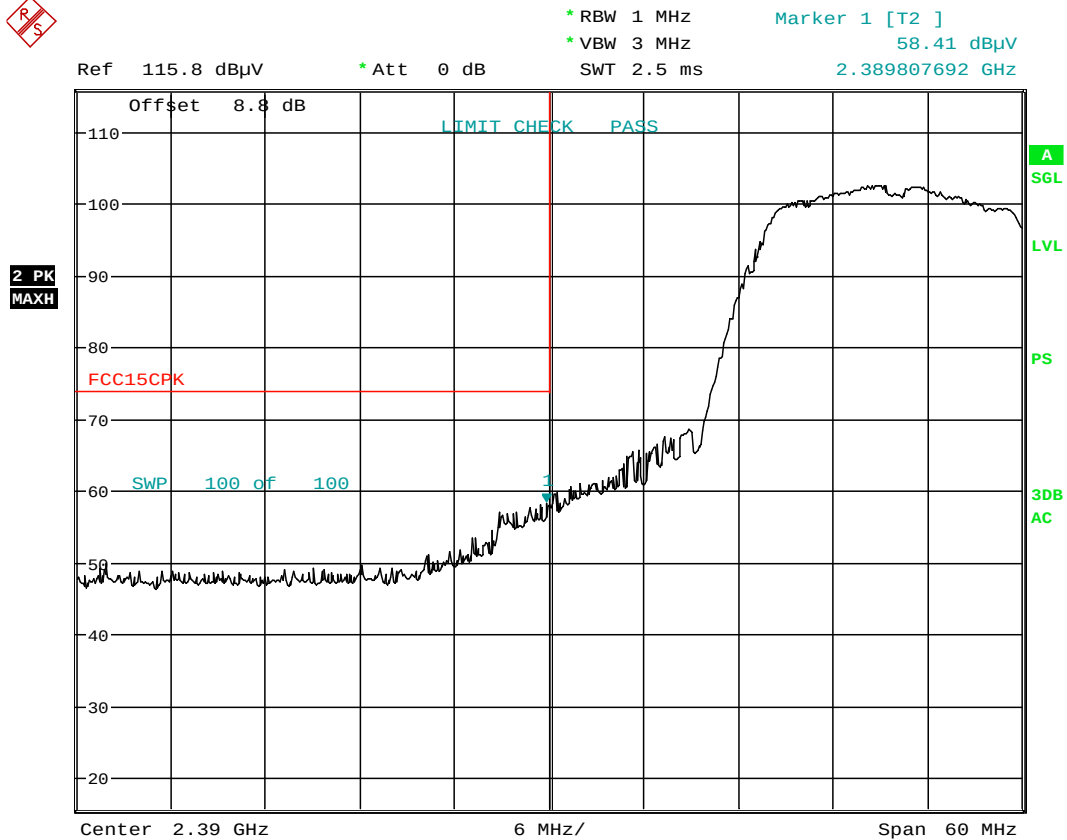
Date: 8.JUN.2015 23:23:35

Plot 6-81. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 68 of 82

Antenna-2 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 8.JUN.2015 23:22:48

Plot 6-82. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 69 of 82

Antenna-2 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209

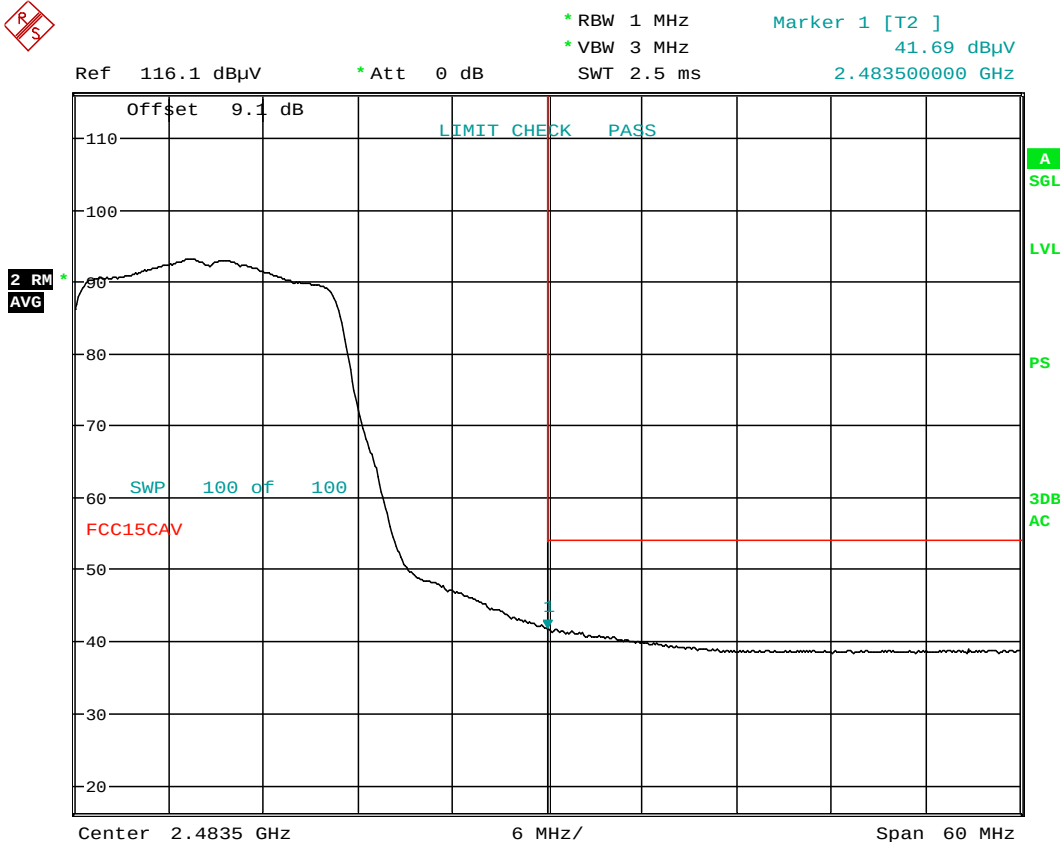
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



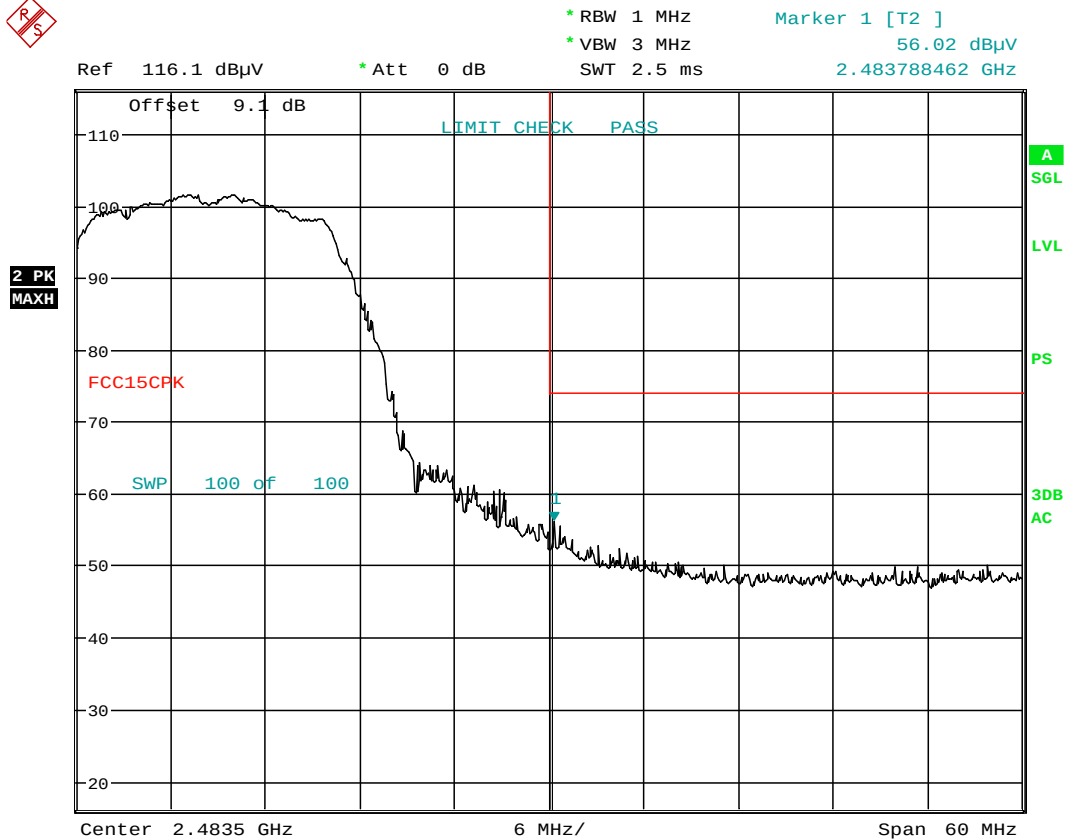
Date: 8.JUN.2015 23:04:00

Plot 6-83. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 70 of 82

Antenna-2 Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 8.JUN.2015 23:05:05

Plot 6-84. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 71 of 82

6.7.4 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.

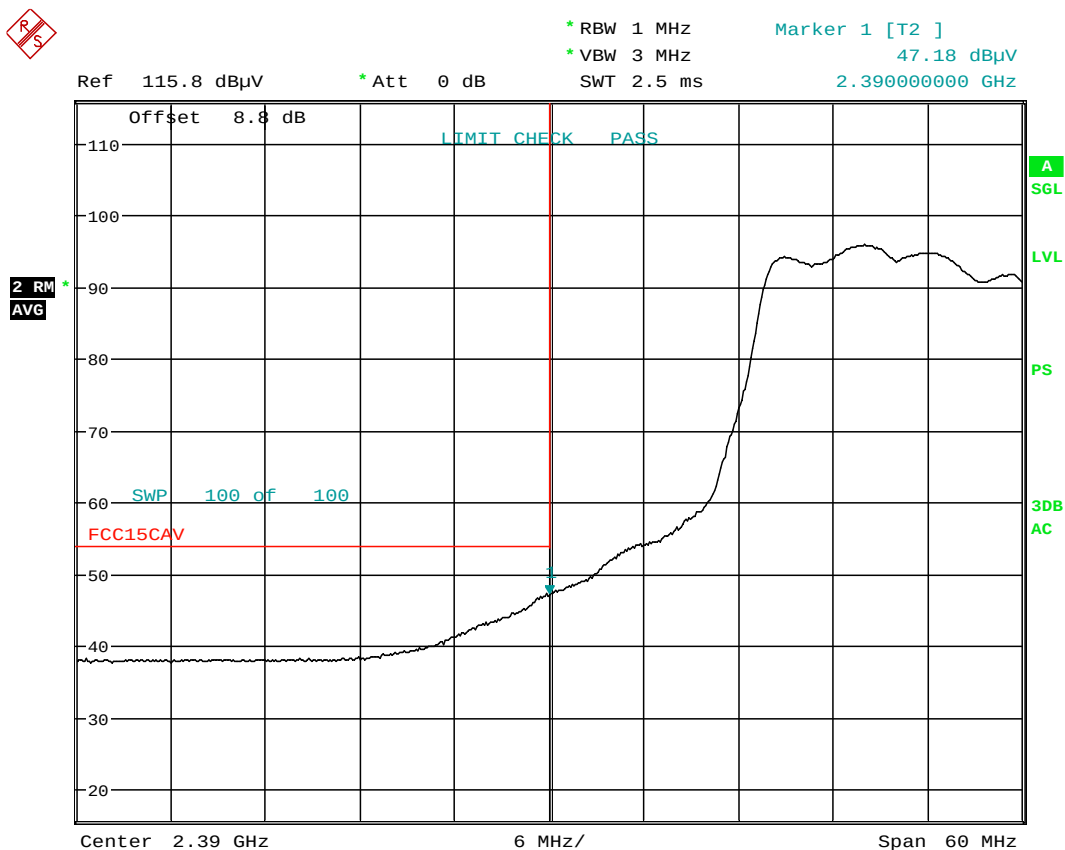
Worst Case Mode: 802.11n

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1



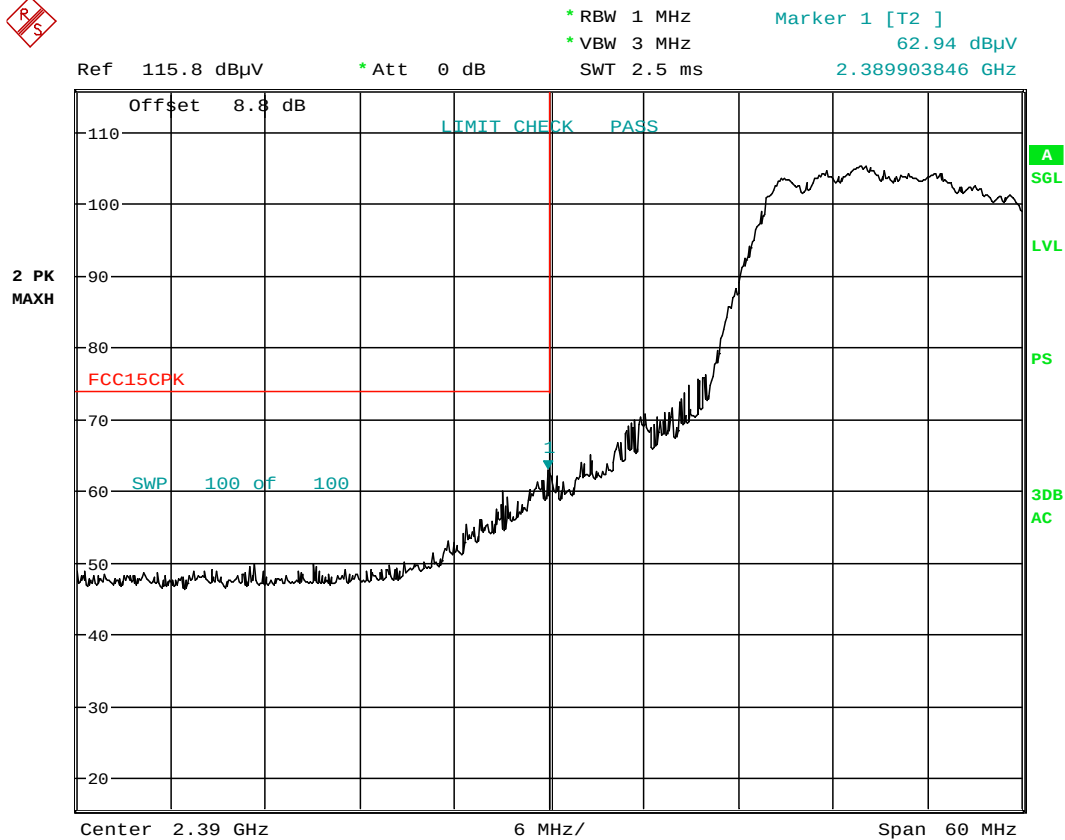
Date: 9.JUN.2015 00:39:46

Plot 6-85. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 72 of 82

MIMO Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 9.JUN.2015 00:40:38

Plot 6-86. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 73 of 82

MIMO Radiated Restricted Band Edge Measurements

\$15.205 \$15.209

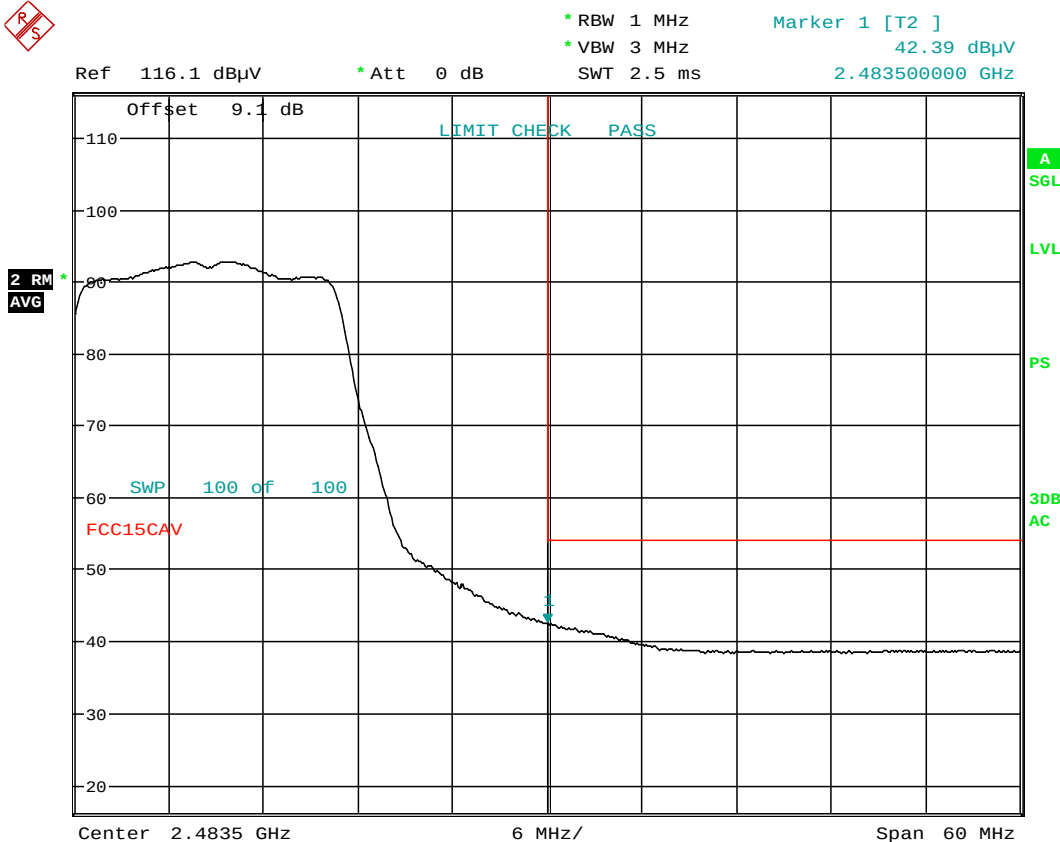
Worst Case Mode: 802.11n

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



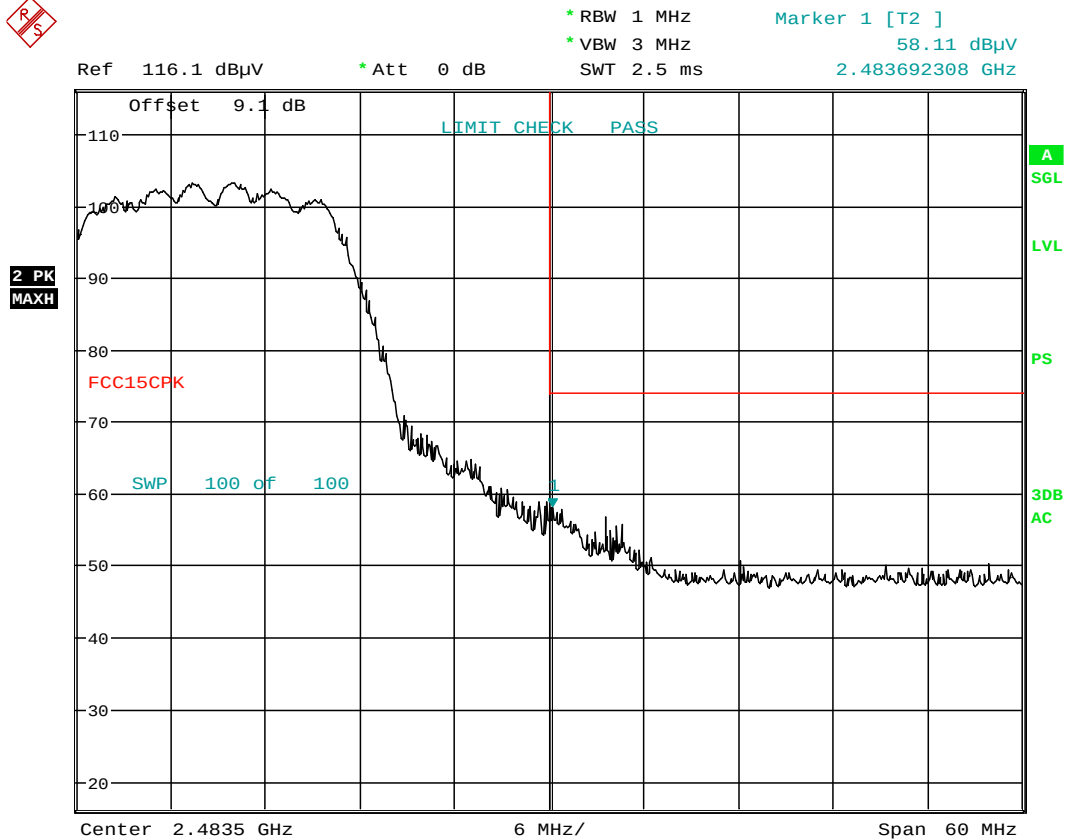
Date: 9.JUN.2015 01:05:09

Plot 6-87. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 74 of 82

MIMO Radiated Restricted Band Edge Measurements

\$15.205 \$15.209



Date: 9.JUN.2015 01:04:21

Plot 6-88. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 75 of 82

6.8 Radiated Spurious Emissions Measurements – Below 1GHz

§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 6-19 per Section 15.209.

Frequency	Field Strength [μV/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 6-19. Radiated Limits

Test Procedures Used

ANSI C63.4-2009

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Test Setup

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

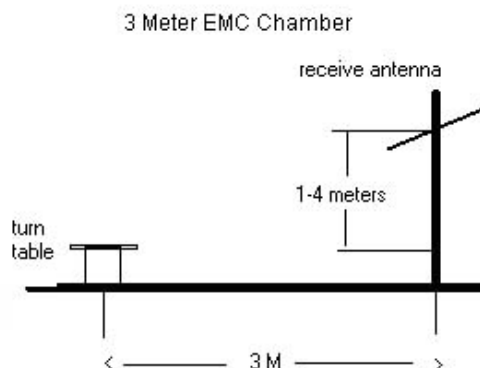


Figure 6-7. Test Instrument & Measurement Setup

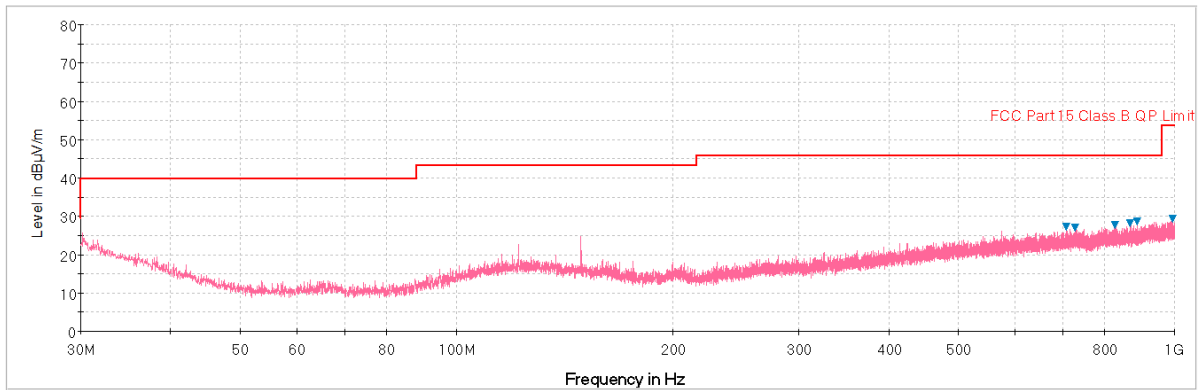
Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-19.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
4. Emissions were measured at a 3 meter test distance.
5. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
6. No spurious emissions were detected within 20dB of the limit below 30MHz.
7. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
8. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.
9. This unit was tested with its standard battery.

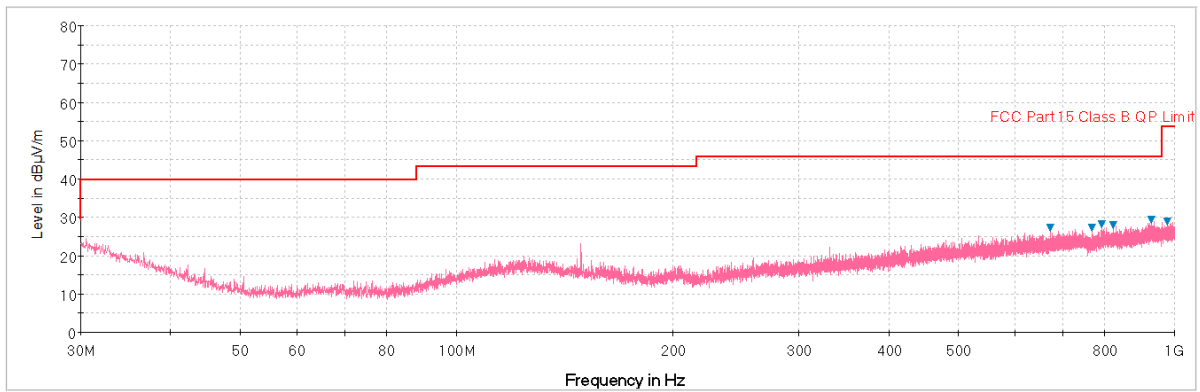
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 77 of 82

Antenna-1 Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209



Plot 6-89. Radiated Spurious Plot below 1GHz (Pol. H)

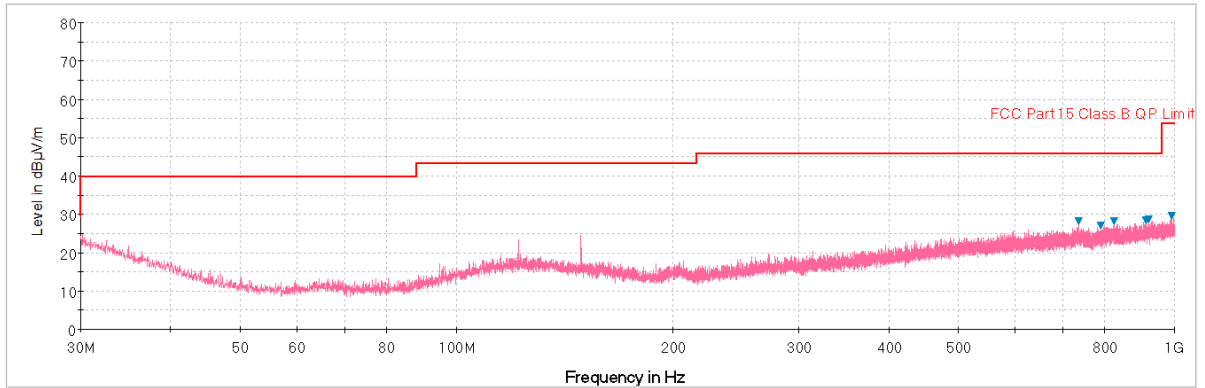


Plot 6-90. Radiated Spurious Plot below 1GHz (Pol. V)

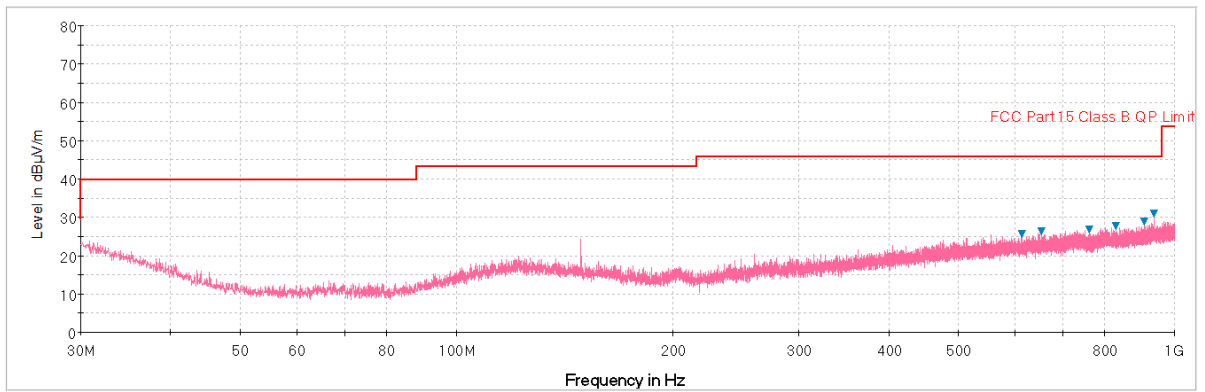
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081070.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 78 of 82

Antenna-2 Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209



Plot 6-91. Radiated Spurious Plot below 1GHz (Pol. H)

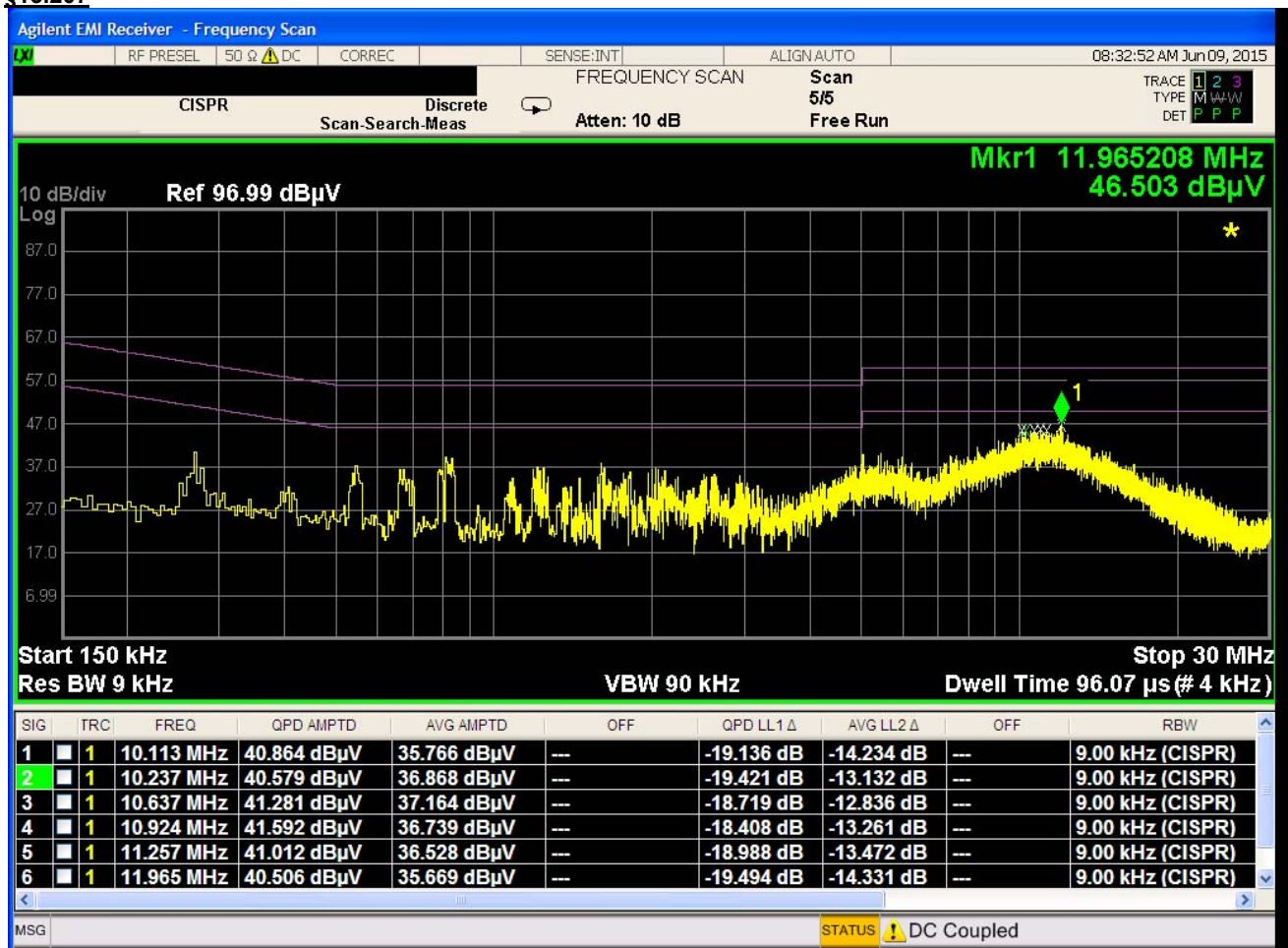


Plot 6-92. Radiated Spurious Plot below 1GHz (Pol. V)

FCC ID: A3LSMN920V		FCC Pt. 15.247 802.11b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.9 Line-Conducted Test Data

\$15.207



Plot 6-93. Line Conducted Plot with 802.11b (L1)

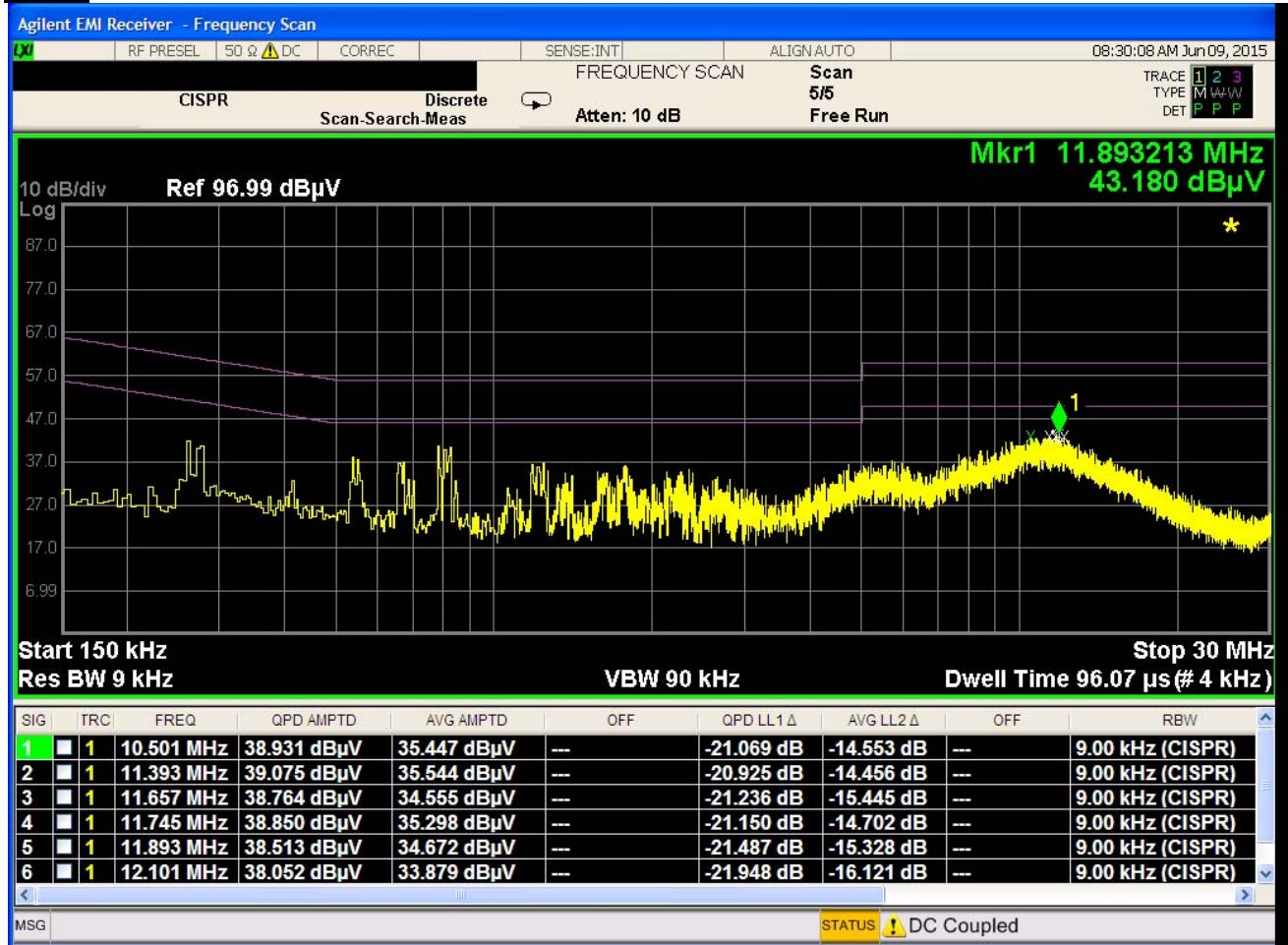
Notes:

1. 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.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBμV) – QP/AV Level (dBμV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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Line-Conducted Test Data

\$15.207



Plot 6-94. Line Conducted Plot with 802.11b (N)

Notes:

1. 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.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBμV) – QP/AV Level (dBμV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMN920V** is in compliance with Part 15C of the FCC Rules.

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