

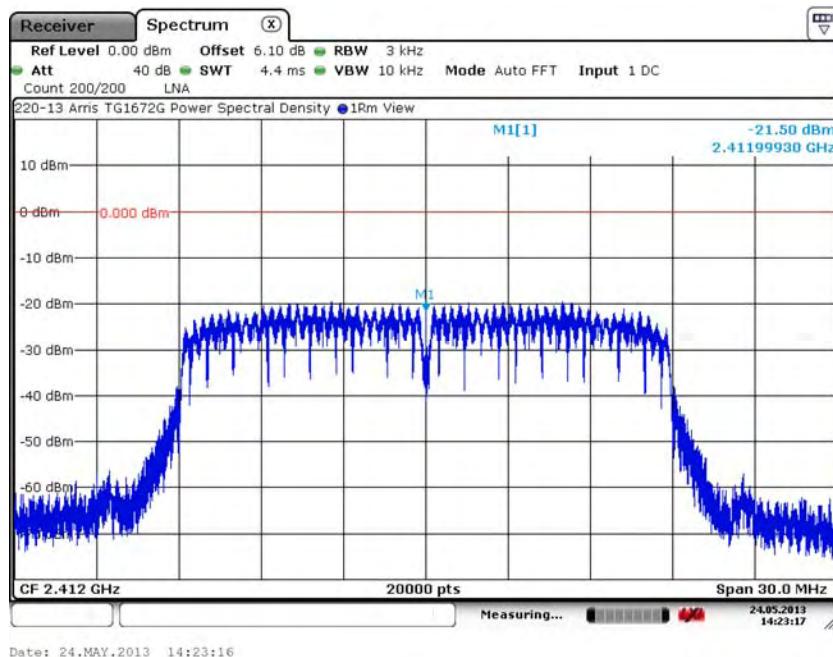
Test Number: 220-13R1

Issue Date: 7/18/2013

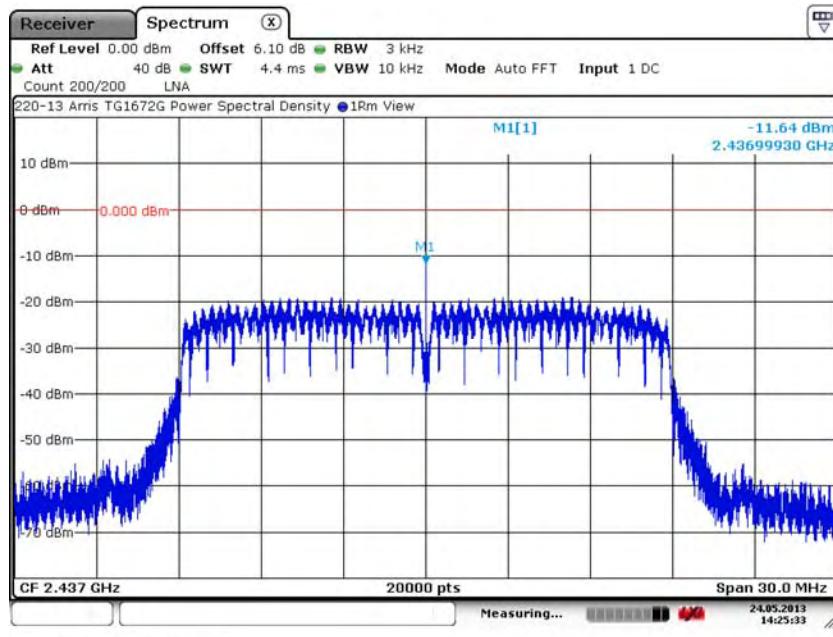
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.21. HT20: Low Channel – 1, J2402



#### 7.8.22. HT20: Mid Channel – 6, J2400



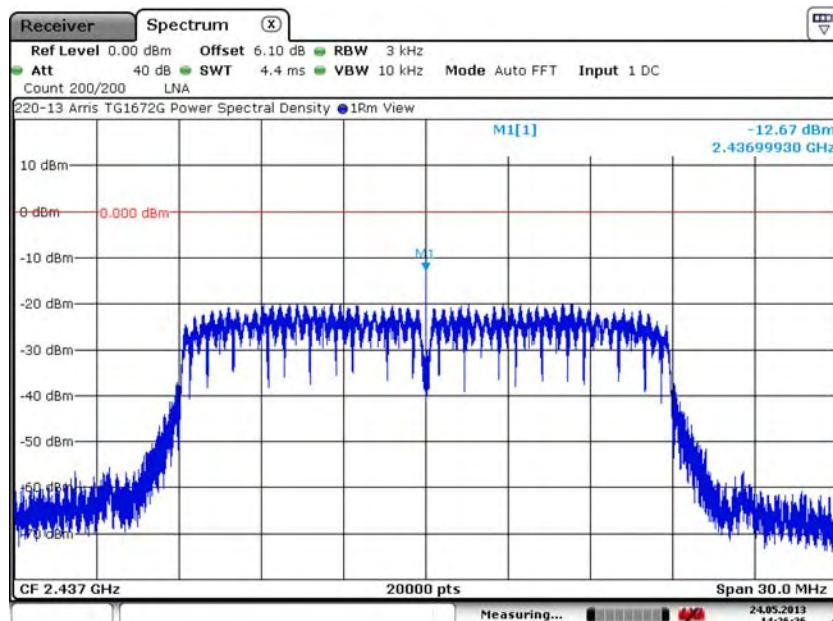
Test Number: 220-13R1

Issue Date: 7/18/2013

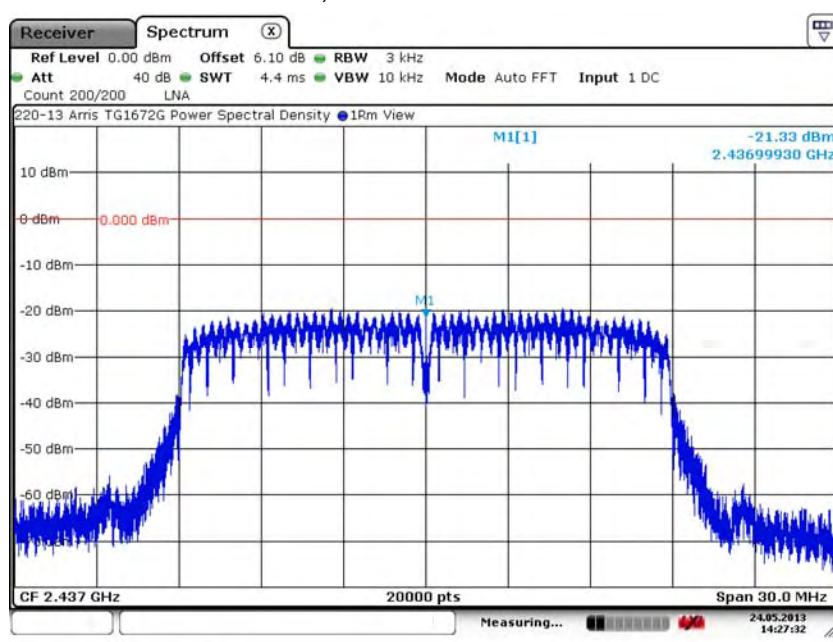
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.23. HT20: Mid Channel – 6, J2401



#### 7.8.24. HT20: Mid Channel – 6, J2402



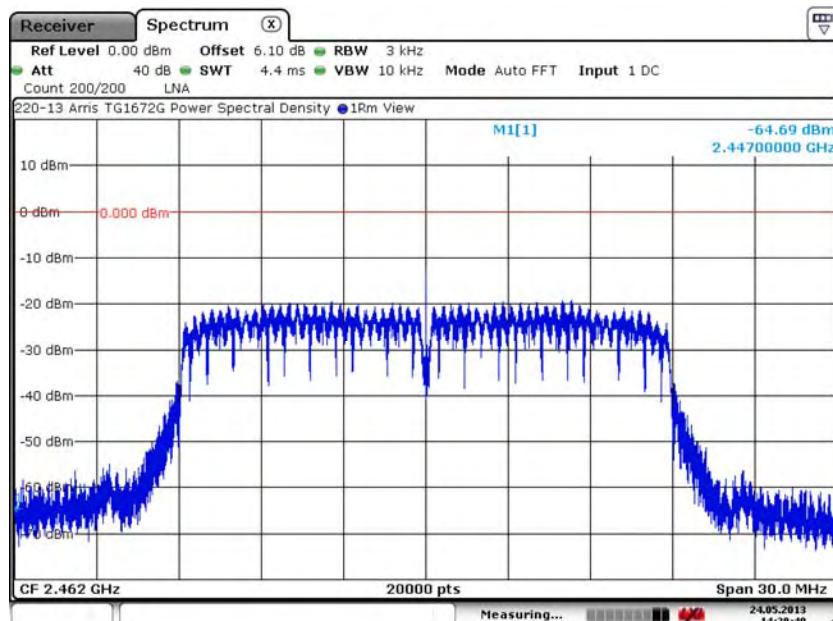
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data

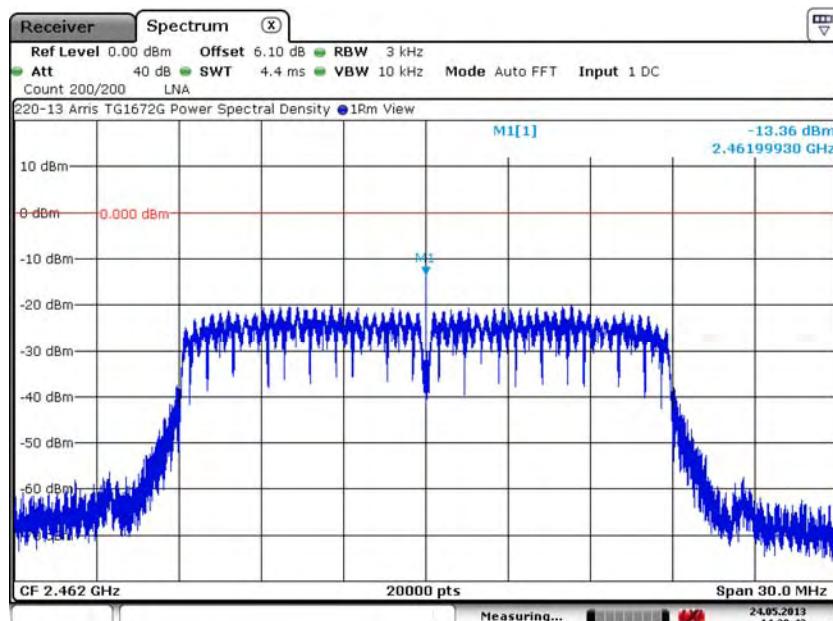
### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.25. HT20: High Channel – 11, J2400



Date: 24.MAY.2013 14:28:49

#### 7.8.26. HT20: High Channel – 11, J2401



Date: 24.MAY.2013 14:29:41

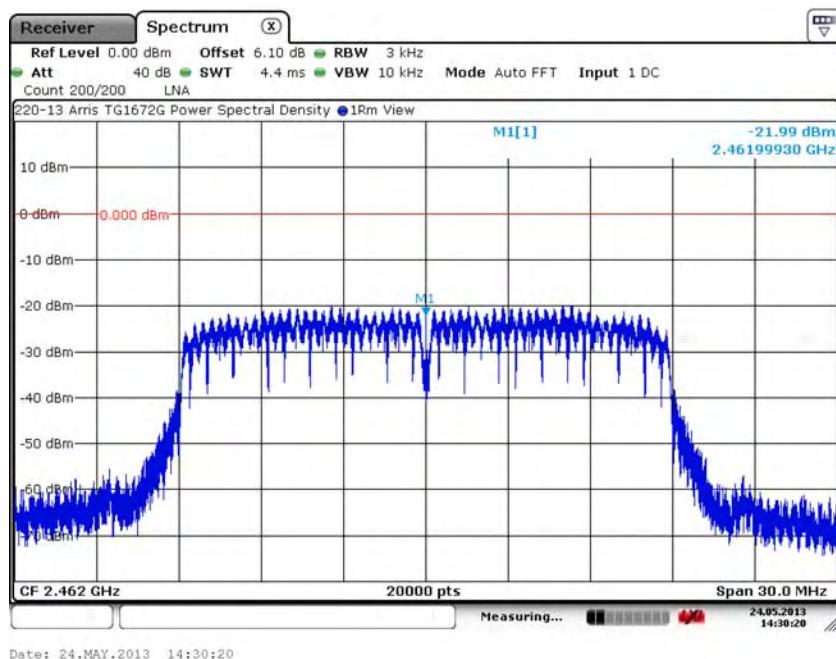
Test Number: 220-13R1

Issue Date: 7/18/2013

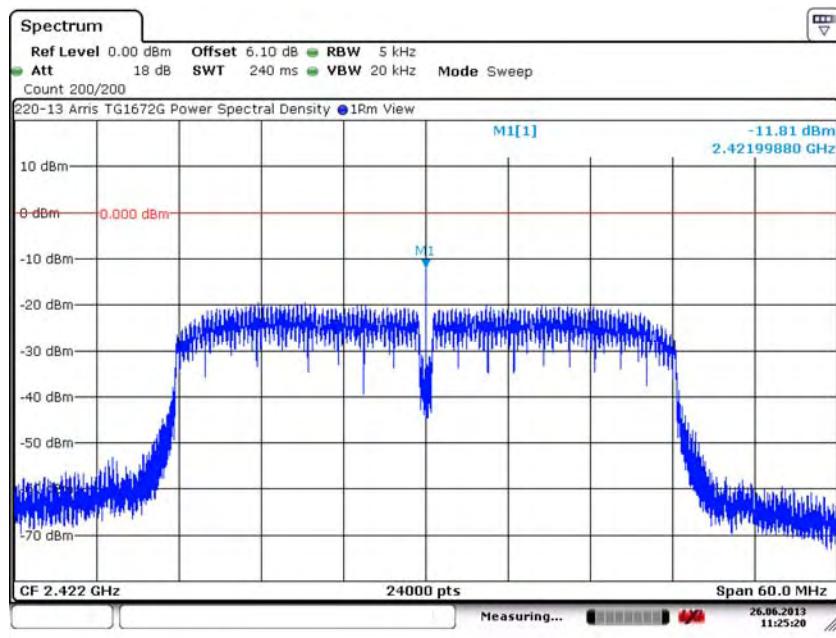
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.27. HT20: High Channel – 11, J2402



#### 7.8.28. HT40: Low Channel – 3, J2400



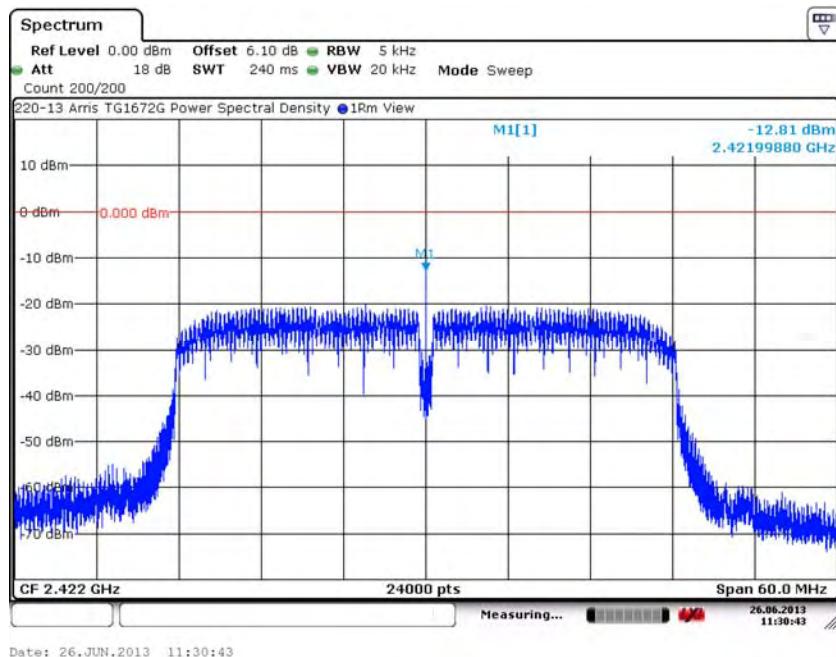
Test Number: 220-13R1

Issue Date: 7/18/2013

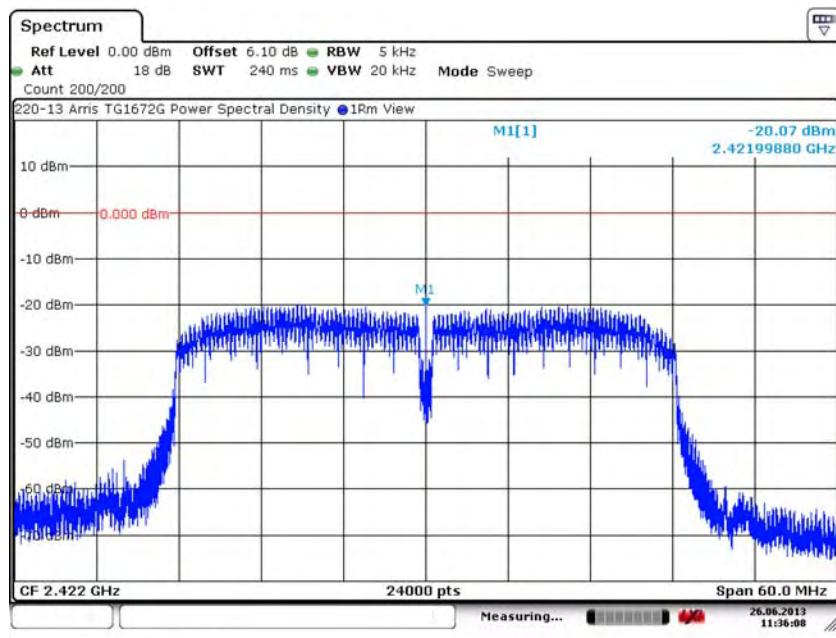
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.29. HT40: Low Channel – 3, J2401



#### 7.8.30. HT40: Low Channel – 3, J2402



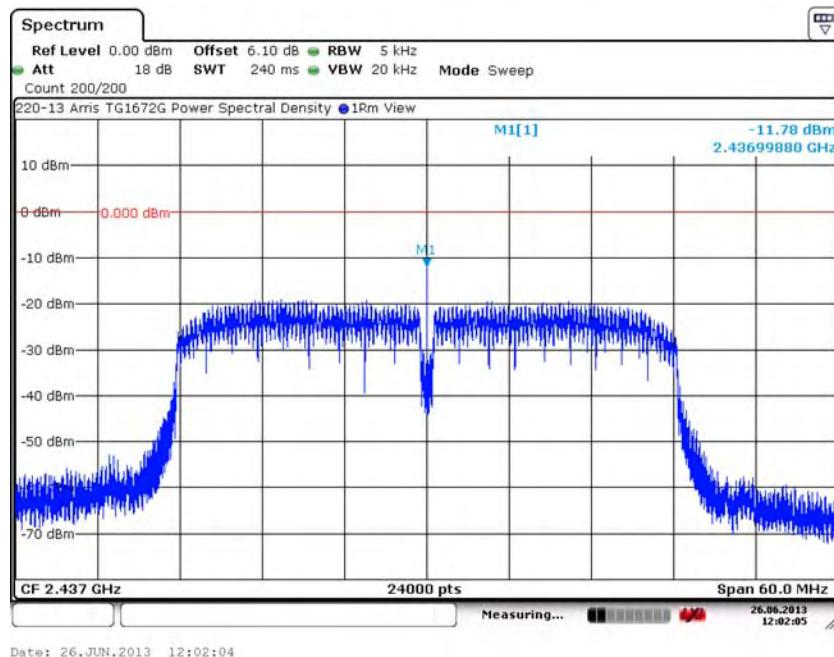
Test Number: 220-13R1

Issue Date: 7/18/2013

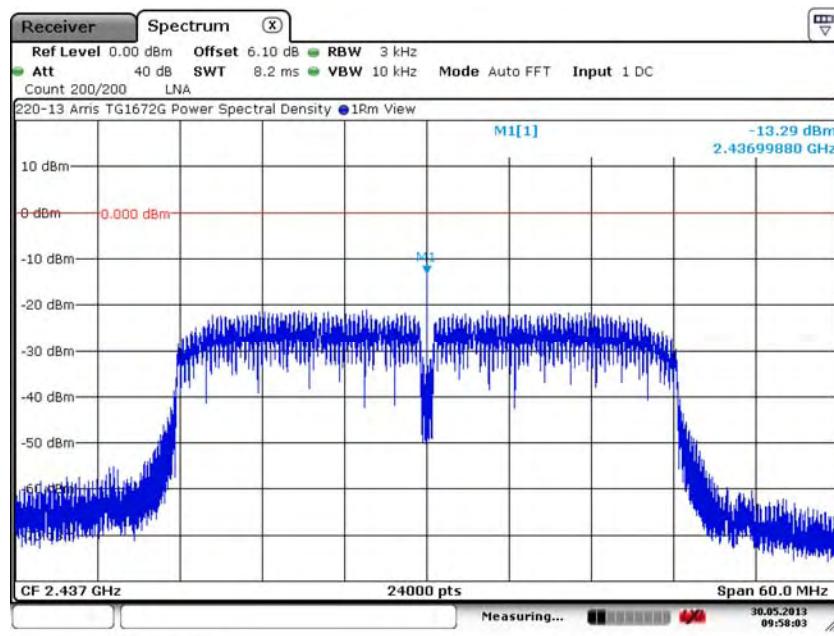
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.31. HT40: Mid Channel – 6, J2400



#### 7.8.32. HT40: Mid Channel – 6, J2401



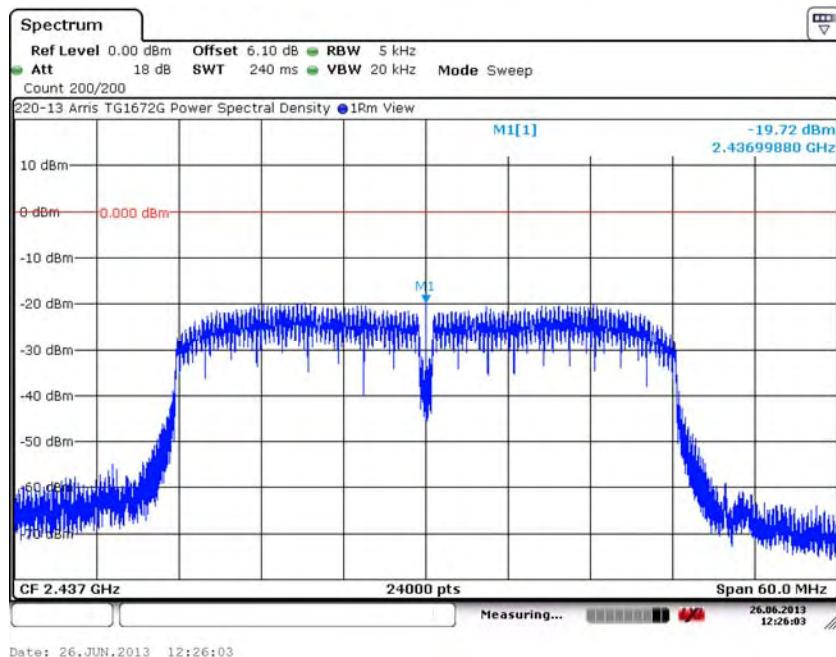
Test Number: 220-13R1

Issue Date: 7/18/2013

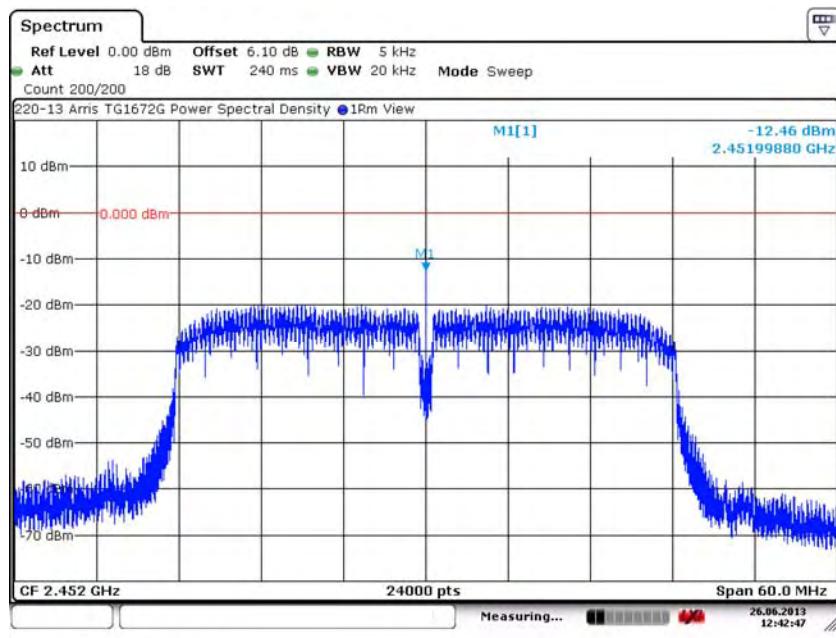
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.33. HT40: Mid Channel – 6, J2402



#### 7.8.34. HT40: High Channel – 9, J2400



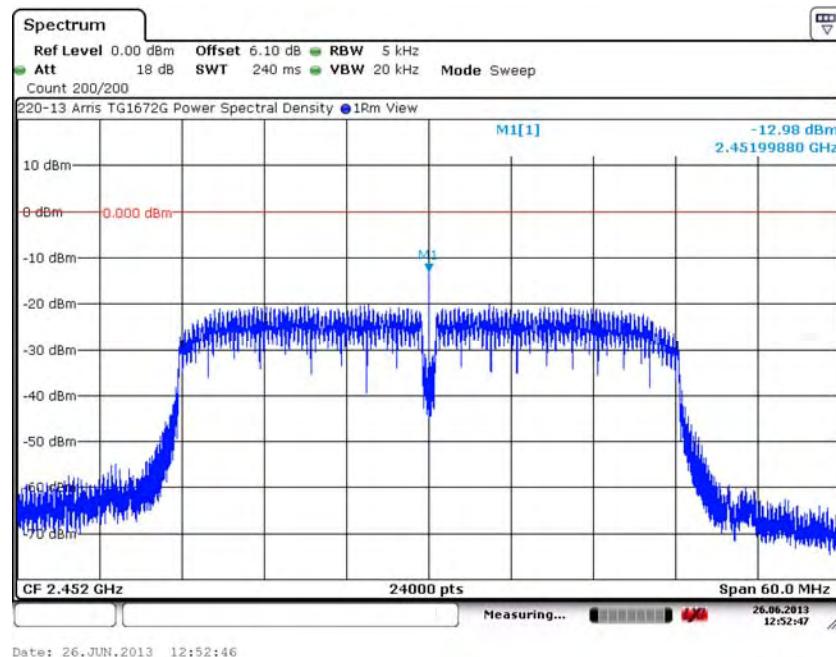
Test Number: 220-13R1

Issue Date: 7/18/2013

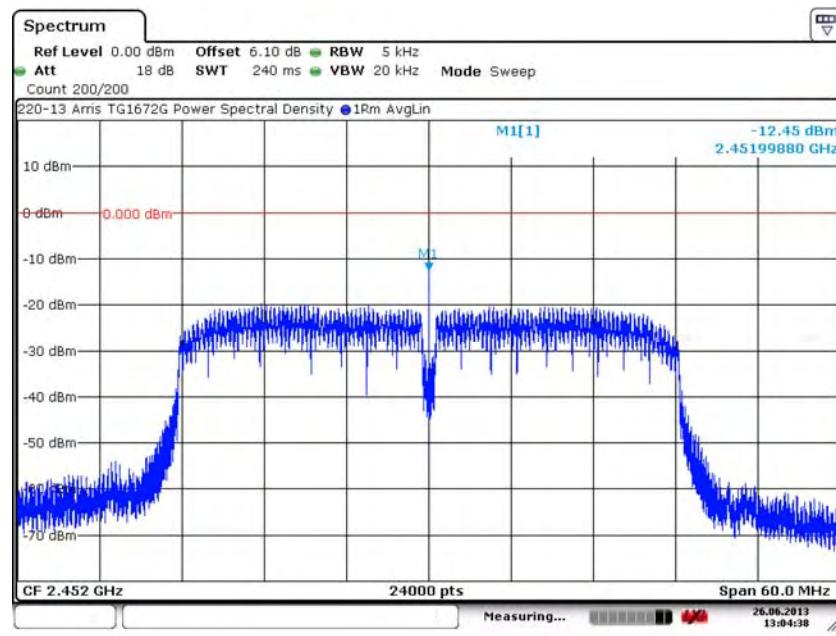
## 7. Measurement Data

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.35. HT40: High Channel – 9, J2401



#### 7.8.36. HT40: High Channel – 9, J2402



**Test Number: 220-13R1**
**Issue Date: 7/18/2013**

## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

Measurement Results in 5725 MHz to 5850 MHz band

802.11a Mode Channel	Frequency (MHz)	Maximum Power Spectral Density			Total Max Power Spectral Density (dBm)	Limit (dBm)	Result
		J5000	J5001	J5002			
		(dBm)	(dBm)	(dBm)			
Low	5744.9752	-20.87	-16.73	-14.23	-11.73	8.00	Compliant
Middle	5784.9752	-17.23	-16.76	-17.94	-12.51	8.00	Compliant
High	5819.9980	-18.63	-18.80	-19.82	-14.28	8.00	Compliant

HT20 Mode Channel	Frequency (MHz)	Maximum Power Spectral Density			Total Max Power Spectral Density (dBm)	Limit (dBm)	Result
		J5000	J5001	J5002			
		(dBm)	(dBm)	(dBm)			
Low	5789.9495	-19.05	-18.42	-19.32	-14.14	8.00	Compliant
Middle	5789.9495	-18.02	-19.38	-18.05	-13.67	8.00	Compliant
High	5824.9782	-18.02	-19.38	-18.05	-13.67	8.00	Compliant

HT40 Mode Channel	Frequency (MHz)	Maximum Power Spectral Density			Total Max Power Spectral Density (dBm)	Limit (dBm)	Result
		J5000	J5001	J5002			
		(dBm)	(dBm)	(dBm)			
Low	5754.9737	-20.21	-16.81	-23.90	-14.63	8.00	Compliant
High	5794.9737	-17.61	-16.32	-21.25	-13.17	8.00	Compliant

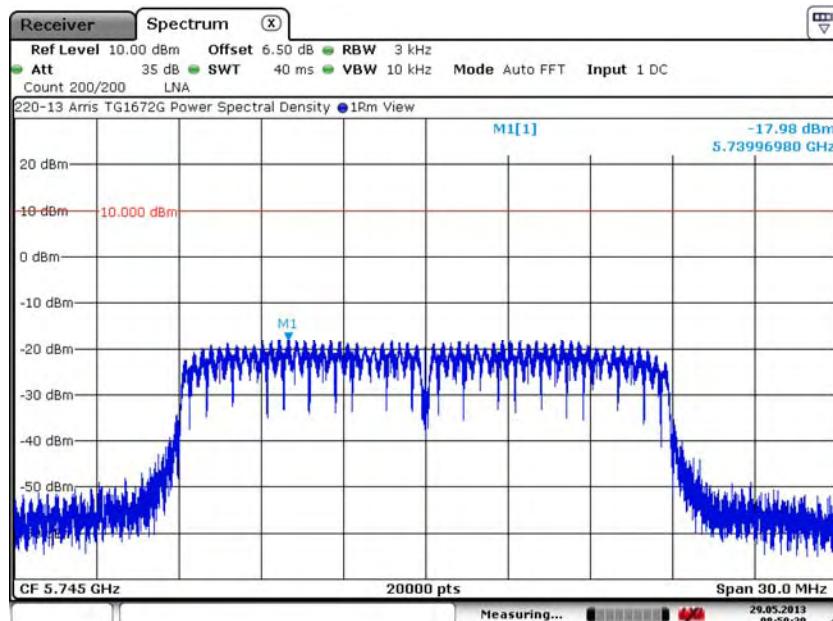
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

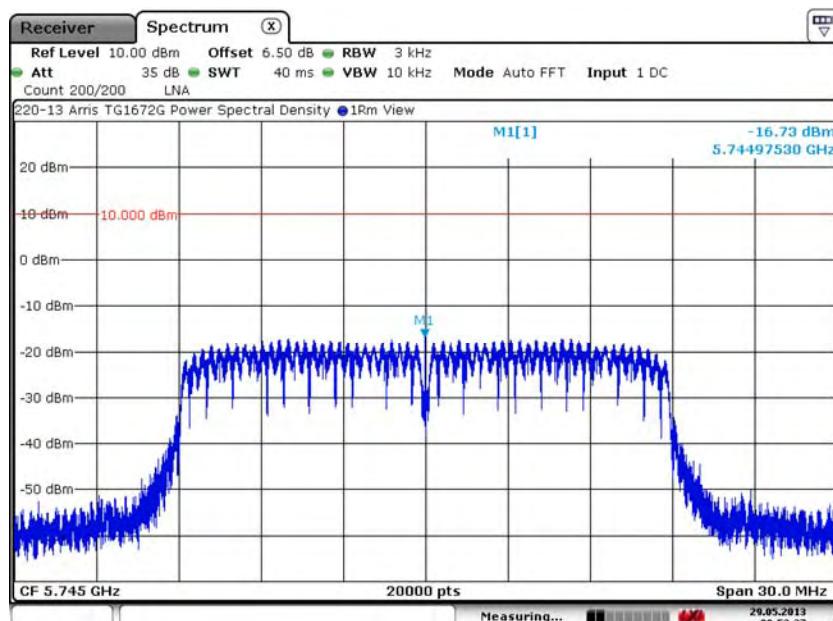
### 7.8. Power Spectral Density (15.247(e)) (continued)

7.8.37. 802.11a: Low Channel – 149, J5000



Date: 29.MAY.2013 08:50:39

7.8.38. 802.11a: Low Channel – 149, J5001



Date: 29.MAY.2013 08:53:38

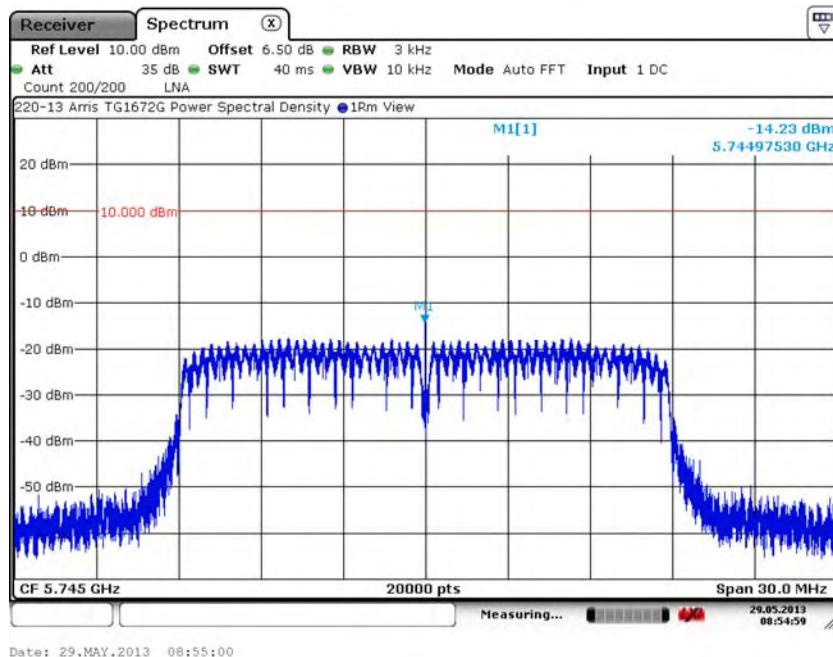
Test Number: 220-13R1

Issue Date: 7/18/2013

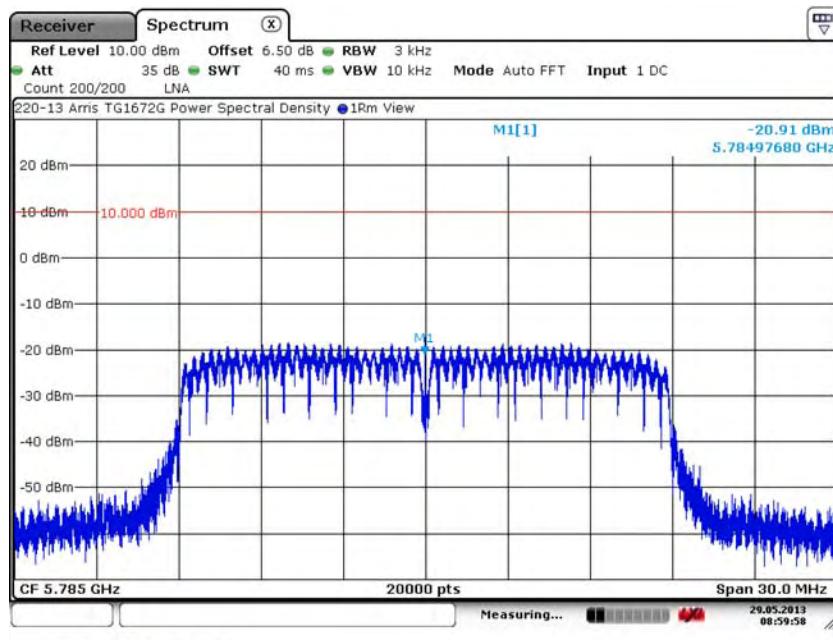
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

7.8.39. 802.11a: Low Channel – 149, J5002



7.8.40. 802.11a: Middle Channel – 157, J5000



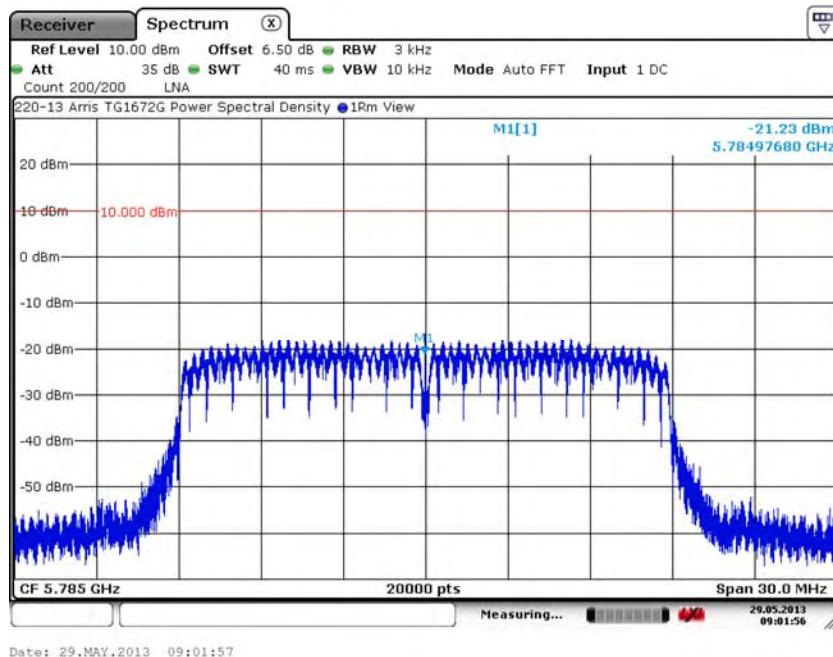
Test Number: 220-13R1

Issue Date: 7/18/2013

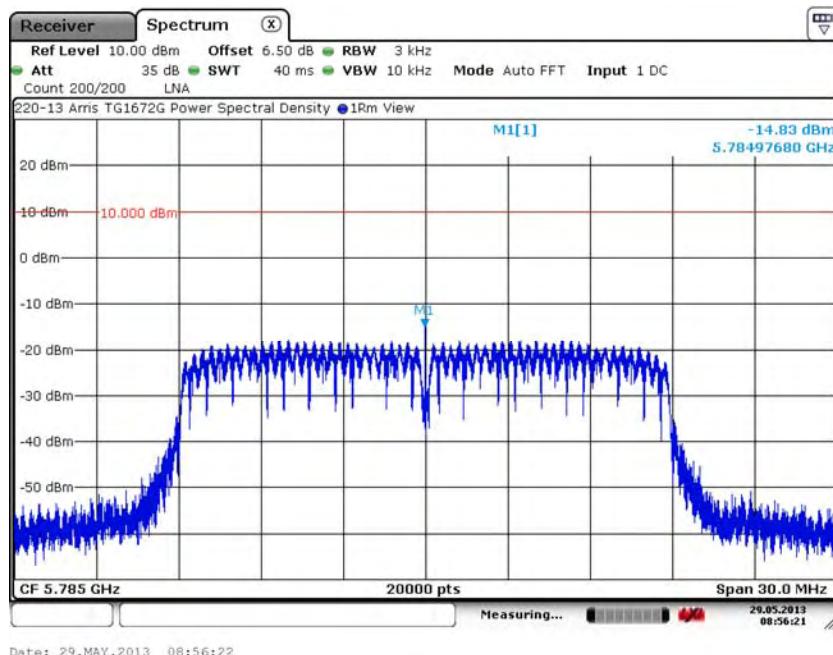
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.41. 802.11a: Middle Channel – 157, J5001



#### 7.8.42. 802.11a: Middle Channel – 157, J5002



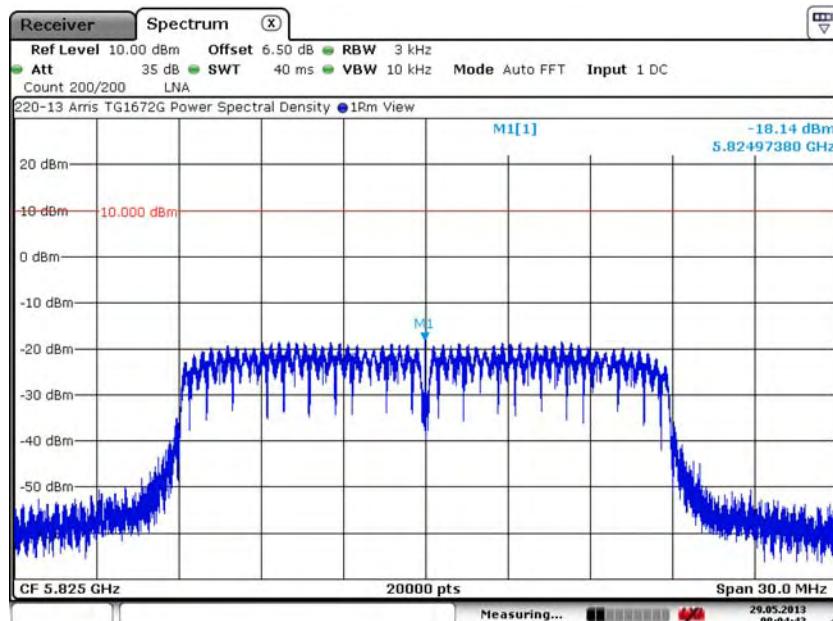
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

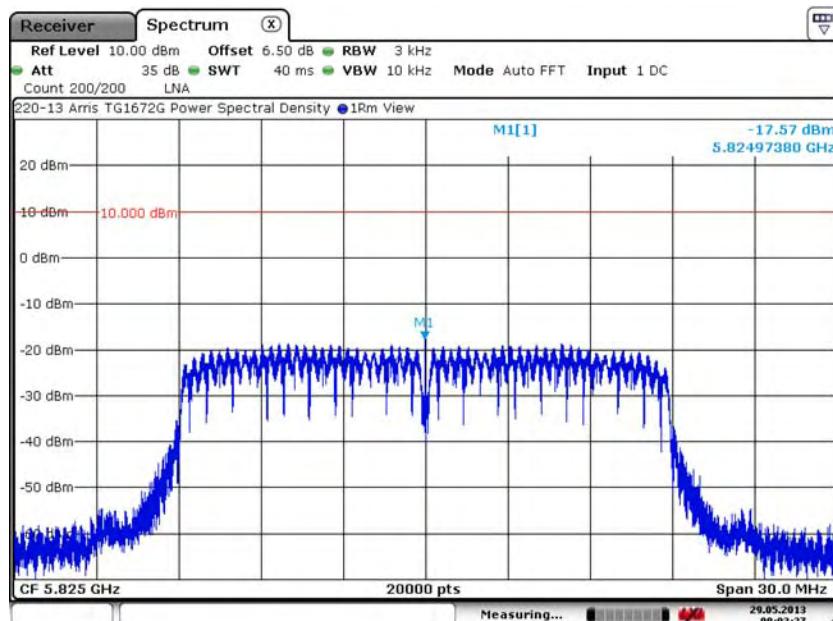
### 7.8. Power Spectral Density (15.247(e)) (continued)

7.8.43. 802.11a: High Channel – 165, J5000



Date: 29.MAY.2013 09:04:43

7.8.44. 802.11a: High Channel – 165, J5001



Date: 29.MAY.2013 09:03:27

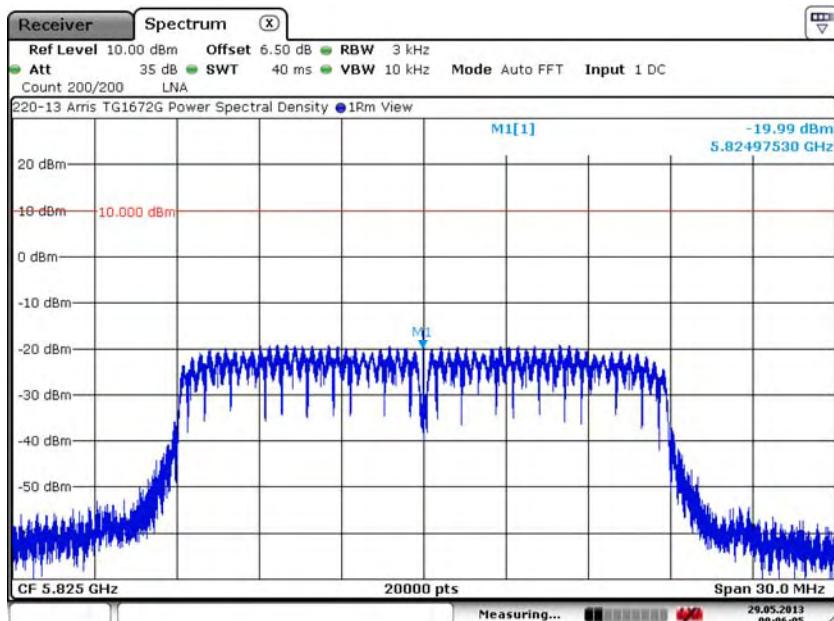
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

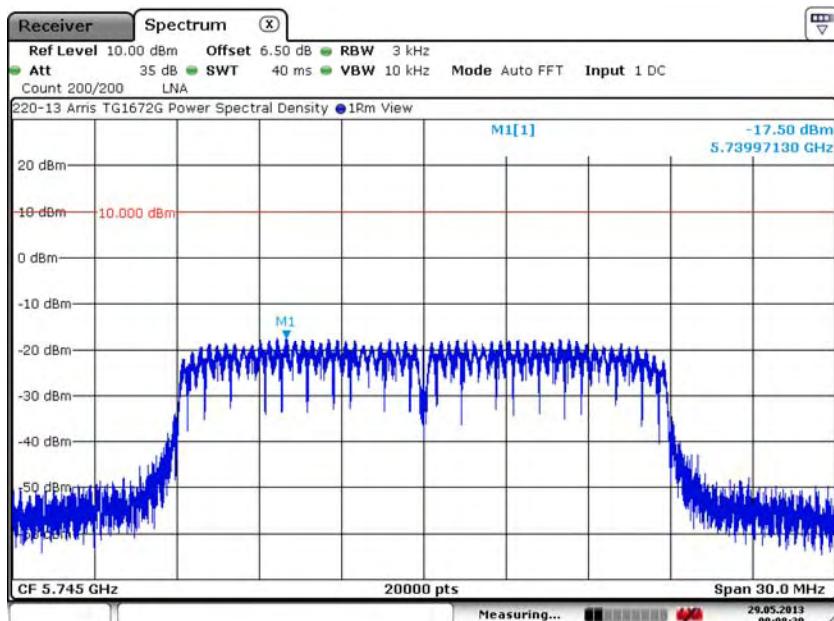
### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.45. 802.11a: High Channel – 165, J5002



Date: 29.MAY.2013 09:06:06

#### 7.8.46. HT20: Low Channel – 149, J5000



Date: 29.MAY.2013 09:08:39

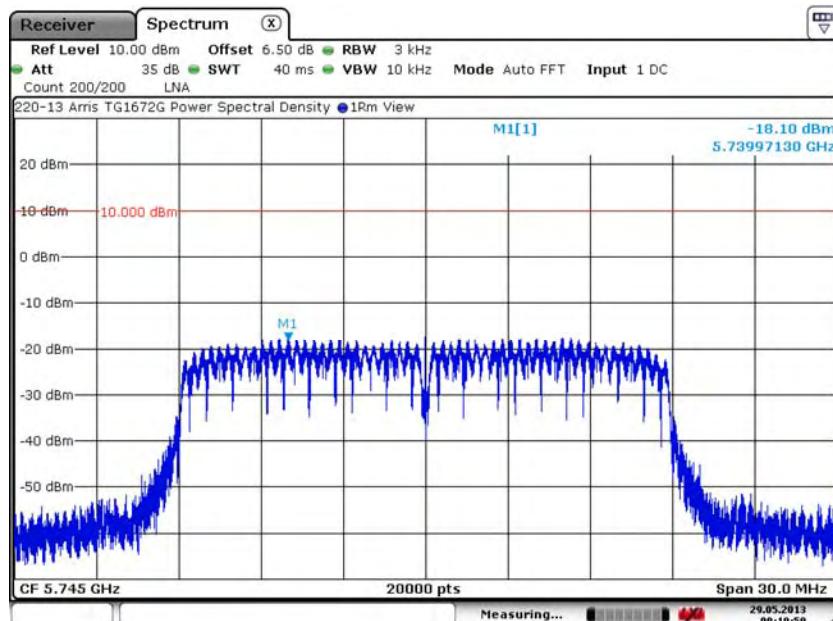
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

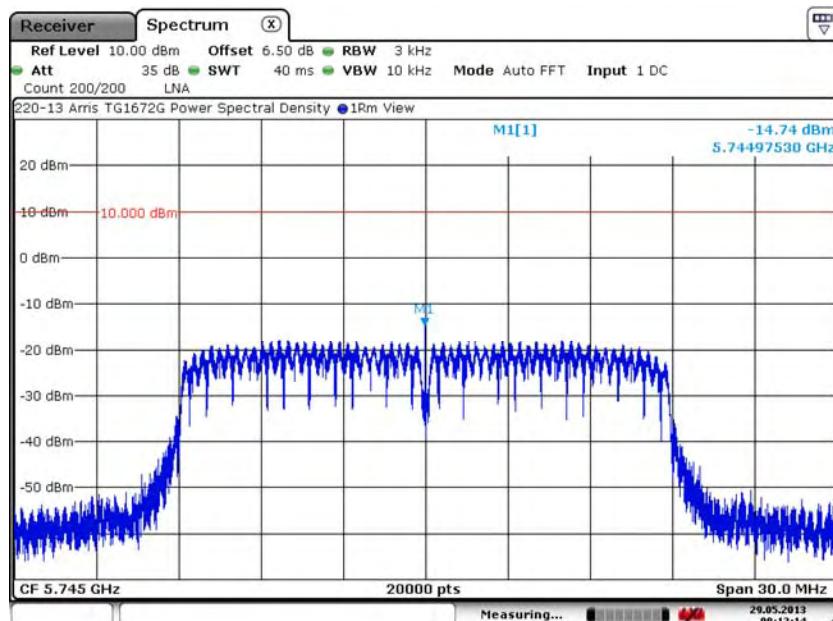
### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.47. HT20: Low Channel – 149, J5001



Date: 29.MAY.2013 09:11:00

#### 7.8.48. HT20: Low Channel – 149, J5002



Date: 29.MAY.2013 09:12:15

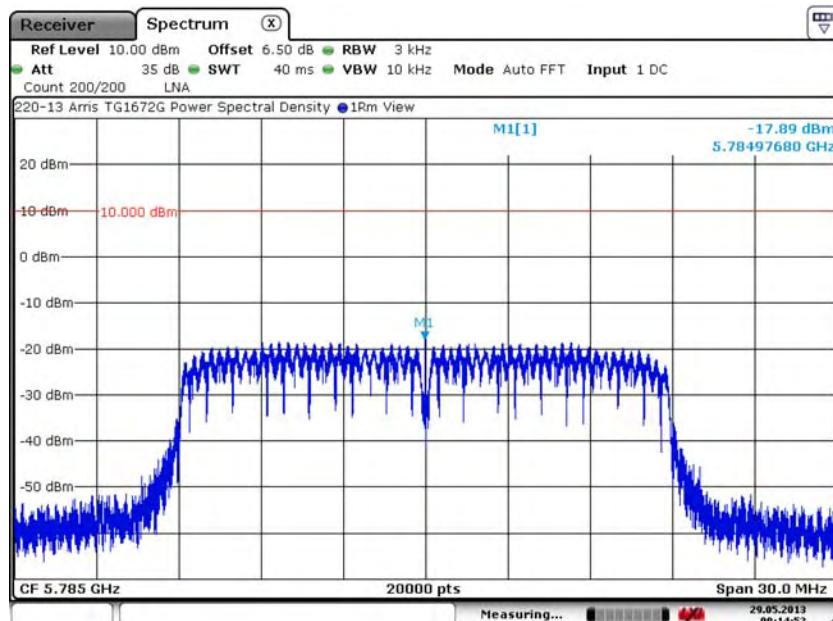
Test Number: 220-13R1

Issue Date: 7/18/2013

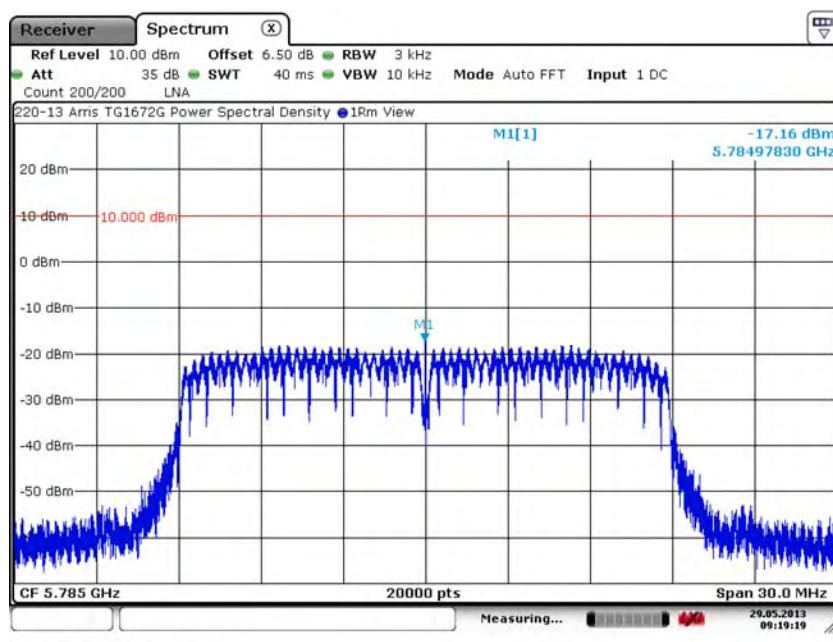
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.49. HT20: Middle Channel – 157, J5000



#### 7.8.50. HT20: Middle Channel – 157, J5001



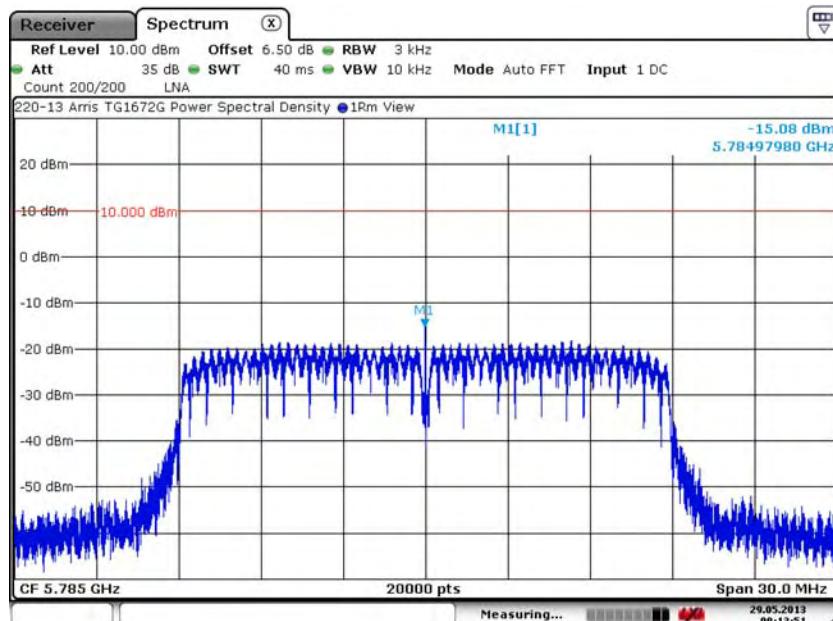
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

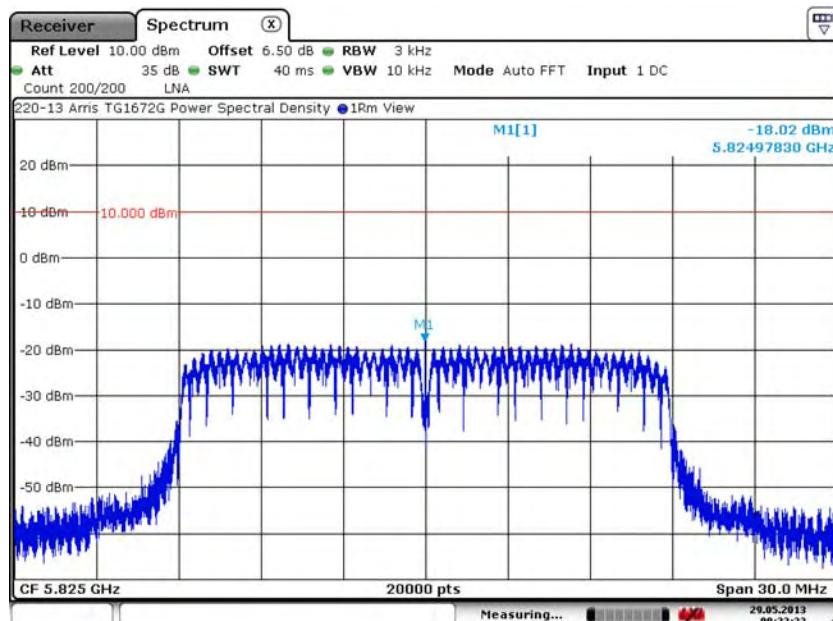
### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.51. HT20: Middle Channel – 157, J5002



Date: 29.MAY.2013 09:13:51

#### 7.8.52. HT20: High Channel – 165, J5000



Date: 29.MAY.2013 09:22:22

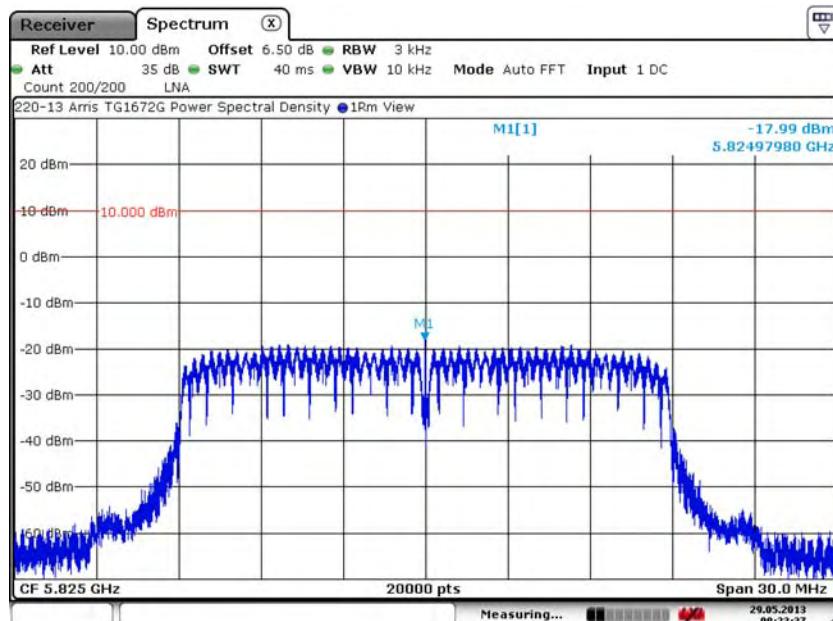
Test Number: 220-13R1

Issue Date: 7/18/2013

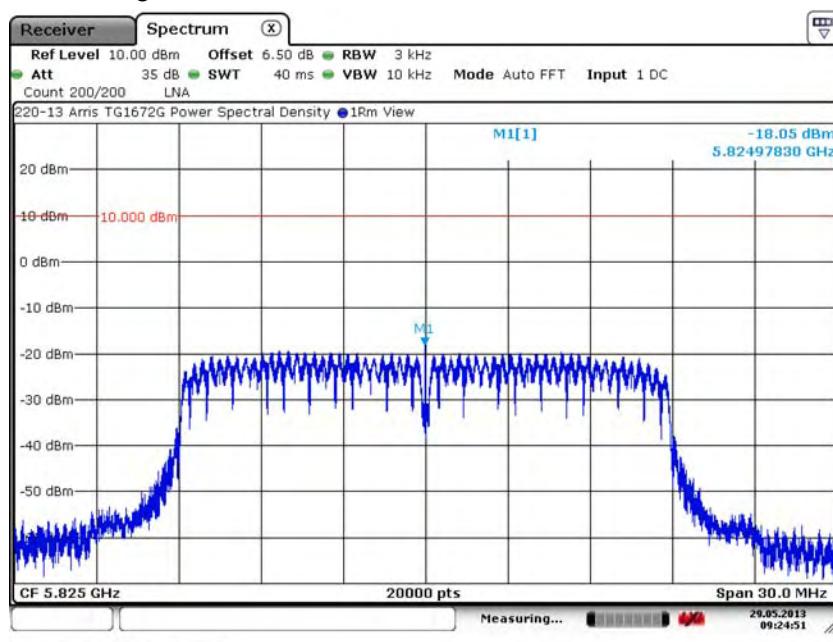
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.53. HT20: High Channel – 165, J5001



#### 7.8.54. HT20: High Channel – 165, J5002



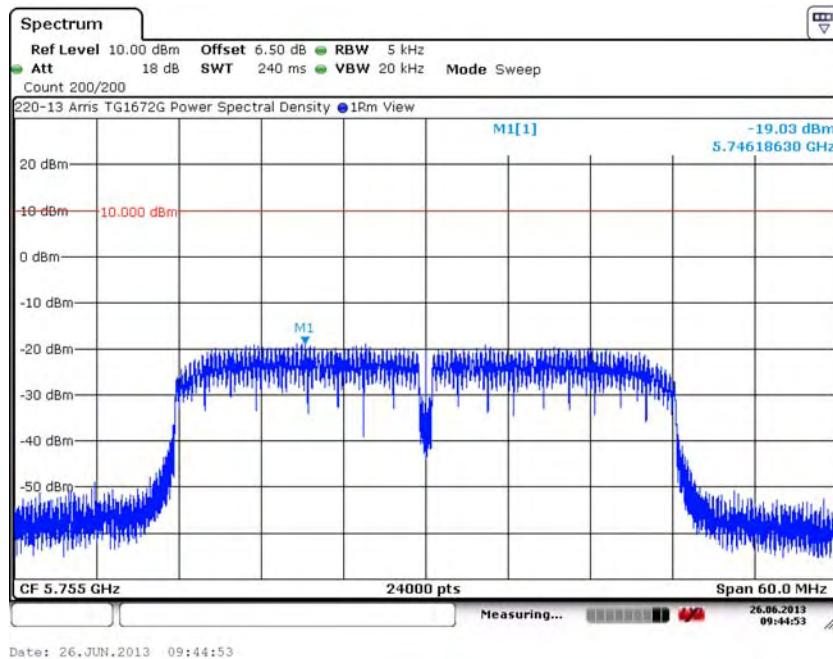
Test Number: 220-13R1

Issue Date: 7/18/2013

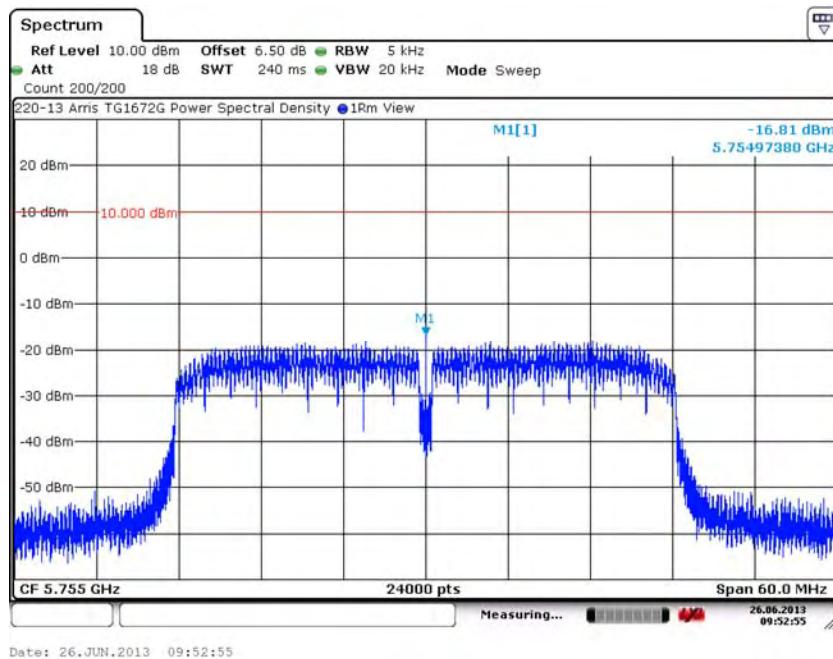
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.55. HT40: Low Channel – 151, J5000



#### 7.8.56. HT40: Low Channel – 151, J5001



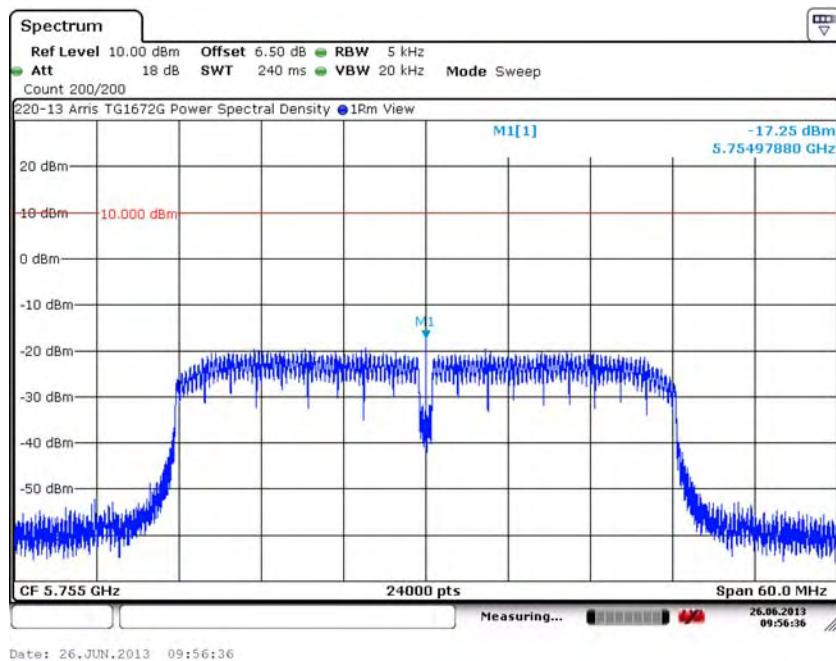
Test Number: 220-13R1

Issue Date: 7/18/2013

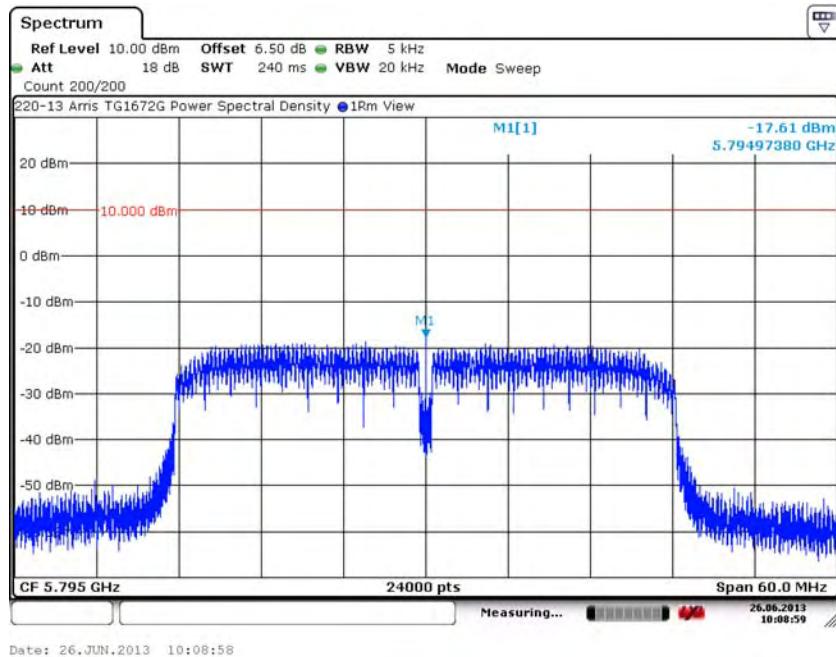
## 7. Measurement Data (continued)

### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.57. HT40: Low Channel – 151, J5002



#### 7.8.58. HT40: High Channel – 159, J5000



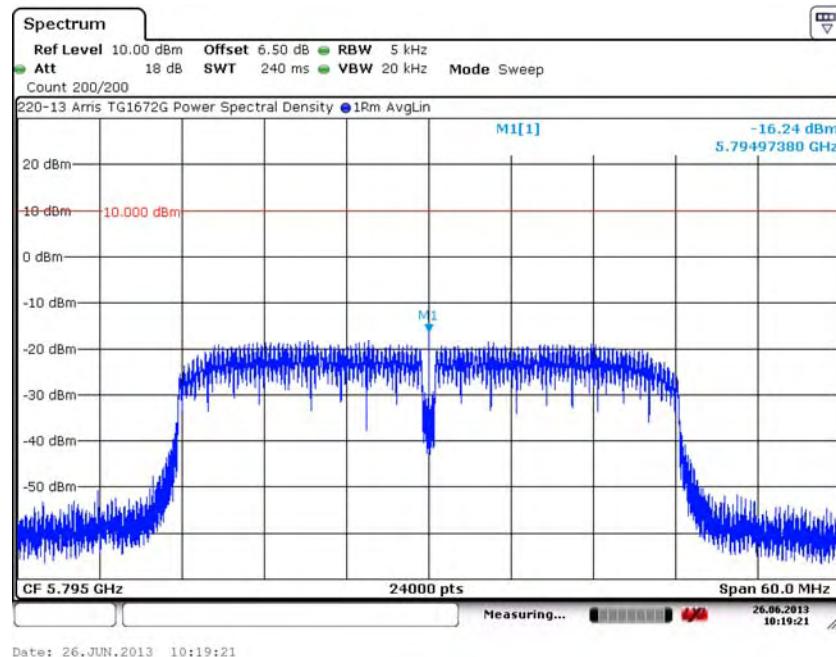
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

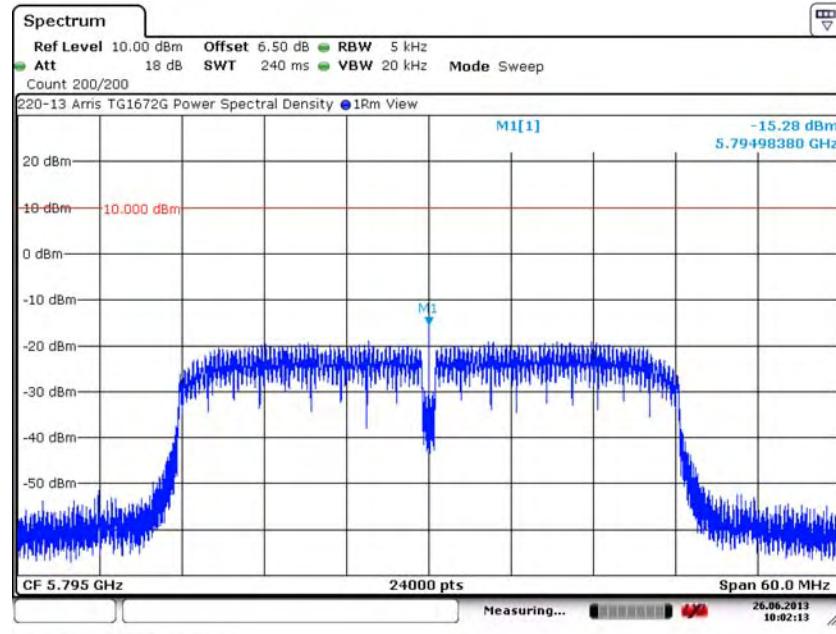
### 7.8. Power Spectral Density (15.247(e)) (continued)

#### 7.8.59. HT40: High Channel – 159, J5001



Date: 26.JUN.2013 10:19:21

#### 7.8.60. HT40: High Channel – 159, J5002



Date: 26.JUN.2013 10:02:13

**Test Number:** 220-13R1

**Issue Date:** 7/18/2013

## 7. Measurement Data (continued)

### 7.9. Conducted Emissions

**Regulatory Limit: FCC Part 15.315, 15.207, IC RSS-213 6.3, RSS-GEN**

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50

\* Decreases with the logarithm of the frequency.

### Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
LISN	EMCO	3825/2	9109-1860	7/2/2013
EMI Receiver	Hewlett Packard	8546A	3330A00115	6/13/2014

Manufacturer	Software Description	Title/Model #	Rev.
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0

### Measurement & Equipment Setup

Test Date:	06/7/2013
Test Engineer:	Cody Merry
Site Temperature (°C):	21
Relative Humidity (%RH):	37
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	30 kHz
Detector Functions:	Peak, Quasi-Peak & Average

### Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

**Test Number: 220-13R1**
**Issue Date: 7/18/2013**

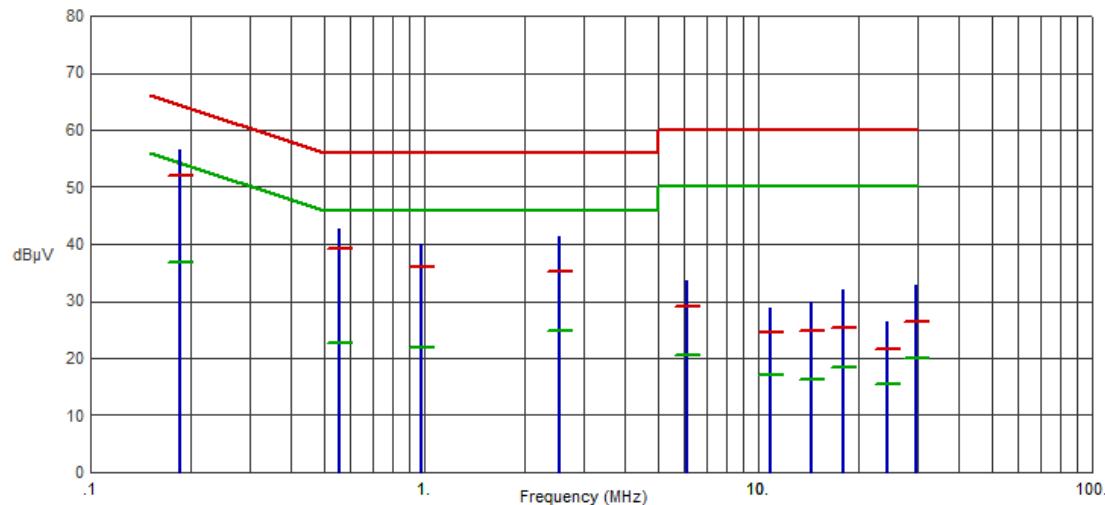
## 7. Measurement Data (continued)

### 7.9. Conducted Emissions

#### 7.9.1. 120 Volts, 60 Hz Phase

Test No.: 220-13, 120 Volts, 60 Hz Phase

FCC, Class B



Frequency (MHz)	Pk Amp (dB $\mu$ V)	QP Amp (dB $\mu$ V)	QP Limit (dB $\mu$ V)	QP Margin (dB)	Avg Amp (dB $\mu$ V)	Avg Limit (dB $\mu$ V)	Avg Margin (dB)	Comments
.1863	56.47	51.88	64.20	-12.32	36.78	54.20	-17.42	
.5574	42.71	39.26	56.00	-16.74	22.56	46.00	-23.44	
.9810	40.01	35.97	56.00	-20.03	21.86	46.00	-24.14	
2.5400	41.27	35.23	56.00	-20.77	24.67	46.00	-21.33	
6.1282	33.68	29.18	60.00	-30.82	20.51	50.00	-29.49	
10.8815	28.82	24.46	60.00	-35.54	16.94	50.00	-33.06	
14.4877	29.79	24.86	60.00	-35.14	16.38	50.00	-33.62	
18.0082	31.95	25.45	60.00	-34.55	18.38	50.00	-31.62	
24.2742	26.48	21.64	60.00	-38.36	15.36	50.00	-34.64	
29.6286	32.77	26.41	60.00	-33.59	19.97	50.00	-30.03	

**Test Number: 220-13R1**
**Issue Date: 7/18/2013**

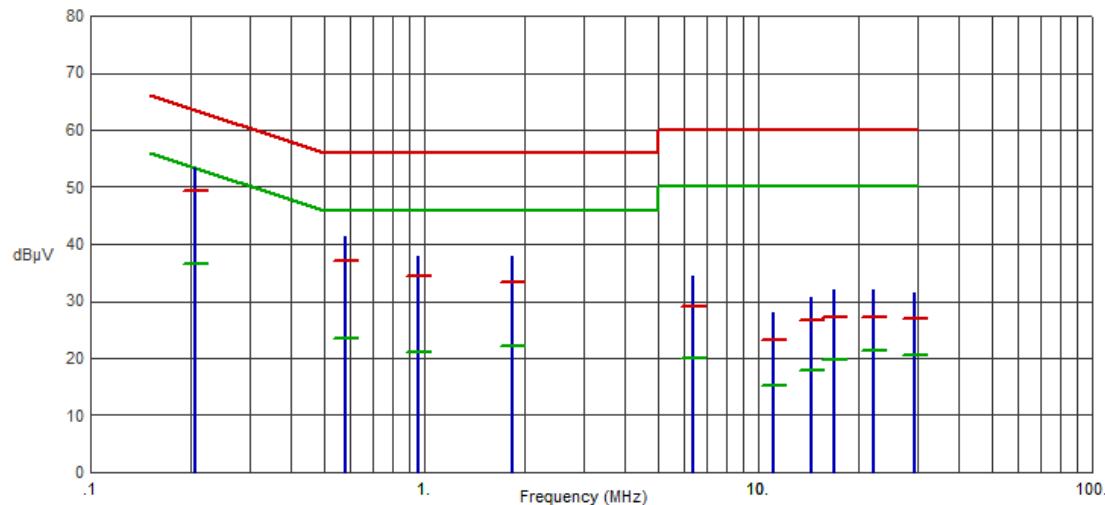
## 7. Measurement Data (continued)

### 7.9. Conducted Emissions

#### 7.9.2. 120 Volts, 60 Hz Neutral

Test No.: 220-13, 120 Volts, 60 Hz Neutral

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.2066	53.42	49.42	63.34	-13.92	36.46	53.34	-16.88	
.5804	41.36	37.11	56.00	-18.89	23.40	46.00	-22.60	
.9574	38.00	34.42	56.00	-21.58	21.10	46.00	-24.90	
1.8402	37.87	33.28	56.00	-22.72	22.24	46.00	-23.76	
6.3744	34.42	29.17	60.00	-30.83	19.91	50.00	-30.09	
11.0827	28.03	23.32	60.00	-36.68	15.26	50.00	-34.74	
14.3608	30.60	26.64	60.00	-33.36	17.97	50.00	-32.03	
16.9161	32.02	27.29	60.00	-32.71	19.74	50.00	-30.26	
22.1846	31.92	27.24	60.00	-32.76	21.25	50.00	-28.75	
29.3477	31.36	26.83	60.00	-33.17	20.50	50.00	-29.50	

**Test Number: 220-13R1**
**Issue Date: 7/18/2013**

## 7. Measurement Data (continued)

### 7.10. Duty Cycle

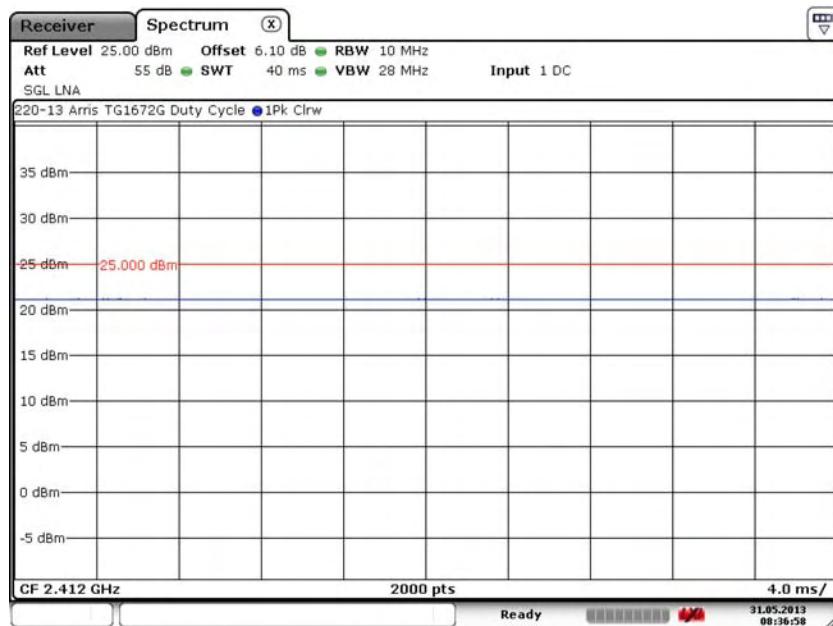
Requirement: (FCC OET publication number 558074)

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).

Procedure: Duty cycle measurements were made according to the procedure detailed FCC OET publication number 558074, Section 6.0 b.

Conclusion: The tested device operates with a duty cycle of greater than or equal to 98%.

#### 7.10.1. 2.4 GHz 802.11b: Low Channel – 1, J2400



Date: 31.MAY.2013 08:36:58

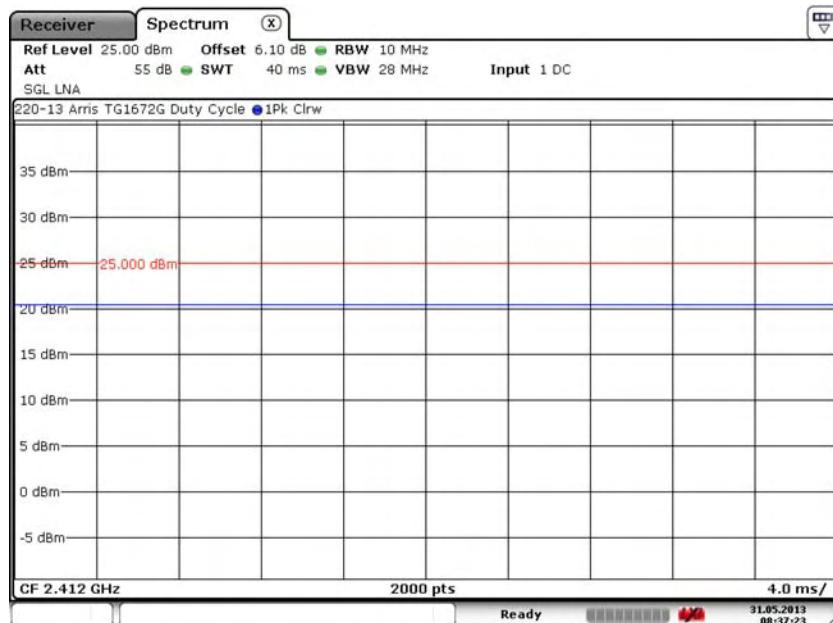
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

### 7.10. Duty Cycle

#### 7.10.2. 2.4 GHz 802.11b: Low Channel – 1, J2401



#### 7.10.3. 2.4 GHz 802.11b: Low Channel – 1, J2402



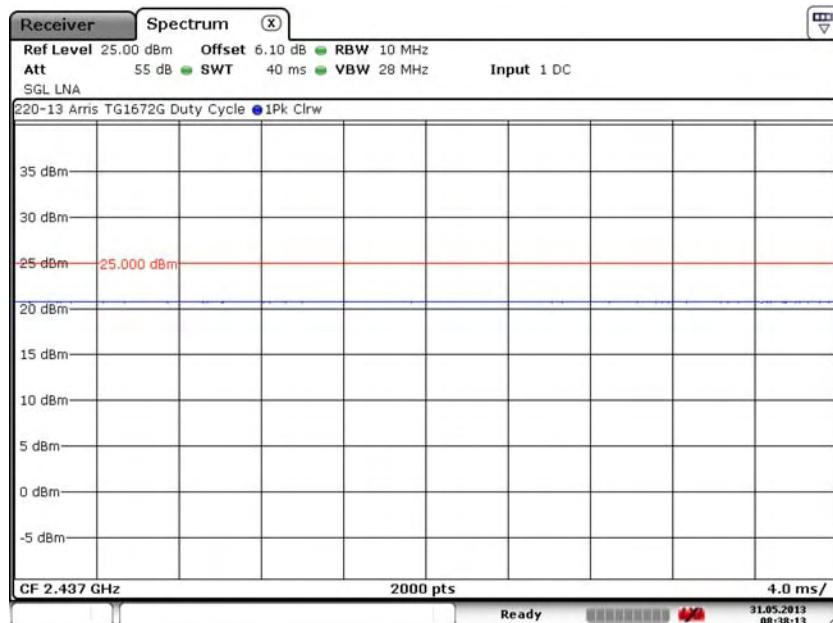
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

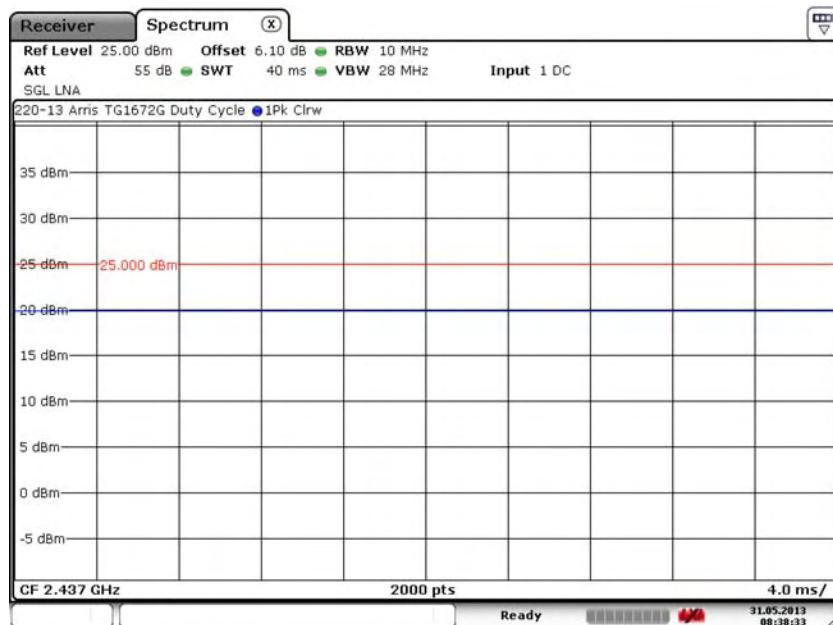
### 7.10. Duty Cycle

#### 7.10.4. 2.4 GHz 802.11b: Middle Channel – 6, J2400



Date: 31.MAY.2013 08:38:13

#### 7.10.5. 2.4 GHz 802.11b: Middle Channel – 6, J2401



Date: 31.MAY.2013 08:38:34

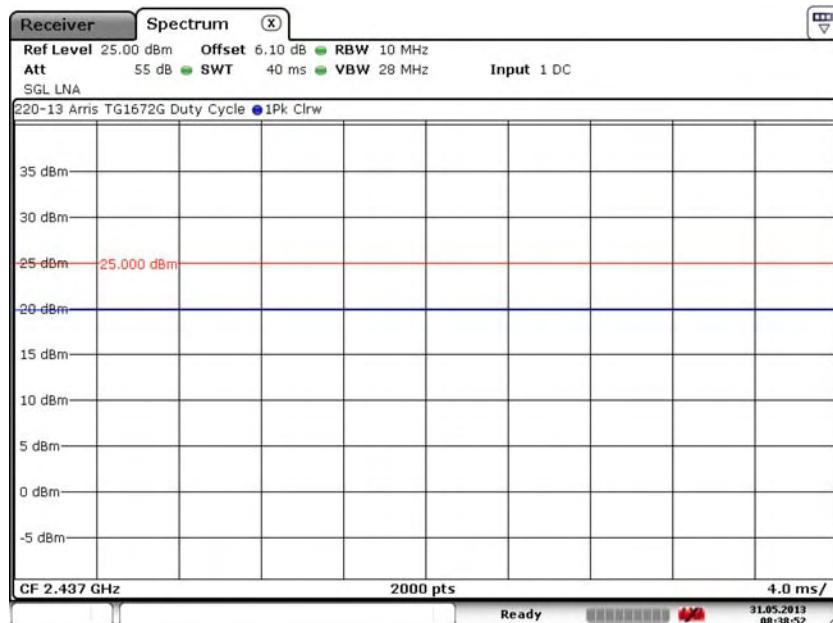
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

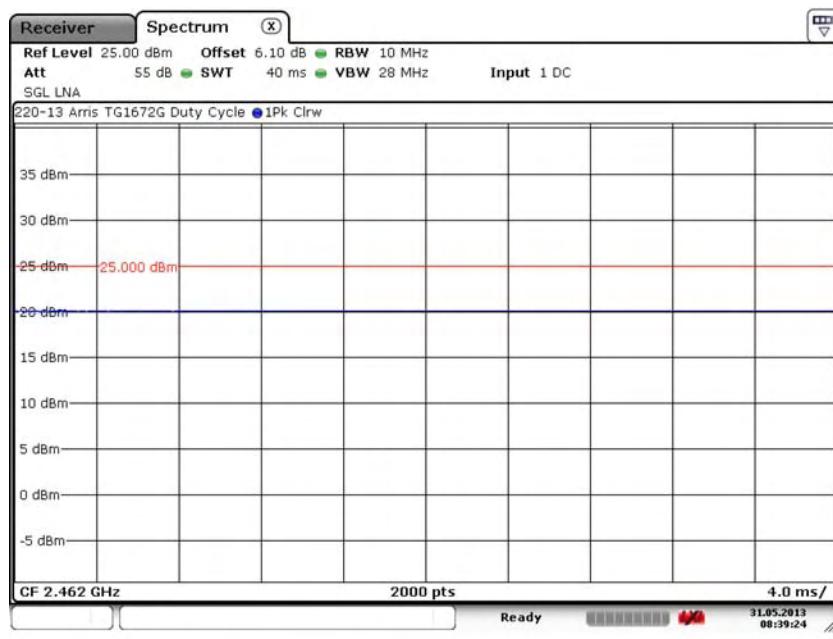
### 7.10. Duty Cycle

#### 7.10.6. 2.4 GHz 802.11b: Middle Channel – 6, J2402



Date: 31.MAY.2013 08:38:53

#### 7.10.7. 2.4 GHz 802.11b: High Channel – 11, J2400



Date: 31.MAY.2013 08:39:25

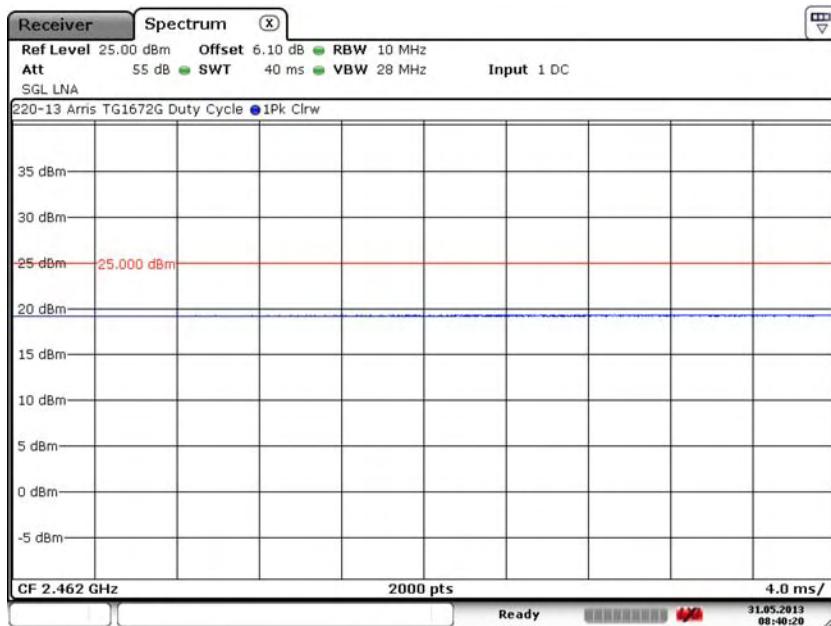
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

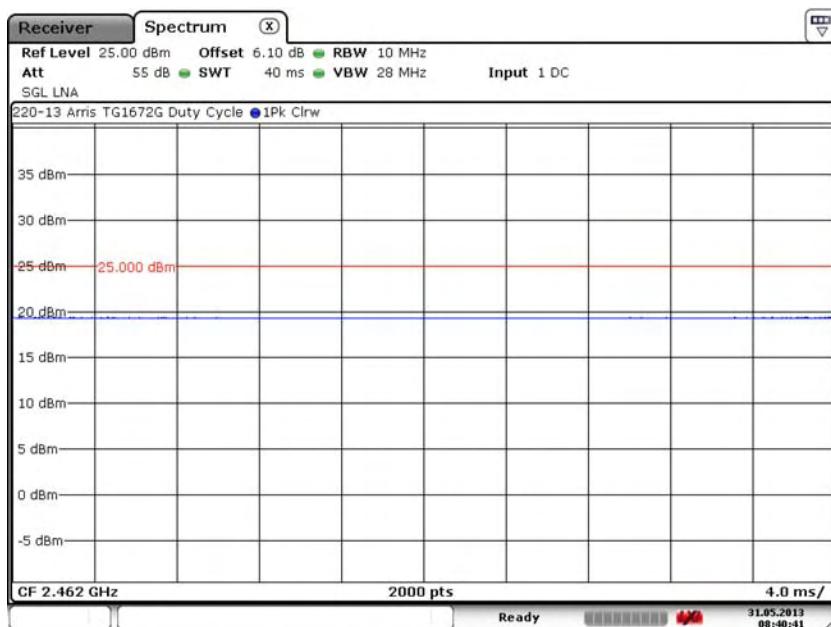
### 7.10. Duty Cycle

7.10.8. 2.4 GHz 802.11b: High Channel – 11, J2401



Date: 31.MAY.2013 08:40:21

7.10.9. 2.4 GHz 802.11b: High Channel – 11, J2402



Date: 31.MAY.2013 08:40:40

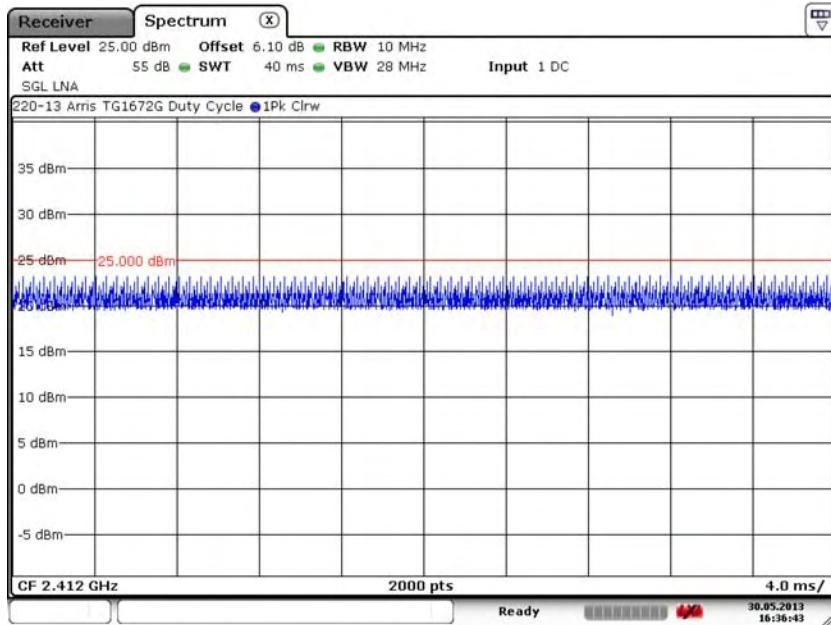
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

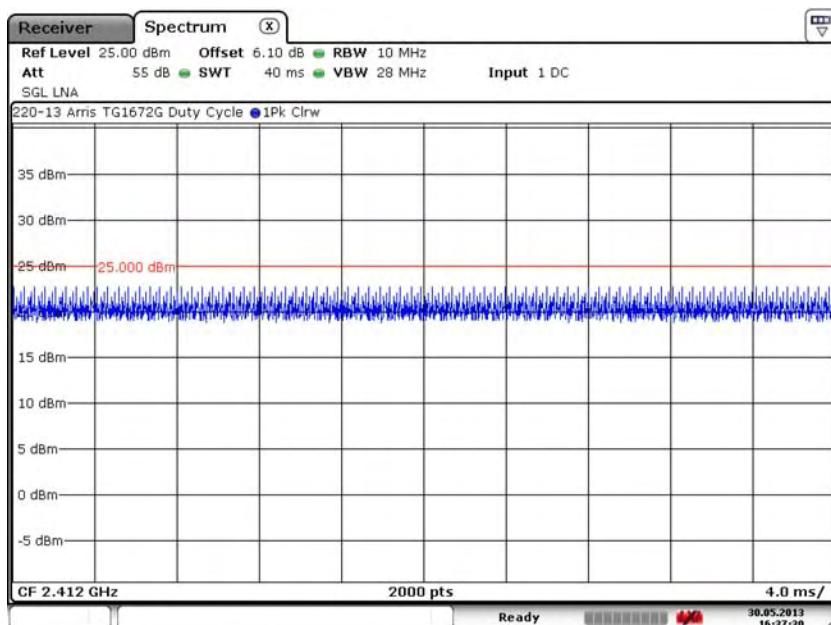
### 7.10. Duty Cycle

7.10.10. 2.4 GHz 802.11g: Low Channel – 1, J2400



Date: 30.MAY.2013 16:36:43

7.10.11. 2.4 GHz 802.11g: Low Channel – 1, J2401



Date: 30.MAY.2013 16:37:31

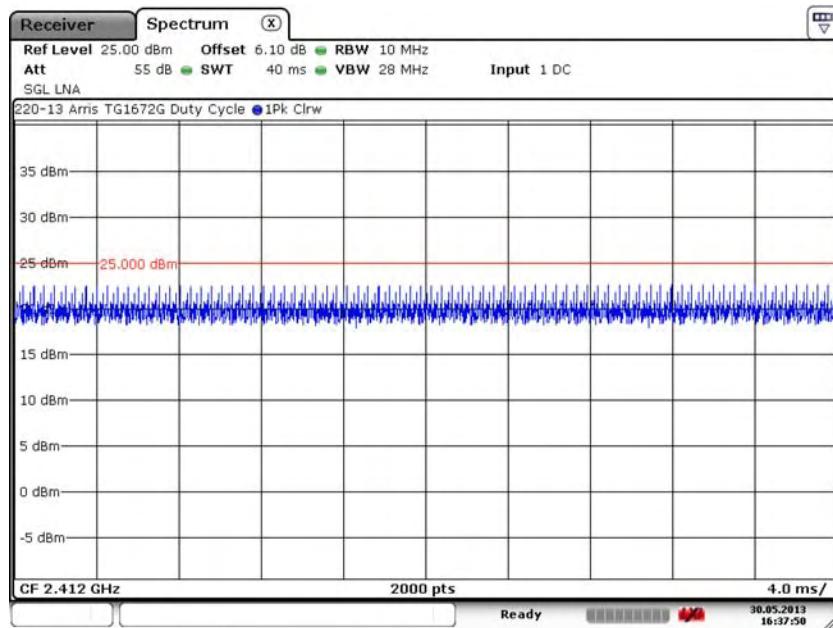
Test Number: 220-13R1

Issue Date: 7/18/2013

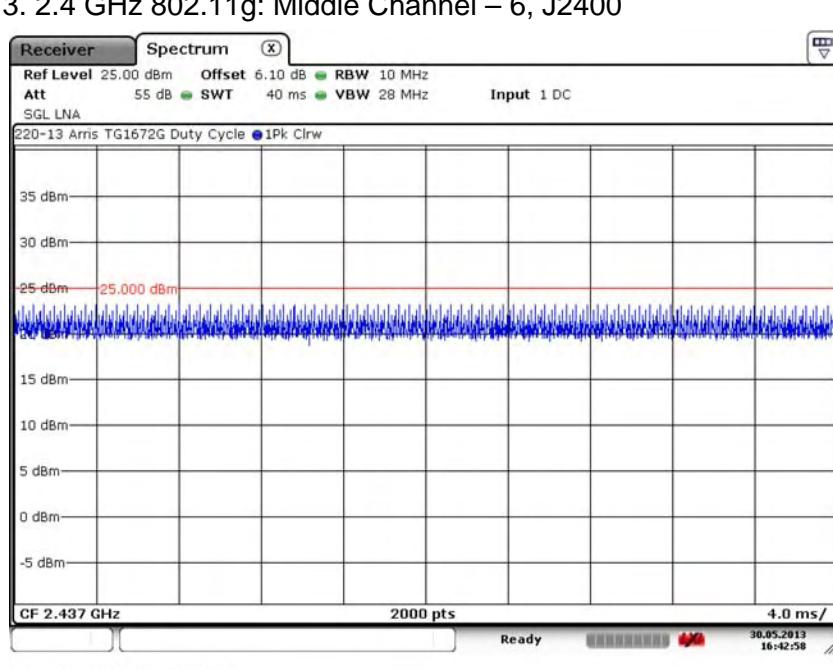
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.12. 2.4 GHz 802.11g: Low Channel – 1, J2402



7.10.13. 2.4 GHz 802.11g: Middle Channel – 6, J2400



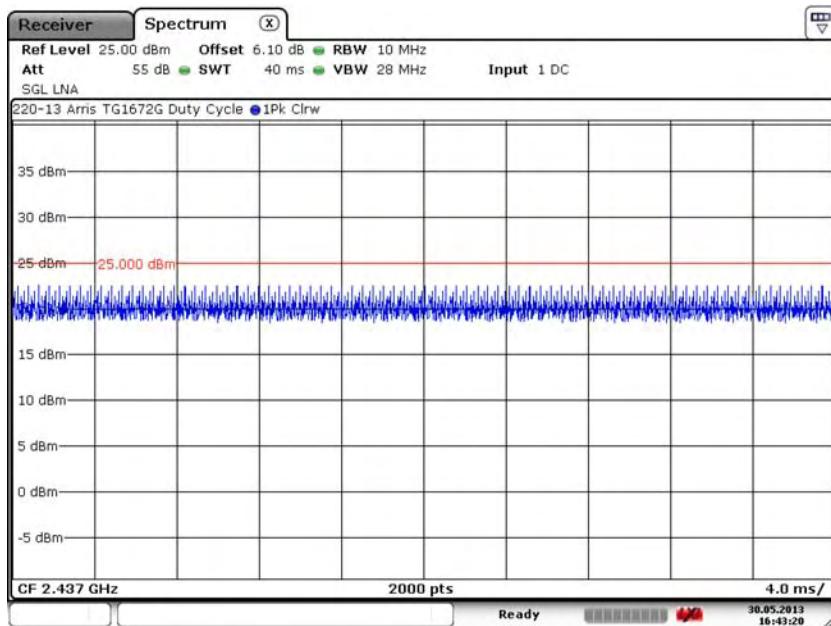
Test Number: 220-13R1

Issue Date: 7/18/2013

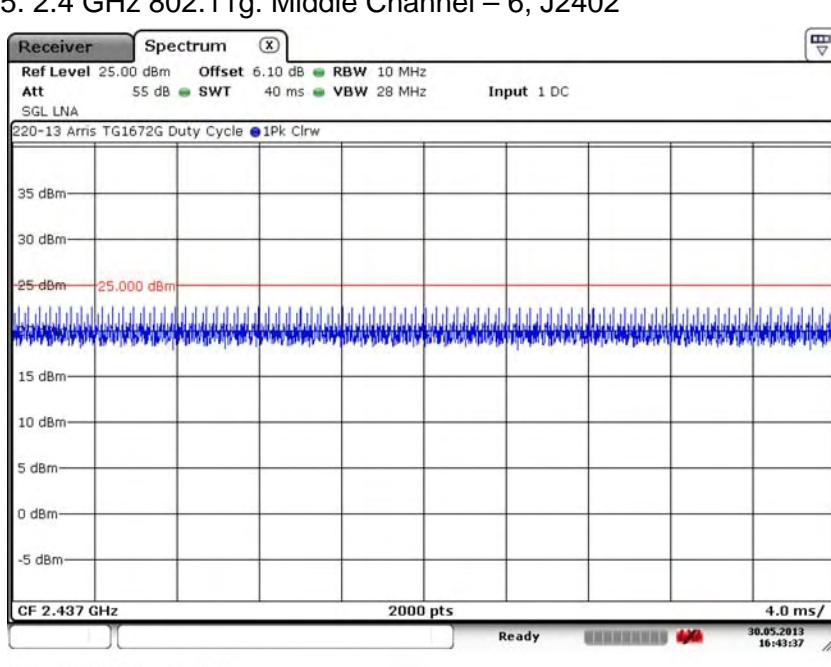
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.14. 2.4 GHz 802.11g: Middle Channel – 6, J2401



7.10.15. 2.4 GHz 802.11g: Middle Channel – 6, J2402



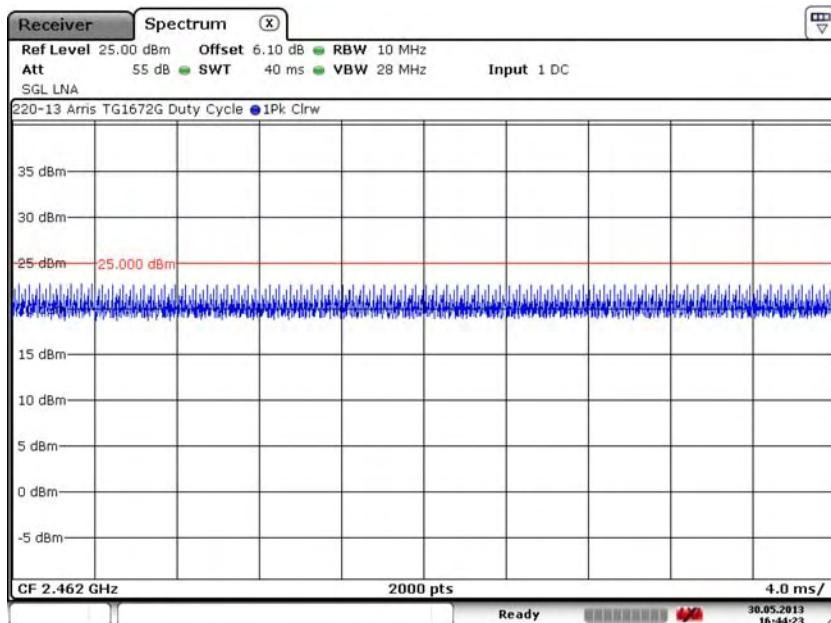
Test Number: 220-13R1

Issue Date: 7/18/2013

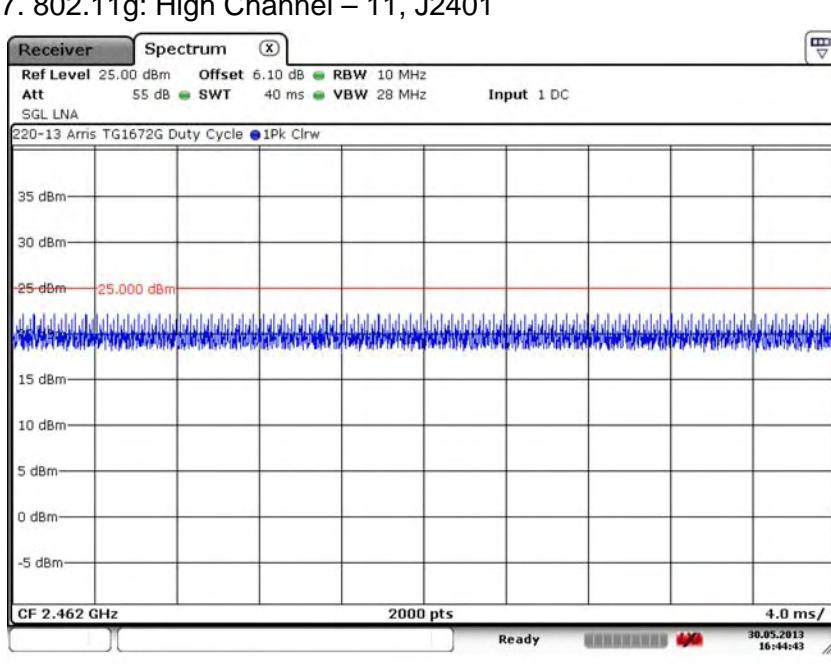
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.16. 2.4 GHz 802.11g: High Channel – 11, J2400



7.10.17. 802.11g: High Channel – 11, J2401



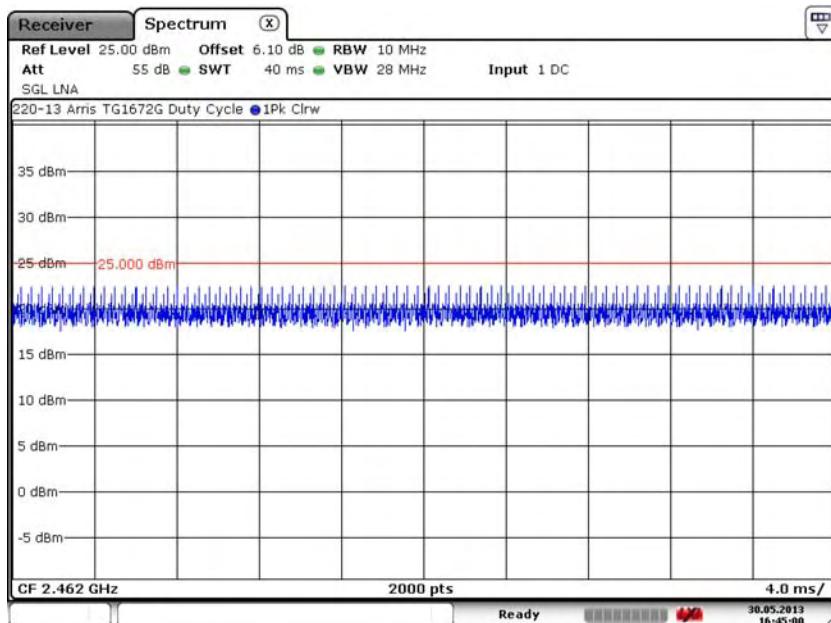
Test Number: 220-13R1

Issue Date: 7/18/2013

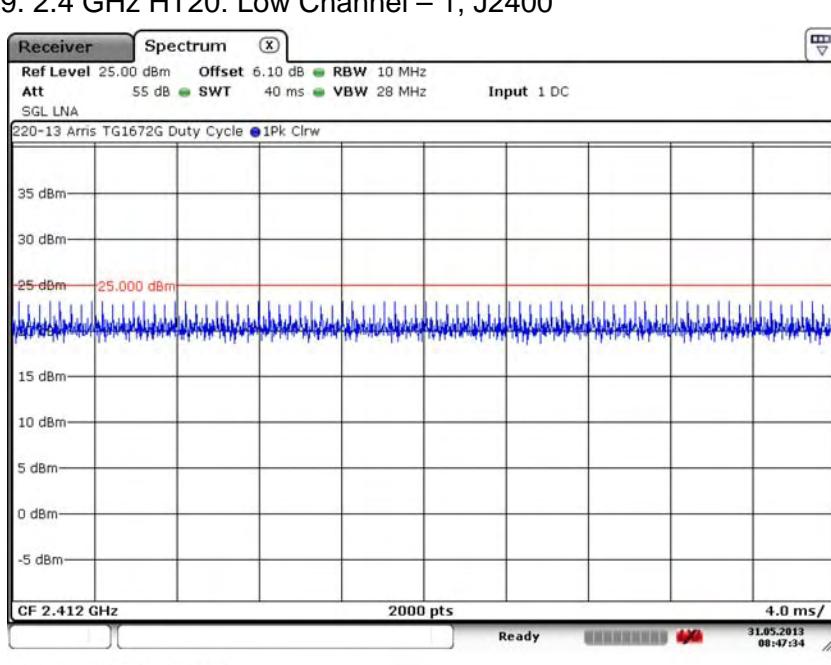
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.18. 2.4 GHz 802.11g: High Channel – 11, J2402



7.10.19. 2.4 GHz HT20: Low Channel – 1, J2400



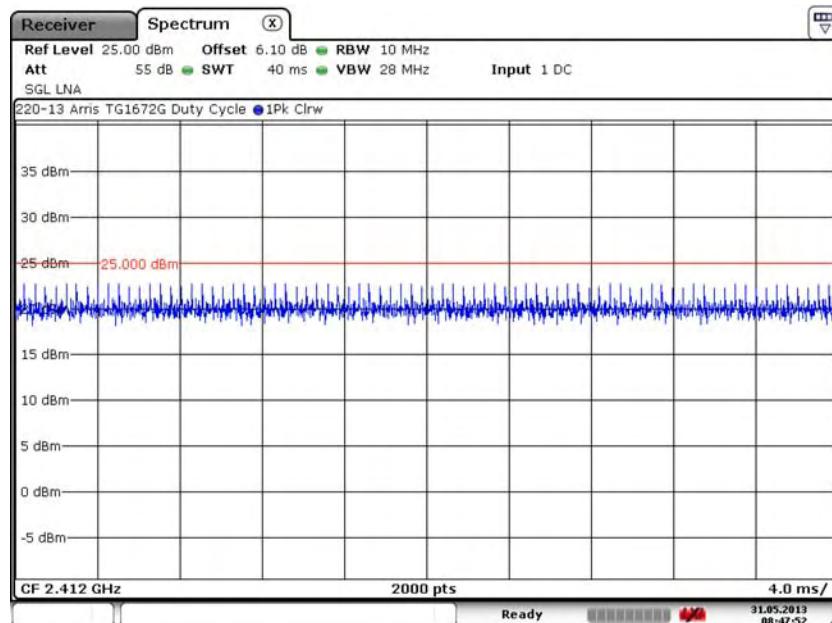
Test Number: 220-13R1

Issue Date: 7/18/2013

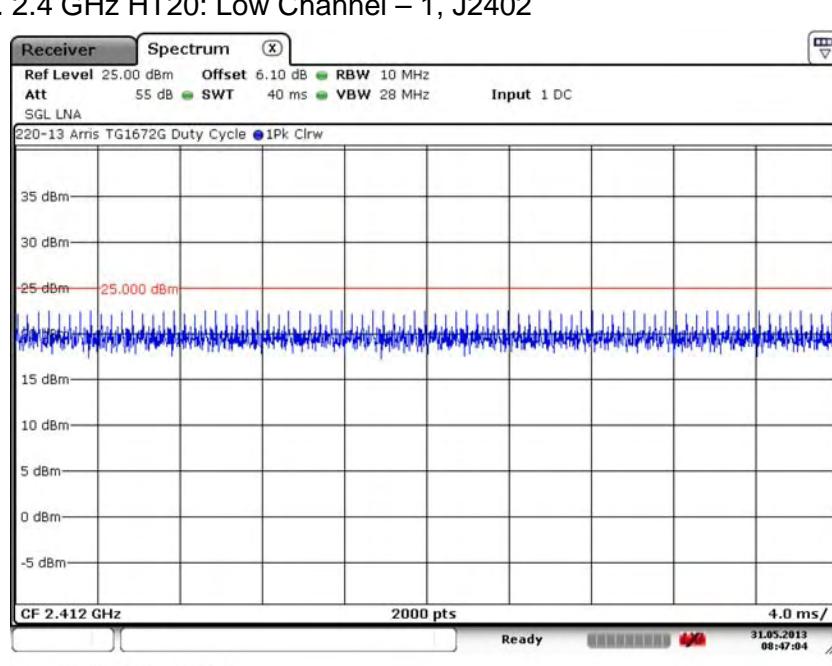
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.20. 2.4 GHz HT20: Low Channel – 1, J2401



7.10.21. 2.4 GHz HT20: Low Channel – 1, J2402



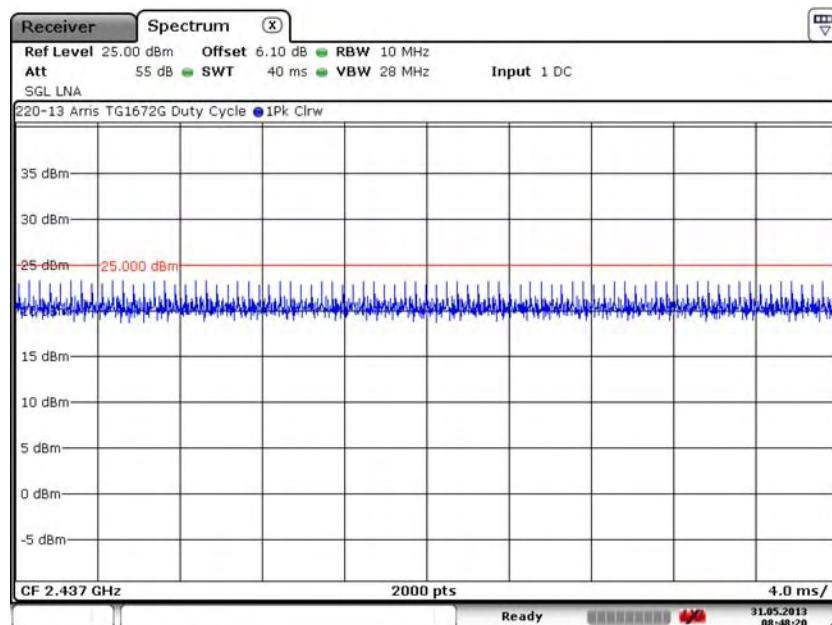
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

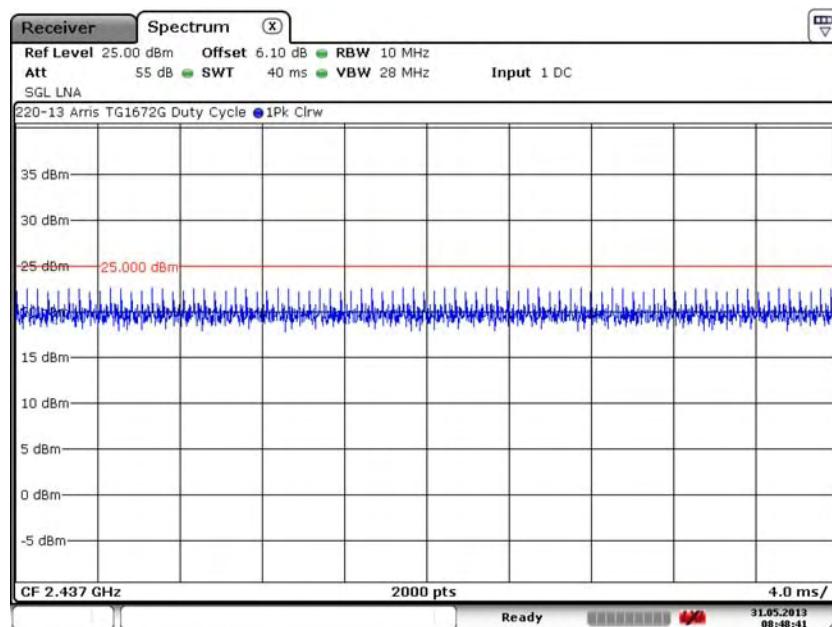
### 7.10. Duty Cycle

7.10.22. 2.4 GHz HT20: Middle Channel – 6, J2400



Date: 31.MAY.2013 08:48:20

7.10.23. 2.4 GHz HT20: Middle Channel – 6, J2401



Date: 31.MAY.2013 08:48:42

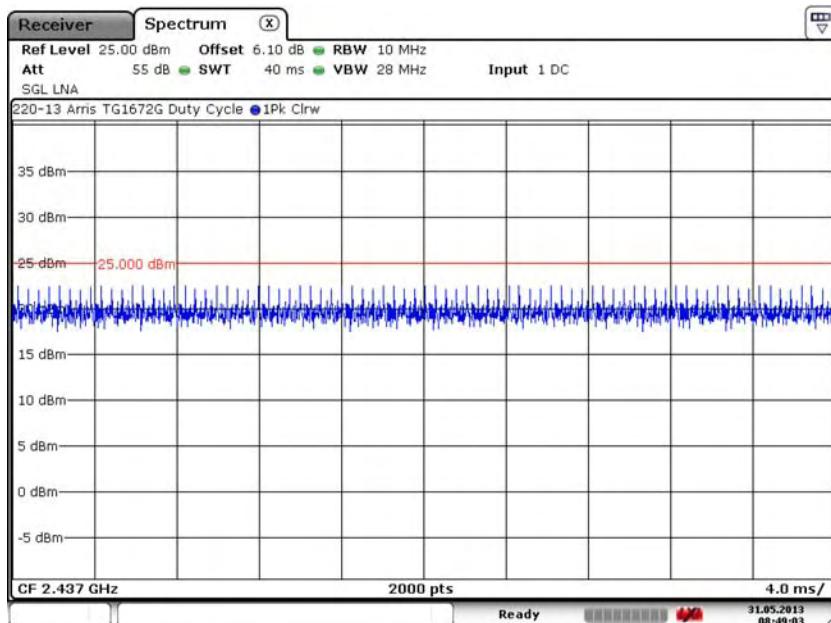
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

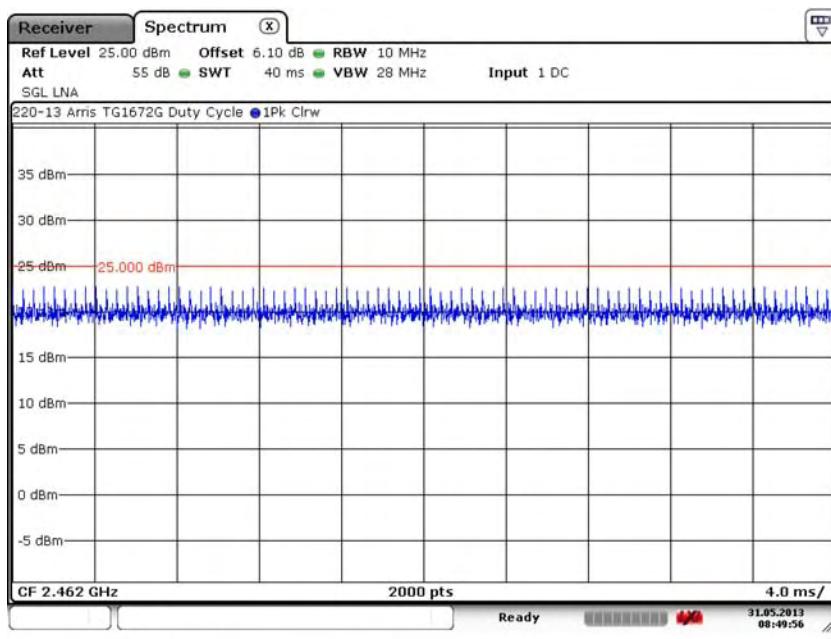
### 7.10. Duty Cycle

#### 7.10.24. 2.4 GHz HT20: Middle Channel – 6, J2402



Date: 31.MAY.2013 08:49:04

#### 7.10.25. 2.4 GHz HT20: High Channel – 11, J2400



Date: 31.MAY.2013 08:49:57

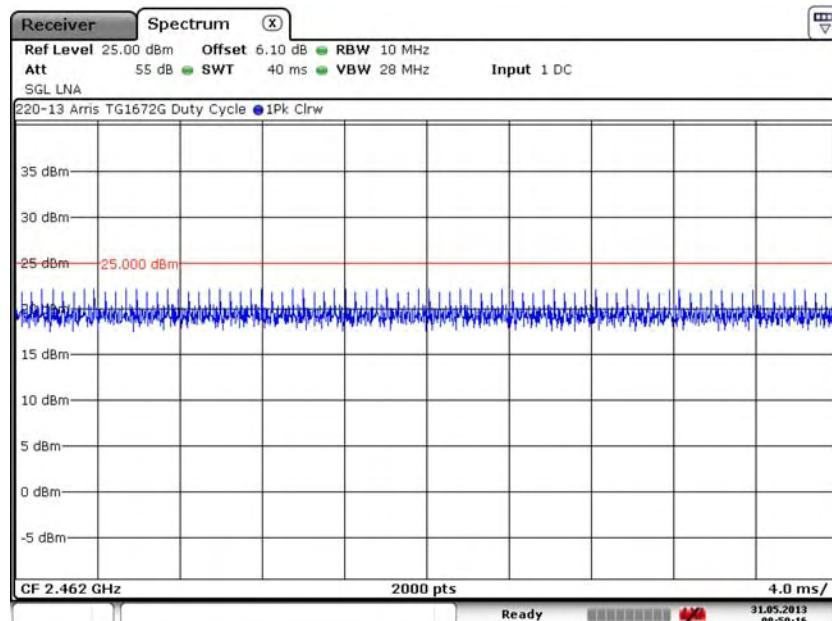
Test Number: 220-13R1

Issue Date: 7/18/2013

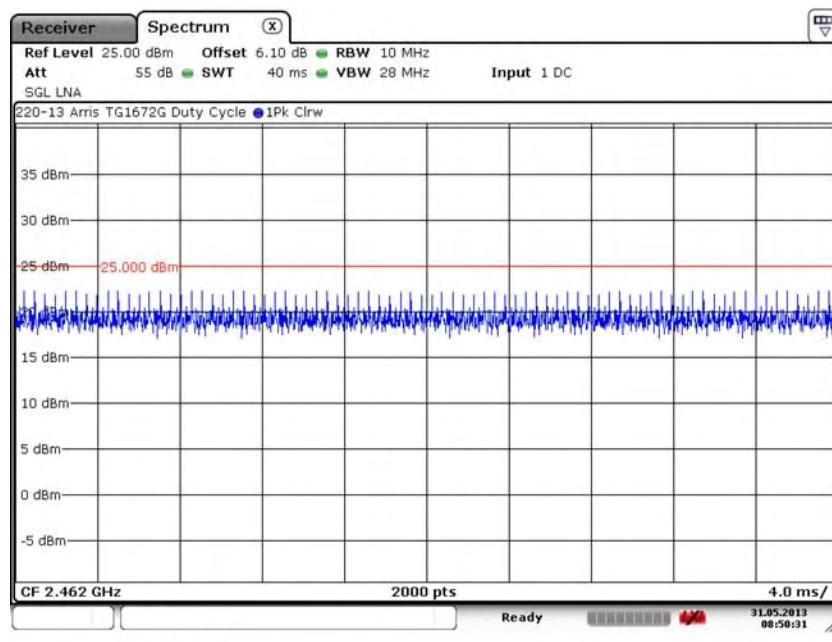
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.26. 2.4 GHz HT20: High Channel – 11, J2401



7.10.27. 2.4 GHz HT20: High Channel – 11, J2402



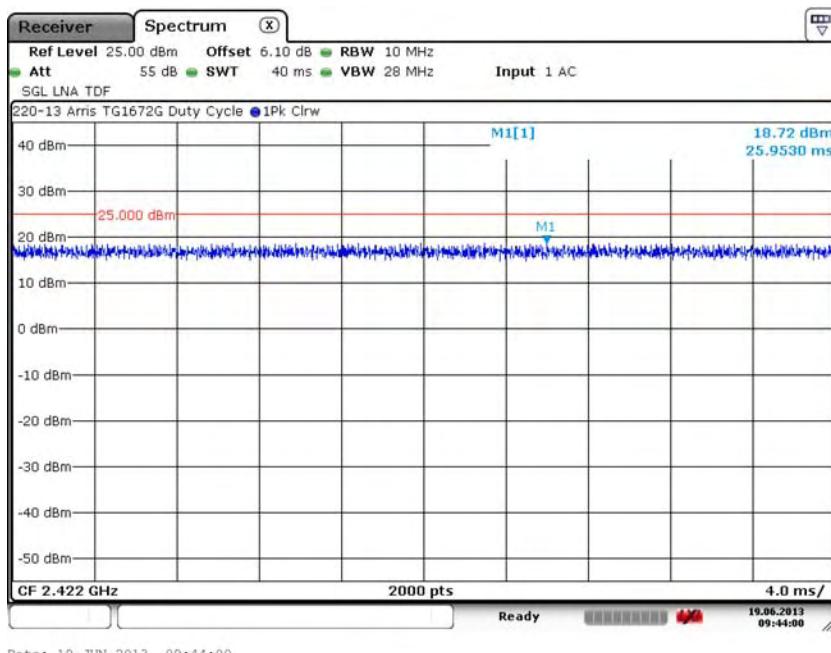
Test Number: 220-13R1

Issue Date: 7/18/2013

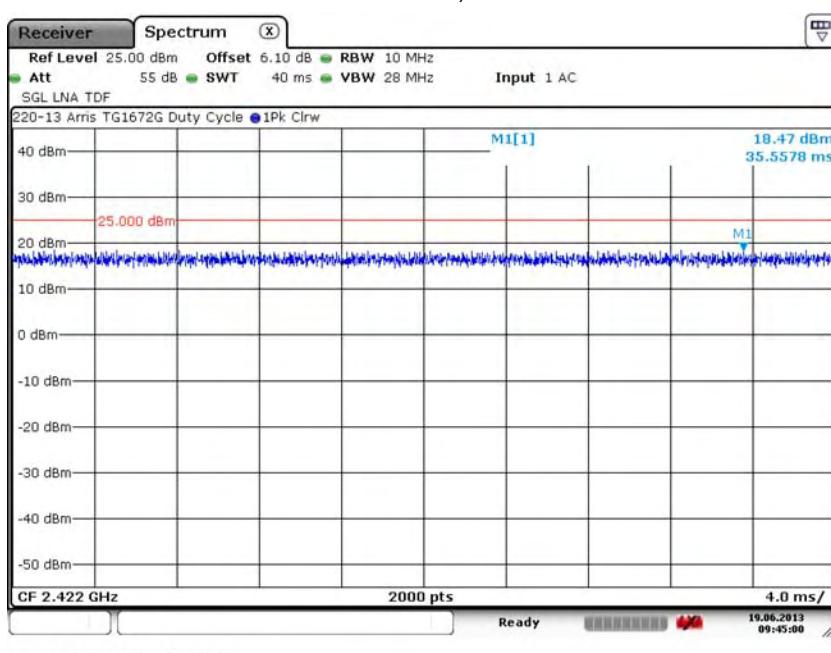
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

#### 7.10.28. 2.4 GHz HT40: Low Channel – 3, J2400



#### 7.10.29. 2.4 GHz HT40: Low Channel – 3, J2401



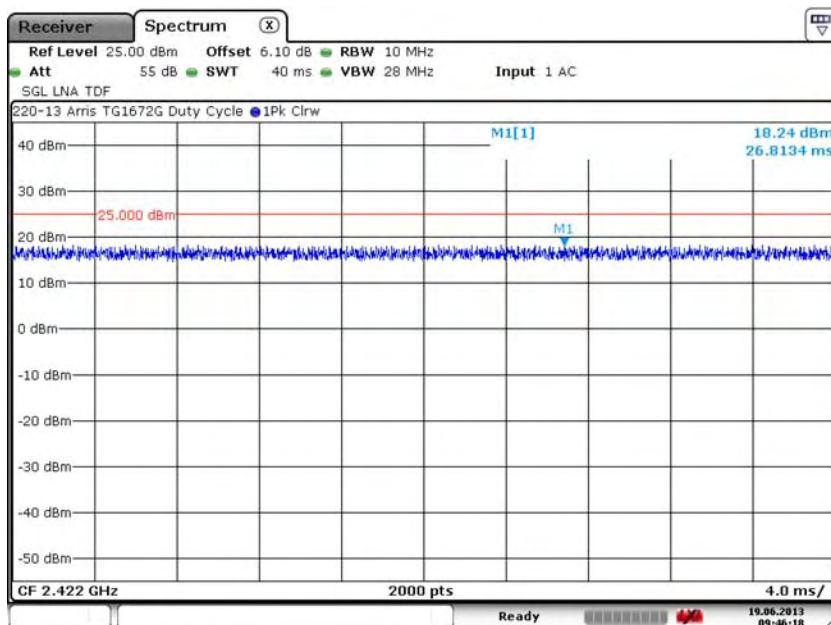
Test Number: 220-13R1

Issue Date: 7/18/2013

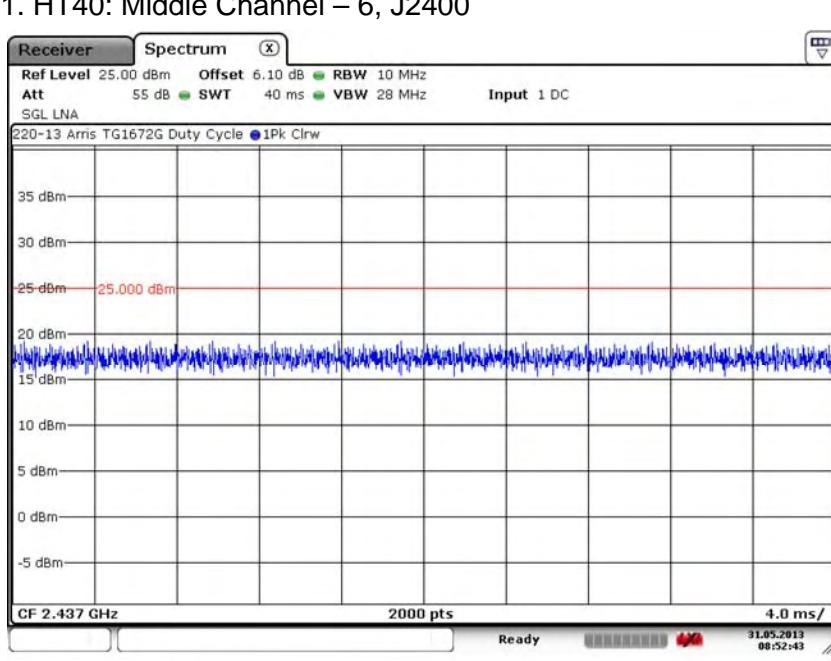
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

#### 7.10.30. HT40: Low Channel – 3, J2402



#### 7.10.31. HT40: Middle Channel – 6, J2400



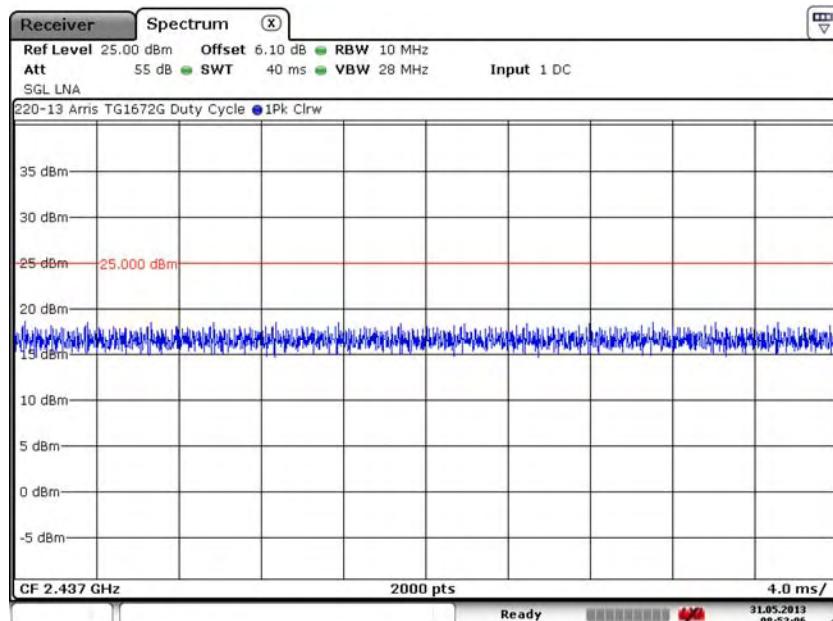
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

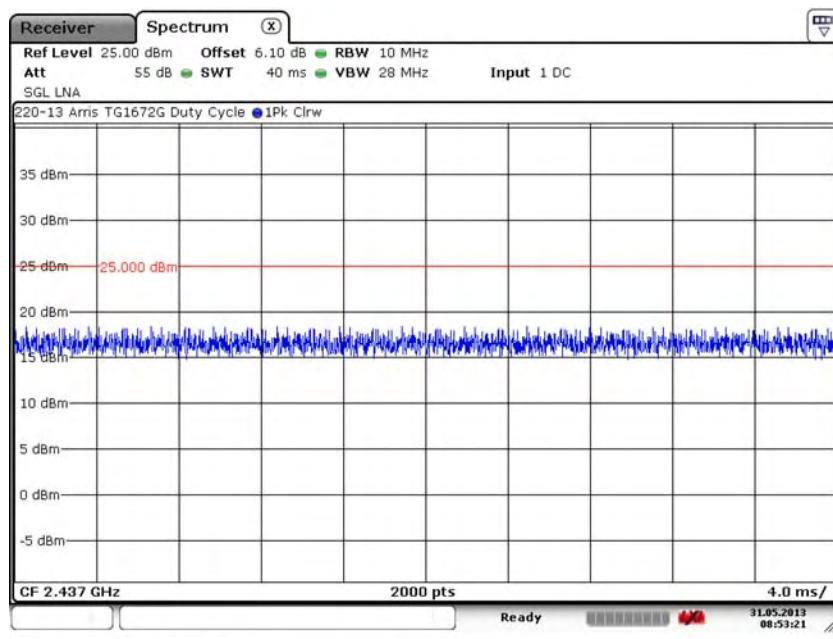
### 7.10. Duty Cycle

#### 7.10.32. 2.4 GHz HT40: Middle Channel – 6, J2401



Date: 31.MAY.2013 08:53:05

#### 7.10.33. 2.4 GHz HT40: Middle Channel – 6, J2402



Date: 31.MAY.2013 08:53:22

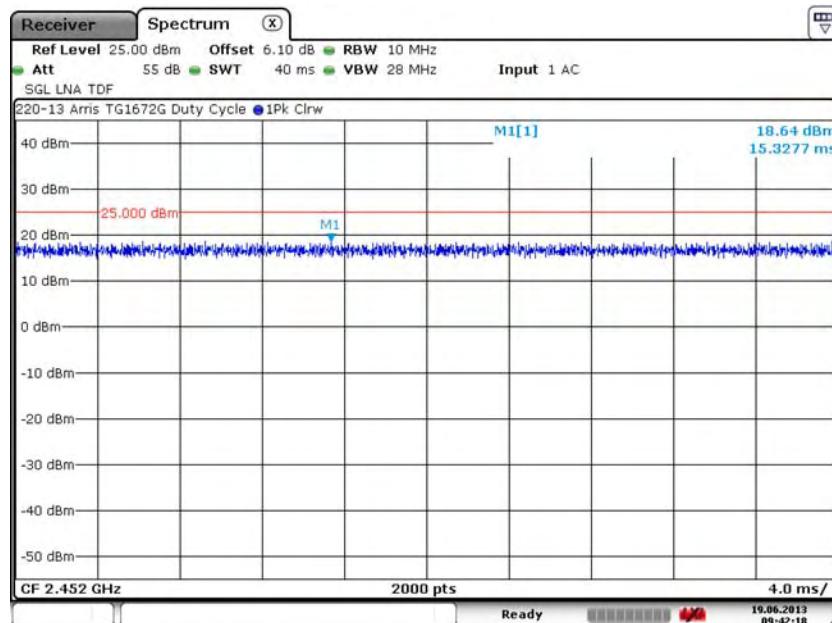
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

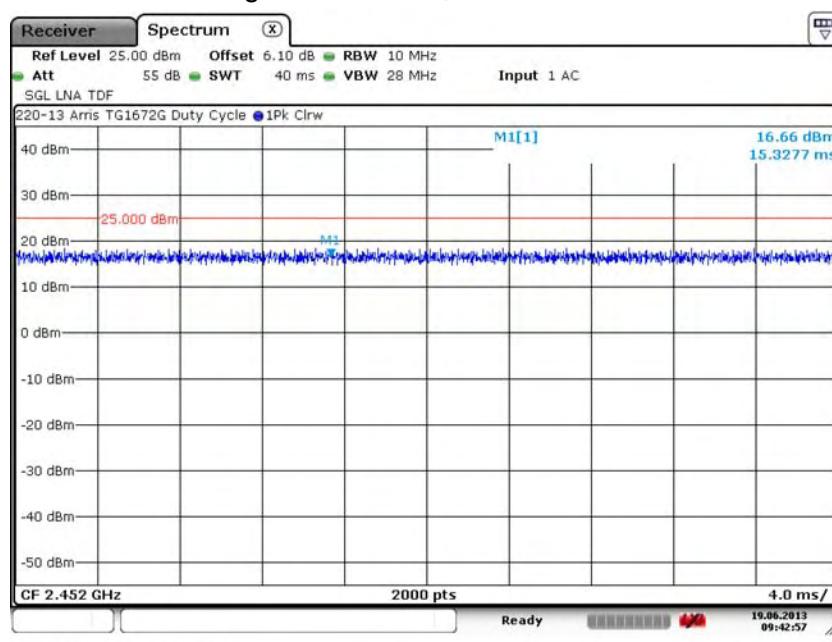
### 7.10. Duty Cycle

#### 7.10.34. 2.4 GHz HT40: High Channel – 9, J2400



Date: 19.JUN.2013 09:42:18

#### 7.10.35. 2.4 GHz HT40: High Channel – 9, J2401



Date: 19.JUN.2013 09:42:57

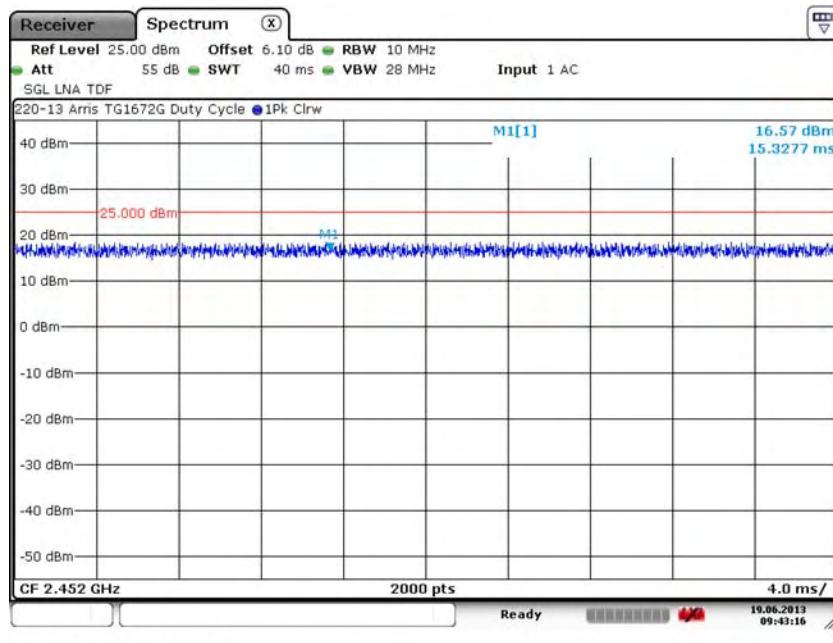
Test Number: 220-13R1

Issue Date: 7/18/2013

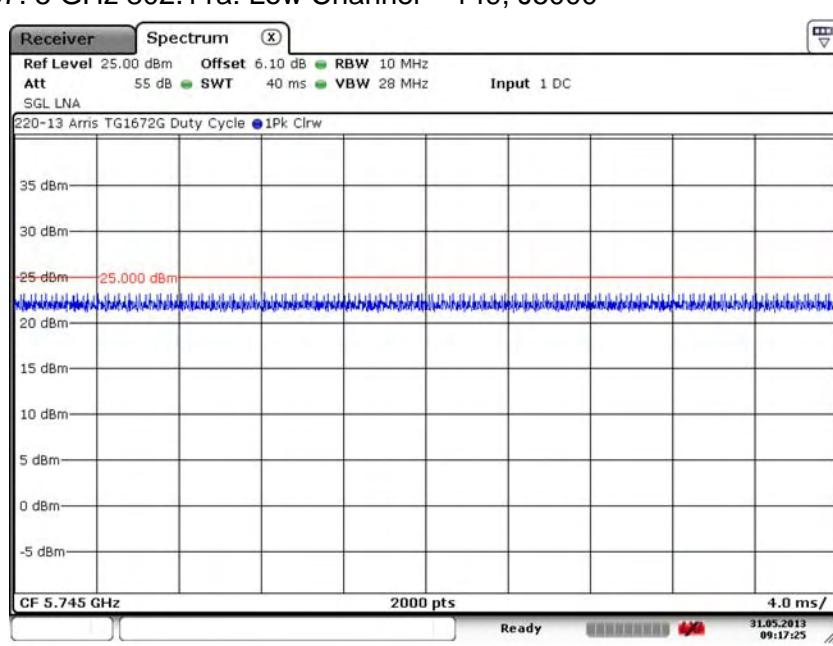
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.36. 2.4 GHz HT40: High Channel – 9, J2402



7.10.37. 5 GHz 802.11a: Low Channel – 149, J5000



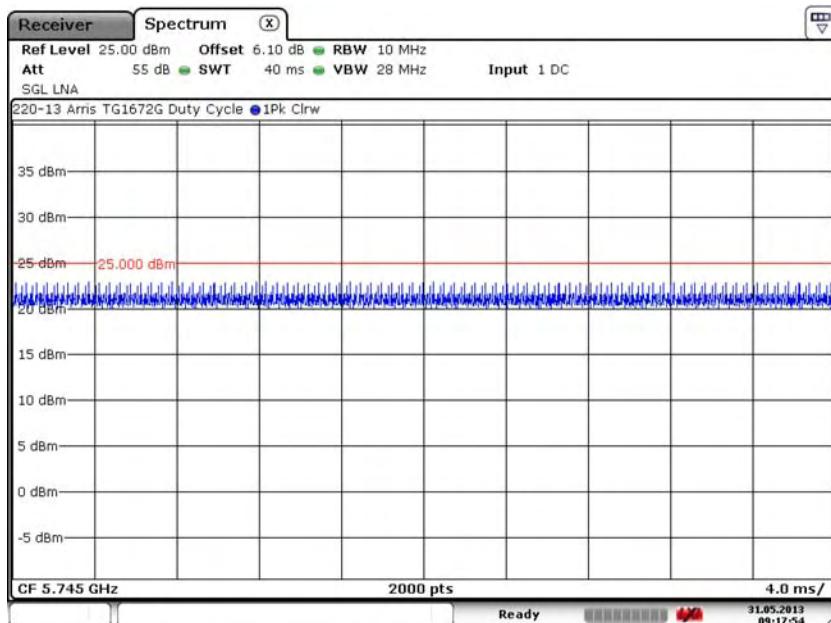
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

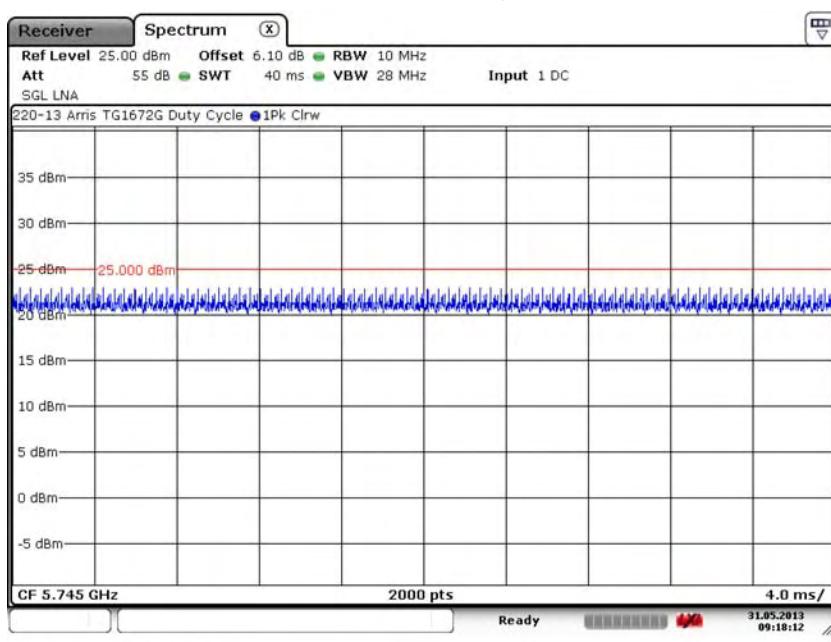
### 7.10. Duty Cycle

7.10.38. 5 GHz 802.11a: Low Channel – 149, J5001



Date: 31.MAY.2013 09:17:54

7.10.39. 5 GHz 802.11a: Low Channel – 149, J5002



Date: 31.MAY.2013 09:18:13

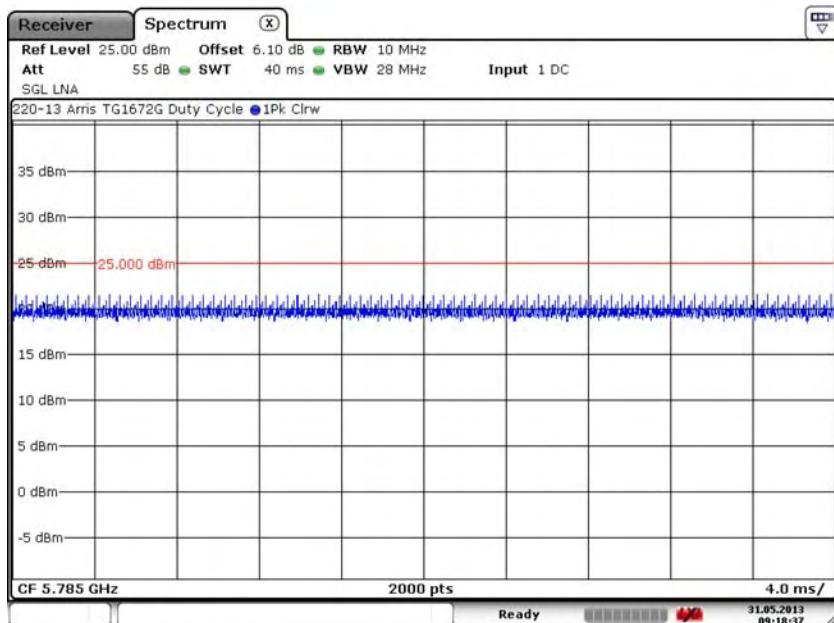
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

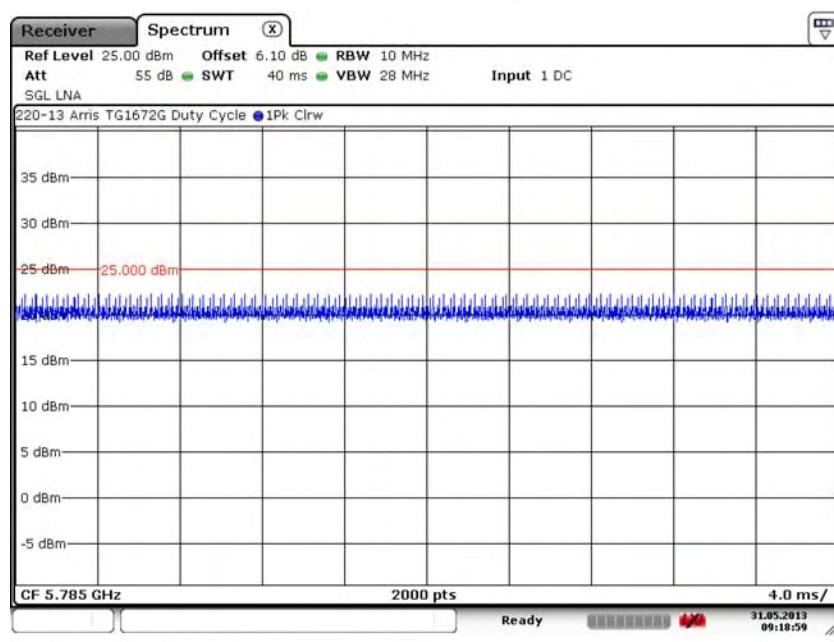
### 7.10. Duty Cycle

7.10.40. 5 GHz 802.11a: Middle Channel – 157, J5000



Date: 31.MAY.2013 09:18:37

7.10.41. 5 GHz 802.11a: Middle Channel – 157, J5001



Date: 31.MAY.2013 09:18:59

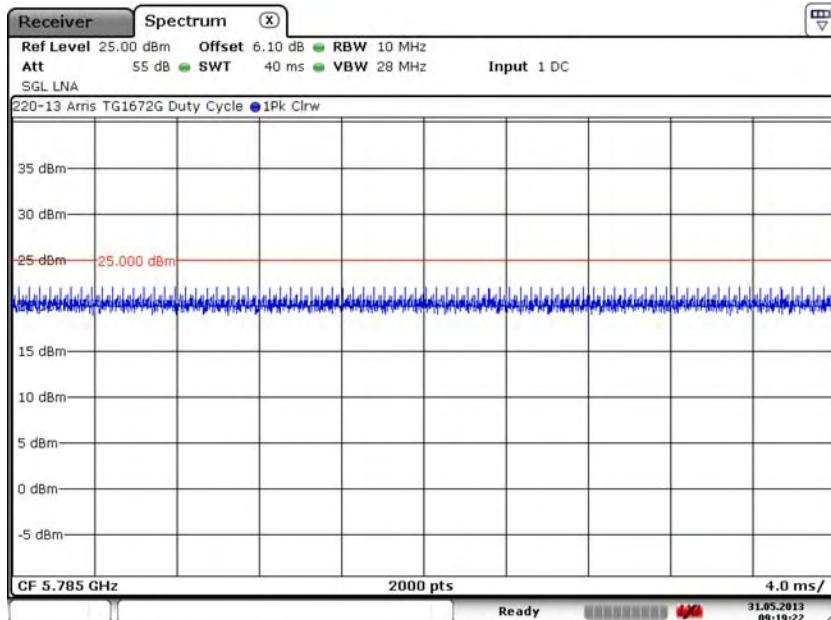
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

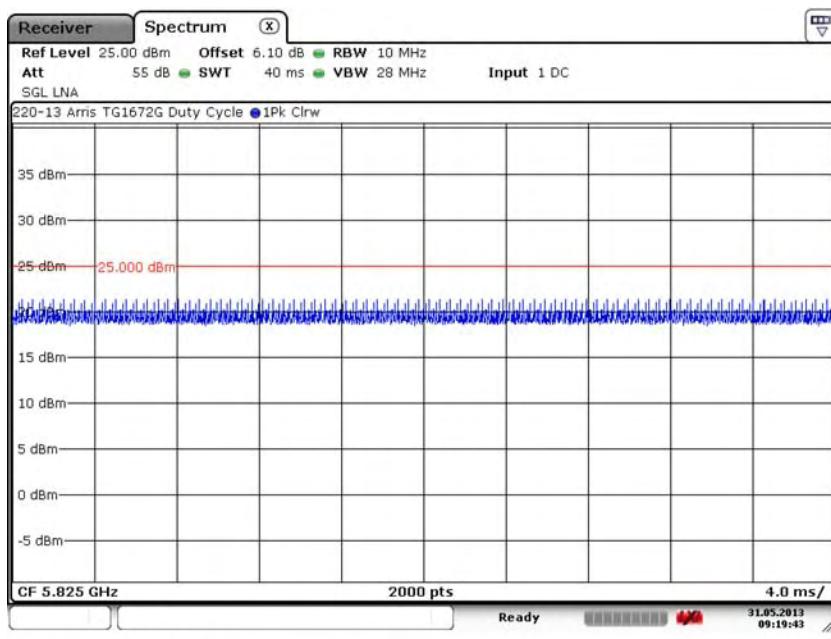
### 7.10. Duty Cycle

7.10.42. 5 GHz 802.11a: Middle Channel – 157, J5002



Date: 31.MAY.2013 09:19:22

7.10.43. 5 GHz 802.11a: High Channel – 165, J5000



Date: 31.MAY.2013 09:19:44

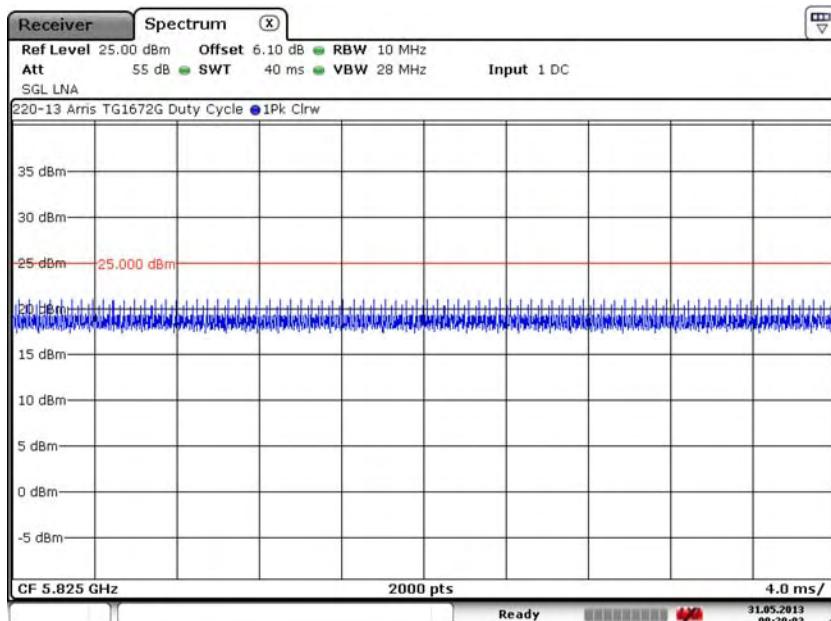
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

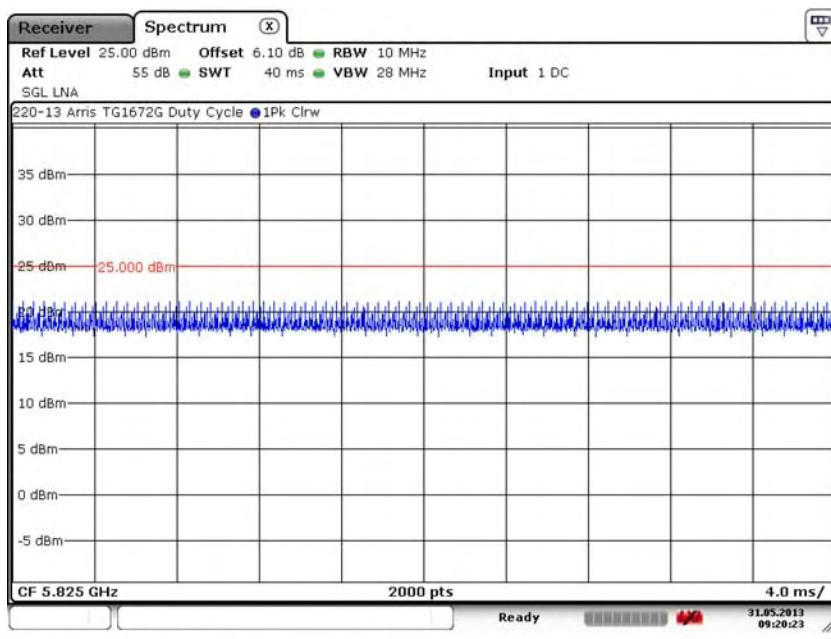
### 7.10. Duty Cycle

7.10.44. 5 GHz 802.11a: High Channel – 165, J5001



Date: 31.MAY.2013 09:20:02

7.10.45. 5 GHz 802.11a: High Channel – 165, J5002



Date: 31.MAY.2013 09:20:23

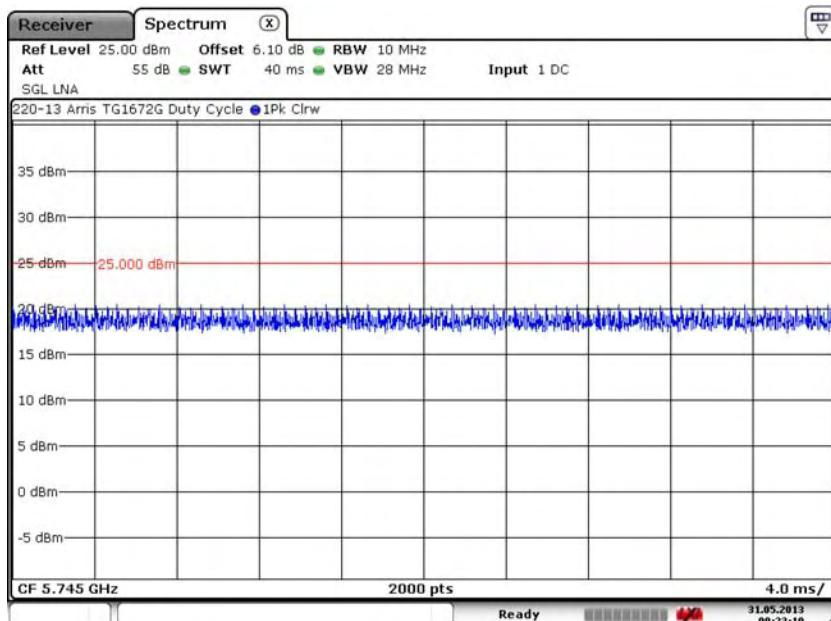
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

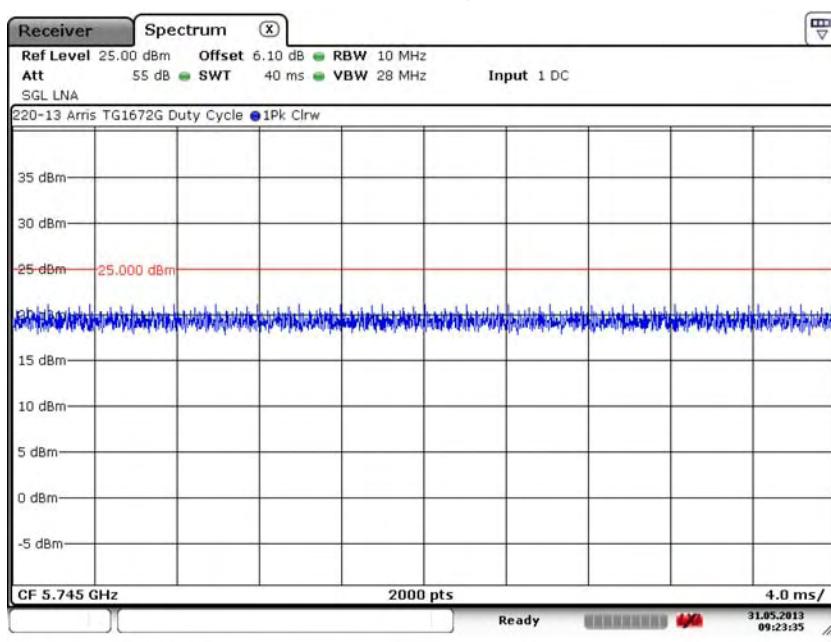
### 7.10. Duty Cycle

7.10.46. 5 GHz HT20: Low Channel – 149, J5000



Date: 31.MAY.2013 09:23:10

7.10.47. 5 GHz HT20: Low Channel – 149, J5001



Date: 31.MAY.2013 09:23:36

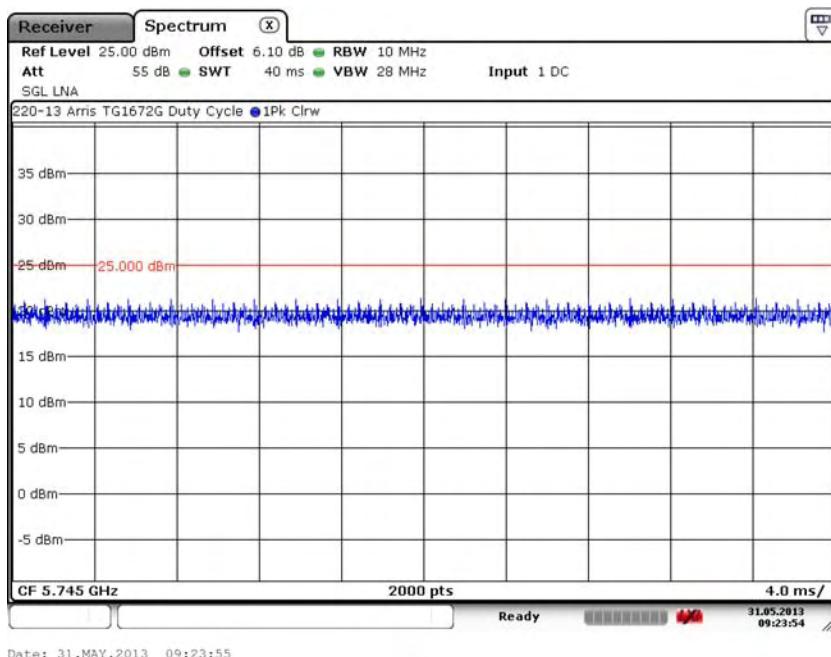
Test Number: 220-13R1

Issue Date: 7/18/2013

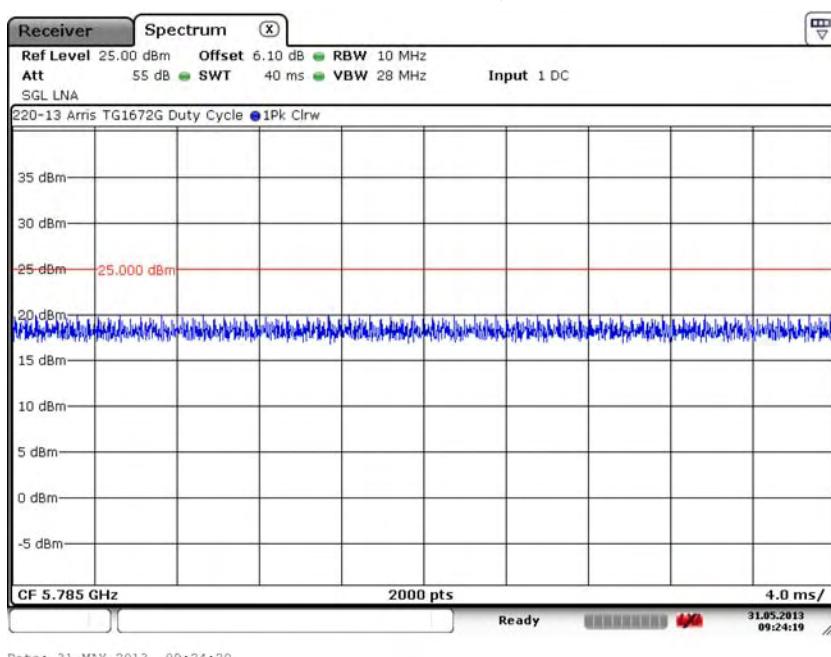
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

#### 7.10.48. 5 GHz HT20: Low Channel – 149, J5002



#### 7.10.49. 5 GHz HT20: Middle Channel – 157, J5000



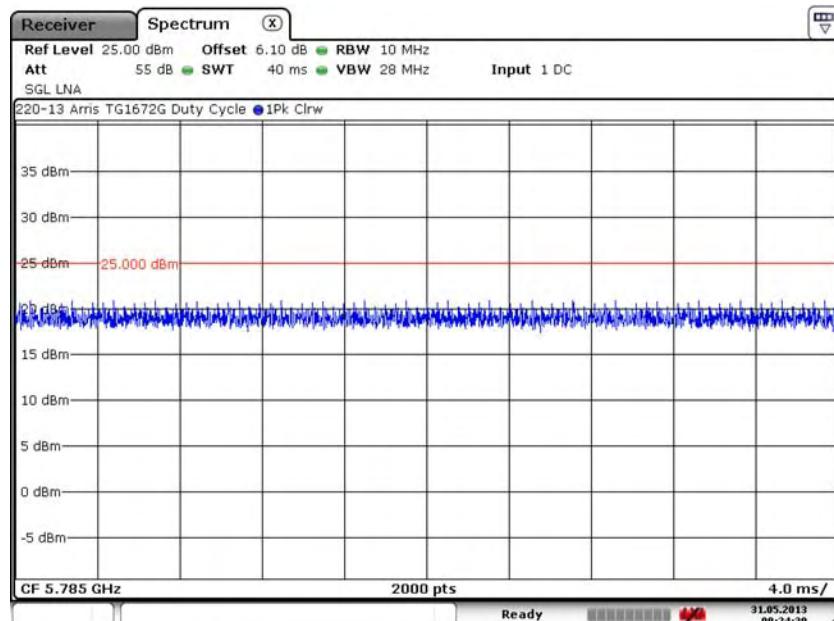
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

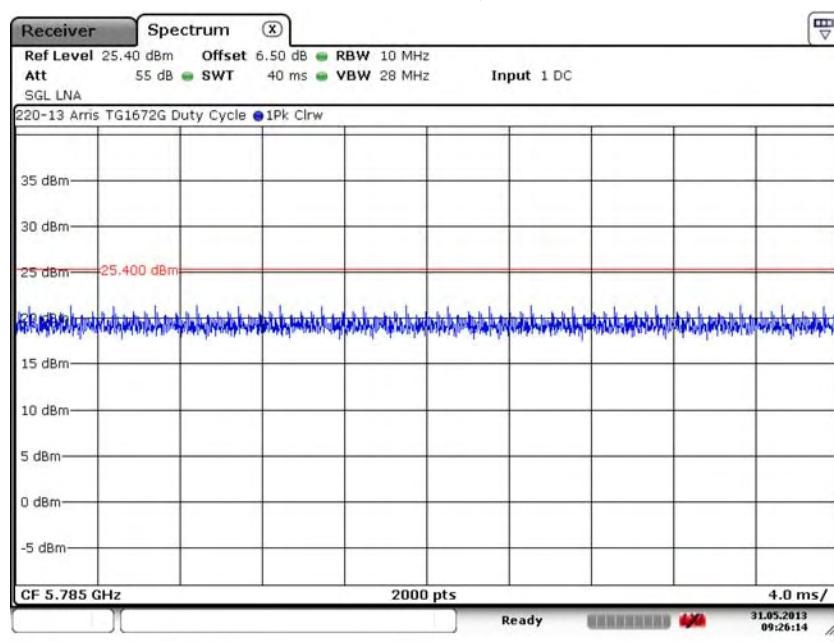
### 7.10. Duty Cycle

7.10.50. 5 GHz HT20: Middle Channel – 157, J5001



Date: 31.MAY.2013 09:24:39

7.10.51. 5 GHz HT20: Middle Channel – 157, J5002



Date: 31.MAY.2013 09:26:14

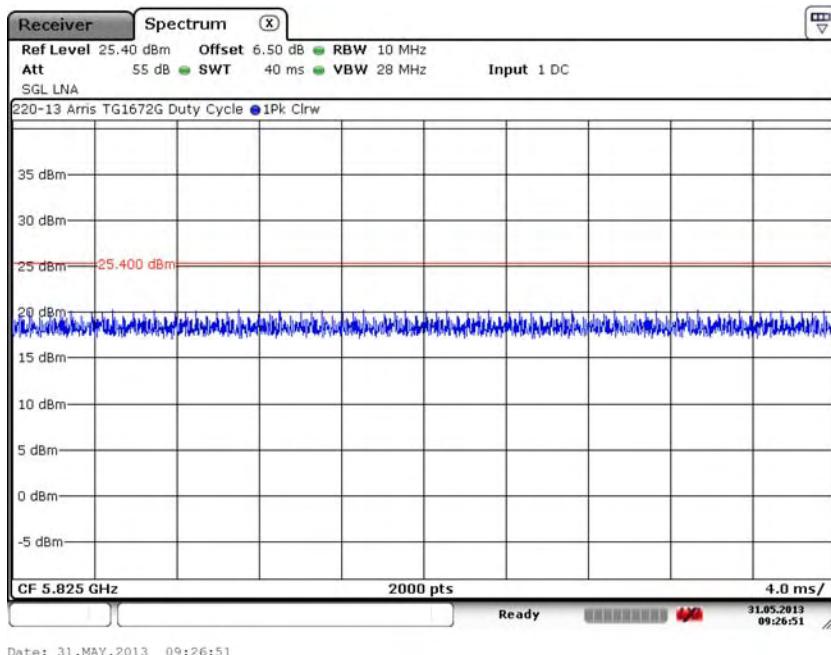
Test Number: 220-13R1

Issue Date: 7/18/2013

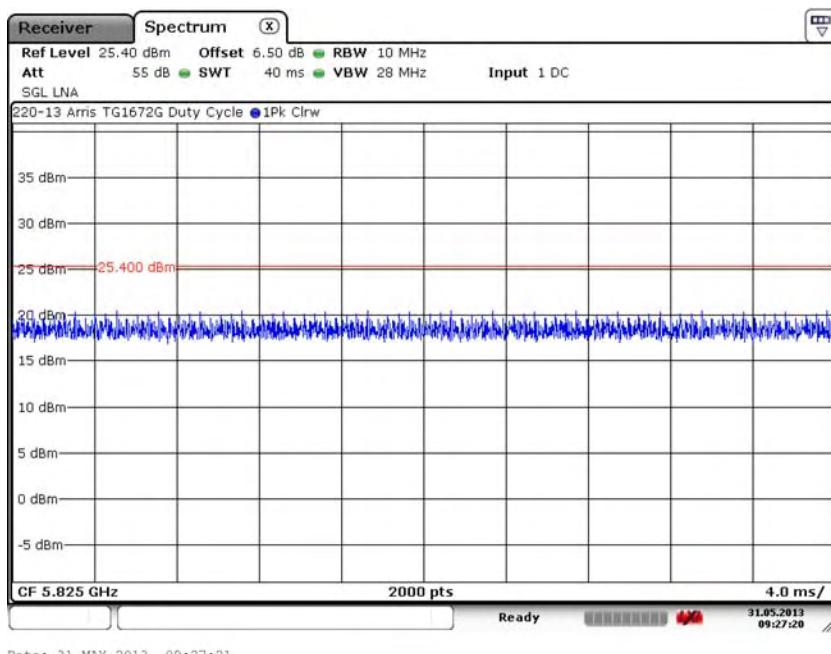
## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.52. 5 GHz HT20: High Channel – 165, J5000



7.10.53. 5 GHz HT20: High Channel – 165, J5001



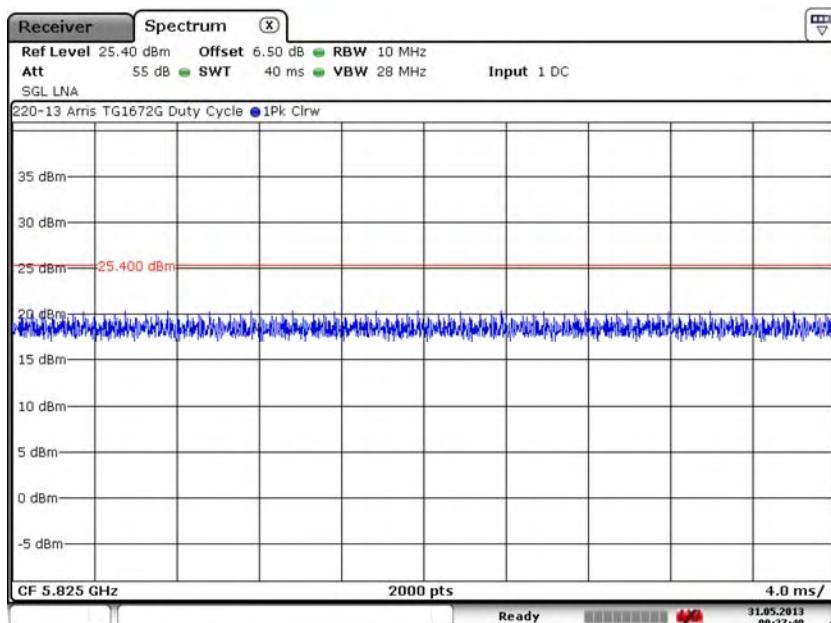
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

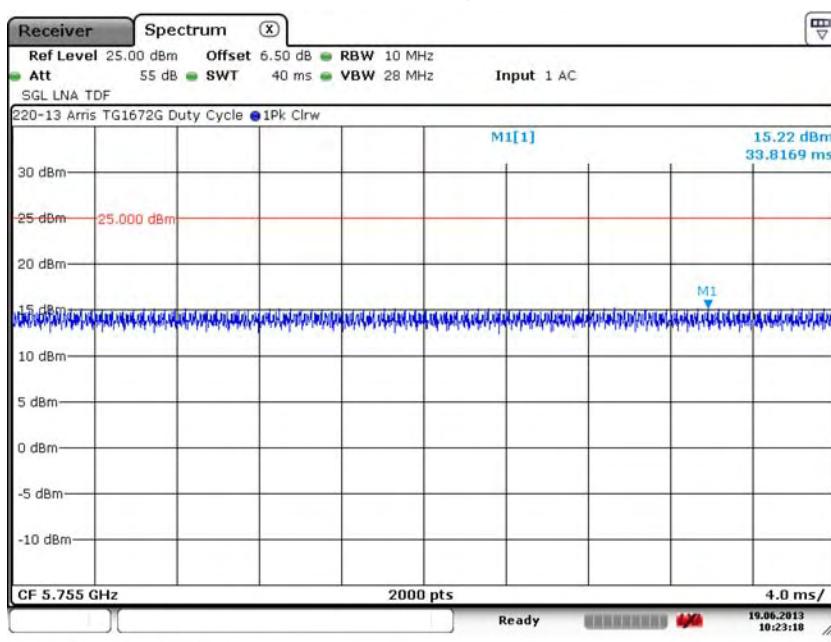
### 7.10. Duty Cycle

7.10.54. 5 GHz HT20: High Channel – 165, J5002



Date: 31.MAY.2013 09:27:39

7.10.55. 5 GHz HT40: Low Channel – 151, J5000



Date: 19.JUN.2013 10:23:18

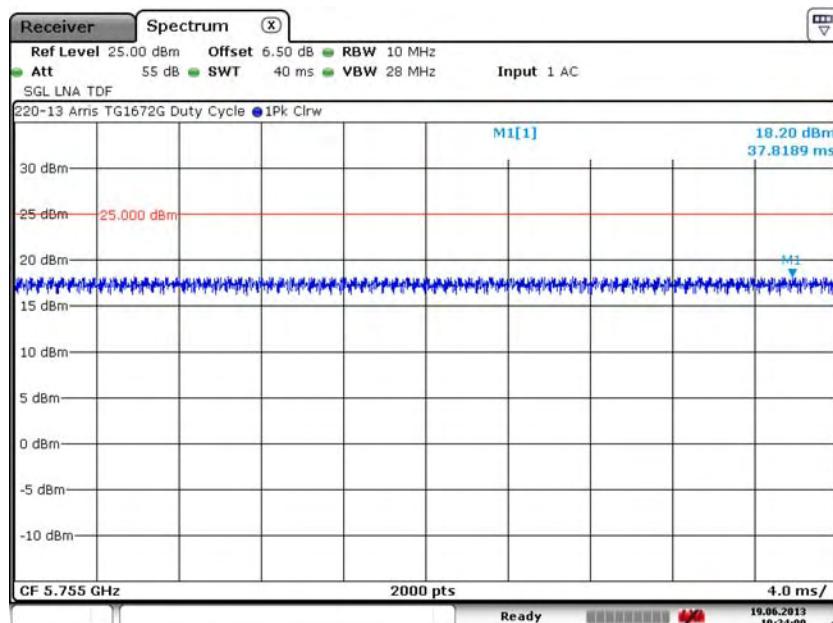
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

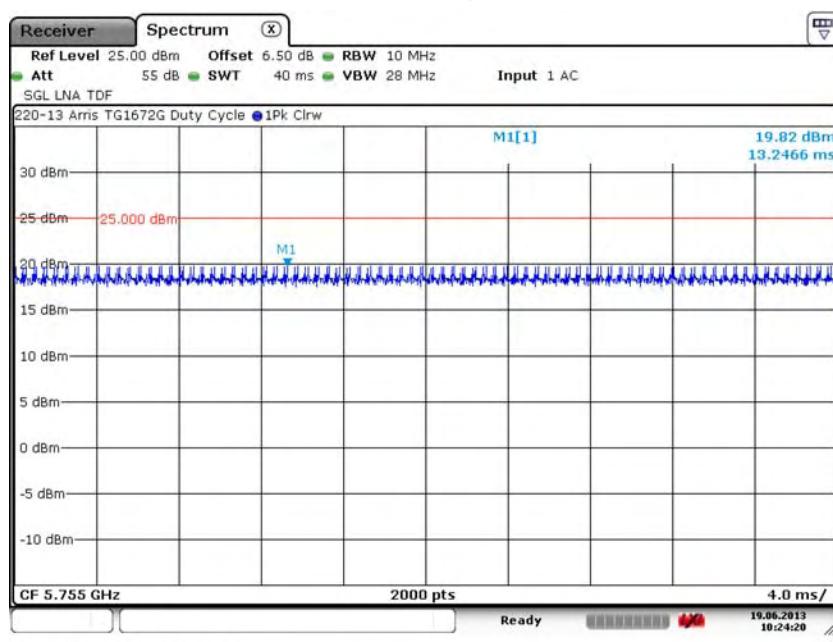
### 7.10. Duty Cycle

#### 7.10.56. 5 GHz HT40: Low Channel – 151, J5001



Date: 19.JUN.2013 10:24:00

#### 7.10.57. 5 GHz HT40: Low Channel – 151, J5002



Date: 19.JUN.2013 10:24:20

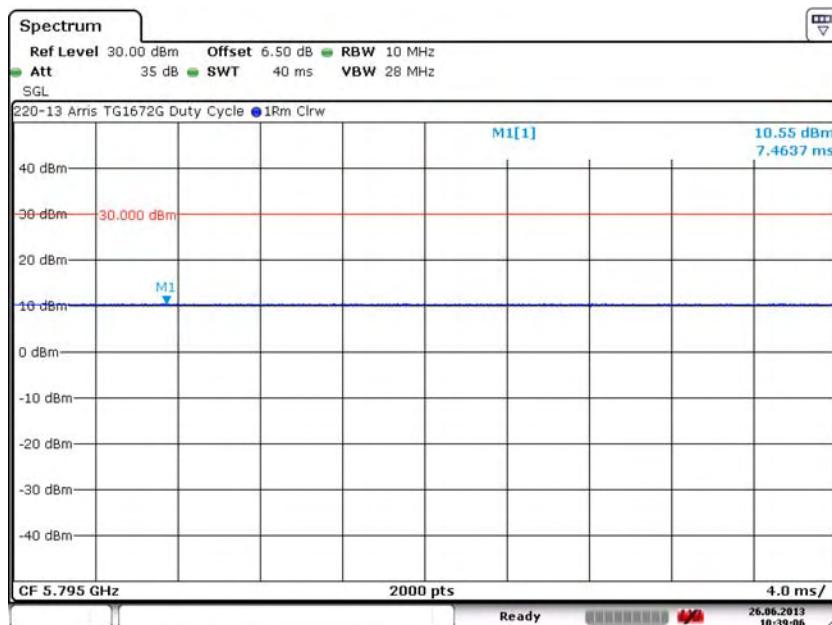
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

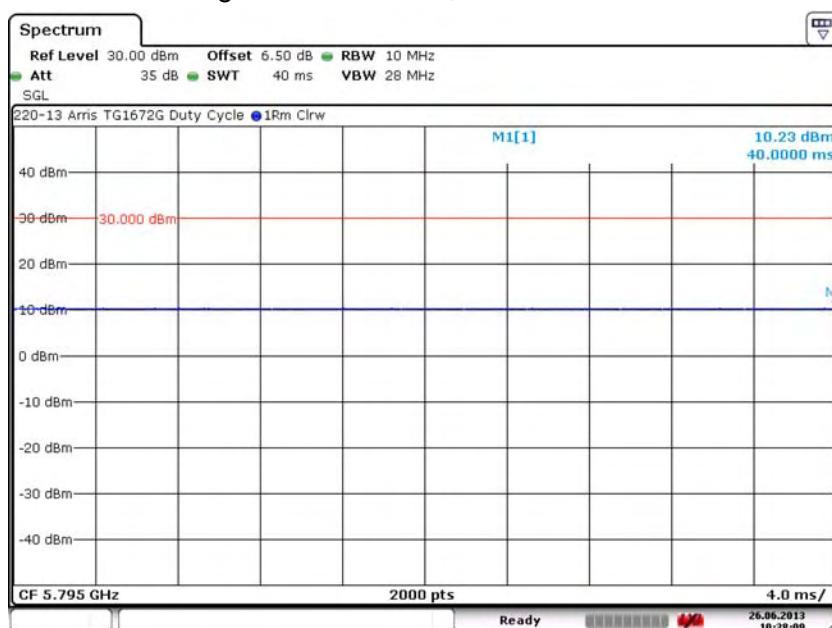
### 7.10. Duty Cycle

7.10.58. 5 GHz HT40: High Channel – 159, J5000



Date: 26.JUN.2013 10:39:06

7.10.59. 5 GHz HT40: High Channel – 159, J5001



Date: 26.JUN.2013 10:38:09

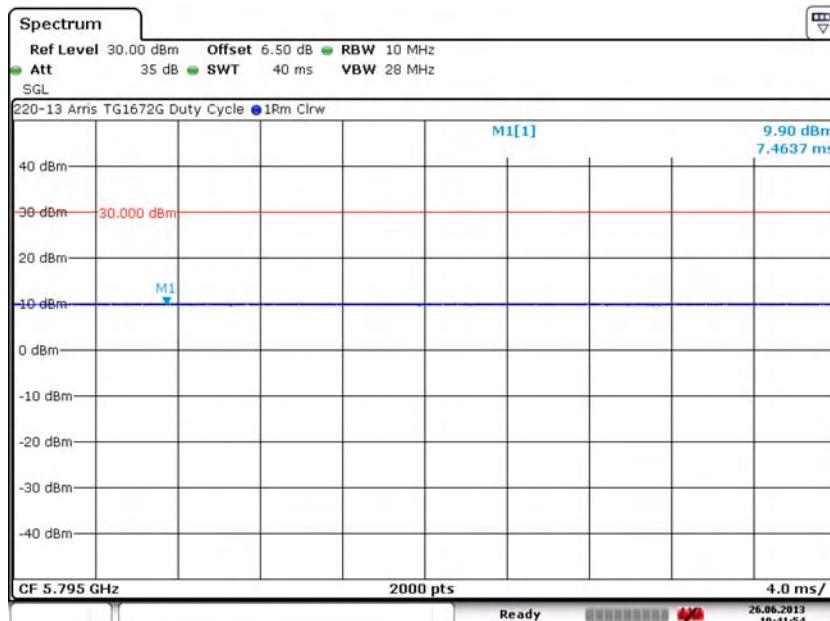
Test Number: 220-13R1

Issue Date: 7/18/2013

## 7. Measurement Data (continued)

### 7.10. Duty Cycle

7.10.60. 5 GHz HT40: High Channel – 159, J5002



Date: 26.JUN.2013 10:41:53

**Test Number:** 220-13R1

**Issue Date:** 7/18/2013

## 7. Measurement Data (continued)

### 7.11. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1))

#### RSS-GEN 5.5, RSS 102

Requirement: (15.247(i))

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. Devices are subject to the radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), FCC 47 CFR 2.1091 and 47 CFR 2.1093, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment.

**Conclusion:** The device under test is meets radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), § 2.1091 and § 2.1093.

#### Measurement Results – 2.4 GHz

802.11b Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result		
				(mW/cm2)	(W/m2)				
2412	20.0	22.16	3.0	0.0652386	0.6523856	1	Compliant		
2437	20.0	22.02	3.0	0.0632658	0.6326585	1	Compliant		
2462	20.0	21.59	3.0	0.0572370	0.5723697	1	Compliant		

802.11g Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result		
				(mW/cm2)	(W/m2)				
2412	20.0	18.66	3.0	0.0291805	0.2918054	1	Compliant		
2437	20.0	18.70	3.0	0.0294240	0.2942398	1	Compliant		
2462	20.0	18.29	3.0	0.0268034	0.2680342	1	Compliant		

HT20 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result		
				(mW/cm2)	(W/m2)				
2412	20.0	18.90	3.0	0.0308039	0.3080388	1	Compliant		
2437	20.0	18.52	3.0	0.0282287	0.2822870	1	Compliant		
2462	20.0	18.11	3.0	0.0256978	0.2569778	1	Compliant		

HT40 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result		
				(mW/cm2)	(W/m2)				
2422	20.0	17.85	3.0	0.0241969	0.2419689	1	Compliant		
2437	20.0	18.12	3.0	0.0257338	0.2573382	1	Compliant		
2452	20.0	17.79	3.0	0.0238382	0.2383816	1	Compliant		

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## 7. Measurement Data (continued)

### 7.11. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102

#### Measurement Results – 5 GHz

802.11a Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	20.0	19.68	3.0	0.0368992	0.3689924	1	Compliant
5785	20.0	19.42	3.0	0.0347669	0.3476687	1	Compliant
5825	20.0	18.76	3.0	0.0298394	0.2983936	1	Compliant

HT20 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	20.0	19.76	3.0	0.0375661	0.3756609	1	Compliant
5785	20.0	19.44	3.0	0.0349130	0.3491304	1	Compliant
5825	20.0	18.95	3.0	0.0311949	0.3119487	1	Compliant

HT40 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	20.0	19.55	3.0	0.0358165	0.3581655	1	Compliant
5785	20.0	19.36	3.0	0.0342696	0.3426959	1	Compliant

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

PD = Power Density

OP = DUT Output Power (dBm)

AG = Antenna Gain (dBi)

D = MPE Distance

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the installer. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter.
2. Section 7.4 of this test report.
3. Data supplied by the client.
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

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## 7. Measurement Data (continued)

### 7.11. Public Exposure to Radio Frequency Energy Levels (15.247(i), (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (cont.)

Simultaneous Transmission of 2.4 GHz and 5.8 GHz WiFi Radios. The highest levels for each of the modes of operation are summed in the following table.

Worse Case Mode of Operation		MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
					(mW/cm2)	(W/m2)		
Mode	MHz	(1)	(2)	(3)	(4)		(5)	
802.11b	2412	20.0	22.16	3.0	0.0652386	0.6523856	1	Compliant
802.11a HT20	5745	20.0	19.76	3.0	0.0375661	0.3756609	1	Compliant
SUM		20.0	N/A	N/A	0.1028047	1.0280465	1	Compliant

Using Directional Gain =  $G_{ant} + 10 * \log_{10} (N_{ant} / N_{ss})$  dBi where  $N_{ant}$  is the number of MIMO Antennas, and  $N_{ss}$  is the number of spatial streams (1). A consideration for Antenna Array Gain is also calculated in the following table.

Worse Case Mode of Operation		MPE Distance (cm)	DUT Output Power (dBm)	DUT Array Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
					(mW/cm2)	(W/m2)		
Mode	MHz	(1)	(2)	(3)	(4)		(5)	
802.11b	2412	20.0	22.16	7.8	0.1957157	1.9571569	1	Compliant
802.11a HT20	5745	20.0	19.76	7.8	0.1126983	1.1269827	1	Compliant
SUM		20.0	N/A	N/A	0.3084140	3.0841396	1	Compliant

However, based upon a recent study by the FCC and KDB 662911 D01 published 5-28-2013, Array Gain for IEEE 802.11 device with antenna arrays less than 4 or channel widths greater than 40 MHz, the value for Array Gain is 0 dB.

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## 8. Test Setup Photographs

### 8.1. Spurious Radiated Emissions – Front



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## 8. Test Setup Photographs

### 8.2. Spurious Radiated Emissions below 30 MHz – Rear



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## 8. Test Setup Photographs

### 8.3. Spurious Radiated Emissions 30 MHz to 1 GHz – Rear



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## 8. Test Setup Photographs

### 8.4. Harmonic Radiated Emissions above 1 GHz – Front



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## 8. Test Setup Photographs

### 8.5. Harmonic Radiated Emissions 1 to 18 GHz – Rear



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## 8. Test Setup Photographs

### 8.6. Harmonic Radiated Emissions 18 to 40 GHz – Rear



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## **8. Test Setup Photographs**

### **8.7. Conducted Emissions Front**



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## 8. Test Setup Photographs

### 8.8. Conducted Emissions Rear





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## 9. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC) and Industry Canada standards. A description of the test sites is on file with the FCC (registration number **96392**) and Industry Canada (file number **IC 3023A-1**).

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meter W x 1.5 meter L x 2.0 meter H, floor standing or table top.