

### 3.2.7 AC Conducted Emissions

■ **TEST PROCEDURE :**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

■ **Measurement Data: Comply**

Note 1: See next pages for actual measured spectrum plots and data.

■ **Minimum Standard: FCC Part 15.207(a)/EN 55022**

FrequencyRange (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

### AC Line Conducted Emissions (Graph)

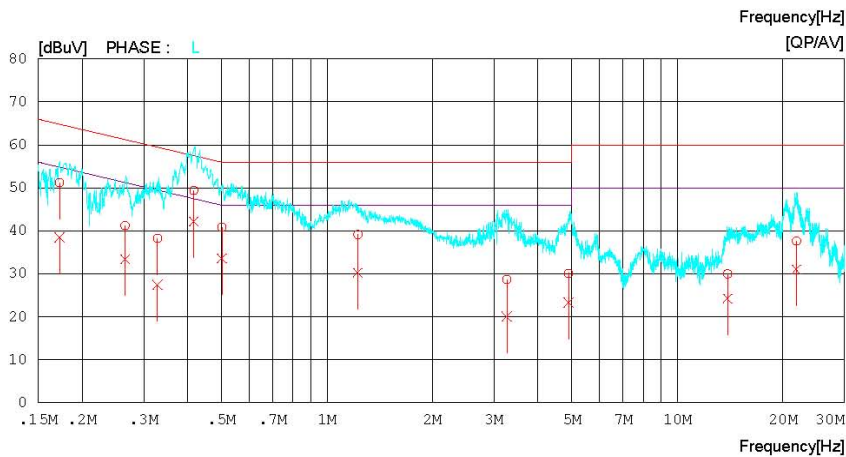
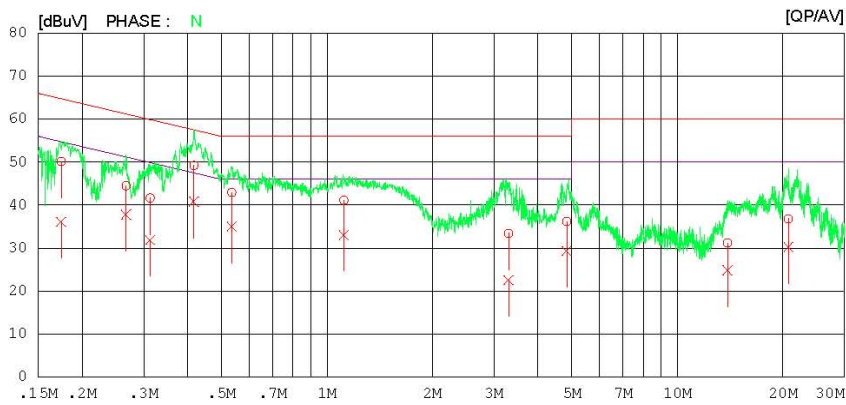
Test Mode: Band I & 802.11n HT40



### Results of Conducted Emission

Digital EMC  
Date : 2013-04-01

Model No.	: NP900X3F	Reference No.	:	
Type	:	Power Supply	:	120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	:	23 °C 45 % R.H.
Test Condition	: 5.1GHz WLAN	Operator	:	H.S SON
Memo	: 802.11n(HT40)			
LIMIT	: FCC P15.207 QP			
	: FCC P15.207 AV			





### AC Line Conducted Emissions (Graph)

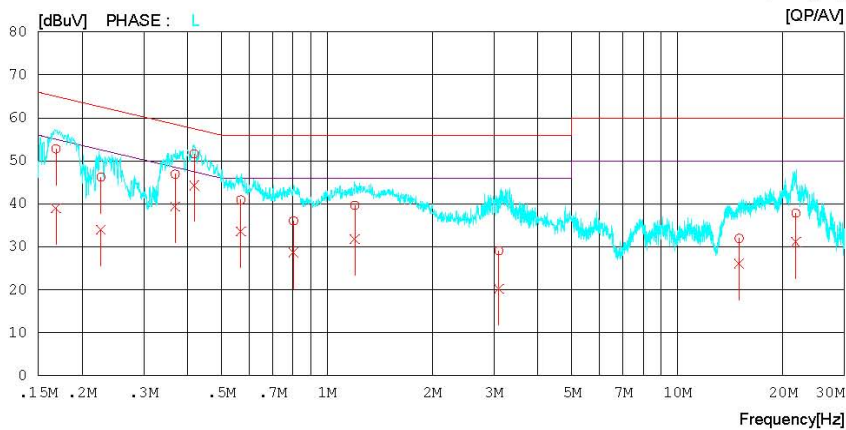
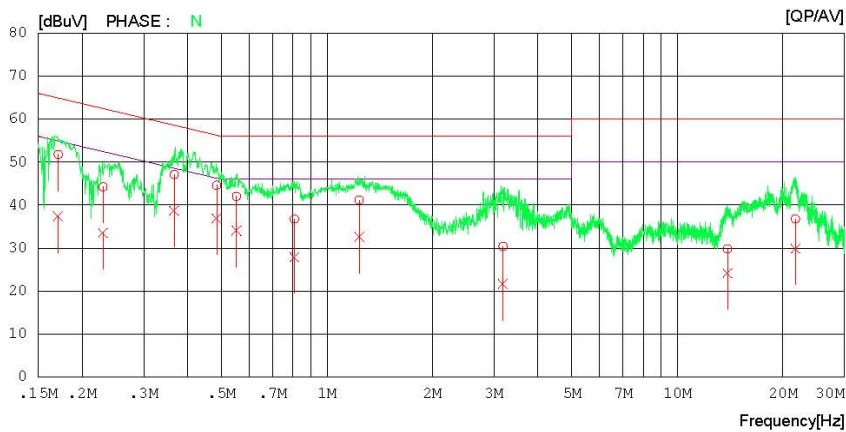
Test Mode: Band II & 802.11n HT40



### Results of Conducted Emission

Digital EMC  
 Date : 2013-04-01

Model No.	: NP900X3F	Reference No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 23 °C 45 % R.H.
Test Condition	: 5.3GHz WLAN	Operator	: H.S SON
Memo	: 802.11n(HT40)		
LIMIT	: FCC P15.207 QP		
	: FCC P15.207 AV		



**AC Line Conducted Emissions (Data List)**

Test Mode: Band II &802.11n HT40

Results of Conducted Emission

Digital EMC  
 Date : 2013-04-01

Model No. : NP900X3F  
 Type :  
 Serial No. : Identical prototype  
 Test Condition : 5.3GHz WLAN  
 Reference No. :  
 Power Supply : 120 V 60 Hz  
 Temp/Humi. : 23 °C 45 % R.H.  
 Operator : H.S SON

Memo : 802.11n(HT40)

LIMIT : FCC P15.207 QP  
 FCC P15.207 AV

NO	FRBQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.17104	51.6	37.3	0.1	51.7	37.4	64.9	54.9	13.2	17.5	N
2	0.22973	44.1	33.4	0.1	44.2	33.5	62.5	52.5	18.3	19.0	N
3	0.36661	47.0	38.5	0.1	47.1	38.6	58.6	48.6	11.5	10.0	N
4	0.48428	44.5	36.8	0.1	44.6	36.9	56.3	46.3	11.7	9.4	N
5	0.55184	41.9	33.9	0.1	42.0	34.0	56.0	46.0	14.0	12.0	N
6	0.80815	36.6	27.8	0.1	36.7	27.9	56.0	46.0	19.3	18.1	N
7	1.23700	41.1	32.5	0.1	41.2	32.6	56.0	46.0	14.8	13.4	N
8	3.18000	30.3	21.5	0.1	30.4	21.6	56.0	46.0	25.6	24.4	N
9	13.91700	29.5	23.8	0.3	29.8	24.1	60.0	50.0	30.2	25.9	N
10	21.74100	36.4	29.5	0.4	36.8	29.9	60.0	50.0	23.2	20.1	N
11	0.16848	52.7	38.9	0.1	52.8	39.0	65.0	55.0	12.2	16.0	L
12	0.22644	46.1	33.9	0.1	46.2	34.0	62.6	52.6	16.4	18.6	L
13	0.36895	46.8	39.3	0.1	46.9	39.4	58.5	48.5	11.6	9.1	L
14	0.41809	51.5	44.2	0.1	51.6	44.3	57.5	47.5	5.9	3.2	L
15	0.56790	40.8	33.5	0.1	40.9	33.6	56.0	46.0	15.1	12.4	L
16	0.80330	35.9	28.6	0.1	36.0	28.7	56.0	46.0	20.0	17.3	L
17	1.20000	39.5	31.7	0.1	39.6	31.8	56.0	46.0	16.4	14.2	L
18	3.09300	29.0	20.1	0.1	29.1	20.2	56.0	46.0	26.9	25.8	L
19	15.01450	31.7	25.8	0.3	32.0	26.1	60.0	50.0	28.0	23.9	L
20	21.80900	37.4	30.7	0.4	37.8	31.1	60.0	50.0	22.2	18.9	L

### AC Line Conducted Emissions (Graph)

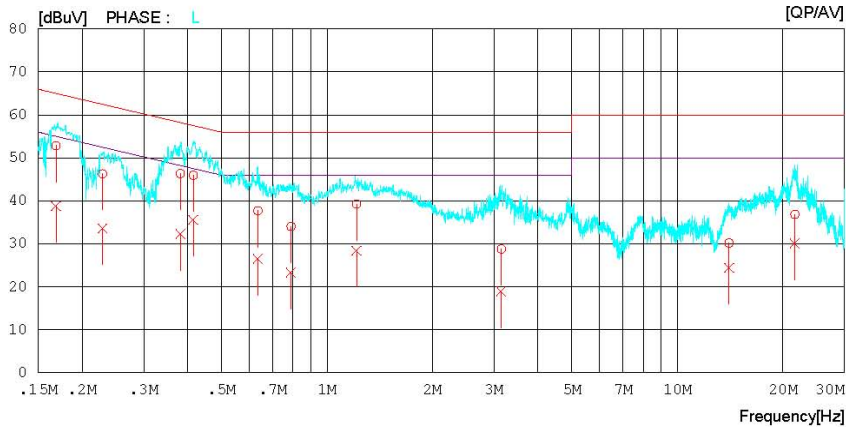
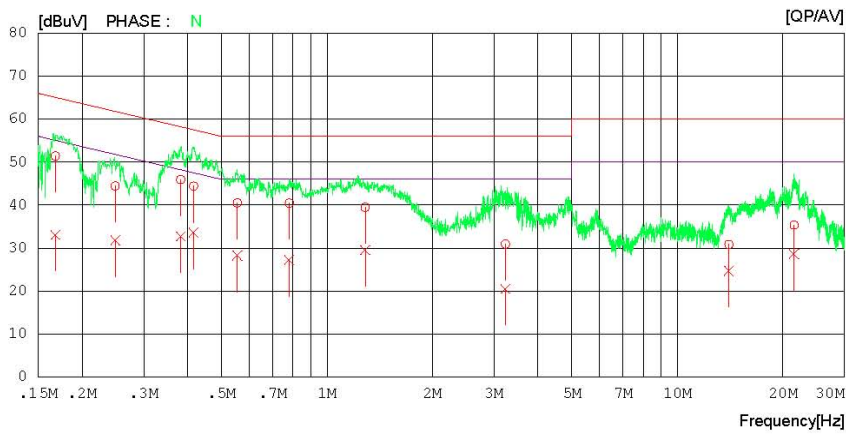
Test Mode: Band III & 802.11n HT40



### Results of Conducted Emission

Digital EMC  
Date : 2013-04-01

Model No.	: NP900X3F	Reference No.	:	
Type	:	Power Supply	:	120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	:	23 °C 45 % R.H.
Test Condition	: 5.5GHz WLAN	Operator	:	H.S SON
Memo	: 802.11n(HT40)			
LIMIT	: FCC P15.207 QP			
	: FCC P15.207 AV			



**AC Line Conducted Emissions (Data List)**

Test Mode: Band III & 802.11n HT40

**Results of Conducted Emission**

Digital EMC  
 Date : 2013-04-01

Model No. : NP900X3F                      Reference No. :  
 Type :                                              Power Supply : 120 V 60 Hz  
 Serial No. : Identical prototype          Temp/Humi. : 23 °C 45 % R.H.  
 Test Condition : 5.5GHz WLAN              Operator : H.S SON

Memo : 802.11n(HT40)

LIMIT : FCC P15.207 QP  
 FCC P15.207 AV

NO	FRFQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16798	51.3	33.0	0.1	51.4	33.1	65.1	55.1	13.7	22.0	N
2	0.24893	44.3	31.6	0.1	44.4	31.7	61.8	51.8	17.4	20.1	N
3	0.38255	45.8	32.6	0.1	45.9	32.7	58.2	48.2	12.3	15.5	N
4	0.41656	44.3	33.5	0.1	44.4	33.6	57.5	47.5	13.1	13.9	N
5	0.55510	40.4	28.2	0.1	40.5	28.3	56.0	46.0	15.5	17.7	N
6	0.78133	40.3	27.1	0.1	40.4	27.2	56.0	46.0	15.6	18.8	N
7	1.28600	39.4	29.4	0.1	39.5	29.5	56.0	46.0	16.5	16.5	N
8	3.23300	30.8	20.4	0.1	30.9	20.5	56.0	46.0	25.1	25.5	N
9	14.03100	30.5	24.4	0.3	30.8	24.7	60.0	50.0	29.2	25.3	N
10	21.53850	34.9	28.2	0.4	35.3	28.6	60.0	50.0	24.7	21.4	N
11	0.16855	52.8	38.7	0.1	52.9	38.8	65.0	55.0	12.1	16.2	L
12	0.22885	46.2	33.5	0.1	46.3	33.6	62.5	52.5	16.2	18.9	L
13	0.38184	46.2	32.2	0.1	46.3	32.3	58.2	48.2	11.9	15.9	L
14	0.41550	45.8	35.5	0.1	45.9	35.6	57.5	47.5	11.6	11.9	L
15	0.63528	37.6	26.5	0.1	37.7	26.6	56.0	46.0	18.3	19.4	L
16	0.79016	33.9	23.2	0.1	34.0	23.3	56.0	46.0	22.0	22.7	L
17	1.21450	39.2	28.3	0.1	39.3	28.4	56.0	46.0	16.7	17.6	L
18	3.14500	28.7	18.9	0.1	28.8	19.0	56.0	46.0	27.2	27.0	L
19	14.04700	29.9	24.1	0.3	30.2	24.4	60.0	50.0	29.8	25.6	L
20	21.63550	36.5	29.7	0.4	36.9	30.1	60.0	50.0	23.1	19.9	L

### 3.2.8 Antenna Requirements

■ **Procedure:**

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

■ **Conclusion: **Comply****

The internal antenna is permanently attached using unique connectors. (Refer to Internal Photo file.)

■ **Minimum Standard:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

### 3.2.9 Occupied Bandwidth

■ **TEST Requirements**

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured

■ **TEST CONFIGURATION**

Refer to the APPENDIX I.

■ **TEST PROCEDURE :**

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual

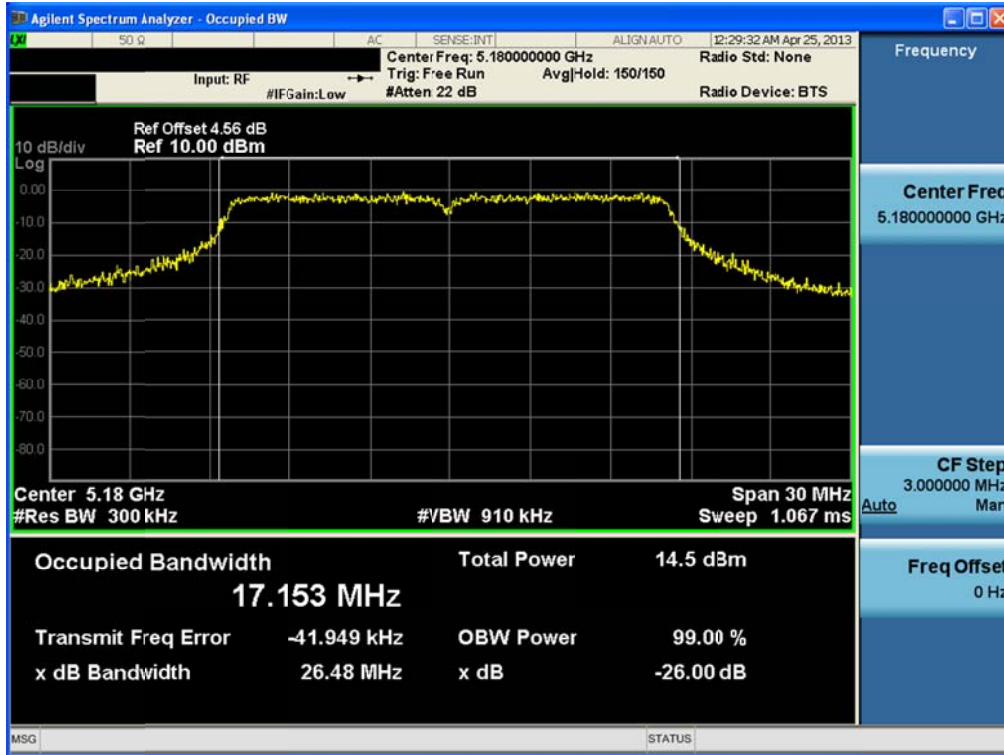
■ **TEST RESULT : Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [MHz]	
				Chain 0	Chain 1
802.11a	Band I	36	5180	17.153	-
		44	5220	17.119	-
		48	5240	17.121	-
	Band II	52	5260	17.172	-
		56	5280	17.098	-
		64	5320	17.077	-
	Band III	100	5500	17.031	-
		116	5580	17.053	-
		140	5700	17.030	-
802.11n (20MHz)	Band I	36	5180	18.113	18.067
		44	5220	18.115	18.084
		48	5240	18.121	18.109
	Band II	52	5260	18.140	18.076
		56	5280	18.099	18.081
		64	5320	18.106	18.104
	Band III	100	5500	18.095	18.132
		116	5580	18.047	18.103
		140	5700	18.127	18.089
802.11n (40MHz)	Band I	38	5190	36.216	36.134
		46	5230	36.144	36.123
	Band II	54	5270	36.122	36.172
		62	5310	36.143	36.187
	Band III	102	5510	36.202	36.121
		110	5550	36.145	36.240
		134	5670	36.121	36.174

RESULT PLOTS

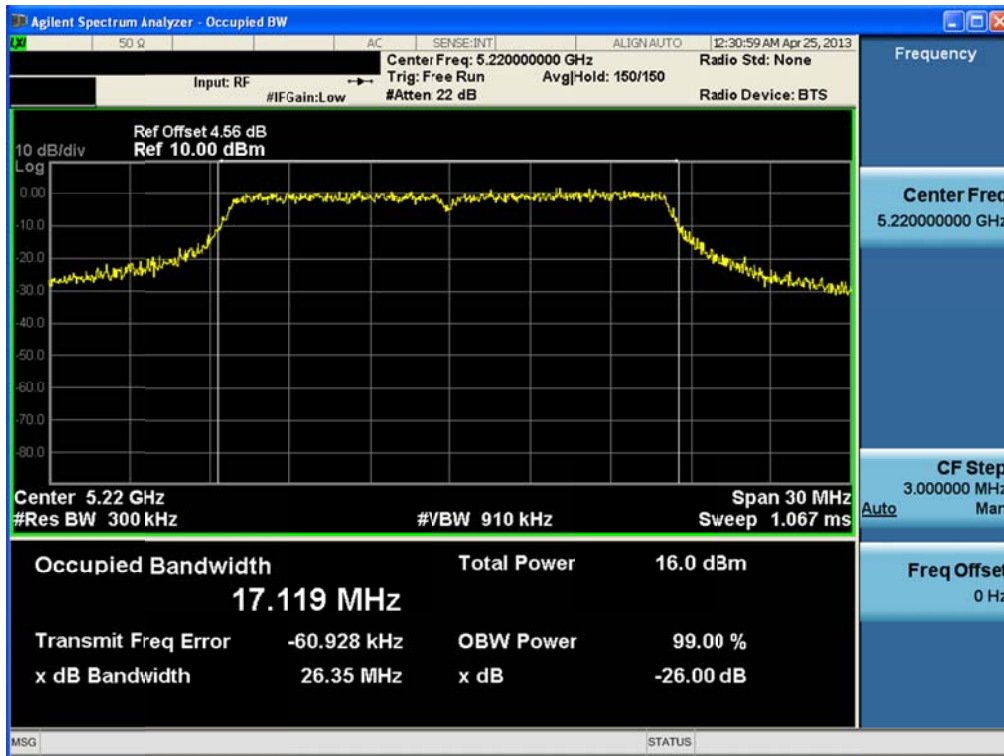
Occupied Bandwidth 99%

Test Mode: Chain 0 & 802.11a& Ch.36



Occupied Bandwidth 99%

Test Mode: Chain 0 & 802.11a& Ch.44



**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.48



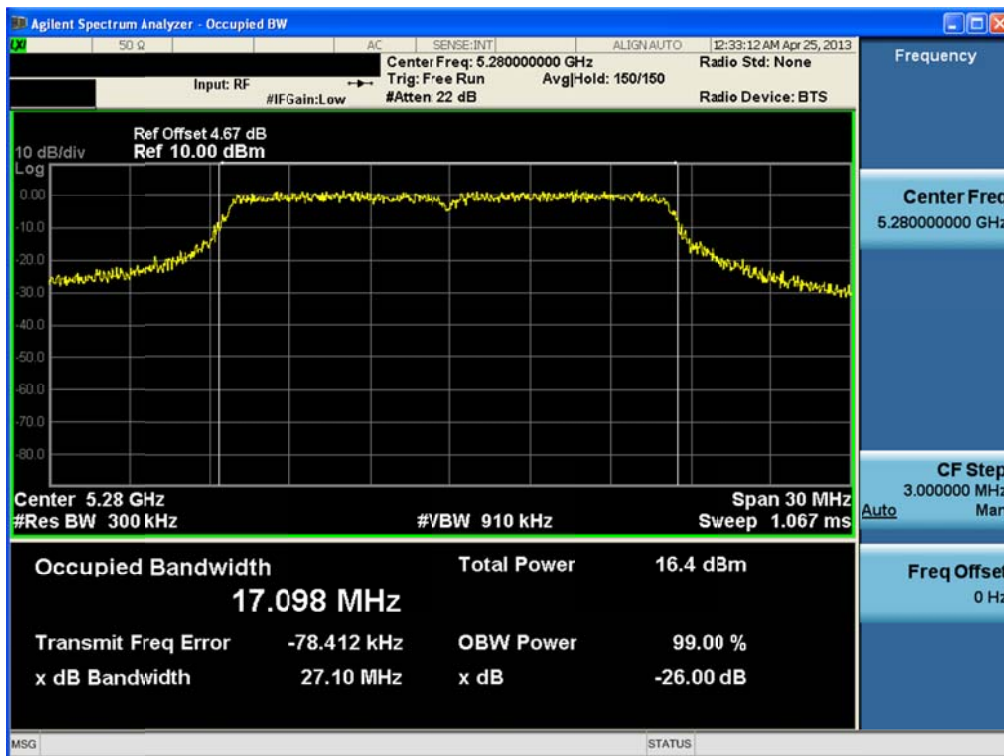
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.52



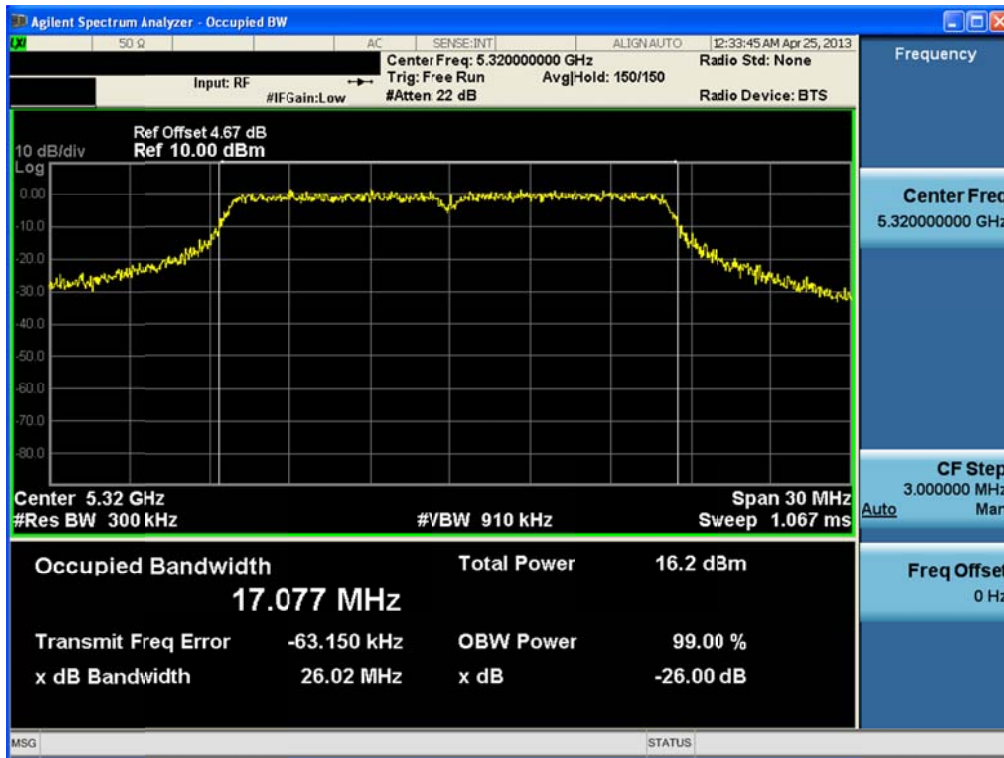
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.56



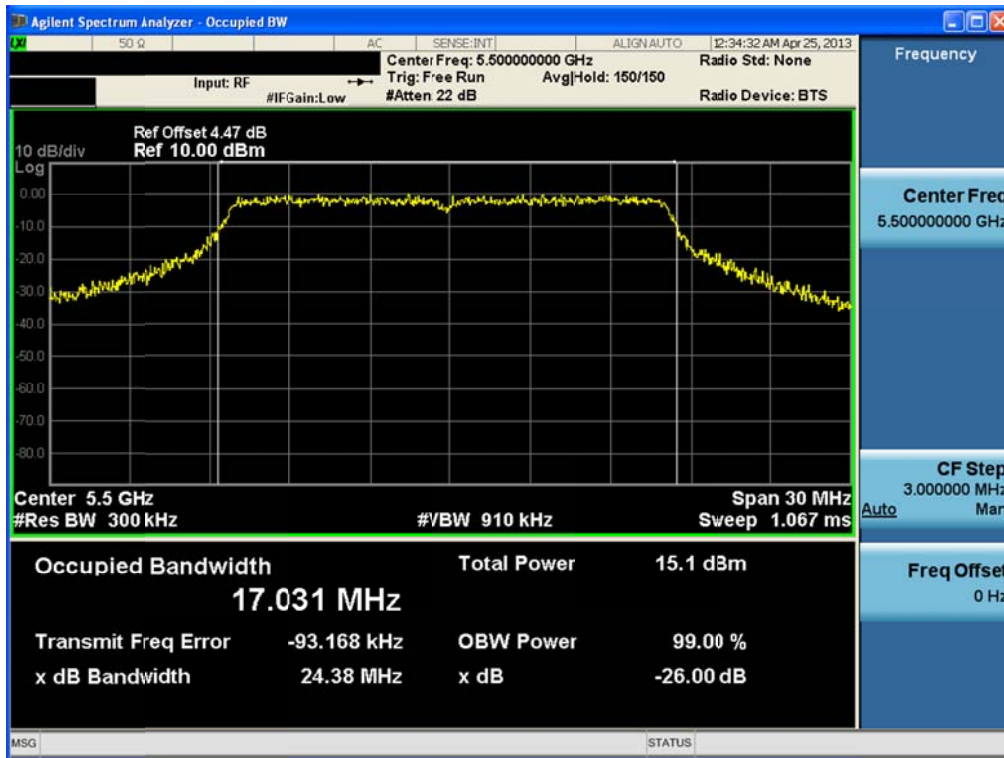
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.64



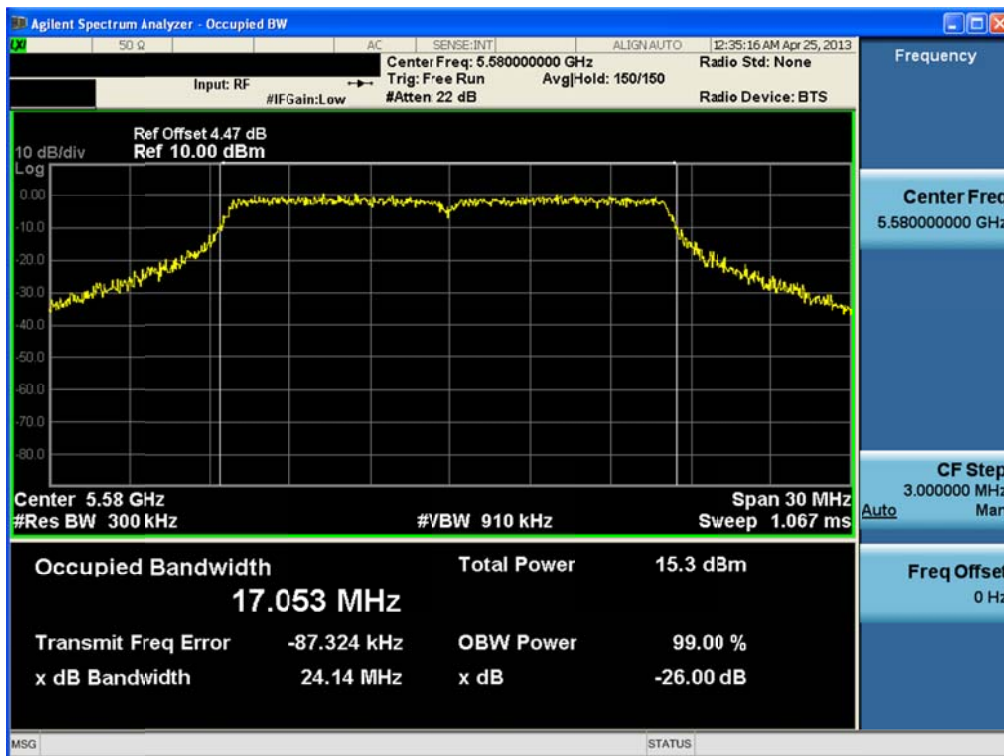
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.100



**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a& Ch.116



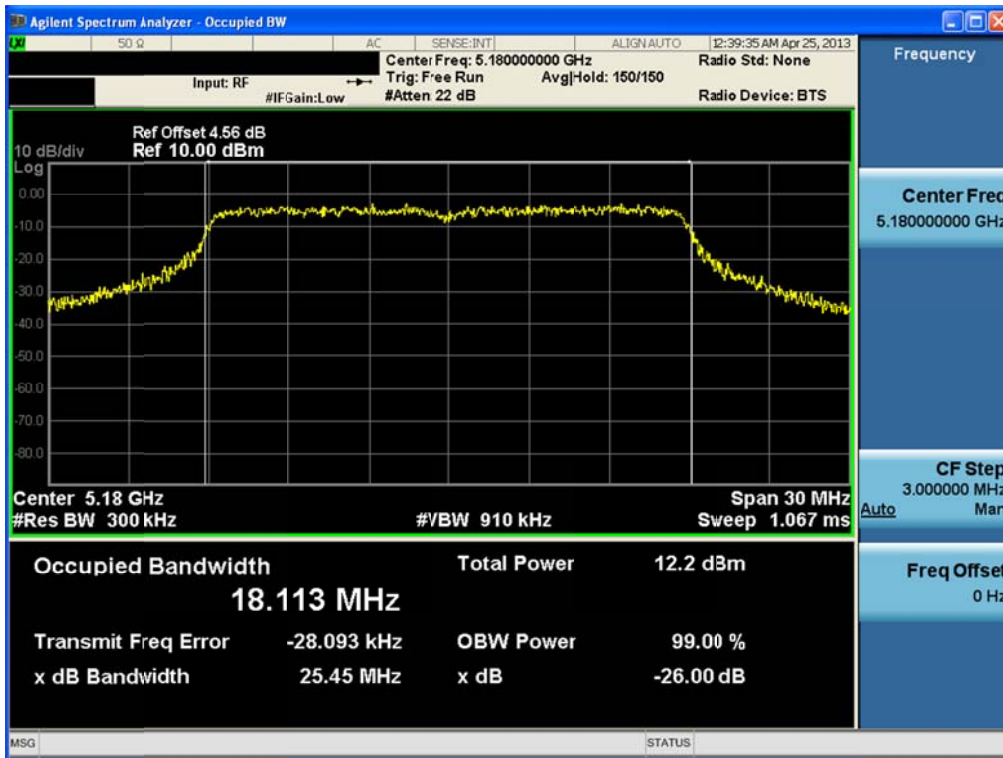
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11a & Ch.140



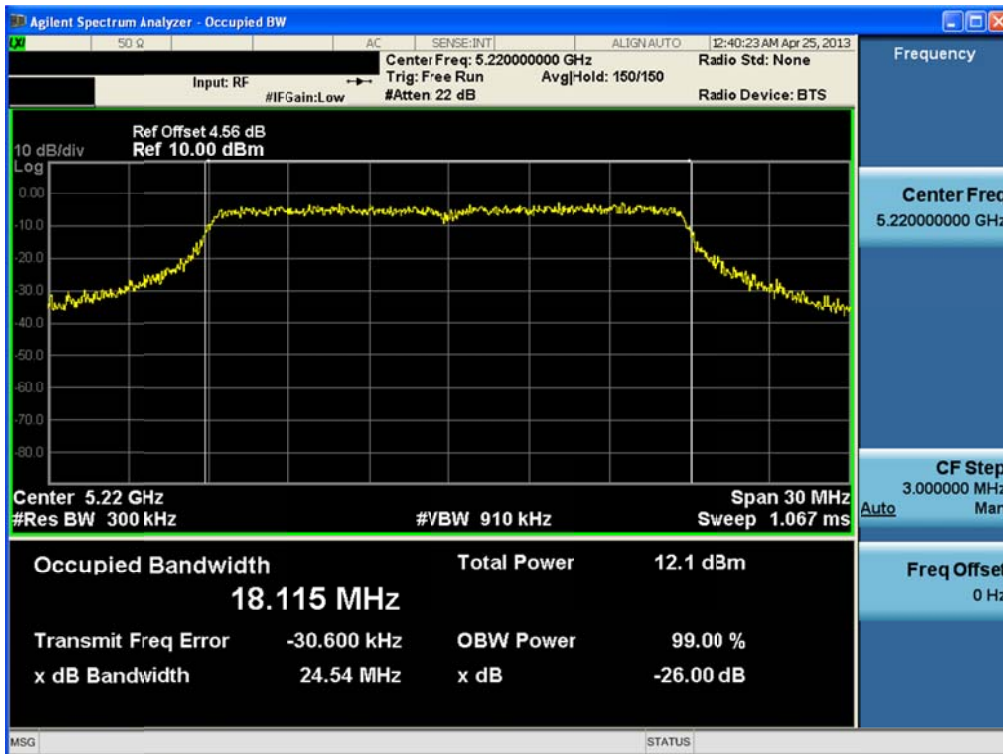
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20& Ch.36



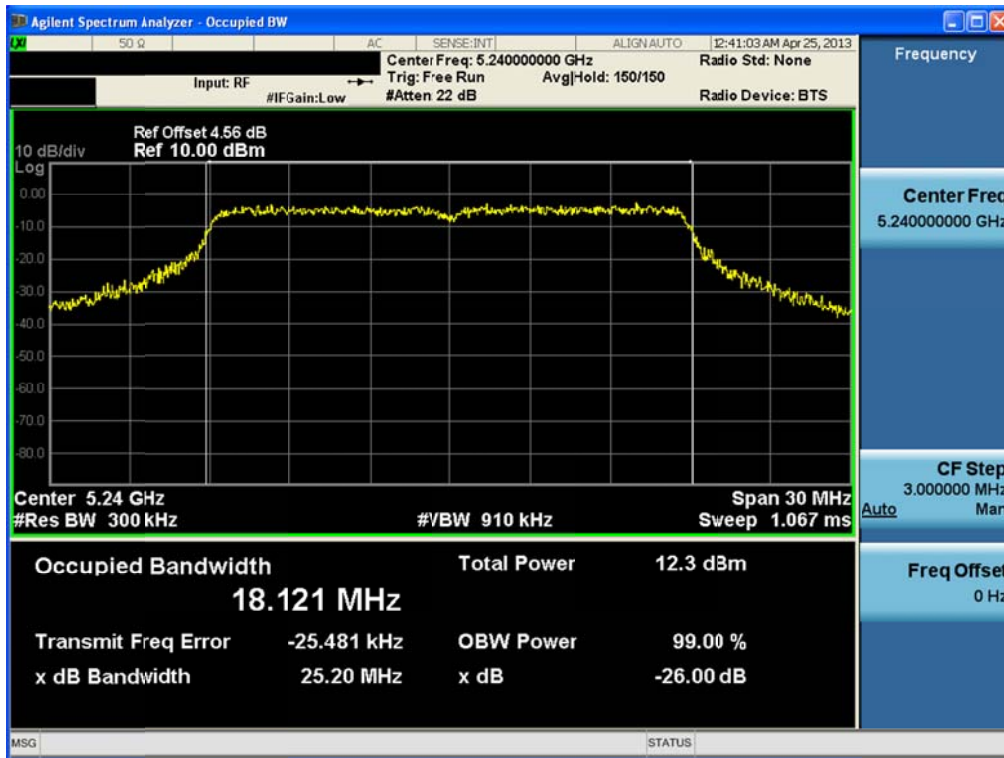
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20 & Ch.44



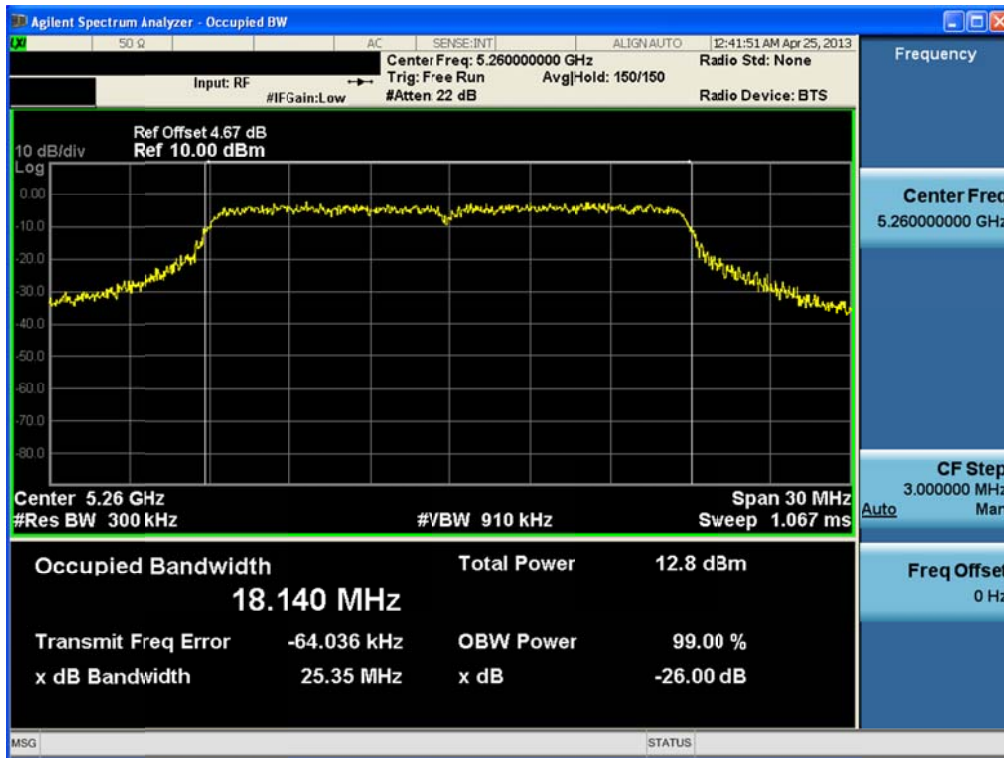
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20& Ch.48



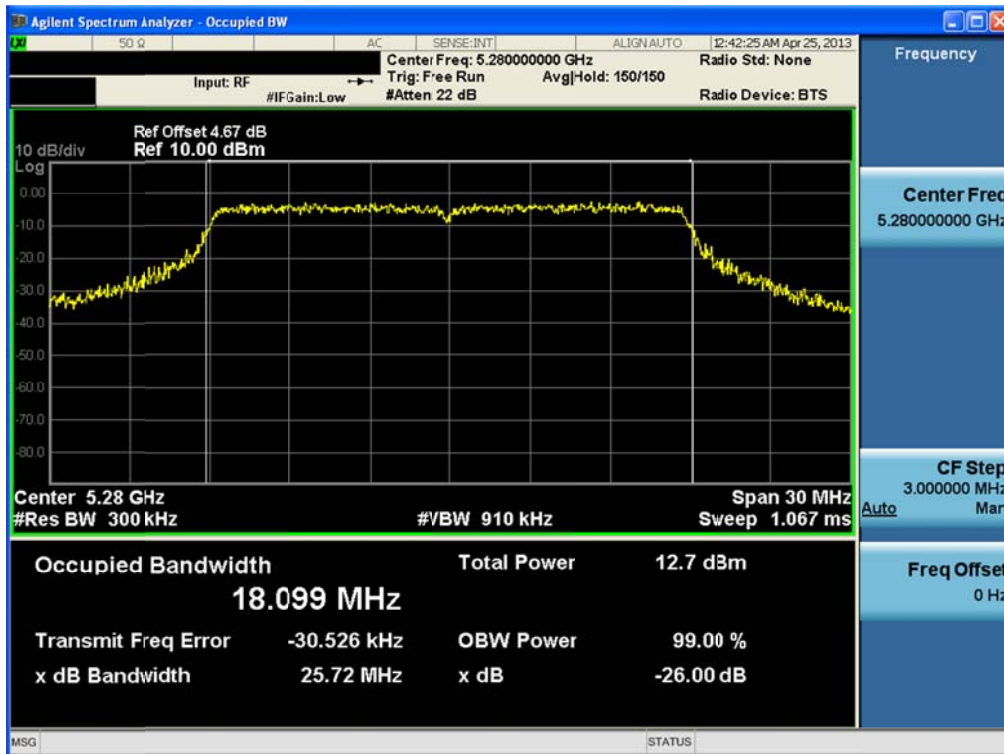
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20& Ch.52



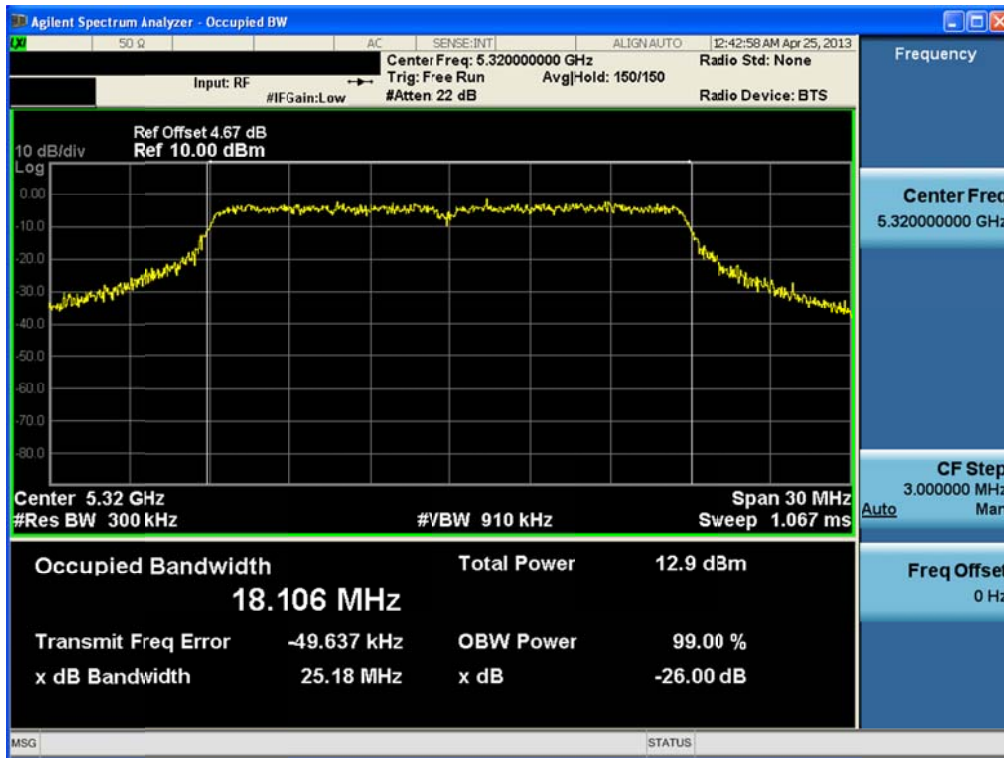
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20&Ch.56



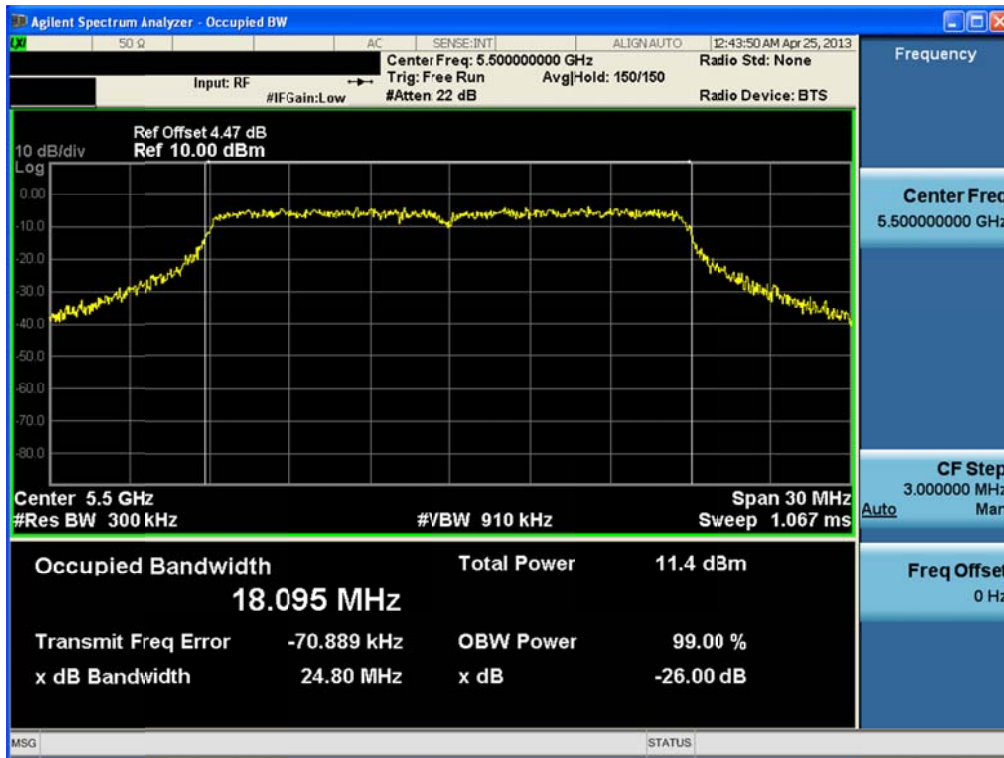
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20& Ch.64



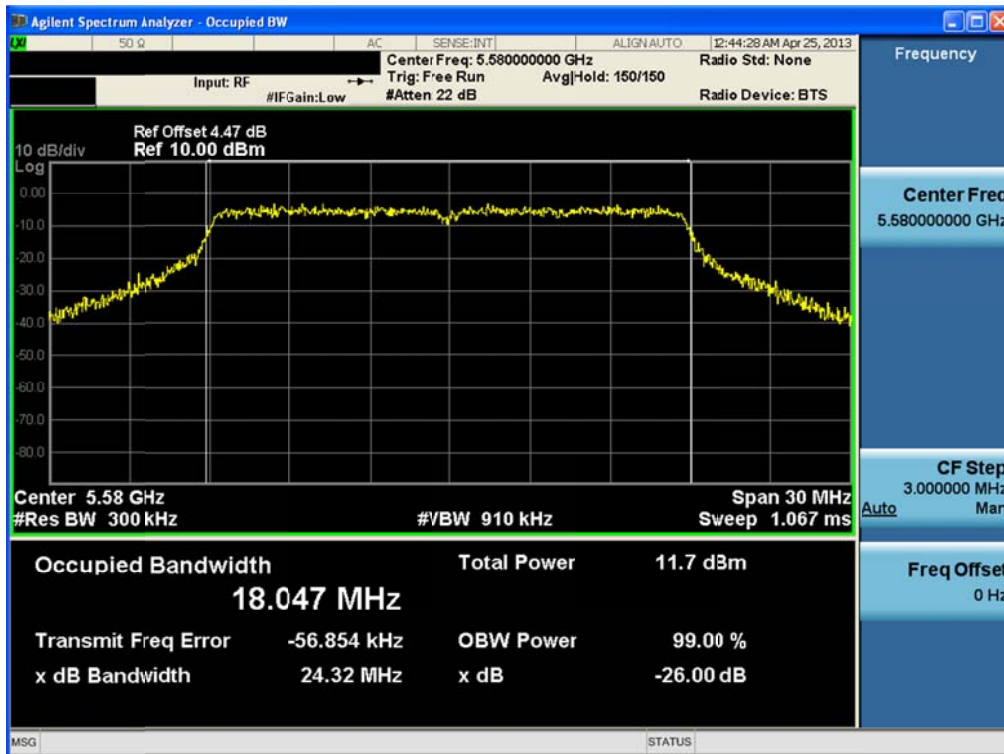
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20& Ch.100



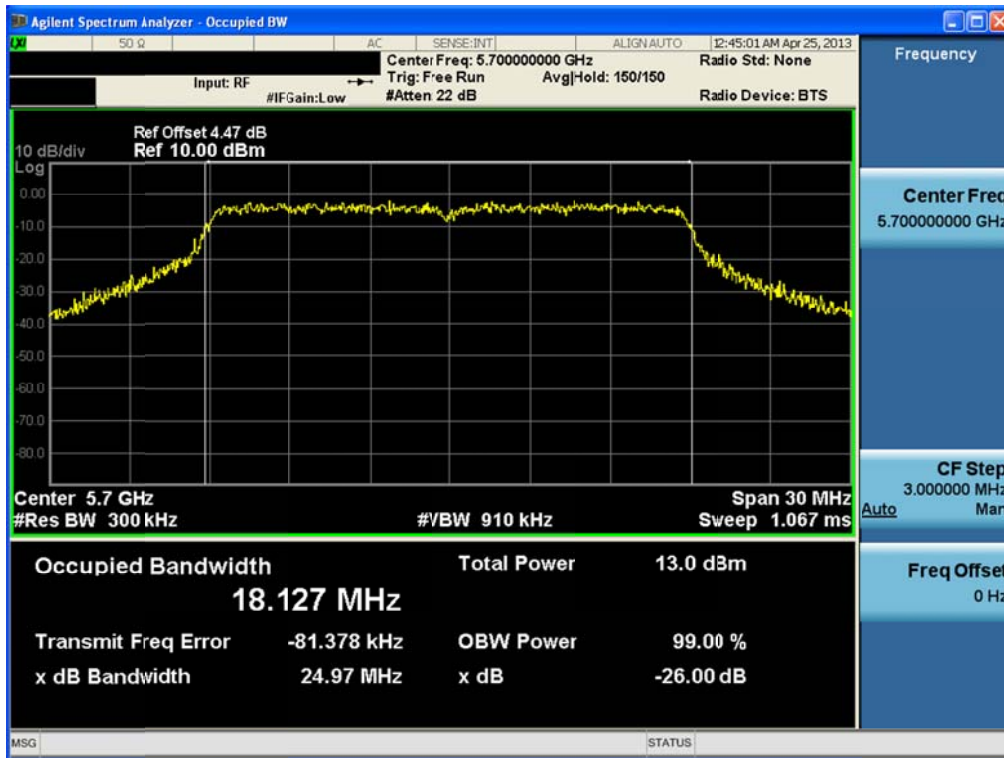
**Occupied Bandwidth 99%**

Test Mode: Chain 0 & 802.11n-HT20&Ch.116



Occupied Bandwidth 99%

Test Mode: Chain 0 & 802.11n-HT20& Ch.140



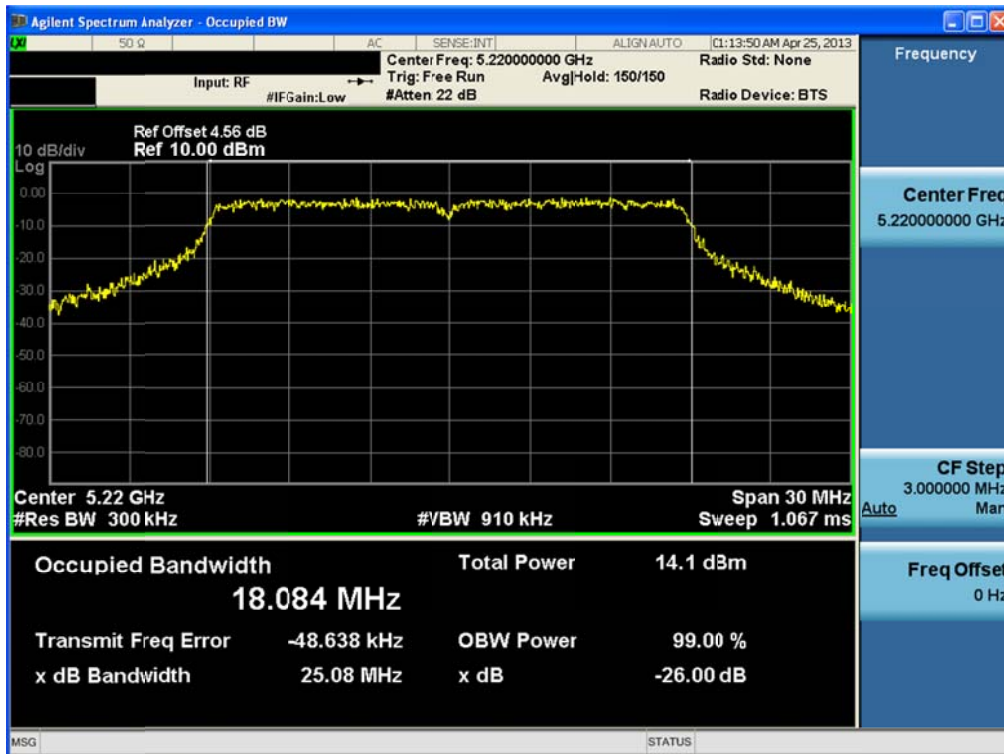
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.36



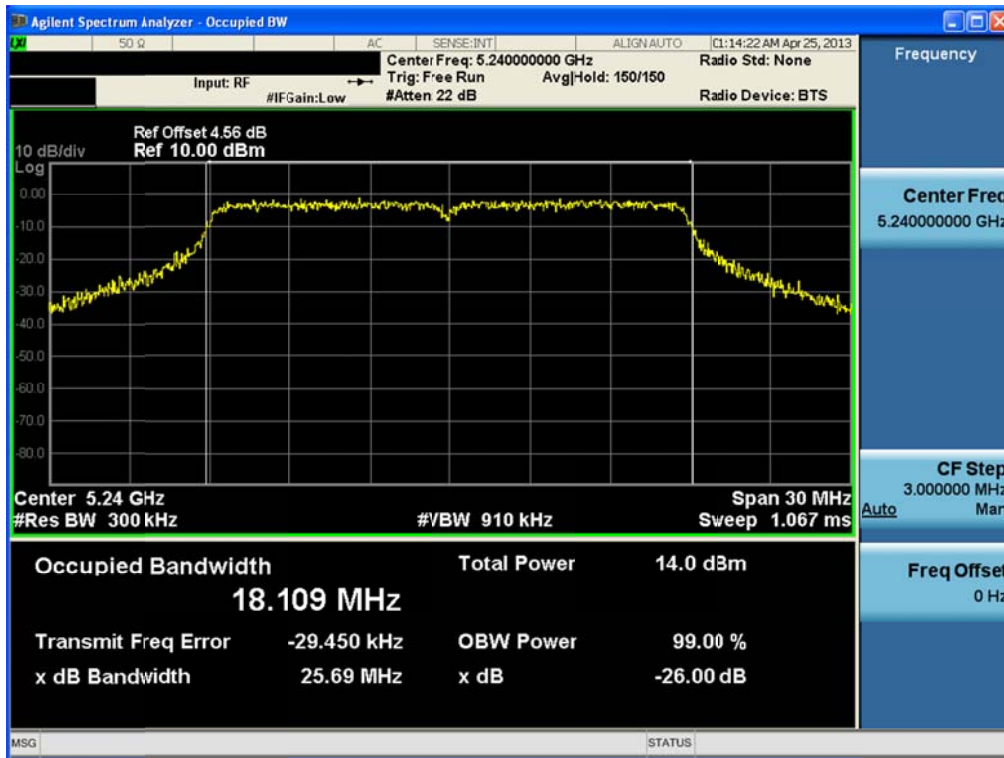
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20&Ch.44



**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.48



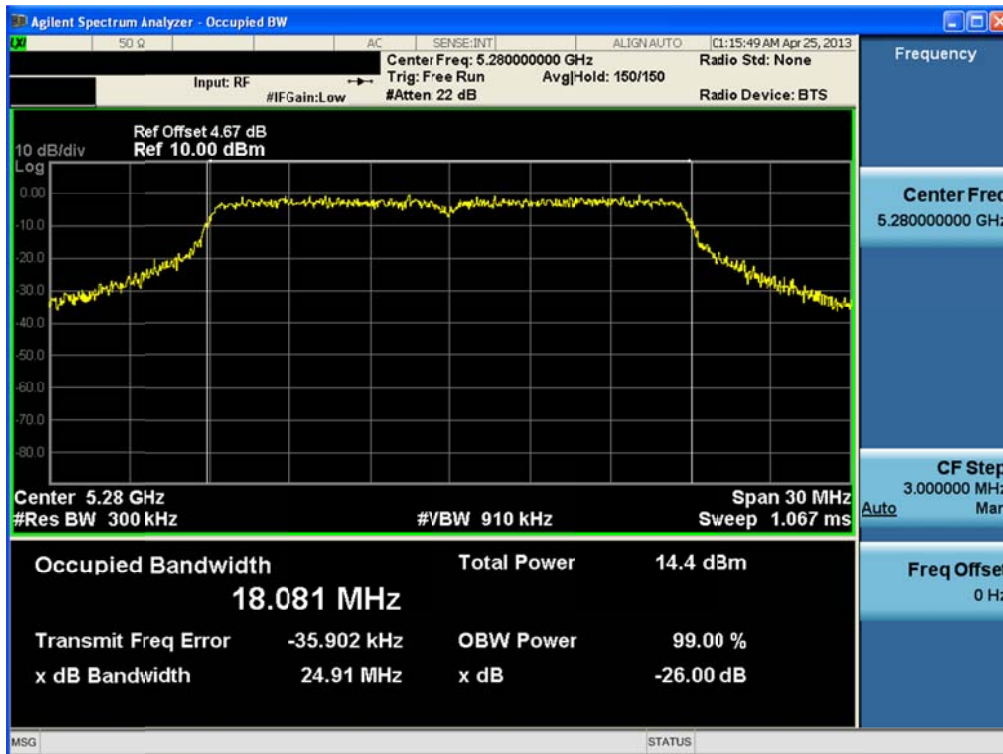
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.52



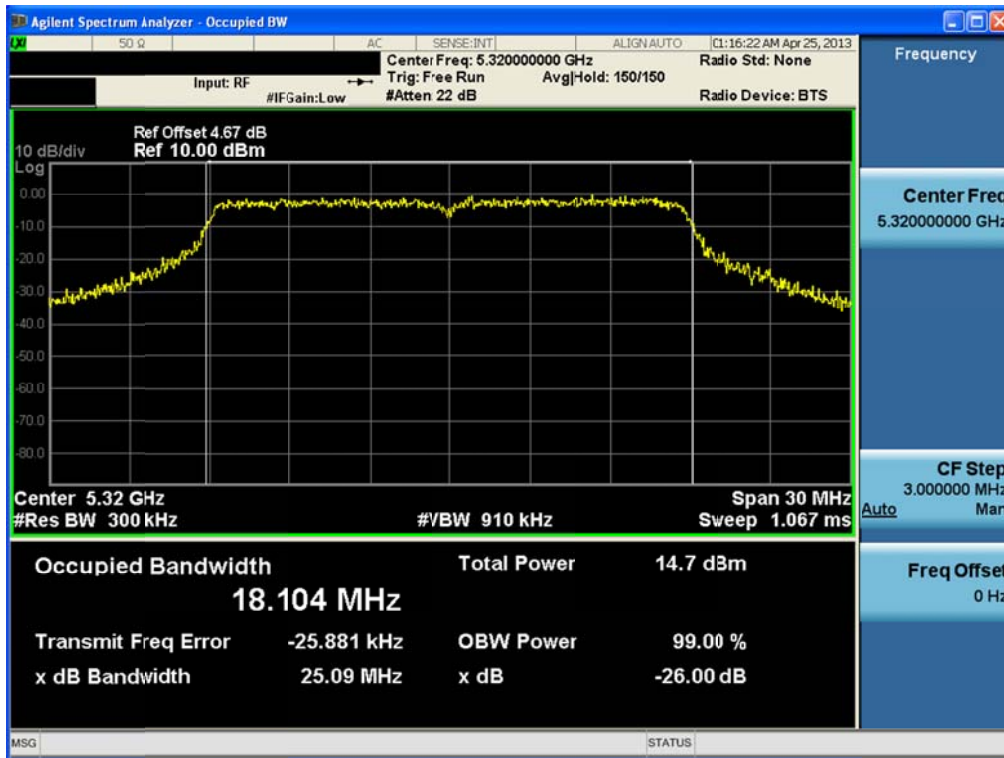
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20&Ch.56



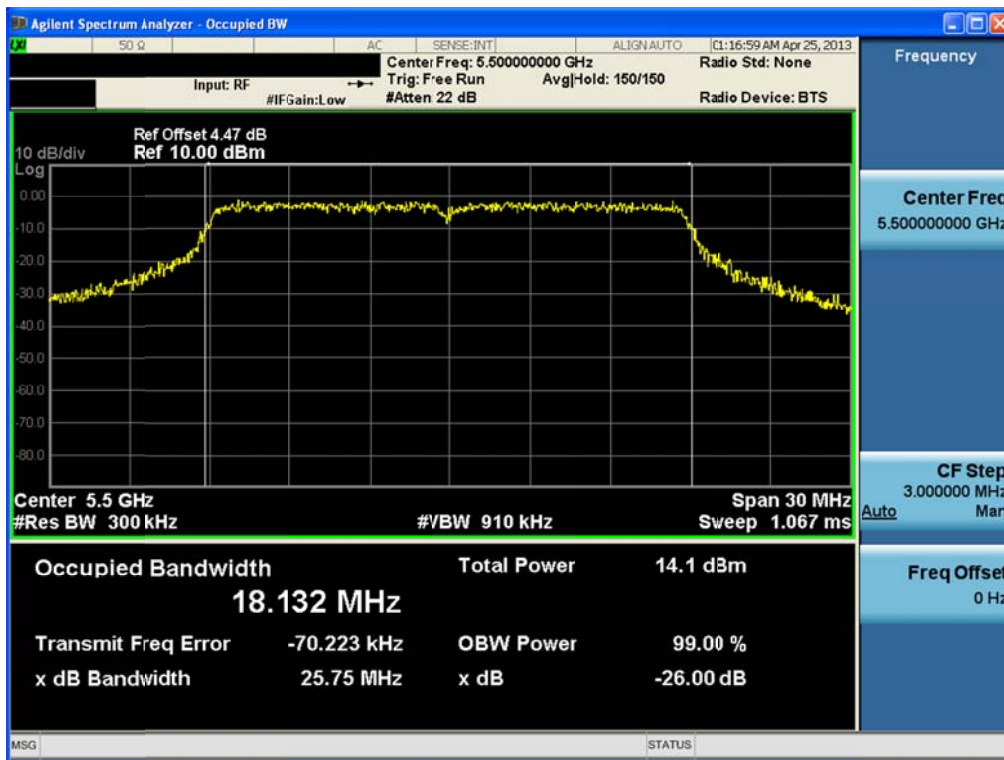
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.64



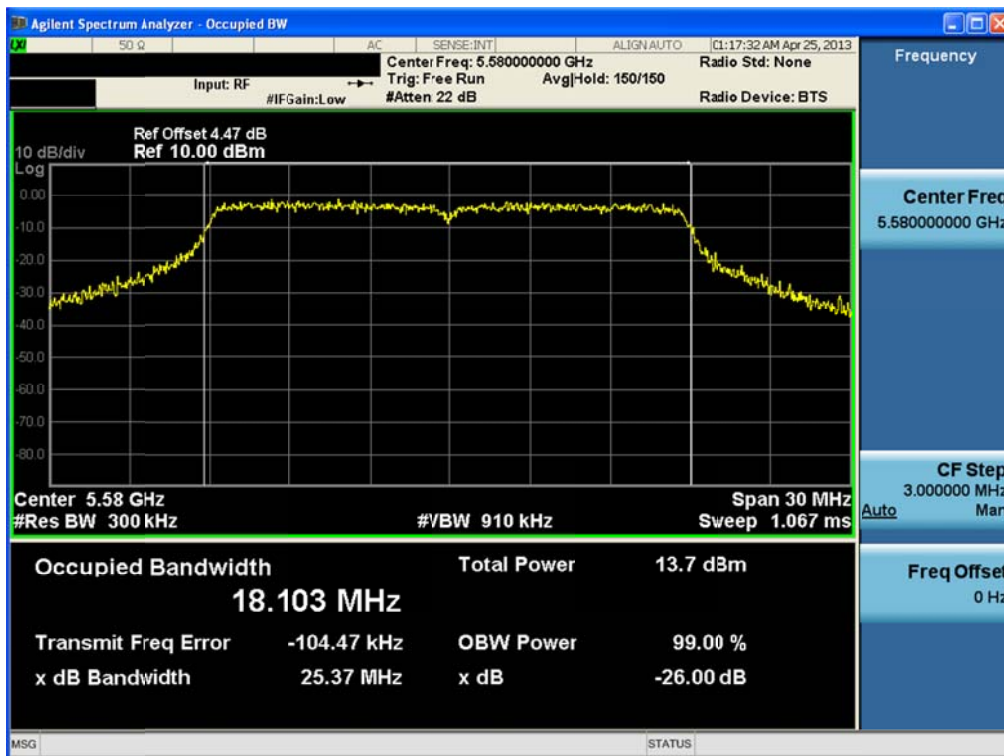
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.100



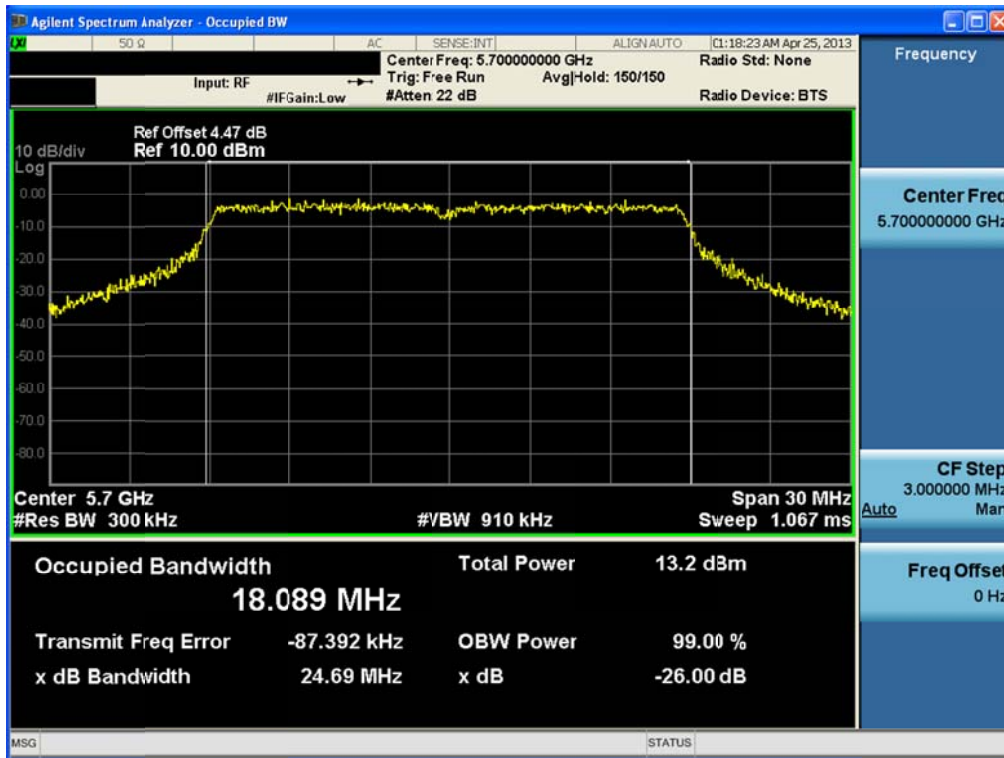
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20&Ch.116



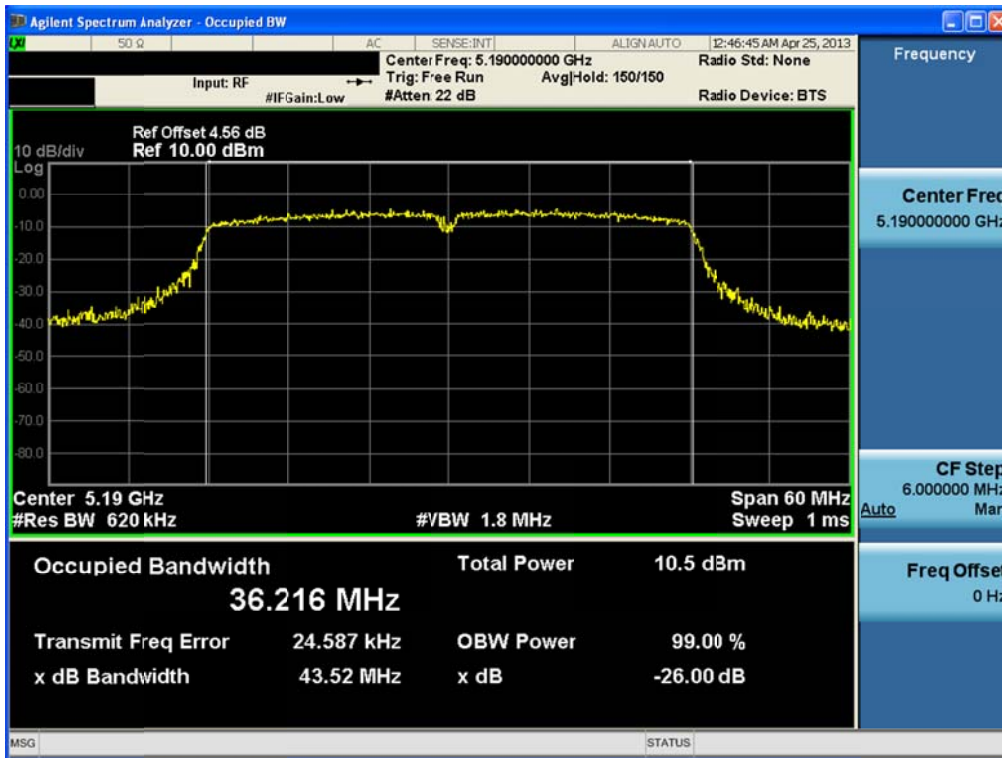
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT20& Ch.140



**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.38



**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.46



**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.54



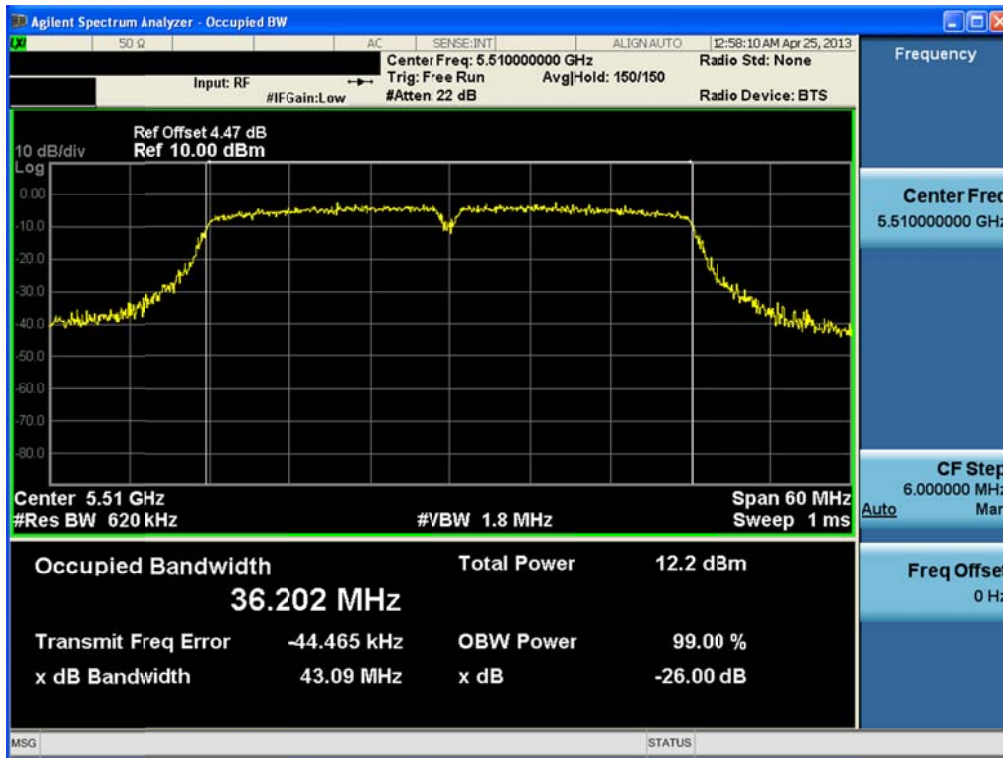
**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.62



**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.102



**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.110



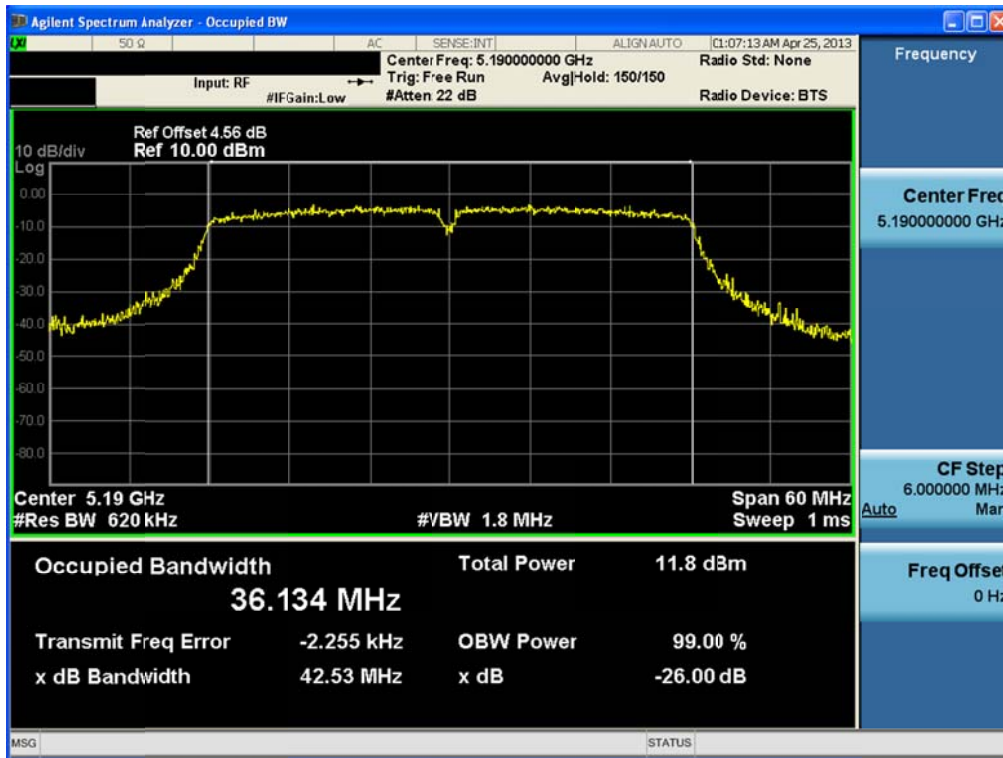
**Occupied Bandwidth 99%**

Test Mode: Chain 0&802.11n-HT40& Ch.134



**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.38



**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.46



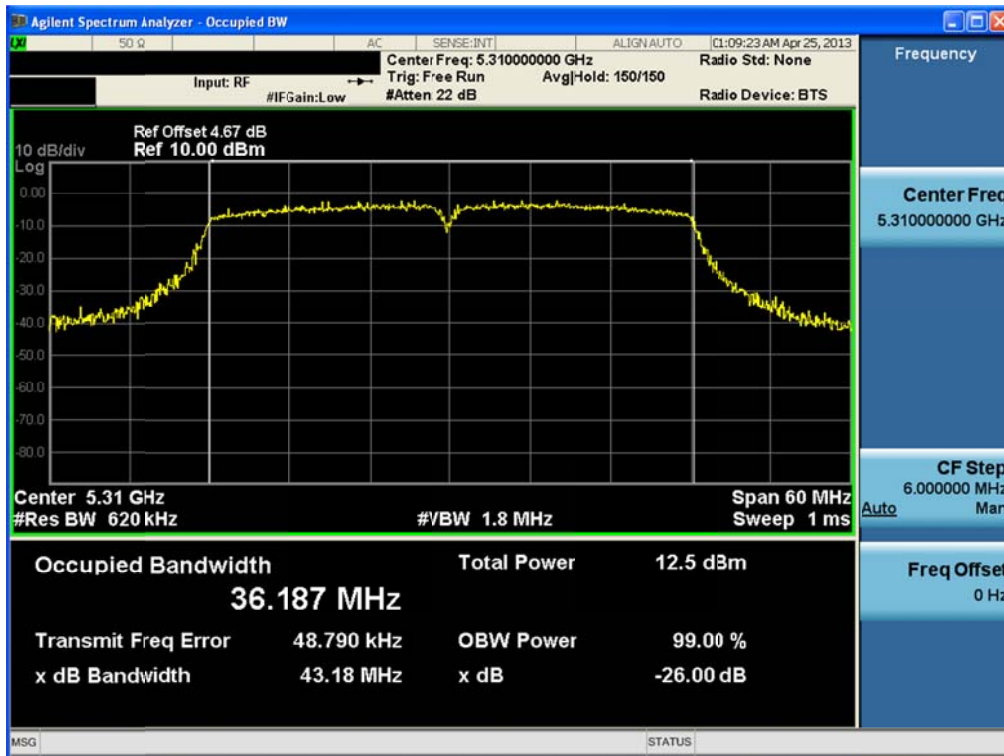
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.54



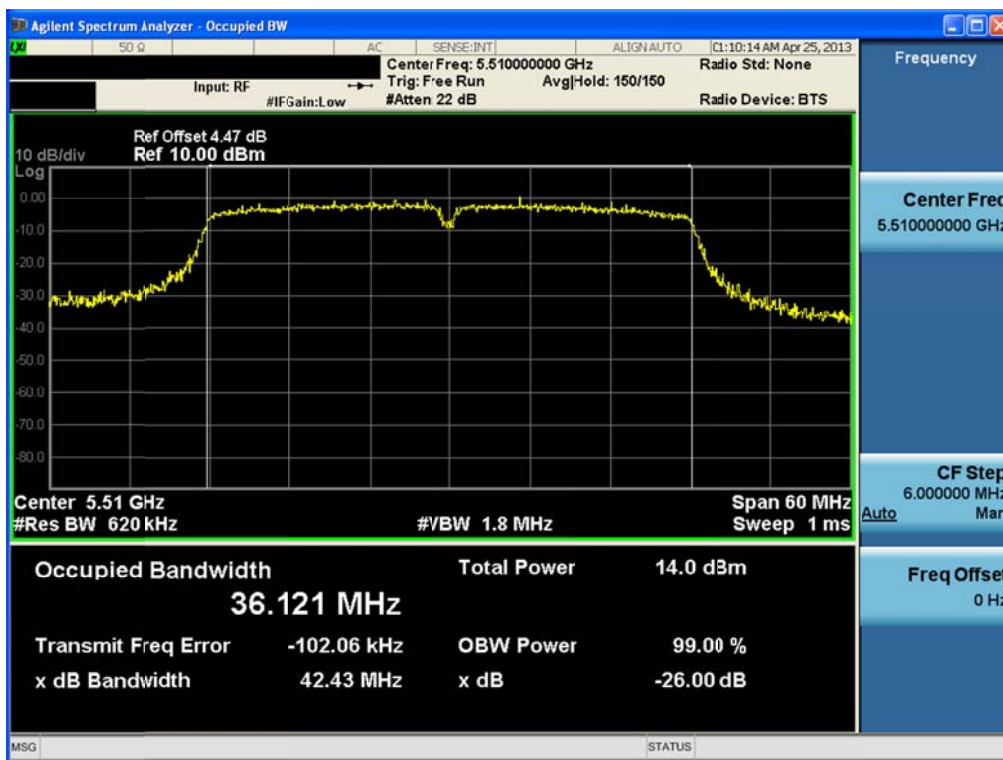
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.62



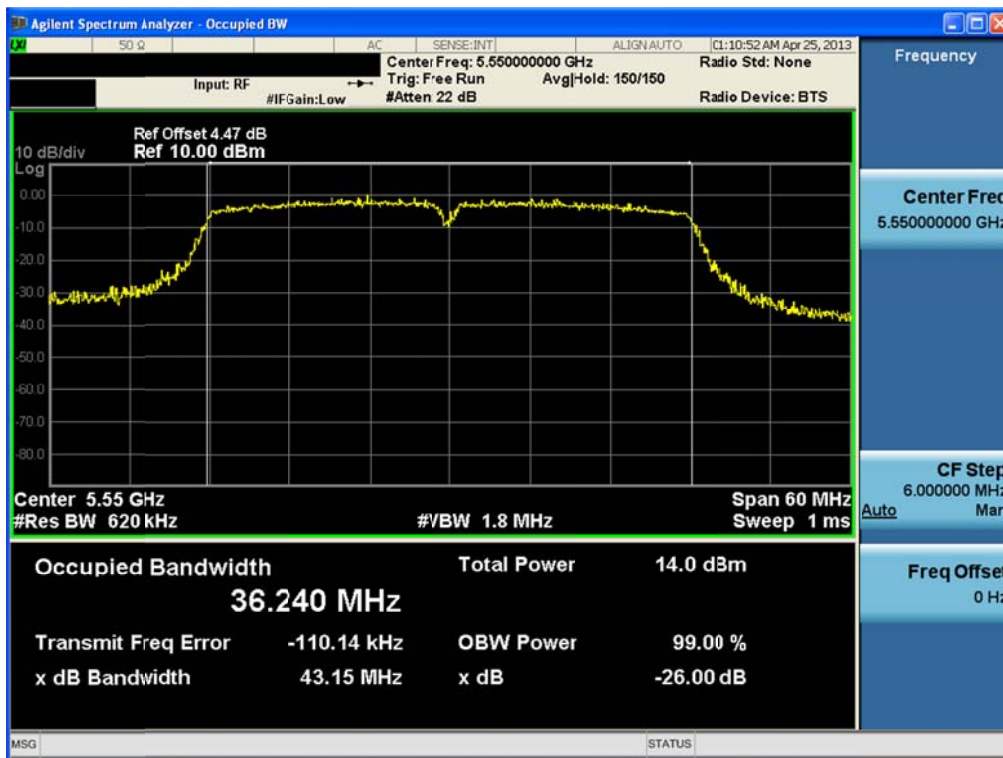
**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.102



**Occupied Bandwidth 99%**

Test Mode: Chain 1&802.11n-HT40& Ch.110



Occupied Bandwidth 99%

Test Mode: Chain 1&802.11n-HT40& Ch.134



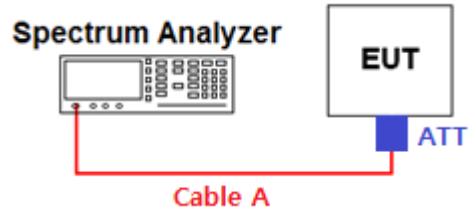
#### 4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent	N9020A	13/01/08	14/01/08	MY49100833
Spectrum Analyzer	Agilent	E4440A	12/10/22	13/10/22	US45303051
Spectrum Analyzer	Rohde Schwarz	FSQ26	13/02/14	14/02/14	200445
Harmonic Mixer	OML	M28HWD	13/02/14	14/02/14	Ka100224-1
Digital Multimeter	H.P	34401A	13/02/27	14/02/27	3146A13475
Signal Generator	Rohde Schwarz	SMR20	13/02/27	14/02/27	101251
Vector Signal Generator	Rohde Schwarz	SMJ100A	13/01/08	14/01/08	100148
Thermo hygrometer	BODYCOM	BJ5478	12/06/20	13/06/20	120612-2
DC Power Supply	HP	6622A	13/02/27	14/02/27	3448A03760
High-Pass Filter	Wainwright	WHKX8.5	12/09/17	13/09/17	1
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
LOOP Antenna	Schwarzbeck	FMZB1513	12/09/24	13/09/24	1513-128
HORN ANT	ETS	3115	12/02/20	14/02/20	6419
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
Attenuator (3dB)	WEINSCHEL	56-3	12/09/17	13/09/17	Y2342
Amplifier (22dB)	H.P	8447E	13/01/08	14/01/08	2945A02865
Amplifier (30dB)	Agilent	8449B	13/02/27	14/02/27	3008A00370
EMI TEST RECEIVER	R&S	ESCI	13/02/27	14/02/27	100364
EMI TEST RECEIVER	R&S	ESU	13/01/08	14/01/08	100014
CVCF	KIKUSUI	PCR1000L	12/09/15	13/09/15	14110610
LISN	R&S	ESH2-Z5	12/09/18	13/09/18	828739/006
TEMP & HUMIDITY Chamber	SJ SCIENCE	TEMI850-10	13/02/28	14/02/28	SJ-TH-S50-120203

## APPENDIX I

### Test set Diagram & Offset value information

▪**Conducted Test** (6dB Bandwidth &Maximum Peak Conducted Output Power)



#### Path Loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
5180	4.49	5260	<b>4.67</b>	5500	4.34
5190	4.52	5270	4.48	5510	4.37
5220	<b>4.56</b>	5280	4.45	5550	4.39
5230	4.55	5310	4.55	5580	4.36
5240	4.53	5320	4.53	5670	4.40
				5700	<b>4.47</b>

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.

Path loss (=S/A's offset value) = Cable A + ATT (Attenuator, Applied only when it was used externally)

Note. 2: The worst case path loss was used as below.

**BAND1 :4.56dB, BAND2 : 4.67dB, Band3 : 4.47dB**

## APPENDIX II Duty cycle plots

### ■ TEST PROCEDURE

**Duty Cycle** [ $X = \text{On Time} / (\text{On} + \text{Off time})$ ] is measured using Measurement Procedure of **KDB789033**

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW  $\geq$  EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW  $\geq$  RBW.
4. Set detector = peak.
5. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are  $> 50/T$** , where  $T$  is defined in section B)1)a), and **the number of sweep points across duration  $T$  exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

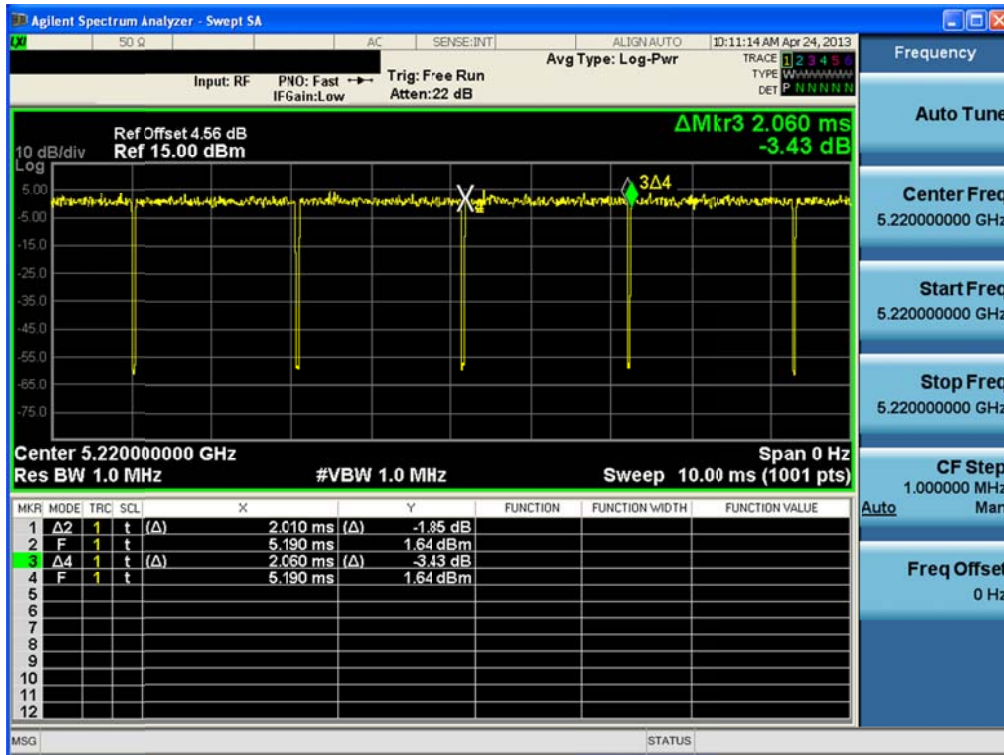
#### - Summary of Duty Cycle Calculation Table

Mode	Channel	Frequency [MHz]	Maximum Achievable Duty Cycle ( $x = \text{On} / (\text{On} + \text{Off})$ )		
			On Time [ms]	(On+Off) Time [ms]	$x$
802.11a	36	5180	2.010	2.060	0.97
	44	5220			
	48	5240			
	52	5260	2.010	2.060	0.97
	56	5280			
	64	5320			
	100	5500	2.010	2.060	0.97
	116	5580			
140	5700				
802.11n (20MHz)	36	5180	0.960	1.015	0.94
	44	5220			
	48	5240			
	52	5260	0.960	1.015	0.94
	56	5280			
	64	5320			
	100	5500	0.960	1.015	0.94
	116	5580			
140	5700				
802.11n (40MHz)	38	5190	0.488	0.520	0.93
	46	5230			
	54	5270	0.488	0.520	0.93
	62	5310			
	102	5510	0.488	0.520	0.93
	110	5550			
134	5670				

- Description for duty cycle plot data on next pages :  $1\Delta = \text{On Time}$  ,  $2\Delta = (\text{On} + \text{Off}) \text{ Time}$  So  $\text{Off Time} = 2\Delta - 1\Delta$
- $T$  : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.  
 ( $T = \text{On time}$  of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)  
 For Duty Cycle with zero span method, both RBW/VBW  $> 50/T$   
 (For example, this case  $\text{RBW/VBW (1 MHz)} > 50/0.00096 = 52.1 \text{ KHz}$ )
- The reason for the Duty Cycle Limitation : The test S/W provided by the applicant supports transmission with above maximum fixed duty cycle.
- The number of sweeps were increased by factor of  $1/x$  until the trace stabilizes for Peak Measurement  
 The number of average traces were increased by factor of  $1/x$  for Method AD

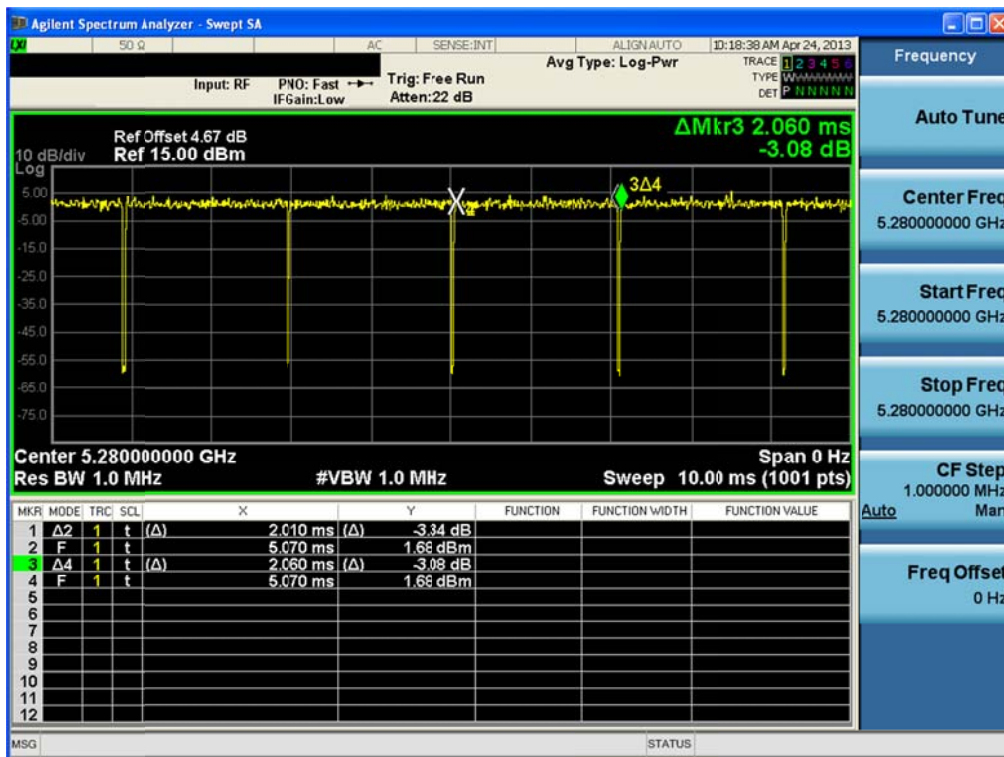
Duty Cycle

Test Mode: 802.11a & Ch.44



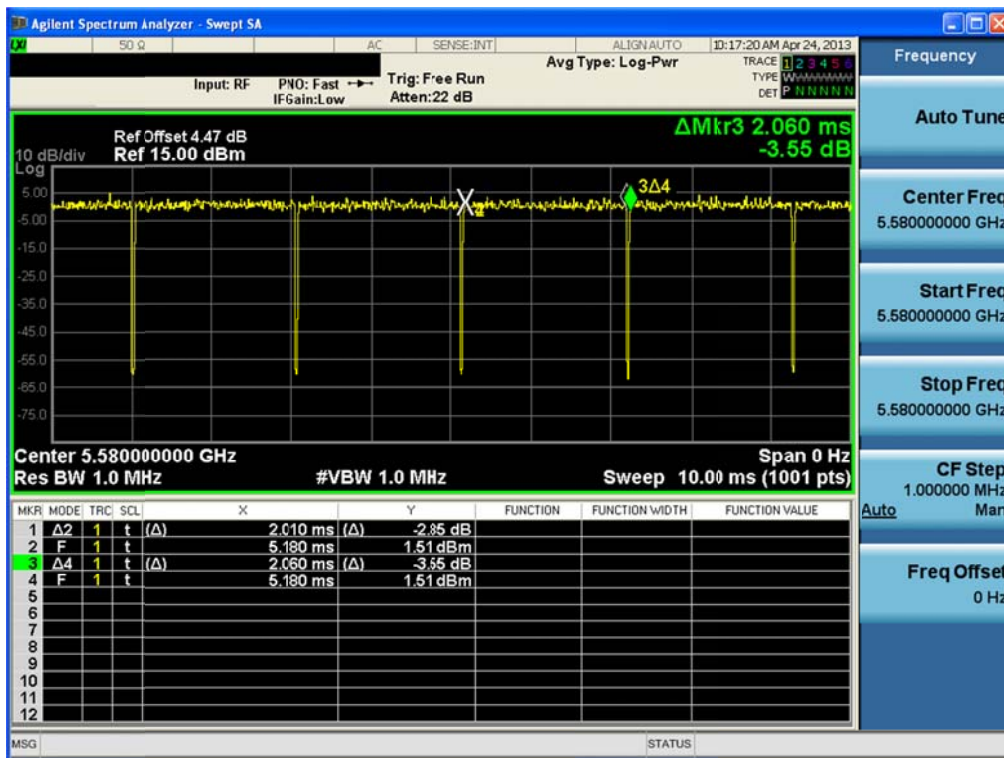
Duty Cycle

Test Mode: 802.11a & Ch.56



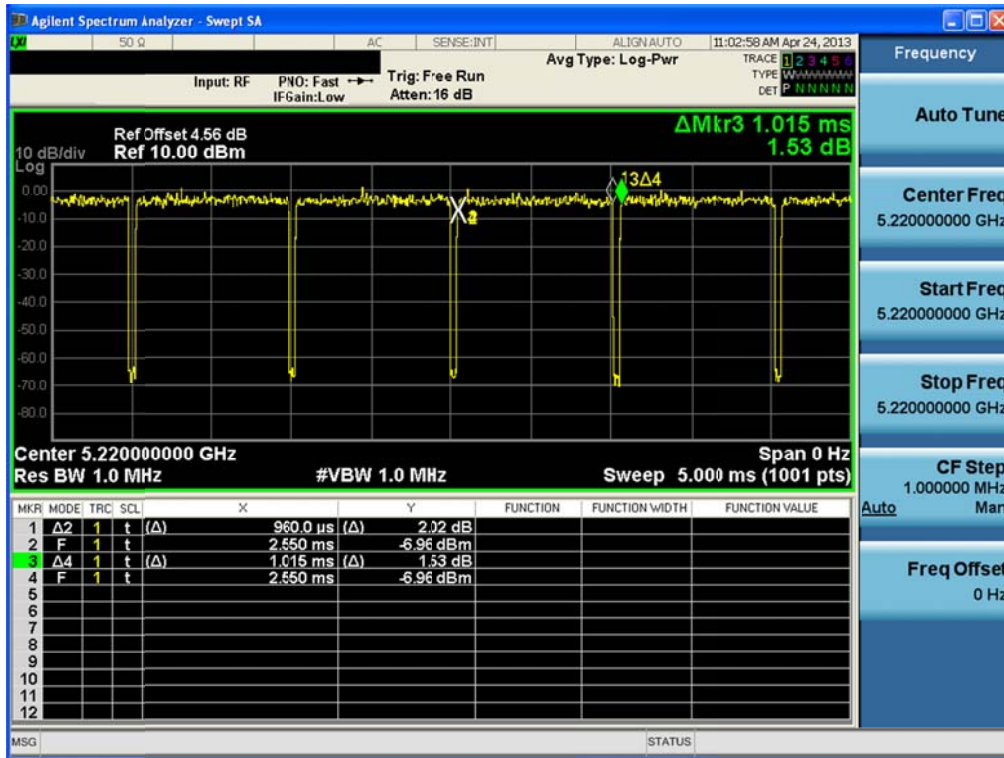
**Duty Cycle**

Test Mode: 802.11a & Ch.116



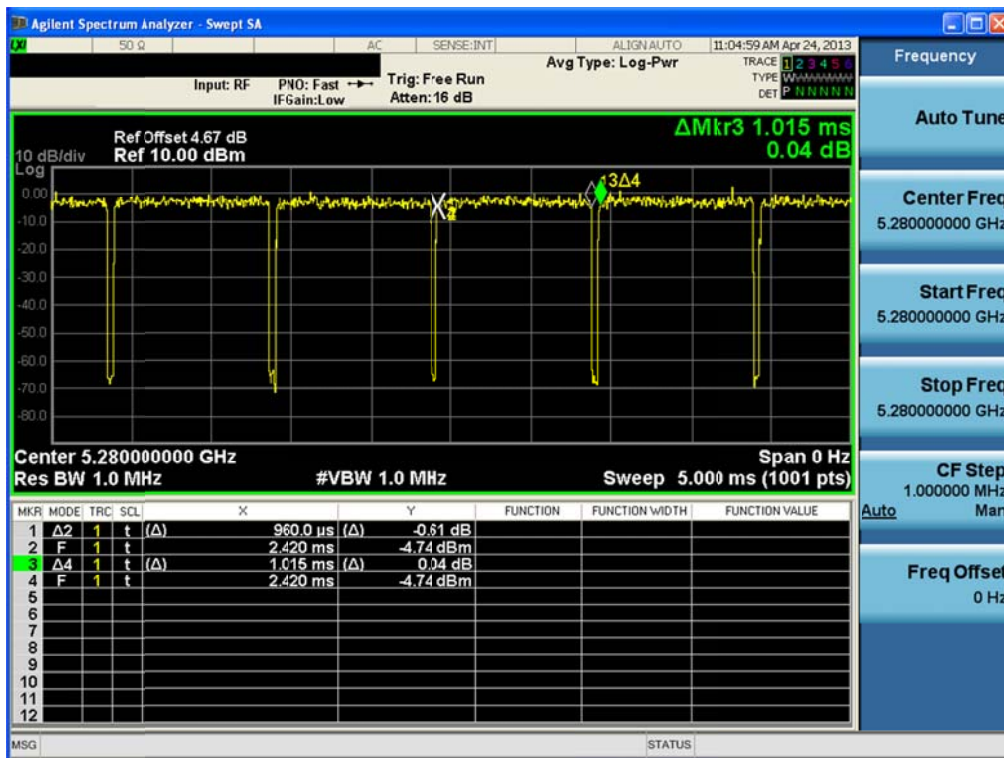
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.44



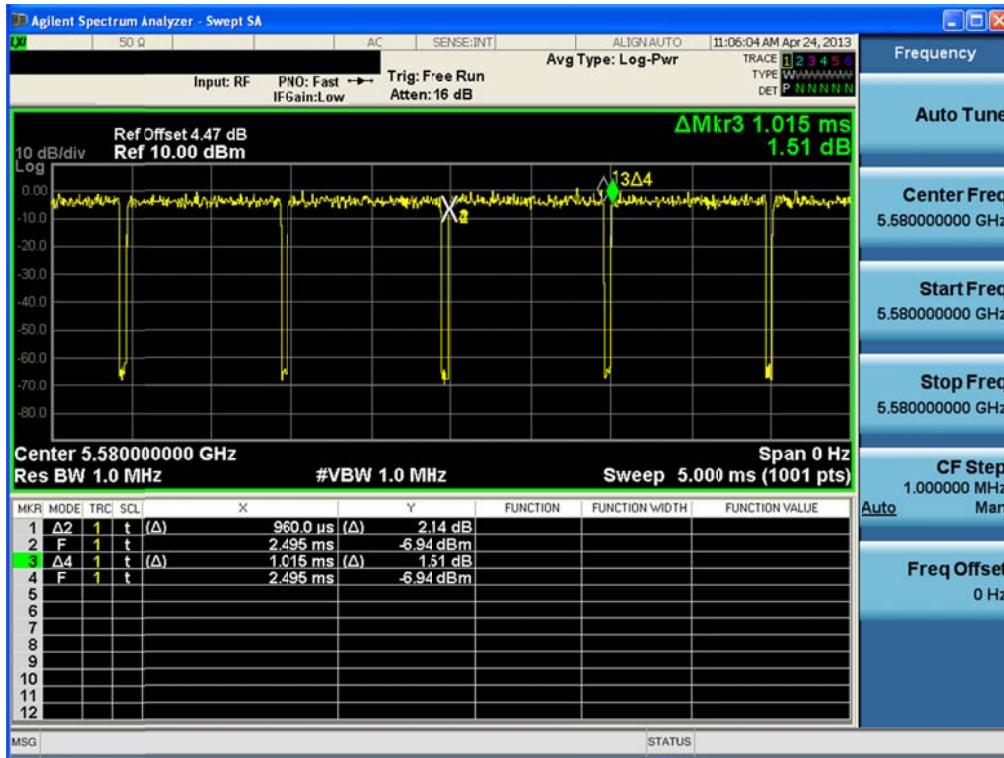
Duty Cycle

Test Mode: 802.11n(HT20) & Ch.56



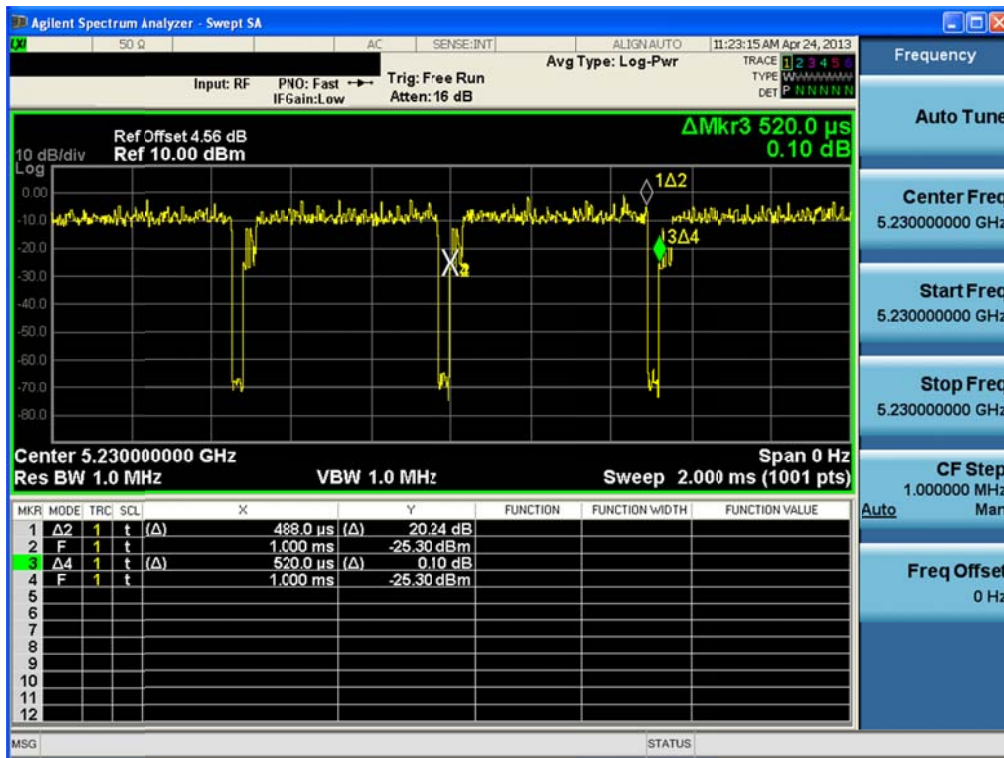
**Duty Cycle**

Test Mode: 802.11n(HT20) & Ch.116



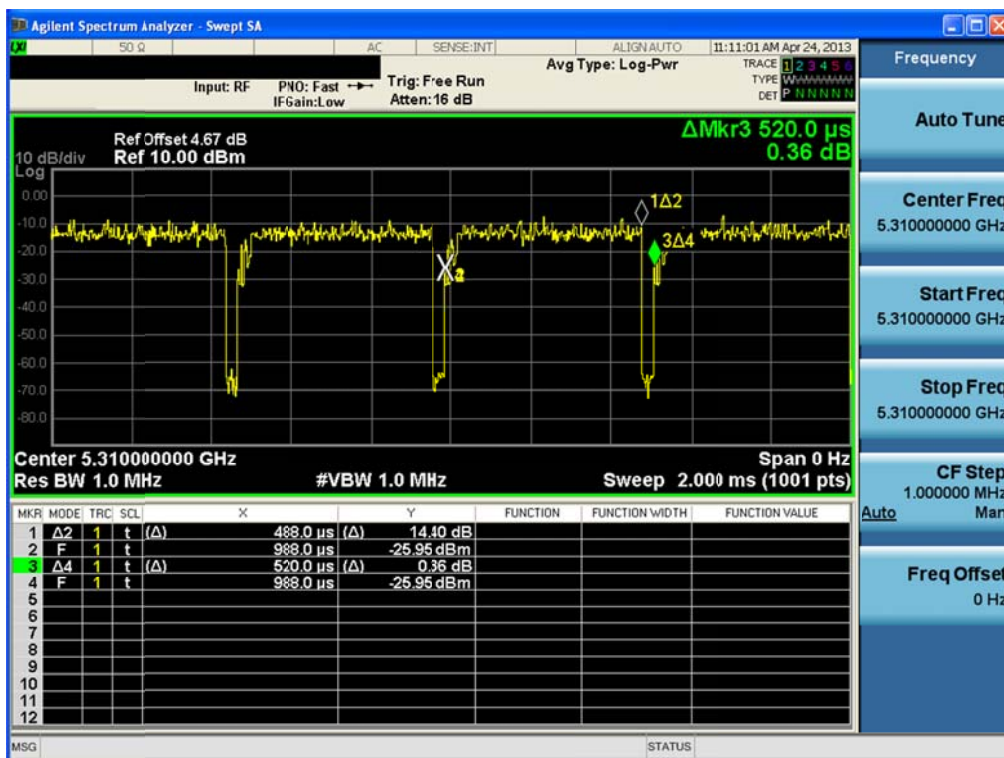
Duty Cycle

Test Mode: 802.11n(HT40) & Ch.46



Duty Cycle

Test Mode: 802.11n(HT40) & Ch.62



**Duty Cycle**

Test Mode: 802.11n(HT40) & Ch.110

