FREQUENCY STABILITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST DESCRIPTION

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. Testing was done with a modulated signal; therefore, the lowest signal data rate was tested.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Per the requirements of FCC 15.407:

"Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual."

No specific limits are provided in either FCC 15.407, the product-specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to operate within the band.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Agilent	N9010A	AFL	9/20/2014	9/20/2015
Generator - Signal	Agilent	N5173B	TIW	7/15/2014	7/15/2017
Attenuator	Fairview Microwave	SA4018-20	TQY	2/27/2015	2/27/2016
Block - DC	Fairview Microwave	SD3379	AMM	2/27/2015	2/27/2016
Power Supply - DC	B&K Precision	9110	TQI	NCR	NCR
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Thermometer	Omegaette	HH311	DTX	4/3/2015	4/3/2018
Meter - Multimeter	Fluke	77-IV	MLT	9/25/2014	9/25/2017

FREQUENCY STABILITY

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	08/12/15
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.8°C
Attendees:	None	Relative Humidity:	46%
Customer Project:	None	Bar. Pressure:	1019 mbar
Tested By:	Jonathan Kiefer	Job Site:	TX09
Power:	48 VDC	Configuration:	2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2015	ANSI C63.10:2013

COMMENTS

2x2 MIMO mode, Chain AC (Chains 0 and 2). Tested at Channel 36 (5180 MHz) and Channel 165 (5825 MHz). The EUT was tested with the fundamental modulated while under test.

DEVIATIONS FROM TEST STANDARD

None

RESULTS

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
Chain A					
802.11(n) HT, MCS8					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage: 115%	5180.025	5180	4.8	100	Pass
Voltage: 100%	5180.025	5180	4.8	100	Pass
Voltage: 85%	5180.025	5180	4.8	100	Pass
Temperature: +50°	5180.025	5180	4.8	100	Pass
Temperature: +40°	5180.025	5180	4.8	100	Pass
Temperature: +30°	5180.025	5180	4.8	100	Pass
Temperature: +20°	5180.025	5180	4.8	100	Pass
Temperature: +10°	5180.05	5180	9.7	100	Pass
Temperature: 0°	5180.05	5180	9.7	100	Pass
Temperature: -10°	5180.075	5180	14.5	100	Pass
Temperature: -20°	5180.075	5180	14.5	100	Pass
Temperature: -30°	5180.075	5180	14.5	100	Pass
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5825	5825	0	100	Pass
Voltage: 100%	5825	5825	0	100	Pass
Voltage: 85%	5825	5825	0	100	Pass
Temperature: +50°	5825	5825	0	100	Pass
Temperature: +40°	5825	5825	0	100	Pass
Temperature: +30°	5825	5825	0	100	Pass
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825.025	5825	4.3	100	Pass
Temperature: 0°	5825.025	5825	4.3	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.05	5825	8.6	100	Pass
Temperature: -30°	5825.075	5825	12.9	100	Pass
Chain C					

FREQUENCY STABILITY

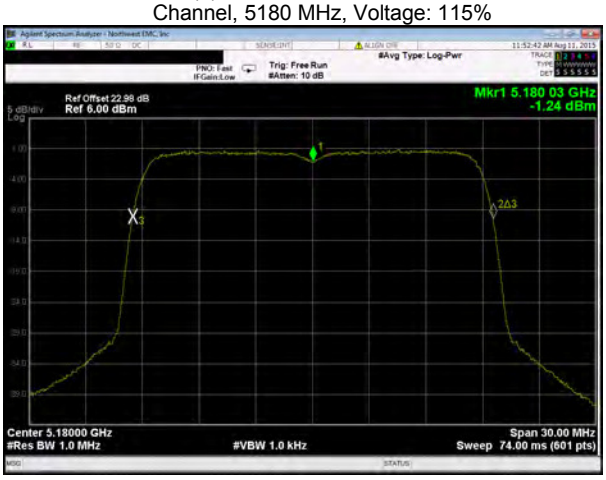
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
802.11(n) HT, MCS8					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage: 115%	5180.025	5180	4.8	100	Pass
Voltage: 100%	5180.025	5180	4.8	100	Pass
Voltage: 85%	5180.025	5180	4.8	100	Pass
Temperature: +50°	5180.025	5180	4.8	100	Pass
Temperature: +40°	5180.025	5180	4.8	100	Pass
Temperature: +30°	5180.025	5180	4.8	100	Pass
Temperature: +20°	5180.025	5180	4.8	100	Pass
Temperature: +10°	5180.05	5180	9.7	100	Pass
Temperature: 0°	5180.05	5180	9.7	100	Pass
Temperature: -10°	5180.075	5180	14.5	100	Pass
Temperature: -20°	5180.075	5180	14.5	100	Pass
Temperature: -30°	5180.075	5180	14.5	100	Pass
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5825	5825	0	100	Pass
Voltage: 100%	5825	5825	0	100	Pass
Voltage: 85%	5825	5825	0	100	Pass
Temperature: +50°	5825.025	5825	4.3	100	Pass
Temperature: +40°	5825	5825	0	100	Pass
Temperature: +30°	5825	5825	0	100	Pass
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825	5825	0	100	Pass
Temperature: 0°	5825.025	5825	4.3	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.05	5825	8.6	100	Pass
Temperature: -30°	5825.075	5825	12.9	100	Pass

Jonathan Kiefer

Tested By

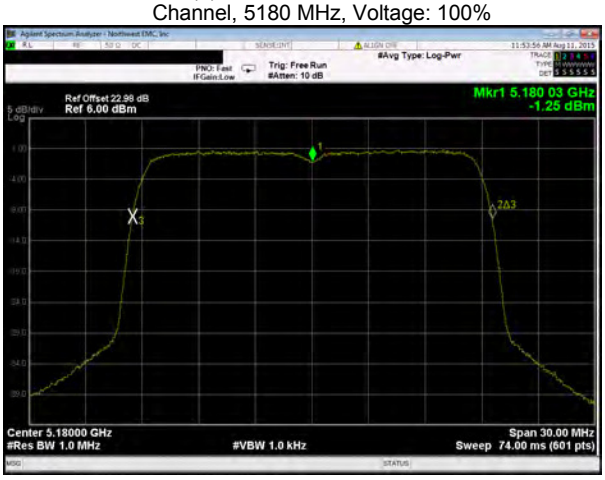
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



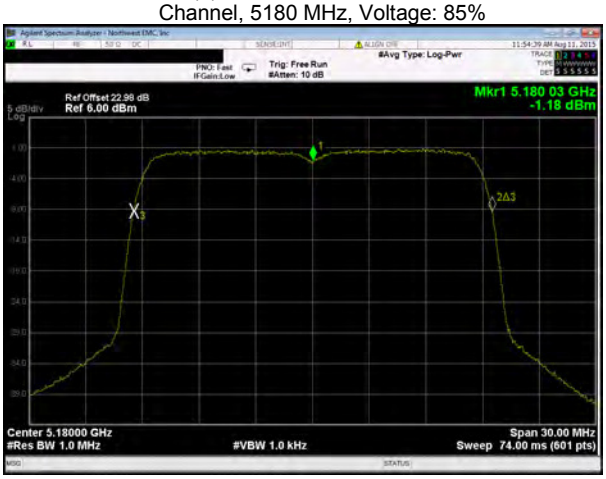
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



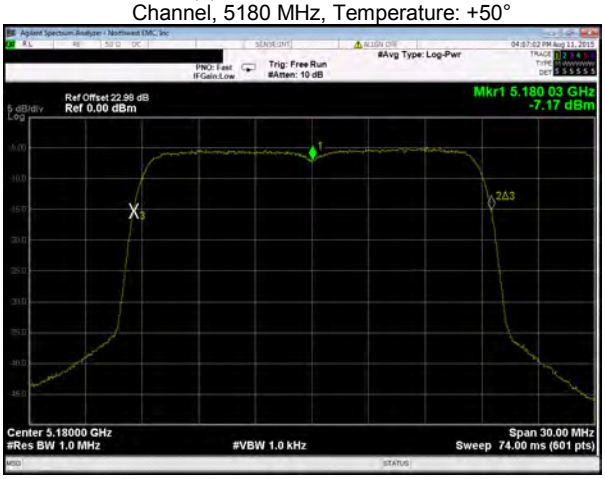
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

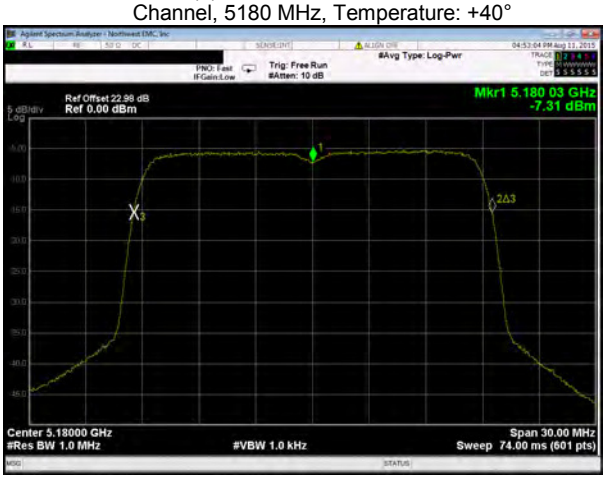
Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

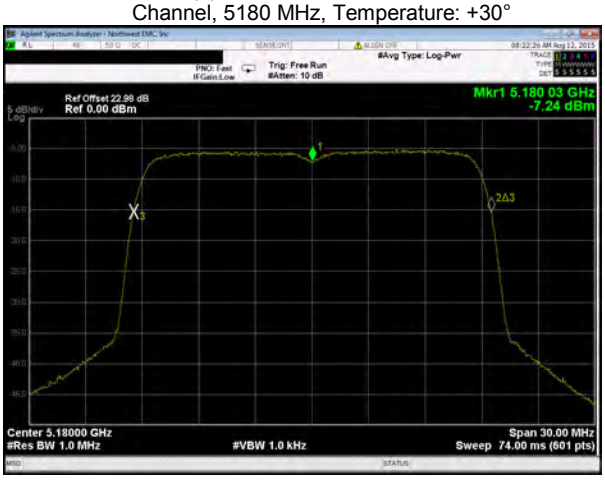
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



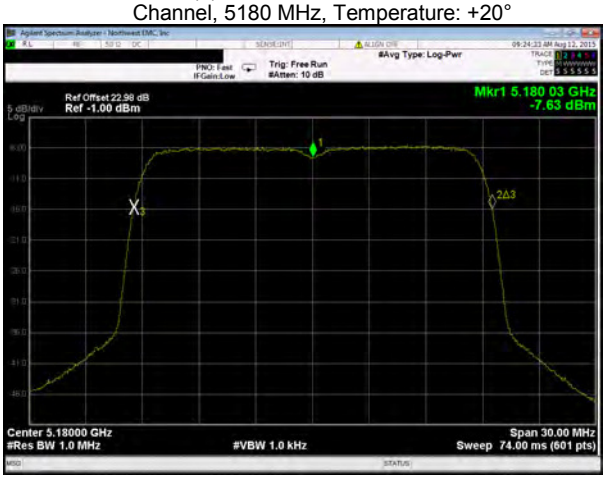
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



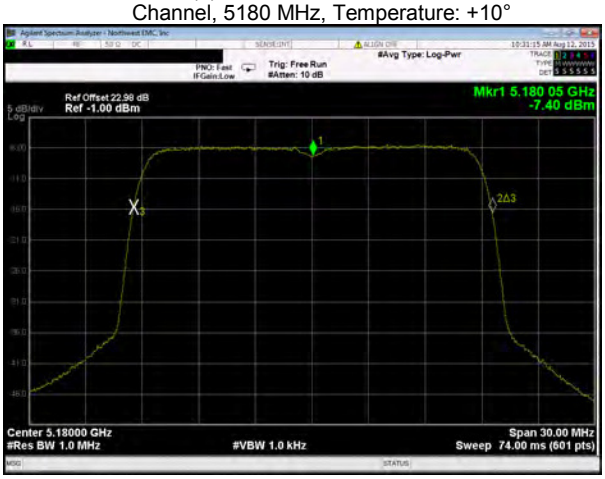
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

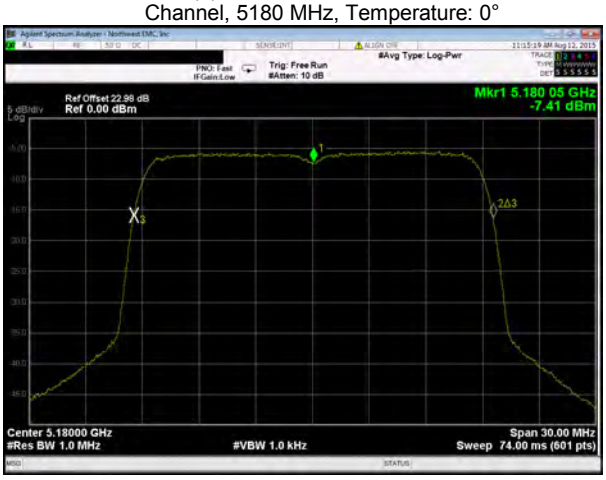
Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

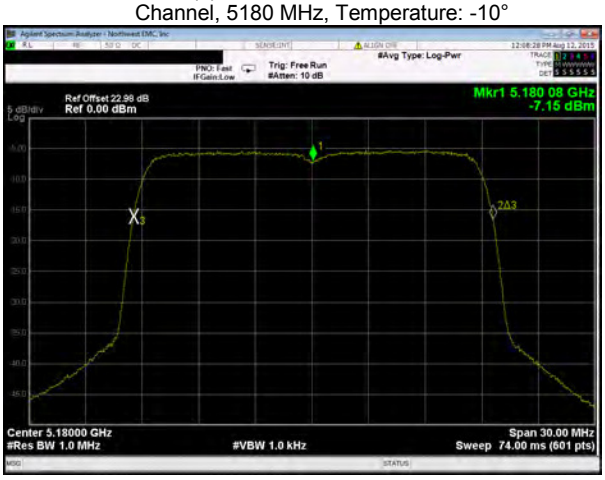
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



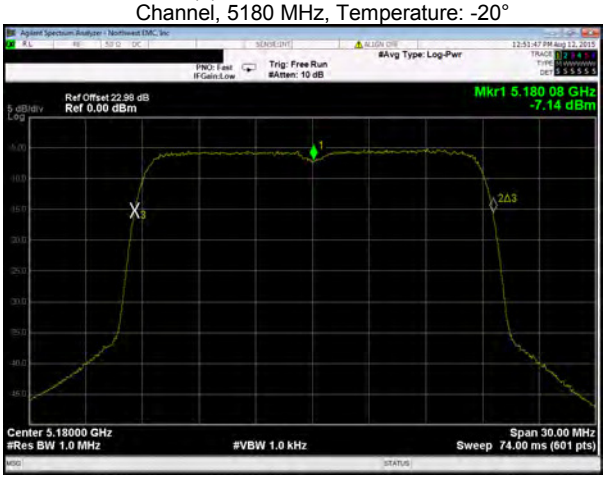
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



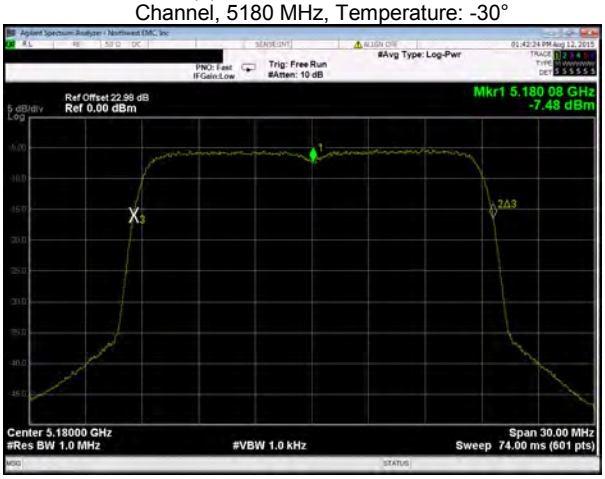
Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

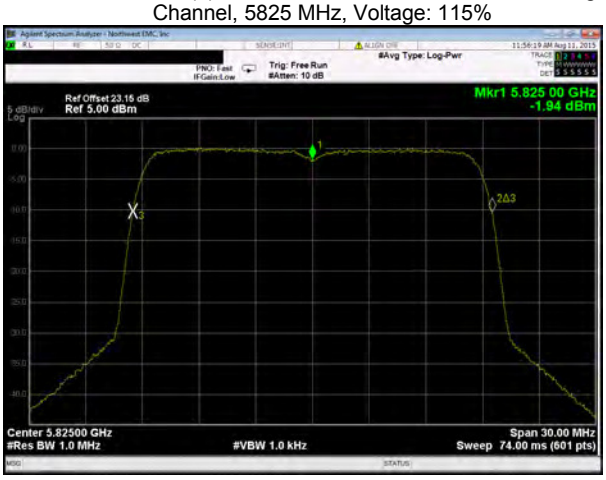
Chain A, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

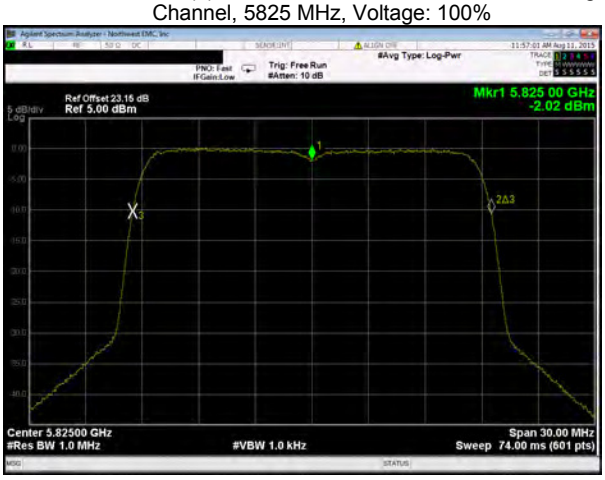
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



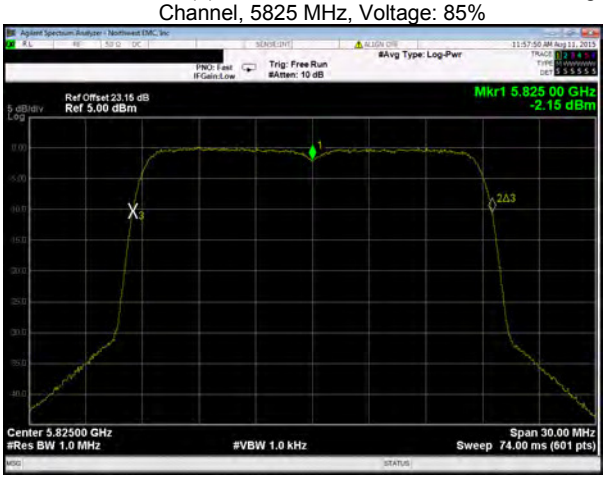
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



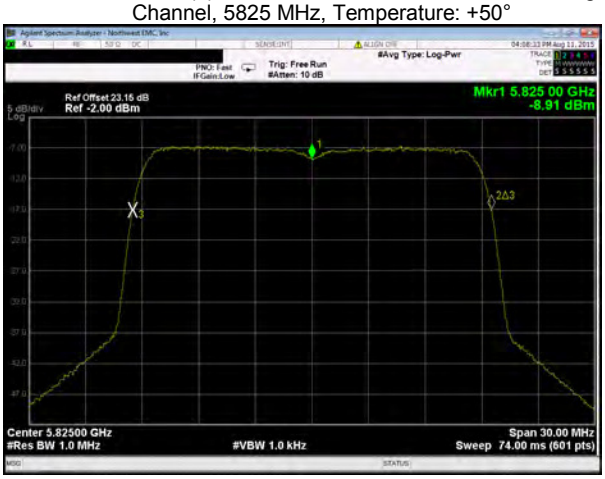
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

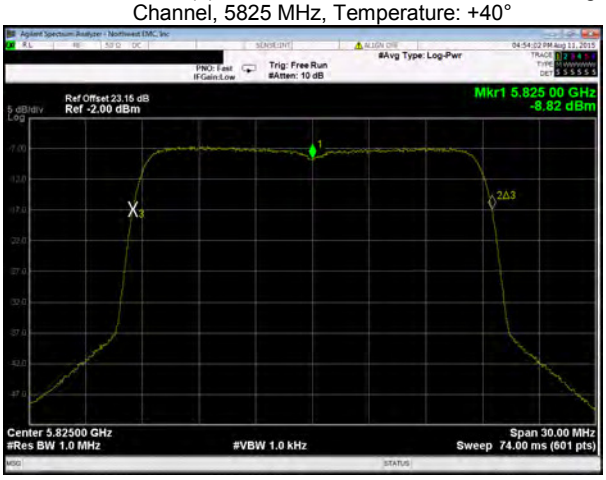
Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

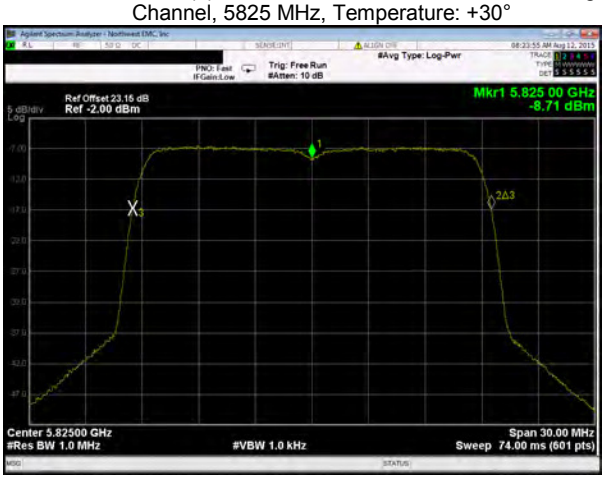
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



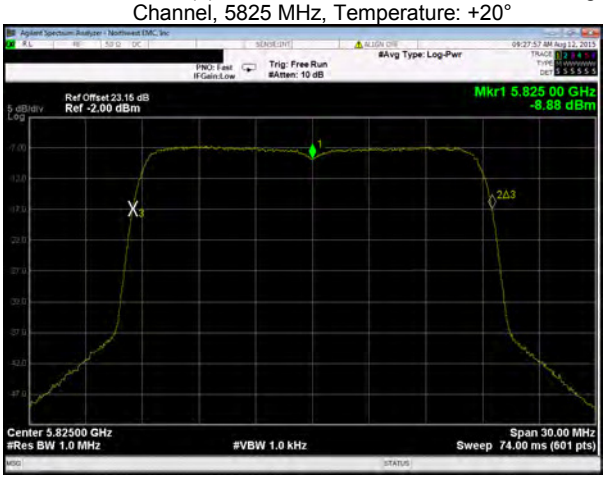
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



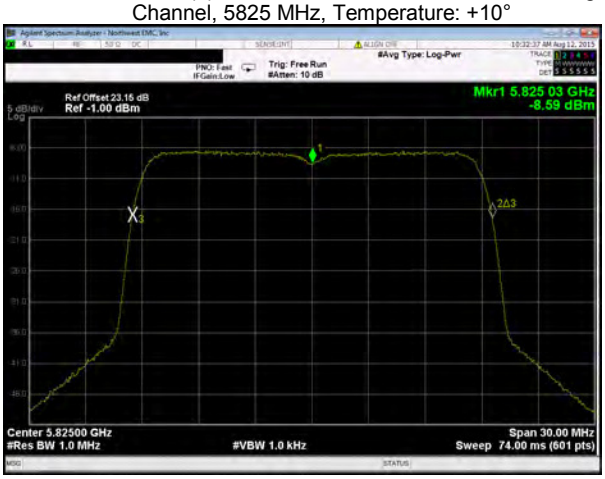
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

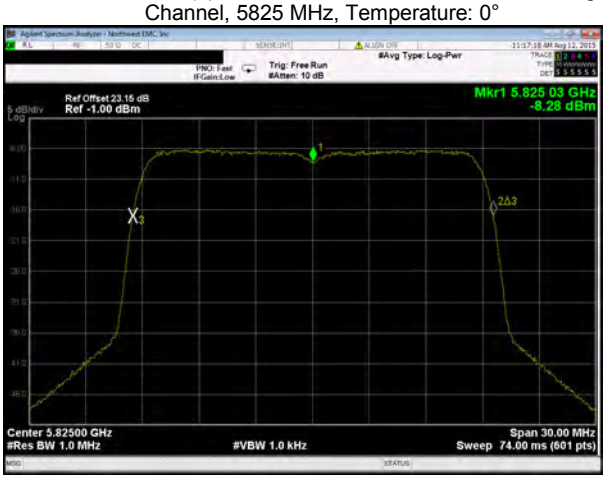
Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

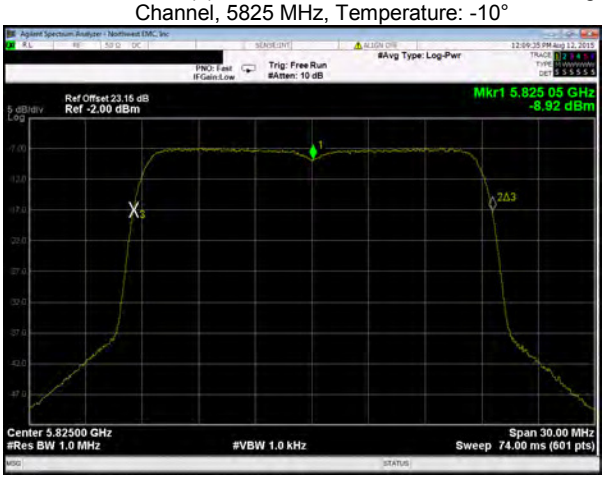
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



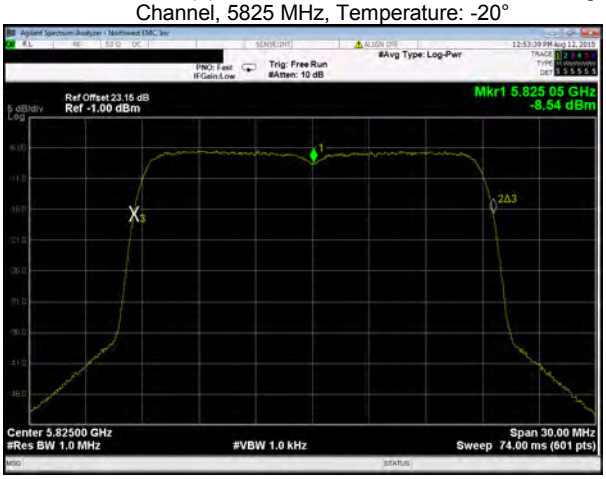
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



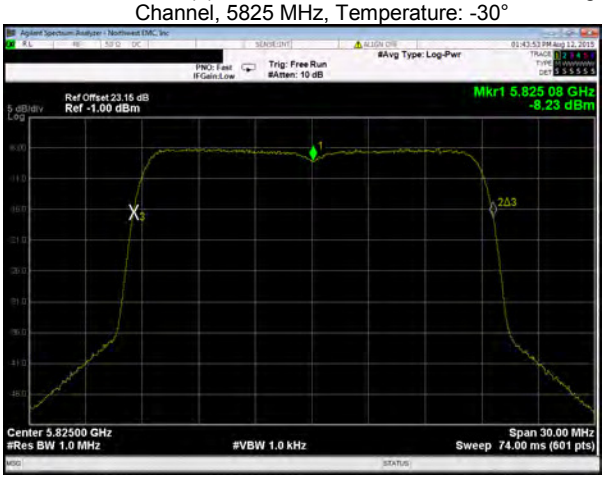
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

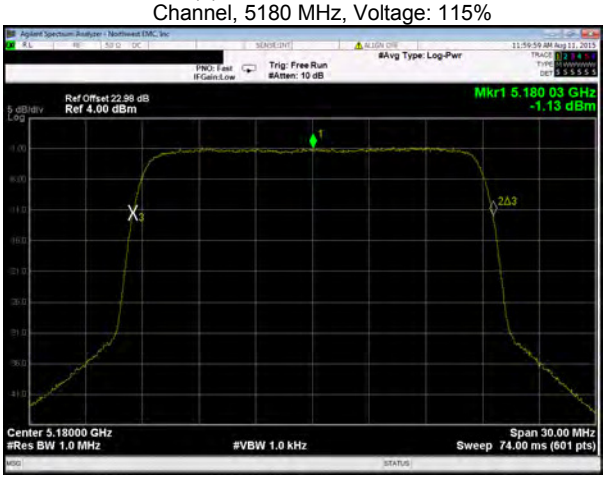
Chain A, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

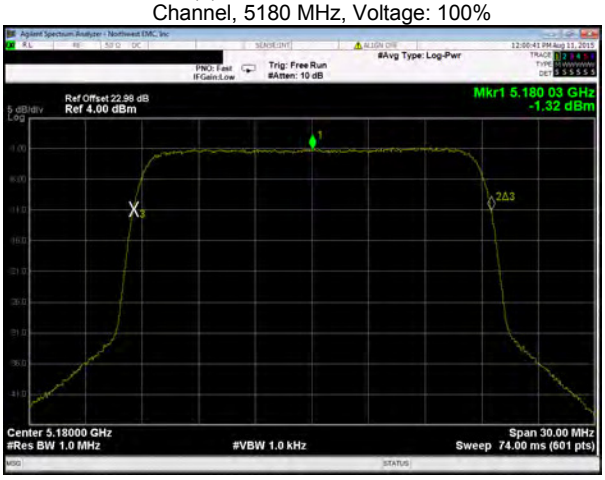
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



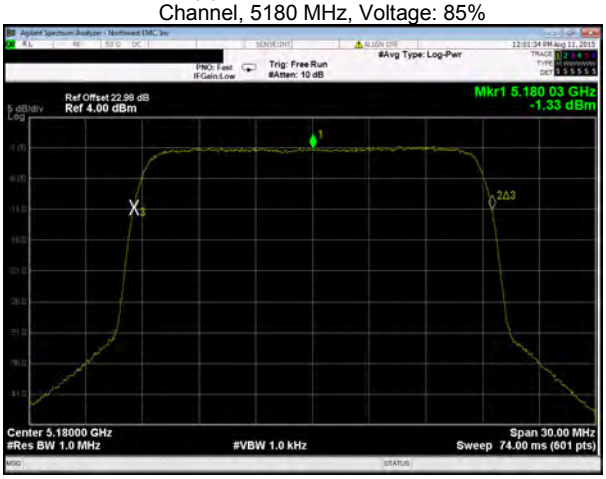
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



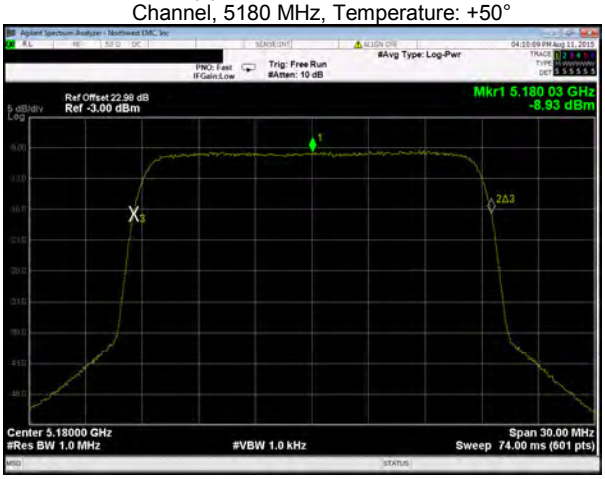
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

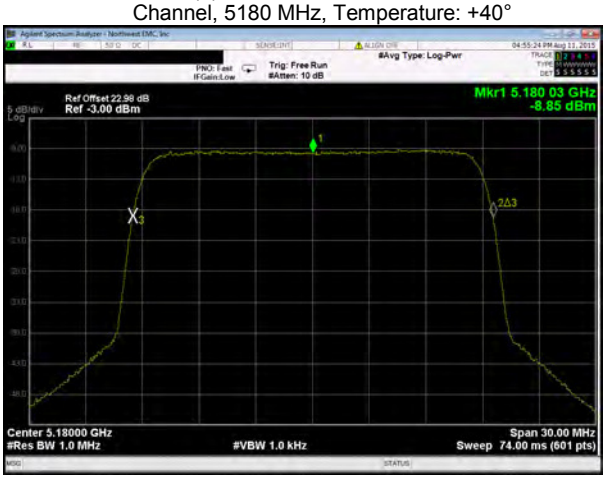
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

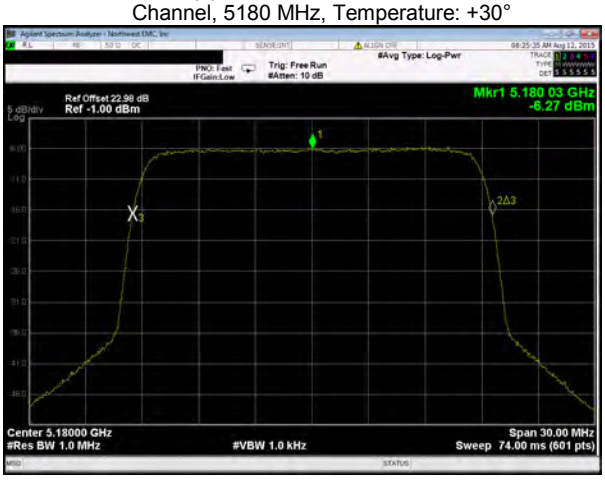
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



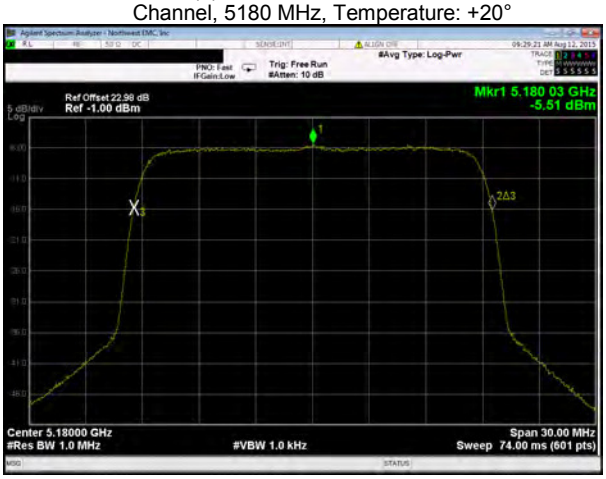
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



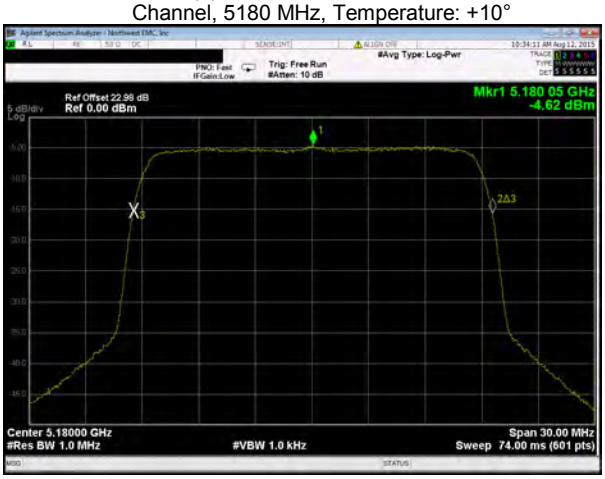
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

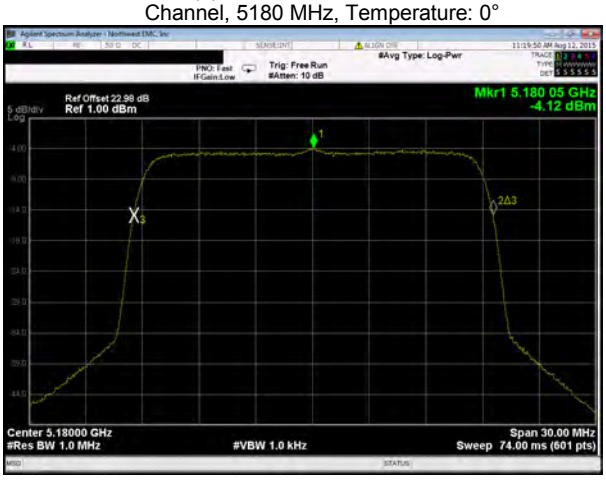
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

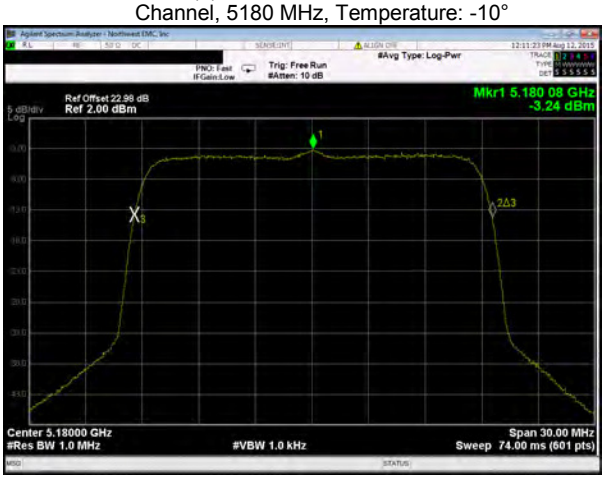
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



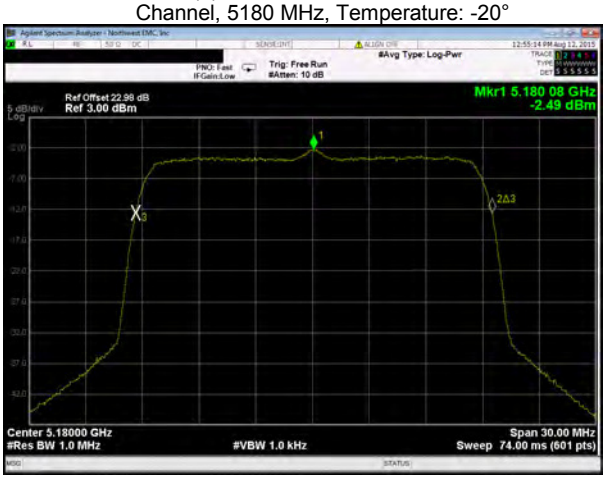
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



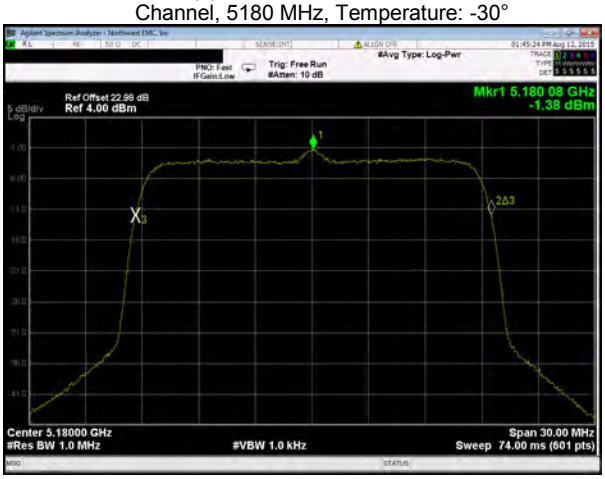
Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

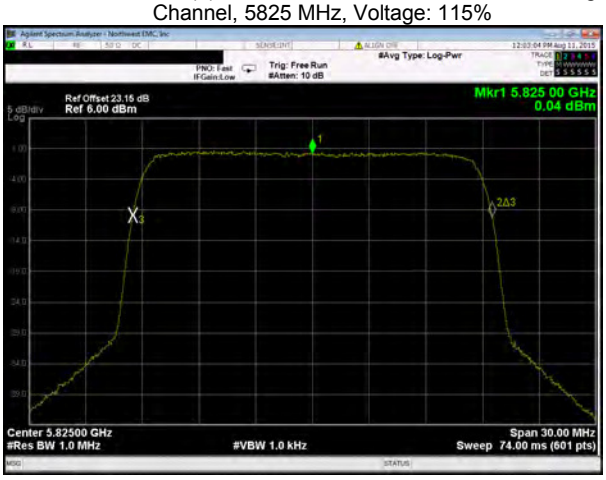
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

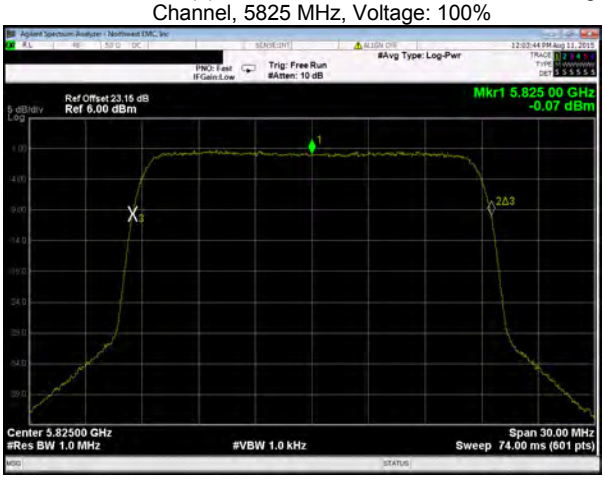
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



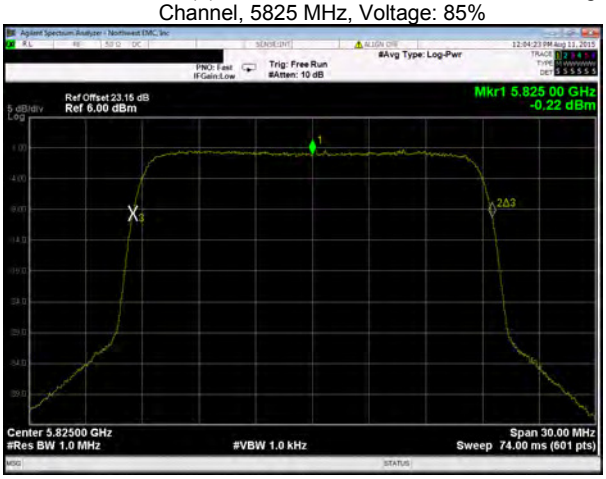
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



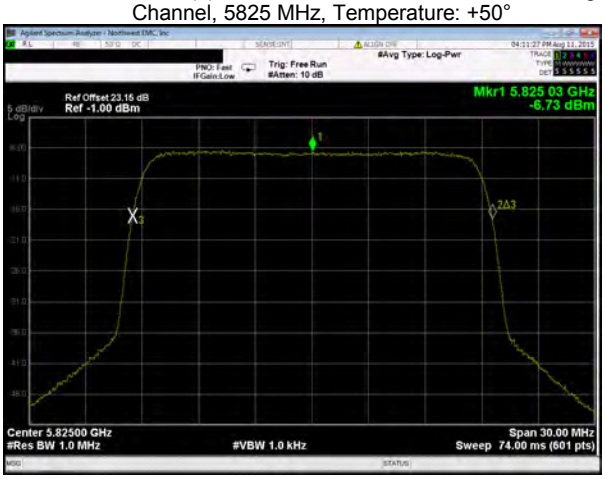
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

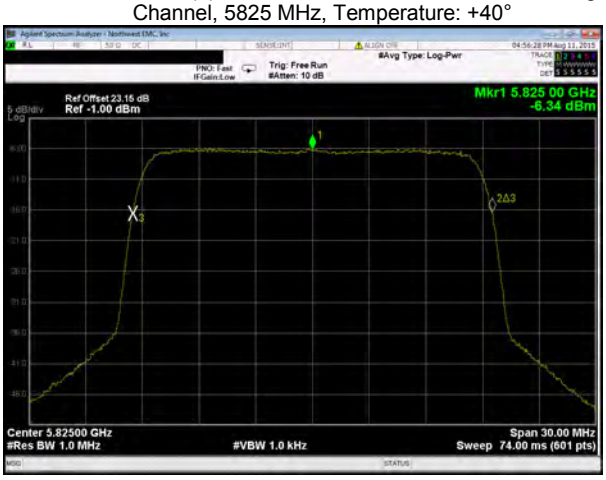
Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

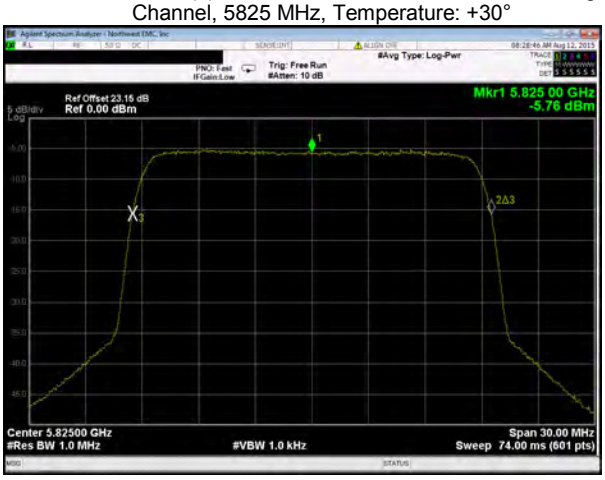
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



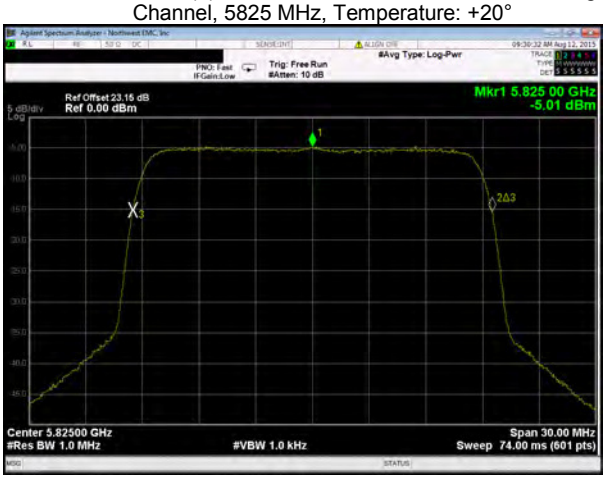
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



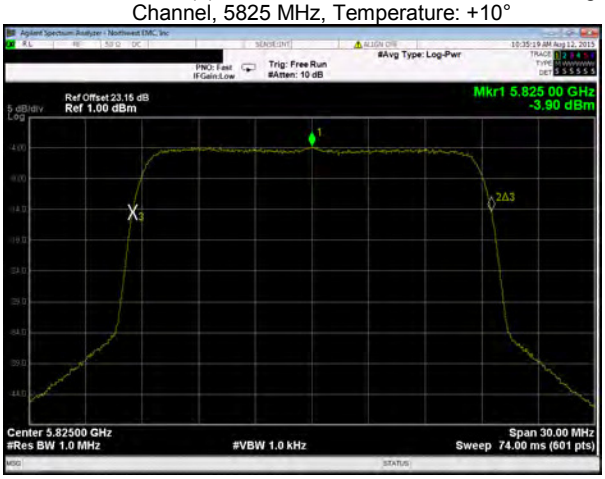
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

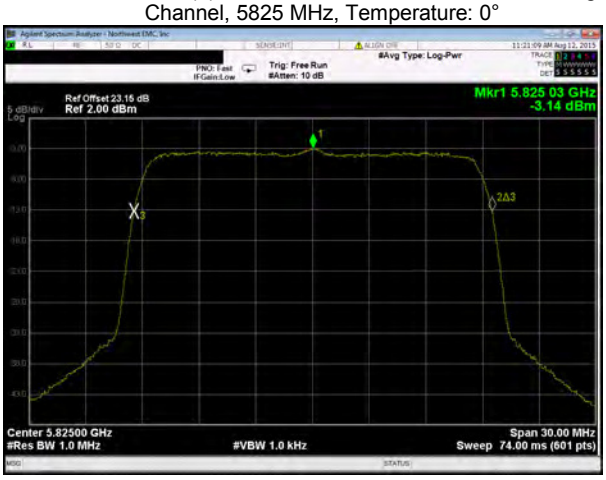
Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

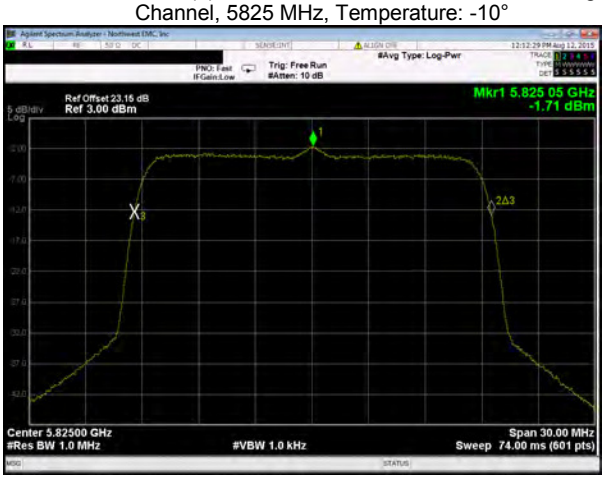
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



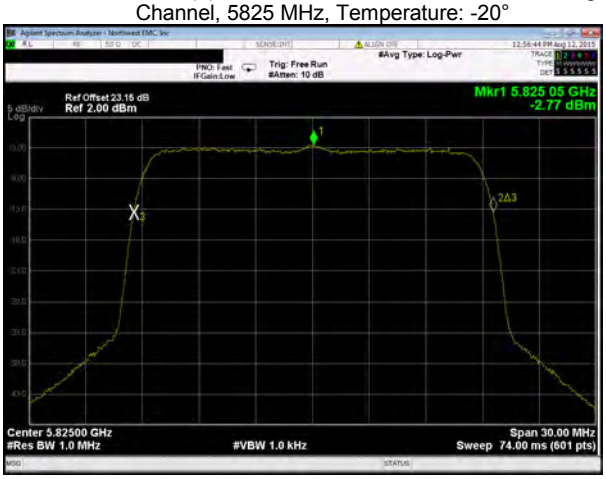
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



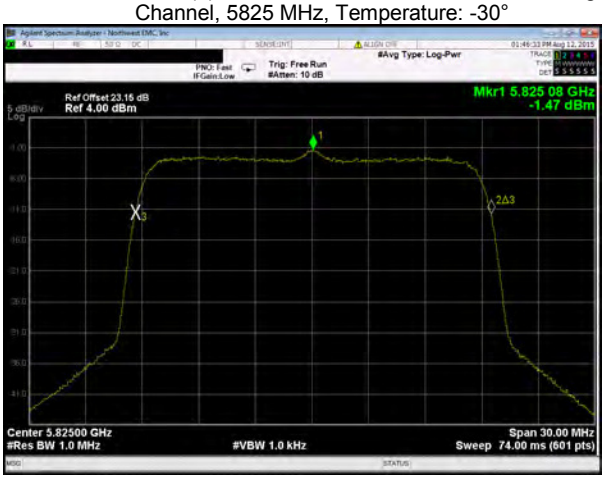
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

FREQUENCY STABILITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST DESCRIPTION

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. Testing was done with a modulated signal; therefore, the lowest signal data rate was tested.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Per the requirements of FCC 15.407:

"Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual."

No specific limits are provided in either FCC 15.407, the product-specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to operate within the band.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Agilent	N9010A	AFL	9/20/2014	9/20/2015
Generator - Signal	Agilent	N5173B	TIW	7/15/2014	7/15/2017
Attenuator	Fairview Microwave	SA4018-20	TQY	2/27/2015	2/27/2016
Block - DC	Fairview Microwave	SD3379	AMM	2/27/2015	2/27/2016
Power Supply - DC	B&K Precision	9110	TQI	NCR	NCR
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Thermometer	Omegaette	HH311	DTX	4/3/2015	4/3/2018
Meter - Multimeter	Fluke	77-IV	MLT	9/25/2014	9/25/2017

FREQUENCY STABILITY

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	08/12/15
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.8°C
Attendees:	None	Relative Humidity:	46%
Customer Project:	None	Bar. Pressure:	1019 mbar
Tested By:	Jonathan Kiefer	Job Site:	TX09
Power:	48 VDC	Configuration:	2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2015	ANSI C63.10:2013

COMMENTS

2x2 MIMO mode, Chain BC (Chains 1 and 2). Tested at Channel 36 (5180 MHz) and Channel 165 (5825 MHz). The EUT was tested with the fundamental modulated while under test.

DEVIATIONS FROM TEST STANDARD

None

RESULTS

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
Chain B					
802.11(n) HT, MCS8					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage: 115%	5180.025	5180	4.8	100	Pass
Voltage: 100%	5180.025	5180	4.8	100	Pass
Voltage: 85%	5180.025	5180	4.8	100	Pass
Temperature: +50°	5180.05	5180	9.7	100	Pass
Temperature: +40°	5180.025	5180	4.8	100	Pass
Temperature: +30°	5180.025	5180	4.8	100	Pass
Temperature: +20°	5180.025	5180	4.8	100	Pass
Temperature: +10°	5180.05	5180	9.7	100	Pass
Temperature: 0°	5180.05	5180	9.7	100	Pass
Temperature: -10°	5180.05	5180	9.7	100	Pass
Temperature: -20°	5180.075	5180	14.5	100	Pass
Temperature: -30°	5180.075	5180	14.5	100	Pass
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5825	5825	0	100	Pass
Voltage: 100%	5825	5825	0	100	Pass
Voltage: 85%	5825	5825	0	100	Pass
Temperature: +50°	5825.025	5825	4.3	100	Pass
Temperature: +40°	5825.025	5825	4.3	100	Pass
Temperature: +30°	5825	5825	0	100	Pass
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825.025	5825	4.3	100	Pass
Temperature: 0°	5825.05	5825	8.6	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.075	5825	12.9	100	Pass
Temperature: -30°	5825.075	5825	12.9	100	Pass
Chain C					

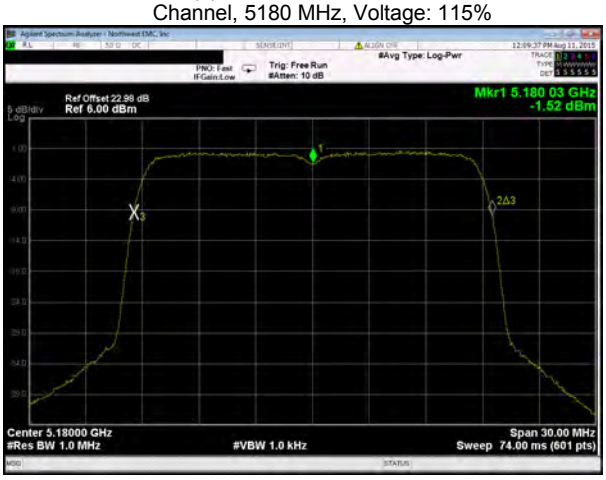
FREQUENCY STABILITY

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
802.11(n) HT, MCS8					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage: 115%	5180.025	5180	4.8	100	Pass
Voltage: 100%	5180.025	5180	4.8	100	Pass
Voltage: 85%	5180.025	5180	4.8	100	Pass
Temperature: +50°	5180.025	5180	4.8	100	Pass
Temperature: +40°	5180.025	5180	4.8	100	Pass
Temperature: +30°	5180.025	5180	4.8	100	Pass
Temperature: +20°	5180.025	5180	4.8	100	Pass
Temperature: +10°	5180.05	5180	9.7	100	Pass
Temperature: 0°	5180.05	5180	9.7	100	Pass
Temperature: -10°	5180.075	5180	14.5	100	Pass
Temperature: -20°	5180.075	5180	14.5	100	Pass
Temperature: -30°	5180.075	5180	14.5	100	Pass
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5825	5825	0	100	Pass
Voltage: 100%	5825	5825	0	100	Pass
Voltage: 85%	5825	5825	0	100	Pass
Temperature: +50°	5825.025	5825	4.3	100	Pass
Temperature: +40°	5825	5825	0	100	Pass
Temperature: +30°	5825.025	5825	4.3	100	Pass
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825.025	5825	4.3	100	Pass
Temperature: 0°	5825.025	5825	4.3	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.05	5825	8.6	100	Pass
Temperature: -30°	5825.05	5825	8.6	100	Pass

Tested By

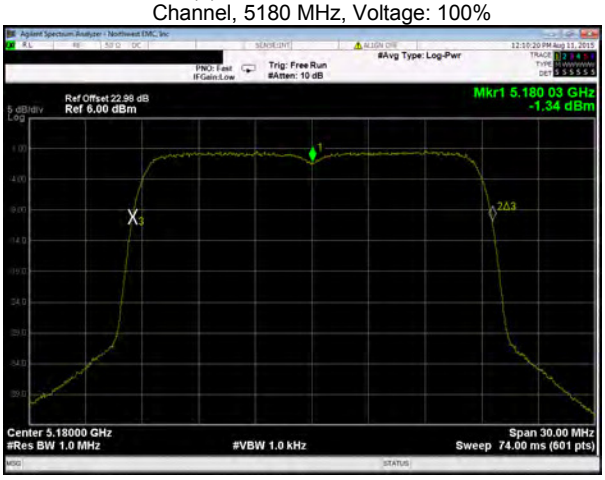
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



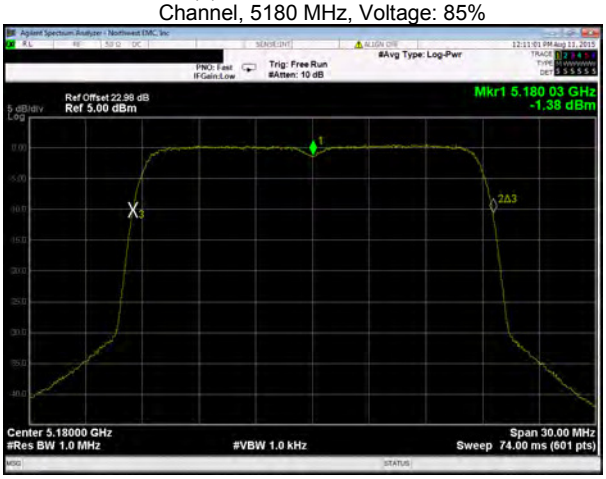
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



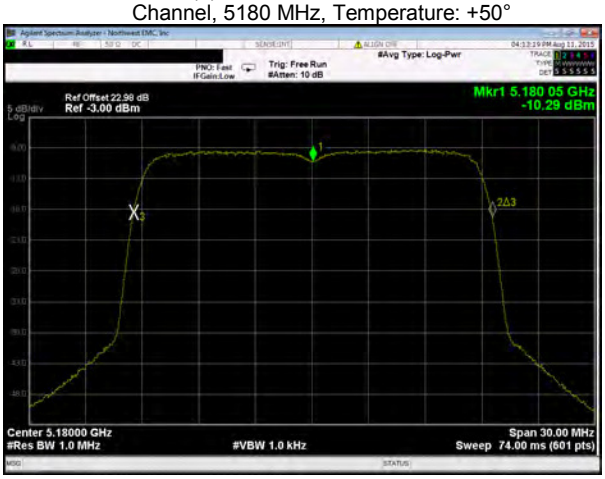
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

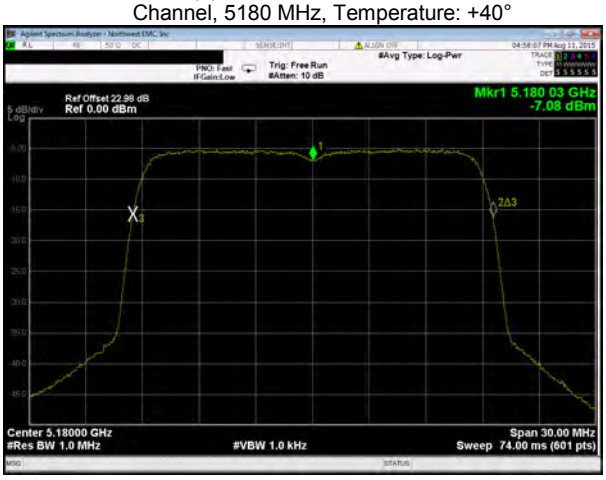
Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

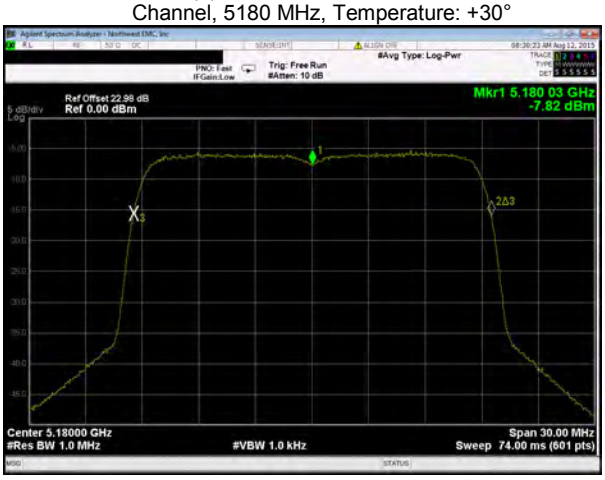
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



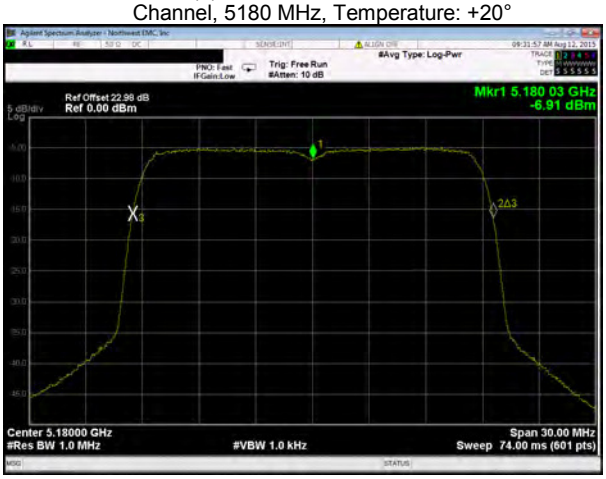
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



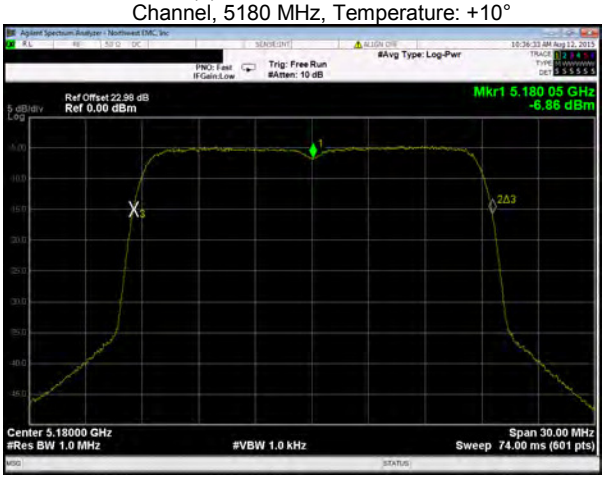
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

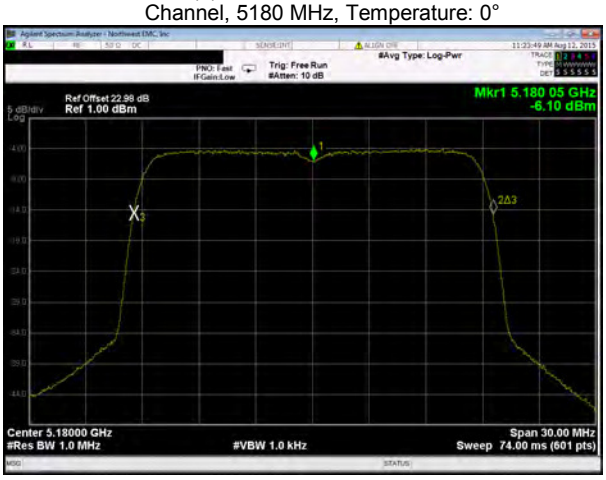
Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

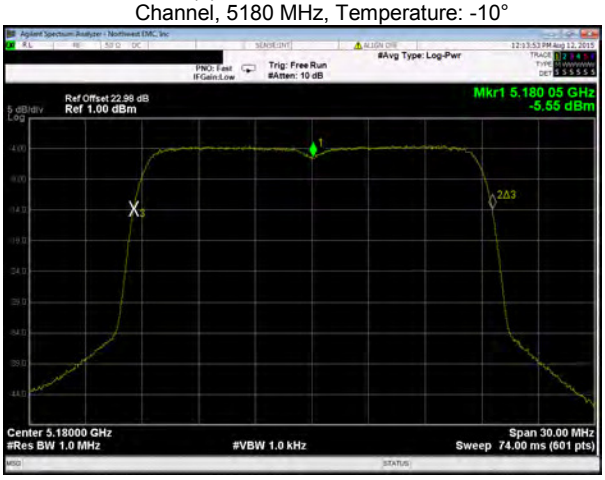
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



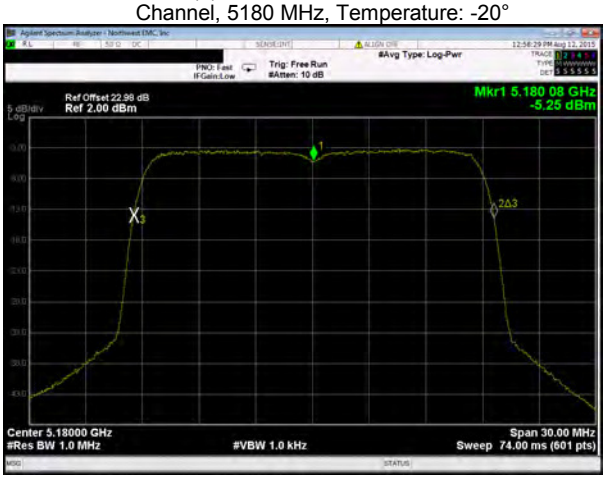
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



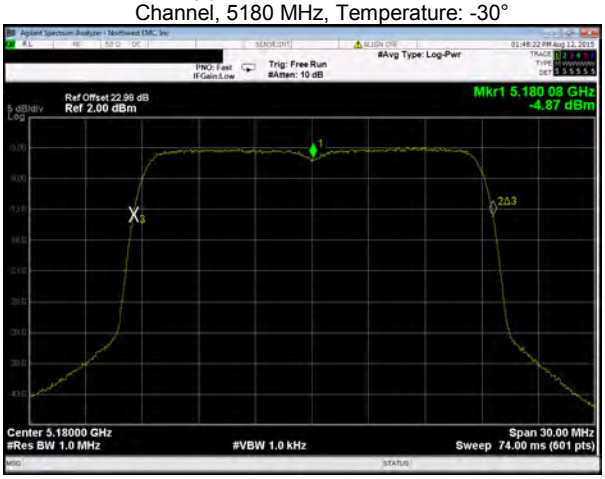
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

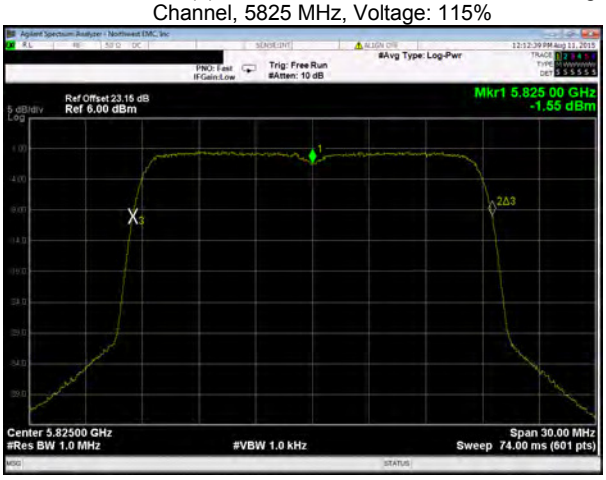
Chain B, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

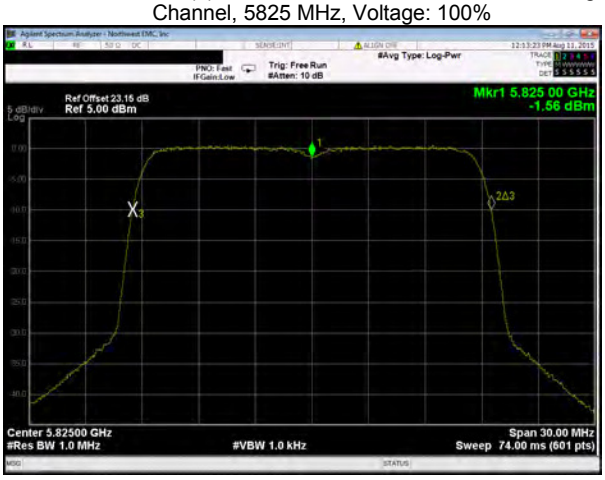
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



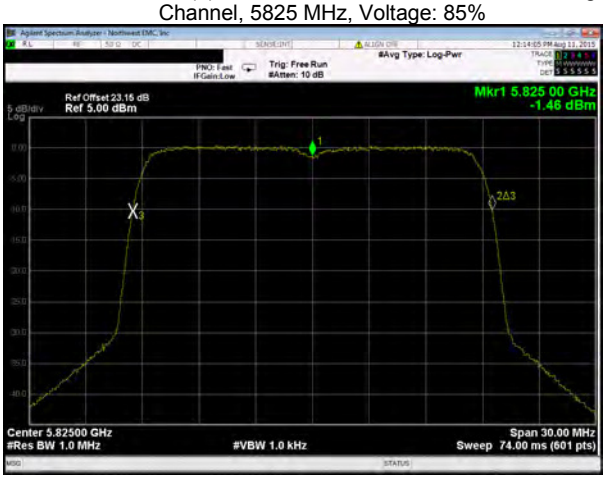
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



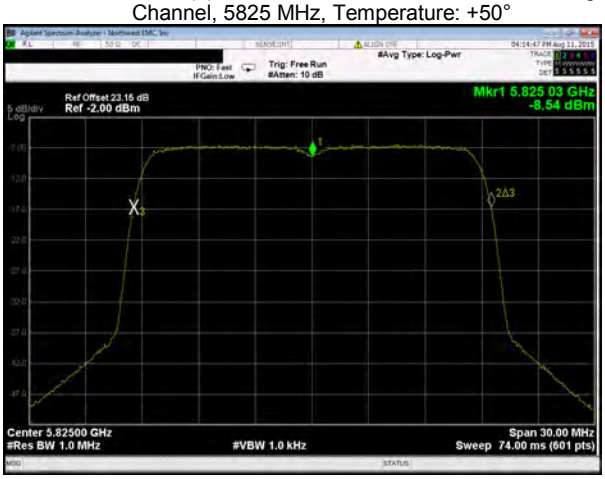
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

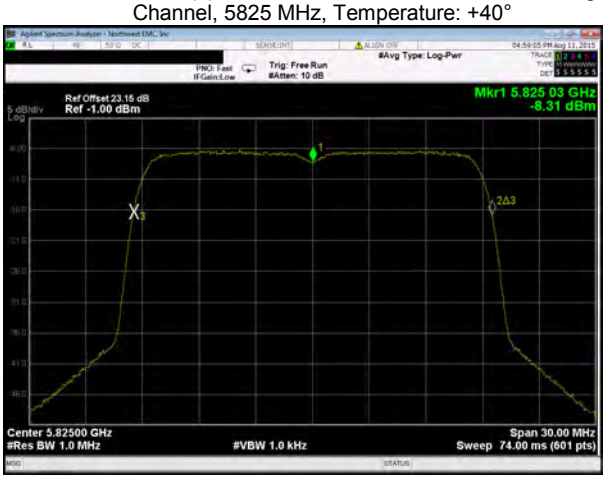
Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

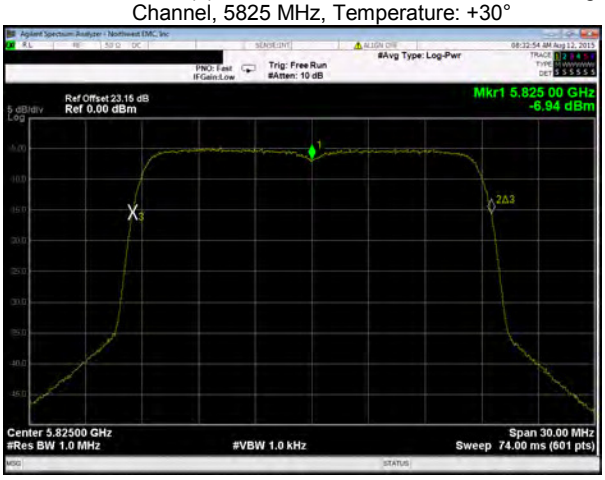
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



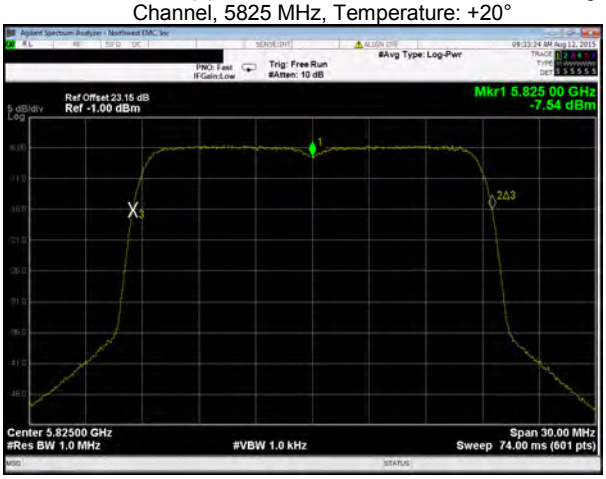
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



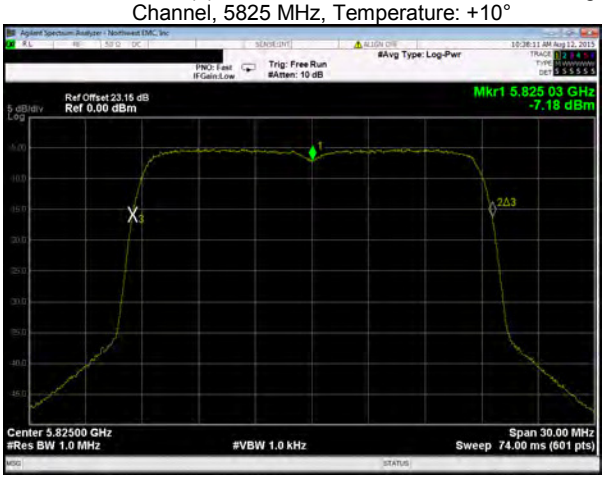
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

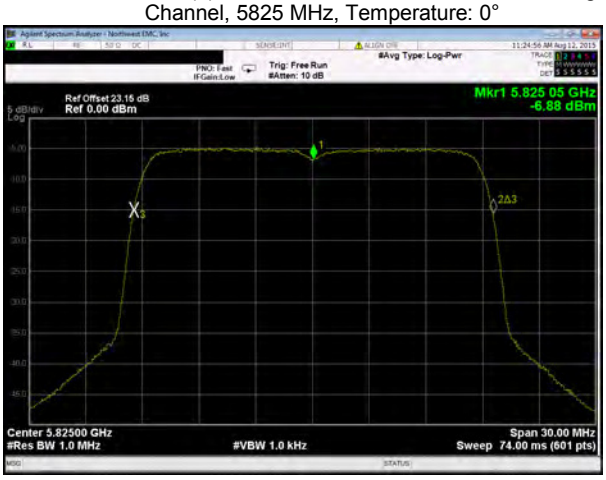
Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

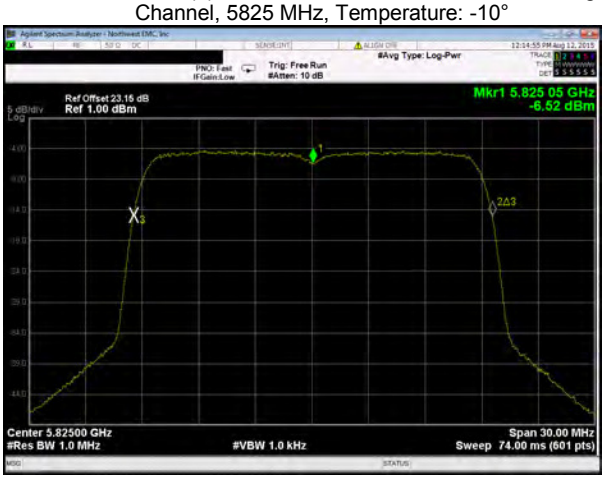
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



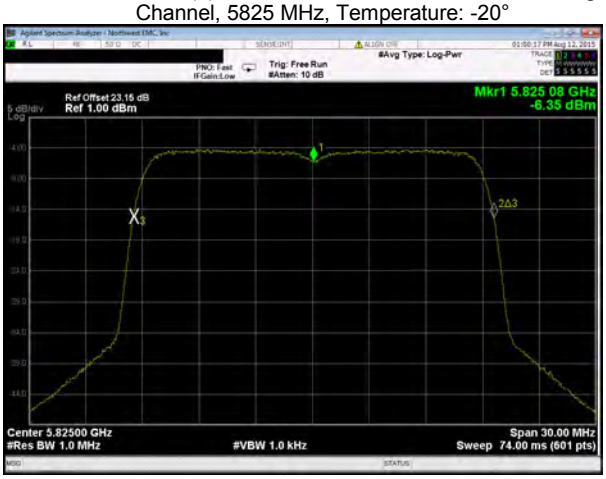
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



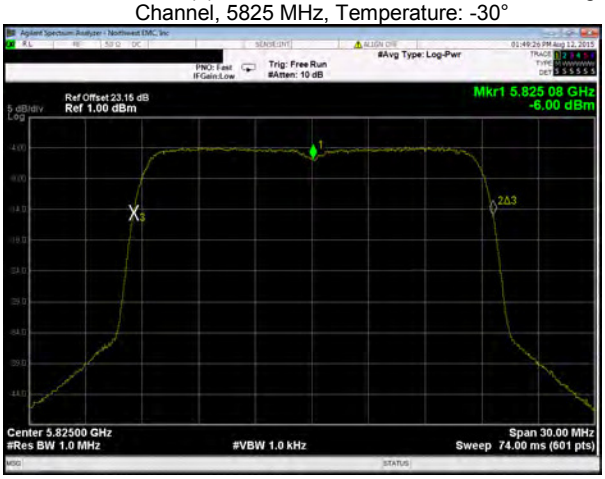
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

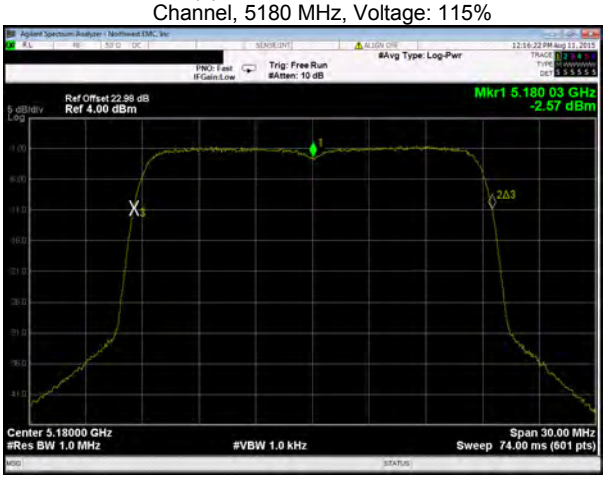
Chain B, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

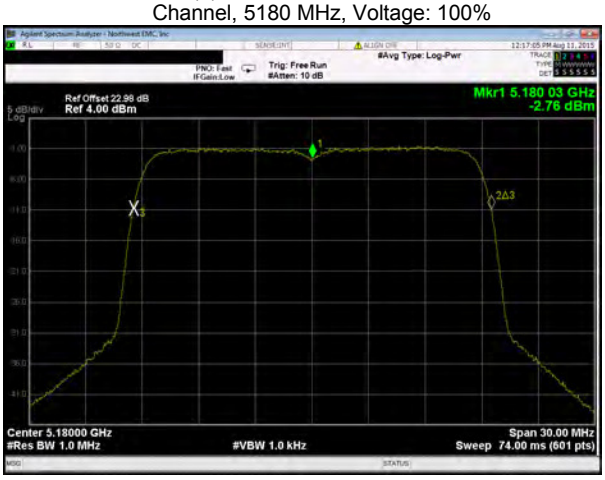
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



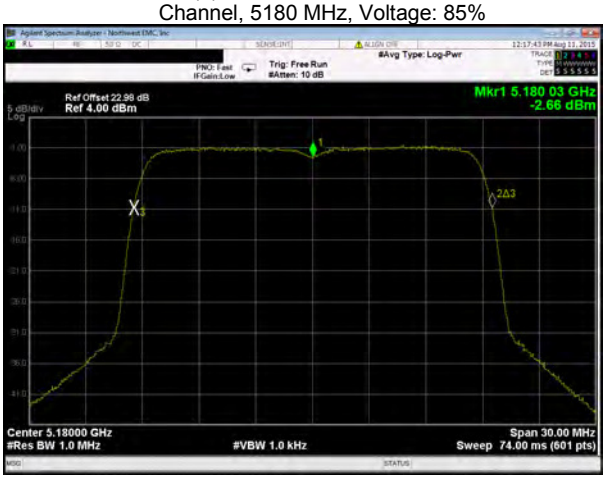
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



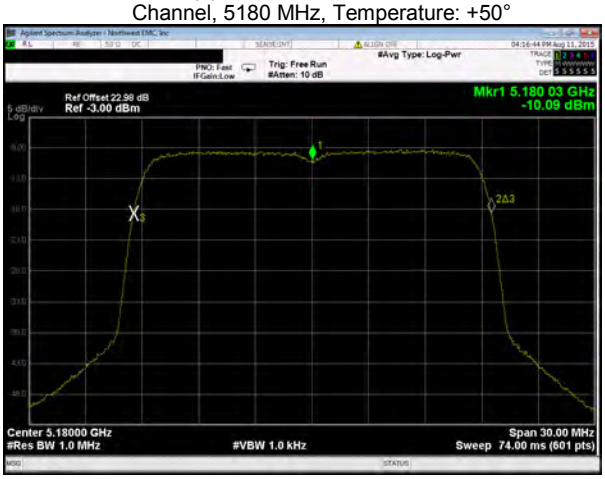
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

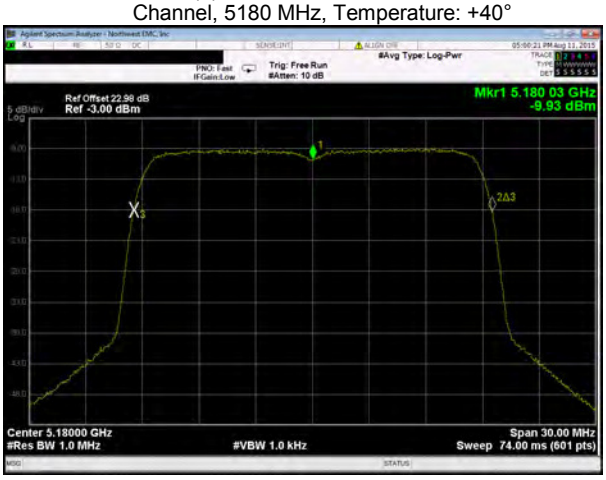
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

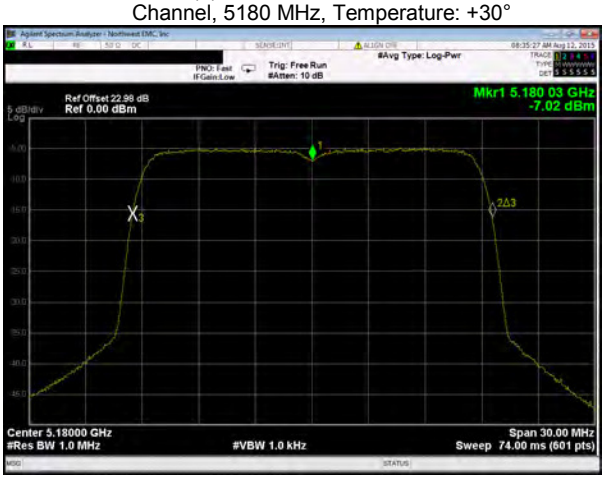
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



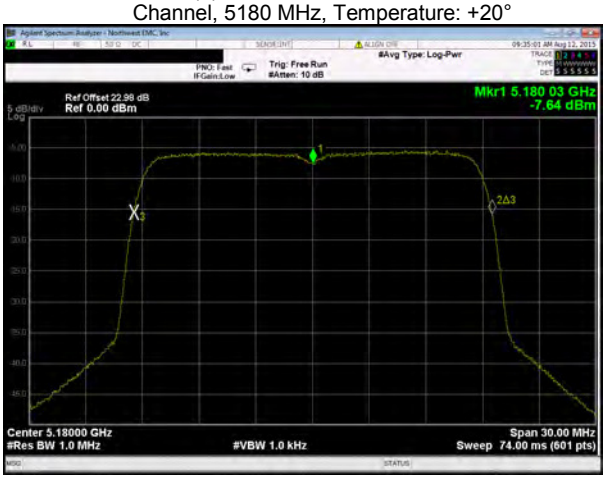
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



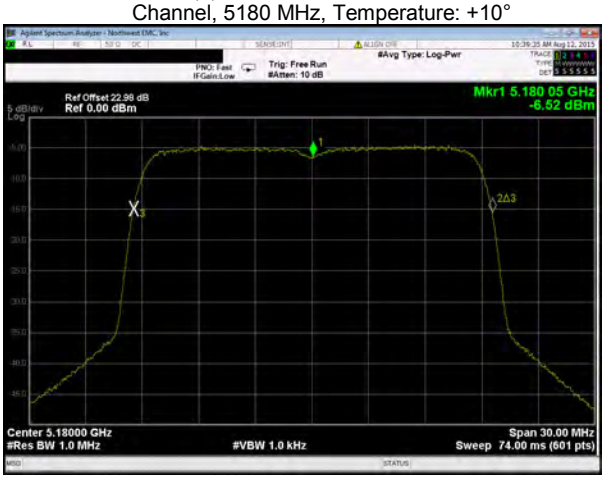
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

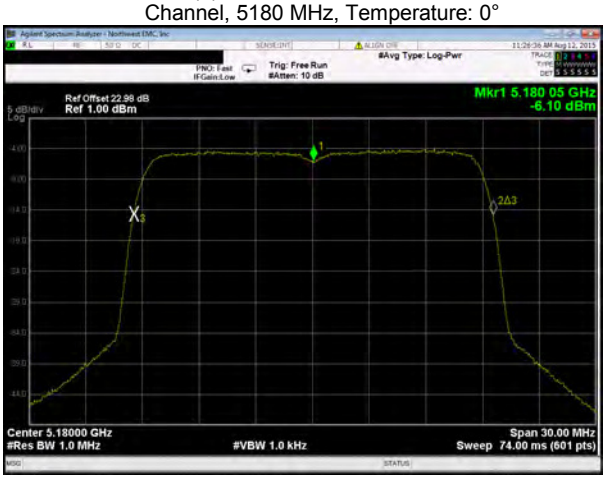
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

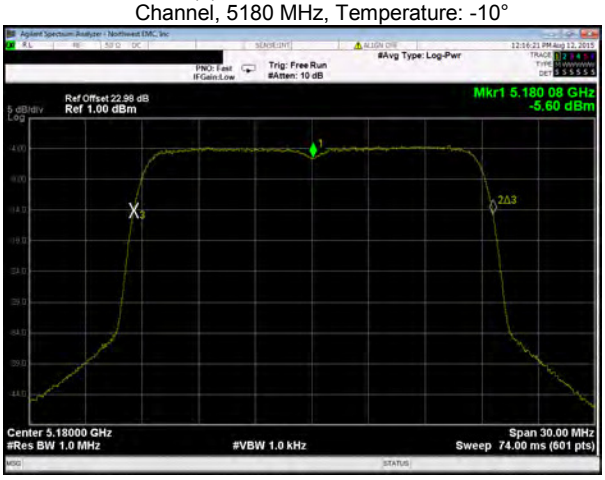
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



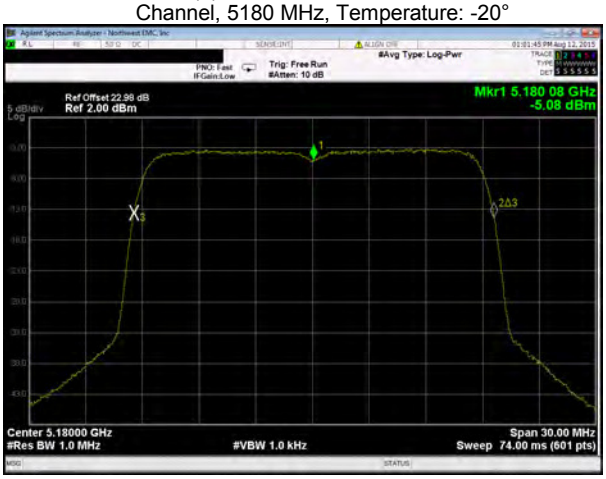
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



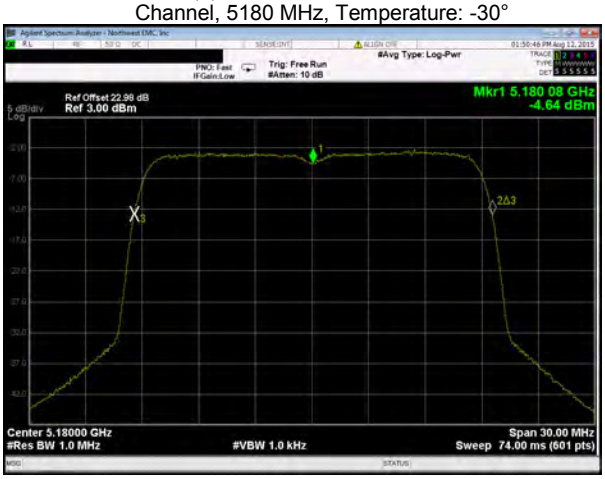
Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

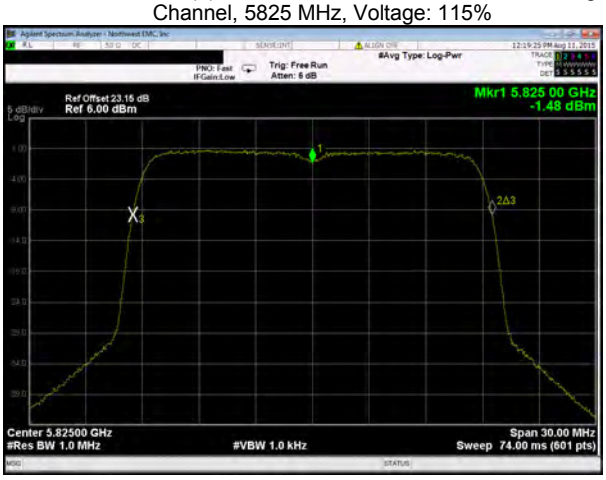
Chain C, 802.11(n) HT, MCS8, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

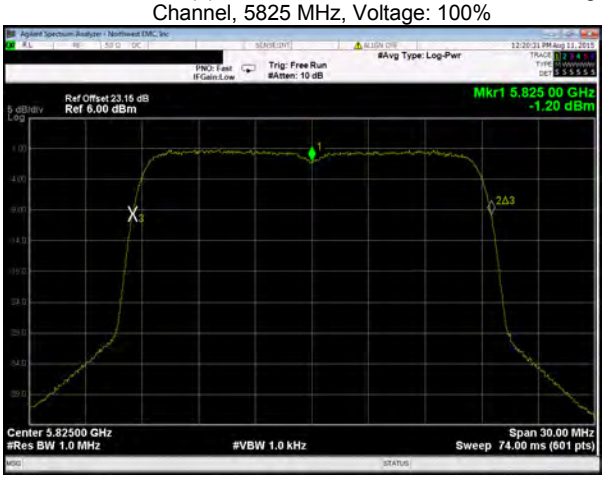
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



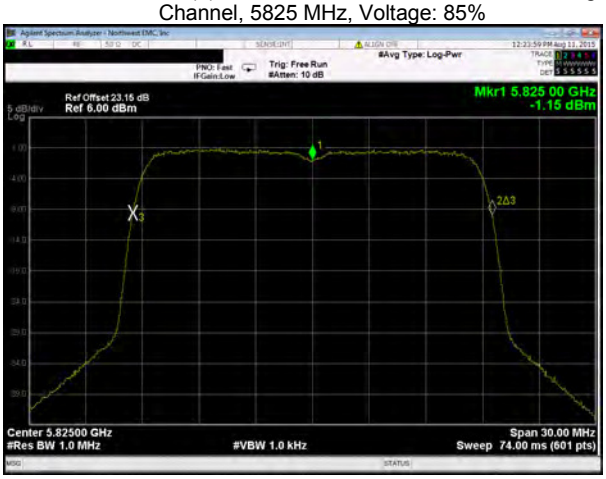
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



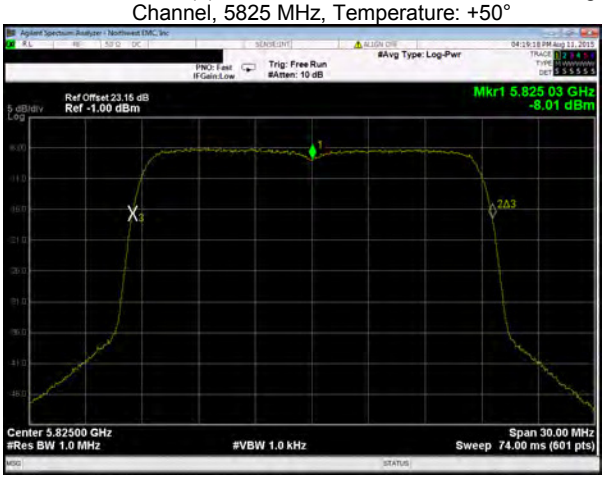
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

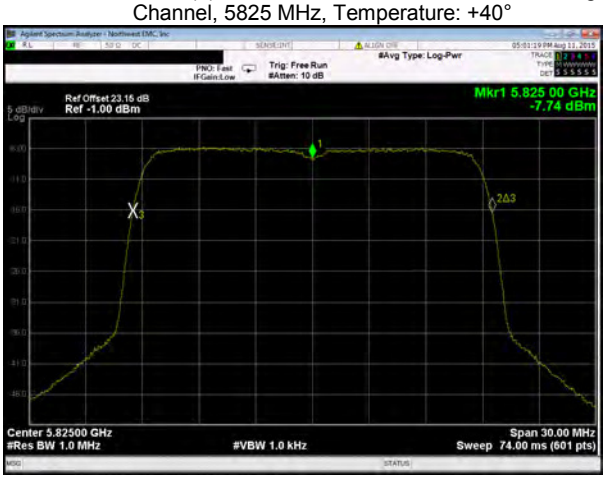
Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

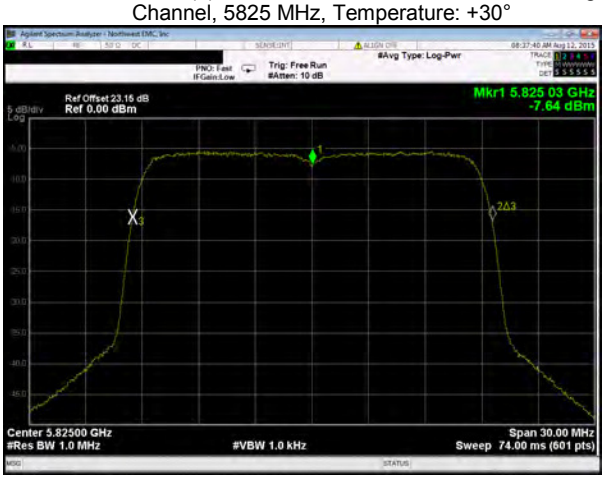
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



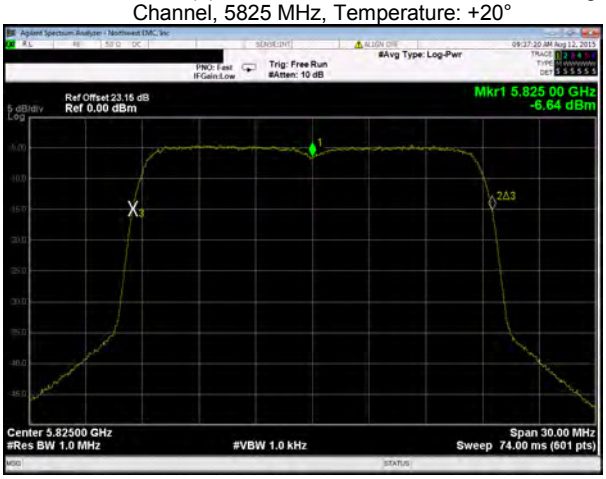
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



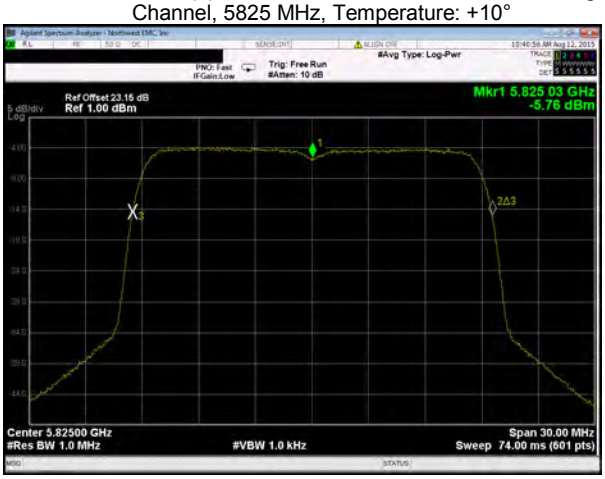
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

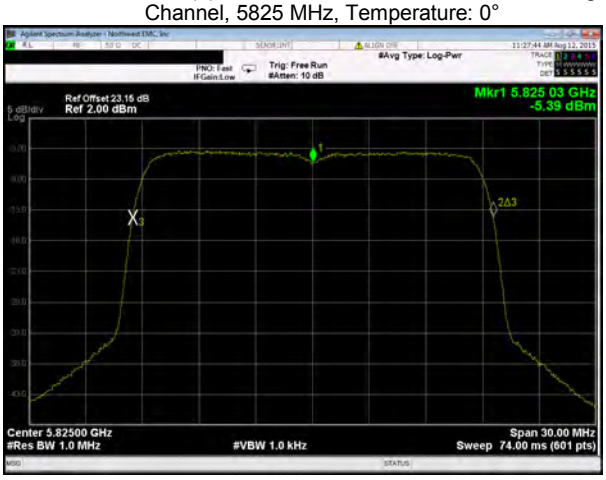
Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

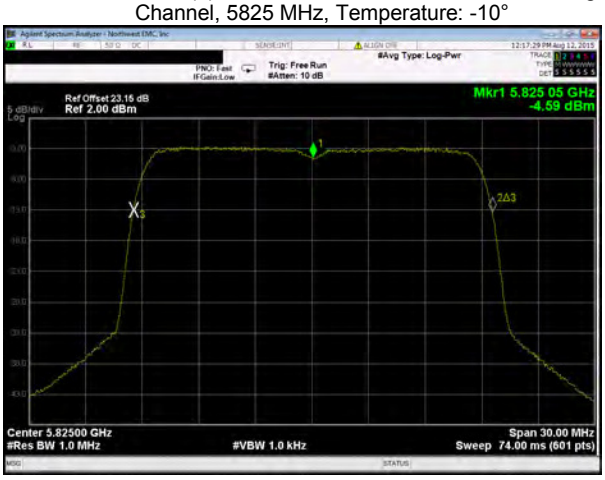
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



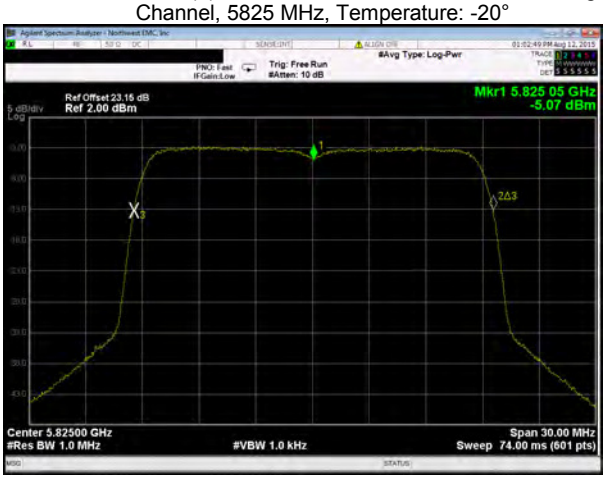
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



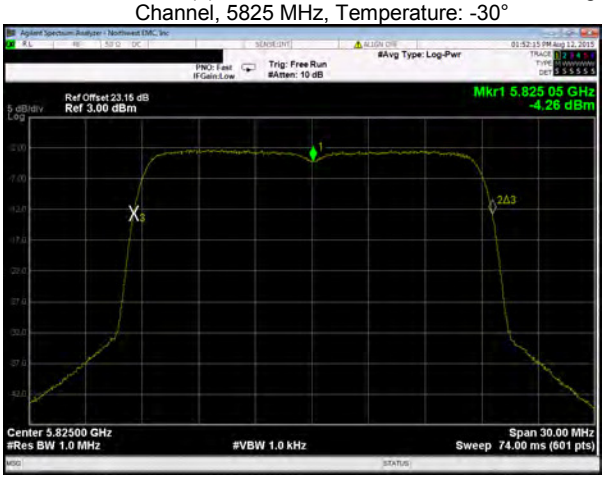
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS8, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

FREQUENCY STABILITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST DESCRIPTION

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. Testing was done with a modulated signal; therefore, the lowest signal data rate was tested.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Per the requirements of FCC 15.407:

"Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual."

No specific limits are provided in either FCC 15.407, the product-specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to operate within the band.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Agilent	N9010A	AFL	9/20/2014	9/20/2015
Generator - Signal	Agilent	N5173B	TIW	7/15/2014	7/15/2017
Attenuator	Fairview Microwave	SA4018-20	TQY	2/27/2015	2/27/2016
Block - DC	Fairview Microwave	SD3379	AMM	2/27/2015	2/27/2016
Power Supply - DC	B&K Precision	9110	TQI	NCR	NCR
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBH	NCR	NCR
Thermometer	Omegaette	HH311	DTX	4/3/2015	4/3/2018
Meter - Multimeter	Fluke	77-IV	MLT	9/25/2014	9/25/2017

FREQUENCY STABILITY

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	08/12/15
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.8°C
Attendees:	None	Relative Humidity:	46%
Customer Project:	None	Bar. Pressure:	1019 mbar
Tested By:	Jonathan Kiefer	Job Site:	TX09
Power:	48 VDC	Configuration:	2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2015	ANSI C63.10:2013

COMMENTS

3x3 MIMO mode, Chain ABC (Chains 0, 1 and 2). Tested at Channel 36 (5180 MHz) and Channel 165 (5825 MHz). The EUT was tested with the fundamental modulated while under test.

DEVIATIONS FROM TEST STANDARD

None

RESULTS

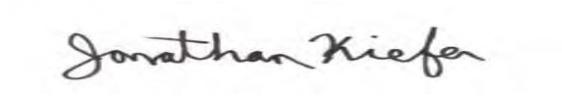
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
Chain A					
802.11(n) HT, MCS16					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage: 115%	5180.025	5180	4.8	100	Pass
Voltage: 100%	5180.025	5180	4.8	100	Pass
Voltage: 85%	5180.025	5180	4.8	100	Pass
Temperature: +50°	5180.05	5180	9.7	100	Pass
Temperature: +40°	5180.025	5180	4.8	100	Pass
Temperature: +30°	5180.025	5180	4.8	100	Pass
Temperature: +20°	5180.025	5180	4.8	100	Pass
Temperature: +10°	5180.025	5180	4.8	100	Pass
Temperature: 0°	5180.05	5180	9.7	100	Pass
Temperature: -10°	5180.075	5180	14.5	100	Pass
Temperature: -20°	5180.075	5180	14.5	100	Pass
Temperature: -30°	5180.075	5180	14.5	100	Pass
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5825	5825	0	100	Pass
Voltage: 100%	5825	5825	0	100	Pass
Voltage: 85%	5825	5825	0	100	Pass
Temperature: +50°	5825.025	5825	4.3	100	Pass
Temperature: +40°	5825	5825	0	100	Pass
Temperature: +30°	5825.025	5825	4.3	100	Pass
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825.025	5825	4.3	100	Pass
Temperature: 0°	5825.05	5825	8.6	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.05	5825	8.6	100	Pass
Temperature: -30°	5825.075	5825	12.9	100	Pass
Chain B					
802.11(n) HT, MCS16					
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					

FREQUENCY STABILITY

		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	Voltage: 115%	5180	5180	0	100	Pass
	Voltage: 100%	5180.025	5180	4.8	100	Pass
	Voltage: 85%	5180.025	5180	4.8	100	Pass
	Temperature: +50°	5180.05	5180	9.7	100	Pass
	Temperature: +40°	5180.025	5180	4.8	100	Pass
	Temperature: +30°	5180.025	5180	4.8	100	Pass
	Temperature: +20°	5180.025	5180	4.8	100	Pass
	Temperature: +10°	5180.025	5180	4.8	100	Pass
	Temperature: 0°	5180.05	5180	9.7	100	Pass
	Temperature: -10°	5180.05	5180	9.7	100	Pass
	Temperature: -20°	5180.075	5180	14.5	100	Pass
	Temperature: -30°	5180.075	5180	14.5	100	Pass
	5725 MHz - 5850 MHz - High Channel, 5825 MHz					
	Voltage: 115%	5825	5825	0	100	Pass
	Voltage: 100%	5825.025	5825	4.3	100	Pass
	Voltage: 85%	5825	5825	0	100	Pass
	Temperature: +50°	5825.05	5825	8.6	100	Pass
	Temperature: +40°	5825.025	5825	4.3	100	Pass
	Temperature: +30°	5825	5825	0	100	Pass
	Temperature: +20°	5825.025	5825	4.3	100	Pass
	Temperature: +10°	5825.025	5825	4.3	100	Pass
	Temperature: 0°	5825.05	5825	8.6	100	Pass
	Temperature: -10°	5825.05	5825	8.6	100	Pass
	Temperature: -20°	5825.05	5825	8.6	100	Pass
	Temperature: -30°	5825.075	5825	12.9	100	Pass
Chain C						
	802.11(n) HT, MCS16					
	5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
	Voltage: 115%	5180.025	5180	4.8	100	Pass
	Voltage: 100%	5180.025	5180	4.8	100	Pass
	Voltage: 85%	5180.025	5180	4.8	100	Pass
	Temperature: +50°	5180.05	5180	9.7	100	Pass
	Temperature: +40°	5180.025	5180	4.8	100	Pass
	Temperature: +30°	5180.025	5180	4.8	100	Pass
	Temperature: +20°	5180.025	5180	4.8	100	Pass
	Temperature: +10°	5180.025	5180	4.8	100	Pass
	Temperature: 0°	5180.05	5180	9.7	100	Pass
	Temperature: -10°	5180.05	5180	9.7	100	Pass
	Temperature: -20°	5180.075	5180	14.5	100	Pass
	Temperature: -30°	5180.075	5180	14.5	100	Pass
	5725 MHz - 5850 MHz - High Channel, 5825 MHz					
	Voltage: 115%	5825	5825	0	100	Pass
	Voltage: 100%	5825	5825	0	100	Pass
	Voltage: 85%	5825	5825	0	100	Pass
	Temperature: +50°	5825.025	5825	4.3	100	Pass
	Temperature: +40°	5825.025	5825	4.3	100	Pass
	Temperature: +30°	5825	5825	0	100	Pass

FREQUENCY STABILITY

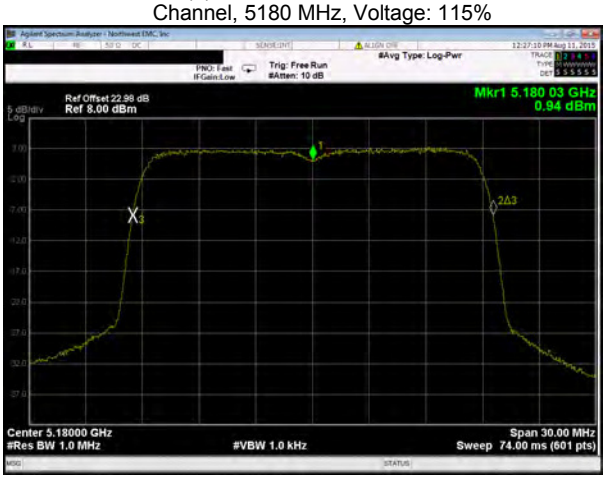
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
Temperature: +20°	5825	5825	0	100	Pass
Temperature: +10°	5825	5825	0	100	Pass
Temperature: 0°	5825.025	5825	4.3	100	Pass
Temperature: -10°	5825.05	5825	8.6	100	Pass
Temperature: -20°	5825.05	5825	8.6	100	Pass
Temperature: -30°	5825.075	5825	12.9	100	Pass



Tested By

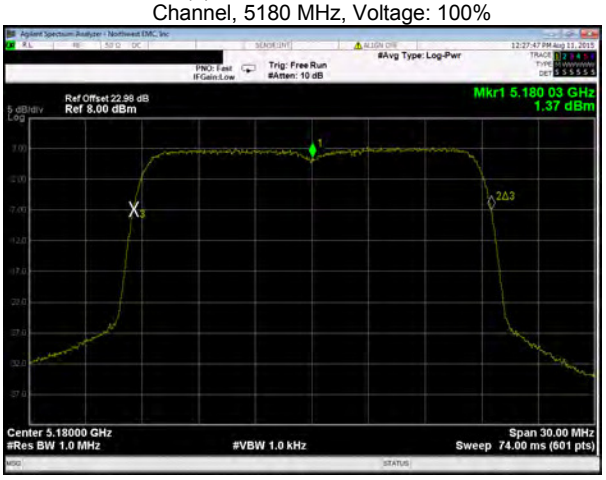
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



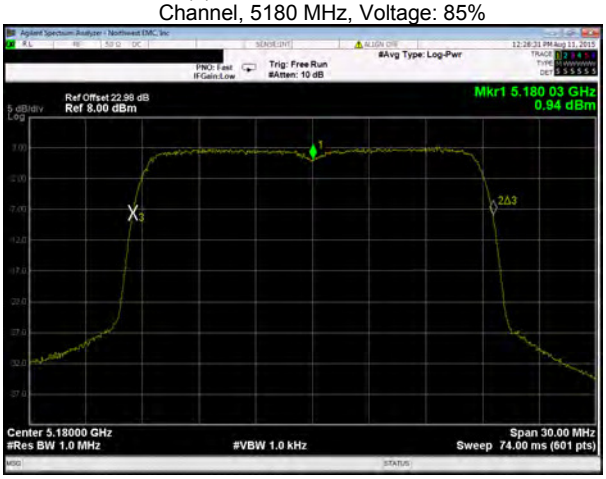
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



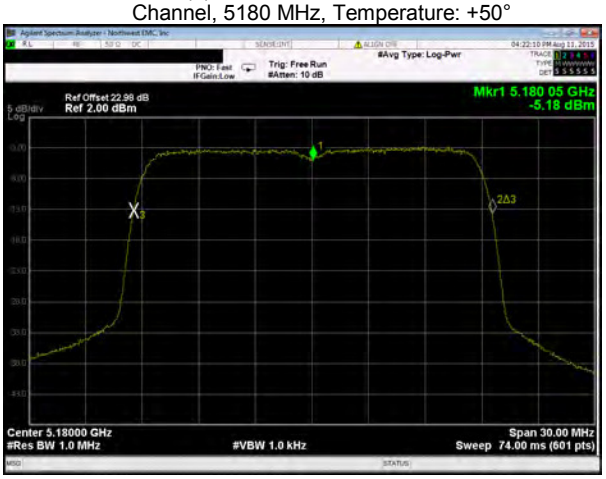
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

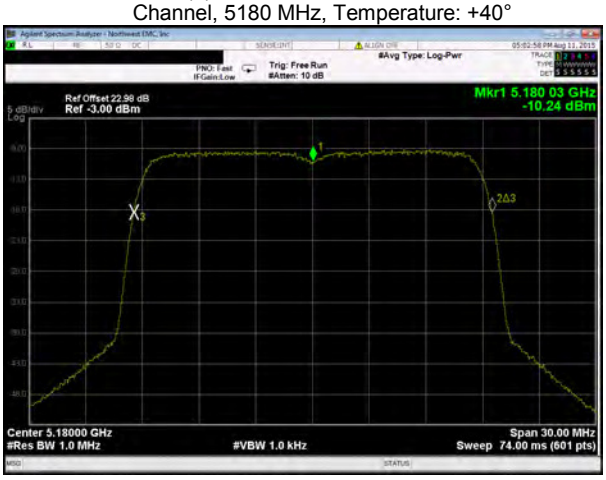
Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

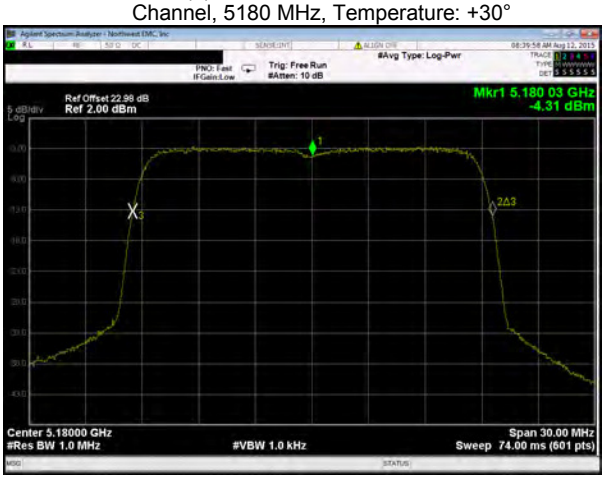
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



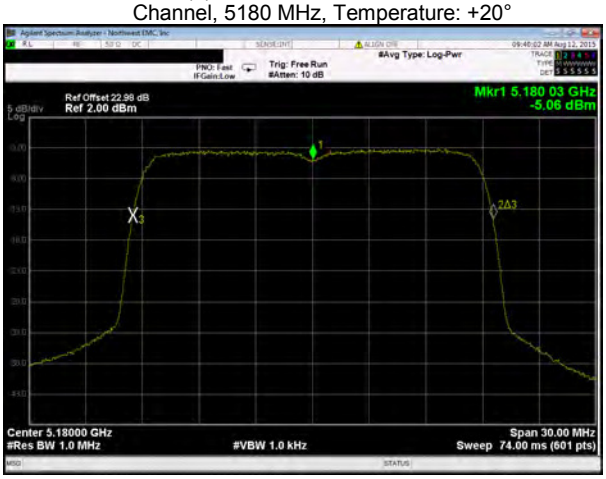
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



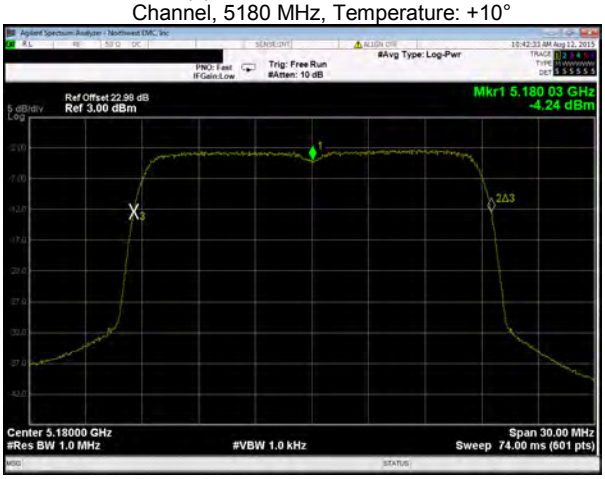
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

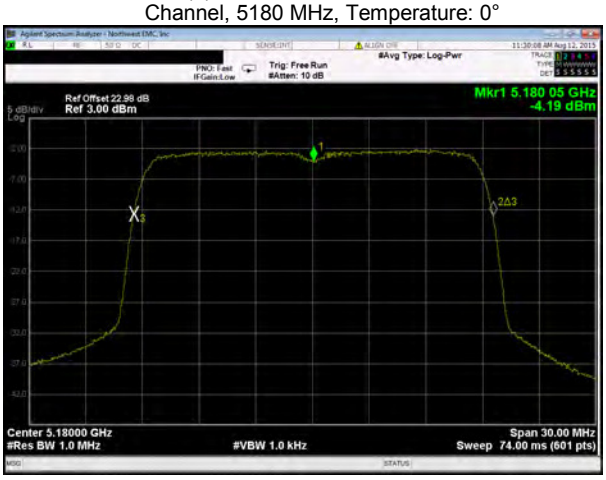
Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

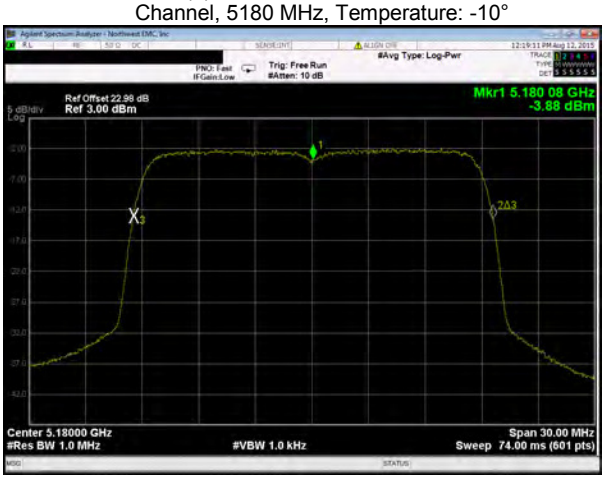
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



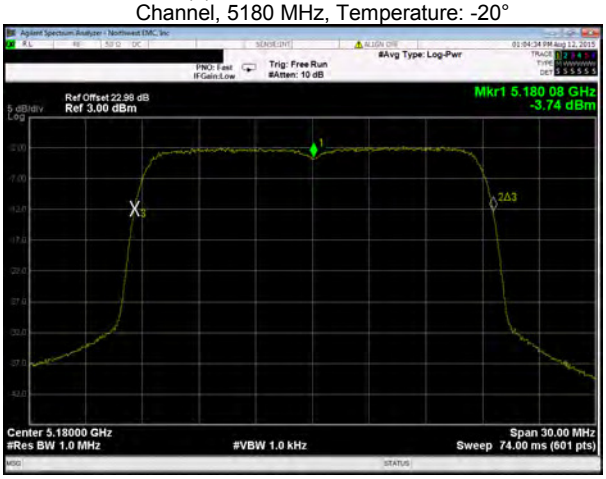
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



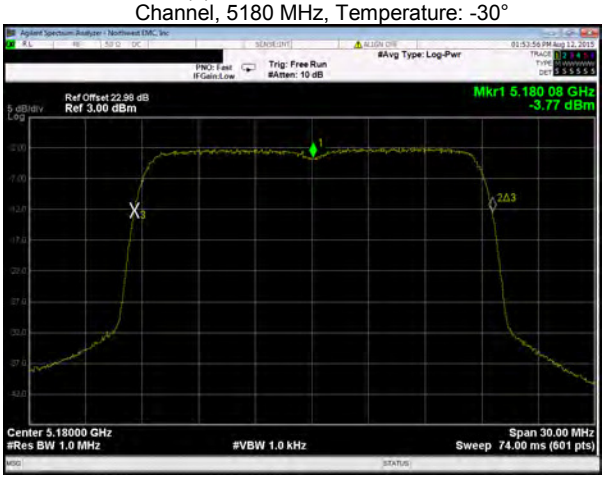
Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

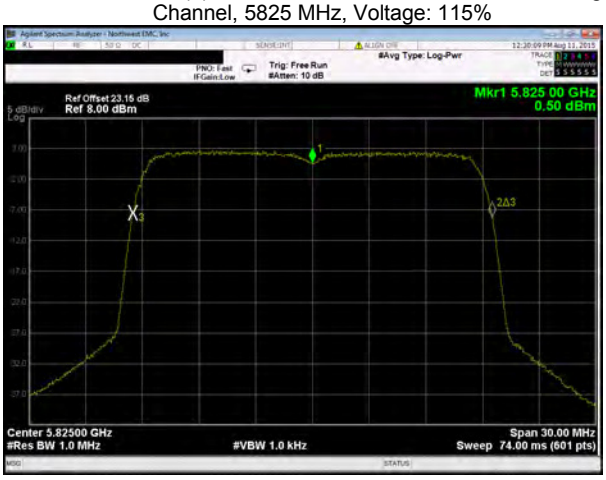
Chain A, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

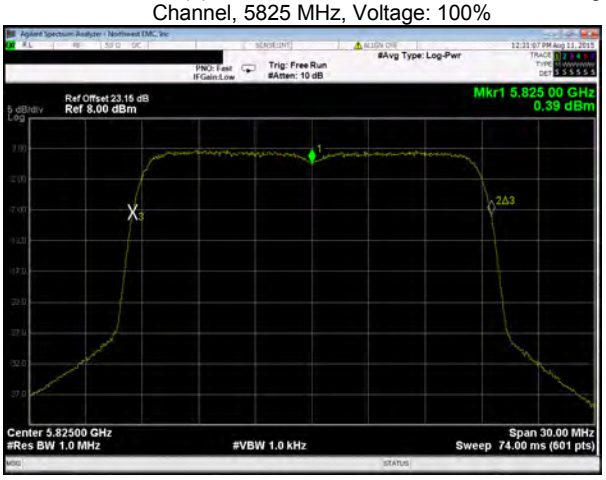
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



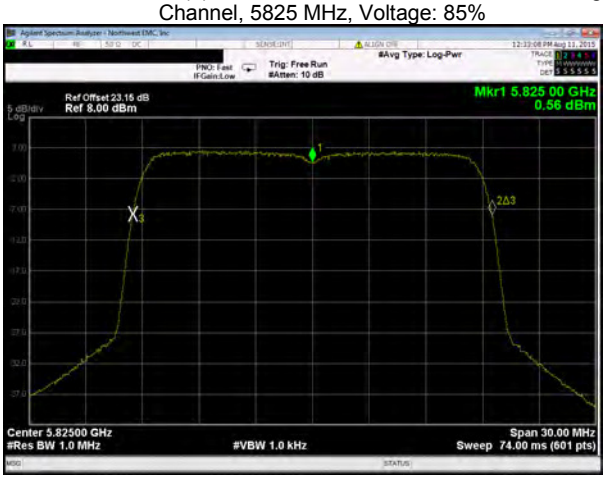
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



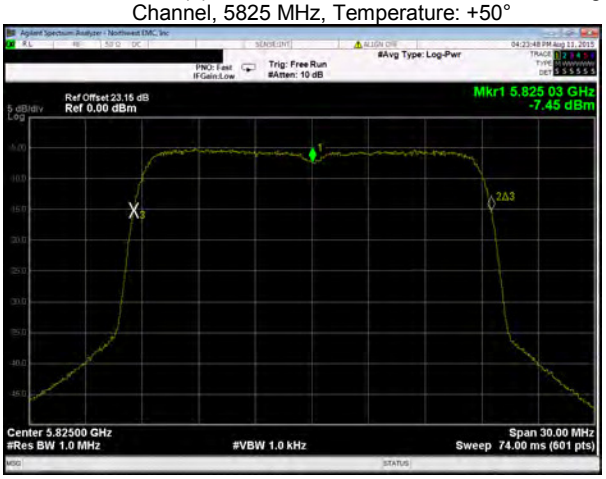
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

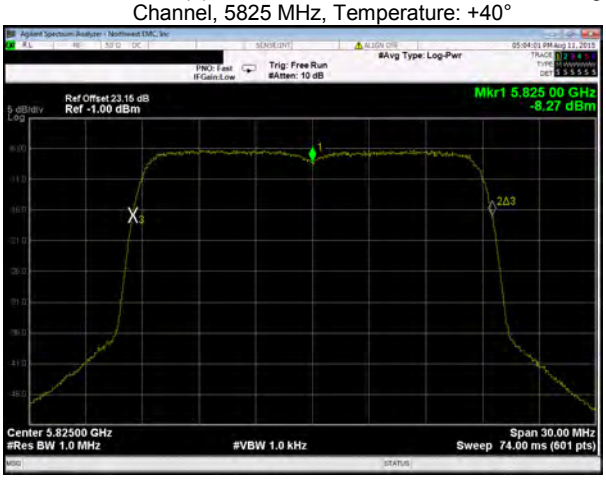
Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

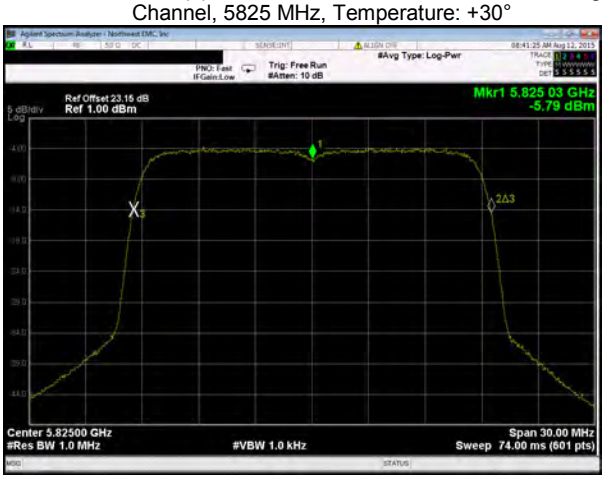
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



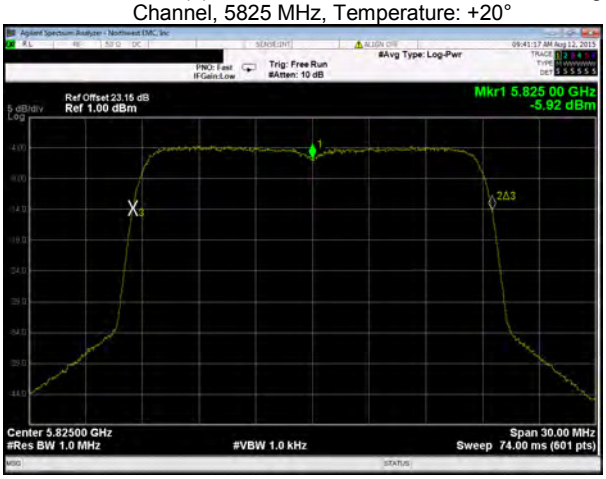
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



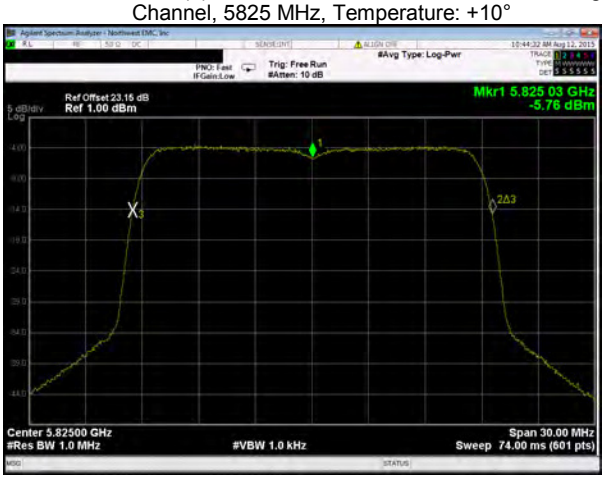
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

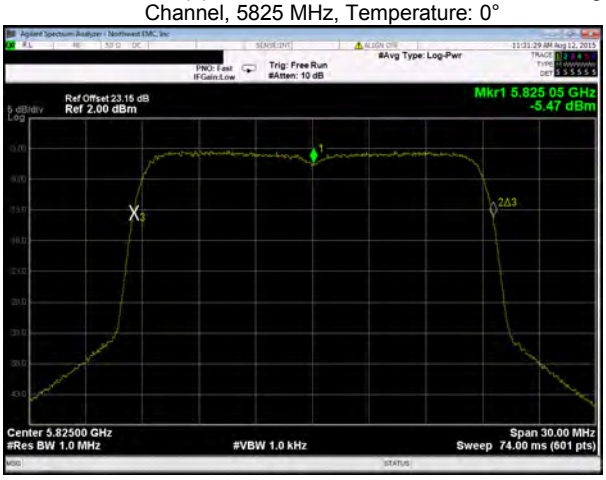
Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

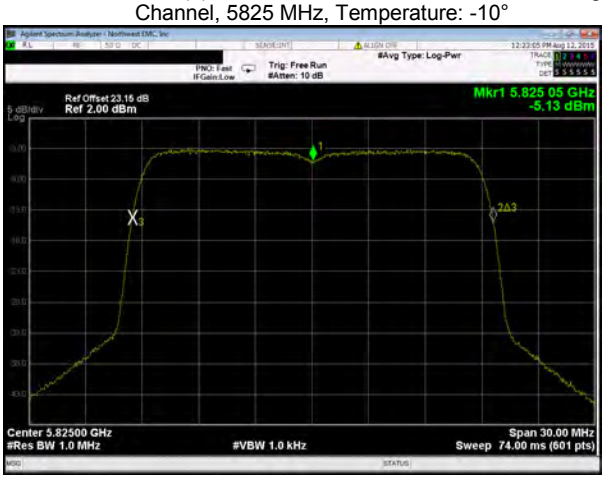
FREQUENCY STABILITY

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



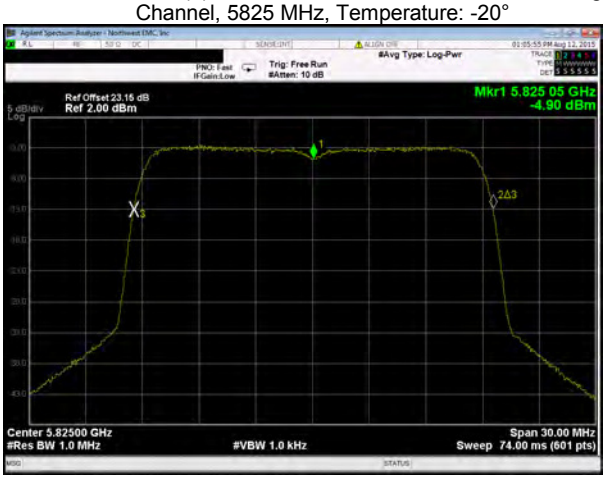
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



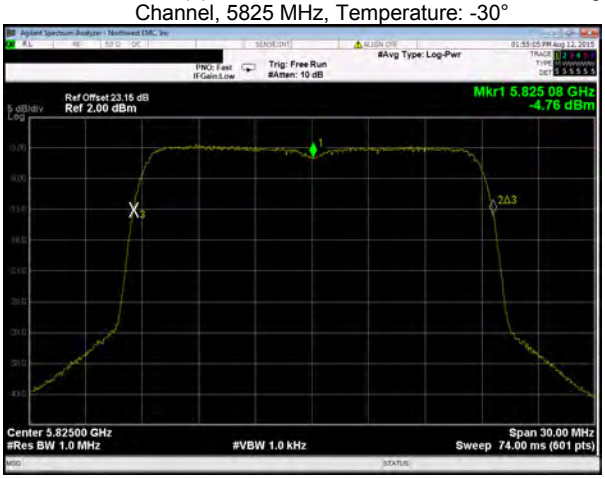
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

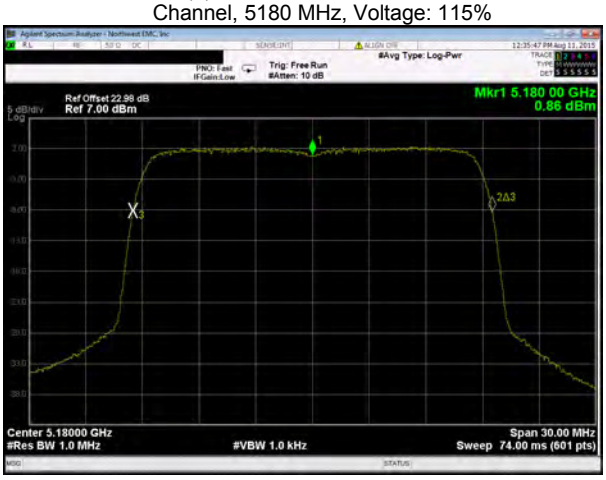
Chain A, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

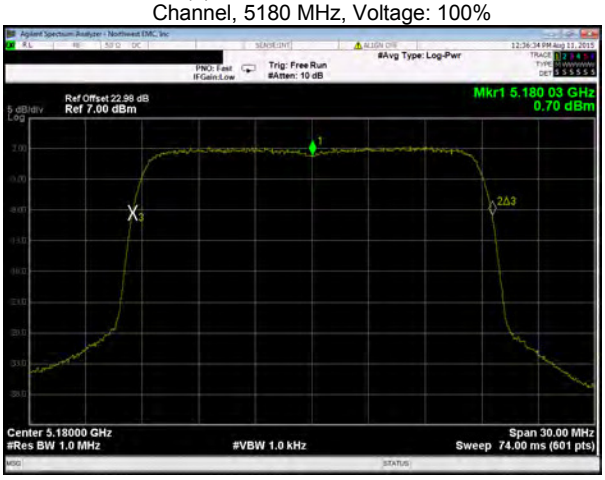
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



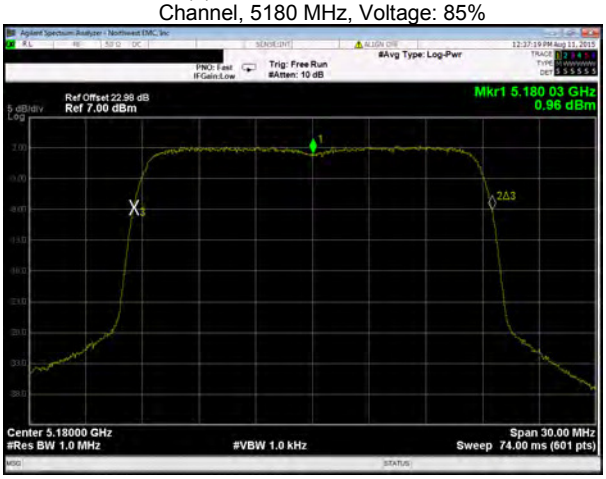
Measured Value (MHz)	5180
Assigned Value (MHz)	5180
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



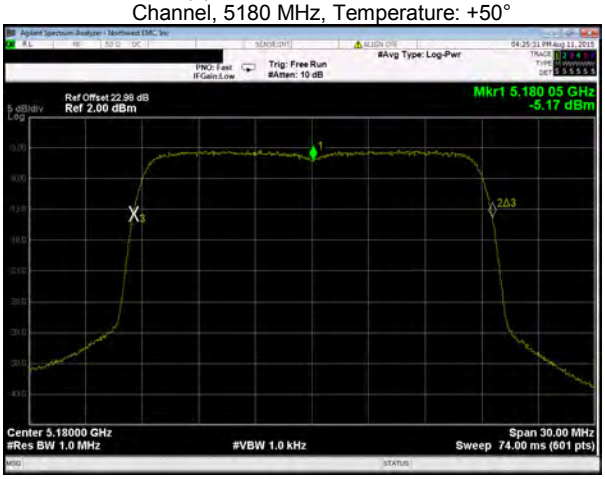
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

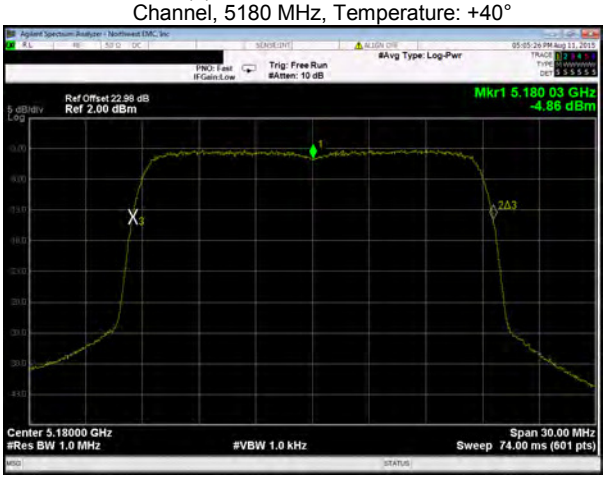
Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

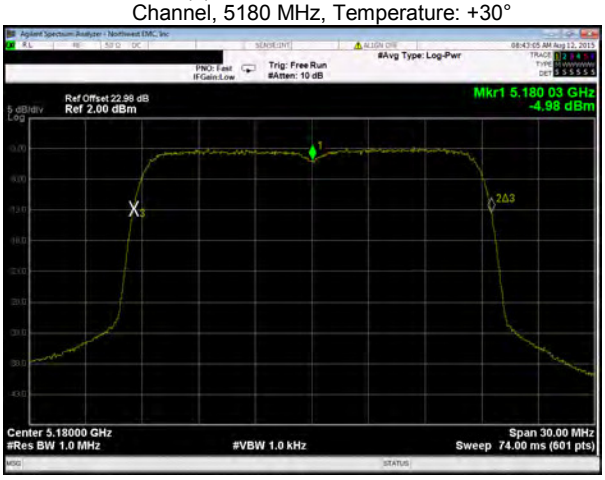
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



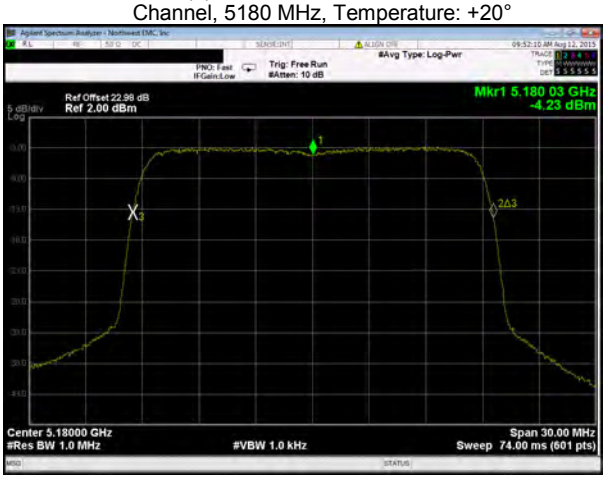
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



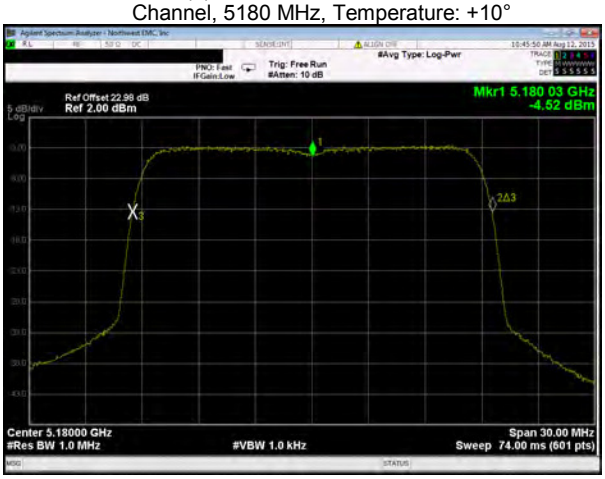
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

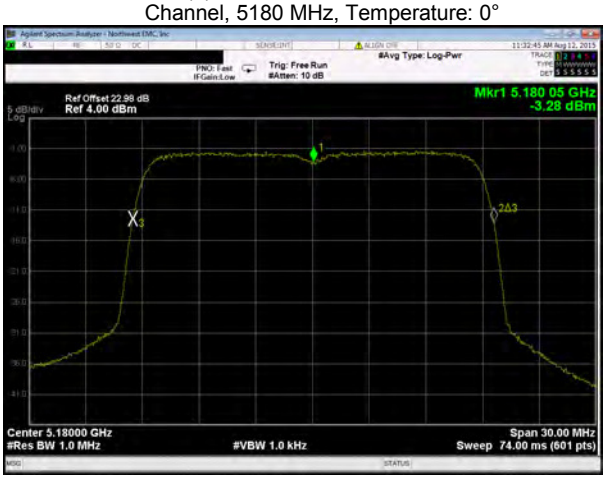
Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

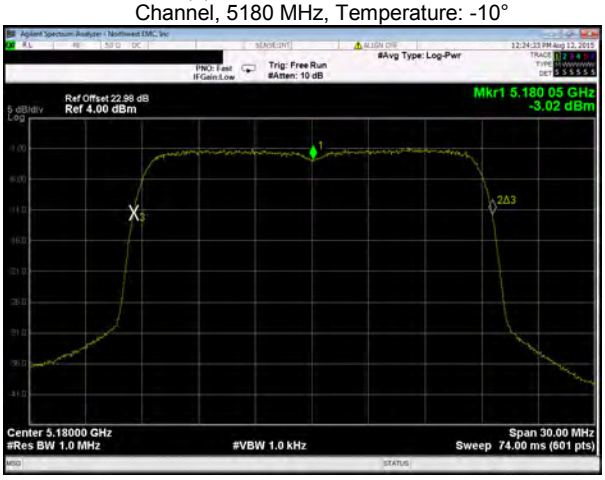
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



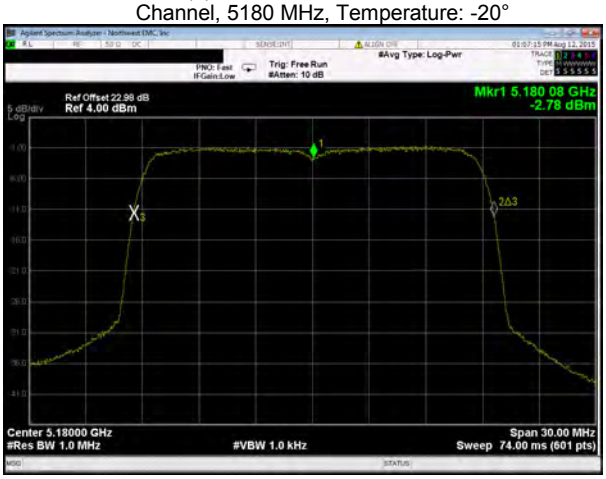
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



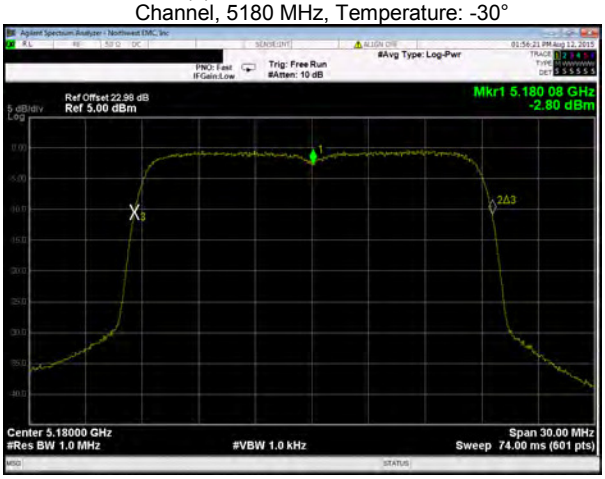
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

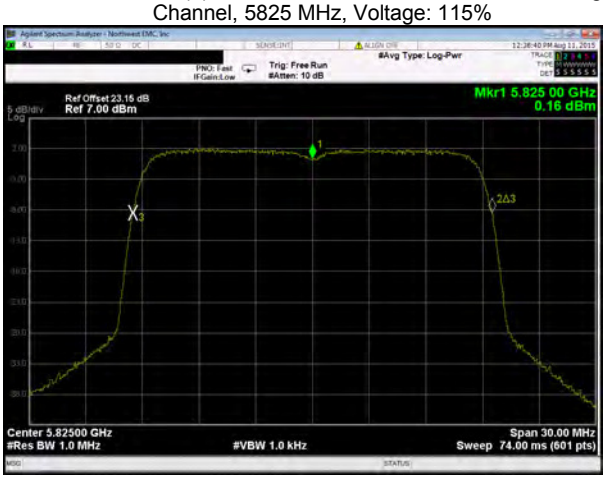
Chain B, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

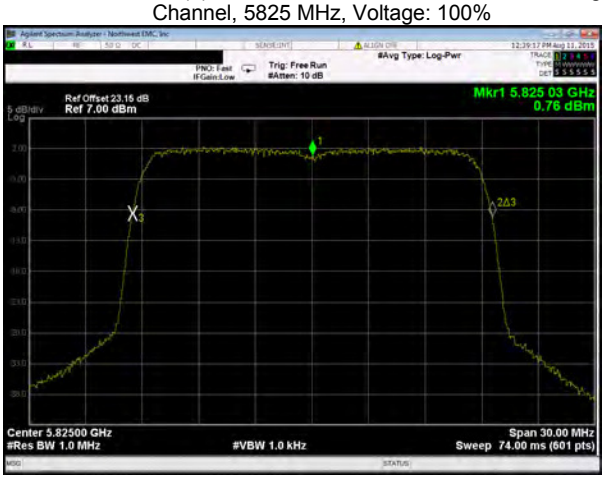
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



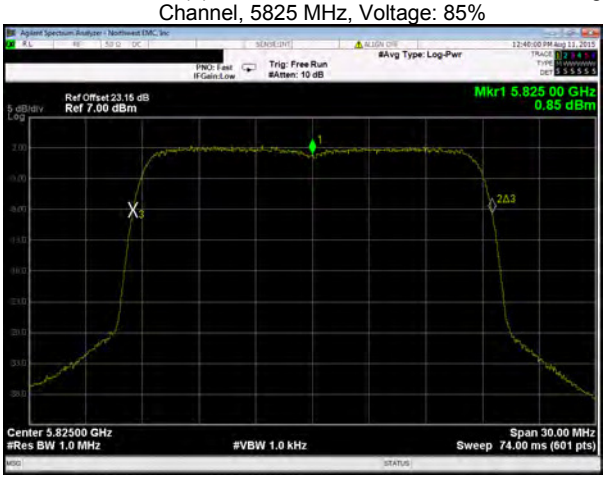
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



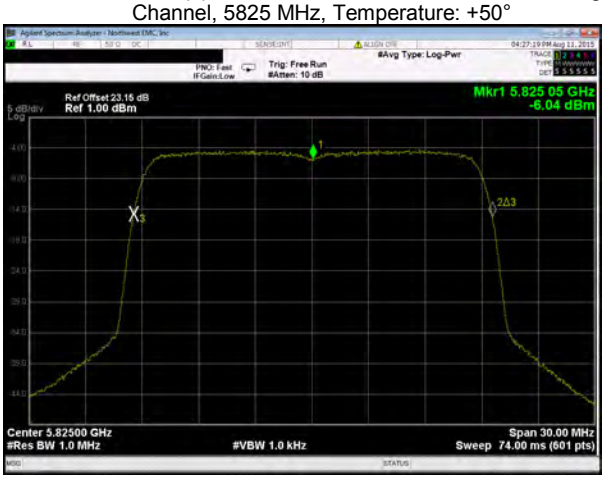
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

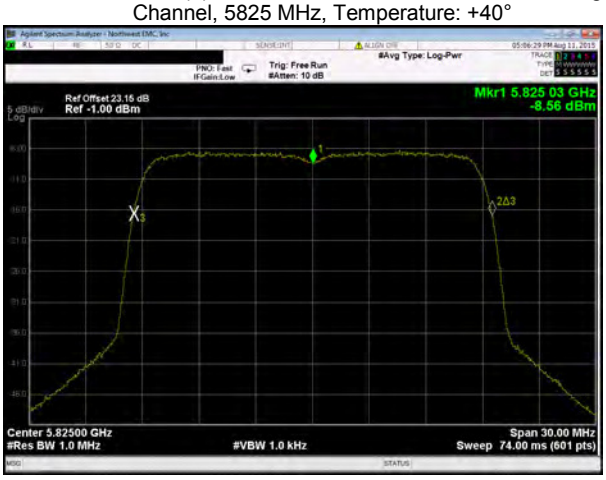
Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

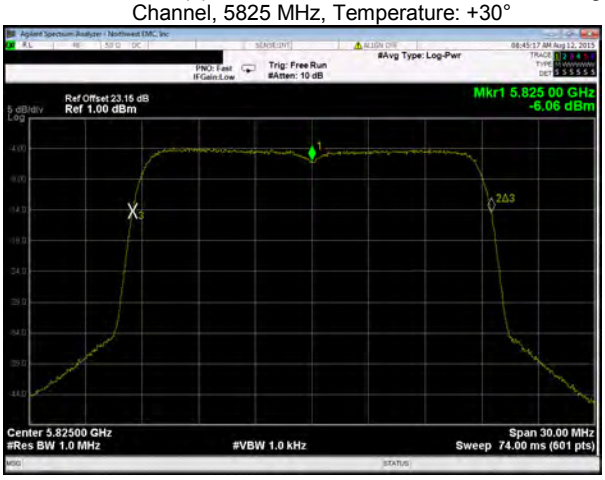
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



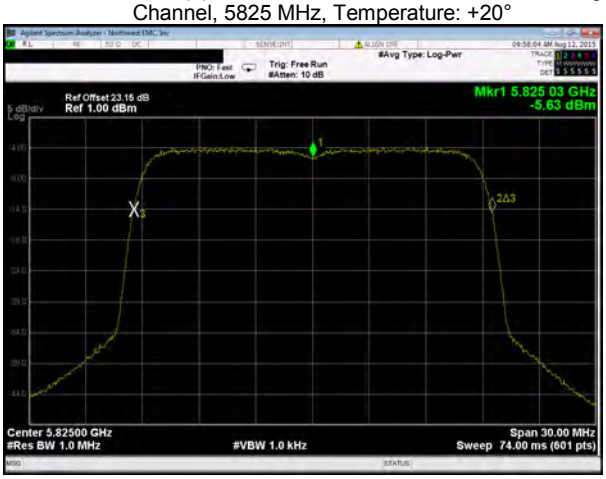
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



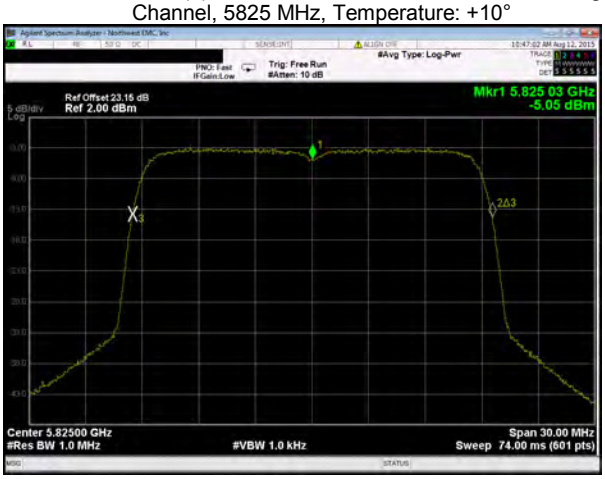
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

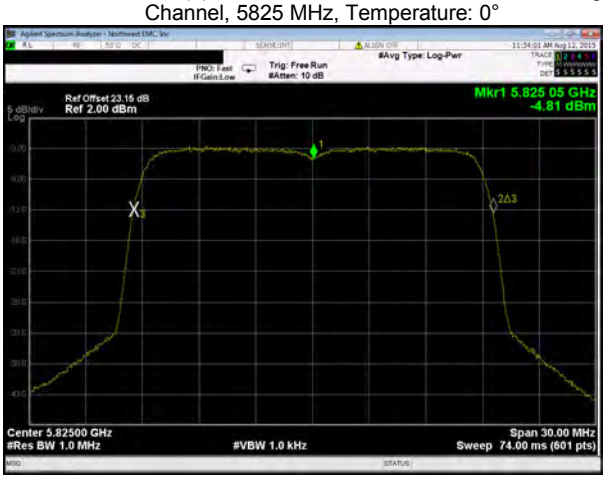
Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

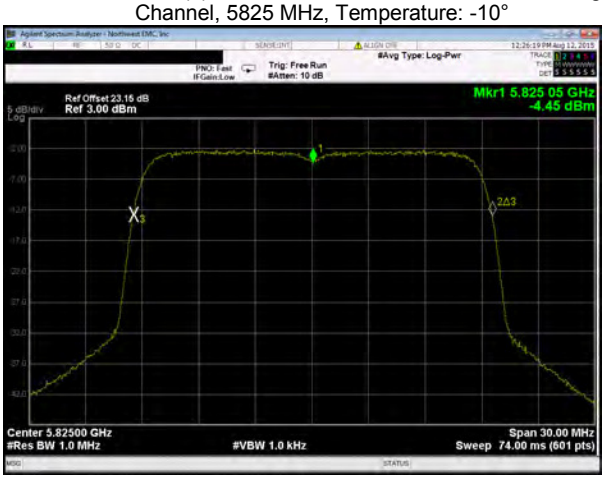
FREQUENCY STABILITY

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



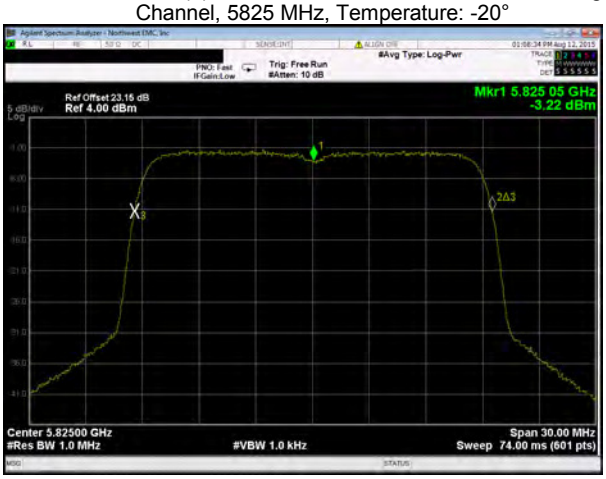
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



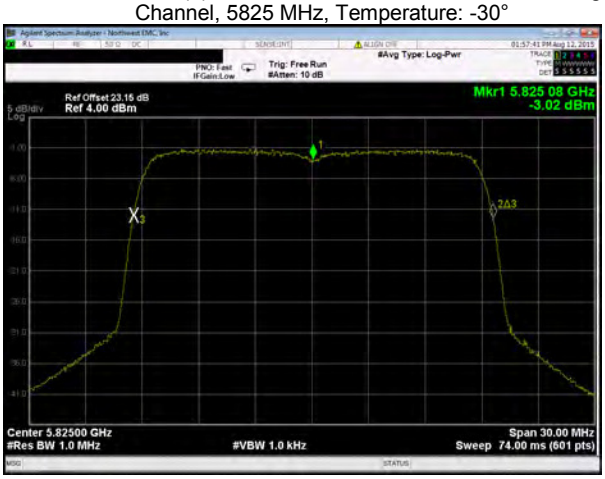
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

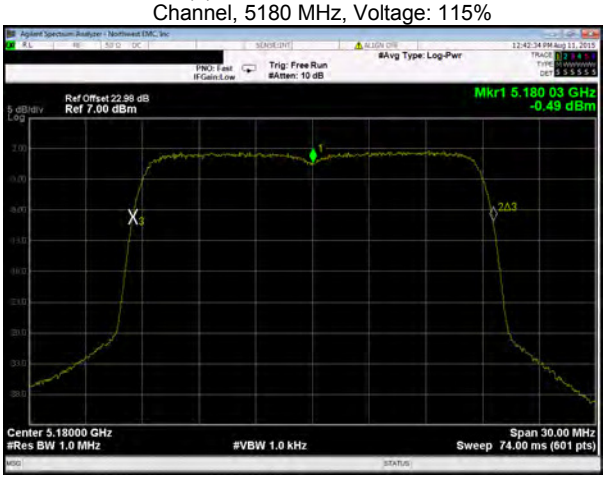
Chain B, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass

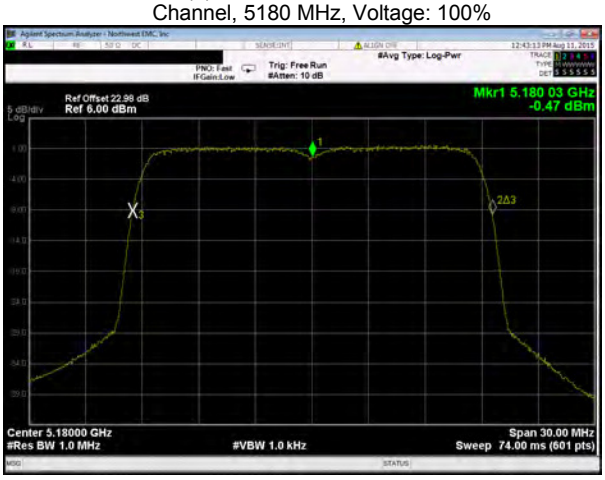
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 115%



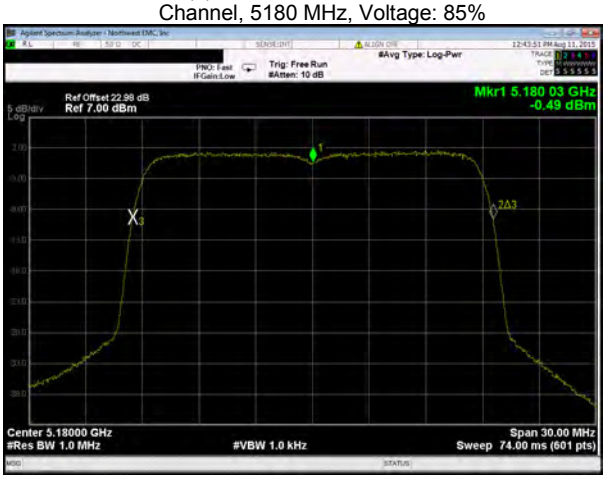
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 100%



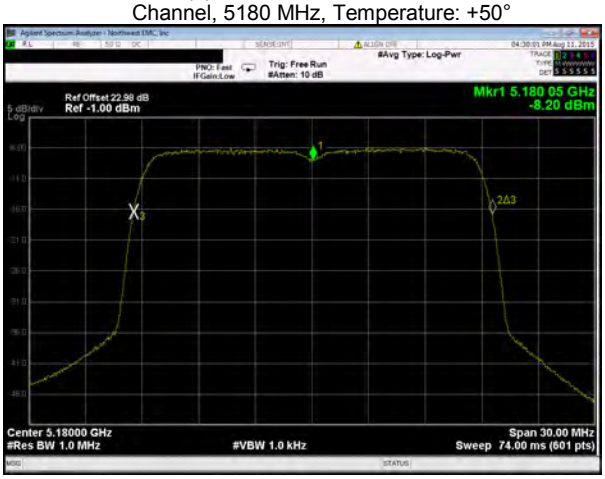
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage: 85%



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

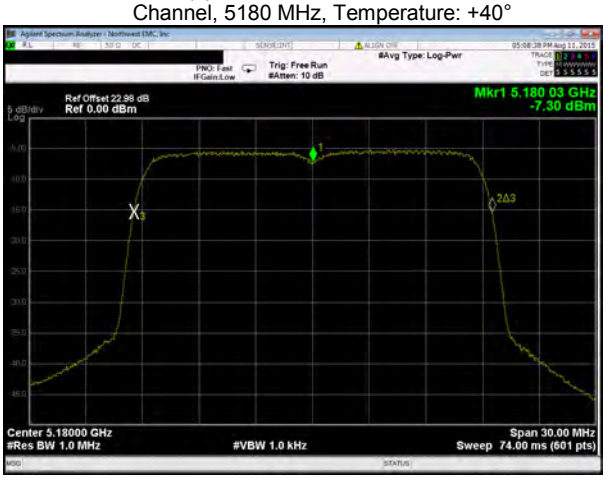
Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°



Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

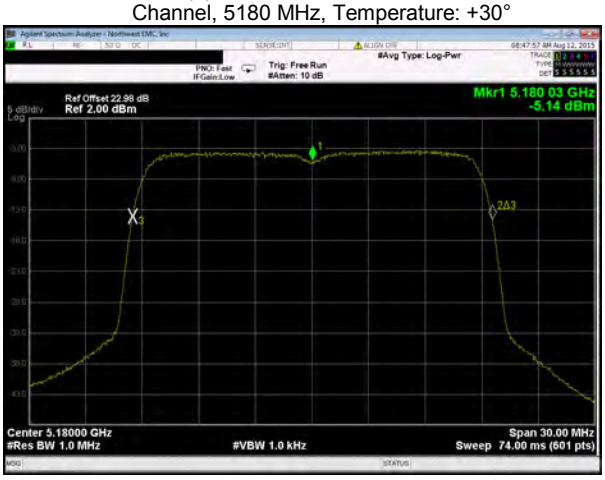
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°



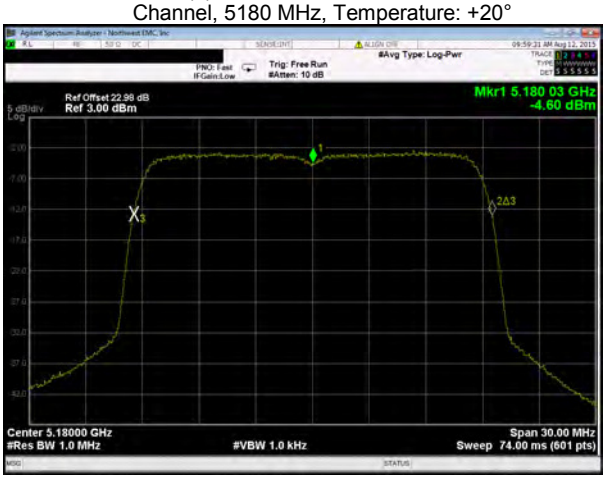
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°



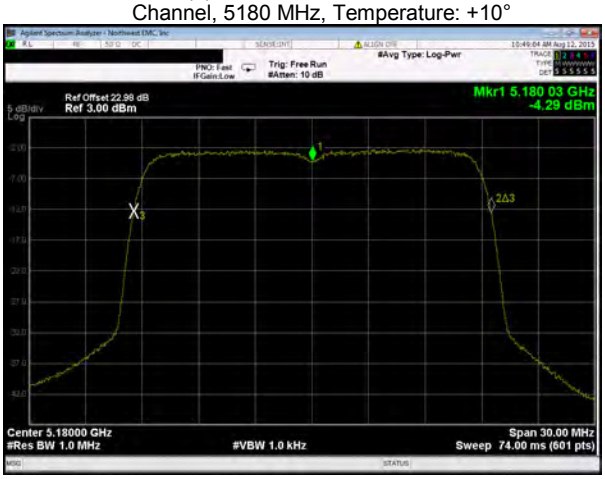
Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

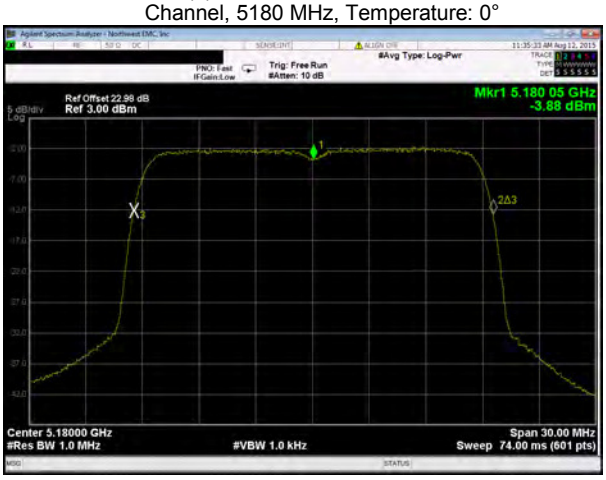
Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°



Measured Value (MHz)	5180.025
Assigned Value (MHz)	5180
Error (ppm)	4.8
Limit (ppm)	100
Results	Pass

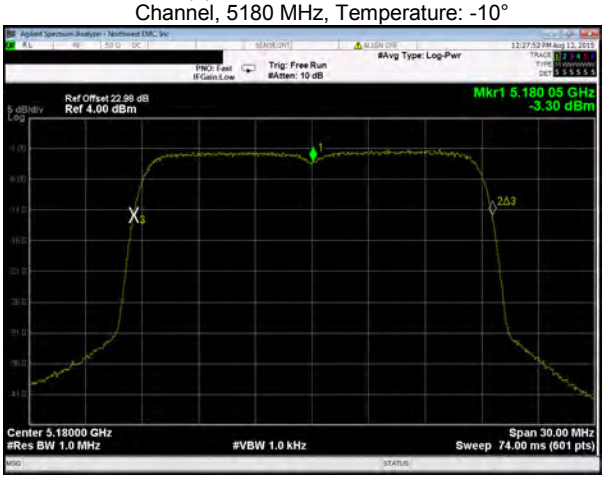
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°



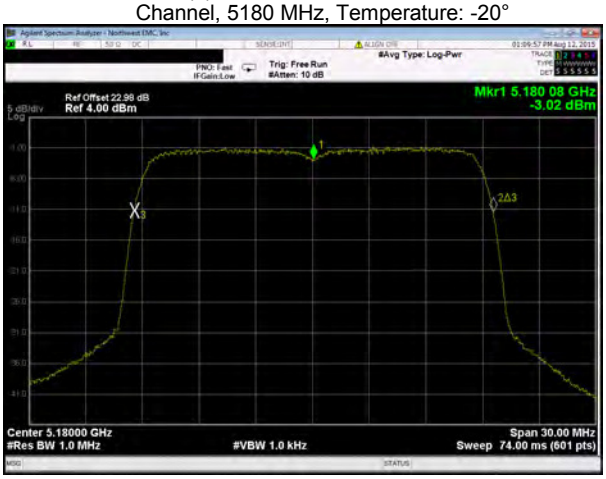
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -10°



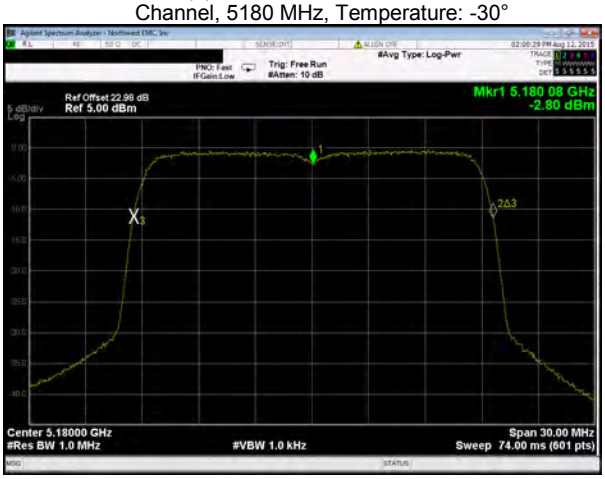
Measured Value (MHz)	5180.05
Assigned Value (MHz)	5180
Error (ppm)	9.7
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -20°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

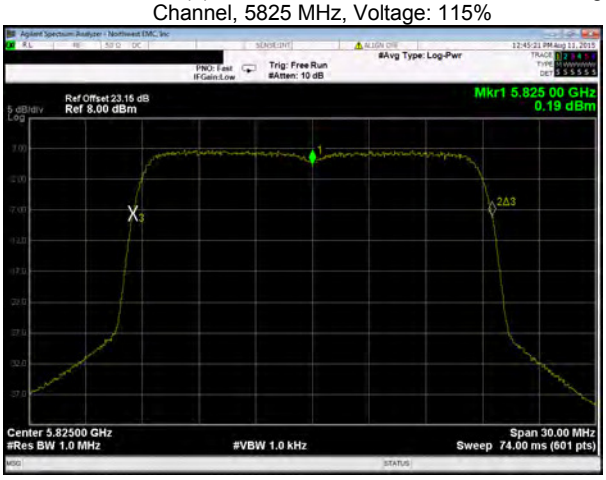
Chain C, 802.11(n) HT, MCS16, 5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: -30°



Measured Value (MHz)	5180.075
Assigned Value (MHz)	5180
Error (ppm)	14.5
Limit (ppm)	100
Results	Pass

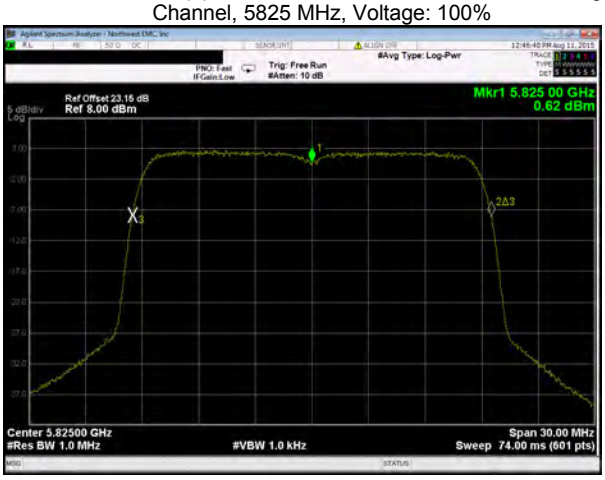
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%



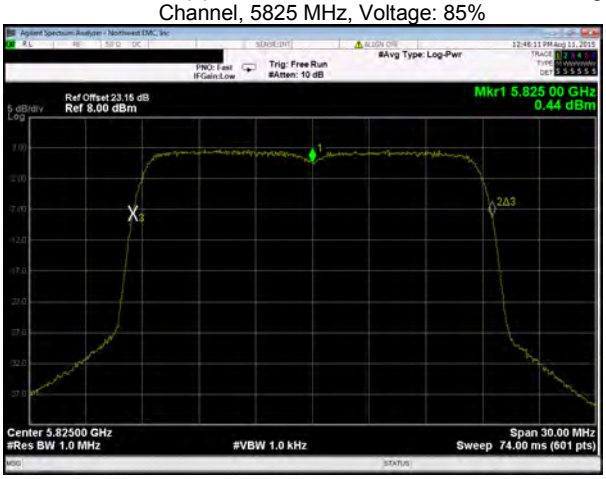
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%



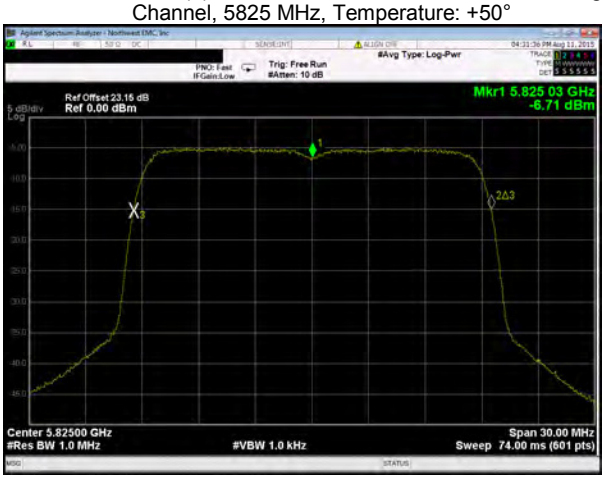
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

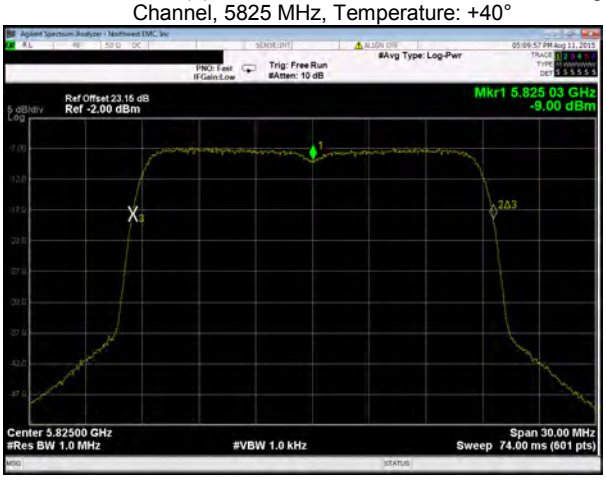
Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°



Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

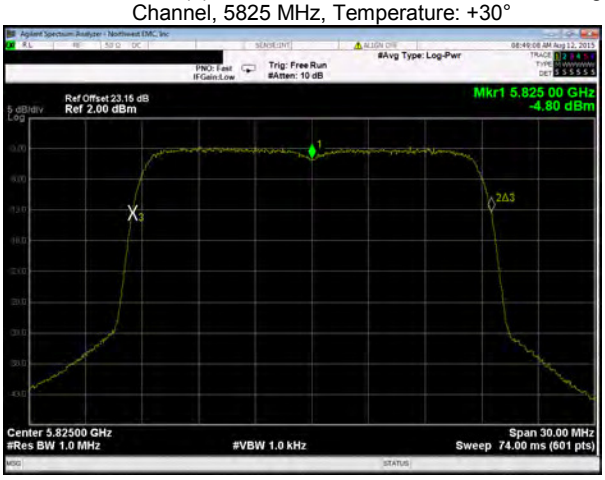
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°



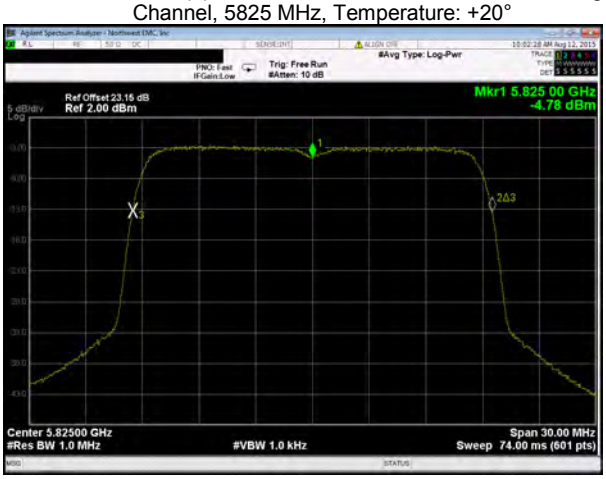
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°



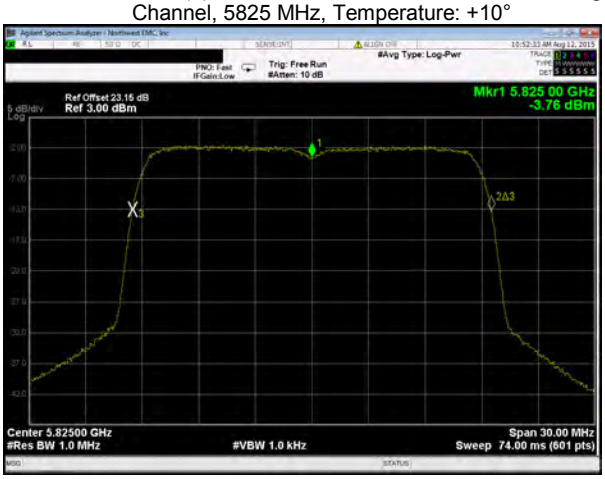
Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

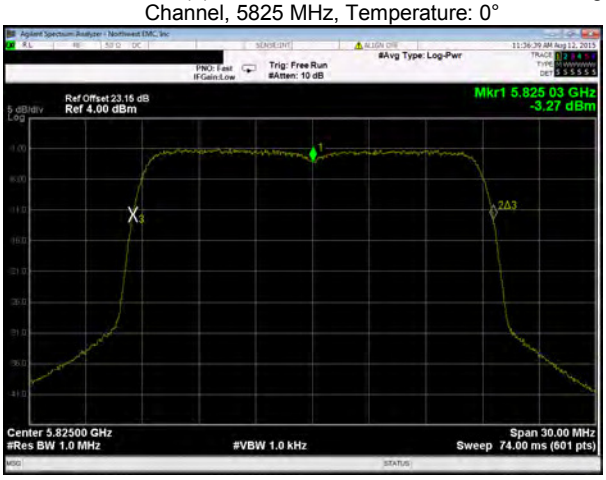
Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°



Measured Value (MHz)	5825
Assigned Value (MHz)	5825
Error (ppm)	0
Limit (ppm)	100
Results	Pass

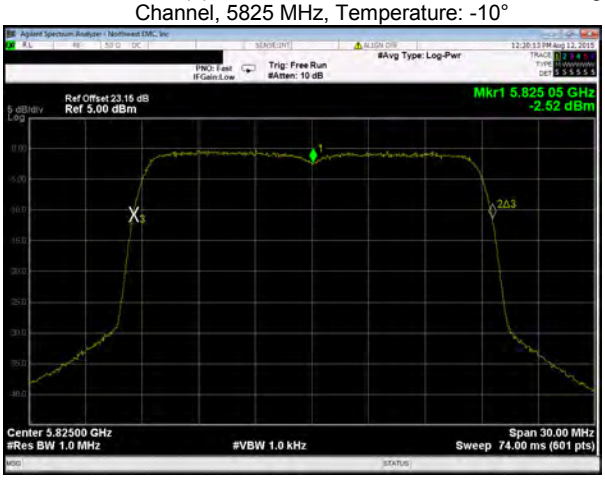
FREQUENCY STABILITY

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°



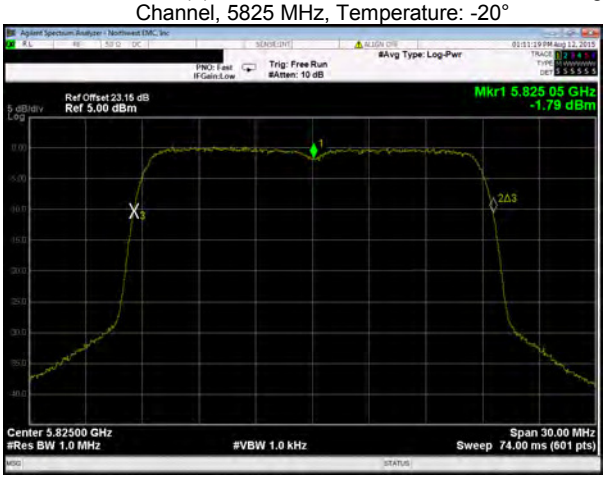
Measured Value (MHz)	5825.025
Assigned Value (MHz)	5825
Error (ppm)	4.3
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°



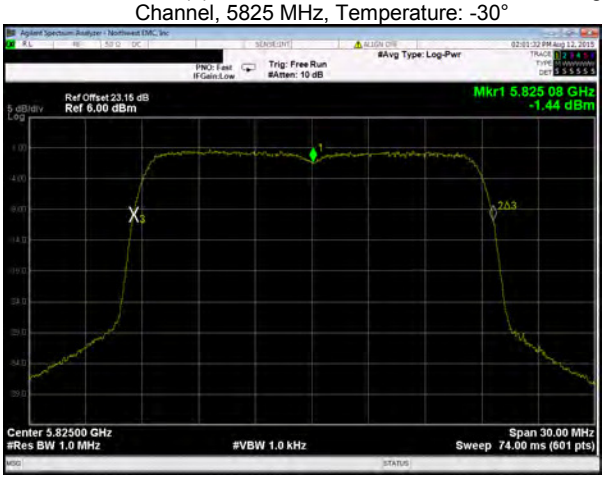
Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°



Measured Value (MHz)	5825.05
Assigned Value (MHz)	5825
Error (ppm)	8.6
Limit (ppm)	100
Results	Pass

Chain C, 802.11(n) HT, MCS16, 5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°



Measured Value (MHz)	5825.075
Assigned Value (MHz)	5825
Error (ppm)	12.9
Limit (ppm)	100
Results	Pass