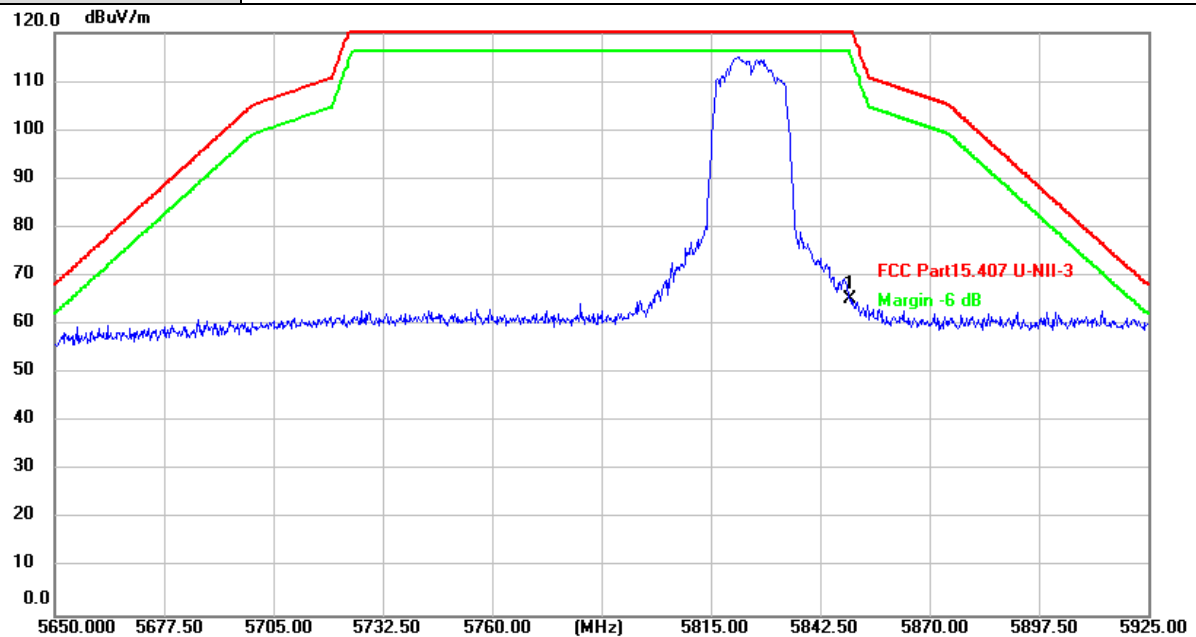




Ant No.	MIMO
Ant. Pol.	Vertical
Test Mode:	TX 802.11ac(VHT20) Mode 5825MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5850.000	60.38	4.95	65.33	122.20	-56.87	peak

Remarks:

- 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- 2.Margin value = Level -Limit value



Ant No.	MIMO
Ant. Pol.	Horizontal
Test Mode:	TX 802.11ac(VHT40) Mode 5755MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	68.32	4.54	72.86	122.20	-49.34	peak

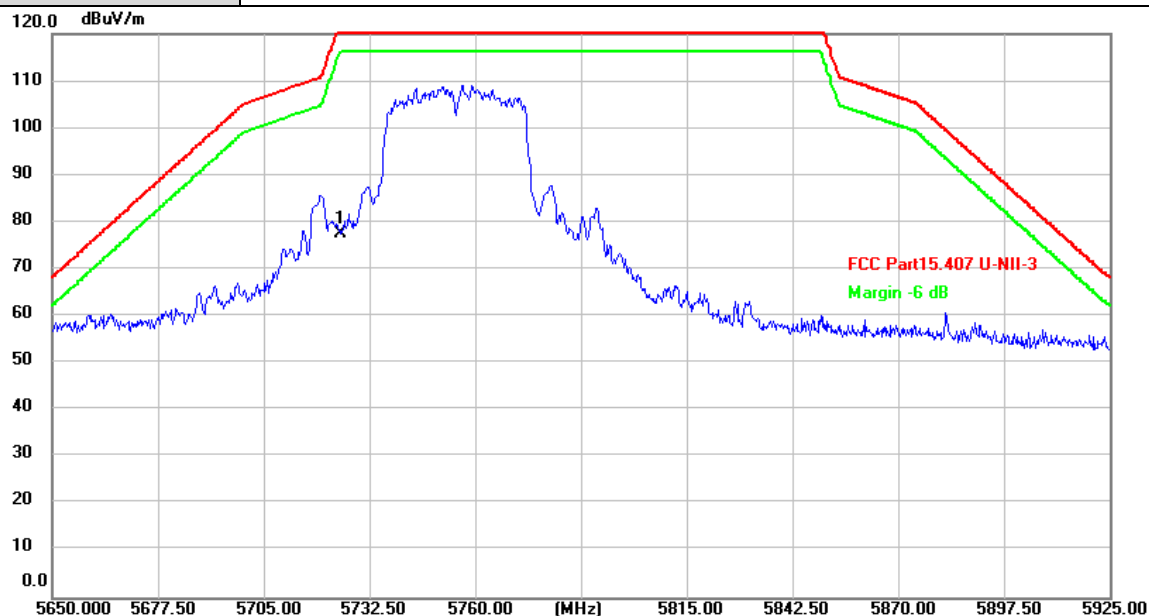
Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value



Ant No.	MIMO
Ant. Pol.	Vertical
Test Mode:	TX 802.11ac(VHT40) Mode 5755MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	73.11	4.54	77.65	122.20	-44.55	peak

Remarks:

- Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
- Margin value = Level -Limit value



Ant No.	MIMO
Ant. Pol.	Horizontal
Test Mode:	TX 802.11ac(VHT40) Mode 5795MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5850.000	49.69	4.95	54.64	122.20	-67.56	peak

Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value



Ant No.	MIMO
Ant. Pol.	Vertical
Test Mode:	TX 802.11ac(VHT40) Mode 5795MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5850.000	59.91	4.95	64.86	122.20	-57.34	peak

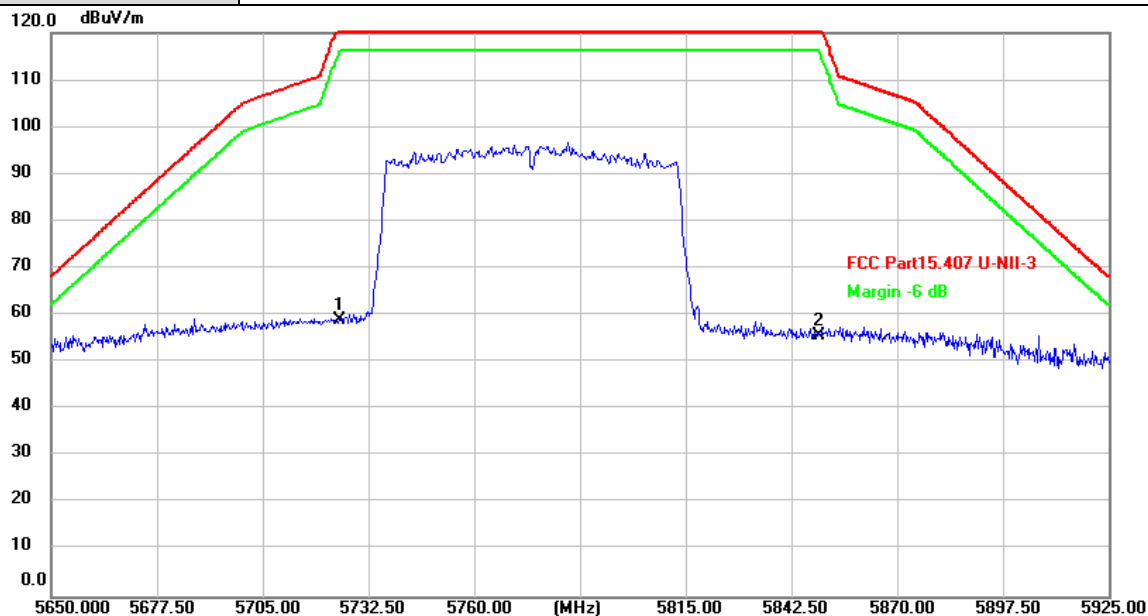
Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value



Ant No.	MIMO
Ant. Pol.	Horizontal
Test Mode:	TX 802.11ac(VHT80) Mode 5775MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	54.48	4.54	59.02	122.20	-63.18	peak
2	5850.000	50.69	4.95	55.64	122.20	-66.56	peak

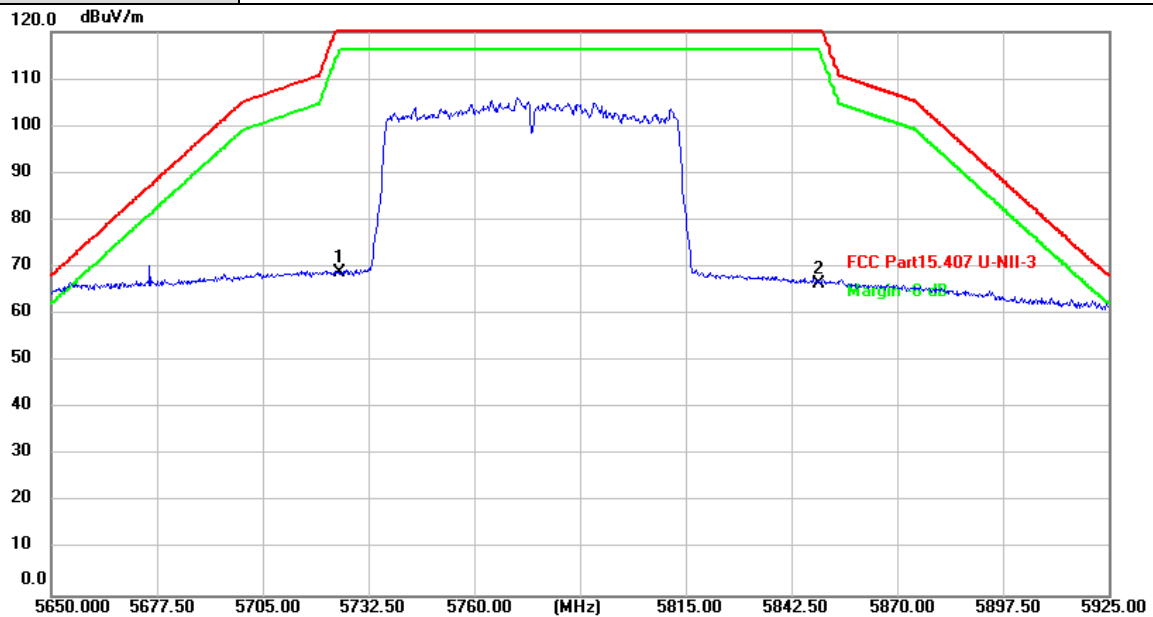
Remarks:

1. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor

2. Margin value = Level - Limit value



Ant No.	MIMO
Ant. Pol.	Vertical
Test Mode:	TX 802.11ac(VHT80) Mode 5775MHz (U-NII-3)
Remark:	No report for the emission which more than 10 dB below the prescribed limit.

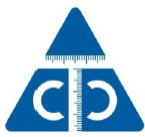


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	64.32	4.54	68.86	122.20	-53.34	peak
2	5850.000	61.65	4.95	66.60	122.20	-55.60	peak

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

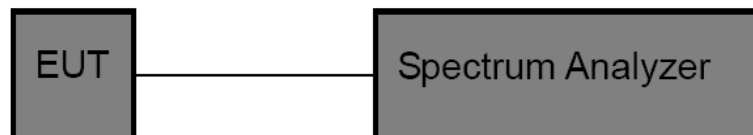


3.4. Bandwidth Test

Limit

FCC Part 15 Subpart C(15.407)/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
26 Bandwidth	N/A	5150~5250
		5250~5350
		5500~5700
6 dB Bandwidth	>500kHz	5725~5850

Test Configuration



Test Procedure

Please refer to According to KDB789033 D02, for the measurement methods.

The setting of the spectrum analyser as below:

26dB Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
Span	>26 dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW>RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto



6dB Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
Span	>6 dB Bandwidth
RBW	100 kHz
VBW	VBW>=3*RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
RBW	1% to 5% of the OBW
VBW	≥ 3RBW
Detector	Peak
Trace	Max Hold

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

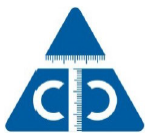
Test Mode

Please refer to the clause 2.4.

Test Results

Please see the Appendix A1, A2, A3





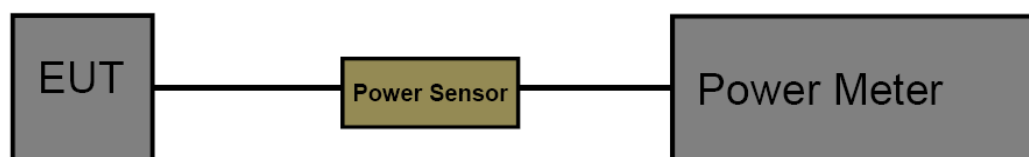
3.5. Output Power Test

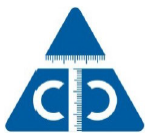
Limit

FCC Part 15 Subpart E (15.407)		
Test Item	Limit	Frequency Range(MHz)
Conducted Output Power	Fixed: 1 Watt (30dBm) Mobile and Portable: 250mW (24dBm)	5150~5250
	250mW (24dBm)	5250~5350
	250mW (24dBm)	5500~5700
	1 Watt (30dBm)	5725~5850

IC Power@PSD Limit					
Frequency	Type of devices	Maximum Conducted Output Power	EIRP Output Power	Conducted Power Spectral Density	EIRP Power Spectral Density
5150MHz-5250MHz	in vehicles		30mW or $1.76 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		
	Other Devices		200mW or $10 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		10dBm/MHz
5250MHz-5350MHz	in vehicles		30mW or $1.76 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		
	Other Devices	250mW or $11 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	1W or $17 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	11dBm/MHz	
5470MHz-5600MHz 5650MHz-5725MHz	ALL Devices	250mW or $11 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	1W or $17 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	11dBm/MHz	
5725MHz-5850MHz	ALL Devices	1W		30dBm/500KHz	

Test Configuration





Test Procedure

The measurement is according to section 3 of KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

Test Mode

Please refer to the clause 2.4.

Test Result

Please see the Appendix B



3.6. Power Spectral Density Test

Limit

FCC Part 15 Subpart E(15.407)/ RSS-247

For the 5.15~5.25GHz band:

- Outdoor AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 17 - (G_{TX} - 6)$.
- Indoor AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 17 - (G_{TX} - 6)$.
- Point-to-point AP
The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz.
If $G_{TX} > 23\text{dBi}$, then $\text{PSD} = 17 - (G_{TX} - 23)$.
- Client devices
The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 11 - (G_{TX} - 6)$.

For the 5.25~5.35GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 11 - (G_{TX} - 6)$.

For the 5.47~5.725GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 11 - (G_{TX} - 6)$.

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.
If $G_{TX} > 6\text{dBi}$, then $\text{PSD} = 30 - (G_{TX} - 6)$.
- Point-to-point systems (P2P)
The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

Note: G_{TX} : EUT Antenna gain.

IC Power&PSD Limit					
Frequency	Type of devices	Maximum Conducted Output Power	EIRP Output Power	Conducted Power Spectral Density	EIRP Power Spectral Density
5150MHz-5250MHz	in vehicles		30mW or $1.76 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		
	Other Devices		200mW or $10 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		10dBm/MHz
5250MHz-5350MHz	in vehicles		30mW or $1.76 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)		
	Other Devices	250mW or $11 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	1W or $17 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	11dBm/MHz	
5470MHz-5600MHz 5650MHz-5725MHz	ALL Devices	250mW or $11 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	1W or $17 + 10 \times \log_{10} B$ dBm, whichever is less (B=99% OBW in MHz)	11dBm/MHz	
5725MHz-5850MHz	ALL Devices	1W		30dBm/500KHz	

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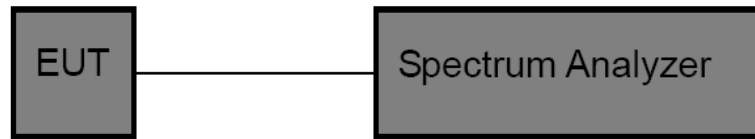
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Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyzer center frequency to transmitting frequency.
- (3) Set the span to encompass the entire emissions bandwidth (EBW)(alternatively, the entire 99% OBW) of the signal.
- (4) RBW=1MHz for devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz
RBW=500kHz for devices operating in the band 5.725-5.85 GHz
- (5) Set the VBW to: ≥ 3 RBW
- (6) Detector: AVG
- (7) Trace: Max Hold and View
- (7) Sweep time: auto
- (8) Trace average at least 100 traces in power averaging.
- (9) User the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Result

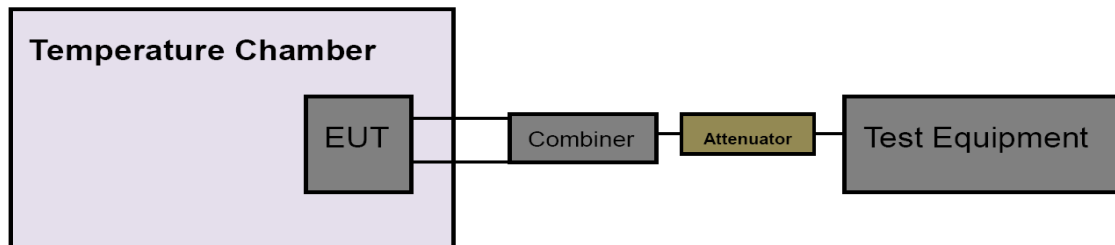
Please see the Appendix C

3.7. Frequency Stability Measurement

Limit

FCC Part 15 Subpart C(15.407)		
Test Item	Limit	Frequency Range(MHz)
Peak Excursion Measurement	Specified in the user's manual, the transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)	5150~5250
		5250~5350
		5500~5700
		5725~5850

Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyzer center frequency to transmitting frequency.
- (3) Set the span to encompass the entire emissions bandwidth (EBW) of the signal.
- (4) Set the RBW to: 10 kHz, VBW=10 kHz with peak detector and maxhold settings.
- (5) The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
- (6) Extreme temperature is 0°C~45°C

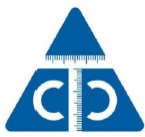
NOTE: The EUT was set to continuously transmitting in continuously un-modulation transmitting mode.

Test Mode

Please refer to the clause 2.4.

Test Result

Please see the Appendix D



3.8 Antenna Requirement

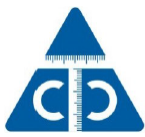
Standard Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Result

Complies



Appendix A1: Emission Bandwidth

Test Result

Mode	Channel	Ant.	Center Frequency (MHz)	26 dB Bandwidth (MHz)
IEEE 802.11a	36	0	5180	22.99
		1	5180	22.09
		2	5180	20.00
		3	5180	19.71
	40	0	5200	22.34
		1	5200	19.98
		2	5200	19.94
		3	5200	19.60
	48	0	5240	19.68
		1	5240	19.46
		2	5240	19.69
		3	5240	19.60
	52	0	5260	19.62
		1	5260	19.64
		2	5260	20.00
		3	5260	19.77
	56	0	5280	19.57
		1	5280	19.77
		2	5280	22.12
		3	5280	19.90
	64	0	5320	19.65
		1	5320	19.74
		2	5320	21.18
		3	5320	20.07
	100	0	5500	20.23
		1	5500	19.75
		2	5500	22.40
		3	5500	22.32
	116	0	5580	19.64
		1	5580	19.89
		2	5580	19.97
		3	5580	19.59
	140	0	5700	19.68
		1	5700	19.70
		2	5700	19.92
		3	5700	19.61
IEEE 802.11n_20	36	0	5180	19.95
		1	5180	20.22
		2	5180	20.05
		3	5180	19.77
	40	0	5200	19.96
		1	5200	20.17
		2	5200	19.97
		3	5200	19.87
	48	0	5240	20.21
		1	5240	20.13
		2	5240	19.98
		3	5240	19.88
	52	0	5260	20.04
		1	5260	20.16
		2	5260	20.07
		3	5260	19.80
	56	0	5280	19.81
		1	5280	20.22
		2	5280	20.04
		3	5280	19.68
	64	0	5320	19.90
		1	5320	20.21

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	100	2	5320	19.92
		3	5320	19.77
		0	5500	20.26
		1	5500	20.15
		2	5500	20.04
		3	5500	19.78
	116	0	5580	20.03
		1	5580	20.17
		2	5580	20.21
		3	5580	19.76
	140	0	5700	20.13
		1	5700	20.12
		2	5700	19.91
		3	5700	19.92
IEEE 802.11n_40	38	0	5190	40.35
		1	5190	40.08
		2	5190	39.67
		3	5190	40.07
	46	0	5230	40.16
		1	5230	40.02
		2	5230	39.68
		3	5230	39.90
	54	0	5270	39.92
		1	5270	40.42
		2	5270	40.08
		3	5270	39.94
	62	0	5310	39.74
		1	5310	39.70
		2	5310	39.96
		3	5310	40.10
	102	0	5510	40.09
		1	5510	40.18
		2	5510	39.92
		3	5510	39.87
	110	0	5550	39.90
		1	5550	40.09
		2	5550	39.95
		3	5550	39.86
	134	0	5670	39.93
		1	5670	40.11
		2	5670	39.72
		3	5670	39.66
IEEE 802.11ac_20	36	0	5180	20.04
		1	5180	19.98
		2	5180	20.18
		3	5180	20.36
	40	0	5200	20.28
		1	5200	20.09
		2	5200	20.23
		3	5200	20.27
	48	0	5240	20.08
		1	5240	20.06
		2	5240	20.08
		3	5240	20.16
	52	0	5260	20.01
		1	5260	20.15
		2	5260	20.02
		3	5260	20.07
	56	0	5280	20.05
		1	5280	20.15
		2	5280	20.13
		3	5280	20.05
	64	0	5320	20.19
		1	5320	20.17
		2	5320	20.18
		3	5320	20.14

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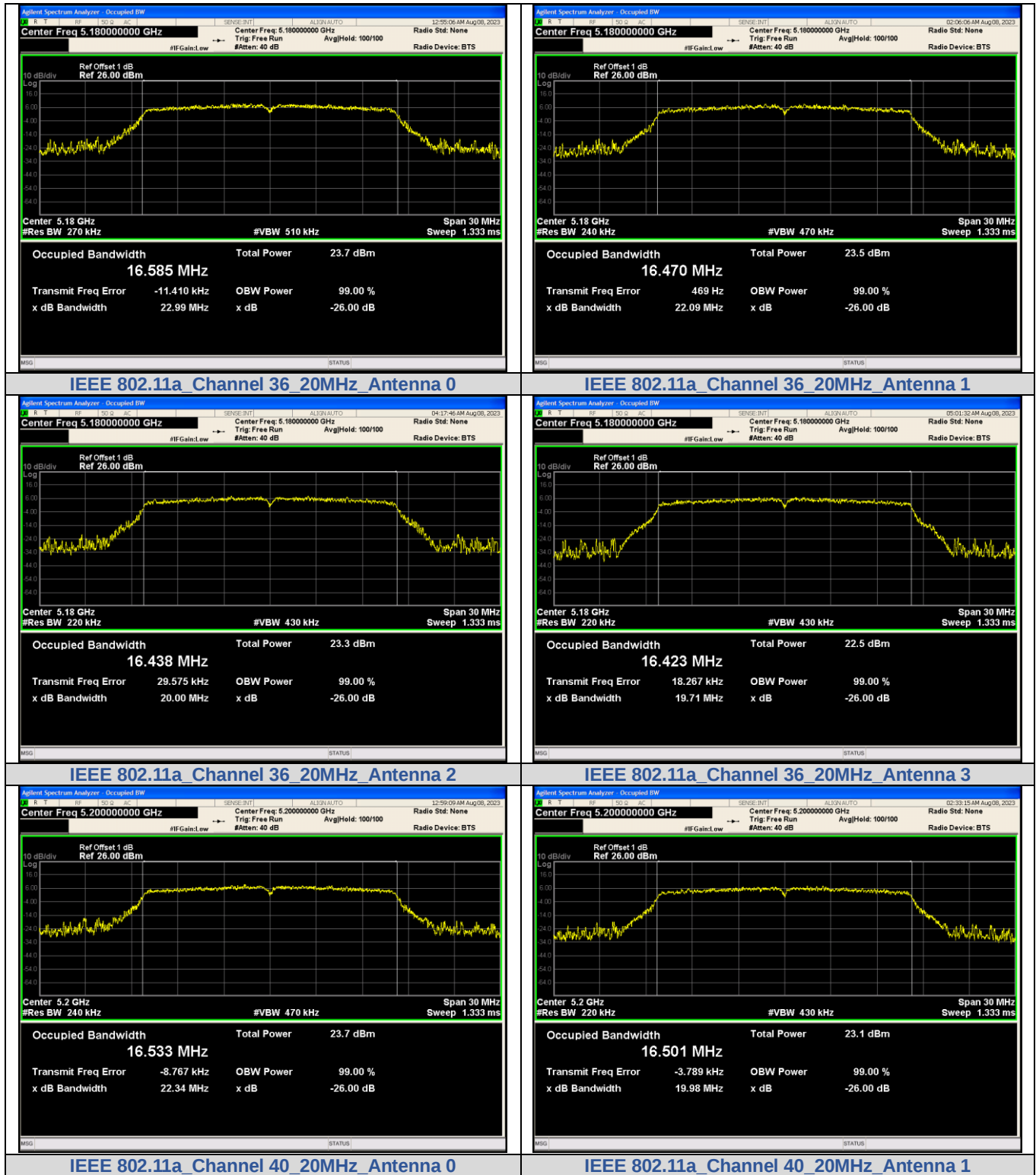
	100	0	5500	20.19
		1	5500	20.02
		2	5500	19.91
		3	5500	20.04
	116	0	5580	20.02
		1	5580	20.06
		2	5580	20.27
		3	5580	20.03
	140	0	5700	20.09
		1	5700	20.05
		2	5700	20.20
		3	5700	20.03
IEEE 802.11ac_40	38	0	5190	39.86
		1	5190	39.48
		2	5190	39.49
		3	5190	39.43
	46	0	5230	40.77
		1	5230	39.62
		2	5230	39.43
		3	5230	39.53
	54	0	5270	40.25
		1	5270	39.61
		2	5270	39.62
		3	5270	39.58
	62	0	5310	40.07
		1	5310	39.73
		2	5310	39.21
		3	5310	39.87
	102	0	5510	39.98
		1	5510	40.37
		2	5510	39.79
		3	5510	39.57
	110	0	5550	40.37
		1	5550	39.80
		2	5550	39.35
		3	5550	39.60
	134	0	5670	39.90
		1	5670	39.96
		2	5670	39.71
		3	5670	39.52
IEEE 802.11ac_80	42	0	5210	80.63
		1	5210	80.08
		2	5210	80.48
		3	5210	80.90
	58	0	5290	80.79
		1	5290	80.37
		2	5290	80.06
		3	5290	80.57
	106	0	5530	80.65
		1	5530	80.41
		2	5530	80.30
		3	5530	80.59
	122	0	5610	80.91
		1	5610	80.22
		2	5610	79.98
		3	5610	80.44



Mode	Channel	Ant.	Center Frequency (MHz)	26 dB Bandwidth (MHz)
IEEE 802.11a	149	0	5745	19.72
		1	5745	20.02
		2	5745	19.44
		3	5745	19.61
	157	0	5785	19.61
		1	5785	19.59
		2	5785	20.02
		3	5785	19.81
	165	0	5825	19.69
		1	5825	19.82
		2	5825	20.05
		3	5825	19.46
IEEE 802.11n_20	149	0	5745	19.91
		1	5745	20.13
		2	5745	19.95
		3	5745	19.76
	157	0	5785	20.05
		1	5785	20.17
		2	5785	19.99
		3	5785	19.90
	165	0	5825	19.99
		1	5825	20.16
		2	5825	20.02
		3	5825	19.82
IEEE 802.11n_40	151	0	5755	39.91
		1	5755	40.51
		2	5755	39.96
		3	5755	39.87
	159	0	5795	39.86
		1	5795	39.95
		2	5795	39.70
		3	5795	40.14
IEEE 802.11ac_20	149	0	5745	20.24
		1	5745	19.98
		2	5745	20.13
		3	5745	20.15
	157	0	5785	20.30
		1	5785	20.08
		2	5785	20.10
		3	5785	20.22
	165	0	5825	20.22
		1	5825	20.03
		2	5825	20.04
		3	5825	20.14
IEEE 802.11ac_40	151	0	5755	48.12
		1	5755	39.69
		2	5755	39.55
		3	5755	39.46
	159	0	5795	53.02
		1	5795	39.98
		2	5795	39.49
		3	5795	39.78
IEEE 802.11ac_80	155	0	5775	80.72
		1	5775	80.15
		2	5775	79.75
		3	5775	80.53



Test Graphs



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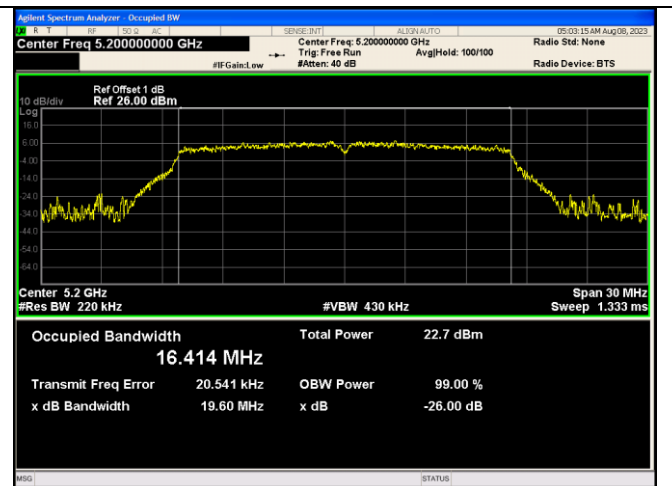
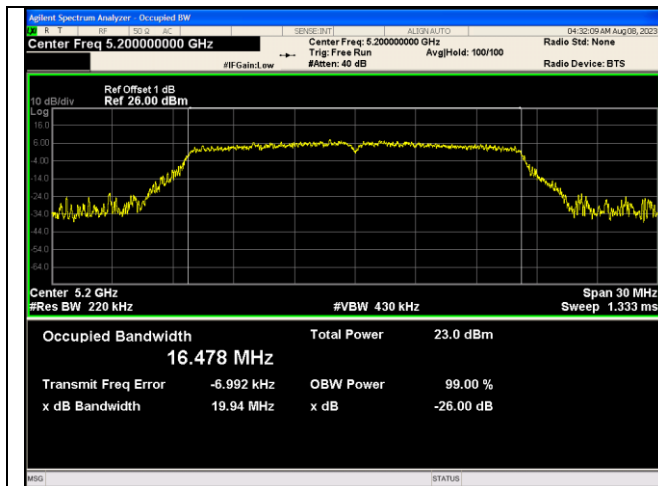
1-2/F, Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Tel.: (86)755-27521059

Fax: (86)755-27521011

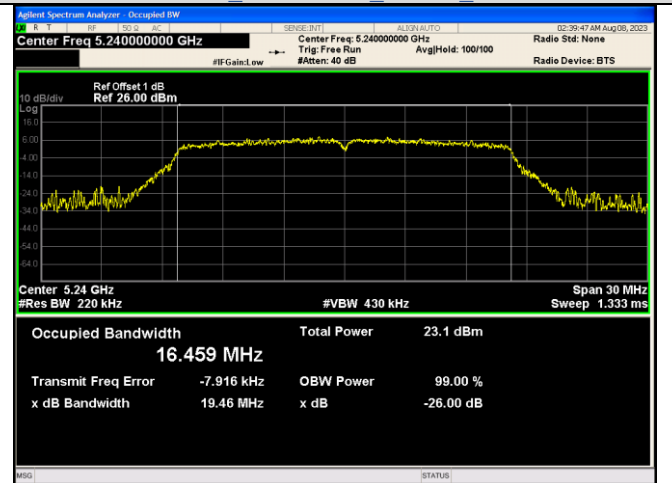
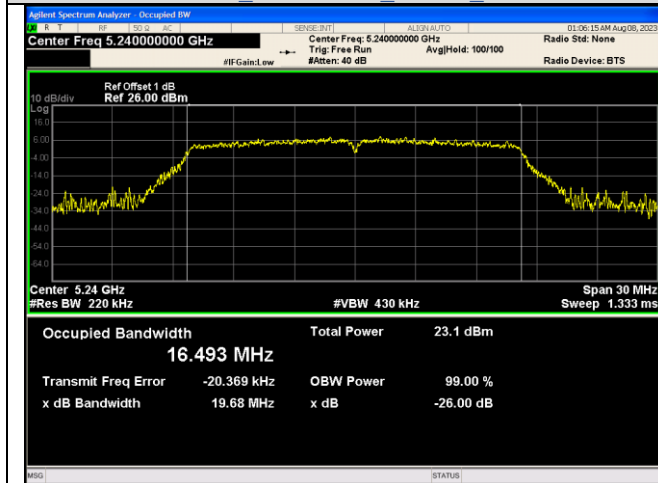
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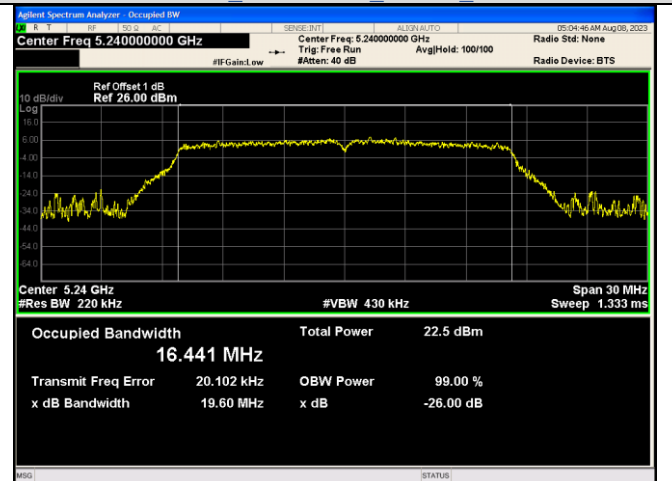
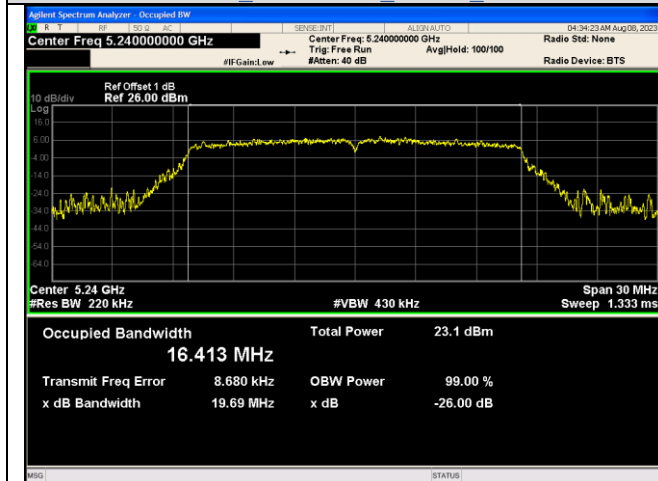
IEEE 802.11a Channel 40 20MHz Antenna 2

IEEE 802.11a Channel 40 20MHz Antenna 3



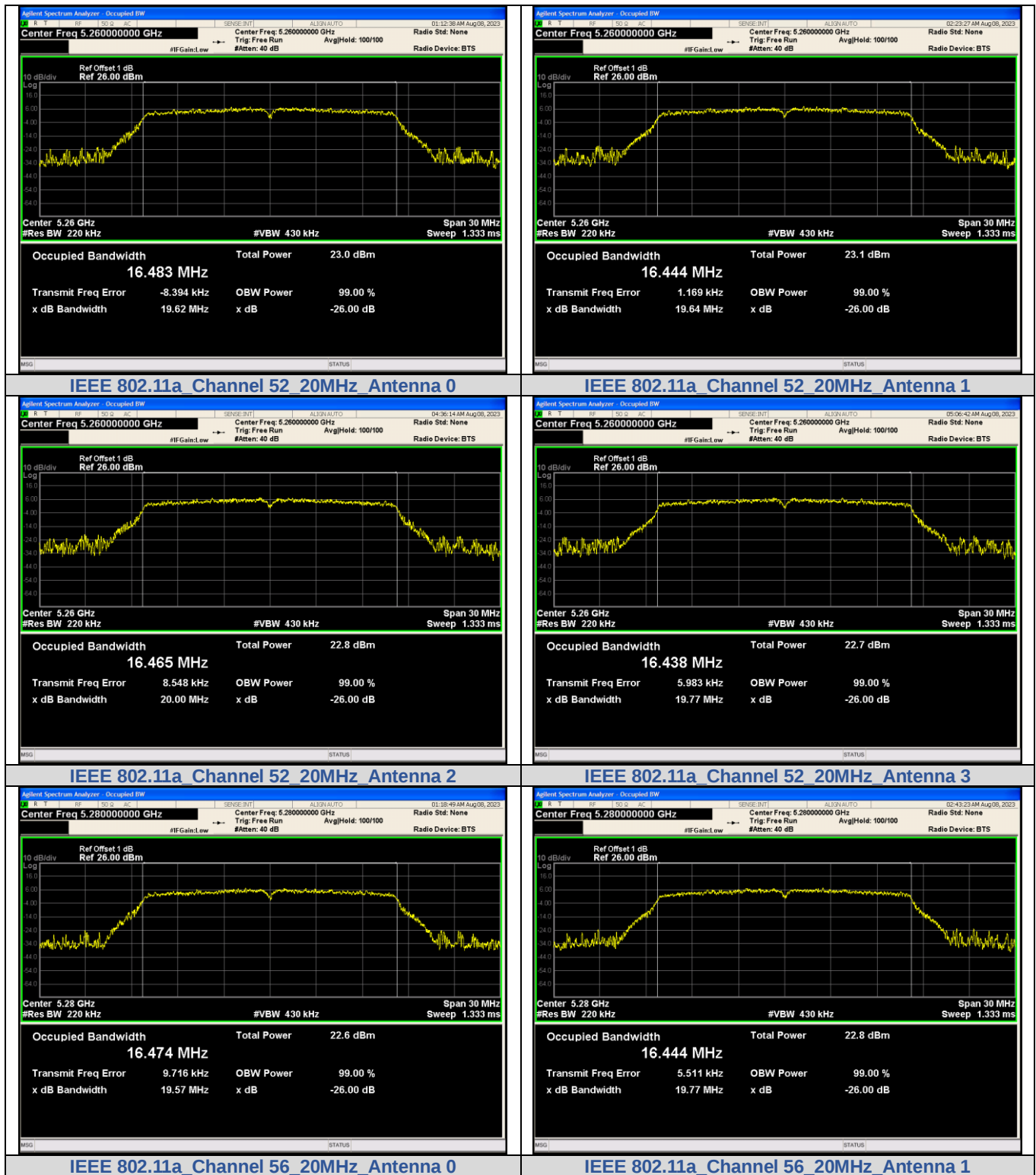
IEEE 802.11a Channel 48 20MHz Antenna 0

IEEE 802.11a Channel 48 20MHz Antenna 1



IEEE 802.11a Channel 48 20MHz Antenna 2

IEEE 802.11a Channel 48 20MHz Antenna 3



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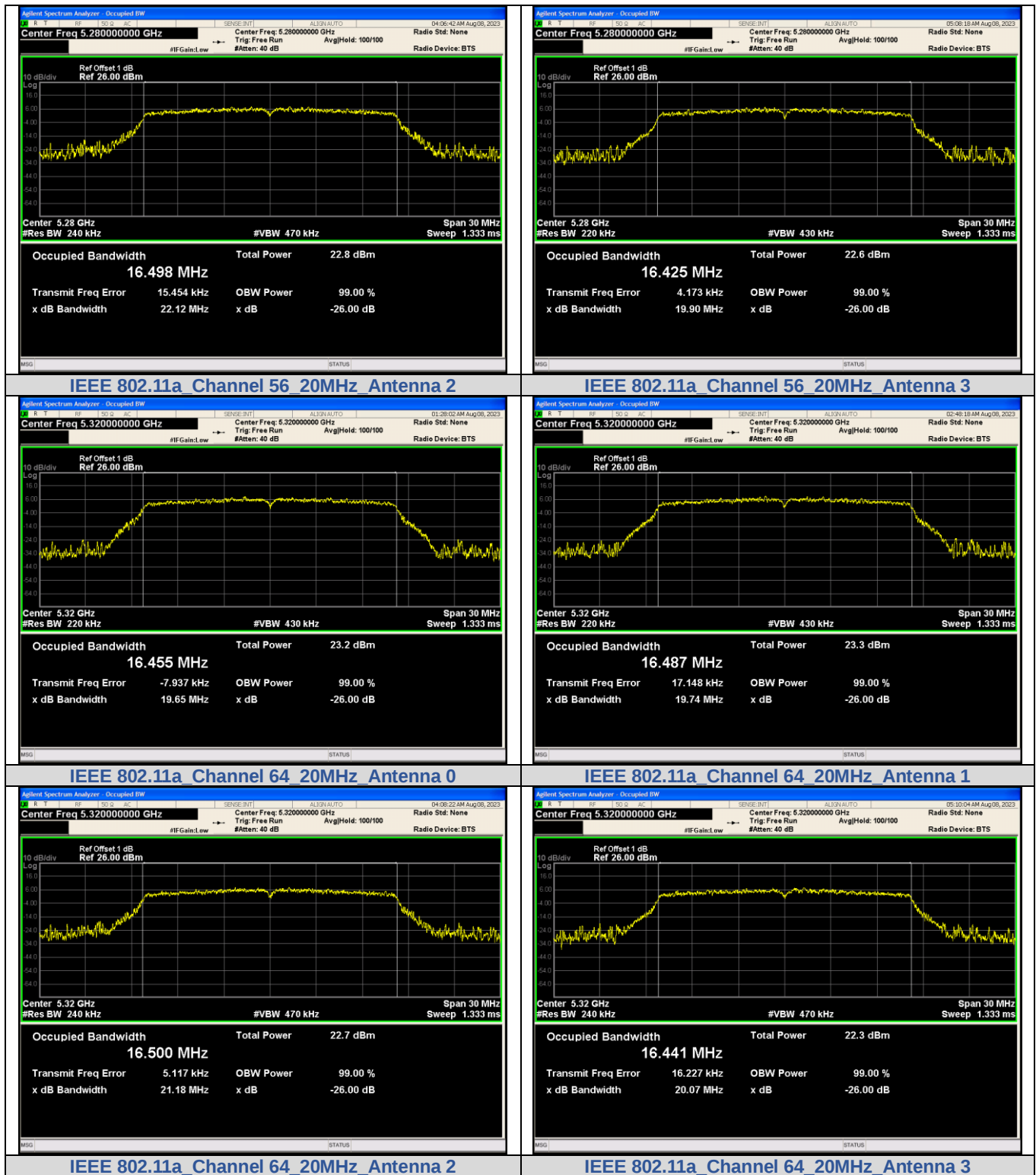
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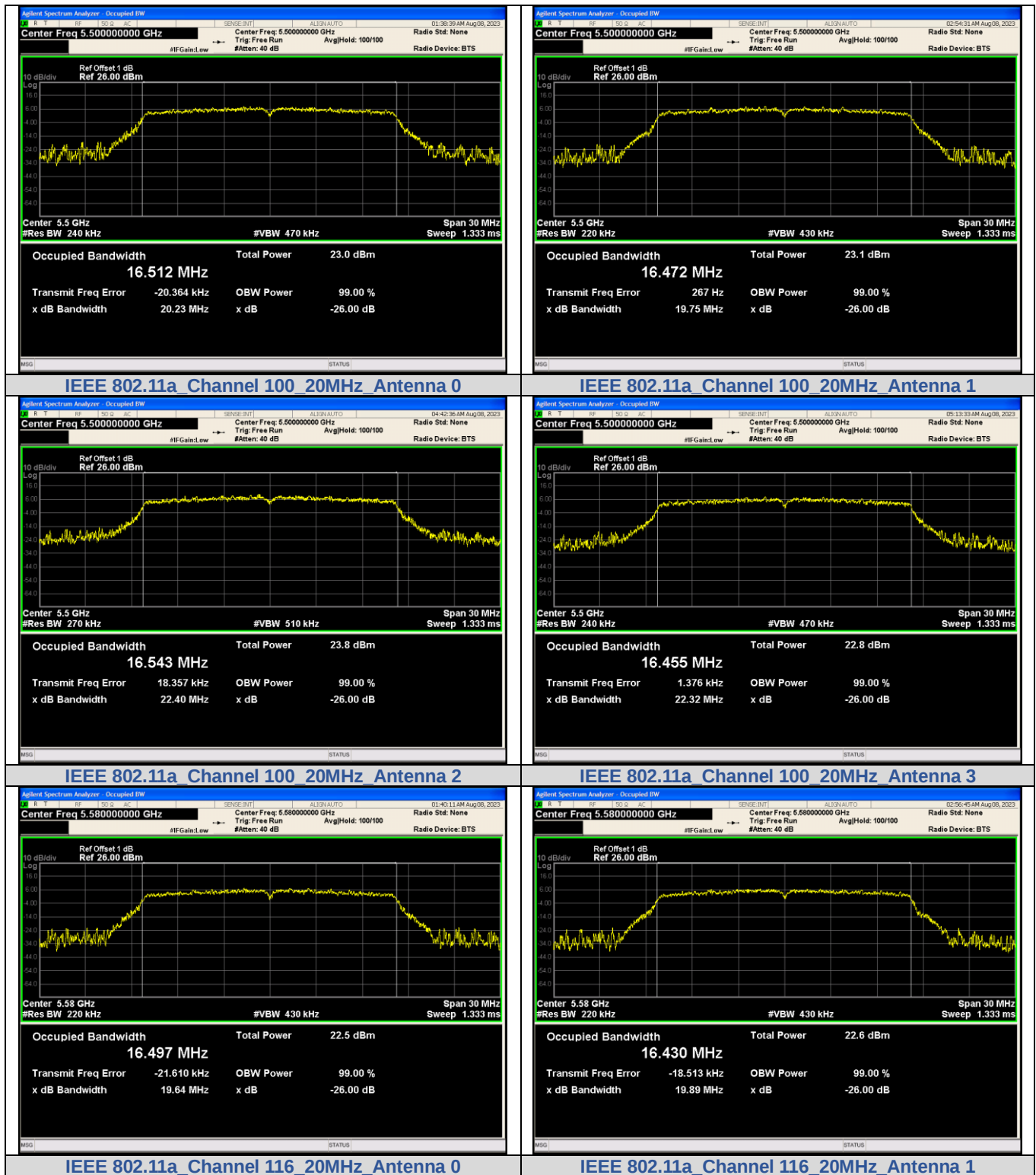
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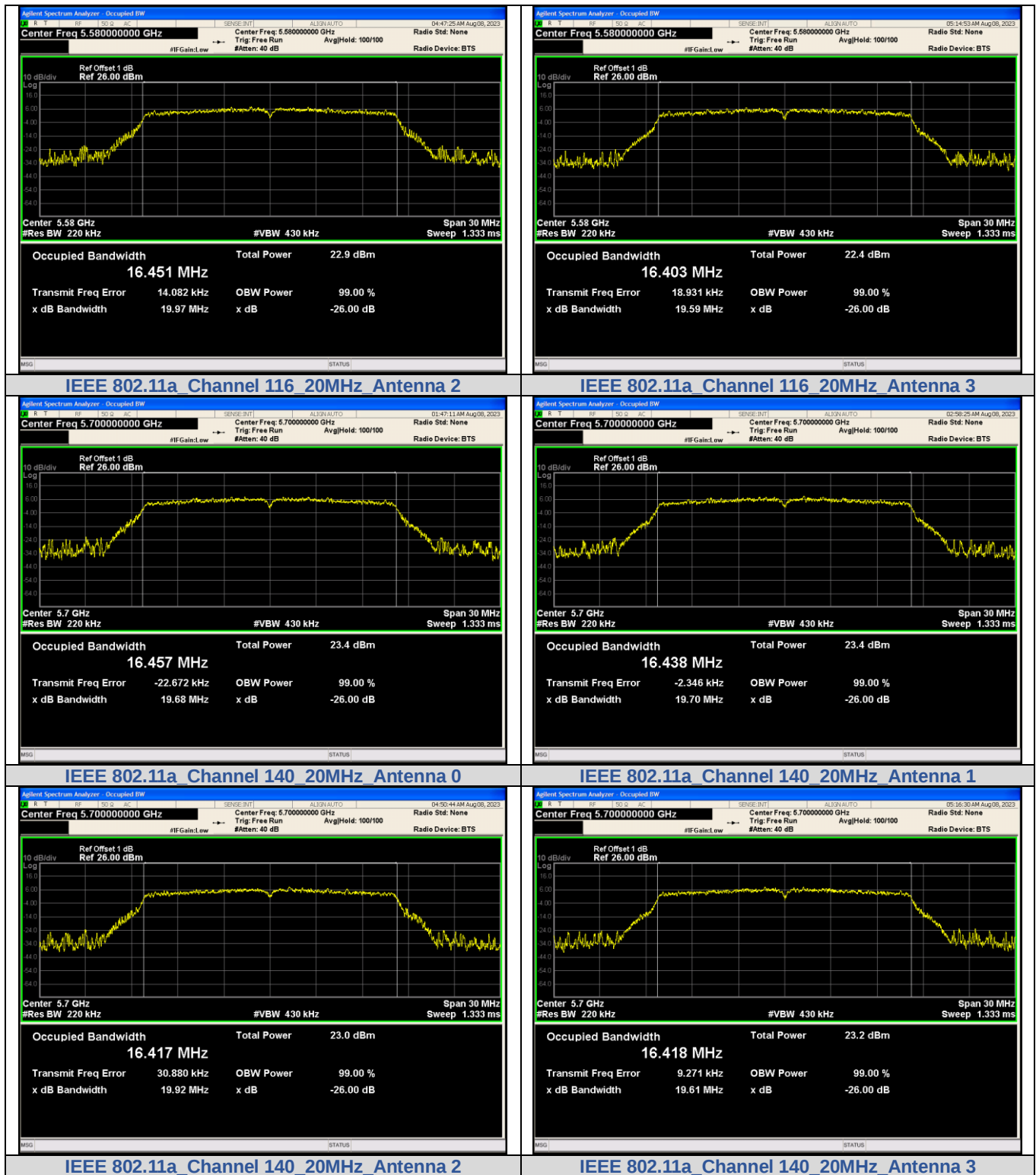
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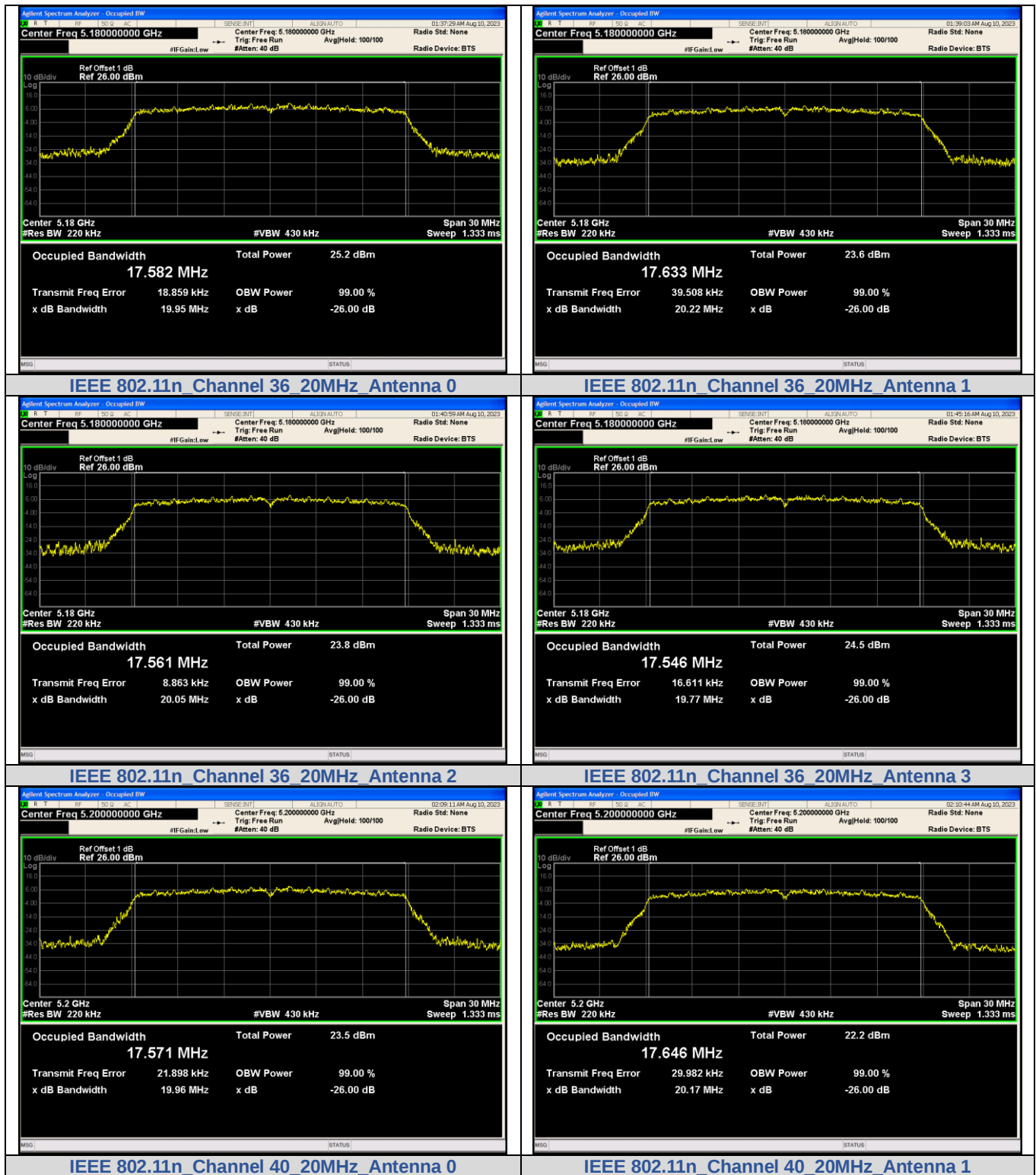
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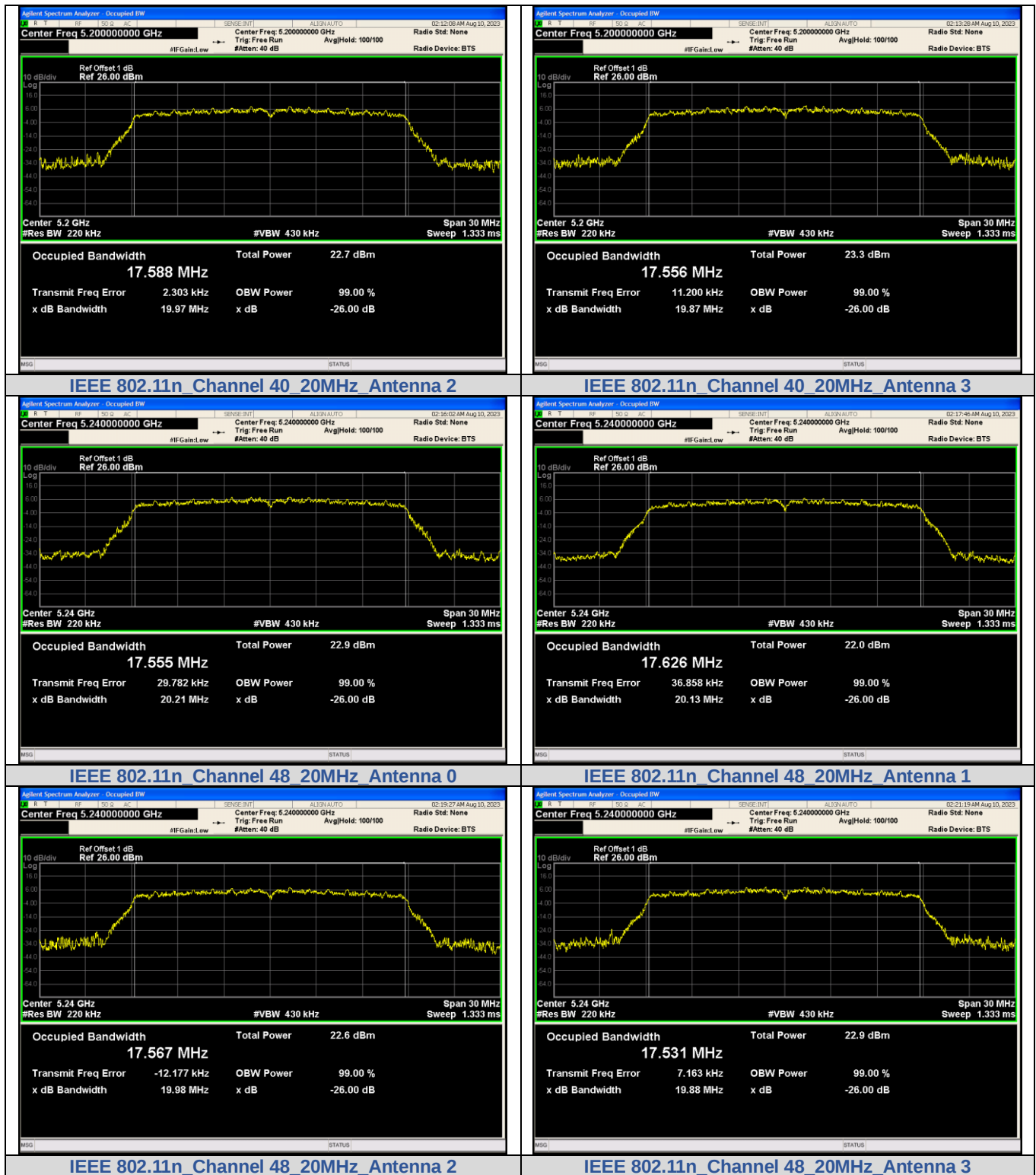
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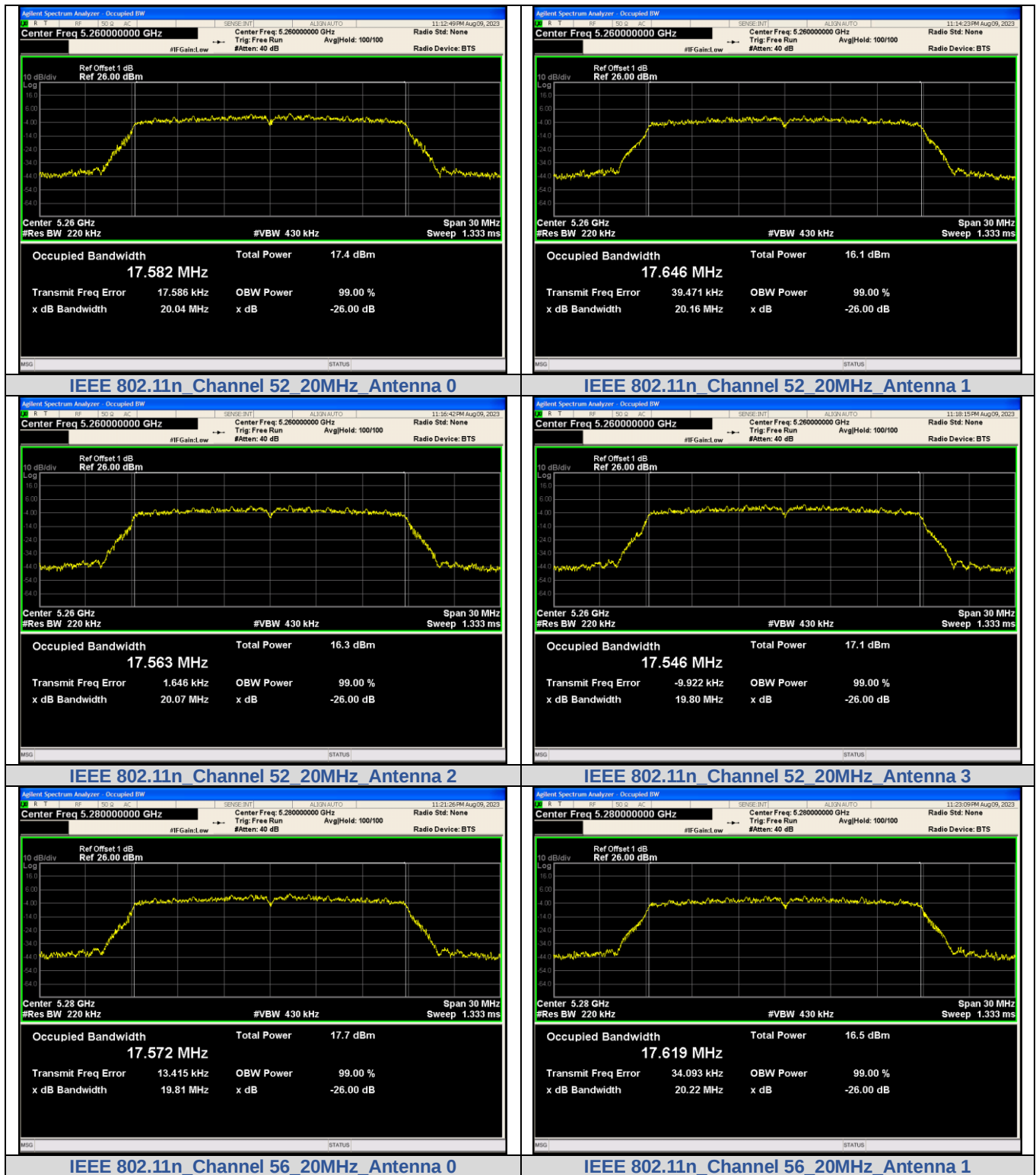
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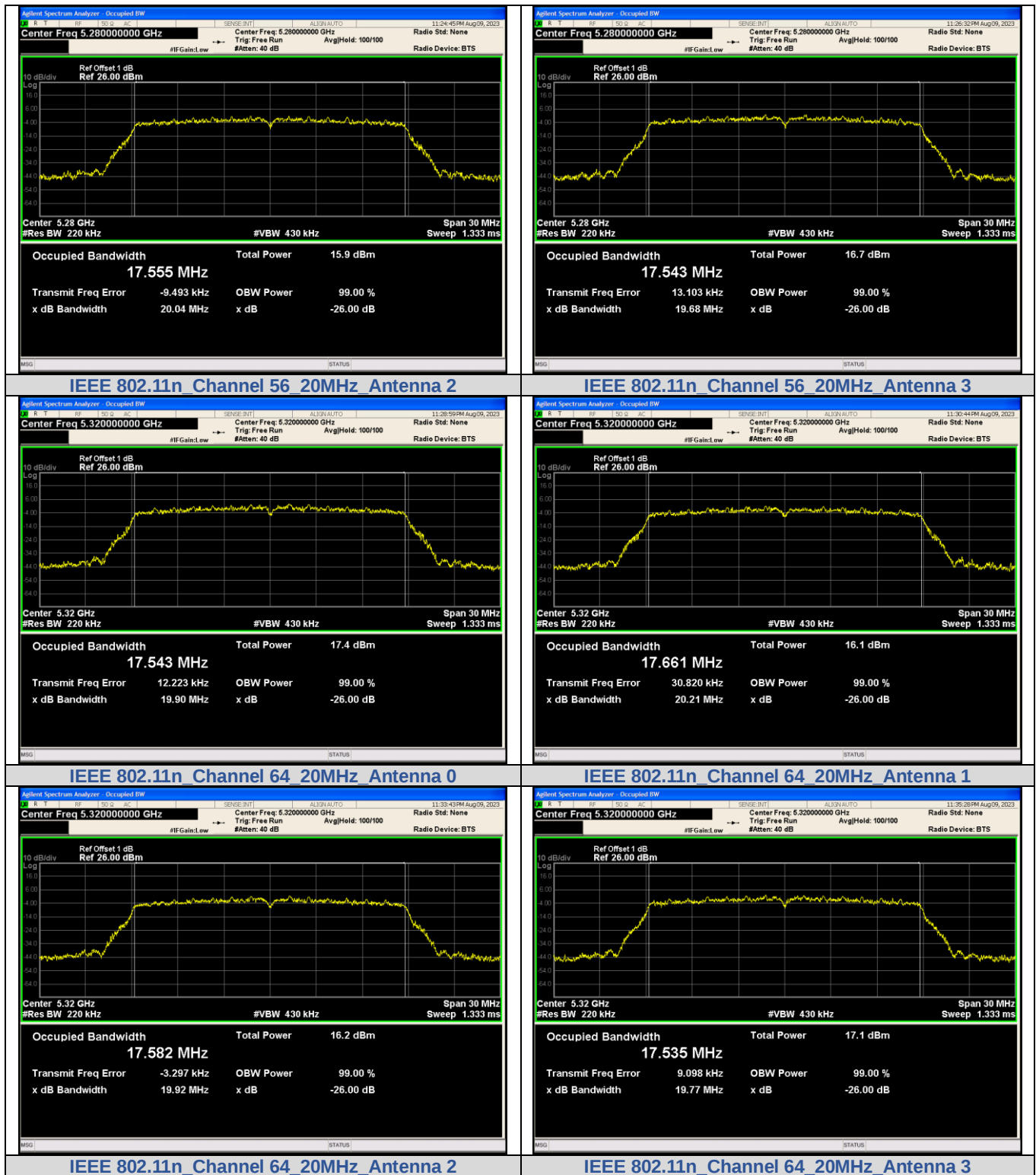
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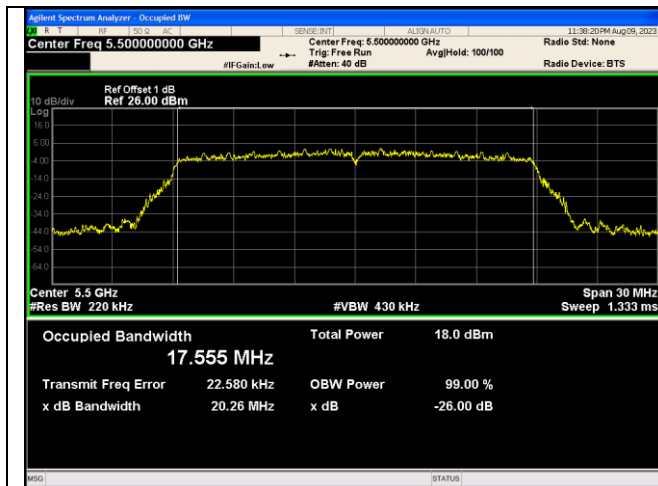
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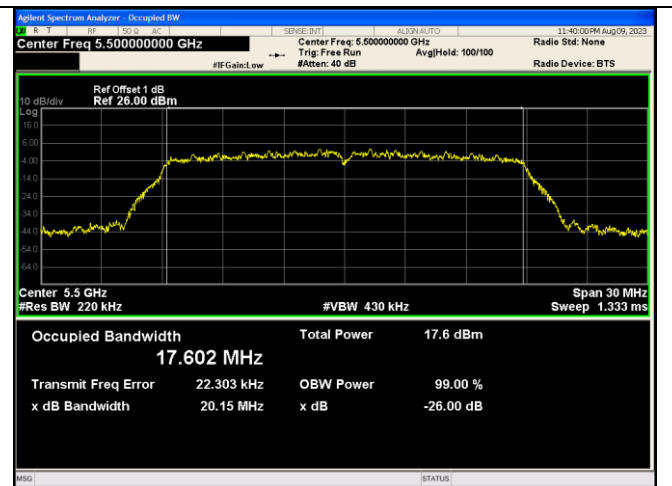
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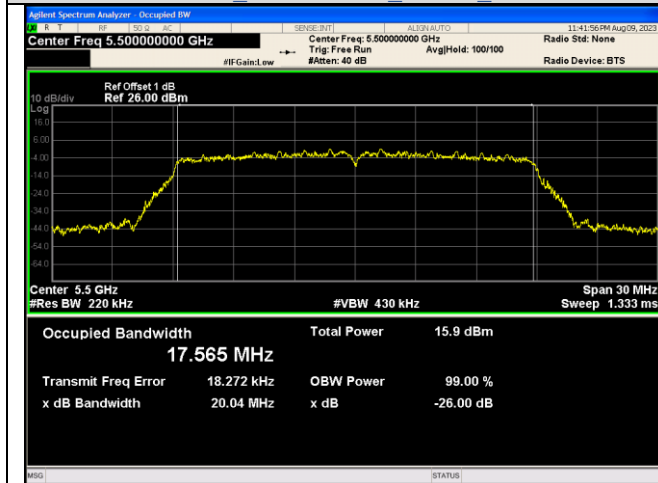




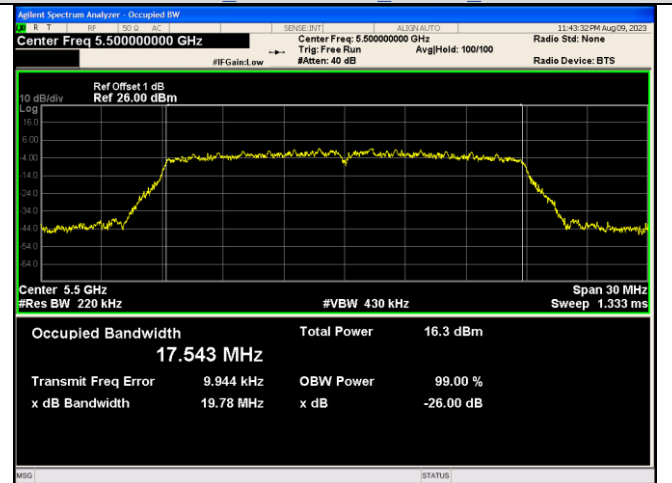
IEEE 802.11n Channel 100 20MHz Antenna 0



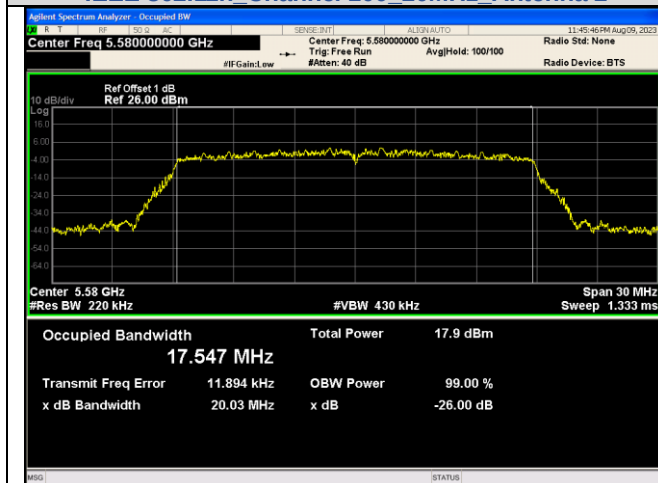
IEEE 802.11n Channel 100 20MHz Antenna 1



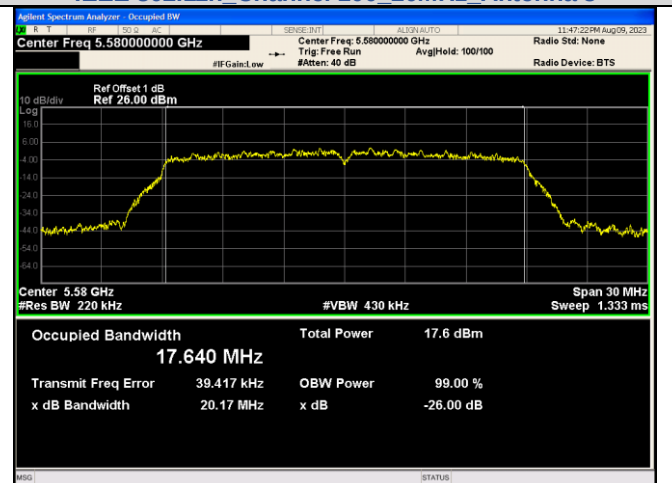
IEEE 802.11n Channel 100 20MHz Antenna 2



IEEE 802.11n Channel 100 20MHz Antenna 3



IEEE 802.11n Channel 116 20MHz Antenna 0



IEEE 802.11n Channel 116 20MHz Antenna 1