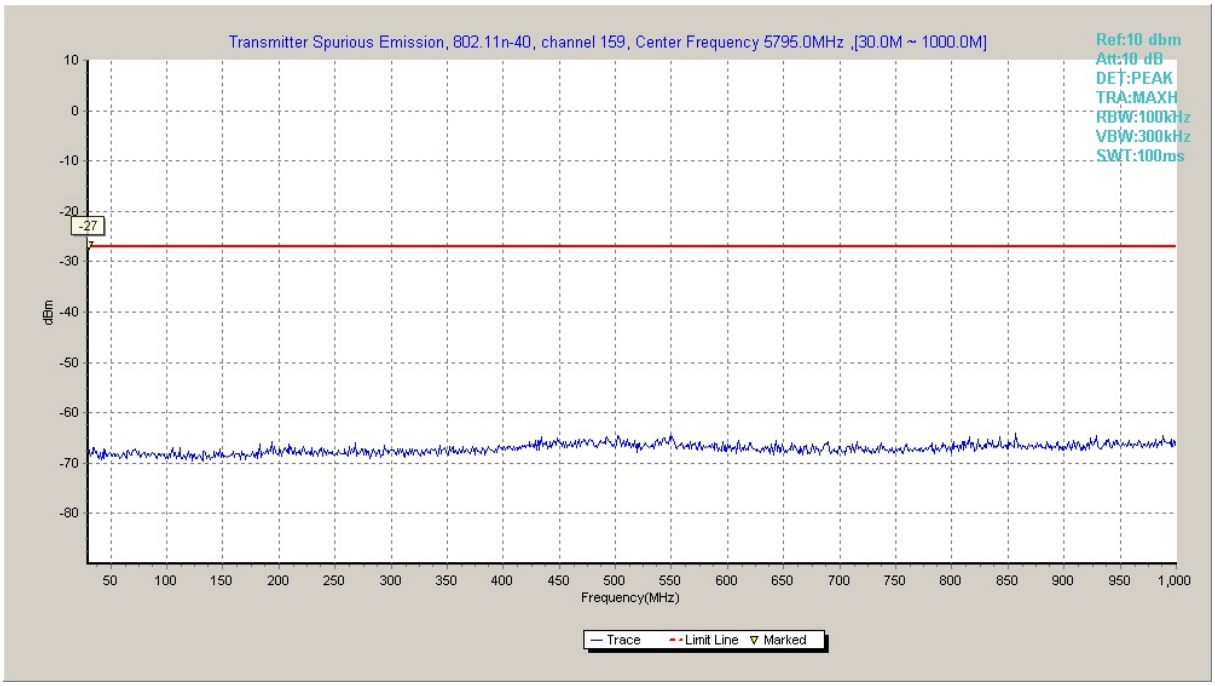

Fig. 37 Conducted Spurious Emission (802.11n-HT40, Ch159, 30 MHz-1 GHz)

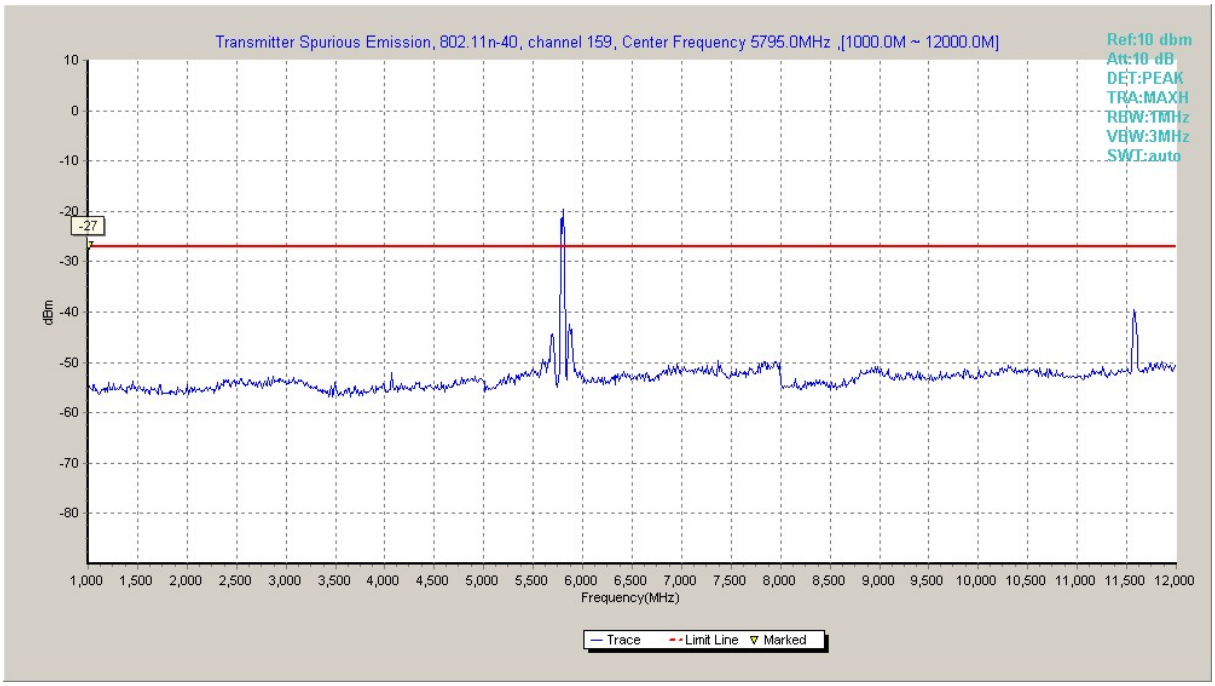

Fig. 38 Conducted Spurious Emission (802.11n-HT40, Ch159, 1 GHz -12 GHz)

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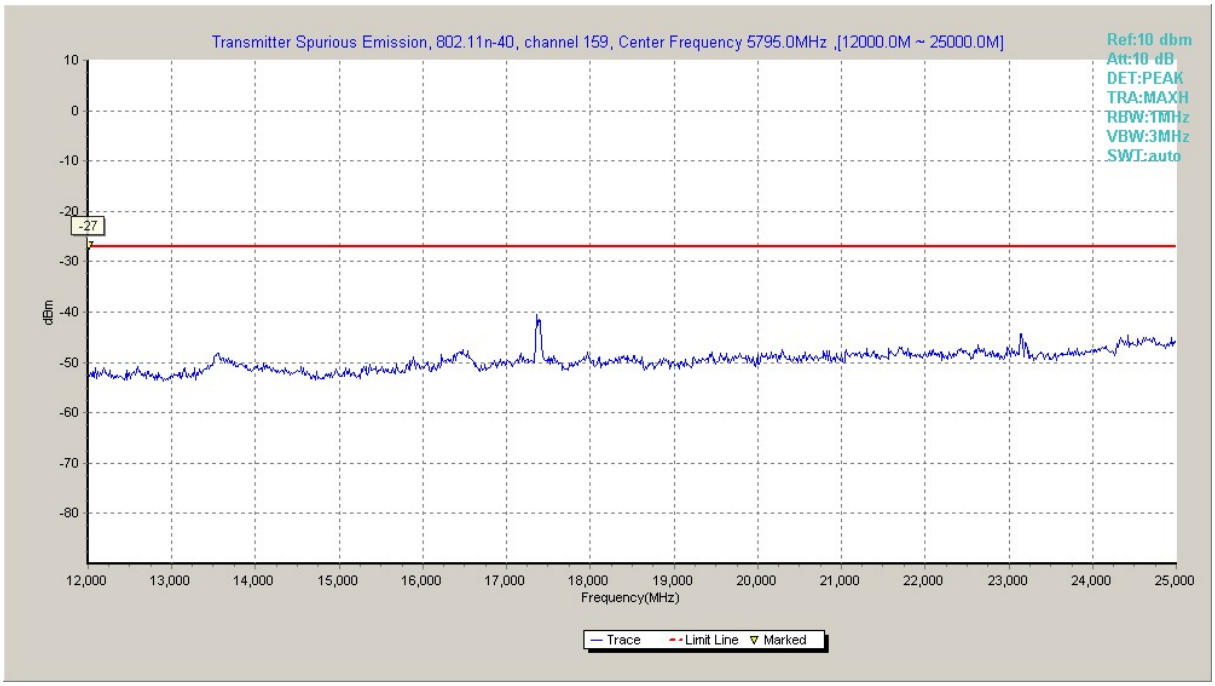

Fig. 39 Conducted Spurious Emission (802.11n-HT40, Ch159, 12 GHz-25 GHz)

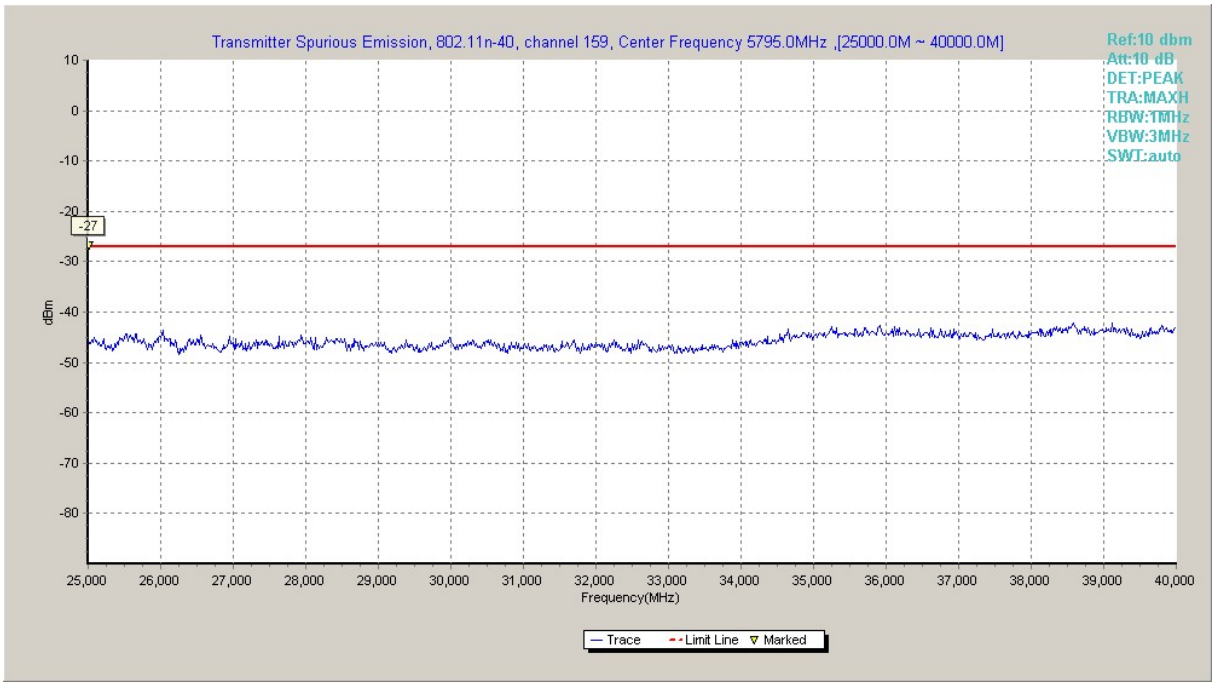

Fig. 40 Conducted Spurious Emission (802.11n-HT40, Ch159, 25 GHz-40 GHz)

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A.5.2 Transmitter Spurious Emission - Radiated

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10 .

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBμV/m)	Measurement distance(m)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Measurement Results:

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the cable loss(the gain of the preamplifier), the gain of receive antenna.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

Average Results：

802.11a

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17973.6	36.1	-25.5	43.4	18.2	V	48.0	11.9
17948.3	36.0	-25.5	43.4	18.1	V	48.0	12.0
17967.0	36.0	-25.5	43.4	18.1	H	48.0	12.0
17972.5	36.0	-25.5	43.4	18.1	V	48.0	12.0
17982.4	36.0	-25.5	43.4	18.1	V	48.0	12.0
5724.9	51.0	-16.3	34.2	33.1	H	102.0	51.0

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Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17984.6	36.4	-25.5	43.4	18.5	H	48.0	11.6
17973.6	36.3	-25.5	43.4	18.4	V	48.0	11.7
17992.3	36.2	-25.5	43.4	18.3	V	48.0	11.8
17976.9	36.1	-25.5	43.4	18.2	V	48.0	11.9
17981.3	36.1	-25.5	43.4	18.2	V	48.0	11.9
17986.8	36.1	-25.5	43.4	18.2	H	48.0	11.9

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17993.4	36.3	-25.5	43.4	18.4	V	48.0	11.7
17986.8	36.2	-25.5	43.4	18.3	V	48.0	11.8
17901.0	36.1	-25.5	43.4	18.2	V	48.0	11.9
17948.3	36.1	-25.5	43.4	18.2	V	48.0	11.9
17960.4	36.1	-25.5	43.4	18.2	V	48.0	11.9
5850.6	44.7	-16.2	34.2	26.7	H	48.0	3.3

802.11n-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17976.9	36.3	-25.5	43.4	18.4	H	48.0	11.7
17981.3	36.3	-25.5	43.4	18.4	V	48.0	11.7
17974.7	36.2	-25.5	43.4	18.3	V	48.0	11.8
17978.0	36.2	-25.5	43.4	18.3	H	48.0	11.8
17979.1	36.2	-25.5	43.4	18.3	V	48.0	11.8
5724.9	41.7	-16.3	34.2	23.8	V	48.0	6.3

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Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17975.8	36.4	-25.5	43.4	18.5	H	48.0	11.6
17970.3	36.2	-25.5	43.4	18.3	V	48.0	11.8
17987.9	36.2	-25.5	43.4	18.3	H	48.0	11.8
17978.0	36.1	-25.5	43.4	18.2	V	48.0	11.9
17982.4	36.1	-25.5	43.4	18.2	V	48.0	11.9
17986.8	36.1	-25.5	43.4	18.2	V	48.0	11.9

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17886.7	36.2	-25.5	43.4	18.3	V	48.0	11.8
17980.2	36.2	-25.5	43.4	18.3	V	48.0	11.8
17990.1	36.2	-25.5	43.4	18.3	V	48.0	11.8
17994.5	36.2	-25.5	43.4	18.3	V	48.0	11.8
17997.8	36.2	-25.5	43.4	18.3	V	48.0	11.8
5876.9	38.0	-16.2	34.2	20	H	48.0	10.0

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17987.9	36.3	-25.5	43.4	18.4	V	48.0	11.7
17994.5	36.3	-25.5	43.4	18.4	H	48.0	11.7
17973.6	36.2	-25.5	43.4	18.3	V	48.0	11.8
17982.4	36.2	-25.5	43.4	18.3	H	48.0	11.8
17957.1	36.1	-25.5	43.4	18.2	H	48.0	11.9
5722.4	58.3	-16.3	34.2	40.4	H	95.0	36.7

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Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17948.3	36.2	-25.5	43.4	18.3	V	48.0	11.8
17969.2	36.2	-25.5	43.4	18.3	H	48.0	11.8
17975.8	36.2	-25.5	43.4	18.3	V	48.0	11.8
17976.9	36.2	-25.5	43.4	18.3	H	48.0	11.8
17982.4	36.2	-25.5	43.4	18.3	V	48.0	11.8
5850.1	44.5	-16.2	34.2	26.5	H	48.0	3.5

Peak Results:

802.11a

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17947.2	48.7	-25.5	43.4	30.8	V	68.0	19.3
17883.4	48.2	-25.5	43.4	30.3	H	68.0	19.8
17939.5	47.9	-25.5	43.4	30.0	V	68.0	20.1
17942.8	47.9	-25.5	43.4	30.0	V	68.0	20.1
17973.6	47.8	-25.5	43.4	29.9	V	68.0	20.2
5724.9	70.5	-16.3	34.2	52.6	V	122.0	51.5

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17941.7	48.5	-25.5	43.4	30.6	H	68.0	19.5
17972.5	48.0	-25.5	43.4	30.1	V	68.0	20.0
17797.6	47.9	-25.5	43.4	30.0	H	68.0	20.1
17857.0	47.9	-25.5	43.4	30.0	V	68.0	20.1
17925.2	47.8	-25.5	43.4	29.9	H	68.0	20.2
17965.9	47.8	-25.5	43.4	29.9	H	68.0	20.2

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Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17983.5	48.1	-25.5	43.4	30.2	H	68.0	19.9
17711.8	48.0	-25.7	43.4	30.3	V	68.0	20.0
17862.5	48.0	-25.5	43.4	30.1	V	68.0	20.0
17895.5	48.0	-25.5	43.4	30.1	V	68.0	20.0
17964.8	48.0	-25.5	43.4	30.1	V	68.0	20.0
5851.3	64.9	-16.2	34.2	46.9	V	68.0	3.1

802.11n-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17997.8	48.5	-25.5	43.4	30.6	V	68.0	19.5
17958.2	48.0	-25.5	43.4	30.1	H	68.0	20.0
17762.4	47.9	-25.5	43.4	30.0	V	68.0	20.1
17836.1	47.9	-25.5	43.4	30.0	H	68.0	20.1
17934.0	47.9	-25.5	43.4	30.0	H	68.0	20.1
5724.3	60.6	-16.3	34.2	42.7	V	68.0	7.4

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17864.7	48.6	-25.5	43.4	30.7	V	68.0	19.4
17973.6	48.6	-25.5	43.4	30.7	H	68.0	19.4
17962.6	48.4	-25.5	43.4	30.5	H	68.0	19.6
17916.4	48.3	-25.5	43.4	30.4	V	68.0	19.7
17971.4	48.1	-25.5	43.4	30.2	H	68.0	19.9
17976.9	47.9	-25.5	43.4	30.0	V	68.0	20.1

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Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17898.8	48.5	-25.5	43.4	30.6	V	68.0	19.5
17982.4	48.1	-25.5	43.4	30.2	V	68.0	19.9
17994.5	48.1	-25.5	43.4	30.2	V	68.0	19.9
17865.8	48.0	-25.5	43.4	30.1	V	68.0	20.0
17462.1	47.9	-26.9	43.4	31.4	H	68.0	20.1
5908.6	49.9	-16.4	34.2	32.1	H	68.0	18.1

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17894.4	48.3	-25.5	43.4	30.4	H	68.0	19.7
17997.8	47.8	-25.5	43.4	29.9	H	68.0	20.2
17840.5	47.7	-25.5	43.4	29.8	V	68.0	20.3
17946.1	47.7	-25.5	43.4	29.8	V	68.0	20.3
17321.3	47.6	-25.9	40.1	33.4	V	68.0	20.4
5724.8	76.9	-16.3	34.2	59.0	H	122.0	45.1

Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)	Limit (dBμV/m))	Margin (dB)
17990.1	48.3	-25.5	43.4	30.4	V	68.0	19.7
17843.8	48.2	-25.5	43.4	30.3	H	68.0	19.8
17982.4	48.2	-25.5	43.4	30.3	V	68.0	19.8
17902.1	48.1	-25.5	43.4	30.2	H	68.0	19.9
17863.6	48.0	-25.5	43.4	30.1	H	68.0	20.0
5850.5	63.4	-16.2	34.2	45.4	H	68.0	4.6

Conclusion: PASS

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A.6. Band Edges Compliance

A6.1 Band Edges - conducted

Measurement Limit:

Standard	Limit (dBm/MHz)
FCC 47 CFR Part 15.407(b)(4)	All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The measurement is made according to KDB 789033 D02

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.41	P
	5825 MHz	Fig.42	P
802.11n HT20	5745 MHz	Fig.43	P
	5825 MHz	Fig.44	P
802.11n HT40	5755 MHz	Fig.45	P
	5795 MHz	Fig.46	P

Conclusion: PASS

Test graphs as below:

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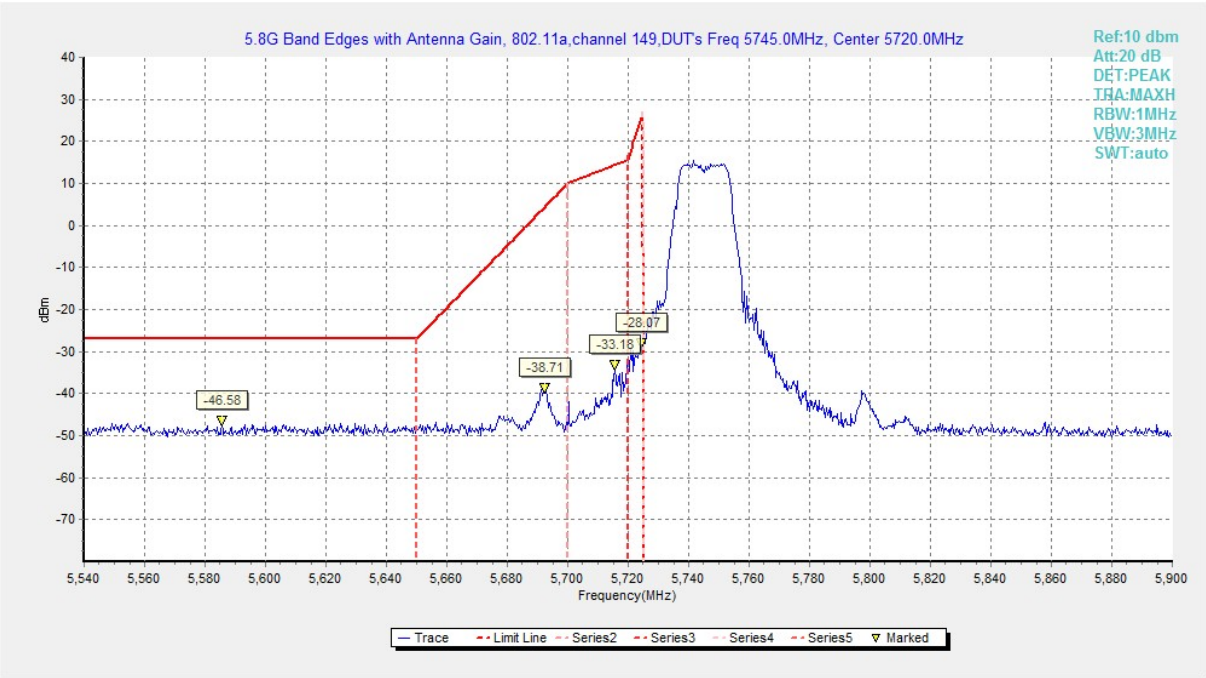

Fig. 41 Band Edges (802.11a, 5745MHz)

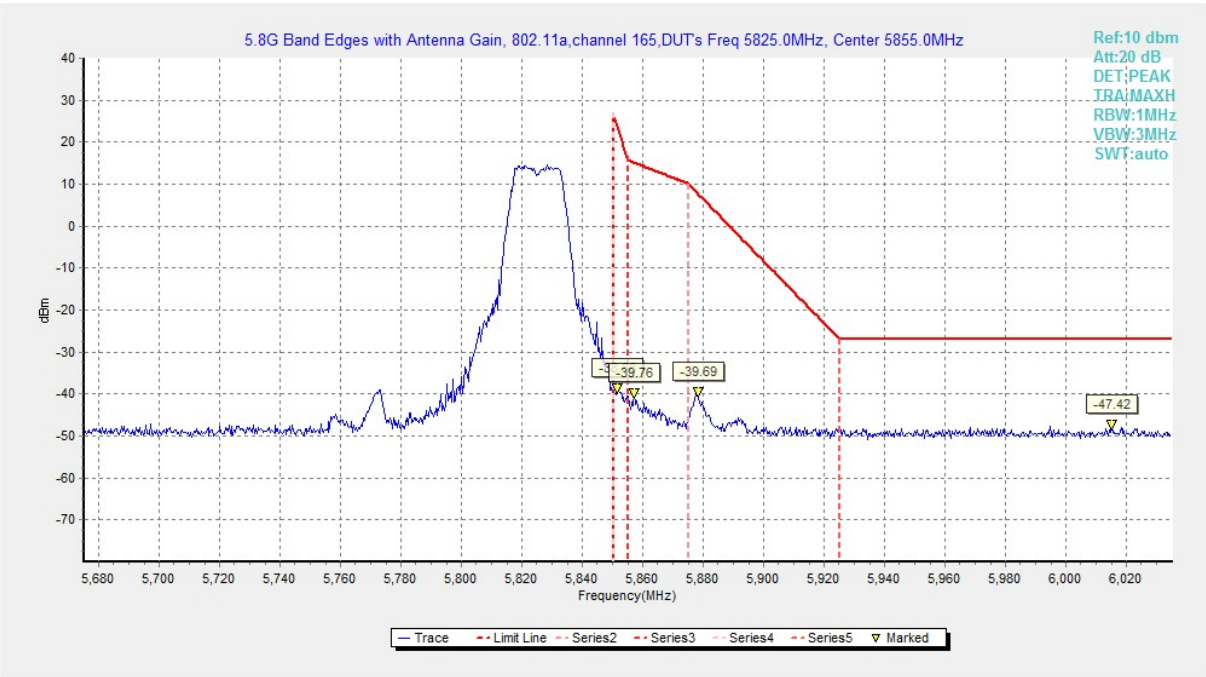

Fig. 42 Band Edges (802.11a, 5825MHz)

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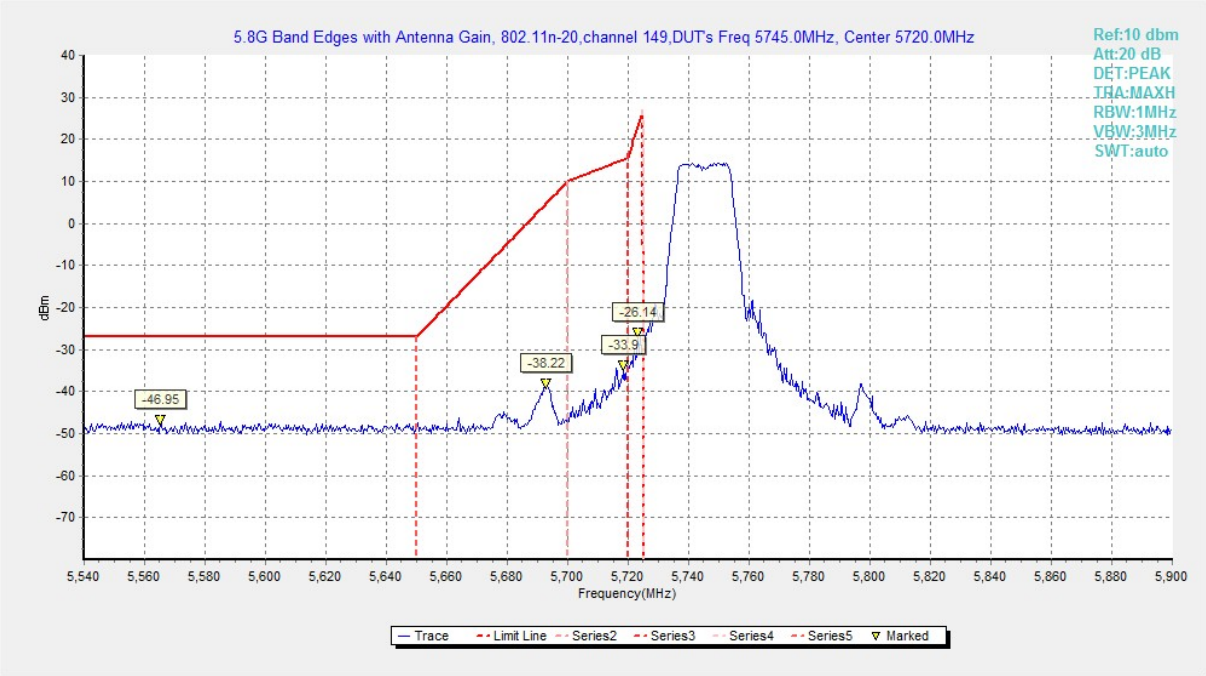

Fig. 43 Band Edges (802.11n-HT20, 5745MHz)

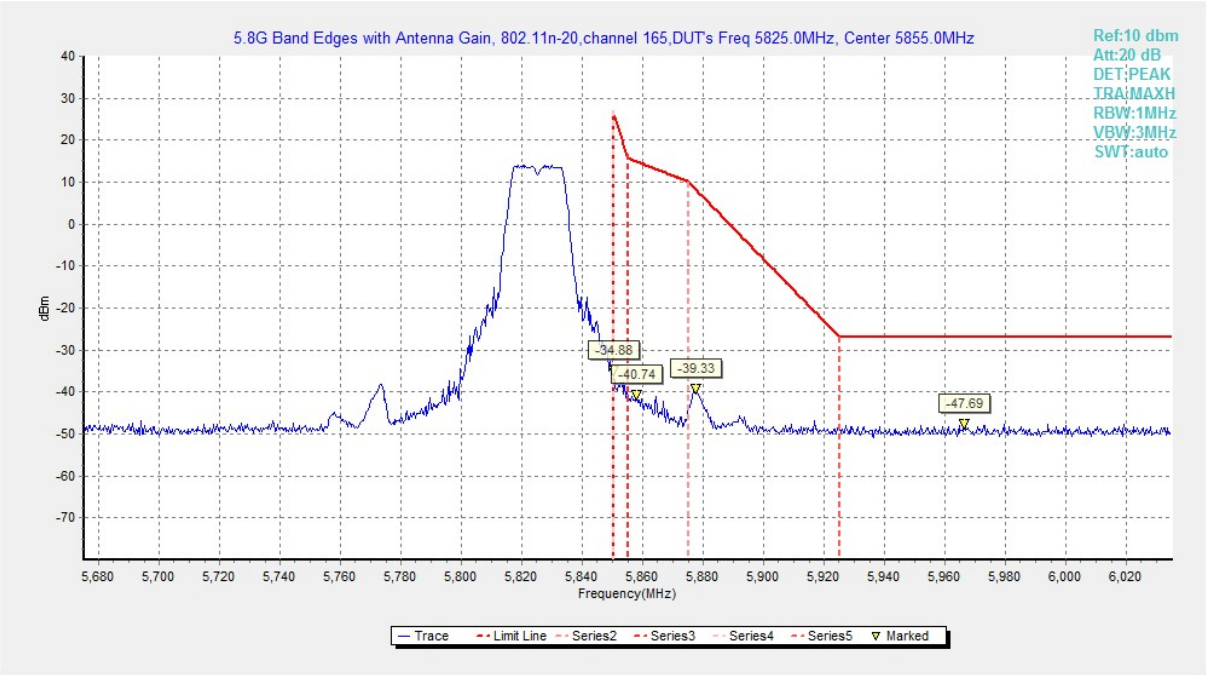

Fig. 44 Band Edges (802.11n-HT20, 5825MHz)

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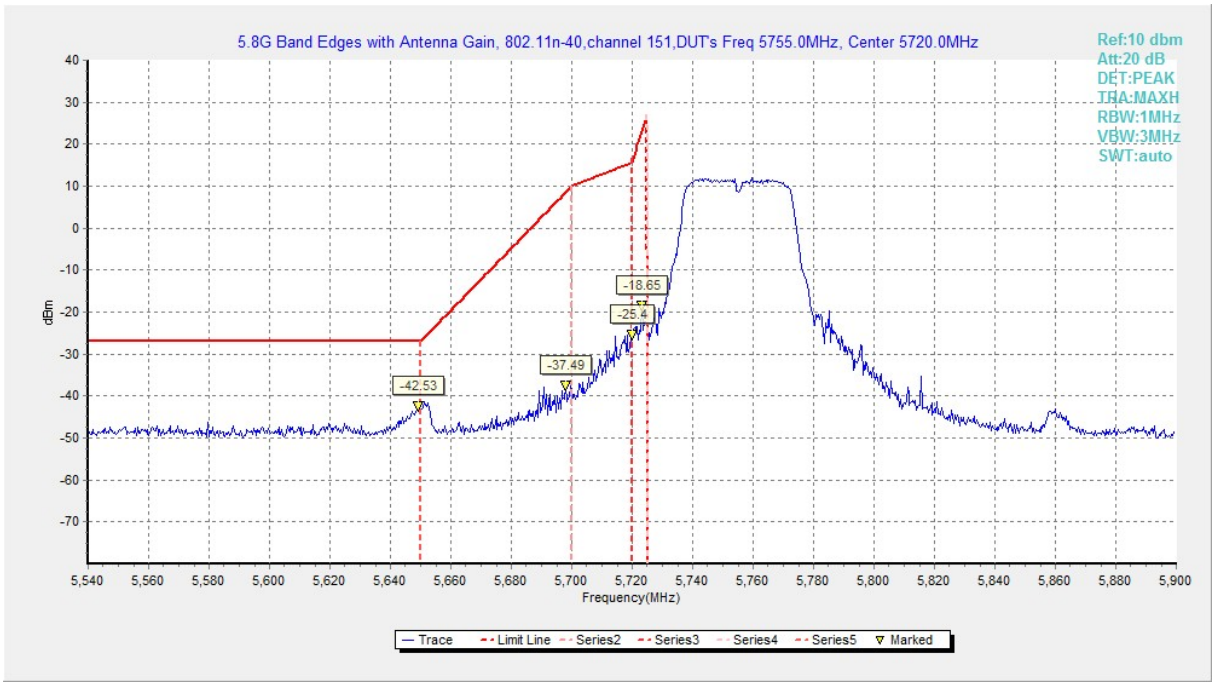

Fig. 45 Band Edges (802.11n-HT40, 5755MHz)

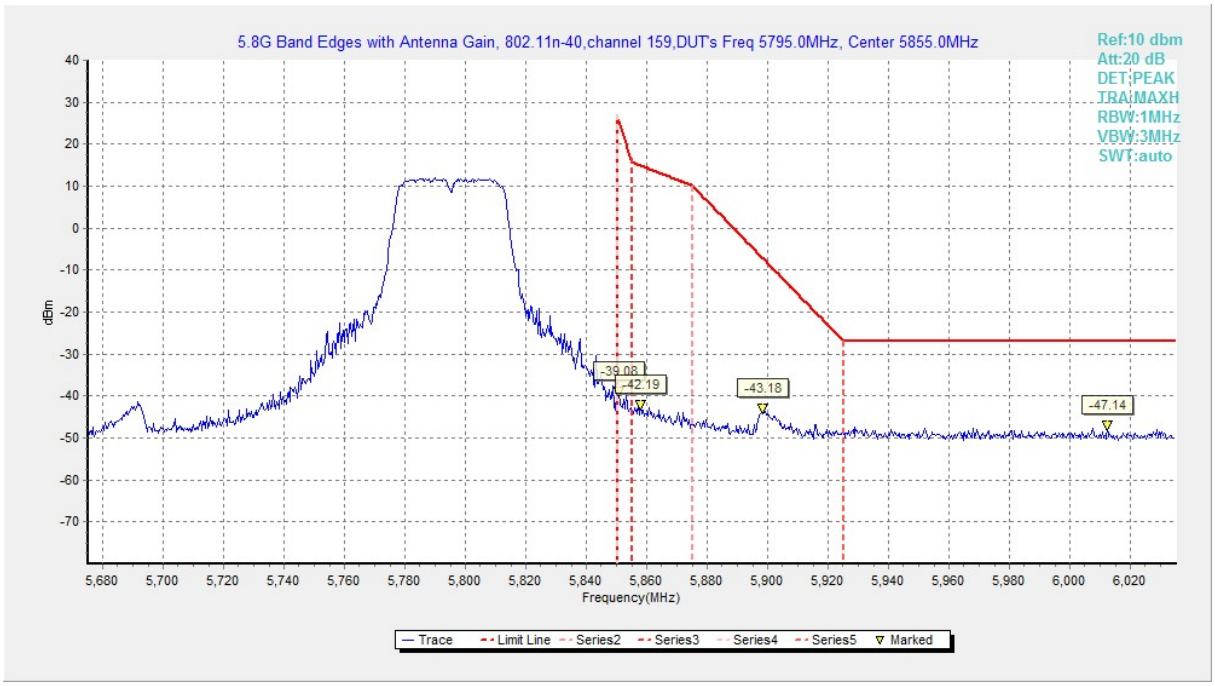

Fig. 46 Band Edges (802.11n-HT40, 5795MHz)

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A6.2 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dBm/MHz)	
FCC 47 CFR Part 15.407	at the band edge	27
	at 5 MHz above or below the band edge	15.6
	at 25 MHz above or below the band edge	10
	at 75 MHz or more above or below the band edge	-27
	Note：increasing linearly from point to point.	

The measurement is made according to KDB 789033 D02

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.47	P
	5825 MHz	Fig.48	P
802.11n HT20	5745 MHz	Fig.49	P
	5825 MHz	Fig.50	P
802.11n HT40	5755 MHz	Fig.51	P
	5795 MHz	Fig.52	P

Conclusion: PASS

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Test graphs as below:

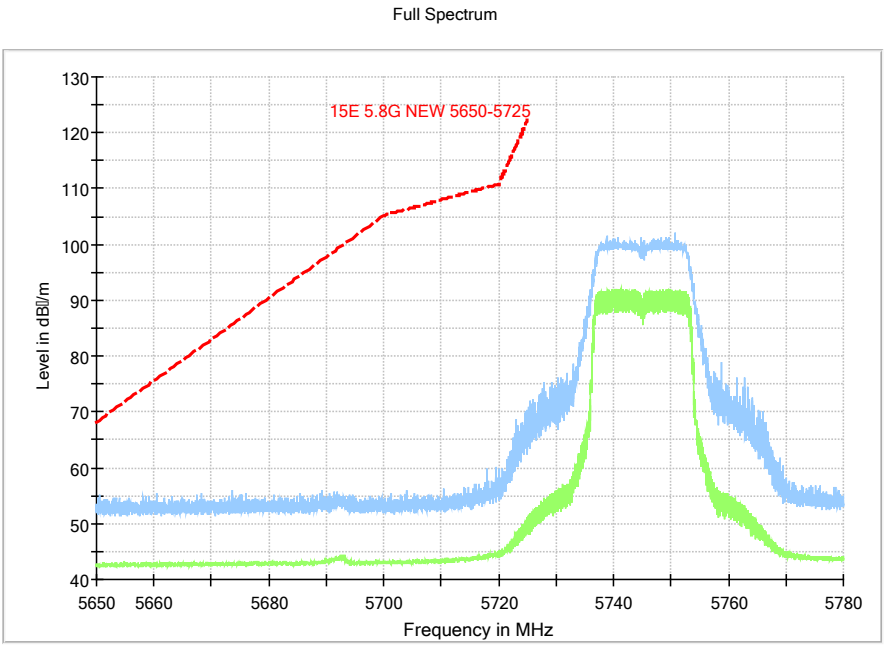

Fig. 47 Band Edges (802.11a, 5745MHz)

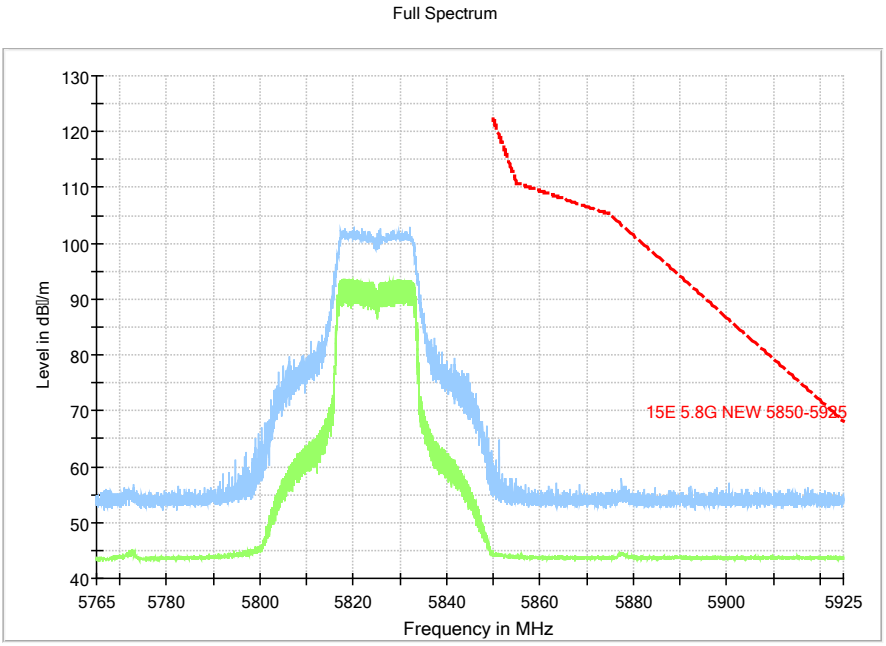

Fig. 48 Band Edges (802.11a, 5825MHz)

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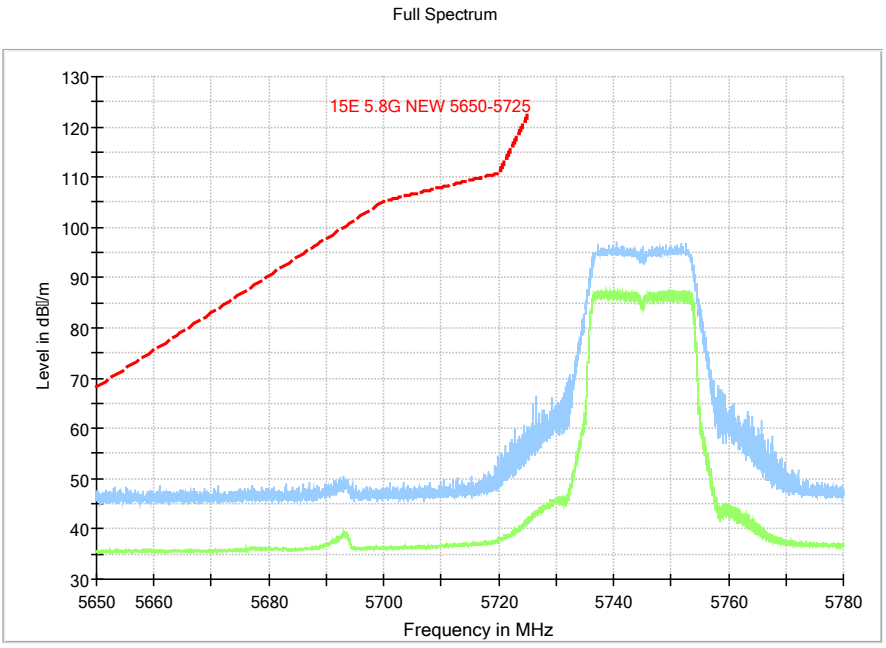

Fig. 49 Band Edges (802.11n-HT20, 5745MHz)

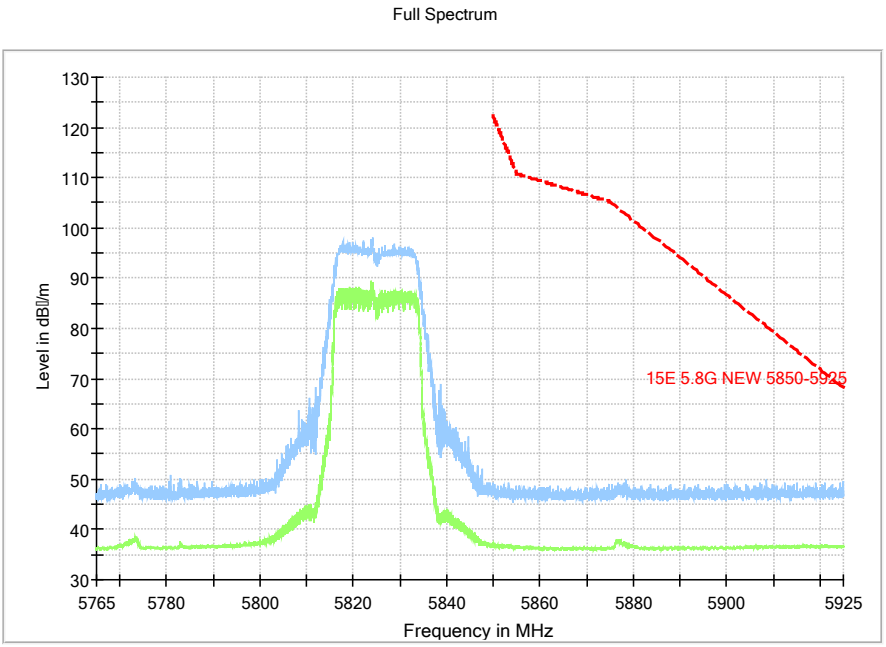

Fig. 50 Band Edges (802.11n-HT20, 5825MHz)

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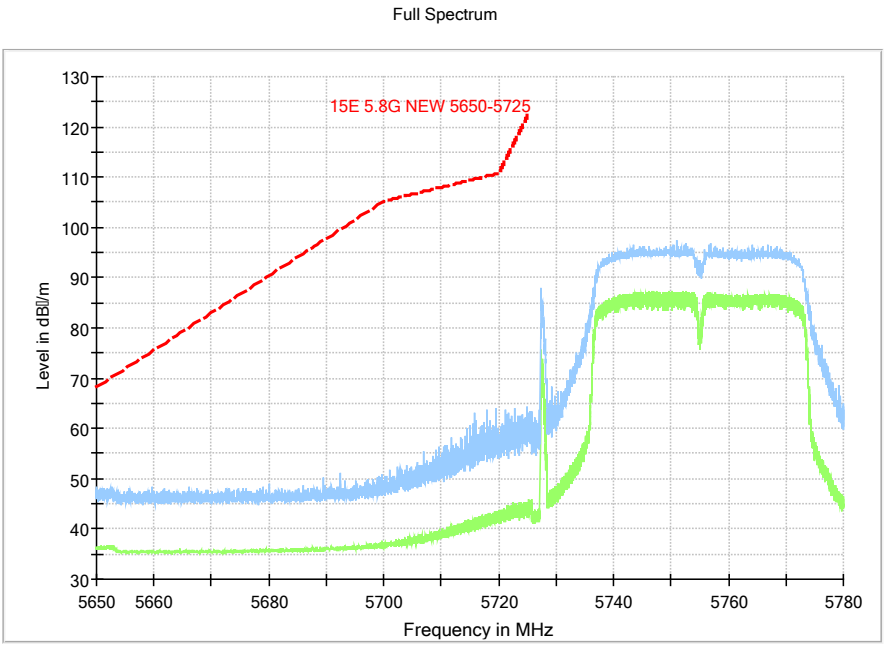

Fig. 51 Band Edges (802.11n-HT40, 5755MHz)

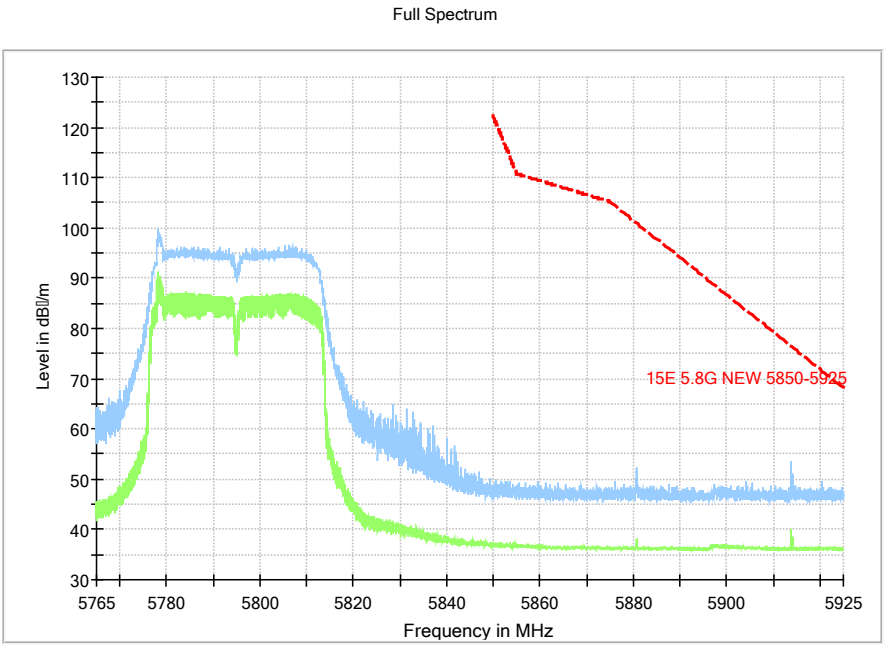

Fig. 52 Band Edges (802.11n-HT40, 5795MHz)

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A.7. AC Powerline Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement uncertainty:
Expanded measurement uncertainty for this test item is U =3.2dB, k=2.

Measurement Result and limit:
WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.53	Fig.54	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.53	Fig.54	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

The measurement is made according to ANSI C63.10 .

Conclusion: PASS

Test graphs as below:

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Result for traffic:

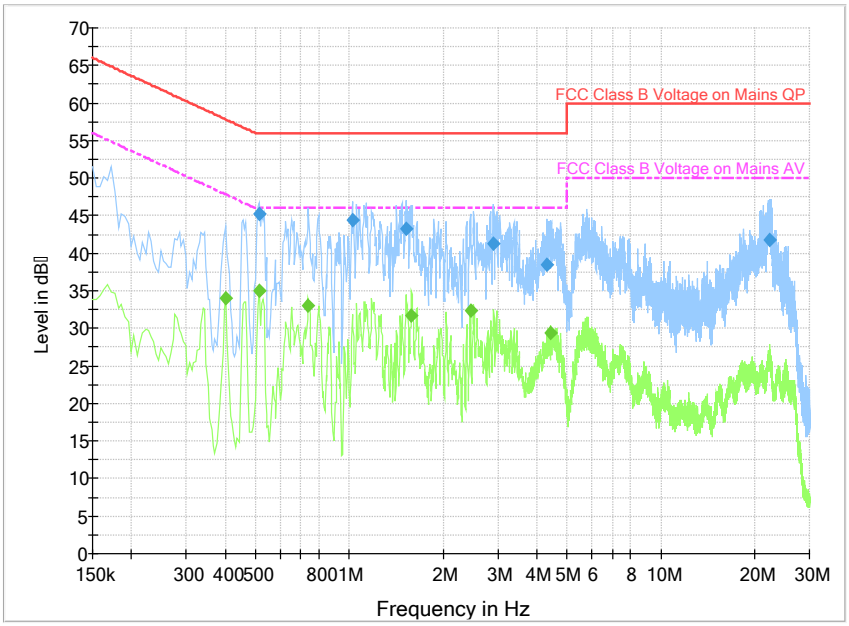

Fig. 53 AC Powerline Conducted Emission-802.11a

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.514500	45.2	2000.0	9.000	On	L1	19.8	10.8	56.0	
1.023000	44.4	2000.0	9.000	On	L1	19.7	11.6	56.0	
1.522500	43.2	2000.0	9.000	On	L1	19.6	12.8	56.0	
2.895000	41.2	2000.0	9.000	On	L1	19.6	14.8	56.0	
4.299000	38.5	2000.0	9.000	On	L1	19.6	17.5	56.0	
22.308000	41.8	2000.0	9.000	On	N	19.9	18.2	60.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.402000	34.0	2000.0	9.000	On	L1	19.8	13.8	47.8	
0.514500	34.9	2000.0	9.000	On	L1	19.8	11.1	46.0	
0.739500	33.0	2000.0	9.000	On	L1	19.8	13.0	46.0	
1.585500	31.7	2000.0	9.000	On	L1	19.6	14.3	46.0	
2.449500	32.4	2000.0	9.000	On	L1	19.6	13.6	46.0	
4.438500	29.4	2000.0	9.000	On	L1	19.6	16.6	46.0	

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Result for Idle:

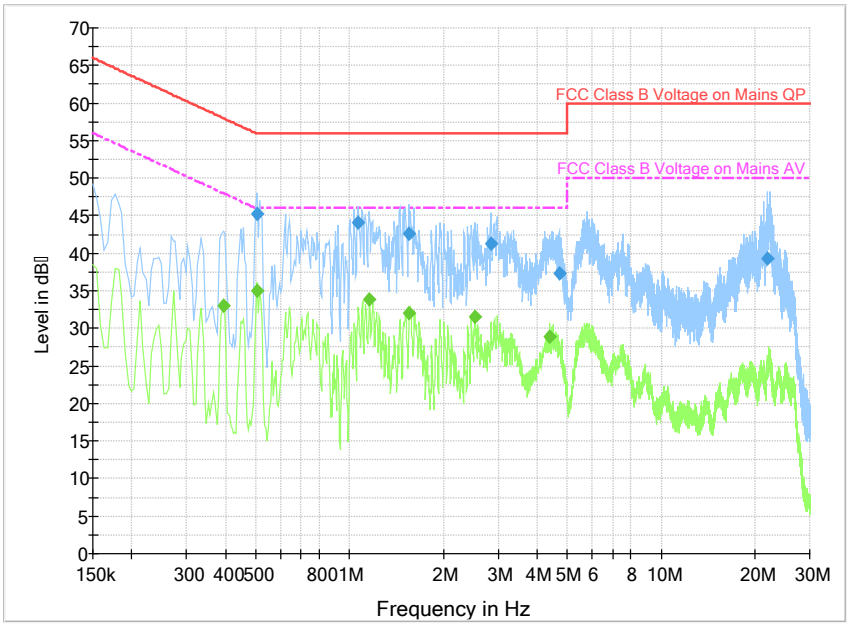

Fig. 54 AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.505500	45.3	2000.0	9.000	On	L1	19.8	10.7	56.0	
1.063500	44.0	2000.0	9.000	On	L1	19.7	12.0	56.0	
1.554000	42.6	2000.0	9.000	On	L1	19.6	13.4	56.0	
2.836500	41.2	2000.0	9.000	On	L1	19.6	14.8	56.0	
4.704000	37.3	2000.0	9.000	On	L1	19.6	18.7	56.0	
21.903000	39.3	2000.0	9.000	On	N	19.9	20.7	60.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.393000	33.0	2000.0	9.000	On	L1	19.8	15.0	48.0	
0.505500	35.1	2000.0	9.000	On	L1	19.8	10.9	46.0	
1.158000	33.9	2000.0	9.000	On	L1	19.7	12.1	46.0	
1.554000	32.0	2000.0	9.000	On	L1	19.6	14.0	46.0	
2.526000	31.6	2000.0	9.000	On	L1	19.6	14.4	46.0	
4.402500	28.9	2000.0	9.000	On	L1	19.6	17.1	46.0	

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ANNEX B: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2019-09-26 through 2020-09-30
Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

***** END OF REPORT BODY *****

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