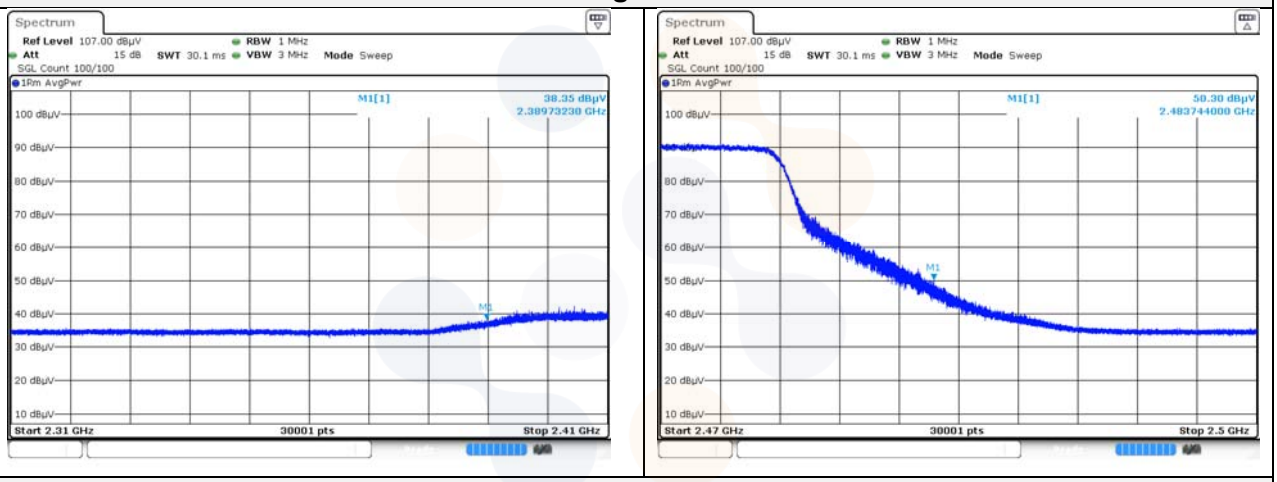
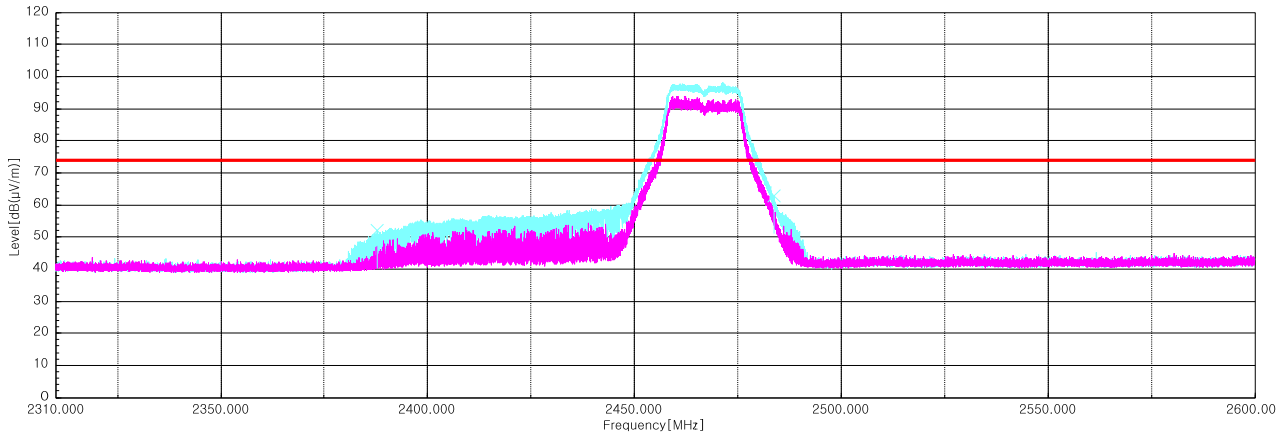
802.11n HT20_2 467 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 389.73[1)]	V	55.30	27.30	-30.59	-	52.01	74.00	21.99
2 483.74[1)]	V	65.60	27.80	-30.48	-	62.92	74.00	11.08
4 938.88[1)]	V	53.40	32.78	-45.25	-	40.93	74.00	33.07
7 408.23[1)]	V	52.20	36.88	-43.95	-	45.13	74.00	28.87
Average Data								
2 389.73[1)]	V	38.35	27.30	-30.59	0.59	35.65	54.00	18.35
2 483.74[1)]	V	50.30	27.80	-30.48	0.59	48.21	54.00	5.79

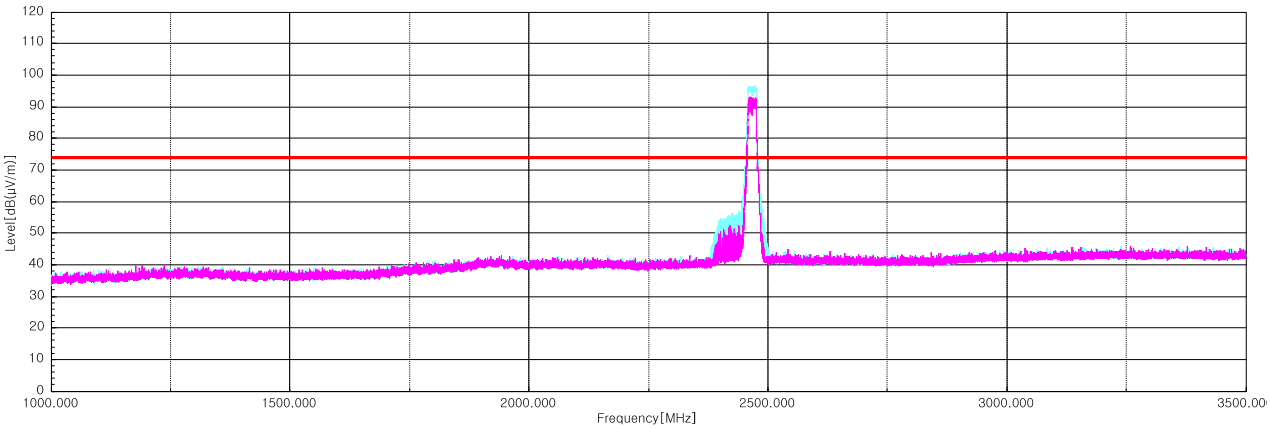
Average data



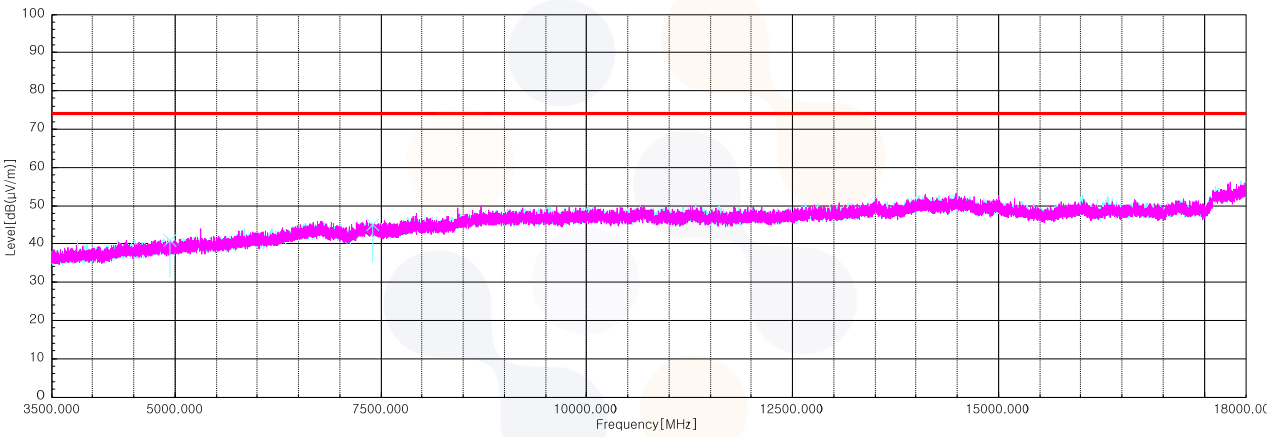
Horizontal/Vertical for Band-edge



Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



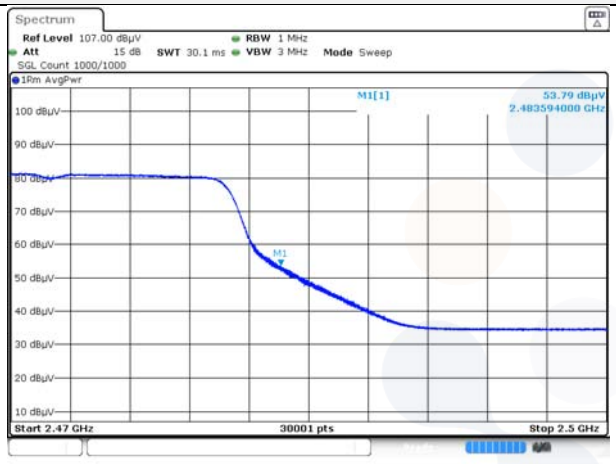
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



802.11n HT20_2 472 ㎒

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 388.57[1)]	V	49.00	27.29	-30.59	-	45.70	74.00	28.30
2 483.59[1)]	V	71.40	27.80	-30.48	-	68.72	74.00	5.28
4 959.67[1)]	V	53.70	32.82	-45.16	-	41.36	74.00	32.64
7 412.10[1)]	V	52.50	36.88	-43.94	-	45.44	74.00	28.56
Average Data								
2 483.59[1)]	V	53.79	27.80	-30.48	0.59	51.70	54.00	2.30

Average data



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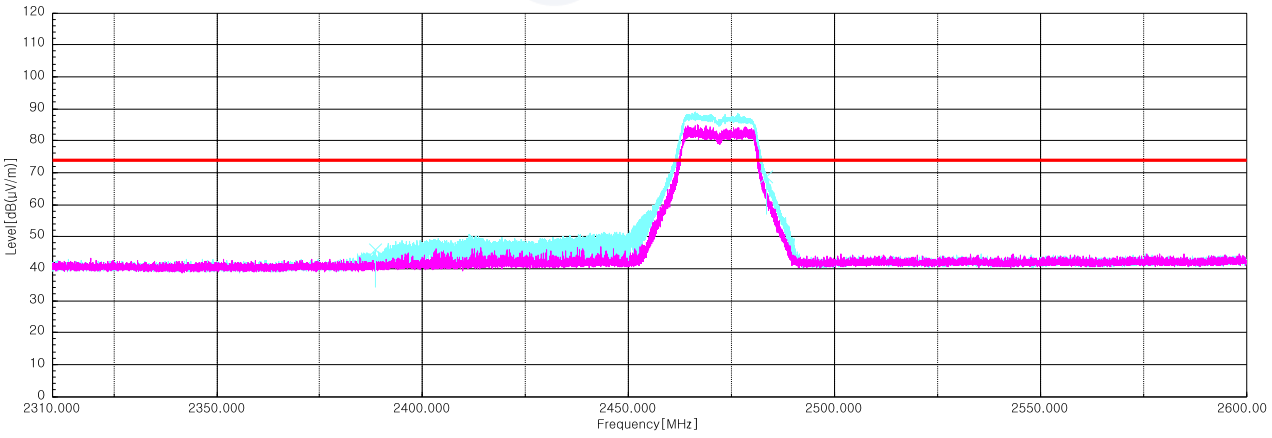
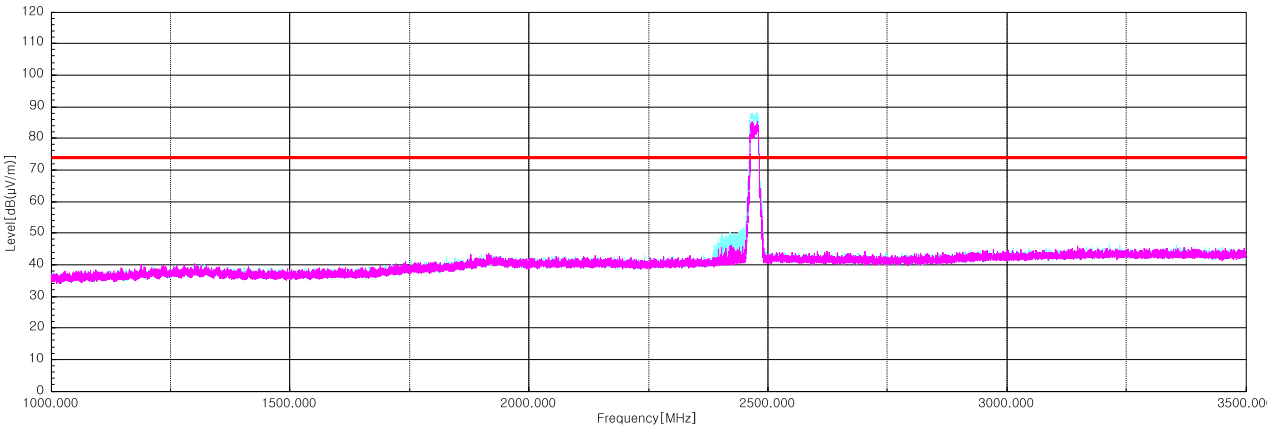
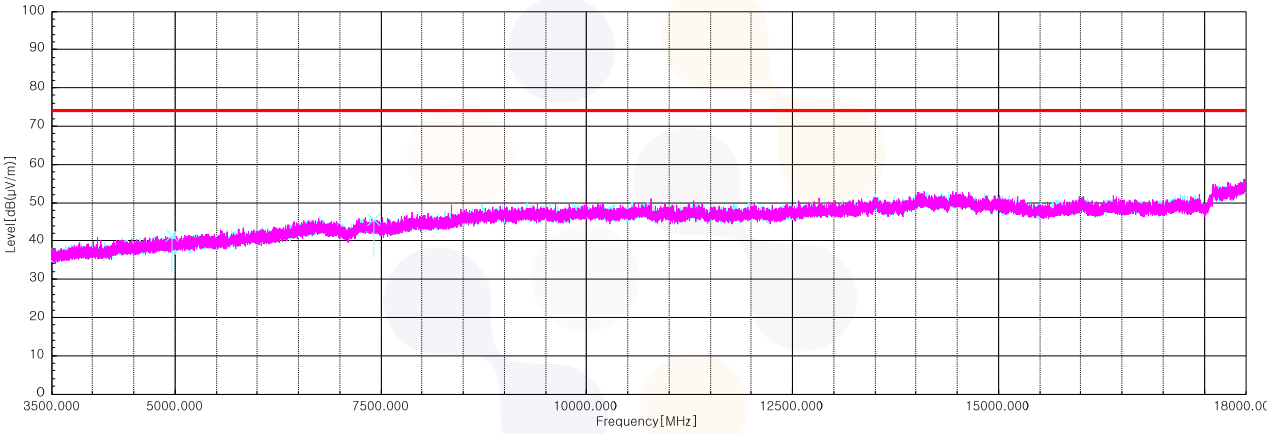
Horizontal/Vertical for Band-edge



Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓

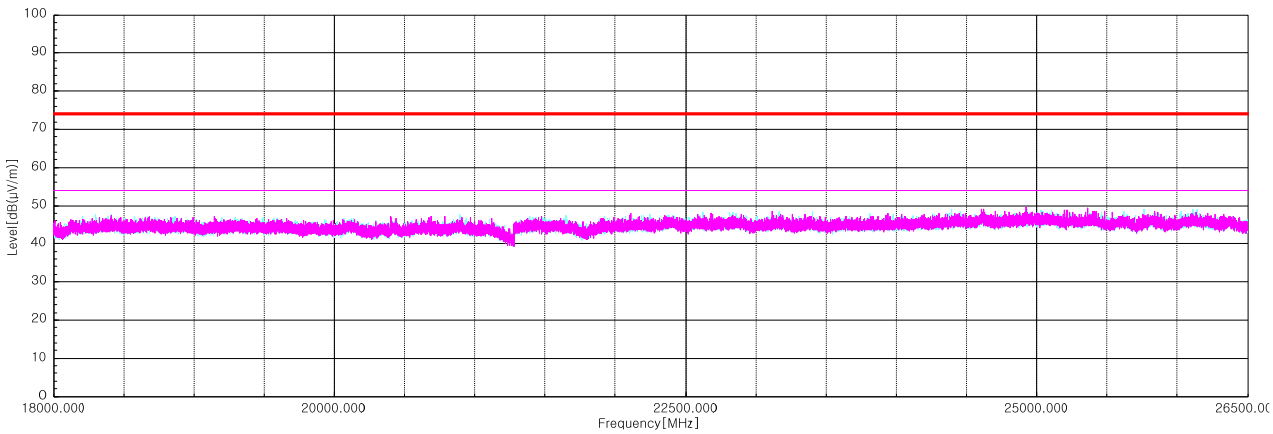


Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



Test results (Above 18 ㎓) – Worst case: 802.11n HT20 SISO / 2 472 ㎒

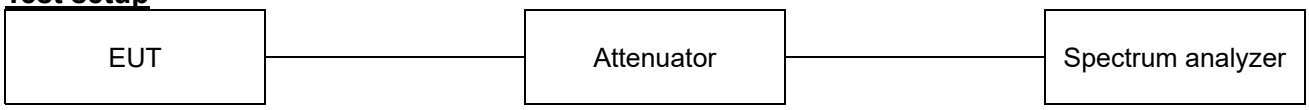
Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓



Note: The Worst case was based on the lowest margin condition considering Harmonic and Spurious Emission

7.5. Conducted Spurious Emission

Test setup



Limit

According to §15.247(d) and RSS-247(5.5), In any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operation, the radio frequency power that is produced by the intentional radiator shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation specified in §15.209(a) is not required. In addition, radiated emission limits specified in §15.209(a) (see §15.205(c)).
Limit : 20 ㏈c

Test procedure

ANSI C63.10 - Section 11.11.3, 14.3.3
KDB 558074 D01 v05 - Section 8.5
KDB 662911 D01 v02r01 – section (E)(3)(b)

Test settings

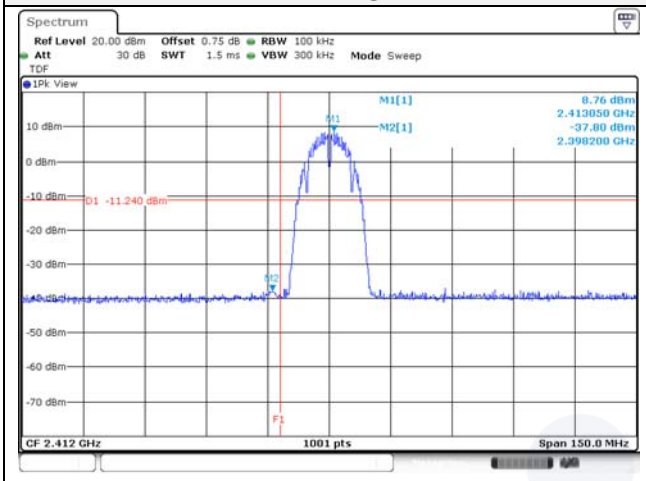
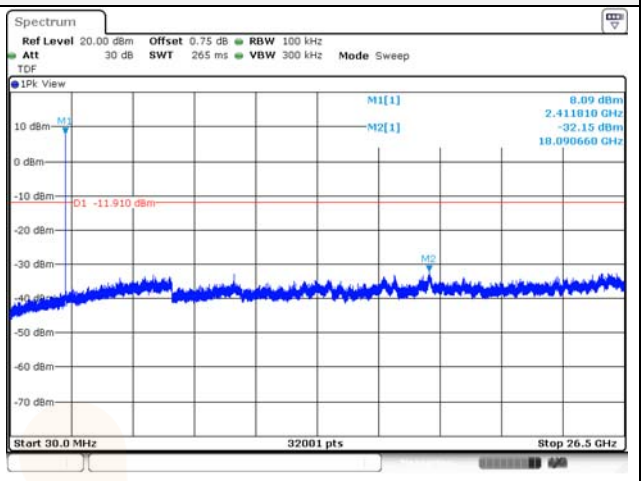
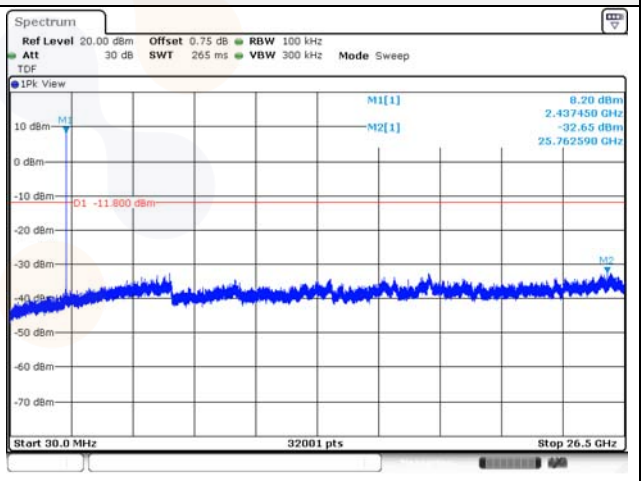
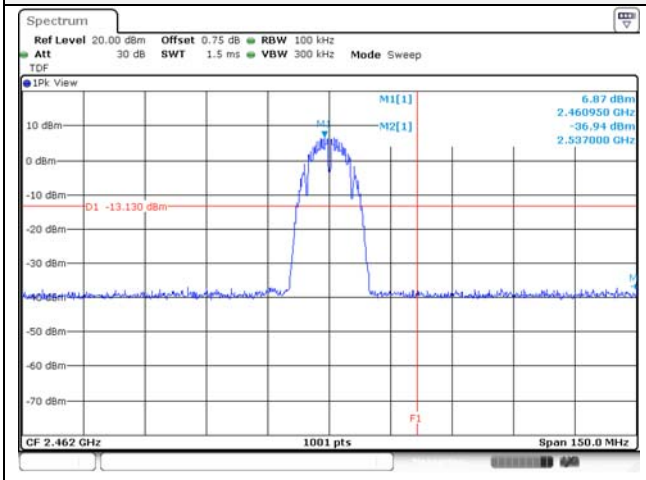
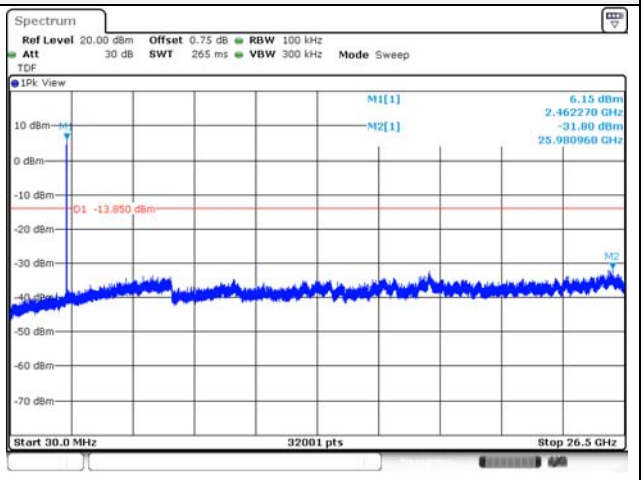
Establish an emission level by using the following procedure:

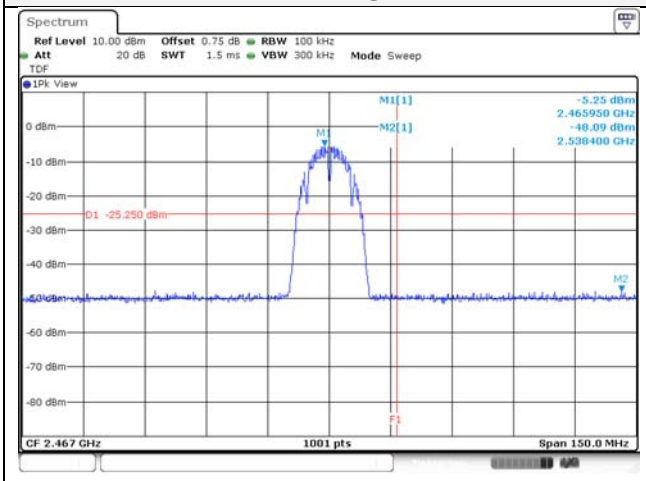
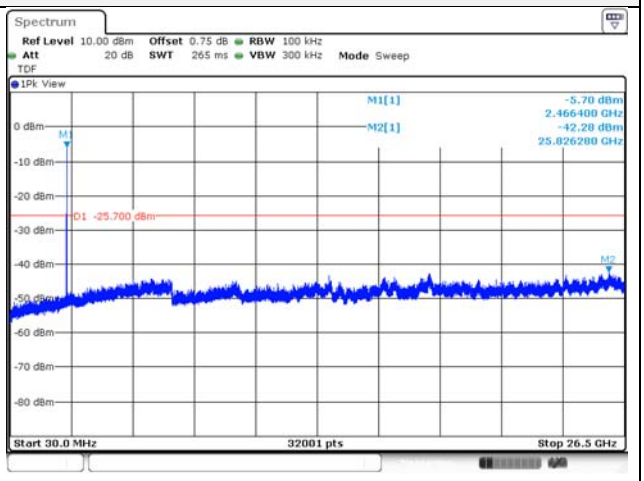
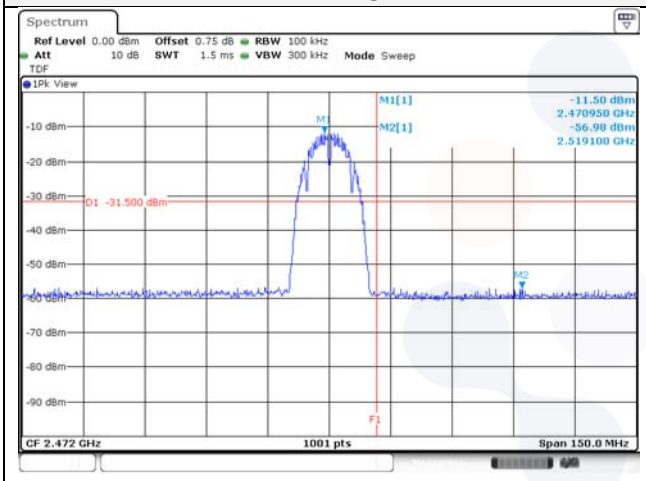
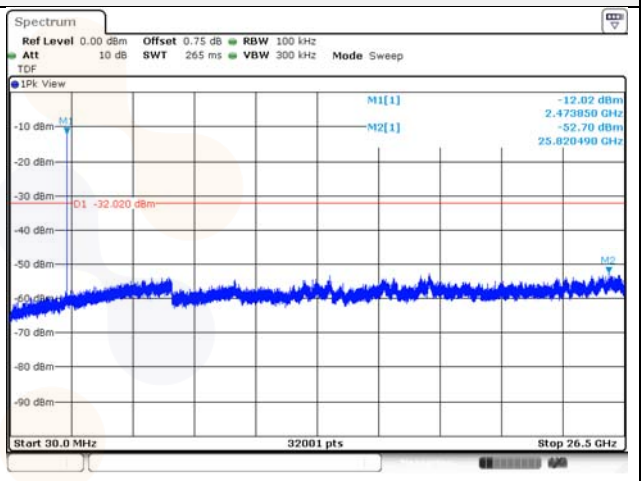
1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 ㎑
3) Set the VBW ≥ [3 x RBW]
4) Detector = peak
5) Sweep time = auto couple
6) Trace mode = max hold
7) Allow trace to fully stabilize.
8) Use the peak marker function to determine the maximum amplitude level.

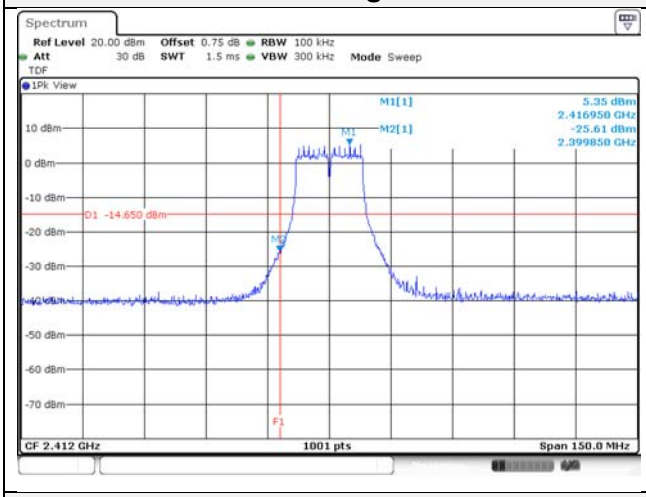
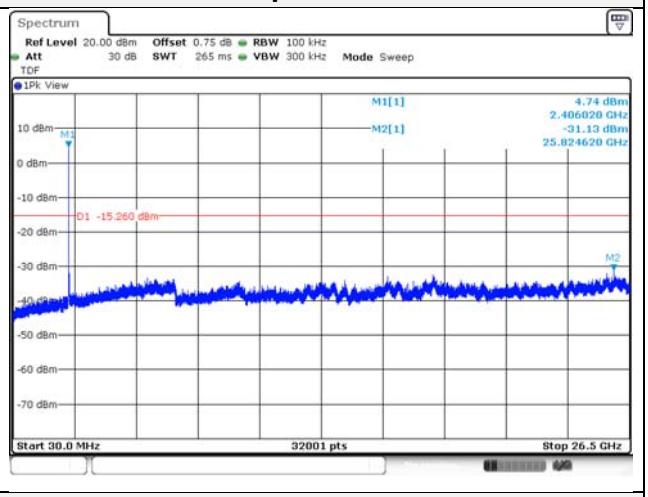
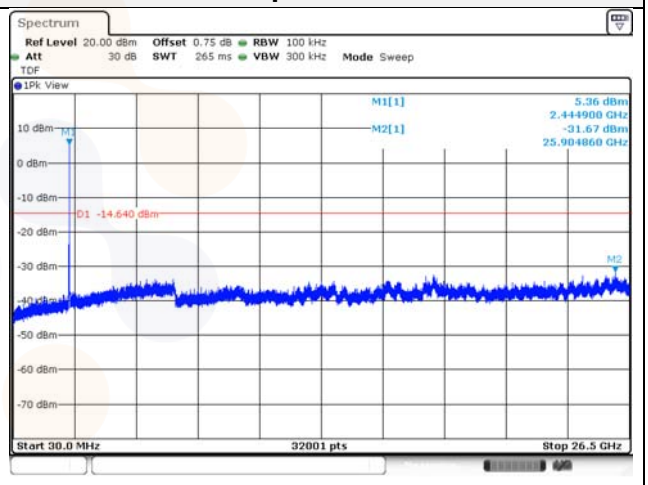
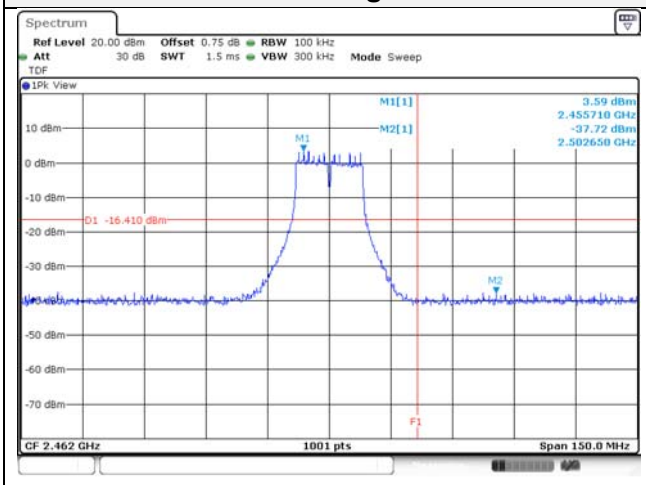
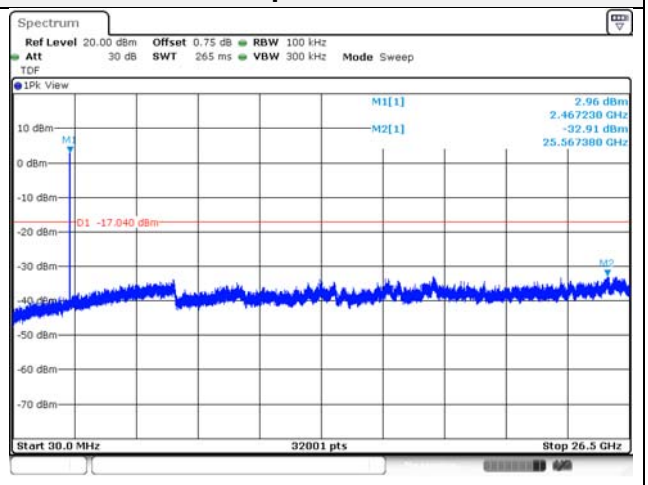
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

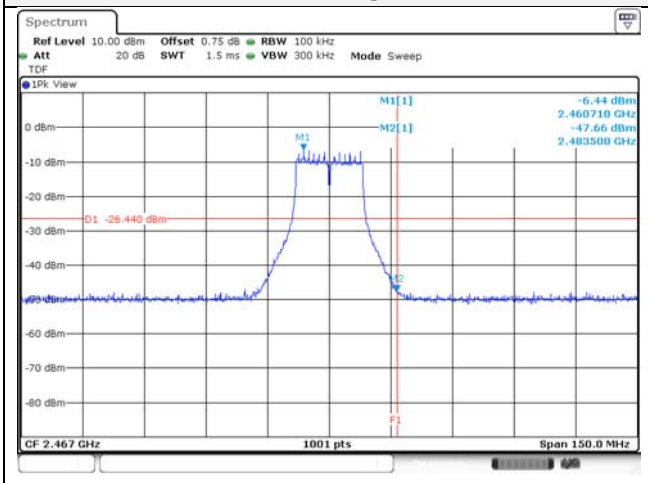
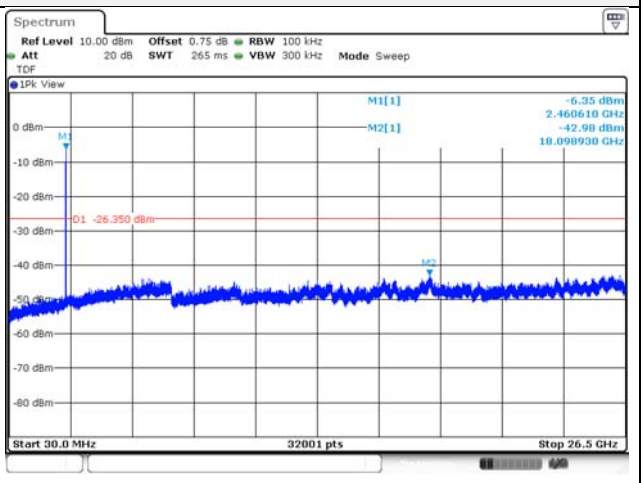
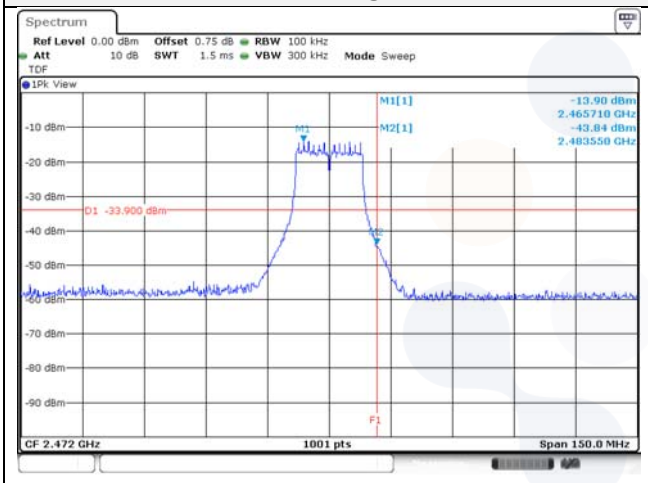
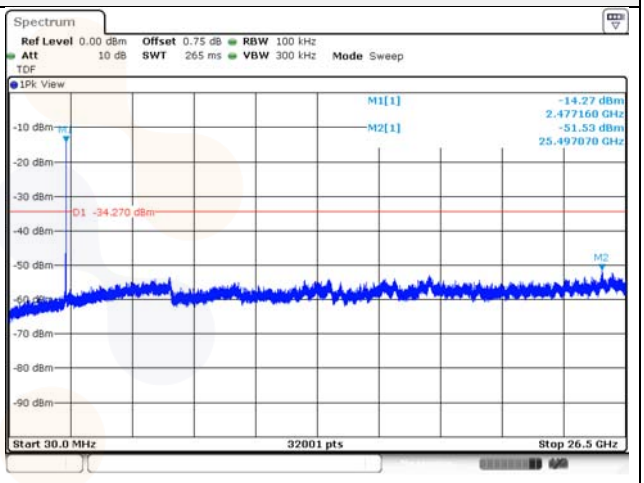
Test results

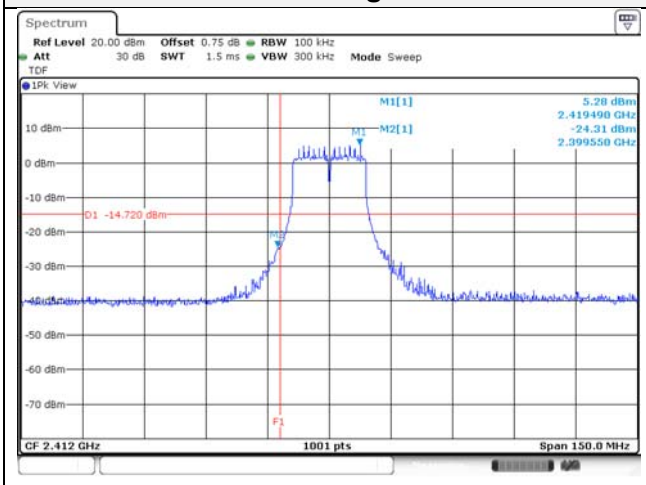
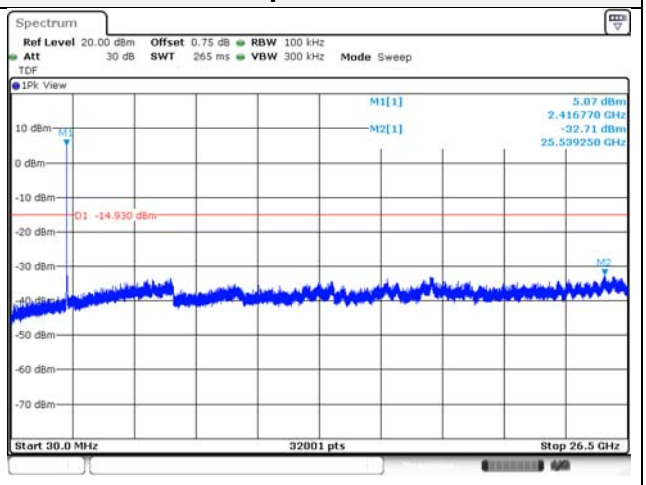
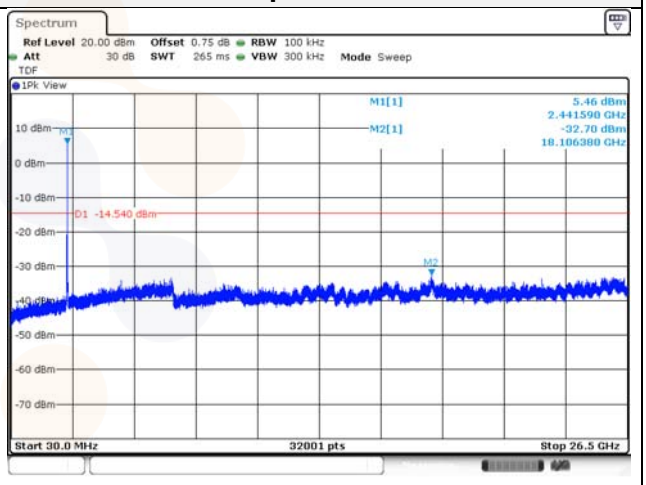
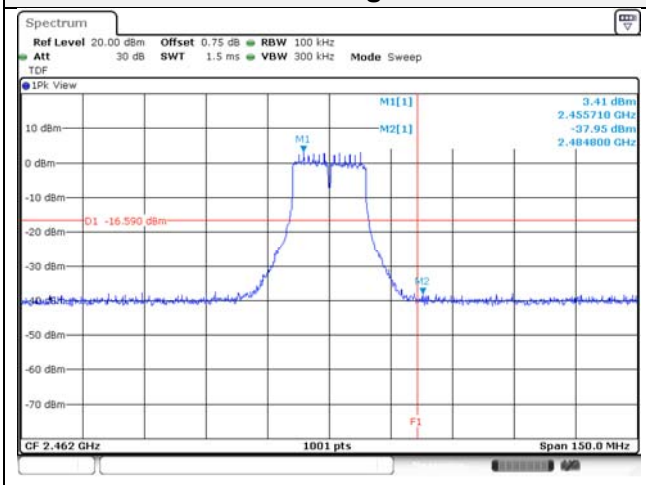
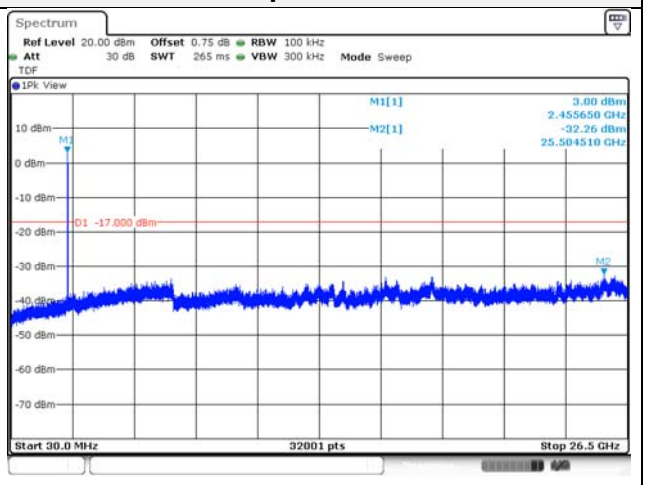
SISO

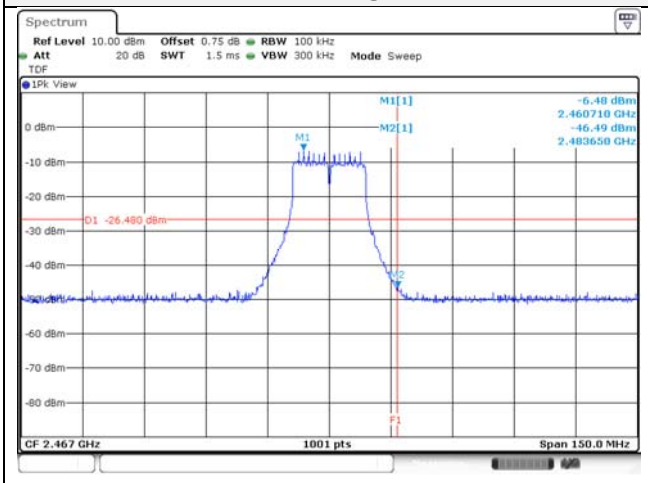
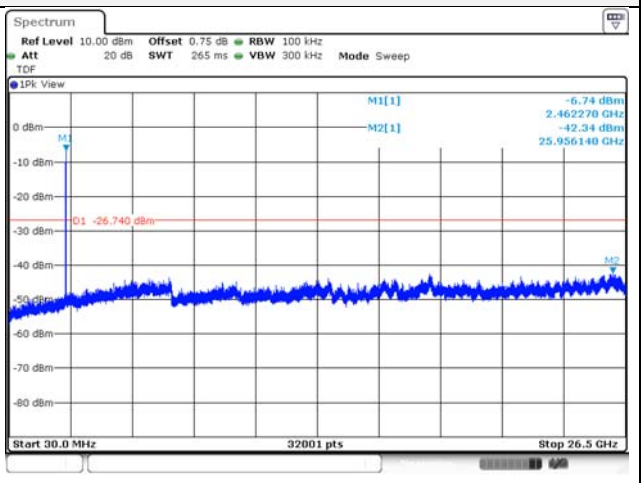
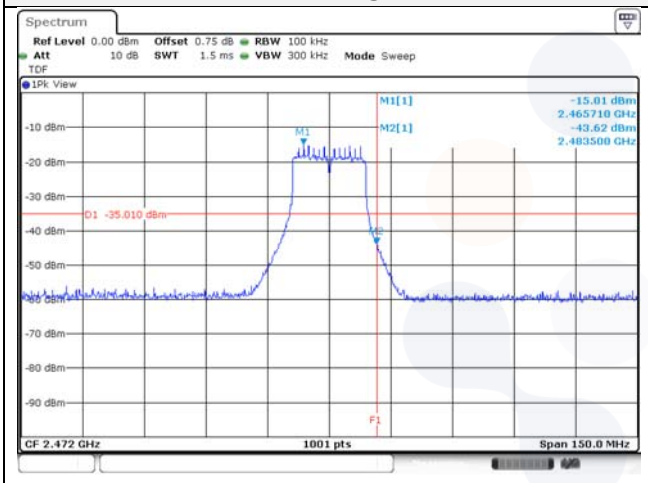
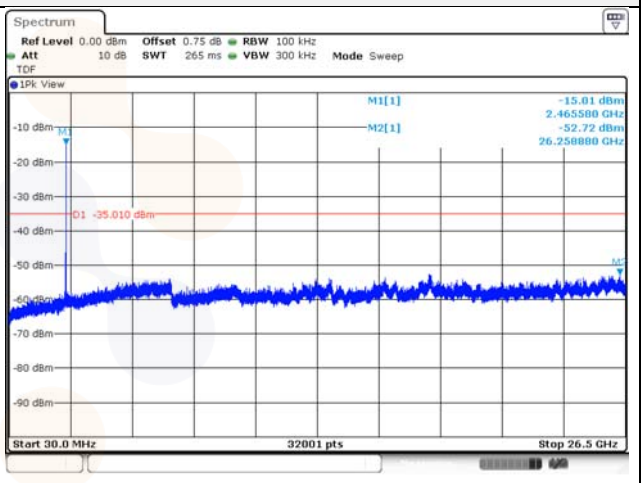
802.11b	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

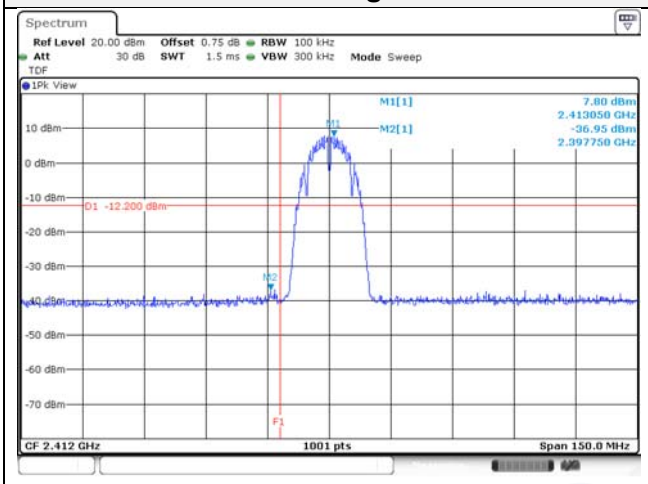
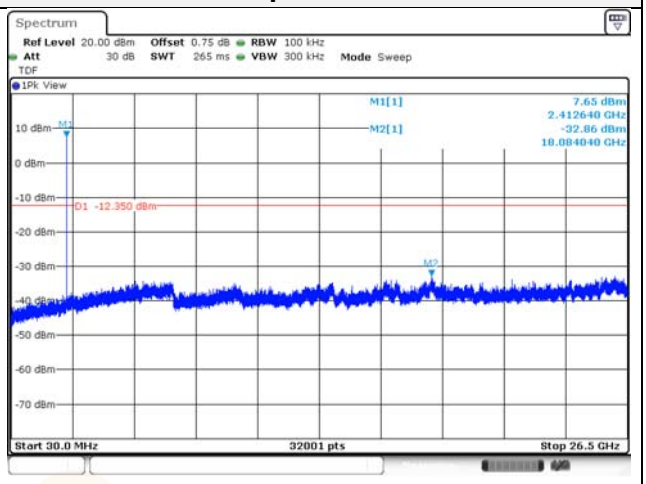
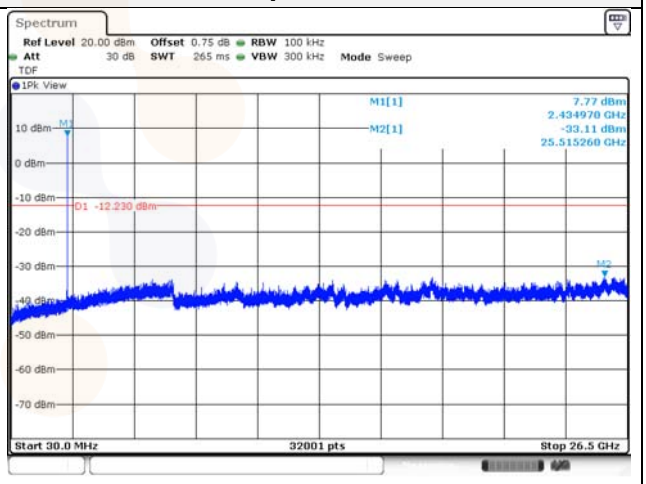
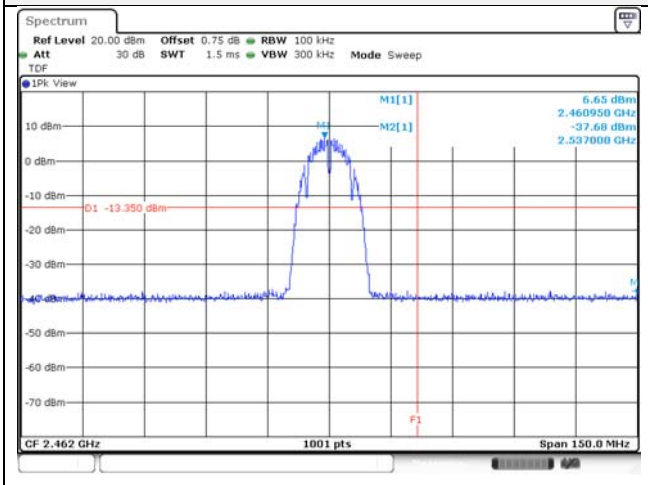
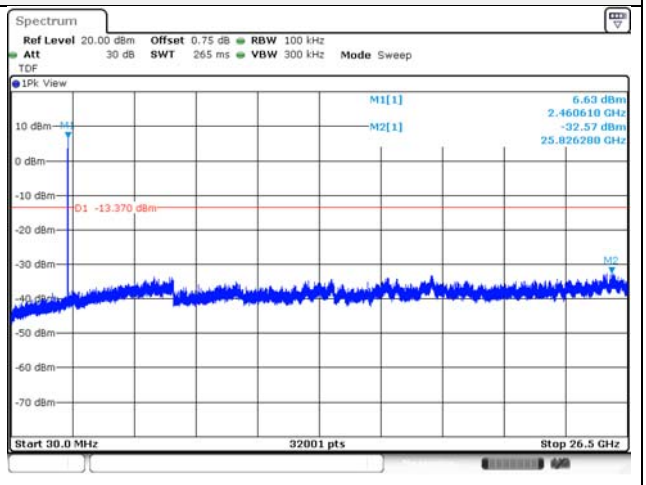
802.11g	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

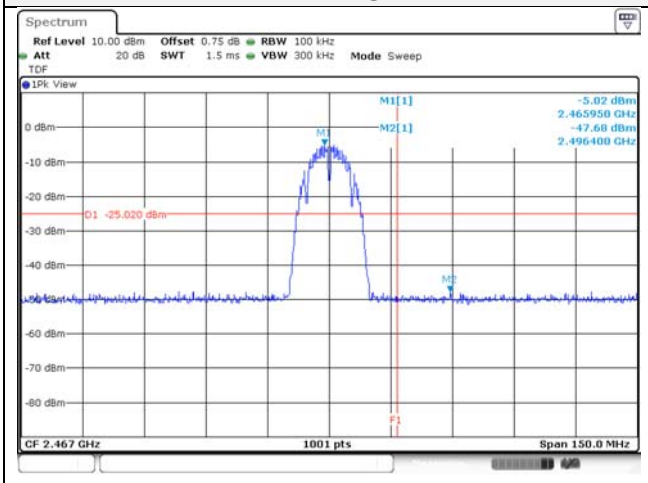
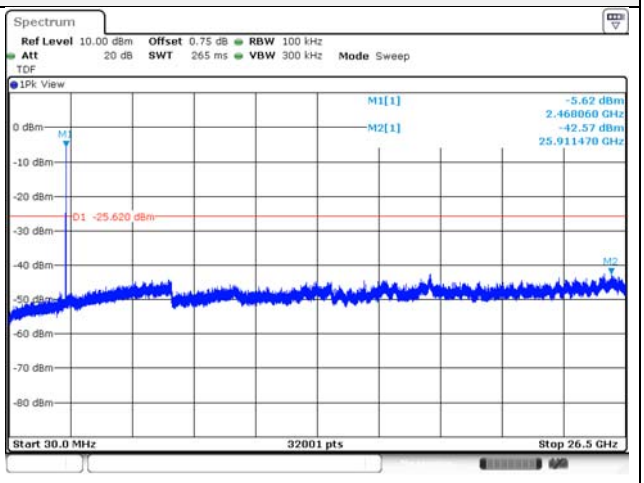
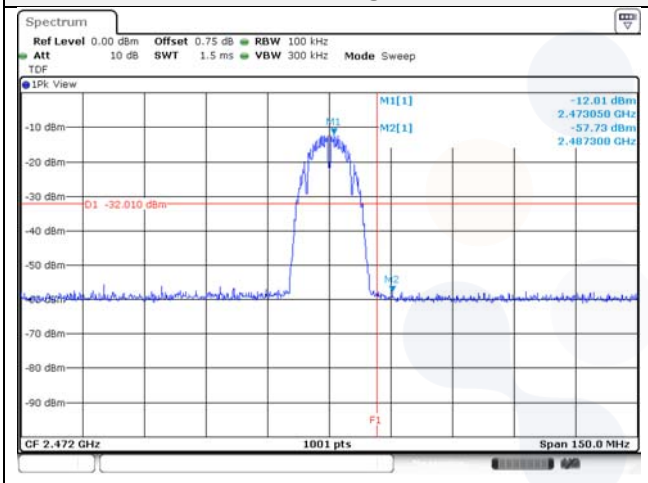
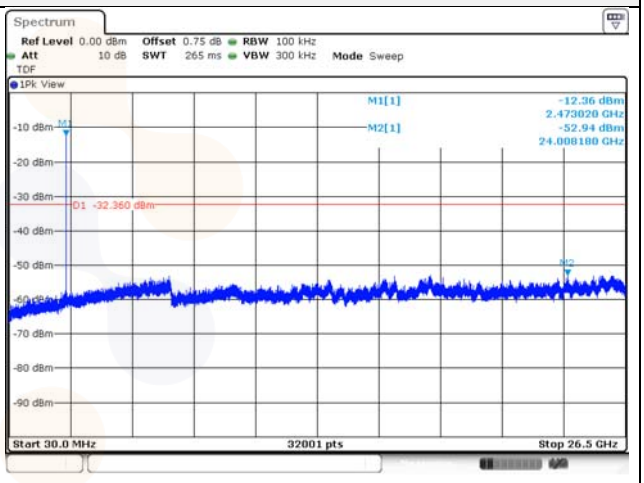
Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

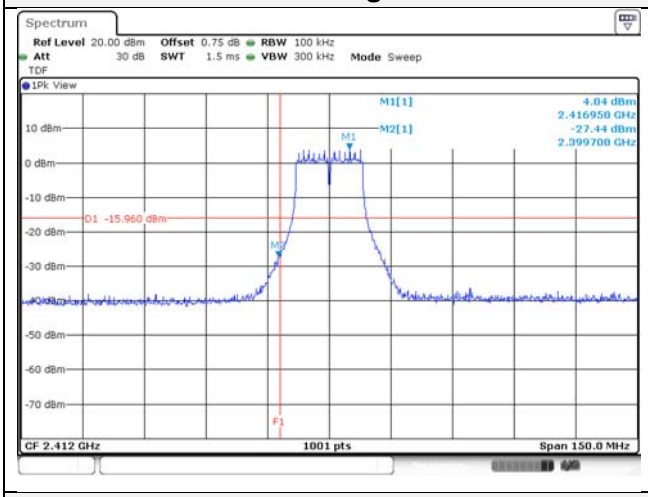
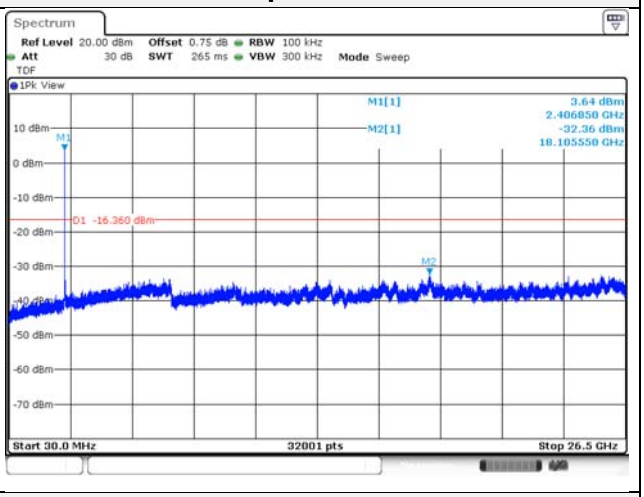
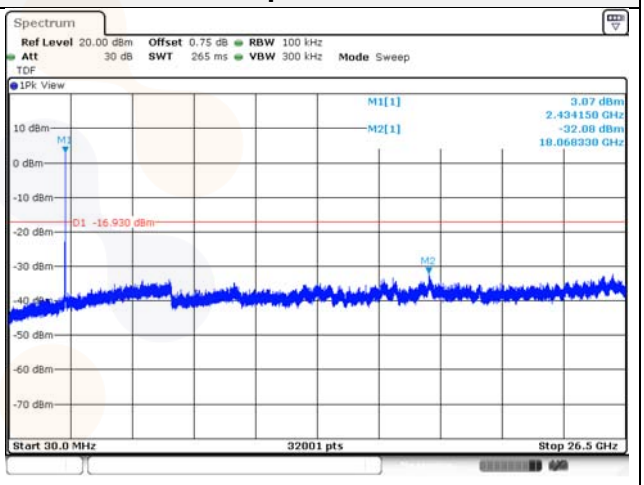
802.11n HT20	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

MIMO_ANT 1

802.11b	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

802.11g	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
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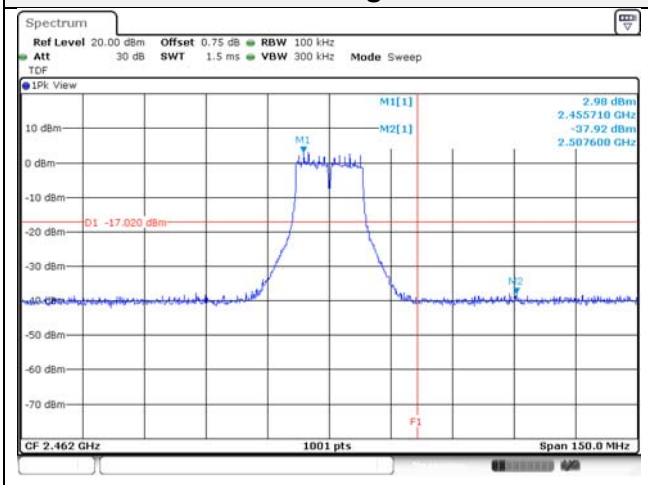
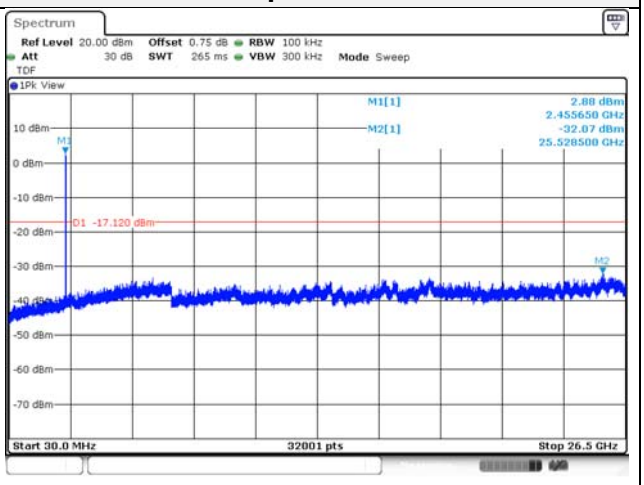
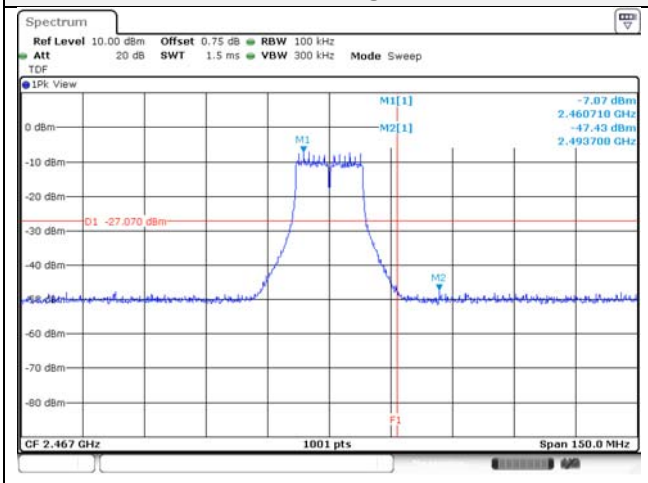
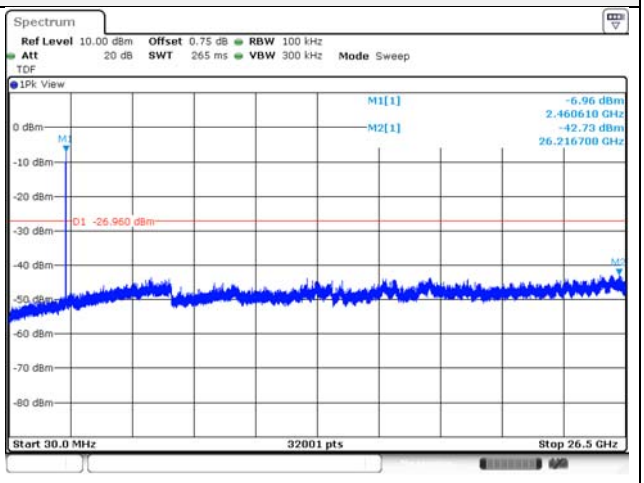
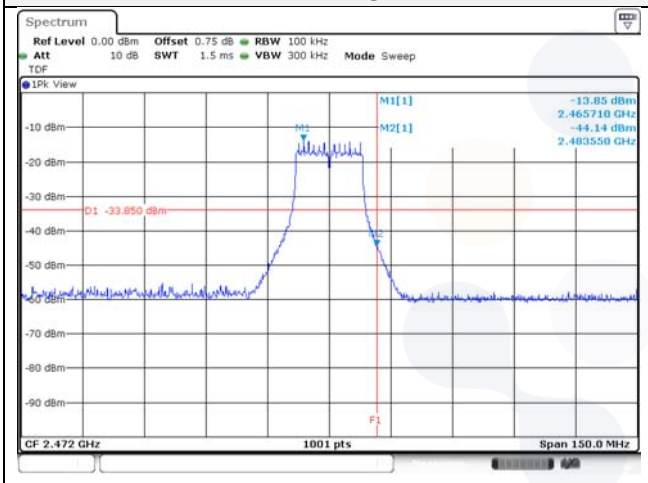
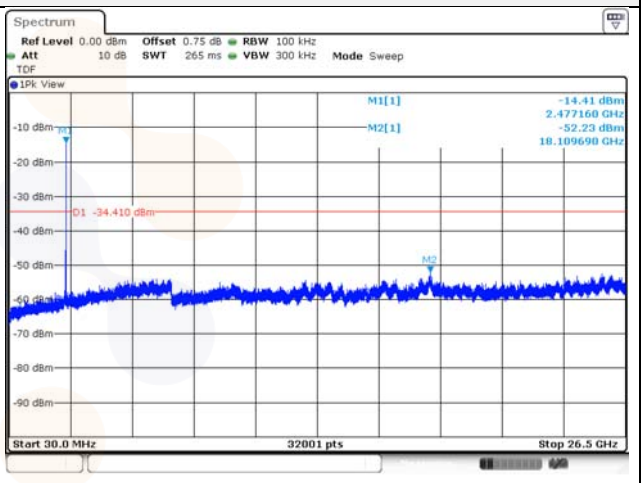
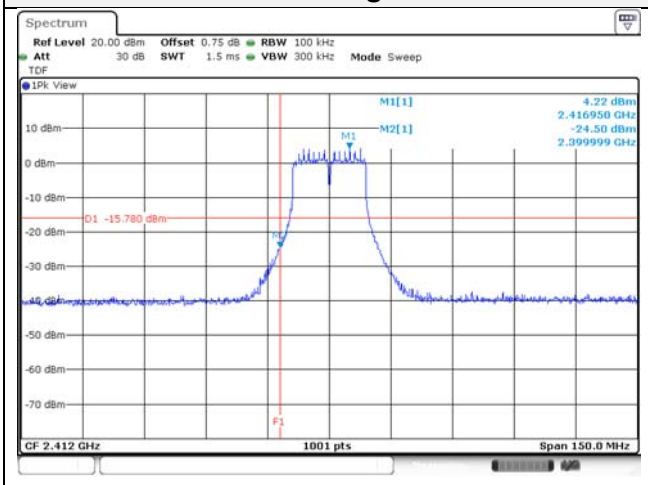
	

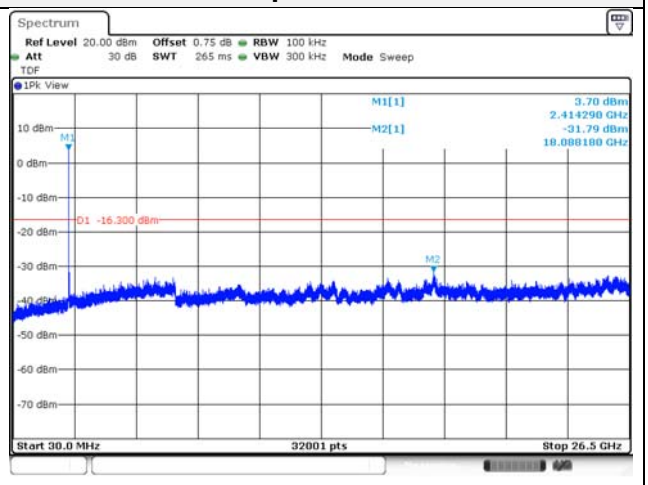
Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

802.11n HT20

Conducted band-edge / 2 412 ㎒



Conducted spurious / 2 412 ㎒



Conducted band-edge / 2 437 ㎒

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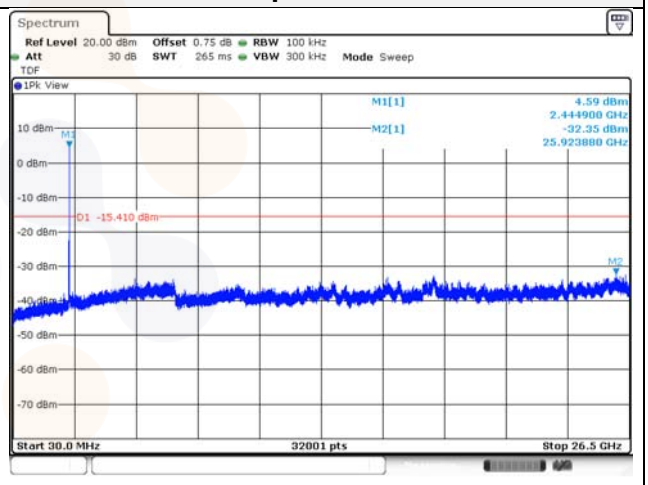
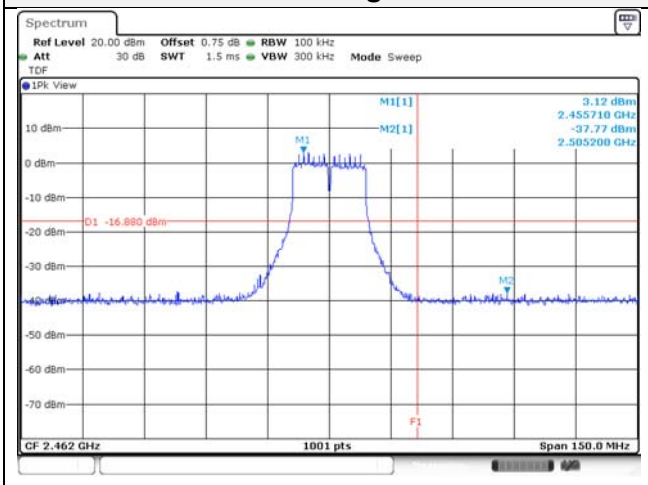
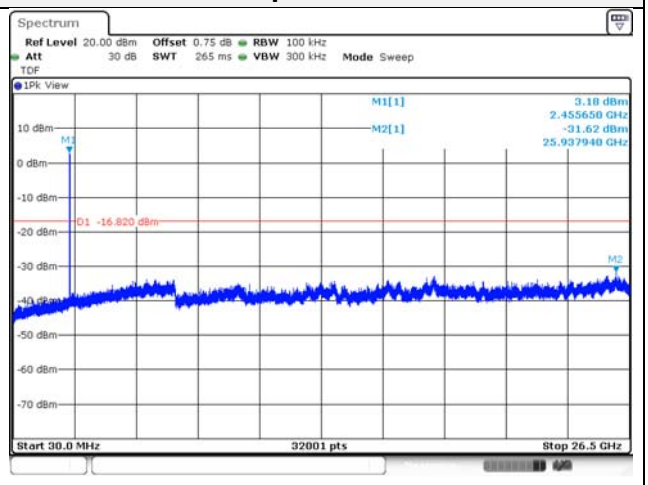
Conducted spurious / 2 437 ㎒

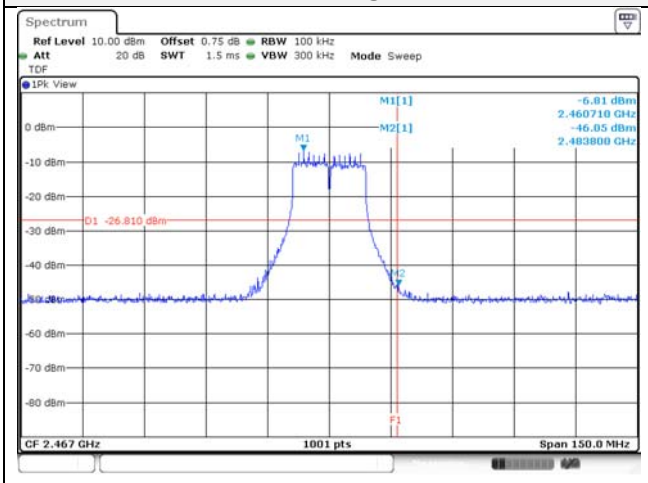
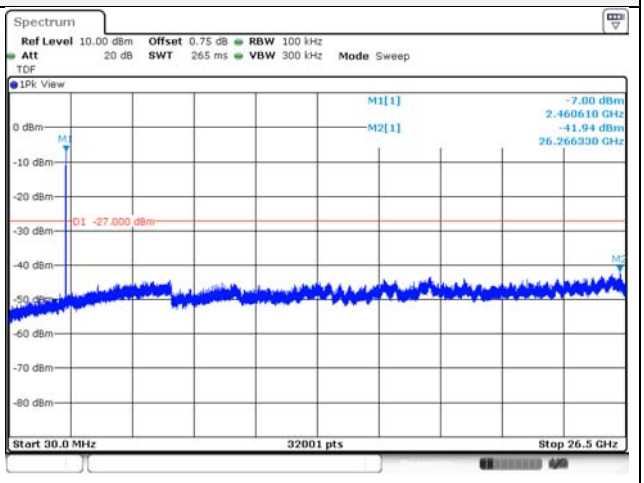
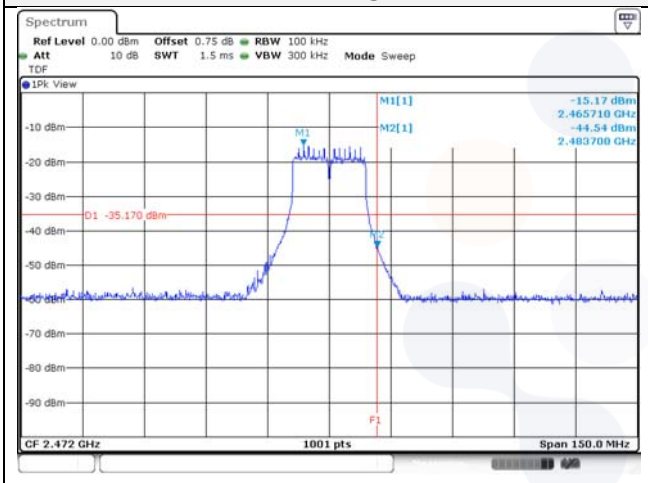
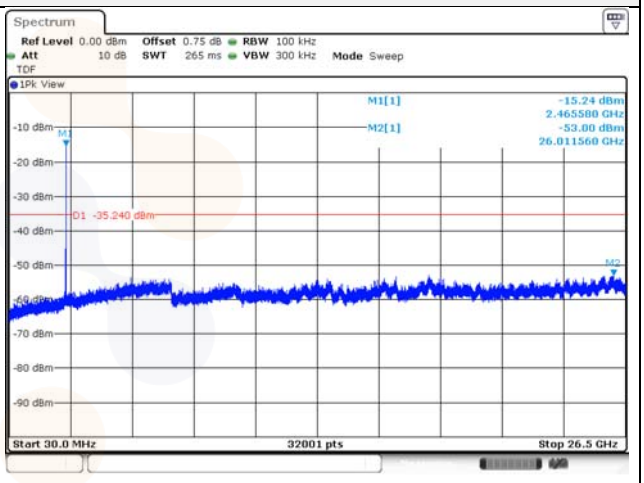


Conducted band-edge / 2 462 ㎒

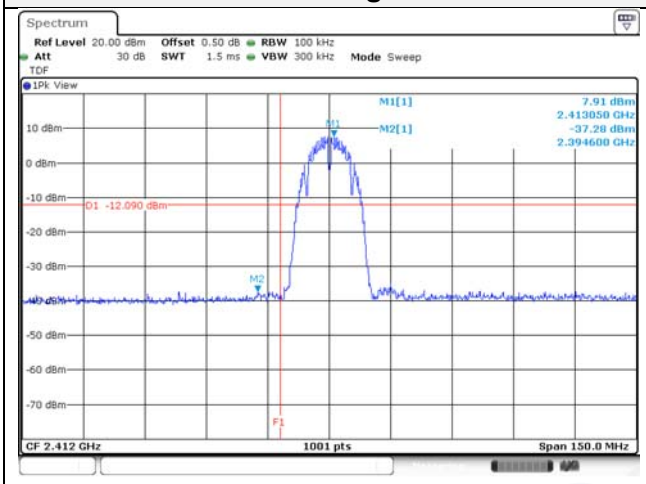
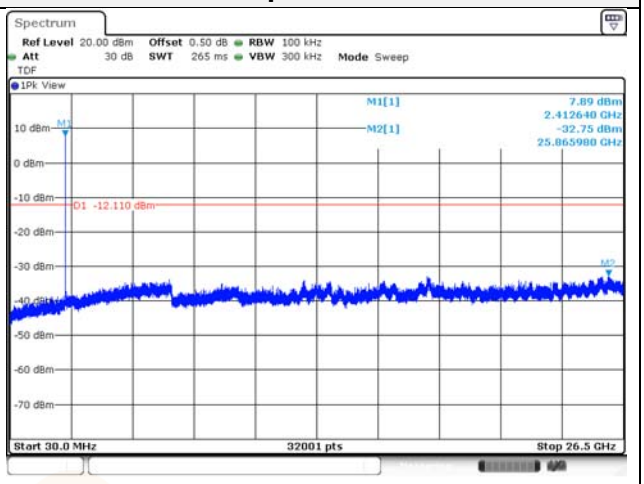
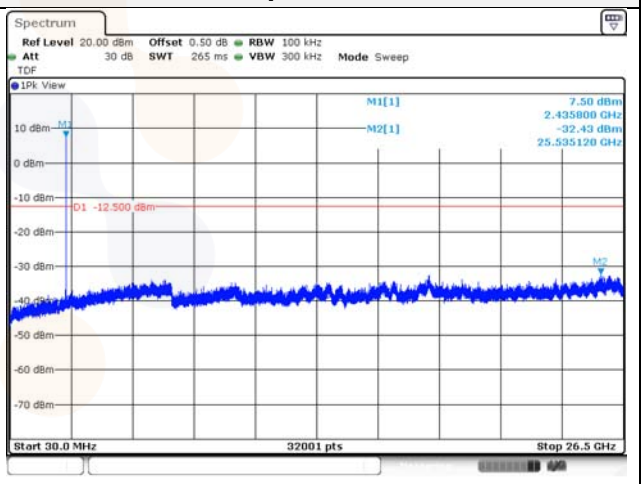


Conducted spurious / 2 462 ㎒



Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

MIMO_ANT 2

802.11b	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
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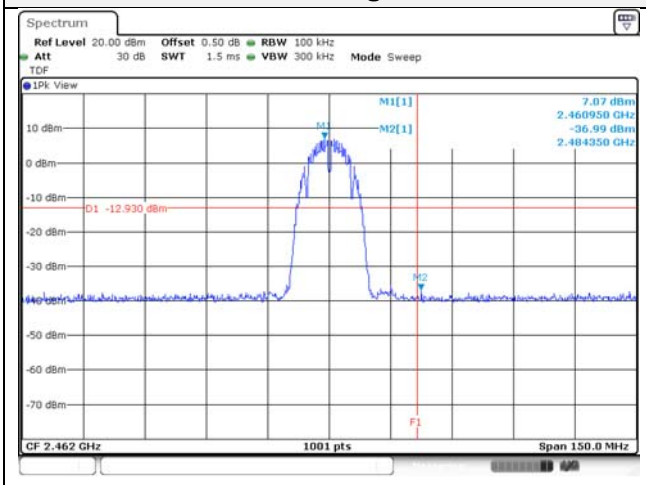
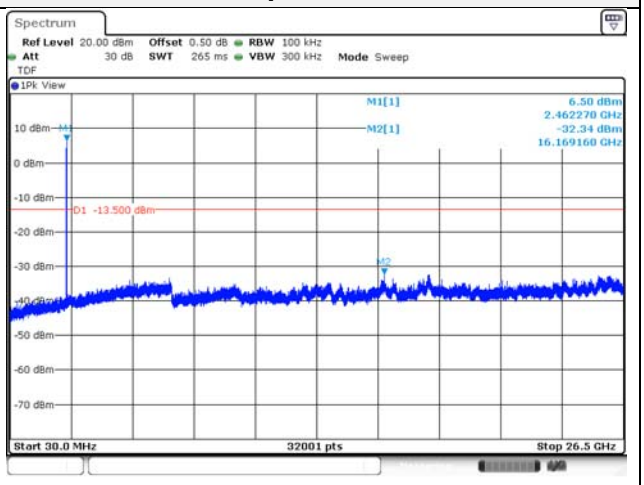
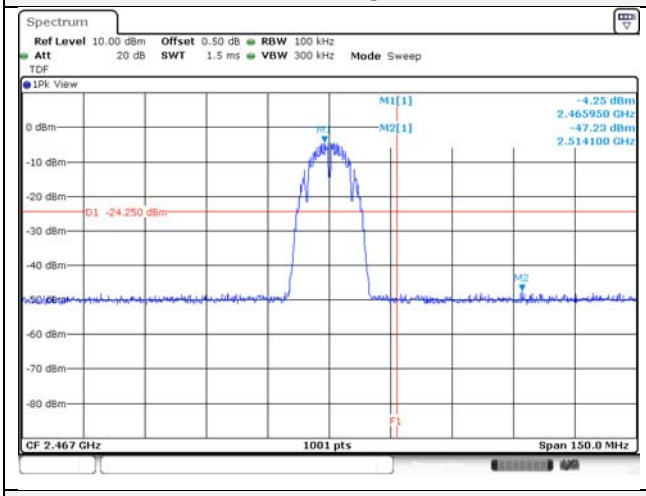
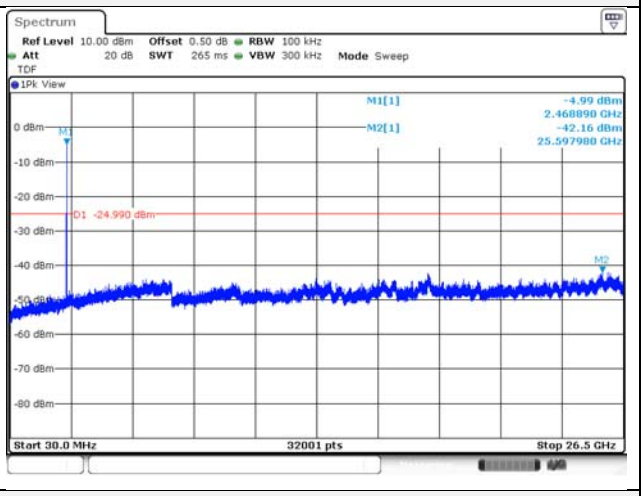
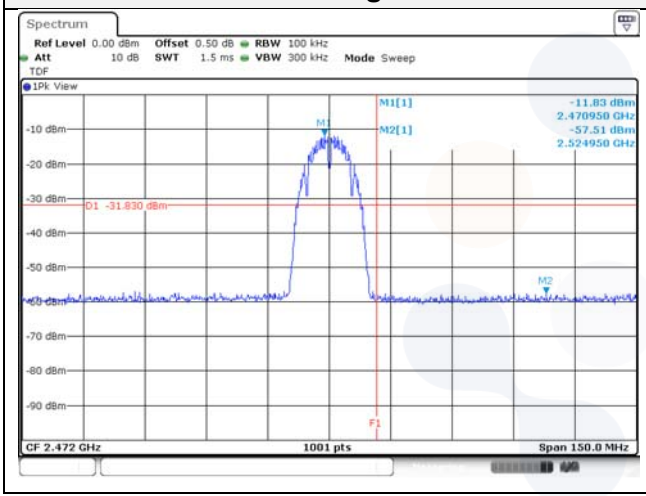
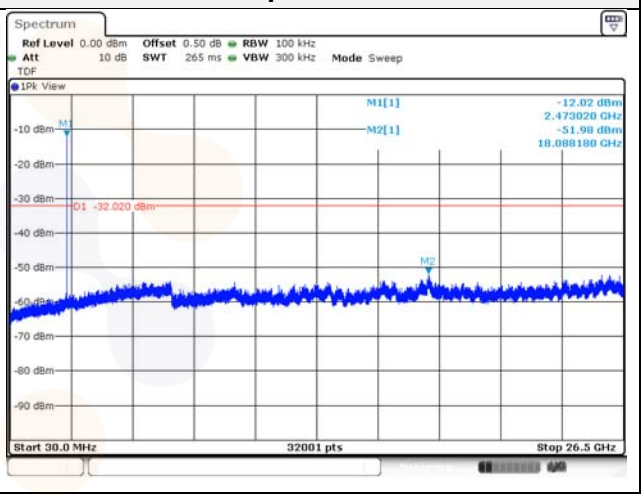
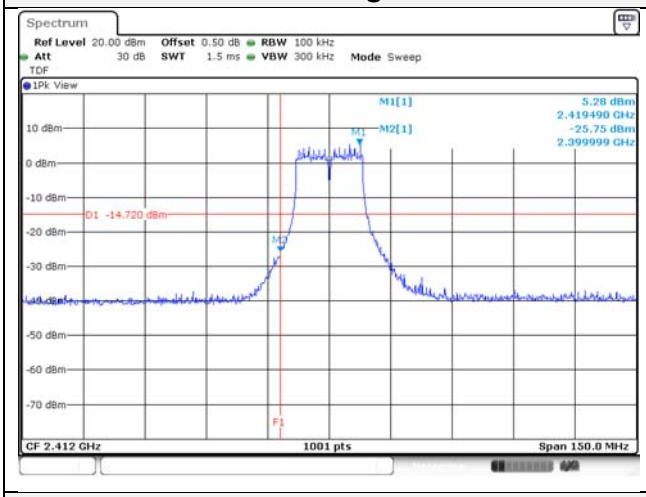
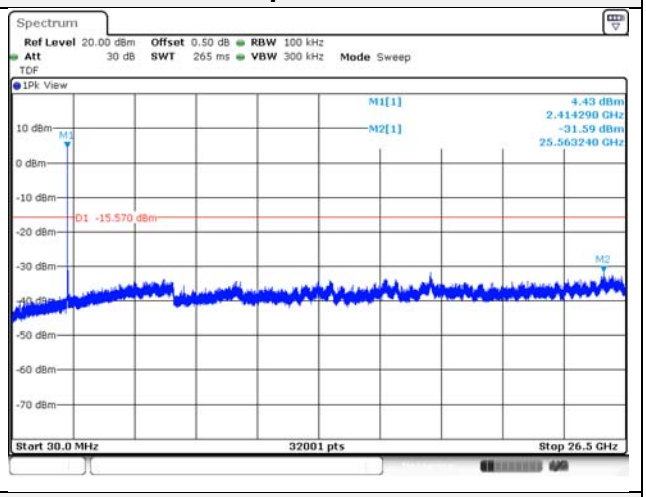
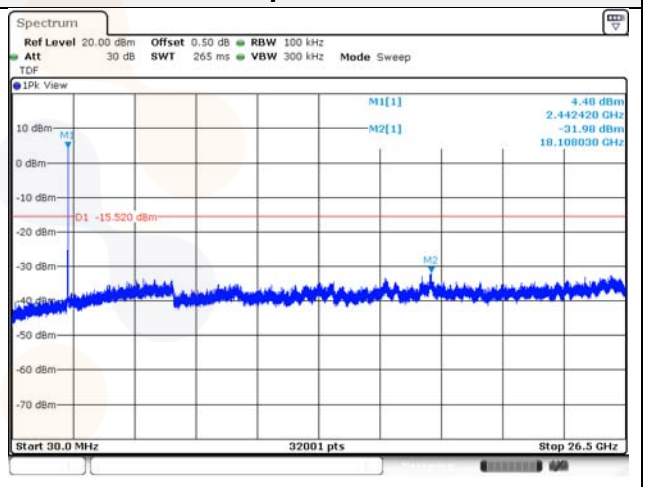
	

Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

802.11g	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
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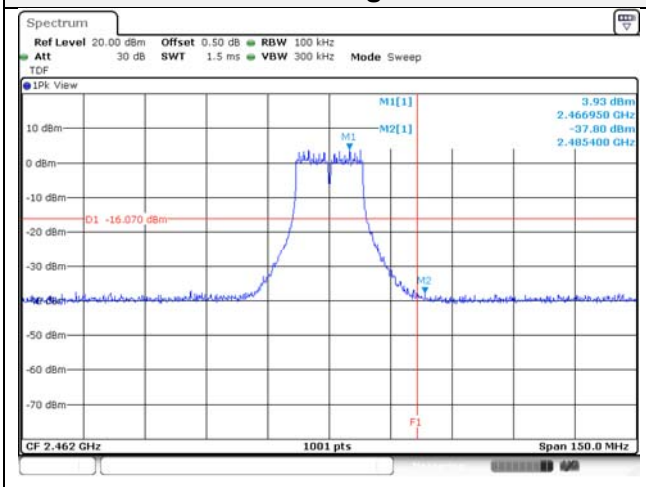
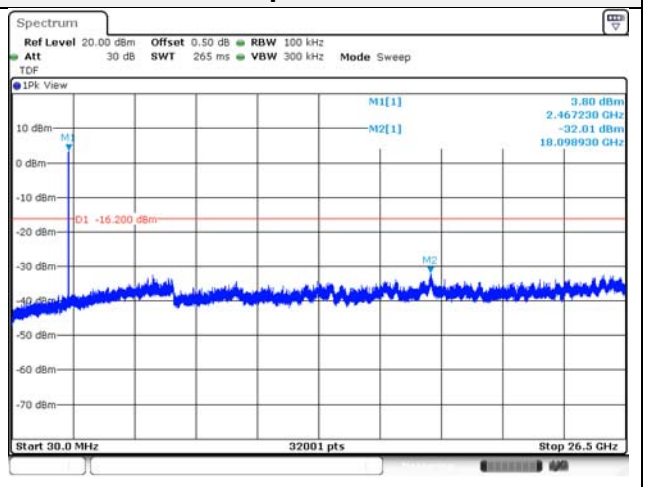
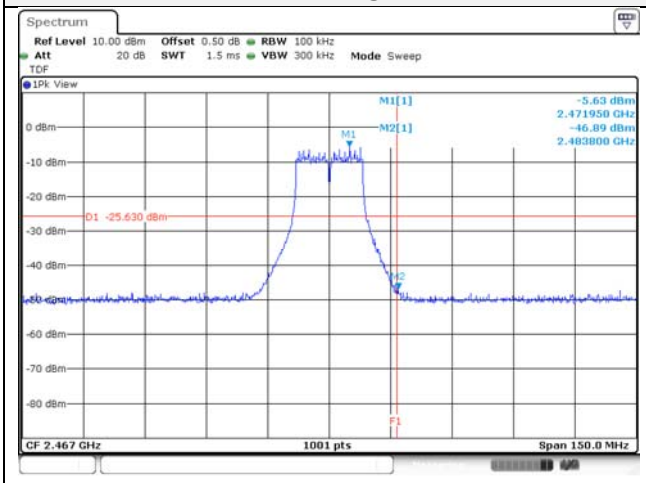
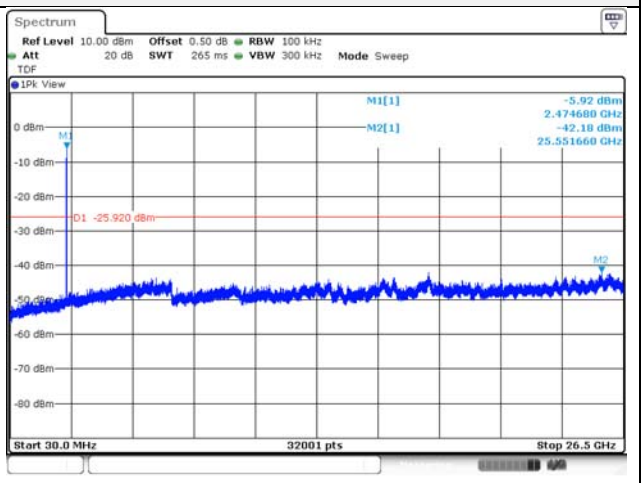
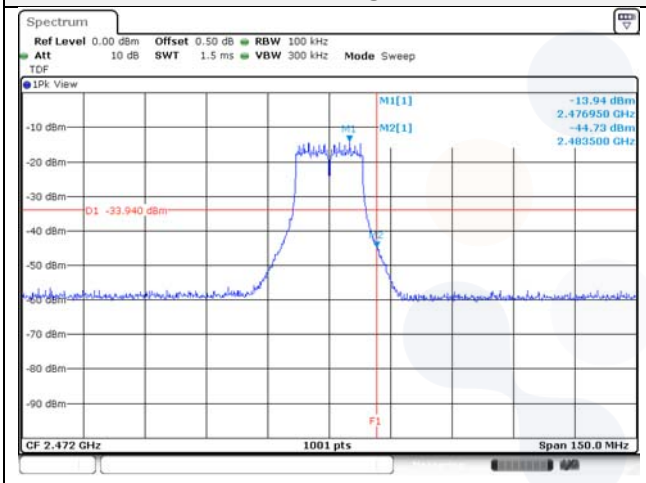
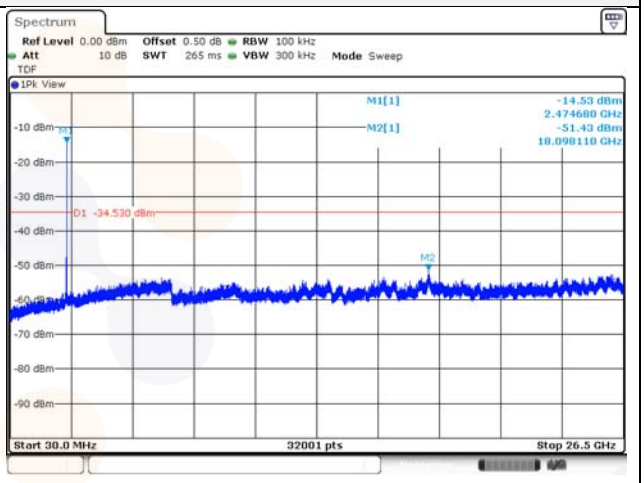
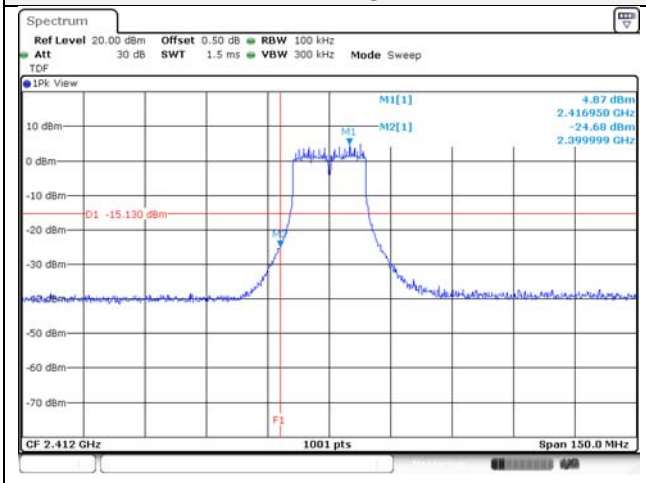
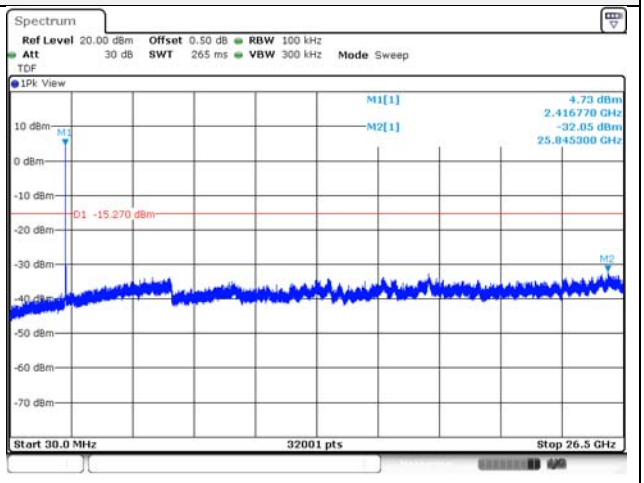
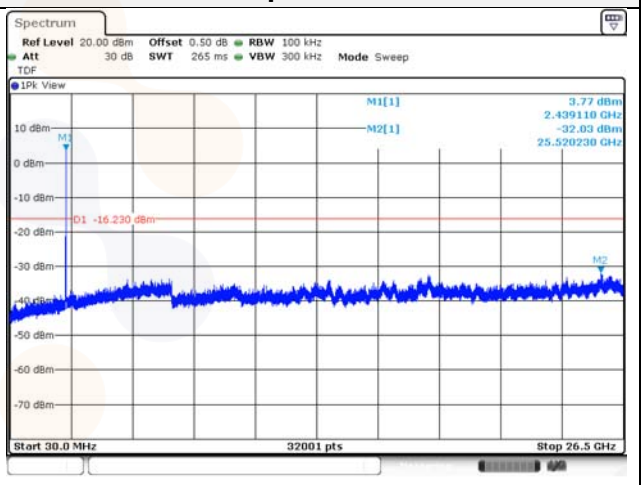
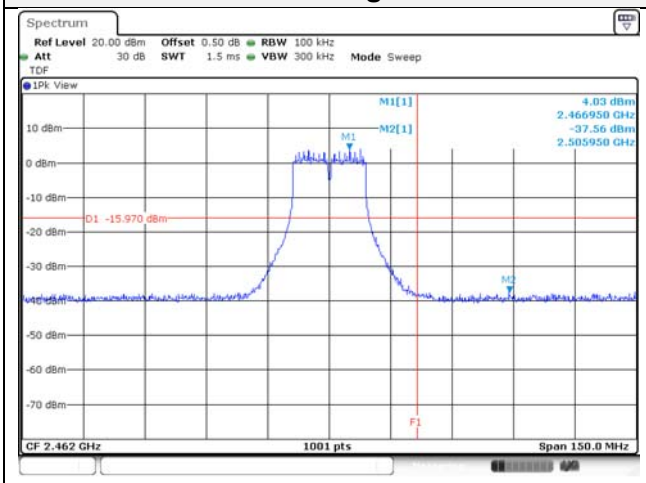
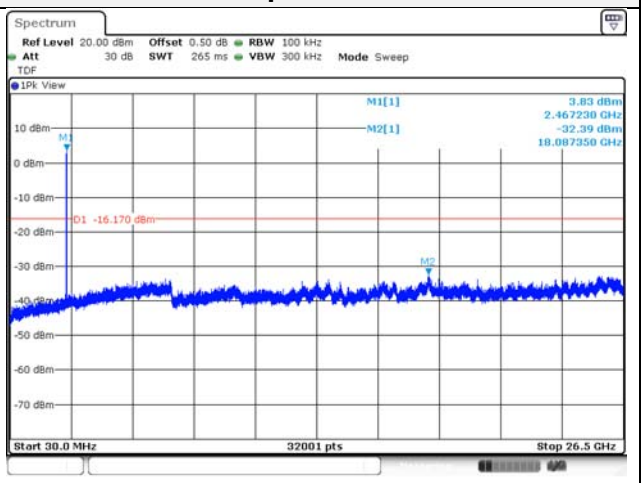
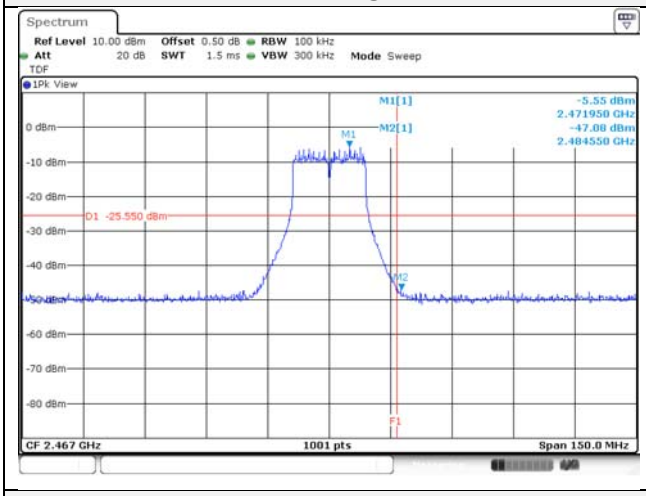
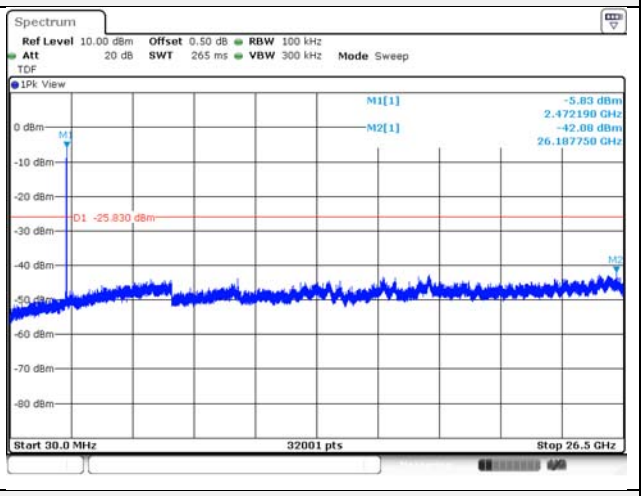
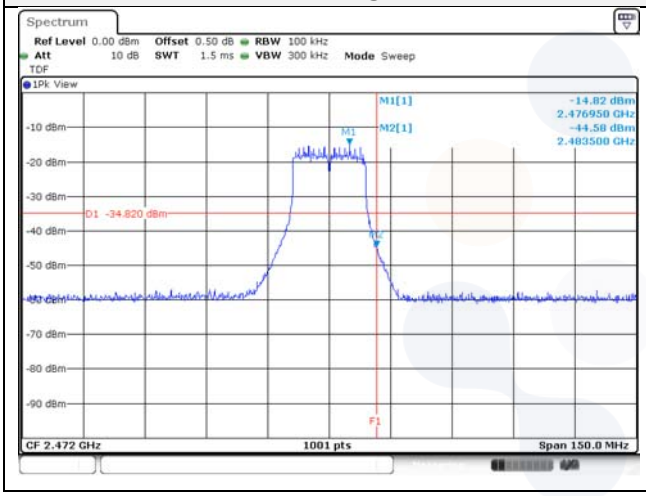
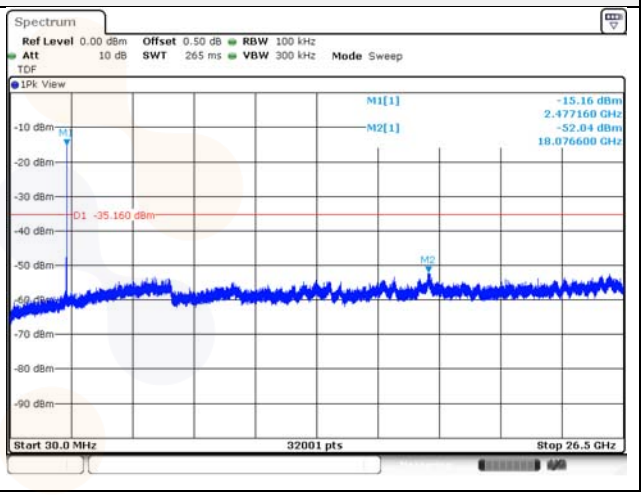
	

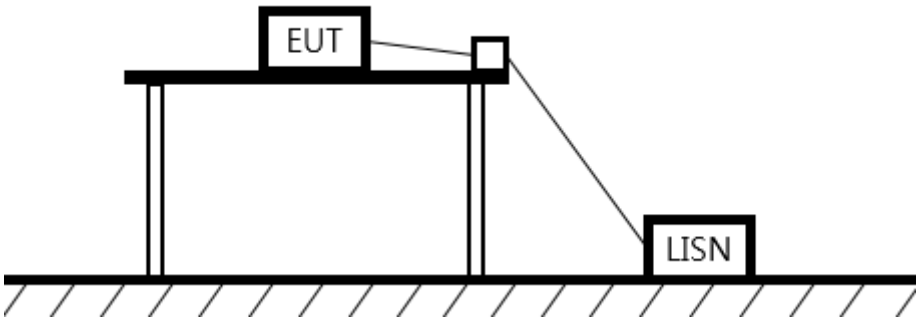
Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

802.11n HT20	
Conducted band-edge / 2 412 ㎒	**Conducted spurious / 2 412 ㎒**
	
Conducted band-edge / 2 437 ㎒	**Conducted spurious / 2 437 ㎒**
Blank	
Conducted band-edge / 2 462 ㎒	**Conducted spurious / 2 462 ㎒**
	

Conducted band-edge / 2 467 ㎒	Conducted spurious / 2 467 ㎒
	
Conducted band-edge / 2 472 ㎒	**Conducted spurious / 2 472 ㎒**
	

7.6. AC Conducted emission

Test setup



Limit

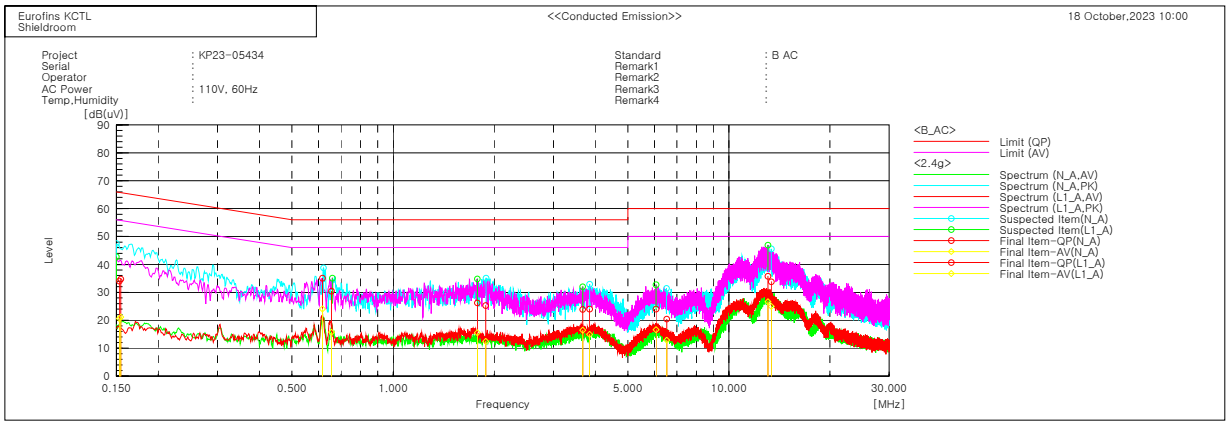
According to 15.207(a) and RSS-Gen(8.8), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminl. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 ㎒ to 30 ㎒.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 ㎑ or to quasi-peak and average within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

Test results – Worst case: 802.11n HT20 2TX MIMO / 2 437 ㎒



Final Result

--- N_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15467	24.8	11.3	9.9	34.7	21.2	65.7	55.7	31.0	34.5
2	0.61625	25.2	14.2	9.9	35.1	24.1	56.0	46.0	20.9	21.9
3	1.88801	15.5	2.6	9.8	25.3	12.4	56.0	46.0	30.7	33.6
4	3.84926	14.2	5.2	9.8	24.0	15.0	56.0	46.0	32.0	31.0
5	6.52532	10.5	3.0	9.9	20.4	12.9	60.0	50.0	39.6	37.1
6	13.37752	23.2	14.3	10.6	33.8	24.9	60.0	50.0	26.2	25.1

--- L1_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.1531	24.2	10.7	9.9	34.1	20.6	65.8	55.8	31.7	35.2
2	0.65534	20.5	5.8	9.9	30.4	15.7	56.0	46.0	25.6	30.3
3	1.78153	16.5	5.7	9.8	26.3	15.5	56.0	46.0	29.7	30.5
4	3.66844	14.1	6.6	9.8	23.9	16.4	56.0	46.0	32.1	29.6
5	6.06788	14.1	6.7	9.9	24.0	16.6	60.0	50.0	36.0	33.4
6	13.07533	25.2	16.1	10.6	35.8	26.7	60.0	50.0	24.2	23.3

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100807	24.07.03
Attenuator	API Inmet	40AH2W-10	11	24.05.03
DC Power Supply	AGILENT	E3632A	MY51220373	24.07.03
Signal Generator	R&S	SMB100A	176206	24.01.19
Vector Signal Generator	R&S	SMBV100A	257566	24.07.04
Power Sensor	R&S	NRP-Z81	1137.9009.02-106224-tg	24.09.12
Attenuator	R&S	DNF Dämpfungsglied 10 dB in N-50 Ohm	31211	24.04.25
Spectrum Analyzer	R&S	FSVA40	101575	24.06.19
PSA Spectrum Analyzer	Agilent	E4440A	MY46186407	24.03.22
Broadband PreAmplifier	SCHWARZBECK	BBV9718D	57	24.03.17
Low Noise Amplifier	TESTEK	TK-PA18H	220124-L	24.10.12**
Low Noise Amplifier	TESTEK	TK-PA1840H	220133-L	24.10.17**
Amplifier	SONOMA INSTRUMENT	310N	421821	24.10.12**
Horn Antenna	SCHWARZBECK	BBHA9120D	2763	24.10.18**
Horn Antenna	SCHWARZBECK	BBHA9170	1267	24.10.16**
Horn Antenna	ETS-LINDGREN	3117	246058	24.03.23
Bilog Antenna	Teseq GmbH	CBL 6112D	63756	24.11.17
Loop Antenna	R&S	HFH2-Z2	100355	24.08.10
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	SN58	24.10.16**
TWO-LINE V - NETWORK	R&S	ENV216	101428	24.09.27*
EMI TEST RECEIVER	R&S	ESCI3	101428	24.08.18
Controller	INNCO SYSTEMS	CO3000	1441/54370322/P	-
Antenna Mast	INNCO SYSTEMS	MA4640-XP-ET	-	-
Turn Device	INNCO SYSTEMS	DS1200-S-1t	-	-

*This equipment was calibrated during the test period, and was used after calibration.
**This equipment was calibrated during the test period, and was used before calibration.

End of test report