8.4.6 Test data for 802.11ac_VHT80 RLAN Mode

8.4.6.1 Test data for Antenna 0

-. Test Date : June 20, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	5 775	76.30

8.4.6.2 Test data for Antenna 1

-. Test Date : June 20, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	5 775	76.30

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8.4.6.3 Test data for Antenna 2

-. Test Date : June 20, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	5 775	76.30

8.4.6.4 Test data for Antenna 3

-. Test Date : June 20, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	5 775	76.30

Tested by: Min-Gu, Ji / Project Engineer

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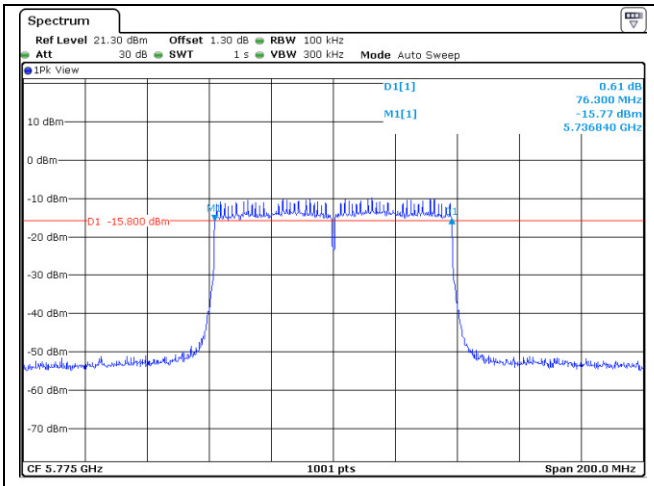
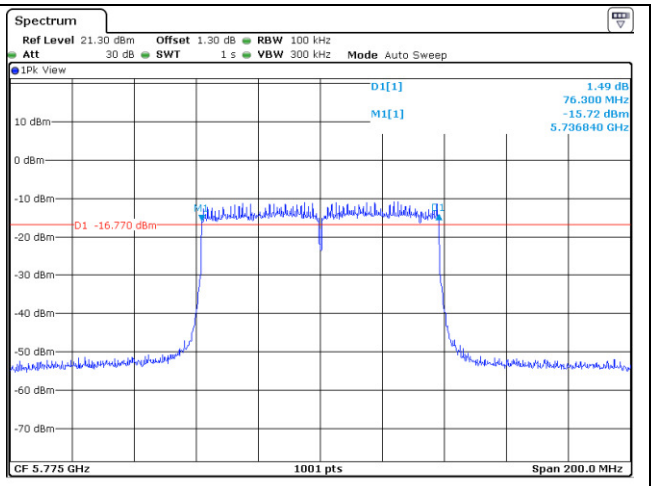
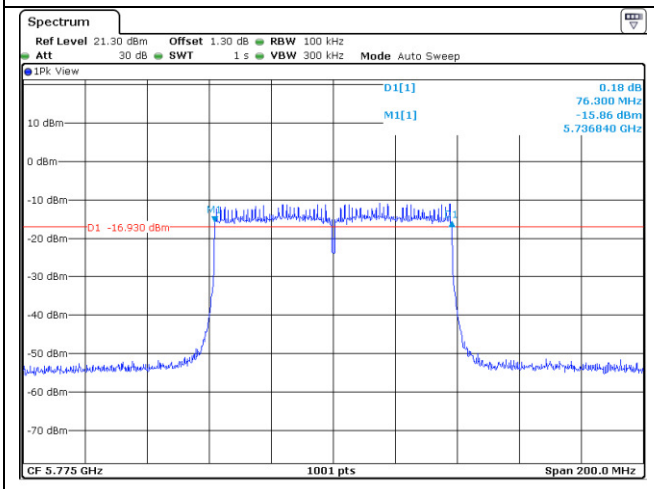


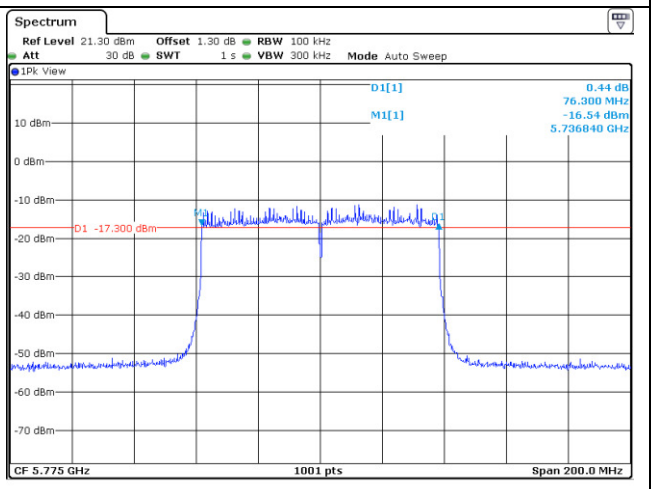
Ant 0



Ant 1



Ant 2



Ant 3

Note: In order to simplify the report, attached plots were only the most wide channel.

9. MAXIMUM PEAK OUTPUT POWER

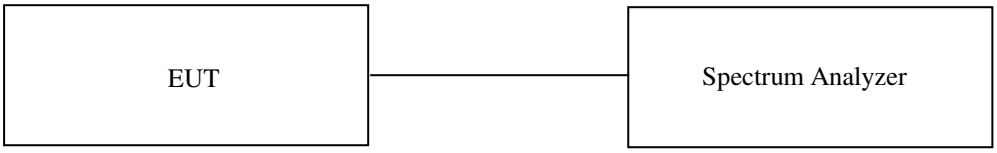
9.1 Operating environment

Temperature : 25 °C

Relative humidity : 45 % R.H.

9.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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9.4 Limit

1. MAXIMUM PEAK OUTPUT POWER (for FCC)

-. Service Port

Operation Mode	Band	Mode	Ant.Port	Ant.gain (dBi)	Limit (dBm)
SISO	UNII 1	802.11a,n,ac	0	5.06	30
			1	5.38	30
			2	4.99	30
			3	5.59	30
	UNII 2A	802.11a,n,ac	0	4.68	24
			1	5.36	24
			2	5.01	24
			3	5.94	24
	UNII 2C	802.11a,n,ac	0	5.08	24
			1	5.33	24
			2	4.59	24
			3	5.32	24
	UNII 3	802.11a,n,ac	0	4.64	30
			1	4.49	30
			2	4.00	30
			3	4.19	30

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MIMO(2TX)	UNII 1	802.11a,n,ac	0+1	8.23	27.77
			0+2	8.04	27.96
			0+3	8.34	27.66
			1+2	8.20	27.80
			1+3	8.50	27.50
			2+3	8.31	27.69
	UNII 2A	802.11a,n,ac	0+1	8.04	21.96
			0+2	7.86	22.14
			0+3	8.37	21.63
			1+2	8.20	21.80
			1+3	8.67	21.33
			2+3	8.51	21.49
	UNII 2C	802.11a,n,ac	0+1	8.22	21.78
			0+2	7.85	22.15
			0+3	8.21	21.79
			1+2	7.99	22.01
			1+3	8.34	21.66
			2+3	7.98	22.02
	UNII 3	802.11a,n,ac	0+1	7.58	28.42
			0+2	7.34	28.66
			0+3	7.43	28.57
			1+2	7.26	28.74
			1+3	7.35	28.65
			2+3	7.11	28.89

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MIMO(3TX)	UNII 1	802.11a,n,ac	0+1+2	9.92	26.08
			0+1+3	10.12	25.88
			0+2+3	9.99	26.01
			1+2+3	10.10	25.90
	UNII 2A	802.11a,n,ac	0+1+2	9.80	20.20
			0+1+3	10.13	19.87
			0+2+3	10.01	19.99
			1+2+3	10.22	19.78
	UNII 2C	802.11a,n,ac	0+1+2	9.78	20.22
			0+1+3	10.02	19.98
			0+2+3	9.78	20.22
			1+2+3	9.86	20.14
	UNII 3	802.11a,n,ac	0+1+2	9.16	26.84
			0+1+3	9.22	26.78
			0+2+3	9.06	26.94
			1+2+3	9.00	27.00
MIMO(4TX)	UNII 1	802.11a,n,ac	0+1+2+3	11.28	24.72
	UNII 2A	802.11a,n,ac	0+1+2+3	11.29	18.71
	UNII 2C	802.11a,n,ac	0+1+2+3	11.11	18.89
	UNII 3	802.11a,n,ac	0+1+2+3	10.36	25.64

Note: 1. If all antenna gains are not equal,

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \cdots 10^{GN/20})^2/N]$ dBi

(according to KDB662911 D01 v02r01)

2. Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

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2. MAXIMUM PEAK OUTPUT POWER (for IC)

-. Service Port

Operation Mode	Band	Mode	Ant.Port	Ant.gain (dBi)	20 MHz BW Limit (dBm)	40/80 MHz BW Limit (dBm)
SISO	UNII 1	802.11a,n,ac	0	5.06	17.11	17.94
			1	5.38	16.79	17.62
			2	4.99	17.18	18.01
			3	5.59	16.58	17.41
	UNII 2A	802.11a,n,ac	0	4.68	23.17	24.00
			1	5.36	23.17	24.00
			2	5.01	23.17	24.00
			3	5.94	23.17	24.00
	UNII 2C	802.11a,n,ac	0	5.08	23.20	24.00
			1	5.33	23.20	24.00
			2	4.59	23.20	24.00
			3	5.32	23.20	24.00
	UNII 3	802.11a,n,ac	0	4.64	30.00	30.00
			1	4.49	30.00	30.00
			2	4.00	30.00	30.00
			3	4.19	30.00	30.00

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MIMO(2TX)	UNII 1	802.11a,n,ac	0+1	8.23	13.94	14.77
			0+2	8.04	14.13	14.96
			0+3	8.34	13.83	14.66
			1+2	8.20	13.97	14.80
			1+3	8.50	13.67	14.50
			2+3	8.31	13.86	14.69
	UNII 2A	802.11a,n,ac	0+1	8.04	21.13	21.96
			0+2	7.86	21.31	22.14
			0+3	8.37	20.80	21.63
			1+2	8.20	20.97	21.80
			1+3	8.67	20.50	21.33
			2+3	8.51	20.66	21.49
	UNII 2C	802.11a,n,ac	0+1	8.22	20.98	21.78
			0+2	7.85	21.35	22.15
			0+3	8.21	20.99	21.79
			1+2	7.99	21.21	22.01
			1+3	8.34	20.86	21.66
			2+3	7.98	21.22	22.02
	UNII 3	802.11a,n,ac	0+1	7.58	28.42	28.42
			0+2	7.34	28.66	28.66
			0+3	7.43	28.57	28.57
			1+2	7.26	28.74	28.74
			1+3	7.35	28.65	28.65
			2+3	7.11	28.89	28.89

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MIMO(3TX)	UNII 1	802.11a,n,ac	0+1+2	9.92	12.25	13.08
			0+1+3	10.12	12.05	12.88
			0+2+3	9.99	12.18	13.01
			1+2+3	10.10	12.07	12.90
	UNII 2A	802.11a,n,ac	0+1+2	9.80	19.40	20.20
			0+1+3	10.13	19.07	19.87
			0+2+3	10.01	19.19	19.99
			1+2+3	10.22	18.98	19.78
	UNII 2C	802.11a,n,ac	0+1+2	9.78	19.39	20.22
			0+1+3	10.02	19.15	19.98
			0+2+3	9.78	19.39	20.22
			1+2+3	9.86	19.31	20.14
	UNII 3	802.11a,n,ac	0+1+2	9.16	26.84	26.84
			0+1+3	9.22	26.78	26.78
			0+2+3	9.06	26.94	26.94
			1+2+3	9.00	27.00	27.00
MIMO(4TX)	UNII 1	802.11a,n,ac	0+1+2+3	11.28	10.89	11.72
	UNII 2A	802.11a,n,ac	0+1+2+3	11.29	17.88	18.71
	UNII 2C	802.11a,n,ac	0+1+2+3	11.11	17.91	18.89
	UNII 3	802.11a,n,ac	0+1+2+3	10.36	25.64	25.64

Note: 1. If all antenna gains are not equal,

Directional gain = $10*\log[(10^{G1/20} + 10^{G2/20} + \cdots 10^{GN/20})^2/N]$ dBi

(according to KDB662911 D01 v02r01)

2. Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

3. Limit of UNII1 and UNII3 for IC is used the conducted level.

* Limit: e.i.r.p. limit – Antenna Gain

4. The limits of maximum conducted power were applied the antenna gain. Therefore, if conducted power is pass, e.i.r.p. is also pass. So, we attached only conducted power table.

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9.5 Test data for Service Port

9.5.1 Test data for 802.11a RLAN Mode

9.5.1.1 Test data for Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.78	6.75	30	23.25
	Middle	5 220	20.73	6.59	30	23.41
	High	5 240	20.78	6.91	30	23.09
5 250 ~ 5 350	Low	5 260	20.68	11.96	24	12.04
	Middle	5 300	20.58	11.92	24	12.08
	High	5 320	20.78	11.85	24	12.15
5 470 ~ 5 725	Low	5 500	20.73	6.49	24	17.51
	Middle	5 560	20.63	10.31	24	13.69
	High	5 720	20.88	10.08	24	13.92
5 725 ~ 5 850	Low	5 745	20.68	14.49	30	15.51
	Middle	5 785	20.73	13.36	30	16.64
	High	5 825	20.63	14.69	30	15.31

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	16.53	3.29	17.11	13.82
	Middle	5 220	16.58	3.03	17.11	14.08
	High	5 240	16.58	3.84	17.11	13.27
5 250 ~ 5 350	Low	5 260	16.58	9.24	23.17	13.93
	Middle	5 300	16.58	9.89	23.17	13.28
	High	5 320	16.58	8.86	23.17	14.31
5 470 ~ 5 725	Low	5 500	16.53	6.37	23.2	16.83
	Middle	5 560	16.53	9.06	23.2	14.14
	High	5 720	16.53	9.29	23.2	13.91
5 725 ~ 5 825	Low	5 745	16.53	12.90	30	17.10
	Middle	5 785	16.58	12.07	30	17.93
	High	5 825	16.58	12.64	30	17.36

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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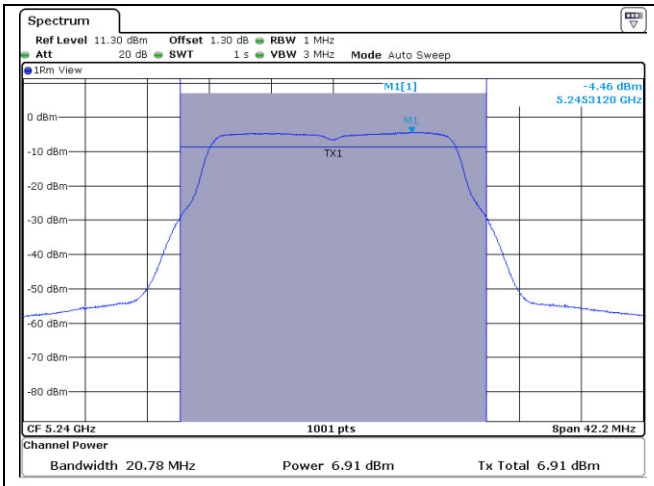
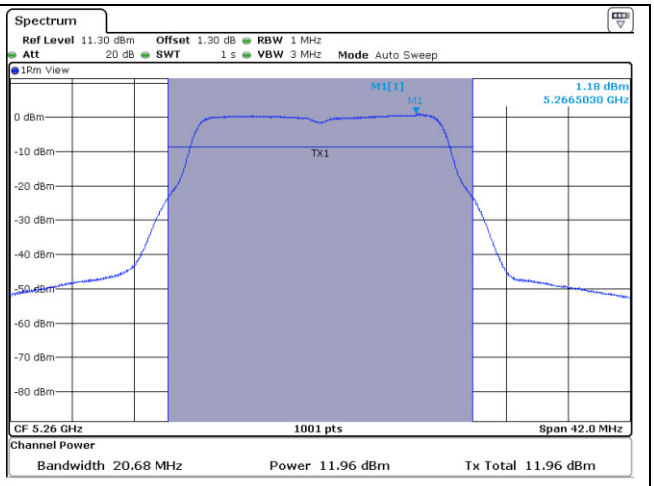
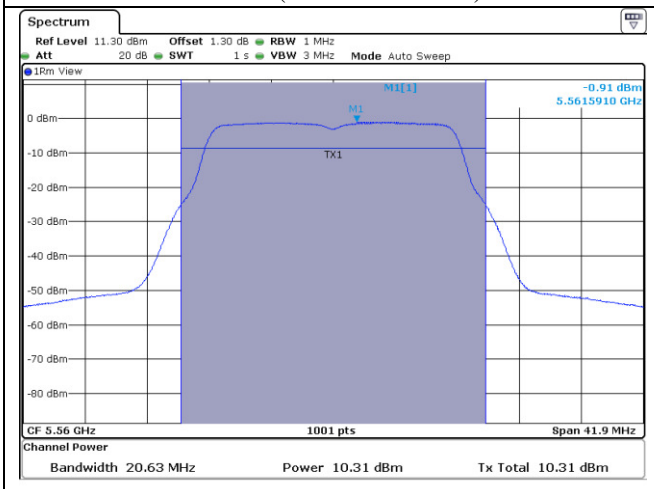


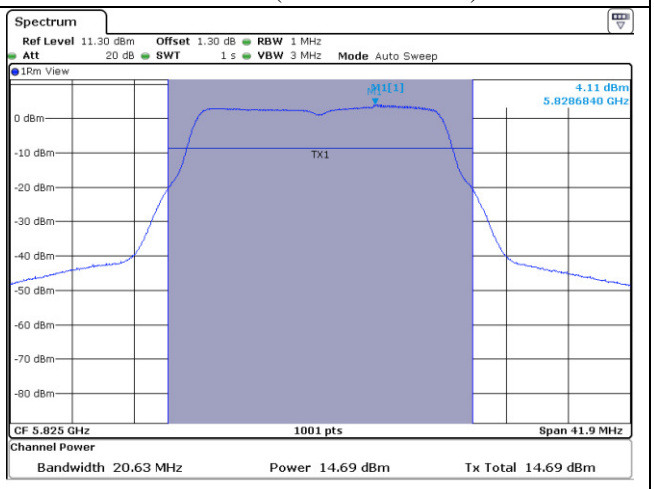
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

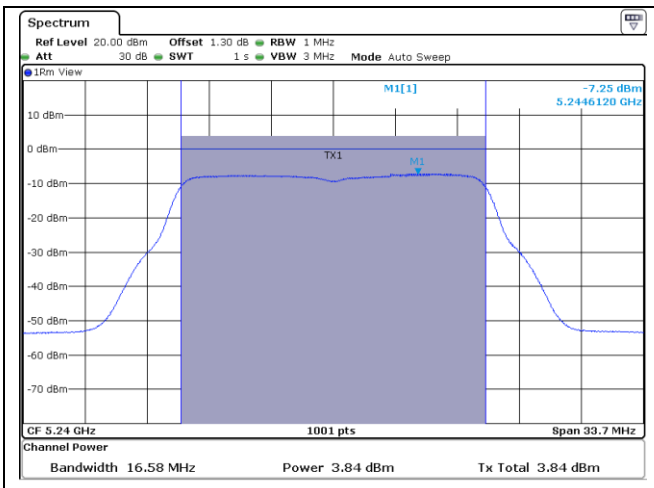


U-NII-2C (26 dB Bandwidth)

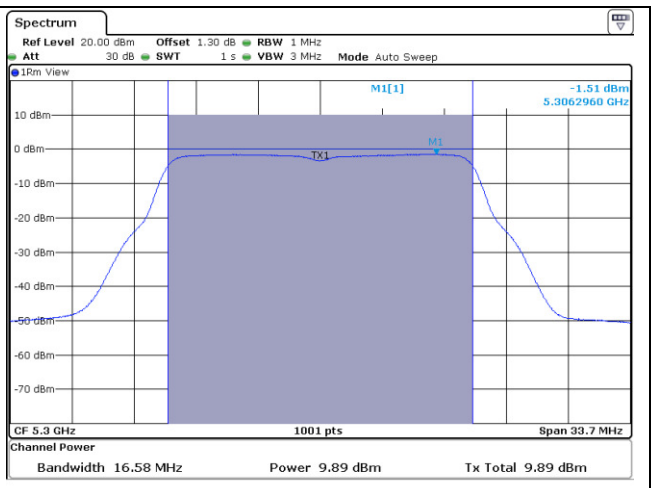


U-NII-3 (26 dB Bandwidth)

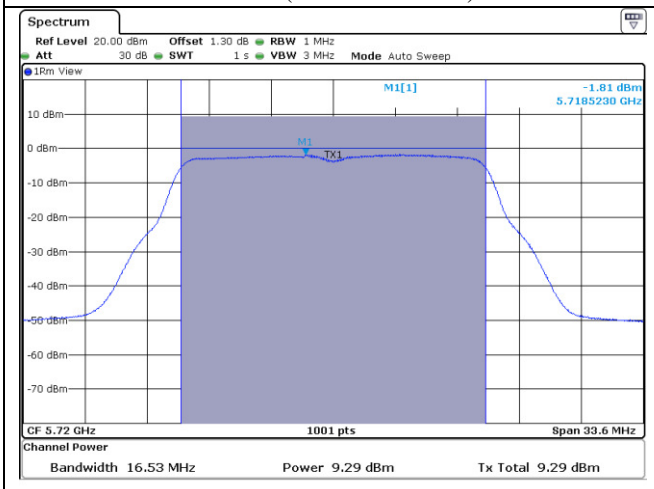
Note: In order to simplify the report, attached plots were only the most wide channel.



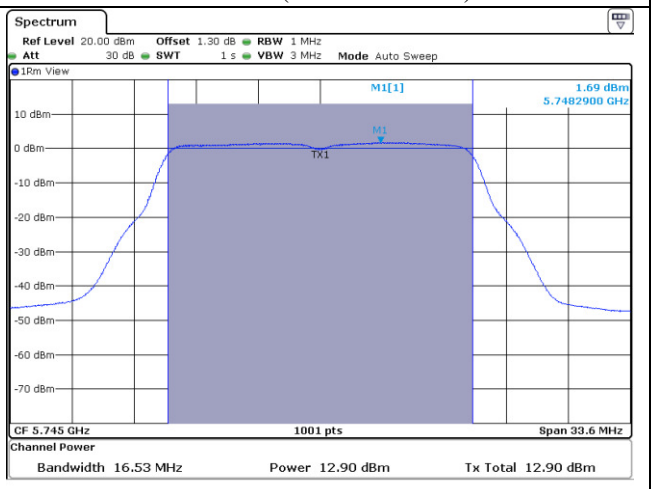
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.1.2 Test data for Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.68	5.98	30	24.02
	Middle	5 220	20.58	5.78	30	24.22
	High	5 240	20.73	6.55	30	23.45
5 250 ~ 5 350	Low	5 260	20.63	10.72	24	13.28
	Middle	5 300	20.63	10.90	24	13.10
	High	5 320	20.58	10.88	24	13.12
5 470 ~ 5 725	Low	5 500	20.63	6.02	24	17.98
	Middle	5 560	20.63	9.82	24	14.18
	High	5 720	20.73	9.45	24	14.55
5 725 ~ 5 850	Low	5 745	20.63	12.93	30	17.07
	Middle	5 785	20.63	12.49	30	17.51
	High	5 825	20.28	13.36	30	16.64

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	16.53	2.42	16.79	14.37
	Middle	5 220	16.53	2.77	16.79	14.02
	High	5 240	16.53	3.09	16.79	13.70
5 250 ~ 5 350	Low	5 260	16.53	8.71	23.17	14.46
	Middle	5 300	16.58	9.04	23.17	14.13
	High	5 320	16.58	8.55	23.17	14.62
5 470 ~ 5 725	Low	5 500	16.53	6.77	23.2	16.43
	Middle	5 560	16.53	8.81	23.2	14.39
	High	5 720	16.53	8.62	23.2	14.58
5 725 ~ 5 825	Low	5 745	16.58	11.90	30	18.10
	Middle	5 785	16.53	11.38	30	18.62
	High	5 825	16.43	12.84	30	17.16

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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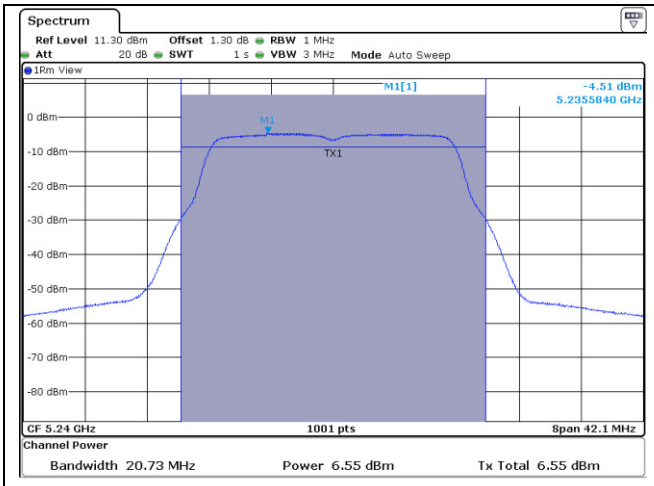
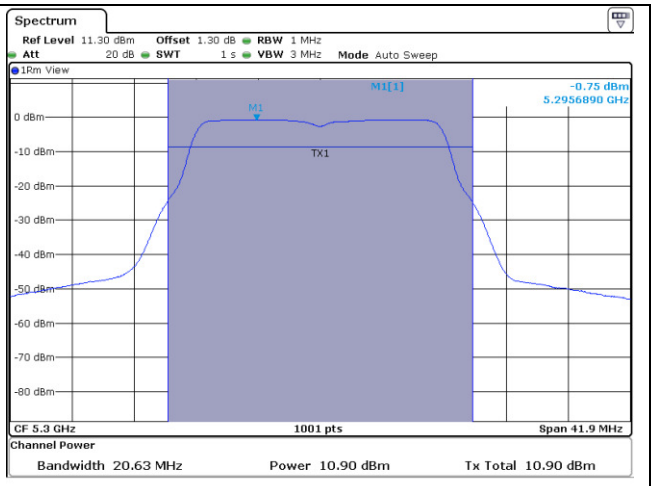
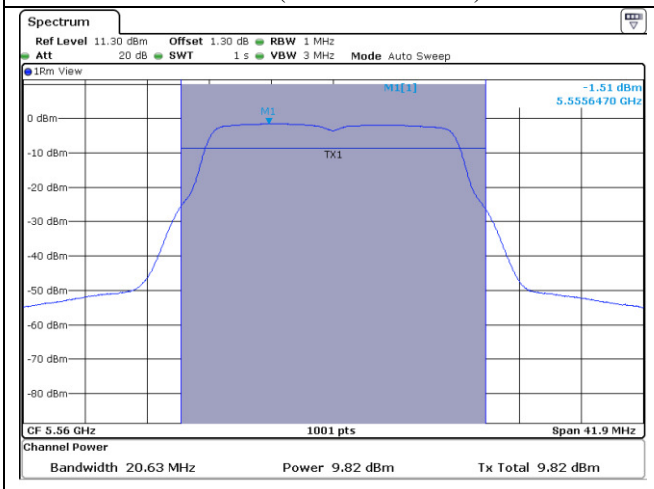


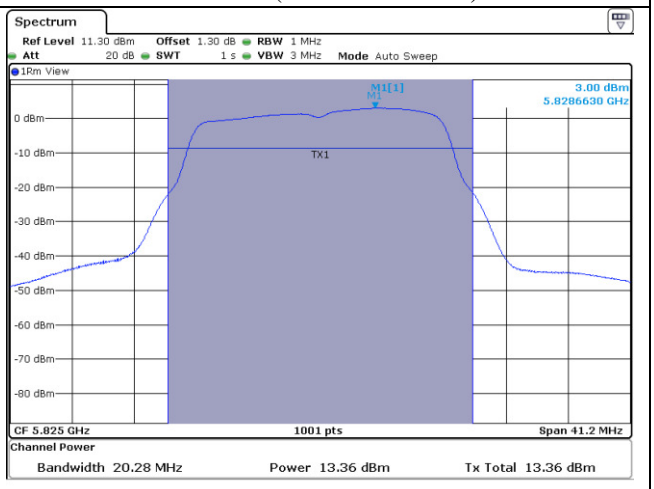
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

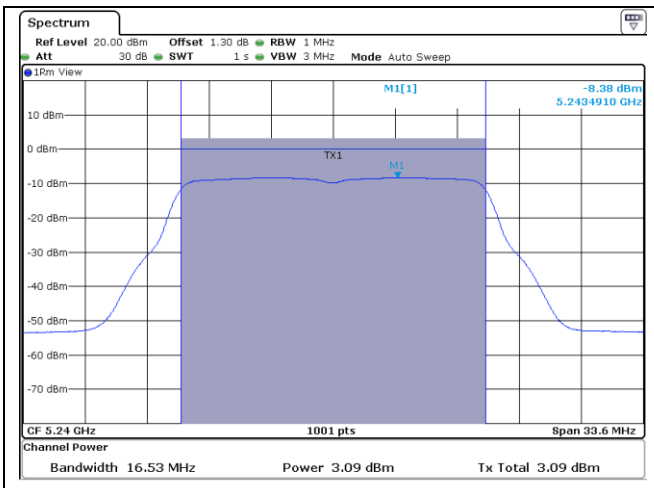


U-NII-2C (26 dB Bandwidth)

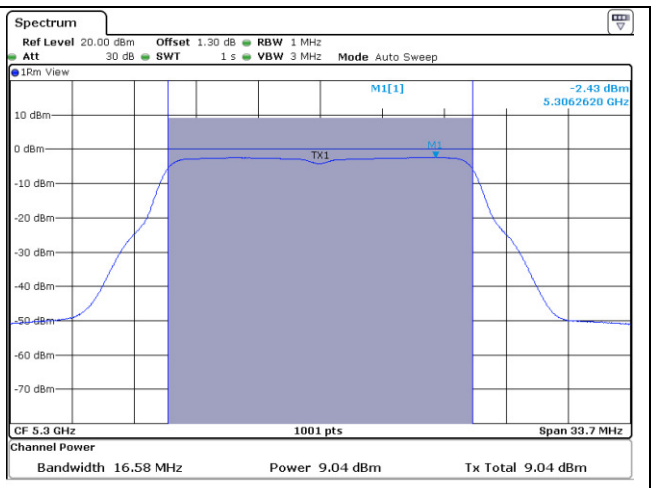


U-NII-3 (26 dB Bandwidth)

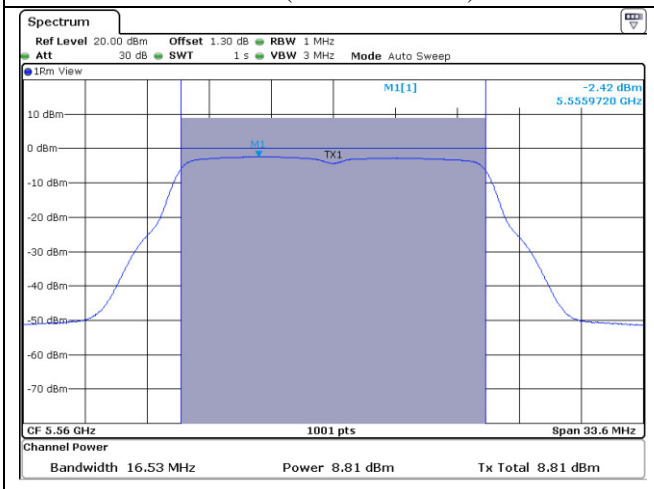
Note: In order to simplify the report, attached plots were only the most wide channel.



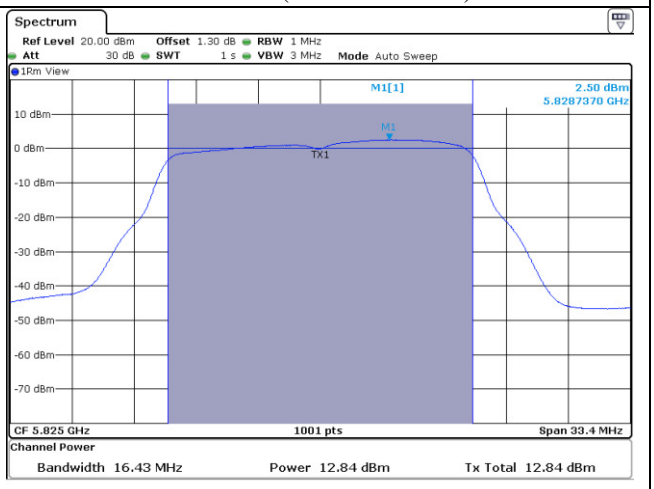
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.1.3 Test data for Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.53	5.71	30	24.29
	Middle	5 220	20.58	5.28	30	24.72
	High	5 240	20.58	5.82	30	24.18
5 250 ~ 5 350	Low	5 260	20.78	10.84	24	13.16
	Middle	5 300	20.73	11.45	24	12.55
	High	5 320	20.73	11.82	24	12.18
5 470 ~ 5 725	Low	5 500	20.73	6.34	24	17.66
	Middle	5 560	20.58	10.03	24	13.97
	High	5 720	20.53	9.77	24	14.23
5 725 ~ 5 850	Low	5 745	20.48	13.28	30	16.72
	Middle	5 785	20.53	12.56	30	17.44
	High	5 825	20.48	13.96	30	16.04

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	16.53	2.25	17.18	14.93
	Middle	5 220	16.48	2.48	17.18	14.70
	High	5 240	16.48	2.69	17.18	14.49
5 250 ~ 5 350	Low	5 260	16.48	8.72	23.17	14.45
	Middle	5 300	16.48	8.94	23.17	14.23
	High	5 320	16.53	9.26	23.17	13.91
5 470 ~ 5 725	Low	5 500	16.53	6.72	23.2	16.48
	Middle	5 560	16.53	8.70	23.2	14.50
	High	5 720	16.48	8.63	23.2	14.57
5 725 ~ 5 825	Low	5 745	16.48	11.55	30	18.45
	Middle	5 785	16.48	11.22	30	18.78
	High	5 825	16.43	12.53	30	17.47

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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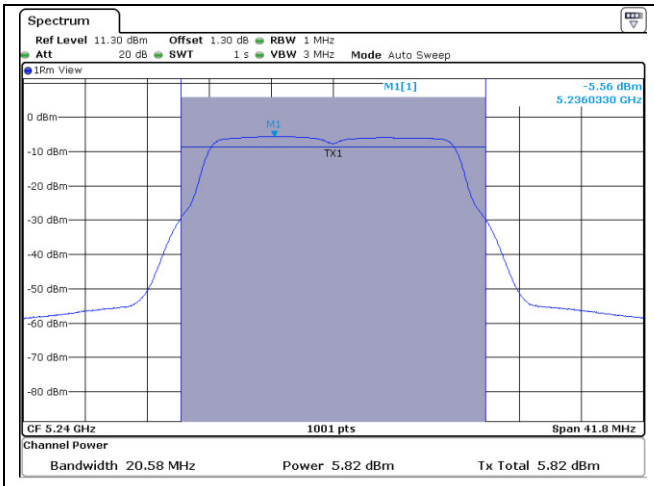
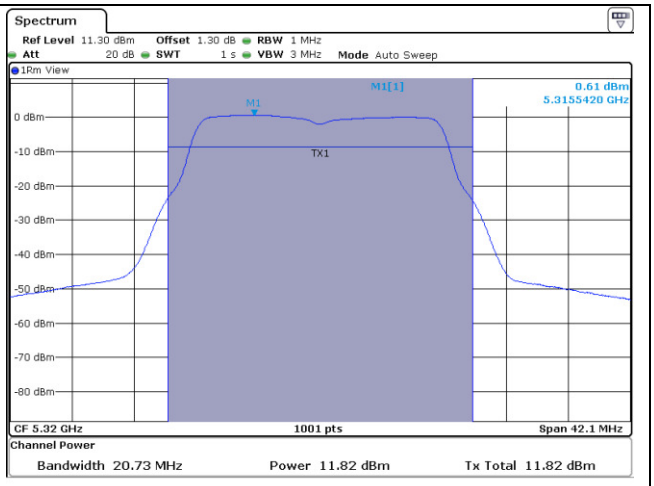
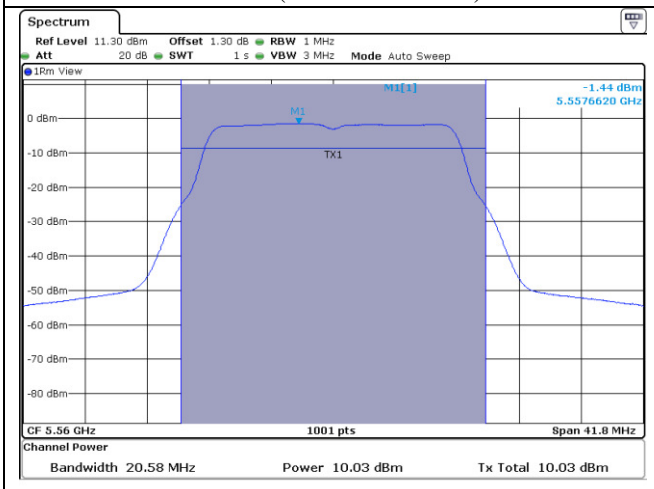


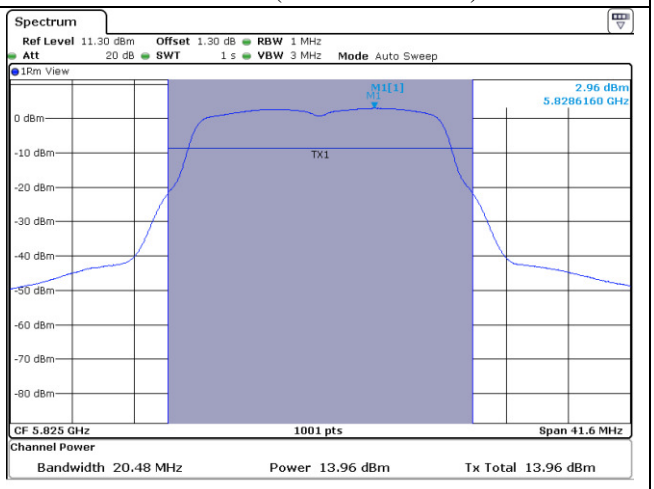
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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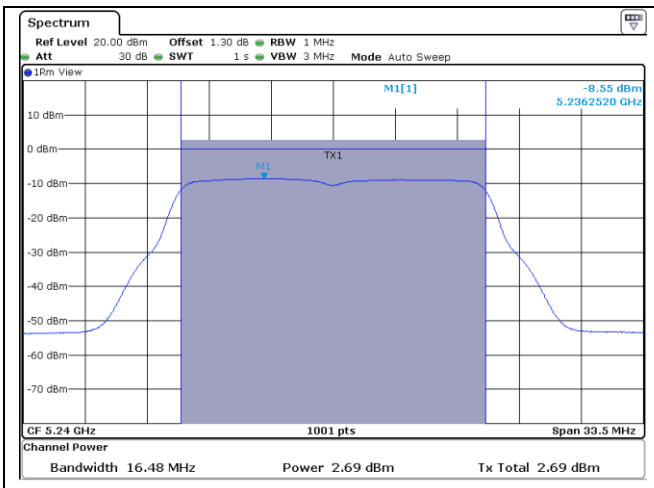
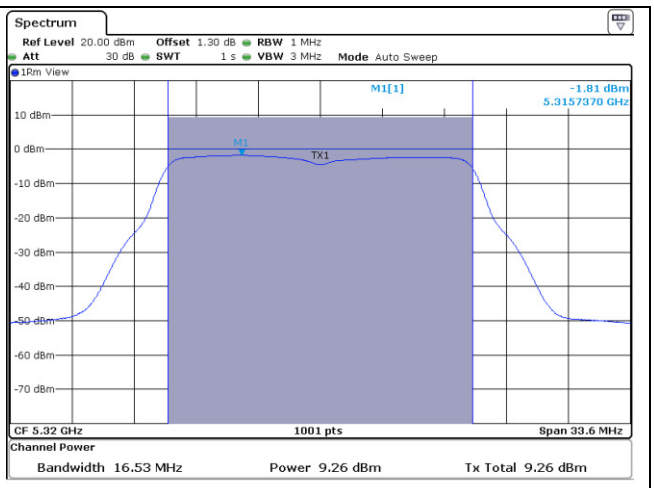
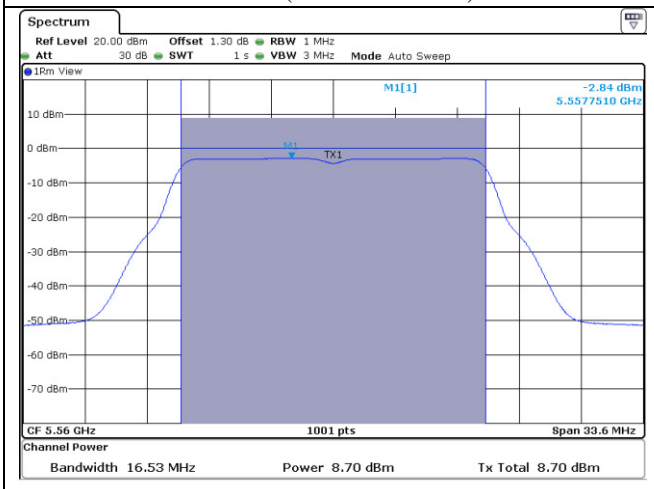


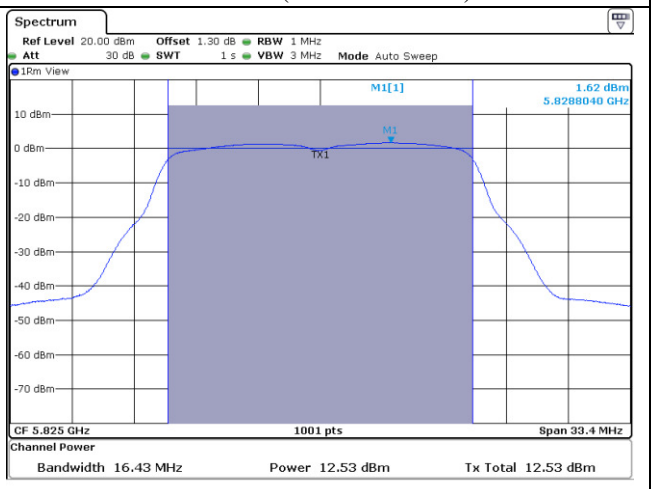
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.1.4 Test data for Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.53	4.21	30	25.79
	Middle	5 220	20.53	4.84	30	25.16
	High	5 240	20.63	5.15	30	24.85
5 250 ~ 5 350	Low	5 260	20.43	9.90	24	14.10
	Middle	5 300	20.63	10.91	24	13.09
	High	5 320	20.63	10.99	24	13.01
5 470 ~ 5 725	Low	5 500	20.73	4.67	24	19.33
	Middle	5 560	20.33	8.78	24	15.22
	High	5 720	20.23	8.73	24	15.27
5 725 ~ 5 850	Low	5 745	20.38	12.24	30	17.76
	Middle	5 785	20.43	11.39	30	18.61
	High	5 825	20.18	12.30	30	17.70

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	16.48	1.40	16.58	15.18
	Middle	5 220	16.48	1.83	16.58	14.75
	High	5 240	16.48	2.14	16.58	14.44
5 250 ~ 5 350	Low	5 260	16.48	7.51	23.17	15.66
	Middle	5 300	16.48	7.95	23.17	15.22
	High	5 320	16.53	8.01	23.17	15.16
5 470 ~ 5 725	Low	5 500	16.53	5.30	23.2	17.90
	Middle	5 560	16.53	7.32	23.2	15.88
	High	5 720	16.48	7.53	23.2	15.67
5 725 ~ 5 825	Low	5 745	16.48	10.97	30	19.03
	Middle	5 785	16.48	10.27	30	19.73
	High	5 825	16.58	11.20	30	18.80

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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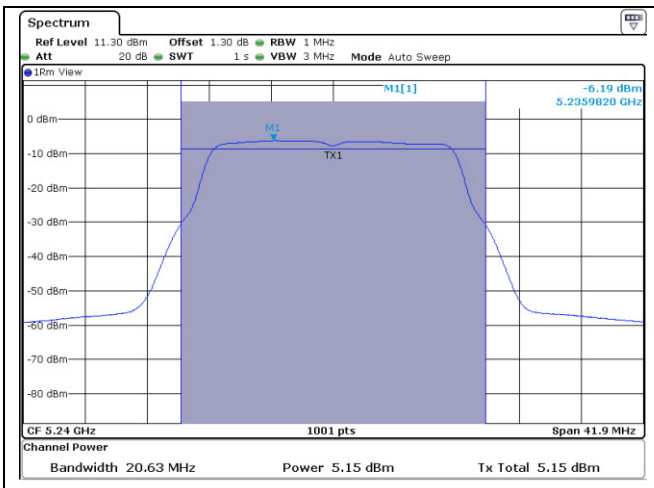
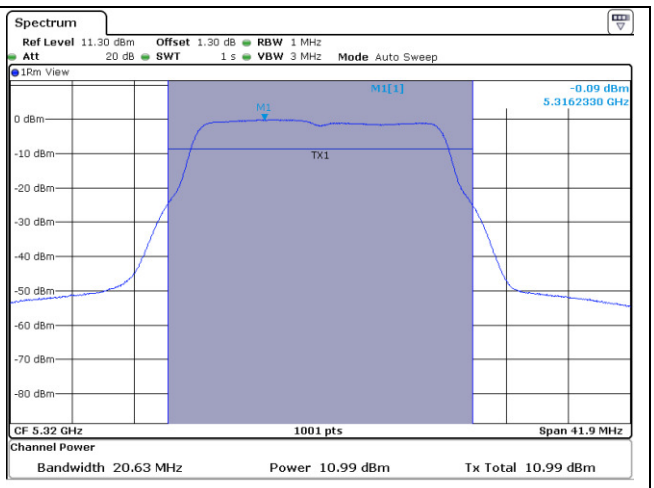
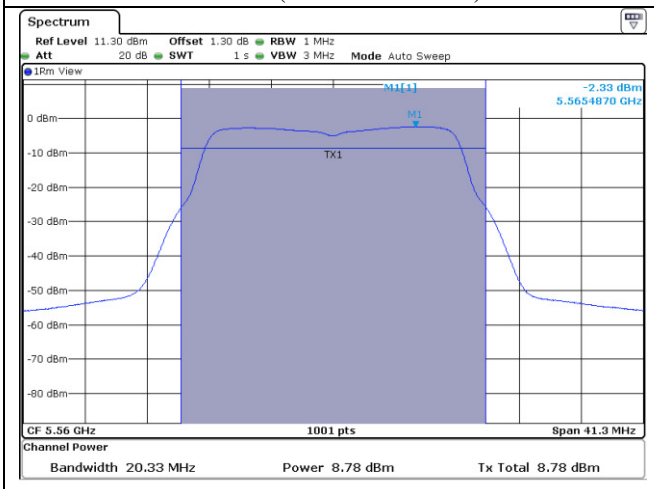


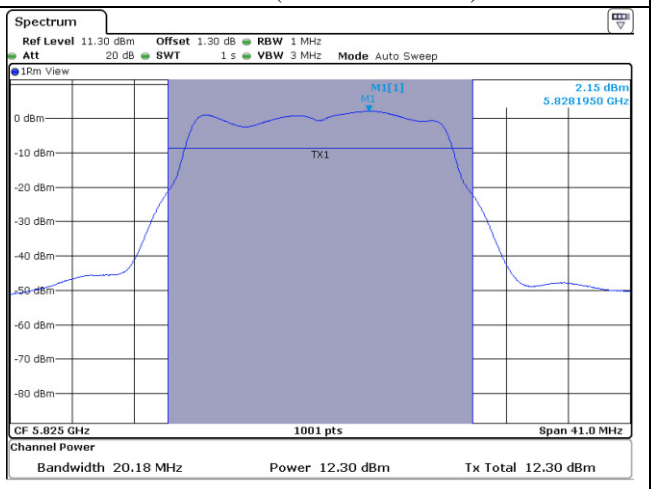
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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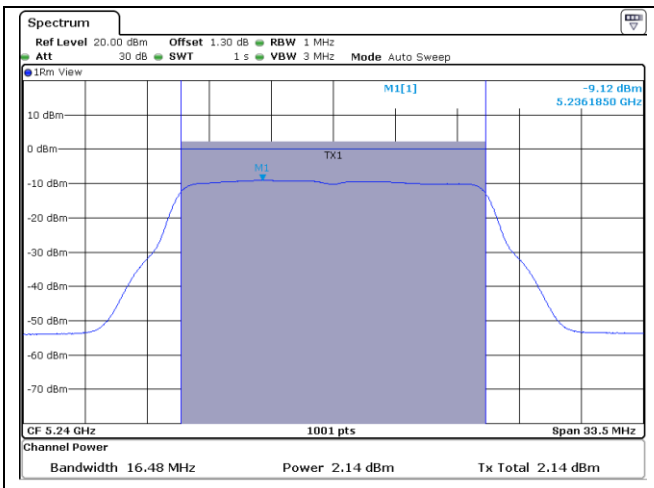
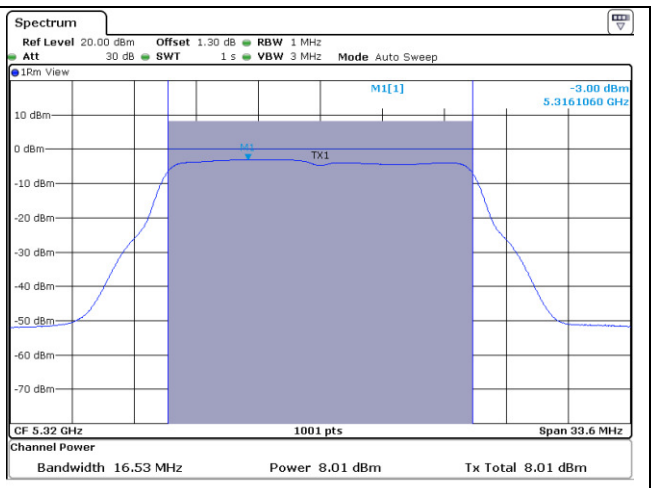
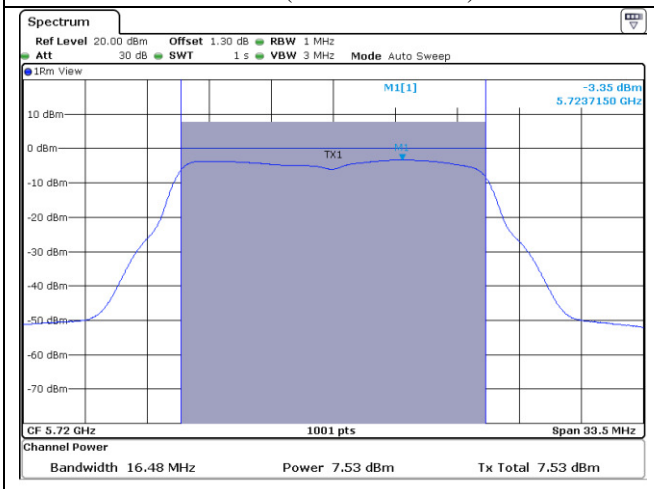


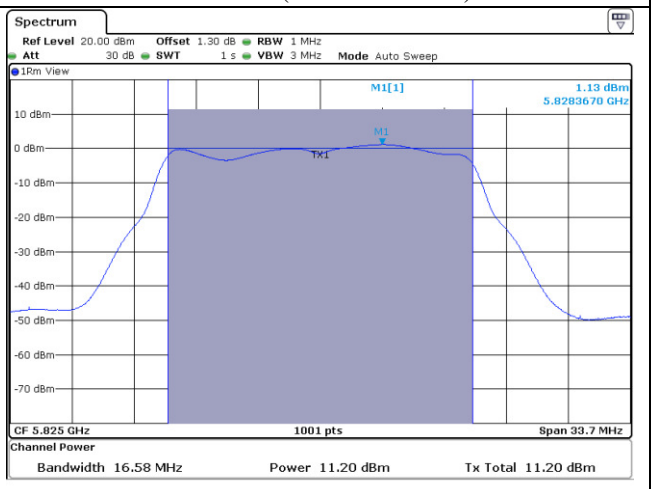
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

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9.5.1.5 Test data for Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	11.78	24.72	12.94
	Middle	5 200	11.69	24.72	13.03
	High	5 240	12.18	24.72	12.54
5 250 ~ 5 350	Low	5 260	16.94	18.71	1.77
	Middle	5 300	17.34	18.71	1.37
	High	5 320	17.43	18.71	1.28
5 470 ~ 5 725	Low	5 500	11.96	18.89	6.93
	Middle	5 580	15.79	18.89	3.10
	High	5 720	15.56	18.89	3.33
5 725 ~ 5 850	Low	5 745	19.33	25.64	6.31
	Middle	5 785	18.53	25.64	7.11
	High	5 825	19.68	25.64	5.96

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	8.41	10.89	2.48
	Middle	5 220	8.57	10.89	2.32
	High	5 240	9.01	10.89	1.88
5 250 ~ 5 350	Low	5 260	14.61	17.88	3.27
	Middle	5 300	15.03	17.88	2.85
	High	5 320	14.71	17.88	3.17
5 470 ~ 5 725	Low	5 500	12.35	17.91	5.56
	Middle	5 560	14.54	17.91	3.37
	High	5 720	14.58	17.91	3.33
5 725 ~ 5 825	Low	5 745	17.91	25.64	7.73
	Middle	5 785	17.30	25.64	8.34
	High	5 825	18.37	25.64	7.27

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

9.5.1.6 Test data for Staddle Channel_Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.44	9.83	24.00	14.17
5 725 ~ 5 825	5 720	5.24	4.02	30.00	25.98

9.5.1.7 Test data for Staddle Channel_Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.44	9.67	24.00	14.33
5 725 ~ 5 825	5 720	5.34	3.68	30.00	26.32

9.5.1.8 Test data for Staddle Channel_Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.34	9.45	24.00	14.55
5 725 ~ 5 825	5 720	5.35	4.08	30.00	25.92

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9.5.1.9 Test data for Staddle Channel_Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.34	8.40	24.00	15.60
5 725 ~ 5 825	5 720	5.09	2.55	30.00	27.45

9.5.1.10 Test data for Staddle Channel_Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.39	18.89	3.50
5 725 ~ 5 850	5 720	9.64	25.64	16.00

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

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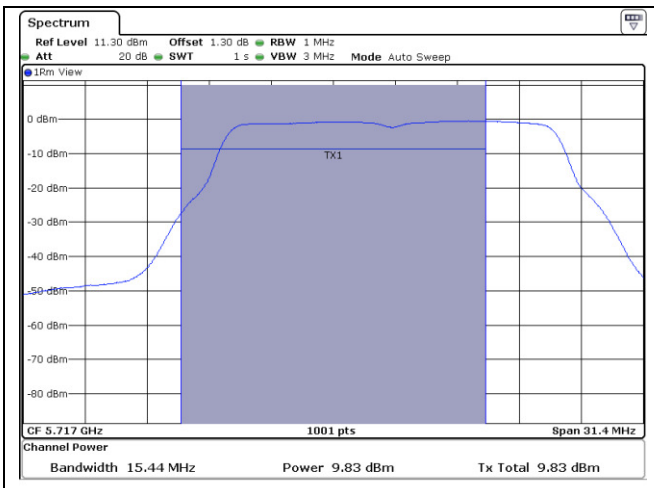
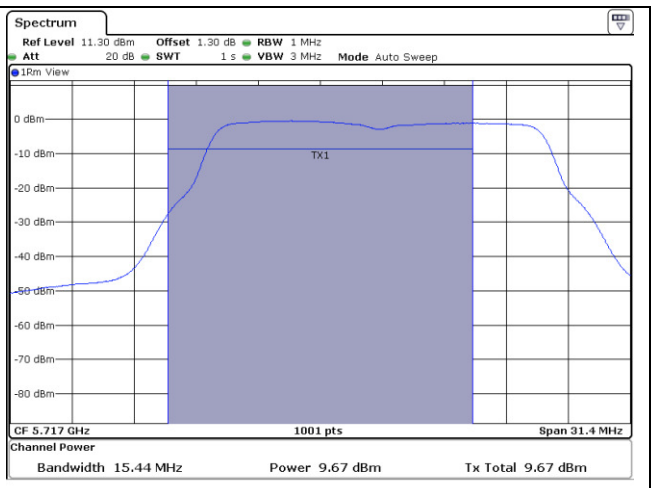
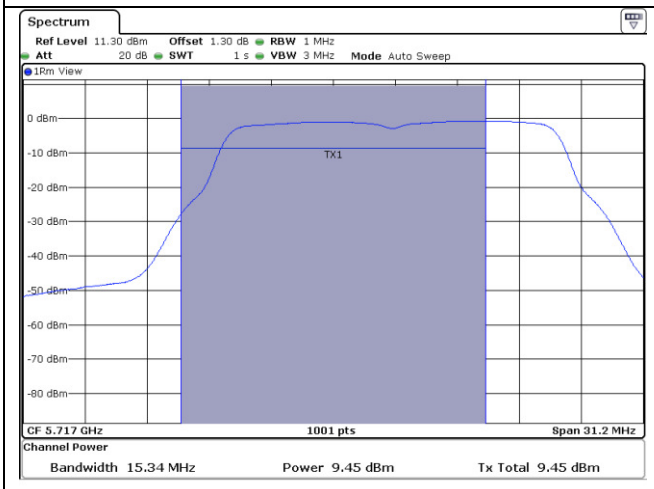


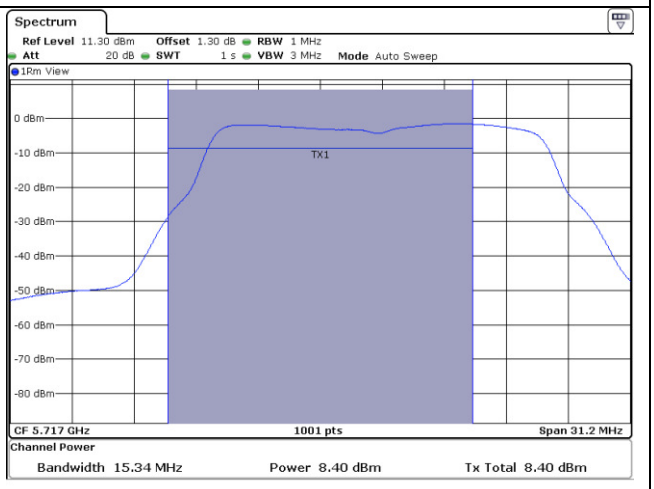
Ant 0



Ant 1



Ant 2



Ant 3

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.2 Test data for 802.11n_HT20 RLAN Mode

9.5.2.1 Test data for Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.98	7.95	30	22.05
	Middle	5 220	20.93	8.67	30	21.33
	High	5 240	21.08	8.16	30	21.84
5 250 ~ 5 350	Low	5 260	21.03	11.96	24	12.04
	Middle	5 300	20.93	12.33	24	11.67
	High	5 320	20.98	12.26	24	11.74
5 470 ~ 5 725	Low	5 500	21.28	7.73	24	16.27
	Middle	5 560	21.13	11.58	24	12.42
	High	5 720	20.98	12.02	24	11.98
5 725 ~ 5 850	Low	5 745	21.03	13.24	30	16.76
	Middle	5 785	20.88	12.26	30	17.74
	High	5 825	21.08	9.05	30	20.95

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	4.07	17.11	13.04
	Middle	5 220	17.73	4.66	17.11	12.45
	High	5 240	17.78	4.46	17.11	12.65
5 250 ~ 5 350	Low	5 260	17.73	9.30	23.17	13.87
	Middle	5 300	17.68	9.64	23.17	13.53
	High	5 320	17.73	9.28	23.17	13.89
5 470 ~ 5 725	Low	5 500	17.73	6.23	23.2	16.97
	Middle	5 560	17.73	10.29	23.2	12.91
	High	5 720	17.73	9.20	23.2	14.00
5 725 ~ 5 825	Low	5 745	17.78	12.19	30	17.81
	Middle	5 785	17.73	11.13	30	18.87
	High	5 825	17.73	8.06	30	21.94

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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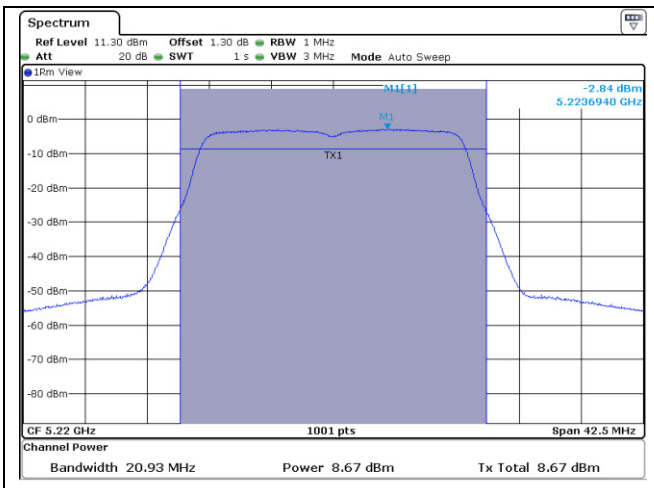
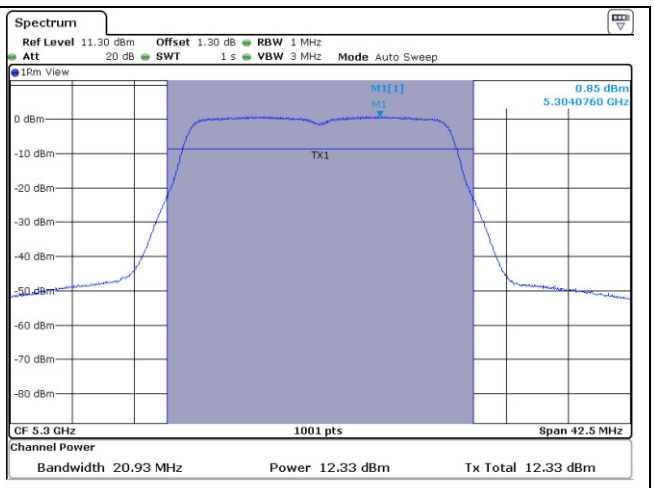
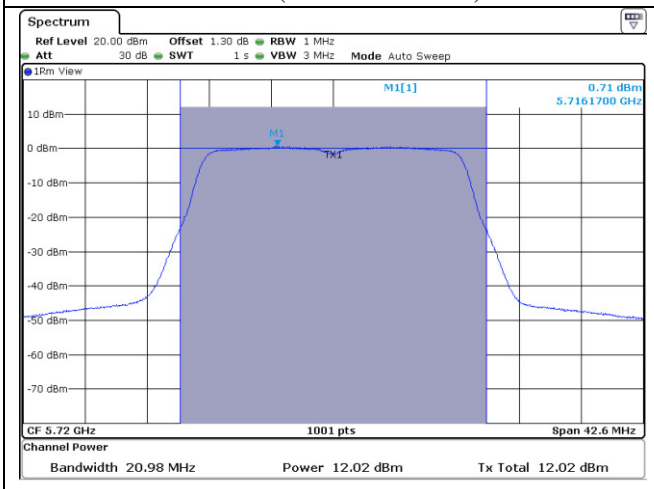


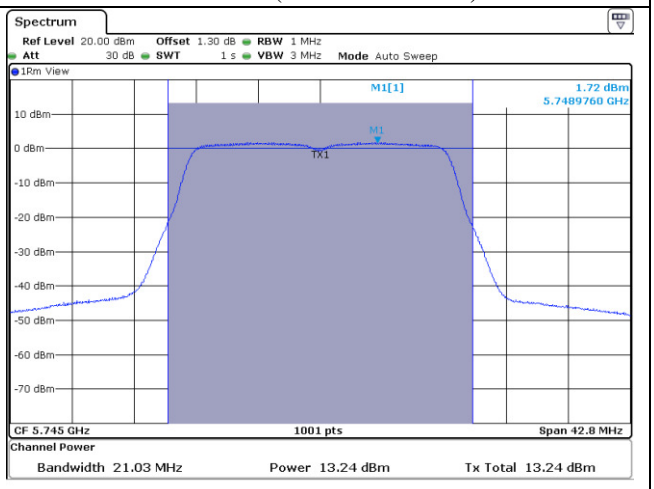
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

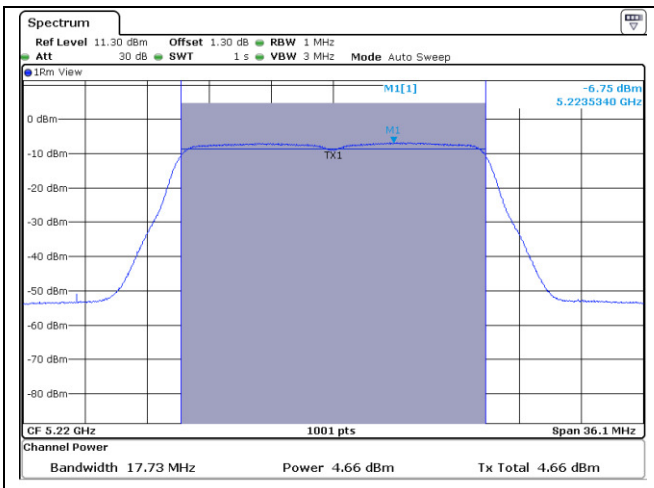


U-NII-2C (26 dB Bandwidth)

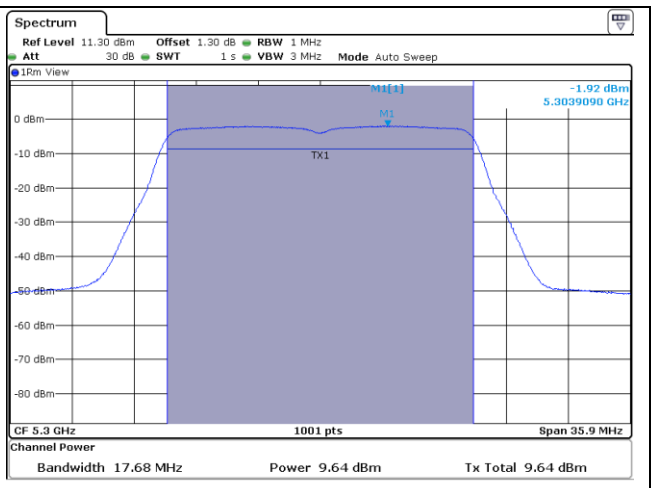


U-NII-3 (26 dB Bandwidth)

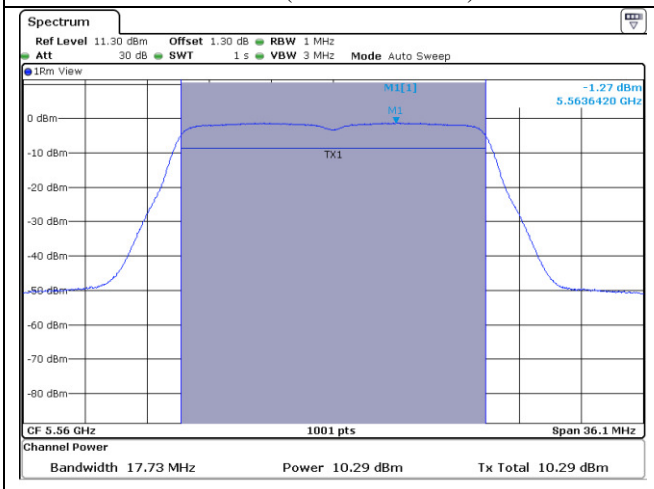
Note: In order to simplify the report, attached plots were only the most wide channel.



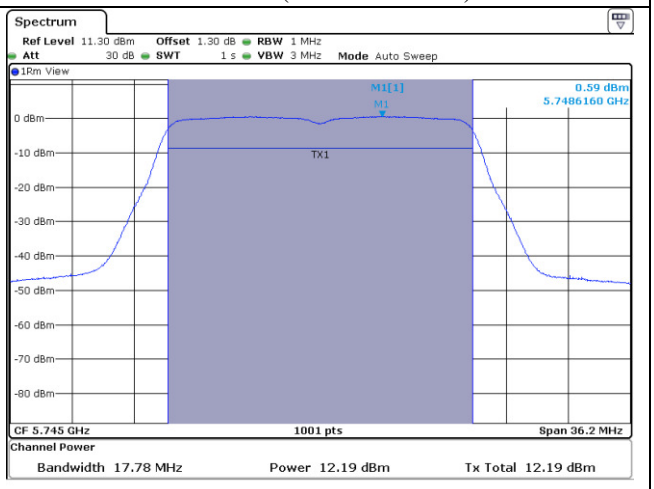
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

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9.5.2.2 Test data for Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	21.23	7.55	30	22.45
	Middle	5 220	20.98	7.46	30	22.54
	High	5 240	21.23	7.39	30	22.61
5 250 ~ 5 350	Low	5 260	21.03	10.90	24	13.10
	Middle	5 300	21.23	11.09	24	12.91
	High	5 320	21.23	11.18	24	12.82
5 470 ~ 5 725	Low	5 500	21.03	7.82	24	16.18
	Middle	5 560	21.03	11.57	24	12.43
	High	5 720	21.18	11.24	24	12.76
5 725 ~ 5 850	Low	5 745	21.08	12.89	30	17.11
	Middle	5 785	21.13	12.37	30	17.63
	High	5 825	20.78	8.74	30	21.26

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	3.88	16.79	12.91
	Middle	5 220	17.73	4.13	16.79	12.66
	High	5 240	17.73	4.51	16.79	12.28
5 250 ~ 5 350	Low	5 260	17.73	8.79	23.17	14.38
	Middle	5 300	17.78	8.79	23.17	14.38
	High	5 320	17.73	8.55	23.17	14.62
5 470 ~ 5 725	Low	5 500	17.73	6.32	23.2	16.88
	Middle	5 560	17.73	9.41	23.2	13.79
	High	5 720	17.73	9.01	23.2	14.19
5 725 ~ 5 825	Low	5 745	17.73	11.83	30	18.17
	Middle	5 785	17.73	11.26	30	18.74
	High	5 825	17.68	7.41	30	22.59

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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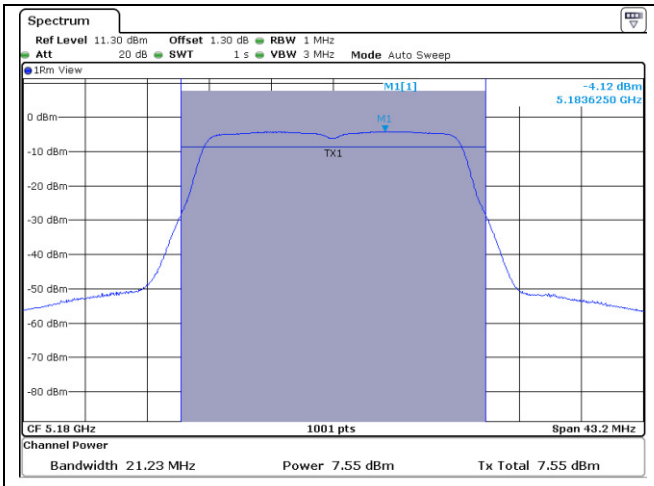
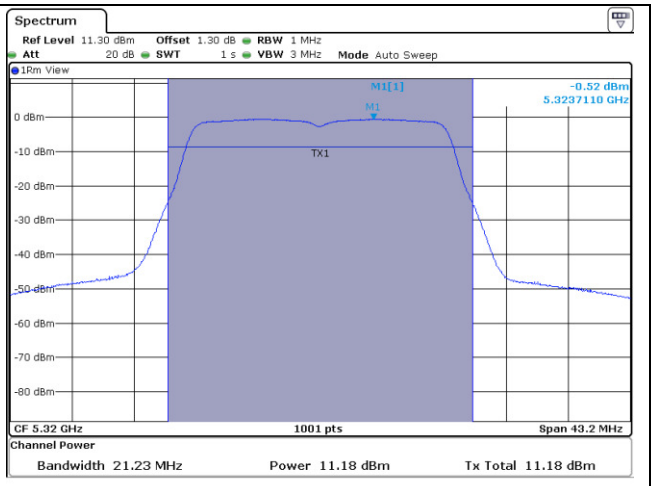
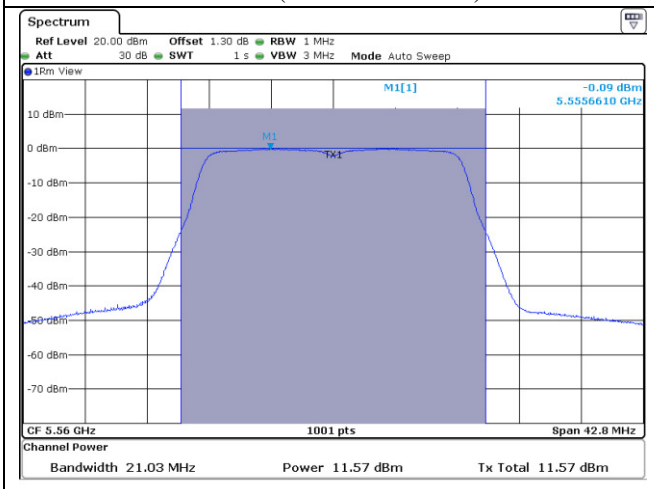


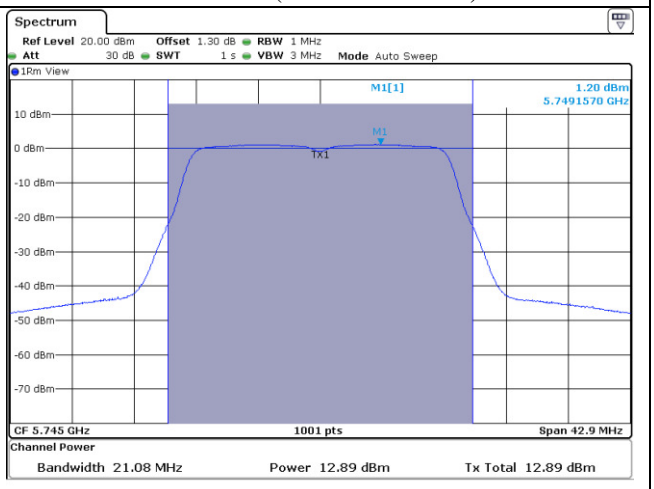
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

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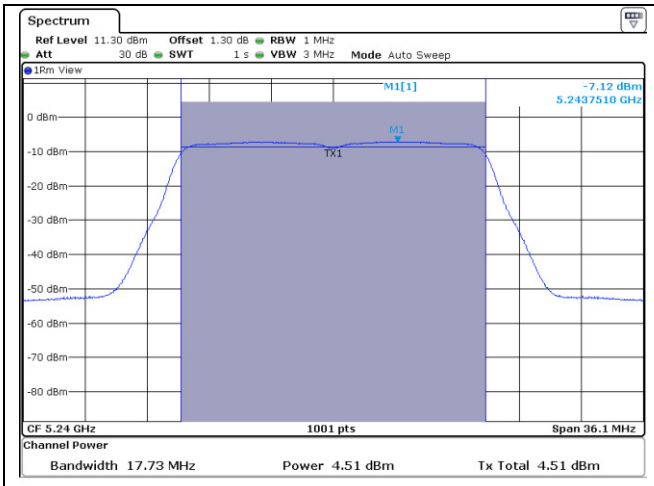
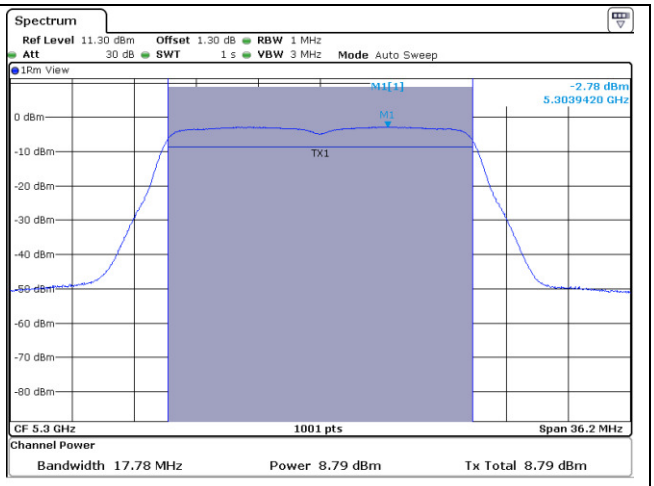
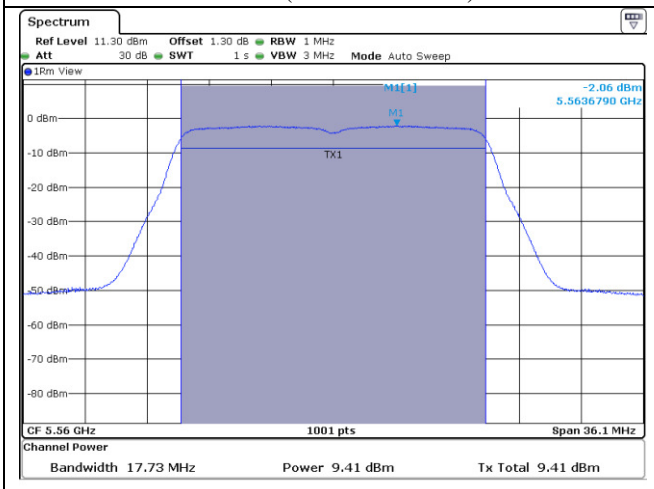


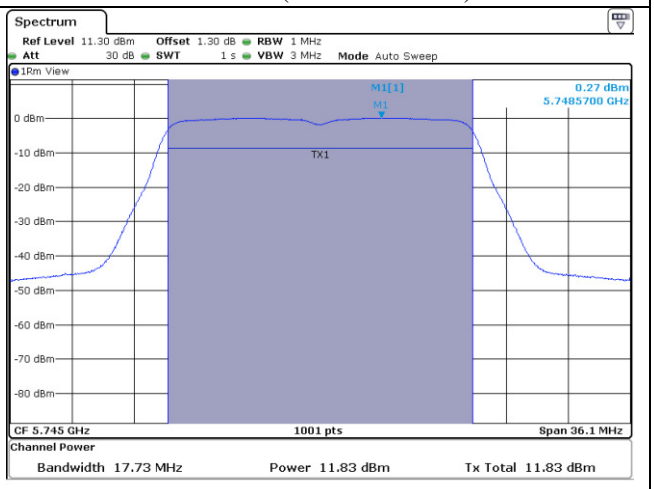
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

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9.5.2.3 Test data for Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.93	7.25	30	22.75
	Middle	5 220	21.08	7.42	30	22.58
	High	5 240	21.03	7.71	30	22.29
5 250 ~ 5 350	Low	5 260	20.98	11.05	24	12.95
	Middle	5 300	21.03	11.58	24	12.42
	High	5 320	20.93	11.89	24	12.11
5 470 ~ 5 725	Low	5 500	21.13	8.34	24	15.66
	Middle	5 560	20.83	12.06	24	11.94
	High	5 720	20.88	11.64	24	12.36
5 725 ~ 5 850	Low	5 745	20.88	13.04	30	16.96
	Middle	5 785	21.03	12.58	30	17.42
	High	5 825	20.88	9.56	30	20.44

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	3.19	17.18	13.99
	Middle	5 220	17.68	3.86	17.18	13.32
	High	5 240	17.68	4.35	17.18	12.83
5 250 ~ 5 350	Low	5 260	17.68	8.77	23.17	14.40
	Middle	5 300	17.68	9.06	23.17	14.11
	High	5 320	17.68	8.95	23.17	14.22
5 470 ~ 5 725	Low	5 500	17.73	6.76	23.2	16.44
	Middle	5 560	17.68	9.44	23.2	13.76
	High	5 720	17.68	8.86	23.2	14.34
5 725 ~ 5 825	Low	5 745	17.68	11.71	30	18.29
	Middle	5 785	17.68	11.04	30	18.96
	High	5 825	17.68	7.91	30	22.09

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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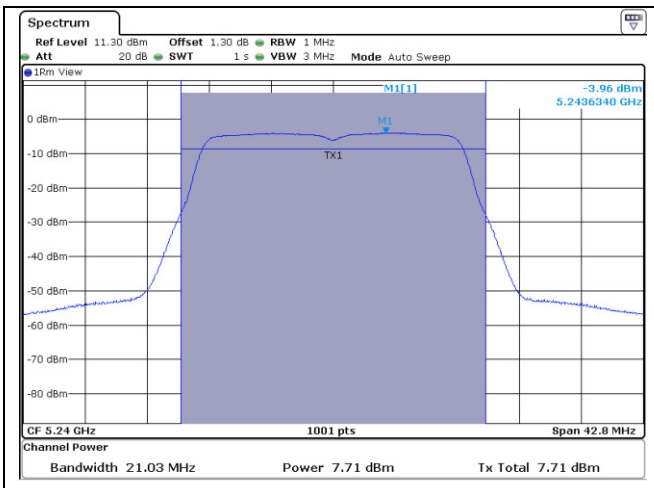
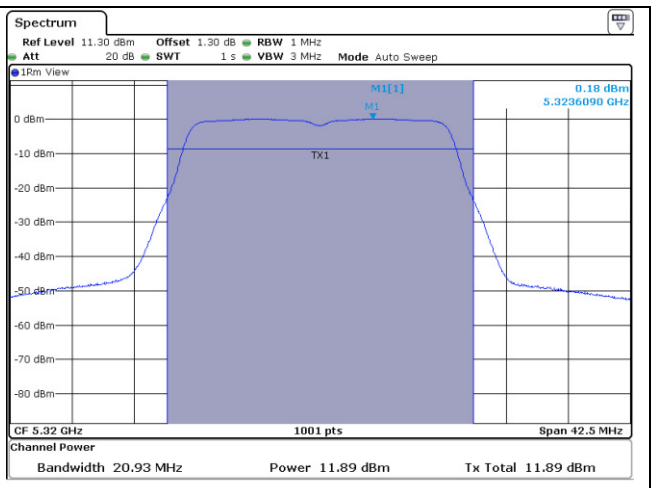
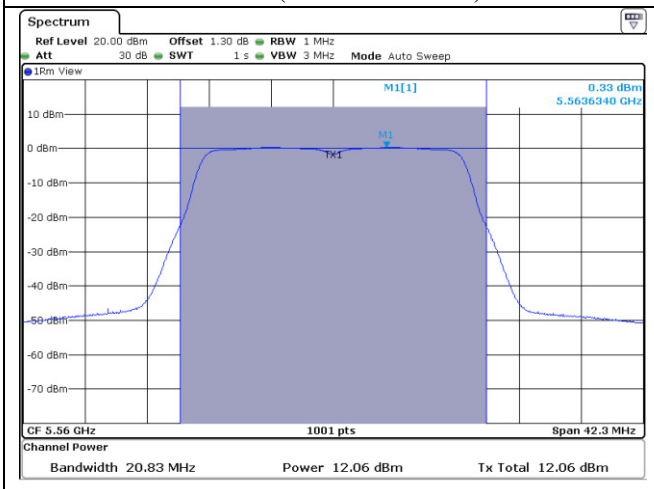


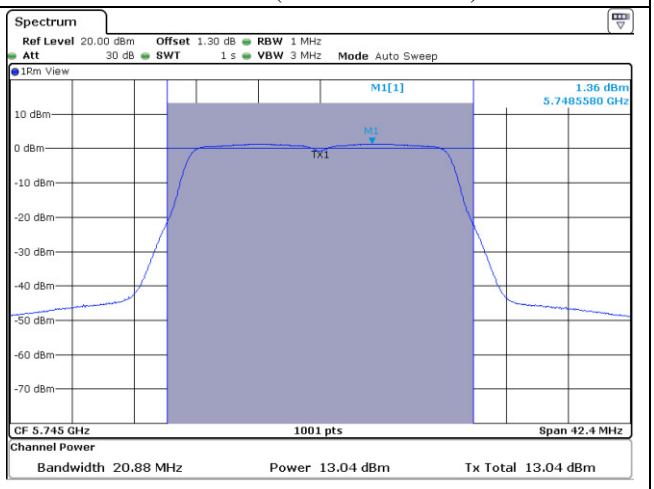
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

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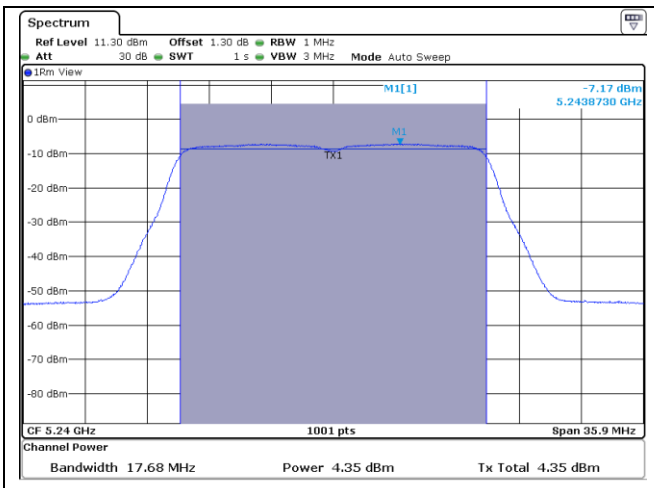
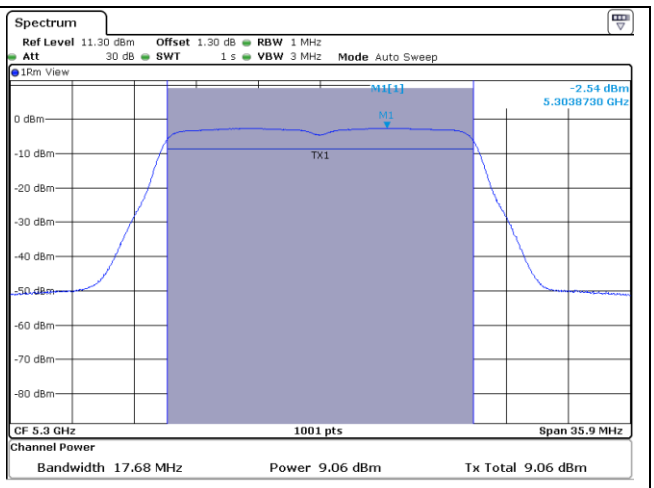
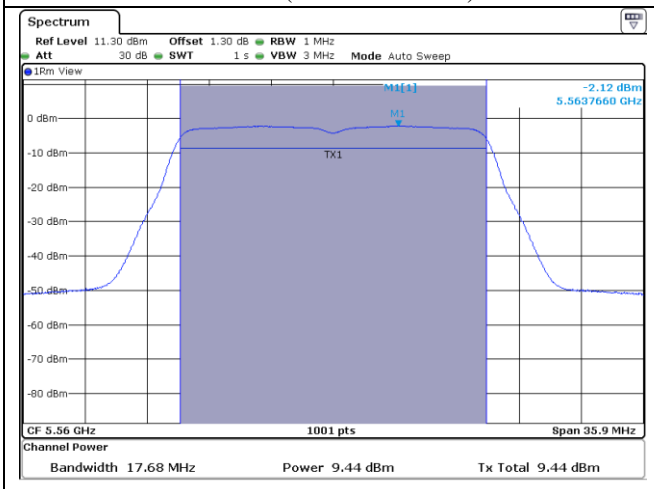


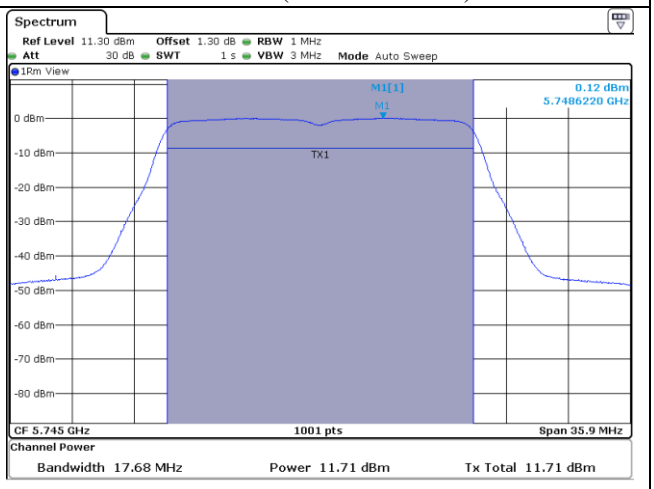
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

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9.5.2.4 Test data for Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	20.93	6.29	30	23.71
	Middle	5 220	21.08	6.50	30	23.50
	High	5 240	21.33	6.76	30	23.24
5 250 ~ 5 350	Low	5 260	21.23	9.98	24	14.02
	Middle	5 300	21.18	10.36	24	13.64
	High	5 320	21.28	10.34	24	13.66
5 470 ~ 5 725	Low	5 500	21.18	6.37	24	17.63
	Middle	5 560	21.03	10.43	24	13.57
	High	5 720	20.88	10.67	24	13.33
5 725 ~ 5 850	Low	5 745	20.68	12.30	30	17.70
	Middle	5 785	20.93	11.75	30	18.25
	High	5 825	20.93	8.11	30	21.89

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.68	2.63	16.58	13.95
	Middle	5 220	17.68	3.01	16.58	13.57
	High	5 240	17.68	3.51	16.58	13.07
5 250 ~ 5 350	Low	5 260	17.68	7.80	23.17	15.37
	Middle	5 300	17.68	7.75	23.17	15.42
	High	5 320	17.73	7.27	23.17	15.90
5 470 ~ 5 725	Low	5 500	17.73	4.86	23.2	18.34
	Middle	5 560	17.73	7.66	23.2	15.54
	High	5 720	17.68	7.96	23.2	15.24
5 725 ~ 5 825	Low	5 745	17.68	10.81	30	19.19
	Middle	5 785	17.68	10.27	30	19.73
	High	5 825	17.68	6.28	30	23.72

Remark: See next page for measurement data.

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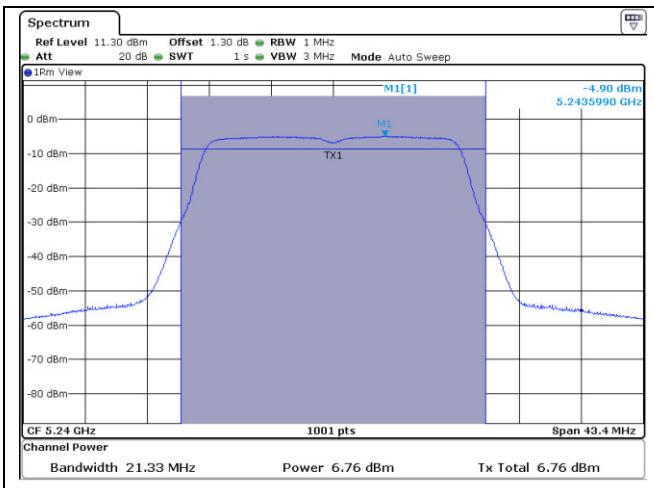
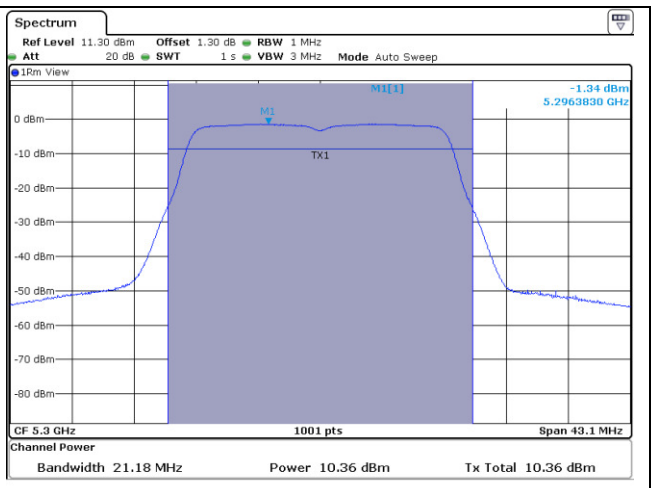
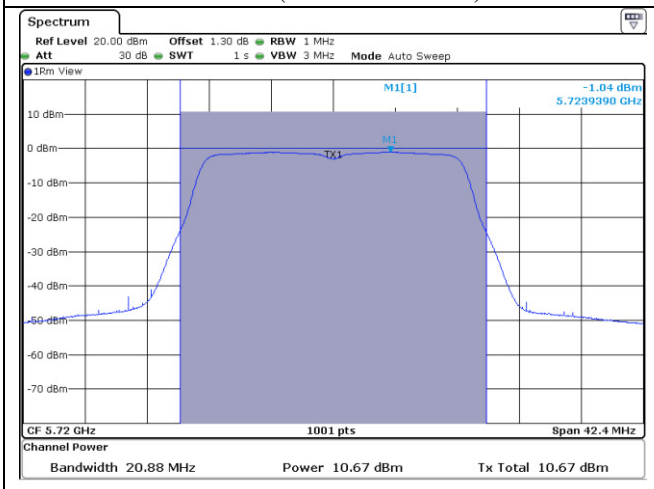


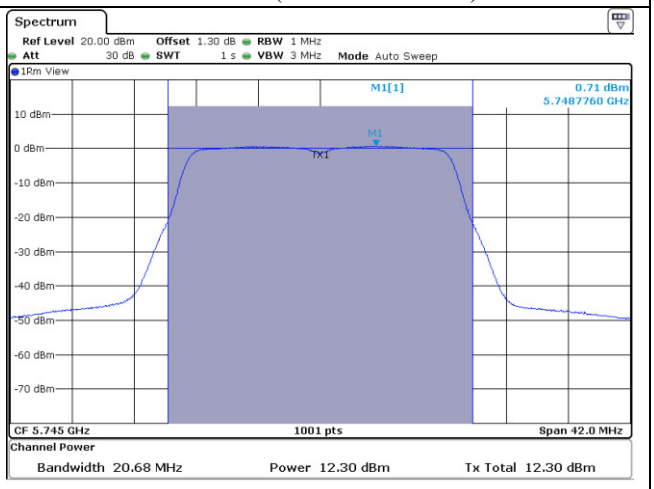
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

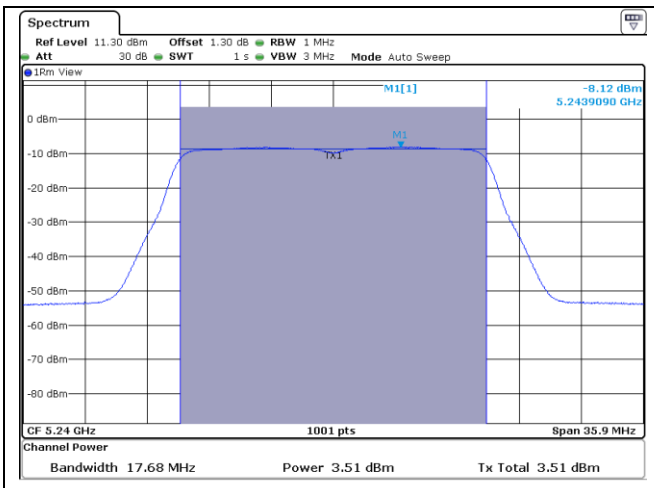


U-NII-2C (26 dB Bandwidth)

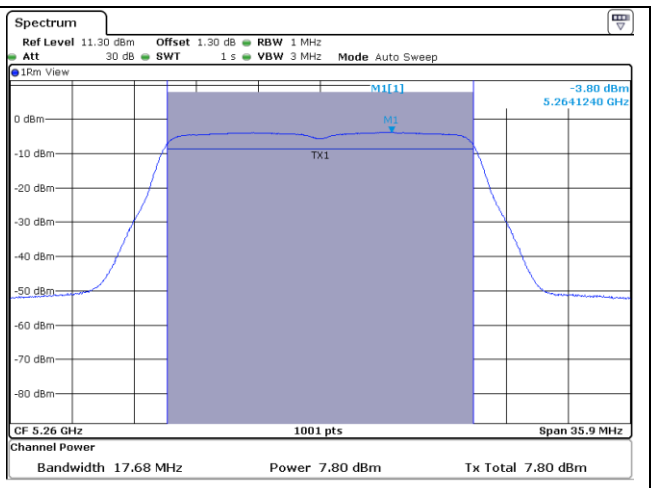


U-NII-3 (26 dB Bandwidth)

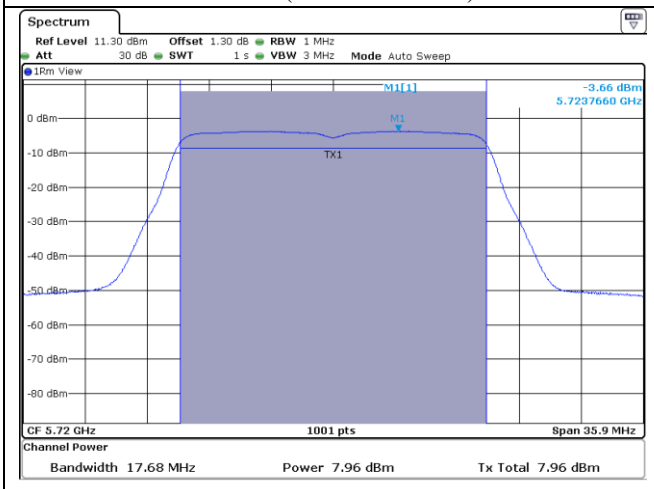
Note: In order to simplify the report, attached plots were only the most wide channel.



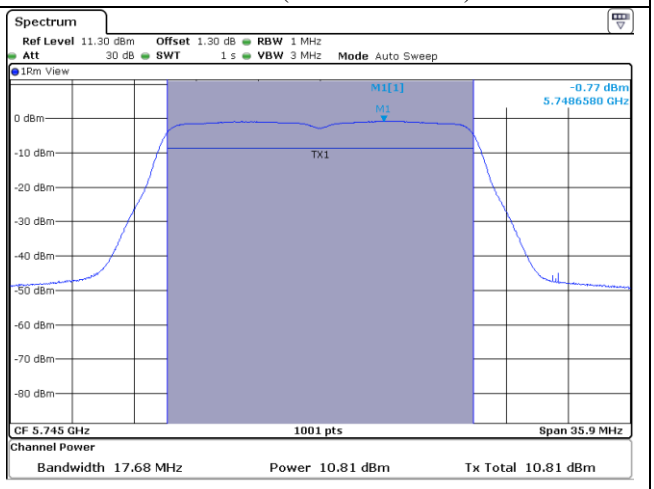
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.2.5 Test data for Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	13.32	24.72	11.40
	Middle	5 200	13.60	24.72	11.12
	High	5 240	13.56	24.72	11.16
5 250 ~ 5 350	Low	5 260	17.05	18.71	1.66
	Middle	5 300	17.42	18.71	1.29
	High	5 320	17.50	18.71	1.21
5 470 ~ 5 725	Low	5 500	13.64	18.89	5.25
	Middle	5 580	17.47	18.89	1.42
	High	5 720	17.44	18.89	1.45
5 725 ~ 5 850	Low	5 745	18.90	25.64	6.74
	Middle	5 785	18.27	25.64	7.37
	High	5 825	14.92	25.64	10.72

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	9.50	10.89	1.39
	Middle	5 220	9.98	10.89	0.91
	High	5 240	10.25	10.89	0.64
5 250 ~ 5 350	Low	5 260	14.72	17.88	3.16
	Middle	5 300	14.88	17.88	3.00
	High	5 320	14.60	17.88	3.28
5 470 ~ 5 725	Low	5 500	12.12	17.91	5.79
	Middle	5 560	15.32	17.91	2.59
	High	5 720	14.80	17.91	3.11
5 725 ~ 5 825	Low	5 745	17.68	25.64	7.96
	Middle	5 785	16.96	25.64	8.68
	High	5 825	13.49	25.64	12.15

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

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9.5.2.6 Test data for Staddle Channel_Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.64	8.63	24.00	15.37
5 725 ~ 5 825	5 720	5.64	3.12	30.00	26.88

9.5.2.7 Test data for Staddle Channel_Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.69	7.88	24.00	16.12
5 725 ~ 5 825	5 720	5.59	2.51	30.00	27.49

9.5.2.8 Test data for Staddle Channel_Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.49	7.85	24.00	16.15
5 725 ~ 5 825	5 720	5.54	2.69	30.00	27.31

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9.5.2.9 Test data for Staddle Channel_Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	15.59	6.75	24.00	17.25
5 725 ~ 5 825	5 720	5.44	1.51	30.00	28.49

9.5.2.10 Test data for Staddle Channel_Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720	13.85	18.89	5.04
5 725 ~ 5 850	5 720	8.52	25.64	17.12

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

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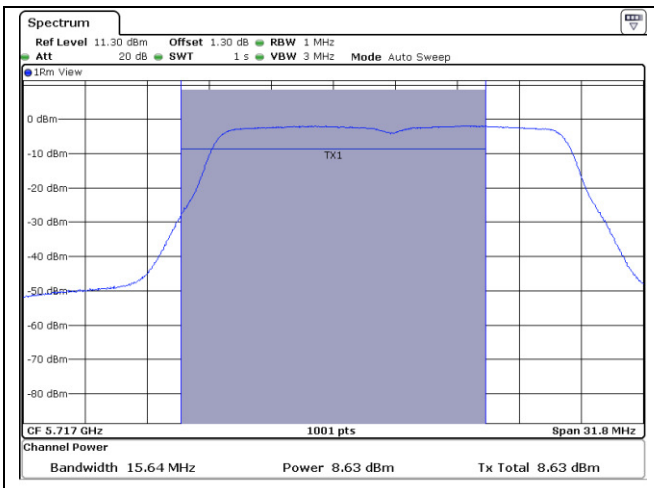
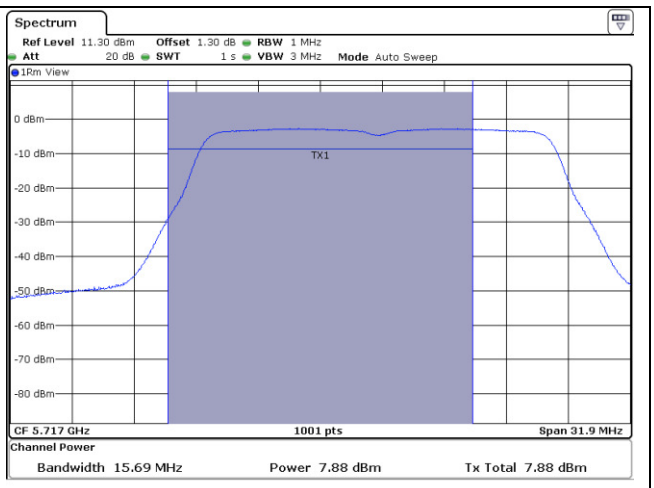


Ant 0



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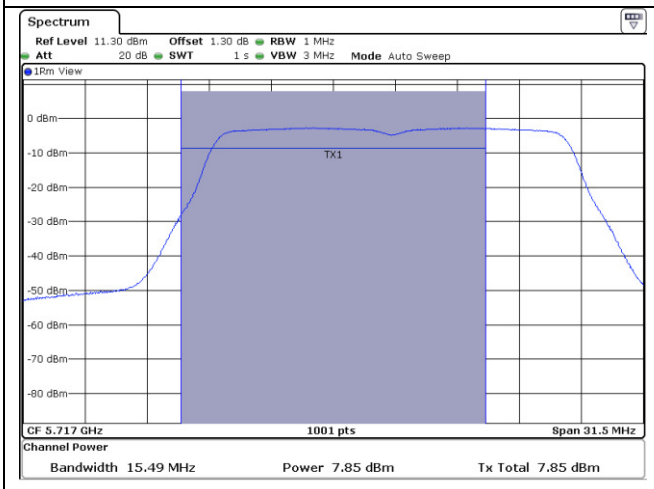
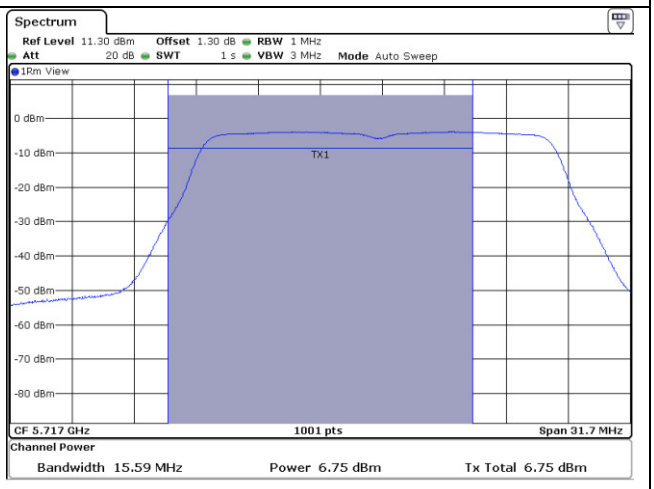


Ant 2



Ant 3

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.3 Test data for 802.11n_HT40 RLAN Mode

9.5.3.1 Test data for Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	38.96	8.40	25.11	16.71
	High	5 230	38.96	9.46	25.11	15.65
5 250 ~ 5 350	Low	5 270	39.06	10.84	18.89	8.05
	High	5 310	39.06	11.07	18.89	7.82
5 470 ~ 5 725	Low	5 510	39.06	9.47	18.80	9.33
	Middle	5 550	39.06	10.75	18.80	8.05
	High	5 710	39.06	11.61	18.80	7.19
5 725 ~ 5 850	Low	5 755	39.06	15.17	25.06	9.89
	High	5 795	38.36	10.39	25.06	14.67

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	36.16	6.14	17.94	11.80
	High	5 230	36.16	6.17	17.94	11.77
5 250 ~ 5 350	Low	5 270	36.16	11.05	24	12.95
	High	5 310	36.16	10.59	24	13.41
5 470 ~ 5 725	Low	5 510	36.16	8.18	24	15.82
	Middle	5 550	36.16	8.70	24	15.30
	High	5 710	36.16	9.18	24	14.82
5 725 ~ 5 825	Low	5 755	36.26	13.79	30	16.21
	High	5 795	36.16	9.48	30	20.52

Remark: See next page for measurement data.

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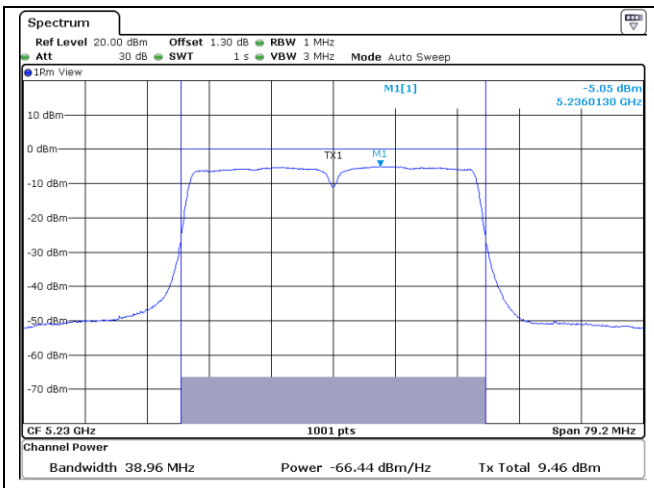
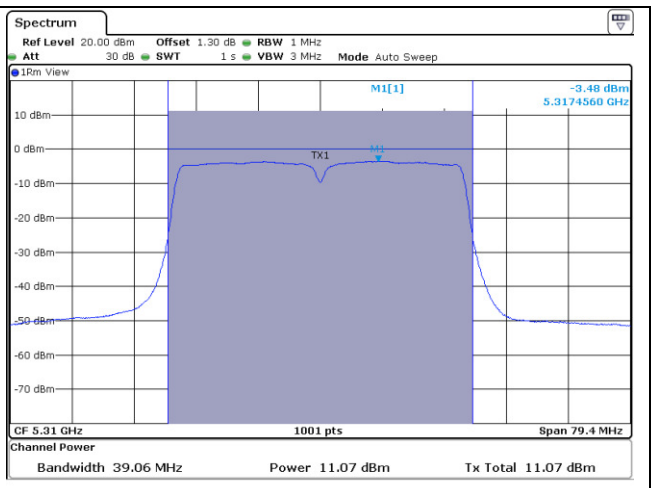
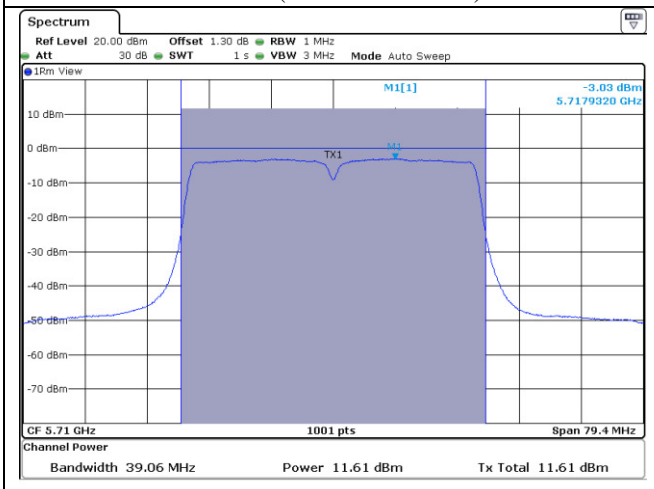


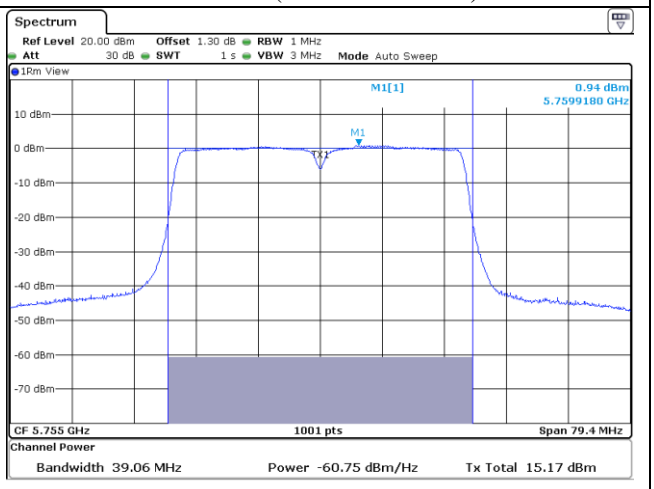
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

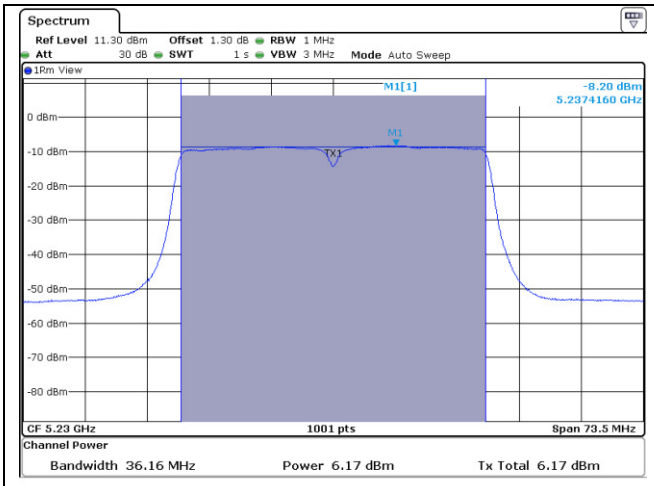


U-NII-2C (26 dB Bandwidth)

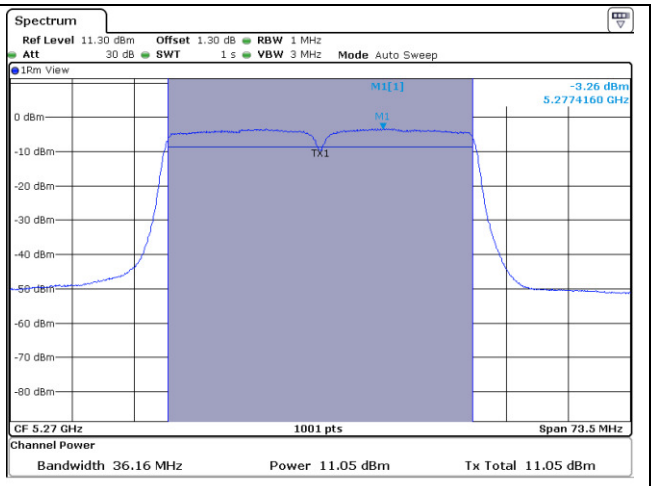


U-NII-3 (26 dB Bandwidth)

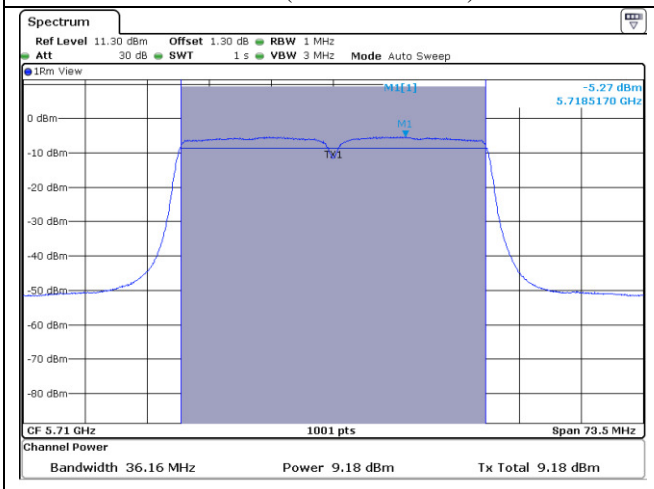
Note: In order to simplify the report, attached plots were only the most wide channel.



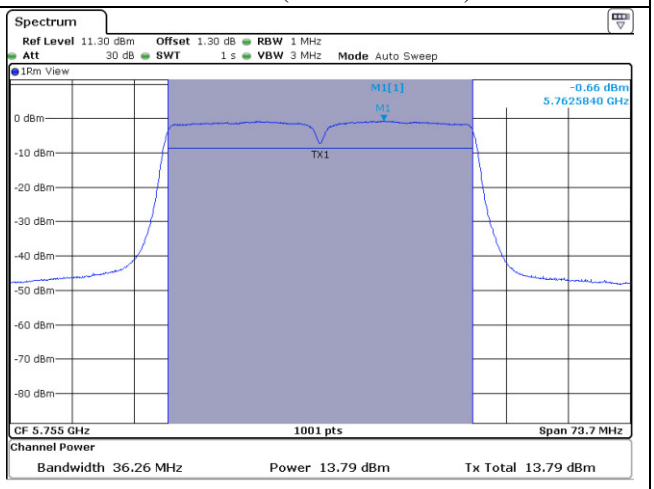
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

9.5.3.2 Test data for Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	39.16	7.93	30	22.07
	High	5 230	38.96	9.45	30	20.55
5 250 ~ 5 350	Low	5 270	39.06	10.76	24	13.24
	High	5 310	39.06	10.77	24	13.23
5 470 ~ 5 725	Low	5 510	38.96	9.27	24	14.73
	Middle	5 550	39.16	11.14	24	12.86
	High	5 710	39.16	11.38	24	12.62
5 725 ~ 5 850	Low	5 755	38.86	14.74	30	15.26
	High	5 795	39.26	10.50	30	19.50

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	36.16	5.80	17.62	11.82
	High	5 230	36.16	6.06	17.62	11.56
5 250 ~ 5 350	Low	5 270	36.16	10.22	24	13.78
	High	5 310	36.16	10.50	24	13.50
5 470 ~ 5 725	Low	5 510	36.16	8.31	24	15.69
	Middle	5 550	36.16	8.75	24	15.25
	High	5 710	36.26	8.65	24	15.35
5 725 ~ 5 825	Low	5 755	36.16	13.30	30	16.70
	High	5 795	36.16	9.02	30	20.98

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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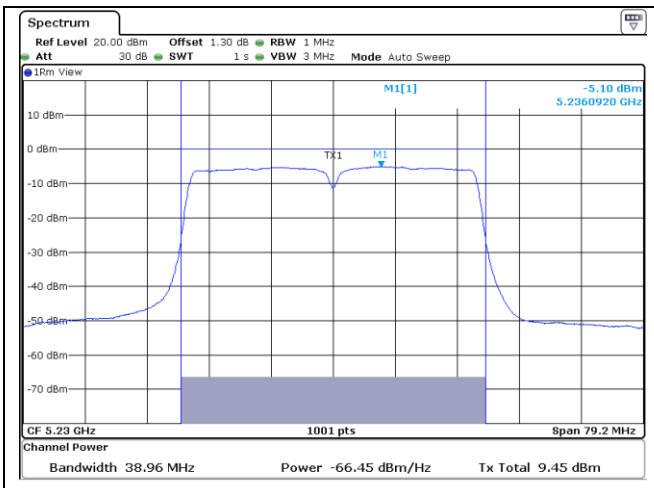
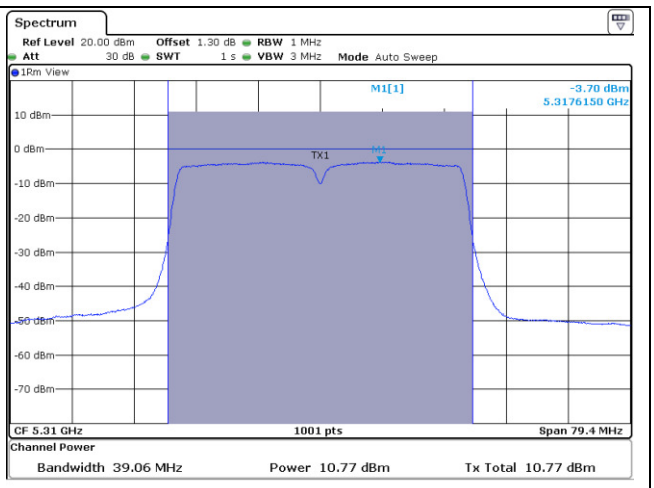
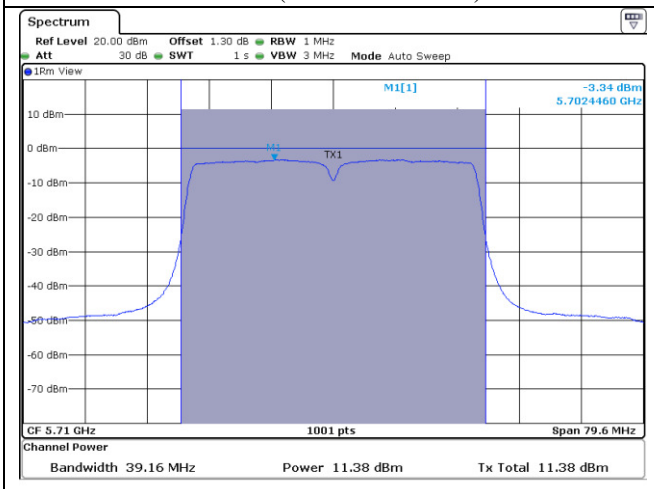


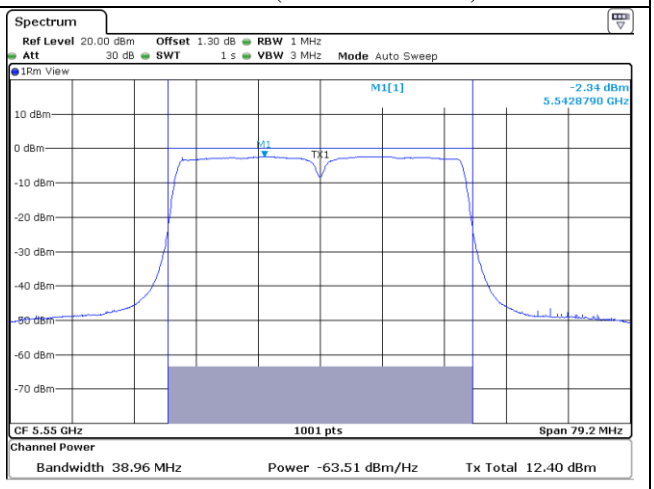
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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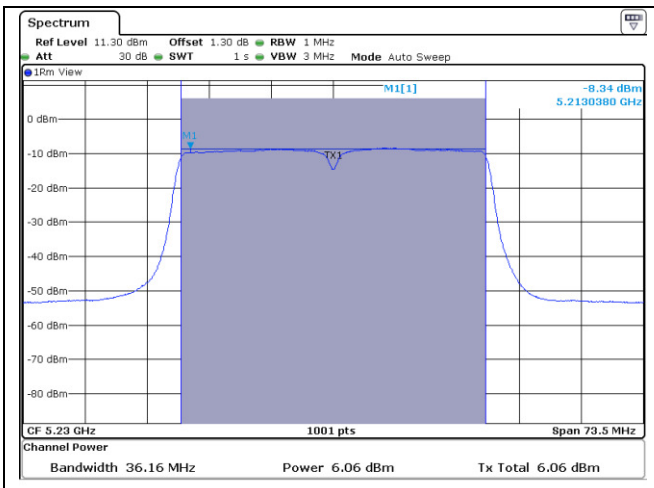
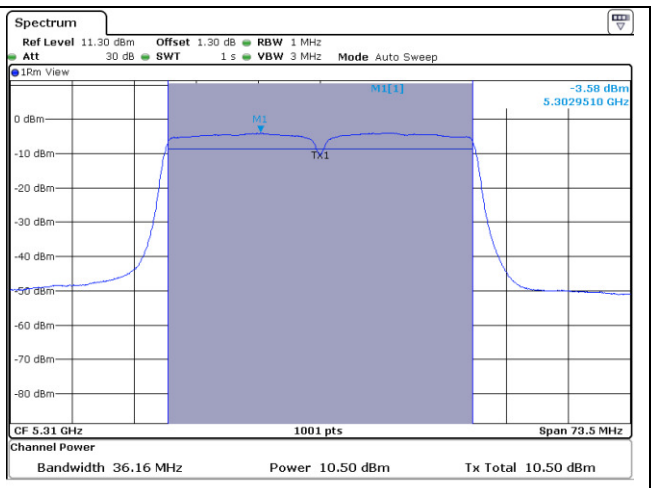
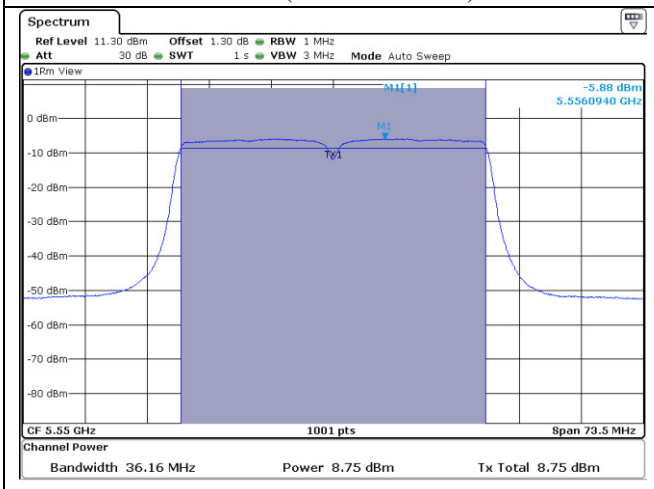


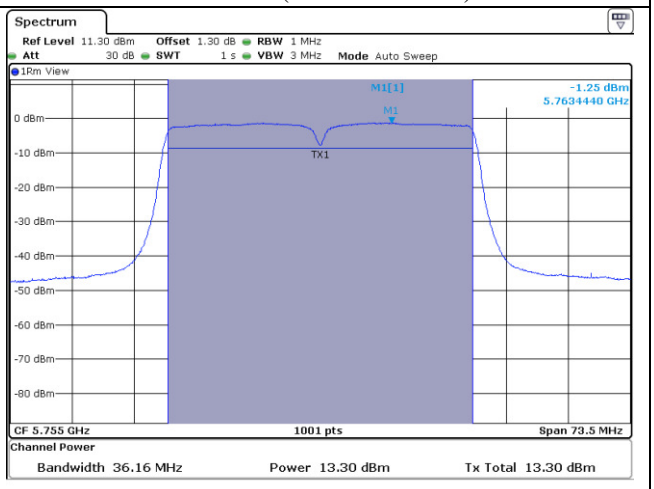
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.3.3 Test data for Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	38.96	7.90	30	22.10
	High	5 230	38.76	9.40	30	20.60
5 250 ~ 5 350	Low	5 270	38.86	11.00	24	13.00
	High	5 310	38.76	11.24	24	12.76
5 470 ~ 5 725	Low	5 510	39.06	9.71	24	14.29
	Middle	5 550	38.96	11.33	24	12.67
	High	5 710	39.06	11.12	24	12.88
5 725 ~ 5 850	Low	5 755	39.06	14.56	30	15.44
	High	5 795	38.96	10.47	30	19.53

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	36.16	5.61	18.01	12.40
	High	5 230	36.16	5.54	18.01	12.47
5 250 ~ 5 350	Low	5 270	36.16	10.09	24	13.91
	High	5 310	36.16	10.82	24	13.18
5 470 ~ 5 725	Low	5 510	36.16	8.24	24	15.76
	Middle	5 550	36.16	8.81	24	15.19
	High	5 710	36.26	8.56	24	15.44
5 725 ~ 5 825	Low	5 755	36.26	12.97	30	17.03
	High	5 795	36.16	8.75	30	21.25

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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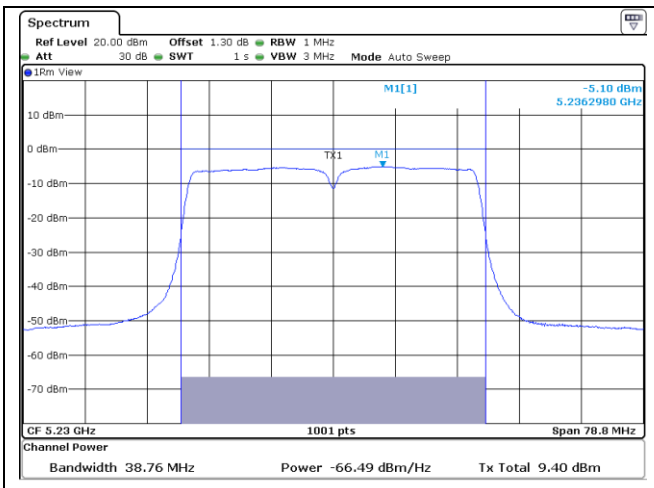
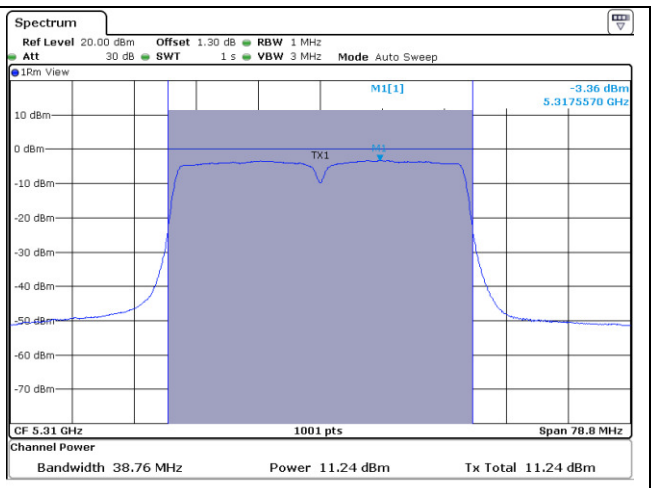
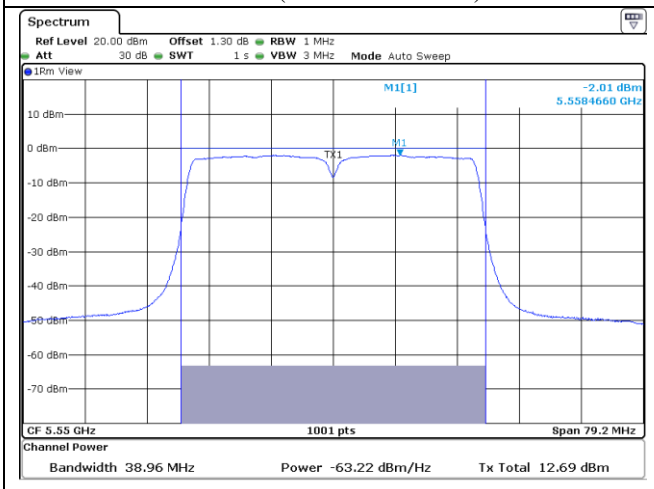


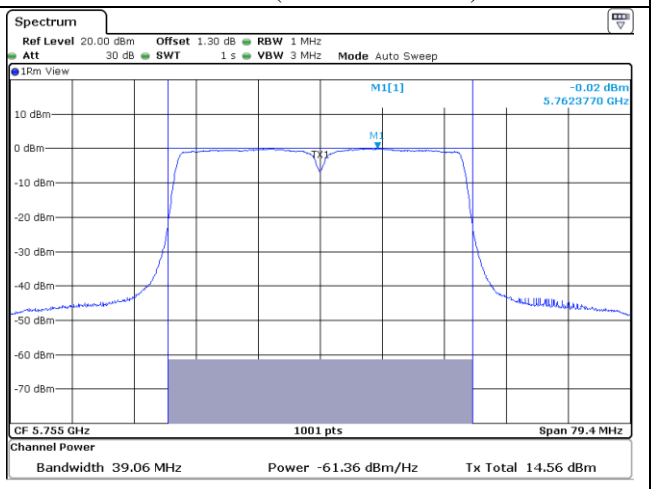
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

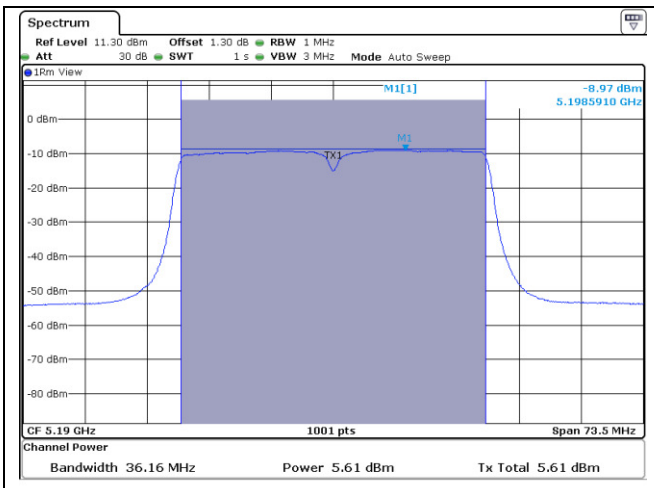


U-NII-2C (26 dB Bandwidth)

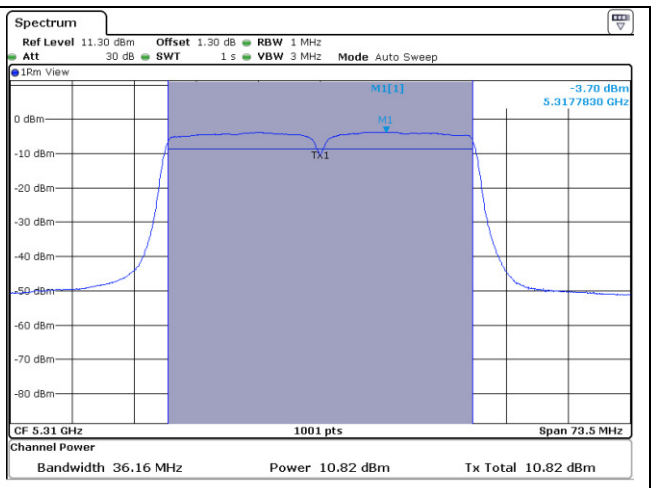


U-NII-3 (26 dB Bandwidth)

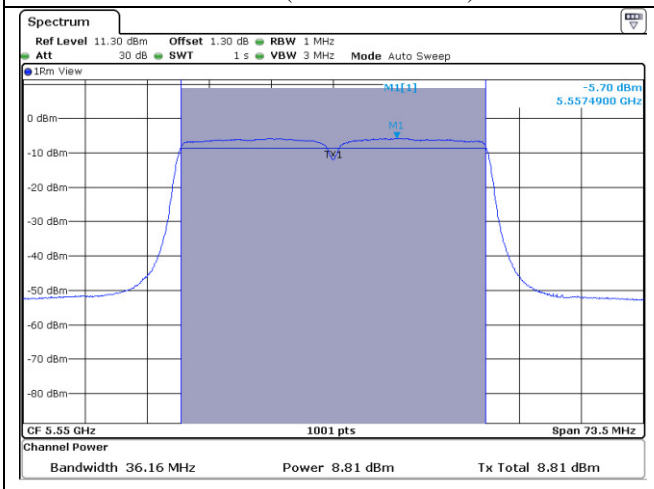
Note: In order to simplify the report, attached plots were only the most wide channel.



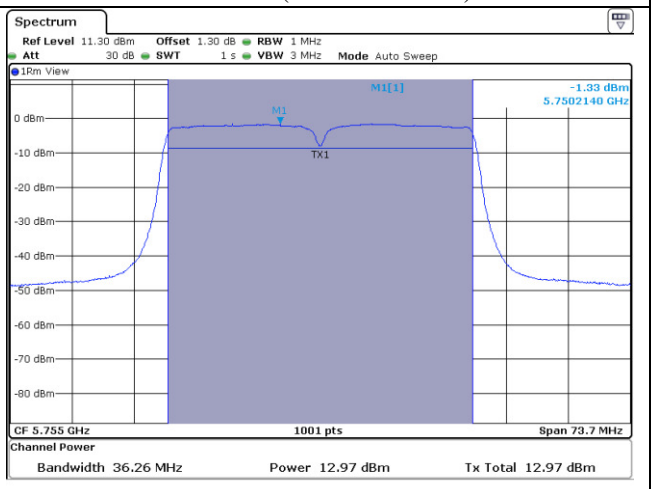
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

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9.5.3.4 Test data for Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	38.76	6.76	30	23.24
	High	5 230	38.76	8.67	30	21.33
5 250 ~ 5 350	Low	5 270	38.76	10.01	24	13.99
	High	5 310	38.86	9.97	24	14.03
5 470 ~ 5 725	Low	5 510	38.96	7.91	24	16.09
	Middle	5 550	38.76	11.29	24	12.71
	High	5 710	38.86	10.41	24	13.59
5 725 ~ 5 850	Low	5 755	38.86	13.80	30	16.20
	High	5 795	38.86	9.60	30	20.40

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	36.16	4.36	17.41	13.05
	High	5 230	36.16	4.94	17.41	12.47
5 250 ~ 5 350	Low	5 270	36.16	8.99	24	15.01
	High	5 310	36.16	9.53	24	14.47
5 470 ~ 5 725	Low	5 510	36.16	8.07	24	15.93
	Middle	5 550	36.16	7.31	24	16.69
	High	5 710	36.26	7.75	24	16.25
5 725 ~ 5 825	Low	5 755	36.26	12.20	30	17.80
	High	5 795	36.16	8.06	30	21.94

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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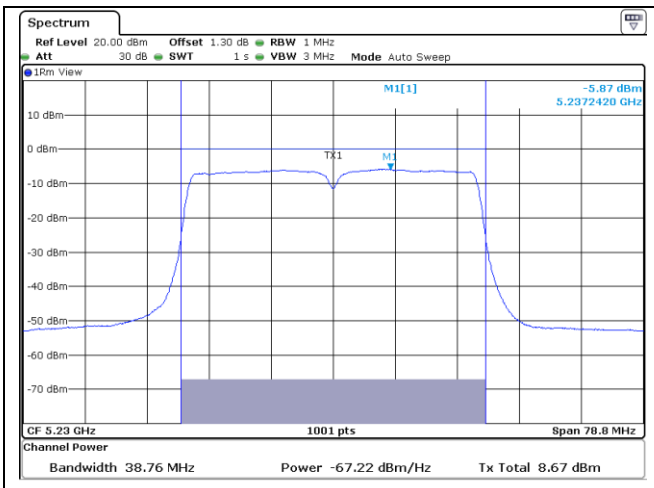
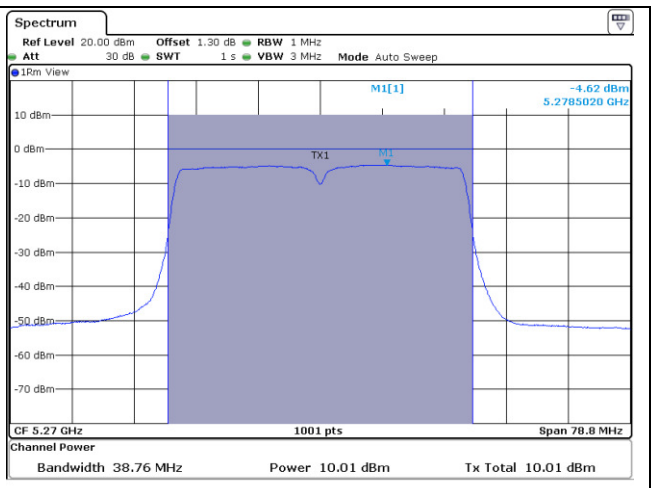
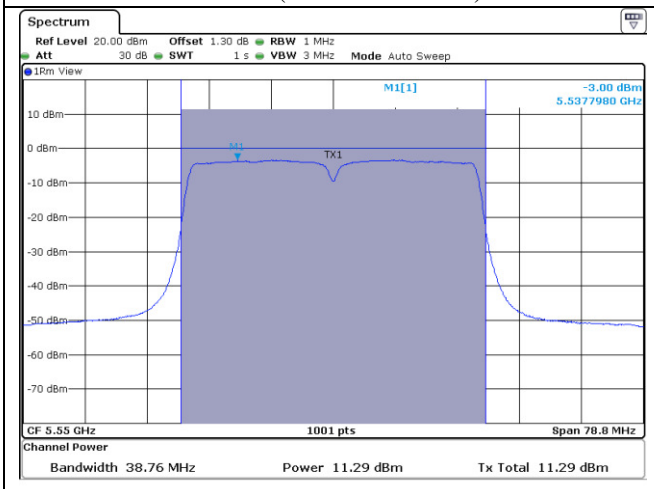


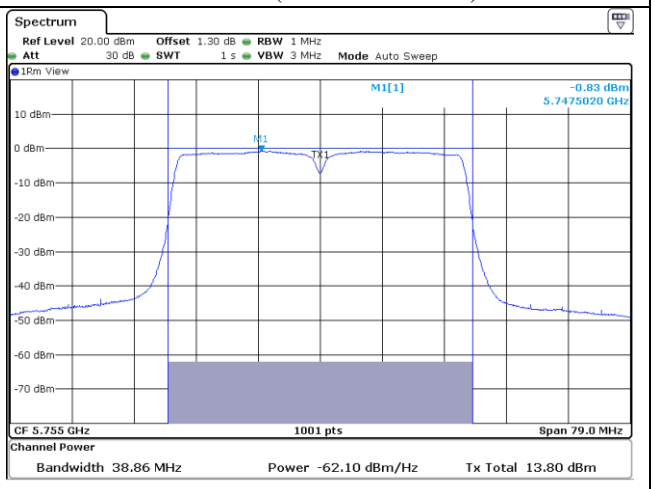
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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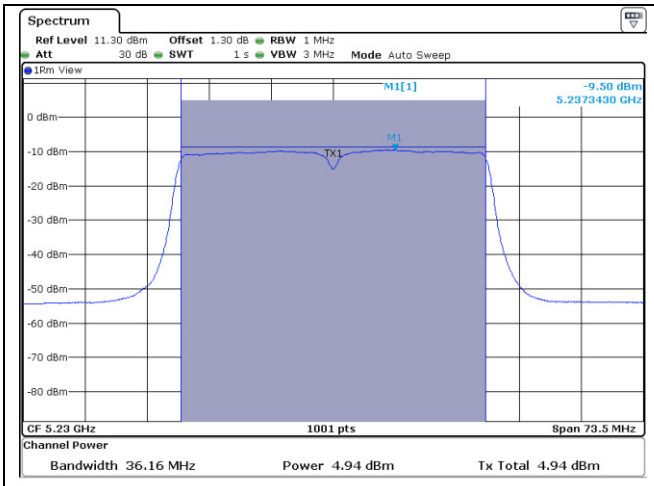
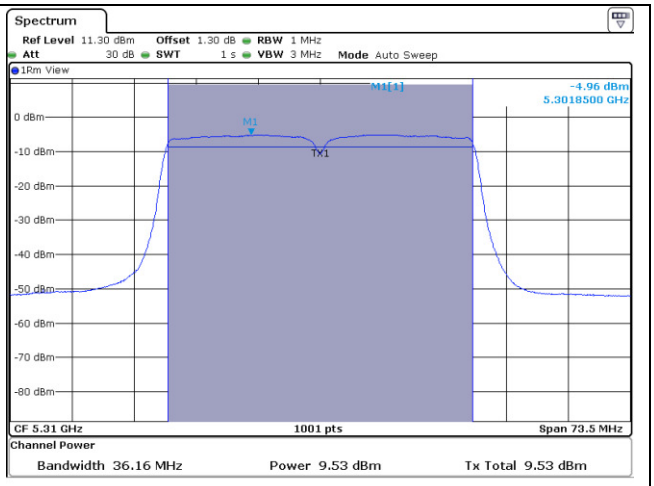
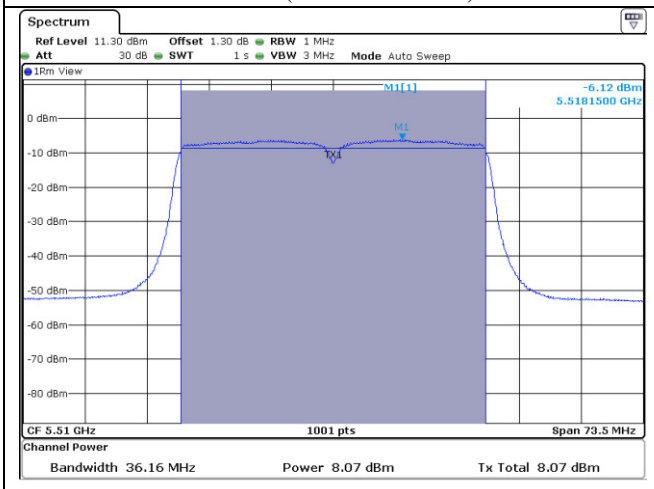


U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



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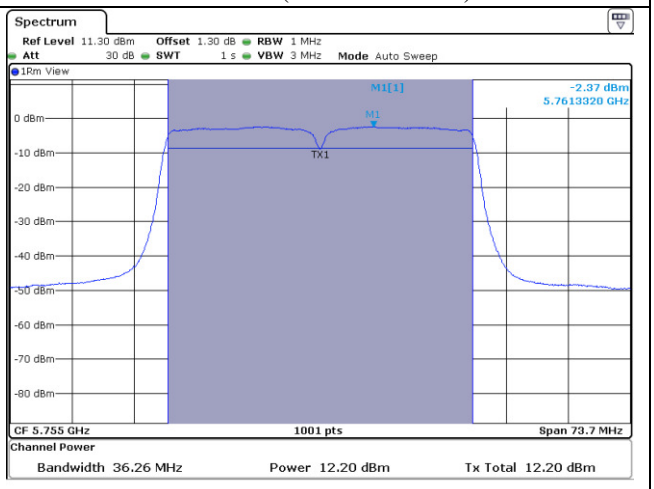

U-NII-3 (99 % bandwidth)

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9.5.3.5 Test data for Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	13.81	24.72	10.91
	High	5 230	15.28	24.72	9.44
5 250 ~ 5 350	Low	5 270	16.69	18.71	2.02
	High	5 310	16.81	18.71	1.90
5 470 ~ 5 725	Low	5 510	15.16	18.89	3.73
	Middle	5 550	17.15	18.89	1.74
	High	5 710	17.17	18.89	1.72
5 725 ~ 5 850	Low	5 755	20.62	25.64	5.02
	High	5 795	16.28	25.64	9.36

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190	11.55	11.72	0.17
	High	5 230	11.72	11.72	0
5 250 ~ 5 350	Low	5 270	16.17	18.71	2.54
	High	5 310	16.41	18.71	2.30
5 470 ~ 5 725	Low	5 510	14.22	18.89	4.67
	Middle	5 550	14.46	18.89	4.43
	High	5 710	14.59	18.89	4.30
5 725 ~ 5 825	Low	5 755	19.12	25.64	6.52
	High	5 795	14.88	25.64	10.76

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

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9.5.3.6 Test data for Staddle Channel_Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710	34.67	8.40	24.00	15.60
5 725 ~ 5 825	5 710	4.49	-3.41	30.00	33.41

9.5.3.7 Test data for Staddle Channel_Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710	34.47	8.08	24.00	15.92
5 725 ~ 5 825	5 710	4.59	-3.39	30.00	33.39

9.5.3.8 Test data for Staddle Channel_Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710	34.57	8.20	24.00	15.80
5 725 ~ 5 825	5 710	4.49	-3.40	30.00	33.40

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9.5.3.9 Test data for Staddle Channel_Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710	34.47	7.06	24.00	16.94
5 725 ~ 5 825	5 710	4.39	-4.67	30.00	34.67

9.5.3.10 Test data for Staddle Channel_Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710	13.99	18.89	4.90
5 725 ~ 5 850	5 710	2.34	25.64	23.30

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

Tested by: Min-Gu, Ji / Project Engineer

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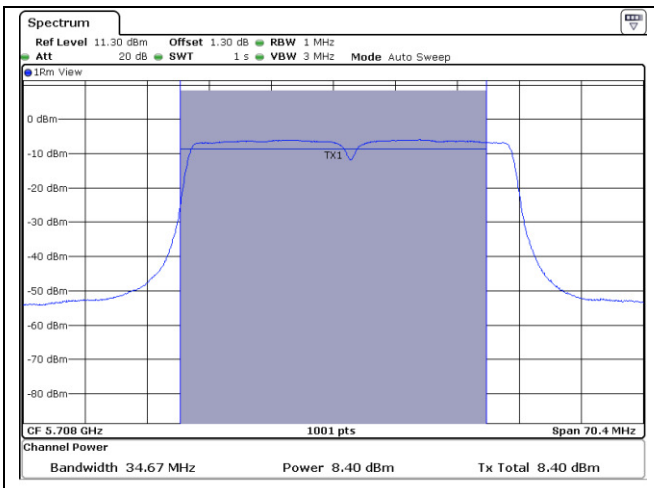
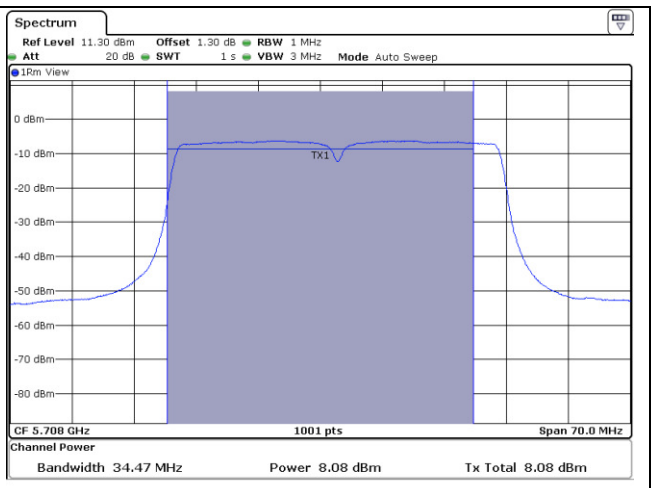


Ant 0



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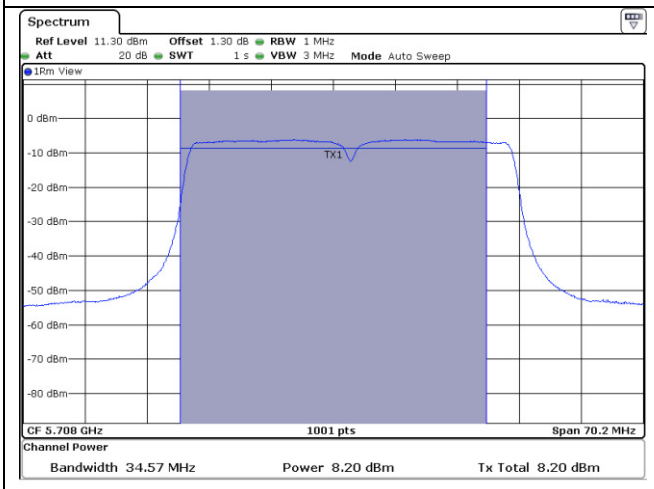
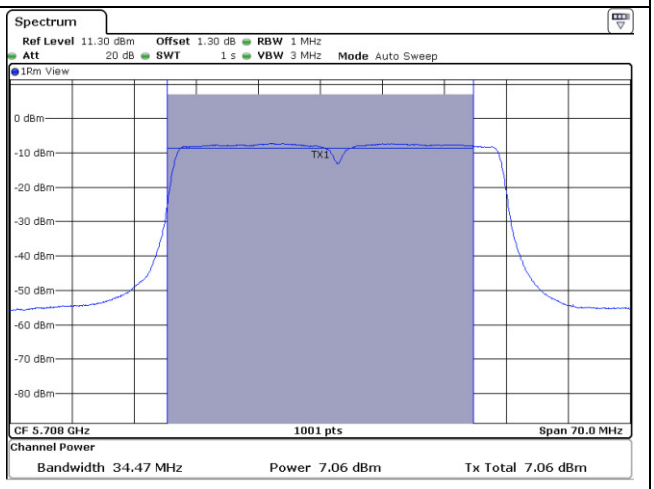


Ant 2



Ant 3

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.4 Test data for 802.11ac_VHT20 RLAN Mode

9.5.4.1 Test data for Antenna 0

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	21.23	8.51	30	21.49
	Middle	5 220	20.93	8.52	30	21.48
	High	5 240	21.03	8.76	30	21.24
5 250 ~ 5 350	Low	5 260	21.08	11.69	24	12.31
	Middle	5 300	20.88	10.68	24	13.32
	High	5 320	20.98	10.89	24	13.11
5 470 ~ 5 725	Low	5 500	21.08	8.35	24	15.65
	Middle	5 560	21.18	10.66	24	13.34
	High	5 720	21.18	10.74	24	13.26
5 725 ~ 5 850	Low	5 745	21.13	14.36	30	15.64
	Middle	5 785	20.98	13.66	30	16.34
	High	5 825	21.23	9.99	30	20.01

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	3.42	17.11	13.69
	Middle	5 220	17.78	3.58	17.11	13.53
	High	5 240	17.73	4.50	17.11	12.61
5 250 ~ 5 350	Low	5 260	17.78	9.06	23.17	14.11
	Middle	5 300	17.73	8.89	23.17	14.28
	High	5 320	17.78	8.67	23.17	14.50
5 470 ~ 5 725	Low	5 500	17.68	6.75	23.2	16.45
	Middle	5 560	17.73	9.44	23.2	13.76
	High	5 720	17.68	9.98	23.2	13.22
5 725 ~ 5 825	Low	5 745	17.73	10.51	30	19.49
	Middle	5 785	17.73	9.29	30	20.71
	High	5 825	17.68	9.10	30	20.90

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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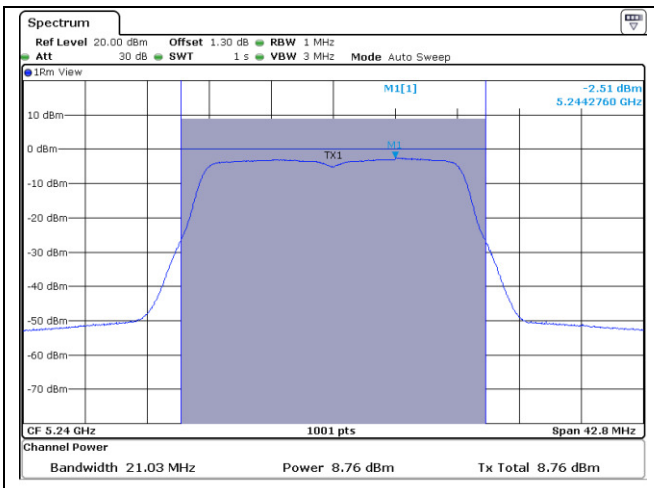
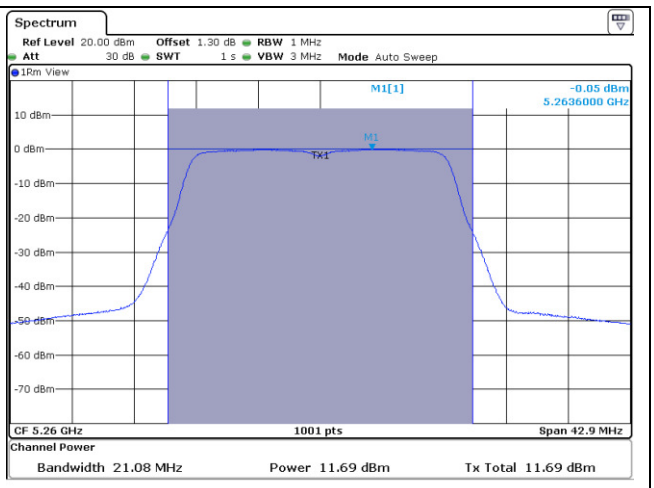
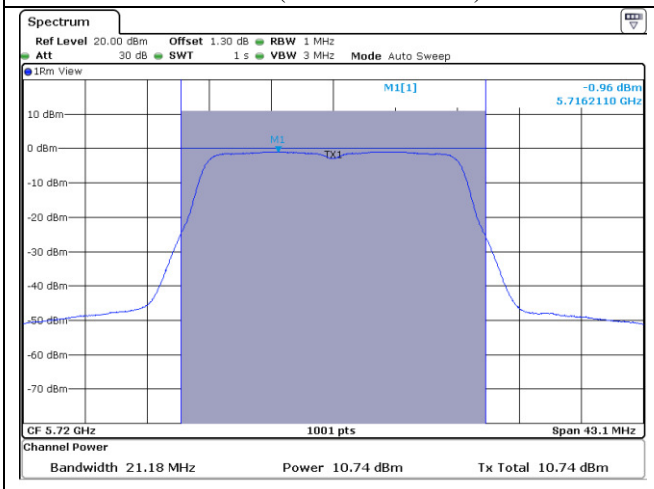


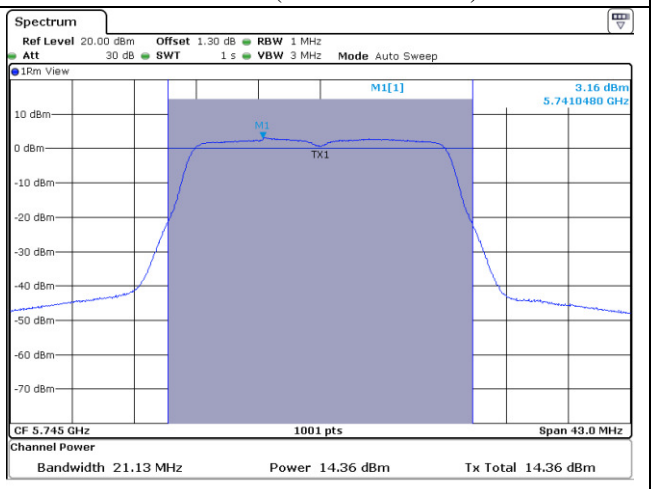
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

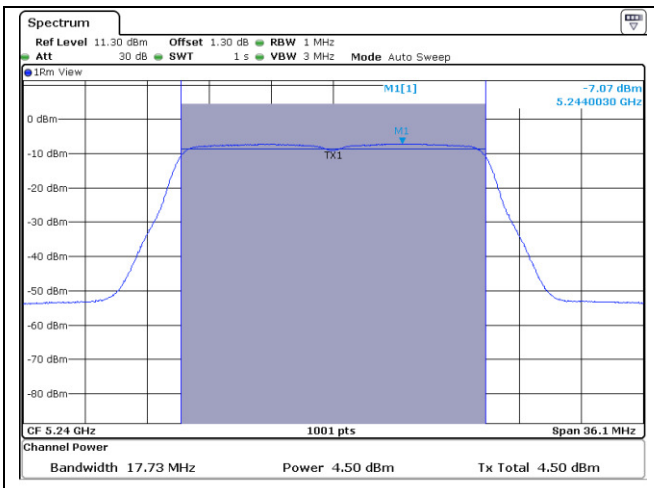


U-NII-2C (26 dB Bandwidth)

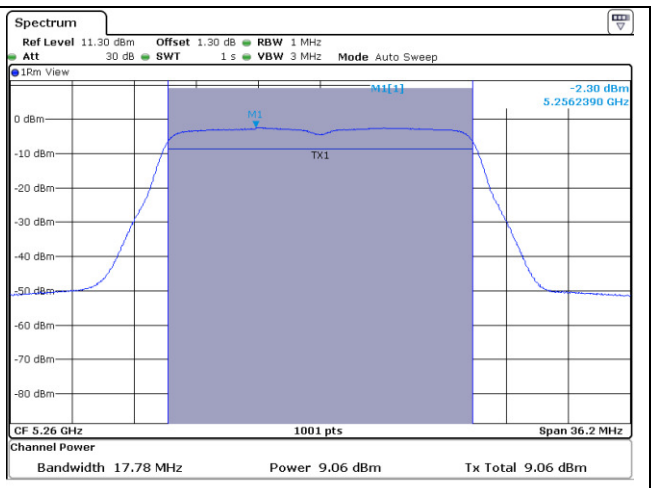


U-NII-3 (26 dB Bandwidth)

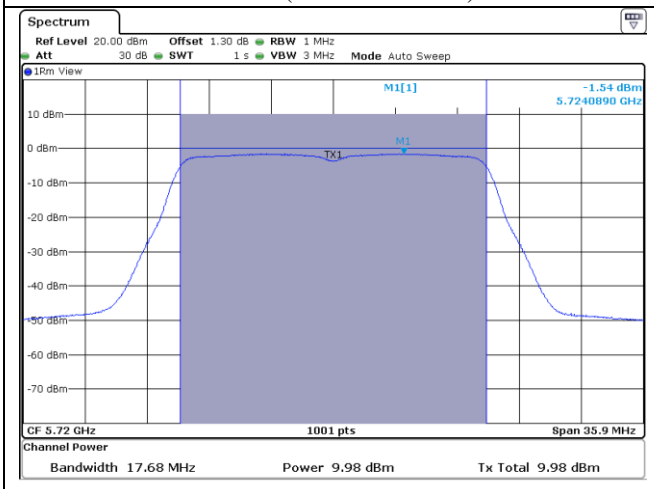
Note: In order to simplify the report, attached plots were only the most wide channel.



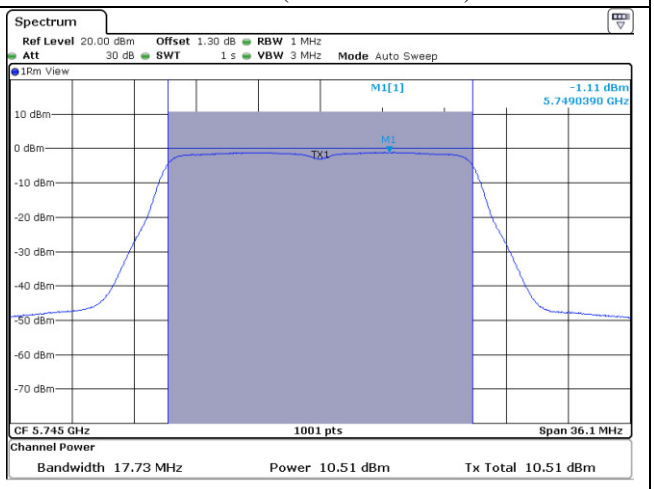
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

9.5.4.2 Test data for Antenna 1

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	21.23	6.81	30	23.19
	Middle	5 220	21.23	7.89	30	22.11
	High	5 240	20.98	7.55	30	22.45
5 250 ~ 5 350	Low	5 260	21.23	11.19	24	12.81
	Middle	5 300	21.13	10.07	24	13.93
	High	5 320	21.13	9.72	24	14.28
5 470 ~ 5 725	Low	5 500	21.08	8.33	24	15.67
	Middle	5 560	21.28	10.51	24	13.49
	High	5 720	21.18	10.48	24	13.52
5 725 ~ 5 850	Low	5 745	21.03	13.32	30	16.68
	Middle	5 785	21.28	12.81	30	17.19
	High	5 825	20.73	9.17	30	20.83

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	3.36	16.79	13.43
	Middle	5 220	17.73	3.51	16.79	13.28
	High	5 240	17.73	3.73	16.79	13.06
5 250 ~ 5 350	Low	5 260	17.73	7.83	23.17	15.34
	Middle	5 300	17.68	7.74	23.17	15.43
	High	5 320	17.73	7.81	23.17	15.36
5 470 ~ 5 725	Low	5 500	17.73	6.98	23.2	16.22
	Middle	5 560	17.73	9.01	23.2	14.19
	High	5 720	17.73	9.32	23.2	13.88
5 725 ~ 5 825	Low	5 745	17.73	10.25	30	19.75
	Middle	5 785	17.73	9.65	30	20.35
	High	5 825	17.68	8.49	30	21.51

Remark: See next page for measurement data.

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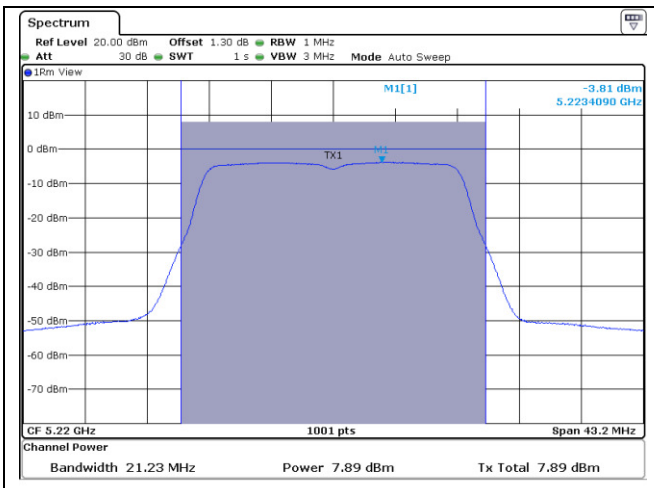
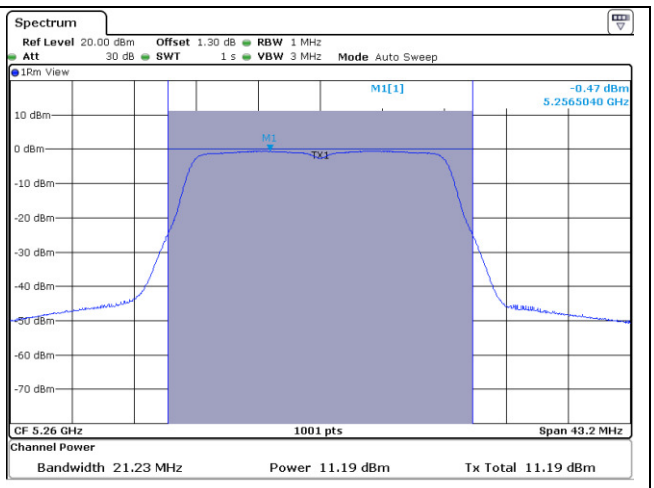
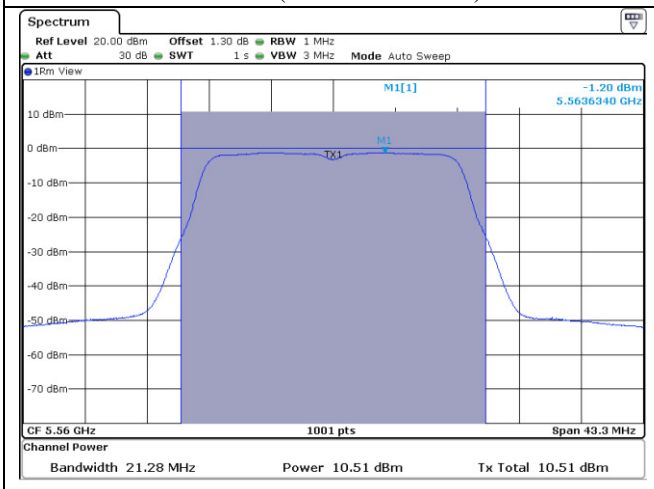


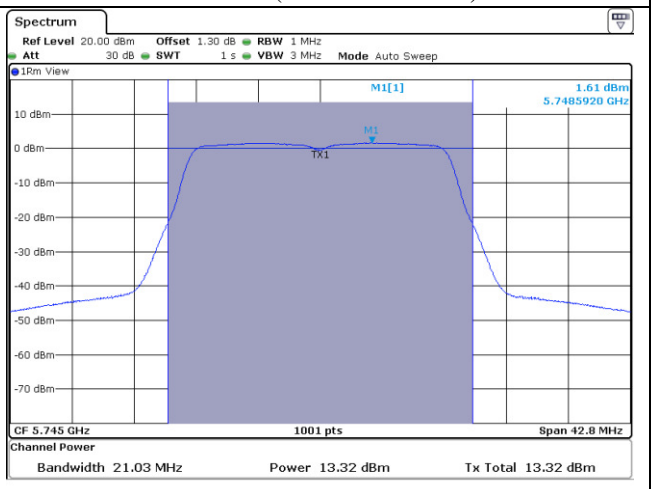
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

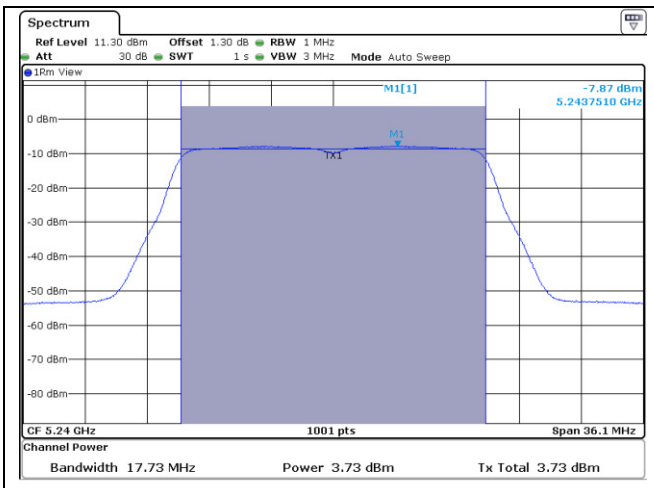


U-NII-2C (26 dB Bandwidth)

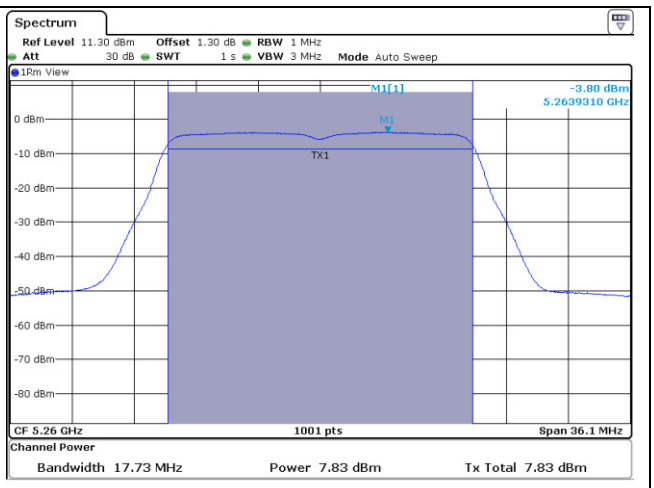


U-NII-3 (26 dB Bandwidth)

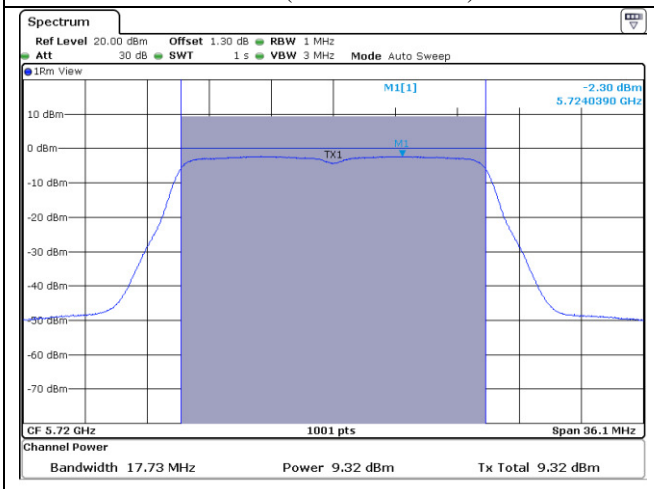
Note: In order to simplify the report, attached plots were only the most wide channel.



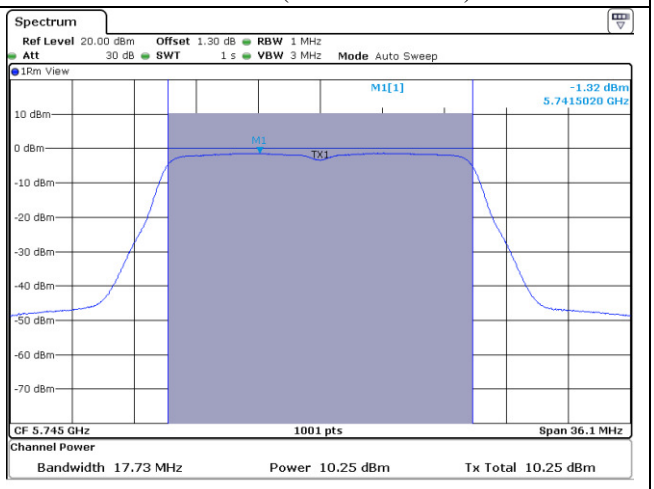
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.4.3 Test data for Antenna 2

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	21.13	6.43	30	23.57
	Middle	5 220	20.93	7.50	30	22.50
	High	5 240	21.13	7.47	30	22.53
5 250 ~ 5 350	Low	5 260	21.13	11.50	24	12.50
	Middle	5 300	21.13	10.18	24	13.82
	High	5 320	20.93	10.58	24	13.42
5 470 ~ 5 725	Low	5 500	21.03	8.50	24	15.50
	Middle	5 560	20.98	10.58	24	13.42
	High	5 720	21.03	10.24	24	13.76
5 725 ~ 5 850	Low	5 745	20.88	13.35	30	16.65
	Middle	5 785	20.93	12.83	30	17.17
	High	5 825	21.03	9.63	30	20.37

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-. IC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.68	3.01	17.18	14.17
	Middle	5 220	17.68	3.26	17.18	13.92
	High	5 240	17.68	3.40	17.18	13.78
5 250 ~ 5 350	Low	5 260	17.68	7.88	23.17	15.29
	Middle	5 300	17.68	8.13	23.17	15.04
	High	5 320	17.68	8.41	23.17	14.76
5 470 ~ 5 725	Low	5 500	17.68	7.27	23.2	15.93
	Middle	5 560	17.68	8.95	23.2	14.25
	High	5 720	17.68	8.84	23.2	14.36
5 725 ~ 5 825	Low	5 745	17.73	10.20	30	19.80
	Middle	5 785	17.68	9.43	30	20.57
	High	5 825	17.68	8.96	30	21.04

Remark: See next page for measurement data.

Tested by: Min-Gu, Ji / Project Engineer

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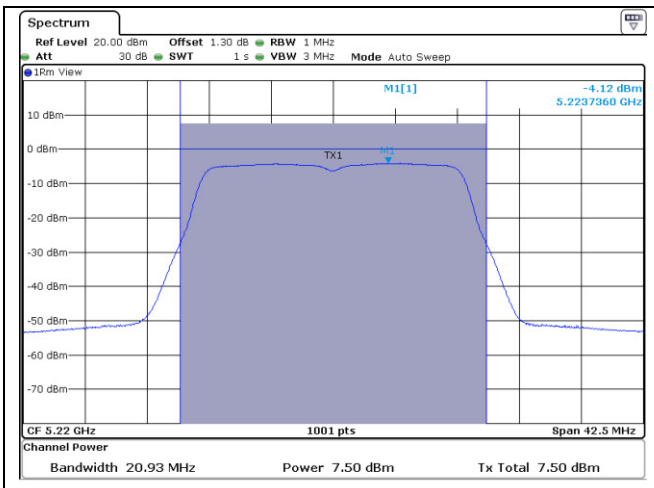
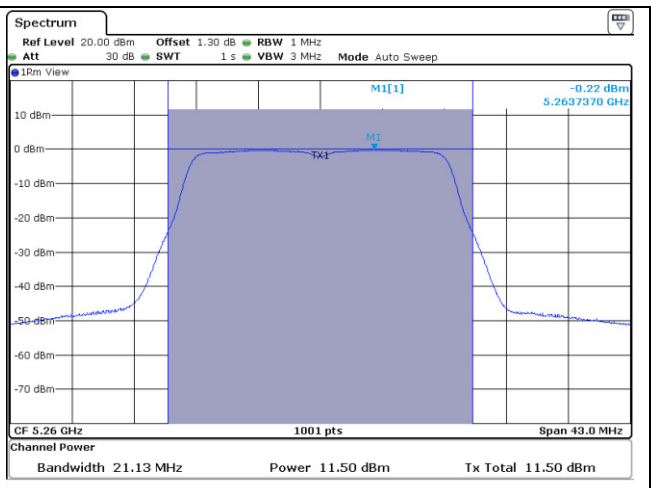
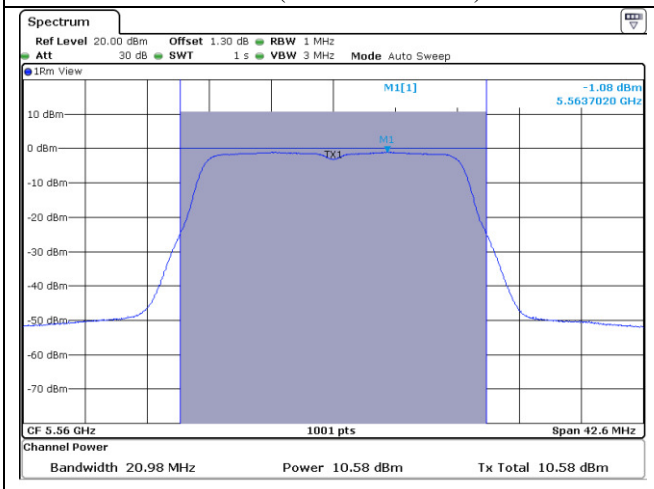


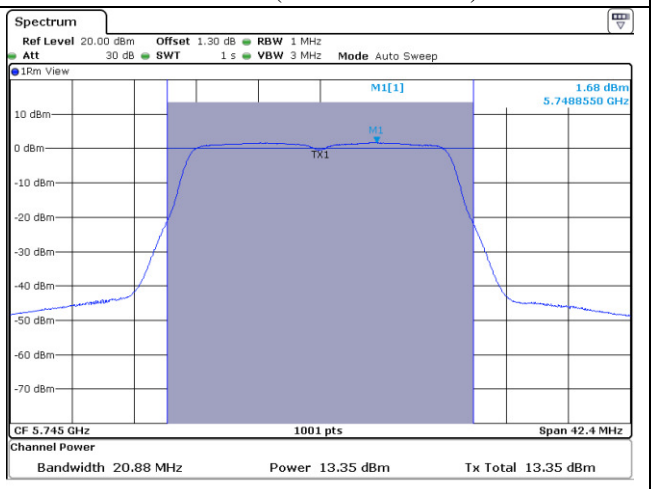
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)



U-NII-2C (26 dB Bandwidth)



U-NII-3 (26 dB Bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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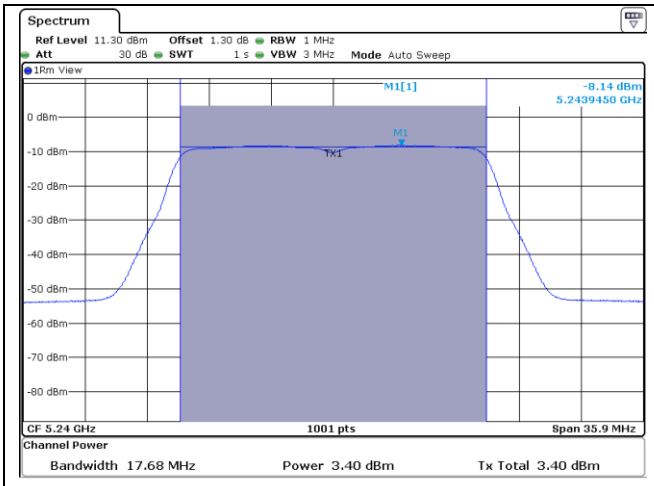
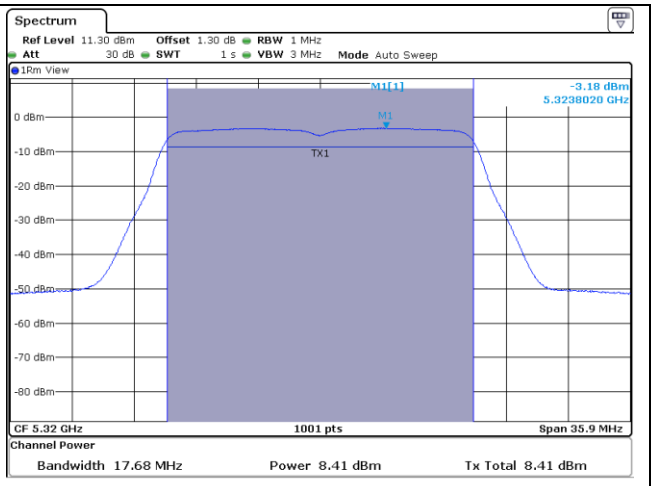
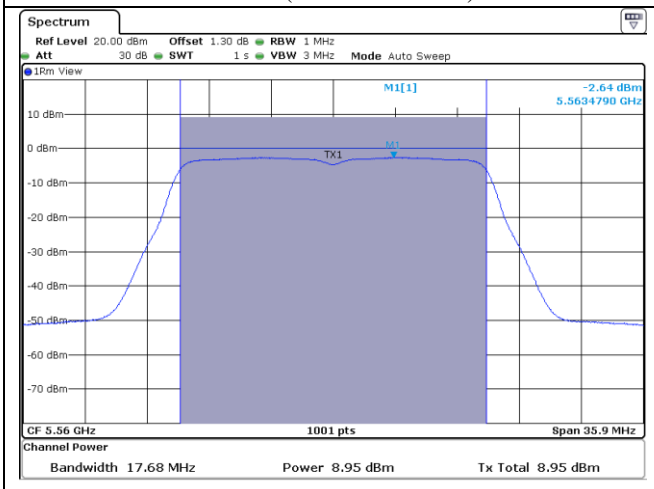


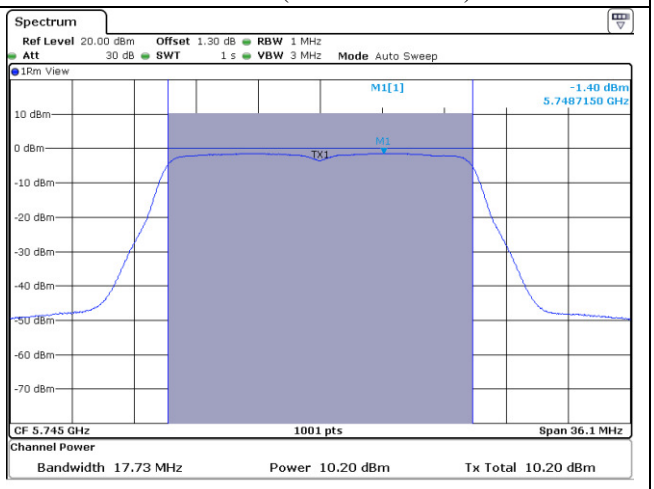
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.4.4 Test data for Antenna 3

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	21.18	5.80	30	24.20
	Middle	5 220	21.18	6.61	30	23.39
	High	5 240	21.08	6.67	30	23.33
5 250 ~ 5 350	Low	5 260	21.18	10.68	24	13.32
	Middle	5 300	21.13	9.07	24	14.93
	High	5 320	21.08	9.21	24	14.79
5 470 ~ 5 725	Low	5 500	20.98	6.68	24	17.32
	Middle	5 560	20.98	9.28	24	14.72
	High	5 720	21.03	9.56	24	14.44
5 725 ~ 5 850	Low	5 745	20.98	12.43	30	17.57
	Middle	5 785	21.03	11.90	30	18.10
	High	5 825	21.08	8.19	30	21.81

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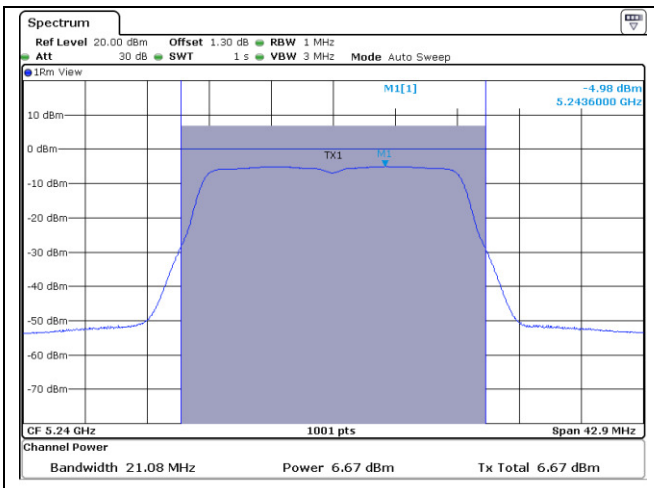
-. IC Test data

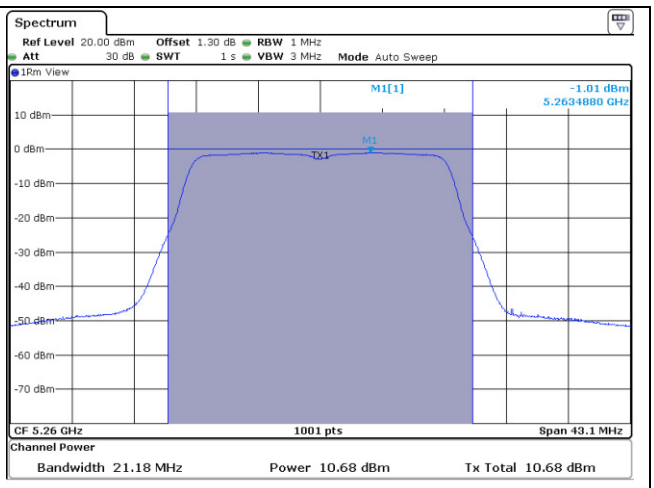
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	99 % bandwidth (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	17.73	2.29	16.58	14.29
	Middle	5 220	17.73	2.54	16.58	14.04
	High	5 240	17.68	2.87	16.58	13.71
5 250 ~ 5 350	Low	5 260	17.73	6.60	23.17	16.57
	Middle	5 300	17.68	7.02	23.17	16.15
	High	5 320	17.73	6.91	23.17	16.26
5 470 ~ 5 725	Low	5 500	17.68	5.52	23.2	17.68
	Middle	5 560	17.68	7.44	23.2	15.76
	High	5 720	17.68	8.07	23.2	15.13
5 725 ~ 5 825	Low	5 745	17.68	9.29	30	20.71
	Middle	5 785	17.68	8.63	30	21.37
	High	5 825	17.73	7.59	30	22.41

Remark: See next page for measurement data.

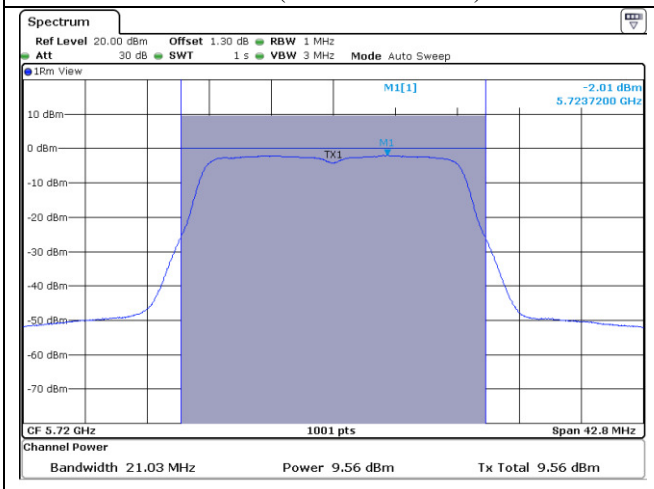
Tested by: Min-Gu, Ji / Project Engineer



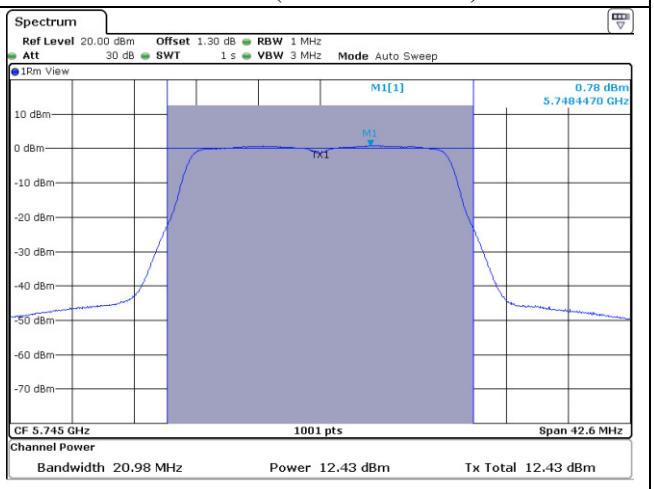
U-NII-1 (26 dB Bandwidth)



U-NII-2A (26 dB Bandwidth)

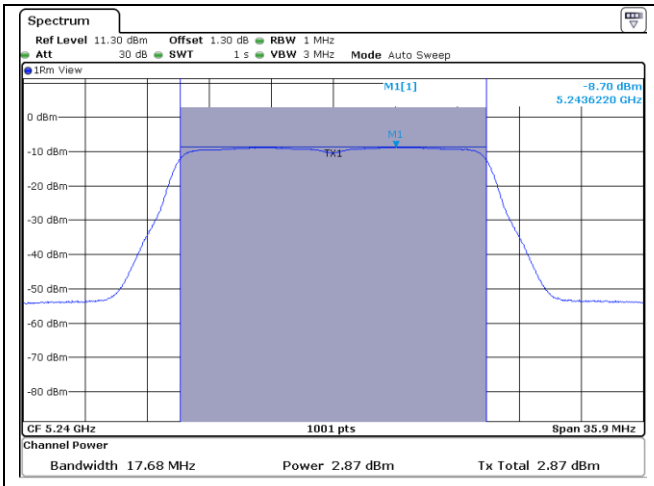


U-NII-2C (26 dB Bandwidth)

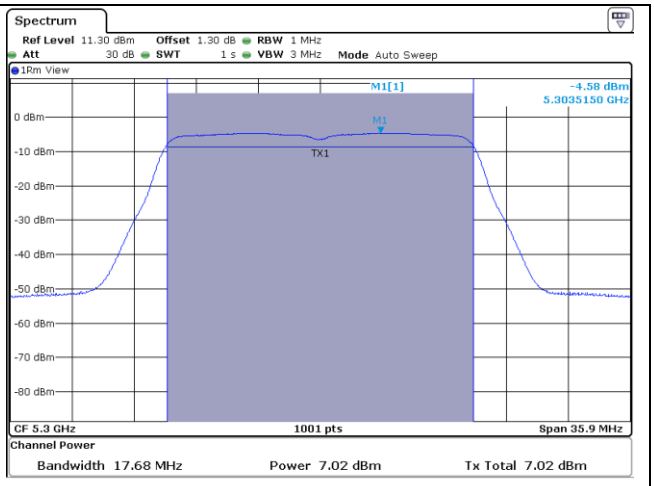


U-NII-3 (26 dB Bandwidth)

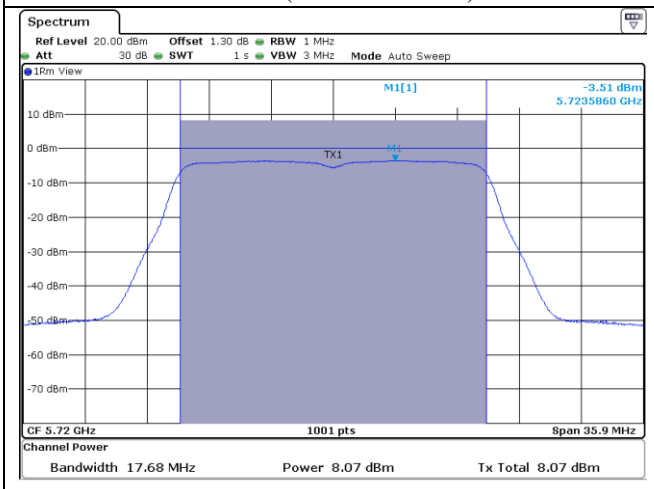
Note: In order to simplify the report, attached plots were only the most wide channel.



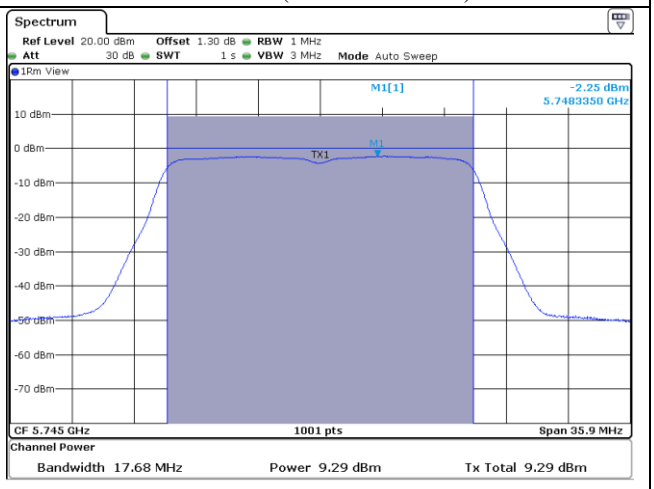
U-NII-1 (99 % bandwidth)



U-NII-2A (99 % bandwidth)



U-NII-2C (99 % bandwidth)



U-NII-3 (99 % bandwidth)

Note: In order to simplify the report, attached plots were only the most wide channel.

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9.5.4.5 Test data for Multiple Transmit

-. Test Date : June 24, 2016

-. Test Result : Pass

-. FCC Test data

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180	13.03	24.72	11.69
	Middle	5 200	13.70	24.72	11.02
	High	5 240	13.70	24.72	11.02
5 250 ~ 5 350	Low	5 260	17.30	18.71	1.41
	Middle	5 300	16.06	18.71	2.65
	High	5 320	16.17	18.71	2.54
5 470 ~ 5 725	Low	5 500	14.05	18.89	4.84
	Middle	5 580	16.31	18.89	2.58
	High	5 720	16.30	18.89	2.59
5 725 ~ 5 850	Low	5 745	19.44	25.64	6.20
	Middle	5 785	18.86	25.64	6.78
	High	5 825	15.32	25.64	10.32

Remark 1 : Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

Remark 2 :Calculated Output Power= $10\log(10^{(\text{Antenna1 Output Power}/10)}+10^{(\text{Antenna2 Output Power}/10)})$

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