

7.7 Test data for 802.11ac_VHT80 RLAN Mode

7.7.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

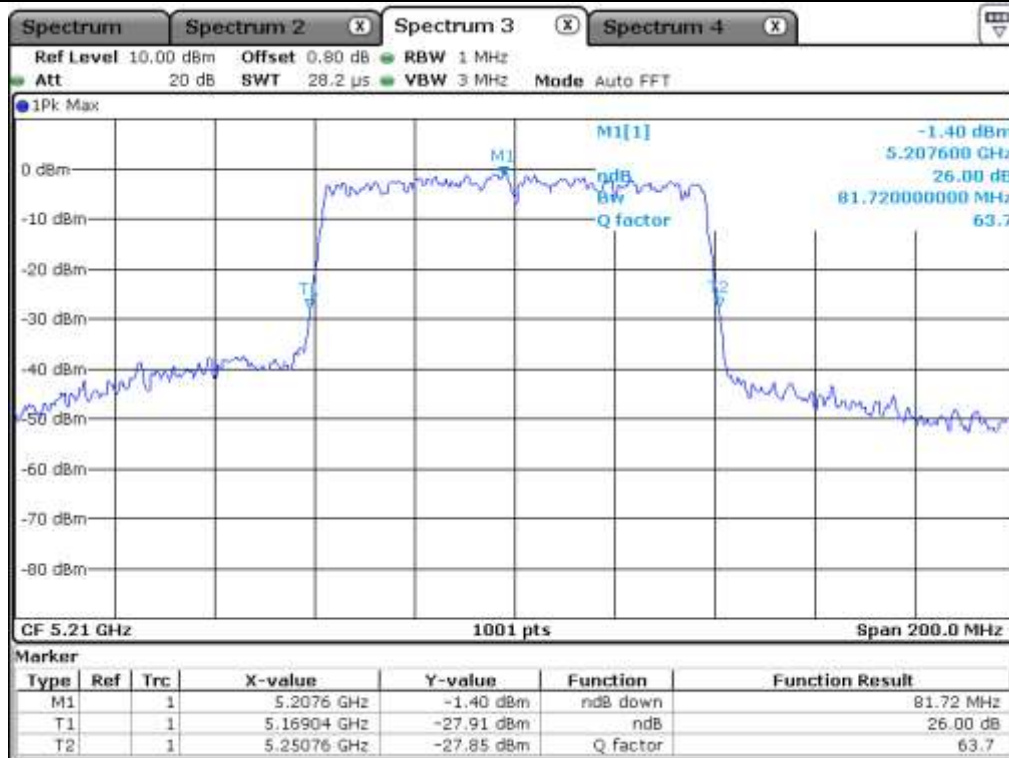
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Low	5 210.00	81.72
5 250 ~ 5 350	Low	5 290.00	81.72
5 470 ~ 5 725	Low	5 530.00	81.12
5 725 ~ 5 850	Low	5 775.00	81.12

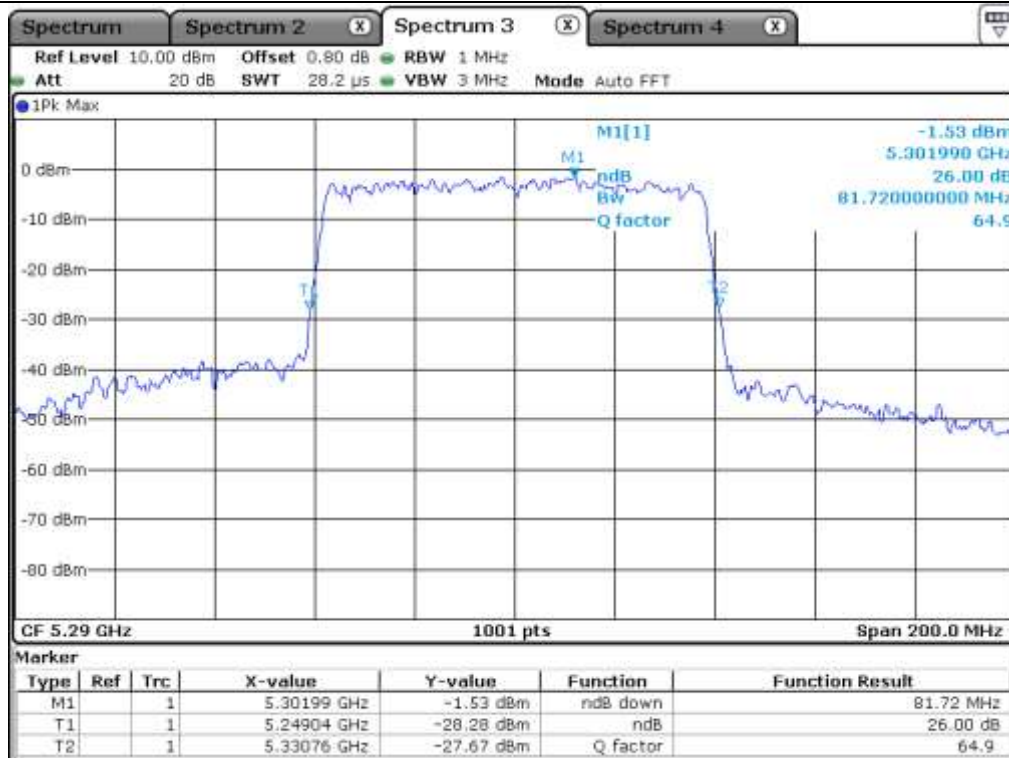
Remark: See next page for measurement data.



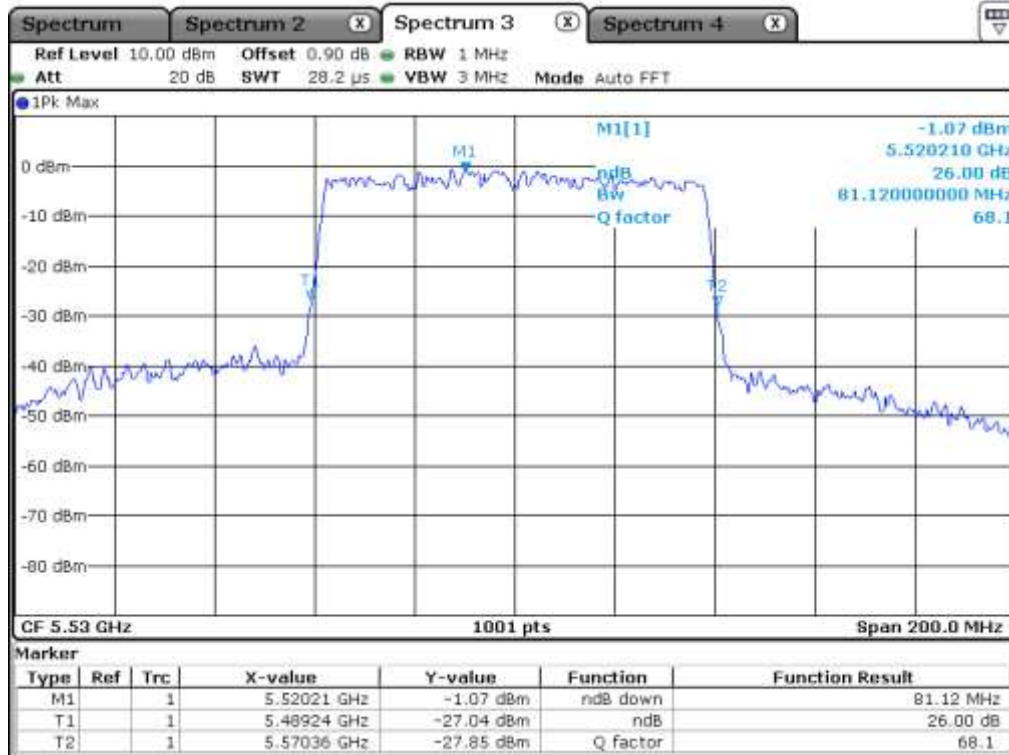
Tested by: Ha-Ram, Lee / Assistant Manager



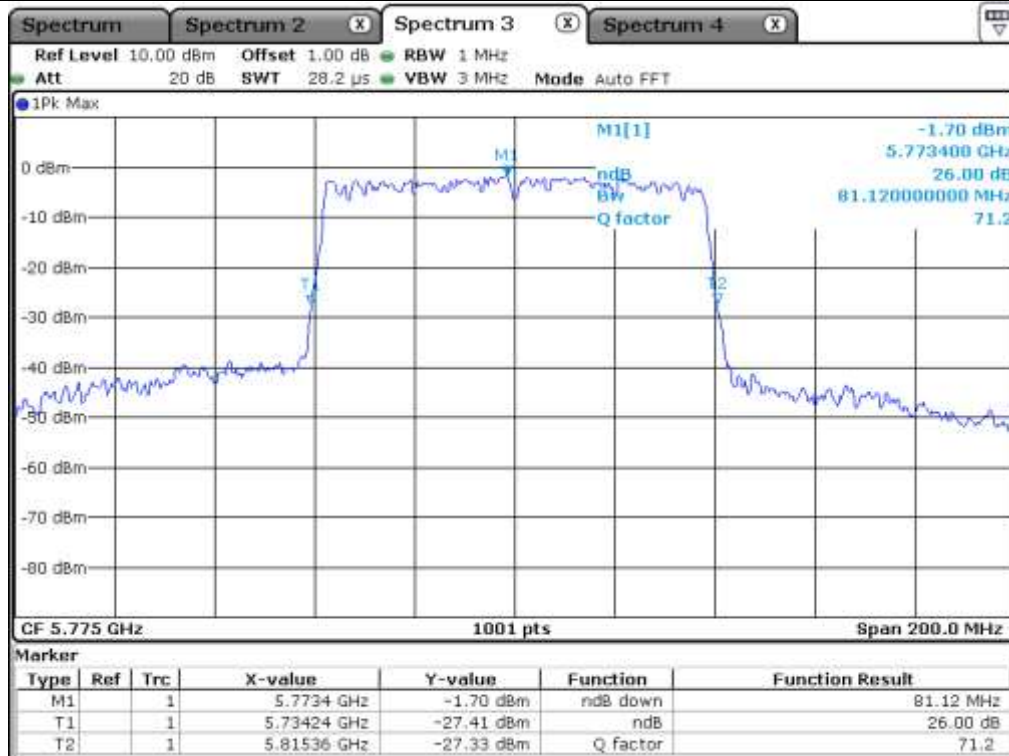
Low Channel (5 210 MHz)



Low Channel (5 290 MHz)



Low Channel (5 530 MHz)



Low Channel (5 775 MHz)

7.7.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

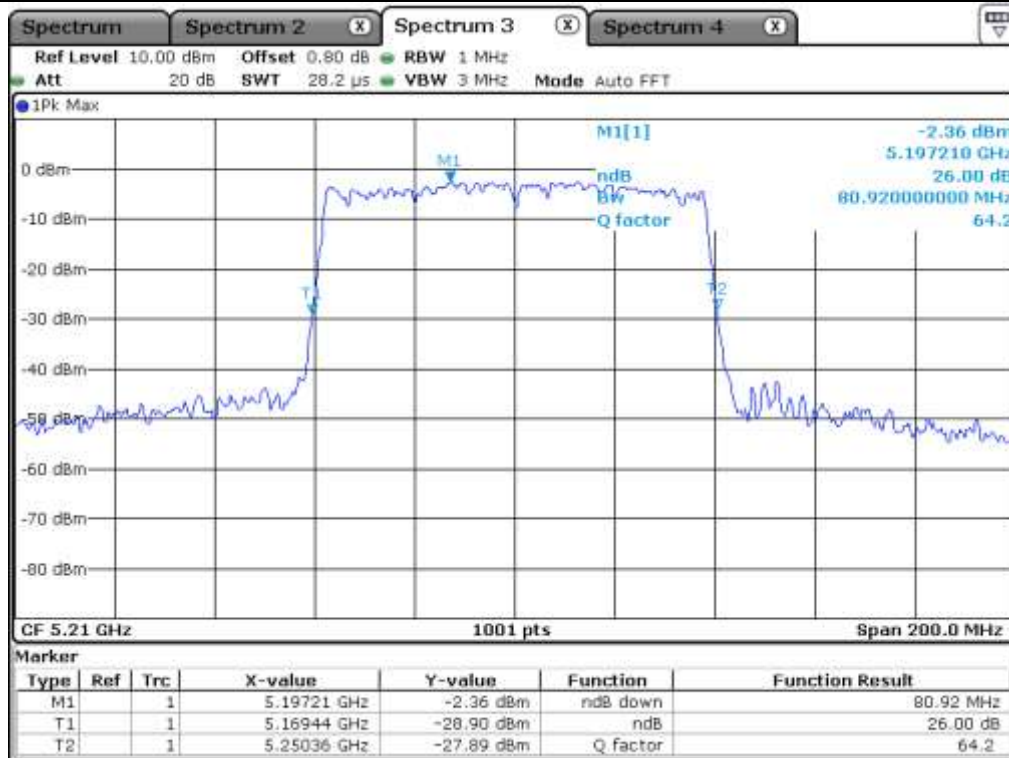
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 150 ~ 5 250	Low	5 210.00	80.92
5 250 ~ 5 350	Low	5 290.00	80.72
5 470 ~ 5 725	Low	5 530.00	80.72
5 725 ~ 5 850	Low	5 775.00	81.32

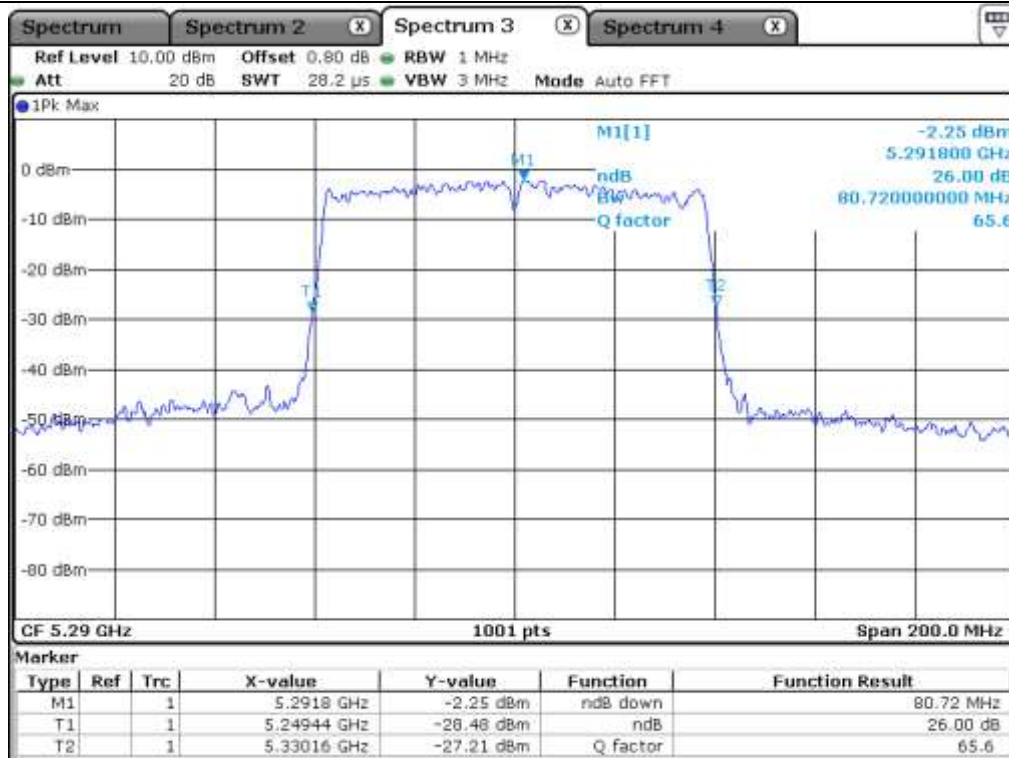
Remark: See next page for measurement data.



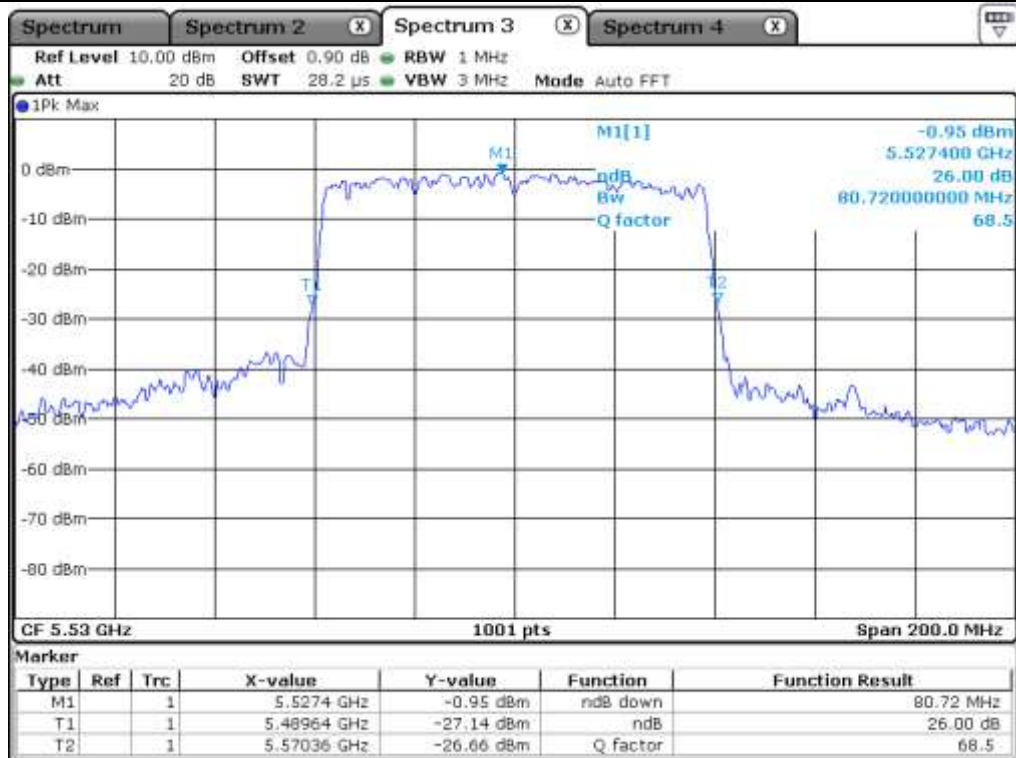
Tested by: Ha-Ram, Lee / Assistant Manager



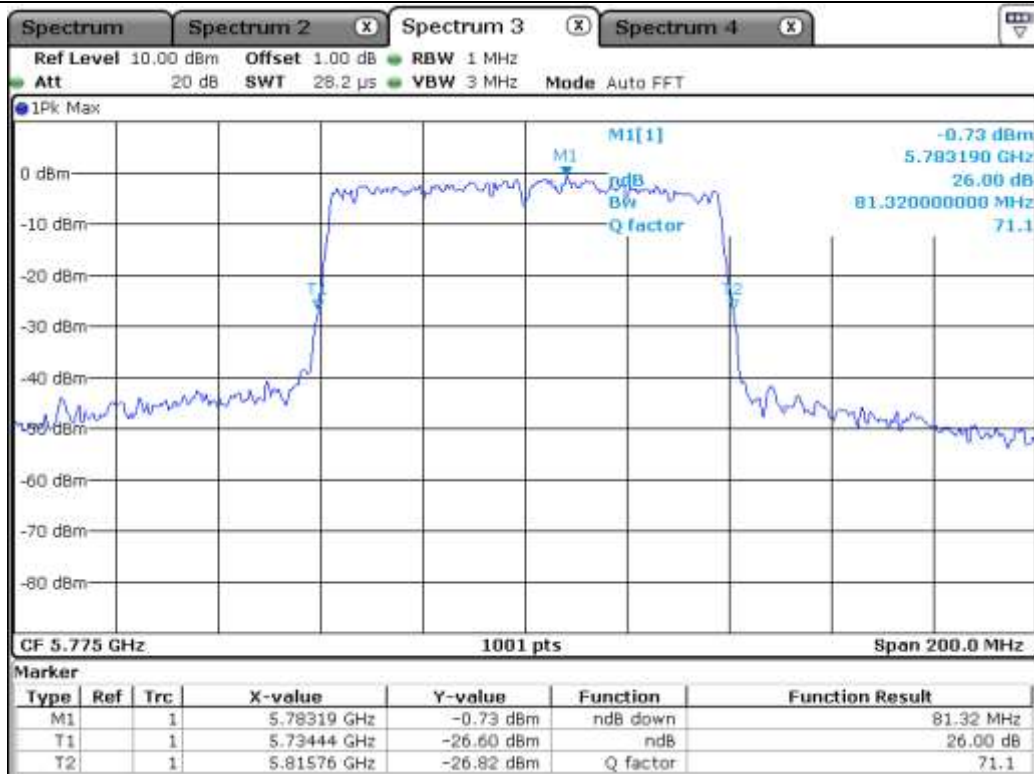
Low Channel (5 210 MHz)



Low Channel (5 290 MHz)



Low Channel (5 530 MHz)



Low Channel (5 775 MHz)

7.7.3 Test data for Staddle Channel_Antenna 0

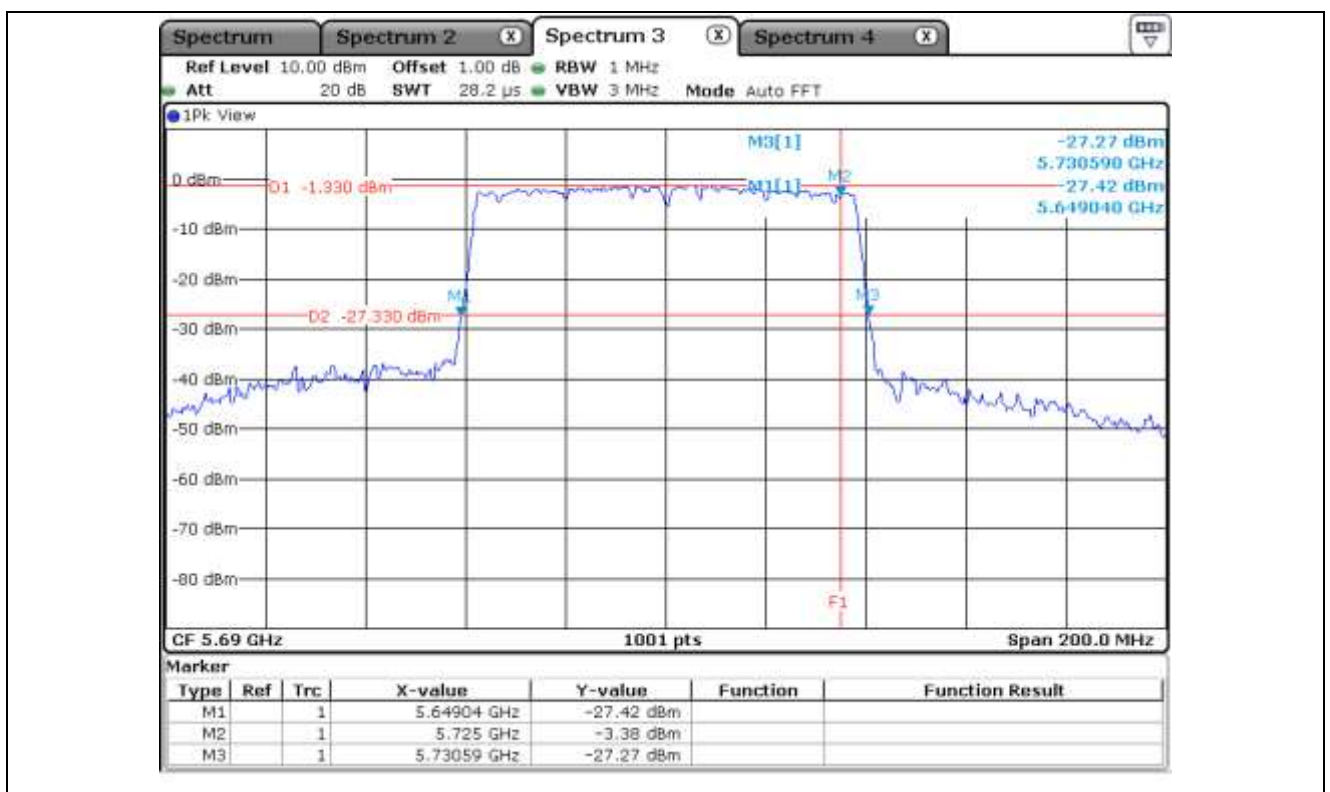
-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 690.00	75.96
5 725 ~ 5 850	5 690.00	5.59



Tested by: Ha-Ram, Lee / Assistant Manager



7.7.4 Test data for Staddle Channel_Antenna 1

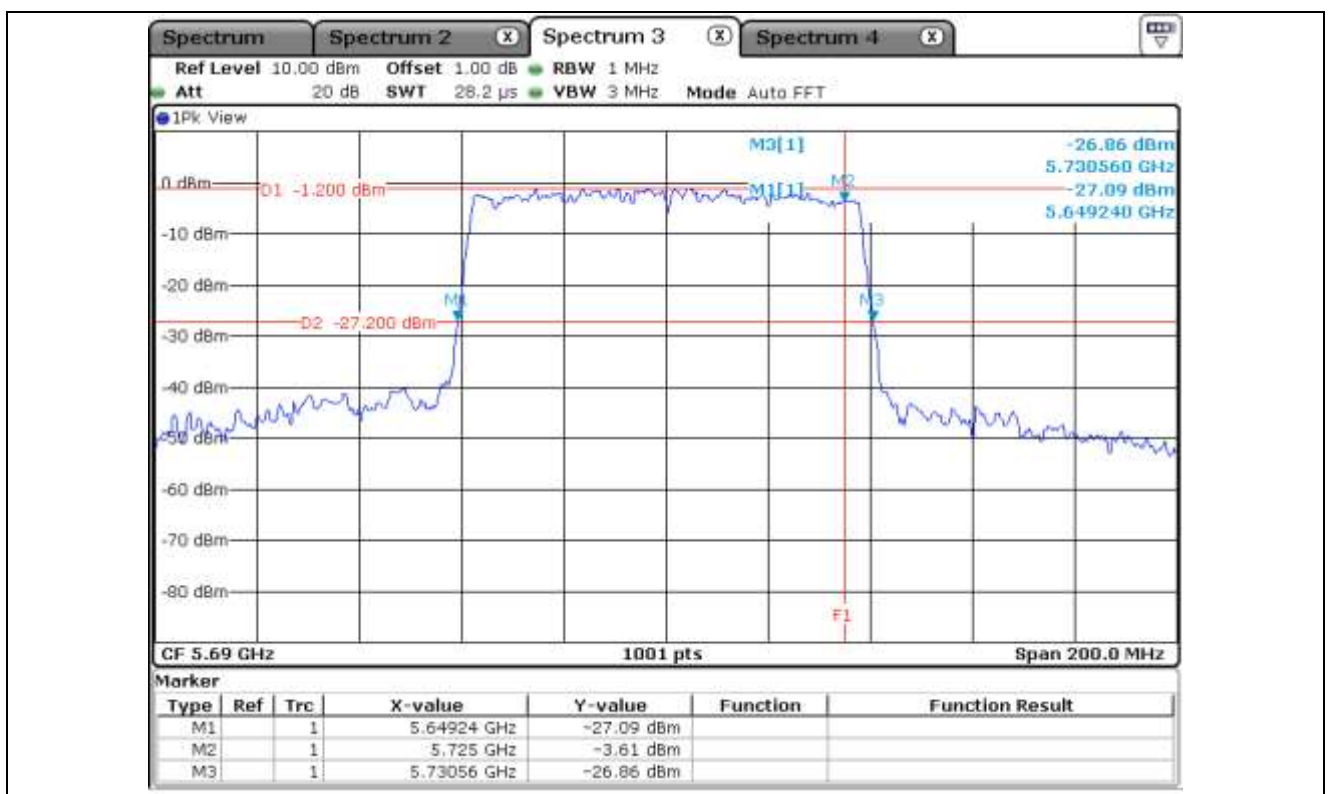
-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	26 dB Bandwidth (MHz)
5 470 ~ 5 725	5 690.00	75.76
5 725 ~ 5 850	5 690.00	5.56



Tested by: Ha-Ram, Lee / Assistant Manager



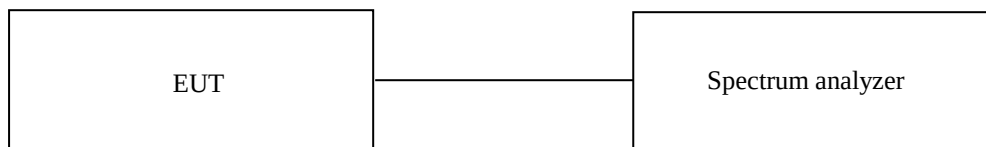
8. 6 dB BANDWIDTH

8.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

8.4 Test data for 802.11a RLAN Mode

8.4.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

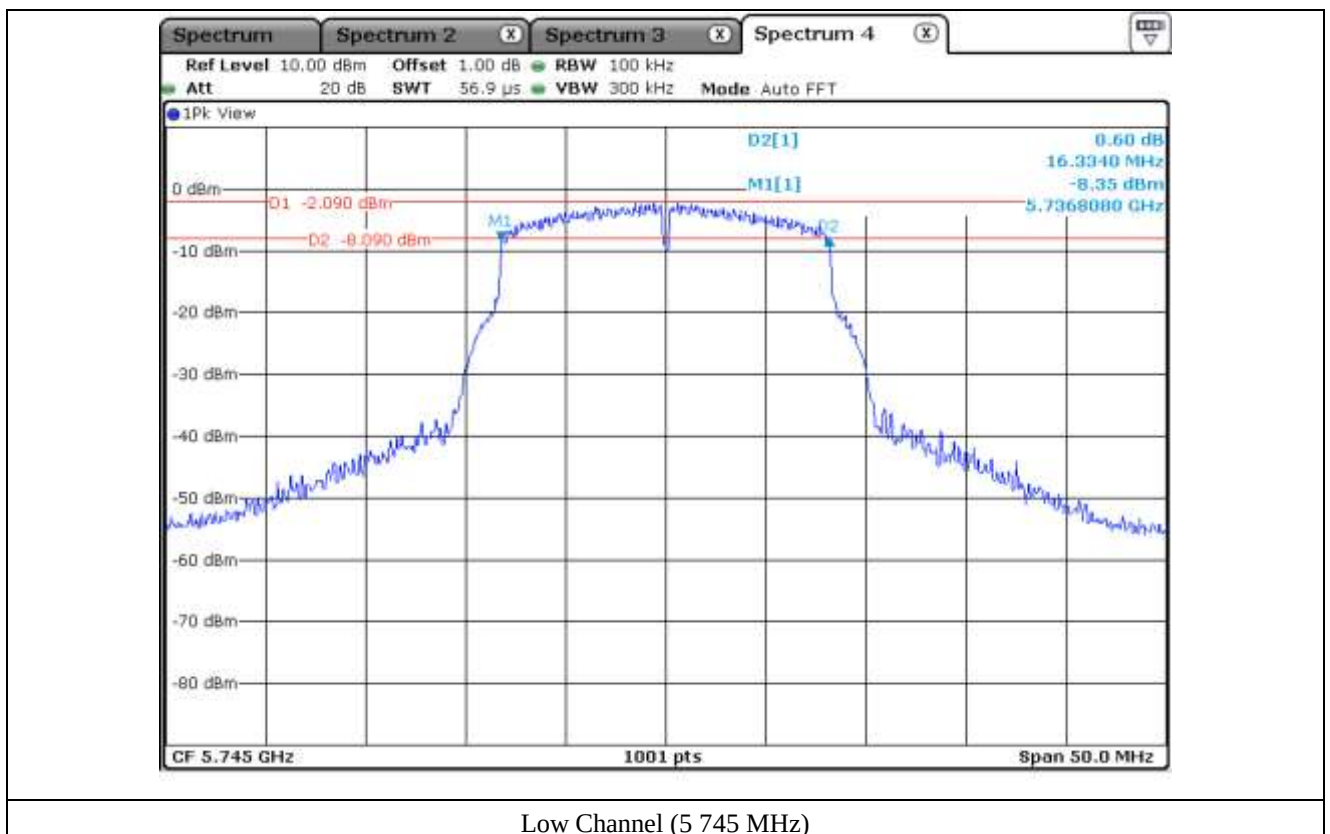
-. Test Result : Pass

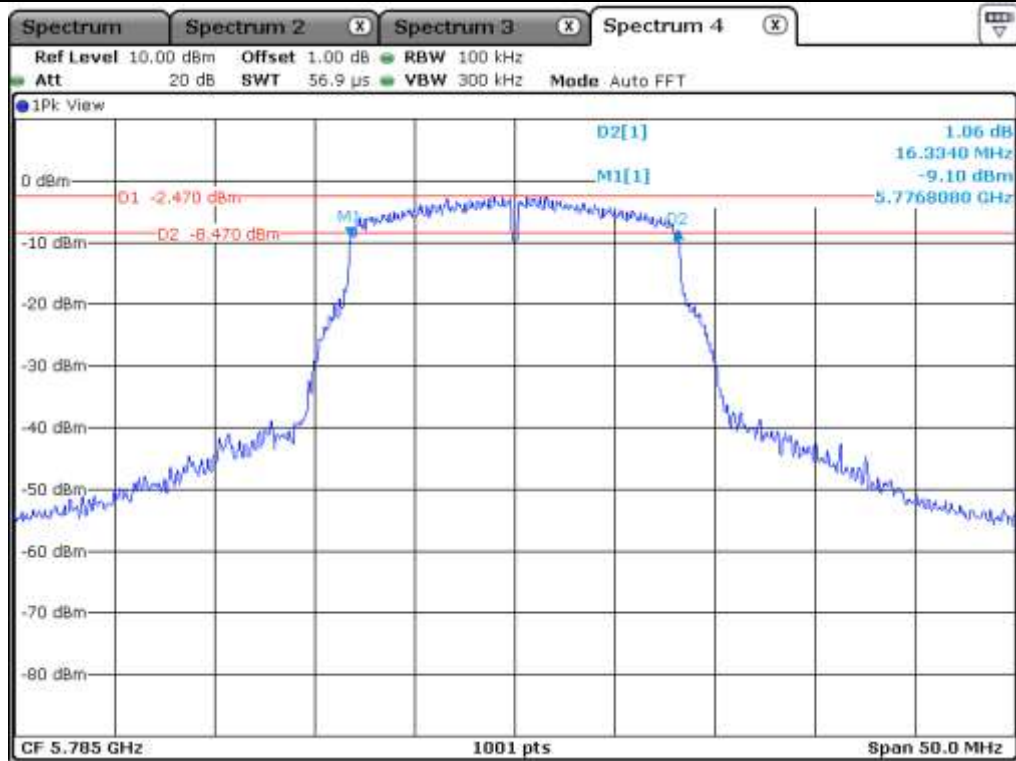
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	16.33
	Middle	5 785.00	16.33
	High	5 825.00	16.33

Remark: See next page for measurement data.

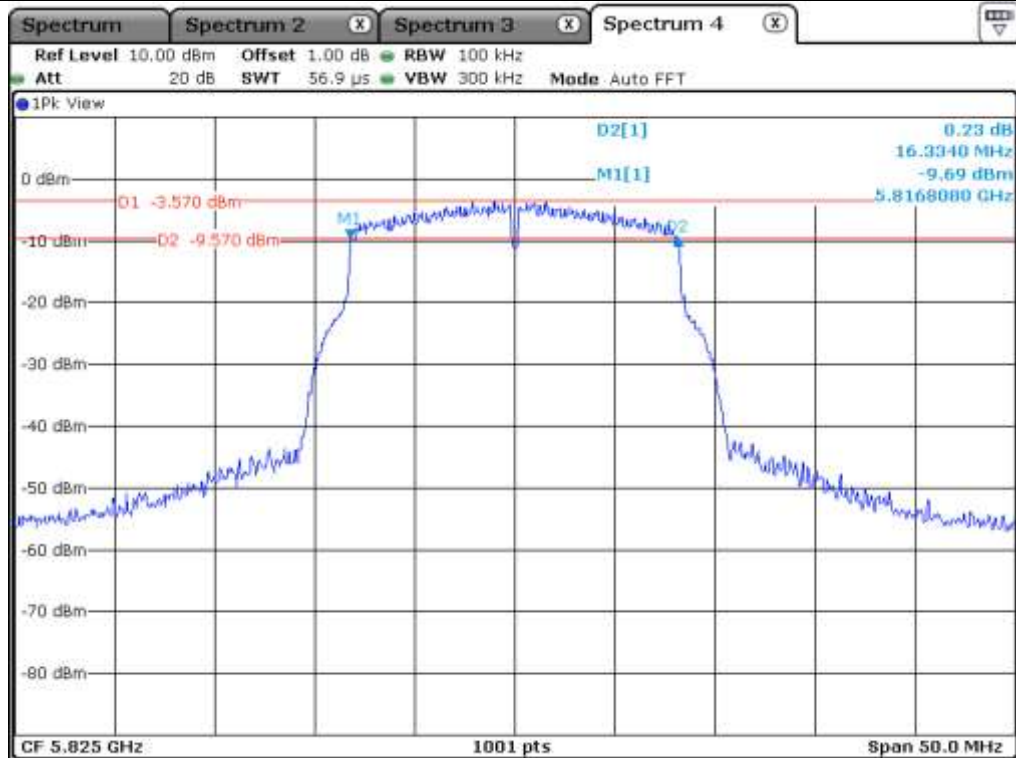


Tested by: Ha-Ram, Lee / Assistant Manager





Middle Channel (5.785 MHz)



High Channel (5.825 MHz)

8.4.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

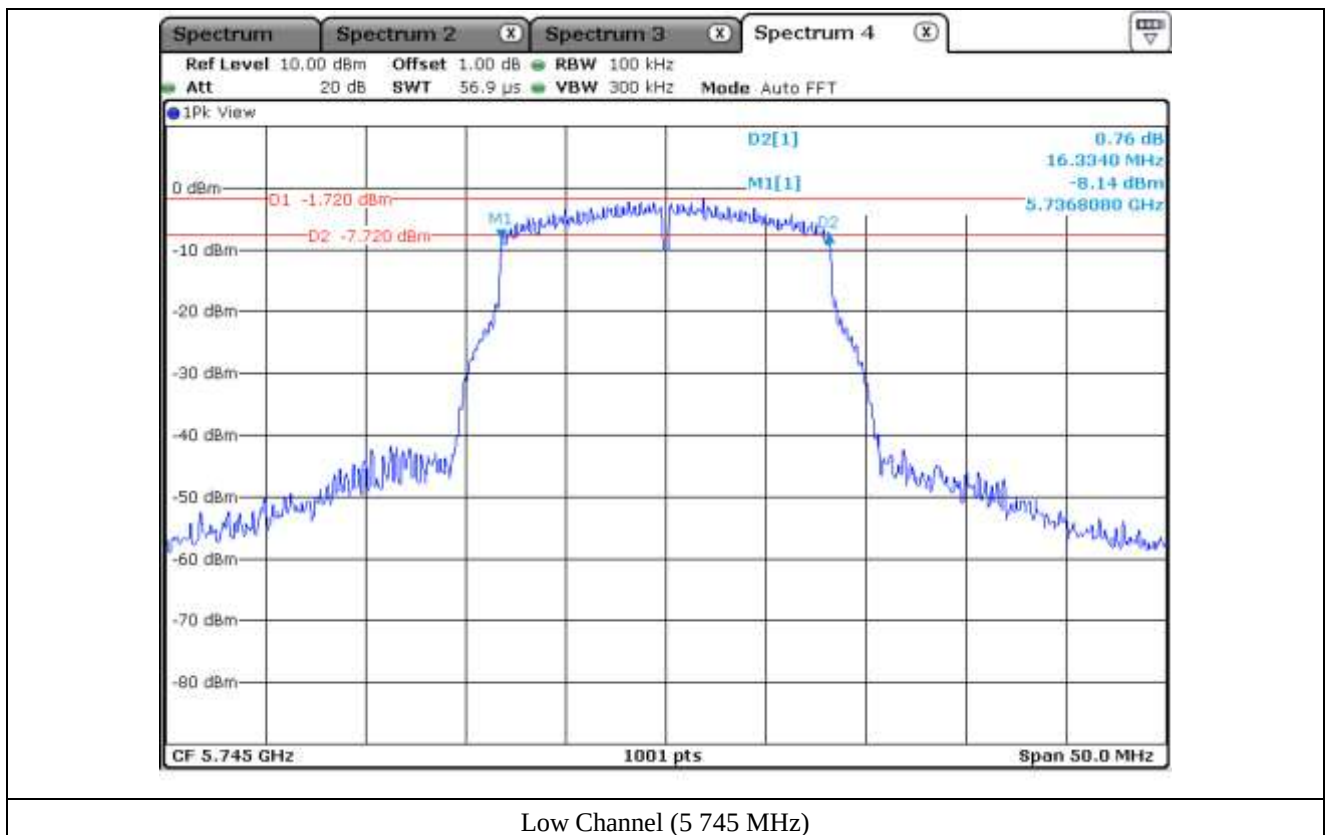
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	16.33
	Middle	5 785.00	16.28
	High	5 825.00	16.33

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



8.5 Test data for 802.11n_HT20 RLAN Mode

8.5.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

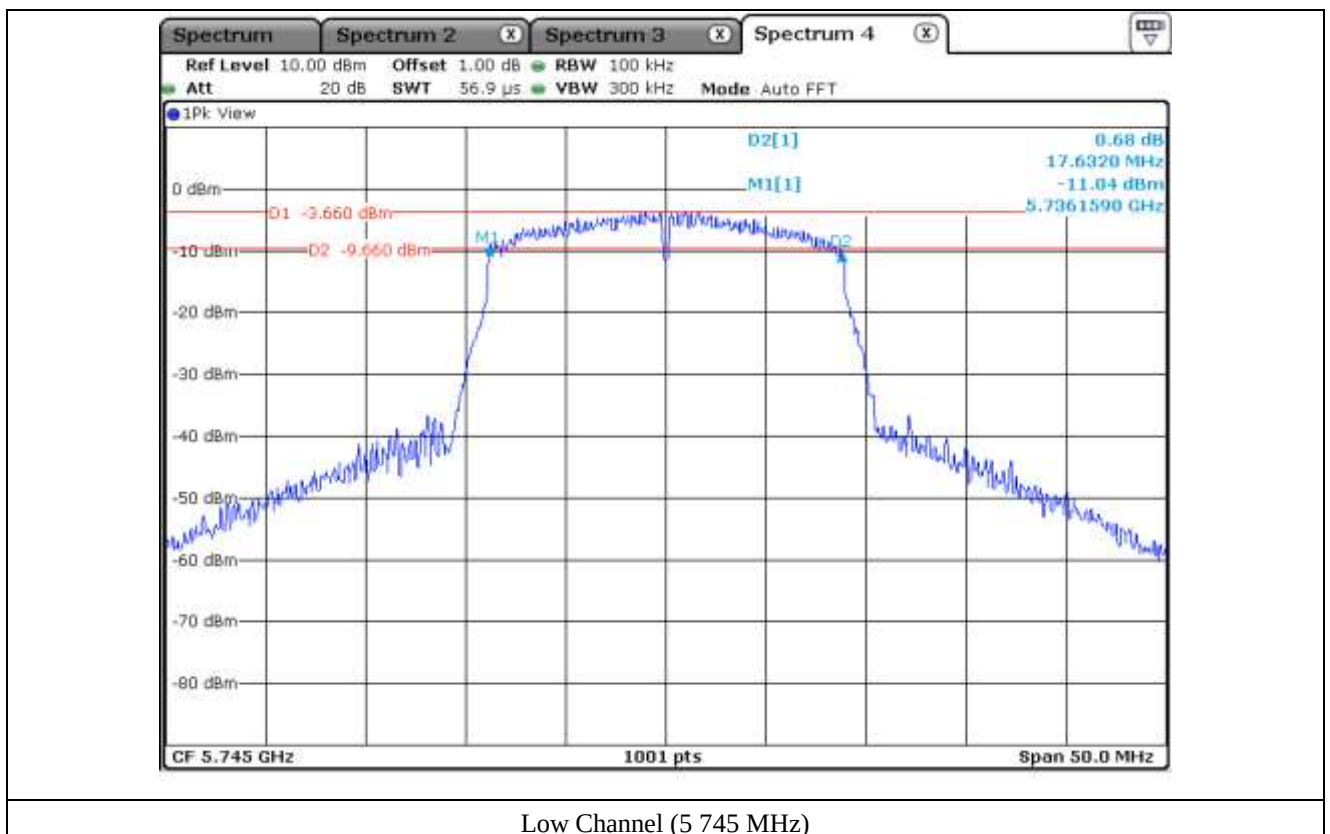
-. Test Result : Pass

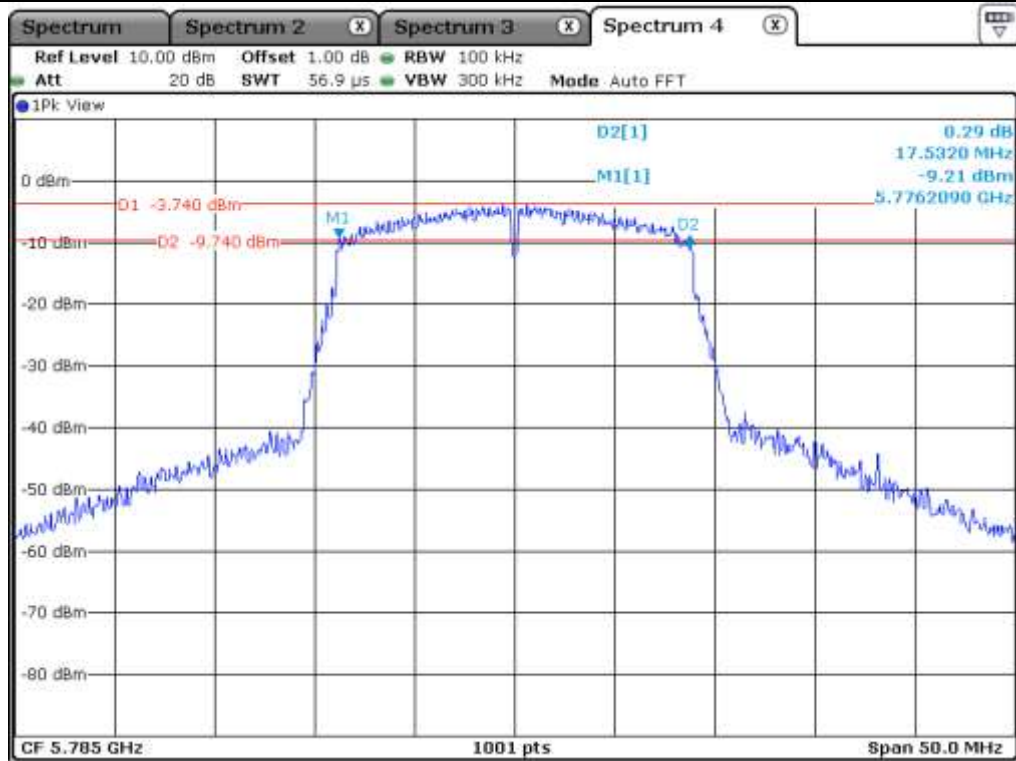
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	17.63
	Middle	5 785.00	17.53
	High	5 825.00	17.63

Remark: See next page for measurement data.

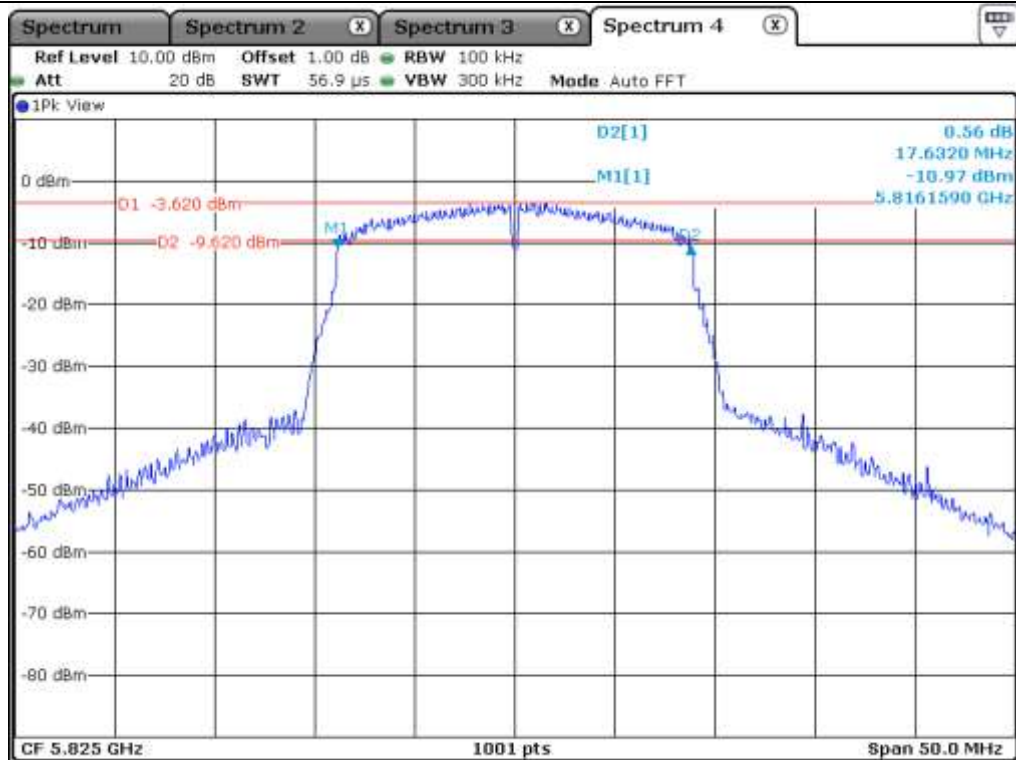


Tested by: Ha-Ram, Lee / Assistant Manager





Middle Channel (5 785 MHz)



High Channel (5 825 MHz)

8.5.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

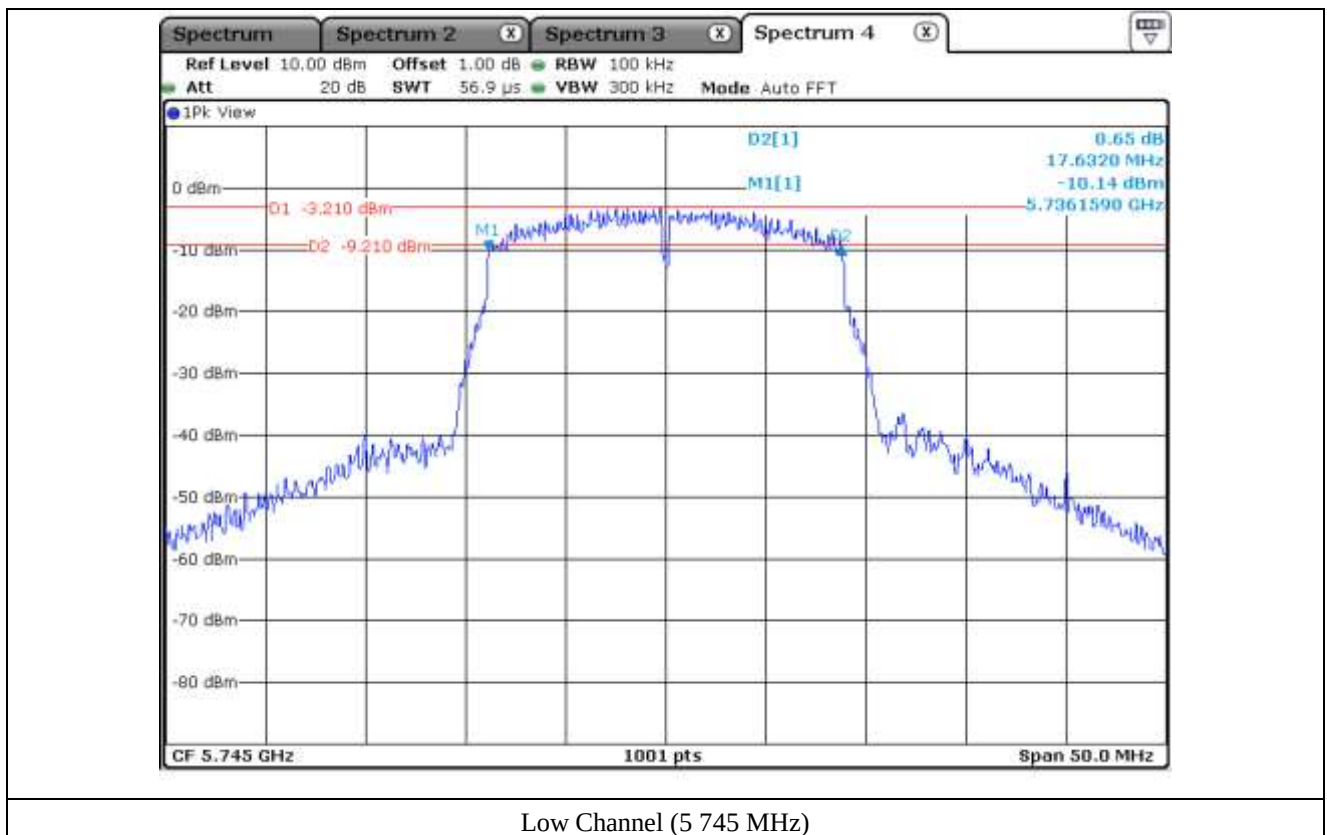
-. Test Result : Pass

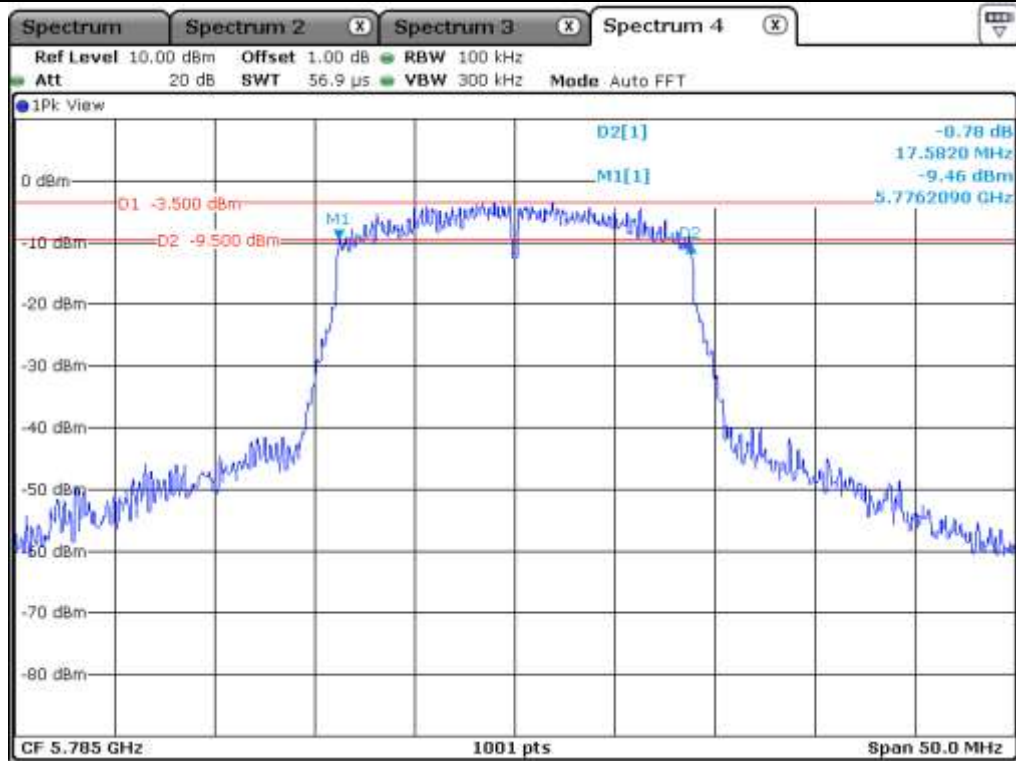
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 745.00	17.63
	Middle	5 785.00	17.58
	High	5 825.00	17.58

Remark: See next page for measurement data.

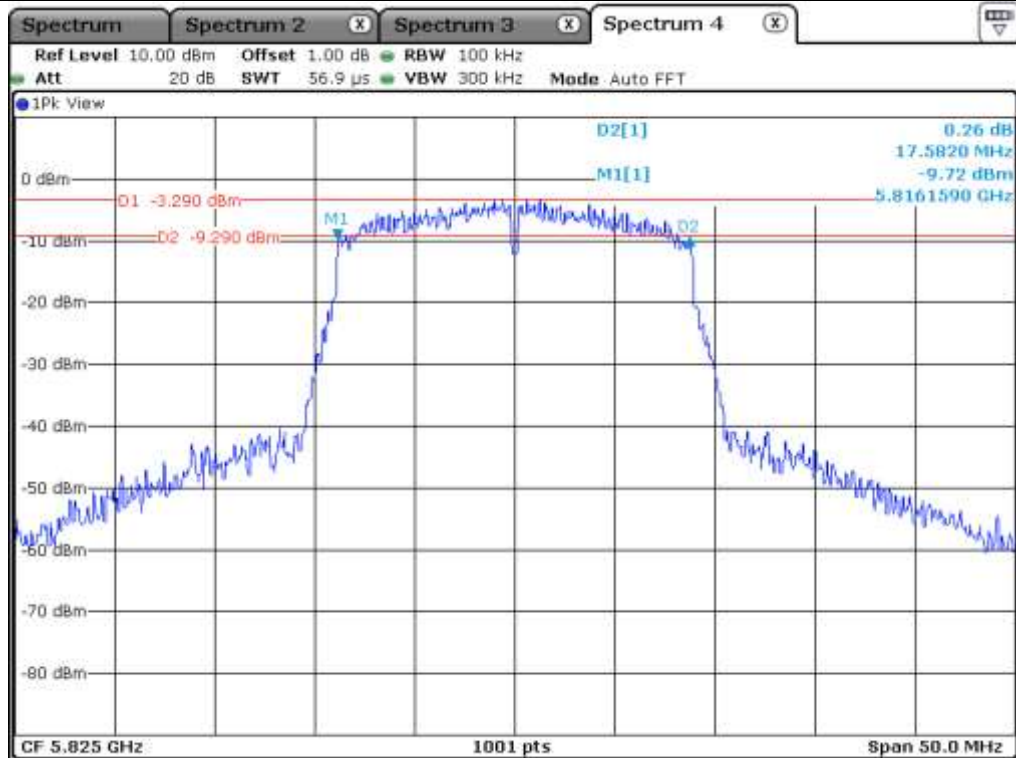


Tested by: Ha-Ram, Lee / Assistant Manager





Middle Channel (5.785 MHz)



High Channel (5.825 MHz)

8.6 Test data for 802.11n_HT40 RLAN Mode

8.6.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

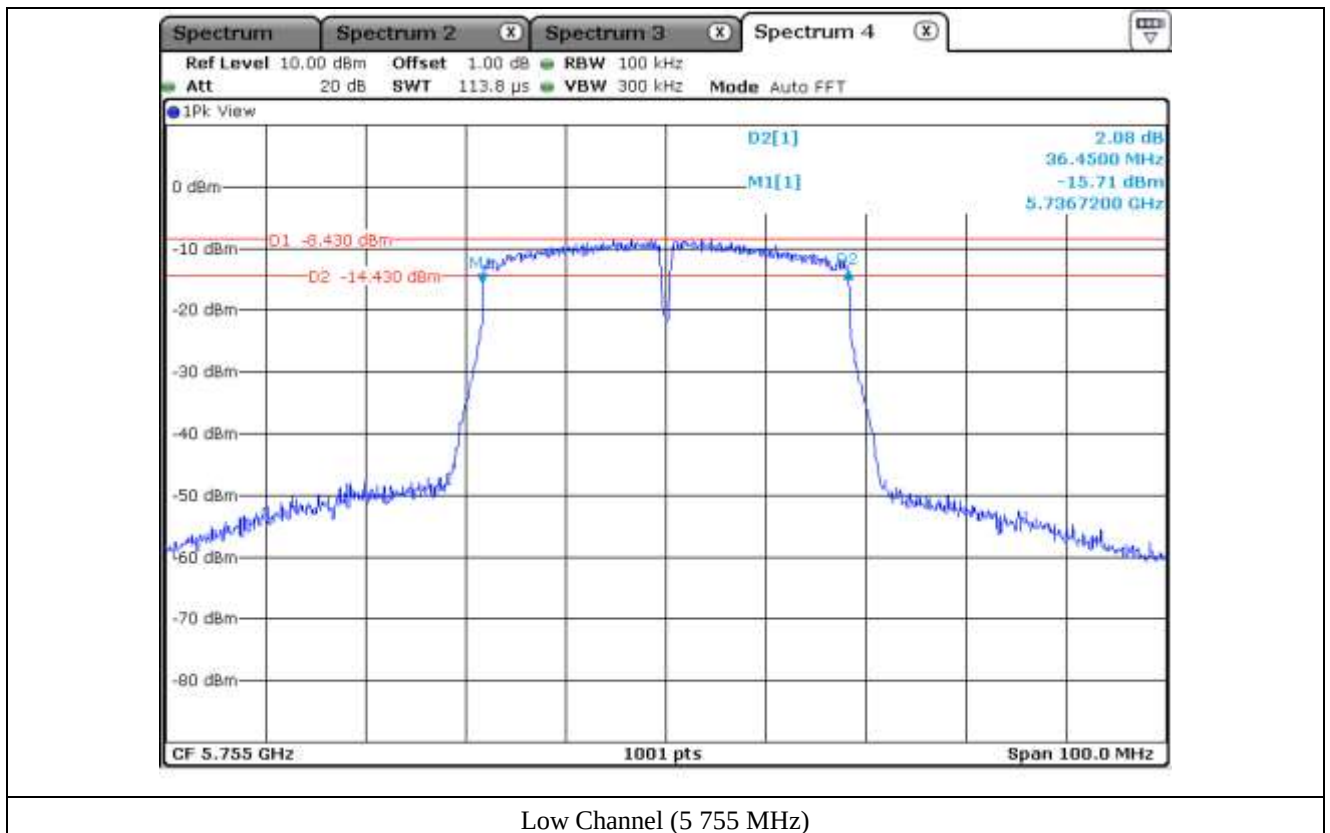
-. Test Result : Pass

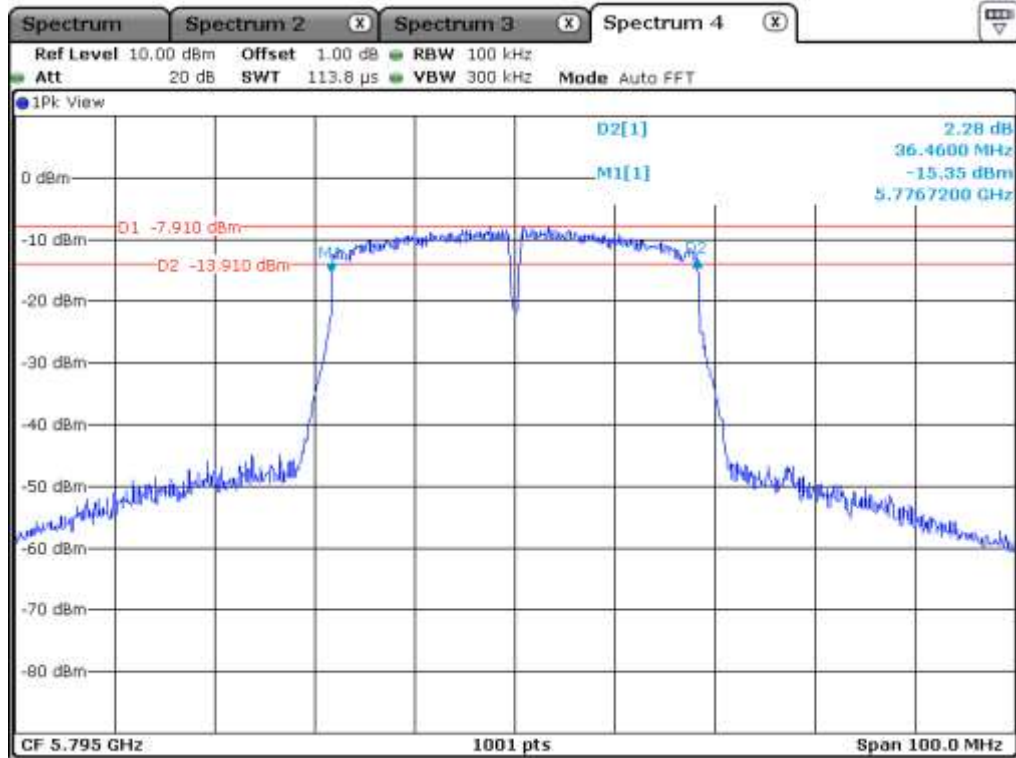
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 755.00	36.45
	High	5 795.00	36.46

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager





High Channel (5 795 MHz)

8.6.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

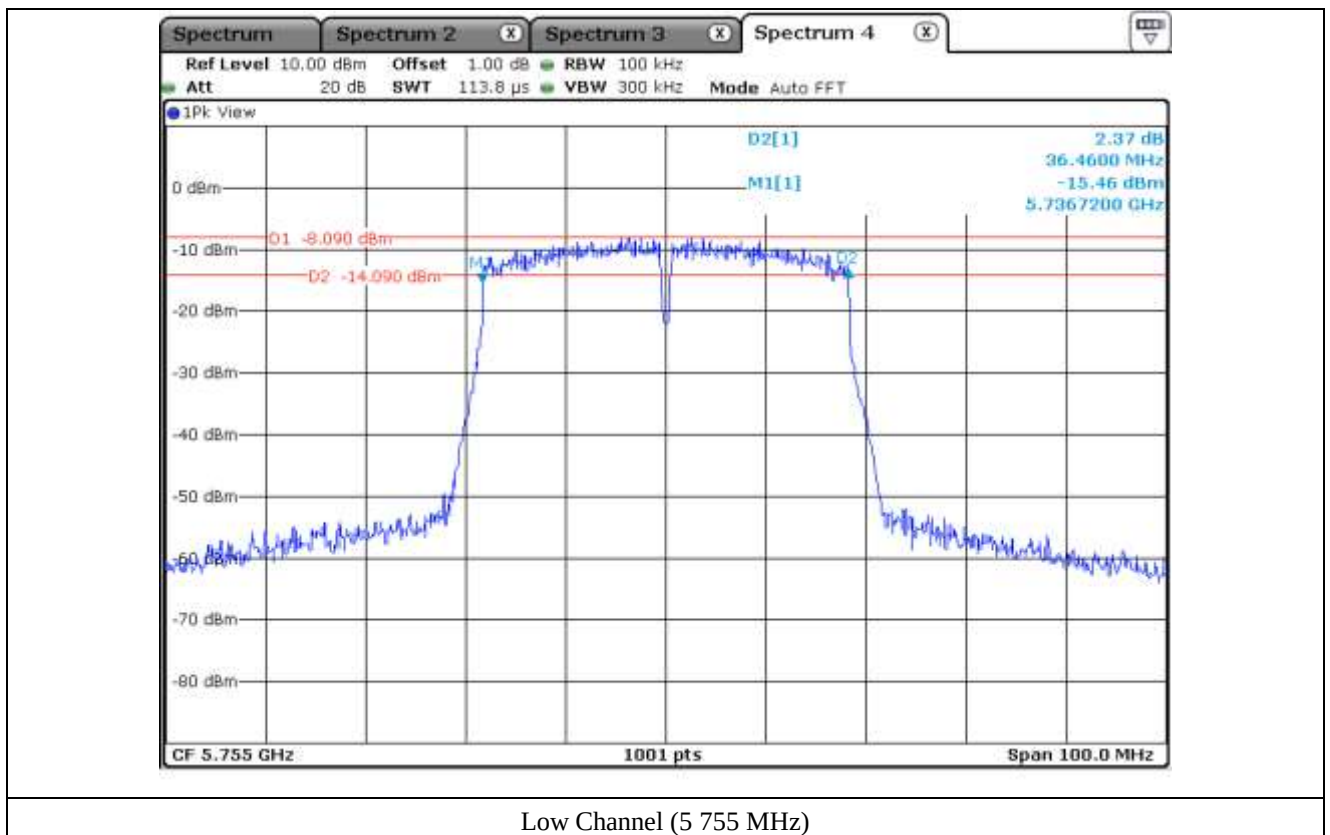
-. Test Result : Pass

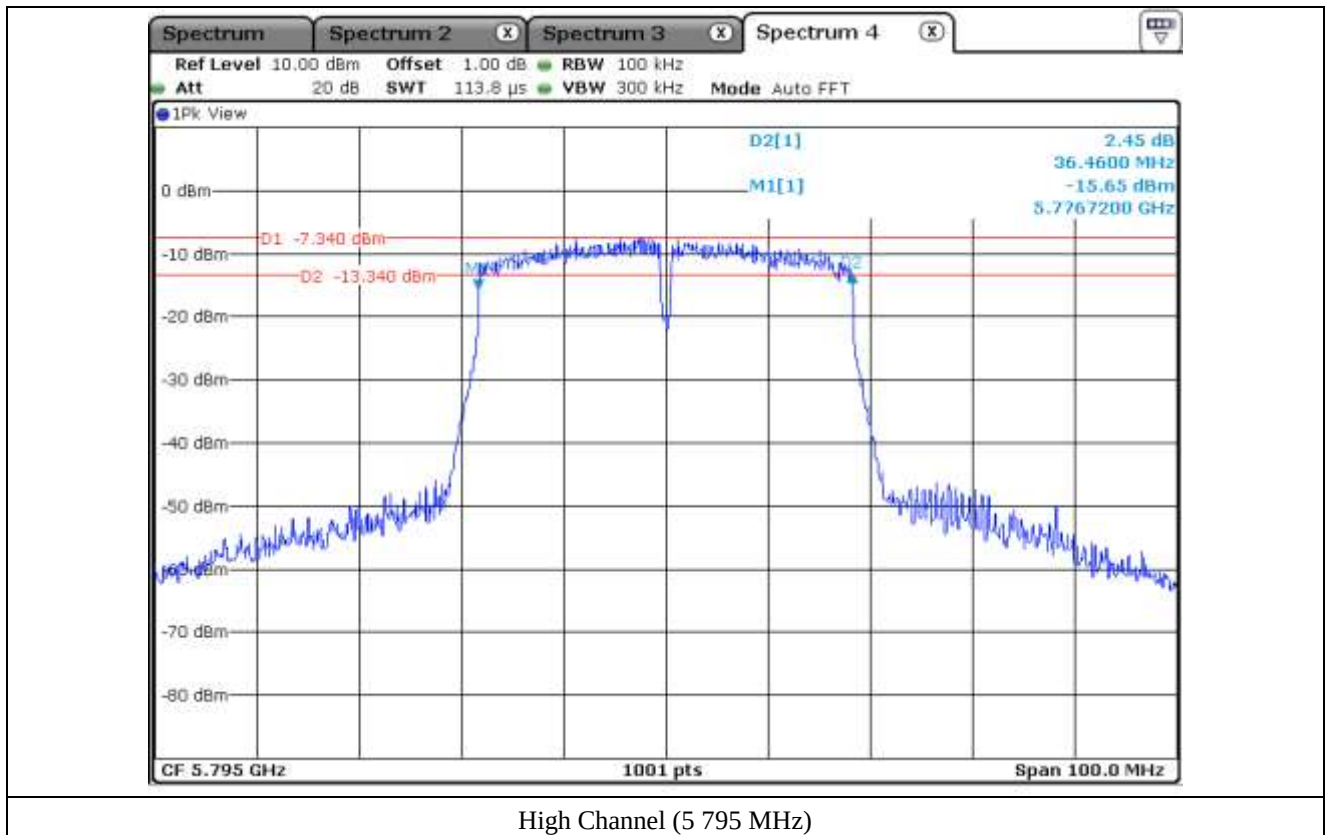
FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 755.00	36.46
	High	5 795.00	36.46

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager





8.7 Test data for 802.11ac_VHT80 RLAN Mode

8.7.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

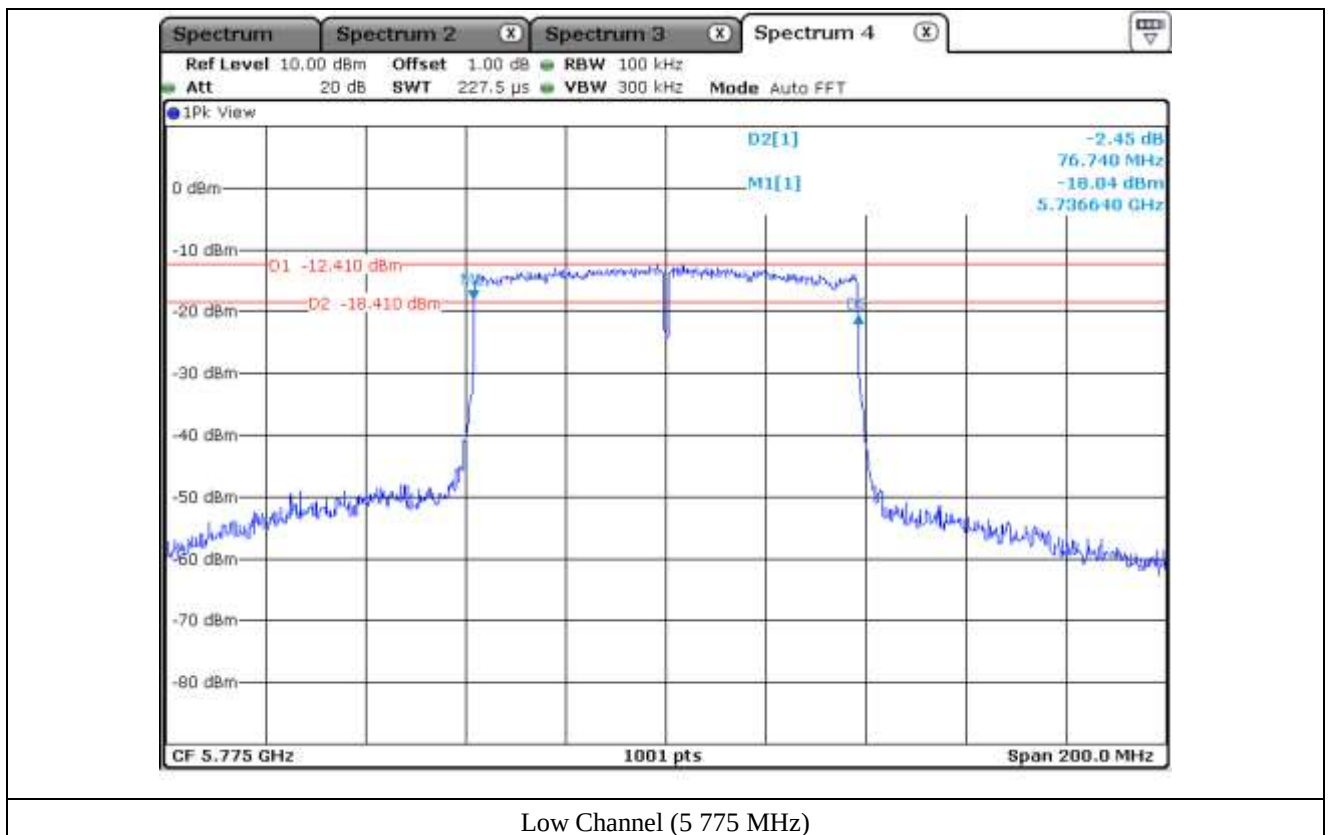
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 775.00	76.74

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



8.7.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

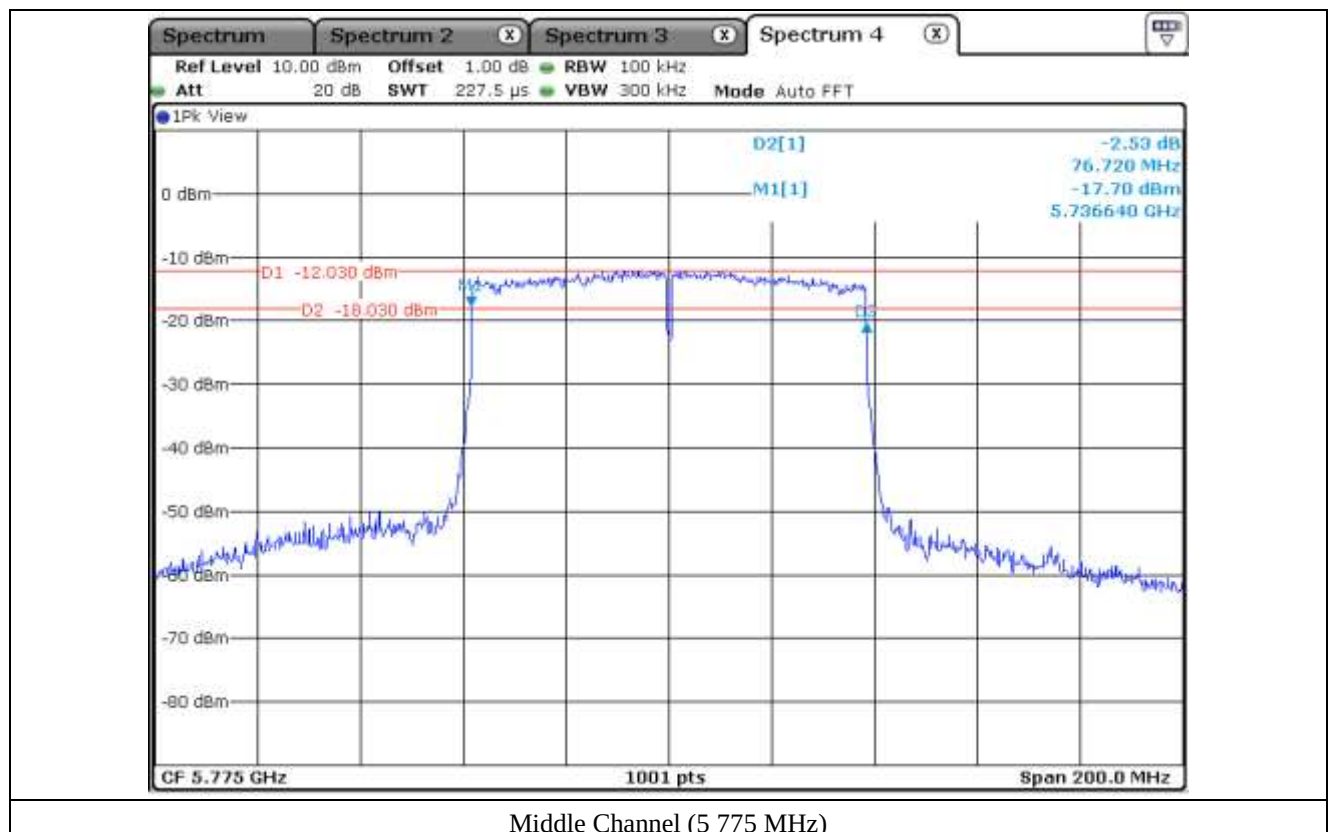
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)
5 725 ~ 5 850	Low	5 775.00	76.72

Remark: See next page for measurement data.

Ha-Ram, Lee

Tested by: Ha-Ram, Lee / Assistant Manager



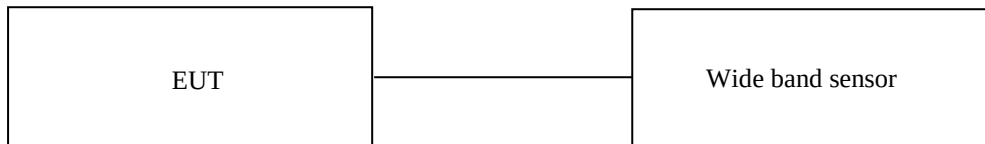
9. MAXIMUM PEAK OUTPUT POWER

9.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H.

9.2 Test set-up

The maximum peak output power was measured with the wide band sensor connected to the antenna output of the EUT.
The Wide Band Sensor is measured when the EUT is transmitting at the appropriate center frequency its maximum power control level as described in Section E. 3.(KDB 789033 D02 General UNII Test Procedures New Rules v02r01).
Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.



9.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - NRP-Z81	Rohde & Schwarz	Wide band Sensor	101975	Mar. 12, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

9.4 Test data for 802.11a RLAN Mode

9.4.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	11.23	24.00	12.77
	Middle	5 220.00	11.73	24.00	12.27
	High	5 240.00	11.35	24.00	12.65
5 250 ~ 5 350	Low	5 260.00	11.74	24.00	12.26
	Middle	5 300.00	11.98	24.00	12.02
	High	5 320.00	12.13	24.00	11.87
5 470 ~ 5 725	Low	5 500.00	11.84	24.00	12.16
	Middle	5 580.00	11.87	24.00	12.13
	High	5 700.00	11.93	24.00	12.07
5 725 ~ 5 850	Low	5 745.00	11.91	30.00	18.09
	Middle	5 785.00	11.98	30.00	18.02
	High	5 825.00	11.78	30.00	18.22

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.4.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	11.15	24.00	12.85
	Middle	5 220.00	11.46	24.00	12.54
	High	5 240.00	11.11	24.00	12.89
5 250 ~ 5 350	Low	5 260.00	11.45	24.00	12.55
	Middle	5 300.00	11.69	24.00	12.31
	High	5 320.00	11.85	24.00	12.15
5 470 ~ 5 725	Low	5 500.00	12.02	24.00	11.98
	Middle	5 580.00	12.07	24.00	11.93
	High	5 700.00	12.09	24.00	11.91
5 725 ~ 5 850	Low	5 745.00	12.13	30.00	17.87
	Middle	5 785.00	12.16	30.00	17.84
	High	5 825.00	12.03	30.00	17.97

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.4.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	14.20	24.00	9.80
	Middle	5 220.00	14.61	24.00	9.39
	High	5 240.00	14.24	24.00	9.76
5 250 ~ 5 350	Low	5 260.00	14.61	24.00	9.39
	Middle	5 300.00	14.85	24.00	9.15
	High	5 320.00	15.00	24.00	9.00
5 470 ~ 5 725	Low	5 500.00	14.94	24.00	9.06
	Middle	5 580.00	14.98	24.00	9.02
	High	5 700.00	15.02	24.00	8.98
5 725 ~ 5 850	Low	5 745.00	15.03	30.00	14.97
	Middle	5 785.00	15.08	30.00	14.92
	High	5 825.00	14.92	30.00	15.08

Remark 1: Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)

Remark 2: Calculated Output Power= $10\log(10^{(\text{Antenna0 Output Power}/10)} + 10^{(\text{Antenna1 Output Power}/10)})$



Tested by: Ha-Ram, Lee / Assistant Manager

9.4.4 Test data for Staddle Channel_Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	10.89	24.00	13.11
5 725 ~ 5 825	5 720.00	3.57	30.00	26.43

9.4.5 Test data for Staddle Channel_Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	11.19	24.00	12.81
5 725 ~ 5 825	5 720.00	4.09	30.00	25.91

9.4.6 Test data for Staddle Channel_Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	14.05	24.00	9.95
5 725 ~ 5 825	5 720.00	6.85	30.00	23.15

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: Ha-Ram, Lee / Assistant Manager

9.5 Test data for 802.11n_HT20 RLAN Mode

9.5.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	10.06	24.00	13.94
	Middle	5 220.00	10.58	24.00	13.42
	High	5 240.00	10.46	24.00	13.54
5 250 ~ 5 350	Low	5 260.00	10.76	24.00	13.24
	Middle	5 300.00	10.80	24.00	13.20
	High	5 320.00	10.74	24.00	13.26
5 470 ~ 5 725	Low	5 500.00	10.21	24.00	13.79
	Middle	5 580.00	10.72	24.00	13.28
	High	5 700.00	10.59	24.00	13.41
5 725 ~ 5 850	Low	5 745.00	10.74	30.00	19.26
	Middle	5 785.00	10.75	30.00	19.25
	High	5 825.00	10.56	30.00	19.44

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.5.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	9.96	24.00	14.04
	Middle	5 220.00	10.27	24.00	13.73
	High	5 240.00	10.07	24.00	13.93
5 250 ~ 5 350	Low	5 260.00	10.08	24.00	13.92
	Middle	5 300.00	10.29	24.00	13.71
	High	5 320.00	10.42	24.00	13.58
5 470 ~ 5 725	Low	5 500.00	10.81	24.00	13.19
	Middle	5 580.00	10.95	24.00	13.05
	High	5 700.00	11.10	24.00	12.90
5 725 ~ 5 850	Low	5 745.00	11.39	30.00	18.61
	Middle	5 785.00	11.26	30.00	18.74
	High	5 825.00	11.30	30.00	18.70

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.5.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	13.02	24.00	10.98
	Middle	5 220.00	13.44	24.00	10.56
	High	5 240.00	13.28	24.00	10.72
5 250 ~ 5 350	Low	5 260.00	13.44	24.00	10.56
	Middle	5 300.00	13.56	24.00	10.44
	High	5 320.00	13.59	24.00	10.41
5 470 ~ 5 725	Low	5 500.00	13.53	24.00	10.47
	Middle	5 580.00	13.85	24.00	10.15
	High	5 700.00	13.86	24.00	10.14
5 725 ~ 5 850	Low	5 745.00	14.09	30.00	15.91
	Middle	5 785.00	14.02	30.00	15.98
	High	5 825.00	13.96	30.00	16.04

Remark 1: Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)

Remark 2: Calculated Output Power= $10\log(10^{(\text{Antenna0 Output Power}/10)} + 10^{(\text{Antenna1 Output Power}/10)})$



Tested by: Ha-Ram, Lee / Assistant Manager

9.5.4 Test data for Staddle Channel_Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	10.44	24.00	13.56
5 725 ~ 5 825	5 720.00	3.57	30.00	26.43

9.5.5 Test data for Staddle Channel_Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	10.83	24.00	13.17
5 725 ~ 5 825	5 720.00	3.89	30.00	26.11

9.5.6 Test data for Staddle Channel_Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	13.65	24.00	10.35
5 725 ~ 5 825	5 720.00	6.74	30.00	23.26

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: Ha-Ram, Lee / Assistant Manager

9.6 Test data for 802.11n_HT40 RLAN Mode

9.6.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	9.09	24.00	14.91
	High	5 230.00	9.20	24.00	14.80
5 250 ~ 5 350	Low	5 270.00	9.64	24.00	14.36
	High	5 310.00	9.80	24.00	14.20
5 470 ~ 5 725	Low	5 510.00	8.94	24.00	15.06
	Middle	5 550.00	9.11	24.00	14.89
	High	5 670.00	8.87	24.00	15.13
5 725 ~ 5 850	Low	5 755.00	9.56	30.00	20.44
	High	5 795.00	9.37	30.00	20.63

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.6.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	8.77	24.00	15.23
	High	5 230.00	8.87	24.00	15.13
5 250 ~ 5 350	Low	5 270.00	8.71	24.00	15.29
	High	5 310.00	9.22	24.00	14.78
5 470 ~ 5 725	Low	5 510.00	9.45	24.00	14.55
	Middle	5 550.00	9.32	24.00	14.68
	High	5 670.00	9.23	24.00	14.77
5 725 ~ 5 850	Low	5 755.00	10.02	30.00	19.98
	High	5 795.00	9.96	30.00	20.04

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.6.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	11.94	24.00	12.06
	High	5 230.00	12.05	24.00	11.95
5 250 ~ 5 350	Low	5 270.00	12.21	24.00	11.79
	High	5 310.00	12.53	24.00	11.47
5 470 ~ 5 725	Low	5 510.00	12.21	24.00	11.79
	Middle	5 550.00	12.23	24.00	11.77
	High	5 670.00	12.06	24.00	11.94
5 725 ~ 5 850	Low	5 755.00	12.81	30.00	17.19
	High	5 795.00	12.69	30.00	17.31

Remark 1: Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)

Remark 2: Calculated Output Power= $10\log(10^{(\text{Antenna0 Output Power}/10)} + 10^{(\text{Antenna1 Output Power}/10)})$



Tested by: Ha-Ram, Lee / Assistant Manager

9.6.4 Test data for Staddle Channel_Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	9.48	24.00	14.52
5 725 ~ 5 825	5 710.00	-1.86	30.00	31.86

9.6.5 Test data for Staddle Channel_Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	9.83	24.00	14.17
5 725 ~ 5 825	5 710.00	-1.53	30.00	31.53

9.6.6 Test data for Staddle Channel_Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	12.67	24.00	11.33
5 725 ~ 5 825	5 710.00	1.32	30.00	28.68

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: Ha-Ram, Lee / Assistant Manager

9.7 Test data for 802.11ac_HT80 RLAN Mode

9.7.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	8.70	24.00	15.30
5 250 ~ 5 350	Low	5 290.00	9.26	24.00	14.74
5 470 ~ 5 725	Low	5 530.00	9.09	24.00	14.91
5 725 ~ 5 850	Low	5 775.00	9.15	24.00	15.13

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)

9.7.2 Test data for Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	8.43	24.00	15.57
5 250 ~ 5 350	Low	5 290.00	8.51	24.00	15.49
5 470 ~ 5 725	Low	5 530.00	9.20	24.00	14.80
5 725 ~ 5 850	Low	5 775.00	9.80	24.00	14.99

Remark : Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)



Tested by: Ha-Ram, Lee / Assistant Manager

9.7.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

-. Duty Cycle : > 98 %

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	11.58	24.00	12.42
5 250 ~ 5 350	Low	5 290.00	11.91	24.00	12.09
5 470 ~ 5 725	Low	5 530.00	12.16	24.00	11.84
5 725 ~ 5 850	Low	5 775.00	12.50	30.00	17.50

Remark 1: Margin = Limit – Measured Value (=Power Sensor Reading - Cable Loss)

Remark 2: Calculated Output Power= $10\log(10^{(\text{Antenna0 Output Power}/10)} + 10^{(\text{Antenna1 Output Power}/10)})$



Tested by: Ha-Ram, Lee / Assistant Manager

9.7.4 Test data for Staddle Channel_Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	8.78	24.00	15.22
5 725 ~ 5 825	5 690.00	-5.51	30.00	35.51

9.7.5 Test data for Staddle Channel_Antenna 1

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	8.98	24.00	15.02
5 725 ~ 5 825	5 690.00	-5.42	30.00	35.42

9.7.6 Test data for Staddle Channel_Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	11.89	24.00	11.78
5 725 ~ 5 825	5 690.00	-2.45	30.00	32.12

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: Ha-Ram, Lee / Assistant Manager

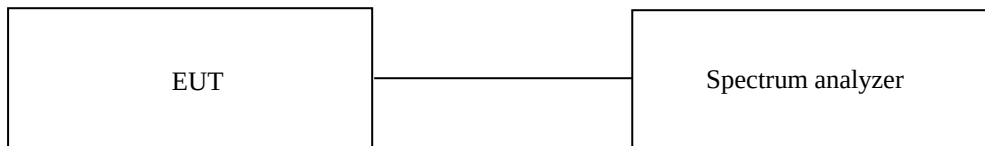
10. PEAK POWER SPECTRAL DENSITY

10.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % R.H.

10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 times the resolution bandwidth. The maximum level from the EUT in 1 MHz bandwidth was measured with above condition.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

10.4 Test data for 802.11a RLAN Mode

10.4.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Operating condition : Highest Output Power Transmitting Mode

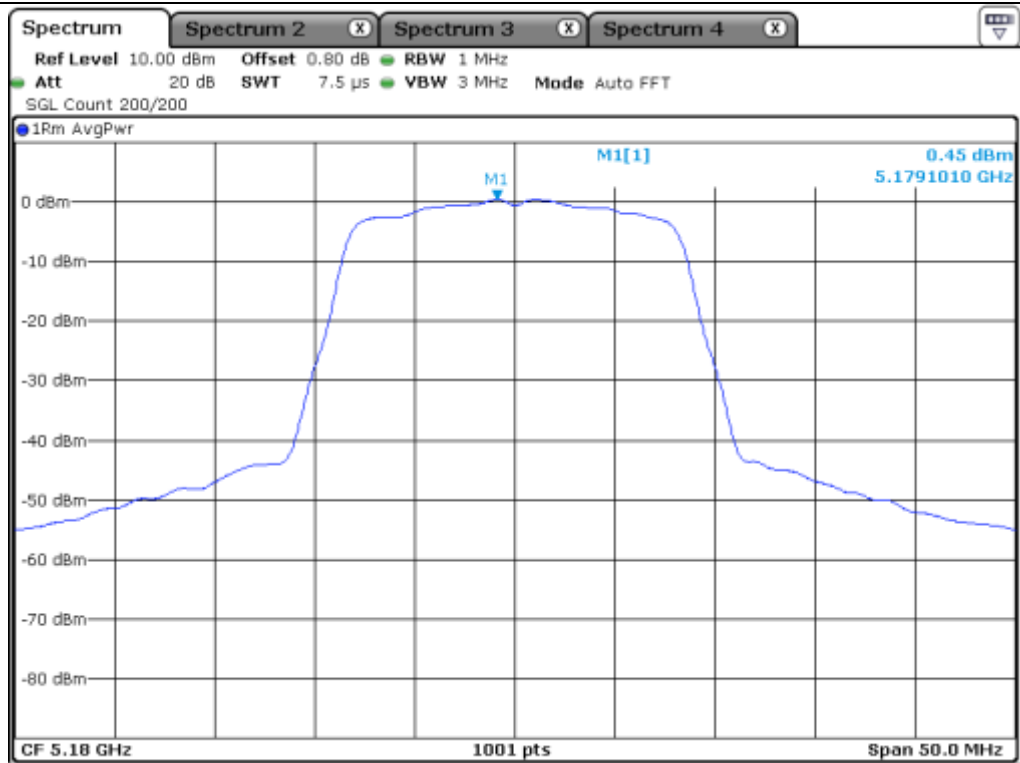
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	0.45	11.00	10.55
	Middle	5 220.00	0.21	11.00	10.79
	High	5 240.00	-0.26	11.00	11.26
5 250 ~ 5 350	Low	5 260.00	0.26	11.00	10.74
	Middle	5 300.00	0.49	11.00	10.51
	High	5 320.00	0.55	11.00	10.45
5 470 ~ 5 725	Low	5 500.00	0.64	11.00	10.36
	Middle	5 580.00	0.86	11.00	10.14
	High	5 700.00	0.06	11.00	10.94
5 725 ~ 5 850	Low	5 745.00	-2.81	30.00	32.81
	Middle	5 785.00	-2.68	30.00	32.68
	High	5 825.00	-2.83	30.00	32.83

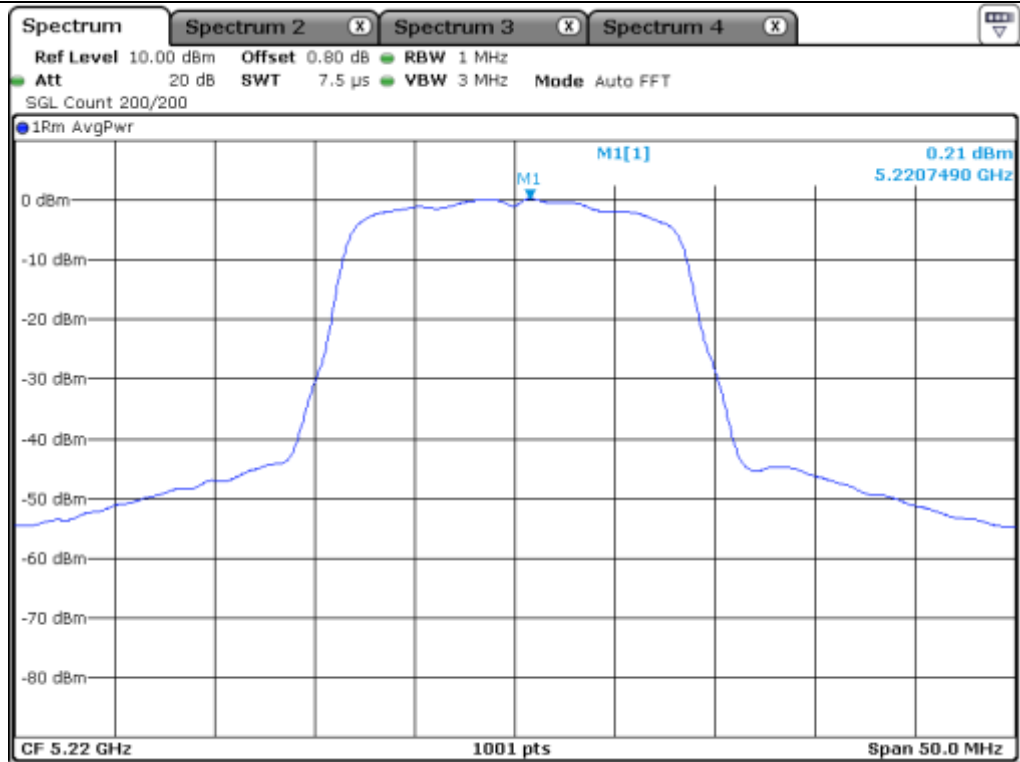
Remark: See next page for measurement data.



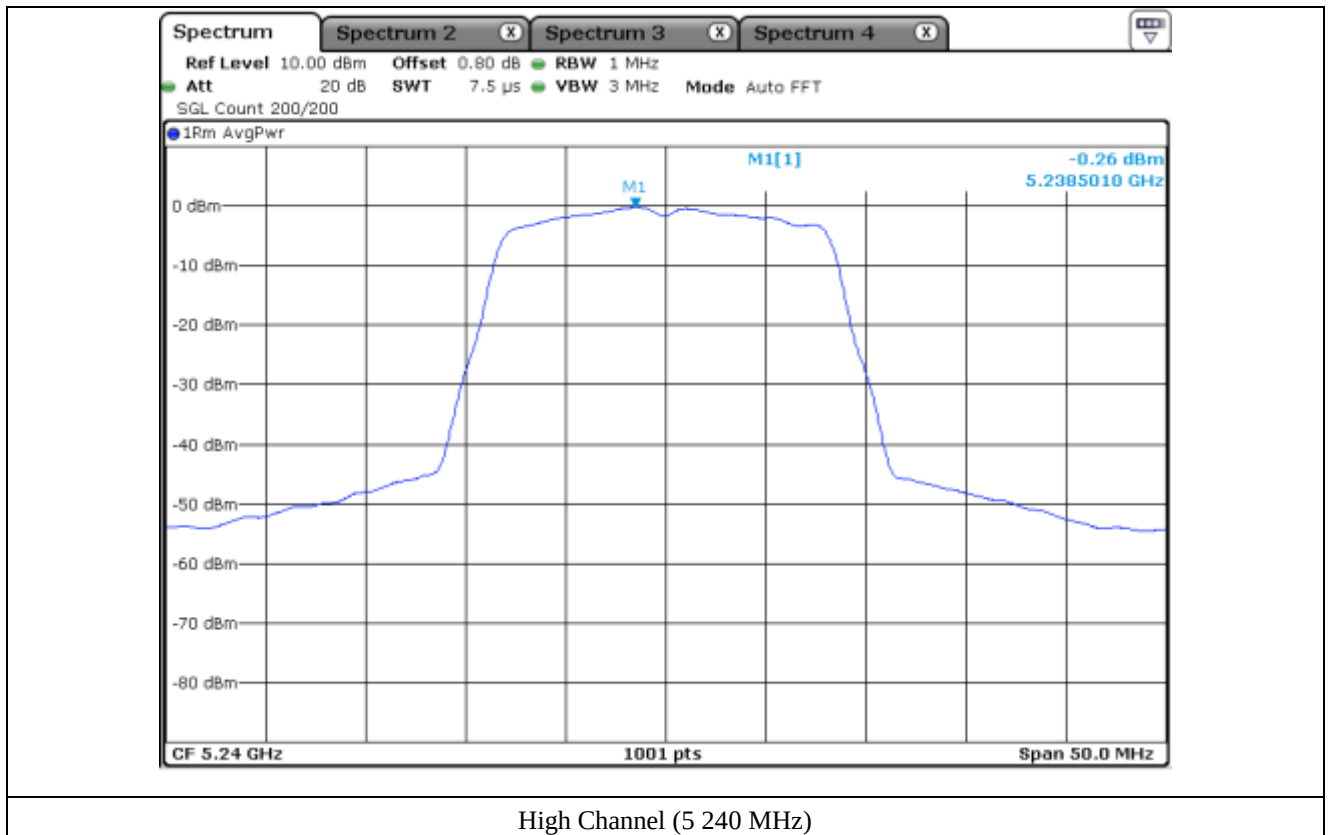
Tested by: Ha-Ram, Lee / Assistant Manager

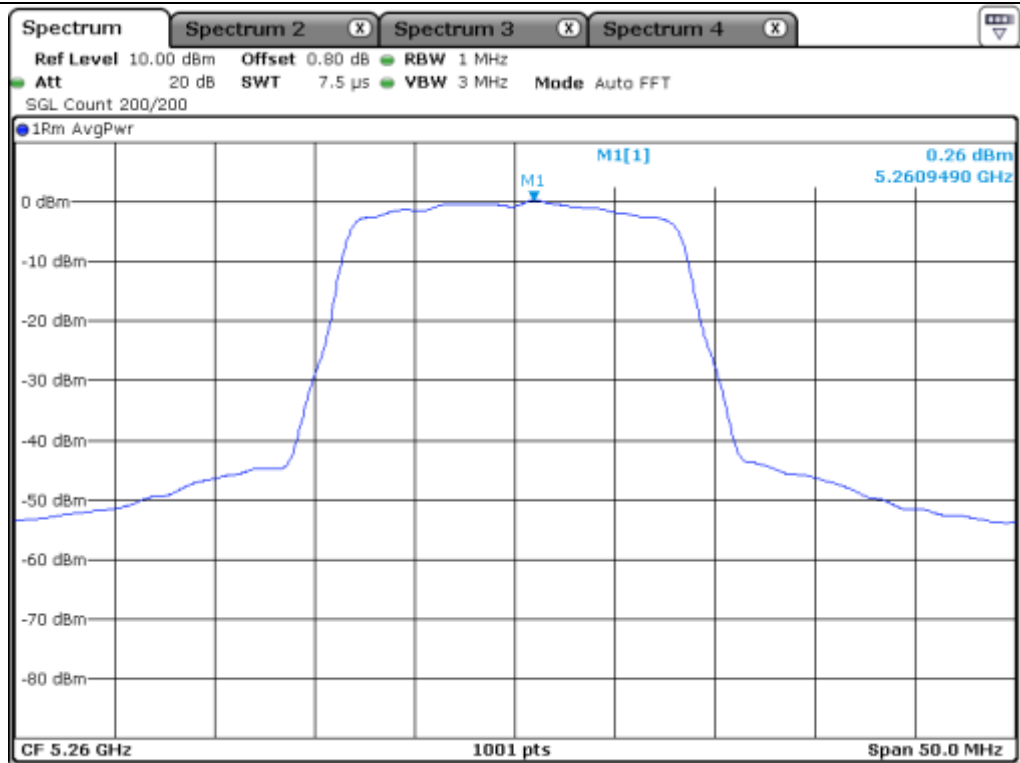


Low Channel (5 180 MHz)

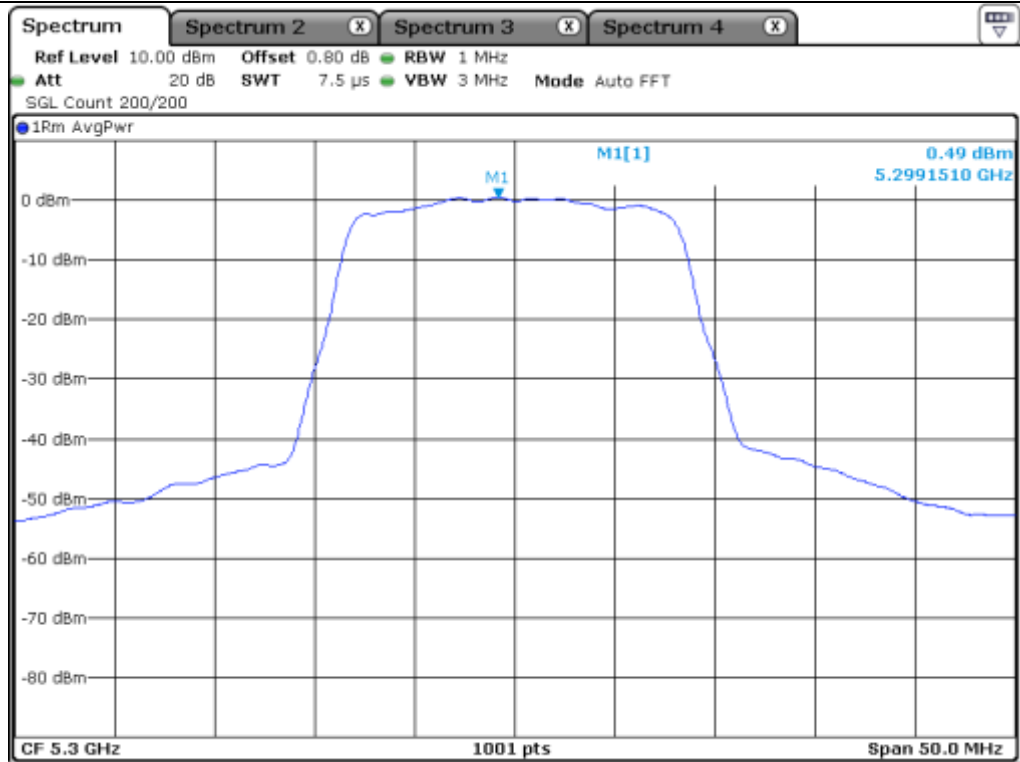


Middle Channel (5 220 MHz)

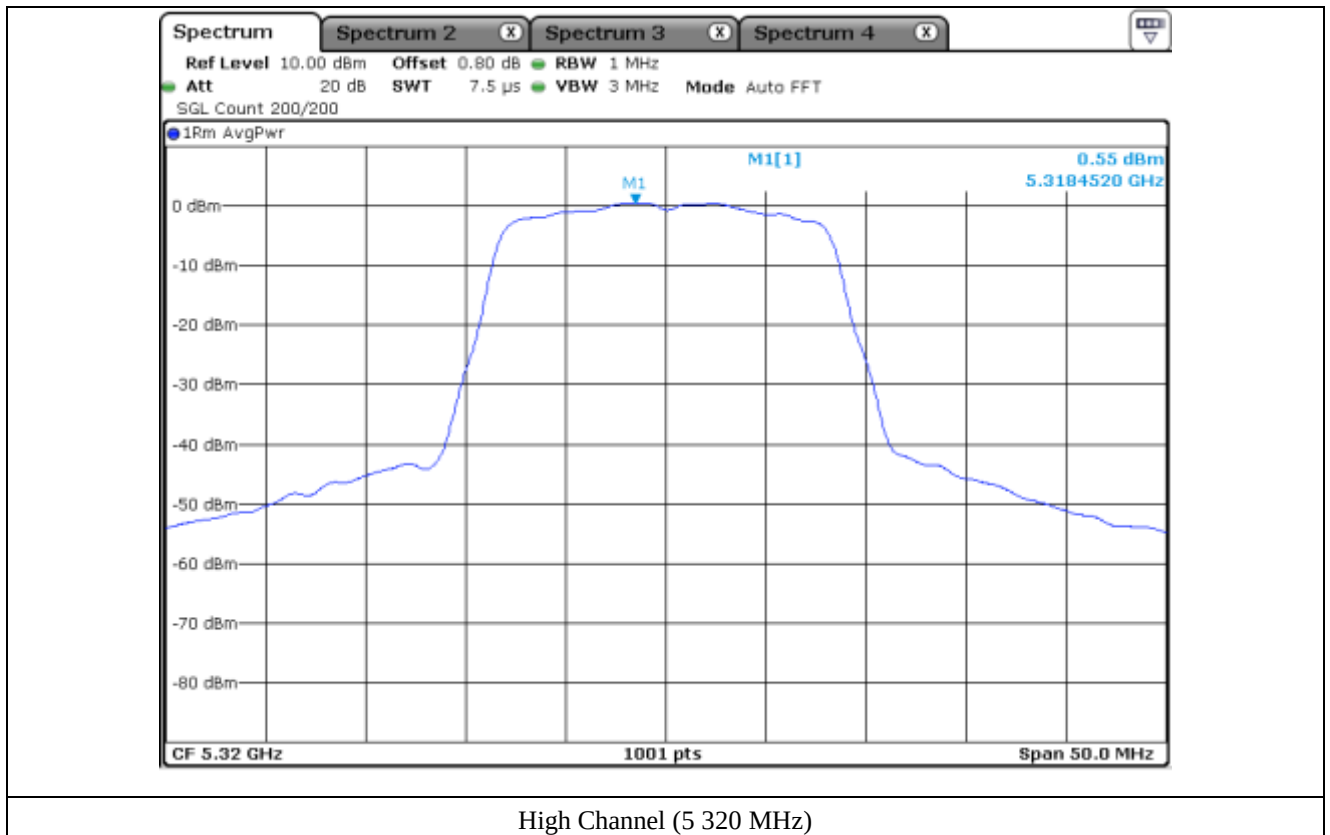


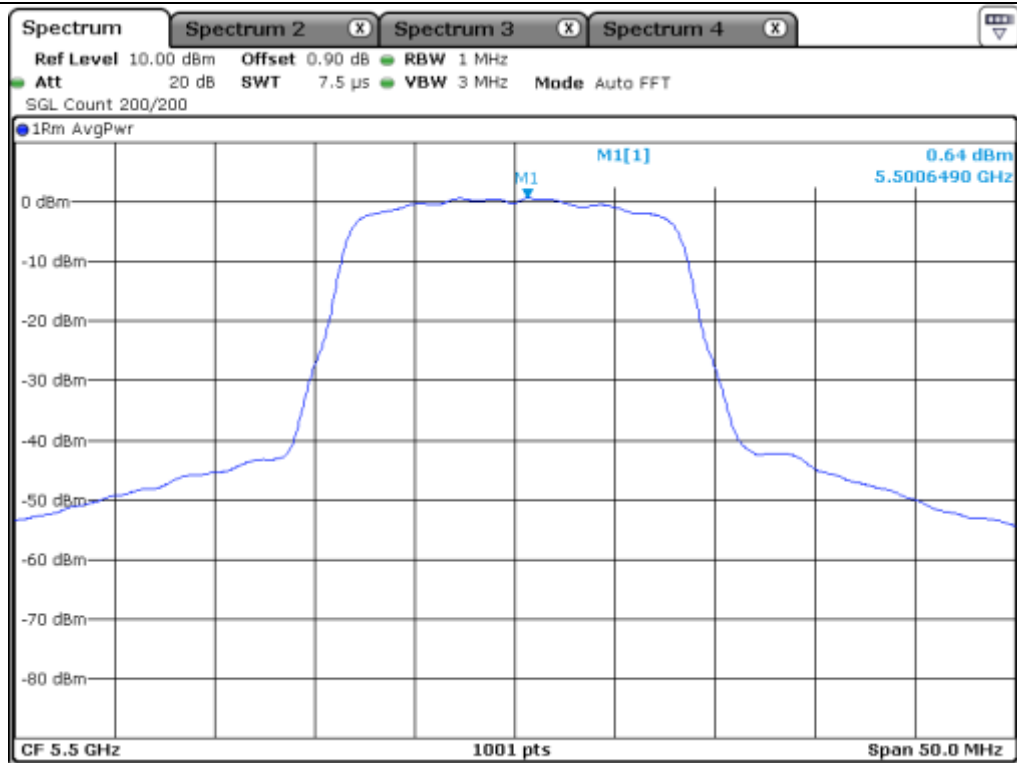


Low Channel (5 260 MHz)

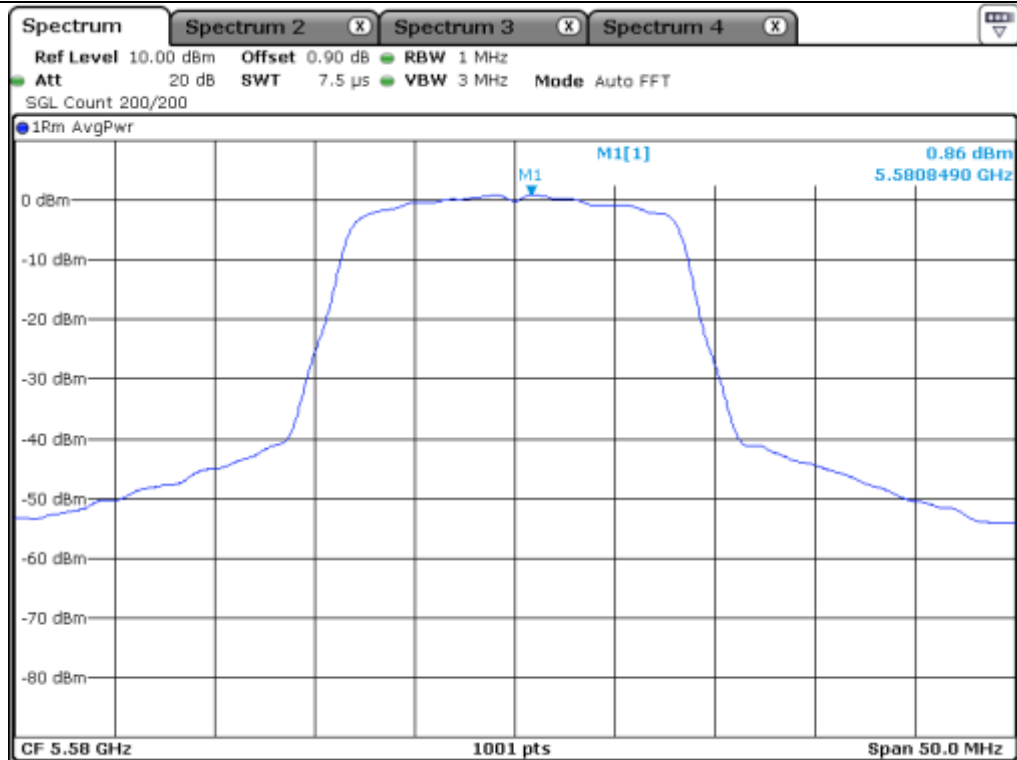


Middle Channel (5 300 MHz)

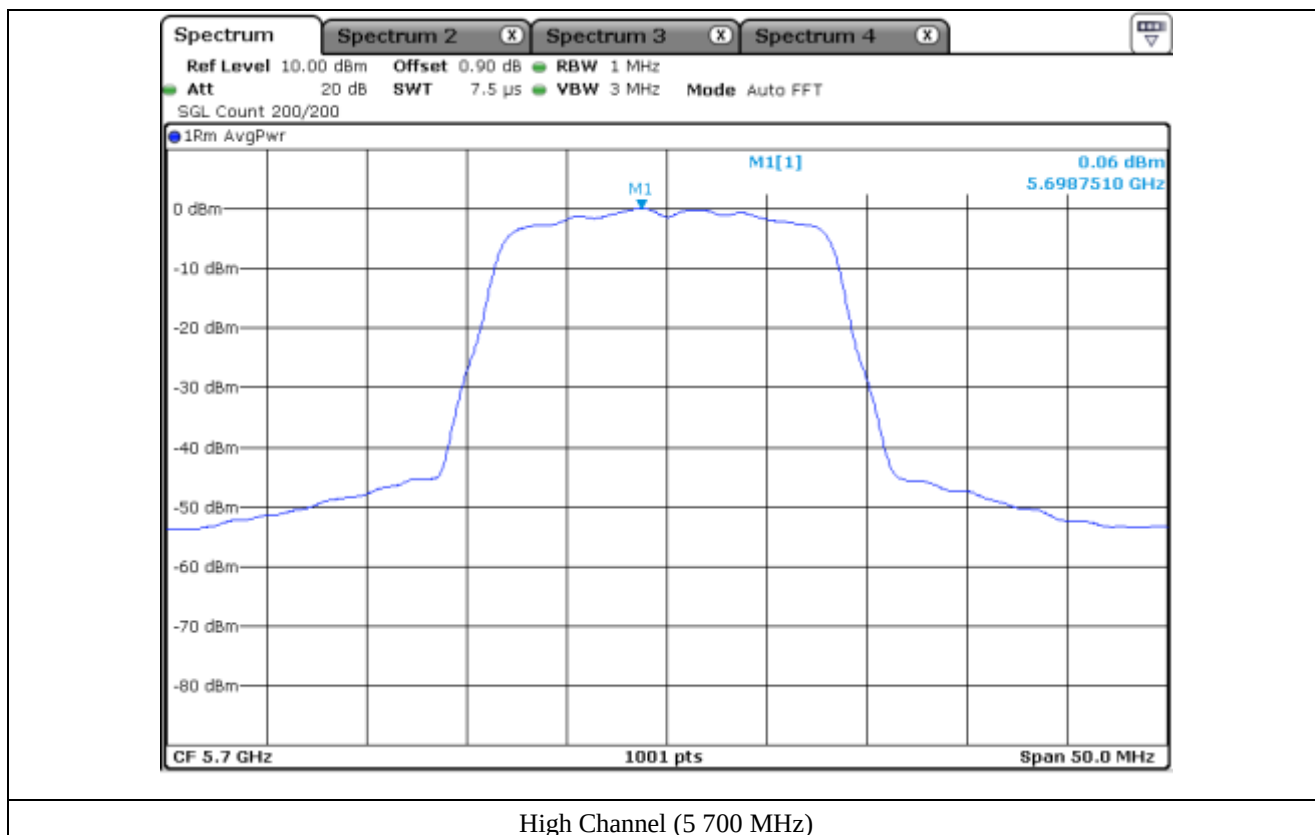


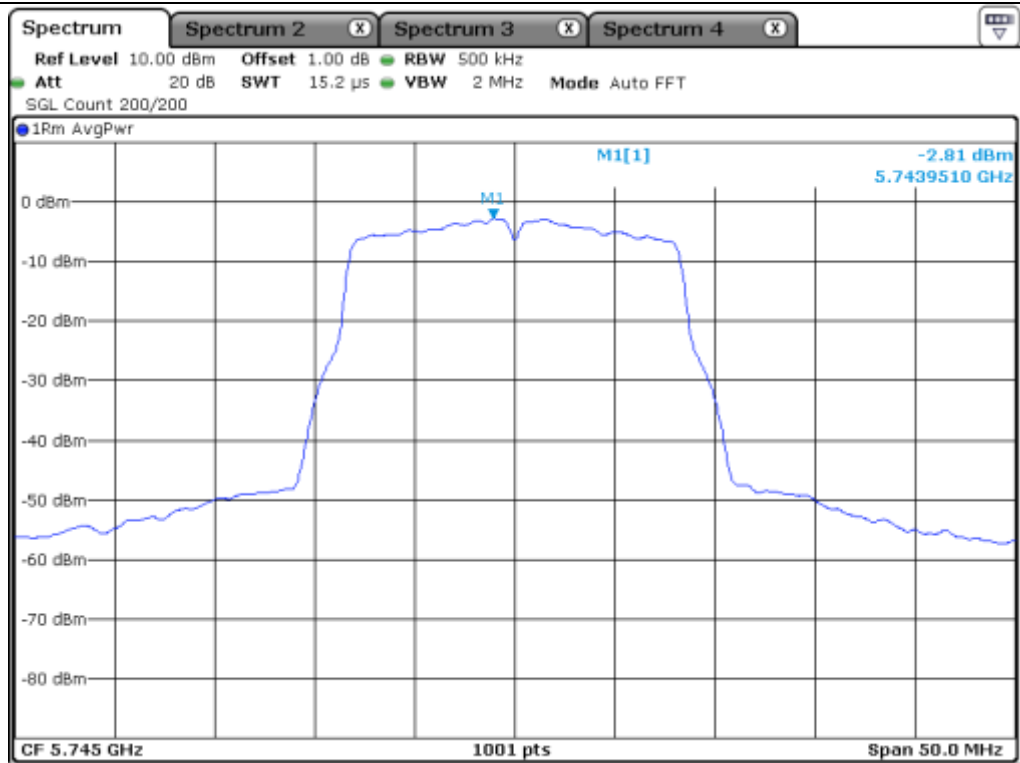


Low Channel (5 500 MHz)

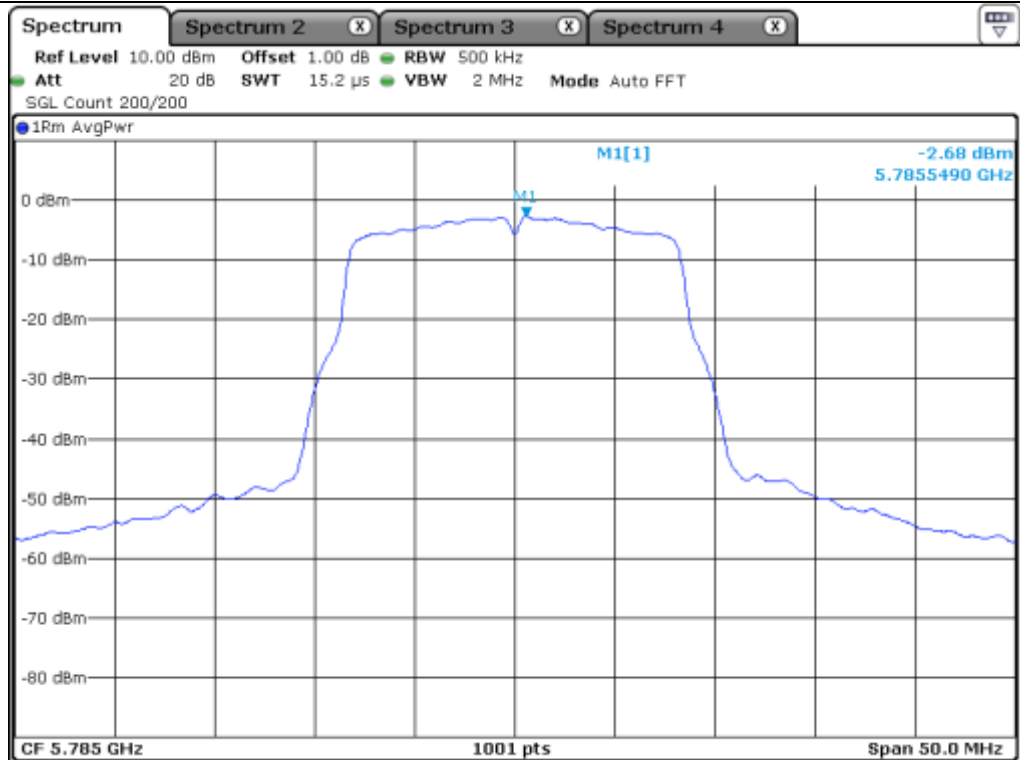


Middle Channel (5 580 MHz)

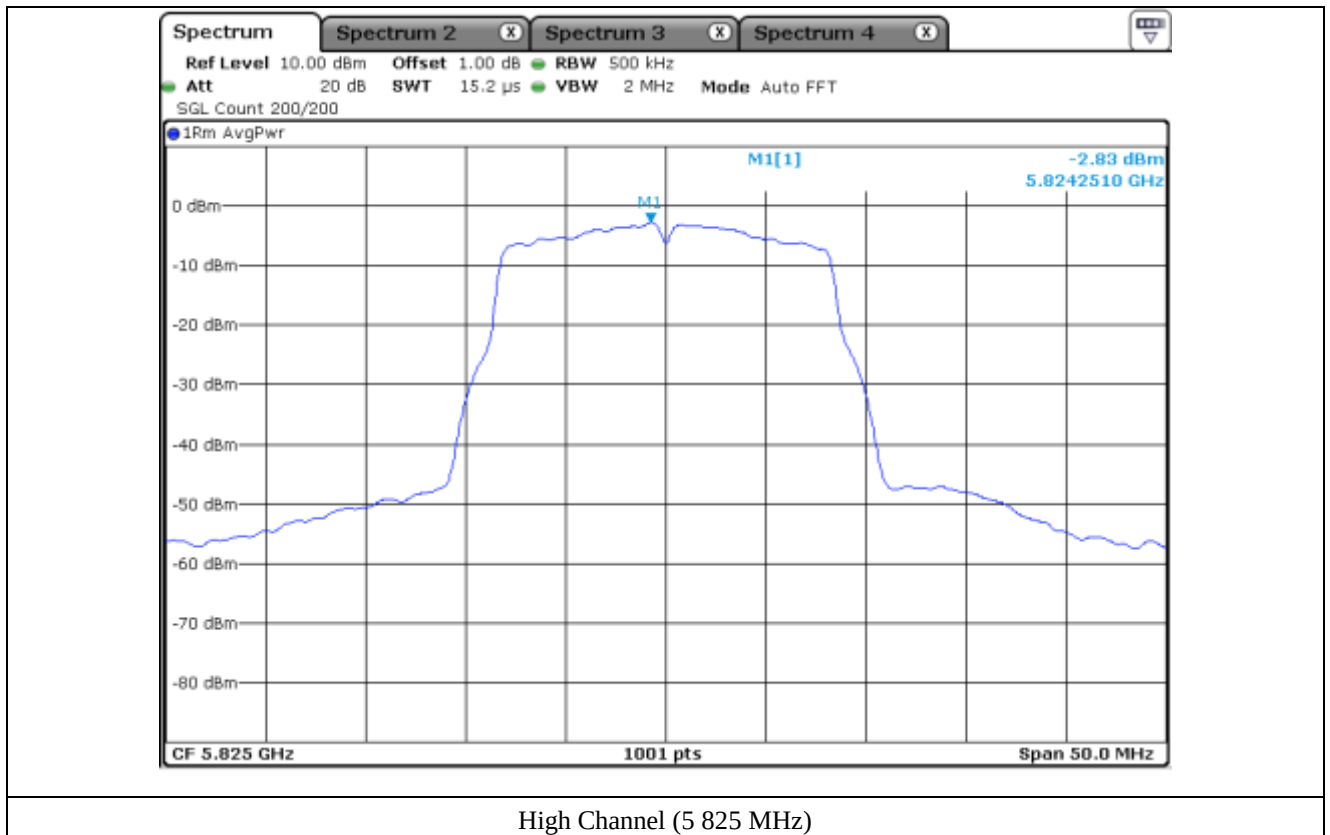




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.4.2 Test data for Antenna 1

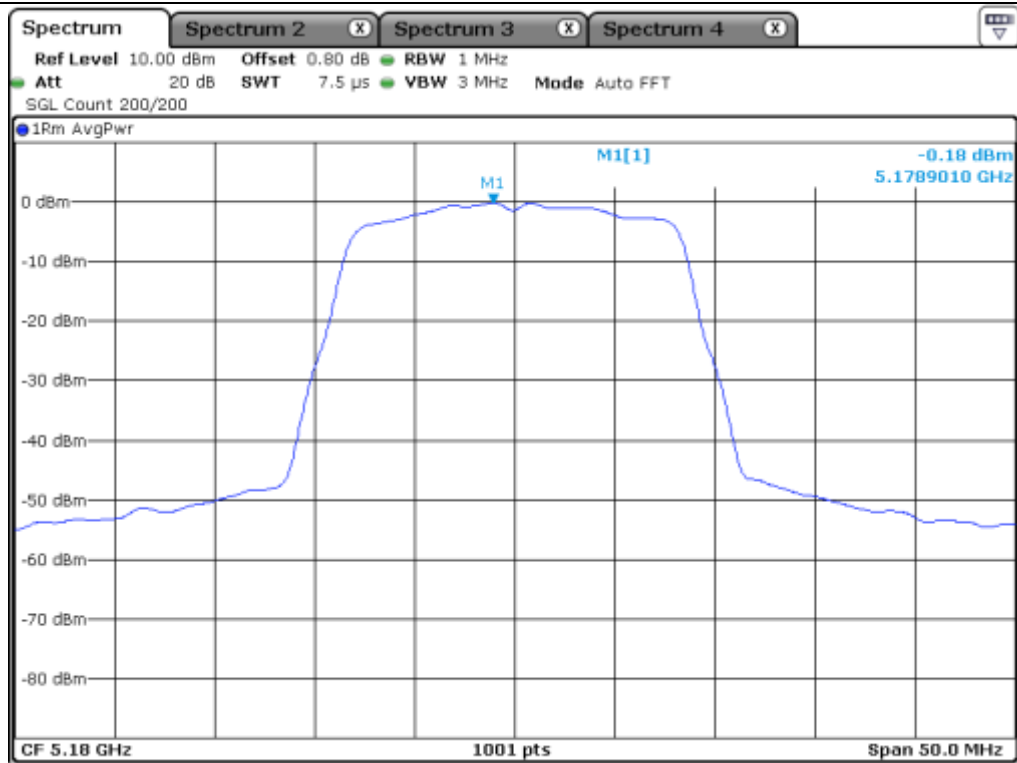
- . Test Date : December 02, 2019 ~ December 11, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	-0.18	11.00	11.18
	Middle	5 220.00	-0.39	11.00	11.39
	High	5 240.00	-0.43	11.00	11.43
5 250 ~ 5 350	Low	5 260.00	-0.29	11.00	11.29
	Middle	5 300.00	-0.13	11.00	11.13
	High	5 320.00	-0.21	11.00	11.21
5 470 ~ 5 725	Low	5 500.00	1.06	11.00	9.94
	Middle	5 580.00	1.08	11.00	9.92
	High	5 700.00	0.32	11.00	10.68
5 725 ~ 5 850	Low	5 745.00	-2.60	30.00	32.60
	Middle	5 785.00	-2.36	30.00	32.36
	High	5 825.00	-2.45	30.00	32.45

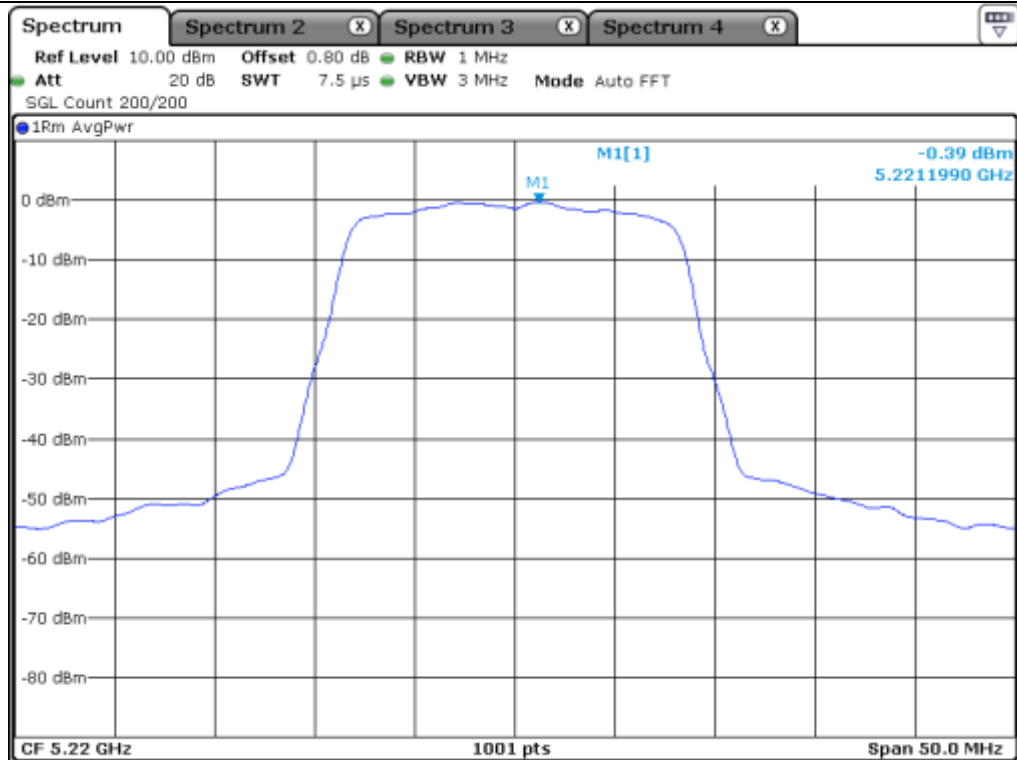
Remark: See next page for measurement data.



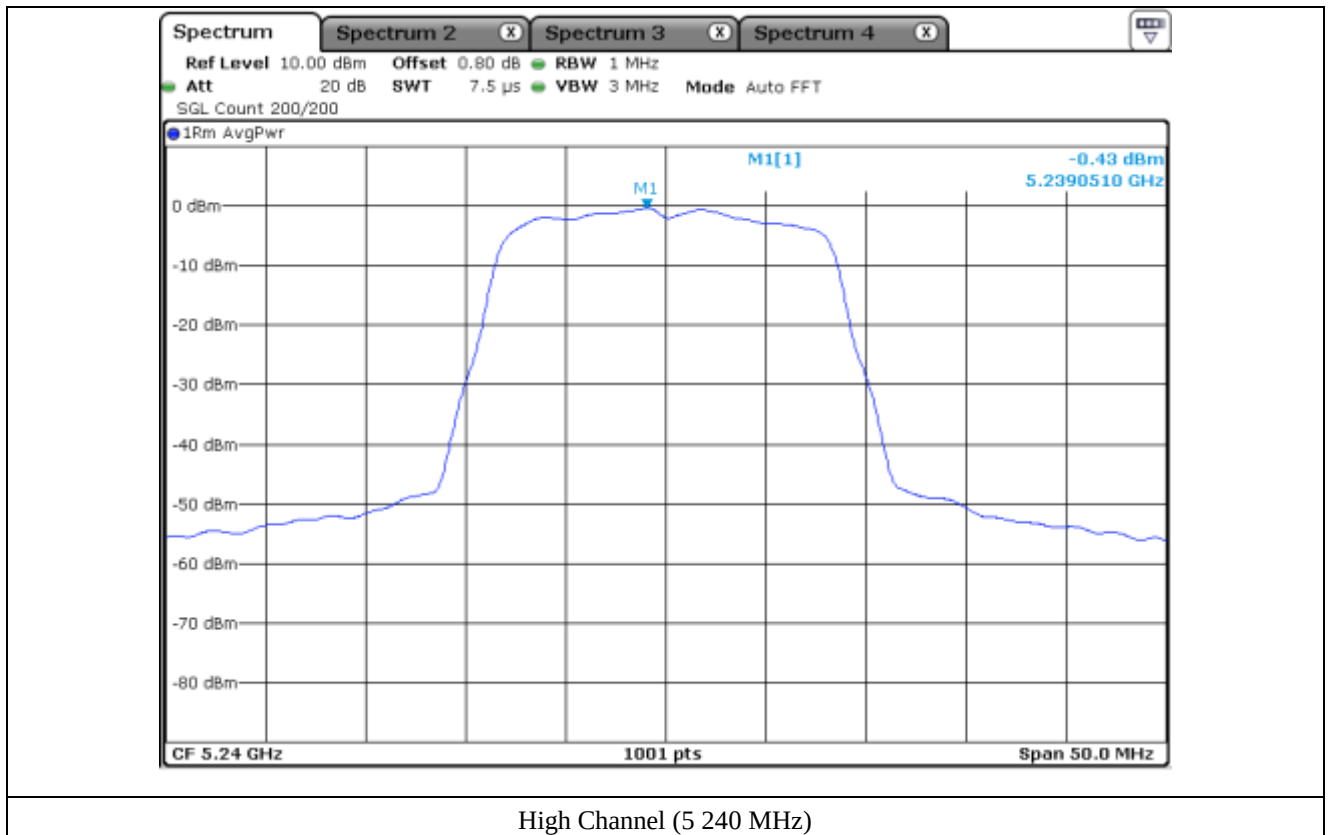
Tested by: Ha-Ram, Lee / Assistant Manager

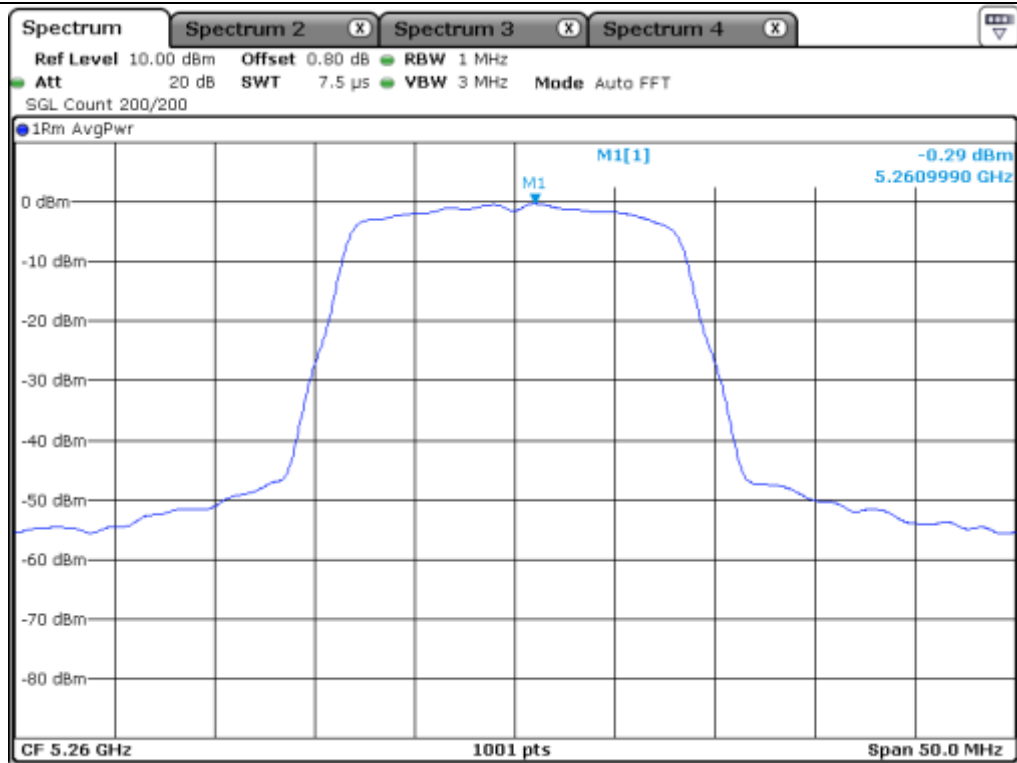


Low Channel (5 180 MHz)

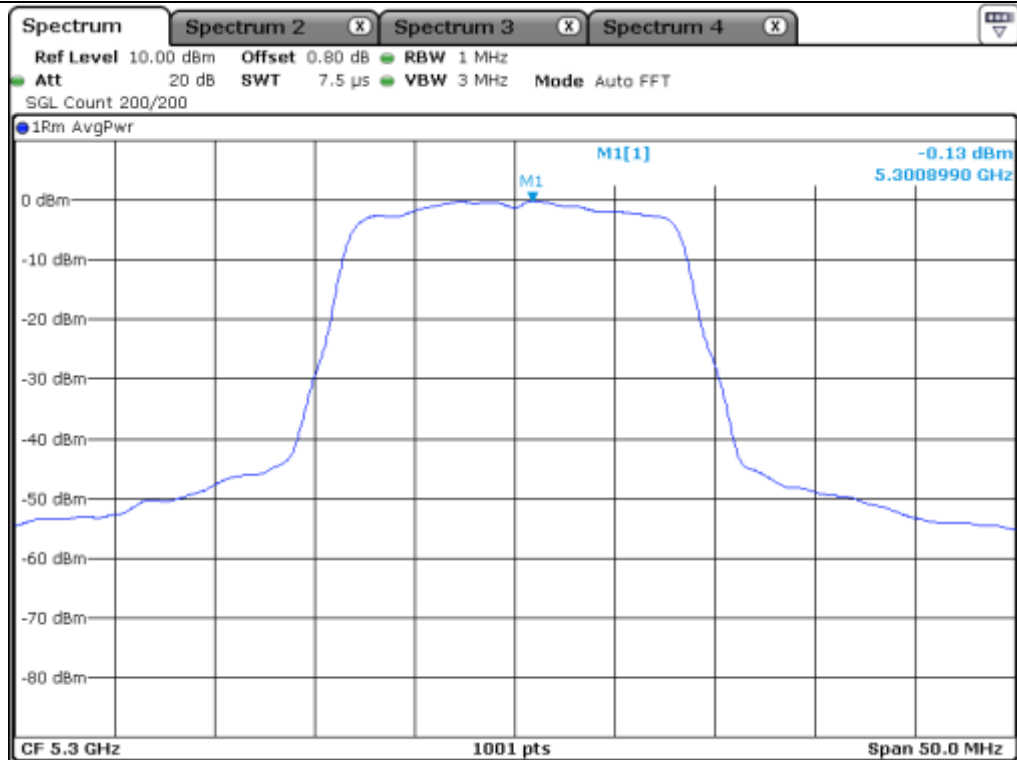


Middle Channel (5 220 MHz)

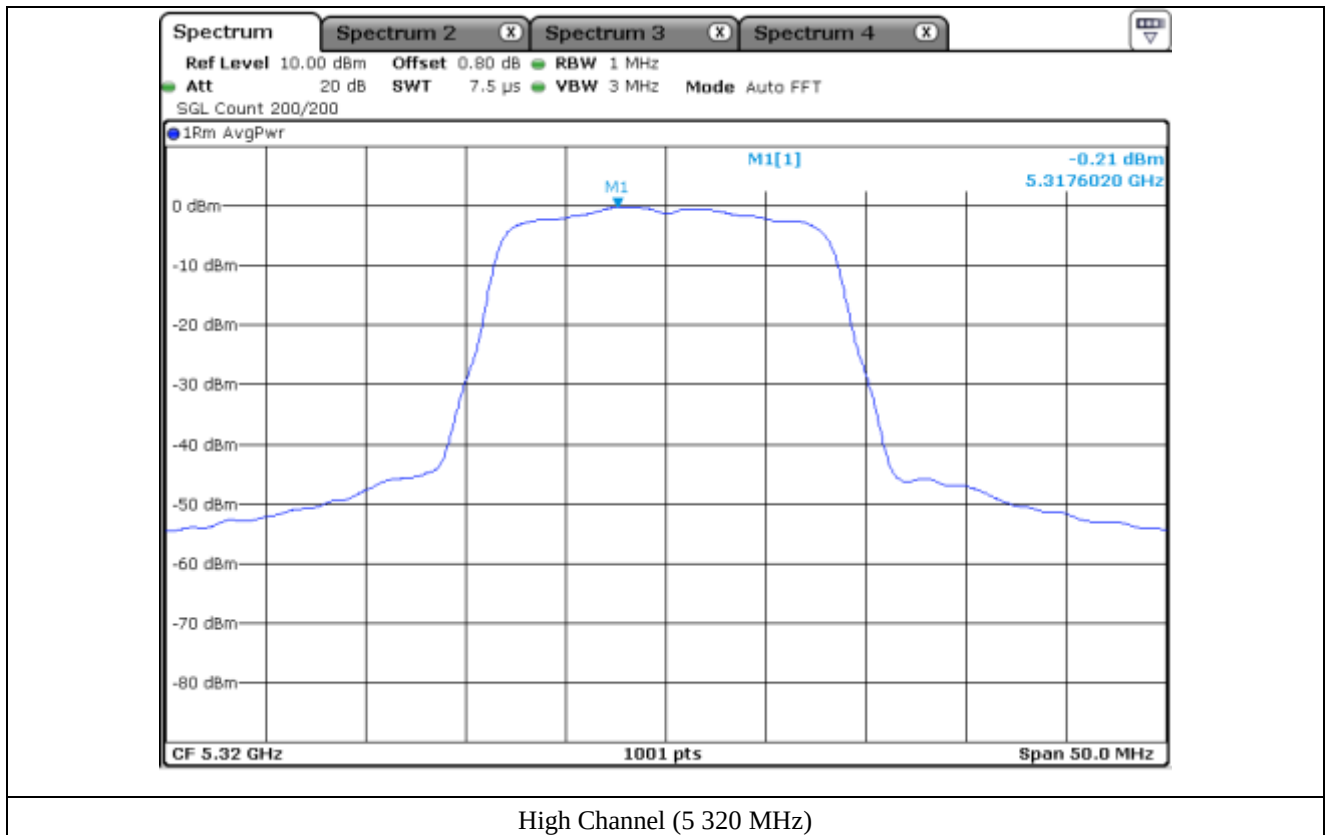


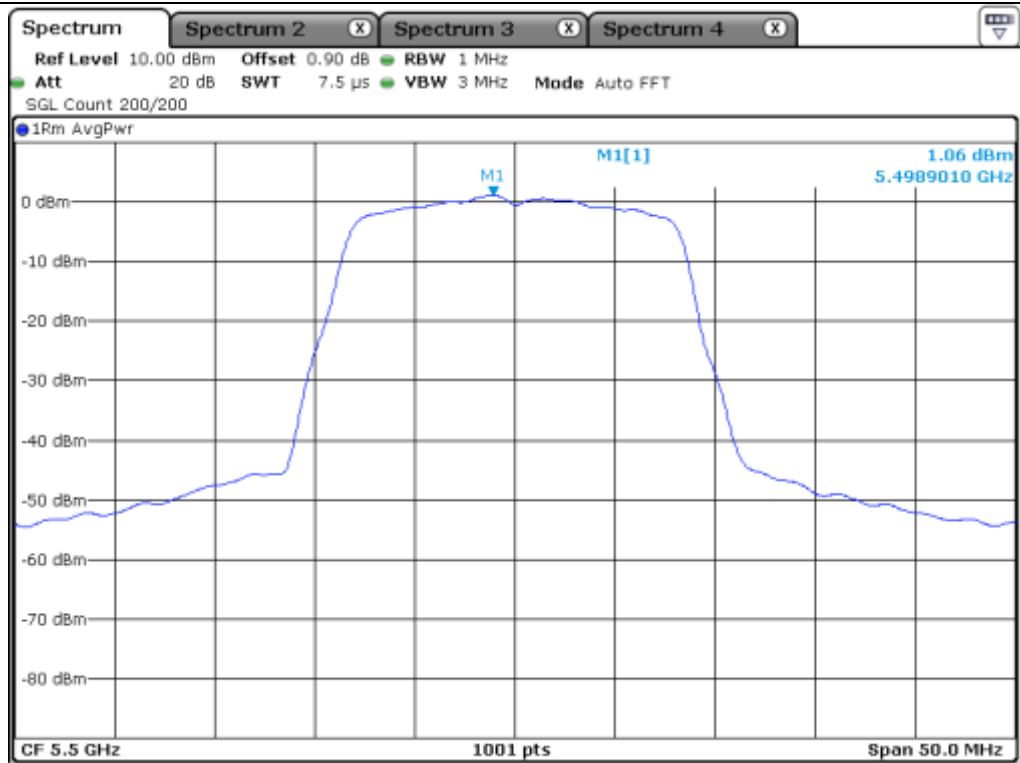


Low Channel (5 260 MHz)

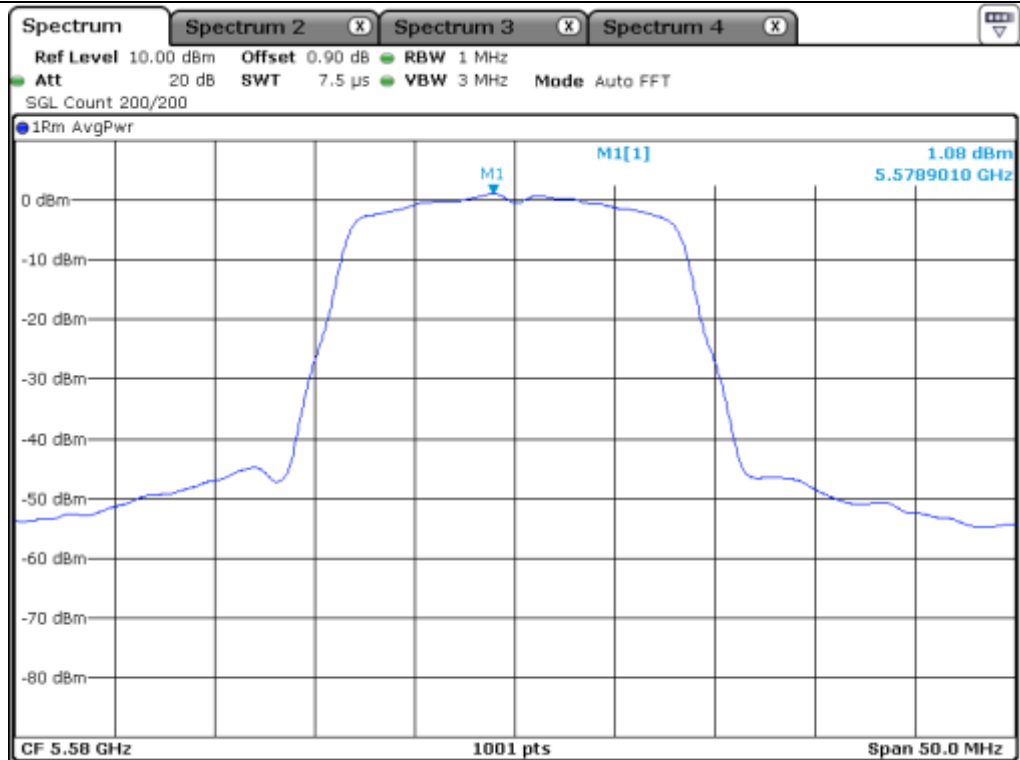


Middle Channel (5 300 MHz)

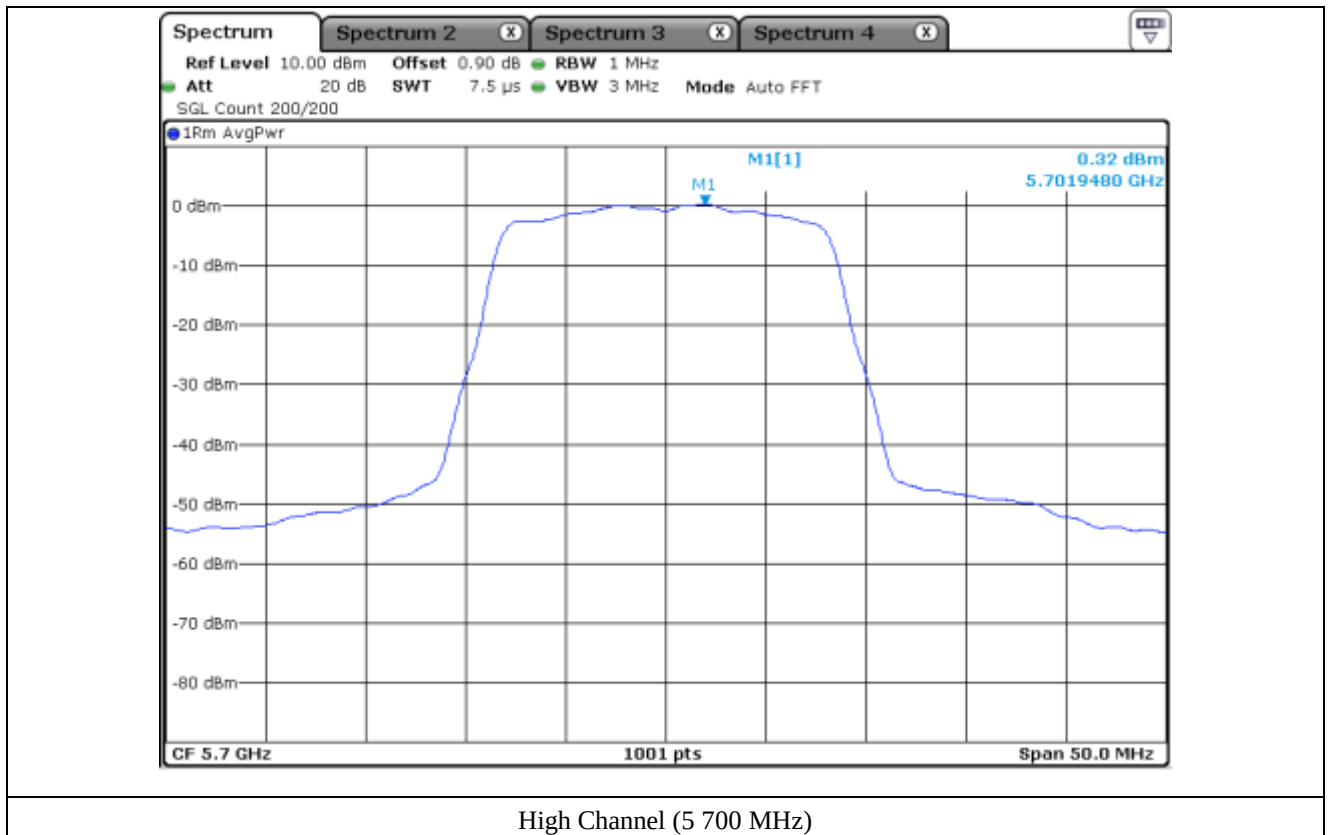


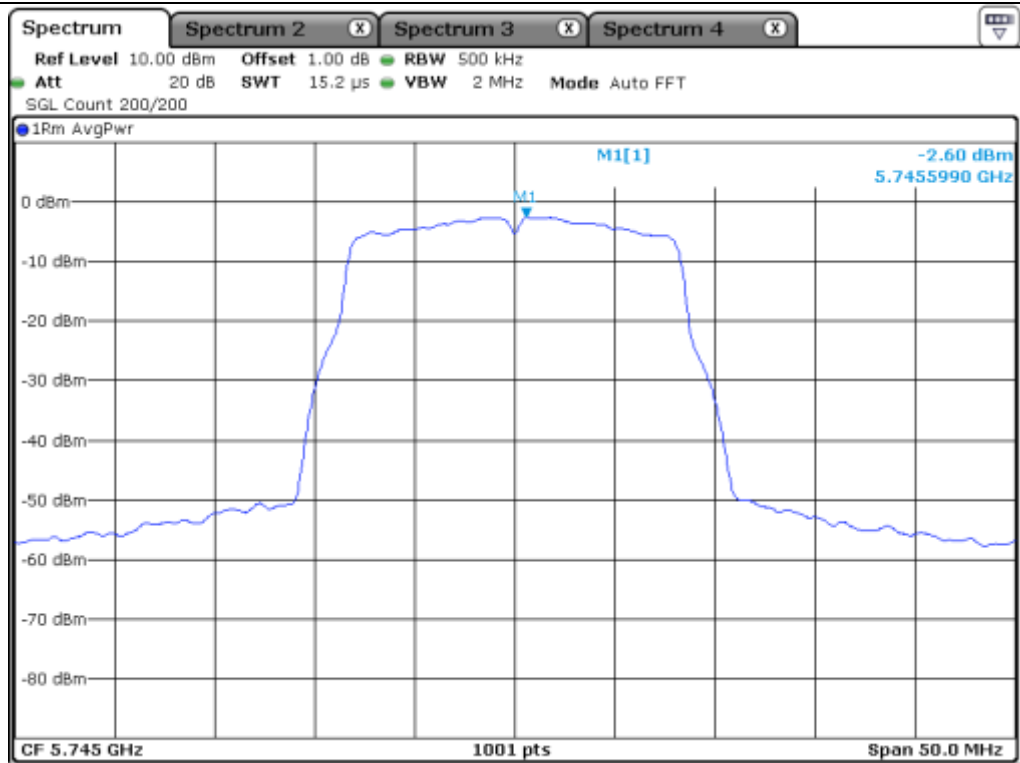


Low Channel (5 500 MHz)

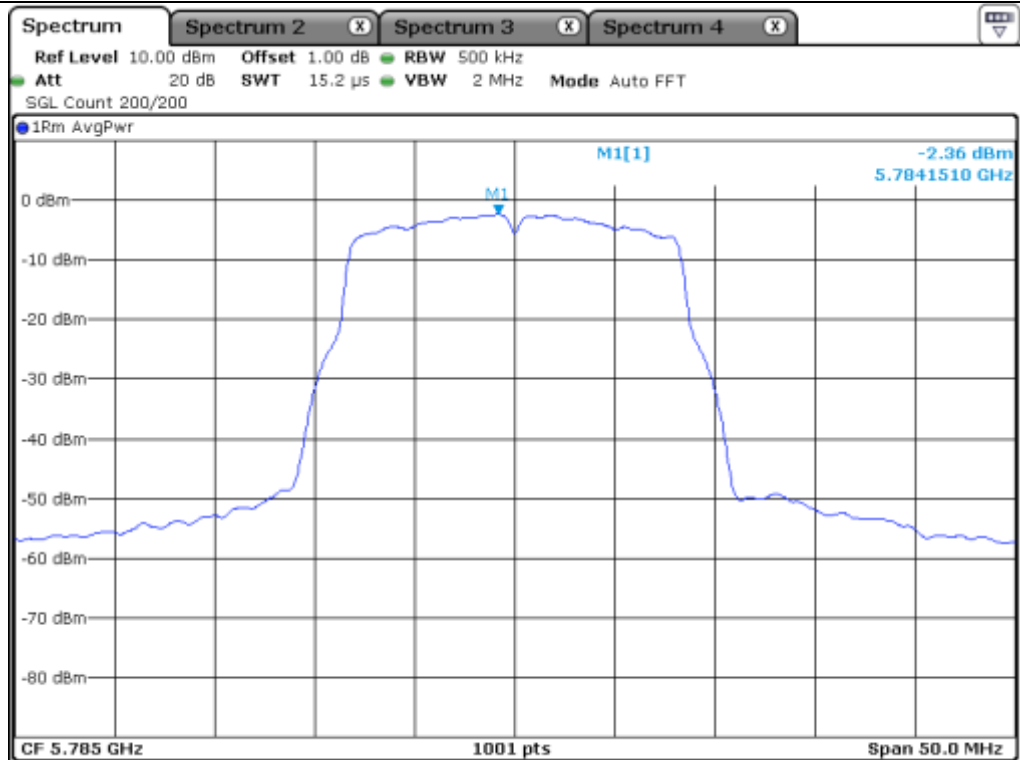


Middle Channel (5 580 MHz)

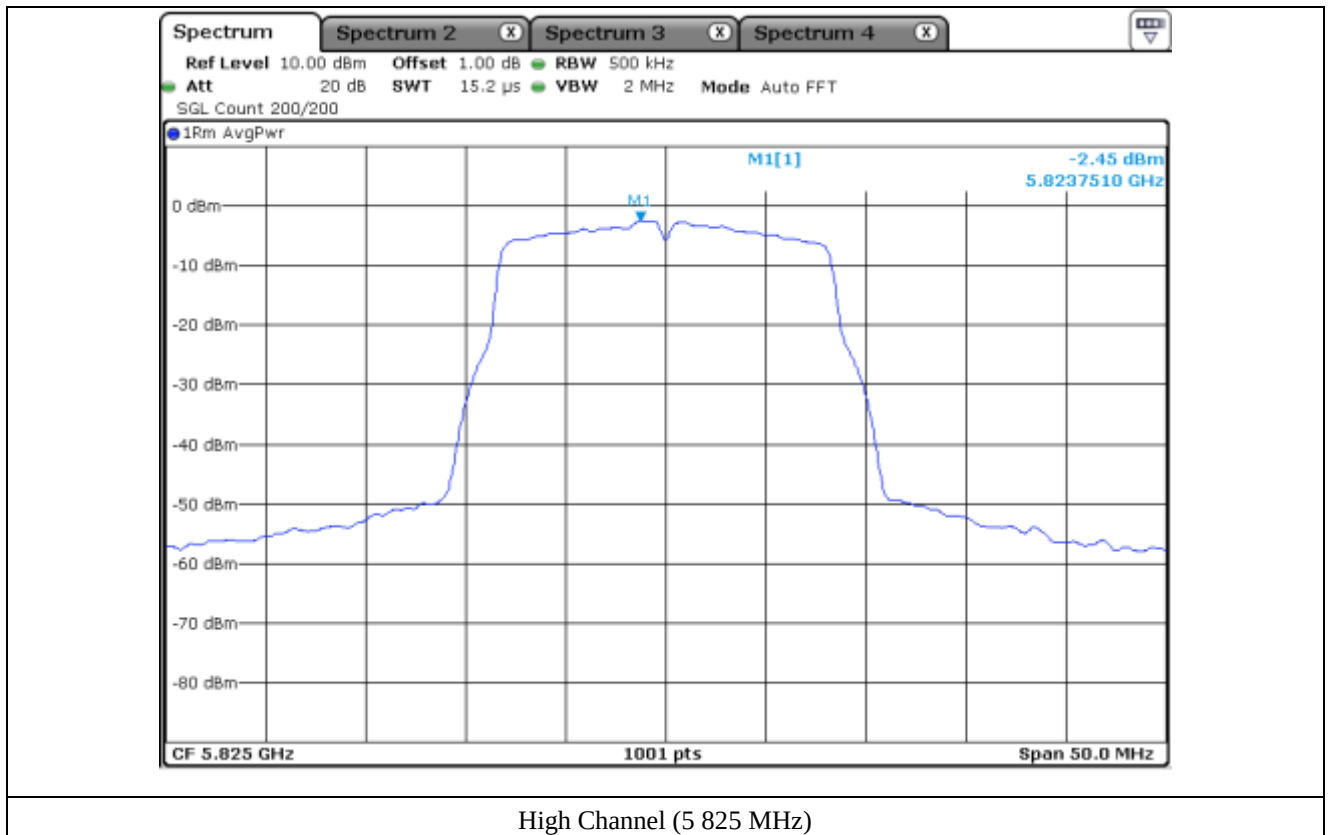




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.4.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	3.16	11.00	7.84
	Middle	5 220.00	2.93	11.00	8.07
	High	5 240.00	2.67	11.00	8.33
5 250 ~ 5 350	Low	5 260.00	3.00	11.00	8.00
	Middle	5 300.00	3.20	11.00	7.80
	High	5 320.00	3.20	11.00	7.80
5 470 ~ 5 725	Low	5 500.00	3.87	11.00	7.13
	Middle	5 580.00	3.98	11.00	7.02
	High	5 700.00	3.20	11.00	7.80
5 725 ~ 5 850	Low	5 745.00	0.31	30.00	29.69
	Middle	5 785.00	0.49	30.00	29.51
	High	5 825.00	0.37	30.00	29.63



Tested by: Ha-Ram, Lee / Assistant Manager

10.4.4 Test data for Staddle Channel_Antenna 0

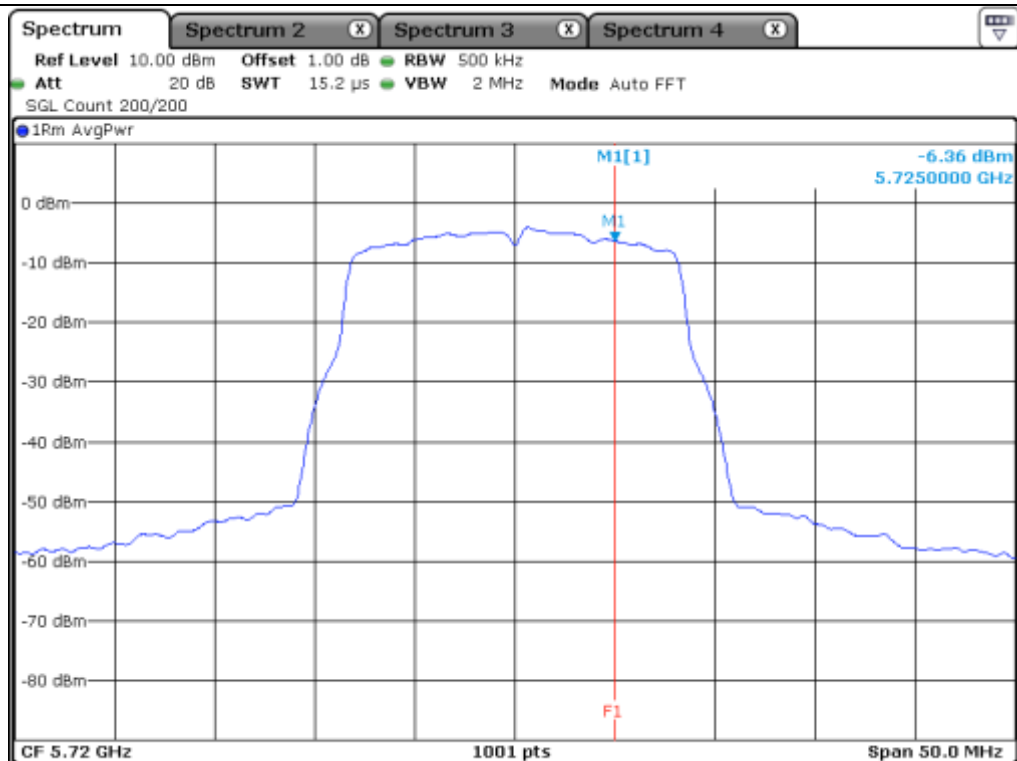
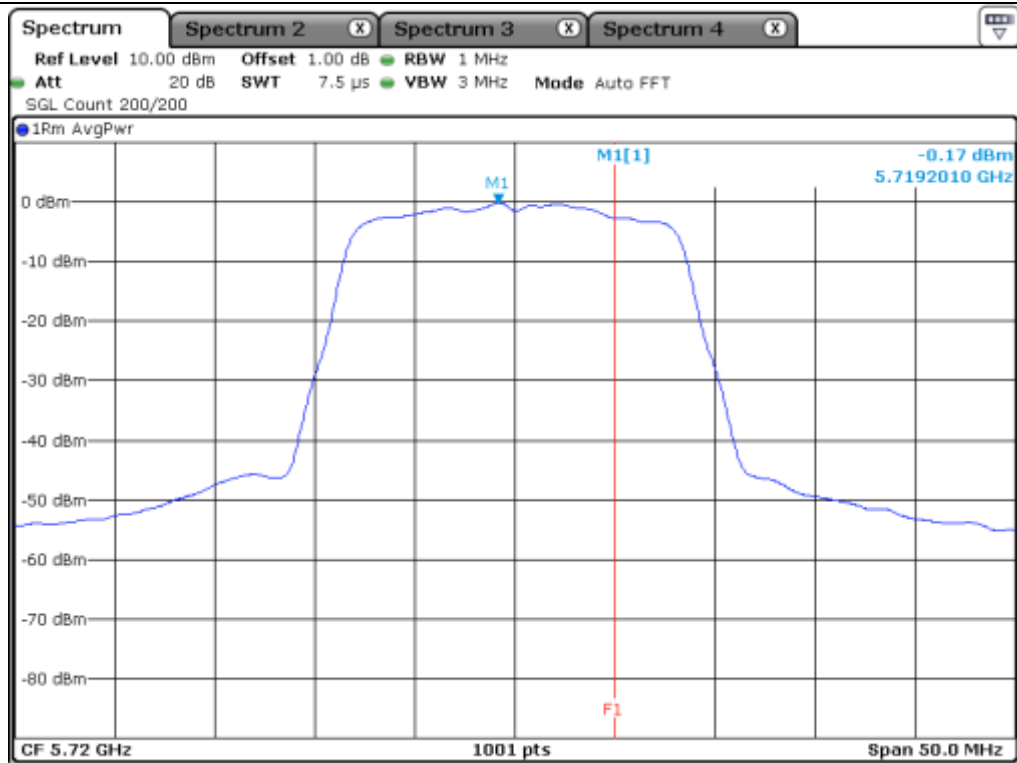
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	-0.17	11.00	11.17
5 725 ~ 5 850	5 720.00	-6.36	30.00	36.36

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.4.5 Test data for Staddle Channel_Antenna 1

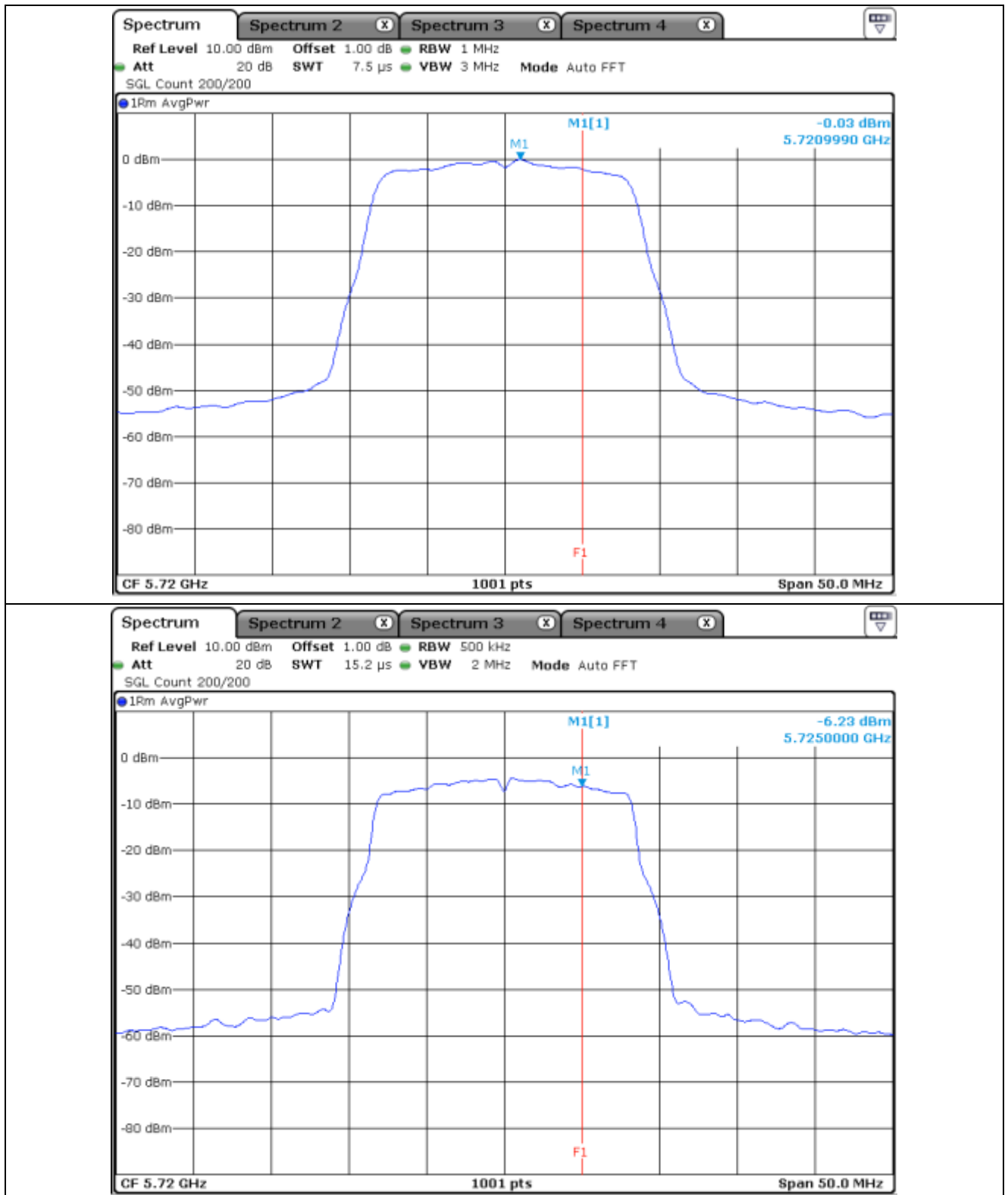
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	-0.03	11.00	11.03
5 725 ~ 5 850	5 720.00	-6.23	30.00	36.23

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.4.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	2.91	11.00	8.09
5 725 ~ 5 850	5 720.00	-3.28	30.00	33.28



Tested by: Ha-Ram, Lee / Assistant Manager

10.5 Test data for 802.11n_HT20 RLAN Mode

10.5.1 Test data for Antenna 0

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Operating condition : Highest Output Power Transmitting Mode

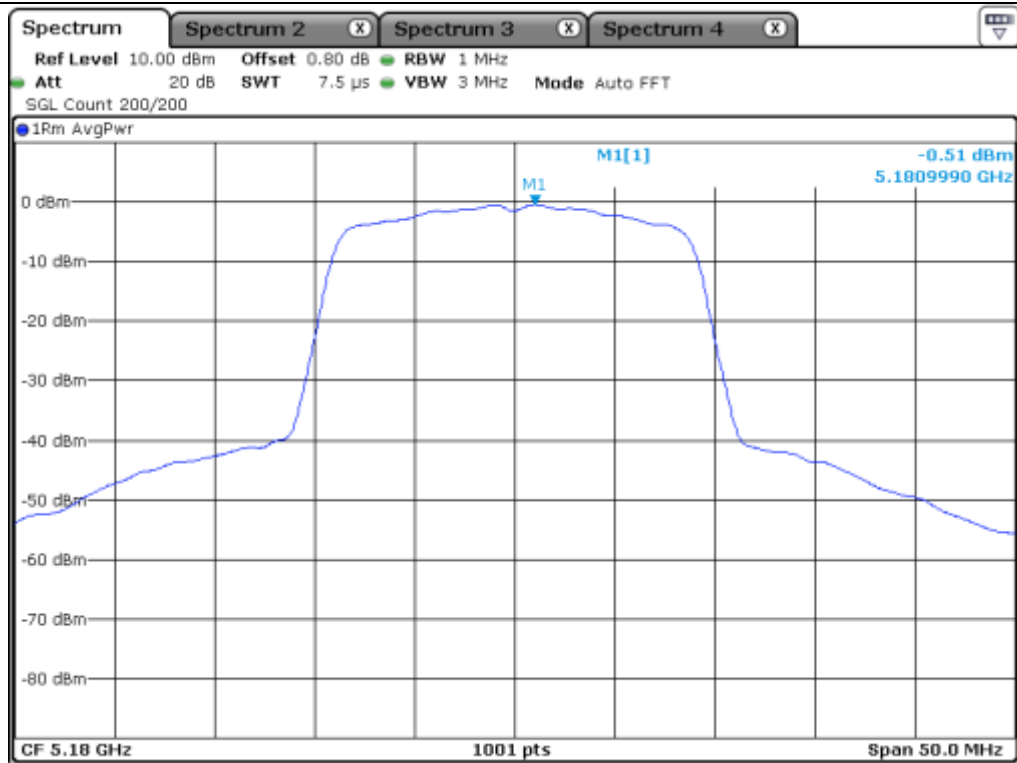
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	-0.51	11.00	11.51
	Middle	5 220.00	-0.23	11.00	11.23
	High	5 240.00	-0.76	11.00	11.76
5 250 ~ 5 350	Low	5 260.00	-0.22	11.00	11.22
	Middle	5 300.00	-0.01	11.00	11.01
	High	5 320.00	-0.22	11.00	11.22
5 470 ~ 5 725	Low	5 500.00	0.09	11.00	10.91
	Middle	5 580.00	-0.26	11.00	11.26
	High	5 700.00	-0.31	11.00	11.31
5 725 ~ 5 850	Low	5 745.00	-3.41	30.00	33.41
	Middle	5 785.00	-3.68	30.00	33.68
	High	5 825.00	-3.67	30.00	33.67

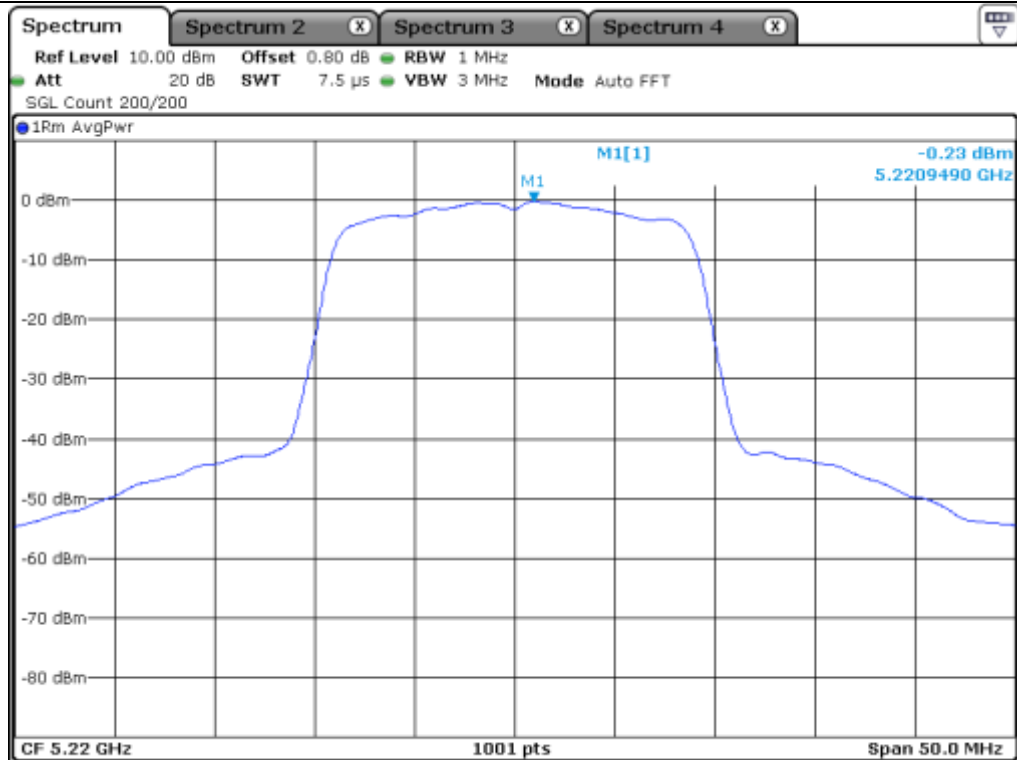
Remark: See next page for measurement data.



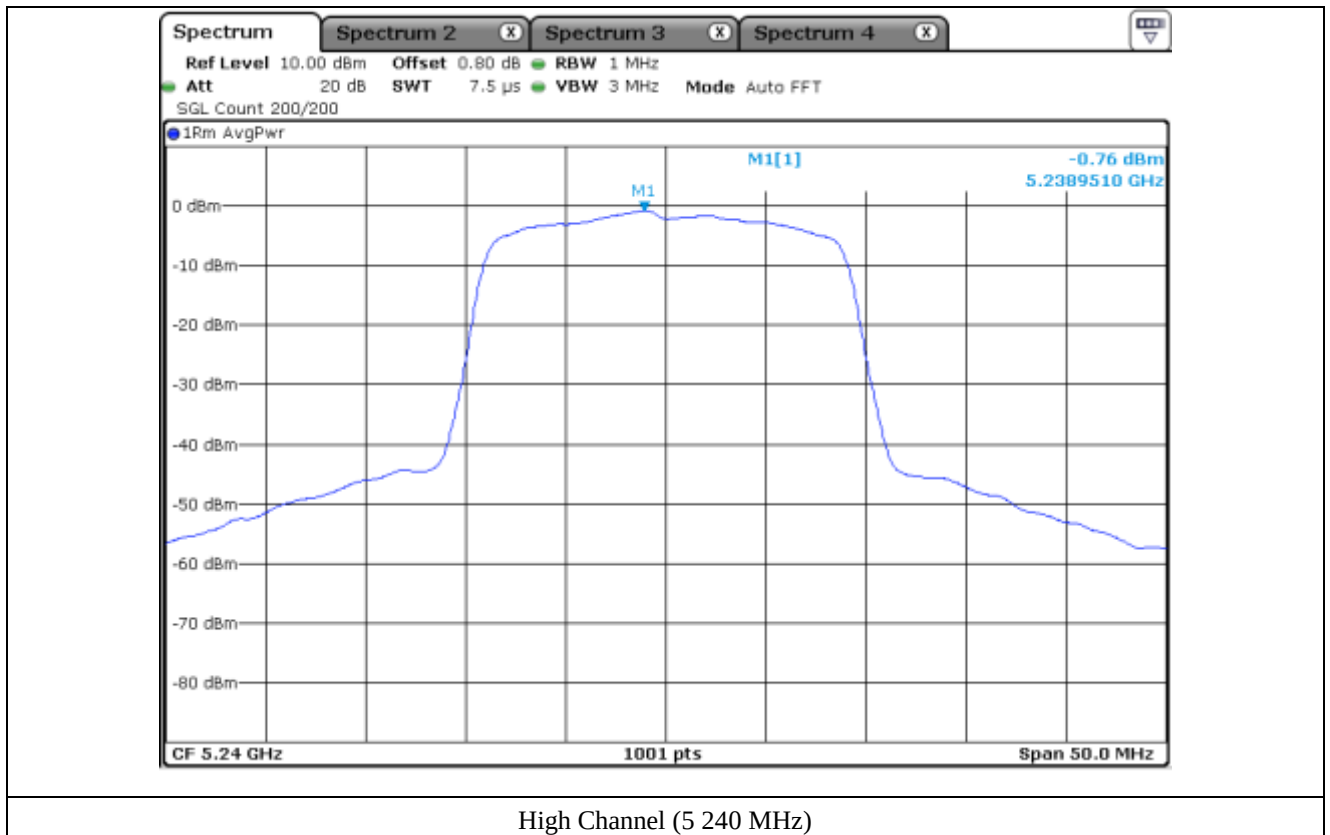
Tested by: Ha-Ram, Lee / Assistant Manager

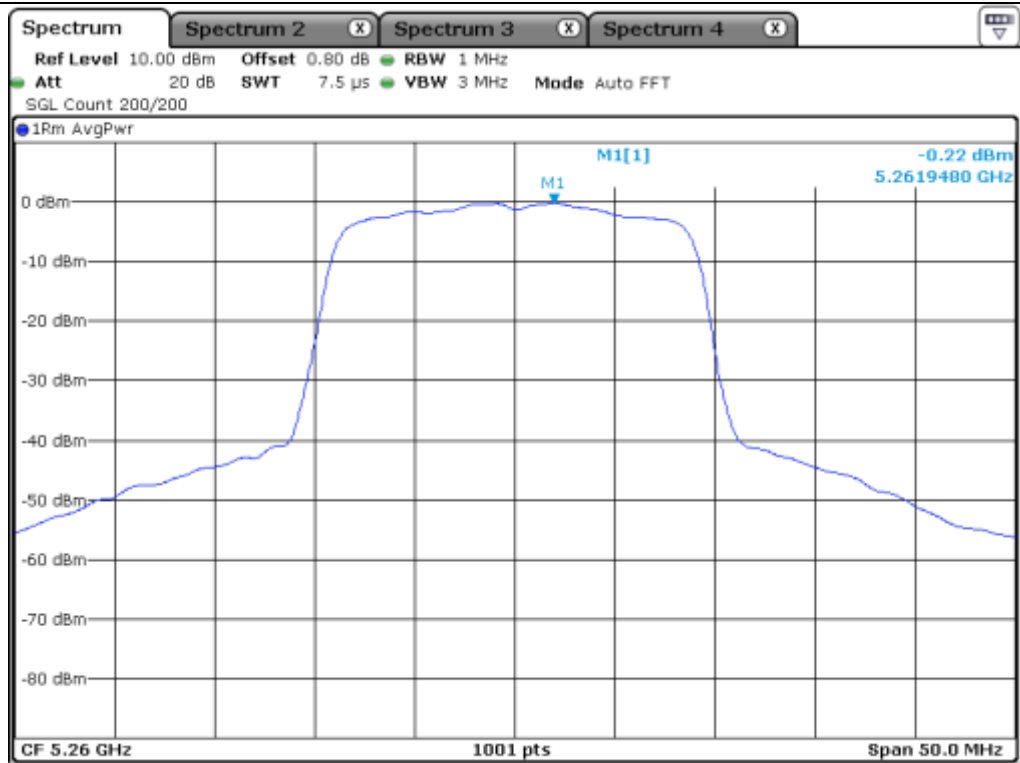


Low Channel (5 180 MHz)

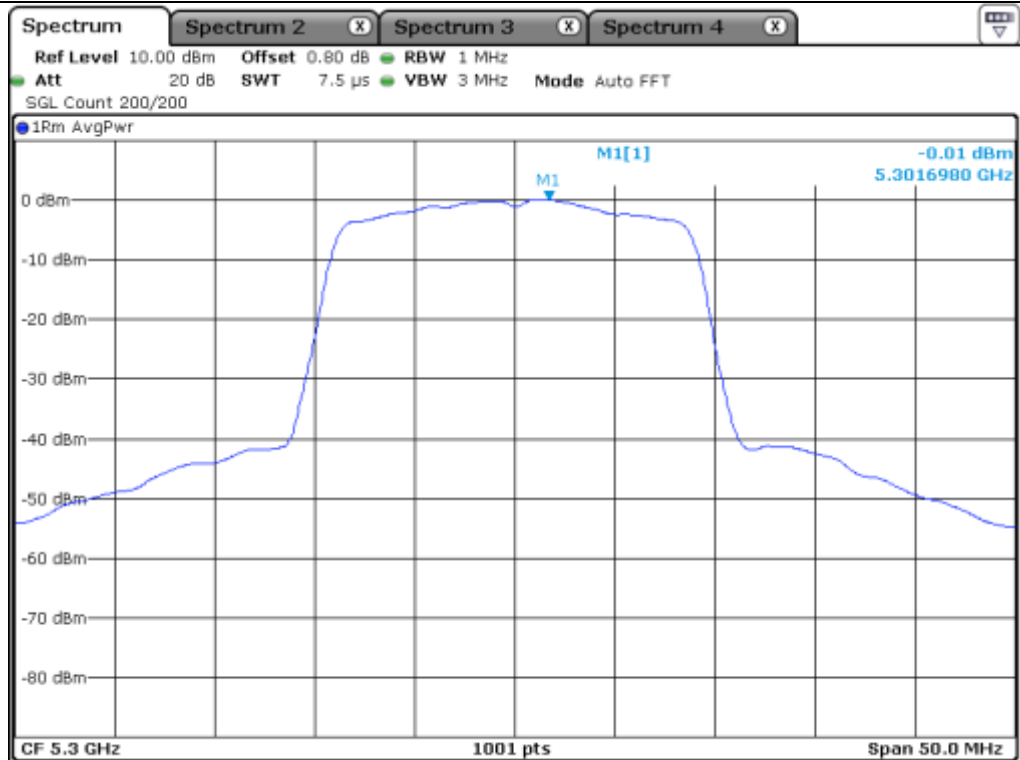


Middle Channel (5 220 MHz)

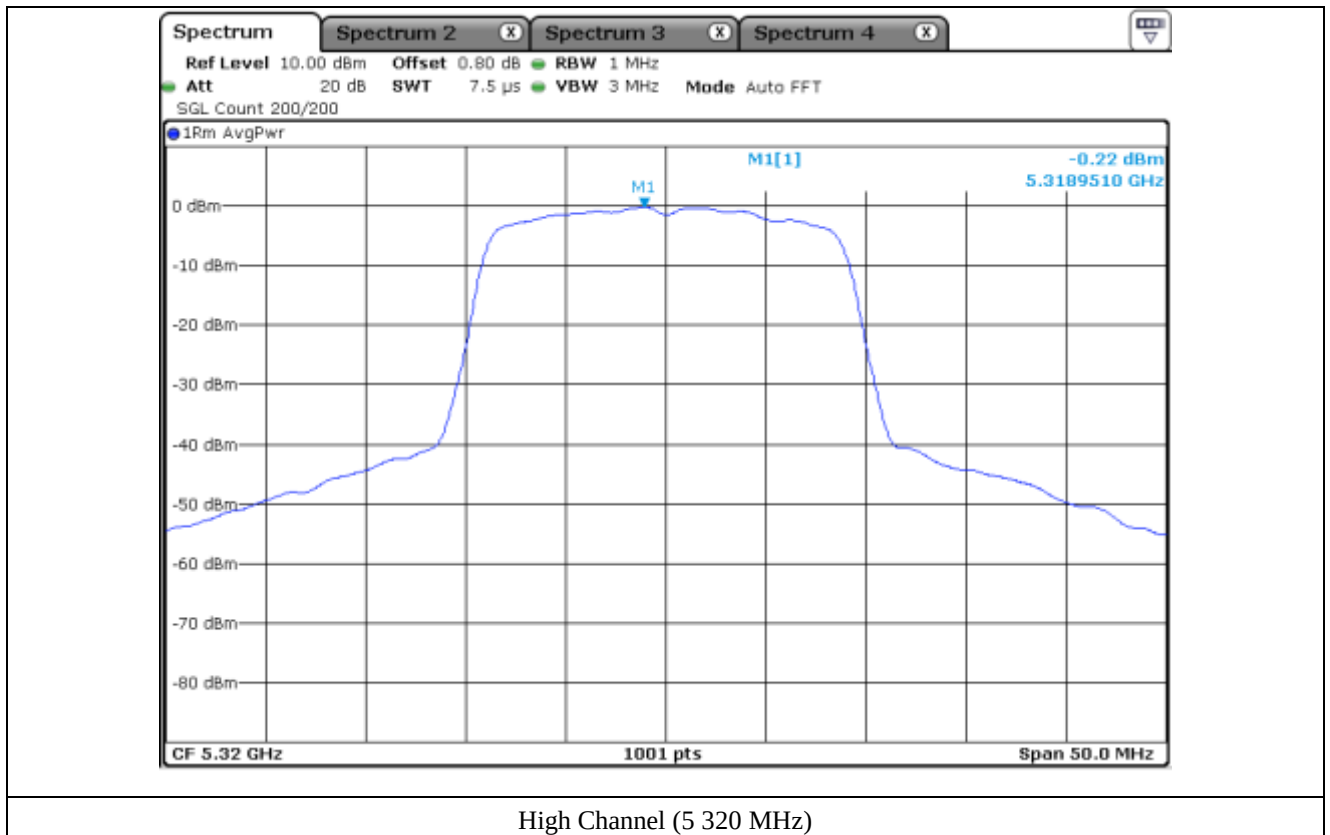


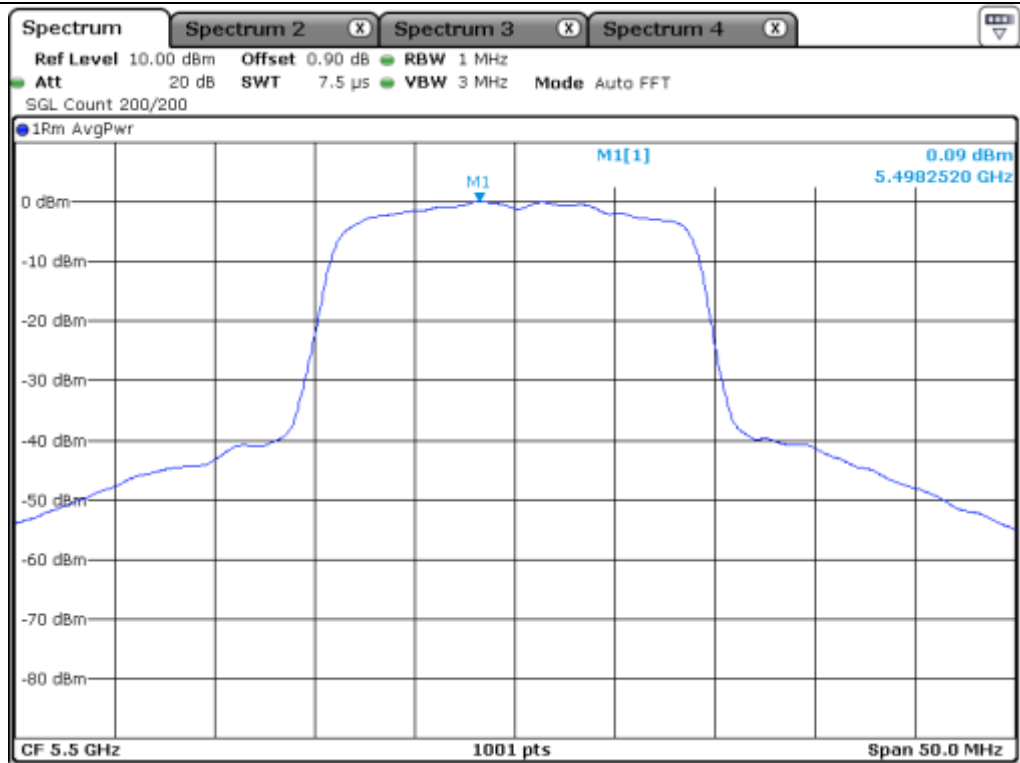


Low Channel (5 260 MHz)

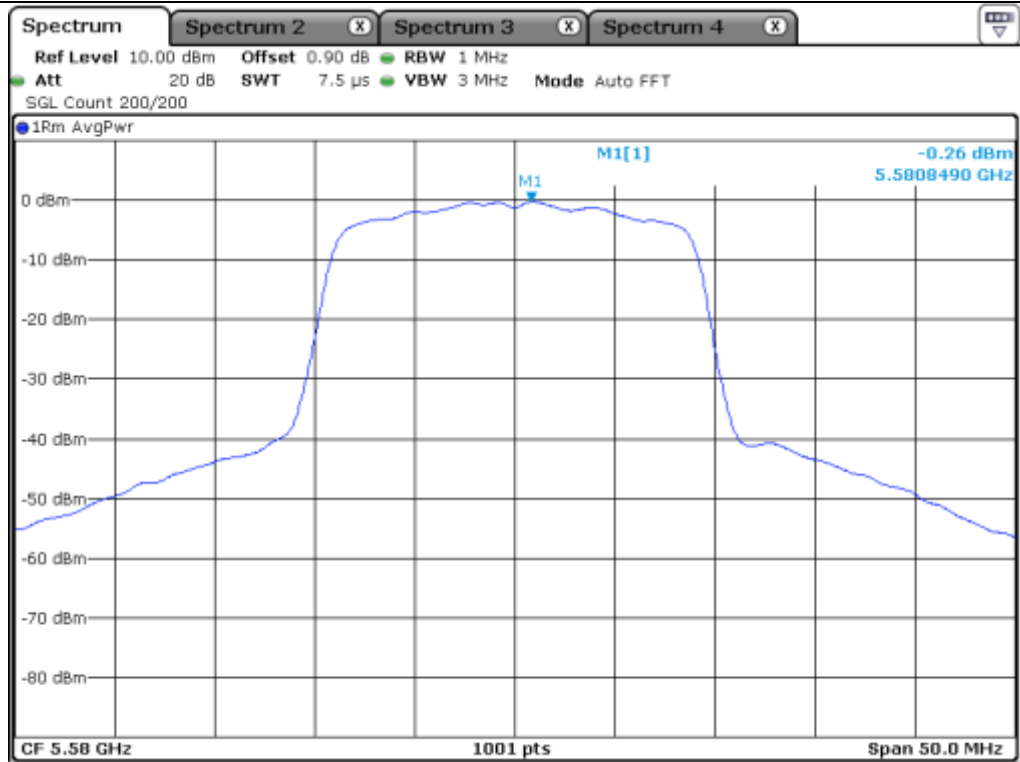


Middle Channel (5 300 MHz)

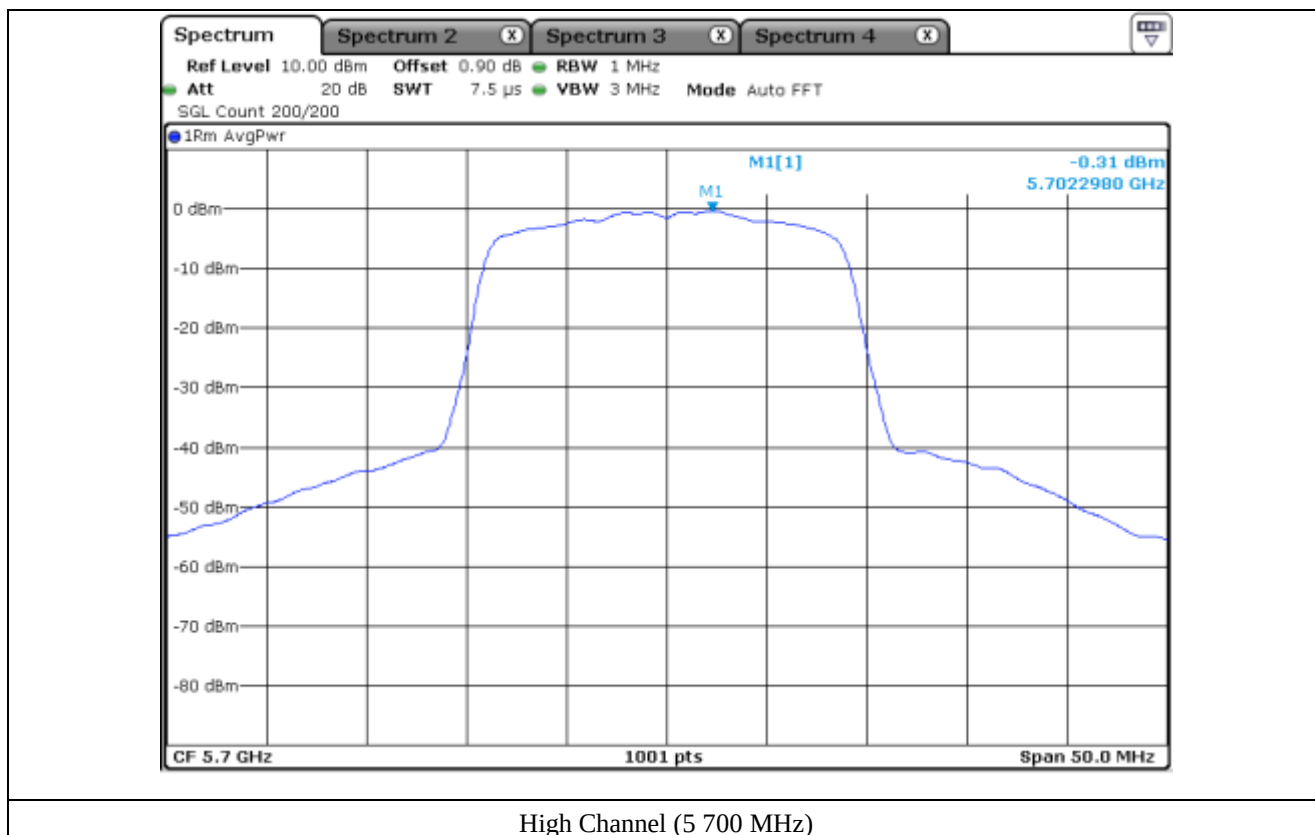


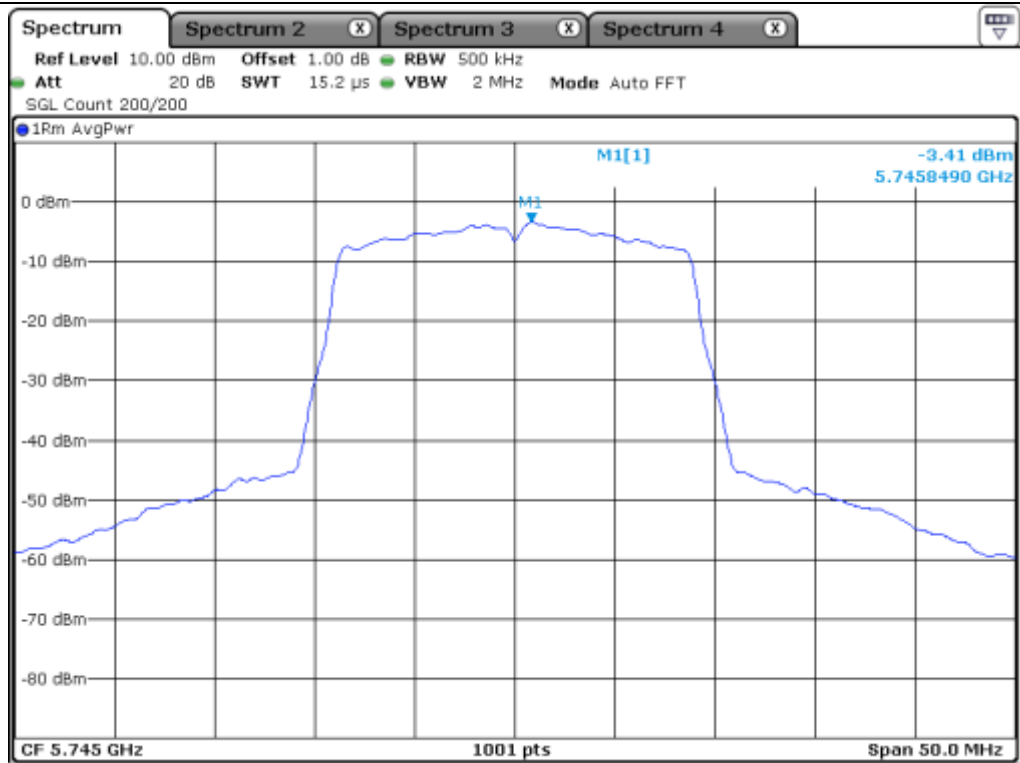


Low Channel (5 500 MHz)

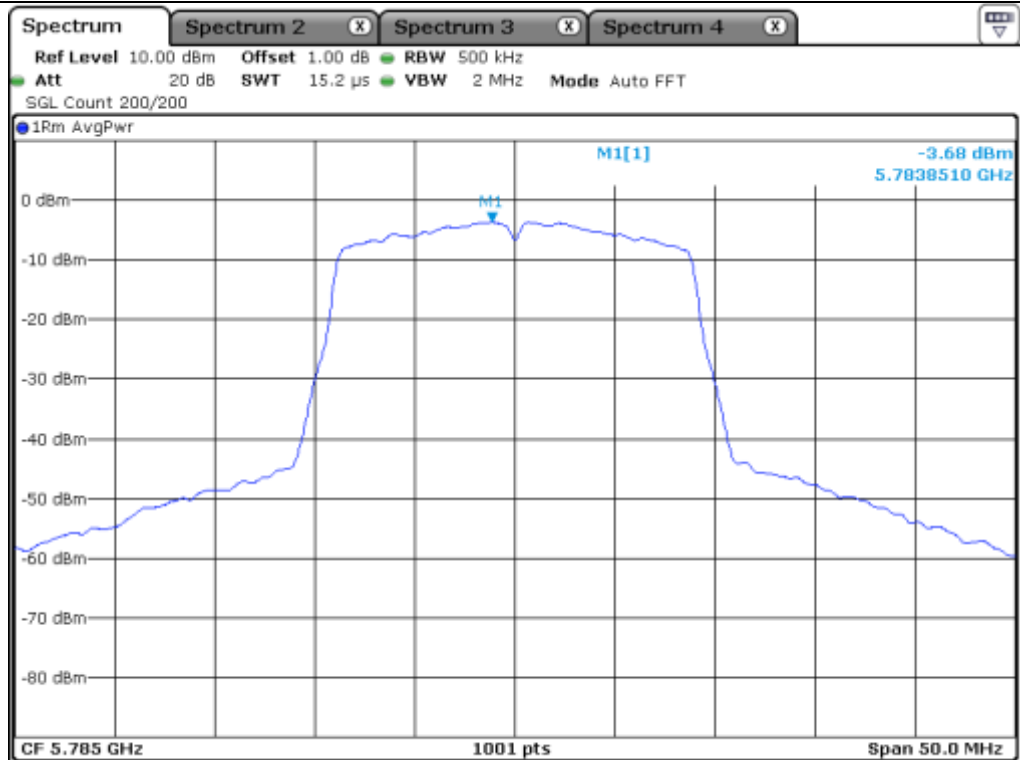


Middle Channel (5 580 MHz)

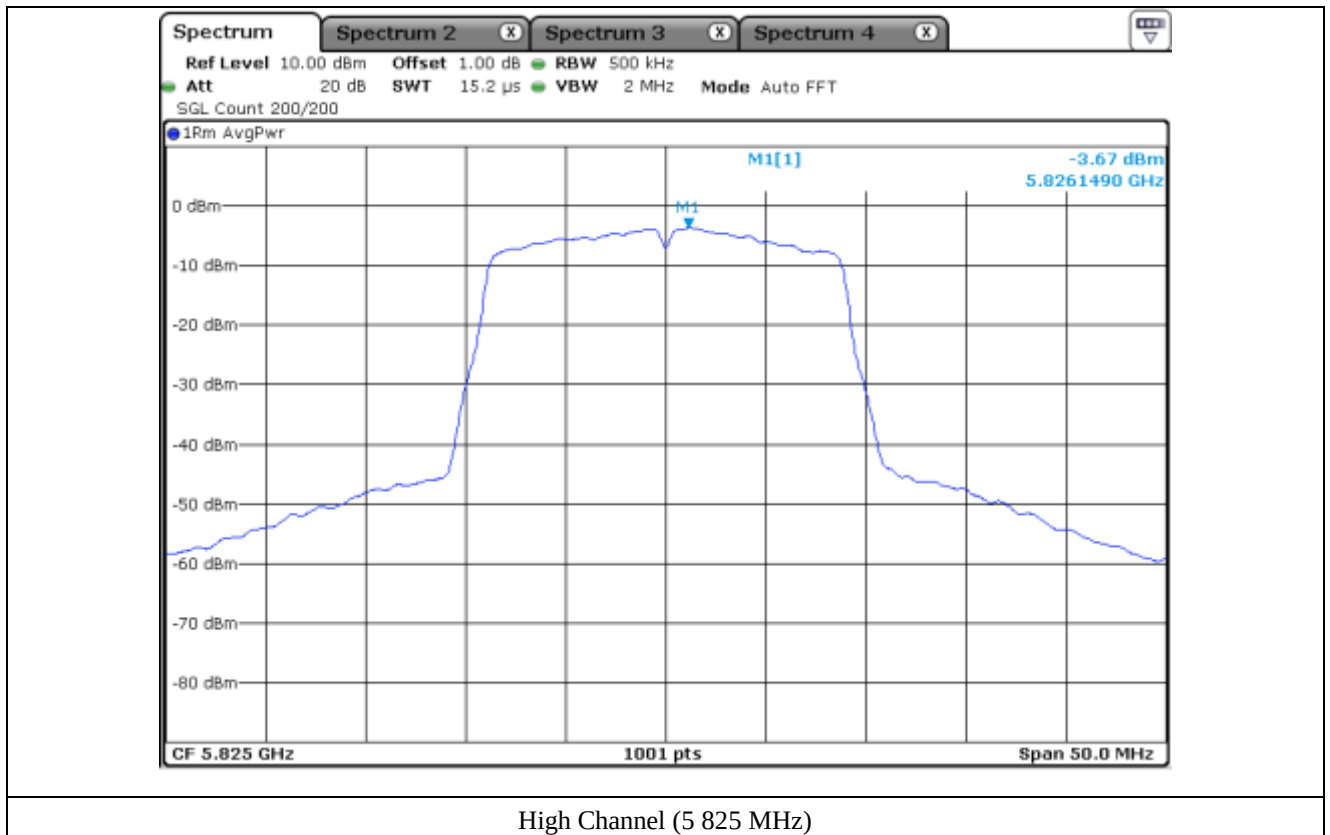




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.5.2 Test data for Antenna 1

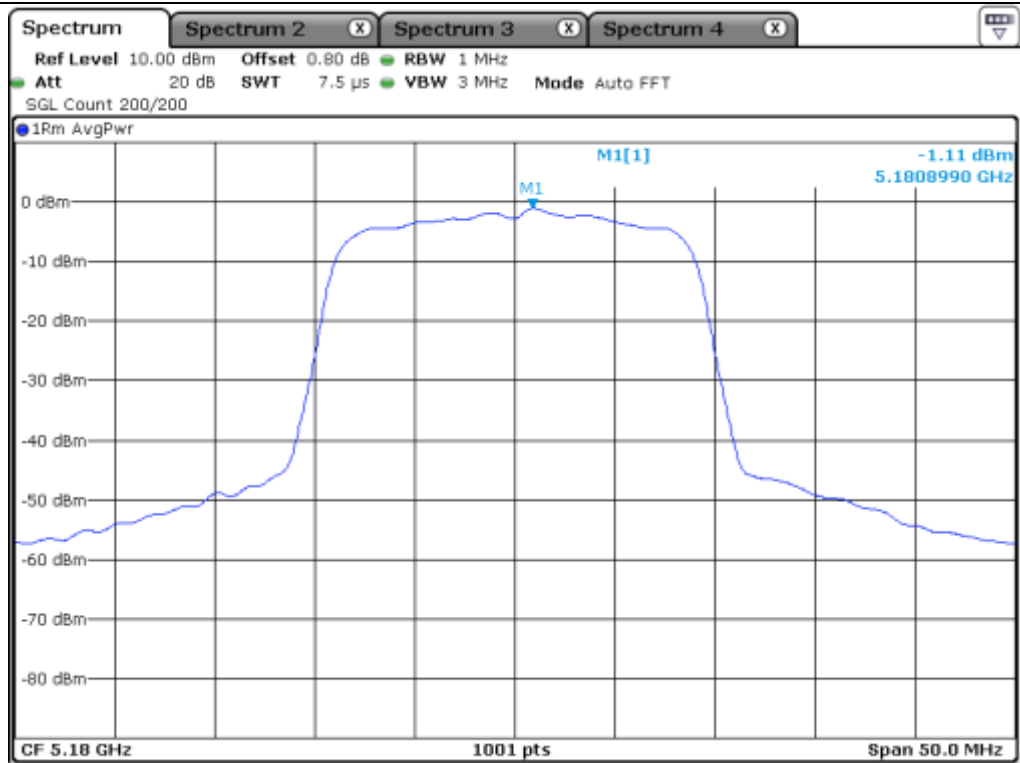
- . Test Date : December 02, 2019 ~ December 11, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	-1.11	11.00	12.11
	Middle	5 220.00	-0.77	11.00	11.77
	High	5 240.00	-1.12	11.00	12.12
5 250 ~ 5 350	Low	5 260.00	-1.03	11.00	12.03
	Middle	5 300.00	-0.49	11.00	11.49
	High	5 320.00	-0.64	11.00	11.64
5 470 ~ 5 725	Low	5 500.00	0.30	11.00	10.70
	Middle	5 580.00	0.12	11.00	10.88
	High	5 700.00	0.05	11.00	10.95
5 725 ~ 5 850	Low	5 745.00	-3.20	30.00	33.20
	Middle	5 785.00	-3.30	30.00	33.30
	High	5 825.00	-3.39	30.00	33.39

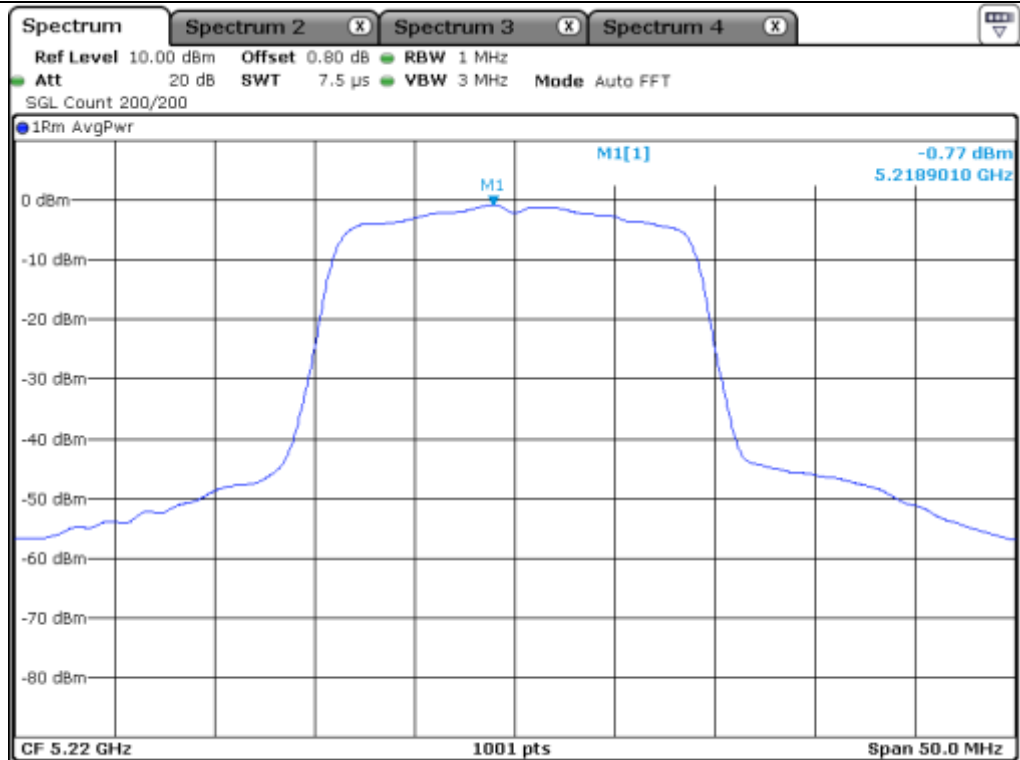
Remark: See next page for measurement data.



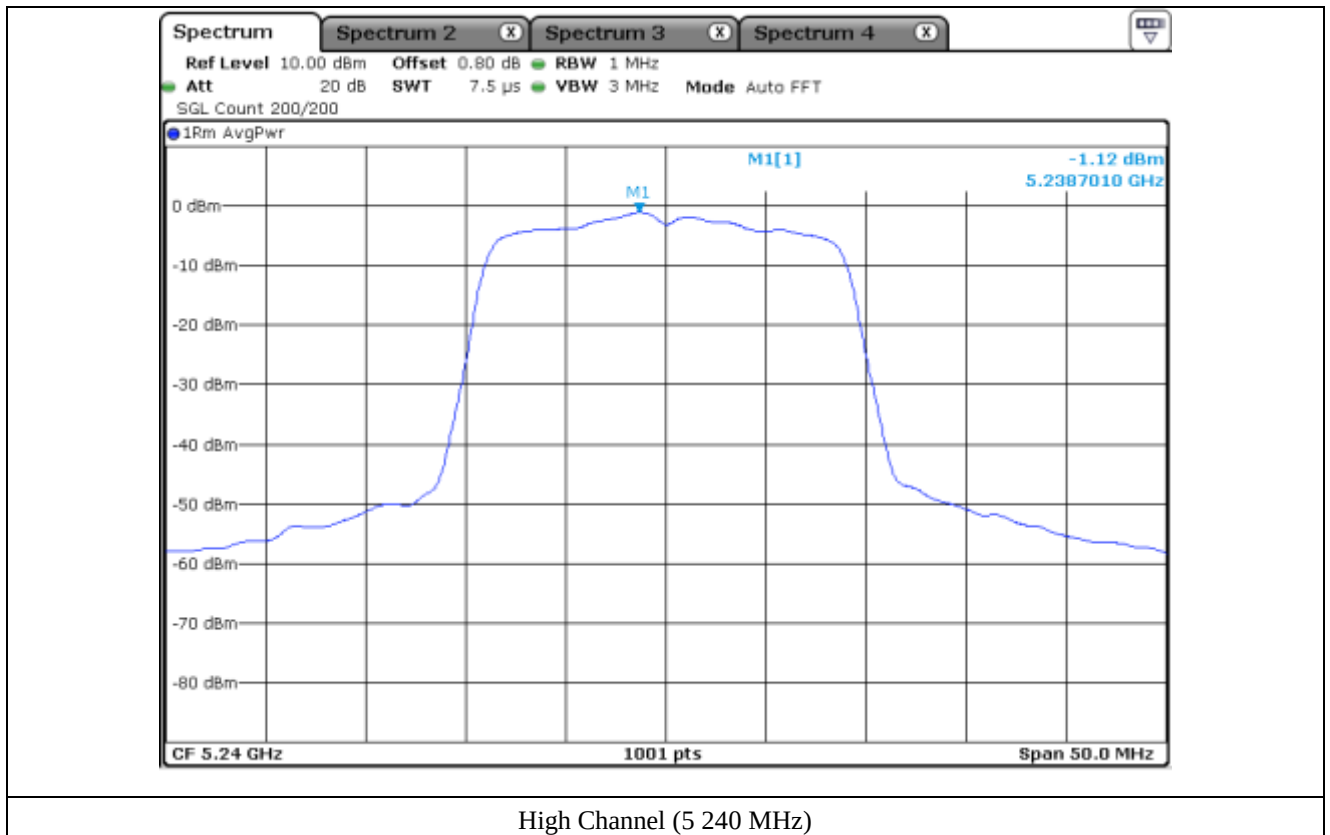
Tested by: Ha-Ram, Lee / Assistant Manager

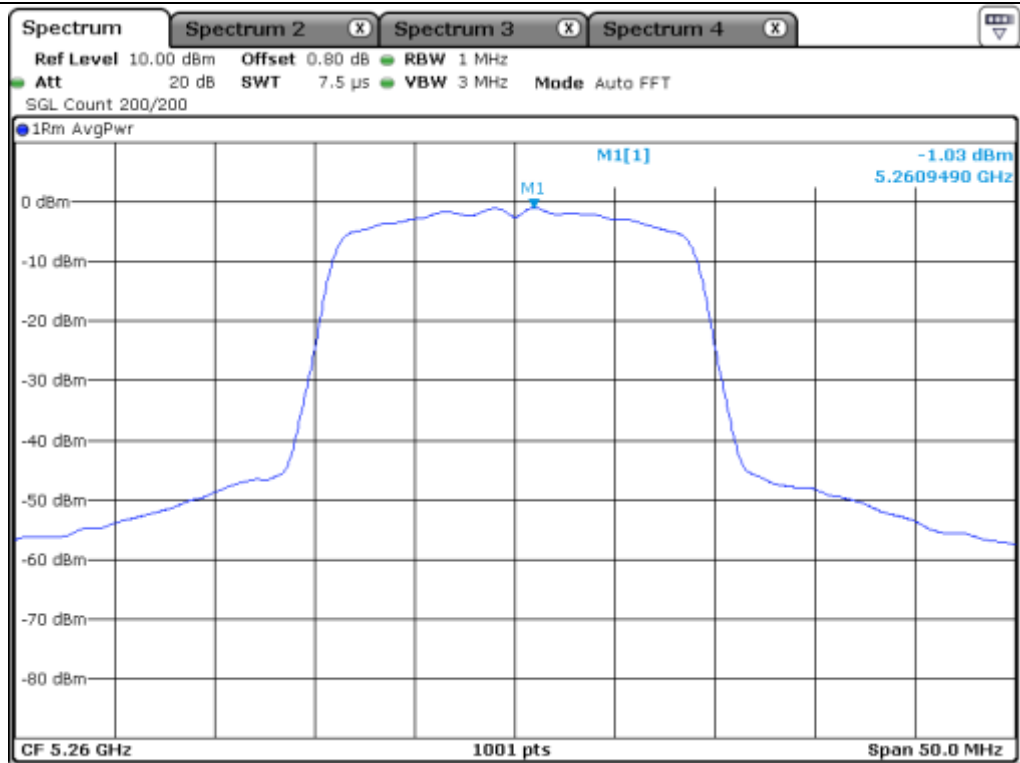


Low Channel (5 180 MHz)

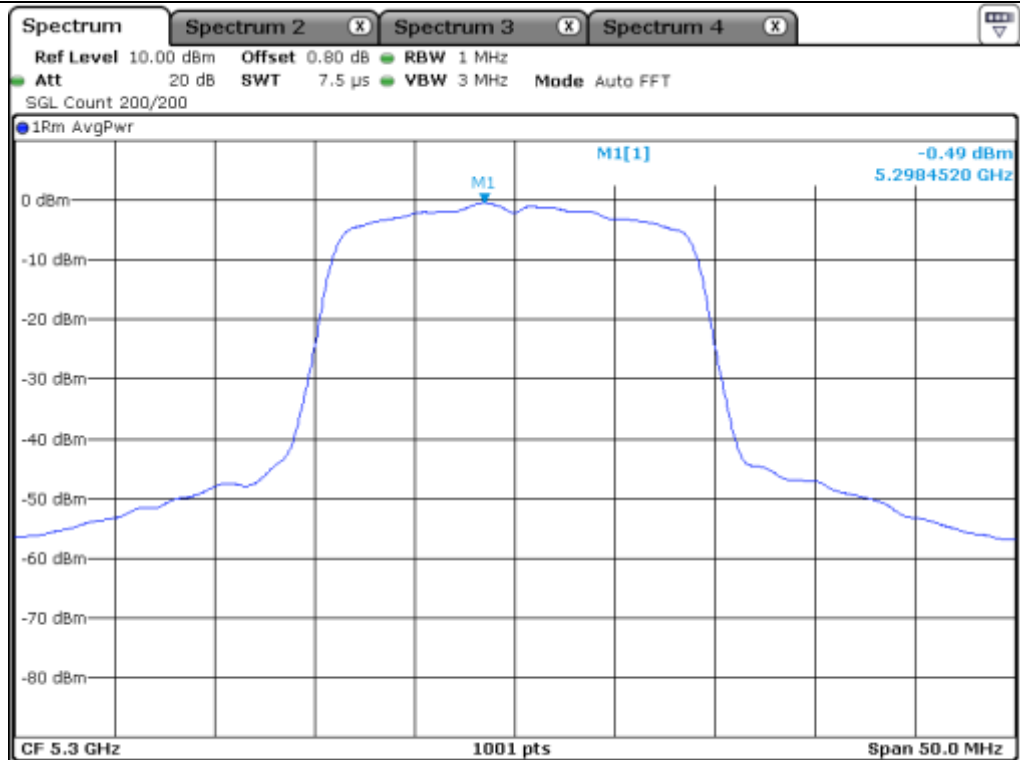


Middle Channel (5 220 MHz)

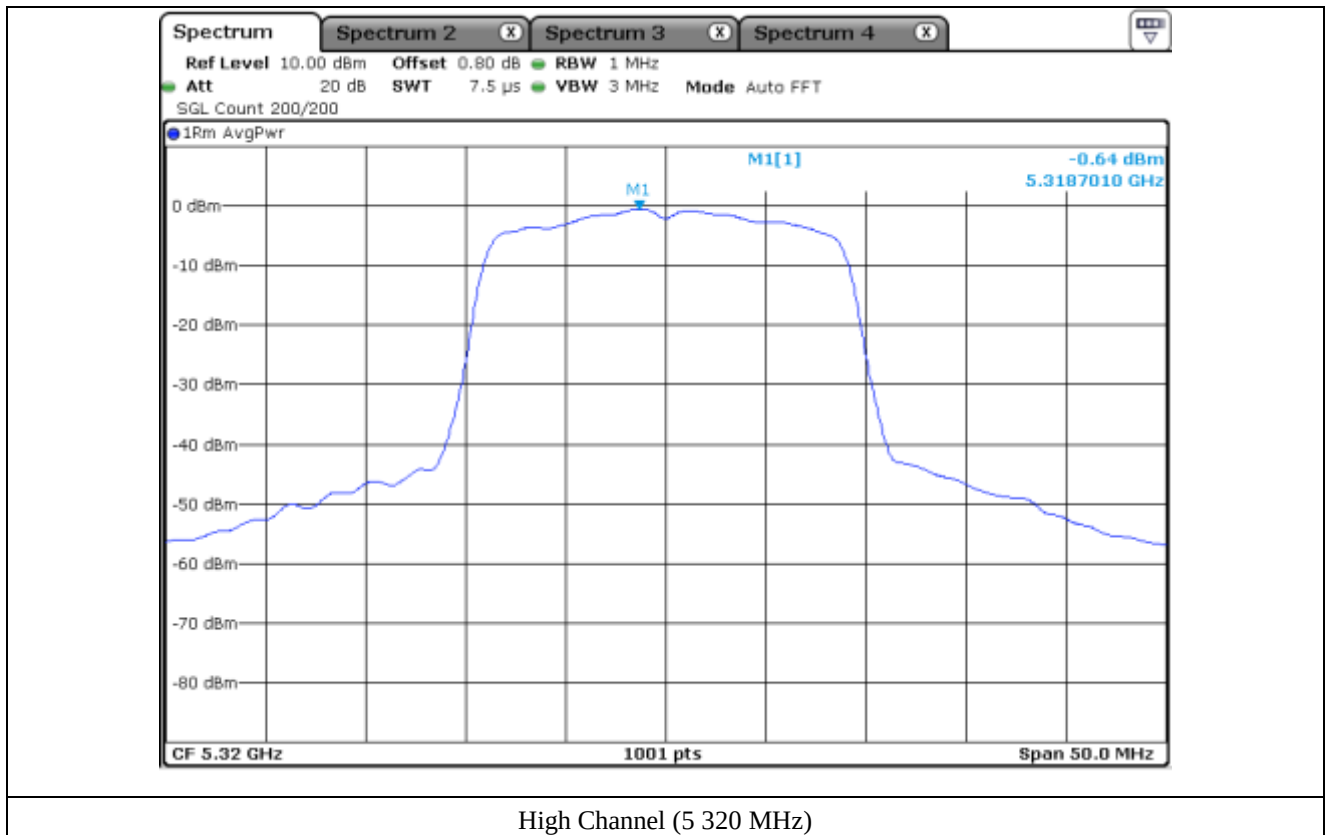


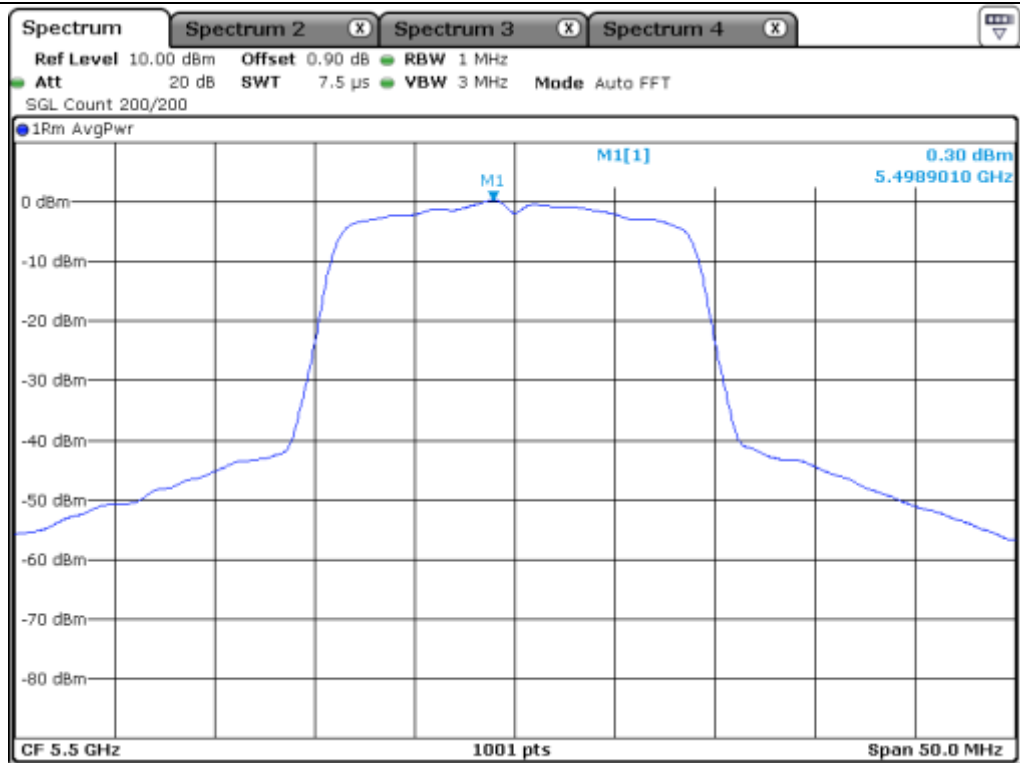


Low Channel (5 260 MHz)

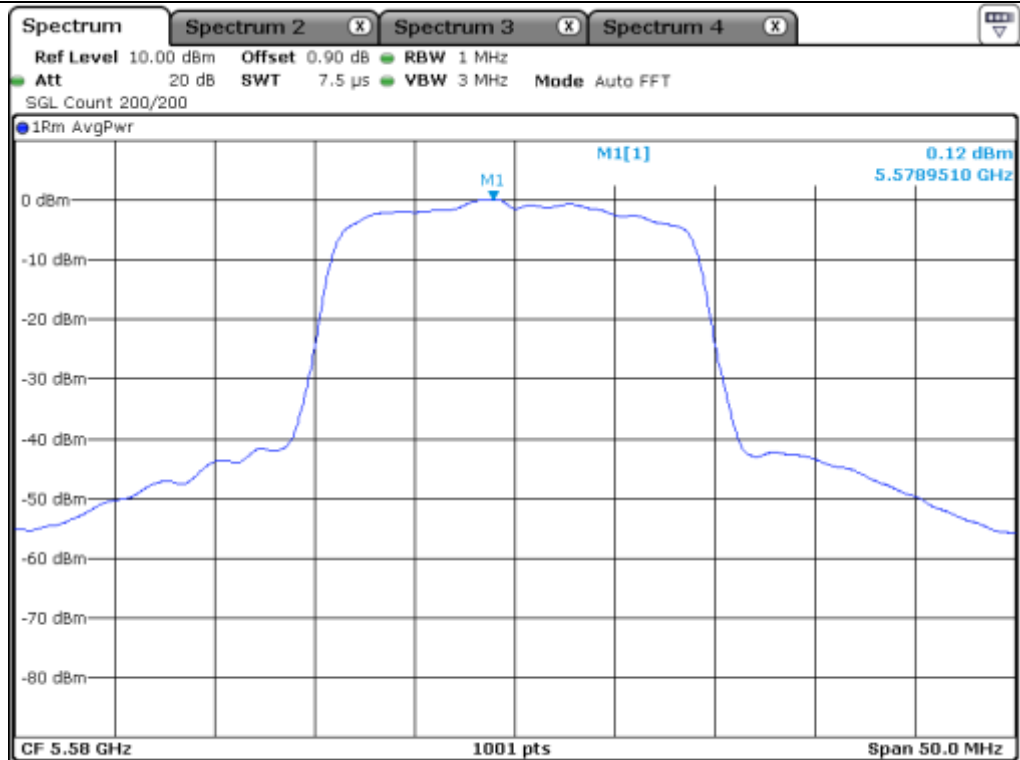


Middle Channel (5 300 MHz)

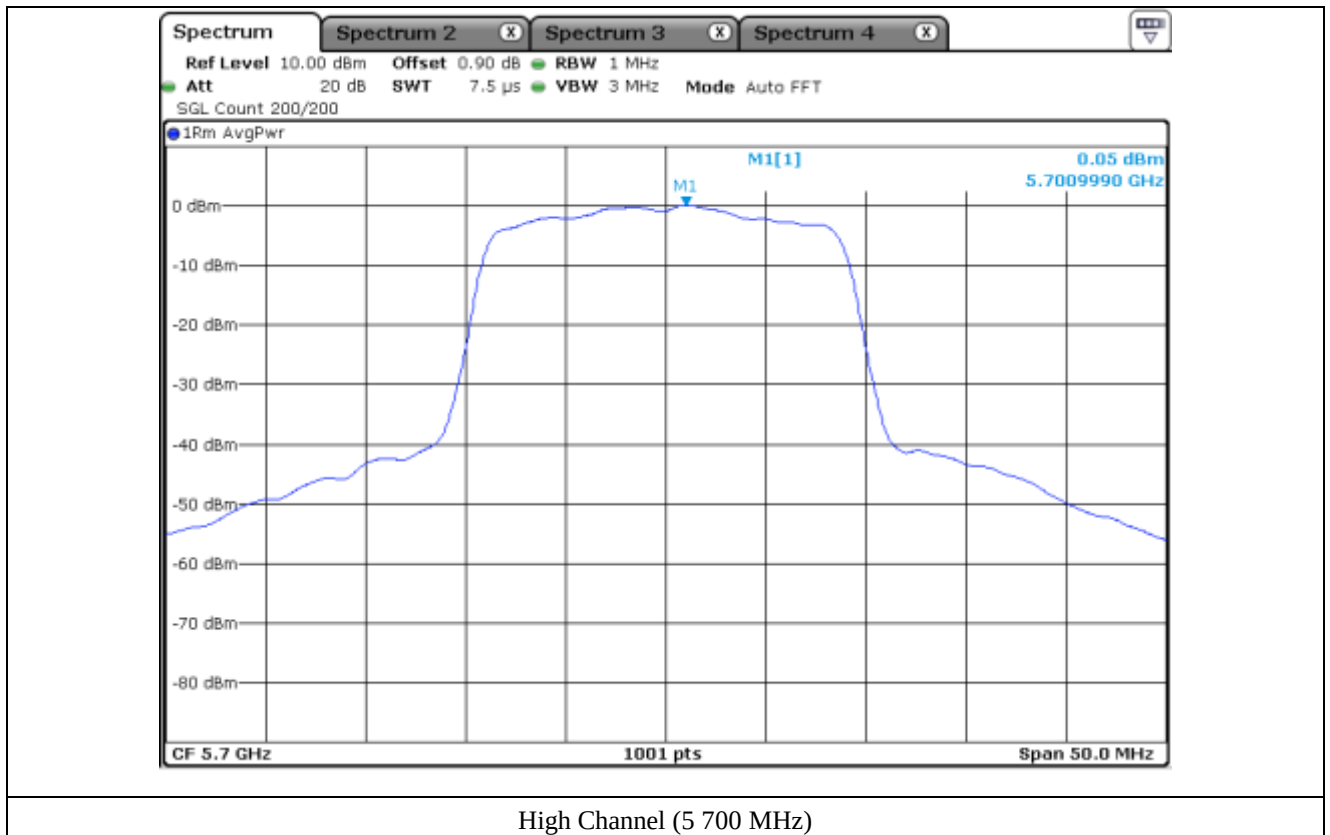


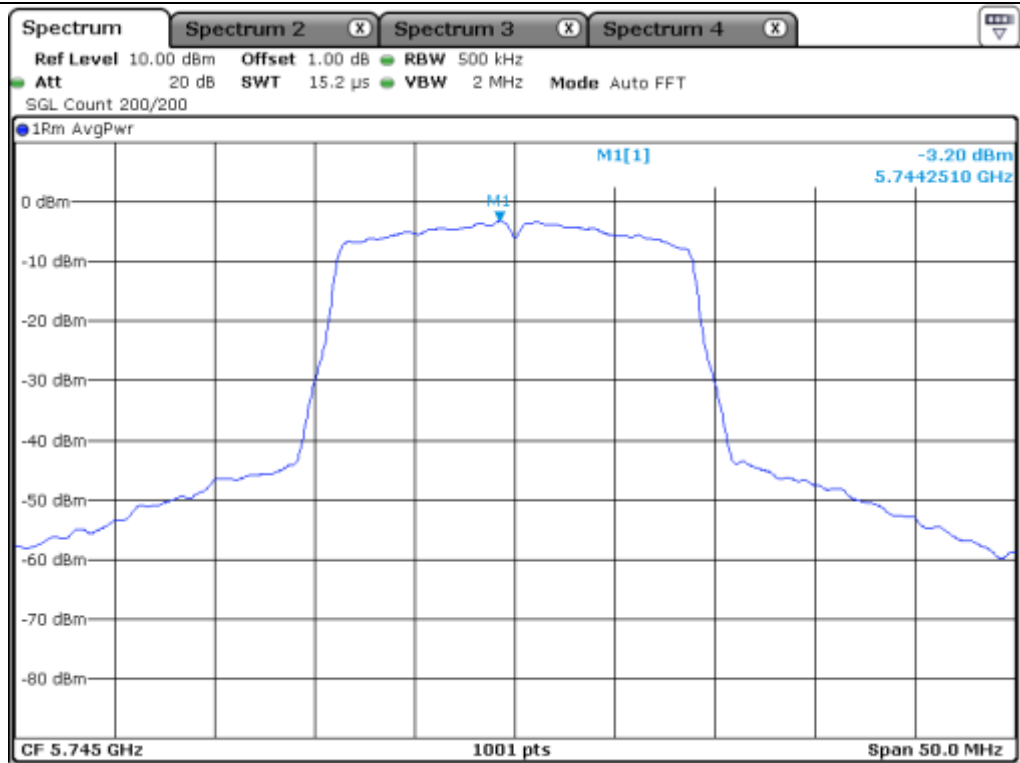


Low Channel (5 500 MHz)

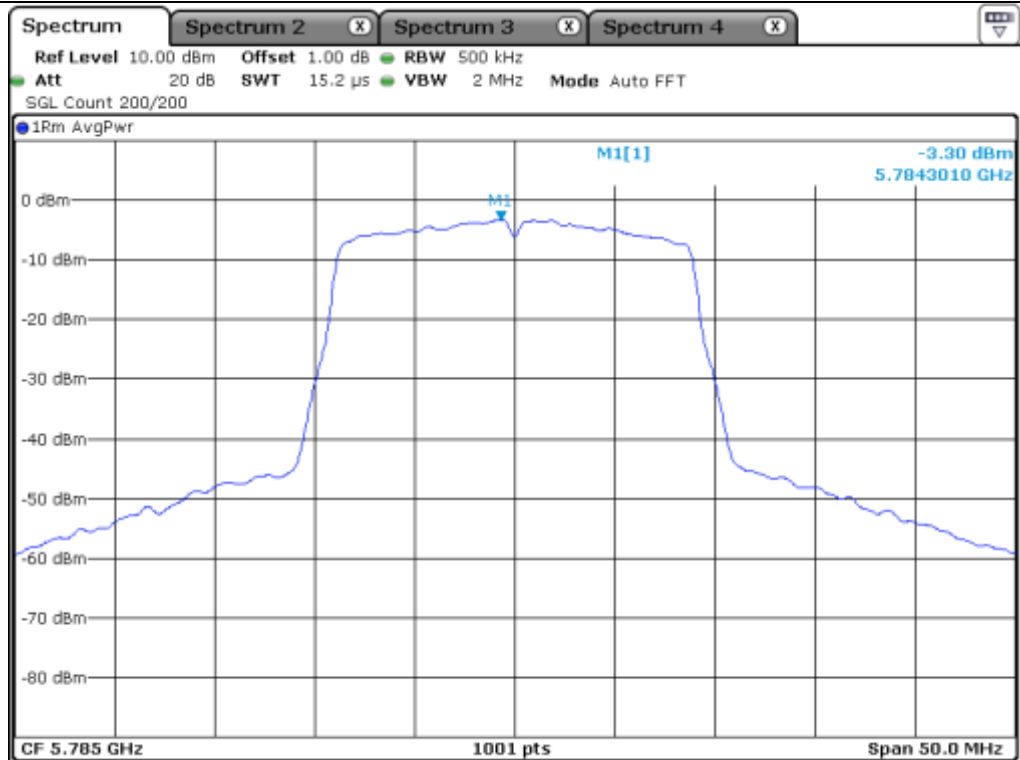


Middle Channel (5 580 MHz)

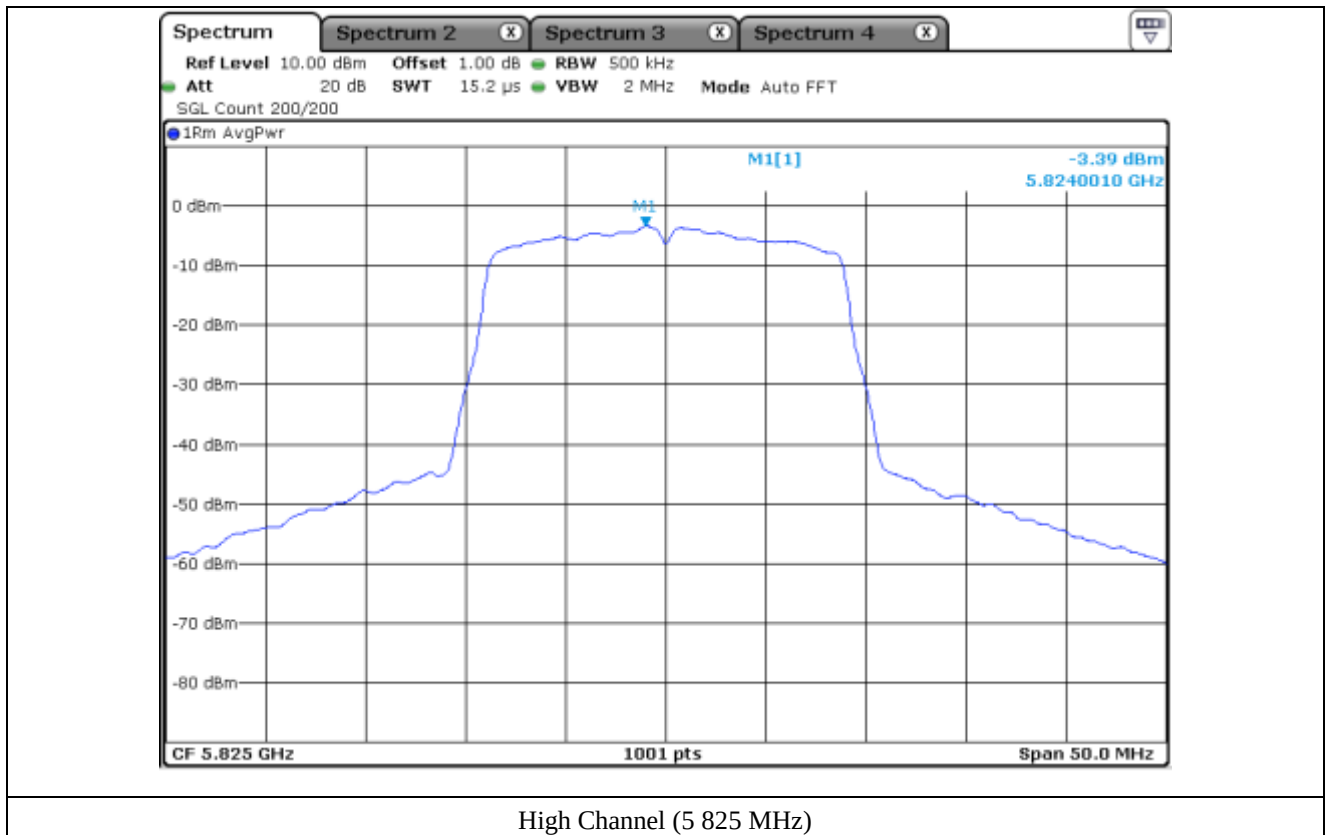




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.5.3 Test data for Multiple Transmit

-. Test Date : December 02, 2019 ~ December 11, 2019

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	2.21	11.00	8.79
	Middle	5 220.00	2.52	11.00	8.48
	High	5 240.00	2.07	11.00	8.93
5 250 ~ 5 350	Low	5 260.00	2.40	11.00	8.60
	Middle	5 300.00	2.77	11.00	8.23
	High	5 320.00	2.59	11.00	8.41
5 470 ~ 5 725	Low	5 500.00	3.21	11.00	7.79
	Middle	5 580.00	2.94	11.00	8.06
	High	5 700.00	2.88	11.00	8.12
5 725 ~ 5 850	Low	5 745.00	-0.29	30.00	30.29
	Middle	5 785.00	-0.48	30.00	30.48
	High	5 825.00	-0.52	30.00	30.52



Tested by: Ha-Ram, Lee / Assistant Manager

10.5.4 Test data for Staddle Channel_Antenna 0

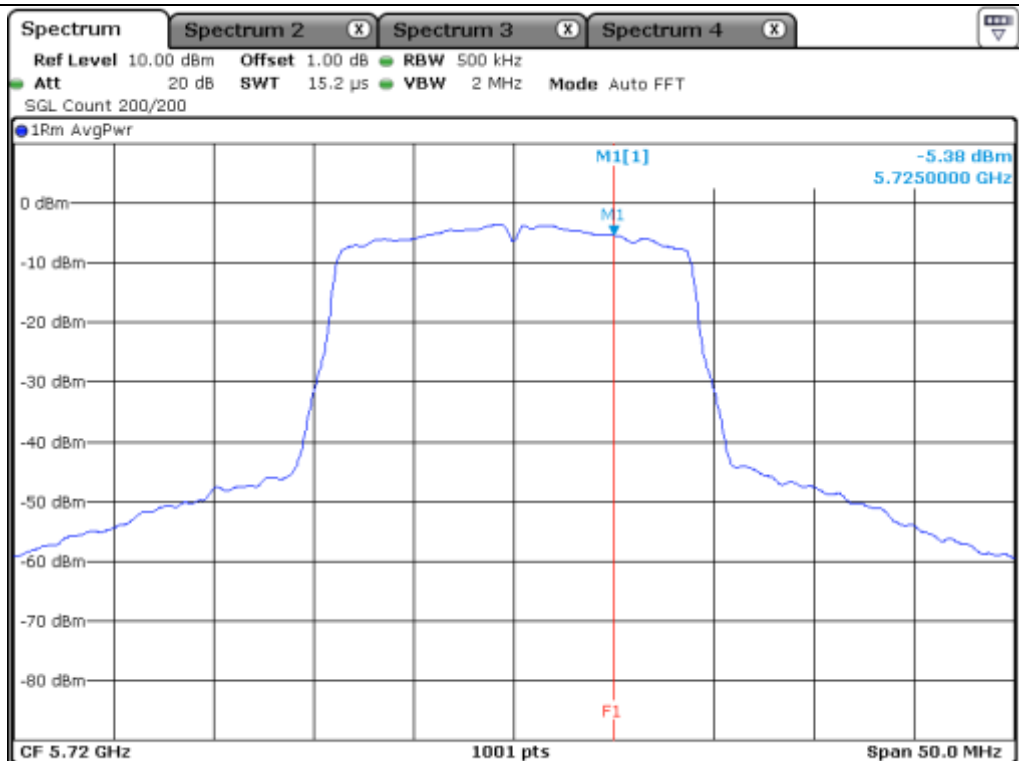
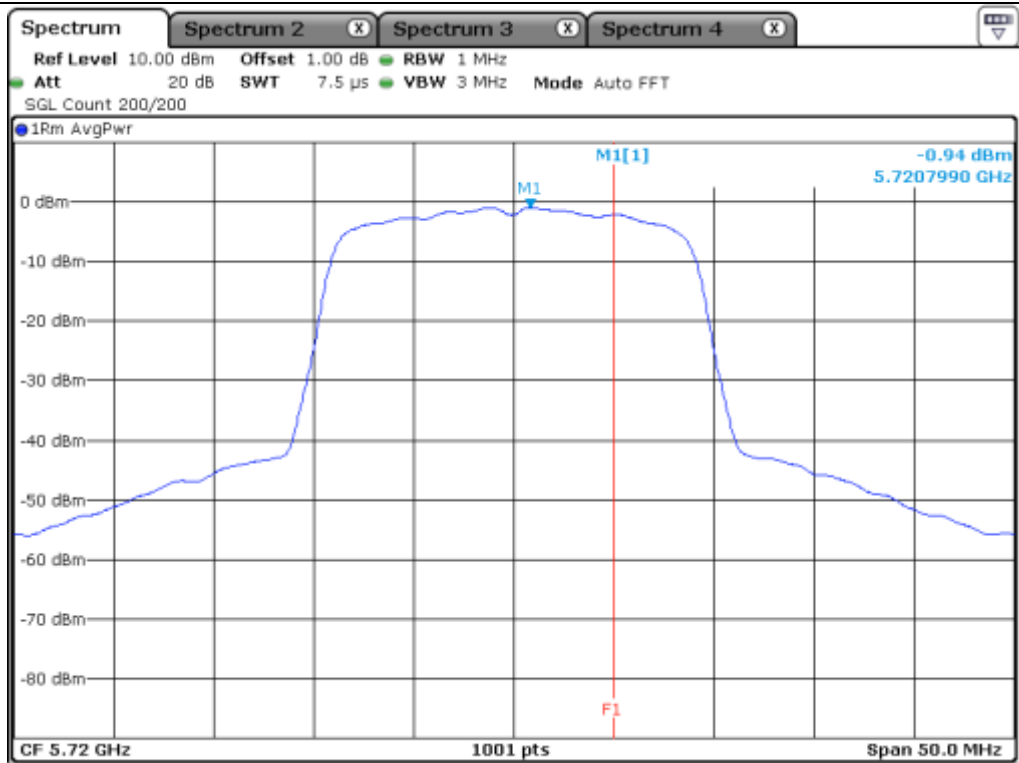
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	-0.94	11.00	11.94
5 725 ~ 5 850	5 720.00	-5.38	30.00	35.38

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.5.5 Test data for Staddle Channel_Antenna 1

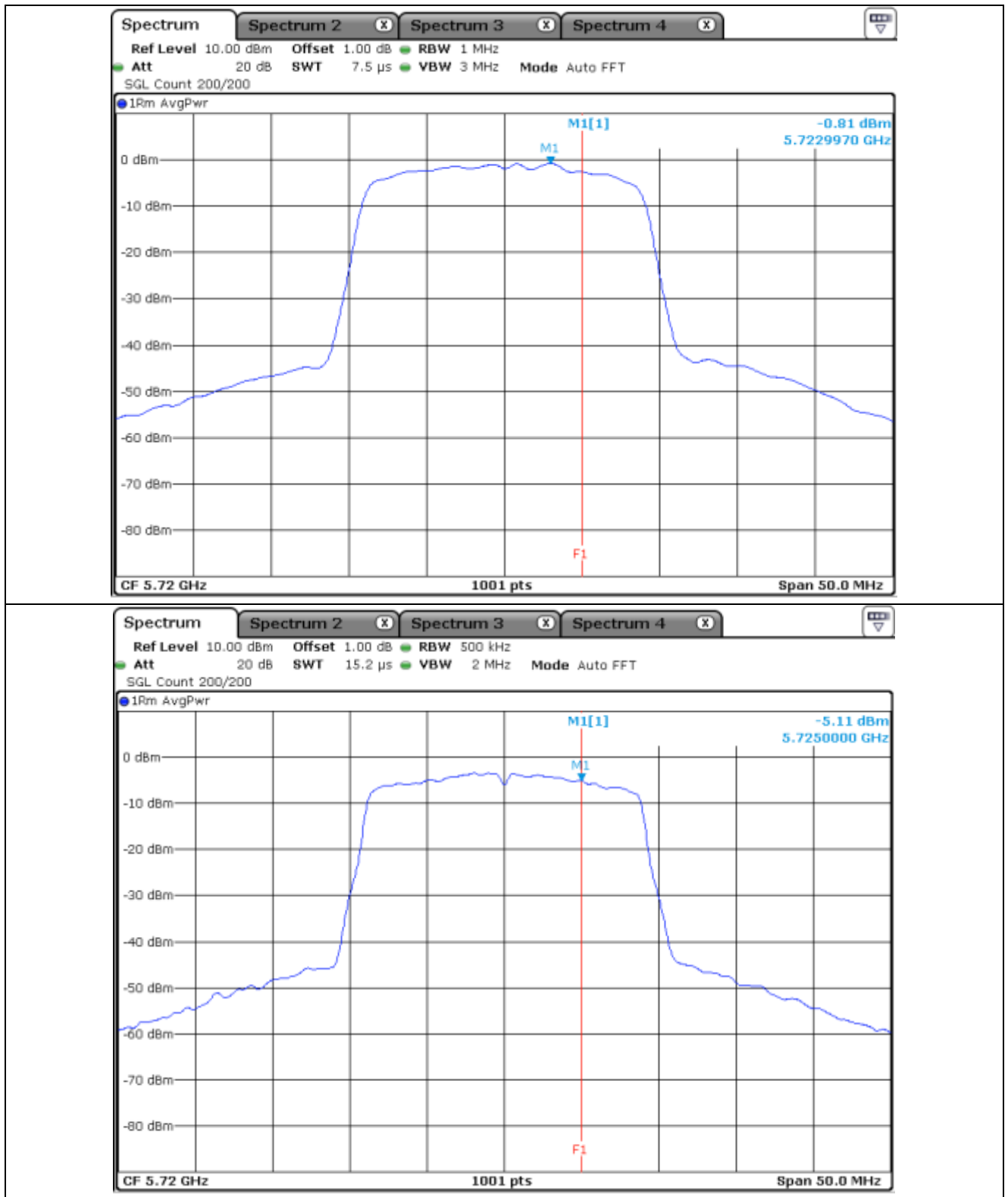
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	-0.81	11.00	11.81
5 725 ~ 5 850	5 720.00	-5.11	30.00	35.11

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.5.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	2.14	11.00	8.86
5 725 ~ 5 850	5 720.00	-2.23	30.00	32.23



Tested by: Ha-Ram, Lee / Assistant Manager

10.6 Test data for 802.11n_HT40 RLAN Mode

10.6.1 Test data for Antenna 0

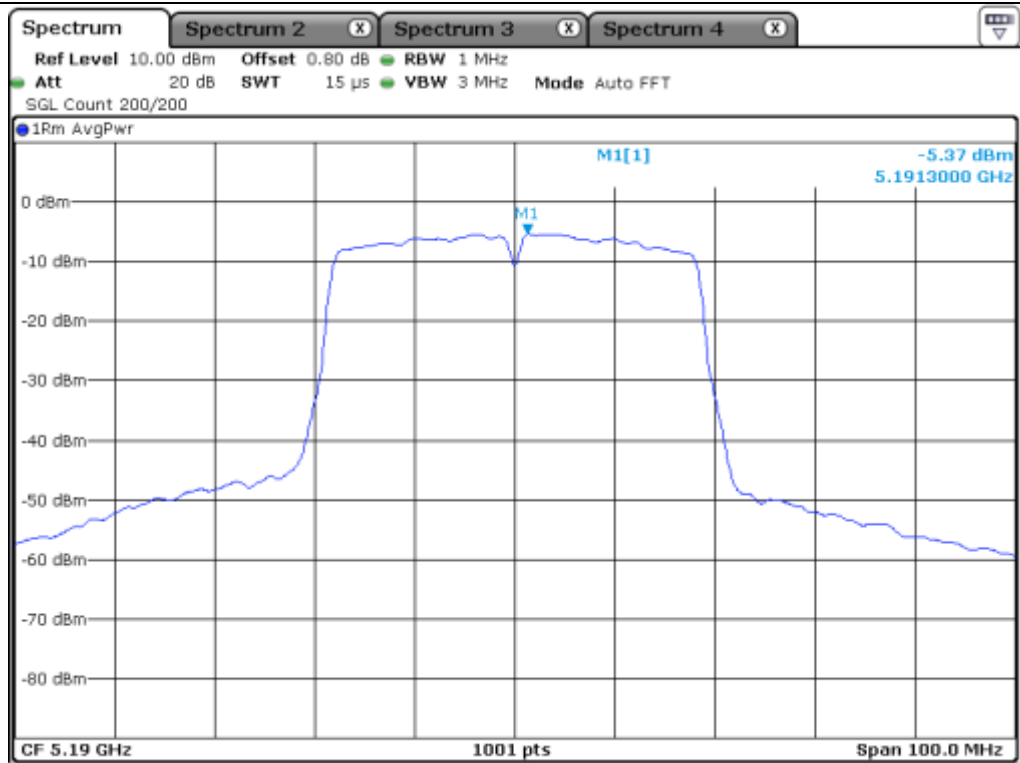
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	-5.37	11.00	16.37
	High	5 230.00	-5.12	11.00	16.12
5 250 ~ 5 350	Low	5 270.00	-5.19	11.00	16.19
	High	5 310.00	-4.87	11.00	15.87
5 470 ~ 5 725	Low	5 510.00	-5.23	11.00	16.23
	Middle	5 550.00	-4.94	11.00	15.94
	High	5 670.00	-5.15	11.00	16.15
5 725 ~ 5 850	Low	5 755.00	-8.17	30.00	38.17
	High	5 795.00	-7.74	30.00	37.74

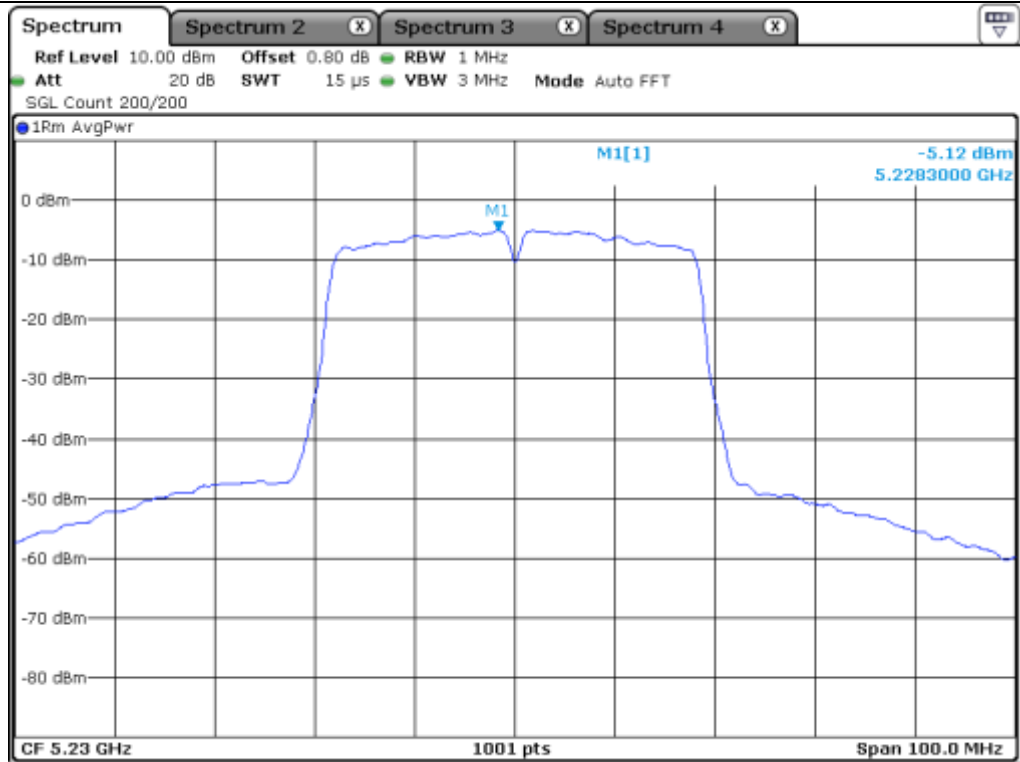
Remark: See next page for measurement data.



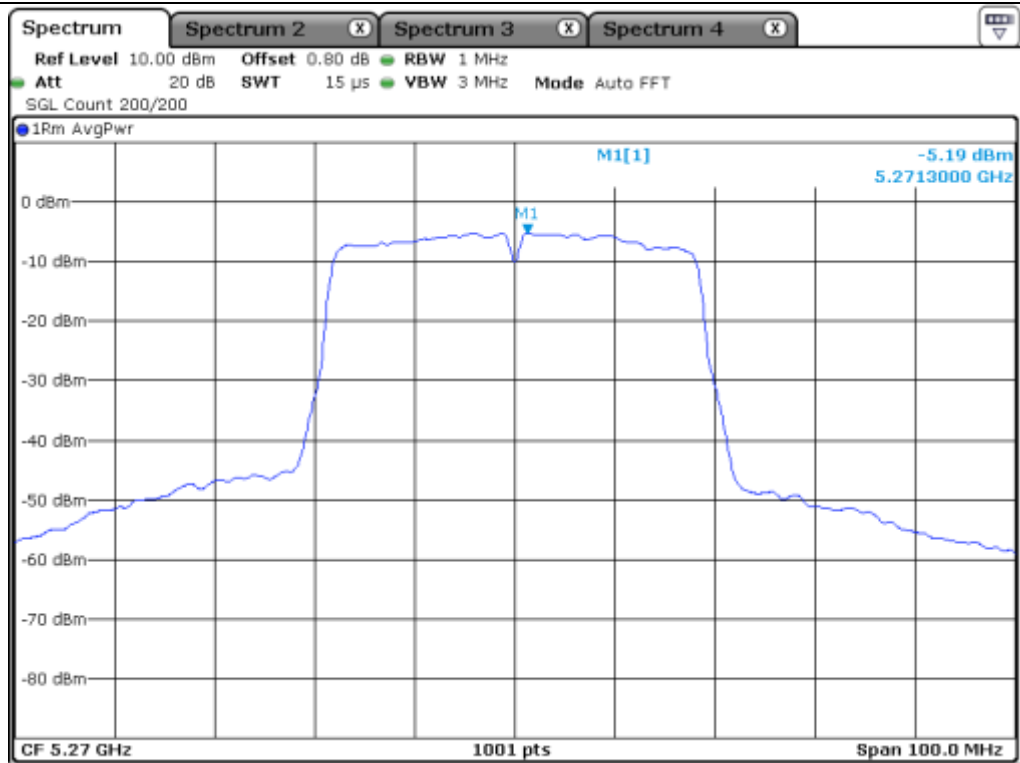
Tested by: Ha-Ram, Lee / Assistant Manager



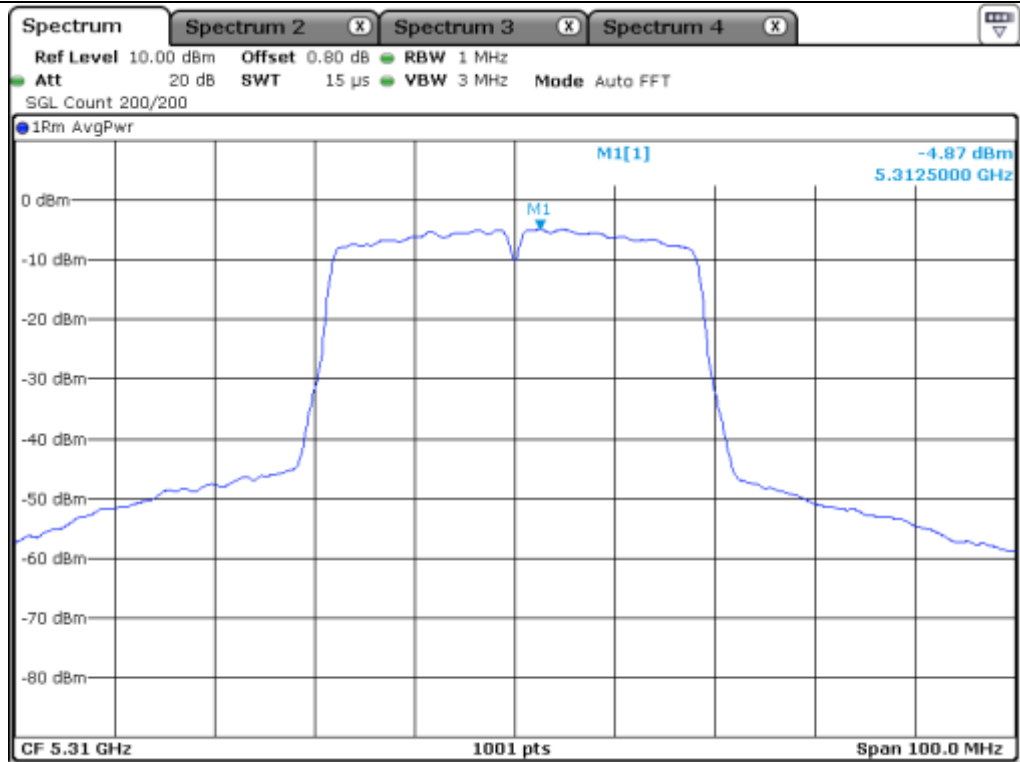
Low Channel (5 190 MHz)



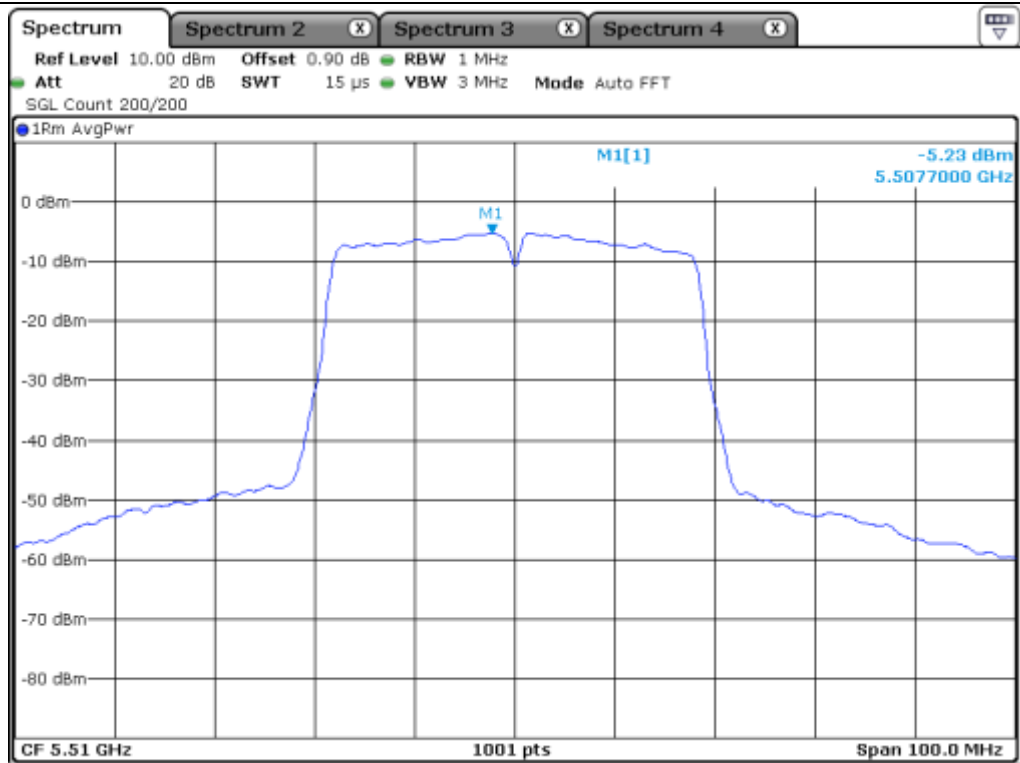
High Channel (5 230 MHz)



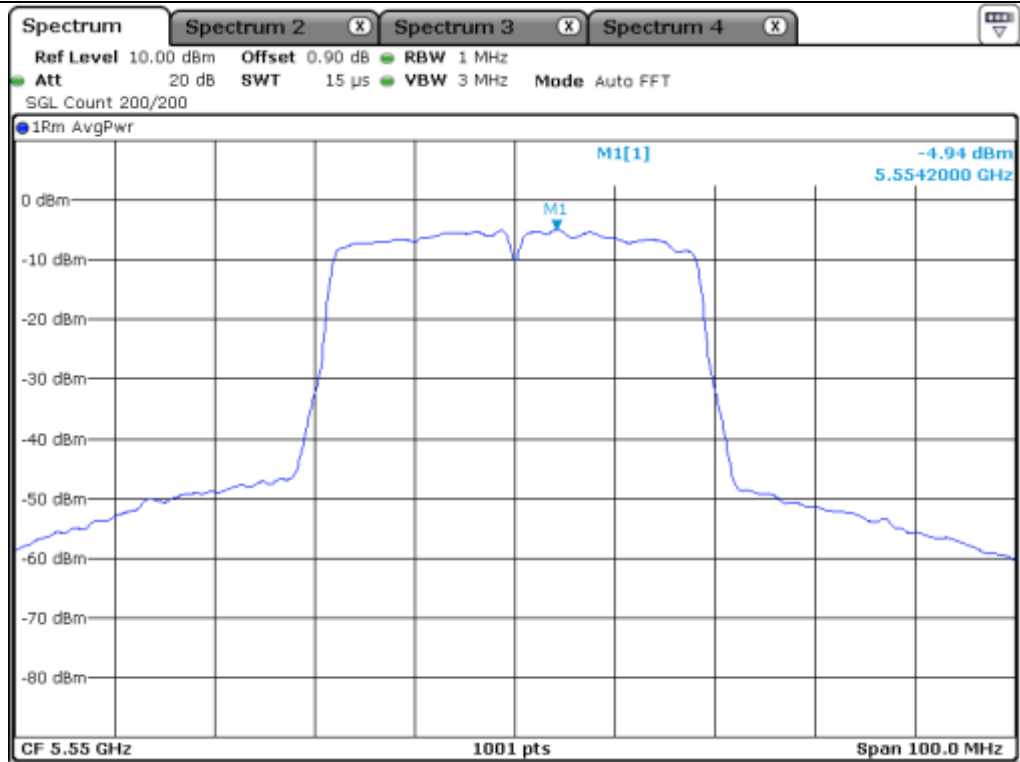
Low Channel (5 270 MHz)



High Channel (5 310 MHz)



Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)

