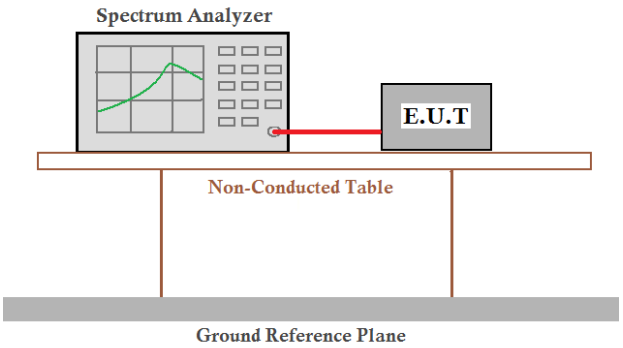
4.6 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407(a)(1)/ (a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	

Frequency band (MHz)	Limit
5150-5250	≤17dBm/1MHz for master device
	≤11dBm/1MHz for client device
5250-5350	≤11dBm/1MHz for client device
5470-5725	≤11dBm/1MHz for client device
5725-5850	≤30dBm/500kHz

Test setup:



Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.3°C	Humid.:51%RH
Test voltage:	DC 5V	
Test results:	Pass	

Measurement Result

Module: WB800D.3(ANT2)

5180-5240MHz

Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Measured Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	4.843	0.00	4.843	11
	5200 MHz	4.537	0.00	4.537	11
	5240 MHz	2.889	0.00	2.889	11
802.11 n20	5180 MHz	2.159	0.00	2.159	11
	5200 MHz	3.129	0.00	3.129	11
	5240 MHz	2.548	0.00	2.548	11
802.11 ac20	5180 MHz	1.783	0.00	1.783	11
	5200 MHz	2.708	0.00	2.708	11
	5240 MHz	2.475	0.00	2.475	11
802.11 n40	5190 MHz	-1.669	0.00	-1.669	11
	5230 MHz	-0.804	0.00	-0.804	11
802.11 ac40	5190 MHz	-1.857	0.00	-1.857	11
	5230 MHz	-1.639	0.00	-1.639	11
802.11 ac80	5210 MHz	-6.123	0.00	-6.123	11

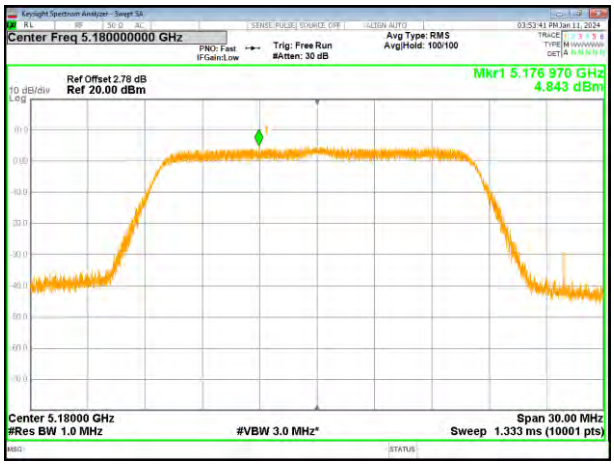
Module: WB663U.1(ANT4)

5180-5240MHz

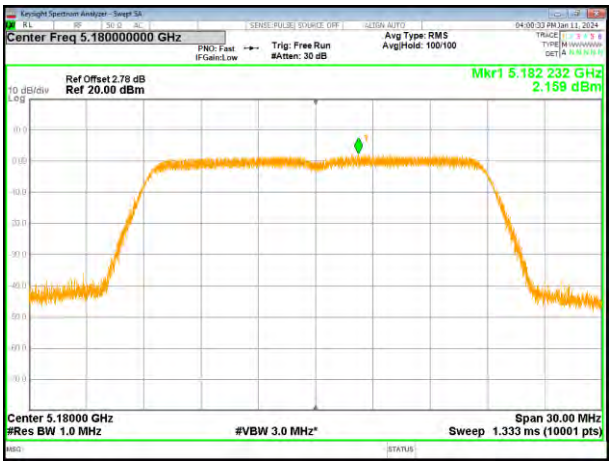
Mode	Frequency	Measured Power Density (dBm/MHz)	Correction Factor (dB)	Total Measured Power Density (dBm/MHz)	Limit (dBm/MHz)
802.11 a	5180 MHz	1.662	0.00	1.662	11
	5200 MHz	1.651	0.00	1.651	11
	5240 MHz	1.436	0.00	1.436	11
802.11 n20	5180 MHz	2.645	0.00	2.645	11
	5200 MHz	1.615	0.00	1.615	11
	5240 MHz	1.896	0.00	1.896	11
802.11 ac20	5180 MHz	-1.511	0.00	-1.511	11
	5200 MHz	-1.084	0.00	-1.084	11
	5240 MHz	1.792	0.00	1.792	11
802.11 n40	5190 MHz	1.971	0.00	1.971	11
	5230 MHz	1.845	0.00	1.845	11
802.11 ac40	5190 MHz	-1.661	0.00	-1.661	11
	5230 MHz	-2.421	0.00	-2.421	11
802.11 ac80	5210 MHz	-6.925	0.00	-6.925	11

Module: WB800D.3(ANT2)

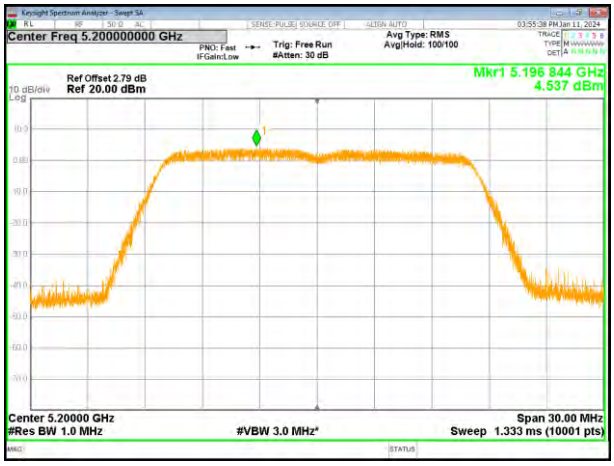
(802.11a) PSD plot on channel 36



(802.11n20) PSD plot on channel 36

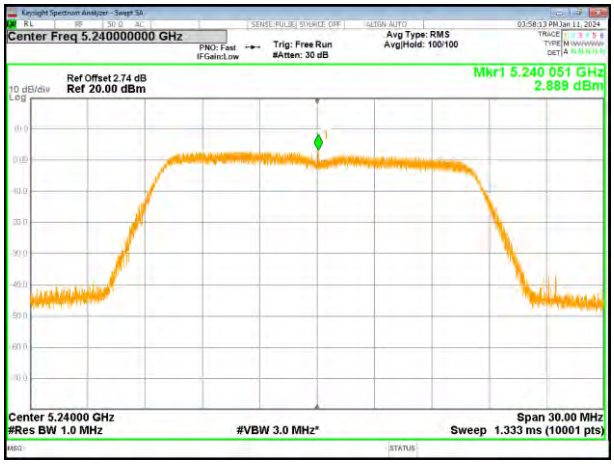


(802.11a) PSD plot on channel 40

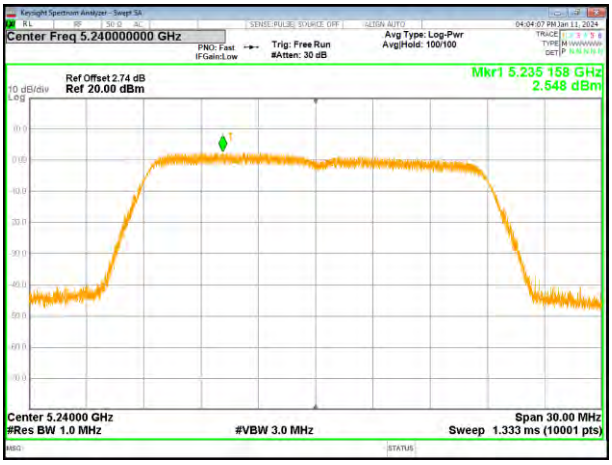


(802.11n20) PSD plot on channel 40

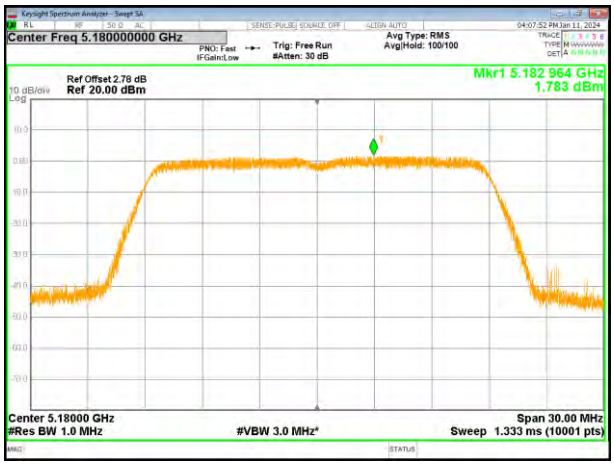
(802.11a) PSD plot on channel 48



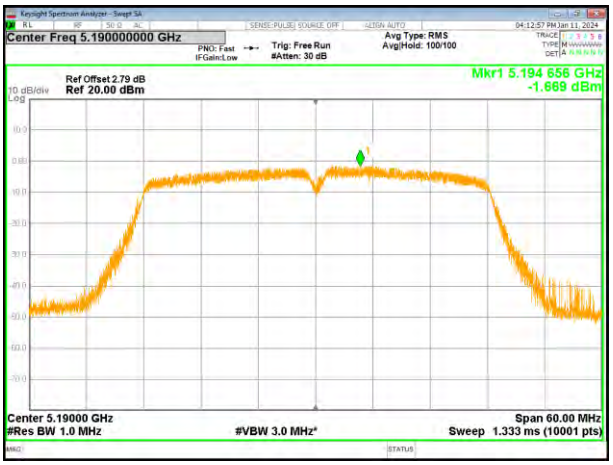
(802.11n20) PSD plot on channel 48



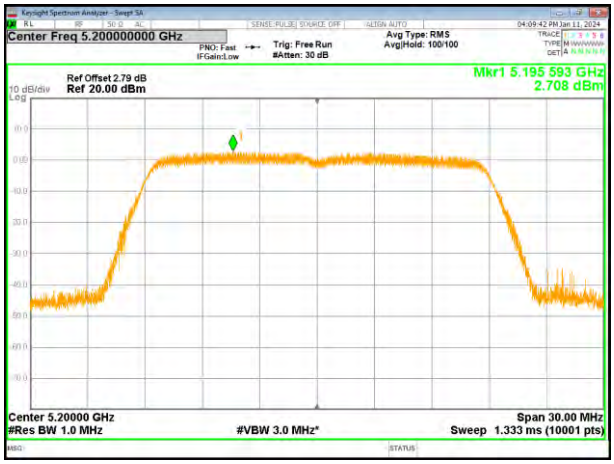
(802.11ac20) PSD plot on channel 36



(802.11n40) PSD plot on channel 38



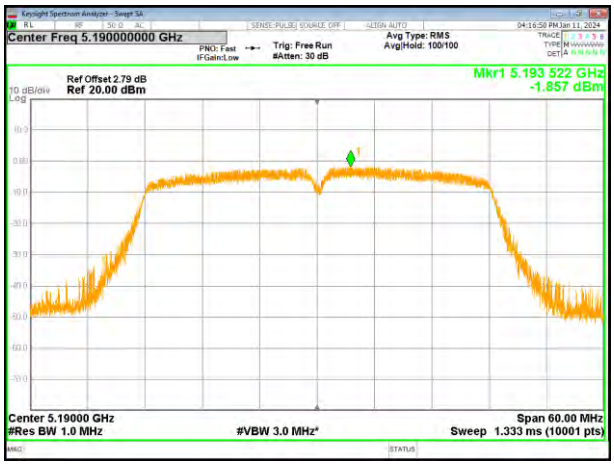
(802.11ac20) PSD plot on channel 40



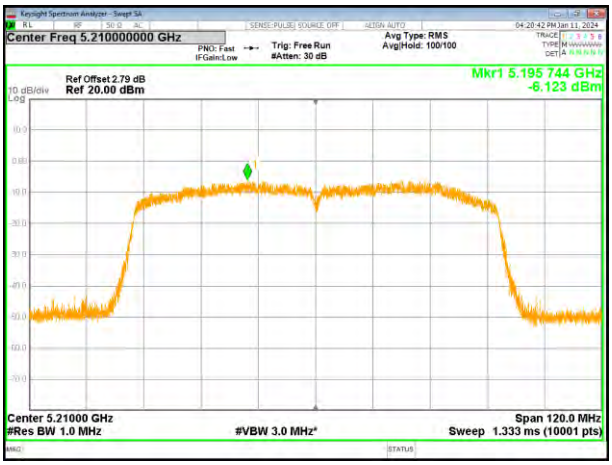
(802.11n40) PSD plot on channel 46

(802.11ac20) PSD plot on channel 48

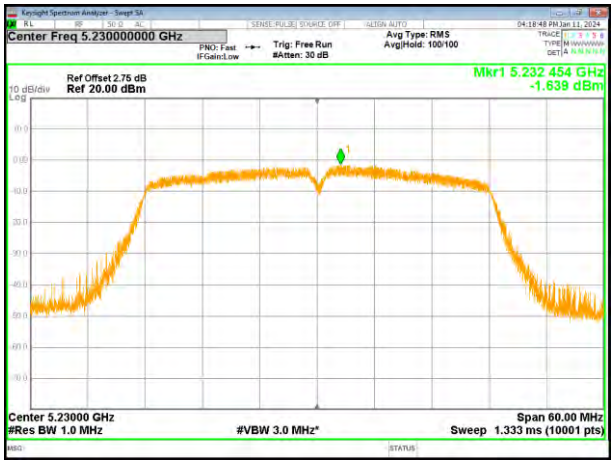
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42

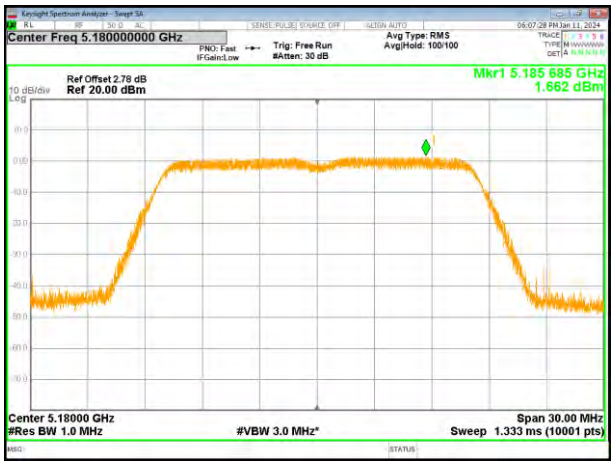


(802.11ac40) PSD plot on channel 46

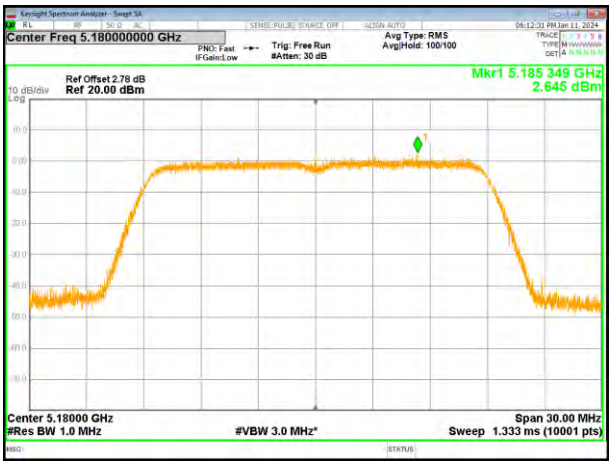


Module: WB663U.1(ANT4)

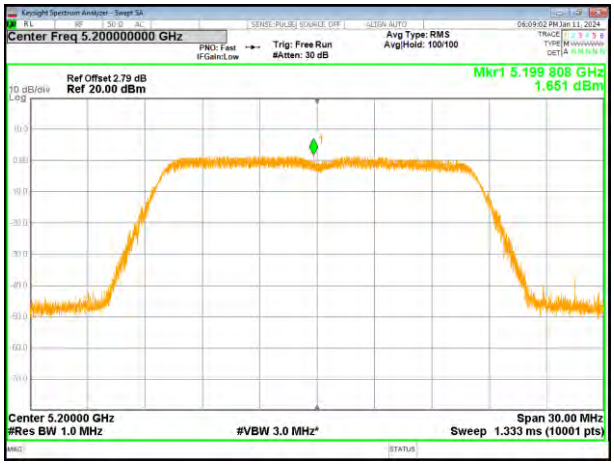
(802.11a) PSD plot on channel 36



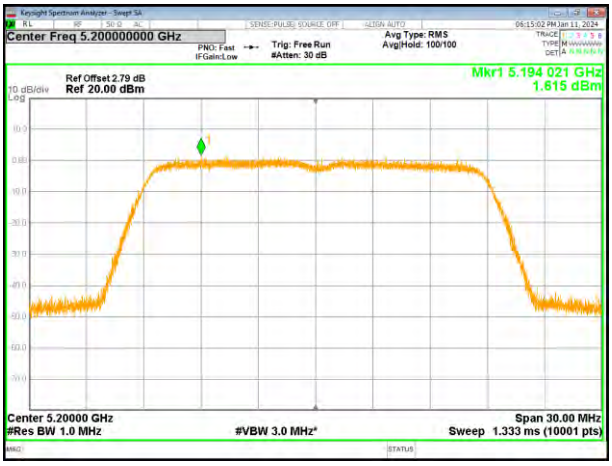
(802.11n20) PSD plot on channel 36



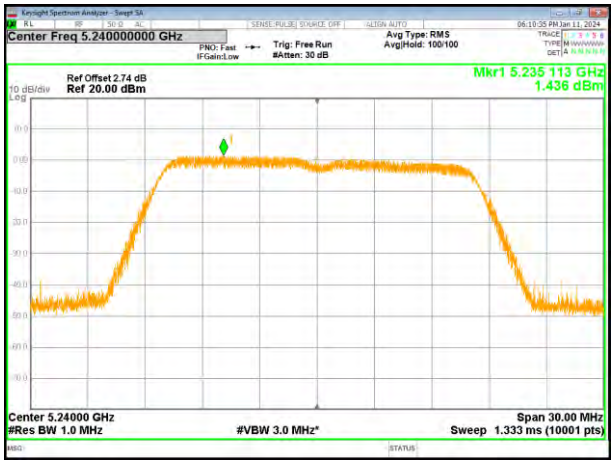
(802.11a) PSD plot on channel 40



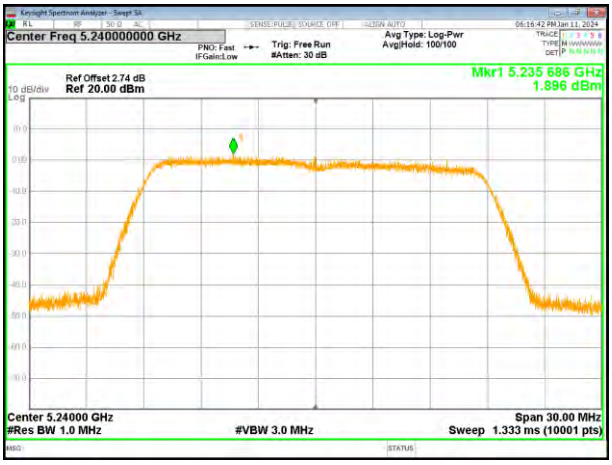
(802.11n20) PSD plot on channel 40



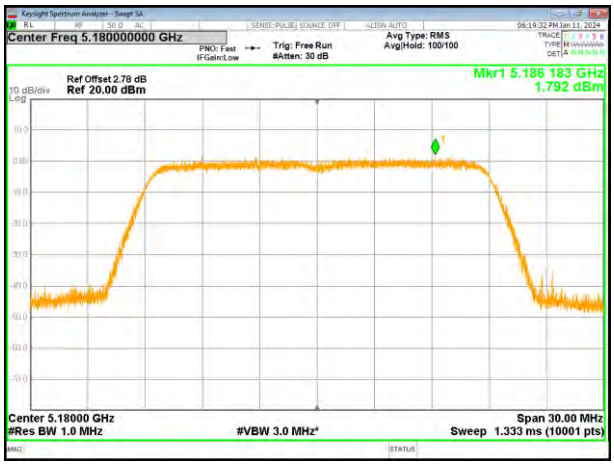
(802.11a) PSD plot on channel 48



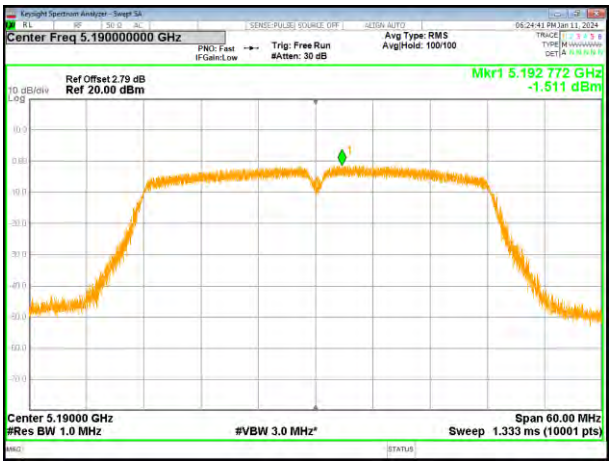
(802.11n20) PSD plot on channel 48



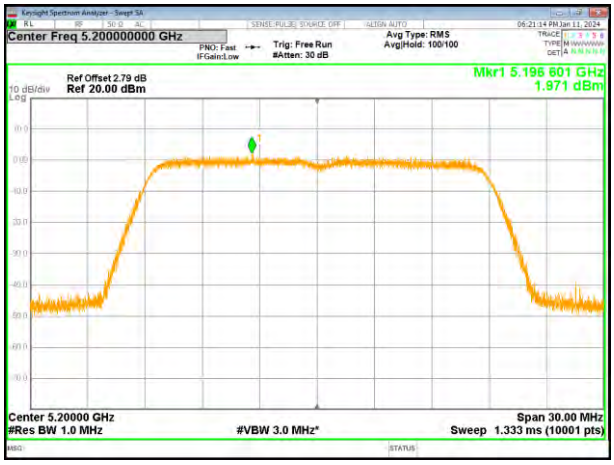
(802.11ac20) PSD plot on channel 36



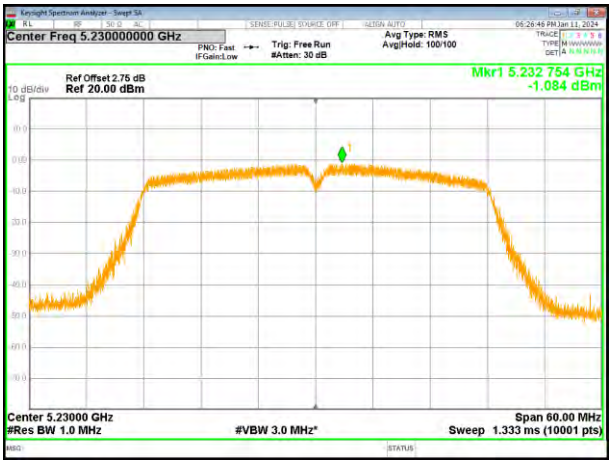
(802.11n40) PSD plot on channel 38



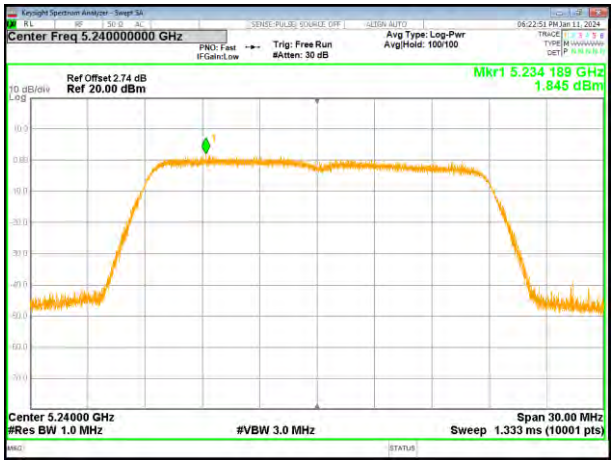
(802.11ac20) PSD plot on channel 40



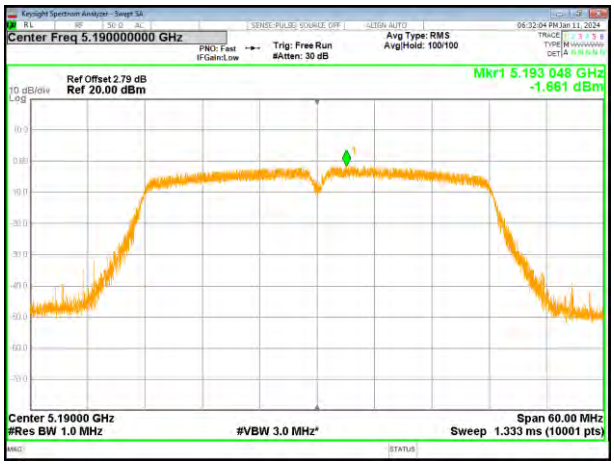
(802.11n40) PSD plot on channel 46



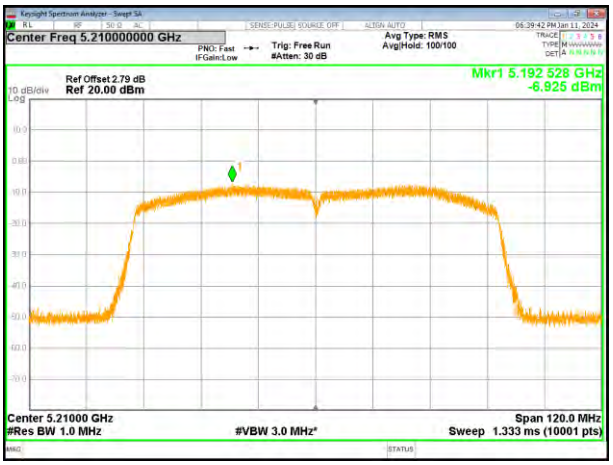
(802.11ac20) PSD plot on channel 48



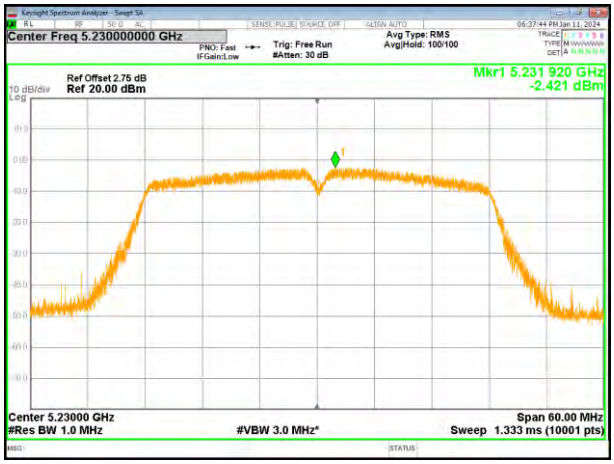
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



(802.11ac40) PSD plot on channel 46



5745-55825MHz

Module: WB800D.3(ANT2)

Mode	Frequency	Measured Power Density (dBm/510KHz)	Measured Power Density (dBm/500KHz)	Correction Factor (dB)	Total Measured Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-0.383	-0.469	0.00	-0.469	30
	5785 MHz	-0.421	-0.507	0.00	-0.507	30
	5825 MHz	-0.228	-0.314	0.00	-0.314	30
802.11 n20	5745 MHz	-0.072	-0.158	0.00	-0.158	30
	5785 MHz	-0.113	-0.199	0.00	-0.199	30
	5825 MHz	-0.481	-0.567	0.00	-0.567	30
802.11ac20	5745 MHz	-4.626	-4.712	0.00	-4.712	30
	5785 MHz	-4.809	-4.895	0.00	-4.895	30
	5825 MHz	-0.767	-0.853	0.00	-0.853	30
802.11 n40	5755 MHz	-0.831	-0.917	0.00	-0.917	30
	5795 MHz	-0.366	-0.452	0.00	-0.452	30
802.11ac40	5755 MHz	-6.754	-6.84	0.00	-6.84	30
	5795 MHz	-6.519	-6.605	0.00	-6.605	30
802.11ac80	5775 MHz	-6.487	-6.573	0.00	-6.573	30

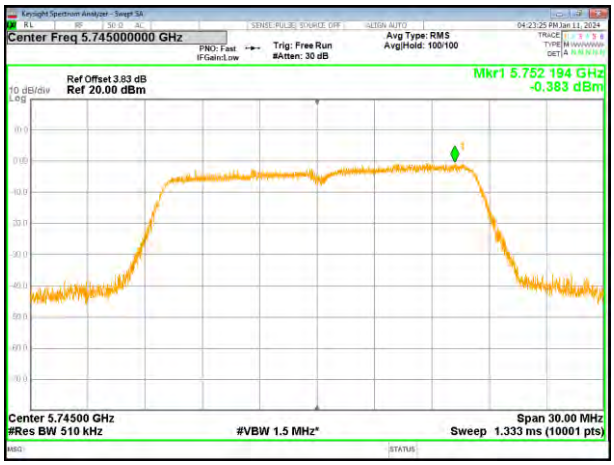
Module: WB663U.1(ANT4)

Mode	Frequency	Measured Power Density (dBm/510KHz)	Measured Power Density (dBm/500KHz)	Correction Factor (dB)	Total Measured Power Density (dBm/500KHz)	Limit (dBm/MHz)
802.11 a	5745 MHz	-0.689	-0.775	0.00	-0.775	30
	5785 MHz	-0.851	-0.937	0.00	-0.937	30
	5825 MHz	-1.053	-1.139	0.00	-1.139	30
802.11 n20	5745 MHz	-1.116	-1.202	0.00	-1.202	30
	5785 MHz	-0.88	-0.966	0.00	-0.966	30
	5825 MHz	-0.629	-0.715	0.00	-0.715	30
802.11ac20	5745 MHz	-5.411	-5.497	0.00	-5.497	30
	5785 MHz	-5.773	-5.859	0.00	-5.859	30
	5825 MHz	-0.976	-1.062	0.00	-1.062	30
802.11 n40	5755 MHz	-1.363	-1.449	0.00	-1.449	30
	5795 MHz	-1.138	-1.224	0.00	-1.224	30
802.11ac40	5755 MHz	-5.262	-5.348	0.00	-5.348	30
	5795 MHz	-5.774	-5.860	0.00	-5.860	30
802.11ac80	5775 MHz	-9.408	-9.494	0.00	-9.494	30

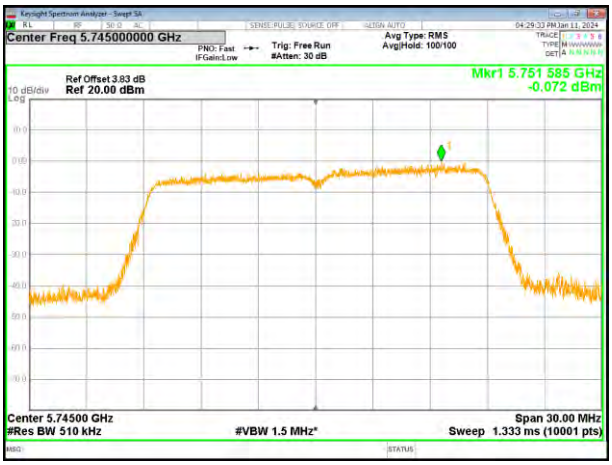
Note: If the measurement is X dBm/510kHz, thus X dBm/510kHz = $(10^{X/10})$*(500 / 510) dBm/500kHz

Module: WB800D.3(ANT2)

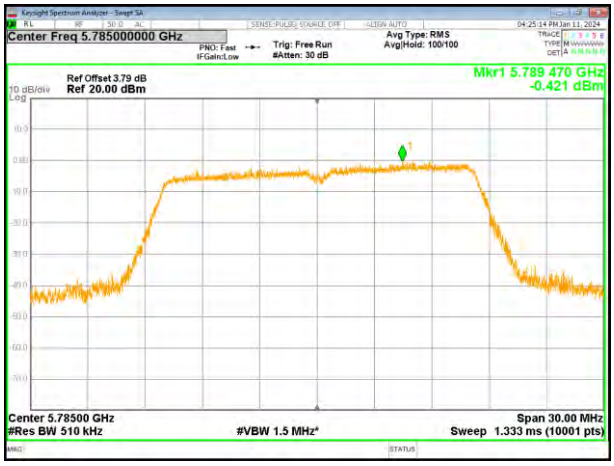
(802.11a) PSD plot on channel 149



(802.11n20) PSD plot on channel 149

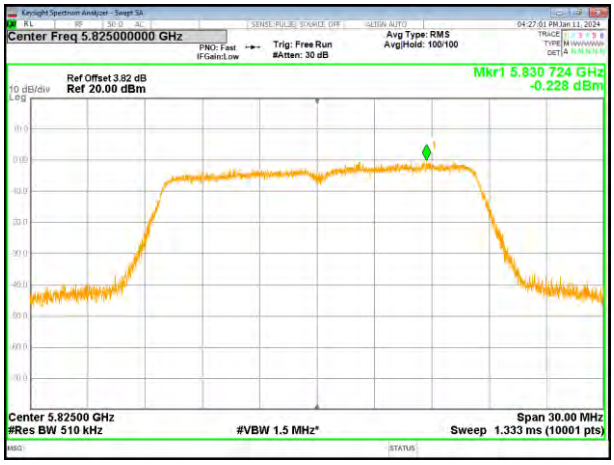


(802.11a) PSD plot on channel 157

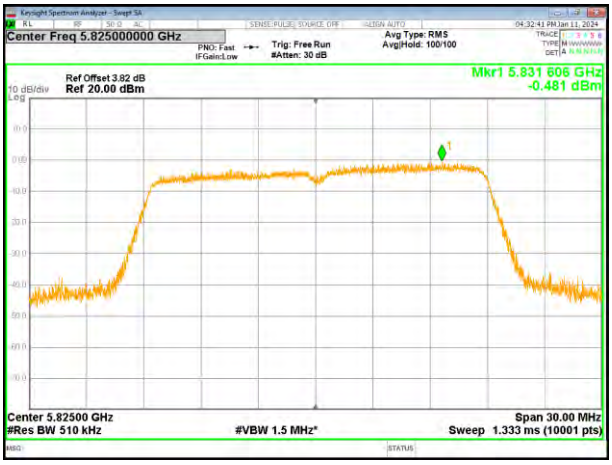


(802.11n20) PSD plot on channel 157

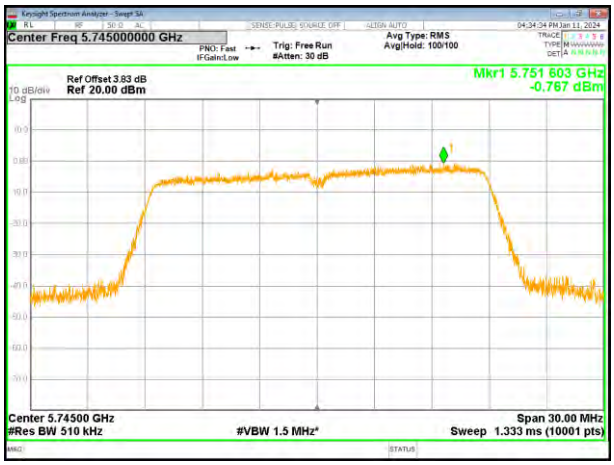
(802.11a) PSD plot on channel 165



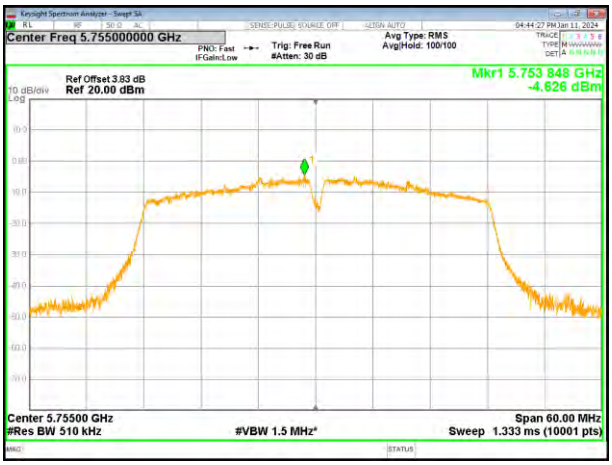
(802.11n20) PSD plot on channel 165



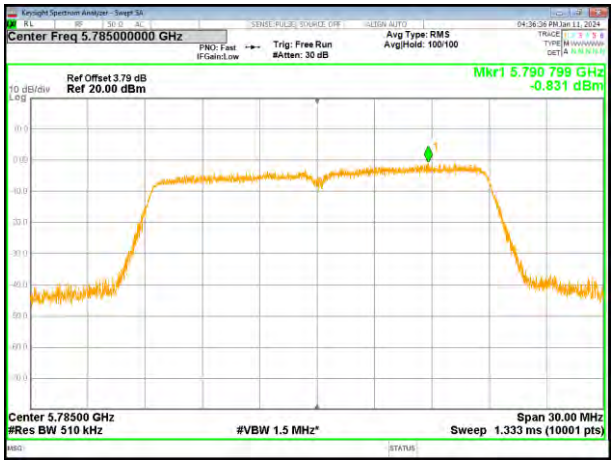
(802.11ac20) PSD plot on channel 149



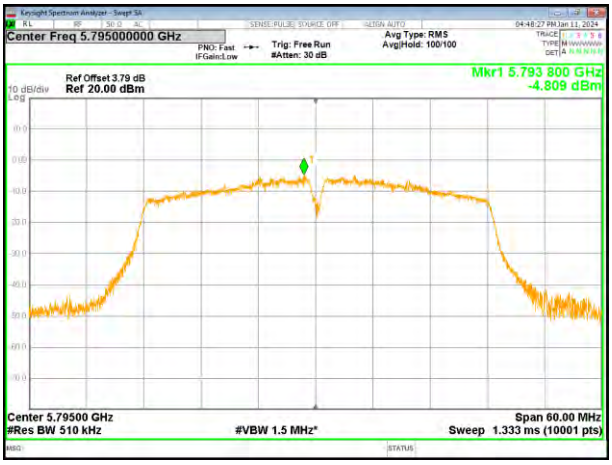
(802.11n40) PSD plot on channel 151



(802.11ac20) PSD plot on channel 157

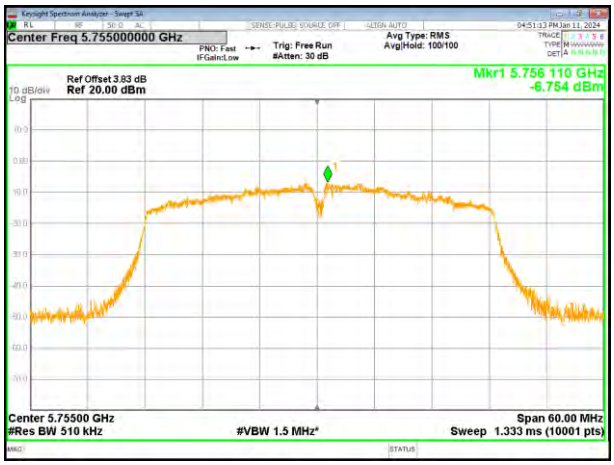


(802.11n40) PSD plot on channel 159

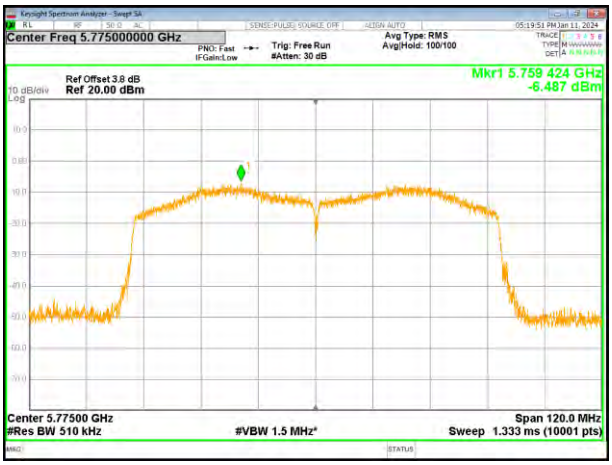


(802.11ac20) PSD plot on channel 165

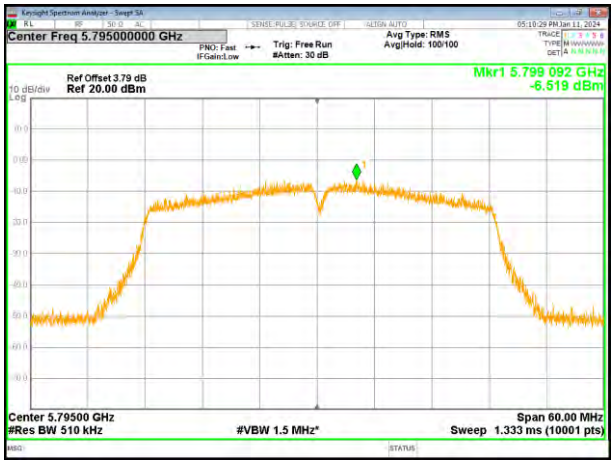
(802.11ac40) PSD plot on channel 151



(802.11ac80) PSD plot on channel 155

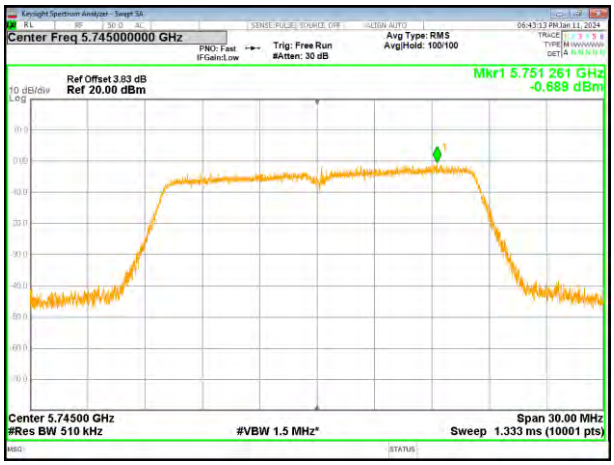


(802.11ac40) PSD plot on channel 159

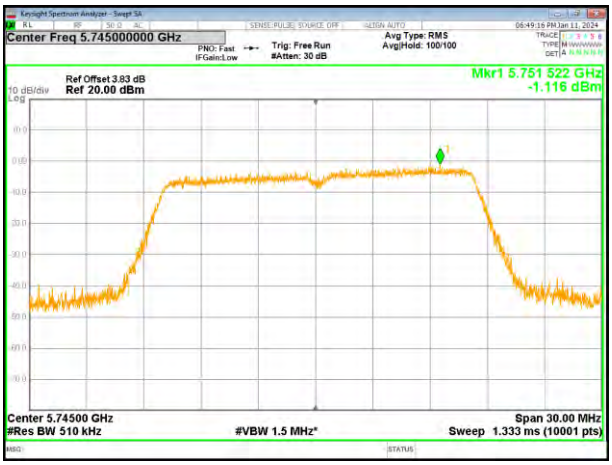


Module: WB663U.1(ANT4)

(802.11a) PSD plot on channel 149

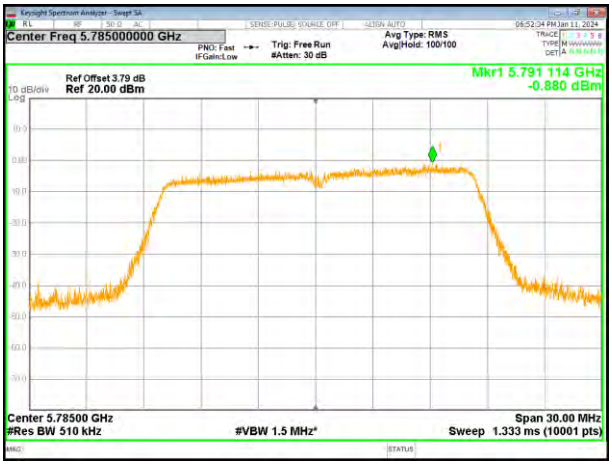


(802.11n20) PSD plot on channel 149



(802.11a) PSD plot on channel 157

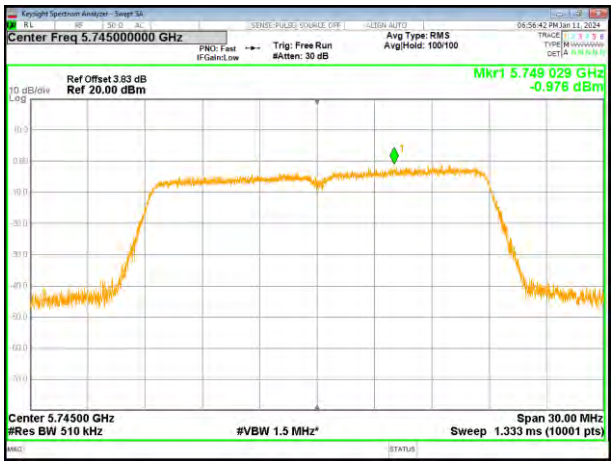
(802.11n20) PSD plot on channel 157



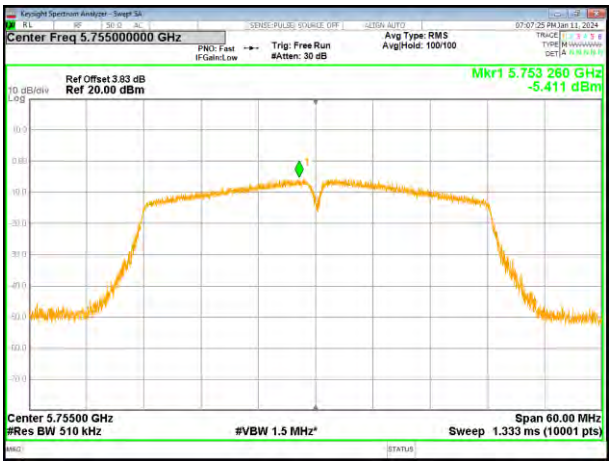
(802.11a) PSD plot on channel 165

(802.11n20) PSD plot on channel 165

(802.11ac20) PSD plot on channel 149

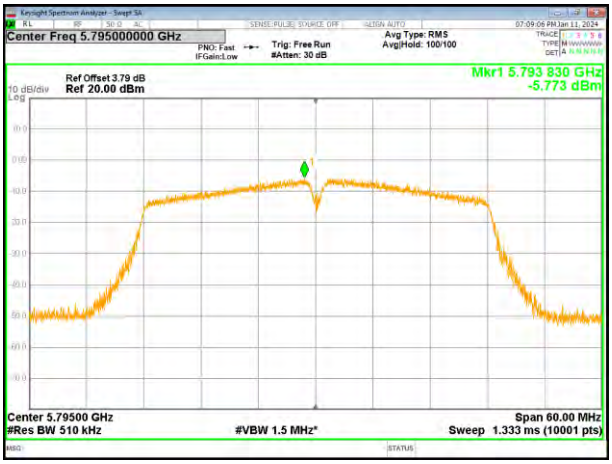


(802.11n40) PSD plot on channel 151



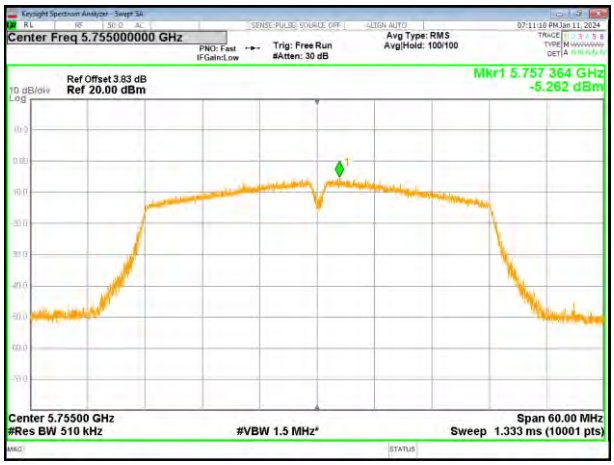
(802.11ac20) PSD plot on channel 157

(802.11n40) PSD plot on channel 159

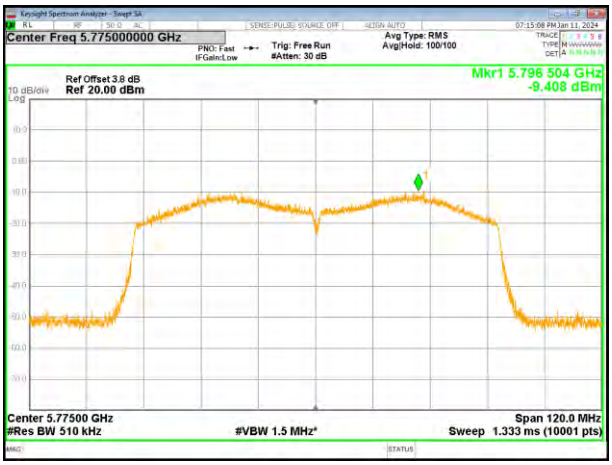


(802.11ac20) PSD plot on channel 165

(802.11ac40) PSD plot on channel 151



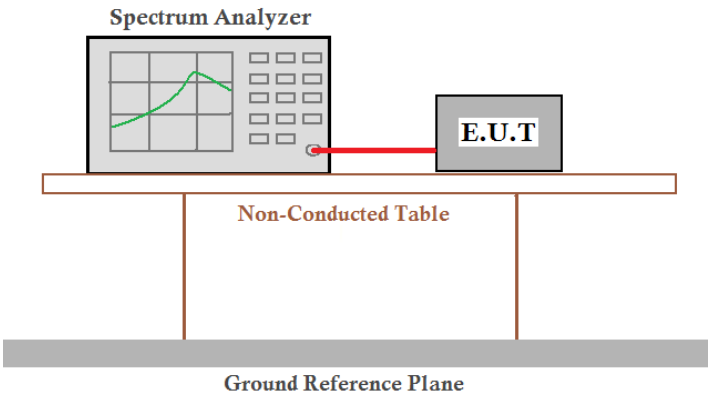
(802.11ac80) PSD plot on channel 155



(802.11ac40) PSD plot on channel 159

4.7 Band edge

4.7.1 Conducted test Method

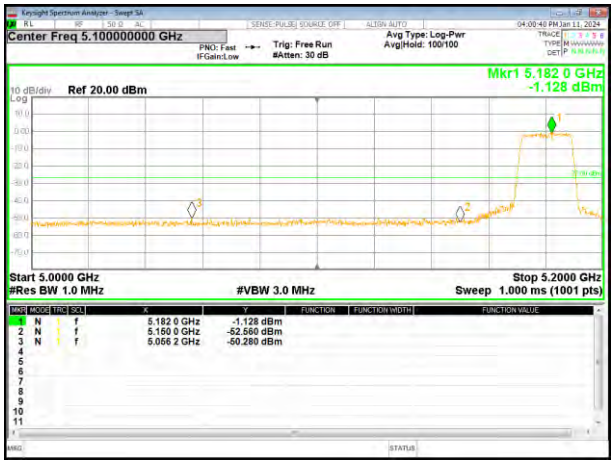
Test Requirement:	FCC Part15 C Section 15.209 and 15.205	
Test Method:	ANSI C63.10: 2013	
Limit:	All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	
Test setup:		
Test Procedure:	1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range. 3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span. 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. 5. Repeat above procedures until all measured frequencies were complete..	
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.3°C	Humid.:51%RH
Test voltage:	DC 5V	
Test results:	Pass	

Module: WB800D.3(ANT2)

5.180~5.240 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

(802.11n40) Band Edge, Right Side

(802.11ac40) Band Edge, Left Side

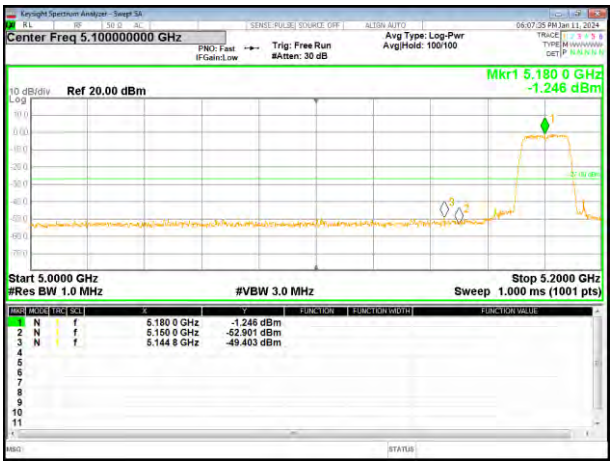
(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

Remark: Test data Margin greater than antenna gain +cable loss.

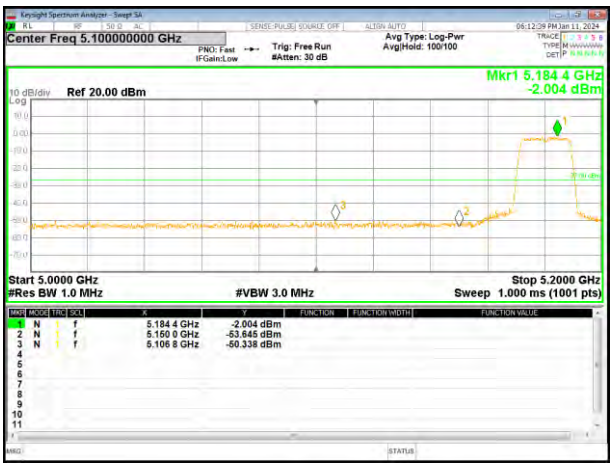
Module: WB663U.1(ANT4)

(802.11a) Band Edge, Left Side

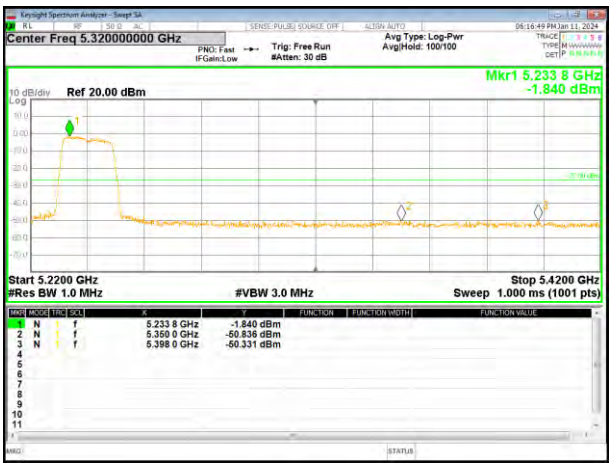


(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side



(802.11n20) Band Edge, Right Side



(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

(802.11n40) Band Edge, Right Side

(802.11ac40) Band Edge, Left Side

(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

Remark: Test data Margin greater than antenna gain +cable loss.

Module: WB800D.3(ANT2)

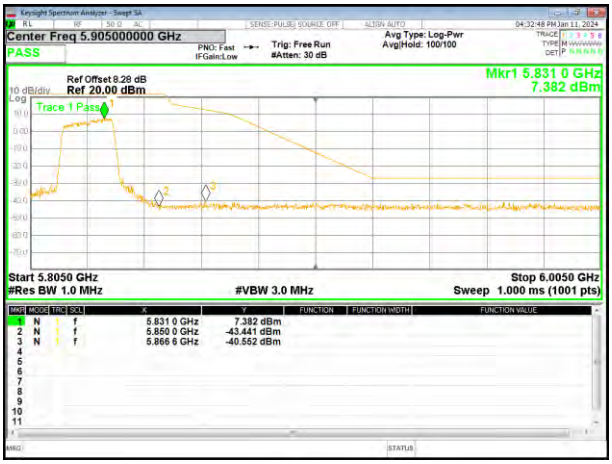
5.745~5.825 GHz

(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

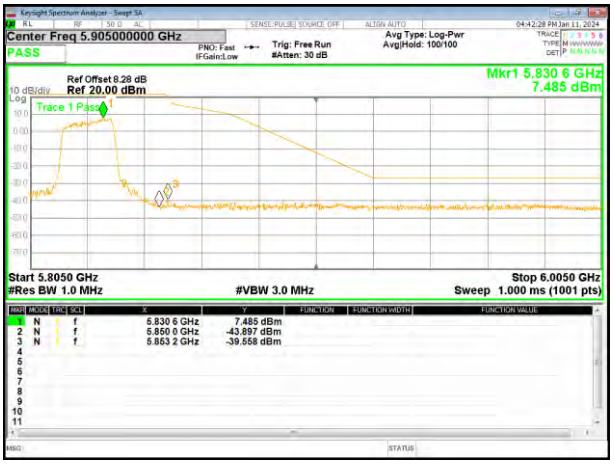
(802.11n20) Band Edge, Right Side



(802.11ac20) Band Edge, Left Side

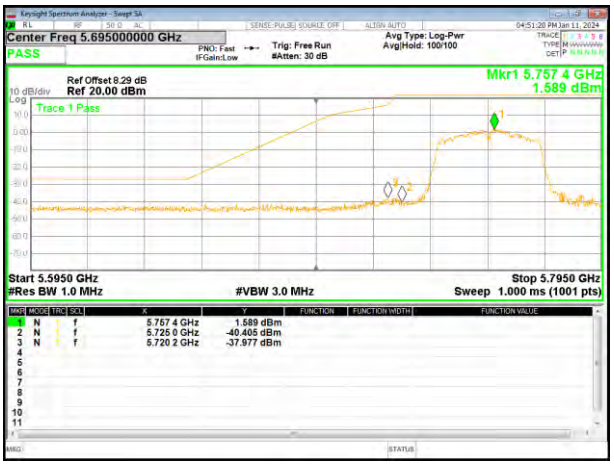
(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side



(802.11n40) Band Edge, Right Side

(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

Remark: Ref Offset including antenna gain and cable loss.

Module: WB663U.1(ANT4)

5.745~5.825 GHz

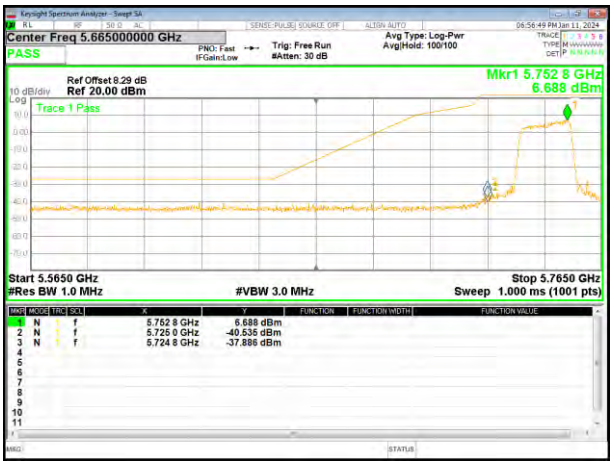
(802.11a) Band Edge, Left Side

(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

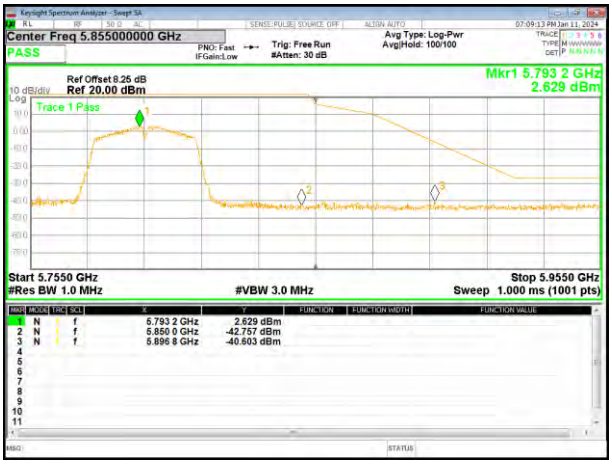
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Right Side

(802.11n40) Band Edge, Right Side



(802.11ac40) Band Edge, Left Side

(802.11ac80) Band Edge

(802.11ac40) Band Edge, Right Side

Remark: Ref Offset including antenna gain and cable loss.

4.8 Spurious Emission

4.8.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

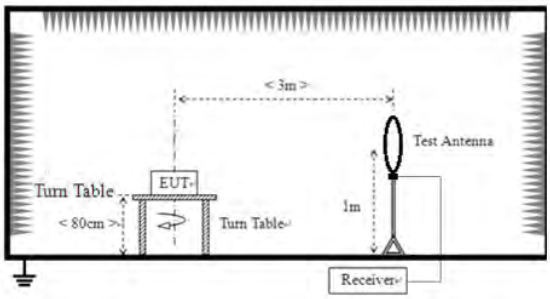
Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	

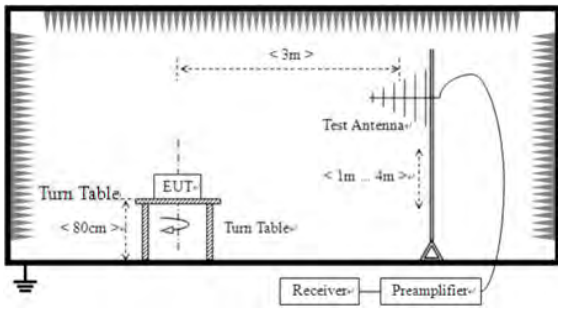
Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	-27.0	Peak Value

Test setup:

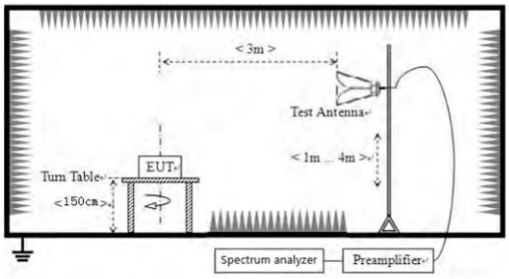
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz

	
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remarks:

1. *The report only shows the worst mode.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

Measurement Data:

9 kHz ~ 30 MHz

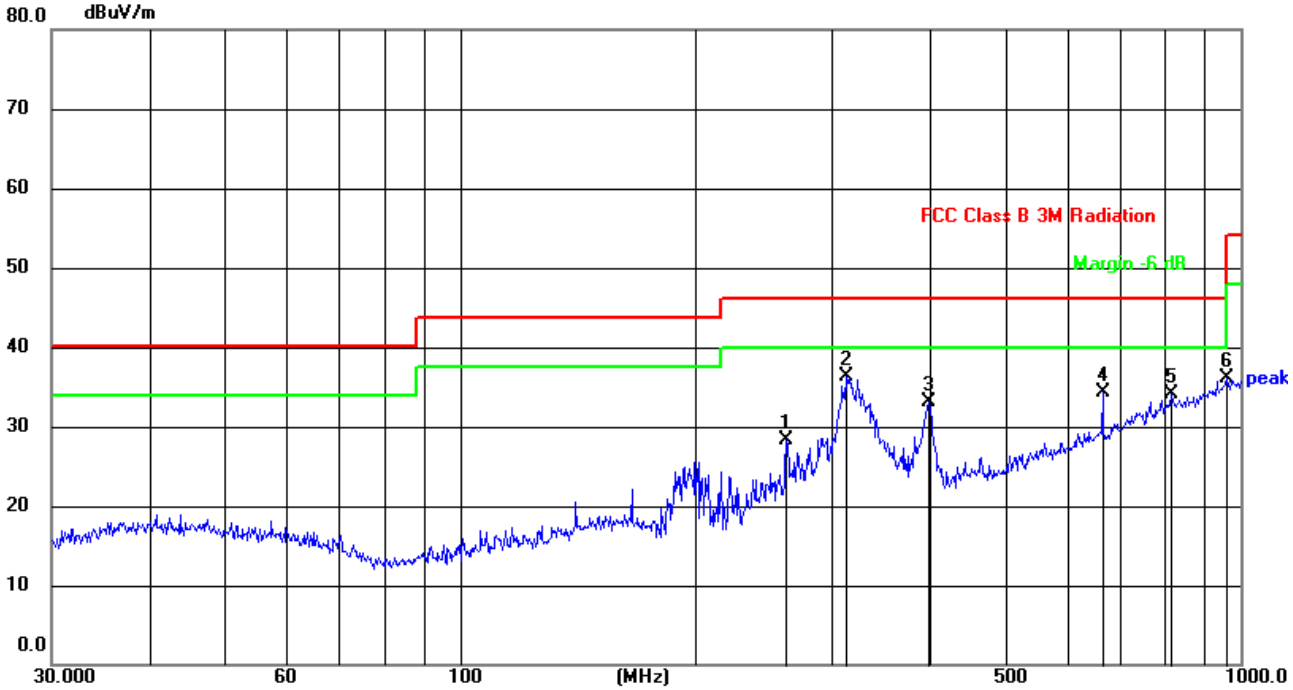
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Below 1GHz

Remark: The test data shows only the worst case (ANT2+ANT4:802.11a 5180MHz) mode.

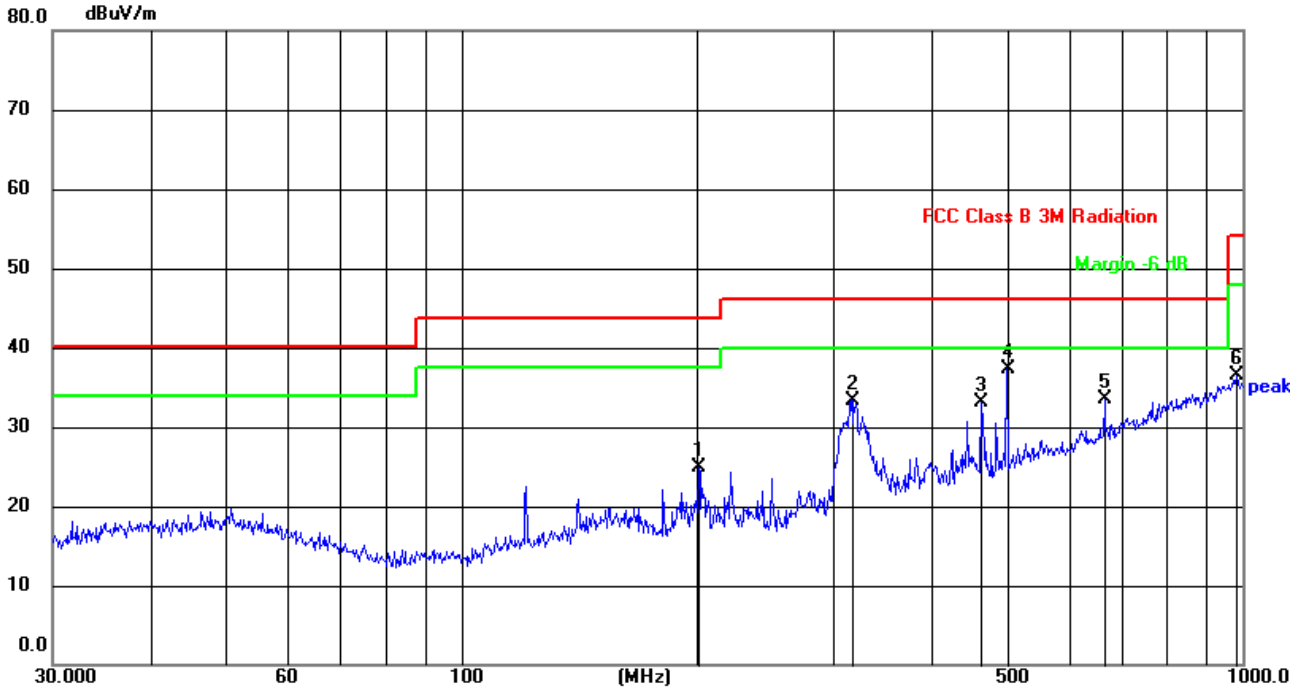
Temperature:	24.3℃	Relative Humidity:	51%
Pressure:	101.2kPar	Test Voltage :	DC 5V
Test Mode :	TX- 802.11a (5180MHz)		

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	261.9752	50.23	-21.99	28.24	46.00	-17.76	QP
2	312.1794	56.13	-19.78	36.35	46.00	-9.65	QP
3	399.0302	50.41	-17.32	33.09	46.00	-12.91	QP
4	665.8034	44.38	-10.13	34.25	46.00	-11.75	QP
5	815.9678	40.62	-6.43	34.19	46.00	-11.81	QP
6	958.7943	39.84	-3.73	36.11	46.00	-9.89	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	201.3930	48.28	-23.39	24.89	43.50	-18.61	QP
2	315.4808	53.04	-19.64	33.40	46.00	-12.60	QP
3	462.3455	48.58	-15.54	33.04	46.00	-12.96	QP
4	499.4247	51.48	-14.23	37.25	46.00	-8.75	QP
5	665.8035	43.57	-10.13	33.44	46.00	-12.56	QP
6	982.6200	39.92	-3.51	36.41	54.00	-17.59	QP

Remarks:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz:

Remark: The test data shows only the worst case (ANT2+ANT4:802.11a) mode.

Temperature:	24.3℃	Relative Humidity:	51%
Pressure:	101.2kPar	Test Voltage :	DC 5V
Test Mode :	5.2G TX- 802.11a		

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
Low Channel:5180MHz									
V	10360.00	49.39	46.20	8.27	38.50	49.96	68.20	-18.24	PK
V	10360.00	39.46	46.20	8.27	38.50	40.03	54.00	-13.97	AV
V	15540.00	46.51	46.30	10.35	38.70	49.26	74.00	-24.74	PK
V	15540.00	36.53	46.30	10.35	38.70	39.28	54.00	-14.72	AV
V	20720.00	55.56	57.40	11.93	37.80	47.89	68.20	-20.31	PK
V	20720.00	45.59	57.40	11.93	37.80	37.92	54.00	-16.08	AV
V	25900.00	53.22	56.50	13.45	39.70	49.87	68.20	-18.33	PK
V	25900.00	42.85	56.50	13.45	39.70	39.50	54.00	-14.50	AV
H	10360.00	49.31	46.20	8.27	38.50	49.88	68.20	-18.32	PK
H	10360.00	38.09	46.20	8.27	38.50	38.66	54.00	-15.34	AV
H	15540.00	45.53	46.30	10.35	38.70	48.28	74.00	-25.72	PK
H	15540.00	34.11	46.30	10.35	38.70	36.86	54.00	-17.14	AV
H	20720.00	57.77	57.40	11.93	37.80	50.10	68.20	-18.10	PK
H	20720.00	46.48	57.40	11.93	37.80	38.81	54.00	-15.19	AV
H	25900.00	54.24	56.50	13.45	39.70	50.89	68.20	-17.31	PK
H	25900.00	42.88	56.50	13.45	39.70	39.53	54.00	-14.47	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:5200MHz									
V	10400.00	48.45	46.20	8.27	38.50	49.02	68.20	-19.18	PK
V	10400.00	39.22	46.20	8.27	38.50	39.79	54.00	-14.21	AV
V	15600.00	46.83	46.30	10.35	38.40	49.28	74.00	-24.72	PK
V	15600.00	38.05	46.30	10.35	38.40	40.50	54.00	-13.50	AV
V	20800.00	56.77	57.40	11.93	37.80	49.10	68.20	-19.10	PK
V	20800.00	47.10	57.40	11.93	37.80	39.43	54.00	-14.57	AV
V	26000.00	51.91	56.50	13.45	39.80	48.66	68.20	-19.54	PK
V	26000.00	44.08	56.50	13.45	39.80	40.83	54.00	-13.17	AV
H	10400.00	49.04	46.20	8.27	38.50	49.61	68.20	-18.59	PK
H	10400.00	39.48	46.20	8.27	38.50	40.05	54.00	-13.95	AV
H	15600.00	46.81	46.30	10.35	38.40	49.26	74.00	-24.74	PK
H	15600.00	38.05	46.30	10.35	38.40	40.50	54.00	-13.50	AV
H	20800.00	55.72	57.40	11.93	37.80	48.05	68.20	-20.15	PK
H	20800.00	45.01	57.40	11.93	37.80	37.34	54.00	-16.66	AV
H	26000.00	51.64	56.50	13.45	39.80	48.39	68.20	-19.81	PK
H	26000.00	43.29	56.50	13.45	39.80	40.04	54.00	-13.96	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5240MHz									
V	10480.00	45.27	46.20	8.27	38.60	45.94	68.20	-22.26	PK
V	10480.00	35.29	46.20	8.27	38.60	35.96	54.00	-18.04	AV
V	15720.00	42.85	46.30	10.35	38.40	45.30	74.00	-28.70	PK
V	15720.00	33.05	46.30	10.35	38.40	35.50	54.00	-18.50	AV
V	20960.00	52.91	57.40	11.93	37.50	44.94	68.20	-23.26	PK
V	20960.00	44.38	57.40	11.93	37.50	36.41	54.00	-17.59	AV
V	26200.00	48.91	56.50	13.45	40.10	45.96	68.20	-22.24	PK
V	26200.00	39.53	56.50	13.45	40.10	36.58	54.00	-17.42	AV
H	10480.00	45.51	46.20	8.27	38.60	46.18	68.20	-22.02	PK
H	10480.00	35.29	46.20	8.27	38.60	35.96	54.00	-18.04	AV
H	15720.00	43.17	46.30	10.35	38.40	45.62	74.00	-28.38	PK
H	15720.00	33.14	46.30	10.35	38.40	35.59	54.00	-18.41	AV
H	20960.00	53.10	57.40	11.93	37.50	45.13	68.20	-23.07	PK
H	20960.00	44.27	57.40	11.93	37.50	36.30	54.00	-17.70	AV
H	26200.00	48.62	56.50	13.45	40.10	45.67	68.20	-22.53	PK
H	26200.00	38.91	56.50	13.45	40.10	35.96	54.00	-18.04	AV

Remark:
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Temperature:	24.3℃	Relative Humidity:	51%
Pressure:	101.2kPar	Test Voltage :	DC 5V
Test Mode :	5.8G TX- 802.11a		

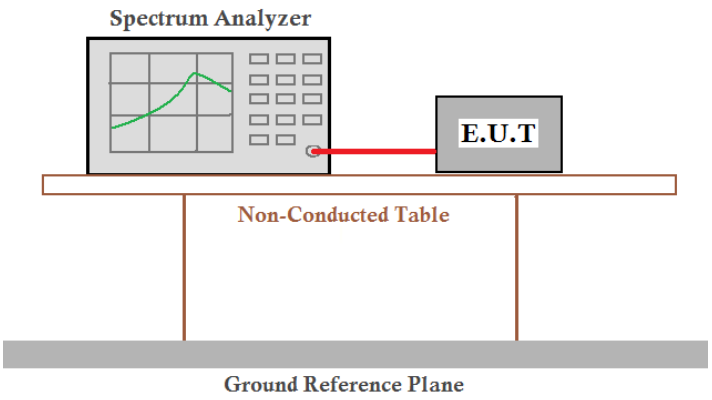
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenn Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Typ
Low Channel:5745MHz									
V	11490.00	44.60	46.10	8.77	39.10	46.37	74.00	-27.63	PK
V	11490.00	36.75	46.10	8.77	39.10	38.52	54.00	-15.48	AV
V	17235.00	42.28	47.60	11.10	38.70	44.48	68.20	-23.72	PK
V	17235.00	35.25	47.60	11.10	38.70	37.45	54.00	-16.55	AV
V	22980.00	50.69	56.90	12.73	37.70	44.22	74.00	-29.78	PK
V	22980.00	42.97	56.90	12.73	37.70	36.50	54.00	-17.50	AV
V	28725.00	47.61	55.60	14.25	40.30	46.56	68.20	-21.64	PK
V	28725.00	39.42	55.60	14.25	40.30	38.37	54.00	-15.63	AV
H	11490.00	45.07	46.10	8.77	39.10	46.84	74.00	-27.16	PK
H	11490.00	36.58	46.10	8.77	39.10	38.35	54.00	-15.65	AV
H	17235.00	43.27	47.60	11.10	38.70	45.47	68.20	-22.73	PK
H	17235.00	35.64	47.60	11.10	38.70	37.84	54.00	-16.16	AV
H	22980.00	52.82	56.90	12.73	37.70	46.35	74.00	-27.65	PK
H	22980.00	42.75	56.90	12.73	37.70	36.28	54.00	-17.72	AV
H	28725.00	49.51	55.60	14.25	40.30	48.46	68.20	-19.74	PK
H	28725.00	40.02	55.60	14.25	40.30	38.97	54.00	-15.03	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5785MHz									
V	11570.00	44.42	46.10	8.77	39.10	46.19	74.00	-27.81	PK
V	11570.00	36.57	46.10	8.77	39.10	38.34	54.00	-15.66	AV
V	17355.00	42.10	47.60	11.10	38.70	44.30	68.20	-23.90	PK
V	17355.00	35.04	47.60	11.10	38.70	37.24	54.00	-16.76	AV
V	23140.00	50.52	56.90	12.73	37.70	44.05	74.00	-29.95	PK
V	23140.00	42.79	56.90	12.73	37.70	36.32	54.00	-17.68	AV
V	28925.00	47.43	55.60	14.25	40.30	46.38	68.20	-21.82	PK
V	28925.00	39.23	55.60	14.25	40.30	38.18	54.00	-15.82	AV
H	11570.00	44.89	46.10	8.77	39.10	46.66	74.00	-27.34	PK
H	11570.00	36.39	46.10	8.77	39.10	38.16	54.00	-15.84	AV
H	17355.00	43.08	47.60	11.10	38.70	45.28	68.20	-22.92	PK
H	17355.00	35.46	47.60	11.10	38.70	37.66	54.00	-16.34	AV
H	23140.00	52.62	56.90	12.73	37.70	46.15	74.00	-27.85	PK
H	23140.00	42.58	56.90	12.73	37.70	36.11	54.00	-17.89	AV
H	28925.00	49.33	55.60	14.25	40.30	48.28	68.20	-19.92	PK
H	28925.00	39.84	55.60	14.25	40.30	38.79	54.00	-15.21	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5825MHz									
V	11650.00	45.48	46.10	8.77	39.10	47.25	74.00	-26.75	PK
V	11650.00	36.75	46.10	8.77	39.10	38.52	54.00	-15.48	AV
V	17475.00	43.42	47.90	11.23	38.90	45.65	68.20	-22.55	PK
V	17475.00	36.04	47.90	11.23	38.90	38.27	54.00	-15.73	AV
V	23300.00	52.75	57.10	12.73	37.80	46.18	68.20	-22.02	PK
V	23300.00	43.68	57.10	12.73	37.80	37.11	54.00	-16.89	AV
V	29125.00	49.59	55.80	14.25	40.50	48.54	68.20	-19.66	PK
V	29125.00	41.05	55.80	14.25	40.50	40.00	54.00	-14.00	AV
H	11650.00	47.41	46.10	8.77	39.10	49.18	74.00	-24.82	PK
H	11650.00	39.05	46.10	8.77	39.10	40.82	54.00	-13.18	AV
H	17475.00	44.59	47.90	11.23	38.90	46.82	68.20	-21.38	PK
H	17475.00	37.28	47.90	11.23	38.90	39.51	54.00	-14.49	AV
H	23300.00	54.09	57.10	12.73	37.80	47.52	68.20	-20.68	PK
H	23300.00	45.09	57.10	12.73	37.80	38.52	54.00	-15.48	AV
H	29125.00	50.61	55.80	14.25	40.50	49.56	68.20	-18.64	PK
H	29125.00	41.75	55.80	14.25	40.50	40.70	54.00	-13.30	AV

Remark:
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

4.8.2 Conducted Emission Method

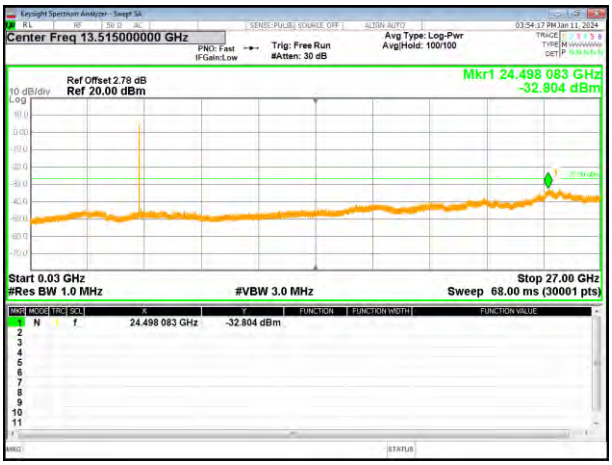
Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)	
Test Method:	ANSI C63.10:2013	
Limit:	-27dBm/MHz	
Test setup:		
Test Instruments:	Refer to section 3.0 for details	
Test mode:	Refer to section 2.2 for details	
Test environment:	Temp.: 24.3°C	Humid.:51%RH
Test voltage:	DC 5V	
Test results:	Pass	

Remark: Ref Offset including antenna gain and cable loss.

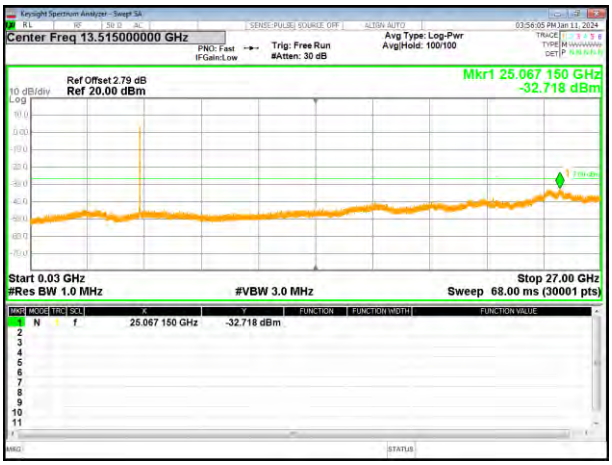
Module: WB800D.3 (ANT2)

5180-5240MHz

802.11a on channel 36

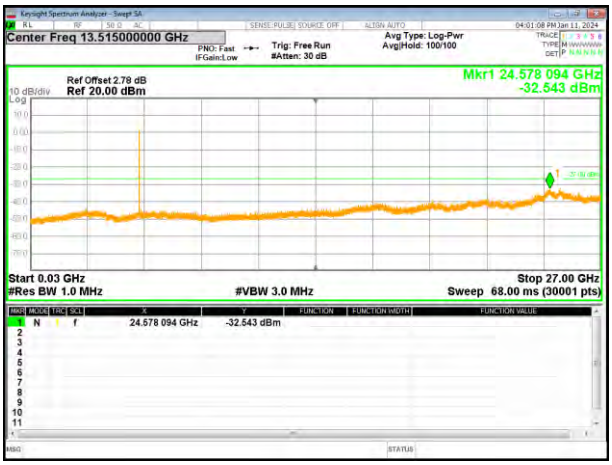


802.11a on channel 40



802.11a on channel 48

802.11n20 on channel 36

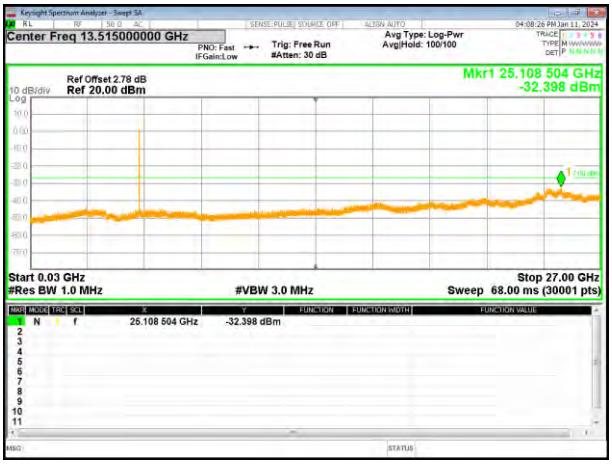


802.11n20 on channel 40

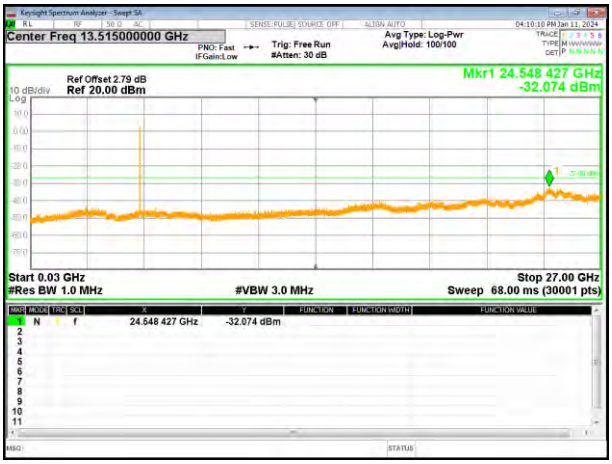
802.11n20 on channel 48

Test Plot

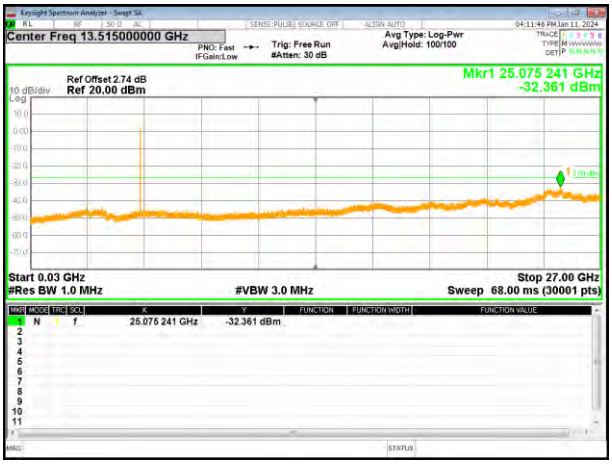
802.11ac20 on channel 36



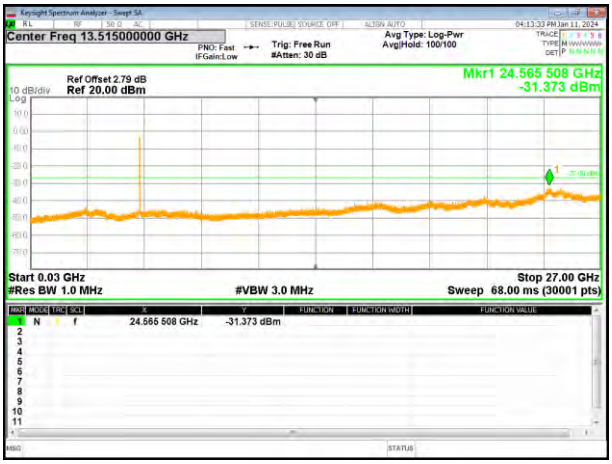
802.11ac20 on channel 40



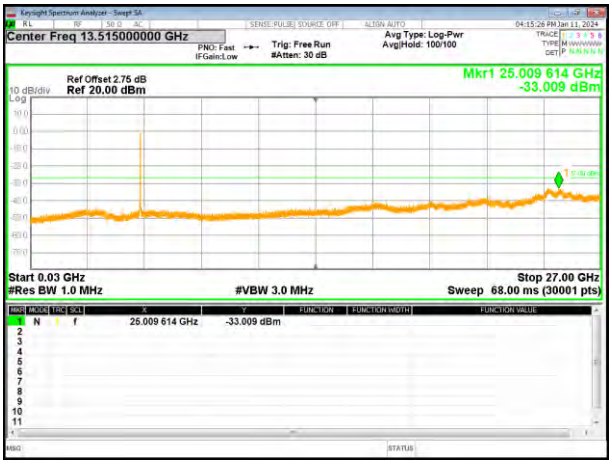
802.11ac20 on channel 48



802.11n40 on channel 38



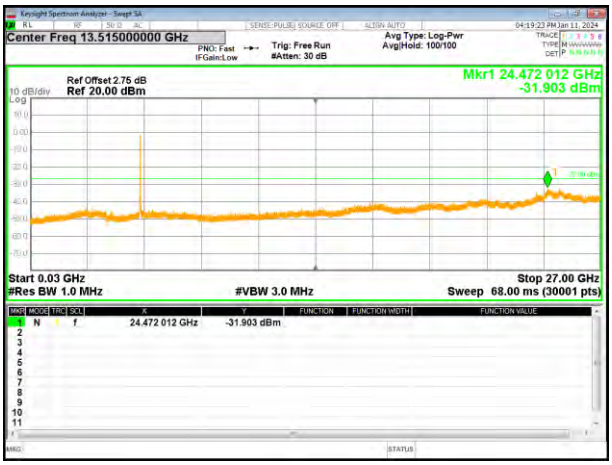
802.11n40 on channel 46



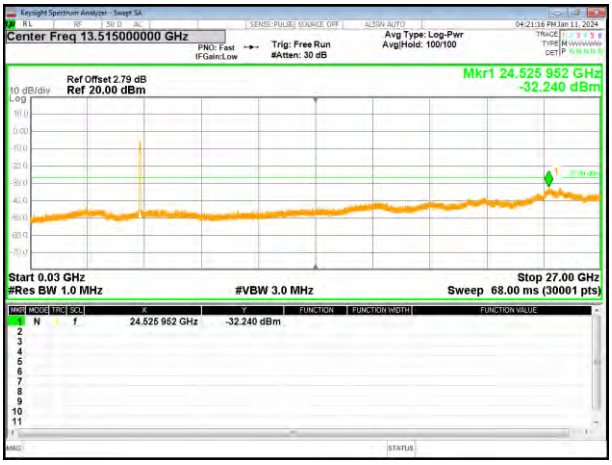
Test Plot

802.11ac40 on channel 38

802.11ac40 on channel 46



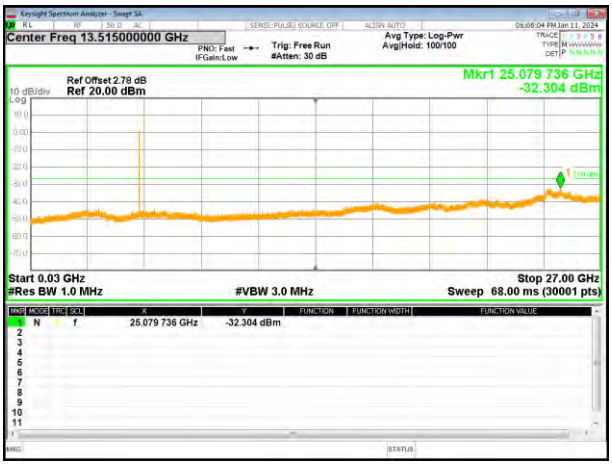
802.11ac80 on channel 42



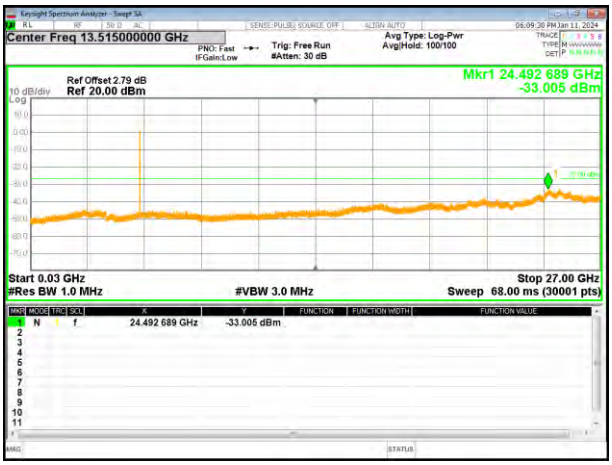
Module: WB663U.1 (ANT4)

5180-5240MHz

802.11a on channel 36



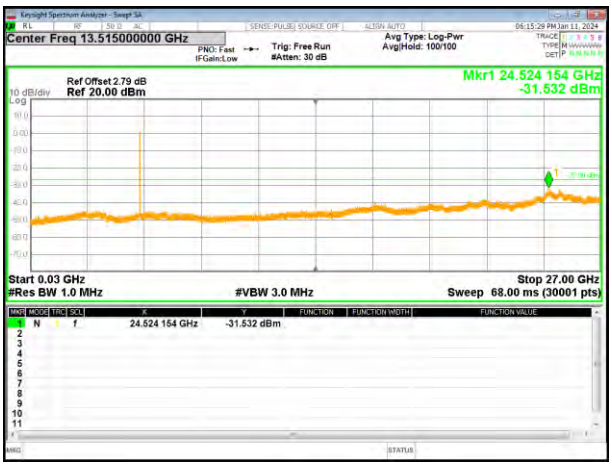
802.11a on channel 40



802.11a on channel 48

802.11n20 on channel 36

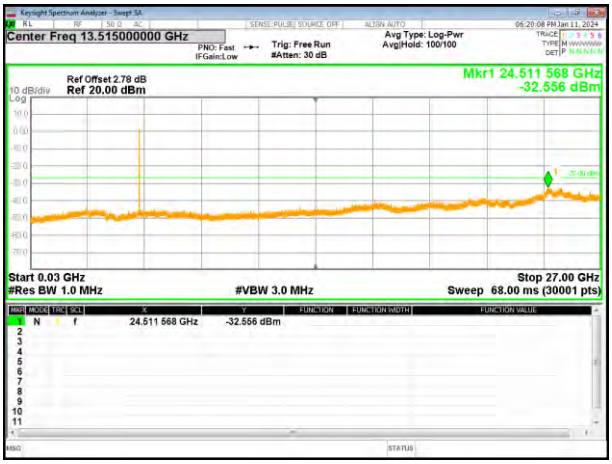
802.11n20 on channel 40



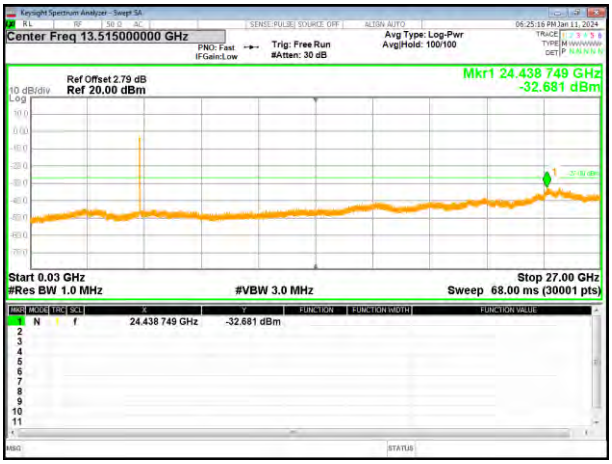
802.11n20 on channel 48

Test Plot

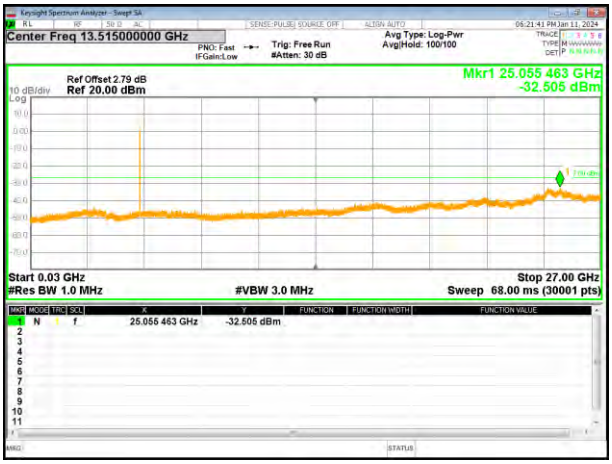
802.11ac20 on channel 36



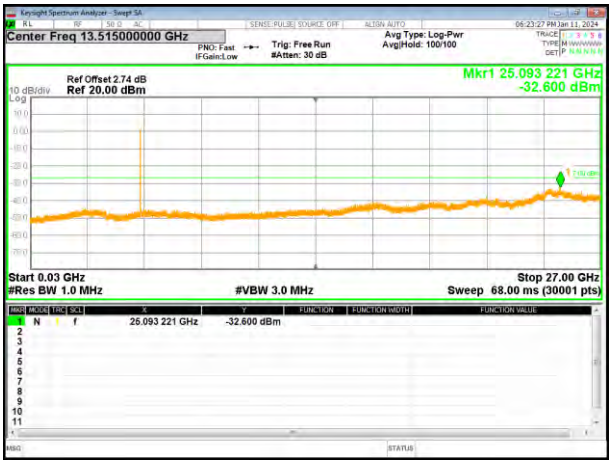
802.11ac20 on channel 40



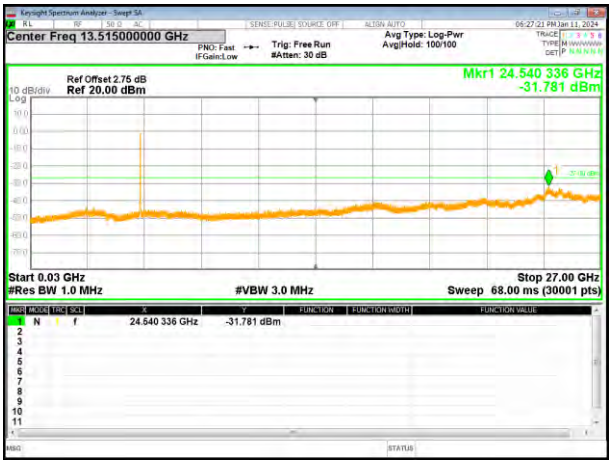
802.11ac20 on channel 48



802.11n40 on channel 38

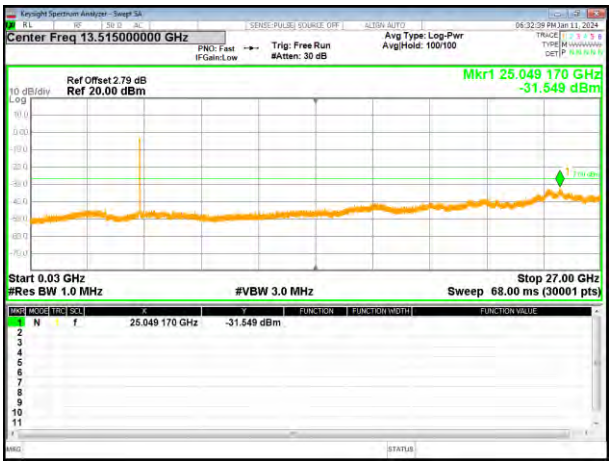


802.11n40 on channel 46

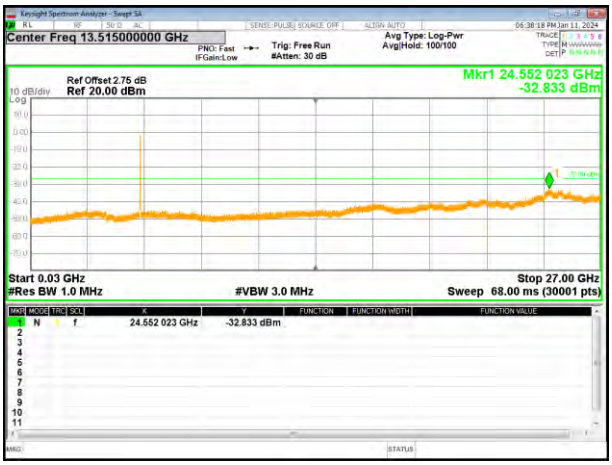


Test Plot

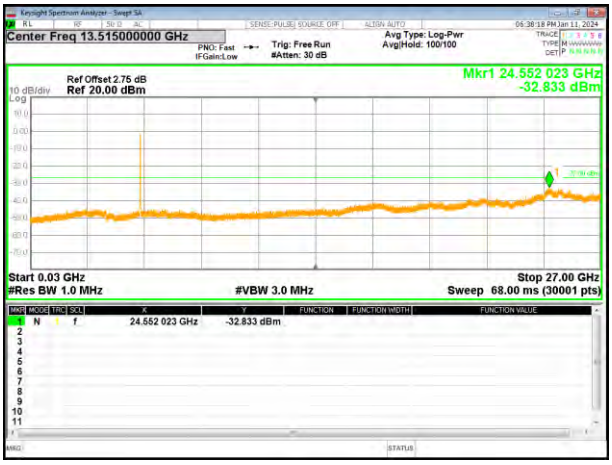
802.11ac40 on channel 38



802.11ac40 on channel 46



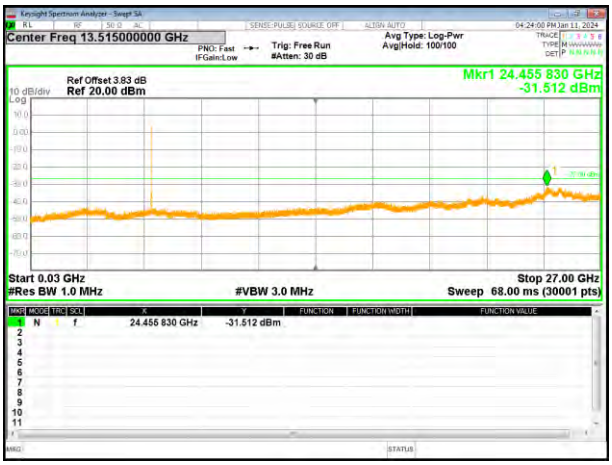
802.11ac80 on channel 42



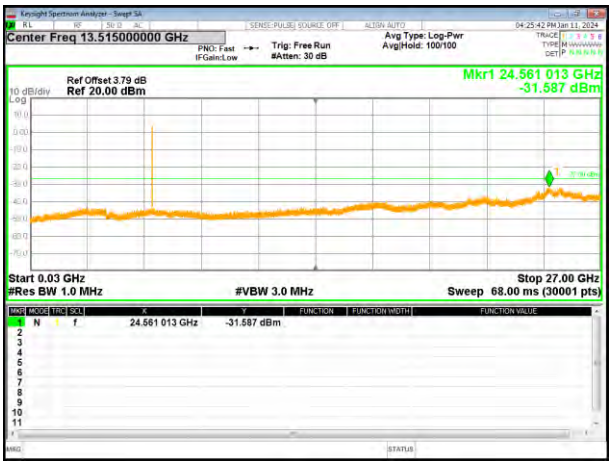
Module: WB800D.3(ANT2)

5745-5825MHz

802.11a on channel 149

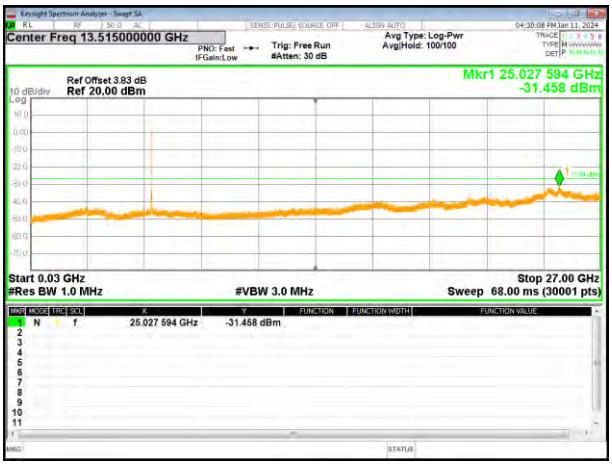


802.11a on channel 157

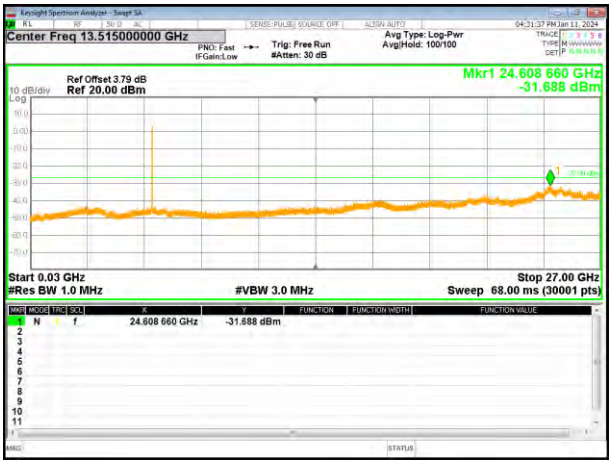


802.11a on channel 165

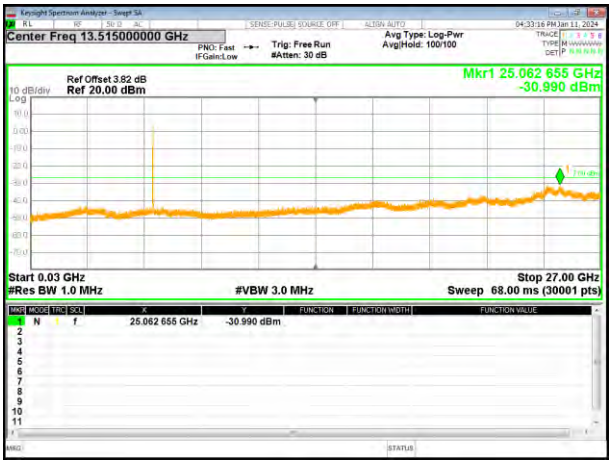
802.11n20 on channel 149



802.11n20 on channel 157

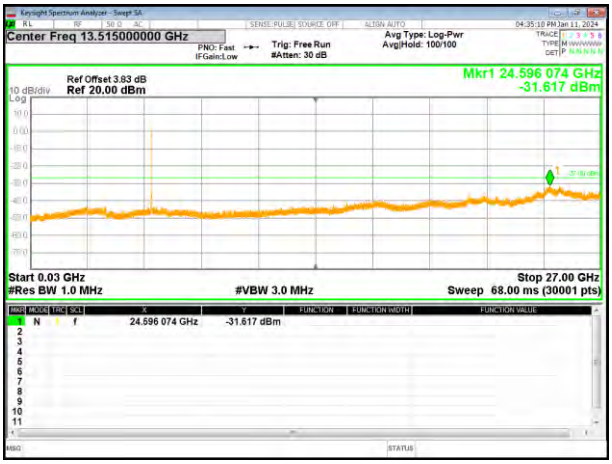


802.11n20 on channel 165

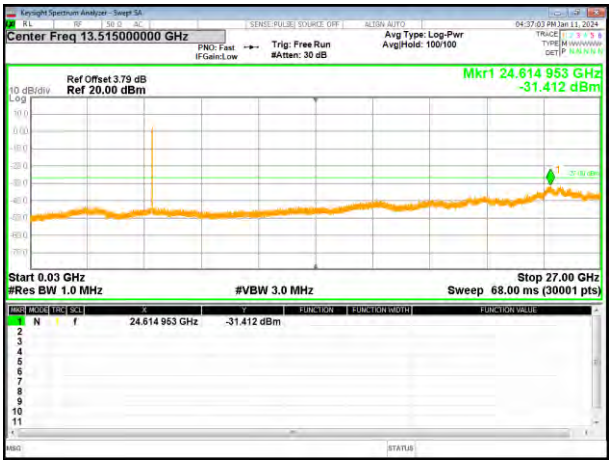


Test Plot

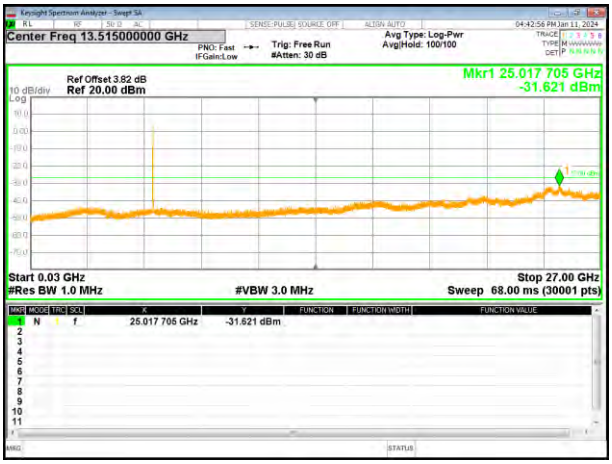
802.11ac20 on channel 149



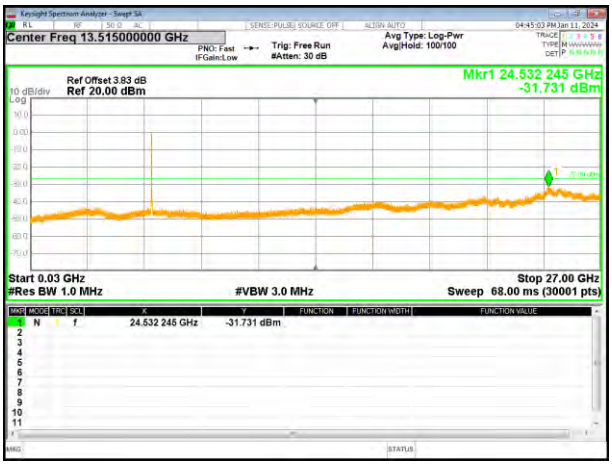
802.11ac20 on channel 157



802.11ac20 on channel 165



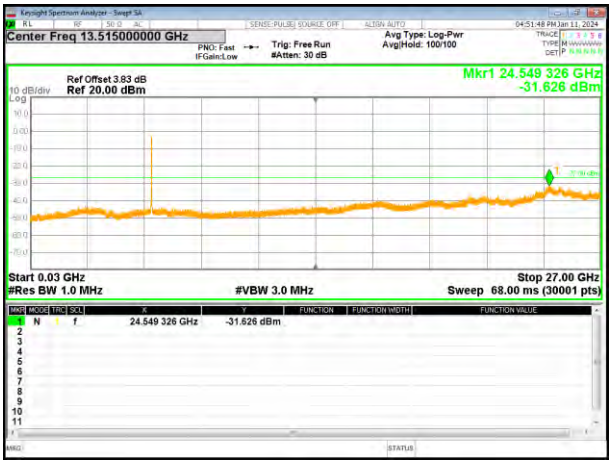
802.11n40 on channel 151



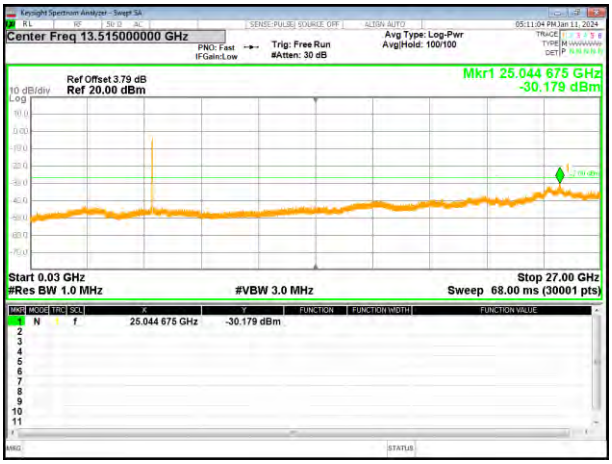
802.11n40 on channel 159

Test Plot

802.11ac40 on channel 151



802.11ac40 on channel 159

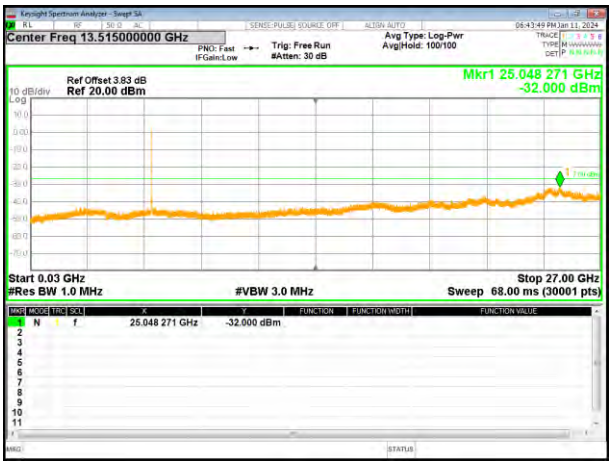


802.11ac80 on channel 155

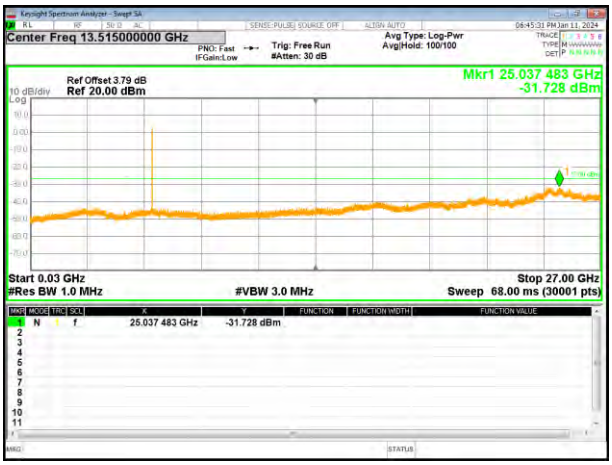
Module: WB663U.1(ANT4)

5745-5825MHz

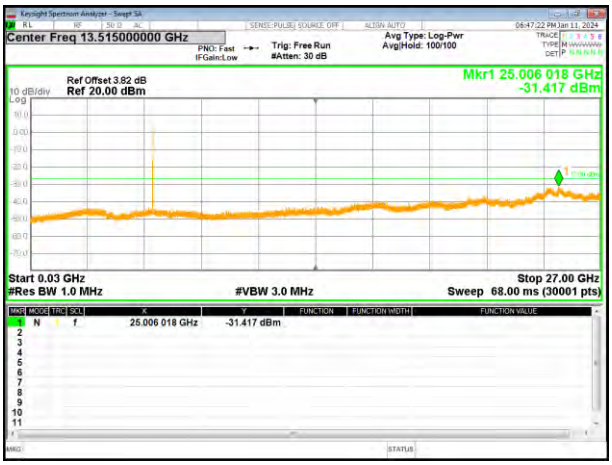
802.11a on channel 149



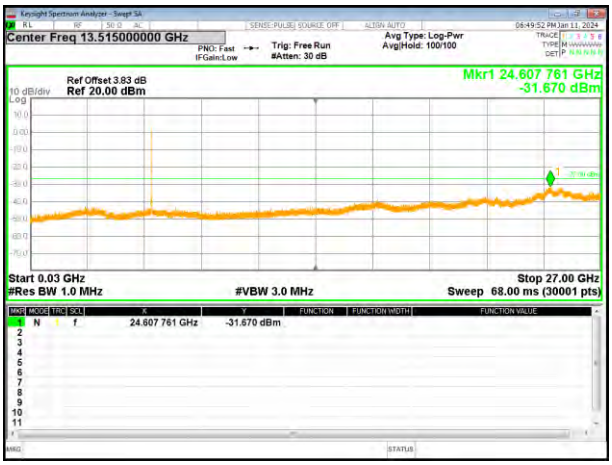
802.11a on channel 157



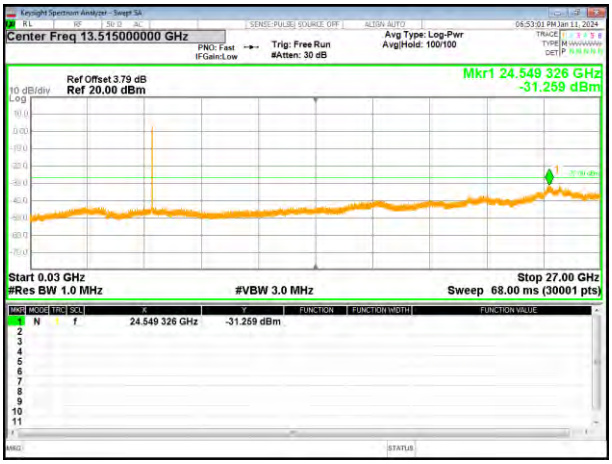
802.11a on channel 165



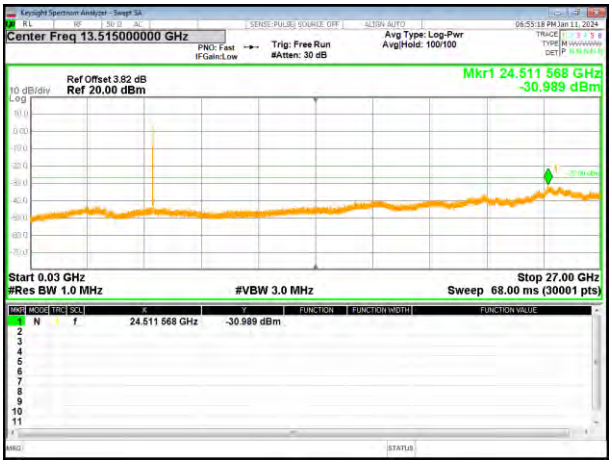
802.11n20 on channel 149



802.11n20 on channel 157

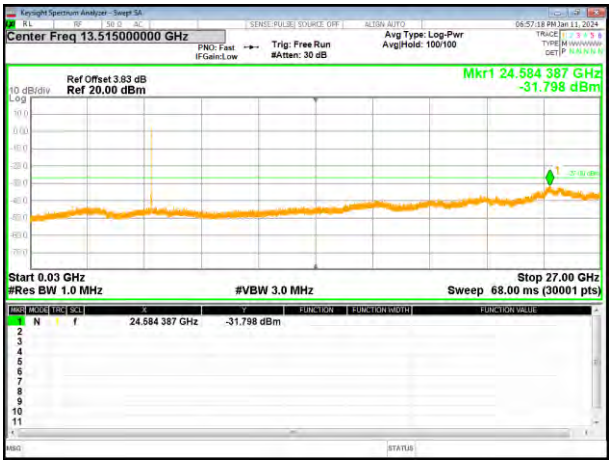


802.11n20 on channel 165

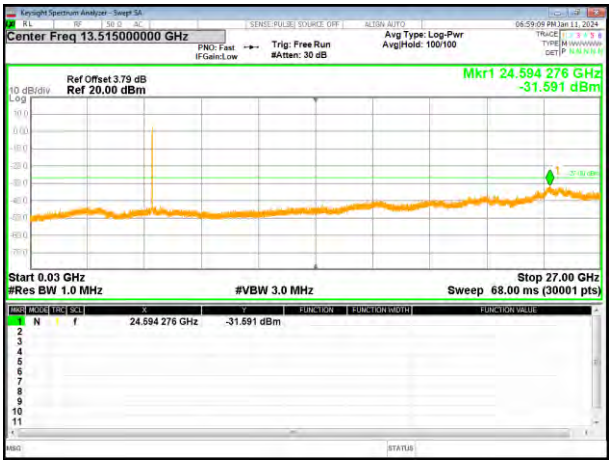


Test Plot

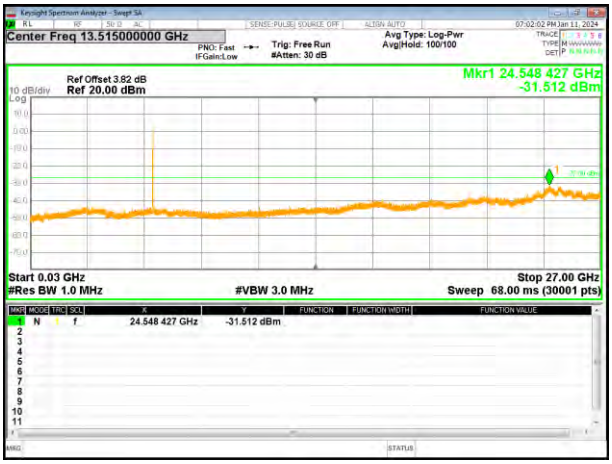
802.11ac20 on channel 149



802.11ac20 on channel 157

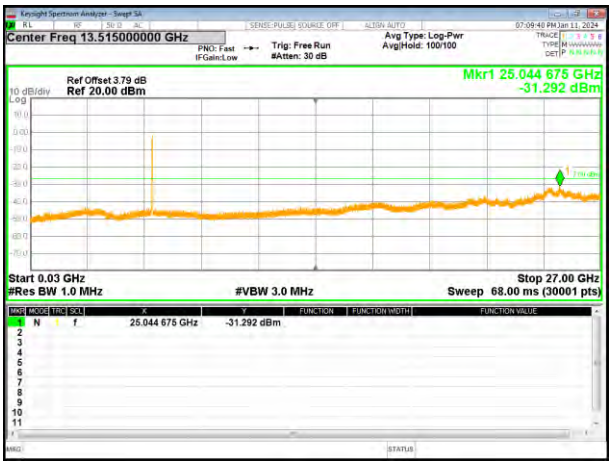


802.11ac20 on channel 165



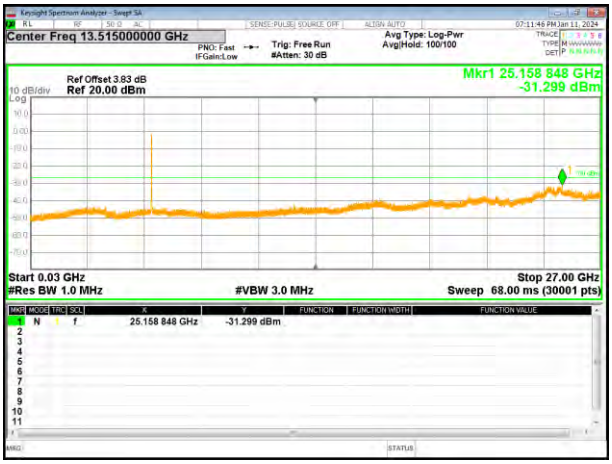
802.11n40 on channel 151

802.11n40 on channel 159

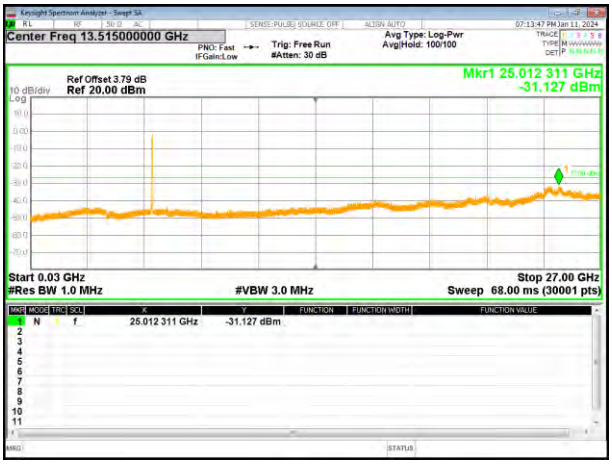


Test Plot

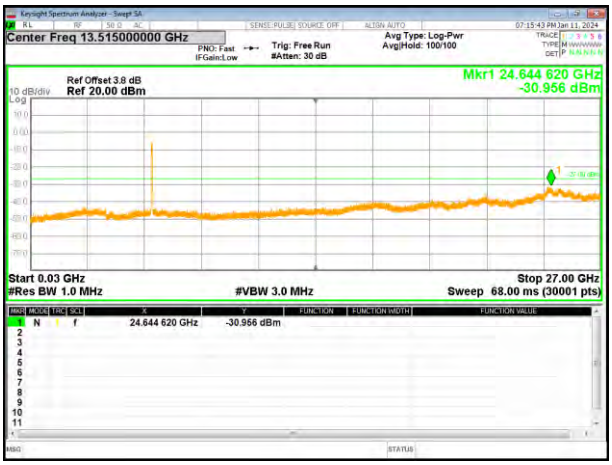
802.11ac40 on channel 151



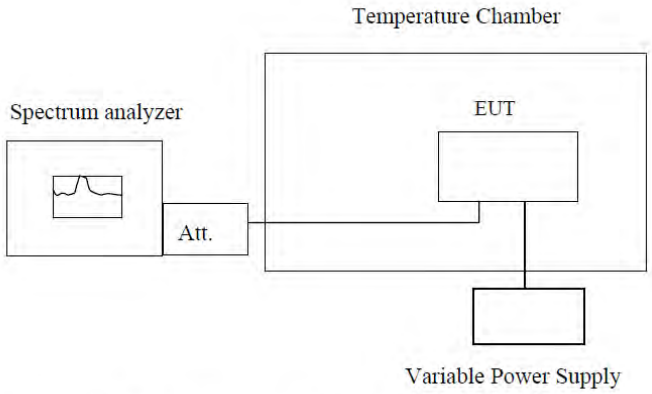
802.11ac40 on channel 159



802.11ac80 on channel 155



4.9 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

Frequency stability versus Temp.					
Power Supply: DC 5V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5180	5179.918	5180.132	5179.638	5179.686
	5190	5189.908	5200.147	5199.512	5189.696
	5200	5199.911	5200.132	5199.537	5199.687
	5210	5209.917	5210.110	5209.514	5209.688
	5220	5219.912	5220.125	5219.529	5219.693
	5230	5229.909	5230.118	5229.520	5229.710
	5240	5239.882	5240.127	5239.528	5239.695
-20	5180	5179.911	5180.108	5179.523	5179.707
	5190	5189.902	5190.099	5189.522	5189.702
	5200	5199.910	5200.107	5199.515	5199.697
	5210	5209.902	5210.099	5209.504	5209.703
	5220	5219.923	5220.120	5219.514	5219.696
	5230	5229.900	5230.098	5299.505	5229.693
	5240	5239.918	5240.117	5239.514	5239.666
-10	5180	5179.920	5180.117	5179.502	5179.686
	5190	5189.916	5190.113	5189.513	5189.696
	5200	5199.911	5200.108	5199.503	5199.687
	5210	5209.917	5210.114	5209.503	5209.688
	5220	5219.912	5220.109	5219.510	5219.693
	5230	5229.909	5230.107	5229.526	5229.710
	5240	5239.882	5240.081	5239.498	5239.682
0	5180	5179.697	5180.096	5179.514	5179.697
	5190	5199.869	5190.107	5189.505	5189.697
	5200	5199.867	5200.098	5199.512	5199.688
	5210	5209.922	5210.099	5209.503	5299.690
	5220	5219.911	5220.106	5219.524	5219.686
	5230	5229.897	5230.124	5229.500	5229.706
	5240	5239.914	5240.097	5239.518	5239.684
10	5180	5179.899	5180.108	5179.523	5179.698
	5190	5189.910	5190.099	5189.519	5189.688
	5200	5199.901	5200.107	5199.513	5199.696
	5210	5209.902	5210.099	5209.518	5209.688

	5220	5219.909	5220.120	5219.513	5219.707
	5230	5229.926	5230.098	5229.509	5229.684
	5240	5239.911	5240.117	5239.482	5239.702
20	5180	5179.977	5179.361	5179.772	5179.460
	5190	5189.920	5190.150	5189.816	5189.724
	5200	5199.915	5200.141	5199.824	5199.749
	5210	5209.921	5300.152	5209.816	5209.733
	5220	5219.916	5220.141	5219.837	5219.723
	5230	5229.913	5230.162	5229.814	5229.750
	5240	5239.886	5240.141	5239.832	5239.738
30	5180	5179.903	5180.149	5179.825	5179.743
	5190	5189.914	5190.141	5189.816	5179.743
	5200	5199.905	5200.149	5199.824	5189.738
	5210	5209.906	5210.141	5209.816	5199.733
	5220	5219.913	5220.162	5219.837	5209.739
	5230	5229.930	5230.140	5229.814	5219.733
	5240	5239.902	5240.159	5239.832	5229.730
40	5180	5179.915	5180.148	5179.611	5179.722
	5190	5189.906	5190.150	5199.783	5189.732
	5200	5199.914	5200.141	5199.781	5199.723
	5210	5209.906	5300.152	5209.836	5209.724
	5220	5219.927	5220.141	5219.825	5219.730
	5230	5229.904	5230.162	5229.811	5229.747
	5240	5239.922	5240.141	5239.828	5239.719
50	5180	5179.915	5180.149	5179.825	5179.695
	5190	5189.906	5190.141	5189.816	5189.724
	5200	5199.914	5200.149	5199.824	5199.749
	5210	5209.906	5210.141	5209.816	5209.733
	5220	5219.927	5220.162	5219.837	5219.723
	5230	5229.904	5230.140	5229.814	5229.750
	5240	5239.922	5240.159	5239.832	5239.738

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
4.25	5180	5179.924	5180.152	5179.825	5179.858
	5190	5189.920	5200.146	5189.816	5199.732
	5200	5199.915	5200.174	5199.824	5199.757
	5210	5209.921	5210.152	5209.816	5209.735
	5220	5219.916	5220.167	5219.837	5219.749
	5230	5229.913	5230.160	5229.814	5229.741
	5240	5239.886	5240.169	5239.828	5239.749
5.0	5180	5179.910	5180.167	5179.824	5179.743
	5190	5189.906	5180.273	5189.825	5189.741
	5200	5199.914	5200.149	5199.816	5199.735
	5210	5209.907	5210.174	5299.822	5209.725
	5220	5219.927	5220.152	5219.816	5219.734
	5230	5229.904	5230.167	5229.835	5299.728
	5240	5239.922	5240.161	5239.814	5239.735
5.75	5180	5179.924	5180.158	5179.813	5179.722
	5190	5189.920	5190.155	5189.824	5189.732
	5200	5199.915	5200.150	5199.815	5199.722
	5210	5209.921	5210.156	5209.816	5209.724
	5220	5219.916	5220.151	5219.823	5219.730
	5230	5229.913	5230.149	5229.840	5229.752
	5240	5239.886	5240.123	5239.812	5239.719

Frequency stability versus Temp.					
Power Supply: DC 5V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5744.889	5745.159	5744.806	5744.697
	5755	5754.899	5755.166	5754.813	5754.685
	5775	5774.919	5775.159	5774.830	5774.696
	5785	5784.895	5785.151	5784.805	5784.701
	5795	5794.891	5795.158	5794.801	5794.719
	5825	5824.888	5825.088	5824.804	5824.710
-20	5745	5744.886	5745.170	5744.800	5744.708
	5755	5754.901	5755.172	5754.825	5754.721
	5775	5774.899	5775.176	5774.806	5774.706
	5785	5784.902	5785.168	5784.814	5784.691
	5795	5794.912	5795.159	5794.812	5794.685
	5825	5824.893	5825.169	5824.822	5824.718
-10	5745	5744.896	5745.160	5744.816	5744.327
	5755	5754.922	5755.167	5754.818	5754.710
	5775	5774.917	5775.185	5774.821	5774.711
	5785	5784.901	5785.161	5784.812	5784.712
	5795	5794.890	5795.157	5794.803	5794.695
	5825	5824.825	5825.160	5824.812	5824.690
0	5745	5744.890	5745.149	5744.816	5744.698
	5755	5754.915	5755.165	5754.818	5754.723
	5775	5774.895	5775.165	5774.821	5774.719
	5785	5784.904	5785.168	5784.812	5784.701
	5795	5794.902	5795.181	5794.803	5794.690
	5825	5824.911	5825.161	5824.812	5824.624
10	5745	5744.890	5745.159	5744.805	5744.693
	5755	5754.915	5755.176	5754.812	5754.704
	5775	5774.895	5775.178	5774.804	5774.721
	5785	5784.904	5785.160	5784.795	5784.695
	5795	5794.902	5795.177	5794.802	5794.691
	5825	5824.911	5825.176	5824.731	5824.693
20	5745	5744.906	5745.184	5744.814	5744.697
	5755	5754.920	5755.156	5754.830	5754.715
	5775	5774.904	5775.180	5774.815	5774.695
	5785	5784.891	5785.180	5784.801	5784.720
	5795	5794.885	5795.171	5794.795	5794.712
	5825	5824.918	5825.187	5824.829	5824.720
30	5745	5744.896	5745.170	5744.799	5744.722
	5755	5754.903	5755.172	5754.822	5754.693
	5775	5774.919	5775.176	5774.823	5774.716
	5785	5784.895	5785.168	5784.804	5784.714
	5795	5794.891	5795.159	5794.821	5794.705
	5825	5824.893	5825.169	5824.819	5824.719
40	5745	5744.906	5745.154	5744.816	5744.691
	5755	5754.920	5755.179	5754.818	5754.723
	5775	5774.904	5775.161	5774.821	5774.719

	5785	5784.891	5785.170	5784.812	5784.701
	5795	5794.885	5795.168	5794.803	5794.690
	5825	5824.918	5825.179	5824.812	5824.624
50	5745	5744.906	5745.184	5744.816	5744.697
	5755	5754.900	5755.156	5754.829	5754.715
	5775	5774.904	5775.180	5774.815	5774.695
	5785	5784.891	5785.180	5784.801	5784.721
	5795	5794.885	5795.170	5794.795	5794.712
	5825	5824.918	5825.191	5824.829	5824.720

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
4.25	5745	5744.885	5745.159	5744.805	5744.692
	5755	5754.901	5755.166	5754.822	5754.716
	5775	5774.899	5775.159	5774.823	5774.697
	5785	5784.902	5785.151	5784.804	5784.704
	5795	5794.913	5795.158	5794.822	5794.702
	5825	5824.893	5825.088	5824.819	5824.711
5.0	5745	5744.885	5745.170	5744.800	5744.708
	5755	5754.901	5755.172	5754.825	5754.721
	5775	5774.899	5775.176	5774.806	5774.706
	5785	5784.902	5785.168	5784.814	5784.691
	5795	5794.909	5795.159	5794.812	5794.685
	5825	5824.893	5825.169	5824.822	5824.718
5.75	5745	5744.906	5745.183	5744.816	5744.697
	5755	5754.920	5755.156	5754.830	5754.715
	5775	5774.904	5775.180	5774.815	5774.695
	5785	5784.891	5785.180	5784.801	5784.720
	5795	5794.885	5795.171	5794.795	5794.712
	5825	5824.918	5825.187	5824.829	5824.720

5 Test Setup Photo

Reference to the **appendix I** for details.

6 EUT Constructional Details

Reference to the **appendix II** for details.

------END------