

FCC Test Report

Report No.: RWAY202300019A

Applicant: Shenzhen VanTop Technology & Innovation Co., Ltd.

Address: 506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China

Product Name: R/C QUADCOPTER

Product Model: DR-SF170C

Multiple Models: N/A

Trade Mark: N/A

FCC ID: 2AQ3A-SF170CT0523

Standards: FCC CFR Title 47 Part 15E (§15.407)

Test Date: 2023-12-01 to 2023-12-13

Test Result: Complied

Issue Date: 2023-12-13

Reviewed by:

Frank Yin

Frank Yin
Project Engineer

Approved by:

Jacob Kong

Jacob Kong
Manager

Prepared by:

World Alliance Testing and Certification (Shenzhen) Co., Ltd

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Revision History

Version No.	Issued Date	Description
00	2023-12-13	Original

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1 General Information

1.1 Client Information

Applicant:	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address:	506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address:	506, BLDG 4, Pingshan minQi Technology Park, No. 65 Lishan Road, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China

1.2 Product Description of EUT

The EUT is R/C QUADCOPTER that contains 5G WLAN radios, this report covers the full testing of the 5G WLAN radio.

Sample Serial number	C-5 for CE&RE test, C-3 for RF test conducted test (assigned by WATC)
Sample Received Date	2023-11-30
Sample Status	Good Condition
Frequency Range	5150 MHz - 5250MHz 5725 MHz - 5850MHz
Maximum Conducted Output Power	5150 MHz - 5250MHz: 11.85dBm; 5725 MHz - 5850MHz: 11.12dBm
Modulation Technology	OFDM
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain [#]	2dBi
Power Supply	DC 3.8V from battery
Operating temperature [#]	0 deg.C to +40 deg.C
Adapter Information	N/A
Modification	Sample No Modification by the test lab

1.3 Antenna information

15.203 requirement:	
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
Device Antenna information:	
The Wi-Fi antenna is an internal antenna which cannot replace by end-user. Please see the product internal photos for details.	

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment Class: DXX, FCC ID: 2AQ3A-SF270CR2422

1.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Power Spectral Density		0.74dB
<p>Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.</p> <p>Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)</p>		

1.6 Laboratory Location

World Alliance Testing and Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: ga@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2020

2 Description of Measurement

2.1 Test Configuration

Operating channels: (5150-5250MHz)					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
36	5180	40	5200	46	5230
38	5190	44	5220	48	5240
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:					
802.11a, 802.11n-HT20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
36	5180	40	5200	48	5240
802.11n-HT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
38	5190	/	/	46	5230

Operating channels: (5725-5850MHz)					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
149	5745	157	5785	165	5825
151	5755	159	5795	/	/
153	5765	161	5805	/	/
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:					
802.11a, 802.11n-HT20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
149	5745	157	5785	165	5825
802.11n-HT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
151	5755	/	/	159	5795

Test Mode:				
Transmitting mode:		Keep the EUT in continuous transmitting with modulation		
Exercise software#:		SecureCRT		
Mode	Data rate	Power Level Setting#		
		Low Channel	Middle Channel	High Channel
5150-5250MHz				
802.11a	6Mbps	80	80	80
802.11n-HT20	MCS0	80	80	80
802.11n-HT40	MCS0	51	/	51

5725-5850MHz				
802.11a	6Mbps	default	default	default
802.11n-HT20	MCS0	default	default	default
802.11n-HT40	MCS0	default	/	default
The exercise software and the maximum power setting that provided by manufacturer.				

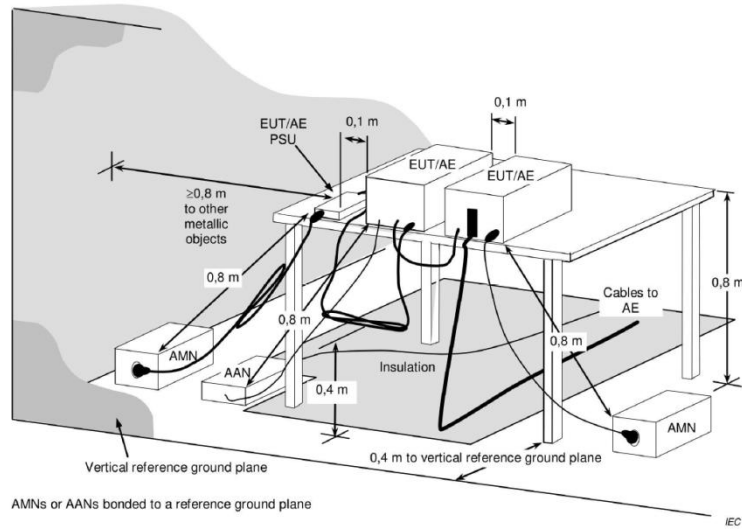
Worst-Case Configuration:
For radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

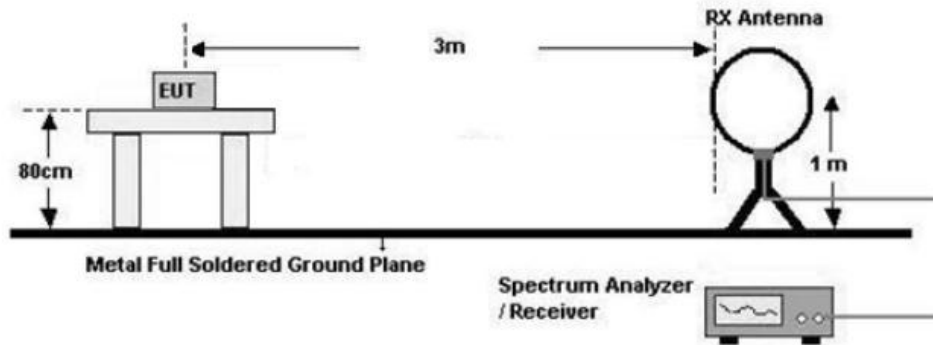
1) Conducted emission measurement:



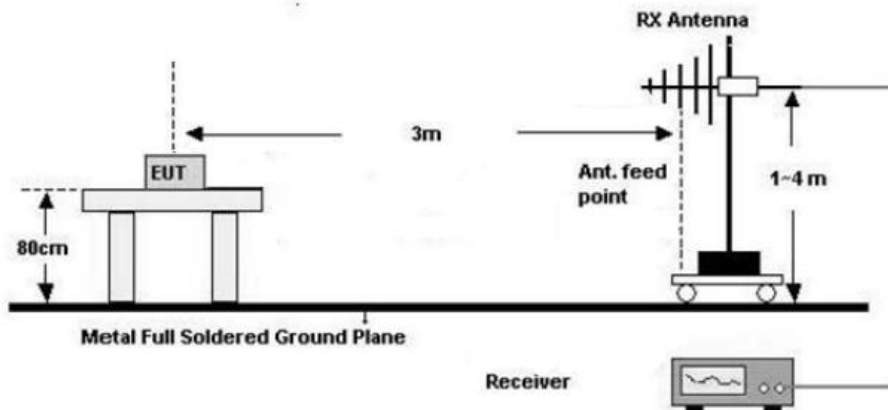
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

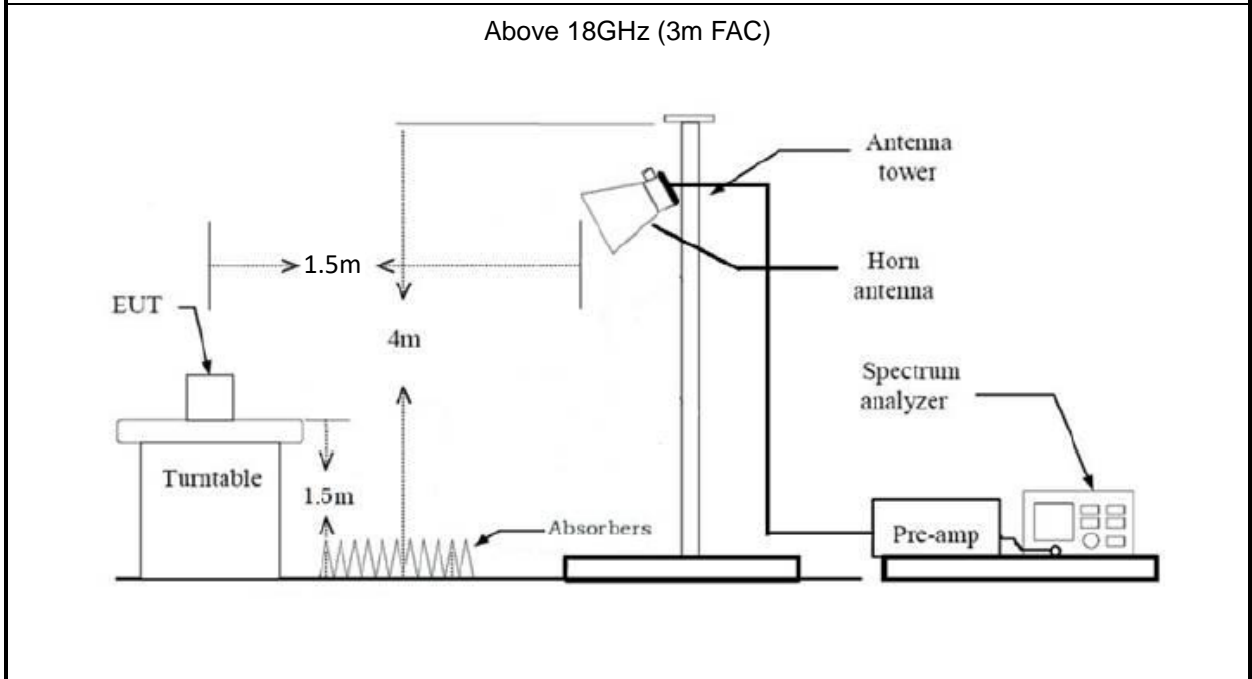
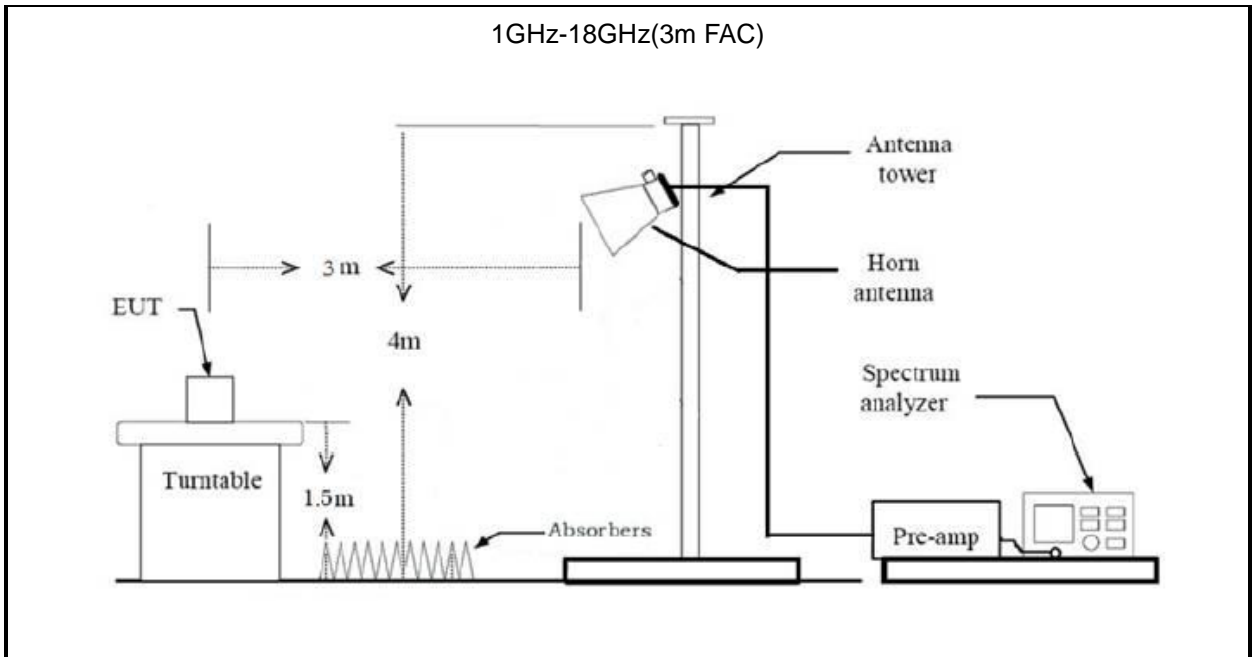
2) Radiated emission measurement:

Below 30MHz (3m SAC)

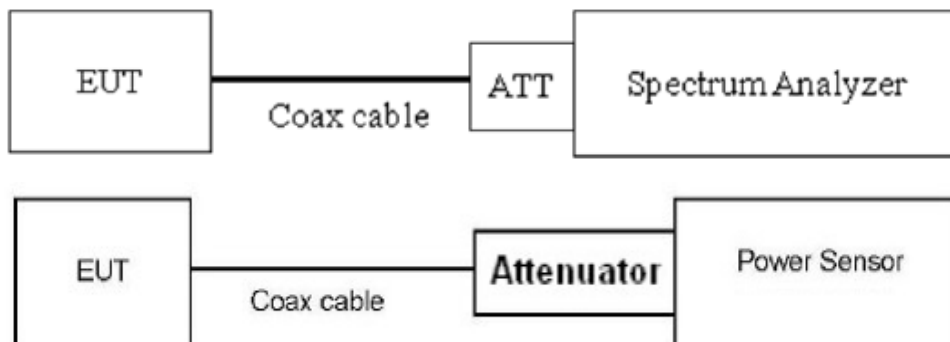


0MHz-1GHz (3m SAC)





3) RF Conducted Test



2.4 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log(\text{test distance} / \text{specification distance})$.
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, ground-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m (above 18GHz).
2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
4. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Power Meter or

Spectrum analyzer) through Attenuator and RF cable.

2. The cable assembly insertion loss of 6.5dB (including 6.0 dB Attenuator and 0.5 dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 0.5dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2020 Section 6.2
Maximum Conducted Output Power	KDB 789033 D02 v02r01 section E.3. b)
Power Spectral Density	KDB 789033 D02 v02r01 section F
26 dB Emission Bandwidth	KDB 789033 D02 v02r01 section C.1
6 dB Emission Bandwidth	KDB 789033 D02 v02r01 section C.2
99% Occupied Bandwidth	KDB 789033 D02 v02r01 section D.
Unwanted Emissions	KDB 789033 D02 v02r01 section G.
Duty Cycle	KDB 789033 D02 v02r01 section B.

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2023/7/3	2024/7/2
R&S	LISN	ENV216	101748	2023/7/3	2024/7/2
N/A	Coaxial Cable	NO.12	N/A	2023/7/3	2024/7/2
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
ETS	Passive Loop Antenna	6512	29604	2023/7/7	2024/7/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2024/7/9
Ducommun technologies	Horn Antenna	ARH-2823-02	1007726-03	2023/7/10	2024/7/9
Oulitong	Band Reject Filter	OBSF-5150-585 0-S	OE02104371	2023/9/15	2024/9/14
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2023/7/12	2024/7/11
ANRITSU	USB Power Sensor	MA24418A	12620	2023/7/12	2024/7/11
narda	6dB attenuator	603-06-1	N/A	2023/7/26	2024/7/25

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a) §15.407 (b)(9)	AC Line Conducted Emissions	N/A
§15.407 (a)(1)(i),(3)(i)	Conducted Peak Output Power Power Spectral Density	Compliance
§15.407 (a)(12)	26dB Emission Bandwidth 99% Occupied Bandwidth	Reporting only
§15.407 (e)	6 dB Emission Bandwidth	Compliance
§15.205, §15.209, §15.407 (b)(1), (4), (9), (10)	Unwanted Emissions	Compliance
/	Duty Cycle	Report only

3.2 Limit

Test items	Limit
AC Power Line Conducted Emission	See details §15.207 (a)
Conducted Peak Output Power Power Spectral Density	<p>For the band 5.150-5.250 GHz:</p> <p>For an outdoor access point operating in the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).</p> <p>For the band 5.725-5.895 GHz:</p> <p>For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, Fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.</p>
26dB Emission Bandwidth 99% Occupied Bandwidth	N/A
6dB Emission Bandwidth	Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

3.3 AC Line Conducted Emissions Test Data

Test Date:	/	Test By:	/
Environment condition:	/		

N/A, the EUT was only powered by battery when operating

3.4 Radiated emission Test Data

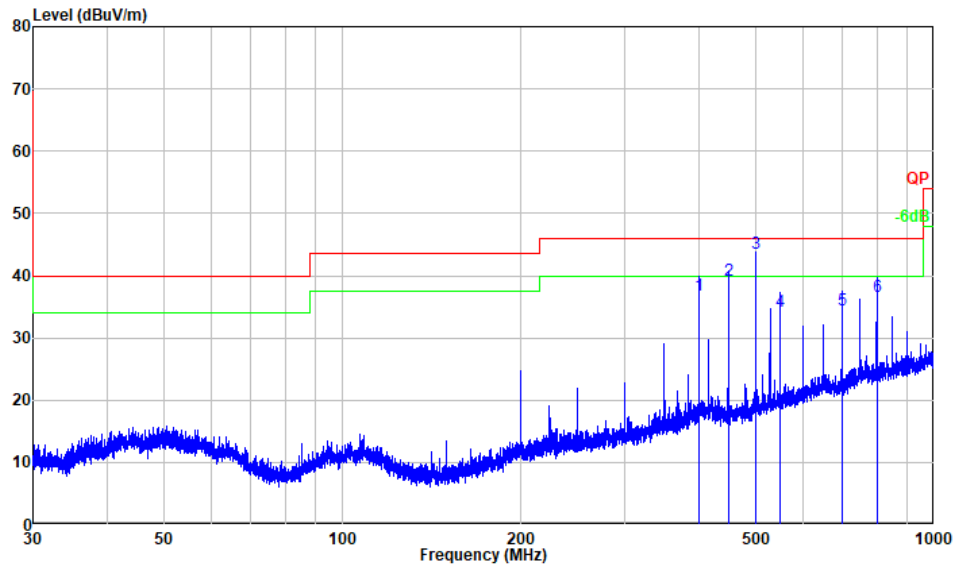
9 kHz-30MHz:

Test Date:	2023-12-02	Test By:	Luke Li
Environment condition:	Temperature: 23°C; Relative Humidity:44%; ATM Pressure: 101kPa		

For radiated emissions below 30MHz, there were no emissions found within 20dB of limit.

30MHz-1GHz:

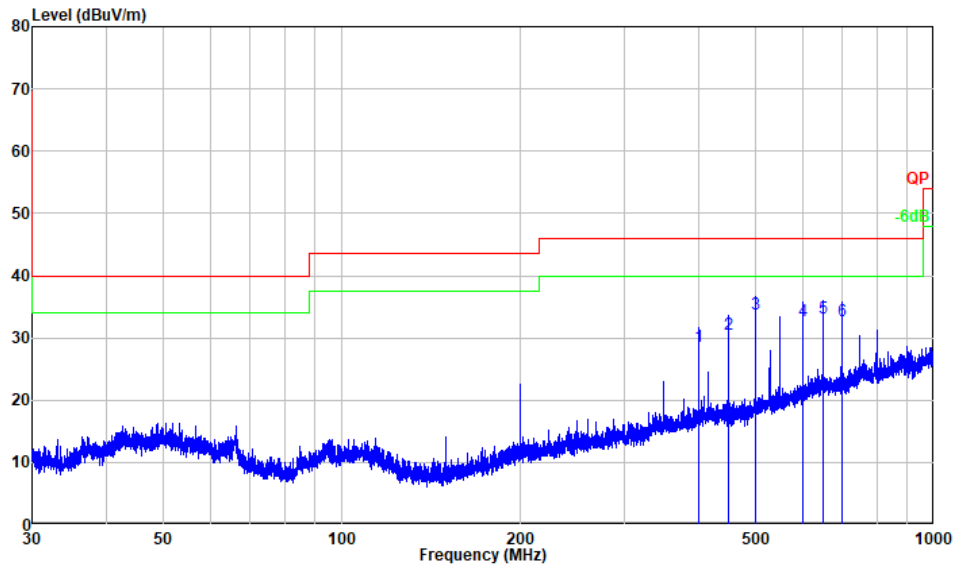
Test Date:	2023-12-02	Test By:	Luke Li
Environment condition:	Temperature: 23°C; Relative Humidity:44%; ATM Pressure: 101kPa		



EUT/Model No.: DR-SF170C
 Test Mode : Transmitting
 Test Voltage : DC 3.8V
 Environment : 23°C/44%R.H./101kPa
 Tested by : Luke Li
 Polarization : horizontal
 Remark : 5G-WiFi Band1 a Mode High Channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	400.081	45.17	-8.26	36.91	46.00	-9.09	QP
2	450.147	47.20	-7.89	39.31	46.00	-6.69	QP
3	500.082	50.40	-6.73	43.67	46.00	-2.33	QP
4	549.983	40.16	-5.98	34.18	46.00	-11.82	QP
5	700.225	37.92	-3.48	34.44	46.00	-11.56	QP
6	800.031	38.40	-1.82	36.58	46.00	-9.42	QP

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



EUT/Model No.: DR-SF170C
 Test Mode : Transmitting
 Test Voltage : DC 3.8V
 Environment : 23°C/44%R.H./101kPa
 Tested by : Luke Li
 Polarization : vertical
 Remark : 5G-WiFi Band1 a Mode High Channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	400.081	36.93	-8.26	28.67	46.00	-17.33	QP
2	450.147	38.47	-7.89	30.58	46.00	-15.42	QP
3	500.082	40.46	-6.73	33.73	46.00	-12.27	QP
4	600.110	37.41	-4.66	32.75	46.00	-13.25	QP
5	650.229	36.93	-3.84	33.09	46.00	-12.91	QP
6	700.225	36.18	-3.48	32.70	46.00	-13.30	QP

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

Test Date:	2023-12-04	Test By:	Luke Li
Environment condition:	Temperature: 23°C; Relative Humidity:59%; ATM Pressure: 101kPa		

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
5150-5250MHz Band							
802.11a							
Low Channel							
5150.000	39.86	horizontal	10.98	50.84	54.00	-3.16	Average
5150.000	53.70	horizontal	10.98	64.68	74.00	-9.32	Peak
5150.000	35.58	vertical	10.98	46.56	54.00	-7.44	Average
5150.000	48.37	vertical	10.98	59.35	74.00	-14.65	Peak
10360.000	46.11	horizontal	6.65	52.76	68.20	-15.44	Peak
10360.000	45.49	vertical	6.65	52.14	68.20	-16.06	Peak
Middle Channel							
10400.000	45.89	horizontal	6.76	52.65	68.20	-15.55	Peak
10400.000	46.26	vertical	6.76	53.02	68.20	-15.18	Peak
High Channel							
5350.000	33.66	horizontal	11.00	44.66	54.00	-9.34	Average
5350.000	46.79	horizontal	11.00	57.79	74.00	-16.21	Peak
5350.000	33.64	vertical	11.00	44.64	54.00	-9.36	Average
5350.000	47.25	vertical	11.00	58.25	74.00	-15.75	Peak
10480.000	43.79	horizontal	6.82	50.61	68.20	-17.59	Peak
10480.000	43.34	vertical	6.82	50.16	68.20	-18.04	Peak
802.11n20							
Low Channel							
5150.000	39.91	horizontal	10.98	50.89	54.00	-3.11	Average
5150.000	59.25	horizontal	10.98	70.23	74.00	-3.77	Peak
5150.000	36.56	vertical	10.98	47.54	54.00	-6.46	Average
5150.000	50.45	vertical	10.98	61.43	74.00	-12.57	Peak
10360.000	45.52	horizontal	6.65	52.17	68.20	-16.03	Peak
10360.000	44.78	vertical	6.65	51.43	68.20	-16.77	Peak
Middle Channel							
10400.000	45.73	horizontal	6.76	52.49	68.20	-15.71	Peak
10400.000	45.82	vertical	6.76	52.58	68.20	-15.62	Peak
High Channel							

5350.000	33.68	horizontal	11.00	44.68	54.00	-9.32	Average
5350.000	46.73	horizontal	11.00	57.73	68.20	-10.47	Peak
5350.000	33.53	vertical	11.00	44.53	54.00	-9.47	Average
5350.000	46.23	vertical	11.00	57.23	74.00	-16.77	Peak
10480.000	43.39	horizontal	6.82	50.21	68.20	-17.99	Peak
10480.000	44.55	vertical	6.82	51.37	68.20	-16.83	Peak
802.11n40							
Low Channel							
5150.000	41.03	horizontal	10.98	52.01	54.00	-1.99	Average
5150.000	56.59	horizontal	10.98	67.57	74.00	-6.43	Peak
5150.000	36.00	vertical	10.98	46.98	54.00	-7.02	Average
5150.000	48.67	vertical	10.98	59.65	74.00	-14.35	Peak
10380.000	45.37	horizontal	6.71	52.08	68.20	-16.12	Peak
10380.000	44.89	vertical	6.71	51.60	68.20	-16.60	Peak
High Channel							
5350.000	33.56	horizontal	11.00	44.56	54.00	-9.44	Average
5350.000	46.04	horizontal	11.00	57.04	74.00	-16.96	Peak
5350.000	33.45	vertical	11.00	44.45	54.00	-9.55	Average
5350.000	45.63	vertical	11.00	56.63	74.00	-17.37	Peak
10460.000	45.52	horizontal	6.81	52.33	68.20	-15.87	Peak
10460.000	46.12	vertical	6.81	52.93	68.20	-15.27	Peak
5725-5850MHz Band							
802.11a							
Low Channel							
5640.660	48.71	horizontal	11.33	60.04	68.20	-8.16	Peak
5655.067	48.28	horizontal	11.36	59.64	71.96	-12.32	Peak
5717.499	53.23	horizontal	11.54	64.77	110.10	-45.33	Peak
5723.582	56.32	horizontal	11.56	67.88	118.97	-51.09	Peak
5636.979	48.37	vertical	11.33	59.70	68.20	-8.50	Peak
5652.826	47.86	vertical	11.35	59.21	70.30	-11.09	Peak
5709.254	48.78	vertical	11.52	60.30	107.79	-47.49	Peak
5724.142	50.94	vertical	11.56	62.50	120.24	-57.74	Peak
11490.000	33.24	horizontal	7.10	40.34	54.00	-13.66	Average
11490.000	41.58	horizontal	7.10	48.68	74.00	-25.32	Peak
11490.000	33.33	vertical	7.10	40.43	54.00	-13.57	Average
11490.000	42.18	vertical	7.10	49.28	74.00	-24.72	Peak

Middle Channel							
11570.000	33.11	horizontal	7.15	40.26	54.00	-13.74	Average
11570.000	43.94	horizontal	7.15	51.09	74.00	-22.91	Peak
11570.000	33.21	vertical	7.15	40.36	54.00	-13.64	Average
11570.000	45.85	vertical	7.15	53.00	74.00	-21.00	Peak
High Channel							
5851.353	57.06	horizontal	11.79	68.85	119.11	-50.26	Peak
5857.461	53.73	horizontal	11.80	65.53	110.11	-44.58	Peak
5922.669	47.60	horizontal	11.83	59.43	69.92	-10.49	Peak
5949.907	48.23	horizontal	11.89	60.12	68.20	-8.08	Peak
5853.334	49.47	vertical	11.78	61.25	114.60	-53.35	Peak
5871.823	48.35	vertical	11.79	60.14	106.09	-45.95	Peak
5923.824	48.27	vertical	11.83	60.10	69.07	-8.97	Peak
5939.095	48.35	vertical	11.87	60.22	68.20	-7.98	Peak
11650.000	33.26	horizontal	7.17	40.43	54.00	-13.57	Average
11650.000	43.69	horizontal	7.17	50.86	74.00	-23.14	Peak
11650.000	33.18	vertical	7.17	40.35	54.00	-13.65	Average
11650.000	44.07	vertical	7.17	51.24	74.00	-22.76	Peak
802.11n20							
Low Channel							
5628.174	48.24	horizontal	11.32	59.56	68.20	-8.64	Peak
5652.586	47.69	horizontal	11.35	59.04	70.12	-11.08	Peak
5717.819	55.69	horizontal	11.55	67.24	110.19	-42.95	Peak
5723.662	58.97	horizontal	11.56	70.53	119.15	-48.62	Peak
5639.380	48.75	vertical	11.33	60.08	68.20	-8.12	Peak
5651.466	47.85	vertical	11.34	59.19	69.29	-10.10	Peak
5707.974	47.92	vertical	11.52	59.44	107.44	-48.00	Peak
5723.982	52.25	vertical	11.56	63.81	119.88	-56.07	Peak
11490.000	33.19	horizontal	7.10	40.29	54.00	-13.71	Average
11490.000	42.23	horizontal	7.10	49.33	74.00	-24.67	Peak
11490.000	33.10	vertical	7.10	40.20	54.00	-13.80	Average
11490.000	41.60	vertical	7.10	48.70	74.00	-25.30	Peak

Middle Channel							
11570.000	33.23	horizontal	7.15	40.38	54.00	-13.62	Average
11570.000	44.27	horizontal	7.15	51.42	74.00	-22.58	Peak
11570.000	33.01	vertical	7.15	40.16	54.00	-13.84	Average
11570.000	45.11	vertical	7.15	52.26	74.00	-21.74	Peak
High Channel							
5850.445	57.85	horizontal	11.79	69.64	121.18	-51.54	Peak
5859.938	52.41	horizontal	11.79	64.20	109.42	-45.22	Peak
5922.256	48.04	horizontal	11.83	59.87	70.22	-10.35	Peak
5961.793	48.58	horizontal	11.89	60.47	68.20	-7.73	Peak
5850.198	52.11	vertical	11.79	63.90	121.75	-57.85	Peak
5865.550	48.52	vertical	11.80	60.32	107.84	-47.52	Peak
5922.008	48.13	vertical	11.83	59.96	70.41	-10.45	Peak
5940.333	49.06	vertical	11.87	60.93	68.20	-7.27	Peak
11650.000	33.16	horizontal	7.17	40.33	54.00	-13.67	Average
11650.000	43.59	horizontal	7.17	50.76	74.00	-23.24	Peak
11650.000	33.05	vertical	7.17	40.22	54.00	-13.78	Average
11650.000	43.43	vertical	7.17	50.60	74.00	-23.40	Peak
802.11n40							
Low Channel							
5630.916	48.47	horizontal	11.32	59.79	68.20	-8.41	Peak
5652.926	48.32	horizontal	11.35	59.67	70.37	-10.70	Peak
5717.259	63.51	horizontal	11.54	75.05	110.03	-34.98	Peak
5722.161	65.52	horizontal	11.55	77.07	115.73	-38.66	Peak
5612.306	48.17	vertical	11.30	59.47	68.20	-8.73	Peak
5652.727	48.25	vertical	11.35	59.60	70.23	-10.63	Peak
5717.659	55.98	vertical	11.55	67.53	110.15	-42.62	Peak
5721.961	57.78	vertical	11.55	69.33	115.27	-45.94	Peak
11510.000	33.21	horizontal	7.10	40.31	54.00	-13.69	Average
11510.000	42.81	horizontal	7.10	49.91	74.00	-24.09	Peak
11510.000	33.27	vertical	7.10	40.37	54.00	-13.63	Average
11510.000	43.27	vertical	7.10	50.37	74.00	-23.63	Peak

High Channel							
5853.890	51.85	horizontal	11.78	63.63	113.33	-49.70	Peak
5855.916	50.57	horizontal	11.80	62.37	110.54	-48.17	Peak
5919.735	47.57	horizontal	11.83	59.40	72.08	-12.68	Peak
5946.861	48.26	horizontal	11.89	60.15	68.20	-8.05	Peak
5853.439	47.36	vertical	11.78	59.14	114.36	-55.22	Peak
5869.422	48.63	vertical	11.79	60.42	106.76	-46.34	Peak
5921.423	47.73	vertical	11.83	59.56	70.84	-11.28	Peak
5963.407	48.57	vertical	11.88	60.45	68.20	-7.75	Peak
11590.000	33.39	horizontal	7.17	40.56	54.00	-13.44	Average
11590.000	44.44	horizontal	7.17	51.61	74.00	-22.39	Peak
11590.000	33.37	vertical	7.17	40.54	54.00	-13.46	Average
11590.000	44.31	vertical	7.17	51.48	74.00	-22.52	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

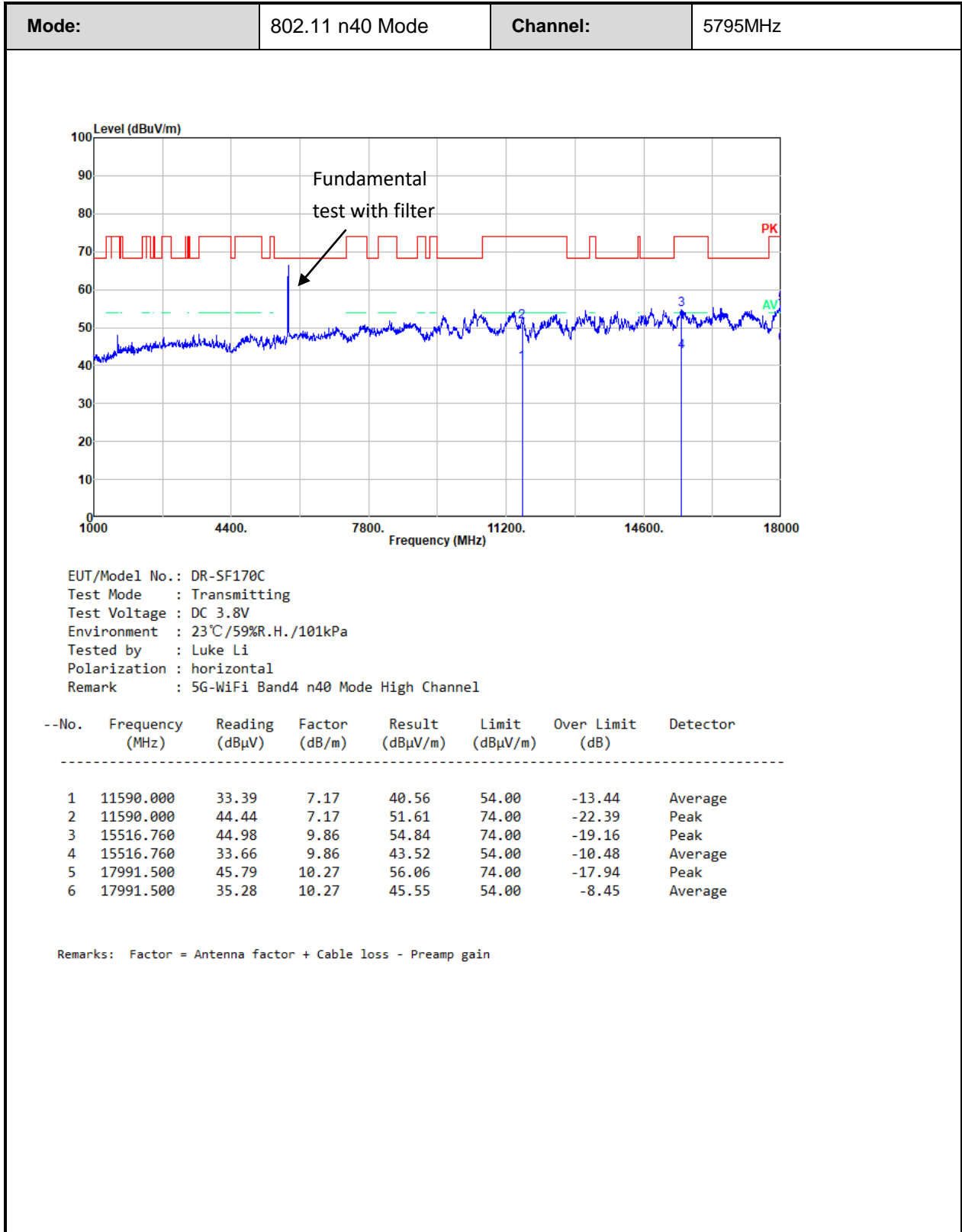
Corrected Factor = Antenna factor + Cable loss – Amplifier gain

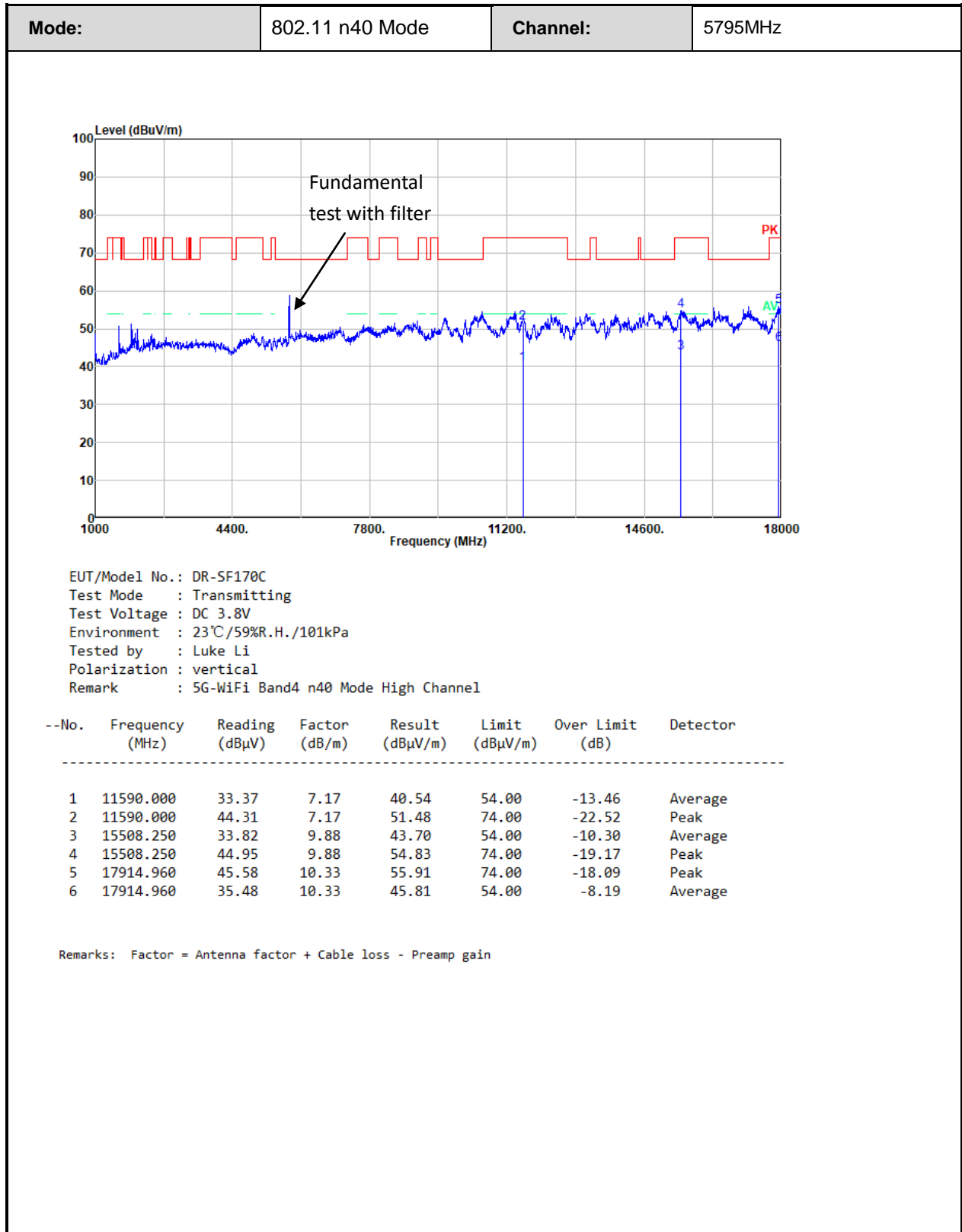
Margin = Corrected Amplitude – Limit

The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

For emissions in 18GHz-40GHz range, all emissions were investigated and in the noise floor level.

Test plot for example as below:





3.5 RF Conducted Test Data

Test Date:	2023-12-01 to 2023-12-13	Test By:	Baylor Li
Environment condition:	Temperature: 22.2~23.2°C; Relative Humidity:51~61%; ATM Pressure: 101.2~103.3kPa		

3.5.1 26dB/6dB Emission Bandwidth and 99% Occupied Bandwidth

5150-5250MHz:			
Test Mode	Channel Frequency [MHz]	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11a	5180	36.09	18.72
	5200	36.92	18.98
	5240	38.42	19.17
802.11n-HT20 SISO	5180	32.64	18.40
	5200	34.86	18.53
	5240	38.37	18.91
802.11n-HT40 SISO	5190	65.53	37.44
	5230	75.67	37.56

Note: no any part of OBW fall within U-NII 2A band.

5725-5850 MHz:					
Test Mode	Channel Frequency [MHz]	6 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]	6 dB Bandwidth Limit [MHz]	Verdict
802.11a	5745	16.423	17.564	0.5	Pass
	5785	16.436	17.500	0.5	Pass
	5825	16.385	17.564	0.5	Pass
802.11n-HT20 SISO	5745	16.769	18.077	0.5	Pass
	5785	17.256	18.141	0.5	Pass
	5825	17.449	18.141	0.5	Pass
802.11n-HT40 SISO	5755	35.897	37.436	0.5	Pass
	5795	35.692	37.436	0.5	Pass

Note: no any part of OBW fall within U-NII 2C band.

3.5.2 Maximum conducted output power

5150-5250 MHz:				
Test Mode	Channel [MHz]	Result [dBm]	Limit [dBm]	Verdict
802.11a	5180	11.38	30	Pass
	5200	11.54	30	Pass
	5240	11.85	30	Pass
802.11n-HT20 SISO	5180	11.39	30	Pass
	5200	11.55	30	Pass
	5240	11.58	30	Pass
802.11n-HT40 SISO	5190	8.14	30	Pass
	5230	8.40	30	Pass
<p>Note: The device belongs to outdoor AP. The maximum EIRP=11.85dBm+2.0dBi=13.85dBm<21dBm, so it's can compliance with the requirement of the maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125mW (21 dBm)</p>				
5725-5850 MHz:				
Test Mode	Channel [MHz]	Result [dBm]	Limit [dBm]	Verdict
802.11a	5745	10.46	30	Pass
	5785	10.22	30	Pass
	5825	9.43	30	Pass
802.11n-HT20 SISO	5745	10.59	30	Pass
	5785	10.40	30	Pass
	5825	9.75	30	Pass
802.11n-HT40 SISO	5755	11.12	30	Pass
	5795	10.64	30	Pass

3.5.3 Power Spectral Density

5150-5250 MHz				
Test Mode	Channel [MHz]	Result [dBm/1MHz]	Limit [dBm/1MHz]	Verdict
802.11a	5180	0.64	17	Pass
	5200	0.80	17	Pass
	5240	0.90	17	Pass
802.11n-HT20 SISO	5180	-1.67	17	Pass
	5200	-1.33	17	Pass
	5240	-1.16	17	Pass
802.11n-HT40 SISO	5190	-5.01	17	Pass
	5230	-4.86	17	Pass
5725-5850 MHz				
Test Mode	Channel [MHz]	Result [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
802.11a	5745	-3.41	30	Pass
	5785	-3.63	30	Pass
	5825	-4.27	30	Pass
802.11n-HT20 SISO	5745	-4.27	30	Pass
	5785	-4.33	30	Pass
	5825	-4.93	30	Pass
802.11n-HT40 SISO	5755	-6.71	30	Pass
	5795	-6.73	30	Pass

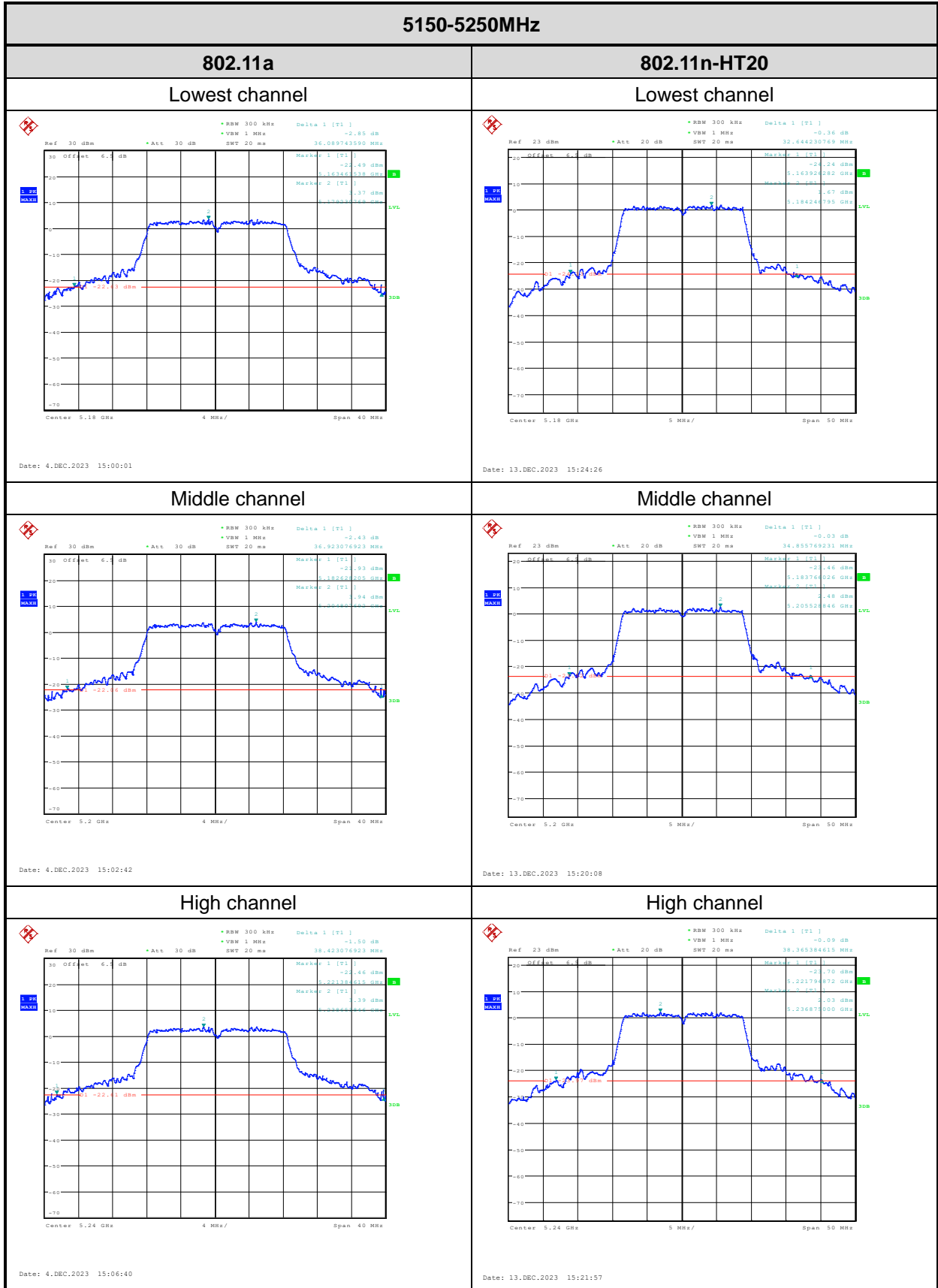
3.5.4 Duty Cycle

5150-5250 MHz						
Test Mode	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	1/T	Duty Cycle Factor[%]	VBW setting* [Hz]
802.11a	2.027	2.052	98.8	/	/	10
802.11n HT20	1.889	1.917	98.5	/	/	10
802.11n HT40	0.931	0.945	98.5	/	/	10
5725-5850 MHz						
Test Mode	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	1/T	Duty Cycle Factor[%]	VBW setting* [Hz]
802.11a	2.035	2.054	99.1	/	/	10
802.11n HT20	1.898	1.916	99.1	/	/	10
802.11n HT40	0.932	0.946	98.5	/	/	10

Note*: Radiated emission test with average value, the Spectrum analyzer VBW setting information.

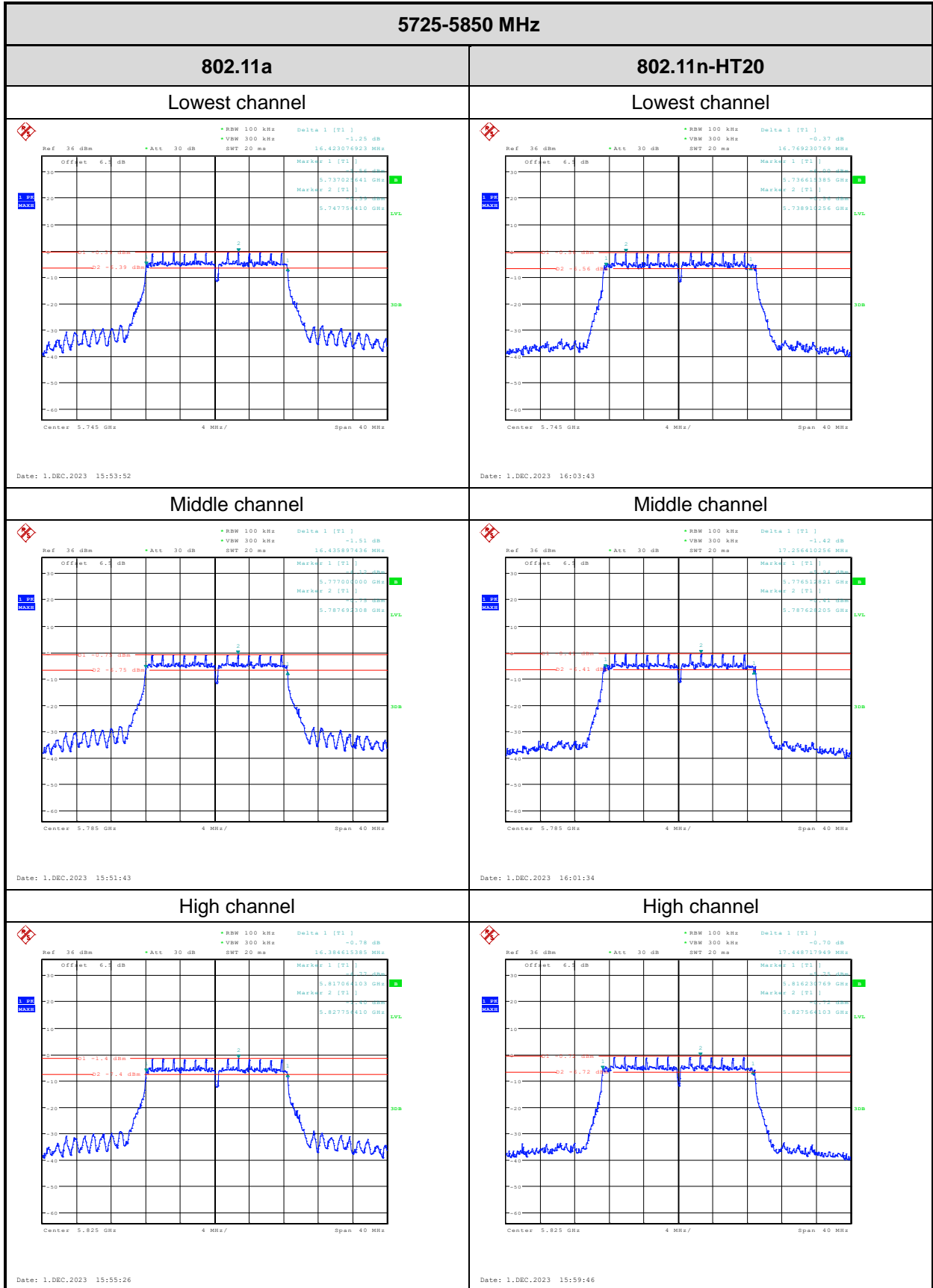
Test Plots:

26dB Emission Bandwidth



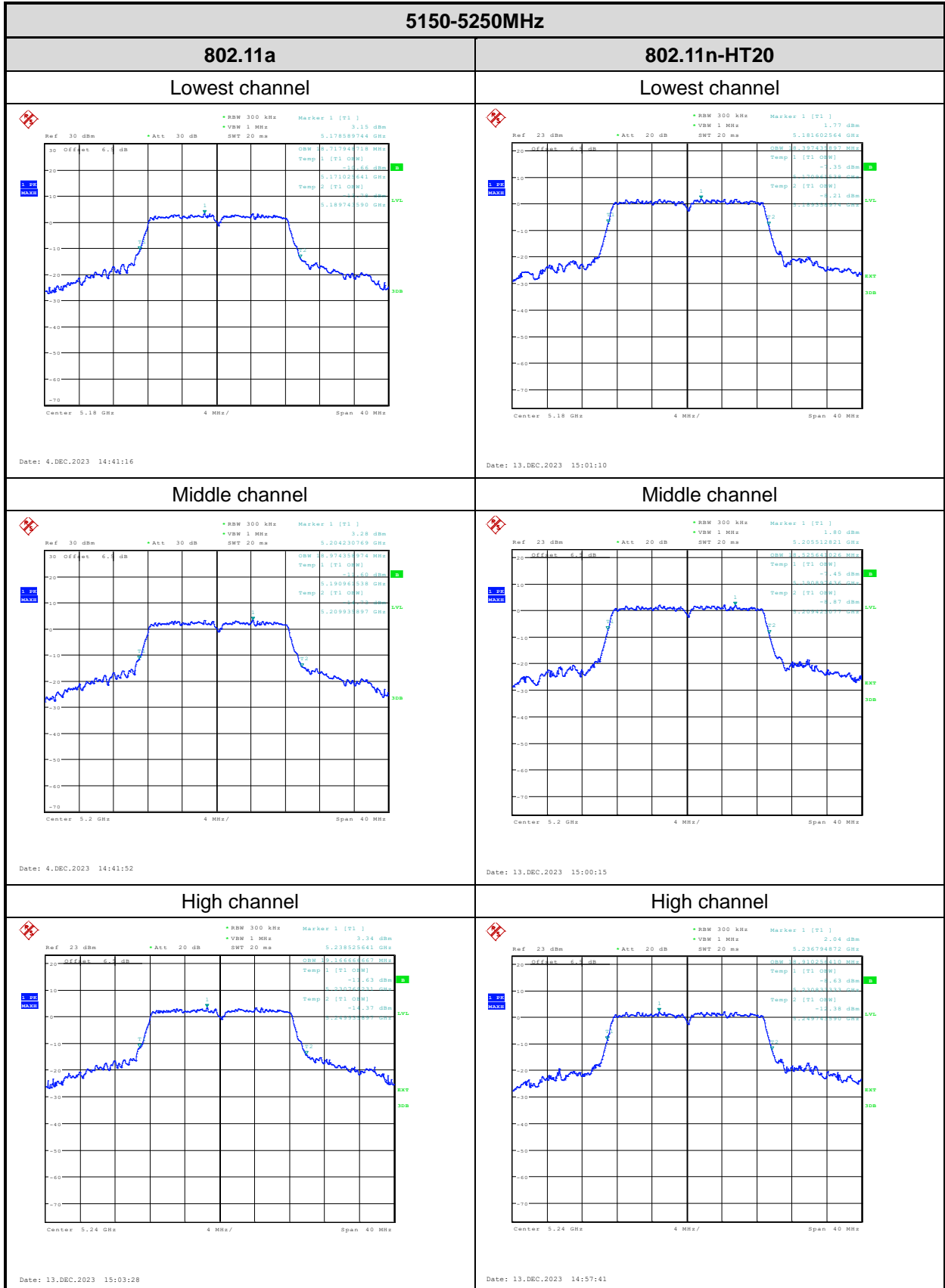
802.11n-HT40	/
Lowest channel	/
<p>Ref 30 dBm Att 30 dB RBW 1 MHz VBW 3 MHz SMT 20 ns Delta 1 [T1] 0.10 dB 65.53846133 MHz</p> <p>Marker 1 [T1] -2.09 dBm 65.53846133 MHz</p> <p>Marker 2 [T1] -128.00 dBm 65.53846133 MHz</p> <p>Center: 5.19 GHz 8 MHz/ Span 80 MHz</p> <p>Date: 4.DEC.2023 14:57:39</p>	/
High channel	/
<p>Ref 30 dBm Att 30 dB RBW 1 MHz VBW 3 MHz SMT 20 ns Delta 1 [T1] -0.05 dB 75.68466667 MHz</p> <p>Marker 1 [T1] -2.74 dBm 75.68466667 MHz</p> <p>Marker 2 [T1] -128.00 dBm 75.68466667 MHz</p> <p>Center: 5.23 GHz 8 MHz/ Span 80 MHz</p> <p>Date: 4.DEC.2023 14:54:08</p>	/

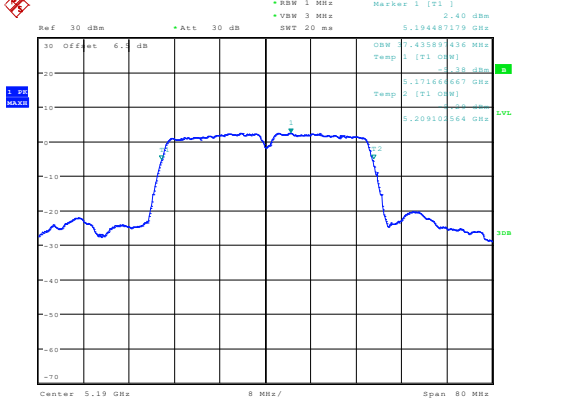
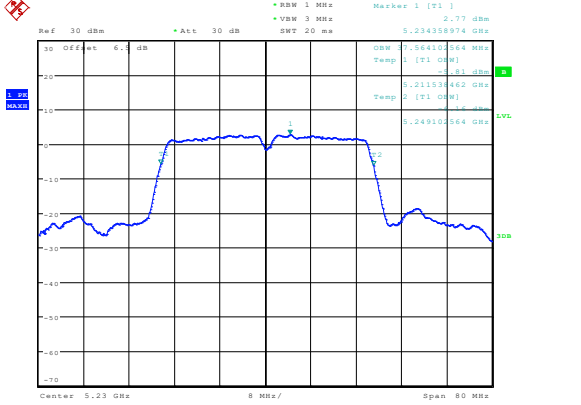
6dB Emission Bandwidth

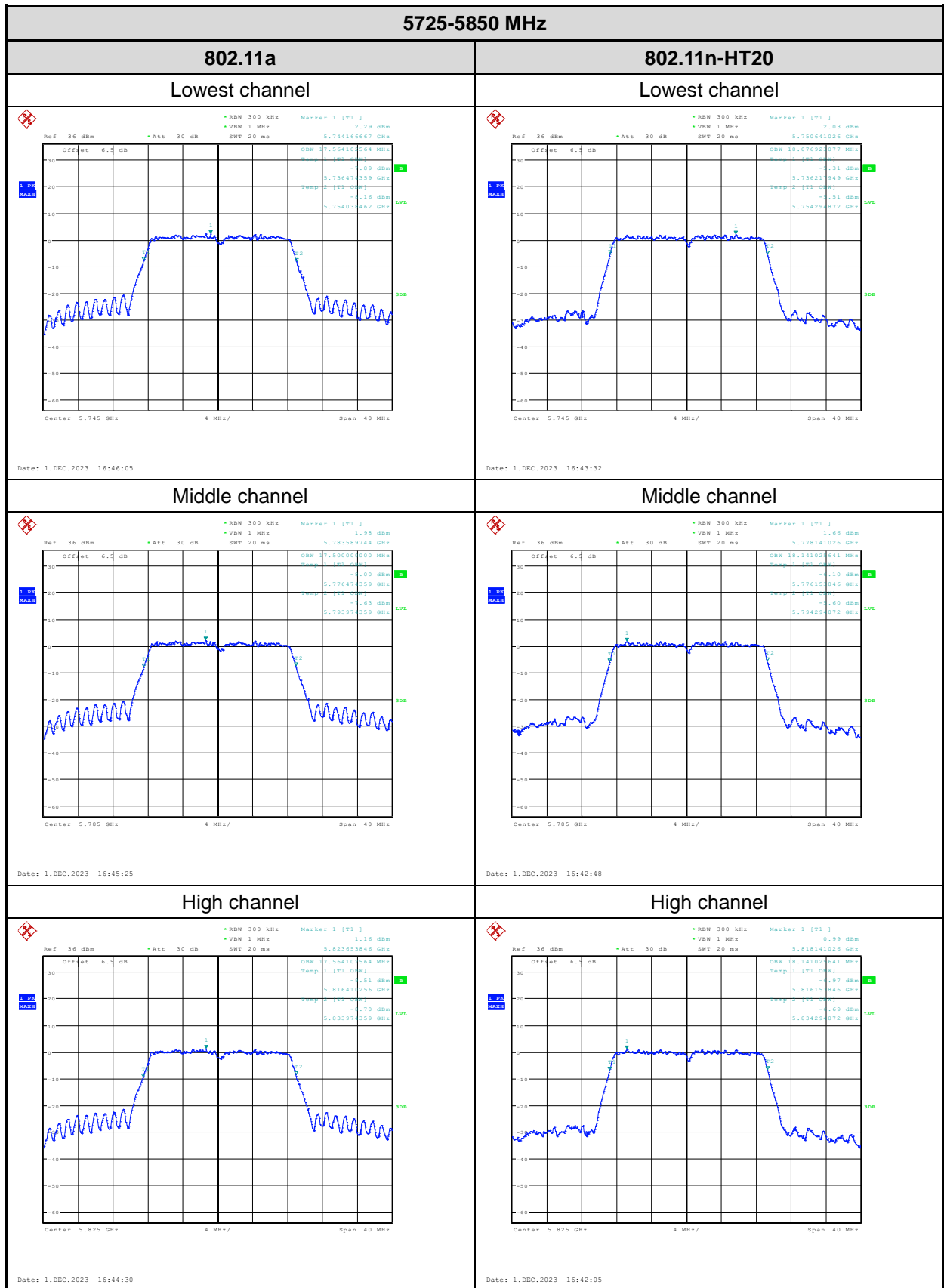


802.11n-HT40	/
Lowest channel	/
<p> *RBW 100 kHz Delta 1 [T1] -0.82 dB *VBW 300 kHz SMT 20 ms 35.887429807 MHz Ref: 36 dBm *Att: 30 dB Offset: 6.3 dB Marker 1 [T1] 5.73725410 GHz -0.82 dBm Marker 2 [T1] 5.75269308 GHz -0.48 dBm Center: 5.755 GHz 8 MHz/ Span: 80 MHz Date: 1.DEC.2023 16:06:54 </p>	/
High channel	/
<p> *RBW 100 kHz Delta 1 [T1] -0.48 dB *VBW 300 kHz SMT 20 ms 35.692307692 MHz Ref: 36 dBm *Att: 30 dB Offset: 6.3 dB Marker 1 [T1] 5.77733333 GHz -0.48 dBm Marker 2 [T1] 5.79269308 GHz -0.48 dBm Center: 5.755 GHz 8 MHz/ Span: 80 MHz Date: 1.DEC.2023 16:08:42 </p>	/

99% Occupied Bandwidth

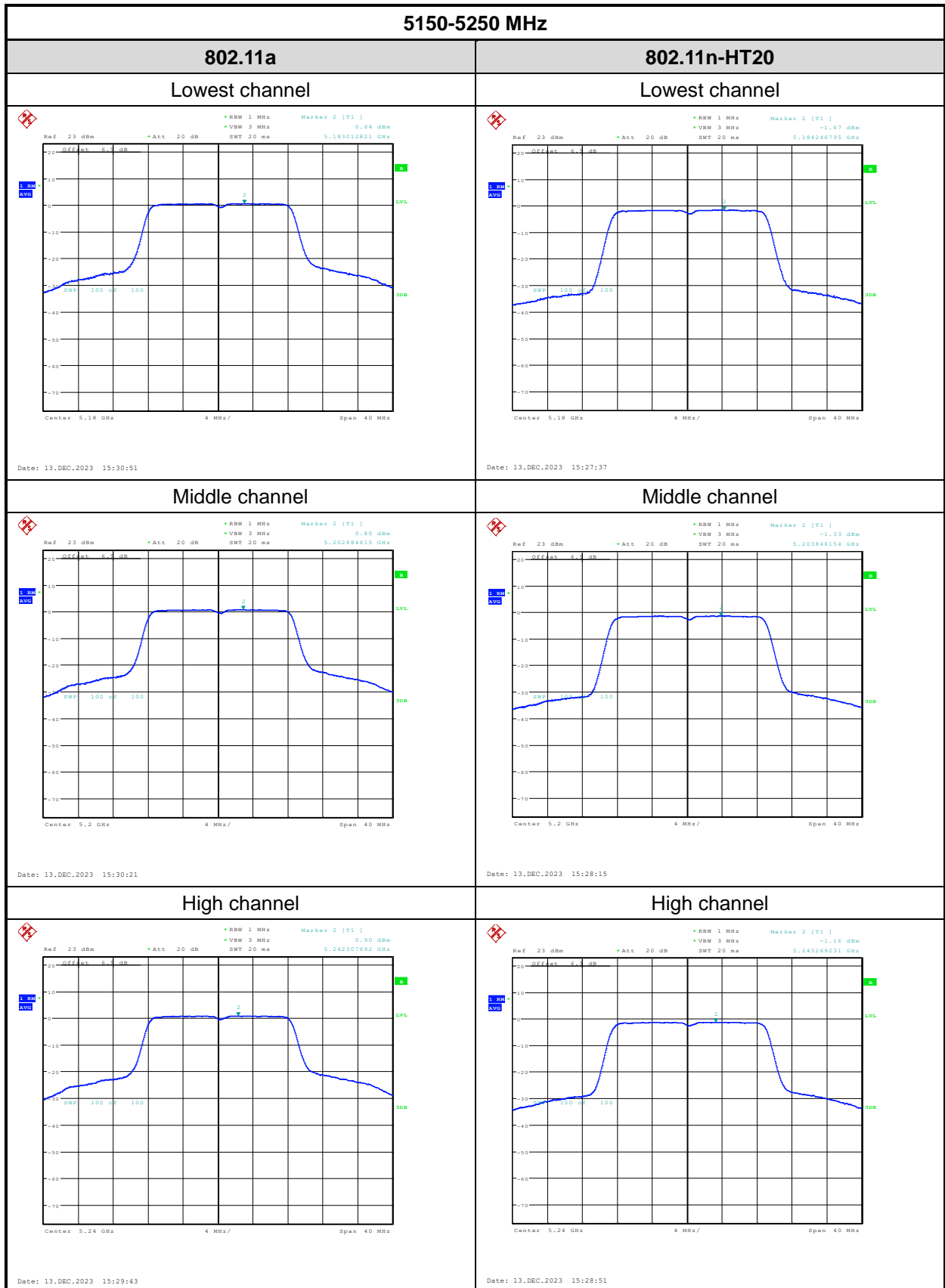


802.11n-HT40	/
Lowest channel	/
 <p>Ref: 30 dBm +Att: 30 dB +BW: 1 MHz Marker 1 [T1] 2.40 dBm +VSW: 3 MHz SWT: 20 mA 5.19448119 GHz</p> <p>30 Offset: 6.3 dB</p> <p>OSW: 7.435897436 MHz 100% Temp 1 [T1] [OSW] -18 dBm VSW: 5.173666667 GHz 100% Temp 2 [T2] [OSW] -18 dBm SWT: 5.209102564 GHz 100%</p> <p>Center: 5.19 GHz 8 MHz/ Span: 80 MHz</p> <p>Date: 4.DEC.2023 14:47:07</p>	
High channel	/
 <p>Ref: 30 dBm +Att: 30 dB +BW: 1 MHz Marker 1 [T1] 2.37 dBm +VSW: 3 MHz SWT: 20 mA 5.234358974 GHz</p> <p>30 Offset: 6.3 dB</p> <p>OSW: 7.064002564 MHz 100% Temp 1 [T1] [OSW] -18 dBm VSW: 5.211538442 GHz 100% Temp 2 [T2] [OSW] -18 dBm SWT: 5.249102564 GHz 100%</p> <p>Center: 5.23 GHz 8 MHz/ Span: 80 MHz</p> <p>Date: 4.DEC.2023 14:47:42</p>	/

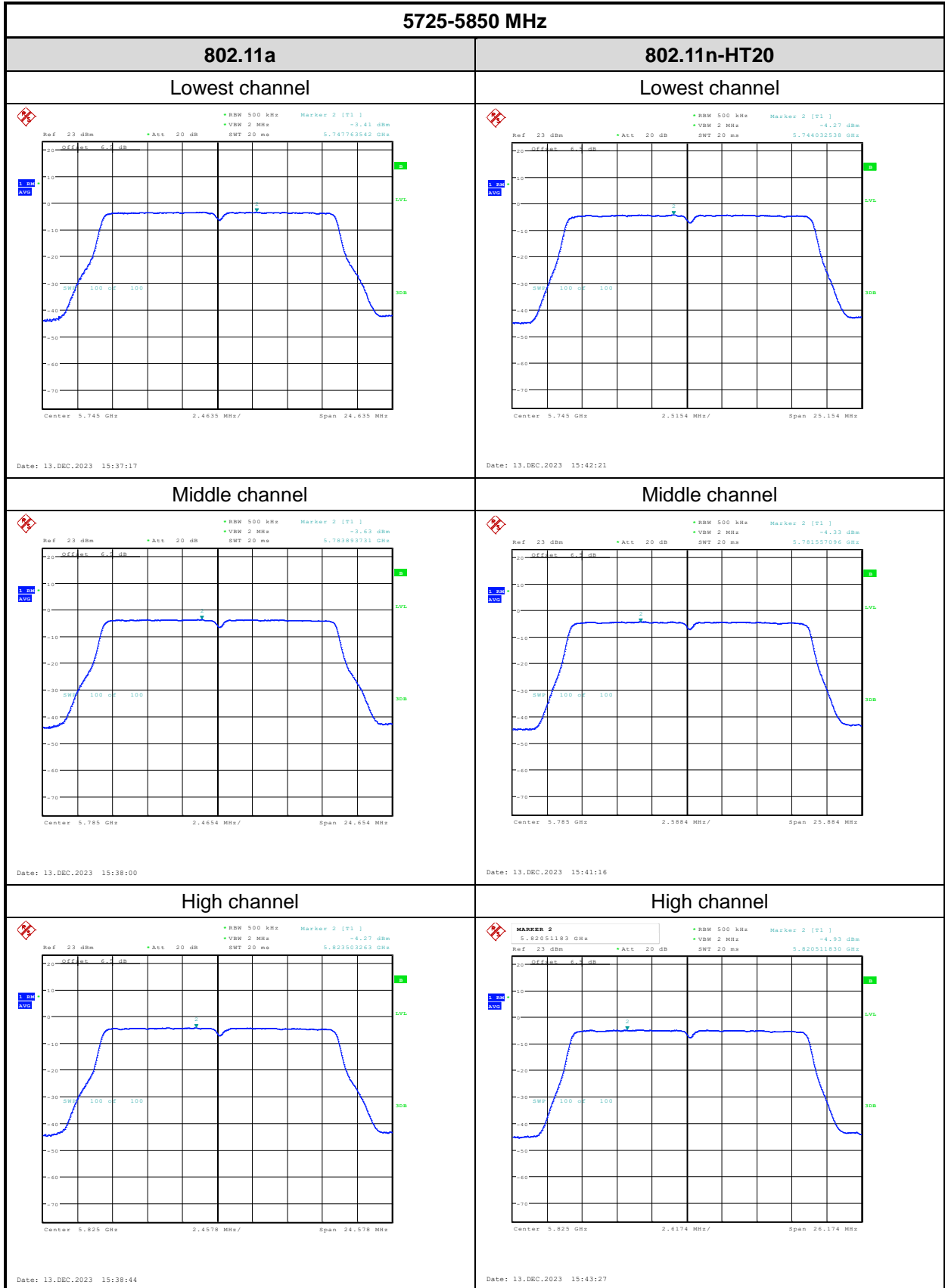


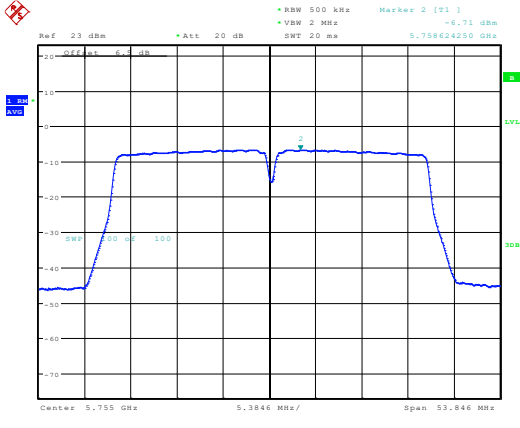
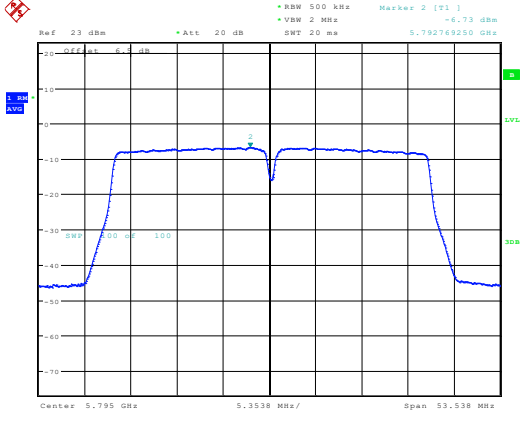
802.11n-HT40		/
Lowest channel		/
<p> *RBW 1 MHz Marker 1 [71] 6.40 dBm *VBW 3 MHz 5.750384615 GHz SMT 20 ms </p> <p> Ref 36 dBm *Att 30 dB Offset 6.3 dB </p> <p> 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm </p> <p> Center 5.755 GHz 8 MHz/ Span 80 MHz </p> <p>Date: 1.DEC.2023 16:52:21</p>		/
High channel		/
<p> *RBW 1 MHz Marker 1 [72] 5.51 dBm *VBW 3 MHz 5.788461538 GHz SMT 20 ms </p> <p> Ref 36 dBm *Att 30 dB Offset 6.3 dB </p> <p> 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm </p> <p> Center 5.795 GHz 8 MHz/ Span 80 MHz </p> <p>Date: 1.DEC.2023 16:53:00</p>		/

Power Spectral Density

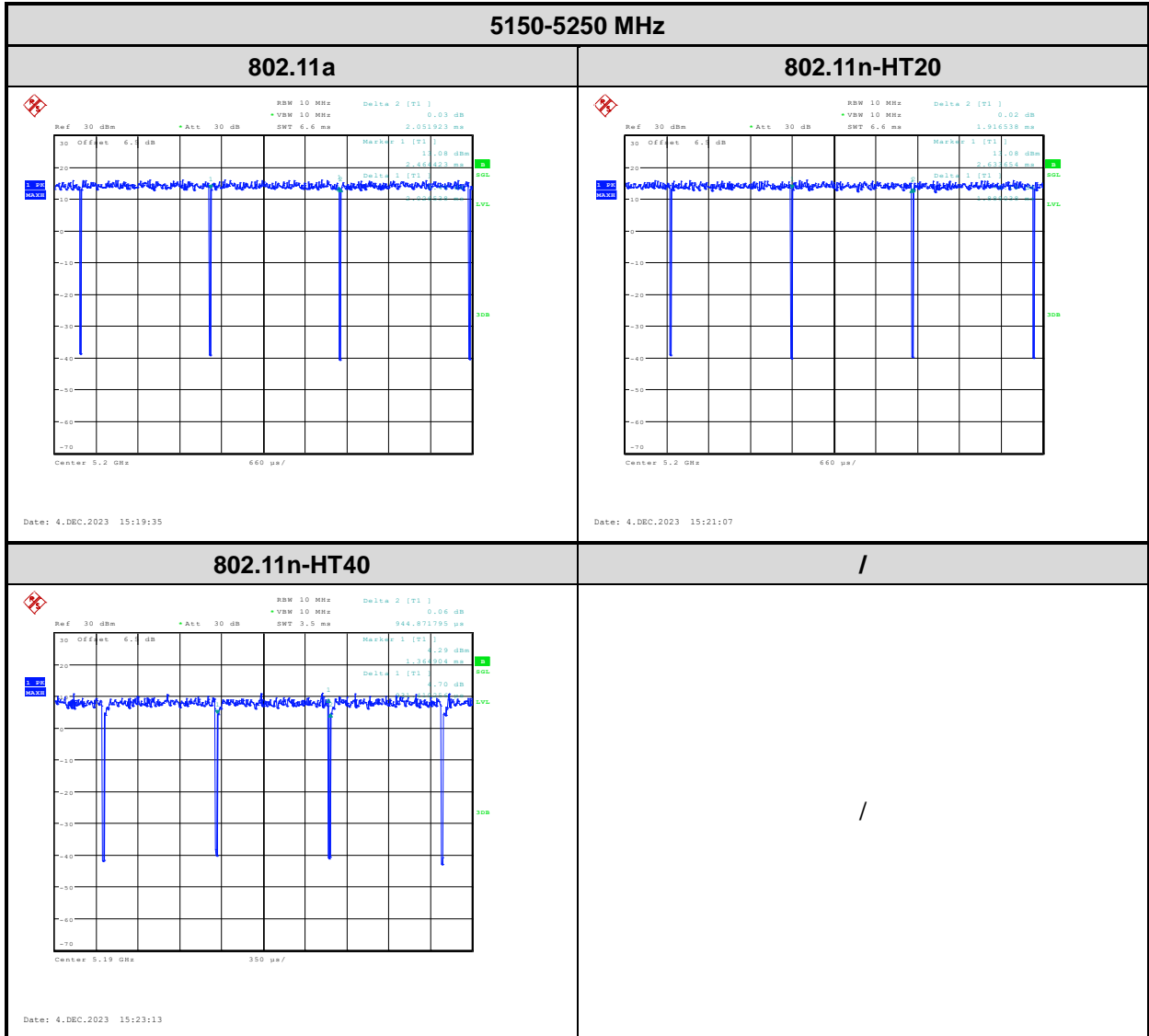


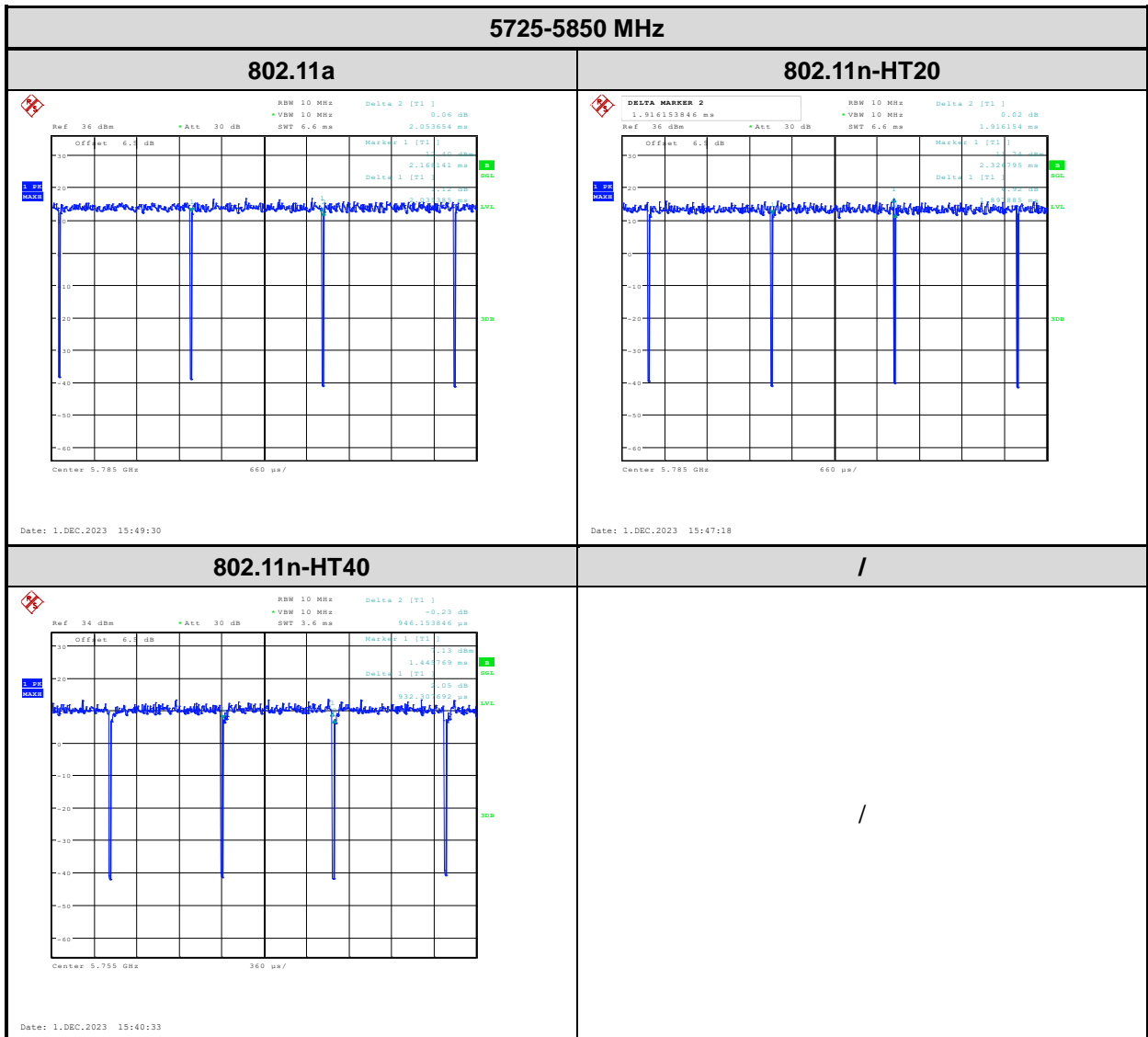
802.11n-HT40	/
Lowest channel	/
<p>Ref: 19 dBm Att: 20 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Marker 1 [T1] -5.01 dBm</p> <p>Center: 5.19 GHz Span: 80 MHz</p> <p>Date: 13.DEC.2023 17:25:30</p>	
High channel	/
<p>Ref: 19 dBm Att: 20 dB RBW: 1 MHz VBW: 3 MHz SWT: 20 ms Marker 1 [T1] -4.86 dBm</p> <p>Center: 5.23 GHz Span: 80 MHz</p> <p>Date: 13.DEC.2023 17:26:01</p>	/



802.11n-HT40	/
Lowest channel	/
 <p>Ref: 23 dBm Att: 20 dB RBW: 500 kHz VBW: 2 MHz SWT: 20 ms Marker 2 [T1] -6.71 dBm 5.755624250 GHz</p> <p>Center: 5.755 GHz Span: 53.846 MHz</p> <p>Date: 13.DEC.2023 15:44:39</p>	
High channel	/
 <p>Ref: 23 dBm Att: 20 dB RBW: 500 kHz VBW: 2 MHz SWT: 20 ms Marker 2 [T2] -6.73 dBm 5.792749250 GHz</p> <p>Center: 5.795 GHz Span: 53.538 MHz</p> <p>Date: 13.DEC.2023 15:45:47</p>	/

Duty Cycle





4 Test Setup Photo

Please refer to the attachment: RWAY202300019 Test Setup photo.

5 E.U.T Photo

Please refer to the attachment: RWAY202300019 External photo and RWAY202300019 Internal photo.

---End of Report---