

FCC Test Report

Report No.: RWAQ202400245D

Applicant: SweatWorks LLC

Address: 4532 Cherry Hill Rd Ste 543, Arlington, VA 22207, United States

Product Name: 21.5 inch tablet

Product Model: SW01

Multiple Models: N/A

Trade Mark: Fitness Console 21.5 SW1

FCC ID: 2BFH9-SW01

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

Test Date: 2024-03-28 to 2024-04-15

Test Result: Complied

Issue Date: 2024-04-17

Reviewed by:

Frank Yin

Approved by:

Jacob Kong

Frank Yin
Project Engineer

Jacob Kong
Manager

Prepared by:

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

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Guangdong, People's Republic of China



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Revision History

Version No.	Issued Date	Description
00	2024-04-17	Original

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1 General Information

1.1 Client Information

Applicant:	SweatWorks LLC
Address:	4532 Cherry Hill Rd Ste 543, Arlington, VA 22207, United States
Manufacturer:	SweatWorks LLC
Address:	4532 Cherry Hill Rd Ste 543, Arlington, VA 22207, United States

1.2 Product Description of EUT

The EUT is 21.5 inch tablet that contains BT, BLE(1M), 2.4G and 5G WLAN radios, this report covers the full testing of the 5G WLAN radio.

Sample Serial number	6T-2 for CE&RE & RF conducted test(assigned by WATC)
Sample Received Date	2024-03-21
Sample Status	Good Condition
Frequency Range	5150 MHz - 5250MHz 5725 MHz - 5850MHz
Maximum Conducted Output Power	5150 MHz - 5250MHz: 13.34dBm 5725 MHz - 5850MHz: 10.31dBm
Modulation Technology	OFDM
Spatial Streams	SISO(1TX, 1RX)
Antenna Gain [#]	1.67dBi for 5150MHz-5250MHz 2.49dBi for 5725 MHz - 5850MHz
Power Supply	DC 12V for adapter
Operating temperature [#]	0 deg.C to +40 deg.C
Adapter Information	Model: J652-1205000DI Input: AC100-240V, 50/60Hz, 1.7A Output: DC 12V/5A, 60.0W
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: DSS, FCC ID: 2BFH9-SW01
FCC Part 15, Subpart C, Equipment Class: DTS, FCC ID: 2BFH9-SW01

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
Emissions, Conducted		1.75dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Power Spectral Density		0.74dB
Note: 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.		

1.6 Laboratory Location

World Alliance Testing & 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: qa@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

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	42	5210	48	5240
38	5190	44	5220	/	/
40	5200	46	5230	/	/
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, 802.11ac-VHT20					
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, 802.11ac-VHT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
38	5190	/	/	46	5230
802.11ac-VHT80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	/	42	5210	/	/

Operating channels: (5725-5850MHz)					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
149	5745	155	5775	161	5805
151	5755	157	5785	165	5825
153	5765	159	5795	/	/
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, 802.11ac-VHT20					
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, 802.11ac-VHT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency

	(MHz)		(MHz)		(MHz)
151	5755	/	/	159	5795
802.11ac-VHT80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	/	155	5775	/	/

Test Mode:				
Transmitting mode:		Keep the EUT in continuous transmitting with modulation		
Exercise software [#] :		engineer mode		
5150 MHz - 5250MHz				
Mode	Data rate	Power Level Setting [#]		
		Low Channel	Middle Channel	High Channel
802.11a	6Mbps	17	17	17
802.11n-HT20	MCS0	17	17	17
802.11n-HT40	MCS0	14	14	14
802.11ac-VHT80	MCS0	17	17	17
The exercise software and the maximum power setting that provided by manufacturer.				
5725 MHz - 5850MHz				
Mode	Data rate	Power Level Setting [#]		
		Low Channel	Middle Channel	High Channel
802.11a	6Mbps	17	17	17
802.11n-HT20	MCS0	17	17	17
802.11n-HT40	MCS0	17	17	17
802.11ac-VHT80	MCS0	17	17	17
The exercise software and the maximum power setting that provided by manufacturer.				

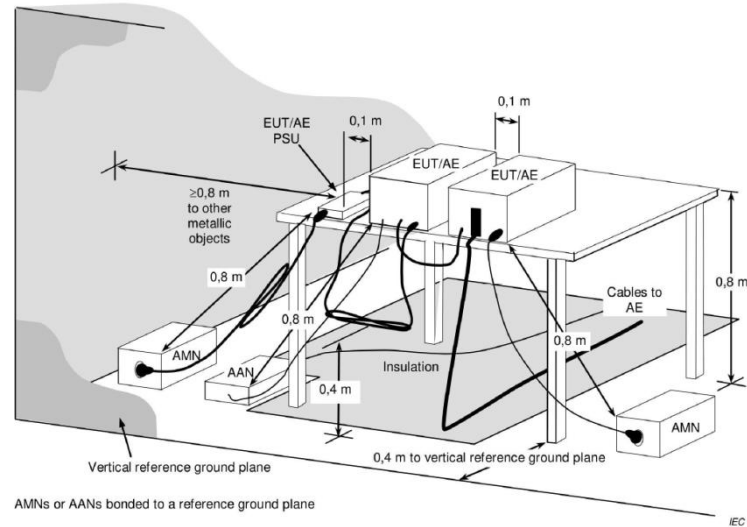
Worst-Case Configuration:
For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.
The ac vht20/ac vht40 were reduced test since the identical parameters with n-ht20/n-ht40.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

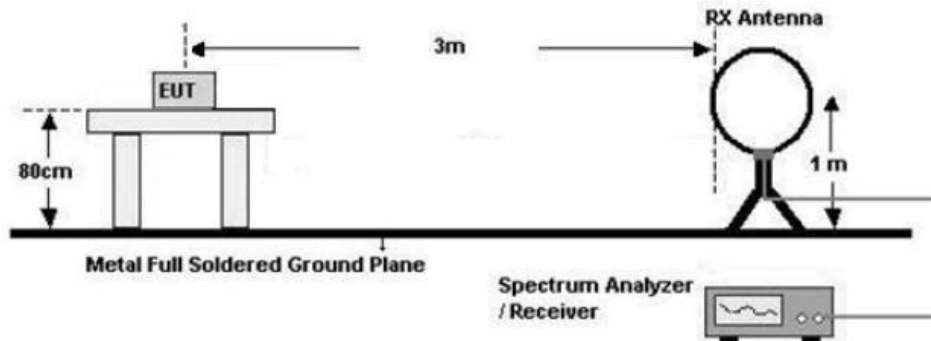
1) Conducted emission measurement:



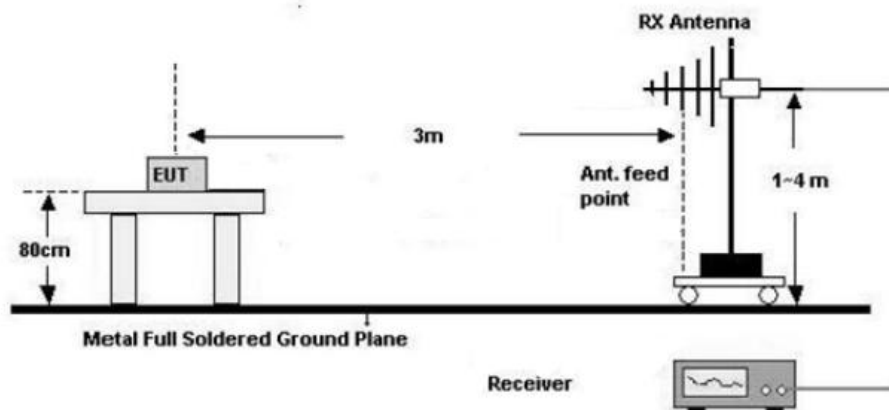
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

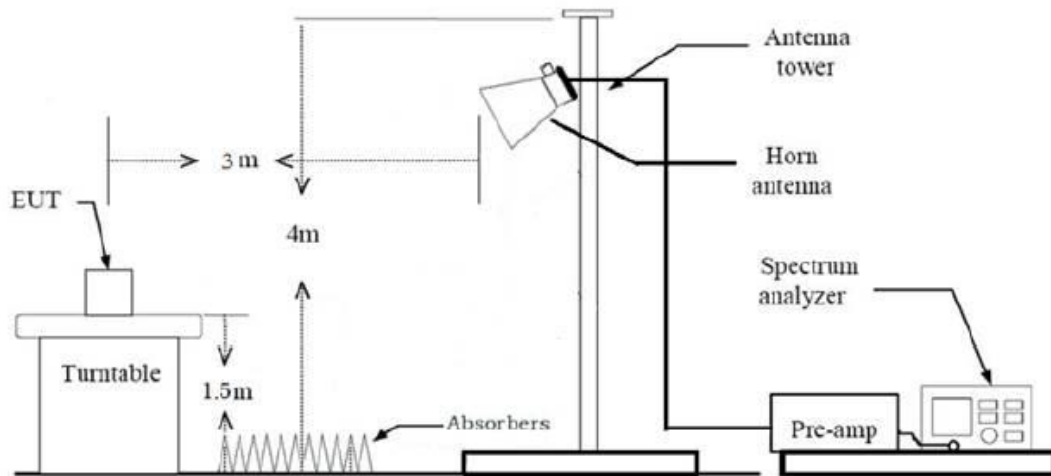
Below 30MHz (3m SAC)



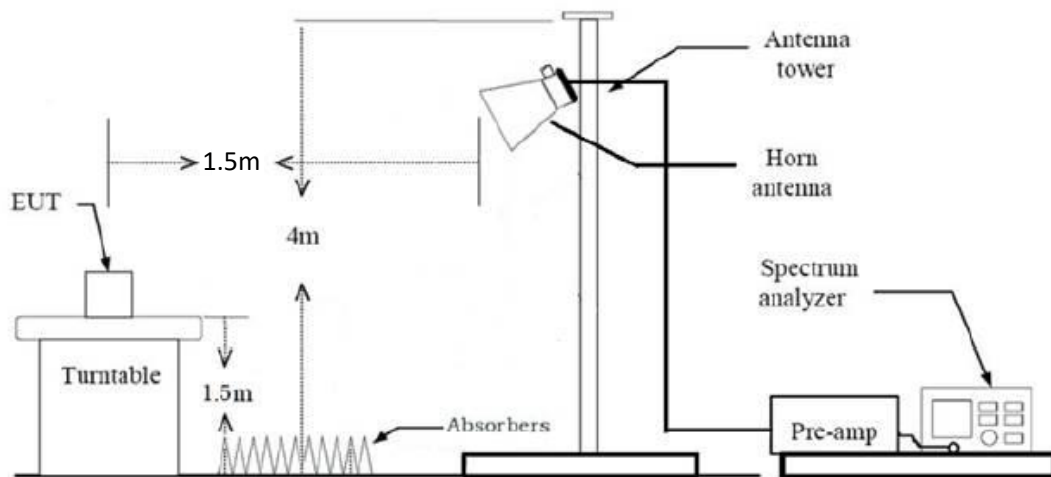
0MHz-1GHz (3m SAC)



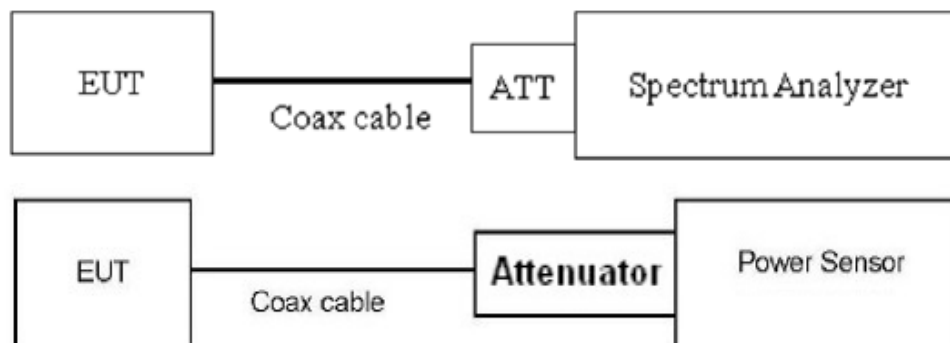
1GHz-18GHz(3m FAC)



Above 18GHz (3m FAC)



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 7.0dB (including 6.0 dB Attenuator and 1.0 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 1.0dB 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	2023/8/1	2024/7/31
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	Low frequency	310	186014	2023/7/12	2024/7/11

INSTRUMENT	amplifier				
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
COM-POWER	Amplifier	PAM-840A	461306	2023/8/8	2024/8/7
BACL	Loop Antenna	1313-1A	4010611	2024/2/7	2027/2/6
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	Compliance
§15.407 (a)(1)(iv),(3)(i)	Conducted Peak Output Power Power Spectral Density	Compliance
§15.407 (a)(12)	99% Occupied Bandwidth	Compliance
§15.407 (a)	26 dB Emission Bandwidth	Compliance
§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

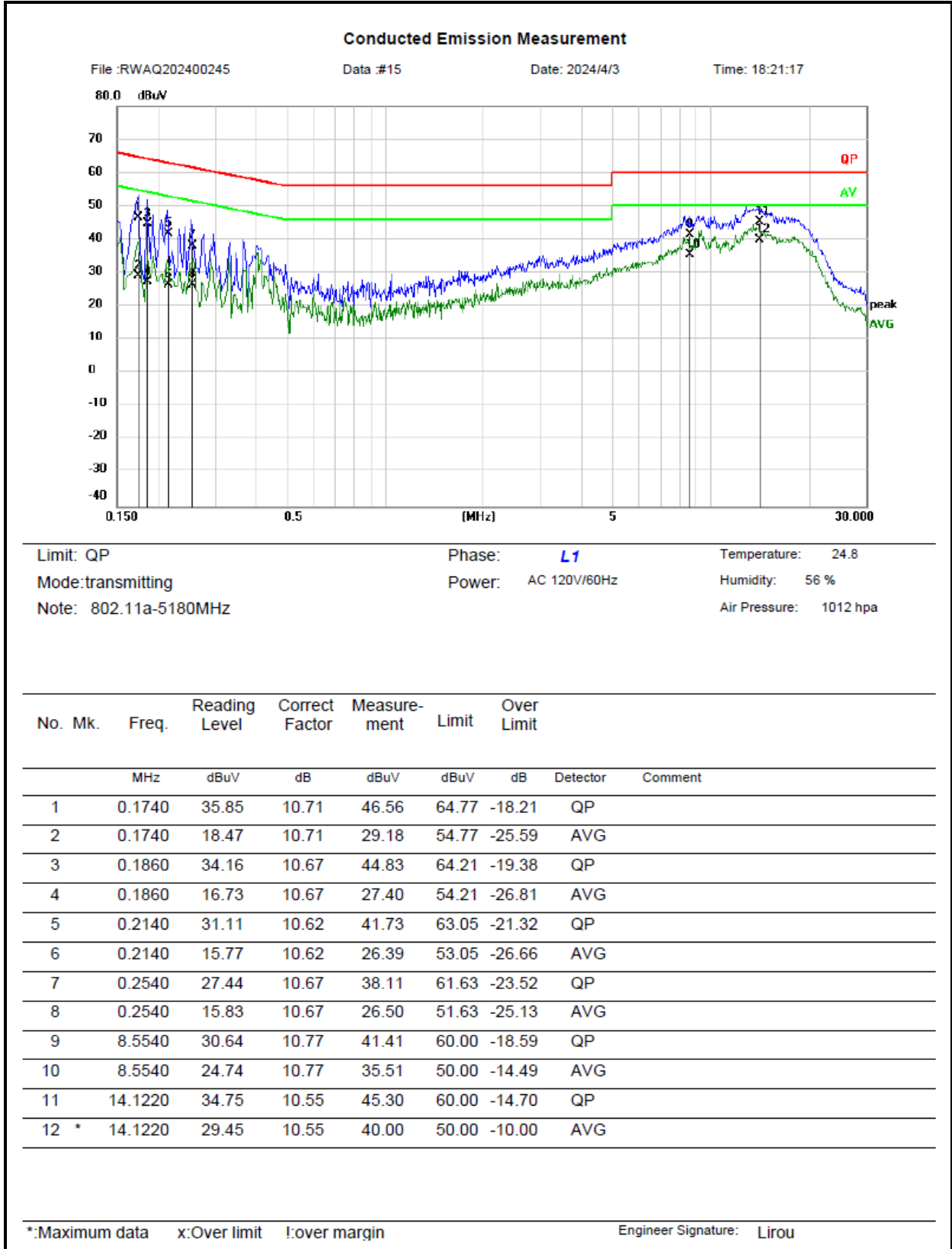
3.2 Limit

Test items	Limit
AC Power Line Conducted Emission	See details §15.207 (a)
Conducted Peak Output Power	For the band 5.150-5.250 GHz Band: For client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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. For the band 5.725-5.895 GHz Band: 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.
Power Spectral Density	
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.

Unwanted Emissions	For transmitters operating in the 5.15–5.25 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating in the 5.25–5.35 GHz band: All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating in the 5.47–5.725 GHz band: All emissions outside of the 5.47–5.725 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz. For transmitters operating solely in the 5.725–5.850 GHz band: 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. Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. The provisions of § 15.205 apply to intentional radiators operating under this section.
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3.3 AC Line Conducted Emissions Test Data

Test Date:	2024-04-03	Test By:	Lirou Li
Environment condition:	Temperature: 24.8°C; Relative Humidity:56%; ATM Pressure: 101.2kPa		



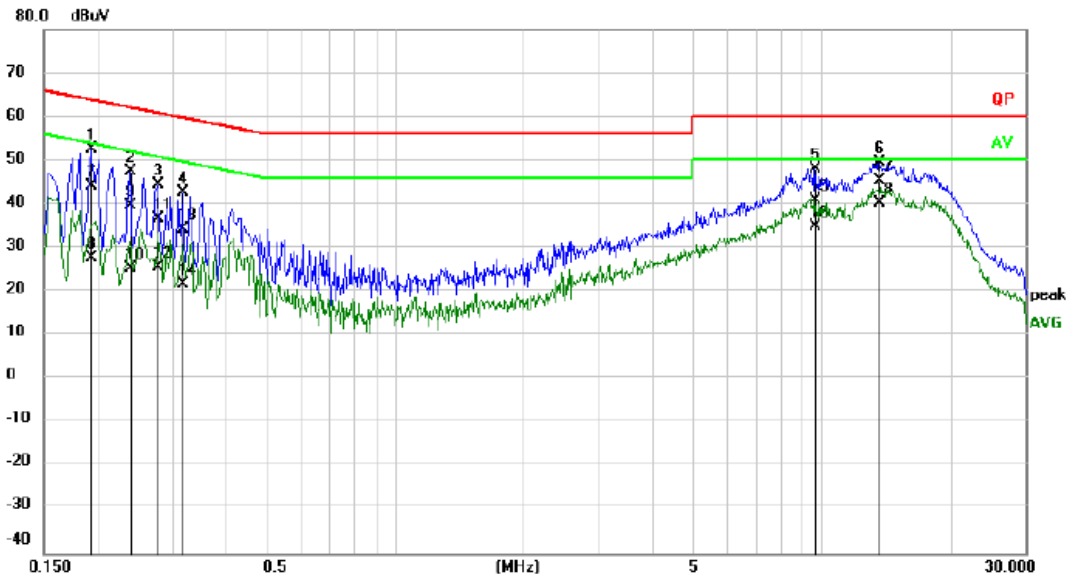
Conducted Emission Measurement

File :RWAQ202400245

Data :#16

Date: 2024/4/3

Time: 18:22:57



Limit: QP

Phase: **N**

Temperature: 24.8

Mode:transmitting

Power: AC 120V/60Hz

Humidity: 56 %

Note: 802.11a-5180MHz

Air Pressure: 1012 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	42.24	10.43	52.67	63.86	-11.19	peak	
2		0.2380	36.94	10.46	47.40	62.17	-14.77	peak	
3		0.2779	33.84	10.51	44.35	60.88	-16.53	peak	
4		0.3180	32.14	10.56	42.70	59.76	-17.06	peak	
5		9.6260	37.45	10.72	48.17	60.00	-11.83	peak	
6		13.5900	38.82	10.83	49.65	60.00	-10.35	peak	
7		0.1940	33.74	10.43	44.17	63.86	-19.69	QP	
8		0.1940	17.33	10.43	27.76	53.86	-26.10	AVG	
9		0.2380	29.31	10.46	39.77	62.17	-22.40	QP	
10		0.2380	14.69	10.46	25.15	52.17	-27.02	AVG	
11		0.2779	26.22	10.51	36.73	60.88	-24.15	QP	
12		0.2779	15.09	10.51	25.60	50.88	-25.28	AVG	
13		0.3180	23.63	10.56	34.19	59.76	-25.57	QP	
14		0.3180	11.21	10.56	21.77	49.76	-27.99	AVG	
*:Maximum data x:Over limit l:over margin									Engineer Signature: Lirou
15		9.6260	30.28	10.72	41.00	60.00	-19.00	QP	
16		9.6260	24.26	10.72	34.98	50.00	-15.02	AVG	
17		13.5900	34.66	10.83	45.49	60.00	-14.51	QP	
18	*	13.5900	29.49	10.83	40.32	50.00	-9.68	AVG	

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

Correct Factor(dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

3.4 Radiated emission Test Data

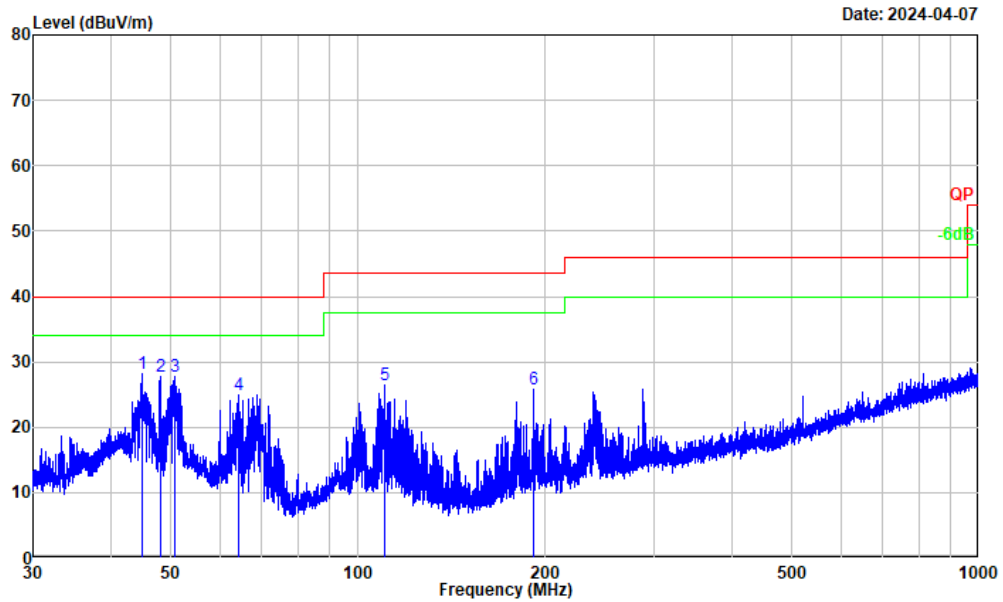
9 kHz-30MHz:

Test Date:	2024-04-07	Test By:	Bard Huang
Environment condition:	Temperature: 21.5°C; Relative Humidity:64%; ATM Pressure: 101.6kPa		

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

30MHz-1GHz:

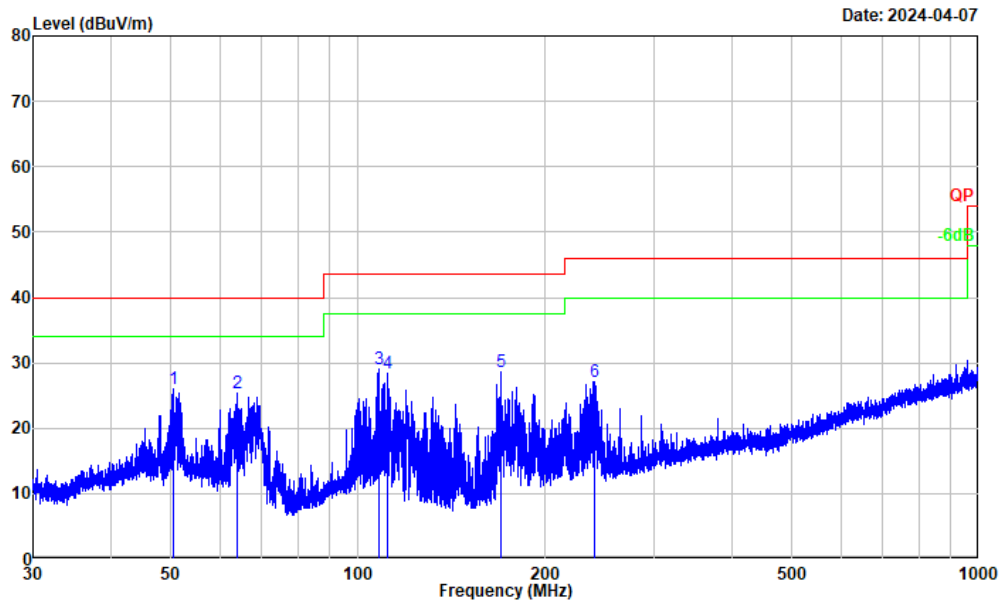
Test Date:	2024-04-07	Test By:	Bard Huang
Environment condition:	Temperature: 21.5°C; Relative Humidity:64%; ATM Pressure: 101.6kPa		



Project No. : RWAQ202400245
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 21.5°C/64%R.H./101.6kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : 802.11a 5180MHz

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	44.923	40.30	-12.21	28.09	40.00	-11.91	Peak
2	48.039	39.92	-12.17	27.75	40.00	-12.25	Peak
3	50.856	39.91	-12.16	27.75	40.00	-12.25	Peak
4	64.185	39.21	-14.27	24.94	40.00	-15.06	Peak
5	110.393	40.84	-14.30	26.54	43.50	-16.96	Peak
6	192.295	40.25	-14.41	25.84	43.50	-17.66	Peak

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



Project No. : RWAQ202400245
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 21.5°C/64%R.H./101.6kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 802.11a 5180MHz

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	50.368	38.19	-12.17	26.02	40.00	-13.98	Peak
2	63.877	39.57	-14.22	25.35	40.00	-14.65	Peak
3	108.000	43.13	-14.04	29.09	43.50	-14.41	Peak
4	111.854	42.96	-14.50	28.46	43.50	-15.04	Peak
5	170.008	45.05	-16.35	28.70	43.50	-14.80	Peak
6	240.050	39.84	-12.70	27.14	46.00	-18.86	Peak

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

Remark:

Level = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Level – Limit

Above 1GHz:

Test Date:	2024-03-29	Test By:	Bard Huang
Environment condition:	Temperature: 21.5°C; Relative Humidity:64%; ATM Pressure: 101.6kPa		

5150-5250MHz:

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
802.11a							
Low Channel							
5150.000	35.60	horizontal	11.57	47.17	54.00	-6.83	Average
5150.000	47.74	horizontal	11.57	59.31	74.00	-14.69	Peak
5150.000	35.67	vertical	11.57	47.24	54.00	-6.76	Average
5150.000	47.94	vertical	11.57	59.51	74.00	-14.49	Peak
10360.000	45.26	horizontal	5.50	50.76	68.20	-17.44	Peak
10360.000	44.80	vertical	5.50	50.30	68.20	-17.90	Peak
Middle Channel							
10400.000	45.67	horizontal	5.70	51.37	68.20	-16.83	Peak
10400.000	45.00	vertical	5.70	50.70	68.20	-17.50	Peak
High Channel							
5350.000	35.12	horizontal	11.44	46.56	54.00	-7.44	Average
5350.000	47.12	horizontal	11.44	58.56	74.00	-15.44	Peak
5350.000	35.18	vertical	11.44	46.62	54.00	-7.38	Average
5350.000	47.17	vertical	11.44	58.61	74.00	-15.39	Peak
10480.000	44.09	horizontal	5.74	49.83	68.20	-18.37	Peak
10480.000	43.57	vertical	5.74	49.31	68.20	-18.89	Peak
802.11n20							
Low Channel							
5150.000	35.58	horizontal	11.57	47.15	54.00	-6.85	Average
5150.000	48.18	horizontal	11.57	59.75	74.00	-14.25	Peak
5150.000	35.62	vertical	11.57	47.19	54.00	-6.81	Average
5150.000	48.42	vertical	11.57	59.99	74.00	-14.01	Peak
10360.000	45.22	horizontal	5.50	50.72	68.20	-17.48	Peak
10360.000	45.03	vertical	5.50	50.53	68.20	-17.67	Peak
Middle Channel							
10400.000	45.54	horizontal	5.70	51.24	68.20	-16.96	Peak
10400.000	45.57	vertical	5.70	51.27	68.20	-16.93	Peak

High Channel							
5350.000	35.12	horizontal	11.44	46.56	54.00	-7.44	Average
5350.000	47.64	horizontal	11.44	59.08	74.00	-14.92	Peak
5350.000	35.16	vertical	11.44	46.60	54.00	-7.40	Average
5350.000	47.13	vertical	11.44	58.57	74.00	-15.43	Peak
10480.000	43.50	horizontal	5.74	49.24	68.20	-18.96	Peak
10480.000	43.42	vertical	5.74	49.16	68.20	-19.04	Peak
802.11n40							
Low Channel							
5150.000	38.33	horizontal	11.57	49.90	54.00	-4.10	Average
5150.000	53.86	horizontal	11.57	65.43	74.00	-8.57	Peak
5150.000	37.15	vertical	11.57	48.72	54.00	-5.28	Average
5150.000	49.18	vertical	11.57	60.75	74.00	-13.25	Peak
10380.000	44.66	horizontal	5.60	50.26	68.20	-17.94	Peak
10380.000	45.38	vertical	5.60	50.98	68.20	-17.22	Peak
High Channel							
5350.000	35.25	horizontal	11.44	46.69	54.00	-7.31	Average
5350.000	47.56	horizontal	11.44	59.00	74.00	-15.00	Peak
5350.000	35.30	vertical	11.44	46.74	54.00	-7.26	Average
5350.000	46.99	vertical	11.44	58.43	74.00	-15.57	Peak
10460.000	45.94	horizontal	5.73	51.67	68.20	-16.53	Peak
10460.000	46.47	vertical	5.73	52.20	68.20	-16.00	Peak
802.11ac80							
5147.949	39.85	horizontal	11.56	51.41	54.00	-2.59	Average
5147.949	55.22	horizontal	11.56	66.78	74.00	-7.22	Peak
5146.823	38.34	vertical	11.56	49.90	54.00	-4.10	Average
5146.823	53.93	vertical	11.56	65.49	74.00	-8.51	Peak
5350.000	35.23	horizontal	11.44	46.67	54.00	-7.33	Average
5350.000	47.70	horizontal	11.44	59.14	74.00	-14.86	Peak
5350.000	35.18	vertical	11.44	46.62	54.00	-7.38	Average
5350.000	47.60	vertical	11.44	59.04	74.00	-14.96	Peak
10420.000	45.79	horizontal	5.71	51.50	68.20	-16.70	Peak
10420.000	45.96	vertical	5.71	51.67	68.20	-16.53	Peak

5725-5850MHz:

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
802.11a							
Low Channel							
5625.638	48.96	horizontal	11.91	60.87	68.20	-7.33	Peak
5650.900	48.06	horizontal	11.90	59.96	68.87	-8.91	Peak
5700.925	48.33	horizontal	12.00	60.33	105.46	-45.13	Peak
5720.811	48.82	horizontal	12.03	60.85	112.65	-51.80	Peak
5626.889	49.46	vertical	11.91	61.37	68.20	-6.83	Peak
5650.900	47.63	vertical	11.90	59.53	68.87	-9.34	Peak
5701.176	47.61	vertical	12.00	59.61	105.53	-45.92	Peak
5720.686	48.00	vertical	12.03	60.03	112.36	-52.33	Peak
11490.000	42.87	horizontal	6.46	49.33	74.00	-24.67	Peak
11490.000	42.00	vertical	6.46	48.46	74.00	-25.54	Peak
Middle Channel							
11570.000	45.85	horizontal	6.52	52.37	74.00	-21.63	Peak
11570.000	45.78	vertical	6.52	52.30	74.00	-21.70	Peak
High Channel							
5854.490	47.95	horizontal	12.31	60.26	111.96	-51.70	Peak
5873.612	47.71	horizontal	12.38	60.09	105.59	-45.50	Peak
5923.824	48.53	horizontal	12.44	60.97	69.07	-8.10	Peak
5944.735	48.92	horizontal	12.41	61.33	68.20	-6.87	Peak
5854.490	47.04	vertical	12.31	59.35	111.96	-52.61	Peak
5874.162	46.60	vertical	12.38	58.98	105.43	-46.45	Peak
5923.824	47.31	vertical	12.44	59.75	69.07	-9.32	Peak
5945.423	48.92	vertical	12.42	61.34	68.20	-6.86	Peak
11650.000	46.59	horizontal	6.55	53.14	74.00	-20.86	Peak
11650.000	45.69	vertical	6.55	52.24	74.00	-21.76	Peak
802.11n20							
Low Channel							
5633.642	50.01	horizontal	11.90	61.91	68.20	-6.29	Peak
5651.025	48.12	horizontal	11.90	60.02	68.96	-8.94	Peak
5700.800	47.81	horizontal	12.00	59.81	105.42	-45.61	Peak
5722.436	58.15	horizontal	12.03	70.18	116.36	-46.18	Peak
5636.018	49.52	vertical	11.91	61.43	68.20	-6.77	Peak
5650.900	48.02	vertical	11.90	59.92	68.87	-8.95	Peak

5701.176	47.69	vertical	12.00	59.69	105.53	-45.84	Peak
5723.937	55.16	vertical	12.03	67.19	119.78	-52.59	Peak
11490.000	42.13	horizontal	6.46	48.59	74.00	-25.41	Peak
11490.000	42.05	vertical	6.46	48.51	74.00	-25.49	Peak
Middle Channel							
11570.000	44.54	horizontal	6.52	51.06	74.00	-22.94	Peak
11570.000	45.54	vertical	6.52	52.06	74.00	-21.94	Peak
High Channel							
5854.490	46.29	horizontal	12.31	58.60	111.96	-53.36	Peak
5874.024	47.04	horizontal	12.38	59.42	105.47	-46.05	Peak
5923.962	46.02	horizontal	12.43	58.45	68.97	-10.52	Peak
5944.185	48.61	horizontal	12.41	61.02	68.20	-7.18	Peak
5854.490	47.63	vertical	12.31	59.94	111.96	-52.02	Peak
5873.750	48.03	vertical	12.38	60.41	105.55	-45.14	Peak
5923.962	47.93	vertical	12.43	60.36	68.97	-8.61	Peak
5935.655	49.11	vertical	12.43	61.54	68.20	-6.66	Peak
11650.000	46.39	horizontal	6.55	52.94	74.00	-21.06	Peak
11650.000	47.14	vertical	6.55	53.69	74.00	-20.31	Peak
802.11n40							
Low Channel							
5643.772	49.11	horizontal	11.90	61.01	68.20	-7.19	Peak
5650.525	49.66	horizontal	11.90	61.56	68.59	-7.03	Peak
5701.301	53.29	horizontal	12.00	65.29	105.56	-40.27	Peak
5721.686	57.98	horizontal	12.03	70.01	114.65	-44.64	Peak
5609.505	49.25	vertical	11.91	61.16	68.20	-7.04	Peak
5651.776	48.98	vertical	11.90	60.88	69.52	-8.64	Peak
5702.301	51.17	vertical	12.00	63.17	105.85	-42.68	Peak
5720.811	51.48	vertical	12.03	63.51	112.65	-49.14	Peak
11510.000	44.43	horizontal	6.48	50.91	74.00	-23.09	Peak
11510.000	43.61	vertical	6.48	50.09	74.00	-23.91	Peak
High Channel							
5853.665	50.97	horizontal	12.31	63.28	113.84	-50.56	Peak
5873.750	47.87	horizontal	12.38	60.25	105.55	-45.30	Peak
5924.100	47.48	horizontal	12.43	59.91	68.86	-8.95	Peak
5936.068	49.22	horizontal	12.43	61.65	68.20	-6.55	Peak
5854.490	46.77	vertical	12.31	59.08	111.96	-52.88	Peak
5874.437	47.44	vertical	12.38	59.82	105.36	-45.54	Peak
5924.375	47.16	vertical	12.43	59.59	68.66	-9.07	Peak

5943.910	49.21	vertical	12.41	61.62	68.20	-6.58	Peak
11590.000	45.87	horizontal	6.53	52.40	74.00	-21.60	Peak
11590.000	46.29	vertical	6.53	52.82	74.00	-21.18	Peak
802.11ac80							
5633.579	49.54	horizontal	11.90	61.44	68.20	-6.76	Peak
5653.277	51.92	horizontal	11.91	63.83	70.63	-6.80	Peak
5700.925	55.48	horizontal	12.00	67.48	105.46	-37.98	Peak
5720.998	56.88	horizontal	12.03	68.91	113.08	-44.17	Peak
5854.002	51.74	horizontal	12.31	64.05	113.07	-49.02	Peak
5874.075	48.81	horizontal	12.38	61.19	105.46	-44.27	Peak
5923.599	47.57	horizontal	12.44	60.01	69.23	-9.22	Peak
5933.729	48.83	horizontal	12.42	61.25	68.20	-6.95	Peak
5622.136	49.68	vertical	11.91	61.59	68.20	-6.61	Peak
5652.151	47.83	vertical	11.90	59.73	69.80	-10.07	Peak
5701.676	51.90	vertical	12.00	63.90	105.67	-41.77	Peak
5721.186	50.48	vertical	12.03	62.51	113.50	-50.99	Peak
5854.002	48.07	vertical	12.31	60.38	113.07	-52.69	Peak
5874.262	47.45	vertical	12.38	59.83	105.41	-45.58	Peak
5923.224	48.54	vertical	12.44	60.98	69.51	-8.53	Peak
5933.917	49.47	vertical	12.42	61.89	68.20	-6.31	Peak
11550.000	45.27	horizontal	6.50	51.77	74.00	-22.23	Peak
11550.000	46.05	vertical	6.50	52.55	74.00	-21.45	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Corrected Amplitude – Limit

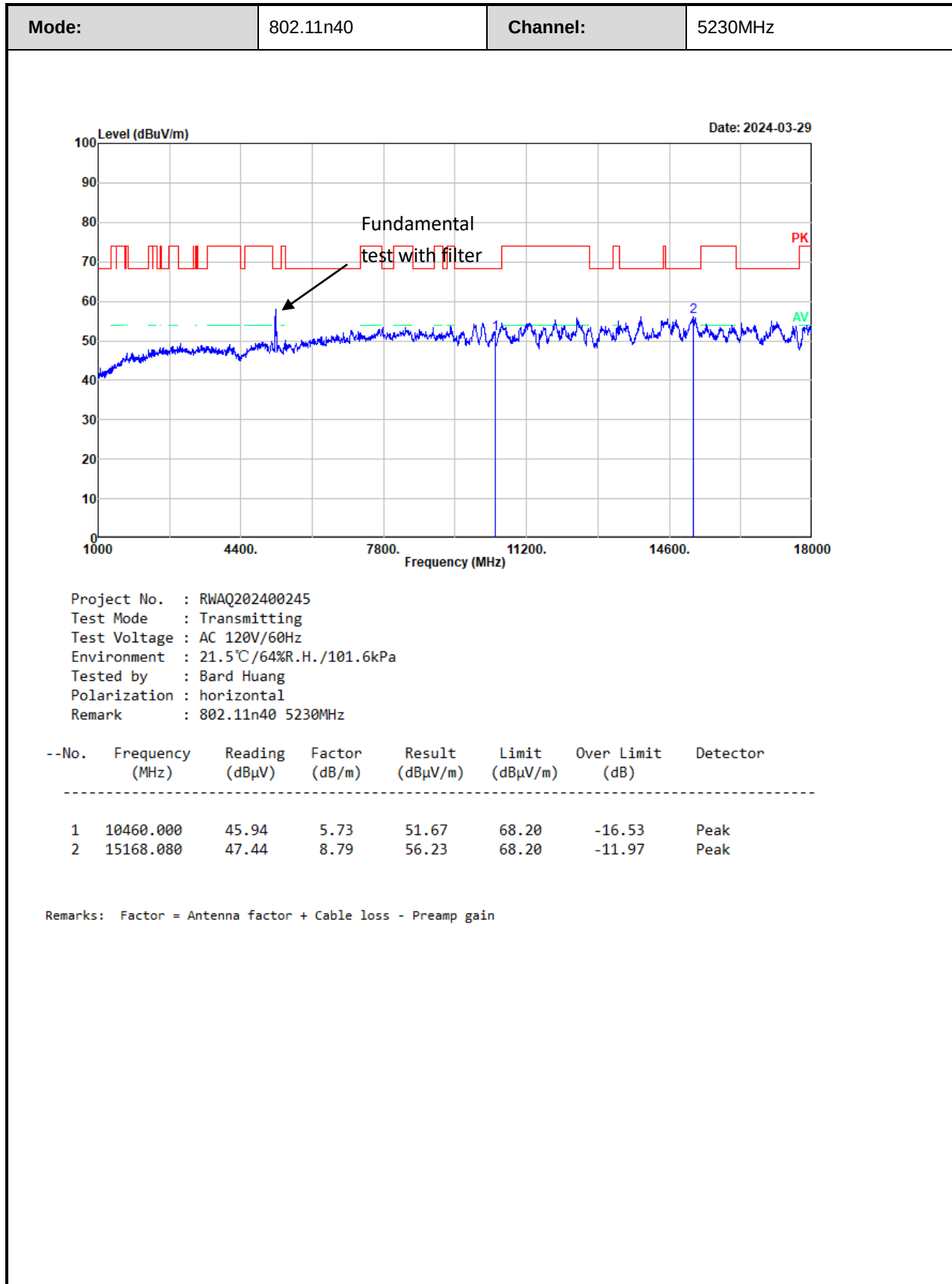
For the test result of Peak below the Peak limit more than 20dB, which can compliance with the average limit, just the Peak level was recorded.

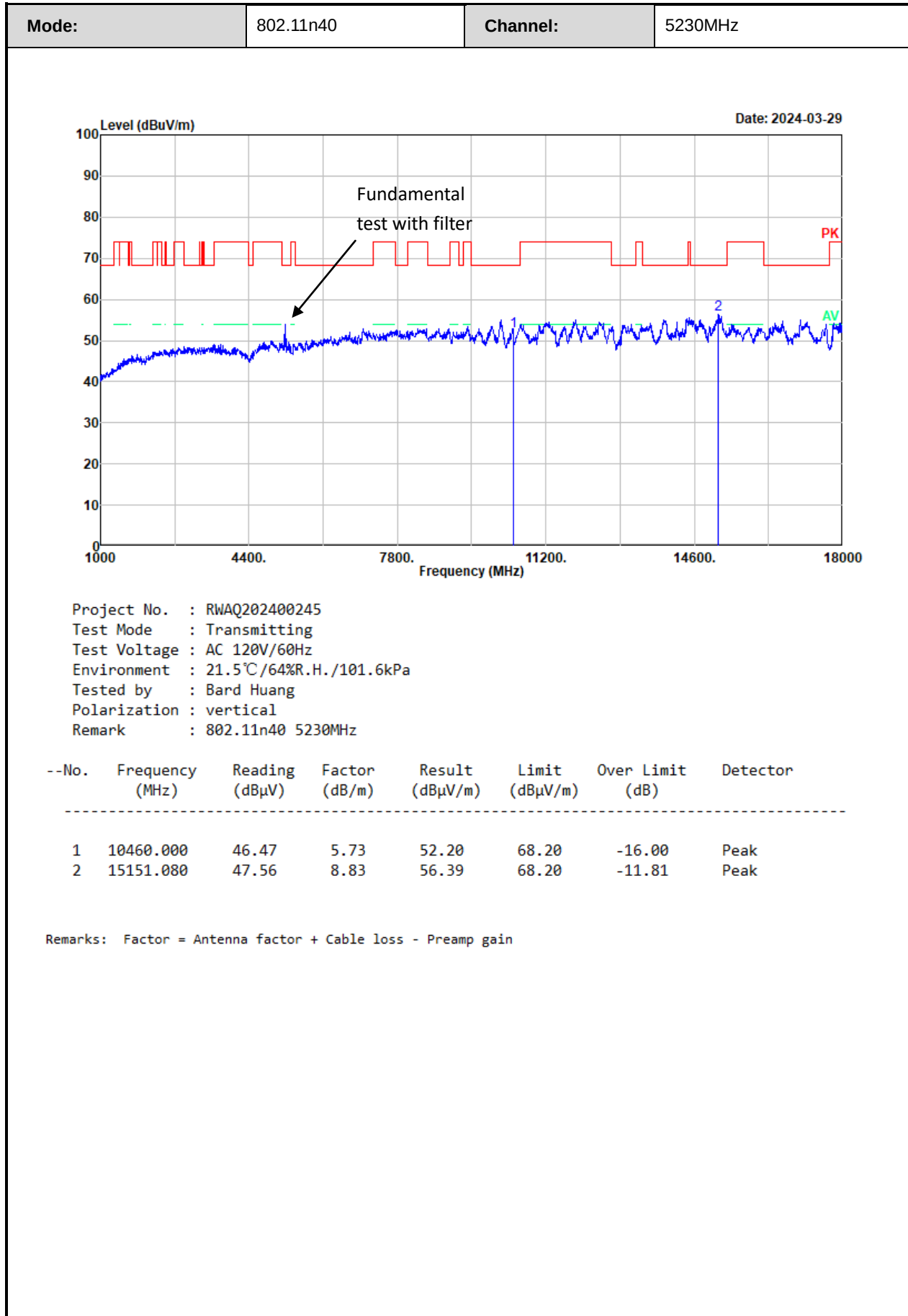
The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

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

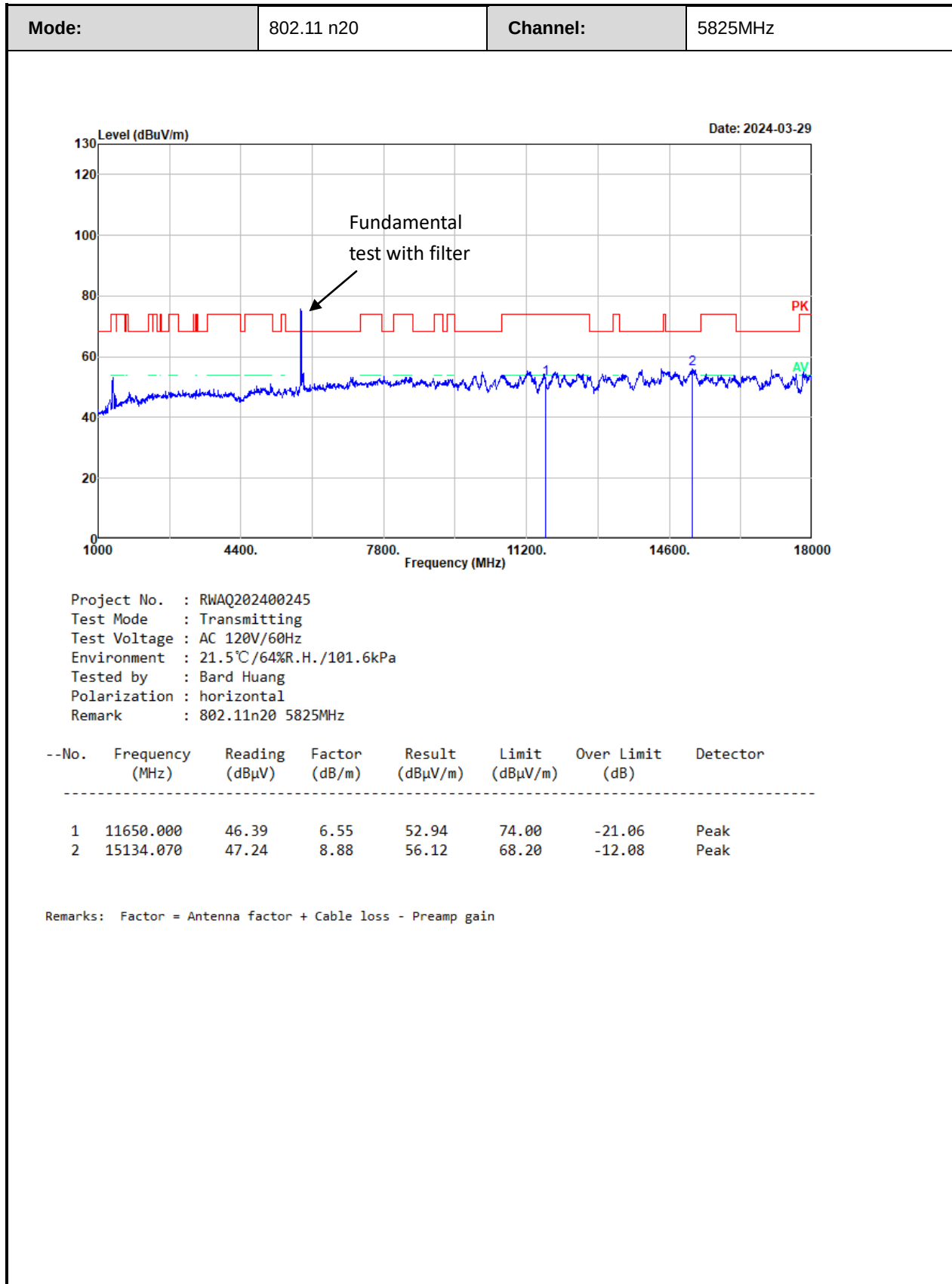
Test plot for example as below:

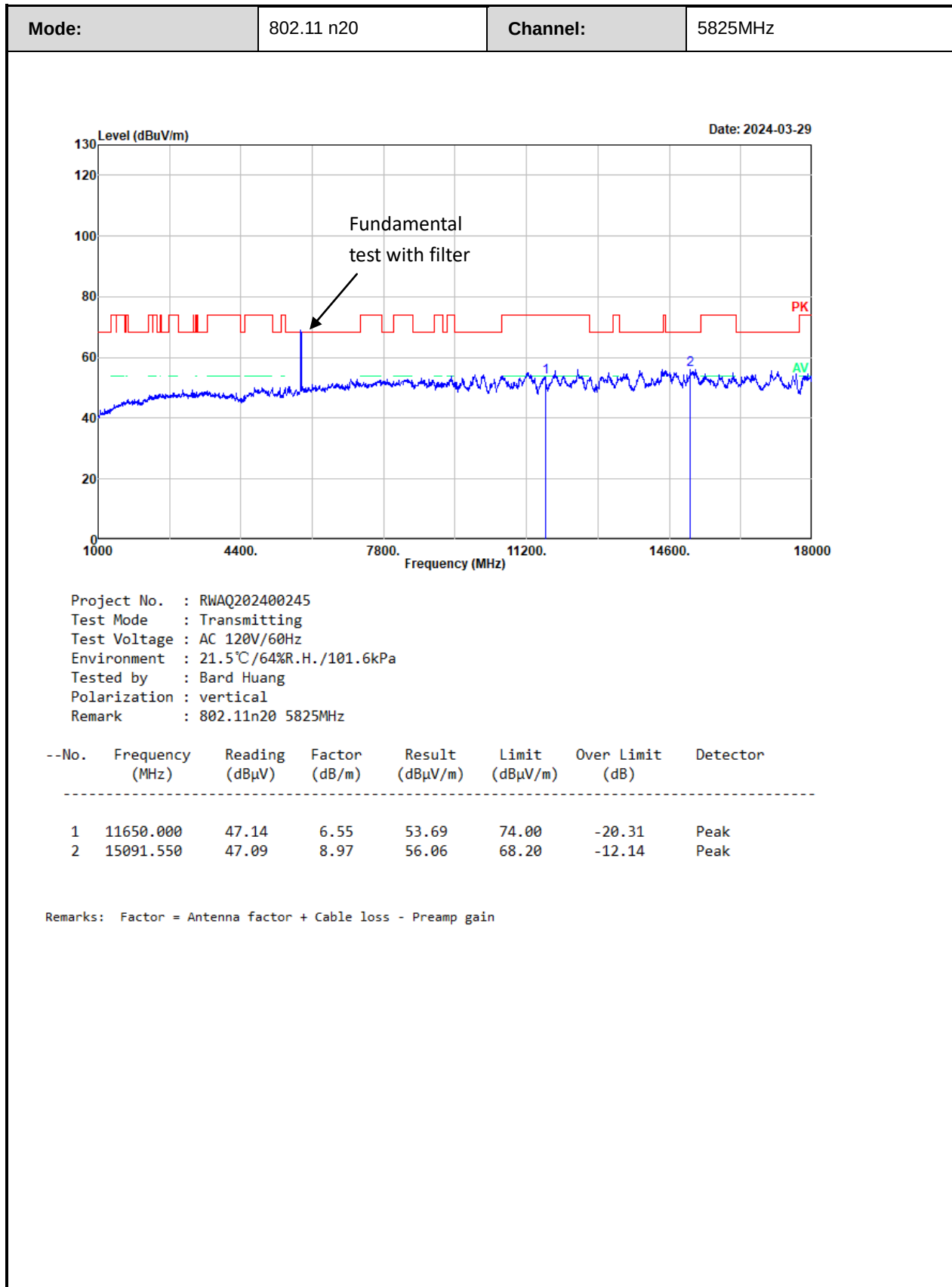
5150-5250MHz:





5725-5850MHz:





3.5 RF Conducted Test Data

Test Date:	2024-4-1~2024-4-15	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.6~26.3°C; Relative Humidity:62~66%; ATM Pressure: 100.8~101.kPa		

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

5150-5250MHz:

Test Mode	Antenna	Channel	26dB BW [MHz]	99% OBW [MHz]
802.11a	Ant1	5180	25.440	17.120
		5200	24.320	17.040
		5240	22.160	17.040
802.11n HT20	Ant1	5180	25.440	17.920
		5200	24.880	17.920
		5240	20.720	17.920
802.11n HT40	Ant1	5190	40.960	36.480
		5230	40.640	36.480
802.11ac VHT80	Ant1	5210	97.600	76.160

5725-5850MHz:

Test Mode	Antenna	Channel	6dB BW [MHz]	99% OBW [MHz]	6dB BW Limit [MHz]	Verdict
802.11a	Ant1	5745	16.080	17.120	0.5	pass
		5785	16.160	17.120	0.5	pass
		5825	16.240	17.120	0.5	pass
802.11n HT20	Ant1	5745	17.600	17.920	0.5	pass
		5785	17.440	17.920	0.5	pass
		5825	17.600	18.000	0.5	pass
802.11n HT40	Ant1	5755	36.000	36.480	0.5	pass
		5795	36.160	36.480	0.5	pass
802.11ac VHT80	Ant1	5210	76.800	76.160	0.5	pass

3.5.2 Maximum conducted output power

5150-5250MHz:

Test Mode	Antenna	Channel [MHz]	Result [dBm]	Limit [dBm]	Verdict
802.11a	Ant1	5180	13.34	24	Pass
		5200	13.05	24	Pass
		5240	12.35	24	Pass
802.11n HT20	Ant1	5180	12.82	24	Pass
		5200	12.62	24	Pass
		5240	11.62	24	Pass
802.11n HT40	Ant1	5190	13.07	24	Pass
		5230	12.38	24	Pass
802.11ac VHT80	Ant1	5210	13.32	24	Pass

5725-5850MHz:

Test Mode	Antenna	Channel [MHz]	Result [dBm]	Limit [dBm]	Verdict
802.11a	Ant1	5745	9.78	30	Pass
		5785	9.51	30	Pass
		5825	9.71	30	Pass
802.11n HT20	Ant1	5745	9.85	30	Pass
		5785	9.62	30	Pass
		5825	9.54	30	Pass
802.11n HT40	Ant1	5755	10.31	30	Pass
		5795	10.29	30	Pass
802.11ac VHT80	Ant1	5775	9.50	30	Pass

3.5.3 Power Spectral Density

5150-5250MHz:

Test Mode	Antenna	Channel [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
802.11a	Ant1	5180	3.27	11	Pass
		5200	3.07	11	Pass
		5240	2.23	11	Pass
802.11n HT20	Ant1	5180	2.89	11	Pass
		5200	2.74	11	Pass
		5240	2.02	11	Pass
802.11n HT40	Ant1	5190	0.03	11	Pass
		5230	-0.63	11	Pass
802.11ac VHT80	Ant1	5210	-2.28	11	Pass

5725-5850MHz:

Test Mode	Antenna	Channel [MHz]	Result [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
802.11a	Ant1	5745	-3.31	30	Pass
		5785	-3.31	30	Pass
		5825	-2.90	30	Pass
802.11n HT20	Ant1	5745	-3.19	30	Pass
		5785	-3.42	30	Pass
		5825	-3.42	30	Pass
802.11n HT40	Ant1	5755	-5.61	30	Pass
		5795	-5.60	30	Pass
802.11ac VHT80	Ant1	5755	-10.55	30	Pass

3.5.4 Duty Cycle

5150-5250MHz:

Test Mode	Antenna	Channel (MHz)	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	1/T	Duty Cycle Factor[%]	VBW setting* [Hz]
802.11a	Ant1	5200	100	100	100	/	/	10
802.11n HT20	Ant1	5210	100	100	100	/	/	10
802.11n HT40	Ant1	5200	100	100	100	/	/	10
802.11ac VHT80	Ant1	5190	100	100	100	/	/	10

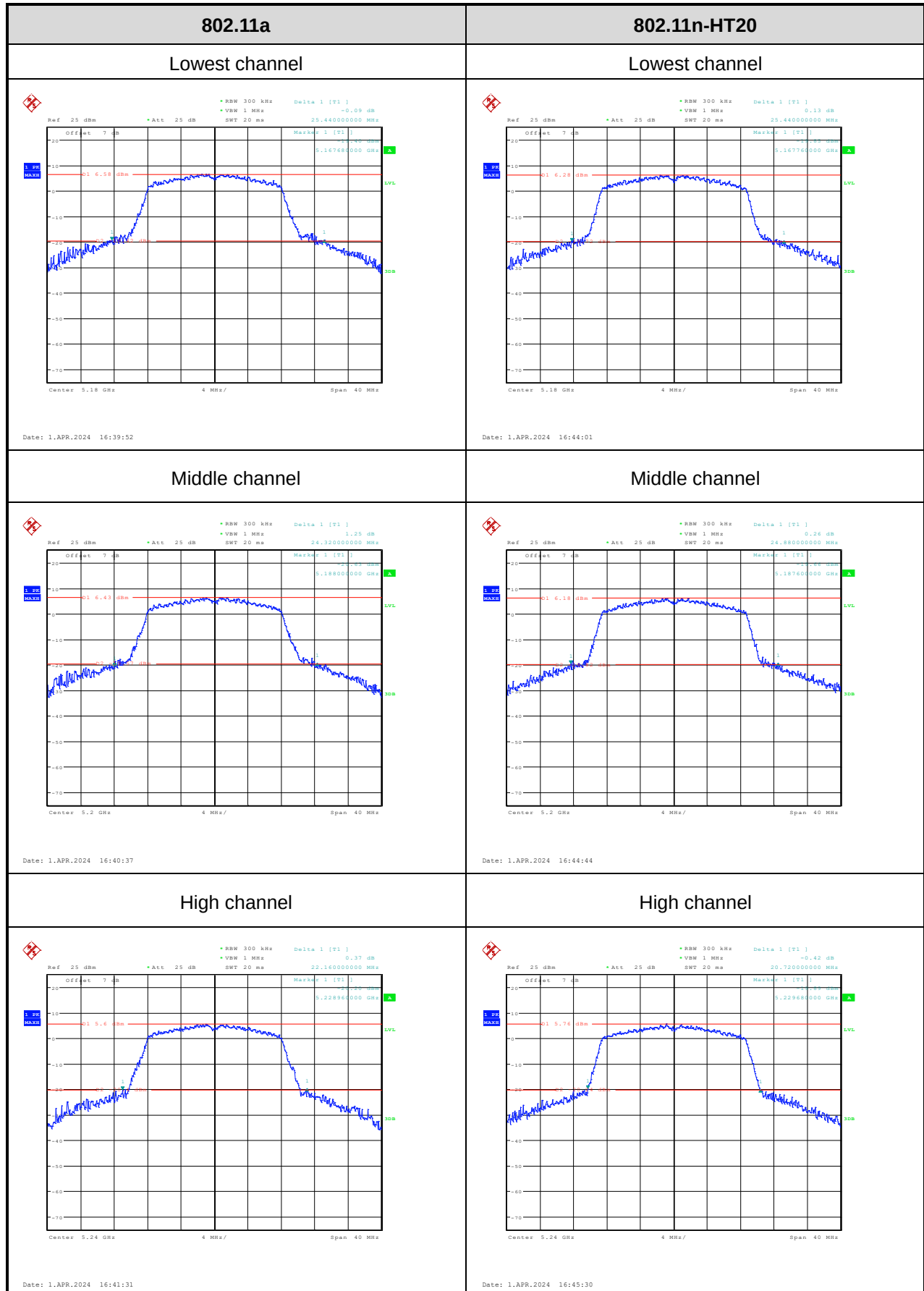
5725-5850MHz:

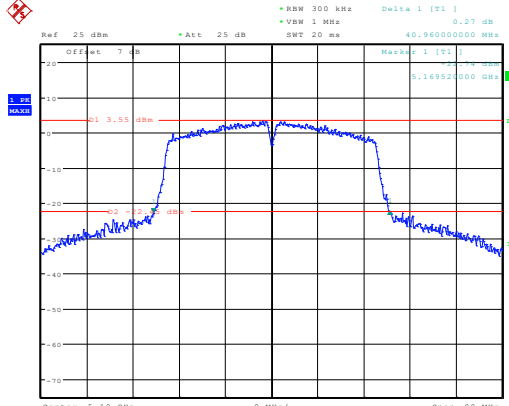
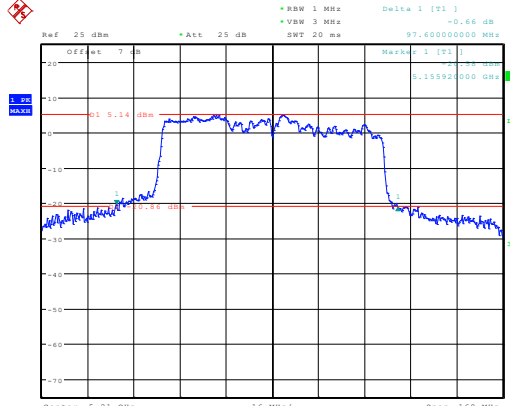
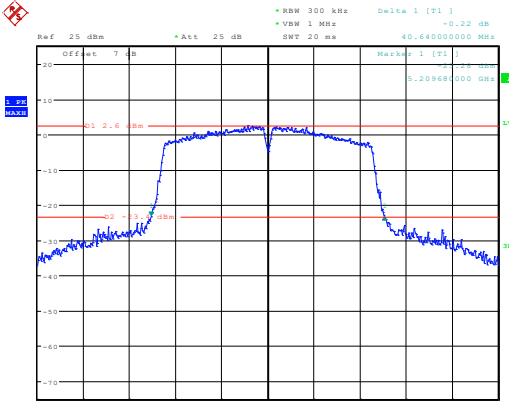
Test Mode	Antenna	Channel (MHz)	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	1/T	Duty Cycle Factor[%]	VBW setting* [Hz]
802.11a	Ant1	5785	100	100	100	/	/	10
802.11n HT20	Ant1	5775	100	100	100	/	/	10
802.11n HT40	Ant1	5785	100	100	100	/	/	10
802.11ac VHT80	Ant1	5755	100	100	100	/	/	10

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

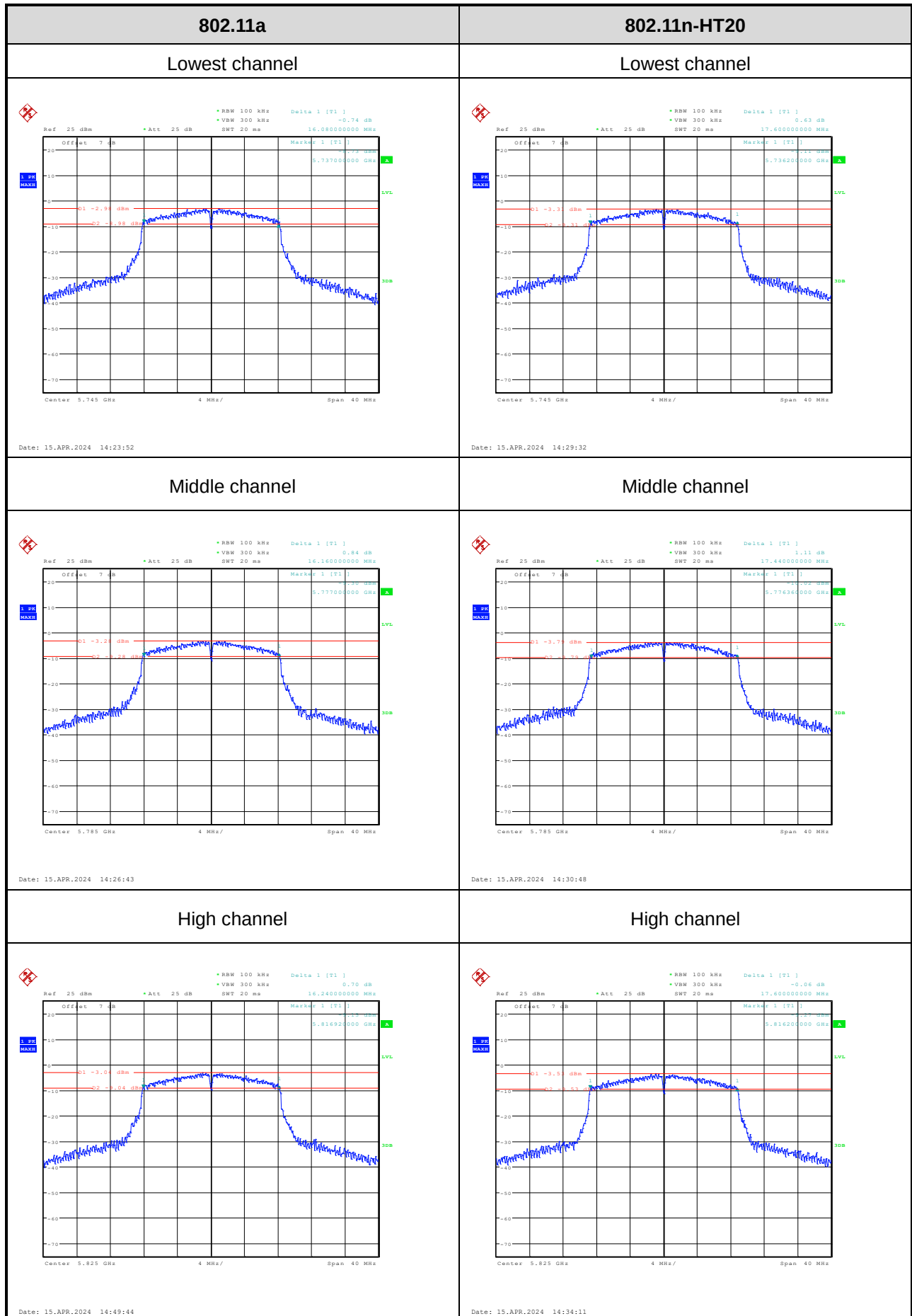
Test Plots:

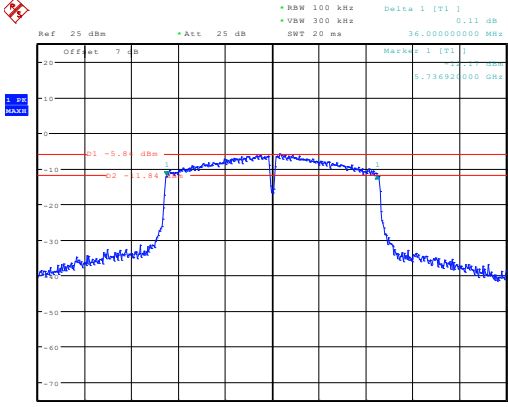
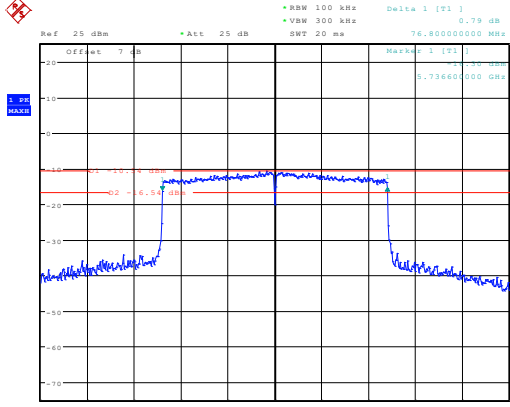
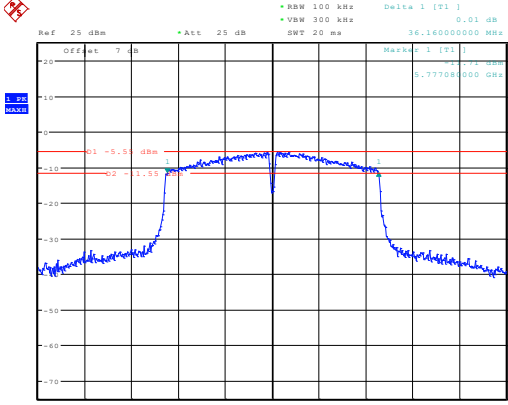
26dB Emission Bandwidth



802.11n-HT40	802.11ac-VHT80
Lowest channel	Middle channel
 Center 5.19 GHz 8 MHz/ Span 80 MHz Date: 1.APR.2024 16:46:53	 Center 5.21 GHz 16 MHz/ Span 160 MHz Date: 1.APR.2024 16:48:14
High channel	/
 Center 5.23 GHz 8 MHz/ Span 80 MHz Date: 1.APR.2024 16:47:32	/

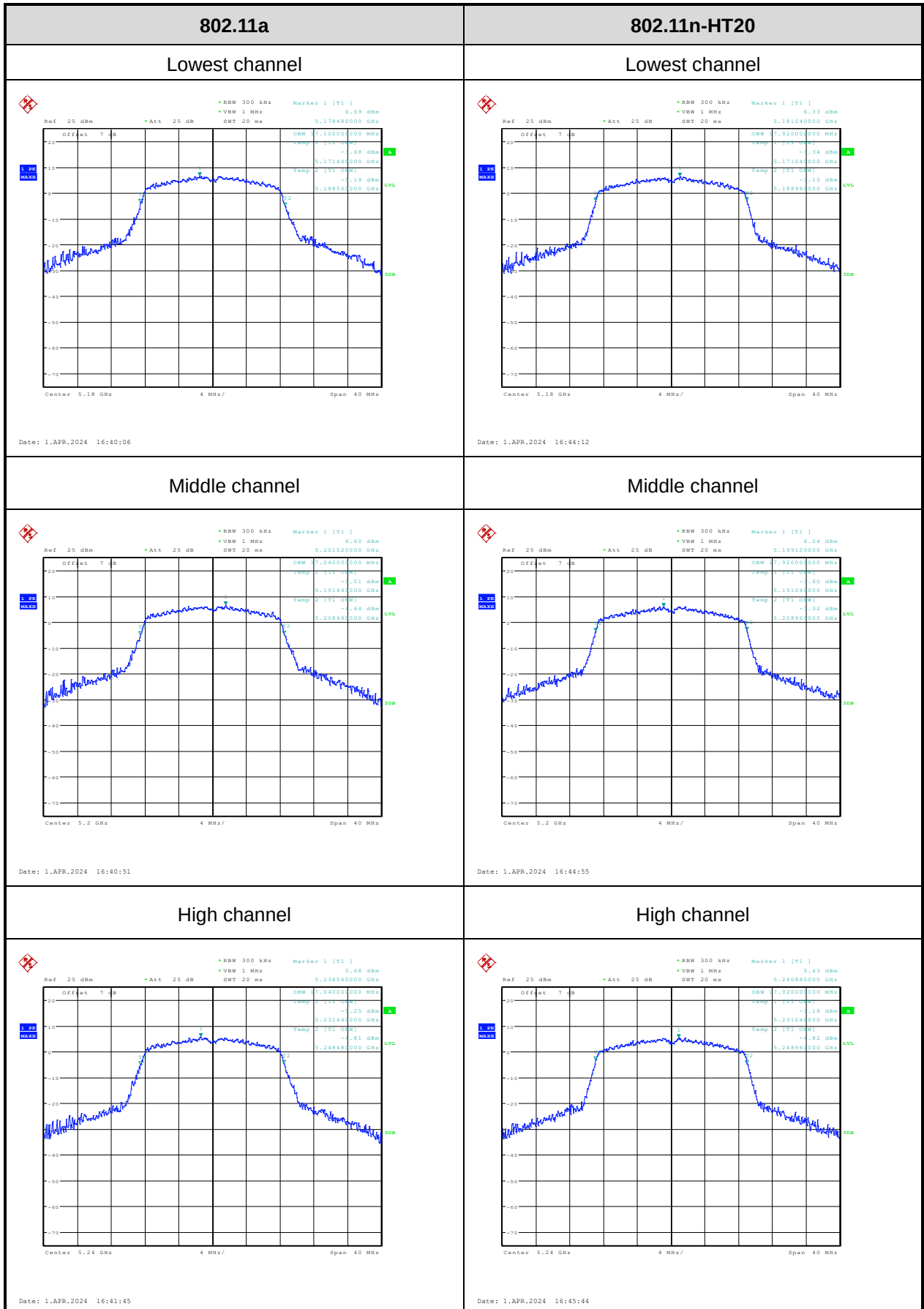
6dB Emission Bandwidth

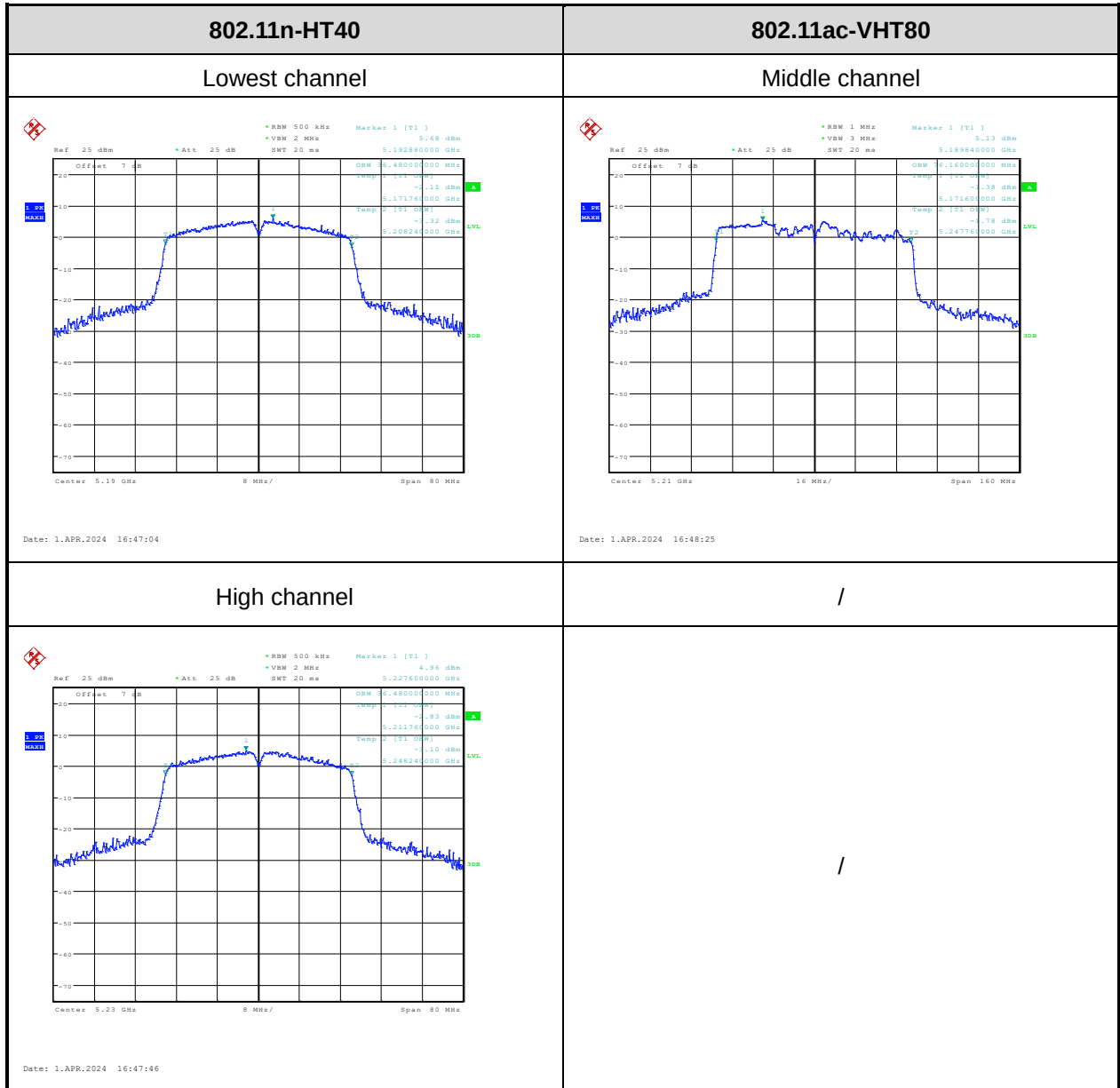


802.11n-HT40	802.11ac-VHT80
Lowest channel	Middle channel
 Ref: 25 dBm Att: 25 dB RBW: 100 kHz VSW: 300 kHz Delta 1 [T1]: 0.11 dB SWT: 20 ms Markers: 1 [T1]: 5.73692000 GHz Center: 5.755 GHz Span: 80 MHz Date: 15.APR.2024 14:44:06	 Ref: 25 dBm Att: 25 dB RBW: 100 kHz VSW: 300 kHz Delta 1 [T1]: 0.79 dB SWT: 20 ms Markers: 1 [T1]: 5.73660000 GHz Center: 5.775 GHz Span: 160 MHz Date: 15.APR.2024 14:46:38
High channel	/
 Ref: 25 dBm Att: 25 dB RBW: 100 kHz VSW: 300 kHz Delta 1 [T1]: 0.01 dB SWT: 20 ms Markers: 1 [T1]: 5.77708000 GHz Center: 5.795 GHz Span: 80 MHz Date: 15.APR.2024 14:45:02	/

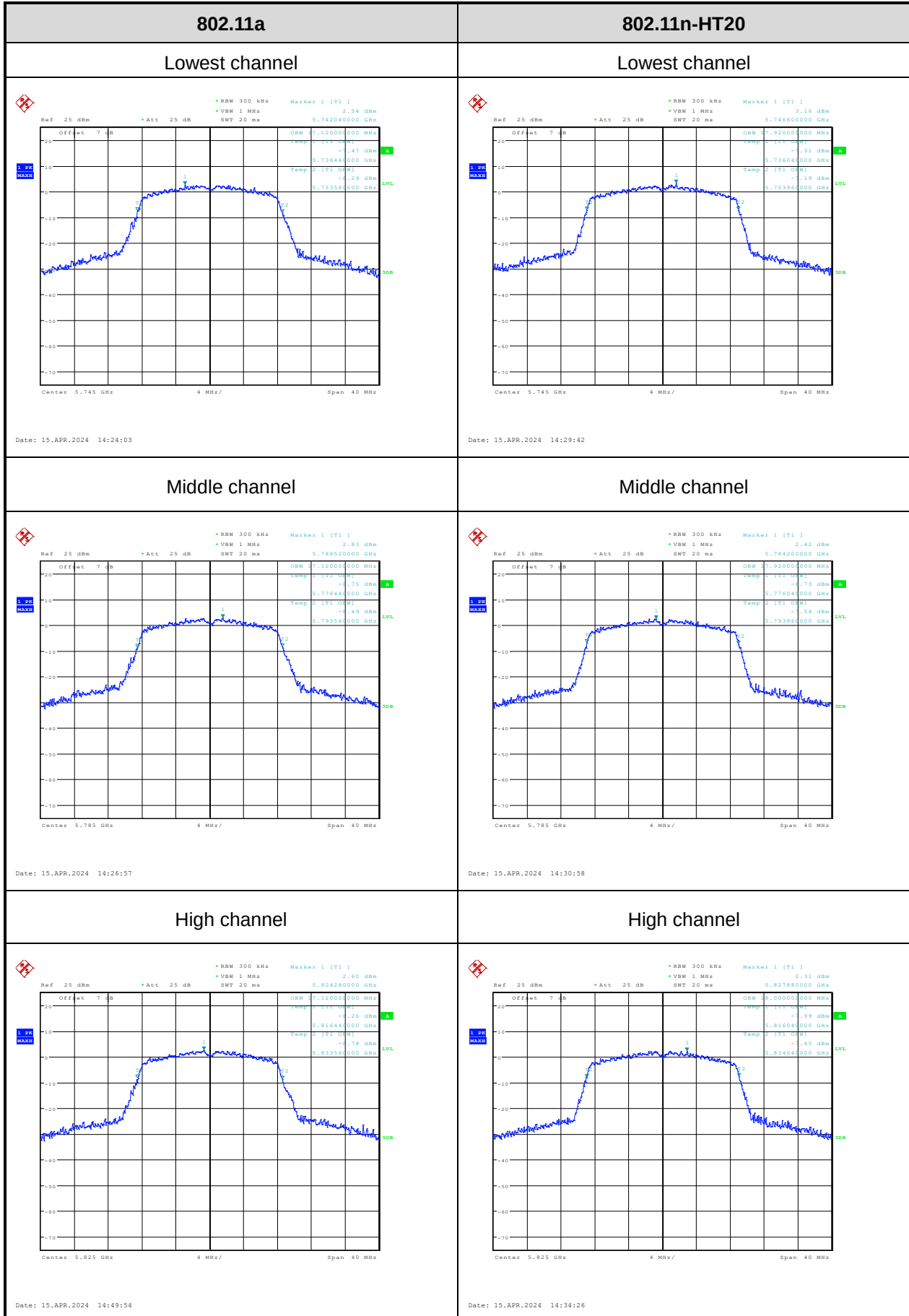
99% Occupied Bandwidth

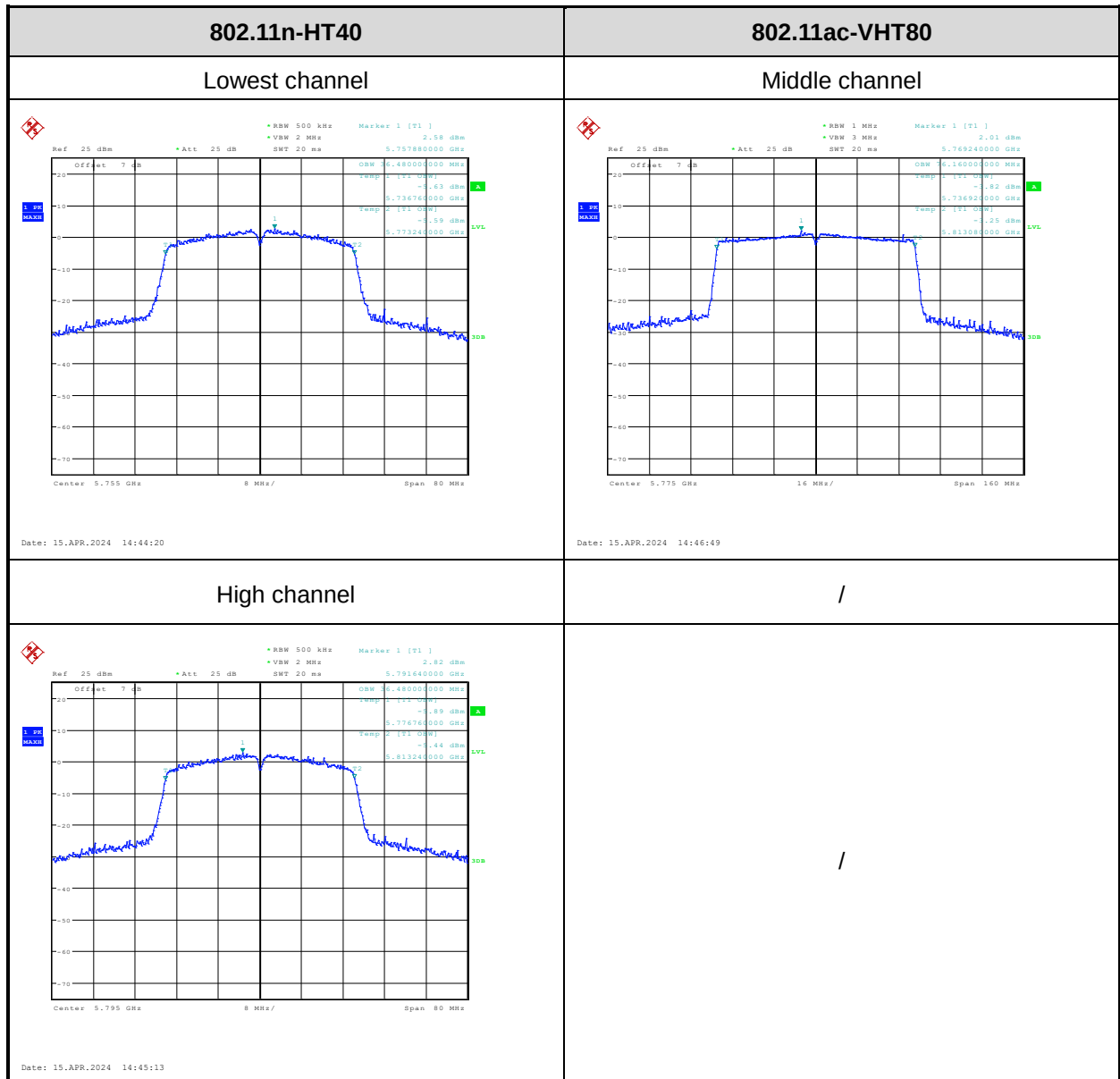
5150-5250MHz:





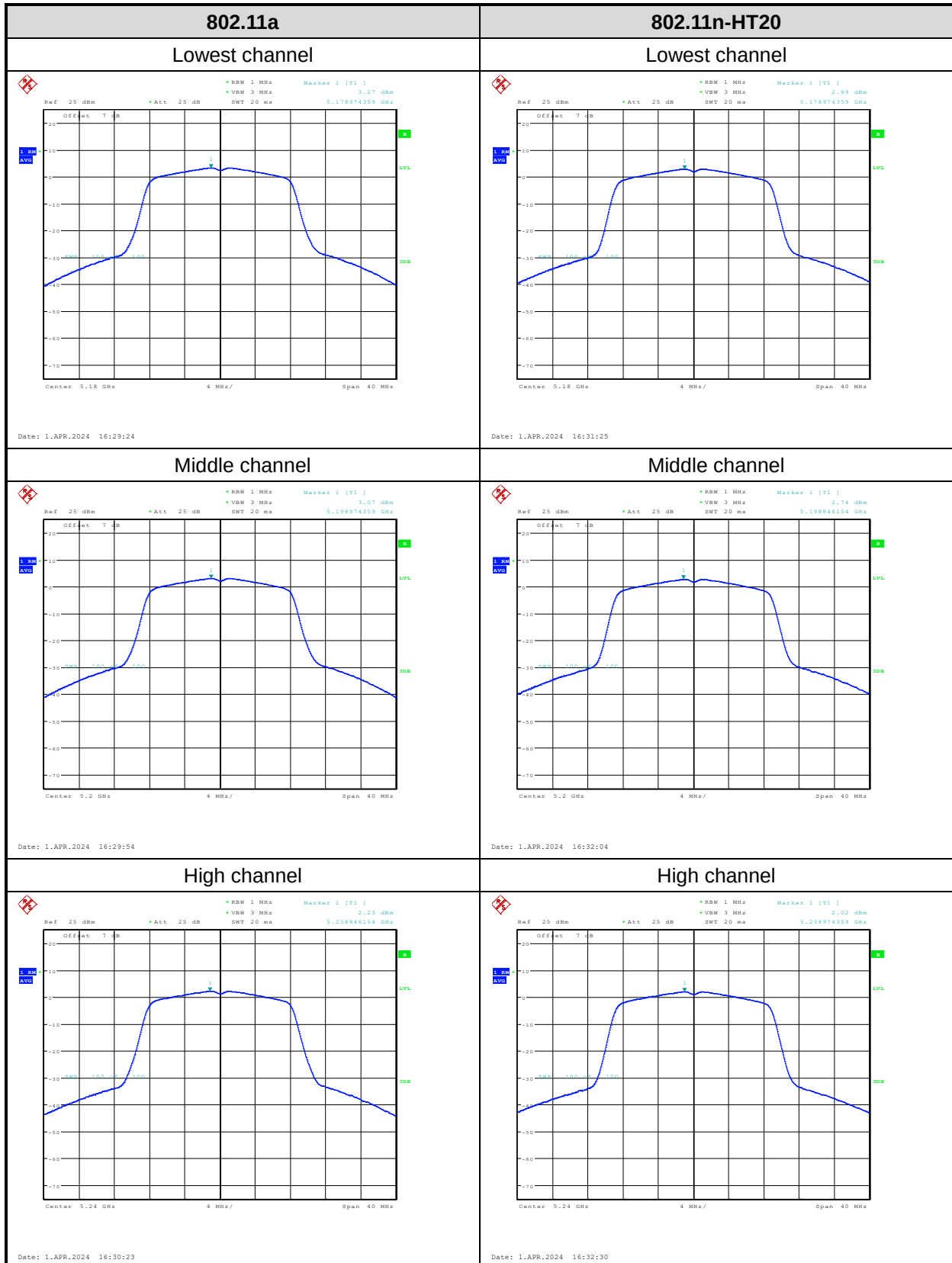
5725-5850MHz:

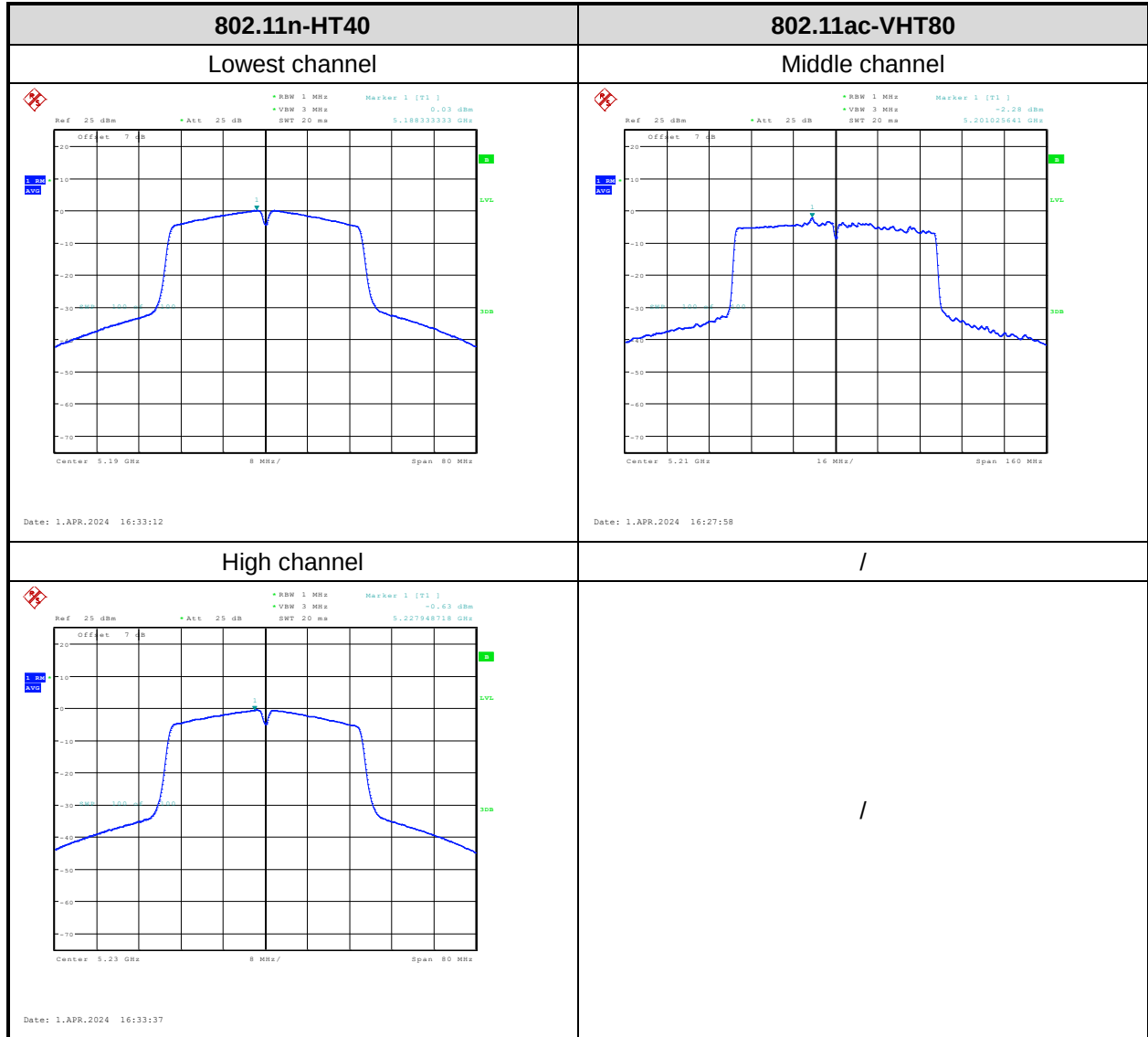




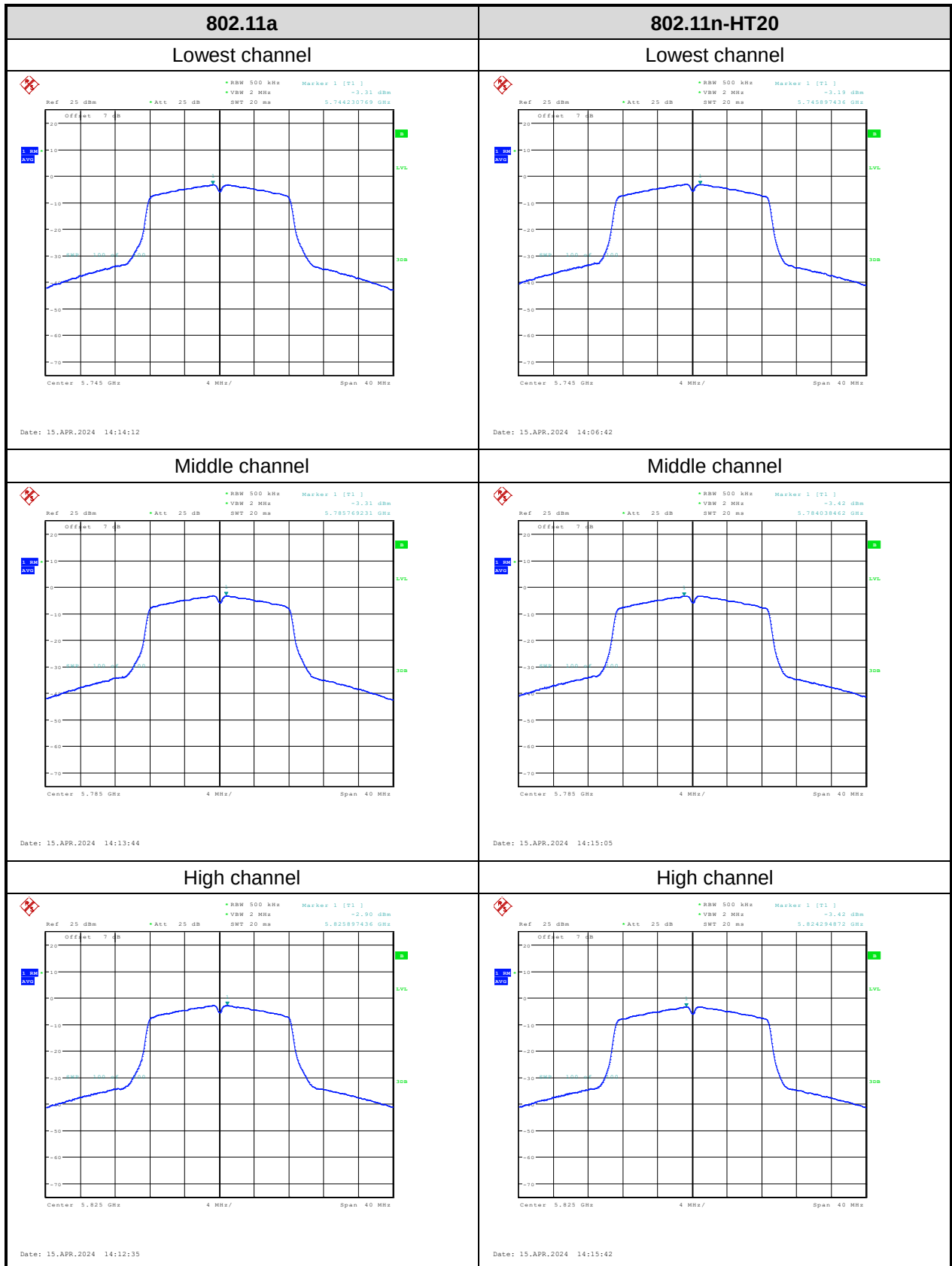
Power Spectral Density

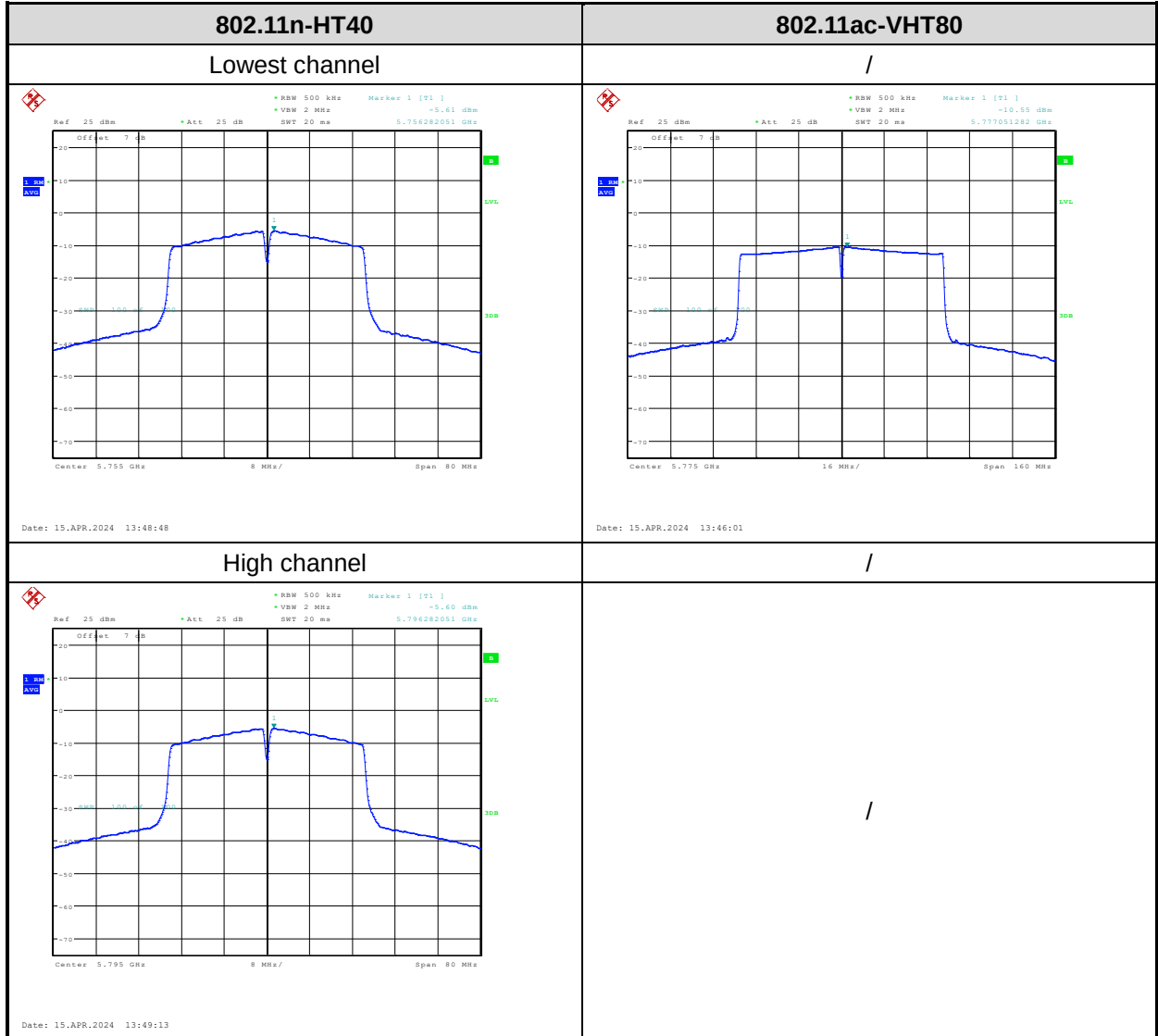
5150-5250MHz:





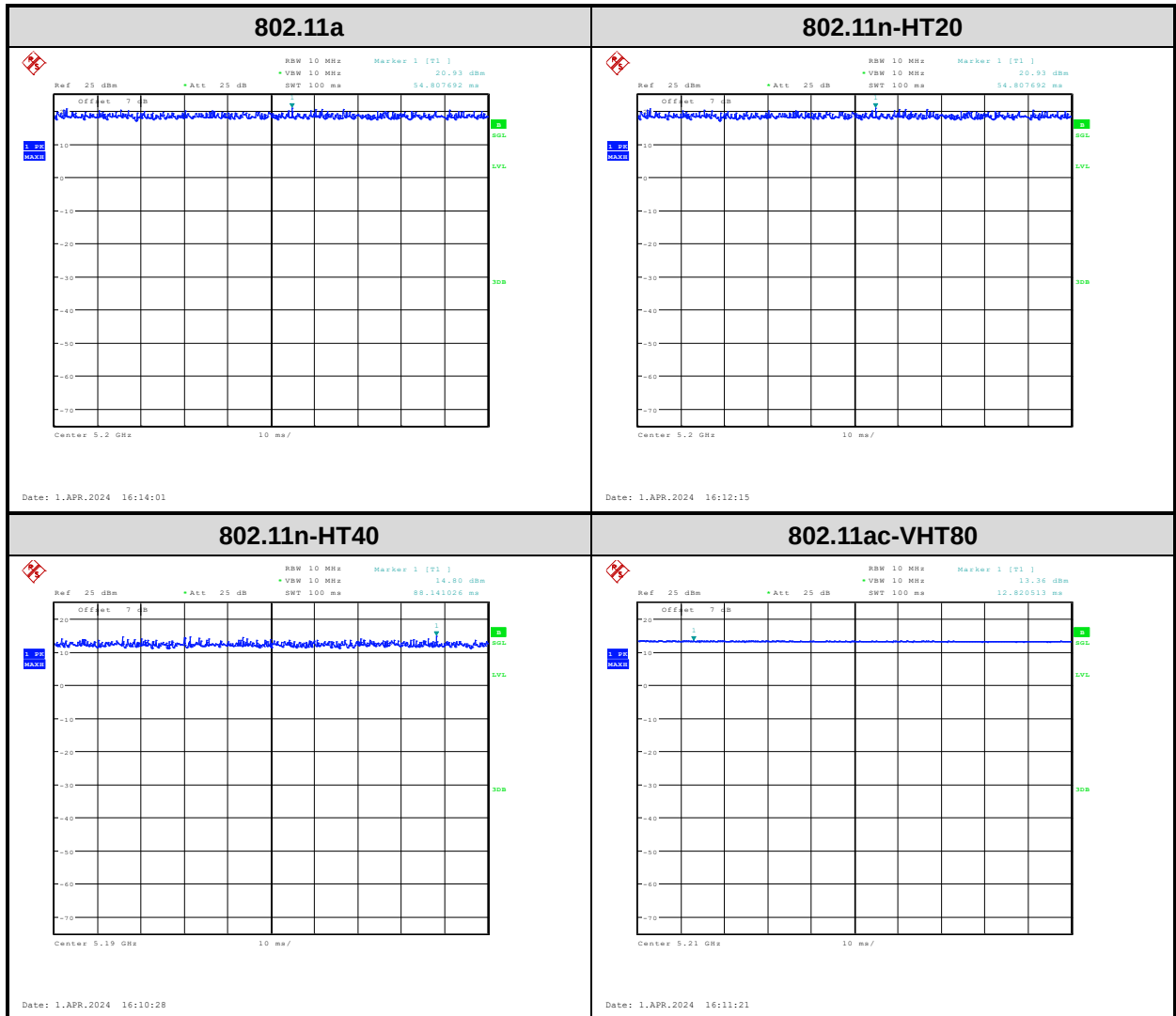
5725-5850MHz:





Duty Cycle

5150-5250MHz:



5725-5850MHz:



4 Test Setup Photo

Please refer to the attachment RWAQ202400245 Test Setup photo.

5 E.U.T Photo

Please refer to the attachment RWAQ202400245 External photo and RWAQ202400245 Internal photo.

---End of Report---