

FCC Test Report

Report No.: RWAY202300045D

Applicant: Shenzhen Youmi Intelligent Technology Co., Ltd.

Address: 406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

Product Name: Smart phone

Product Model: PG2309GBA

Multiple Models: N/A

Trade Mark: UMIDIGI

FCC ID: 2ATZ4-G65GA

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

Test Date: 2023-11-16~2024-02-01

Test Result: Complied

Issue Date: 2024-02-06

Reviewed by:

Frank Yin

Approved by:

Jacob Kong

Frank Yin

Project Engineer

Jacob Kong

Manager

Prepared by:

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



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Revision History

Version No.	Issued Date	Description
00	2024-02-06	Original

Contents

1	General Information	4
1.1	Client Information	4
1.2	Product Description of EUT	4
1.3	Antenna information	4
1.4	Related Submittal(s)/Grant(s).....	5
1.5	Measurement Uncertainty	5
1.6	Laboratory Location.....	5
1.7	Test Methodology	6
2	Description of Measurement.....	7
2.1	Test Configuration.....	7
2.2	Test Auxiliary Equipment	8
2.3	Test Setup.....	9
2.4	Test Procedure	11
2.5	Measurement Method.....	12
2.6	Measurement Equipment	13
3	Test Results	14
3.1	Test Summary.....	14
3.2	Limit	15
3.3	AC Line Conducted Emissions Test Data.....	17
3.4	Radiated emission Test Data.....	19
3.5	RF Conducted Test Data	32
3.5.1	26dB/6dB Emission Bandwidth and 99% Occupied Bandwidth	32
3.5.2	Maximum conducted output power	33
3.5.3	Power Spectral Density.....	34
3.5.4	Duty Cycle	35
4	Test Setup Photo.....	49
5	E.U.T Photo.....	50

1 General Information

1.1 Client Information

Applicant:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China
Manufacturer:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

1.2 Product Description of EUT

The EUT is Smart phone that contains Classic Bluetooth(BDR/EDR), BLE, 2.4G/5G WLAN, NFC, GSM/GPRS/EGPRS/WCDMA/LTE and 5G NR radios, this report covers the full testing of the 5G WLAN radio.

Sample Serial number	2W-1 for CE&RE test, 2W-2 for RF test conducted test (assigned by WATC)
Sample Received Date	2023-11-15
Sample Status	Good Condition
Frequency Range	5150 MHz - 5250MHz 5725 MHz - 5850MHz
Maximum Conducted Peak Output Power	5150 MHz - 5250MHz: 13.95dBm 5725 MHz - 5850MHz: 15.98dBm
Modulation Technology	OFDM
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain [#]	0.55dBi
Power Supply	DC5V from adapter or DC3.87 V from battery
Adapter 1 Information	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5V, 2A
Adapter 2 Information	Model: HF-0502000U Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5.0V, 2A
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: DTS, FCC ID: 2ATZ4-G65GA
 FCC Part 15, Subpart C, Equipment Class: DXX, FCC ID: 2ATZ4-G65GA
 FCC Part 15, Subpart C, Equipment Class: DSS, FCC ID: 2ATZ4-G65GA
 FCC Part 22H/24E/27, Equipment Class: PCE, FCC ID: 2ATZ4-G65GA

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	
<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: qa@watac.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, 802.11ac-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
802.11ac-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, 802.11ac-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
802.11ac-VHT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (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 [#] :	Engineering mode			
5150-5250MHz Band				
Mode	Data rate	Powel Level Setting [#]		
		Low Channel	Middle Channel	High Channel
802.11a	6Mbps	16	16	16
802.11ac-HT20	MCS0	16	16	16
802.11ac-HT40	MCS0	17	17	17
802.11ac-VHT80	MCS0	14	14	14
5725-5850MHz Band				
Mode	Data rate	Powel Level Setting [#]		
		Low Channel	Middle Channel	High Channel
802.11a	6Mbps	20	20	20
802.11ac-HT20	MCS0	20	20	20
802.11ac-HT40	MCS0	20	20	20
802.11ac-VHT80	MCS0	17	17	17
The exercise software and the maximum power setting that provided by manufacturer.				

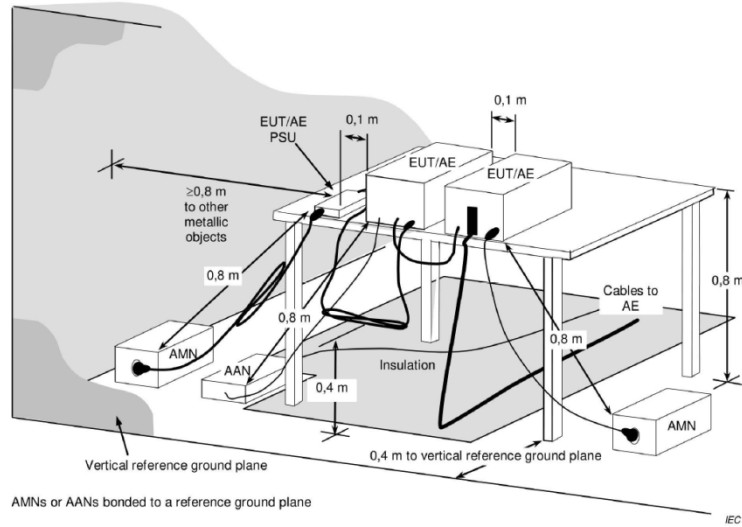
Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report
For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.
For AC power line conducted emission and radiated emission below 1GHz, according to the two adapter test result in BT report, the worst case adapter HJ-0502000W2-US was select to test.
The n-ht20/n-ht40 were reduced test since the identical parameters with ac vht20/ac vht40.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

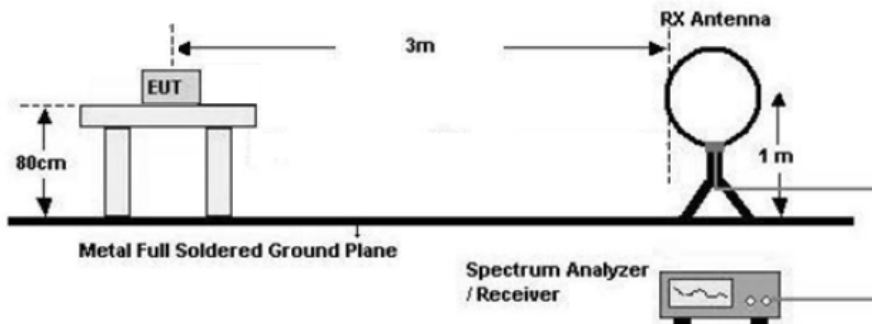
1) Conducted emission measurement:



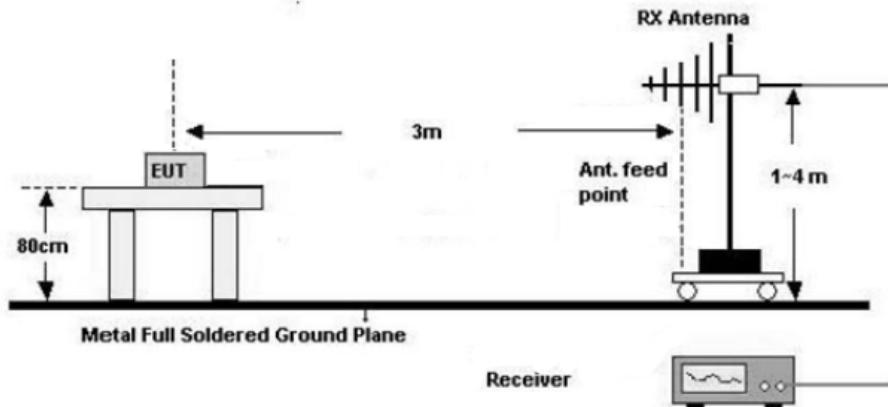
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

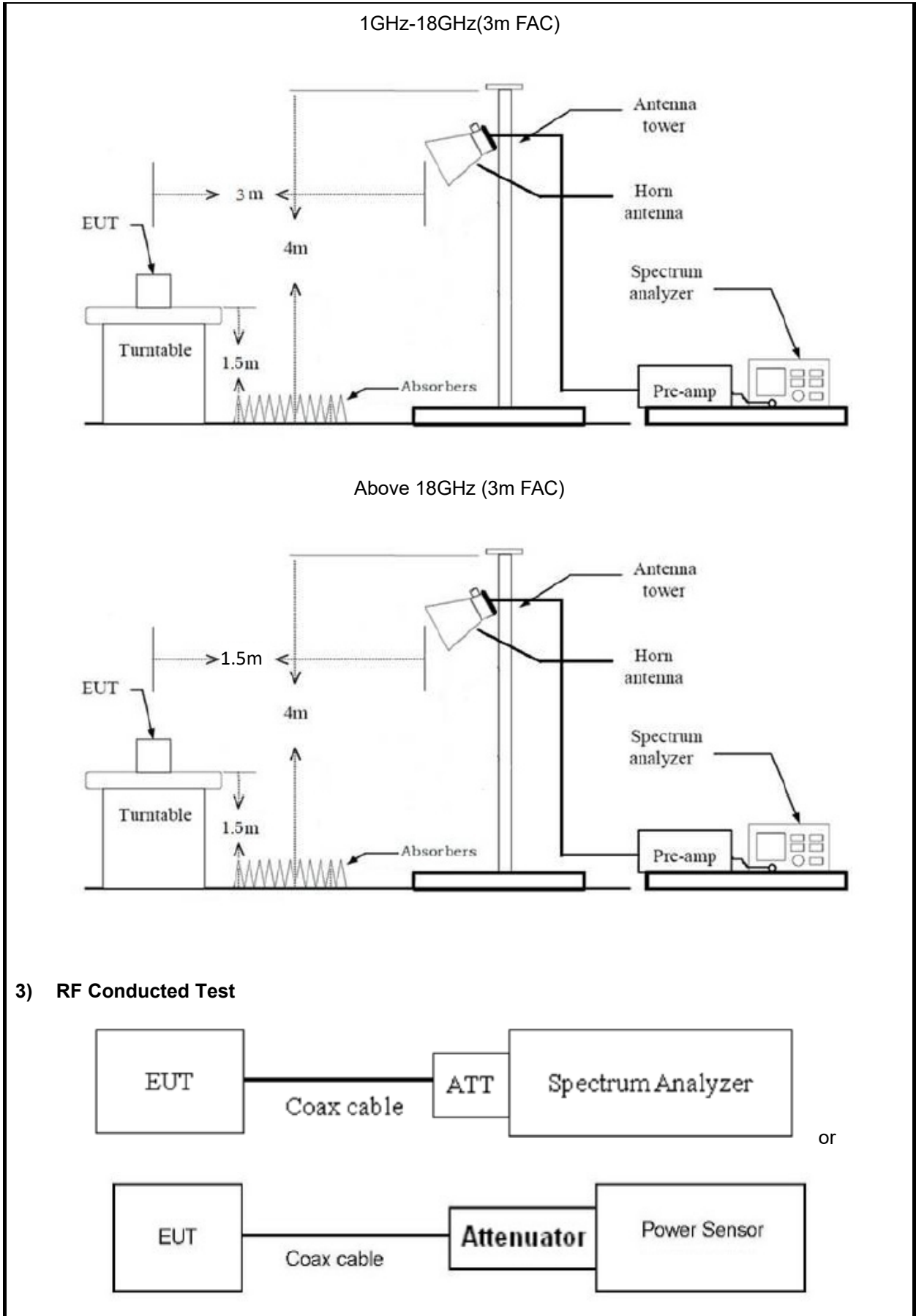
2) Radiated emission measurement:

Below 30MHz (3m SAC)



30MHz-1GHz (3m SAC)





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 10.5dB (including 10.0dB Attenuator and 0.5dB 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	2023/8/1	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 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					
R&S	Spectrum Analyzer	FSV40	101590	2023/11/16	2024/11/15
MARCONI	10dB Attenuator	1692595	2942	2023/10/25	2024/10/24
ANRITSU	USB Power Sensor	MA24418A	12620	2023/7/12	2024/7/11

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

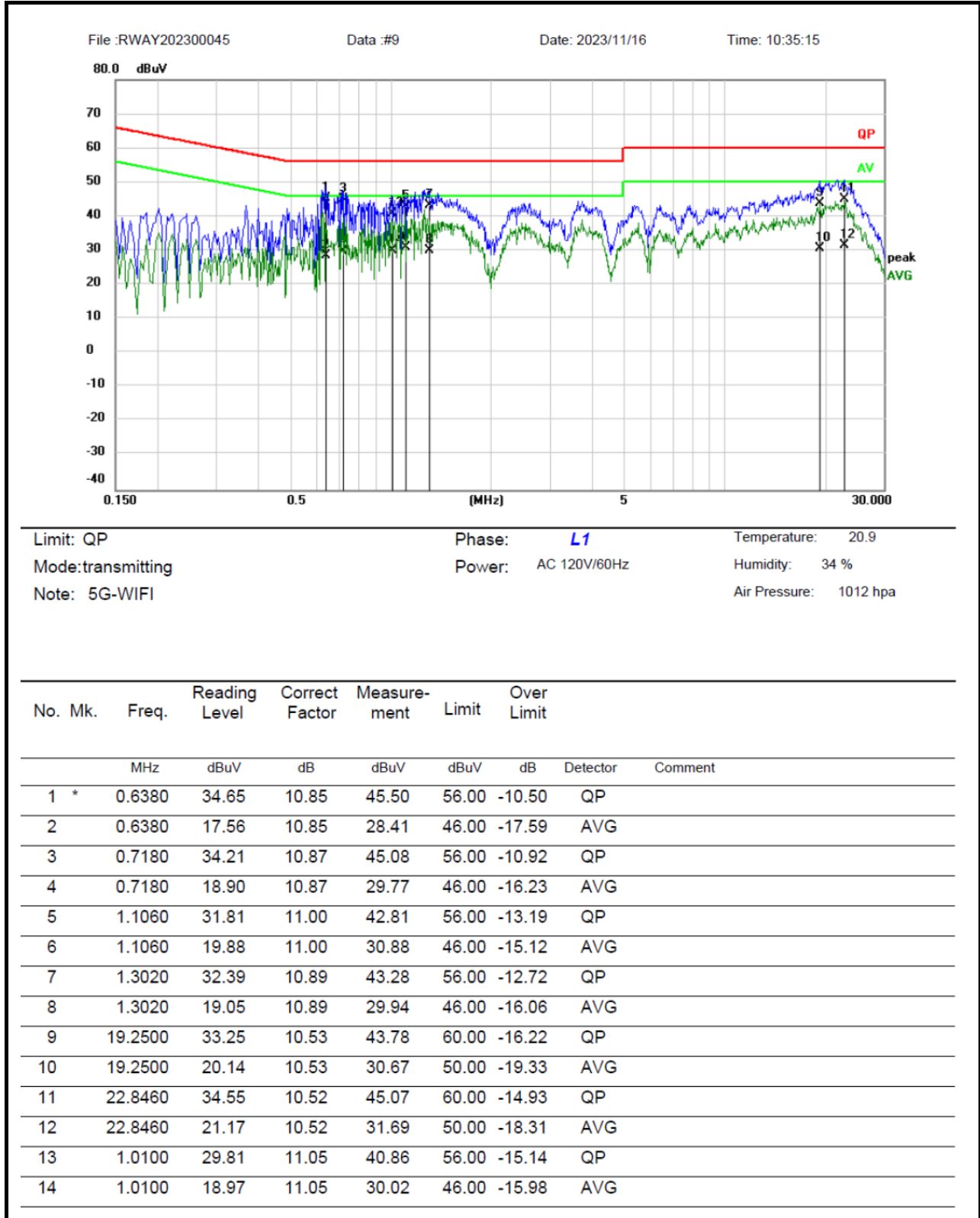
3.2 Limit

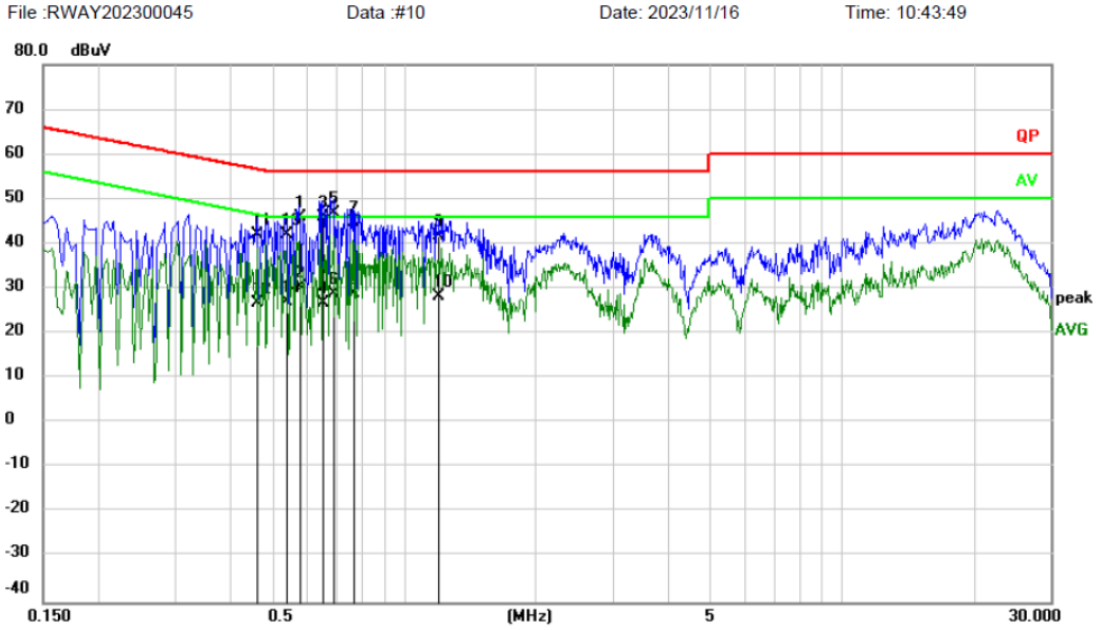
Test items	Limit
AC Power Line Conducted Emission	See details §15.207 (a)
<p>Conducted Peak Output Power</p> <p>Power Spectral Density</p>	<p>For the band 5.150-5.250 GHz Band:</p> <p>For client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation 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.</p> <p>For the band 5.725-5.895 GHz Band:</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.

Unwanted Emissions	<p>Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209</p> <p>For the band 5.150-5.250 GHz Band:</p> <p>All emissions outside of the 5.15–5.35 GHz band shall not exceed an e.i.r.p. of –27 dBm/MHz.</p> <p>For the band 5.725-5.895 GHz Band:</p> <p>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.</p>
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3.3 AC Line Conducted Emissions Test Data

Test Date:	2023-11-16	Test By:	Lirou Li
Environment condition:	Temperature: 20.9°C; Relative Humidity: 34%; ATM Pressure: 101.2kPa		





Limit: QP Phase: **N** Temperature: 20.9
 Mode:transmitting Power: AC 120V/60Hz Humidity: 34 %
 Note: 5G-WIFI Air Pressure: 1012 hpa

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over Limit	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.5780	35.34	10.65	45.99	56.00	-10.01	QP	
2	0.5780	19.78	10.65	30.43	46.00	-15.57	AVG	
3	0.6540	35.25	10.60	45.85	56.00	-10.15	QP	
4	0.6540	16.05	10.60	26.65	46.00	-19.35	AVG	
5 *	0.6900	36.26	10.56	46.82	56.00	-9.18	QP	
6	0.6900	18.31	10.56	28.87	46.00	-17.13	AVG	
7	0.7660	34.12	10.58	44.70	56.00	-11.30	QP	
8	0.7660	18.29	10.58	28.87	46.00	-17.13	AVG	
9	1.1940	30.99	10.67	41.66	56.00	-14.34	QP	
10	1.1940	17.63	10.67	28.30	46.00	-17.70	AVG	
11	0.4620	31.33	10.69	42.02	56.66	-14.64	QP	
12	0.4620	16.11	10.69	26.80	46.66	-19.86	AVG	
13	0.5380	31.24	10.68	41.92	56.00	-14.08	QP	
14	0.5380	16.49	10.68	27.17	46.00	-18.83	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

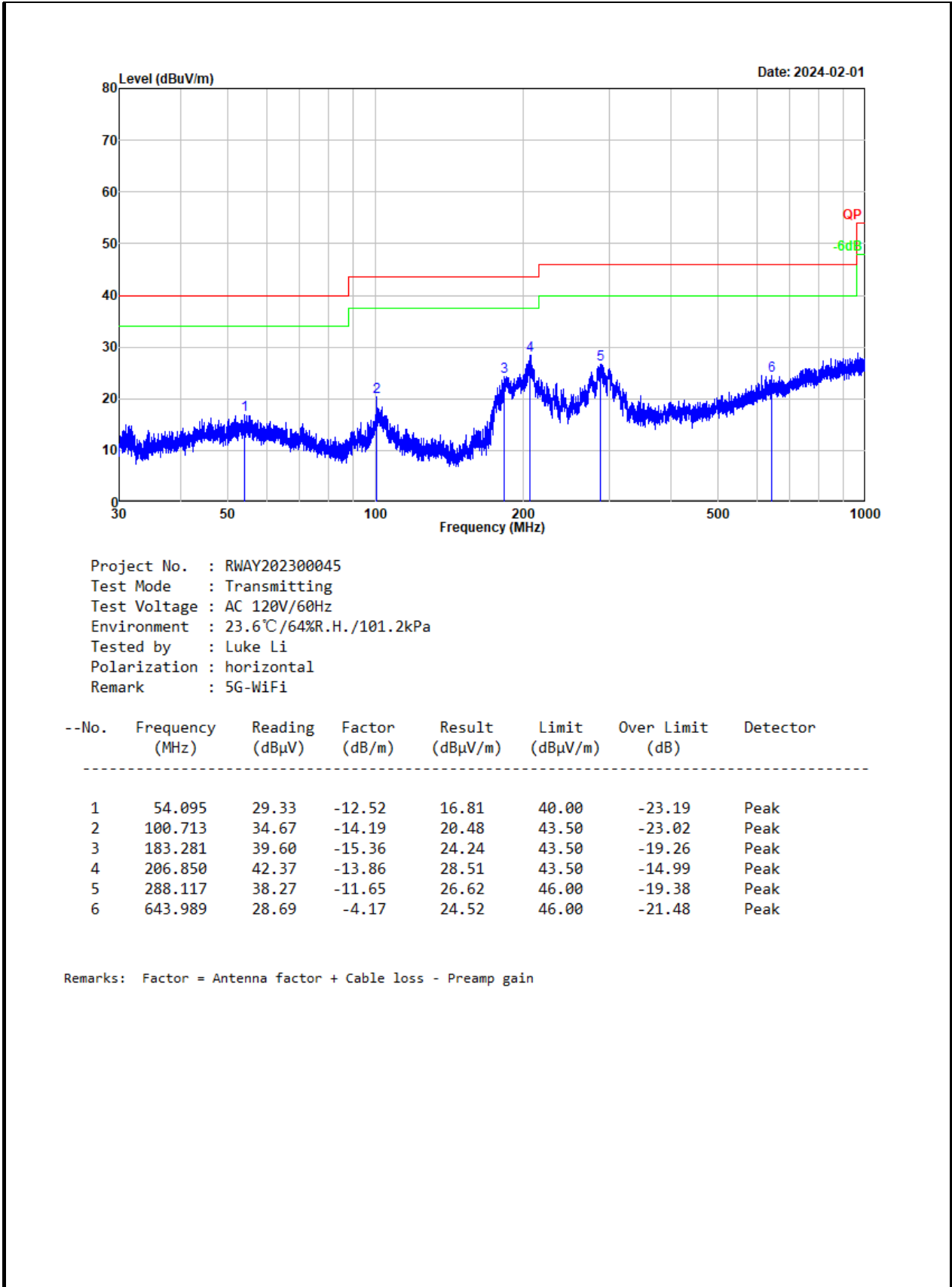
9 kHz-30MHz:

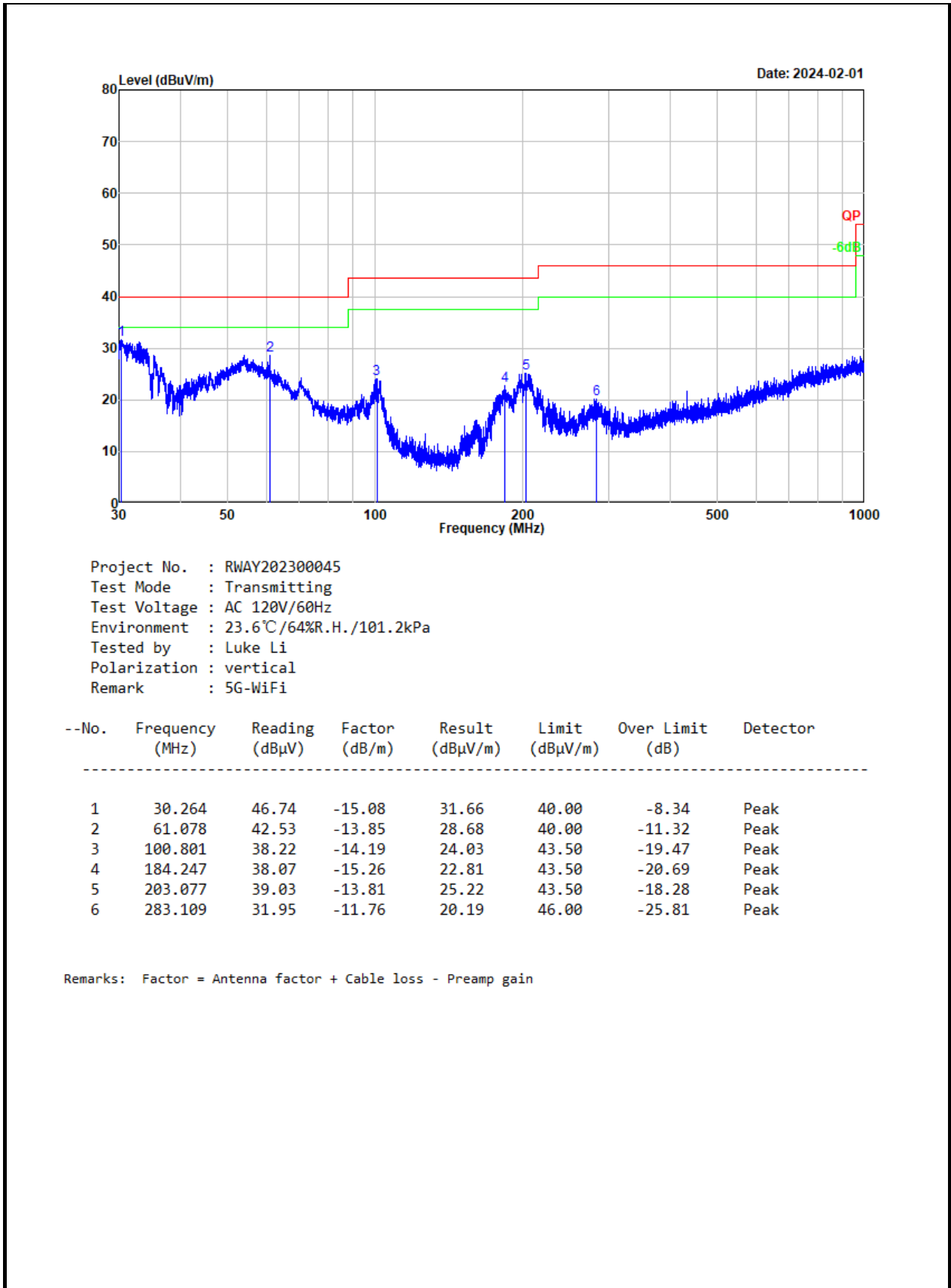
Test Date:	2024-02-01	Test By:	Luke Li
Environment condition:	Temperature: 23.6°C; Relative Humidity:64%; ATM Pressure: 101.2kPa		

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

30MHz-1GHz:

Test Date:	2024-02-01	Test By:	Luke Li
Environment condition:	Temperature: 23.6°C; Relative Humidity:64%; ATM Pressure: 101.2kPa		





Project No. : RWAY202300045
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 23.6°C/64%R.H./101.2kPa
 Tested by : Luke Li
 Polarization : vertical
 Remark : 5G-WiFi

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	30.264	46.74	-15.08	31.66	40.00	-8.34	Peak
2	61.078	42.53	-13.85	28.68	40.00	-11.32	Peak
3	100.801	38.22	-14.19	24.03	43.50	-19.47	Peak
4	184.247	38.07	-15.26	22.81	43.50	-20.69	Peak
5	203.077	39.03	-13.81	25.22	43.50	-18.28	Peak
6	283.109	31.95	-11.76	20.19	46.00	-25.81	Peak

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:	2024-01-20	Test By:	Bard Huang
Environment condition:	Temperature: 25.4°C; Relative Humidity:49.8%; ATM Pressure: 101.9kPa		

5150-5250MHz Band:

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	56.17	horizontal	11.57	67.74	74.00	-6.26	Peak
5150.000	38.35	horizontal	11.57	49.92	54.00	-4.08	Average
5150.000	54.26	vertical	11.57	65.83	74.00	-8.17	Peak
5150.000	37.58	vertical	11.57	49.15	54.00	-4.85	Average
10360.000	48.98	horizontal	5.50	54.48	68.20	-13.72	Peak
10360.000	49.89	vertical	5.50	55.39	68.20	-12.81	Peak
Middle Channel							
10400.000	49.00	horizontal	5.70	54.70	68.20	-13.50	Peak
10400.000	49.24	vertical	5.70	54.94	68.20	-13.26	Peak
High Channel							
5350.000	46.60	horizontal	11.44	58.04	74.00	-15.96	Peak
5350.000	32.75	horizontal	11.44	44.19	54.00	-9.81	Average
5350.000	46.69	vertical	11.44	58.13	74.00	-15.87	Peak
5350.000	33.16	vertical	11.44	44.60	54.00	-9.40	Average
10480.000	49.42	horizontal	5.74	55.16	68.20	-13.04	Peak
10480.000	49.25	vertical	5.74	54.99	68.20	-13.21	Peak
802.11ac20							
Low Channel							
5150.000	56.88	horizontal	11.57	68.45	74.00	-5.55	Peak
5150.000	38.76	horizontal	11.57	50.33	54.00	-3.67	Average
5150.000	55.57	vertical	11.57	67.14	74.00	-6.86	Peak
5150.000	37.49	vertical	11.57	49.06	54.00	-4.94	Average
10360.000	49.54	horizontal	5.50	55.04	68.20	-13.16	Peak
10360.000	49.27	vertical	5.50	54.77	68.20	-13.43	Peak
Middle Channel							
10400.000	49.37	horizontal	5.70	55.07	68.20	-13.13	Peak
10400.000	49.11	vertical	5.70	54.81	68.20	-13.39	Peak
High Channel							
5350.000	47.01	horizontal	11.44	58.45	74.00	-15.55	Peak

5350.000	33.68	horizontal	11.44	45.12	54.00	-8.88	Average
5350.000	46.50	vertical	11.44	57.94	74.00	-16.06	Peak
5350.000	33.39	vertical	11.44	44.83	54.00	-9.17	Average
10480.000	49.19	horizontal	5.74	54.93	68.20	-13.27	Peak
10480.000	48.92	vertical	5.74	54.66	68.20	-13.54	Peak
802.11ac40							
Low Channel							
5150.000	55.99	horizontal	11.57	67.56	74.00	-6.44	Peak
5150.000	38.51	horizontal	11.57	50.08	54.00	-3.92	Average
5150.000	54.45	vertical	11.57	66.02	74.00	-7.98	Peak
5150.000	37.37	vertical	11.57	48.94	54.00	-5.06	Average
10380.000	49.04	horizontal	5.60	54.64	68.20	-13.56	Peak
10380.000	49.58	vertical	5.60	55.18	68.20	-13.02	Peak
High Channel							
5350.000	46.68	horizontal	11.44	58.12	74.00	-15.88	Peak
5350.000	33.62	horizontal	11.44	45.06	54.00	-8.94	Average
5350.000	46.39	vertical	11.44	57.83	74.00	-16.17	Peak
5350.000	33.50	vertical	11.44	44.94	54.00	-9.06	Average
10460.000	49.16	horizontal	5.73	54.89	68.20	-13.31	Peak
10460.000	49.20	vertical	5.73	54.93	68.20	-13.27	Peak
802.11ac80							
Middle Channel							
5150.000	49.54	horizontal	11.57	61.11	74.00	-12.89	Peak
5150.000	38.68	horizontal	11.57	50.25	54.00	-3.75	Average
5150.000	48.73	vertical	11.57	60.30	74.00	-13.70	Peak
5150.000	37.37	vertical	11.57	48.94	54.00	-5.06	Average
5350.000	46.71	horizontal	11.44	58.15	74.00	-15.85	Peak
5350.000	34.57	horizontal	11.44	46.01	54.00	-7.99	Average
5350.000	46.49	vertical	11.44	57.93	74.00	-16.07	Peak
5350.000	34.35	vertical	11.44	45.79	54.00	-8.21	Average
10420.000	48.85	horizontal	5.71	54.56	68.20	-13.64	Peak
10420.000	49.10	vertical	5.71	54.81	68.20	-13.39	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

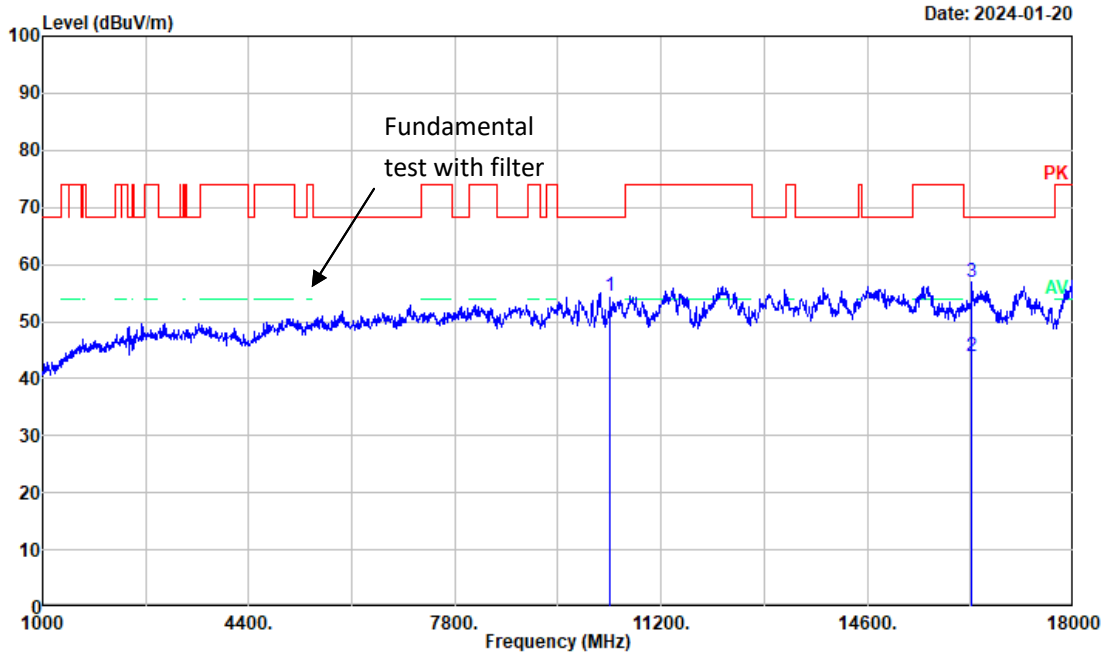
Margin = Corrected Amplitude – Limit

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:

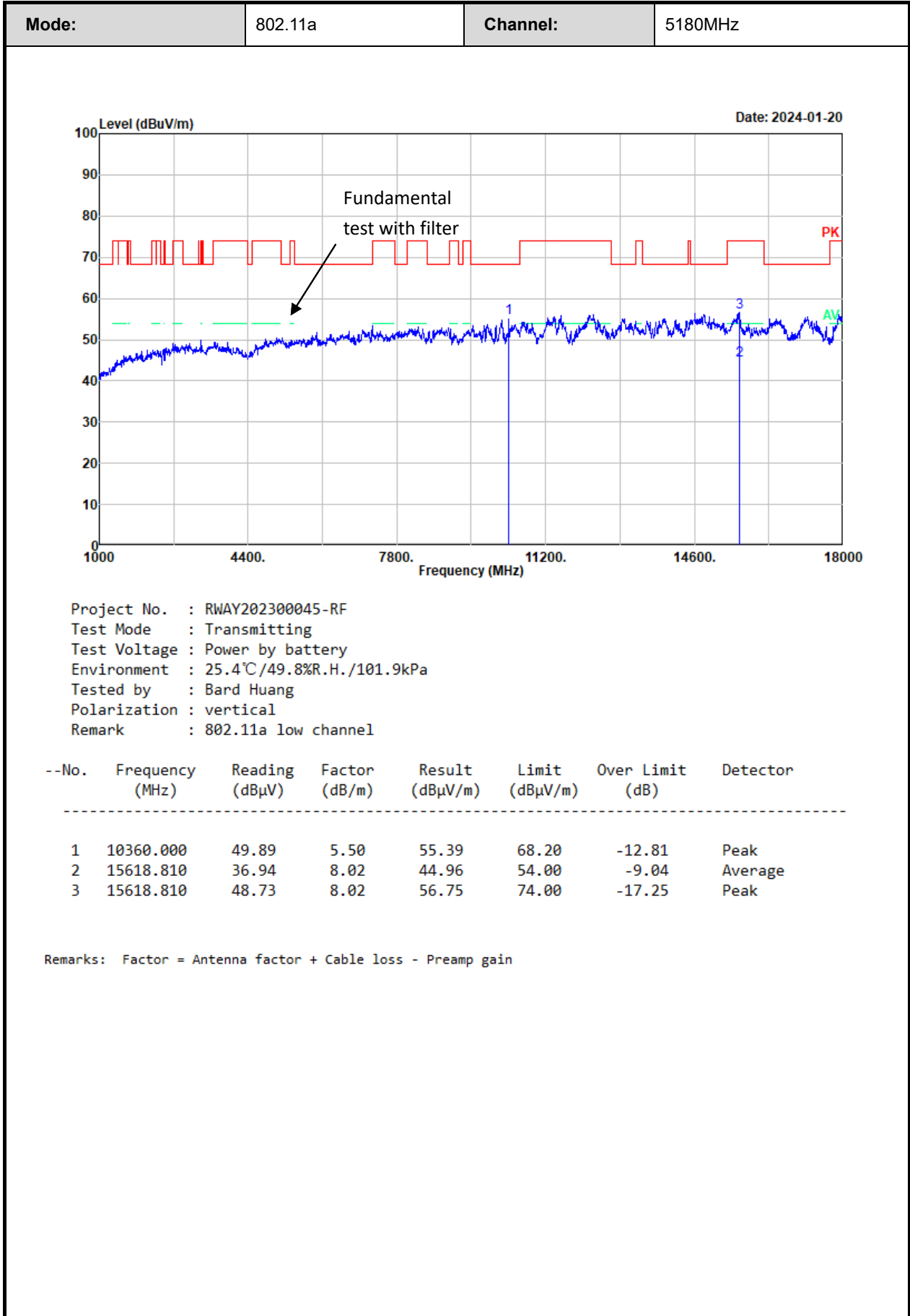
Mode:	802.11a	Channel:	5180MHz
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Project No. : RWAY202300045-RF
 Test Mode : Transmitting
 Test Voltage : Power by battery
 Environment : 25.4°C/49.8%R.H./101.9kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : 802.11a low channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	10360.000	48.98	5.50	54.48	68.20	-13.72	Peak
2	16324.660	36.70	7.27	43.97	-----	-----	Average
3	16324.660	49.55	7.27	56.82	68.20	-11.38	Peak

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



5725-5850MHz Band:

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							
5650.00	48.53	horizontal	11.90	60.43	68.20	-7.77	Peak
5700.00	51.28	horizontal	12.00	63.28	105.20	-41.92	Peak
5720.00	62.23	horizontal	12.03	74.26	110.80	-36.54	Peak
5725.00	68.70	horizontal	12.03	80.73	122.20	-41.47	Peak
5650.00	47.89	vertical	11.90	59.79	68.20	-8.41	Peak
5700.00	50.77	vertical	12.00	62.77	105.20	-42.43	Peak
5720.00	61.68	vertical	12.03	73.71	110.80	-37.09	Peak
5725.00	68.46	vertical	12.03	80.49	122.20	-41.71	Peak
11490.000	49.60	horizontal	6.46	56.06	74.00	-17.94	Peak
11490.000	37.16	horizontal	6.46	43.62	54.00	-10.38	Average
11490.000	49.48	vertical	6.46	55.94	74.00	-18.06	Peak
11490.000	37.03	vertical	6.46	43.49	54.00	-10.51	Average
Middle Channel							
11570.000	50.04	horizontal	6.52	56.56	74.00	-17.44	Peak
11570.000	37.28	horizontal	6.52	43.80	54.00	-10.20	Average
11570.000	49.83	vertical	6.52	56.35	74.00	-17.65	Peak
11570.000	38.10	vertical	6.52	44.62	54.00	-9.38	Average
High Channel							
5850.00	70.32	horizontal	12.31	82.63	122.20	-39.57	Peak
5855.00	62.76	horizontal	12.32	75.08	110.80	-35.72	Peak
5875.00	51.61	horizontal	12.39	64.00	105.20	-41.20	Peak
5925.00	49.04	horizontal	12.43	61.47	68.20	-6.73	Peak
5850.00	69.73	vertical	12.31	82.04	122.20	-40.16	Peak
5855.00	61.76	vertical	12.32	74.08	110.80	-36.72	Peak
5875.00	51.96	vertical	12.39	64.35	105.20	-40.85	Peak
5925.00	47.28	vertical	12.43	59.71	68.20	-8.49	Peak
11650.000	50.33	horizontal	6.55	56.88	74.00	-17.12	Peak
11650.000	38.29	horizontal	6.55	44.84	54.00	-9.16	Average
11650.000	49.95	vertical	6.55	56.50	74.00	-17.50	Peak
11650.000	38.15	vertical	6.55	44.70	54.00	-9.30	Average
802.11ac20							
Low Channel							
5650.00	49.62	horizontal	11.90	61.52	68.20	-6.68	Peak
5700.00	51.39	horizontal	12.00	63.39	105.20	-41.81	Peak

5720.00	63.40	horizontal	12.03	75.43	110.80	-35.37	Peak
5725.00	68.84	horizontal	12.03	80.87	122.20	-41.33	Peak
5650.00	48.24	vertical	11.90	60.14	68.20	-8.06	Peak
5700.00	50.59	vertical	12.00	62.59	105.20	-42.61	Peak
5720.00	61.74	vertical	12.03	73.77	110.80	-37.03	Peak
5725.00	68.57	vertical	12.03	80.60	122.20	-41.60	Peak
11490.000	49.57	horizontal	6.46	56.03	74.00	-17.97	Peak
11490.000	37.94	horizontal	6.46	44.40	54.00	-9.60	Average
11490.000	49.40	vertical	6.46	55.86	74.00	-18.14	Peak
11490.000	37.79	vertical	6.46	44.25	54.00	-9.75	Average
Middle Channel							
11570.000	49.70	horizontal	6.52	56.22	74.00	-17.78	Peak
11570.000	38.13	horizontal	6.52	44.65	54.00	-9.35	Average
11570.000	49.49	vertical	6.52	56.01	74.00	-17.99	Peak
11570.000	37.97	vertical	6.52	44.49	54.00	-9.51	Average
High Channel							
5850.00	70.16	horizontal	12.31	82.47	122.20	-39.73	Peak
5855.00	63.13	horizontal	12.32	75.45	110.80	-35.35	Peak
5875.00	52.07	horizontal	12.39	64.46	105.20	-40.74	Peak
5925.00	49.63	horizontal	12.43	62.06	68.20	-6.14	Peak
5850.00	70.00	vertical	12.31	82.31	122.20	-39.89	Peak
5855.00	61.19	vertical	12.32	73.51	110.80	-37.29	Peak
5875.00	52.02	vertical	12.39	64.41	105.20	-40.79	Peak
5925.00	47.06	vertical	12.43	59.49	68.20	-8.71	Peak
11650.000	49.79	horizontal	6.55	56.34	74.00	-17.66	Peak
11650.000	38.20	horizontal	6.55	44.75	54.00	-9.25	Average
11650.000	49.52	vertical	6.55	56.07	74.00	-17.93	Peak
11650.000	38.07	vertical	6.55	44.62	54.00	-9.38	Average
802.11ac40							
Low Channel							
5650.00	48.85	horizontal	11.90	60.75	68.20	-7.45	Peak
5700.00	51.73	horizontal	12.00	63.73	105.20	-41.47	Peak
5720.00	62.97	horizontal	12.03	75.00	110.80	-35.80	Peak
5725.00	71.14	horizontal	12.03	83.17	122.20	-39.03	Peak
5650.00	47.89	vertical	11.90	59.79	68.20	-8.41	Peak
5700.00	50.23	vertical	12.00	62.23	105.20	-42.97	Peak
5720.00	62.95	vertical	12.03	74.98	110.80	-35.82	Peak
5725.00	69.19	vertical	12.03	81.22	122.20	-40.98	Peak

11510.000	49.28	horizontal	6.48	55.76	74.00	-18.24	Peak
11510.000	37.19	horizontal	6.48	43.67	54.00	-10.33	Average
11510.000	49.97	vertical	6.48	56.45	74.00	-17.55	Peak
11510.000	37.04	vertical	6.48	43.52	54.00	-10.48	Average
High Channel							
5850.00	71.86	horizontal	12.31	84.17	122.20	-38.03	Peak
5855.00	61.23	horizontal	12.32	73.55	110.80	-37.25	Peak
5875.00	51.22	horizontal	12.39	63.61	105.20	-41.59	Peak
5925.00	50.07	horizontal	12.43	62.50	68.20	-5.70	Peak
5850.00	70.72	vertical	12.31	83.03	122.20	-39.17	Peak
5855.00	59.96	vertical	12.32	72.28	110.80	-38.52	Peak
5875.00	51.56	vertical	12.39	63.95	105.20	-41.25	Peak
5925.00	49.07	vertical	12.43	61.50	68.20	-6.70	Peak
11590.000	49.89	horizontal	6.53	56.42	74.00	-17.58	Peak
11590.000	37.73	horizontal	6.53	44.26	54.00	-9.74	Average
11590.000	49.75	vertical	6.53	56.28	74.00	-17.72	Peak
11590.000	37.60	vertical	6.53	44.13	54.00	-9.87	Average
802.11ac80							
Middle Channel							
5650.00	49.52	horizontal	11.90	61.42	68.20	-6.78	Peak
5700.00	51.58	horizontal	12.00	63.58	105.20	-41.62	Peak
5720.00	62.87	horizontal	12.03	74.90	110.80	-35.90	Peak
5725.00	70.25	horizontal	12.03	82.28	122.20	-39.92	Peak
5650.00	47.62	vertical	11.90	59.52	68.20	-8.68	Peak
5700.00	50.71	vertical	12.00	62.71	105.20	-42.49	Peak
5720.00	62.63	vertical	12.03	74.66	110.80	-36.14	Peak
5725.00	69.24	vertical	12.03	81.27	122.20	-40.93	Peak
5850.00	71.73	horizontal	12.31	84.04	122.20	-38.16	Peak
5855.00	61.58	horizontal	12.32	73.90	110.80	-36.90	Peak
5875.00	51.97	horizontal	12.39	64.36	105.20	-40.84	Peak
5925.00	49.35	horizontal	12.43	61.78	68.20	-6.42	Peak
5850.00	70.84	vertical	12.31	83.15	122.20	-39.05	Peak
5855.00	60.61	vertical	12.32	72.93	110.80	-37.87	Peak
5875.00	50.28	vertical	12.39	62.67	105.20	-42.53	Peak
5925.00	49.23	vertical	12.43	61.66	68.20	-6.54	Peak
11550	49.53	horizontal	6.5	56.03	74.00	-17.97	Peak
11550	37.42	horizontal	6.5	43.92	54.00	-10.08	Average
11550	49.31	vertical	6.5	55.81	74.00	-18.19	Peak

11550	37.26	vertical	6.5	43.76	54.00	-10.24	Average
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Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

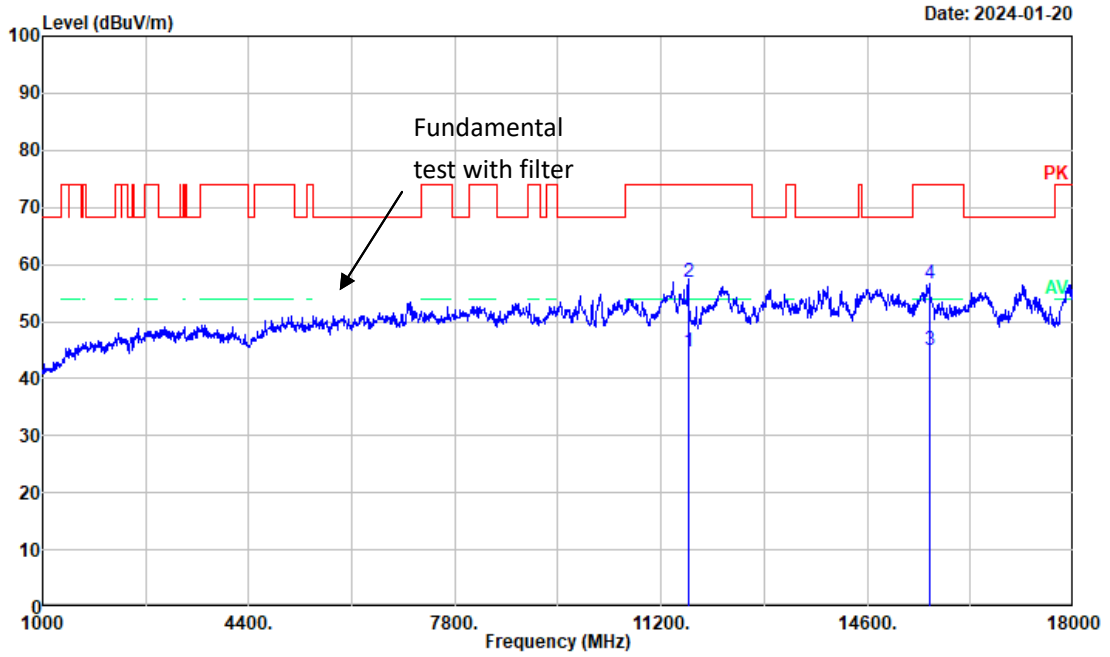
Margin = Corrected Amplitude – Limit

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:

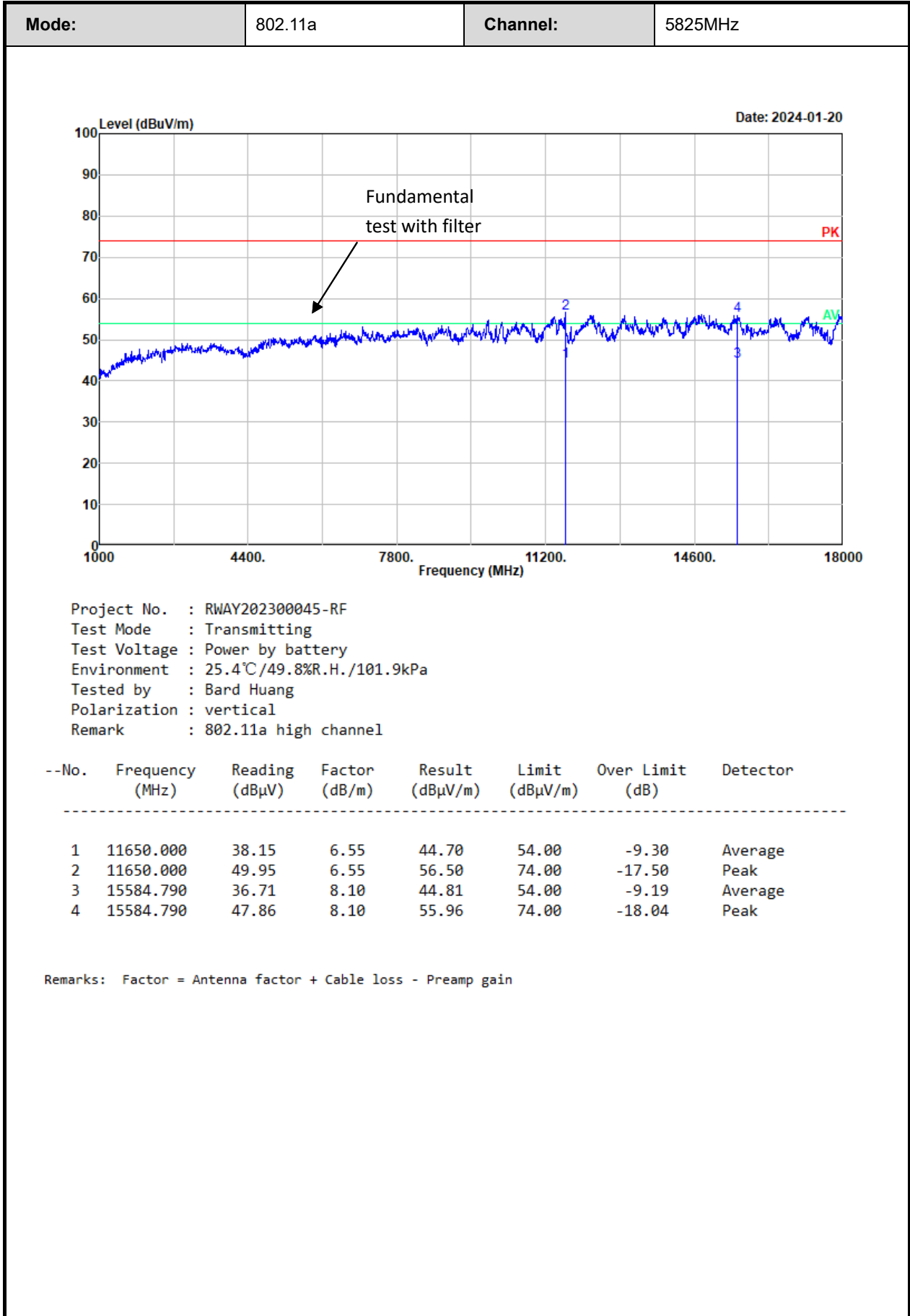
Mode:	802.11a	Channel:	5825MHz
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Project No. : RWAY202300045-RF
 Test Mode : Transmitting
 Test Voltage : Power by battery
 Environment : 25.4°C/49.8%R.H./101.9kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : 802.11a high channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	11650.000	38.29	6.55	44.84	54.00	-9.16	Average
2	11650.000	50.33	6.55	56.88	74.00	-17.12	Peak
3	15618.810	36.87	8.02	44.89	54.00	-9.11	Average
4	15618.810	48.49	8.02	56.51	74.00	-17.49	Peak

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



3.5 RF Conducted Test Data

Test Date:	2023-12-07~2023-12-21	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.7~26.2°C; Relative Humidity: 45~51%; ATM Pressure: 101kPa		

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

5150-5250MHz

Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Verdict
802.11a	5180	20.6	16.98	pass
	5200	20.55	16.94	pass
	5240	20.6	16.9	pass
802.11ac vht20	5180	20.68	17.82	pass
	5200	20.75	17.86	pass
	5240	20.8	17.86	pass
802.11ac vht40	5190	41.2	36.2	pass
	5230	40.95	36.28	pass
802.11ac vht80	5210	81.6	75.28	pass

Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz, please refer to the test plots of 99% occupied bandwidth.

5725-5850MHz

Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Verdict
802.11a	5745	16.44	17.7	pass
	5785	16.4	17.86	pass
	5825	16.44	17.98	pass
802.11ac vht20	5745	17.64	18.34	pass
	5785	17.68	18.38	pass
	5825	17.64	18.42	pass
802.11ac vht40	5755	36.48	36.68	pass
	5795	36.48	36.92	pass
802.11ac vht80	5775	76.56	75.6	pass

Note:

1. 6dB Emission Bandwidth Limit: ≥ 0.5 MHz
2. the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

3.5.2 Maximum conducted output power

5150-5250MHz

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)		Verdict
		Result	Limit	
802.11a	5180	13.06	24	pass
	5200	12.89	24	pass
	5240	12.81	24	pass
802.11ac vht20	5180	12.88	24	pass
	5200	12.89	24	pass
	5240	12.93	24	pass
802.11ac vht40	5190	13.94	24	pass
	5230	13.95	24	pass
802.11ac vht80	5210	10.81	24	pass

Note: The device is a client device.

5725-5850MHz

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)		Verdict
		Result	Limit	
802.11a	5745	15.94	30	pass
	5785	15.98	30	pass
	5825	15.97	30	pass
802.11ac vht20	5745	15.82	30	pass
	5785	15.78	30	pass
	5825	15.73	30	pass
802.11ac vht40	5755	15.76	30	pass
	5795	15.81	30	pass
802.11ac vht80	5775	12.88	30	pass

3.5.3 Power Spectral Density

5150-5250MHz

Test Modes	Test Frequency (MHz)	Reading (dBm/500kHz)	Duty Cycle Factor (dB)	Maximum Power Spectral Density (dBm/500kHz)		Verdict
				Result	Limit	
802.11a	5180	2.93	/	2.93	11	pass
	5200	2.59	/	2.59	11	pass
	5240	2.12	/	2.12	11	pass
802.11ac vht20	5180	1.88	/	1.88	11	pass
	5200	2.48	/	2.48	11	pass
	5240	2.49	/	2.49	11	pass
802.11ac vht40	5190	0.87	/	0.87	11	pass
	5230	0.45	/	0.45	11	pass
802.11ac vht80	5210	-5.47	/	-5.47	11	pass

Note: The device is a client device.

Method SA-1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 was used for PSD test.

5725-5850 MHz

Test Modes	Test Frequency (MHz)	Reading (dBm/500kHz)	Duty Cycle Factor (dB)	Maximum Power Spectral Density (dBm/500kHz)		Verdict
				Result	Limit	
802.11a	5745	2.43	/	2.43	30	pass
	5785	2.82	/	2.82	30	pass
	5825	2.97	/	2.97	30	pass
802.11ac vht20	5745	2.39	/	2.39	30	pass
	5785	2.16	/	2.16	30	pass
	5825	2.60	/	2.60	30	pass
802.11ac vht40	5755	-0.37	/	-0.37	30	pass
	5795	-0.59	/	-0.59	30	pass
802.11ac vht80	5775	-6.37	/	-6.37	30	pass

Note: Method SA-1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 was used for PSD test.

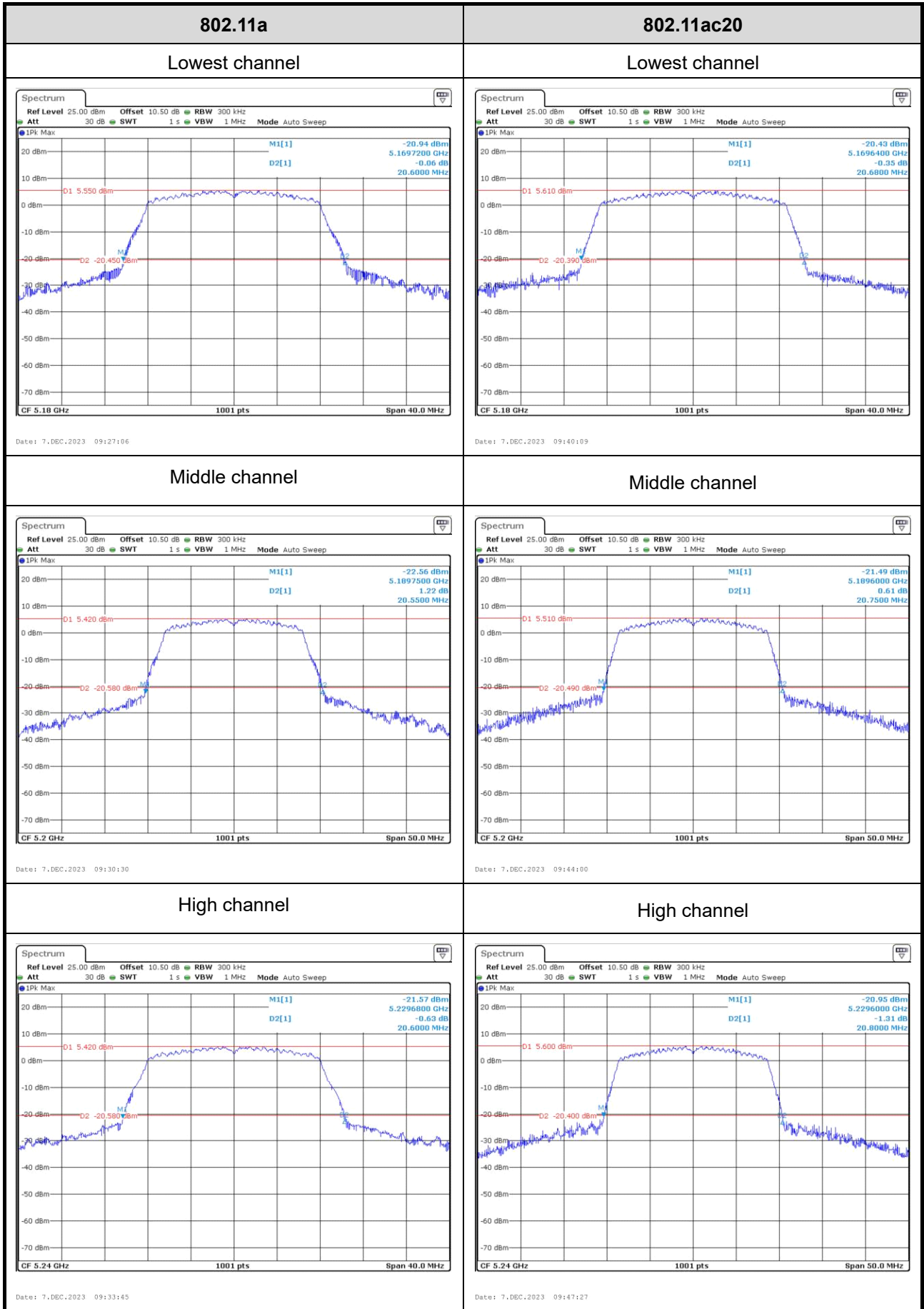
3.5.4 Duty Cycle

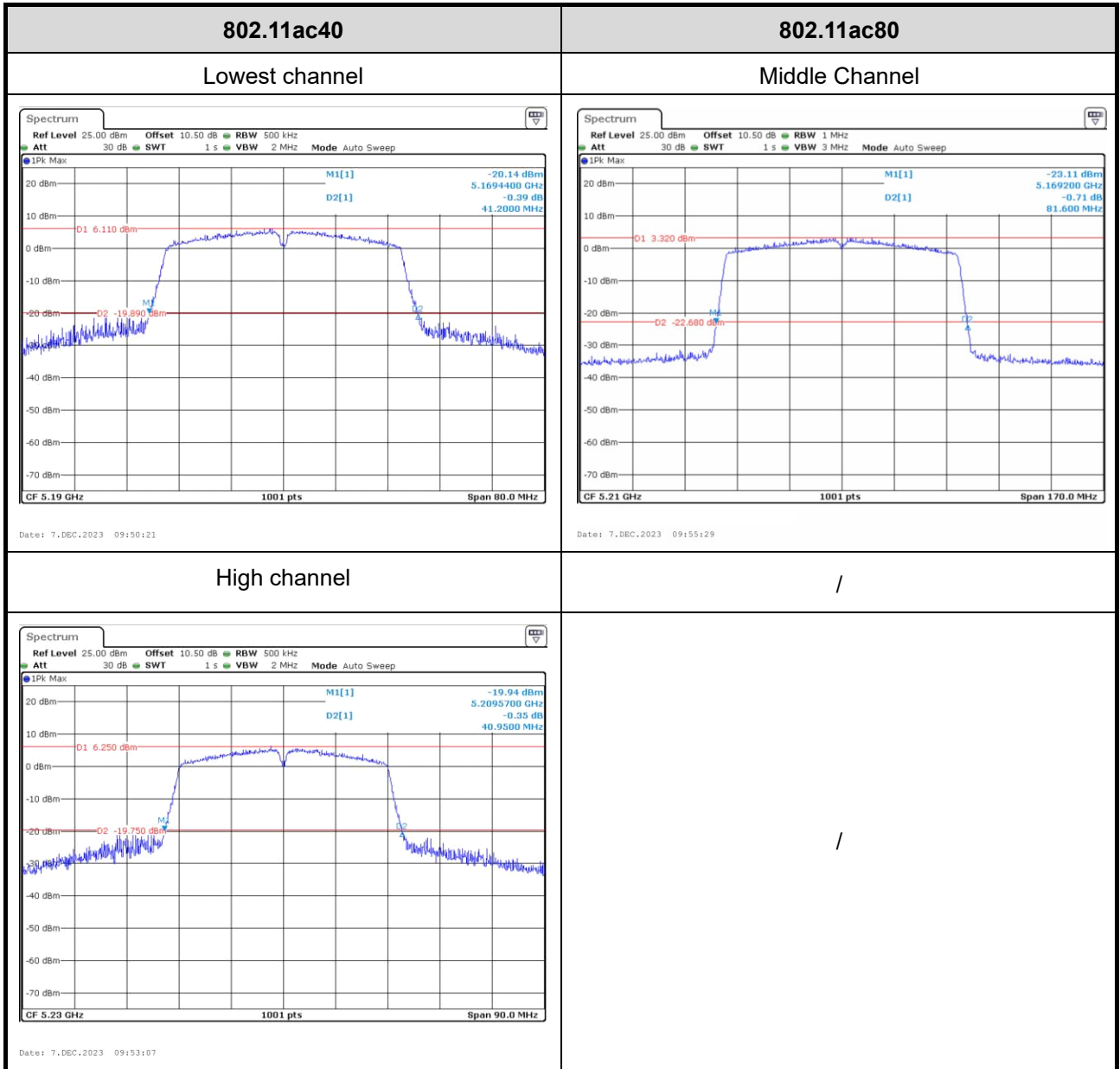
Test Mode	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	Duty Cycle Factor[%]	1/T [Hz]	VBW setting* [Hz]
802.11a	100	100	100.00	/	/	10
802.11ac vht20	100	100	100.00	/	/	10
802.11ac vht40	100	100	100.00	/	/	10
802.11acVHT80	100	100	100.00	/	/	10

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

Test Plots:

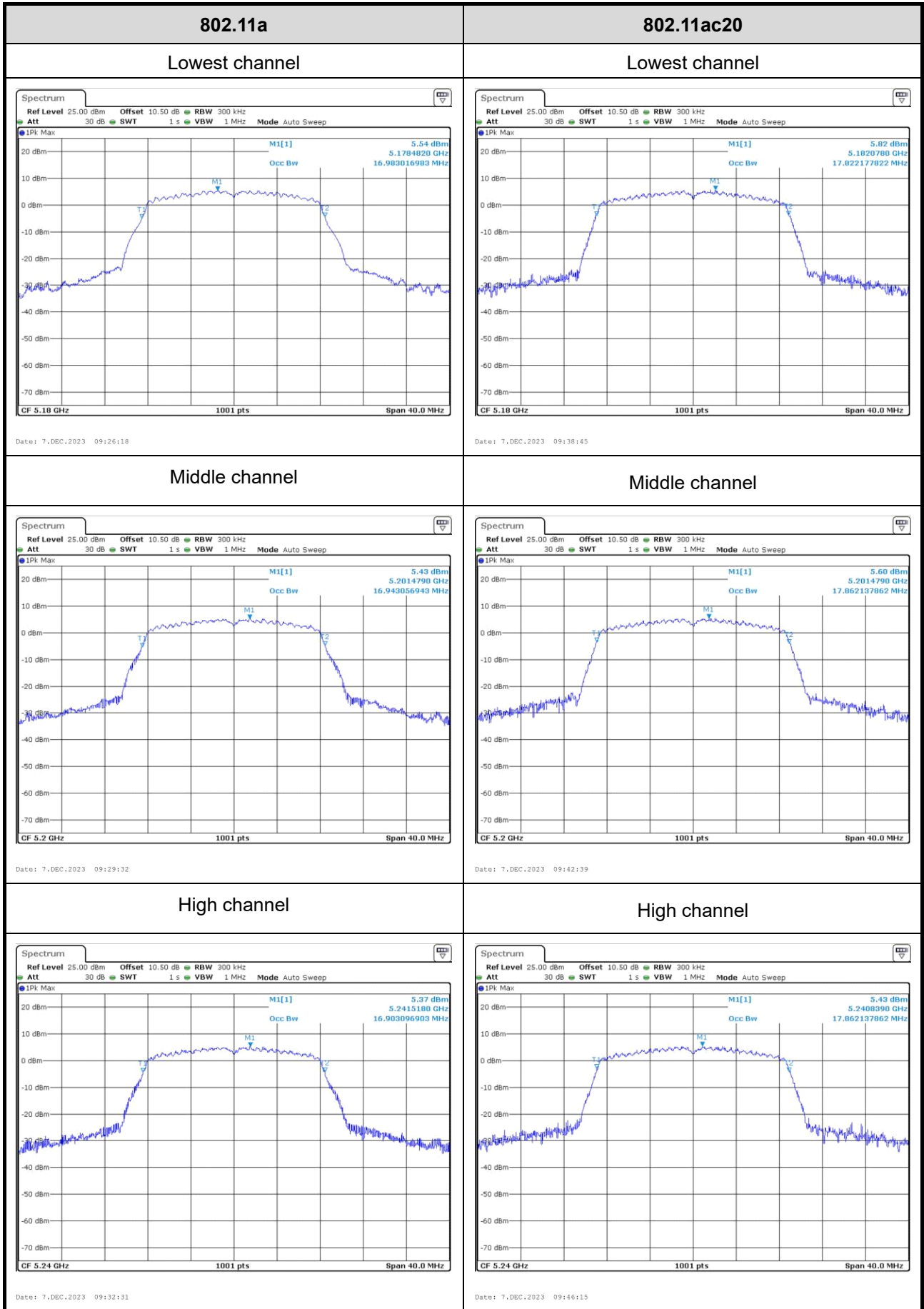
26dB Emission Bandwidth

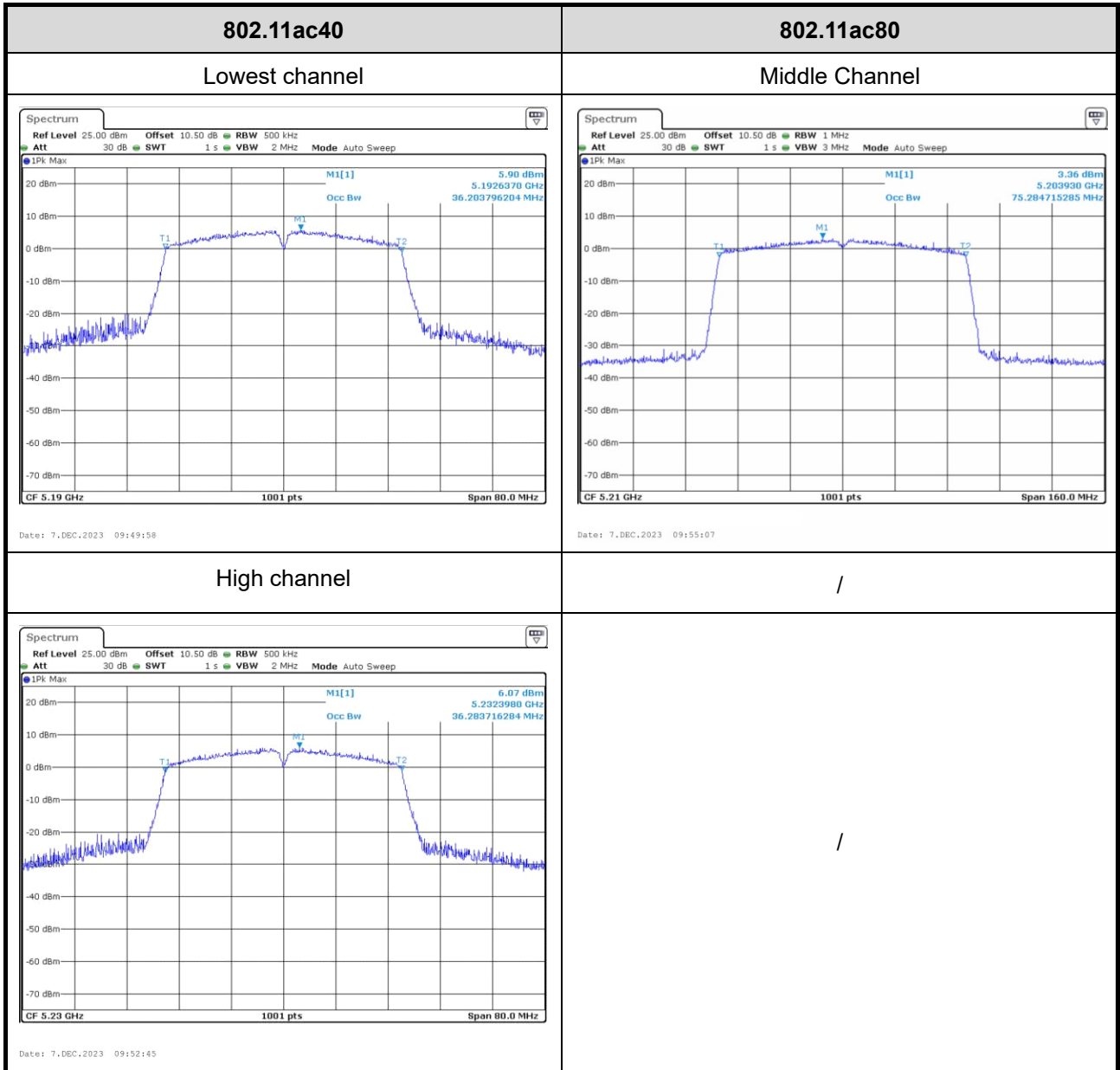




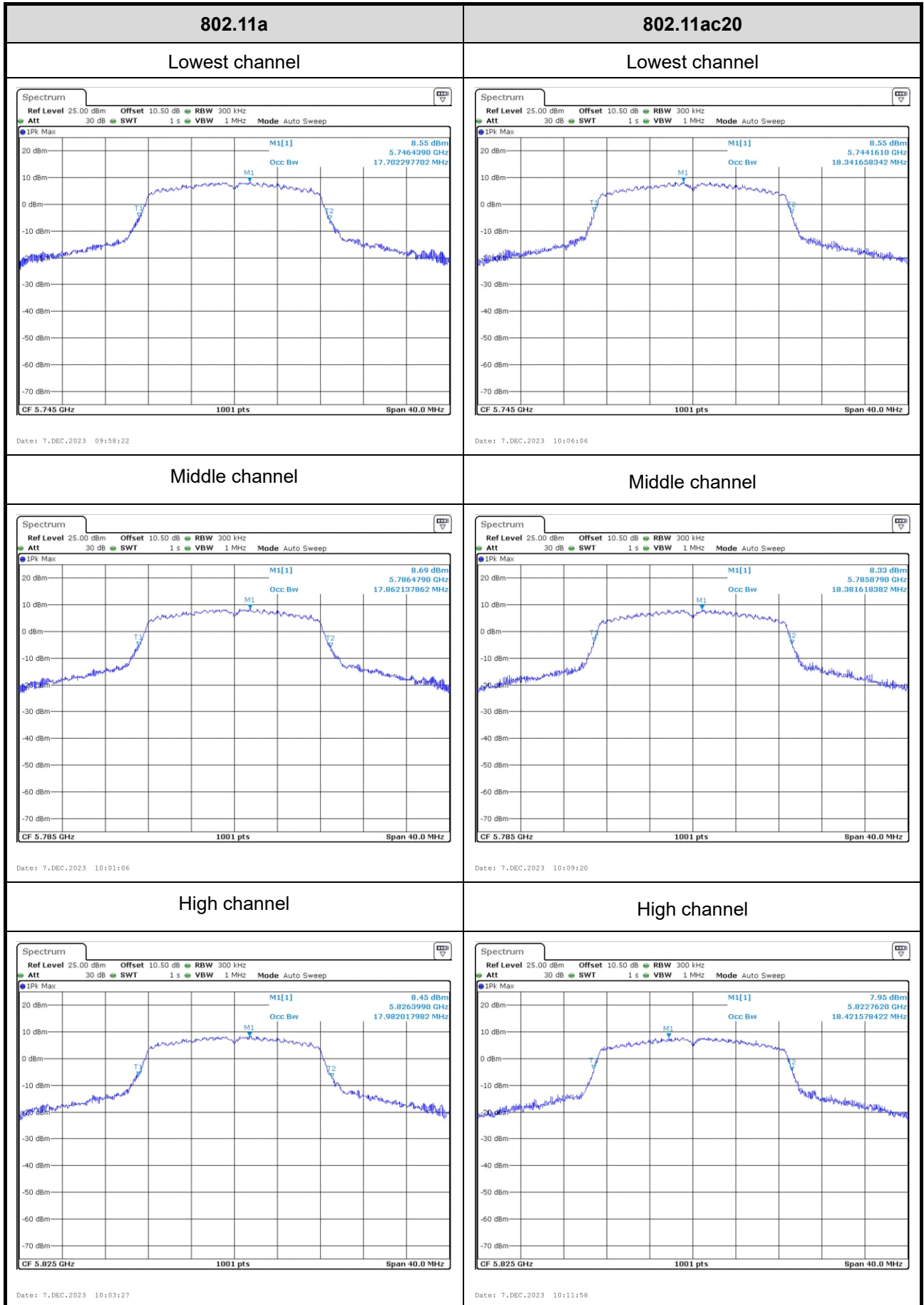
99% Occupied Bandwidth

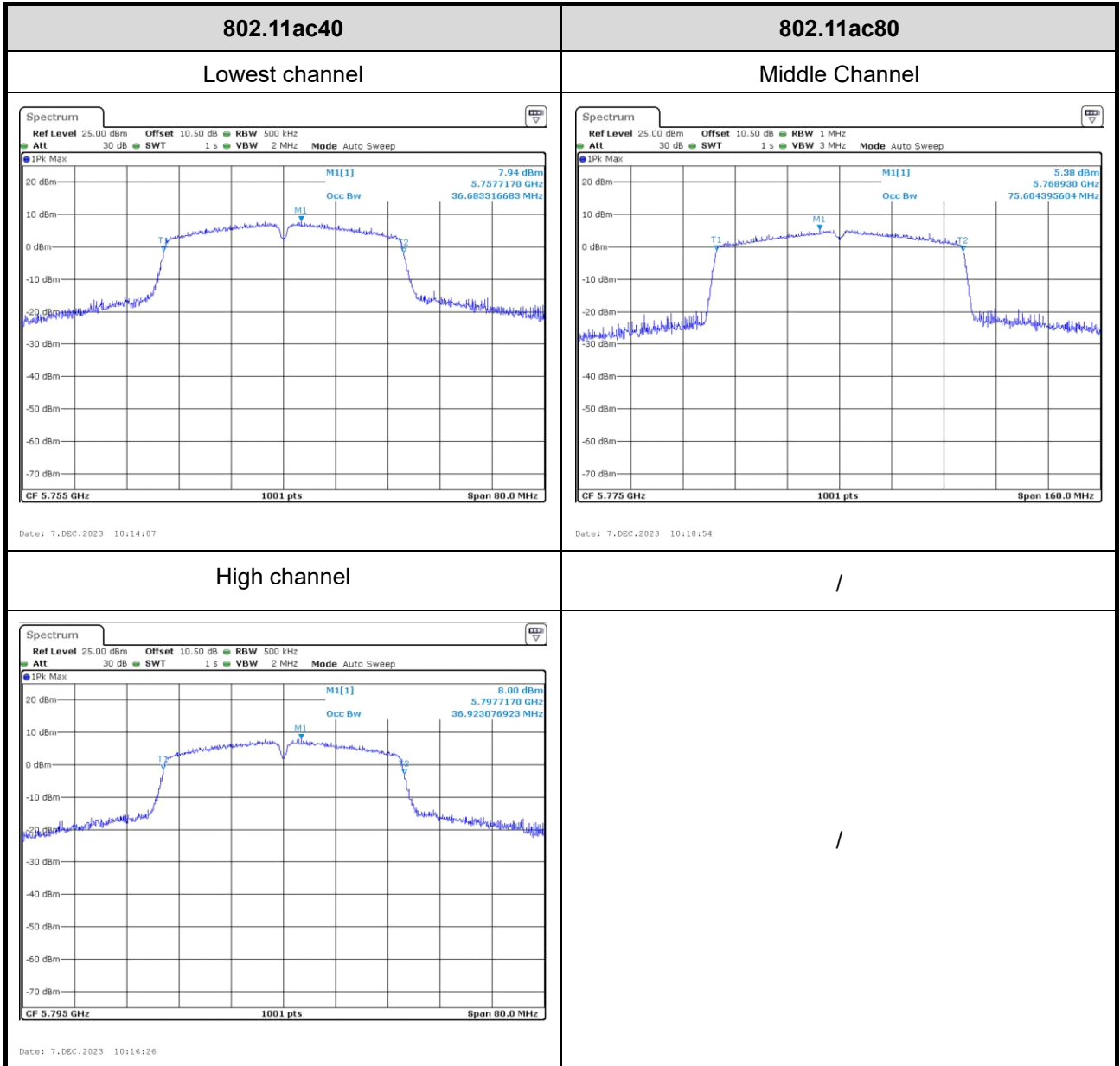
5150-5250MHz Band:



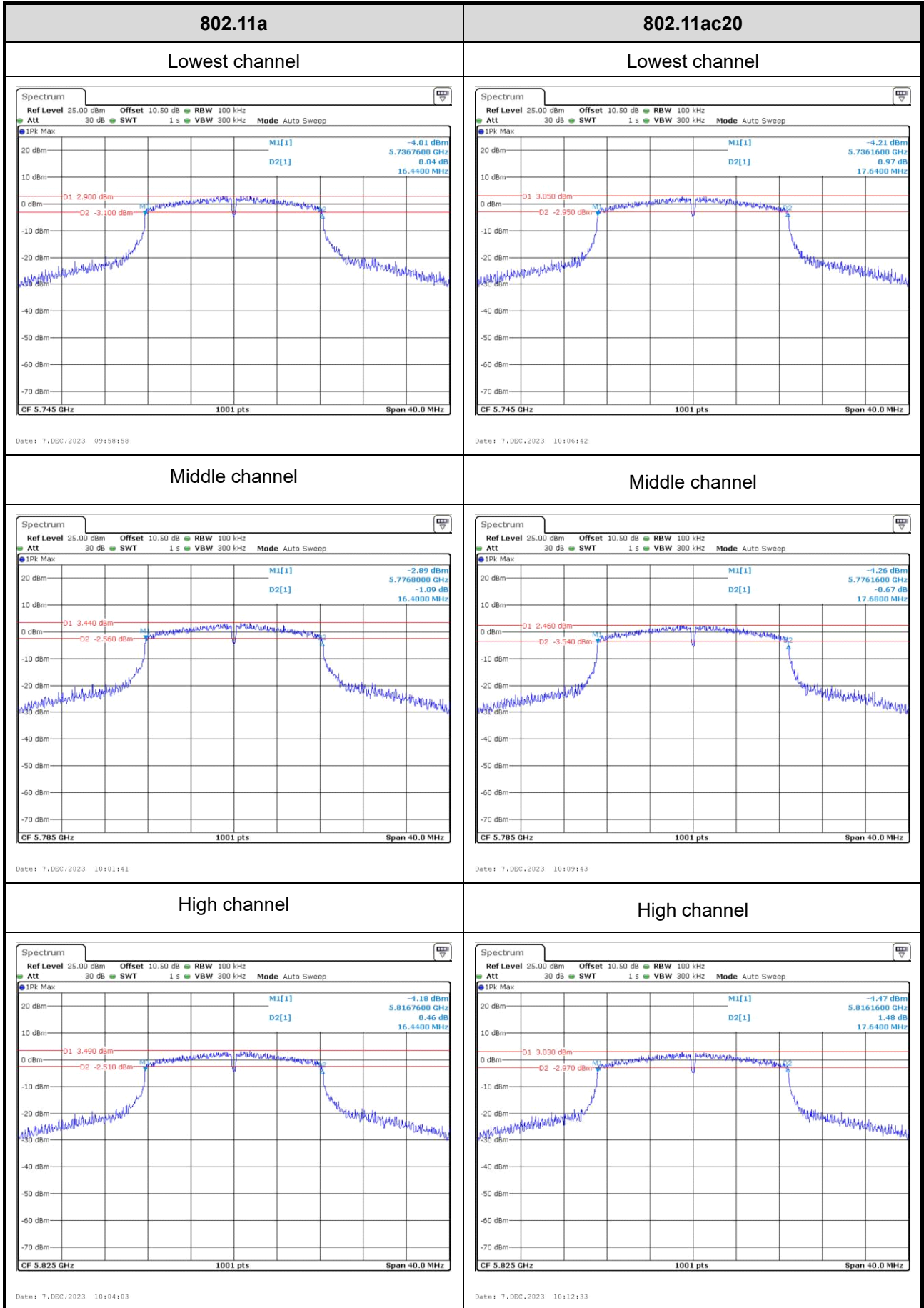


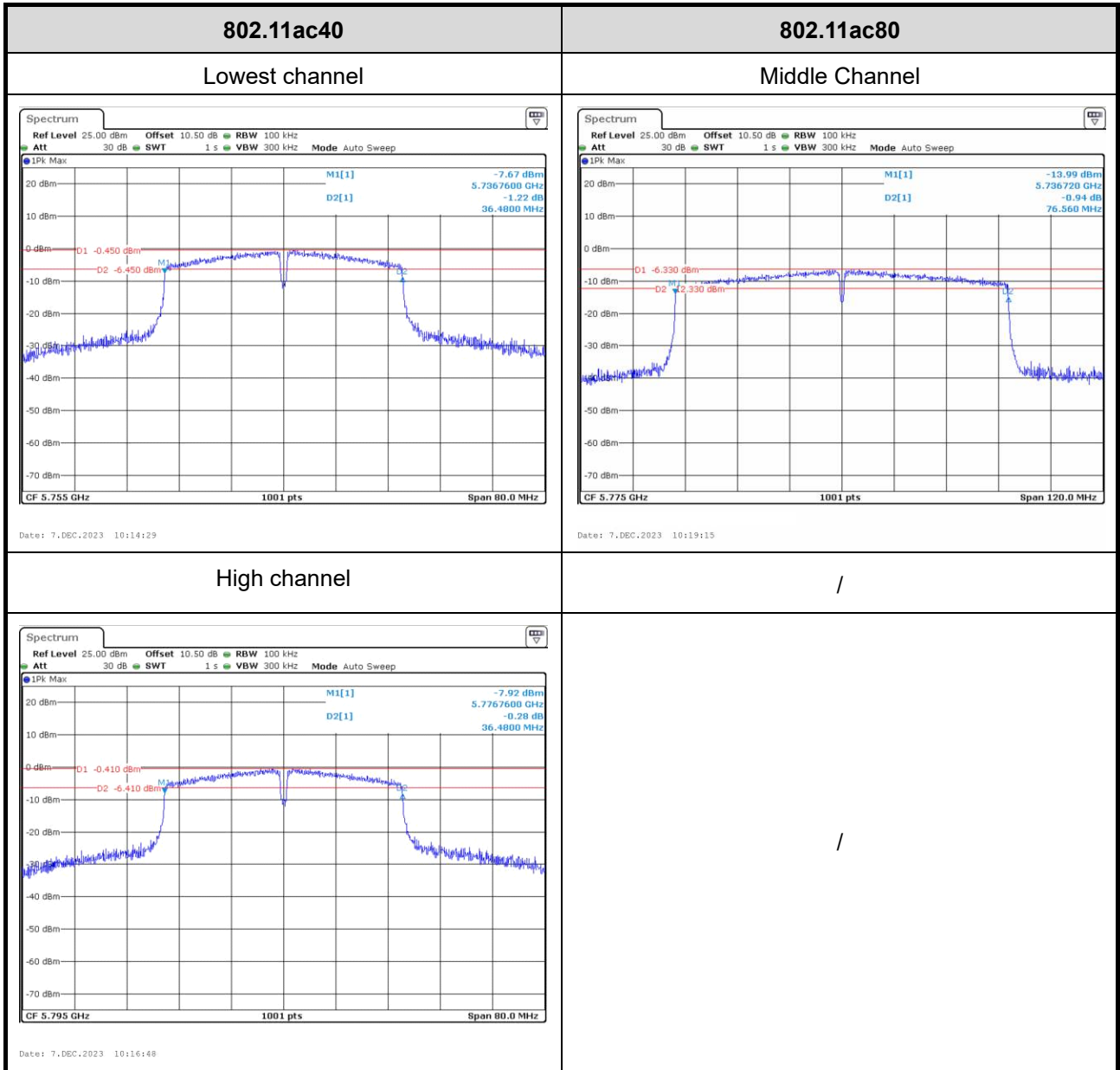
5725-5850MHz Band:





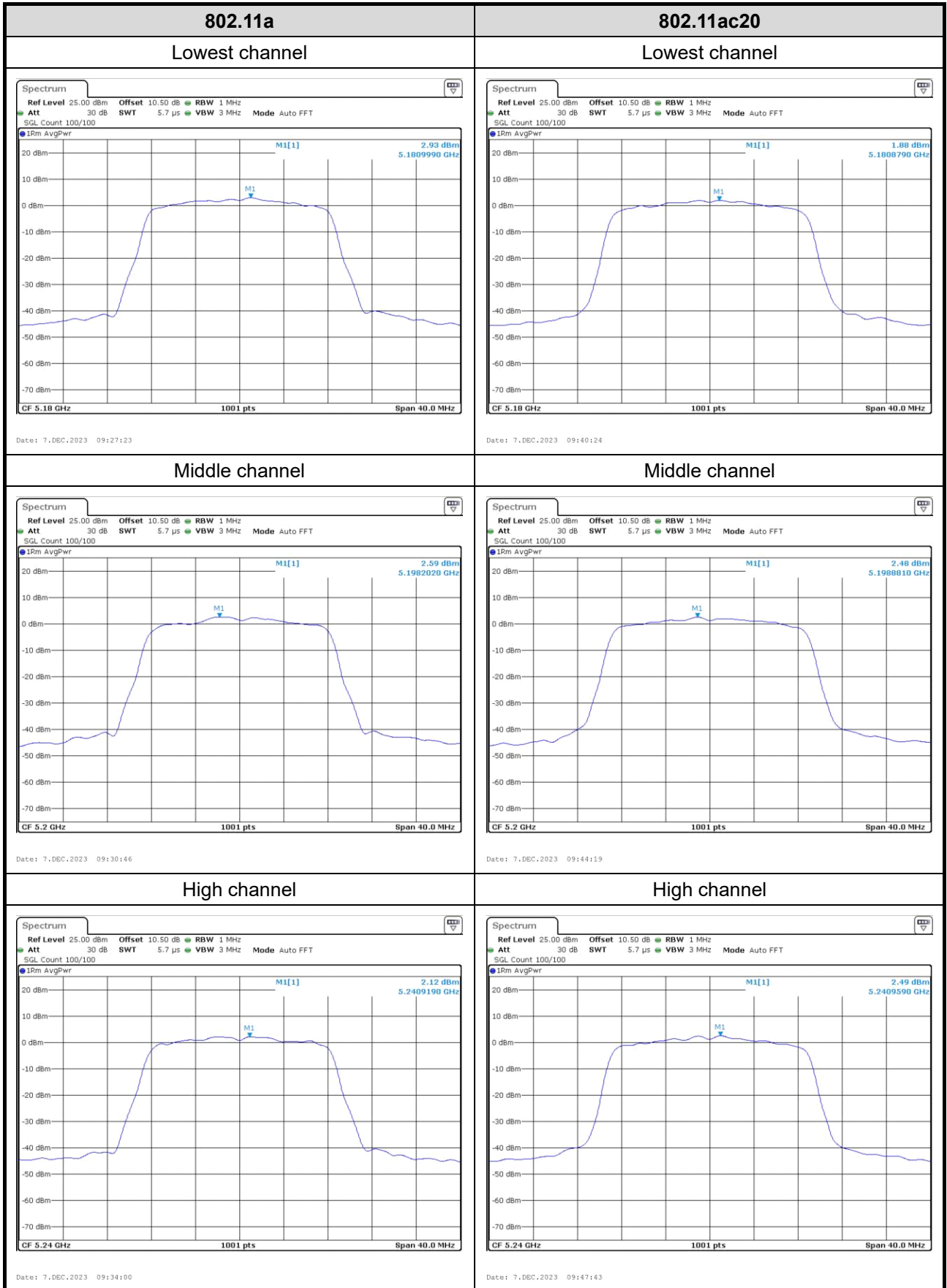
6dB Emission Bandwidth

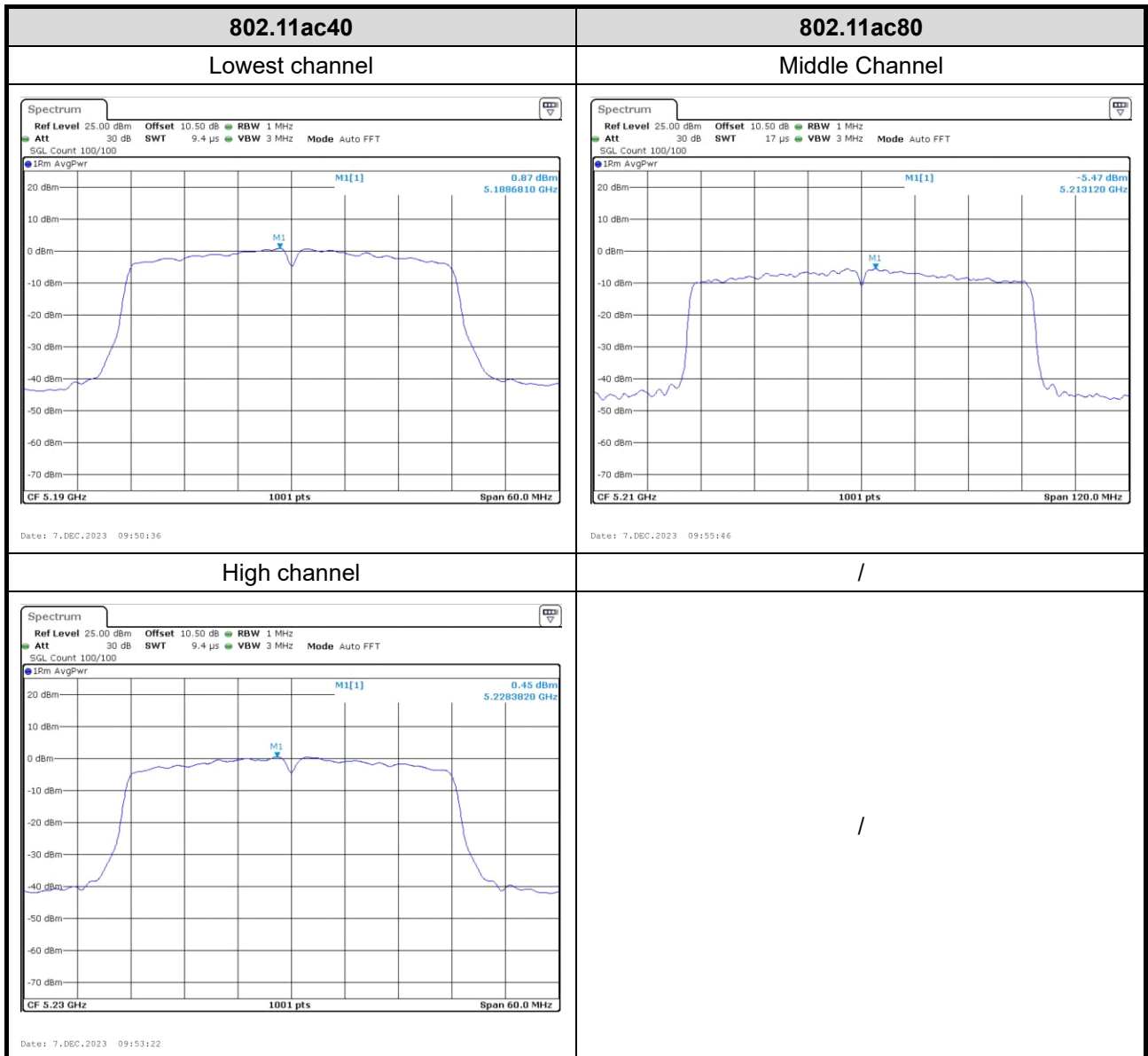




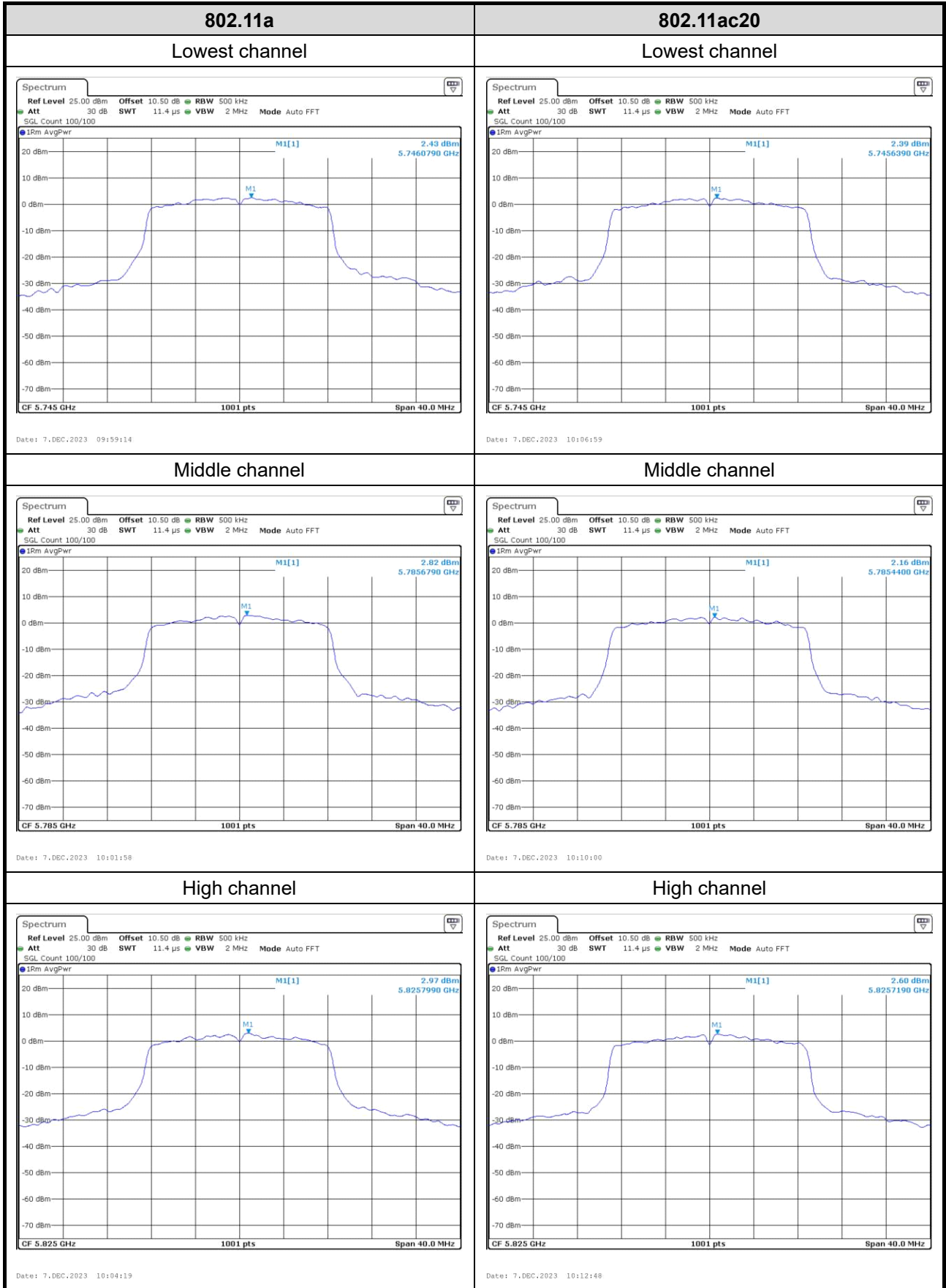
Power Spectral Density

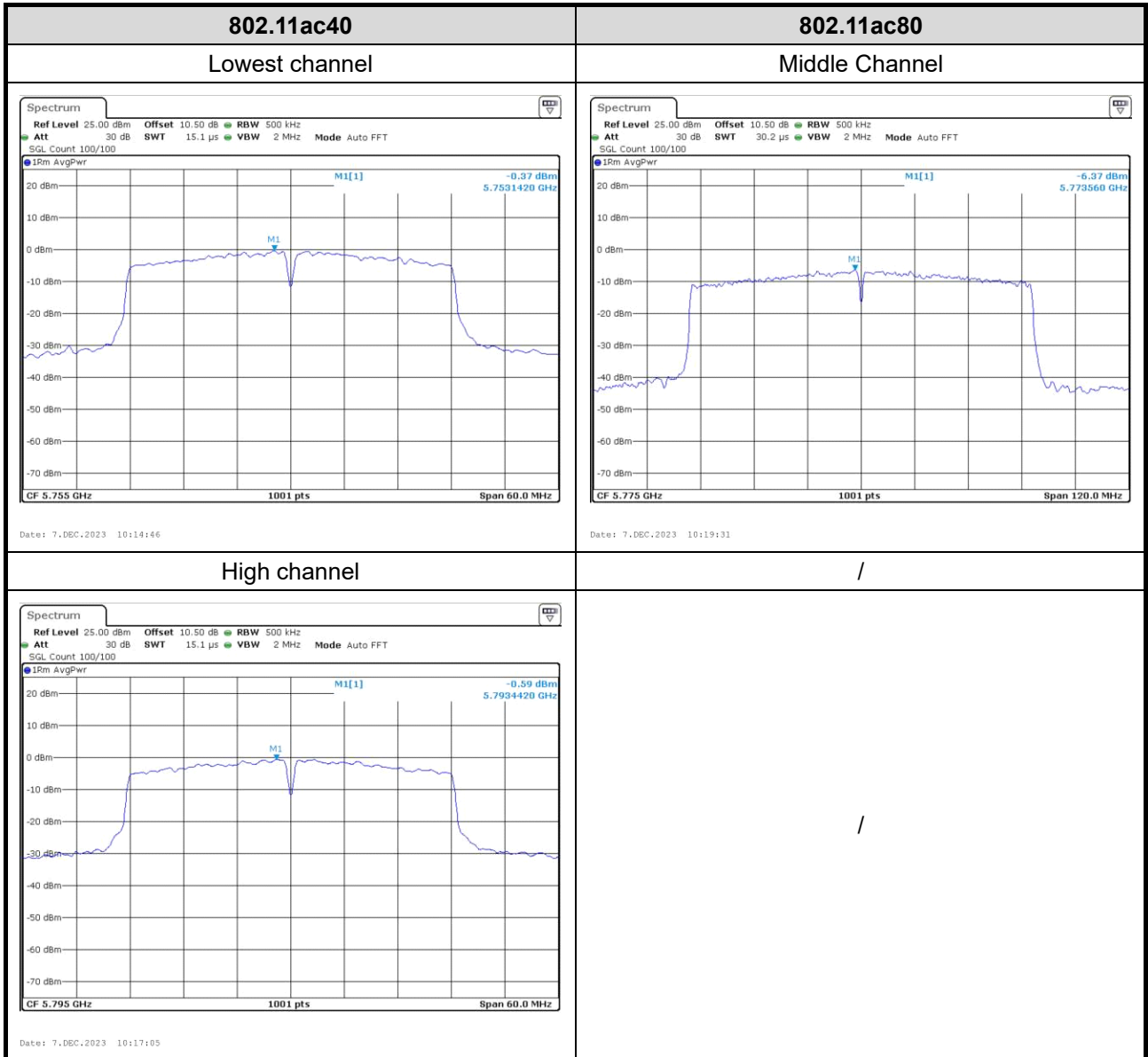
5150-5250MHz Band:



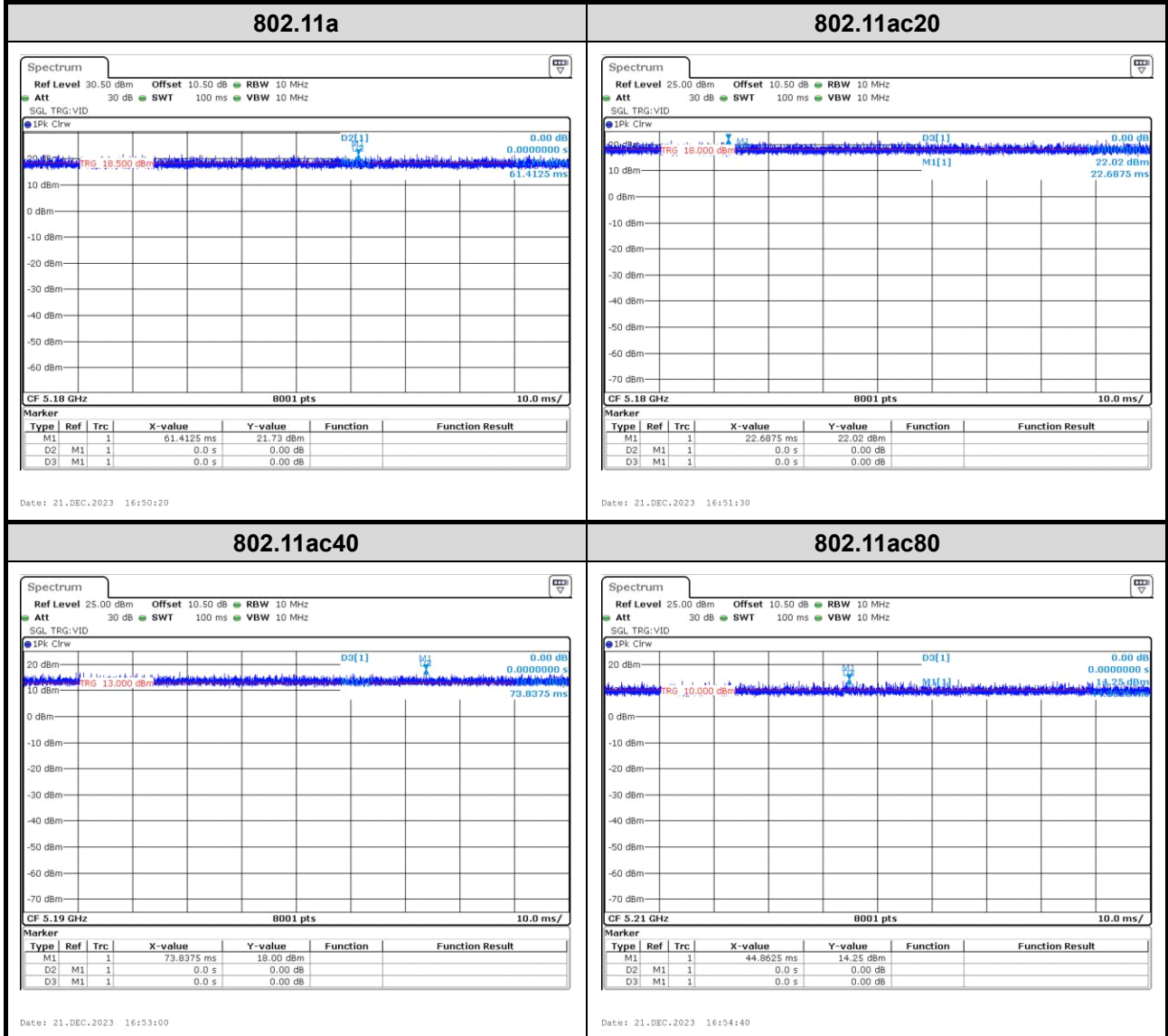


5725-5850MHz Band:





Duty Cycle



4 Test Setup Photo

Please refer to the attachment RWAY202300045 Test Setup photo.

5 E.U.T Photo

Please refer to the attachment RWAY202300045 External photo and RWAY202300045 Internal photo.

---End of Report---