

FCC Test Report

Report No.: RWAY202300049D
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 Tablet
Product Model: MT13
Multiple Models: N/A
Trade Mark: UMIDIGI
FCC ID: 2ATZ4-G3TABULTRA
Standards: FCC CFR Title 47 Part 15E (§15.407)
Test Date: 2023-11-22~2024-02-02
Test Result: Complied
Issue Date: 2024/2/2

Reviewed by:

Abel Chen

Approved by:

Jacob Kong

Abel Chen
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	2024-02-02	Original

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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 Tablet that contains Classic Bluetooth(BDR/EDR), BLE, 2.4G/5G WLAN, GSM/GPRS/WCDMA/LTE radios, this report covers the full testing of the 5G WLAN radio.

Sample Serial number	2Y-2 for CE&RE test, 2Y-1 for RF test conducted test (assigned by WATC)
Sample Received Date	2023-11-20
Sample Status	Good Condition
Frequency Range	5150 MHz - 5250MHz 5725 MHz - 5850MHz
Maximum Conducted Output Power	5150 MHz - 5250MHz: 13.09dBm 5725 MHz - 5850MHz: 12.35dBm
Modulation Technology	OFDM
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain [#]	5150 MHz - 5250MHz: 0.88dBi 5725 MHz - 5850MHz: 3.91dBi
Power Supply	DC 3.80V from Battery or 5V from Adapter
Adapter Information	Model: HJ-0502000W2-US Input: AC 100-240V~50/60Hz, 0.3A Output: DC 5V, 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 E, Equipment Class: DSS, FCC ID: 2ATZ4-G3TABULTRA
FCC Part 15, Subpart E, Equipment Class: DTS, FCC ID: 2ATZ4-G3TABULTRA
FCC Part 15, Subpart E, Equipment Class: PCB, FCC ID: 2ATZ4-G3TABULTRA

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 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. 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.)		

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@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 (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	14	14	14
802.11ac-HT20	MCS0	14	14	14
802.11ac-HT40	MCS0	14	14	14
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	14	14	14
802.11ac-HT20	MCS0	14	14	14
802.11ac-HT40	MCS0	14	14	14
802.11ac-VHT80	MCS0	14	14	14
The exercise software and the maximum power setting that provided by manufacturer.				

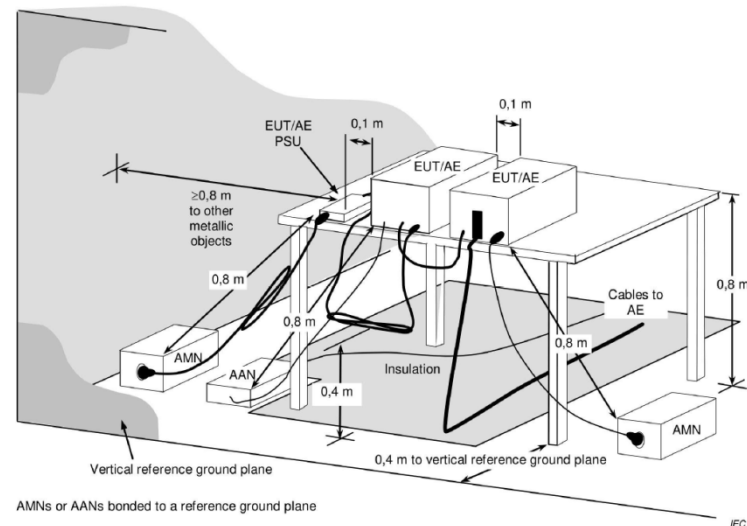
Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report
For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.
The ac vht20/ac vht40 were reduced test since the identical parameters with n-ht20/n-ht40.
For 802.11ax mode, the device only support full RU mode, not support partial RU mode.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

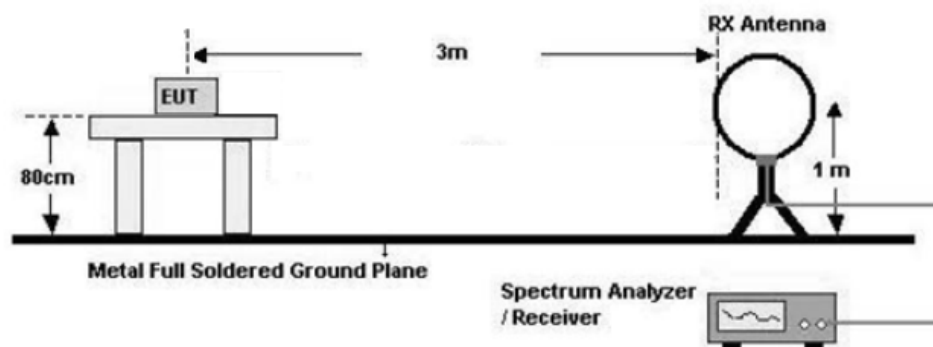
1) Conducted emission measurement:



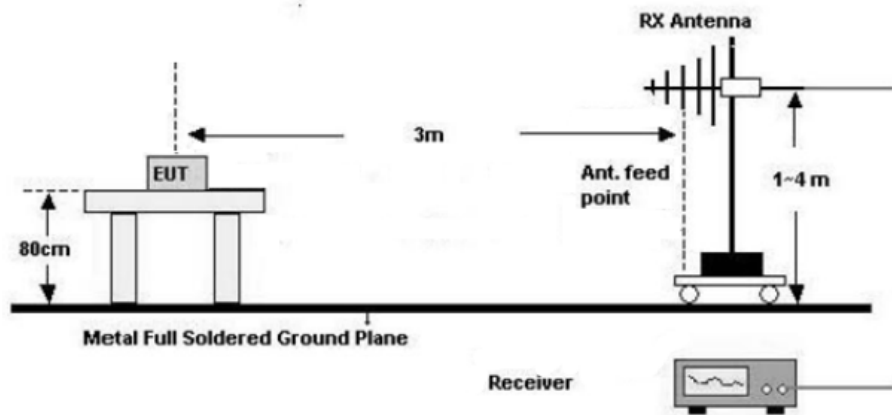
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

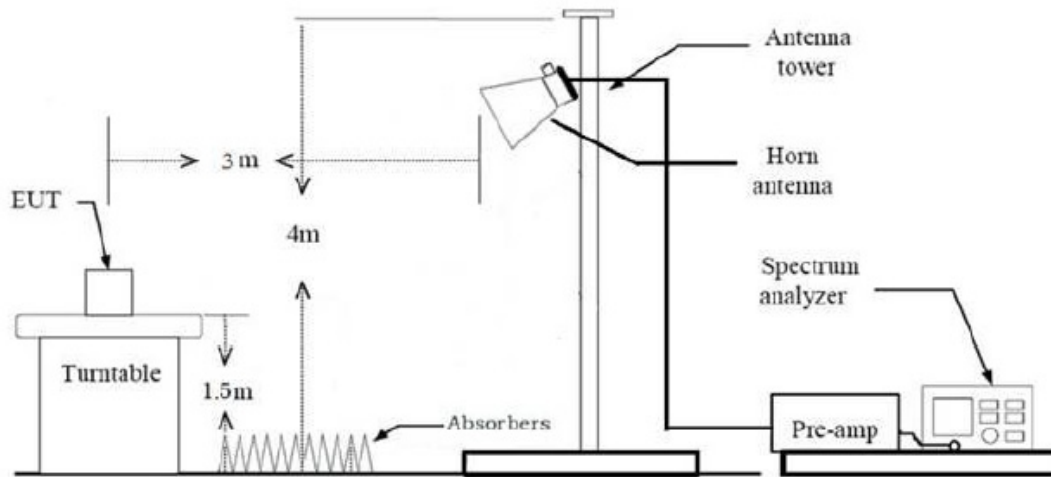
Below 30MHz (3m SAC)



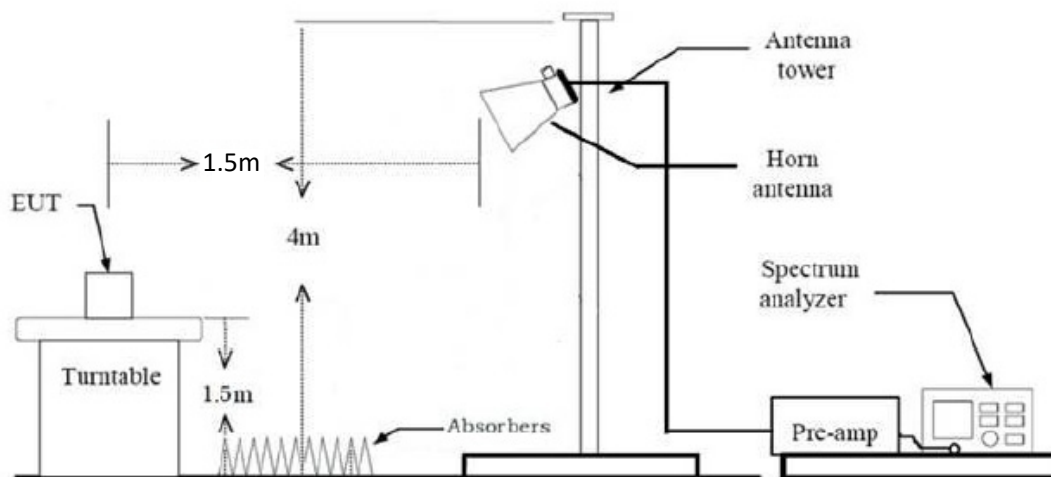
0MHz-1GHz (3m SAC)



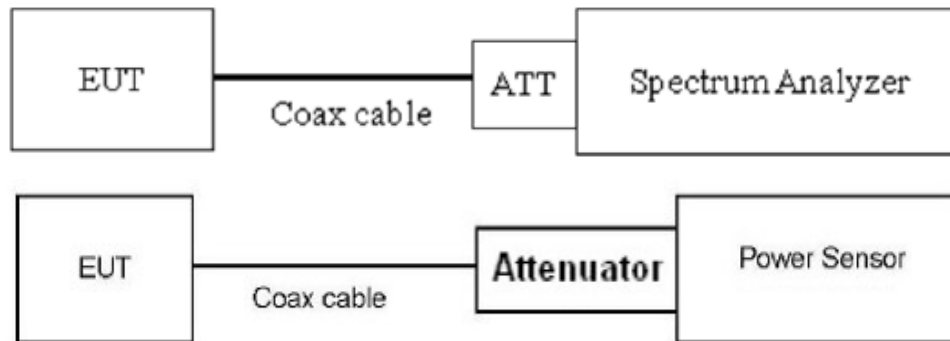
1GHz-18GHz(3m FAC)



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 10.0dB (including 10.0 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	2024/7/30
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	FSU	200982	2023/10/25	2024/10/24
ANRITSU	USB Power Sensor	MA24418A	12620	2023/7/12	2024/7/11
MARCONI	10dB Attenuator	1692595	2942	2023/10/25	2024/10/24

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

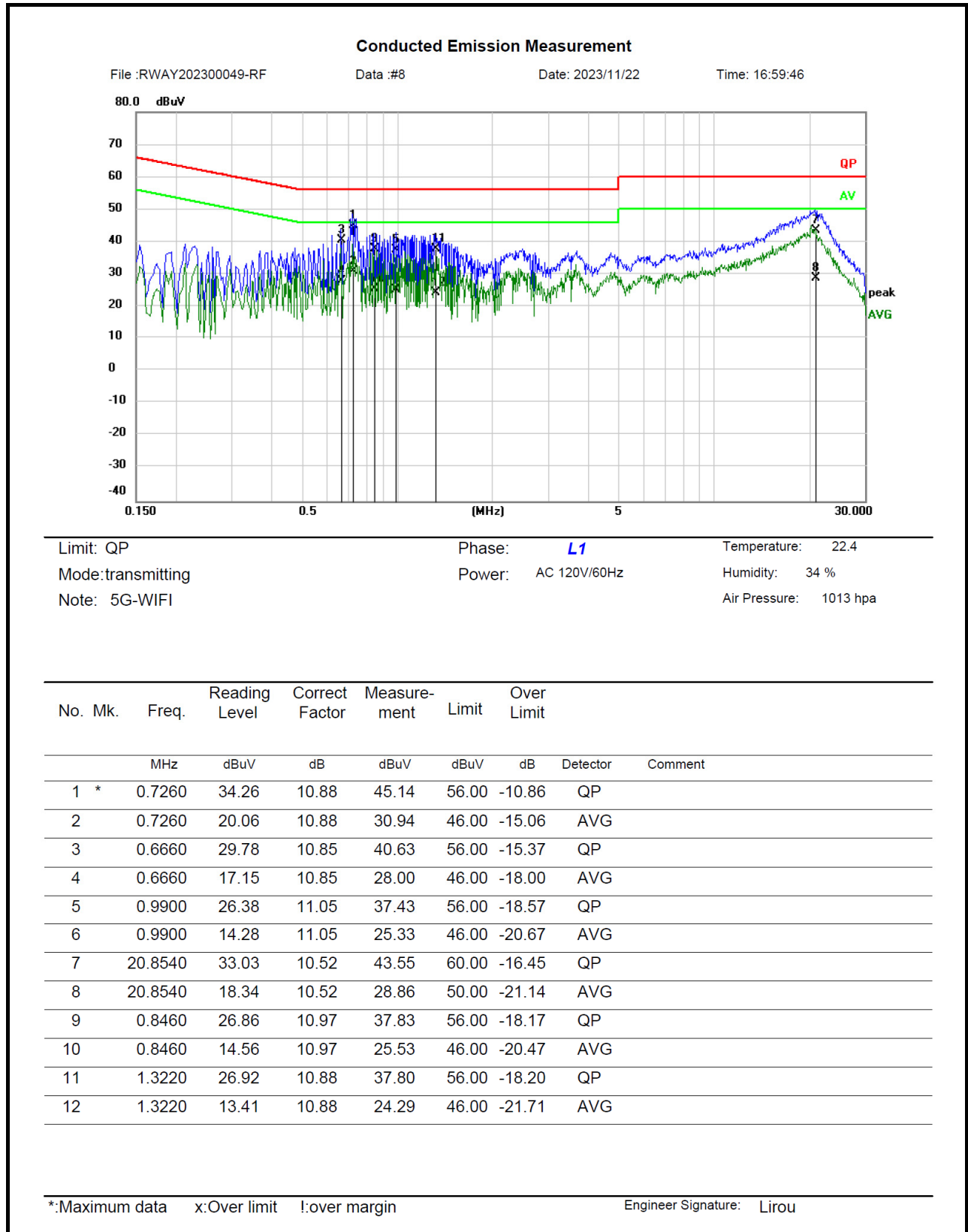
3.2 Limit

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	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209 For the band 5.150-5.250 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 the band 5.725-5.895 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.
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3.3 AC Line Conducted Emissions Test Data

Test Date:	2023-11-22	Test By:	Lirou Li
Environment condition:	Temperature: 22.4°C; Relative Humidity:34%; ATM Pressure: 101.3kPa		



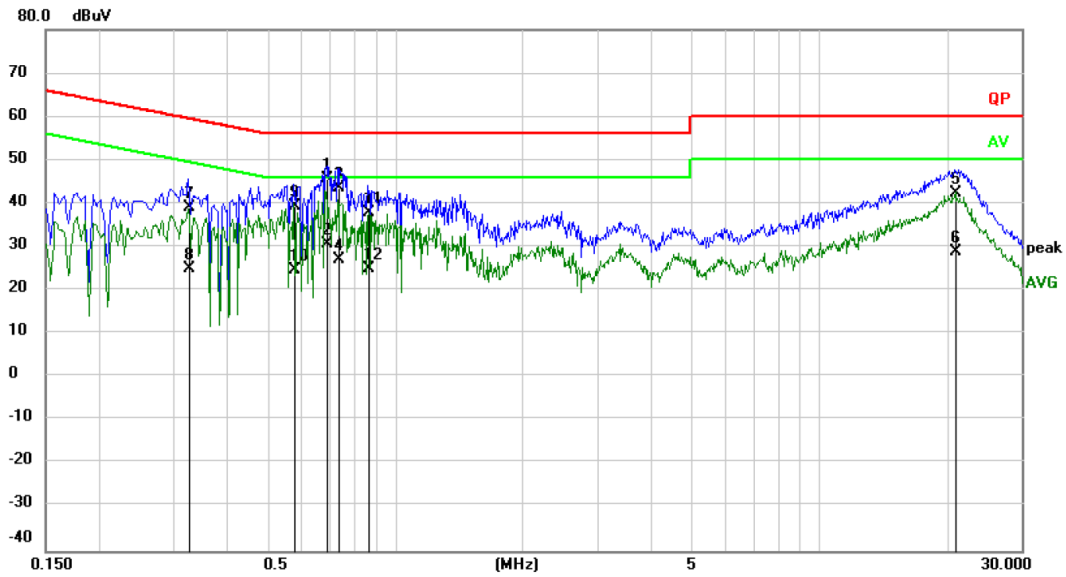
Conducted Emission Measurement

File :RWAY202300049-RF

Data :#7

Date: 2023/11/22

Time: 16:54:56



Limit: QP
Mode: transmitting
Note: 5G-WIFI

Phase: **N**
Power: AC 120V/60Hz

Temperature: 22.4
Humidity: 34 %
Air Pressure: 1013 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.6900	35.19	10.56	45.75	56.00	-10.25	QP	
2		0.6900	19.98	10.56	30.54	46.00	-15.46	AVG	
3		0.7340	33.03	10.57	43.60	56.00	-12.40	QP	
4		0.7340	16.39	10.57	26.96	46.00	-19.04	AVG	
5		20.9060	31.73	10.65	42.38	60.00	-17.62	QP	
6		20.9060	18.13	10.65	28.78	50.00	-21.22	AVG	
7		0.3260	28.62	10.57	39.19	59.55	-20.36	QP	
8		0.3260	14.33	10.57	24.90	49.55	-24.65	AVG	
9		0.5780	28.85	10.65	39.50	56.00	-16.50	QP	
10		0.5780	13.89	10.65	24.54	46.00	-21.46	AVG	
11		0.8660	27.26	10.63	37.89	56.00	-18.11	QP	
12		0.8660	14.38	10.63	25.01	46.00	-20.99	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

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:

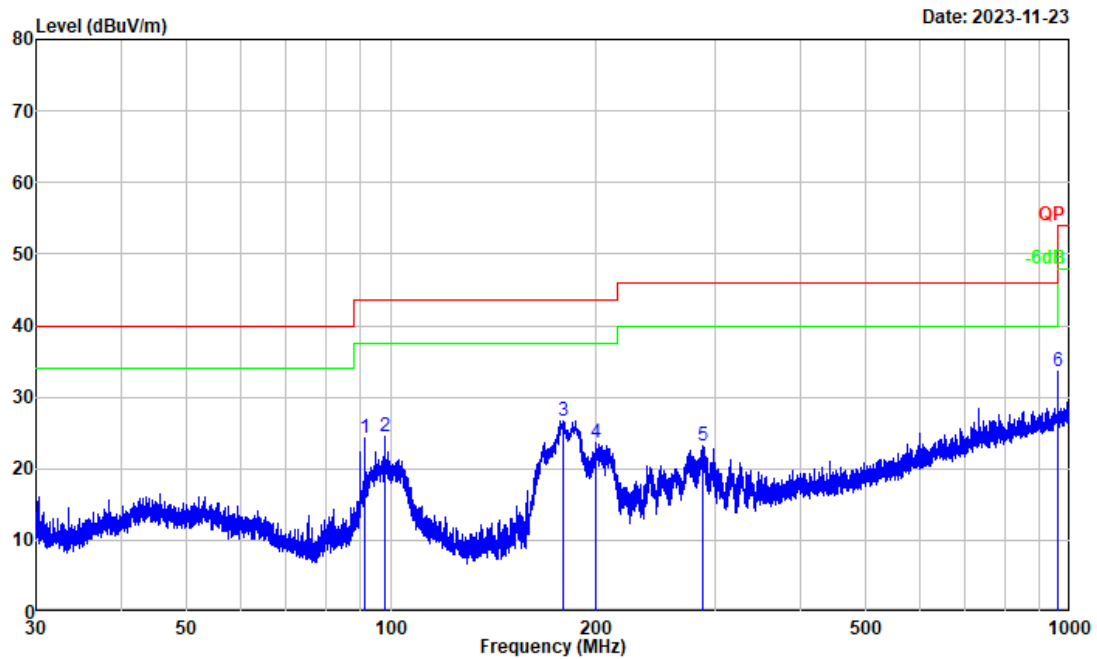
Test Date:	2023-11-23	Test By:	Luke Li
Environment condition:	Temperature: 25.0 C; Relative Humidity:53%; ATM Pressure: 101.0kPa		

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

30MHz-1GHz:

Test Date:	2023-11-23	Test By:	Luke Li
Environment condition:	Temperature: 25.0 C; Relative Humidity:53%; ATM Pressure: 101.0kPa		

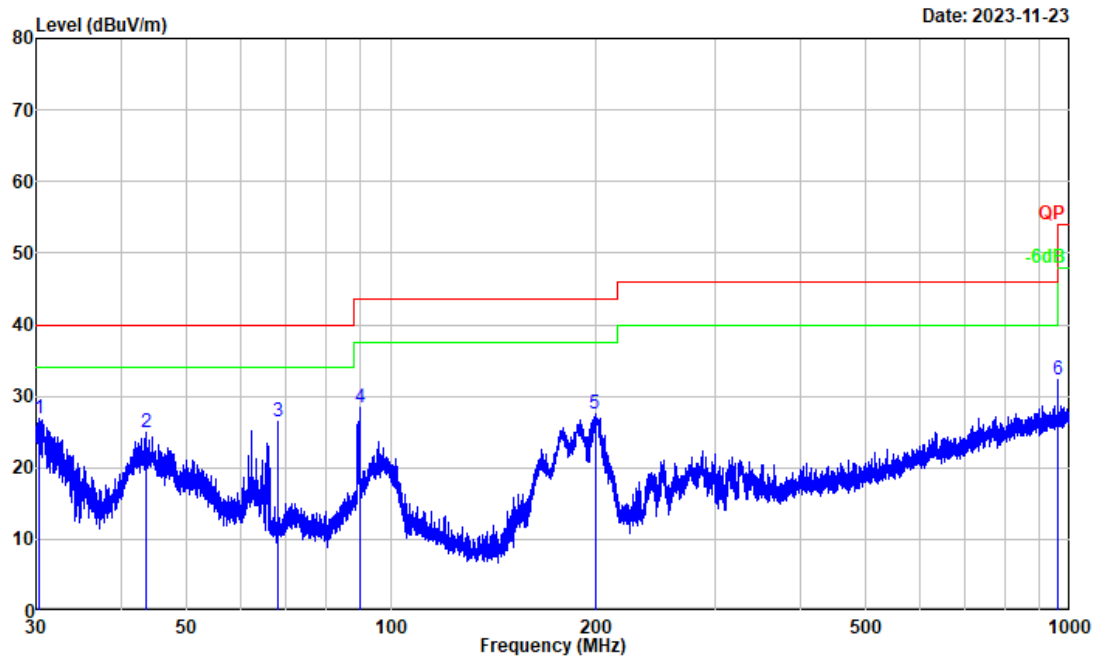
5150-5250MHz Band:



Project No. : RWAY202300049-RF
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 25.0°C/53%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 5.2G-WiFi

--No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
1	91.295	39.70	-15.43	24.27	43.50	-19.23	Peak
2	97.884	39.03	-14.50	24.53	43.50	-18.97	Peak
3	179.622	42.46	-15.71	26.75	43.50	-16.75	Peak
4	200.337	37.48	-13.81	23.67	43.50	-19.83	Peak
5	287.990	34.95	-11.65	23.30	46.00	-22.70	Peak
6	960.056	33.25	0.44	33.69	54.00	-20.31	Peak

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

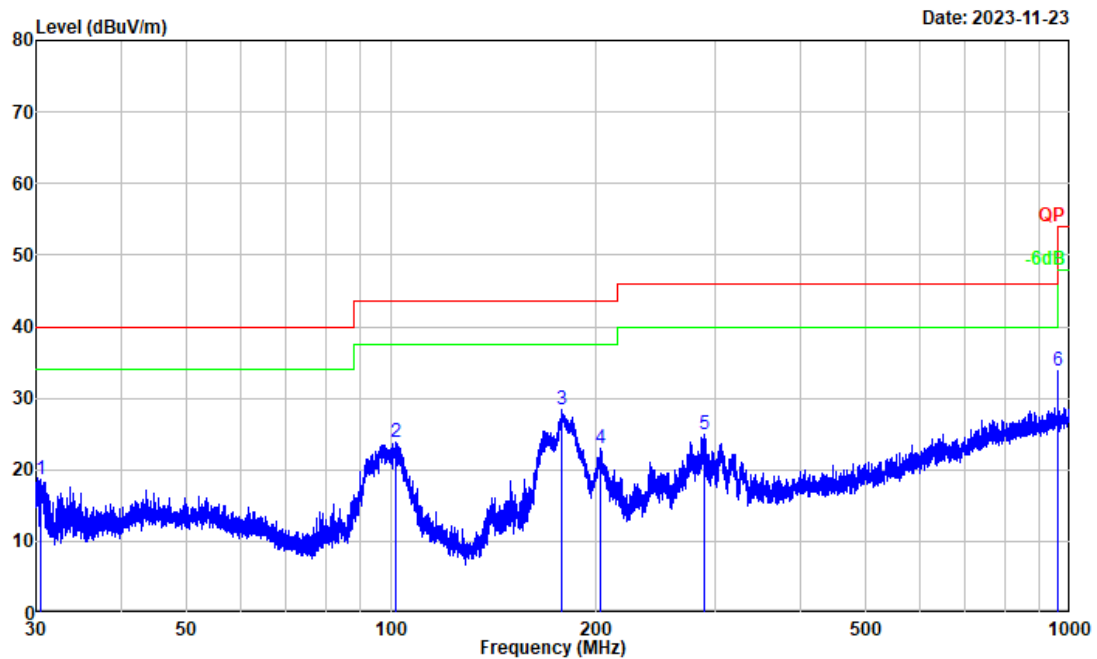


Project No. : RWAY202300049-RF
 Test Mode : Transmitting
 Test Voltage : AC 120V/60Hz
 Environment : 25.0°C/53%R.H./101.0kPa
 Tested by : Luke Li
 Polarization : vertical
 Remark : 5.2G-WiFi

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	30.264	41.93	-15.08	26.85	40.00	-13.15	Peak
2	43.601	37.27	-12.34	24.93	40.00	-15.07	Peak
3	68.122	42.01	-15.48	26.53	40.00	-13.47	Peak
4	89.984	44.11	-15.69	28.42	43.50	-15.08	Peak
5	199.635	41.31	-13.81	27.50	43.50	-16.00	Peak
6	960.056	31.93	0.44	32.37	54.00	-21.63	Peak

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

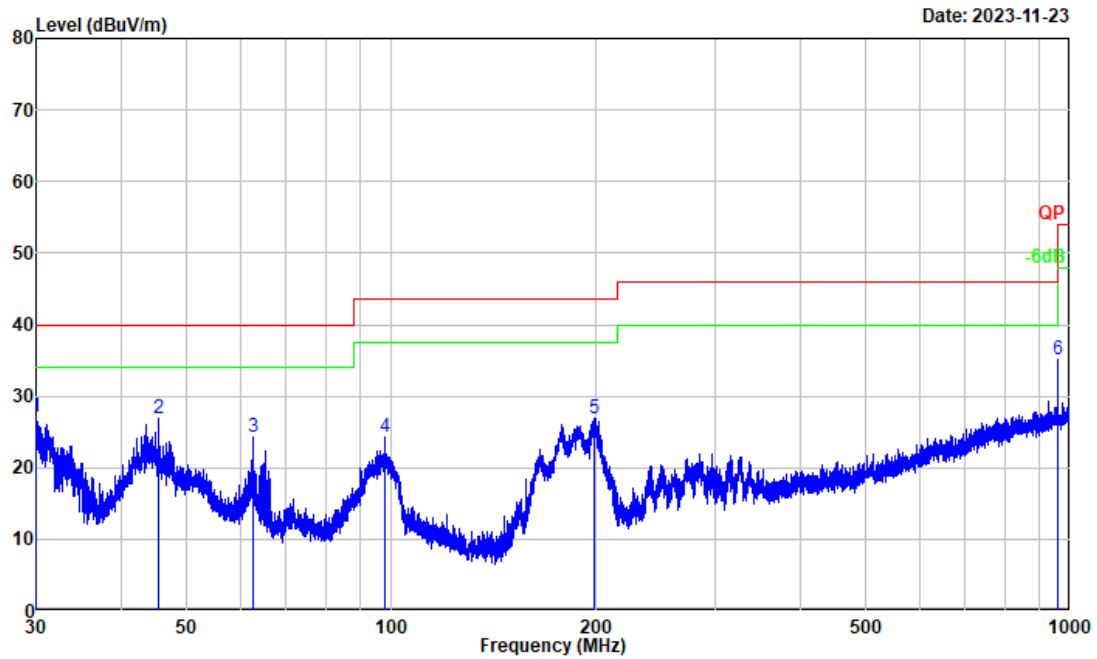
5725-5850MHz:



Project No. : RWAY202300049-RF
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 25.0°C/53%R.H./101.0kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 5.8G-WiFi

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	30.544	33.77	-15.17	18.60	40.00	-21.40	Peak
2	101.823	37.99	-14.09	23.90	43.50	-19.60	Peak
3	178.524	44.21	-15.76	28.45	43.50	-15.05	Peak
4	203.434	36.77	-13.81	22.96	43.50	-20.54	Peak
5	288.749	36.66	-11.64	25.02	46.00	-20.98	Peak
6	960.056	33.41	0.44	33.85	54.00	-20.15	Peak

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



Project No. : RWAY202300049-RF
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 25.0°C/53%R.H./101.0kPa
Tested by : Luke Li
Polarization : vertical
Remark : 5.8G-WiFi

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	30.026	42.09	-15.01	27.08	40.00	-12.92	Peak
2	45.375	39.01	-12.19	26.82	40.00	-13.18	Peak
3	62.486	38.22	-13.99	24.23	40.00	-15.77	Peak
4	97.713	38.82	-14.52	24.30	43.50	-19.20	Peak
5	198.936	40.79	-13.82	26.97	43.50	-16.53	Peak
6	960.056	34.59	0.44	35.03	54.00	-18.97	Peak

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

Remark:

Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Level – Limit

Above 1GHz:

Test Date:	2023-11-25	Test By:	Luke Li
Environment condition:	Temperature: 23.3°C; Relative Humidity:53%; ATM Pressure: 101.2kPa		

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	48.87	Horizontal	11.57	60.44	74	-13.56	Peak
5150	38.04	Horizontal	11.57	49.61	54	-4.39	Average
5150	48.36	Vertical	11.57	59.93	74	-14.07	Peak
5150	38.25	Vertical	11.57	49.82	54	-4.18	Average
10360	42.98	Horizontal	5.5	48.48	68.2	-19.72	Peak
10360	42.61	Vertical	5.5	48.11	68.2	-20.09	Peak
Middle Channel							
10400	47.74	Horizontal	5.7	53.44	68.2	-14.76	Peak
10400	46.43	Vertical	5.7	52.13	68.2	-16.07	Peak
High Channel							
5350	48.56	Horizontal	11.57	60.13	74	-13.87	Peak
5350	38.23	Horizontal	11.57	49.80	54	-4.20	Average
5350	48.37	Vertical	11.57	59.94	74	-14.06	Peak
5350	38.05	Vertical	11.57	49.62	54	-4.38	Average
10480	50.40	Horizontal	5.74	56.14	68.2	-12.06	Peak
10480	50.45	Vertical	5.74	56.19	68.2	-12.01	Peak
802.11n20							
Low Channel							
5150	48.62	Horizontal	11.57	60.19	74	-13.81	Peak
5150	38.98	Horizontal	11.57	50.55	54	-3.45	Average
5150	48.33	Vertical	11.57	59.9	74	-14.10	Peak
5150	38.25	Vertical	11.57	49.82	54	-4.18	Average
10360	50.81	Horizontal	5.5	56.31	68.2	-11.89	Peak
10360	50.36	Vertical	5.5	55.86	68.2	-12.34	Peak
Middle Channel							
10400	50.74	Horizontal	5.7	56.44	68.2	-11.76	Peak
10400	50.03	Vertical	5.7	55.73	68.2	-12.47	Peak
High Channel							
5350	48.89	Horizontal	11.57	60.46	74	-13.54	Peak

5350	38.46	Horizontal	11.57	50.03	54	-3.97	Average
5350	48.51	Vertical	11.57	60.08	74	-13.92	Peak
5350	38.27	Vertical	11.57	49.84	54	-4.16	Average
10480	49.74	Horizontal	5.74	55.48	68.2	-12.72	Peak
10480	50.59	Vertical	5.74	56.33	68.2	-11.87	Peak
802.11n40							
Low Channel							
5150	54.41	Horizontal	11.57	65.98	74	-8.02	Peak
5150	38.07	Horizontal	11.57	49.64	54	-4.36	Average
5150	53.55	Vertical	11.57	65.12	74	-8.88	Peak
5150	38.46	Vertical	11.57	50.03	54	-3.97	Average
10380	49.87	Horizontal	5.5	55.37	68.2	-12.83	Peak
10380	49.99	Vertical	5.5	55.49	68.2	-12.71	Peak
High Channel							
5350	48.89	Horizontal	11.57	60.46	74	-13.54	Peak
5350	38.46	Horizontal	11.57	50.03	54	-3.97	Average
5350	48.51	Vertical	11.57	60.08	74	-13.92	Peak
5350	38.27	Vertical	11.57	49.84	54	-4.16	Average
10460	50.12	Horizontal	5.73	55.85	68.2	-12.35	Peak
10460	50.30	Vertical	5.73	56.03	68.2	-12.17	Peak
802.11ac80							
Low Channel							
5150	49.34	Horizontal	11.57	60.91	74	-13.09	Peak
5150	38.41	Horizontal	11.57	49.98	54	-4.02	Average
5150	48.84	Vertical	11.57	60.41	74	-13.59	Peak
5150	38.58	Vertical	11.57	50.15	54	-3.85	Average
5350	48.58	Horizontal	11.57	60.15	74	-13.85	Peak
5350	38.46	Horizontal	11.57	50.03	54	-3.97	Average
5350	48.37	Vertical	11.57	59.94	74	-14.06	Peak
5350	38.25	Vertical	11.57	49.82	54	-4.18	Average
10420	50.34	Horizontal	5.71	56.05	68.2	-12.15	Peak
10420	50.47	Vertical	5.71	56.18	68.2	-12.02	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

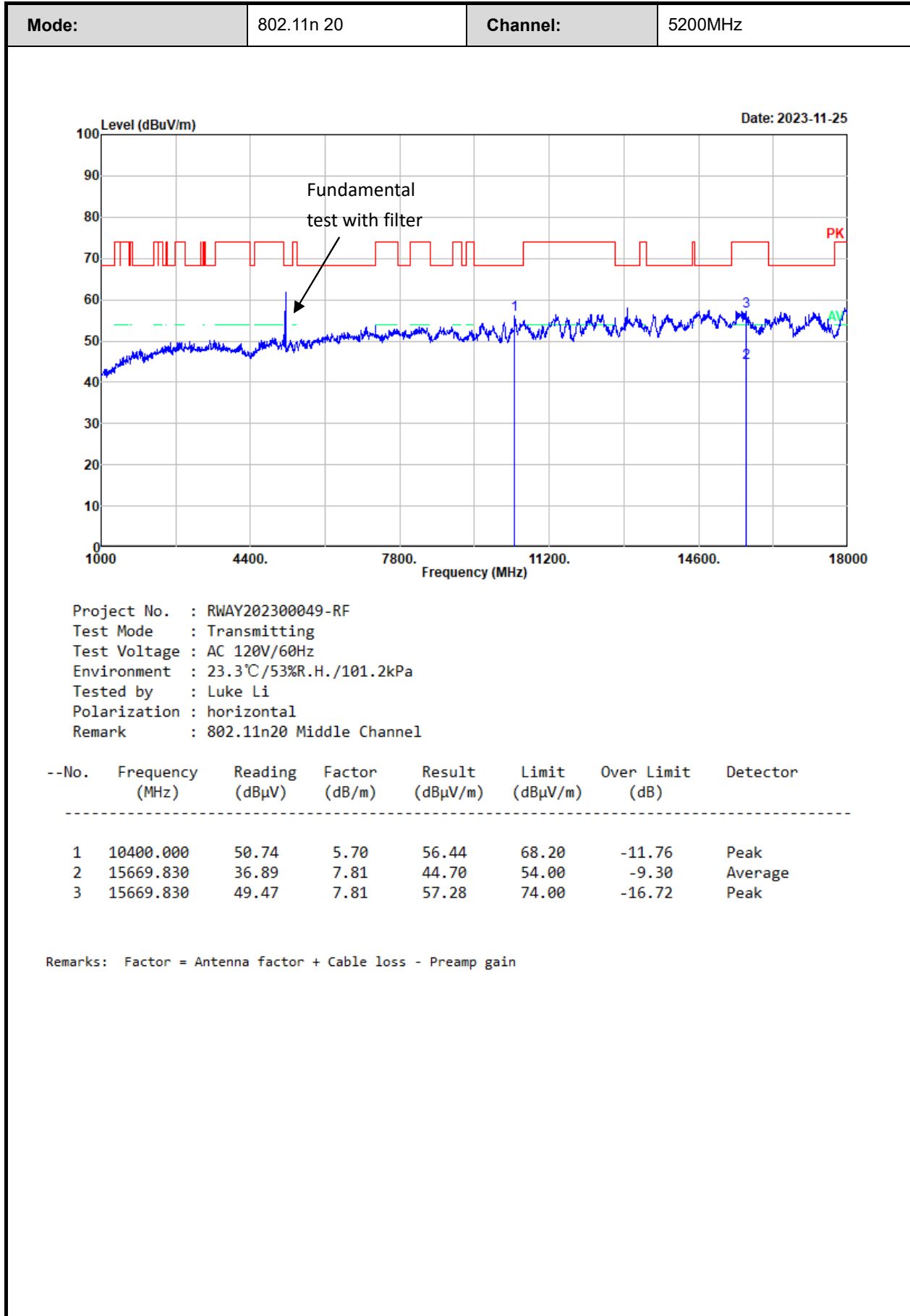
Corrected Factor = Antenna factor + Cable loss – Amplifier gain

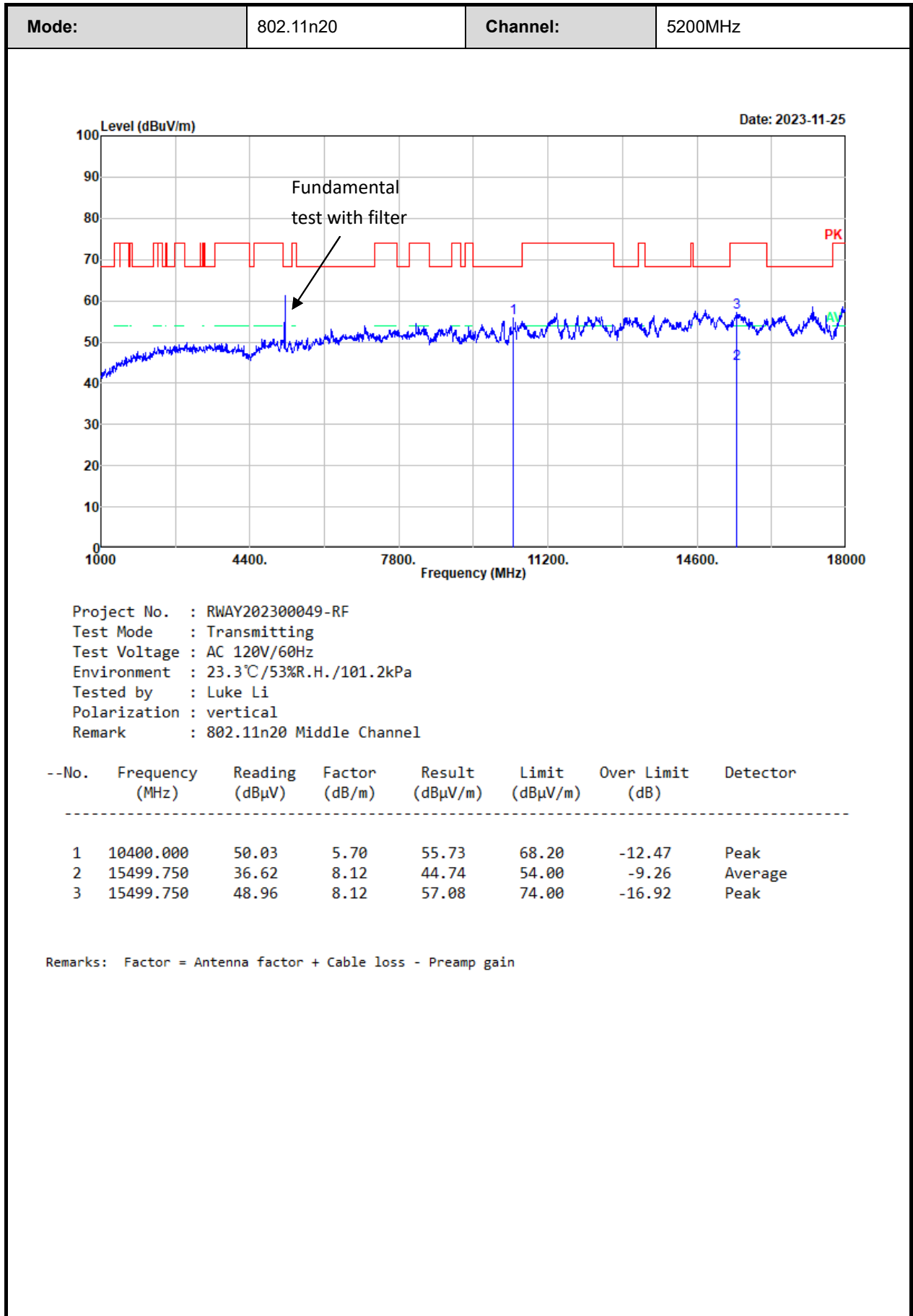
Margin = Corrected Amplitude – Limit

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:





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	48.75	Horizontal	11.9	60.65	68.2	-7.55	Peak
5700	48.84	Horizontal	12	60.84	105.2	-44.36	Peak
5720	59.75	Horizontal	12.03	71.78	110.8	-39.02	Peak
5725	67.14	Horizontal	12.03	79.17	122.2	-43.03	Peak
5650	48.56	Vertical	11.9	60.46	68.2	-7.74	Peak
5700	48.23	Vertical	12	60.23	105.2	-44.97	Peak
5720	58.29	Vertical	12.03	70.32	110.8	-40.48	Peak
5725	65.58	Vertical	12.03	77.61	122.2	-44.59	Peak
11490	50.07	horizontal	6.46	56.53	74	-17.47	Peak
11490	38.66	horizontal	6.46	45.12	54	-8.88	Average
11490	50.79	vertical	6.46	57.25	74	-16.75	Peak
11490	38.98	vertical	6.46	45.44	54	-8.56	Average
Middle Channel							
11570	50.52	horizontal	6.52	57.04	74	-16.96	Peak
11570	38.06	horizontal	6.52	44.58	54	-9.42	Average
11570	50.27	vertical	6.52	56.79	74	-17.21	Peak
11570	38.83	vertical	6.52	45.35	54	-8.65	Average
High Channel							
5850	52.04	Horizontal	12.31	67.83	122.2	-57.85	Peak
5855	52.65	Horizontal	12.32	64.36	105.2	-40.23	Peak
5875	48.70	Horizontal	12.39	61.10	110.8	-49.71	Peak
5925	48.15	Horizontal	12.43	58.54	68.2	-7.62	Peak
5850	58.58	Vertical	12.31	66.48	122.2	-51.31	Peak
5855	57.47	Vertical	12.32	63.15	105.2	-35.41	Peak
5875	52.87	Vertical	12.39	60.27	110.8	-45.54	Peak
5925	48.90	Vertical	12.43	61.33	68.2	-6.87	Peak
11650	50.82	horizontal	6.55	57.37	74	-16.63	Peak
11650	38.30	horizontal	6.55	44.85	54	-9.15	Average
11650	50.59	vertical	6.55	57.14	74	-16.86	Peak
11650	39.04	vertical	6.55	45.59	54	-8.41	Average
802.11n20							
Low Channel							
5650	48.70	Horizontal	11.9	64.35	68.2	-57.85	Peak
5700	48.15	Horizontal	12	64.97	105.2	-40.23	Peak

5720	58.58	Horizontal	12.03	61.09	110.8	-49.71	Peak
5725	57.47	Horizontal	12.03	60.58	122.2	-7.62	Peak
5650	52.87	Vertical	11.9	70.89	68.2	-51.31	Peak
5700	48.80	Vertical	12	69.79	105.2	-35.41	Peak
5720	50.82	Vertical	12.03	65.26	110.8	-45.54	Peak
5725	38.30	Vertical	12.03	61.23	122.2	-6.97	Peak
11490	48.14	horizontal	6.46	54.60	74	-19.40	Peak
11490	38.80	horizontal	6.46	45.26	54	-8.74	Average
11490	48.73	vertical	6.46	55.33	74	-18.67	Peak
11490	38.54	vertical	6.46	45.01	54	-8.99	Average
Middle Channel							
11570	49.81	horizontal	6.52	56.33	74	-17.67	Peak
11570	38.18	horizontal	6.52	44.70	54	-9.30	Average
11570	50.40	vertical	6.52	56.92	74	-17.08	Peak
11570	38.92	vertical	6.52	44.44	54	-8.56	Average
High Channel							
5850	57.23	Horizontal	12.31	69.54	122.2	-52.66	Peak
5855	54.29	Horizontal	12.32	66.61	105.2	-38.59	Peak
5875	49.66	Horizontal	12.39	62.05	110.8	-48.75	Peak
5925	48.34	Horizontal	12.43	60.77	68.2	-7.43	Peak
5850	55.81	Vertical	12.31	68.12	122.2	-54.08	Peak
5855	52.94	Vertical	12.32	65.26	105.2	-39.94	Peak
5875	48.64	Vertical	12.39	61.03	110.8	-49.77	Peak
5925	46.12	Vertical	12.43	58.55	68.2	-9.65	Peak
11650	50.98	horizontal	6.55	57.53	74	-16.47	Peak
11650	38.39	horizontal	6.55	44.94	54	-9.06	Average
11650	50.73	vertical	6.55	57.28	74	-16.72	Peak
11650	38.15	vertical	6.55	44.70	54	-9.30	Average
802.11n40							
Low Channel							
5650.00	48.56	Horizontal	11.9	60.46	68.2	-7.74	Peak
5700.00	54.63	Horizontal	12	66.63	105.2	-38.57	Peak
5720.00	65.74	Horizontal	12.03	77.77	110.8	-33.03	Peak
5725.00	68.51	Horizontal	12.03	80.54	122.2	-41.66	Peak
5650.00	48.35	Vertical	11.9	60.25	68.2	-7.95	Peak
5700.00	53.18	Vertical	12	65.18	105.2	-40.02	Peak
5720.00	64.33	Vertical	12.03	76.36	110.8	-34.44	Peak
5725.00	67.04	Vertical	12.03	79.07	122.2	-43.13	Peak

11510	49.67	horizontal	6.48	56.15	74	-17.85	Peak
11510	38.72	horizontal	6.48	45.20	54	-8.80	Average
11510	50.38	vertical	6.48	56.86	74	-17.14	Peak
11510	38.49	vertical	6.48	44.97	54	-9.03	Average
High Channel							
5850	53.56	Horizontal	12.31	65.87	122.2	-56.33	Peak
5855	50.46	Horizontal	12.32	62.78	105.2	-42.42	Peak
5875	48.95	Horizontal	12.39	61.34	110.8	-49.46	Peak
5925	48.70	Horizontal	12.43	61.13	68.2	-7.07	Peak
5850	52.44	Vertical	12.31	64.75	122.2	-57.45	Peak
5855	49.49	Vertical	12.32	61.81	105.2	-43.39	Peak
5875	48.24	Vertical	12.39	60.63	110.8	-50.17	Peak
5925	48.47	Vertical	12.43	60.9	68.2	-7.30	Peak
11590	50.32	horizontal	6.53	56.85	74	-17.15	Peak
11590	38.37	horizontal	6.53	44.90	54	-9.10	Average
11590	50.06	vertical	6.53	56.59	74	-17.41	Peak
11590	38.15	vertical	6.53	44.68	54	-9.32	Average
802.11ac80							
Low Channel							
5650	53.14	Horizontal	11.9	65.04	68.2	-3.16	Peak
5700	63.50	Horizontal	12	75.50	105.2	-29.70	Peak
5720	66.08	Horizontal	12.03	78.11	110.8	-32.69	Peak
5725	68.60	Horizontal	12.03	80.63	122.2	-41.57	Peak
5650	52.06	Vertical	11.9	63.96	68.2	-4.24	Peak
5700	62.12	Vertical	12	74.12	105.2	-31.08	Peak
5720	64.62	Vertical	12.03	76.65	110.8	-34.15	Peak
5725	67.24	Vertical	12.03	79.27	122.2	-42.93	Peak
5850	61.05	Horizontal	12.31	73.36	122.2	-48.84	Peak
5855	58.96	Horizontal	12.32	71.28	105.2	-33.92	Peak
5875	54.75	Horizontal	12.39	67.14	110.8	-43.66	Peak
5925	48.50	Horizontal	12.43	60.93	68.2	-7.27	Peak
5850	59.86	Vertical	12.31	72.17	122.2	-50.03	Peak
5855	57.63	Vertical	12.32	69.95	105.2	-35.25	Peak
5875	53.25	Vertical	12.39	65.64	110.8	-45.16	Peak
5925	48.27	Vertical	12.43	60.7	68.2	-7.50	Peak
11550	50.49	horizontal	6.5	56.99	74	-17.01	Peak
11550	38.12	horizontal	6.5	44.62	54	-9.38	Average
11550	50.20	vertical	6.5	56.70	74	-17.30	Peak

11550	38.88	vertical	6.5	45.38	54	-8.62	Average
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Remark:

Corrected Amplitude= Reading level + corrected Factor

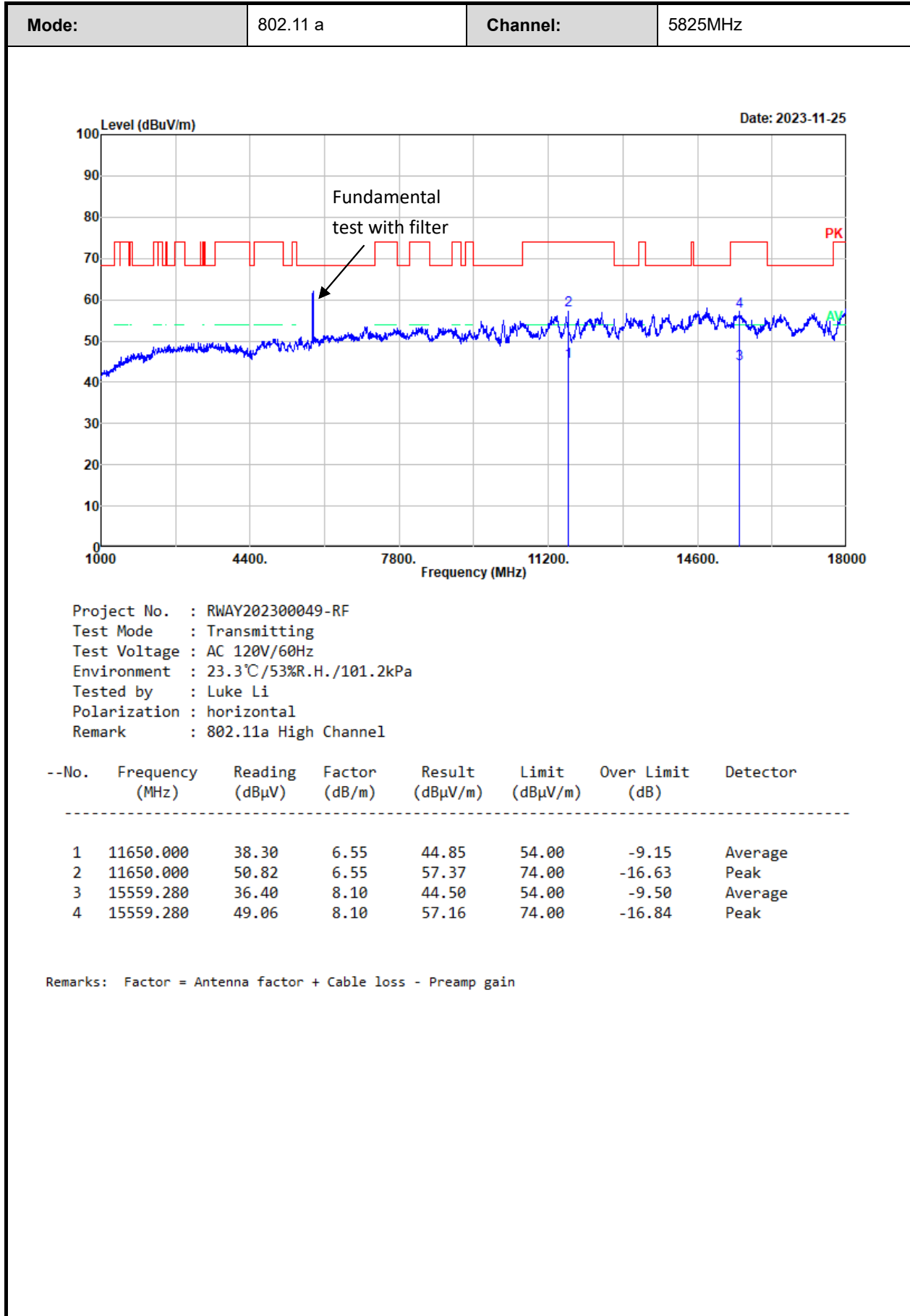
Corrected Factor = Antenna factor + Cable loss – Amplifier gain

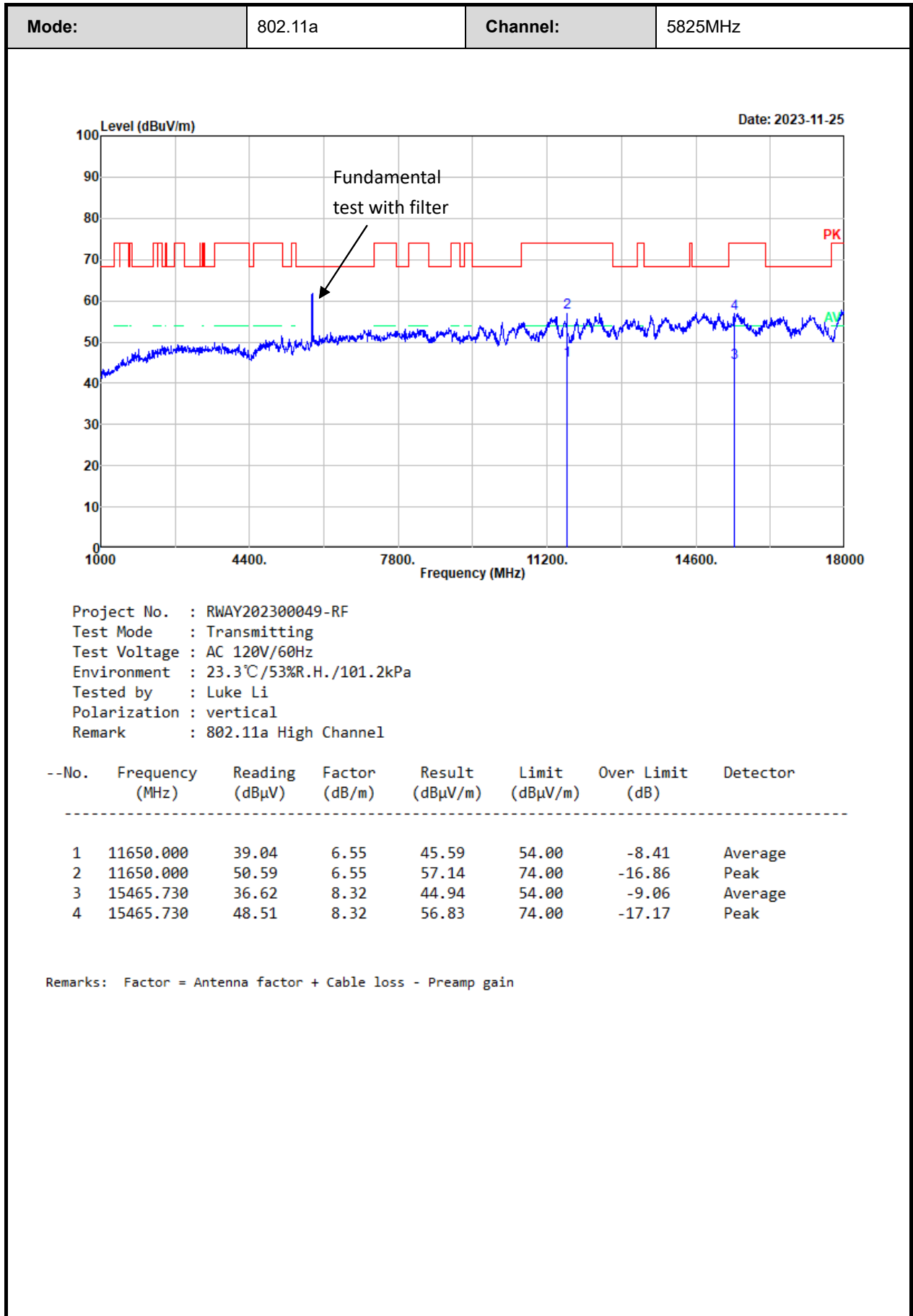
Margin = Corrected Amplitude – Limit

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:





3.5 RF Conducted Test Data

Test Date:	2023-12-06~2024-02-02	Test By:	Ryan Zhang
Environment condition:	Temperature: 23.9~24.5°C; Relative Humidity: 55~68%; ATM Pressure: 99~102.1kPa		

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

5150-5250MHz

Test Modes	Antenna	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	Ant1	5180	20.46	16.88
		5200	20.64	17
		5240	20.64	17.04
802.11n ht20	Ant1	5180	20.82	17.84
		5200	20.7	17.84
		5240	20.76	17.84
802.11n ht40	Ant1	5190	41.52	36.32
		5230	41.44	36.32
802.11ac80	Ant1	5210	81.92	75.52

Note: the device not operate with any part of OBW fall within U-NII 2A Band.

5725-5850MHz

Test Modes	Antenna	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6dB BW Limit (MHz)	Verdict
802.11a	Ant1	5745	16.4	17.04	0.5	pass
		5785	16.4	17	0.5	pass
		5825	16.4	17.04	0.5	pass
802.11n ht20	Ant1	5745	17.64	17.88	0.5	pass
		5785	17.68	17.92	0.5	pass
		5825	17.68	17.92	0.5	pass
802.11n ht40	Ant1	5755	36.48	36.32	0.5	pass
		5795	36	36.4	0.5	pass
802.11n ht80	Ant1	5775	76.56	75.52	0.5	pass

Note: the device not operate with any part of OBW fall within U-NII 2C Band.

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	13.09	24	pass
	5200	11.59	24	pass
	5240	12.35	24	pass
802.11n ht20	5180	12.67	24	pass
	5200	11.92	24	pass
	5240	11.73	24	pass
802.11n ht40	5190	12	24	pass
	5230	11.52	24	pass
802.11ac80	5210	11.77	24	pass

5725-5850MHz

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)		Verdict
		Result	Limit	
802.11a	5745	11.47	30	pass
	5785	11.58	30	pass
	5825	12.35	30	pass
802.11n ht20	5745	11.3	30	pass
	5785	11.47	30	pass
	5825	11.23	30	pass
802.11n ht40	5755	11.3	30	pass
	5795	11.45	30	pass
802.11n ht80	5775	11.04	30	pass

3.5.3 Power Spectral Density

5150-5250MHz

Test Modes	Test Frequency (MHz)	Reading (dBm/MHz)	Duty Cycle Factor (dB)	Maximum Power Spectral Density (dBm/MHz)		Verdict
				Result	Limit	
802.11a	5180	1.8	/	1.8	11	pass
	5200	1.34	/	1.34	11	pass
	5240	1.12	/	1.12	11	pass
802.11n ht20	5180	1.24	/	1.24	11	pass
	5200	1.51	/	1.51	11	pass
	5240	1.31	/	1.31	11	pass
802.11n ht40	5190	-1.25	/	-1.25	11	pass
	5230	-1.74	/	-1.74	11	pass
802.11ac80	5210	-4.67	/	-4.67	11	pass

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	-1.70	/	-1.70	30	pass
	5785	-1.57	/	-1.57	30	pass
	5825	-1.73	/	-1.73	30	pass
802.11n ht20	5745	-2.24	/	-2.24	30	pass
	5785	-1.86	/	-1.86	30	pass
	5825	-2.15	/	-2.15	30	pass
802.11n ht40	5755	-4.92	/	-4.92	30	pass
	5795	-4.83	/	-4.83	30	pass
802.11n ht80	5775	-8.53	/	-8.53	30	pass

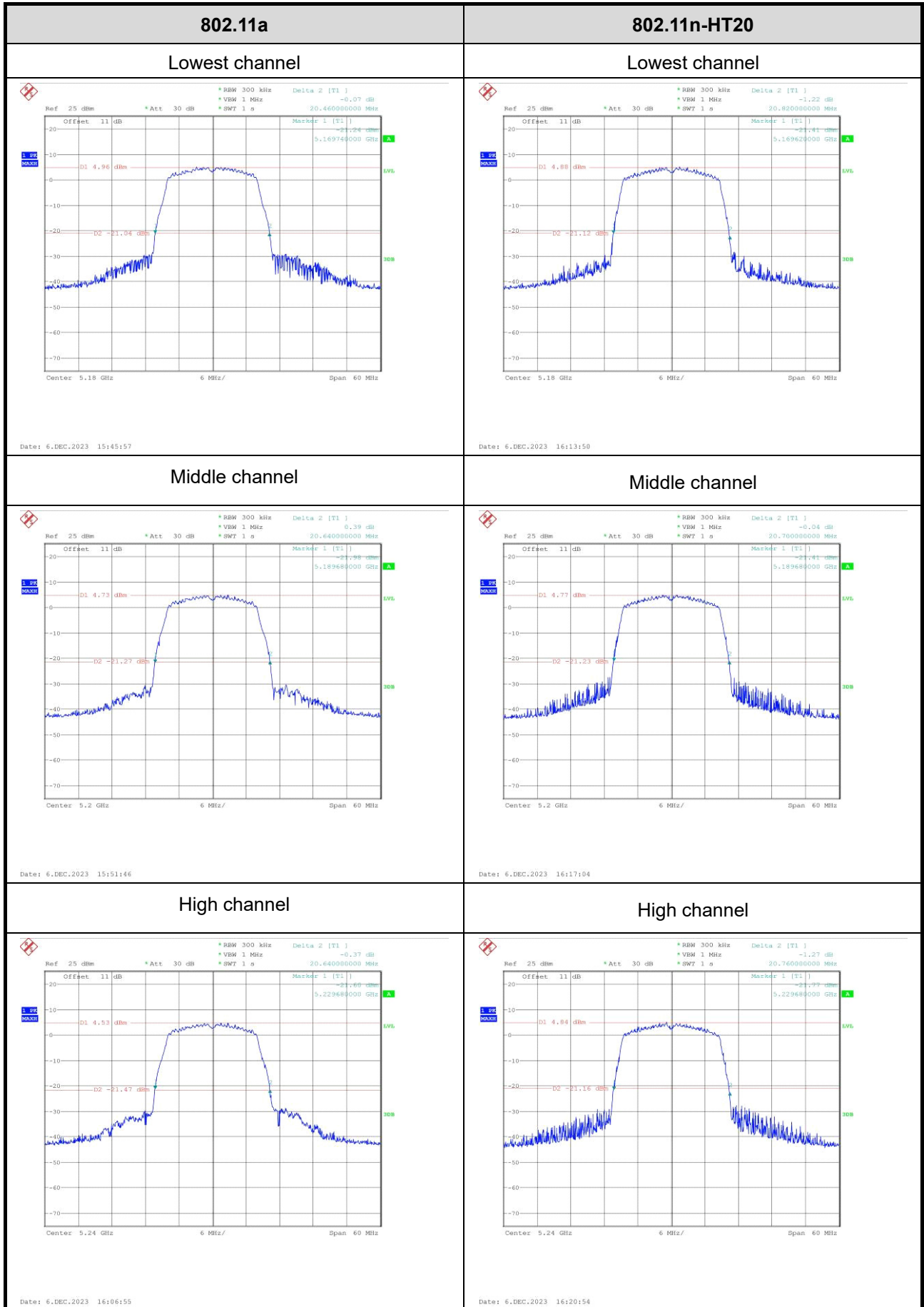
3.5.4 Duty Cycle

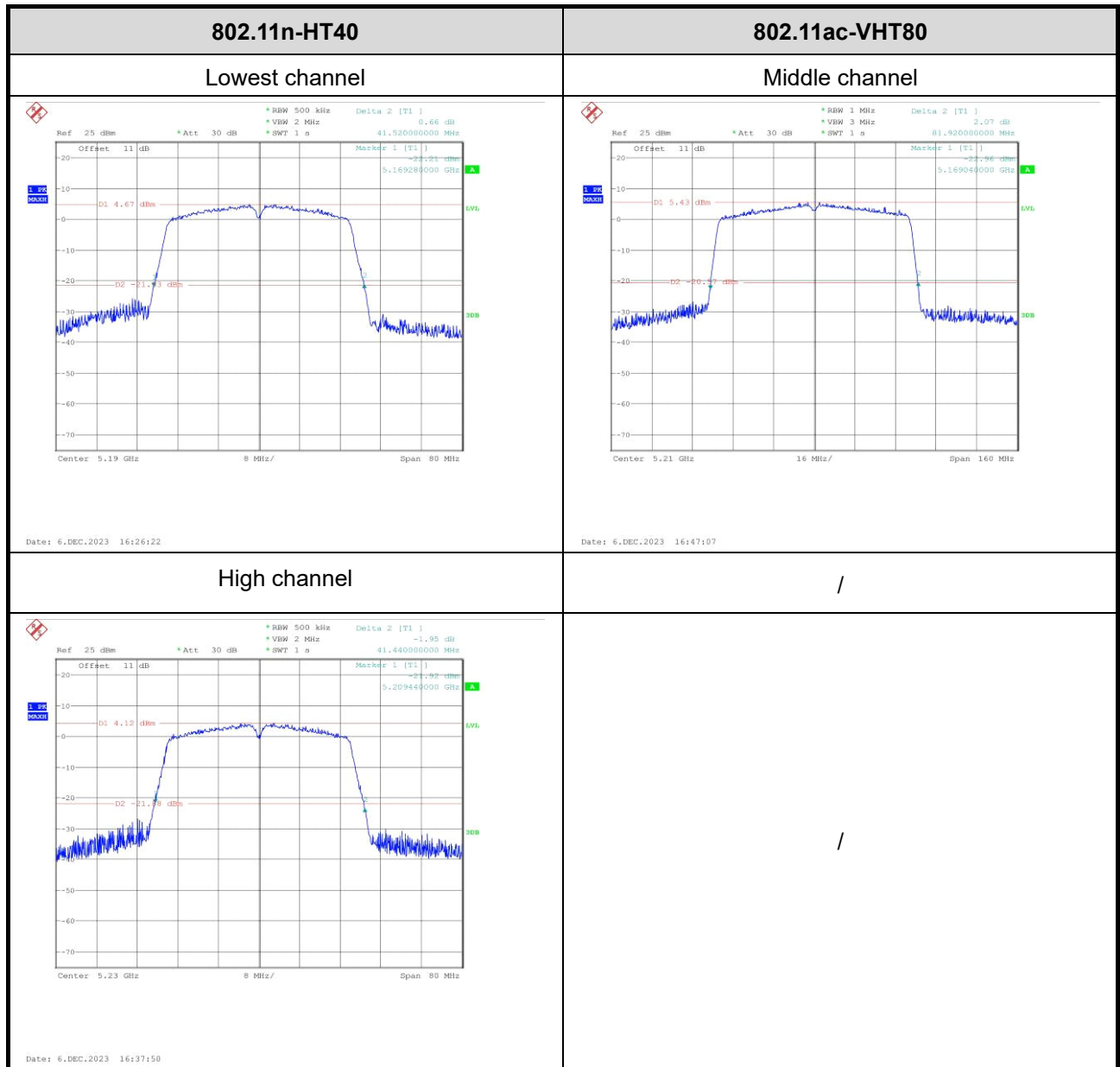
Test Mode	Antenna	Ton (ms)	Ton+off (ms)	Duty Cycle [%]	Duty Cycle Factor[%]	1/T [Hz]	VBW setting* [Hz]
802.11a	Ant1	/	/	100.00	/	/	10
802.11n HT20	Ant1	/	/	100.00	/	/	10
802.11n HT40	Ant1	/	/	100.00	/	/	10
802.11ac VHT80	Ant1	/	/	100.00	/	/	10

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

Test Plots:

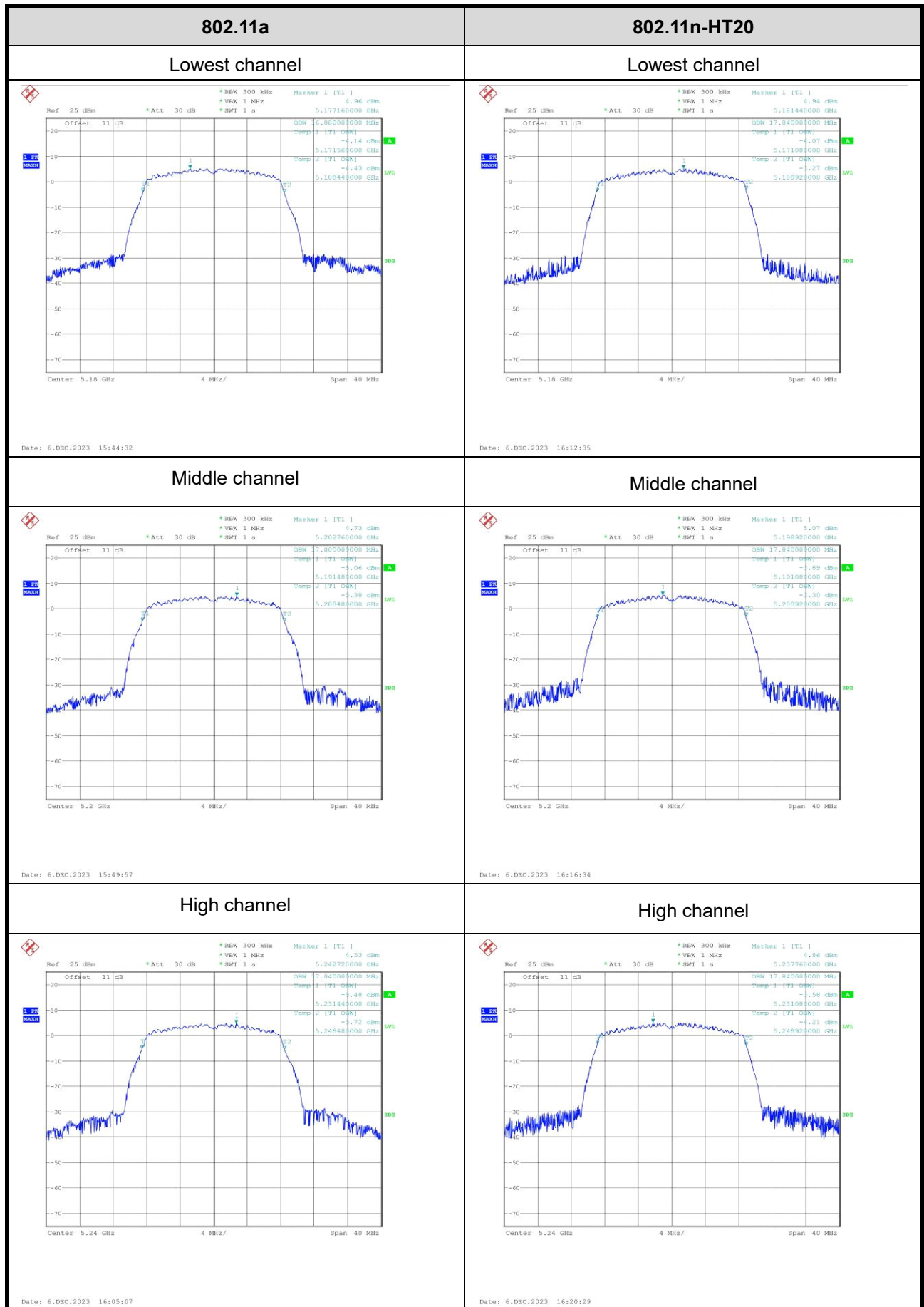
26dB Emission Bandwidth

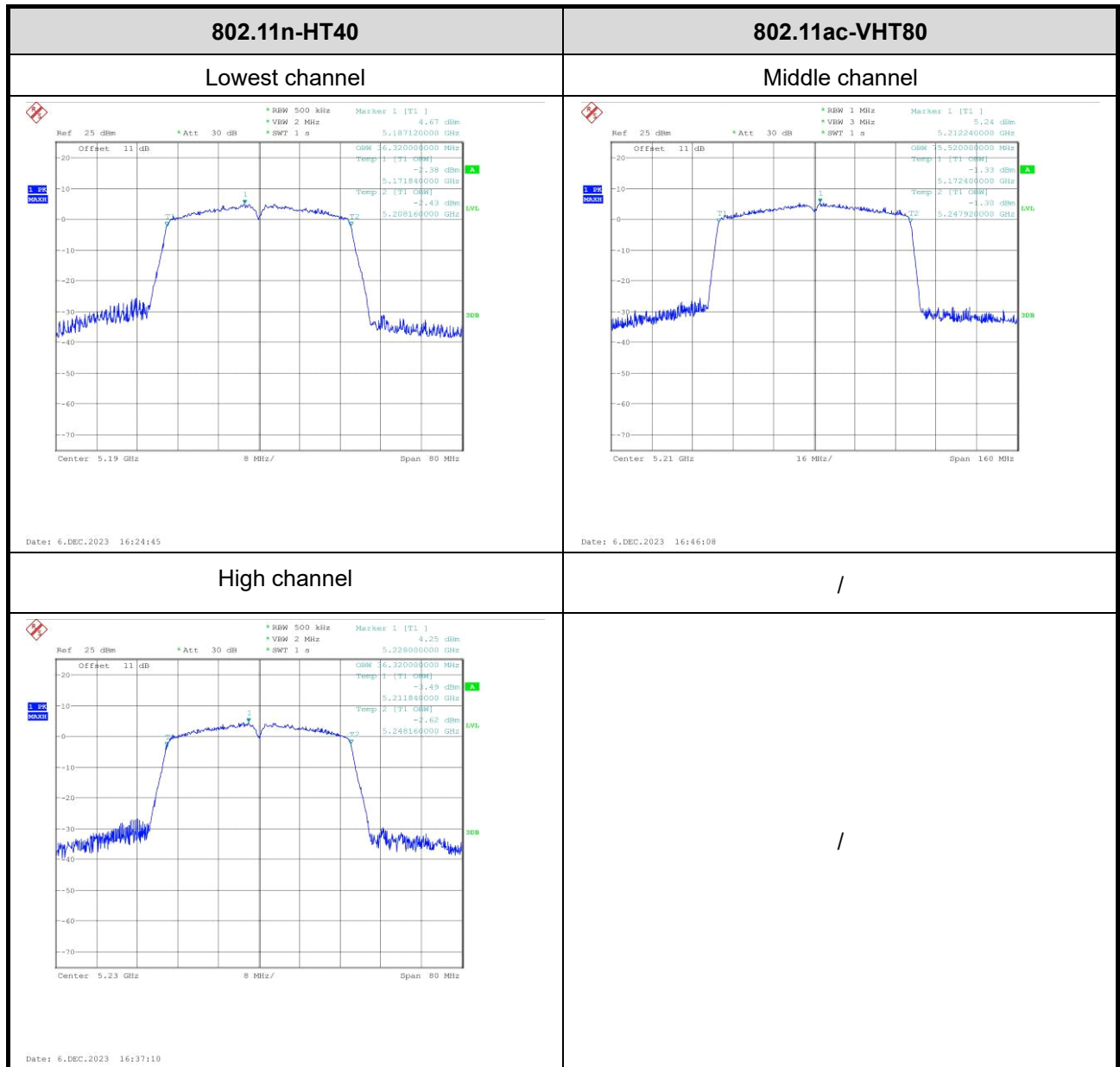




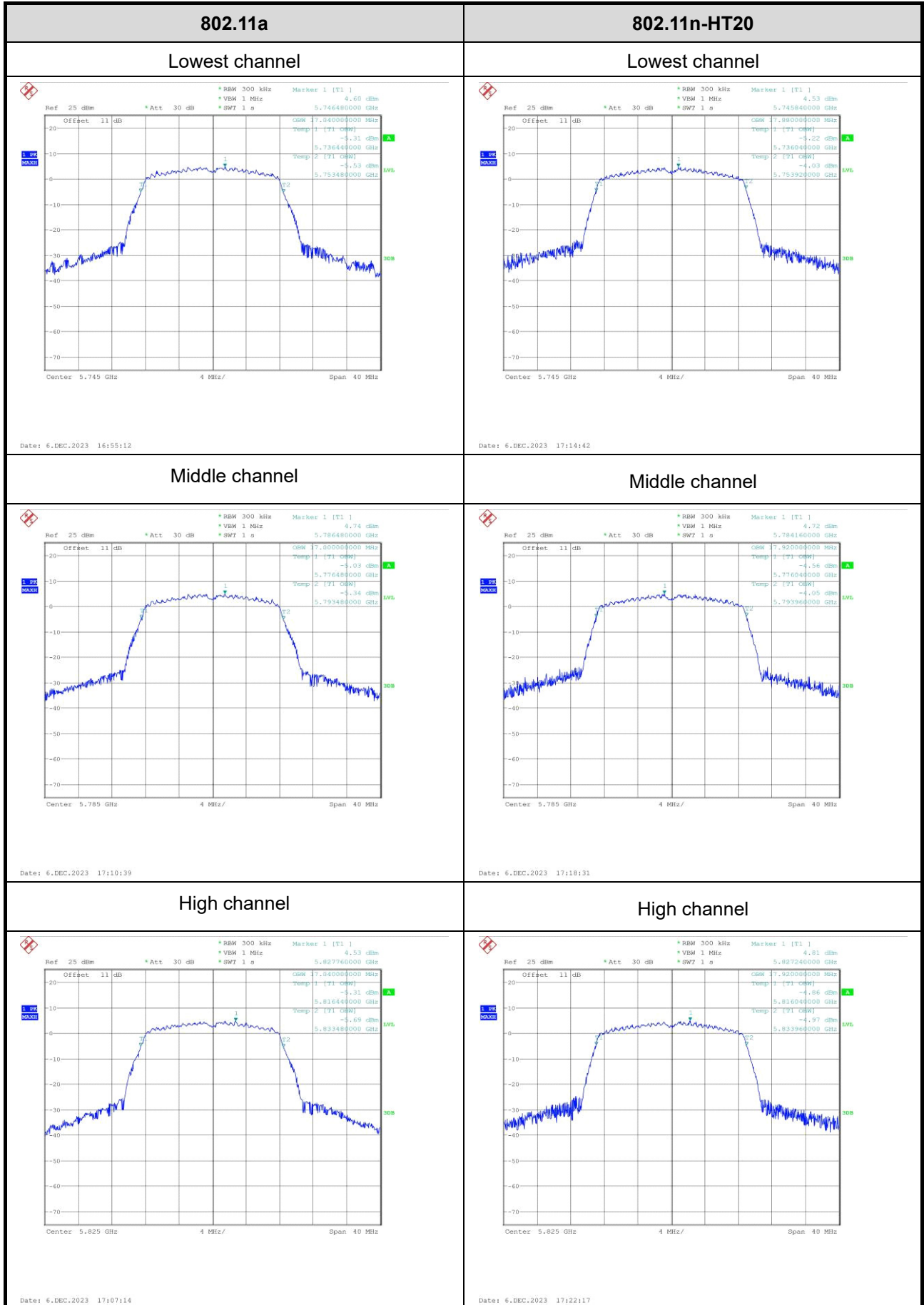
99% Occupied Bandwidth

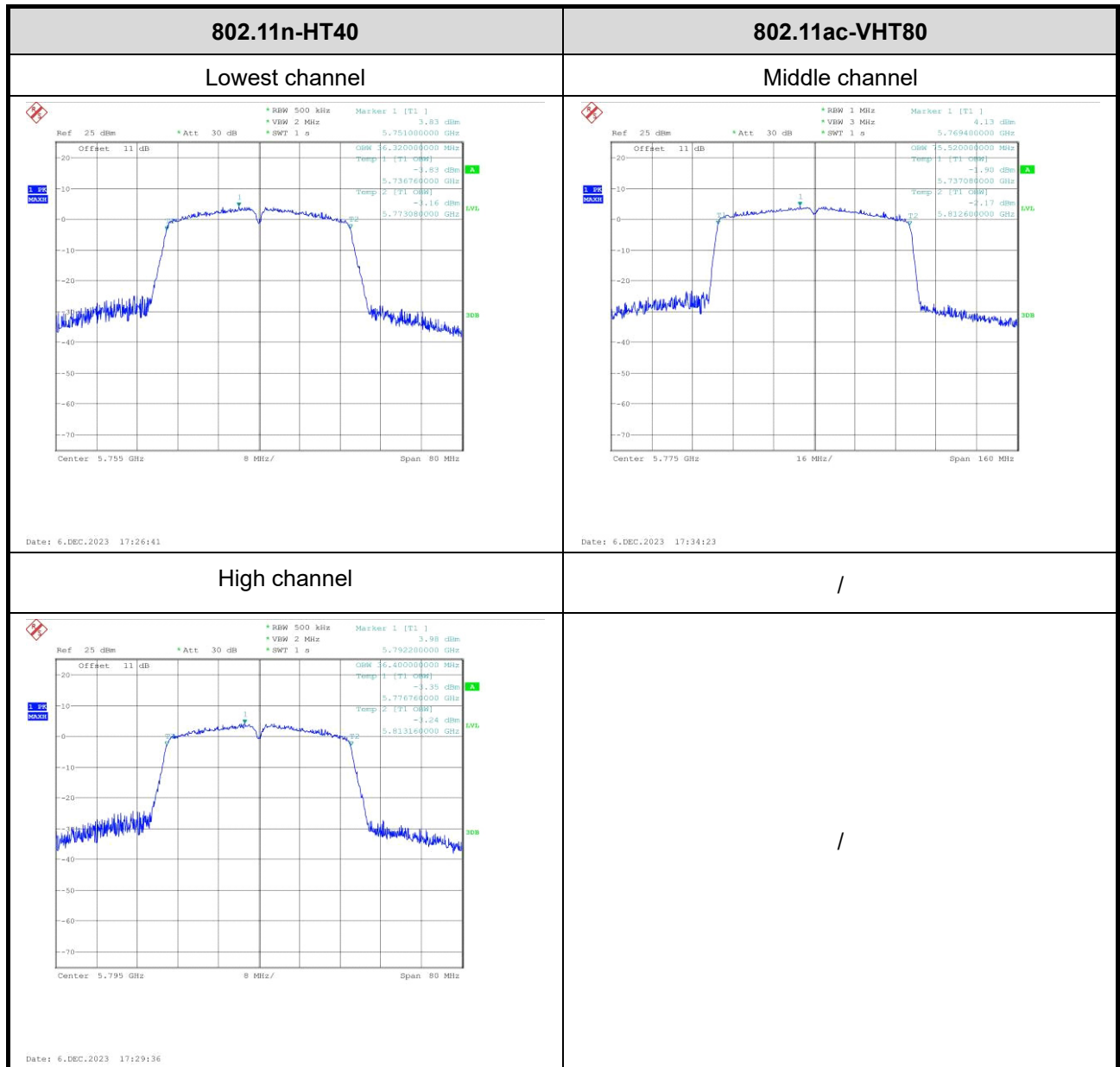
5150-5250MHz Band:



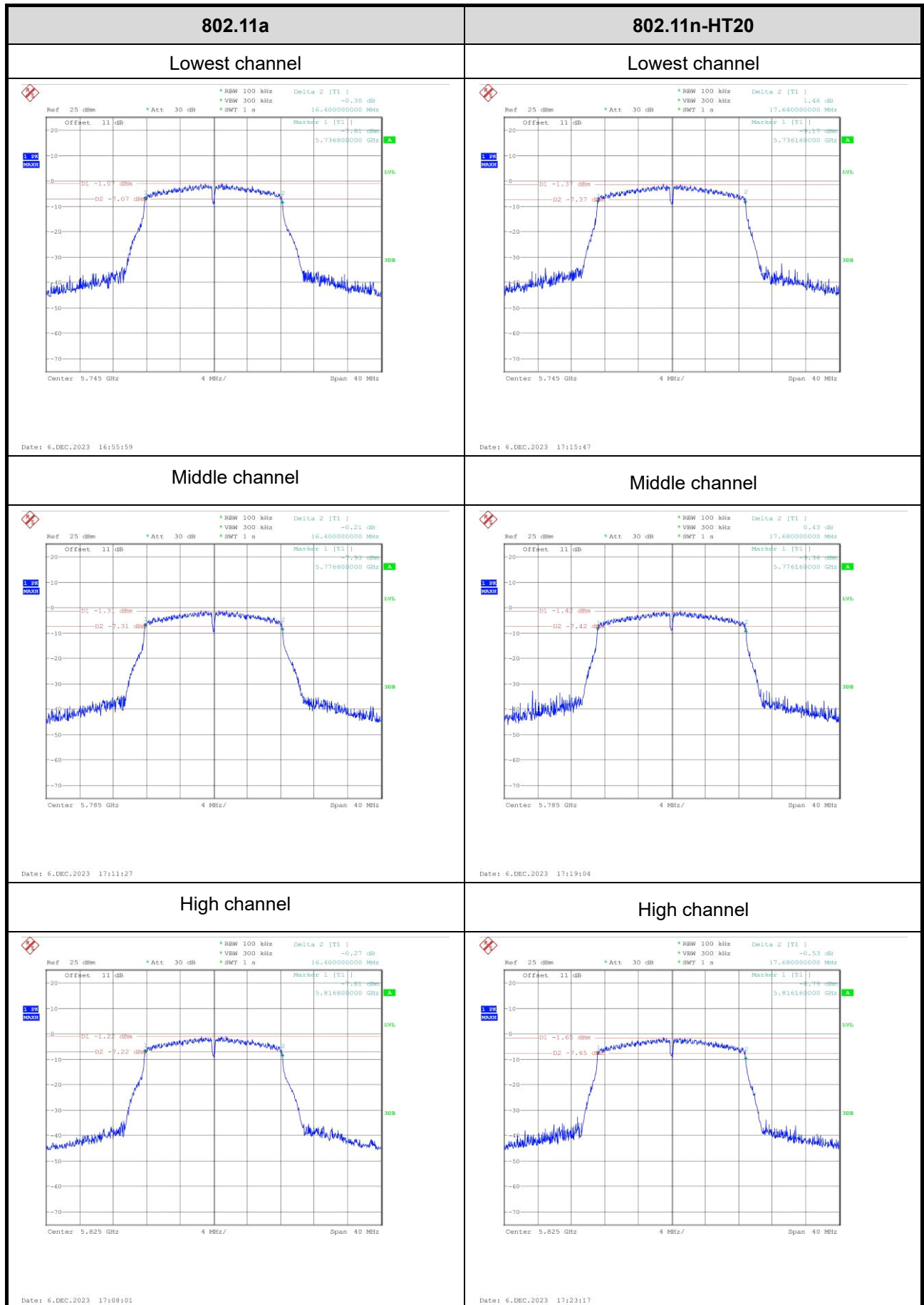


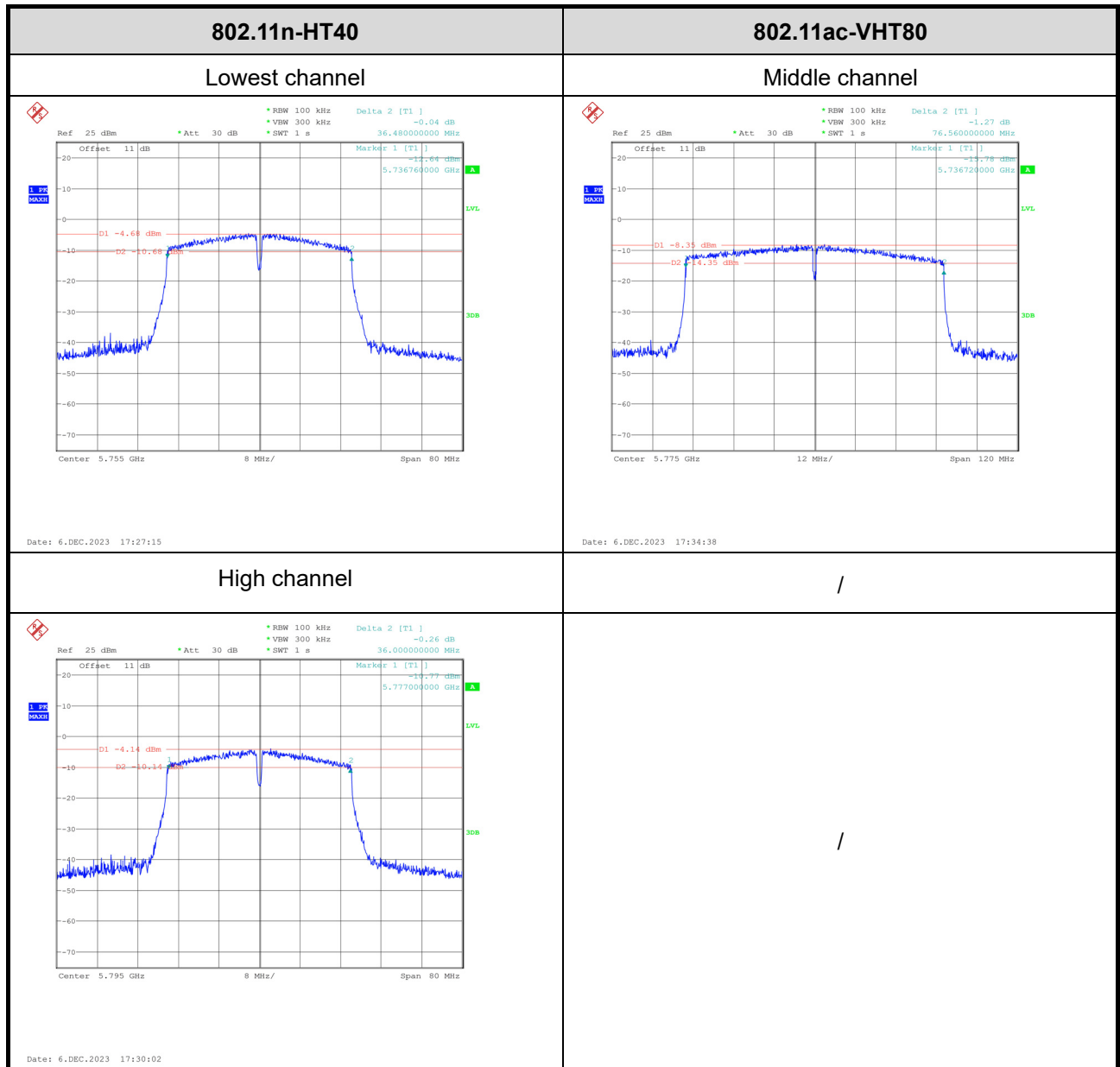
5725-5850MHz Band:





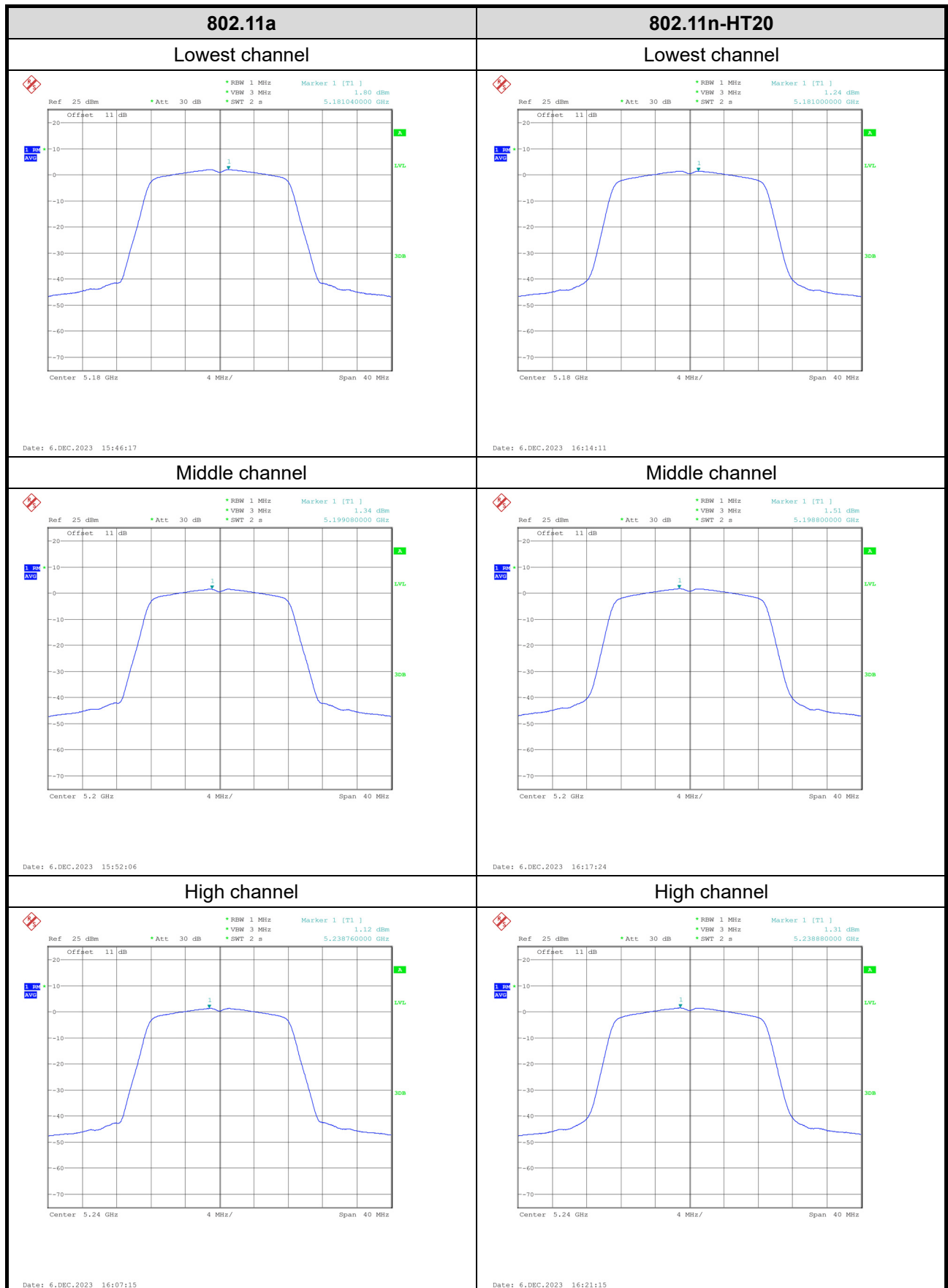
6dB Emission Bandwidth

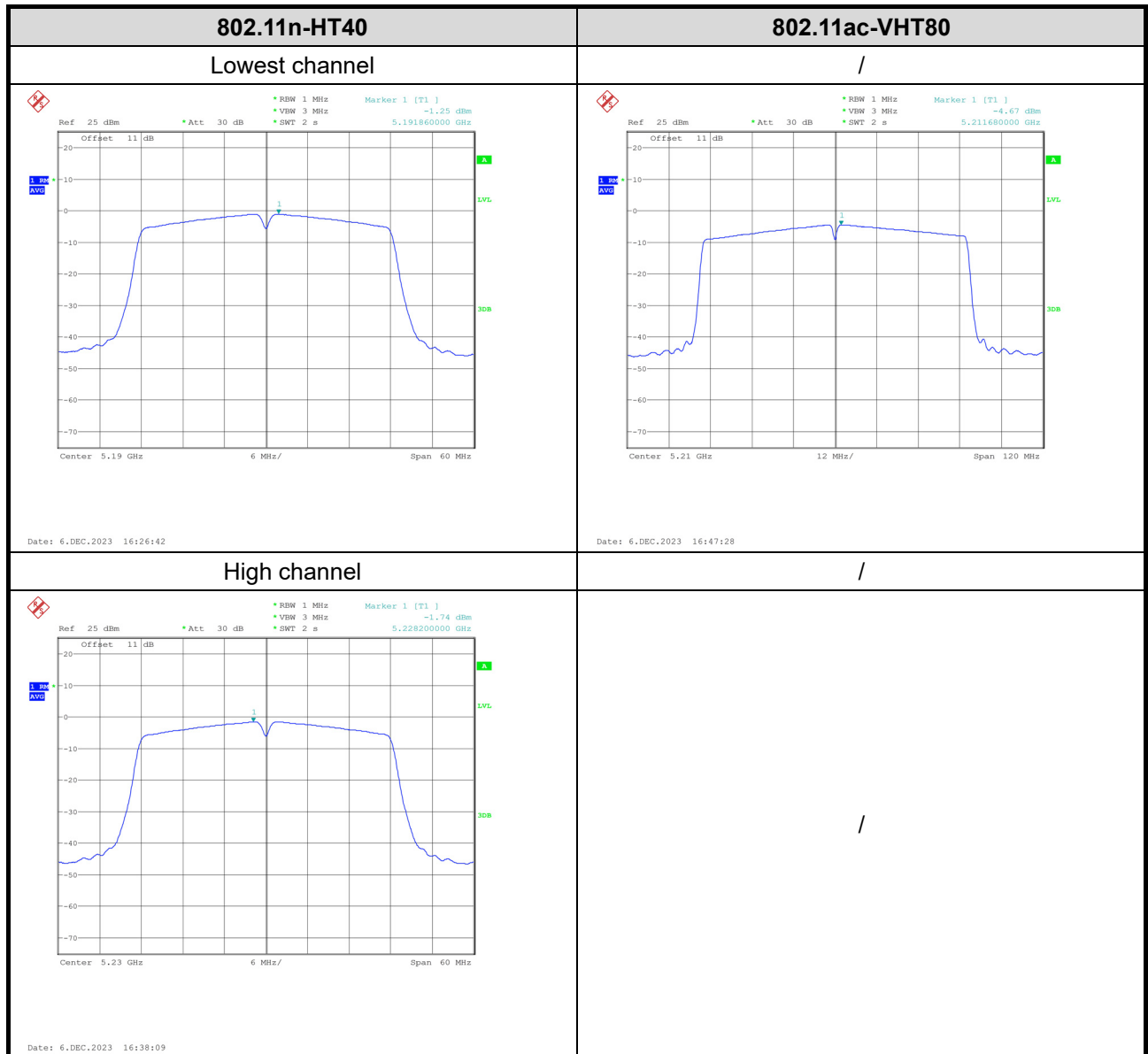




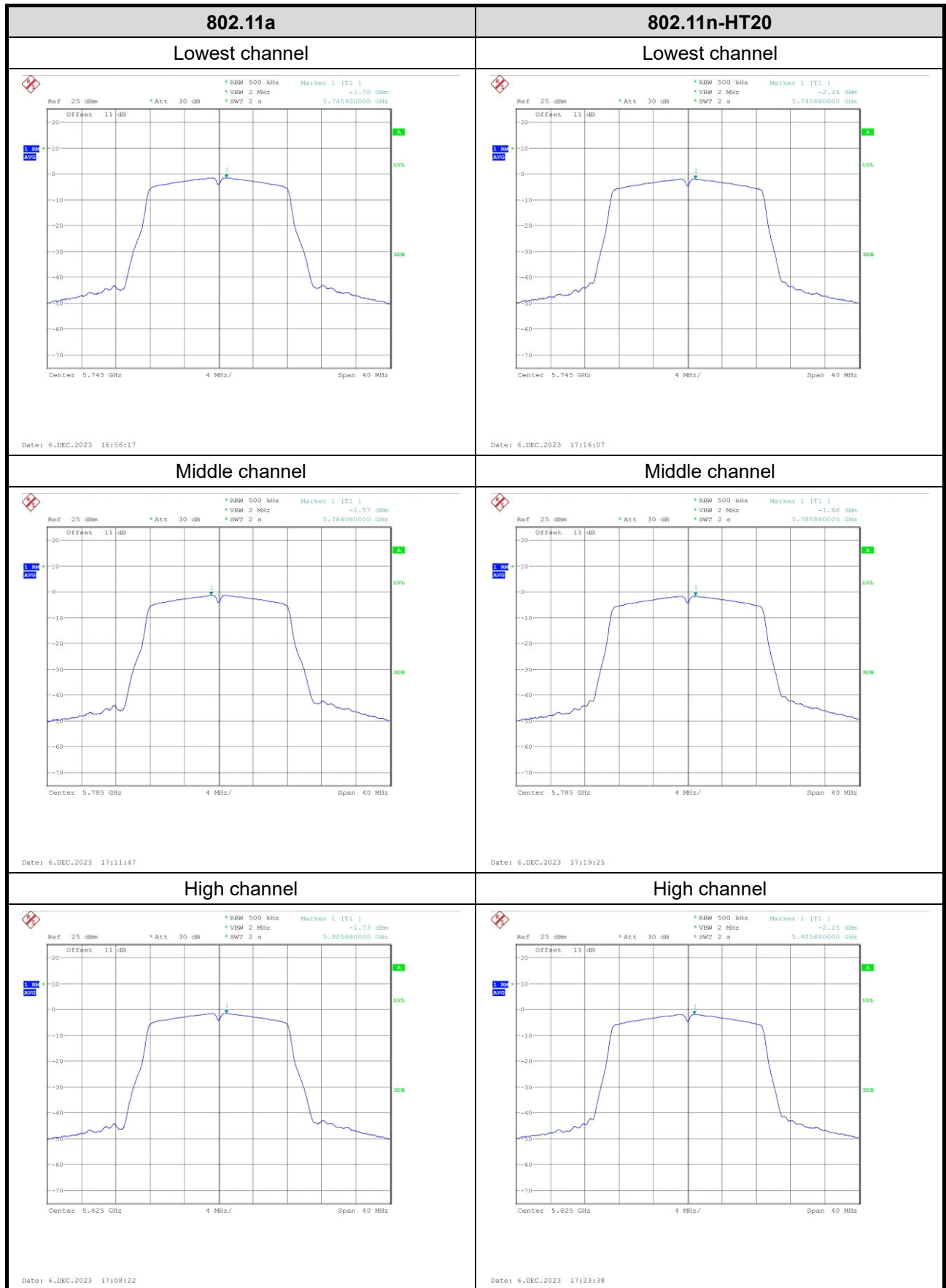
Power Spectral Density

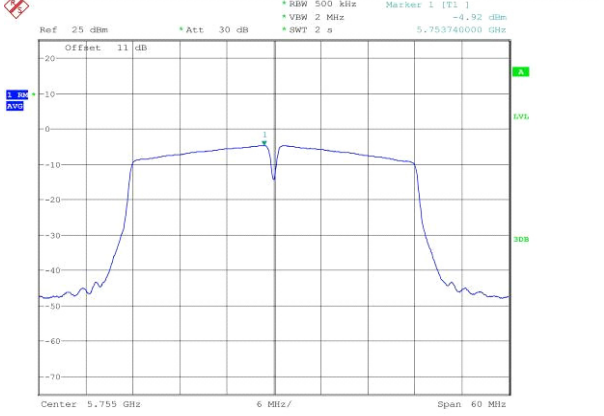
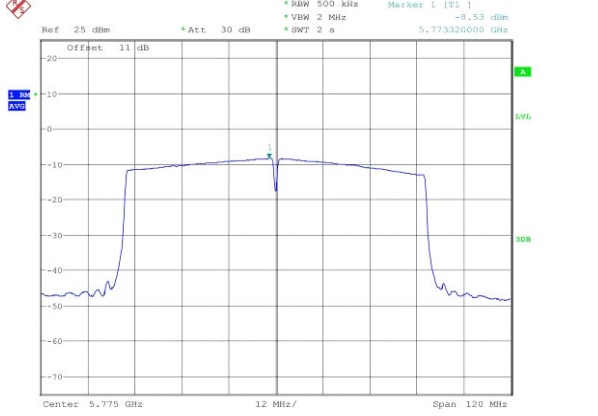
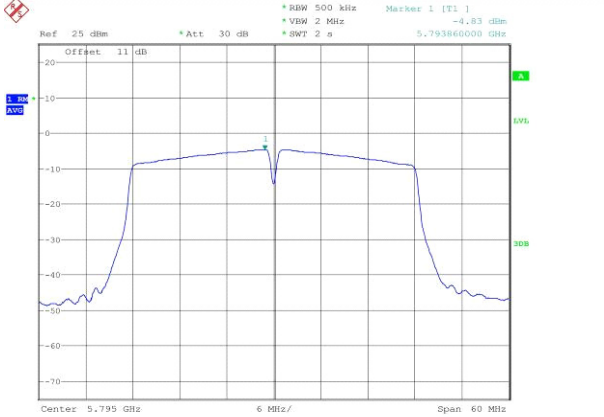
5150-5250MHz Band:



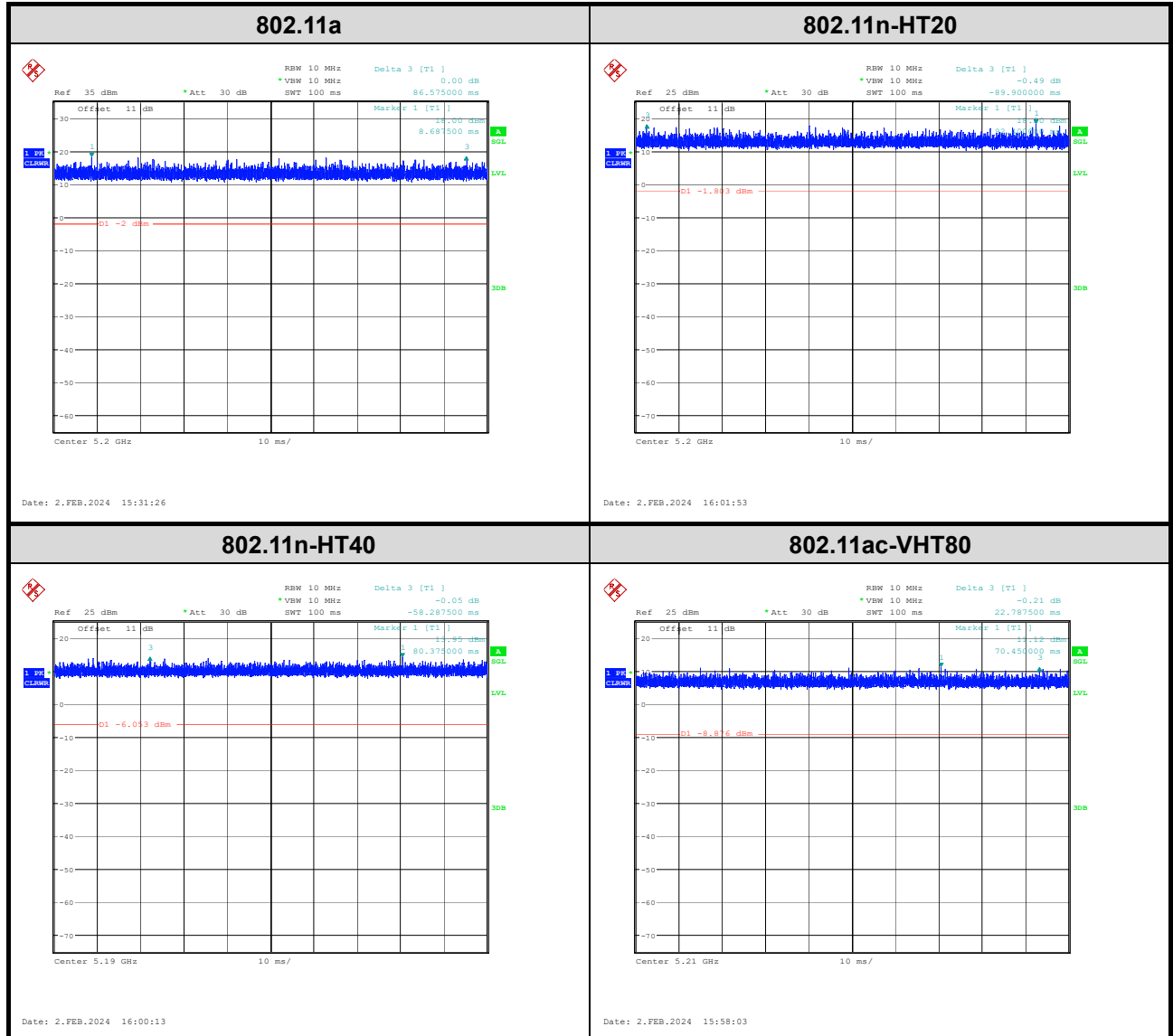


5725-5850MHz Band:



802.11n-HT40	802.11ac-VHT80
Lowest channel	/
 Ref: 25 dBm *Att: 30 dB *RBW: 500 kHz *VBW: 2 MHz *SWT: 2 s Marker 1 [T1]: -4.92 dBm 5.75374000 GHz Offset: 11 dB Center: 5.755 GHz 6 MHz/ Span: 60 MHz Date: 6.DEC.2023 17:27:37	 Ref: 25 dBm *Att: 30 dB *RBW: 500 kHz *VBW: 2 MHz *SWT: 2 s Marker 1 [T1]: -8.53 dBm 5.77332000 GHz Offset: 11 dB Center: 5.775 GHz 12 MHz/ Span: 120 MHz Date: 6.DEC.2023 17:34:54
High channel	/
 Ref: 25 dBm *Att: 30 dB *RBW: 500 kHz *VBW: 2 MHz *SWT: 2 s Marker 1 [T1]: -4.83 dBm 5.79386000 GHz Offset: 11 dB Center: 5.795 GHz 6 MHz/ Span: 60 MHz Date: 6.DEC.2023 17:30:23	/

Duty Cycle



4 Test Setup Photo

Please refer to the attachment RWAY202300049 Test Setup photo.

5 E.U.T Photo

Please refer to the attachment RWAY202300049 External photo and RWAY202300049 Internal photo.

---End of Report---