FCC PART 15C
TEST REPORT
No.I23Z60340-IOT05

for

Wingtech Group (Hong Kong) Limited

5G Mobile Phone

TMRV065G

With

FCC ID: 2APXW-TMRV065G

Hardware Version: V1.0

Software Version: TMRV065G_0.01.01

Issued Date: 2023-04-11

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23Z60340-IOT05	Rev.0	1st edition	2023-04-11

CONTENTS

1. TEST LATORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Conducted testing Location: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

Radiated testing Location: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, 100191, P. R. China

1.3. TestingEnvironment

Normal Temperature: 15-35℃

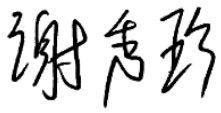
Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2023-02-28

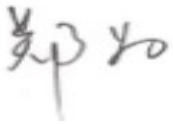
Testing End Date: 2023-04-11

1.5. Signature



Xie Xiuzhen

(Prepared this test report)



Zheng Wei

(Reviewed this test report)

Pang Shuai

(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address:	Flat/RM 1903 19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL, HK
City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86-21-53529900
Fax:	/

2.2. Manufacturer Information

Company Name:	Wingtech Group (Hong Kong) Limited
Address:	Flat/RM 1903 19/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL, HK
City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86-21-53529900
Fax:	/

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE)

3.1. About EUT

Description	5G Mobile Phone
Model name	TMRV065G
FCC ID	2APXW-TMRV065G
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.85V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT22a	861690060031057	V1.0	TMRV065G_0.01.01
UT09a	861690060031701	V1.0	TMRV065G_0.01.01

*EUT ID: is used to identify the test sample in the lab internally.

UT09a is used for Conduction test, UT22a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Battery	/
AE2	Charger	/
AE3	USB Cable	/

AE1

Model	RE001
Manufacturer	SUNWODA ELECTRONIC CO ., LTD
Capacity	4500mAh
Nominal Voltage	

AE2

Model	BLJ-QC06HU
Manufacturer	Zhongshan Baolijin Electronic Co., Ltd
Length of cable	/

AE3

Model	USB AM TO TYPE-C2.0
Manufacturer	Huizhou WASHIN Electronics Co.，Ltd
Length of cable	/

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

Equipment Under Test (EUT) is a model of 5G Mobile Phone with integrated antenna. It consists of normal options: Battery and Charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the Client.

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

FCC Part15	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2021
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.407 (a)	/	P
Peak Power Spectral Density	15.407 (a)	/	P
Occupied 6dB Bandwidth	15.407 (e)	/	P
Band Edges Compliance - Conducted& Radiated	15.407 (b)	/	P
Transmitter Spurious Emission - Conducted	15.407	/	P
Transmitter Spurious Emission - Radiated	15.407, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26℃
Voltage	3.85V
Humidity	44%

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2024-03-06
2	Test Receiver	ESU26	100235	R&S	1 year	2023-04-07
3	LISN	ENV216	101200	R&S	1 year	2023-06-29
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	R&S	1 year	2023-10-25
2	EMI Antenna	VULB 9163	01223	SCHWARZBECK	1 year	2023-07-25
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2023-06-20
4	Loop Antenna	HFH2-22	829324/007	R&S	1 year	2023-12-23

8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Spurious Emissions

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.15
1GHz ≤ f ≤18GHz	5.54
18GHz ≤ f ≤40GHz	5.26

8.6. AC Power-line Conducted Emission

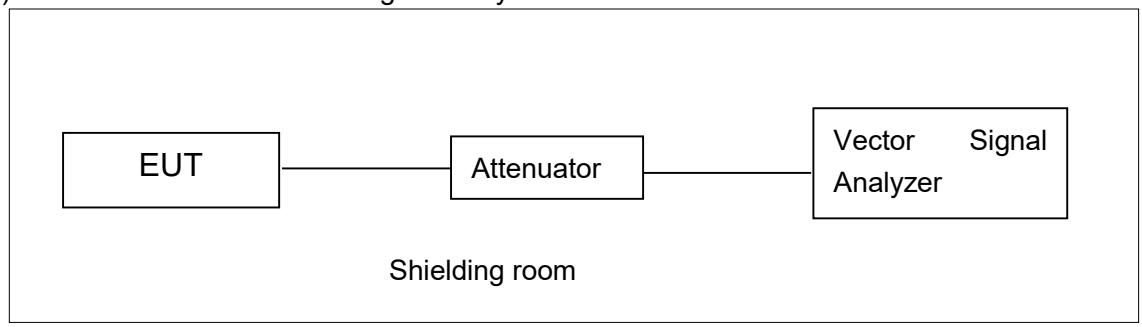
Measurement Uncertainty : 3.08dB,k=2

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

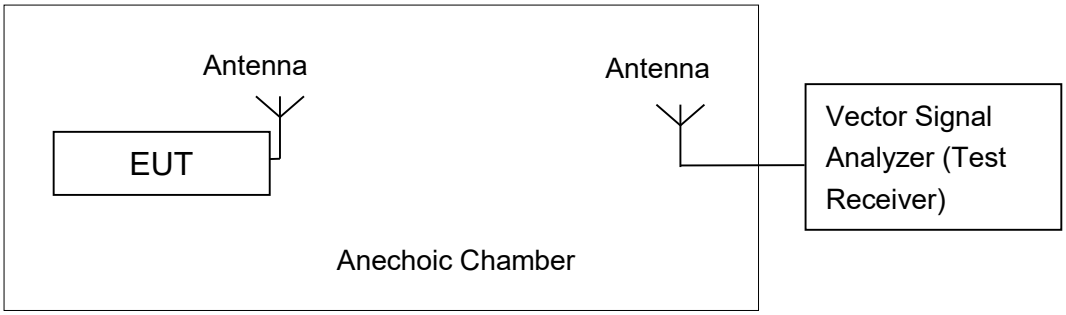
A.1.1. Conducted Measurements

1). Connect the EUT to the test system correctly.
2). Set the EUT to the required work mode.
3). Set the EUT to the required channel.
4). Set the spectrum analyzer to start measurement.
5). Record the values. Vector Signal Analyzer



A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,
Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;
Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.10.
The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

A.2.1 Antenna Gain

Antenna gain is -0.1dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	19.65	19.89	19.28

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	19.66	19.44	18.94

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	18.22	17.71	17.31

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	18.71	18.09

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	17.14	16.86

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	17.13

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

The duty cycle of all mode are 100%

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz

The measurement is made according to ANSI C63.10 and KDB789033 D02

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	6.81	P
	157	6.18	P
	165	5.97	P
802.11n HT20	149	6.37	P
	157	6.06	P
	165	5.44	P
802.11n HT40	151	2.54	P
	159	2.00	P
802.11ac HT80	155	-2.51	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.407 (e)	≥ 500

The measurement is made according to KDB789033 D02 .

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11a	149	Fig.1	16.32	P
	157	Fig.2	16.32	P
	165	Fig.3	16.36	P
802.11n HT20	149	Fig.4	17.56	P
	157	Fig.5	17.56	P
	165	Fig.6	17.56	P
802.11n HT40	151	Fig.7	36.24	P
	159	Fig.8	36.24	P
802.11ac HT80	155	Fig.9	76.32	P

Conclusion: PASS

Test graphs as below:

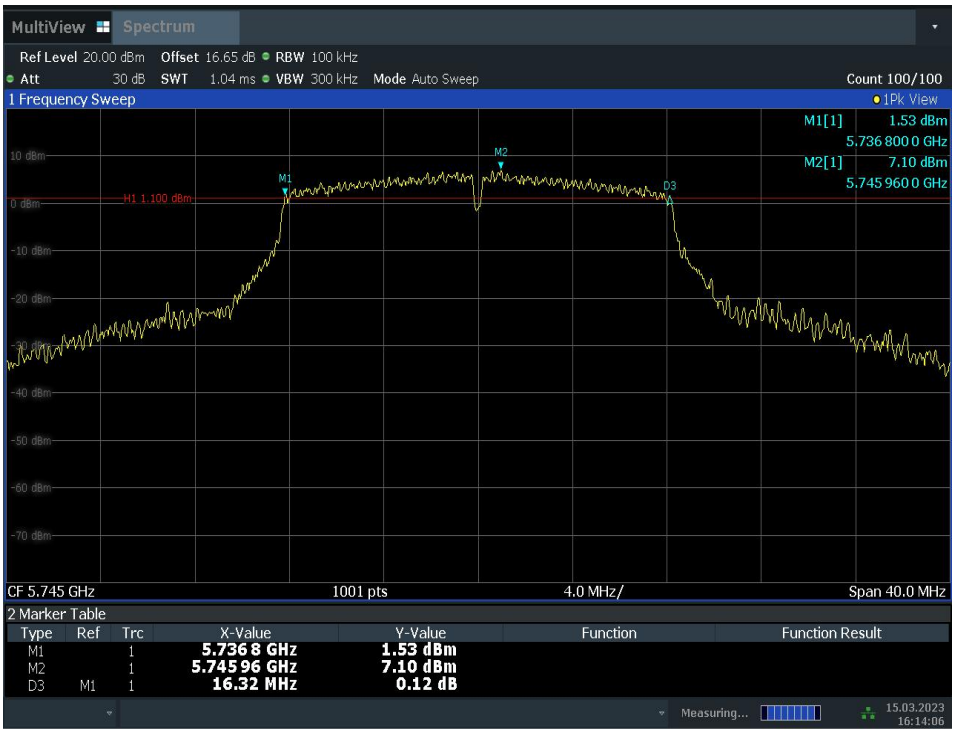


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Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

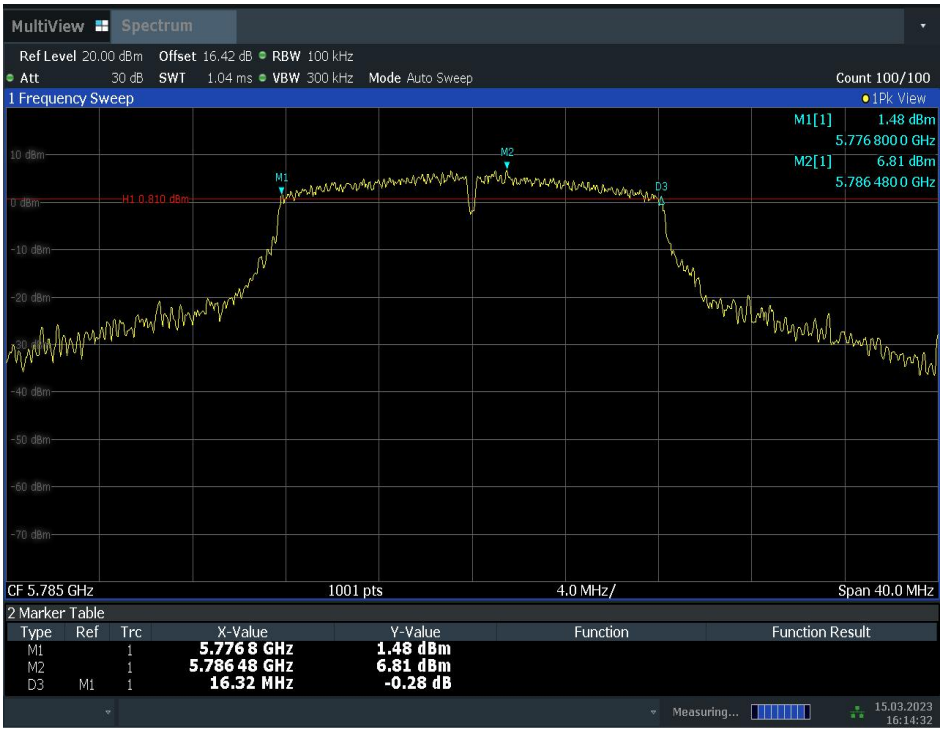

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Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

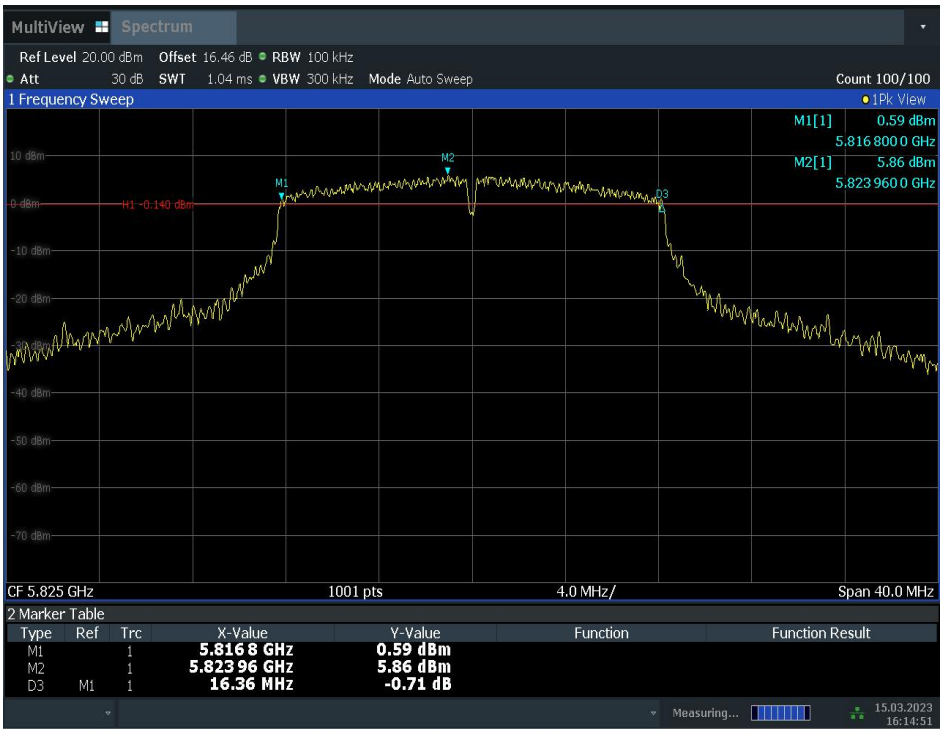

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Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

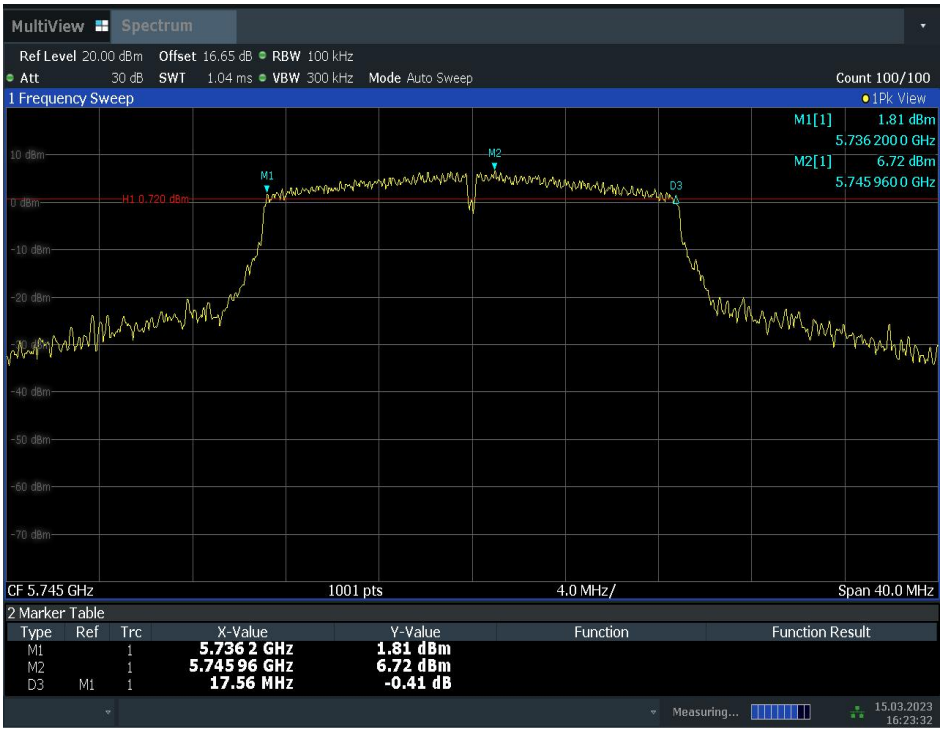

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Fig. 4 Occupied 6dB Bandwidth (802.11n-HT20, Ch 149)

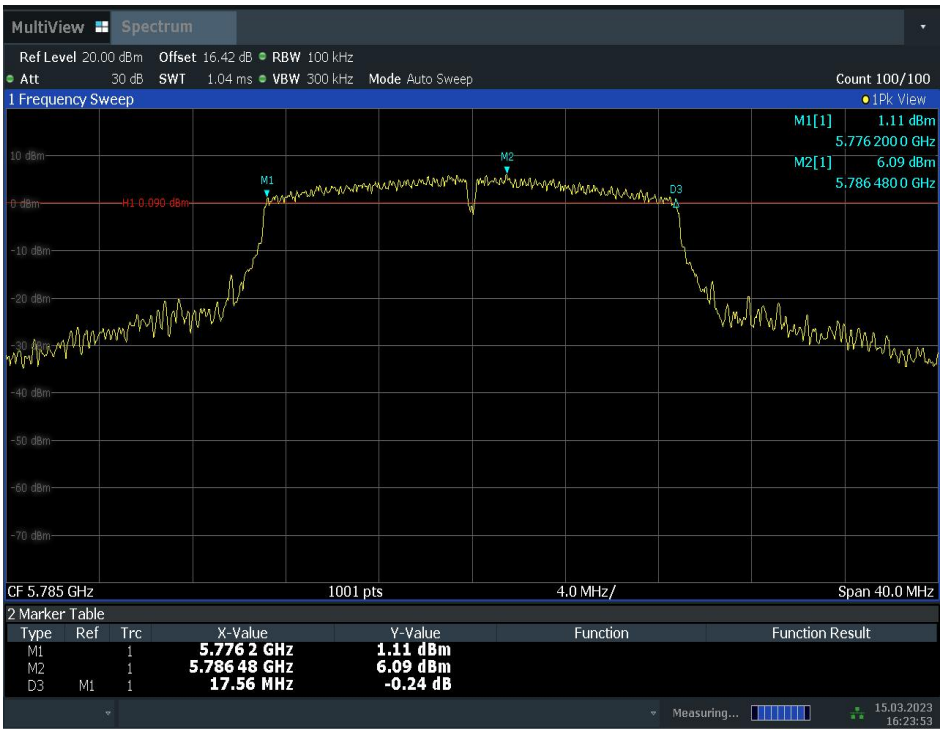

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Fig. 5 Occupied 6dB Bandwidth (802.11n-HT20, Ch 157)

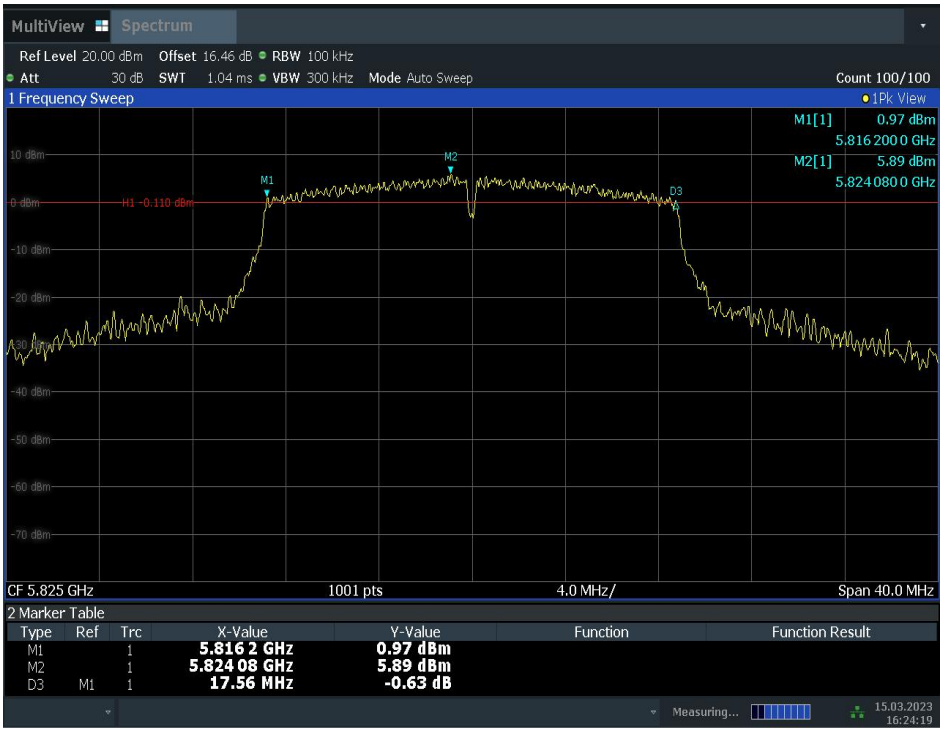

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Fig. 6 Occupied 6dB Bandwidth (802.11n-HT20, Ch 165)

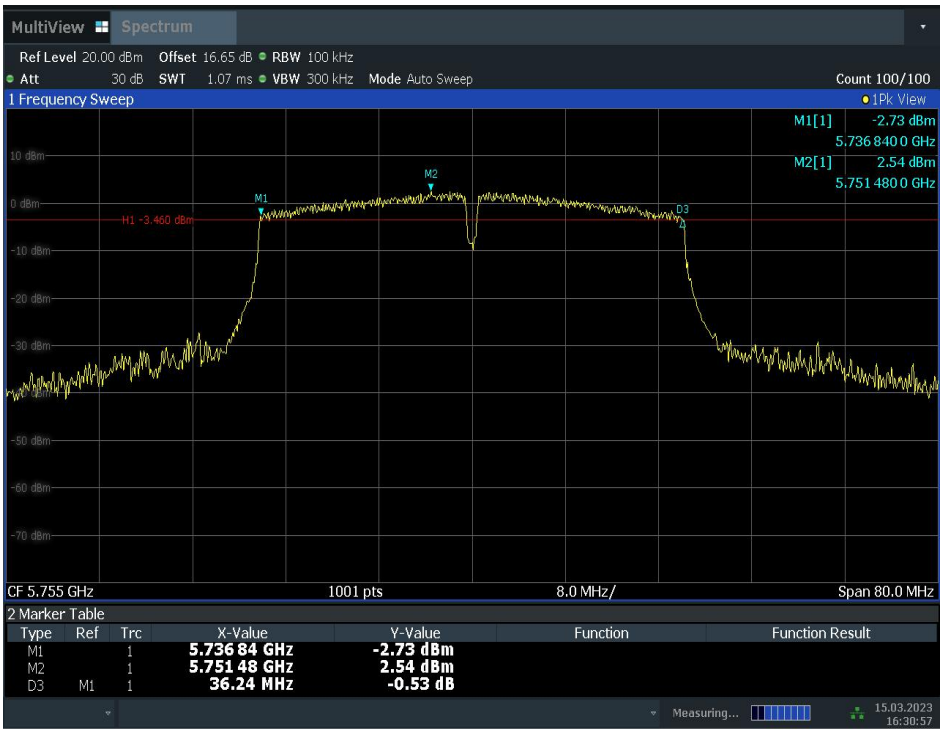

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Fig. 7 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

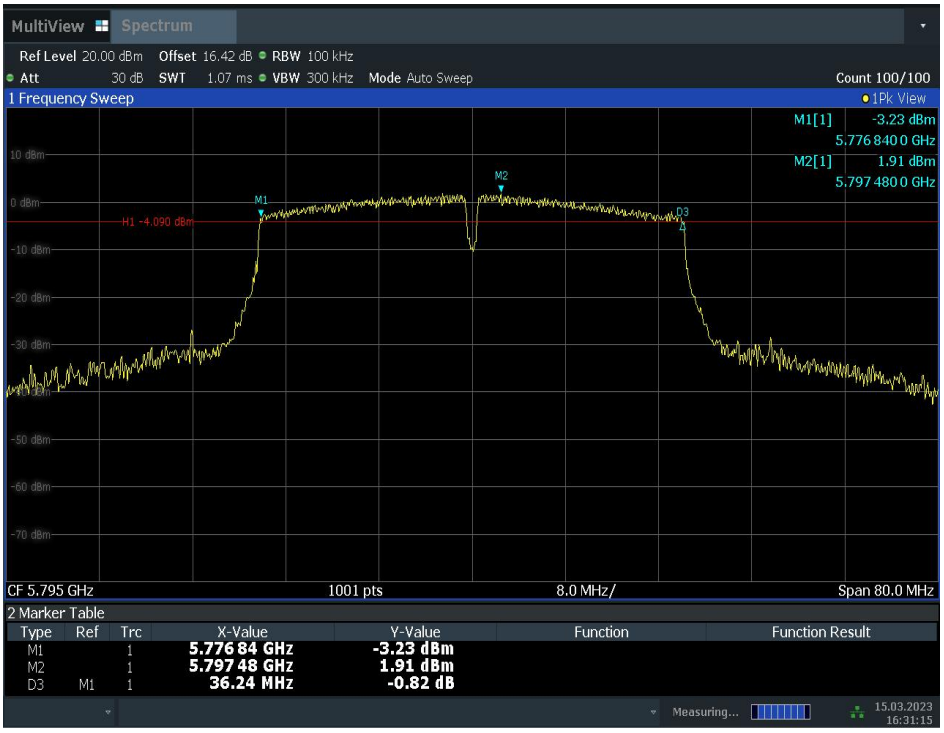

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Fig. 8 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

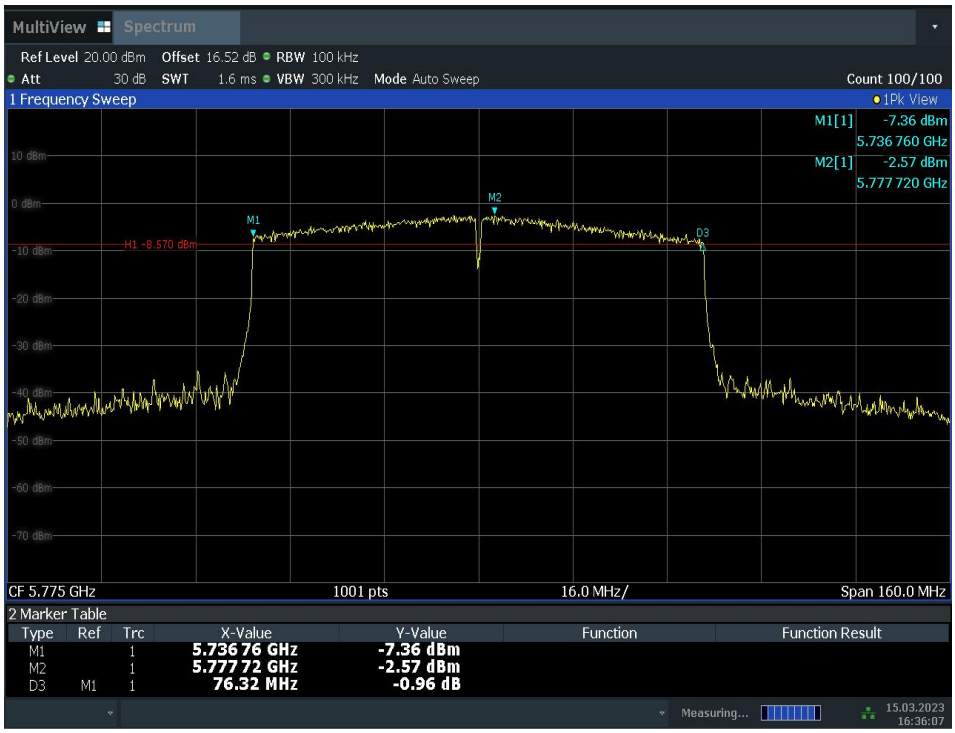

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Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

A.5. Transmitter Spurious Emission

A.5.1 Transmitter Spurious Emission - Radiated

Measurement Limit:

Standard	Limit (dBm/MHz)	
FCC 47 CFR Part 15.407	at the band edge	27
	at 5 MHz above or below the band edge	15.6
	at 25 MHz above or below the band edge	10
	at 75 MHz or more above or below the band edge	-27
	Note：Increasing linearly from point to point.	

The measurement is made according to KDB 789033

Measurement Results:

802.11a mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	149	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	157	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P
	165	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	149	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	157	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P
	165	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11n-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT40)	151	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P
	159	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11ac-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ac (HT20)	149	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	157	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P
	165	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11ac-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ac (HT40)	151	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P
	159	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11ac-HT80 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ac (HT80)	155	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P

		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P

Conclusion: PASS

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

Average Results：

802.11a

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17959.300	37.81	-25.50	46.66	16.65	54.00	16.19	H
17996.150	37.63	-25.50	46.66	16.47	54.00	16.37	V
13305.200	35.05	-29.49	39.71	24.83	54.00	18.95	V
13324.450	34.81	-29.49	39.71	24.59	54.00	19.19	V
11836.150	34.26	-31.85	39.05	27.06	54.00	19.74	H
11935.150	34.19	-31.48	39.09	26.58	54.00	19.81	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17976.350	38.50	-25.50	46.66	17.34	54.00	15.50	H
17990.650	38.16	-25.50	46.66	17.00	54.00	15.84	V
13331.050	34.69	-29.49	39.71	24.47	54.00	19.31	H
13313.450	34.43	-29.49	39.71	24.21	54.00	19.57	H
11857.600	34.33	-31.85	39.05	27.13	54.00	19.67	V
11884.000	34.13	-31.85	39.05	26.93	54.00	19.87	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17992.850	38.07	-25.50	46.66	16.91	54.00	15.93	V
17997.800	37.92	-25.50	46.66	16.76	54.00	16.08	H
13328.300	34.84	-29.49	39.71	24.62	54.00	19.16	H
13292.000	34.83	-29.49	39.71	24.61	54.00	19.17	H
11908.750	34.70	-31.85	39.05	27.50	54.00	19.30	H
11907.650	34.35	-31.85	39.05	27.15	54.00	19.65	V

802.11n-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17896.050	37.74	-25.50	46.66	16.58	54.00	16.26	H
17997.800	37.69	-25.50	46.66	16.53	54.00	16.31	H
13306.850	35.10	-29.49	39.71	24.88	54.00	18.90	H
13331.600	34.86	-29.49	39.71	24.64	54.00	19.14	H
11799.300	34.54	-31.85	39.05	27.34	54.00	19.46	H
11885.650	34.21	-31.85	39.05	27.01	54.00	19.79	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17957.650	37.90	-25.50	46.66	16.74	54.00	16.10	V
17987.350	37.67	-25.50	46.66	16.51	54.00	16.33	H
13299.150	34.95	-29.49	39.71	24.73	54.00	19.05	H
13295.300	34.88	-29.49	39.71	24.66	54.00	19.12	H
11909.300	34.34	-31.85	39.05	27.14	54.00	19.66	V
11882.900	34.21	-31.85	39.05	27.01	54.00	19.79	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.250	37.74	-25.50	46.66	16.58	54.00	16.26	V
17951.050	37.66	-25.50	46.66	16.50	54.00	16.34	H
13313.450	34.82	-29.49	39.71	24.60	54.00	19.18	H
13303.000	34.80	-29.49	39.71	24.58	54.00	19.20	H
11899.400	34.39	-31.85	39.05	27.19	54.00	19.61	H
11904.350	34.27	-31.85	39.05	27.07	54.00	19.73	V

802.11n-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17991.750	37.92	-25.50	46.66	16.76	54.00	16.08	H
17967.550	37.79	-25.50	46.66	16.63	54.00	16.21	V
13305.750	34.88	-29.49	39.71	24.66	54.00	19.12	H
13312.350	34.77	-29.49	39.71	24.55	54.00	19.23	H
11815.800	34.61	-31.85	39.05	27.41	54.00	19.39	H
11899.400	34.41	-31.85	39.05	27.21	54.00	19.59	V

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17956.000	38.03	-25.50	46.66	16.87	54.00	15.97	V
17974.150	38.02	-25.50	46.66	16.86	54.00	15.98	V
13252.950	34.99	-29.67	39.55	25.11	54.00	19.01	H
11893.350	34.67	-31.85	39.05	27.47	54.00	19.33	V
13315.650	34.63	-29.49	39.71	24.41	54.00	19.37	H
11902.150	34.38	-31.85	39.05	27.18	54.00	19.62	V

802.11ac-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.800	38.17	-25.50	46.66	17.01	54.00	15.83	H
17976.350	38.00	-25.50	46.66	16.84	54.00	16.00	H
13312.900	35.87	-29.49	39.71	25.65	54.00	18.13	H
13302.450	35.38	-29.49	39.71	25.16	54.00	18.62	H
11810.300	34.68	-31.85	39.05	27.48	54.00	19.32	H
11789.950	34.43	-31.99	38.98	27.44	54.00	19.57	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17980.200	37.97	-25.50	46.66	16.81	54.00	16.03	V
17968.100	37.75	-25.50	46.66	16.59	54.00	16.25	V
13327.200	34.80	-29.49	39.71	24.58	54.00	19.20	V
13254.600	34.68	-29.67	39.55	24.80	54.00	19.32	H
11907.100	34.50	-31.85	39.05	27.30	54.00	19.50	H
11825.700	34.23	-31.85	39.05	27.03	54.00	19.77	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17990.650	37.68	-25.50	46.66	16.52	54.00	16.32	H
17956.000	37.62	-25.50	46.66	16.46	54.00	16.38	H
13297.500	34.84	-29.49	39.71	24.62	54.00	19.16	H
13292.550	34.78	-29.49	39.71	24.56	54.00	19.22	V
11787.200	34.27	-31.99	38.98	27.28	54.00	19.73	V
11893.350	34.20	-31.85	39.05	27.00	54.00	19.80	H

802.11ac-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17964.800	38.21	-25.50	46.66	17.05	54.00	15.79	H
17993.400	37.93	-25.50	46.66	16.77	54.00	16.07	V
13320.600	34.93	-29.49	39.71	24.71	54.00	19.07	H
13309.050	34.85	-29.49	39.71	24.63	54.00	19.15	H
11829.000	34.80	-31.85	39.05	27.60	54.00	19.20	H
11904.900	34.66	-31.85	39.05	27.46	54.00	19.34	H

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17997.250	38.63	-25.50	46.66	17.47	54.00	15.37	H
17959.300	38.24	-25.50	46.66	17.08	54.00	15.76	H
13250.200	34.85	-29.67	39.55	24.97	54.00	19.15	H
13312.350	34.80	-29.49	39.71	24.58	54.00	19.20	H
11902.150	34.32	-31.85	39.05	27.12	54.00	19.68	V
11912.050	34.26	-31.85	39.05	27.06	54.00	19.74	H

802.11ac-HT80

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17992.300	38.00	-25.50	46.66	16.84	54.00	16.00	V
17976.900	37.96	-25.50	46.66	16.80	54.00	16.04	H
13319.500	34.96	-29.49	39.71	24.74	54.00	19.04	V
13309.600	34.82	-29.49	39.71	24.60	54.00	19.18	V
11885.100	34.78	-31.85	39.05	27.58	54.00	19.22	V
11905.450	34.68	-31.85	39.05	27.48	54.00	19.32	H

Peak Results：

802.11a

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17983.500	48.56	-25.50	46.66	27.40	74.00	25.44	H
17050.700	48.23	-26.60	43.36	31.47	68.20	19.97	H
13771.600	45.80	-29.10	40.86	34.03	68.20	22.40	V
14700.550	45.61	-28.32	41.35	32.59	68.20	22.59	V
11523.750	44.68	-32.26	38.84	38.11	74.00	29.32	H
11897.200	44.56	-31.85	39.05	37.36	74.00	29.44	V

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17993.950	48.91	-25.50	46.66	27.75	74.00	25.09	V
17871.850	48.13	-25.50	46.66	26.97	74.00	25.87	V
14093.900	45.76	-29.44	41.66	33.54	68.20	22.44	V
14655.450	45.49	-27.29	41.90	30.88	68.20	22.71	H
9614.700	44.36	-33.06	37.97	39.45	68.20	23.84	H
11033.150	44.36	-32.49	38.72	38.12	74.00	29.64	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17035.850	49.14	-26.32	42.36	33.09	68.20	19.06	V
17955.450	48.59	-25.50	46.66	27.43	74.00	25.41	V
14714.300	46.22	-28.32	41.35	33.20	68.20	21.98	H
14567.450	45.80	-27.29	41.90	31.19	68.20	22.40	V
11300.450	45.40	-32.36	38.77	39.00	74.00	28.60	H
10569.500	44.70	-32.99	38.27	39.41	68.20	23.50	V

802.11n-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17057.300	49.16	-26.60	43.36	32.40	68.20	19.04	V
17973.600	48.85	-25.50	46.66	27.69	74.00	25.15	V
14595.500	46.09	-27.29	41.90	31.48	68.20	22.11	H
14588.900	45.84	-27.29	41.90	31.23	68.20	22.36	H
11761.900	44.90	-31.99	38.98	37.91	74.00	29.10	V
11815.250	44.71	-31.85	39.05	37.51	74.00	29.29	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17350.450	49.16	-25.95	44.35	30.75	68.20	19.04	V
17348.800	48.33	-25.95	44.35	29.92	68.20	19.87	V
14604.850	45.87	-27.29	41.90	31.26	68.20	22.33	V
13879.400	45.62	-29.51	41.30	33.83	68.20	22.58	V
10368.750	44.67	-33.22	38.19	39.70	68.20	23.53	V
11788.850	44.47	-31.99	38.98	37.48	74.00	29.53	V

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17358.700	48.49	-25.95	44.35	30.08	68.20	19.71	V
17064.450	48.39	-26.60	43.36	31.63	68.20	19.81	H
14632.350	45.93	-27.29	41.90	31.32	68.20	22.27	V
13204.550	45.82	-29.67	39.55	35.94	68.20	22.38	V
11902.150	44.71	-31.85	39.05	37.51	74.00	29.29	H
11349.400	44.62	-32.42	38.79	38.25	74.00	29.38	H

802.11n-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17216.250	48.66	-25.95	44.35	30.25	68.20	19.54	H
17067.750	48.39	-26.60	43.36	31.63	68.20	19.81	V
14650.500	46.36	-27.29	41.90	31.75	68.20	21.84	V
14318.850	45.98	-28.42	42.34	32.06	68.20	22.22	H
11912.600	45.32	-31.85	39.05	38.12	74.00	28.68	H
11822.950	45.07	-31.85	39.05	37.87	74.00	28.93	H

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17385.100	49.24	-25.95	44.35	30.83	68.20	18.96	V
17890.550	49.04	-25.50	46.66	27.88	74.00	24.96	H
13871.150	46.69	-29.51	41.30	34.90	68.20	21.51	V
14090.050	45.78	-29.44	41.66	33.56	68.20	22.42	H
11909.850	44.37	-31.85	39.05	37.17	74.00	29.63	V
11825.700	44.33	-31.85	39.05	37.13	74.00	29.67	V

802.11ac-HT20

Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17544.600	48.96	-26.85	45.25	30.56	68.20	19.24	H
16753.700	48.46	-26.62	41.49	33.59	68.20	19.74	H
13952.000	46.38	-29.51	41.30	34.59	68.20	21.82	H
14601.000	46.02	-27.29	41.90	31.41	68.20	22.18	H
11903.800	44.69	-31.85	39.05	37.49	74.00	29.31	H
11870.250	44.66	-31.85	39.05	37.46	74.00	29.34	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17540.750	49.39	-26.85	45.25	30.99	68.20	18.81	V
16979.200	48.66	-26.32	42.36	32.61	68.20	19.54	H
13980.600	46.41	-29.44	41.66	34.19	68.20	21.79	V
14082.350	45.74	-29.44	41.66	33.52	68.20	22.46	V
9120.250	44.74	-33.85	38.08	40.51	74.00	29.26	V
11924.700	44.51	-31.48	39.09	36.90	74.00	29.49	H

Channel 165

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17055.650	48.98	-26.60	43.36	32.22	68.20	19.22	H
16972.050	48.24	-26.32	42.36	32.19	68.20	19.96	H
14634.550	45.90	-27.29	41.90	31.29	68.20	22.30	H
14093.350	45.63	-29.44	41.66	33.41	68.20	22.57	H
11023.250	44.58	-32.49	38.72	38.34	74.00	29.42	H
11302.650	44.51	-32.36	38.77	38.11	74.00	29.49	V

802.11ac-HT40

Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17541.850	48.52	-26.85	45.25	30.12	68.20	19.68	V
17482.450	48.20	-26.85	45.25	29.80	68.20	20.00	V
14661.500	45.98	-27.29	41.90	31.37	68.20	22.22	V
14165.400	45.83	-28.99	42.00	32.81	68.20	22.37	V
11367.000	45.32	-32.42	38.79	38.95	74.00	28.68	V
11907.650	44.63	-31.85	39.05	37.43	74.00	29.37	V

Channel 159

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
16876.900	48.66	-26.32	42.36	32.61	68.20	19.54	H
17971.950	48.34	-25.50	46.66	27.18	74.00	25.66	H
14076.300	46.51	-29.44	41.66	34.29	68.20	21.69	V
14707.150	45.85	-28.32	41.35	32.83	68.20	22.35	V
11858.150	45.24	-31.85	39.05	38.04	74.00	28.76	H
11918.650	45.08	-31.48	39.09	37.47	74.00	28.92	H

802.11ac-HT80

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17965.350	48.78	-25.50	46.66	27.62	74.00	25.22	H
17539.100	48.38	-26.85	45.25	29.98	68.20	19.82	H
13976.200	46.09	-29.44	41.66	33.87	68.20	22.11	V
14104.350	45.90	-29.44	41.66	33.68	68.20	22.30	V
11909.850	45.06	-31.85	39.05	37.86	74.00	28.94	H
11790.500	44.94	-31.99	38.98	37.95	74.00	29.06	H

A.6. Band Edges Compliance

A6.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dBm/MHz)	
FCC 47 CFR Part 15.407	at the band edge	27
	at 5 MHz above or below the band edge	15.6
	at 25 MHz above or below the band edge	10
	at 75 MHz or more above or below the band edge	-27
	Note：increasing linearly from point to point.	

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.10	P
	5825 MHz	Fig.11	P
802.11n HT20	5745 MHz	Fig.12	P
	5825 MHz	Fig.13	P
802.11n HT40	5755 MHz	Fig.14	P
	5795 MHz	Fig.15	P
802.11ac HT20	5745 MHz	Fig.16	P
	5825 MHz	Fig.17	P
802.11ac HT40	5755 MHz	Fig.18	P
	5795 MHz	Fig.19	P
802.11ac HT80	5775 MHz	Fig.20 Fig.21	P

Conclusion: PASS

Test graphs as below:

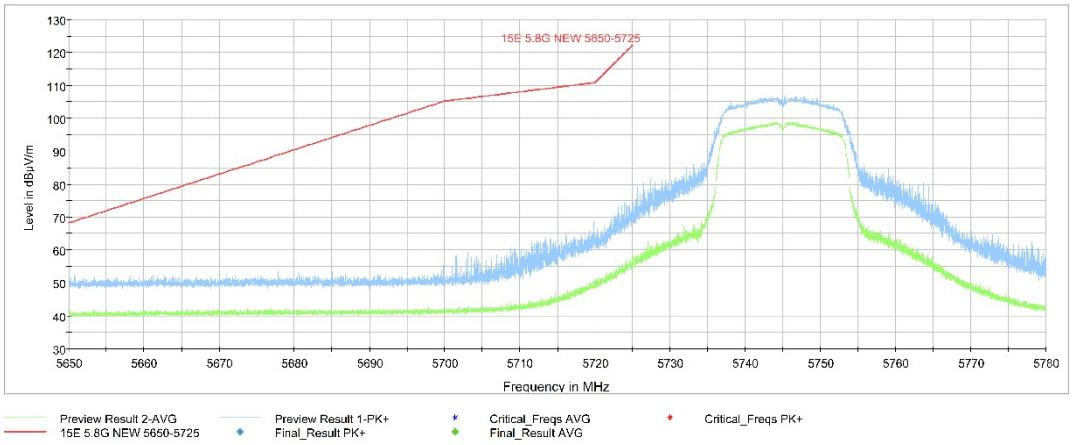

Fig. 10 Band Edges (802.11a Ch149,5745MHz)

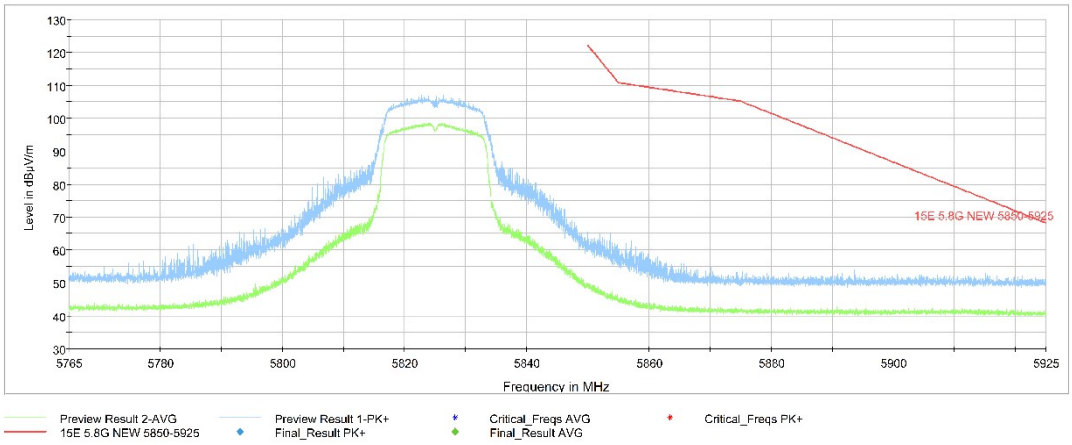

Fig. 11 Band Edges (802.11a Ch165, 5825MHz)

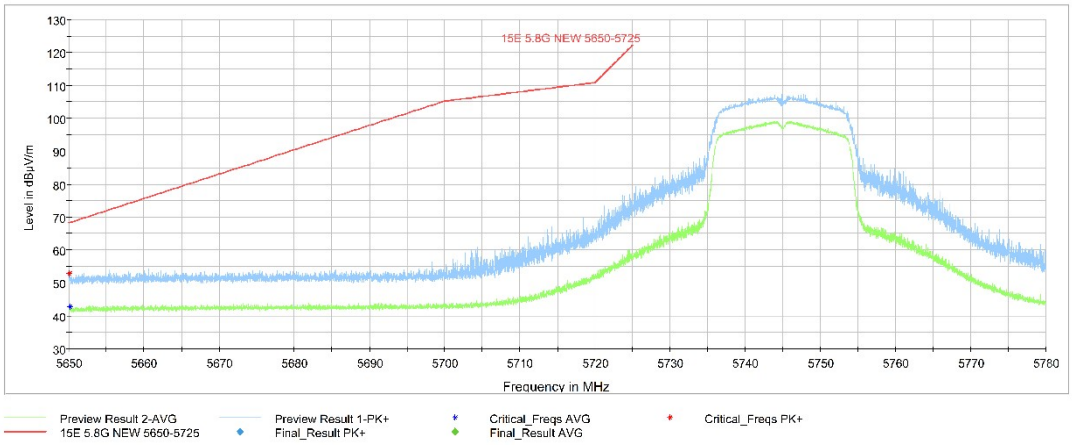

Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)

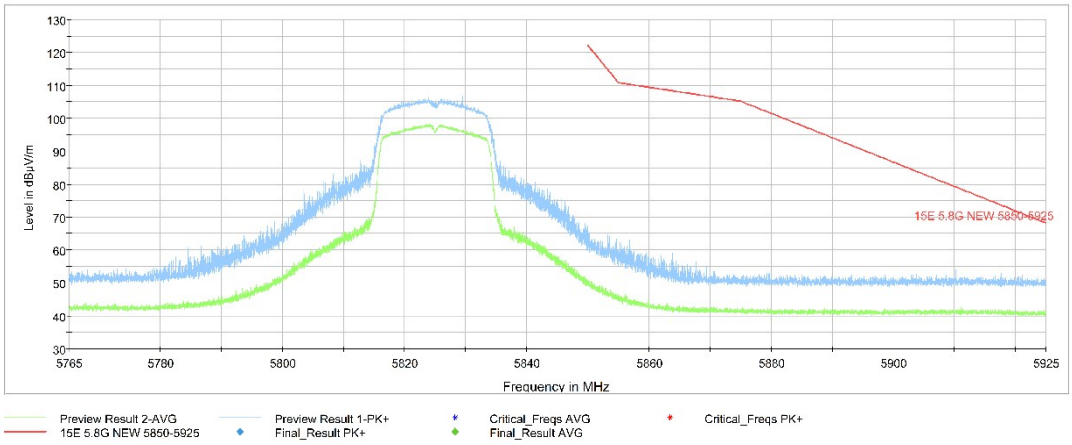

Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)

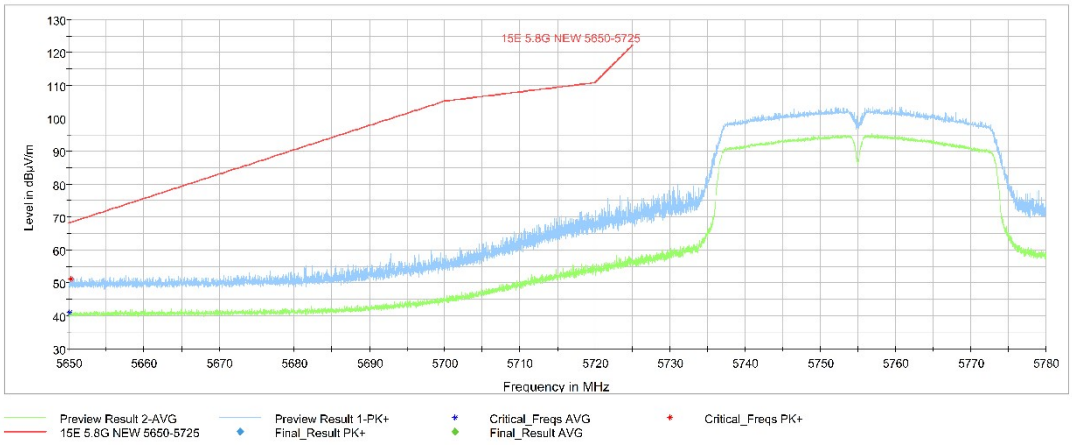

Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)

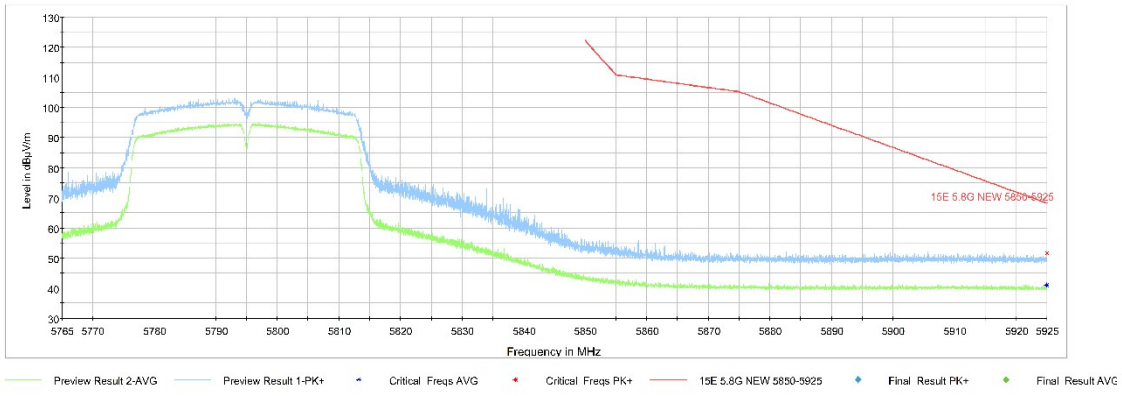

Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)

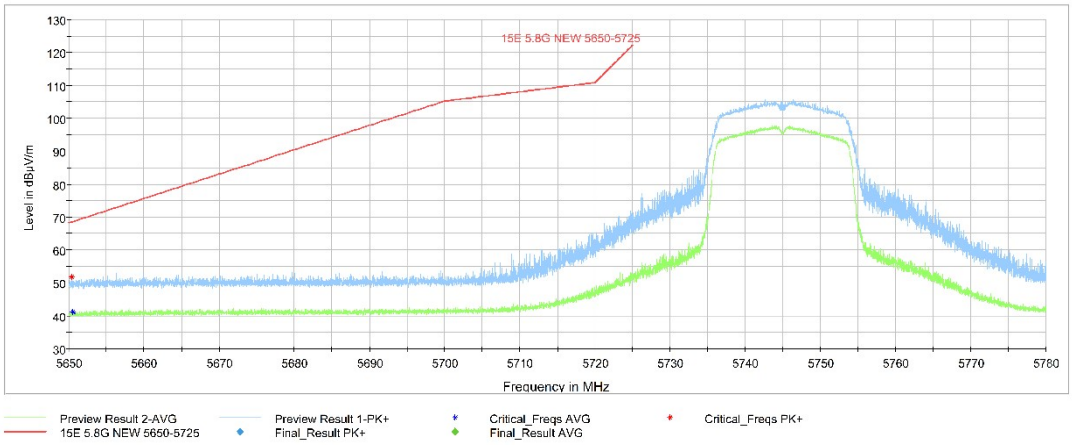

Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

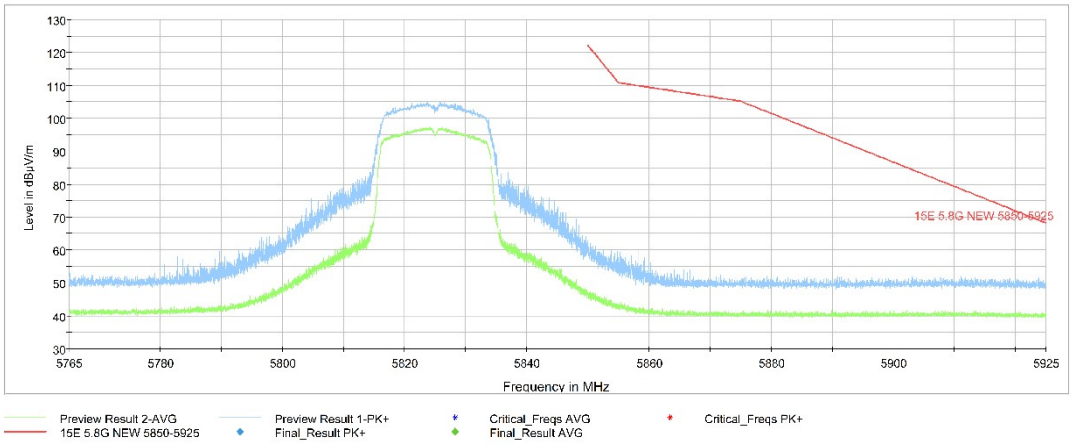

Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

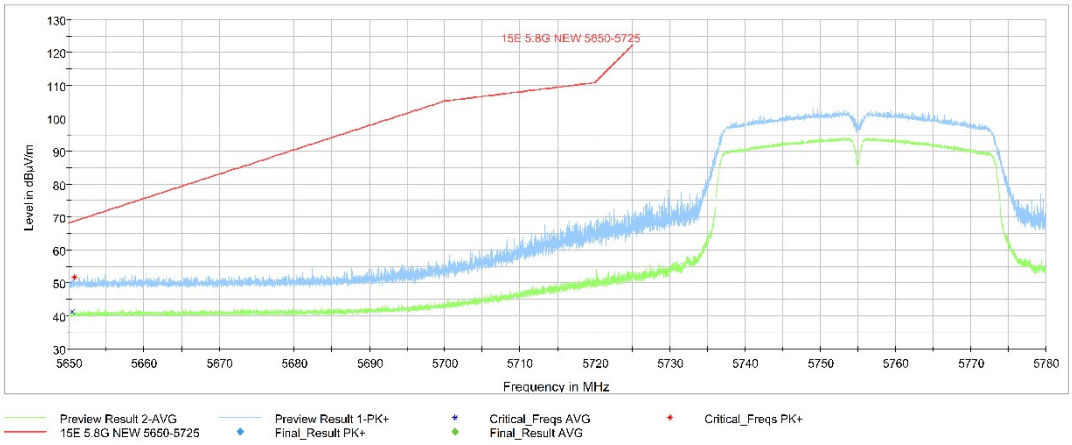

Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

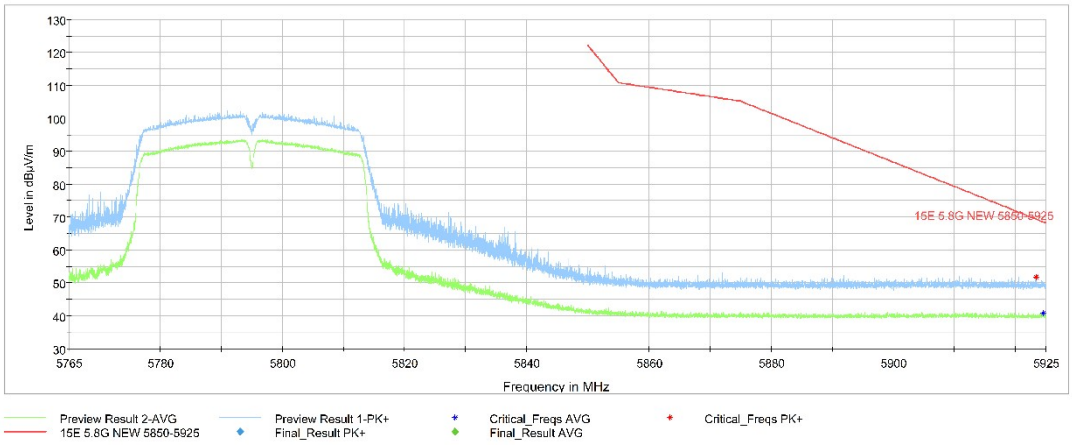

Fig. 19 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

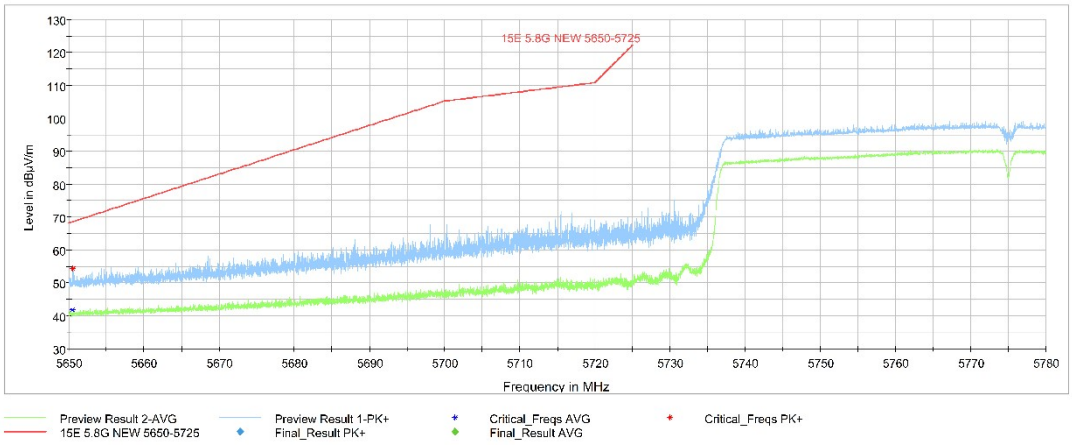

Fig. 20 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

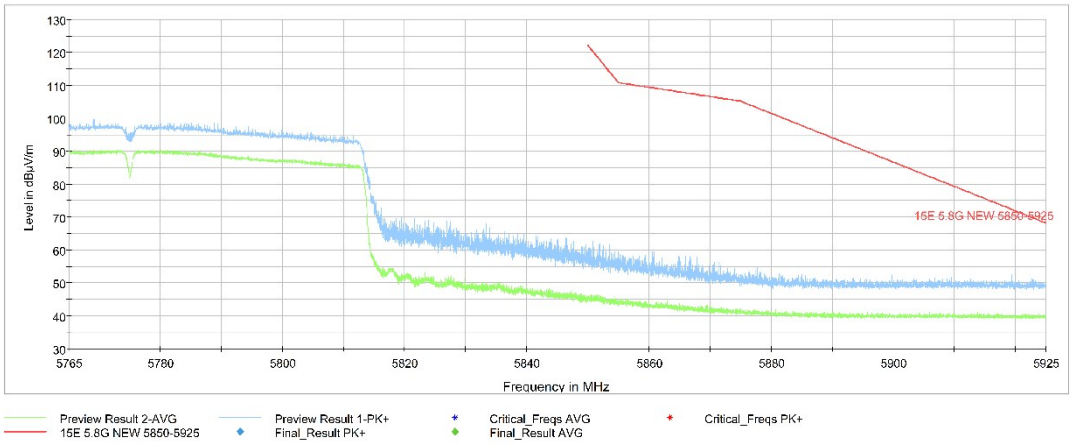

Fig. 21 Band Edges (802.11ac-HT80, 5775MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement uncertainty:

Expanded measurement uncertainty for this test item is U =3.08dB, k=2.

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.22	Fig.23	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.22	Fig.23	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

The measurement is made according to ANSI C63.10 .

Conclusion: PASS

Test graphs as below:

Traffic:

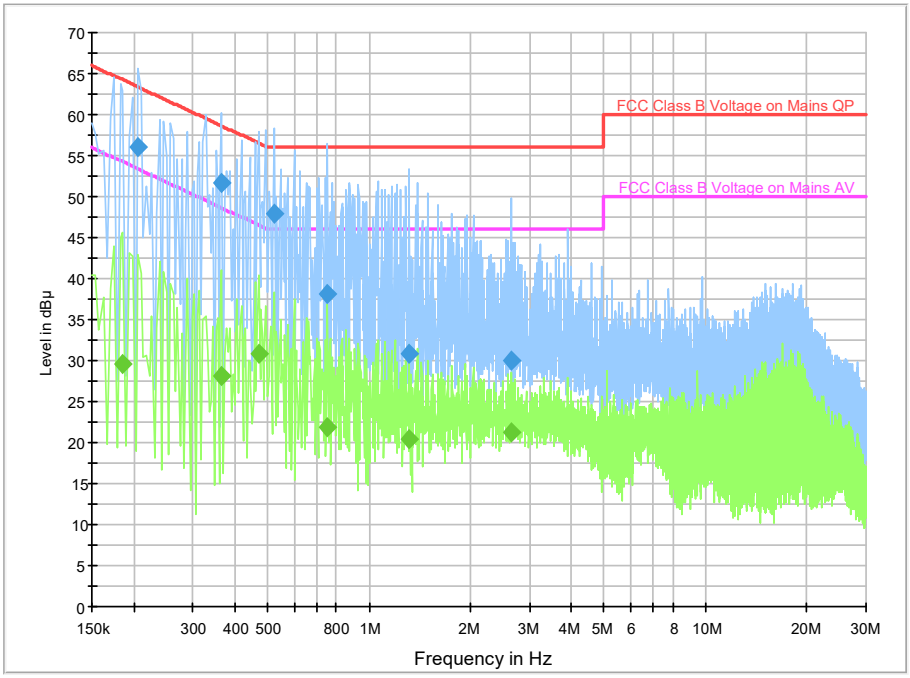

Fig. 22 AC Power line Conducted Emission-802.11a

Note1: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.206000	56.1	2000.0	9.000	On	N	19.7	7.3	63.4	
0.366000	51.6	2000.0	9.000	On	L1	19.7	7.0	58.6	
0.522000	48.0	2000.0	9.000	On	L1	19.7	8.0	56.0	
0.754000	38.1	2000.0	9.000	On	L1	19.7	17.9	56.0	
1.318000	30.8	2000.0	9.000	On	N	19.6	25.2	56.0	
2.642000	30.0	2000.0	9.000	On	L1	19.6	26.0	56.0	

Final Result 2

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.186000	29.5	2000.0	9.000	On	L1	19.7	24.7	54.2	
0.366000	28.1	2000.0	9.000	On	L1	19.7	20.4	48.6	
0.470000	30.9	2000.0	9.000	On	L1	19.7	15.6	46.5	
0.754000	21.8	2000.0	9.000	On	L1	19.7	24.2	46.0	
1.318000	20.4	2000.0	9.000	On	N	19.6	25.6	46.0	
2.642000	21.3	2000.0	9.000	On	L1	19.6	24.7	46.0	

Idle:

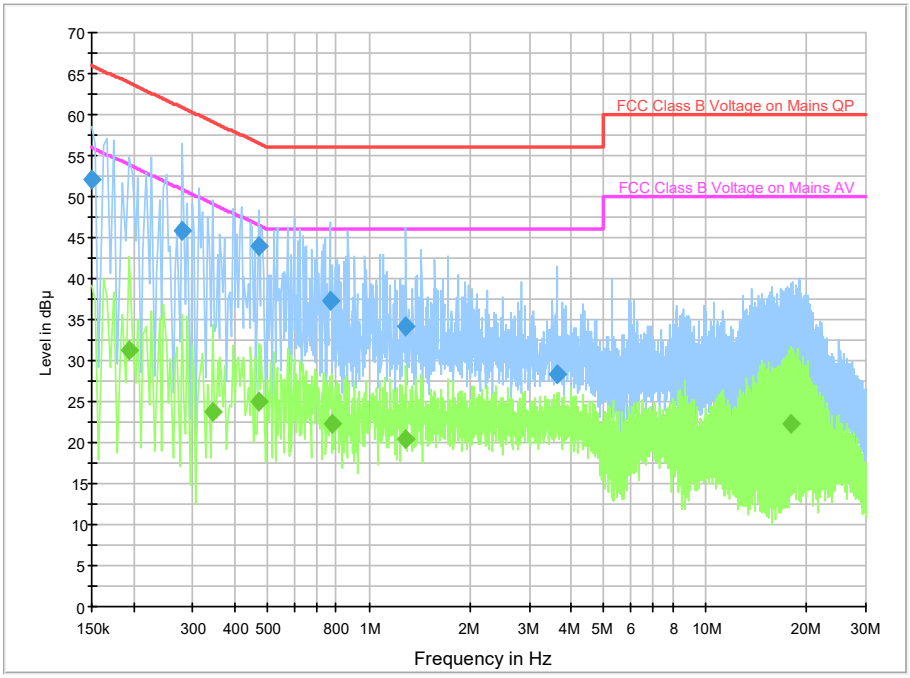

Fig. 23 AC Power line Conducted Emission-Idle

Note1: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.150000	52.1	2000.0	9.000	On	L1	20.0	13.9	66.0	
0.278000	45.9	2000.0	9.000	On	L1	19.7	15.0	60.9	
0.470000	43.9	2000.0	9.000	On	L1	19.7	12.6	56.5	
0.766000	37.3	2000.0	9.000	On	L1	19.7	18.7	56.0	
1.290000	34.3	2000.0	9.000	On	N	19.6	21.7	56.0	
3.614000	28.3	2000.0	9.000	On	L1	19.6	27.7	56.0	

Final Result 2

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.194000	31.3	2000.0	9.000	On	N	19.7	22.6	53.9	
0.342000	23.7	2000.0	9.000	On	L1	19.7	25.5	49.2	
0.470000	25.0	2000.0	9.000	On	L1	19.7	21.6	46.5	
0.774000	22.2	2000.0	9.000	On	N	19.7	23.8	46.0	
1.290000	20.5	2000.0	9.000	On	N	19.6	25.5	46.0	
17.982000	22.3	2000.0	9.000	On	L1	19.7	27.7	50.0	

ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-10-01 through 2023-09-30
Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

***** END OF REPORT BODY *****