



FCC PART 15C TEST REPORT No.I22Z60731-IOT08

for

Wingtech Group (Hong Kong) Limited

4G Mobile phone

WTCKT01

With

FCC ID: 2APXW-WTCKT01

Hardware Version: V1.1

Software Version: WTCKT01_0.01.40

Issued Date: 2019-07-08

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.

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REPORT HISTORY

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1. TEST LABORATORY

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

1.3. Testing Environment

Normal Temperature: 15-35°C

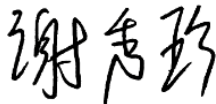
Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2022-04-13

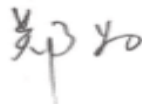
Testing End Date: 2022-07-08

1.5. Signature



Xie Xiuzhen

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Hu Xiaoyu

(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: Wingtech Group (Hong Kong) Limited
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HK
City: Hong Kong
Postal Code: /
Country: China
sharui@wingtech.com
Telephone: +86-21-53529900
Fax: /

2.2. Manufacturer Information

Company Name: Wingtech Group (Hong Kong) Limited
Address: Flat/RM 1802 18/F, Podium Plaza, 5 Hanoi Road, Tsim Sha Tsui, KL,
HK
City: Hong Kong
Postal Code: /
Country: China
sharui@wingtech.com
Telephone: +86-21-53529900
Fax: /

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

Description	4G Mobile phone
Model name	WTCKT01
FCC ID	2APXW-WTCKT01
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
UT05a	861024060013982	V1.1	WTCKT01_0.01.40
UT62a	861024060010442	V1.1	WTCKT01_0.01.40

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

3.3. Internal Identification of AE used during the test

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

AE1

Model	JU001
Manufacturer	Jiade Energy Technology (Zhuhai) Co.,Ltd.
Capacity	4000mAh
Nominal Voltage	3.85V

AE2

Model	TPA-46B050100UU
Manufacturer	SHENZHEN TIANYIN ELECTRONICS CO.,LTD
Length of cable	/

AE3

Model	USB TYPE A to C 2.0 Cable
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	2018
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/manufacture 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°C
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	FSQ40	200089	Rohde & Schwarz	1 year	2023-05-15
2	Test Receiver	ESCI	100344	R&S	1 year	2023-03-21
3	LISN	ENV216	101200	R&S	1 year	2022-06-29
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	103023	R&S	1 year	2022-10-28
2	EMI Antenna	VULB 9163	302	SCHWARZBECK	1 year	2022-12-28
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2022-07-01

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)
$30\text{MHz} \leq f \leq 2\text{GHz}$	1.22
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	1.22
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.22
$8\text{GHz} \leq f \leq 12.75\text{GHz}$	1.51
$12.75\text{GHz} \leq f \leq 26\text{GHz}$	1.51
$26\text{GHz} \leq f \leq 40\text{GHz}$	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.15
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.54
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

8.6. AC Power-line Conducted Emission

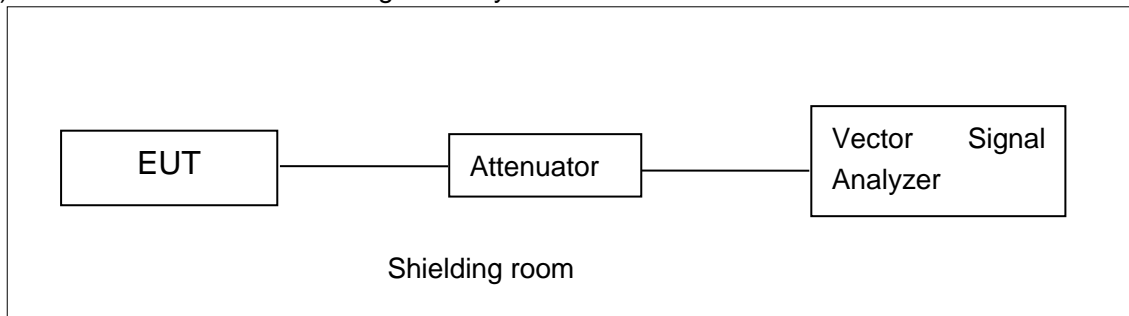
Measurement Uncertainty : 3.08dB,k=2

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

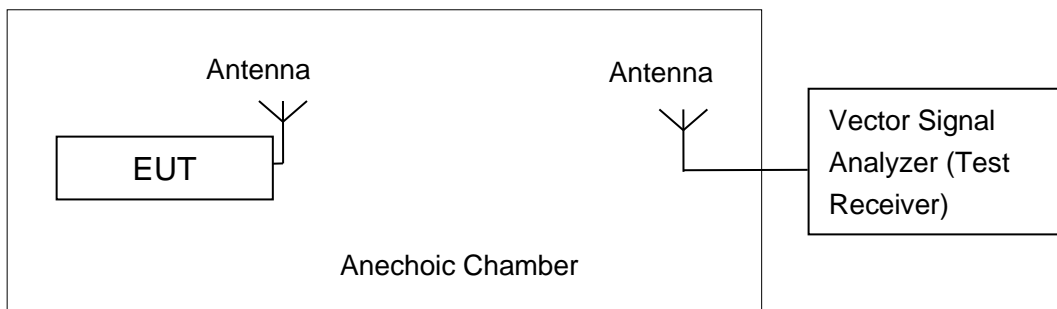


A.1.2. Radiated Emission Measurements

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 -0.07dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Peak Output Power-conducted

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	18.64	18.97	18.48

The data rate 6Mbps is selected as worse 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	17.44	17.36	17.11

The data rate MCS0 is selected as worse 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	17.56	17.37	17.04

The data rate MCS0 is selected as worse 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	16.31	16.25

The data rate MCS0 is selected as worse 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	16.61	16.67

The data rate MCS0 is selected as worse 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	16.36

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

Conclusion: PASS

The duty cycle of all mode are 100%.

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
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Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	5.38	P
	157	5.48	P
	165	5.24	P
802.11ac HT20	149	5.08	P
	157	5.16	P
	165	4.93	P
802.11ac HT40	151	1.27	P
	159	1.41	P
802.11ac HT80	155	-2.04	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
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Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
		Fig.	Value	
802.11a	149	Fig.1	16.30	P
	157	Fig.2	16.35	P
	165	Fig.3	16.35	P
802.11ac HT20	149	Fig.4	17.55	P
	157	Fig.5	17.55	P
	165	Fig.6	17.60	P
802.11ac HT40	151	Fig.7	36.32	P
	159	Fig.8	36.08	P
802.11ac HT80	155	Fig.9	76.32	P

Conclusion: PASS

Test graphs as below:

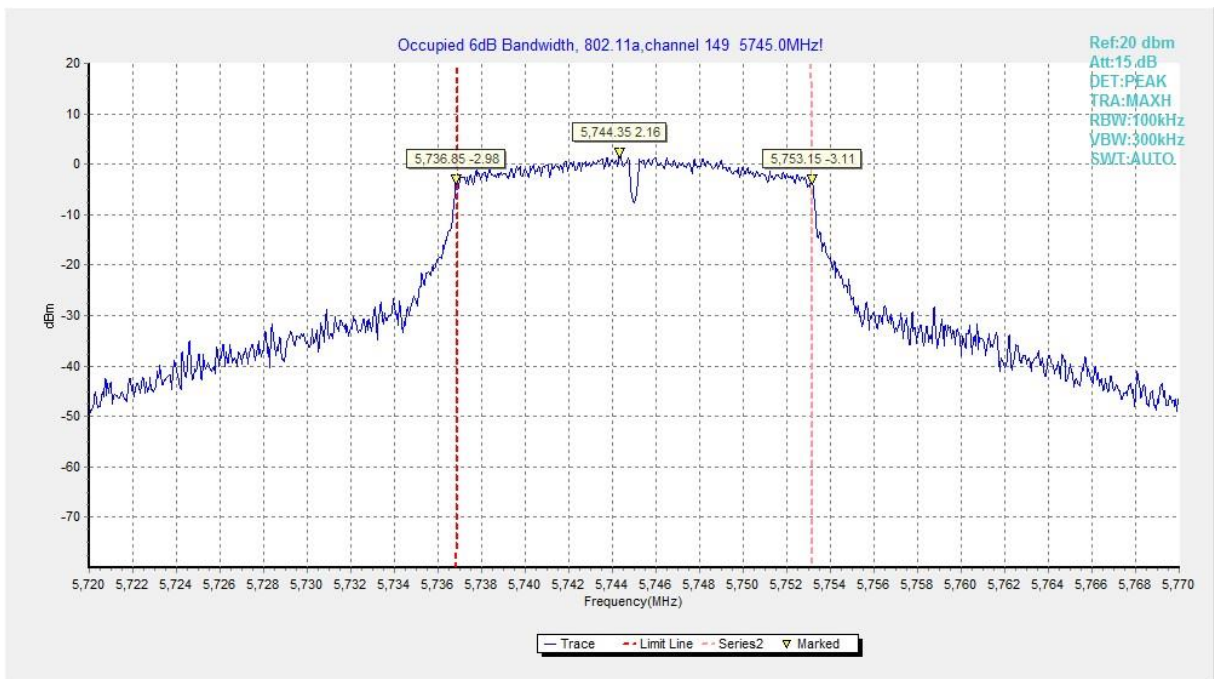


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

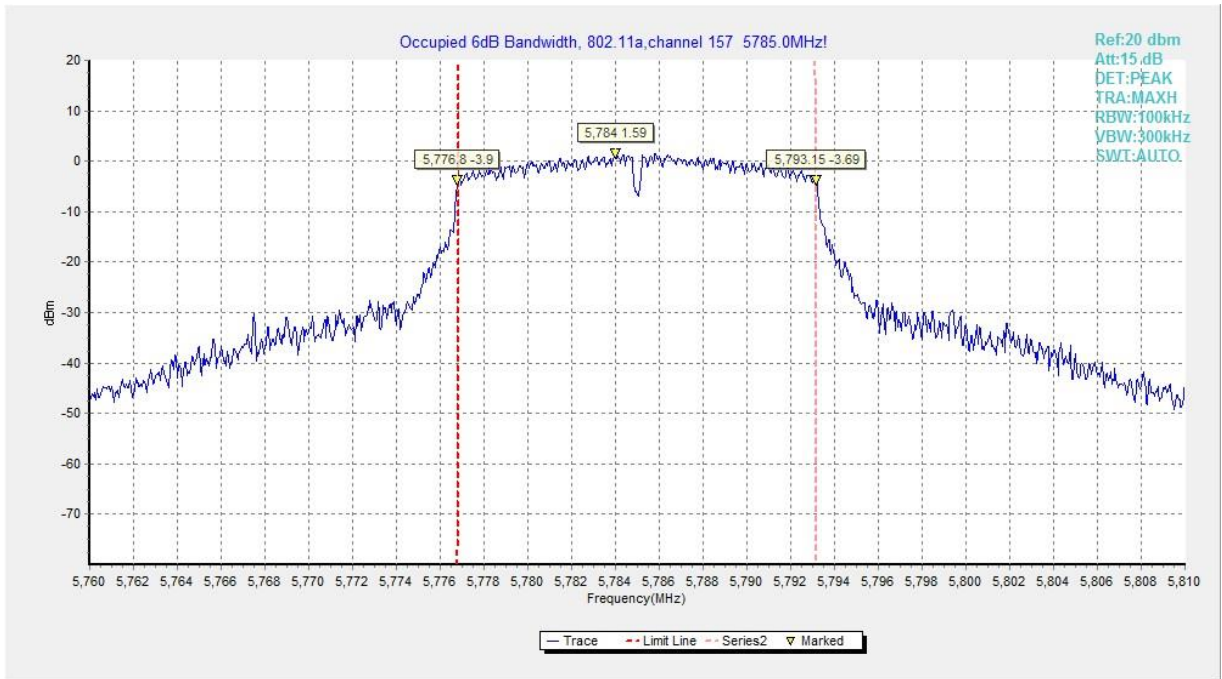


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

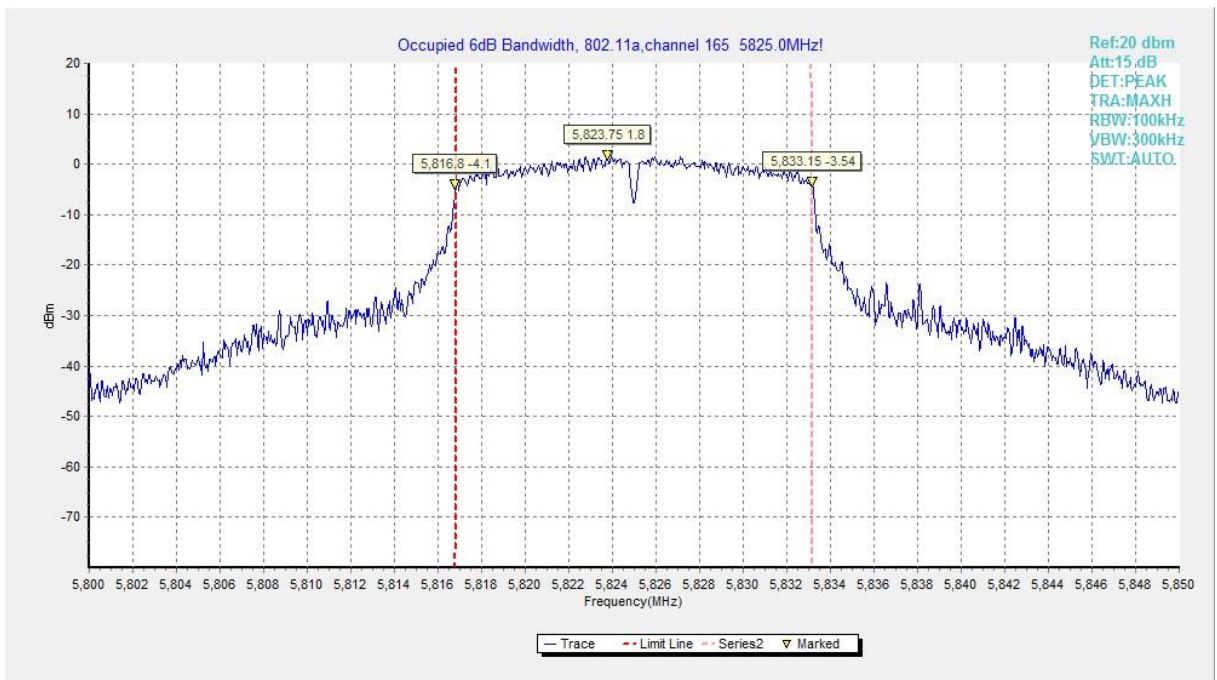


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

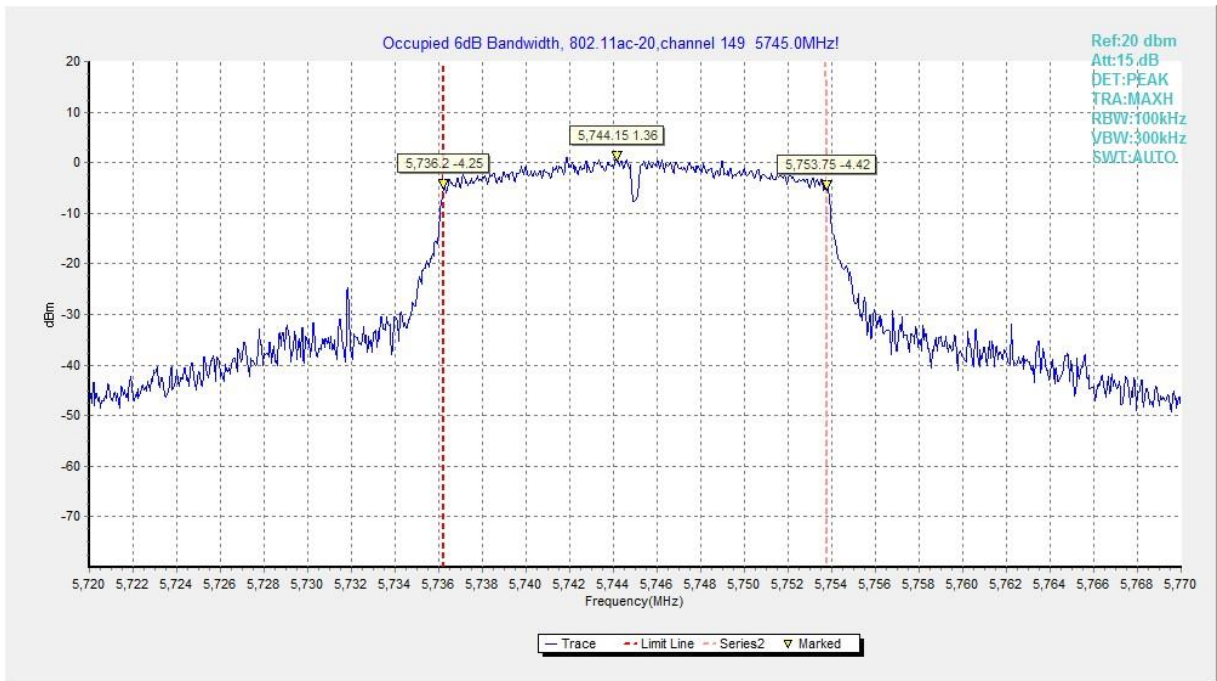


Fig. 4 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)

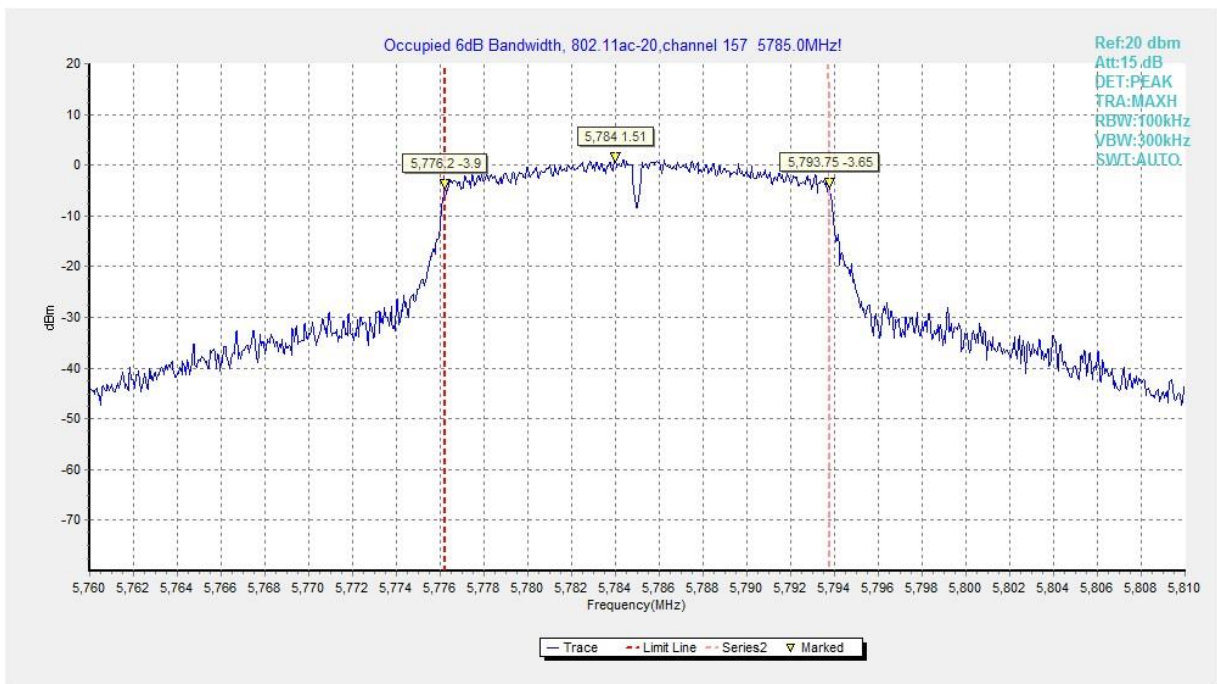


Fig. 5 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)

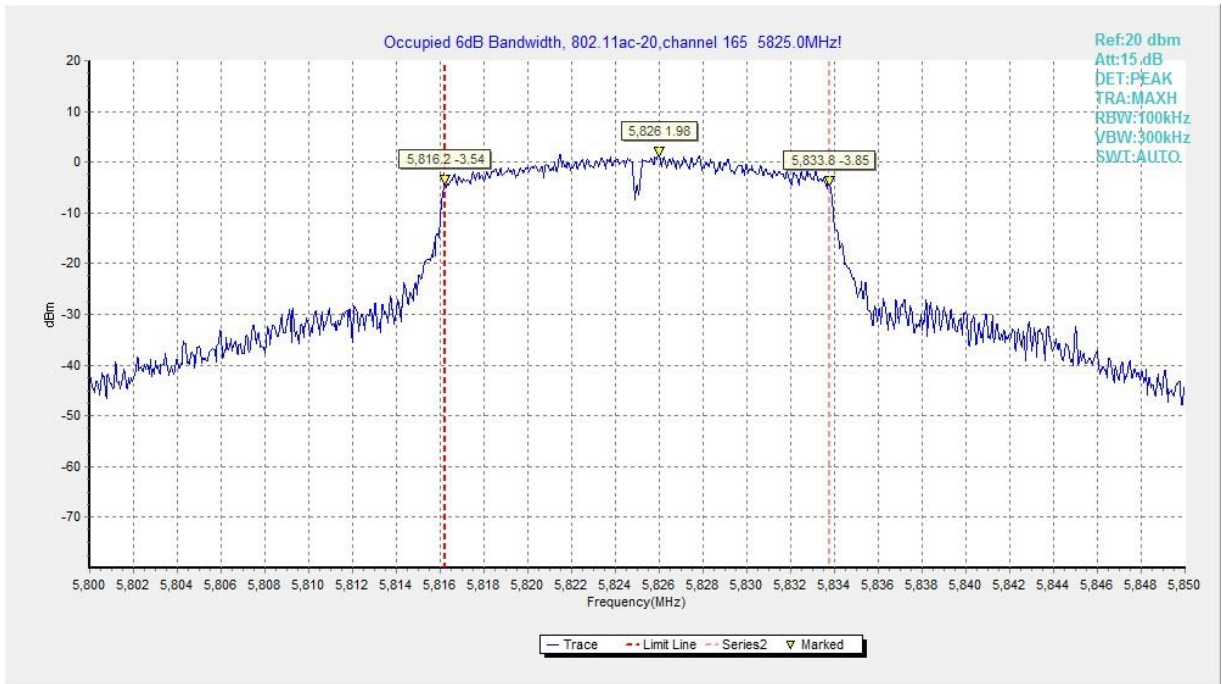


Fig. 6 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)

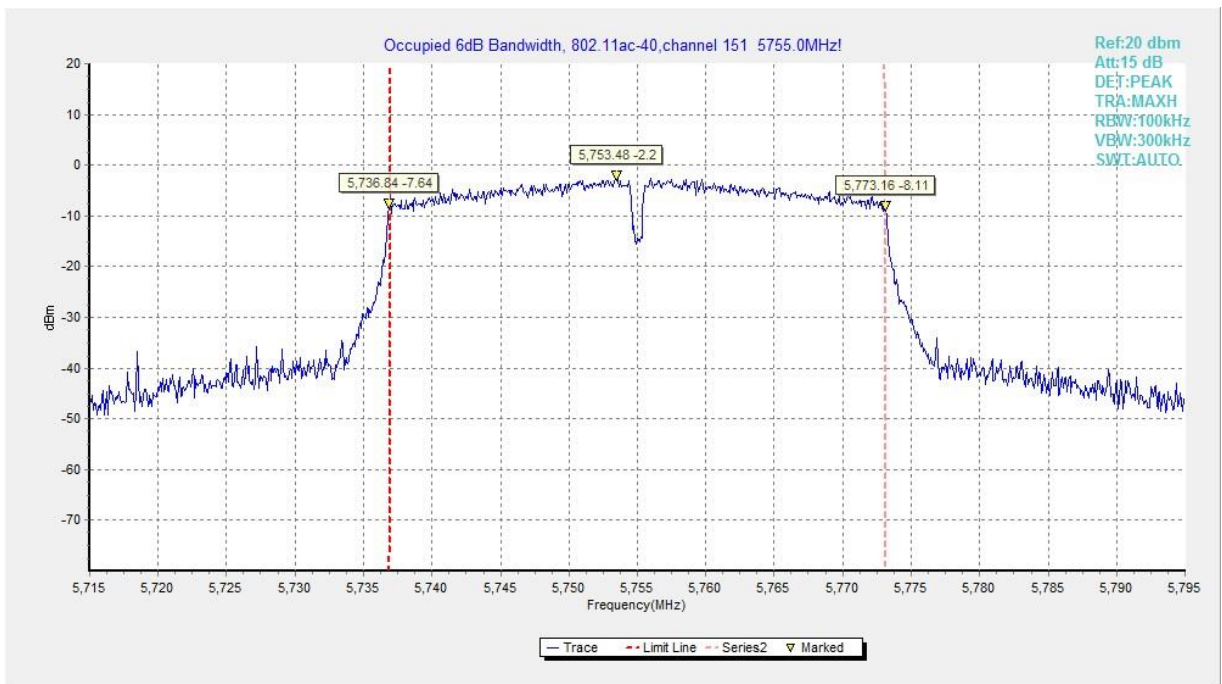


Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)

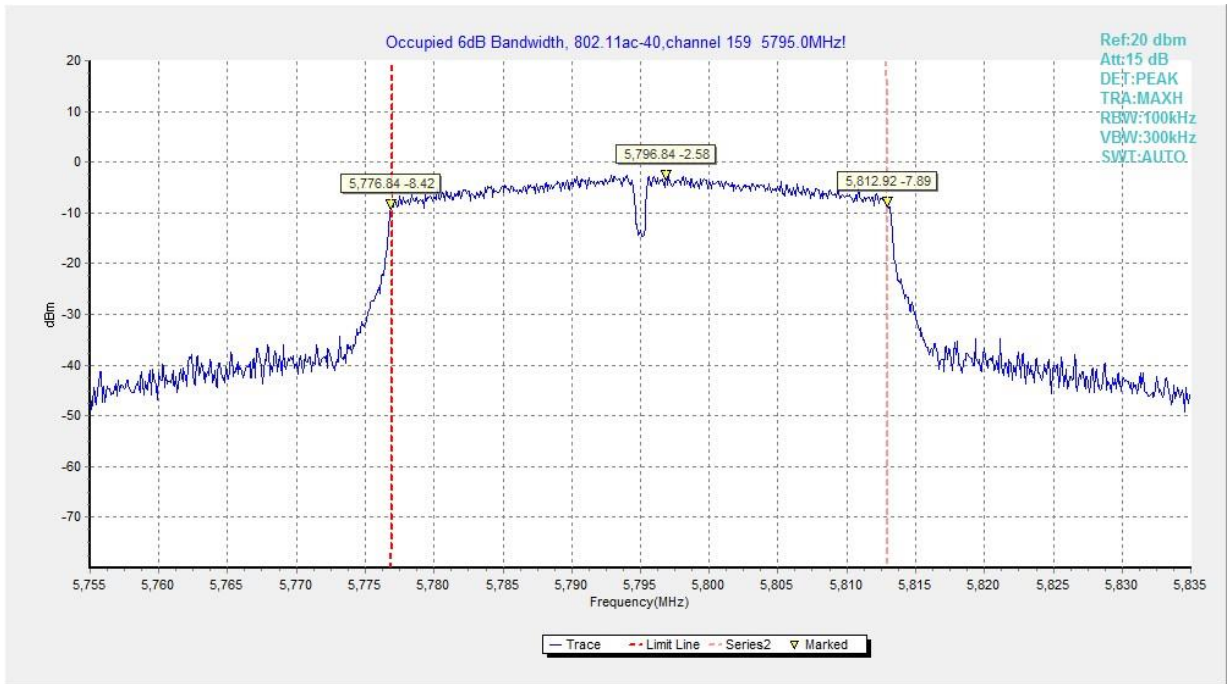


Fig. 8 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 159)

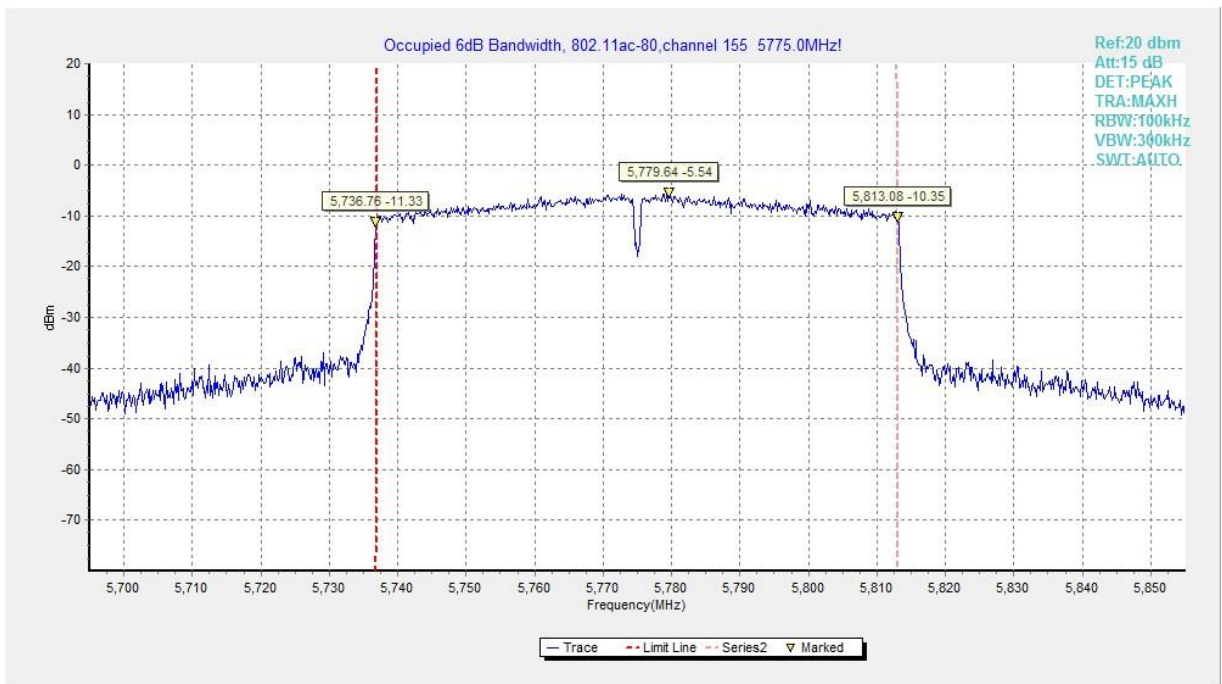


Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

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
	165	26.5 GHz~ 40 GHz	---	P
		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
	165	26.5 GHz~ 40 GHz	---	P
		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
	165	26.5 GHz~ 40 GHz	---	P
		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)
17743.200	41.56	-25.50	46.66	20.40	54.00	12.44	V
17796.500	41.54	-25.50	46.66	20.38	54.00	12.46	H
16142.100	38.09	-26.77	38.93	25.93	54.00	15.91	H
16048.600	37.90	-27.35	38.54	26.71	54.00	16.10	H
11930.800	36.05	-31.48	39.09	28.44	54.00	17.95	H
11890.600	36.01	-31.85	39.05	28.81	54.00	17.99	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)
17977.500	41.60	-25.50	46.66	20.44	54.00	12.40	H
17982.400	41.53	-25.50	46.66	20.37	54.00	12.47	H
16043.600	38.00	-27.35	38.54	26.81	54.00	16.00	V
16148.100	37.95	-26.77	38.93	25.79	54.00	16.05	V
11951.600	36.25	-31.48	39.09	28.64	54.00	17.75	H
11961.000	36.03	-31.48	39.09	28.42	54.00	17.97	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)
17963.700	41.64	-25.50	46.66	20.48	54.00	12.36	V
17959.300	41.49	-25.50	46.66	20.33	54.00	12.51	V
16042.500	38.05	-27.35	38.54	26.86	54.00	15.95	V
16146.500	38.05	-26.77	38.93	25.89	54.00	15.95	H
11043.600	35.99	-32.49	38.72	29.75	54.00	18.01	H
11988.500	35.96	-31.48	39.09	28.35	54.00	18.04	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)
17752.000	41.50	-25.50	46.66	20.34	54.00	12.50	H
17869.700	41.48	-25.50	46.66	20.32	54.00	12.52	H
14495.400	38.00	-28.59	42.46	24.13	54.00	16.00	H
14486.600	37.92	-28.59	42.46	24.05	54.00	16.08	H
11925.800	36.06	-31.48	39.09	28.45	54.00	17.94	V
11961.500	36.06	-31.48	39.09	28.45	54.00	17.94	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)
17984.600	41.55	-25.50	46.66	20.39	54.00	12.45	V
17712.300	41.52	-25.74	45.95	21.31	54.00	12.48	H
15976.000	38.14	-27.35	38.54	26.95	54.00	15.86	V
16149.800	38.04	-26.77	38.93	25.88	54.00	15.96	V
11933.000	36.08	-31.48	39.09	28.47	54.00	17.92	H
11999.000	36.01	-31.48	39.09	28.40	54.00	17.99	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)
17996.200	41.66	-25.50	46.66	20.50	54.00	12.34	H
17959.800	41.59	-25.50	46.66	20.43	54.00	12.41	H
16059.000	37.93	-26.77	38.93	25.77	54.00	16.07	V
16051.400	37.83	-27.35	38.54	26.64	54.00	16.17	H
11838.900	36.13	-31.85	39.05	28.93	54.00	17.87	V
11935.100	36.03	-31.48	39.09	28.42	54.00	17.97	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)
17967.000	41.64	-25.50	46.66	20.48	54.00	12.36	H
17705.200	41.53	-25.74	45.95	21.32	54.00	12.47	H
16053.500	38.10	-27.35	38.54	26.91	54.00	15.90	V
16150.900	38.03	-26.77	38.93	25.87	54.00	15.97	V
11929.100	36.19	-31.48	39.09	28.58	54.00	17.81	V
11979.700	36.00	-31.48	39.09	28.39	54.00	18.00	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)
17719.500	41.64	-25.74	45.95	21.43	54.00	12.36	H
17978.500	41.61	-25.50	46.66	20.45	54.00	12.39	V
16152.000	38.03	-26.77	38.93	25.87	54.00	15.97	V
14477.800	38.02	-28.59	42.46	24.15	54.00	15.98	H
11990.700	36.25	-31.48	39.09	28.64	54.00	17.75	H
11998.400	36.02	-31.48	39.09	28.41	54.00	17.98	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)
17954.300	41.71	-25.50	46.66	20.55	54.00	12.29	H
17976.900	41.55	-25.50	46.66	20.39	54.00	12.45	V
16137.700	38.34	-26.77	38.93	26.18	54.00	15.66	H
16054.600	38.11	-27.35	38.54	26.92	54.00	15.89	V
11946.700	36.07	-31.48	39.09	28.46	54.00	17.93	H
11944.000	36.05	-31.48	39.09	28.44	54.00	17.95	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)
17863.600	41.56	-25.50	46.66	20.40	54.00	12.44	V
17804.800	41.53	-25.50	46.66	20.37	54.00	12.47	V
16062.400	38.19	-26.77	38.93	26.03	54.00	15.81	V
16075.500	37.98	-26.77	38.93	25.82	54.00	16.02	V
11920.900	36.19	-31.48	39.09	28.58	54.00	17.81	V
11988.000	36.03	-31.48	39.09	28.42	54.00	17.97	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)
17700.800	41.56	-25.74	45.95	21.35	54.00	12.44	H
17752.000	41.52	-25.50	46.66	20.36	54.00	12.48	V
16055.200	37.91	-27.35	38.54	26.72	54.00	16.09	H
15989.200	37.84	-27.35	38.54	26.65	54.00	16.16	H
11994.500	36.30	-31.48	39.09	28.69	54.00	17.70	V
11918.100	36.11	-31.48	39.09	28.50	54.00	17.89	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)
17756.900	41.63	-25.50	46.66	20.47	54.00	12.37	V
17716.200	41.56	-25.74	45.95	21.35	54.00	12.44	H
16049.700	38.28	-27.35	38.54	27.09	54.00	15.72	H
14487.100	38.03	-28.59	42.46	24.16	54.00	15.97	V
11989.600	36.10	-31.48	39.09	28.49	54.00	17.90	H
11947.800	36.00	-31.48	39.09	28.39	54.00	18.00	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)
17968.100	41.67	-25.50	46.66	20.51	54.00	12.33	H
17947.800	41.47	-25.50	46.66	20.31	54.00	12.53	H
16141.000	38.02	-26.77	38.93	25.86	54.00	15.98	V
16057.400	37.94	-26.77	38.93	25.78	54.00	16.06	V
11995.600	36.14	-31.48	39.09	28.53	54.00	17.86	V
11948.400	36.02	-31.48	39.09	28.41	54.00	17.98	V

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)
17790.500	41.59	-25.50	46.66	20.43	54.00	12.41	V
17808.000	41.54	-25.50	46.66	20.38	54.00	12.46	V
15978.200	38.14	-27.35	38.54	26.95	54.00	15.86	V
13348.600	37.93	-29.49	39.71	27.71	54.00	16.07	H
11857.600	36.14	-31.85	39.05	28.94	54.00	17.86	H
11997.900	36.14	-31.48	39.09	28.53	54.00	17.86	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)
17246.500	52.07	-25.95	44.35	33.66	68.30	16.23	H
17990.700	51.90	-25.50	46.66	30.74	74.00	22.10	H
16973.200	50.58	-26.32	42.36	34.53	68.30	17.72	H
13702.300	50.15	-29.10	40.86	38.38	68.30	18.15	H
11544.600	46.92	-32.26	38.84	40.35	74.00	27.08	V
11792.100	46.50	-31.99	38.98	39.51	74.00	27.50	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)
17709.600	52.25	-25.74	45.95	32.04	74.00	21.75	H
17453.300	52.09	-26.85	45.25	33.69	68.30	16.21	V
16971.000	51.45	-26.32	42.36	35.40	68.30	16.85	V
13553.200	50.96	-29.56	39.99	40.53	68.30	17.34	H
11913.700	47.47	-31.48	39.09	39.86	74.00	26.53	V
11758.000	46.60	-31.99	38.98	39.61	74.00	27.40	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)
17775.600	52.45	-25.50	46.66	31.29	74.00	21.55	H
17258.600	52.05	-25.95	44.35	33.64	68.30	16.25	V
16542.000	50.39	-26.96	39.82	37.53	68.30	17.91	H
13506.000	50.37	-29.56	39.99	39.94	68.30	17.93	H
11606.800	46.75	-32.31	38.91	40.16	74.00	27.25	H
11771.200	46.74	-31.99	38.98	39.75	74.00	27.26	H

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)
17797.000	52.54	-25.50	46.66	31.38	74.00	21.46	V
17685.400	51.92	-25.74	45.95	31.71	68.30	16.38	V
16556.200	51.00	-26.87	40.65	37.22	68.30	17.30	H
13592.300	50.44	-29.50	40.43	39.51	68.30	17.86	V
11519.900	47.00	-32.26	38.84	40.43	74.00	27.00	V
11984.600	46.72	-31.48	39.09	39.11	74.00	27.28	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)
17997.200	51.98	-25.50	46.66	30.82	74.00	22.02	V
17690.300	51.87	-25.74	45.95	31.66	68.30	16.43	H
16845.500	50.86	-26.62	41.49	35.99	68.30	17.44	H
16521.600	50.52	-26.96	39.82	37.66	68.30	17.78	V
11919.200	46.28	-31.48	39.09	38.67	74.00	27.72	H
11898.900	46.13	-31.85	39.05	38.93	74.00	27.87	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)
17682.100	52.65	-25.74	45.95	32.44	68.30	15.65	V
17665.000	52.32	-25.74	45.95	32.11	68.30	15.98	V
16730.000	50.19	-26.62	41.49	35.32	68.30	18.11	V
16747.100	50.01	-26.62	41.49	35.14	68.30	18.29	V
11451.700	46.94	-32.26	38.84	40.37	74.00	27.06	V
11135.500	46.58	-32.60	38.75	40.44	74.00	27.42	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)
17827.800	52.94	-25.50	46.66	31.78	74.00	21.06	V
17821.800	52.16	-25.50	46.66	31.00	74.00	21.84	V
16945.700	50.92	-26.32	42.36	34.87	68.30	17.38	V
16925.300	50.89	-26.32	42.36	34.84	68.30	17.41	H
11994.500	47.02	-31.48	39.09	39.41	74.00	26.98	V
10639.400	46.93	-32.76	38.38	41.31	74.00	27.07	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)
17759.100	52.59	-25.50	46.66	31.43	74.00	21.41	V
17398.300	52.10	-26.85	45.25	33.70	68.30	16.20	H
16877.500	51.01	-26.32	42.36	34.96	68.30	17.29	V
16648.100	50.41	-26.87	40.65	36.63	68.30	17.89	H
11990.700	47.24	-31.48	39.09	39.63	74.00	26.76	H
11929.100	46.74	-31.48	39.09	39.13	74.00	27.26	H

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)
17784.400	52.06	-25.50	46.66	30.90	74.00	21.94	V
17359.800	52.04	-25.95	44.35	33.63	68.30	16.26	V
16572.200	50.48	-26.87	40.65	36.70	68.30	17.82	V
16595.300	50.47	-26.87	40.65	36.69	68.30	17.83	H
11930.200	47.71	-31.48	39.09	40.10	74.00	26.29	V
11984.100	46.42	-31.48	39.09	38.81	74.00	27.58	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)
17249.800	52.15	-25.95	44.35	33.74	68.30	16.15	V
17822.900	51.83	-25.50	46.66	30.67	74.00	22.17	H
13568.100	50.58	-29.50	40.43	39.65	68.30	17.72	V
16863.200	50.45	-26.62	41.49	35.58	68.30	17.85	V
11879.000	47.30	-31.85	39.05	40.10	74.00	26.70	V
11527.600	47.02	-32.26	38.84	40.45	74.00	26.98	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)
17791.500	52.46	-25.50	46.66	31.30	74.00	21.54	V
17376.800	52.17	-25.95	44.35	33.76	68.30	16.13	H
13554.900	50.57	-29.56	39.99	40.14	68.30	17.73	V
13553.200	50.46	-29.56	39.99	40.03	68.30	17.84	V
11042.500	46.68	-32.49	38.72	40.44	74.00	27.32	H
11938.500	46.41	-31.48	39.09	38.80	74.00	27.59	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)
17326.200	52.12	-25.95	44.35	33.71	68.30	16.18	V
17942.200	52.03	-25.50	46.66	30.87	74.00	21.97	H
13666.500	50.58	-29.50	40.43	39.65	68.30	17.72	H
13604.400	50.52	-29.50	40.43	39.59	68.30	17.78	V
11860.900	46.80	-31.85	39.05	39.60	74.00	27.20	V
11585.400	46.50	-32.31	38.91	39.91	74.00	27.50	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)
17219.000	52.41	-25.95	44.35	34.00	68.30	15.89	V
17881.800	51.94	-25.50	46.66	30.78	74.00	22.06	H
16405.000	49.96	-26.96	39.82	37.10	68.30	18.34	V
13520.200	49.94	-29.56	39.99	39.51	68.30	18.36	V
11423.100	46.52	-32.42	38.79	40.15	74.00	27.48	H
11820.200	46.48	-31.85	39.05	39.28	74.00	27.52	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)
17769.000	52.22	-25.50	46.66	31.06	74.00	21.78	H
17297.100	52.00	-25.95	44.35	33.59	68.30	16.30	H
16962.200	50.41	-26.32	42.36	34.36	68.30	17.89	H
16577.700	50.23	-26.87	40.65	36.45	68.30	18.07	H
11904.400	47.27	-31.85	39.05	40.07	74.00	26.73	H
10572.200	47.11	-32.99	38.27	41.82	68.30	21.19	V

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:

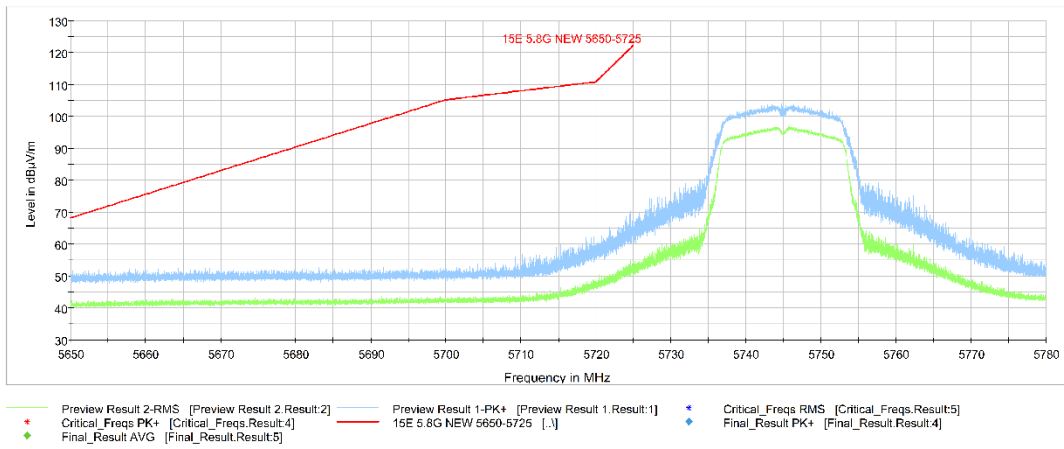


Fig. 10 Band Edges (802.11a Ch149,5745MHz)

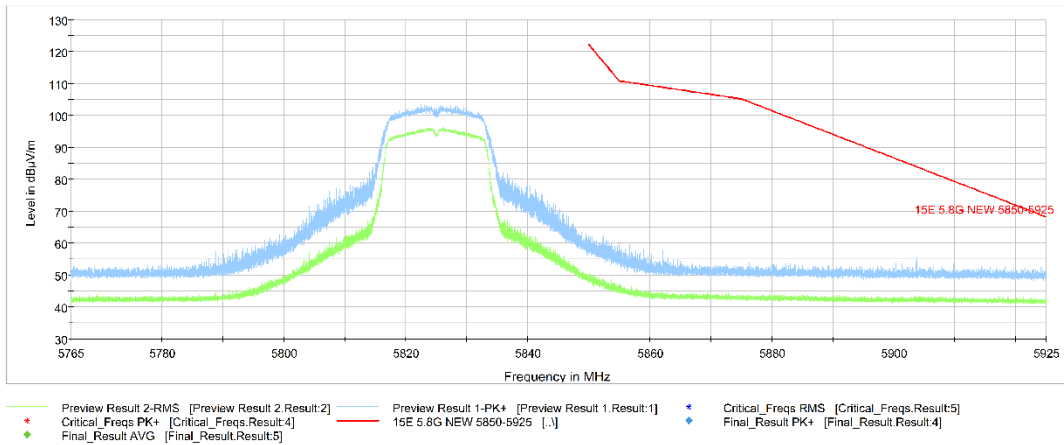


Fig. 11 Band Edges (802.11a Ch165, 5825MHz)

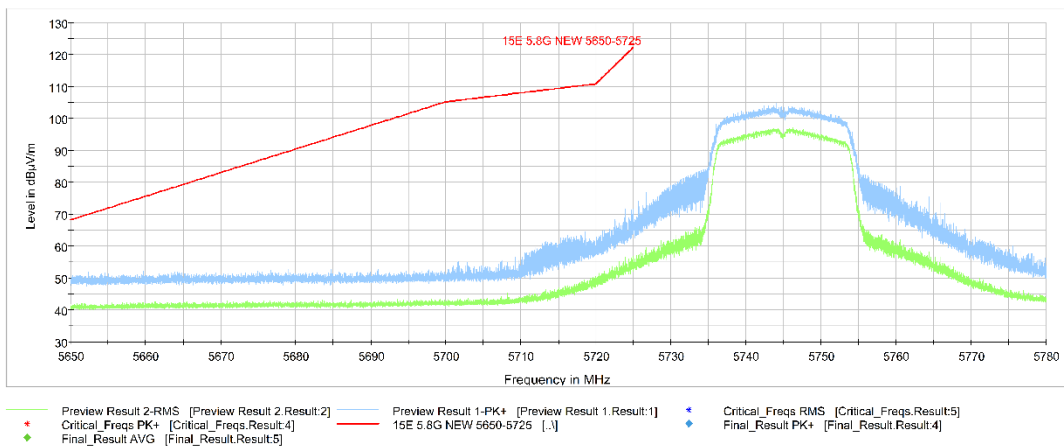


Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)

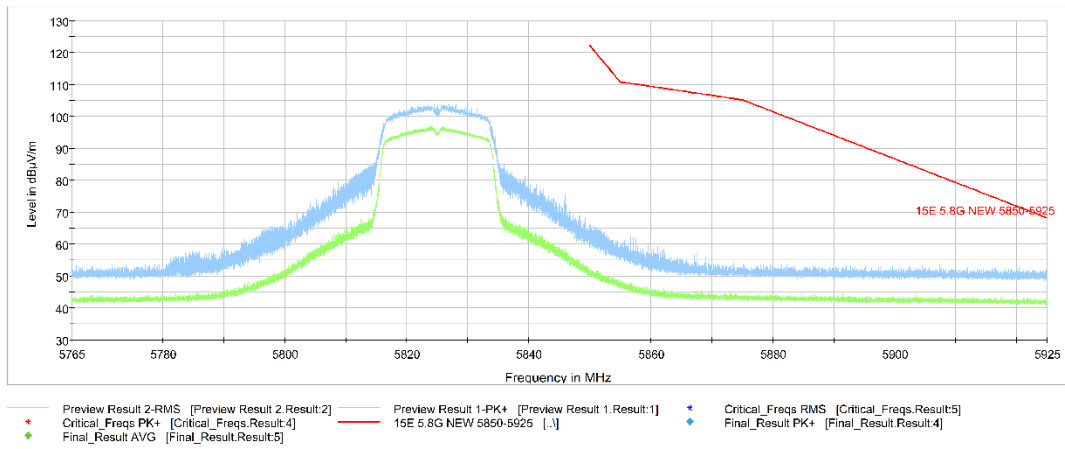


Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)

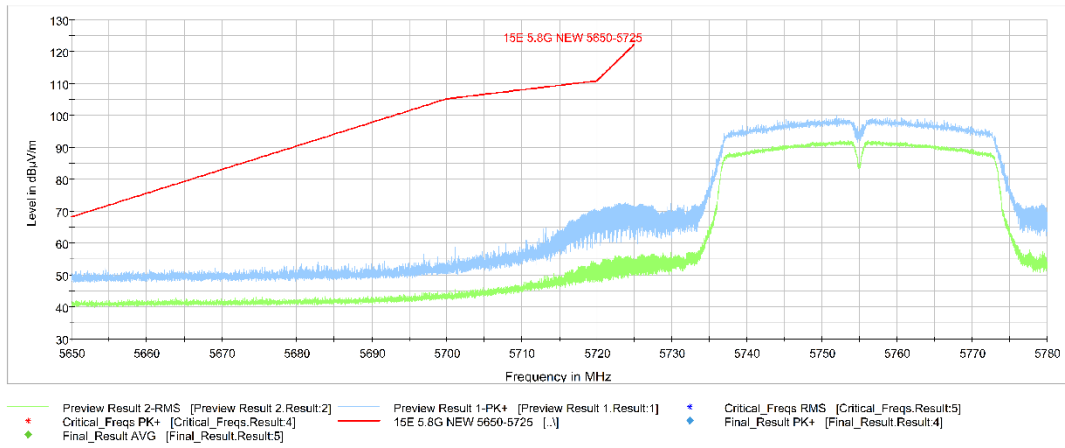


Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)

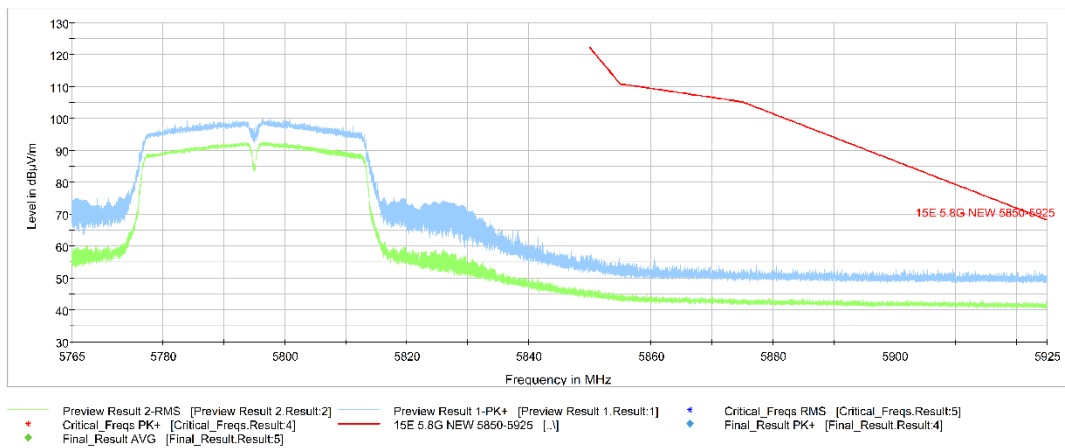


Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)

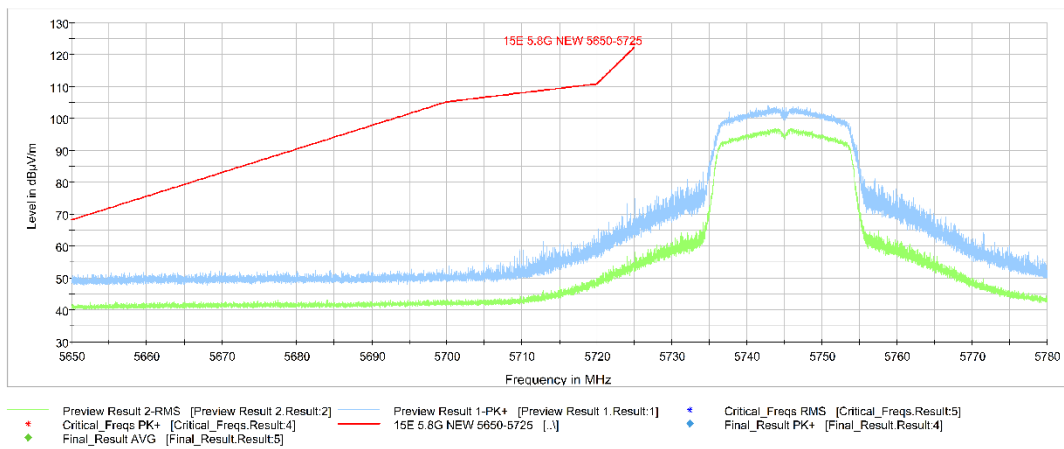


Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

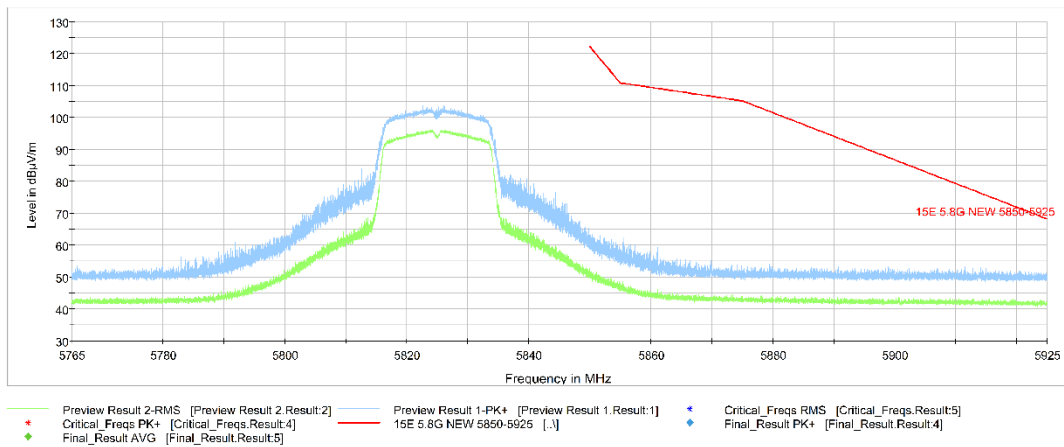


Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

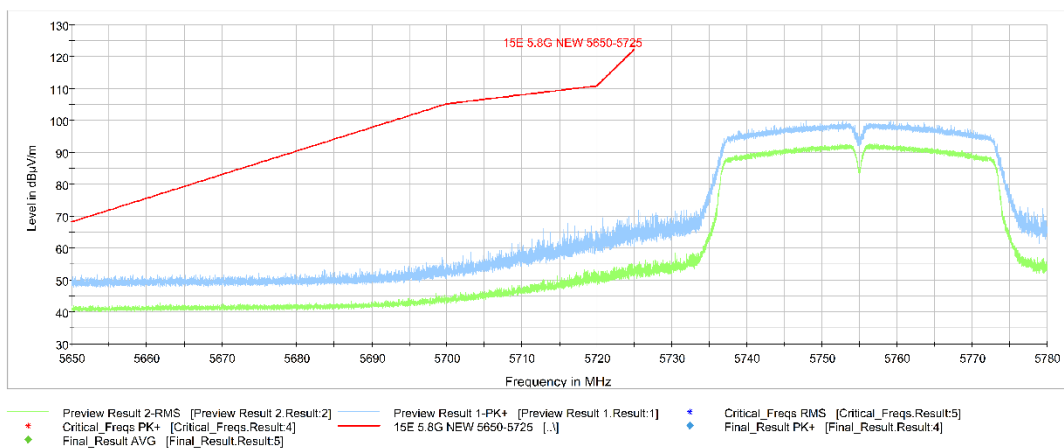


Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

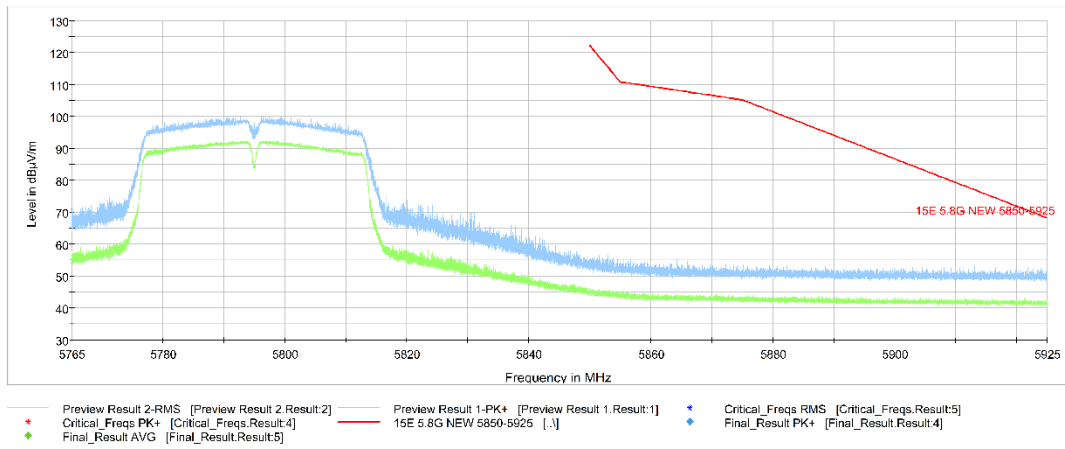


Fig. 19 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

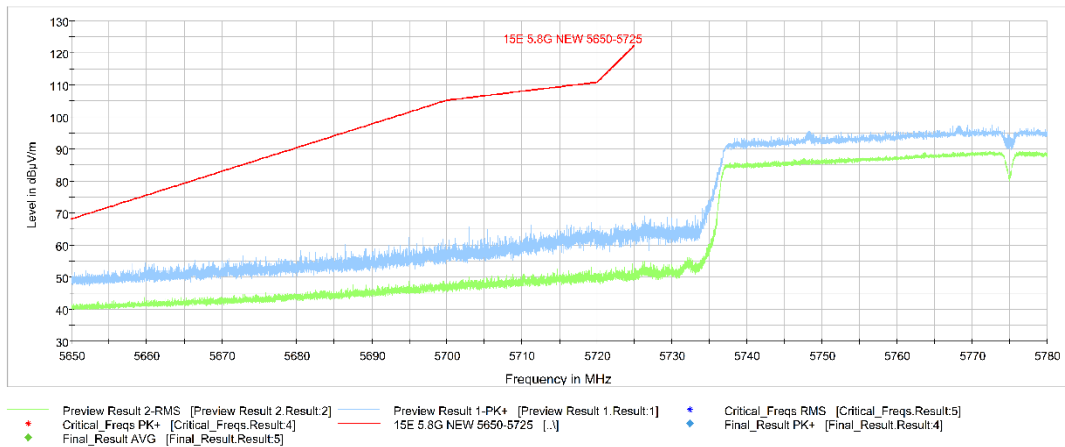


Fig. 20 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

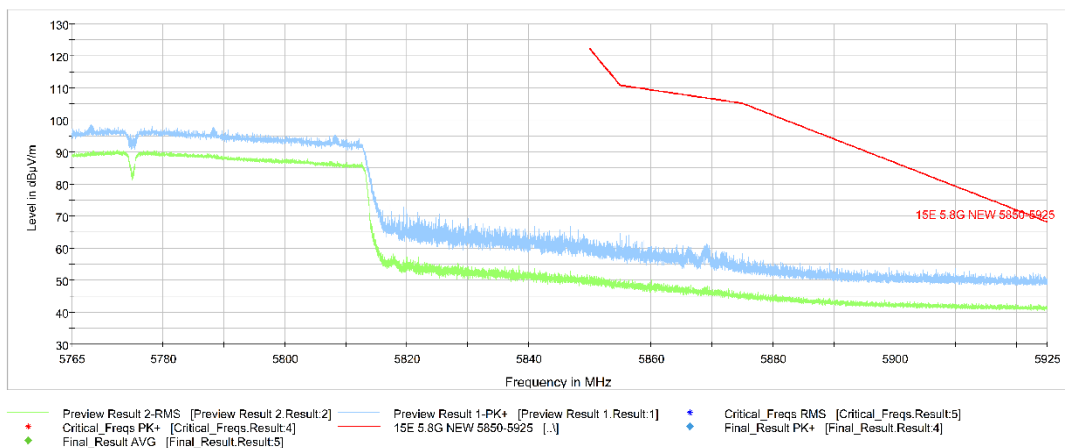


Fig. 21 Band Edges (802.11ac-HT80, 5775MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement uncertainty:

Expanded measurement uncertainty for this test item is $U = 3.08\text{dB}$, $k=2$.

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		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 (dB μ V)	Result (dB μ V)		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:

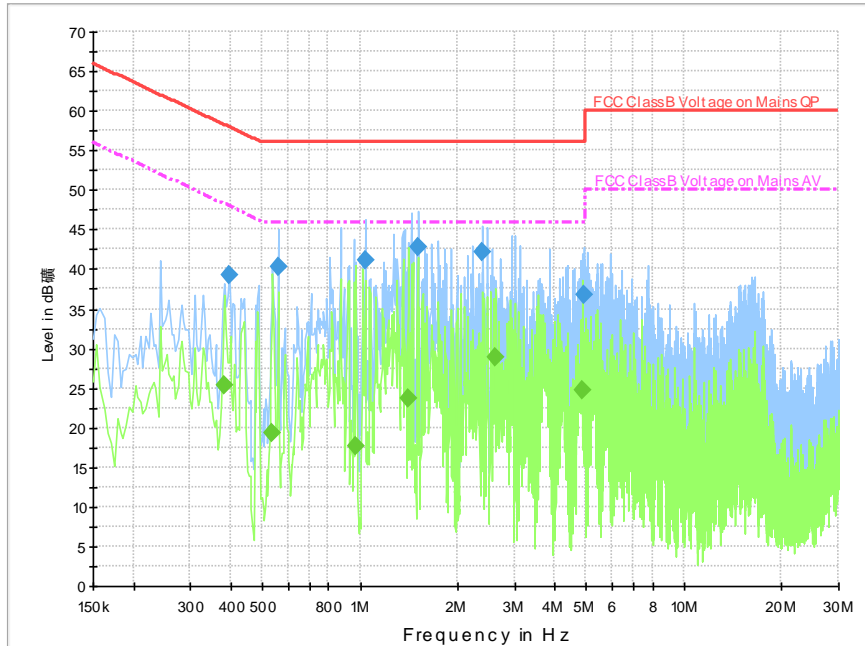


Fig. 22 AC Power line Conducted Emission-802.11a

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

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.394000	39.2	5000.	9.000	On	N	19.8	18.8	58.0	
0.558000	40.2	5000.	9.000	On	N	19.8	15.8	56.0	
1.038000	41.2	5000.	9.000	On	N	19.6	14.8	56.0	
1.518000	42.7	5000.	9.000	On	N	19.6	13.3	56.0	
2.394000	42.1	5000.	9.000	On	N	19.7	13.9	56.0	
4.910000	36.9	5000.	9.000	On	L1	19.6	19.1	56.0	

Final Result 2

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.382000	25.4	5000.	9.000	On	L1	19.8	22.9	48.2	
0.538000	19.3	5000.	9.000	On	L1	19.7	26.7	46.0	
0.970000	17.7	5000.	9.000	On	L1	19.7	28.3	46.0	
1.406000	23.7	5000.	9.000	On	L1	19.7	22.3	46.0	
2.630000	28.8	5000.	9.000	On	L1	19.6	17.2	46.0	
4.846000	24.7	5000.	9.000	On	L1	19.6	21.3	46.0	

Note2: The measurement results showed here are worst cases of the combinations of different cables and chargers

Idle:

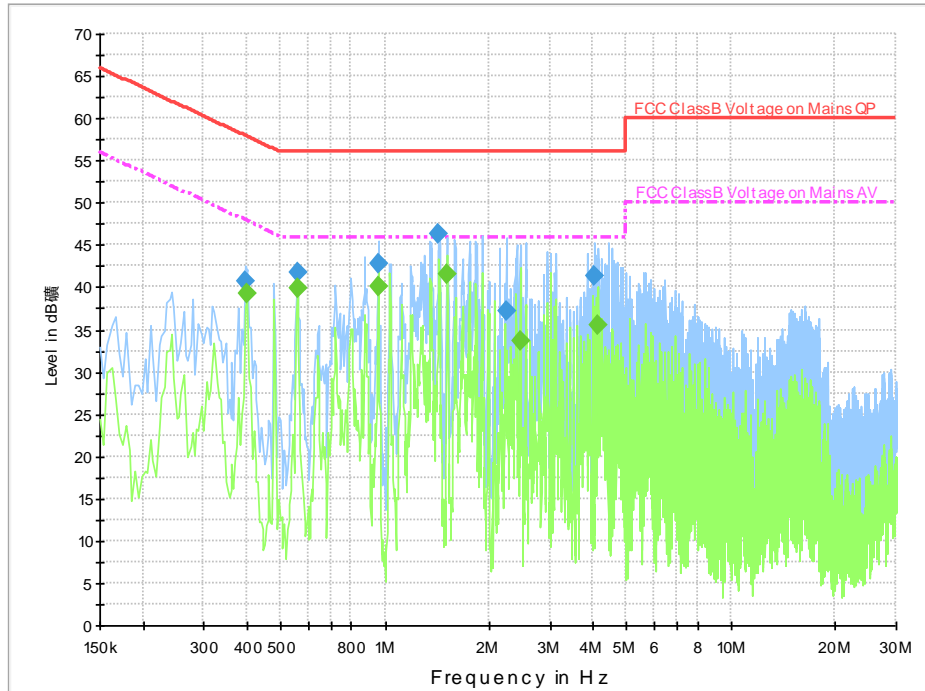


Fig. 23 AC Power line Conducted Emission-Idle

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

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.394000	40.8	5000.	9.000	On	L1	19.7	17.2	58.0	
0.558000	41.8	5000.	9.000	On	L1	19.7	14.2	56.0	
0.958000	42.8	5000.	9.000	On	N	19.6	13.2	56.0	
1.434000	46.4	5000.	9.000	On	L1	19.7	9.6	56.0	
2.238000	37.2	5000.	9.000	On	N	19.7	18.8	56.0	
4.042000	41.4	5000.	9.000	On	L1	19.6	14.6	56.0	

Final Result 2

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.398000	39.3	5000.0	9.000	On	L1	19.7	8.6	47.9	
0.558000	39.8	5000.0	9.000	On	L1	19.7	6.2	46.0	
0.954000	40.0	5000.0	9.000	On	L1	19.7	6.0	46.0	
1.510000	41.5	5000.0	9.000	On	L1	19.7	4.5	46.0	
2.458000	33.6	5000.0	9.000	On	L1	19.6	12.4	46.0	
4.138000	35.4	5000.0	9.000	On	L1	19.6	10.6	46.0	

Note2: The measurement results showed here are worst cases of the combinations of different cables and chargers

ANNEX B: EUT parameters

Disclaimer: The 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



*** END OF REPORT BODY ***