FCC PART 15
TEST REPORT
No.I22Z60940-IOT04

for

TCL Communication Ltd.

Mobile Hot Spot

MW513U

With

FCC ID: 2ACCJB183

Hardware Version: 06

Software Version: MW513U_ZZ_02.00_06

Issued Date: 2022-08-01

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

Report Number	Revision	Description	Issue Date
I22Z60940-IOT04	Rev.0	1st edition	2022-07-19
I22Z60940-IOT04	Rev.1	Add modulation type of OFDMA. Update the description of LISN date. Add the information of attenuator. Add mimo result description(CDD&BF). Add the plot of duty cycle. Add the reference Document (KDB 662911).	2022-08-01

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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

Testing Location: CTTL(huayuan North Road)

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

1.3. TestingEnvironment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2022-05-11

Testing End Date: 2022-07-16

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:	TCL Communication Ltd.
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City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86075536645759
Fax:	/

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Telephone:	+86075536645759
Fax:	/

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

3.1. About EUT

Description	Mobile Hot Spot
Model name	MW513U
FCC ID	2ACCJB183
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM/OFDMA
Voltage	3.8V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	352950940201148	06	MW513U_ZZ_02.00_06
EUT2	352950940002589	06	MW513U_ZZ_02.00_06
EUT3	352950940202708	06	MW513U_ZZ_02.00_06

*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
AE1	Charger1	QC13US

*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 Mobile Hot Spot 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
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band(e.g., MIMO, Smart Antenna, etc)	2013-10

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	/	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	3.8V
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	LISN	ENV216	101200	R&S	1 year	2022-06-29
3	Test Receiver	ESCI	100344	R&S	1 year	2023-03-21
4	Attenuator	10dB/2W	/	Rosenberger	/	/
5	Shielding Room	S81	/	ETS-Lindgren	/	/

The LISN was in calibration due date when used for testing.

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	BiLog Antenna	VULB9163	9163-302	Schwarzbeck	1 year	2022-12-28
3	EMI Antenna	3115	0016725	ETS-Lindgren	1 year	2022-07-01

Note:The radiated emission test system was in calibration due date when used for testing.

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	5.16
1GHz ≤ f ≤18GHz	5.44
18GHz ≤ f ≤40GHz	5.28

8.6. AC Power-line Conducted Emission

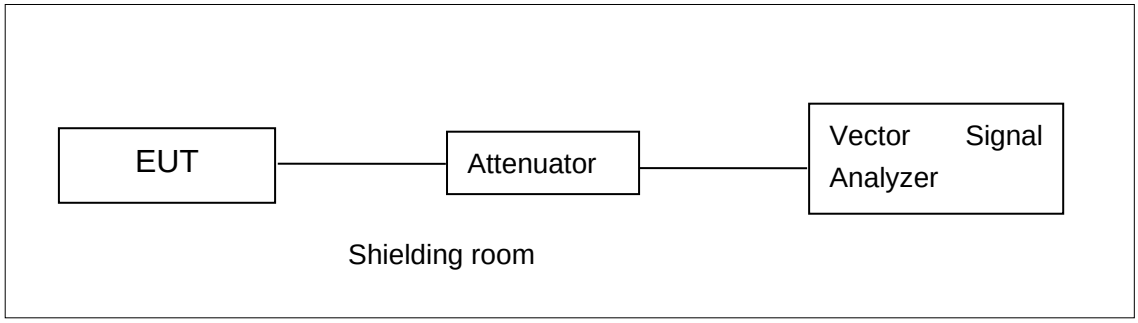
Measurement Uncertainty : 3.08dB,k=2

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

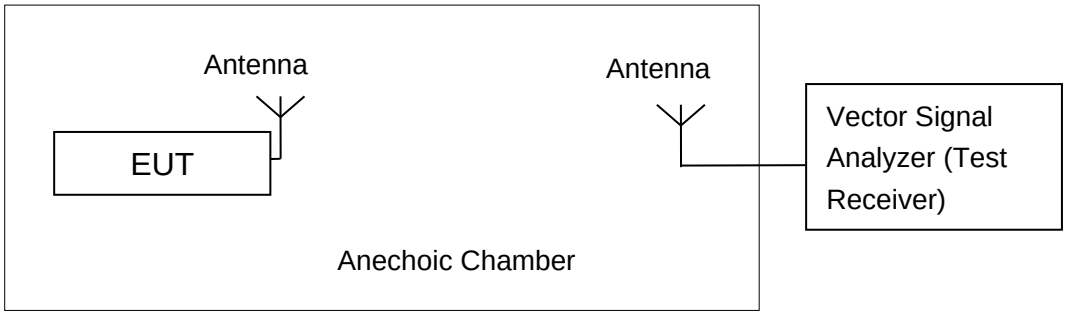
A.1.1. Conducted Measurements

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 Directional Gain

Mode	Ant9(dBi)	Ant10(dBi)	Power(dBi)	PSD(dBi)
CDD	0.9	1.2	1.2	4.06
BF	0.9	1.2	4.06	4.06

For CDD transmissions, directional gain is calculated as:

a) For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e.,

Directional gain = GANT MAX (Ant.1 Gain, Ant.2 Gain, …) + Array Gain, as following table for Power, where Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

b) For PSD, the directional gain calculation is following:

Directional gain = 10 log [(10G1 /20 + 10G2 /20 + … + 10Gn /20) 2 /NANT] dBi, as following table for PSD. NANT = number of transmit antennas NSS = number of spatial streams. (The worst case directional gain will occur when NSS = 1)

For BF transmissions, power and PSD directional gain is calculated as:

Directional gain = 10 log [(10G1 /20 + 10G2 /20 + … + 10Gn /20) 2 /NANT] dBi, as following table for PSD. NANT = number of transmit antennas NSS = number of spatial streams. (The worst case directional gain will occur when NSS = 1)

A.2.2. Maximum Average Output Power-Conducted

Method of Measurement: See ANSI C63.10-clause 12.3.2.2 Method SA-1

SISO:

Mode	Channel	RF output power (dBm)		Conclusion
		ANT9	ANT10	
802.11a	5745MHz(CH149)	13.11	13.59	P
	5785MHz(CH157)	13.28	14.10	P
	5825MHz(CH165)	14.61	13.20	P
802.11n-HT20	5745MHz(CH149)	8.11	10.11	P
	5785MHz(CH157)	8.00	9.47	P
	5825MHz(CH165)	8.40	9.14	P
802.11ac-VHT20	5745MHz(CH149)	10.09	10.13	P
	5785MHz(CH157)	9.95	9.51	P
	5825MHz(CH165)	10.46	9.16	P
802.11ax-HE20	5745MHz(CH149)	8.68	7.90	P

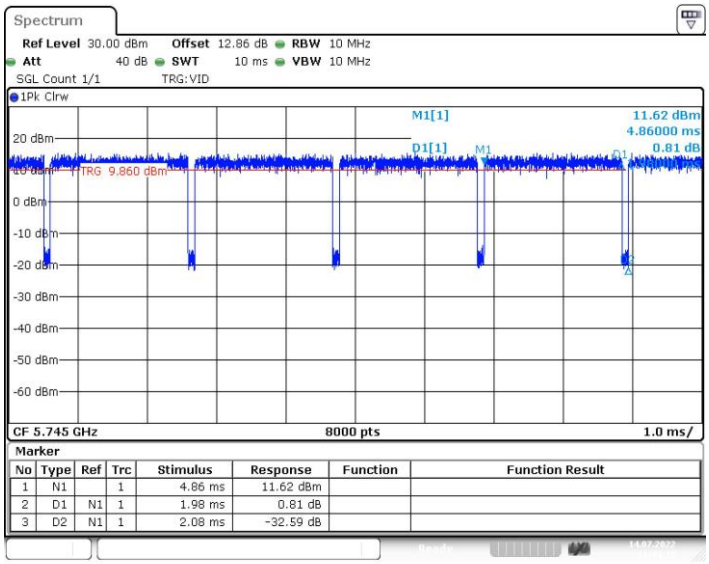
	5785MHz(CH157)	9.12	7.68	**P**
	5825MHz(CH165)	9.58	7.62	**P**
802.11n-HT40	5755MHz(CH151)	9.70	10.05	**P**
	5795MHz(CH159)	9.68	9.44	**P**
802.11ac-VHT40	5755MHz(CH151)	10.70	10.99	**P**
	5795MHz(CH159)	10.65	10.40	**P**
802.11ax-HE40	5755MHz(CH151)	7.86	10.22	**P**
	5795MHz(CH159)	8.31	10.20	**P**
802.11ac-VHT80	5775MHz(CH155)	7.06	10.40	**P**
802.11ax-HE80	5775MHz(CH155)	7.10	9.92	**P**

MIMO(CDD&BF):

Mode	**Channel**	**RF output power (dBm)**			**Conclusion**
		ANT9	**ANT10**	**SUM**	
802.11n-HT20	5745MHz(CH149)	7.00	10.99	12.45	**P**
	5785MHz(CH157)	6.74	10.41	11.96	**P**
	5825MHz(CH165)	7.34	9.78	11.74	**P**
802.11ac-VHT20	5745MHz(CH149)	9.01	12.30	13.97	**P**
	5785MHz(CH157)	8.92	12.02	13.75	**P**
	5825MHz(CH165)	9.33	11.45	13.53	**P**
802.11ax-HE20	5745MHz(CH149)	8.01	11.98	13.44	**P**
	5785MHz(CH157)	8.20	11.89	13.44	**P**
	5825MHz(CH165)	8.60	11.32	13.18	**P**
802.11n-HT40	5755MHz(CH151)	8.61	12.30	13.85	**P**
	5795MHz(CH159)	8.56	11.66	13.39	**P**
802.11ac-VHT40	5755MHz(CH151)	8.66	11.70	13.45	**P**
	5795MHz(CH159)	8.60	11.89	13.56	**P**
802.11ax-HE40	5755MHz(CH151)	8.00	12.16	13.57	**P**
	5795MHz(CH159)	8.11	12.03	13.51	**P**
802.11ac-VHT80	5775MHz(CH155)	5.73	9.12	10.76	**P**
802.11ax-HE80	5775MHz(CH155)	7.48	10.80	12.46	**P**

Duty Cycle

Mode	11a	11n20	11ac20	11ax20	11n40	11ac40	11ax40	11ac80	11ax80	11ac160	11ax160
Duty Cycle	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%



Note:

The data rate 6Mbps (11a mode), MCS0 (11n mode), MCS0 (11ac mode) and MCS0 (11ax mode (only support Full-RU)) are selected as the worst case. SISO-ANT10 (802.11a, 802.11ac-VHT40 and 802.11ac-VHT80) and MIMO (802.11ac-VHT20, 802.11n-HT40 and 802.11ax-HE80) are selected as the worst-case. The following cases and test graphs are mostly performed with this condition.

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

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:

SISO:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	5745MHz(CH149)	0.31	**P**
	5785MHz(CH157)	0.29	**P**
	5825MHz(CH165)	0.93	**P**
802.11n-HT20	5745MHz(CH149)	-3.32	**P**
	5785MHz(CH157)	-3.28	**P**
	5825MHz(CH165)	-3.26	**P**

802.11ac-VHT20	5745MHz(CH149)	-3.74	**P**
	5785MHz(CH157)	-2.97	**P**
	5825MHz(CH165)	-3.10	**P**
802.11ax-HE20	5745MHz(CH149)	-5.21	**P**
	5785MHz(CH157)	-5.12	**P**
	5825MHz(CH165)	-5.18	**P**
802.11n-HT40	5755MHz(CH151)	-6.19	**P**
	5795MHz(CH159)	-6.28	**P**
802.11ac-VHT40	5755MHz(CH151)	-5.61	**P**
	5795MHz(CH159)	-5.82	**P**
802.11ax-HE40	5755MHz(CH151)	-5.84	**P**
	5795MHz(CH159)	-6.12	**P**
802.11ac-VHT80	5775MHz(CH155)	-8.50	**P**
802.11ax-HE80	5775MHz(CH155)	-8.77	**P**

MIMO:

Mode	Channel	/	Power Spectral Density (dBm/500kHz)	Conclusion
802.11n-HT20	5745MHz(CH149)	Ant9	-4.22	**P**
		Ant10	-2.29	**P**
		SUM	-0.14	**P**
	5785MHz(CH157)	Ant9	-3.96	**P**
		Ant10	-2.10	**P**
		SUM	0.08	**P**
	5825MHz(CH165)	Ant9	-3.73	**P**
		Ant10	-1.97	**P**
		SUM	0.25	**P**
802.11ac-VHT20	5745MHz(CH149)	Ant9	-2.30	**P**
		Ant10	-0.04	**P**
		SUM	1.99	**P**
	5785MHz(CH157)	Ant9	-2.17	**P**
		Ant10	0.27	**P**
		SUM	2.23	**P**
	5825MHz(CH165)	Ant9	-1.93	**P**
		Ant10	-0.15	**P**
		SUM	2.06	**P**
802.11ax-HE20	5745MHz(CH149)	Ant9	-4.14	**P**
		Ant10	-1.79	**P**
		SUM	0.20	**P**
	5785MHz(CH157)	Ant9	-4.33	**P**
		Ant10	-1.68	**P**
		SUM	0.20	**P**
	5825MHz(CH165)	Ant9	-3.95	**P**

		Ant10	-2.22	**P**
		SUM	0.01	**P**
802.11n-HT40	5755MHz(CH151)	Ant9	-5.40	**P**
		Ant10	-2.45	**P**
		SUM	-0.67	**P**
	5795MHz(CH159)	Ant9	-5.56	**P**
		Ant10	-3.21	**P**
		SUM	-1.22	**P**
802.11ac-VHT40	5755MHz(CH151)	Ant9	-4.35	**P**
		Ant10	-1.66	**P**
		SUM	0.21	**P**
	5795MHz(CH159)	Ant9	-4.68	**P**
		Ant10	-1.99	**P**
		SUM	-0.12	**P**
802.11ax-HE40	5755MHz(CH151)	Ant9	-7.17	**P**
		Ant10	-4.37	**P**
		SUM	-2.54	**P**
	5795MHz(CH159)	Ant9	-7.50	**P**
		Ant10	-4.70	**P**
		SUM	-2.87	**P**
802.11ac-VHT80	5775MHz(CH155)	Ant9	-10.62	**P**
		Ant10	-7.51	**P**
		SUM	-5.78	**P**
802.11ax-HE80	5775MHz(CH155)	Ant9	-10.35	**P**
		Ant10	-8.20	**P**
		SUM	-6.13	**P**

Conclusion: PASS

A.4. Occupied 26dB Bandwidth (conducted)

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403 (i)	/

The measurement is made according to KDB 789033 D02.

Measurement Result:

Mode	Channel	Occupied 26dB Bandwidth(MHz)		Conclusion
802.11a	5745MHz(Ch149)	Fig.1	18.80	*I*
	5785MHz(Ch157)	Fig.2	18.52	*I*
	5825MHz(Ch165)	Fig.3	18.28	*I*
802.11ac-VHT40	5755MHz(Ch151)	Fig.4	40.00	*I*
	5795MHz(Ch159)	Fig.5	40.00	*I*

802.11ac-VHT80	5775MHz(Ch155)	Fig.6	82.24	*I*

Note: All modes have been evaluated and tested, the cases of 802.11a, 802.11ac-VHT40 and 802.11ac-VHT80 mode were selected and showed in this test case.

See below for test graphs.

Conclusion: PASS

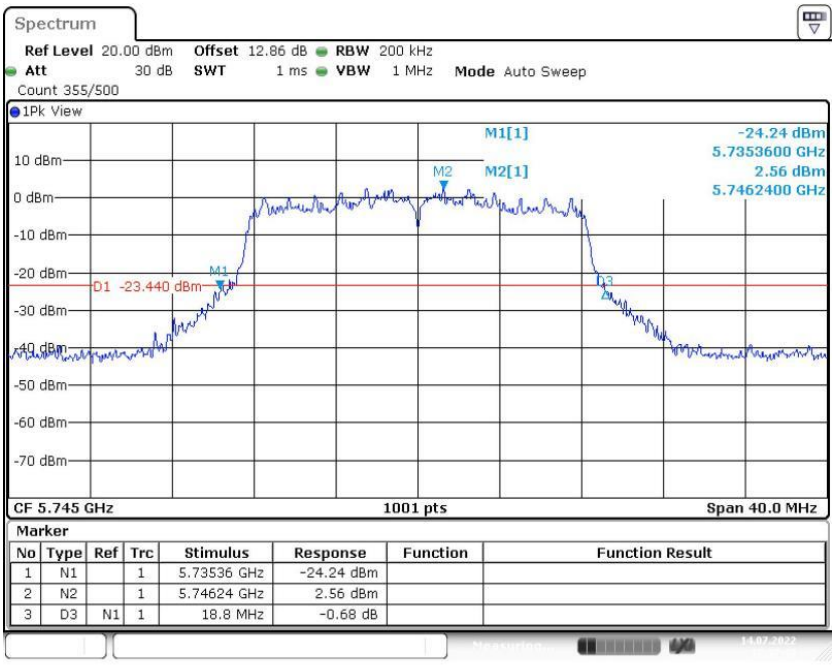


Fig. 1 Occupied 26dB Bandwidth (802.11a, 5745MHz)

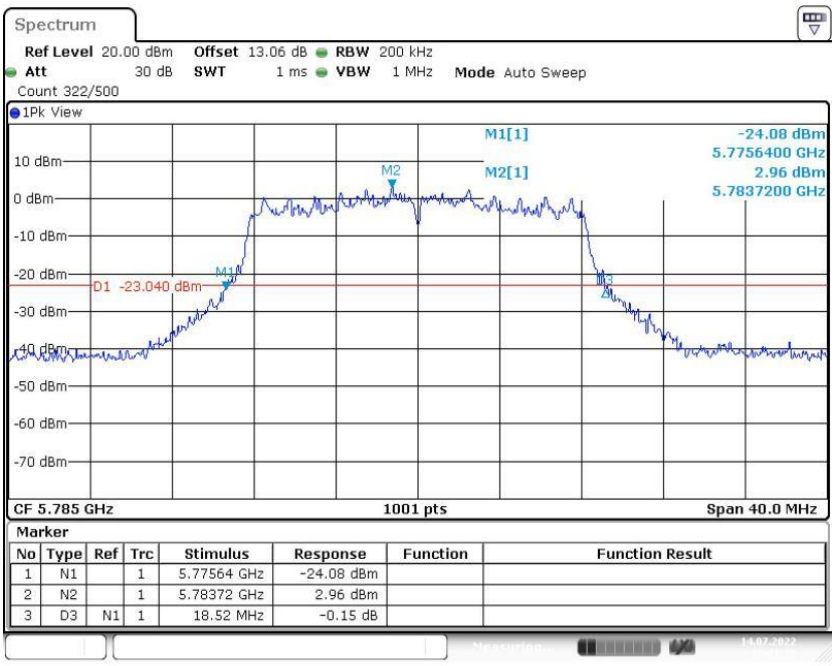


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5785MHz)

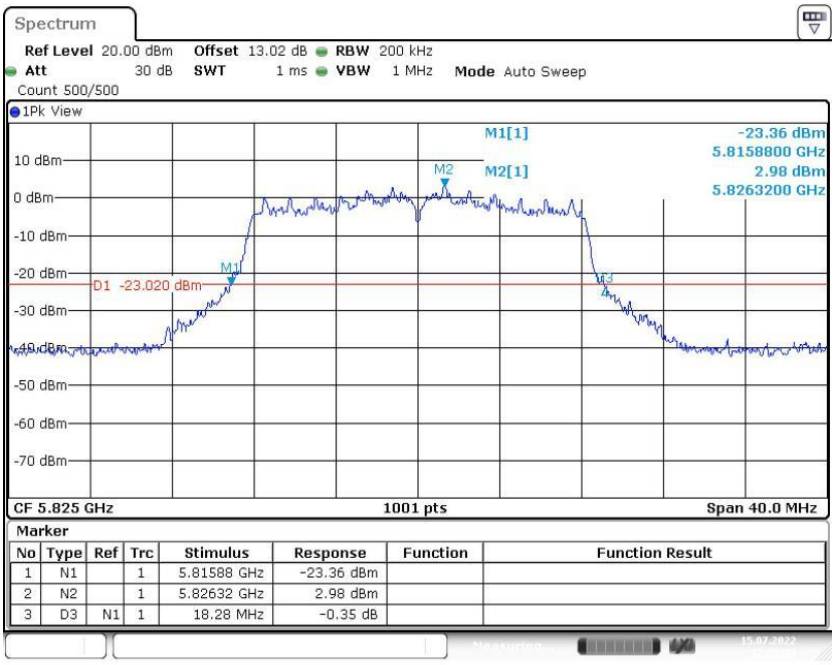


Fig. 3 Occupied 26dB Bandwidth (802.11a, 5825MHz)

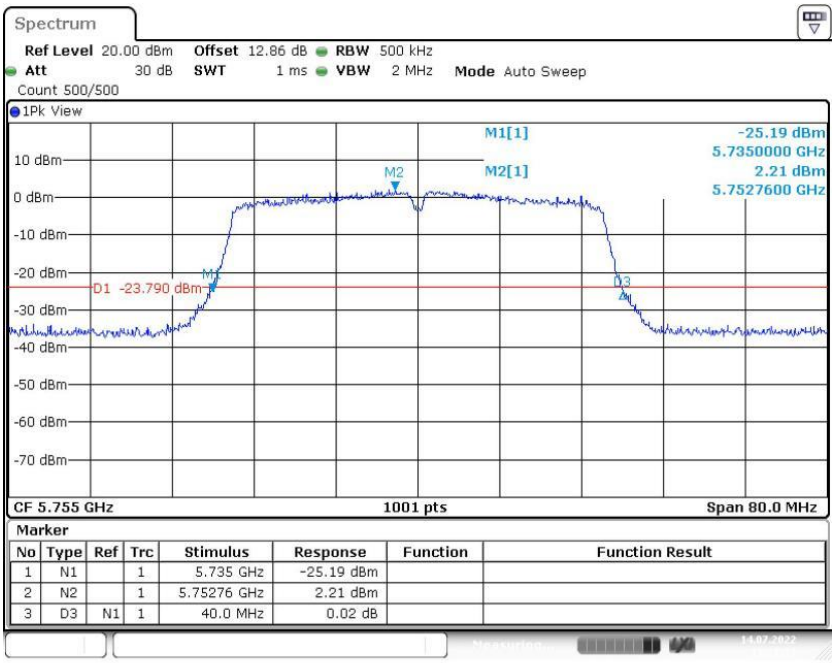


Fig. 4 Occupied 26dB Bandwidth (802.11ac-VHT40, 5755MHz)

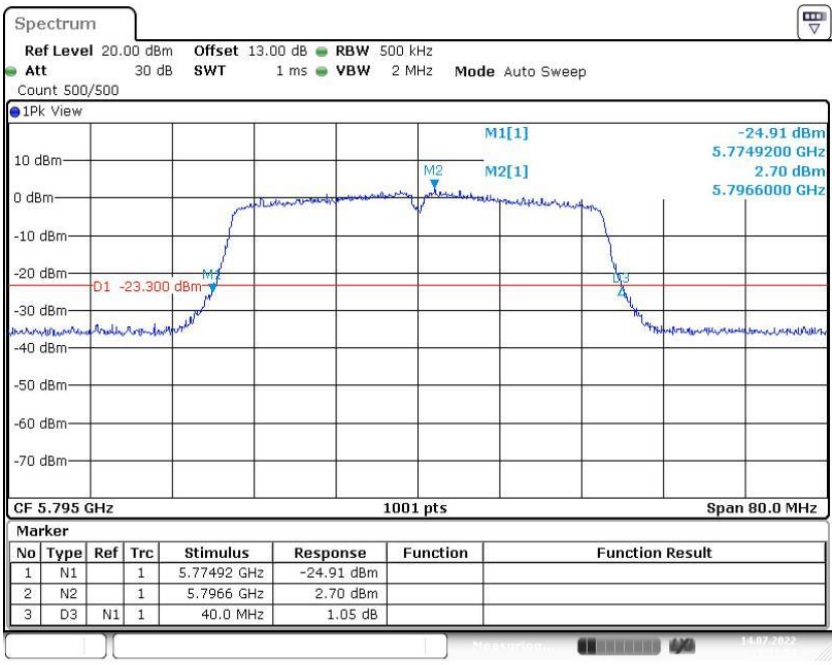


Fig. 5 Occupied 26dB Bandwidth (802.11ac-VHT40, 5795MHz)

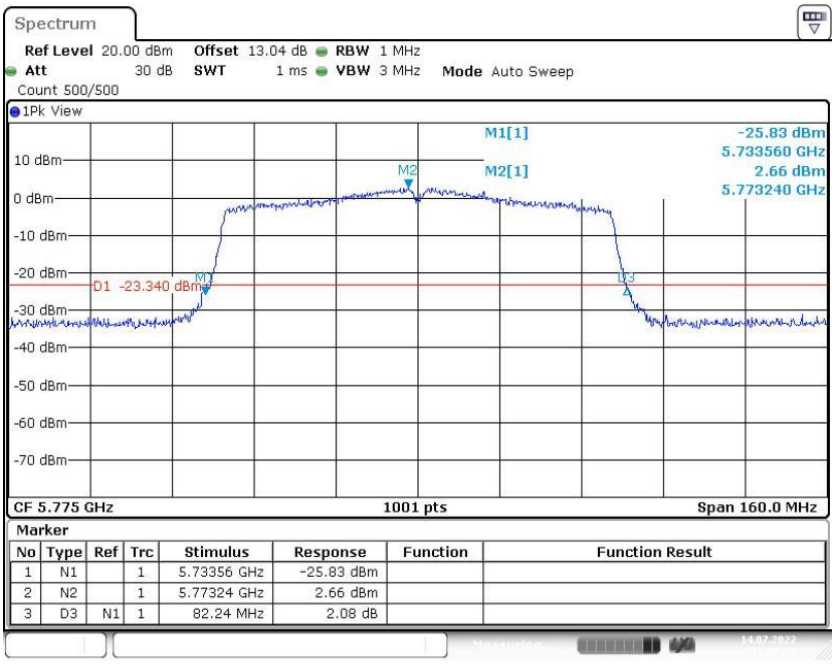


Fig. 6 Occupied 26dB Bandwidth (802.11ac-VHT80, 5775MHz)

A.5. 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	5745MHz(Ch149)	Fig.7	15.16	**P**
	5785MHz(Ch157)	Fig.8	15.08	**P**
	5825MHz(Ch165)	Fig.9	15.12	**P**
802.11ac-VHT40	5755MHz(Ch151)	Fig.10	35.12	**P**
	5795MHz(Ch159)	Fig.11	35.12	**P**
802.11ac-VHT80	5775MHz(Ch155)	Fig.12	77.44	**P**

Note: All modes have been evaluated and tested, the cases of 802.11a, 802.11ac-VHT40 and 802.11ac-VHT80 mode were selected and showed in this test case.

Conclusion: PASS

Test graphs as below:

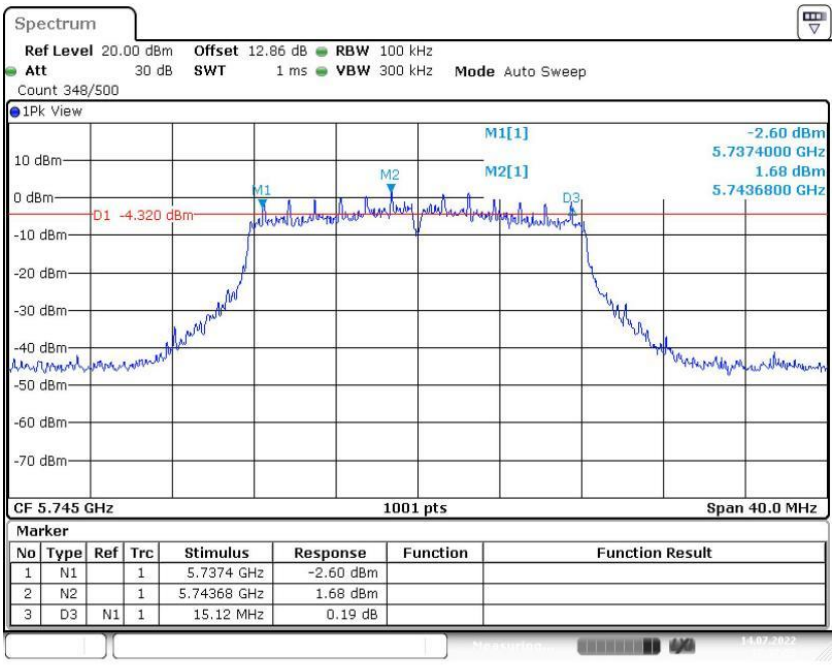


Fig. 7 Occupied 6dB Bandwidth (802.11a, 5745MHz)

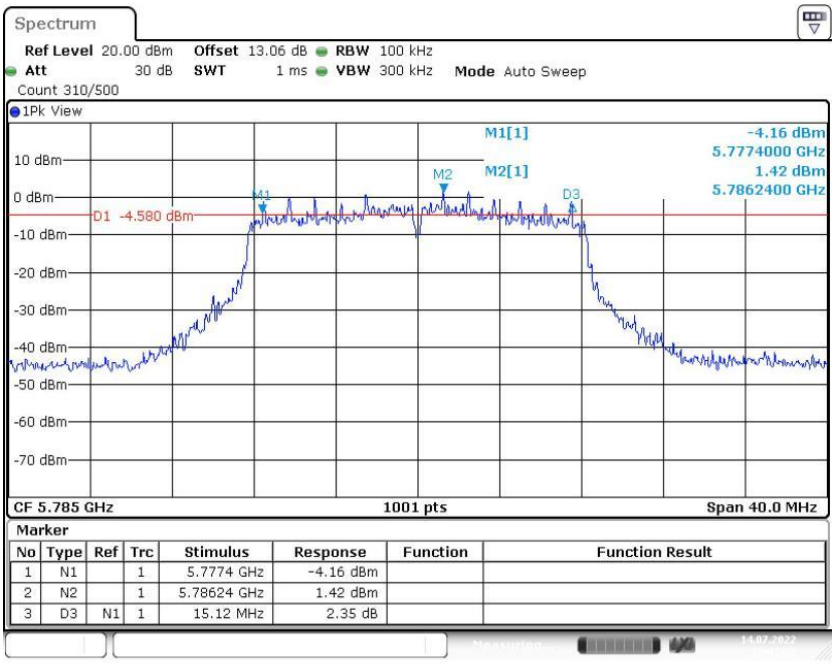


Fig. 8 Occupied 6dB Bandwidth (802.11a, 5785MHz)

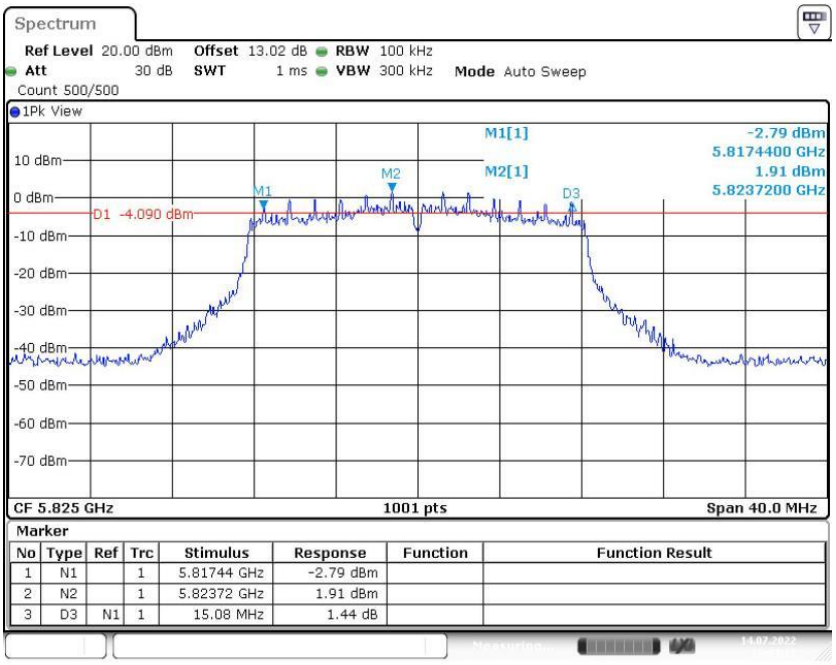


Fig. 9 Occupied 6dB Bandwidth (802.11a, 5825MHz)

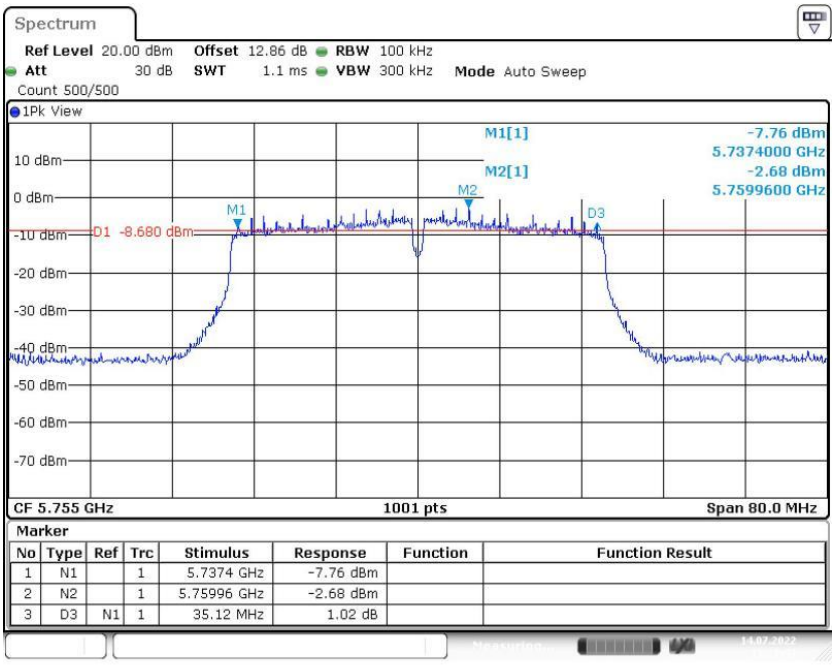


Fig. 10 Occupied 6dB Bandwidth (802.11ac-VHT40, 5755MHz)

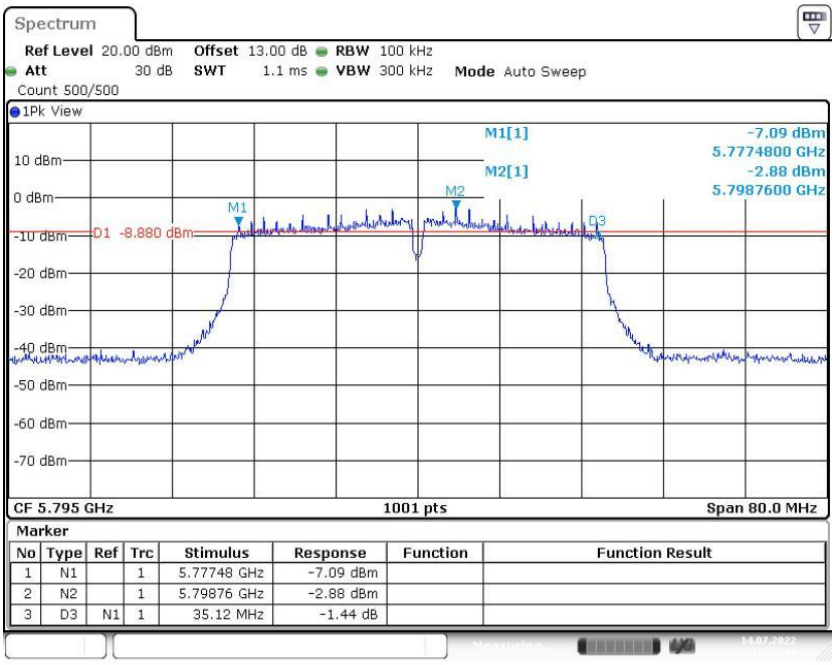


Fig. 11 Occupied 6dB Bandwidth (802.11ac-VHT40, 5795MHz)

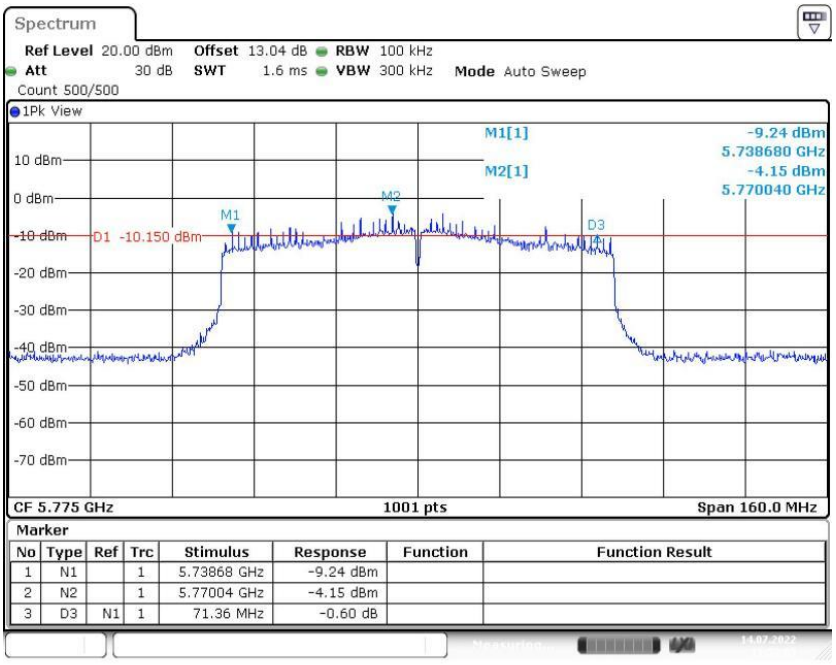


Fig. 12 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)

A.6. 99% Occupied Bandwidth (conducted)

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403	/

The measurement is made according to KDB 789033 D02.

Measurement Result:

Mode	Channel	99% Occupied Bandwidth(MHz)		Conclusion
802.11a	5745MHz(Ch149)	Fig.13	16.54	**/**
	5785MHz(Ch157)	Fig.14	16.58	**/**
	5825MHz(Ch165)	Fig.15	16.58	**/**
802.11ac-VHT40	5755MHz(Ch151)	Fig.16	36.12	**/**
	5795MHz(Ch159)	Fig.17	36.04	**/**
802.11ac-VHT80	5775MHz(Ch155)	Fig.18	75.29	**/**

Note: All modes have been evaluated and tested, the cases of 802.11a, 802.11ac-VHT40 and 802.11ac-VHT80 mode were selected and showed in this test case.

See below for test graphs.

Conclusion: PASS

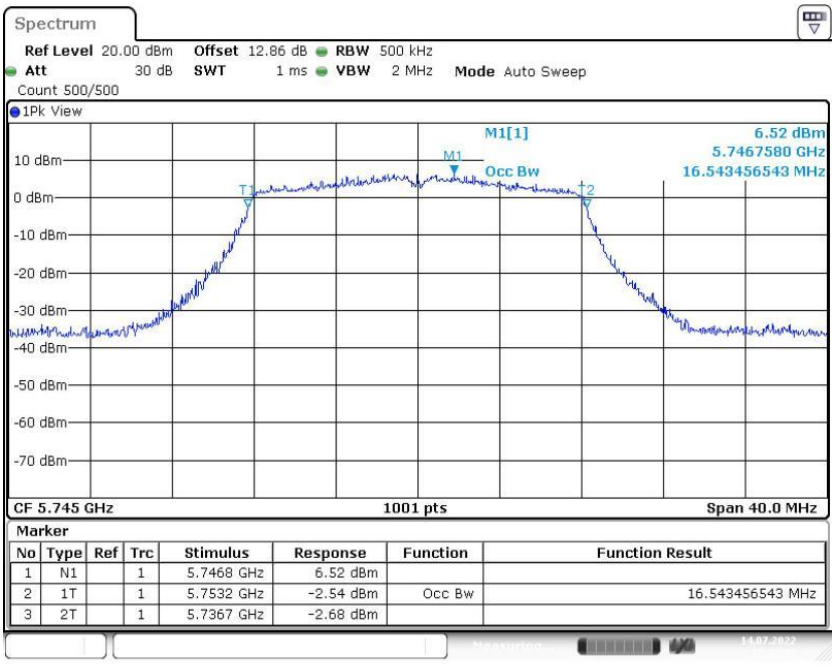


Fig. 13 99% Occupied Bandwidth (802.11a, 5745MHz)

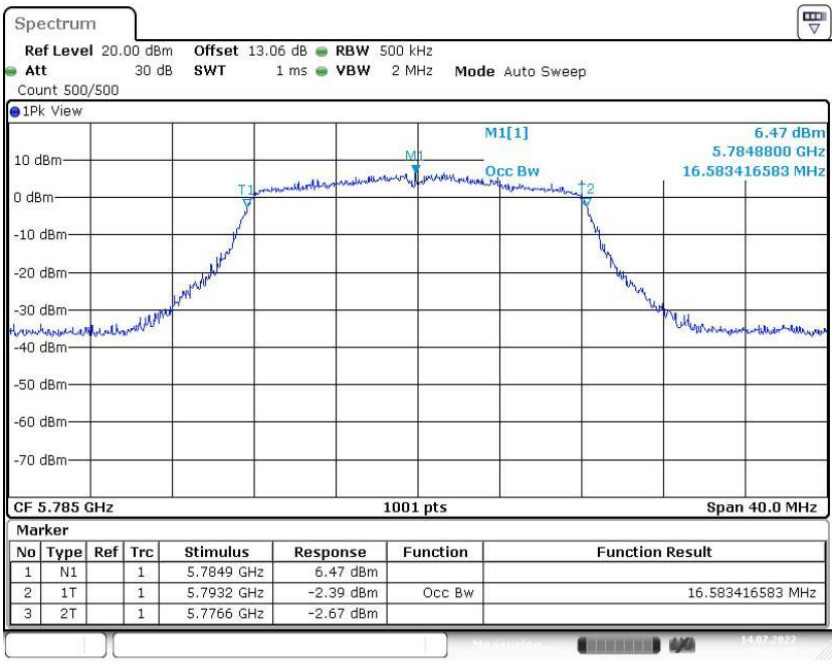


Fig. 14 99% Occupied Bandwidth (802.11a, 5785MHz)

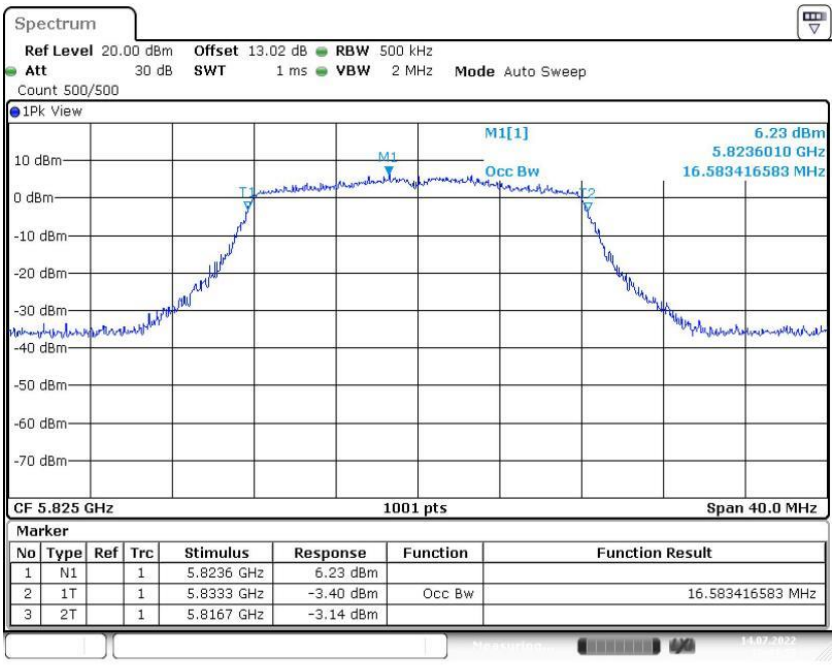


Fig. 15 99% Occupied Bandwidth (802.11a, 5825MHz)

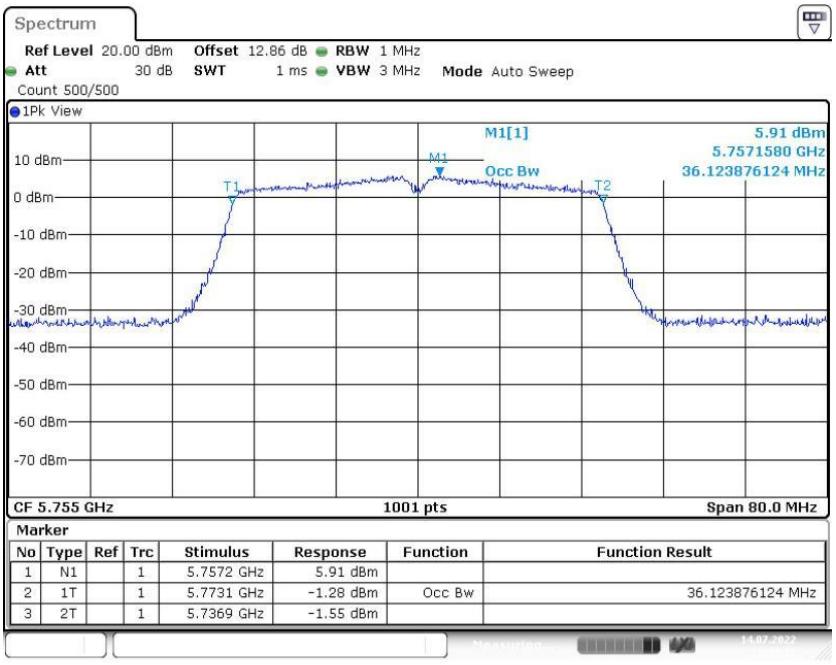


Fig. 16 99% Occupied Bandwidth (802.11ac-VHT40, 5755MHz)

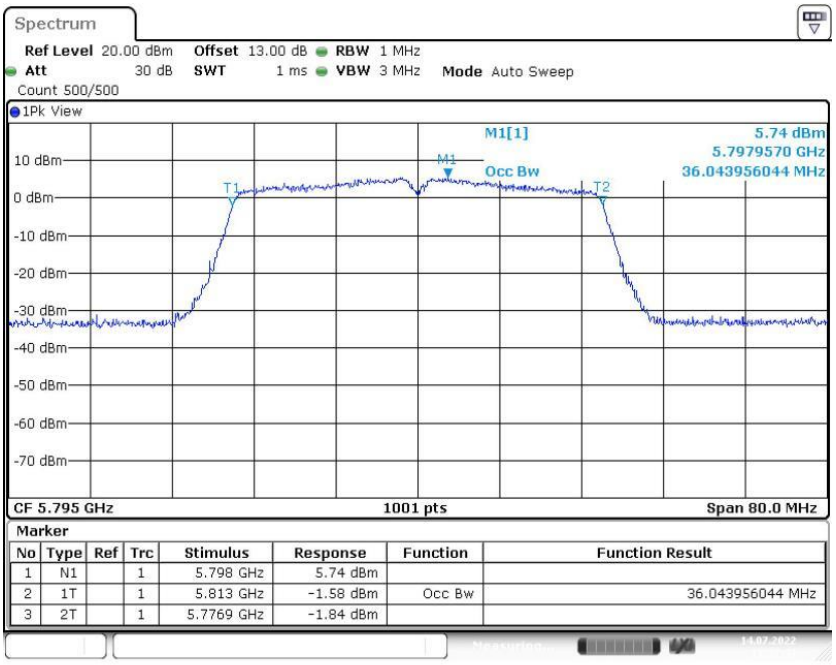


Fig. 17 99% Occupied Bandwidth (802.11ac-VHT40, 5795MHz)

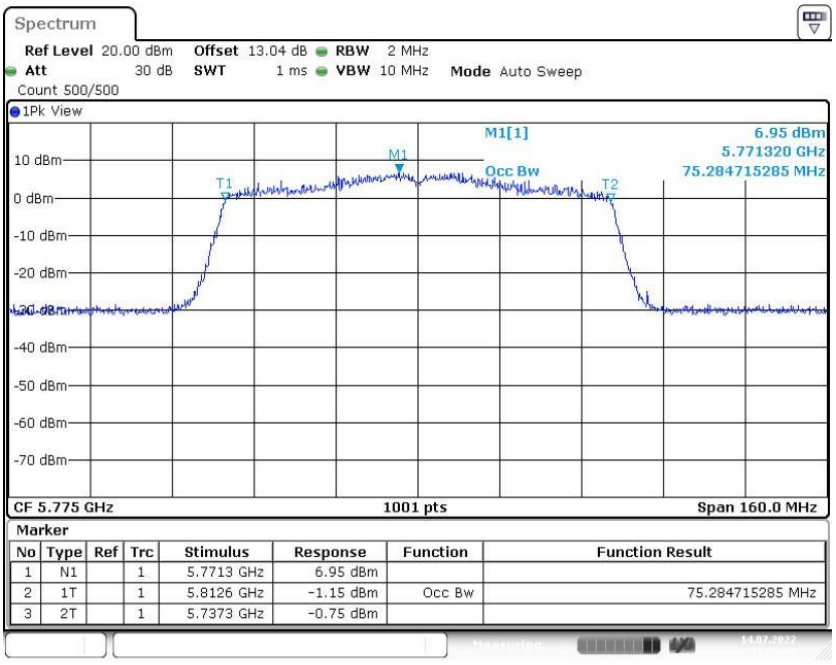


Fig. 18 99% Occupied Bandwidth (802.11ac-VHT80, 5775MHz)

A.6. Transmitter Spurious Emission

A.6.1 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

802.11ax-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ax (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

802.11ax-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ax (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

802.11ax-HT80 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ax (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)
17930.7	42.8	-25.5	46.66	21.64	54	11.2	H
17960.4	42.76	-25.5	46.66	21.6	54	11.24	V
15996.9	41.86	-27.35	38.54	30.67	54	12.14	V
16025.5	41.79	-27.35	38.54	30.6	54	12.21	V
11998.4	37.24	-31.48	39.09	29.63	54	16.76	H
11760.25	36.88	-31.99	38.98	29.89	54	17.12	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)
17902.1	42.94	-25.5	46.66	21.78	54	11.06	V
17945.55	42.7	-25.5	46.66	21.54	54	11.3	V
15946.85	42.03	-27.35	38.54	30.84	54	11.97	H
15982.6	41.99	-27.35	38.54	30.8	54	12.01	V
11969.25	37.45	-31.48	39.09	29.84	54	16.55	H
11833.95	37.13	-31.85	39.05	29.93	54	16.87	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)
17929.05	43.2	-25.5	46.66	22.04	54	10.8	V
17980.2	43.15	-25.5	46.66	21.99	54	10.85	V
15932.55	41.87	-27.35	38.54	30.68	54	12.13	V
15949.6	41.84	-27.35	38.54	30.65	54	12.16	H
11727.25	37.02	-31.99	38.98	30.03	54	16.98	H
11940.1	36.97	-31.48	39.09	29.36	54	17.03	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)
17898.25	42.76	-25.5	46.66	21.6	54	11.24	V
17962.6	42.71	-25.5	46.66	21.55	54	11.29	H
15961.7	41.66	-27.35	38.54	30.47	54	12.34	H
15999.65	41.66	-27.35	38.54	30.47	54	12.34	V
11998.95	37.03	-31.48	39.09	29.42	54	16.97	V
11947.8	36.83	-31.48	39.09	29.22	54	17.17	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)
17923.55	43.54	-25.5	46.66	22.38	54	10.46	H
17883.95	42.67	-25.5	46.66	21.51	54	11.33	H
15954	41.77	-27.35	38.54	30.58	54	12.23	H
16139.35	41.66	-26.77	38.93	29.5	54	12.34	H
11967.6	37	-31.48	39.09	29.39	54	17	V
11973.65	36.99	-31.48	39.09	29.38	54	17.01	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)
17853.15	43.37	-25.5	46.66	22.21	54	10.63	H
17960.4	42.98	-25.5	46.66	21.82	54	11.02	H
16121.2	41.98	-26.77	38.93	29.82	54	12.02	V
15938.05	41.57	-27.35	38.54	30.38	54	12.43	V
11839.45	37	-31.85	39.05	29.8	54	17	V
11953.3	36.96	-31.48	39.09	29.35	54	17.04	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)
17876.8	42.79	-25.5	46.66	21.63	54	11.21	H
17874.05	42.78	-25.5	46.66	21.62	54	11.22	V
15960.6	42	-27.35	38.54	30.81	54	12	V
15979.3	41.99	-27.35	38.54	30.8	54	12.01	H
11968.15	37.34	-31.48	39.09	29.73	54	16.66	V
11760.25	37.21	-31.99	38.98	30.22	54	16.79	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)
17848.75	42.94	-25.5	46.66	21.78	54	11.06	V
17870.2	42.77	-25.5	46.66	21.61	54	11.23	V
16001.3	41.8	-27.35	38.54	30.61	54	12.2	H
16000.2	41.7	-27.35	38.54	30.51	54	12.3	V
11990.15	37.31	-31.48	39.09	29.7	54	16.69	H
11973.65	37.04	-31.48	39.09	29.43	54	16.96	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)
17970.85	42.89	-25.5	46.66	21.73	54	11.11	V
17971.95	42.88	-25.5	46.66	21.72	54	11.12	H
15949.6	42.33	-27.35	38.54	31.14	54	11.67	H
16045.85	42.03	-27.35	38.54	30.84	54	11.97	H
11939	37.19	-31.48	39.09	29.58	54	16.81	H
11997.3	37.07	-31.48	39.09	29.46	54	16.93	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)
17941.15	43.02	-25.5	46.66	21.86	54	10.98	H
17974.15	42.89	-25.5	46.66	21.73	54	11.11	H
15926.5	41.78	-27.35	38.54	30.59	54	12.22	H
15964.45	41.76	-27.35	38.54	30.57	54	12.24	H
11988.5	37.14	-31.48	39.09	29.53	54	16.86	V
11832.3	36.87	-31.85	39.05	29.67	54	17.13	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)
17957.65	43.19	-25.5	46.66	22.03	54	10.81	H
17944.45	43	-25.5	46.66	21.84	54	11	V
15995.8	42.24	-27.35	38.54	31.05	54	11.76	V
15966.65	41.68	-27.35	38.54	30.49	54	12.32	H
11970.35	37.17	-31.48	39.09	29.56	54	16.83	H
11979.7	36.92	-31.48	39.09	29.31	54	17.08	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)
17956	42.86	-25.5	46.66	21.7	54	11.14	H
17964.8	42.75	-25.5	46.66	21.59	54	11.25	H
15952.9	41.81	-27.35	38.54	30.62	54	12.19	V
15921	41.73	-27.35	38.54	30.54	54	12.27	V
11739.35	37.29	-31.99	38.98	30.3	54	16.71	V
11751.45	37.28	-31.99	38.98	30.29	54	16.72	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)
17949.4	43.03	-25.5	46.66	21.87	54	10.97	V
17926.85	42.86	-25.5	46.66	21.7	54	11.14	H
15959.5	42.25	-27.35	38.54	31.06	54	11.75	V
15994.7	42.08	-27.35	38.54	30.89	54	11.92	H
11986.3	37.68	-31.48	39.09	30.07	54	16.32	H
11941.2	36.98	-31.48	39.09	29.37	54	17.02	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)
17962.05	42.14	-25.5	46.66	20.98	54	11.86	V
17971.4	41.91	-25.5	46.66	20.75	54	12.09	H
15953.45	41.12	-27.35	38.54	29.93	54	12.88	V
15948.5	41.03	-27.35	38.54	29.84	54	12.97	V
11986.85	36.37	-31.48	39.09	28.76	54	17.63	V
11979.15	36.35	-31.48	39.09	28.74	54	17.65	V

802.11ax-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)
17839.4	43.16	-25.5	46.66	22	54	10.84	V
17941.15	42.98	-25.5	46.66	21.82	54	11.02	V
16037.6	41.89	-27.35	38.54	30.7	54	12.11	V
16039.8	41.84	-27.35	38.54	30.65	54	12.16	V
11743.75	37.01	-31.99	38.98	30.02	54	16.99	H
11970.35	36.93	-31.48	39.09	29.32	54	17.07	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)
17843.8	42.79	-25.5	46.66	21.63	54	11.21	V
17878.45	42.63	-25.5	46.66	21.47	54	11.37	H
15939.15	41.77	-27.35	38.54	30.58	54	12.23	V
15955.1	41.67	-27.35	38.54	30.48	54	12.33	V
11986.85	37.13	-31.48	39.09	29.52	54	16.87	H
11970.35	37.05	-31.48	39.09	29.44	54	16.95	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)
17953.8	43.02	-25.5	46.66	21.86	54	10.98	V
17971.95	42.61	-25.5	46.66	21.45	54	11.39	V
16031.55	42.22	-27.35	38.54	31.03	54	11.78	V
15958.4	41.96	-27.35	38.54	30.77	54	12.04	V
11765.2	37.47	-31.99	38.98	30.48	54	16.53	V
11989.6	36.92	-31.48	39.09	29.31	54	17.08	V

802.11ax-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)
17922.45	43.03	-25.5	46.66	21.87	54	10.97	V
17955.45	42.99	-25.5	46.66	21.83	54	11.01	H
16049.7	42.55	-27.35	38.54	31.36	54	11.45	V
15926.5	41.7	-27.35	38.54	30.51	54	12.3	V
11992.9	37.2	-31.48	39.09	29.59	54	16.8	H
11942.3	37.16	-31.48	39.09	29.55	54	16.84	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)
17941.15	43.45	-25.5	46.66	22.29	54	10.55	H
17874.05	42.5	-25.5	46.66	21.34	54	11.5	H
15968.85	42.32	-27.35	38.54	31.13	54	11.68	H
15960.6	41.9	-27.35	38.54	30.71	54	12.1	H
11743.2	36.92	-31.99	38.98	29.93	54	17.08	V
11841.1	36.92	-31.85	39.05	29.72	54	17.08	H

802.11ax-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)
17937.3	41.92	-25.5	46.66	20.76	54	12.08	H
17965.9	41.9	-25.5	46.66	20.74	54	12.1	V
15912.75	40.91	-27.35	38.54	29.72	54	13.09	H
16174	40.78	-26.77	38.93	28.62	54	13.22	H
11995.1	36.43	-31.48	39.09	28.82	54	17.57	H
11969.8	36.29	-31.48	39.09	28.68	54	17.71	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)
17875.7	52.93	-25.5	46.66	31.77	74	21.07	H
17845.45	52.39	-25.5	46.66	31.23	74	21.61	H
16117.9	51.92	-26.77	38.93	39.76	74	22.08	H
16065.1	51.62	-26.77	38.93	39.46	74	22.38	V
11956.6	46.4	-31.48	39.09	38.79	74	27.6	H
11978.6	46.26	-31.48	39.09	38.65	74	27.74	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)
17960.4	52.49	-25.5	46.66	31.33	74	21.51	H
16859.3	51.85	-26.62	41.49	36.98	68.2	16.35	H
17936.2	51.72	-25.5	46.66	30.56	74	22.28	H
16445.7	51.68	-26.96	39.82	38.82	68.2	16.52	H
11972	46.73	-31.48	39.09	39.12	74	27.27	H
11655.75	46.12	-32.31	38.91	39.53	74	27.88	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)
17940.05	53.36	-25.5	46.66	32.2	74	20.64	H
17910.35	52.75	-25.5	46.66	31.59	74	21.25	H
16986.9	52.06	-26.32	42.36	36.01	68.2	16.14	V
16114.05	51.57	-26.77	38.93	39.41	74	22.43	V
11983	46.39	-31.48	39.09	38.78	74	27.61	V
11990.15	46.36	-31.48	39.09	38.75	74	27.64	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)
17998.9	52.58	-25.5	46.66	31.42	74	21.42	H
17952.15	52.16	-25.5	46.66	31	74	21.84	H
16861.5	51.31	-26.62	41.49	36.44	68.2	16.89	H
16502.9	51.28	-26.96	39.82	38.42	68.2	16.92	H
11923.6	47.44	-31.48	39.09	39.83	74	26.56	V
11943.95	46.45	-31.48	39.09	38.84	74	27.55	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)
17956.55	52.69	-25.5	46.66	31.53	74	21.31	H
17936.75	52.31	-25.5	46.66	31.15	74	21.69	V
16962.15	51.34	-26.32	42.36	35.29	68.2	16.86	H
15883.05	51.27	-26.97	38.48	39.76	74	22.73	H
11800.4	47.32	-31.85	39.05	40.12	74	26.68	H
11765.2	46.91	-31.99	38.98	39.92	74	27.09	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)
17941.15	51.91	-25.5	46.66	30.75	74	22.09	H
17928.5	51.84	-25.5	46.66	30.68	74	22.16	V
16977.55	51.4	-26.32	42.36	35.35	68.2	16.8	V
16860.95	51.26	-26.62	41.49	36.39	68.2	16.94	H
11753.65	47.14	-31.99	38.98	40.15	74	26.86	V
11765.75	46.46	-31.99	38.98	39.47	74	27.54	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)
16561.75	51.87	-26.87	40.65	38.09	68.2	16.33	V
17941.7	51.69	-25.5	46.66	30.53	74	22.31	V
17933.45	51.61	-25.5	46.66	30.45	74	22.39	V
15926.5	51.4	-27.35	38.54	40.21	74	22.6	V
11490.75	46.47	-32.26	38.84	39.9	74	27.53	V
11976.4	46.27	-31.48	39.09	38.66	74	27.73	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)
17930.7	51.96	-25.5	46.66	30.8	74	22.04	H
17970.85	51.94	-25.5	46.66	30.78	74	22.06	H
16560.65	51.4	-26.87	40.65	37.62	68.2	16.8	V
16501.25	51.16	-26.96	39.82	38.3	68.2	17.04	H
11969.25	46.56	-31.48	39.09	38.95	74	27.44	V
11976.4	46.23	-31.48	39.09	38.62	74	27.77	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)
17876.8	52.53	-25.5	46.66	31.37	74	21.47	V
17851.5	52.07	-25.5	46.66	30.91	74	21.93	H
16157.5	51.87	-26.77	38.93	39.71	74	22.13	V
16844.45	51.49	-26.62	41.49	36.62	68.2	16.71	V
11997.3	46.23	-31.48	39.09	38.62	74	27.77	H
11835.05	46.11	-31.85	39.05	38.91	74	27.89	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)
17924.65	52.51	-25.5	46.66	31.35	74	21.49	V
17959.85	52.31	-25.5	46.66	31.15	74	21.69	H
16767.45	51.7	-26.62	41.49	36.83	68.2	16.5	V
16991.85	51.6	-26.32	42.36	35.55	68.2	16.6	H
11852.1	46.71	-31.85	39.05	39.51	74	27.29	H
11870.25	46.5	-31.85	39.05	39.3	74	27.5	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)
17877.35	52.51	-25.5	46.66	31.35	74	21.49	V
17978	52.44	-25.5	46.66	31.28	74	21.56	V
16642.05	52.07	-26.87	40.65	38.29	68.2	16.13	V
15937.5	51.27	-27.35	38.54	40.08	74	22.73	V
11651.9	46.85	-32.31	38.91	40.26	74	27.15	V
11998.95	46.67	-31.48	39.09	39.06	74	27.33	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)
17989.55	51.85	-25.5	46.66	30.69	74	22.15	V
17872.4	51.78	-25.5	46.66	30.62	74	22.22	V
16864.8	51.31	-26.62	41.49	36.44	68.2	16.89	H
16233.4	51.27	-27.1	39.31	39.06	68.2	16.93	H
11872.45	46.76	-31.85	39.05	39.56	74	27.24	H
11742.1	46.71	-31.99	38.98	39.72	74	27.29	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)
17997.25	52.18	-25.5	46.66	31.02	74	21.82	H
17840.5	52.11	-25.5	46.66	30.95	74	21.89	H
16970.4	51.72	-26.32	42.36	35.67	68.2	16.48	H
16593.65	51.64	-26.87	40.65	37.86	68.2	16.56	H
11922.5	46.62	-31.48	39.09	39.01	74	27.38	V
11855.4	46.61	-31.85	39.05	39.41	74	27.39	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)
17858.1	53.1	-25.5	46.66	31.94	74	20.9	V
17892.2	52.52	-25.5	46.66	31.36	74	21.48	V
15968.3	52.09	-27.35	38.54	40.9	74	21.91	H
16947.85	51.84	-26.32	42.36	35.79	68.2	16.36	V
11984.1	46.55	-31.48	39.09	38.94	74	27.45	H
11771.8	46.47	-31.99	38.98	39.48	74	27.53	V

802.11ax-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)
16002.95	52.63	-27.35	38.54	41.44	74	21.37	V
17905.4	52.35	-25.5	46.66	31.19	74	21.65	H
17840.5	52.08	-25.5	46.66	30.92	74	21.92	V
16845.55	51.67	-26.62	41.49	36.8	68.2	16.53	V
11764.1	46.99	-31.99	38.98	40	74	27.01	V
11907.65	46.65	-31.85	39.05	39.45	74	27.35	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)
17946.65	52.15	-25.5	46.66	30.99	74	21.85	V
17930.15	52.14	-25.5	46.66	30.98	74	21.86	H
16033.75	51.48	-27.35	38.54	40.29	74	22.52	V
16854.35	51.41	-26.62	41.49	36.54	68.2	16.79	H
11941.75	46.86	-31.48	39.09	39.25	74	27.14	V
11756.4	46.81	-31.99	38.98	39.82	74	27.19	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)
17938.95	52.15	-25.5	46.66	30.99	74	21.85	H
17947.75	51.71	-25.5	46.66	30.55	74	22.29	V
16918.7	51.64	-26.32	42.36	35.59	68.2	16.56	V
16856	51.63	-26.62	41.49	36.76	68.2	16.57	V
11997.85	46.39	-31.48	39.09	38.78	74	27.61	V
11991.8	46.17	-31.48	39.09	38.56	74	27.83	H

802.11ax-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)
17985.15	52.19	-25.5	46.66	31.03	74	21.81	V
17823.45	52.07	-25.5	46.66	30.91	74	21.93	V
16488.05	51.47	-26.96	39.82	38.61	68.2	16.73	H
16594.75	51.45	-26.87	40.65	37.67	68.2	16.75	H
11966.5	46.91	-31.48	39.09	39.3	74	27.09	V
11975.3	46.37	-31.48	39.09	38.76	74	27.63	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)
17949.95	52.03	-25.5	46.66	30.87	74	21.97	V
16595.85	51.77	-26.87	40.65	37.99	68.2	16.43	V
17868.55	51.75	-25.5	46.66	30.59	74	22.25	V
16891.75	51.56	-26.32	42.36	35.51	68.2	16.64	V
11826.8	46.91	-31.85	39.05	39.71	74	27.09	V
11986.3	46.72	-31.48	39.09	39.11	74	27.28	H

802.11ax-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)
17898.8	52.7	-25.5	46.66	31.54	74	21.3	H
17952.7	52.63	-25.5	46.66	31.47	74	21.37	H
16868.65	51.97	-26.62	41.49	37.1	68.2	16.23	V
15326.45	51.57	-27.53	39.06	40.04	68.2	16.63	V
11984.1	47.3	-31.48	39.09	39.69	74	26.7	H
11966.5	47.04	-31.48	39.09	39.43	74	26.96	V

A.7. Band Edges Compliance

A7.1 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.19	P
	5825 MHz	Fig.20	P
802.11n HT20	5745 MHz	Fig.21	P
	5825 MHz	Fig.22	P
802.11n HT40	5755 MHz	Fig.23	P
	5795 MHz	Fig.24	P
802.11ac HT20	5745 MHz	Fig.25	P
	5825 MHz	Fig.26	P
802.11ac HT40	5755 MHz	Fig.27	P
	5795 MHz	Fig.28	P
802.11ac HT80	5775 MHz	Fig.29 Fig.30	P
802.11ax HT20	5745 MHz	Fig.31	P
	5825 MHz	Fig.32	P
802.11ax HT40	5755 MHz	Fig.33	P
	5795 MHz	Fig.34	P
802.11ax HT80	5775 MHz	Fig.35 Fig.36	P

Conclusion: PASS

Test graphs as below:

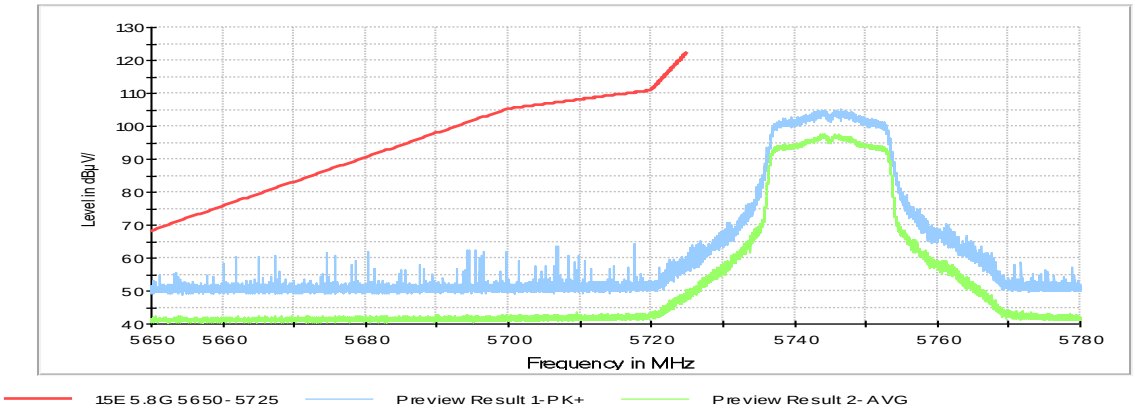


Fig. 19 Band Edges (802.11a Ch149,5745MHz)

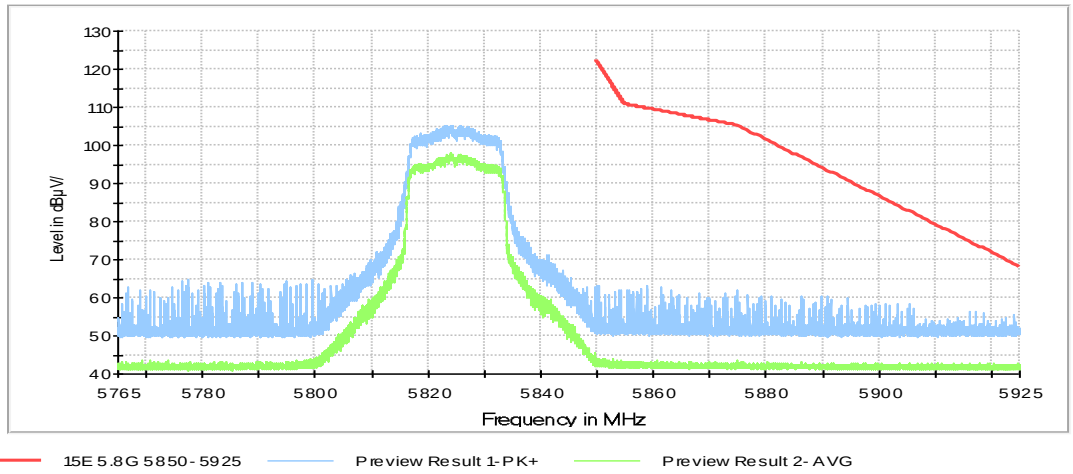


Fig. 20 Band Edges (802.11a Ch165, 5825MHz)

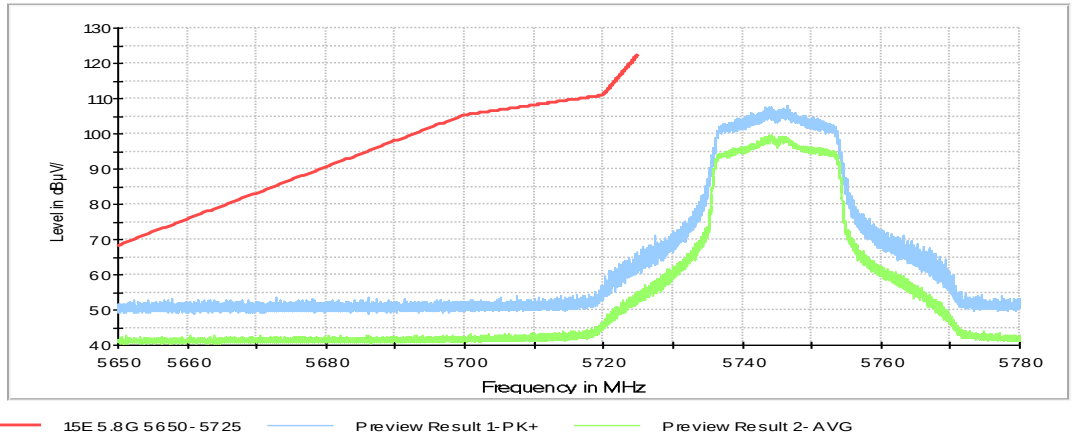


Fig. 21 Band Edges (802.11n-HT20 Ch149, 5745MHz)

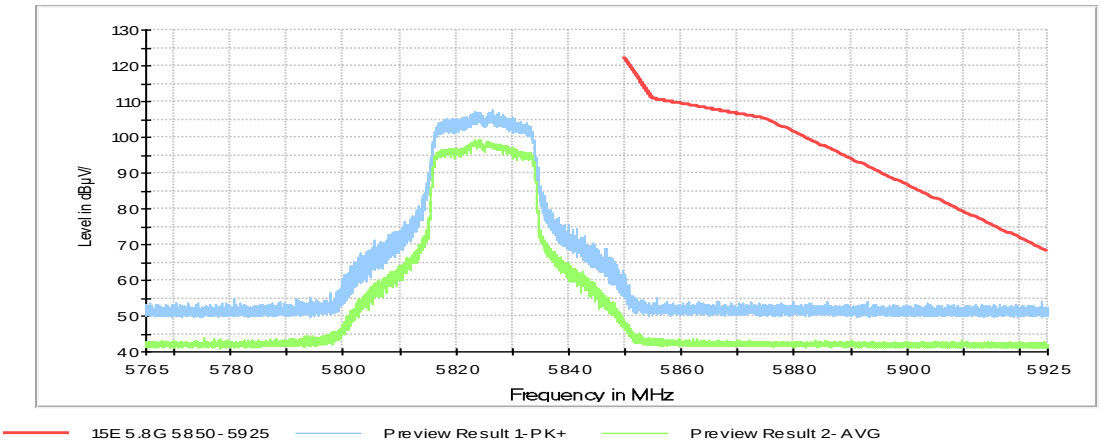


Fig. 22 Band Edges (802.11n-HT20 Ch165, 5825MHz)

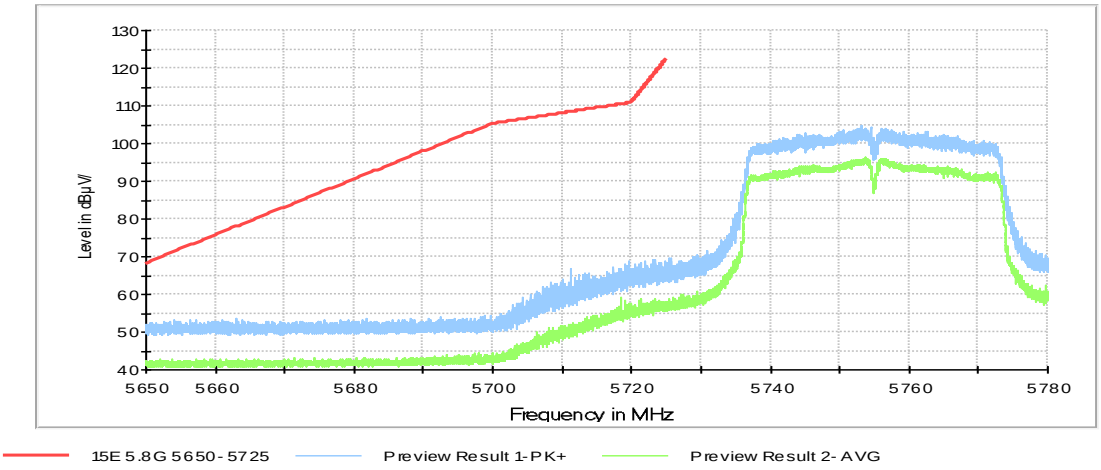


Fig. 23 Band Edges (802.11n-HT40 Ch151, 5755MHz)

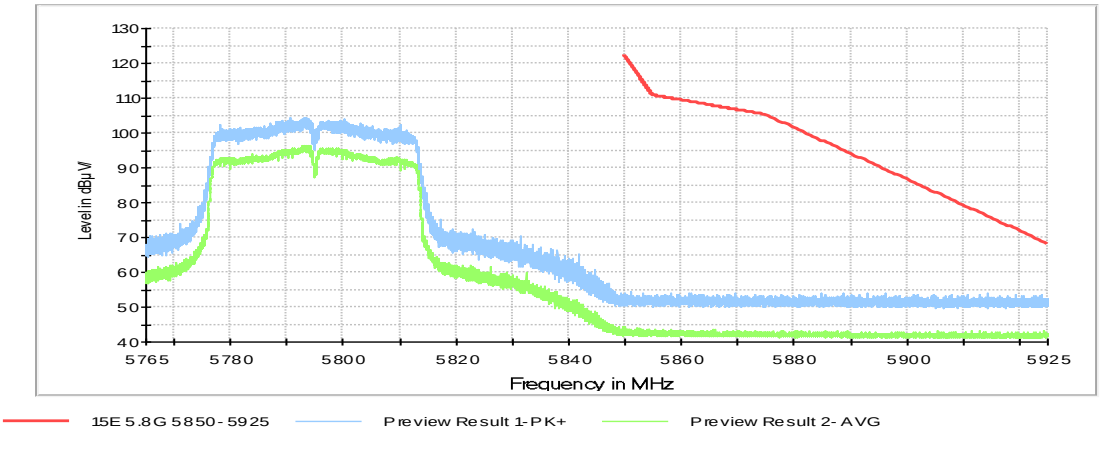


Fig. 24 Band Edges (802.11n-HT40 Ch159, 5795MHz)

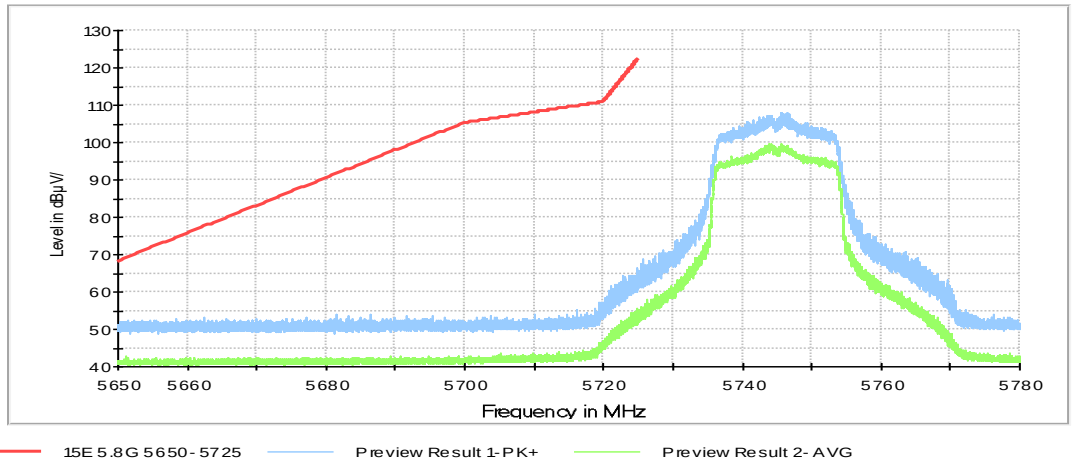


Fig. 25 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

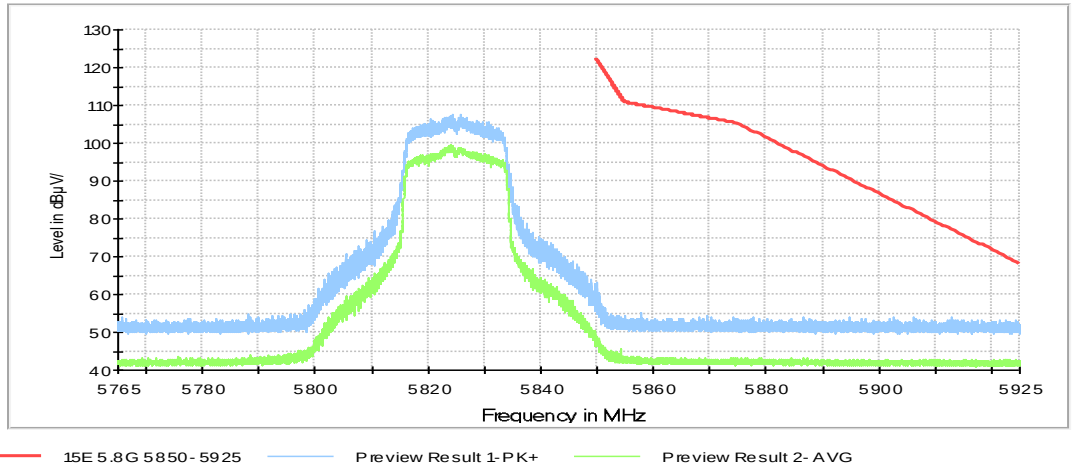


Fig. 26 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

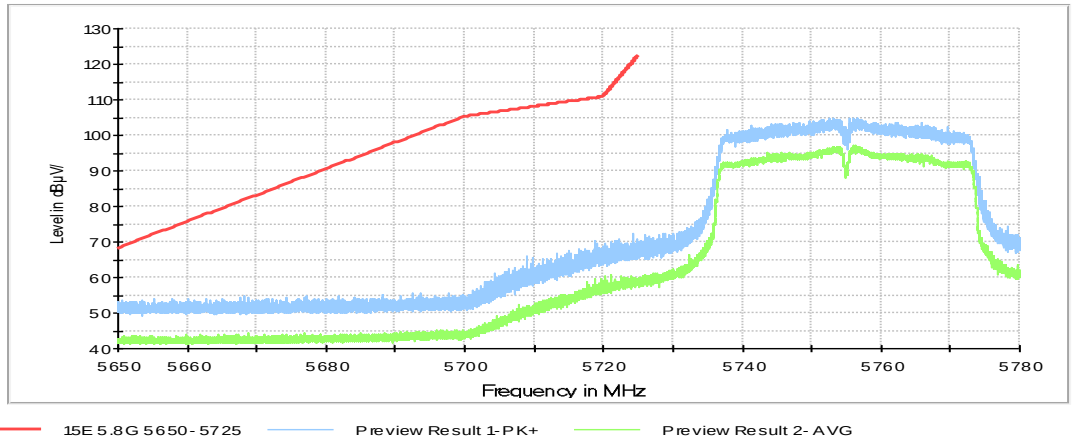


Fig. 27 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

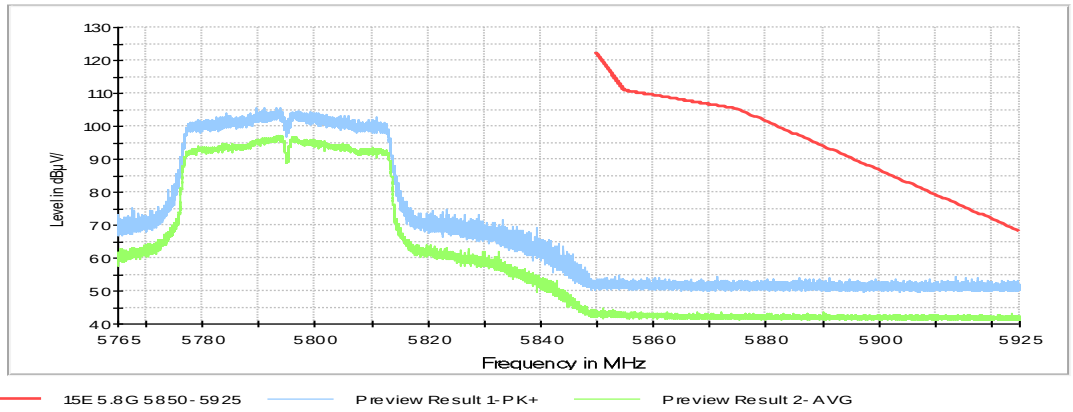


Fig. 28 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

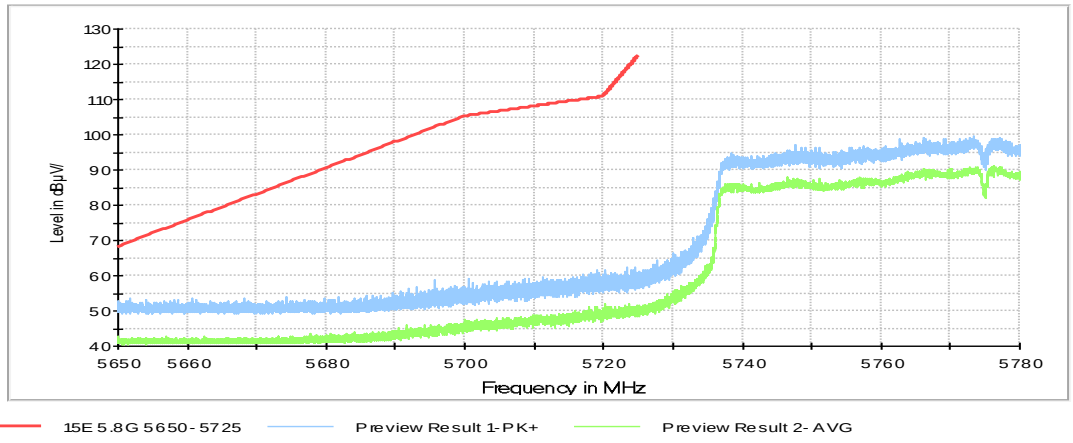


Fig. 29 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

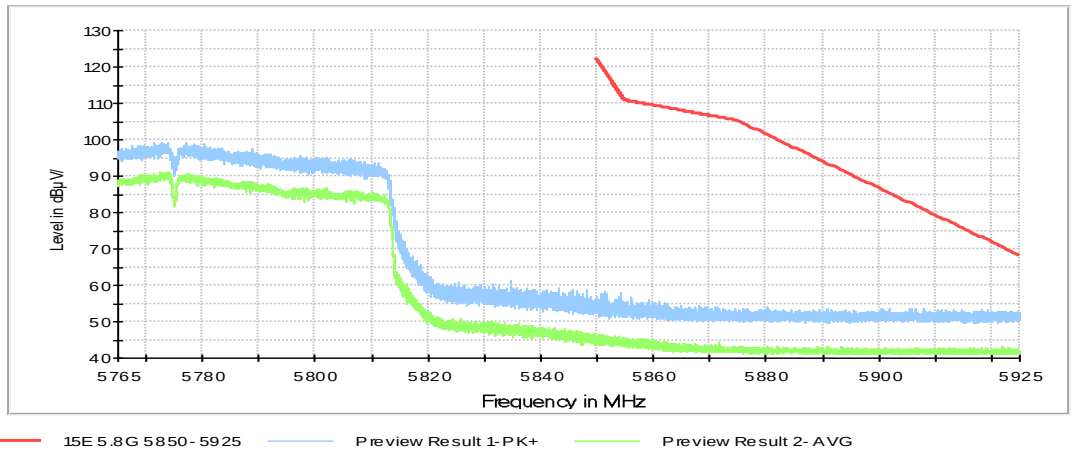


Fig. 30 Band Edges (802.11ac-HT80, 5775MHz)

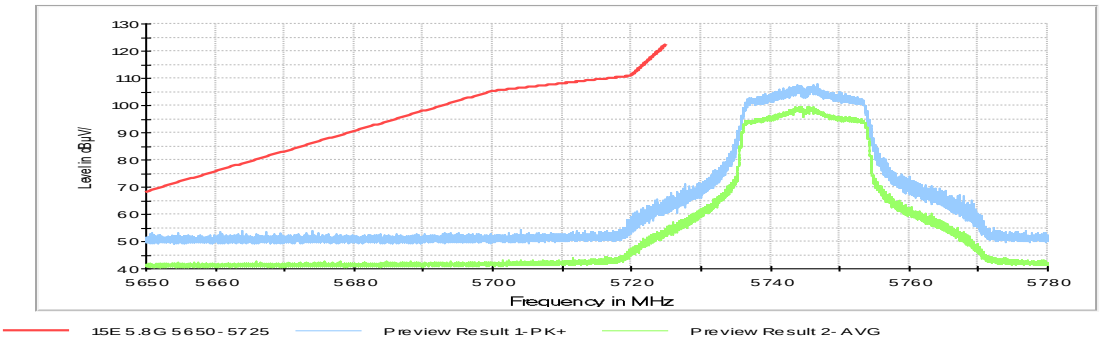


Fig. 31 Band Edges (802.11ax-HT20 Ch149, 5745MHz)

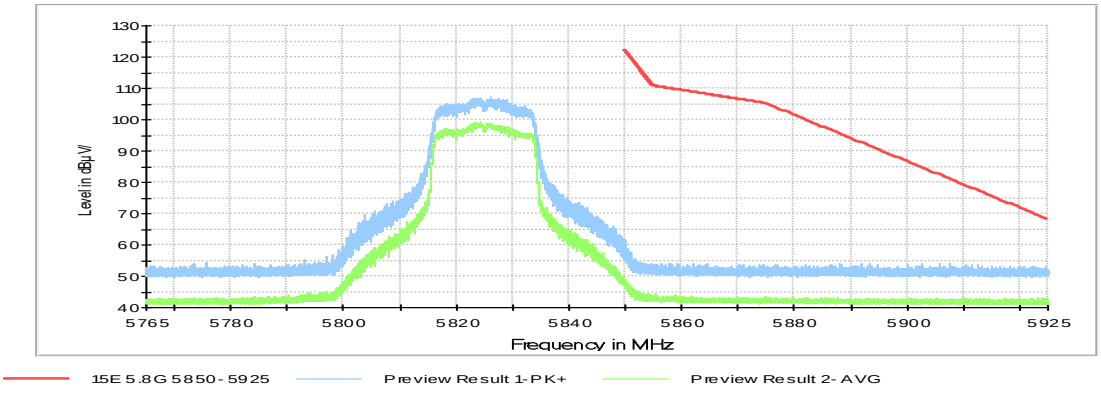


Fig. 32 Band Edges (802.11ax-HT20 Ch165, 5825MHz)

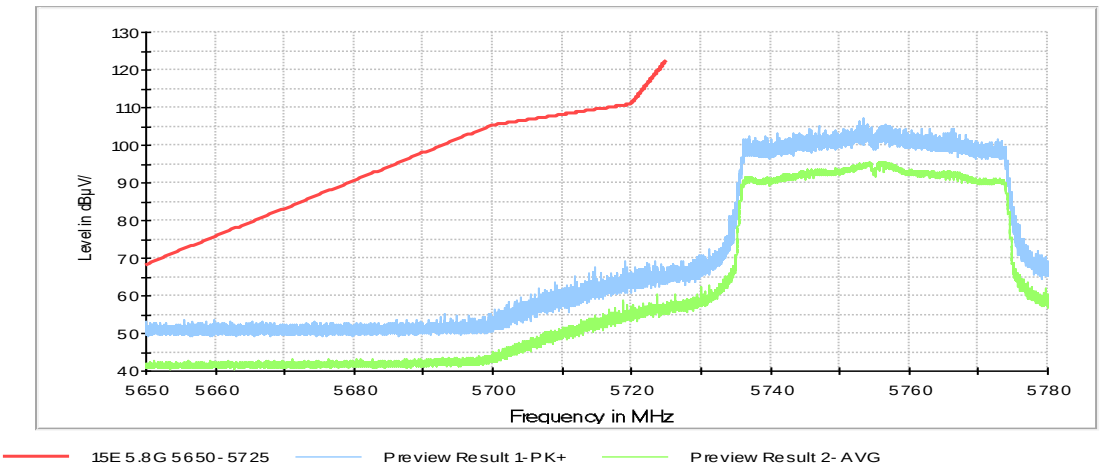


Fig. 33 Band Edges (802.11ax-HT40 Ch151, 5755MHz)

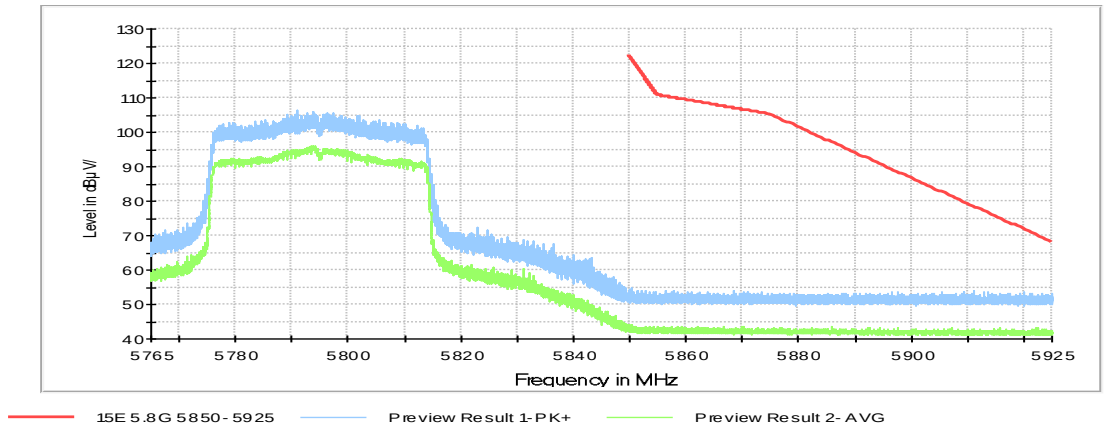


Fig. 34 Band Edges (802.11ax-HT40 Ch159, 5795MHz)

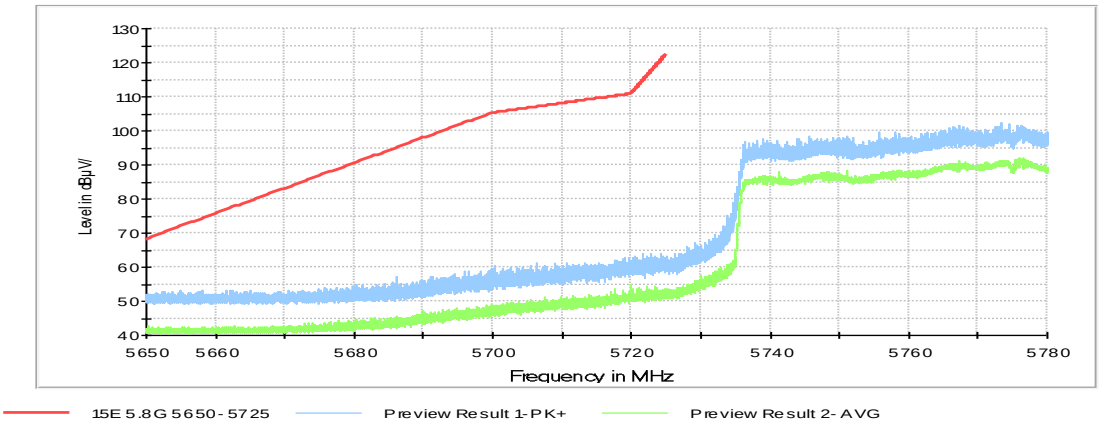


Fig. 35 Band Edges (802.11ax-HT80 Ch155, 5775MHz)

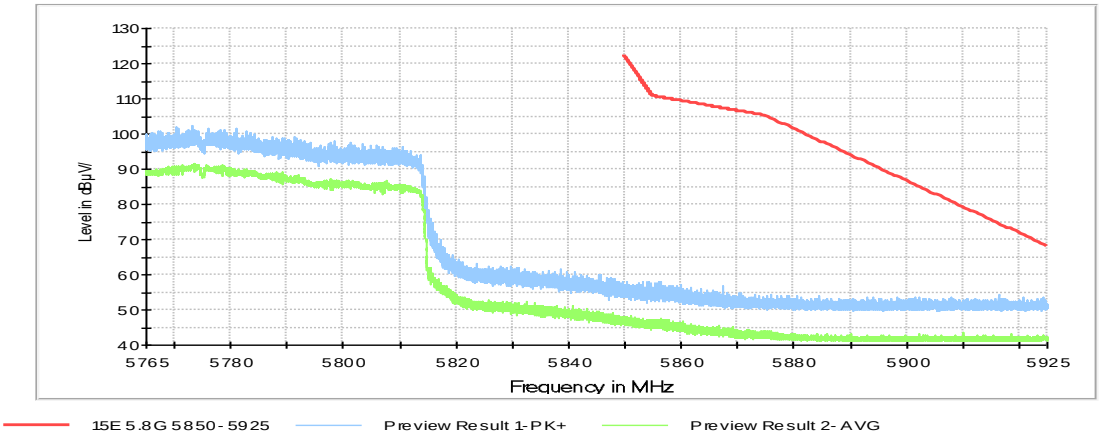


Fig. 36 Band Edges (802.11ax-HT80, 5775MHz)

A.8. 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 AE1		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.37	Fig.38	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 AE1		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.37	Fig.38	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:

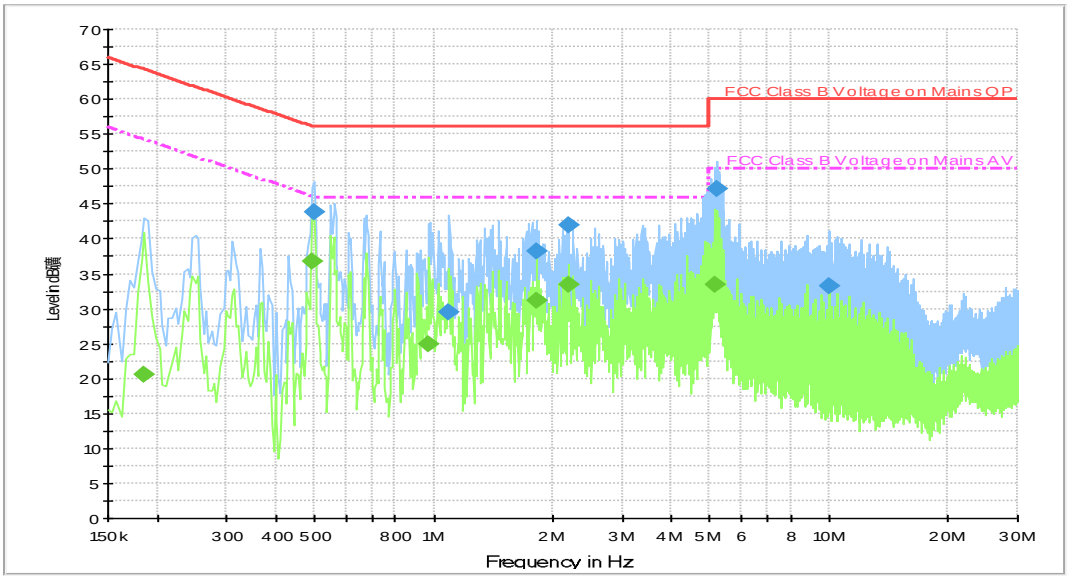


Fig. 37 AC Power line Conducted Emission-802.11a

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)
0.498000	43.9	5000.	9.000	On	L1	19.8	12.1	56.0
1.094000	29.4	5000.	9.000	On	L1	19.7	26.6	56.0
1.818000	38.3	5000.	9.000	On	N	19.7	17.7	56.0
2.198000	42.0	5000.	9.000	On	L1	19.6	14.0	56.0
5.194000	47.2	5000.	9.000	On	L1	19.6	12.8	60.0
9.998000	33.1	5000.	9.000	On	L1	19.6	26.9	60.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	20.6	5000.	9.000	On	L1	19.8	33.6	54.2
0.494000	36.8	5000.	9.000	On	N	19.8	9.3	46.1
0.974000	24.8	5000.	9.000	On	N	19.6	21.2	46.0
1.818000	31.2	5000.	9.000	On	N	19.7	14.8	46.0
2.198000	33.4	5000.	9.000	On	L1	19.6	12.6	46.0
5.122000	33.4	5000.	9.000	On	L1	19.6	16.6	50.0

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

Idle:

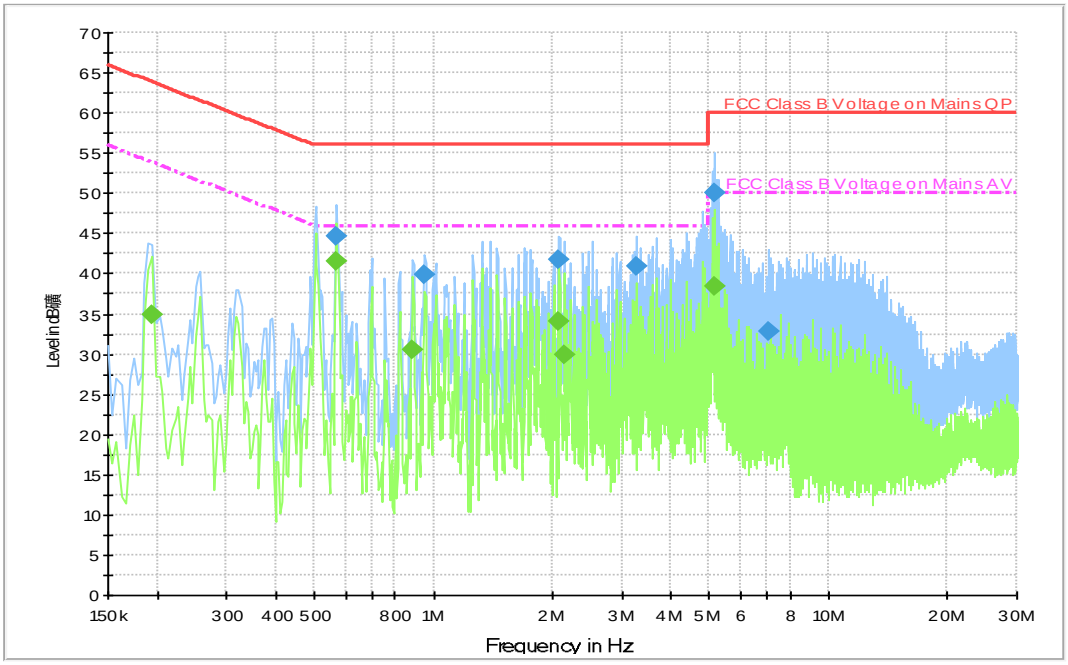


Fig. 38 AC Power line Conducted Emission-Idle

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)
0.570000	44.7	5000.	9.000	On	L1	19.7	11.3	56.0
0.950000	39.9	5000.	9.000	On	L1	19.7	16.1	56.0
2.082000	41.7	5000.	9.000	On	N	19.7	14.3	56.0
3.282000	41.0	5000.	9.000	On	L1	19.6	15.0	56.0
5.170000	50.1	5000.	9.000	On	L1	19.6	9.9	60.0
7.046000	32.8	5000.	9.000	On	N	19.7	27.2	60.0

Final Result 2

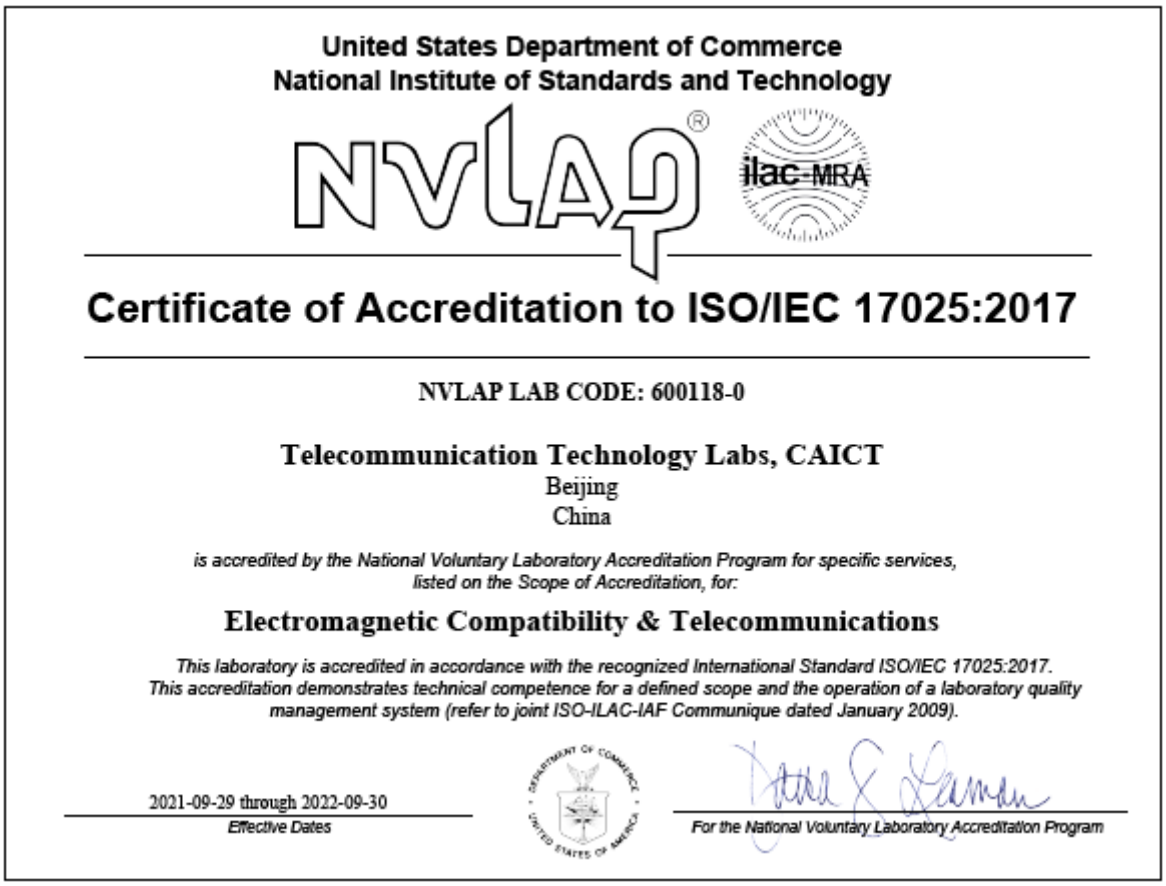
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.194000	35.0	5000.0	9.000	On	L1	19.8	18.9	53.9
0.566000	41.6	5000.0	9.000	On	N	19.8	4.4	46.0
0.886000	30.6	5000.0	9.000	On	L1	19.7	15.4	46.0
2.082000	34.0	5000.0	9.000	On	N	19.7	12.0	46.0
2.142000	29.9	5000.0	9.000	On	N	19.7	16.1	46.0
5.170000	38.5	5000.0	9.000	On	L1	19.6	11.5	50.0

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

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).

2021-09-29 through 2022-09-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

*** END OF REPORT BODY ***