



FCC PART 15C TEST REPORT No.I23Z60093-IOT05

for

TCL Communication Ltd.

Tablet PC

9138S,9150S

With

FCC ID: 2ACCJB199

Hardware Version: 05

Software Version: YNS7

Issued Date: 2023-03-09

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
I23Z60093-IOT05	Rev.0	1st edition	2023-03-09

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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

Radiated testing Location: CTTL(huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35°C

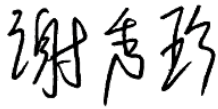
Relative Humidity: 20-75%

1.4. Project date

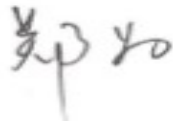
Testing Start Date: 2023-01-31

Testing End Date: 2023-03-09

1.5. Signature



Xie Xiuzhen
(Prepared this test report)



Zheng Wei
(Reviewed this test report)



Pang Shuai
(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: 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: +86 755 3661 1621
Fax: +86 755 3661 2000-81722

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: +86 755 3661 1621
Fax: +86 755 3661 2000-81722

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

Description	Tablet PC
Model name	9138S,9150S
FCC ID	2ACCJB199
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
UT25a	358975210000866	05	YNS7
UT32a	358975210000676	05	YNS7

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

UT32a is used for Conduction test, UT25a is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	Manufacture
AE1	Battery	TLp053C1	BYD
AE2-1	Charger	QC13US	PUAN
AE3	USB cable	CDA0000128C1	JUWEI

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

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

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

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

Terms used in Verdict column

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

6.2. Statements

CTTL has evaluated the test cases requested by the client/matrix 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°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	ESU26	100235	R&S	1 year	2023-04-07
3	LISN	ENV216	101200	R&S	1 year	2023-06-29
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	Rohde & Schwarz	1 year	2023-10-25
2	BiLog Antenna	VULB9163	9163-1223	Schwarzbeck	1 year	2023-07-25
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2023-06-20
4	Loop Antenna	HFH2-Z2	829324/00 7	R&S	1 year	2024-12-23
5	EMI Antenna	3116	2663	ETS-Lindgren	1 year	2023-11-22

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	4.92
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.18
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.54
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

8.6. AC Power-line Conducted Emission

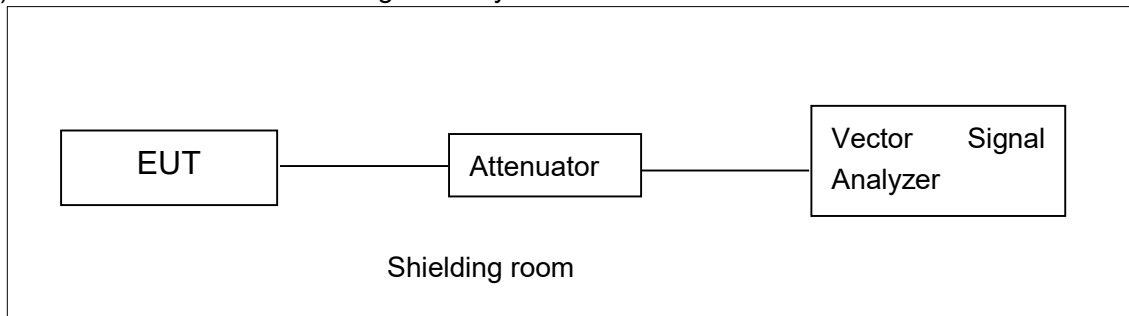
Measurement Uncertainty: 3.08dB, k=2

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

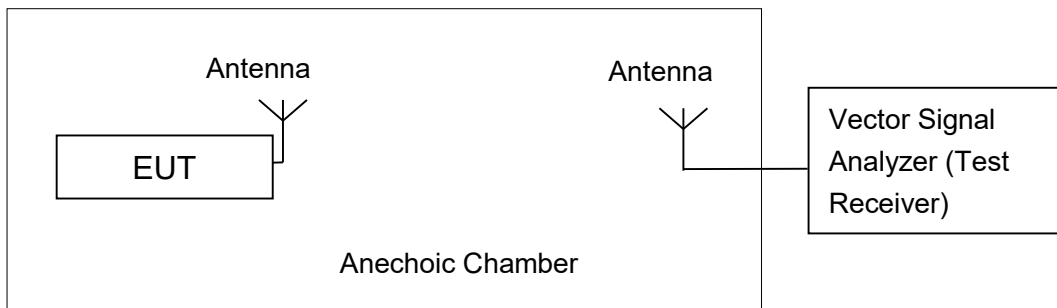


A.1.2. Radiated Emission Measurements

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 1.75dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	18.11	18.00	17.58

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

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	19.14	19.14	18.98

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

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	17.93	17.59	17.62

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	15.82	15.41

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

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	15.84	15.44

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

802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	12.48

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

The duty cycle of all mode are 100%.

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

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

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

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	4.95	P
	157	4.50	P
	165	4.41	P
802.11n HT20	149	5.19	P
	157	4.88	P
	165	4.74	P
802.11ac HT40	151	-0.37	P
	159	-0.71	P
802.11ac HT80	155	-7.21	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is made according to KDB789033 D02 .

Measurement Uncertainty:

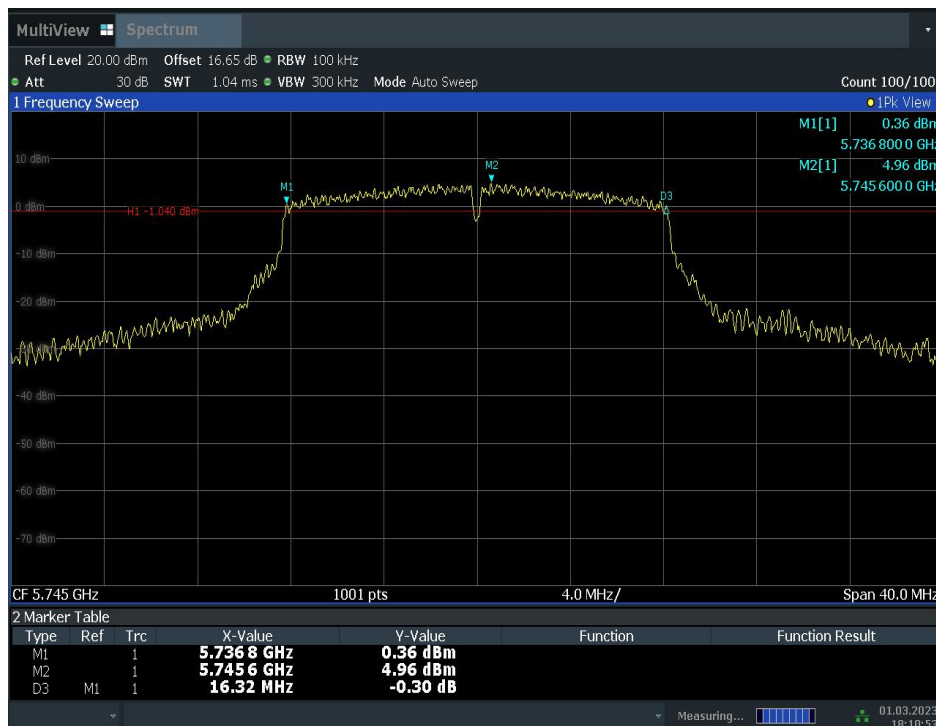
Measurement Uncertainty	60.80Hz
-------------------------	---------

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11a	149	Fig.1	16.32	P
	157	Fig.2	16.32	P
	165	Fig.3	16.32	P
802.11n HT20	149	Fig.4	17.60	P
	157	Fig.5	17.60	P
	165	Fig.6	17.60	P
802.11ac HT40	151	Fig.7	36.32	P
	159	Fig.8	36.00	P
802.11ac HT80	155	Fig.9	76.32	P

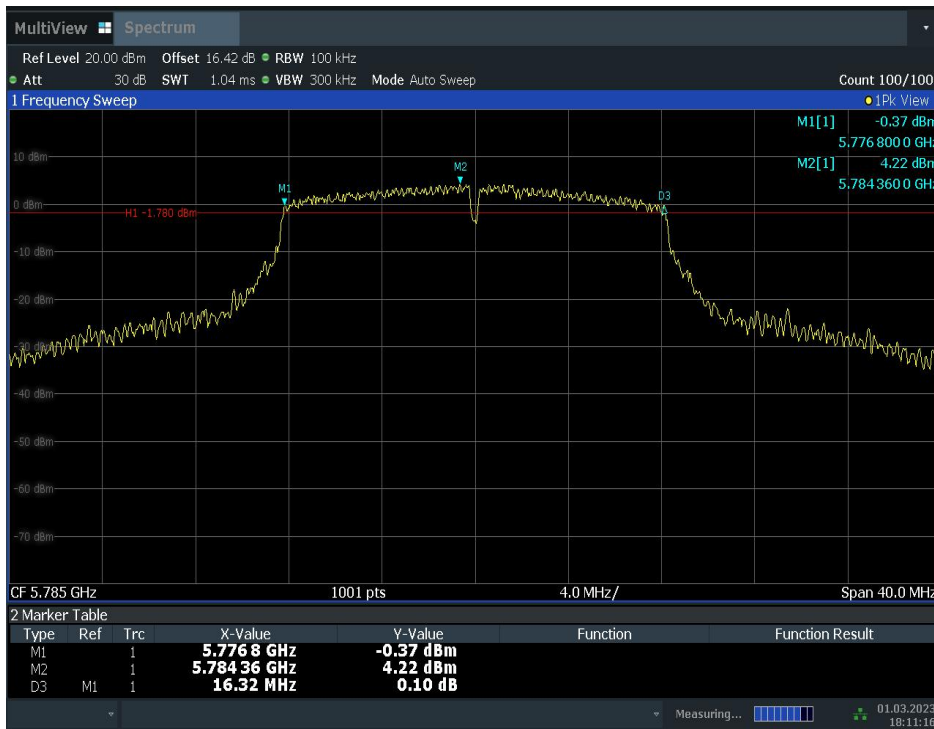
Conclusion: PASS

Test graphs as below:



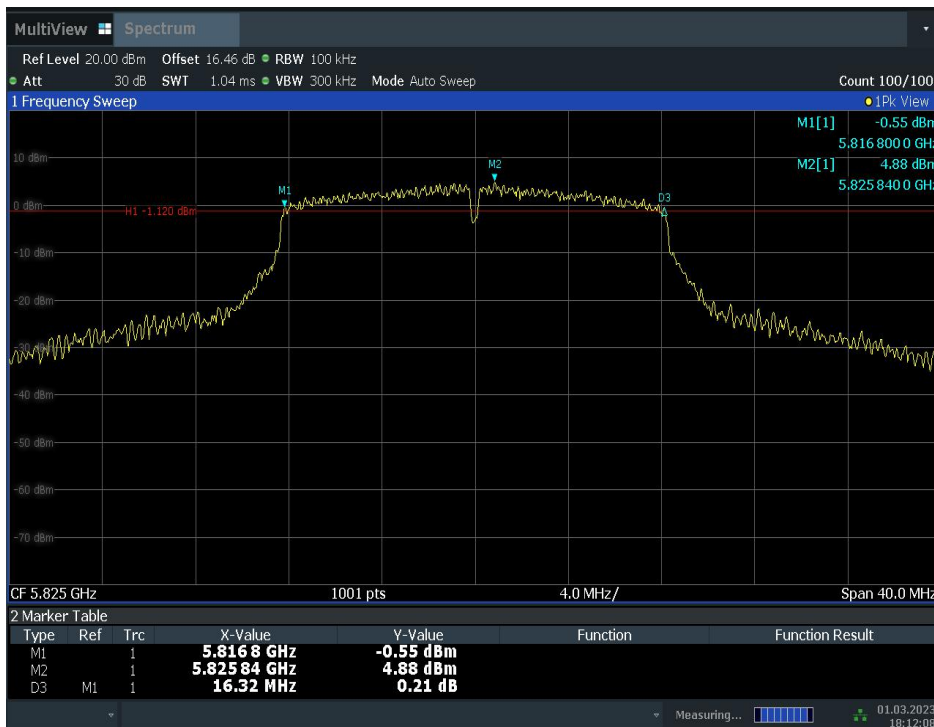
18:10:53 01.03.2023

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



18:11:17 01.03.2023

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



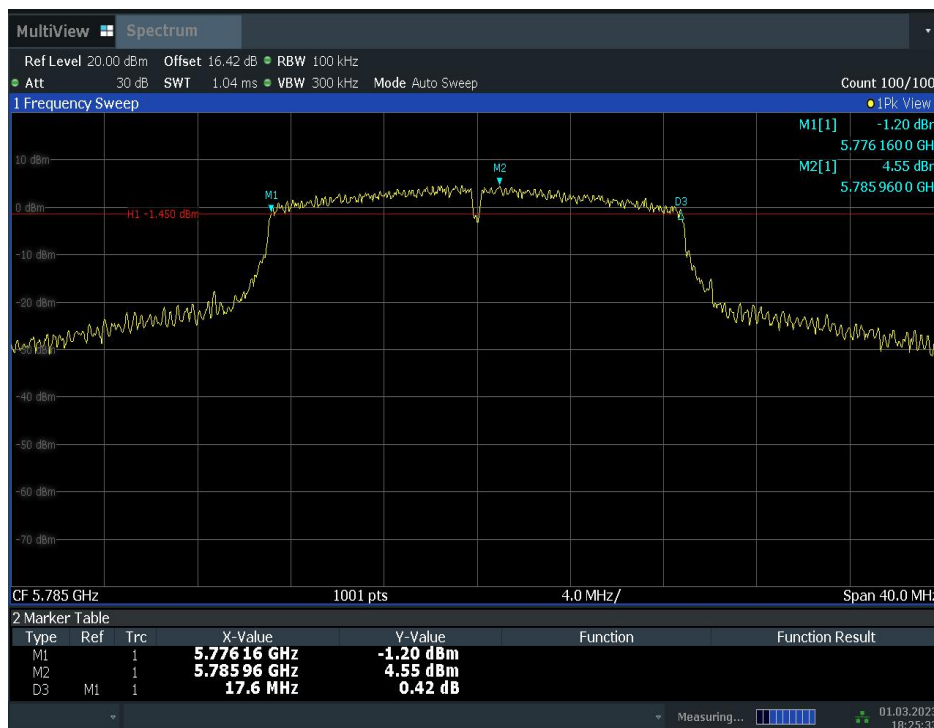
18:12:09 01.03.2023

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



18:25:13 01.03.2023

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



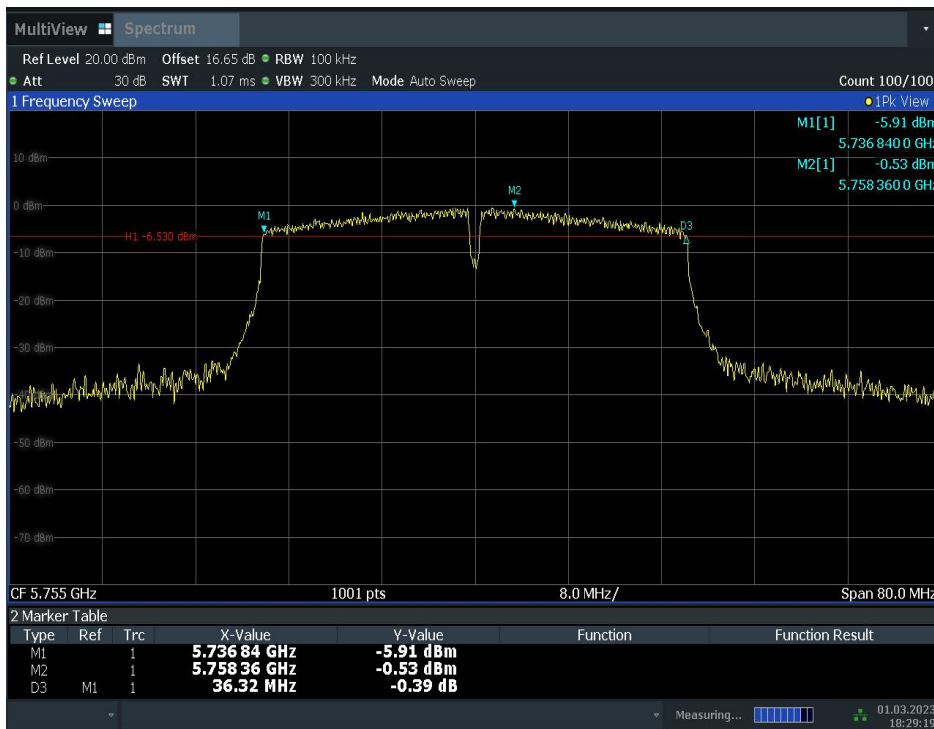
18:25:34 01.03.2023

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



18:25:55 01.03.2023

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



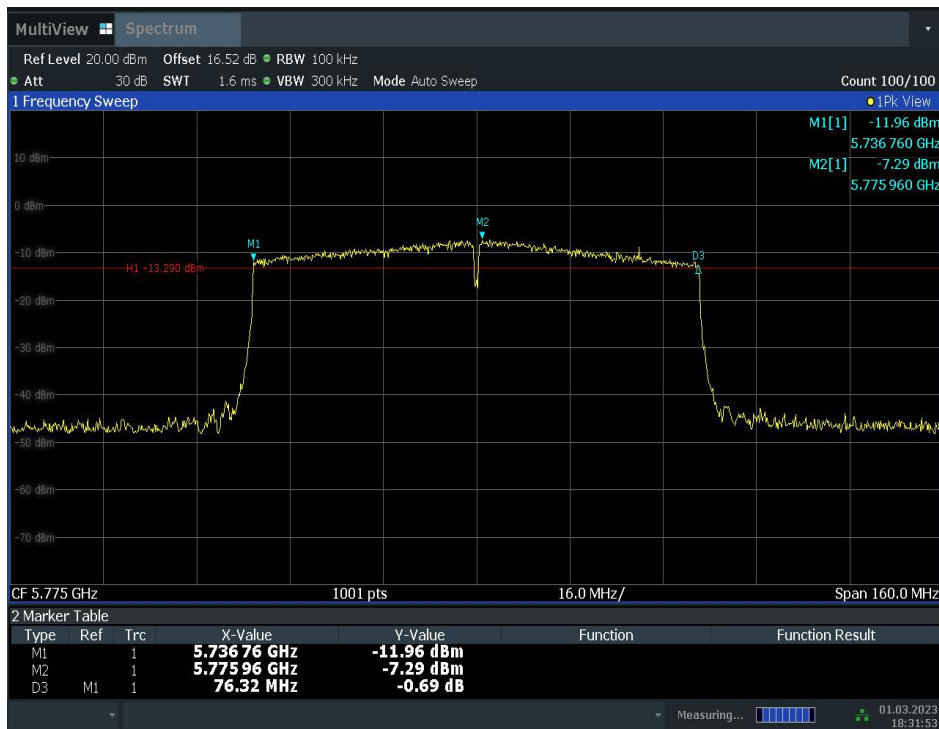
18:29:19 01.03.2023

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



18:29:43 01.03.2023

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



18:31:54 01.03.2023

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

A.5. Transmitter Spurious Emission

A.5.1 Transmitter Spurious Emission - Radiated

Measurement Limit:

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

The measurement is made according to KDB 789033

Measurement Results:

802.11a mode

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

802.11n-HT20 mode

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

802.11n-HT40 mode

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

802.11ac-HT20 mode

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

802.11ac-HT40 mode

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

802.11ac-HT80 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11ac (HT80)	155	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz~ 40 GHz	---	P

Conclusion: PASS**Note:**

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

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

Average Results:
802.11a
Channel 149

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17947.200	38.28	-25.50	46.66	17.12	54.00	15.72	H
17962.600	38.20	-25.50	46.66	17.04	54.00	15.80	V
13272.750	36.07	-29.67	39.55	26.19	54.00	17.93	H
13280.450	36.03	-29.67	39.55	26.15	54.00	17.97	H
11864.200	35.10	-31.85	39.05	27.90	54.00	18.90	H
11857.600	35.08	-31.85	39.05	27.88	54.00	18.92	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)
17884.500	38.28	-25.50	46.66	17.12	54.00	15.72	H
17994.500	38.16	-25.50	46.66	17.00	54.00	15.84	H
13266.700	36.05	-29.67	39.55	26.17	54.00	17.95	V
13303.550	35.83	-29.49	39.71	25.61	54.00	18.17	V
11866.400	35.34	-31.85	39.05	28.14	54.00	18.66	H
11881.800	35.00	-31.85	39.05	27.80	54.00	19.00	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)
17987.350	38.48	-25.50	46.66	17.32	54.00	15.52	H
17943.350	38.47	-25.50	46.66	17.31	54.00	15.53	H
13294.200	36.06	-29.49	39.71	25.84	54.00	17.94	H
13282.100	36.00	-29.67	39.55	26.12	54.00	18.00	V
11779.500	35.13	-31.99	38.98	28.14	54.00	18.87	V
11869.150	34.98	-31.85	39.05	27.78	54.00	19.02	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)
17984.050	38.75	-25.50	46.66	17.59	54.00	15.25	H
17951.050	38.71	-25.50	46.66	17.55	54.00	15.29	H
13268.900	36.48	-29.67	39.55	26.60	54.00	17.52	H
13287.600	36.34	-29.67	39.55	26.46	54.00	17.66	H
11890.600	35.49	-31.85	39.05	28.29	54.00	18.51	V
11884.550	35.41	-31.85	39.05	28.21	54.00	18.59	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)
17937.300	38.66	-25.50	46.66	17.50	54.00	15.34	V
17998.350	38.43	-25.50	46.66	17.27	54.00	15.57	H
13262.300	36.25	-29.67	39.55	26.37	54.00	17.75	H
13293.650	36.02	-29.49	39.71	25.80	54.00	17.98	H
11873.000	35.28	-31.85	39.05	28.08	54.00	18.72	H
11876.300	35.27	-31.85	39.05	28.07	54.00	18.73	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)
17970.300	38.52	-25.50	46.66	17.36	54.00	15.48	H
17945.550	38.30	-25.50	46.66	17.14	54.00	15.70	V
13269.450	36.10	-29.67	39.55	26.22	54.00	17.90	V
13291.450	36.08	-29.49	39.71	25.86	54.00	17.92	H
11870.800	35.13	-31.85	39.05	27.93	54.00	18.87	H
11865.850	35.08	-31.85	39.05	27.88	54.00	18.92	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)
17991.200	38.03	-25.50	46.66	16.87	54.00	15.97	V
17985.700	37.64	-25.50	46.66	16.48	54.00	16.36	V
9191.750	35.37	-33.85	38.08	31.14	54.00	18.63	H
13269.450	35.31	-29.67	39.55	25.43	54.00	18.69	H
13297.500	35.28	-29.49	39.71	25.06	54.00	18.72	H
11884.550	34.18	-31.85	39.05	26.98	54.00	19.82	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)
17955.450	37.73	-25.50	46.66	16.57	54.00	16.27	V
17997.800	37.71	-25.50	46.66	16.55	54.00	16.29	H
13266.150	35.42	-29.67	39.55	25.54	54.00	18.58	V
13277.150	35.28	-29.67	39.55	25.40	54.00	18.72	V
11857.050	34.29	-31.85	39.05	27.09	54.00	19.71	V
9191.750	34.24	-33.85	38.08	30.01	54.00	19.76	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)
17966.450	37.56	-25.50	46.66	16.40	54.00	16.44	H
17967.550	37.48	-25.50	46.66	16.32	54.00	16.52	H
13283.750	35.24	-29.67	39.55	25.36	54.00	18.76	H
13301.900	35.19	-29.49	39.71	24.97	54.00	18.81	H
11893.350	34.39	-31.85	39.05	27.19	54.00	19.61	V
11893.900	34.36	-31.85	39.05	27.16	54.00	19.64	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)
17956.550	37.88	-25.50	46.66	16.72	54.00	16.12	V
17956.000	37.63	-25.50	46.66	16.47	54.00	16.37	H
13280.450	35.51	-29.67	39.55	25.63	54.00	18.49	H
13287.050	35.21	-29.67	39.55	25.33	54.00	18.79	V
11879.600	34.30	-31.85	39.05	27.10	54.00	19.70	V
11875.200	34.11	-31.85	39.05	26.91	54.00	19.89	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)
17946.650	37.92	-25.50	46.66	16.76	54.00	16.08	V
17998.350	37.80	-25.50	46.66	16.64	54.00	16.20	V
13287.600	35.64	-29.67	39.55	25.76	54.00	18.36	H
13279.900	35.23	-29.67	39.55	25.35	54.00	18.77	H
11890.050	34.31	-31.85	39.05	27.11	54.00	19.69	H
11888.950	34.15	-31.85	39.05	26.95	54.00	19.85	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)
17945.550	37.79	-25.50	46.66	16.63	54.00	16.21	V
17996.700	37.70	-25.50	46.66	16.54	54.00	16.30	H
13282.650	35.42	-29.67	39.55	25.54	54.00	18.58	H
13278.800	35.25	-29.67	39.55	25.37	54.00	18.75	H
11847.150	34.28	-31.85	39.05	27.08	54.00	19.72	V
11861.450	34.18	-31.85	39.05	26.98	54.00	19.82	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)
17971.400	37.94	-25.50	46.66	16.78	54.00	16.06	V
17965.900	37.78	-25.50	46.66	16.62	54.00	16.22	H
13256.250	34.89	-29.67	39.55	25.01	54.00	19.11	V
13272.750	34.83	-29.67	39.55	24.95	54.00	19.17	V
9191.750	34.24	-33.85	38.08	30.01	54.00	19.76	H
11852.100	34.19	-31.85	39.05	26.99	54.00	19.81	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)
17997.250	37.70	-25.50	46.66	16.54	54.00	16.30	H
17996.700	37.64	-25.50	46.66	16.48	54.00	16.36	V
9191.750	35.36	-33.85	38.08	31.13	54.00	18.64	H
13336.000	35.29	-29.49	39.71	25.07	54.00	18.71	H
13288.150	35.15	-29.67	39.55	25.27	54.00	18.85	V
11802.050	34.60	-31.85	39.05	27.40	54.00	19.40	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)
17989.550	49.09	-25.50	46.66	27.93	74.00	24.91	V
17560.000	49.07	-26.85	45.25	30.67	68.20	19.13	V
13963.000	47.81	-29.51	41.30	36.02	68.20	20.39	V
13800.200	47.26	-29.10	40.86	35.49	68.20	20.94	H
11862.000	46.19	-31.85	39.05	38.99	74.00	27.81	H
11872.450	45.59	-31.85	39.05	38.39	74.00	28.41	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)
17023.200	48.99	-26.32	42.36	32.94	68.20	19.21	V
16886.800	48.91	-26.32	42.36	32.86	68.20	19.29	H
13871.700	46.62	-29.51	41.30	34.83	68.20	21.58	V
14397.500	46.59	-28.59	42.46	32.72	68.20	21.61	V
10464.450	45.82	-33.22	38.19	40.85	68.20	22.38	V
10458.950	45.72	-33.22	38.19	40.75	68.20	22.48	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)
16945.100	48.68	-26.32	42.36	32.63	68.20	19.52	V
16961.600	48.65	-26.32	42.36	32.60	68.20	19.55	H
13631.350	47.07	-29.50	40.43	36.14	68.20	21.13	H
13951.450	47.06	-29.51	41.30	35.27	68.20	21.14	H
11869.700	45.10	-31.85	39.05	37.90	74.00	28.90	H
10476.000	45.00	-32.99	38.27	39.71	68.20	23.20	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)
17547.350	50.12	-26.85	45.25	31.72	68.20	18.08	H
17548.450	49.50	-26.85	45.25	31.10	68.20	18.70	H
13255.150	47.67	-29.67	39.55	37.79	74.00	26.33	H
13945.400	47.15	-29.51	41.30	35.36	68.20	21.05	V
11873.550	45.63	-31.85	39.05	38.43	74.00	28.37	H
10656.400	45.37	-32.76	38.38	39.75	74.00	28.63	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)
16773.500	48.94	-26.62	41.49	34.07	68.20	19.26	H
17856.450	48.91	-25.50	46.66	27.75	74.00	25.09	V
13270.550	46.59	-29.67	39.55	36.71	74.00	27.41	V
13201.800	46.55	-29.67	39.55	36.67	68.20	21.65	H
10463.900	45.52	-33.22	38.19	40.55	68.20	22.68	H
11912.050	45.31	-31.85	39.05	38.11	74.00	28.69	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)
16941.800	49.83	-26.32	42.36	33.78	68.20	18.37	V
17245.400	48.76	-25.95	44.35	30.35	68.20	19.44	H
13833.750	46.64	-29.51	41.30	34.85	68.20	21.56	H
12740.900	46.45	-30.47	39.06	37.86	68.20	21.75	H
11775.100	45.36	-31.99	38.98	38.37	74.00	28.64	H
11893.350	45.19	-31.85	39.05	37.99	74.00	28.81	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)
16948.400	48.38	-26.32	42.36	32.33	68.20	19.82	H
17556.150	48.31	-26.85	45.25	29.91	68.20	19.89	V
14580.650	46.41	-27.29	41.90	31.80	68.20	21.79	V
13291.450	45.69	-29.49	39.71	35.47	74.00	28.31	H
10831.850	44.89	-32.33	38.59	38.63	74.00	29.11	H
11915.350	44.52	-31.48	39.09	36.91	74.00	29.48	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)
16972.050	49.57	-26.32	42.36	33.52	68.20	18.63	H
17348.800	48.23	-25.95	44.35	29.82	68.20	19.97	H
13694.050	46.24	-29.10	40.86	34.47	68.20	21.96	V
13946.500	45.91	-29.51	41.30	34.12	68.20	22.29	V
11838.350	44.52	-31.85	39.05	37.32	74.00	29.48	H
10960.000	44.36	-32.82	38.70	38.48	74.00	29.64	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)
17043.550	48.88	-26.32	42.36	32.83	68.20	19.32	H
17053.450	48.58	-26.60	43.36	31.82	68.20	19.62	V
14615.300	46.32	-27.29	41.90	31.71	68.20	21.88	V
13298.050	45.98	-29.49	39.71	35.76	74.00	28.02	H
10483.700	44.21	-32.99	38.27	38.92	68.20	23.99	H
11886.200	44.19	-31.85	39.05	36.99	74.00	29.81	H

Channel 157

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17030.350	48.46	-26.32	42.36	32.41	68.20	19.74	H
16854.900	48.05	-26.62	41.49	33.18	68.20	20.15	V
13936.050	45.46	-29.51	41.30	33.67	68.20	22.74	V
14679.100	45.44	-27.29	41.90	30.83	68.20	22.76	H
11840.550	44.88	-31.85	39.05	37.68	74.00	29.12	H
10531.000	44.53	-32.99	38.27	39.24	68.20	23.67	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)
17551.200	48.77	-26.85	45.25	30.37	68.20	19.43	V
17373.550	48.28	-25.95	44.35	29.87	68.20	19.92	V
14601.550	45.80	-27.29	41.90	31.19	68.20	22.40	V
14692.300	45.71	-28.32	41.35	32.69	68.20	22.49	V
11853.200	44.97	-31.85	39.05	37.77	74.00	29.03	V
11853.750	44.65	-31.85	39.05	37.45	74.00	29.35	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)
17553.950	48.65	-26.85	45.25	30.25	68.20	19.55	H
17945.550	48.45	-25.50	46.66	27.29	74.00	25.55	V
14180.250	46.67	-28.99	42.00	33.65	68.20	21.53	V
13692.950	46.00	-29.50	40.43	35.07	68.20	22.20	V
11905.450	44.67	-31.85	39.05	37.47	74.00	29.33	V
10944.050	44.38	-32.82	38.70	38.50	74.00	29.62	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)
17457.700	48.42	-26.85	45.25	30.02	68.20	19.78	V
16874.700	48.23	-26.62	41.49	33.36	68.20	19.97	V
14594.950	46.43	-27.29	41.90	31.82	68.20	21.77	V
14548.200	45.76	-27.29	41.90	31.15	68.20	22.44	V
11791.050	44.52	-31.99	38.98	37.53	74.00	29.48	V
11250.950	44.50	-32.36	38.77	38.10	74.00	29.50	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)
17948.850	48.54	-25.50	46.66	27.38	74.00	25.46	V
17256.950	48.21	-25.95	44.35	29.80	68.20	19.99	H
14591.650	46.37	-27.29	41.90	31.76	68.20	21.83	V
13935.500	45.98	-29.51	41.30	34.19	68.20	22.22	V
11891.700	44.53	-31.85	39.05	37.33	74.00	29.47	V
11097.500	44.49	-32.49	38.72	38.25	74.00	29.51	V

Conclusion: PASS

Sample calculation: 17948.850MHz

$$\text{Peak ERP(dBm)} = P_{\text{Mea}}(27.38\text{dBuV/m}) + \text{Cable Loss}(-25.50) + \text{Antenna Factor}(46.66) = 48.54 \text{ dBuV/m}$$

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	P
	5775 MHz	Fig.21	P

Conclusion: PASS

Test graphs as below:

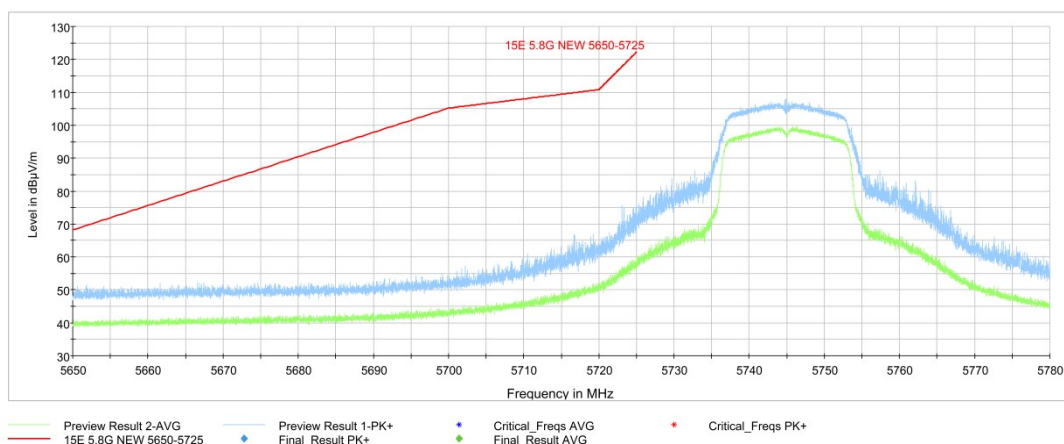


Fig. 10 Band Edges (802.11a Ch149,5745MHz)

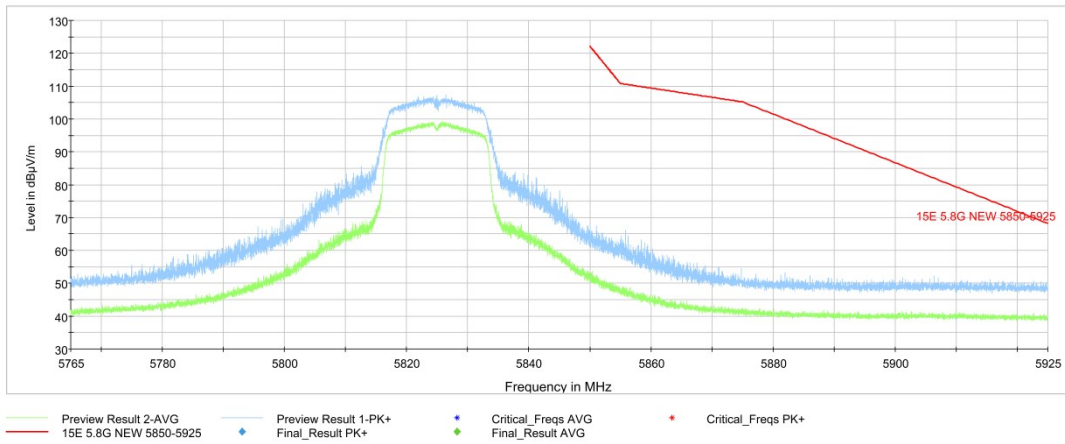


Fig. 11 Band Edges (802.11a Ch165, 5825MHz)

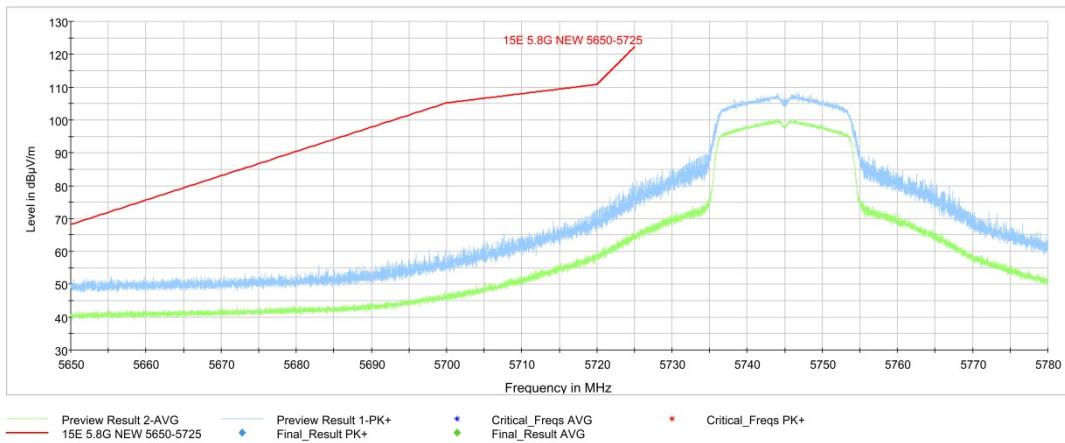


Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)

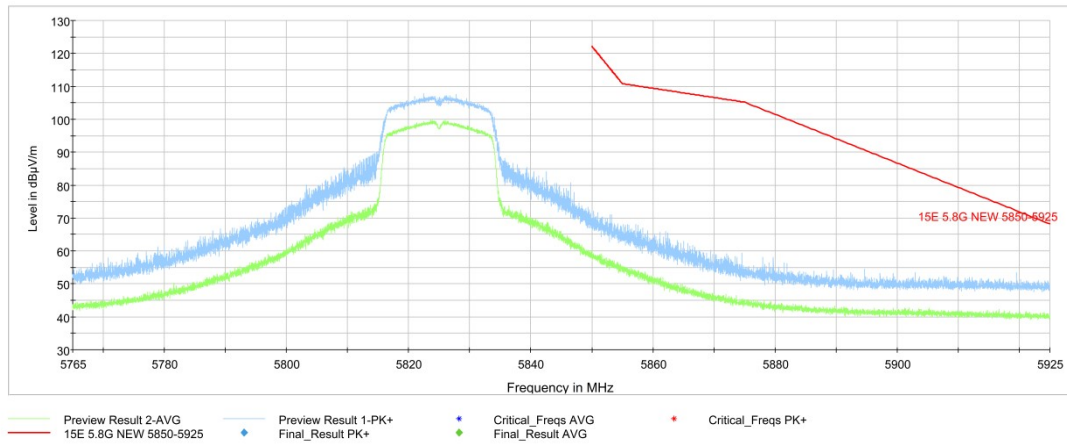


Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)

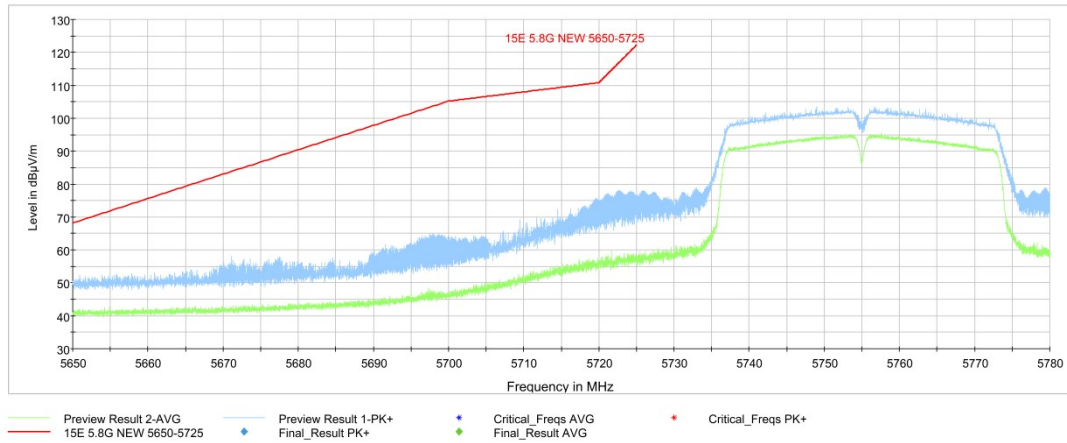


Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)

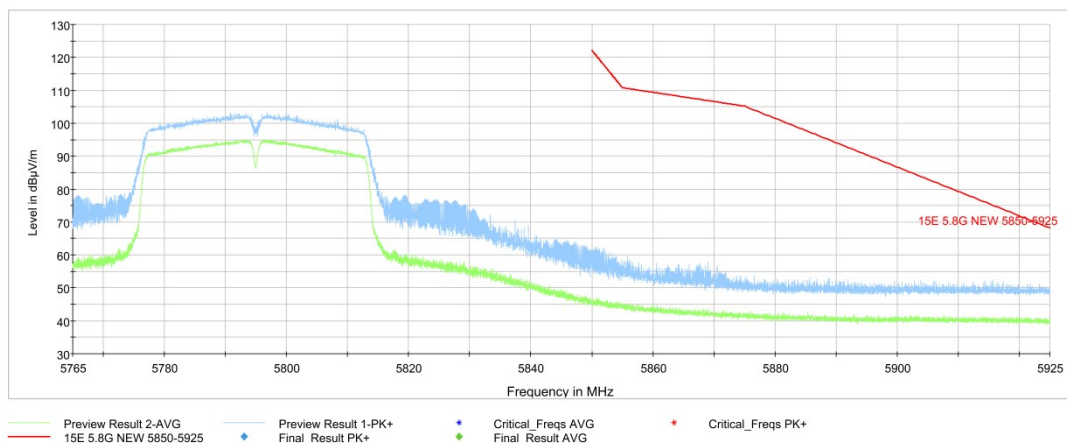


Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)

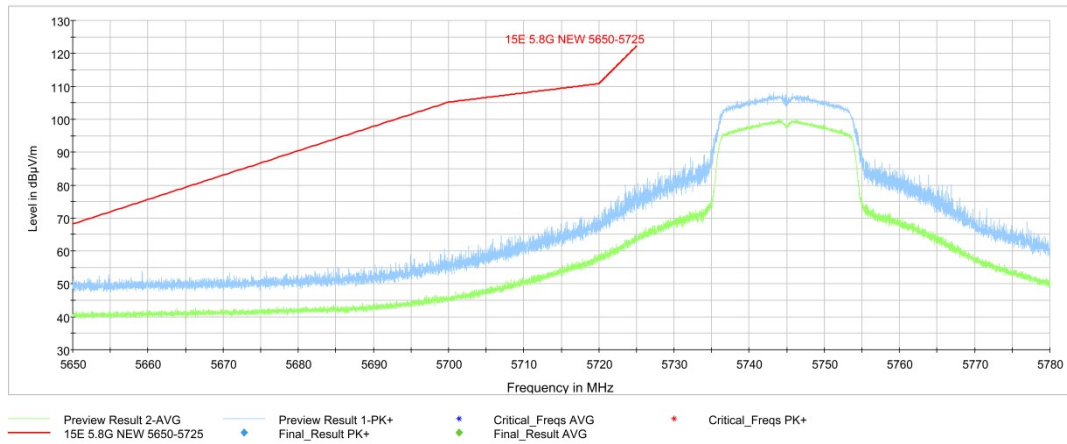


Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

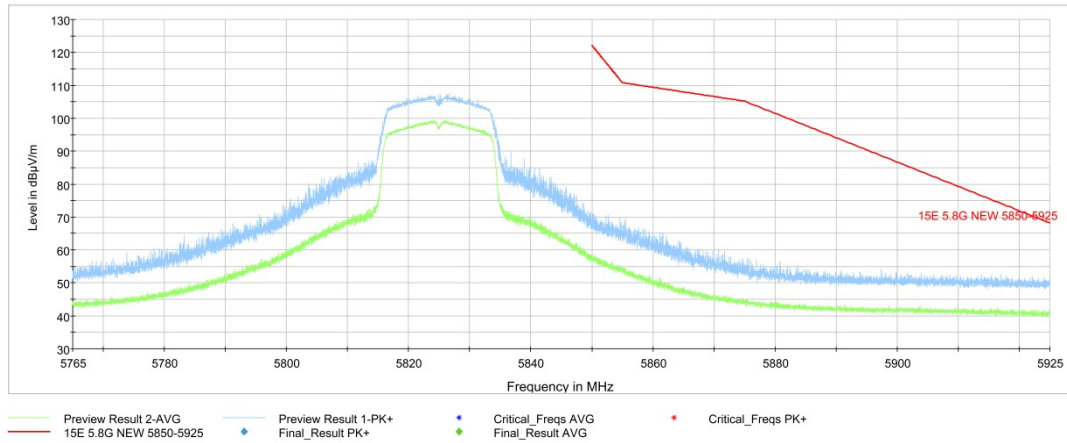


Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

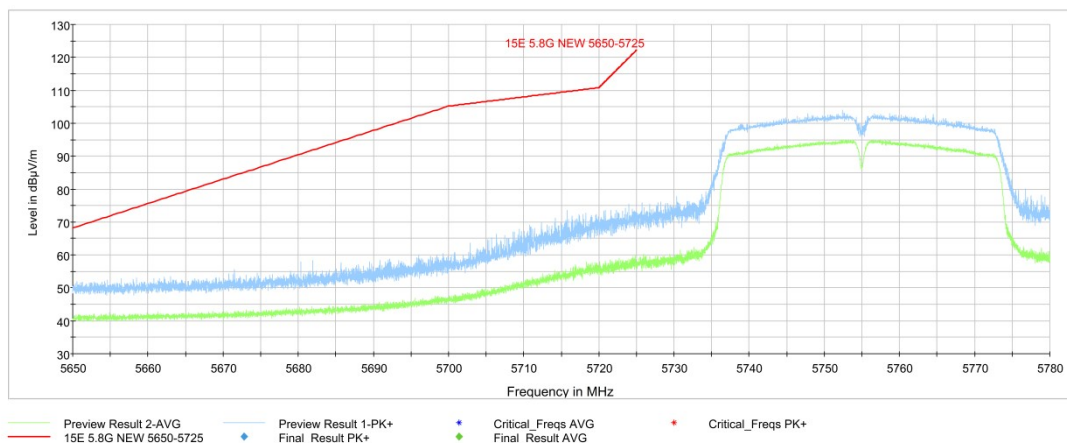


Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

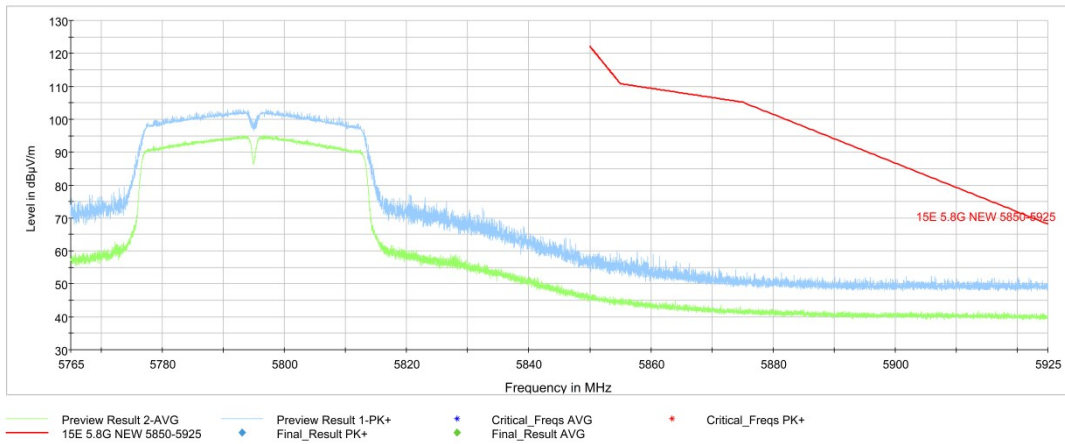


Fig. 19 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

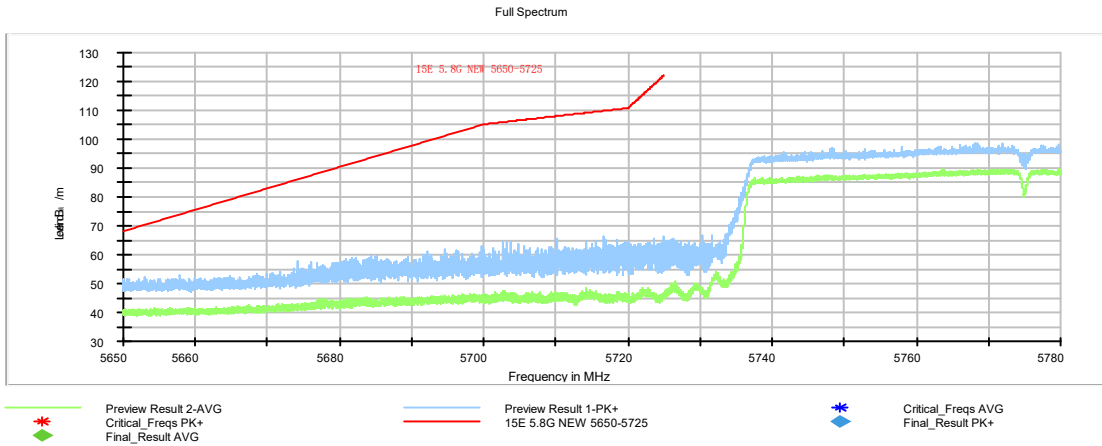


Fig. 20 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

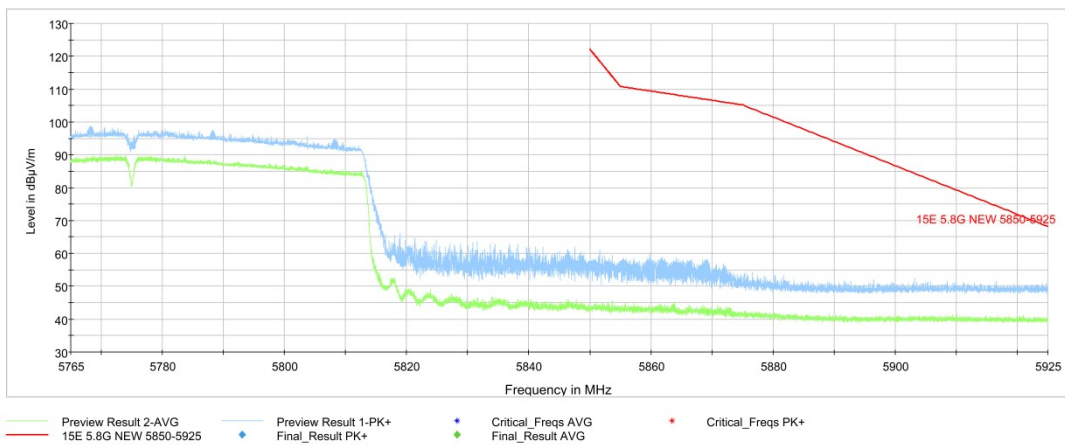


Fig. 21 Band Edges (802.11ac-HT80, 5775MHz)

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:

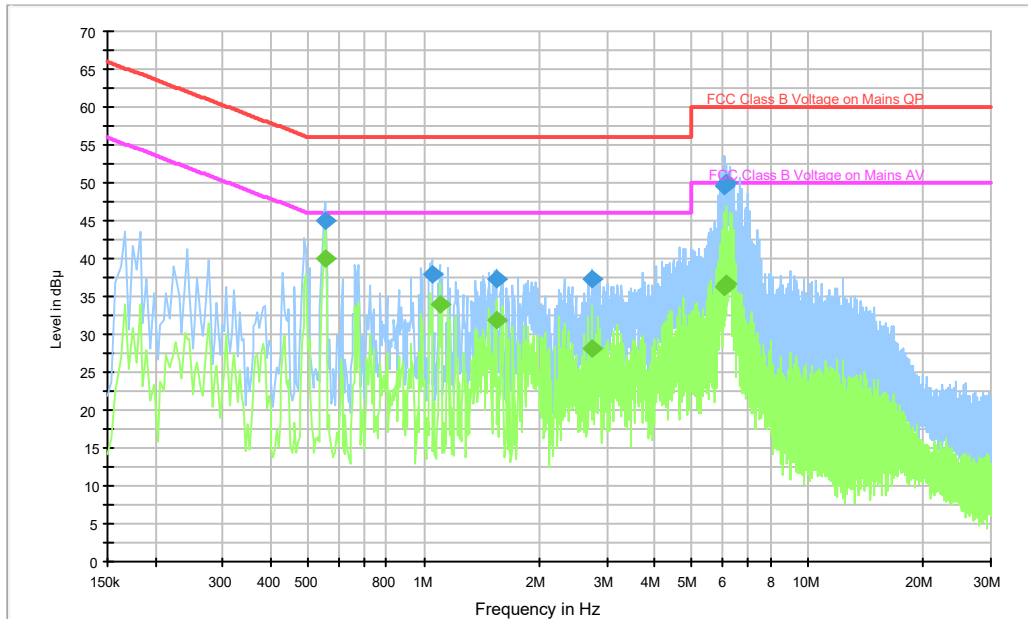


Fig. 22 AC Power line Conducted Emission-802.11a

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)
0.554000	44.9	2000.	9.000	On	L1	19.7	11.1	56.0
1.050000	37.9	2000.	9.000	On	N	19.6	18.1	56.0
1.546000	37.2	2000.	9.000	On	L1	19.6	18.8	56.0
2.750000	37.2	2000.	9.000	On	L1	19.6	18.8	56.0
6.034000	49.6	2000.	9.000	On	L1	19.6	10.4	60.0
6.146000	50.0	2000.	9.000	On	L1	19.6	10.0	60.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.554000	40.1	2000.	9.000	On	L1	19.7	5.9	46.0
1.098000	33.9	2000.	9.000	On	L1	19.6	12.1	46.0
1.542000	31.8	2000.	9.000	On	L1	19.6	14.2	46.0
2.742000	28.1	2000.	9.000	On	L1	19.6	17.9	46.0
6.090000	36.3	2000.	9.000	On	L1	19.6	13.7	50.0
6.146000	36.6	2000.	9.000	On	L1	19.6	13.4	50.0

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

Idle:

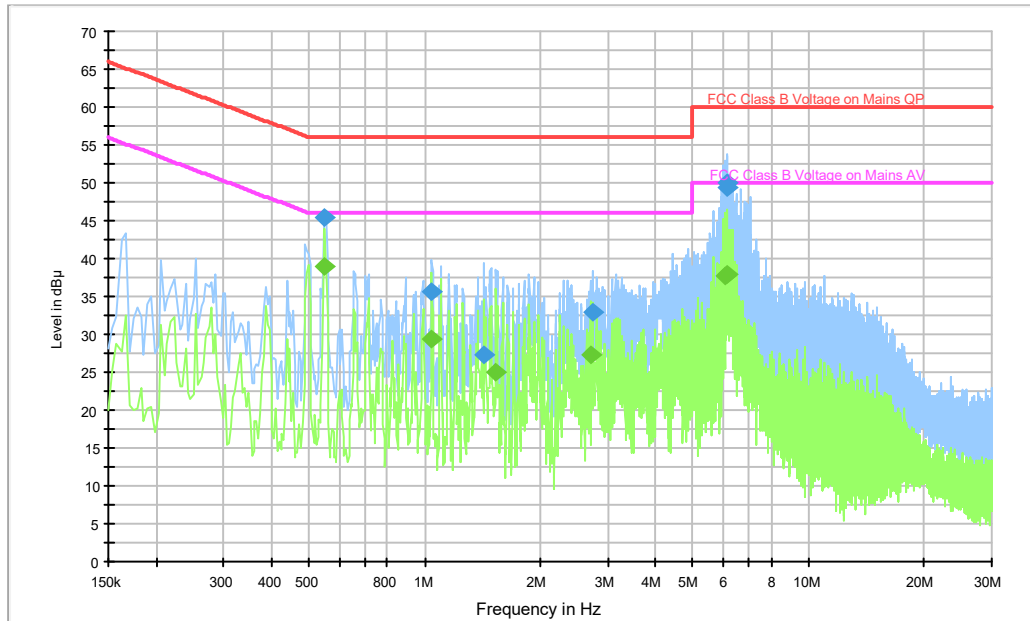


Fig. 23 AC Power line Conducted Emission-802.11a-idle

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)
0.546000	45.5	2000.	9.000	On	L1	19.7	10.5	56.0
1.042000	35.6	2000.	9.000	On	L1	19.7	20.4	56.0
1.430000	27.3	2000.	9.000	On	L1	19.7	28.7	56.0
2.754000	33.0	2000.	9.000	On	L1	19.6	23.0	56.0
6.118000	50.1	2000.	9.000	On	L1	19.6	9.9	60.0
6.162000	49.3	2000.	9.000	On	L1	19.6	10.7	60.0

Final Result 2


Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.550000	39.0	2000.0	9.000	On	N	19.7	7.0	46.0
1.042000	29.5	2000.0	9.000	On	L1	19.7	16.5	46.0
1.538000	25.1	2000.0	9.000	On	L1	19.6	20.9	46.0
2.698000	27.2	2000.0	9.000	On	L1	19.6	18.8	46.0
6.066000	37.7	2000.0	9.000	On	L1	19.6	12.3	50.0
6.162000	38.0	2000.0	9.000	On	L1	19.6	12.0	50.0

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

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

<p>United States Department of Commerce National Institute of Standards and Technology</p> <div style="display: flex; justify-content: space-around; align-items: center;"><div style="font-size: 2em; font-weight: bold; letter-spacing: 0.5em;">NVLAP[®]</div><div style="text-align: center;"> ILAC-MRA</div></div> <hr/> <p style="font-size: 1.2em; font-weight: bold; text-align: center;">Certificate of Accreditation to ISO/IEC 17025:2017</p> <hr/> <p style="text-align: center;">NVLAP LAB CODE: 600118-0</p> <p style="text-align: center; font-weight: bold;">Telecommunication Technology Labs, CAICT</p> <p style="text-align: center;">Beijing China</p> <p style="text-align: center;"><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p> <p style="text-align: center; font-weight: bold;">Electromagnetic Compatibility & Telecommunications</p> <p style="text-align: center;"><i>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).</i></p> <div style="display: flex; justify-content: space-between; align-items: center;"><div style="text-align: center;"><hr/><p>2022-10-01 through 2023-09-30 <i>Effective Dates</i></p></div><div style="text-align: center;"> DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA</div><div style="text-align: center;"> For the National Voluntary Laboratory Accreditation Program</div></div>	
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