



FCC PART 15C TEST REPORT No.I21Z61051-IOT25

for

TCL Communication Ltd.

GSM/UMTS/LTE/NR Mobile phone

T767H

with

FCC ID: 2ACCJH140

Hardware Version: PIO

Software Version: 2B56

Issued Date: 2021-08-09

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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Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: ctl_terminals@caict.ac.cn, website: www.caict.ac.cn



REPORT HISTORY

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I21Z61051-IOT25	Rev.0	1st edition	2021-07-29
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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(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

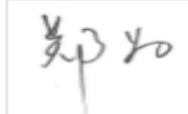
Testing Start Date: 2021-06-09

Testing End Date: 2021-07-29

1.5. Signature

谢秀珍

Xie Xiuzhen
(Prepared this test report)



Zheng Wei
(Reviewed this test report)

胡晓宇

Hu Xiaoyu
(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: 0086-755-36611722
Fax: /

2.2. Manufacturer Information

Company Name: TCL Commcation 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: 0086-755-36611722
Fax: /

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

Description	GSM/UMTS/LTE/NR Mobile phone
Model name	T767H
FCC ID	2ACCJH140
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.8V

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	354382910001712/	PIO	2B56
	354382910001720		
EUT2	354382910001258/	PIO	2B56
	354382910001266		

*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	SN	Note
AE2	Adapter	CBA0059AGTC5	Test
AE21	Adapter	CBA0059AATC5	No Test
AE22	Adapter	CBA0059ABTC5	No Test
AE23	Adapter	CBA0059ACNC5	No Test
AE3	USB Cable	/	/
AE4	USB Cable	/	/
AE5	Battery	/	/

AE2

Model	CBA0059AGTC5
Manufacturer	/
Length	/

AE21

Model	CBA0059AATC5
Manufacturer	/
Length	/

AE22

Model	CBA0059ABTC5
Manufacturer	/

Length /

AE23

Model CBA0059ACNC5
Manufacturer /
Length /

AE3

Model CDA0000123C8
Manufacturer PUAN
Length /

AE4

Model CDA0000123C1
Manufacturer JUWEI
Length /

AE5

Model TLp043E7
Manufacturer VEKEN
Capacitance 4500mAh
Nominal voltage /

*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 GSM/UMTS/LTE/NR Mobile phone with integrated antenna. It consists of normal options: Battery and Charger.

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

Samples undergoing test were selected by the Client.

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

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

4.2. Reference Documents for testing

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

FCC Part15	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2018
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019

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	3.8V
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	2022-05-24
2	LISN	ENV216	101459	Rohde & Schwarz	1 year	2022-03-22
3	Test Receiver	ESCI	100766	Rohde & Schwarz	1 year	2022-03-09
4	Shielding Room	S81	/	ETS-Lindgren	/	/
5	Attenuator	10dB/2W	/	Rosenberger	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2021-09-04
2	BiLog Antenna	VULB9163	482	Schwarzbeck	1 year	2021-11-04
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2021-10-11
4	EMI Antenna	LB-180400-2 5-C-KF	2110084000 006	A-INFO	1 year	2022-02-28

8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Spurious Emissions

Conducted (k=1.96)

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

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.16
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.44
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.28

8.6. AC Power-line Conducted Emission

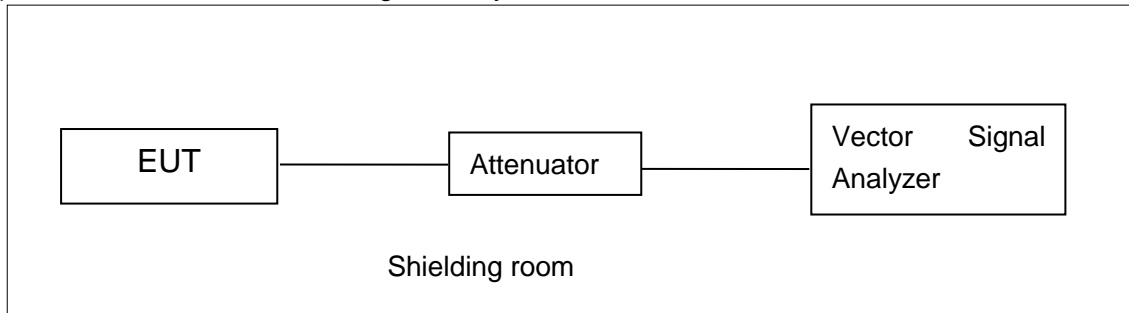
Measurement Uncertainty : 3.08dB,k=2

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

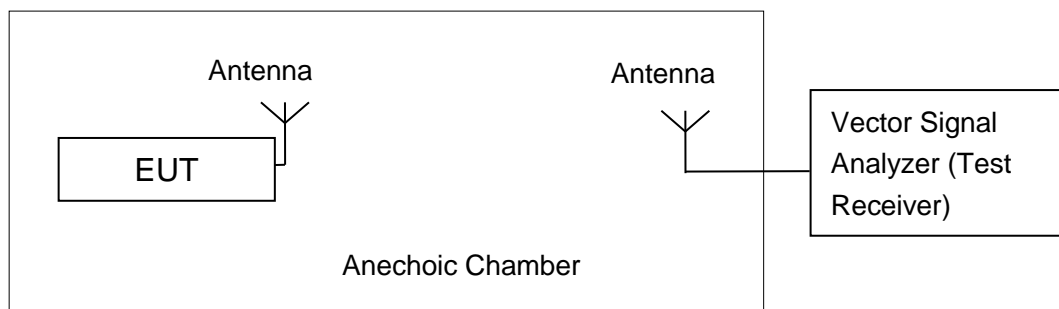


A.1.2. Radiated Emission Measurements

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 Antenna Gain

Antenna gain is dBi 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	16.42	16.58	16.64

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

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n(20MHz)	MCS0	15.28	15.47	15.55

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

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac(20MHz)	MCS0	16.25	16.43	16.51

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

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n(40MHz)	MCS0	15.03	15.15

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

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac(40MHz)	MCS0	16.07	16.22

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

802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac(80MHz)	MCS0	16.12

The data rate MCS0 is selected as worse 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	1.81	P
	157	1.43	P
	165	1.46	P
802.11ac HT20	149	1.51	P
	157	1.58	P
	165	1.16	P
802.11ac HT40	151	-0.97	P
	159	-1.27	P
802.11ac HT80	155	-4.43	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is made according to KDB789033 D02 .

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
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Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
802.11a	149	Fig.1	16.35	P
	157	Fig.2	16.30	P
	165	Fig.3	16.35	P
802.11ac HT20	149	Fig.4	17.55	P
	157	Fig.5	17.60	P
	165	Fig.6	17.55	P
802.11ac HT40	151	Fig.7	36.24	P
	159	Fig.8	36.32	P
802.11ac HT80	155	Fig.9	76.16	P

Conclusion: PASS

Test graphs as below:

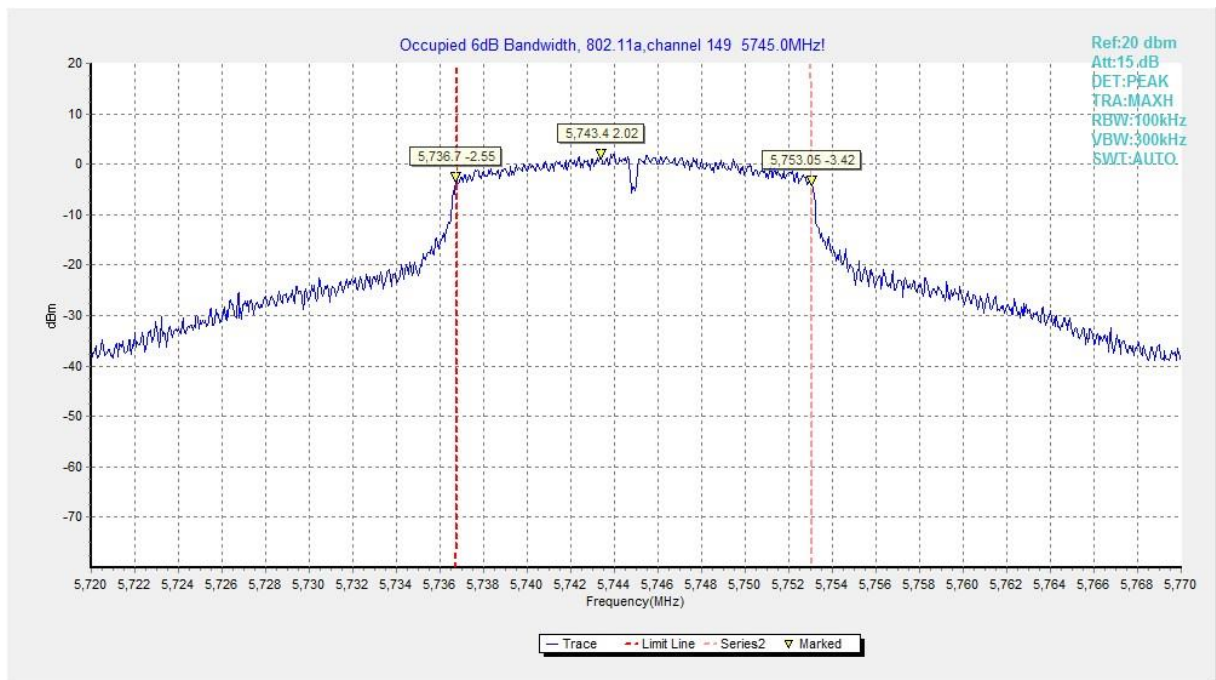


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

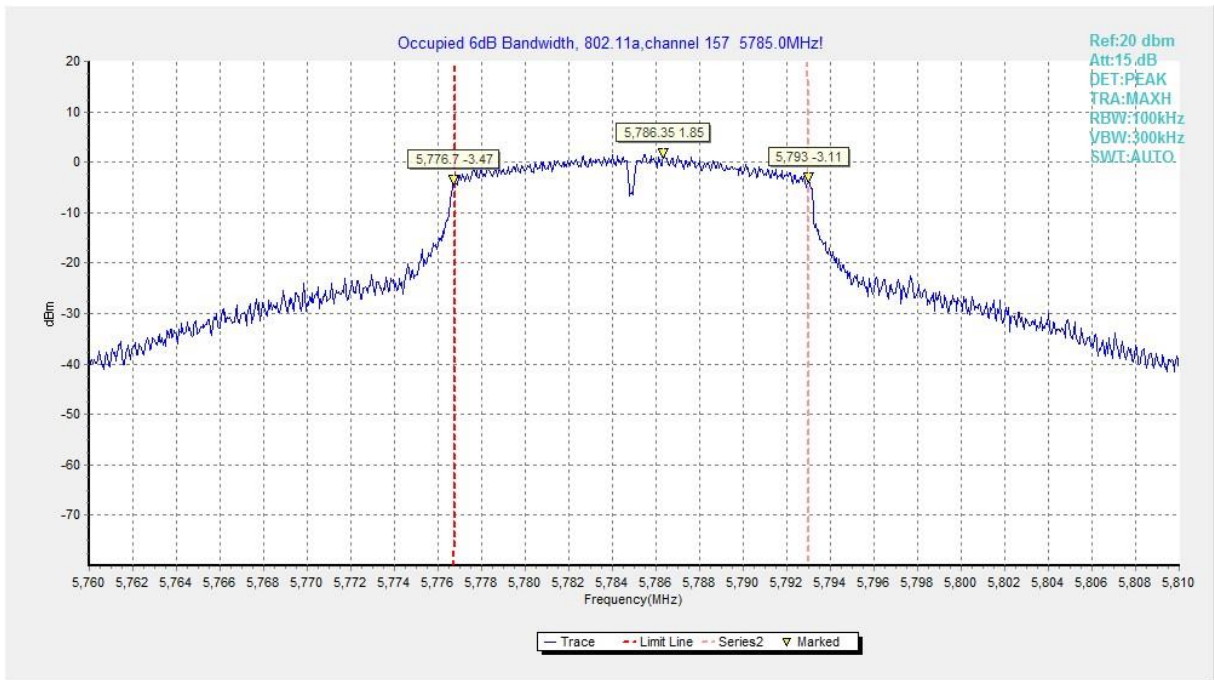


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

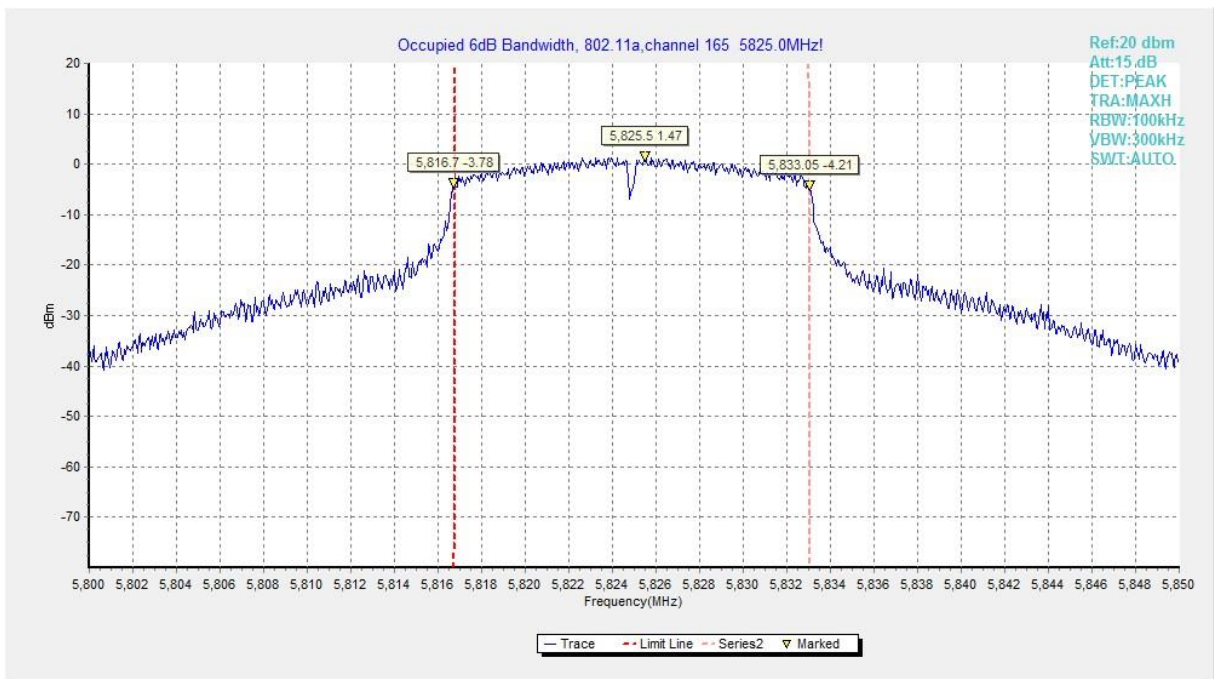


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

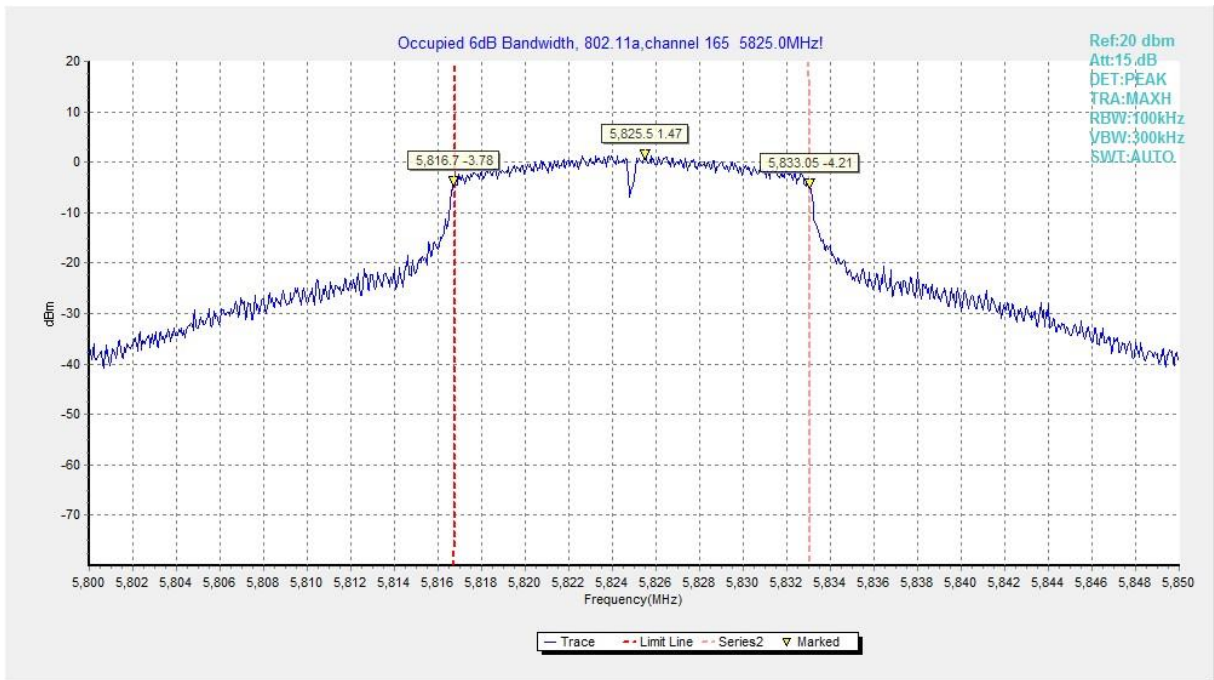


Fig. 4 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)

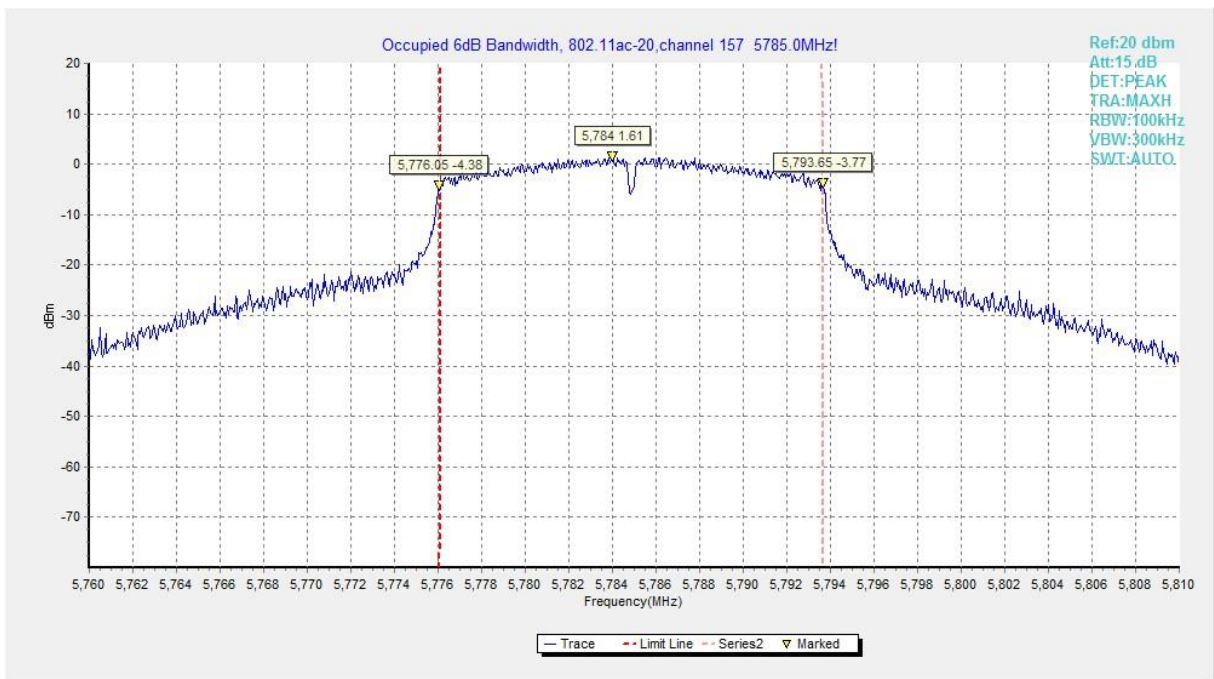


Fig. 5 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)

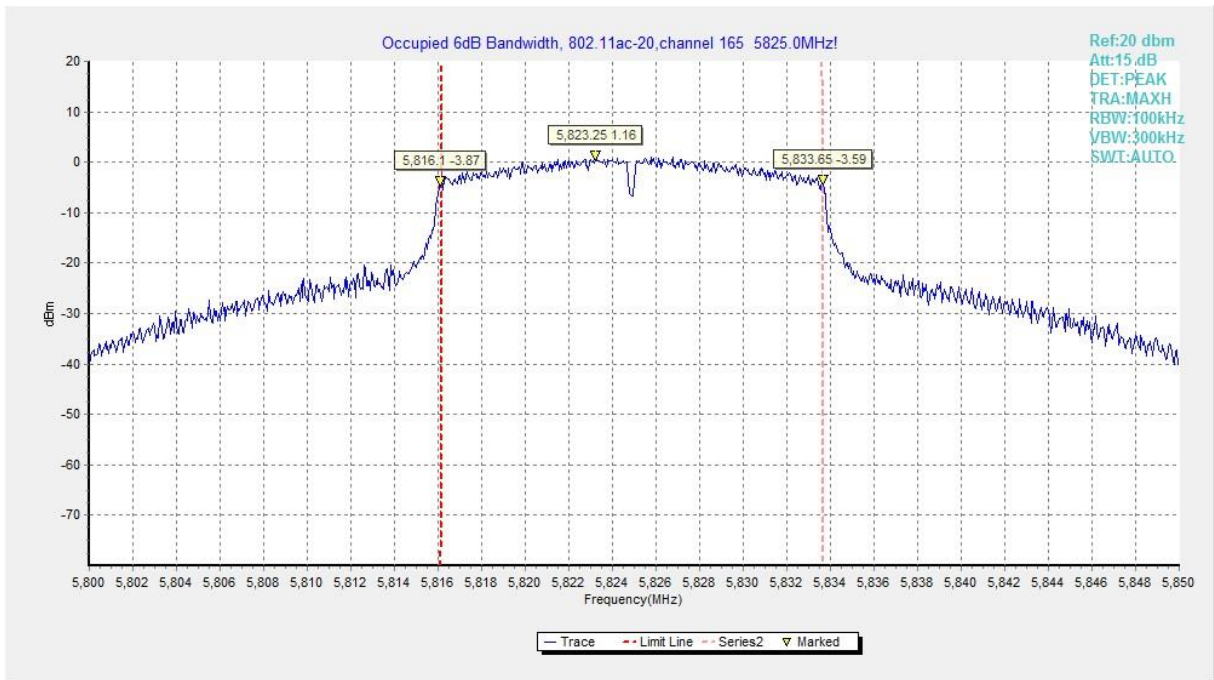


Fig. 6 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)

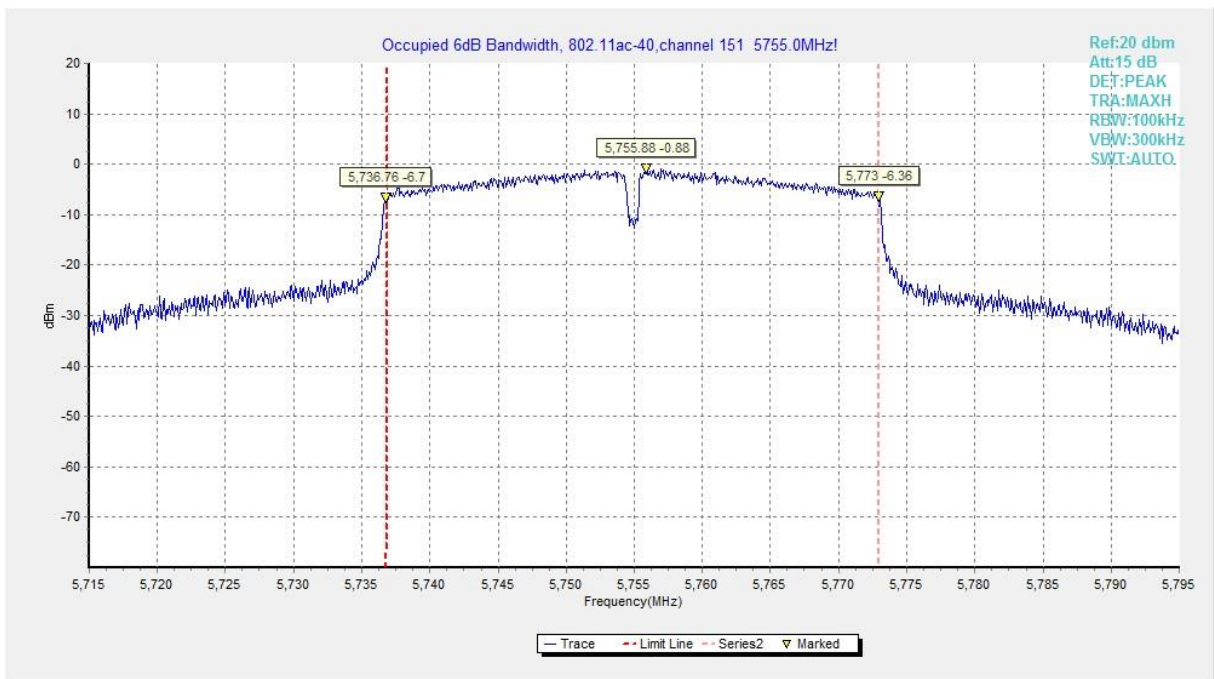


Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)

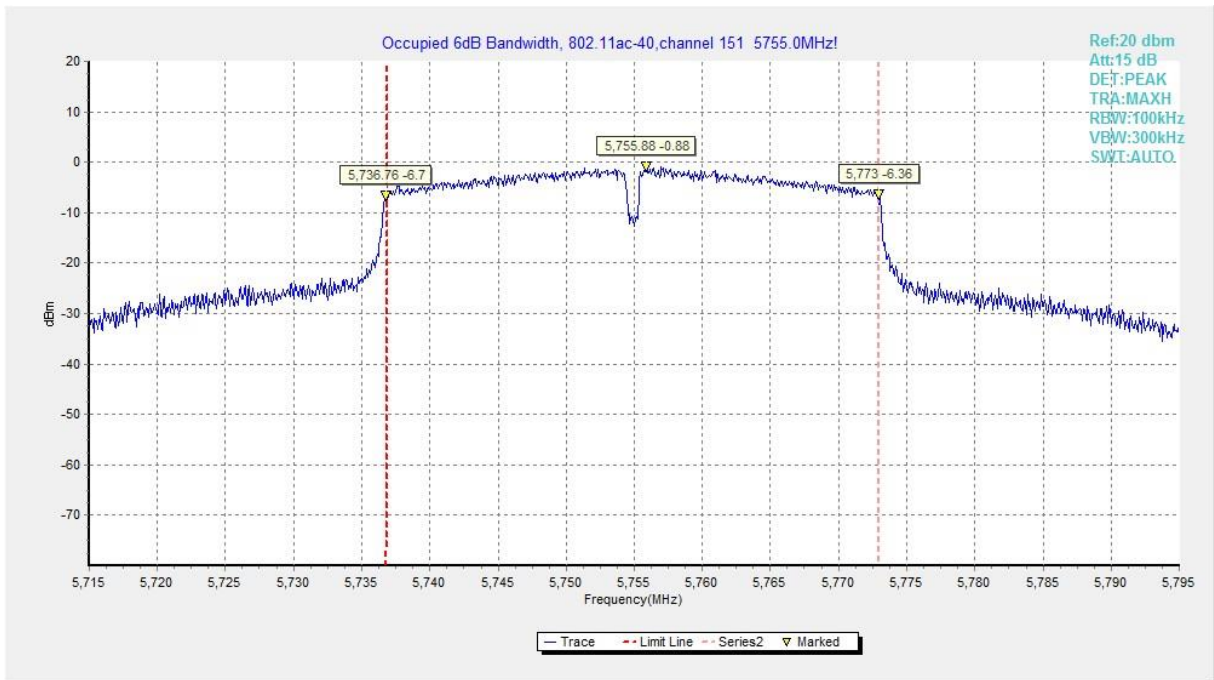


Fig. 8 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 159)

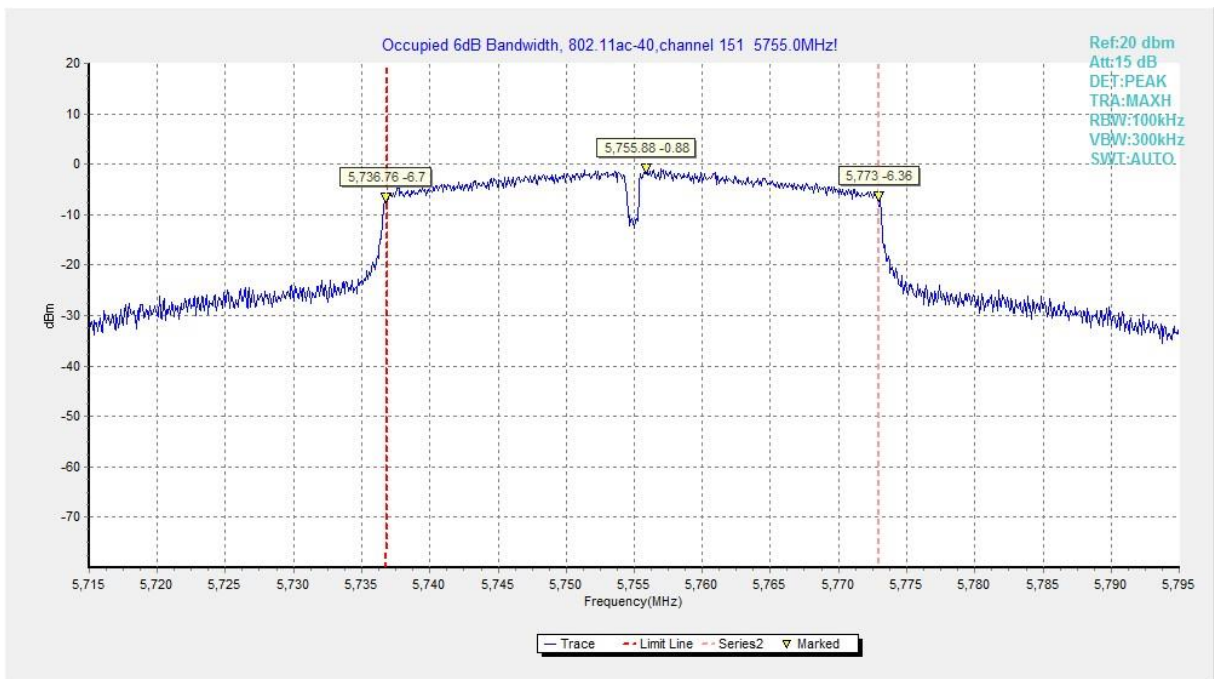


Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

A.5. Transmitter Spurious Emission

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10 .

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Measurement Uncertainty:

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	0.63
2GHz ≤ f ≤ 3.6GHz	0.82
3.6GHz ≤ f ≤ 8GHz	1.55
8GHz ≤ f ≤ 20GHz	1.86
20GHz ≤ f ≤ 22GHz	1.90
22GHz ≤ f ≤ 26GHz	2.20

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
	165	26.5 GHz~ 40 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11n-HT40 mode

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

802.11ac-HT20 mode

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

		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		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)
5353.900	44.52	-22.29	34.34	32.47	48.30	3.78	V
5359.350	44.46	-22.29	34.35	32.41	48.30	3.84	V
11490.400	35.54	-29.15	38.20	26.50	48.30	12.76	H
17763.200	39.78	-22.33	41.55	20.56	48.30	8.52	H
17806.400	39.45	-22.43	41.54	20.34	48.30	8.85	V
17881.600	39.47	-22.58	41.52	20.53	48.30	8.83	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)
5362.350	44.37	-22.29	34.35	32.31	48.30	3.93	V
5447.890	44.36	-22.69	34.38	32.67	48.30	3.94	V
11570.400	35.64	-29.25	38.27	26.61	48.30	12.66	H
17812.000	39.35	-22.44	41.54	20.25	48.30	8.95	H
17869.600	39.44	-22.56	41.53	20.47	48.30	8.86	H
17959.200	39.35	-22.74	41.51	20.58	48.30	8.95	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)
5357.250	44.50	-22.29	34.34	32.45	48.30	3.80	V
5359.970	44.39	-22.29	34.35	32.33	48.30	3.91	V
11650.400	35.89	-29.41	38.35	26.95	48.30	12.41	H
17806.400	39.45	-22.43	41.54	20.34	48.30	8.85	H
17864.000	39.40	-22.54	41.53	20.42	48.30	8.90	V
17955.200	39.42	-22.73	41.51	20.64	48.30	8.88	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)
5353.900	40.60	-22.29	34.34	28.55	48.30	7.70	V
5364.700	40.44	-22.29	34.35	28.38	48.30	7.86	V
11490.400	35.61	-29.15	38.20	26.56	48.30	12.69	V

17833.600	39.67	-22.48	41.53	20.62	48.30	8.63	H
17883.200	39.57	-22.58	41.52	20.63	48.30	8.73	H
17948.800	39.28	-22.72	41.51	20.49	48.30	9.02	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)
5351.500	40.75	-22.29	34.34	28.70	48.30	7.55	V
5355.400	40.69	-22.29	34.34	28.63	48.30	7.61	V
11570.400	35.77	-29.25	38.27	26.75	48.30	12.52	H
17839.200	39.54	-22.49	41.53	20.50	48.30	8.76	V
17889.600	39.60	-22.60	41.52	20.68	48.30	8.70	H
17952.800	39.35	-22.73	41.51	20.57	48.30	8.95	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)
5350.900	40.74	-22.29	34.34	28.69	48.30	7.56	V
5353.300	40.68	-22.29	34.34	28.63	48.30	7.62	V
11650.400	35.97	-29.41	38.35	27.03	48.30	12.33	H
17841.600	39.51	-22.50	41.53	20.48	48.30	8.79	V
17895.200	39.56	-22.61	41.52	20.65	48.30	8.74	H
17957.600	39.36	-22.74	41.51	20.59	48.30	8.94	V

802.11n-HT40
Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
5358.400	39.91	-22.29	34.35	27.85	48.30	8.39	V
5431.000	39.49	-22.56	34.37	27.68	48.30	8.81	V
11510.400	35.82	-29.15	38.21	26.75	48.30	12.48	V
17826.400	39.65	-22.47	41.53	20.58	48.30	8.65	V
17880.000	39.55	-22.58	41.52	20.60	48.30	8.75	V
17931.200	39.53	-22.68	41.51	20.70	48.30	8.77	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)
5356.000	40.52	-22.29	34.34	28.47	48.30	7.78	V

5365.000	40.46	-22.29	34.35	28.40	48.30	7.84	V
11590.400	36.00	-29.28	38.29	26.98	48.30	12.30	V
17832.000	39.70	-22.48	41.53	20.65	48.30	8.60	H
17885.000	39.62	-22.59	41.52	20.69	48.30	8.67	H
17936.800	39.40	-22.69	41.51	20.58	48.30	8.90	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)
5371.300	39.74	-22.29	34.35	27.68	48.30	8.56	V
5381.500	39.79	-22.29	34.35	27.72	48.30	8.51	V
11490.400	35.76	-29.15	38.20	26.71	48.30	12.54	V
17828.800	39.69	-22.47	41.53	20.63	48.30	8.61	H
17884.800	39.68	-22.59	41.52	20.75	48.30	8.62	H
17924.000	39.52	-22.67	41.52	20.68	48.30	8.78	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)
5359.300	40.27	-22.29	34.35	28.21	48.30	8.03	V
5364.700	40.15	-22.29	34.35	28.09	48.30	8.15	V
11570.400	35.89	-29.25	38.27	26.86	48.30	12.41	H
17836.800	39.71	-22.49	41.53	20.67	48.30	8.59	V
17890.400	39.77	-22.60	41.52	20.85	48.30	8.53	H
17904.800	39.68	-22.63	41.52	20.79	48.30	8.62	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)
5360.800	40.37	-22.29	34.35	28.31	48.30	7.93	V
5362.900	40.27	-22.29	34.35	28.21	48.30	8.03	V
11650.400	36.13	-29.41	38.35	27.18	48.30	12.17	H
17800.800	39.67	-22.41	41.54	20.55	48.30	8.63	V
17890.400	39.77	-22.60	41.52	20.85	48.30	8.53	V
17972.800	39.56	-22.77	41.51	20.82	48.30	8.74	H

802.11ac-HT40

Channel 151

Frequency	Measurement	Cable	Antenna	Receiver	Limit	Margin	Antenna
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(MHz)	Result (dBuV/m)	Loss (dB)	Factor (dB/m)	Reading (dBuV)	(dBuV/m)	(dB)	Pol. (H/V)
5352.400	40.65	-22.29	34.34	28.60	48.30	7.65	V
5357.500	40.46	-22.29	34.34	28.41	48.30	7.84	V
11510.400	35.92	-29.15	38.21	26.85	48.30	12.38	V
17794.400	39.72	-22.40	41.54	20.57	48.30	8.58	V
17830.400	39.81	-22.48	41.53	20.76	48.30	8.49	H
17885.600	39.82	-22.59	41.52	20.89	48.30	8.48	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)
5351.200	40.92	-22.29	34.34	28.87	48.30	7.38	V
5355.100	40.97	-22.29	34.34	28.92	48.30	7.33	V
11590.400	36.06	-29.28	38.29	27.05	48.30	12.23	V
17798.400	39.69	-22.41	41.54	20.55	48.30	8.61	V
17836.800	39.71	-22.49	41.53	20.66	48.30	8.59	V
17894.400	39.81	-22.61	41.52	20.89	48.30	8.49	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)
5353.300	42.4	-22.3	34.5	30.21	48.3	5.9	V
5356.600	42.3	-22.3	34.5	30.14	48.3	6.0	V
11550.400	36.0	-29.2	38.5	26.66	48.3	12.3	H
17800.000	39.6	-22.4	41.3	20.79	48.3	8.7	V
17836.000	39.8	-22.5	41.3	20.99	48.3	8.5	H
17904.800	39.8	-22.6	41.3	21.14	48.3	8.5	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)
5652.323	58.74	-22.84	34.68	46.90	69.92	11.18	V
5658.763	61.25	-22.84	34.69	49.39	74.68	13.44	V
11490.200	50.60	-29.15	38.20	41.56	74.00	23.40	H
17234.950	57.93	-22.85	41.92	38.86	68.30	10.37	V
17329.000	58.65	-22.87	41.80	39.72	68.30	9.65	H

17426.350	59.20	-23.10	41.69	40.62	68.30	9.10	H
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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)
5748.450	59.10	-22.94	34.86	47.18	68.30	9.20	H
5806.400	59.97	-22.72	34.96	47.73	68.30	8.33	V
11569.950	50.03	-29.24	38.27	41.00	74.00	23.97	V
17354.850	56.49	-22.93	41.77	37.65	68.30	11.81	V
17485.200	58.60	-23.00	41.62	39.99	68.30	9.70	H
17538.000	58.76	-22.65	41.59	39.82	68.30	9.54	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)
5923.114	59.71	-22.22	35.17	46.76	69.60	9.89	V
5923.815	59.75	-22.22	35.17	46.80	69.08	9.33	H
11650.250	50.20	-29.41	38.35	41.25	74.00	23.80	H
17474.750	58.08	-23.07	41.63	39.52	68.30	10.22	H
17570.450	58.67	-22.44	41.59	39.52	68.30	9.63	V
17635.900	58.10	-22.03	41.57	38.56	68.30	10.20	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)
5650.207	56.93	-22.84	34.68	45.09	68.35	11.43	V
5650.748	56.46	-22.84	34.68	44.62	68.75	12.29	H
11490.200	49.87	-29.15	38.20	40.82	74.00	24.13	V
17234.950	57.09	-22.85	41.92	38.02	68.30	11.21	V
17311.400	58.59	-22.83	41.82	39.60	68.30	9.71	V
17443.950	59.36	-23.14	41.67	40.84	68.30	8.94	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)
5740.000	56.90	-22.96	34.84	45.01	68.30	11.40	V
5816.000	57.51	-22.64	34.98	45.17	68.30	10.79	V
11569.950	50.05	-29.24	38.27	41.03	74.00	23.95	V

17354.850	57.02	-22.93	41.77	38.19	68.30	11.27	H
17453.850	58.63	-23.17	41.65	40.14	68.30	9.67	V
17577.050	58.63	-22.39	41.58	39.44	68.30	9.67	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)
5923.931	58.06	-22.22	35.17	45.11	68.99	10.93	H
5924.620	57.67	-22.21	35.17	44.71	68.48	10.81	V
11650.250	50.70	-29.41	38.35	41.76	74.00	23.30	H
17474.750	57.45	-23.07	41.63	38.89	68.30	10.85	V
17534.150	58.99	-22.68	41.59	40.07	68.30	9.31	H
17605.650	58.31	-22.20	41.58	38.94	68.30	9.99	V

802.11n-HT40
Channel 151

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
5650.517	55.34	-22.84	34.68	43.50	68.58	13.24	V
5652.254	55.55	-22.84	34.68	43.71	69.87	14.31	V
11510.000	50.15	-29.14	38.21	41.08	74.00	23.85	H
17265.200	57.44	-22.80	41.88	38.37	68.30	10.86	H
17437.350	59.46	-23.13	41.67	40.92	68.30	8.84	H
17530.300	59.06	-22.70	41.59	40.16	68.30	9.24	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)
5922.999	57.43	-22.22	35.17	44.49	69.68	12.25	V
5924.540	57.91	-22.21	35.17	44.95	68.54	10.63	V
11589.750	50.61	-29.28	38.29	41.60	74.00	23.39	V
17385.100	57.19	-23.01	41.74	38.45	68.30	11.11	H
17484.100	58.43	-23.01	41.62	39.82	68.30	9.87	V
17564.400	58.23	-22.48	41.59	39.12	68.30	10.06	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)
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5650.621	56.95	-22.84	34.68	45.11	68.66	11.71	V
5651.403	55.78	-22.84	34.68	43.94	69.24	13.46	H
11490.200	49.01	-29.15	38.20	39.96	74.00	24.99	V
17234.950	57.53	-22.85	41.92	38.47	68.30	10.77	H
17350.450	58.29	-22.92	41.78	39.44	68.30	10.01	H
17440.650	59.54	-23.14	41.67	41.01	68.30	8.76	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)
5742.200	57.65	-22.96	34.85	45.76	68.30	10.65	V
5844.400	58.51	-22.44	35.03	45.92	68.30	9.79	H
11569.950	49.76	-29.24	38.27	40.74	74.00	24.24	V
17354.850	58.14	-22.93	41.77	39.30	68.30	10.16	V
17454.950	58.88	-23.17	41.65	40.40	68.30	9.42	H
17497.850	58.98	-22.92	41.60	40.29	68.30	9.32	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)
5923.367	58.47	-22.22	35.17	45.52	69.41	10.94	V
5924.172	57.47	-22.21	35.17	44.51	68.81	11.35	H
11650.250	51.02	-29.41	38.35	42.08	74.00	22.98	H
17474.750	57.47	-23.07	41.63	38.91	68.30	10.83	V
17557.705	58.64	-22.52	41.59	39.57	68.30	9.66	V
17651.300	58.61	-22.06	41.57	39.11	68.30	9.69	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)
5650.138	55.67	-22.84	34.68	43.84	68.30	12.63	H
5650.460	55.20	-22.84	34.68	43.36	68.54	13.34	H
11510.000	49.22	-29.14	38.21	40.16	74.00	24.78	V
17265.200	56.54	-22.80	41.88	37.46	68.30	11.76	H
17376.300	60.09	-22.98	41.75	41.33	68.30	8.21	V
17459.350	58.69	-23.17	41.65	40.21	68.30	9.61	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)
5924.103	57.96	-22.22	35.17	45.01	68.86	10.90	V
5924.816	58.45	-22.21	35.17	45.49	68.34	9.89	V
11589.750	50.61	-29.28	38.29	41.60	74.00	23.39	V
17385.100	57.19	-23.01	41.74	38.45	68.30	11.11	V
17476.950	58.91	-23.06	41.63	40.34	68.30	9.38	H
17564.400	58.23	-22.48	41.59	39.12	68.30	10.06	H

802.11ac-HT80

Channel 155

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
5650.092	58.6	-22.8	34.8	46.65	68.3	9.7	V
5650.230	60.1	-22.8	34.8	48.18	68.3	8.2	V
11550.150	49.7	-29.2	38.5	40.33	74.0	24.3	V
17325.150	58.6	-22.9	41.4	40.10	68.3	9.7	V
17419.200	58.5	-23.1	41.3	40.29	68.3	9.8	V
17488.500	58.7	-23.0	41.2	40.49	68.3	9.6	V

A.6. Band Edges Compliance

A6.1 Band Edges – Radiated

Measurement Limit:

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

Measurement Result:

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

Conclusion: PASS

Test graphs as below:

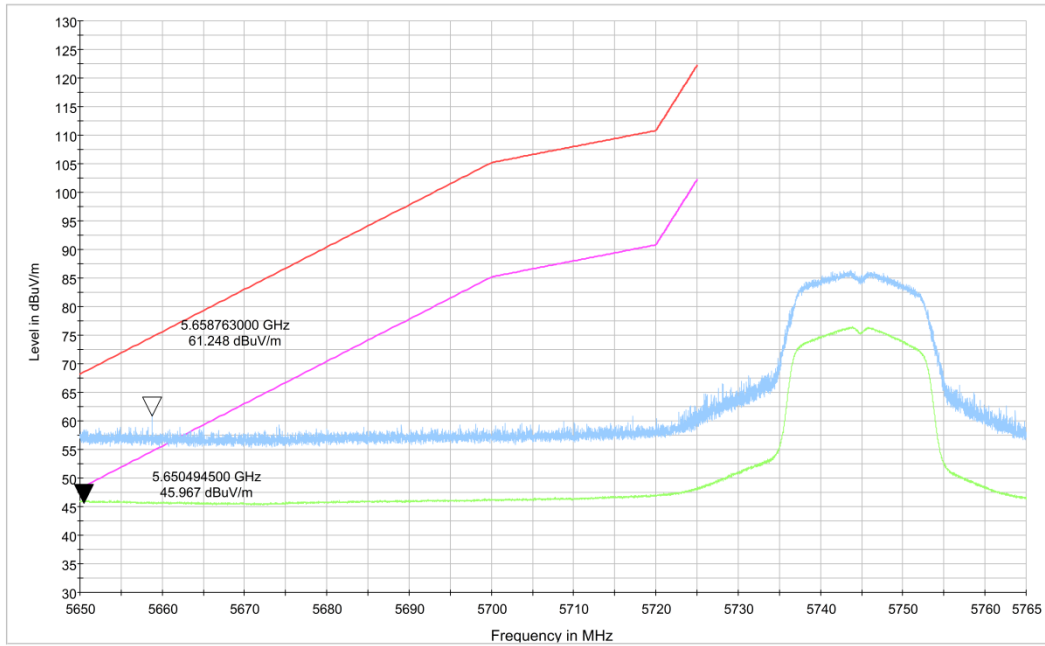


Fig. 10 Band Edges (802.11a Ch149,5745MHz)

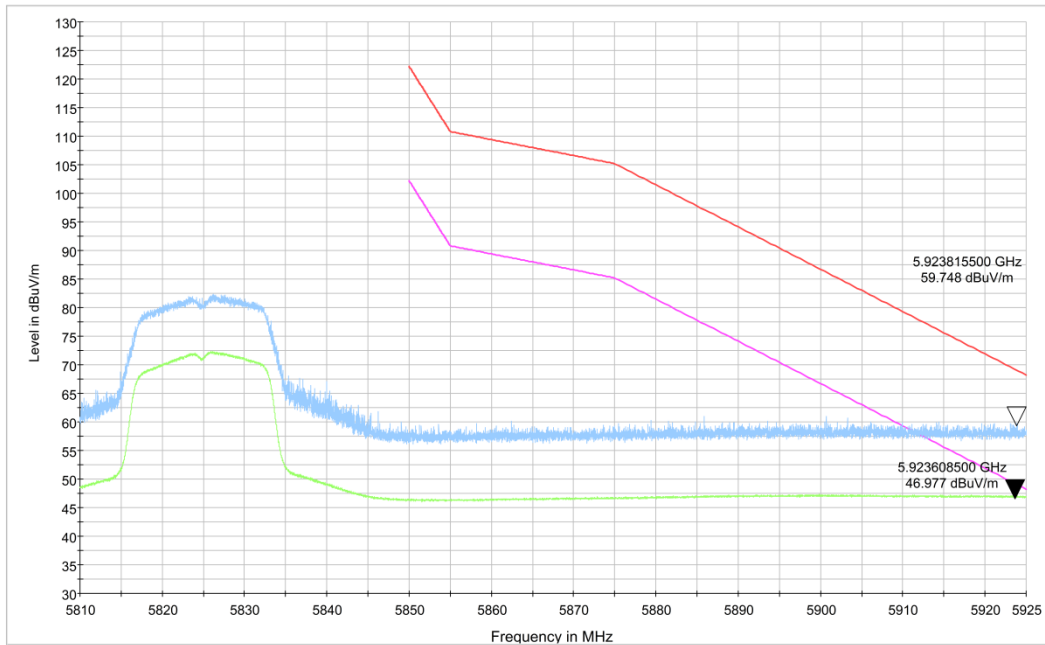


Fig. 11 Band Edges (802.11a Ch165, 5825MHz)

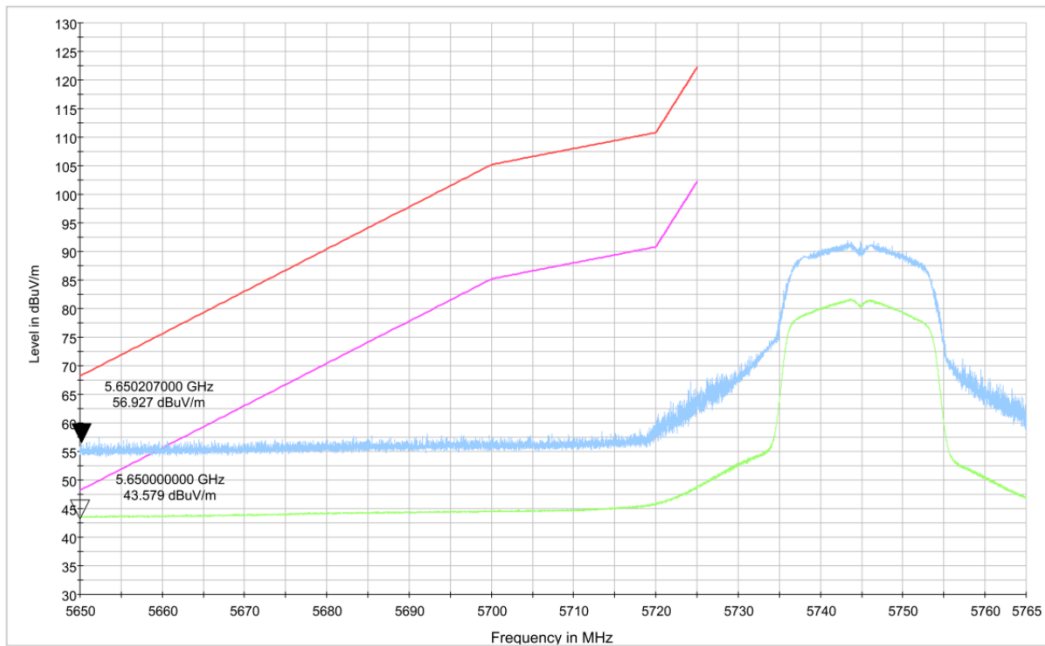


Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)

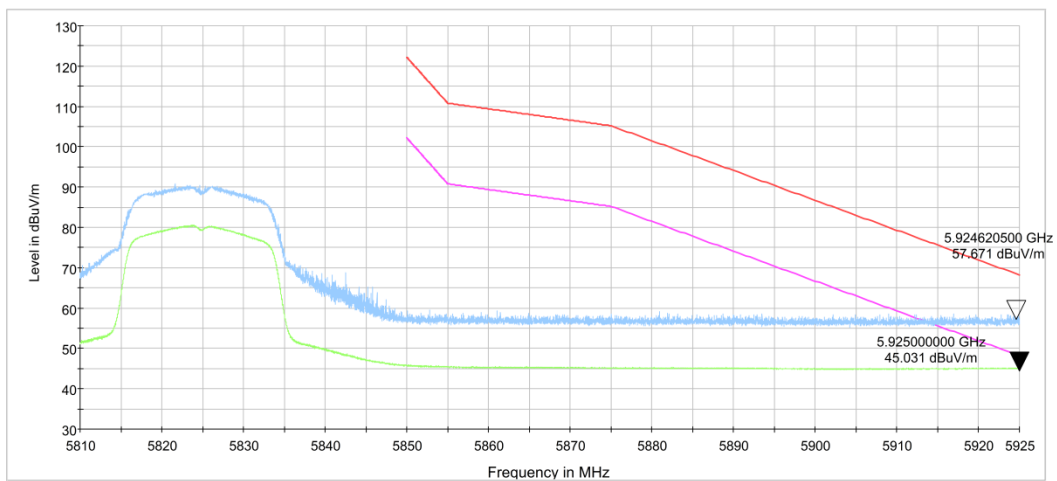


Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)

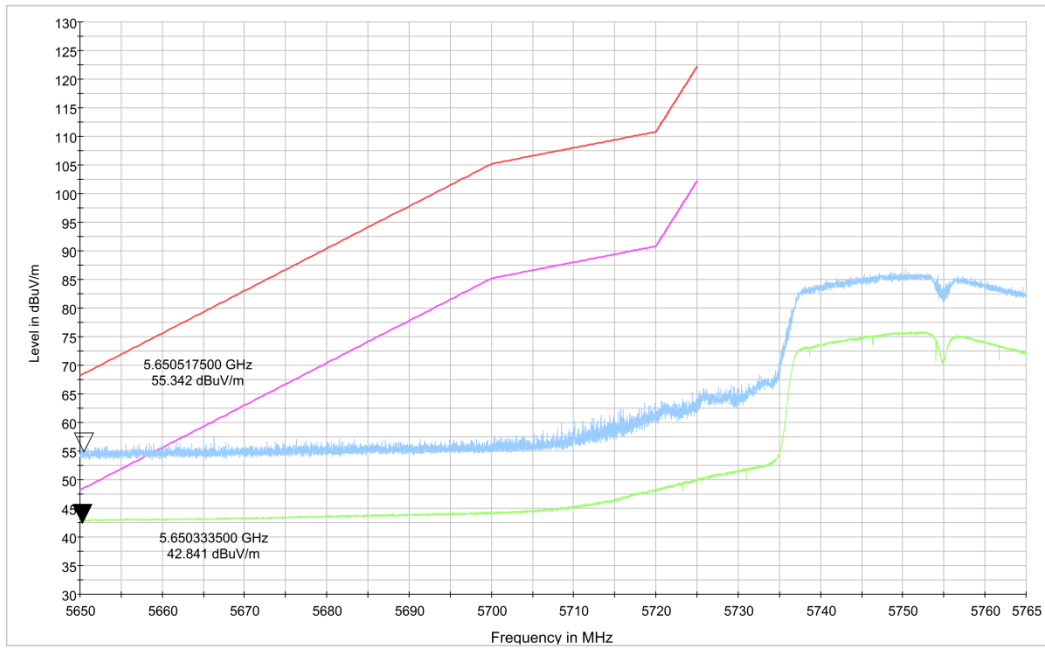


Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)

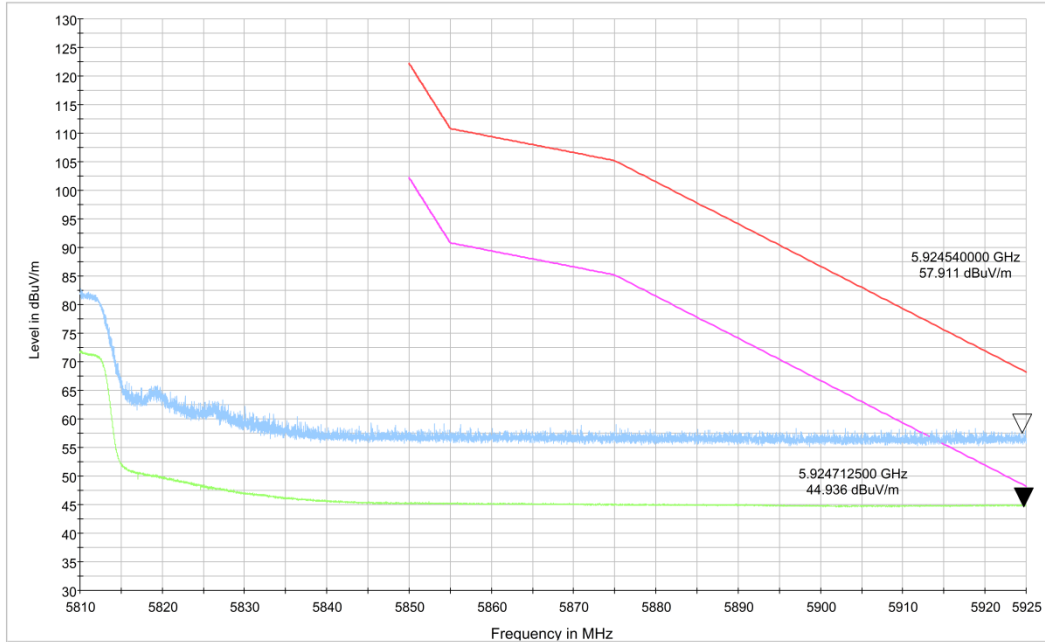


Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)

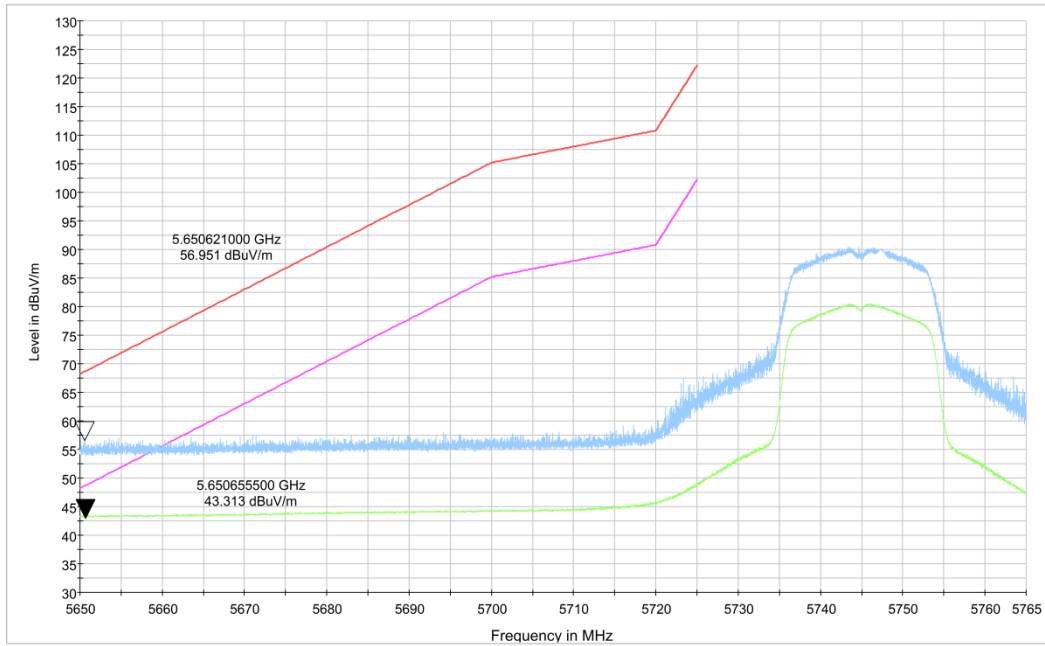


Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

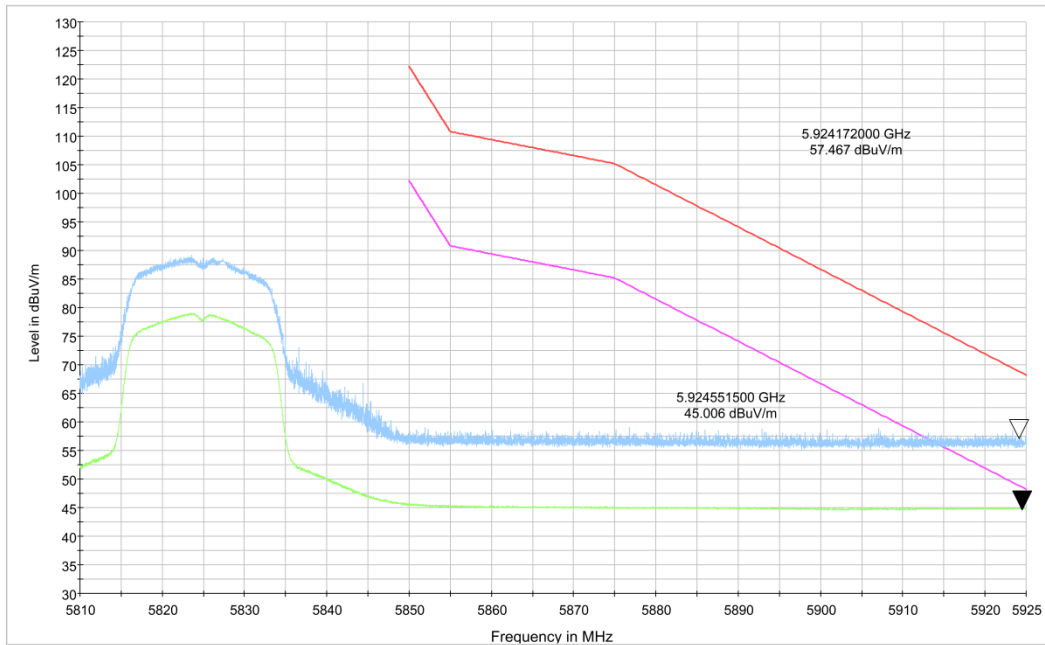


Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

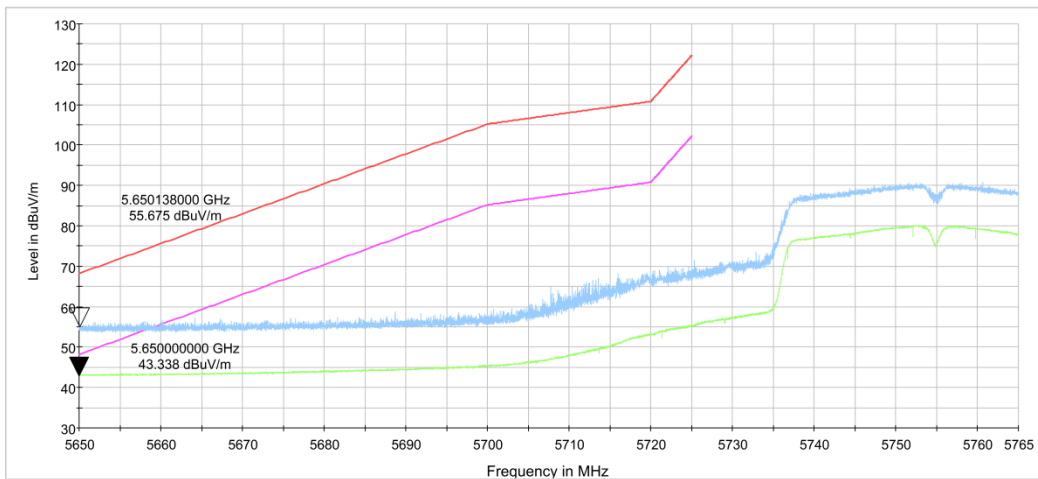


Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

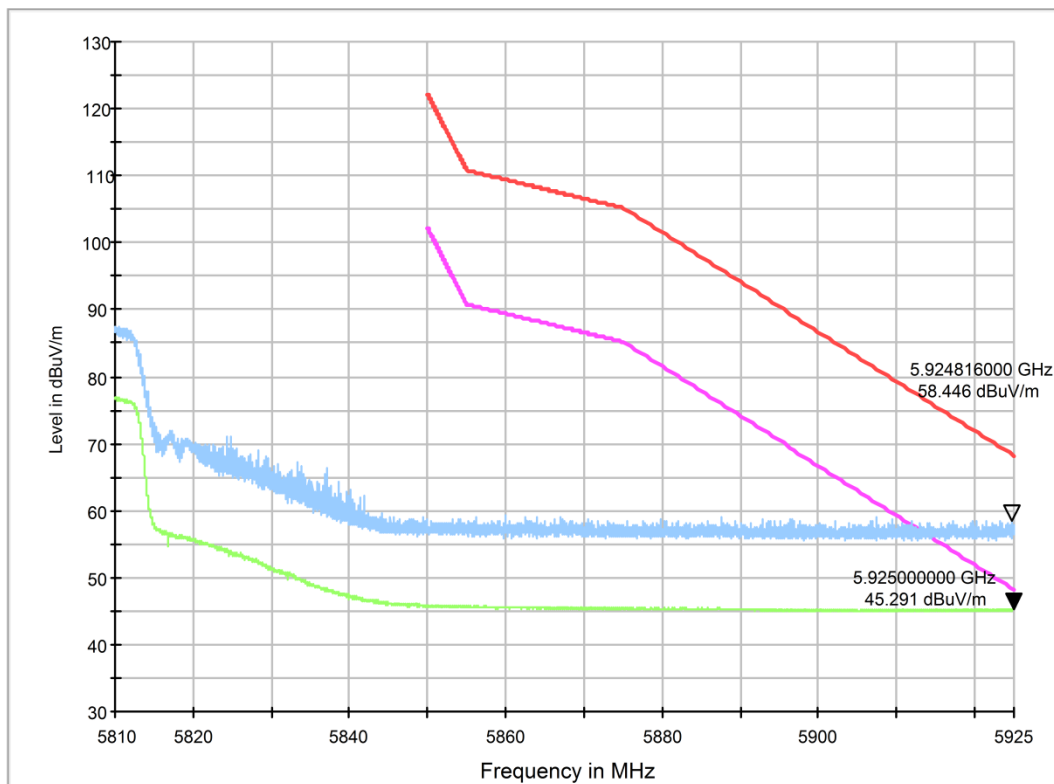


Fig. 19 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

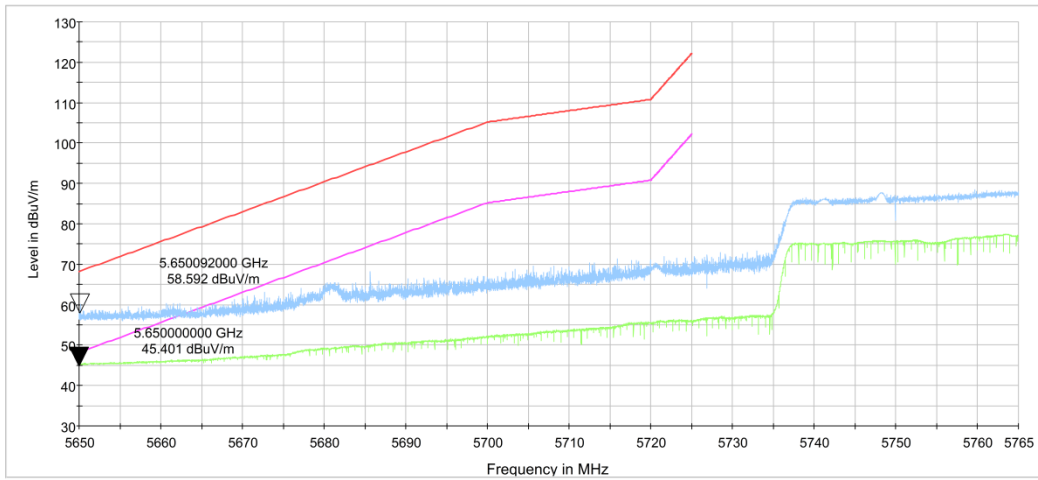


Fig. 20 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

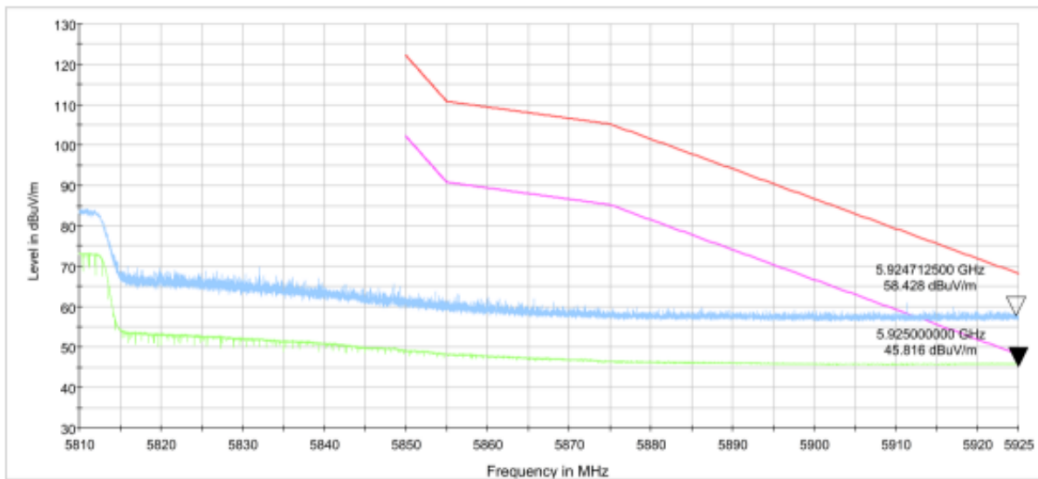


Fig. 21 Band Edges (802.11ac-HT80, 5775MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement uncertainty:

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

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.22	Fig.23	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.22	Fig.23	P
0.5 to 5	46			
5 to 30	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10 .

Conclusion: PASS

Test graphs as below:

Traffic:

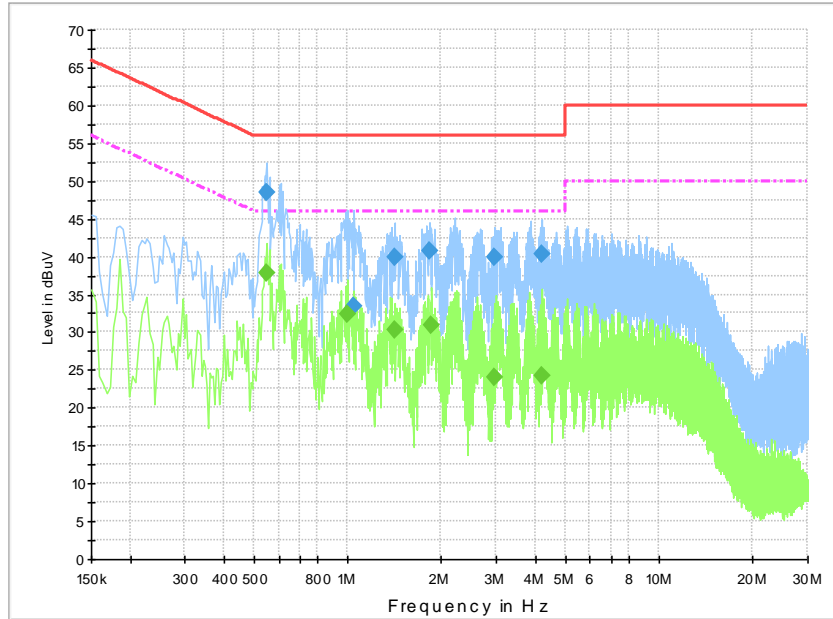


Fig. 22 AC Power line Conducted Emission-802.11a

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

Final Result 1

Frequency	QuasiPeak	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr.	Margin (dB)	Limit (dBuV)
0.550500	48.4	1000.	9.000	On	L1	19.8	7.6	56.0
1.050000	33.4	1000.	9.000	On	N	19.6	22.6	56.0
1.410000	39.8	1000.	9.000	On	L1	19.6	16.2	56.0
1.828500	40.8	1000.	9.000	On	L1	19.7	15.2	56.0
2.967000	39.9	1000.	9.000	On	L1	19.6	16.1	56.0
4.222500	40.2	1000.	9.000	On	L1	19.6	15.8	56.0

Final Result 2

Frequency	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr.	Margin (dB)	Limit (dBuV)
0.550500	37.8	1000.	9.000	On	L1	19.8	8.2	46.0
1.000500	32.4	1000.	9.000	On	L1	19.7	13.6	46.0
1.419000	30.2	1000.	9.000	On	L1	19.6	15.8	46.0
1.864500	31.0	1000.	9.000	On	L1	19.7	15.0	46.0
2.944500	24.0	1000.	9.000	On	N	19.6	22.0	46.0
4.200000	24.3	1000.	9.000	On	N	19.6	21.7	46.0

Note2: The measurement results showed here are worst cases.

Idle:

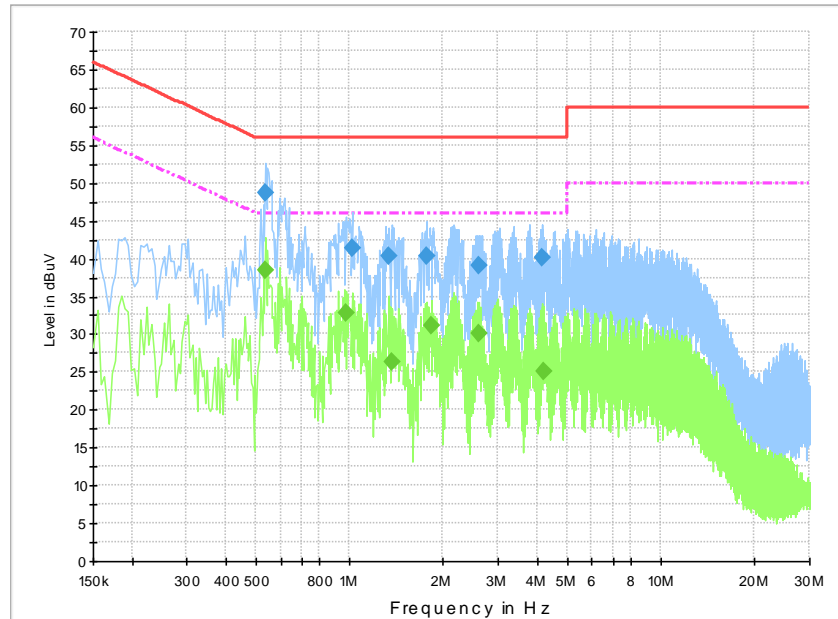


Fig. 23 AC Power line Conducted Emission-Idle

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

Final Result 1

Frequency	QuasiPeak	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr.	Margin (dB)	Limit (dBuV)
0.537000	48.6	1000.	9.000	On	L1	19.8	7.4	56.0
1.018500	41.3	1000.	9.000	On	L1	19.6	14.7	56.0
1.342500	40.3	1000.	9.000	On	L1	19.7	15.7	56.0
1.774500	40.4	1000.	9.000	On	L1	19.7	15.6	56.0
2.611500	39.2	1000.	9.000	On	L1	19.6	16.8	56.0
4.164000	40.1	1000.	9.000	On	L1	19.6	15.9	56.0




Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.537000	38.5	1000.0	9.000	On	L1	19.8	7.5	46.0
0.978000	32.8	1000.0	9.000	On	L1	19.7	13.2	46.0
1.360500	26.4	1000.0	9.000	On	N	19.6	19.6	46.0
1.833000	31.2	1000.0	9.000	On	L1	19.7	14.8	46.0
2.589000	30.1	1000.0	9.000	On	L1	19.7	15.9	46.0
4.182000	25.1	1000.0	9.000	On	N	19.6	20.9	46.0

ANNEX B: EUT parameters

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

ANNEX C: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p>  	
<hr/> Certificate of Accreditation to ISO/IEC 17025:2017 <hr/>	
NVLAP LAB CODE: 600118-0	
Telecommunication Technology Labs, CAICT Beijing China	
<i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i>	
Electromagnetic Compatibility & Telecommunications	
<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>	
2020-09-29 through 2021-09-30 <i>Effective Dates</i>	 For the National Voluntary Laboratory Accreditation Program

*** END OF REPORT BODY ***