



FCC PART 15C TEST REPORT No.I20Z60999-IOT03

for

Client name: TCL Communication Ltd.

Product name: Tablet PC

Model name: 9032W

With

FCC ID: 2ACCJB129

Hardware Version: 03

Software Version: 1CS09000

Issued Date: 2020-07-28

Note:

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

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

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REPORT HISTORY

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I20Z60999-IOT03	Rev.0	1st edition	2020-07-28

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1. TEST LABORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 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 (CN0066). 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,
P. R. China100191

1.3. Testing Environment

Normal Temperature: 15-35°C

Extreme Temperature: -20/+55°C

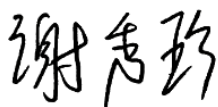
Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2020-06-17

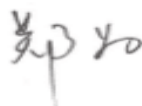
Testing End Date: 2020-07-28

1.5. Signature



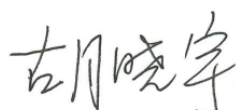
Xie Xiuzhen

(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.
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science
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City: Hong Kong
Postal Code: /
Country: China
Telephone: 0086-755-36611722
Fax: 0086-755-36612000-81722

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: 0086-755-36611722
Fax: 0086-755-36612000-81722

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

Description	Tablet PC
Model name	9032W
FCC ID	2ACCJB129
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.85V

Note: Photographs of EUT are shown in ANNEX C of this test report. Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	015773000002571	03	WFA100311
EUT2	015773000002274	03	WFA100311

*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	Remarks
AE1	Battery	CAC4000020C1	/
AE2	Charger	CBA0059AGAC5	/
AE3	USB Cable	CDA0000123C2	/

AE1

Type	TLp040M1
Manufacturer	BYD
Capacitance	/
Nominal voltage	/

AE2

Model	UC13US
Manufacturer	PUAN
Length of cable	/

AE3

Type:	Data Cable
Manufacturer	SHENGHUA
Length of cable	/

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

3.4. General Description

Equipment Under Test (EUT) is a model of 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 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 - Radiated	15.407 (b)	/	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°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	2021-05-06
2	LISN	ENV216	101200	Rohde & Schwarz	1 year	2021-05-17
3	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2021-02-26
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100235	Rohde & Schwarz	1 year	2021-03-05
2	BiLog Antenna	VULB9163	483	Schwarzbeck	1 year	2020-09-17
3	Dual-Ridge Waveguide Horn Antenna	3115	6914	ETS-Lindgren	1 year	2021-01-14
4	EMI Antenna	3116	2661	ETS-Lindgren	1 year	2020-10-18

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

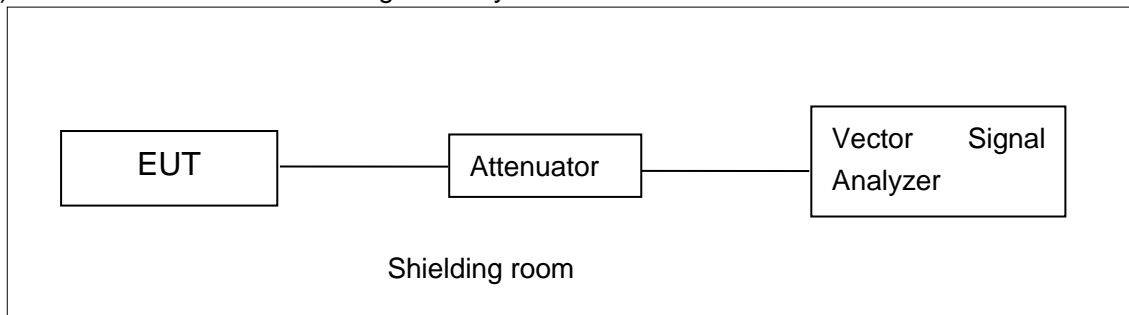
Measurement Uncertainty : 3.08dB,k=2

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

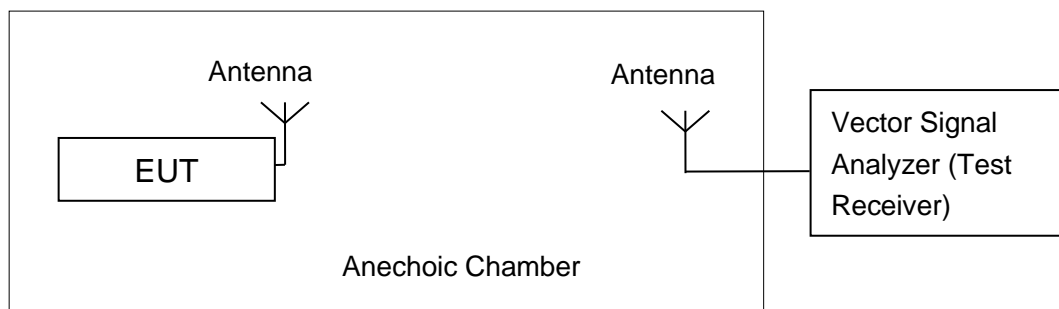


A.1.2. Radiated Emission Measurements

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 0.98dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

Duty Cycle:

11a	1Mbps
Duty Cycle	100%
11n-20	6Mbps
Duty Cycle	100%
11n-40	MCS0
Duty Cycle	100%
11ac-20	MCS0
Duty Cycle	100%
11ac-40	MCS0
Duty Cycle	100%
11ac-80	MCS0
Duty Cycle	100%

Measurement Results:

The data rate 6Mbps(11a)/ MCS0(11n-20)/ MCS0(11n-40)/ MCS0(11ac-20)/ MCS0(11ac-40)/ MCS0(11ac-80)are worse condition declared by client, and the following cases are performed with this condition.

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	18.25	18.21	18.09

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	17.88	18.04	16.68

802.11ac-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	16.13	16.09	16.05

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	9.41	9.02

802.11ac-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11ac (40MHz)	MCS0	15.56	15.53

802.11ac-HT80 mode

Mode	Data Rate (Index)	Test Result (dBm)
		5775MHz (Ch155)
802.11ac (80MHz)	MCS0	15.53

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	3.78	P
	157	3.99	P
	165	3.08	P
802.11n HT20	149	3.43	P
	157	3.75	P
	165	2.79	P
802.11ac HT20	149	1.54	P
	157	1.24	P
	165	1.78	P
802.11n HT40	151	0.64	P
	159	-0.71	P
802.11ac HT40	151	-1.33	P
	159	-1.71	P
802.11ac HT80	155	-4.70	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is made according to KDB789033 D02 .

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
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Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		conclusion
		Fig.	Value	
802.11a	149	Fig.1	16.30	P
	157	Fig.2	16.30	P
	165	Fig.3	16.30	P
802.11n HT20	149	Fig.4	17.55	P
	157	Fig.5	17.55	P
	165	Fig.6	17.55	P
802.11ac HT20	149	Fig.7	17.55	P
	157	Fig.8	17.55	P
	165	Fig.9	17.55	P
802.11n HT40	151	Fig.10	36.32	P
	159	Fig.11	35.84	P
802.11ac HT40	151	Fig.12	36.32	P
	159	Fig.13	36.32	P
802.11ac HT80	155	Fig.14	76.32	P

Conclusion: PASS

Test graphs as below:

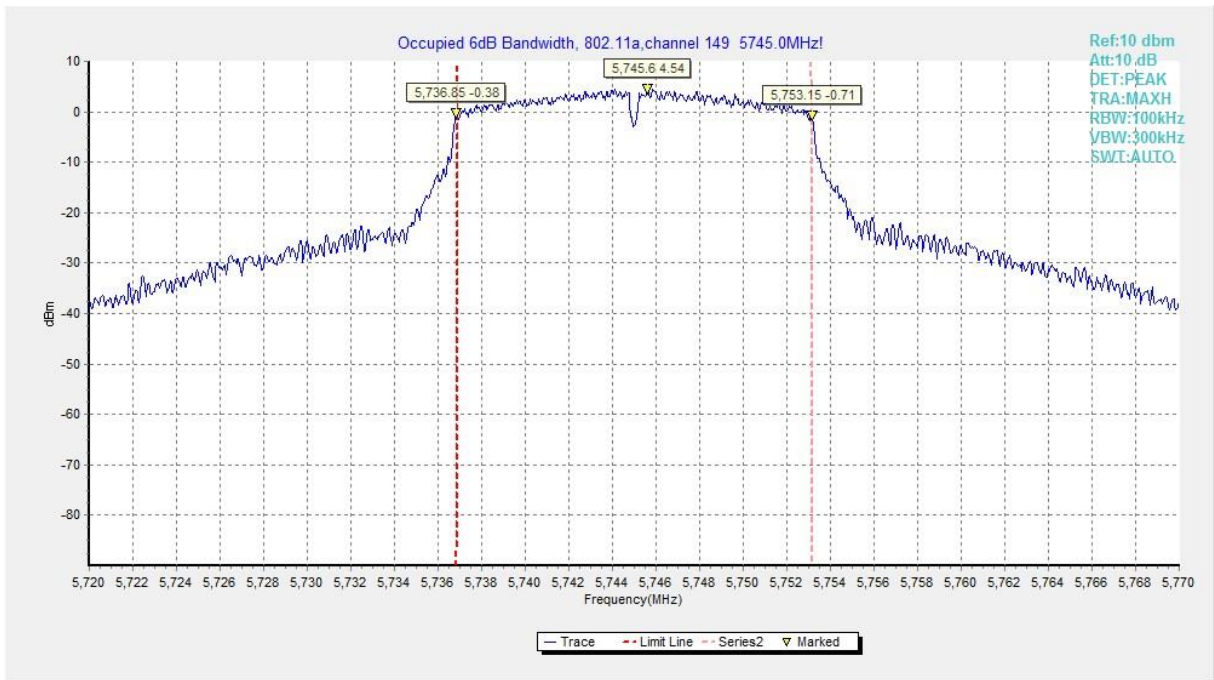


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

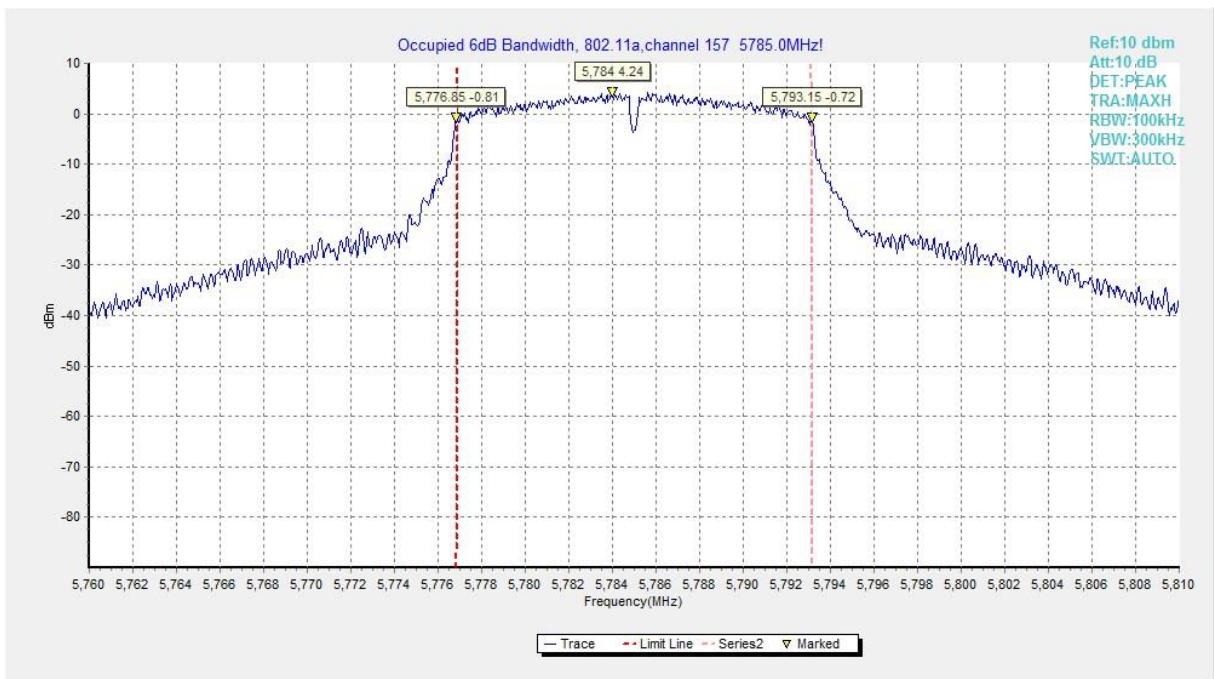


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

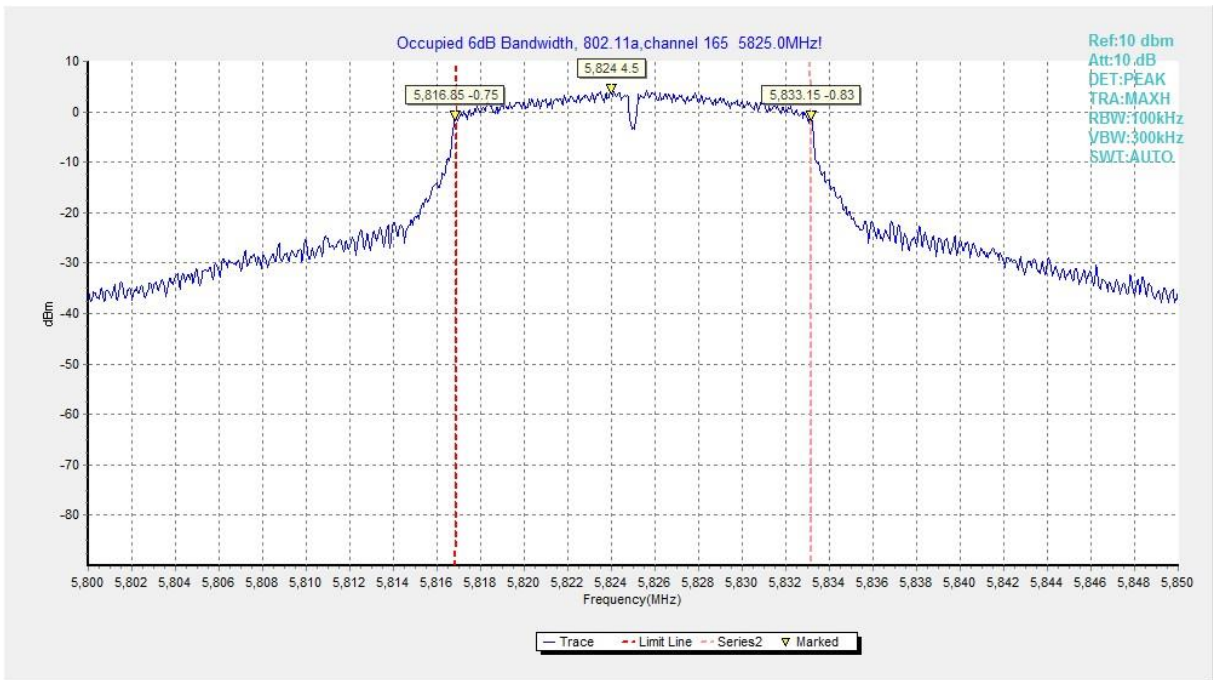


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

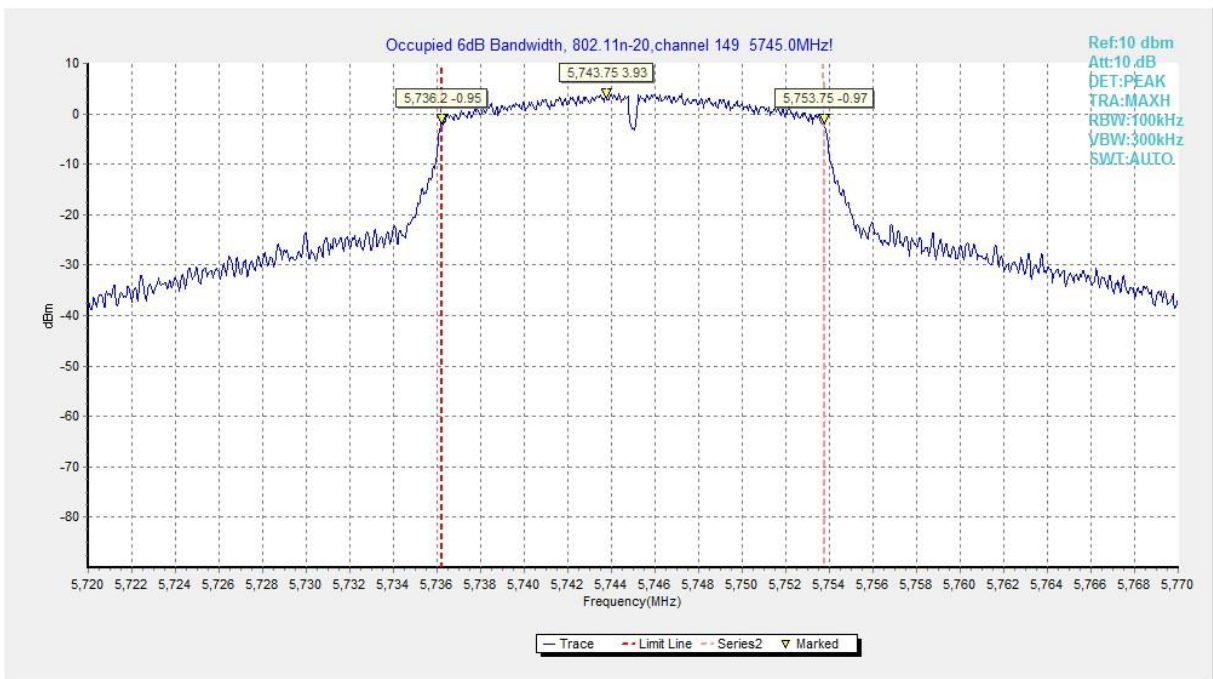


Fig. 4 Occupied 6dB Bandwidth (802.11n-HT20, Ch 149)

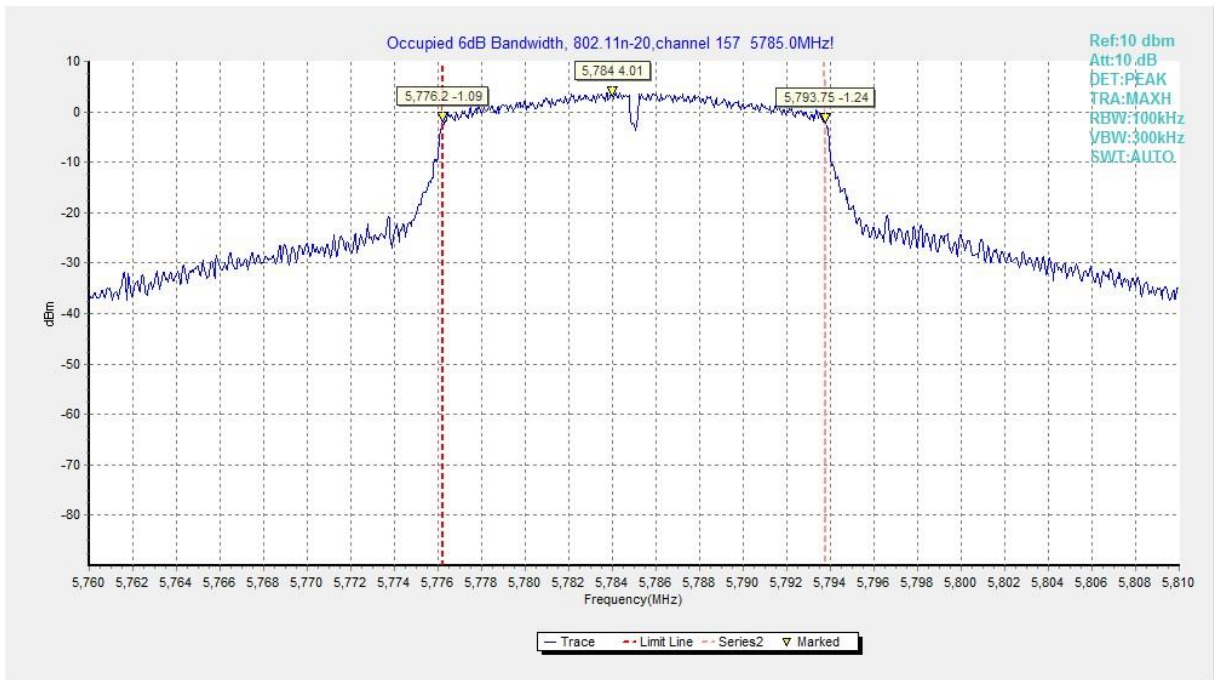


Fig. 5 Occupied 6dB Bandwidth (802.11n-HT20, Ch 157)

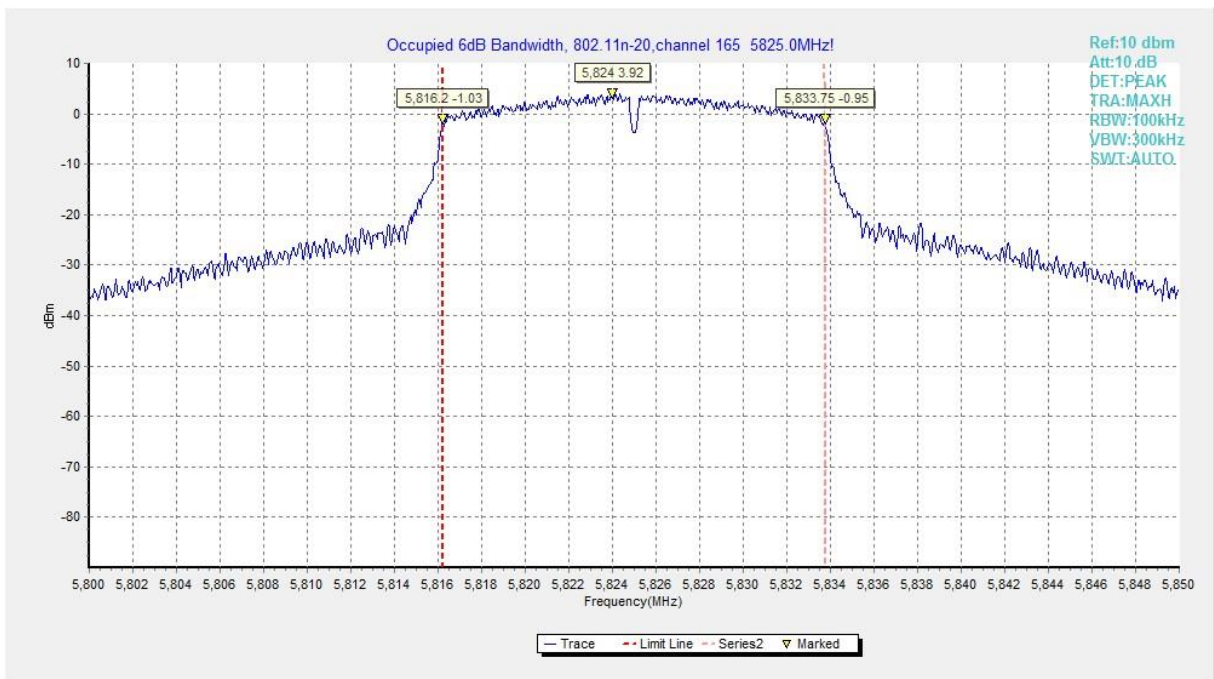


Fig. 6 Occupied 6dB Bandwidth (802.11n-HT20, Ch 165)

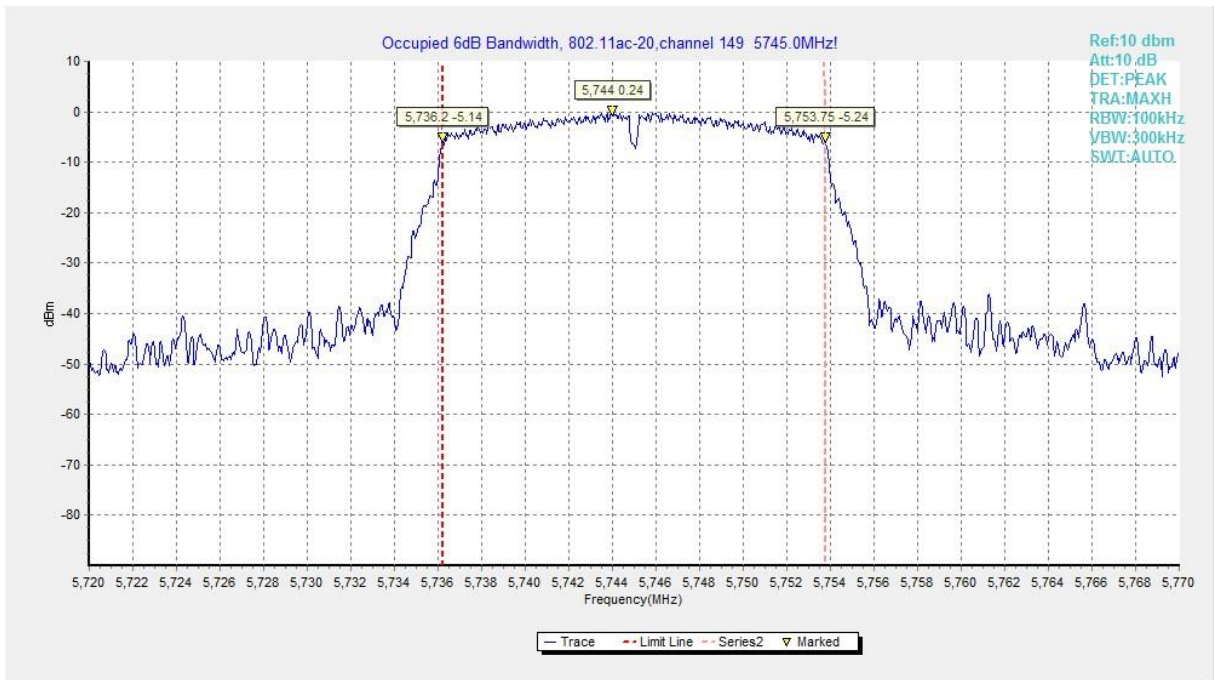


Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)

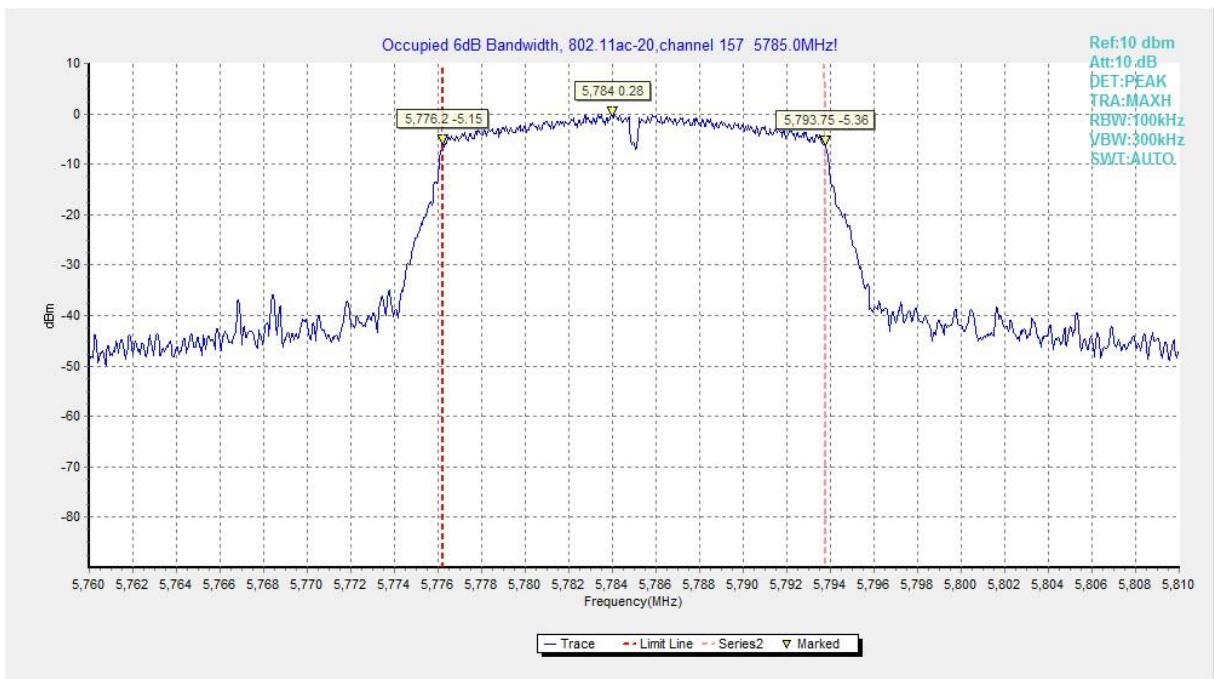


Fig. 8 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)

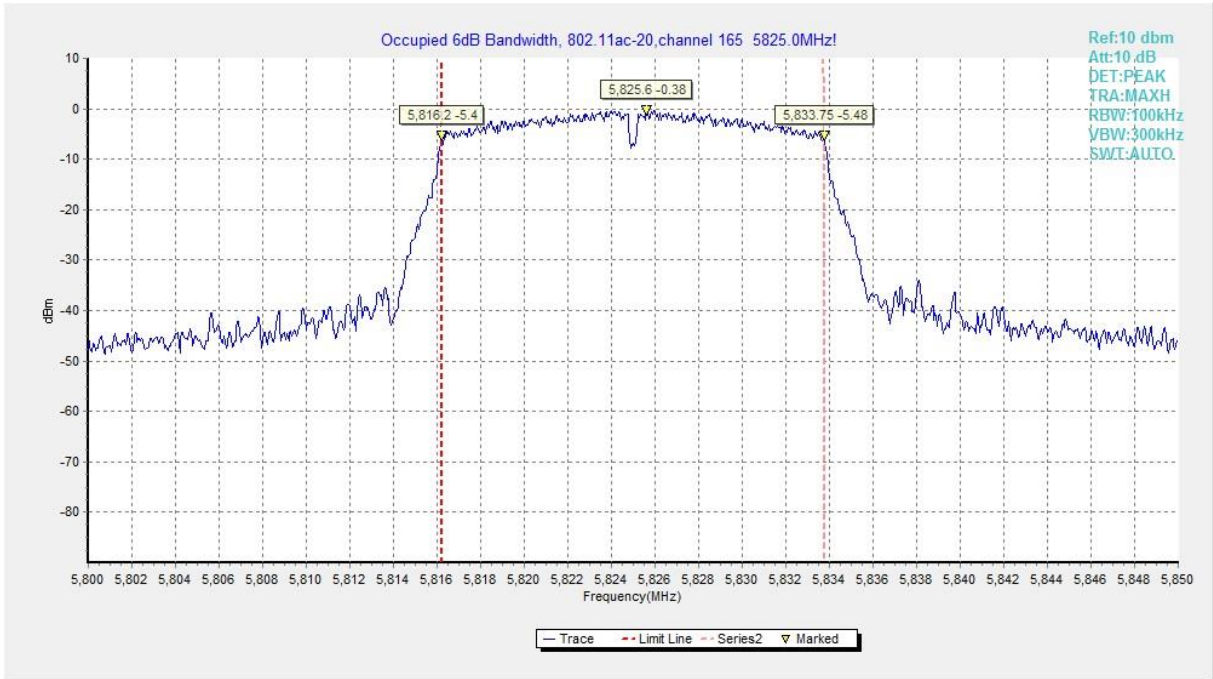


Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)

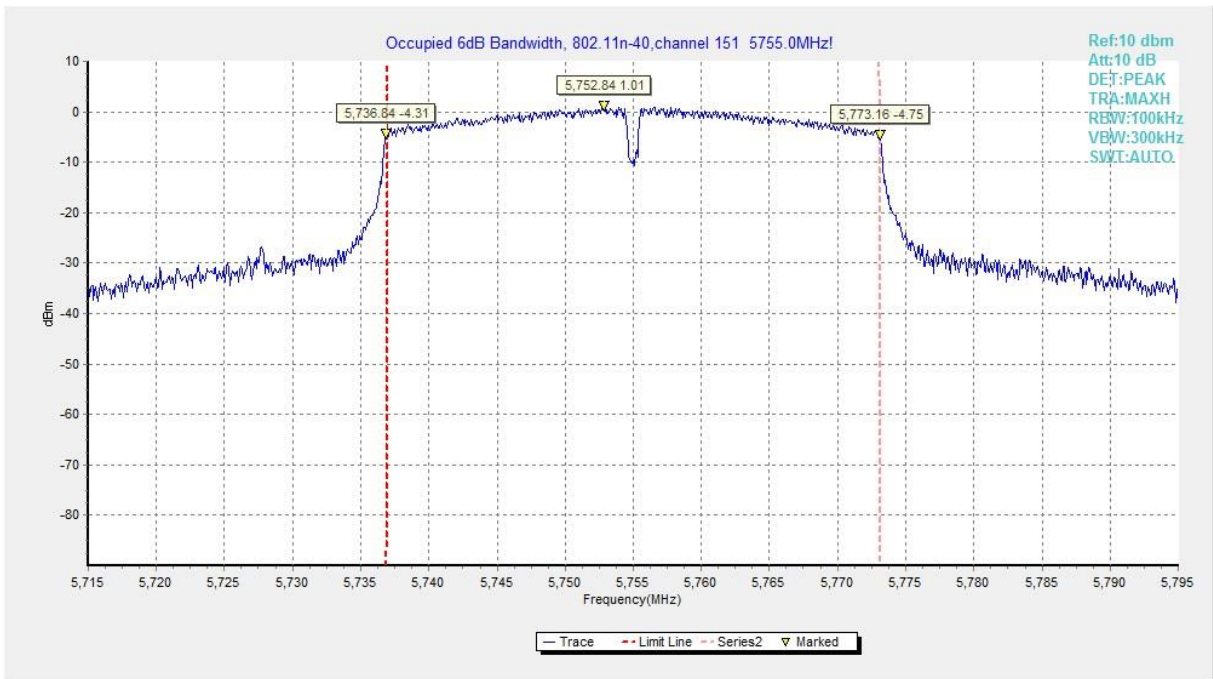


Fig. 10 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

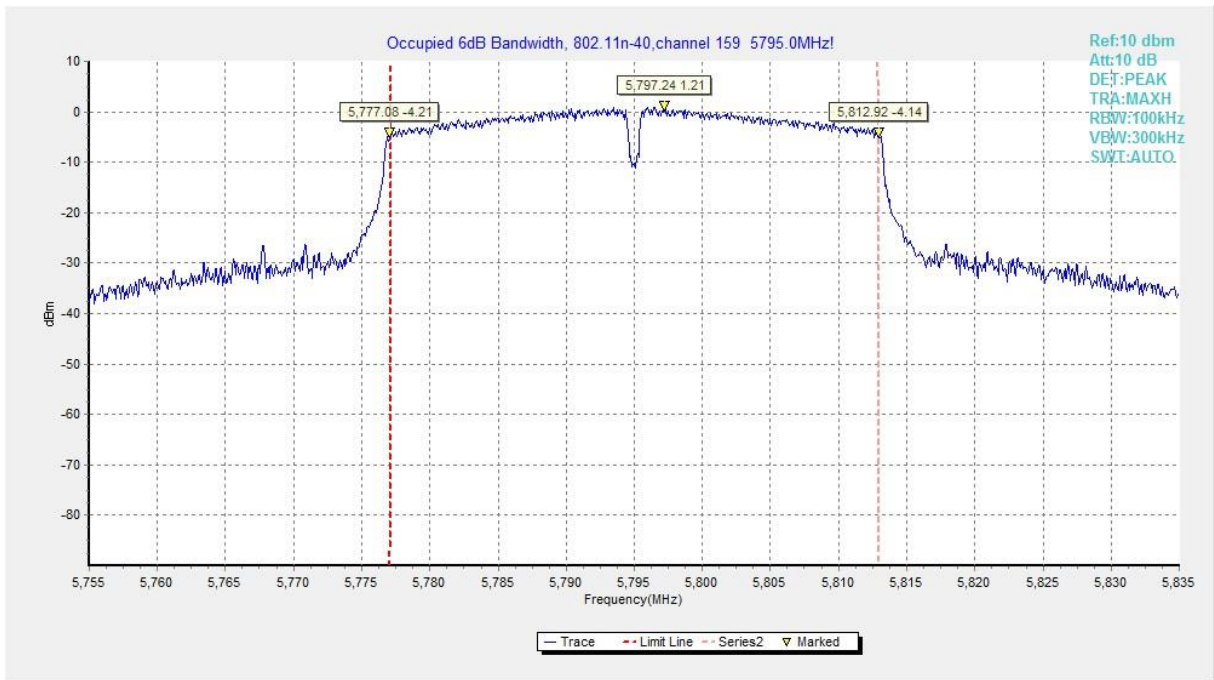


Fig. 11 Occupied 6dB Bandwidth (802.11n-HT40, Ch 159)

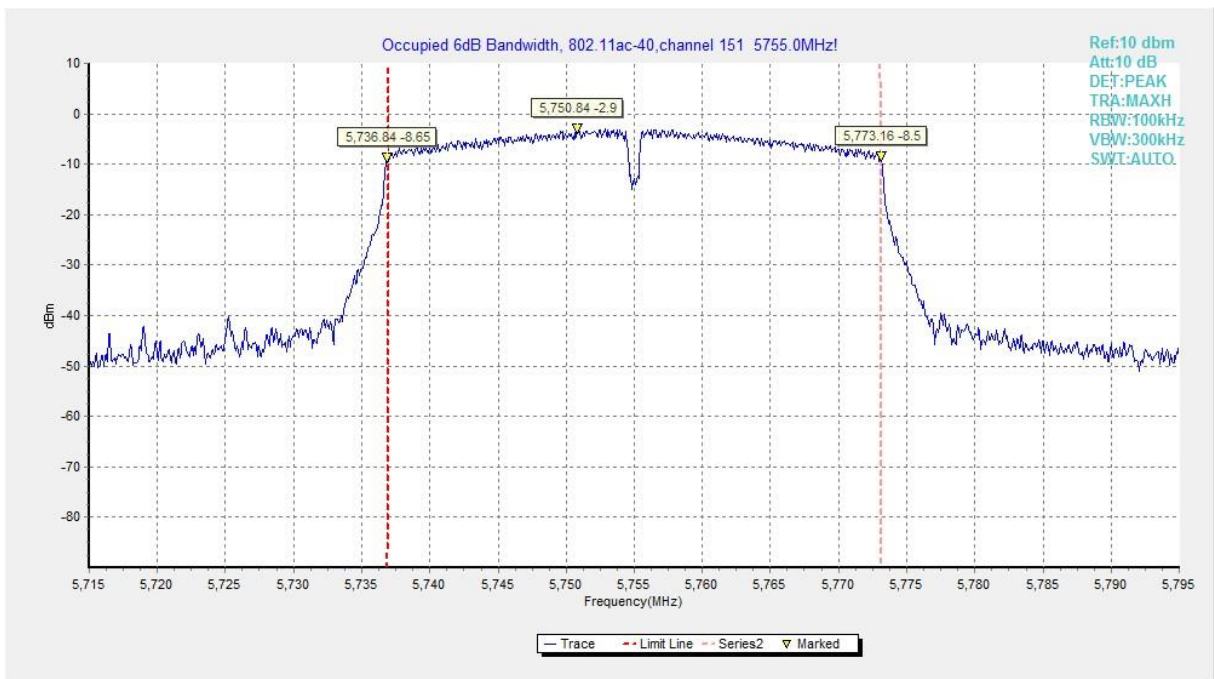


Fig. 12 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)

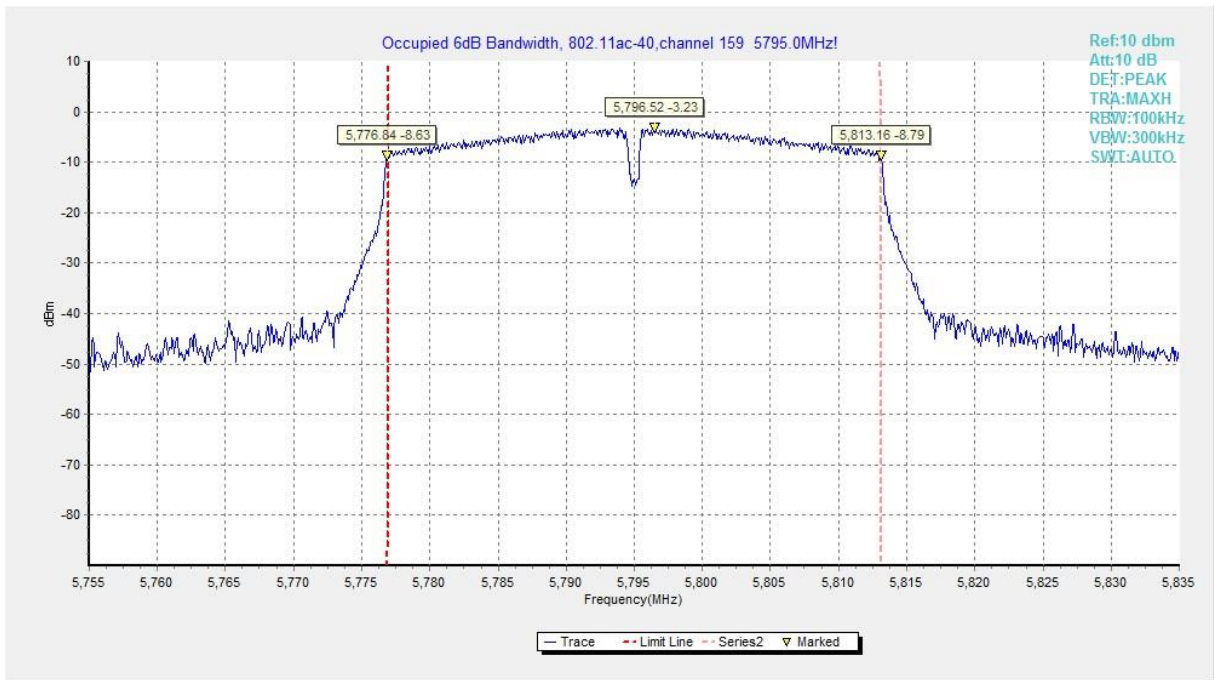


Fig. 13 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 159)

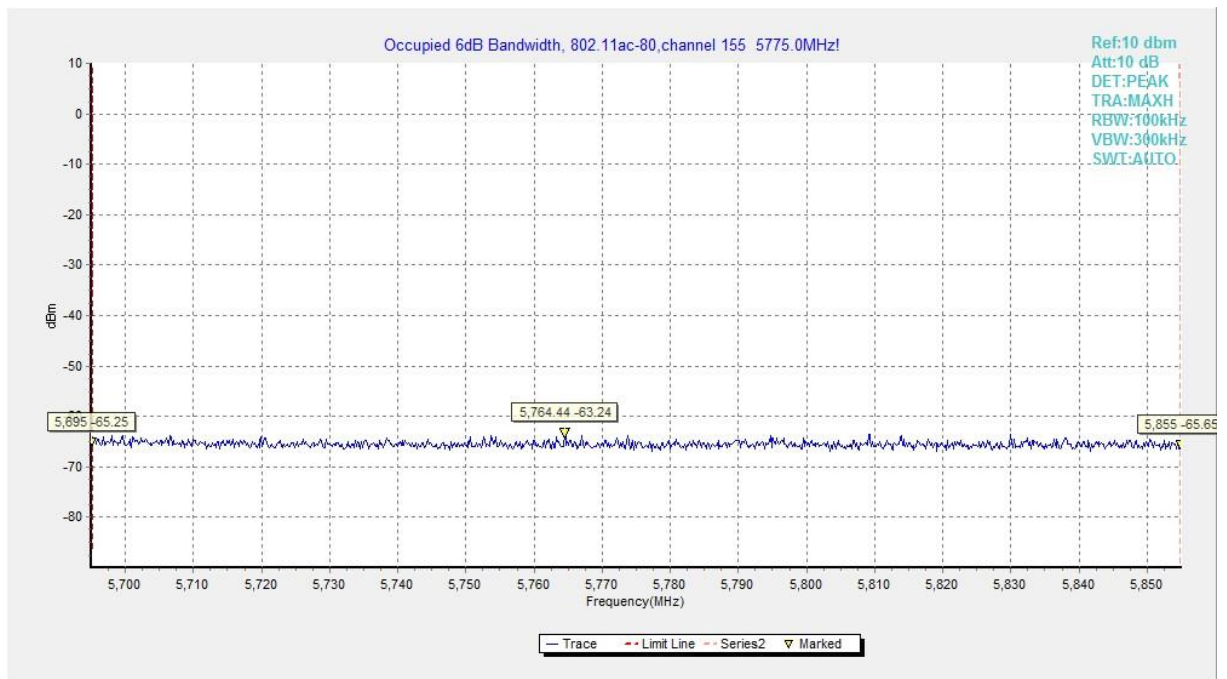


Fig. 14 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

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

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 1GHz	5.40
1GHz ≤ f ≤ 18GHz	4.32
18GHz ≤ f ≤ 40GHz	5.26

Measurement Results:

802.11a mode

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

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
802.11n (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

802.11ac-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-HT80 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (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

Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.269	61.1	-16.5	34.2	43.37	102	40.9	H
17996.7	34.7	-5.4	33.8	6.32	54	19.3	H
18000	34.6	-6.5	46.4	-5.26	54	19.4	V
17998.9	34.5	-5.4	43.4	-3.48	54	19.5	H
17995.6	34.5	-5.4	43.4	-3.48	54	19.5	H
17997.8	34.5	-5.4	43.4	-3.48	54	19.5	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17998.9	34.5	-5.4	43.4	-3.48	54	19.5	H
17996.7	34.5	-5.4	33.8	6.12	54	19.5	H
17992.3	34.4	-5.4	43.4	-3.58	54	19.6	V
17997.8	34.3	-5.4	43.4	-3.68	54	19.7	H
17982.4	34.3	-5.4	43.4	-3.68	54	19.7	H
17995.6	34.2	-5.4	43.4	-3.78	54	19.8	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5854.376	53.7	-16.5	34.2	35.98	90	36.3	H
17992.3	34.4	-5.4	33.8	6.02	54	19.6	H
18000	34.4	-6.5	46.4	-5.46	54	19.6	V
17996.7	34.3	-5.4	43.4	-3.68	54	19.7	H
17991.2	34.3	-5.4	43.4	-3.68	54	19.7	H
17994.5	34.3	-5.4	43.4	-3.68	54	19.7	H

802.11n-HT20
Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5723.463	54.4	-16.5	34.2	36.67	101.6	47.2	H
17996.7	34.6	-5.4	33.8	6.22	54	19.4	H
17993.4	34.4	-5.4	43.4	-3.58	54	19.6	V
17994.5	34.4	-5.4	43.4	-3.58	54	19.6	H
18000	34.3	-6.5	46.4	-5.56	54	19.7	H
17998.9	34.2	-5.4	43.4	-3.78	54	19.8	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
18000	34.4	-6.5	46.4	-5.46	54	19.6	H
17998.9	34.4	-5.4	33.8	6.02	54	19.6	H
17985.7	34.1	-5.4	43.4	-3.88	54	19.9	V
17991.2	34.1	-5.4	43.4	-3.88	54	19.9	H
17996.7	34.1	-5.4	43.4	-3.88	54	19.9	H
17981.3	34.1	-5.4	43.4	-3.88	54	19.9	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5851.304	54.6	-16.5	34.2	36.88	101.8	47.2	H
17997.8	34.4	-5.4	33.8	6.02	54	19.6	H
17998.9	34.2	-5.4	43.4	-3.78	54	19.8	V
17995.6	34.2	-5.4	43.4	-3.78	54	19.8	H
17990.1	34.2	-5.4	43.4	-3.78	54	19.8	H
17993.4	34.2	-5.4	43.4	-3.78	54	19.8	H

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.308	60.4	-16.5	34.2	42.67	101.9	41.5	H
17998.9	34.5	-5.4	33.8	6.12	54	19.5	H
17995.6	34.2	-5.4	43.4	-3.78	54	19.8	V
17997.8	34.2	-5.4	43.4	-3.78	54	19.8	H
17994.5	34.2	-5.4	43.4	-3.78	54	19.8	H
17993.4	34.2	-5.4	43.4	-3.78	54	19.8	H

Ch159

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5853.96	50.9	-16.5	34.2	33.18	89	38.1	H
17995.6	34.2	-5.4	33.8	5.82	54	19.8	H
17992.3	34.2	-5.4	43.4	-3.78	54	19.8	V
17996.7	34.2	-5.4	43.4	-3.78	54	19.8	H
17997.8	34.1	-5.4	43.4	-3.88	54	19.9	H
17984.6	34.1	-5.4	43.4	-3.88	54	19.9	H

802.11ac-HT20

Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.022	54.9	-16.5	34.2	37.17	101	46.1	H
17996.7	34.8	-5.4	33.8	6.42	54	19.2	H
18000	34.5	-6.5	46.4	-5.36	54	19.5	V
17992.3	34.4	-5.4	43.4	-3.58	54	19.6	H
17994.5	34.4	-5.4	43.4	-3.58	54	19.6	H
17995.6	34.3	-5.4	43.4	-3.68	54	19.7	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17994.5	34.5	-5.4	43.4	-3.48	54	19.5	H
17998.9	34.4	-5.4	33.8	6.02	54	19.6	H
17975.8	34.4	-5.4	43.4	-3.58	54	19.6	V
17987.9	34.3	-5.4	43.4	-3.68	54	19.7	H
17993.4	34.3	-5.4	43.4	-3.68	54	19.7	H
17996.7	34.2	-5.4	43.4	-3.78	54	19.8	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5854.424	53.3	-16.5	34.2	35.58	99.5	46.2	H
18000	34.6	-6.5	33.8	7.34	54	19.4	H
17990.1	34.4	-5.4	43.4	-3.58	54	19.6	V
17996.7	34.3	-5.4	43.4	-3.68	54	19.7	H
17998.9	34.3	-5.4	43.4	-3.68	54	19.7	H
17993.4	34.3	-5.4	43.4	-3.68	54	19.7	H

802.11ac-HT40

Ch151

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.282	51	-16.5	34.2	33.27	101.4	50.4	H
17993.4	34.5	-5.4	33.8	6.12	54	19.5	H
17996.7	34.4	-5.4	43.4	-3.58	54	19.6	V
17995.6	34.3	-5.4	43.4	-3.68	54	19.7	H
18000	34.2	-6.5	46.4	-5.66	54	19.8	H
17991.2	34.1	-5.4	43.4	-3.88	54	19.9	H

Ch159

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5851.176	47	-16.5	34.2	29.28	102	55	H
17993.4	34.3	-5.4	33.8	5.92	54	19.7	H
18000	34.3	-6.5	46.4	-5.56	54	19.7	V
17997.8	34.2	-5.4	43.4	-3.78	54	19.8	H
17990.1	34.2	-5.4	43.4	-3.78	54	19.8	H
17987.9	34.1	-5.4	43.4	-3.88	54	19.9	H

802.11ac-HT80

Ch155

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17982.4	33.9	-5.4	43.4	-4.08	54	20.1	H
17972.5	33.9	-5.4	33.8	5.52	54	20.1	H
17970.3	33.9	-5.4	43.4	-4.08	54	20.1	V
17960.4	33.9	-5.4	43.4	-4.08	54	20.1	H
17998.9	33.8	-5.4	43.4	-4.18	54	20.2	H
17991.2	33.8	-5.4	43.4	-4.18	54	20.2	H

Peak Results:
802.11a

Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.516	81.8	-16.5	34.2	64.07	121	39.2	H
17993.4	46.3	-5.4	33.8	17.92	74	27.7	H
17953.8	46.3	-5.4	43.4	8.32	74	27.7	V
17995.6	46.3	-5.4	43.4	8.32	74	27.7	H
17998.9	46	-5.4	43.4	8.02	74	28	H
17991.2	45.8	-5.4	43.4	7.82	74	28.2	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17985.7	46.5	-5.4	43.4	8.52	74	27.5	H
17872.4	45.5	-5.7	33.8	17.44	74	28.5	H
17501.7	45.3	-5.9	43.4	7.82	74	28.7	V
17881.2	45.2	-5.7	43.4	7.54	74	28.8	H
17976.9	45.2	-5.4	43.4	7.22	74	28.8	H
17979.1	45.1	-5.4	43.4	7.12	74	28.9	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5854.428	69.9	-16.5	34.2	52.18	110	40.1	H
17993.4	48.1	-5.4	33.8	19.72	74	25.9	H
17596.3	46	-6.9	43.4	9.50	74	28	V
17972.5	45.6	-5.4	43.4	7.62	74	28.4	H
17981.3	45.6	-5.4	43.4	7.62	74	28.4	H
17887.8	45.5	-5.7	43.4	7.84	74	28.5	H

802.11n-HT20

Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.477	79	-16.5	34.2	61.27	74	-5	H
17885.6	46	-5.7	33.8	17.94	74	28	H
17494	46	-5.9	40.1	11.82	74	28	V
17910.9	45.7	-5.7	43.4	8.04	74	28.3	H
17984.6	45.7	-5.4	43.4	7.72	74	28.3	H
17956	45.6	-5.4	43.4	7.62	74	28.4	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17546.8	46	-5.9	43.4	8.52	74	28	H
17893.3	45.8	-5.7	33.8	17.74	74	28.2	H
17995.6	45.7	-5.4	43.4	7.72	74	28.3	V
17884.5	45.6	-5.7	43.4	7.94	74	28.4	H
17503.9	45.6	-5.9	43.4	8.12	74	28.4	H
17894.4	45.5	-5.7	43.4	7.84	74	28.5	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5852.984	70.5	-16.5	34.2	52.78	121	50.5	H
17969.2	46.5	-5.4	33.8	18.12	74	27.5	H
17998.9	46.2	-5.4	43.4	8.22	74	27.8	V
17983.5	45.7	-5.4	43.4	7.72	74	28.3	H
17888.9	45.7	-5.7	43.4	8.04	74	28.3	H
17403.8	45.6	-5.9	40.1	11.42	74	28.4	H

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5724.087	80.8	-16.5	34.2	63.07	121.7	40.9	H
17968.1	45.8	-5.4	33.8	17.42	74	28.2	H
17998.9	45.7	-5.4	43.4	7.72	74	28.3	V
17989	45.6	-5.4	43.4	7.62	74	28.4	H
17995.6	45.5	-5.4	43.4	7.52	74	28.5	H
17973.6	45.5	-5.4	43.4	7.52	74	28.5	H

Ch159

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5859.72	65.8	-16.5	34.2	48.08	112	46.2	H
17986.8	46.3	-5.4	33.8	17.92	74	27.7	H
17507.2	45.9	-5.9	43.4	8.42	74	28.1	V
17996.7	45.7	-5.4	43.4	7.72	74	28.3	H
17492.9	45.5	-5.9	40.1	11.32	74	28.5	H
17993.4	34.2	-5.4	43.4	-3.78	74	39.8	H

802.11ac-HT20

Ch149

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5723.554	76.5	-16.5	34.2	58.77	120.7	44.2	H
17994.5	46.9	-5.4	33.8	18.52	74	27.1	H
17995.6	46.4	-5.4	43.4	8.42	74	27.6	V
17984.6	46.2	-5.4	43.4	8.22	74	27.8	H
17981.3	45.9	-5.4	43.4	7.92	74	28.1	H
17502.8	45.7	-5.9	43.4	8.22	74	28.3	H

Ch157

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
18000	46.7	-6.5	46.4	6.84	74	27.3	H
17974.7	46.7	-5.4	33.8	18.32	74	27.3	H
17998.9	46.5	-5.4	43.4	8.52	74	27.5	V
17983.5	45.8	-5.4	43.4	7.82	74	28.2	H
17896.6	45.8	-5.7	43.4	8.14	74	28.2	H
17991.2	45.6	-5.4	43.4	7.62	74	28.4	H

Ch165

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5851.048	69.7	-16.5	34.2	51.98	121.4	51.7	H
17483	47.3	-5.9	33.8	19.42	74	26.7	H
18000	46	-6.5	46.4	6.14	74	28	V
17907.6	45.9	-5.7	43.4	8.24	74	28.1	H
17872.4	45.7	-5.7	43.4	8.04	74	28.3	H
17303.7	45.6	-6.5	40.1	12.00	74	28.4	H

802.11ac-HT40

Ch151

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
17997.8	57.1	-25.5	46.7	35.90	74	16.9	H
18000	45.9	-6.5	33.8	18.64	74	28.1	H
17990.1	45.6	-5.4	43.4	7.62	74	28.4	V
17480.8	45.5	-5.9	40.1	11.32	74	28.5	H
17981.3	45.5	-5.4	43.4	7.52	74	28.5	H
17942.8	45.3	-5.4	43.4	7.32	74	28.7	H

Ch159

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
5850.504	60.1	-16.5	34.2	42.38	122	61.9	H
18000	45.9	-6.5	33.8	18.64	74	28.1	H
17991.2	45.6	-5.4	43.4	7.62	74	28.4	V
17985.7	45.4	-5.4	43.4	7.42	74	28.6	H
17996.7	45.4	-5.4	43.4	7.42	74	28.6	H
17797.6	45.3	-5.7	43.4	7.64	74	28.7	H

802.11ac-HT80

Ch155

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)
16980.3	45.8	-6.6	38.5	13.89	74	28.2	H
17937.3	45.6	-5.4	33.8	17.22	74	28.4	H
17980.2	45.6	-5.4	43.4	7.62	74	28.4	V
17975.8	45.5	-5.4	43.4	7.52	74	28.5	H
17990.1	45.4	-5.4	43.4	7.42	74	28.6	H
16903.3	45.3	-6.6	38.5	13.39	74	28.7	H

A.6. Band Edges Compliance

A6.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dBm/MHz)	
	FCC 47 CFR Part 15.407	at the band edge
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 Uncertainty:

Measurement Uncertainty	0.75dB
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Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.15	P
	5825 MHz	Fig.16	P
802.11n HT20	5745 MHz	Fig.17	P
	5825 MHz	Fig.18	P
	5805 MHz	Fig.19	P
802.11n HT40	5755 MHz	Fig.20	P
	5755 MHz	Fig.21	P
	5795 MHz	Fig.22	P
802.11ac HT20	5745 MHz	Fig.23	P
	5825 MHz	Fig.24	P
802.11ac HT40	5755 MHz	Fig.25	P
	5755 MHz	Fig.26	P
802.11ac HT80	5775 MHz	Fig.27 Fig.28	P

Conclusion: PASS

Test graphs as below:

Full Spectrum

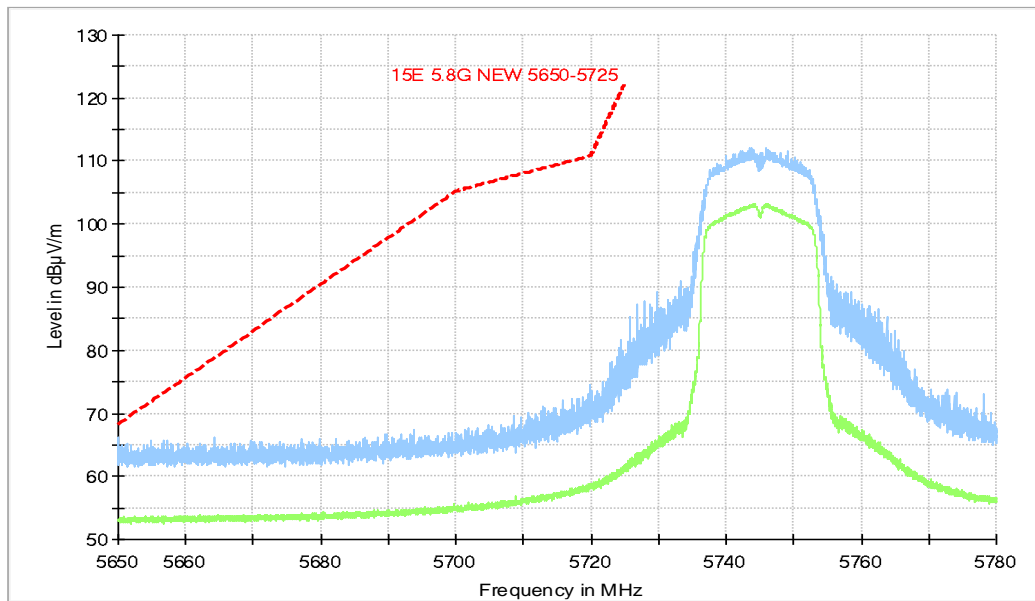


Fig. 15 Band Edges (802.11a, 5745MHz)

Full Spectrum

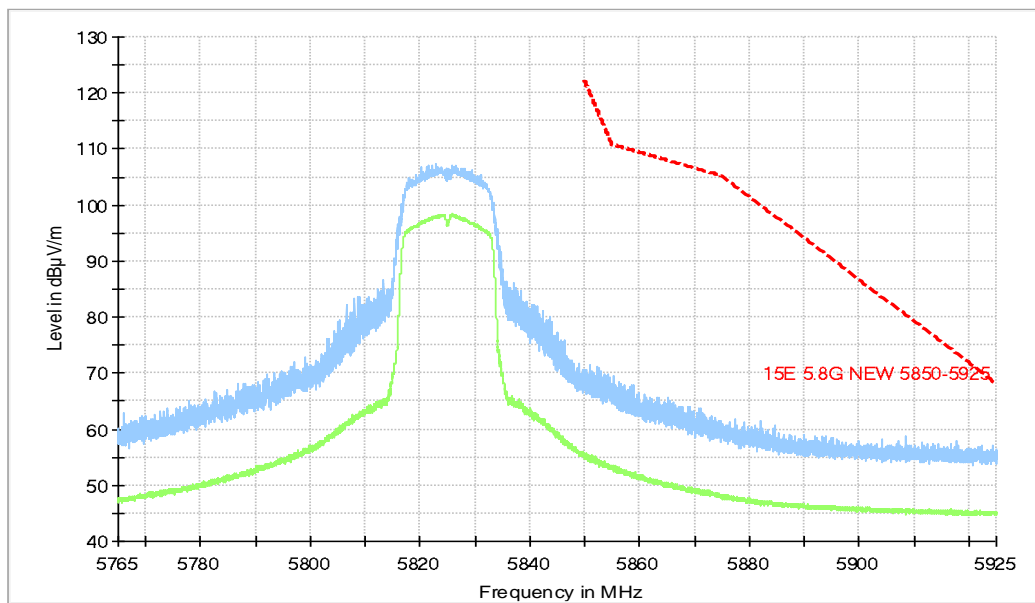


Fig. 16 Band Edges (802.11a, 5825MHz)

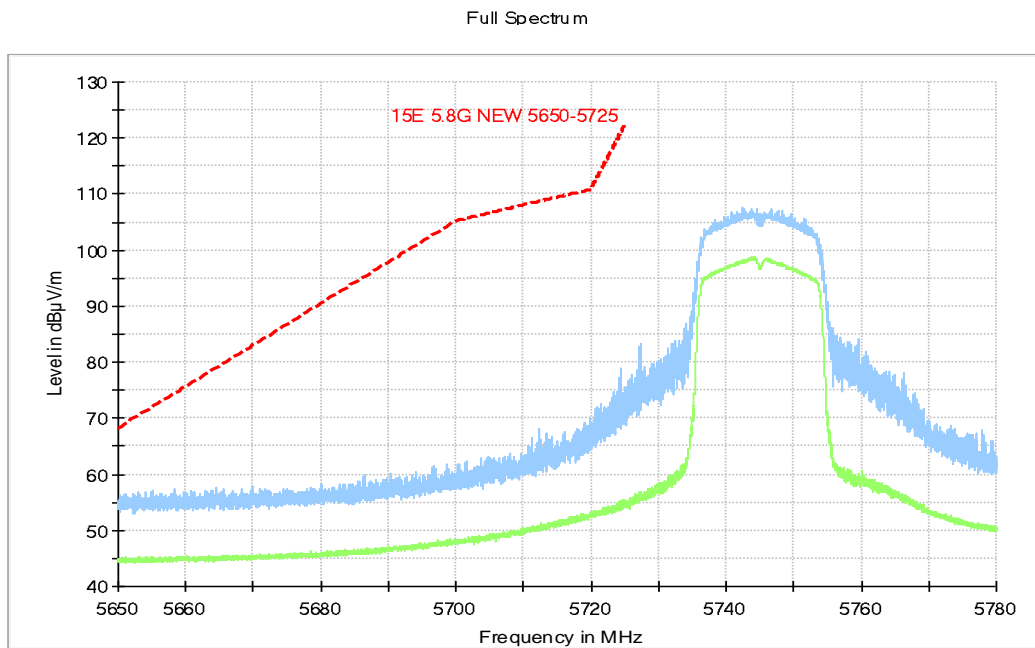


Fig. 17 Band Edges (802.11n-HT20, 5745MHz)

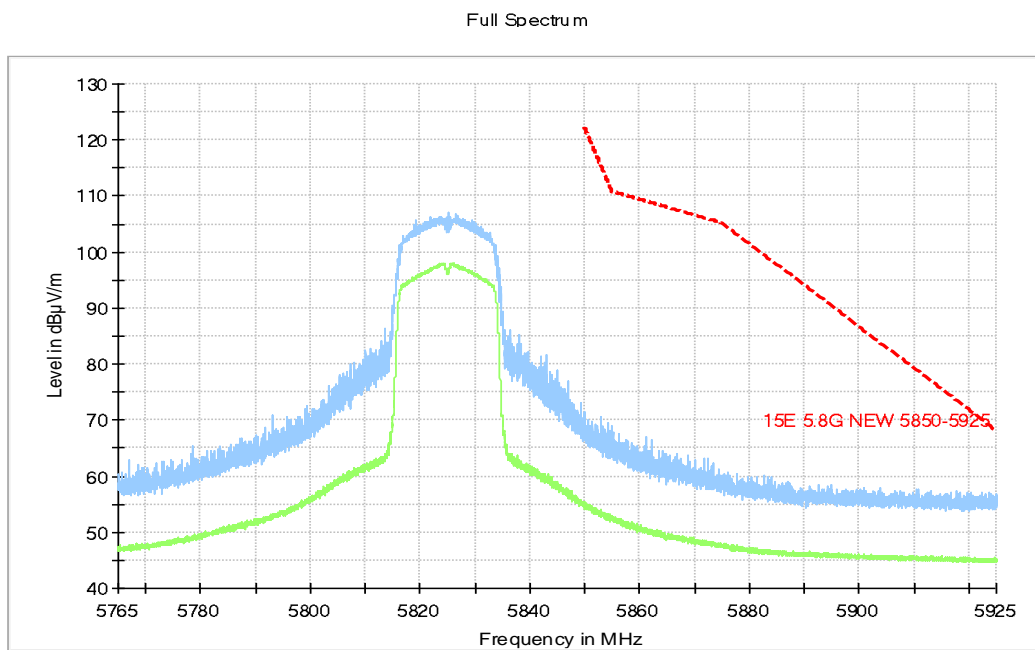


Fig. 18 Band Edges (802.11n-HT20, 5825MHz)

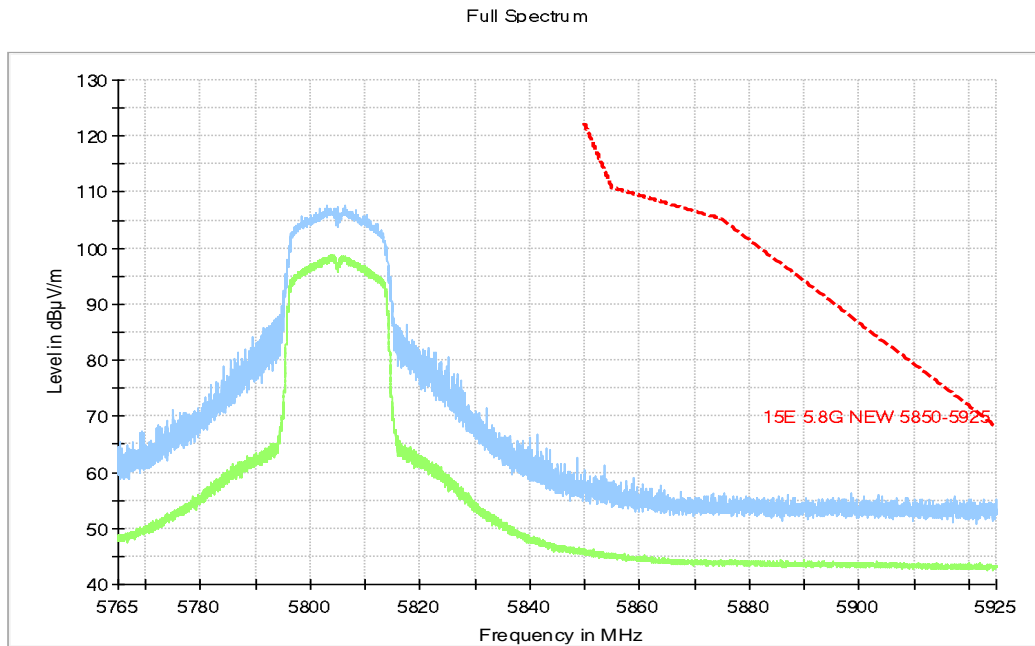


Fig. 19 Band Edges (802.11n-HT20, 5805MHz)

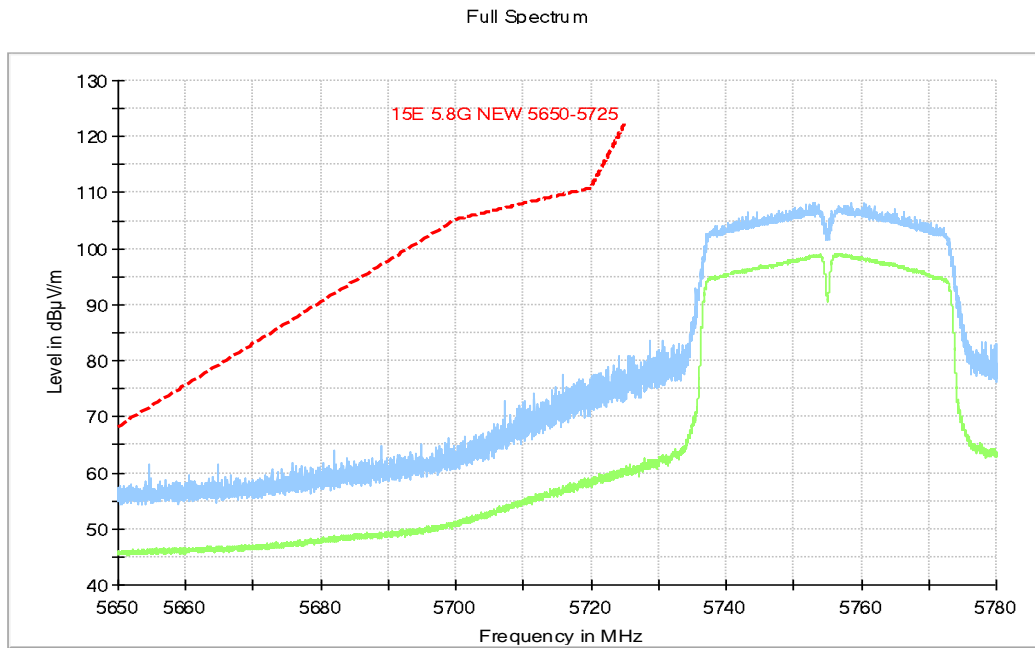


Fig. 20 Band Edges (802.11n-HT40, 5755MHz)

Full Spectrum

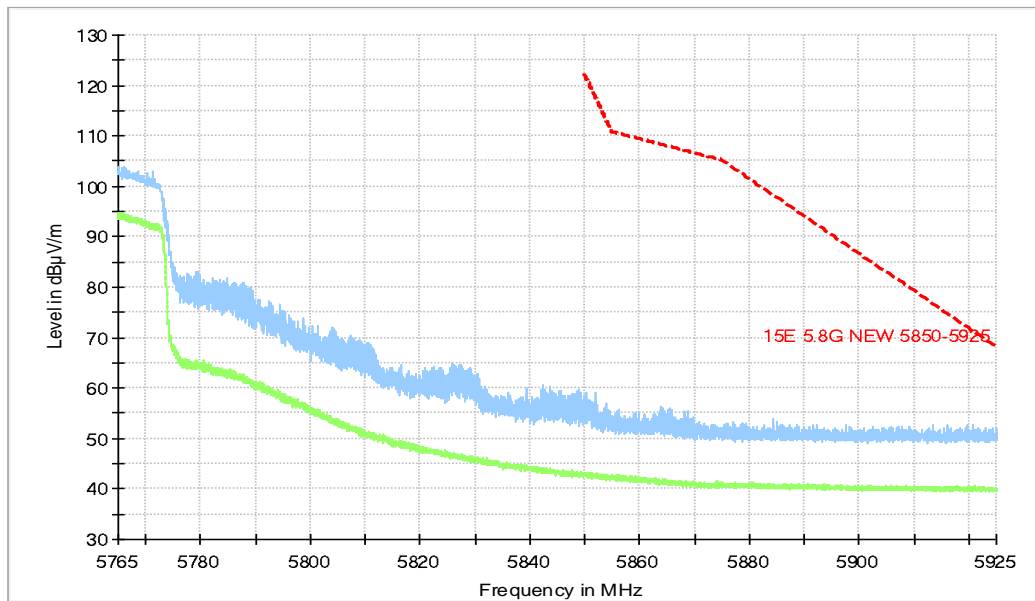


Fig. 21 Band Edges (802.11n-HT40, 5755MHz)

Full Spectrum

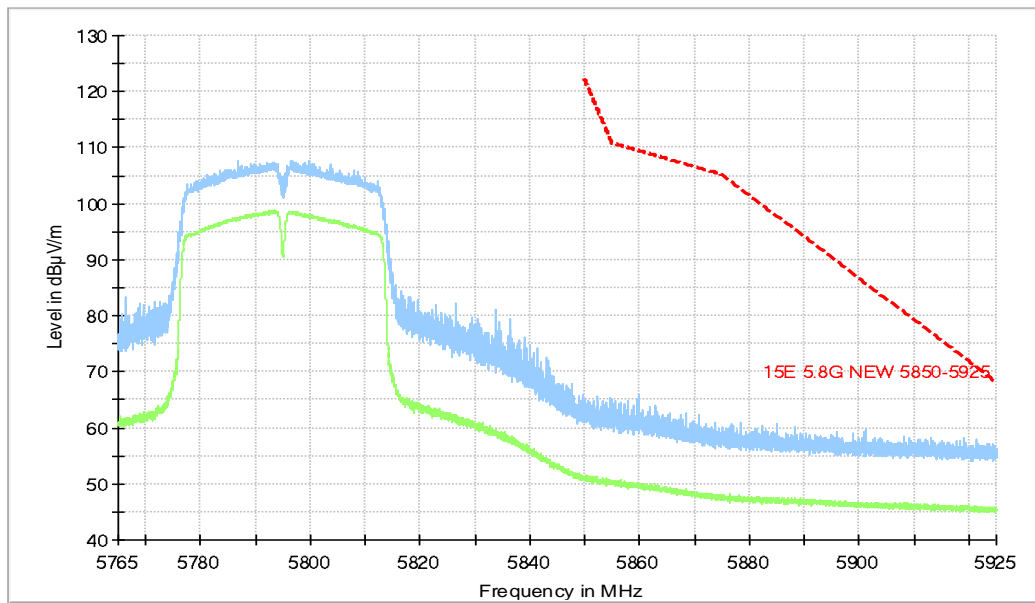


Fig. 22 Band Edges (802.11n-HT40, 5795MHz)

Full Spectrum

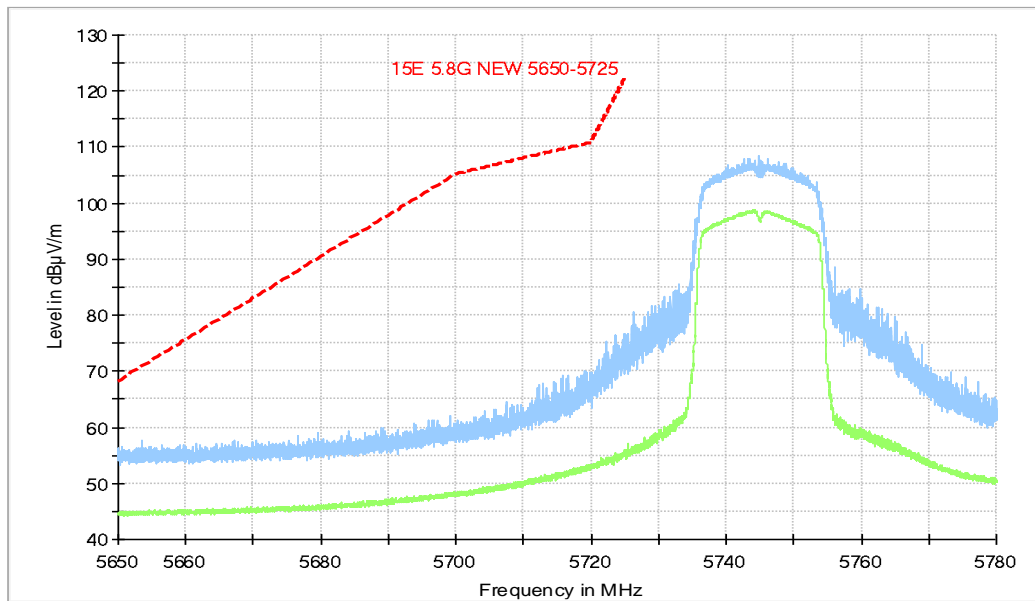


Fig. 23 Band Edges (802.11ac-HT20, 5745MHz)

Full Spectrum

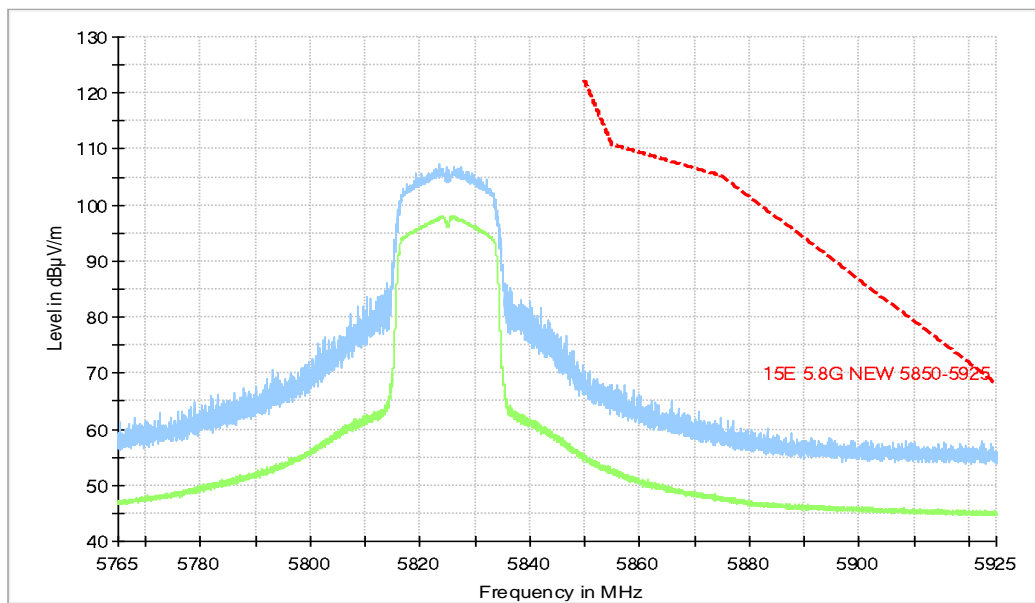


Fig. 24 Band Edges (802.11ac-HT20, 5825MHz)

Full Spectrum

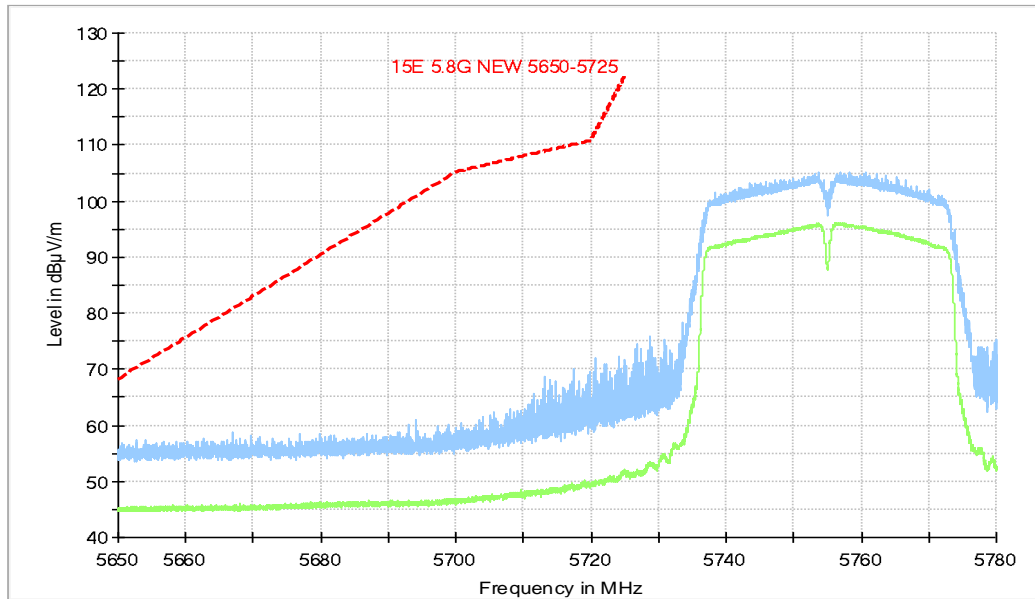


Fig. 25 Band Edges (802.11ac-HT40, 5755MHz)

Full Spectrum

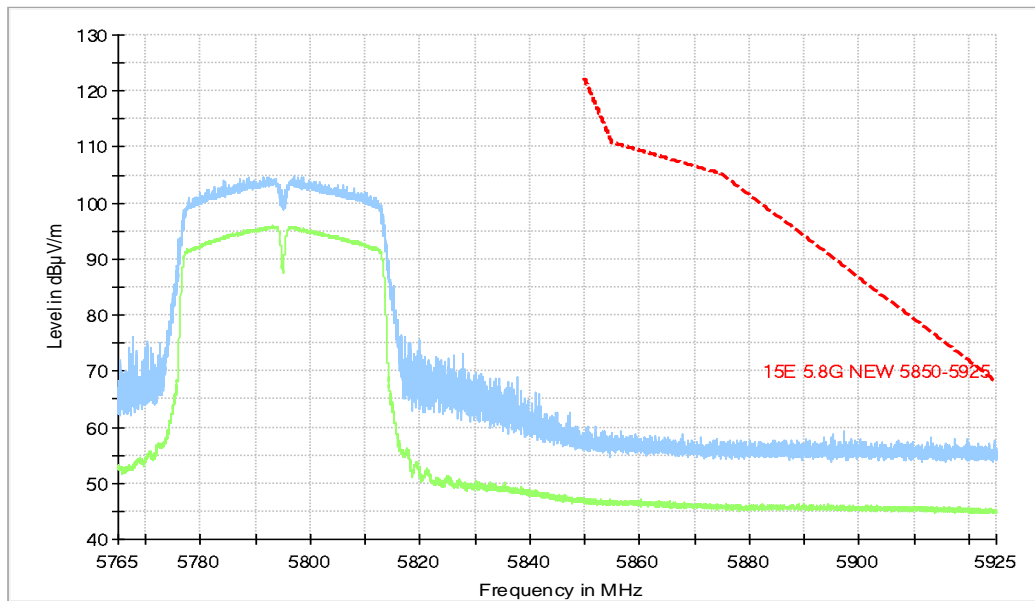


Fig. 26 Band Edges (802.11ac-HT40, 5795MHz)

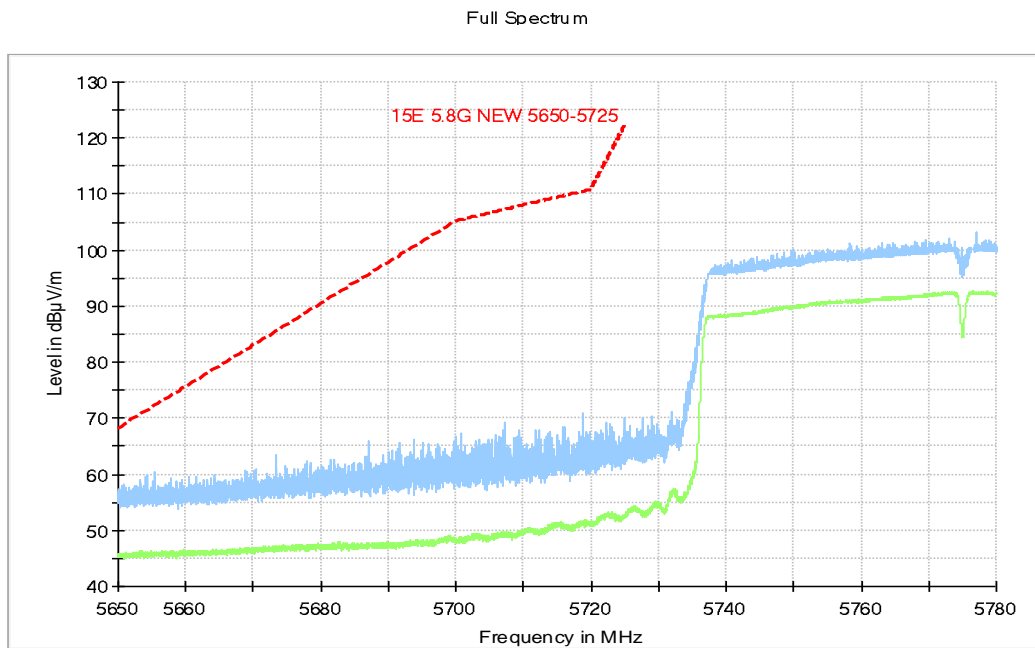


Fig. 27 Band Edges (802.11ac-HT80, 5775MHz)

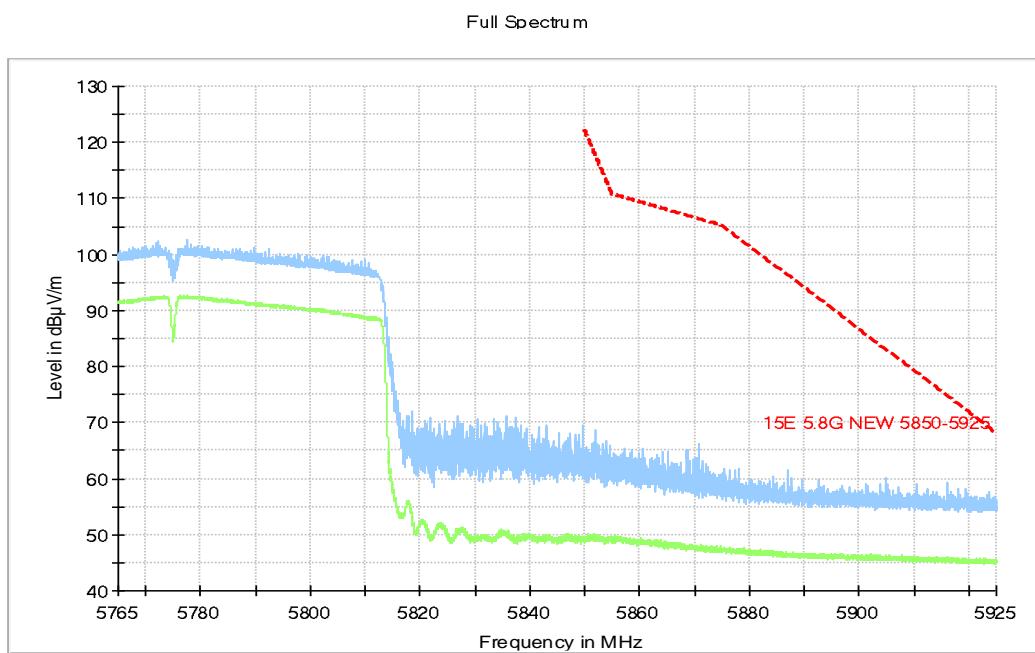


Fig. 28 Band Edges (802.11ac-HT80, 5775MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement uncertainty:

Expanded measurement uncertainty for this test item is $U = 3.10\text{dB}$, $k=2$.

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.29	Fig.30	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.29	Fig.30	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:

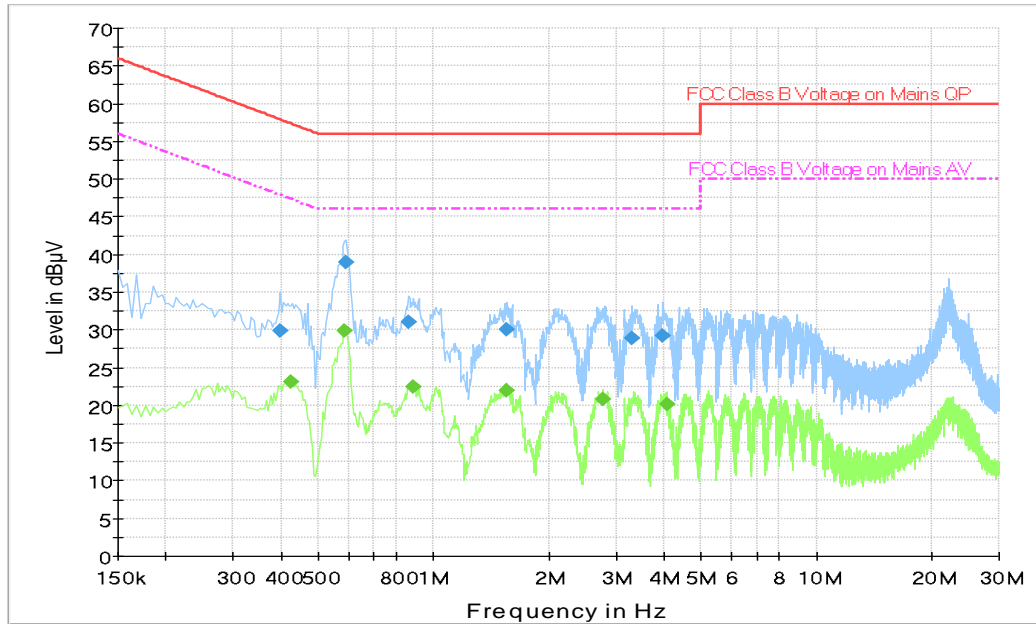


Fig. 29 AC Power line Conducted Emission-802.11a

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 (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.397500	29.9	1000.0	9.000	L1	20.1	28.0	57.9
0.591000	38.9	1000.0	9.000	L1	20.1	17.1	56.0
0.861000	31.0	1000.0	9.000	N	20.0	25.0	56.0
1.558500	30.1	1000.0	9.000	N	19.9	25.9	56.0
3.295500	28.8	1000.0	9.000	L1	20.4	27.2	56.0
3.979500	29.2	1000.0	9.000	N	20.3	26.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.424500	23.1	1000.0	9.000	L1	20.1	24.2	47.4
0.586500	29.9	1000.0	9.000	L1	20.1	16.1	46.0
0.888000	22.4	1000.0	9.000	N	20.0	23.6	46.0
1.558500	22.0	1000.0	9.000	N	19.9	24.0	46.0
2.769000	20.8	1000.0	9.000	L1	20.3	25.2	46.0
4.060500	20.2	1000.0	9.000	L1	20.6	25.8	46.0

Idle:

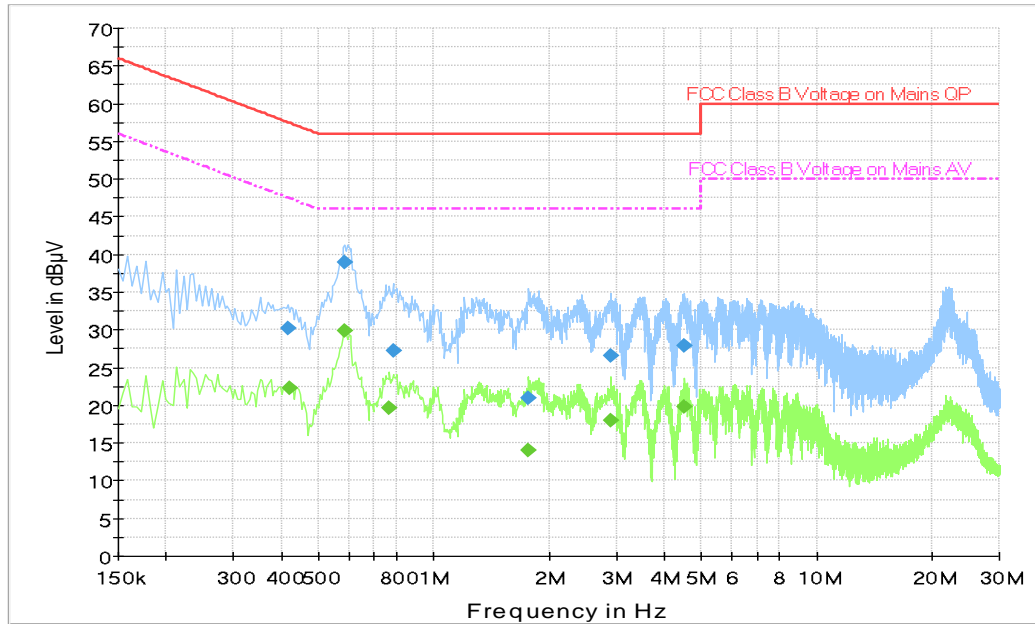


Fig. 30 AC Power line Conducted Emission-Idle

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 (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	30.2	1000.0	9.000	N	19.9	27.3	57.5
0.586500	39.0	1000.0	9.000	L1	20.1	17.0	56.0
0.784500	27.2	1000.0	9.000	L1	20.0	28.8	56.0
1.770000	20.9	1000.0	9.000	L1	20.0	35.1	56.0
2.895000	26.5	1000.0	9.000	L1	20.3	29.5	56.0
4.501500	27.9	1000.0	9.000	L1	20.7	28.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.420000	22.4	1000.0	9.000	N	19.9	25.1	47.4
0.586500	29.8	1000.0	9.000	N	20.0	16.2	46.0
0.766500	19.7	1000.0	9.000	L1	20.0	26.3	46.0
1.765500	14.1	1000.0	9.000	L1	20.0	31.9	46.0
2.904000	17.9	1000.0	9.000	L1	20.3	28.1	46.0
4.528500	19.8	1000.0	9.000	L1	20.7	26.2	46.0

ANNEX B: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p> 	
<hr/> Certificate of Accreditation to ISO/IEC 17025:2005 <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 17025:2005. 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>	
<hr/> 2019-09-26 through 2020-09-30 Effective Dates	
	 For the National Voluntary Laboratory Accreditation Program

*** END OF REPORT BODY ***