FCC PART 15C
TEST REPORT
No.I21Z70040-IOT07

for

Samsung Electronics Co., Ltd.

Tablet PC

SM-T220

With

FCC ID: ZCASMT220

Hardware Version: REV1.0

Software Version: T220.001

Issued Date: 2021-03-05

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z70040-IOT07	Rev.0	1st edition	2021-03-01
I21Z70040-IOT07	Rev.1	Add the information of attenuator on page 11.	2021-03-05

CONTENTS

1. TEST LATORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Testing Location: CTTL(huayuan North Road)

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

1.3. TestingEnvironment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2020-12-31

Testing End Date: 2021-03-01

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:	Samsung Electronics Co., Ltd.
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Contact:	Jenni Chun
Email:	j1.chun@samsung.com
Telephone:	+1-201-937-4203
Fax:	/

2.2. Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address:	Samsung R5, Maetan dong 129, Samsung ro Youngtong gu, Suwon city 443 742, Korea
Contact:	Sunghoon Cho
Email:	ggobi.cho@samsung.com
Telephone:	+82-10-2722-4159
Fax:	/

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

3.1. About EUT

Description	Tablet PC
Model name	SM-T220
FCC ID	ZCASMT220
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	4.0V
Antenna Gain	-1.1dBi

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT08a	2170040UT08a	REV1.0	T220.001
UT01a	2170040UT01a	REV1.0	T220.001

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Charger1	/	/
AE2	Charger2	/	/
AE3	Charger3	/	/
AE4	Charger4	/	/
AE5	Charger5	/	/
AE6	Charger6	/	/
AE7	USB cable	/	/
AE8	Headset1	/	/
AE9	Headset2	/	/
AE10	battery	/	/

AE1

Model	EP-TA50JWE
Manufacturer	RFTECH Co., Ltd.
Length of cable	/

AE2

Model	EP-TA50JWE
Manufacturer	HAEM Co., Ltd.
Length of cable	/

AE3

Model	EP-TA200
Manufacturer	DongYang E&P Inc.
Length of cable	/

AE4

Model	EP-TA200
Manufacturer	HAEM Co., Ltd.
Length of cable	/

AE5

Model	EP-TA200
Manufacturer	SoluM Co.,Ltd
Length of cable	/

AE6

Model	EP-TA200
Manufacturer	RFTECH Co., Ltd.
Length of cable	/

AE7

Model	EP-DT725BWE
Manufacturer	Samsung Electronics Co., Ltd.
Length of cable	/

AE8

Model	EHS61ASFWE
Manufacturer	ALMUS
Length of cable	/

AE9

Model	EHS61ASFWE
Manufacturer	Cresyn
Length of cable	/

AE10

Type	Secondary Li-ion Battery
SN	HQ-3565S
Manufacturer	SCUD (Fujian) Electronics CO.,LTD

*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)	/	**BR**
Peak Power Spectral Density	15.407 (a)	/	**BR**
Occupied 6dB Bandwidth	15.407 (e)	/	**BR**
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
BR	Re-use test data from basic model report.
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

The Equipment Under Test (EUT) model SM-T220 (FCC ID: ZCASMT220) is a variant product of SM-T225 (FCC ID: ZCASMT225), according to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01, spot check measurements were performed on this device, all the test results are derived from test report No.I20Z60378-IOT05, except the result of radiated.

For detail differences between two models please refer the Declaration of Changes document.

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26℃
Voltage	4.0V
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	R&S	1 year	2021-05-19
3	Test Receiver	ESCI3	100344	R&S	1 year	2022-02-23
4	Shielding Room	S81	/	ETS-Lindgren	/	/
5	Attenuator	10dB	/	Rosenberger	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100235	Rohde & Schwarz	1 year	2021-03-03
2	BiLog Antenna	VULB9163	9163-1223	Schwarzbeck	1 year	2021-03-18
3	Antenna	3115	00167250	ETS-Lindgren	1 year	2021-05-14
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	1 year	2021-08-05

8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Spurious Emissions

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.16
1GHz ≤ f ≤18GHz	5.44
18GHz ≤ f ≤40GHz	5.28

8.6. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2

ANNEX A: EUT parameters

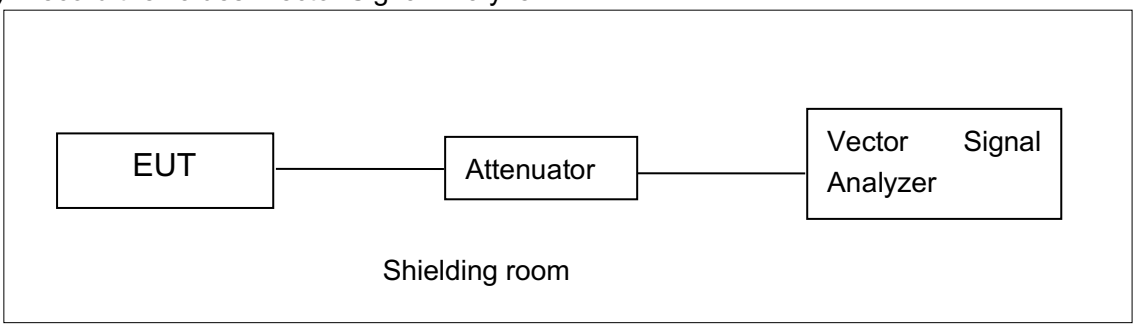
Disclaimer: the antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX B: MEASUREMENT RESULTS

B.1. Measurement Method

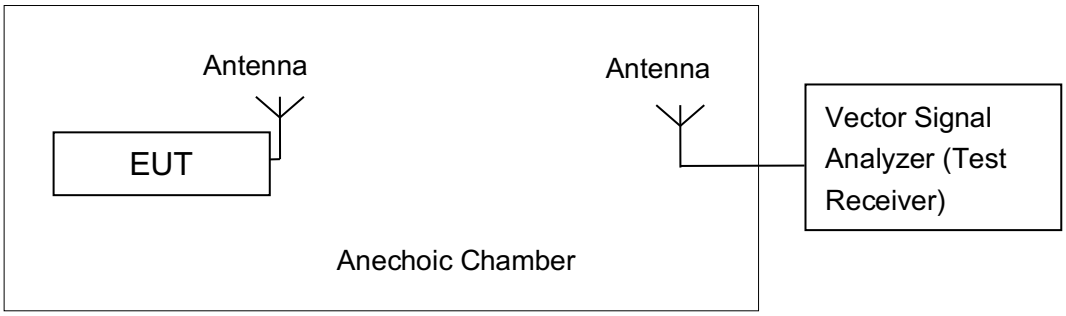
B.1.1. Conducted Measurements

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



B.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.

B.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30

B.2.1 Antenna Gain

Antenna gain is -1.1dBi and the value is supplied by the applicant or manufacturer.

B.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	14.37	14.57	14.23

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 (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n-HT20	MCS0	13.70	13.88	13.79

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 (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac-HT20	MCS0	13.95	14.53	14.20

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	14.01	14.22

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	14.00	14.38

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	13.86

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%.

The spot check result of average output power is 14.27dBm (802.11a 6Mbps ch157)

Conclusion: PASS

B.3. Peak Power Spectral Density

Measurement Limit:

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

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

Measurement Uncertainty:

Measurement Uncertainty	0.75dB

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	0.84	P
	157	0.74	P
	165	0.31	P
802.11ac HT20	149	0.33	P
	157	0.19	P
	165	0.49	P
802.11ac HT40	151	-2.60	P
	159	-2.42	P
802.11ac HT80	155	-5.77	P

Conclusion: PASS

B.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	16.30	P
	157	Fig.2	16.30	P
	165	Fig.3	16.35	P
802.11ac HT20	149	Fig.4	17.60	P
	157	Fig.5	17.55	P
	165	Fig.6	17.55	P
802.11ac HT40	151	Fig.7	36.32	P
	159	Fig.8	36.08	P
802.11ac HT80	155	Fig.9	76.48	P

Conclusion: PASS

Test graphs as below:

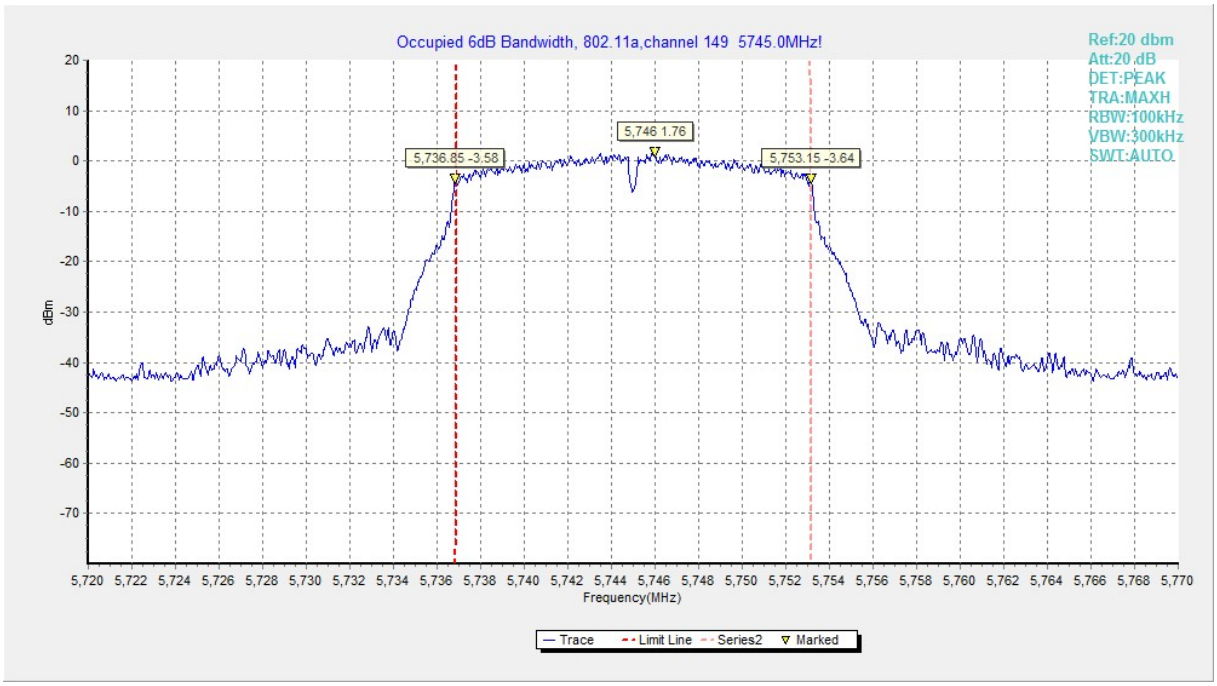


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

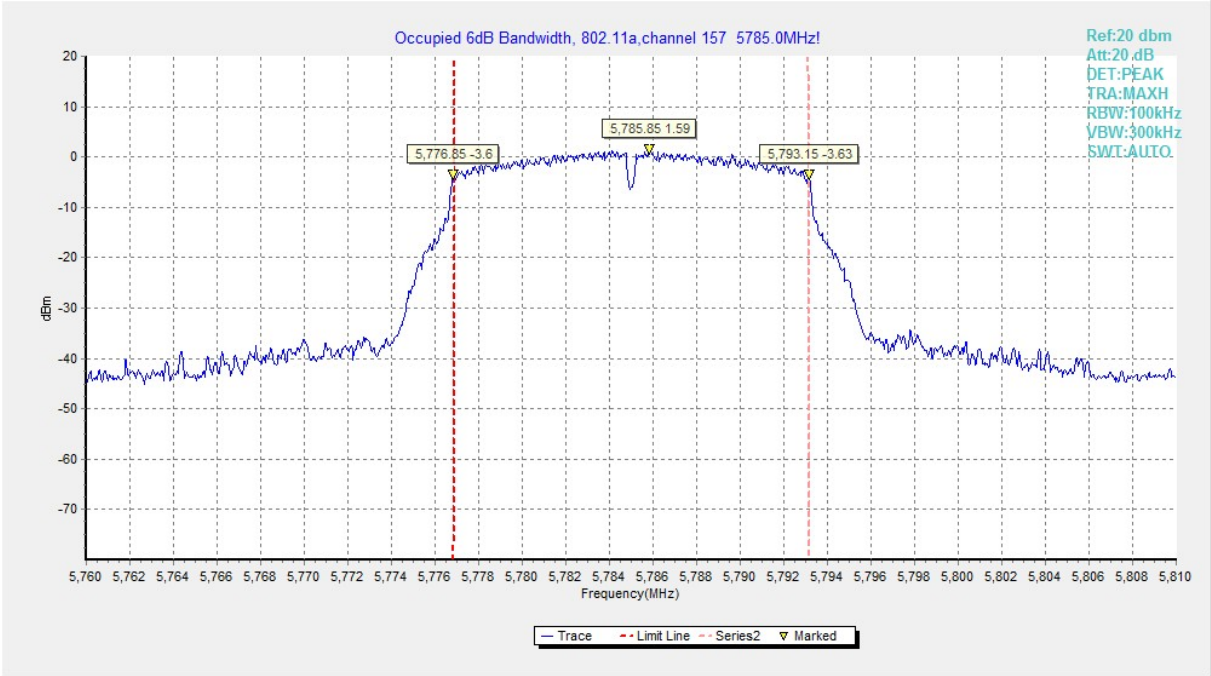


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

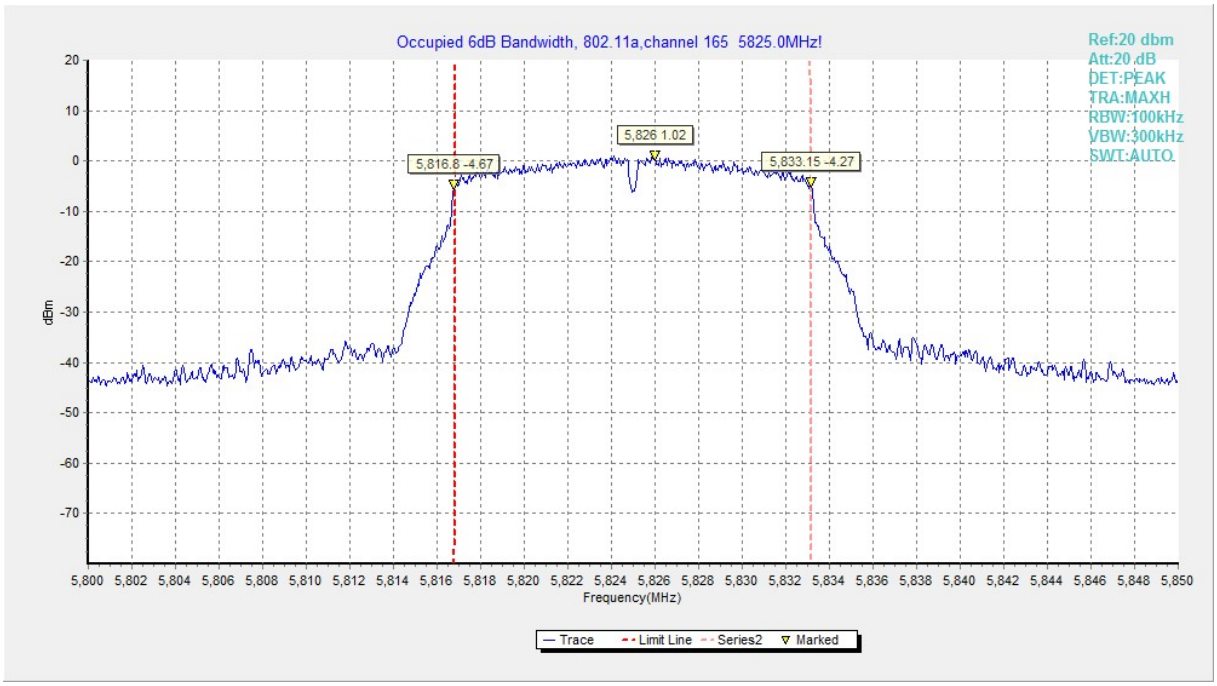


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

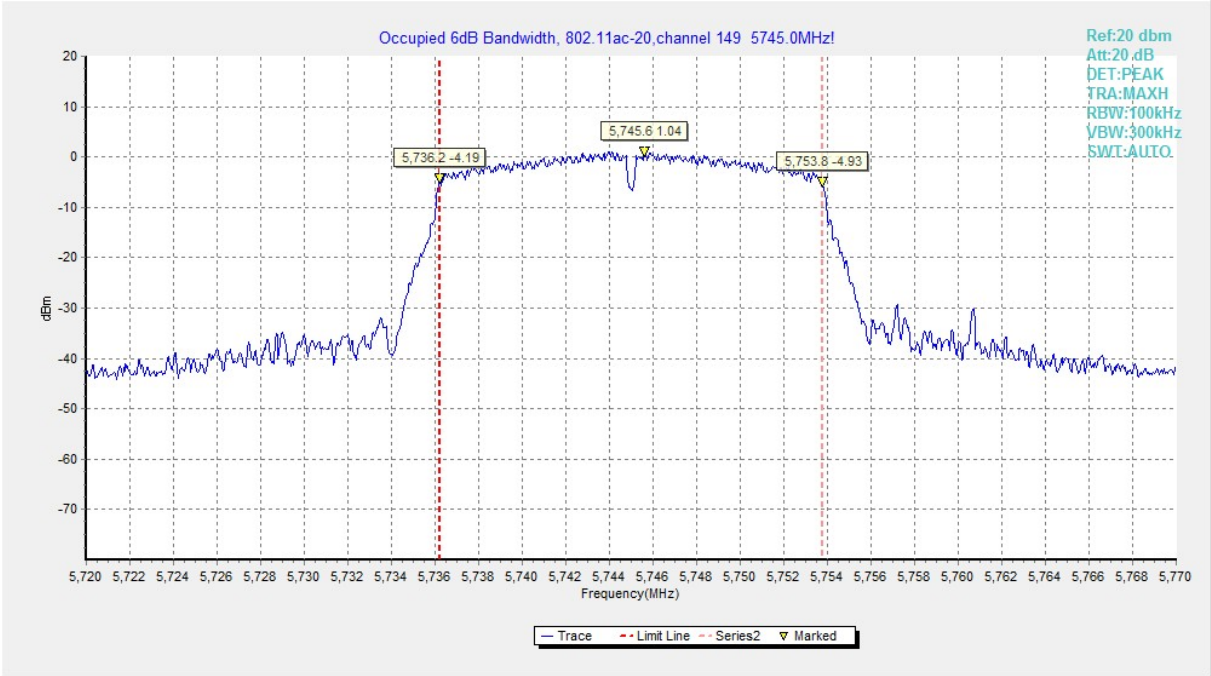


Fig. 4 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)

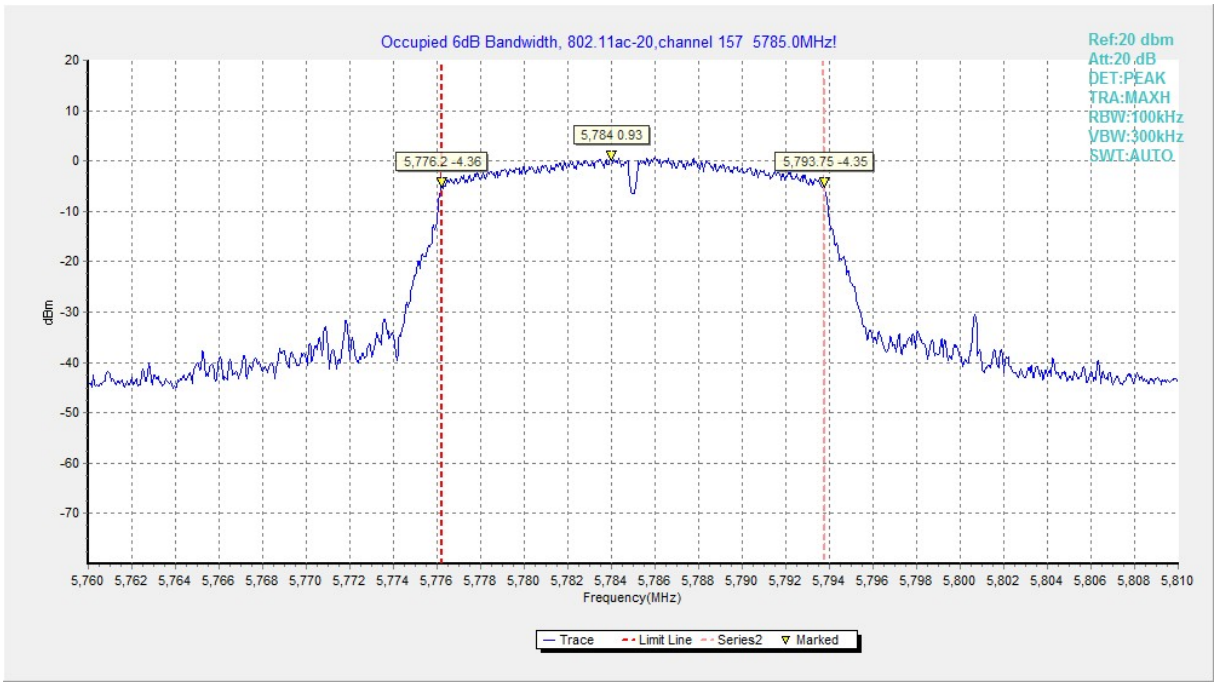


Fig. 5 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)

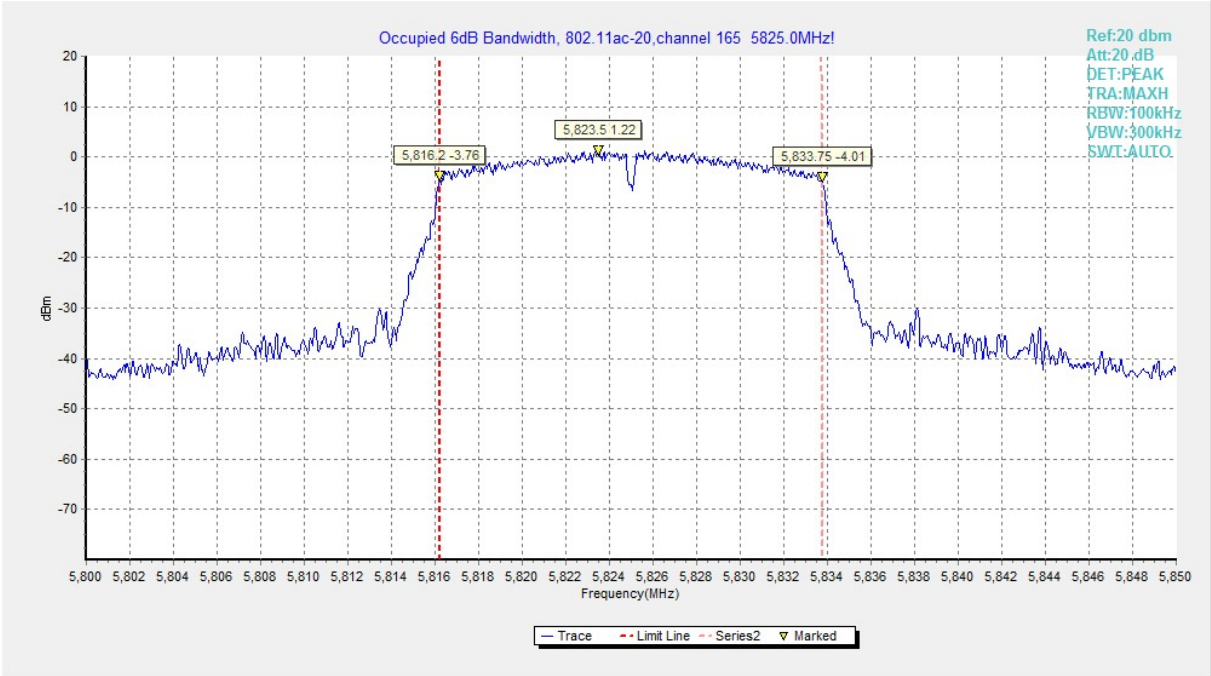


Fig. 6 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)

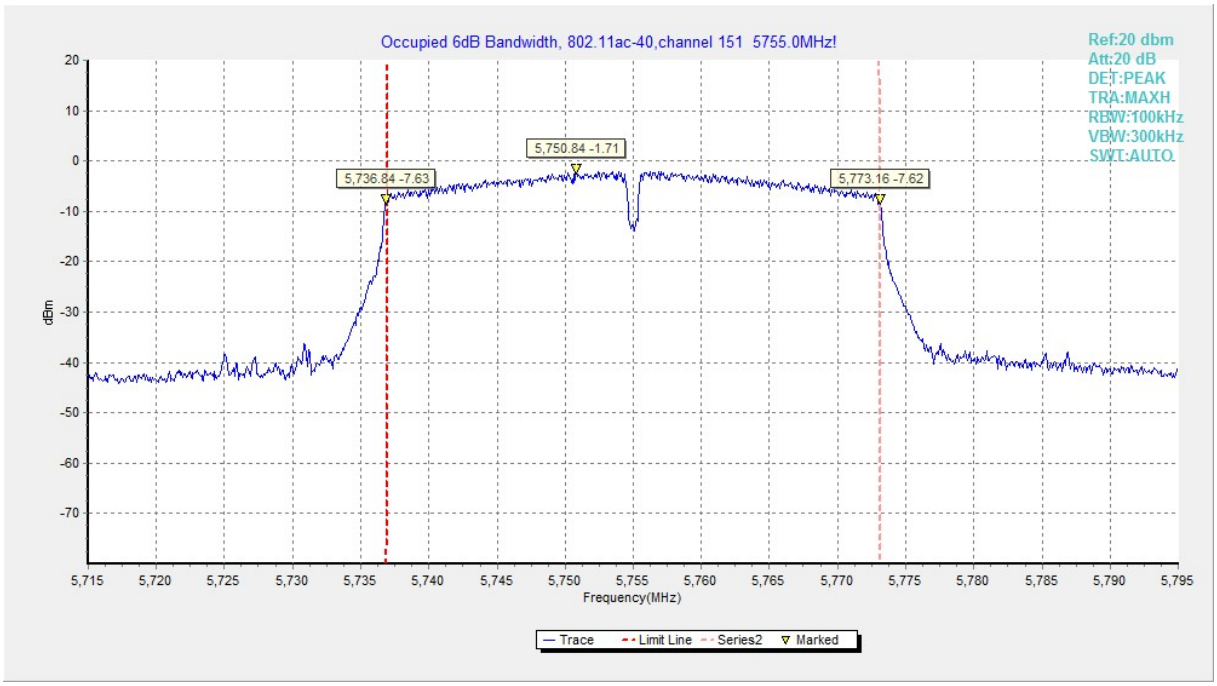


Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)

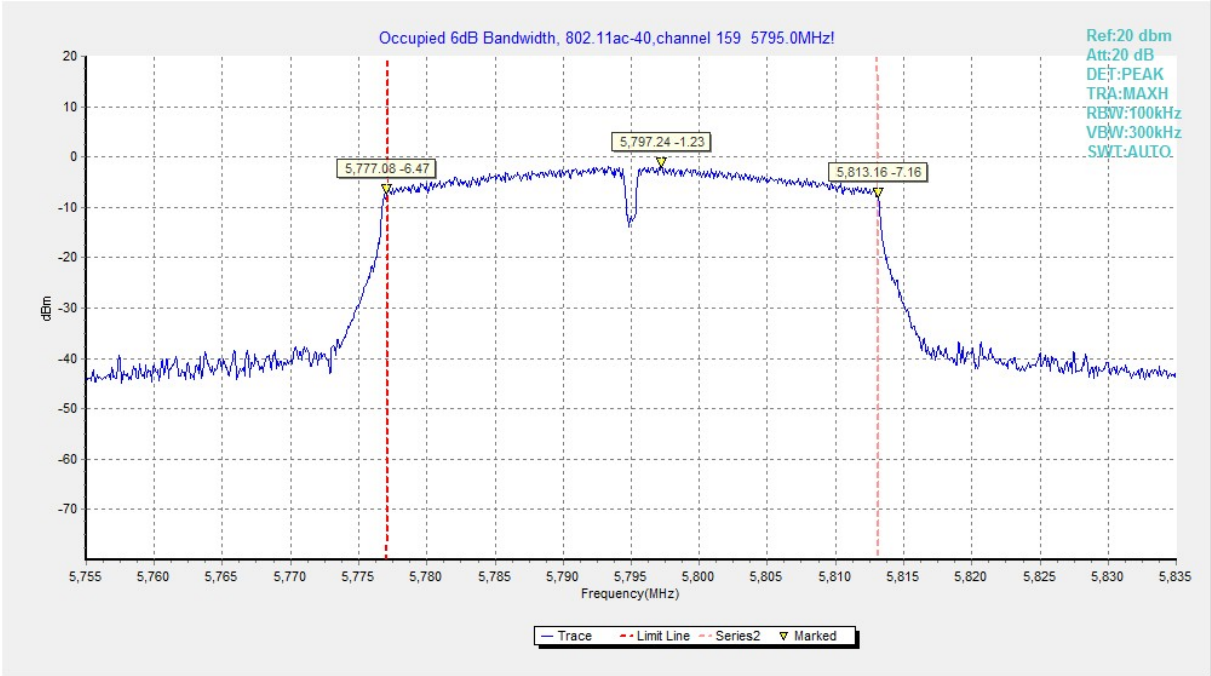


Fig. 8 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 159)

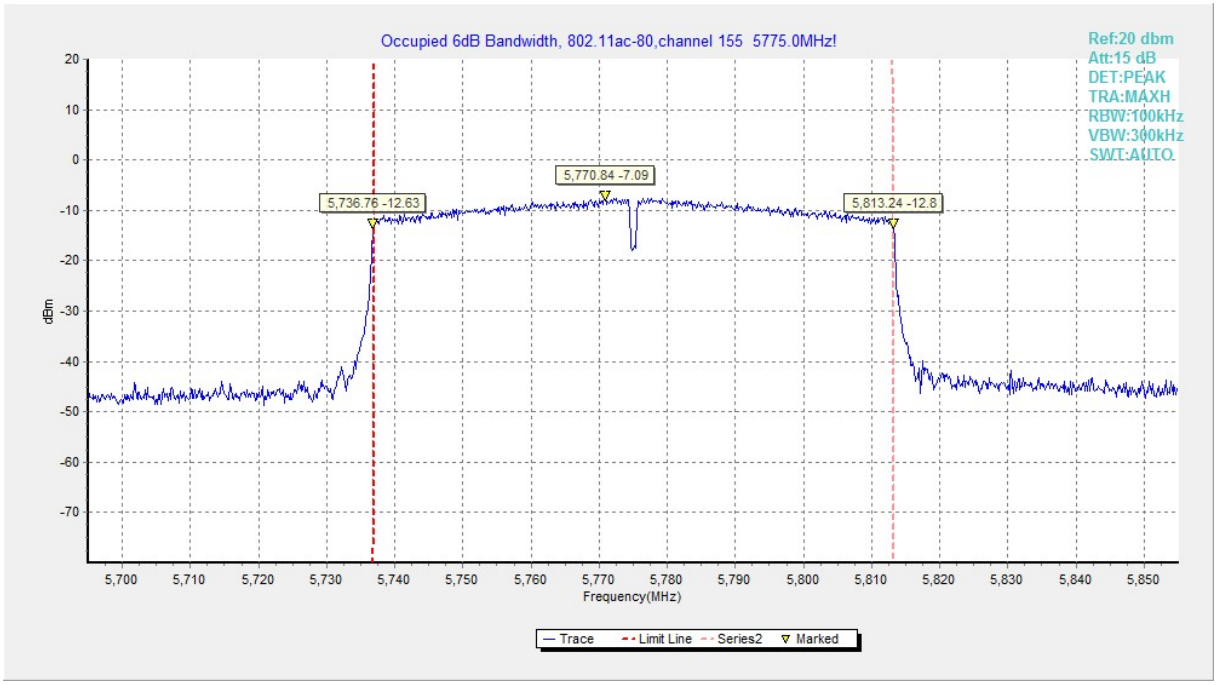


Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

B.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

B.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

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17985.7	41.8	-25.5	46.7	20.6	54	12.2	V
17984	41.6	-25.5	46.7	20.4	54	12.4	H
17965.3	41.5	-25.5	46.7	20.3	54	12.5	V
17973.6	41.5	-25.5	46.7	20.3	54	12.5	H
17978	41.5	-25.5	46.7	20.3	54	12.5	V
17978.5	41.5	-25.5	46.7	20.3	54	12.5	V

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17982.4	41.7	-25.5	46.7	20.5	54	12.3	V
17972.5	41.6	-25.5	46.7	20.4	54	12.4	V
17983.5	41.6	-25.5	46.7	20.4	54	12.4	V
17962	41.5	-25.5	46.7	20.3	54	12.5	V
17974.7	41.5	-25.5	46.7	20.3	54	12.5	V
17977.5	41.5	-25.5	46.7	20.3	54	12.5	H

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17987.3	41.7	-25.5	46.7	20.5	54	12.3	H
17880.7	41.6	-25.5	46.7	20.4	54	12.4	H
17976.9	41.6	-25.5	46.7	20.4	54	12.4	V
17992.3	41.6	-25.5	46.7	20.4	54	12.4	H
17994.5	41.6	-25.5	46.7	20.4	54	12.4	H
17972	41.5	-25.5	46.7	20.3	54	12.5	V

802.11n-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17981.3	42.2	-25.5	46.7	21	54	11.8	V
17994	42	-25.5	46.7	20.8	54	12	V
17996.7	42	-25.5	46.7	20.8	54	12	H
17968.1	41.9	-25.5	46.7	20.7	54	12.1	H
17985.2	41.9	-25.5	46.7	20.7	54	12.1	H
17990.7	41.9	-25.5	46.7	20.7	54	12.1	H

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17994.5	42.1	-25.5	46.7	20.9	54	11.9	H
17982.4	42	-25.5	46.7	20.8	54	12	V
17985.7	42	-25.5	46.7	20.8	54	12	V
17987.9	42	-25.5	46.7	20.8	54	12	V
17997.8	42	-25.5	46.7	20.8	54	12	H
17987.3	41.8	-25.5	46.7	20.6	54	12.2	V

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17955.5	41.7	-25.5	46.7	20.5	54	12.3	V
17984.6	41.7	-25.5	46.7	20.5	54	12.3	V
17985.2	41.7	-25.5	46.7	20.5	54	12.3	V
17996.7	41.7	-25.5	46.7	20.5	54	12.3	H
17968.7	41.6	-25.5	46.7	20.4	54	12.4	H
17986.8	41.6	-25.5	46.7	20.4	54	12.4	V

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17961.5	41.7	-25.5	46.7	20.5	54	12.3	H
17966.5	41.6	-25.5	46.7	20.4	54	12.4	V
17990.7	41.6	-25.5	46.7	20.4	54	12.4	V
17973	41.5	-25.5	46.7	20.3	54	12.5	V
17980.8	41.5	-25.5	46.7	20.3	54	12.5	V
17993.4	41.5	-25.5	46.7	20.3	54	12.5	V

Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17985.2	41.7	-25.5	46.7	20.5	54	12.3	V
17992.8	41.5	-25.5	46.7	20.3	54	12.5	V
17995.6	41.5	-25.5	46.7	20.3	54	12.5	V
17998.9	41.5	-25.5	46.7	20.3	54	12.5	V
17979.1	41.4	-25.5	46.7	20.2	54	12.6	V
17980.8	41.4	-25.5	46.7	20.2	54	12.6	H

802.11ac-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17998.3	41.8	-25.5	46.7	20.6	54	12.2	V
17975.8	41.6	-25.5	46.7	20.4	54	12.4	H
17963.7	41.5	-25.5	46.7	20.3	54	12.5	H
17950	41.4	-25.5	46.7	20.2	54	12.6	V
17975.2	41.4	-25.5	46.7	20.2	54	12.6	H
17976.9	41.4	-25.5	46.7	20.2	54	12.6	H

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17979.1	41.9	-25.5	46.7	20.7	54	12.1	H
17989.5	41.6	-25.5	46.7	20.4	54	12.4	H
17990.1	41.6	-25.5	46.7	20.4	54	12.4	H
17985.7	41.5	-25.5	46.7	20.3	54	12.5	H
17973.6	41.4	-25.5	46.7	20.2	54	12.6	V
17981.3	41.4	-25.5	46.7	20.2	54	12.6	H

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17994.5	41.9	-25.5	46.7	20.7	54	12.1	V
17987.3	41.8	-25.5	46.7	20.6	54	12.2	V
17975.8	41.7	-25.5	46.7	20.5	54	12.3	H
17981.3	41.7	-25.5	46.7	20.5	54	12.3	V
17983.5	41.7	-25.5	46.7	20.5	54	12.3	H
17991.2	41.7	-25.5	46.7	20.5	54	12.3	H

802.11ac-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17983	41.9	-25.5	46.7	20.7	54	12.1	H
17972.5	41.8	-25.5	46.7	20.6	54	12.2	V
17982.4	41.8	-25.5	46.7	20.6	54	12.2	V
17991.2	41.8	-25.5	46.7	20.6	54	12.2	V
17990.1	41.7	-25.5	46.7	20.5	54	12.3	H
17991.8	41.7	-25.5	46.7	20.5	54	12.3	V

Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17982.4	41.9	-25.5	46.7	20.7	54	12.1	V
17991.8	41.9	-25.5	46.7	20.7	54	12.1	H
17971.4	41.8	-25.5	46.7	20.6	54	12.2	V
17998.9	41.8	-25.5	46.7	20.6	54	12.2	H
17962.6	41.7	-25.5	46.7	20.5	54	12.3	H
17969.8	41.7	-25.5	46.7	20.5	54	12.3	V

802.11ac-HT80

Ch155

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17968.7	41.6	-25.5	46.7	20.4	54	12.4	H
17977.5	41.6	-25.5	46.7	20.4	54	12.4	H
17893.8	41.5	-25.5	46.7	20.3	54	12.5	V
17991.8	41.5	-25.5	46.7	20.3	54	12.5	H
17998.3	41.5	-25.5	46.7	20.3	54	12.5	H
17879.5	41.4	-25.5	46.7	20.2	54	12.6	H

Peak Results：

802.11a

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17984	53.5	-25.5	46.7	32.3	74	20.5	H
17962	53.3	-25.5	46.7	32.1	74	20.7	V
17905.4	53	-25.5	46.7	31.8	74	21	H
17971.4	52.8	-25.5	46.7	31.6	74	21.2	H
17906	52.7	-25.5	46.7	31.5	74	21.3	V
17871.8	52.6	-25.5	46.7	31.4	74	21.4	H

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17897.2	53.2	-25.5	46.7	32	74	20.8	H
17970.3	53.1	-25.5	46.7	31.9	74	20.9	H
17989.5	53.1	-25.5	46.7	31.9	74	20.9	H
17897.7	52.9	-25.5	46.7	31.7	74	21.1	V
17998.9	52.8	-25.5	46.7	31.6	74	21.2	V
17901	52.7	-25.5	46.7	31.5	74	21.3	H

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17992.3	53.2	-25.5	46.7	32	74	20.8	H
17965.9	53.1	-25.5	46.7	31.9	74	20.9	V
17994	53	-25.5	46.7	31.8	74	21	H
17978.5	52.9	-25.5	46.7	31.7	74	21.1	H
17992.8	52.9	-25.5	46.7	31.7	74	21.1	H
17968.7	52.5	-25.5	46.7	31.3	74	21.5	V

802.11n-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17983.5	54.1	-25.5	46.7	32.9	74	19.9	H
17902.1	53.7	-25.5	46.7	32.5	74	20.3	V
17954.9	53.6	-25.5	46.7	32.4	74	20.4	H
17995	53.5	-25.5	46.7	32.3	74	20.5	H
17637.5	53.2	-25.7	46	33	74	20.8	V
17989	53.2	-25.5	46.7	32	74	20.8	V

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17981.3	53	-25.5	46.7	31.8	74	21	V
17962	52.9	-25.5	46.7	31.7	74	21.1	H
17978	52.8	-25.5	46.7	31.6	74	21.2	V
17995.6	52.8	-25.5	46.7	31.6	74	21.2	H
17943.9	52.7	-25.5	46.7	31.5	74	21.3	H
17982.4	52.7	-25.5	46.7	31.5	74	21.3	V

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17886.7	53.2	-25.5	46.7	32	74	20.8	H
17980.2	53.2	-25.5	46.7	32	74	20.8	V
17994.5	53.1	-25.5	46.7	31.9	74	20.9	H
17995.6	53.1	-25.5	46.7	31.9	74	20.9	H
17961.5	53	-25.5	46.7	31.8	74	21	V
17998.3	53	-25.5	46.7	31.8	74	21	H

802.11n-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17610.6	53	-25.7	46	32.8	74	21	H
17983	52.6	-25.5	46.7	31.4	74	21.4	H
17981.3	52.5	-25.5	46.7	31.3	74	21.5	V
17993.4	52.5	-25.5	46.7	31.3	74	21.5	V
17875.2	52.4	-25.5	46.7	31.2	74	21.6	H
17959.8	52.4	-25.5	46.7	31.2	74	21.6	H

Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17989.5	53.2	-25.5	46.7	32	74	20.8	V
17956	53	-25.5	46.7	31.8	74	21	H
17849.8	52.5	-25.5	46.7	31.3	74	21.5	V
17946.1	52.5	-25.5	46.7	31.3	74	21.5	V
17954.3	52.5	-25.5	46.7	31.3	74	21.5	V
17914.2	52.4	-25.5	46.7	31.2	74	21.6	V

802.11ac-HT20

Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17907	53.8	-25.5	46.7	32.6	74	20.2	H
17994.5	53.4	-25.5	46.7	32.2	74	20.6	V
17966.5	53.3	-25.5	46.7	32.1	74	20.7	V
17854.2	53.2	-25.5	46.7	32	74	20.8	H
17928.5	53	-25.5	46.7	31.8	74	21	H
17884	52.8	-25.5	46.7	31.6	74	21.2	V

Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17868	53.3	-25.5	46.7	32.1	74	20.7	V
17979.7	53	-25.5	46.7	31.8	74	21	H
17968.7	52.8	-25.5	46.7	31.6	74	21.2	H
17981.3	52.6	-25.5	46.7	31.4	74	21.4	H
17502.2	52.5	-26.9	45.2	34.1	74	21.5	H
17989	52.5	-25.5	46.7	31.3	74	21.5	V

Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.8	53.3	-25.5	46.7	32.1	74	20.7	V
17943.9	53.2	-25.5	46.7	32	74	20.8	H
17939	53	-25.5	46.7	31.8	74	21	V
17972.5	52.8	-25.5	46.7	31.6	74	21.2	H
17772.3	52.7	-25.5	46.7	31.5	74	21.3	V
17877.3	52.7	-25.5	46.7	31.5	74	21.3	V

802.11ac-HT40

Ch151

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17983	53.2	-25.5	46.7	32	74	20.8	H
17682.7	52.8	-25.7	46	32.6	74	21.2	H
17970.8	52.8	-25.5	46.7	31.6	74	21.2	V
17973.6	52.8	-25.5	46.7	31.6	74	21.2	H
17902.7	52.7	-25.5	46.7	31.5	74	21.3	V
17970.3	52.7	-25.5	46.7	31.5	74	21.3	H

Ch159

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17997.2	53.7	-25.5	46.7	32.5	74	20.3	H
17950	53.5	-25.5	46.7	32.3	74	20.5	V
17500.6	52.9	-26.9	45.2	34.5	74	21.1	V
17973.6	52.9	-25.5	46.7	31.7	74	21.1	H
17997.8	52.8	-25.5	46.7	31.6	74	21.2	H
17969.8	52.7	-25.5	46.7	31.5	74	21.3	V

802.11ac-HT80

Ch155

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
17913.7	53	-25.5	46.7	31.8	74	21	V
17980.8	52.9	-25.5	46.7	31.7	74	21.1	H
17989	52.9	-25.5	46.7	31.7	74	21.1	V
17986.8	52.8	-25.5	46.7	31.6	74	21.2	H
17799.2	52.7	-25.5	46.7	31.5	74	21.3	H
17940.6	52.6	-25.5	46.7	31.4	74	21.4	H

B.6. Band Edges Compliance

B.6.1 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:

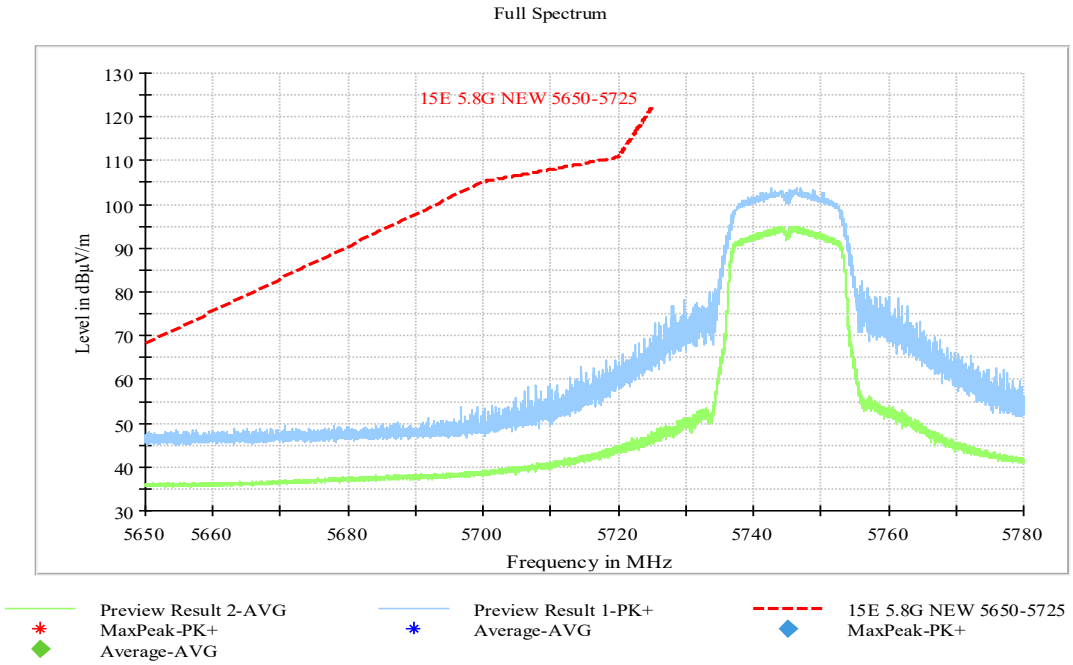


Fig. 10 Band Edges (802.11a, 5745MHz)

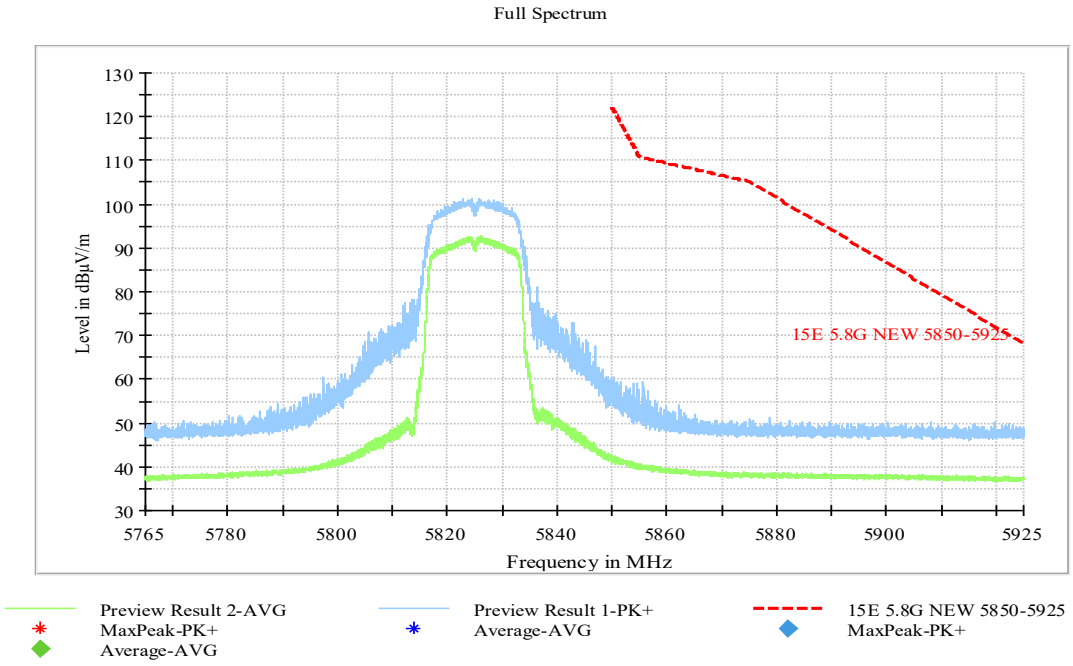


Fig. 11 Band Edges (802.11a, 5825MHz)

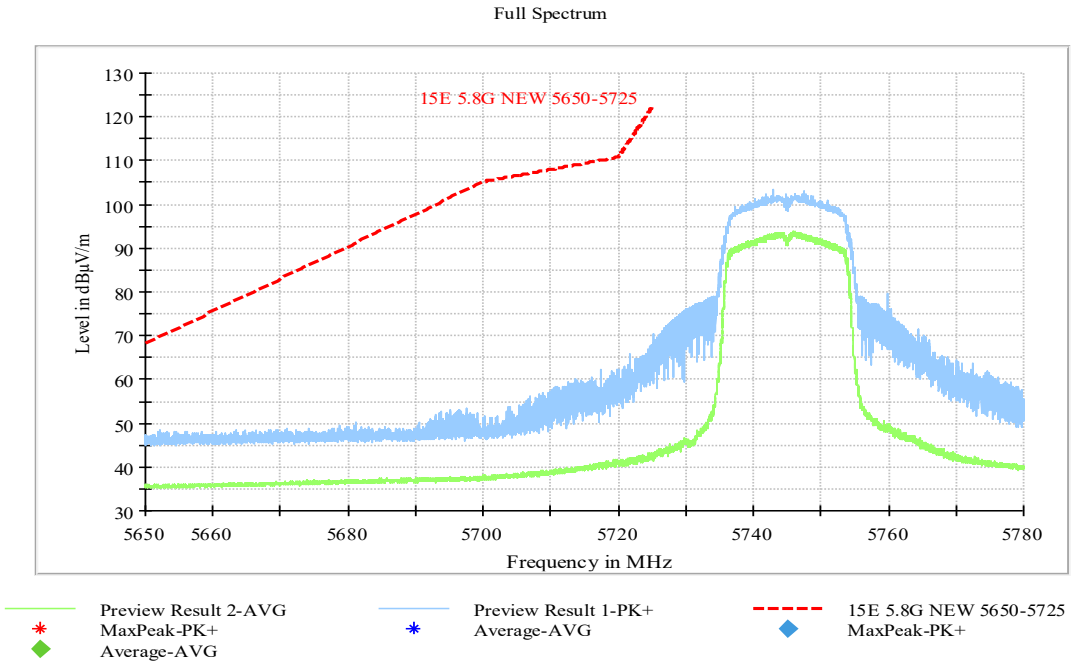


Fig. 12 Band Edges (802.11n-HT20, 5745MHz)

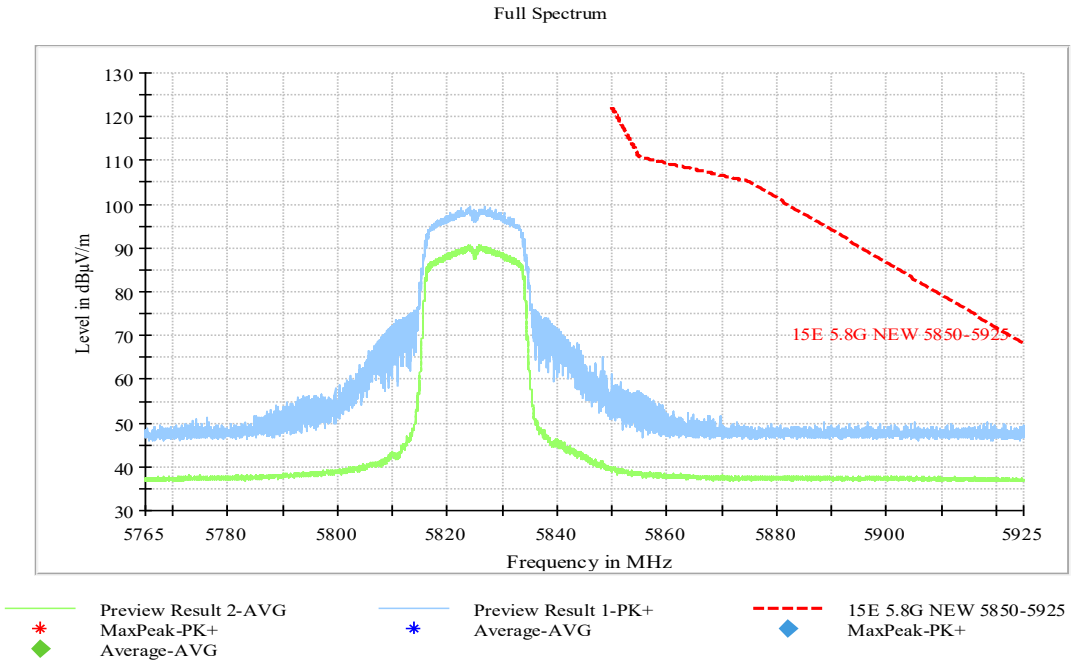


Fig. 13 Band Edges (802.11n-HT20, 5825MHz)

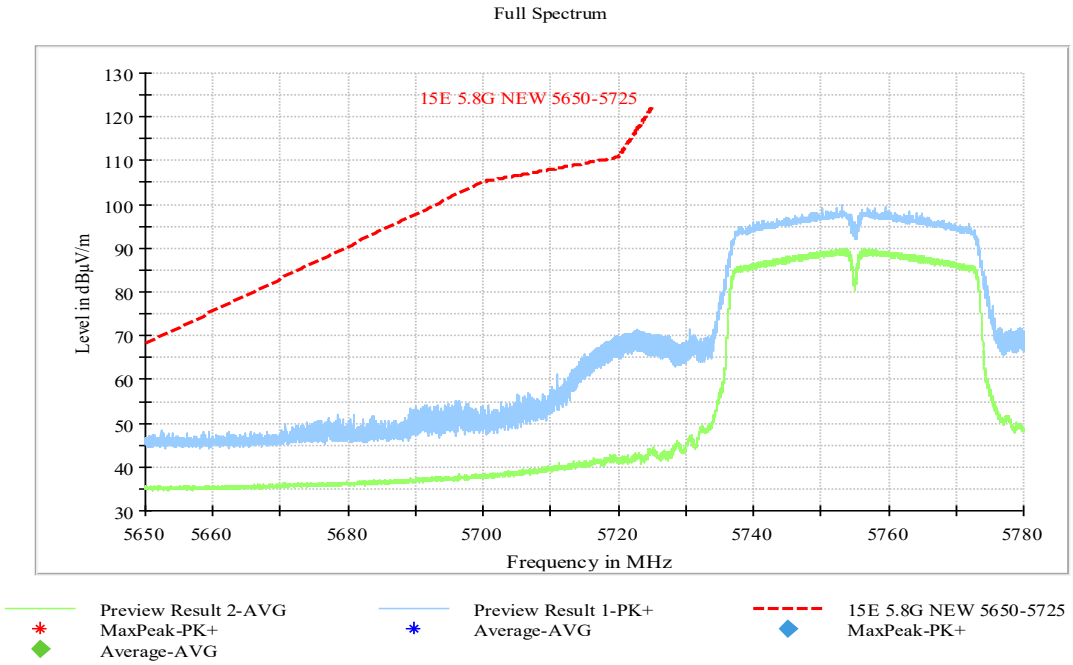


Fig. 14 Band Edges (802.11n-HT40, 5755MHz)

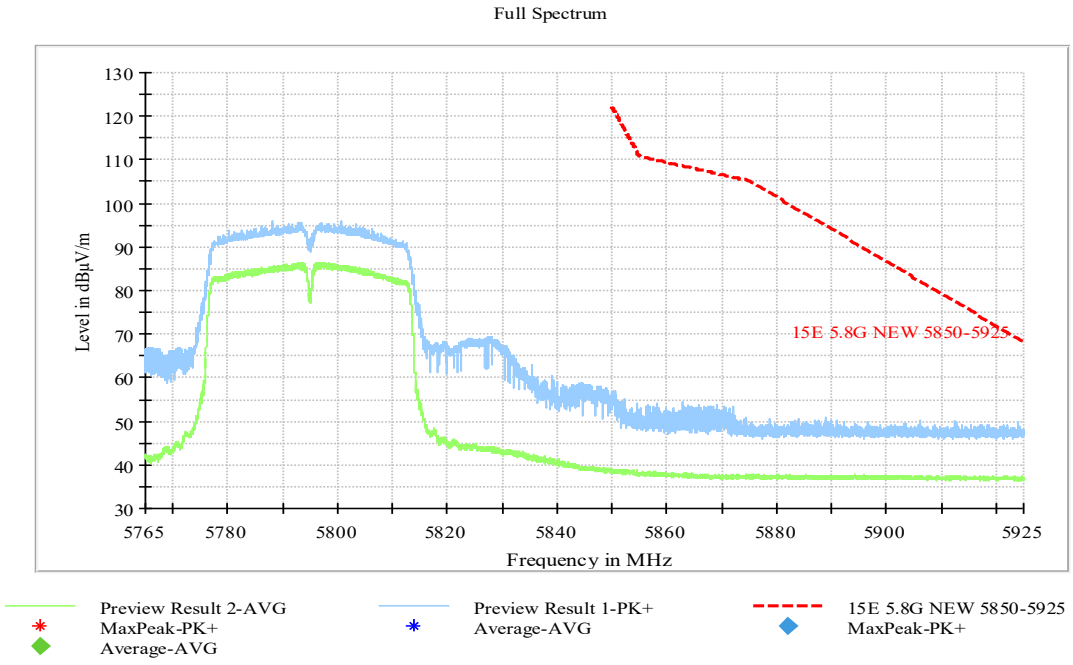


Fig. 15 Band Edges (802.11n-HT40, 5795MHz)