



FCC PART 15C TEST REPORT

No. I17Z60505-SRD07

for

TCL Communication Ltd.

GSM Quad-band /UMTS Quad-band CDMA/EVDO Tri-band /LTE 13

bands mobile phone

6060S

with

FCC ID: 2ACCJA024

Hardware Version: 04

Software Version: v4E1W

Issued Date: 2017-05-23



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

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REPORT HISTORY

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CONTENTS

CONTENTS	3
1. TEST LATORATORY.....	6
1.1. TESTING LOCATION	6
1.2. TESTING ENVIRONMENT	6
1.3. PROJECT DATA	6
1.4. SIGNATURE	6
2. CLIENT INFORMATION.....	7
2.1. APPLICANT INFORMATION	7
2.2. MANUFACTURER INFORMATION	7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE)	8
3.1. ABOUT EUT	8
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	8
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	8
3.4. GENERAL DESCRIPTION.....	9
4. REFERENCE DOCUMENTS	9
4.1. DOCUMENTS SUPPLIED BY APPLICANT	9
4.2. REFERENCE DOCUMENTS FOR TESTING.....	9
5. LABORATORY ENVIRONMENT.....	10
6. SUMMARY OF TEST RESULTS	11
6.1. SUMMARY OF TEST RESULTS	11
6.2. STATEMENTS.....	11
6.3. TEST CONDITIONS	11
7. TEST EQUIPMENTS UTILIZED	12
TEST SOFTWARE UTILIZED	12
8. MEASUREMENT UNCERTAINTY	13
8.1. TRANSMITTER OUTPUT POWER	13
8.2. PEAK POWER SPECTRAL DENSITY.....	13
8.3. OCCUPIED 6DB BANDWIDTH	13
8.4. BAND EDGES COMPLIANCE	13
8.5. SPURIOUS EMISSIONS	13
8.6. AC POWER-LINE CONDUCTED EMISSION	13
ANNEX A: MEASUREMENT RESULTS.....	14

A.1. MEASUREMENT METHOD	14
A.2. MAXIMUM PEAK OUTPUT POWER	15
A.2.1 ANTENNA GAIN	15
A.2.2. MAXIMUM PEAK OUTPUT POWER-CONDUCTED	15
A.2.3. MAXIMUM AVERAGE OUTPUT POWER-CONDUCTED	18
A.3. PEAK POWER SPECTRAL DENSITY	19
A.4. OCCUPIED 6dB BANDWIDTH	19
FIG. 1 OCCUPIED 6dB BANDWIDTH (802.11A, CH 149).....	20
FIG. 2 OCCUPIED 6dB BANDWIDTH (802.11A, CH 157).....	20
FIG. 3 OCCUPIED 6dB BANDWIDTH (802.11A, CH 165).....	21
FIG. 4 OCCUPIED 6dB BANDWIDTH (802.11N-HT40, CH 151).....	21
FIG. 5 OCCUPIED 6dB BANDWIDTH (802.11N-HT40, CH 159).....	22
FIG. 6 OCCUPIED 6dB BANDWIDTH (802.11N-HT80, CH 155)	22
A.5. TRANSMITTER SPURIOUS EMISSION	23
A.5.1 TRANSMITTER SPURIOUS EMISSION - CONDUCTED	23
FIG. 7 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 30 MHz-1 GHz).....	24
FIG. 8 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 1 GHz -12 GHz).....	25
FIG. 9 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 12 GHz-25 GHz)	25
FIG. 10 CONDUCTED SPURIOUS EMISSION (802.11A, CH149, 25 GHz-40 GHz)	26
FIG. 11 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 30 MHz-1 GHz).....	26
FIG. 12 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 1 GHz -12 GHz).....	27
FIG. 13 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 12 GHz-25 GHz)	27
FIG. 14 CONDUCTED SPURIOUS EMISSION (802.11A, CH157, 25 GHz-40 GHz)	28
FIG. 15 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 30 MHz-1 GHz).....	28
FIG. 16 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 1 GHz -12 GHz).....	29
FIG. 17 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 12 GHz-25 GHz)	29
FIG. 18 CONDUCTED SPURIOUS EMISSION (802.11A, CH165, 25 GHz-40 GHz)	30
FIG. 19 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 30 MHz-1 GHz)	30
FIG. 20 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 1 GHz -12 GHz)	31
FIG. 21 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 12 GHz-25 GHz)	31
FIG. 22 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH151, 25 GHz-40 GHz)	32
FIG. 23 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 30 MHz-1 GHz)	32
FIG. 24 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 1 GHz -12 GHz)	33
FIG. 25 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 12 GHz-25 GHz)	33
FIG. 26 CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH159, 25 GHz-40 GHz)	34
FIG. 27 CONDUCTED SPURIOUS EMISSION (802.11AC-HT80, CH155, 30 MHz-1 GHz)	34
FIG. 28 CONDUCTED SPURIOUS EMISSION (802.11AC-HT80, CH155, 1 GHz -12 GHz)	35
FIG. 29 CONDUCTED SPURIOUS EMISSION (802.11AC-HT80, CH155, 12 GHz-25 GHz)	35
FIG. 30 CONDUCTED SPURIOUS EMISSION (802.11AC-HT80, CH155, 25 GHz-40 GHz)	36
A.5.2 TRANSMITTER SPURIOUS EMISSION - RADIATED	37
A.6. BAND EDGES COMPLIANCE	47
A6.1 BAND EDGES - CONDUCTED.....	47
FIG. 31 BAND EDGES (802.11N-HT20, 5745MHz).....	47
FIG. 32 BAND EDGES (802.11N-HT20, 5825MHz).....	48

A6.2 BAND EDGES - RADIATED	49
FIG. 33 BAND EDGES (802.11A, 5745MHz)	50
FIG. 34 BAND EDGES (802.11A, 5825MHz)	50
FIG. 35 BAND EDGES (802.11n-HT20, 5745MHz)	51
FIG. 36 BAND EDGES (802.11n-HT20, 5825MHz)	51
FIG. 37 BAND EDGES (802.11n-HT40, 5755MHz)	52
FIG. 38 BAND EDGES (802.11n-HT40, 5795MHz)	52
FIG. 39 BAND EDGES (802.11AC-HT20, 5745MHz)	53
FIG. 40 BAND EDGES (802.11AC-HT20, 5825MHz)	53
FIG. 41 BAND EDGES (802.11AC-HT40, 5755MHz)	54
FIG. 42 BAND EDGES (802.11AC-HT40, 5795MHz)	54
A.7. AC POWERLINE CONDUCTED EMISSION	55
FIG. 43 AC POWERLINE CONDUCTED EMISSION-802.11A	56
FIG. 44 AC POWERLINE CONDUCTED EMISSION-IDLE	57



1. TEST LATORATORY

1.1. 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. 18 Jia Kangding Street, BDA District, Beijing, P. R.
China 100191

1.2. Testing Environment

Normal Temperature: 15-35°C

Extreme Temperature: -20/+60°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-4-17

Testing End Date: 2017-5-19

1.4. Signature

A handwritten signature in black ink, appearing to read "姜雪".

Jiang Xue

(Prepared this test report)

A handwritten signature in black ink, appearing to read "郑伟".

Zheng Wei

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Lv Songdong

(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: TCL Communication Ltd.
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City: Shanghai
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2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
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Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Contact: Gong Zhizhou
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

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

3.1. About EUT

Description	GSM Quad-band /UMTS Quad-band CDMA/EVDO Tri-band /LTE 13 bands mobile phone
Model name	6060S
FCC ID	2ACCJA024
WLAN Frequency Range	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.85V DC by Battery

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	IMEI	HW Version	SW Version
ID*			
EUT1	01490900006748	04	v4E1W
EUT2	01490900000778	04	v4E1W

*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	battery	/	/
AE2	battery	/	/
AE3	Travel charger	/	1760505CH005/004/008
AE4	USB Cable	/	1760505DC005
AE5	USB Cable	/	1760505DC011
AE6	USB Cable	/	1760505DC003

AE1

Model	CAC2560001CJ
Manufacturer	COSLIGHT
Capacitance	2560 mAh
Nominal voltage	3.85V

AE2

Model	CAC2560002C1
Manufacturer	BYD
Capacitance	2560 mAh



Nominal voltage 3.85V

AE3

Model CBA0059AGAC2
Manufacturer Tenpao
Length of cable /

AE4

Model CDA0000078CF
Manufacturer LUXSHARE
Length of cable /

AE5

Model CDA0000078C1
Manufacturer juwei
Length of cable /

AE6

Model CDA0000103CF
Manufacturer LUXSHARE
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 GSM Quad-band /UMTS Quad-band CDMA/EVDO Tri-band /LTE 13 bands 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: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; Subpart E—Unlicensed National Information Infrastructure Devices	2015
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



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	15.407 (b)	/	P
Transmitter Spurious Emission - Conducted	15.407,15.205	/	P
Transmitter Spurious Emission - Radiated	15.407, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P
99% Occupied Bandwidth	/	/	P
Transmitter Spurious Emission - Radiated < 30MHz	15.407, 15.209	/	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	3.84V
Humidity	44%

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2016-06-07	2017-06-06
2	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Test Receiver	ESU26	100235	Rohde & Schwarz	2017-03-02	2018-04-01
2	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2014-12-17	2017-12-16
3	BiLog Antenna	VULB9163	301	Schwarzbeck	2014-12-17	2017-12-16
4	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	2014-12-16	2017-12-15
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	2014-06-18	2017-06-17
6	Vector Signal Analyzer	FSV40	101047	Rohde & Schwarz	2016-06-29	2017-06-28
7	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/

Test Software Utilized

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01.00	R&S
Conducted Continuous Emission	EMC32 V8.52.0	R&S

8. Measurement Uncertainty

8.1. Transmitter Output Power

Measurement Uncertainty: 0.339dB, k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dBm/MHz, k=1.96

8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz, k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dBm, k=1.96

8.5. Spurious Emissions

Conducted (k=1.96)

Frequency Range	Uncertainty(dBm)
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(dBm)
9kHz-30MHz	
30MHz ≤ f ≤ 1GHz	4.86
1GHz ≤ f ≤ 18GHz	5.26
18GHz ≤ f ≤ 40GHz	5.28

8.6. AC Power-line Conducted Emission

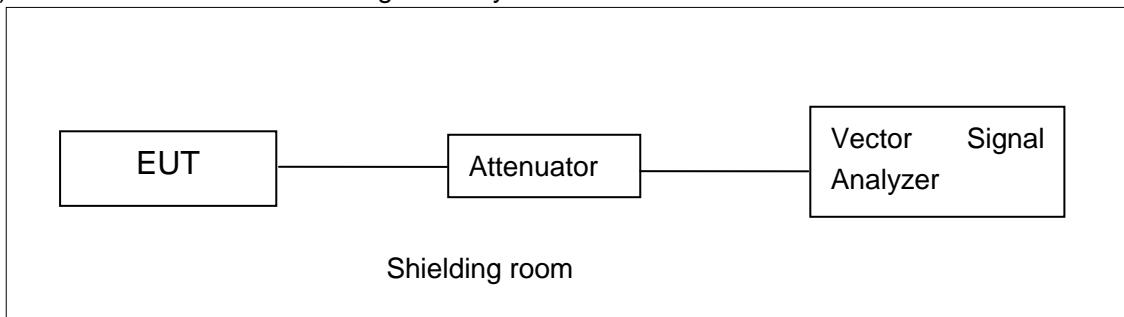
Measurement Uncertainty : 3.38dBm, k=2

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

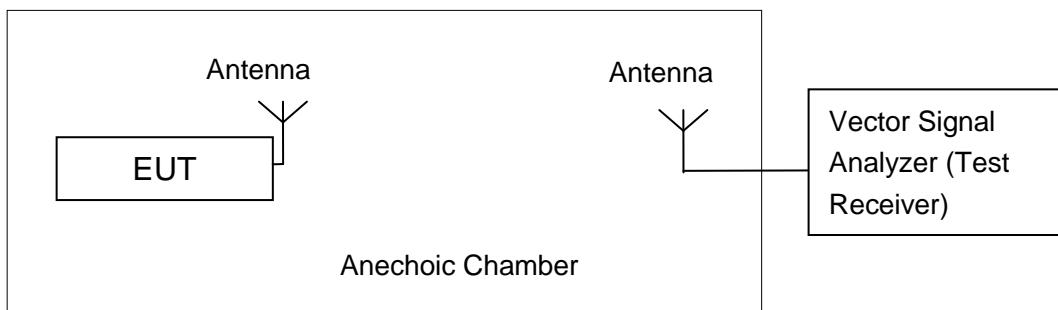


A.1.2. Radiated Emission Measurements

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 -3.2 dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Peak Output Power-conducted

Measurement Results:

802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	20.74	/	/
	9	20.66	/	/
	12	20.68	/	/
	18	20.65	/	/
	24	21.17	21.70	21.84
	36	21.15	/	/
	48	20.28	/	/
	54	19.30	/	/

The data rate 24Mbps 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	20.73	/	/
	MCS1	20.68	/	/
	MCS2	20.65	/	/
	MCS3	21.14	/	/
	MCS4	21.15	21.74	21.90
	MCS5	20.25	/	/
	MCS6	19.25	/	/
	MCS7	18.23	/	/

The data rate MCS4 is selected as worse condition, and the following cases are performed with this condition.

802.11ac-HT20 mode

Mode	Data Rate	Test Result (dBm)

	(Index)	5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac (20MHz)	MCS0	20.92	21.57	21.42
	MCS1	20.22	/	/
	MCS2	20.57	/	/
	MCS3	19.60	/	/
	MCS4	18.57	/	/
	MCS5	18.65	/	/
	MCS6	17.48	/	/
	MCS7	17.21	/	/
	MCS8	17.25	/	/

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	20.59	/
	MCS1	20.66	/
	MCS2	20.70	/
	MCS3	21.11	21.91
	MCS4	21.08	/
	MCS5	20.17	/
	MCS6	19.13	/
	MCS7	18.15	/

The data rate MCS3 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	20.50	21.28
	MCS1	20.42	/
	MCS2	20.07	/
	MCS3	19.51	/
	MCS4	18.45	/
	MCS5	18.09	/
	MCS6	17.16	/
	MCS7	17.13	/
	MCS8	17.15	/

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	20.66
	MCS1	19.99
	MCS2	19.96
	MCS3	19.03
	MCS4	18.16
	MCS5	18.06
	MCS6	16.82
	MCS7	16.92
	MCS8	16.88

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

Conclusion: PASS

A.2.3. Maximum Average Output Power-Conducted

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

802.11a mode

Mode	Test Result (dBm)		
	5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	11.05	11.69	11.85

802.11n-HT20 mode

Mode	Test Result (dBm)		
	5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n(20MHz)	11.07	11.75	12.01

802.11ac-HT20 mode

Mode	Test Result (dBm)		
	5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11ac(20MHz)	10.66	11.20	11.84

802.11n-HT40 mode

Mode	Test Result (dBm)	
	5755MHz (Ch151)	5795MHz (Ch159)
802.11n(40MHz)	10.82	11.65

802.11ac-HT40 mode

Mode	Test Result (dBm)	
	5755MHz (Ch151)	5795MHz (Ch159)
802.11ac(40MHz)	9.82	10.63

802.11ac-HT80 mode

Mode	Test Result (dBm)	
	5775MHz (Ch155)	
802.11ac(80MHz)		9.20

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

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

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

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	7.81	P
	157	9.19	P
	165	9.44	P

Note: 802.11a was selected as the worst-case of the test case.

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:

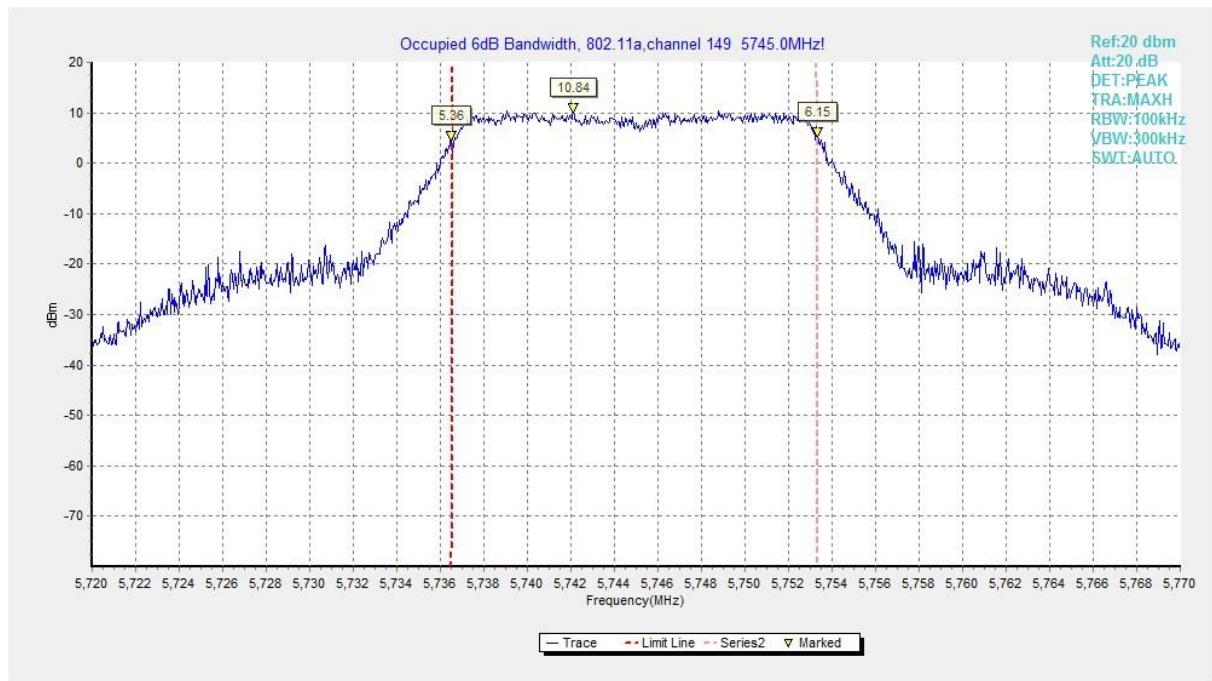
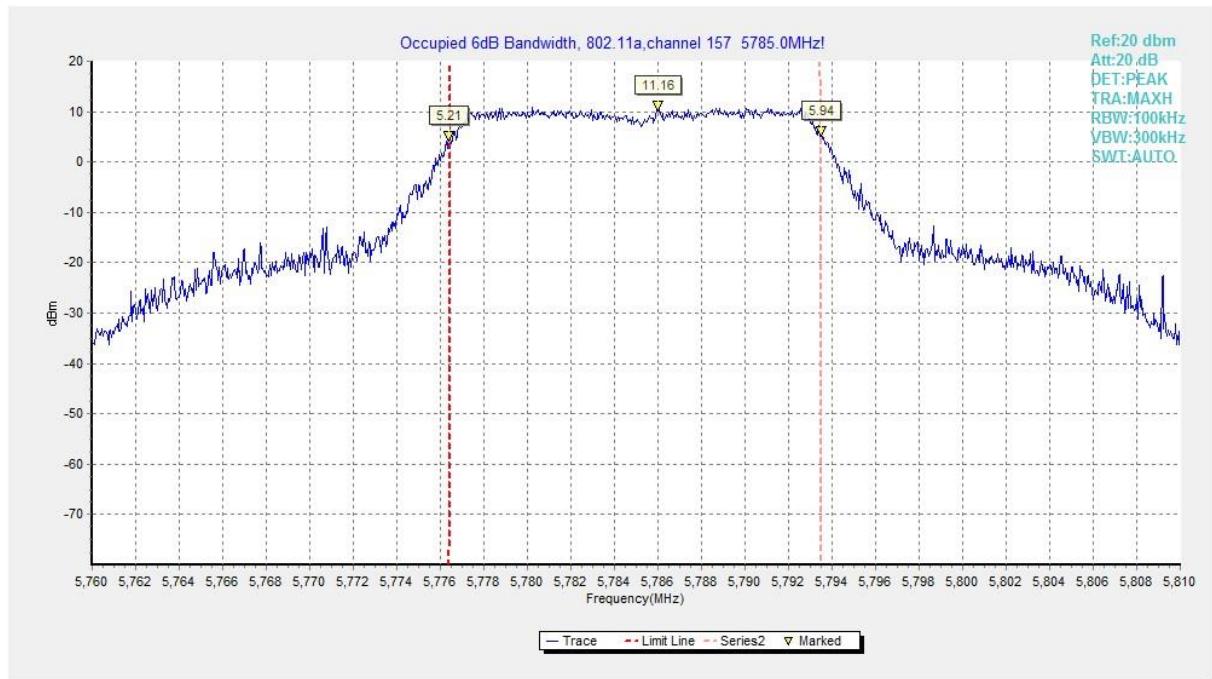
Measurement Uncertainty	60.80Hz
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Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (kHz)		Conclusion
802.11a	149	Fig.1	16.85	P
	157	Fig.2	17.10	P
	165	Fig.3	16.55	P
802.11n HT40	151	Fig.4	35.92	P
	159	Fig.5	35.92	P
802.11ac HT80	155	Fig.6	75.04	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)

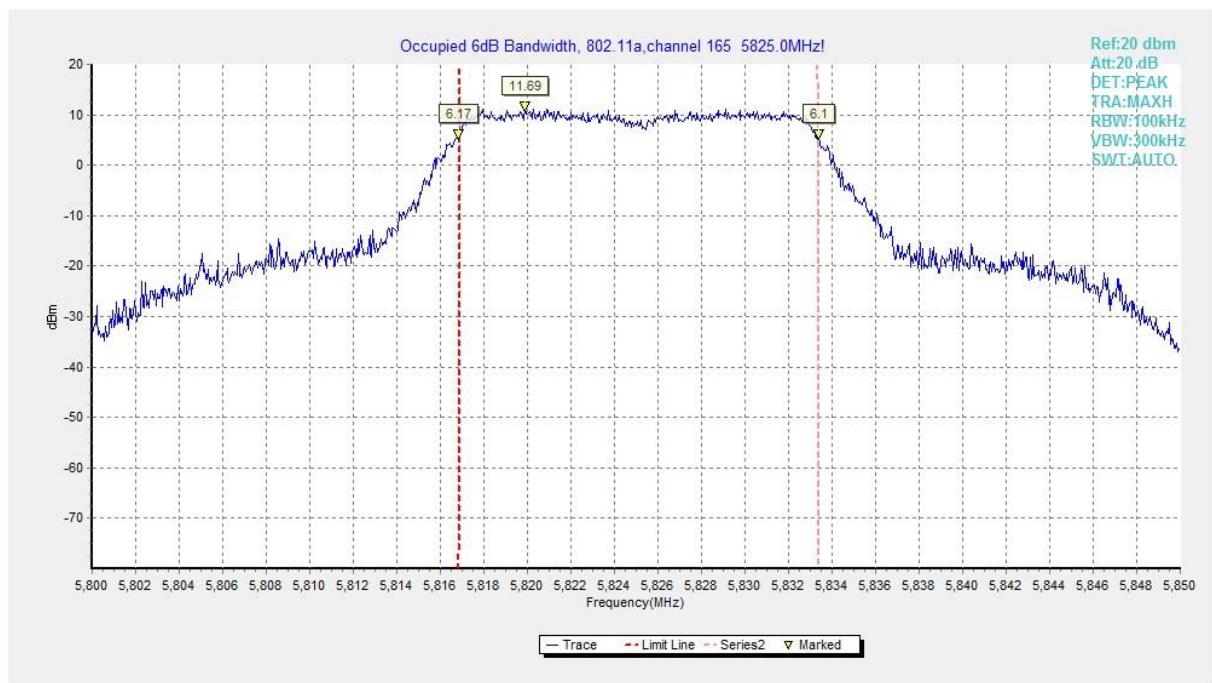


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

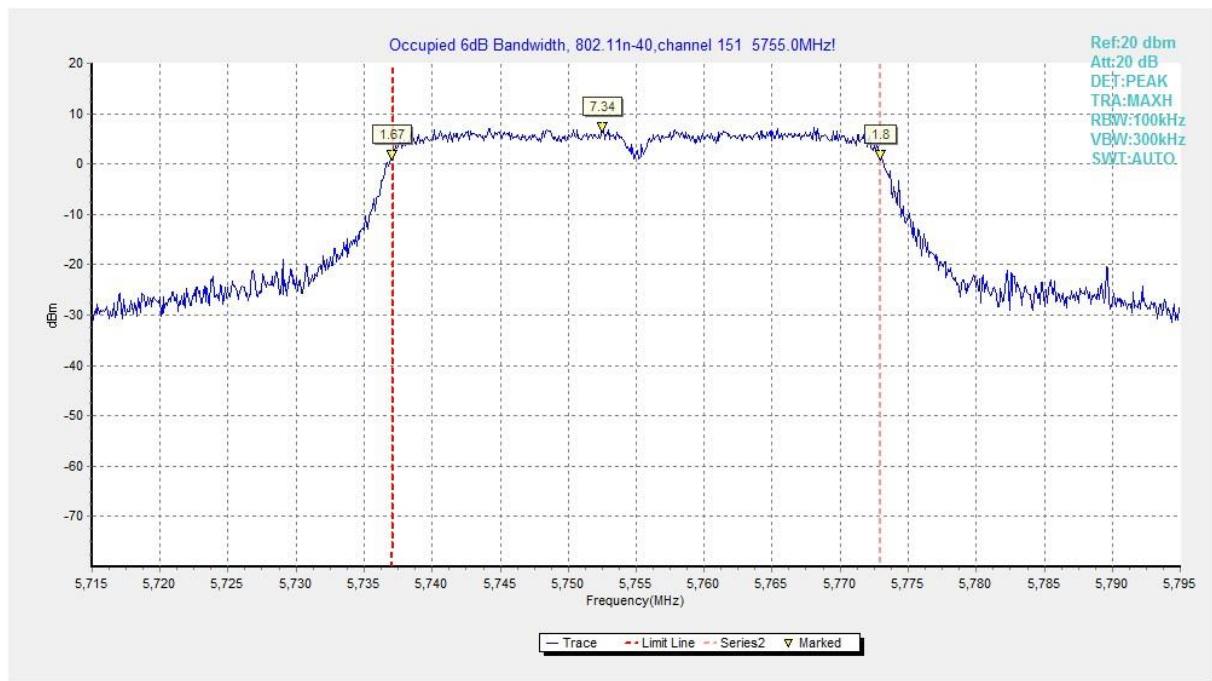


Fig. 4 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

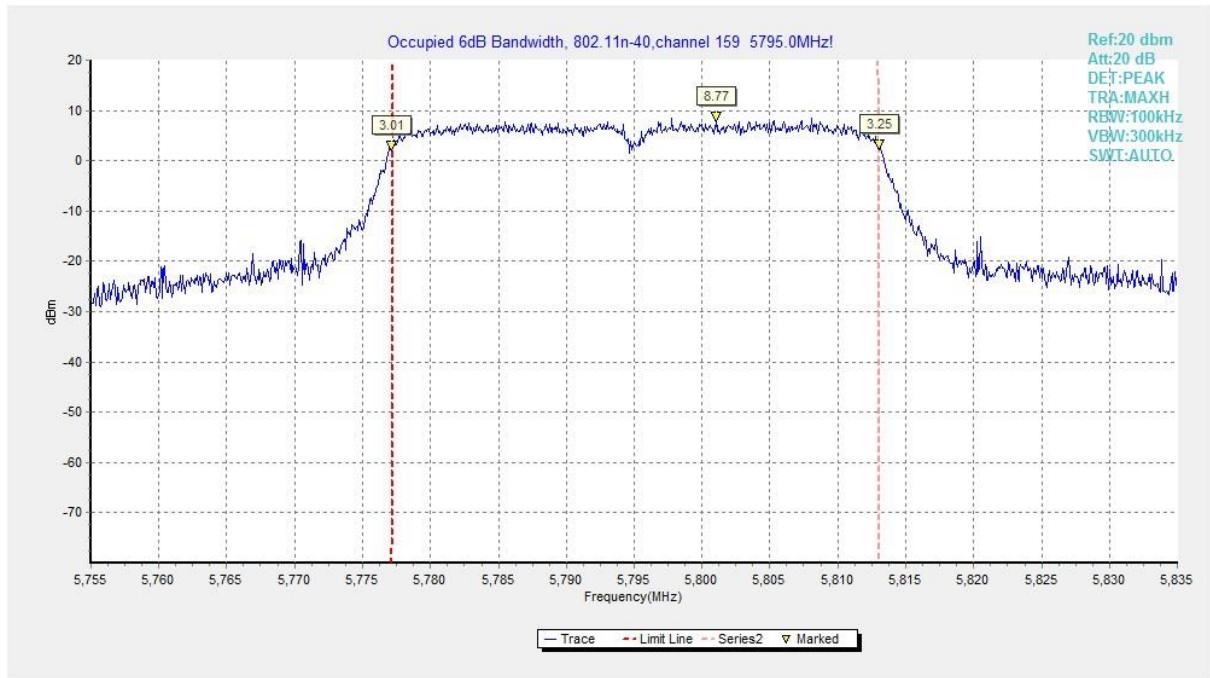


Fig. 5 Occupied 6dB Bandwidth (802.11n-HT40, Ch 159)

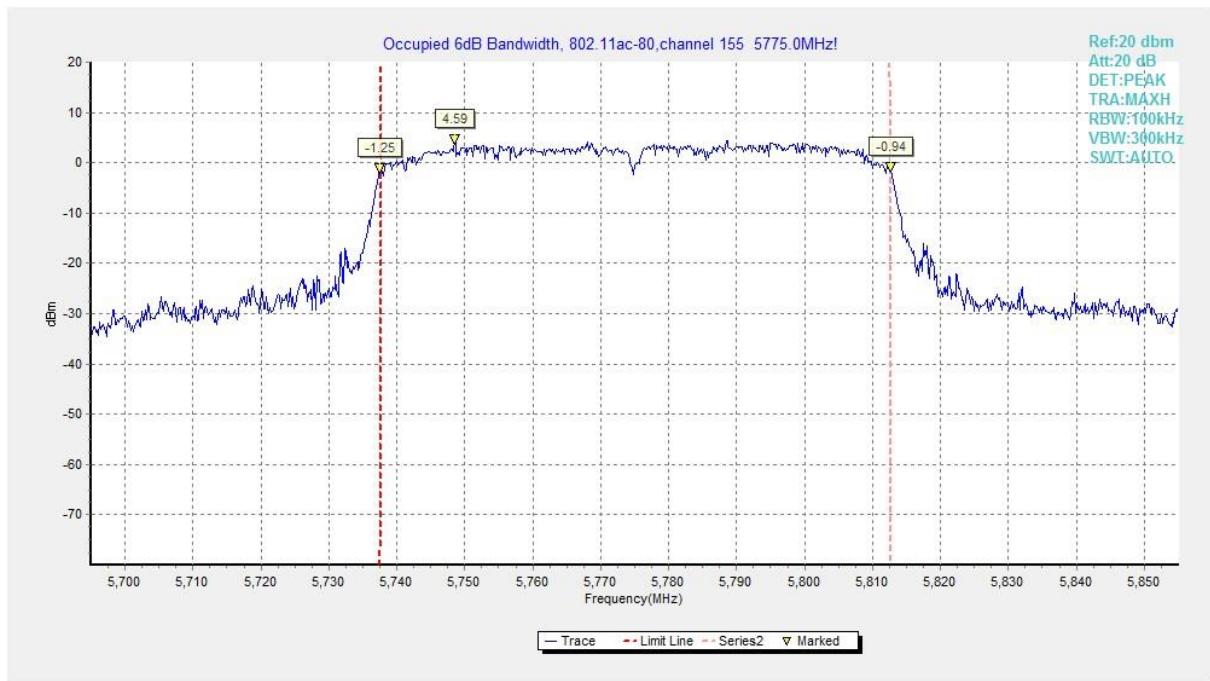


Fig. 6 Occupied 6dB Bandwidth (802.11n-HT80, Ch 155)

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 - Conducted

Measurement Results:

802.11a mode

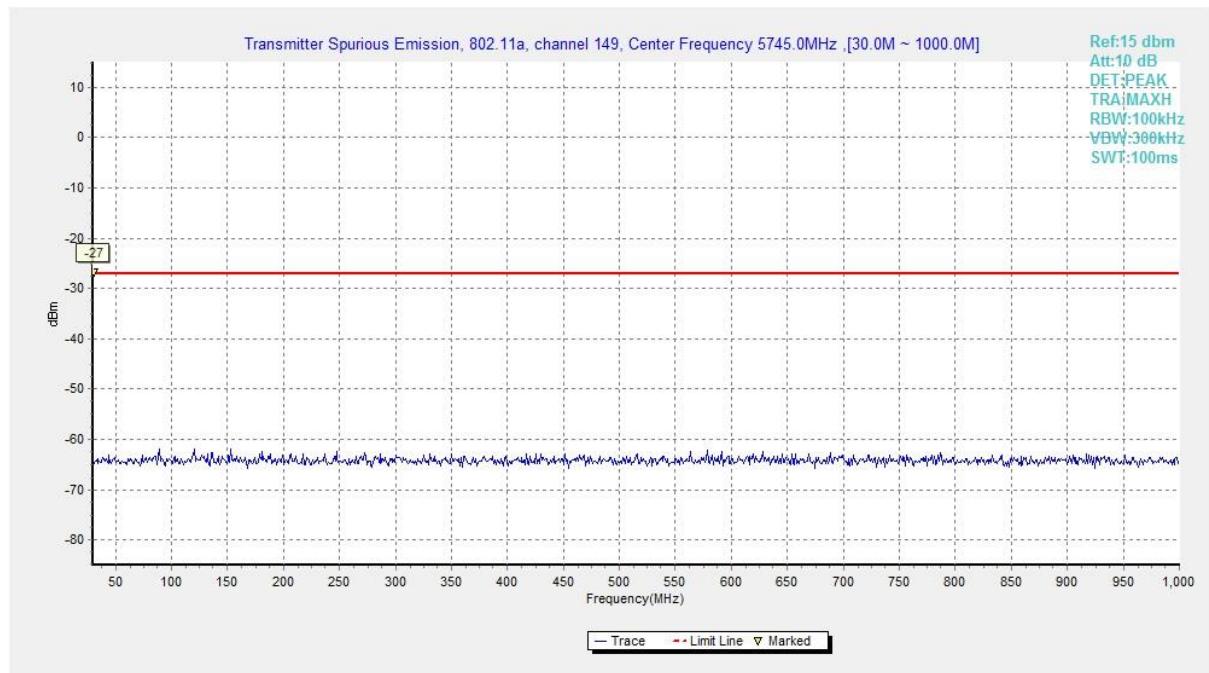
MODE	Channel	Frequency Range	Test Results	Conclusion
802.11a	149	30 MHz ~ 1 GHz	Fig.7	P
		1 GHz ~ 12 GHz	Fig.8	P
		12 GHz ~ 25 GHz	Fig.9	P
		25 GHz ~ 40 GHz	Fig.10	P
	157	30 MHz ~ 1 GHz	Fig.11	P
		1 GHz ~ 12 GHz	Fig.12	P
		12 GHz ~ 25 GHz	Fig.13	P
		25 GHz ~ 40 GHz	Fig.14	P
	165	30 MHz ~ 1 GHz	Fig.15	P
		1 GHz ~ 12 GHz	Fig.16	P
		12 GHz ~ 25 GHz	Fig.17	P
		25 GHz ~ 40 GHz	Fig.18	P

802.11n-HT40 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n HT40	151	30 MHz ~ 1 GHz	Fig.19	P
		1 GHz ~ 12 GHz	Fig.20	P
		12 GHz ~ 25 GHz	Fig.21	P
		25 GHz ~ 40 GHz	Fig.22	P
	159	30 MHz ~ 1 GHz	Fig.23	P
		1 GHz ~ 12 GHz	Fig.24	P
		12 GHz ~ 25 GHz	Fig.25	P
		25 GHz ~ 40 GHz	Fig.26	P

802.11ac-HT80 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11ac HT80	155	30 MHz ~ 1 GHz	Fig.27	P
		1 GHz ~ 12 GHz	Fig.28	P
		12 GHz ~ 25 GHz	Fig.29	P
		25 GHz ~ 40 GHz	Fig.30	P

Conclusion: PASS
Test graphs as below:

Fig. 7 Conducted Spurious Emission (802.11a, Ch149, 30 MHz-1 GHz)

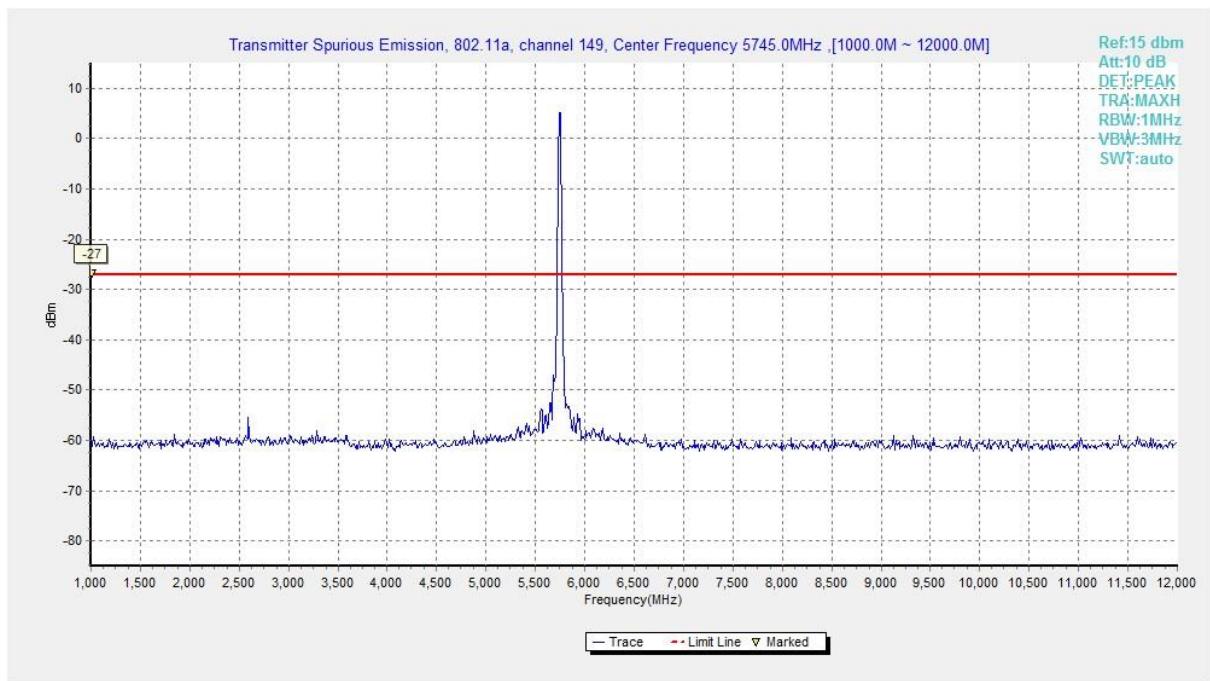


Fig. 8 Conducted Spurious Emission (802.11a, Ch149, 1 GHz -12 GHz)

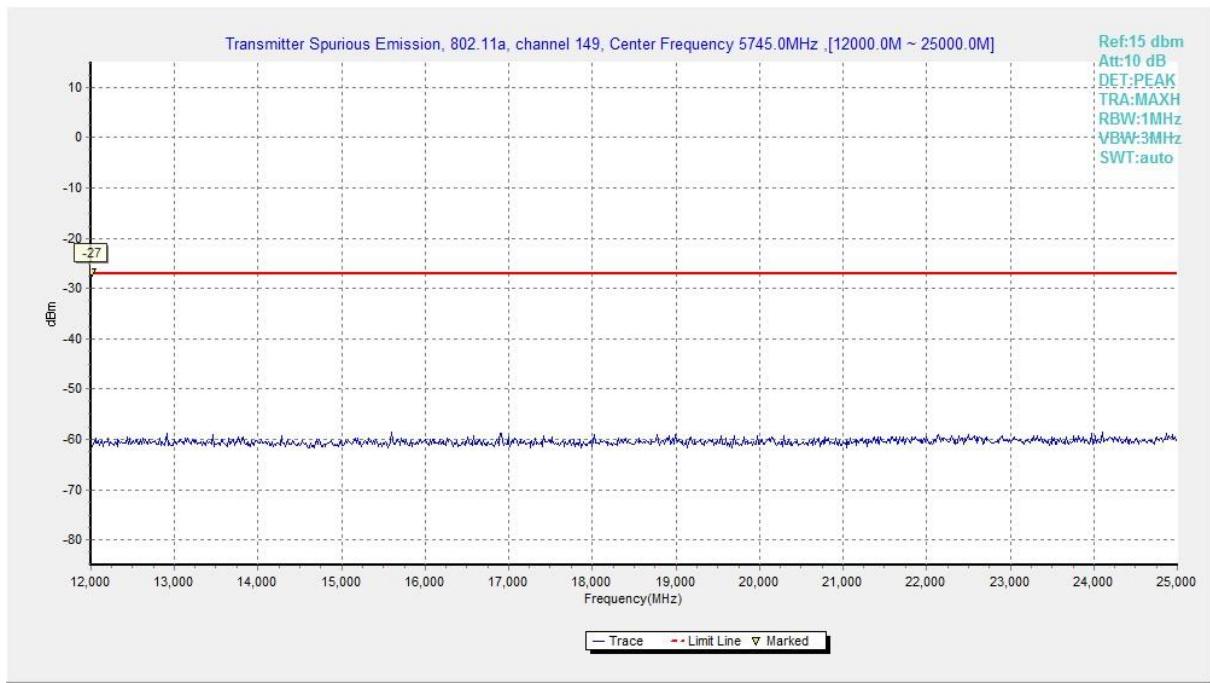


Fig. 9 Conducted Spurious Emission (802.11a, Ch149, 12 GHz-25 GHz)

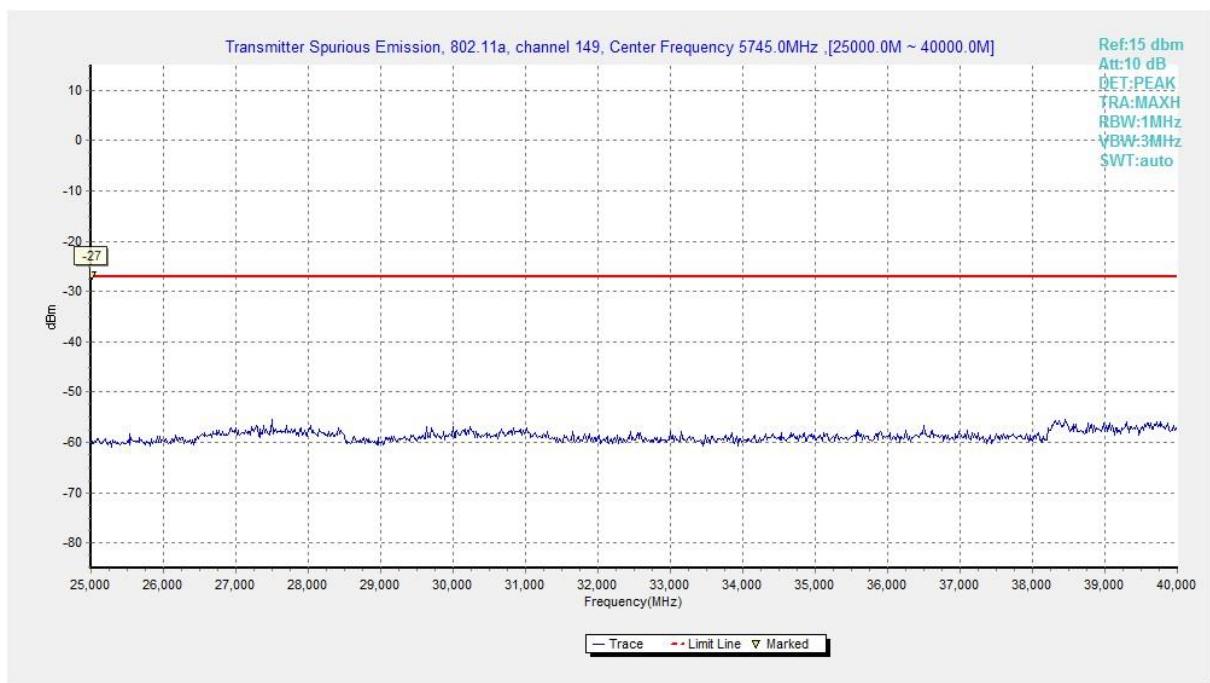


Fig. 10 Conducted Spurious Emission (802.11a, Ch149, 25 GHz-40 GHz)

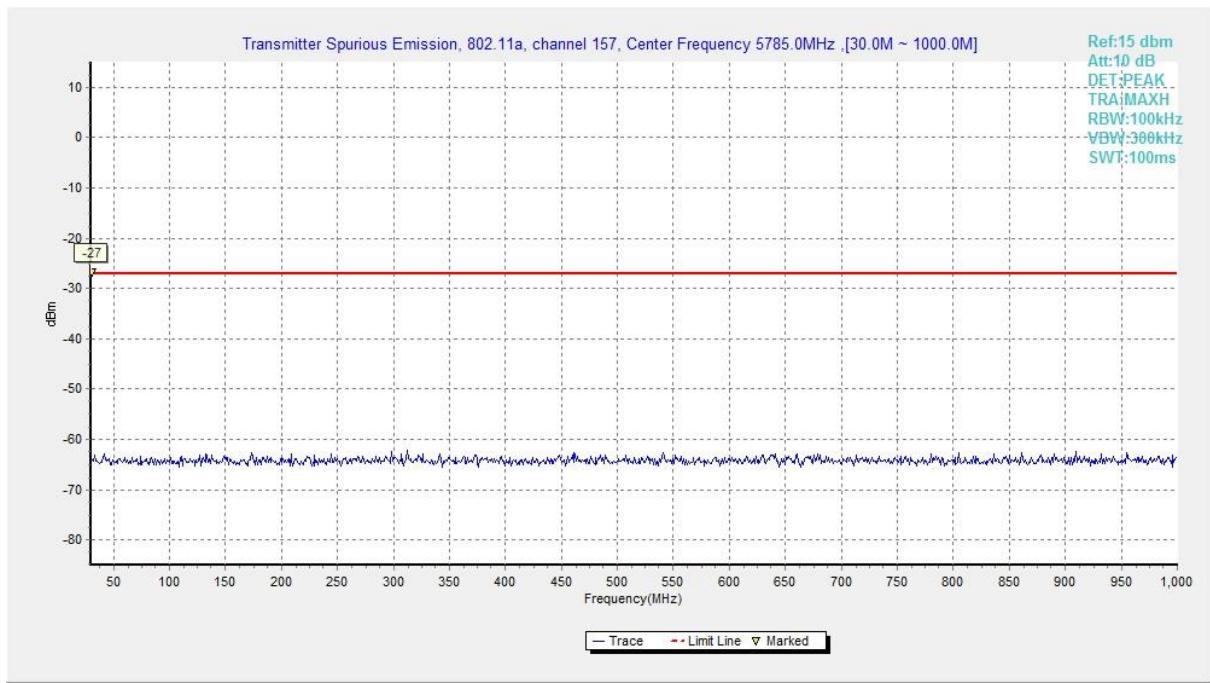


Fig. 11 Conducted Spurious Emission (802.11a, Ch157, 30 MHz-1 GHz)

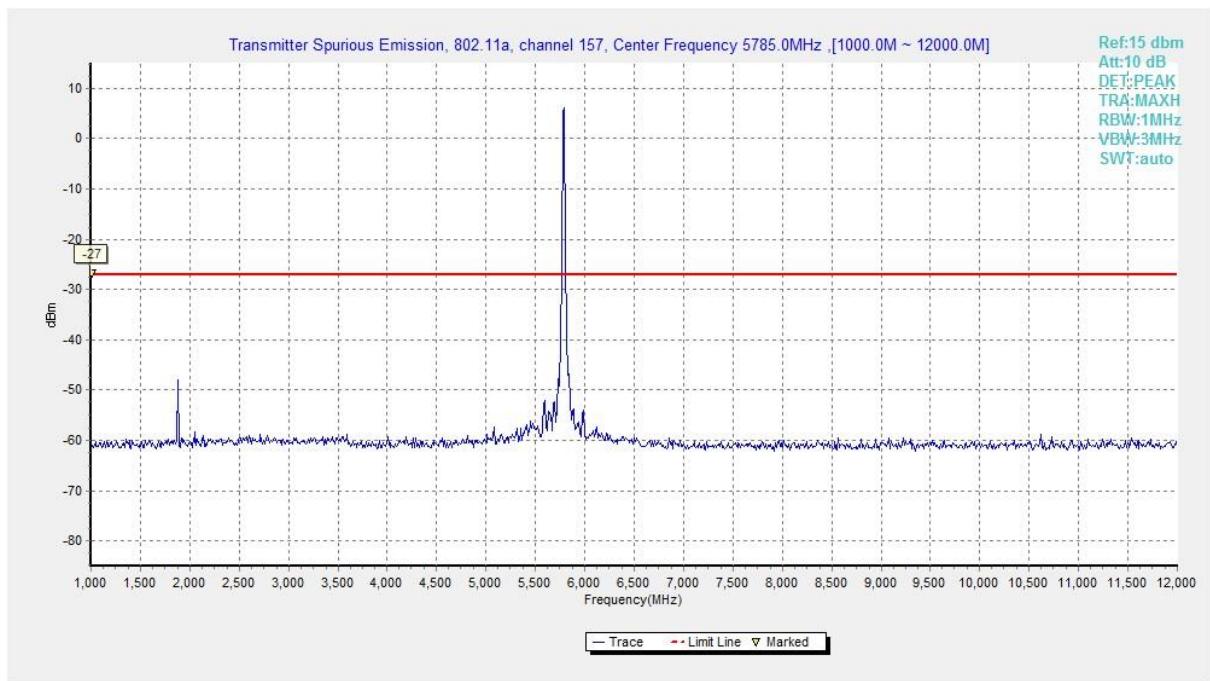


Fig. 12 Conducted Spurious Emission (802.11a, Ch157, 1 GHz -12 GHz)

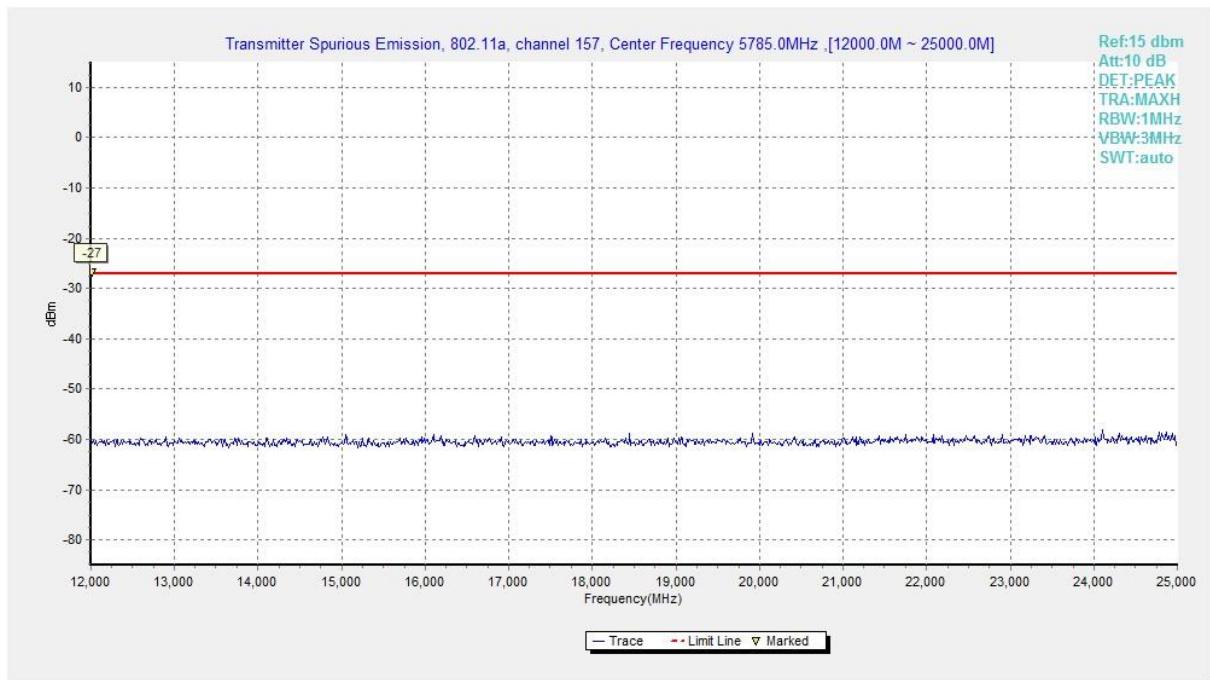


Fig. 13 Conducted Spurious Emission (802.11a, Ch157, 12 GHz-25 GHz)

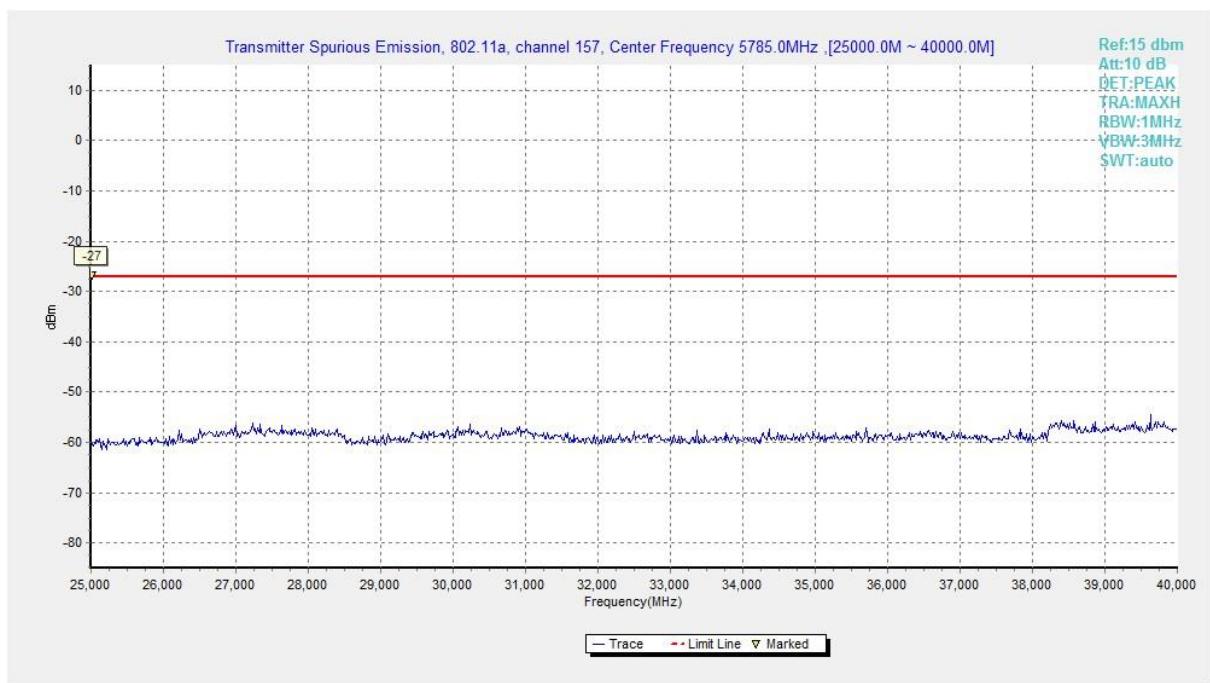


Fig. 14 Conducted Spurious Emission (802.11a, Ch157, 25 GHz-40 GHz)

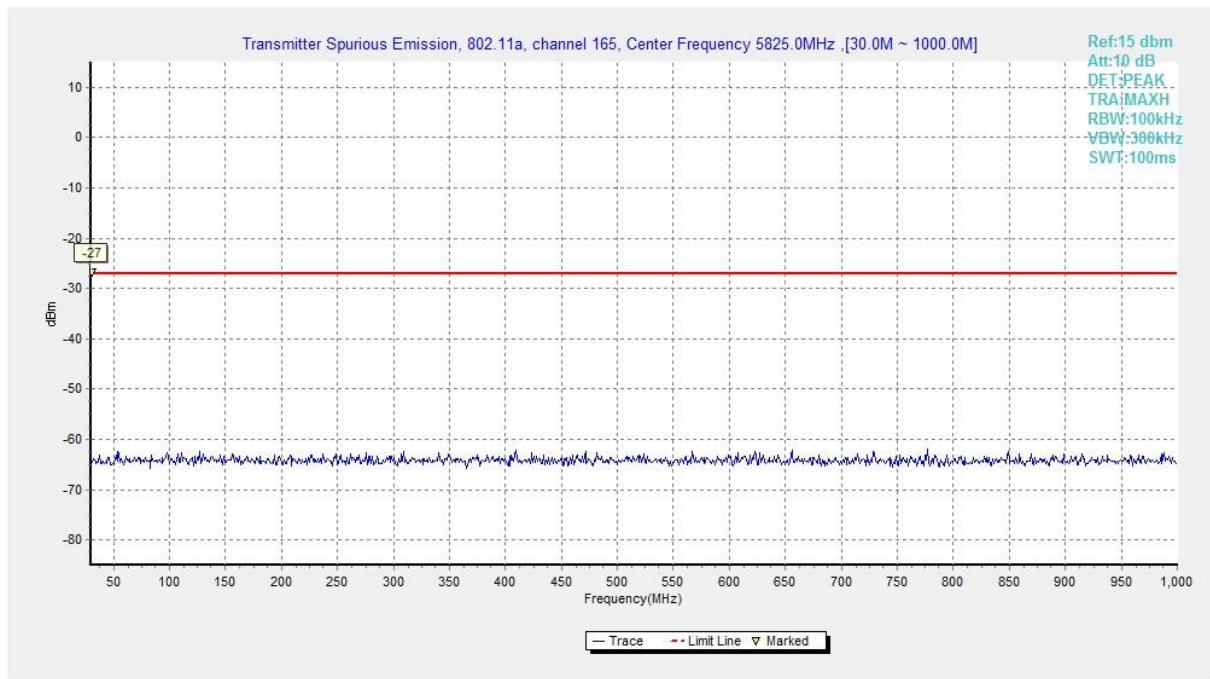


Fig. 15 Conducted Spurious Emission (802.11a, Ch165, 30 MHz-1 GHz)

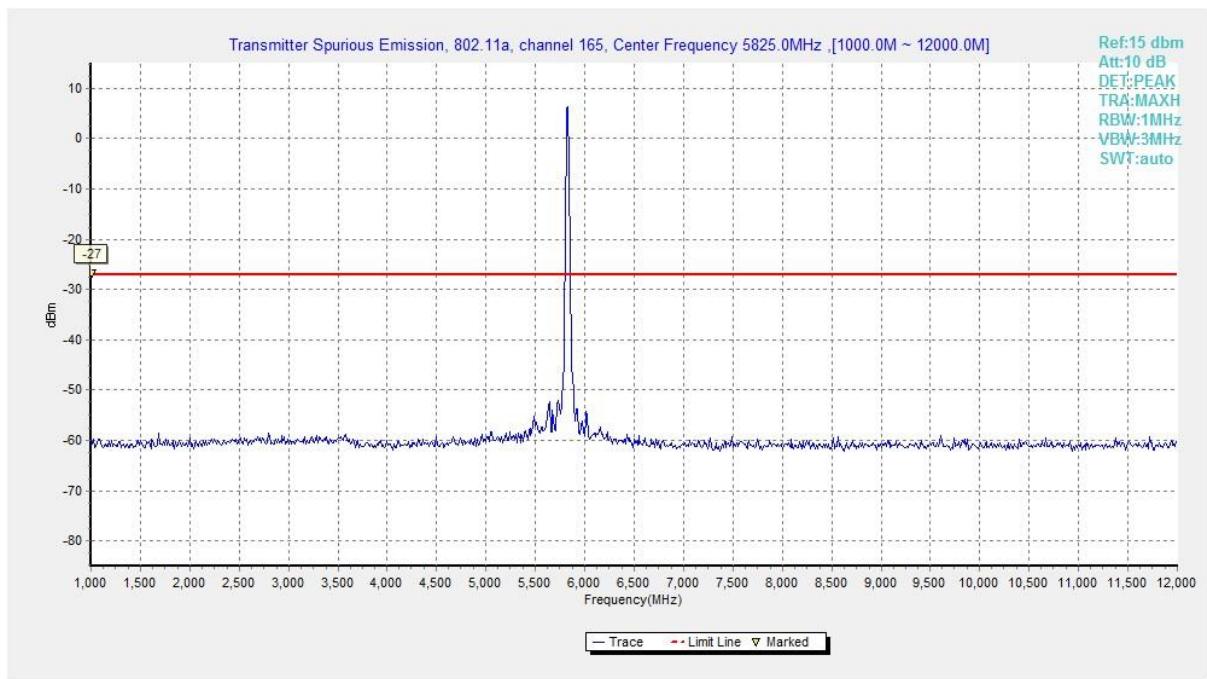


Fig. 16 Conducted Spurious Emission (802.11a, Ch165, 1 GHz -12 GHz)

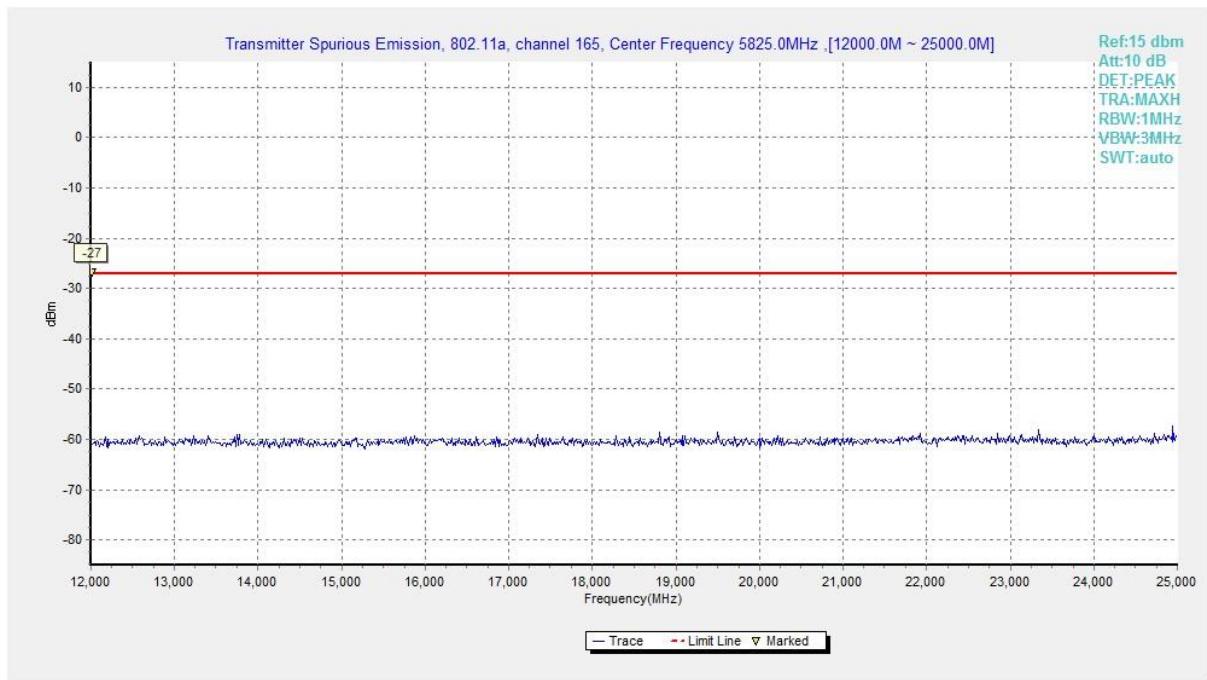


Fig. 17 Conducted Spurious Emission (802.11a, Ch165, 12 GHz-25 GHz)

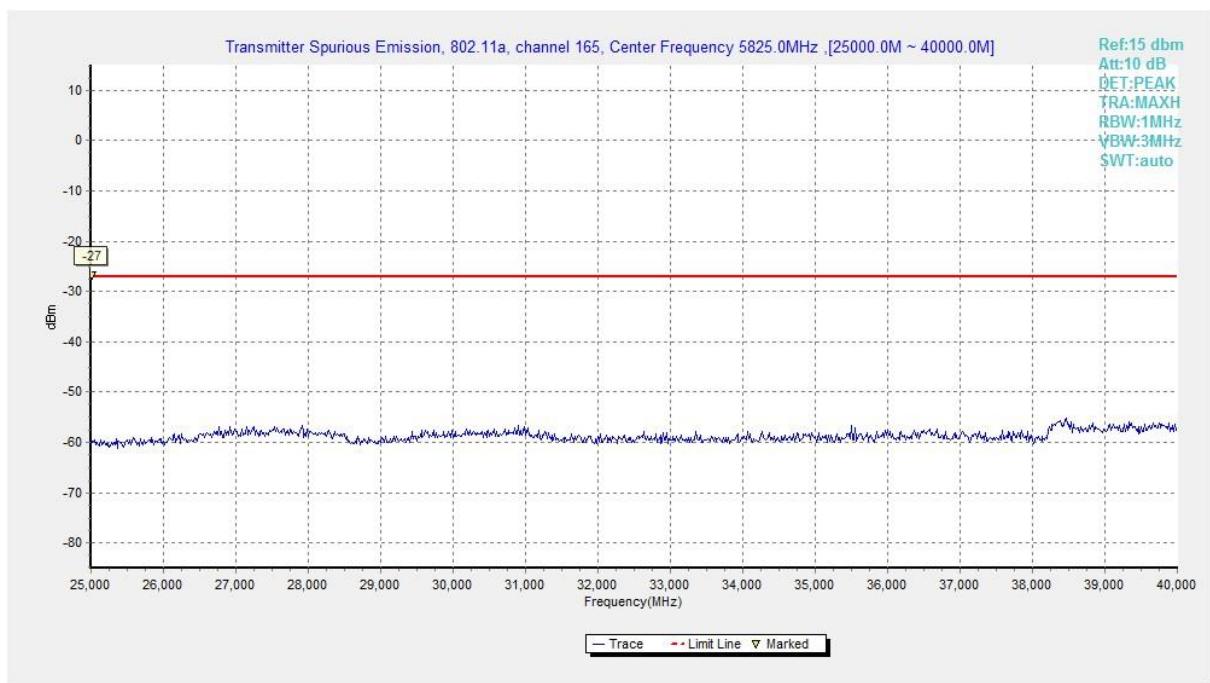


Fig. 18 Conducted Spurious Emission (802.11a, Ch165, 25 GHz-40 GHz)

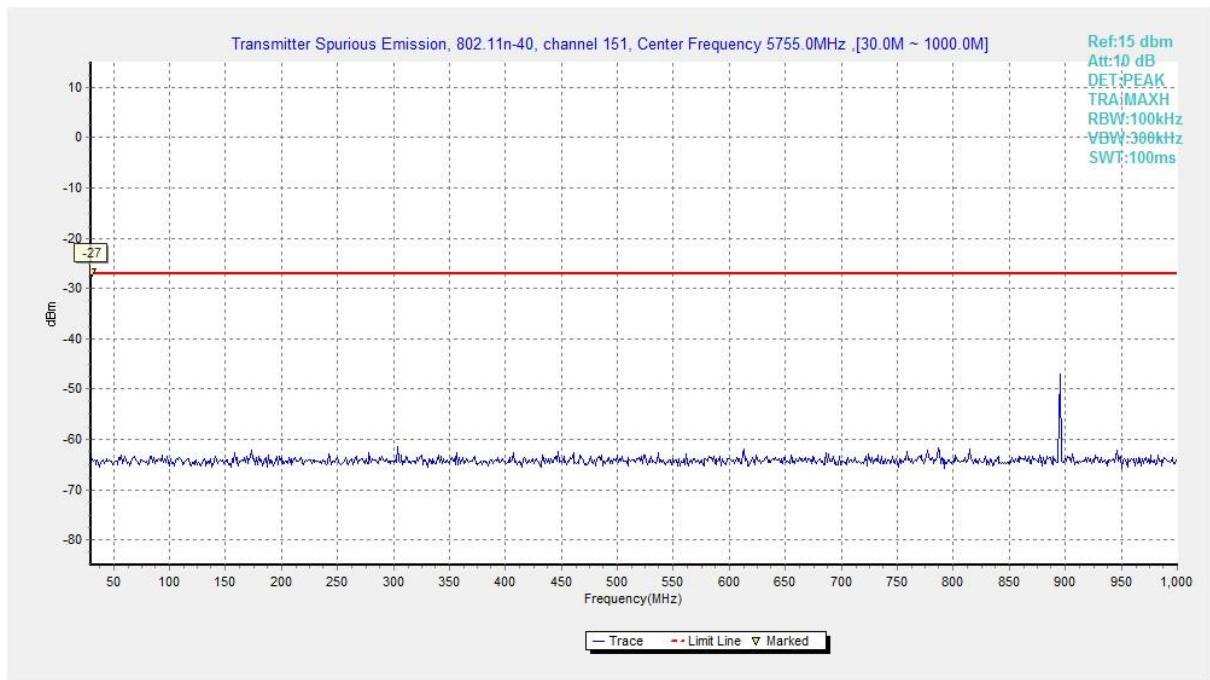


Fig. 19 Conducted Spurious Emission (802.11n-HT40, Ch151, 30 MHz-1 GHz)

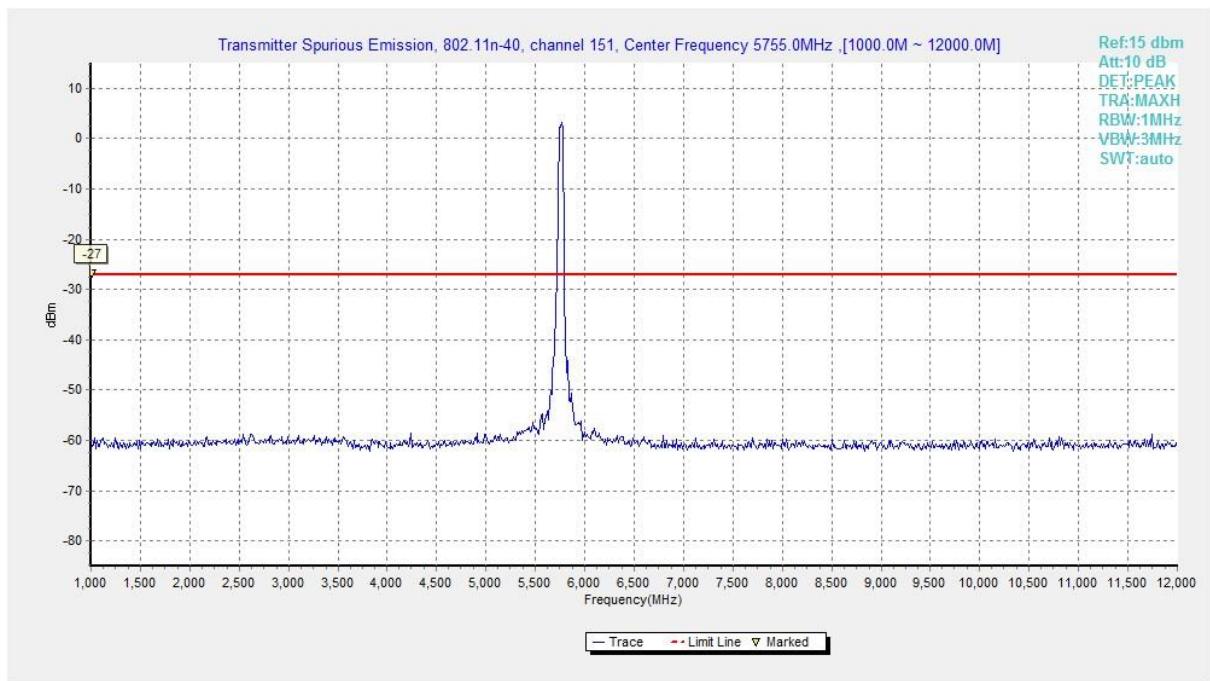


Fig. 20 Conducted Spurious Emission (802.11n-HT40, Ch151, 1 GHz -12 GHz)

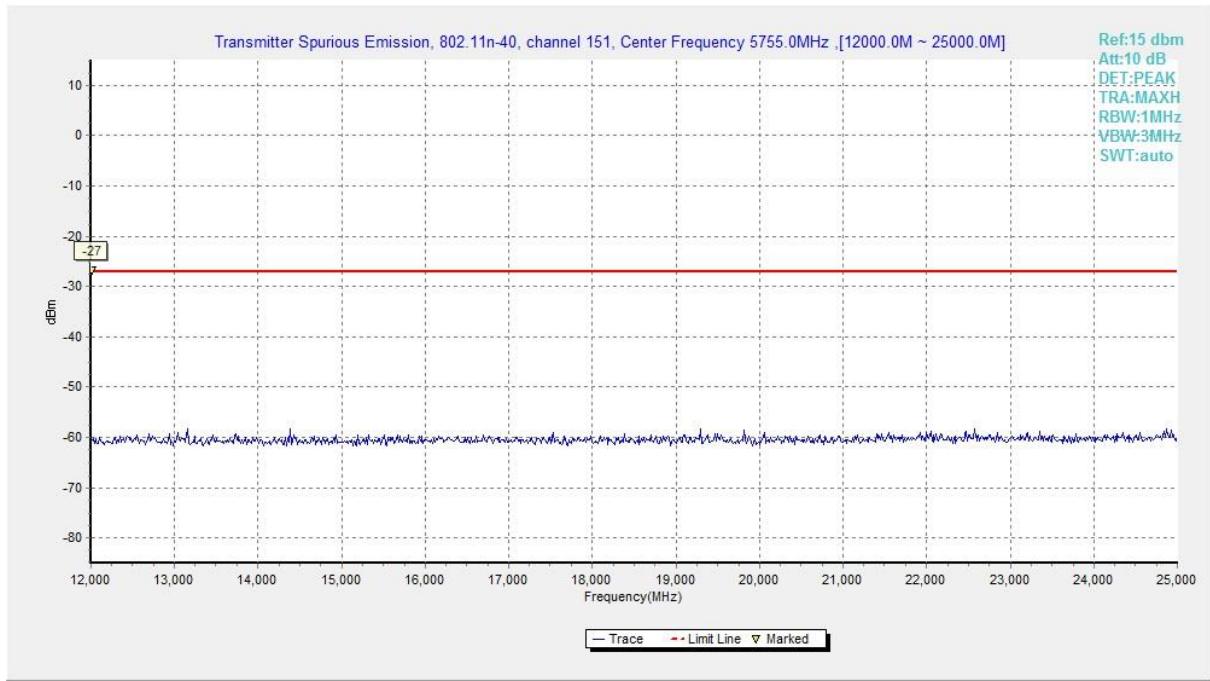


Fig. 21 Conducted Spurious Emission (802.11n-HT40, Ch151, 12 GHz-25 GHz)

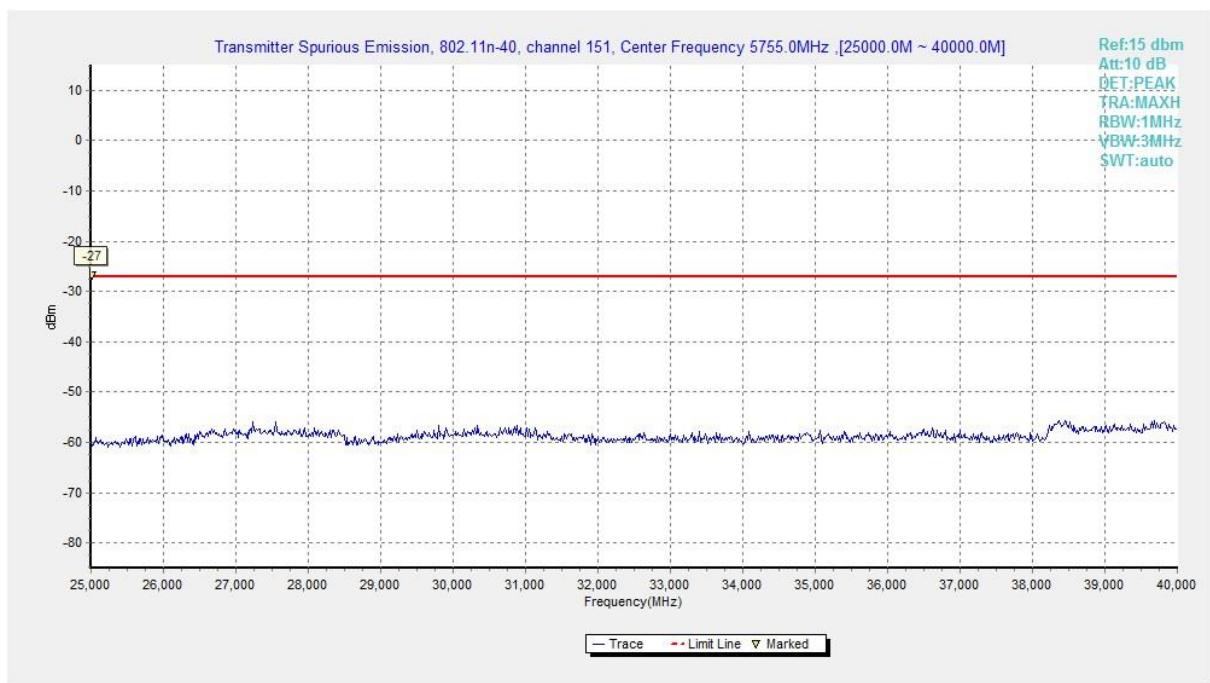


Fig. 22 Conducted Spurious Emission (802.11n-HT40, Ch151, 25 GHz-40 GHz)

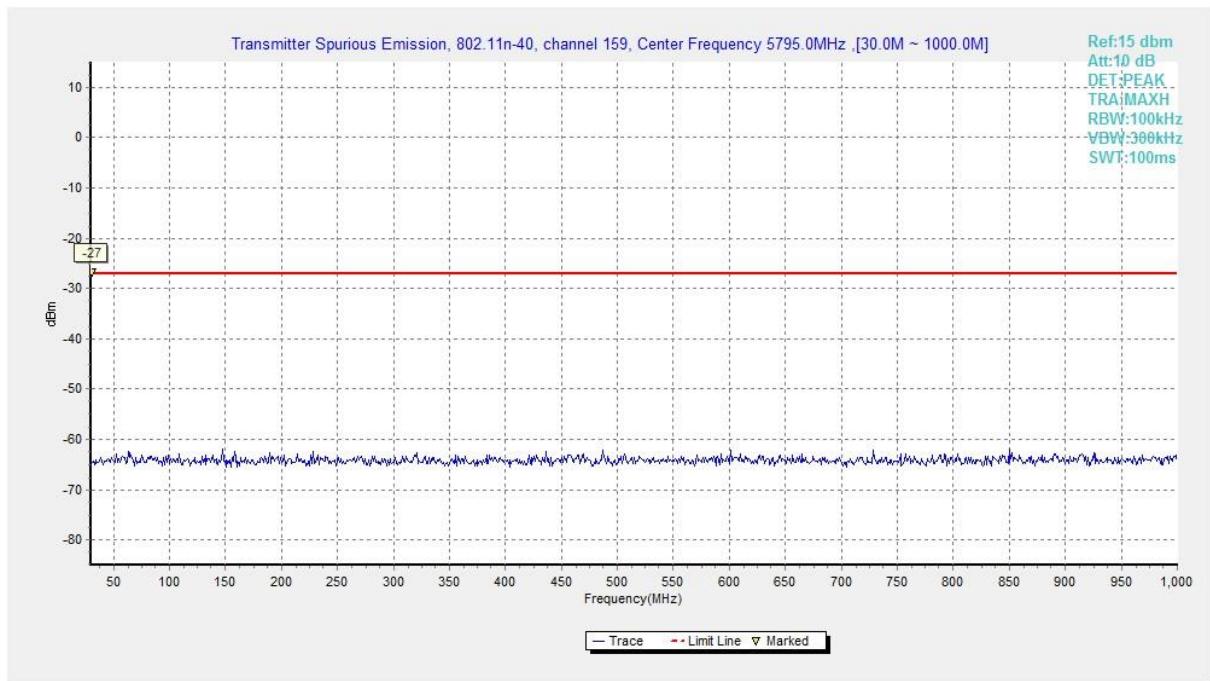


Fig. 23 Conducted Spurious Emission (802.11n-HT40, Ch159, 30 MHz-1 GHz)

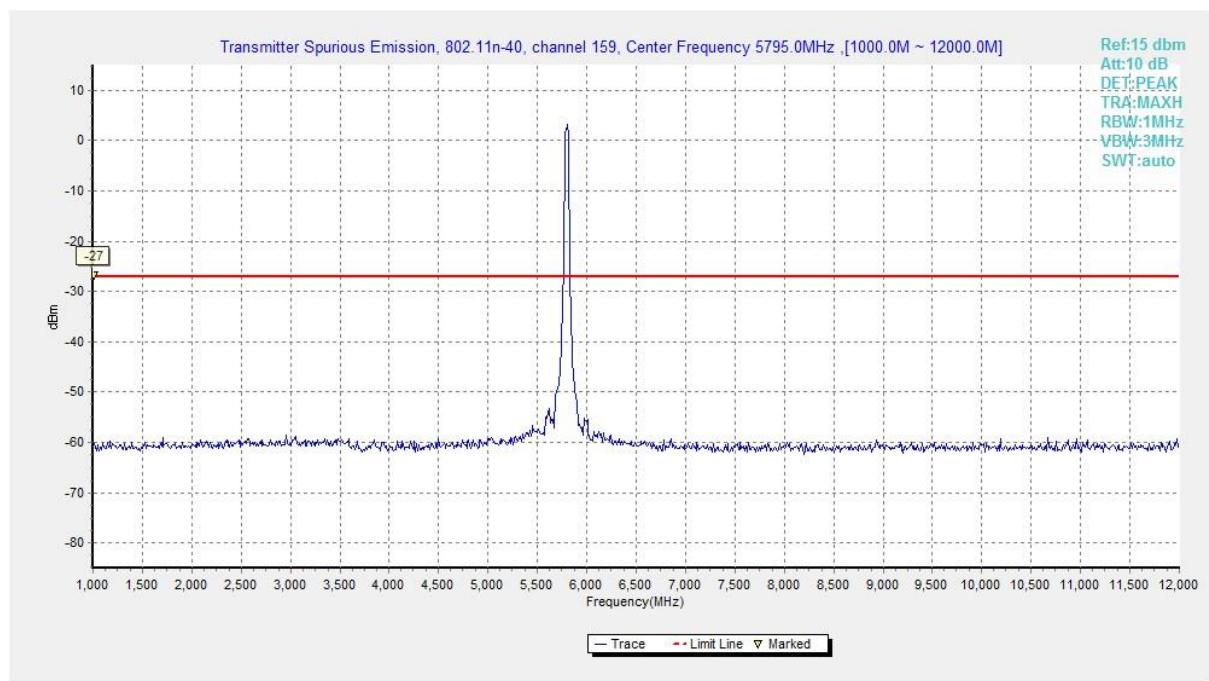


Fig. 24 Conducted Spurious Emission (802.11n-HT40, Ch159, 1 GHz -12 GHz)

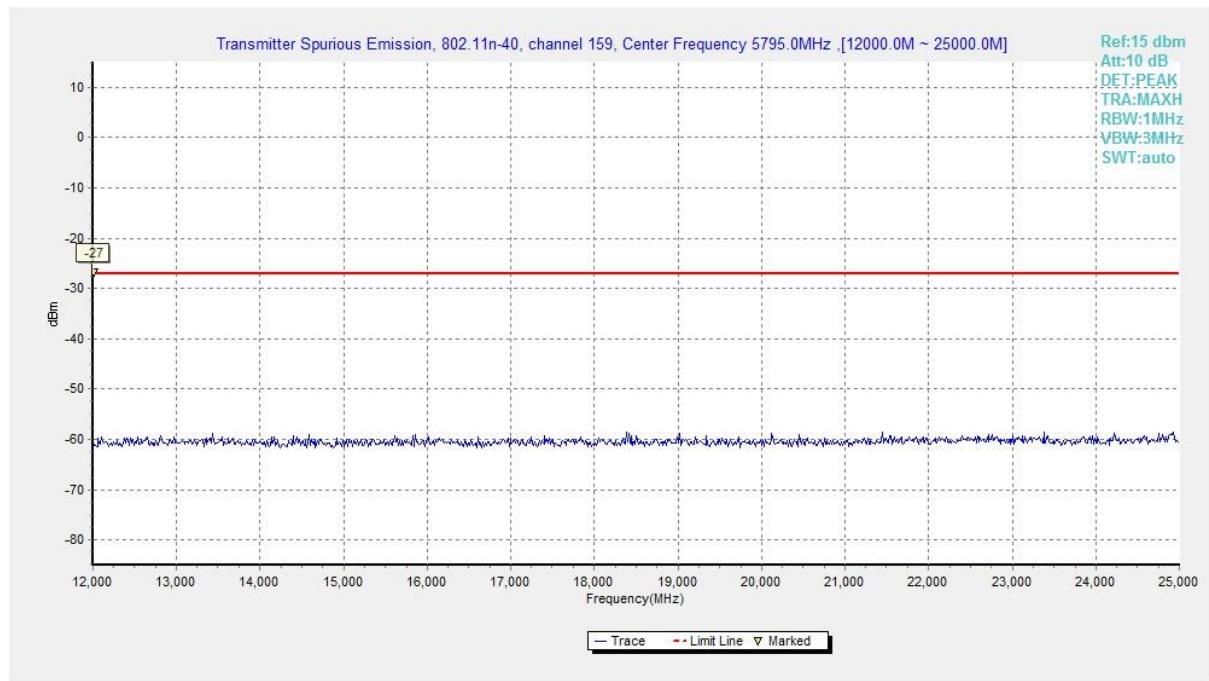


Fig. 25 Conducted Spurious Emission (802.11n-HT40, Ch159, 12 GHz-25 GHz)

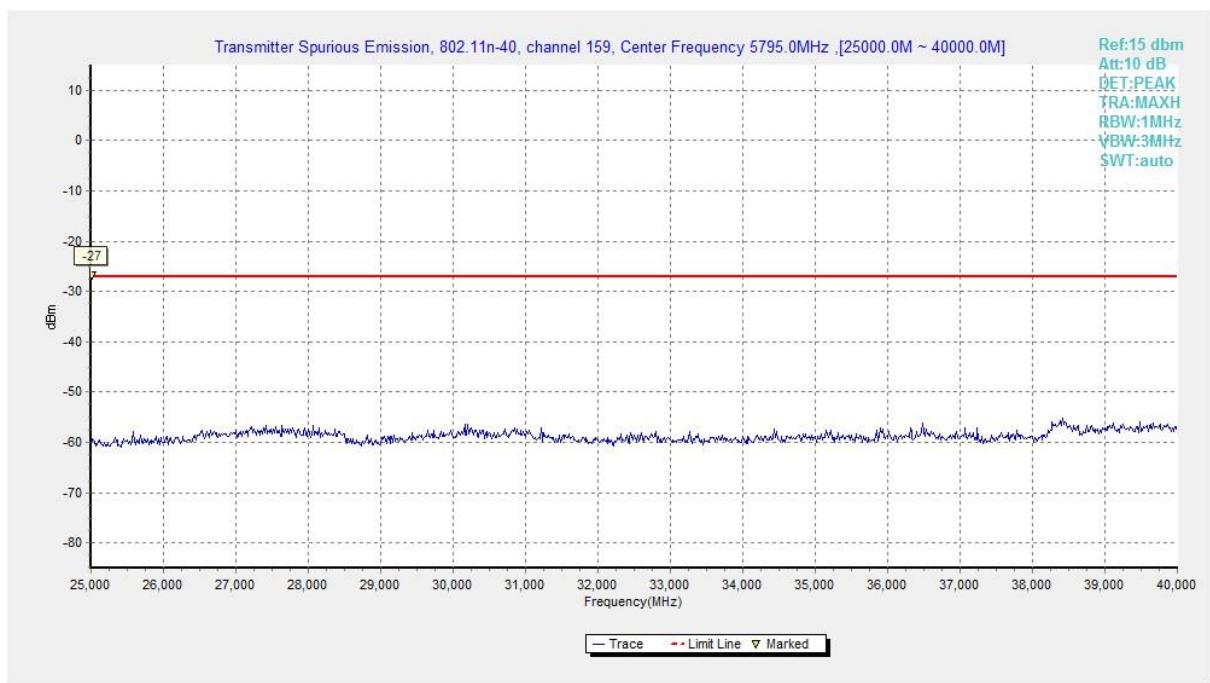


Fig. 26 Conducted Spurious Emission (802.11n-HT40, Ch159, 25 GHz-40 GHz)

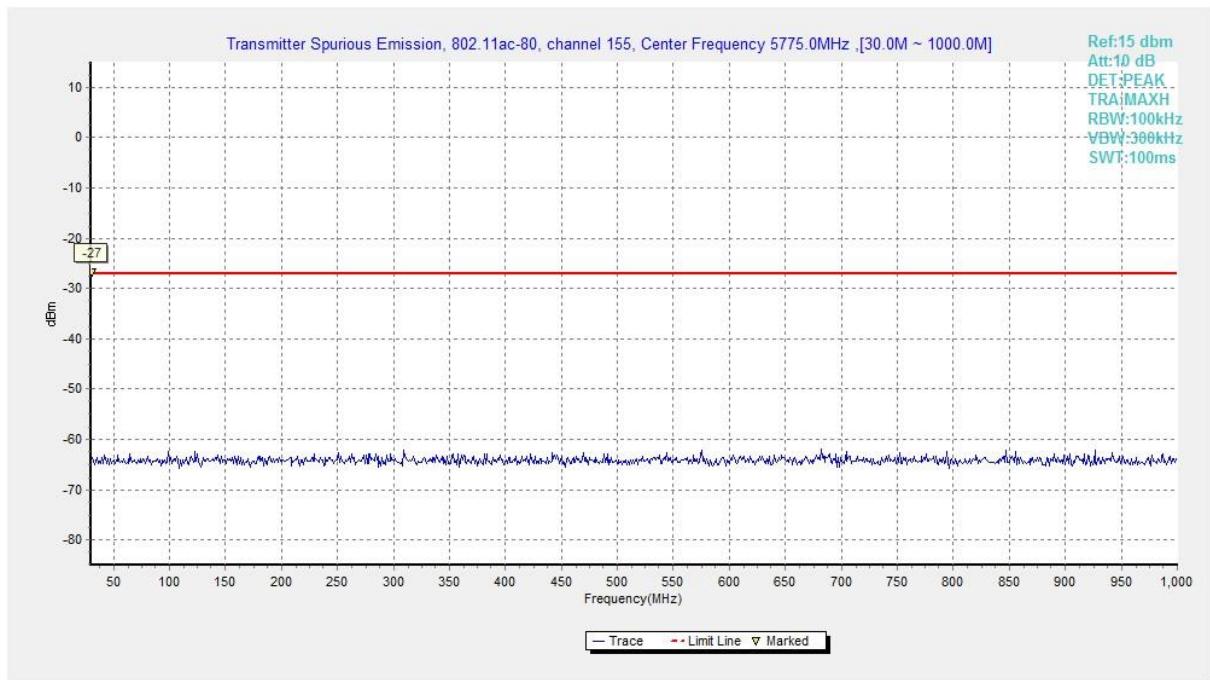


Fig. 27 Conducted Spurious Emission (802.11ac-HT80, Ch155, 30 MHz-1 GHz)

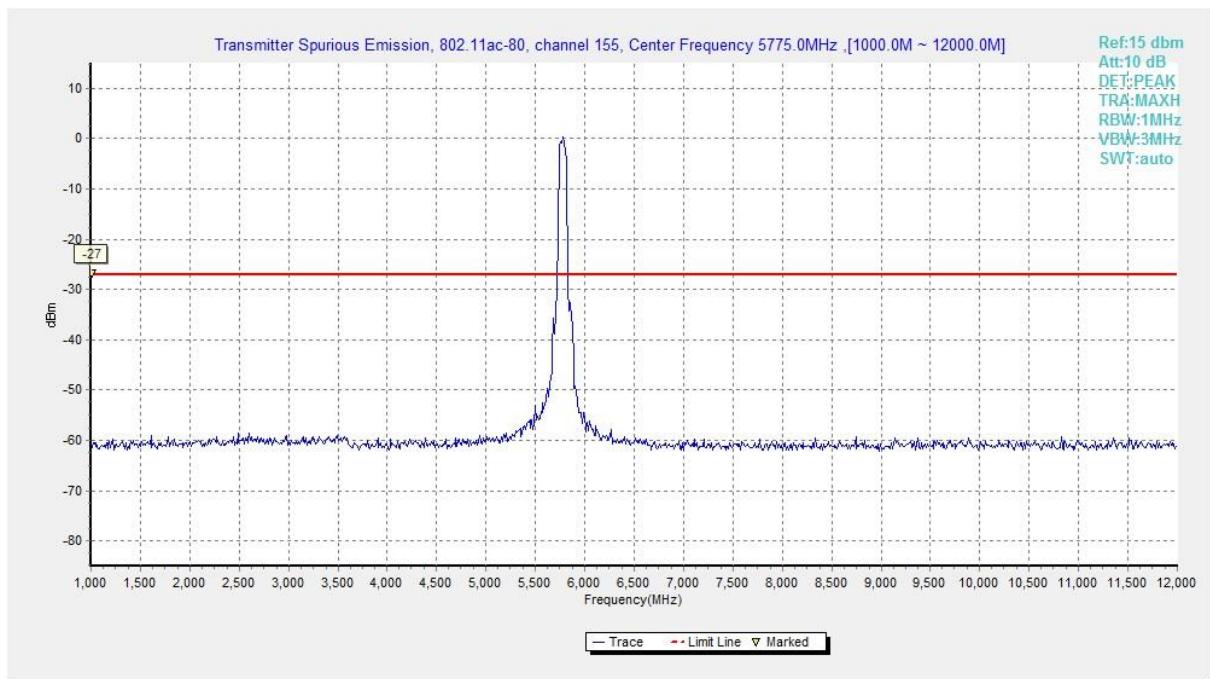


Fig. 28 Conducted Spurious Emission (802.11ac-HT80, Ch155, 1 GHz -12 GHz)

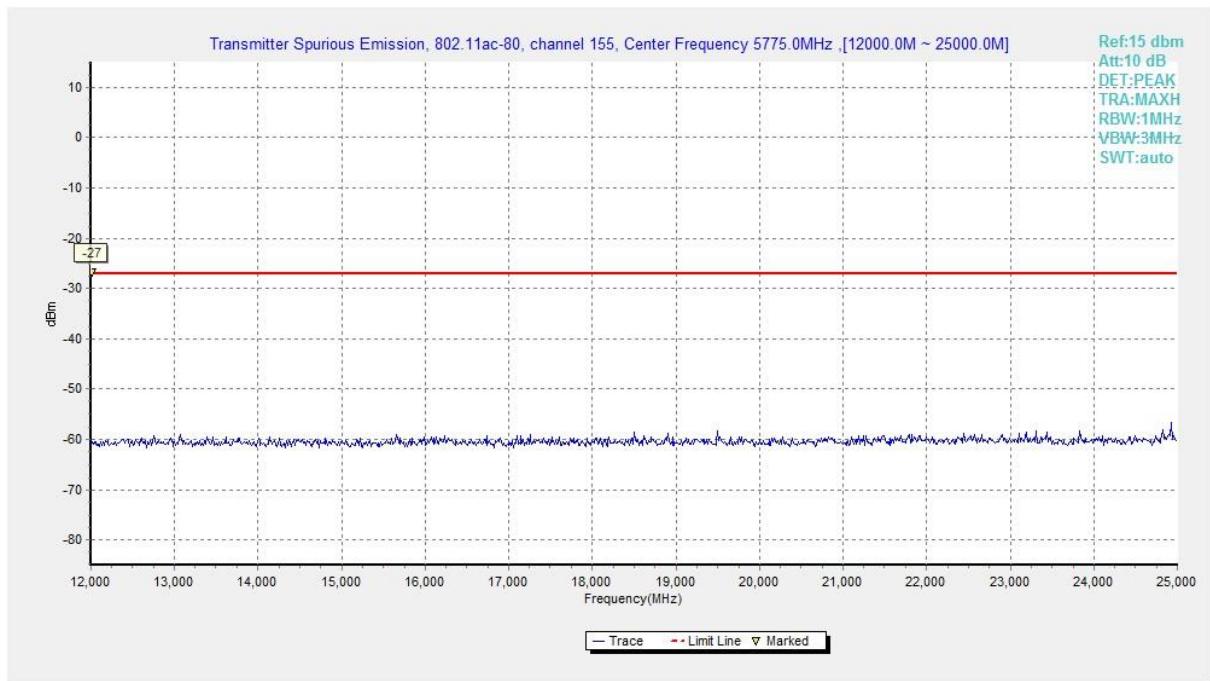


Fig. 29 Conducted Spurious Emission (802.11ac-HT80, Ch155, 12 GHz-25 GHz)

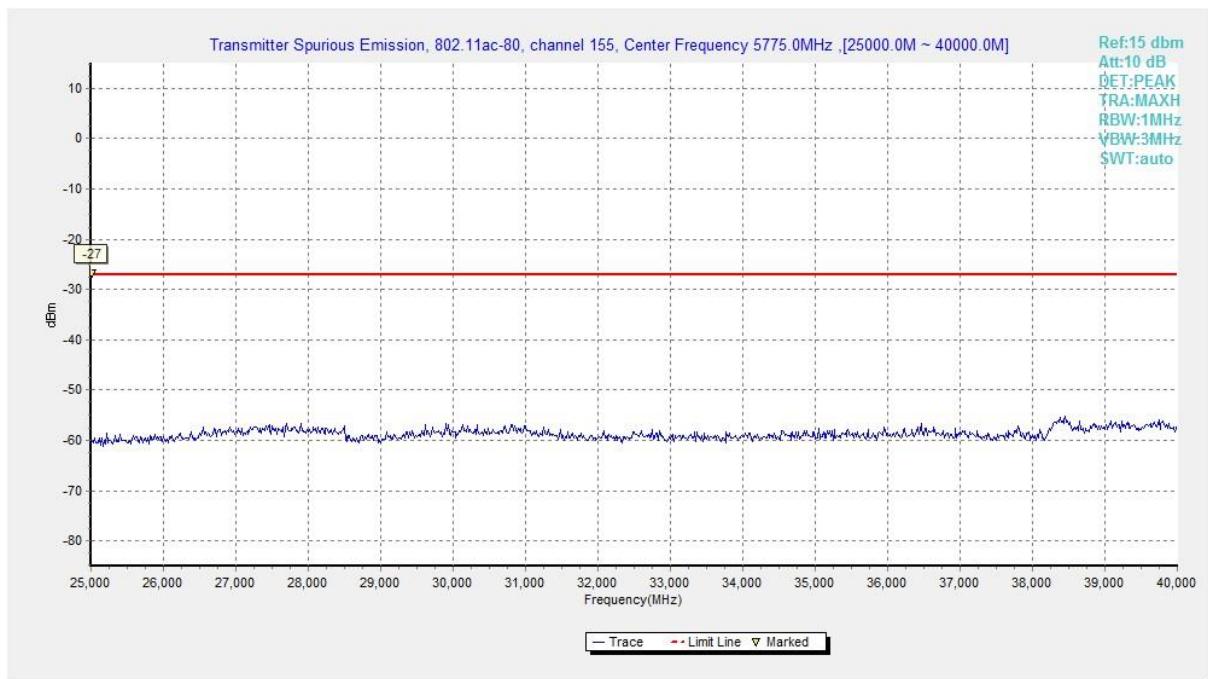


Fig. 30 Conducted Spurious Emission (802.11ac-HT80, Ch155, 25 GHz-40 GHz)

A.5.2 Transmitter Spurious Emission - Radiated

Measurement Uncertainty:

Frequency Range	Uncertainty(dB)
$f \leq 1\text{GHz}$	4.86
$f > 1\text{GHz}$	5.28

Measurement Results:

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

802.11a

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
5724.360	50.4	-33.8	35.1	49.1	H
11490.000	37.3	-22.7	39.0	21.0	H
17906.800	44.0	-18.5	45.6	16.9	H
17922.400	44.0	-17.7	45.6	16.1	H
17916.800	43.9	-17.7	45.6	16.0	H
17906.400	43.8	-18.5	45.6	16.7	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
11570.000	37.4	-22.7	39.6	20.5	H
17909.600	44.0	-18.5	45.6	16.9	H
17918.400	43.9	-17.7	45.6	16.0	H
17922.800	43.8	-17.7	45.6	15.9	H
17910.800	43.8	-18.5	45.6	16.7	H
17915.600	43.8	-17.7	45.6	15.9	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
5850.632	49.6	-33.8	35.1	48.3	H
11650.000	38.1	-22.7	39.6	21.2	H
17911.200	44.0	-18.5	45.6	16.9	H
17908.400	43.9	-18.5	45.6	16.8	H
17912.800	43.9	-18.5	45.6	16.8	H
17910.400	43.9	-18.5	45.6	16.8	H

802.11n-HT20

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5723.712	51.4	-33.8	35.1	50.1	H
11490.000	37.0	-22.7	39.0	20.7	H
17914.400	44.0	-17.7	45.6	16.1	V
17916.400	44.0	-17.7	45.6	16.1	H
17913.200	43.9	-18.5	45.6	16.8	H
17920.400	43.9	-17.7	45.6	16.0	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
11570.000	37.8	-22.7	39.6	20.9	H
17912.400	44.1	-18.5	45.6	17.0	H
17914.000	44.0	-18.5	45.6	16.9	H
17910.800	44.0	-18.5	45.6	16.9	H
17908.800	44.0	-18.5	45.6	16.9	H
17921.200	43.9	-17.7	45.6	16.0	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5852.536	49.9	-33.8	35.1	48.6	H
11650.000	38.2	-22.7	39.6	21.3	H
17908.400	44.0	-18.5	45.6	16.9	H
17923.600	44.0	-17.7	45.6	16.1	H
17909.600	43.8	-18.5	45.6	16.7	H
17920.000	43.8	-17.7	45.6	15.9	H

802.11n-HT40

Ch151

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5724.336	54.0	-33.8	35.1	52.7	H
11510.000	39.8	-22.7	39.6	22.9	H
17910.800	44.0	-18.5	45.6	16.9	V
17912.000	43.8	-18.5	45.6	16.7	H
17915.600	43.8	-17.7	45.6	15.9	H
17915.200	43.8	-17.7	45.6	15.9	H

Ch159

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5852.480	48.1	-33.8	35.1	46.8	H
11590.000	39.3	-22.7	39.6	22.4	H
17914.000	44.0	-18.5	45.6	16.9	H
17906.800	43.9	-18.5	45.6	16.8	H
17912.800	43.9	-18.5	45.6	16.8	H
17905.200	43.8	-18.5	45.6	16.7	H

802.11ac-HT20

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5722.872	50.3	-33.8	35.1	49.0	H
11490.000	37.0	-22.7	39.0	20.7	H
17925.600	43.9	-17.7	45.6	16.0	H
17906.400	43.9	-18.5	45.6	16.8	H
17913.200	43.9	-18.5	45.6	16.8	H
17907.600	43.9	-18.5	45.6	16.8	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
11570.000	37.5	-22.7	39.6	20.6	H
17924.400	44.2	-17.7	45.6	16.3	H
17918.400	44.0	-17.7	45.6	16.1	V
17906.000	43.9	-18.5	45.6	16.8	H
17910.000	43.8	-18.5	45.6	16.7	H
17906.800	43.8	-18.5	45.6	16.7	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5850.208	49.6	-33.8	35.1	48.3	H
11650.000	38.0	-22.7	39.6	21.1	H
17919.200	43.9	-17.7	45.6	16.0	H
17911.600	43.9	-18.5	45.6	16.8	H
17907.600	43.9	-18.5	45.6	16.8	H
17920.000	43.9	-17.7	45.6	16.0	H

802.11ac-HT40

Ch151

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5724.136	52.0	-33.8	35.1	50.7	H
11510.000	38.2	-22.7	39.6	21.3	H
17922.800	43.9	-17.7	45.6	16.0	H
17908.800	43.9	-18.5	45.6	16.8	H
17905.200	43.8	-18.5	45.6	16.7	H
17916.800	43.8	-17.7	45.6	15.9	H

Ch159

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5850.944	48.1	-33.8	35.1	46.8	H
11590.000	37.5	-22.7	39.6	20.6	H
17912.400	44.1	-18.5	45.6	17.0	H
17914.400	44.0	-17.7	45.6	16.1	H
17912.800	43.8	-18.5	45.6	16.7	H
17912.000	43.8	-18.5	45.6	16.7	H

802.11ac-HT80

Ch155

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
17920.400	44.4	-17.7	45.6	16.5	H
17908.400	44.2	-18.5	45.6	17.1	H
17910.800	44.2	-18.5	45.6	17.1	H
17919.200	44.2	-17.7	45.6	16.3	H
17918.000	44.1	-17.7	45.6	16.2	H
17905.200	44.1	-18.5	45.6	17.0	H

Peak
802.11a

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5724.320	68.5	-33.8	35.1	67.2	H
11490.000	45.4	-22.7	39.0	29.1	H
17913.600	44.1	-18.5	45.6	17.0	H
17920.000	44.1	-17.7	45.6	16.2	H
17918.800	44.0	-17.7	45.6	16.1	H
17910.000	44.0	-18.5	45.6	16.9	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
11570.000	45.8	-22.7	39.6	28.9	H
17901.200	55.8	-18.5	45.6	28.7	H
17942.000	55.5	-17.7	45.6	27.6	H
17933.200	55.5	-17.7	45.6	27.6	H
17913.200	55.1	-18.5	45.6	28.0	H
17800.000	55.1	-18.5	45.6	28.0	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5850.368	66.1	-33.8	35.1	64.8	H
11674.800	46.8	-22.7	39.6	29.9	H
17940.800	55.6	-17.7	45.6	27.7	H
17914.000	55.4	-18.5	45.6	28.3	H
17842.800	55.3	-18.5	45.6	28.2	H
17920.000	55.3	-17.7	45.6	27.4	H

802.11n-HT20

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5723.648	69.4	-33.8	35.1	68.1	H
11490.400	46.2	-22.7	39.0	29.9	H
17896.800	56.1	-18.5	45.6	29.0	H
17862.800	55.7	-18.5	45.6	28.6	H
17910.000	55.6	-18.5	45.6	28.5	H
17871.600	55.1	-18.5	45.6	28.0	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
11570.000	45.5	-22.7	39.6	28.6	H
17909.200	55.6	-18.5	45.6	28.5	H
17908.800	55.6	-18.5	45.6	28.5	H
17923.200	55.3	-17.7	45.6	27.4	H
17833.600	55.2	-18.5	45.6	28.1	H
17904.800	55.2	-18.5	45.6	28.1	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5852.536	67.6	-33.8	35.1	66.3	H
11650.000	46.9	-22.7	39.6	30.0	H
17993.600	56.5	-17.7	45.6	28.6	H
17895.200	56.2	-18.5	45.6	29.1	H
17863.600	55.5	-18.5	45.6	28.4	H
17912.400	55.3	-18.5	45.6	28.2	H

802.11n-HT40

Ch151

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5721.232	71.1	-33.8	35.1	69.8	H
11510.000	46.7	-22.7	39.6	29.8	H
17902.400	56.9	-18.5	45.6	29.8	H
17933.600	56.1	-17.7	45.6	28.2	H
17902.800	55.7	-18.5	45.6	28.6	H
17946.800	55.6	-17.7	45.6	27.7	H

Ch159

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
5852.240	60.1	-33.8	35.1	58.8	H
11590.000	46.3	-22.7	39.6	29.4	H
17886.000	55.7	-18.5	45.6	28.6	H
17827.600	55.4	-18.5	45.6	28.3	H
17836.000	55.3	-18.5	45.6	28.2	H
17878.000	55.0	-18.5	45.6	27.9	H

802.11ac-HT20

Ch149

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	PMea (dBuV/m)	Polarization
5722.880	67.5	-33.8	35.1	66.2	H
11514.800	46.1	-22.7	39.6	29.2	H
17924.400	55.4	-17.7	45.6	27.5	H
17817.200	55.3	-18.5	45.6	28.2	H
17980.800	55.1	-17.7	45.6	27.2	H
17747.600	54.9	-18.5	45.6	27.8	H

Ch157

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	PMea (dBuV/m)	Polarization
11536.800	46.1	-22.7	39.6	29.2	H
17930.800	55.4	-17.7	45.6	27.5	H
17808.400	55.0	-18.5	45.6	27.9	H
17948.800	55.0	-17.7	45.6	27.1	H
17914.800	55.0	-17.7	45.6	27.1	H
17990.000	54.9	-17.7	45.6	27.0	H

Ch165

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	PMea (dBuV/m)	Polarization
5850.200	63.0	-33.8	35.1	61.7	H
11650.000	45.5	-22.7	39.6	28.6	H
17931.600	56.1	-17.7	45.6	28.2	H
17926.800	55.8	-17.7	45.6	27.9	H
17910.400	55.8	-18.5	45.6	28.7	H
17976.800	55.4	-17.7	45.6	27.5	H

802.11ac-HT40

Ch151

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	PMea (dBuV/m)	Polarization
5724.240	67.7	-33.8	35.1	66.4	H
11510.000	45.7	-22.7	39.6	28.8	H
17940.400	55.8	-17.7	45.6	27.9	H
17906.800	55.3	-18.5	45.6	28.2	H
17911.200	55.3	-18.5	45.6	28.2	H
17943.600	55.2	-17.7	45.6	27.3	H

Ch159

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	PMea (dBuV/m)	Polarization
5851.432	61.0	-33.8	35.1	59.7	H
11522.800	45.9	-22.7	39.6	29.0	H
17926.800	56.1	-17.7	45.6	28.2	H
17905.600	56.0	-18.5	45.6	28.9	H
17911.600	55.4	-18.5	45.6	28.3	H
17912.400	55.4	-18.5	45.6	28.3	H

802.11ac-HT80

Ch155

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P _{Mea} (dBuV/m)	Polarization
17968.800	56.4	-17.7	45.6	28.5	H
17932.400	56.1	-17.7	45.6	28.2	H
17962.000	56.1	-17.7	45.6	28.2	H
17904.800	55.9	-18.5	45.6	28.8	H
17939.200	55.6	-17.7	45.6	27.7	H
17919.600	55.6	-17.7	45.6	27.7	H

Sample calculation: 802.11ac 80MHz CH155–Peak, 17968.800 MHz

Peak ERP(dBm) = P_{Mea}(28.5dBuV/m) + Cable Loss(-17.7) + Antenna Factor(45.6) = 56.4 dBuV/m

A.6. Band Edges Compliance

A6.1 Band Edges - conducted

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407 (b) (4)	5715MHz~5860MHz	< -17
	Below 5715MHz, Above 5860MHz	< -27

The measurement is made according to KDB 789033 D02

Measurement Uncertainty:

Measurement Uncertainty	3.38dB
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Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11n	5745 MHz	Fig.31	P
HT20	5825 MHz	Fig.32	P

Note: 802.11n HT20 was selected as the worst-case of the test case.

Conclusion: PASS

Test graphs as below:

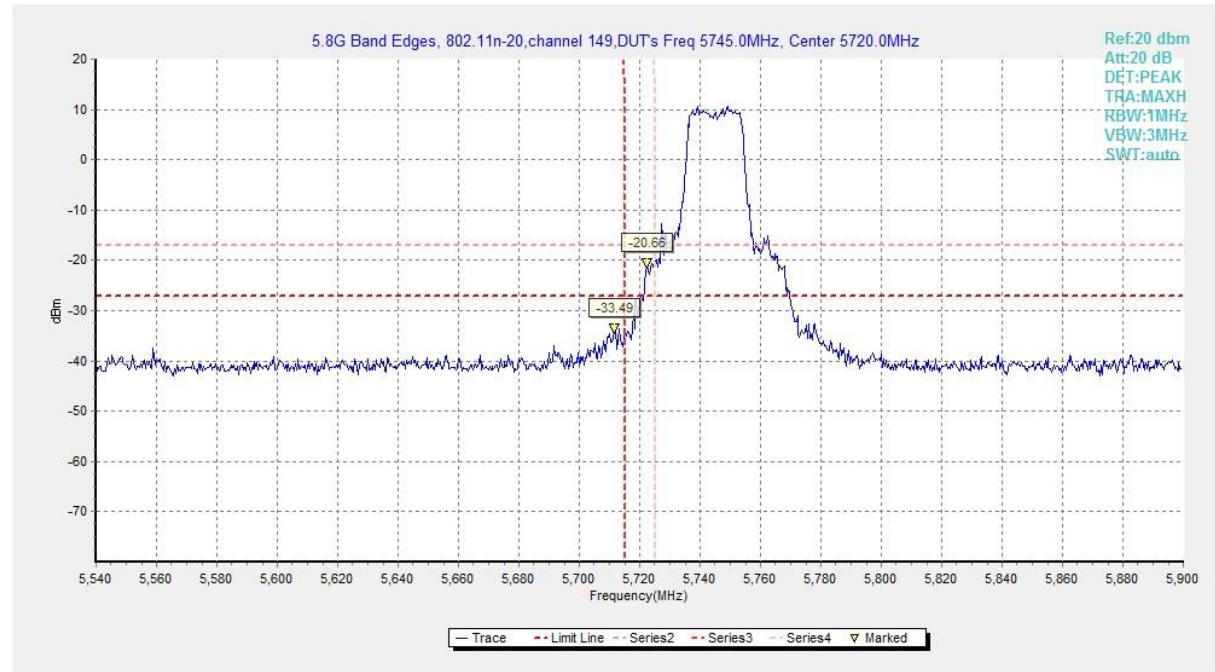


Fig. 31 Band Edges (802.11n-HT20, 5745MHz)

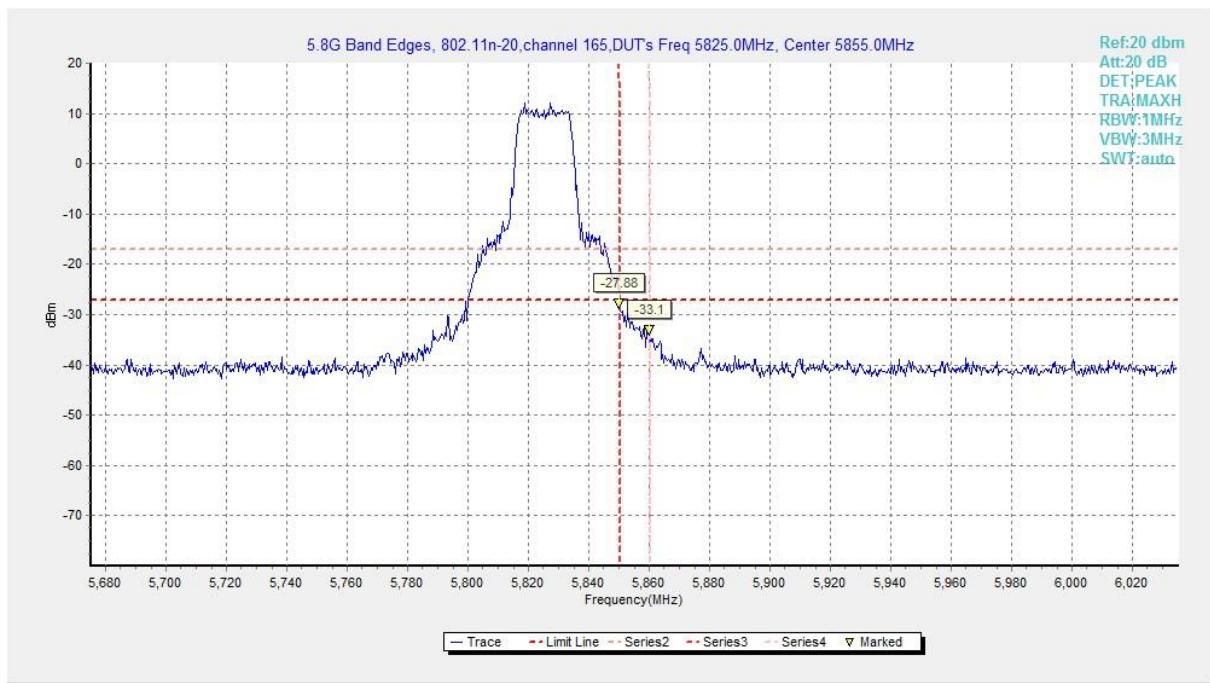


Fig. 32 Band Edges (802.11n-HT20, 5825MHz)

A6.2 Band Edges - Radiated

Measurement Limit:

Standard	Limit (dB μ V/m)	
FCC 47 CFR Part 15.209	Peak	74
	Average	54

The measurement is made according to KDB 789033 D02

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)).

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.33	P
	5825 MHz	Fig.34	P
802.11n HT20	5745 MHz	Fig.35	P
	5825 MHz	Fig.36	P
802.11n HT40	5755 MHz	Fig.37	P
	5795 MHz	Fig.38	P
802.11ac HT20	5745 MHz	Fig.39	P
	5825 MHz	Fig.40	P
802.11ac HT40	5755 MHz	Fig.41	P
	5795 MHz	Fig.42	P

Conclusion: PASS

Test graphs as below:

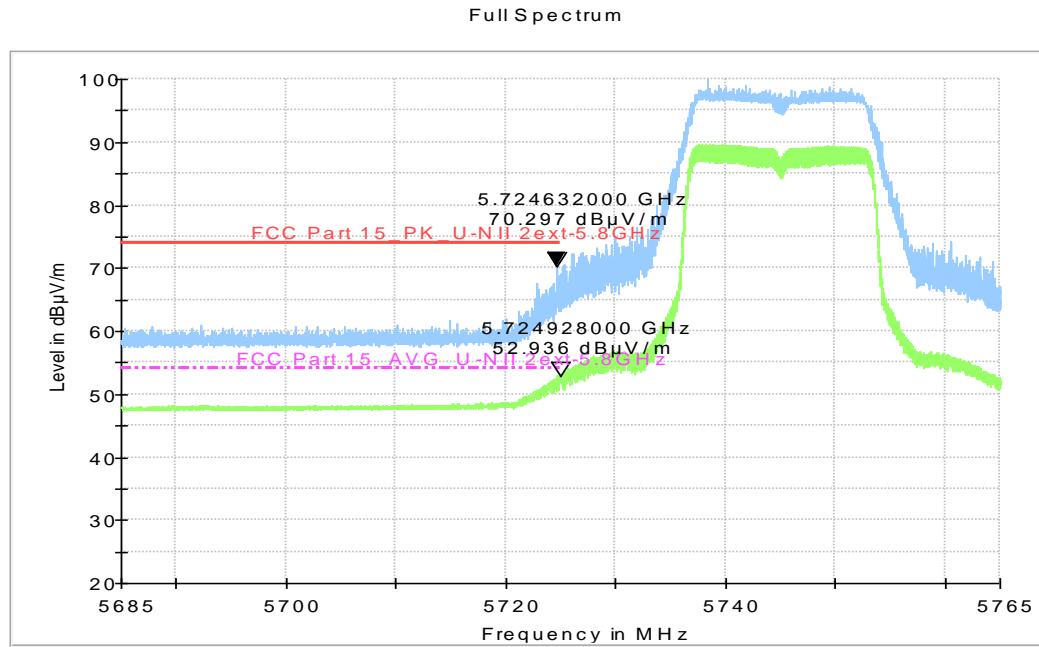


Fig. 33 Band Edges (802.11a, 5745MHz)

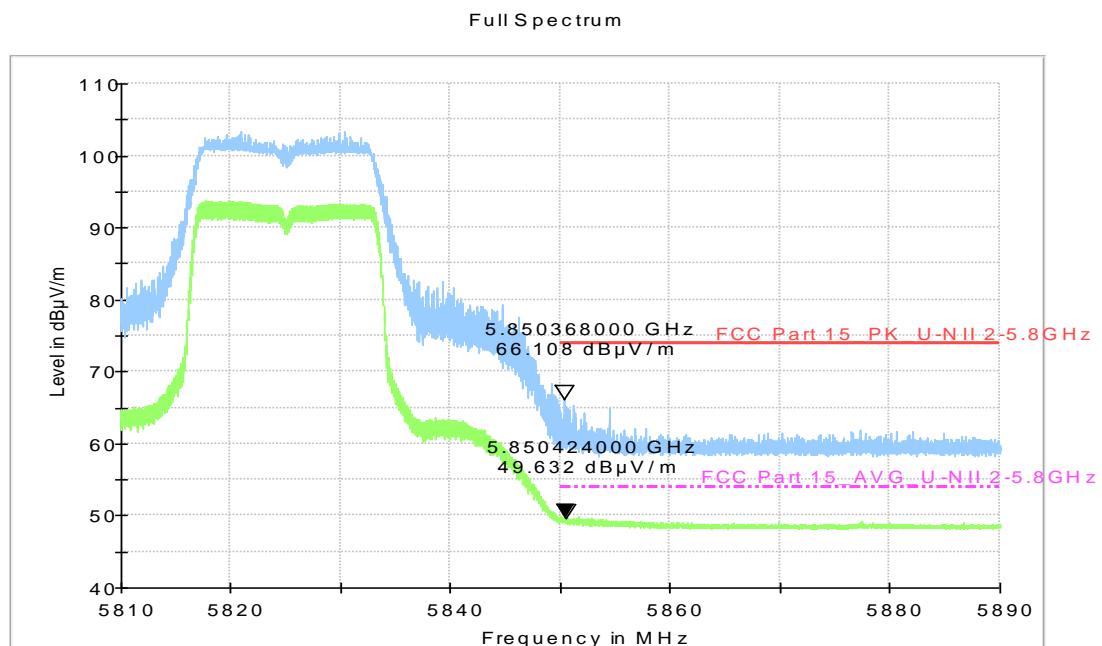


Fig. 34 Band Edges (802.11a, 5825MHz)

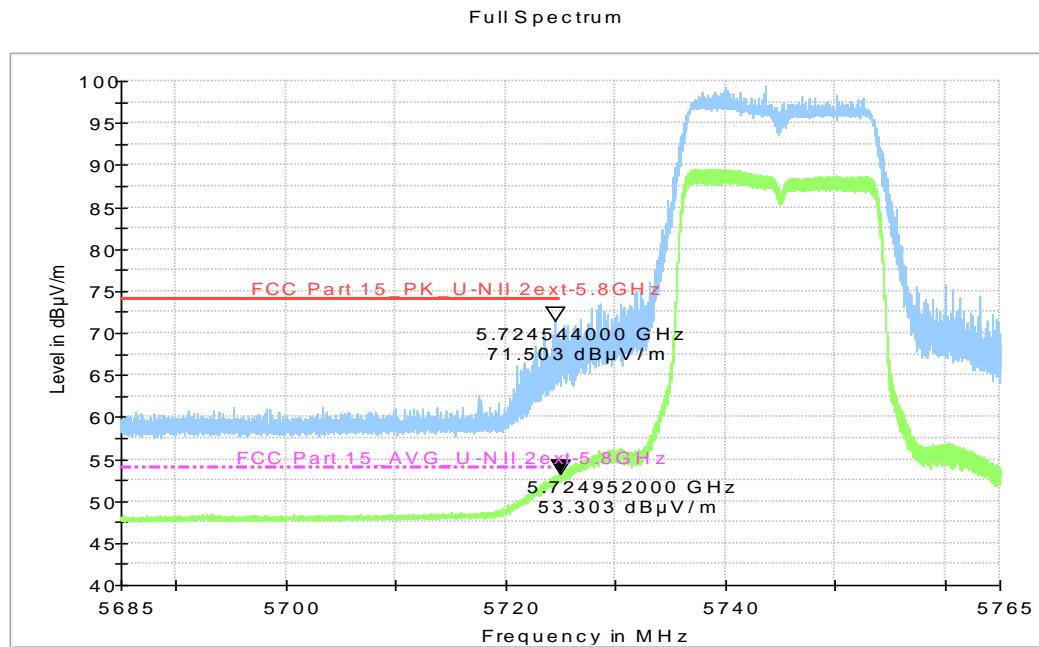


Fig. 35 Band Edges (802.11n-HT20, 5745MHz)

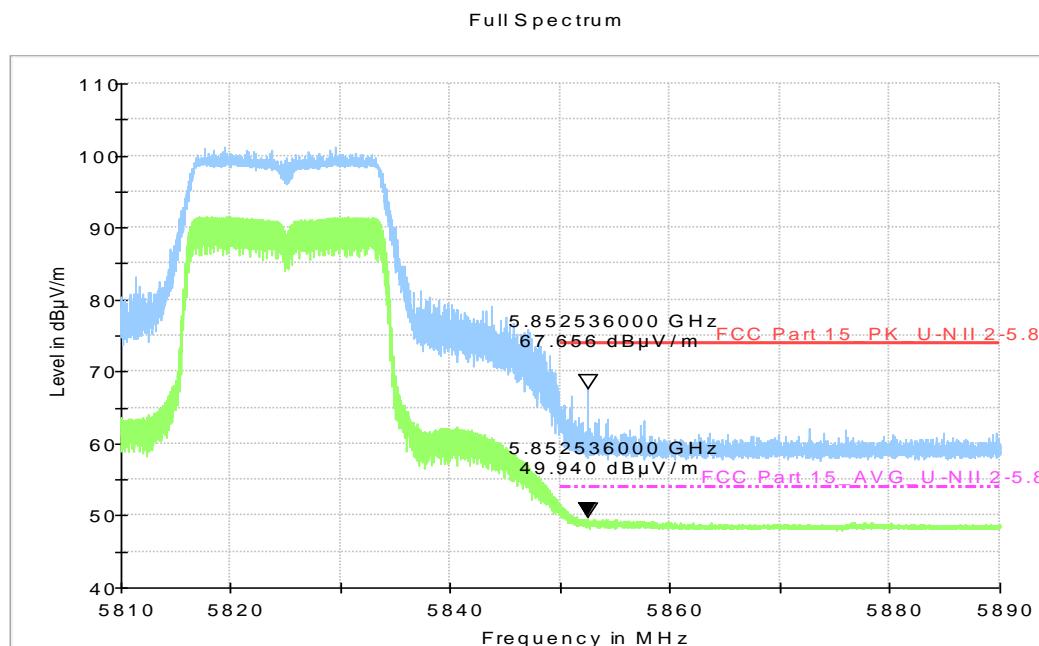


Fig. 36 Band Edges (802.11n-HT20, 5825MHz)

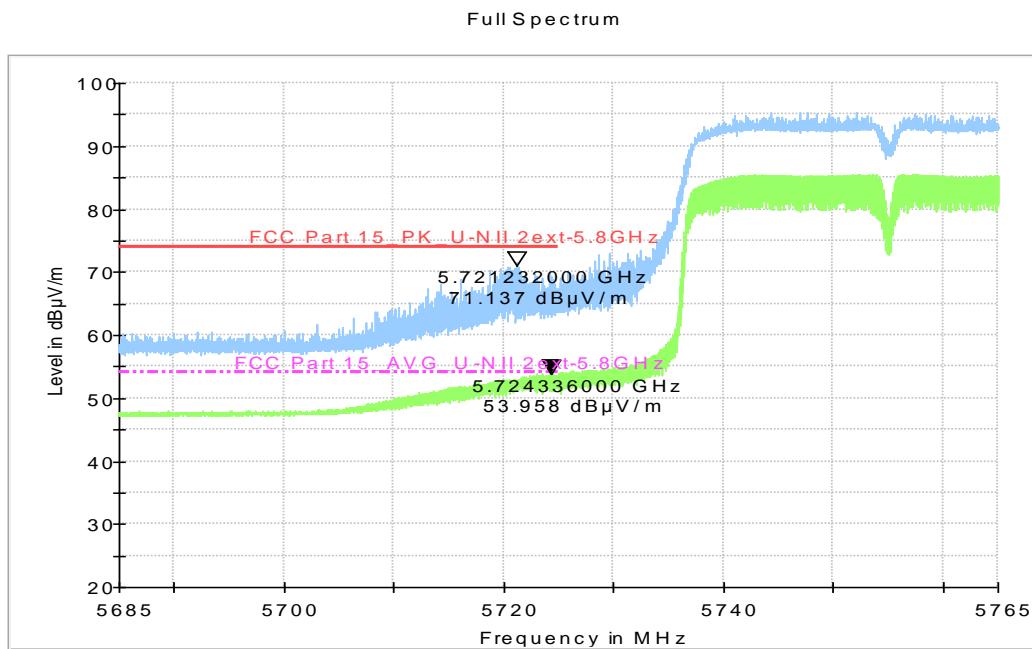


Fig. 37 Band Edges (802.11n-HT40, 5755MHz)

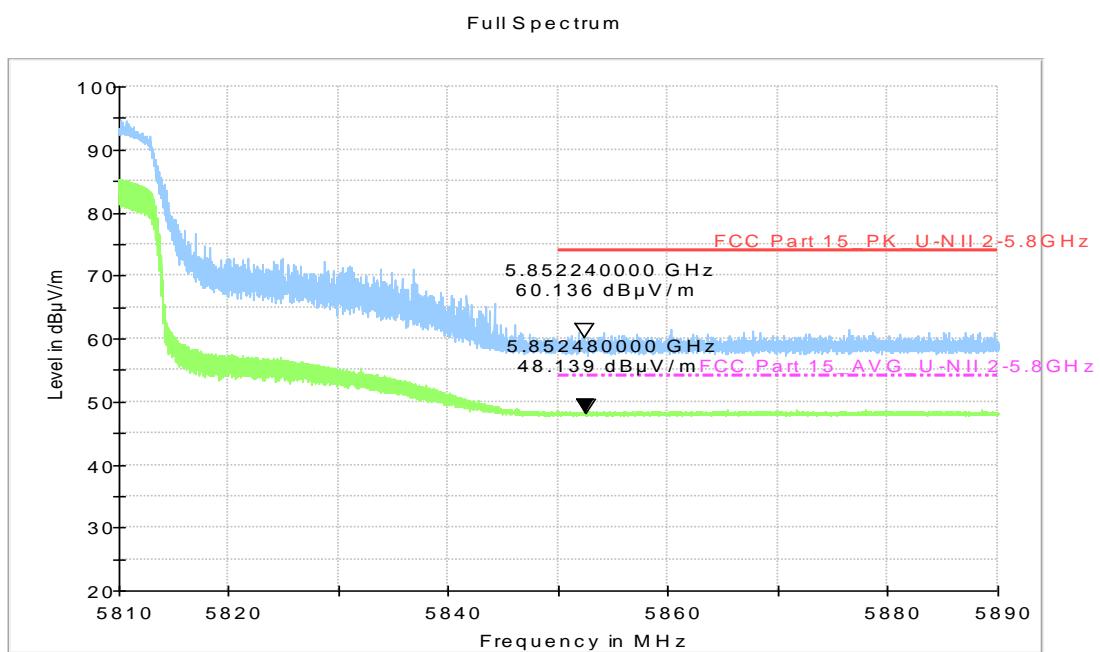


Fig. 38 Band Edges (802.11n-HT40, 5795MHz)

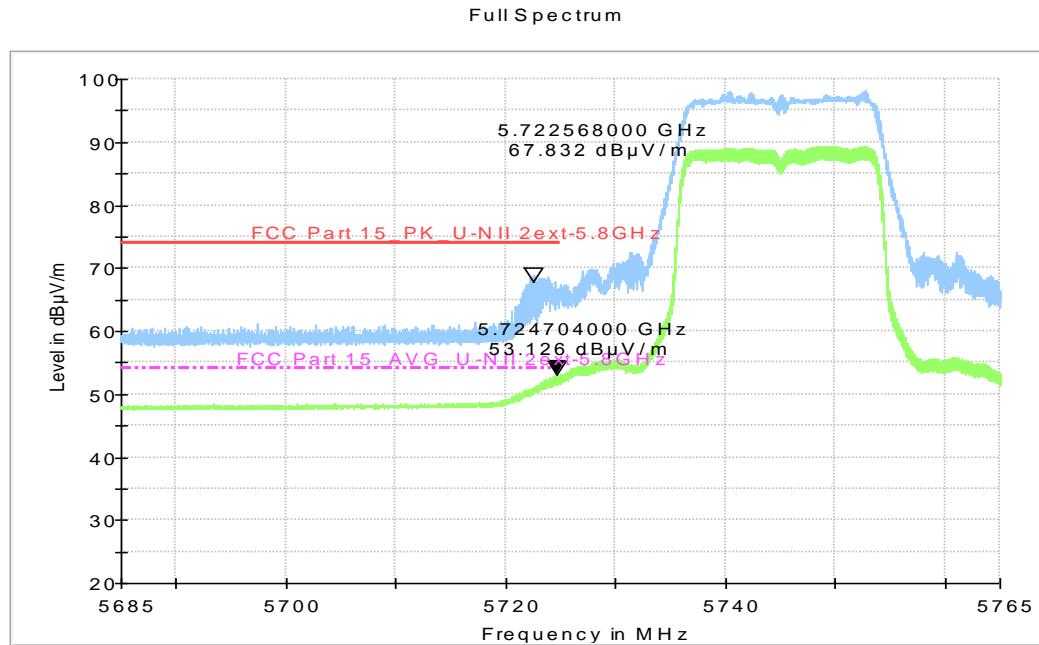


Fig. 39 Band Edges (802.11ac-HT20, 5745MHz)

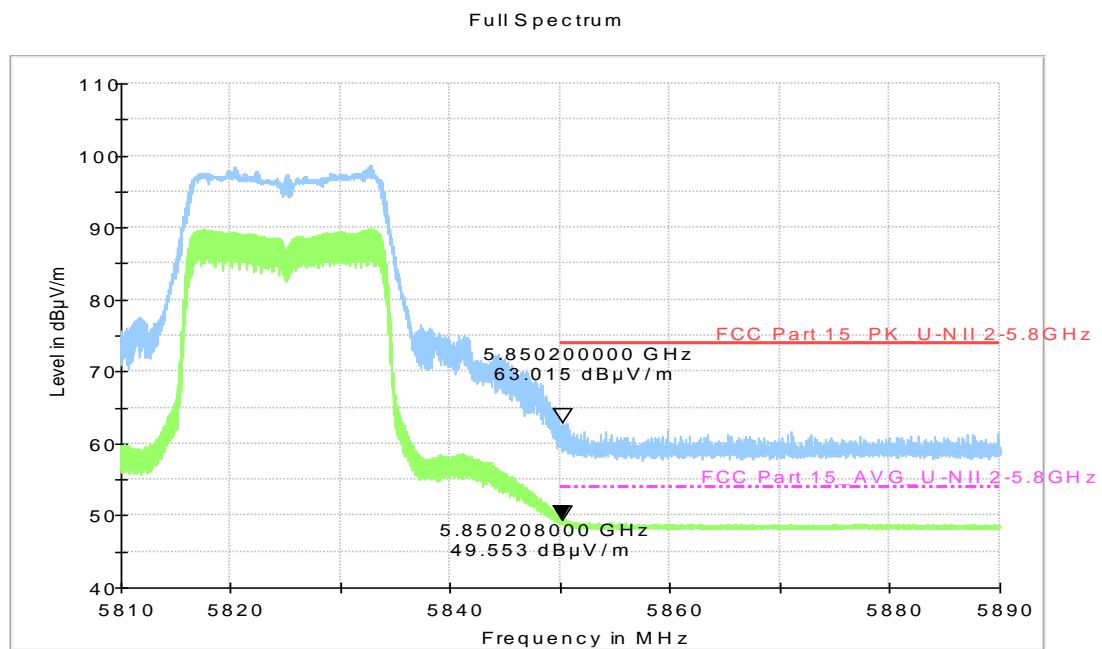


Fig. 40 Band Edges (802.11ac-HT20, 5825MHz)

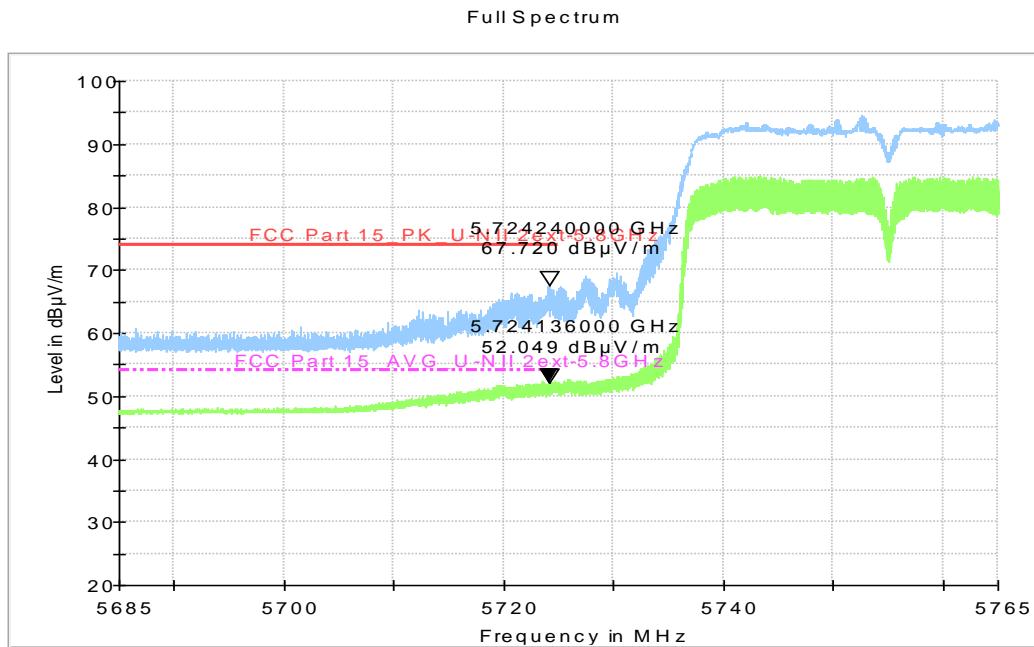


Fig. 41 Band Edges (802.11ac-HT40, 5755MHz)

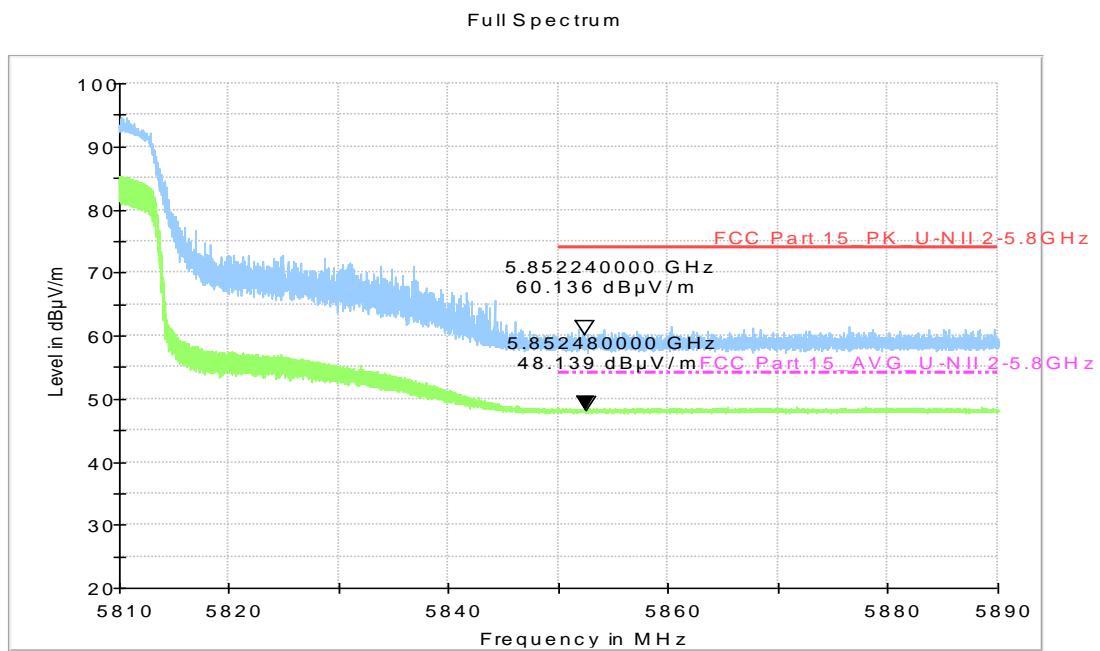


Fig. 42 Band Edges (802.11ac-HT40, 5795MHz)

A.7. AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
110	60

Measurement uncertainty:

Expanded measurement uncertainty for this test item is $U = 3.38\text{dB}$, $k=2$.

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.43	Fig.44	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.43	Fig.44	P	
0.5 to 5	46				
5 to 30	50				

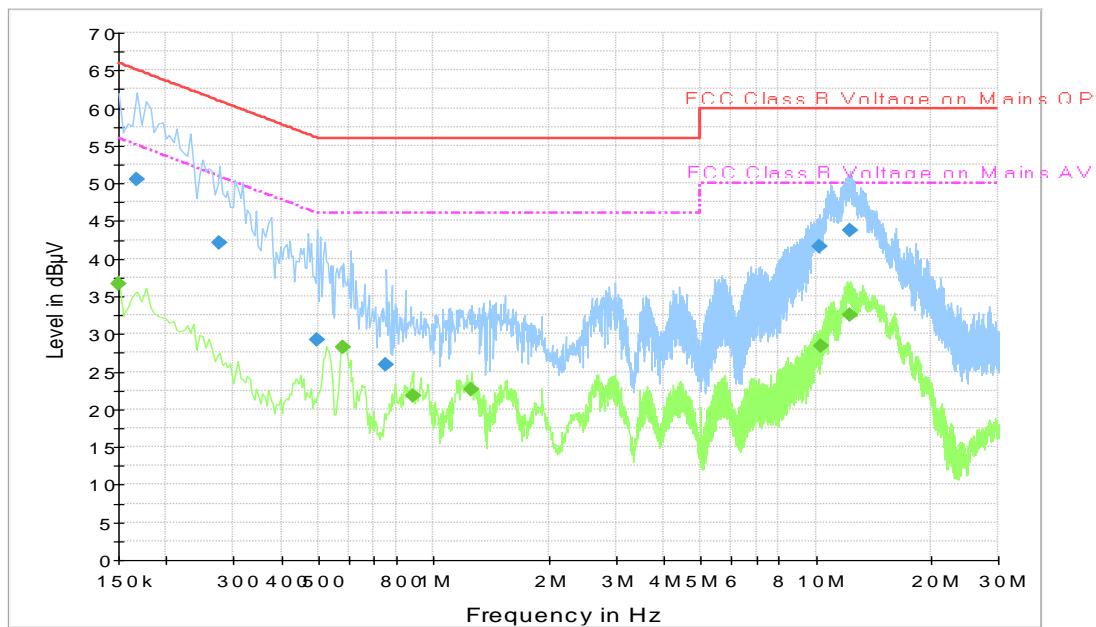
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10 .

Conclusion: PASS

Test graphs as below:

traffic

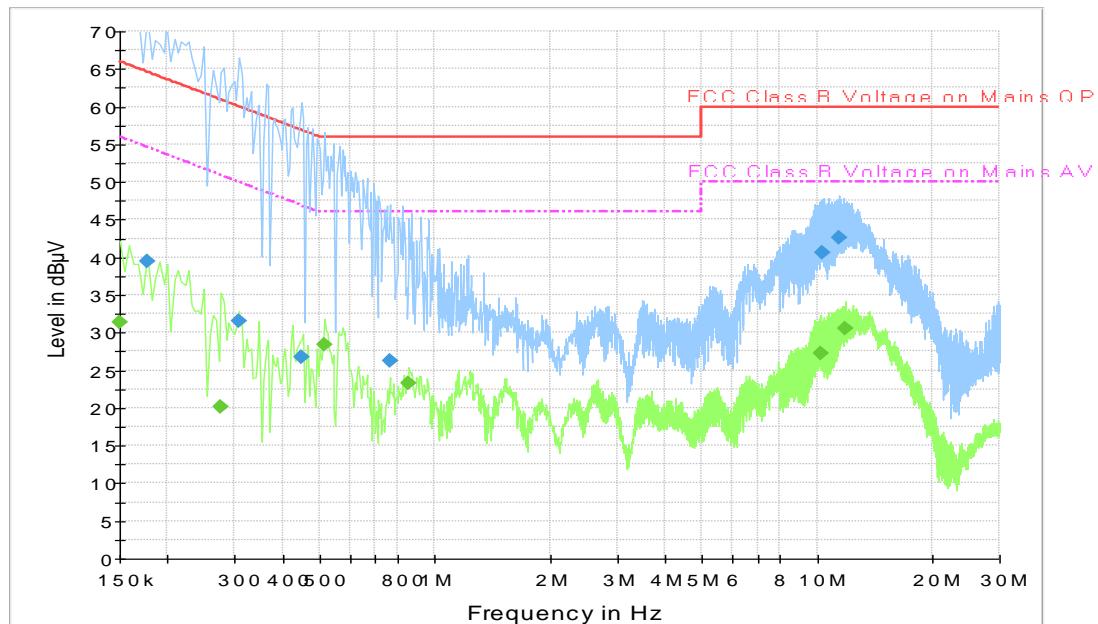

Fig. 43 AC Powerline Conducted Emission-802.11a
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.168000	50.5	L1	19.9	14.5	65.1
0.276000	42.2	L1	19.8	18.8	60.9
0.496500	29.2	N	19.9	26.8	56.1
0.753000	25.9	N	19.8	30.1	56.0
10.243500	41.6	N	19.8	18.4	60.0
12.300000	43.8	L1	19.7	16.2	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	36.6	L1	20.2	19.4	56.0
0.582000	28.2	L1	19.9	17.8	46.0
0.883500	21.8	L1	19.8	24.2	46.0
1.257000	22.6	L1	19.7	23.4	46.0
10.333500	28.4	N	19.8	21.6	50.0
12.250500	32.4	L1	19.7	17.6	50.0

idle


Fig. 44 AC Powerline Conducted Emission-Idle

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.177000	39.5	L1	19.8	25.1	64.6
0.307500	31.5	L1	19.8	28.5	60.0
0.447000	26.8	N	19.9	30.1	56.9
0.762000	26.2	N	19.8	29.8	56.0
10.333500	40.6	L1	19.7	19.4	60.0
11.413500	42.7	N	19.7	17.3	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	31.3	N	20.2	24.7	56.0
0.276000	20.1	L1	19.8	30.8	50.9
0.514500	28.4	L1	19.9	17.6	46.0
0.856500	23.3	L1	19.8	22.7	46.0
10.203000	27.3	L1	19.7	22.7	50.0
11.863500	30.6	L1	19.7	19.4	50.0

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