



FCC RF Test Report

APPLICANT : Acer Incorporated
EQUIPMENT : Notebook computer
BRAND NAME : acer
MODEL NAME : N18H1
FCC ID : Contains FCC ID : HLZ9560D2W
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was installed a module during the test: WLAN and BT, 2*2 PCIe M.2 1216 SD adapter card (Brand Name: acer, Model Name: 9560D2W, FCC ID: HLZ9560D2W) during test.

The product was received on Mar. 28, 2018 and testing was completed on May 01, 2018. We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Shenzhen) Inc., the test report shall not be reproduced except in full.

Approved by: Eric Shih / Manager



Sporton International (Shenzhen) Inc.

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Guangdong Province 518055 China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR832801E	Rev. 01	Initial issue of report	May 11, 2018



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.403(i)	6dB, 26dB and 99% Occupied Bandwidth	> 500kHz	Pass	1
3.1	15.407(a)	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
-	15.407(a)	Power Spectral Density	≤ 30 dBm/500kHz	Pass	1
3.2	15.407(b)	Unwanted Emissions	15.407(b)(4)(i) & 15.209(a)	Pass	Under limit 6.16 dB at 80.440 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.10 dB at 0.520 MHz
3.4	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.5	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-
Remark: All conducted test items were leveraged from module RF report "170919-03.TR03".					



1 General Description

1.1 Applicant

Acer Incorporated

8F, 88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

1.2 Manufacturer

Acer Incorporated

8F, 88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook computer
Brand Name	acer
Model Name	N18H1
FCC ID	Contains FCC ID : HLZ9560D2W
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN5GHz 802.11a/n HT20/HT40 WLAN5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 Bluetooth V3.0+EDR/ Bluetooth V5.0 LE
EUT Stage	Identical Prototype

Module Feature & Specification	
Equipment	WLAN and BT, 2*2 PCIe M.2 1216 SD adapter card
Brand Name	acer
Model Name	9560D2W
FCC ID	HLZ9560D2W
Applicant	Acer Incorporated 8F, 88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C
Manufacturer	Acer Incorporated 8F, 88, Sec.1 Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan, R.O.C

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification												
Tx/Rx Channel Frequency Range		5745 MHz ~ 5825 MHz										
Maximum Output Power		<5745 MHz ~ 5825 MHz> <Ant. 1> 802.11a : 17.46 dBm / 0.0557 W 802.11n HT20 : 17.43 dBm / 0.0553 W 802.11n HT40 : 17.43 dBm / 0.0553 W 802.11ac VHT20: 17.41 dBm / 0.0551 W 802.11ac VHT40: 17.40 dBm / 0.0550 W 802.11ac VHT80: 17.00 dBm / 0.0501 W <Ant. 2> 802.11a : 16.45 dBm / 0.0442 W 802.11n HT20 : 16.42 dBm / 0.0439 W 802.11n HT40 : 16.50 dBm / 0.0447 W 802.11ac VHT20: 16.41 dBm / 0.0438 W 802.11ac VHT40: 16.46 dBm / 0.0443 W 802.11ac VHT80: 16.47 dBm / 0.0444 W MIMO <Ant. 1 + 2> 802.11n HT20 : 20.01 dBm / 0.1002 W 802.11n HT40 : 20.00 dBm / 0.1000 W 802.11ac VHT20: 19.98 dBm / 0.0995 W 802.11ac VHT40: 19.99 dBm / 0.0998 W 802.11ac VHT80: 16.34 dBm / 0.0431 W										
Type of Modulation		802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)										
Antenna Type / Gain		<Ant. 1> : PIFA Antenna with gain 2.70 dBi <Ant. 2> : PIFA Antenna with gain 2.50 dBi										
Antenna Function Description		<table><tr><td></td><td>Ant. 1</td><td>Ant. 2</td></tr><tr><td>802.11 a/n/ac SISO</td><td>V</td><td>V</td></tr><tr><td>802.11 n/ac MIMO</td><td>V</td><td>V</td></tr></table>			Ant. 1	Ant. 2	802.11 a/n/ac SISO	V	V	802.11 n/ac MIMO	V	V
	Ant. 1	Ant. 2										
802.11 a/n/ac SISO	V	V										
802.11 n/ac MIMO	V	V										

Note:

- For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing has assessed only 802.11ac VHT20/ VHT40 by referring to their higher conducted power.
- For 802.11n/ac SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power.



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	TH01-SZ	CO01-SZ	251365

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	03CH04-SZ		577730

Note: The test site complies with ANSI C63.4 2014 requirement.



1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155 [#]	5775	165	5825

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80.

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Single Mode

Modulation	Data Rate
802.11a	6 Mbps

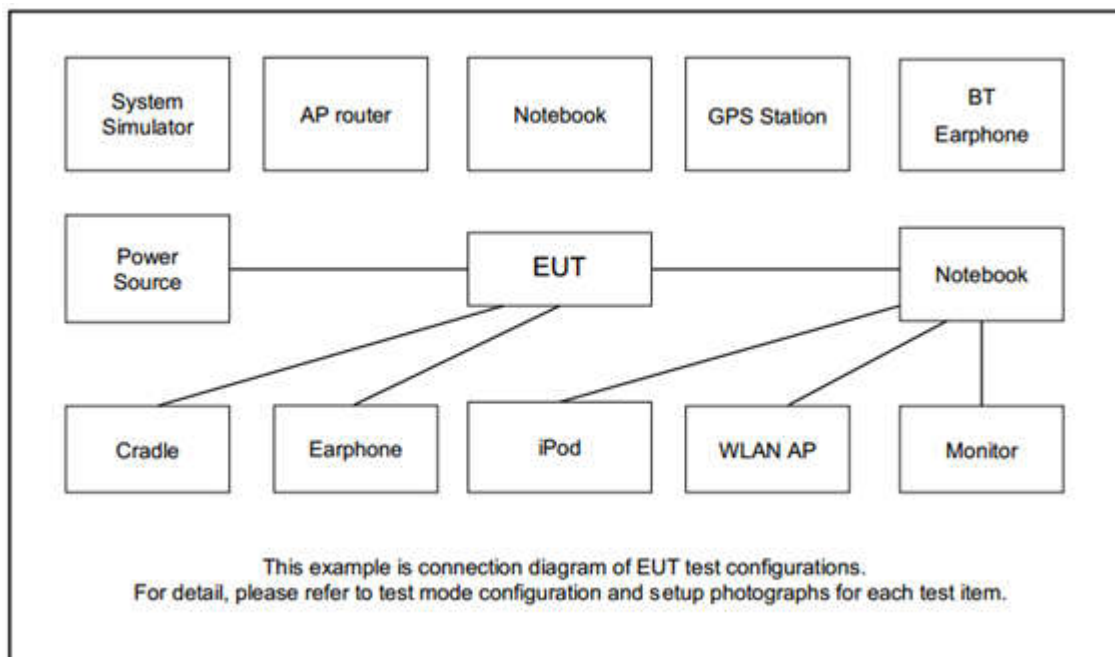
MIMO Mode

Modulation	Data Rate
802.11n HT20 (Covered by VHT20)	MCS8
802.11n HT40 (Covered by VHT40)	MCS8
802.11ac VHT80	MCS0

AC Conducted Emission	Mode 1 : WLAN(5G Band 4) Link + Bluetooth Link + Earphone + Adapter 1 Mode 2 : WLAN(5G Band 4) Link + Bluetooth Link + Earphone + Adapter 2
Remark: 1. The worst case of conducted emission is mode 2; only the test data of it was reported. 2. For Radiated Test Cases, we chose Adapter 1 to evaluate full test, and Adapter 2 only verified the worst cases of Adapter 1.	

Ch. #		Band IV : 5725-5850 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	149	149	151	-
M	Middle	157	157	-	155
H	High	165	165	159	-

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8 m
3.	Earphone	Apple	MC690ZP/A	N/A	Unshielded, 1.0 m	N/A
4.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

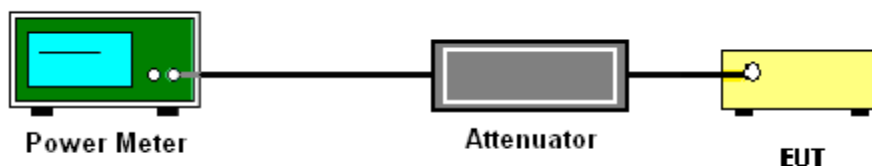
3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

(3) KDB789033 D02 v02r01 G)2)c)

- (i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.³
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.⁴

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

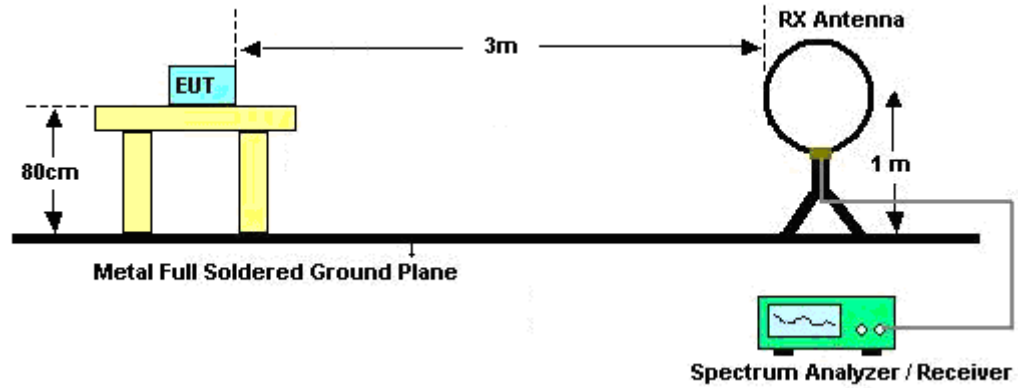


3.2.3 Test Procedures

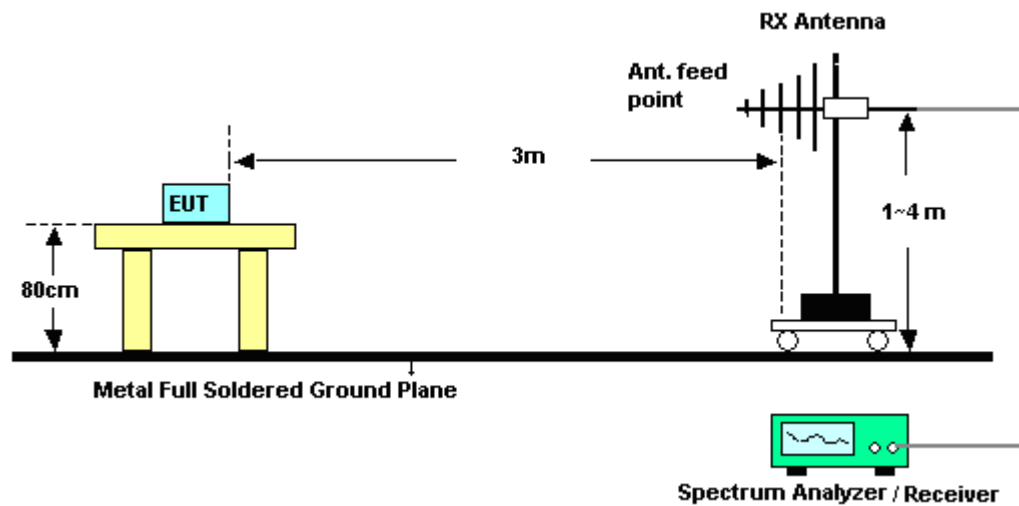
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.4 Test Setup

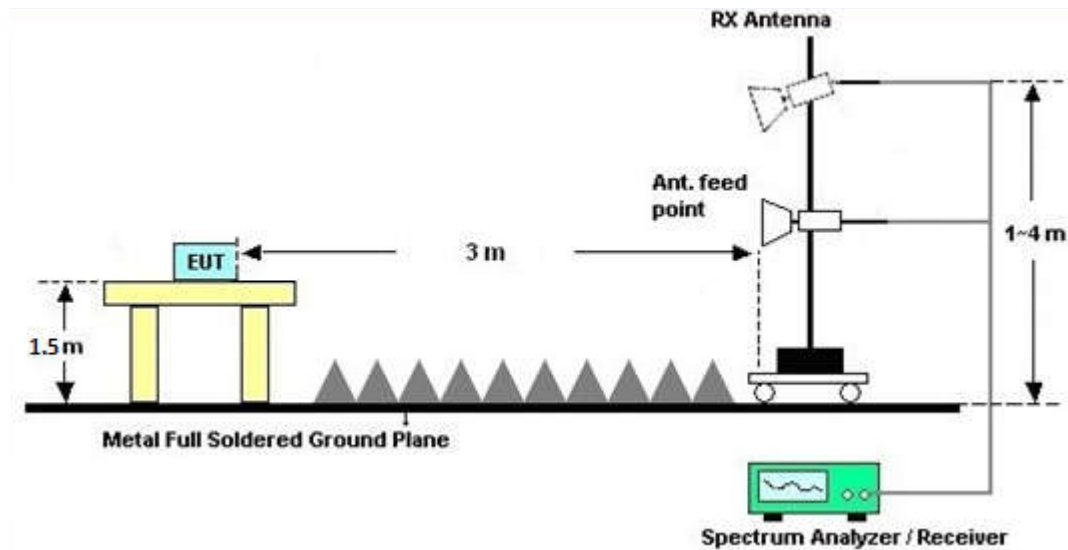
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.2.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.2.7 Duty Cycle

Please refer to Appendix D.

3.2.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

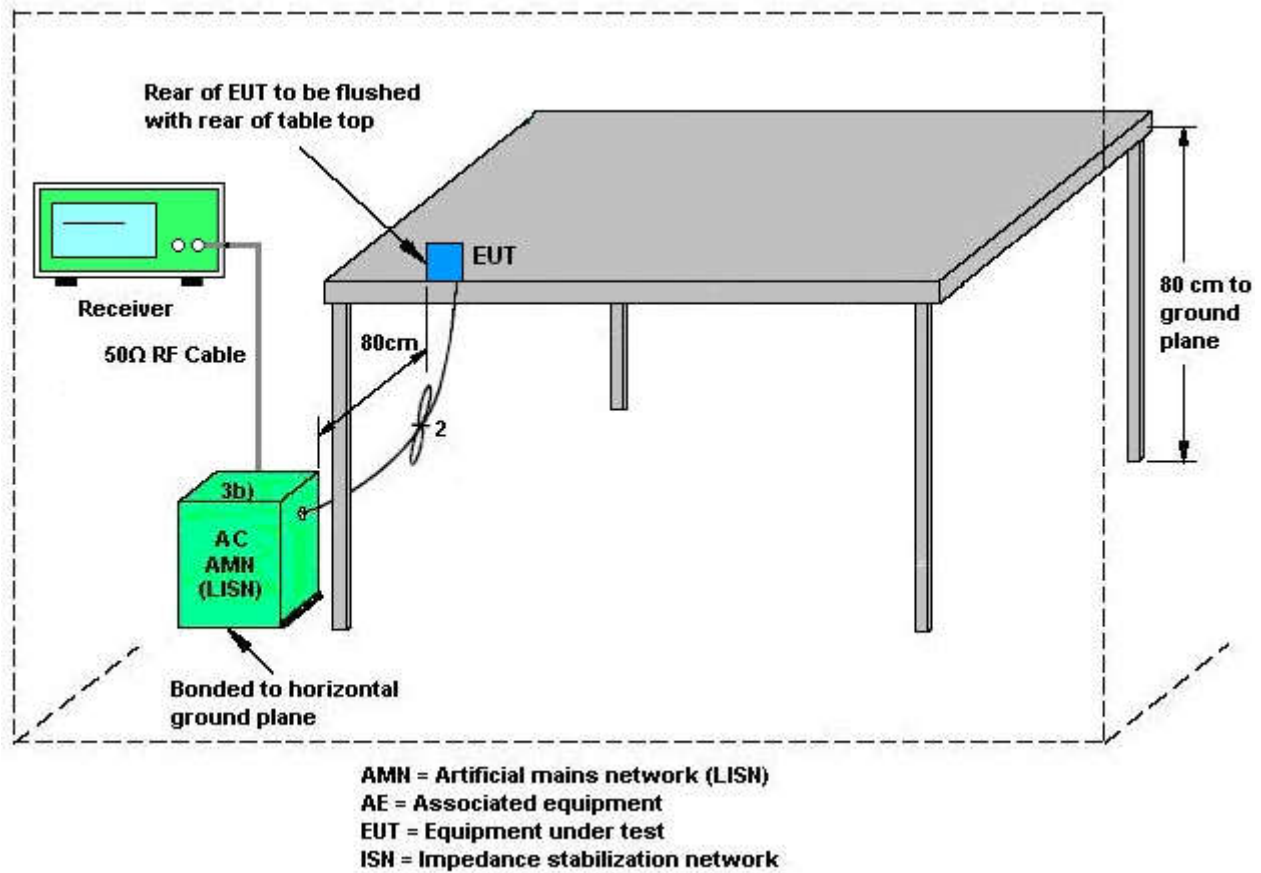
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.3.4 Test Setup



3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.4 Automatically Discontinue Transmission

3.4.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.5 Antenna Requirements

3.5.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.5.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.5.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
	Ant. 1	Ant. 2	DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
Band IV	2.70	2.50	2.70	5.61	0.00	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr.19, 2018	Apr. 21, 2018	Apr.18, 2019	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2017	Apr. 21, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2017	Apr. 21, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 19, 2018	May 01, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2018	May 01, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	May 01, 2018	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	May 01, 2018	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1285	1GHz~18GHz	Dec. 13, 2017	May 01, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	May 17, 2017	May 01, 2018	May 16, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct. 19, 2017	May 01, 2018	Oct. 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	May 01, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1988315	18GHz~40GHz	Jul. 27, 2017	May 01, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Apr. 19, 2018	May 01, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	May 01, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 01, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 01, 2018	NCR	Radiation (03CH04-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2017	Apr. 20 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Dec. 26, 2017	Apr. 20 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Nov. 01, 2017	Apr. 20 2018	Oct. 31, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 19, 2017	Apr. 20 2018	Jul. 18, 2018	Conduction (CO01-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.6 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
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Appendix A. Test Result of Conducted Test Items

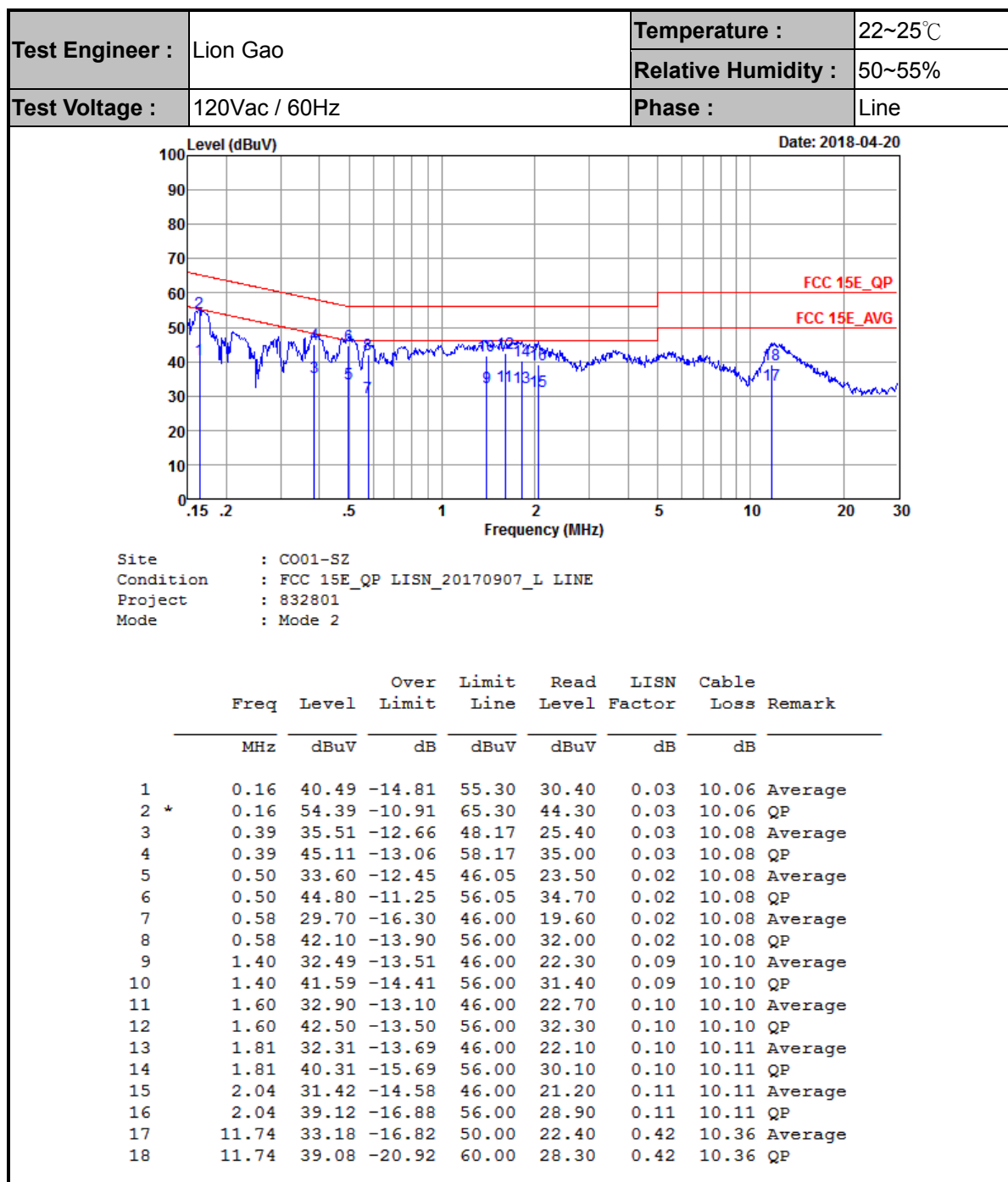
Test Engineer:	Sam Zheng	Temperature:	21~25	°C
Test Date:	2018/4/21	Relative Humidity:	51~54	%

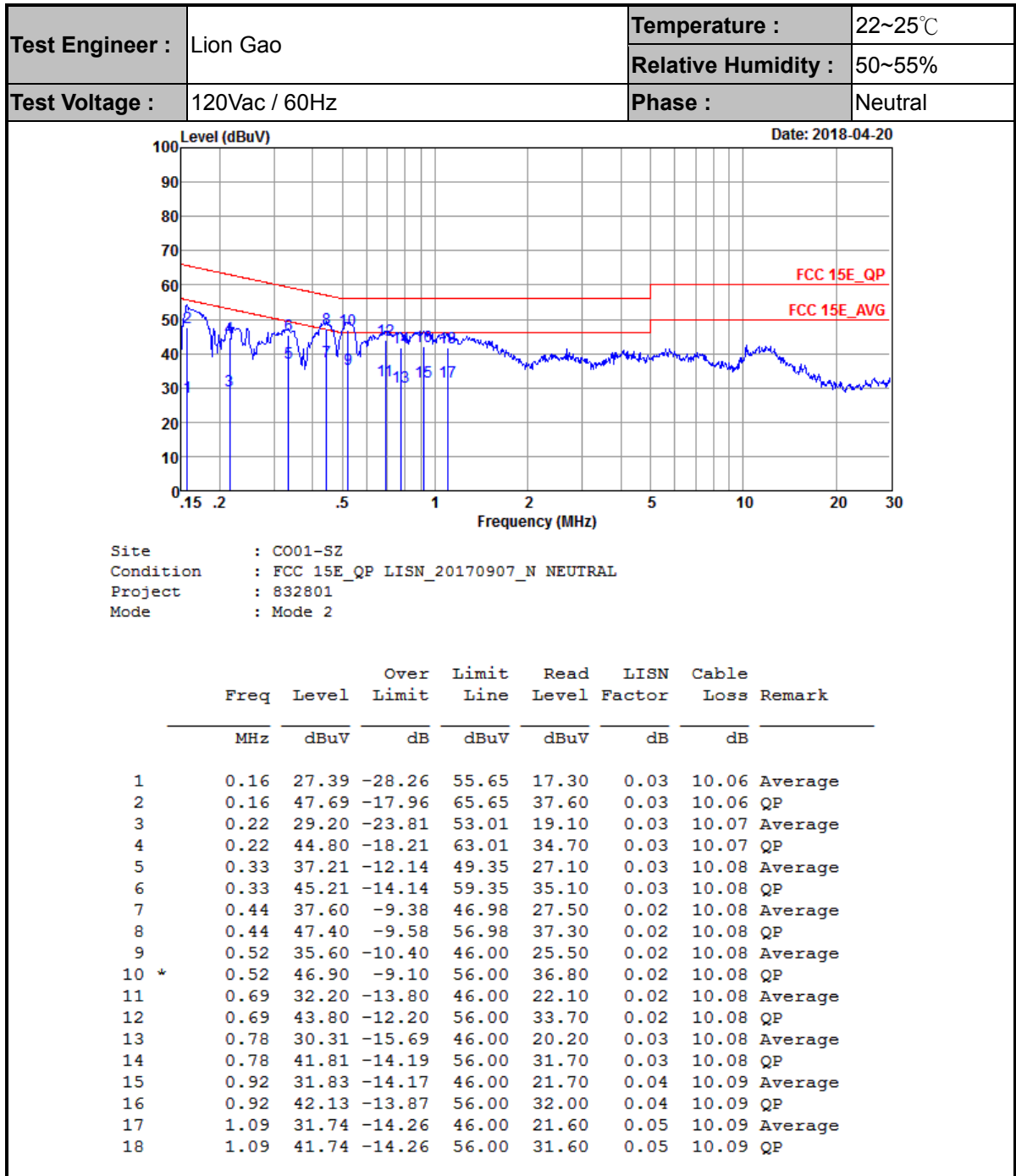
TEST RESULTS DATA
Average Power Table

Band IV														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	149	5745	0.67	0.67	17.40	16.14		30.00	30.00	2.70	2.50	Pass
11a	6Mbps	1	157	5785	0.67	0.67	17.46	16.45		30.00	30.00	2.70	2.50	Pass
11a	6Mbps	1	165	5825	0.67	0.67	17.45	16.38		30.00	30.00	2.70	2.50	Pass
HT20	MCS0	1	149	5745	0.67	0.67	17.43	16.10		30.00	30.00	2.70	2.50	Pass
HT20	MCS0	1	157	5785	0.67	0.67	17.40	16.42		30.00	30.00	2.70	2.50	Pass
HT20	MCS0	1	165	5825	0.67	0.67	17.37	16.34		30.00	30.00	2.70	2.50	Pass
HT40	MCS0	1	151	5755	0.70	0.69	17.40	16.41		30.00	30.00	2.70	2.50	Pass
HT40	MCS0	1	159	5795	0.70	0.69	17.43	16.50		30.00	30.00	2.70	2.50	Pass
VHT20	MCS0	1	149	5745	0.68	0.68	17.41	16.08		30.00	30.00	2.70	2.50	Pass
VHT20	MCS0	1	157	5785	0.68	0.68	17.38	16.41		30.00	30.00	2.70	2.50	Pass
VHT20	MCS0	1	165	5825	0.68	0.68	17.36	16.32		30.00	30.00	2.70	2.50	Pass
VHT40	MCS0	1	151	5755	0.70	0.68	17.38	16.38		30.00	30.00	2.70	2.50	Pass
VHT40	MCS0	1	159	5795	0.70	0.68	17.40	16.46		30.00	30.00	2.70	2.50	Pass
VHT80	MCS0	1	155	5775	0.68	0.70	17.00	16.47		30.00	30.00	2.70	2.50	Pass
HT20	MCS8	2	149	5745	0.70	0.69	17.47	16.19	19.89	30.00		2.70		Pass
HT20	MCS8	2	157	5785	0.70	0.69	17.55	16.37	20.01	30.00		2.70		Pass
HT20	MCS8	2	165	5825	0.70	0.69	17.57	16.33	20.01	30.00		2.70		Pass
HT40	MCS8	2	151	5755	0.67	0.67	17.57	16.33	20.00	30.00		2.70		Pass
HT40	MCS8	2	159	5795	0.67	0.67	17.49	16.41	19.99	30.00		2.70		Pass
VHT20	MCS0	2	149	5745	0.69	0.69	17.44	16.15	19.85	30.00		2.70		Pass
VHT20	MCS0	2	157	5785	0.69	0.69	17.52	16.34	19.98	30.00		2.70		Pass
VHT20	MCS0	2	165	5825	0.69	0.69	17.53	16.31	19.97	30.00		2.70		Pass
VHT40	MCS0	2	151	5755	0.70	0.69	17.56	16.31	19.99	30.00		2.70		Pass
VHT40	MCS0	2	159	5795	0.70	0.69	17.48	16.40	19.99	30.00		2.70		Pass
VHT80	MCS0	2	155	5775	0.80	0.78	13.40	13.25	16.34	30.00		2.70		Pass



Appendix B. AC Conducted Emission Test Results







Appendix C. Radiated Spurious Emission

For Adapter 1

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5634.4	52.81	-15.39	68.2	41.02	32.4	6.25	26.86	341	159	P	H
		5697.2	53.89	-49.25	103.14	42.09	32.45	6.23	26.88	341	159	P	H
		5712	66.44	-42.12	108.56	54.65	32.46	6.22	26.89	341	159	P	H
		5724.8	65.64	-56.1	121.74	53.83	32.48	6.22	26.89	341	159	P	H
	*	5745	106.44	-	-	94.65	32.49	6.2	26.9	341	159	P	H
	*	5745	99.02	-	-	87.23	32.49	6.2	26.9	341	159	A	H
		5628.4	51.64	-16.56	68.2	39.86	32.39	6.25	26.86	238	222	P	V
		5664.8	52.23	-26.96	79.19	40.45	32.42	6.23	26.87	238	222	P	V
		5719.8	63.74	-47	110.74	51.93	32.48	6.22	26.89	238	222	P	V
		5725	60.83	-61.37	122.2	49.02	32.48	6.22	26.89	238	222	P	V
	*	5745	102.5	-	-	90.71	32.49	6.2	26.9	238	222	P	V
	*	5745	95.27	-	-	83.48	32.49	6.2	26.9	238	222	A	V



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5633.2	52.7	-15.5	68.2	40.91	32.4	6.25	26.86	148	105	P	H
		5659.6	52.88	-22.45	75.33	41.08	32.42	6.25	26.87	148	105	P	H
		5714.2	52.05	-57.13	109.18	40.26	32.46	6.22	26.89	148	105	P	H
		5722.6	50.61	-66.12	116.73	38.8	32.48	6.22	26.89	148	105	P	H
	*	5785	106.61	-	-	94.83	32.52	6.18	26.92	148	105	P	H
	*	5785	99.26	-	-	87.48	32.52	6.18	26.92	148	105	A	H
		5851.8	50.86	-67.24	118.1	38.93	32.58	6.29	26.94	148	105	P	H
		5863.2	53.28	-55.22	108.5	41.23	32.6	6.4	26.95	148	105	P	H
		5876.4	52.26	-51.9	104.16	40.17	32.64	6.4	26.95	148	105	P	H
		5940	52.6	-15.6	68.2	40.15	32.8	6.63	26.98	148	105	P	H
		5607.6	51.85	-16.35	68.2	40.04	32.39	6.27	26.85	205	237	P	V
		5652.4	52.98	-17	69.98	41.17	32.42	6.25	26.86	205	237	P	V
		5705	51.45	-55.15	106.6	39.66	32.46	6.22	26.89	205	237	P	V
		5724	51.21	-68.71	119.92	39.4	32.48	6.22	26.89	205	237	P	V
	*	5785	102.37	-	-	90.59	32.52	6.18	26.92	205	237	P	V
	*	5785	95.25	-	-	83.47	32.52	6.18	26.92	205	237	A	V
		5851	50.61	-69.31	119.92	38.68	32.58	6.29	26.94	205	237	P	V
		5866	52.01	-55.71	107.72	39.96	32.6	6.4	26.95	205	237	P	V
		5893.6	52.28	-39.12	91.4	40.16	32.68	6.4	26.96	205	237	P	V
		5935.2	52.42	-15.78	68.2	40.01	32.76	6.63	26.98	205	237	P	V



WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	105.55	-	-	93.62	32.57	6.29	26.93	133	107	P	H
	*	5825	98.96	-	-	87.03	32.57	6.29	26.93	133	107	A	H
		5853.2	59.92	-54.98	114.9	47.99	32.58	6.29	26.94	133	107	P	H
		5856.8	57.94	-52.36	110.3	45.88	32.6	6.4	26.94	133	107	P	H
		5915	53.35	-22.22	75.57	41.08	32.72	6.52	26.97	133	107	P	H
		5947.8	52.45	-15.75	68.2	40	32.8	6.63	26.98	133	107	P	H
	*	5825	102.21	-	-	90.28	32.57	6.29	26.93	108	246	P	V
	*	5825	95.43	-	-	83.5	32.57	6.29	26.93	108	246	A	V
		5853.8	57.89	-55.65	113.54	45.94	32.6	6.29	26.94	108	246	P	V
		5855.6	54.57	-56.06	110.63	42.51	32.6	6.4	26.94	108	246	P	V
		5899.8	51.83	-34.98	86.81	39.59	32.68	6.52	26.96	108	246	P	V
		5937.2	52.4	-15.8	68.2	39.99	32.76	6.63	26.98	108	246	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	47.08	-26.92	74	53.66	39.28	9.5	55.36	160	360	P	H
		17235	49.99	-18.21	68.2	48.55	43.04	14.89	56.49	170	360	P	H
		11490	47.36	-26.64	74	53.94	39.28	9.5	55.36	160	360	P	V
		17235	50.58	-17.62	68.2	49.14	43.04	14.89	56.49	170	360	P	V
802.11a CH 157 5785MHz		11570	45.46	-28.54	74	51.88	39.3	9.52	55.24	175	198	P	H
		17355	50.26	-17.94	68.2	47.91	43.81	15.12	56.58	189	185	P	H
		11570	46.31	-27.69	74	52.73	39.3	9.52	55.24	175	198	P	V
		17355	49.76	-18.44	68.2	47.41	43.81	15.12	56.58	189	185	P	V
802.11a CH 165 5825MHz		11650	44.73	-29.27	74	51.02	39.3	9.54	55.13	156	347	P	H
		17475	50.67	-17.53	68.2	47.41	44.58	15.36	56.68	150	360	P	H
		11650	44.38	-29.62	74	50.67	39.3	9.54	55.13	156	347	P	V
		17472	50.68	-17.52	68.2	47.42	44.58	15.36	56.68	151	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5604.2	52.11	-16.09	68.2	40.3	32.39	6.27	26.85	318	165	P	H
		5697	55.58	-47.41	102.99	43.78	32.45	6.23	26.88	318	165	P	H
		5719.6	61.49	-49.2	110.69	49.68	32.48	6.22	26.89	318	165	P	H
		5723	65.46	-52.18	117.64	53.65	32.48	6.22	26.89	318	165	P	H
	*	5745	110.17	-	-	98.38	32.49	6.2	26.9	318	165	P	H
	*	5745	102.84	-	-	91.05	32.49	6.2	26.9	318	165	A	H
		5647.2	52.01	-16.19	68.2	40.22	32.4	6.25	26.86	290	242	P	V
		5678.2	52.82	-36.29	89.11	41.03	32.43	6.23	26.87	290	242	P	V
		5718.6	61.2	-49.21	110.41	49.39	32.48	6.22	26.89	290	242	P	V
		5722.8	58.48	-58.7	117.18	46.67	32.48	6.22	26.89	290	242	P	V
	*	5745	106.78	-	-	94.99	32.49	6.2	26.9	290	242	P	V
	*	5745	99.28	-	-	87.49	32.49	6.2	26.9	290	242	A	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5639	52.81	-15.39	68.2	41.02	32.4	6.25	26.86	325	175	P	H
		5662.6	52.57	-24.98	77.55	40.79	32.42	6.23	26.87	325	175	P	H
		5711.8	52.78	-55.73	108.51	40.99	32.46	6.22	26.89	325	175	P	H
		5723.8	50.29	-69.17	119.46	38.48	32.48	6.22	26.89	325	175	P	H
	*	5785	110.87	-	-	99.09	32.52	6.18	26.92	325	175	P	H
	*	5785	103.18	-	-	91.4	32.52	6.18	26.92	325	175	A	H
		5853	52.23	-63.13	115.36	40.3	32.58	6.29	26.94	325	175	P	H
		5859.2	51.68	-57.94	109.62	39.63	32.6	6.4	26.95	325	175	P	H
		5900	52.31	-34.35	86.66	40.07	32.68	6.52	26.96	325	175	P	H
		5938.8	52.14	-16.06	68.2	39.69	32.8	6.63	26.98	325	175	P	H
		5625.4	51.74	-16.46	68.2	39.95	32.39	6.25	26.85	290	241	P	V
		5680	51.79	-38.65	90.44	40.01	32.43	6.23	26.88	290	241	P	V
		5709.4	51.47	-56.36	107.83	39.68	32.46	6.22	26.89	290	241	P	V
		5721	50.59	-62.49	113.08	38.78	32.48	6.22	26.89	290	241	P	V
	*	5785	106.78	-	-	95	32.52	6.18	26.92	290	241	P	V
	*	5785	99.29	-	-	87.51	32.52	6.18	26.92	290	241	A	V
		5851.8	50.93	-67.17	118.1	39	32.58	6.29	26.94	290	241	P	V
		5857.6	51.67	-58.4	110.07	39.61	32.6	6.4	26.94	290	241	P	V
		5884.6	51.86	-46.21	98.07	39.78	32.64	6.4	26.96	290	241	P	V
		5937.4	51.97	-16.23	68.2	39.56	32.76	6.63	26.98	290	241	P	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5825	109.85	-	-	97.92	32.57	6.29	26.93	322	174	P	H
	*	5825	103.21	-	-	91.28	32.57	6.29	26.93	322	174	A	H
		5850	59.01	-63.19	122.2	47.08	32.58	6.29	26.94	322	174	P	H
		5858.4	56.17	-53.68	109.85	44.12	32.6	6.4	26.95	322	174	P	H
		5903.8	53.04	-30.81	83.85	40.8	32.68	6.52	26.96	322	174	P	H
		5929.4	52.7	-15.5	68.2	40.39	32.76	6.52	26.97	322	174	P	H
	*	5825	107.23	-	-	95.3	32.57	6.29	26.93	290	240	P	V
	*	5825	99.51	-	-	87.58	32.57	6.29	26.93	290	240	A	V
		5852.4	56.56	-60.17	116.73	44.63	32.58	6.29	26.94	290	240	P	V
		5857.2	55.38	-54.8	110.18	43.32	32.6	6.4	26.94	290	240	P	V
		5877.4	52.63	-50.79	103.42	40.54	32.64	6.4	26.95	290	240	P	V
		5937.8	51.29	-16.91	68.2	38.88	32.76	6.63	26.98	290	240	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	47.03	-26.97	74	53.61	39.28	9.5	55.36	160	360	P	H
		17235	50.76	-17.44	68.2	49.32	43.04	14.89	56.49	170	360	P	H
		11490	47.38	-26.62	74	53.96	39.28	9.5	55.36	160	360	P	V
		17235	50.26	-17.94	68.2	48.82	43.04	14.89	56.49	170	360	P	V
802.11n HT20 CH 157 5785MHz		11570	45.69	-28.31	74	52.11	39.3	9.52	55.24	175	198	P	H
		17355	50.63	-17.57	68.2	48.28	43.81	15.12	56.58	189	185	P	H
		11570	45.38	-28.62	74	51.8	39.3	9.52	55.24	175	198	P	V
		17355	50.84	-17.36	68.2	48.49	43.81	15.12	56.58	189	185	P	V
802.11n HT20 CH 165 5825MHz		11650	44.71	-29.29	74	51	39.3	9.54	55.13	156	347	P	H
		17475	49.79	-18.41	68.2	46.53	44.58	15.36	56.68	150	360	P	H
		11650	44.61	-29.39	74	50.9	39.3	9.54	55.13	156	347	P	V
		17475	49.34	-18.86	68.2	46.08	44.58	15.36	56.68	150	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5648	53.09	-15.11	68.2	41.3	32.4	6.25	26.86	261	175	P	H
		5698	57.49	-46.24	103.73	45.69	32.45	6.23	26.88	261	175	P	H
		5715.6	66.48	-43.09	109.57	54.69	32.46	6.22	26.89	261	175	P	H
		5721	65.46	-47.62	113.08	53.65	32.48	6.22	26.89	261	175	P	H
	*	5755	107.89	-	-	96.08	32.51	6.2	26.9	261	175	P	H
	*	5755	98.71	-	-	86.9	32.51	6.2	26.9	261	175	A	H
		5854	52.98	-60.1	113.08	41.03	32.6	6.29	26.94	261	175	P	H
		5855.6	52.34	-58.29	110.63	40.28	32.6	6.4	26.94	261	175	P	H
		5885.2	51.66	-45.97	97.63	39.58	32.64	6.4	26.96	261	175	P	H
		5927.4	52.67	-15.53	68.2	40.36	32.76	6.52	26.97	261	175	P	H
		5602.8	53.71	-14.49	68.2	41.9	32.39	6.27	26.85	292	240	P	V
		5693.8	56.79	-43.84	100.63	44.99	32.45	6.23	26.88	292	240	P	V
		5715.2	61.47	-47.99	109.46	49.68	32.46	6.22	26.89	292	240	P	V
		5721.2	62.73	-50.81	113.54	50.92	32.48	6.22	26.89	292	240	P	V
	*	5755	103.76	-	-	91.95	32.51	6.2	26.9	292	240	P	V
	*	5755	94.86	-	-	83.05	32.51	6.2	26.9	292	240	A	V
		5853.8	51.8	-61.74	113.54	39.85	32.6	6.29	26.94	292	240	P	V
		5858.4	52.13	-57.72	109.85	40.08	32.6	6.4	26.95	292	240	P	V
		5885.2	52.64	-44.99	97.63	40.56	32.64	6.4	26.96	292	240	P	V
		5936.8	52.7	-15.5	68.2	40.29	32.76	6.63	26.98	292	240	P	V



WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5644.8	52.58	-15.62	68.2	40.79	32.4	6.25	26.86	253	177	P	H
		5679.8	52.82	-37.47	90.29	41.04	32.43	6.23	26.88	253	177	P	H
		5705.4	54.72	-51.99	106.71	42.93	32.46	6.22	26.89	253	177	P	H
		5723.2	54.66	-63.44	118.1	42.85	32.48	6.22	26.89	253	177	P	H
	*	5795	106.89	-	-	95.09	32.54	6.18	26.92	253	177	P	H
	*	5795	98.78	-	-	86.98	32.54	6.18	26.92	253	177	A	H
		5851.6	56.25	-62.3	118.55	44.32	32.58	6.29	26.94	253	177	P	H
		5857.6	56.53	-53.54	110.07	44.47	32.6	6.4	26.94	253	177	P	H
		5908	52.67	-28.07	80.74	40.39	32.72	6.52	26.96	253	177	P	H
		5948.4	55.68	-12.52	68.2	43.23	32.8	6.63	26.98	253	177	P	H
		5616.8	52.45	-15.75	68.2	40.64	32.39	6.27	26.85	281	241	P	V
		5692	52.29	-47.01	99.3	40.49	32.45	6.23	26.88	281	241	P	V
		5715	52.76	-56.64	109.4	40.97	32.46	6.22	26.89	281	241	P	V
		5724.8	52.5	-69.24	121.74	40.69	32.48	6.22	26.89	281	241	P	V
	*	5795	102.64	-	-	90.84	32.54	6.18	26.92	281	241	P	V
	*	5795	95.3	-	-	83.5	32.54	6.18	26.92	281	241	A	V
		5853.4	54.96	-59.49	114.45	43.03	32.58	6.29	26.94	281	241	P	V
		5858.6	54.71	-55.08	109.79	42.66	32.6	6.4	26.95	281	241	P	V
		5879.6	53.51	-48.27	101.78	41.42	32.64	6.4	26.95	281	241	P	V
		5927.2	51.25	-16.95	68.2	38.94	32.76	6.52	26.97	281	241	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	48.13	-25.87	74	54.67	39.3	9.5	55.34	160	360	P	H
		17265	50.17	-18.03	68.2	48.46	43.26	14.97	56.52	170	360	P	H
		11510	47.12	-26.88	74	53.66	39.3	9.5	55.34	160	360	P	V
		17265	50.62	-17.58	68.2	48.91	43.26	14.97	56.52	170	360	P	V
802.11n HT40 CH 159 5795MHz		11590	45.8	-28.2	74	52.18	39.3	9.53	55.21	170	300	P	H
		17385	50.01	-18.19	68.2	47.39	44.03	15.2	56.61	150	200	P	H
		11590	46.06	-27.94	74	52.44	39.3	9.53	55.21	170	300	P	V
		17385	50.2	-18	68.2	47.58	44.03	15.2	56.61	150	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5630.6	55.06	-13.14	68.2	43.28	32.39	6.25	26.86	136	104	P	H
		5696.6	58.92	-43.77	102.69	47.12	32.45	6.23	26.88	136	104	P	H
		5719	66.31	-44.21	110.52	54.5	32.48	6.22	26.89	136	104	P	H
		5725	62.51	-59.69	122.2	50.7	32.48	6.22	26.89	136	104	P	H
	*	5775	100.41	-	-	88.6	32.52	6.2	26.91	136	104	P	H
	*	5775	93.95	-	-	82.14	32.52	6.2	26.91	136	104	A	H
		5851.2	62.94	-56.52	119.46	51.01	32.58	6.29	26.94	136	104	P	H
		5855.6	61.12	-49.51	110.63	49.06	32.6	6.4	26.94	136	104	P	H
		5886.8	57.37	-39.07	96.44	45.29	32.64	6.4	26.96	136	104	P	H
		5925.4	53.4	-14.8	68.2	41.09	32.76	6.52	26.97	136	104	P	H
		5643.4	52.49	-15.71	68.2	40.7	32.4	6.25	26.86	214	239	P	V
		5698	55.68	-48.05	103.73	43.88	32.45	6.23	26.88	214	239	P	V
		5713.4	59.5	-49.45	108.95	47.71	32.46	6.22	26.89	214	239	P	V
		5724.6	60.25	-61.04	121.29	48.44	32.48	6.22	26.89	214	239	P	V
	*	5775	98.13	-	-	86.32	32.52	6.2	26.91	214	239	P	V
	*	5775	91.15	-	-	79.34	32.52	6.2	26.91	214	239	A	V
		5852.8	59.08	-56.74	115.82	47.15	32.58	6.29	26.94	214	239	P	V
		5855.4	58.16	-52.53	110.69	46.21	32.6	6.29	26.94	214	239	P	V
		5893	53.99	-37.85	91.84	41.87	32.68	6.4	26.96	214	239	P	V
		5927.6	53.05	-15.15	68.2	40.74	32.76	6.52	26.97	214	239	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac		11550	45.59	-28.41	74	52.03	39.3	9.52	55.26	160	360	P	H
VHT80		17325	48.8	-19.4	68.2	46.65	43.59	15.12	56.56	170	360	P	H
CH 155		11550	45.55	-28.45	74	51.99	39.3	9.52	55.26	160	360	P	V
5775MHz		17325	47.93	-20.27	68.2	45.78	43.59	15.12	56.56	170	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



For Adapter 2

Band 4 - 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 159 5795MHz		5616	52.54	-15.66	68.2	40.73	32.39	6.27	26.85	195	176	P	H
		5689.8	53.04	-44.64	97.68	41.24	32.45	6.23	26.88	195	176	P	H
		5719	57.25	-53.27	110.52	45.44	32.48	6.22	26.89	195	176	P	H
		5722.4	54.55	-61.72	116.27	42.74	32.48	6.22	26.89	195	176	P	H
	*	5795	106.22	-	-	94.42	32.54	6.18	26.92	195	176	P	H
	*	5795	99.63	-	-	87.83	32.54	6.18	26.92	195	176	A	H
		5851.6	58.86	-59.69	118.55	46.93	32.58	6.29	26.94	195	176	P	H
		5857.2	59.19	-50.99	110.18	47.13	32.6	6.4	26.94	195	176	P	H
		5885	55.36	-42.41	97.77	43.28	32.64	6.4	26.96	195	176	P	H
		5932.8	52.72	-15.48	68.2	40.41	32.76	6.52	26.97	195	176	P	H
		5622.8	52.06	-16.14	68.2	40.27	32.39	6.25	26.85	224	238	P	V
		5690	52.57	-45.26	97.83	40.77	32.45	6.23	26.88	224	238	P	V
		5715.2	54.17	-55.29	109.46	42.38	32.46	6.22	26.89	224	238	P	V
		5722.8	54.26	-62.92	117.18	42.45	32.48	6.22	26.89	224	238	P	V
	*	5795	103.21	-	-	91.41	32.54	6.18	26.92	224	238	P	V
	*	5795	96.47	-	-	84.67	32.54	6.18	26.92	224	238	A	V
		5851	57.75	-62.17	119.92	45.82	32.58	6.29	26.94	224	238	P	V
		5855.2	58.29	-52.45	110.74	46.34	32.6	6.29	26.94	224	238	P	V
		5878.4	54.08	-48.59	102.67	41.99	32.64	6.4	26.95	224	238	P	V
		5928.4	53.31	-14.89	68.2	41	32.76	6.52	26.97	224	238	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		11590	46.35	-27.65	74	52.73	39.3	9.53	55.21	170	300	P	H
		17385	47.17	-21.03	68.2	44.55	44.03	15.2	56.61	151	245	P	H
		11590	45.35	-28.65	74	51.73	39.3	9.53	55.21	170	300	P	V
		17385	49.29	-18.91	68.2	46.67	44.03	15.2	56.61	150	200	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT40 LF		30	23.53	-16.47	40	30.35	24.9	0.25	31.97	-	-	P	H
		191.02	34.84	-8.66	43.5	49.53	15.16	1.52	31.37	100	147	P	H
		288.02	26.35	-19.65	46	36.59	19.16	1.82	31.22	-	-	P	H
		599.39	28.9	-17.1	46	31.69	25.78	2.7	31.27	-	-	P	H
		773.99	32.13	-13.87	46	32.19	28.03	3.09	31.18	-	-	P	H
		900.09	33.27	-12.73	46	31.74	29.3	3.39	31.16	-	-	P	H
		54.25	30.96	-9.04	40	48.67	13.46	0.75	31.92	-	-	P	V
		80.44	33.84	-6.16	40	51.23	13.6	0.85	31.84	100	243	P	V
		190.05	33.38	-10.12	43.5	48.09	15.15	1.51	31.37	-	-	P	V
		478.14	28.03	-17.97	46	33.37	23.54	2.37	31.25	-	-	P	V
		540.22	29.57	-16.43	46	33.57	24.72	2.53	31.25	-	-	P	V
		789.51	31.59	-14.41	46	31.32	28.31	3.13	31.17	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

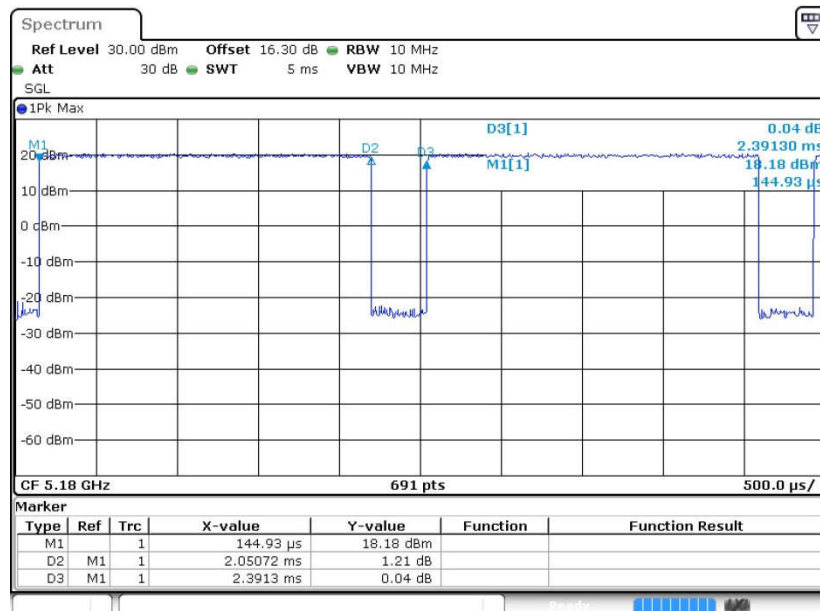
Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1	802.11a	85.76	2.051	0.488	1kHz
1+2	802.11n HT20	85.25	0.980	1.021	3kHz
1+2	802.11n HT40	85.76	0.493	2.031	3kHz
1+2	802.11ac VHT80	83.49	0.257	3.898	10kHz
1+2	802.11ac VHT160	74.89	0.152	6.571	10kHz

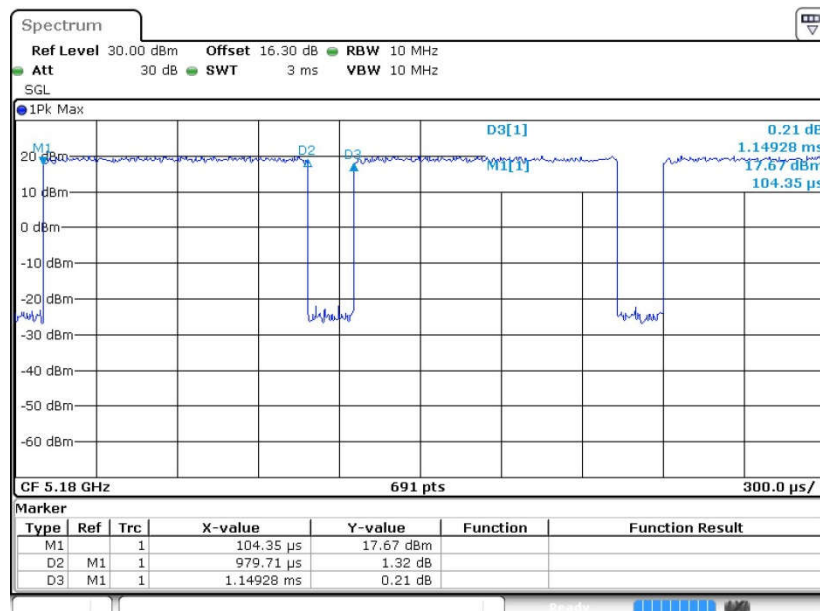
Ant.1

802.11a



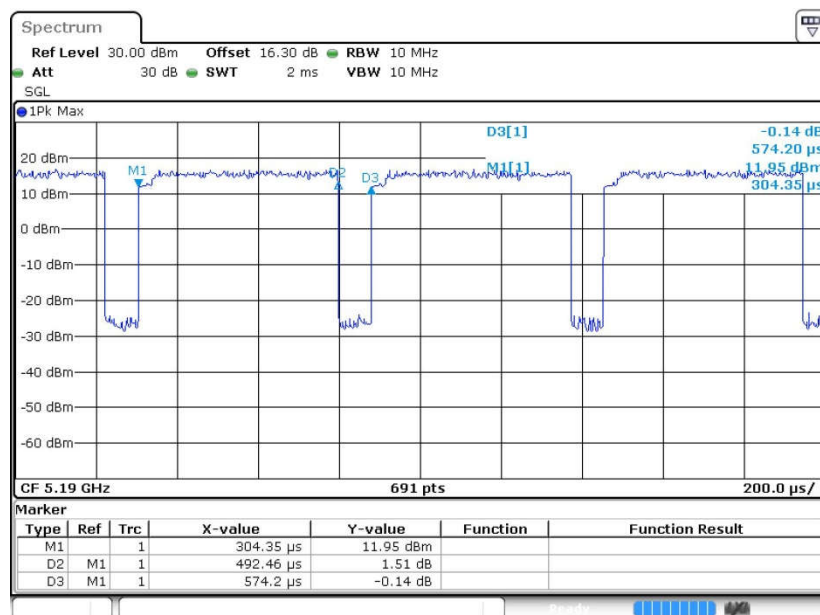
Ant.1+2

802.11n HT20

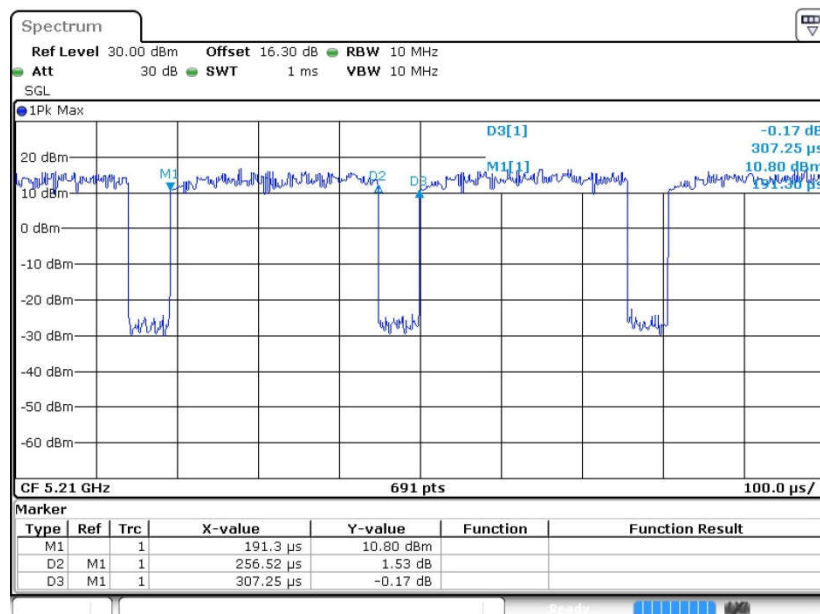




802.11n HT40



802.11ac VHT80





802.11ac VHT160

