



FCC RF Test Report

APPLICANT : Continental Aftermarket & Services GmbH
EQUIPMENT : RVD 4G OBD Dongle
BRAND NAME : Continental
MODEL NAME : GD504
FCC ID : 2AVAW-GD504
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was completed on Jan. 12, 2020. 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.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager



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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR9N0607B	Rev. 01	Initial issue of report	May 15, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 6.68 dB at 5150.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 15.11 dB at 0.280 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Continental Aftermarket & Services GmbH

Sodener Strasse 9, 65824 Schwalbach am Taunus, Germany

1.2 Manufacturer

Continental Aftermarket & Services GmbH

Sodener Strasse 9, 65824 Schwalbach am Taunus, Germany

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	RVD 4G OBD Dongle
Brand Name	Continental
Model Name	GD504
FCC ID	2AVAW-GD504
EUT supports Radios application	WCDMA/LTE/GNSS WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
IMEI Code	Conducted: 861473040027507 Conduction: 861473040025428 Radiation: 861473040025691
HW Version	GD504.H02
SW Version	03.01.01
EUT Stage	Identical Prototype

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 Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	<5180 MHz ~ 5240 MHz> 802.11a : 15.39 dBm / 0.0346 W 802.11n HT20 : 15.02 dBm / 0.0318 W 802.11n HT40 : 15.79 dBm / 0.0379 W 802.11ac VHT20 : 12.82 dBm / 0.0191 W 802.11ac VHT40 : 12.66 dBm / 0.0185 W 802.11ac VHT80 : 12.08 dBm / 0.0161 W
99% Occupied Bandwidth	802.11a : 16.28 MHz 802.11n HT20 : 17.38 MHz 802.11n HT40 : 36.06 MHz 802.11ac VHT80 : 74.93 MHz
Antenna Type / Gain	<5180 MHz ~ 5240 MHz> Fixed Internal Antenna with gain 0.70 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20 / HT40 by referring to their maximum 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/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-SZ TH01-SZ	CN1256	421272

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

1.8 Applicable Standards

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

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules 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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- 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)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42 [#]	5210		

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.

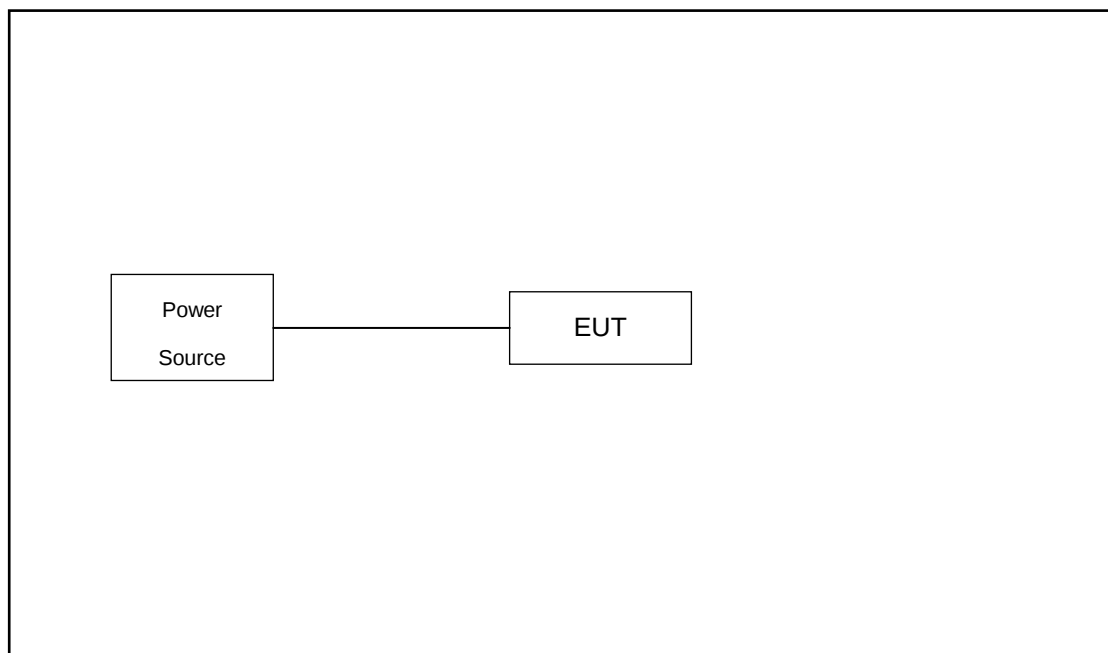
Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band II Idle + WLAN Link + Adapter
Remark: For Radiated Test Cases, The tests were performed with Adapter	

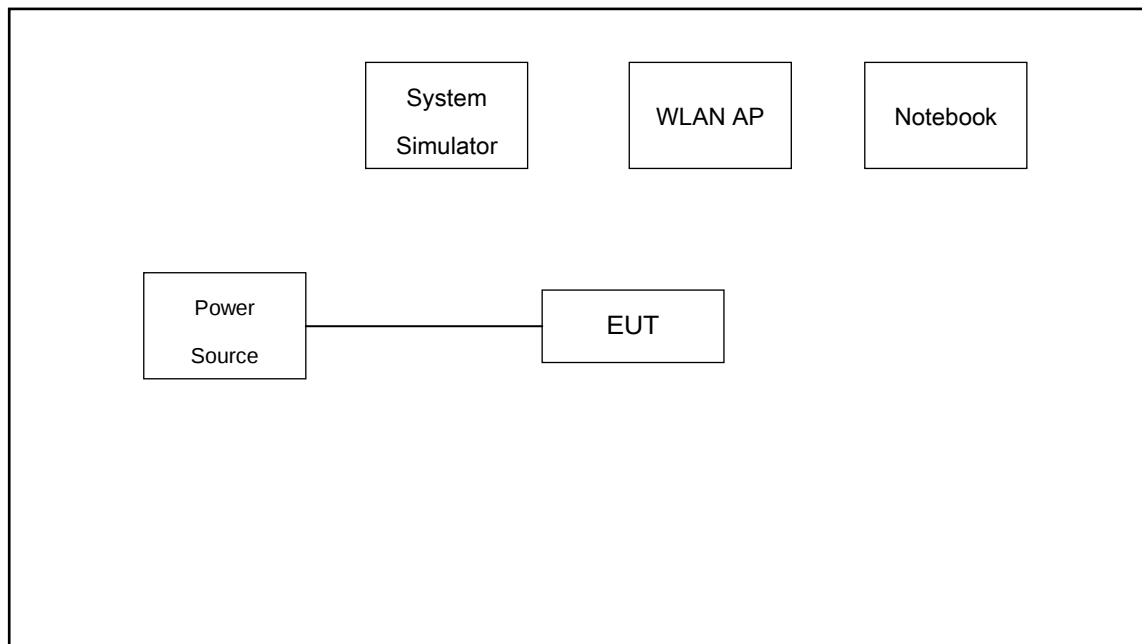
Ch. #		Band I : 5150-5250 MHz			
		802.11a	802.11n HT20	802.11n HT40	802.11ac VHT80
L	Low	36	36	38	-
M	Middle	44	44	-	42
H	High	48	48	46	-
Straddle		-	-	-	-

2.3 Connection Diagram of Test System

For Radiation



For Conducted Emission



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
3.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Adapter	N/A	N/A	N/A	Unshielded, 1.2m	N/A
5.	Test Jig	N/A	N/A	N/A	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 continuously transmit/receive.

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

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.6 dB and 10dB attenuator.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 6.6 + 10 = 16.6 \text{ (dB)}
 \end{aligned}$$

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

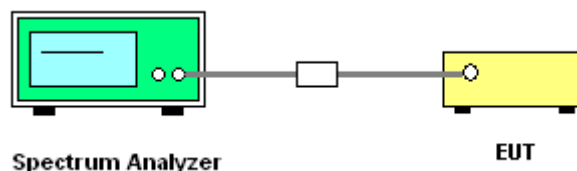
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 3MHz and set the Video bandwidth (VBW) $\geq 3 * RBW$.
8. Measure and record the results in the test report.

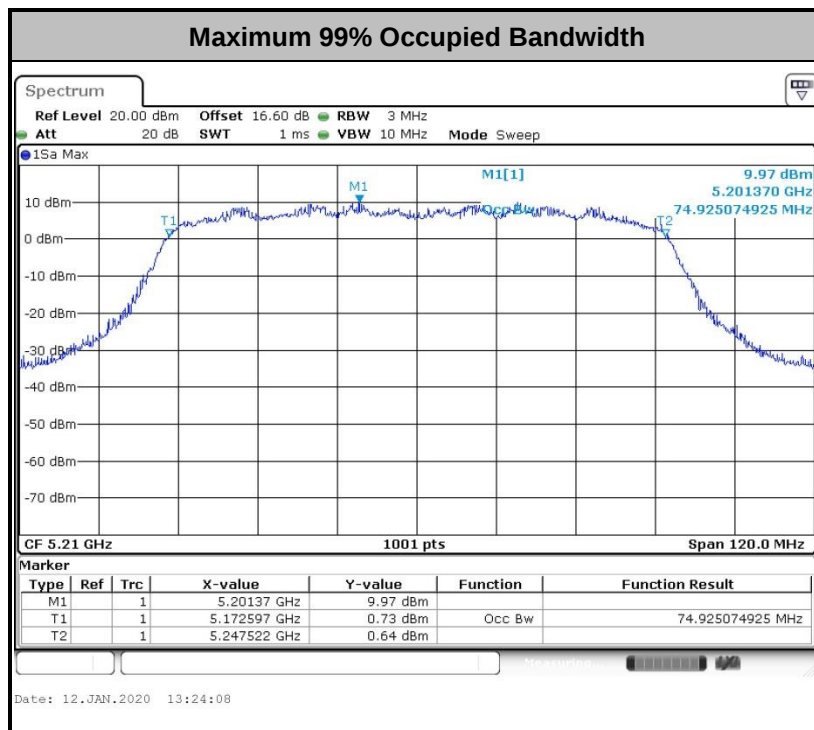
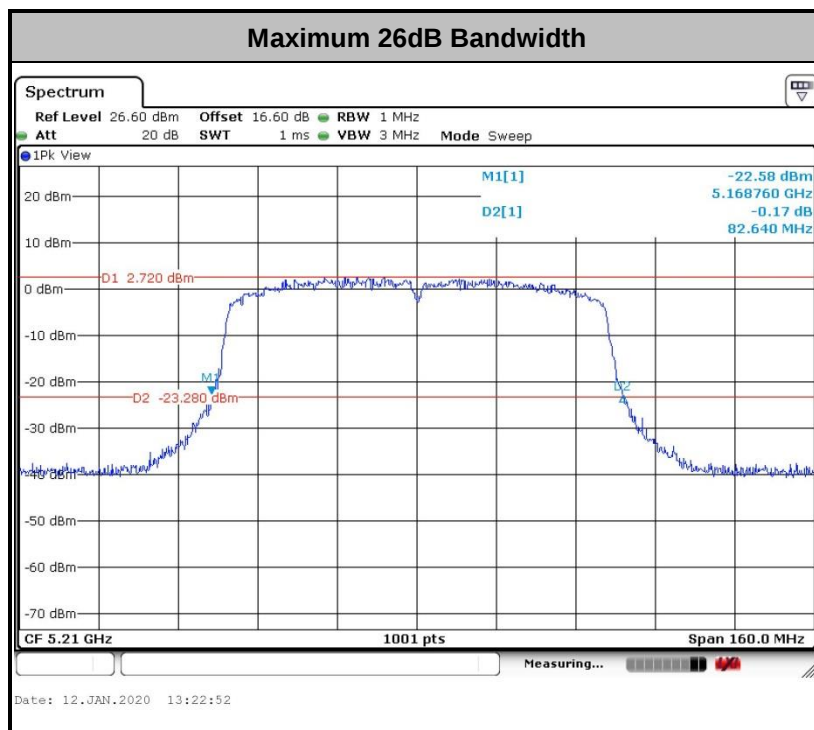
3.1.4 Test Setup





3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

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.

3.2.2 Measuring Instruments

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

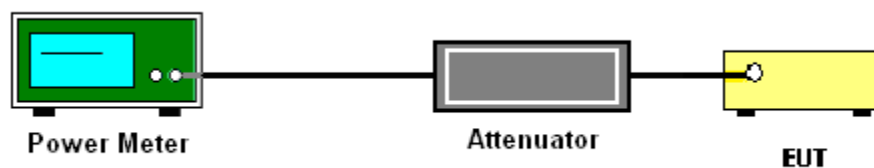
3.2.3 Test Procedures

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.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

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.

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

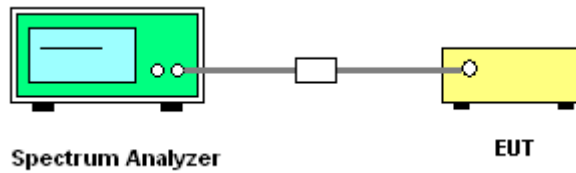
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section F) Maximum power spectral density.

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

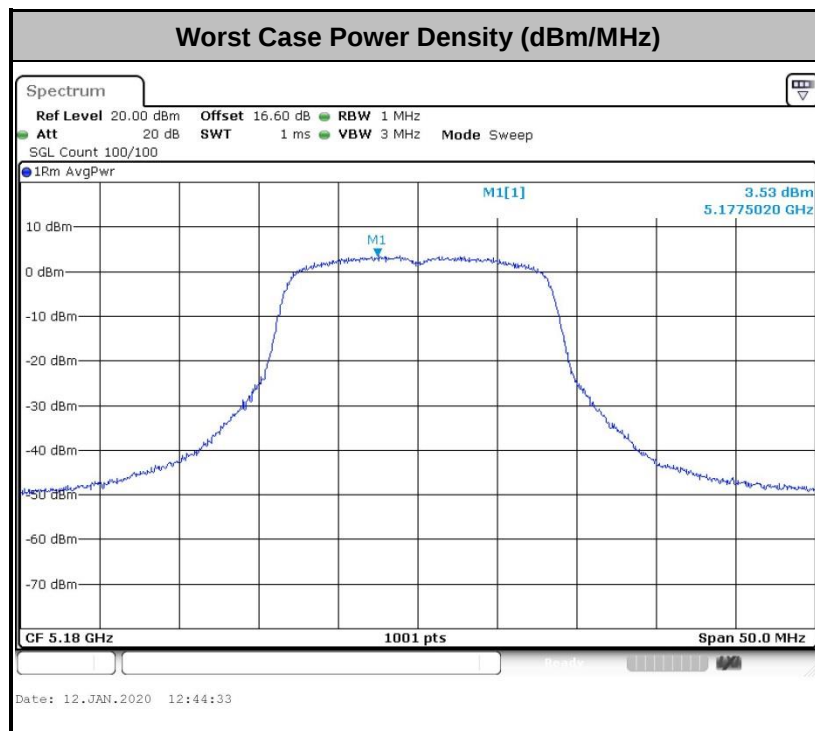
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW $\geq$ 3 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
-
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



Note: Average Power Density (dB) = Measured value+ Duty Factor

3.4 Unwanted Emissions Measurement

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

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.
- (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

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27	68.2

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

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

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

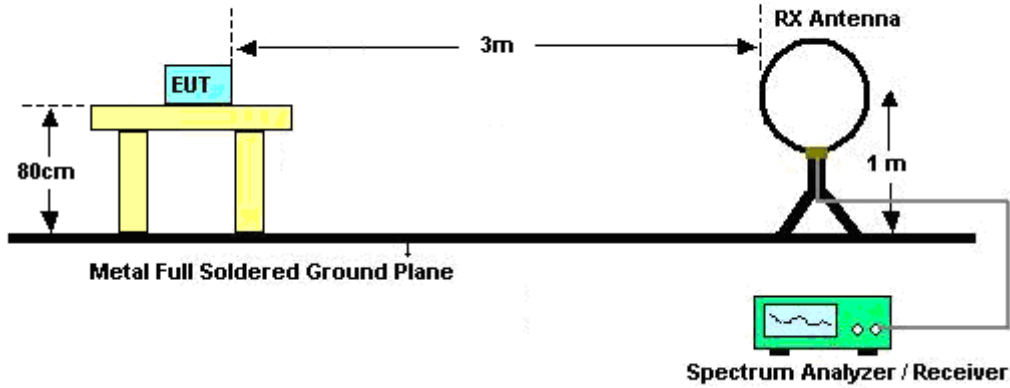


3.4.3 Test Procedures

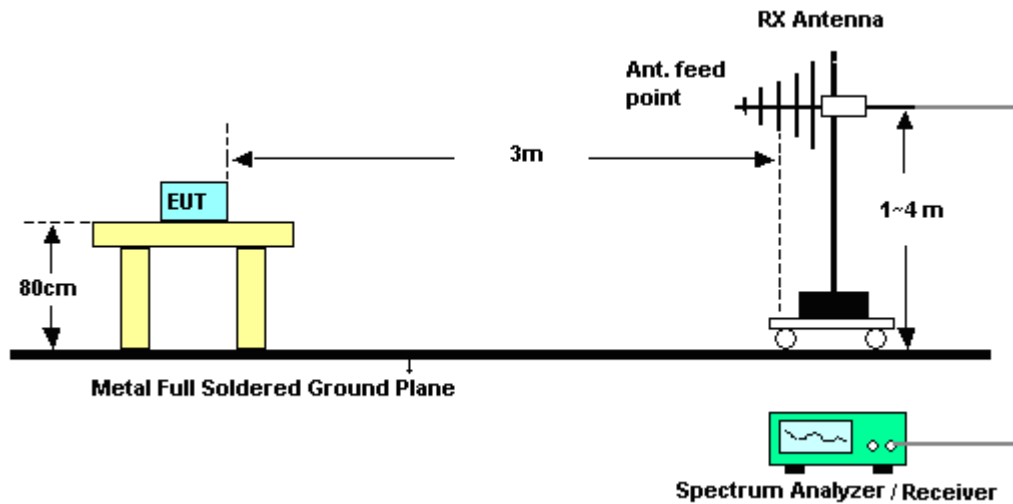
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
(1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold(2) Procedure for Peak Unwanted 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.

3.4.4 Test Setup

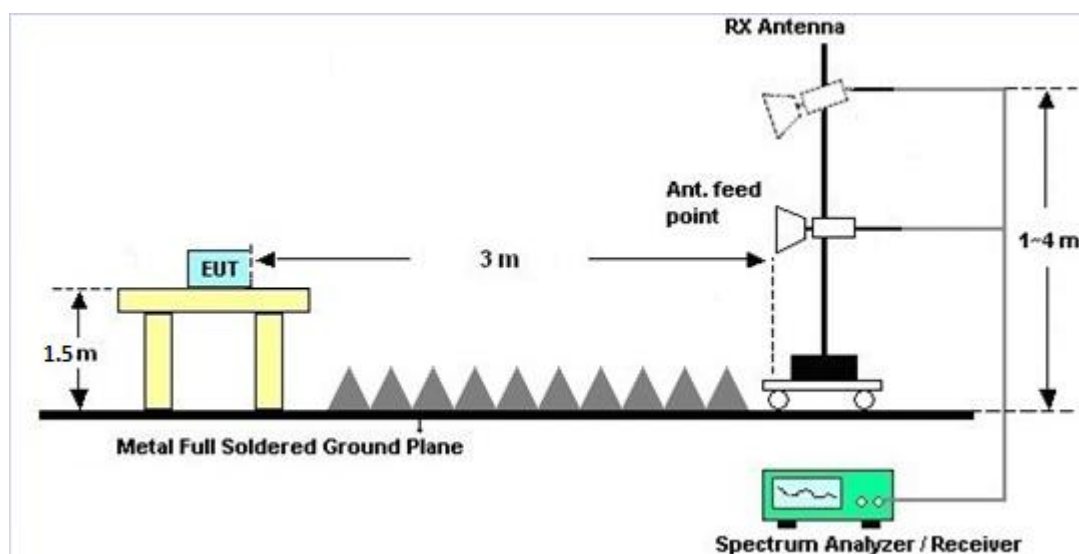
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



**3.4.5 Test Results of Radiated Spurious 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.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.5 AC Conducted Emission Measurement

3.5.1 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 (dBμV)	
	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.

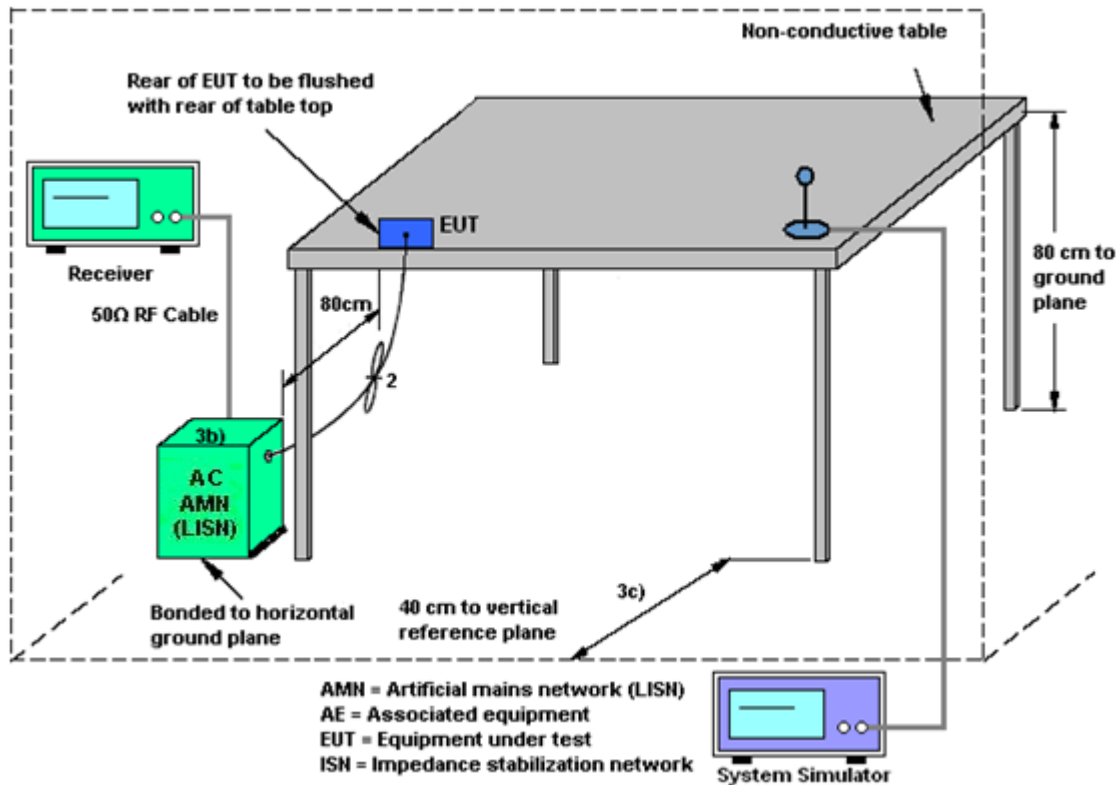
3.5.2 Measuring Instruments

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

3.5.3 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.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.6 Automatically Discontinue Transmission

3.6.1 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.

3.6.2 Measuring Instruments

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

3.6.3 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.



3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



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. 18, 2019	Jan. 12, 2020	Apr. 17, 2020	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2019	Jan. 12, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2019	Jan. 12, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 18, 2019	Dec. 16, 2019	Apr. 17, 2020	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 18, 2019	Dec. 16, 2019	Apr. 17, 2020	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2019	Dec. 16, 2019	May 28, 2020	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Aug. 27, 2019	Dec. 16, 2019	Aug. 26, 2020	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Apr. 01, 2019	Dec. 16, 2019	Mar. 31, 2020	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Apr. 19, 2019	Dec. 16, 2019	Apr. 18, 2020	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct. 18, 2019	Dec. 16, 2019	Oct. 17, 2020	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2019	Dec. 16, 2019	Oct. 17, 2020	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 22, 2019	Dec. 16, 2019	Jul. 21, 2020	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Aug. 26, 2019	Dec. 16, 2019	Aug. 25, 2020	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Dec. 16, 2019	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Dec. 16, 2019	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Dec. 16, 2019	NCR	Radiation (03CH04-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2018	Nov. 29, 2019	Dec. 25, 2019	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 17, 2019	Nov. 29, 2019	Oct. 16, 2020	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Dec. 27, 2018	Nov. 29, 2019	Dec. 26, 2019	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 23, 2019	Nov. 29, 2019	Jul. 22, 2020	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

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

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

Report Number : FR9N0607B

Test Engineer:	Sam Zheng	Temperature:	21~25	°C
Test Date:	2020/1/12	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

Band I										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)		
11a	6Mbps	1	36	5180	16.28	20.73	-	22.12		
11a	6Mbps	1	44	5220	16.23	20.58	-	22.10		
11a	6Mbps	1	48	5240	16.28	20.78	-	22.12		
HT20	MCS0	1	36	5180	17.38	21.58	-	22.40		
HT20	MCS0	1	44	5220	17.38	21.63	-	22.40		
HT20	MCS0	1	48	5240	17.38	21.63	-	22.40		
HT40	MCS0	1	38	5190	36.06	41.36	-	23.01		
HT40	MCS0	1	46	5230	36.06	41.63	-	23.01		
VHT80	MCS0	1	42	5210	74.93	82.64	-	23.01		

TEST RESULTS DATA
Average Power Table

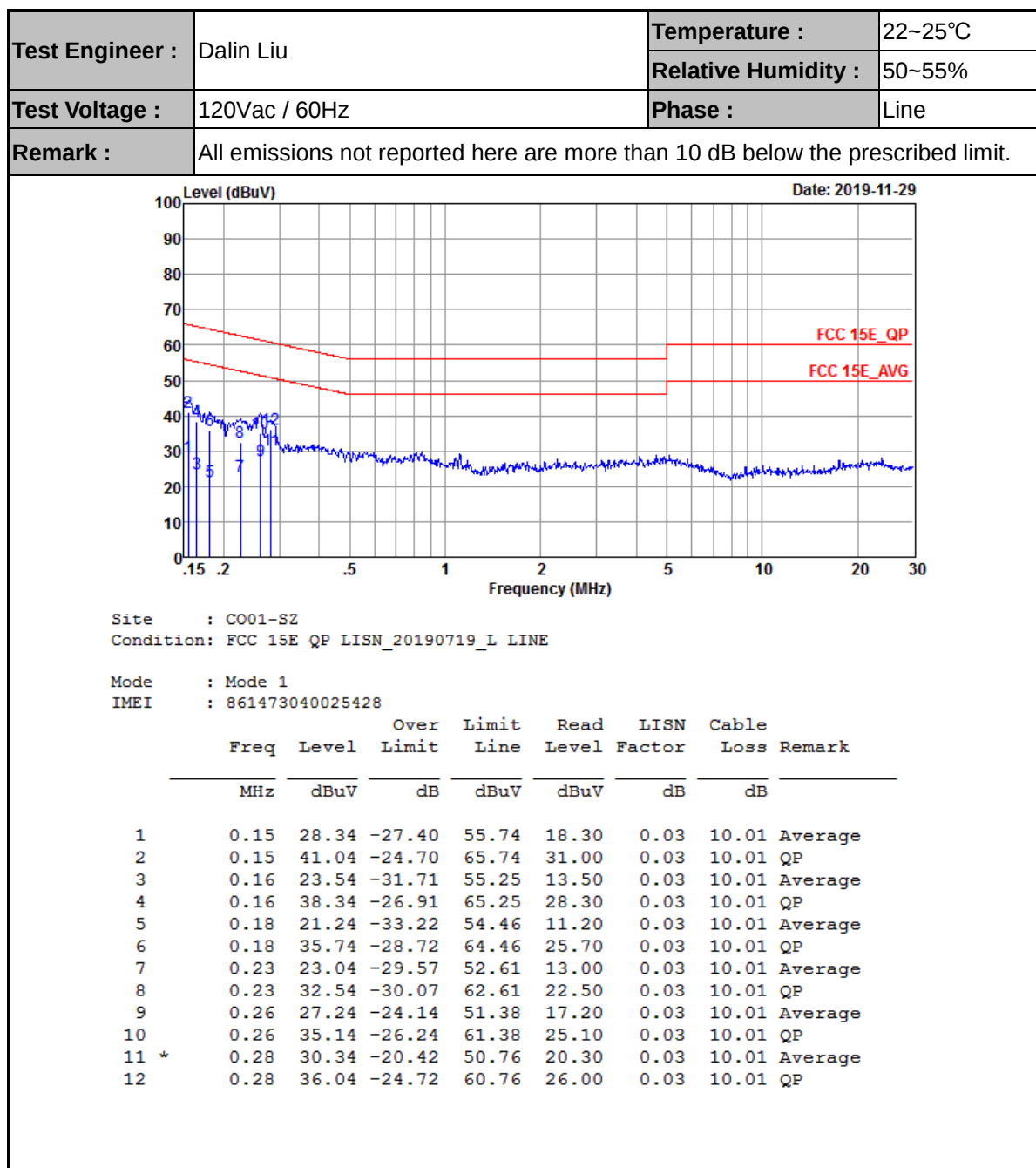
FCC Band I										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.34	15.39	24.00	0.70		Pass
11a	6Mbps	1	44	5220	0.34	15.24	24.00	0.70		Pass
11a	6Mbps	1	48	5240	0.34	15.15	24.00	0.70		Pass
HT20	MCS0	1	36	5180	0.22	15.02	24.00	0.70		Pass
HT20	MCS0	1	44	5220	0.22	14.82	24.00	0.70		Pass
HT20	MCS0	1	48	5240	0.22	14.73	24.00	0.70		Pass
HT40	MCS0	1	38	5190	0.44	15.79	24.00	0.70		Pass
HT40	MCS0	1	46	5230	0.44	15.47	24.00	0.70		Pass
VHT20	MCS0	1	36	5180	0.24	12.82	24.00	0.70		Pass
VHT20	MCS0	1	44	5220	0.24	12.74	24.00	0.70		Pass
VHT20	MCS0	1	48	5240	0.24	12.64	24.00	0.70		Pass
VHT40	MCS0	1	38	5190	0.47	12.66	24.00	0.70		Pass
VHT40	MCS0	1	46	5230	0.47	12.31	24.00	0.70		Pass
VHT80	MCS0	1	42	5210	0.85	12.08	24.00	0.70		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.34	3.87	11.00	0.70		Pass
11a	6Mbps	1	44	5220	0.34	3.43	11.00	0.70		Pass
11a	6Mbps	1	48	5240	0.34	3.12	11.00	0.70		Pass
HT20	MCS0	1	36	5180	0.22	3.20	11.00	0.70		Pass
HT20	MCS0	1	44	5220	0.22	2.77	11.00	0.70		Pass
HT20	MCS0	1	48	5240	0.22	2.53	11.00	0.70		Pass
HT40	MCS0	1	38	5190	0.44	0.58	11.00	0.70		Pass
HT40	MCS0	1	46	5230	0.44	0.51	11.00	0.70		Pass
VHT80	MCS0	1	42	5210	0.85	-6.07	11.00	0.70		Pass

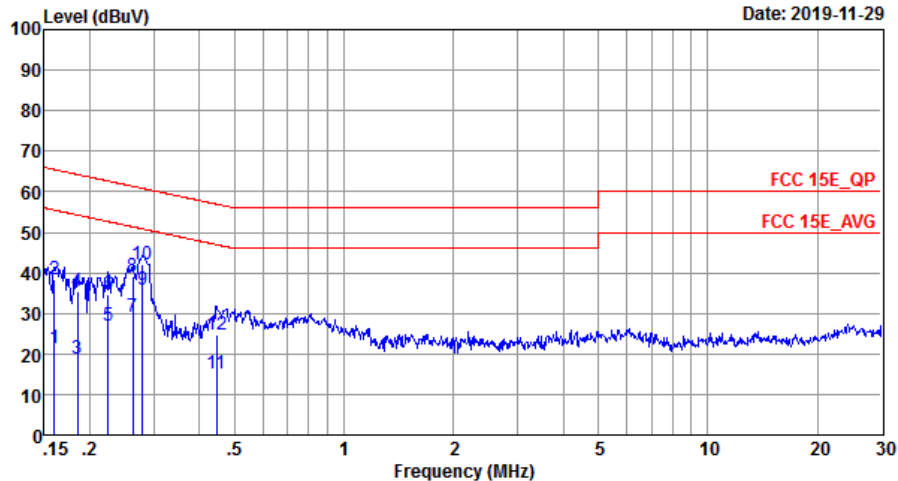


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Dalin Liu	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15E_QP LISN_20190719_N NEUTRAL

Mode : Mode 1
IMEI : 861473040025428

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	21.54	-33.93	55.47	11.50	0.03	10.01	Average
2	0.16	38.54	-26.93	65.47	28.50	0.03	10.01	QP
3	0.19	18.84	-35.40	54.24	8.80	0.03	10.01	Average
4	0.19	35.34	-28.90	64.24	25.30	0.03	10.01	QP
5	0.22	27.04	-25.62	52.66	17.00	0.03	10.01	Average
6	0.22	34.54	-28.12	62.66	24.50	0.03	10.01	QP
7	0.26	29.04	-22.30	51.34	19.00	0.03	10.01	Average
8	0.26	39.04	-22.30	61.34	29.00	0.03	10.01	QP
9 *	0.28	35.74	-15.11	50.85	25.70	0.03	10.01	Average
10	0.28	42.24	-18.61	60.85	32.20	0.03	10.01	QP
11	0.45	14.95	-31.98	46.93	4.90	0.02	10.03	Average
12	0.45	24.85	-32.08	56.93	14.80	0.02	10.03	QP

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

Test Engineer :	Feiyan Zhang	Temperature :	24~25°C
		Relative Humidity :	48~49%

Band 1 - 5150~5250MHz

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 36 5180MHz		5052	48.81	-25.19	74	40.76	32.21	8.36	32.52	115	63	P	H
		5016.38	40.01	-13.99	54	32.03	32.2	8.29	32.51	115	63	A	H
	*	5180	96.91	-	-	88.65	32.25	8.58	32.57	115	63	P	H
		5180	89.14	-	-	80.88	32.25	8.58	32.57	115	63	A	H
		5053.82	48.53	-25.47	74	40.48	32.21	8.36	32.52	108	336	P	V
		5019.5	40.02	-13.98	54	32.04	32.2	8.29	32.51	108	336	A	V
	*	5180	97.94	-	-	89.68	32.25	8.58	32.57	108	336	P	V
		5180	89.86	-	-	81.6	32.25	8.58	32.57	108	336	A	V
802.11a CH 44 5220MHz		5050.96	49.13	-24.87	74	41.08	32.21	8.36	32.52	104	65	P	H
		5031.98	40.17	-13.83	54	32.18	32.21	8.29	32.51	104	65	A	H
	*	5220	96.33	-	-	88	32.26	8.65	32.58	104	65	P	H
		5220	89.56	-	-	81.23	32.26	8.65	32.58	104	65	A	H
		5435.28	48.88	-25.12	74	39.54	32.34	9.68	32.68	104	65	P	H
		5458.08	39.95	-14.05	54	30.62	32.34	9.68	32.69	104	65	A	H
		5052.78	48.5	-25.5	74	40.45	32.21	8.36	32.52	109	336	P	V
		5034.84	40.05	-13.95	54	32.06	32.21	8.29	32.51	109	336	A	V
	*	5220	97.13	-	-	88.8	32.26	8.65	32.58	109	336	P	V
		5220	90.22	-	-	81.89	32.26	8.65	32.58	109	336	A	V
		5455.92	48.38	-25.62	74	39.05	32.34	9.68	32.69	109	336	P	V
		5446.56	39.87	-14.13	54	30.53	32.34	9.68	32.68	109	336	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 48 5240MHz		5066.82	48.95	-25.05	74	40.89	32.22	8.36	32.52	107	64	P	H
		5027.04	39.96	-14.04	54	31.97	32.21	8.29	32.51	107	64	A	H
	*	5240	96.15	-	-	87.62	32.27	8.85	32.59	107	64	P	H
		5240	89.21	-	-	80.68	32.27	8.85	32.59	107	64	A	H
		5442.48	47.74	-26.26	74	38.4	32.34	9.68	32.68	107	64	P	H
		5457.6	39.76	-14.24	54	30.43	32.34	9.68	32.69	107	64	A	H
		5024.96	49.12	-24.88	74	41.13	32.21	8.29	32.51	102	350	P	V
		5028.6	39.94	-14.06	54	31.95	32.21	8.29	32.51	102	350	A	V
	*	5240	97.99	-	-	89.46	32.27	8.85	32.59	102	350	P	V
		5240	90.46	-	-	81.93	32.27	8.85	32.59	102	350	A	V
		5425.68	48.35	-25.65	74	39.04	32.33	9.66	32.68	102	350	P	V
		5455.2	39.75	-14.25	54	30.42	32.34	9.68	32.69	102	350	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

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 36 5180MHz		10360	48.84	-19.36	68.2	57.52	38.25	12.06	58.99	152	260	P	H
		15540	48.45	-25.55	74	53.85	38.94	14.59	58.93	189	238	P	H
		10360	48.4	-19.8	68.2	57.08	38.25	12.06	58.99	152	260	P	V
		15540	48.01	-25.99	74	53.41	38.94	14.59	58.93	189	238	P	V
802.11a CH 44 5220MHz		10440	48.24	-19.96	68.2	56.73	38.31	12.12	58.92	150	230	P	H
		15660	49.17	-24.83	74	55.05	38.54	14.64	59.06	160	225	P	H
		10440	48.39	-19.81	68.2	56.88	38.31	12.12	58.92	150	230	P	V
		15660	49.45	-24.55	74	55.33	38.54	14.64	59.06	160	225	P	V
802.11a CH 48 5240MHz		10480	48.06	-20.14	68.2	56.41	38.36	12.15	58.86	189	12	P	H
		15720	49.58	-24.42	74	55.73	38.31	14.66	59.12	198	226	P	H
		10480	48.35	-19.85	68.2	56.7	38.36	12.15	58.86	189	12	P	V
		15720	49.53	-24.47	74	55.68	38.31	14.66	59.12	198	226	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT20 (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)
802.11n HT20 CH 36 5180MHz		5105.04	49.64	-24.36	74	41.52	32.23	8.43	32.54	113	64	P	H
		5028.34	40.25	-13.75	54	32.26	32.21	8.29	32.51	113	64	A	H
	*	5180	96.81	-	-	88.55	32.25	8.58	32.57	113	64	P	H
		5180	89.86	-	-	81.6	32.25	8.58	32.57	113	64	A	H
		5032.24	49.58	-24.42	74	41.59	32.21	8.29	32.51	107	337	P	V
		5146.38	40.17	-13.83	54	31.98	32.24	8.51	32.56	107	337	A	V
	*	5180	97.75	-	-	89.49	32.25	8.58	32.57	107	337	P	V
		5180	89.4	-	-	81.14	32.25	8.58	32.57	107	337	A	V
802.11n HT20 CH 44 5220MHz		5036.66	49.51	-24.49	74	41.45	32.21	8.36	32.51	105	67	P	H
		5031.98	40.04	-13.96	54	32.05	32.21	8.29	32.51	105	67	A	H
	*	5220	95	-	-	86.67	32.26	8.65	32.58	105	67	P	H
		5220	88.76	-	-	80.43	32.26	8.65	32.58	105	67	A	H
		5429.28	48.55	-25.45	74	39.21	32.34	9.68	32.68	105	67	P	H
		5447.28	39.97	-14.03	54	30.63	32.34	9.68	32.68	105	67	A	H
		5123.24	50.37	-23.63	74	42.17	32.24	8.51	32.55	120	337	P	V
		5028.08	40.07	-13.93	54	32.08	32.21	8.29	32.51	120	337	A	V
	*	5220	97.44	-	-	89.11	32.26	8.65	32.58	120	337	P	V
		5220	89.89	-	-	81.56	32.26	8.65	32.58	120	337	A	V
		5426.12	49.54	-24.46	74	40.23	32.33	9.66	32.68	120	337	P	V
		5446.28	39.85	-14.15	54	30.51	32.34	9.68	32.68	120	337	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)
802.11n HT20 CH 48 5240MHz		5021.06	49.66	-24.34	74	41.67	32.21	8.29	32.51	106	63	P	H
		5016.64	40	-14	54	32.02	32.2	8.29	32.51	106	63	A	H
	*	5240	96.13	-	-	87.6	32.27	8.85	32.59	106	63	P	H
		5240	89.54	-	-	81.01	32.27	8.85	32.59	106	63	A	H
		5424.96	50.31	-23.69	74	41	32.33	9.66	32.68	106	63	P	H
		5438.88	39.8	-14.2	54	30.46	32.34	9.68	32.68	106	63	A	H
		5062.4	49.22	-24.78	74	41.16	32.22	8.36	32.52	100	351	P	V
		5026.78	40.05	-13.95	54	32.06	32.21	8.29	32.51	100	351	A	V
	*	5240	97.14	-	-	88.61	32.27	8.85	32.59	100	351	P	V
		5240	90.21	-	-	81.68	32.27	8.85	32.59	100	351	A	V
		5369.52	48.99	-25.01	74	39.87	32.31	9.46	32.65	100	351	P	V
		5444.16	39.96	-14.04	54	30.62	32.34	9.68	32.68	100	351	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT20 (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)
802.11n		10360	47.87	-20.33	68.2	56.55	38.25	12.06	58.99	152	260	P	H
HT20		15540	48.15	-25.85	74	53.55	38.94	14.59	58.93	189	238	P	H
CH 36		10360	48.26	-19.94	68.2	56.94	38.25	12.06	58.99	152	260	P	V
5180MHz		15540	49.61	-24.39	74	55.01	38.94	14.59	58.93	189	238	P	V
802.11n		10440	48.01	-20.19	68.2	56.5	38.31	12.12	58.92	150	230	P	H
HT20		15660	49.73	-24.27	74	55.61	38.54	14.64	59.06	160	225	P	H
CH 44		10440	48.22	-19.98	68.2	56.71	38.31	12.12	58.92	150	230	P	V
5220MHz		15660	49.65	-24.35	74	55.53	38.54	14.64	59.06	160	225	P	V
802.11n		10480	48.55	-19.65	68.2	56.9	38.36	12.15	58.86	189	12	P	H
HT20		15720	49.69	-24.31	74	55.84	38.31	14.66	59.12	198	226	P	H
CH 48		10480	48.69	-19.51	68.2	57.04	38.36	12.15	58.86	189	12	P	V
5240MHz		15720	49.36	-24.64	74	55.51	38.31	14.66	59.12	198	226	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT40 (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)
802.11n HT40 CH 38 5190MHz		5149.5	52.67	-21.33	74	44.48	32.24	8.51	32.56	118	65	P	H
		5150	45.55	-8.45	54	37.36	32.24	8.51	32.56	118	65	A	H
	*	5190	93.27	-	-	85.01	32.25	8.58	32.57	118	65	P	H
		5190	86.28	-	-	78.02	32.25	8.58	32.57	118	65	A	H
		5450.2	49.2	-24.8	74	39.87	32.34	9.68	32.69	118	65	P	H
		5434.52	40.21	-13.79	54	30.87	32.34	9.68	32.68	118	65	A	H
		5150.02	52.74	-21.26	74	44.55	32.24	8.51	32.56	100	351	P	V
	*	5150	47.32	-6.68	54	39.13	32.24	8.51	32.56	100	351	A	V
		5190	94.56	-	-	86.3	32.25	8.58	32.57	100	351	P	V
		5190	87.82	-	-	79.56	32.25	8.58	32.57	100	351	A	V
		5436.2	48.7	-25.3	74	39.36	32.34	9.68	32.68	100	351	P	V
		5440.68	40.85	-13.15	54	31.51	32.34	9.68	32.68	100	351	A	V
802.11n HT40 CH 46 5230MHz		5021.58	49.2	-24.8	74	41.21	32.21	8.29	32.51	106	65	P	H
		5002.08	40.85	-13.15	54	32.9	32.16	8.29	32.5	106	65	A	H
	*	5230	93.77	-	-	85.44	32.27	8.65	32.59	106	65	P	H
		5230	86.75	-	-	78.42	32.27	8.65	32.59	106	65	A	H
		5362.28	48.6	-25.4	74	39.48	32.31	9.46	32.65	106	65	P	H
		5447.68	40.46	-13.54	54	31.12	32.34	9.68	32.68	106	65	A	H
		5142.48	49.5	-24.5	74	41.3	32.24	8.51	32.55	100	336	P	V
		5056.94	40.64	-13.36	54	32.58	32.22	8.36	32.52	100	336	A	V
	*	5230	94.96	-	-	86.63	32.27	8.65	32.59	100	336	P	V
		5230	87.64	-	-	79.31	32.27	8.65	32.59	100	336	A	V
		5441.52	47.84	-26.16	74	38.5	32.34	9.68	32.68	100	336	P	V
		5439.56	40.37	-13.63	54	31.03	32.34	9.68	32.68	100	336	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT40 (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)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		10380	49.37	-18.83	68.2	57.99	38.26	12.09	58.97	150	360	P	H
HT40		15570	49.6	-24.4	74	55.15	38.82	14.6	58.97	155	360	P	H
CH 38		10380	48.04	-20.16	68.2	56.66	38.26	12.09	58.97	150	360	P	V
5190MHz		15570	49.74	-24.26	74	55.29	38.82	14.6	58.97	155	360	P	V
802.11n		10460	49.21	-18.99	68.2	57.64	38.32	12.15	58.9	150	360	P	H
HT40		15690	49.82	-24.18	74	55.83	38.42	14.66	59.09	150	225	P	H
CH 48		10460	48.88	-19.32	68.2	57.31	38.32	12.15	58.9	150	360	P	V
5230MHz		15690	49.84	-24.16	74	55.85	38.42	14.66	59.09	150	225	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

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 42 5210MHz		5107.38	49.74	-24.26	74	41.62	32.23	8.43	32.54	100	63	P	H
		5139.62	41.61	-12.39	54	33.41	32.24	8.51	32.55	100	63	A	H
	*	5210	87.25	-	-	78.92	32.26	8.65	32.58	100	63	P	H
		5210	79.92	-	-	71.59	32.26	8.65	32.58	100	63	A	H
		5408.76	48.61	-25.39	74	39.3	32.32	9.66	32.67	100	63	P	H
		5459.44	40.47	-13.53	54	31.14	32.34	9.68	32.69	100	63	A	H
		5079.82	49.47	-24.53	74	41.35	32.22	8.43	32.53	102	337	P	V
		5141.7	41.9	-12.1	54	33.7	32.24	8.51	32.55	102	337	A	V
	*	5210	87.72	-	-	79.39	32.26	8.65	32.58	102	337	P	V
		5210	80.69	-	-	72.36	32.26	8.65	32.58	102	337	A	V
		5352.48	49.39	-24.61	74	40.27	32.31	9.46	32.65	102	337	P	V
		5439.84	40.38	-13.62	54	31.04	32.34	9.68	32.68	102	337	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 1 5150~5250MHz****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		10420	49.33	-18.87	68.2	57.85	38.29	12.12	58.93	150	360	P	H
VHT80		15630	49.62	-24.38	74	55.45	38.59	14.62	59.04	155	360	P	H
CH 42		10420	48.28	-19.92	68.2	56.8	38.29	12.12	58.93	150	360	P	V
5210MHz		15630	49.74	-24.26	74	55.57	38.59	14.62	59.04	155	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30	23.47	-16.53	40	31.34	24.2	0.53	32.6	-	-	P	H
		82.38	19.94	-20.06	40	38.3	13.3	0.9	32.56	-	-	P	H
		141.55	28.94	-14.56	43.5	42.79	17.36	1.22	32.43	-	-	P	H
		202.66	26.94	-16.56	43.5	42.13	15.56	1.44	32.19	-	-	P	H
		266.68	33.01	-12.99	46	44.08	19.23	1.7	32	100	144	P	H
		337.49	24.72	-21.28	46	34.74	20.05	1.93	32	-	-	P	H
		30	29.43	-10.57	40	37.3	24.2	0.53	32.6	100	57	P	V
		36.79	28.7	-11.3	40	38.67	20.84	0.59	31.4	-	-	P	V
		101.78	23.71	-19.79	43.5	38.36	16.91	1.03	32.59	-	-	P	V
		202.66	22.03	-21.47	43.5	37.22	15.56	1.44	32.19	-	-	P	V
		263.77	32.83	-13.17	46	43.84	19.3	1.69	32	-	-	P	V
		450.01	24.2	-21.8	46	31.4	22.5	2.2	31.9	-	-	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		(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)

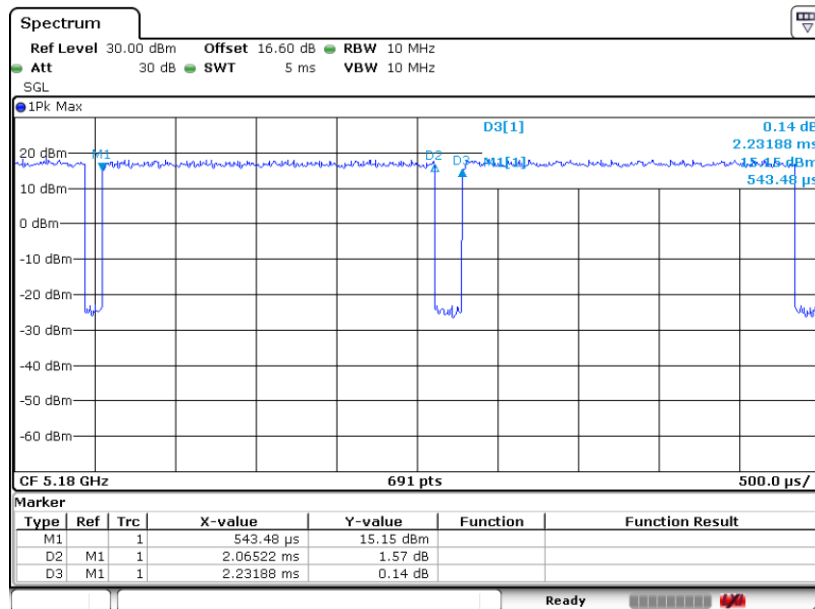
= -10.46(dB)

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

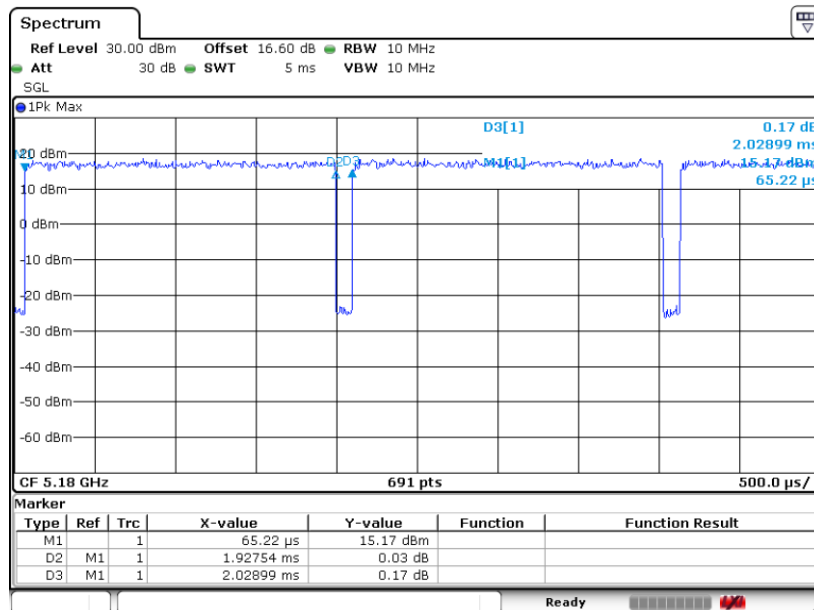
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	92.53	2.065	0.484	1kHz
5GHz 802.11n HT20	95.00	1.928	0.519	1kHz
5GHz 802.11n HT40	90.46	0.948	1.055	3kHz
5GHz 802.11n HT40	82.24	0.463	2.160	3kHz

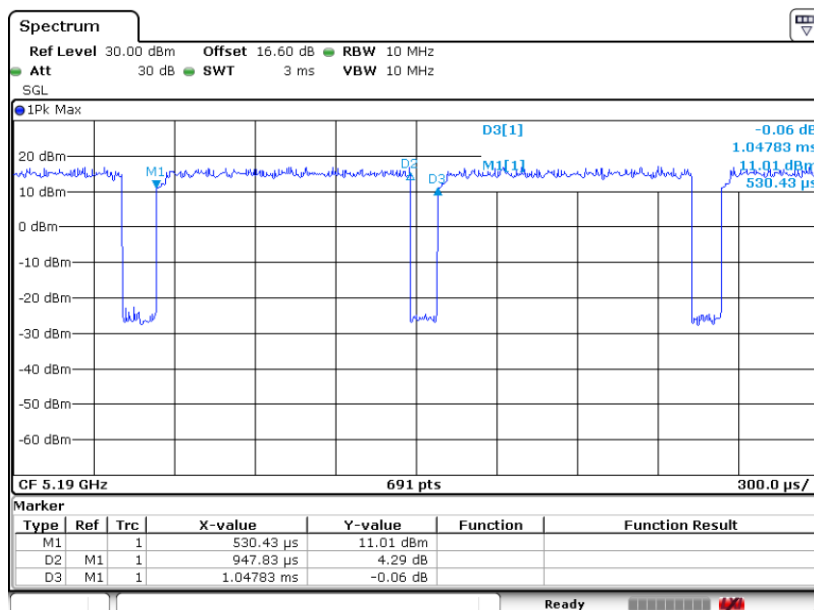
802.11a



802.11n HT20



802.11n HT40



802.11ac VHT80

