FCC RF Test Report

APPLICANT	:	Nokia Shanghai Bell Co., Ltd.
EQUIPMENT	:	NOK 5G21 GATEWAY GRY KIT
BRAND NAME	:	T-Mobile
MODEL NAME	:	5G21-12W-A
FCC ID	:	2ADZR5G2112WA
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on Mar. 11, 2020 and testing was completed on Jul. 22, 2020. We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED Cert #5145.02

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR9D2703C	Rev. 01	Initial issue of report	Jul. 29, 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	≤ 30 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 17 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 0.09 dB at 5145.760 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.87 dB at 0.367 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

Nokia Shanghai Bell Co., Ltd.
388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

1.2 Manufacturer

Nokia Solutions and Networks Oy
Karakaari 7, 02610 Espoo, Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	NOK 5G21 GATEWAY GRY KIT
Brand Name	T-Mobile
Model Name	5G21-12W-A
FCC ID	2ADZR5G2112WA
EUT supports Radios application	LTE/5G NR/GNSS WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/HE20/HE40/HE80 Bluetooth LE
HW Version	3TG00739A
SW Version	HB5GGW_D010000B42T0101E0379.tar
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.

Specification of Accessory				
AC Adapter 1	**Brand Name**	DELTA	**Model Name**	UPD-480WNAB B
	Power Rating	I/P: 100-240Vac, 1600mA, O/P:12Vdc, 4000mA		
AC Adapter 2	**Brand Name**	FSP	**Model Name**	FSP048-A12U01
	Power Rating	I/P: 100-240Vac, 1300mA, O/P:12Vdc, 4000mA		

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>5180 MHz ~ 5240 MHz</td></tr>
<tr><td>Maximum Output Power to Antenna</td><td><SISO Ant.1/2/3/4>
<5180 MHz ~ 5240 MHz>
802.11a : 27.34 dBm / 0.5420 W
<MIMO Ant.1+2+3+4>
<5180 MHz ~ 5240 MHz>
802.11n HT20 : 27.94 dBm / 0.6223 W
802.11n HT40 : 29.66 dBm / 0.9247 W
802.11ac VHT80 : 18.14 dBm / 0.0652 W
802.11ax HE20 : 27.84 dBm / 0.6081 W
802.11ax HE40 : 27.71 dBm / 0.5902 W
802.11ax HE80 : 19.92 dBm / 0.0982 W</td></tr>
<tr><td>99% Occupied Bandwidth</td><td><SISO Ant.2>
<5180 MHz ~ 5240 MHz>
802.11a : 17.03 MHz
<MIMO Ant.1+2+3+4>
<5180 MHz ~ 5240 MHz>
802.11n HT20 : 18.23 MHz
802.11n HT40 : 36.36 MHz
802.11ac VHT80 : 75.52 MHz
802.11ax HE20 : 19.53 MHz
802.11ax HE40 : 38.06 MHz
802.11ax HE80 : 77.20 MHz</td></tr>
<tr><td>Antenna Type / Gain</td><td><5150 MHz ~ 5250 MHz>
<Ant. 1> : PCB Antenna with gain 5.00 dBi
<Ant. 2> : PCB Antenna with gain 5.00 dBi
<Ant. 3> : PCB Antenna with gain 5.00 dBi
<Ant. 4> : PCB Antenna with gain 5.00 dBi
MIMO Gain (Ant. 1+2+3+4)：5.0 dBi
Beamforming Gain (Ant. 1+2+3+4)：5.51 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 512QAM / 1024QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th><th>Ant. 3</th><th>Ant. 4</th></tr>
<tr><td>802.11 a
SISO</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n/ac/ax
MIMO/Beamforming</td><td>V</td><td>V</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Note:

1. 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.
2. For 11ax, manufacturer declared the EUT does not support OFDMA of Resource unit combination (26 tones, 52 tones, 106 tones, 242 tones…etc).
3. The EUT supports for MIMO/Beamforming mode for 802.11n/ac/ax mode only.

4. The Tx Power of EUT will less than or equal to non-beamforming power when Beamforming mode is active. So we only evaluate RSE testing would be verified.
5. For 802.11a mode, the whole testing has assessed Ant.2 for band1 by referring to their higher conducted power for RSE testing.

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	CO01-KS 03CH06-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

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.
- 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). 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)
5150-5250 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, 802.11ac VHT40 and 802.11ax HE40.
2. The above Frequency and Channel in "#" were 802.11ac VHT80 and 802.11ax HE80.

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	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0
802.11ax HE20	MCS0
802.11ax HE40	MCS0
802.11ax HE80	MCS0

TXBF Mode

Modulation	Data Rate
802.11ax HE20	MCS0
802.11ax HE40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : LTE Band 5 Idle + Bluetooth Link + WLAN Link (5G) + Lan 1 Link + Lan 2 Link + RJ11 Link + Adapter 1

Remark:

1. For Radiated Test Cases, The tests were performance with Adapter 1.
2. Tx BF mode evaluation is to select the worst mode in the MIMO mode for testing.

Ch. #		Band I : 5150-5250 MHz
		802.11a
L	Low	36
M	Middle	44
H	High	48
Straddle		-

Ch. #		Band I : 5150-5250 MHz
		802.11n HT20
L	Low	36
M	Middle	44
H	High	48
Straddle		-

Ch. #		Band I : 5150-5250 MHz
		802.11n HT40
L	Low	38
M	Middle	-
H	High	46
Straddle		-

Ch. #		Band I : 5150-5250 MHz
		802.11ac VHT80
L	Low	-
M	Middle	42
H	High	-
Straddle		-

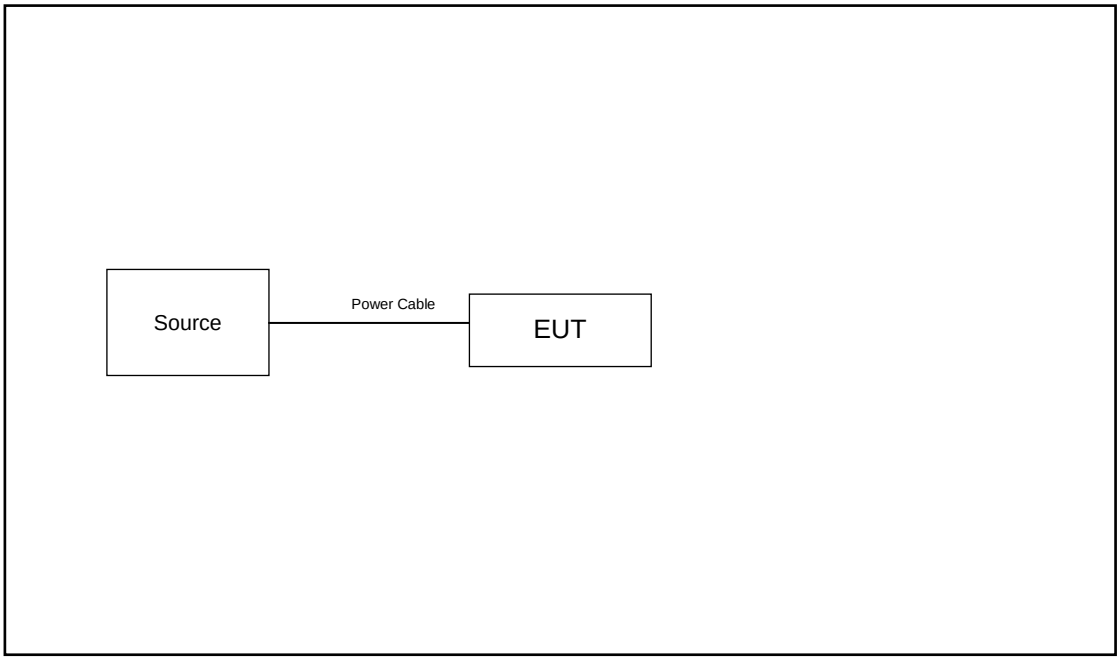
Ch. #		Band I : 5150-5250 MHz
		802.11ax HE20
L	Low	36
M	Middle	44
H	High	48
Straddle		-

Ch. #		Band I : 5150-5250 MHz
		802.11ax HE40
L	Low	38
M	Middle	-
H	High	46
Straddle		-

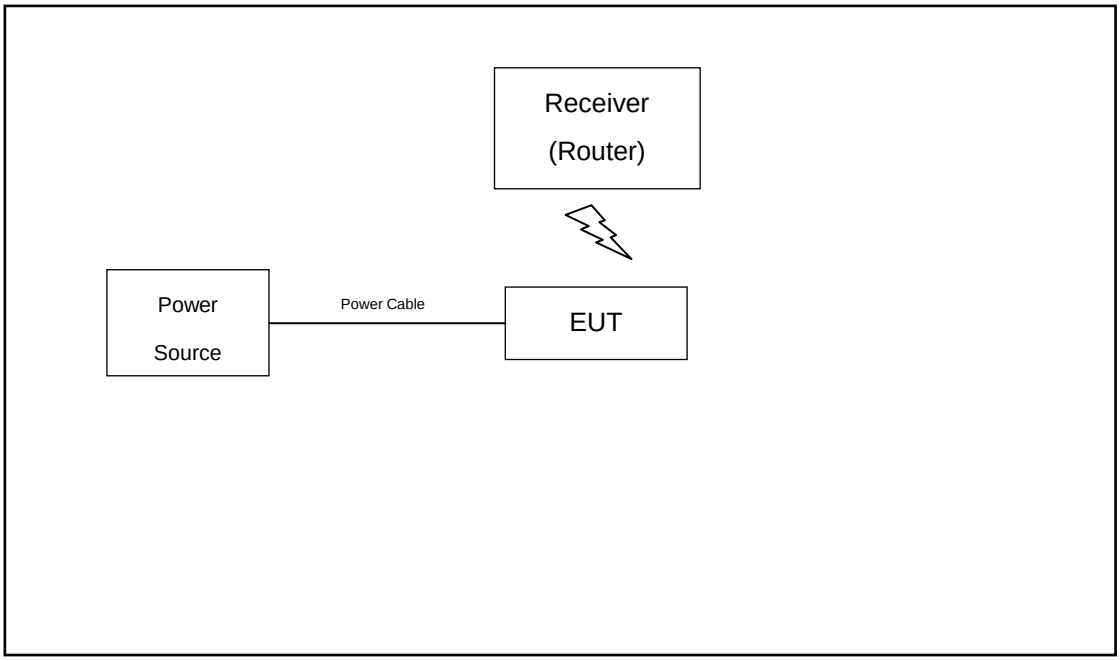
Ch. #		Band I : 5150-5250 MHz
		802.11ax HE80
L	Low	-
M	Middle	42
H	High	-
Straddle		-

2.3 Connection Diagram of Test System

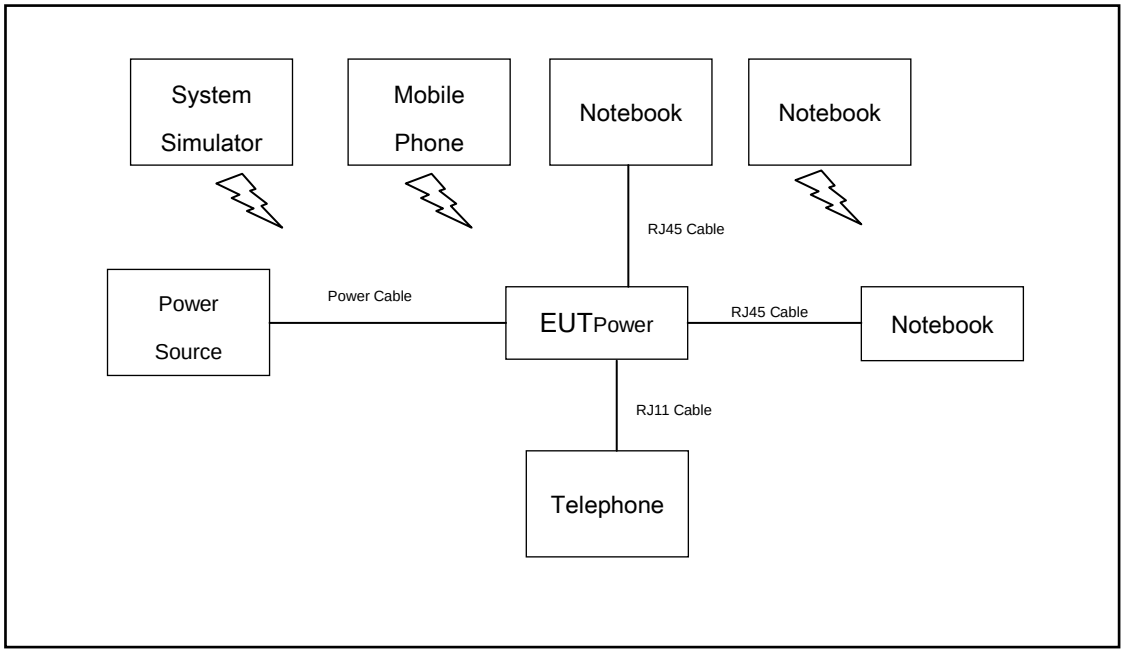
For Radiation (SISO/MIMO)



For Radiation (Beamforming)



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.	Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Mobile Phone	MOTO	XT1952-1	XXXX	N/A	N/A
3.	Lenovo	G480	QDS-BRCM1050I	N/A	Lenovo	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	Notebook	Lenovo	V130-14IKB004	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
6.	Hard DISK*2	WD	C6B	N/A	N/A	N/A
7.	Earphone*2	Lenovo	P121	N/A	N/A	Unshielded,1.2m
8.	U Disk	Sandra Disk	SDDDC2	N/A	N/A	N/A
9.	Telephone	bubugao	HCD007(6082)TSD	N/A	N/A	N/A
10.	RJ45 cable	N/A	N/A	N/A	N/A	N/A
11.	RJ11 cable	N/A	N/A	N/A	N/A	N/A
12.	Receiver(Router)	Nokia	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 continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the Notebook 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6.9dB.

Offset(dB) = RF cable loss(dB).

= 6.9 (dB)

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.

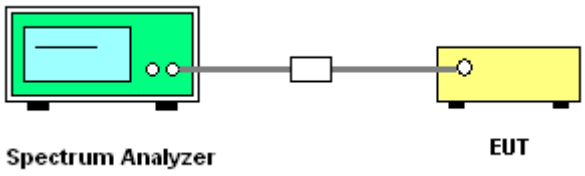
3.1.2 Measuring Instruments

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 1MHz and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

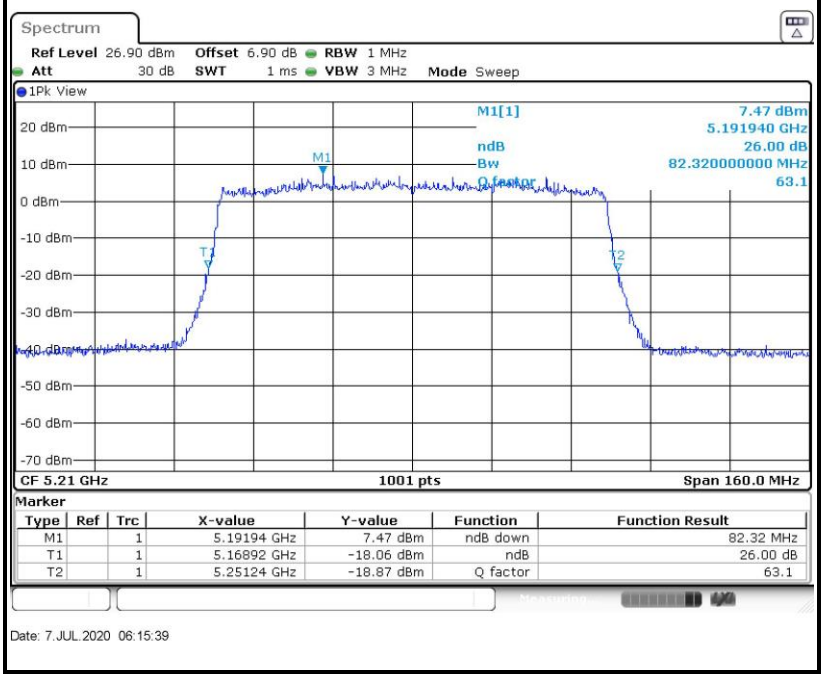
3.1.4 Test Setup



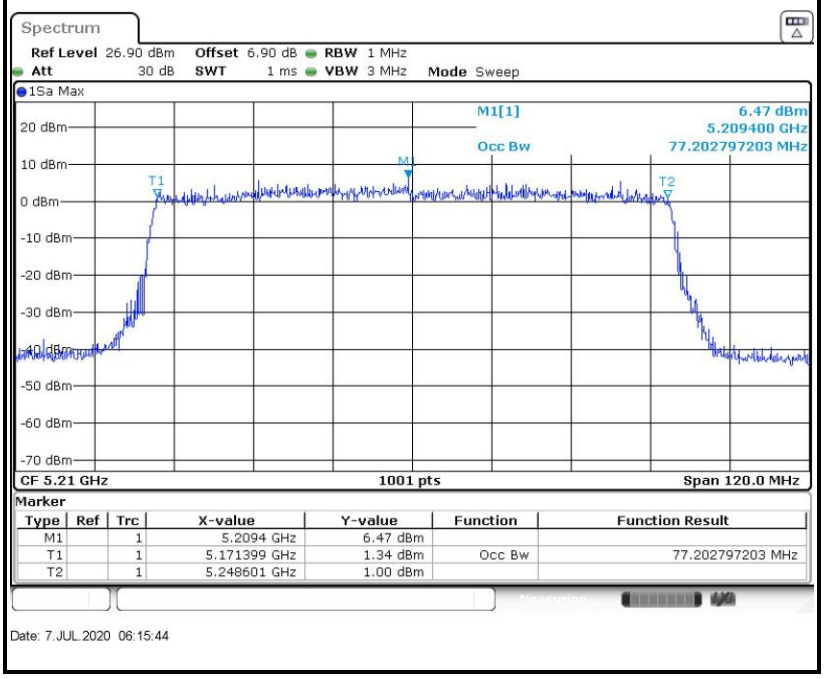
3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.

Maximum 26dB Bandwidth



Maximum 99% Occupied Bandwidth



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 an indoor access point operating in the band 5.15-5.25 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.

3.2.2 Measuring Instruments

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

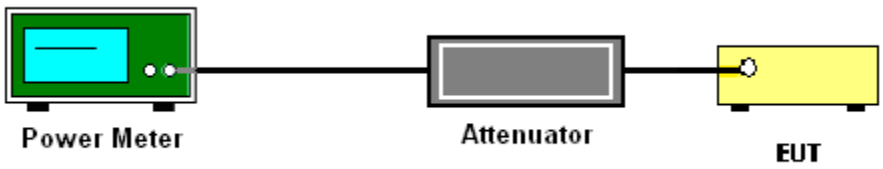
3.2.3 Test Procedures

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 an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm 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).

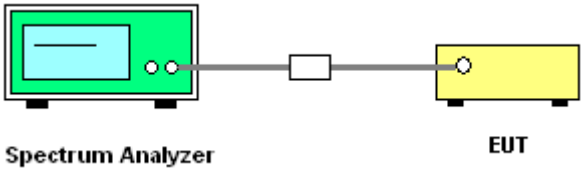
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), 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. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 4 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2, output 3 and output 4 to obtain the value for the first frequency bin of the summed spectrum.

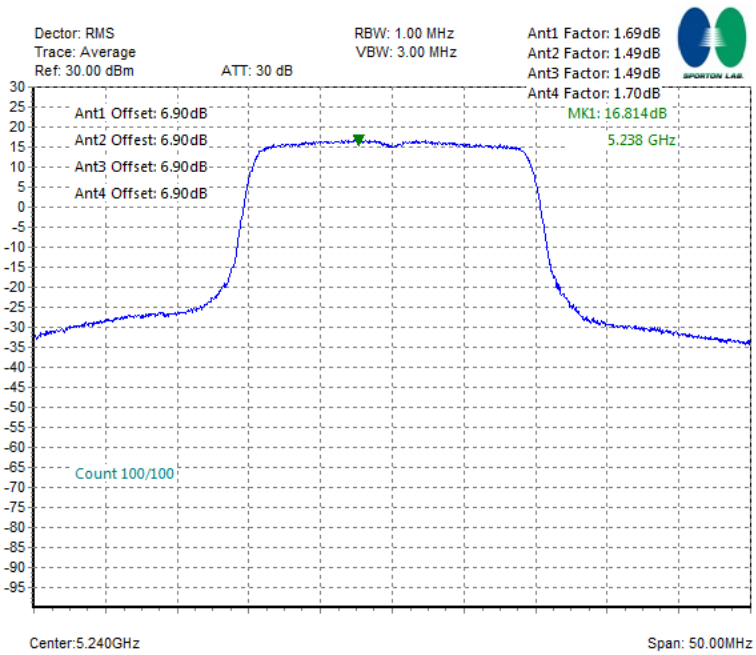
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Worst Case Power Density (dBm/MHz)



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	68.3

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

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.77$$

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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

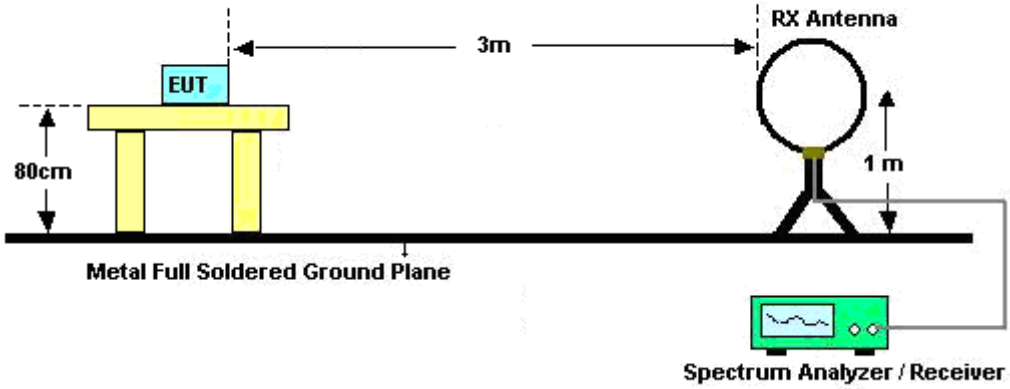
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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.

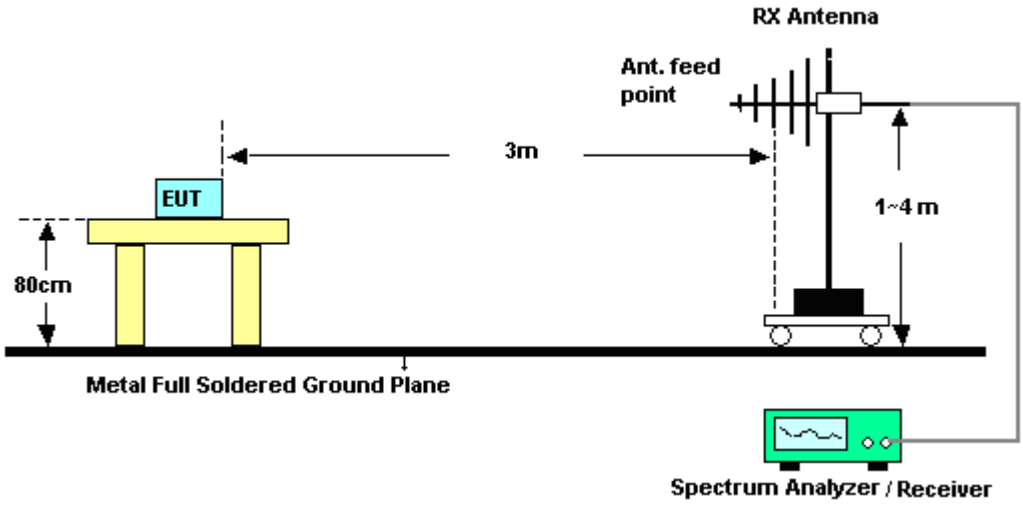
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

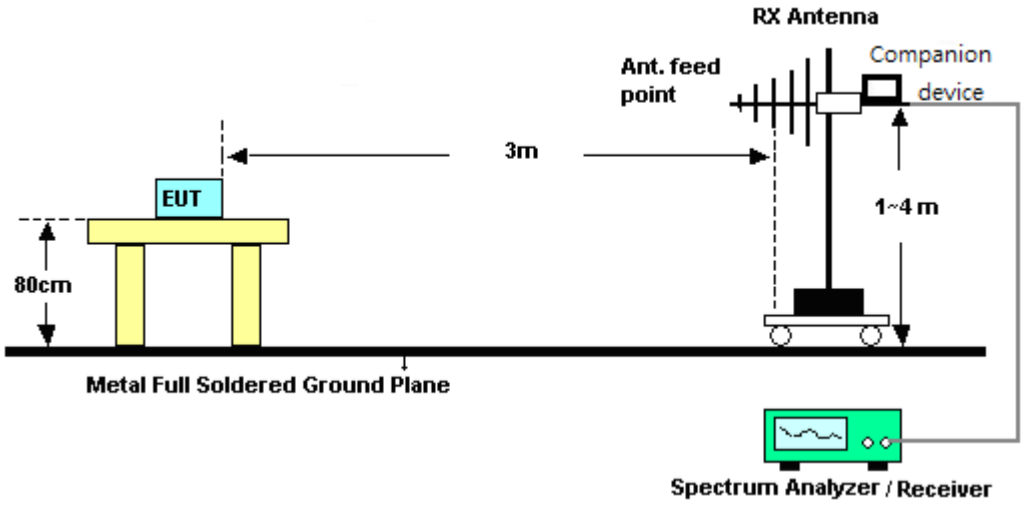
For radiated emissions below 30MHz



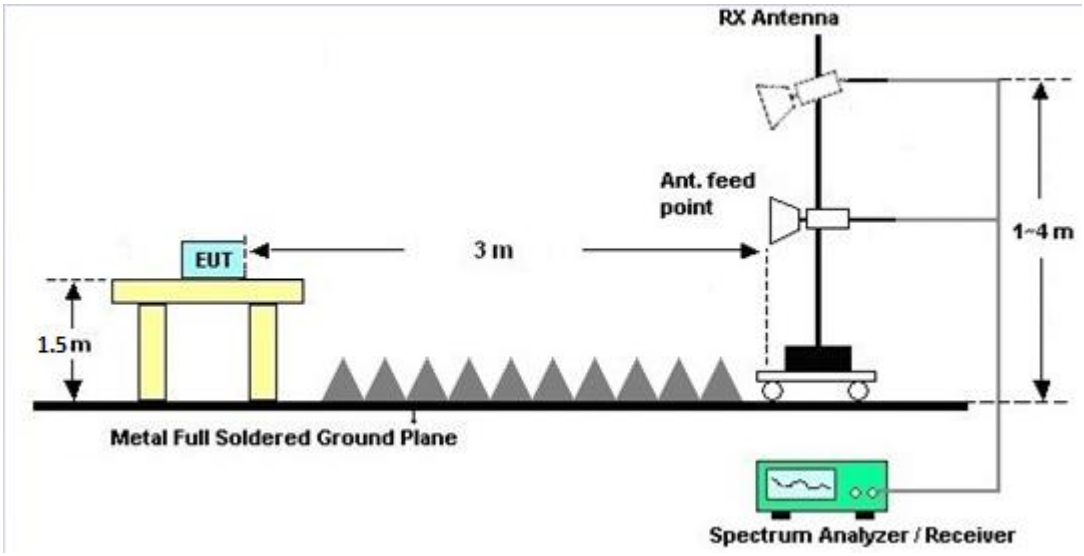
For radiated emissions from 30MHz to 1GHz



<TXBF Modes>



For radiated emissions above 1GHz



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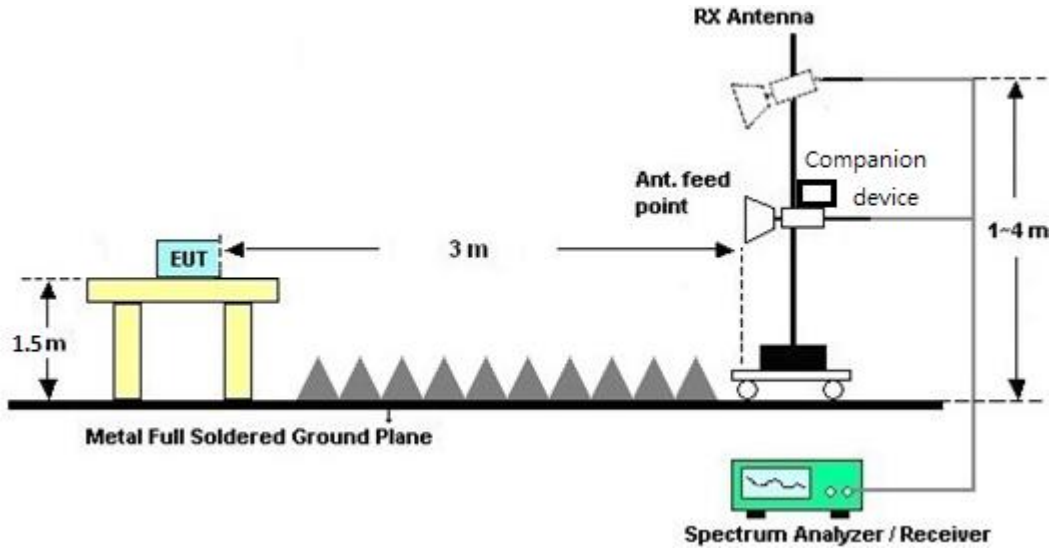


3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

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.

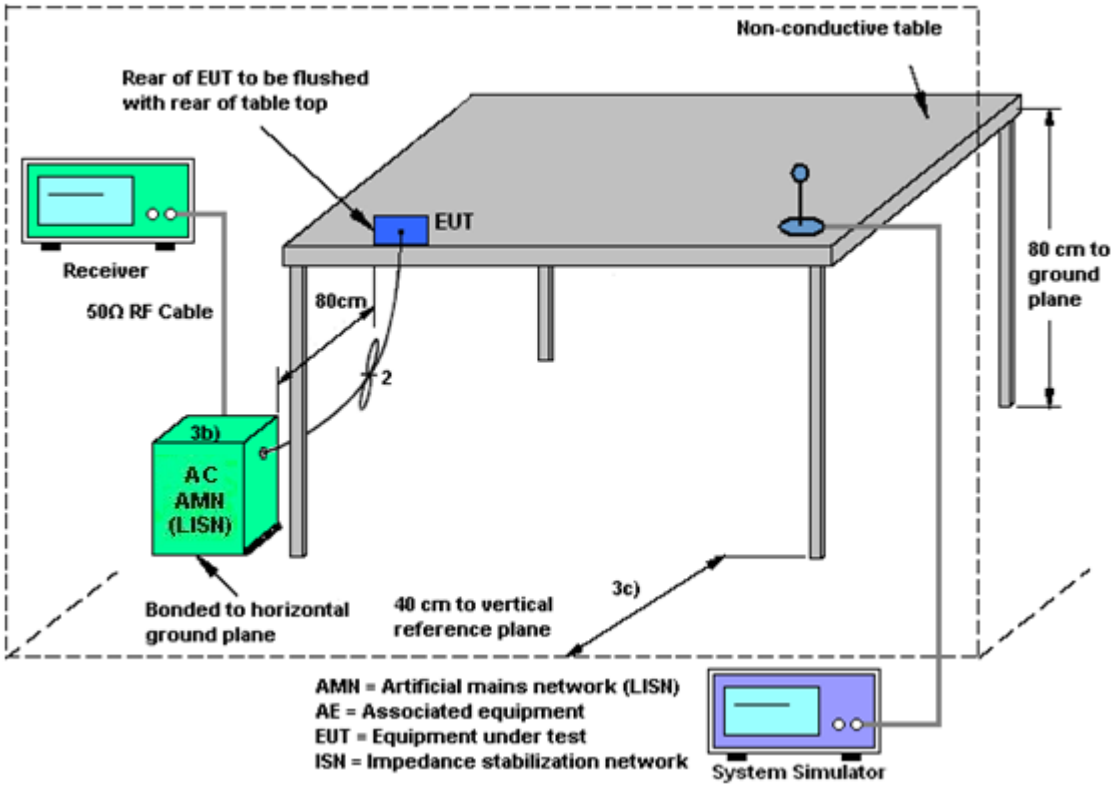
3.5.2 Measuring Instruments

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

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power measurements on IEEE 802.11 devices,

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

For power, the directional gain GANT 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.

	Ant. 1 (dBi)	Ant. 2 (dBi)	Ant. 3 (dBi)	Ant. 4 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	5.00	5.00	5.00	5.00	5.00	5.51	0.00	0.00

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 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	101040	10Hz~40GHz	Nov. 02, 2019	Jul. 07, 2020~ Jul. 16, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 15, 2020	Jul. 07, 2020~ Jul. 16, 2020	Jan. 14, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Jul. 07, 2020~ Jul. 16, 2020	Jan. 07, 2021	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY57290157	3Hz~8.5GHz;Max 30dBm	Jul. 18, 2019	Apr. 20, 2020~ Jul. 22, 2020	Jul. 17, 2020	Radiation (03CH06-KS)
EMI Test Receiver	Keysight	N9038A	MY57290157	3Hz~8.5GHz;Max 30dBm	Jul. 16, 2020		Jul. 15, 2021	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 15, 2020	Apr. 20, 2020~ Jul. 22, 2020	Apr. 16, 2021	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Apr. 20, 2020~ Jul. 22, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 30, 2020	Apr. 20, 2020~ Jul. 22, 2020	May 29, 2021	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2019	Apr. 20, 2020~ Jul. 22, 2020	Apr. 26, 2020	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2020		Apr. 26, 2021	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Apr. 20, 2020~ Jul. 22, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2019	Apr. 20, 2020~ Jul. 22, 2020	Aug. 05, 2020	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Apr. 20, 2020~ Jul. 22, 2020	Jan. 07, 2021	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Aug. 16, 2019	Apr. 20, 2020~ Jul. 22, 2020	Aug. 15, 2020	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2020	Apr. 20, 2020~ Jul. 22, 2020	Apr. 14, 2021	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Apr. 20, 2020~ Jul. 22, 2020	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Apr. 20, 2020~ Jul. 22, 2020	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Apr. 20, 2020~ Jul. 22, 2020	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 14, 2020	Jul. 22, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Jul. 22, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Jul. 22, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Jul. 22, 2020	Oct. 17, 2020	Conduction (CO01-KS)

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))	**2.9dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Appendix A. Conducted Test Results

Report Number : FR9D2703C

Test Engineer:	Weller Liu	Temperature:	21~25	°C
Test Date:	2020/7/7~2020/7/16	Relative Humidity:	51~54	%

Report Number : FR9D2703C

TEST RESULTS DATA
26dB and 99% OBW

Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4
11a	6Mbps	1	36	5180		20.98				17.03				22.31		
11a	6Mbps	1	44	5220		21.08				17.03				22.31		
11a	6Mbps	1	48	5240		21.33				17.03				22.31		

Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	26 dB Bandwidth (MHz)				99% Bandwidth (MHz)				IC 99% Bandwidth EIRP Limit (dBm)			
					Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4
HT20	MCS0	4	36	5180	21.728	22.03	22.03	21.83	18.13	18.18	18.03	18.13	22.58	22.60	22.56	22.58
HT20	MCS0	4	44	5220	22.078	21.63	21.88	21.78	18.08	18.08	18.23	18.23	22.57	22.57	22.61	22.61
HT20	MCS0	4	48	5240	22.078	21.73	22.18	21.63	18.18	18.13	18.13	18.08	22.60	22.58	22.58	22.57
HT40	MCS0	4	38	5190	41.179	40.91	41.27	40.73	36.16	36.16	36.26	36.36	23.01	23.01	23.01	23.01
HT40	MCS0	4	46	5230	41.179	41.00	41.09	40.64	36.26	36.26	36.36	36.36	23.01	23.01	23.01	23.01
AX20	MCS0	4	36	5180	22.577	22.48	22.38	22.23	19.53	19.43	19.38	19.38	22.91	22.88	22.87	22.87
AX20	MCS0	4	44	5220	22.577	22.23	22.43	22.33	19.33	19.33	19.48	19.38	22.86	22.86	22.90	22.87
AX20	MCS0	4	48	5240	22.428	22.28	22.58	22.28	19.38	19.33	19.33	19.33	22.87	22.86	22.86	22.86
AX40	MCS0	4	38	5190	41.718	41.63	41.72	41.54	37.96	37.96	37.96	37.96	23.01	23.01	23.01	23.01
AX40	MCS0	4	46	5230	41.538	41.27	41.72	41.45	38.06	37.86	37.96	37.96	23.01	23.01	23.01	23.01
VHT80	MCS0	4	42	5210	81.84	81.04	81.52	80.88	75.40	75.28	75.52	75.40	23.01	23.01	23.01	23.01
AX80	MCS0	4	42	5210	81.84	82.32	81.84	82.32	77.08	77.20	76.96	77.08	23.01	23.01	23.01	23.01

Report Number : FR9D2703C

TEST RESULTS DATA
Average Power Table

FCC Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	Ant. Gain (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail
						Ant 1	Ant 2	Ant 3	Ant 4	SUM					
11a	6Mbps	1	36	5180	1	17.95					30.00	5.00	22.95	-	Pass
11a	6Mbps	1	44	5220	1	24.60					30.00	5.00	29.60	-	Pass
11a	6Mbps	1	48	5240	1	27.23					30.00	5.00	32.23	-	Pass
11a	6Mbps	1	36	5180	2		17.74				30.00	5.00	22.74	-	Pass
11a	6Mbps	1	44	5220	2		24.32				30.00	5.00	29.32	-	Pass
11a	6Mbps	1	48	5240	2		27.34				30.00	5.00	32.34	-	Pass
11a	6Mbps	1	36	5180	3			17.86			30.00	5.00	22.86	-	Pass
11a	6Mbps	1	44	5220	3			24.18			30.00	5.00	29.18	-	Pass
11a	6Mbps	1	48	5240	3			27.27			30.00	5.00	32.27	-	Pass

FCC Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	Ant. Gain (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail
						Ant 1	Ant 2	Ant 3	Ant 4	SUM					
11a	6Mbps	1	36	5180	4				17.65		30.00	5.00	22.65	-	Pass
11a	6Mbps	1	44	5220	4				24.19		30.00	5.00	29.19	-	Pass
11a	6Mbps	1	48	5240	4				27.30		30.00	5.00	32.30	-	Pass

FCC Band I																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Average Conducted Power with duty factor (dBm)					FCC Power Limit (dBm)	DG (dBi)	FCC EIRP Power (dBm)	FCC EIRP Power Limit (dBm)	Pass/Fail
						Ant 1	Ant 2	Ant 3	Ant 4	SUM					
HT20	MCS0	4	36	5180	1+2+3+4	19.88	20.73	19.62	19.91	26.08	30.00	5.00	31.08	-	Pass
HT20	MCS0	4	44	5220	1+2+3+4	21.61	22.14	21.12	21.79	27.70	30.00	5.00	32.70	-	Pass
HT20	MCS0	4	48	5240	1+2+3+4	21.78	22.03	21.64	22.20	27.94	30.00	5.00	32.94	-	Pass
HT40	MCS0	4	38	5190	1+2+3+4	18.38	17.88	18.39	17.97	24.18	30.00	5.00	29.18	-	Pass
HT40	MCS0	4	46	5230	1+2+3+4	23.68	23.90	23.67	23.29	29.66	30.00	5.00	34.66	-	Pass
AX20	MCS0	4	36	5180	1+2+3+4	20.02	19.32	19.61	19.71	25.69	30.00	5.00	30.69	-	Pass
AX20	MCS0	4	44	5220	1+2+3+4	21.95	21.45	21.64	21.95	27.77	30.00	5.00	32.77	-	Pass
AX20	MCS0	4	48	5240	1+2+3+4	21.82	21.88	21.75	21.81	27.84	30.00	5.00	32.84	-	Pass
AX40	MCS0	4	38	5190	1+2+3+4	18.44	18.17	18.23	18.16	24.27	30.00	5.00	29.27	-	Pass
AX40	MCS0	4	46	5230	1+2+3+4	21.72	21.69	21.76	21.59	27.71	30.00	5.00	32.71	-	Pass
VHT80	MCS0	4	42	5210	1+2+3+4	12.43	11.74	12.18	12.08	18.14	30.00	5.00	23.14	-	Pass
AX80	MCS0	4	42	5210	1+2+3+4	13.73	13.80	14.15	13.92	19.92	30.00	5.00	24.92	-	Pass

Report Number : FR9D2703C

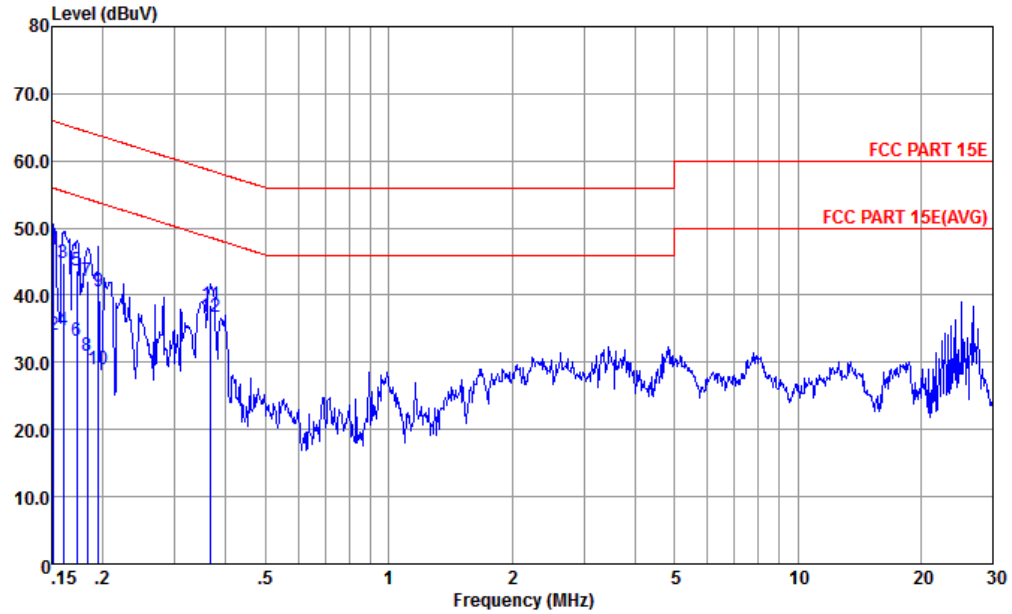
TEST RESULTS DATA
Power Spectral Density

FCC Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	Ant. Gain (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
11a	6Mbps	1	36	5180	2		0.32			7.03	17.00	5.00		Pass
11a	6Mbps	1	44	5220	2		0.32			7.52	17.00	5.00		Pass
11a	6Mbps	1	48	5240	2		0.32			8.68	17.00	5.00		Pass

FCC Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Ant	Duty Factor (dB)				Average PSD with Duty Factor (dBm/MHz)	PSD Limit (dBm/ MHz)	DG (dBi)		Pass /Fail
						Ant 1	Ant 2	Ant 3	Ant 4					
HT20	MCS0	4	36	5180	1+2+3+4	1.53	1.88	1.53	1.58	14.416	17.00	5.51		Pass
HT20	MCS0	4	44	5220	1+2+3+4	1.53	1.88	1.53	1.58	16.426	17.00	5.51		Pass
HT20	MCS0	4	48	5240	1+2+3+4	1.53	1.88	1.53	1.58	16.66	17.00	5.51		Pass
HT40	MCS0	4	38	5190	1+2+3+4	1.76	1.62	1.61	1.57	9.916	17.00	5.51		Pass
HT40	MCS0	4	46	5230	1+2+3+4	1.76	1.62	1.61	1.57	15.84	17.00	5.51		Pass
ax20	MCS0	4	36	5180	1+2+3+4	1.69	1.49	1.49	1.57	14.454	17.00	5.51		Pass
ax20	MCS0	4	44	5220	1+2+3+4	1.69	1.49	1.49	1.57	16.43	17.00	5.51		Pass
ax20	MCS0	4	48	5240	1+2+3+4	1.69	1.49	1.49	1.57	16.814	17.00	5.51		Pass
ax40	MCS0	4	38	5190	1+2+3+4	1.69	1.63	1.61	1.57	9.634	17.00	5.51		Pass
ax40	MCS0	4	46	5230	1+2+3+4	1.69	1.63	1.61	1.57	16.081	17.00	5.51		Pass
VHT80	MCS0	4	42	5210	1+2+3+4	1.68	1.66	1.62	1.66	1.252	17.00	5.51		Pass
AX80	MCS0	4	42	5210	1+2+3+4	1.61	1.63	1.69	1.70	2.896	17.00	5.51		Pass

Appendix B. AC Conducted Emission Test Results

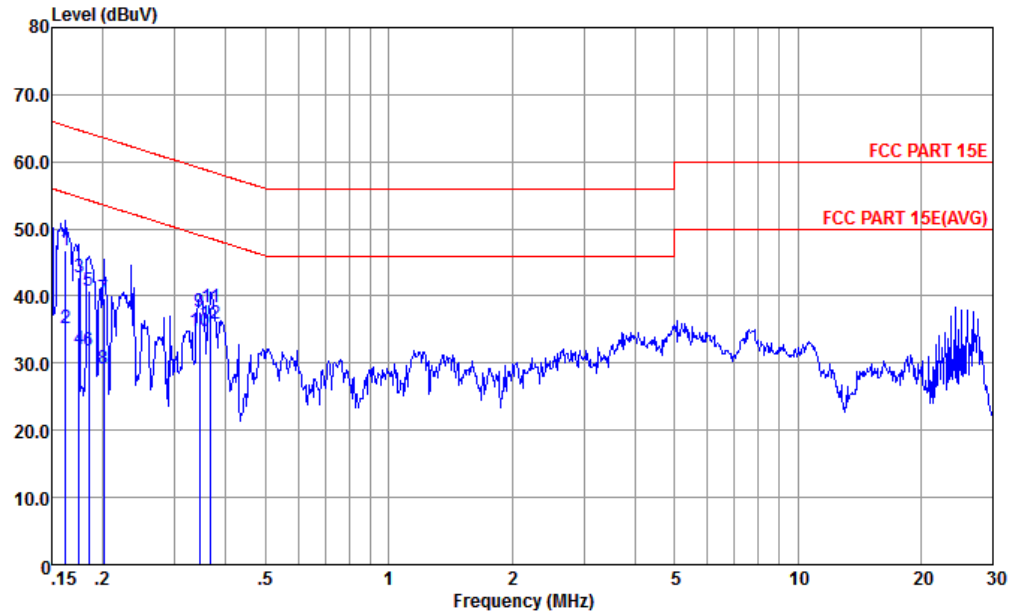
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Test mode :	LTE Band 5 Idle + Bluetooth Link + WLAN Link (5G) + Lan 1 Link + Lan 2 Link + RJ11 Link + Adapter 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-L-191028-CN02 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.152	46.75	-19.16	65.91	36.20	0.07	10.48	QP
2		0.152	34.15	-21.76	55.91	23.60	0.07	10.48	Average
3		0.160	44.73	-20.74	65.47	34.21	0.07	10.45	QP
4		0.160	34.83	-20.64	55.47	24.31	0.07	10.45	Average
5		0.173	43.70	-21.11	64.81	33.20	0.08	10.42	QP
6		0.173	33.10	-21.71	54.81	22.60	0.08	10.42	Average
7		0.183	42.08	-22.25	64.33	31.60	0.08	10.40	QP
8		0.183	31.08	-23.25	54.33	20.60	0.08	10.40	Average
9		0.195	40.66	-23.14	63.80	30.20	0.09	10.37	QP
10		0.195	29.06	-24.74	53.80	18.60	0.09	10.37	Average
11		0.367	38.59	-19.97	58.56	28.19	0.12	10.28	QP
12	*	0.367	36.69	-11.87	48.56	26.29	0.12	10.28	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Test mode :	LTE Band 5 Idle + Bluetooth Link + WLAN Link (5G) + Lan 1 Link + Lan 2 Link + RJ11 Link + Adapter 1		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-191028-CN02 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.162	46.80	-18.54	65.34	36.20	0.15	10.45	QP
2	0.162	35.10	-20.24	55.34	24.50	0.15	10.45	Average
3	0.175	42.78	-21.94	64.72	32.20	0.16	10.42	QP
4	0.175	32.18	-22.54	54.72	21.60	0.16	10.42	Average
5	0.184	40.76	-23.52	64.28	30.20	0.16	10.40	QP
6	0.184	31.76	-22.52	54.28	21.20	0.16	10.40	Average
7	0.201	39.73	-23.85	63.58	29.20	0.17	10.36	QP
8	0.201	29.13	-24.45	53.58	18.60	0.17	10.36	Average
9	0.345	37.69	-21.40	59.09	27.20	0.20	10.29	QP
10	0.345	34.79	-14.30	49.09	24.30	0.20	10.29	Average
11	0.367	38.29	-20.27	58.56	27.80	0.21	10.28	QP
12 *	0.367	35.99	-12.57	48.56	25.50	0.21	10.28	Average

Note:

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

Appendix C. Radiated Spurious Emission

Band 1 - 5150~5250MHz

WIFI 802.11a (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.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5148.32	56.43	-17.57	74	43.53	35.33	10.89	33.32	141	288	P	H
		5149.6	47.48	-6.52	54	34.58	35.33	10.89	33.32	141	288	A	H
	*	5176	113.07	-	-	100.1	35.36	10.93	33.32	141	288	P	H
		5176	106.17	-	-	93.2	35.36	10.93	33.32	141	288	A	H
		5147.52	63.25	-10.75	74	50.35	35.33	10.89	33.32	185	234	P	V
		5150	53.23	-0.77	54	40.33	35.33	10.89	33.32	185	234	A	V
	*	5182	119.66	-	-	106.69	35.36	10.93	33.32	185	234	P	V
		5182	113.64	-	-	100.67	35.36	10.93	33.32	185	234	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. 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)
802.11a CH 36 5180MHz		10360	47.96	-20.34	68.3	57.79	37.67	15.07	62.57	300	0	P	H
		10360	44.34	-23.96	68.3	54.17	37.67	15.07	62.57	100	360	P	V
802.11a CH 44 5220MHz		10440	48.78	-19.52	68.3	58.52	37.73	15.12	62.59	300	0	P	H
		10440	44.96	-23.34	68.3	54.7	37.73	15.12	62.59	100	360	P	V
802.11a CH 48 5240MHz		10480	46.77	-21.53	68.3	56.43	37.78	15.16	62.6	300	0	P	H
		10480	45.04	-23.26	68.3	54.7	37.78	15.16	62.6	100	360	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+2+3+4	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		5148.32	58.63	-15.37	74	43.9	34.3	10.89	30.46	100	277	P	H
		5149.44	50.17	-3.83	54	35.44	34.3	10.89	30.46	100	277	A	H
	*	5176	114.44	-	-	99.58	34.37	10.93	30.44	100	277	P	H
		5176	107.63	-	-	92.77	34.37	10.93	30.44	100	277	A	H
		5149.12	63.23	-10.77	74	48.5	34.3	10.89	30.46	135	44	P	V
		5149.76	52.9	-1.1	54	38.17	34.3	10.89	30.46	135	44	A	V
	*	5176	120.73	-	-	105.87	34.37	10.93	30.44	135	44	P	V
		5176	113.3	-	-	98.44	34.37	10.93	30.44	135	44	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+2+3+4	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		10360	41.78	-26.52	68.3	51.61	37.67	15.07	62.57	300	0	P	H
		10360	44.47	-23.83	68.3	54.3	37.67	15.07	62.57	100	360	P	V
802.11n HT20 CH 44 5220MHz		10440	45.44	-22.86	68.3	55.18	37.73	15.12	62.59	100	0	P	H
		10440	40.63	-27.67	68.3	50.37	37.73	15.12	62.59	100	360	P	V
802.11n HT20 CH 48 5240MHz		10480	44.2	-24.1	68.3	53.86	37.78	15.16	62.6	300	0	P	H
		10480	41.53	-26.77	68.3	51.19	37.78	15.16	62.6	100	360	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+2+3+4	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		5147.68	57.06	-16.94	74	42.33	34.3	10.89	30.46	317	315	P	H
		5148.96	49.25	-4.75	54	34.52	34.3	10.89	30.46	317	315	A	H
	*	5188	111.22	-	-	96.36	34.37	10.93	30.44	317	315	P	H
		5188	104.74	-	-	89.88	34.37	10.93	30.44	317	315	A	H
		5390.1	54.36	-19.64	74	38.84	34.7	11.15	30.33	317	315	P	H
		5365.26	46.13	-7.87	54	30.65	34.7	11.13	30.35	317	315	A	H
		5150.08	59.69	-8.61	68.3	44.96	34.3	10.89	30.46	139	45	P	V
		5150	53.43	-0.57	54	38.7	34.3	10.89	30.46	139	45	A	V
	*	5200	117.28	-	-	102.36	34.4	10.95	30.43	139	45	P	V
		5200	110.71	-	-	95.79	34.4	10.95	30.43	139	45	A	V
		5351.58	54.49	-19.51	74	39.03	34.7	11.11	30.35	139	45	P	V
		5350.5	46.5	-7.5	54	31.04	34.7	11.11	30.35	139	45	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+2+3+4	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		10380	44.15	-24.15	68.3	53.97	37.68	15.08	62.58	300	0	P	H
		10380	42.38	-25.92	68.3	52.2	37.68	15.08	62.58	100	360	P	V
802.11n HT40 CH 46 5230MHz		10460	43.2	-25.1	68.3	52.9	37.75	15.14	62.59	300	0	P	H
		10460	41.09	-27.21	68.3	50.79	37.75	15.14	62.59	100	360	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+2+3+4	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		5134.56	55.4	-18.6	74	40.73	34.27	10.87	30.47	100	287	P	H
		5136.8	47.95	-6.05	54	33.28	34.27	10.87	30.47	100	287	A	H
	*	5218	104.67	-	-	89.7	34.43	10.97	30.43	100	287	P	H
		5218	97.51	-	-	82.54	34.43	10.97	30.43	100	287	A	H
		5367.24	53.95	-20.05	74	38.47	34.7	11.13	30.35	100	287	P	H
		5398.38	45.63	-8.37	54	30.09	34.7	11.17	30.33	100	287	A	H
		5139.52	63.09	-10.91	74	48.37	34.3	10.89	30.47	138	45	P	V
		5138.56	53.66	-0.34	54	38.99	34.27	10.87	30.47	138	45	A	V
	*	5218	110.25	-	-	95.28	34.43	10.97	30.43	138	45	P	V
		5218	103.48	-	-	88.14	35.39	10.97	31.02	138	45	A	V
		5354.1	54.31	-19.69	74	38.85	34.7	11.11	30.35	138	45	P	V
		5351.04	45.91	-8.09	54	30.45	34.7	11.11	30.35	138	45	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+2+3+4	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		10420	42.3	-26	68.3	52.05	37.72	15.11	62.58	100	360	P	H
		10420	42.52	-25.78	68.3	52.27	37.72	15.11	62.58	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

WIFI 802.11ax HEX20 (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+3+4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ax HEX20 CH 36 5180MHz		5149.44	59.91	-14.09	74	45.18	34.3	10.89	30.46	100	285	P	H
		5149.76	49.03	-4.97	54	34.3	34.3	10.89	30.46	100	285	A	H
		5176	115.91	-	-	101.05	34.37	10.93	30.44	100	285	P	H
		5176	108.86	-	-	94	34.37	10.93	30.44	100	285	A	H
		5144.32	64.33	-9.67	74	49.6	34.3	10.89	30.46	252	302	P	V
		5145.76	53.91	-0.09	54	39.18	34.3	10.89	30.46	252	302	A	V
		5188	121.71	-	-	106.85	34.37	10.93	30.44	252	302	P	V
		5188	113.3	-	-	98.44	34.37	10.93	30.44	252	302	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX20 (Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX20 CH 36 5180MHz		10360	45.17	-23.13	68.3	55	37.67	15.07	62.57	100	360	P	H
		10360	42.5	-25.8	68.3	52.33	37.67	15.07	62.57	100	360	P	V
802.11ax HEX20 CH 44 5220MHz		10440	44.09	-24.21	68.3	53.83	37.73	15.12	62.59	100	360	P	H
		10440	41.16	-27.14	68.3	50.9	37.73	15.12	62.59	100	360	P	V
802.11ax HEX20 CH 48 5240MHz		10480	43.87	-24.43	68.3	53.53	37.78	15.16	62.6	100	360	P	H
		10480	41.34	-26.96	68.3	51	37.78	15.16	62.6	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX40 (Band Edge @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX40 CH 38 5190MHz		5148.96	57.18	-16.82	74	42.45	34.3	10.89	30.46	317	325	P	H
		5148.48	49.28	-4.72	54	34.55	34.3	10.89	30.46	317	325	A	H
		5194	111.94	-	-	97.03	34.4	10.95	30.44	317	325	P	H
		5194	105.48	-	-	90.57	34.4	10.95	30.44	317	325	A	H
		5397.84	53.94	-20.06	74	38.4	34.7	11.17	30.33	317	325	P	H
		5400	45.5	-8.5	54	29.95	34.7	11.17	30.32	317	325	A	H
		5146.24	64.06	-9.94	74	49.33	34.3	10.89	30.46	269	69	P	V
		5149.92	53.65	-0.35	54	38.92	34.3	10.89	30.46	269	69	A	V
		5194	117.63	-	-	102.72	34.4	10.95	30.44	269	69	P	V
		5194	110.53	-	-	95.62	34.4	10.95	30.44	269	69	A	V
		5358.06	54.91	-19.09	74	39.45	34.7	11.11	30.35	269	69	P	V
		5350.5	46.82	-7.18	54	31.36	34.7	11.11	30.35	269	69	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX40 (Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX40 CH 38 5190MHz		10380	44.48	-23.82	68.3	54.3	37.68	15.08	62.58	100	360	P	H
		10380	42.4	-25.9	68.3	52.22	37.68	15.08	62.58	100	360	P	V
802.11ax HEX40 CH 46 5230MHz		10460	44.59	-23.71	68.3	54.29	37.75	15.14	62.59	100	360	P	H
		10460	41.94	-26.36	68.3	51.64	37.75	15.14	62.59	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX80 (Band Edge @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX80 CH 42 5210MHz		5141.44	57.39	-16.61	74	42.67	34.3	10.89	30.47	100	203	P	H
		5140.64	49.68	-4.32	54	34.96	34.3	10.89	30.47	100	203	A	H
		5182	103.21	-	-	88.35	34.37	10.93	30.44	100	203	P	H
		5182	96.24	-	-	81.38	34.37	10.93	30.44	100	203	A	H
		5371.92	53.77	-20.23	74	38.29	34.7	11.13	30.35	100	203	P	H
		5389.02	45.62	-8.38	54	30.1	34.7	11.15	30.33	100	203	A	H
		5140.16	61.16	-12.84	74	46.44	34.3	10.89	30.47	271	67	P	V
		5138.72	53.59	-0.41	54	38.92	34.27	10.87	30.47	271	67	A	V
		5218	113.2	-	-	98.23	34.43	10.97	30.43	271	67	P	V
		5218	103.79	-	-	88.82	34.43	10.97	30.43	271	67	A	V
		5383.8	54.19	-19.81	74	38.67	34.7	11.15	30.33	271	67	P	V
		5353.2	46.15	-7.85	54	30.69	34.7	11.11	30.35	271	67	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX80 (Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX80 CH 42 5210MHz		10420	45.51	-22.79	68.3	55.26	37.72	15.11	62.58	100	360	P	H
		10420	41.29	-27.01	68.3	51.04	37.72	15.11	62.58	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11ac HT20 (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+3+4		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac HT20 LF		30	20.75	-19.25	40	27.64	25.1	1.11	33.1	100	360	P	H
		96.93	15.73	-27.77	43.5	31.36	15.71	1.64	32.98	-	-	P	H
		188.11	18.5	-25	43.5	34.39	14.86	2.17	32.92	-	-	P	H
		239.52	25.45	-20.55	46	38.34	17.5	2.43	32.82	-	-	P	H
		457.77	21.25	-24.75	46	26.95	23.24	3.31	32.25	-	-	P	H
		735.19	25.76	-20.24	46	26.41	27.76	4.16	32.57	-	-	P	H
		31.94	30.07	-9.93	40	37.99	24.04	1.1	33.06	100	360	P	V
		55.22	23.29	-16.71	40	42.05	13.15	1.29	33.2	-	-	P	V
		128.94	22.89	-20.61	43.5	36.5	17.6	1.83	33.04	-	-	P	V
		395.69	19.13	-26.87	46	26.61	21.76	3.1	32.34	-	-	P	V
		589.69	28.36	-17.64	46	31.84	25.72	3.62	32.82	-	-	P	V
		951.5	29.96	-16.04	46	26.37	30.98	4.71	32.1	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

For Beamforming

WIFI 802.11ax HEX20 (Band Edge @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX20 CH 36 5180MHz		5147.36	60.41	-13.59	74	45.89	34.07	11.06	30.61	334	60	P	H
		5148	46.95	-7.05	54	32.43	34.07	11.06	30.61	334	60	A	H
		5176	106.97	-	-	92.4	34.12	11.07	30.62	334	60	P	H
		5176	97.97	-	-	83.4	34.12	11.07	30.62	334	60	A	H
		5148	59.82	-14.18	74	45.3	34.07	11.06	30.61	151	165	P	V
		5148.32	47.9	-6.1	54	33.38	34.07	11.06	30.61	151	165	A	V
		5188	109.75	-	-	95.18	34.12	11.07	30.62	151	165	P	V
		5188	100.88	-	-	86.31	34.12	11.07	30.62	151	165	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11ax HEX20 (Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX20 CH 36 5180MHz		10360	45.51	-22.79	68.3	53.41	37.02	15.76	60.68	100	360	P	H
		10360	44.09	-24.21	68.3	51.99	37.02	15.76	60.68	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

For Co-location

WIFI 2.4G + WIFI 5G Band 1

(Band Edge @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX20 CH 36 5180MHz		5149.44	61.16	-12.84	74	46.64	34.07	11.06	30.61	100	124	P	H
		5147.2	49.07	-4.93	54	34.55	34.07	11.06	30.61	100	124	A	H
		5188	113.09	-	-	98.52	34.12	11.07	30.62	100	124	P	H
		5188	105.09	-	-	90.52	34.12	11.07	30.62	100	124	A	H
		5147.68	63.73	-10.27	74	49.21	34.07	11.06	30.61	323	88	P	V
		5149.98	51.94	-2.06	54	37.42	34.07	11.06	30.61	323	88	A	V
		5176	119.02	-	-	104.45	34.12	11.07	30.62	323	88	P	V
		5176	111.59	-	-	97.02	34.12	11.07	30.62	323	88	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

WIFI 2.4G + WIFI 5G Band 1

(Band Edge @ 3m)

WIFI Ant. 1+2+3+4	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)
		2388.78	60.32	-13.68	74	53.35	31.2	7.42	31.65	101	50	P	H
		2388.65	48.76	-5.24	54	41.79	31.2	7.42	31.65	101	50	A	H
		2483.98	60.57	-13.43	74	52.83	31.77	7.55	31.58	101	50	P	H
		2483.68	49.47	-4.53	54	41.73	31.77	7.55	31.58	101	50	A	H
802.11ax		2434	112.24	-	-	104.97	31.43	7.47	31.63	101	50	P	H
HEX40		2434	106.16	-	-	98.89	31.43	7.47	31.63	101	50	A	H
CH 06		2388.65	56.89	-17.11	74	49.92	31.2	7.42	31.65	340	154	P	V
2437MHz		2388.91	46.42	-7.58	54	39.45	31.2	7.42	31.65	340	154	A	V
		2483.92	57.18	-16.82	74	49.44	31.77	7.55	31.58	340	154	P	V
		2483.5	47.75	-6.25	54	40.01	31.77	7.55	31.58	340	154	A	V
		2440	111.38	-	-	103.96	31.54	7.49	31.61	340	154	P	V
		2440	104.43	-	-	97.01	31.54	7.49	31.61	340	154	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

WIFI 2.4G + WIFI 5G Band 1

(Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
802.11ax HEX20CH 36 5180MHz + 802.11ax HEX40CH06 2437MHZ		4874	37.74	-36.26	74	53.29	33.77	10.71	60.03	100	360	P	H
		7311	42.55	-31.45	74	53.99	35.86	13.21	60.51	300	0	P	H
		9748	62.17	-6.13	68.3	70.78	36.85	15.43	60.89	400	221	P	H
		10360	45.19	-23.11	68.3	53.09	37.02	15.76	60.68	300	0	P	H
		11020	48.33	-25.67	74	54.98	37.41	16.48	60.54	300	0	P	H
		4874	38.33	-35.67	74	53.88	33.77	10.71	60.03	100	0	P	V
		7314	42.77	-31.23	74	54.21	35.86	13.21	60.51	100	0	P	V
		9748	55.52	-12.78	68.3	64.13	36.85	15.43	60.89	312	157	P	V
		10360	43.14	-25.16	68.3	51.04	37.02	15.76	60.68	100	0	P	V
		11020	45.07	-28.93	74	51.72	37.41	16.48	60.54	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

LTE + WIFI 5G + 5G NR

(Harmonic @ 3m)

WIFI Ant. 1+2+3+4	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)
LTE + WIFI 5G + 5G NR		11020	47.92	-26.08	74	54.57	37.41	16.48	60.54	300	0	P	H
		11020	45.11	-28.89	74	51.76	37.41	16.48	60.54	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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 CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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)

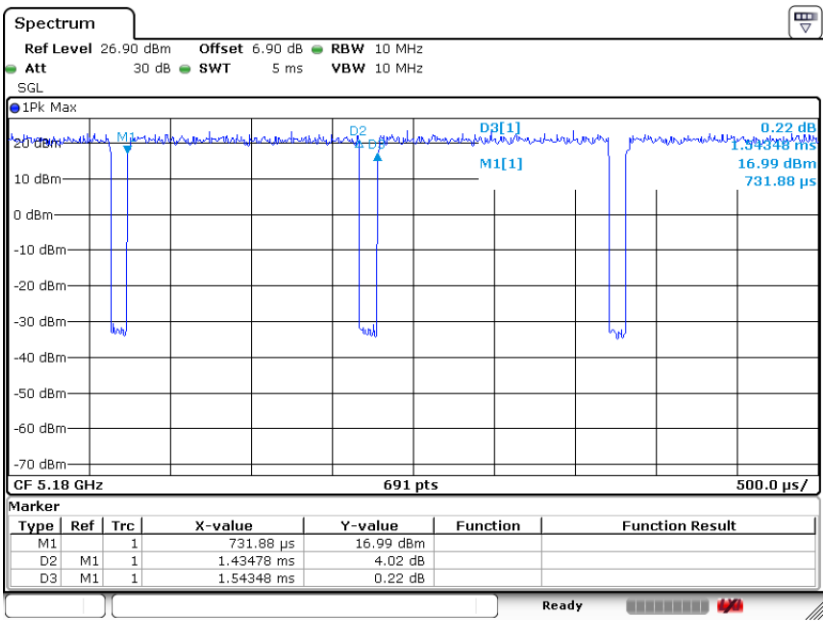
= -10.46(dB)

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

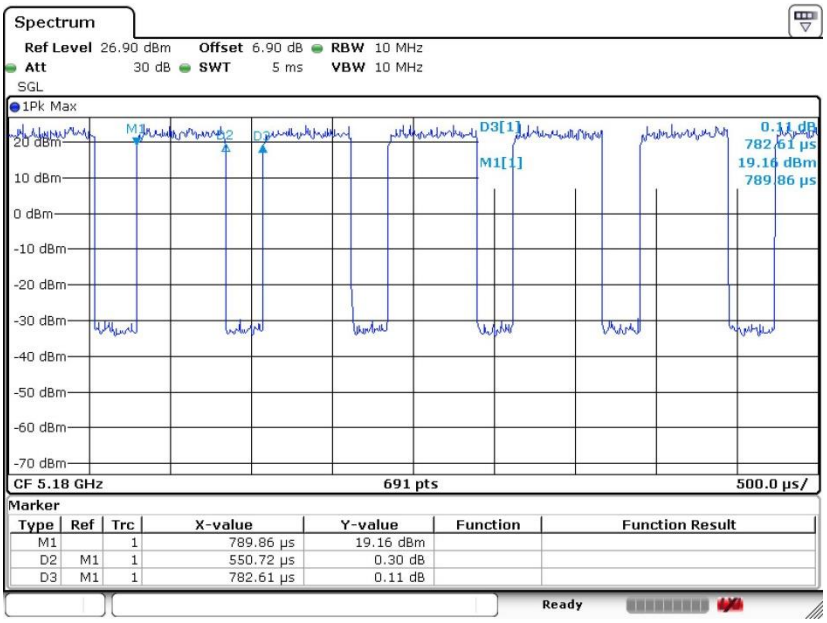
Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1/2/3/4	802.11a	92.96	1.434	0.697	0.75KHz
1+2+3+4	802.11n HT20	70.37	0.551	1.816	2.2KHz
1+2+3+4	802.11n HT40	69.72	0.551	1.816	2.2KHz
1+2+3+4	802.11ac VHT80	68.81	0.543	1.840	2.2KHz
1+2+3+4	802.11ax HE20	70.91	0.565	1.769	1.8KHz
1+2+3+4	802.11ax HE40	69.64	0.565	1.769	1.8KHz
1+2+3+4	802.11ax HE80	69.03	0.565	1.769	1.8KHz

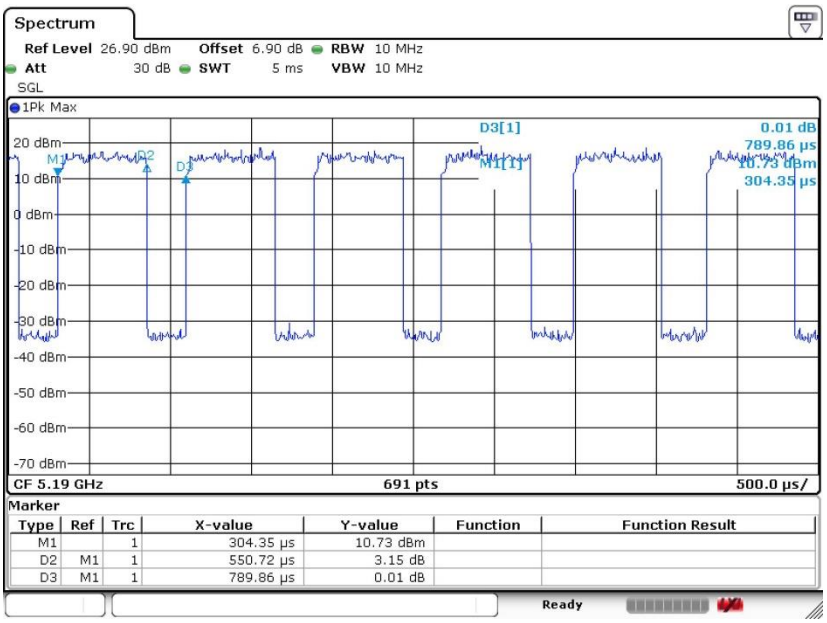
802.11a



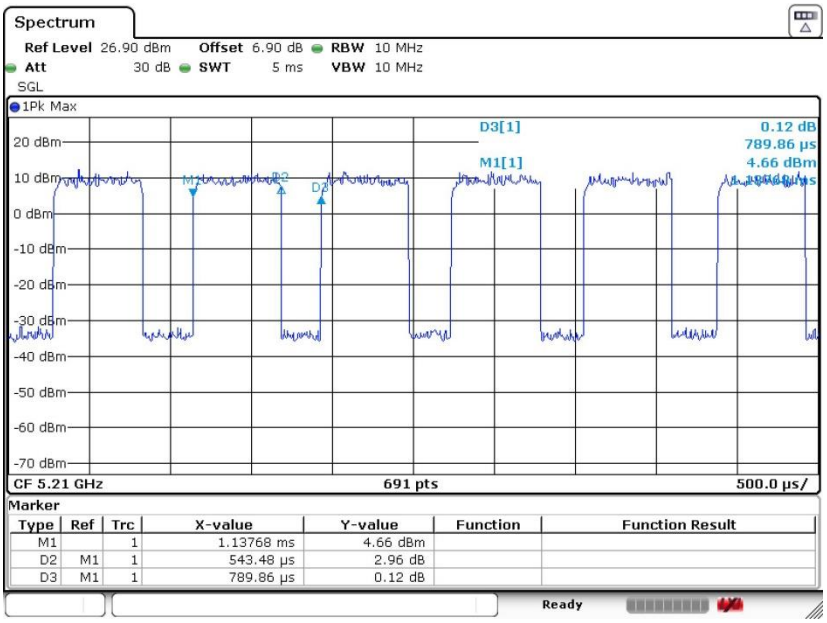
802.11n HT20



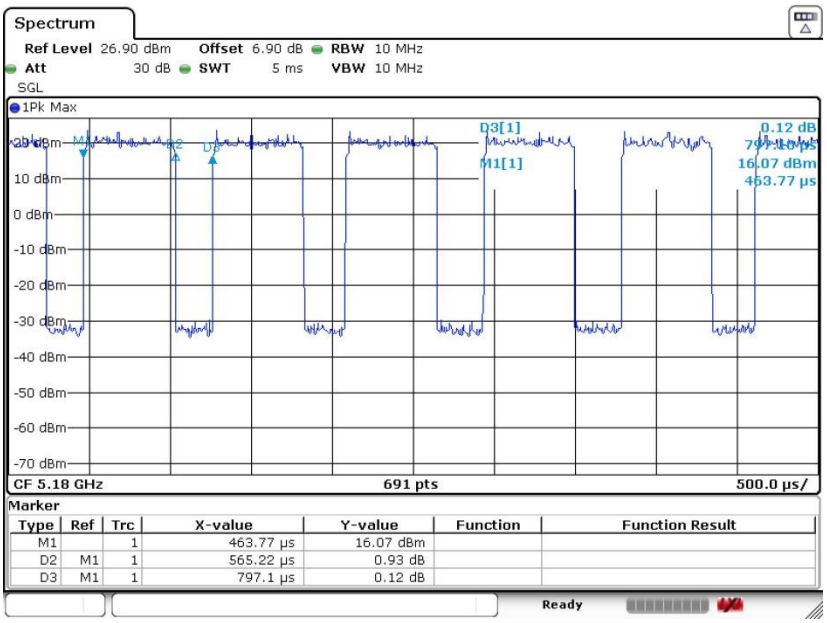
802.11n HT40



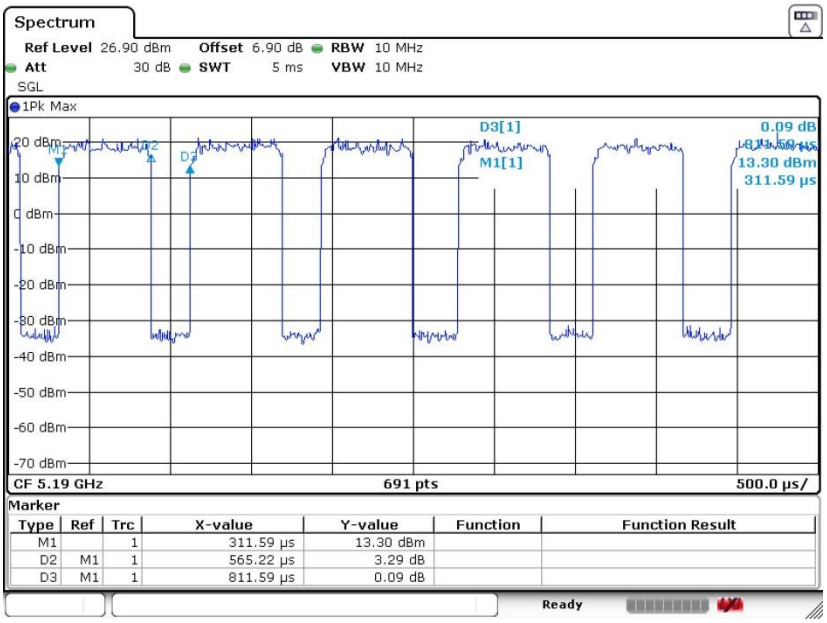
802.11ac VHT80



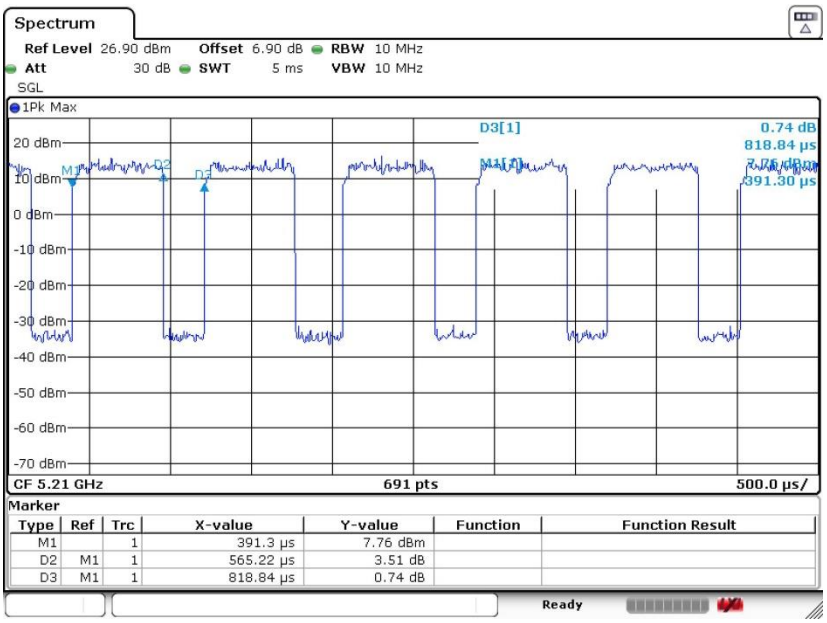
802.11ax HE20



802.11ax HE40



802.11ax HE80



Appendix E. Setup Photographs