



FCC RF Test Report

APPLICANT : Shenzhen Tinno Mobile Technology Corp.
EQUIPMENT : Smartphone
BRAND NAME : TINNO
MODEL NAME : U705AA, U705AC
FCC ID : XD6U705AA
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Feb. 21, 2020 and testing was completed on Mar. 17, 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



Sporton International (ShenZhen) Inc.

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055
People's Republic of China**



TABLE OF CONTENTS

REVISION HISTORY..... 3
SUMMARY OF TEST RESULT 4
1 GENERAL DESCRIPTION 5
1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 6
1.5 Modification of EUT 7
1.6 Testing Location 7
1.7 Test Software 7
1.8 Applicable Standards 8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 9
2.1 Carrier Frequency and Channel 9
2.2 Test Mode 10
2.3 Connection Diagram of Test System 12
2.4 Support Unit used in test configuration and system 13
2.5 EUT Operation Test Setup 13
2.6 Measurement Results Explanation Example 13
3 TEST RESULT 14
3.1 26dB & 99% Occupied Bandwidth Measurement 14
3.2 Maximum Conducted Output Power Measurement 16
3.3 Power Spectral Density Measurement 18
3.4 Unwanted Emissions Measurement 20
3.5 AC Conducted Emission Measurement 26
3.6 Automatically Discontinue Transmission 28
3.7 Antenna Requirements 29
4 LIST OF MEASURING EQUIPMENT 30
5 UNCERTAINTY OF EVALUATION 32
APPENDIX A. CONDUCTED TEST RESULTS
APPENDIX B. AC CONDUCTED EMISSION TEST RESULT
APPENDIX C. RADIATED SPURIOUS EMISSION
APPENDIX D. DUTY CYCLE PLOTS
APPENDIX E. SETUP PHOTOGRAPHS



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR022101E	Rev. 01	Initial issue of report	May 08, 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 2.06 dB at 66.240 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.00 dB at 0.180 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

Shenzhen Tinno Mobile Technology Corp.

4/F, H-3 Building, OCT Eastern Industrial Park.NO.1 XiangShan East Road, Nan Shan District, Shenzhen, P.R.China.

1.2 Manufacturer

Shenzhen Tinno Mobile Technology Corp.

4/F, H-3 Building, OCT Eastern Industrial Park.NO.1 XiangShan East Road, Nan Shan District, Shenzhen, P.R.China.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Brand Name	TINNO
Model Name	U705AA, U705AC
FCC ID	XD6U705AA
EUT supports Radios application	GSM/WCDMA/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE GNSS
IMEI Code	Conducted: 865638040007008 Conduction: 865638040005622 Radiation: 865638040006919
HW Version	V1.0
SW Version	U705AA SW: U705AAV01.16.11 U705AC SW: U705ACV01.43.01
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two types of EUT sample 1(Model Name: U705AA) and sample 2(Model Name: U705AC), the change note could be referred to the product equality declaration which is exhibit separately. According to the difference, we chose the sample 1 to perform all tests.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5700 MHz
Maximum Output Power to Antenna	<p><5180 MHz ~ 5240 MHz> 802.11a : 13.70 dBm / 0.0234 W 802.11n HT20 : 13.15 dBm / 0.0207 W 802.11n HT40 : 13.14 dBm / 0.0206 W 802.11ac VHT20 : 13.14 dBm / 0.0206 W 802.11ac VHT40 : 13.12 dBm / 0.0205 W 802.11ac VHT80 : 13.50 dBm / 0.0224 W</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 14.01 dBm / 0.0252 W 802.11n HT20 : 13.54 dBm / 0.0226 W 802.11n HT40 : 13.42 dBm / 0.0220 W 802.11ac VHT20 : 13.49 dBm / 0.0223 W 802.11ac VHT40 : 13.26 dBm / 0.0212 W 802.11ac VHT80 : 13.88 dBm / 0.0244 W</p> <p><5500 MHz ~ 5700 MHz > 802.11a : 13.27 dBm / 0.0212 W 802.11n HT20 : 13.10 dBm / 0.0204 W 802.11n HT40 : 13.21 dBm / 0.0209 W 802.11ac VHT20 : 13.08 dBm / 0.0203 W 802.11ac VHT40 : 13.14 dBm / 0.0206 W 802.11ac VHT80 : 13.84 dBm / 0.0242 W</p>
99% Occupied Bandwidth	<p><5180 MHz ~ 5240 MHz> 802.11a : 17.43 MHz 802.11n HT20 : 18.43 MHz 802.11n HT40 : 36.96 MHz 802.11ac VHT80 : 75.88 MHz</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 17.28 MHz 802.11n HT20 : 18.33 MHz 802.11n HT40 : 36.76 MHz 802.11ac VHT80 : 75.76 MHz</p> <p><5500 MHz ~ 5700 MHz > 802.11a : 17.63 MHz 802.11n HT20 : 18.38 MHz 802.11n HT40 : 37.16 MHz 802.11ac VHT80 : 75.76 MHz</p>
Antenna Type / Gain	<p><5150 MHz ~ 5250 MHz> LDS Antenna with gain -1.20 dBi</p> <p><5250 MHz ~ 5350 MHz> LDS Antenna with gain -1.20 dBi</p> <p><5470 MHz ~ 5725 MHz> LDS Antenna with gain -1.20 dBi</p>
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note:

1. WLAN operation in 5600 MHz ~ 5650 MHz is notched.
2. 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

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.
	03CH02-KS 03CH05-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
2.	03CH05-KS	AUDIX	E3	6.2009-8-24a1
3.	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 (X 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		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58 [#]	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz Band 3 (U-NII-2C)	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106 [#]	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

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 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G) + Earphone + USB Cable(Charging from Adapter) for Sample 1
Remark: For Radiated Test Cases, The tests were performance with Adapter , Earphone, USB Cable1 and Sample 1	



Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

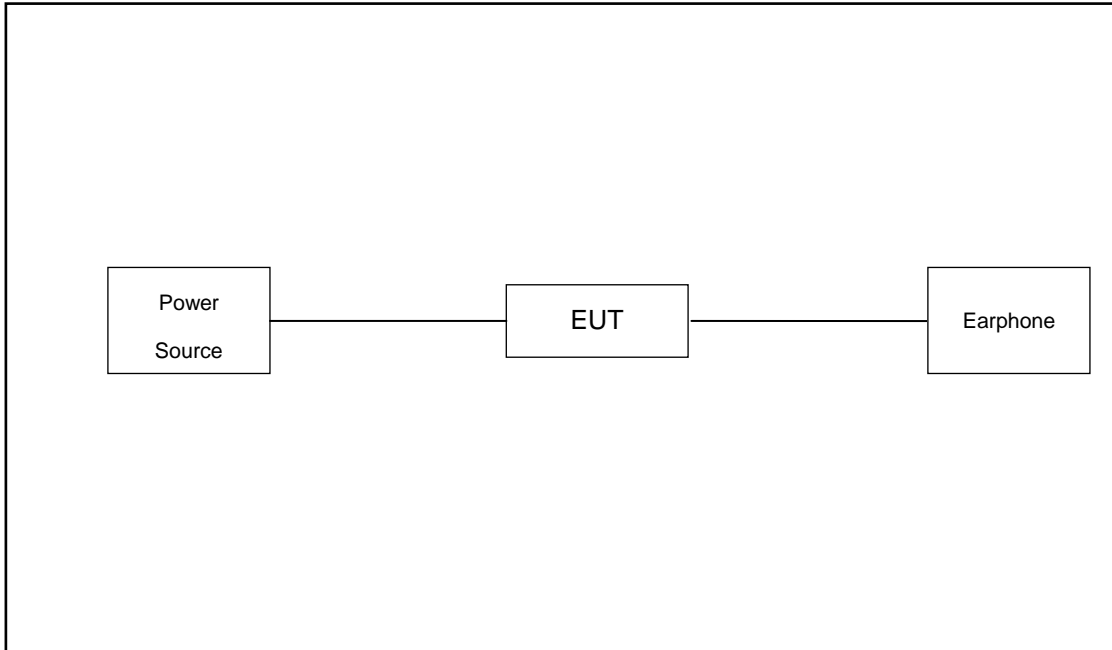
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134

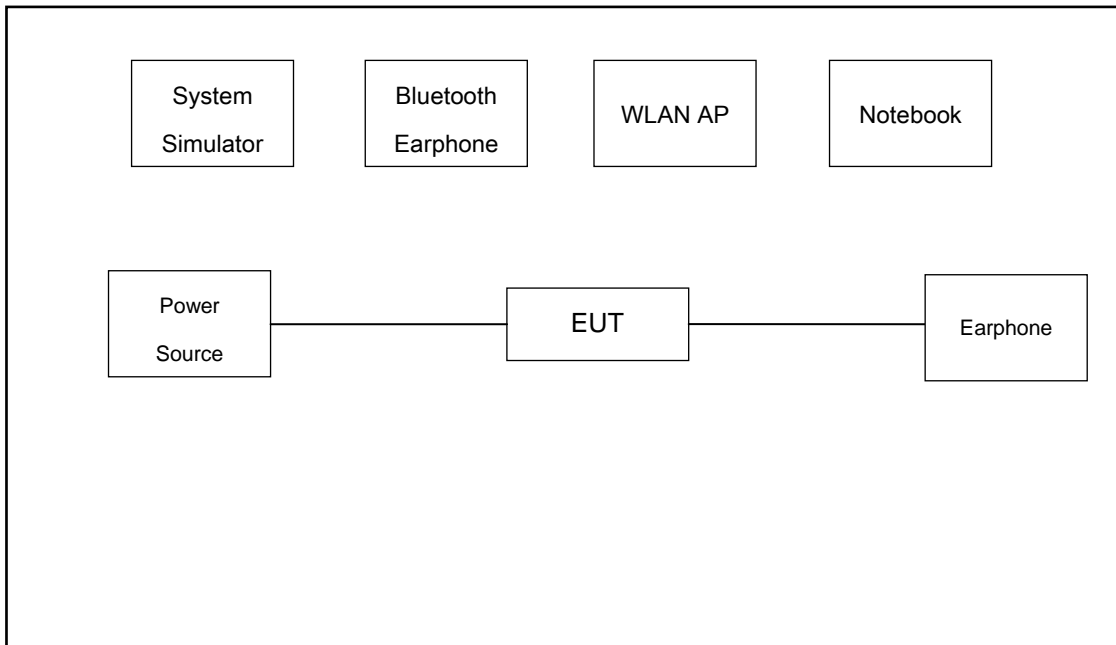
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-

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.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded,1.8m
2.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
3.	WLAN AP	D-link	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
4.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Earphone	apple	DCAY1V-A9007ZJW3-000	N/A	N/A	N/A
6.	SD Card	N/A	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

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

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

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.

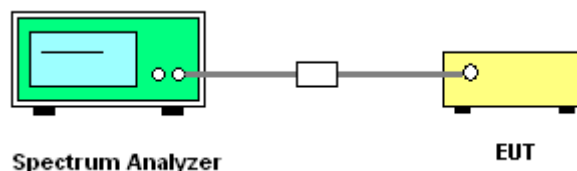
3.1.2 Measuring Instruments

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

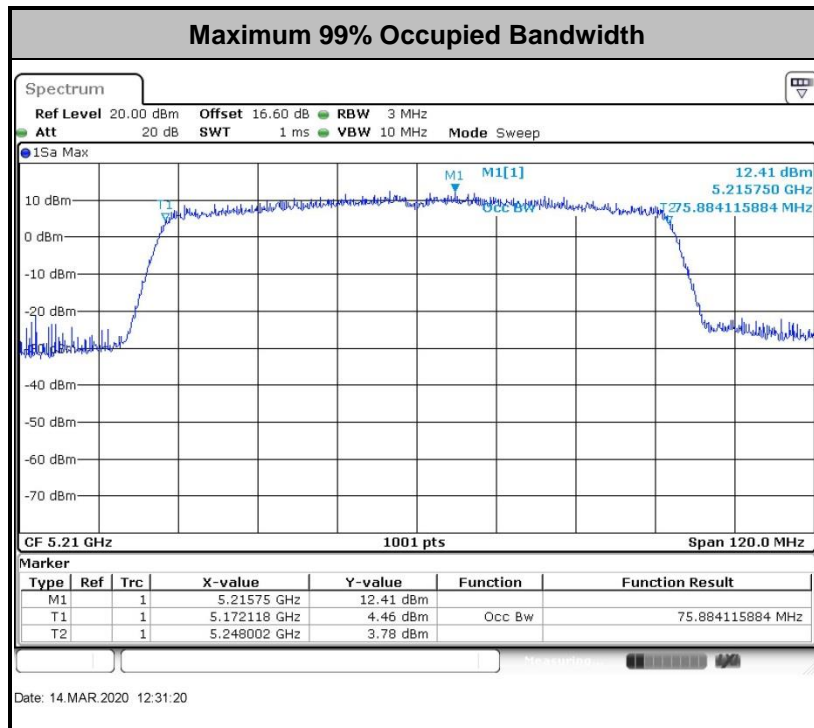
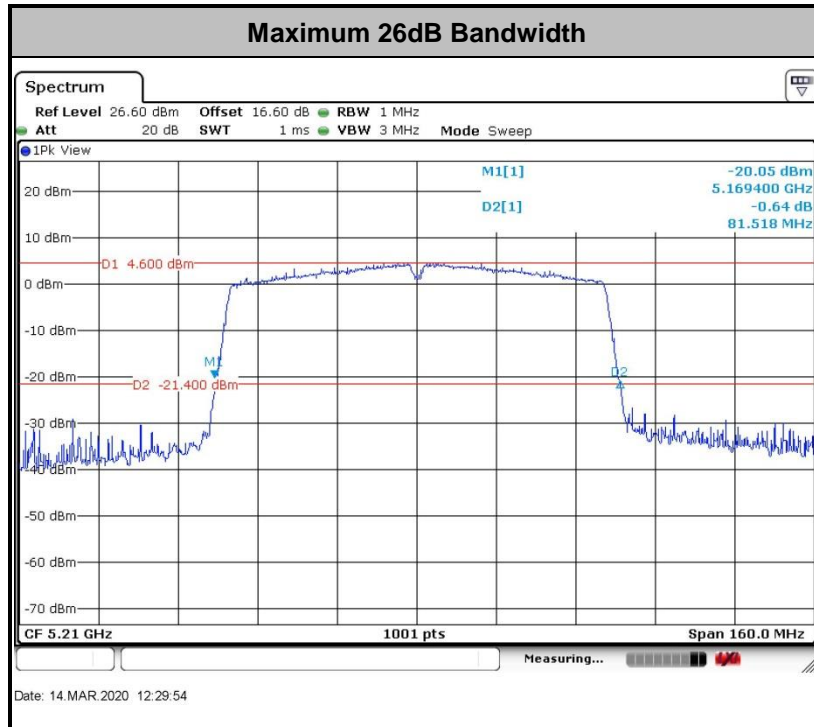
3.1.4 Test Setup





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.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 + 10 \log B$, dBm, where B is the 26 dB emission bandwidth in megahertz.

For the 5.47–5.6 GHz and 5.65–5.725 GHz band, the maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

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.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

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

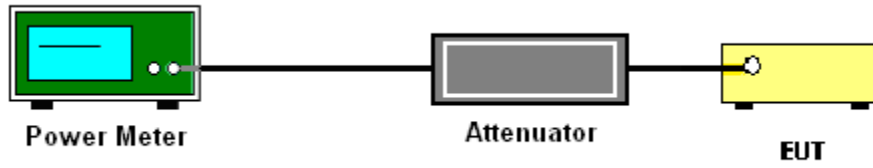
3.2.3 Test Procedures

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.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 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

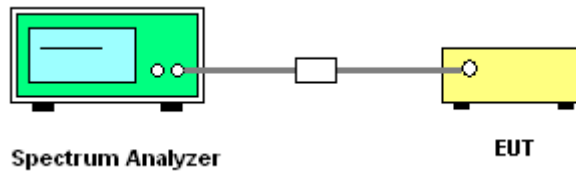
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

Method SA-2

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

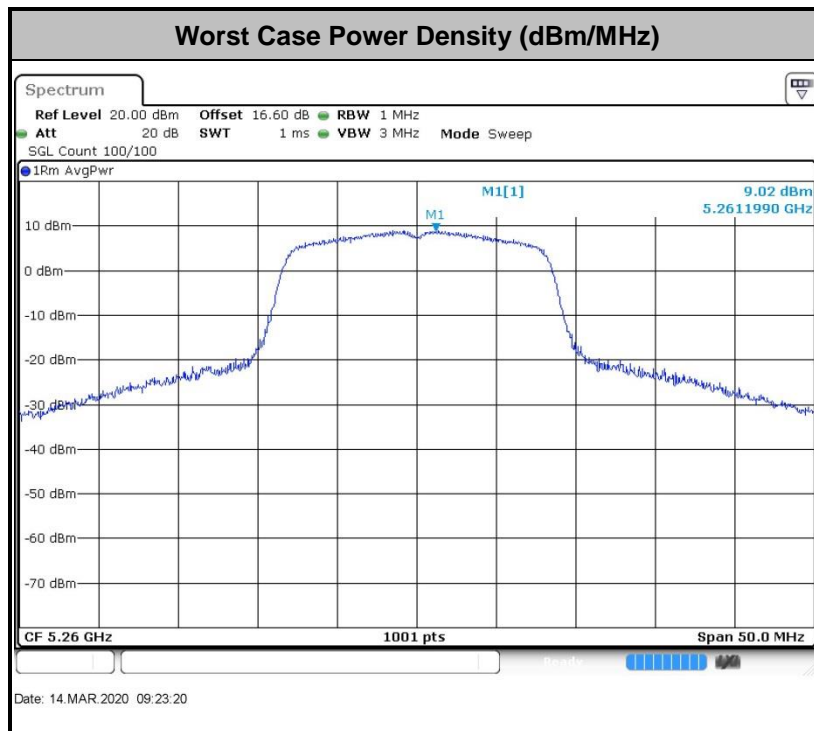
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, 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.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/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.

$$EIRP = E_{Meas} + 20\log (d_{Meas}) - 104.8$$

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.



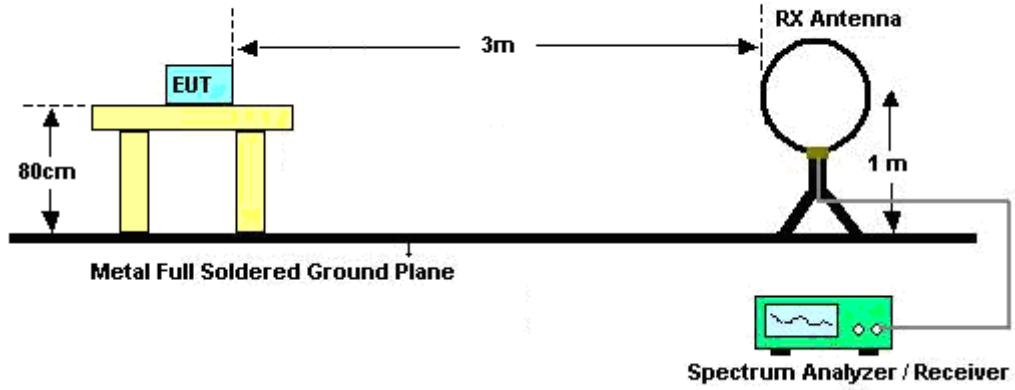
3.4.3 Test Procedures

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.

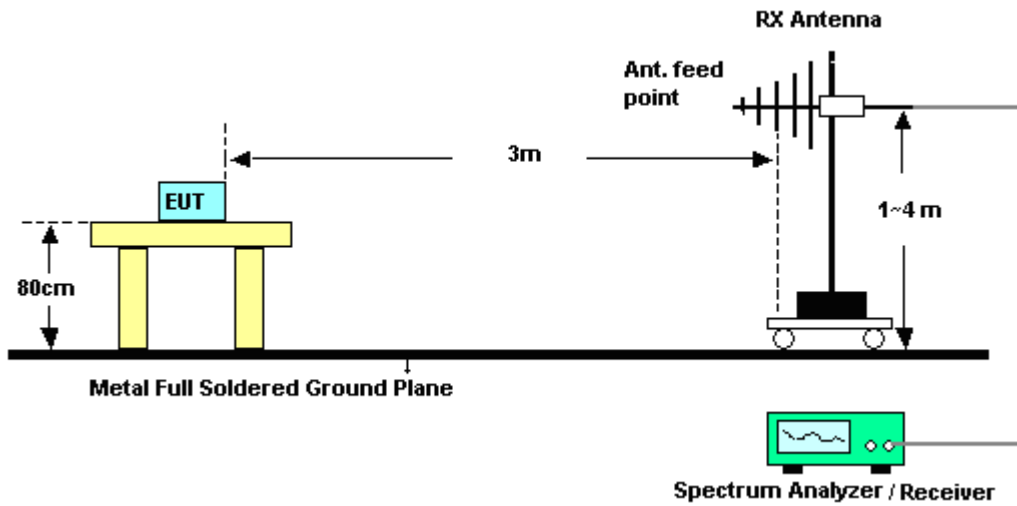


3.4.4 Test Setup

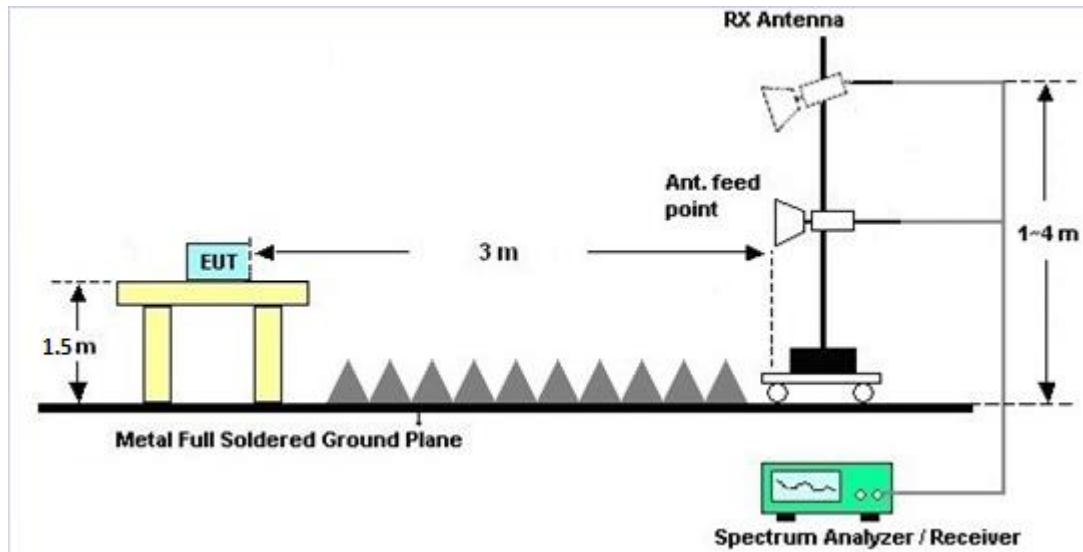
For radiated emissions below 30MHz



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.

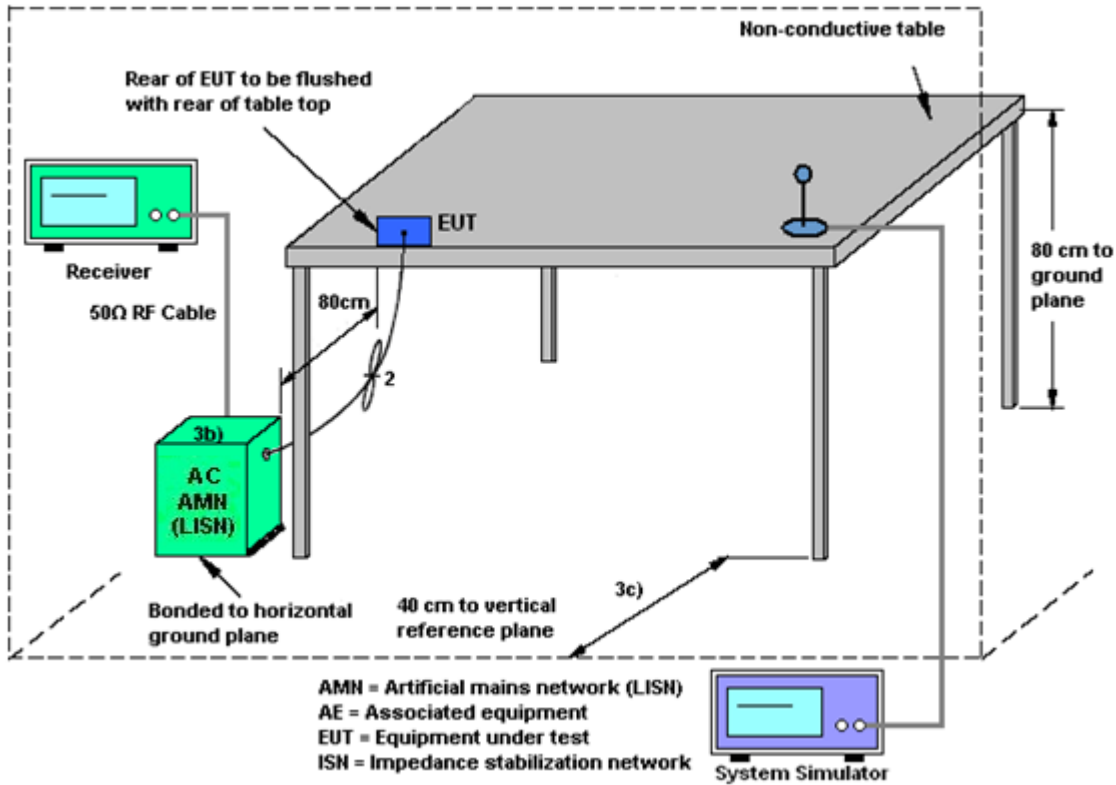
3.5.2 Measuring Instruments

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
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2019	Mar. 14, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
DC Power Supply	GWINSTEK	AnritsuGPS-3030D	EM882636	Max 30V	Apr. 16, 2010	Mar. 14, 2020	Apr. 15, 2021	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Dec. 26, 2019	Mar. 14, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 18, 2019	Mar. 17, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 15, 2019	Mar. 17, 2020	Apr. 16, 2020	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Mar. 17, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2019	Mar. 17, 2020	May 29, 2020	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2019	Mar. 17, 2020	Apr. 26, 2020	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	100MHz-18GHz	Aug. 14, 2019	Mar. 17, 2020	Aug. 13, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Mar. 17, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2019	Mar. 17, 2020	Aug. 05, 2020	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5G Hz	Apr. 15, 2019	Mar. 17, 2020	Apr. 14, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 08, 2020	Mar. 17, 2020	Jan. 07, 2021	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Mar. 17, 2020	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Mar. 17, 2020	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Mar. 17, 2020	NCR	Radiation (03CH02-KS)
EMI Test Receiver	Keysight	N9038A	MY57290151	3Hz~8.5GHz;Max 30dBm	Jul. 18, 2019	Mar. 17, 2020	Jul. 17, 2020	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 16, 2019	Mar. 17, 2020	Apr. 15, 2020	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 14, 2020	Mar. 17, 2020	Apr. 13, 2021	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Mar. 17, 2020	Nov. 09, 2020	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2019	Mar. 17, 2020	May 29, 2020	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2019	Mar. 17, 2020	Apr. 26, 2020	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Mar. 17, 2020	Nov. 09, 2020	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Aug. 06, 2019	Mar. 17, 2020	Aug. 05, 2020	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 08, 2020	Mar. 17, 2020	Jan. 07, 2021	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Aug. 17, 2019	Mar. 17, 2020	Aug.16, 2020	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5G Hz	Oct. 18, 2019	Mar. 17, 2020	Oct. 17, 2020	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 17, 2020	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 17, 2020	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 17, 2020	NCR	Radiation (03CH05-KS)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2018	Feb. 22, 2020	Dec. 25, 2020	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 17, 2019	Feb. 22, 2020	Oct. 16, 2020	Conduction (CO01-SZ)



AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2019	Feb. 22, 2020	Oct. 16, 2020	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000 891	100Vac~250Vac	Jul. 23, 2019	Feb. 22, 2020	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
---	-------

03CH02-KS

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
---	-------

03CH05-KS

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 : FR022101E

Test Engineer:	Jensen Wu	Temperature:	21~25	°C
Test Date:	2020/3/14	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	17.13	38.96	-	22.34		
11a	6Mbps	1	44	5220	17.43	40.21	-	22.41		
11a	6Mbps	1	48	5240	17.43	38.51	-	22.41		
HT20	MCS0	1	36	5180	18.08	36.41	-	22.57		
HT20	MCS0	1	44	5220	18.43	40.46	-	22.66		
HT20	MCS0	1	48	5240	18.38	39.96	-	22.64		
HT40	MCS0	1	38	5190	36.96	65.54	-	23.01		
HT40	MCS0	1	46	5230	36.96	65.63	-	23.01		
VHT80	MCS0	1	42	5210	75.88	81.52	-	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	0.00	13.45	24.00	-1.20		Pass
11a	6Mbps	1	44	5220	0.00	13.54	24.00	-1.20		Pass
11a	6Mbps	1	48	5240	0.00	13.70	24.00	-1.20		Pass
HT20	MCS0	1	36	5180	0.00	12.85	24.00	-1.20		Pass
HT20	MCS0	1	44	5220	0.00	13.05	24.00	-1.20		Pass
HT20	MCS0	1	48	5240	0.00	13.15	24.00	-1.20		Pass
HT40	MCS0	1	38	5190	0.00	13.06	24.00	-1.20		Pass
HT40	MCS0	1	46	5230	0.00	13.14	24.00	-1.20		Pass
VHT20	MCS0	1	36	5180	0.00	12.84	24.00	-1.20		Pass
VHT20	MCS0	1	44	5220	0.00	12.94	24.00	-1.20		Pass
VHT20	MCS0	1	48	5240	0.00	13.14	24.00	-1.20		Pass
VHT40	MCS0	1	38	5190	0.00	13.02	24.00	-1.20		Pass
VHT40	MCS0	1	46	5230	0.00	13.12	24.00	-1.20		Pass
VHT80	MCS0	1	42	5210	0.00	13.50	24.00	-1.20		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	0.00	8.28	11.00	-1.20		Pass
11a	6Mbps	1	44	5220	0.00	8.48	11.00	-1.20		Pass
11a	6Mbps	1	48	5240	0.00	8.88	11.00	-1.20		Pass
HT20	MCS0	1	36	5180	0.00	7.96	11.00	-1.20		Pass
HT20	MCS0	1	44	5220	0.00	8.47	11.00	-1.20		Pass
HT20	MCS0	1	48	5240	0.00	8.71	11.00	-1.20		Pass
HT40	MCS0	1	38	5190	0.00	4.09	11.00	-1.20		Pass
HT40	MCS0	1	46	5230	0.00	4.20	11.00	-1.20		Pass
VHT80	MCS0	1	42	5210	0.00	-3.46	11.00	-1.20		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band II										
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)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	52	5260	17.28	41.61	23.38	29.38	23.98	
11a	6M bps	1	60	5300	17.23	39.31	23.36	29.36	23.98	
11a	6M bps	1	64	5320	17.18	38.61	23.35	29.35	23.98	
HT20	MCS 0	1	52	5260	18.18	39.66	23.60	29.60	23.98	
HT20	MCS 0	1	60	5300	18.13	39.01	23.58	29.58	23.98	
HT20	MCS 0	1	64	5320	18.33	39.76	23.63	29.63	23.98	
HT40	MCS 0	1	54	5270	36.66	54.76	23.98	30.00	23.98	
HT40	MCS 0	1	62	5310	36.76	61.68	23.98	30.00	23.98	
VHT80	MCS 0	1	58	5290	75.76	81.04	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	N _{Tx}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.00	13.85	23.98	-1.20	26.99	Pass
11a	6M bps	1	60	5300	0.00	14.01	23.98	-1.20	26.99	Pass
11a	6M bps	1	64	5320	0.00	13.91	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	52	5260	0.00	13.36	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	60	5300	0.00	13.48	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	64	5320	0.00	13.54	23.98	-1.20	26.99	Pass
HT40	MCS 0	1	54	5270	0.00	13.42	23.98	-1.20	26.99	Pass
HT40	MCS 0	1	62	5310	0.00	12.88	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	52	5260	0.00	13.25	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	60	5300	0.00	13.41	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	64	5320	0.00	13.49	23.98	-1.20	26.99	Pass
VHT40	MCS 0	1	54	5270	0.00	13.26	23.98	-1.20	26.99	Pass
VHT40	MCS 0	1	62	5310	0.00	12.86	23.98	-1.20	26.99	Pass
VHT80	MCS 0	1	58	5290	0.00	13.88	23.98	-1.20	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band II										
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	6M bps	1	52	5260	0.00	9.02	11.00	-1.20		Pass
11a	6M bps	1	60	5300	0.00	8.64	11.00	-1.20		Pass
11a	6M bps	1	64	5320	0.00	8.79	11.00	-1.20		Pass
HT20	MCS 0	1	52	5260	0.00	8.65	11.00	-1.20		Pass
HT20	MCS 0	1	60	5300	0.00	8.49	11.00	-1.20		Pass
HT20	MCS 0	1	64	5320	0.00	8.38	11.00	-1.20		Pass
HT40	MCS 0	1	54	5270	0.00	4.53	11.00	-1.20		Pass
HT40	MCS 0	1	62	5310	0.00	4.44	11.00	-1.20		Pass
VHT80	MCS 0	1	58	5290	0.00	-2.57	11.00	-1.20		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band III										
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)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	100	5500	17.58	40.46	23.45	29.45	23.98	
11a	6M bps	1	116	5580	17.63	38.56	23.46	29.46	23.98	
11a	6M bps	1	140	5700	17.48	38.26	23.43	29.43	23.98	
HT20	MCS 0	1	100	5500	18.38	39.61	23.64	29.64	23.98	
HT20	MCS 0	1	116	5580	18.28	41.11	23.62	29.62	23.98	
HT20	MCS 0	1	140	5700	18.13	36.51	23.58	29.58	23.98	
HT40	MCS 0	1	102	5510	36.76	61.50	23.98	30.00	23.98	
HT40	MCS 0	1	110	5550	37.16	60.24	23.98	30.00	23.98	
HT40	MCS 0	1	134	5670	37.16	59.70	23.98	30.00	23.98	
VHT80	MCS 0	1	106	5530	75.76	80.72	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

FCC Band III										
Mod.	Data Rate	N _{Tx}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	0.00	13.27	23.98	-1.20	26.99	Pass
11a	6M bps	1	116	5580	0.00	13.19	23.98	-1.20	26.99	Pass
11a	6M bps	1	140	5700	0.00	13.10	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	100	5500	0.00	12.95	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	116	5580	0.00	13.10	23.98	-1.20	26.99	Pass
HT20	MCS 0	1	140	5700	0.00	13.06	23.98	-1.20	26.99	Pass
HT40	MCS 0	1	102	5510	0.00	11.61	23.98	-1.20	26.99	Pass
HT40	MCS 0	1	110	5550	0.00	13.21	23.98	-1.20	26.99	Pass
HT40	MCS 0	1	134	5670	0.00	13.06	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	100	5500	0.00	12.94	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	116	5580	0.00	13.08	23.98	-1.20	26.99	Pass
VHT20	MCS 0	1	140	5700	0.00	13.04	23.98	-1.20	26.99	Pass
VHT40	MCS 0	1	102	5510	0.00	11.51	23.98	-1.20	26.99	Pass
VHT40	MCS 0	1	110	5550	0.00	13.14	23.98	-1.20	26.99	Pass
VHT40	MCS 0	1	134	5670	0.00	13.05	23.98	-1.20	26.99	Pass
VHT80	MCS 0	1	106	5530	0.00	13.84	23.98	-1.20	26.99	Pass

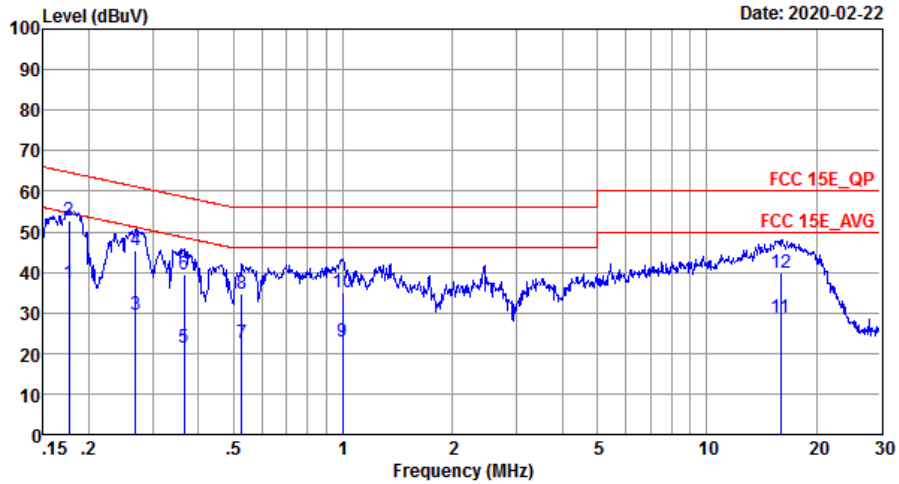
TEST RESULTS DATA
Power Spectral Density

Band III										
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	6M bps	1	100	5500	0.00	8.47	11.00	-1.20		Pass
11a	6M bps	1	116	5580	0.00	8.66	11.00	-1.20		Pass
11a	6M bps	1	140	5700	0.00	8.39	11.00	-1.20		Pass
HT20	MCS 0	1	100	5500	0.00	8.45	11.00	-1.20		Pass
HT20	MCS 0	1	116	5580	0.00	8.36	11.00	-1.20		Pass
HT20	MCS 0	1	140	5700	0.00	8.07	11.00	-1.20		Pass
HT40	MCS 0	1	102	5510	0.00	4.53	11.00	-1.20		Pass
HT40	MCS 0	1	110	5550	0.00	4.56	11.00	-1.20		Pass
HT40	MCS 0	1	134	5670	0.00	4.40	11.00	-1.20		Pass
VHT80	MCS 0	1	106	5530	0.00	-2.69	11.00	-1.20		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 :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

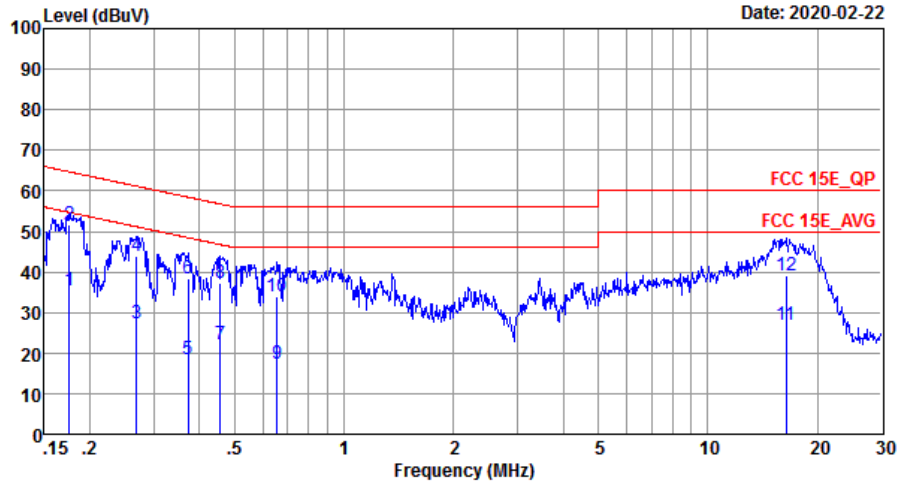


Site : CO01-SZ
 Condition: FCC 15E_QP LISN_20190719_L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.18	37.24	-17.40	54.64	27.20	0.03	10.01	Average
2 *	0.18	52.64	-12.00	64.64	42.60	0.03	10.01	QP
3	0.27	29.34	-21.82	51.16	19.30	0.03	10.01	Average
4	0.27	45.44	-15.72	61.16	35.40	0.03	10.01	QP
5	0.37	21.34	-27.27	48.61	11.30	0.03	10.01	Average
6	0.37	39.34	-19.27	58.61	29.30	0.03	10.01	QP
7	0.53	22.68	-23.32	46.00	12.60	0.02	10.06	Average
8	0.53	34.78	-21.22	56.00	24.70	0.02	10.06	QP
9	1.00	22.72	-23.28	46.00	12.60	0.07	10.05	Average
10	1.00	35.22	-20.78	56.00	25.10	0.07	10.05	QP
11	15.97	28.96	-21.04	50.00	18.00	0.67	10.29	Average
12	15.97	39.96	-20.04	60.00	29.00	0.67	10.29	QP



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

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18	35.54	-19.14	54.68	25.50	0.03	10.01	Average
2 *	0.18	51.64	-13.04	64.68	41.60	0.03	10.01	QP
3	0.27	27.44	-23.72	51.16	17.40	0.03	10.01	Average
4	0.27	43.74	-17.42	61.16	33.70	0.03	10.01	QP
5	0.37	18.33	-30.10	48.43	8.30	0.02	10.01	Average
6	0.37	38.53	-19.90	58.43	28.50	0.02	10.01	QP
7	0.46	22.26	-24.50	46.76	12.20	0.02	10.04	Average
8	0.46	37.16	-19.60	56.76	27.10	0.02	10.04	QP
9	0.65	17.49	-28.51	46.00	7.40	0.02	10.07	Average
10	0.65	34.09	-21.91	56.00	24.00	0.02	10.07	QP
11	16.40	26.80	-23.20	50.00	16.10	0.41	10.29	Average
12	16.40	39.20	-20.80	60.00	28.50	0.41	10.29	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

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		5150.08	57.81	-10.49	68.3	49.33	34.07	10.43	36.02	101	263	P	H
		5149.98	46.5	-7.5	54	38.02	34.07	10.43	36.02	101	263	A	H
	*	5176	108.82	-	-	100.22	34.12	10.48	36	101	263	P	H
		5176	101.36	-	-	92.76	34.12	10.48	36	101	263	A	H
		5134.24	54.29	-19.71	74	45.87	34.05	10.4	36.03	100	275	P	V
		5149.76	42.28	-11.72	54	33.8	34.07	10.43	36.02	100	275	A	V
	*	5182	99.46	-	-	90.86	34.12	10.48	36	100	275	P	V
		5182	92.06	-	-	83.46	34.12	10.48	36	100	275	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	40.73	-27.57	68.3	49.12	37.02	15.27	60.68	100	360	P	H
		15540	60.98	-13.02	74	60.94	40.83	19.03	59.82	100	193	P	H
		15540	49.58	-4.42	54	49.54	40.83	19.03	59.82	100	193	A	H
		10360	42.2	-26.1	68.3	50.59	37.02	15.27	60.68	100	156	P	V
		15540	60.94	-13.06	74	60.9	40.83	19.03	59.82	122	306	P	V
		15540	50.12	-3.88	54	50.08	40.83	19.03	59.82	122	306	A	V
802.11a CH 44 5220MHz		10440	42.09	-26.21	68.3	50.37	37.06	15.32	60.66	100	360	P	H
		15660	59.62	-14.38	74	59.34	40.96	19.1	59.78	100	182	P	H
		15660	48.93	-5.07	54	48.65	40.96	19.1	59.78	100	182	A	H
		10440	42.38	-25.92	68.3	50.66	37.06	15.32	60.66	100	360	P	V
		15660	62.87	-11.13	74	62.59	40.96	19.1	59.78	100	197	P	V
		15660	50.21	-3.79	54	49.93	40.96	19.1	59.78	100	197	A	V
802.11a CH 48 5240MHz		10480	42.76	-25.54	68.3	50.96	37.09	15.36	60.65	100	360	P	H
		15720	57.54	-16.46	74	57.12	41.02	19.15	59.75	100	200	P	H
		15720	47.11	-6.89	54	46.69	41.02	19.15	59.75	100	200	A	H
		10480	43	-25.3	68.3	51.2	37.09	15.36	60.65	100	360	P	V
		15720	62.39	-11.61	74	61.97	41.02	19.15	59.75	120	306	P	V
		15720	50.54	-3.46	54	50.12	41.02	19.15	59.75	120	306	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 (Band Edge @ 3m)

Table with 14 columns: 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). Rows include test results for 802.11n HT20 CH 36 5180MHz and a Remark section.



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 HT20 CH 36 5180MHz		10360	41.48	-26.82	68.3	49.87	37.02	15.27	60.68	100	360	P	H
		15540	57.6	-16.4	74	57.56	40.83	19.03	59.82	100	194	P	H
		15540	46.15	-7.85	54	46.11	40.83	19.03	59.82	100	194	A	H
		10360	42.2	-26.1	68.3	50.59	37.02	15.27	60.68	100	360	P	V
		15540	61.1	-12.9	74	61.06	40.83	19.03	59.82	122	301	P	V
		15540	50.15	-3.85	54	50.11	40.83	19.03	59.82	122	301	A	V
802.11n HT20 CH 44 5220MHz		10440	43.35	-24.95	68.3	51.63	37.06	15.32	60.66	100	360	P	H
		15660	59.13	-14.87	74	58.85	40.96	19.1	59.78	100	192	P	H
		15660	48.02	-5.98	54	47.74	40.96	19.1	59.78	100	192	A	H
		10440	43.49	-24.81	68.3	51.77	37.06	15.32	60.66	100	360	P	V
		15660	60.96	-13.04	74	60.68	40.96	19.1	59.78	120	302	P	V
		15660	50.88	-3.12	54	50.6	40.96	19.1	59.78	120	302	A	V
802.11n HT20 CH 48 5240MHz		10480	41.88	-26.42	68.3	50.08	37.09	15.36	60.65	100	360	P	H
		15720	58.6	-15.4	74	58.18	41.02	19.15	59.75	100	192	P	H
		15720	49.05	-4.95	54	48.63	41.02	19.15	59.75	100	192	A	H
		10480	43.09	-25.21	68.3	51.29	37.09	15.36	60.65	100	360	P	V
		15720	61.36	-12.64	74	60.94	41.02	19.15	59.75	100	192	P	V
		15720	50.33	-3.67	54	49.91	41.02	19.15	59.75	100	192	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 (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		5148.48	67.41	-6.59	74	58.93	34.07	10.43	36.02	104	245	P	H
		5149.76	47.53	-6.47	54	39.05	34.07	10.43	36.02	104	245	A	H
	*	5194	105.2	-	-	96.54	34.14	10.51	35.99	104	245	P	H
		5194	97.8	-	-	89.14	34.14	10.51	35.99	104	245	A	H
		5355.72	52.4	-21.6	74	43.25	34.33	10.71	35.89	104	245	P	H
		5350.14	42.71	-11.29	54	33.56	34.33	10.71	35.89	104	245	A	H
		5144.48	59.37	-14.63	74	50.89	34.07	10.43	36.02	100	278	P	V
		5149.76	43.58	-10.42	54	35.1	34.07	10.43	36.02	100	278	A	V
	*	5188	97.53	-	-	88.93	34.12	10.48	36	100	278	P	V
		5188	90.14	-	-	81.54	34.12	10.48	36	100	278	A	V
		5354.82	50.79	-23.21	74	41.64	34.33	10.71	35.89	100	278	P	V
		5352.48	41.02	-12.98	54	31.87	34.33	10.71	35.89	100	278	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)

Table with 14 columns: 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). Rows include data for 802.11n HT40 CH 38 (5190MHz) and 802.11n HT40 CH 46 (5230MHz).

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		5149.76	60.74	-13.26	74	52.26	34.07	10.43	36.02	100	247	P	H
		5149.98	48.72	-5.28	54	40.24	34.07	10.43	36.02	100	247	A	H
	*	5212	100.2	-	-	91.49	34.16	10.53	35.98	100	247	P	H
		5212	92.9	-	-	84.19	34.16	10.53	35.98	100	247	A	H
		5356.8	53.92	-20.08	74	44.77	34.33	10.71	35.89	100	247	P	H
		5350.1	43.44	-10.56	54	34.29	34.33	10.71	35.89	100	247	A	H
		5149.6	54.51	-19.49	74	46.03	34.07	10.43	36.02	100	299	P	V
		5149.98	43.58	-10.42	54	35.1	34.07	10.43	36.02	100	299	A	V
	*	5206	92.97	-	-	84.31	34.14	10.51	35.99	100	299	P	V
		5206	85.53	-	-	76.87	34.14	10.51	35.99	100	299	A	V
		5353.74	50.7	-23.3	74	41.55	34.33	10.71	35.89	100	299	P	V
		5355.36	40.83	-13.17	54	31.68	34.33	10.71	35.89	100	299	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 VHT80 CH 42 5210MHz		10420	42.51	-25.79	68.3	50.82	37.05	15.31	60.67	100	360	P	H
		15630	49.6	-24.4	74	49.35	40.94	19.09	59.78	100	0	P	H
		10420	41.83	-26.47	68.3	50.14	37.05	15.31	60.67	100	0	P	V
		15630	51.06	-22.94	74	50.81	40.94	19.09	59.78	114	304	P	V
		15630	44.5	-9.5	54	44.25	40.94	19.09	59.78	114	304	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 - 5250~5350MHz
WIFI 802.11a (Band Edge @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains test data for 802.11a CH 64 at 5320MHz and a Remark section.



Band 2 5250~5350MHz

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 52 5260MHz		10520	42.27	-26.03	68.3	50.42	37.11	15.39	60.65	100	360	P	H
		15780	59.5	-14.5	74	58.97	41.08	19.18	59.73	100	198	P	H
		15780	44.61	-9.39	54	44.08	41.08	19.18	59.73	100	198	A	H
		10520	42.61	-25.69	68.3	50.76	37.11	15.39	60.65	100	360	P	V
		15780	62.22	-11.78	74	61.69	41.08	19.18	59.73	100	191	P	V
802.11a CH 60 5300MHz		10600	42.91	-31.09	74	50.93	37.16	15.45	60.63	100	360	P	H
		15900	58.83	-15.17	74	58.07	41.2	19.25	59.69	100	191	P	H
		15900	47.67	-6.33	54	46.91	41.2	19.25	59.69	100	191	A	H
		10600	42.56	-31.44	74	50.58	37.16	15.45	60.63	100	360	P	V
		15900	60.37	-13.63	74	59.61	41.2	19.25	59.69	100	188	P	V
802.11a CH 64 5320MHz		10640	43.29	-30.71	74	51.25	37.18	15.48	60.62	100	360	P	H
		15960	55.57	-18.43	74	54.67	41.27	19.29	59.66	100	184	P	H
		15960	45.27	-8.73	54	44.37	41.27	19.29	59.66	100	184	A	H
		10640	42.59	-31.41	74	50.55	37.18	15.48	60.62	100	360	P	V
		15960	58.51	-15.49	74	57.61	41.27	19.29	59.66	100	189	P	V
		15960	47.05	-6.95	54	46.15	41.27	19.29	59.66	100	189	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



Band 2 5250~5350MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

Table with 14 columns: 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). Rows include test data for 802.11n HT20 CH 64 5320MHz and a Remark section.



Band 2 5250~5350MHz
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 HT20 CH 52 5260MHz		10520	42.6	-25.7	68.3	50.75	37.11	15.39	60.65	100	360	P	H
		15780	56.93	-17.07	74	56.4	41.08	19.18	59.73	100	187	P	H
		15780	46.85	-7.15	54	46.32	41.08	19.18	59.73	100	187	A	H
		10520	43.24	-25.06	68.3	51.39	37.11	15.39	60.65	100	360	P	V
		15780	59.22	-14.78	74	58.69	41.08	19.18	59.73	100	195	P	V
		15780	48.81	-5.19	54	48.28	41.08	19.18	59.73	100	195	A	V
802.11n HT20 CH 60 5300MHz		10600	42.59	-31.41	74	50.61	37.16	15.45	60.63	100	360	P	H
		15900	56.4	-17.6	74	55.64	41.2	19.25	59.69	100	185	P	H
		15900	45.85	-8.15	54	45.09	41.2	19.25	59.69	100	185	A	H
		10600	42.93	-31.07	74	50.95	37.16	15.45	60.63	100	360	P	V
		15900	58.55	-15.45	74	57.79	41.2	19.25	59.69	100	194	P	V
		15900	47.84	-6.16	54	47.08	41.2	19.25	59.69	100	194	A	V
802.11n HT20 CH 64 5320MHz		10640	43.02	-30.98	74	50.98	37.18	15.48	60.62	100	360	P	H
		15960	56.25	-17.75	74	55.35	41.27	19.29	59.66	100	184	P	H
		15960	45.24	-8.76	54	44.34	41.27	19.29	59.66	100	184	A	H
		10640	43.05	-30.95	74	51.01	37.18	15.48	60.62	100	360	P	V
		15960	58.98	-15.02	74	58.08	41.27	19.29	59.66	113	289	P	V
		15960	47.91	-6.09	54	47.01	41.27	19.29	59.66	113	289	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

Table with 14 columns: 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). Rows include frequencies like 5143.36, 5144.64, 5308, 5350.3, 5350, 5142.08, 5145.76, 5308, 5308, 5352.5, 5350.



Band 2 5250~5350MHz
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)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 54 5270MHz		10540	42.91	-25.39	68.3	51.03	37.12	15.4	60.64	100	360	P	H
		15810	51.39	-22.61	74	50.8	41.11	19.2	59.72	100	185	P	H
		15810	45.62	-8.38	54	45.03	41.11	19.2	59.72	100	185	A	H
		10540	42.54	-25.76	68.3	50.66	37.12	15.4	60.64	100	0	P	V
		15810	57.13	-16.87	74	56.54	41.11	19.2	59.72	119	306	P	V
802.11n HT40 CH 62 5310MHz		10620	43.7	-30.3	74	51.68	37.17	15.47	60.62	100	0	P	H
		15930	51.06	-22.94	74	50.24	41.23	19.27	59.68	100	360	P	H
		10620	43.96	-30.04	74	51.94	37.17	15.47	60.62	100	360	P	V
		15930	54.27	-19.73	74	53.45	41.23	19.27	59.68	100	192	P	V
		15930	44.86	-9.14	54	44.04	41.23	19.27	59.68	100	192	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



Band 2 5250~5350MHz
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 58 5290MHz		5137.44	52.54	-21.46	74	44.12	34.05	10.4	36.03	100	247	P	H
		5149.92	42.16	-11.84	54	33.68	34.07	10.43	36.02	100	247	A	H
	*	5290	101.13	-	-	92.2	34.25	10.62	35.94	100	247	P	H
		5290	93.95	-	-	85.02	34.25	10.62	35.94	100	247	A	H
		5368.7	64.55	-9.45	74	55.35	34.35	10.73	35.88	100	247	P	H
		5350.2	50.38	-3.62	54	41.23	34.33	10.71	35.89	100	247	A	H
		5126.56	51.96	-22.04	74	43.54	34.05	10.4	36.03	104	347	P	V
		5116.8	41.32	-12.68	54	32.95	34.03	10.38	36.04	104	347	A	V
	*	5290	94.47	-	-	85.54	34.25	10.62	35.94	104	347	P	V
		5290	87.17	-	-	78.24	34.25	10.62	35.94	104	347	A	V
		5363.6	56.24	-17.76	74	47.04	34.35	10.73	35.88	104	347	P	V
		5350.1	44.19	-9.81	54	35.04	34.33	10.71	35.89	104	347	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 2 5250~5350MHz

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 VHT80 CH 58 5290MHz		10580	42.38	-25.92	68.3	50.42	37.15	15.44	60.63	100	360	P	H
		15870	52.56	-21.44	74	51.83	41.18	19.24	59.69	100	191	P	H
		15870	42.2	-11.8	54	41.47	41.18	19.24	59.69	100	191	A	H
		10580	42.63	-25.67	68.3	50.67	37.15	15.44	60.63	100	0	P	V
		15876	51.37	-22.63	74	50.64	41.18	19.24	59.69	102	194	P	V
		15876	42.51	-11.49	54	41.78	41.18	19.24	59.69	102	194	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 100 5500MHz		5458.32	55.94	-18.06	74	46.54	34.46	10.77	35.83	100	240	P	H
		5470	60.22	-8.08	68.3	50.79	34.48	10.77	35.82	100	240	P	H
		5459.98	45.86	-8.14	54	36.46	34.46	10.77	35.83	100	240	A	H
	*	5500	108.79	-	-	99.29	34.53	10.77	35.8	100	240	P	H
		5500	102.17	-	-	92.67	34.53	10.77	35.8	100	240	A	H
		5453.36	52.46	-21.54	74	43.06	34.46	10.77	35.83	111	293	P	V
		5465.68	55.9	-12.4	68.3	46.47	34.48	10.77	35.82	111	293	P	V
		5459.98	43.74	-10.26	54	34.34	34.46	10.77	35.83	111	293	A	V
	*	5500	105.95	-	-	96.45	34.53	10.77	35.8	111	293	P	V
		5500	98.65	-	-	89.15	34.53	10.77	35.8	111	293	A	V
802.11a CH 140 5700MHz	*	5704	107.42	-	-	97.62	34.76	10.8	35.76	111	245	P	H
		5704	99.83	-	-	90.03	34.76	10.8	35.76	111	245	A	H
		5725.96	60.55	-7.75	68.3	50.74	34.78	10.8	35.77	111	245	P	H
	*	5704	105.61	-	-	95.81	34.76	10.8	35.76	100	352	P	V
		5704	98.04	-	-	88.24	34.76	10.8	35.76	100	352	A	V
		5726.52	58.53	-9.77	68.3	48.72	34.78	10.8	35.77	100	352	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 100 5500MHz		11000	43.64	-30.36	74	51.02	37.4	15.76	60.54	100	360	P	H
		16500	57.57	-10.73	68.3	55.76	40.94	19.78	58.91	100	338	P	H
		11000	46.04	-27.96	74	53.42	37.4	15.76	60.54	100	360	P	V
		16500	60.14	-8.16	68.3	58.33	40.94	19.78	58.91	100	199	P	V
802.11a CH 116 5580MHz		11160	45.58	-28.42	74	52.7	37.5	15.88	60.5	100	360	P	H
		16740	58.45	-9.85	68.3	56.25	40.78	19.99	58.57	100	146	P	H
		11160	52.28	-21.72	74	59.4	37.5	15.88	60.5	100	285	P	V
		11160	42.81	-11.19	54	49.93	37.5	15.88	60.5	100	285	A	V
		16746	60.54	-7.76	68.3	58.34	40.78	19.99	58.57	100	196	P	V
802.11a CH 140 5700MHz		11400	47.57	-26.43	74	54.33	37.64	16.05	60.45	100	360	P	H
		17100	60.62	-7.68	68.3	57.61	40.65	20.44	58.08	100	332	P	H
		11400	46.8	-27.2	74	53.56	37.64	16.05	60.45	100	360	P	V
		17100	64.05	-4.25	68.3	61.04	40.65	20.44	58.08	100	197	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 100 5500MHz		5453.52	55.58	-18.42	74	46.18	34.46	10.77	35.83	111	269	P	H
		5467.28	64.34	-3.96	68.3	54.91	34.48	10.77	35.82	111	269	P	H
		5459.98	45.82	-8.18	54	36.42	34.46	10.77	35.83	111	269	A	H
	*	5500	108.75	-	-	99.25	34.53	10.77	35.8	111	269	P	H
		5500	101.52	-	-	92.02	34.53	10.77	35.8	111	269	A	H
		5453.68	52.86	-21.14	74	43.46	34.46	10.77	35.83	100	285	P	V
		5468.24	57.46	-10.84	68.3	48.03	34.48	10.77	35.82	100	285	P	V
		5459.98	43.65	-10.35	54	34.25	34.46	10.77	35.83	100	285	A	V
	*	5500	104.36	-	-	94.86	34.53	10.77	35.8	100	285	P	V
	5500	96.65	-	-	87.15	34.53	10.77	35.8	100	285	A	V	
802.11n HT20 CH 140 5700MHz	*	5698	109.43	-	-	99.64	34.75	10.79	35.75	100	251	P	H
		5698	101.87	-	-	92.08	34.75	10.79	35.75	100	251	A	H
		5728.28	63.96	-4.34	68.3	54.15	34.78	10.8	35.77	100	251	P	H
	*	5698	104.88	-	-	95.09	34.75	10.79	35.75	100	252	P	V
		5698	97.57	-	-	87.78	34.75	10.79	35.75	100	252	A	V
	5725.8	64.68	-3.62	68.3	54.87	34.78	10.8	35.77	100	252	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 HT20		11000	42.16	-31.84	74	49.54	37.4	15.76	60.54	100	360	P	H
		16500	58.02	-10.28	68.3	56.21	40.94	19.78	58.91	100	147	P	H
CH 100 5500MHz		11000	44.56	-29.44	74	51.94	37.4	15.76	60.54	100	360	P	V
		16500	58.19	-10.11	68.3	56.38	40.94	19.78	58.91	100	195	P	V
802.11n HT20 CH 116 5580MHz		11160	44.23	-29.77	74	51.35	37.5	15.88	60.5	100	360	P	H
		16740	55.76	-12.54	68.3	53.56	40.78	19.99	58.57	100	148	P	H
		11160	47.36	-26.64	74	54.48	37.5	15.88	60.5	100	360	P	V
		16734	56.54	-11.76	68.3	54.34	40.78	19.99	58.57	100	194	P	V
802.11n HT20 CH 140 5700MHz		11400	44.59	-29.41	74	51.35	37.64	16.05	60.45	100	360	P	H
		17100	60.49	-7.81	68.3	57.48	40.65	20.44	58.08	100	338	P	H
		11400	48.36	-25.64	74	55.12	37.64	16.05	60.45	100	360	P	V
		17100	64.93	-3.37	68.3	61.92	40.65	20.44	58.08	100	196	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 102 5510MHz		5458.48	62.8	-11.2	74	53.4	34.46	10.77	35.83	100	299	P	H
		5465.84	66.24	-2.06	68.3	56.81	34.48	10.77	35.82	100	299	P	H
		5459.98	48.94	-5.06	54	39.54	34.46	10.77	35.83	100	299	A	H
	*	5512	105.31	-	-	95.81	34.53	10.77	35.8	100	299	P	H
		5512	97.52	-	-	88.02	34.53	10.77	35.8	100	299	A	H
		5749.96	53.48	-14.82	68.3	43.66	34.79	10.81	35.78	100	299	P	H
		5457.2	57.06	-16.94	74	47.66	34.46	10.77	35.83	278	311	P	V
		5470	59.54	-8.76	68.3	50.11	34.48	10.77	35.82	278	311	P	V
		5459.98	44.39	-9.61	54	34.99	34.46	10.77	35.83	278	311	A	V
	*	5506	101.75	-	-	92.25	34.53	10.77	35.8	278	311	P	V
		5506	94.72	-	-	85.22	34.53	10.77	35.8	278	311	A	V
		5761.56	53.13	-15.17	68.3	43.31	34.81	10.81	35.8	278	311	P	V
802.11n HT40 CH 134 5670MHz		5362.64	50.88	-23.12	74	41.68	34.35	10.73	35.88	100	243	P	H
		5465.04	49.94	-18.36	68.3	40.51	34.48	10.77	35.82	100	243	P	H
		5458.32	41.52	-12.48	54	32.12	34.46	10.77	35.83	100	243	A	H
	*	5674	107.39	-	-	97.61	34.73	10.79	35.74	100	243	P	H
		5674	100.02	-	-	90.24	34.73	10.79	35.74	100	243	A	H
		5729.72	61.58	-6.72	68.3	51.77	34.78	10.8	35.77	100	243	P	H
		5429.36	50.51	-23.49	74	41.14	34.44	10.77	35.84	100	244	P	V
		5461.52	50.14	-18.16	68.3	40.74	34.46	10.77	35.83	100	244	P	V
		5453.52	40.93	-13.07	54	31.53	34.46	10.77	35.83	100	244	A	V
	*	5668	104.61	-	-	94.83	34.73	10.79	35.74	100	244	P	V
	5668	97.14	-	-	87.36	34.73	10.79	35.74	100	244	A	V	
	5725	61.43	-6.87	68.3	51.62	34.78	10.8	35.77	100	244	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 102 5510MHz		11020	43.68	-30.32	74	51.03	37.41	15.78	60.54	100	0	P	H
		11020	44.4	-29.6	74	51.75	37.41	15.78	60.54	100	360	P	V
802.11n HT40 CH 110 5550MHz		11100	43.67	-30.33	74	50.9	37.46	15.83	60.52	100	360	P	H
		16650	53.55	-14.75	68.3	51.49	40.84	19.91	58.69	101	148	P	H
		11100	44.82	-29.18	74	52.05	37.46	15.83	60.52	100	0	P	V
		16650	54.43	-13.87	68.3	52.37	40.84	19.91	58.69	100	194	P	V
802.11n HT40 CH 134 5670MHz		11340	43.73	-30.27	74	50.6	37.6	16	60.47	100	0	P	H
		17010	53.15	-15.15	68.3	50.46	40.61	20.26	58.18	100	148	P	H
		11340	45.28	-28.72	74	52.15	37.6	16	60.47	100	360	P	V
		17010	56.11	-12.19	68.3	53.42	40.61	20.26	58.18	100	197	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 - 5470~5725MHz
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 106 5530MHz		5459.6	62.87	-11.13	74	53.47	34.46	10.77	35.83	100	254	P	H
		5469.52	62.51	-5.79	68.3	53.08	34.48	10.77	35.82	100	254	P	H
		5457.84	49.47	-4.53	54	40.07	34.46	10.77	35.83	100	254	A	H
	*	5530	103.11	-	-	93.58	34.55	10.77	35.79	100	254	P	H
		5530	95.73	-	-	86.2	34.55	10.77	35.79	100	254	A	H
		5763	53.34	-14.96	68.3	43.52	34.81	10.81	35.8	100	254	P	H
		5458.8	55.4	-18.6	74	46	34.46	10.77	35.83	103	360	P	V
		5469.2	55.54	-12.76	68.3	46.11	34.48	10.77	35.82	103	360	P	V
		5458	44.39	-9.61	54	34.99	34.46	10.77	35.83	103	360	A	V
	*	5530	97.78	-	-	88.25	34.55	10.77	35.79	103	360	P	V
		5530	90.07	-	-	80.54	34.55	10.77	35.79	103	360	A	V
	5753.48	52.17	-16.13	68.3	42.35	34.81	10.81	35.8	103	360	P	V	
802.11ac VHT80 CH 122 5610MHz		5458.96	53.33	-20.67	74	43.93	34.46	10.77	35.83	101	247	P	H
		5468.56	55.15	-13.15	68.3	45.72	34.48	10.77	35.82	101	247	P	H
		5459.6	43.72	-10.28	54	34.32	34.46	10.77	35.83	101	247	A	H
	*	5614	104.42	-	-	94.73	34.66	10.77	35.74	101	247	P	H
		5614	96.89	-	-	87.2	34.66	10.77	35.74	101	247	A	H
		5725.16	61.52	-6.78	68.3	51.71	34.78	10.8	35.77	101	247	P	H
		5430.96	50.23	-23.77	74	40.86	34.44	10.77	35.84	100	251	P	V
		5468.08	50.46	-17.84	68.3	41.03	34.48	10.77	35.82	100	251	P	V
		5459.6	41.26	-12.74	54	31.86	34.46	10.77	35.83	100	251	A	V
	*	5614	98.42	-	-	88.73	34.66	10.77	35.74	100	251	P	V
	5614	91.5	-	-	81.81	34.66	10.77	35.74	100	251	A	V	
	5728.6	57.13	-11.17	68.3	47.32	34.78	10.8	35.77	100	251	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 3 5470~5725MHz

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 VHT80		11060	43.49	-30.51	74	50.77	37.44	15.81	60.53	100	360	P	H
CH 106 5530MHz		11060	43.51	-30.49	74	50.79	37.44	15.81	60.53	100	0	P	V
802.11ac VHT80		11220	42.66	-31.34	74	49.7	37.53	15.92	60.49	100	360	P	H
CH 122 5610MHz		16830	48.17	-20.13	68.3	45.83	40.72	20.07	58.45	100	0	P	H
		11220	44.32	-29.68	74	51.36	37.53	15.92	60.49	100	0	P	V
		16830	48.92	-19.38	68.3	46.58	40.72	20.07	58.45	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 802.11n 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		176.47	28.7	-14.8	43.5	44.86	15.32	1.47	32.95	-	-	P	H
		214.3	38.64	-4.86	43.5	54.55	15.34	1.62	32.87	100	0	P	H
		224.97	38.95	-7.05	46	54.29	15.85	1.66	32.85	-	-	P	H
		249.22	40.45	-5.55	46	52.91	18.59	1.75	32.8	-	-	P	H
		278.32	39.11	-6.89	46	50.97	19.04	1.84	32.74	-	-	P	H
		938.89	28.12	-17.88	46	27.17	29.7	3.37	32.12	-	-	P	H
		47.46	32.58	-7.42	40	48.99	15.9	0.79	33.1	100	0	P	V
		59.1	29.38	-10.62	40	49.08	12.55	0.87	33.12	-	-	P	V
		203.63	34.09	-9.41	43.5	50.22	15.17	1.59	32.89	-	-	P	V
		217.21	37	-9	46	52.87	15.37	1.63	32.87	-	-	P	V
		254.07	35.29	-10.71	46	47.02	19.3	1.76	32.79	-	-	P	V
		968.96	28.2	-25.8	54	26.72	30.1	3.44	32.06	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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

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

For Peak Limit @ 2390MHz:

- 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)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- 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)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

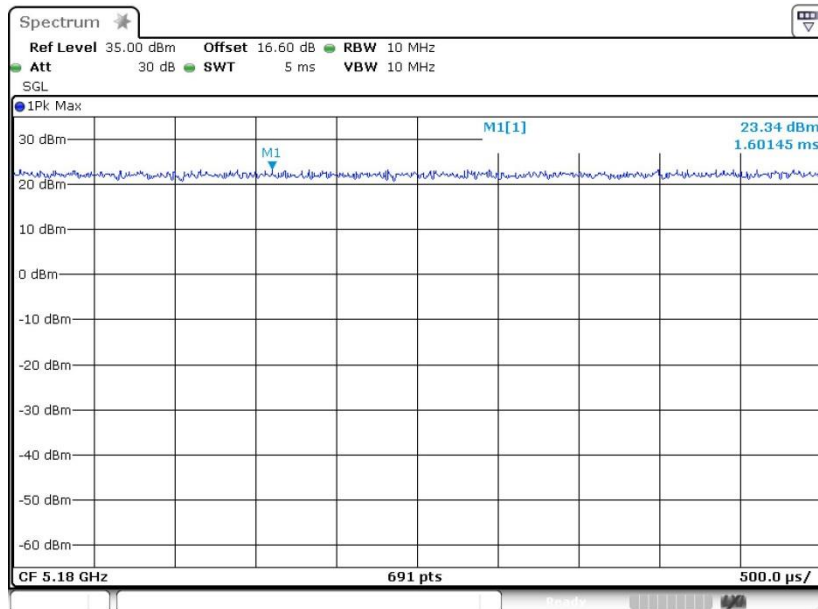
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	100	-	-	10Hz
802.11n HT20	100	-	-	10Hz
802.11n HT40	100	-	-	10Hz
802.11ac VHT80	100	-	-	10Hz

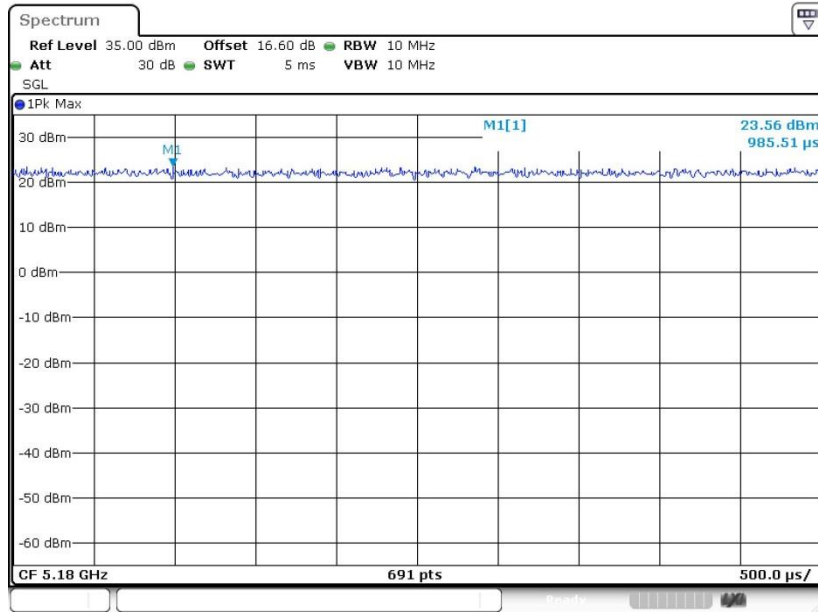
802.11a



Date: 3.MAR.2020 15:16:25

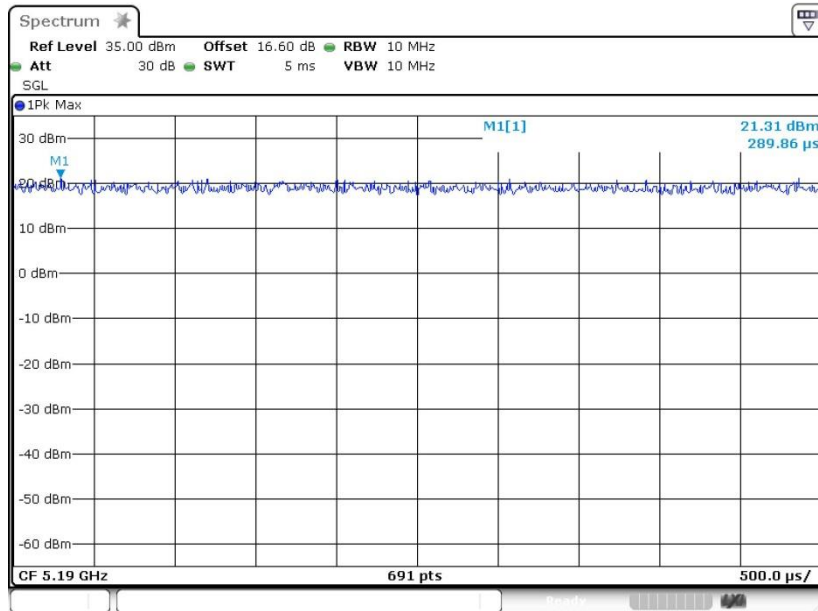


802.11n HT20



Date: 3.MAR.2020 15:23:21

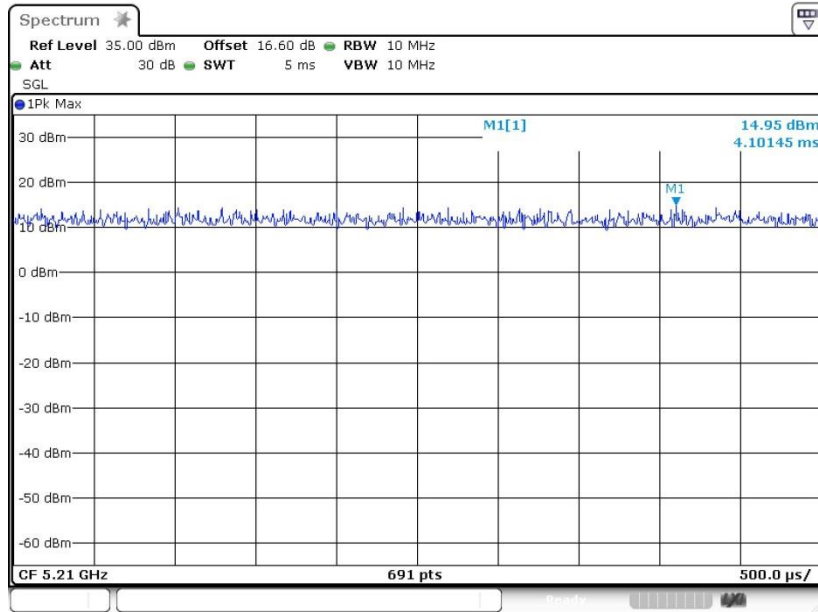
802.11n HT40



Date: 3.MAR.2020 15:28:34



802.11ac VHT80



Date: 3.MAR.2020 15:40:17