



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2087-1
FCC ID : IHDT56ZE1
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jun. 03, 2020 and testing was completed on Jul. 21, 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



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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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
2.7	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
2.8	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
2.9	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
2.10	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 12.18 dB at 0.194 MHz
2.11	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 3.05 dB at 5147.200 MHz
2.12	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
2.13	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

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2. Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2087-1
FCC ID	IHDT56ZE1
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 FM Receiver and GNSS
IMEI Code	Conducted: N/A Conduction: 355536110028457/355536110028465 Radiation: 35536110028317/355536110028325
HW Version	DVT2
SW Version	QPA30.19
EUT Stage	Identical Prototype

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



1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz
Maximum Output Power to Antenna	<p><5180 MHz ~ 5240 MHz> 802.11a : 19.26 dBm / 0.0843 W 802.11n HT20 : 19.49 dBm / 0.0889 W 802.11n HT40 : 18.09 dBm / 0.0644 W 802.11ac VHT20 : 16.19 dBm / 0.0416 W 802.11ac VHT40 : 15.93 dBm / 0.0392 W 802.11ac VHT80 : 12.17 dBm / 0.0165 W</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 19.36 dBm / 0.0863 W 802.11n HT20 : 19.26 dBm / 0.0843 W 802.11n HT40 : 18.34 dBm / 0.0682 W 802.11ac VHT20 : 15.87 dBm / 0.0386 W 802.11ac VHT40 : 15.77 dBm / 0.0378 W 802.11ac VHT80 : 14.47 dBm / 0.0280 W</p> <p><5500 MHz ~ 5720 MHz > 802.11a : 19.33 dBm / 0.0857 W 802.11n HT20 : 19.35 dBm / 0.0861 W 802.11n HT40 : 19.50 dBm / 0.0891 W 802.11ac VHT20 : 16.98 dBm / 0.0499 W 802.11ac VHT40 : 16.82 dBm / 0.0481 W 802.11ac VHT80 : 16.46 dBm / 0.0443 W</p>
99% Occupied Bandwidth	<p><5180 MHz ~ 5240 MHz> 802.11a : 22.38 MHz 802.11n HT20 : 22.63 MHz 802.11n HT40 : 37.36 MHz 802.11ac VHT80 : 75.64 MHz</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 21.78 MHz 802.11n HT20 : 22.58 MHz 802.11n HT40 : 37.76 MHz 802.11ac VHT80 : 75.64 MHz</p> <p><5500 MHz ~ 5720 MHz > 802.11a : 23.43 MHz 802.11n HT20 : 24.03 MHz 802.11n HT40 : 46.65 MHz 802.11ac VHT80 : 75.88 MHz</p>
Antenna Type / Gain	<p><5180 MHz ~ 5240 MHz > PIFA Antenna with gain -4.0 dBi</p> <p><5260 MHz ~ 5320 MHz > PIFA Antenna with gain -4.0 dBi</p> <p><5500 MHz ~ 5720 MHz > PIFA Antenna with gain -4.0 dBi</p>
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11n HT20/ HT40 by referring to the higher output power.



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 03CH02-KS TH01-KS	CN1257	314309

1.7. Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
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.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



1.9. Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola (Acbel)	Model Name	SC-301
AC Adapter 1(EU)	Brand Name	Motorola (Acbel)	Model Name	SC-302
AC Adapter 1(UK)	Brand Name	Motorola (Acbel)	Model Name	SC-303
AC Adapter 1(AR)	Brand Name	Motorola (Acbel)	Model Name	SC-306
AC Adapter 1(AU)	Brand Name	Motorola (Acbel)	Model Name	SC-305
AC Adapter 1(Chile)	Brand Name	Motorola (Acbel)	Model Name	SC-309
AC Adapter 2(US)	Brand Name	Motorola (Salom)	Model Name	SC-301
AC Adapter 2(EU)	Brand Name	Motorola (Salom)	Model Name	SC-302
AC Adapter 2(UK)	Brand Name	Motorola (Salom)	Model Name	SC-303
AC Adapter 2(AR)	Brand Name	Motorola (Salom)	Model Name	SC-306
AC Adapter 2(AU)	Brand Name	Motorola (Salom)	Model Name	SC-305
AC Adapter 2(BR)	Brand Name	Motorola (Salom)	Model Name	SC-307
AC Adapter 3(BR)	Brand Name	Motorola (Salom/Flex)	Model Name	SC-307
Battery	Brand Name	Motorola(ATL)	Model Name	MG50
Earphone 1	Brand Name	Motorola (Lianyun)	Model Name	MI181 (SH38C37773)
Earphone 2	Brand Name	Motorola (Cosonic)	Model Name	MI181 (SH38C44959)
USB Cable 1	Brand Name	Motorola (Cabletech)	Model Name	SC18C37155
USB Cable 1 (Brazil local build)	Brand Name	Motorola (I SHENG)	Model Name	SC18C79240
USB Cable 2	Brand Name	Motorola (Luxshare)	Model Name	SC18C37156
USB Cable 3	Brand Name	Motorola (Saibao)	Model Name	SC18C37157



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 (Z 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



Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122 [#]	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138 [#]	5690	144	5720
	142*	5710		

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 + BT Link + WLAN Link(5G) + Earphone 2+ USB Cable 2(Charging from Adapter 2)
Remark: For Radiated Test Cases, The tests were performance with Adapter 1, Earphone 1 and USB Cable 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
Straddle		-	-	144

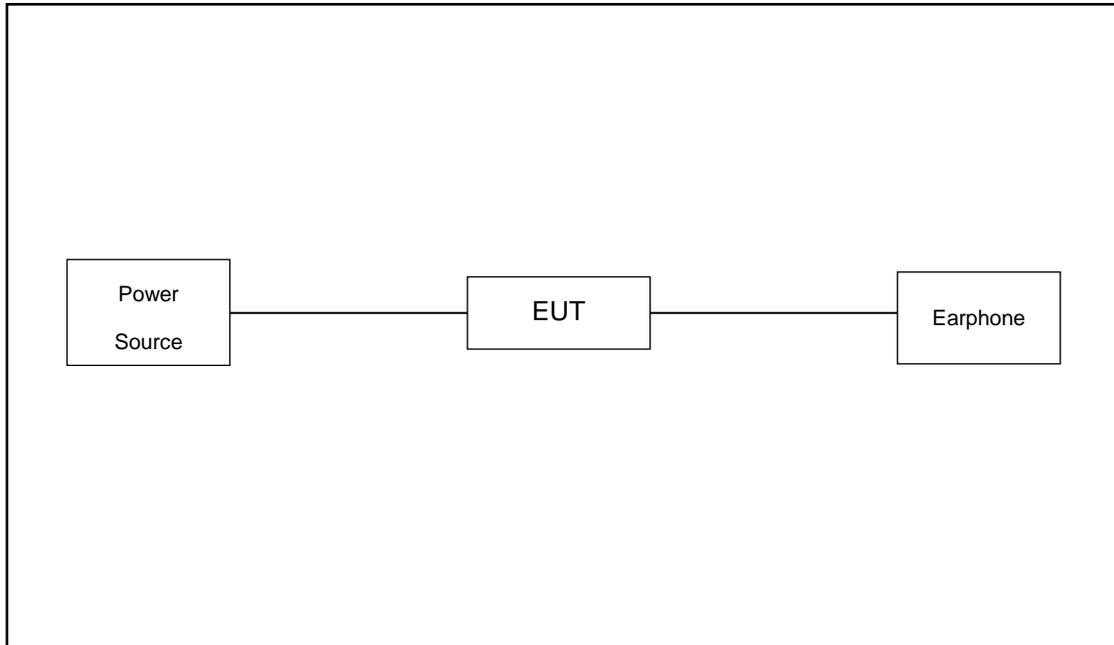
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

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
Straddle		-	-	142

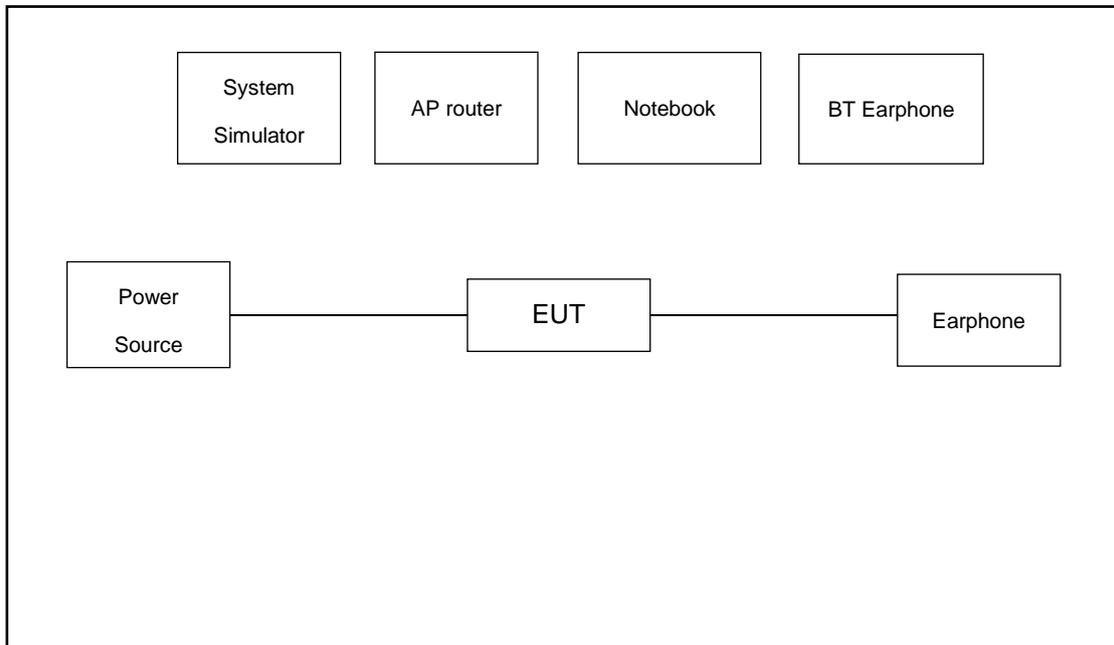
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-
Straddle		-	-	138

2.3. Connection Diagram of Test System

For Radiation



For Conduction





2.4. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
3.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded, 1.8m
4.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
5.	SD Card	Kingston	8GB	N/A	N/A	N/A

2.5. EUT Operation Test Setup

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

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

2.6. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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 7.4 dB.

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\
 &= 7.4 \text{ (dB)}
 \end{aligned}$$

3 Test Result

2.7. 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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

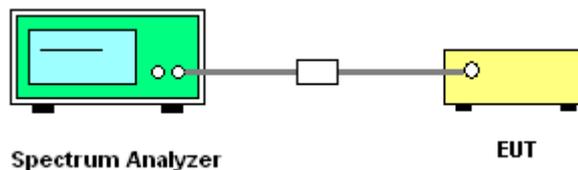
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

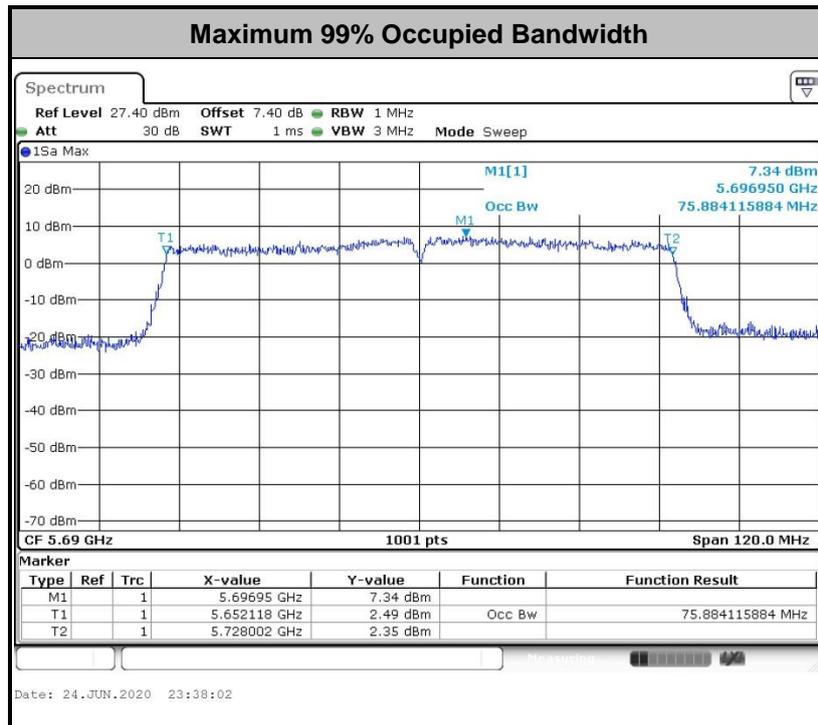
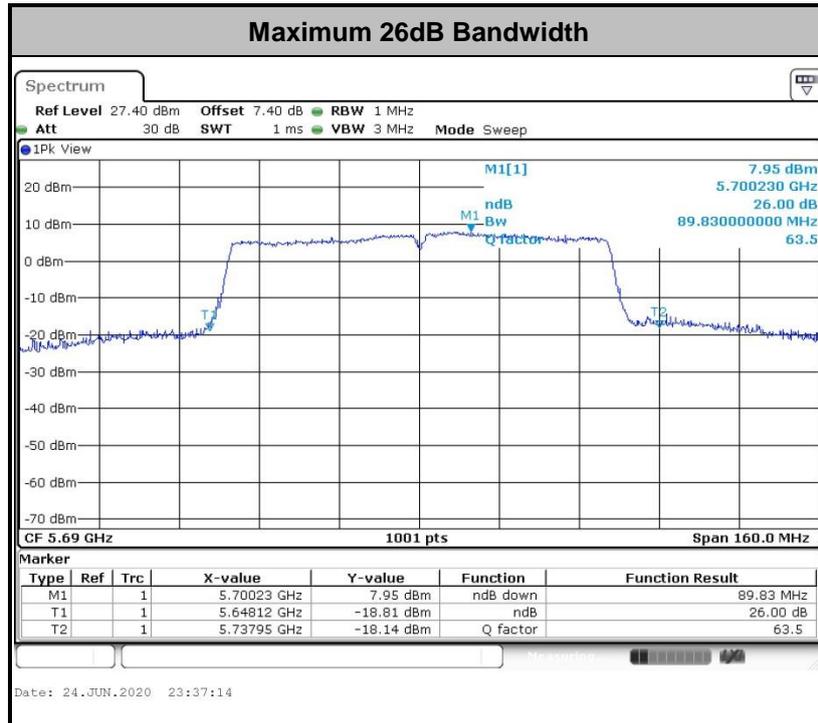
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB 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.



2.8. Maximum Conducted Output Power Measurement

3.1.6 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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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.

3.1.7 Measuring Instruments

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

3.1.8 Test Procedures

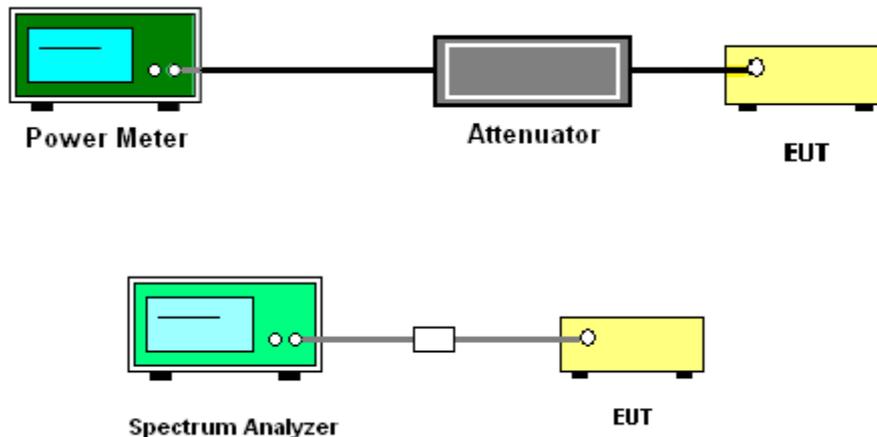
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.1.9 Test Setup



3.1.10 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



2.9. Power Spectral Density Measurement

3.1.11 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.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

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

3.1.12 Measuring Instruments

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

3.1.13 Test Procedures

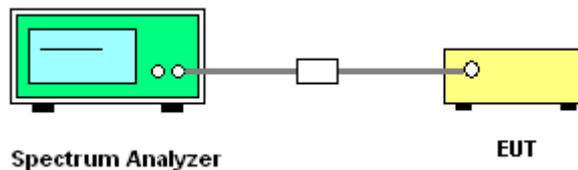
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section F) Maximum power spectral density.

Method SA-2

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

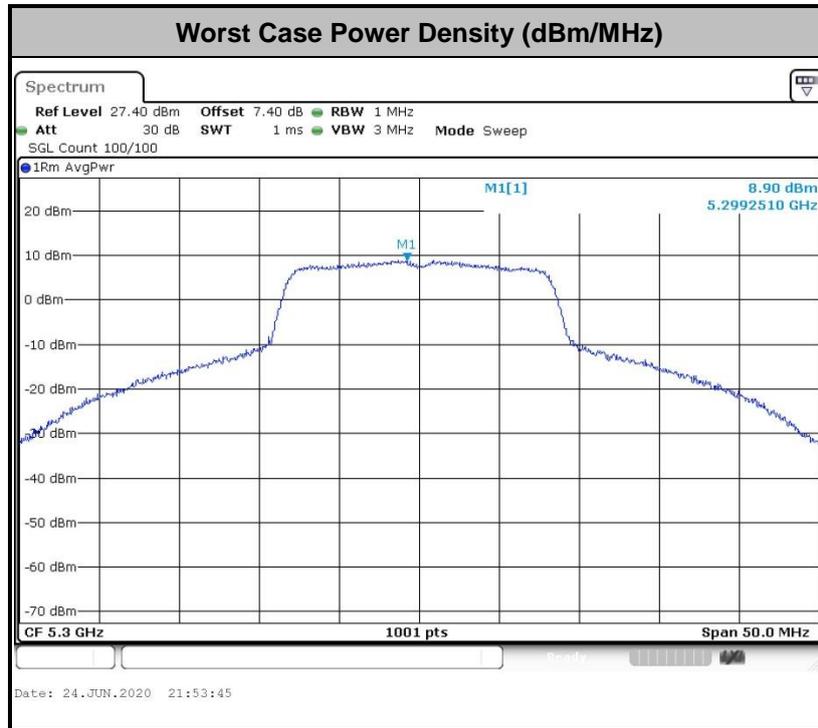
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add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

3.1.14 Test Setup



3.1.15 Test Result of Power Spectral Density

Please refer to Appendix A.



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



2.10. Unwanted Emissions Measurement

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

3.1.16 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

3.1.17 Measuring Instruments

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

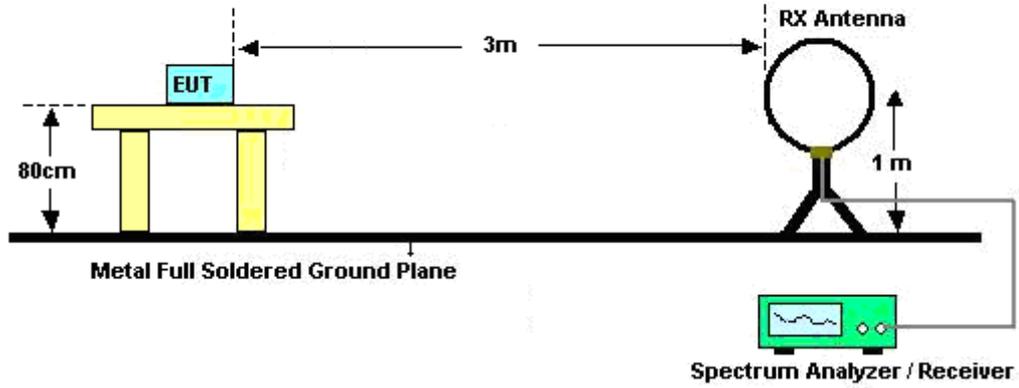


3.1.18 Test Procedures

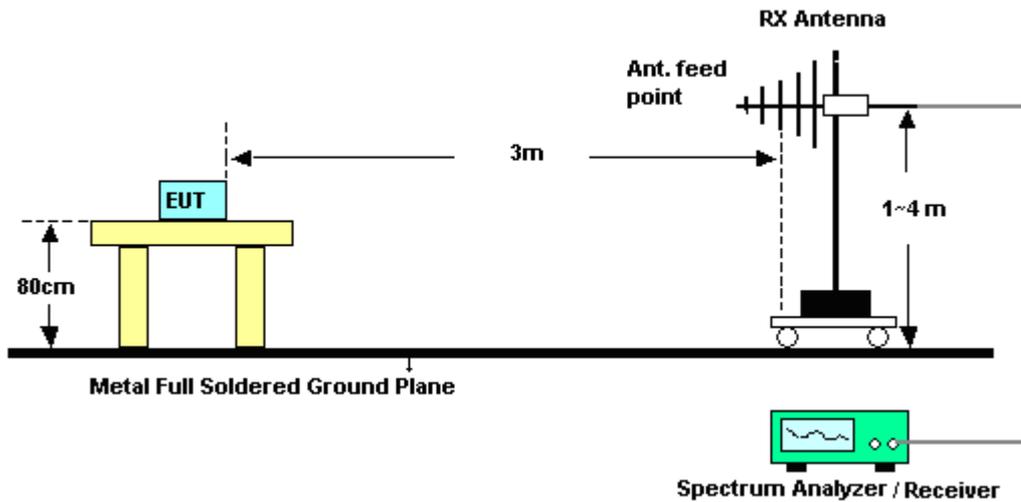
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak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

3.1.19 Test Setup

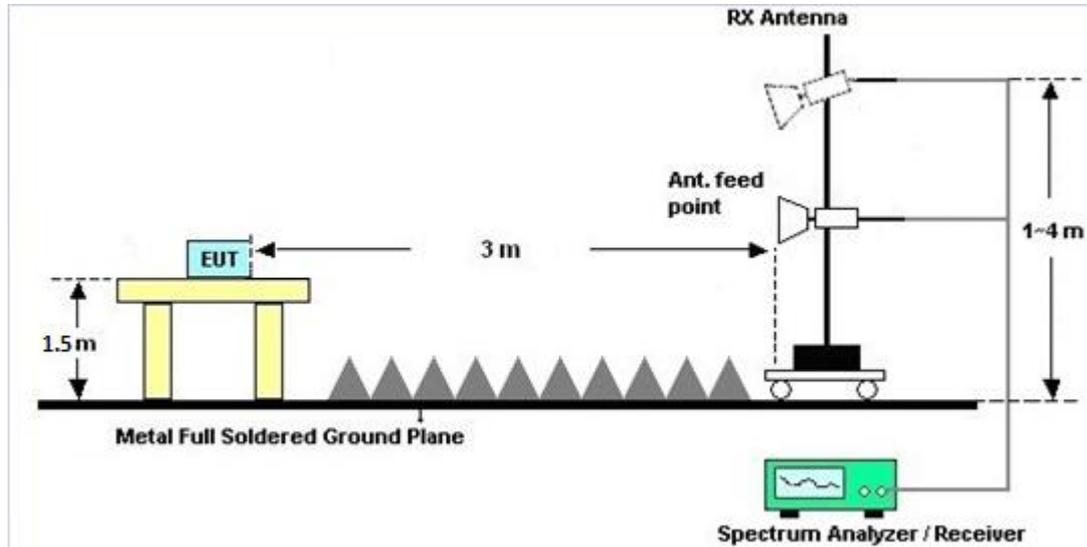
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.20 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.

3.1.21 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.1.22 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.



2.11. AC Conducted Emission Measurement

3.1.24 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.

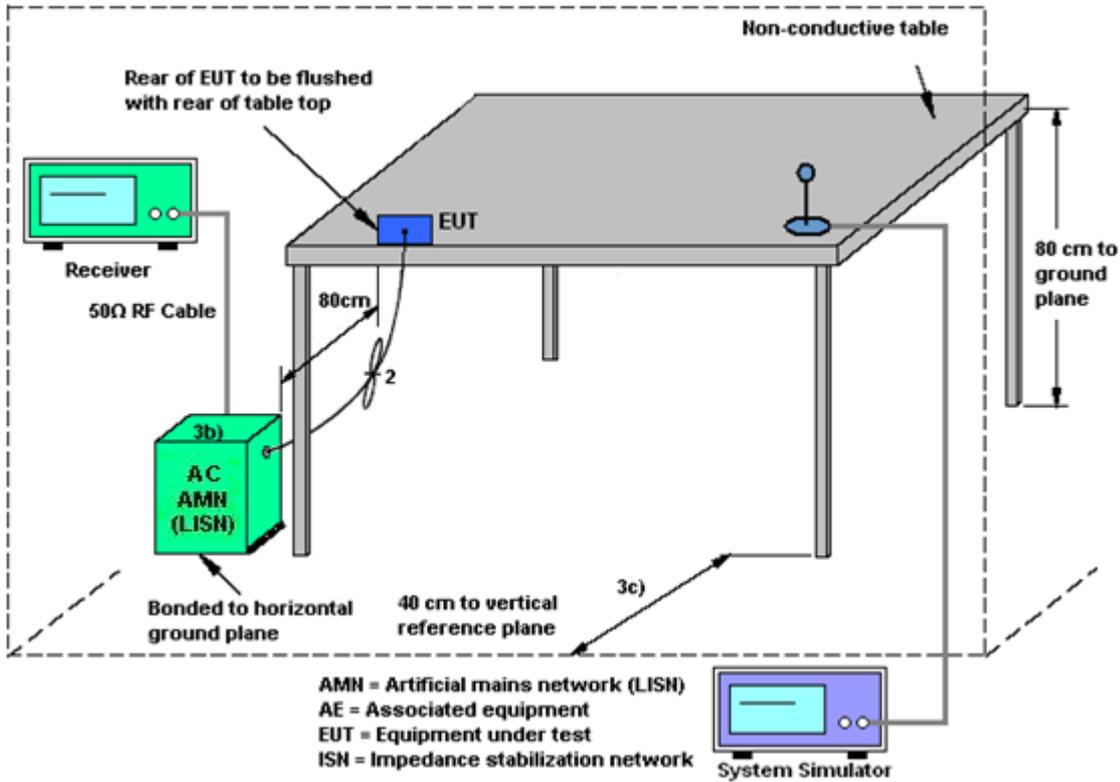
3.1.25 Measuring Instruments

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

3.1.26 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.

3.1.27 Test Setup



3.1.28 Test Result of AC Conducted Emission

Please refer to Appendix B.



2.12. Automatically Discontinue Transmission

3.1.29 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.

3.1.30 Measuring Instruments

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

3.1.31 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.



2.13. Antenna Requirements

3.1.32 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.

3.1.33 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.1.34 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 02, 2019	Jun. 24, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 15, 2020	Jun. 24, 2020	Jan. 14, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Jun. 24, 2020	Jan. 07, 2021	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 18, 2019	Jul. 21, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct.18, 2019	Jul. 21, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Jul. 21, 2020	Nov. 9, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 30, 2019	Jul. 21, 2020	Dec. 29, 2020	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 10, 2019	Jul. 21, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	100MHz~18GHz	Aug.14, 2019	Jul. 21, 2020	Aug.13, 2020	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Jul. 21, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Aug. 06, 2019	Jul. 21, 2020	Aug. 05, 2020	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 18, 2019	Jul. 21, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 08, 2020	Jul. 21, 2020	Jan. 07, 2021	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002 473	N/A	NCR	Jul. 21, 2020	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 21, 2020	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 21, 2020	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 14, 2020	Jun. 20, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Jun. 20, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Jun. 20, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Jun. 20, 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
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

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

Test Engineer:	Asa Cheng	Temperature:	21~25	°C
Test Date:	2020/6/24	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	17.38	22.73	-	22.40		
11a	6Mbps	1	44	5220	22.38	37.06	-	23.01		
11a	6Mbps	1	48	5240	19.68	32.82	-	22.94		
HT20	MCS0	1	36	5180	18.68	23.98	-	22.71		
HT20	MCS0	1	44	5220	22.63	40.01	-	23.01		
HT20	MCS0	1	48	5240	19.83	30.37	-	22.97		
HT40	MCS0	1	38	5190	36.36	41.54	-	23.01		
HT40	MCS0	1	46	5230	37.36	43.79	-	23.01		
VHT80	MCS0	1	42	5210	75.64	82.80	-	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	98.28	17.96	24.00	-4.00		Pass
11a	6Mbps	1	44	5220	98.28	19.26	24.00	-4.00		Pass
11a	6Mbps	1	48	5240	98.28	18.93	24.00	-4.00		Pass
HT20	MCS0	1	36	5180	98.16	17.02	24.00	-4.00		Pass
HT20	MCS0	1	44	5220	98.16	19.49	24.00	-4.00		Pass
HT20	MCS0	1	48	5240	98.16	19.20	24.00	-4.00		Pass
HT40	MCS0	1	38	5190	96.03	12.96	24.00	-4.00		Pass
HT40	MCS0	1	46	5230	96.03	18.09	24.00	-4.00		Pass
VHT20	MCS0	1	36	5180	98.01	16.19	24.00	-4.00		Pass
VHT20	MCS0	1	44	5220	98.01	15.94	24.00	-4.00		Pass
VHT20	MCS0	1	48	5240	98.01	15.90	24.00	-4.00		Pass
VHT40	MCS0	1	38	5190	96.50	12.86	24.00	-4.00		Pass
VHT40	MCS0	1	46	5230	96.50	15.93	24.00	-4.00		Pass
VHT80	MCS0	1	42	5210	91.00	12.17	24.00	-4.00		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I										
Mod.	Data Rate	NTX	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	0.08	7.01	11.00	-4.00		Pass
11a	6Mbps	1	44	5220	0.08	8.50	11.00	-4.00		Pass
11a	6Mbps	1	48	5240	0.08	8.78	11.00	-4.00		Pass
HT20	MCS0	1	36	5180	0.08	6.55	11.00	-4.00		Pass
HT20	MCS0	1	44	5220	0.08	8.52	11.00	-4.00		Pass
HT20	MCS0	1	48	5240	0.08	8.63	11.00	-4.00		Pass
HT40	MCS0	1	38	5190	0.18	-0.69	11.00	-4.00		Pass
HT40	MCS0	1	46	5230	0.18	3.70	11.00	-4.00		Pass
VHT80	MCS0	1	42	5210	0.41	-4.58	11.00	-4.00		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band II											
Mod.	Data Rate	NTX	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	21.68	37.51	23.98	30.00	23.98		
11a	6M bps	1	60	5300	21.78	37.81	23.98	30.00	23.98		
11a	6M bps	1	64	5320	18.13	27.62	23.58	29.58	23.98		
HT20	MCS 0	1	52	5260	18.68	40.56	23.71	29.71	23.98		
HT20	MCS 0	1	60	5300	22.58	40.71	23.98	30.00	23.98		
HT20	MCS 0	1	64	5320	21.82	30.92	23.98	30.00	23.98		
HT40	MCS 0	1	54	5270	37.76	68.24	23.98	30.00	23.98		
HT40	MCS 0	1	62	5310	36.56	41.44	23.98	30.00	23.98		
VHT80	MCS 0	1	58	5290	75.64	82.48	23.98	30.00	23.98		

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	NTX	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	98.28	19.25	23.98	-4.00	26.99	Pass
11a	6M bps	1	60	5300	98.28	19.36	23.98	-4.00	26.99	Pass
11a	6M bps	1	64	5320	98.28	17.75	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	52	5260	98.16	19.15	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	60	5300	98.16	19.26	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	64	5320	98.16	17.62	23.98	-4.00	26.99	Pass
HT40	MCS 0	1	54	5270	96.03	18.34	23.98	-4.00	26.99	Pass
HT40	MCS 0	1	62	5310	96.03	15.62	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	52	5260	98.01	15.73	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	60	5300	98.01	15.81	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	64	5320	98.01	15.87	23.98	-4.00	26.99	Pass
VHT40	MCS 0	1	54	5270	96.50	15.72	23.98	-4.00	26.99	Pass
VHT40	MCS 0	1	62	5310	96.50	15.77	23.98	-4.00	26.99	Pass
VHT80	MCS 0	1	58	5290	91.00	14.47	23.98	-4.00	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

Band II										
Mod.	Data Rate	NTX	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	0.08	8.88	11.00	-4.00		Pass
11a	6M bps	1	60	5300	0.08	8.98	11.00	-4.00		Pass
11a	6M bps	1	64	5320	0.08	6.90	11.00	-4.00		Pass
HT20	MCS 0	1	52	5260	0.08	8.74	11.00	-4.00		Pass
HT20	MCS 0	1	60	5300	0.08	8.52	11.00	-4.00		Pass
HT20	MCS 0	1	64	5320	0.08	6.83	11.00	-4.00		Pass
HT40	MCS 0	1	54	5270	0.18	3.09	11.00	-4.00		Pass
HT40	MCS 0	1	62	5310	0.18	1.96	11.00	-4.00		Pass
VHT80	MCS 0	1	58	5290	0.41	-2.14	11.00	-4.00		Pass

TEST RESULTS DATA
26dB and 99% OBW

Band III											
Mod.	Data Rate	NTX	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	23.18	40.26	23.98	30.00	23.98		
11a	6M bps	1	116	5580	22.13	38.81	23.98	30.00	23.98		
11a	6M bps	1	140	5700	17.98	27.92	23.55	29.55	23.98		
11a	6Mbps	1	144	5720	23.43	40.61	23.98	30.00	23.98		
HT20	MCS 0	1	100	5500	24.03	41.96	23.98	30.00	23.98		
HT20	MCS 0	1	116	5580	23.08	42.86	23.98	30.00	23.98		
HT20	MCS 0	1	140	5700	19.18	28.82	23.83	29.83	23.98		
HT20	MCS0	1	144	5720	23.93	42.01	23.98	30.00	23.98		
HT40	MCS 0	1	102	5510	36.56	41.81	23.98	30.00	23.98		
HT40	MCS 0	1	110	5550	43.86	80.11	23.98	30.00	23.98		
HT40	MCS 0	1	134	5670	36.56	42.62	23.98	30.00	23.98		
HT40	MCS0	1	142	5710	46.65	78.13	23.98	30.00	23.98		
VHT80	MCS 0	1	106	5530	75.64	82.96	23.98	30.00	23.98		
VHT80	MCS 0	1	122	5610	75.76	83.92	23.98	30.00	23.98		
VHT80	MCS0	1	138	5690	75.88	89.83	23.98	30.00	23.98		

TEST RESULTS DATA
Average Power Table

FCC Band III										
Mod.	Data Rate	NTX	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	98.28	18.83	23.98	-4.00	26.99	Pass
11a	6M bps	1	116	5580	98.28	18.70	23.98	-4.00	26.99	Pass
11a	6M bps	1	140	5700	98.28	18.35	23.98	-4.00	26.99	Pass
11a	6Mbps	1	144	5720	98.28	19.33	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	100	5500	98.16	18.72	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	116	5580	98.16	18.62	23.98	-4.00	26.99	Pass
HT20	MCS 0	1	140	5700	98.16	18.46	23.98	-4.00	26.99	Pass
HT20	MCS0	1	144	5720	98.16	19.35	23.98	-4.00	26.99	Pass
HT40	MCS 0	1	102	5510	96.03	16.34	23.98	-4.00	26.99	Pass
HT40	MCS 0	1	110	5550	96.03	18.44	23.98	-4.00	26.99	Pass
HT40	MCS 0	1	134	5670	96.03	17.72	23.98	-4.00	26.99	Pass
HT40	MCS0	1	142	5710	96.03	19.50	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	100	5500	98.01	15.99	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	116	5580	98.01	15.64	23.98	-4.00	26.99	Pass
VHT20	MCS 0	1	140	5700	98.01	16.83	23.98	-4.00	26.99	Pass
VHT20	MCS0	1	144	5720	98.01	16.98	23.98	-4.00	26.99	Pass
VHT40	MCS 0	1	102	5510	96.50	15.88	23.98	-4.00	26.99	Pass
VHT40	MCS 0	1	110	5550	96.50	16.06	23.98	-4.00	26.99	Pass
VHT40	MCS 0	1	134	5670	96.50	16.27	23.98	-4.00	26.99	Pass
VHT40	MCS0	1	142	5710	96.50	16.82	23.98	-4.00	26.99	Pass
VHT80	MCS 0	1	106	5530	91.00	12.94	23.98	-4.00	26.99	Pass
VHT80	MCS 0	1	122	5610	91.00	15.91	23.98	-4.00	26.99	Pass
VHT80	MCS0	1	138	5690	91.00	16.46	23.98	-4.00	26.99	Pass

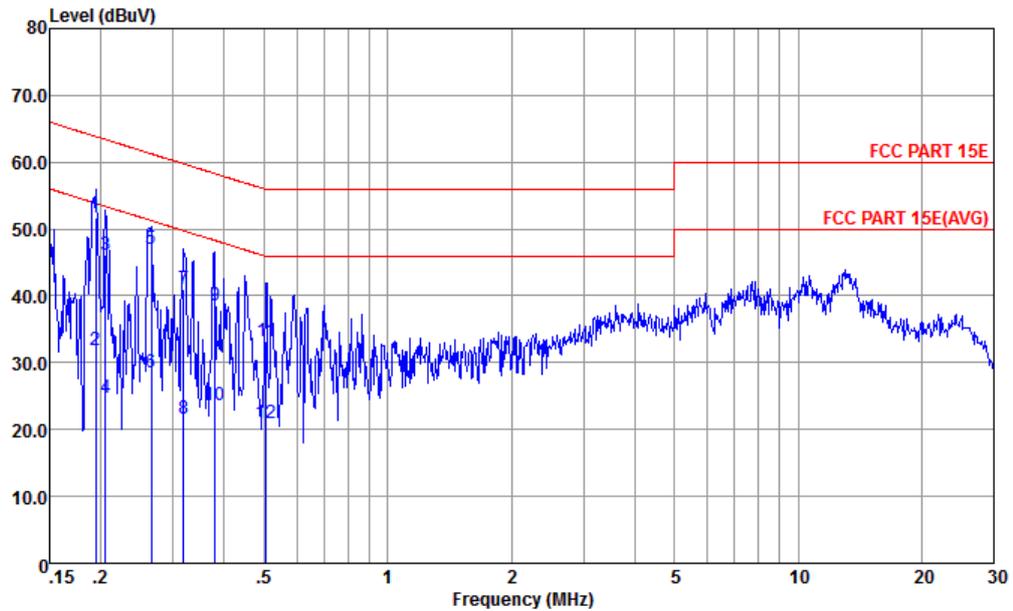
TEST RESULTS DATA
Power Spectral Density

Band III										
Mod.	Data Rate	NTX	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	0.08	7.99	11.00	-4.00		Pass
11a	6M bps	1	116	5580	0.08	7.88	11.00	-4.00		Pass
11a	6M bps	1	140	5700	0.08	7.69	11.00	-4.00		Pass
11a	6Mbps	1	144	5720	0.08	8.87	11.00	-4.00		Pass
HT20	MCS 0	1	100	5500	0.08	7.66	11.00	-4.00		Pass
HT20	MCS 0	1	116	5580	0.08	7.34	11.00	-4.00		Pass
HT20	MCS 0	1	140	5700	0.08	7.98	11.00	-4.00		Pass
HT20	MCS0	1	144	5720	0.08	8.56	11.00	-4.00		Pass
HT40	MCS 0	1	102	5510	0.18	2.69	11.00	-4.00		Pass
HT40	MCS 0	1	110	5550	0.18	5.26	11.00	-4.00		Pass
HT40	MCS 0	1	134	5670	0.18	3.77	11.00	-4.00		Pass
HT40	MCS0	1	142	5710	0.18	5.80	11.00	-4.00		Pass
VHT80	MCS 0	1	106	5530	0.41	-3.71	11.00	-4.00		Pass
VHT80	MCS 0	1	122	5690	0.41	-0.59	11.00	-4.00		Pass
VHT80	MCS0	1	138	5690	0.41	0.08	11.00	-4.00		Pass



Appendix B. AC Conducted Emission Test Results

Test Engineer :	Amos Zhang	Temperature :	24.2~25.6°C
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



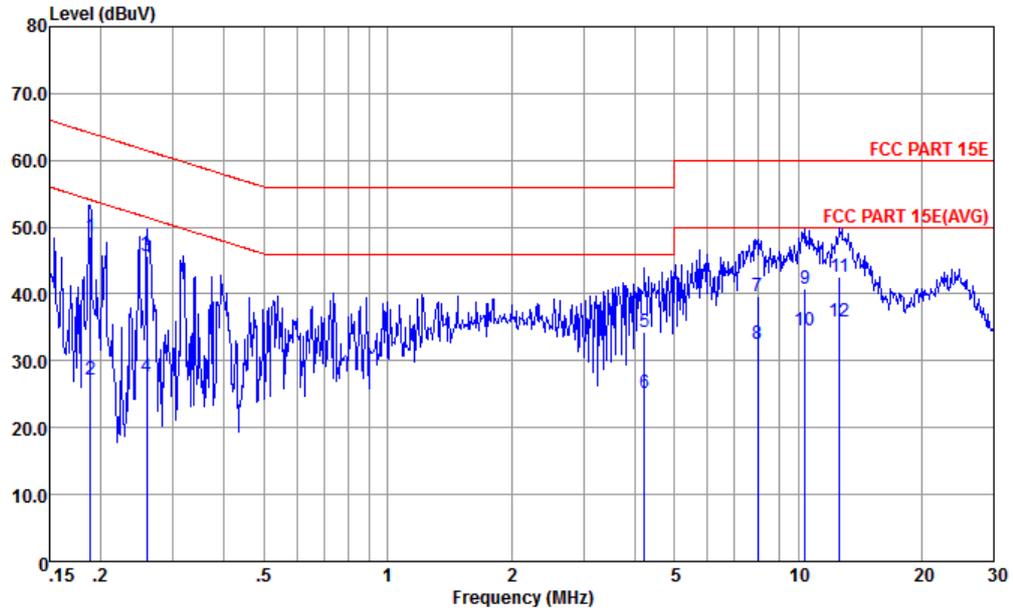
Site : CO01-KS
 Condition : FCC PART 15E LISN-L-191028-CN02 LINE

: 355536110028457/355536110028465 #6

	Freq	Level	Over Limit	Limit	Read	LISN	Cable	Remark
	MHz	dBuV		dB	dBuV	dB	dB	
1 *	0.194	51.66	-12.18	63.84	41.20	0.09	10.37	QP
2	0.194	31.96	-21.88	53.84	21.50	0.09	10.37	Average
3	0.205	46.05	-17.35	63.40	35.60	0.09	10.36	QP
4	0.205	24.65	-28.75	53.40	14.20	0.09	10.36	Average
5	0.266	47.03	-14.22	61.25	36.61	0.10	10.32	QP
6	0.266	28.63	-22.62	51.25	18.21	0.10	10.32	Average
7	0.318	41.01	-18.74	59.75	30.60	0.11	10.30	QP
8	0.318	21.71	-28.04	49.75	11.30	0.11	10.30	Average
9	0.379	38.59	-19.71	58.30	28.20	0.12	10.27	QP
10	0.379	23.69	-24.61	48.30	13.30	0.12	10.27	Average
11	0.505	33.27	-22.73	56.00	22.90	0.13	10.24	QP
12	0.505	20.97	-25.03	46.00	10.60	0.13	10.24	Average



Test Engineer :	Amos Zhang	Temperature :	24.2~25.6°C
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
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

: 355536110028457/355536110028465 #6

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	Remark
1	0.188	48.65	-15.46	64.11	38.10	0.16	10.39	QP
2	0.188	27.15	-26.96	54.11	16.60	0.16	10.39	Average
3	0.259	45.61	-15.86	61.47	35.10	0.18	10.33	QP
4	0.259	27.71	-23.76	51.47	17.20	0.18	10.33	Average
5	4.224	34.33	-21.67	56.00	23.30	0.77	10.26	QP
6	4.224	25.23	-20.77	46.00	14.20	0.77	10.26	Average
7	7.977	39.58	-20.42	60.00	28.20	1.06	10.32	QP
8	7.977	32.58	-17.42	50.00	21.20	1.06	10.32	Average
9	10.397	40.81	-19.19	60.00	29.20	1.26	10.35	QP
10	10.397	34.51	-15.49	50.00	22.90	1.26	10.35	Average
11	12.649	42.50	-17.50	60.00	30.50	1.63	10.37	QP
12 *	12.649	35.90	-14.10	50.00	23.90	1.63	10.37	Average

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

15E 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.	
1		(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5127.52	57.77	-16.23	74	43.27	34.05	11.05	30.6	102	141	P	H
		5149.28	46.26	-7.74	54	31.74	34.07	11.06	30.61	102	141	A	H
	*	5176	100.97	-	-	86.4	34.12	11.07	30.62	102	141	P	H
		5176	93.8	-	-	79.23	34.12	11.07	30.62	102	141	A	H
		5147.84	60.37	-13.63	74	45.85	34.07	11.06	30.61	217	181	P	V
		5149.92	49.03	-4.97	54	34.51	34.07	11.06	30.61	217	181	A	V
	*	5176	109.91	-	-	95.34	34.12	11.07	30.62	217	181	P	V
		5176	102.91	-	-	88.34	34.12	11.07	30.62	217	181	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



15E band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 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 36		10360	47.09	-21.21	68.3	55.48	37.02	15.27	60.68	100	360	P	H
5180MHz		10360	47.62	-20.68	68.3	56.01	37.02	15.27	60.68	100	360	P	V
802.11a CH 44		10440	48.25	-20.05	68.3	56.53	37.06	15.32	60.66	100	360	P	H
5220MHz		10440	50.45	-17.85	68.3	58.73	37.06	15.32	60.66	100	360	P	V
802.11a CH 48		10480	47.21	-21.09	68.3	55.41	37.09	15.36	60.65	100	360	P	H
5240MHz		10480	51.88	-16.42	68.3	60.08	37.09	15.36	60.65	100	360	P	V

Remark

- No other spurious found.
- All results are PASS against Peak and Average limit line.



15E band 1 5150~5250MHz
WIFI 802.11n HT20 (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 802.11n HT20 CH 36 5180MHz and a Remark section.



15E band 1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains test results for three channels (CH 36, CH 44, CH 48) and a Remark section.



**15E band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 38 5190MHz		5148	56.87	-17.13	74	42.35	34.07	11.06	30.61	107	136	P	H
		5148.8	47.24	-6.76	54	32.72	34.07	11.06	30.61	107	136	A	H
	*	5188	94.18	-	-	79.61	34.12	11.07	30.62	107	136	P	H
		5188	86.87	-	-	72.3	34.12	11.07	30.62	107	136	A	H
		5376.6	54.51	-19.49	74	39.61	34.35	11.24	30.69	107	136	P	H
		5353.02	45.12	-8.88	54	30.25	34.33	11.22	30.68	107	136	A	H
		5147.2	60.59	-13.41	74	46.07	34.07	11.06	30.61	100	182	P	V
		5149.98	50.29	-3.71	54	35.77	34.07	11.06	30.61	100	182	A	V
	*	5188	102.44	-	-	87.87	34.12	11.07	30.62	100	182	P	V
		5188	95.21	-	-	80.64	34.12	11.07	30.62	100	182	A	V
		5394.24	55.06	-18.94	74	40.11	34.38	11.26	30.69	100	182	P	V
	5370.84	44.95	-9.05	54	30.05	34.35	11.24	30.69	100	182	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains test results for 802.11n HT40 channels 38 and 46 at frequencies 10378.38 MHz and 10458.46 MHz.



**15E band 1 5150~5250MHz
WIFI 802.11ac VHT80 (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)
802.11ac VHT80 CH 42 5210MHz		5136.8	57.02	-16.98	74	42.53	34.05	11.05	30.61	100	137	P	H
		5142.56	47.73	-6.27	54	33.21	34.07	11.06	30.61	100	137	A	H
	*	5206	89.93	-	-	75.34	34.14	11.08	30.63	100	137	P	H
		5206	83	-	-	68.41	34.14	11.08	30.63	100	137	A	H
		5383.26	54.44	-19.56	74	39.49	34.38	11.26	30.69	100	137	P	H
		5387.22	45.36	-8.64	54	30.41	34.38	11.26	30.69	100	137	A	H
		5149.76	59.87	-14.13	74	45.35	34.07	11.06	30.61	100	179	P	V
		5147.2	50.95	-3.05	54	36.43	34.07	11.06	30.61	100	179	A	V
	*	5200	98.87	-	-	84.28	34.14	11.08	30.63	100	179	P	V
		5200	90.69	-	-	76.1	34.14	11.08	30.63	100	179	A	V
		5395.68	54.05	-19.95	74	39.07	34.4	11.27	30.69	100	179	P	V
	5362.02	45.47	-8.53	54	30.57	34.35	11.24	30.69	100	179	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 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)
802.11ac VHT80		10420	40.89	-27.41	68.3	49.2	37.05	15.31	60.67	100	360	P	H
CH 42 5210MHz		10420	41.21	-27.09	68.3	49.52	37.05	15.31	60.67	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 2 - 5250~5350MHz

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 64 5320MHz		5351	56.44	-17.56	74	41.57	34.33	11.22	30.68	100	117	P	H
		5350.1	45.91	-8.09	54	31.04	34.33	11.22	30.68	100	117	A	H
	*	5314	101.78	-	-	86.97	34.29	11.19	30.67	100	117	P	H
		5314	94.85	-	-	80.04	34.29	11.19	30.67	100	117	A	H
		5352	58.22	-15.78	74	43.35	34.33	11.22	30.68	282	6	P	V
		5350	48.6	-5.4	54	33.73	34.33	11.22	30.68	282	6	A	V
	*	5320	109	-	-	94.19	34.29	11.19	30.67	282	6	P	V
		5320	101.12	-	-	86.31	34.29	11.19	30.67	282	6	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 2 5250~5350MHz

WIFI 802.11a (Harmonic @ 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		10520	49.16	-19.14	68.3	57.31	37.11	15.39	60.65	100	360	P	H
CH 52 5260MHz		10520	52.75	-15.55	68.3	60.9	37.11	15.39	60.65	100	360	P	V
802.11a		10600	54.92	-19.08	74	62.94	37.16	15.45	60.63	260	173	P	H
CH 60		10600	45.3	-8.7	54	53.32	37.16	15.45	60.63	260	173	A	H
5300MHz		10600	52.54	-21.46	74	60.56	37.16	15.45	60.63	107	213	P	V
		10600	43.09	-10.91	54	51.11	37.16	15.45	60.63	107	213	A	V
802.11a		10640	54.37	-19.63	74	62.33	37.18	15.48	60.62	100	352	P	H
CH 64		10640	44.45	-9.55	54	52.41	37.18	15.48	60.62	100	352	A	H
5320MHz		10640	50.24	-23.76	74	58.2	37.18	15.48	60.62	100	299	P	V
		10640	41.43	-12.57	54	49.39	37.18	15.48	60.62	100	299	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 2 5250~5350MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains multiple rows of test data for 802.11n HT20 CH 64 5320MHz.

Remark
1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



**15E band 2 5250~5350MHz
WIFI 802.11n HT20 (Harmonic @ 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 HT20 CH 52 5260MHz		10520	54.64	-13.66	68.3	62.79	37.11	15.39	60.65	300	0	P	H
		10520	50.52	-17.78	68.3	58.67	37.11	15.39	60.65	300	0	P	V
802.11n HT20 CH 60 5300MHz		10600	54.64	-19.36	74	62.66	37.16	15.45	60.63	100	30	P	H
		10600	44.74	-9.26	54	52.76	37.16	15.45	60.63	100	30	A	H
		10600	52.28	-21.72	74	60.3	37.16	15.45	60.63	100	300	P	V
		10600	41.83	-12.17	54	49.85	37.16	15.45	60.63	100	300	A	V
802.11n HT20 CH 64 5320MHz		10638.63	53.93	-20.07	74	61.89	37.18	15.48	60.62	100	18	P	H
		10638.63	43.49	-10.51	54	51.45	37.18	15.48	60.62	100	18	A	H
		10638.63	49.28	-24.72	74	57.24	37.18	15.48	60.62	100	299	P	V
		10638.63	40.09	-13.91	54	48.05	37.18	15.48	60.62	100	299	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**15E band 2 5250~5350MHz
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 62 5310MHz		5115.84	57	-17	74	42.52	34.03	11.05	30.6	100	114	P	H
		5120.32	46.87	-7.13	54	32.39	34.03	11.05	30.6	100	114	A	H
	*	5308	98.08	-	-	83.3	34.27	11.18	30.67	100	114	P	H
		5308	90.19	-	-	75.41	34.27	11.18	30.67	100	114	A	H
		5350.8	56.36	-17.64	74	41.49	34.33	11.22	30.68	100	114	P	H
		5350.2	47.3	-6.7	54	32.43	34.33	11.22	30.68	100	114	A	H
		5149.12	57.05	-16.95	74	42.53	34.07	11.06	30.61	101	173	P	V
		5109.44	46.92	-7.08	54	32.44	34.03	11.05	30.6	101	173	A	V
	*	5308	103.27	-	-	88.49	34.27	11.18	30.67	101	173	P	V
		5308	96.06	-	-	81.28	34.27	11.18	30.67	101	173	A	V
		5350	60.84	-13.16	74	45.97	34.33	11.22	30.68	101	173	P	V
	5350.3	50.33	-3.67	54	35.46	34.33	11.22	30.68	101	173	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 2 5250~5350MHz
WIFI 802.11n HT40 (Harmonic @ 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 CH 54 5270MHz		10538.54	42.42	-25.88	68.3	50.54	37.12	15.4	60.64	100	360	P	H
		10538.54	41.64	-26.66	68.3	49.76	37.12	15.4	60.64	100	360	P	V
802.11n HT40 CH 62 5310MHz		10618.62	42.56	-31.44	74	50.54	37.17	15.47	60.62	100	360	P	H
		10618.62	42.92	-31.08	74	50.9	37.17	15.47	60.62	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 2 5250~5350MHz
WIFI 802.11ac VHT80 (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 802.11ac VHT80 CH 58 5290MHz and a Remark section.



15E band 2 5250~5350MHz

WIFI 802.11ac VHT80 (Harmonic @ 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)
802.11ac VHT80		10580	42.75	-25.55	68.3	50.79	37.15	15.44	60.63	100	360	P	H
CH 58 5290MHz		10580	42.57	-25.73	68.3	50.61	37.15	15.44	60.63	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E 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		5457.84	55.16	-18.84	74	40.13	34.46	11.29	30.72	100	114	P	H
		5469.52	57.41	-10.89	68.3	42.35	34.48	11.3	30.72	100	114	P	H
		5459.98	46.1	-7.9	54	31.07	34.46	11.29	30.72	100	114	A	H
	*	5500	103.94	-	-	88.83	34.53	11.31	30.73	100	114	P	H
		5500	96.55	-	-	81.44	34.53	11.31	30.73	100	114	A	H
		5458.8	58.14	-15.86	74	43.11	34.46	11.29	30.72	110	174	P	V
		5469.36	61.76	-6.54	68.3	46.7	34.48	11.3	30.72	110	174	P	V
		5459.98	48.88	-5.12	54	33.85	34.46	11.29	30.72	110	174	A	V
	*	5500	107.94	-	-	92.83	34.53	11.31	30.73	110	174	P	V
		5500	101.36	-	-	86.25	34.53	11.31	30.73	110	174	A	V
802.11a CH 140 5700MHz		5725.96	62.79	-5.51	68.3	47.19	34.78	11.64	30.82	100	116	P	H
	*	5704	108.33	-	-	92.78	34.76	11.6	30.81	100	116	P	H
		5704	100.76	-	-	85.21	34.76	11.6	30.81	100	116	A	H
		5725.72	62.47	-5.83	68.3	46.87	34.78	11.64	30.82	100	180	P	V
	*	5704	108.44	-	-	92.89	34.76	11.6	30.81	100	180	P	V
		5704	100.96	-	-	85.41	34.76	11.6	30.81	100	180	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 - 5470~5725MHz

WIFI 802.11a (Harmonic @ 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		11000	45.64	-28.36	74	53.02	37.4	15.76	60.54	300	0	P	H
5500MHz		11000	43.61	-30.39	74	50.99	37.4	15.76	60.54	300	0	P	V
802.11a CH 116		11160	45.19	-28.81	74	52.31	37.5	15.88	60.5	300	0	P	H
5580MHz		11160	44.25	-29.75	74	51.37	37.5	15.88	60.5	300	0	P	V
802.11a CH 140		11400	42.92	-31.08	74	49.68	37.64	16.05	60.45	300	0	P	H
5700MHz		11400	42.57	-31.43	74	49.33	37.64	16.05	60.45	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**15E band 3 - 5470~5725MHz
WIFI 802.11n HT20 (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)
802.11n HT20 CH 100 5500MHz		5458.16	55.61	-18.39	74	40.58	34.46	11.29	30.72	100	113	P	H
		5469.84	57.09	-11.21	68.3	42.03	34.48	11.3	30.72	100	113	P	H
		5459.92	46.12	-7.88	54	31.09	34.46	11.29	30.72	100	113	A	H
	*	5500	104.01	-	-	88.9	34.53	11.31	30.73	100	113	P	H
		5500	96.36	-	-	81.25	34.53	11.31	30.73	100	113	A	H
		5457.84	57.2	-16.8	74	42.17	34.46	11.29	30.72	107	174	P	V
		5469.04	61.3	-7	68.3	46.24	34.48	11.3	30.72	107	174	P	V
		5459.98	48.57	-5.43	54	33.54	34.46	11.29	30.72	107	174	A	V
	*	5500	107.85	-	-	92.74	34.53	11.31	30.73	107	174	P	V
	5500	101.96	-	-	86.85	34.53	11.31	30.73	107	174	A	V	
802.11n HT20 CH 140 5700MHz		5725.48	62.88	-5.42	68.3	47.28	34.78	11.64	30.82	100	117	P	H
	*	5704	108.13	-	-	92.58	34.76	11.6	30.81	100	117	P	H
		5704	99.04	-	-	83.49	34.76	11.6	30.81	100	117	A	H
		5729.32	63.21	-5.09	68.3	47.61	34.78	11.64	30.82	100	181	P	V
	*	5704	108.82	-	-	93.27	34.76	11.6	30.81	100	181	P	V
	5704	100.96	-	-	85.41	34.76	11.6	30.81	100	181	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 - 5470~5725MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains test results for three channels (CH 100, CH 116, CH 140) and a Remark section.



**15E band 3 - 5470~5725MHz
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 102 5510MHz		5459.6	56.06	-17.94	74	41.03	34.46	11.29	30.72	105	117	P	H
		5465.52	59.75	-8.55	68.3	44.69	34.48	11.3	30.72	105	117	P	H
		5459.98	48.13	-5.87	54	33.1	34.46	11.29	30.72	105	117	A	H
	*	5518	99.3	-	-	84.17	34.55	11.32	30.74	105	117	P	H
		5518	91.83	-	-	76.7	34.55	11.32	30.74	105	117	A	H
		5762.52	56.81	-11.49	68.3	41.12	34.81	11.72	30.84	105	117	P	H
		5459.92	60.02	-13.98	74	44.99	34.46	11.29	30.72	124	171	P	V
		5470	63.17	-5.13	68.3	48.11	34.48	11.3	30.72	124	171	P	V
		5459.98	49.74	-4.26	54	34.71	34.46	11.29	30.72	124	171	A	V
	*	5512	102.45	-	-	87.34	34.53	11.31	30.73	124	171	P	V
		5512	95.5	-	-	80.39	34.53	11.31	30.73	124	171	A	V
		5733.16	56.27	-12.03	68.3	40.67	34.78	11.64	30.82	124	171	P	V
802.11n HT40 CH 134 5670MHz		5363.12	54.75	-19.25	74	39.85	34.35	11.24	30.69	100	117	P	H
		5460.4	54.16	-14.14	68.3	39.13	34.46	11.29	30.72	100	117	P	H
		5446.8	46.07	-7.93	54	31.03	34.46	11.29	30.71	100	117	A	H
	*	5674	105.57	-	-	90.12	34.73	11.51	30.79	100	117	P	H
		5674	97.96	-	-	82.51	34.73	11.51	30.79	100	117	A	H
		5726.28	65.01	-3.29	68.3	49.41	34.78	11.64	30.82	100	117	P	H
		5448.88	54.69	-19.31	74	39.65	34.46	11.29	30.71	100	179	P	V
		5463.12	54.25	-14.05	68.3	39.19	34.48	11.3	30.72	100	179	P	V
		5447.6	46.97	-7.03	54	31.93	34.46	11.29	30.71	100	179	A	V
	*	5674	106.59	-	-	91.14	34.73	11.51	30.79	100	179	P	V
		5674	99.04	-	-	83.59	34.73	11.51	30.79	100	179	A	V
		5725.72	65.13	-3.17	68.3	49.53	34.78	11.64	30.82	100	179	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**15E band 3 - 5470~5725MHz
WIFI 802.11n HT40 (Harmonic @ 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 CH 102 5510MHz		11019.02	42.13	-31.87	74	49.48	37.41	15.78	60.54	100	360	P	H
		11019.02	42.59	-31.41	74	49.94	37.41	15.78	60.54	100	360	P	V
802.11n HT40 CH 110 5550MHz		11099.1	44.48	-29.52	74	51.71	37.46	15.83	60.52	100	360	P	H
		11099.1	42.64	-31.36	74	49.87	37.46	15.83	60.52	100	360	P	V
802.11n HT40 CH 134 5670MHz		11339.33	42.64	-31.36	74	49.51	37.6	16	60.47	100	360	P	H
		11339.33	42.34	-31.66	74	49.21	37.6	16	60.47	100	360	P	V
Remark	<p align="center">1. No other spurious found. 2. All results are PASS against Peak and Average limit line.</p>												



**15E band 3 - 5470~5725MHz
WIFI 802.11ac VHT80 (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)
802.11ac VHT80 CH 106 5530MHz		5452.4	55.9	-18.1	74	40.86	34.46	11.29	30.71	100	113	P	H
		5462.32	55.71	-12.59	68.3	40.68	34.46	11.29	30.72	100	113	P	H
		5458.32	48.26	-5.74	54	33.23	34.46	11.29	30.72	100	113	A	H
	*	5524	93.43	-	-	78.3	34.55	11.32	30.74	100	113	P	H
		5524	85.65	-	-	70.52	34.55	11.32	30.74	100	113	A	H
		5747.96	56.83	-11.47	68.3	41.19	34.79	11.68	30.83	100	113	P	H
		5454.16	58.86	-15.14	74	43.82	34.46	11.29	30.71	101	170	P	V
		5460.72	57.72	-10.58	68.3	42.69	34.46	11.29	30.72	101	170	P	V
		5457.52	50.7	-3.3	54	35.67	34.46	11.29	30.72	101	170	A	V
	*	5536	96.89	-	-	81.74	34.57	11.32	30.74	101	170	P	V
		5536	89.31	-	-	74.16	34.57	11.32	30.74	101	170	A	V
	5740.52	57.47	-10.83	68.3	41.83	34.79	11.68	30.83	101	170	P	V	
802.11ac VHT80 CH 122 5610MHz		5412.08	55.02	-18.98	74	40.02	34.42	11.28	30.7	100	110	P	H
		5462.32	54.99	-13.31	68.3	39.96	34.46	11.29	30.72	100	110	P	H
		5455.6	46.27	-7.73	54	31.24	34.46	11.29	30.72	100	110	A	H
	*	5620	96.85	-	-	81.55	34.68	11.39	30.77	100	110	P	H
		5620	89.49	-	-	74.19	34.68	11.39	30.77	100	110	A	H
		5743.72	58.33	-9.97	68.3	42.69	34.79	11.68	30.83	100	110	P	H
		5357.84	55.28	-18.72	74	40.41	34.33	11.22	30.68	100	187	P	V
		5465.36	54.73	-13.57	68.3	39.67	34.48	11.3	30.72	100	187	P	V
		5450.32	46.38	-7.62	54	31.34	34.46	11.29	30.71	100	187	A	V
	*	5608	100.67	-	-	85.43	34.66	11.35	30.77	100	187	P	V
		5608	92.94	-	-	77.7	34.66	11.35	30.77	100	187	A	V
	5731.08	58.67	-9.63	68.3	43.07	34.78	11.64	30.82	100	187	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 5470~5725MHz

WIFI 802.11ac VHT80 (Harmonic @ 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)
802.11ac VHT80 CH 106 5530MHz		11060	41.44	-32.56	74	48.72	37.44	15.81	60.53	100	360	P	H
802.11ac VHT80 CH 122 5610MHz		11220	42.42	-31.58	74	48.78	37.53	16.6	60.49	100	360	P	H
802.11ac VHT80 CH 106 5530MHz		11060	42.64	-31.36	74	49.92	37.44	15.81	60.53	100	360	P	V
802.11ac VHT80 CH 122 5610MHz		11220	41.64	-32.36	74	48	37.53	16.6	60.49	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 3 - Straddle Channel

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 144 5720MHz	*	5722	107.82	-	-	92.22	34.78	11.64	30.82	100	116	P	H
		5722	100.26	-	-	84.66	34.78	11.64	30.82	100	116	A	H
	*	5722	108.24	-	-	92.64	34.78	11.64	30.82	105	173	P	V
		5722	101.2	-	-	85.6	34.78	11.64	30.82	105	173	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 - Straddle Channel
WIFI 802.11a (Harmonic @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains two rows of test data for 802.11a CH 144 at 5720MHz and a Remark section with two points.



15E band 3 - Straddle Channel
WIFI 802.11n HT20 (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)
802.11n	*	5716	107.25	-	-	91.7	34.76	11.6	30.81	100	115	P	H
HT20		5716	100.75	-	-	85.2	34.76	11.6	30.81	100	115	A	H
CH 144	*	5716	108.02	-	-	92.47	34.76	11.6	30.81	106	172	P	V
5720MHz		5716	101.17	-	-	85.62	34.76	11.6	30.81	106	172	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**15E band 3 - Straddle Channel
WIFI 802.11n HT20 (Harmonic @ 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 HT20		11440	43.98	-30.02	74	50.02	37.66	16.74	60.44	100	360	P	H
CH 144 5720MHz		11440	42.82	-31.18	74	48.86	37.66	16.74	60.44	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



**15E band 3 - Straddle Channel
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n	*	5710	104.32	-	-	88.77	34.76	11.6	30.81	100	114	P	H
HT40		5710	96.62	-	-	81.07	34.76	11.6	30.81	100	114	A	H
CH 142	*	5710	105.27	-	-	89.72	34.76	11.6	30.81	112	171	P	V
5710MHz		5710	97.69	-	-	82.14	34.76	11.6	30.81	112	171	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 - Straddle Channel
WIFI 802.11n HT40 (Harmonic @ 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		11420	43.4	-30.6	74	49.47	37.65	16.73	60.45	100	360	P	H
CH 142 5710MHz		11420	42.89	-31.11	74	48.96	37.65	16.73	60.45	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E band 3 - Straddle Channel
WIFI 802.11ac VHT80 (Band Edge @ 3m)

Table with 14 columns: WIFI, Note, Frequency, Level, Over, Limit, Read, Antenna, Cable, Preamp, Ant, Table, Peak, Pol. It contains test results for 802.11ac VHT80 and CH 138 at 5690MHz, including a Remark section stating 'No other spurious found' and 'All results are PASS against Peak and Average limit line.'



15E band 3 - Straddle Channel

WIFI 802.11ac VHT80 (Harmonic @ 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)
802.11ac VHT80		10380	42.09	-26.21	68.3	49.95	37.03	15.78	60.67	300	0	P	H
CH 138 5690MHz		10380	42.74	-25.56	68.3	50.6	37.03	15.78	60.67	300	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Emission below 1GHz
WIFI 802.11ac VHT80 (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)
802.11ac VHT80 LF		33.88	21.79	-18.21	40	29.77	22.98	1	31.96	100	0	P	H
		107.6	16.39	-27.11	43.5	29.44	16.82	2.06	31.93	-	-	P	H
		153.19	21.59	-21.91	43.5	34.16	16.92	2.45	31.94	-	-	P	H
		160.95	21.55	-21.95	43.5	34.54	16.42	2.52	31.93	-	-	P	H
		806.97	26.79	-19.21	46	24.87	28.35	5.64	32.07	-	-	P	H
		841.89	26.82	-19.18	46	23.77	29.13	5.76	31.84	-	-	P	H
		31.94	33.23	-6.77	40	40.19	24.04	0.97	31.97	100	0	P	V
		41.64	31.68	-8.32	40	43.69	18.82	1.12	31.95	-	-	P	V
		95.96	14.53	-28.97	43.5	28.94	15.58	1.94	31.93	-	-	P	V
		164.83	15.75	-27.75	43.5	29.03	16.1	2.55	31.93	-	-	P	V
		867.11	27.4	-18.6	46	24	29.23	5.85	31.68	-	-	P	V
		939.86	28.67	-17.33	46	23.04	30.63	6.08	31.08	-	-	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 per 15.209(c).
!	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		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
2412MHz													

- 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)

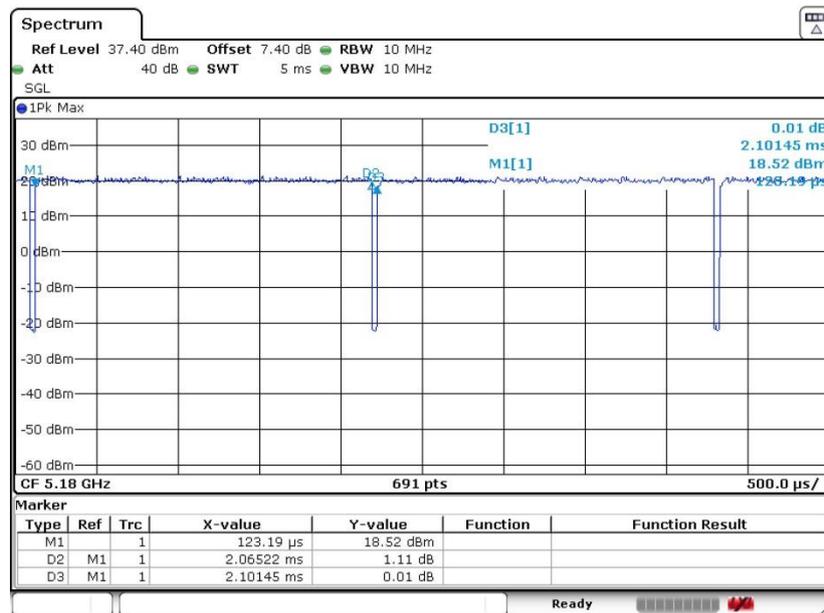
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	98.28	-	-	10Hz
802.11n HT20	98.16	-	-	10Hz
802.11n HT40	96.03	0.946	1.057	1.1KHz
802.11ac VHT80	93.00	0.462	2.163	2.2KHz

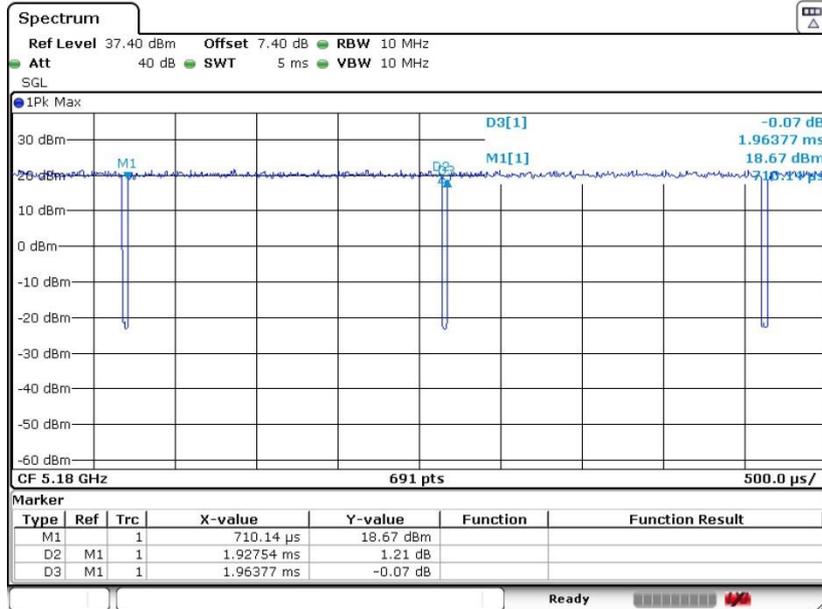
802.11a



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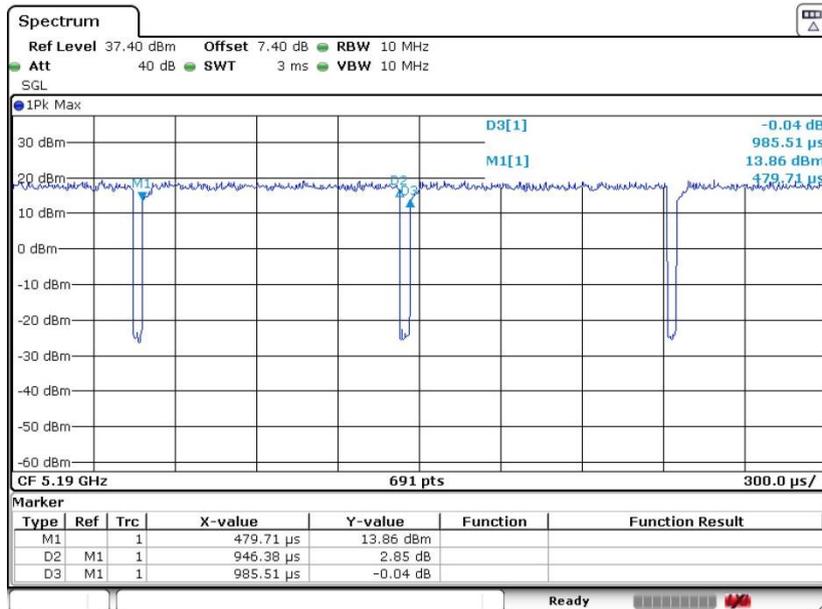


802.11n HT20



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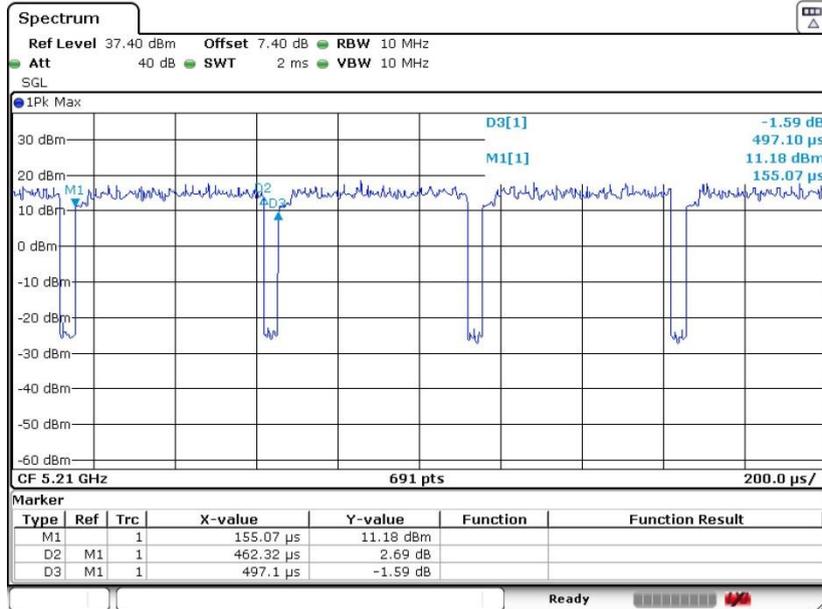
802.11n HT20



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802.11ac VHT80



Date: 10 JUN 2020 16:22:53