



FCC RADIO TEST REPORT

FCC ID : A4RG1F8F
Equipment : Phone
Model Name : G1F8F
Applicant : Google LLC
1600 Amphitheatre Parkway,
Mountain View, California, 94043 USA
Standard : FCC Part 15 Subpart E §15.407

The product was received on Dec. 11, 2020 and testing was started from Dec. 12, 2020 and completed on Feb. 09, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, 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 Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR093032-02F	01	Initial issue of report	Mar. 15, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.403(i)	6dB & 26dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.407(a)	Maximum Conducted Output Power	Pass	-
3.3	15.407(a)	Power Spectral Density	Pass	-
3.4	15.407(b)	Unwanted Emissions	Pass	Under limit 3.84 dB at 17989.000 MHz
3.5	15.207	AC Conducted Emission	Pass	Under limit 17.97 dB at 0.500 MHz
3.6	15.407(c)	Automatically Discontinue Transmission	Pass	-
3.7	15.203 15.407(a)	Antenna Requirement	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.

Reviewed by: Wii Chang

Report Producer: Amy Chen



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Phone
Model Name	G1F8F
FCC ID	A4RG1F8F
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/5G NR/ NFC/GNSS WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE

Remark: The above EUT's information was declared by manufacturer.

EUT Information List	
S/N	Performed Test Item
0B271FQCB00069	RF Conducted Measurement
0C031FQCB00084	Radiated Spurious Emission
0C101FQCB00034	Conducted Emission

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification												
Tx/Rx Channel Frequency Range		5745 MHz ~ 5825 MHz										
Maximum Output Power		<Ant. 4> 802.11a: 19.40 dBm / 0.0871 W 802.11n HT20: 19.40 dBm / 0.0871 W 802.11n HT40: 17.40 dBm / 0.0550 W 802.11ac VHT20: 19.30 dBm / 0.0851 W 802.11ac VHT40: 17.30 dBm / 0.0537 W 802.11ac VHT80: 16.80 dBm / 0.0479 W <Ant. 3> 802.11a: 19.40 dBm / 0.0871 W 802.11n HT20: 19.40 dBm / 0.0871 W 802.11n HT40: 17.40 dBm / 0.0550 W 802.11ac VHT20: 19.30 dBm / 0.0851 W 802.11ac VHT40: 17.30 dBm / 0.0537 W 802.11ac VHT80: 16.70 dBm / 0.0468 W MIMO <Ant. 4+3> 802.11a: 22.31 dBm / 0.1702 W 802.11n HT20: 22.21 dBm / 0.1664 W 802.11n HT40: 20.46 dBm / 0.1112 W 802.11ac VHT20: 22.11 dBm / 0.1626 W 802.11ac VHT40: 20.36 dBm / 0.1087 W 802.11ac VHT80: 19.63 dBm / 0.0918 W										
99% Occupied Bandwidth		MIMO <Ant. 4> 802.11a: 20.15 MHz 802.11n HT20: 20.65 MHz 802.11n HT40: 34.92 MHz 802.11ac VHT80: 77.16 MHz MIMO <Ant. 3> 802.11a: 19.65 MHz 802.11n HT20: 20.60 MHz 802.11n HT40: 36.80 MHz 802.11ac VHT80: 76.92 MHz										
Antenna Type		<Ant. 4> : IFA Antenna <Ant. 3> : IFA Antenna										
Antenna Gain		<Ant. 4> : -0.3 dBi <Ant. 3> : -3.3 dBi										
Type of Modulation		802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)										
Antenna Function Description		<table><tr><td></td><td>Ant. 4</td><td>Ant. 3</td></tr><tr><td>802.11 a/n/ac</td><td>V</td><td>V</td></tr><tr><td>802.11 a/n/ac MIMO</td><td>V</td><td>V</td></tr></table>			Ant. 4	Ant. 3	802.11 a/n/ac	V	V	802.11 a/n/ac MIMO	V	V
	Ant. 4	Ant. 3										
802.11 a/n/ac	V	V										
802.11 a/n/ac MIMO	V	V										

Remark:

1. MIMO Ant. 4+3 is a calculated result from sum of the power MIMO Ant. 4 and MIMO Ant. 3.
2. The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. TH05-HY, CO05-HY, DFS02-HY

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

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH16-HY (TAF Code: 3786)
Remark	The Radiated Emissions test item subcontracted to Sporton International Inc. Wensan Laboratory

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

FCC designation No.: TW1190 and TW0007

1.5 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151*	5755	159*	5795
	153	5765	161	5805
	155 [#]	5775	165	5825

Note:

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

2.2 Test Mode

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

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20 (Covered by HT20)	MCS0
802.11ac VHT40 (Covered by HT40)	MCS0
802.11ac VHT80	MCS0

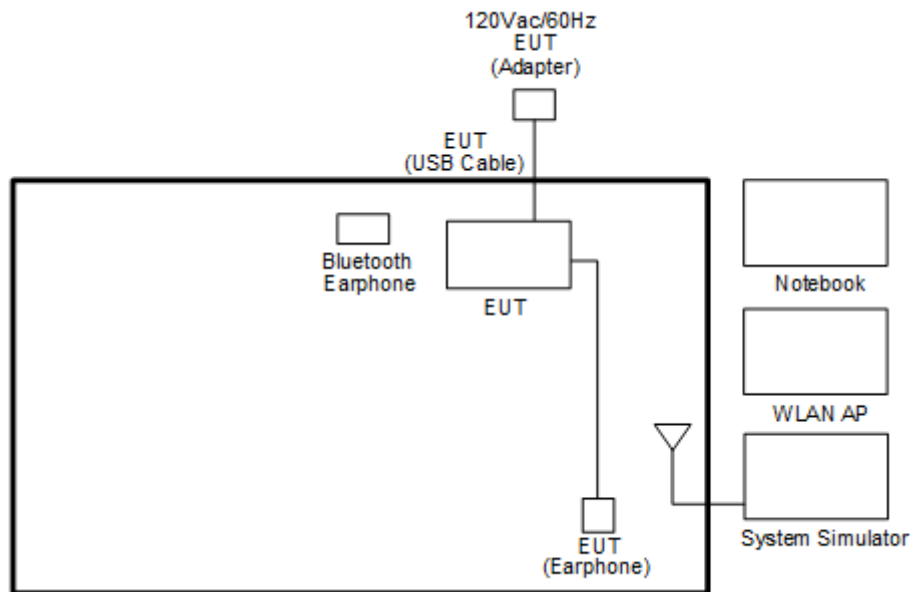
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + WLAN (5GHz) Link + Bluetooth Link + 3.5mm Headset + USB Cable 1 (Charging from AC Adapter 1) Mode 2 : WCDMA Band V Idle + WLAN (5GHz) Idle + Bluetooth Idle + 3.5mm Headset + USB Cable 1 (Charging from AC Adapter 1)
Remark: - The worst case of conducted emission is mode 1; only the test data of it was reported. - For Radiated Test Cases, the tests were performed with Adapter 1 and USB Cable 1.	

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

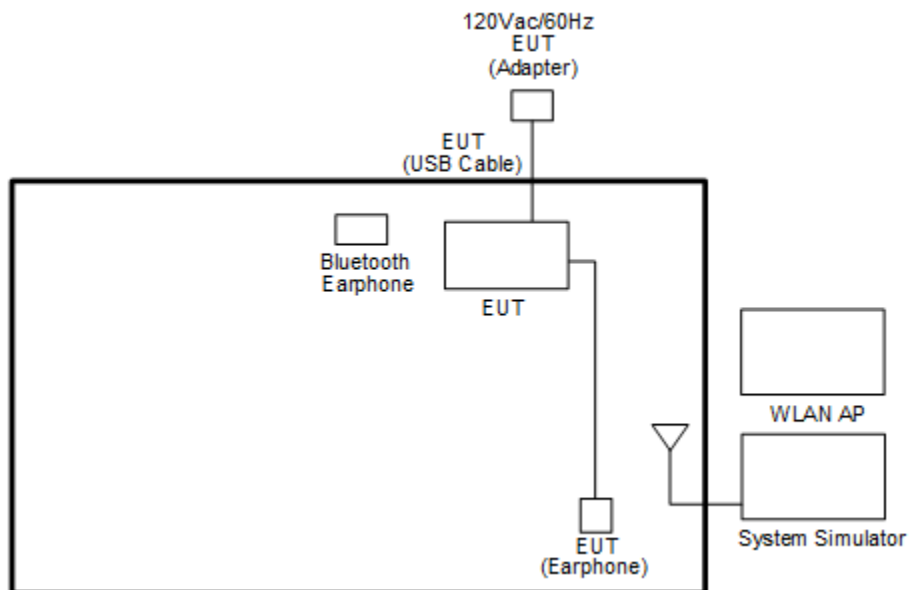
Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

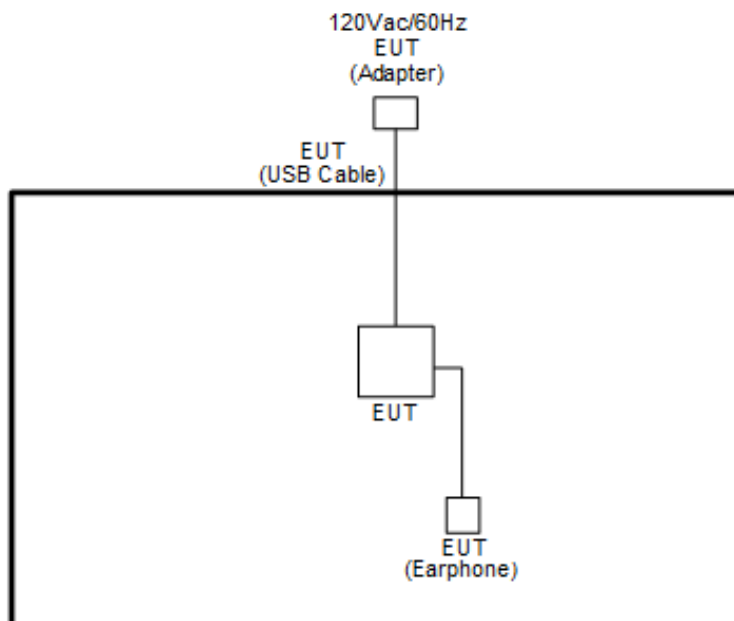
<AC Conducted Emission for WLAN Link Mode>



<AC Conducted Emission for WLAN Idle Mode>



<WLAN Tx Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Wireless Earphone	Google	G1007/ G1008	A4RG1007 / A4RG1008	N/A	N/A
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m



2.5 EUT Operation Test Setup

The RF test items, utility “QRCT V4.0.00158.0” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

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 4.2 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

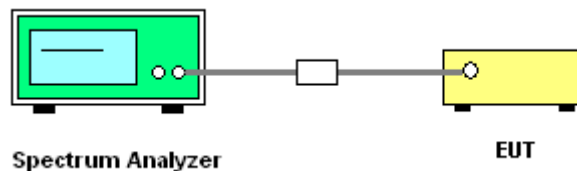
3.1.2 Measuring Instruments

See list of measuring equipment 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 for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

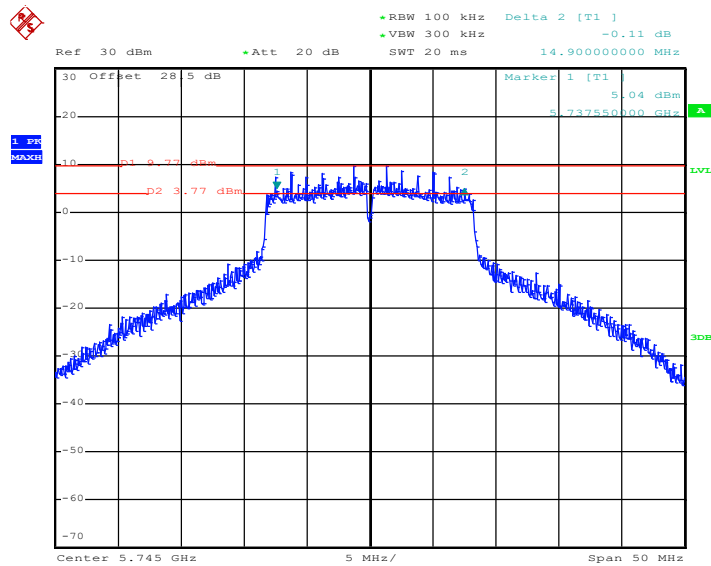
3.1.4 Test Setup



3.1.5 Test Result of 6dB and 26dB and 99% Occupied Bandwidth

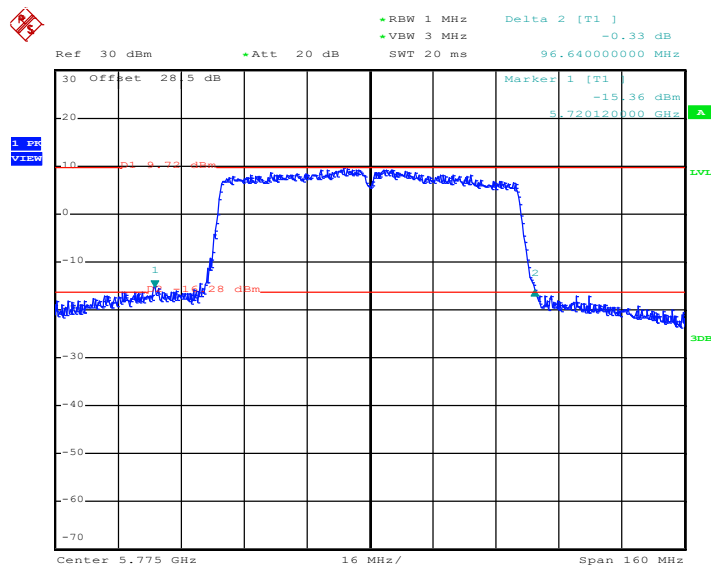
Please refer to Appendix A.

Minimum 6dB Bandwidth

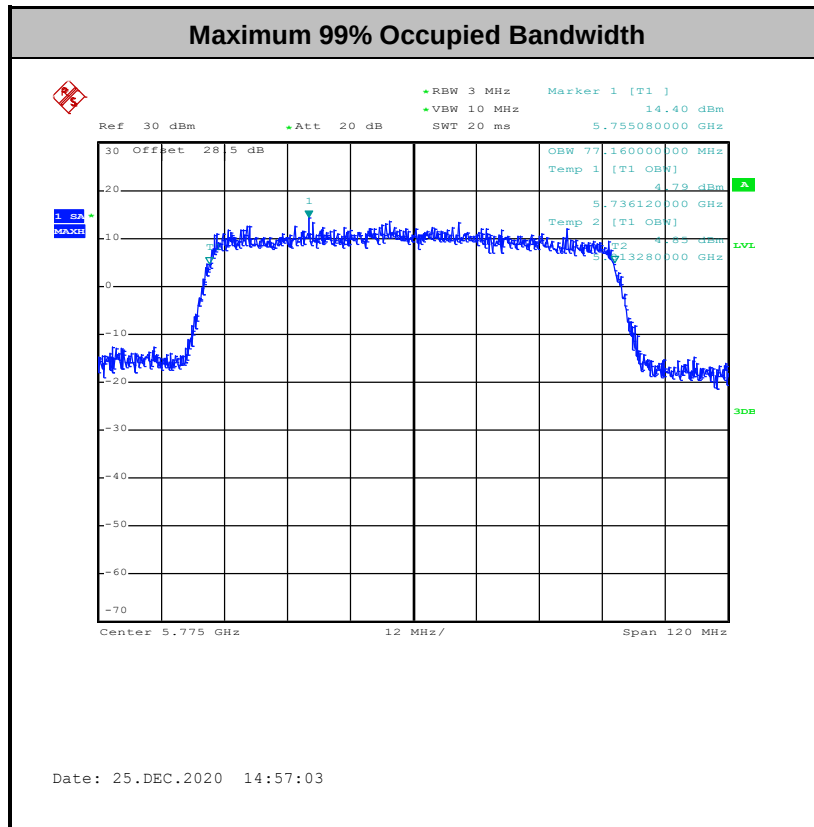


Date: 25.DEC.2020 13:19:51

Maximum 26dB Bandwidth



Date: 25.DEC.2020 14:55:27



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

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

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

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

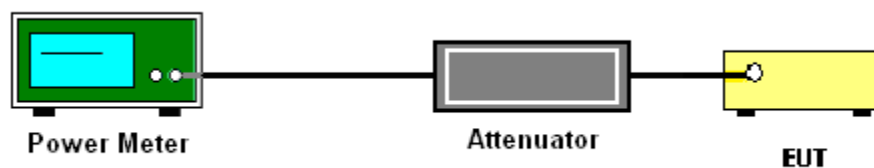
3.2.3 Test Procedures

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

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter.
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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

See list of measuring equipment 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-3

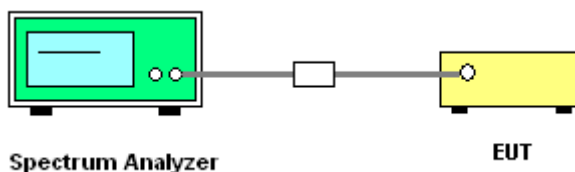
(power averaging (rms) detection with max hold):

- 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 $\leq$ (number of points in sweep) $\times$ 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.
Detector = power averaging (rms).
 - Trace mode = max hold.
 - Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
 3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (c): Measure and add $10 \log(N_{\text{ANT}})$ dB.

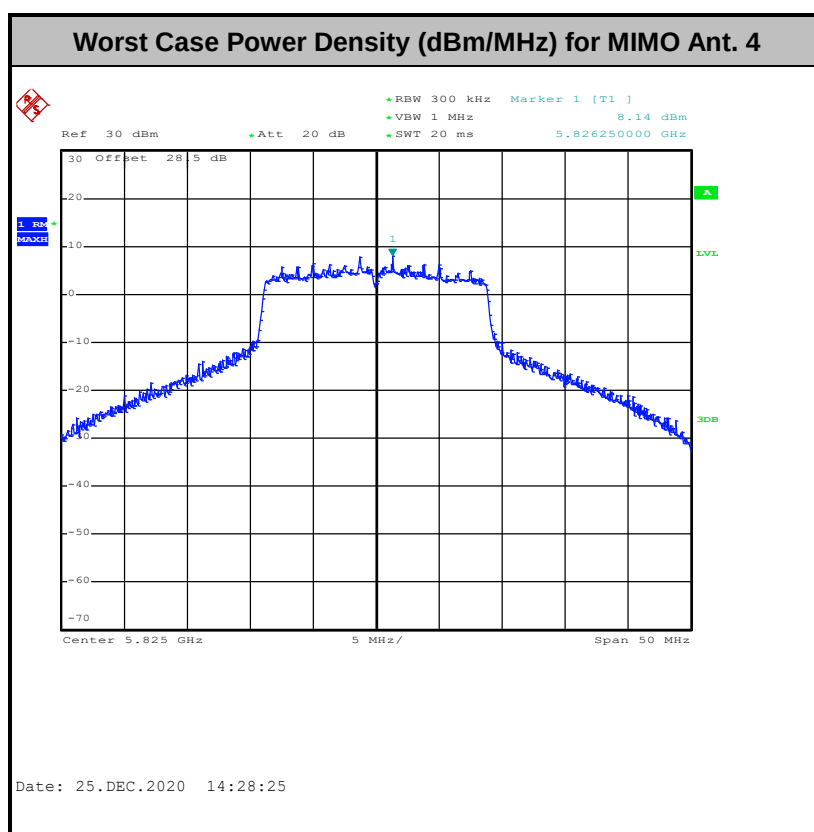
With this technique, spectrum measurements are performed at each output of the device, but rather than summing the spectra or the spectral peaks across the outputs, the quantity $10 \log(N_{\text{ANT}})$ dB is added to each spectrum value before comparing to the emission limit. The addition of $10 \log(N_{\text{ANT}})$ dB serves to apportion the emission limit among the N_{ANT} outputs so that each output is permitted to contribute no more than $1/N_{\text{ANT}}^{\text{th}}$ of the PSD limit.

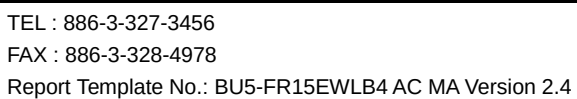
3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.





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.

<Limit of Unwanted Emissions>

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

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

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

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

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

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

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

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

(i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.

(ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.4.1 Measuring Instruments

See list of measuring equipment of this test report.

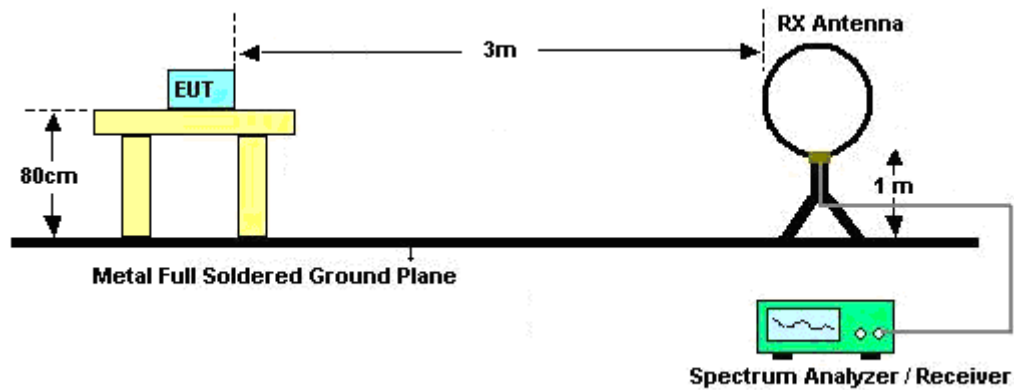
3.4.2 Test Procedures

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.

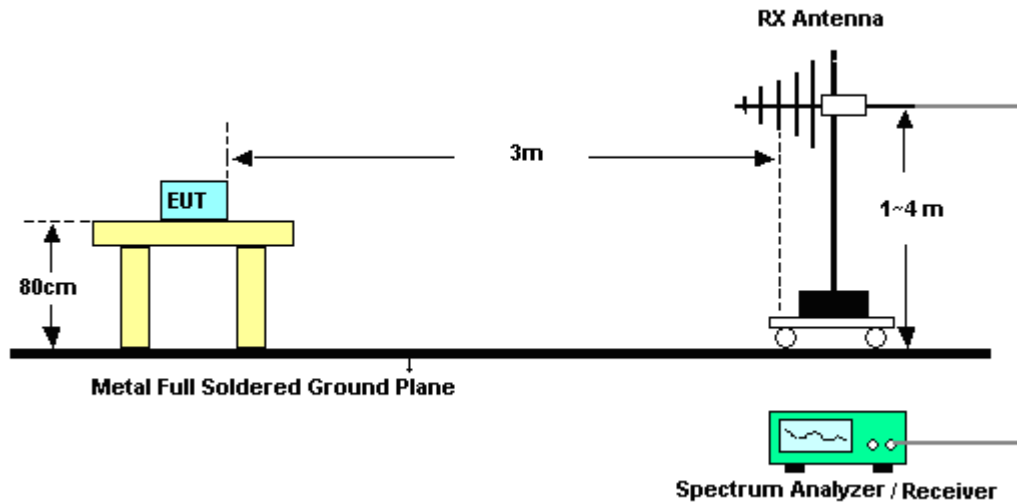
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.3 Test Setup

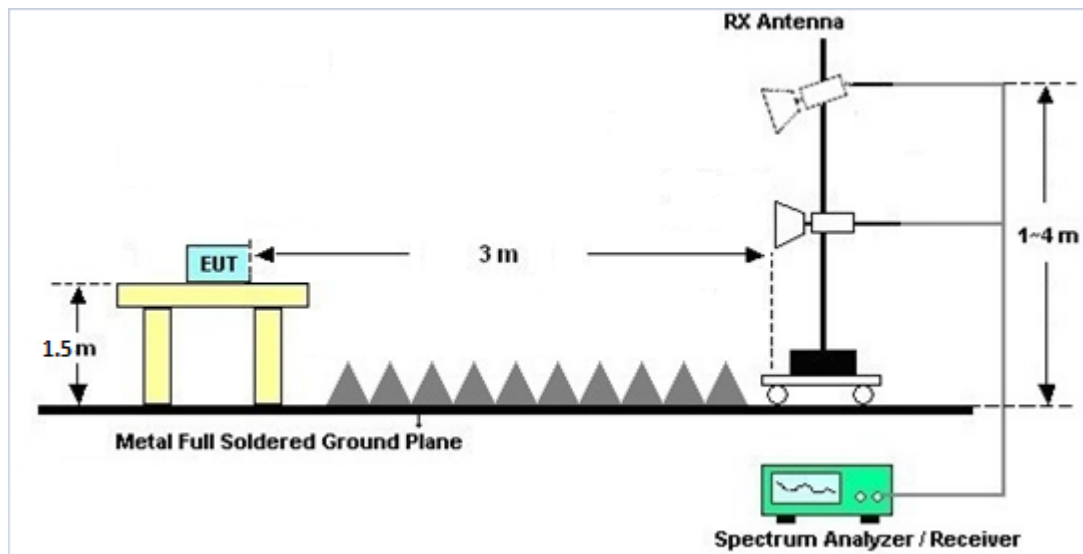
For radiated emissions below 30MHz



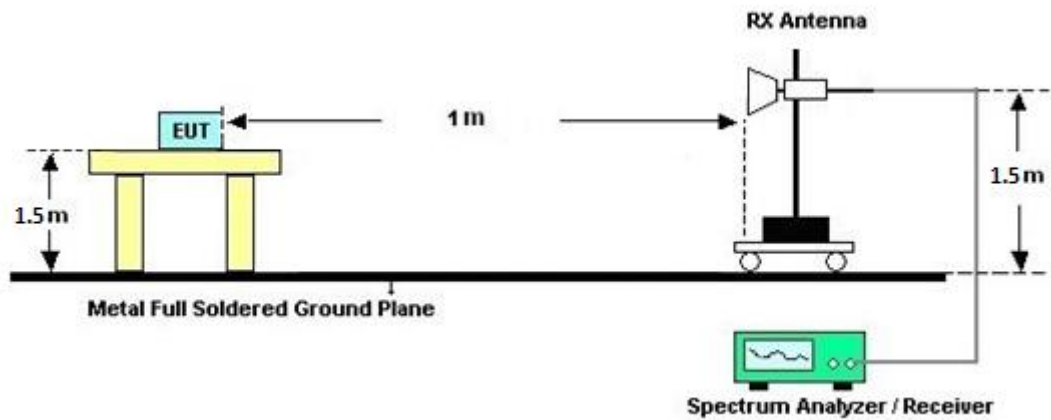
For radiated emissions from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



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

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

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.4.5 Test Result of Radiated Band Edges

Please refer to Appendix C and D.

3.4.6 Duty Cycle

Please refer to Appendix E.

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

Please refer to Appendix C and D.

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 (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

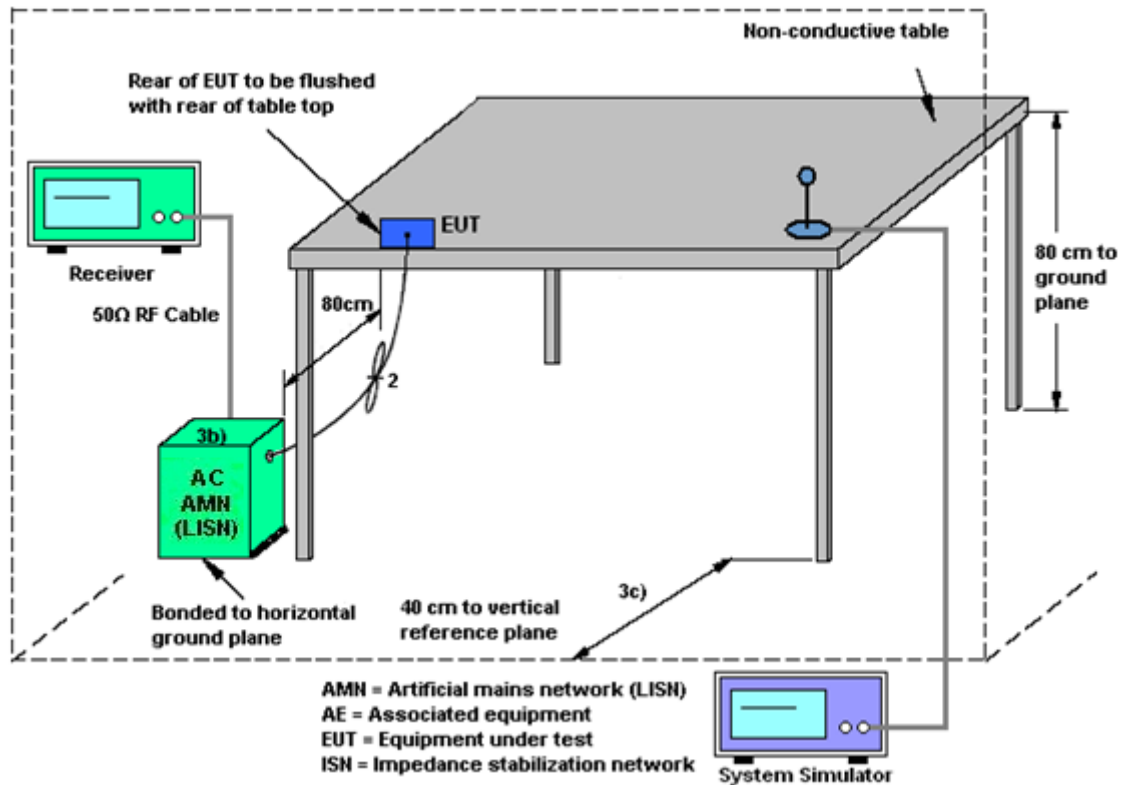
3.5.2 Measuring Instruments

See list of measuring equipment 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

See list of measuring equipment of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

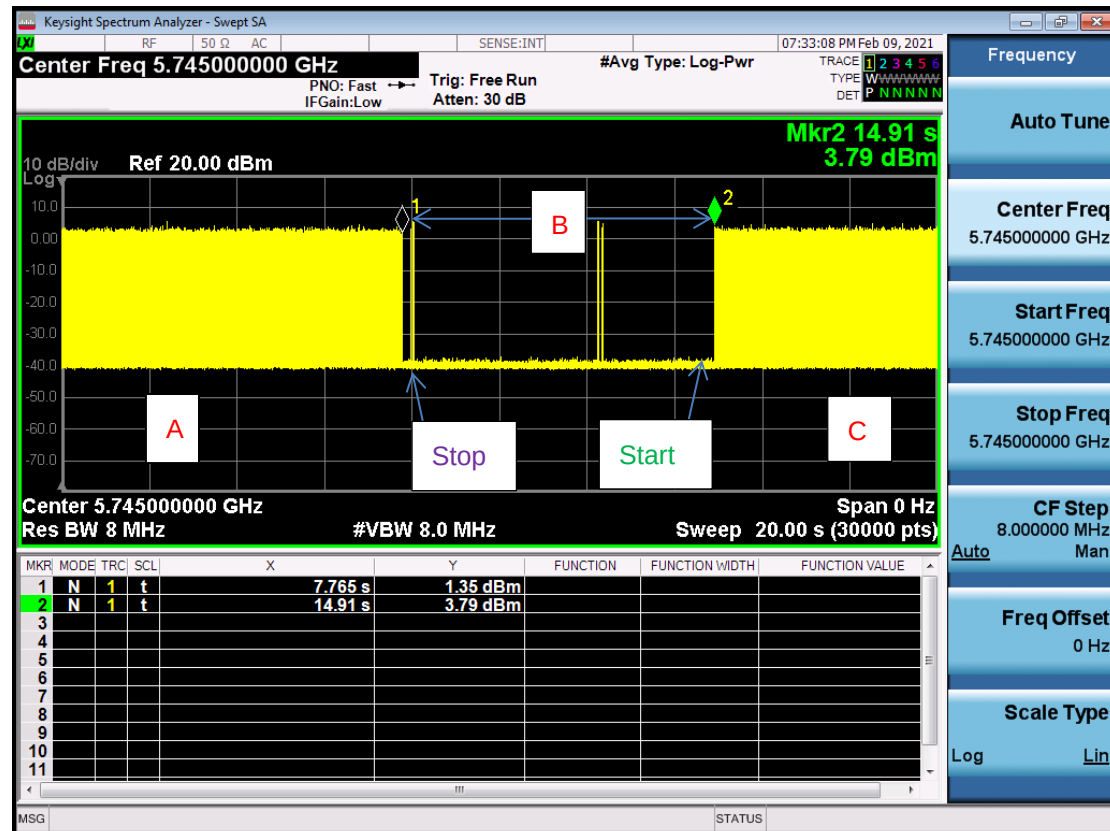
EUT is verified this characteristic during the function check of normal sample associated with an access point:

- A. Information start: make EUT supply information to the access point.
- B. Information stop: stop supplying information to the access point.

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving.

- C. Information start: make EUT supply information to the access point again.

The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

5745MHz


Note: The control / signalling information during the period B is precluded.

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

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

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

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

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

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

The EUT supports CDD mode.

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

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

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

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

<CDD Modes>						
			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. 4 (dBi)	Ant. 3 (dBi)				
Band IV	-0.30	-3.30	-0.30	1.34	0.00	0.00

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

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



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Dec. 19, 2020~ Dec. 22, 2020	Jul. 13, 2021	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01 N-06	47020 & 06	30MHz to 1GHz	Oct. 11, 2020	Dec. 19, 2020~ Dec. 22, 2020	Oct. 10, 2021	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1G	Sep. 30, 2020	Dec. 19, 2020~ Dec. 22, 2020	Sep. 29, 2021	Radiation (03CH16-HY)
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	9120D-1522	1G~18GHz	Sep. 29, 2020	Dec. 19, 2020~ Dec. 22, 2020	Sep. 28, 2021	Radiation (03CH16-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03	17100018000 54001	1GHz~18GHz	Sep. 04, 2020	Dec. 19, 2020~ Dec. 22, 2020	Sep. 03, 2021	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZB ECK	BBHA 9170	BBHA917057 6	18GHz ~40GHz	May 22, 2020	Dec. 19, 2020~ Dec. 22, 2020	May 21, 2021	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 10, 2020	Dec. 19, 2020~ Dec. 22, 2020	Dec. 09, 2021	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Dec. 11, 2020	Dec. 19, 2020~ Dec. 22, 2020	Dec. 10, 2021	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11680/4PE	NA	Aug. 29, 2020	Dec. 19, 2020~ Dec. 22, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY11688/4PE	NA	Aug. 29, 2020	Dec. 19, 2020~ Dec. 22, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-57 57	NA	Aug. 29, 2020	Dec. 19, 2020~ Dec. 22, 2020	Aug. 28, 2021	Radiation (03CH16-HY)
Hygrometer	TECPEL	DTM-303B	TP200881	QA-3-031	Oct. 22, 2020	Dec. 19, 2020~ Dec. 22, 2020	Oct. 21, 2021	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Dec. 19, 2020~ Dec. 22, 2020	N/A	Radiation (03CH16-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Dec. 19, 2020~ Dec. 22, 2020	N/A	Radiation (03CH16-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Dec. 19, 2020~ Dec. 22, 2020	N/A	Radiation (03CH16-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Dec. 19, 2020~ Dec. 22, 2020	N/A	Radiation (03CH16-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Dec. 12, 2020~ Dec. 28, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO 10	10MHz~6GHz	Dec. 09, 2020	Dec. 12, 2020~ Dec. 28, 2020	Dec. 08, 2021	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz-40GHz	Dec. 30, 2019	Dec. 12, 2020~ Dec. 28, 2020	Dec. 29, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Dec. 12, 2020~ Dec. 28, 2020	Mar. 16, 2021	Conducted (TH05-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jan. 15, 2021	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Jan. 15, 2021	Sep. 10, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 18, 2020	Jan. 15, 2021	Nov. 17, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 16, 2020	Jan. 15, 2021	Nov. 15, 2021	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jan. 15, 2021	N/A	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 31, 2020	Jan. 15, 2021	Dec. 30, 2021	Conduction (CO05-HY)
Pulse Limiter	SCHWARZB ECK	ESHVTSD 9561-F N3-Z2	109561-F N003730851	9kHz-200MHz	Nov. 02, 2020	Jan. 15, 2021	Nov. 01, 2021	Conduction (CO05-HY)
Spectrum Analyzer	Keysight	N9010A	MY56070412	10Hz~7GHz	Aug. 27, 2020	Feb. 09, 2021	Aug. 26, 2021	DFS (DFS02-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.3
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Mina Liu	Temperature:	20.7~23.4	°C
Test Date:	2020/12/12~2020/12/28	Relative Humidity:	54.6~57.3	%

TEST RESULTS DATA
6dB and 26dB EBW and 99% OBW

Band IV MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)		6 dB Bandwidth (MHz)		6 dB Bandwidth Min. Limit (MHz)	Pass/Fail
					Ant 4	Ant 3	Ant 4	Ant 3	Ant 4	Ant 3		
11a	6Mbps	2	149	5745	18.55	17.95	34.85	30.60	14.90	15.35	0.5	Pass
11a	6Mbps	2	157	5785	18.45	19.65	35.75	36.50	15.10	15.70	0.5	Pass
11a	6Mbps	2	165	5825	20.15	18.80	37.15	34.85	15.80	14.95	0.5	Pass
HT20	MCS0	2	149	5745	18.85	18.75	34.55	31.90	16.30	15.00	0.5	Pass
HT20	MCS0	2	157	5785	19.40	20.05	34.45	39.05	15.90	15.70	0.5	Pass
HT20	MCS0	2	165	5825	20.65	20.60	39.95	39.35	15.00	15.00	0.5	Pass
HT40	MCS0	2	151	5755	34.92	36.50	42.12	42.12	34.92	35.01	0.5	Pass
HT40	MCS0	2	159	5795	34.56	36.80	42.12	57.69	34.56	35.37	0.5	Pass
VHT80	MCS0	2	155	5775	77.16	76.92	96.64	83.84	75.20	73.92	0.5	Pass

TEST RESULTS DATA
Average Power Table

Band IV single antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 4	Ant 3	SUM	Ant 4	Ant 3	Ant 4	Ant 3	
11a	6Mbps	1	149	5745	19.40	19.40		30.00	30.00	-0.30	-3.30	Pass
11a	6Mbps	1	157	5785	19.30	19.40		30.00	30.00	-0.30	-3.30	Pass
11a	6Mbps	1	165	5825	19.40	19.20		30.00	30.00	-0.30	-3.30	Pass
HT20	MCS0	1	149	5745	19.40	19.40		30.00	30.00	-0.30	-3.30	Pass
HT20	MCS0	1	157	5785	19.40	19.40		30.00	30.00	-0.30	-3.30	Pass
HT20	MCS0	1	165	5825	19.10	19.20		30.00	30.00	-0.30	-3.30	Pass
HT40	MCS0	1	151	5755	17.20	17.30		30.00	30.00	-0.30	-3.30	Pass
HT40	MCS0	1	159	5795	17.40	17.40		30.00	30.00	-0.30	-3.30	Pass
VHT20	MCS0	1	149	5745	19.30	19.30		30.00	30.00	-0.30	-3.30	Pass
VHT20	MCS0	1	157	5785	19.30	19.30		30.00	30.00	-0.30	-3.30	Pass
VHT20	MCS0	1	165	5825	19.00	19.10		30.00	30.00	-0.30	-3.30	Pass
VHT40	MCS0	1	151	5755	17.10	17.20		30.00	30.00	-0.30	-3.30	Pass
VHT40	MCS0	1	159	5795	17.30	17.30		30.00	30.00	-0.30	-3.30	Pass
VHT80	MCS0	1	155	5775	16.80	16.70		30.00	30.00	-0.30	-3.30	Pass

Band IV MIMO												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 4	Ant 3	SUM	Ant 4	Ant 3	Ant 4	Ant 3	
11a	6Mbps	2	149	5745	19.50	18.80	22.17	30.00		-0.30		Pass
11a	6Mbps	2	157	5785	19.30	19.30	22.31	30.00		-0.30		Pass
11a	6Mbps	2	165	5825	19.20	19.20	22.21	30.00		-0.30		Pass
HT20	MCS0	2	149	5745	19.40	18.90	22.17	30.00		-0.30		Pass
HT20	MCS0	2	157	5785	19.20	19.20	22.21	30.00		-0.30		Pass
HT20	MCS0	2	165	5825	19.00	19.20	22.11	30.00		-0.30		Pass
HT40	MCS0	2	151	5755	17.50	16.70	20.13	30.00		-0.30		Pass
HT40	MCS0	2	159	5795	17.50	17.40	20.46	30.00		-0.30		Pass
VHT20	MCS0	2	149	5745	19.30	18.80	22.07	30.00		-0.30		Pass
VHT20	MCS0	2	157	5785	19.10	19.10	22.11	30.00		-0.30		Pass
VHT20	MCS0	2	165	5825	18.90	19.10	22.01	30.00		-0.30		Pass
VHT40	MCS0	2	151	5755	17.40	16.60	20.03	30.00		-0.30		Pass
VHT40	MCS0	2	159	5795	17.40	17.30	20.36	30.00		-0.30		Pass
VHT80	MCS0	2	155	5775	17.00	16.20	19.63	30.00		-0.30		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV MIMO														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	10log (500kHz /RBW) Factor (dB)		Average Power Density (dBm/500kHz)			Average PSD Limit (dBm/500kHz)		DG (dBi)		Pass /Fail
					Ant 4	Ant 3	Ant 4	Ant 3	SUM	Ant 4	Ant 3	Ant 4	Ant 3	
11a	6Mbps	2	149	5745	2.22		10.11	8.92	13.12	30.00		1.34		Pass
11a	6Mbps	2	157	5785	2.22		10.21	10.01	13.22	30.00		1.34		Pass
11a	6Mbps	2	165	5825	2.22		10.04	9.76	13.05	30.00		1.34		Pass
HT20	MCS0	2	149	5745	2.22		9.83	9.47	12.84	30.00		1.34		Pass
HT20	MCS0	2	157	5785	2.22		10.38	10.40	13.41	30.00		1.34		Pass
HT20	MCS0	2	165	5825	2.22		10.36	10.41	13.42	30.00		1.34		Pass
HT40	MCS0	2	151	5755	2.22		4.29	3.66	7.30	30.00		1.34		Pass
HT40	MCS0	2	159	5795	2.22		4.29	4.55	7.56	30.00		1.34		Pass
VHT80	MCS0	2	155	5775	2.22		3.03	2.12	6.04	30.00		1.34		Pass

Note: PSD Sum = Max PSD(Ant. 1, Ant. 2) + 10 log (n)



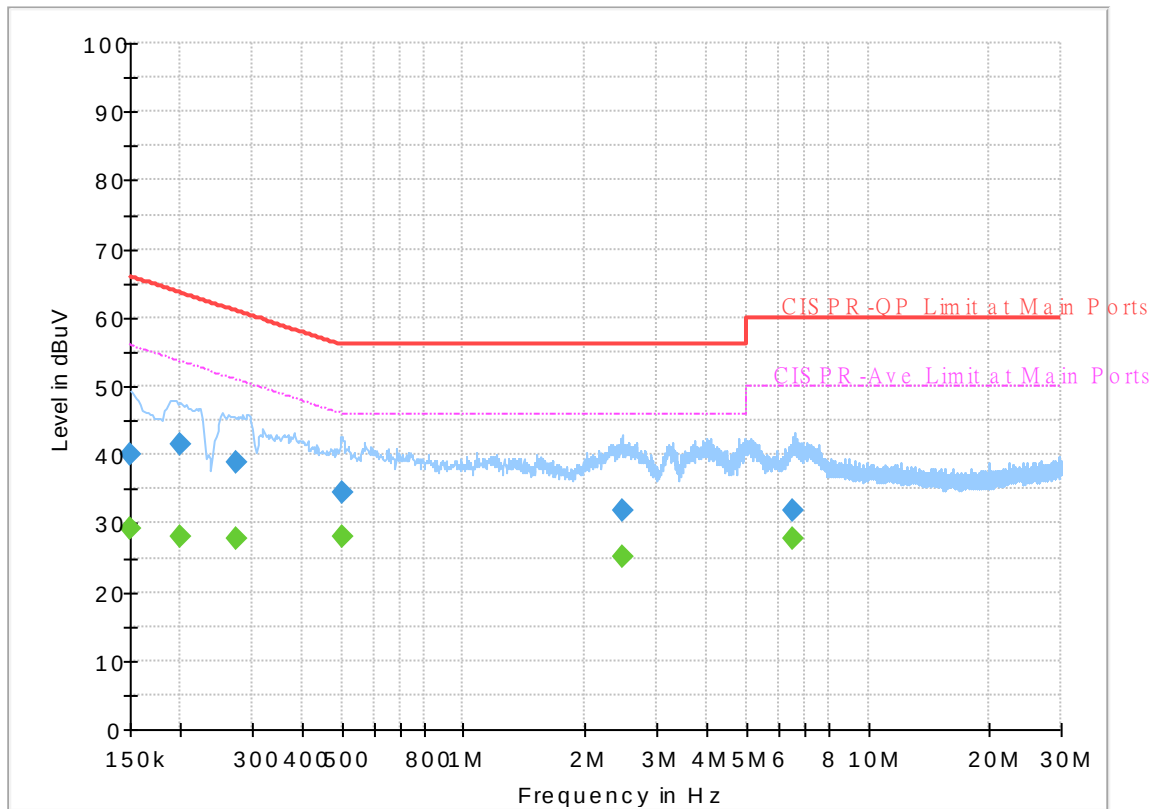
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	Temperature :	23~26℃
		Relative Humidity :	40~50%

EUT Information

Report NO : 093032-02
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



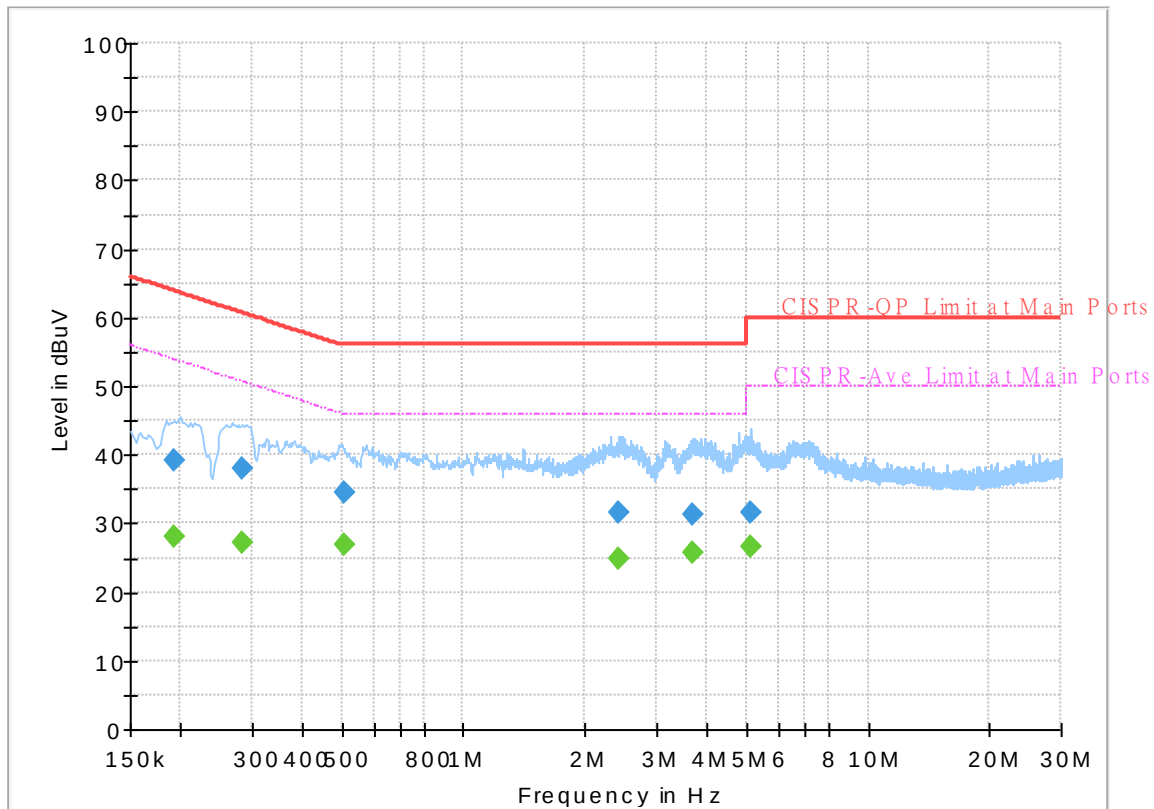
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	29.35	56.00	26.65	L1	OFF	19.7
0.150000	40.18	---	66.00	25.82	L1	OFF	19.7
0.199500	---	27.96	53.63	25.67	L1	OFF	19.7
0.199500	41.42	---	63.63	22.21	L1	OFF	19.7
0.272850	---	27.87	51.03	23.16	L1	OFF	19.7
0.272850	38.98	---	61.03	22.05	L1	OFF	19.7
0.500280	---	28.03	46.00	17.97	L1	OFF	19.9
0.500280	34.55	---	56.00	21.45	L1	OFF	19.9
2.463180	---	25.03	46.00	20.97	L1	OFF	20.2
2.463180	31.86	---	56.00	24.14	L1	OFF	20.2
6.490500	---	27.72	50.00	22.28	L1	OFF	20.1
6.490500	31.91	---	60.00	28.09	L1	OFF	20.1

EUT Information

Report NO : 093032-02
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.192750	---	27.96	53.92	25.96	N	OFF	19.7
0.192750	39.14	---	63.92	24.78	N	OFF	19.7
0.282750	---	27.09	50.74	23.65	N	OFF	19.8
0.282750	37.95	---	60.74	22.79	N	OFF	19.8
0.504780	---	26.78	46.00	19.22	N	OFF	19.9
0.504780	34.51	---	56.00	21.49	N	OFF	19.9
2.418180	---	24.91	46.00	21.09	N	OFF	20.2
2.418180	31.63	---	56.00	24.37	N	OFF	20.2
3.696270	---	25.80	46.00	20.20	N	OFF	20.1
3.696270	31.33	---	56.00	24.67	N	OFF	20.1
5.157060	---	26.55	50.00	23.45	N	OFF	20.1
5.157060	31.57	---	60.00	28.43	N	OFF	20.1



Appendix C. Radiated Spurious Emission

Test Engineer :	Karl Hou, Caster Liao, and Andy Yang	Temperature :	20~25°C
		Relative Humidity :	50~60%

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
4+3		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		5649	54.17	-14.03	68.2	38.68	31.6	13.68	29.79	101	315	P	H
		5700	64.35	-40.85	105.2	48.73	31.7	13.73	29.81	101	315	P	H
		5720	76.65	-34.15	110.8	60.89	31.82	13.75	29.81	101	315	P	H
		5725	80.41	-41.79	122.2	64.63	31.85	13.75	29.82	101	315	P	H
	*	5745	113.45	-	-	97.53	31.97	13.77	29.82	101	315	P	H
	*	5745	105.46	-	-	89.54	31.97	13.77	29.82	101	315	A	H
													H
													H
		5603.6	53.91	-14.29	68.2	38.35	31.69	13.64	29.77	351	33	P	V
		5697.2	56.23	-46.91	103.14	40.61	31.69	13.73	29.8	351	33	P	V
		5717	70.37	-39.59	109.96	54.63	31.8	13.75	29.81	351	33	P	V
		5722.6	74.49	-42.24	116.73	58.71	31.84	13.75	29.81	351	33	P	V
	*	5745	109.84	-	-	93.92	31.97	13.77	29.82	351	33	P	V
	*	5745	101.54	-	-	85.62	31.97	13.77	29.82	351	33	A	V
													V
													V



WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 157 5785MHz		5648.6	53.87	-14.33	68.2	38.38	31.6	13.68	29.79	100	320	P	H
		5696	54.28	-47.97	102.25	38.66	31.69	13.73	29.8	100	320	P	H
		5718.8	54.33	-56.13	110.46	38.58	31.81	13.75	29.81	100	320	P	H
		5723	55.13	-62.51	117.64	39.35	31.84	13.75	29.81	100	320	P	H
	*	5785	113.9	-	-	97.93	32	13.81	29.84	100	320	P	H
	*	5785	105.41	-	-	89.44	32	13.81	29.84	100	320	A	H
		5851.8	53.84	-64.26	118.1	37.79	32.1	13.81	29.86	100	320	P	H
		5859.8	53.78	-55.67	109.45	37.72	32.12	13.81	29.87	100	320	P	H
		5896.6	55.14	-34.04	89.18	39.02	32.19	13.81	29.88	100	320	P	H
		5932.8	54.81	-13.39	68.2	38.62	32.27	13.81	29.89	100	320	P	H
													H
													H
		5637.8	54.01	-14.19	68.2	38.5	31.62	13.67	29.78	268	31	P	V
		5663.4	53.38	-24.77	78.15	37.84	31.63	13.7	29.79	268	31	P	V
		5717.2	53.46	-56.56	110.02	37.72	31.8	13.75	29.81	268	31	P	V
		5723	54.84	-62.8	117.64	39.06	31.84	13.75	29.81	268	31	P	V
	*	5785	109.61	-	-	93.64	32	13.81	29.84	268	31	P	V
	*	5785	101.46	-	-	85.49	32	13.81	29.84	268	31	A	V
		5853.2	54.2	-60.7	114.9	38.14	32.11	13.81	29.86	268	31	P	V
		5863	54.15	-54.41	108.56	38.08	32.13	13.81	29.87	268	31	P	V
		5913.4	54.27	-22.49	76.76	38.12	32.23	13.81	29.89	268	31	P	V
		5936.8	54.69	-13.51	68.2	38.51	32.27	13.81	29.9	268	31	P	V
													V
													V



WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 165 5825MHz	*	5825	113.32	-	-	97.3	32.05	13.82	29.85	100	319	P	H
	*	5825	105.07	-	-	89.05	32.05	13.82	29.85	100	319	A	H
		5852.4	74.89	-41.84	116.73	58.84	32.1	13.81	29.86	100	319	P	H
		5857.4	72.21	-37.92	110.13	56.16	32.11	13.81	29.87	100	319	P	H
		5877	63.38	-40.33	103.71	47.29	32.15	13.81	29.87	100	319	P	H
		5945.8	54.22	-13.98	68.2	38.02	32.29	13.81	29.9	100	319	P	H
													H
													H
	*	5825	109.59	-	-	93.57	32.05	13.82	29.85	267	29	P	V
	*	5825	101.25	-	-	85.23	32.05	13.82	29.85	267	29	A	V
		5853	70.81	-44.55	115.36	54.75	32.11	13.81	29.86	267	29	P	V
		5857.6	65.14	-44.93	110.07	49.08	32.12	13.81	29.87	267	29	P	V
		5879.6	56.64	-45.14	101.78	40.54	32.16	13.81	29.87	267	29	P	V
		5925.2	54.31	-13.89	68.2	38.14	32.25	13.81	29.89	267	29	P	V
													V
													V
													V
Remark 1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



Band 4 5725~5850MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	47.83	-26.17	74	49.02	39.91	20.11	61.21	100	0	P	H
		17235	49.81	-18.39	68.2	43.24	40.9	25.16	59.49	100	0	P	H
		17978	60.75	-13.25	74	43.26	48.84	25.44	56.79	100	0	P	H
		17978	48.87	-5.13	54	31.38	48.84	25.44	56.79	100	0	A	H
		11490	49.11	-24.89	74	50.3	39.91	20.11	61.21	100	0	P	V
		17235	49.05	-19.15	68.2	42.48	40.9	25.16	59.49	100	0	P	V
		18000	61.71	-12.29	74	43.66	49.3	25.45	56.7	100	0	P	V
		18000	49.56	-4.44	54	31.51	49.3	25.45	56.7	100	0	A	V
802.11a CH 157 5785MHz		11570	47.76	-26.24	74	49.03	39.76	20.18	61.21	100	0	P	H
		17355	50.14	-18.06	68.2	42.47	41.6	25.21	59.14	100	0	P	H
		17967	60.63	-13.37	74	43.41	48.61	25.44	56.83	100	0	P	H
		17967	48.49	-5.51	54	31.27	48.61	25.44	56.83	100	0	A	H
		11570	47.59	-26.41	74	48.86	39.76	20.18	61.21	100	0	P	V
		17355	50.55	-17.65	68.2	42.88	41.6	25.21	59.14	100	0	P	V
		17989	61.23	-12.77	74	43.45	49.07	25.45	56.74	100	0	P	V
		17989	49.22	-4.78	54	31.44	49.07	25.45	56.74	100	0	A	V
802.11a CH 165 5825MHz		11650	47.45	-26.55	74	48.9	39.55	20.23	61.23	100	0	P	H
		17475	51.99	-16.21	68.2	43.07	42.45	25.25	58.78	100	0	P	H
		17978	60.75	-13.25	74	43.26	48.84	25.44	56.79	100	0	P	H
		17978	48.9	-5.1	54	31.41	48.84	25.44	56.79	100	0	A	H
		11650	47.45	-26.55	74	48.9	39.55	20.23	61.23	100	0	P	V
		17475	51.51	-16.69	68.2	42.59	42.45	25.25	58.78	100	0	P	V
		18000	61.71	-12.29	74	43.66	49.3	25.45	56.7	100	0	P	V
		18000	49.5	-4.5	54	31.45	49.3	25.45	56.7	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		5600.2	53.29	-14.91	68.2	37.72	31.7	13.64	29.77	100	319	P	H
		5700	55.47	-49.73	105.2	39.85	31.7	13.73	29.81	100	319	P	H
		5720	68.95	-41.85	110.8	53.19	31.82	13.75	29.81	100	319	P	H
		5725	75.78	-46.42	122.2	60	31.85	13.75	29.82	100	319	P	H
	*	5745	114.17	-	-	98.25	31.97	13.77	29.82	100	319	P	H
	*	5745	105.62	-	-	89.7	31.97	13.77	29.82	100	319	A	H
													H
													H
		5632.6	52.97	-15.23	68.2	37.45	31.63	13.67	29.78	315	59	P	V
		5698.4	53.55	-50.47	104.02	37.93	31.7	13.73	29.81	315	59	P	V
		5709.6	60.78	-47.11	107.89	45.09	31.76	13.74	29.81	315	59	P	V
		5724.8	69.58	-52.16	121.74	53.8	31.85	13.75	29.82	315	59	P	V
	*	5745	108.99	-	-	93.07	31.97	13.77	29.82	315	59	P	V
	*	5745	100.88	-	-	84.96	31.97	13.77	29.82	315	59	A	V
													V
													V



WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 157 5785MHz		5638.4	53.26	-14.94	68.2	37.75	31.62	13.67	29.78	100	303	P	H
		5684	53.38	-40.02	93.4	37.79	31.67	13.72	29.8	100	303	P	H
		5718.4	53.96	-56.39	110.35	38.21	31.81	13.75	29.81	100	303	P	H
		5722.8	56.25	-60.93	117.18	40.47	31.84	13.75	29.81	100	303	P	H
	*	5785	114.13	-	-	98.16	32	13.81	29.84	100	303	P	H
	*	5785	105.62	-	-	89.65	32	13.81	29.84	100	303	A	H
		5850.6	53.55	-67.28	120.83	37.5	32.1	13.81	29.86	100	303	P	H
		5864.8	54.36	-53.69	108.05	38.29	32.13	13.81	29.87	100	303	P	H
		5893	54.25	-37.59	91.84	38.13	32.19	13.81	29.88	100	303	P	H
		5932.8	54.21	-13.99	68.2	38.02	32.27	13.81	29.89	100	303	P	H
													H
													H
		5612.2	53.05	-15.15	68.2	37.49	31.68	13.65	29.77	336	309	P	V
		5660	53.35	-22.28	75.63	37.83	31.62	13.69	29.79	336	309	P	V
		5717	53.06	-56.9	109.96	37.32	31.8	13.75	29.81	336	309	P	V
		5723.8	54.1	-65.36	119.46	38.33	31.84	13.75	29.82	336	309	P	V
	*	5785	109.99	-	-	94.02	32	13.81	29.84	336	309	P	V
	*	5785	101.61	-	-	85.64	32	13.81	29.84	336	309	A	V
		5850.6	52.67	-68.16	120.83	36.62	32.1	13.81	29.86	336	309	P	V
		5861	53.66	-55.46	109.12	37.6	32.12	13.81	29.87	336	309	P	V
		5907.2	54.92	-26.42	81.34	38.78	32.21	13.81	29.88	336	309	P	V
		5938.6	53.83	-14.37	68.2	37.64	32.28	13.81	29.9	336	309	P	V
													V
													V



WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 165 5825MHz	*	5825	113.34	-	-	97.32	32.05	13.82	29.85	100	302	P	H
	*	5825	105.07	-	-	89.05	32.05	13.82	29.85	100	302	A	H
		5851.6	70.07	-48.48	118.55	54.02	32.1	13.81	29.86	100	302	P	H
		5859.8	68.36	-41.09	109.45	52.3	32.12	13.81	29.87	100	302	P	H
		5878	58.31	-44.66	102.97	42.21	32.16	13.81	29.87	100	302	P	H
		5932.2	53.49	-14.71	68.2	37.31	32.26	13.81	29.89	100	302	P	H
													H
													H
	*	5825	108.24	-	-	92.22	32.05	13.82	29.85	360	29	P	V
	*	5825	100.13	-	-	84.11	32.05	13.82	29.85	360	29	A	V
		5850	62.27	-59.93	122.2	46.22	32.1	13.81	29.86	360	29	P	V
		5858.2	63.53	-46.37	109.9	47.47	32.12	13.81	29.87	360	29	P	V
		5882	56.75	-43.25	100	40.66	32.16	13.81	29.88	360	29	P	V
		5946.6	54.12	-14.08	68.2	37.92	32.29	13.81	29.9	360	29	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	48	-26	74	49.19	39.91	20.11	61.21	100	0	P	H
		17235	49.21	-18.99	68.2	42.64	40.9	25.16	59.49	100	0	P	H
		18000	61.57	-12.43	74	43.52	49.3	25.45	56.7	100	0	P	H
		18000	49.71	-4.29	54	31.66	49.3	25.45	56.7	100	0	A	H
		11490	47.77	-26.23	74	48.96	39.91	20.11	61.21	100	0	P	V
		17235	49.64	-18.56	68.2	43.07	40.9	25.16	59.49	100	0	P	V
		17989	61.21	-12.79	74	43.43	49.07	25.45	56.74	100	0	P	V
		17989	49.23	-4.77	54	31.45	49.07	25.45	56.74	100	0	A	V
802.11n HT20 CH 157 5785MHz		11570	48.35	-25.65	74	49.62	39.76	20.18	61.21	100	0	P	H
		17355	50.66	-17.54	68.2	42.99	41.6	25.21	59.14	100	0	P	H
		17989	60.98	-13.02	74	43.2	49.07	25.45	56.74	100	0	P	H
		17989	49.21	-4.79	54	31.43	49.07	25.45	56.74	100	0	A	H
		11570	47.31	-26.69	74	48.58	39.76	20.18	61.21	100	0	P	V
		17355	49.46	-18.74	68.2	41.79	41.6	25.21	59.14	100	0	P	V
		17956	60.45	-13.55	74	43.51	48.38	25.44	56.88	100	0	P	V
		17956	48.51	-5.49	54	31.57	48.38	25.44	56.88	100	0	A	V
802.11n HT20 CH 165 5825MHz		11650	47.06	-26.94	74	48.51	39.55	20.23	61.23	100	0	P	H
		17475	51.78	-16.42	68.2	42.86	42.45	25.25	58.78	100	0	P	H
		18000	61.56	-12.44	74	43.51	49.3	25.45	56.7	100	0	P	H
		18000	49.65	-4.35	54	31.6	49.3	25.45	56.7	100	0	A	H
		11650	47.79	-26.21	74	49.24	39.55	20.23	61.23	100	0	P	V
		17475	50.94	-17.26	68.2	42.02	42.45	25.25	58.78	100	0	P	V
		17989	61.24	-12.76	74	43.46	49.07	25.45	56.74	100	0	P	V
		17989	49.26	-4.74	54	31.48	49.07	25.45	56.74	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		5628.6	53.71	-14.49	68.2	38.18	31.64	13.67	29.78	100	304	P	H
		5692.2	62.77	-36.68	99.45	47.17	31.68	13.72	29.8	100	304	P	H
		5713.4	68.28	-40.67	108.95	52.57	31.78	13.74	29.81	100	304	P	H
		5725	65.17	-57.03	122.2	49.39	31.85	13.75	29.82	100	304	P	H
	*	5755	109.67	-	-	93.72	32	13.78	29.83	100	304	P	H
	*	5755	101.52	-	-	85.57	32	13.78	29.83	100	304	A	H
		5855	53.73	-57.07	110.8	37.67	32.11	13.81	29.86	100	304	P	H
		5866.8	54.51	-52.98	107.49	38.44	32.13	13.81	29.87	100	304	P	H
		5899.6	54.37	-32.59	86.96	38.24	32.2	13.81	29.88	100	304	P	H
		5927.2	53.53	-14.67	68.2	37.36	32.25	13.81	29.89	100	304	P	H
													H
													H
		5646.8	54.01	-14.19	68.2	38.51	31.61	13.68	29.79	369	34	P	V
		5696.4	58.34	-44.21	102.55	42.72	31.69	13.73	29.8	369	34	P	V
		5710.6	62.78	-45.39	108.17	47.09	31.76	13.74	29.81	369	34	P	V
		5724.4	59.16	-61.67	120.83	43.38	31.85	13.75	29.82	369	34	P	V
	*	5755	104.96	-	-	89.01	32	13.78	29.83	369	34	P	V
	*	5755	96.98	-	-	81.03	32	13.78	29.83	369	34	A	V
		5853	53.04	-62.32	115.36	36.98	32.11	13.81	29.86	369	34	P	V
		5868.2	53.77	-53.33	107.1	37.69	32.14	13.81	29.87	369	34	P	V
		5890.8	54.7	-38.77	93.47	38.59	32.18	13.81	29.88	369	34	P	V
		5948.6	54.73	-13.47	68.2	38.52	32.3	13.81	29.9	369	34	P	V
													V
													V



WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 159 5795MHz		5648.2	54.13	-14.07	68.2	38.64	31.6	13.68	29.79	100	316	P	H
		5698.8	57.36	-46.96	104.32	41.74	31.7	13.73	29.81	100	316	P	H
		5719.4	61.86	-48.77	110.63	46.1	31.82	13.75	29.81	100	316	P	H
		5720.6	62.65	-49.52	112.17	46.89	31.82	13.75	29.81	100	316	P	H
	*	5795	109.01	-	-	93.03	32	13.82	29.84	100	316	P	H
	*	5795	101.28	-	-	85.3	32	13.82	29.84	100	316	A	H
		5853	60.96	-54.4	115.36	44.9	32.11	13.81	29.86	100	316	P	H
		5856.8	61.64	-48.66	110.3	45.59	32.11	13.81	29.87	100	316	P	H
		5882.2	58.24	-41.61	99.85	42.15	32.16	13.81	29.88	100	316	P	H
		5935.2	54.38	-13.82	68.2	38.2	32.27	13.81	29.9	100	316	P	H
													H
													H
		5610	53.33	-14.87	68.2	37.77	31.68	13.65	29.77	339	309	P	V
		5695.2	53.7	-47.96	101.66	38.08	31.69	13.73	29.8	339	309	P	V
		5718.4	55.8	-54.55	110.35	40.05	31.81	13.75	29.81	339	309	P	V
		5723.2	57.81	-60.29	118.1	42.03	31.84	13.75	29.81	339	309	P	V
	*	5795	103.96	-	-	87.98	32	13.82	29.84	339	309	P	V
	*	5795	96.34	-	-	80.36	32	13.82	29.84	339	309	A	V
		5853	58.03	-57.33	115.36	41.97	32.11	13.81	29.86	339	309	P	V
		5861	57	-52.12	109.12	40.94	32.12	13.81	29.87	339	309	P	V
		5875	55.01	-50.19	105.2	38.92	32.15	13.81	29.87	339	309	P	V
		5940.8	55.84	-12.36	68.2	39.65	32.28	13.81	29.9	339	309	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11510	47.3	-26.7	74	48.49	39.88	20.13	61.2	100	0	P	H
		17265	49.61	-18.59	68.2	42.86	40.99	25.17	59.41	100	0	P	H
		17934	60.07	-13.93	74	43.69	47.91	25.43	56.96	100	0	P	H
		17934	48.85	-5.15	54	32.47	47.91	25.43	56.96	100	0	A	H
		11510	47.57	-26.43	74	48.76	39.88	20.13	61.2	100	0	P	V
		17265	49.16	-19.04	68.2	42.41	40.99	25.17	59.41	100	0	P	V
		17978	60.68	-13.32	74	43.19	48.84	25.44	56.79	100	0	P	V
		17978	49.75	-4.25	54	32.26	48.84	25.44	56.79	100	0	A	V
802.11n HT40 CH 159 5795MHz		11590	47.43	-26.57	74	48.74	39.72	20.19	61.22	100	0	P	H
		17385	50.63	-17.57	68.2	42.6	41.86	25.22	59.05	100	0	P	H
		17989	61.33	-12.67	74	43.55	49.07	25.45	56.74	100	0	P	H
		17989	50.16	-3.84	54	32.38	49.07	25.45	56.74	100	0	A	H
		11590	46.65	-27.35	74	47.96	39.72	20.19	61.22	100	0	P	V
		17385	50.18	-18.02	68.2	42.15	41.86	25.22	59.05	100	0	P	V
		17978	60.98	-13.02	74	43.49	48.84	25.44	56.79	100	0	P	V
		17978	50	-4	54	32.51	48.84	25.44	56.79	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		5645.6	59.56	-8.64	68.2	44.06	31.61	13.68	29.79	100	319	P	H
		5697	70.72	-32.27	102.99	55.1	31.69	13.73	29.8	100	319	P	H
		5705.2	73.63	-33.03	106.66	57.98	31.73	13.73	29.81	100	319	P	H
		5722.4	71.21	-45.06	116.27	55.44	31.83	13.75	29.81	100	319	P	H
	*	5775	105.8	-	-	89.83	32	13.8	29.83	100	319	P	H
	*	5775	98.19	-	-	82.22	32	13.8	29.83	100	319	A	H
		5851.6	64.86	-53.69	118.55	48.81	32.1	13.81	29.86	100	319	P	H
		5861.2	66.14	-42.92	109.06	50.08	32.12	13.81	29.87	100	319	P	H
		5883.4	61.87	-37.09	98.96	45.77	32.17	13.81	29.88	100	319	P	H
		5946	54.17	-14.03	68.2	37.97	32.29	13.81	29.9	100	319	P	H
													H
													H
		5637.4	56.08	-12.12	68.2	40.56	31.63	13.67	29.78	268	30	P	V
		5697.4	68.4	-34.88	103.28	52.79	31.69	13.73	29.81	268	30	P	V
		5716.8	70.49	-39.42	109.91	54.75	31.8	13.75	29.81	268	30	P	V
		5720	68.76	-42.04	110.8	53	31.82	13.75	29.81	268	30	P	V
	*	5775	101.51	-	-	85.54	32	13.8	29.83	268	30	P	V
	*	5775	94.06	-	-	78.09	32	13.8	29.83	268	30	A	V
		5854.6	64.29	-47.42	111.71	48.23	32.11	13.81	29.86	268	30	P	V
		5855	63.22	-47.58	110.8	47.16	32.11	13.81	29.86	268	30	P	V
		5877.2	58.57	-45	103.57	42.48	32.15	13.81	29.87	268	30	P	V
		5933.6	54.73	-13.47	68.2	38.54	32.27	13.81	29.89	268	30	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

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

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz		11550	48.79	-25.21	74	50.04	39.8	20.16	61.21	100	0	P	H
		17325	51.28	-16.92	68.2	43.99	41.32	25.2	59.23	100	0	P	H
		17967	60.76	-13.24	74	43.54	48.61	25.44	56.83	100	0	P	H
		17967	49.59	-4.41	54	32.37	48.61	25.44	56.83	100	0	A	H
		11550	48.57	-25.43	74	49.82	39.8	20.16	61.21	100	0	P	V
		17325	50.25	-17.95	68.2	42.96	41.32	25.2	59.23	100	0	P	V
		17967	60.44	-13.56	74	43.22	48.61	25.44	56.83	100	0	P	V
		17967	49.63	-4.37	54	32.41	48.61	25.44	56.83	100	0	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission above 18GHz

5GHz WIFI 802.11ac VHT80 (SHF)

[illegible]



Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF)

WIFI Ant. 4+3	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
5GHz 802.11ac VHT80 LF		99.84	31.01	-12.49	43.5	45.99	16.07	1.55	32.6	-	-	P	H
		249.22	34.39	-11.61	46	46.06	18.4	2.66	32.73	-	-	P	H
		487.84	31.4	-14.6	46	36.32	23.96	3.74	32.62	-	-	P	H
		646.92	29	-17	46	30.68	26.49	4.37	32.54	-	-	P	H
		729.37	32.94	-13.06	46	33.09	27.74	4.65	32.54	-	-	P	H
		903	34.94	-11.06	46	32.77	29.23	5.31	32.37	100	0	P	H
													H
													H
													H
													H
													H
		98.87	35.86	-7.64	43.5	50.97	15.96	1.54	32.61	100	0	P	V
		307.42	27.5	-18.5	46	37.74	19.35	2.95	32.54	-	-	P	V
		457.77	29.14	-16.86	46	34.64	23.42	3.62	32.54	-	-	P	V
		568.35	31.05	-14.95	46	33.5	26.14	4.08	32.67	-	-	P	V
		746.83	34.12	-11.88	46	33.92	28.13	4.69	32.62	-	-	P	V
		896.21	35.46	-10.54	46	33.47	29.14	5.29	32.44	-	-	P	V
													V
													V
													V
													V
													V
													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	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

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



Appendix D. Radiated Spurious Emission Plots

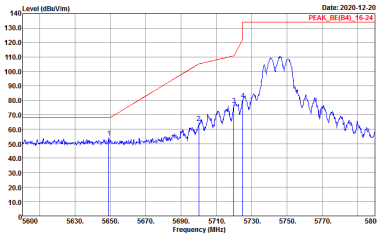
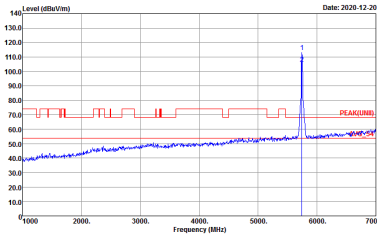
Test Engineer :	Karl Hou, Caster Liao, and Andy Yang	Temperature :	20~25°C
		Relative Humidity :	50~60%

Note symbol

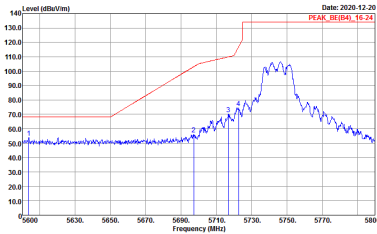
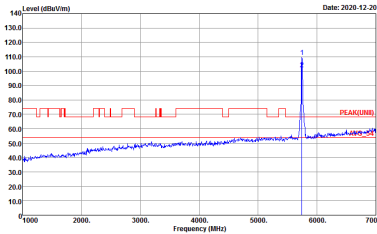
-L	Low channel location
-R	High channel location

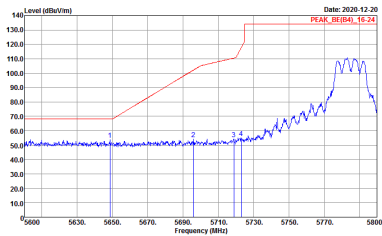
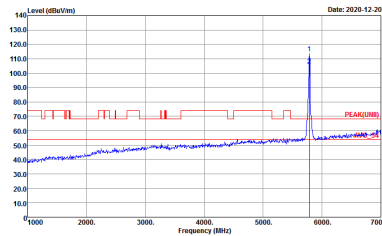
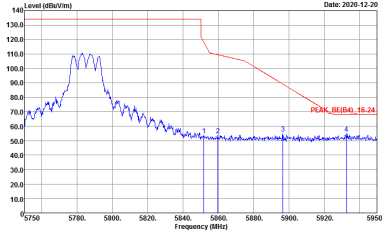


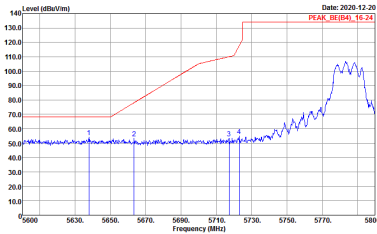
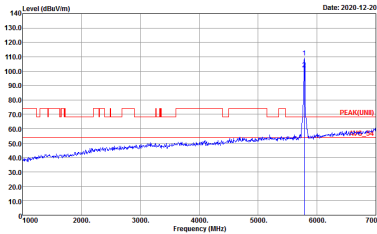
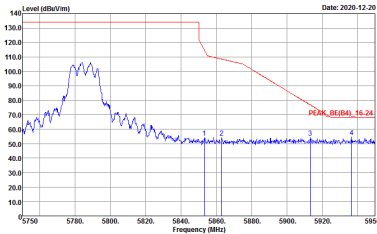
Band 4 - 5725~5850MHz
WIFI 802.11a (Band Edge @ 3m)

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE[84]_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000kHz VSW:3000.000kHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK[UNIT] 3m 91200_1522 HORIZONTAL RBW:1000.000kHz VSW:3000.000kHz SWT:Auto

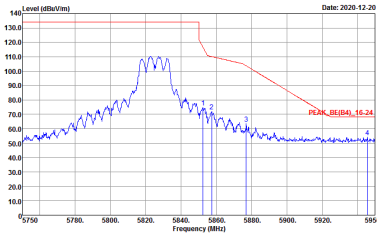
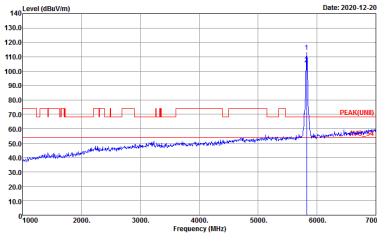


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH149 5745MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(FUND) 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

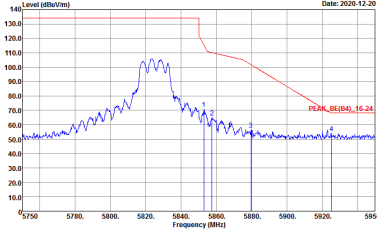
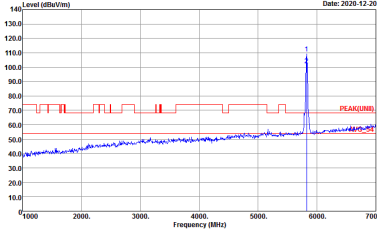
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(LINE) 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH157 5785MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(LINE) 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

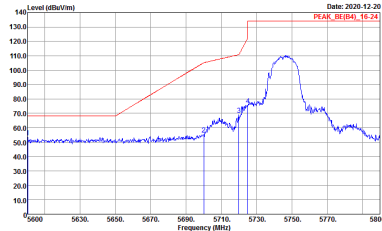
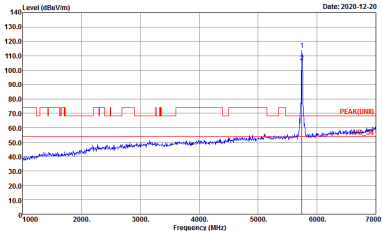


WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BU(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_BU(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11a CH165 5825MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_802.11a_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_802.11a_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

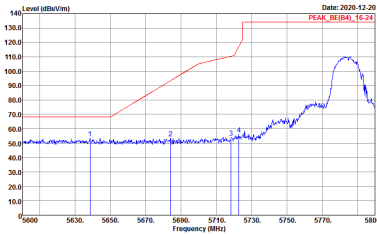
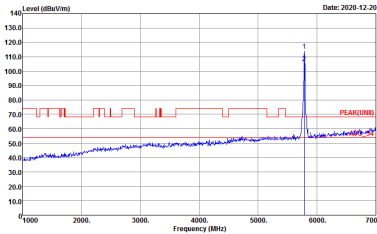
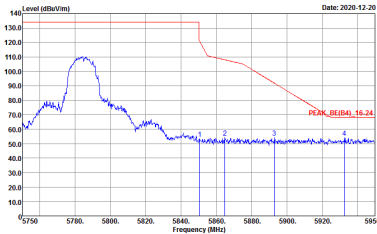
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

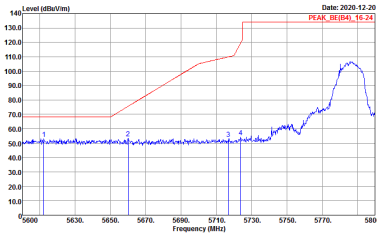
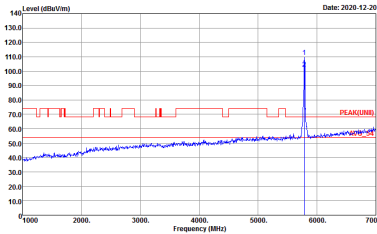
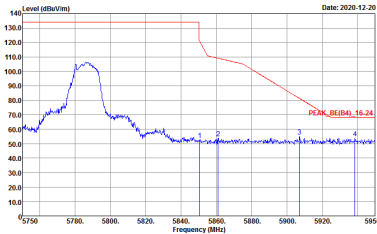
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(84)_16-24 3m 91200_1522 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



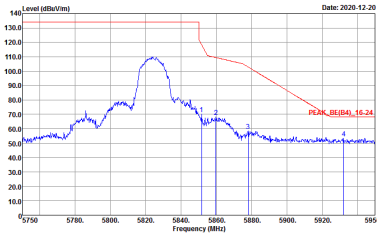
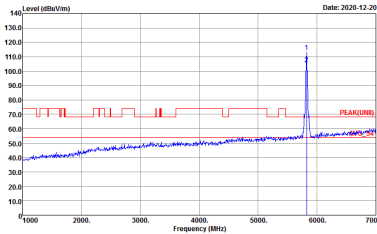
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
4+3	Vertical	Fundamental
Peak	Site : 03CH16-HY Condition : PEAK_BC[94]_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Site : 03CH16-HY Condition : PEAK_UNI[1] 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto



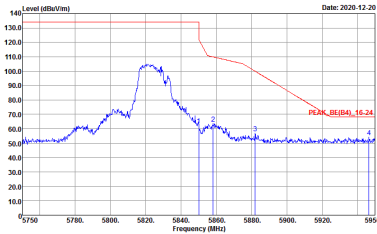
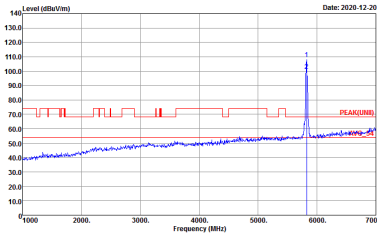
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(LINE) 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank



WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_80[84]_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK[UNII] 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

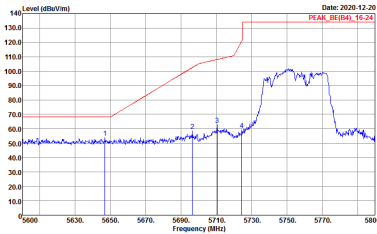
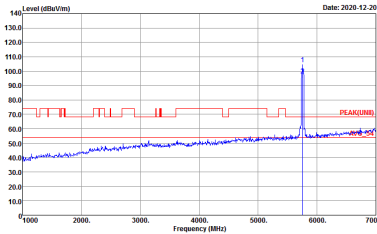
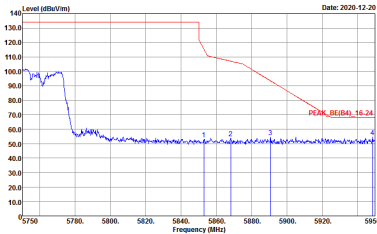


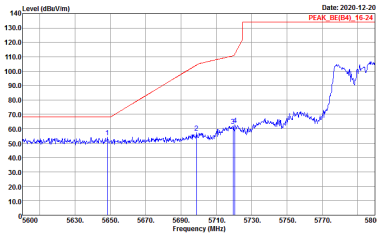
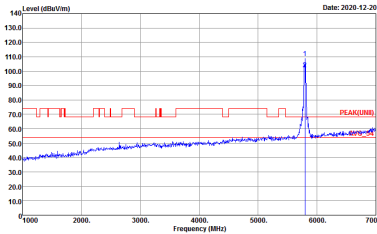
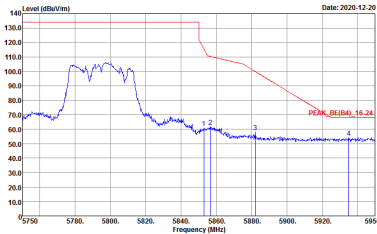
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BU(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_BU(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

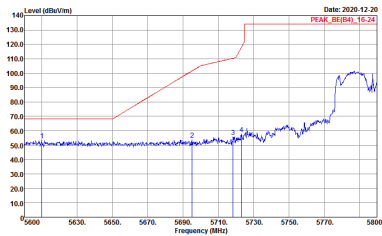
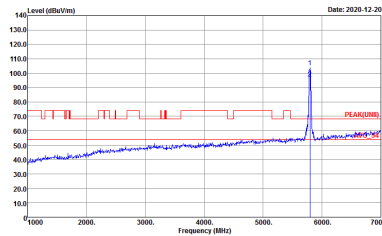
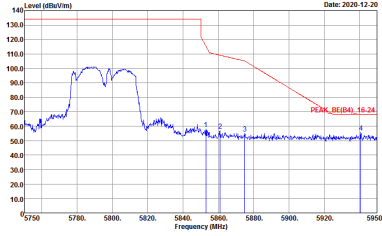


Band 4 5725~5850MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

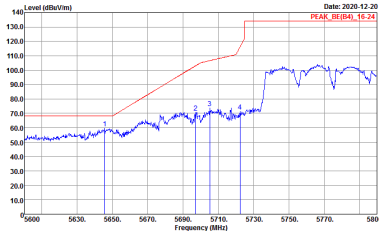
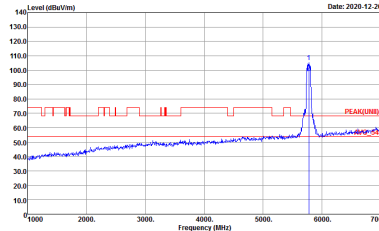
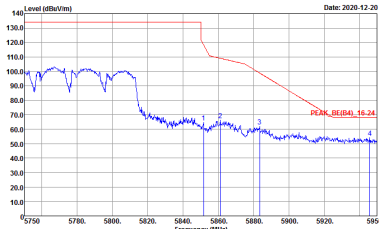
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
4+3	Horizontal	Fundamental
Peak	Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Site : 03CH16-HY Condition : PEAK(UNII) 3m 91200_1522 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto
Peak	Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto	Left blank

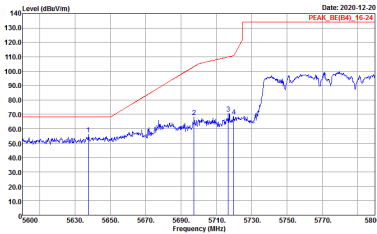
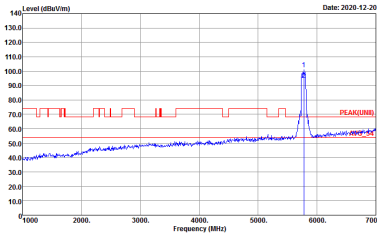
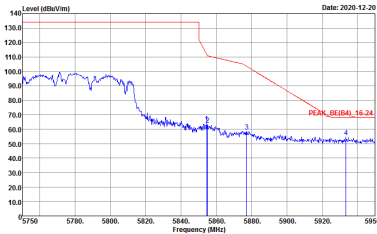
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

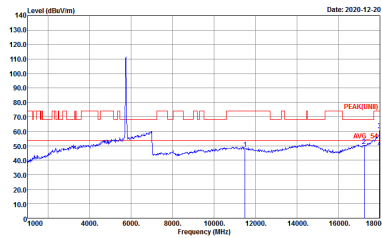
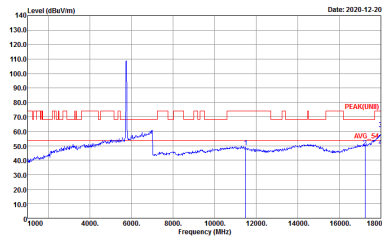
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(LINE) 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

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

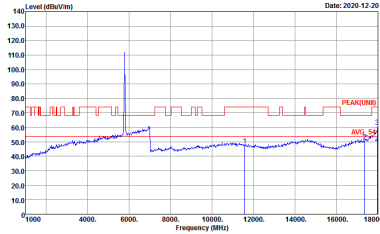
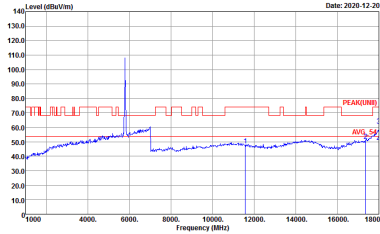
WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
4+3	Horizontal	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

WIFI	Band 4 5725~5850MHz Band Edge @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
4+3	Vertical	Fundamental
Peak	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto
	 Site : 03CH16-HY Condition : PEAK_BE(B4)_16-24 3m 91200_1522 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto	Left blank

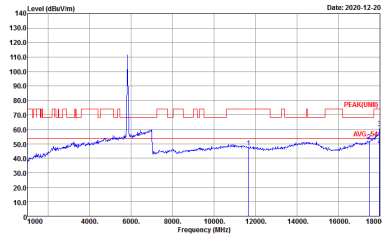
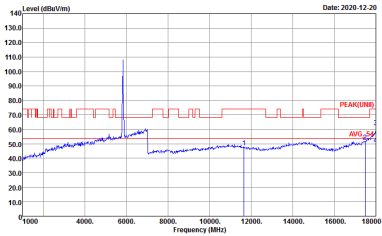
Band 4 - 5725~5850MHz
WIFI 802.11a (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH149 5745MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNIT) 3m 91200_1522 VERTICAL

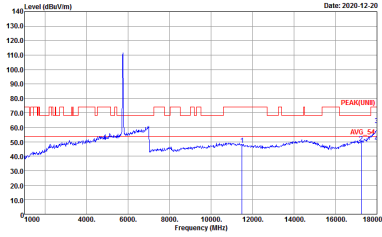
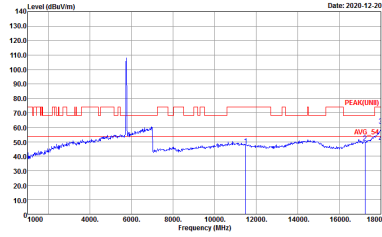


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH157 5785MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 VERTICAL

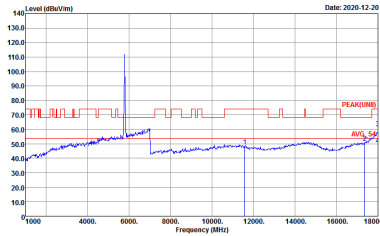
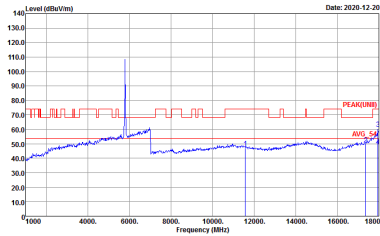


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11a CH165 5825MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 VERTICAL

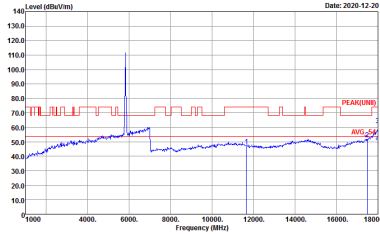
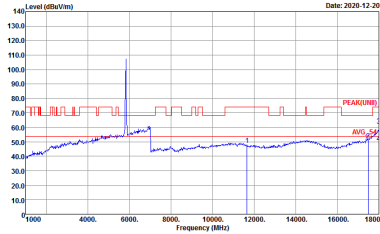
Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH149 5745MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 VERTICAL

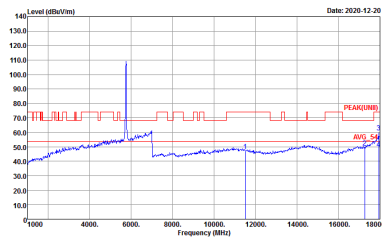
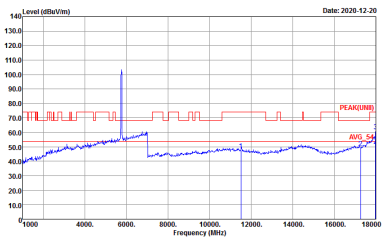


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH157 5785MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 VERTICAL

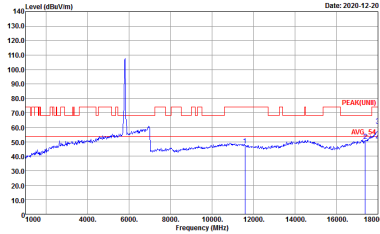
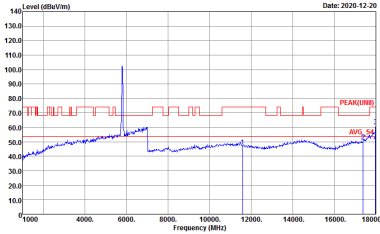


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT20 CH165 5825MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 VERTICAL

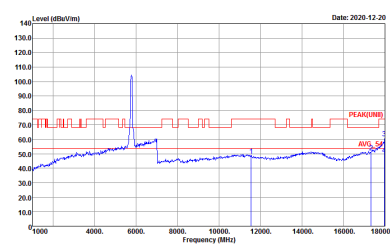
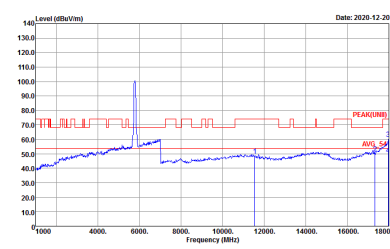
Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH151 5755MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 VERTICAL

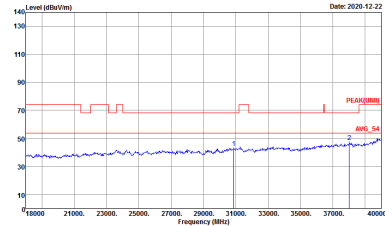
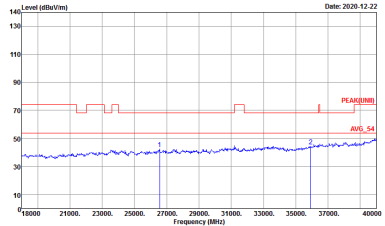


WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11n HT40 CH159 5795MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120b_1522 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK(UNII) 3m 9120D_1522 VERTICAL

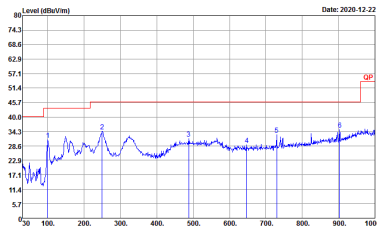
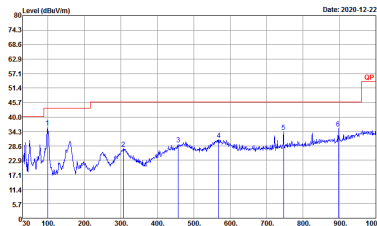
Band 4 5725~5850MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI	Band 4 5725~5850MHz Harmonic @ 3m	
ANT	802.11ac VHT80 CH155 5775MHz	
4+3	Horizontal	Vertical
Peak Avg.	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 HORIZONTAL	 Site : 03CH16-14Y Condition : PEAK(UNIT) 3m 91200_1522 VERTICAL

**Emission above 18GHz
5GHz WIFI 802.11ac VHT80 (SHF)**

WIFI	5GHz WIFI	
ANT	802.11ac VHT80 SHF	
4+3	Horizontal	Vertical
QP / Peak	 Site : 03CH16-HY Condition : PEAK[UNIT] 1m SHF HORN BBHA9170584 HORIZONTAL	 Site : 03CH16-HY Condition : PEAK[UNIT] 1m SHF HORN BBHA9170584 VERTICAL

Emission below 1GHz
5GHz WIFI 802.11ac VHT80 (LF)

WIFI	5GHz WIFI	
ANT	802.11ac VHT80 LF	
4+3	Horizontal	Vertical
QP / Peak	 Site : 03CH16-HY Condition : QP 3m 81LOG_47020406 HORIZONTAL	 Site : 03CH16-HY Condition : QP 3m 81LOG_47020406 VERTICAL

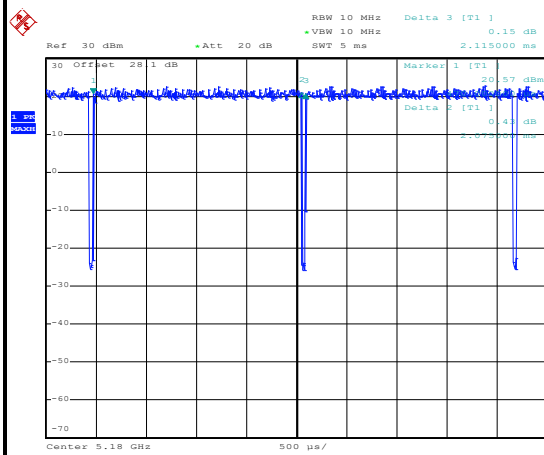
Appendix E. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
4+3	802.11a for Ant. 4	98.11	-	-	10Hz	0.08
4+3	802.11a for Ant. 3	97.88	2075	0.48	1kHz	0.09
4+3	5GHz 802.11n HT20 for Ant. 4	97.72	1925	0.52	1kHz	0.10
4+3	5GHz 802.11n HT20 for Ant. 3	97.47	1925	0.52	1kHz	0.11
4+3	5GHz 802.11n HT40 for Ant. 4	94.36	920	1.09	3kHz	0.25
4+3	5GHz 802.11n HT40 for Ant. 3	94.36	930	1.08	3kHz	0.25
4+3	5GHz 802.11ac VHT80 for Ant. 4	92.00	460	2.17	3kHz	0.36
4+3	5GHz 802.11ac VHT80 for Ant. 3	92.06	464	2.16	3kHz	0.36



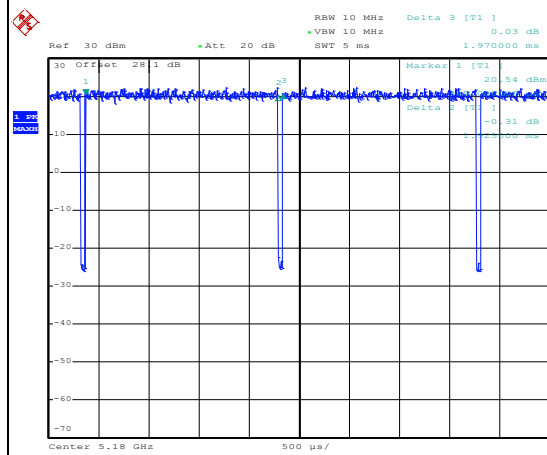
MIMO <Ant. 4>

802.11a



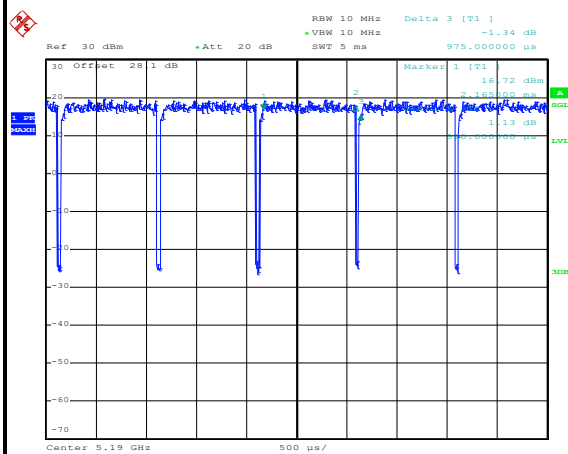
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802.11n HT20



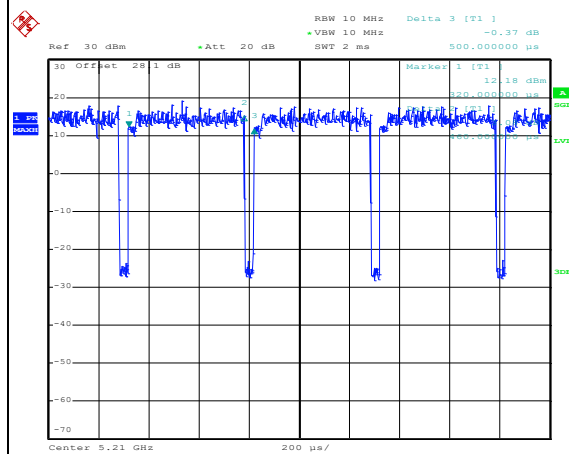
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802.11n HT40



Date: 12.DEC.2020 09:37:41

802.11ac VHT80

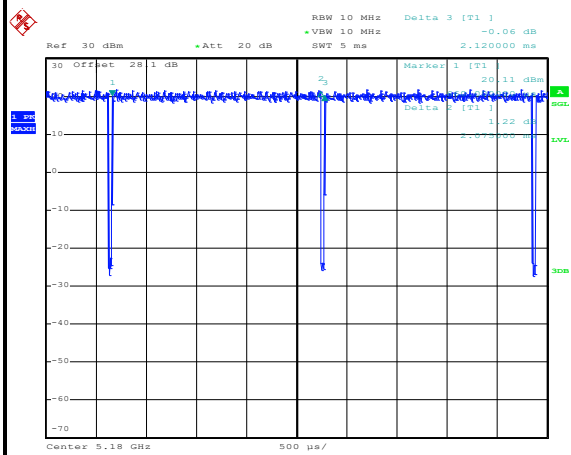


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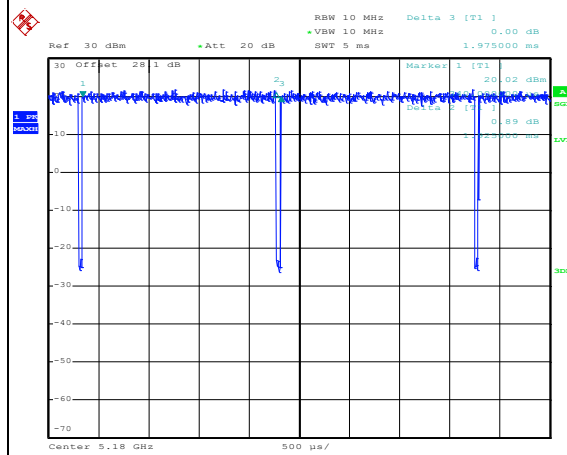
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802.11a



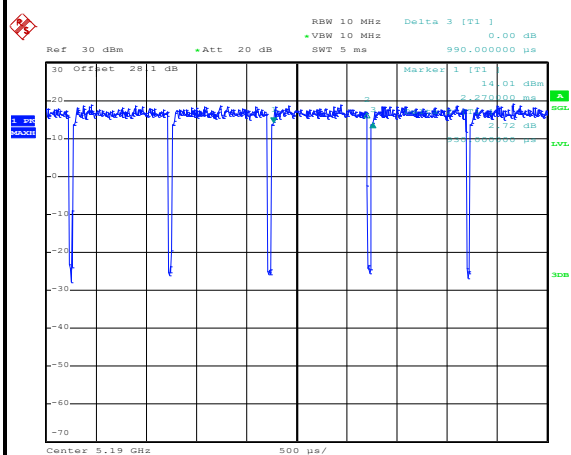
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802.11n HT20



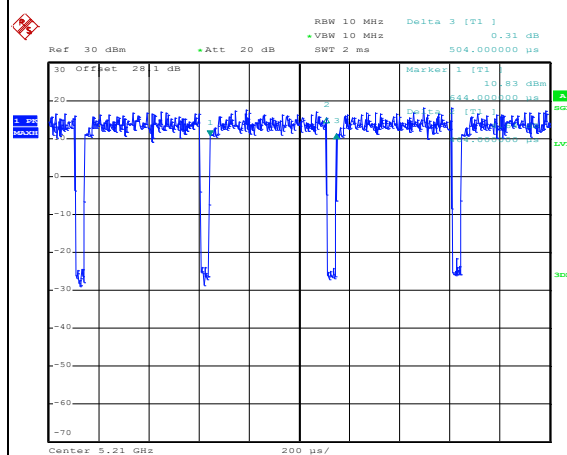
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802.11n HT40



Date: 12.DEC.2020 09:38:05

802.11ac VHT80



Date: 12.DEC.2020 09:52:35

—THE END—