# FCC Test Report

| Product Name | Notebook |
|---|---|
| Model No | NU50;NUx0xx (x=0~9;A~Z;a~z;_- ) |
| FCC ID | WL6-NU509560D2W |

| Applicant | ELITEGROUP COMPUTER SYSTEMS CO., LTD |
|---|---|
| Address | No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan |

| Date of Receipt | June 23, 2020 |
|---|---|
| Issued Date | Dec. 21, 2020 |
| Report No. | 2060931R-E3032110125 |
| Report Version | V1.0 |

**DEKRA**

# Test Report

Issued Date: Dec. 21, 2020
Report No.: 2060931R-E3032110125

**DEKRA**

| | |
|---|---|
| Product Name | Notebook |
| Applicant | ELITEGROUP COMPUTER SYSTEMS CO., LTD |
| Address | No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan |
| Manufacturer | Golden Elite Technology (SHENZHEN) Co., Ltd. |
| Model No. | NU50;NUx0xx (x=0~9;A~Z;a~z;_- ) |
| FCC ID. | WL6-NU509560D2W |
| EUT Rated Voltage | AC 100-240V, 50-60Hz |
| EUT Test Voltage | AC 120V / 60Hz |
| Trade Name | ECS ELITEGROUP |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart E<br><br>ANSI C63.4: 2014, ANSI C63.10: 2013<br><br>KDB Publication 789033 |
| Test Result | Complied |

Documented By        :      *Anita Chou*

( Senior Engineering Adm. Specialist / Anita Chou )

Tested By              :      *Yun Che Chen*

( Engineer / Yunche Chen)

Approved By          :      *signature*

( Director / Vincent Lin )

# TABLE OF CONTENTS

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

# <u>Revision History</u>

| Report No. | Version | Description | Issued Date |
|:---:|:---:|:---:|:---:|
| 2060931R-E3032110125 | V1.0 | Initial issue of report. | 2020-12-21 |

# 1. GENERAL INFORMATION

## 1.1. EUT Description

| | |
|---|---|
| Product Name | Notebook |
| Trade Name | ECS ELITEGROUP |
| FCC ID. | WL6-NU509560D2W |
| Model No. | NU50;NUx0xx (x=0~9;A~Z;a~z;_- ) |
| Frequency Range | 802.11a/n-20MHz: 5180-5240MHz |
| | 802.11n-40MHz: 5190-5230 MHz |
| | 802.11ac-80MHz: 5210MHz |
| Number of Channels | 802.11a/n-20MHz: 4; 802.11n-40MHz: 2 |
| | 802.11ac-80MHz: 1 |
| Data Rate | 802.11a: 6 - 54Mbps |
| | 802.11n: up to 300Mbps |
| | 802.11ac-80MHz: up to 866.7MHz |
| Channel Control | Auto |
| Type of Modulation | 802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM |
| Antenna Type | PIFA Antenna |
| Antenna Gain | Refer to the table "Antenna List" |
| Power Adapter | MFR: FSP, M/N: FSP065-A1BR3 |
| | Input: AC 100-240V，50-60Hz 1.7A |
| | Output: DC 5V, 3A; 9V, 3A; 12V, 3A; 15V, 3A; 20V, 3.25A |
| | Cable Out: Shielded, 1m |
| | Power cord: Non-shielded, 0.8m |

**Antenna List**

| No. | Manufacturer | Part No. | Antenna Type | Peak Gain |
|---|---|---|---|---|
| 1 | WGT | 13-130-XD2050 (Main) | PIFA Antenna | 3.04 dBi For 5.15~5.25GHz |
| | | 13-130-XD2051 (Aux) | | |

Note: The antenna of EUT is conform to FCC 15.203.

802.11a/n-20MHz Center Working Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 36: | 5180 MHz | Channel 40: | 5200 MHz | Channel 44: | 5220 MHz | Channel 48: | 5240 MHz |

802.11n-40MHz Center Working Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency |
|---|---|---|---|
| Channel 38: | 5190 MHz | Channel 46: | 5230 MHz |

802.11ac-80MHz Center Working Frequency of Each Channel:

| Channel | Frequency |
|---|---|
| Channel 42: | 5210 MHz |

Note:
1. This device is a Notebook with a built-in 2.4 GHz and 5 GHz WLAN and Bluetooth V5.0, V3.0, V2.1+EDR transceiver, this report for 5GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

| Test Mode | Mode 1: Transmit (802.11a-6Mbps) |
|---|---|
| | Mode 2: Transmit (802.11n-20BW 14.4Mbps) |
| | Mode 3: Transmit (802.11n-40BW 30Mbps) |
| | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) |
| | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) |

## 1.2. Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product | | Manufacturer | Model No. | Serial No. | Power Cord |
|---|---|---|---|---|---|
| 1 | LCD Monitor | DELL | ST2320Lf | CN-0M2NN6-72872-22I-C9VS | Non-Shielded, 1.8m |
| 2 | External HDD | Transcend | TS1TSJ25H3B | F21786-0125 | N/A |
| 3 | External HDD | Transcend | TS1TSJ25H3B | F21786-0005 | N/A |
| 4 | External HDD | Transcend | TS1TSJ25MC | F30467-0003 | N/A |
| 5 | Microphone & Earphone | RONEVER | MOE241 | N/A | N/A |

| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A | HDMI Cable | Non-shielded, 1.8m |
| B | USB Cable | Shielded, 0.5m, two PCS. |
| C | USB Type-C Cable | Shielded, 0.5m |
| D | Microphone & Earphone Cable | Non-shielded, 1.2m |
| E | LAN Cable | Non-shielded, 2.0m |

## 1.3. Configuration of tested System

## 1.4.    EUT Exercise Software

1.  Setup the EUT as shown in Section 1.4.

2.  Execute software "DRTU V.11.1941.0-10270" on the EUT.

3.  Configure the test mode, the test channel, and the data rate.

4.  Press "OK" to start the continuous Transmit.

5.  Verify that the EUT works properly.

## 1.5. Test Facility

Ambient conditions in the laboratory:

| Performed Item | Items | Required | Actual |
|---|---|---|---|
| Conducted Emission | Temperature (℃) | 10~40 ℃ | 26.5 ℃ |
| | Humidity (%RH) | 10~90 % | 56.0 % |
| Radiated Emission | Temperature (℃) | 10~40 ℃ | 26.1 ℃ |
| | Humidity (%RH) | 10~90 % | 73.0 % |
| Conductive | Temperature (℃) | 10~40 ℃ | 28.0 ℃ |
| | Humidity (%RH) | 10~90 % | 72.9 % |

| | | |
|---|---|---|
| **USA** | **:** | **FCC Registration Number: TW3023** |
| **Canada** | **:** | **IC Registration Number: 4075A** |

Site Description:    Accredited by TAF
                     Accredited Number: 3023

Test Laboratory:     DEKRA Testing and Certification Co., Ltd
Address:             No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
                     Taiwan, R.O.C.
Phone number:        886-2-8601-3788
Fax number:          886-2-8601-3789
Email address:       info.tw@dekra.com
Website:             http://www.dekra.com.tw

| | | |
|---|---|---|
| **USA** | **:** | **FCC Registration Number: TW0023** |
| **Canada** | **:** | **IC Registration Number: 25880** |

Site Description    :   Accredited by TAF
                        Accredited Number: 3023

Test Laboratory     :   DEKRA Testing and Certification Co., Ltd
Address             :   No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
                        New Taipei City 24457, Taiwan, R.O.C.
Phone number        :   886-2-2602-7968
Fax number          :   866-2-2602-3286
Email address       :   info.tw@dekra.com
Website             :   http://www.dekra.com.tw

## 1.6. List of Test Equipment

**For Conducted measurements /CB3/SR8**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Date | Due. Date |
|---|---|---|---|---|---|---|
| | Temperature Chamber | WIT GROUP | TH-1S-B | EQ-201-00146 | 2020/04/06 | 2021/04/05 |
| X | Spectrum Analyzer | Agilent | N9010A | MY53470892 | 2019/09/25 | 2020/09/24 |
| X | Peak Power Analyzer | Keysight | 8990B | MY51000410 | 2020/07/01 | 2021/06/30 |
| X | Wideband Power Sensor | Keysight | N1923A | MY56080003 | 2020/07/01 | 2021/06/30 |
| X | Wideband Power Sensor | Keysight | N1923A | MY56080004 | 2020/07/01 | 2021/06/30 |
| X | EMI Test Receiver | R&S | ESCS 30 | 100369 | 2019/11/27 | 2020/11/26 |
| X | LISN | R&S | ENV216 | 101105 | 2020/04/27 | 2021/04/26 |
| X | LISN | R&S | ESH3-Z5 | 836679/014 | 2020/04/26 | 2021/04/25 |
| X | Coaxial Cable | DEKRA | RG 400 | LC018-RG | 2020/06/19 | 2021/06/18 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test SystemV9.0.5.

**For Radiated measurements /Site3/CB8**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Date | Due. Date |
|---|---|---|---|---|---|---|
| X | Test Receiver | R&S | ESR7 | 101602 | 2019/12/16 | 2020/12/15 |
| X | Signal Analyzer | R&S | FSV40 | 101869 | 2020/06/24 | 2021/06/23 |
| X | Loop Antenna | Teseq | HLA6121 | 37133 | 2019/10/15 | 2021/10/14 |
| X | Bilog Antenna | Schaffner Chase | CBL6112B | 2916 | 2020/01/20 | 2021/01/19 |
| X | Coaxial Cable | DEKRA | L1907-001C | 280280.F141.1000D | 2020/07/09 | 2021/07/08 |
| X | Amplifier | EMCI | EMC001330 | 980254 | 2020/07/28 | 2021/06/10 |
| X | Horn Antenna | ETS-LINDGREN | 3117 | 00228113 | 2020/05/28 | 2021/05/27 |
| X | Coaxial Cable | DEKRA | L1907-002C | 280280.F141.1000D | 2020/07/09 | 2021/07/08 |
| X | Amplifier | EMCI | EMC05820SE | 980361 | 2019/09/23 | 2020/09/22 |
| X | Amplifier | SGH | PRAMP118 | 20200202 | 2020/03/17 | 2021/03/16 |
| X | Horn Antenna | Com-Power | AH-1840 | 101101 | 2019/10/31 | 2020/10/30 |
| X | Amplifier + Cable | EMCI | EMC184045SE | 980369 | 2020/04/23 | 2021/04/22 |
| | Bilog Antenna | Schaffner Chase | CBL6112B | 2916 | 2020/01/20 | 2021/01/19 |
| | Coaxial Cable | DEKRA | L1907-003C | 00100A1B3A120M | 2020/07/09 | 2021/07/08 |
| | Amplifier | EMCI | EMC001330 | 980255 | 2020/03/17 | 2021/03/16 |
| | Horn Antenna | ETS-LINDGREN | 3117 | 00228111 | 2020/05/28 | 2021/05/27 |
| | Amplifier | SGH | PRAMP0510 | 20200206 | 2020/03/17 | 2021/03/16 |
| | Amplifier | SGH | PRAMP118 | 20200202 | 2020/03/17 | 2021/03/16 |
| X | Filter | MICRO-TRONICS | BRM50702 | G270 | 2019/08/08 | 2020/08/07 |
| X | Filter | MICRO-TRONICS | BRM50716 | G196 | 2019/08/08 | 2020/08/07 |

Note:
1. Loop Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Test SystemV1.1.

**For Conduction measurements /ASR1**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | EMI Test Receiver | R&S | ESR7 | 101601 | 2020.05.28 | 2021.05.27 |
| X | Two-Line V-Network | R&S | ENV216 | 101306 | 2020.03.25 | 2021.03.24 |
| X | Two-Line V-Network | R&S | ENV216 | 101307 | 2020.04.17 | 2021.04.16 |
| X | Coaxial Cable | DEKRA | RG400_BNC | RF001 | 2020.05.24 | 2021.05.23 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0.

**For Conducted measurements /ASR2**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | Spectrum Analyzer | R&S | FSV30 | 103464 | 2020.02.11 | 2021.02.10 |
| X | Spectrum Analyzer | Agilent | N9010A | MY55150401 | 2020.09.15 | 2021.09.14 |
| X | Power Meter | Anritsu | ML2496A | 1548002 | 2020.02.10 | 2021.02.09 |
| X | Power Sensor | Anritsu | MA2411B | 1531023 | 2020.02.10 | 2021.02.09 |
| X | Power Sensor | Anritsu | MA2411B | 1531022 | 2020.02.10 | 2021.02.09 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.5.

**For Radiated measurements /ACB1**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | Loop Antenna | AMETEK | HLA6121 | 49611 | 2020.03.16 | 2021.03.15 |
| X | Bi-Log Antenna | SCHWARZBECK | VULB9168 | 9168-953 | 2020.01.03 | 2021.01.02 |
| X | Horn Antenna | ETS-Lindgren | 3117 | 00203761 | 2020.11.23 | 2021.11.22 |
| X | Horn Antenna | Com-Power | AH-840 | 101087 | 2020.06.08 | 2021.06.07 |
| X | Pre-Amplifier | EMCI | EMC001330 | 980316 | 2020.06.23 | 2021.06.22 |
| X | Pre-Amplifier | EMCI | EMC051845SE | SN980632 | 2020.08.21 | 2021.08.20 |
| X | Pre-Amplifier | EMCI | EMC184045SE | 980314 | 2020.06.10 | 2021.06.09 |
| | Filter | MICRO-TRONICS | BRM50702 | G270 | 2020.08.17 | 2021.08.16 |
| X | Filter | MICRO-TRONICS | BRM50716 | G196 | 2020.08.17 | 2021.08.16 |
| X | EMI Test Receiver | R&S | ESR7 | 101601 | 2020.05.21 | 2021.05.20 |
| X | Spectrum Analyzer | R&S | FSV40 | 101148 | 2020.03.16 | 2021.03.15 |
| X | Coaxial Cable | SUHNER | SUCOFLEX 106 | RF002 | 2020.07.03 | 2021.07.02 |
| X | Mircoflex Cable | HUBER SUHNER | SUCOFLEX 102 | MY3381/2 | 2020.06.10 | 2021.06.09 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0.

## 1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.
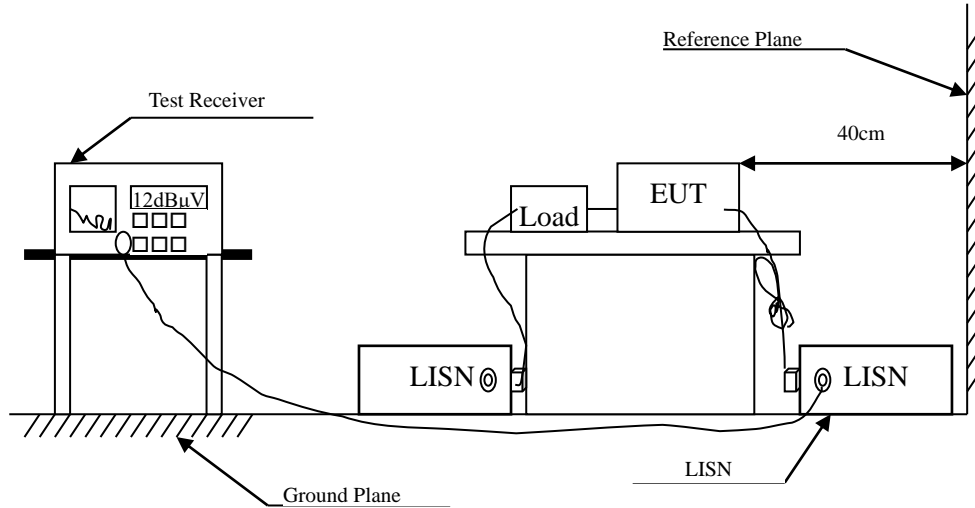
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

| Test item | Uncertainty | |
|---|---|---|
| Conducted Emission | ±3.42 dB | |
| Maximun conducted output power | Power Meter ±0.89dB | Spectrum Analyzer ±2.06dB |
| Power Density | ±2.06dB | |
| Radiated Emission | 9kHz~30MHz: ±3.88dB<br>30MHz~1GHz: ±4.06dB<br>1GHz~18GHz: ±3.71dB<br>18GHz~40GHz: ±3.73dB<br>40GHz~50GHz: ±3.75dB<br>50GHz~325GHz: ±4.39dB | |
| Band Edge | 9kHz~30MHz: ±3.88dB<br>30MHz~1GHz: ±4.06dB<br>1GHz~18GHz: ±3.71dB<br>18GHz~40GHz: ±3.73dB<br>40GHz~50GHz: ±3.75dB<br>50GHz~325GHz: ±4.39dB | |
| Occupied Bandwidth | ±1544.74Hz | |
| Duty Cycle | ±2.31msec | |

**2.** **Conducted Emission**

**2.1.** **Test Setup**



**2.2.** **Limits**

| FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit | | |
|---|---|---|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

Remarks :    In the above table, the tighter limit applies at the band edges.

## 2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
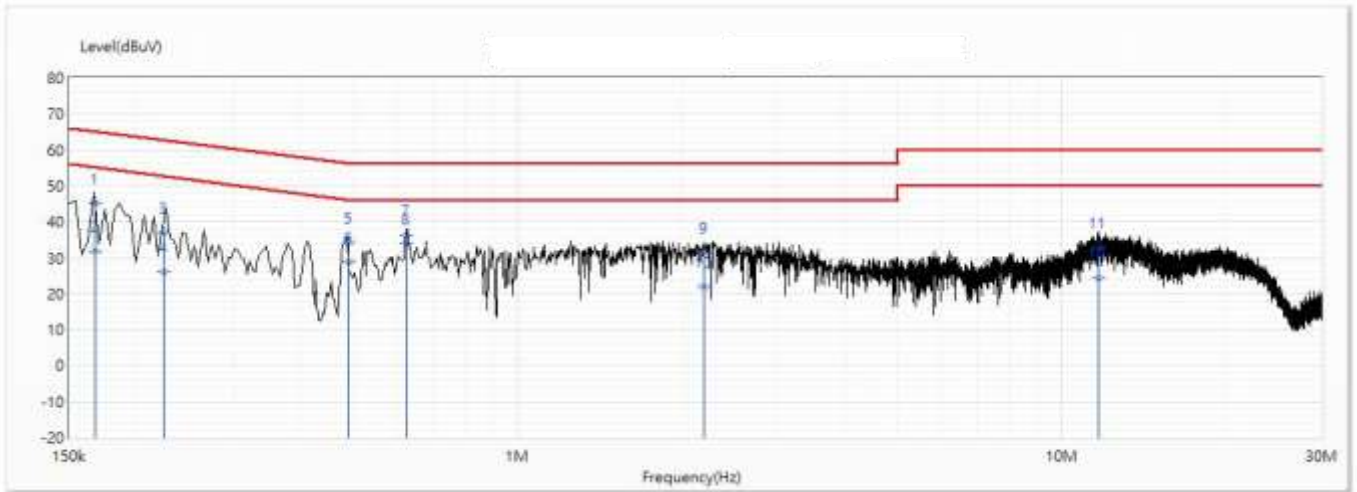
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

## 2.4. Test Result of Conducted Emission

Product : Notebook

Test Item : Conducted Emission Test

Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)
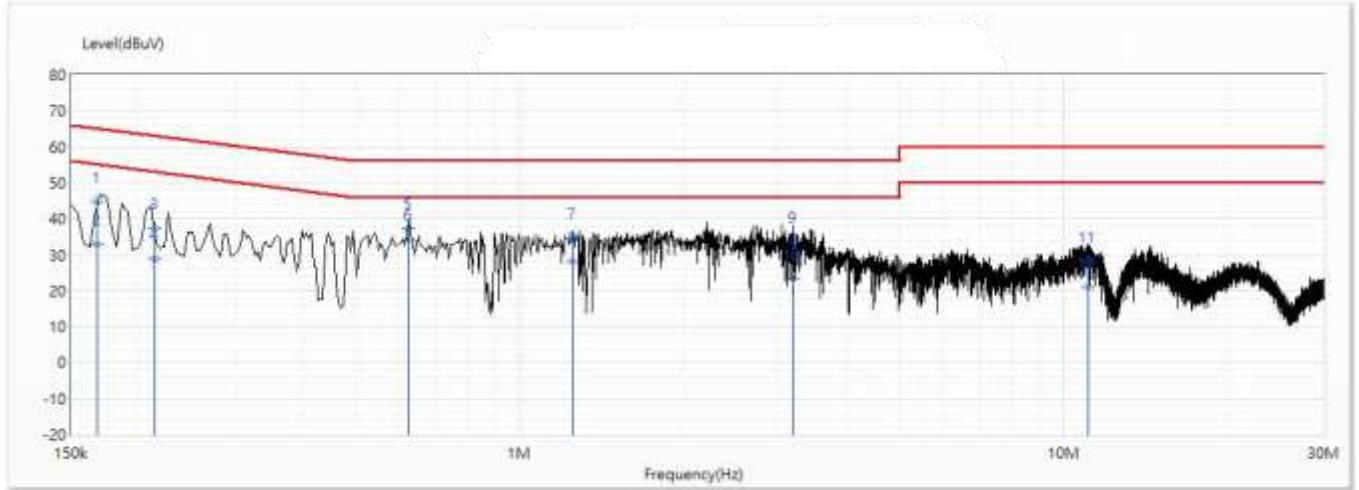
Test Date : 2020/08/15

Line1



| No | Frequency (MHz) | Emission Level (dBuV) | Limit (dBuV) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB) | Detector Type |
|------|------|------|------|------|------|------|------|
| 1 | 0.167 | 45.03 | 65.10 | -20.07 | 35.22 | 9.81 | QP |
| 2 | 0.167 | 31.80 | 55.10 | -23.30 | 22.00 | 9.81 | AV |
| 3 | 0.223 | 37.07 | 62.70 | -25.63 | 27.27 | 9.80 | QP |
| 4 | 0.223 | 26.04 | 52.70 | -26.66 | 16.24 | 9.80 | AV |
| 5 | 0.489 | 34.29 | 56.18 | -21.90 | 24.49 | 9.80 | QP |
| 6 | 0.489 | 28.64 | 46.18 | -17.54 | 18.84 | 9.80 | AV |
| 7 | 0.625 | 36.17 | 56.00 | -19.83 | 26.37 | 9.80 | QP |
| *8 | 0.625 | 33.91 | 46.00 | -12.09 | 24.11 | 9.80 | AV |
| 9 | 2.197 | 31.67 | 56.00 | -24.33 | 21.81 | 9.85 | QP |
| 10 | 2.197 | 21.92 | 46.00 | -24.08 | 12.07 | 9.85 | AV |
| 11 | 11.653 | 33.07 | 60.00 | -26.93 | 22.97 | 10.09 | QP |
| 12 | 11.653 | 24.29 | 50.00 | -25.71 | 14.19 | 10.09 | AV |

Remark:

1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit

Product : Notebook

Test Item : Conducted Emission Test

Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)

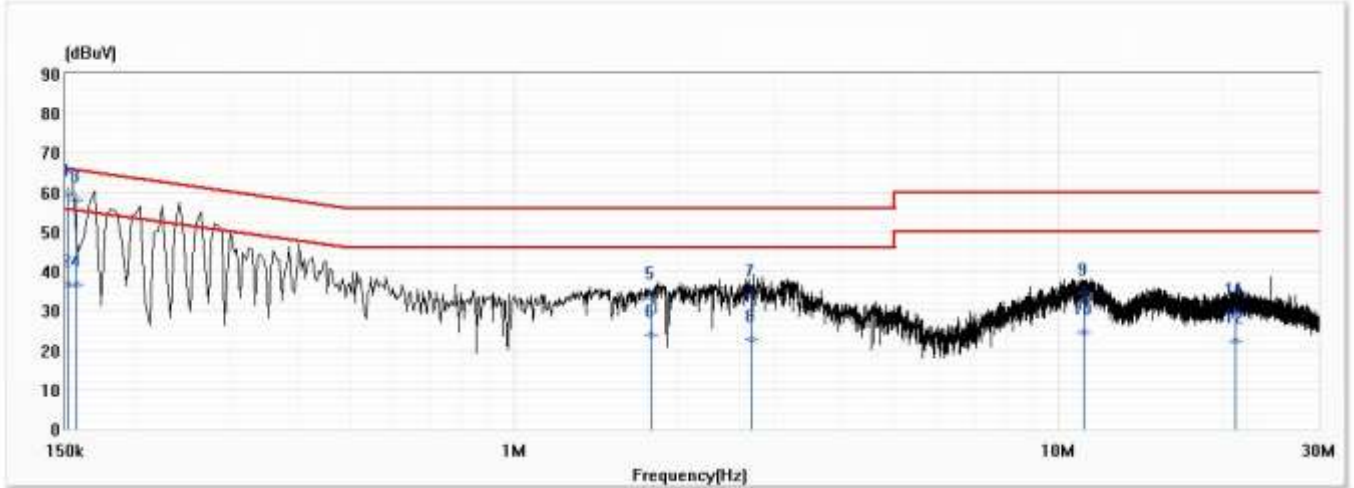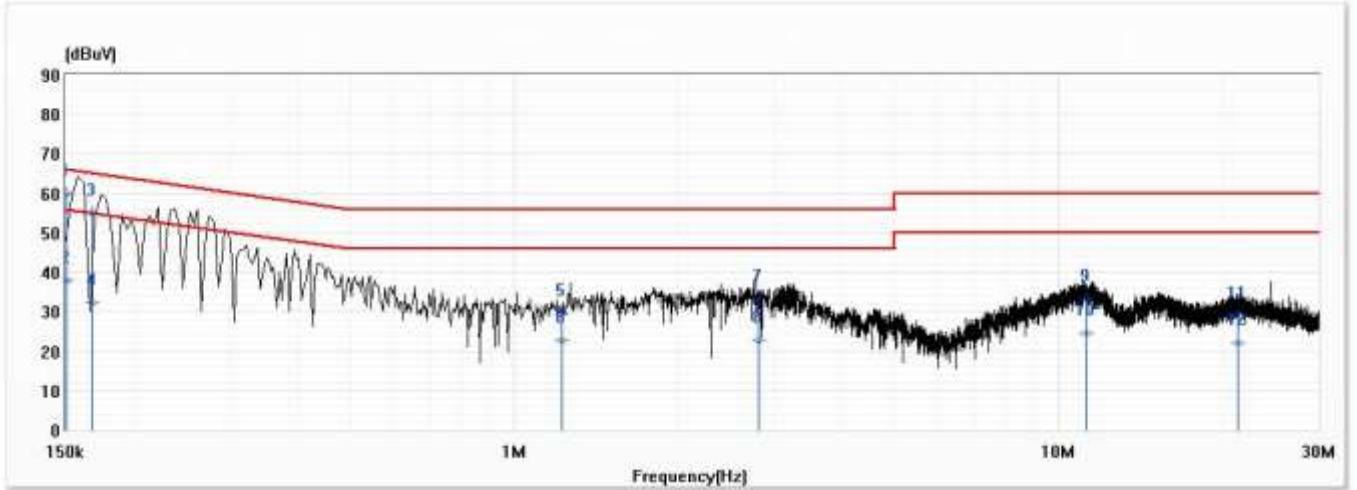Test Date : 2020/08/15

Neutral



| No | Frequency (MHz) | Emission Level (dBuV) | Limit (dBuV) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB) | Detector Type |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 0.168 | 44.82 | 65.08 | -20.26 | 35.03 | 9.79 | QP |
| 2 | 0.168 | 32.86 | 55.08 | -22.22 | 23.07 | 9.79 | AV |
| 3 | 0.214 | 37.32 | 63.05 | -25.73 | 27.54 | 9.78 | QP |
| 4 | 0.214 | 28.66 | 53.05 | -24.39 | 18.88 | 9.78 | AV |
| 5 | 0.625 | 37.17 | 56.00 | -18.83 | 27.38 | 9.79 | QP |
| *6 | 0.625 | 34.25 | 46.00 | -11.75 | 24.46 | 9.79 | AV |
| 7 | 1.25 | 34.64 | 56.00 | -21.36 | 24.84 | 9.80 | QP |
| 8 | 1.25 | 27.98 | 46.00 | -18.02 | 18.17 | 9.80 | AV |
| 9 | 3.181 | 33.72 | 56.00 | -22.28 | 23.85 | 9.88 | QP |
| 10 | 3.181 | 23.34 | 46.00 | -22.66 | 13.46 | 9.88 | AV |
| 11 | 11.116 | 28.23 | 60.00 | -31.77 | 18.11 | 10.12 | QP |
| 12 | 11.116 | 20.82 | 50.00 | -29.18 | 10.70 | 10.12 | AV |

Remark:

1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit

**DEKRA**

|  |  |  |  |
|---|---|---|---|
| Product | : | Notebook | |
| Test Item | : | Conducted Emission Test | |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz) | |
| Test Date | : | 2020/12/21 | |

Line1



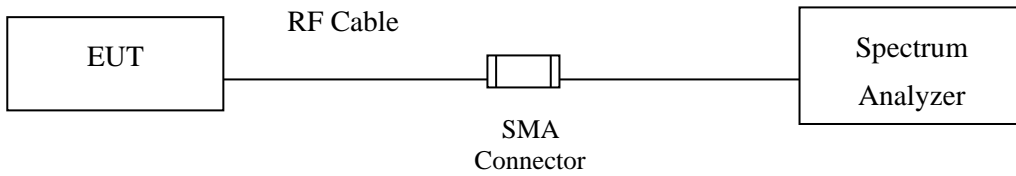| No | Frequency (MHz) | Emission Level (dBuV) | Limit (dBuV) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB) | Detector Type |
|---|---|---|---|---|---|---|---|
| *1 | 0.152 | 59.55 | 65.90 | -6.35 | 49.89 | 9.66 | QP |
| 2 | 0.152 | 36.58 | 55.90 | -19.32 | 26.92 | 9.66 | AV |
| 3 | 0.157 | 57.92 | 65.63 | -7.71 | 48.27 | 9.66 | QP |
| 4 | 0.157 | 36.64 | 55.63 | -18.99 | 26.99 | 9.66 | AV |
| 5 | 1.785 | 33.58 | 56.00 | -22.42 | 23.86 | 9.71 | QP |
| 6 | 1.785 | 23.94 | 46.00 | -22.06 | 14.22 | 9.71 | AV |
| 7 | 2.727 | 34.05 | 56.00 | -21.95 | 24.31 | 9.73 | QP |
| 8 | 2.727 | 22.70 | 46.00 | -23.30 | 12.96 | 9.73 | AV |
| 9 | 11.132 | 34.30 | 60.00 | -25.70 | 24.40 | 9.90 | QP |
| 10 | 11.132 | 24.57 | 50.00 | -25.43 | 14.67 | 9.90 | AV |
| 11 | 21.152 | 29.50 | 60.00 | -30.50 | 19.53 | 9.97 | QP |
| 12 | 21.152 | 22.42 | 50.00 | -27.58 | 12.45 | 9.97 | AV |

Remark:

1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit

DEKRA

|   |   |   |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Conducted Emission Test |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz) |
| Test Date | : | 2020/12/21 |

Neutral



| No | Frequency (MHz) | Emission Level (dBuV) | Limit (dBuV) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB) | Detector Type |
|----|----|----|----|----|----|----|----|
| *1 | 0.151 | 59.99 | 65.97 | -5.98 | 50.32 | 9.67 | QP |
| 2 | 0.151 | 38.00 | 55.97 | -17.97 | 28.33 | 9.67 | AV |
| 3 | 0.168 | 54.90 | 65.05 | -10.16 | 45.23 | 9.67 | QP |
| 4 | 0.168 | 32.24 | 55.05 | -22.81 | 22.57 | 9.67 | AV |
| 5 | 1.221 | 29.36 | 56.00 | -26.64 | 19.66 | 9.70 | QP |
| 6 | 1.221 | 22.51 | 46.00 | -23.49 | 12.81 | 9.70 | AV |
| 7 | 2.806 | 33.23 | 56.00 | -22.77 | 23.48 | 9.75 | QP |
| 8 | 2.806 | 22.63 | 46.00 | -23.37 | 12.88 | 9.75 | AV |
| 9 | 11.223 | 33.33 | 60.00 | -26.67 | 23.40 | 9.93 | QP |
| 10 | 11.223 | 24.64 | 50.00 | -25.36 | 14.71 | 9.93 | AV |
| 11 | 21.277 | 29.00 | 60.00 | -31.00 | 18.94 | 10.06 | QP |
| 12 | 21.277 | 22.14 | 50.00 | -27.86 | 12.08 | 10.06 | AV |

Remark:

1. "*" means this data is the worst emission level;"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).

3. Margin=Emission Level-Limit
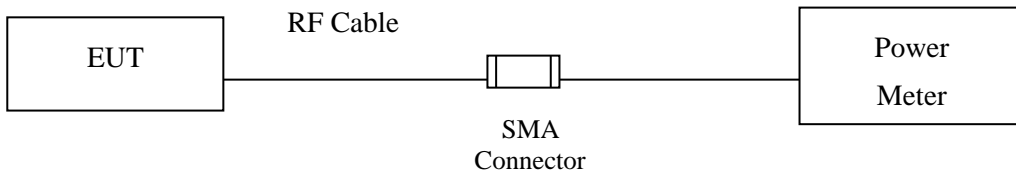
# 3. Maximun conducted output power

## 3.1. Test Setup

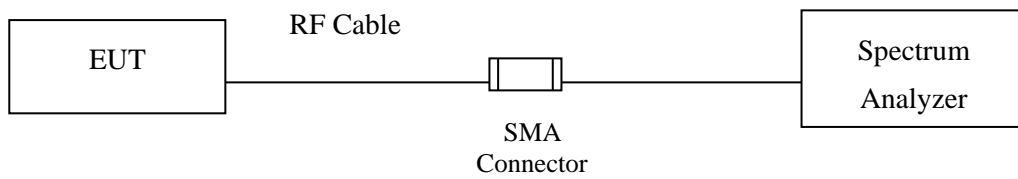**99% Occupied Bandwidth**



**Conduction Power Measurement**

Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)

## 3.2. Limits

For the band 5.15-5.25 GHz,

**(i)** For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

**(ii)** For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**(iii)** For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-topoint U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

**(iv)** 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 provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 99% emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

## 3.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW$\leqq$40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)
*Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)*

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

### 3.4. Test Result of Maximum conducted output power

Product : Notebook
Test Item : Maximum conducted output power
Test Mode : Mode 1: Transmit (802.11a-6Mbps)
Test Date : 2020/08/28

**CHAIN A**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate (Mbps) | | | | | | | |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 |
| | | Measurement Level (dBm) | | | | | | | |
| 36 | 5180 | 15.26 | -- | -- | -- | -- | -- | -- | -- |
| 44 | 5220 | 15.18 | 15.10 | 15.06 | 14.96 | 14.92 | 14.82 | 14.79 | 14.71 |
| 48 | 5240 | 15.08 | -- | -- | -- | -- | -- | -- | -- |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:**

| Channel No | Frequency Range | 26dB Bandwidth | Output Power | Output Power Limit | |
|---|---|---|---|---|---|
| | (MHz) | (MHz) | (dBm) | (dBm) | dBm+10log(BW) |
| 36 | 5180 | -- | 15.26 | 24 | -- |
| 44 | 5220 | -- | 15.18 | 24 | -- |
| 48 | 5240 | -- | 15.08 | 24 | -- |

Note: 1.Peak Power Output Value =Reading value on power meter + cable loss

2.CHAIN A is selected as the test mode

**CHAIN B**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate (Mbps) | | | | | | | |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 |
| | | Measurement Level (dBm) | | | | | | | |
| 36 | 5180 | 15.11 | -- | -- | -- | -- | -- | -- | -- |
| 44 | 5220 | 15.09 | 15.00 | 14.92 | 14.86 | 14.80 | 14.76 | 14.67 | 14.63 |
| 48 | 5240 | 15.08 | -- | -- | -- | -- | -- | -- | -- |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:**

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Output Power (dBm) | Output Power Limit | |
|---|---|---|---|---|---|
| | | | | (dBm) | dBm+10log(BW) |
| 36 | 5180 | -- | 15.11 | 24 | -- |
| 44 | 5220 | -- | 15.09 | 24 | -- |
| 48 | 5240 | -- | 15.08 | 24 | -- |

Note: Power Output Value =Reading value on average power meter + cable loss

Product      :    Notebook
Test Item    :    Maximum conducted output power
Test Mode    :    Mode 2: Transmit (802.11n-20BW 14.4Mbps)
Test Date    :    2020/12/21

**CHAIN A**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Data Rate (Mbps) | | | | | | | |
| Channel No. | Frequency (MHz) | 14.4 | 28.9 | 43.3 | 57.8 | 86.7 | 115.6 | 130 | 144.4 |
| | | Measurement Level (dBm) | | | | | | | |
| 36 | 5180 | 15.45 | -- | -- | -- | -- | -- | -- | -- |
| 44 | 5220 | 15.26 | 15.22 | 15.18 | 15.15 | 15.12 | 15.08 | 14.98 | 14.92 |
| 48 | 5240 | 15.25 | -- | -- | -- | -- | -- | -- | -- |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**CHAIN B**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Data Rate (Mbps) | | | | | | | |
| Channel No. | Frequency (MHz) | 14.4 | 28.9 | 43.3 | 57.8 | 86.7 | 115.6 | 130 | 144.4 |
| | | Measurement Level (dBm) | | | | | | | |
| 36 | 5180 | 15.32 | -- | -- | -- | -- | -- | -- | -- |
| 44 | 5220 | 15.39 | 15.34 | 15.28 | 15.22 | 15.14 | 15.08 | 15.02 | 14.99 |
| 48 | 5240 | 15.42 | -- | -- | -- | -- | -- | -- | -- |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement:**

(**CHAIN A+ B)**

| Channel Number | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Output Power Limit | |
|---|---|---|---|---|---|---|---|
| | | | | | | (dBm) | dBm+10log(BW) |
| 36 | 5180 | -- | 15.45 | 15.32 | 18.40 | 24 | -- |
| 44 | 5220 | -- | 15.26 | 15.39 | 18.34 | 24 | -- |
| 48 | 5240 | -- | 15.25 | 15.42 | 18.35 | 24 | -- |

Note:

1.  Power Output Value =Reading value on average power meter + cable loss

2.  Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

| Product | : | Notebook |
|---|---|---|
| Test Item | : | Maximum conducted output power |
| Test Mode | : | Mode 3: Transmit (802.11n-40BW 30Mbps) |
| Test Date | : | 2020/12/21 |

**CHAIN A**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate (Mbps) | | | | | | | |
| | | 30 | 60 | 90 | 120 | 180 | 240 | 270 | 300 |
| | | Measurement Level (dBm) | | | | | | | |
| 38 | 5190 | 13.91 | -- | -- | -- | -- | -- | -- | -- |
| 46 | 5230 | 15.35 | 15.27 | 15.21 | 15.13 | 15.07 | 15.01 | 14.97 | 14.94 |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**CHAIN B**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Data Rate (Mbps) | | | | | | | |
| | | 30 | 60 | 90 | 120 | 180 | 240 | 270 | 300 |
| | | Measurement Level (dBm) | | | | | | | |
| 38 | 5190 | 13.87 | -- | -- | -- | -- | -- | -- | -- |
| 46 | 5230 | 15.25 | 15.2 | 15.17 | 15.14 | 15.06 | 15.02 | 14.93 | 14.84 |

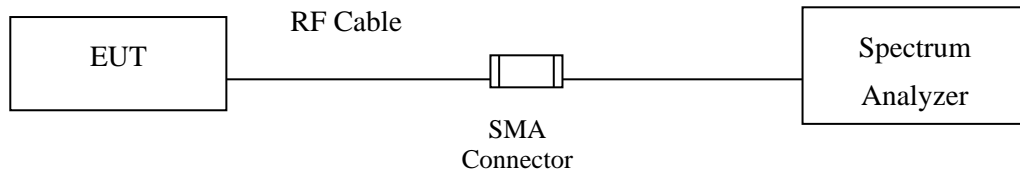Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

## Maximum conducted output power Measurement:

(**CHAIN A+ B)**

| Channel Number | Frequency | 26dB Bandwidth | Chain A Power | Chain B Power | Output Power | Output Power Limit | |
|---|---|---|---|---|---|---|---|
| | (MHz) | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | dBm+10log(BW) |
| 38 | 5190 | -- | 13.91 | 13.87 | 16.90 | 24 | -- |
| 46 | 5230 | -- | 15.35 | 15.25 | 18.31 | 24 | -- |

Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

Product       :    Notebook
Test Item     :    Maximum conducted output power
Test Mode     :    Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO)
Test Date     :    2020/08/28

**Chain A**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel No | Frequency | Data Rate (Mbps) | | | | | | | | | |
| | (MHz) | VTH0 | VTH1 | VTH2 | VTH3 | VTH4 | VTH5 | VTH6 | VTH7 | VTH8 | VTH9 |
| 42 | 5210 | 9.01 | 8.92 | 8.83 | 8.74 | 8.65 | 8.6 | 8.55 | 8.49 | 8.44 | 8.35 |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Chain B**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel No | Frequency | Data Rate (Mbps) | | | | | | | | | |
| | (MHz) | VTH0 | VTH1 | VTH2 | VTH3 | VTH4 | VTH5 | VTH6 | VTH7 | VTH8 | VTH9 |
| 42 | 5210 | 10.2 | 10.13 | 10.08 | 10 | 9.95 | 9.92 | 9.82 | 9.79 | 9.75 | 9.66 |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Maximum conducted output power Measurement**

(**CHAIN A+ B**)

| Channel No | Frequency Range (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Output Power Limit | | Result |
|---|---|---|---|---|---|---|---|---|
| | | | | | | (dBm) | dBm+10log(BW) | |
| 42 | 5210 | 81.200 | 9.01 | 10.20 | 12.66 | 24 | -- | Pass |

Note: Power Output Value =Reading value on average power meter + cable loss

| Product | : | Notebook |
|---|---|---|
| Test Item | : | Maximum conducted output power |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) |
| Test Date | : | 2020/12/21 |

**Chain A**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel No | Frequency | Data Rate (Mbps) | | | | | | | | | |
| | (MHz) | VTH0 | VTH1 | VTH2 | VTH3 | VTH4 | VTH5 | VTH6 | VTH7 | VTH8 | VTH9 |
| 42 | 5210 | 15.31 | 15.26 | 15.16 | 15.13 | 15.09 | 15.01 | 14.92 | 14.86 | 14.78 | 14.74 |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

**Chain B**

| Cable loss=1dB | | Maximum conducted output power | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Channel No | Frequency | Data Rate (Mbps) | | | | | | | | | |
| | (MHz) | VTH0 | VTH1 | VTH2 | VTH3 | VTH4 | VTH5 | VTH6 | VTH7 | VTH8 | VTH9 |
| 42 | 5210 | 15.29 | 15.22 | 15.18 | 15.08 | 15.04 | 15 | 14.92 | 14.86 | 14.8 | 14.77 |

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

## Maximum conducted output power Measurement:
**Chain A**

| Channel No | Frequency Range | 26dB Bandwidth | Output Power | Output Power Limit | |
|---|---|---|---|---|---|
| | (MHz) | (MHz) | (dBm) | (dBm) | dBm+10log(BW) |
| 42 | 5210 | -- | 15.31 | 24 | -- |

Note: Power Output Value =Reading value on average power meter + cable loss

# 4. Peak Power Spectral Density

## 4.1. Test Setup



## 4.2. Limits

For the band 5.15-5.25 GHz,

**(i)** For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**(ii)** For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**(iii)** For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-topoint U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

**(iv)** For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

## 4.3.    Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (500 kHz/100 kHz) = 6.98 dB.

## 4.4. Test Result of Peak Power Spectral Density

Product : Notebook
Test Item : Peak Power Spectral Density
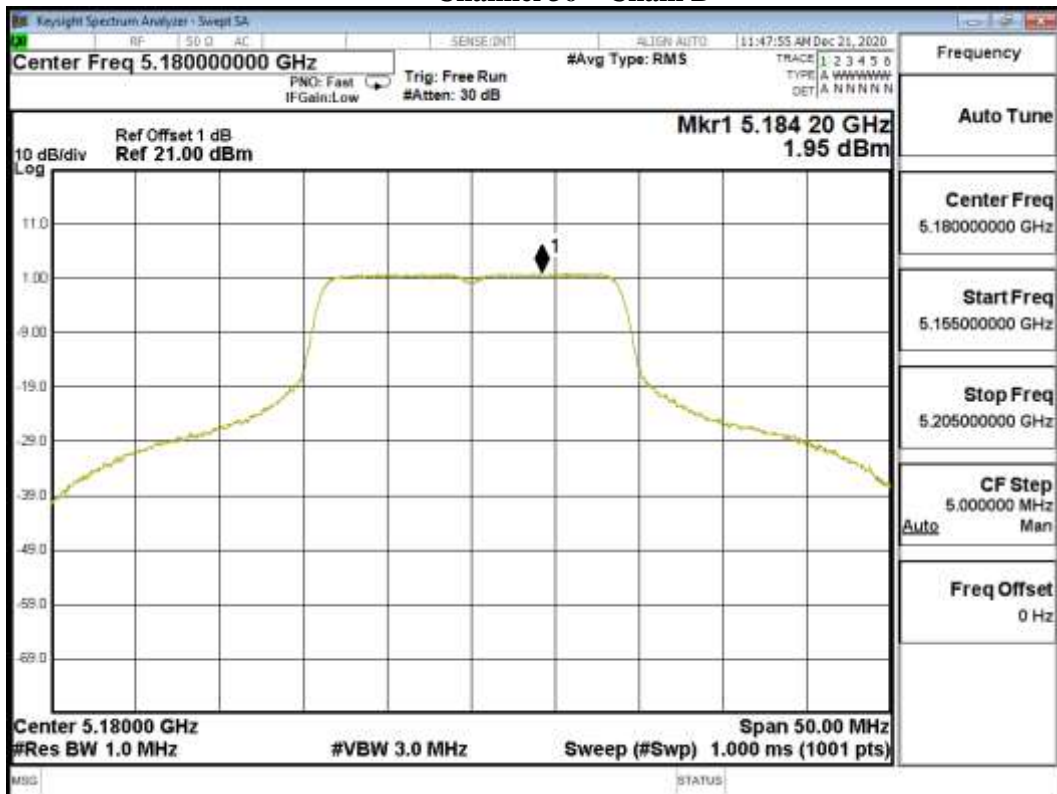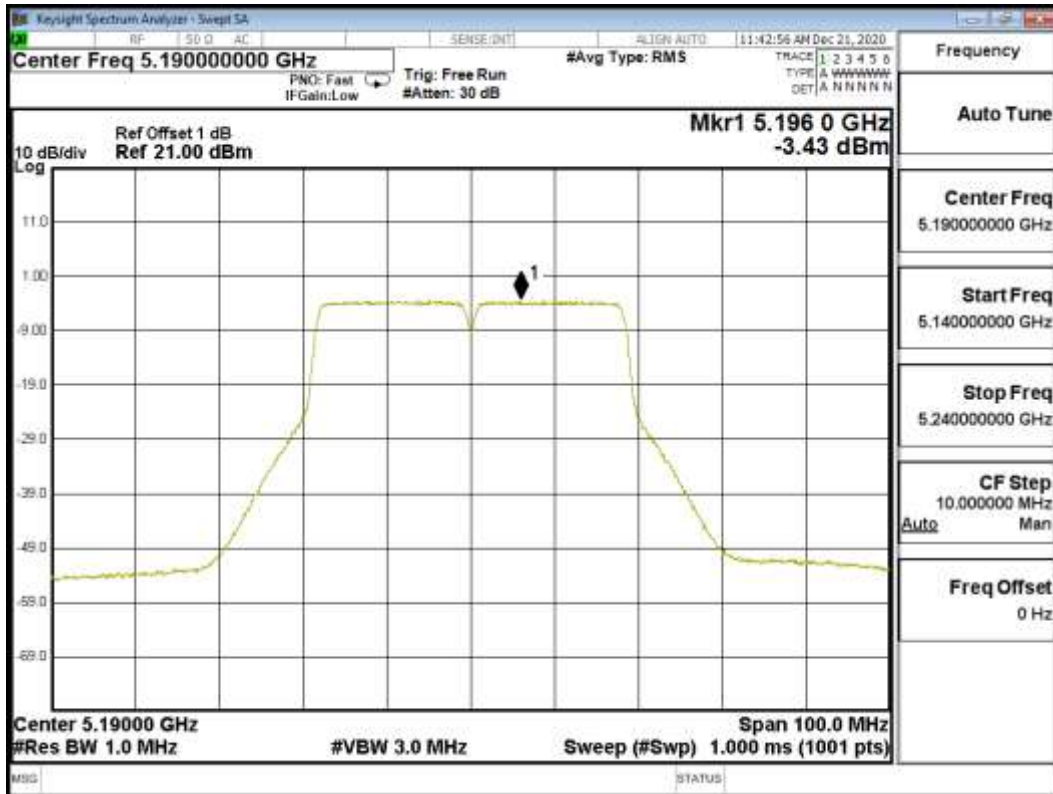Test Mode : Mode 1: Transmit (802.11a-6Mbps)
Test Date : 2020/08/28

| Channel Number | Frequency (MHz) | Measurement Level (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|
| 36 | 5180 | 5.27 | <11 | Pass |
| 44 | 5220 | 7.76 | <11 | Pass |
| 48 | 5240 | 8.27 | <11 | Pass |

**Channel 36:**



**Channel 44:**

**Channel 48:**

Product        :    Notebook
Test Item      :    Peak Power Spectral Density
Test Mode      :    Mode 2: Transmit (802.11n-20BW 14.4Mbps)
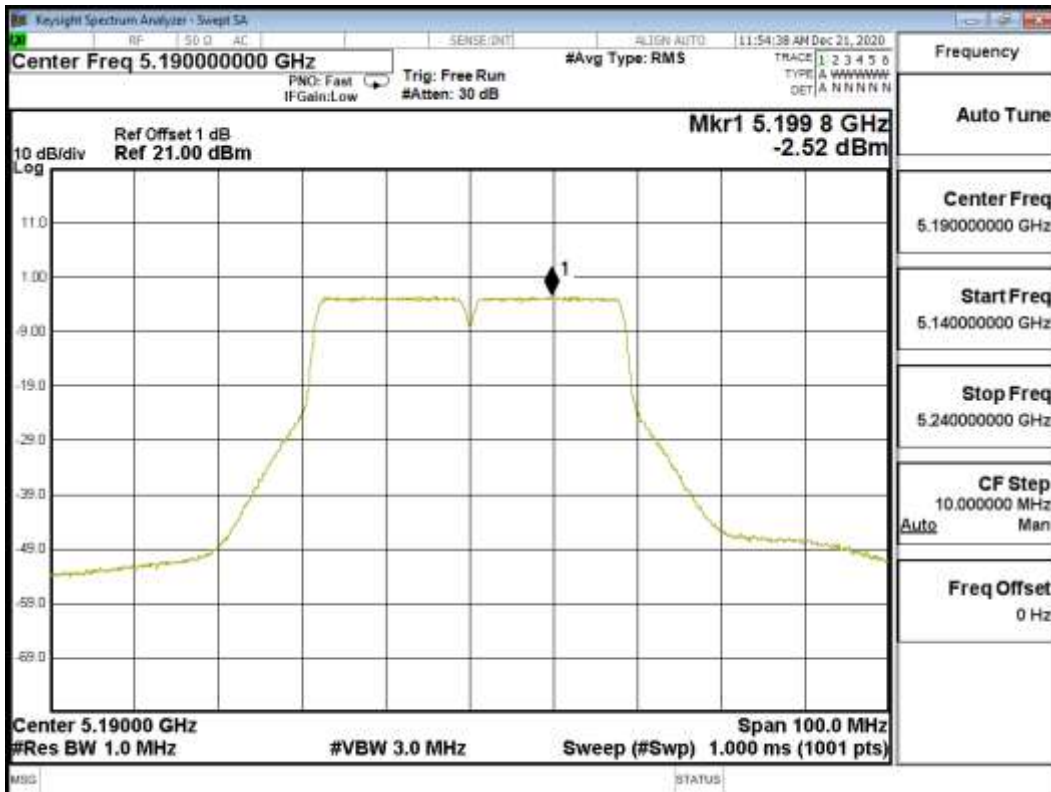Test Date      :    2020/12/21

| Channel Number | Frequency (MHz) | Chain | PPSD (dBm) | Total PPSD (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| 36 | 5180 | A | 1.16 | 4.17 | <11 | Pass |
| | | B | 1.95 | 4.96 | <11 | Pass |
| 44 | 5220 | A | 1.86 | 4.87 | <11 | Pass |
| | | B | 2.15 | 5.16 | <11 | Pass |
| 48 | 5240 | A | 1.89 | 4.90 | <11 | Pass |
| | | B | 2.33 | 5.34 | <11 | Pass |

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

**Channel 36 – Chain A**
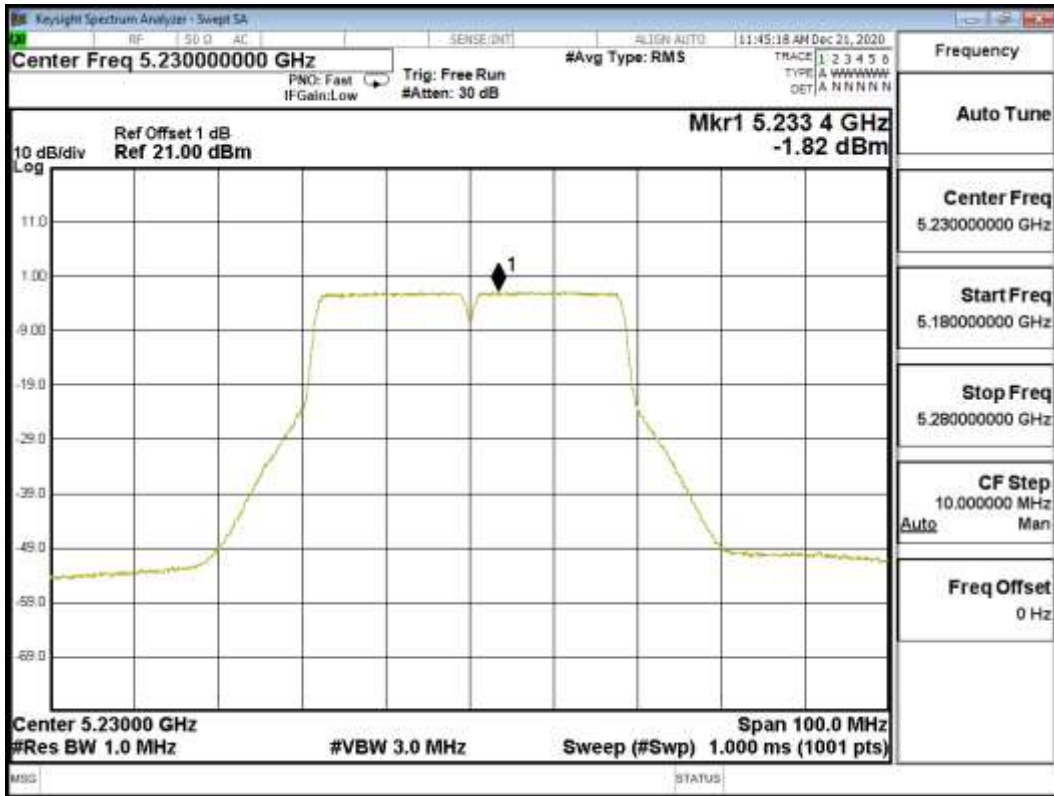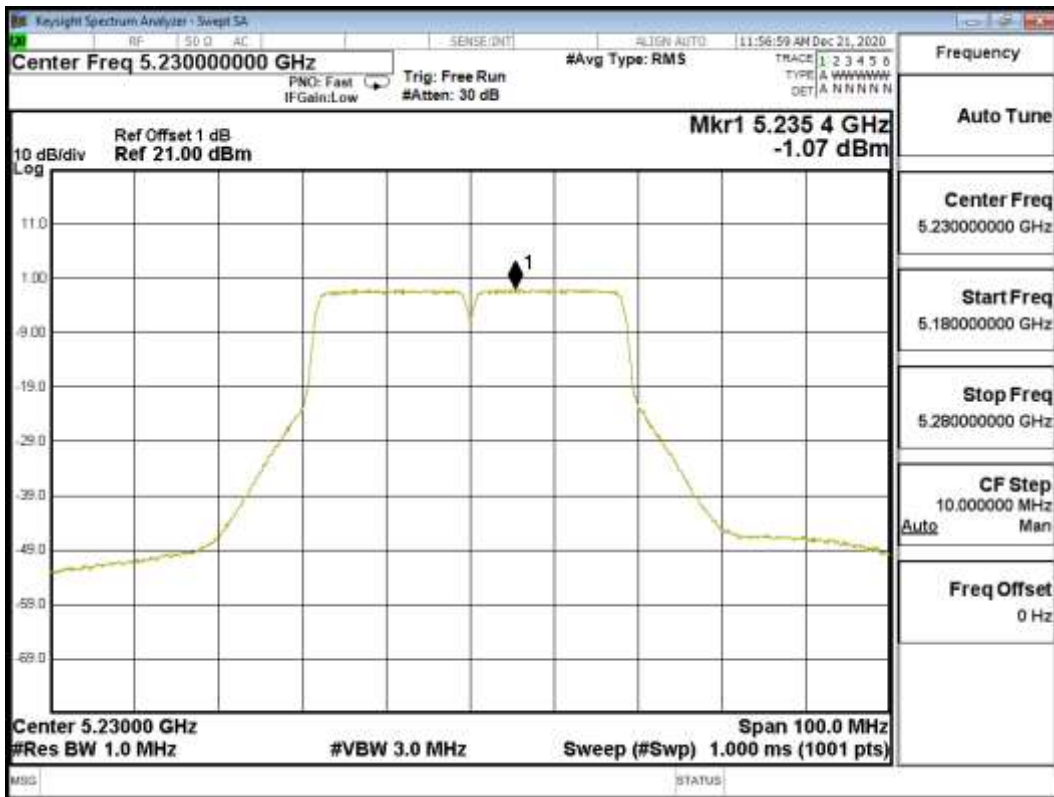


**Channel 36 – Chain B**

**Channel 44 – Chain A**



**Channel 44 – Chain B**

**Channel 48 – Chain A**



**Channel 48 – Chain B**

Product : Notebook
Test Item : Peak Power Spectral Density
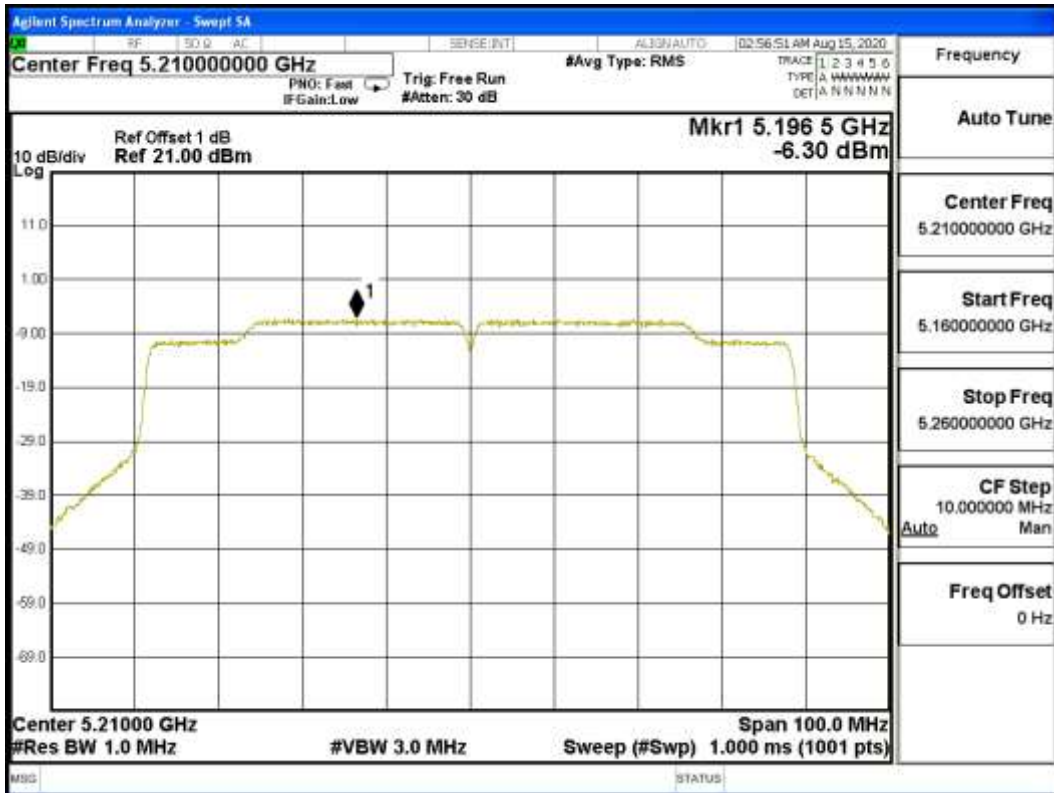Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps)
Test Date : 2020/12/21

| Channel Number | Frequency (MHz) | Chain | PPSD (dBm) | Total PPSD (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| 38 | 5190 | A | -3.43 | -0.42 | <11 | Pass |
| | | B | -2.52 | 0.49 | <11 | Pass |
| 46 | 5230 | A | -1.82 | 1.19 | <11 | Pass |
| | | B | -1.07 | 1.94 | <11 | Pass |

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

**Channel 38 – Chain A**



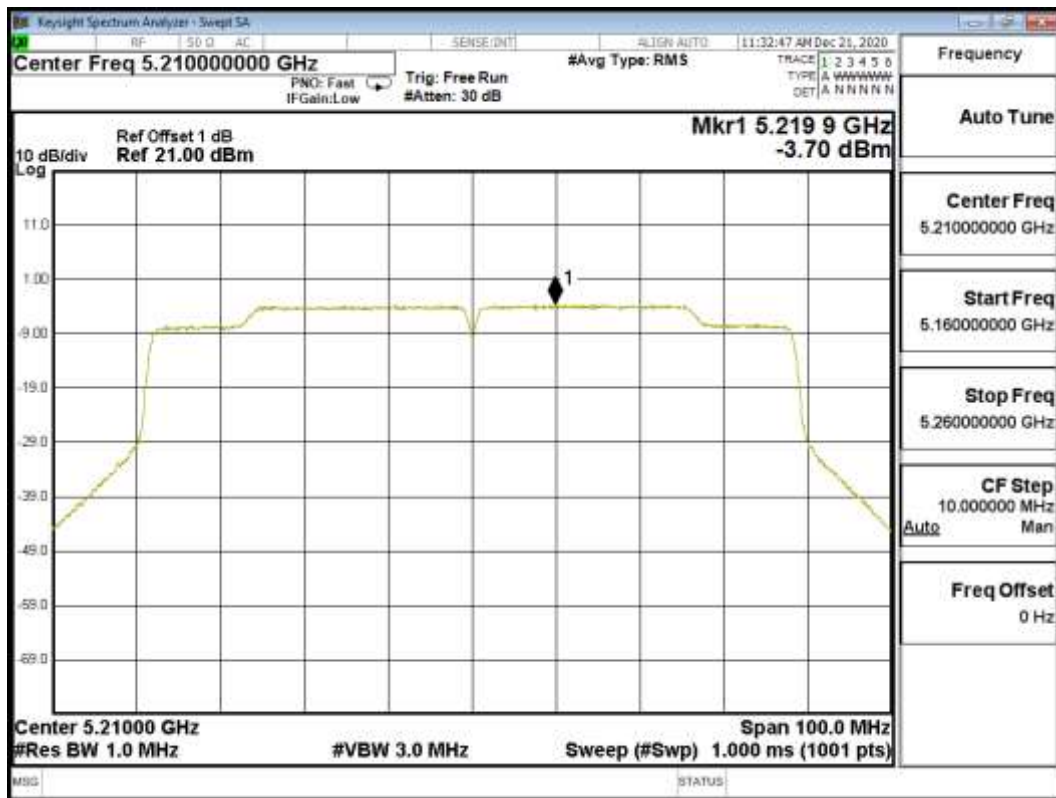**Channel 38 – Chain B**

**Channel 46 – Chain A**



**Channel 46 – Chain B**

Product : Notebook
Test Item : Peak Power Spectral Density
Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO)
Test Date : 2020/08/28

| Channel Number | Frequency (MHz) | Chain | PPSD (dBm) | Total PPSD (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| 42 | 5210 | A | -9.51 | -6.50 | <11 | Pass |
| | | B | -6.30 | -3.29 | <11 | Pass |

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

**Channel 42 – Chain A**



**Channel 42 – Chain B**

Product : Notebook
Test Item : Peak Power Spectral Density
Test Mode : Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)
Test Date : 2020/12/21

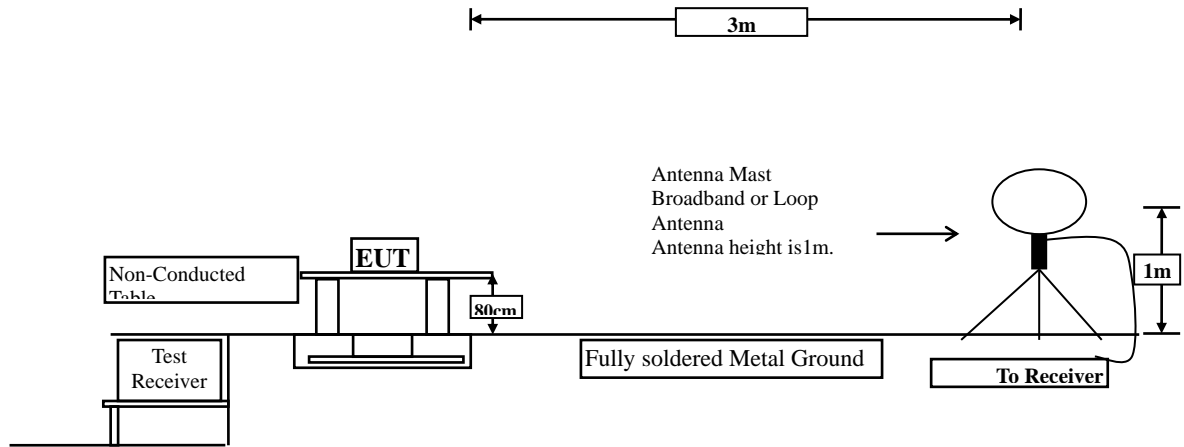| Channel Number | Frequency (MHz) | Chain | PPSD (dBm) | Required Limit (dBm) | Result |
|---|---|---|---|---|---|
| 42 | 5210 | A | -3.70 | <11 | Pass |

**Channel 42 – Chain A**
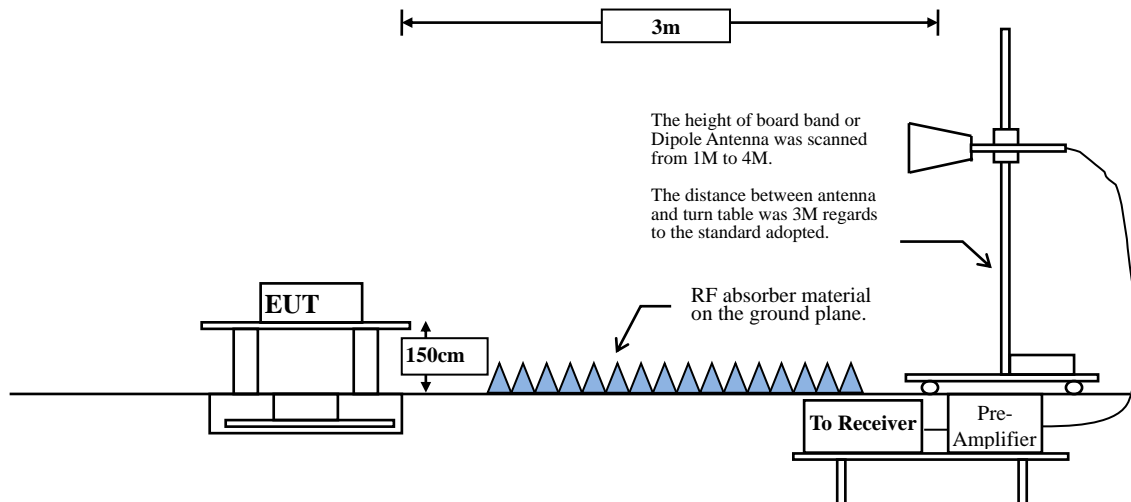
# 5. Radiated Emission

## 5.1. Test Setup

Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz

## 5.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209(a) Limits | | |
|---|---|---|
| Frequency MHz | Field strength (microvolts/meter) | Measurement distance (meter) |
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remarks: E field strength (dBμV/m) = 20 log E field strength (uV/m)

### 5.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

**RBW and VBW Parameter setting:**

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW ≥ 3MHz.


According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

( T refers to 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.)
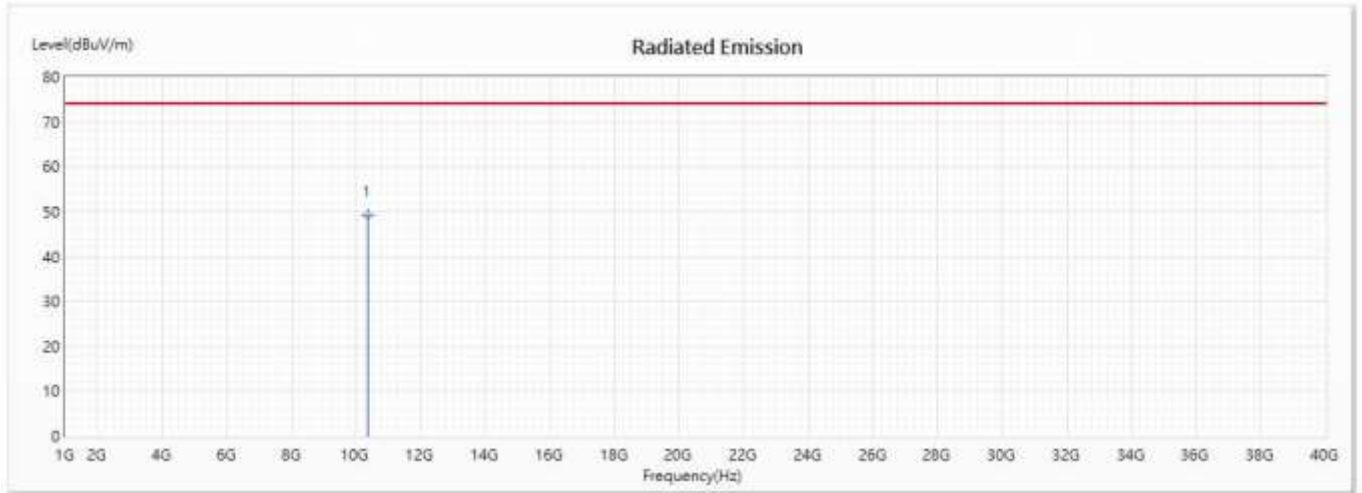
| 5GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|---|---|---|---|---|
| 802.11a | 97.22 | 2.0290 | 493 | 500 |
| 802.11n20 | 98.77 | 18.5507 | 54 | 10 |
| 802.11n40 | 98.40 | 8.9275 | 112 | 10 |
| 802.11ac80(MIMO) | 98.44 | 5.4783 | 183 | 10 |
| 802.11ac80(SISO) | 99.00 | 10.9980 | 91 | 10 |

Note: Duty Cycle Refer to Section 7

## 5.4. Test Result of Radiated Emission

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5180MHz)
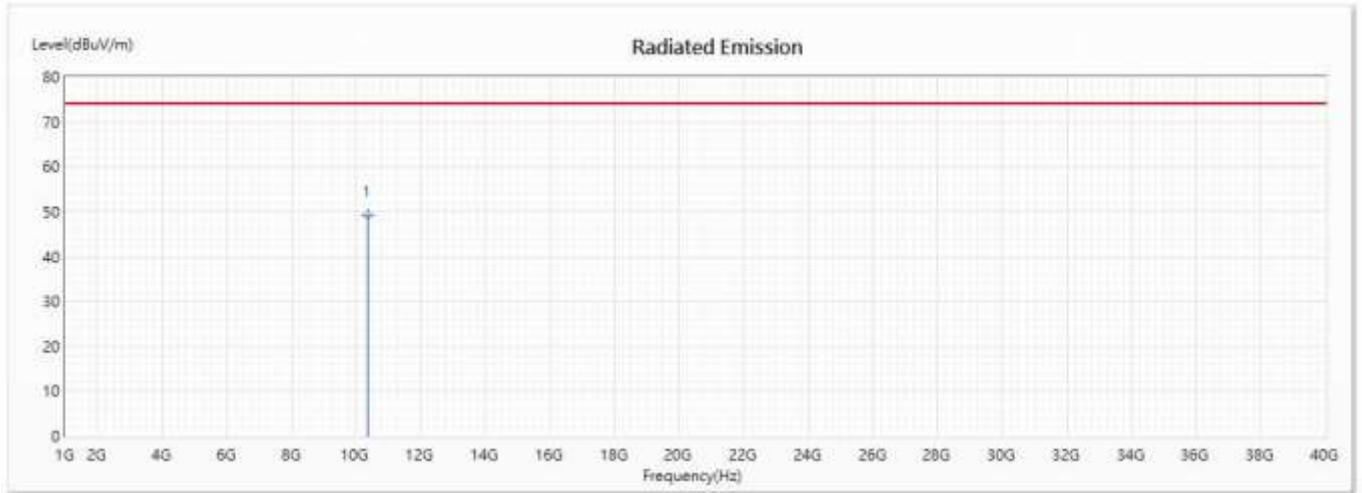Test Date : 2020/07/28

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| * 1 | 10360 | 49.02 | 74.00 | -24.98 | 60.62 | -11.60 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5180MHz)
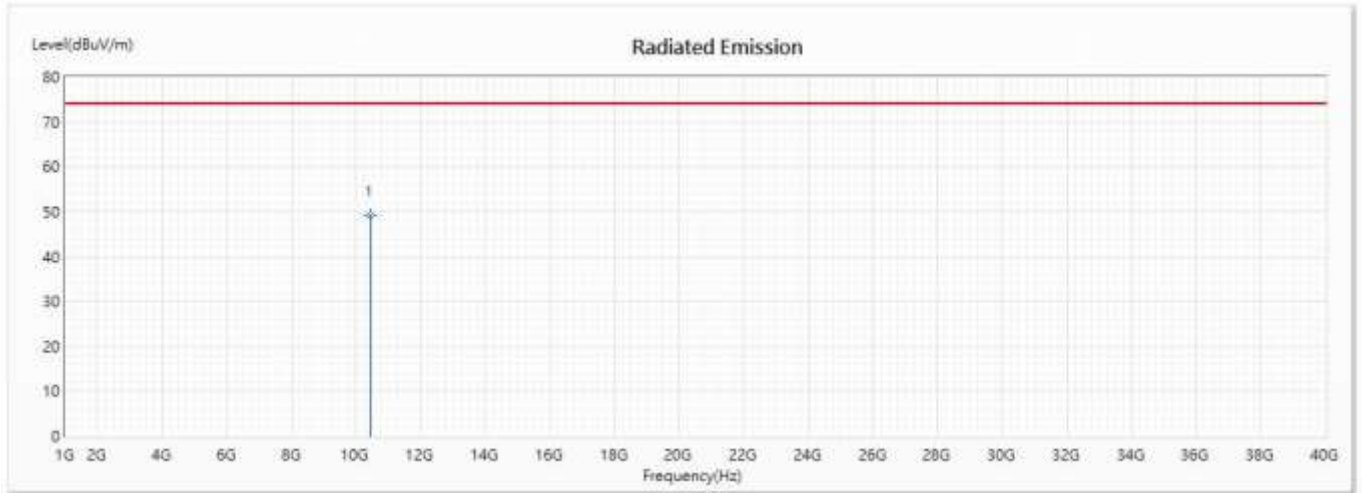Test Date : 2020/07/28

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10360 | 49.11 | 74.00 | -24.89 | 60.71 | -11.60 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5220MHz)
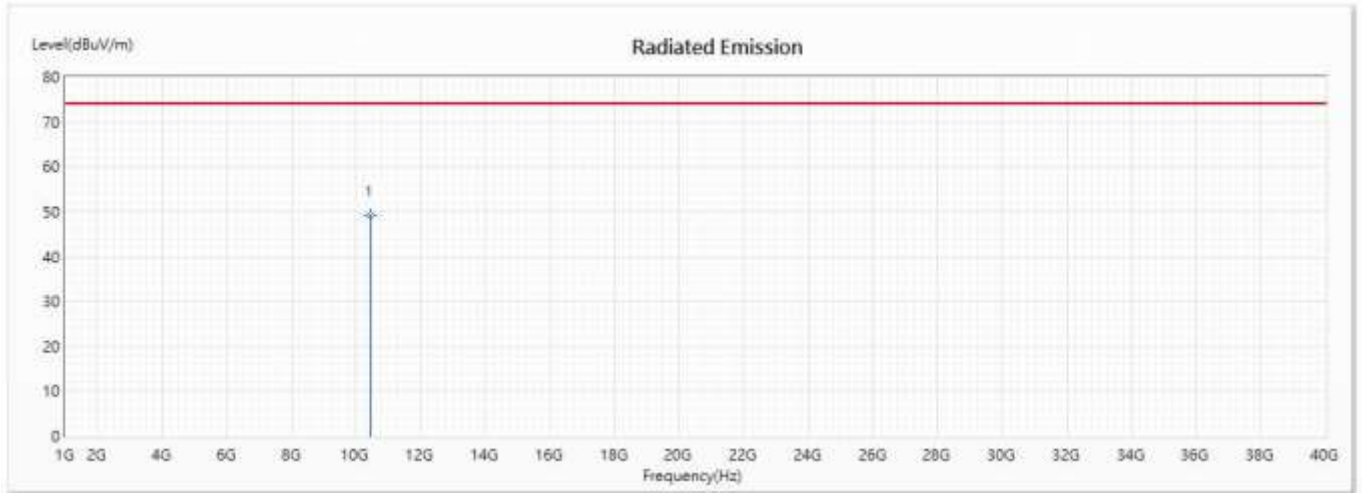Test Date : 2020/07/28

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|------|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| * 1 | 10440 | 49.15 | 74.00 | -24.85 | 61.56 | -12.41 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

DEKRA

| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 1: Transmit (802.11a-6Mbps) (5220MHz) |
| Test Date | : | 2020/07/28 |

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10440 | 49.07 | 74.00 | -24.93 | 61.48 | -12.41 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product        :        Notebook
Test Item      :        Harmonic Radiated Emission Data
Test Mode      :        Mode 1: Transmit (802.11a-6Mbps) (5240MHz)
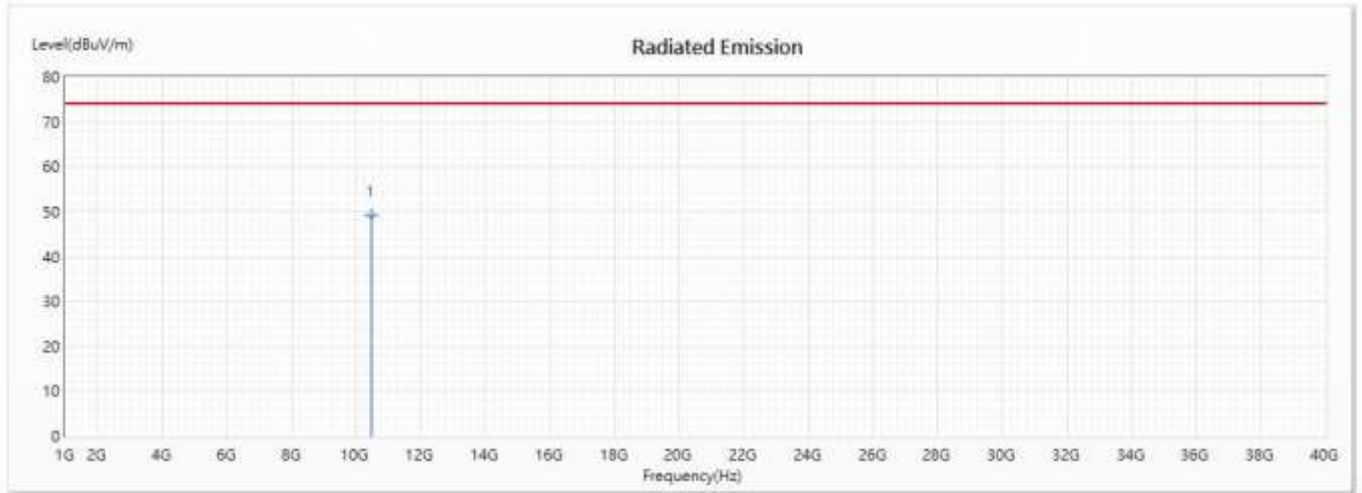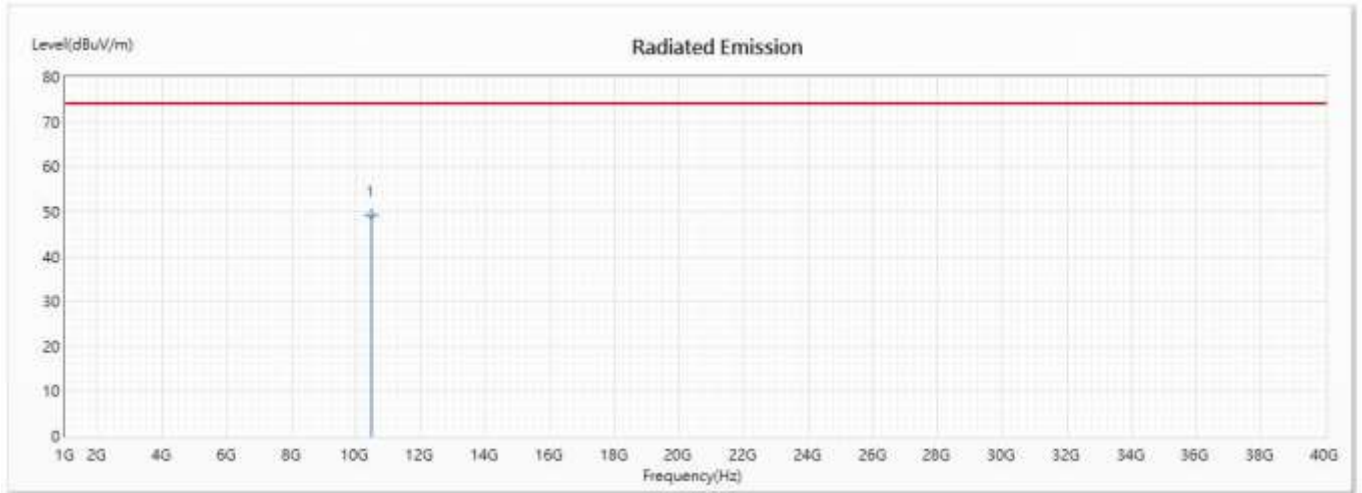Test Date      :        2020/07/28

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|-------------------------|----------------|-------------|----------------------|------------------------|---------------|
| * 1 | 10480 | 49.28 | 74.00 | -24.72 | 62.03 | -12.75 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5240MHz)
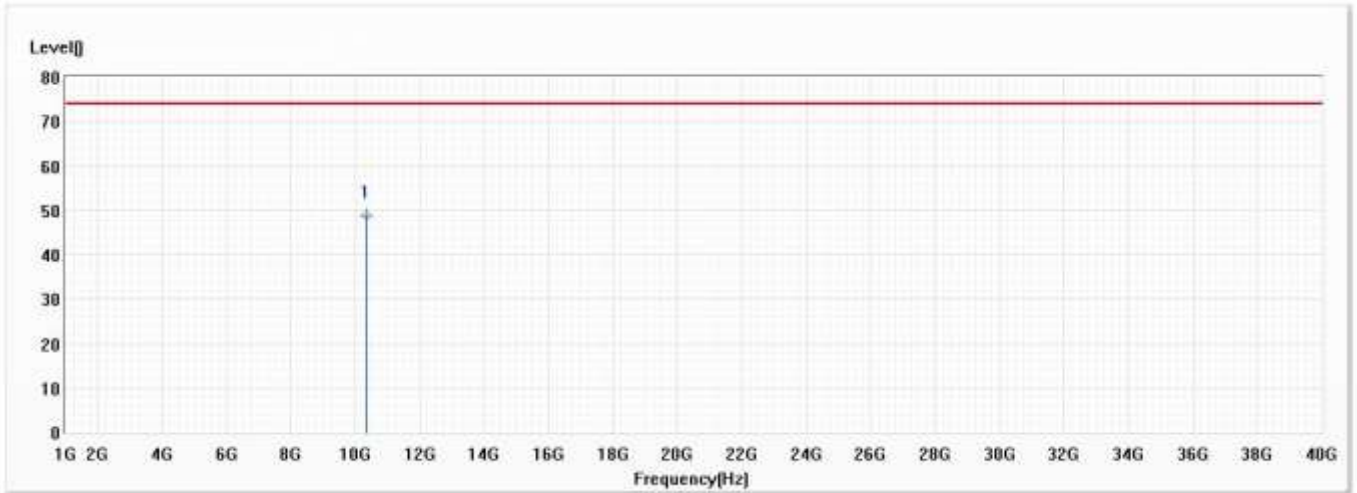Test Date : 2020/07/28

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10480 | 49.22 | 74.00 | -24.78 | 61.97 | -12.75 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)
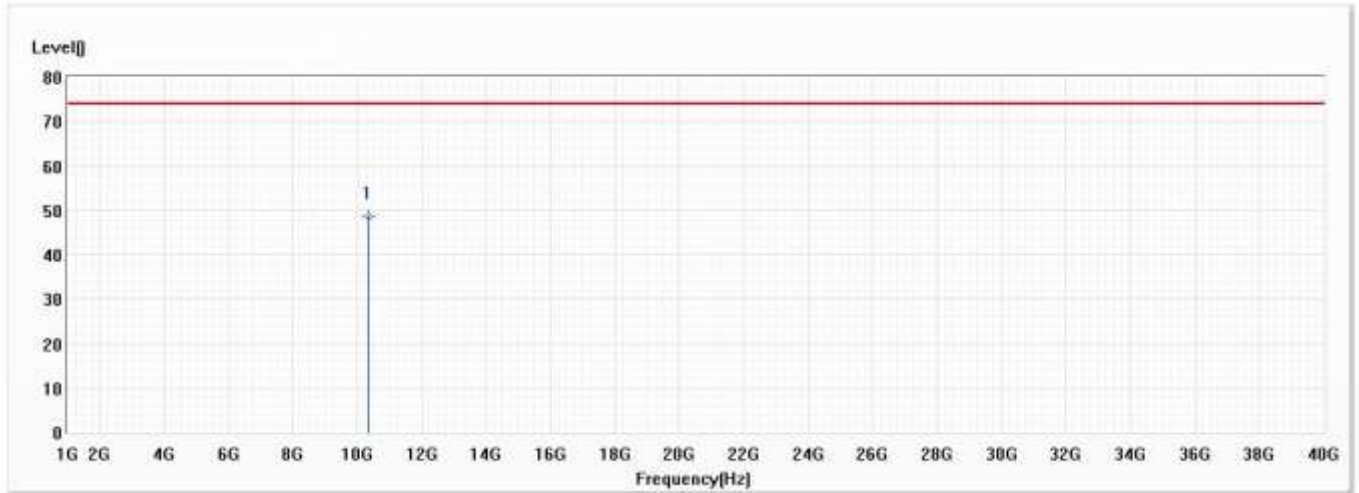Test Date : 2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10360.000 | 48.88 | 74.00 | -25.12 | 59.10 | -10.22 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)
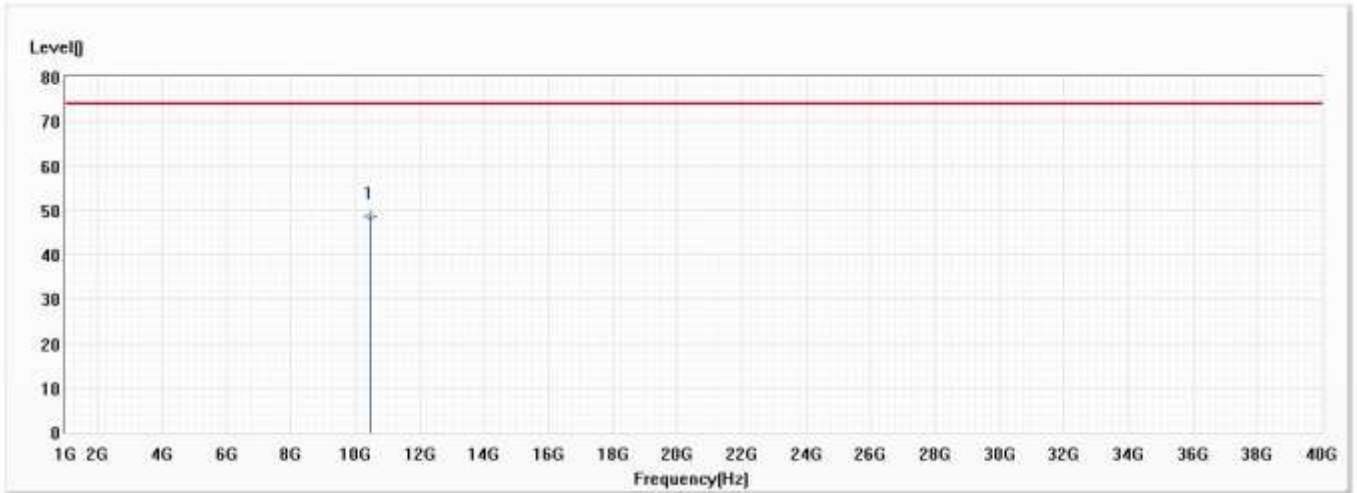Test Date : 2020/12/21

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10360.000 | 48.67 | 74.00 | -25.33 | 58.89 | -10.22 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5220MHz)
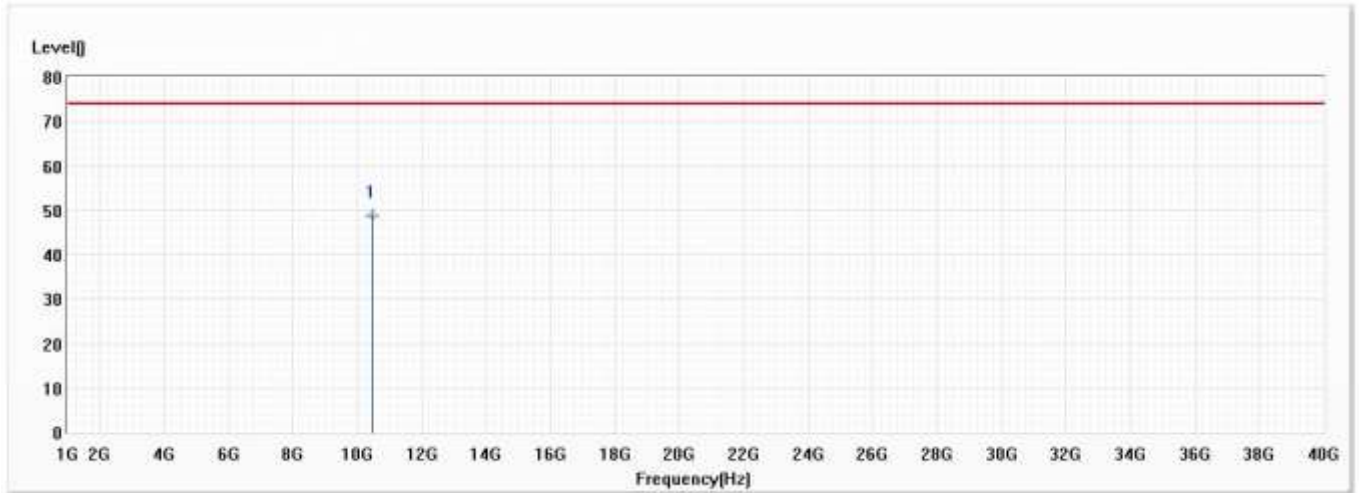Test Date : 2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10440.000 | 48.60 | 74.00 | -25.40 | 58.73 | -10.13 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

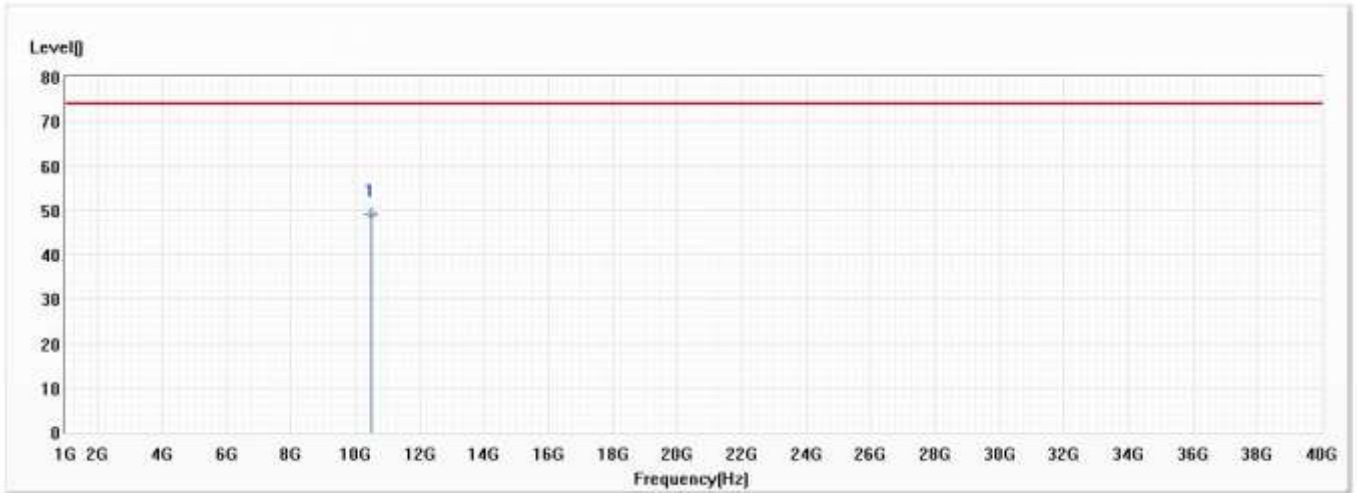| Product | : | Notebook |
|---|---|---|
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5220MHz) |
| Test Date | : | 2020/12/21 |

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10440.000 | 48.93 | 74.00 | -25.07 | 59.06 | -10.13 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

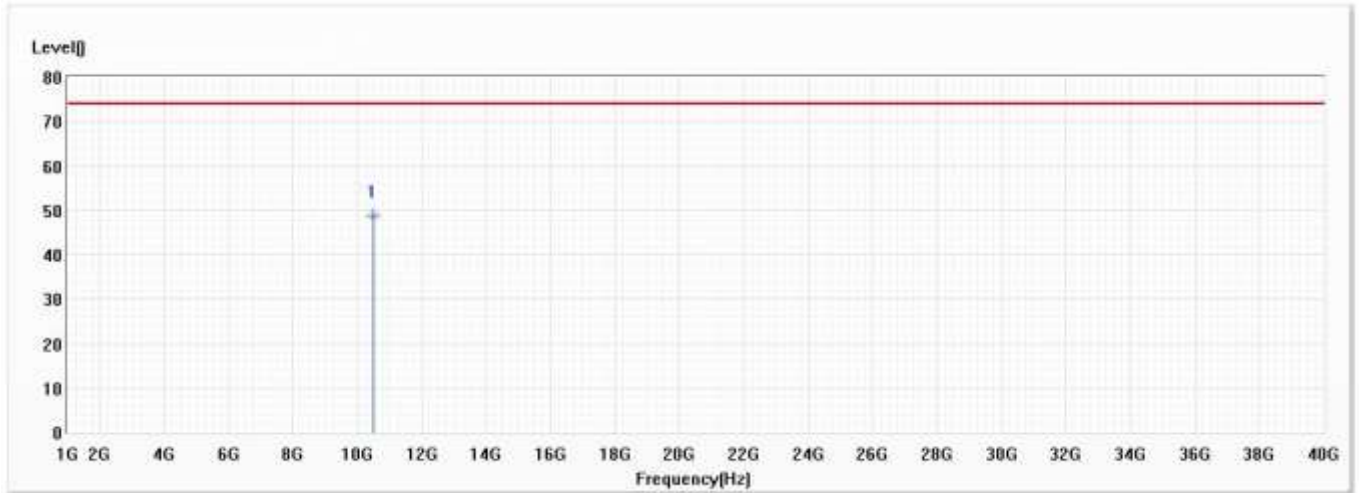| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5240MHz) |
| Test Date | : | 2020/12/21 |

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10480.000 | 49.03 | 74.00 | -24.97 | 59.03 | -10.00 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5240MHz) |
| Test Date | : | 2020/12/21 |

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10480.000 | 48.91 | 74.00 | -25.09 | 58.91 | -10.00 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Notebook
Test Item : Harmonic Radiated Emission Data
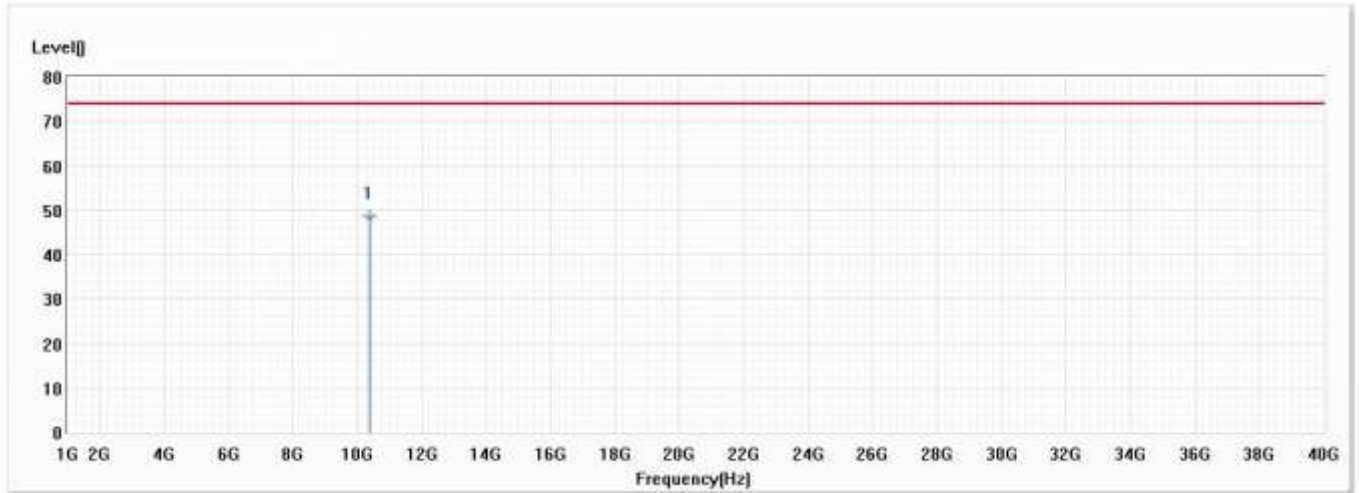Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
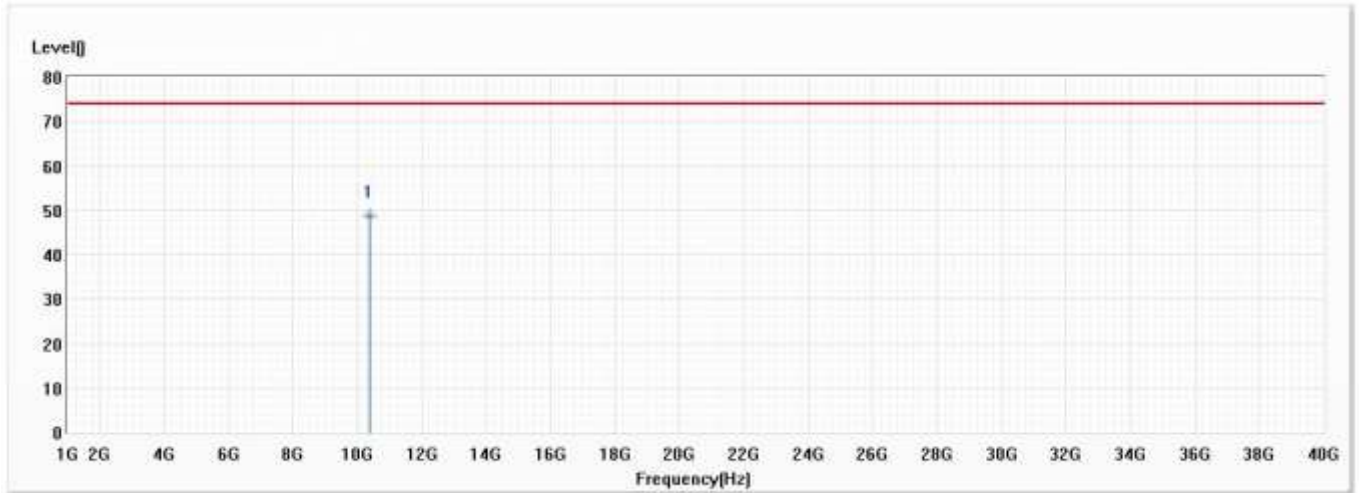Test Date : 2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10380.000 | 48.67 | 74.00 | -25.33 | 58.86 | -10.19 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product        :    Notebook
Test Item     :    Harmonic Radiated Emission Data
Test Mode   :    Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
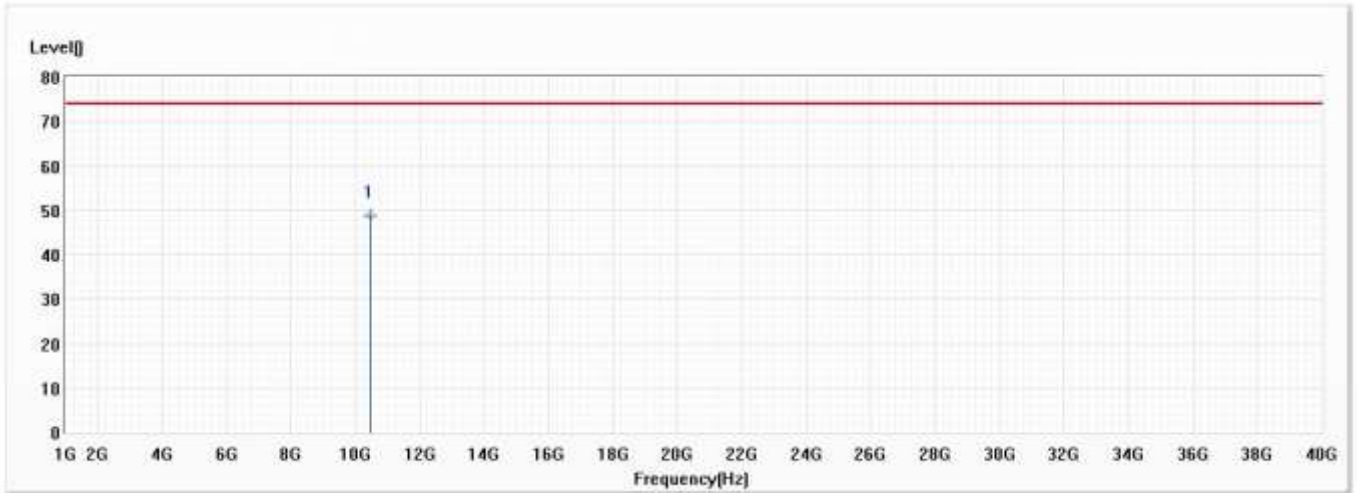Test Date    :    2020/12/21

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10380.000 | 48.73 | 74.00 | -25.27 | 58.92 | -10.19 | PK |

Note:
1.   All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2.   Emission Level = Reading Level + Correct Factor.
3.   Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4.   The average measurement was not performed when the peak measured data under the limit of average detection.
5.   The emission levels of other frequencies are very lower than the limit and not show in test report.

Product      :    Notebook
Test Item    :    Harmonic Radiated Emission Data
Test Mode    :    Mode 3: Transmit (802.11n-40BW 30Mbps) (5230MHz)
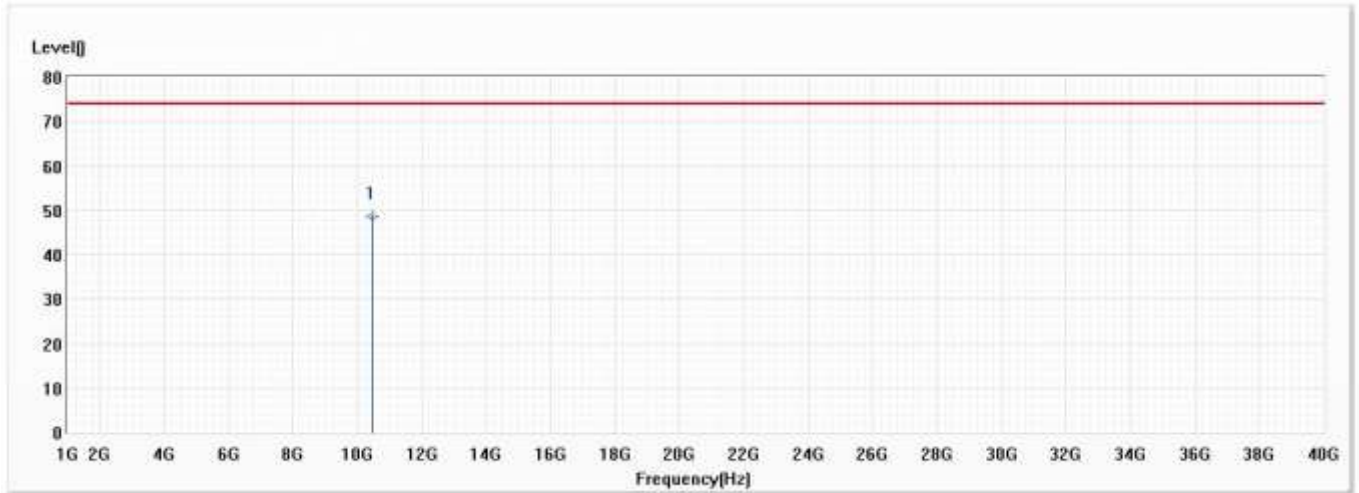Test Date    :    2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|--------------------------|-----------------|-------------|----------------------|------------------------|----------------|
| * 1 | 10460.000 | 48.87 | 74.00 | -25.13 | 58.93 | -10.06 | PK |

Note:
1.  All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2.  Emission Level = Reading Level + Correct Factor.
3.  Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4.  The average measurement was not performed when the peak measured data under the limit of average detection.
5.  The emission levels of other frequencies are very lower than the limit and not show in test report.

| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 3: Transmit (802.11n-40BW 30Mbps) (5230MHz) |
| Test Date | : | 2020/12/21 |

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10460.000 | 48.61 | 74.00 | -25.39 | 58.67 | -10.06 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product       :    Notebook
Test Item     :    Harmonic Radiated Emission Data
Test Mode     :    Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)
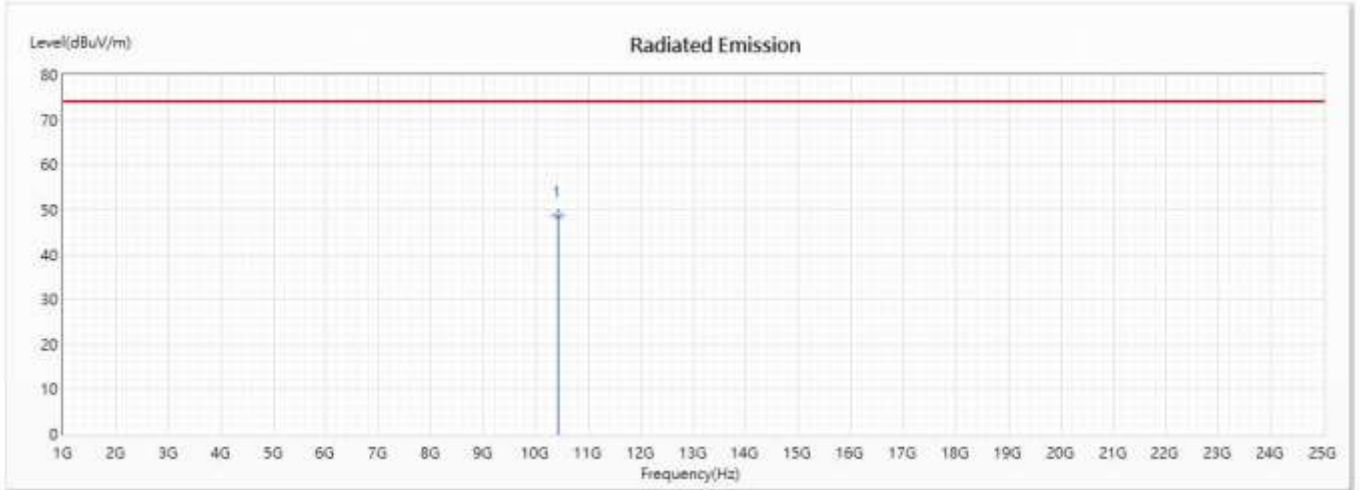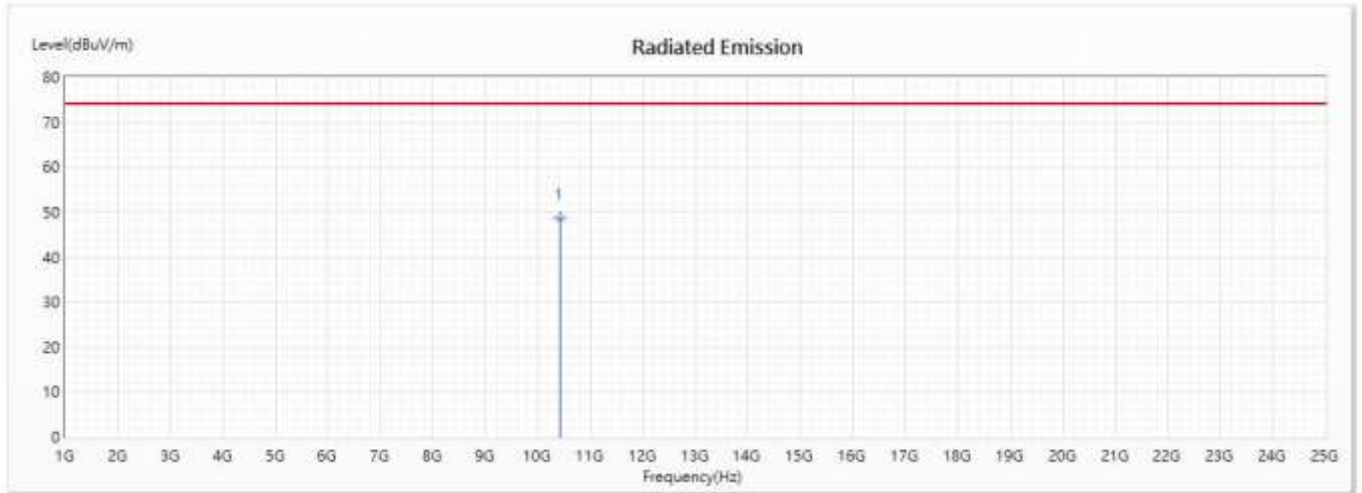Test Date     :    2020/06/16

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| * 1 | 10420 | 48.66 | 74.00 | -25.34 | 60.89 | -12.23 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

DEKRA

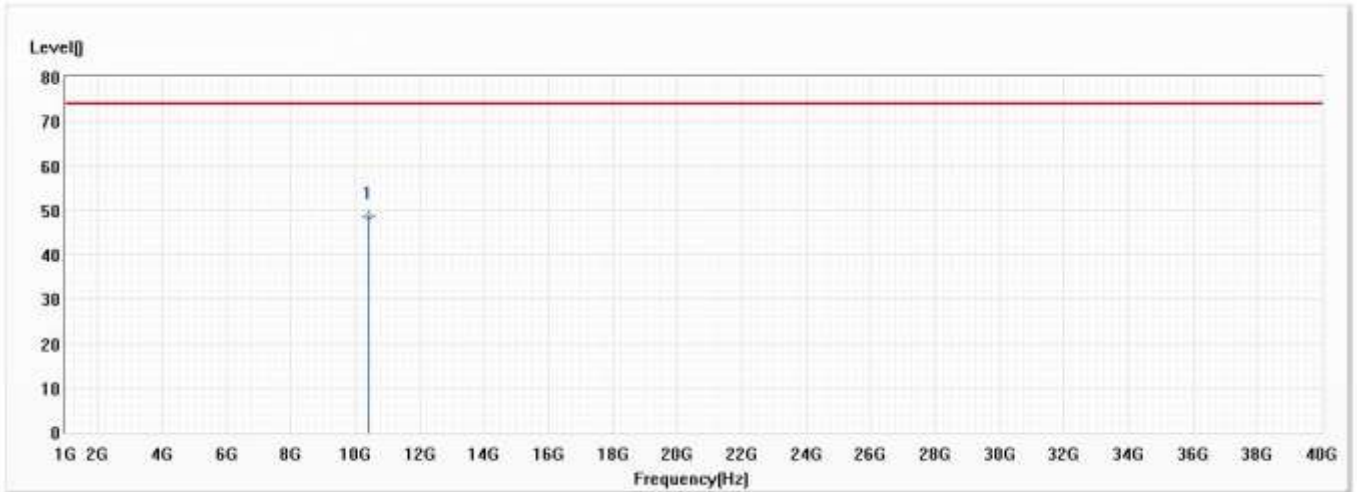| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/06/16 |

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10420 | 48.73 | 74.00 | -25.27 | 60.96 | -12.23 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

**DEKRA**

| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Harmonic Radiated Emission Data |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz) |
| Test Date | : | 2020/12/21 |

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10420.000 | 48.51 | 74.00 | -25.49 | 58.67 | -10.16 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product     :     Notebook
Test Item     :     Harmonic Radiated Emission Data
Test Mode     :     Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz)
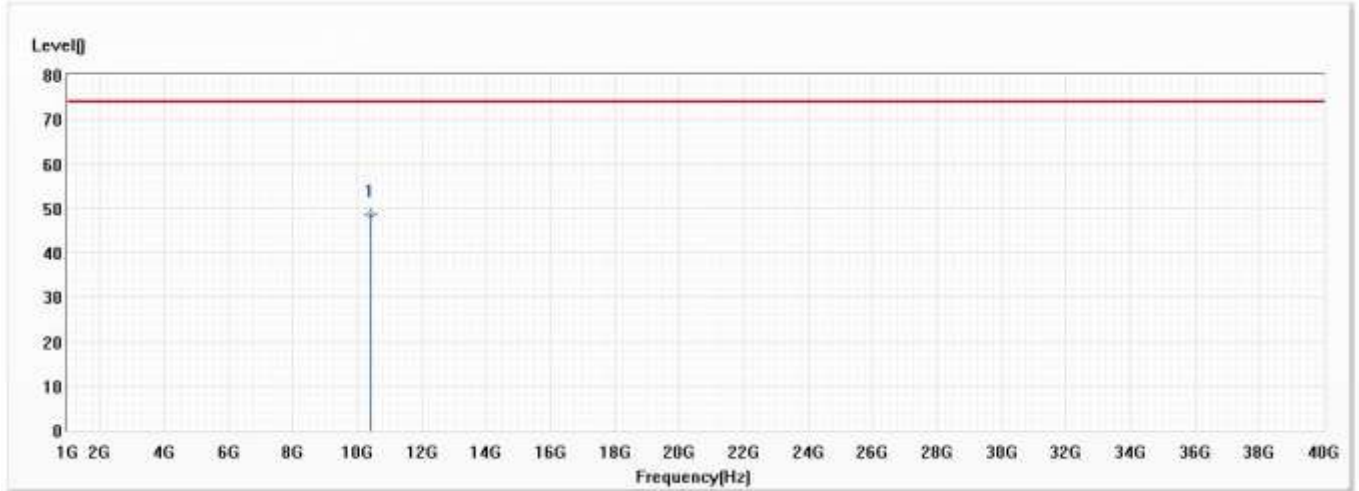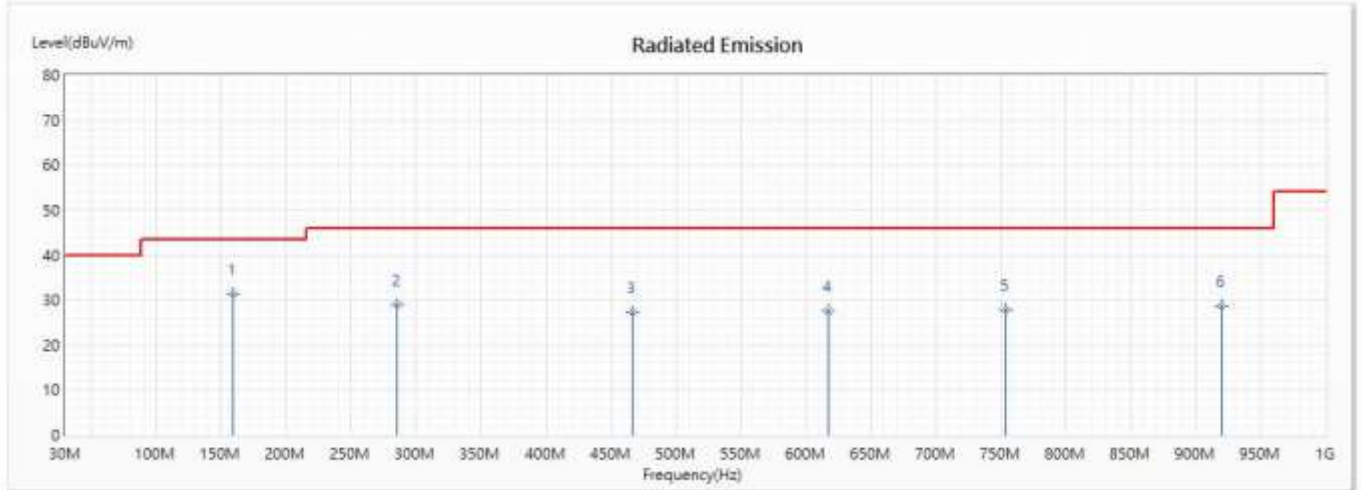Test Date     :     2020/12/21

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 10420.000 | 48.55 | 74.00 | -25.45 | 58.71 | -10.16 | PK |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

**DEKRA**

| Product | : | Notebook |
|---|---|---|
| Test Item | : | General Radiated Emission |
| Test Mode | : | Mode 1: Transmit (802.11a-6Mbps) (5180MHz) |
| Test Date | : | 2020/07/28 |

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 159.01 | 31.32 | 43.50 | -12.18 | 43.49 | -12.17 | QP |
| 2 | 285.11 | 29.04 | 46.00 | -16.96 | 38.86 | -9.82 | QP |
| 3 | 466.5 | 27.35 | 46.00 | -18.65 | 30.85 | -3.50 | QP |
| 4 | 616.85 | 27.68 | 46.00 | -18.32 | 28.23 | -0.55 | QP |
| 5 | 753.62 | 27.88 | 46.00 | -18.12 | 27.95 | -0.07 | QP |
| 6 | 919.49 | 28.75 | 46.00 | -17.25 | 32.26 | -3.51 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5180MHz)
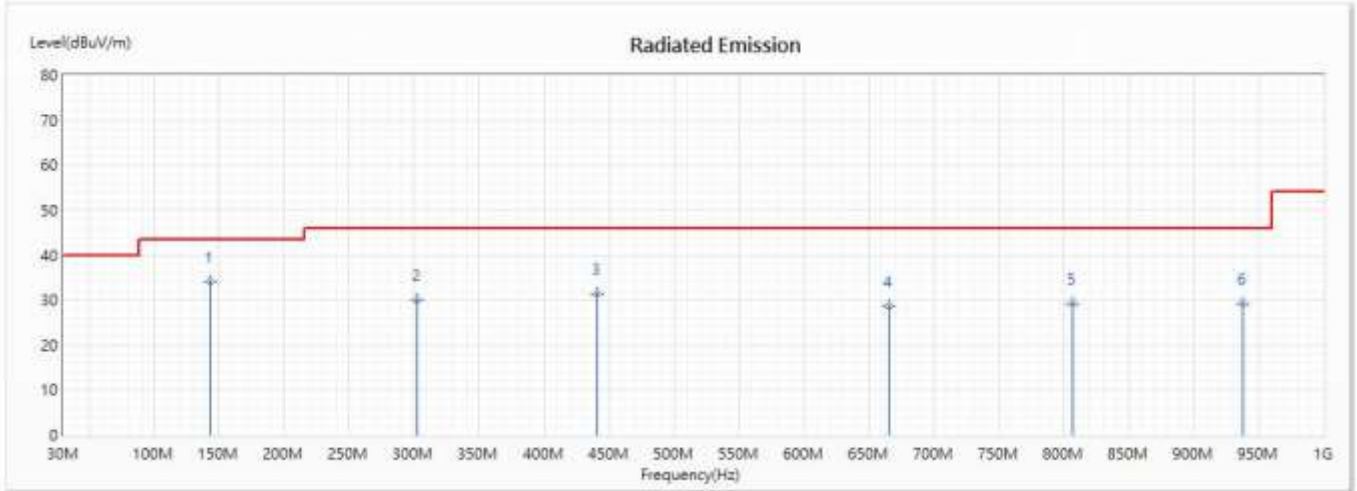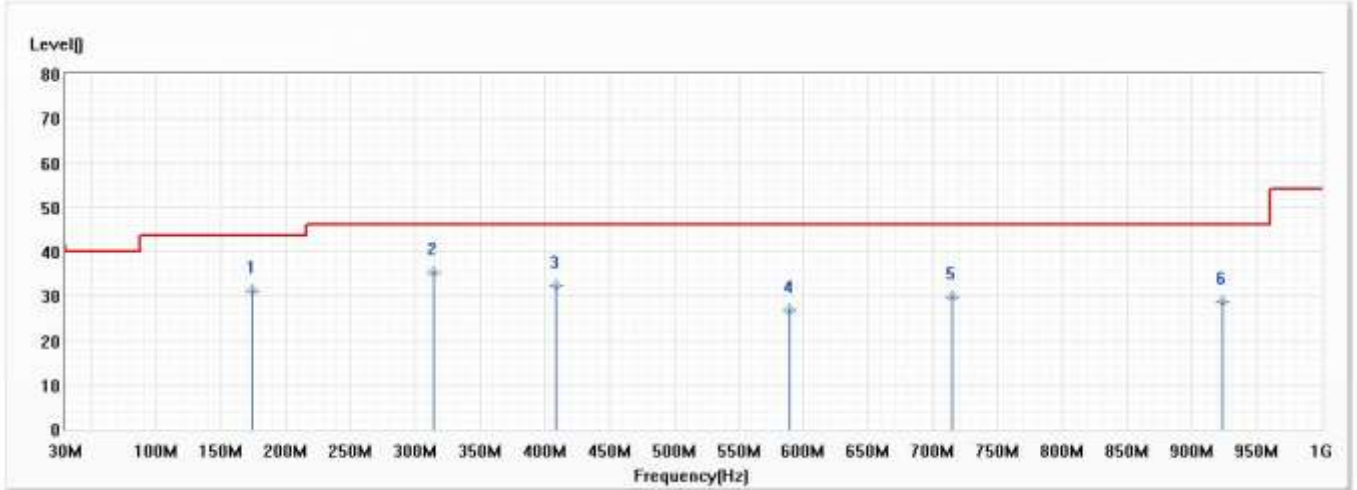Test Date : 2020/07/28

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 143.49 | 34.25 | 43.50 | -9.25 | 44.19 | -9.94 | QP |
| 2 | 302.57 | 30.06 | 46.00 | -15.94 | 36.83 | -6.77 | QP |
| 3 | 441.28 | 31.37 | 46.00 | -14.63 | 33.66 | -2.29 | QP |
| 4 | 665.35 | 28.76 | 46.00 | -17.24 | 31.56 | -2.80 | QP |
| 5 | 806.97 | 29.24 | 46.00 | -16.76 | 31.25 | -2.01 | QP |
| 6 | 937.92 | 29.17 | 46.00 | -16.83 | 30.95 | -1.78 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)
Test Date : 2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 174.190 | 31.27 | 43.50 | -12.23 | 42.30 | -11.03 | QP |
| * 2 | 314.580 | 35.23 | 46.00 | -10.77 | 44.24 | -9.01 | QP |
| 3 | 408.410 | 32.18 | 46.00 | -13.82 | 39.26 | -7.08 | QP |
| 4 | 588.750 | 26.76 | 46.00 | -19.24 | 30.03 | -3.27 | QP |
| 5 | 715.080 | 29.93 | 46.00 | -16.07 | 31.37 | -1.44 | QP |
| 6 | 923.140 | 28.62 | 46.00 | -17.38 | 27.50 | 1.12 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)
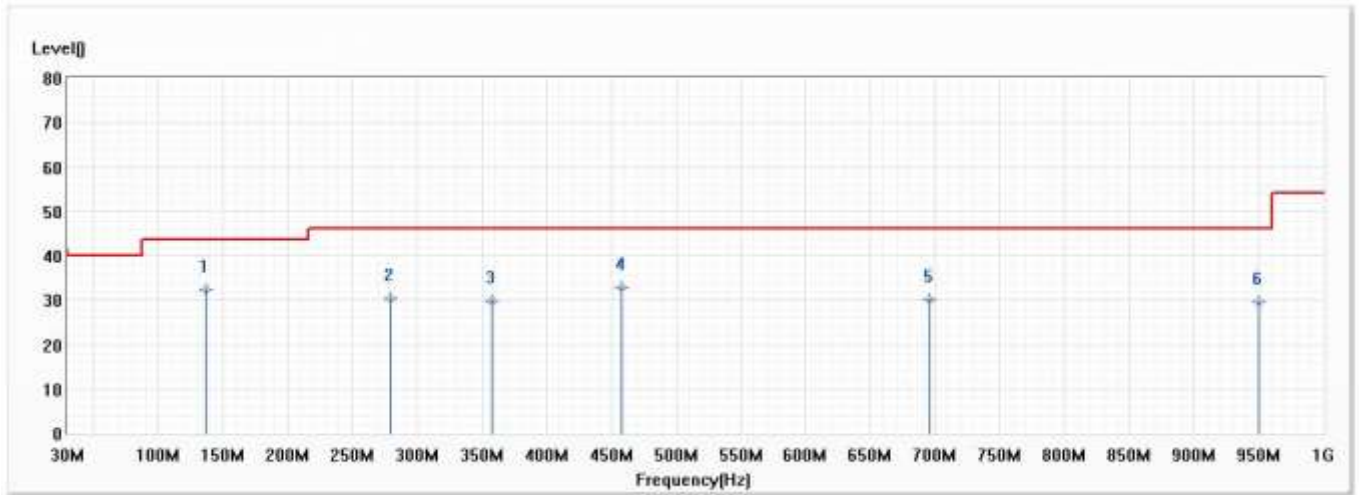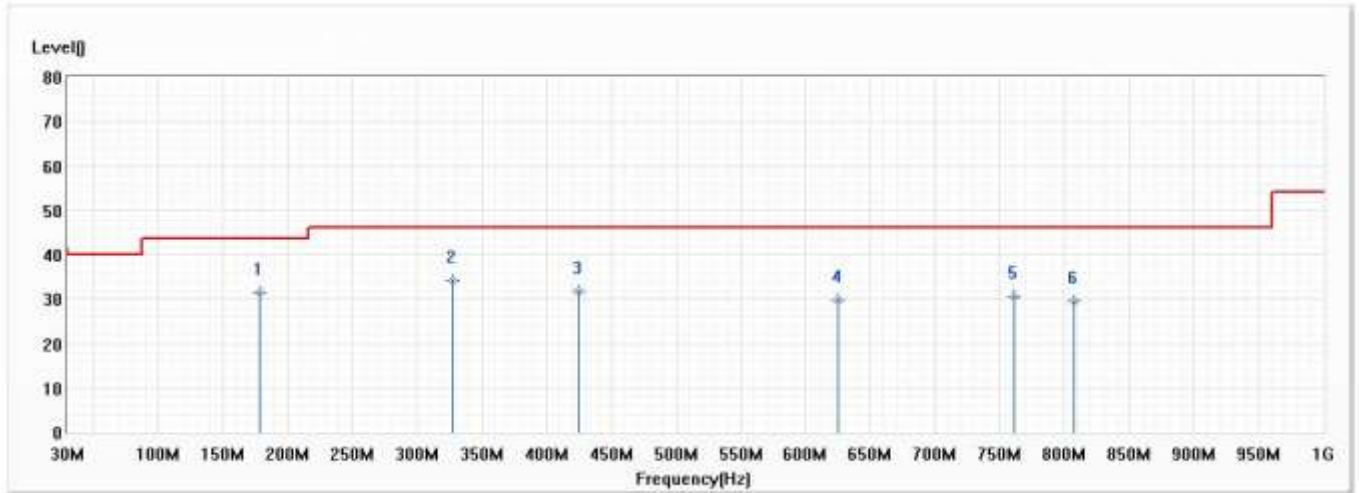Test Date : 2020/12/21

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 136.270 | 32.41 | 43.50 | -11.09 | 43.88 | -11.47 | QP |
| 2 | 279.360 | 30.30 | 46.00 | -15.70 | 40.31 | -10.01 | QP |
| 3 | 358.190 | 29.73 | 46.00 | -16.27 | 37.80 | -8.07 | QP |
| 4 | 457.490 | 32.82 | 46.00 | -13.18 | 38.52 | -5.70 | QP |
| 5 | 695.740 | 30.11 | 46.00 | -15.89 | 32.06 | -1.95 | QP |
| 6 | 949.710 | 29.63 | 46.00 | -16.37 | 28.01 | 1.62 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product   :   Notebook
Test Item   :   General Radiated Emission
Test Mode   :   Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
Test Date   :   2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 178.020 | 31.44 | 43.50 | -12.06 | 42.91 | -11.47 | QP |
| * 2 | 327.200 | 34.23 | 46.00 | -11.77 | 42.85 | -8.62 | QP |
| 3 | 425.060 | 31.68 | 46.00 | -14.32 | 38.25 | -6.57 | QP |
| 4 | 624.770 | 29.71 | 46.00 | -16.29 | 32.47 | -2.76 | QP |
| 5 | 761.050 | 30.74 | 46.00 | -15.26 | 31.40 | -0.66 | QP |
| 6 | 807.290 | 29.63 | 46.00 | -16.37 | 30.03 | -0.40 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
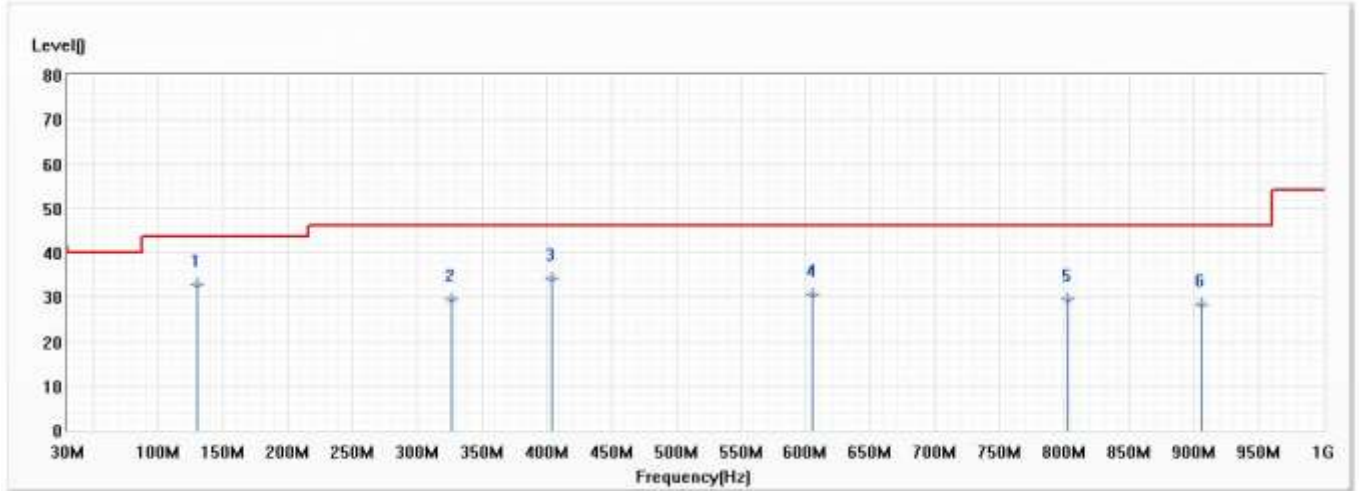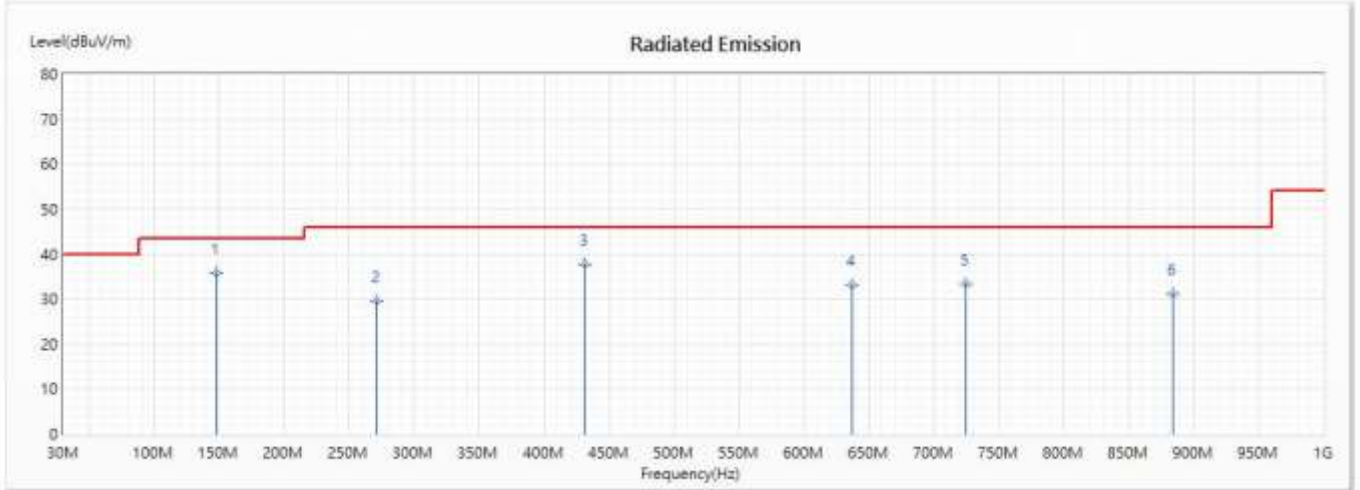Test Date : 2020/12/21

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| * 1 | 129.770 | 32.96 | 43.50 | -10.54 | 45.31 | -12.35 | QP |
| 2 | 326.330 | 29.40 | 46.00 | -16.60 | 38.03 | -8.63 | QP |
| 3 | 403.620 | 34.26 | 46.00 | -11.74 | 41.37 | -7.11 | QP |
| 4 | 605.380 | 30.57 | 46.00 | -15.43 | 33.35 | -2.78 | QP |
| 5 | 802.140 | 29.49 | 46.00 | -16.51 | 30.02 | -0.53 | QP |
| 6 | 905.610 | 28.33 | 46.00 | -17.67 | 27.35 | 0.98 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

**DEKRA**

|         |   |                                                        |
|---------|---|--------------------------------------------------------|
| Product | : | Notebook                                               |
| Test Item | : | General Radiated Emission                            |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/07/28                                           |

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|-----|-------|-------|-------|--------|-------|--------|----|
| * 1 | 147.37 | 35.84 | 43.50 | -7.66 | 46.70 | -10.86 | QP |
| 2 | 271.53 | 29.41 | 46.00 | -16.59 | 40.33 | -10.92 | QP |
| 3 | 431.58 | 37.76 | 46.00 | -8.24 | 40.81 | -3.05 | QP |
| 4 | 637.22 | 33.12 | 46.00 | -12.88 | 34.65 | -1.53 | QP |
| 5 | 724.52 | 33.32 | 46.00 | -12.68 | 34.60 | -1.28 | QP |
| 6 | 883.6 | 31.21 | 46.00 | -14.79 | 32.90 | -1.69 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)
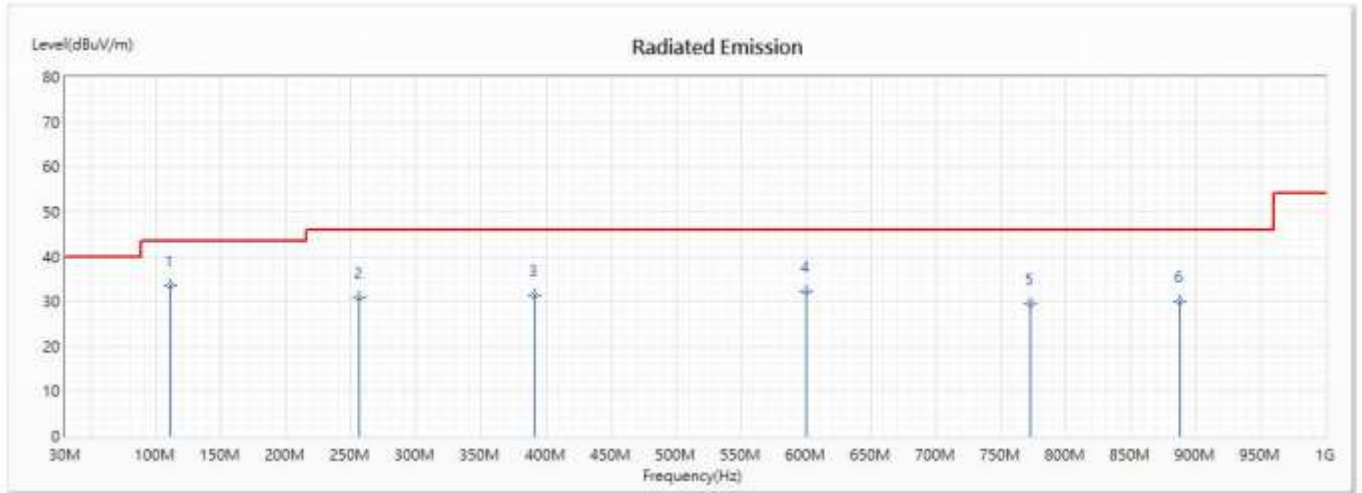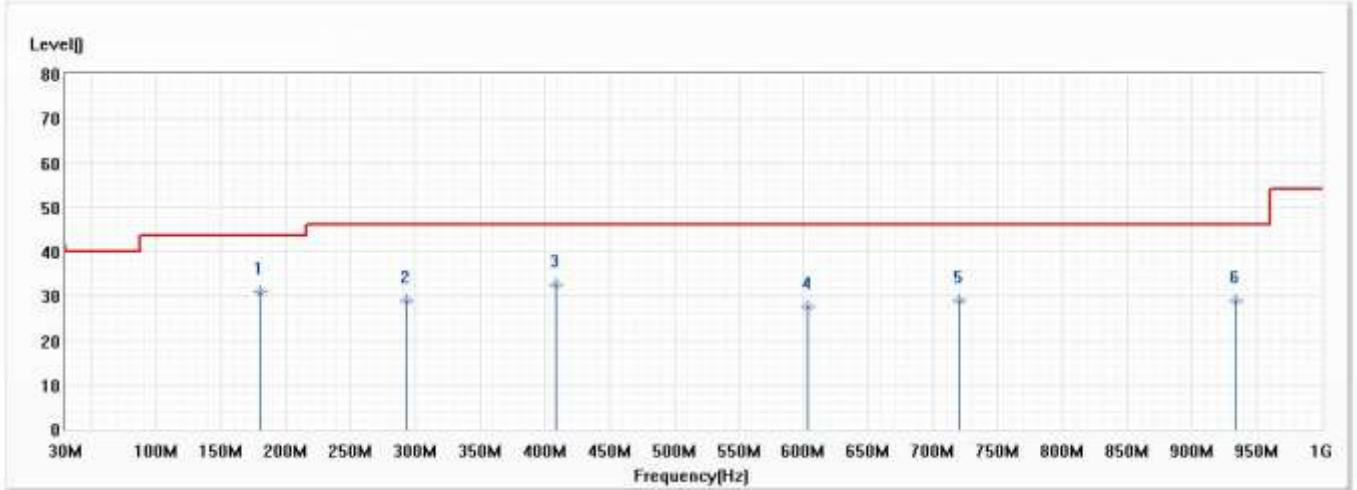Test Date : 2020/07/28

Vertical



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|------|------|------|------|------|------|------|------|
| * 1 | 111.48 | 33.53 | 43.50 | -9.97 | 41.50 | -7.97 | QP |
| 2 | 256.01 | 30.92 | 46.00 | -15.08 | 41.14 | -10.22 | QP |
| 3 | 390.84 | 31.33 | 46.00 | -14.67 | 36.72 | -5.39 | QP |
| 4 | 600.36 | 32.33 | 46.00 | -13.67 | 31.56 | 0.77 | QP |
| 5 | 773.02 | 29.56 | 46.00 | -16.44 | 30.86 | -1.30 | QP |
| 6 | 887.48 | 30.01 | 46.00 | -15.99 | 31.99 | -1.98 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz)
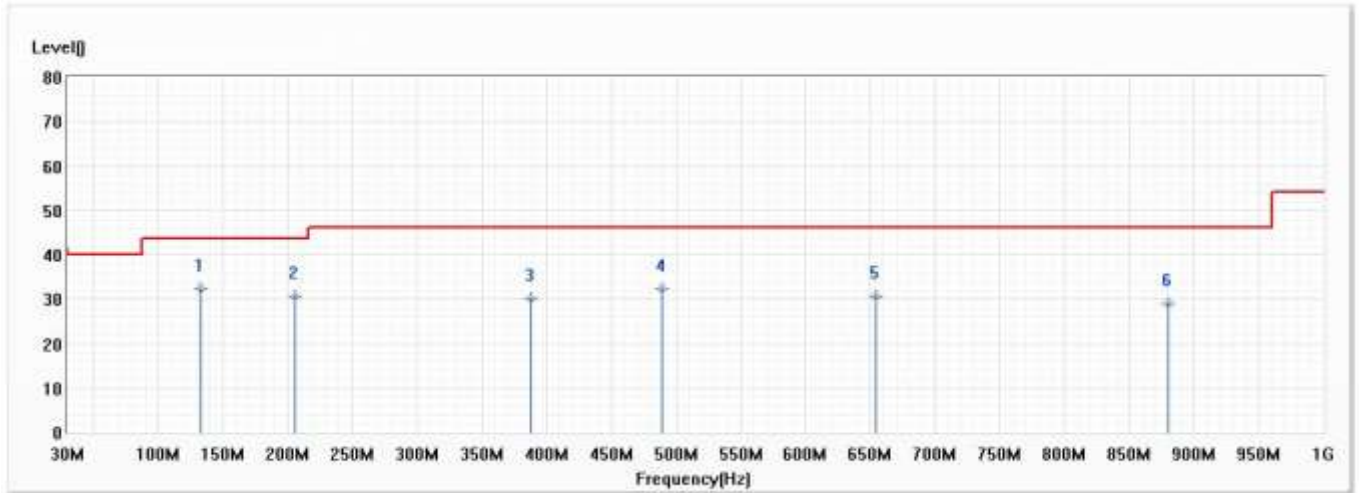Test Date : 2020/12/21

Horizontal



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 180.160 | 30.85 | 43.50 | -12.65 | 42.53 | -11.68 | QP |
| 2 | 293.510 | 29.09 | 46.00 | -16.91 | 38.85 | -9.76 | QP |
| 3 | 408.910 | 32.47 | 46.00 | -13.53 | 39.55 | -7.08 | QP |
| 4 | 603.180 | 27.63 | 46.00 | -18.37 | 30.46 | -2.83 | QP |
| 5 | 720.220 | 29.08 | 46.00 | -16.92 | 30.51 | -1.43 | QP |
| 6 | 934.030 | 28.84 | 46.00 | -17.16 | 27.60 | 1.24 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Notebook
Test Item : General Radiated Emission
Test Mode : Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO) (5210MHz)
Test Date : 2020/12/21

Vertical



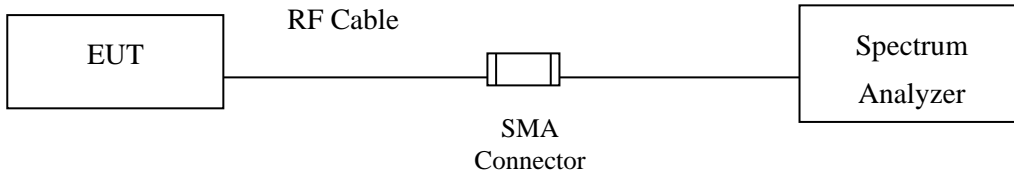| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| * 1 | 133.190 | 32.21 | 43.50 | -11.29 | 44.19 | -11.98 | QP |
| 2 | 205.900 | 30.70 | 43.50 | -12.80 | 43.42 | -12.72 | QP |
| 3 | 387.750 | 30.03 | 46.00 | -15.97 | 37.38 | -7.35 | QP |
| 4 | 489.410 | 32.29 | 46.00 | -13.71 | 37.51 | -5.22 | QP |
| 5 | 653.990 | 30.62 | 46.00 | -15.38 | 32.97 | -2.35 | QP |
| 6 | 879.930 | 29.07 | 46.00 | -16.93 | 28.57 | 0.50 | QP |

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.
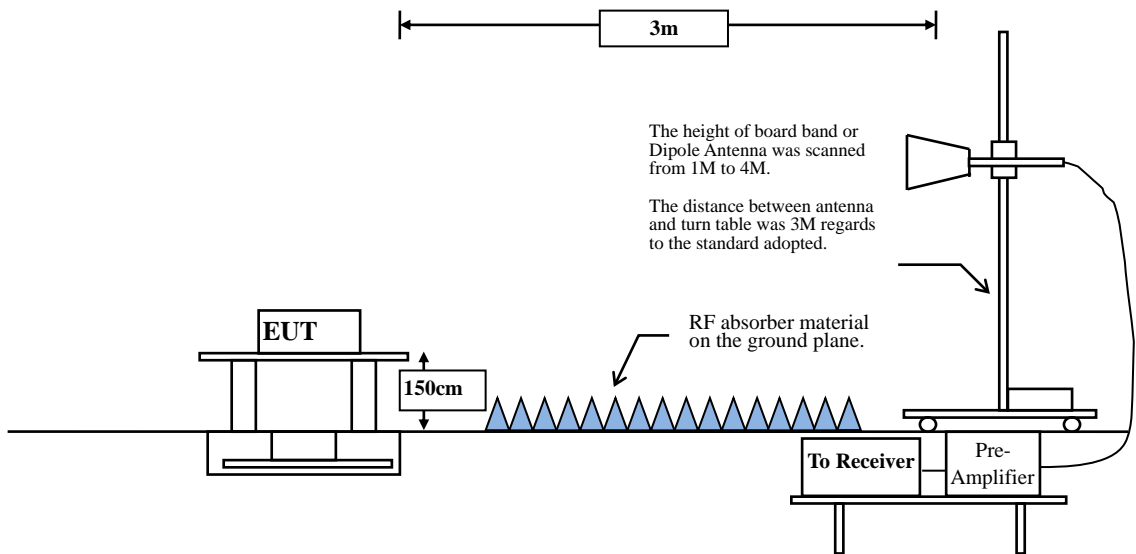
## 6. Band Edge

## 6.1. Test Setup

**RF Conducted Measurement:**

```
┌─────────┐      RF Cable                      ┌─────────────┐
│         │                  ┌──┐              │  Spectrum   │
│   EUT   │──────────────────┤  ├──────────────│             │
│         │                  └──┘              │  Analyzer   │
└─────────┘                                    └─────────────┘
                             SMA
                           Connector
```

**RF Radiated Measurement:**

The height of board band or Dipole Antenna was scanned from 1M to 4M.

The distance between antenna and turn table was 3M regards to the standard adopted.

RF absorber material on the ground plane.

|← —————— 3m —————— →|

**EUT**

150cm

**To Receiver**     Pre-Amplifier

## 6.2. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|---|---|---|
| Frequency MHz | uV/m @3m | dBμV/m@3m |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

Remarks :   1. RF Voltage (dBμV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

**RBW and VBW Parameter setting:**

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW ≥ 3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

( T refers to 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.)
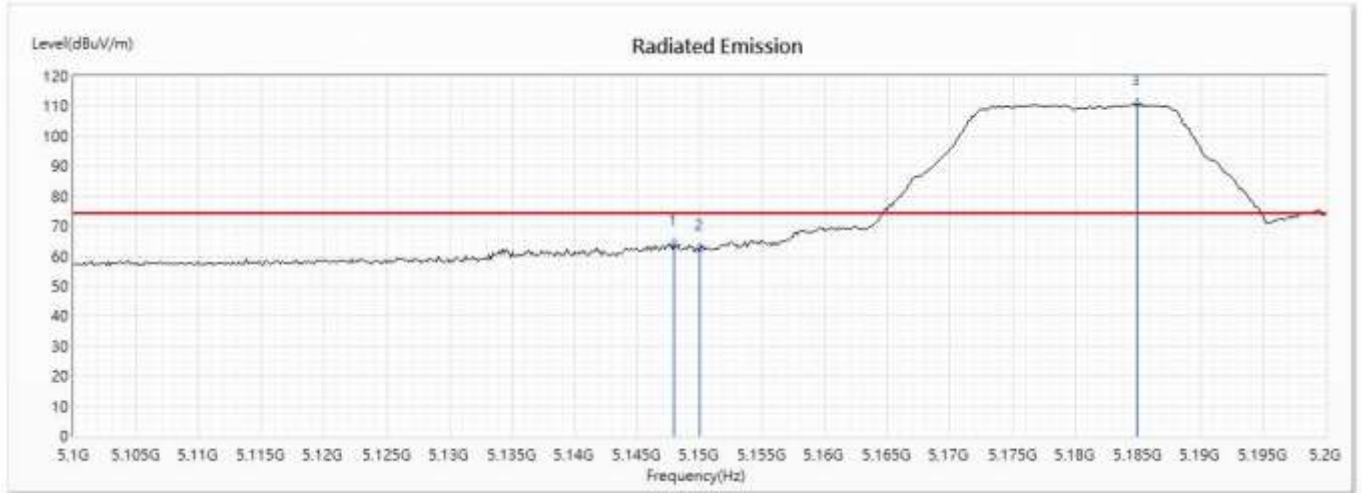
| 5GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|---|---|---|---|---|
| 802.11a | 97.22 | 2.0290 | 493 | 500 |
| 802.11n20 | 98.77 | 18.5507 | 54 | 10 |
| 802.11n40 | 98.40 | 8.9275 | 112 | 10 |
| 802.11ac80(MIMO) | 98.44 | 5.4783 | 183 | 10 |
| 802.11ac80(SISO) | 99.00 | 10.9980 | 91 | 10 |

Note: Duty Cycle Refer to Section 7

**6.4.** **Test Result of Band Edge**

| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 1: Transmit (802.11a-6Mbps) (5180MHz) |
| Test Date | : | 2020/07/28 |

**Horizontal**



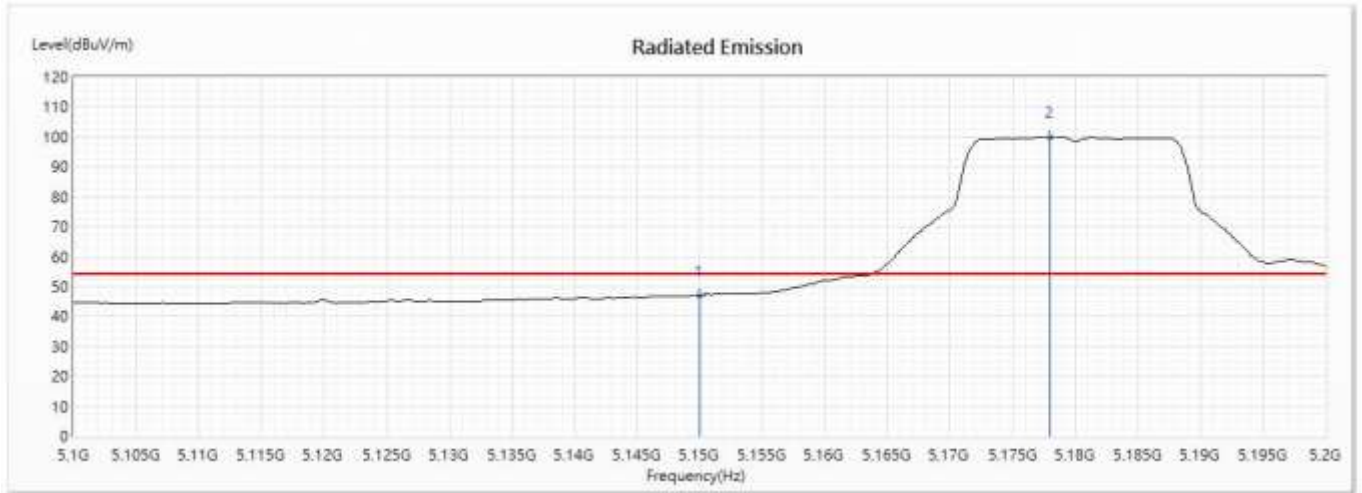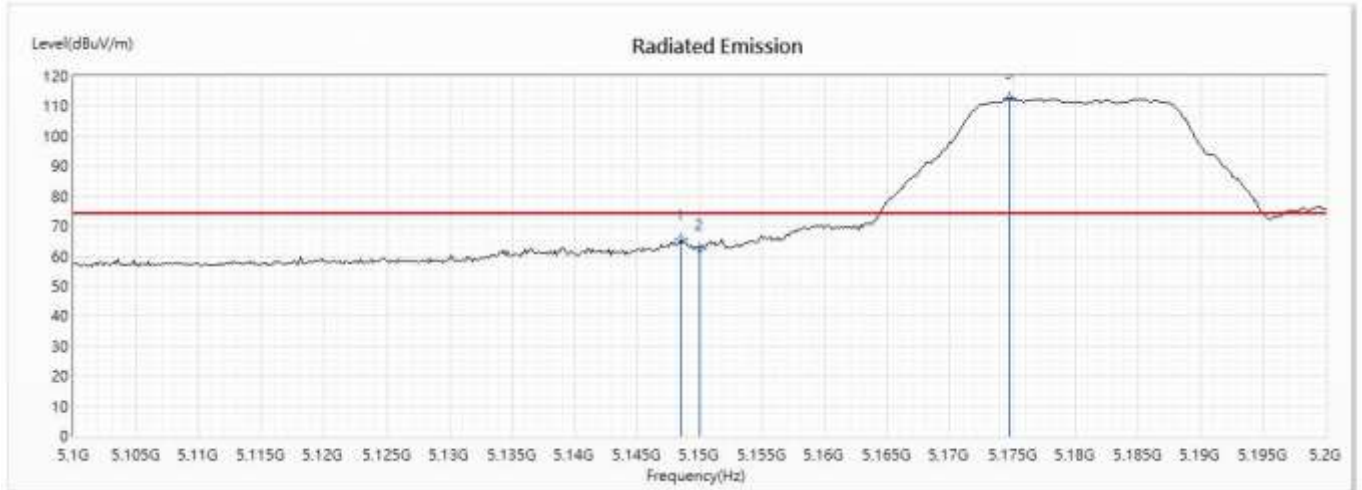| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5147.971 | 63.99 | 74.00 | -10.01 | 45.67 | 18.32 | PK |
| 2 | 5150 | 62.15 | 74.00 | -11.85 | 43.84 | 18.31 | PK |
| ! 3 | 5184.928 | 110.73 | -- | -- | 92.53 | 18.20 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

**DEKRA**

|  | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 1: Transmit (802.11a-6Mbps) (5180MHz) |
| Test Date | : | 2020/07/28 |

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150 | 46.97 | 54.00 | -7.03 | 28.66 | 18.31 | AV |
| ! 2 | 5177.971 | 100.07 | -- | -- | 81.84 | 18.23 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product      :    Notebook
Test Item    :    Band Edge Data
Test Mode    :    Mode 1: Transmit (802.11a-6Mbps) (5180MHz)
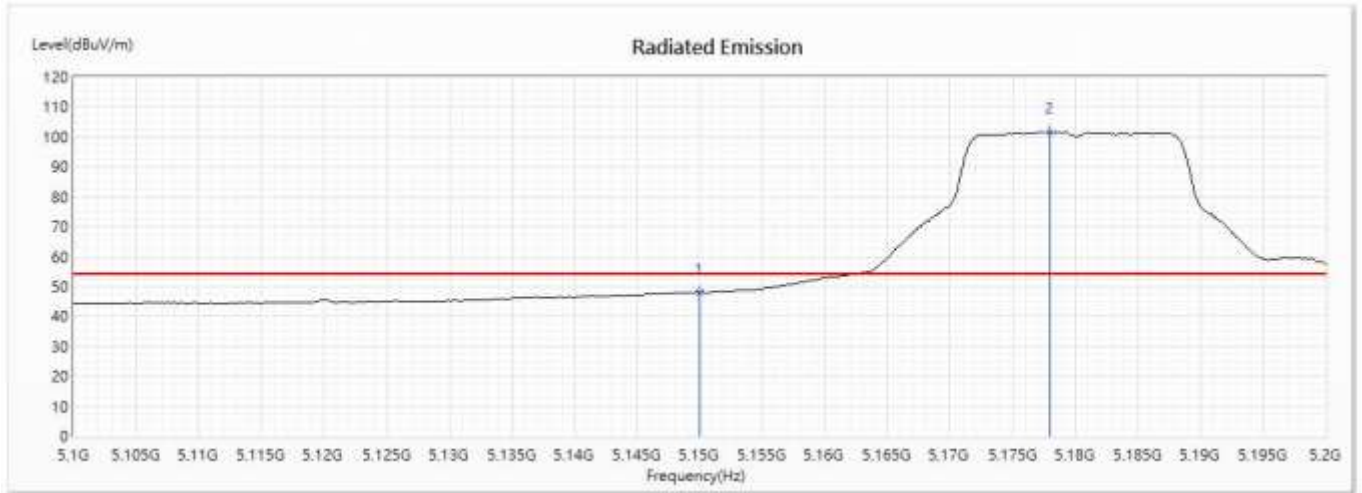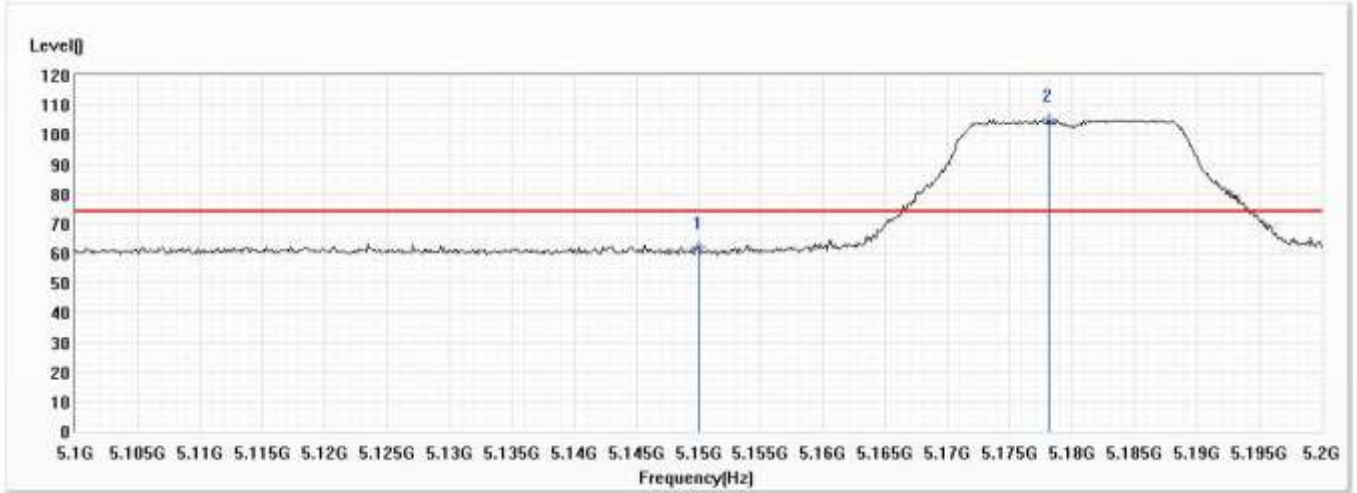Test Date    :    2020/07/28

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|--------------------------|-----------------|--------------|----------------------|------------------------|----------------|
| 1  | 5148.551        | 65.59                    | 74.00           | -8.41        | 47.28                | 18.31                  | PK             |
| 2  | 5150            | 62.38                    | 74.00           | -11.62       | 44.07                | 18.31                  | PK             |
| ! 3 | 5174.783       | 112.76                   | --              | --           | 94.53                | 18.23                  | PK             |

Note:
1.  All readings above 1GHz are performed with peak and/or average measurements as necessary.
2.  Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5180MHz)
Test Date : 2020/07/28

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150 | 48.05 | 54.00 | -5.95 | 29.74 | 18.31 | AV |
| ! 2 | 5177.971 | 101.54 | -- | -- | 83.31 | 18.23 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

![DEKRA]

Product      :   Notebook
Test Item    :   Band Edge Data
Test Mode    :   Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz)
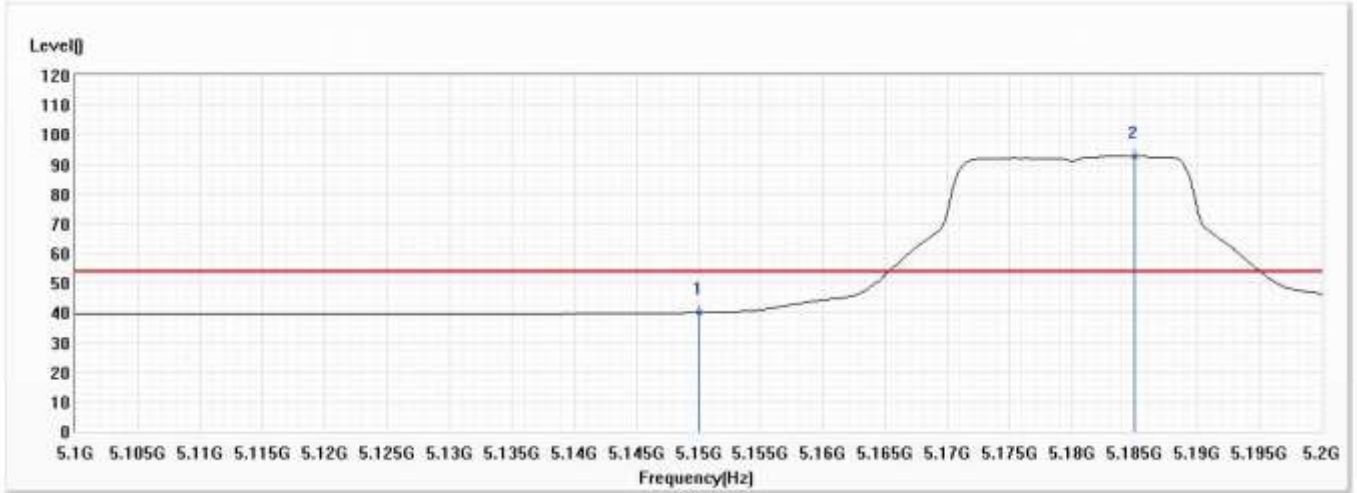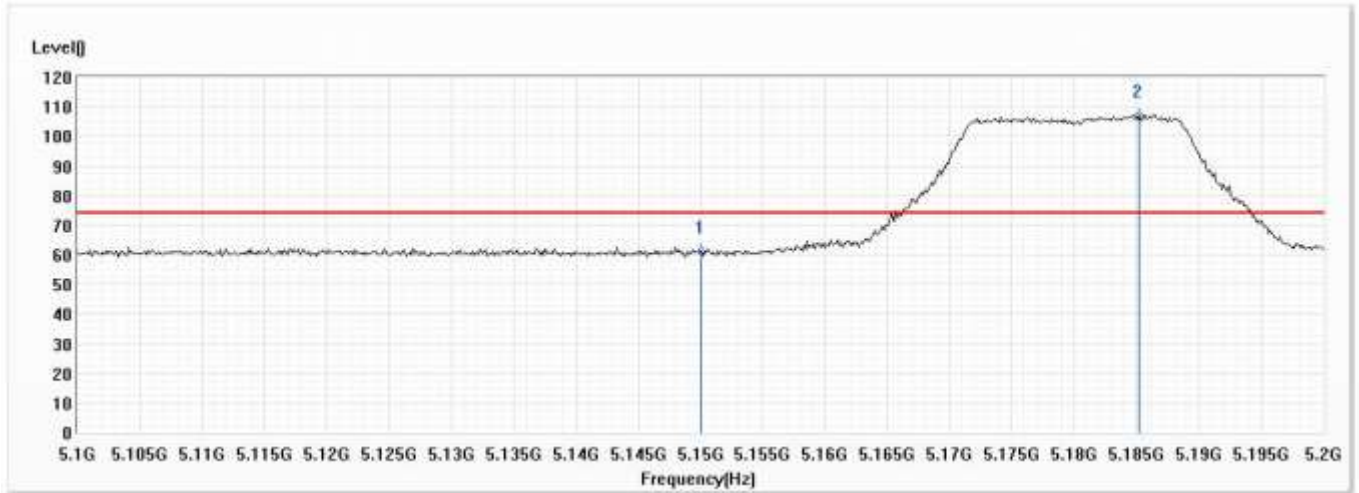Test Date    :   2020/12/19

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|----------|----------|----------|----------|----------|----------|----------|
| 1 | 5150.000 | 62.18 | 74.00 | -11.82 | 46.50 | 15.68 | PK |
| ! 2 | 5178.100 | 105.06 | -- | -- | 89.21 | 15.85 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

**DEKRA**

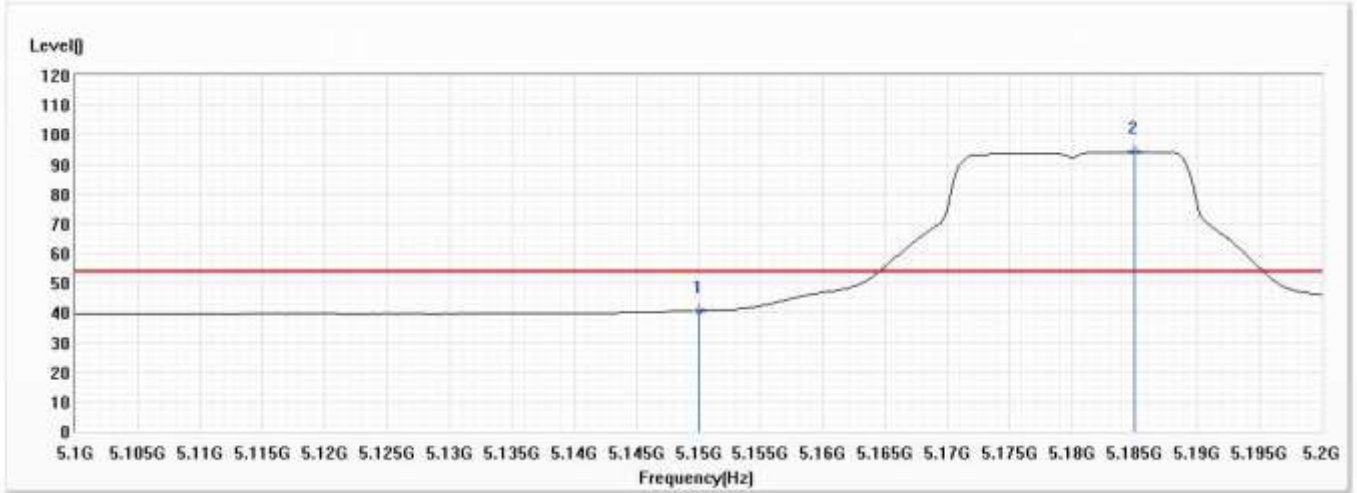| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz) |
| Test Date | : | 2020/12/19 |

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150.000 | 40.02 | 54.00 | -13.98 | 24.34 | 15.68 | AV |
| ! 2 | 5185.000 | 92.58 | -- | -- | 76.66 | 15.92 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

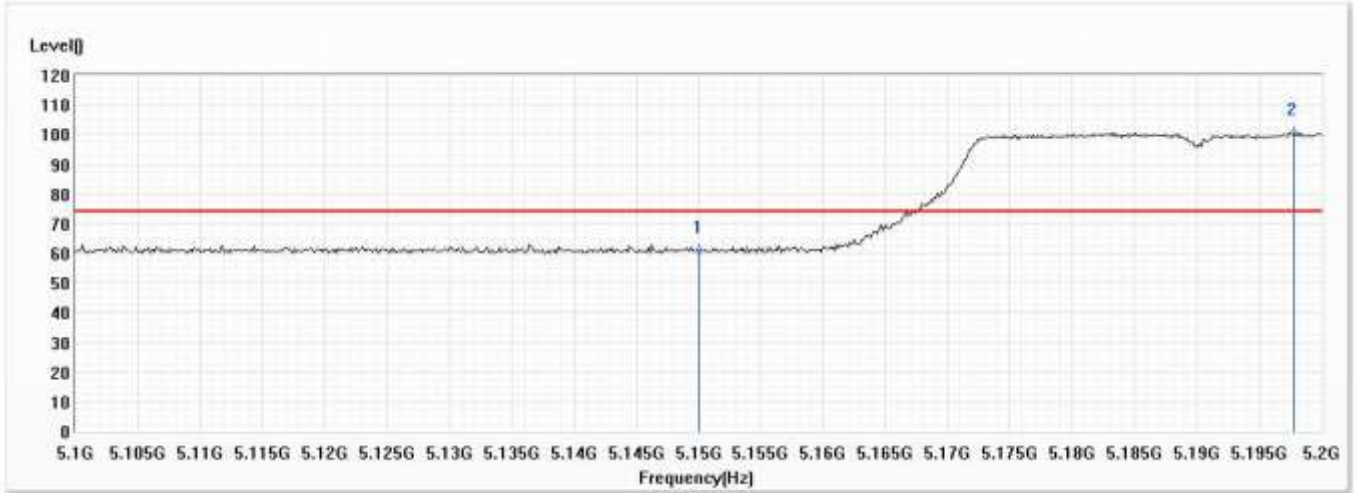| Product | : | Notebook |
| --- | --- | --- |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz) |
| Test Date | : | 2020/12/19 |

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 5150.000 | 61.31 | 74.00 | -12.69 | 45.63 | 15.68 | PK |
| ! 2 | 5185.200 | 107.25 | -- | -- | 91.33 | 15.92 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

| Product | : | Notebook |
|---|---|---|
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5180MHz) |
| Test Date | : | 2020/12/19 |

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150.000 | 40.69 | 54.00 | -13.31 | 25.01 | 15.68 | AV |
| ! 2 | 5185.000 | 94.15 | -- | -- | 78.23 | 15.92 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product       :   Notebook
Test Item     :   Band Edge Data
Test Mode     :   Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
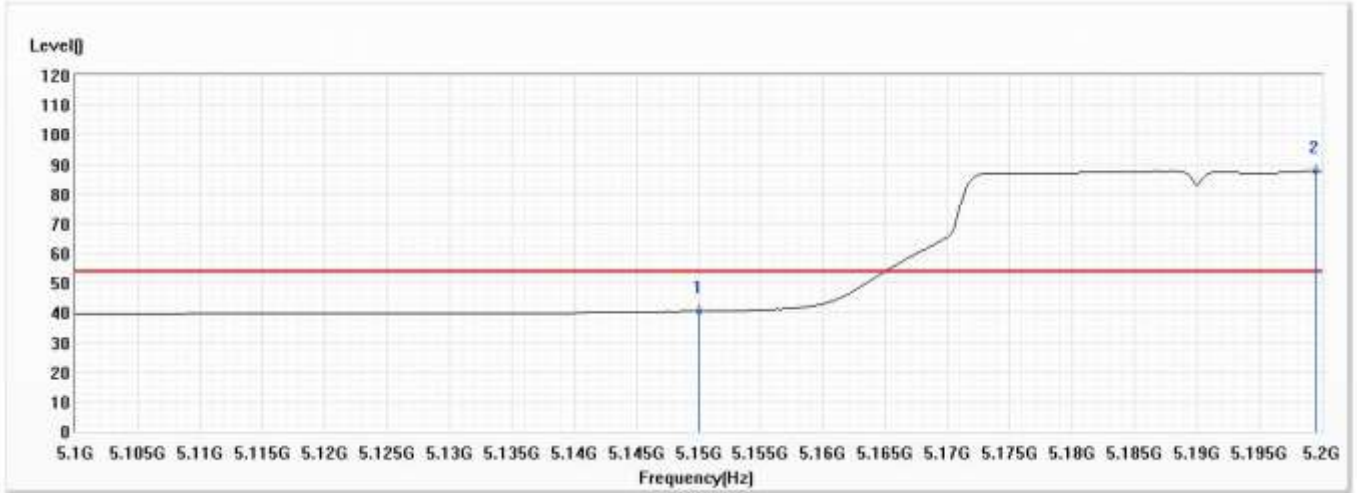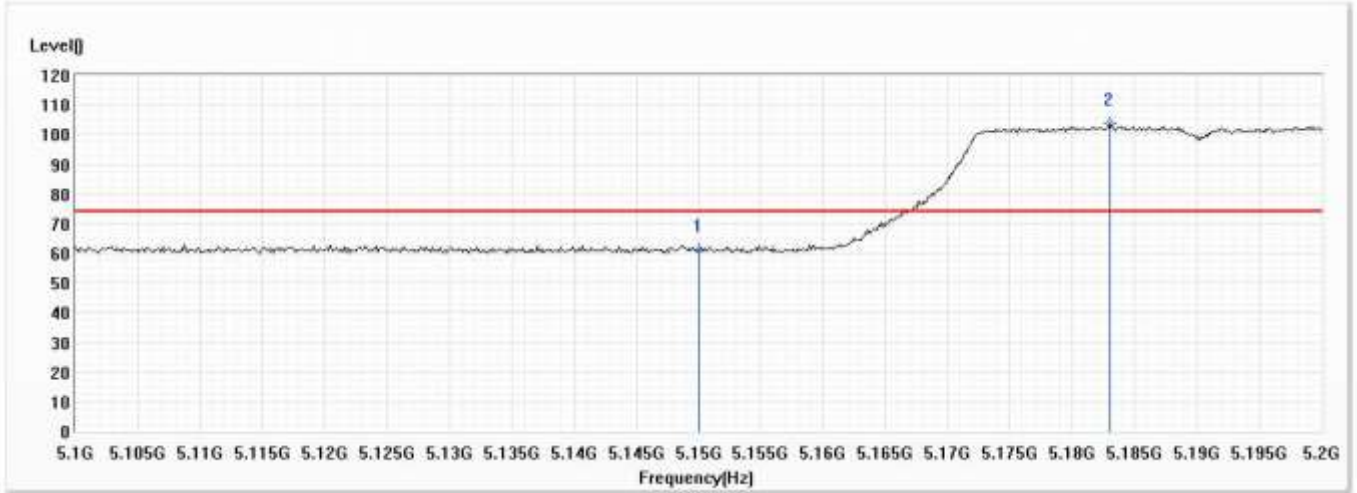Test Date     :   2020/12/19

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|-----|-----------|-------|-------|--------|-------|-------|-----|
| 1 | 5150.000 | 60.75 | 74.00 | -13.25 | 45.07 | 15.68 | PK |
| ! 2 | 5197.700 | 100.54 | -- | -- | 84.58 | 15.96 | PK |

Note:
   1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
   2. Emission Level = Reading Level + Correct Factor.

| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz) |
| Test Date | : | 2020/12/19 |

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150.000 | 40.45 | 54.00 | -13.55 | 24.77 | 15.68 | AV |
| ! 2 | 5199.500 | 87.70 | -- | -- | 71.75 | 15.95 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
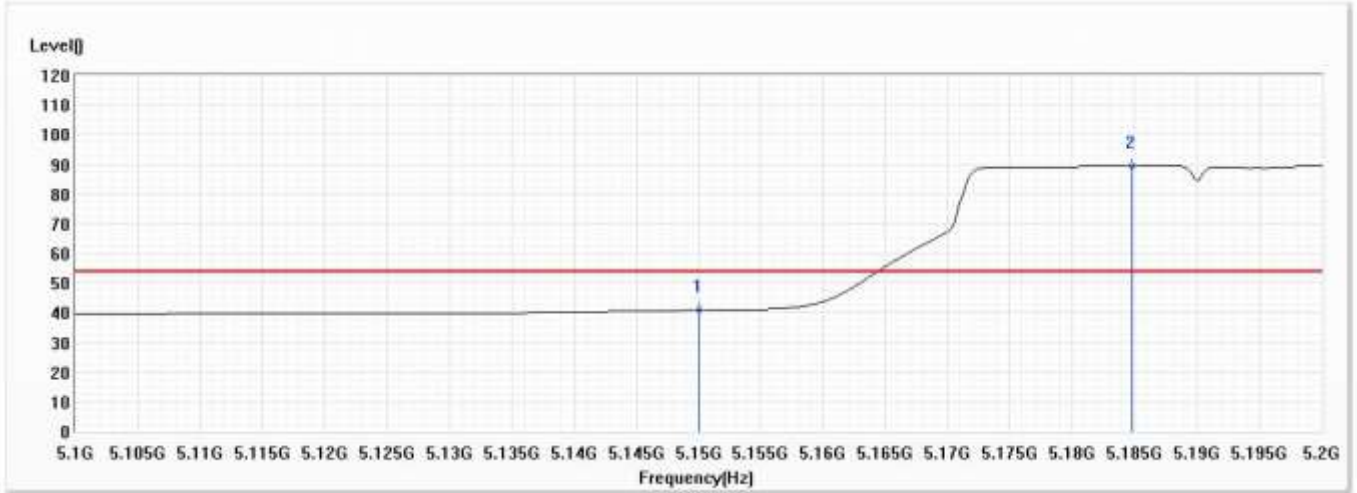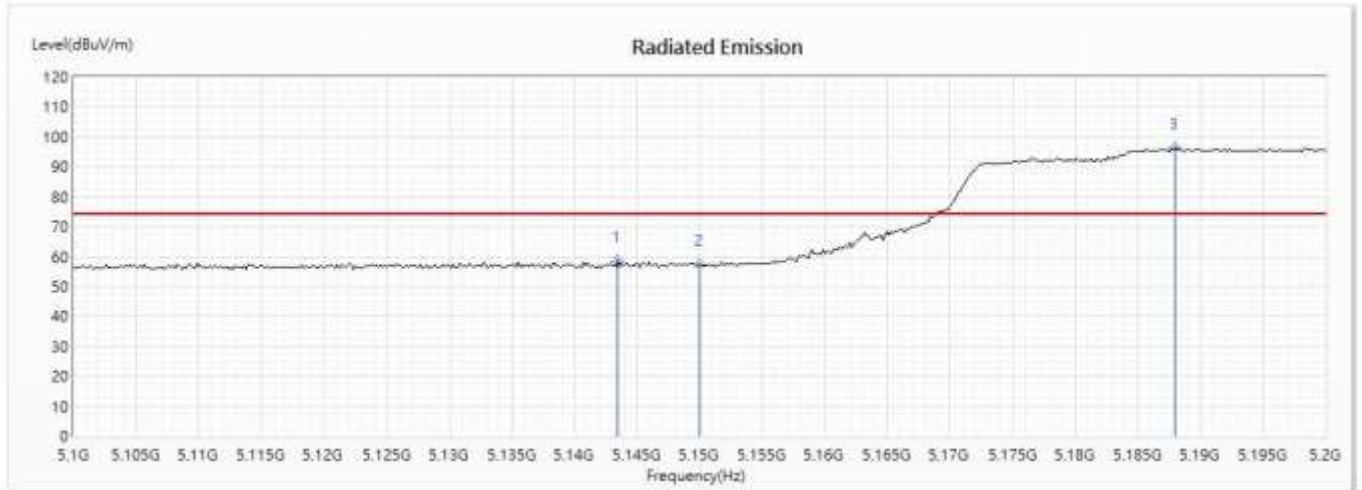Test Date : 2020/12/19

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| 1 | 5150.000 | 61.34 | 74.00 | -12.66 | 45.66 | 15.68 | PK |
| ! 2 | 5183.000 | 103.95 | -- | -- | 88.05 | 15.90 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product      :      Notebook
Test Item    :      Band Edge Data
Test Mode    :      Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)
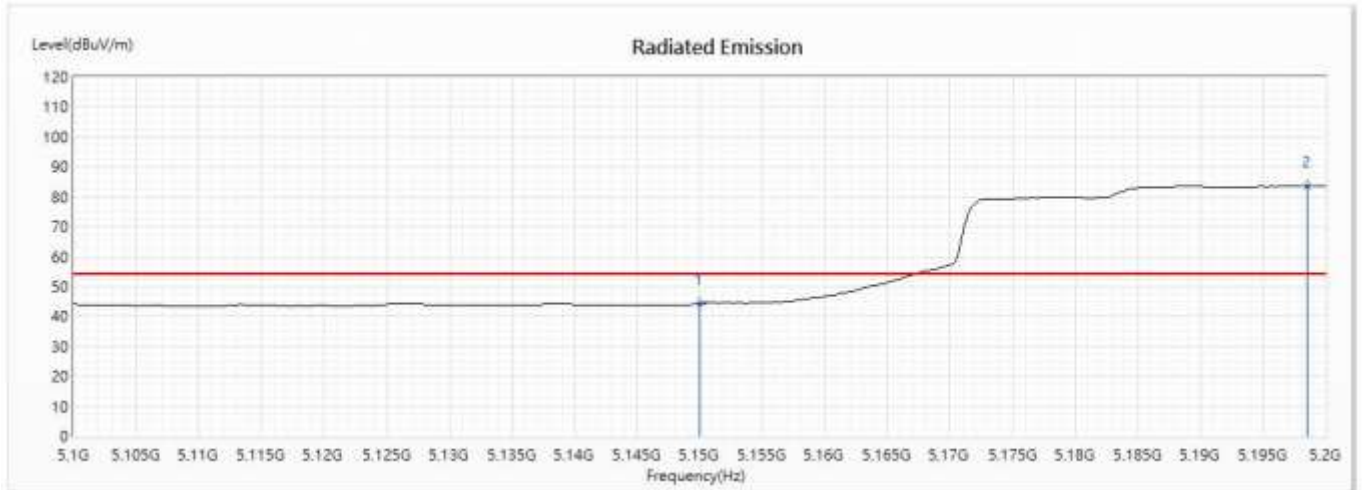Test Date    :      2020/12/19

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|-----|------|------|------|------|------|------|------|
| 1 | 5150.000 | 40.86 | 54.00 | -13.14 | 25.18 | 15.68 | AV |
| ! 2 | 5184.800 | 89.56 | -- | -- | 73.64 | 15.92 | AV |

Note:
  1.  All readings above 1GHz are performed with peak and/or average measurements as necessary.
  2.  Emission Level = Reading Level + Correct Factor.

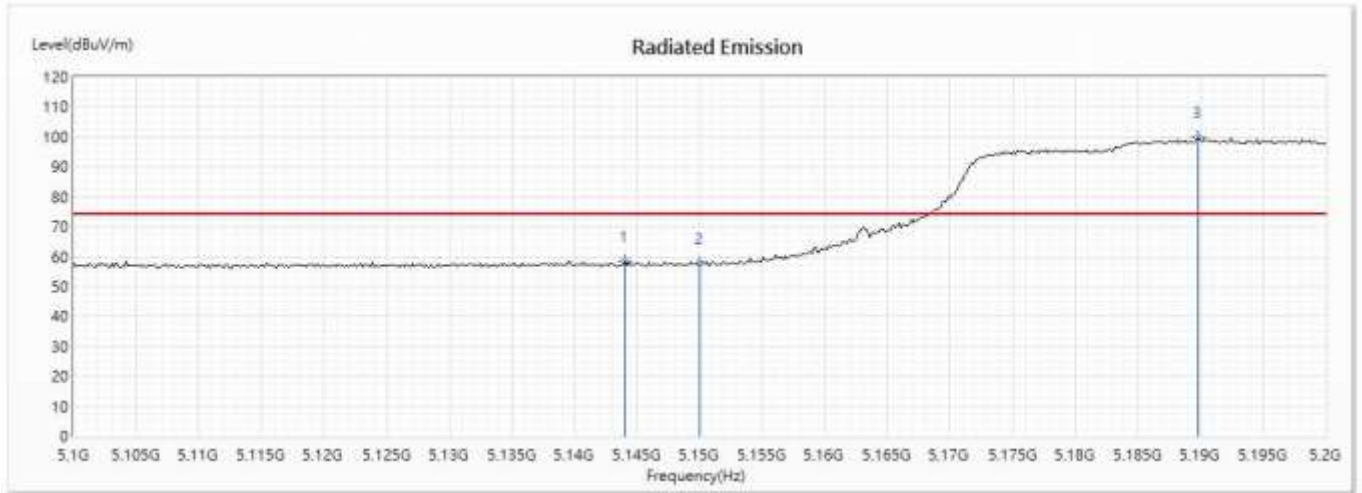| | | |
|---|---|---|
| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/07/28 |

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5143.478 | 58.48 | 74.00 | -15.52 | 40.15 | 18.33 | PK |
| 2 | 5150 | 57.52 | 74.00 | -16.48 | 39.21 | 18.31 | PK |
| ! 3 | 5187.971 | 96.21 | -- | -- | 78.02 | 18.19 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

| Product | : | Notebook |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/07/28 |

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|------|-----------------|------------------------|-----------------|-------------|----------------------|------------------------|----------------|
| 1 | 5150 | 44.27 | 54.00 | -9.73 | 25.96 | 18.31 | AV |
| ! 2 | 5198.551 | 83.57 | -- | -- | 65.41 | 18.16 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

**DEKRA**

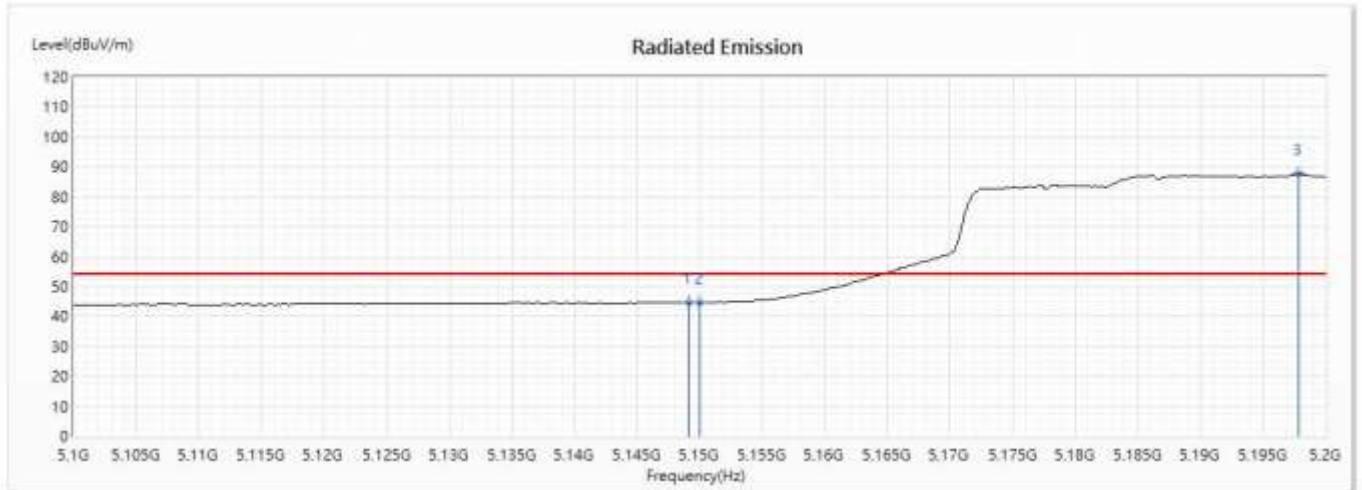|         |   |                                                          |
|---------|---|----------------------------------------------------------|
| Product | : | Notebook                                                 |
| Test Item | : | Band Edge Data                                         |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/07/28                                             |

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|-----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| 1   | 5144.058        | 58.60                   | 74.00          | -15.40      | 40.26                | 18.34                 | PK            |
| 2   | 5150            | 57.63                   | 74.00          | -16.37      | 39.32                | 18.31                 | PK            |
| ! 3 | 5189.855        | 99.94                   | --             | --          | 81.74                | 18.20                 | PK            |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook

Test Item : Band Edge Data

Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)
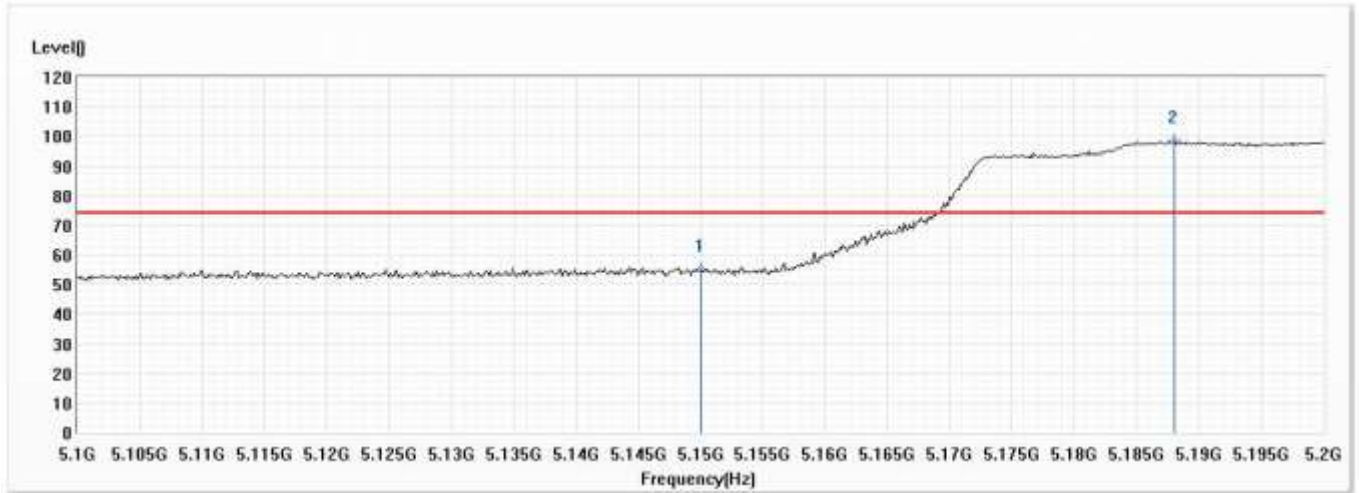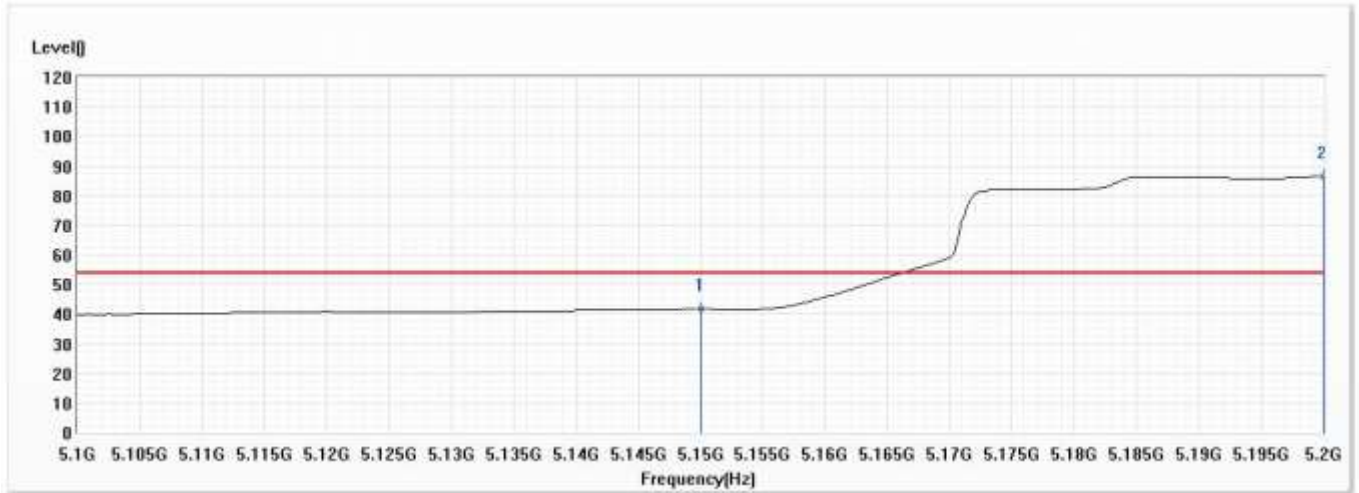
Test Date : 2020/07/28

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|-----|-----------------|-------------------------|----------------|-------------|----------------------|-----------------------|---------------|
| 1 | 5149.13 | 44.68 | 54.00 | -9.32 | 26.36 | 18.32 | AV |
| 2 | 5150 | 44.61 | 54.00 | -9.39 | 26.30 | 18.31 | AV |
| ! 3 | 5197.826 | 87.64 | -- | -- | 69.48 | 18.16 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook

Test Item : Band Edge Data

Test Mode : Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)(5210MHz)
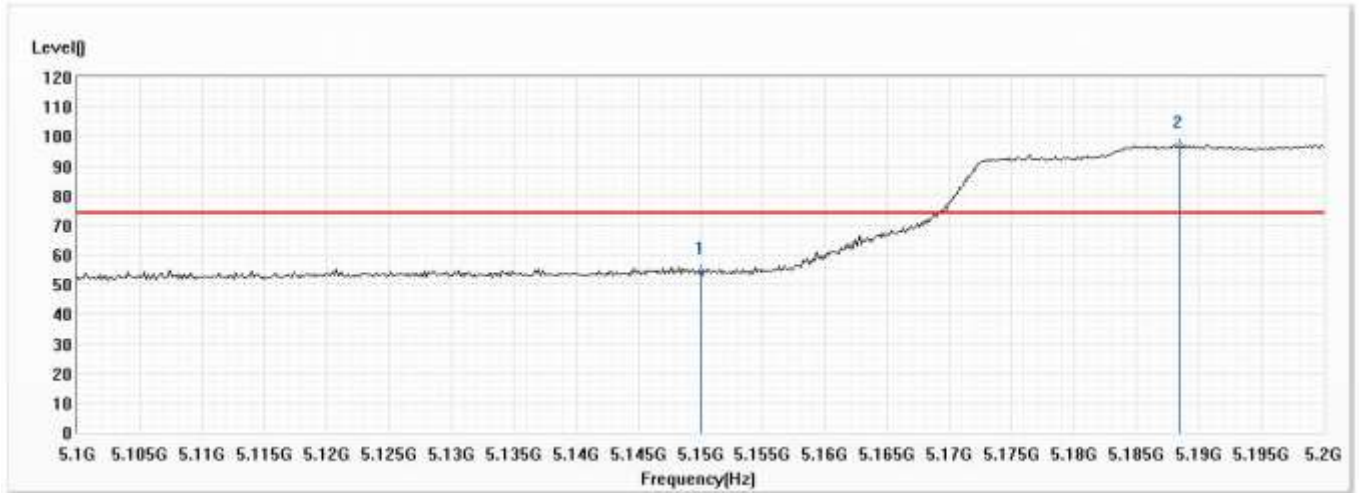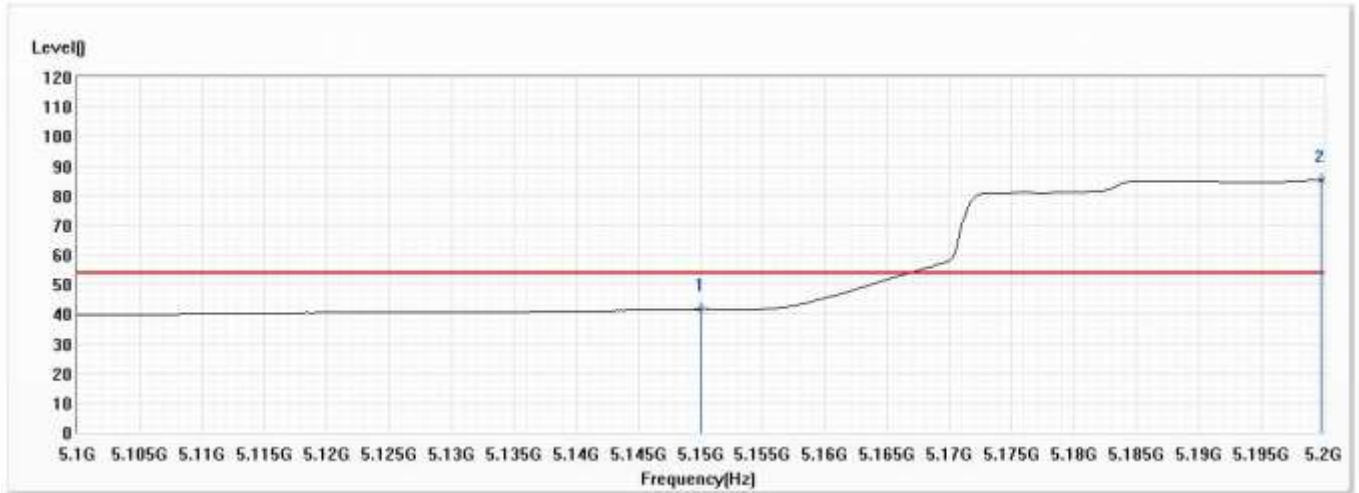
Test Date : 2020/12/19

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|----|----------|----------|------|--------|-------|-------|----|
| 1 | 5150.000 | 55.07 | 74.00 | -18.93 | 39.39 | 15.68 | PK |
| ! 2 | 5188.000 | 98.38 | -- | -- | 82.45 | 15.93 | PK |

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product     :     Notebook

Test Item     :     Band Edge Data

Test Mode     :     Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)(5210MHz)
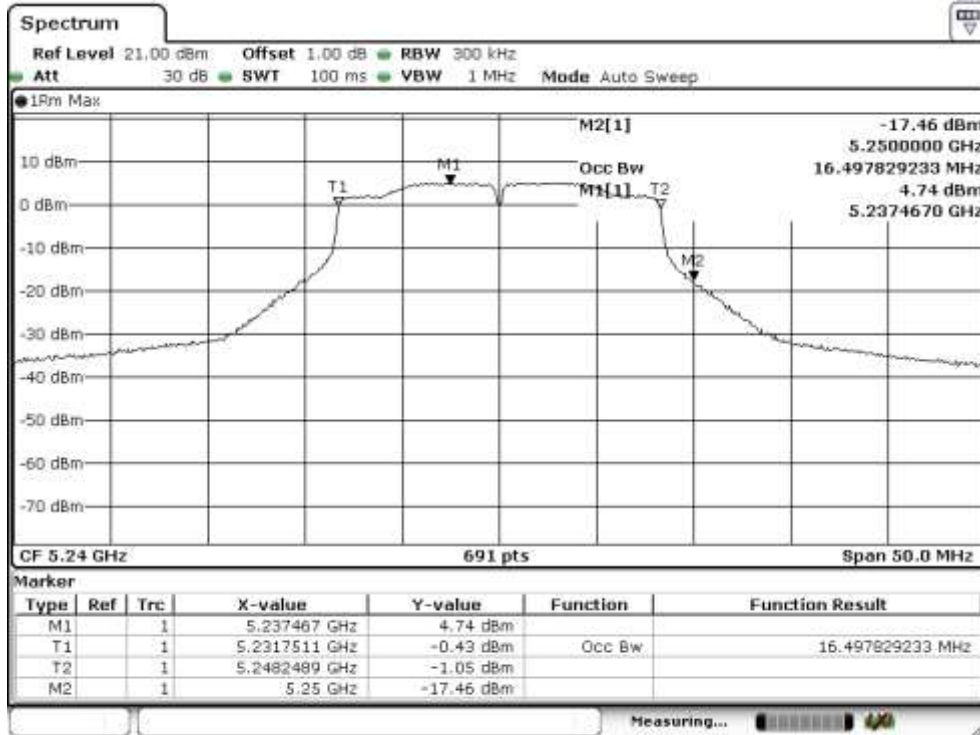
Test Date     :     2020/12/19

**Horizontal**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150.000 | 41.59 | 54.00 | -12.41 | 25.91 | 15.68 | AV |
| ! 2 | 5200.000 | 86.37 | -- | -- | 70.43 | 15.94 | AV |

Note:

1.  All readings above 1GHz are performed with peak and/or average measurements as necessary.
2.  Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)(5210MHz)
Test Date : 2020/12/19

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
|---|---|---|---|---|---|---|---|
| 1 | 5150.000 | 54.41 | 74.00 | -19.59 | 38.73 | 15.68 | PK |
| ! 2 | 5188.400 | 97.01 | -- | -- | 81.08 | 15.93 | PK |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

| Product | : | Notebook |
| --- | --- | --- |
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)(5210MHz) |
| Test Date | : | 2020/12/19 |

**Vertical**



| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Reading Level (dBuV) | Correct Factor (dB/m) | Detector Type |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 5150.000 | 41.59 | 54.00 | -12.41 | 25.91 | 15.68 | AV |
| ! 2 | 5199.800 | 85.18 | -- | -- | 69.23 | 15.95 | AV |

Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5240MHz)
Test Date : 2020/08/14

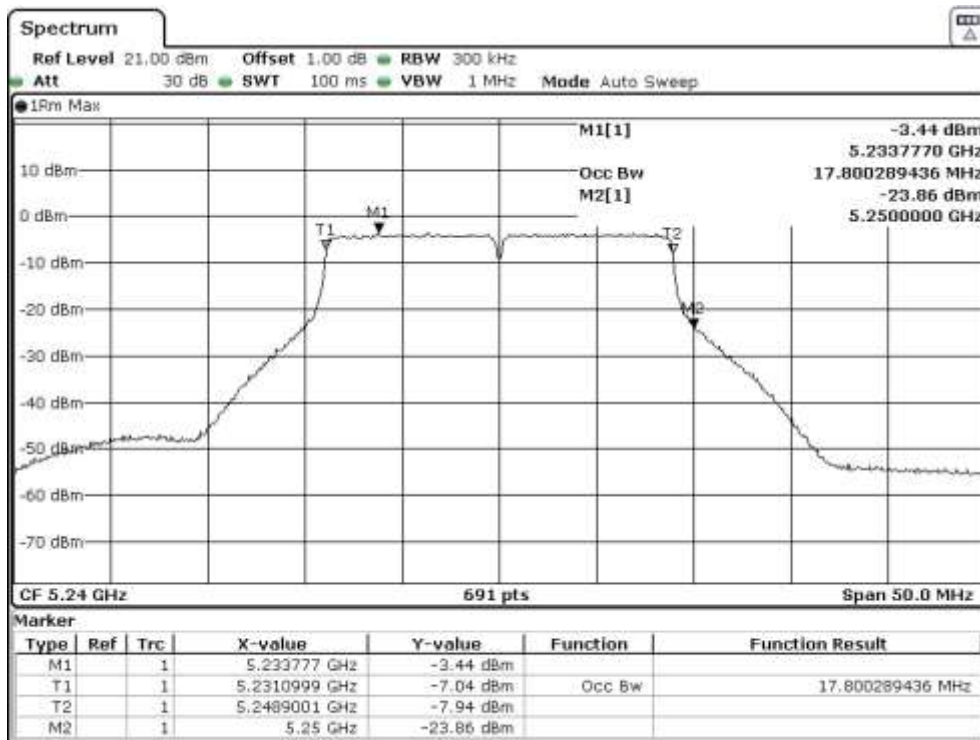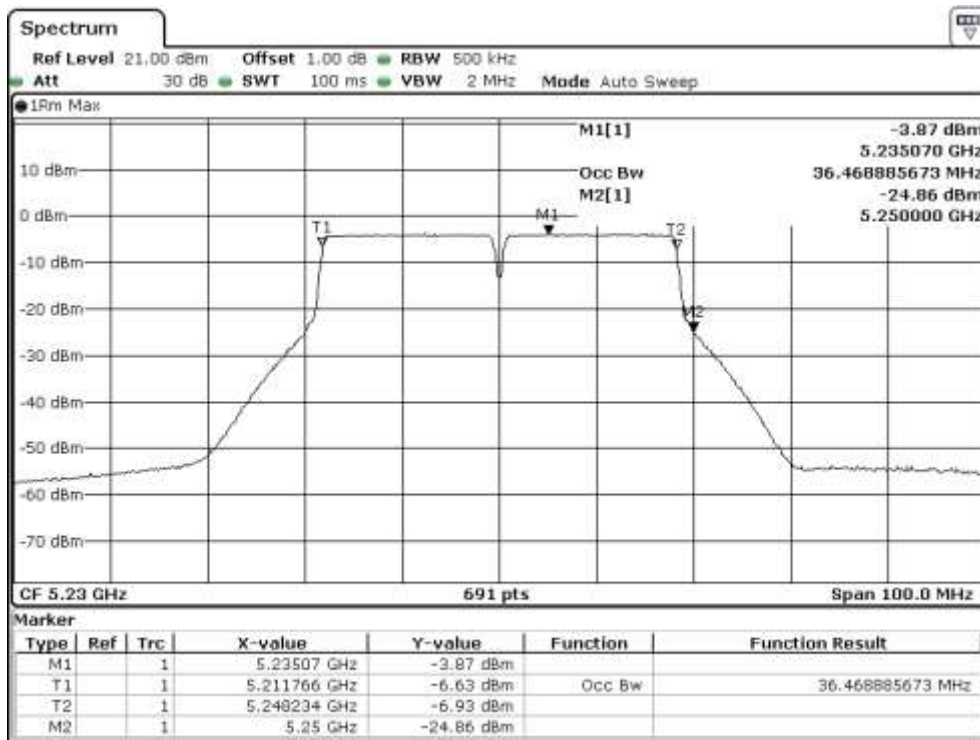| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5240 | 5248.249 | <5250 | PASS |



Date: 14.AUG.2020  19:30:30

Product        :    Notebook
Test Item      :    Band Edge Data
Test Mode      :    Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5240MHz)
Test Date      :    2020/12/21

**Chain A**

| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5240 | 5248.900 | <5250 | PASS |



Date: 21.DEC.2020  21:07:31

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps) (5240MHz)
Test Date : 2020/12/21

**Chain B**

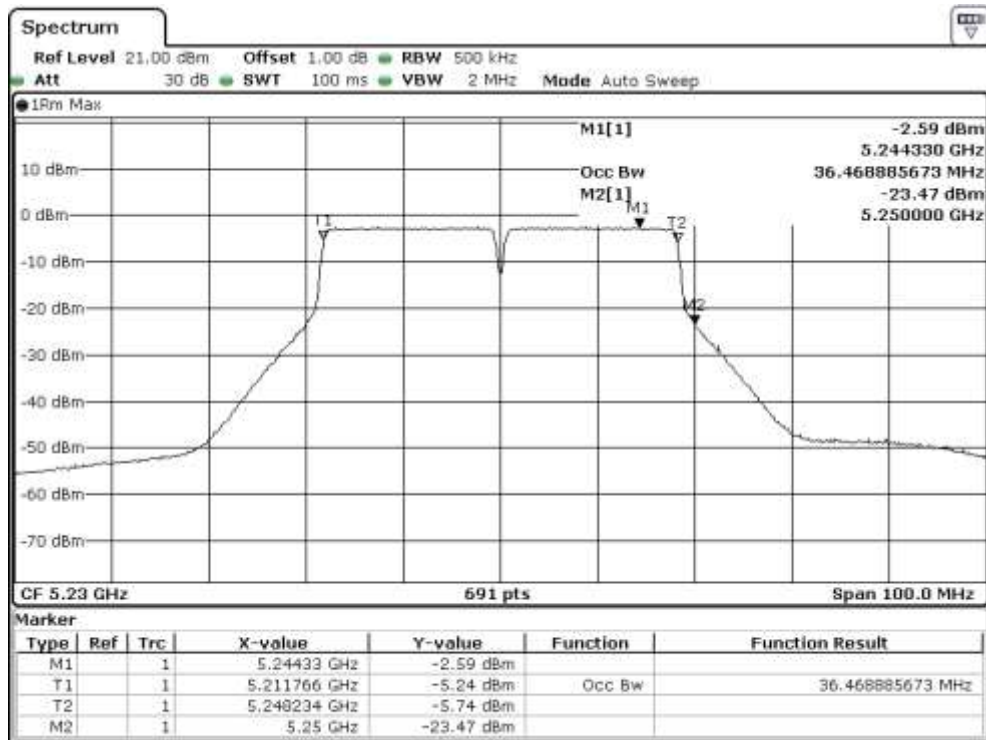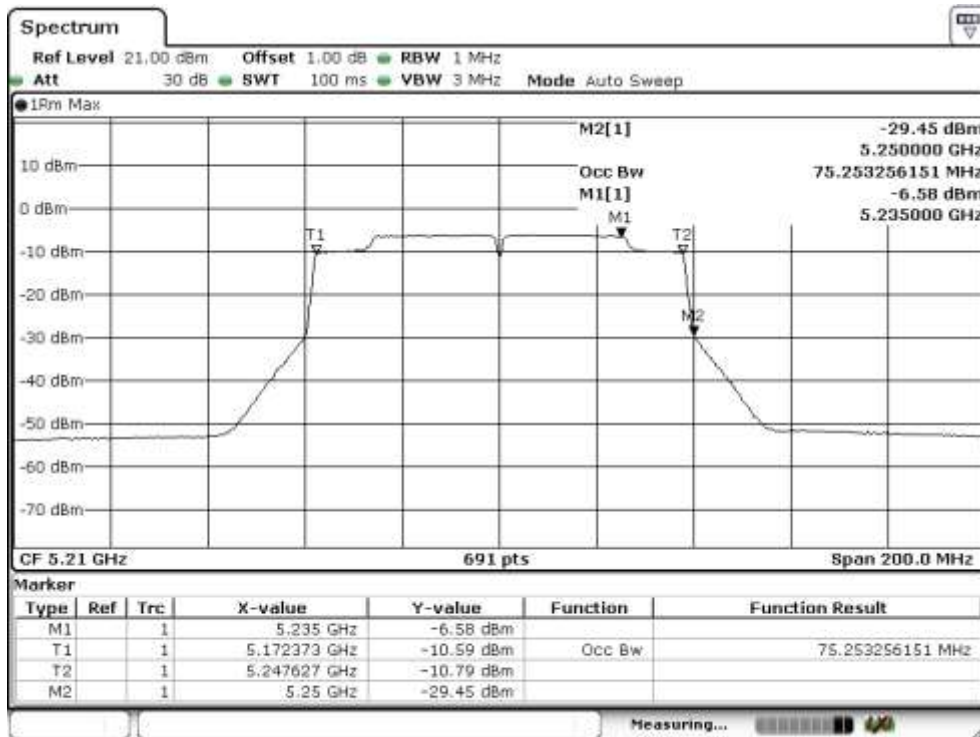| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5240 | 5248.900 | <5250 | PASS |



Date: 21.DEC.2020 21:06:46

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5230MHz)
Test Date : 2020/12/21

**Chain A**

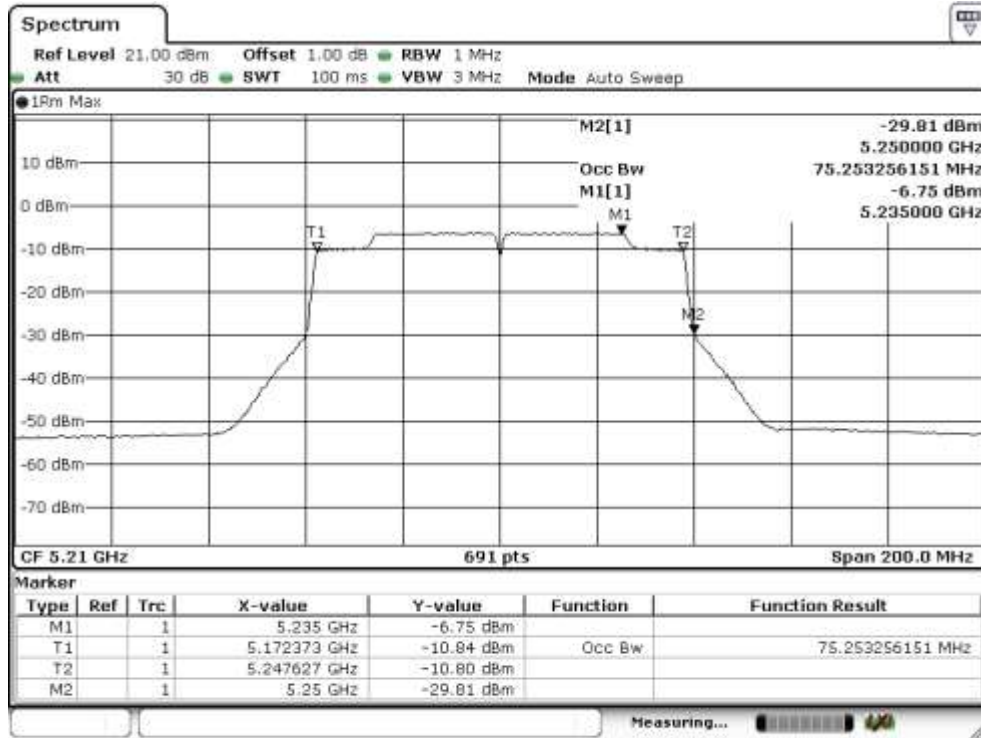| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5230 | 5248.234 | <5250 | PASS |



Date: 21.DEC.2020 13:06:44

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5230MHz)
Test Date : 2020/12/21

**Chain B**

| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5230 | 5248.234 | <5250 | PASS |



Date: 21.DEC.2020 13:06.04

**DEKRA**

| Product | : | Notebook |
|---|---|---|
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz) |
| Test Date | : | 2020/08/14 |

**Chain A**

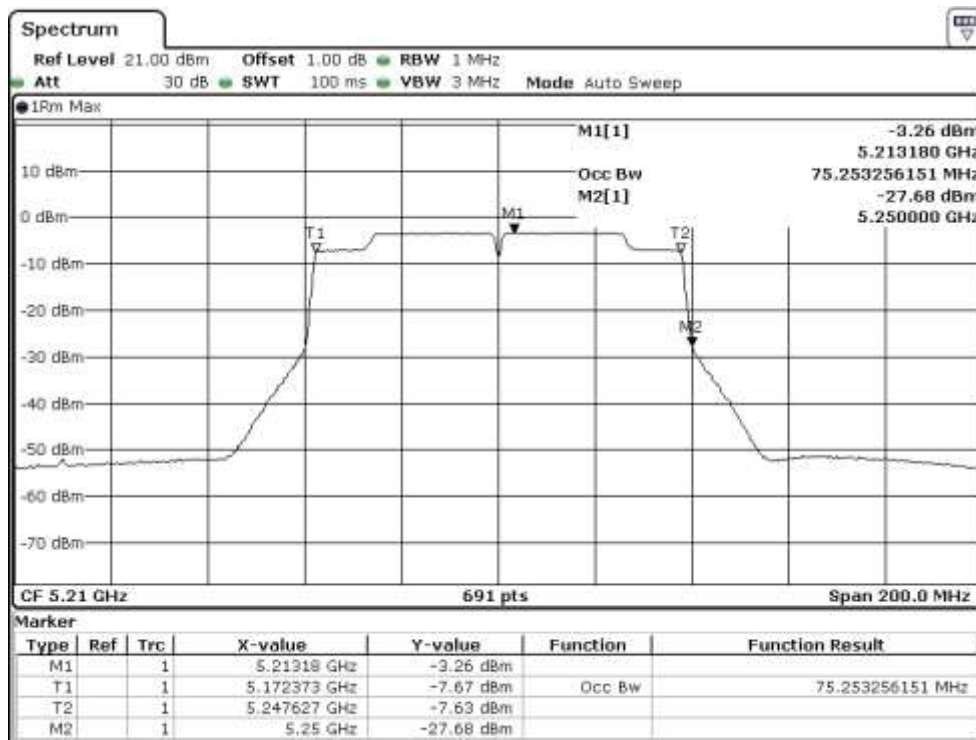| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5210 | 5247.627 | <5250 | PASS |



Date: 14.AUG.2020  19:39:31

Product : Notebook
Test Item : Band Edge Data
Test Mode : Mode 4: Transmit (802.11ac-80BW 65Mbps)(MIMO) (5210MHz)
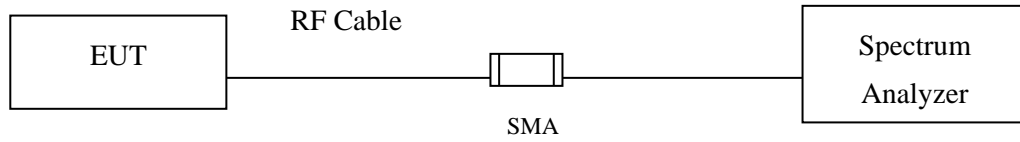Test Date : 2020/08/14

**Chain B**

| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5210 | 5247.627 | <5250 | PASS |



Date: 14.AUG.2020  19:40:59

**DEKRA**

| Product | : | Notebook |
|---|---|---|
| Test Item | : | Band Edge Data |
| Test Mode | : | Mode 5: Transmit (802.11ac-80BW 32.5Mbps)(SISO)(5210MHz) |
| Test Date | : | 2020/12/21 |

**Chain A**

| Test Frequency (MHz) | Measurement Level (MHz) | Limit (MHz) | Result |
|---|---|---|---|
| 5210 | 5247.627 | <5250 | PASS |



Date: 21.DEC.2020 13:11:25

## 7. Duty Cycle

## 7.1. Test Setup

```
  ┌────────────┐        RF Cable                          ┌────────────┐
  │            │                                          │  Spectrum  │
  │    EUT     │─────────────────────[    ]───────────────│  Analyzer  │
  │            │                                          │            │
  └────────────┘                       SMA                └────────────┘
```

## 7.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to U-NII test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

## 7.3. Test Result of Duty Cycle

Product    :    Notebook
Test Item   :    Duty Cycle
Test Mode  :    Transmit

Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)
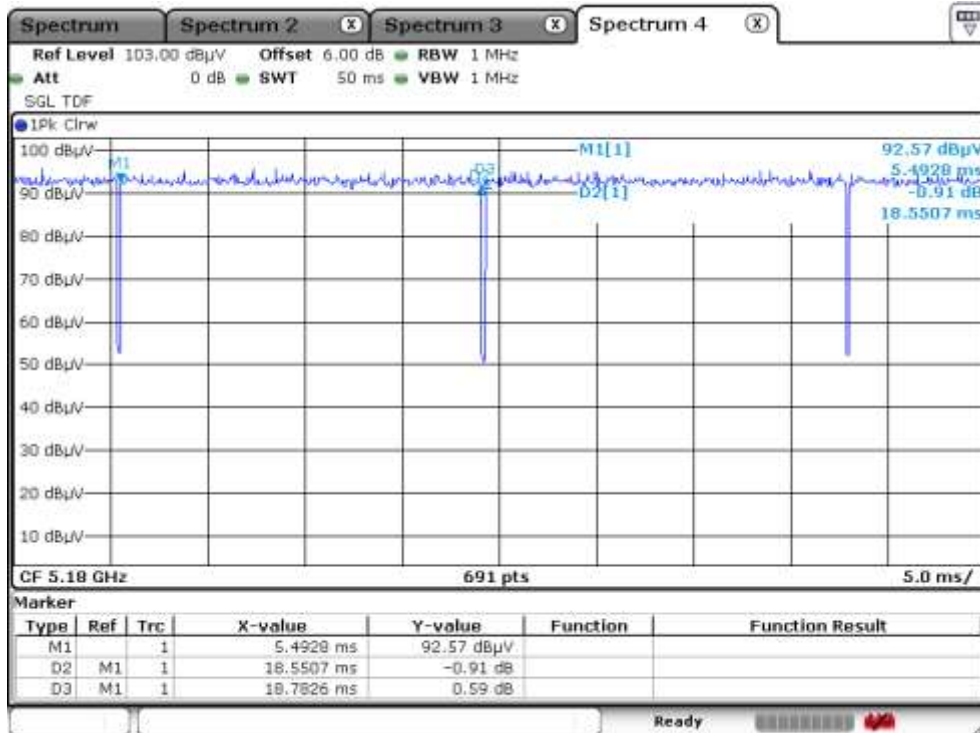
Duty Factor = 10 Log (1/Duty Cycle)

Results:

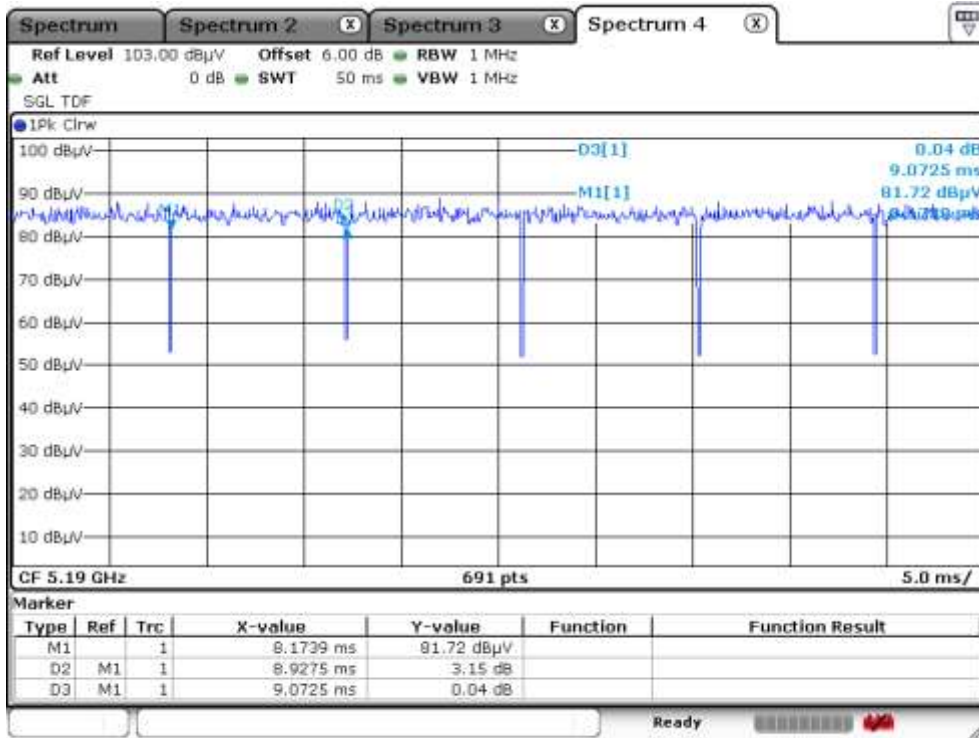| 5GHz band | Ton (ms) | Ton + Toff (ms) | Duty Cycle (%) | Duty Factor (dB) |
|---|---|---|---|---|
| 802.11 a | 2.0290 | 2.0870 | 97.22 | 0.12 |
| 802.11 n20 | 18.5507 | 18.7826 | 98.77 | 0.05 |
| 802.11 n40 | 8.9275 | 9.0725 | 98.40 | 0.07 |
| 802.11 ac80(MIMO) | 5.4783 | 5.5652 | 98.44 | 0.07 |
| 802.11 ac80(SISO) | 10.9980 | 11.1090 | 99.00 | 0.04 |

**DEKRA**

802.11a



Date: 28.JUL.2020  04:38:06
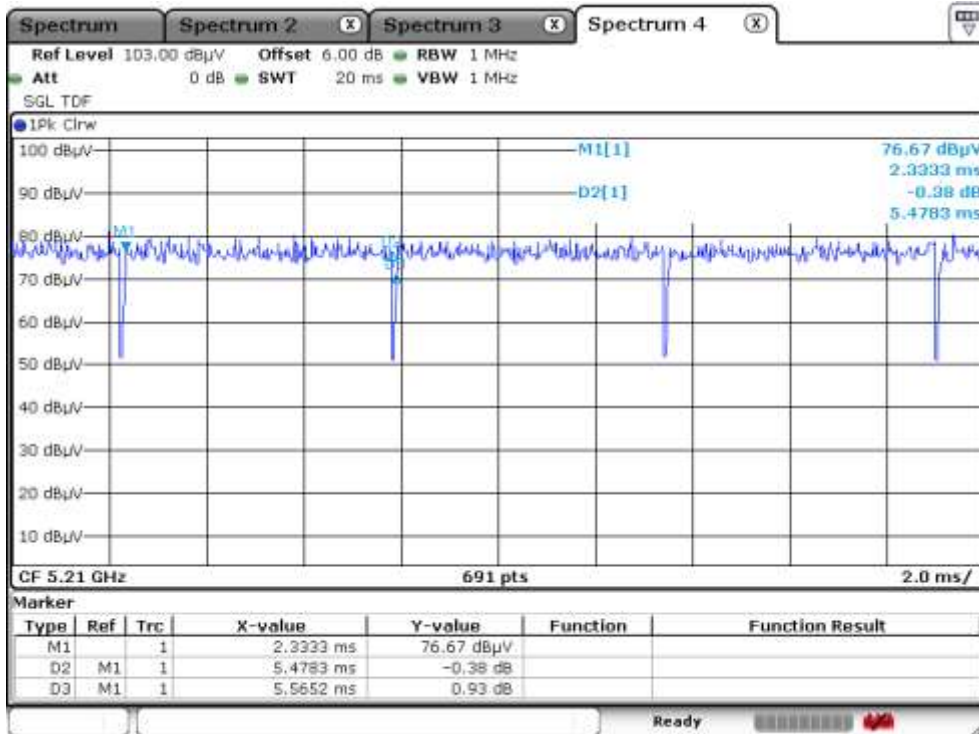
802.11n20



Date: 28.JUL.2020  04:39:13
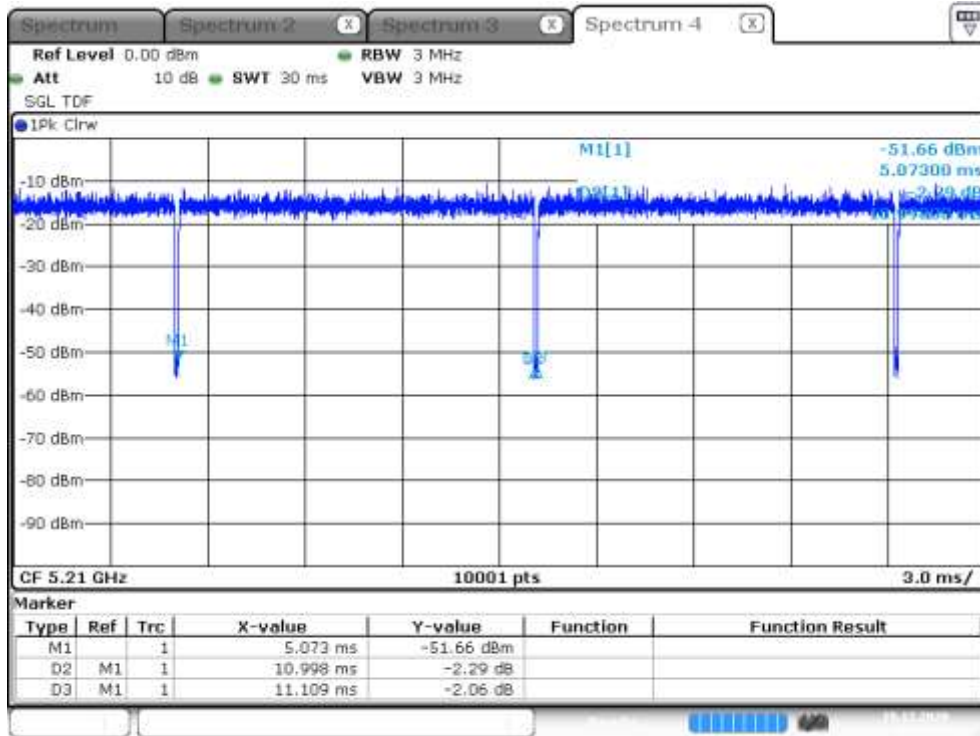
**DEKRA**

802.11n40



Date: 28.JUL.2020  04:44:22

802.11ac80(MIMO)



Date: 28.JUL.2020  04:46:04

**DEKRA**

802.11ac80(SISO)



Date: 19.DEC.2020 06:21:51

## 8. EMI Reduction Method During Compliance Testing

No modification was made during testing.