# FCC Part 15.407

# TEST REPORT

For

# Align Technology Inc.

**2820 Orchard Parkway San Jose, CA 95134 United States**

## FCC ID: 2ARGX-WIFIM

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | WiFi Module |

**Report Producer :** **Himiko Chen**

**Report Number :** **RLK1810002-00B**

**Report Date :** **2019-03-19**

**Reviewed By:** **Jerry Chang**

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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Taiwan) The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.

# Revision History

| Revision | Report Number | Issue Date | Description | Author/ Revised by |
|---|---|---|---|---|
| 1.0 | RLK1810002-00B | 2019-03-19 | Original Report | Himiko Chen |

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# 1 General Information

## 1.1 Product Description for Equipment under Test (EUT)

| | |
|---|---|
| Applicant | Align Technology Inc.<br>2820 Orchard Parkway San Jose, CA 95134 United States |
| Manufacturer | AsiaRF Co., Ltd.<br>1F, 7, Houde Street, Younghe District, New Taipei City, 23455, Taiwan |
| Brand(Trade) Name | align |
| Product (Equipment) | WiFi Module |
| Main Model Name | WifiM |
| Frequency Range | 5150 MHz ~ 5250 MHz, 5250 MHz ~ 5350 MHz,<br>5470 MHz ~ 5725 MHz, 5725 MHz ~ 5850 MHz |
| Transmit Power | IEEE 802.11a Mode: 16.26dBm ( 0.0422W)<br>IEEE802.11ac VHT20 Mode: 16.96dBm ( 0.0496W)<br>IEEE 802.11ac VHT40 Mode: 17.19dBm ( 0.0523W)<br>IEEE 802.11ac VHT80 Mode: 17.87dBm ( 0.0612W) |
| Modulation Technique | IEEE 802.11a Mode: OFDM<br>IEEE 802.11ac VHT 20 Mode: OFDM<br>IEEE 802.11ac VHT 40 Mode: OFDM<br>IEEE 802.11ac VHT80 Mode: OFDM |
| Transmit Data Rate | IEEE 802.11a Mode: 54-6 Mbps<br>IEEE 802.11n HT20 Mode: MCS 0-7<br>IEEE 802.11n HT40 Mode: MCS 0-7<br>IEEE 802.11ac VHT80 Mode: MCS 0-9 |

| | |
|---|---|
| Number of Channels | For UNII-1 Band I:<br>IEEE 802.11a / IEEE802.11n HT20 Mode: 4 Channels<br>IEEE 802.11n HT40 Mode: 2 Channels<br>IEEE 802.11ac VHT80 Mode: 1 Channels<br>For UNII-2A Band II:<br>IEEE 802.11a / IEEE802.11n HT20 Mode: 4 Channels<br>IEEE 802.11n HT40 Mode: 2 Channels<br>IEEE 802.11ac VHT80 Mode: 1 Channels<br>For UNII-2C Band III:<br>IEEE 802.11a / IEEE802.11n HT20 Mode: 11 Channels<br>IEEE 802.11n HT40 Mode: 5 Channels<br>IEEE 802.11ac VHT80 Mode: 2 Channels<br>For UNII-3 Band IV:<br>IEEE 802.11a / IEEE802.11n HT20 Mode: 5 Channels<br>IEEE 802.11n HT40 Mode: 2 Channels<br>IEEE 802.11ac VHT80 Mode: 1 Channels |
| Antenna Specification | PCB Antenna / 6.5 dBi |
| Power Operation<br>(Voltage Range) | ☐ AC 120V/60Hz<br>☐ Adapter:<br>☐ By AC Power Cord<br>☐ PoE |
| | ☐ DC Type<br>☐ Battery:<br>☐ DC Power Supply<br>☐ External from USB Cable<br>☐ External DC Adapter |
| | ☒ Host System |
| Received Date | Oct. 09, 2018 |
| Date of Test | Feb. 15, 2019 ~ Mar. 12, 2019 |

**All measurement and test data in this report was gathered from production sample serial number: 1810002 (Assigned by BACL, Taiwan).*

## 1.2 Objective

This report is prepared on behalf of Align Technology Inc.. in accordance with Part 2, Subpart J, Part 15, Subparts A, C and E of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

## 1.3 Related Submittal(s)/Grant(s)

N/A.

## 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

## 1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

☐68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (Taiwan) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3180) and the FCC designation No.TW3180 under the Mutual Recognition Agreement (MRA) in FCC Test. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 974454. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

# 2 System Test Configuration

## 2.1 Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacture.

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the 820.11n ht20/n ht40 were reduced since the identical parameters with 802.11ac vht20 and vht40.

SISO mode and MIMO mode have the same power level setting and base on output power testing, MIMO mode power than SISO mode large, MIMO mode was selected for full testing.

The device supports MIMO (CDD) at all modes.

**For 5150 ~ 5250MHz**

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 38 | 5190 | 46 | 5230 |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---|---|
| 42 | 5210 |

**For 5250 ~ 5350MHz**

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 52 | 5260 | 60 | 5300 |
| 56 | 5280 | 64 | 5320 |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 54 | 5270 | 62 | 5310 |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---|---|
| 58 | 5290 |

**For 5470 ~ 5725MHz**

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 100 | 5500 | 124 | 5620 |
| 104 | 5520 | 128 | 5640 |
| 108 | 5540 | 132 | 5660 |
| 112 | 5560 | 136 | 5680 |
| 116 | 5580 | 140 | 5700 |
| 120 | 5560 | | |

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 102 | 5510 | 126 | 5630 |
| 110 | 5550 | 134 | 5670 |
| 118 | 5590 | | |

2 channels are provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 106 | 5530 | 122 | 5610 |

**For 5725 ~ 5850MHz:**

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 149 | 5745 | 161 | 5805 |
| 153 | 5765 | 165 | 5825 |
| 157 | 5785 | | |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 151 | 5755 | 159 | 5795 |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---|---|
| 155 | 5775 |

## 2.2 Equipment Modifications

No modification was made to the EUT.

## 2.3 Test Mode

Mode: Full System (Model: WifiM) tested all measure item.

## 2.4 EUT Exercise Software

The EUT was programmed to be in continuously transmitting mode.

The software was used "CMD.EXE".

| UNII Band | Mode | Channel | Frequency (MHz) | Power setting |
|---|---|---|---|---|
| UNII-1 | 802.11a | 36 | 5180 | 12 |
| | | 40 | 5200 | 12 |
| | | 48 | 5240 | 12 |
| UNII-2A | | 52 | 5260 | 12 |
| | | 60 | 5300 | 12 |
| | | 64 | 5320 | 12 |
| UNII-2C | | 100 | 5500 | 10 |
| | | 116 | 5580 | 10 |
| | | 140 | 5700 | 10 |
| UNII-3 | | 149 | 5745 | 16 |
| | | 157 | 5785 | 16 |
| | | 165 | 5825 | 16 |
| UNII-1 | 802.11n 20 / ac20 | 36 | 5180 | 8 |
| | | 40 | 5200 | 8 |
| | | 48 | 5240 | 8 |
| UNII-2A | | 52 | 5260 | 8 |
| | | 60 | 5300 | 8 |
| | | 64 | 5320 | 8 |
| UNII-2C | | 100 | 5500 | 4 |
| | | 116 | 5580 | 4 |
| | | 140 | 5700 | 4 |
| UNII-3 | | 149 | 5745 | 18 |
| | | 157 | 5785 | 18 |
| | | 165 | 5825 | 18 |
| UNII-1 | 802.11n 40 / ac 40 | 38 | 5190 | 12 |
| | | 46 | 5230 | 12 |
| UNII-2A | | 54 | 5270 | 12 |
| | | 62 | 5310 | 12 |
| UNII-2C | | 102 | 5510 | 7 |
| | | 118 | 5590 | 6 |
| | | 134 | 5670 | 6 |
| UNII-3 | | 151 | 5755 | 14 |
| | | 159 | 5795 | 15 |
| UNII-1 | 802.11n 80 / ac 80 | 42 | 5210 | 8 |
| UNII-2A | | 58 | 5290 | 8 |
| UNII-2C | | 106 | 5530 | 6 |
| | | 122 | 5610 | 6 |
| UNII-3 | | 155 | 5775 | 17 |

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

## 2.5 Support Equipment List and Details

| Description | Manufacturer | Model Number | BSMI | FCC ID | S/N |
|---|---|---|---|---|---|
| Adapter | L.T.E | LTE65ES-S2-1 | N/A | N/A | 174702842 |
| NB | Dell | E6410 | N/A | N/A | 10912240367 |
| Base | align | align | N/A | N/A | N/A |

## 2.6 External Cable List and Details

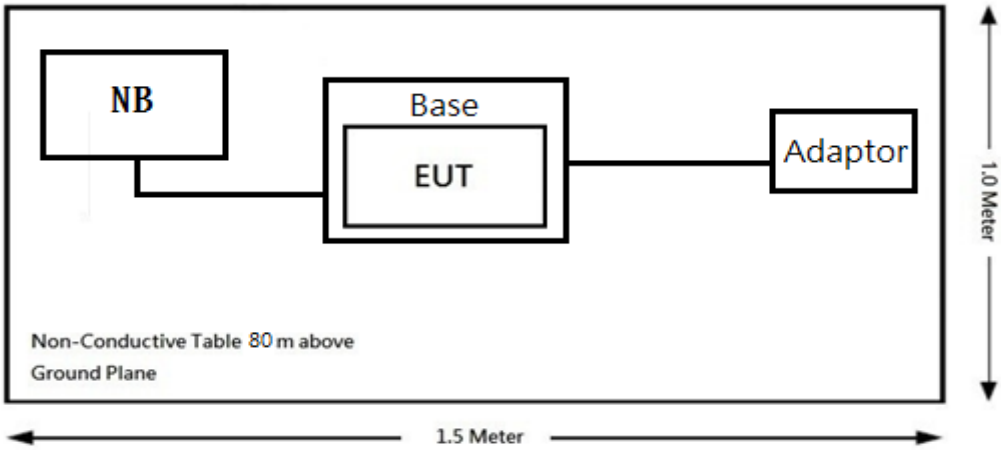
| Cable Description | Length (m) | From | To |
|---|---|---|---|
| Micro USB Cable | 1.5 | NB | Base |

## 2.7 Block Diagram of Test Setup

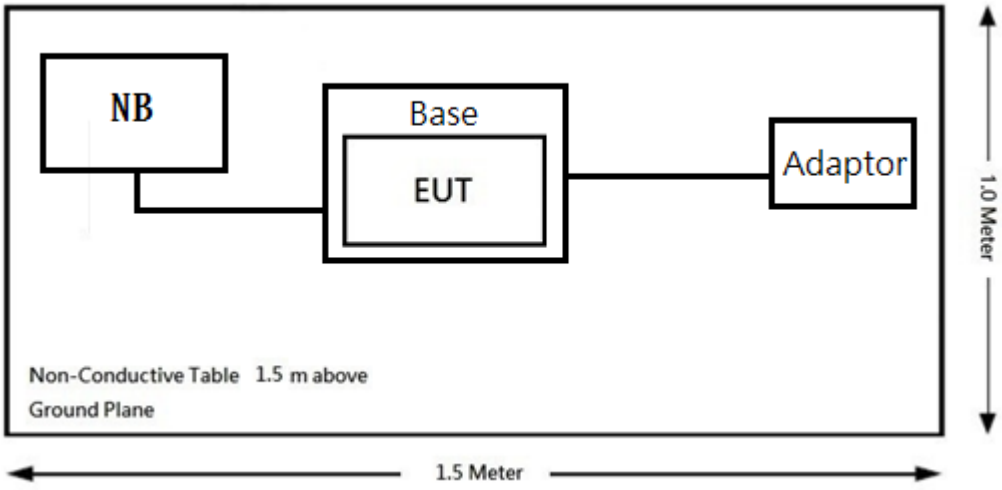
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

**Radiation:**

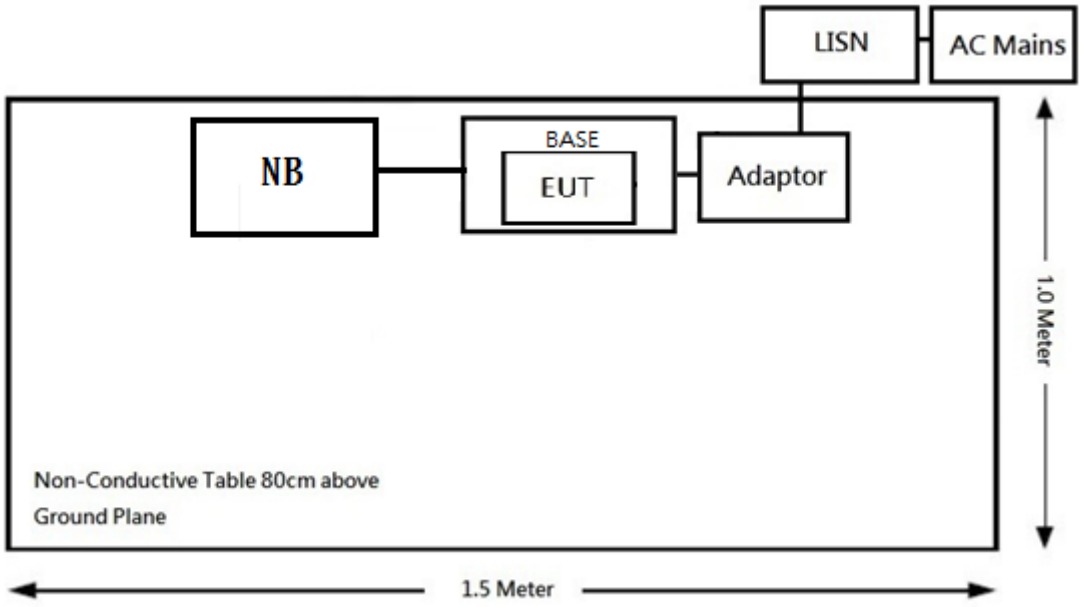
Below 1GHz:




Above 1GHz:


NB
Base
EUT
Adaptor
1.0 Meter
Non-Conductive Table 1.5 m above
Ground Plane
1.5 Meter

**Conduction:**


LISN
AC Mains
NB
BASE
EUT
Adaptor
1.0 Meter
Non-Conductive Table 80cm above
Ground Plane
1.5 Meter

## 2.8 Duty Cycle

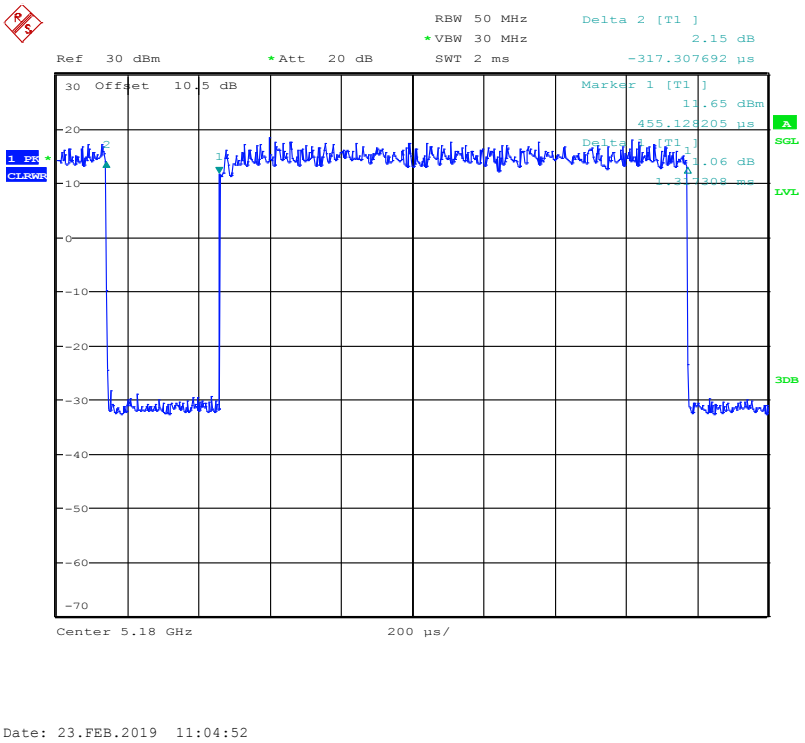
According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section B: Measurements of duty cycle, x, and maximum power transmission duration, T, are required for each tested mode of operation.

| Radio Mode | On Time (ms) | Off Time (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|
| CDD Mode | | | | |
| 802.11a | 1.32 | 0.32 | 0.8 | 0.97 |
| 802.11ac20 | 0.37 | 0.31 | 0.54 | 2.68 |
| 802.11ac40 | 0.21 | 0.31 | 0.4 | 3.98 |
| 802.11ac80 | 0.12 | 0.3 | 0.29 | 5.38 |

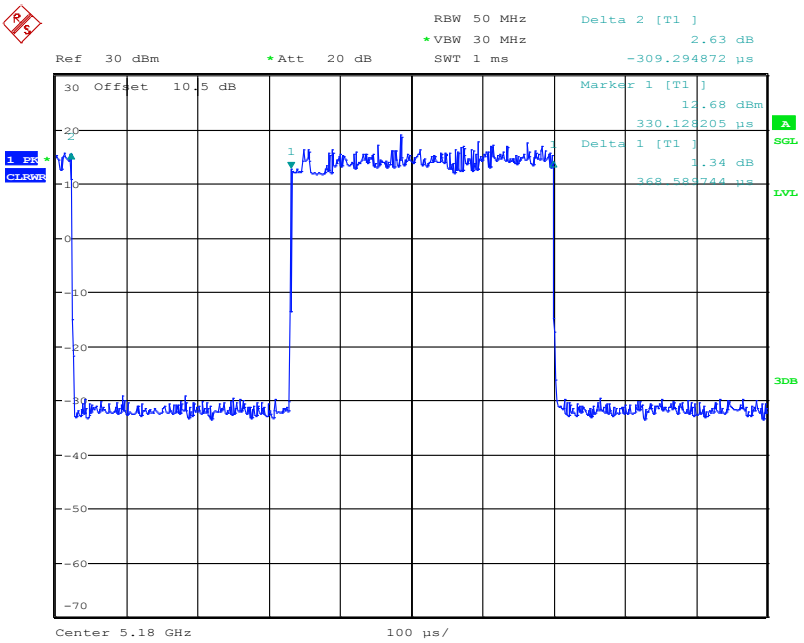
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

### A Mode

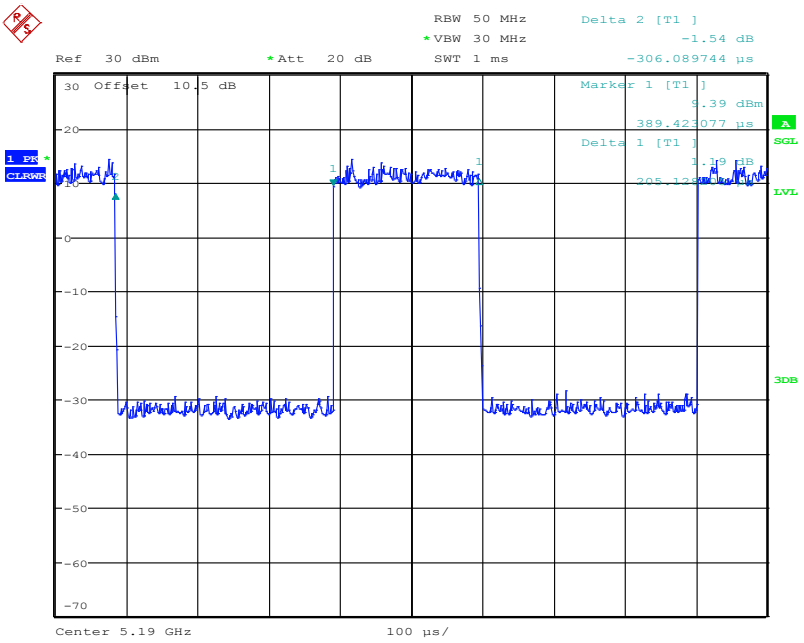


## AC20 Mode



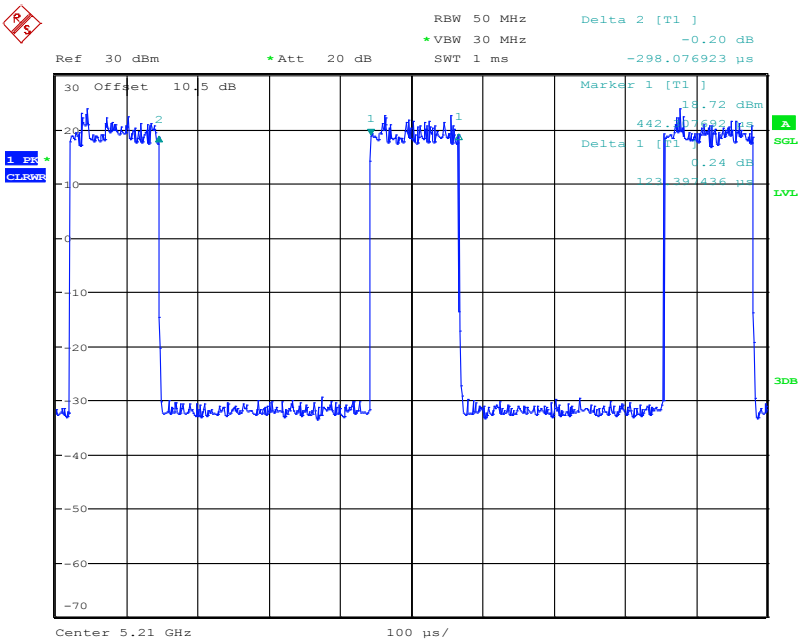

Date: 23.FEB.2019 11:10:20

## AC40 Mode




Date: 23.FEB.2019 11:13:24

# AC80 Mode




Date: 23.FEB.2019 11:24:03

# 3 Summary of Test Results

| FCC Rules | Description of Test | Results |
|---|---|---|
| §15.407(f), §1.1310, §2.1091 | Maximum Permissible Exposure (MPE) | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.407(b)(6) & §15.207(a) | AC Line Conducted Emissions | Compliance |
| §15.205 & §15.209 & §15.407(b)(1),(2),(3),(4),(7) | Unwanted Emission | Compliance |
| §15.407(a)(1),(5),(e) | Emission Bandwidth | Compliance |
| §15.407(a)(1),(2),(3) | Conducted Transmitter Output Power | Compliance |
| §15.407(a)(1),(2),(3) | Power Spectral Density | Compliance |

# 4 Test Equipment List and Details

| Description | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| AC Line Conduction Room (CON-A) | | | | | |
| LISN | Rohde & Schwarz | ENV216 | 101612 | 2019/02/21 | 2020/02/20 |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | 101419 | 2018/10/23 | 2019/10/22 |
| Pulse Limiter | Rohde & Schwarz | ESH3Z2 | TXZEM104 | 2018/08/03 | 2019/08/02 |
| RF Cable | EMEC | EM-CB5D | 001 | 2018/07/02 | 2019/07/01 |
| Software | AUDIX | E3 | V9.150826k | N.C.R | N.C.R |
| Radiated Room (966-A) | | | | | |
| Active Loop Antenna | ETS-Lindgren | 6502 | 00035796 | 2018/03/13 | 2019/03/12 |
| Bilog Antenna with 6 dB Attenuator | SUNOL SCIENCES & MINI-CIRCUITS | JB6/UNAT-6+ | A050115/1554 2_01 | 2018/12/11 | 2019/12/10 |
| Horn Antenna | EMCO | 3115 | 9311-4158 | 2018/04/20 | 2019/04/19 |
| Horn Antenna | ETS-Lindgren | 3116 | 62638 | 2018/08/29 | 2019/08/28 |
| Preamplifier | Sonoma | 310N | 130602 | 2018/07/04 | 2019/07/03 |
| Preamplifier | EM Electronics Corp. | EM01G18G | 060657 | 2018/12/07 | 2019/12/06 |
| Microware Preamplifier | EM Electronics Corporation | EM18G40G | 060656 | 2019/01/11 | 2020/01/10 |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | 101419 | 2018/10/23 | 2019/10/22 |
| Spectrum Analyzer | Rohde & Schwarz | FSV40 | 101435 | 2019/02/13 | 2020/02/12 |
| Micro flex Cable | UTIFLEX | FSCM 64639 / (2M) | 93D0127 | 2018/07/31 | 2019/07/30 |
| Micro flex Cable | UTIFLEX | UFA210A-1-3149-300300 | MFR64639 226389-001 | 2018/11/16 | 2019/11/15 |
| Micro flex Cable | ROSNOL | K1K50-UP0264-K1K50-450CM | 160309-1 | 2019/03/04 | 2020/03/03 |
| Micro flex Cable | ROSNOL | K1K50-UP0264-K1K50-80CM | 160309-2 | 2019/01/16 | 2020/01/15 |
| Turn Table | Champro | TT-2000 | 060772-T | N.C.R | N.C.R |
| Antenna Tower | Champro | AM-BS-4500-B | 060772-A | N.C.R | N.C.R |
| Controller | Champro | EM1000 | 60772 | N.C.R | N.C.R |
| Software | Farad | EZ_EMC | BACL-03A1 | N.C.R | N.C.R |
| NSA | BACL | 966-A | N/A | 2018/07/09 | 2019/07/08 |

| | | | | | |
|---|---|---|---|---|---|
| VSWR | BACL | 966-A | N/A | 2018/07/16 | 2019/07/15 |
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due Date** |
| Conducted Room | | | | | |
| Spectrum Analyzer | Rohde & Schwarz | FSU26 | 200268 | 2018/05/04 | 2019/05/03 |
| Cable | WOKEN | SFL402 | S02-160323-07 | 2019/02/11 | 2020/02/10 |
| Attenuator | MINI-CIRCUITS | BW-S10W5+ | N/A | 2019/03/07 | 2020/03/06 |
| Power Sensor | KEYSIGHT | U2021XA | MY54080018 | 2019/03/06 | 2020/03/05 |

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements*

# 5 FCC §15.407(f), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

## 5.1 Applicable Standard

According to§15.407(f) and §1.1310, U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), and 2.1091 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

## 5.2 RF Exposure Evaluation Result

**MPE evaluation for single transmission:**

| Mode | Frequency Range (MHz) | Antenna Gain | | Target Power | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|---|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| 5G WIFI B1 | 5150-5250 | 6.5 | 4.467 | 18 | 63.096 | 20 | 0.0561 | 1 |
| 5G WIFI B2 | 5250-5350 | 6.5 | 4.467 | 18 | 63.096 | 20 | 0.0561 | 1 |
| 5G WIFI B3 | 5470-5725 | 6.5 | 4.467 | 18 | 63.096 | 20 | 0.0561 | 1 |
| 5G WIFI B4 | 5725-5850 | 6.5 | 4.467 | 17 | 50.119 | 20 | 0.0445 | 1 |

Note: the maximum antenna gain was used for evaluation.

**Result:** MPE evaluation of single and simultaneous transmission meet 20cm the requirement of standard.

# 6 FCC §15.203 – Antenna Requirements

## 6.1 Applicable Standard

According to § 15.203,

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in Db that the directional gain of the antenna exceeds 6 dBi.

## 6.2 Antenna List and Details

| No. | Manufacturer | Model | Antenna Type | Antenna Gain | Connector Type | Result |
|---|---|---|---|---|---|---|
| Ant 1 | AsiaRF | ANT010-DAU | PCB Antenna | 6.5 dBi | I-PEX Connectors | Compliance |
| Ant 2 | AsiaRF | ANT010-DAU | PCB Antenna | 6.5 dBi | I-PEX Connectors | Compliance |
| Ant 3 | AsiaRF | ANT010-DAU | PCB Antenna | 6.5 dBi | I-PEX Connectors | Compliance |
| Ant 4 | AsiaRF | ANT010-DAU | PCB Antenna | 6.5 dBi | I-PEX Connectors | Compliance |

The EUT has I-PEX connector to attach an external antenna and antenna gain is 6.5dBi, fulfill the requirement of this section, please refer to the EUT photos.

**Result: Compliance**

# 7 FCC §15.407(b)(6) & § 15.207(a) – AC Line Conducted Emissions

## 7.1 Applicable Standard

As per FCC §15.407(b) (6)

Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207

As per FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

**The lower limit applies at the boundary between the frequencies ranges.**

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15-0.5 | 66 to 56 Note 1 | 56 to 46 Note 2 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Note 1: Decreases with the logarithm of the frequency.*

*Note 2: A linear average detector is required*

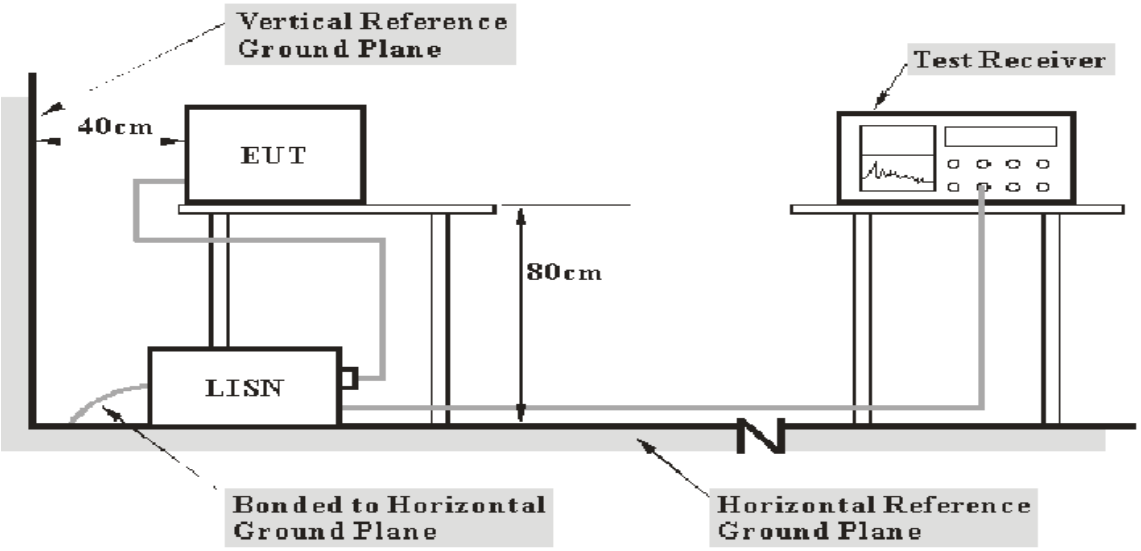
## 7.2 Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Taiwan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

| Port | Expanded Measurement uncertainty |
|---|---|
| AC Mains | 2.71 dB (k=2, 95% level of confidence) |

## 7.3 EUT Setup




Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

## 7.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

| Frequency Range | IF B/W |
|---|---|
| 150kHz – 30MHz | 9kHz |

## 7.5 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## 7.6 Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Over Limit" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

## 7.7 Environmental Conditions

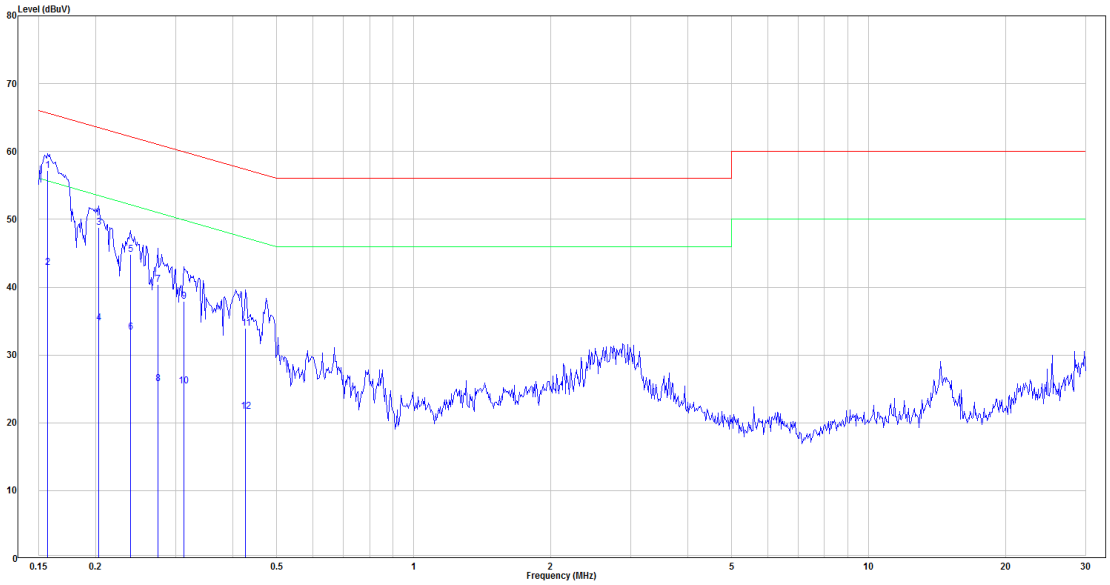
| | |
|---|---|
| **Temperature:** | 23.2 ℃ |
| **Relative Humidity:** | 61 % |
| **ATM Pressure:** | 1009 hPa |

*The testing was performed by Kevin Kao on 2019-03-12.*

## 7.8 Test Results

*Test Mode: Transmitting*

**Main: AC120 V, 60 Hz, Line**




| No. | Frequency | Reading | Correct | Result | Limit | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBµV) | Factor(dB) | (dBµV) | (dBµV) | (dB) | |
| 1 | 0.157 | 37.73 | 19.45 | 57.18 | 65.63 | -8.45 | QP |
| 2 | 0.157 | 23.46 | 19.45 | 42.91 | 55.63 | -12.71 | Average |
| 3 | 0.203 | 29.36 | 19.46 | 48.82 | 63.47 | -14.65 | QP |
| 4 | 0.203 | 15.26 | 19.46 | 34.73 | 53.47 | -18.75 | Average |
| 5 | 0.238 | 25.33 | 19.46 | 44.79 | 62.15 | -17.36 | QP |
| 6 | 0.238 | 13.86 | 19.46 | 33.32 | 52.15 | -18.83 | Average |
| 7 | 0.274 | 20.91 | 19.46 | 40.37 | 60.99 | -20.62 | QP |
| 8 | 0.274 | 6.33 | 19.46 | 25.80 | 50.99 | -25.19 | Average |
| 9 | 0.312 | 18.44 | 19.47 | 37.91 | 59.91 | -22.01 | QP |
| 10 | 0.312 | 5.96 | 19.47 | 25.43 | 49.91 | -24.49 | Average |
| 11 | 0.427 | 14.42 | 19.47 | 33.90 | 57.31 | -23.41 | QP |
| 12 | 0.427 | 2.20 | 19.47 | 21.67 | 47.31 | -25.63 | Average |

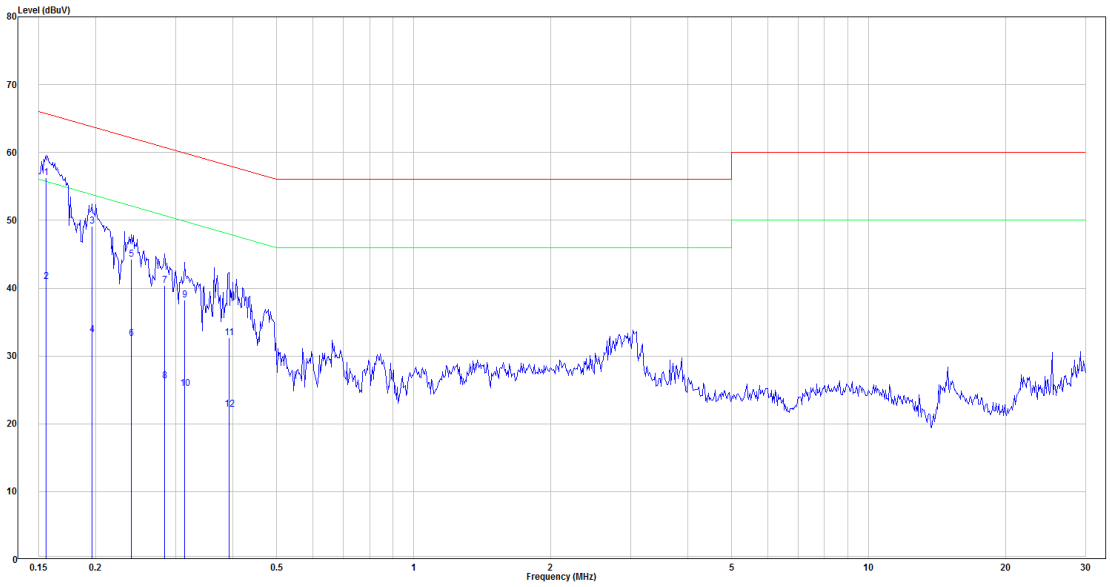
Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

**Main: AC120 V, 60 Hz, Neutral**




| No. | Frequency | Reading | Correct | Result | Limit | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBµV) | Factor(dB) | (dBµV) | (dBµV) | (dB) | |
| 1 | 0.155 | 36.84 | 19.44 | 56.28 | 65.71 | -9.43 | QP |
| 2 | 0.155 | 21.54 | 19.44 | 40.98 | 55.71 | -14.73 | Average |
| 3 | 0.196 | 29.72 | 19.46 | 49.18 | 63.76 | -14.58 | QP |
| 4 | 0.196 | 13.72 | 19.46 | 33.18 | 53.76 | -20.59 | Average |
| 5 | 0.240 | 24.77 | 19.46 | 44.23 | 62.11 | -17.88 | QP |
| 6 | 0.240 | 13.13 | 19.46 | 32.59 | 52.11 | -19.52 | Average |
| 7 | 0.284 | 20.92 | 19.46 | 40.38 | 60.70 | -20.33 | QP |
| 8 | 0.284 | 6.82 | 19.46 | 26.28 | 50.70 | -24.42 | Average |
| 9 | 0.314 | 18.77 | 19.46 | 38.23 | 59.87 | -21.64 | QP |
| 10 | 0.314 | 5.76 | 19.46 | 25.22 | 49.87 | -24.65 | Average |
| 11 | 0.393 | 13.21 | 19.46 | 32.67 | 58.01 | -25.34 | QP |
| 12 | 0.393 | 2.62 | 19.46 | 22.08 | 48.01 | -25.93 | Average |

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

# 8 FCC §15.209, §15.205 , §15.407(b) (1),(2),(3),(4),(6),(7) – Spurious Emissions

## 8.1 Applicable Standard

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 – 0.110<br>0.495 – 0.505<br>2.1735 – 2.1905<br>4.125 – 4.128<br>4.17725 – 4.17775<br>4.20725 – 4.20775<br>6.215 – 6.218<br>6.26775 – 6.26825<br>6.31175 – 6.31225<br>8.291 – 8.294<br>8.362 – 8.366<br>8.37625 – 8.38675<br>8.41425 – 8.41475<br>12.29 – 12.293<br>12.51975 – 12.52025<br>12.57675 – 12.57725<br>13.36 – 13.41 | 16.42 – 16.423<br>16.69475 – 16.69525<br>25.5 – 25.67<br>37.5 – 38.25<br>73 – 74.6<br>74.8 – 75.2<br>108 – 121.94<br>123 – 138<br>149.9 – 150.05<br>156.52475 – 156.52525<br>156.7 – 156.9<br>162.0125 –167.17<br>167.72 – 173.2<br>240 – 285<br>322 – 335.4<br>399.9 – 410<br>608 – 614 | 960 – 1240<br>1300 – 1427<br>1435 – 1626.5<br>1645.5 – 1646.5<br>1660 – 1710<br>1718.8 – 1722.2<br>2200 – 2300<br>2310 – 2390<br>2483.5 – 2500<br>2690 – 2900<br>3260 – 3267<br>3.332 – 3.339<br>3 3458 – 3 358<br>3.600 – 4.400 | 4. 5 – 5. 15<br>5. 35 – 5. 46<br>7.25 – 7.75<br>8.025 – 8.5<br>9.0 – 9.2<br>9.3 – 9.5<br>10.6 – 12.7<br>13.25 – 13.4<br>14.47 – 14.5<br>15.35 – 16.2<br>17.7 – 21.4<br>22.01 – 23.12<br>23.6 – 24.0<br>31.2 – 31.8<br>36.43 – 36.5<br>Above 38.6 |

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

Note 1: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC Part 15.407 (b)

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of−27 dBm/MHz

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of−27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall noet exceed an e.i.r.p. of -27 dBm/MHz.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

## 8.2 Measurement Uncertainty

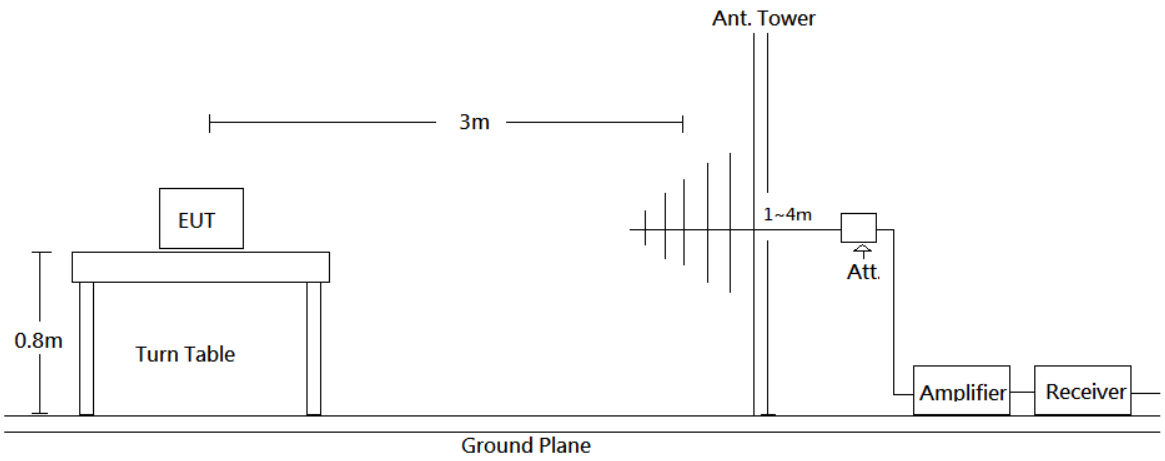
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Taiwan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report.

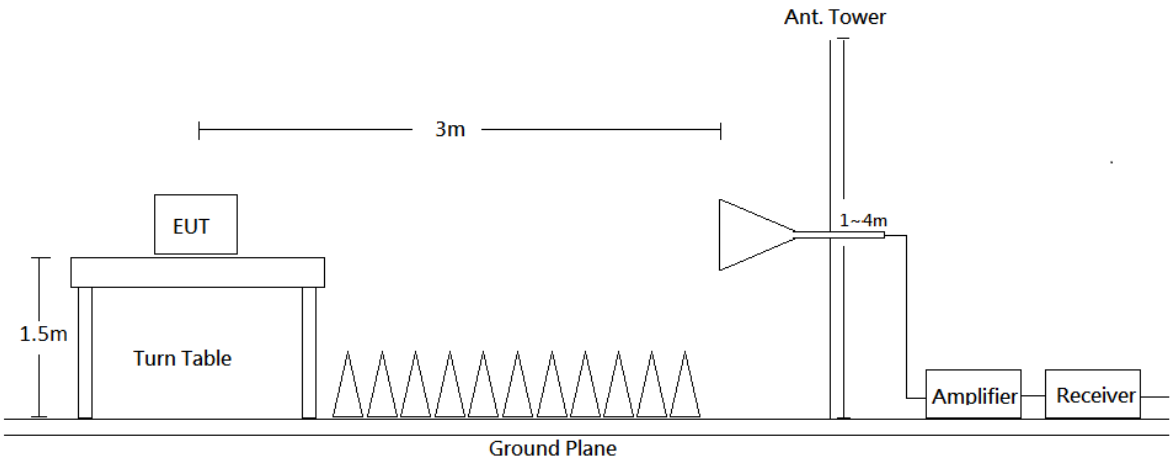
| Frequency | Measurement uncertainty |
|---|---|
| 30 MHz~200 MHz | 3.75 dB (k=2, 95% level of confidence) |
| 200 MHz~1 GHz | 4.21 dB (k=2, 95% level of confidence) |
| 1 GHz~6 GHz | 4.83 dB (k=2, 95% level of confidence) |
| 6 GHz~18 GHz | 5.18 dB (k=2, 95% level of confidence) |
| 18 GHz~26 GHz | 4.55 dB (k=2, 95% level of confidence) |
| 26 GHz~40 GHz | 4.67 dB (k=2, 95% level of confidence) |

## 8.3 EUT Setup

Below 1 GHz:

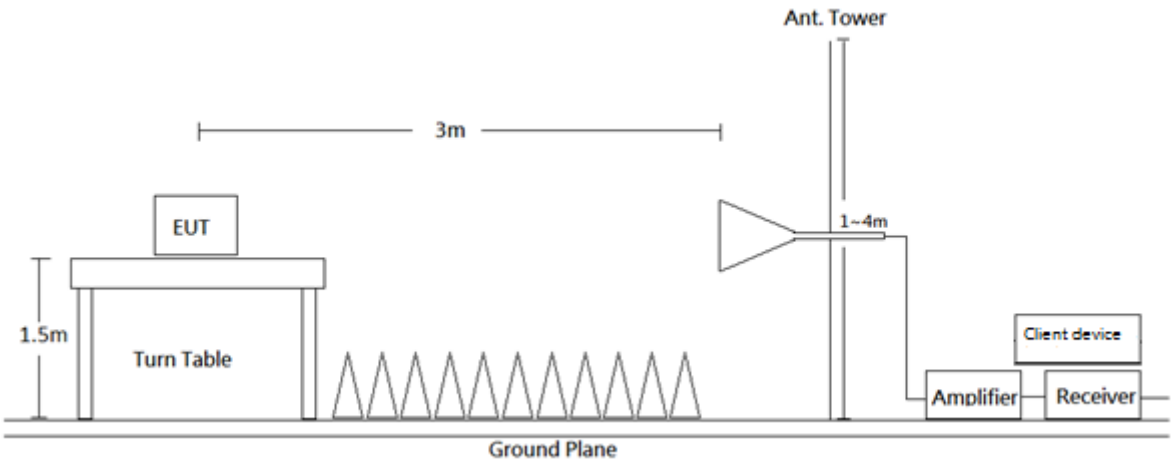



Above 1 GHz:




Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.407 Limits.

Beamforming Mode



During the test, the following programs under WIN XP were executed.

The program was executed as follows:

1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under Telnet.
3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX device.
4. The client device is placed behind the receiving antenna to find the maximum field angle.

## 8.4 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

| Frequency Range | RBW | VBW | Detector | Duty cycle | Measurement method |
|---|---|---|---|---|---|
| 30-1000 MHz | 120 kHz | / | QP | | QP |
| Above 1 GHz | 1 MHz | 3 MHz | PK | | PK |
| | 1 MHz | 3 MHz | RMS | >98% | Ave |
| | 1 MHz | 1/T | PK | <98% | Ave |

## 8.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

According to C63.10-2013, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

Frequency Band 5150~5250 MHz, EIRP Limit -27(dBm/MHz)

Equivalent Field Strength at 3m is 68.23 dBμV/m

Frequency Band 5725~5850 MHz, EIRP is all emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Equivalent Field Strength at 3m is all emissions shall be limited to a level of 68.2 dBμV/m at 75 MHz or more above or below the band edge increasing linearly to 105.2 dBμV/m at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 110.8 dBμV/m at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 122.2 dBμV/m at the band edge.

## 8.6 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result – Limit

## 8.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.407 Limit.

## 8.8 Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 58 % |
| **ATM Pressure:** | 1010 hPa |

*The Radiation Spurious Emissions testing was performed by Tom Hsu on 2019-02-15 ~ 2019-02-20.*

*The Conducted Spurious Emissions testing was performed by Tom Hsu from 2019-02-21 to 2019-03-04.*

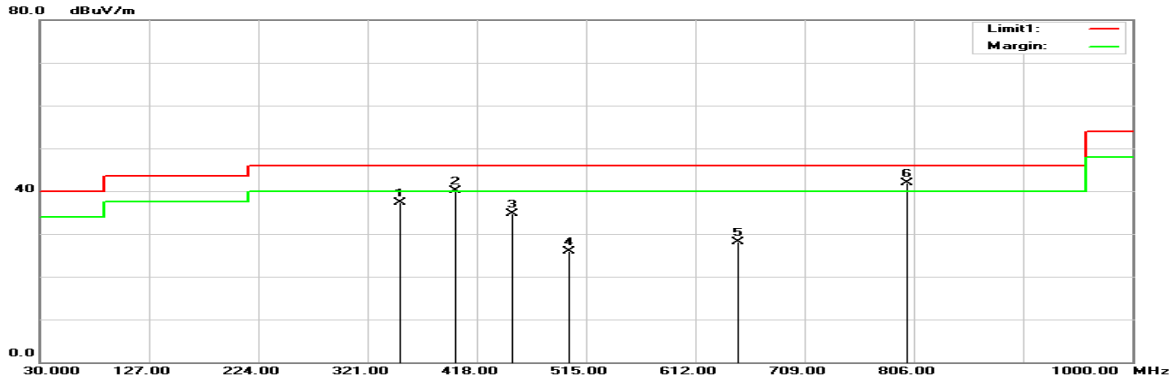
## 8.9 Test Results

*Test Mode: Transmitting*

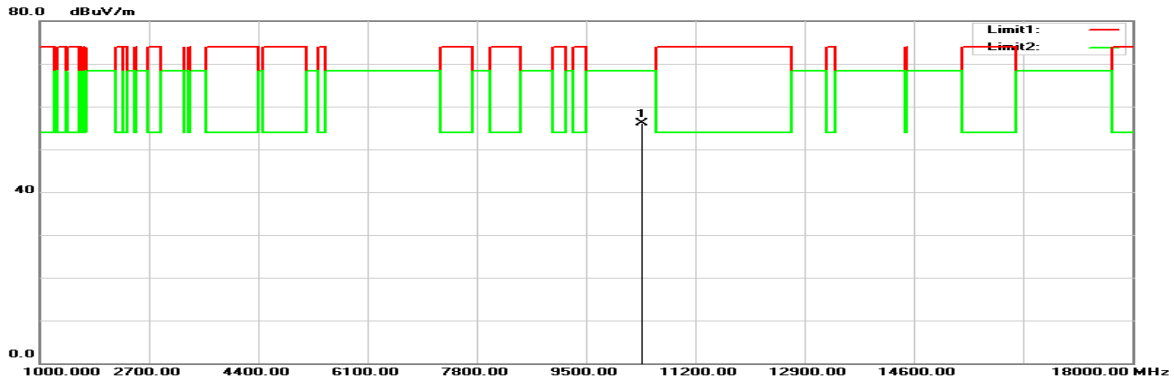
*(Pre-scan with three orthogonal axis, and worse case as Z axis.)*

**Horizontal** (*worst case is Wi-Fi ac VHT40 mode 5190MHz*)

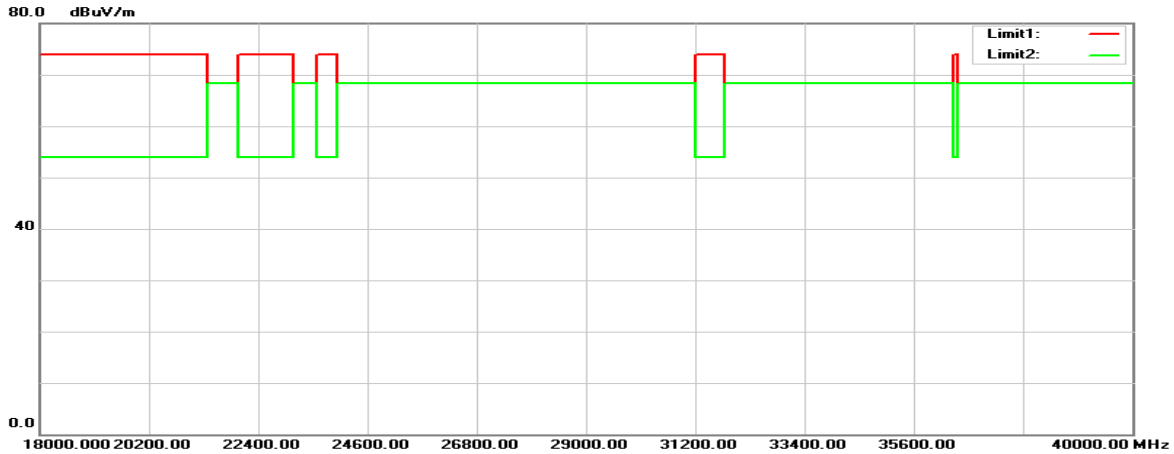
30MHz-1GHz:




1GHz-18GHz:

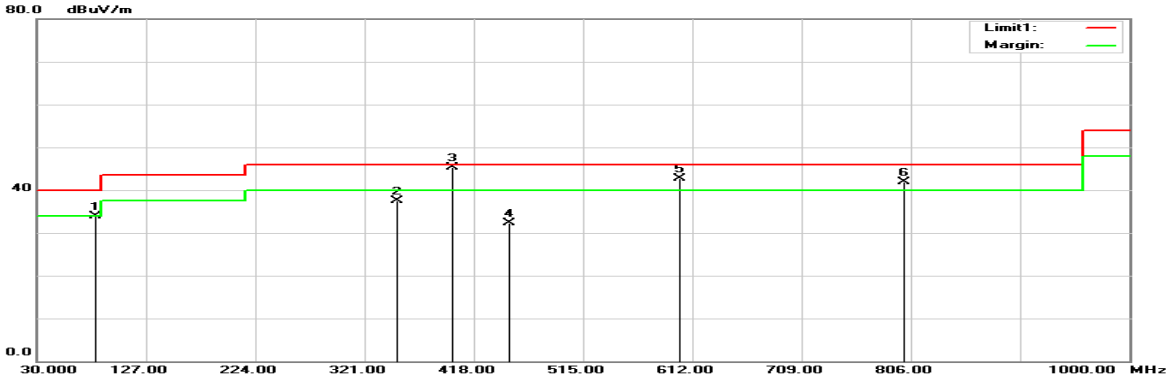



18GHz-40GHz:

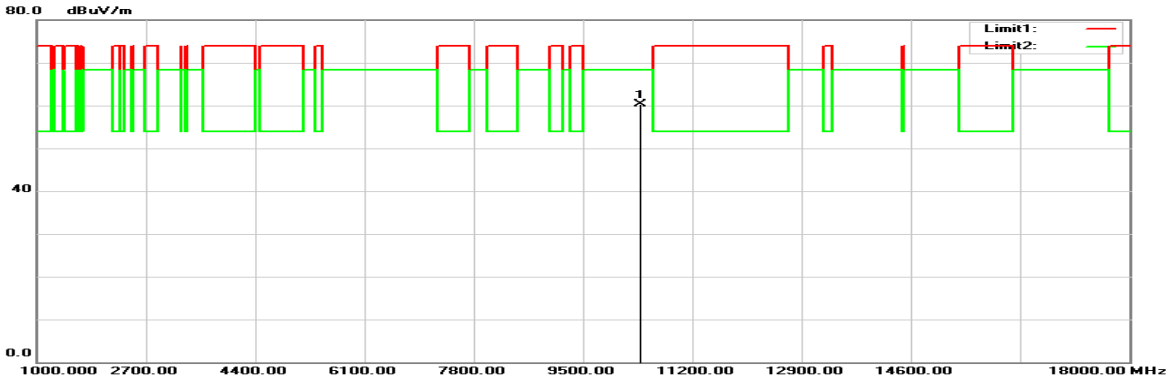


**Vertical** (*worst case is Wi-Fi ac VHT40 mode 5190MHz*)

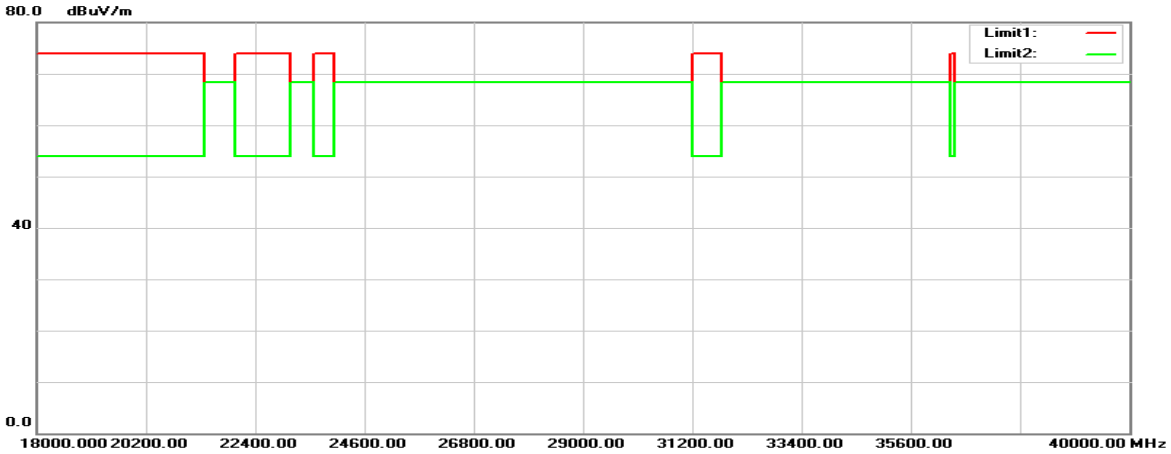
30MHz-1GHz:




1GHz-18GHz:




18GHz-40GHz:



## Below 1GHz

### Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| 350.1000 | 46.07 | -8.78 | 37.29 | 46.00 | -8.71 | 100 | 269 | peak |
| 399.5700 | 47.87 | -7.74 | 40.13 | 46.00 | -5.87 | 100 | 228 | peak |
| 450.0100 | 41.19 | -6.54 | 34.65 | 46.00 | -11.35 | 100 | 199 | peak |
| 500.4500 | 31.59 | -5.71 | 25.88 | 46.00 | -20.12 | 100 | 225 | peak |
| 649.8300 | 31.43 | -3.35 | 28.08 | 46.00 | -17.92 | 100 | 66 | peak |
| 800.1800 | 42.45 | -0.57 | 41.88 | 46.00 | -4.12 | 100 | 105 | peak |

### Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| 82.3800 | 50.67 | -16.82 | 33.85 | 40.00 | -6.15 | 100 | 262 | peak |
| 350.1000 | 46.27 | -8.78 | 37.49 | 46.00 | -8.51 | 100 | 314 | peak |
| 399.5700 | 53.02 | -7.74 | 45.28 | 46.00 | -0.72 | 100 | 319 | peak |
| 450.0100 | 38.84 | -6.54 | 32.30 | 46.00 | -13.70 | 100 | 1 | peak |
| 600.3600 | 46.70 | -3.97 | 42.73 | 46.00 | -3.27 | 100 | 241 | peak |
| 800.1800 | 42.46 | -0.57 | 41.89 | 46.00 | -4.11 | 100 | 329 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## For UNII-1 Band I:

## Above 1GHz

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5150.000 | 53.63 | 2.91 | 56.54 | 74.00 | -17.46 | 180 | 65 | peak |
| 5150.000 | 40.21 | 2.91 | 43.12 | 54.00 | -10.88 | 180 | 65 | AVG |
| 5180.000 | 93.04 | 2.92 | 95.96 | N/A | N/A | 180 | 265 | peak |
| 5180.000 | 82.97 | 2.92 | 85.89 | N/A | N/A | 180 | 265 | AVG |
| 10360.000 | 45.72 | 13.62 | 59.34 | 68.23 | -8.89 | 100 | 130 | peak |
| a Mode, Middle channel | | | | | | | | |
| 5200.000 | 93.55 | 2.94 | 96.49 | N/A | N/A | 180 | 254 | peak |
| 5200.000 | 83.45 | 2.94 | 86.39 | N/A | N/A | 180 | 254 | AVG |
| 10400.000 | 46.53 | 13.57 | 60.10 | 68.23 | -8.13 | 100 | 230 | peak |
| a Mode, High channel | | | | | | | | |
| 5240.000 | 95.29 | 2.89 | 98.18 | N/A | N/A | 180 | 257 | peak |
| 5240.000 | 84.80 | 2.89 | 87.69 | N/A | N/A | 180 | 257 | AVG |
| 5350.000 | 55.07 | 2.94 | 58.01 | 74.00 | -15.99 | 180 | 84 | peak |
| 5350.000 | 40.62 | 2.94 | 43.56 | 54.00 | -10.44 | 180 | 84 | AVG |
| 10480.000 | 42.10 | 13.71 | 55.81 | 68.23 | -12.42 | 100 | 146 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5150.000 | 56.30 | 2.91 | 59.21 | 74.00 | -14.79 | 300 | 271 | peak |
| 5150.000 | 42.87 | 2.91 | 45.78 | 54.00 | -8.22 | 300 | 271 | AVG |
| 5180.000 | 108.52 | 2.92 | 111.44 | N/A | N/A | 300 | 190 | peak |
| 5180.000 | 99.21 | 2.92 | 102.13 | N/A | N/A | 300 | 190 | AVG |
| 10360.000 | 48.30 | 13.63 | 61.93 | 68.23 | -6.30 | 100 | 228 | peak |
| a Mode, Middle channel | | | | | | | | |
| 5200.000 | 108.02 | 2.94 | 110.96 | N/A | N/A | 300 | 188 | peak |
| 5200.000 | 98.51 | 2.94 | 101.45 | N/A | N/A | 300 | 188 | AVG |
| 10400.000 | 49.86 | 13.57 | 63.43 | 68.23 | -4.80 | 100 | 359 | peak |
| a Mode, High channel | | | | | | | | |
| 5240.000 | 107.48 | 2.89 | 110.37 | N/A | N/A | 300 | 187 | peak |
| 5240.000 | 97.89 | 2.89 | 100.78 | N/A | N/A | 300 | 187 | AVG |
| 5350.000 | 56.68 | 2.94 | 59.62 | 74.00 | -14.38 | 300 | 19 | peak |
| 5350.000 | 42.18 | 2.94 | 45.12 | 54.00 | -8.88 | 300 | 19 | AVG |
| 10480.000 | 46.95 | 13.71 | 60.66 | 68.23 | -7.57 | 100 | 357 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5150.000 | 52.16 | 2.91 | 55.07 | 74.00 | -18.93 | 180 | 134 | peak |
| 5150.000 | 40.23 | 2.91 | 43.14 | 54.00 | -10.86 | 180 | 134 | AVG |
| 5180.000 | 92.64 | 2.92 | 95.56 | N/A | N/A | 180 | 265 | peak |
| 5180.000 | 80.58 | 2.92 | 83.50 | N/A | N/A | 180 | 265 | AVG |
| 10360.000 | 41.87 | 13.62 | 55.49 | 68.23 | -12.74 | 100 | 133 | peak |
| ac20 Mode, Middle channel | | | | | | | | |
| 5200.000 | 95.20 | 2.94 | 98.14 | N/A | N/A | 180 | 252 | peak |
| 5200.000 | 82.28 | 2.94 | 85.22 | N/A | N/A | 180 | 252 | AVG |
| 10400.000 | 46.16 | 13.57 | 59.73 | 68.23 | -8.50 | 100 | 126 | peak |
| ac20 Mode, High channel | | | | | | | | |
| 5240.000 | 96.35 | 2.89 | 99.24 | N/A | N/A | 180 | 257 | peak |
| 5240.000 | 83.04 | 2.89 | 85.93 | N/A | N/A | 180 | 257 | AVG |
| 5350.000 | 54.25 | 2.94 | 57.19 | 74.00 | -16.81 | 180 | 176 | peak |
| 5350.000 | 41.43 | 2.94 | 44.37 | 54.00 | -9.63 | 180 | 176 | AVG |
| 10480.000 | 42.69 | 13.71 | 56.40 | 68.23 | -11.83 | 100 | 210 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5150.000 | 56.72 | 2.91 | 59.63 | 74.00 | -14.37 | 300 | 33 | peak |
| 5150.000 | 43.66 | 2.91 | 46.57 | 54.00 | -7.43 | 300 | 33 | AVG |
| 5180.000 | 108.29 | 2.92 | 111.21 | N/A | N/A | 300 | 205 | peak |
| 5180.000 | 95.54 | 2.92 | 98.46 | N/A | N/A | 300 | 205 | AVG |
| 10360.000 | 45.08 | 13.62 | 58.70 | 68.23 | -9.53 | 100 | 221 | peak |
| ac20 Mode, Middle channel | | | | | | | | |
| 5200.000 | 108.59 | 2.94 | 111.53 | N/A | N/A | 300 | 222 | peak |
| 5200.000 | 94.60 | 2.94 | 97.54 | N/A | N/A | 300 | 222 | AVG |
| 10400.000 | 49.57 | 13.57 | 63.14 | 68.23 | -5.09 | 100 | 357 | peak |
| ac20 Mode, High channel | | | | | | | | |
| 5240.000 | 107.95 | 2.89 | 110.84 | N/A | N/A | 300 | 220 | peak |
| 5240.000 | 94.18 | 2.89 | 97.07 | N/A | N/A | 300 | 220 | AVG |
| 5350.000 | 55.51 | 2.94 | 58.45 | 74.00 | -15.55 | 300 | 159 | peak |
| 5350.000 | 42.67 | 2.94 | 45.61 | 54.00 | -8.39 | 300 | 159 | AVG |
| 10480.000 | 43.76 | 13.71 | 57.47 | 68.23 | -10.76 | 100 | 162 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5150.000 | 53.48 | 2.91 | 56.39 | 74.00 | -17.61 | 180 | 71 | peak |
| 5150.000 | 41.36 | 2.91 | 44.27 | 54.00 | -9.73 | 180 | 71 | AVG |
| 5190.000 | 89.67 | 2.93 | 92.60 | N/A | N/A | 180 | 256 | peak |
| 5190.000 | 77.80 | 2.93 | 80.73 | N/A | N/A | 180 | 256 | AVG |
| 10380.000 | 42.56 | 13.60 | 56.16 | 68.23 | -12.07 | 100 | 150 | peak |
| ac40 Mode, High channel | | | | | | | | |
| 5230.000 | 92.04 | 2.90 | 94.94 | N/A | N/A | 180 | 266 | peak |
| 5230.000 | 80.88 | 2.90 | 83.78 | N/A | N/A | 180 | 266 | AVG |
| 5350.000 | 54.97 | 2.94 | 57.91 | 74.00 | -16.09 | 180 | 270 | peak |
| 5350.000 | 41.85 | 2.94 | 44.79 | 54.00 | -9.21 | 180 | 270 | AVG |
| 10460.000 | 40.09 | 13.68 | 53.77 | 68.23 | -14.46 | 100 | 133 | peak |

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5150.000 | 56.92 | 2.91 | 59.83 | 74.00 | -14.17 | 300 | 144 | peak |
| 5150.000 | 44.50 | 2.91 | 47.41 | 54.00 | -6.59 | 300 | 144 | AVG |
| 5190.000 | 104.81 | 2.93 | 107.74 | N/A | N/A | 300 | 190 | peak |
| 5190.000 | 91.69 | 2.93 | 94.62 | N/A | N/A | 300 | 190 | AVG |
| 10380.000 | 46.63 | 13.59 | 60.22 | 68.23 | -8.01 | 100 | 19 | peak |
| ac40 Mode, High channel | | | | | | | | |
| 5230.000 | 104.32 | 2.90 | 107.22 | N/A | N/A | 300 | 73 | peak |
| 5230.000 | 90.66 | 2.90 | 93.56 | N/A | N/A | 300 | 73 | AVG |
| 5350.000 | 55.37 | 2.94 | 58.31 | 74.00 | -15.69 | 300 | 242 | peak |
| 5350.000 | 42.81 | 2.94 | 45.75 | 54.00 | -8.25 | 300 | 242 | AVG |
| 10460.000 | 43.92 | 13.68 | 57.60 | 68.23 | -10.63 | 100 | 1 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5150.000 | 54.30 | 2.91 | 57.21 | 74.00 | -16.79 | 180 | 233 | peak |
| 5150.000 | 41.64 | 2.91 | 44.55 | 54.00 | -9.45 | 180 | 233 | AVG |
| 5210.000 | 89.06 | 2.93 | 91.99 | N/A | N/A | 180 | 262 | peak |
| 5210.000 | 77.80 | 2.93 | 80.73 | N/A | N/A | 180 | 262 | AVG |
| 5350.000 | 54.26 | 2.94 | 57.20 | 74.00 | -16.80 | 180 | 250 | peak |
| 5350.000 | 42.09 | 2.94 | 45.03 | 54.00 | -8.97 | 180 | 250 | AVG |
| 10420.000 | 39.42 | 13.60 | 53.02 | 68.23 | -15.21 | 100 | 136 | peak |

## Vertical

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5150.000 | 67.82 | 2.91 | 70.73 | 74.00 | -3.27 | 300 | 224 | peak |
| 5150.000 | 49.81 | 2.91 | 52.72 | 54.00 | -1.28 | 300 | 224 | AVG |
| 5210.000 | 103.72 | 2.93 | 106.65 | N/A | N/A | 300 | 188 | peak |
| 5210.000 | 93.06 | 2.93 | 95.99 | N/A | N/A | 300 | 188 | AVG |
| 5350.000 | 62.44 | 2.94 | 65.38 | 74.00 | -8.62 | 300 | 228 | peak |
| 5350.000 | 44.00 | 2.94 | 46.94 | 54.00 | -7.06 | 300 | 228 | AVG |
| 10420.000 | 45.05 | 13.60 | 58.65 | 68.23 | -9.58 | 100 | 20 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## For UNII-2A Band II:

## Above 1GHz

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5150.000 | 53.62 | 2.91 | 56.53 | 74.00 | -17.47 | 180 | 85 | peak |
| 5150.000 | 39.91 | 2.91 | 42.82 | 54.00 | -11.18 | 180 | 85 | AVG |
| 5260.000 | 94.03 | 2.86 | 96.89 | N/A | N/A | 180 | 263 | peak |
| 5260.000 | 84.31 | 2.86 | 87.17 | N/A | N/A | 180 | 263 | AVG |
| 10520.000 | 49.22 | 13.75 | 62.97 | 68.23 | -5.26 | 100 | 122 | peak |
| a Mode, Middle channel | | | | | | | | |
| 5300.000 | 95.32 | 2.81 | 98.13 | N/A | N/A | 180 | 264 | peak |
| 5300.000 | 85.79 | 2.81 | 88.60 | N/A | N/A | 180 | 264 | AVG |
| 10600.000 | 45.56 | 13.78 | 59.34 | 68.23 | -8.89 | 100 | 137 | peak |
| a Mode, High channel | | | | | | | | |
| 5320.000 | 94.73 | 2.87 | 97.60 | N/A | N/A | 180 | 264 | peak |
| 5320.000 | 85.21 | 2.87 | 88.08 | N/A | N/A | 180 | 264 | AVG |
| 5350.000 | 54.54 | 2.94 | 57.48 | 74.00 | -16.52 | 180 | 247 | peak |
| 5350.000 | 40.71 | 2.94 | 43.65 | 54.00 | -10.35 | 180 | 247 | AVG |
| 10640.000 | 47.77 | 13.88 | 61.65 | 74.00 | -12.35 | 100 | 130 | peak |
| 10640.000 | 32.18 | 13.88 | 46.06 | 54.00 | -7.94 | 100 | 130 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5150.000 | 55.84 | 2.91 | 58.75 | 74.00 | -15.25 | 300 | 173 | peak |
| 5150.000 | 41.89 | 2.91 | 44.80 | 54.00 | -9.20 | 300 | 173 | AVG |
| 5260.000 | 108.30 | 2.86 | 111.16 | N/A | N/A | 300 | 185 | peak |
| 5260.000 | 98.52 | 2.86 | 101.38 | N/A | N/A | 300 | 185 | AVG |
| 10520.000 | 49.00 | 13.75 | 62.75 | 68.23 | -5.48 | 100 | 10 | peak |
| a Mode, Middle channel | | | | | | | | |
| 5300.000 | 108.31 | 2.81 | 111.12 | N/A | N/A | 300 | 188 | peak |
| 5300.000 | 98.18 | 2.81 | 100.99 | N/A | N/A | 300 | 188 | AVG |
| 10600.000 | 47.33 | 13.78 | 61.11 | 68.23 | -7.12 | 100 | 17 | peak |
| a Mode, High channel | | | | | | | | |
| 5320.000 | 108.79 | 2.87 | 111.66 | N/A | N/A | 300 | 185 | peak |
| 5320.000 | 98.84 | 2.87 | 101.71 | N/A | N/A | 300 | 185 | AVG |
| 5350.000 | 56.45 | 2.94 | 59.39 | 74.00 | -14.61 | 300 | 200 | peak |
| 5350.000 | 43.00 | 2.94 | 45.94 | 54.00 | -8.06 | 300 | 200 | AVG |
| 10640.000 | 48.59 | 13.88 | 62.47 | 74.00 | -11.53 | 100 | 3 | peak |
| 10640.000 | 36.96 | 13.88 | 50.84 | 54.00 | -3.16 | 100 | 3 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5150.000 | 53.63 | 2.91 | 56.54 | 74.00 | -17.46 | 180 | 224 | peak |
| 5150.000 | 40.92 | 2.91 | 43.83 | 54.00 | -10.17 | 180 | 224 | AVG |
| 5260.000 | 95.36 | 2.86 | 98.22 | N/A | N/A | 180 | 266 | peak |
| 5260.000 | 83.15 | 2.86 | 86.01 | N/A | N/A | 180 | 266 | AVG |
| 10520.000 | 45.27 | 13.75 | 59.02 | 68.23 | -9.21 | 100 | 129 | peak |
| ac20 Mode, Middle channel | | | | | | | | |
| 5300.000 | 96.78 | 2.81 | 99.59 | N/A | N/A | 180 | 264 | peak |
| 5300.000 | 83.65 | 2.81 | 86.46 | N/A | N/A | 180 | 264 | AVG |
| 10600.000 | 41.80 | 13.78 | 55.58 | 68.23 | -12.65 | 100 | 135 | peak |
| ac20 Mode, High channel | | | | | | | | |
| 5320.000 | 96.03 | 2.87 | 98.90 | N/A | N/A | 180 | 264 | peak |
| 5320.000 | 83.28 | 2.87 | 86.15 | N/A | N/A | 180 | 264 | AVG |
| 5350.000 | 54.93 | 2.94 | 57.87 | 74.00 | -16.13 | 180 | 142 | peak |
| 5350.000 | 41.63 | 2.94 | 44.57 | 54.00 | -9.43 | 180 | 142 | AVG |
| 10640.000 | 44.30 | 13.88 | 58.18 | 74.00 | -15.82 | 100 | 130 | peak |
| 10640.000 | 31.62 | 13.88 | 45.50 | 54.00 | -8.50 | 100 | 130 | AVG |

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5150.000 | 54.81 | 2.91 | 57.72 | 74.00 | -16.28 | 300 | 213 | peak |
| 5150.000 | 41.88 | 2.91 | 44.79 | 54.00 | -9.21 | 300 | 213 | AVG |
| 5260.000 | 107.60 | 2.86 | 110.46 | N/A | N/A | 300 | 217 | peak |
| 5260.000 | 93.87 | 2.86 | 96.73 | N/A | N/A | 300 | 217 | AVG |
| 10520.000 | 44.77 | 13.75 | 58.52 | 68.23 | -9.71 | 100 | 3 | peak |
| ac20 Mode, Middle channel | | | | | | | | |
| 5300.000 | 108.53 | 2.81 | 111.34 | N/A | N/A | 300 | 217 | peak |
| 5300.000 | 95.67 | 2.81 | 98.48 | N/A | N/A | 300 | 217 | AVG |
| 10600.000 | 47.40 | 13.78 | 61.18 | 68.23 | -7.05 | 100 | 1 | peak |
| ac20 Mode, High channel | | | | | | | | |
| 5320.000 | 108.52 | 2.87 | 111.39 | N/A | N/A | 300 | 183 | peak |
| 5320.000 | 96.03 | 2.87 | 98.90 | N/A | N/A | 300 | 183 | AVG |
| 5350.000 | 57.34 | 2.94 | 60.28 | 74.00 | -13.72 | 300 | 163 | peak |
| 5350.000 | 43.94 | 2.94 | 46.88 | 54.00 | -7.12 | 300 | 163 | AVG |
| 10640.000 | 45.04 | 13.88 | 58.92 | 74.00 | -15.08 | 100 | 28 | peak |
| 10640.000 | 36.41 | 13.88 | 50.29 | 54.00 | -3.71 | 100 | 28 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5150.000 | 54.23 | 2.91 | 57.14 | 74.00 | -16.86 | 180 | 229 | peak |
| 5150.000 | 41.32 | 2.91 | 44.23 | 54.00 | -9.77 | 180 | 229 | AVG |
| 5270.000 | 92.10 | 2.85 | 94.95 | N/A | N/A | 180 | 264 | peak |
| 5270.000 | 80.66 | 2.85 | 83.51 | N/A | N/A | 180 | 264 | AVG |
| 10540.000 | 45.80 | 13.75 | 59.55 | 68.23 | -8.68 | 100 | 126 | peak |
| ac40 Mode, High channel | | | | | | | | |
| 5310.000 | 91.92 | 2.84 | 94.76 | N/A | N/A | 180 | 265 | peak |
| 5310.000 | 80.51 | 2.84 | 83.35 | N/A | N/A | 180 | 265 | AVG |
| 5350.000 | 54.91 | 2.94 | 57.85 | 74.00 | -16.15 | 180 | 13 | peak |
| 5350.000 | 41.93 | 2.94 | 44.87 | 54.00 | -9.13 | 180 | 13 | AVG |
| 10620.000 | 42.35 | 13.83 | 56.18 | 74.00 | -17.82 | 100 | 136 | peak |
| 10620.000 | 30.26 | 13.83 | 44.09 | 54.00 | -9.91 | 100 | 136 | AVG |

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5150.000 | 56.07 | 2.91 | 58.98 | 74.00 | -15.02 | 300 | 210 | peak |
| 5150.000 | 42.70 | 2.91 | 45.61 | 54.00 | -8.39 | 300 | 210 | AVG |
| 5270.000 | 105.98 | 2.85 | 108.83 | N/A | N/A | 300 | 185 | peak |
| 5270.000 | 93.16 | 2.85 | 96.01 | N/A | N/A | 300 | 185 | AVG |
| 10540.000 | 46.96 | 13.75 | 60.71 | 68.23 | -7.52 | 100 | 2 | peak |
| ac40 Mode, High channel | | | | | | | | |
| 5310.000 | 106.33 | 2.84 | 109.17 | N/A | N/A | 300 | 186 | peak |
| 5310.000 | 92.98 | 2.84 | 95.82 | N/A | N/A | 300 | 186 | AVG |
| 5350.000 | 58.16 | 2.94 | 61.10 | 74.00 | -12.90 | 300 | 207 | peak |
| 5350.000 | 44.88 | 2.94 | 47.82 | 54.00 | -6.18 | 300 | 207 | AVG |
| 10620.000 | 46.16 | 13.83 | 59.99 | 74.00 | -14.01 | 100 | 4 | peak |
| 10620.000 | 36.63 | 13.83 | 50.46 | 54.00 | -3.54 | 100 | 4 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5150.000 | 54.10 | 2.91 | 57.01 | 74.00 | -16.99 | 180 | 122 | peak |
| 5150.000 | 42.55 | 2.91 | 45.46 | 54.00 | -8.54 | 180 | 122 | AVG |
| 5290.000 | 91.32 | 2.82 | 94.14 | N/A | N/A | 180 | 265 | peak |
| 5290.000 | 79.20 | 2.82 | 82.02 | N/A | N/A | 180 | 265 | AVG |
| 5350.000 | 58.36 | 2.94 | 61.30 | 74.00 | -12.70 | 180 | 251 | peak |
| 5350.000 | 43.36 | 2.94 | 46.30 | 54.00 | -7.70 | 180 | 251 | AVG |
| 10580.000 | 41.57 | 13.77 | 55.34 | 68.23 | -12.89 | 100 | 128 | peak |

## Vertical

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5150.000 | 65.16 | 2.91 | 68.07 | 74.00 | -5.93 | 300 | 200 | peak |
| 5150.000 | 43.76 | 2.91 | 46.67 | 54.00 | -7.33 | 300 | 200 | AVG |
| 5290.000 | 103.51 | 2.82 | 106.33 | N/A | N/A | 300 | 191 | peak |
| 5290.000 | 92.16 | 2.82 | 94.98 | N/A | N/A | 300 | 191 | AVG |
| 5350.000 | 66.88 | 2.94 | 69.82 | 74.00 | -4.18 | 300 | 161 | peak |
| 5350.000 | 49.92 | 2.94 | 52.86 | 54.00 | -1.14 | 300 | 161 | AVG |
| 10580.000 | 46.45 | 13.77 | 60.22 | 68.23 | -8.01 | 100 | 16 | peak |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## For UNII-2C Band III:

## Above 1GHz

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5460.000 | 54.75 | 3.53 | 58.28 | 74.00 | -15.72 | 180 | 27 | peak |
| 5460.000 | 40.71 | 3.53 | 44.24 | 54.00 | -9.76 | 180 | 27 | AVG |
| 5500.000 | 94.49 | 3.55 | 98.04 | N/A | N/A | 180 | 265 | peak |
| 5500.000 | 84.31 | 3.55 | 87.86 | N/A | N/A | 180 | 265 | AVG |
| 11000.000 | 43.47 | 14.05 | 57.52 | 74.00 | -16.48 | 100 | 137 | peak |
| 11000.000 | 33.95 | 14.05 | 48.00 | 54.00 | -6.00 | 100 | 137 | AVG |
| a Mode, Middle channel | | | | | | | | |
| 5580.000 | 95.16 | 3.57 | 98.73 | N/A | N/A | 180 | 247 | peak |
| 5580.000 | 85.90 | 3.57 | 89.47 | N/A | N/A | 180 | 247 | AVG |
| 11160.000 | 42.01 | 14.15 | 56.16 | 74.00 | -17.84 | 100 | 136 | peak |
| 11160.000 | 31.88 | 14.15 | 46.03 | 54.00 | -7.97 | 100 | 136 | AVG |
| a Mode, High channel | | | | | | | | |
| 5700.000 | 92.83 | 3.70 | 96.53 | N/A | N/A | 180 | 222 | peak |
| 5700.000 | 83.07 | 3.70 | 86.77 | N/A | N/A | 180 | 222 | AVG |
| 5725.000 | 54.66 | 3.73 | 58.39 | 68.23 | -9.84 | 180 | 71 | peak |
| 11400.000 | 39.88 | 14.21 | 54.09 | 74.00 | -19.91 | 100 | 135 | peak |
| 11400.000 | 31.64 | 14.21 | 45.85 | 54.00 | -8.15 | 100 | 135 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5460.000 | 56.94 | 3.53 | 60.47 | 74.00 | -13.53 | 300 | 3 | peak |
| 5460.000 | 43.00 | 3.53 | 46.53 | 54.00 | -7.47 | 300 | 3 | AVG |
| 5500.000 | 107.47 | 3.55 | 111.02 | N/A | N/A | 300 | 192 | peak |
| 5500.000 | 97.71 | 3.55 | 101.26 | N/A | N/A | 300 | 192 | AVG |
| 11000.000 | 44.54 | 14.05 | 58.59 | 74.00 | -15.41 | 100 | 13 | peak |
| 11000.000 | 35.67 | 14.05 | 49.72 | 54.00 | -4.28 | 100 | 13 | AVG |
| a Mode, Middle channel | | | | | | | | |
| 5580.000 | 106.72 | 3.57 | 110.29 | N/A | N/A | 300 | 185 | peak |
| 5580.000 | 96.54 | 3.57 | 100.11 | N/A | N/A | 300 | 185 | AVG |
| 11160.000 | 43.93 | 14.15 | 58.08 | 74.00 | -15.92 | 100 | 18 | peak |
| 11160.000 | 31.55 | 14.15 | 45.70 | 54.00 | -8.30 | 100 | 18 | AVG |
| a Mode, High channel | | | | | | | | |
| 5700.000 | 105.09 | 3.70 | 108.79 | N/A | N/A | 300 | 199 | peak |
| 5700.000 | 95.36 | 3.70 | 99.06 | N/A | N/A | 300 | 199 | AVG |
| 5725.000 | 55.92 | 3.73 | 59.65 | 68.23 | -8.58 | 300 | 183 | peak |
| 11400.000 | 41.75 | 14.21 | 55.96 | 74.00 | -18.04 | 100 | 235 | peak |
| 11400.000 | 29.32 | 14.21 | 43.53 | 54.00 | -10.47 | 100 | 235 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5460.000 | 54.33 | 3.53 | 57.86 | 74.00 | -16.14 | 180 | 145 | peak |
| 5460.000 | 41.29 | 3.53 | 44.82 | 54.00 | -9.18 | 180 | 145 | AVG |
| 5500.000 | 95.68 | 3.55 | 99.23 | N/A | N/A | 180 | 266 | peak |
| 5500.000 | 82.82 | 3.55 | 86.37 | N/A | N/A | 180 | 266 | AVG |
| 11000.000 | 42.34 | 14.05 | 56.39 | 74.00 | -17.61 | 100 | 138 | peak |
| 11000.000 | 33.77 | 14.05 | 47.82 | 54.00 | -6.18 | 100 | 138 | AVG |
| ac20 Mode, Middle channel | | | | | | | | |
| 5580.000 | 97.15 | 3.57 | 100.72 | N/A | N/A | 180 | 248 | peak |
| 5580.000 | 83.79 | 3.57 | 87.36 | N/A | N/A | 180 | 248 | AVG |
| 11160.000 | 40.97 | 14.15 | 55.12 | 74.00 | -18.88 | 100 | 139 | peak |
| 11160.000 | 31.96 | 14.15 | 46.11 | 54.00 | -7.89 | 100 | 139 | AVG |
| ac20 Mode, High channel | | | | | | | | |
| 5700.000 | 94.12 | 3.70 | 97.82 | N/A | N/A | 180 | 232 | peak |
| 5700.000 | 81.40 | 3.70 | 85.10 | N/A | N/A | 180 | 232 | AVG |
| 5725.000 | 54.98 | 3.73 | 58.71 | 68.23 | -9.52 | 180 | 234 | peak |
| 11400.000 | 38.03 | 14.21 | 52.24 | 74.00 | -21.76 | 100 | 327 | peak |
| 11400.000 | 27.44 | 14.21 | 41.65 | 54.00 | -12.35 | 100 | 327 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5460.000 | 57.45 | 3.53 | 60.98 | 74.00 | -13.02 | 300 | 144 | peak |
| 5460.000 | 44.08 | 3.53 | 47.61 | 54.00 | -6.39 | 300 | 144 | AVG |
| 5500.000 | 107.90 | 3.55 | 111.45 | N/A | N/A | 300 | 224 | peak |
| 5500.000 | 94.74 | 3.55 | 98.29 | N/A | N/A | 300 | 224 | AVG |
| 11000.000 | 45.53 | 14.05 | 59.58 | 74.00 | -14.42 | 100 | 14 | peak |
| 11000.000 | 36.52 | 14.05 | 50.57 | 54.00 | -3.43 | 100 | 14 | AVG |
| ac20 Mode, Middle channel | | | | | | | | |
| 5580.000 | 106.64 | 3.57 | 110.21 | N/A | N/A | 300 | 226 | peak |
| 5580.000 | 94.07 | 3.57 | 97.64 | N/A | N/A | 300 | 226 | AVG |
| 11160.000 | 41.40 | 14.15 | 55.55 | 74.00 | -18.45 | 100 | 6 | peak |
| 11160.000 | 33.02 | 14.15 | 47.17 | 54.00 | -6.83 | 100 | 6 | AVG |
| ac20 Mode, High channel | | | | | | | | |
| 5700.000 | 105.10 | 3.70 | 108.80 | N/A | N/A | 300 | 200 | peak |
| 5700.000 | 92.92 | 3.70 | 96.62 | N/A | N/A | 300 | 200 | AVG |
| 5725.000 | 56.24 | 3.73 | 59.97 | 68.23 | -8.26 | 300 | 147 | peak |
| 11400.000 | 38.09 | 14.21 | 52.30 | 74.00 | -21.70 | 100 | 11 | peak |
| 11400.000 | 30.30 | 14.21 | 44.51 | 54.00 | -9.49 | 100 | 11 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Taiwan)

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5460.000 | 54.86 | 3.53 | 58.39 | 74.00 | -15.61 | 180 | 121 | peak |
| 5460.000 | 41.26 | 3.53 | 44.79 | 54.00 | -9.21 | 180 | 121 | AVG |
| 5510.000 | 89.28 | 3.57 | 92.85 | N/A | N/A | 180 | 269 | peak |
| 5510.000 | 77.49 | 3.57 | 81.06 | N/A | N/A | 180 | 269 | AVG |
| 11020.000 | 37.02 | 14.06 | 51.08 | 74.00 | -22.92 | 100 | 137 | peak |
| 11020.000 | 29.00 | 14.06 | 43.06 | 54.00 | -10.94 | 100 | 137 | AVG |
| ac40 Mode, Middle channel | | | | | | | | |
| 5590.000 | 89.82 | 3.55 | 93.37 | N/A | N/A | 180 | 247 | peak |
| 5590.000 | 78.53 | 3.55 | 82.08 | N/A | N/A | 180 | 247 | AVG |
| 11180.000 | 36.58 | 14.17 | 50.75 | 74.00 | -23.25 | 100 | 219 | peak |
| 11180.000 | 27.98 | 14.17 | 42.15 | 54.00 | -11.85 | 100 | 219 | AVG |
| ac40 Mode, High channel | | | | | | | | |
| 5670.000 | 89.46 | 3.64 | 93.10 | N/A | N/A | 180 | 280 | peak |
| 5670.000 | 77.95 | 3.64 | 81.59 | N/A | N/A | 180 | 280 | AVG |
| 5725.000 | 55.02 | 3.73 | 58.75 | 68.23 | -9.48 | 180 | 360 | peak |
| 11340.000 | 37.86 | 14.17 | 52.03 | 74.00 | -21.97 | 100 | 221 | peak |
| 11340.000 | 29.59 | 14.17 | 43.76 | 54.00 | -10.24 | 100 | 221 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5460.000 | 56.62 | 3.53 | 60.15 | 74.00 | -13.85 | 300 | 198 | peak |
| 5460.000 | 43.66 | 3.53 | 47.19 | 54.00 | -6.81 | 300 | 198 | AVG |
| 5510.000 | 103.40 | 3.57 | 106.97 | N/A | N/A | 300 | 188 | peak |
| 5510.000 | 89.78 | 3.57 | 93.35 | N/A | N/A | 300 | 188 | AVG |
| 11020.000 | 39.65 | 14.06 | 53.71 | 74.00 | -20.29 | 100 | 5 | peak |
| 11020.000 | 32.31 | 14.06 | 46.37 | 54.00 | -7.63 | 100 | 5 | AVG |
| ac40 Mode, Middle channel | | | | | | | | |
| 5590.000 | 103.84 | 3.55 | 107.39 | N/A | N/A | 300 | 187 | peak |
| 5590.000 | 90.69 | 3.55 | 94.24 | N/A | N/A | 300 | 187 | AVG |
| 11180.000 | 38.51 | 14.17 | 52.68 | 74.00 | -21.32 | 100 | 23 | peak |
| 11180.000 | 28.87 | 14.17 | 43.04 | 54.00 | -10.96 | 100 | 23 | AVG |
| ac40 Mode, High channel | | | | | | | | |
| 5670.000 | 102.45 | 3.64 | 106.09 | N/A | N/A | 300 | 195 | peak |
| 5670.000 | 89.20 | 3.64 | 92.84 | N/A | N/A | 300 | 195 | AVG |
| 5725.000 | 55.46 | 3.73 | 59.19 | 68.23 | -9.04 | 300 | 125 | peak |
| 11340.000 | 37.95 | 14.17 | 52.12 | 74.00 | -21.88 | 100 | 10 | peak |
| 11340.000 | 30.22 | 14.17 | 44.39 | 54.00 | -9.61 | 100 | 10 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Taiwan)

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5460.000 | 55.08 | 3.53 | 58.61 | 74.00 | -15.39 | 180 | 128 | peak |
| 5460.000 | 42.70 | 3.53 | 46.23 | 54.00 | -7.77 | 180 | 128 | AVG |
| 5530.000 | 89.18 | 3.60 | 92.78 | N/A | N/A | 180 | 266 | peak |
| 5530.000 | 78.24 | 3.60 | 81.84 | N/A | N/A | 180 | 266 | AVG |
| 11060.000 | 39.51 | 14.09 | 53.60 | 74.00 | -20.40 | 100 | 221 | peak |
| 11060.000 | 28.43 | 14.09 | 42.52 | 54.00 | -11.48 | 100 | 221 | AVG |
| ac80 Mode, High channel | | | | | | | | |
| 5610.000 | 88.17 | 3.54 | 91.71 | N/A | N/A | 180 | 245 | peak |
| 5610.000 | 77.51 | 3.54 | 81.05 | N/A | N/A | 180 | 245 | AVG |
| 5725.000 | 54.24 | 3.73 | 57.97 | 68.23 | -10.26 | 180 | 348 | peak |
| 11220.000 | 39.24 | 14.17 | 53.41 | 74.00 | -20.59 | 100 | 140 | peak |
| 11220.000 | 30.23 | 14.17 | 44.40 | 54.00 | -9.60 | 100 | 140 | AVG |

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5460.000 | 60.92 | 3.53 | 64.45 | 74.00 | -9.55 | 300 | 183 | peak |
| 5460.000 | 50.12 | 3.53 | 53.65 | 54.00 | -0.35 | 300 | 183 | AVG |
| 5530.000 | 101.81 | 3.60 | 105.41 | N/A | N/A | 300 | 188 | peak |
| 5530.000 | 91.92 | 3.60 | 95.52 | N/A | N/A | 300 | 188 | AVG |
| 11060.000 | 40.00 | 14.09 | 54.09 | 74.00 | -19.91 | 100 | 8 | peak |
| 11060.000 | 31.85 | 14.09 | 45.94 | 54.00 | -8.06 | 100 | 8 | AVG |
| ac80 Mode, High channel | | | | | | | | |
| 5610.000 | 101.48 | 3.54 | 105.02 | N/A | N/A | 300 | 187 | peak |
| 5610.000 | 91.16 | 3.54 | 94.70 | N/A | N/A | 300 | 187 | AVG |
| 5725.000 | 55.82 | 3.73 | 59.55 | 68.23 | -8.68 | 300 | 160 | peak |
| 11220.000 | 42.16 | 14.17 | 56.33 | 74.00 | -17.67 | 100 | 13 | peak |
| 11220.000 | 30.25 | 14.17 | 44.42 | 54.00 | -9.58 | 100 | 13 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## For UNII-3 Band IV:

## Above 1GHz

## Horizontal

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5626.600 | 53.19 | 3.57 | 56.76 | 68.20 | -11.44 | 180 | 166 | peak |
| 5654.250 | 53.36 | 3.62 | 56.98 | 71.34 | -14.36 | 180 | 21 | peak |
| 5714.100 | 54.04 | 3.72 | 57.76 | 109.15 | -51.39 | 180 | 290 | peak |
| 5724.950 | 53.18 | 3.73 | 56.91 | 122.09 | -65.18 | 180 | 215 | peak |
| 5745.000 | 92.58 | 3.77 | 96.35 | N/A | N/A | 180 | 209 | peak |
| 5745.000 | 81.10 | 3.77 | 84.87 | N/A | N/A | 180 | 209 | AVG |
| 5851.300 | 54.11 | 3.95 | 58.06 | 119.24 | -61.18 | 180 | 359 | peak |
| 5863.550 | 55.19 | 4.00 | 59.19 | 108.41 | -49.22 | 180 | 347 | peak |
| 5882.800 | 55.00 | 4.07 | 59.07 | 99.43 | -40.36 | 180 | 251 | peak |
| 5931.100 | 54.18 | 4.20 | 58.38 | 68.20 | -9.82 | 180 | 139 | peak |
| 11490.000 | 39.36 | 14.36 | 53.72 | 74.00 | -20.28 | 100 | 254 | peak |
| 11490.000 | 25.54 | 14.36 | 39.90 | 54.00 | -14.10 | 100 | 254 | AVG |
| a Mode, Middle channel | | | | | | | | |
| 5602.800 | 53.01 | 3.53 | 56.54 | 68.20 | -11.66 | 180 | 331 | peak |
| 5674.200 | 53.62 | 3.65 | 57.27 | 86.11 | -28.84 | 180 | 339 | peak |
| 5718.300 | 53.97 | 3.73 | 57.70 | 110.32 | -52.62 | 180 | 147 | peak |
| 5723.200 | 53.13 | 3.73 | 56.86 | 118.10 | -61.24 | 180 | 298 | peak |
| 5785.000 | 92.12 | 3.91 | 96.03 | N/A | N/A | 180 | 305 | peak |
| 5785.000 | 82.15 | 3.91 | 86.06 | N/A | N/A | 180 | 305 | AVG |
| 5850.600 | 54.35 | 3.95 | 58.30 | 120.83 | -62.53 | 180 | 360 | peak |
| 5860.400 | 54.65 | 3.99 | 58.64 | 109.29 | -50.65 | 180 | 347 | peak |
| 5887.700 | 54.88 | 4.10 | 58.98 | 95.80 | -36.82 | 180 | 78 | peak |
| 5937.400 | 54.05 | 4.20 | 58.25 | 68.20 | -9.95 | 180 | 118 | peak |
| 11570.000 | 38.18 | 14.33 | 52.51 | 74.00 | -21.49 | 100 | 237 | peak |
| 11570.000 | 28.55 | 14.33 | 42.88 | 54.00 | -11.12 | 100 | 237 | AVG |
| a Mode, High channel | | | | | | | | |
| 5646.550 | 53.45 | 3.60 | 57.05 | 68.20 | -11.15 | 180 | 56 | peak |
| 5677.700 | 54.15 | 3.65 | 57.80 | 88.70 | -30.90 | 180 | 291 | peak |
| 5713.400 | 53.73 | 3.72 | 57.45 | 108.95 | -51.50 | 180 | 2 | peak |
| 5721.450 | 53.34 | 3.73 | 57.07 | 114.11 | -57.04 | 180 | 124 | peak |
| 5825.000 | 92.12 | 3.96 | 96.08 | N/A | N/A | 180 | 323 | peak |
| 5825.000 | 80.98 | 3.96 | 84.94 | N/A | N/A | 180 | 323 | AVG |
| 5850.250 | 54.22 | 3.95 | 58.17 | 121.63 | -63.46 | 180 | 258 | peak |
| 5870.900 | 55.38 | 4.03 | 59.41 | 106.35 | -46.94 | 180 | 275 | peak |
| 5913.250 | 54.43 | 4.16 | 58.59 | 76.89 | -18.30 | 180 | 187 | peak |
| 5931.450 | 54.41 | 4.20 | 58.61 | 68.20 | -9.59 | 180 | 205 | peak |
| 11650.000 | 40.33 | 14.43 | 54.76 | 74.00 | -19.24 | 100 | 221 | peak |
| 11650.000 | 29.31 | 14.43 | 43.74 | 54.00 | -10.26 | 100 | 221 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| a Mode, Low channel | | | | | | | | |
| 5643.750 | 55.23 | 3.60 | 58.83 | 68.20 | -9.37 | 300 | 181 | peak |
| 5673.500 | 55.57 | 3.65 | 59.22 | 85.59 | -26.37 | 300 | 191 | peak |
| 5718.300 | 54.63 | 3.73 | 58.36 | 110.32 | -51.96 | 300 | 342 | peak |
| 5723.900 | 57.51 | 3.73 | 61.24 | 119.69 | -58.45 | 300 | 199 | peak |
| 5745.000 | 105.23 | 3.77 | 109.00 | N/A | N/A | 300 | 191 | peak |
| 5745.000 | 95.23 | 3.77 | 99.00 | N/A | N/A | 300 | 191 | AVG |
| 5850.250 | 54.88 | 3.95 | 58.83 | 121.63 | -62.80 | 300 | 233 | peak |
| 5869.850 | 55.19 | 4.03 | 59.22 | 106.64 | -47.42 | 300 | 337 | peak |
| 5912.900 | 54.56 | 4.16 | 58.72 | 77.15 | -18.43 | 300 | 181 | peak |
| 5940.200 | 54.17 | 4.21 | 58.38 | 68.20 | -9.82 | 300 | 295 | peak |
| 11490.000 | 41.41 | 14.36 | 55.77 | 74.00 | -18.23 | 100 | 28 | peak |
| 11490.000 | 31.86 | 14.36 | 46.22 | 54.00 | -7.78 | 100 | 28 | AVG |
| a Mode, Middle channel | | | | | | | | |
| 5607.000 | 54.20 | 3.54 | 57.74 | 68.20 | -10.46 | 300 | 121 | peak |
| 5693.100 | 54.44 | 3.68 | 58.12 | 100.09 | -41.97 | 300 | 198 | peak |
| 5715.850 | 54.91 | 3.72 | 58.63 | 109.64 | -51.01 | 300 | 212 | peak |
| 5721.450 | 54.28 | 3.73 | 58.01 | 114.11 | -56.10 | 300 | 6 | peak |
| 5785.000 | 103.11 | 3.91 | 107.02 | N/A | N/A | 300 | 195 | peak |
| 5785.000 | 93.32 | 3.91 | 97.23 | N/A | N/A | 300 | 195 | AVG |
| 5850.600 | 54.27 | 3.95 | 58.22 | 120.83 | -62.61 | 300 | 89 | peak |
| 5866.000 | 54.91 | 4.01 | 58.92 | 107.72 | -48.80 | 300 | 176 | peak |
| 5924.800 | 54.56 | 4.18 | 58.74 | 68.35 | -9.61 | 300 | 340 | peak |
| 5946.150 | 55.12 | 4.22 | 59.34 | 68.20 | -8.86 | 300 | 266 | peak |
| 11570.000 | 42.88 | 14.33 | 57.21 | 74.00 | -16.79 | 100 | 17 | peak |
| 11570.000 | 32.74 | 14.33 | 47.07 | 54.00 | -6.93 | 100 | 17 | AVG |
| a Mode, High channel | | | | | | | | |
| 5647.950 | 53.77 | 3.60 | 57.37 | 68.20 | -10.83 | 300 | 159 | peak |
| 5680.150 | 54.41 | 3.66 | 58.07 | 90.51 | -32.44 | 300 | 202 | peak |
| 5715.150 | 54.80 | 3.72 | 58.52 | 109.44 | -50.92 | 300 | 174 | peak |
| 5723.200 | 54.64 | 3.73 | 58.37 | 118.10 | -59.73 | 300 | 157 | peak |
| 5825.000 | 101.88 | 3.96 | 105.84 | N/A | N/A | 300 | 188 | peak |
| 5825.000 | 91.73 | 3.96 | 95.69 | N/A | N/A | 300 | 188 | AVG |
| 5851.650 | 55.01 | 3.96 | 58.97 | 118.44 | -59.47 | 300 | 264 | peak |
| 5868.800 | 54.46 | 4.03 | 58.49 | 106.94 | -48.45 | 300 | 131 | peak |
| 5888.400 | 54.37 | 4.10 | 58.47 | 95.28 | -36.81 | 300 | 275 | peak |
| 5930.400 | 54.63 | 4.19 | 58.82 | 68.20 | -9.38 | 300 | 128 | peak |
| 11650.000 | 40.54 | 14.43 | 54.97 | 74.00 | -19.03 | 100 | 19 | peak |
| 11650.000 | 31.60 | 14.43 | 46.03 | 54.00 | -7.97 | 100 | 19 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5643.400 | 52.90 | 3.59 | 56.49 | 68.20 | -11.71 | 180 | 185 | peak |
| 5694.500 | 54.12 | 3.68 | 57.80 | 101.13 | -43.33 | 180 | 330 | peak |
| 5712.700 | 54.18 | 3.72 | 57.90 | 108.76 | -50.86 | 180 | 313 | peak |
| 5722.500 | 53.74 | 3.73 | 57.47 | 116.50 | -59.03 | 180 | 88 | peak |
| 5745.000 | 91.60 | 3.77 | 95.37 | N/A | N/A | 180 | 207 | peak |
| 5745.000 | 80.11 | 3.77 | 83.88 | N/A | N/A | 180 | 207 | AVG |
| 5852.700 | 54.81 | 3.97 | 58.78 | 116.04 | -57.26 | 180 | 180 | peak |
| 5857.600 | 54.26 | 3.99 | 58.25 | 110.07 | -51.82 | 180 | 223 | peak |
| 5906.250 | 54.68 | 4.15 | 58.83 | 82.08 | -23.25 | 180 | 0 | peak |
| 5946.500 | 54.36 | 4.22 | 58.58 | 68.20 | -9.62 | 180 | 194 | peak |
| 11490.000 | 39.87 | 14.36 | 54.23 | 74.00 | -19.77 | 100 | 238 | peak |
| 11490.000 | 27.29 | 14.36 | 41.65 | 54.00 | -12.35 | 100 | 238 | AVG |
| ac20 Mode, Middle channel | | | | | | | | |
| 5632.900 | 52.97 | 3.58 | 56.55 | 68.20 | -11.65 | 180 | 308 | peak |
| 5697.300 | 53.21 | 3.69 | 56.90 | 103.20 | -46.30 | 180 | 328 | peak |
| 5708.850 | 53.85 | 3.71 | 57.56 | 107.68 | -50.12 | 180 | 14 | peak |
| 5724.600 | 53.10 | 3.73 | 56.83 | 121.29 | -64.46 | 180 | 161 | peak |
| 5785.000 | 94.45 | 3.91 | 98.36 | N/A | N/A | 180 | 303 | peak |
| 5785.000 | 82.21 | 3.91 | 86.12 | N/A | N/A | 180 | 303 | AVG |
| 5852.350 | 54.43 | 3.96 | 58.39 | 116.84 | -58.45 | 180 | 323 | peak |
| 5871.600 | 54.80 | 4.03 | 58.83 | 106.15 | -47.32 | 180 | 252 | peak |
| 5892.600 | 55.85 | 4.11 | 59.96 | 92.18 | -32.22 | 180 | 196 | peak |
| 5926.200 | 54.82 | 4.18 | 59.00 | 68.20 | -9.20 | 180 | 127 | peak |
| 11570.000 | 36.94 | 14.33 | 51.27 | 74.00 | -22.73 | 100 | 283 | peak |
| 11570.000 | 25.58 | 14.33 | 39.91 | 54.00 | -14.09 | 100 | 283 | AVG |
| ac20 Mode, High channel | | | | | | | | |
| 5638.500 | 53.62 | 3.59 | 57.21 | 68.20 | -10.99 | 180 | 234 | peak |
| 5698.000 | 53.42 | 3.69 | 57.11 | 103.72 | -46.61 | 180 | 166 | peak |
| 5706.750 | 53.47 | 3.70 | 57.17 | 107.09 | -49.92 | 180 | 353 | peak |
| 5724.600 | 53.76 | 3.73 | 57.49 | 121.29 | -63.80 | 180 | 278 | peak |
| 5825.000 | 94.65 | 3.96 | 98.61 | N/A | N/A | 180 | 302 | peak |
| 5825.000 | 81.92 | 3.96 | 85.88 | N/A | N/A | 180 | 302 | AVG |
| 5852.700 | 54.40 | 3.97 | 58.37 | 116.04 | -57.67 | 180 | 270 | peak |
| 5864.250 | 54.55 | 4.00 | 58.55 | 108.21 | -49.66 | 180 | 275 | peak |
| 5922.700 | 54.54 | 4.18 | 58.72 | 69.90 | -11.18 | 180 | 348 | peak |
| 5925.850 | 54.24 | 4.18 | 58.42 | 68.20 | -9.78 | 180 | 244 | peak |
| 11650.000 | 36.76 | 14.43 | 51.19 | 74.00 | -22.81 | 100 | 139 | peak |
| 11650.000 | 27.00 | 14.43 | 41.43 | 54.00 | -12.57 | 100 | 139 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac20 Mode, Low channel | | | | | | | | |
| 5641.650 | 54.91 | 3.59 | 58.50 | 68.20 | -9.70 | 300 | 203 | peak |
| 5699.050 | 54.61 | 3.69 | 58.30 | 104.50 | -46.20 | 300 | 359 | peak |
| 5717.600 | 54.59 | 3.73 | 58.32 | 110.13 | -51.81 | 300 | 180 | peak |
| 5724.600 | 57.88 | 3.73 | 61.61 | 121.29 | -59.68 | 300 | 146 | peak |
| 5745.000 | 103.03 | 3.77 | 106.80 | N/A | N/A | 300 | 193 | peak |
| 5745.000 | 91.49 | 3.77 | 95.26 | N/A | N/A | 300 | 193 | AVG |
| 5850.950 | 54.21 | 3.95 | 58.16 | 120.03 | -61.87 | 300 | 206 | peak |
| 5870.900 | 54.90 | 4.03 | 58.93 | 106.35 | -47.42 | 300 | 318 | peak |
| 5881.400 | 55.14 | 4.06 | 59.20 | 100.46 | -41.26 | 300 | 193 | peak |
| 5930.400 | 54.50 | 4.19 | 58.69 | 68.20 | -9.51 | 300 | 57 | peak |
| 11490.000 | 41.39 | 14.36 | 55.75 | 74.00 | -18.25 | 100 | 14 | peak |
| 11490.000 | 31.80 | 14.36 | 46.16 | 54.00 | -7.84 | 100 | 14 | AVG |
| ac20 Mode, Middle channel | | | | | | | | |
| 5636.050 | 55.06 | 3.59 | 58.65 | 68.20 | -9.55 | 300 | 162 | peak |
| 5686.800 | 54.99 | 3.67 | 58.66 | 95.43 | -36.77 | 300 | 214 | peak |
| 5714.800 | 55.50 | 3.72 | 59.22 | 109.34 | -50.12 | 300 | 181 | peak |
| 5722.500 | 54.50 | 3.73 | 58.23 | 116.50 | -58.27 | 300 | 170 | peak |
| 5785.000 | 103.04 | 3.91 | 106.95 | N/A | N/A | 300 | 179 | peak |
| 5785.000 | 91.70 | 3.91 | 95.61 | N/A | N/A | 300 | 179 | AVG |
| 5851.650 | 54.28 | 3.96 | 58.24 | 118.44 | -60.20 | 300 | 193 | peak |
| 5855.500 | 54.42 | 3.97 | 58.39 | 110.66 | -52.27 | 300 | 193 | peak |
| 5905.550 | 55.13 | 4.15 | 59.28 | 82.59 | -23.31 | 300 | 18 | peak |
| 5925.500 | 54.05 | 4.18 | 58.23 | 68.20 | -9.97 | 300 | 331 | peak |
| 11570.000 | 39.21 | 14.33 | 53.54 | 74.00 | -20.46 | 100 | 10 | peak |
| 11570.000 | 31.60 | 14.33 | 45.93 | 54.00 | -8.07 | 100 | 10 | AVG |
| ac20 Mode, High channel | | | | | | | | |
| 5631.500 | 53.90 | 3.57 | 57.47 | 68.20 | -10.73 | 300 | 194 | peak |
| 5679.800 | 55.50 | 3.66 | 59.16 | 90.25 | -31.09 | 300 | 214 | peak |
| 5718.300 | 55.98 | 3.73 | 59.71 | 110.32 | -50.61 | 300 | 180 | peak |
| 5724.600 | 54.72 | 3.73 | 58.45 | 121.29 | -62.84 | 300 | 197 | peak |
| 5825.000 | 101.85 | 3.96 | 105.81 | N/A | N/A | 300 | 174 | peak |
| 5825.000 | 90.04 | 3.96 | 94.00 | N/A | N/A | 300 | 174 | AVG |
| 5850.600 | 54.55 | 3.95 | 58.50 | 120.83 | -62.33 | 300 | 51 | peak |
| 5871.600 | 55.22 | 4.03 | 59.25 | 106.15 | -46.90 | 300 | 71 | peak |
| 5880.700 | 54.99 | 4.06 | 59.05 | 100.98 | -41.93 | 300 | 103 | peak |
| 5926.900 | 55.20 | 4.18 | 59.38 | 68.20 | -8.82 | 300 | 185 | peak |
| 11650.000 | 39.11 | 14.43 | 53.54 | 74.00 | -20.46 | 100 | 140 | peak |
| 11650.000 | 29.87 | 14.43 | 44.30 | 54.00 | -9.70 | 100 | 140 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBµV) | Correct Factor(dB/m) | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5647.950 | 53.43 | 3.60 | 57.03 | 68.20 | -11.17 | 180 | 359 | peak |
| 5664.750 | 53.60 | 3.64 | 57.24 | 79.12 | -21.88 | 180 | 330 | peak |
| 5719.000 | 53.91 | 3.73 | 57.64 | 110.52 | -52.88 | 180 | 311 | peak |
| 5722.500 | 53.49 | 3.73 | 57.22 | 116.50 | -59.28 | 180 | 0 | peak |
| 5755.000 | 89.76 | 3.80 | 93.56 | N/A | N/A | 180 | 302 | peak |
| 5755.000 | 77.89 | 3.80 | 81.69 | N/A | N/A | 180 | 302 | AVG |
| 5854.450 | 54.13 | 3.97 | 58.10 | 112.05 | -53.95 | 180 | 219 | peak |
| 5874.750 | 54.51 | 4.04 | 58.55 | 105.27 | -46.72 | 180 | 189 | peak |
| 5880.350 | 55.04 | 4.06 | 59.10 | 101.24 | -42.14 | 180 | 338 | peak |
| 5928.650 | 54.48 | 4.18 | 58.66 | 68.20 | -9.54 | 180 | 122 | peak |
| 11510.000 | 37.22 | 14.36 | 51.58 | 74.00 | -22.42 | 100 | 123 | peak |
| 11510.000 | 26.94 | 14.36 | 41.30 | 54.00 | -12.70 | 100 | 123 | AVG |
| ac40 Mode, High channel | | | | | | | | |
| 5640.600 | 53.16 | 3.59 | 56.75 | 68.20 | -11.45 | 180 | 149 | peak |
| 5677.000 | 53.69 | 3.65 | 57.34 | 88.18 | -30.84 | 180 | 351 | peak |
| 5700.100 | 54.07 | 3.70 | 57.77 | 105.23 | -47.46 | 180 | 311 | peak |
| 5722.150 | 53.24 | 3.73 | 56.97 | 115.70 | -58.73 | 180 | 49 | peak |
| 5795.000 | 91.99 | 3.95 | 95.94 | N/A | N/A | 180 | 302 | peak |
| 5795.000 | 79.65 | 3.95 | 83.60 | N/A | N/A | 180 | 302 | AVG |
| 5851.650 | 54.43 | 3.96 | 58.39 | 118.44 | -60.05 | 180 | 12 | peak |
| 5873.000 | 54.74 | 4.04 | 58.78 | 105.76 | -46.98 | 180 | 224 | peak |
| 5901.350 | 55.26 | 4.14 | 59.40 | 85.70 | -26.30 | 180 | 83 | peak |
| 5945.450 | 54.37 | 4.22 | 58.59 | 68.20 | -9.61 | 180 | 136 | peak |
| 11590.000 | 35.02 | 14.32 | 49.34 | 74.00 | -24.66 | 100 | 140 | peak |
| 11590.000 | 26.95 | 14.32 | 41.27 | 54.00 | -12.73 | 100 | 140 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac40 Mode, Low channel | | | | | | | | |
| 5644.450 | 54.82 | 3.60 | 58.42 | 68.20 | -9.78 | 300 | 50 | peak |
| 5680.150 | 54.29 | 3.66 | 57.95 | 90.51 | -32.56 | 300 | 179 | peak |
| 5719.000 | 58.20 | 3.73 | 61.93 | 110.52 | -48.59 | 300 | 213 | peak |
| 5721.450 | 58.18 | 3.73 | 61.91 | 114.11 | -52.20 | 300 | 154 | peak |
| 5755.000 | 99.77 | 3.80 | 103.57 | N/A | N/A | 300 | 191 | peak |
| 5755.000 | 87.56 | 3.80 | 91.36 | N/A | N/A | 300 | 191 | AVG |
| 5852.350 | 54.43 | 3.96 | 58.39 | 116.84 | -58.45 | 300 | 211 | peak |
| 5868.800 | 54.80 | 4.03 | 58.83 | 106.94 | -48.11 | 300 | 211 | peak |
| 5900.300 | 54.87 | 4.14 | 59.01 | 86.48 | -27.47 | 300 | 122 | peak |
| 5936.700 | 54.20 | 4.20 | 58.40 | 68.20 | -9.80 | 300 | 325 | peak |
| 11510.000 | 37.64 | 14.36 | 52.00 | 74.00 | -22.00 | 100 | 224 | peak |
| 11510.000 | 29.50 | 14.36 | 43.86 | 54.00 | -10.14 | 100 | 224 | AVG |
| ac40 Mode, High channel | | | | | | | | |
| 5633.600 | 54.46 | 3.58 | 58.04 | 68.20 | -10.16 | 300 | 188 | peak |
| 5667.200 | 55.68 | 3.64 | 59.32 | 80.93 | -21.61 | 300 | 301 | peak |
| 5707.100 | 54.38 | 3.70 | 58.08 | 107.19 | -49.11 | 300 | 162 | peak |
| 5722.850 | 54.35 | 3.73 | 58.08 | 117.30 | -59.22 | 300 | 188 | peak |
| 5795.000 | 99.40 | 3.95 | 103.35 | N/A | N/A | 300 | 195 | peak |
| 5795.000 | 87.89 | 3.95 | 91.84 | N/A | N/A | 300 | 195 | AVG |
| 5853.400 | 54.31 | 3.97 | 58.28 | 114.45 | -56.17 | 300 | 66 | peak |
| 5862.850 | 54.80 | 4.00 | 58.80 | 108.60 | -49.80 | 300 | 131 | peak |
| 5888.050 | 55.12 | 4.10 | 59.22 | 95.54 | -36.32 | 300 | 54 | peak |
| 5935.650 | 54.38 | 4.20 | 58.58 | 68.20 | -9.62 | 300 | 252 | peak |
| 11590.000 | 37.10 | 14.32 | 51.42 | 74.00 | -22.58 | 100 | 330 | peak |
| 11590.000 | 27.89 | 14.32 | 42.21 | 54.00 | -11.79 | 100 | 330 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

## Horizontal

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5632.550 | 53.33 | 3.57 | 56.90 | 68.20 | -11.30 | 180 | 170 | peak |
| 5661.950 | 53.82 | 3.62 | 57.44 | 77.04 | -19.60 | 180 | 304 | peak |
| 5717.950 | 54.62 | 3.73 | 58.35 | 110.23 | -51.88 | 180 | 312 | peak |
| 5723.550 | 54.73 | 3.73 | 58.46 | 118.89 | -60.43 | 180 | 289 | peak |
| 5775.000 | 88.10 | 3.88 | 91.98 | N/A | N/A | 180 | 304 | peak |
| 5775.000 | 78.73 | 3.88 | 82.61 | N/A | N/A | 180 | 304 | AVG |
| 5853.750 | 54.89 | 3.97 | 58.86 | 113.65 | -54.79 | 180 | 125 | peak |
| 5873.350 | 54.85 | 4.04 | 58.89 | 105.66 | -46.77 | 180 | 226 | peak |
| 5892.250 | 54.56 | 4.10 | 58.66 | 92.44 | -33.78 | 180 | 245 | peak |
| 5945.450 | 54.18 | 4.22 | 58.40 | 68.20 | -9.80 | 180 | 233 | peak |
| 11550.000 | 33.95 | 14.34 | 48.29 | 74.00 | -25.71 | 100 | 138 | peak |
| 11550.000 | 24.29 | 14.34 | 38.63 | 54.00 | -15.37 | 100 | 138 | AVG |

## Vertical

| Frequency (MHz) | Reading (dBμV) | Correct Factor(dB/m) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|---|---|---|---|---|---|---|---|---|
| ac80 Mode, Low channel | | | | | | | | |
| 5632.550 | 61.05 | 3.57 | 64.62 | 68.20 | -3.58 | 300 | 214 | peak |
| 5696.600 | 63.76 | 3.69 | 67.45 | 102.68 | -35.23 | 300 | 178 | peak |
| 5718.300 | 63.92 | 3.73 | 67.65 | 110.32 | -42.67 | 300 | 171 | peak |
| 5721.450 | 62.97 | 3.73 | 66.70 | 114.11 | -47.41 | 300 | 214 | peak |
| 5775.000 | 98.29 | 3.88 | 102.17 | N/A | N/A | 300 | 196 | peak |
| 5775.000 | 88.23 | 3.88 | 92.11 | N/A | N/A | 300 | 196 | AVG |
| 5854.800 | 57.62 | 3.97 | 61.59 | 111.26 | -49.67 | 300 | 199 | peak |
| 5856.200 | 56.94 | 3.97 | 60.91 | 110.46 | -49.55 | 300 | 173 | peak |
| 5880.350 | 59.03 | 4.06 | 63.09 | 101.24 | -38.15 | 300 | 67 | peak |
| 5927.600 | 56.22 | 4.18 | 60.40 | 68.20 | -7.80 | 300 | 165 | peak |
| 11550.000 | 37.47 | 14.34 | 51.81 | 74.00 | -22.19 | 100 | 11 | peak |
| 11550.000 | 28.39 | 14.34 | 42.73 | 54.00 | -11.27 | 100 | 11 | AVG |

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported.

# 9 FCC §15.407(a)(e) – Emission Bandwidth And Occupied Bandwidth

## 9.1 Applicable Standard

As per FCC §15.407(a): The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

As per FCC §15.407(e): for equipment operating in the band 5725 – 5850 MHz, the minimum 6 dB bandwidth of U-NII devices shall be 500 kHz.

## 9.2 Test Procedure

As per 789033 D02 General U-NII Test Procedures New Rules v02r01

**Emission Bandwidth (EBW)**

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

**99% Occupied Bandwidth**

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99 % power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

## 9.3 Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 1010 hPa |

*The testing was performed by Tom Hsu from 2019-02-21 to 2019-03-04.*

## 9.4 Test Results

*Test mode: Transmitting*

***<UNII-1>***

| Mode | Channel | Frequency (MHz) | 26dB Emission Bandwidth (MHz) | | | | 99% Emission Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Chain 0 | Chain 1 | Chain 2 | Chain 3 |
| 802.11a | 36 | 5180 | 20.32 | 20.19 | 20.19 | 20.32 | 17.56 | 17.56 | 17.56 | 17.56 |
| | 40 | 5200 | 20.26 | 20.13 | 20.13 | 20.26 | 17.56 | 17.56 | 17.56 | 17.63 |
| | 48 | 5240 | 20.19 | 20.06 | 20.13 | 20.32 | 17.63 | 17.56 | 17.56 | 17.63 |
| 802.11ac20 | 36 | 5180 | 20.39 | 20.39 | 20.45 | 20.39 | 17.56 | 17.56 | 17.69 | 17.69 |
| | 40 | 5200 | 20.26 | 20.39 | 20.39 | 20.32 | 17.56 | 17.63 | 17.69 | 17.69 |
| | 48 | 5240 | 20.19 | 20.32 | 20.32 | 20.39 | 17.56 | 17.63 | 17.69 | 17.69 |
| 802.11ac 40 | 38 | 5190 | 41.28 | 40.77 | 40.39 | 40 | 36.15 | 36.15 | 36.03 | 36.15 |
| | 46 | 5230 | 41.28 | 40.39 | 40.64 | 40.13 | 36.28 | 36.15 | 36.03 | 36.03 |
| 802.11ac 80 | 42 | 5210 | 81.28 | 80.77 | 81.28 | 80.77 | 75.13 | 75.39 | 75.13 | 75.13 |

***< UNII-2A Band II>***

| Mode | Channel | Frequency (MHz) | 26dB Emission Bandwidth (MHz) | | | | 99% Emission Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Chain 0 | Chain 1 | Chain 2 | Chain 3 |
| 802.11a | 52 | 5260 | 20.26 | 20.13 | 20.19 | 20.32 | 17.56 | 17.56 | 17.56 | 17.63 |
| | 60 | 5300 | 20.32 | 20.06 | 20.13 | 20.26 | 17.63 | 17.56 | 17.56 | 17.69 |
| | 64 | 5320 | 20.26 | 20 | 20.19 | 20.32 | 17.56 | 17.56 | 17.56 | 17.56 |
| 802.11ac20 | 52 | 5260 | 20.39 | 20.32 | 20.39 | 20.32 | 17.63 | 17.63 | 17.69 | 17.69 |
| | 60 | 5300 | 20.26 | 20.26 | 20.32 | 20.32 | 17.63 | 17.69 | 17.69 | 17.69 |
| | 64 | 5320 | 20.32 | 20.32 | 20.45 | 20.39 | 17.56 | 17.63 | 17.69 | 17.63 |
| 802.11ac 40 | 54 | 5270 | 40.9 | 40.64 | 40.26 | 40.13 | 36.28 | 36.15 | 35.9 | 36.03 |
| | 62 | 5310 | 41.41 | 40.64 | 40.9 | 40.13 | 36.28 | 36.15 | 35.9 | 36.03 |
| 802.11ac 80 | 58 | 5290 | 81.28 | 80.77 | 80.51 | 80.77 | 75.13 | 75.13 | 74.87 | 75.13 |

***< UNII-2C Band III>***

| Mode | Channel | Frequency (MHz) | 26dB Emission Bandwidth (MHz) | | | | 99% Emission Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Chain 0 | Chain 1 | Chain 2 | Chain 3 |
| 802.11a | 100 | 5500 | 20.32 | 20.06 | 20.06 | 20.64 | 17.56 | 17.56 | 17.56 | 17.69 |
| | 116 | 5580 | 20.39 | 20 | 20.06 | 20.51 | 17.63 | 17.56 | 17.56 | 17.63 |
| | 140 | 5700 | 20.06 | 20.13 | 20.19 | 21.67 | 17.56 | 17.56 | 18.27 | 18.08 |
| 802.11ac20 | 100 | 5500 | 20.32 | 20.32 | 20.39 | 20.39 | 17.56 | 17.63 | 17.69 | 17.69 |
| | 116 | 5580 | 20.26 | 20.39 | 20.39 | 20.45 | 17.56 | 17.63 | 17.63 | 17.63 |
| | 140 | 5700 | 20.32 | 20.32 | 20.39 | 20.26 | 17.69 | 17.63 | 17.69 | 17.69 |
| 802.11ac 40 | 102 | 5510 | 41.28 | 40.64 | 40.51 | 40.26 | 36.28 | 36.15 | 36.03 | 36.03 |
| | 118 | 5590 | 41.41 | 40.64 | 40.39 | 40.13 | 36.28 | 36.15 | 36.03 | 35.9 |
| | 134 | 5670 | 41.03 | 40.51 | 40.26 | 40.13 | 36.28 | 36.15 | 35.9 | 36.03 |
| 802.11ac 80 | 106 | 5530 | 81.28 | 80.51 | 81.03 | 81.03 | 75.13 | 75.13 | 75.13 | 75.13 |
| | 122 | 5610 | 81.54 | 80.51 | 80.51 | 81.03 | 75.13 | 75.39 | 75.13 | 75.13 |

***< UNII-3 Band IV>***

| Mode | Channel | Frequency (MHz) | 6dB Emission Bandwidth (MHz) | | | | 99% Emission Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Chain 0 | Chain 1 | Chain 2 | Chain 3 | Chain 0 | Chain 1 | Chain 2 | Chain 3 |
| 802.11a | 149 | 5745 | 15.13 | 16.28 | 16.28 | 15.96 | 17.69 | 17.56 | 17.5 | 17.63 |
| | 157 | 5785 | 15.13 | 16.6 | 15.71 | 15.13 | 17.69 | 17.56 | 17.56 | 17.63 |
| | 165 | 5825 | 15.13 | 15.96 | 15.64 | 15.71 | 17.69 | 17.56 | 17.5 | 17.56 |
| 802.11ac20 | 149 | 5745 | 15.13 | 15.71 | 15.71 | 15.96 | 17.63 | 17.63 | 17.69 | 17.69 |
| | 157 | 5785 | 15.13 | 15.71 | 15.71 | 15.13 | 17.63 | 17.63 | 17.69 | 17.63 |
| | 165 | 5825 | 15.13 | 16.09 | 15.71 | 15.45 | 17.63 | 17.63 | 17.63 | 17.63 |
| 802.11ac 40 | 151 | 5755 | 35.13 | 35.13 | 35.13 | 35.13 | 36.28 | 36.03 | 36.03 | 36.03 |
| | 159 | 5795 | 35.13 | 35.13 | 35.13 | 35.13 | 36.28 | 36.28 | 36.15 | 36.15 |
| 802.11ac 80 | 155 | 5775 | 75.39 | 75.13 | 75.13 | 75.39 | 75.39 | 75.13 | 75.13 | 75.13 |

Please refer to the following plots

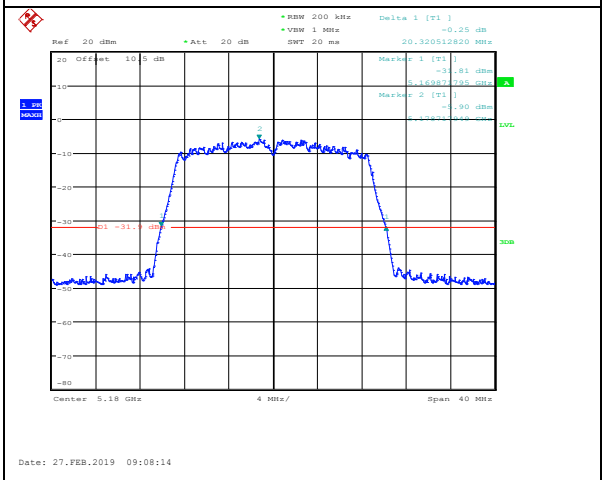
*Transmitting Mode:*

**UNII-1 Band I / BW 26dBc**

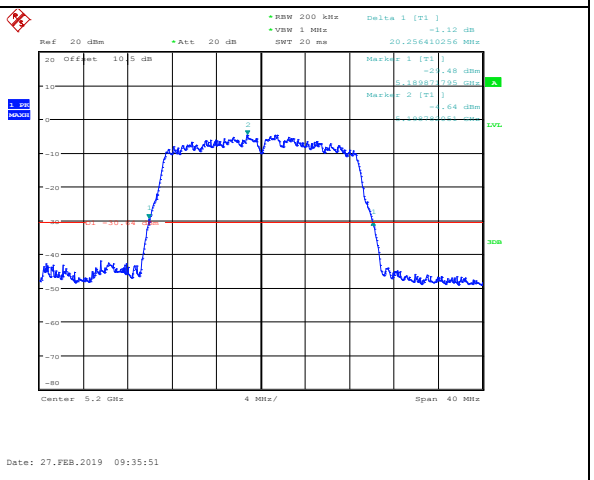
**IEEE 802.11a Mode / 5150 ~ 5250MHz**

**<Chain 0>**

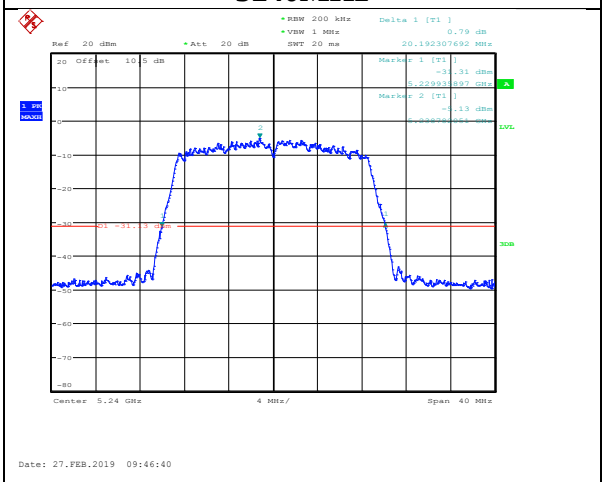
**5180MHz**




**5200MHz**

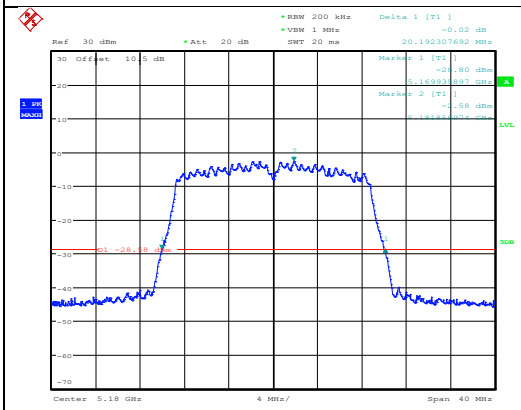



**5240MHz**



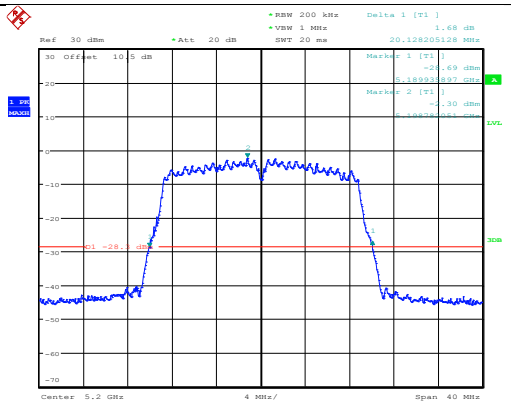
## <Chain 1>

### 5180MHz



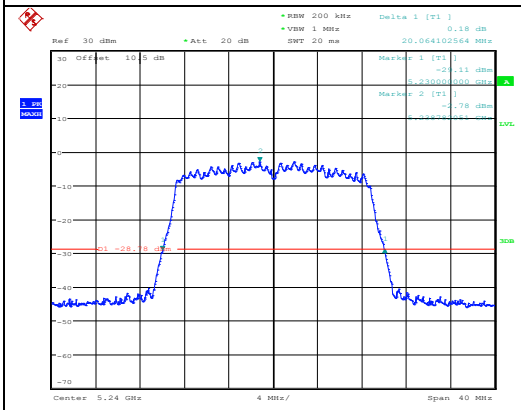

Date: 27.FEB.2019 09:11:44

### 5200MHz




Date: 27.FEB.2019 09:32:03

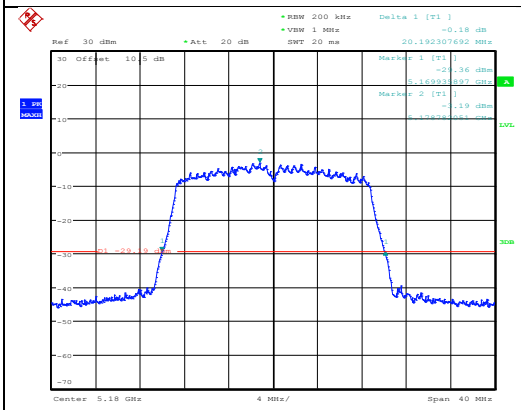
### 5240MHz




Date: 27.FEB.2019 09:48:47

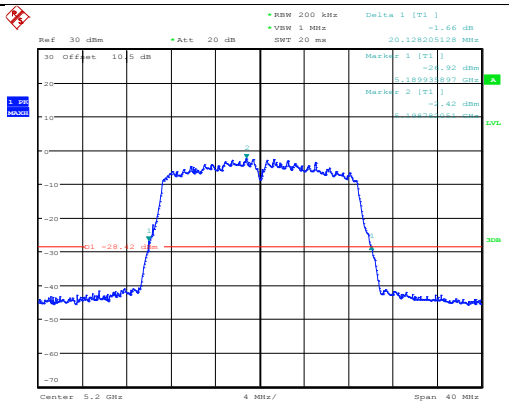
## <Chain 2>

### 5180MHz



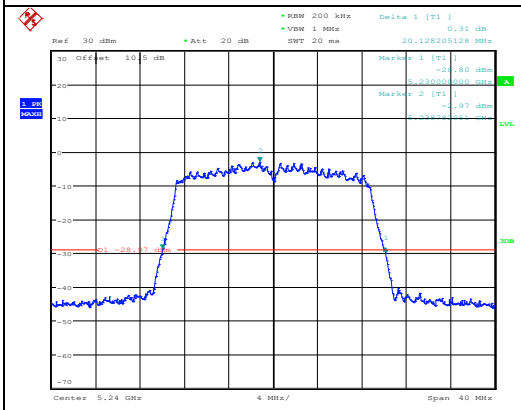

Date: 27.FEB.2019 09:13:43

### 5200MHz




Date: 27.FEB.2019 09:21:30

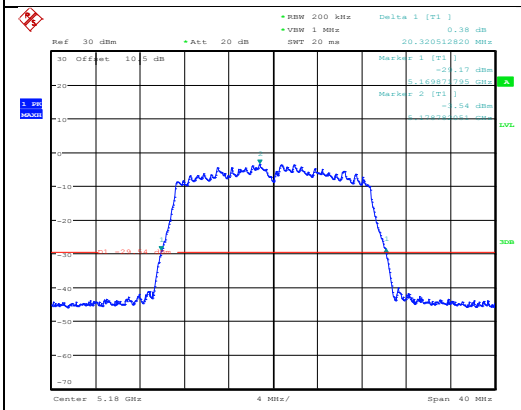
### 5240MHz




Date: 27.FEB.2019 09:51:38

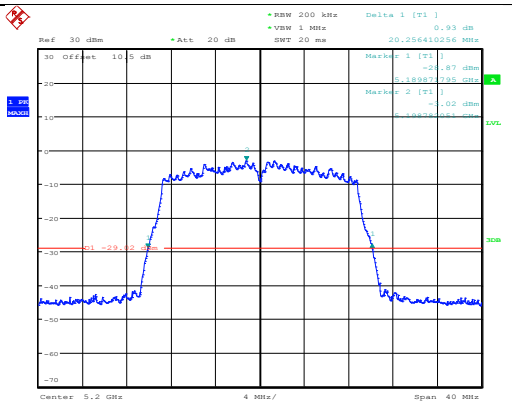
## <Chain 3>

### 5180MHz



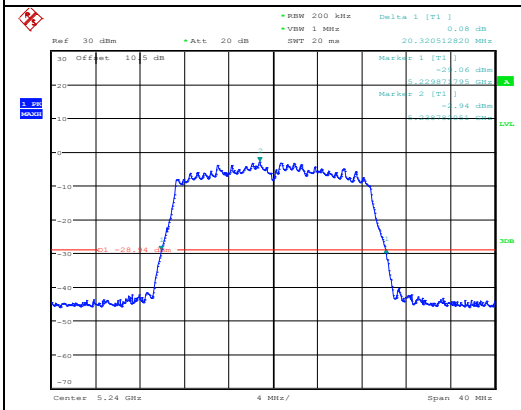

Date: 27.FEB.2019 09:16:15

### 5200MHz




Date: 27.FEB.2019 09:19:16

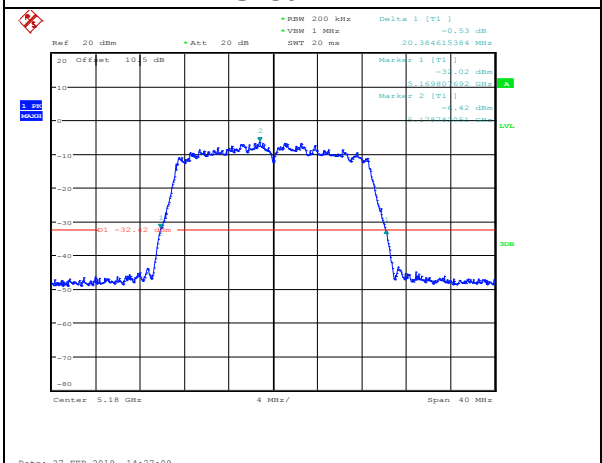
### 5240MHz



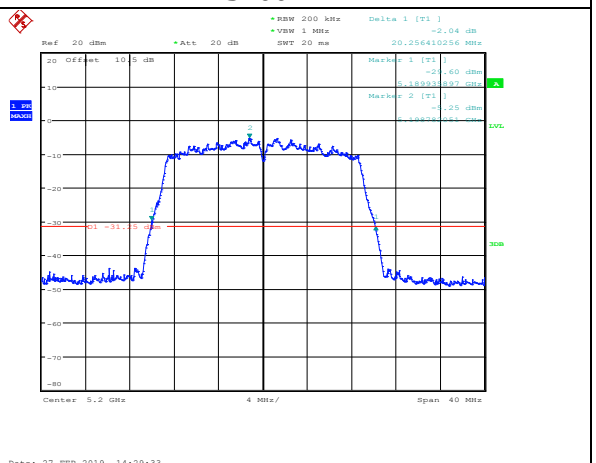

Date: 27.FEB.2019 09:54:07

## IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz
## <Chain 0>

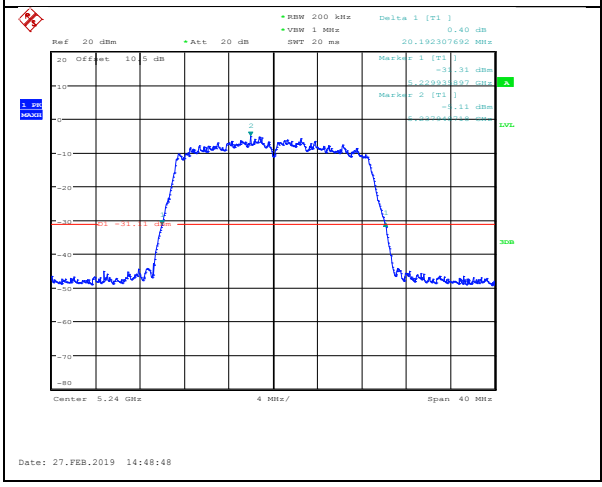
### 5180MHz




### 5200MHz

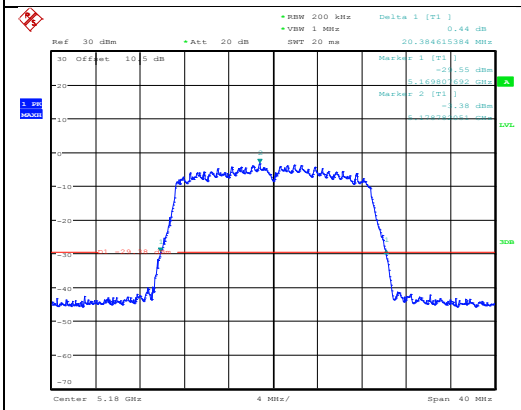



### 5240MHz



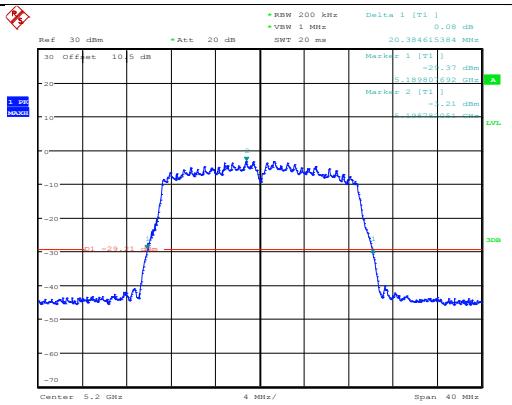
## <Chain 1>

### 5180MHz



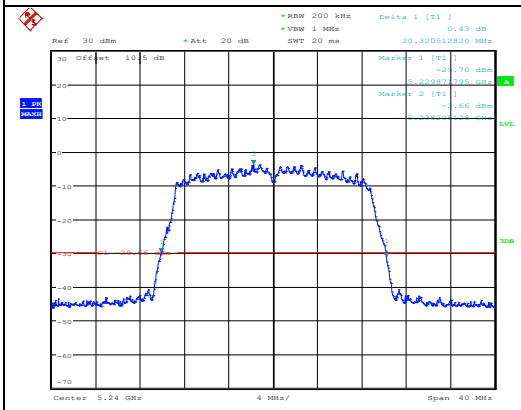

Date: 27.FEB.2019 14:24:12

### 5200MHz




Date: 27.FEB.2019 14:32:20

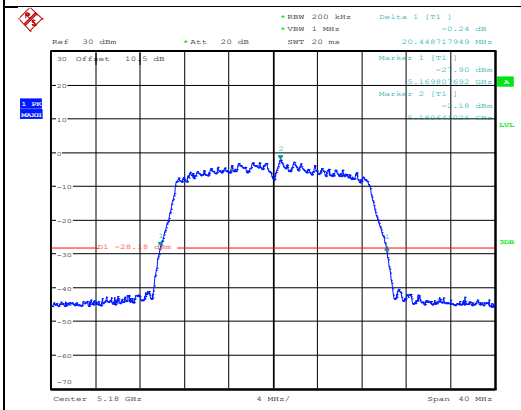
### 5240MHz



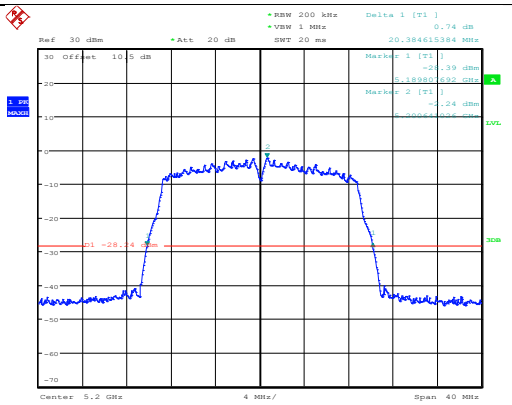

Date: 27.FEB.2019 14:45:43

## <Chain 2>

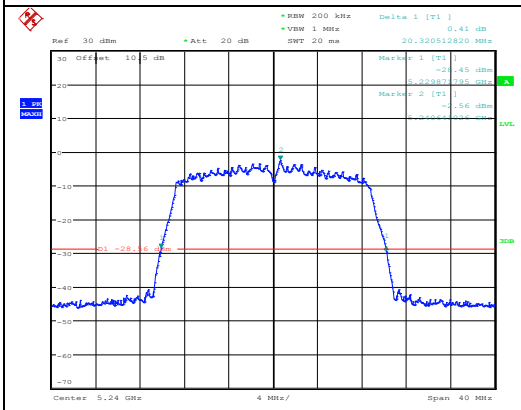
### 5180MHz




### 5200MHz

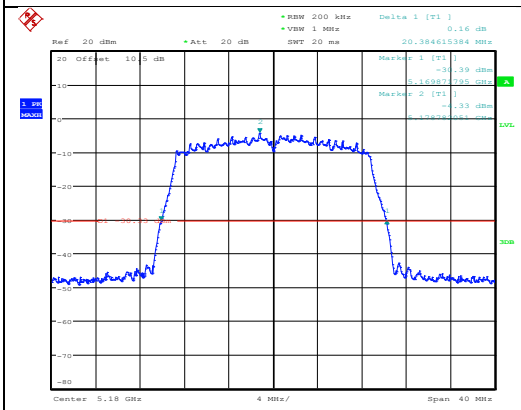



### 5240MHz



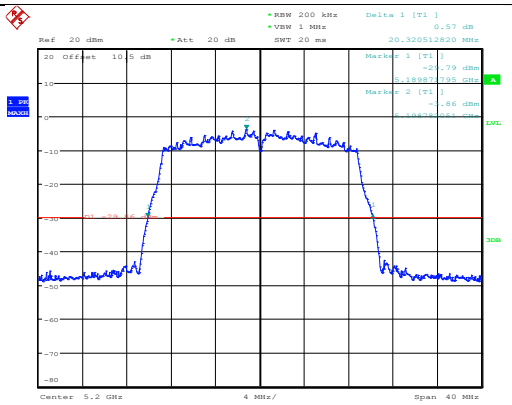
## <Chain 3>

### 5180MHz



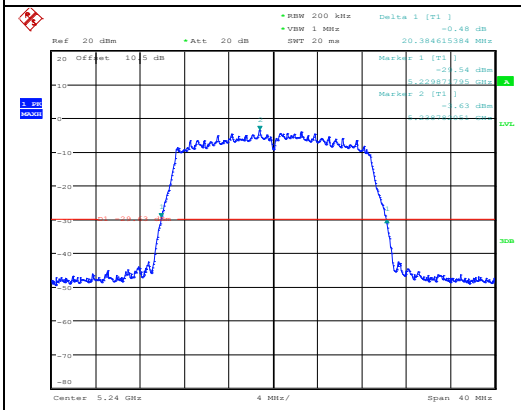

Date: 27.FEB.2019 14:21:45

### 5200MHz




Date: 27.FEB.2019 14:36:38

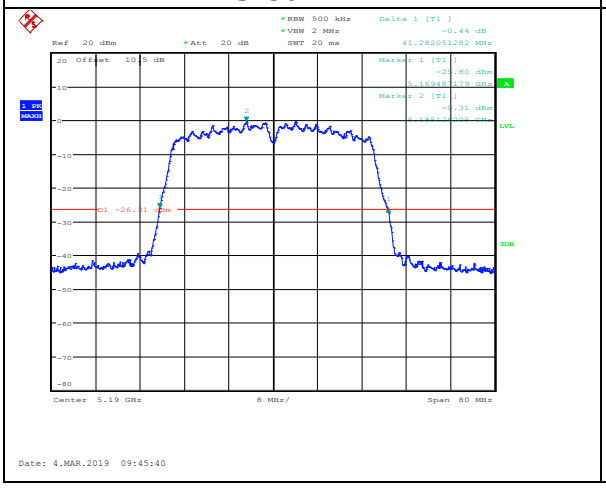
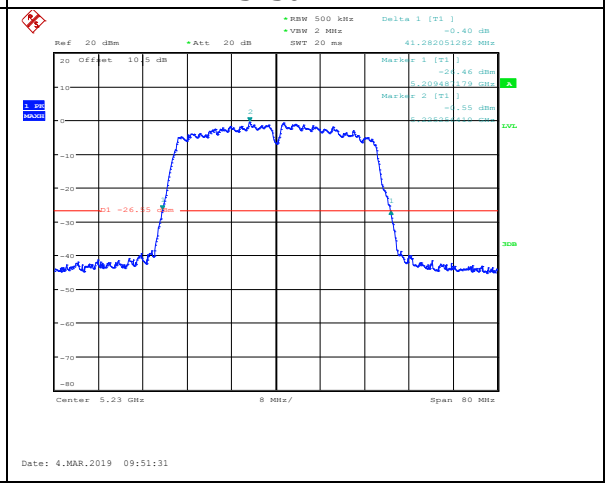
### 5240MHz



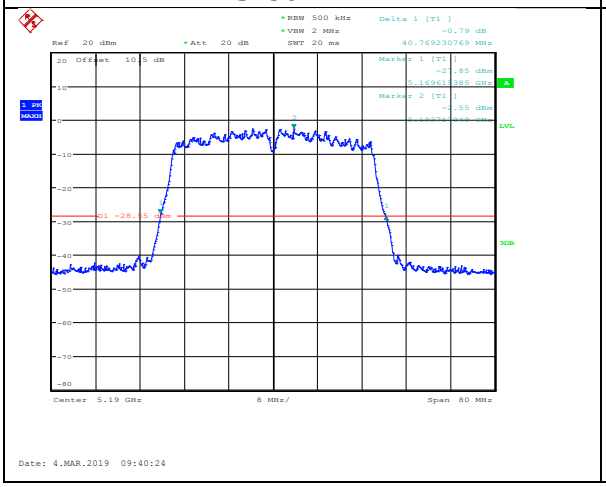
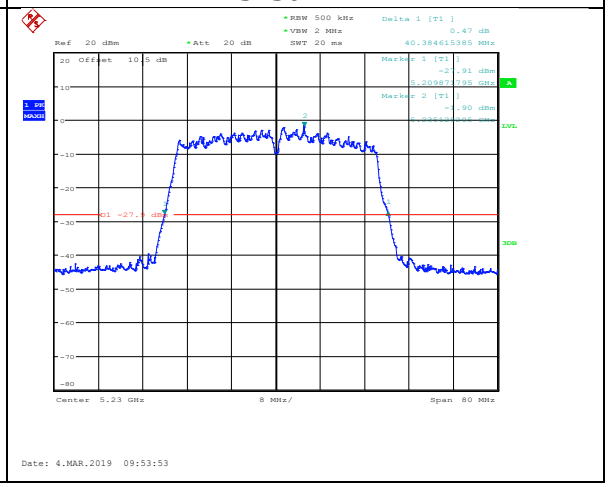

Date: 27.FEB.2019 14:39:08

## IEEE 802.11ac VHT40 Mode / 5150 ~ 5250MHz

### <Chain 0>

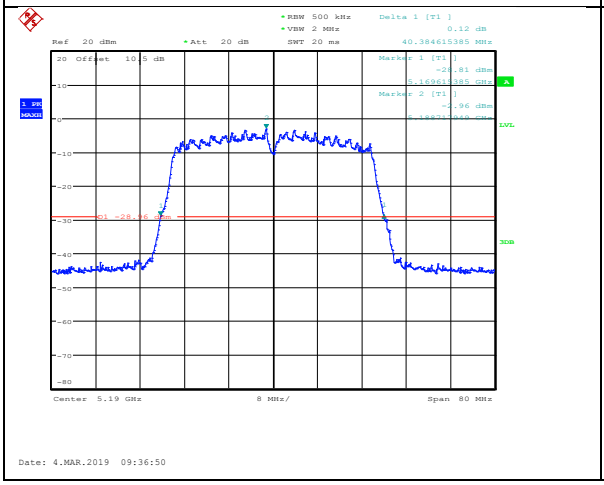
| 5190MHz | 5230MHz |
|---|---|
|  |  |

### <Chain 1>

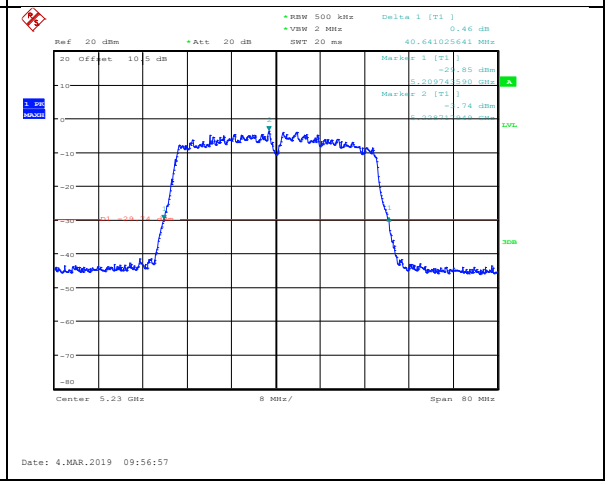
| 5190MHz | 5230MHz |
|---|---|
|  |  |

## <Chain 2>

### 5190MHz

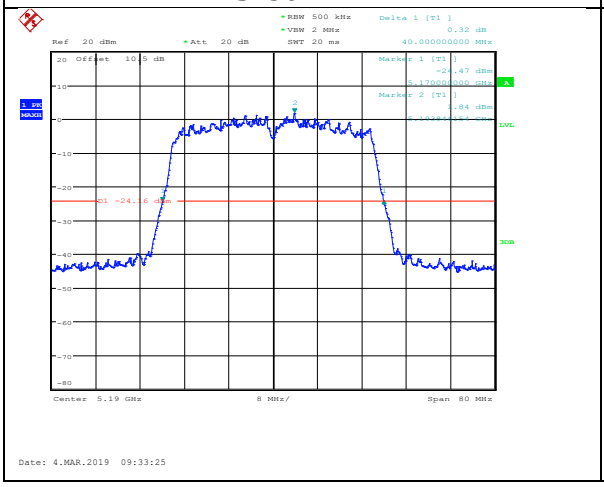



### 5230MHz

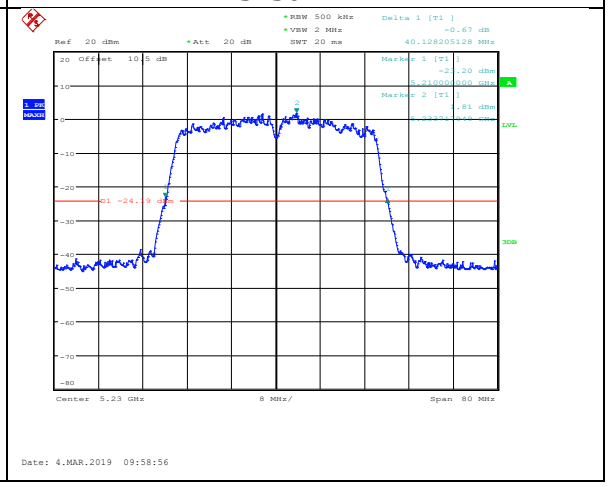



## <Chain 3>

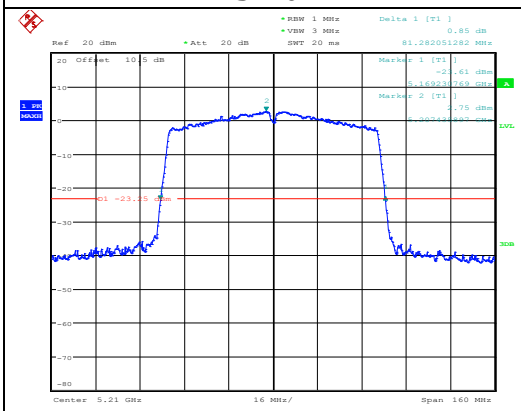
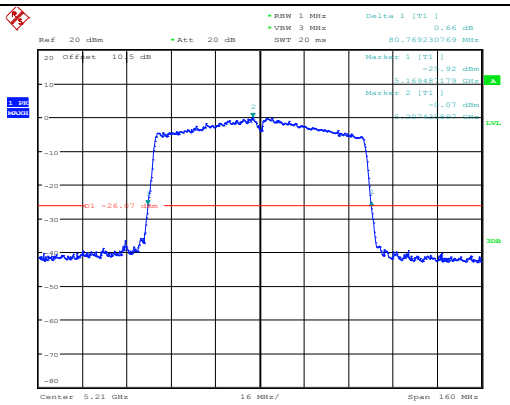
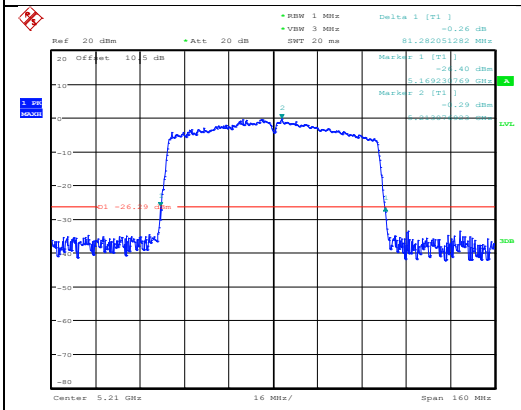
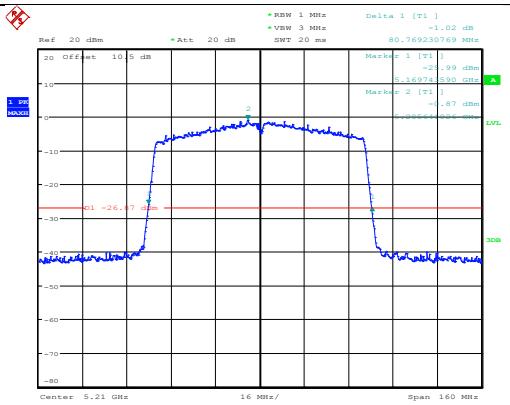
### 5190MHz




### 5230MHz

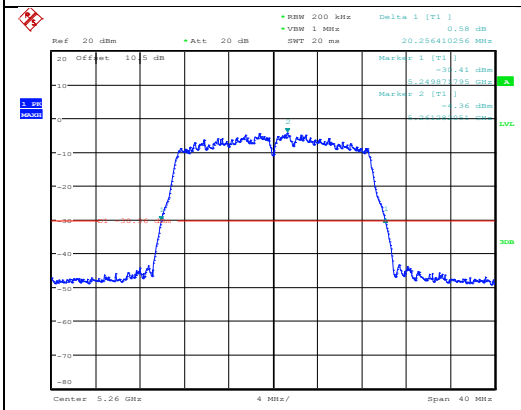


## IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz

| <Chain 0> 5210MHz | <Chain 1> 5210MHz |
|---|---|
|  |  |
| Date: 4.MAR.2019 18:05:55 | Date: 4.MAR.2019 18:09:03 |
| **<Chain 2> 5210MHz** | **<Chain 3> 210MHz** |
|  |  |
| Date: 4.MAR.2019 18:11:18 | Date: 4.MAR.2019 18:13:27 |

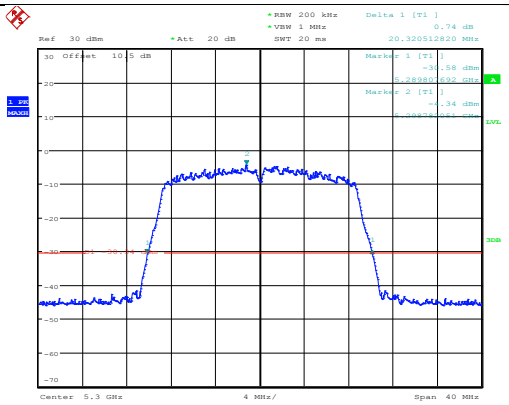
## UNII-2A Band II / BW 26dBc
## IEEE 802.11a Mode / 5250 ~ 5350MHz
## <Chain 0>

### 5260MHz



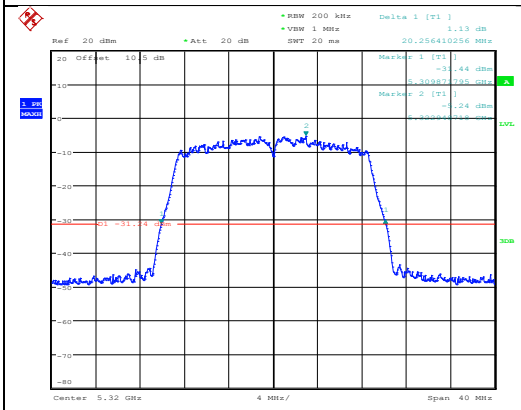

Date: 27.FEB.2019 10:05:09

### 5300MHz




Date: 27.FEB.2019 10:08:07

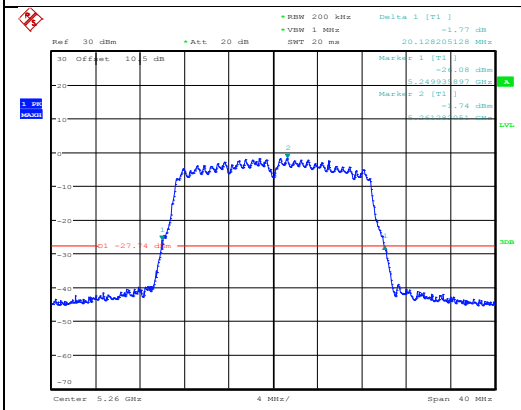
### 5320MHz




Date: 27.FEB.2019 10:49:44

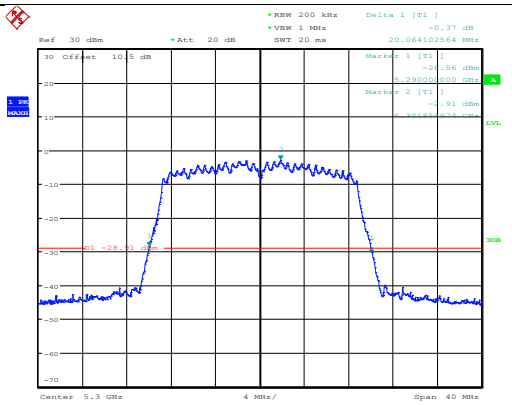
## <Chain 1>

### 5260MHz



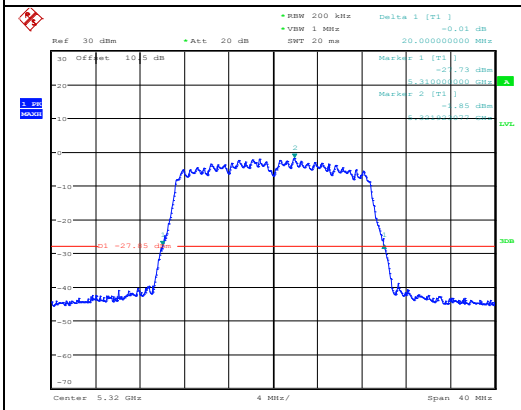

Date: 27.FEB.2019 10:02:06

### 5300MHz




Date: 27.FEB.2019 10:24:19

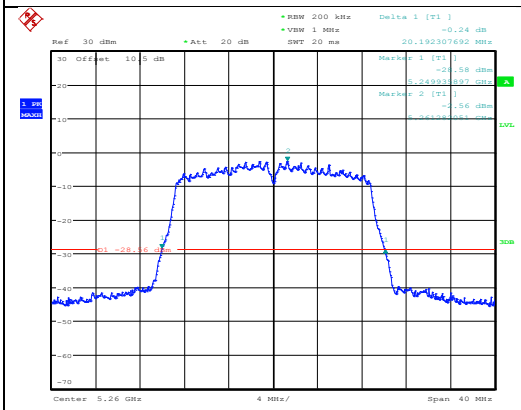
### 5320MHz




Date: 27.FEB.2019 10:46:50

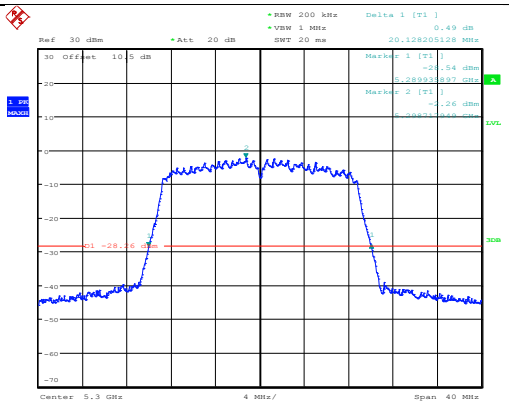
## <Chain 2>

### 5260MHz



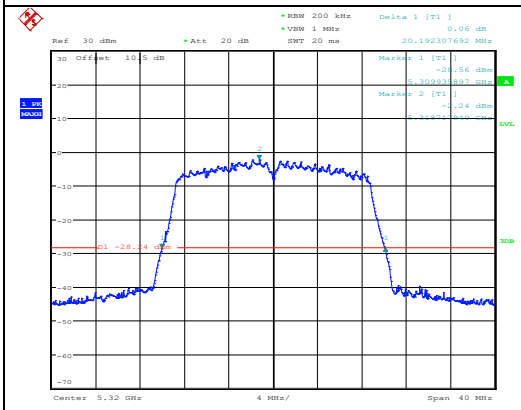

Date: 27.FEB.2019 09:59:20

### 5300MHz




Date: 27.FEB.2019 10:26:49

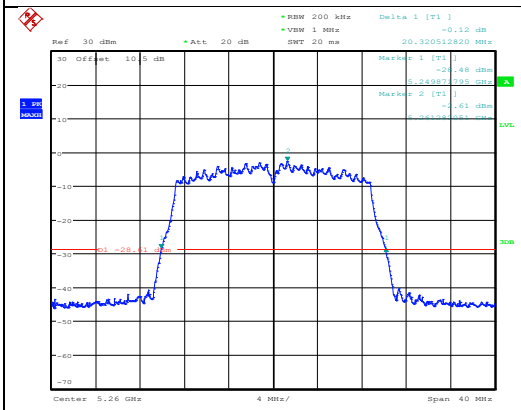
### 5320MHz




Date: 27.FEB.2019 10:42:59

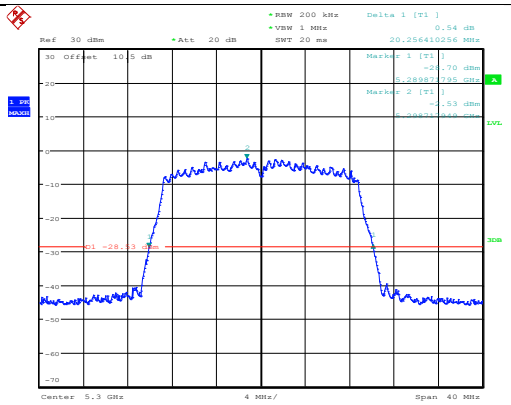
## <Chain 3>

### 5260MHz



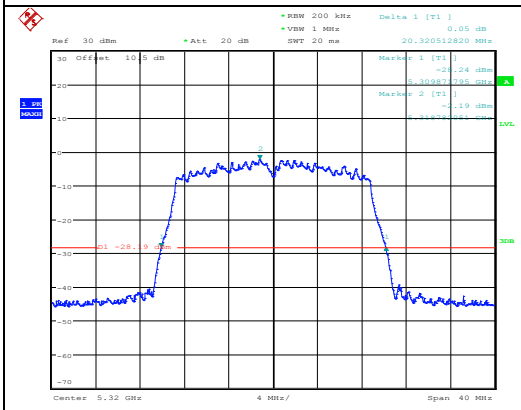

Date: 27.FEB.2019 09:56:59

### 5300MHz




Date: 27.FEB.2019 10:37:12

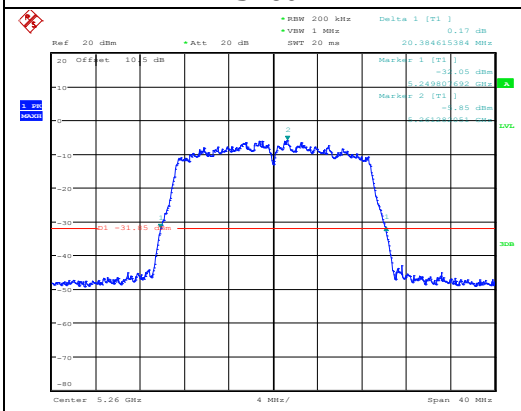
### 5320MHz




Date: 27.FEB.2019 10:40:41

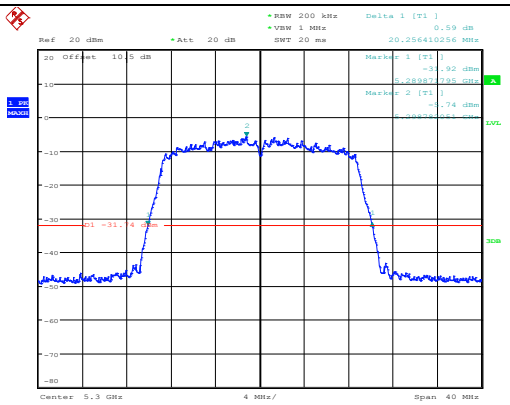
## IEEE 802.11ac VHT20 Mode / 5250 ~ 5350MHz
## <Chain 0>

### 5260MHz



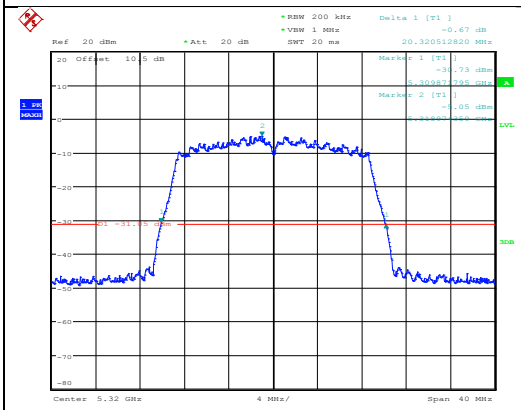

Date: 27.FEB.2019 14:55:43

### 5300MHz




Date: 27.FEB.2019 15:19:12

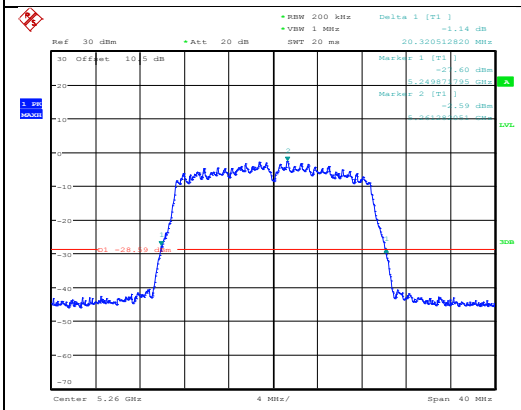
### 5320MHz




Date: 27.FEB.2019 15:22:05

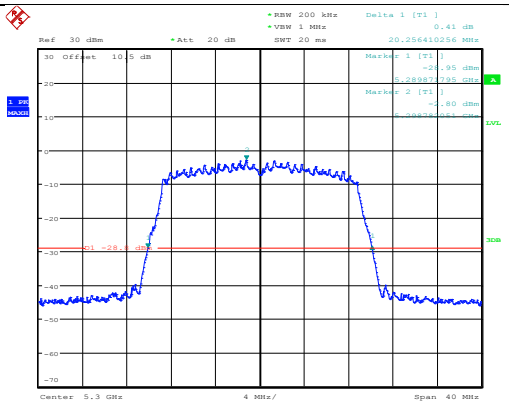
## <Chain 1>

### 5260MHz



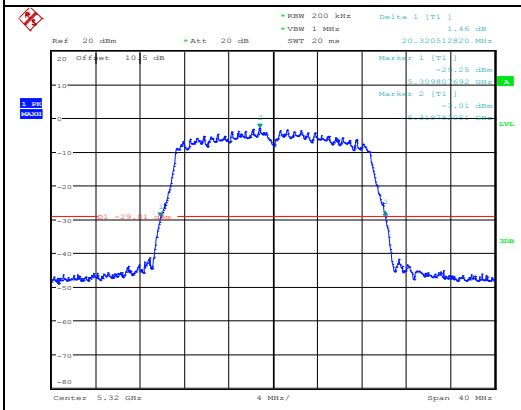

Date: 27.FEB.2019 14:58:21

### 5300MHz




Date: 27.FEB.2019 15:16:19

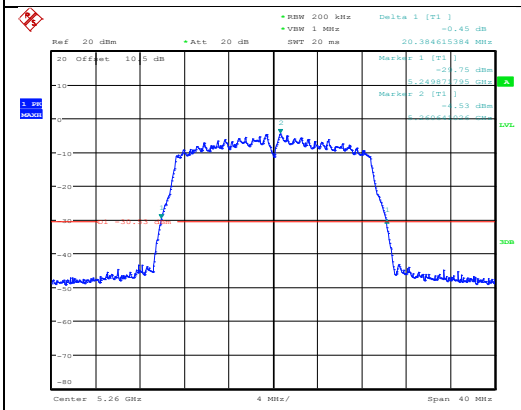
### 5320MHz




Date: 27.FEB.2019 15:27:43

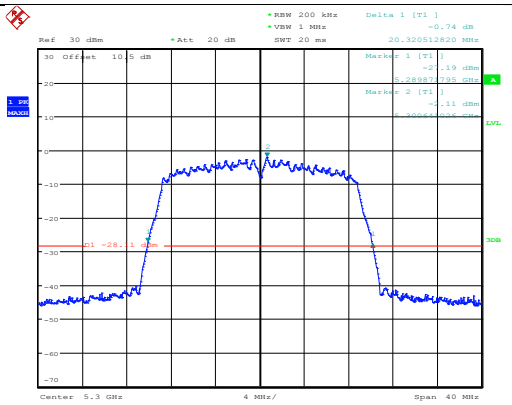
## <Chain 2>

### 5260MHz



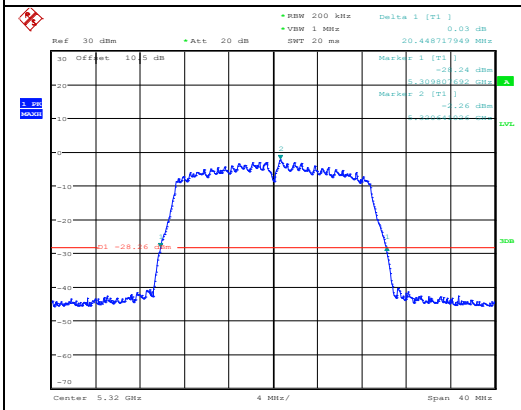

Date: 27.FEB.2019 15:00:35

### 5300MHz




Date: 27.FEB.2019 15:13:27

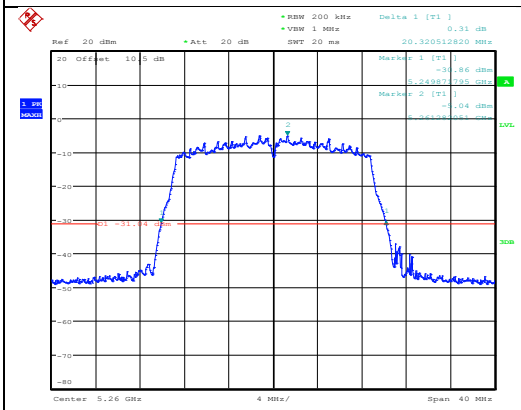
### 5320MHz




Date: 27.FEB.2019 15:30:02

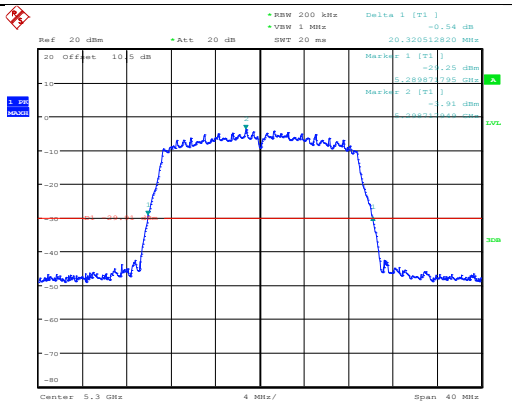
## <Chain 3>

### 5260MHz



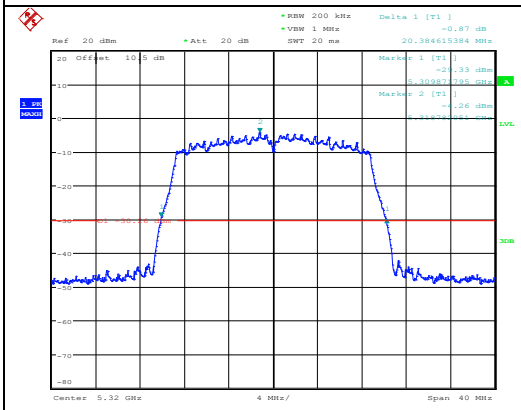

Date: 27.FEB.2019 15:05:18

### 5300MHz




Date: 27.FEB.2019 15:11:04

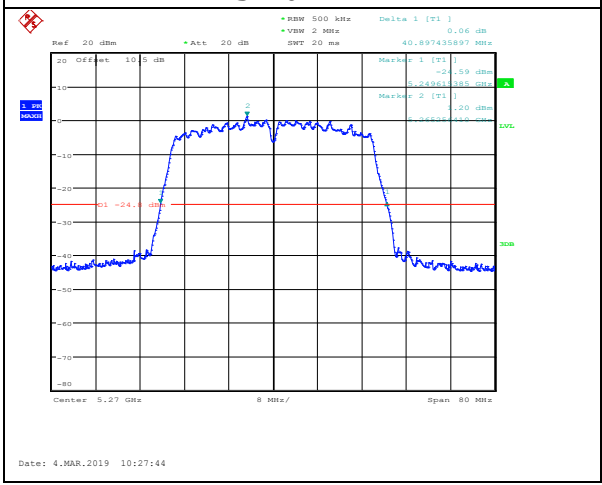
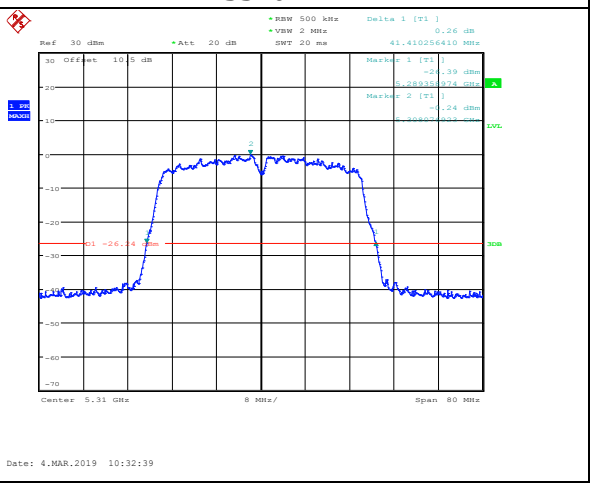
### 5320MHz



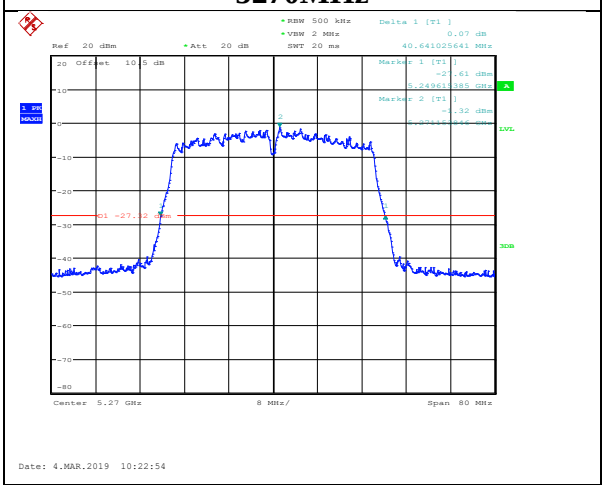
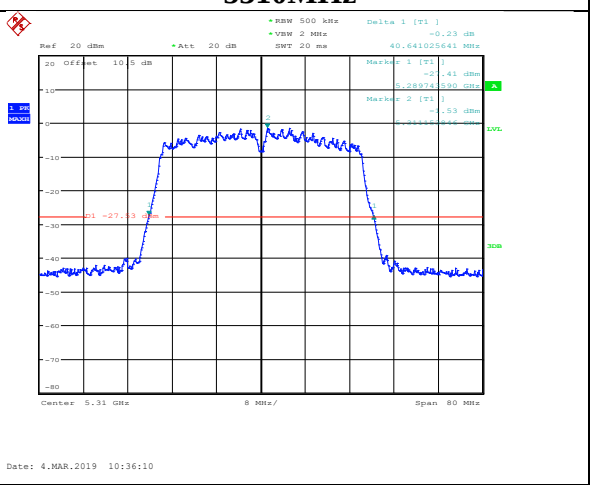

Date: 27.FEB.2019 15:34:21

## IEEE 802.11ac VHT40 Mode / 5250 ~ 5350MHz

### <Chain 0>

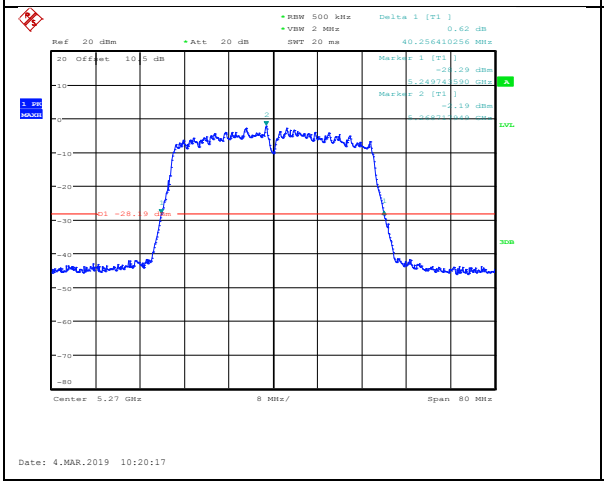
| 5270MHz | 5310MHz |
|---|---|
|  |  |

### <Chain 1>

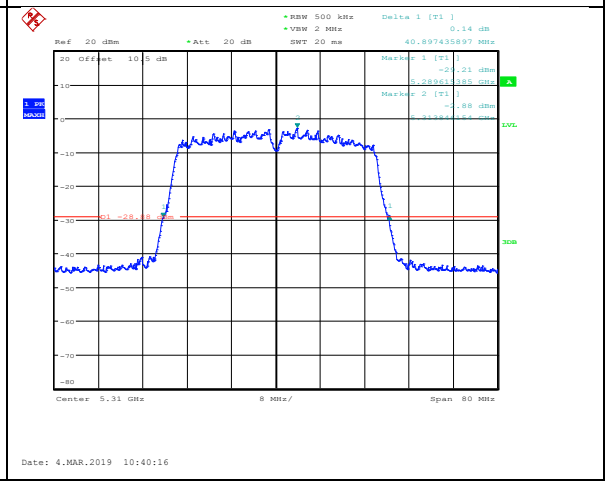
| 5270MHz | 5310MHz |
|---|---|
|  |  |

## <Chain 2>

### 5270MHz

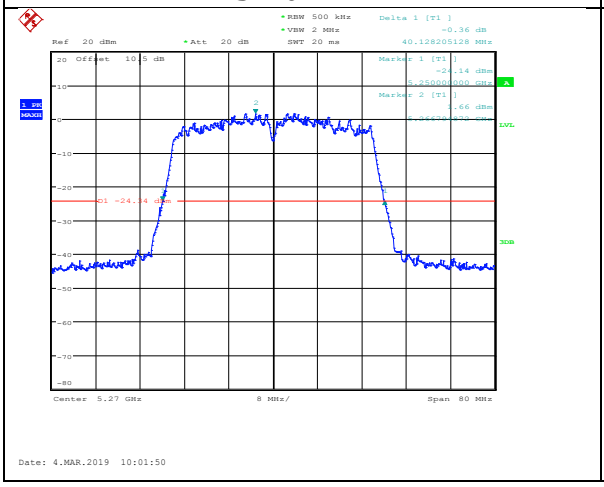



### 5310MHz

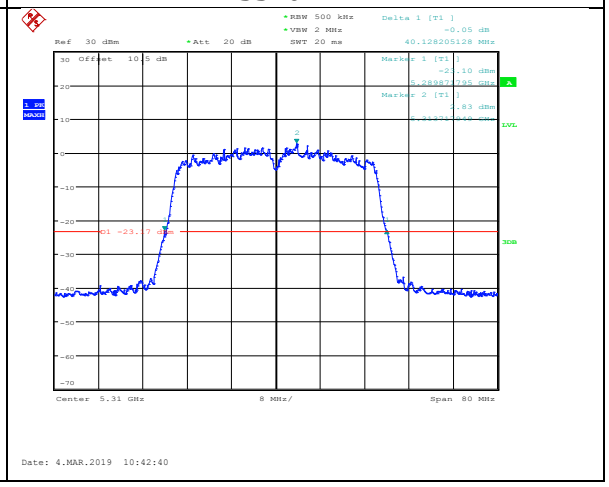



## <Chain 3>

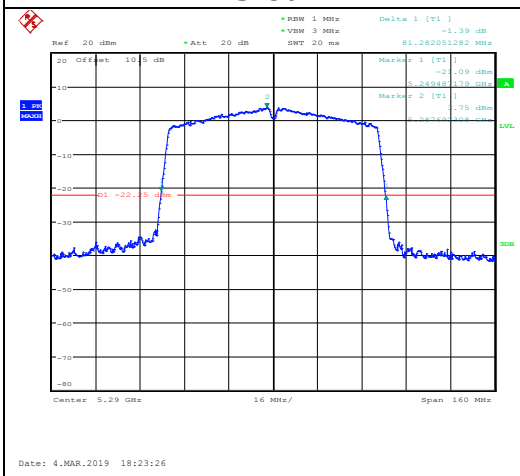
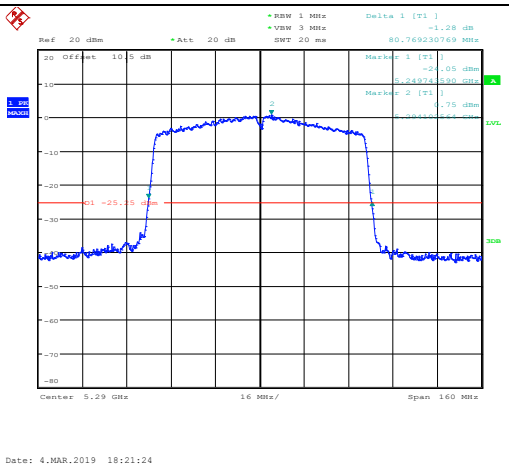
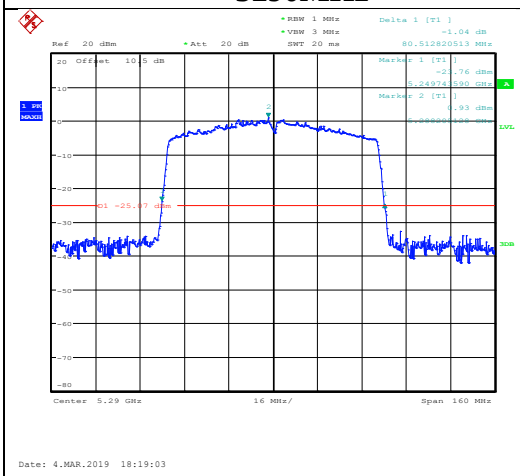
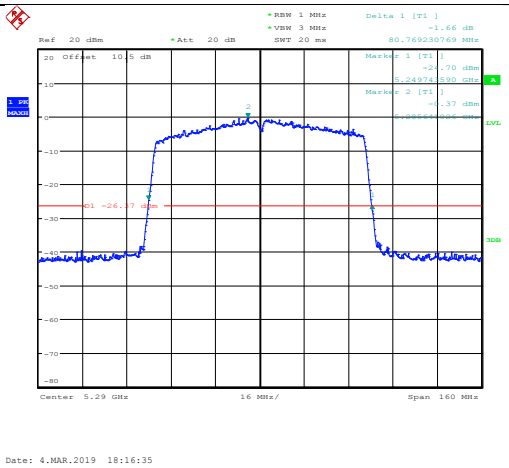
### 5270MHz




### 5310MHz

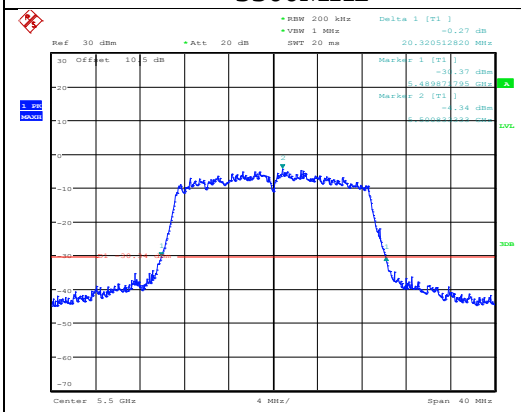


## IEEE 802.11ac VHT80 Mode / 5250 ~ 5350MHz

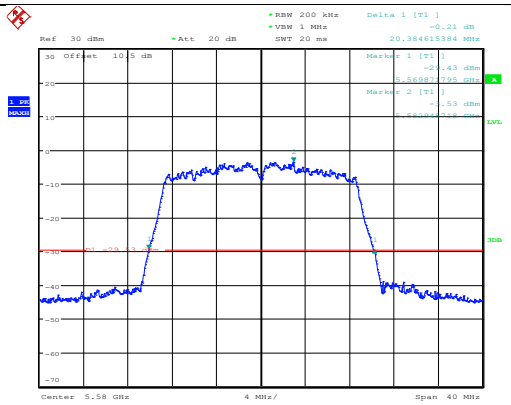
| <Chain 0> 5290MHz | <Chain 1> 5290MHz |
|---|---|
|  |  |
| <Chain 2> 5290MHz | <Chain 3> 5290MHz |
|  |  |

## UNII-2C Band III / BW 26dBc
## IEEE 802.11a Mode / 5470 ~ 5725MHz
### <Chain 0>

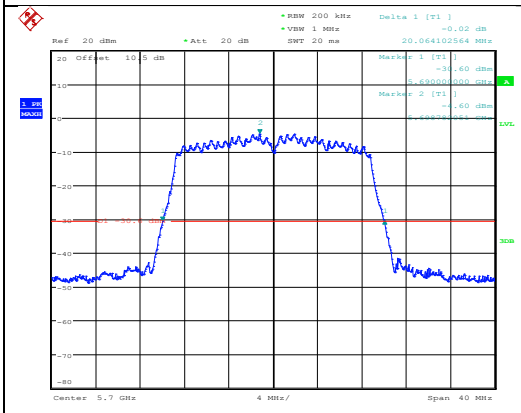
**5500MHz**




**5580MHz**

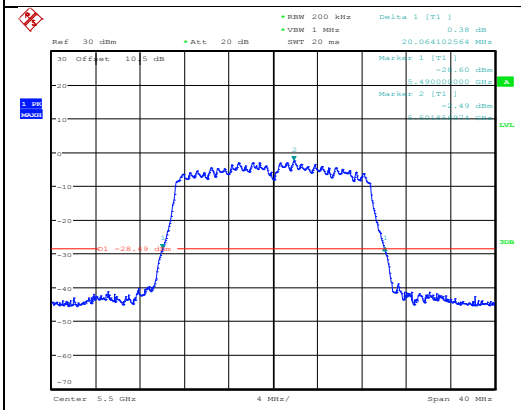



**5700MHz**



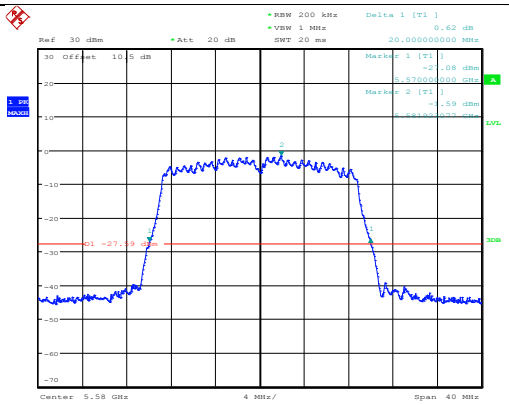
## <Chain 1>

### 5500MHz



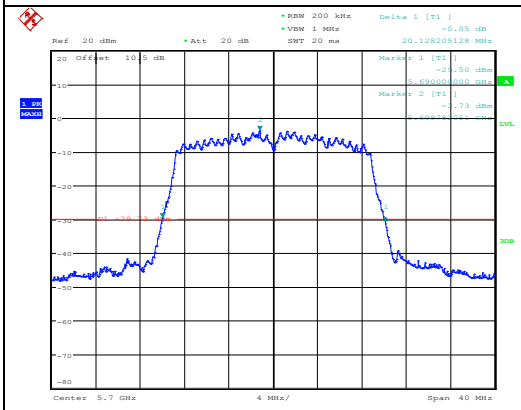

Date: 27.FEB.2019 10:55:47

### 5580MHz




Date: 27.FEB.2019 11:15:24

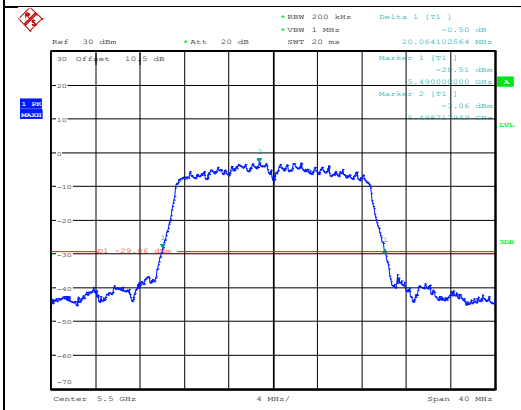
### 5700MHz




Date: 27.FEB.2019 11:48:44

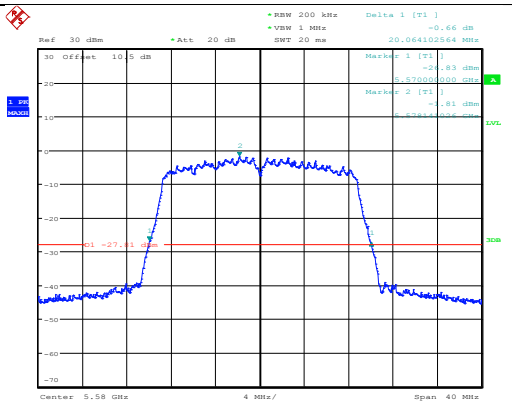
## <Chain 2>

### 5500MHz



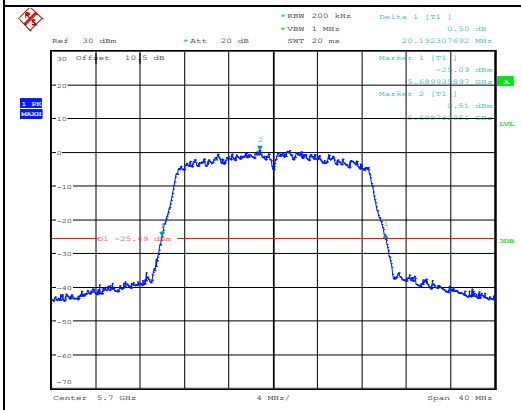

Date: 27.FEB.2019 10:57:49

### 5580MHz




Date: 27.FEB.2019 11:11:06

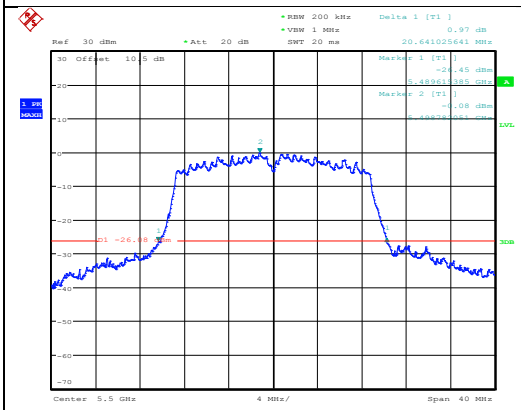
### 5700MHz




Date: 27.FEB.2019 11:43:07

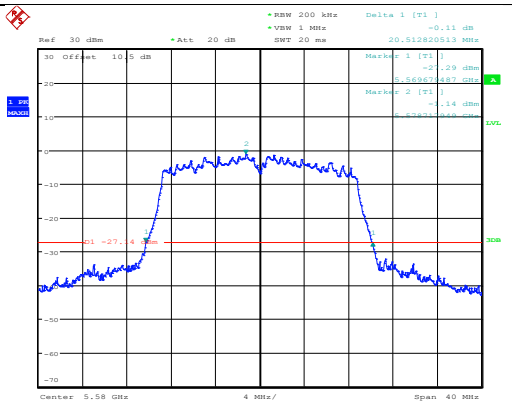
## <Chain 3>

### 5500MHz



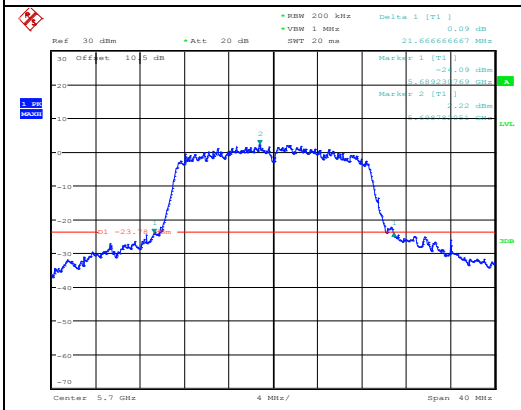

Date: 27.FEB.2019 11:03:40

### 5580MHz




Date: 27.FEB.2019 11:07:11

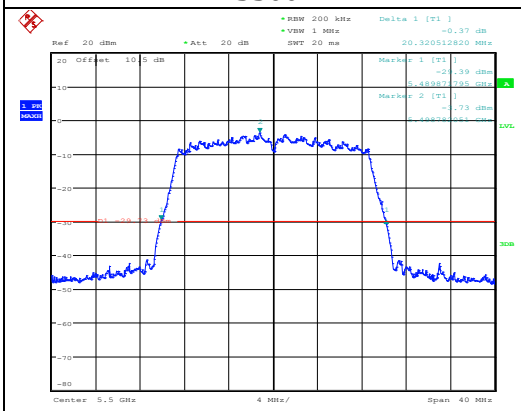
### 5700MHz




Date: 27.FEB.2019 11:43:45

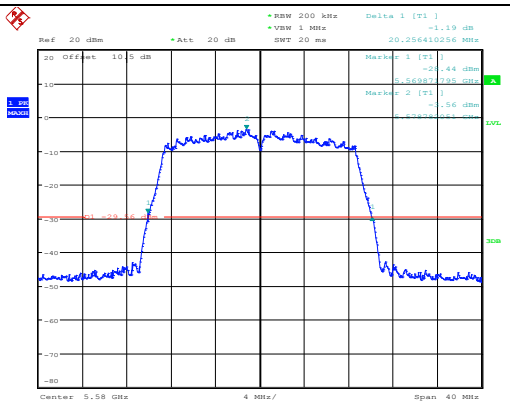
## IEEE 802.11ac VHT20 Mode / 5470 ~ 5725MHz
## <Chain 0>

### 5500MHz



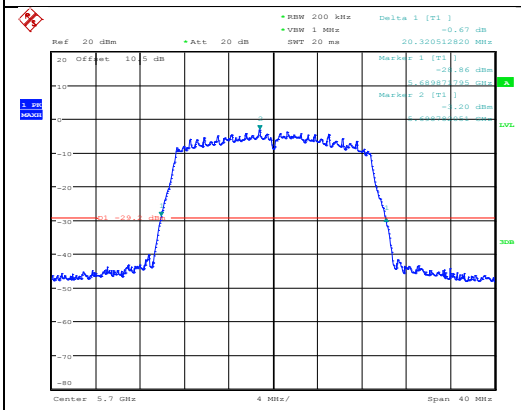

Date: 27.FEB.2019 16:12:58

### 5580MHz




Date: 27.FEB.2019 16:15:25

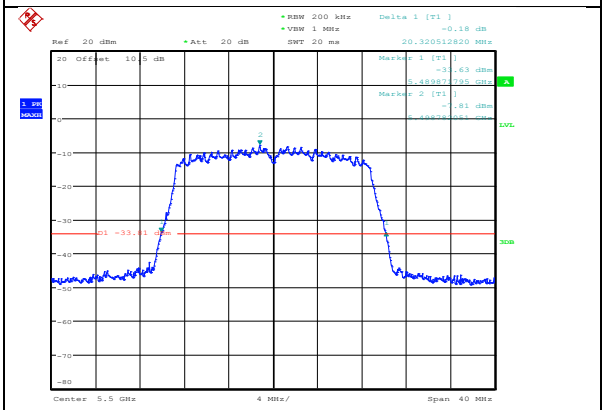
### 5700MHz




Date: 27.FEB.2019 16:43:48

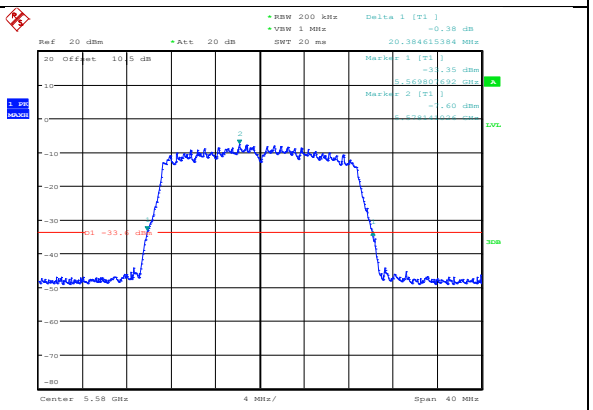
## <Chain 1>

### 5500MHz



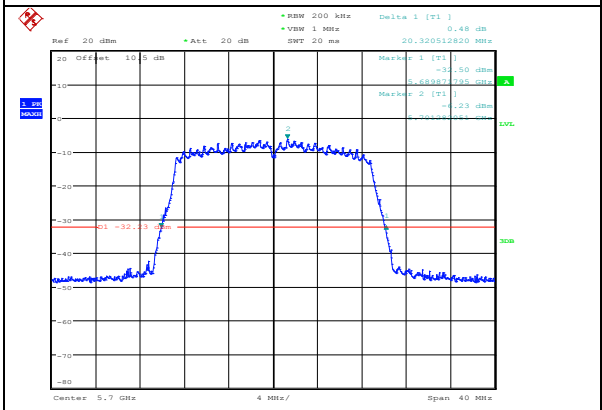

Date: 27.FEB.2019 16:10:55

### 5580MHz




Date: 27.FEB.2019 16:18:15

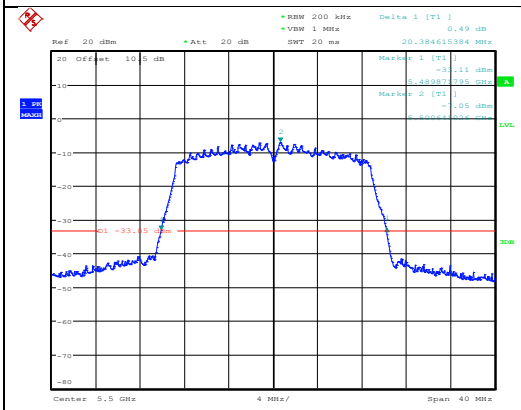
### 5700MHz




Date: 27.FEB.2019 16:36:57

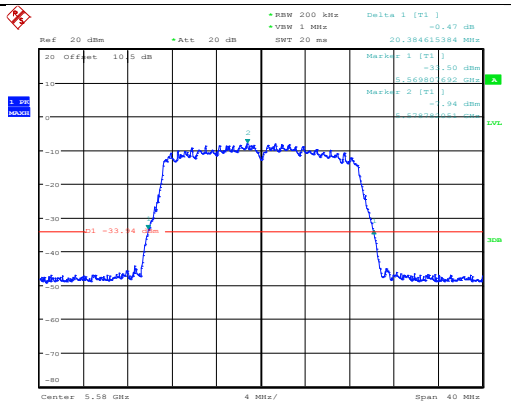
## <Chain 2>

### 5500MHz



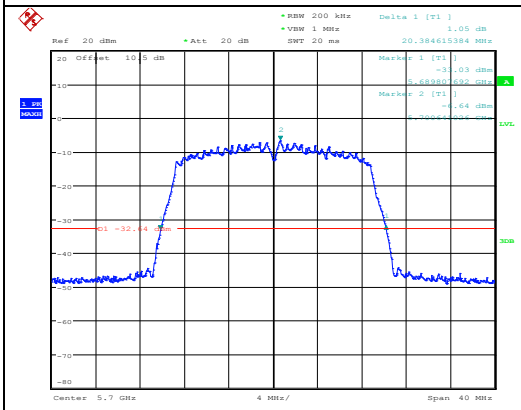

Date: 27.FEB.2019 16:08:17

### 5580MHz




Date: 27.FEB.2019 16:21:45

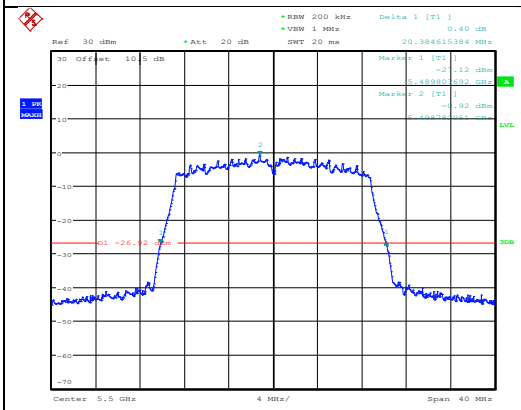
### 5700MHz




Date: 27.FEB.2019 16:30:51

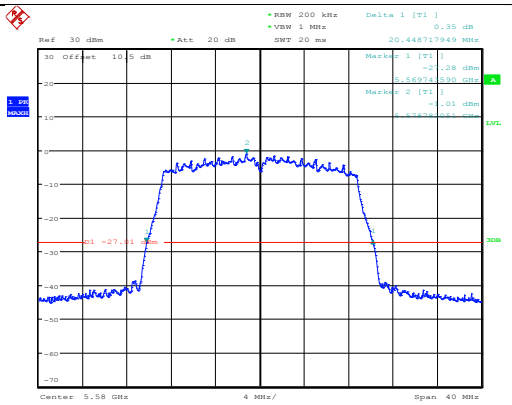
## <Chain 3>

### 5500MHz



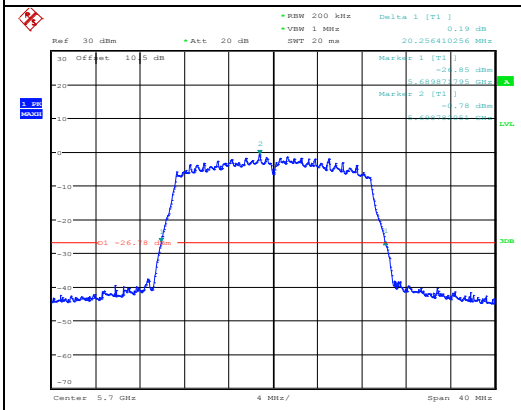

Date: 27.FEB.2019 16:05:27

### 5580MHz



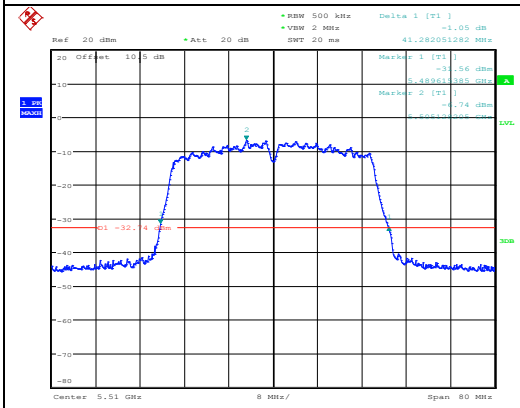
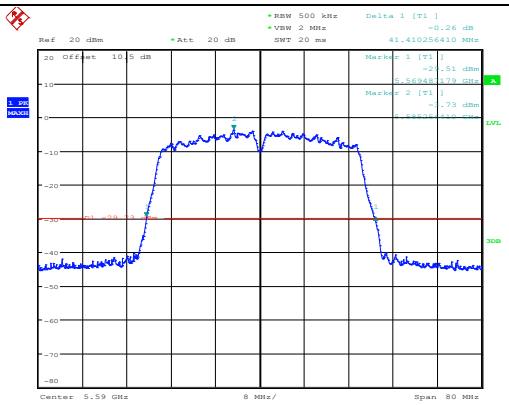
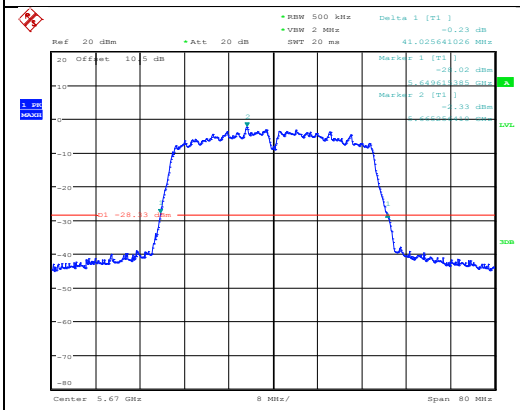

Date: 27.FEB.2019 16:24:31

### 5700MHz



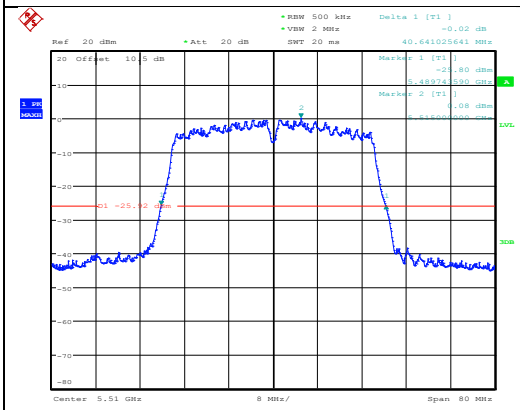

Date: 27.FEB.2019 16:28:15

## IEEE 802.11ac VHT40 Mode / 5470 ~ 5725MHz
## <Chain 0>

| 5510MHz | 5590MHz |
|---|---|
|  |  |
| Date: 4.MAR.2019 13:57:31 | Date: 4.MAR.2019 14:30:21 |
| **5670MHz** | |
|  | |
| Date: 4.MAR.2019 14:55:14 | |

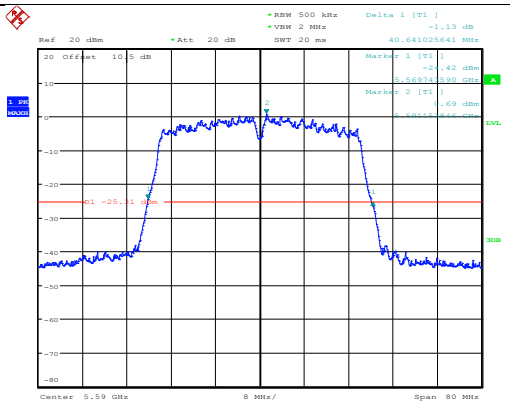
## <Chain 1>

### 5510MHz



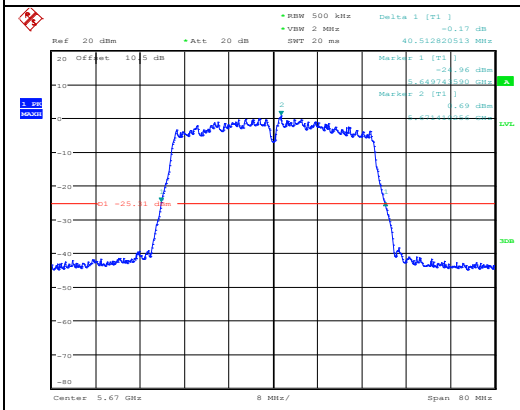

Date: 4.MAR.2019 13:55:00

### 5590MHz




Date: 4.MAR.2019 14:32:37

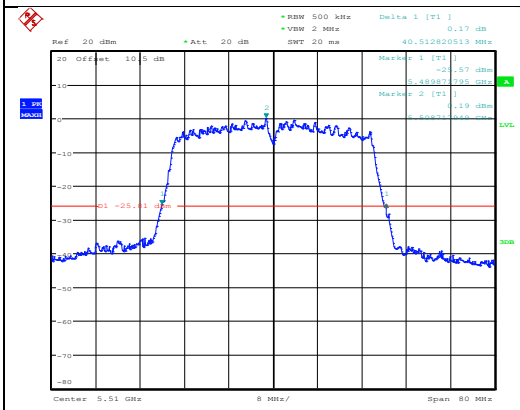
### 5670MHz




Date: 4.MAR.2019 14:52:57

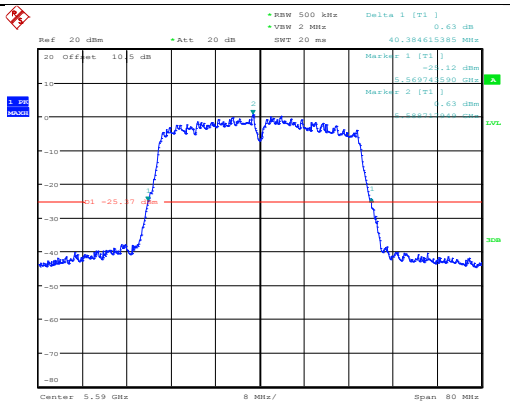
## <Chain 2>

### 5510MHz



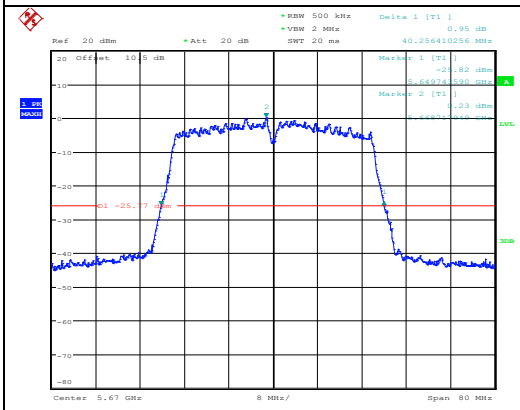

Date: 4.MAR.2019 13:52:08

### 5590MHz




Date: 4.MAR.2019 14:37:08

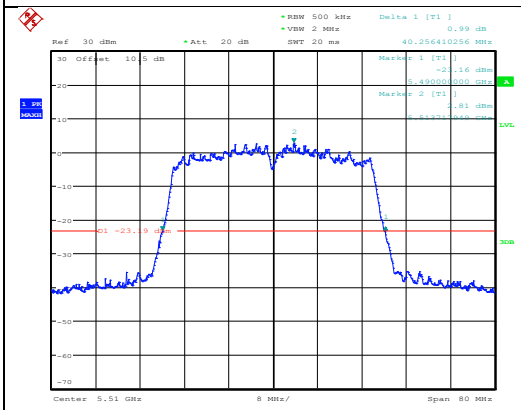
### 5670MHz




Date: 4.MAR.2019 14:47:33

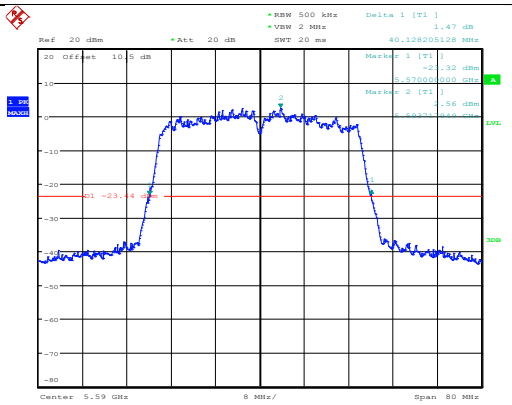
## <Chain 3>

### 5510MHz



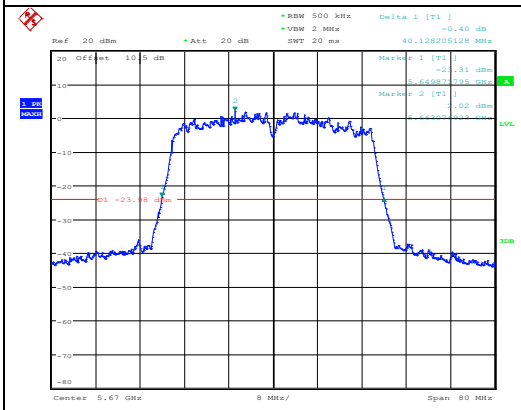

Date: 4.MAR.2019 13:42:52

### 5590MHz




Date: 4.MAR.2019 14:40:18

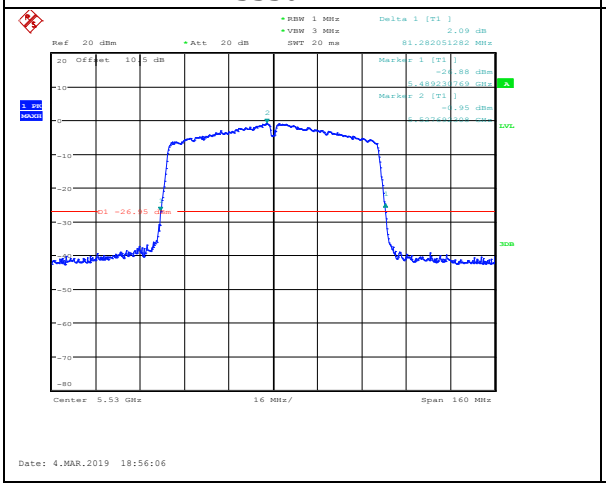
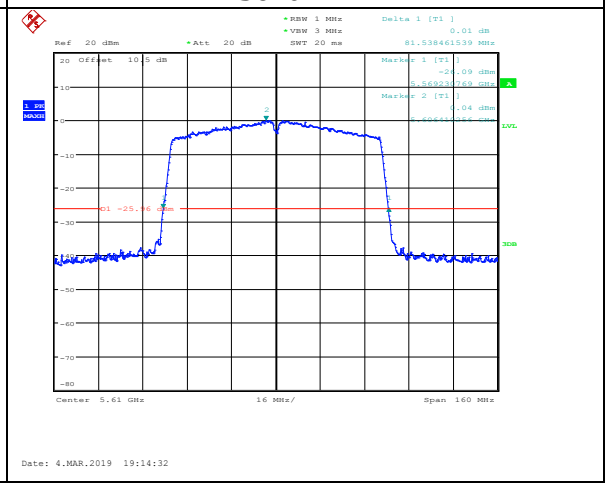
### 5670MHz




Date: 4.MAR.2019 14:44:14

## IEEE 802.11ac VHT80 Mode / 5470 ~ 5725MHz

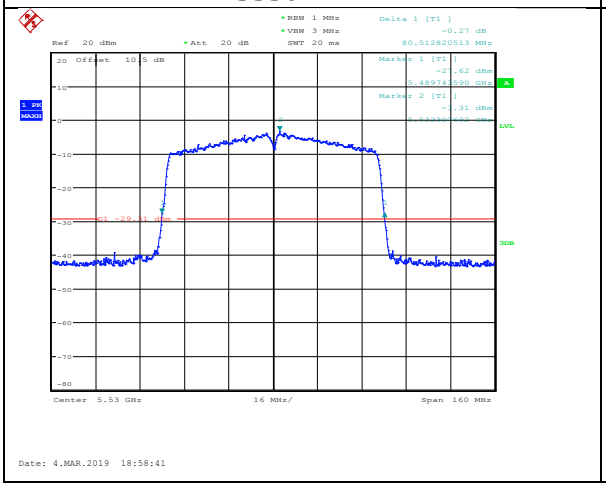
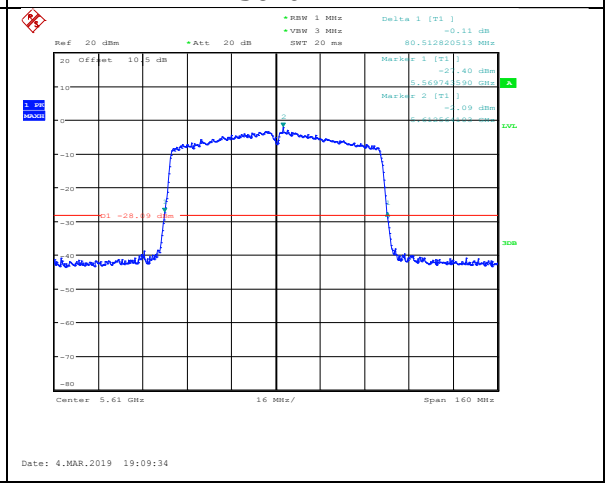
### <Chain 0>

| 5530MHz | 5610MHz |
|---|---|
|  |  |



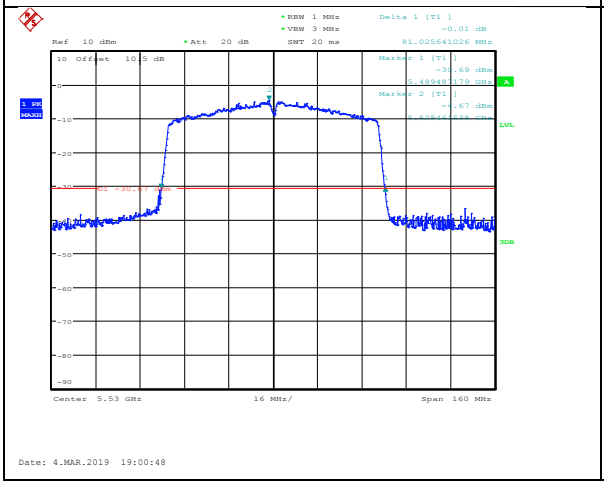


### <Chain 1>

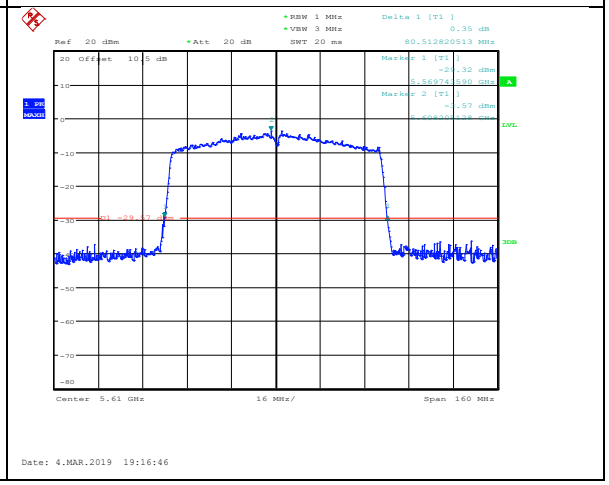
| 5530MHz | 5610MHz |
|---|---|
|  |  |

## <Chain 2>

### 5530MHz

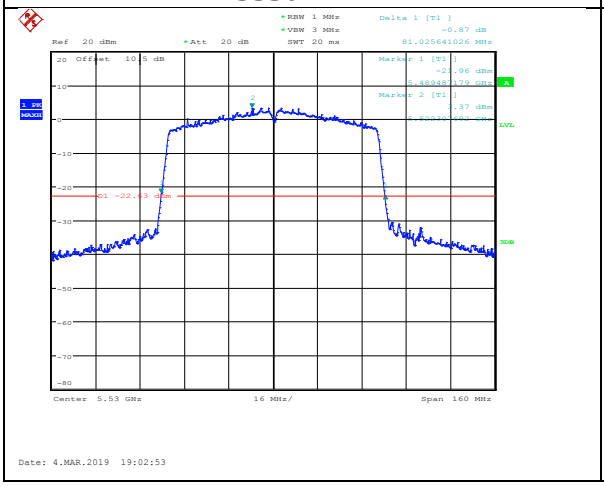



### 5610MHz

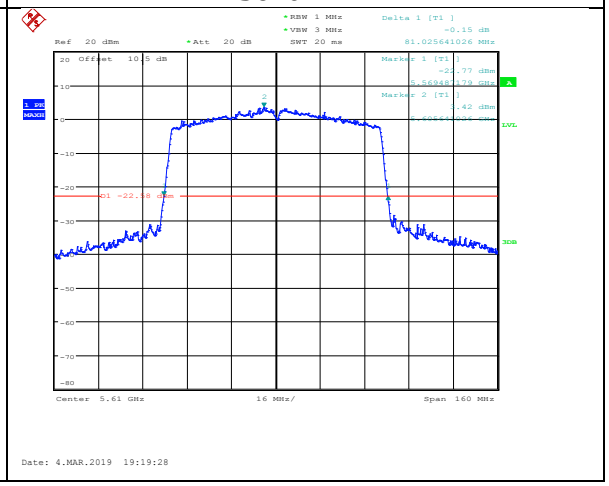



## <Chain 3>

### 5530MHz

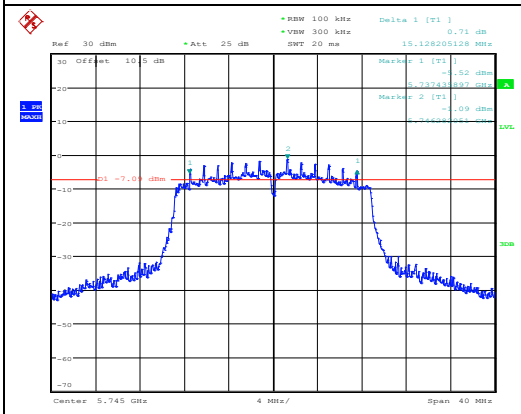
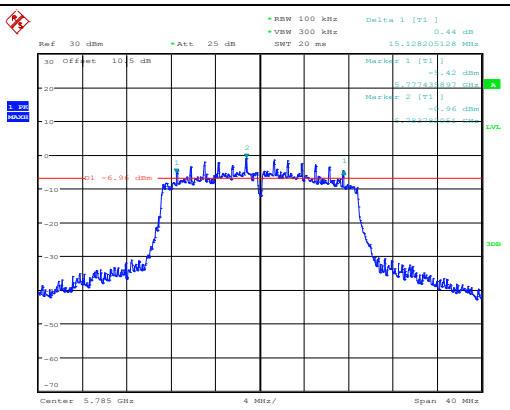
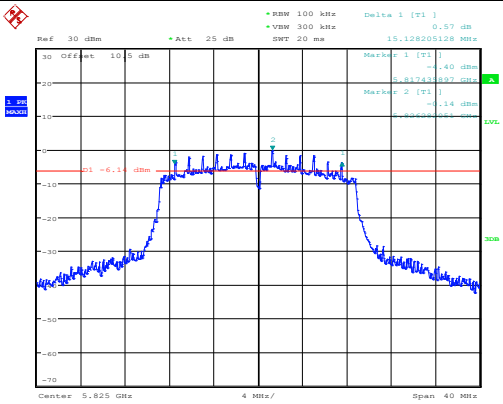



### 5610MHz



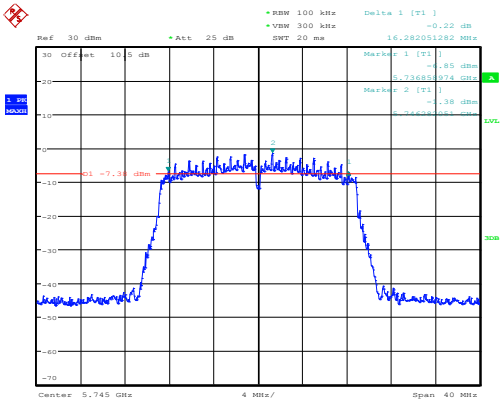
## UNII-3 Band IV / BW 6dBc
## IEEE 802.11a Mode / 5725 ~ 5850MHz

### <Chain 0>

| 5745MHz | 5785MHz |
|---|---|
|  |  |
| Date: 21.FEB.2019 16:40:54 | Date: 21.FEB.2019 16:44:31 |
| **5825MHz** | |
|  | |
| Date: 21.FEB.2019 17:16:18 | |

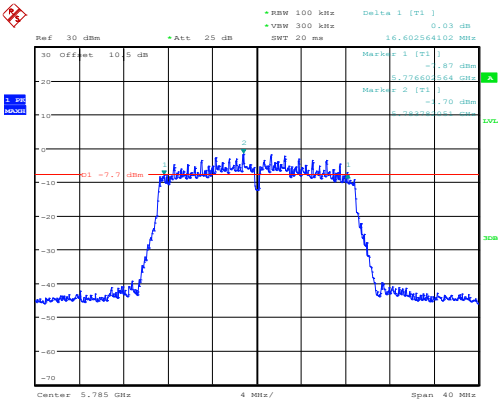
## <Chain 1>

### 5745MHz



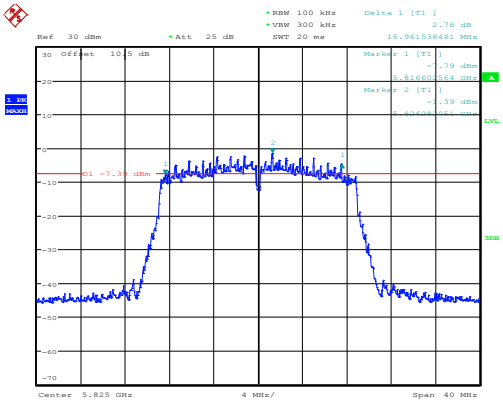

Date: 21.FEB.2019 16:38:47

### 5785MHz




Date: 21.FEB.2019 16:46:53

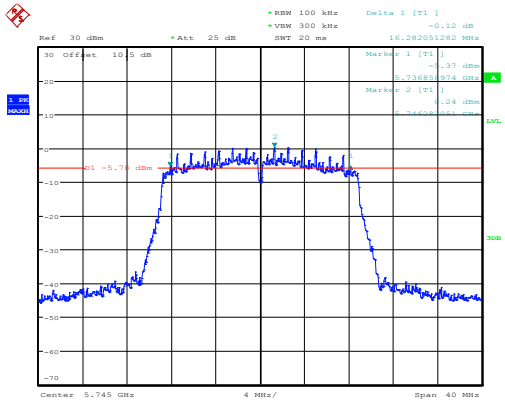
### 5825MHz




Date: 21.FEB.2019 17:13:26

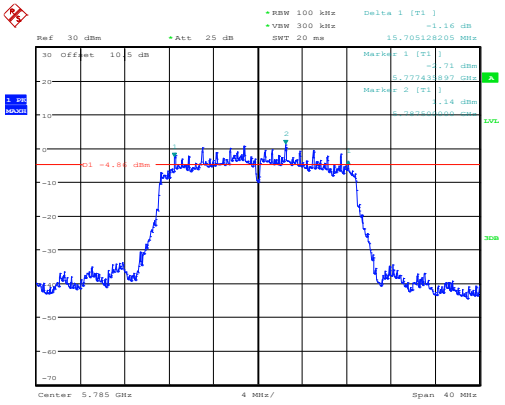
## <Chain 2>

### 5745MHz



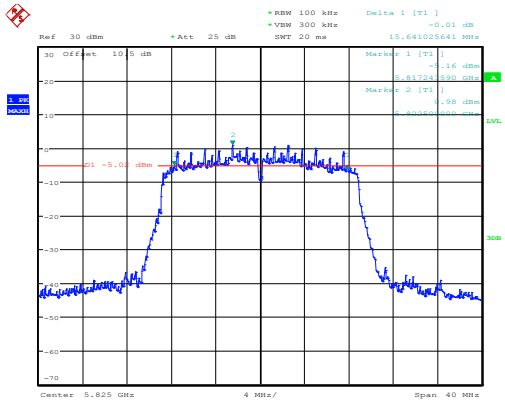

Date: 21.FEB.2019 16:36:01

### 5785MHz




Date: 21.FEB.2019 16:48:53

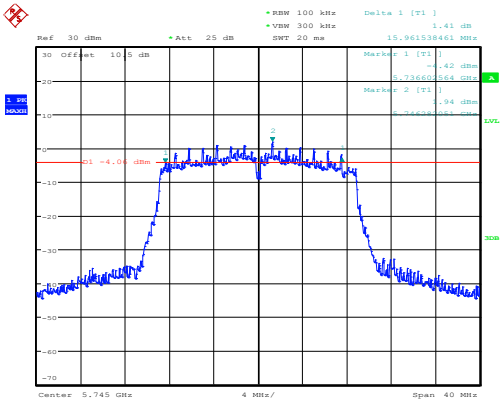
### 5825MHz




Date: 21.FEB.2019 17:09:19

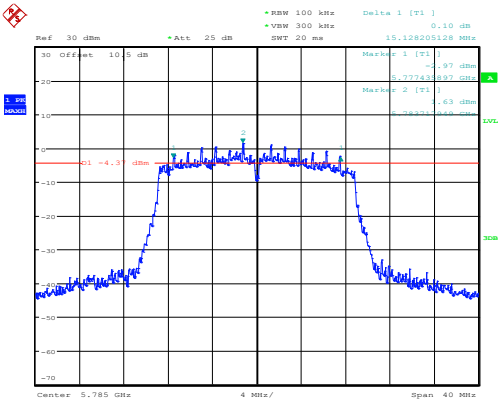
## <Chain 3>

### 5745MHz



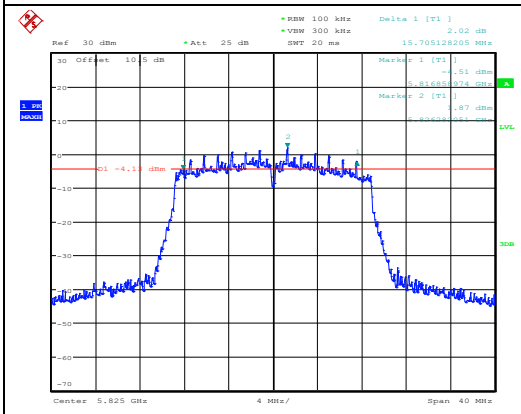

Date: 21.FEB.2019 16:33:47

### 5785MHz



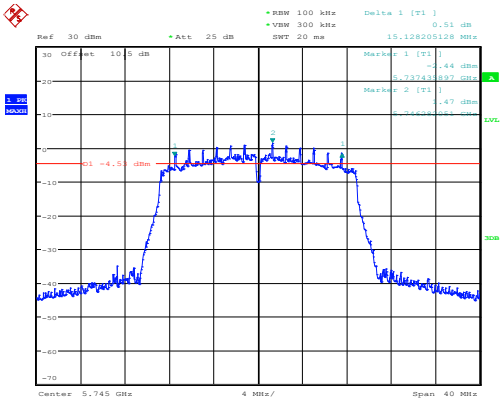
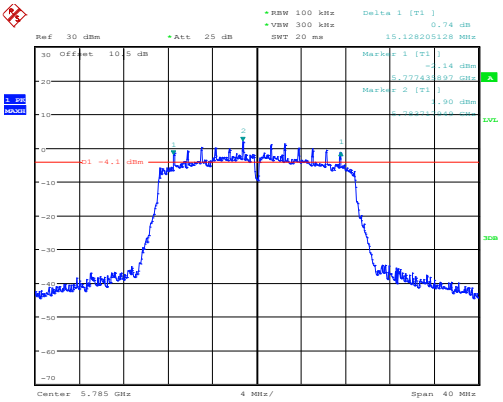
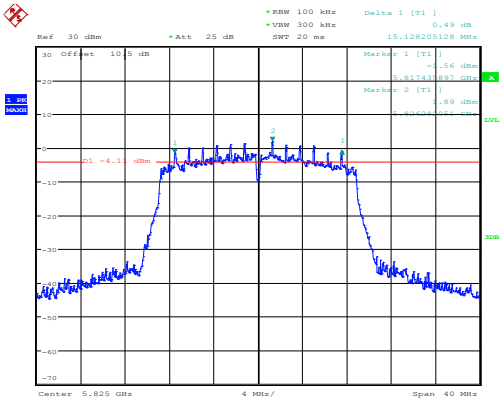

Date: 21.FEB.2019 16:51:22

### 5825MHz



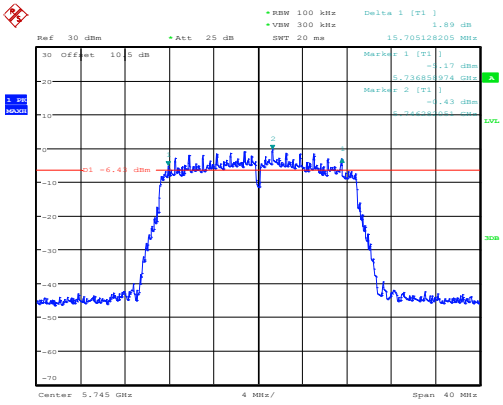

Date: 21.FEB.2019 17:07:13

## IEEE 802.11ac VHT20 Mode / 5725 ~ 5850MHz
## <Chain 0>

| 5745MHz | 5785MHz |
|---|---|
|  |  |
| Date: 22.FEB.2019 13:37:03 | Date: 22.FEB.2019 13:40:41 |
| **5825MHz** | |
|  | |
| Date: 22.FEB.2019 15:52:34 | |

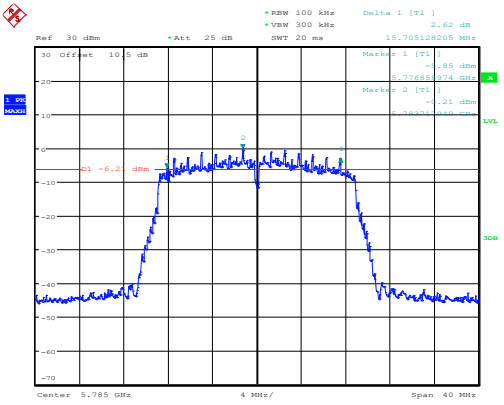
## <Chain 1>

### 5745MHz



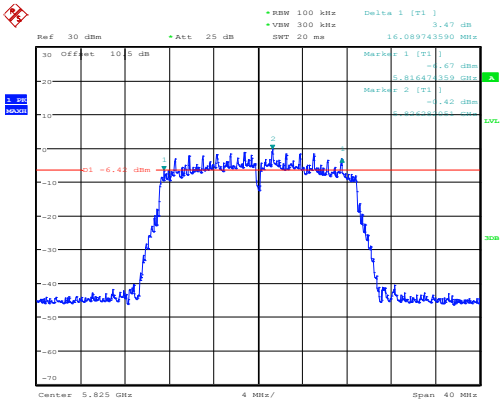

Date: 22.FEB.2019 13:34:20

### 5785MHz




Date: 22.FEB.2019 14:01:36

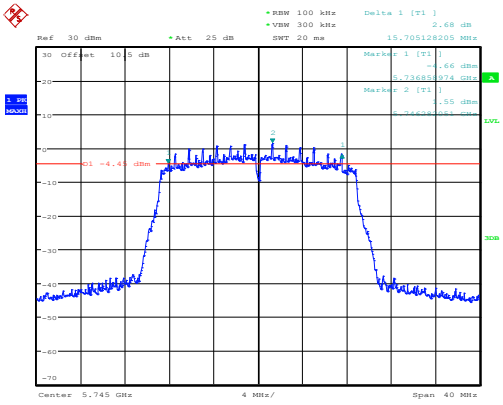
### 5825MHz




Date: 22.FEB.2019 15:48:44

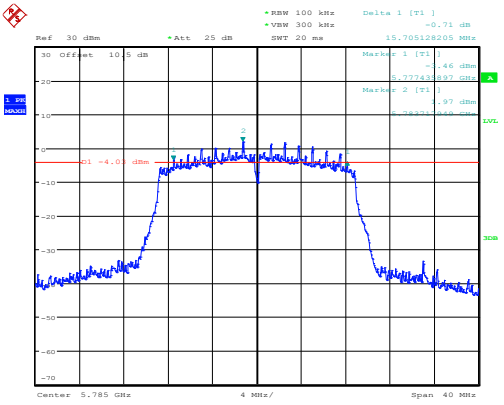
## <Chain 2>

### 5745MHz



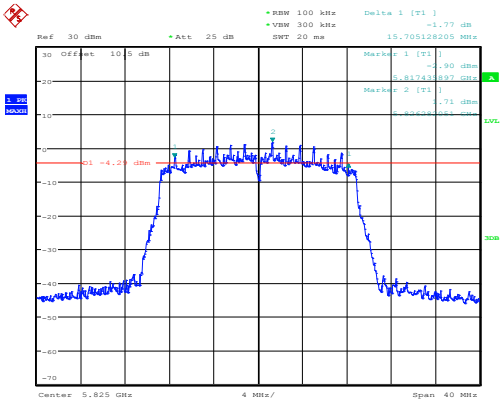

Date: 22.FEB.2019 13:32:10

### 5785MHz




Date: 22.FEB.2019 14:03:42

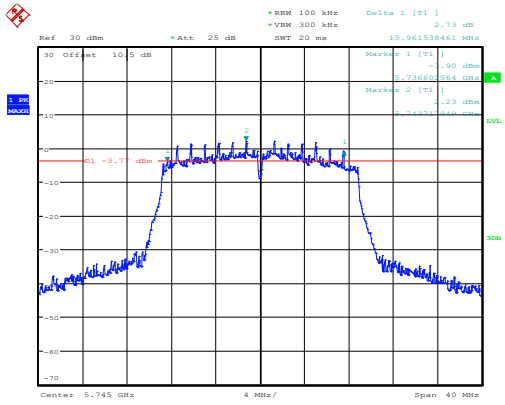
### 5825MHz




Date: 22.FEB.2019 15:41:40

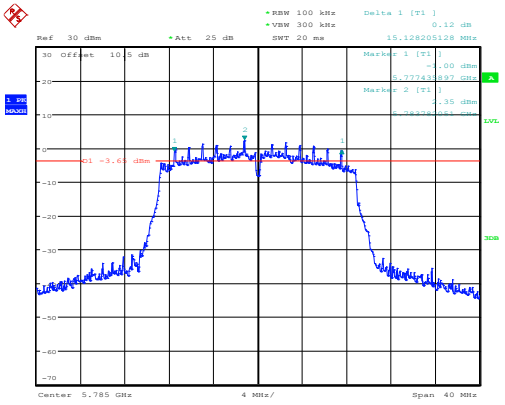
## <Chain 3>

### 5745MHz



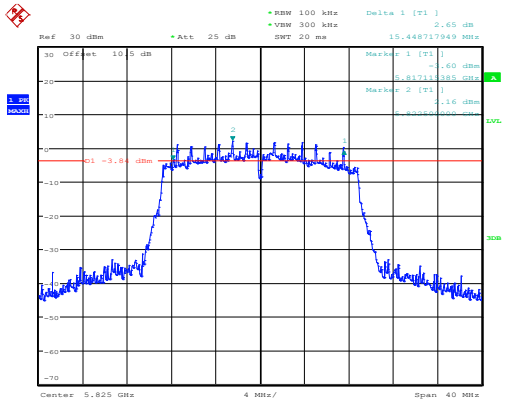

Date: 22.FEB.2019 13:22:57

### 5785MHz




Date: 22.FEB.2019 15:13:27

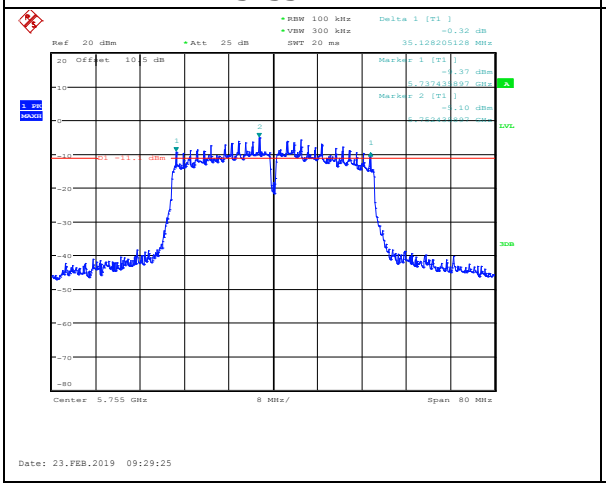
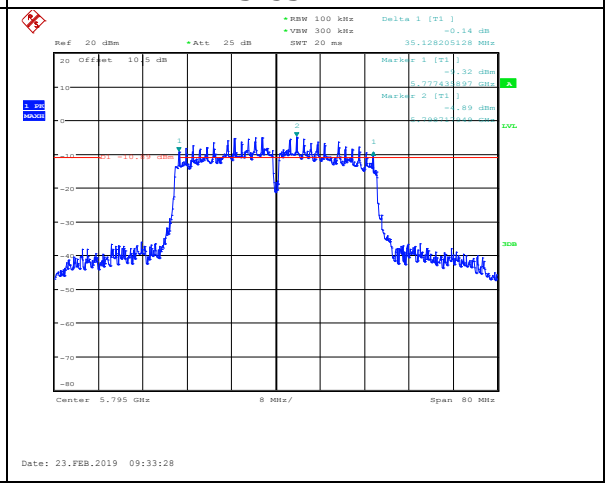
### 5825MHz



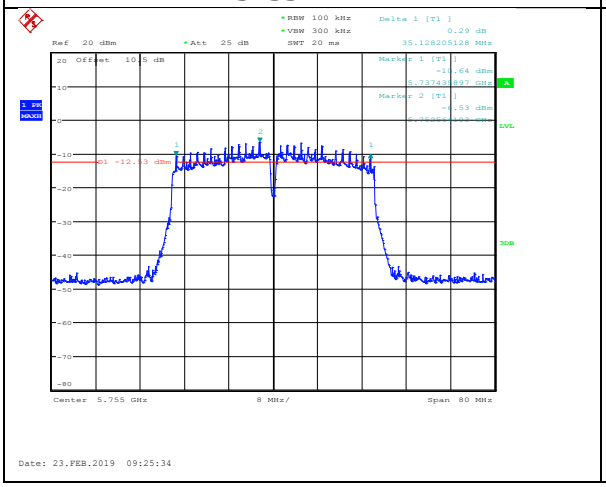
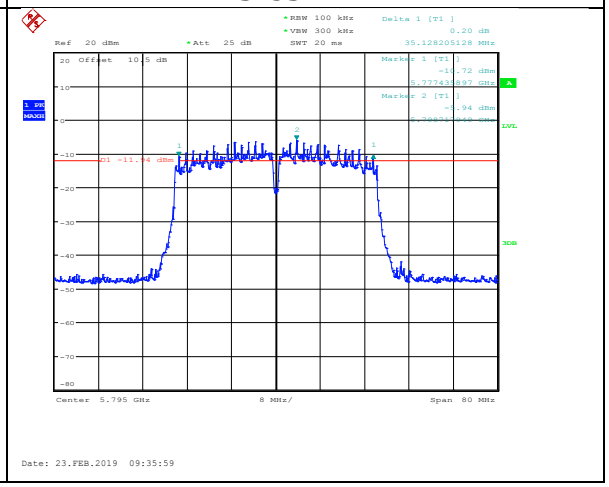

Date: 22.FEB.2019 15:39:30

## IEEE 802.11ac VHT40 Mode / 5725 ~ 5850MHz

### <Chain 0>

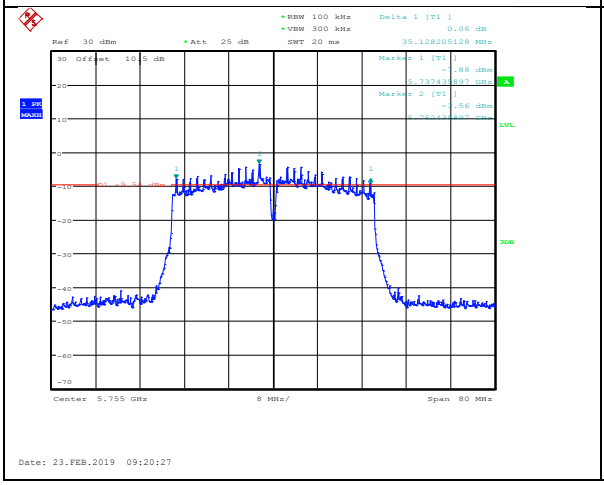
| 5755MHz | 5795MHz |
|---|---|
|  |  |

### <Chain 1>

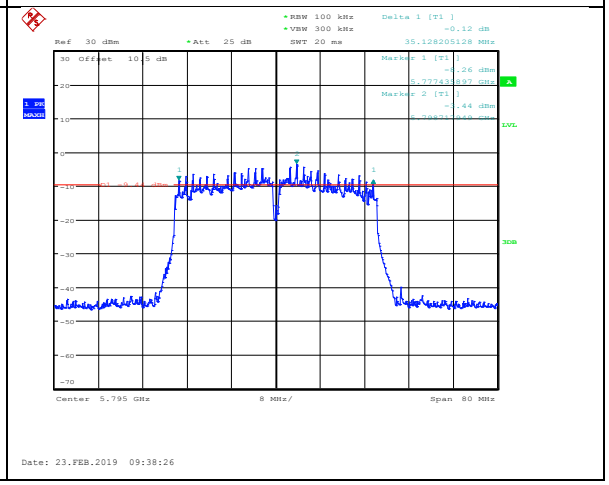
| 5755MHz | 5795MHz |
|---|---|
|  |  |

## <Chain 2>

### 5755MHz

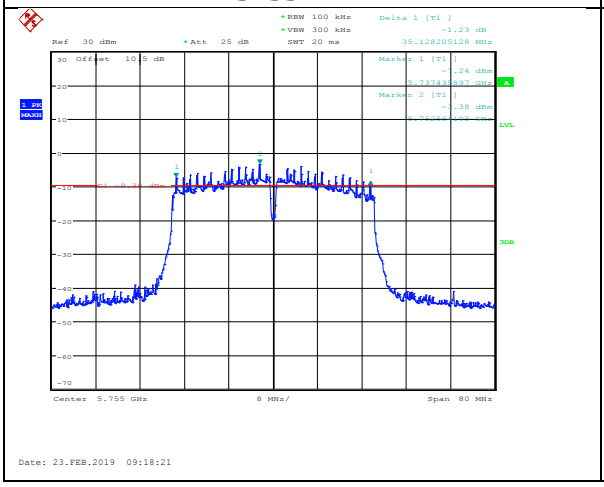



### 5795MHz

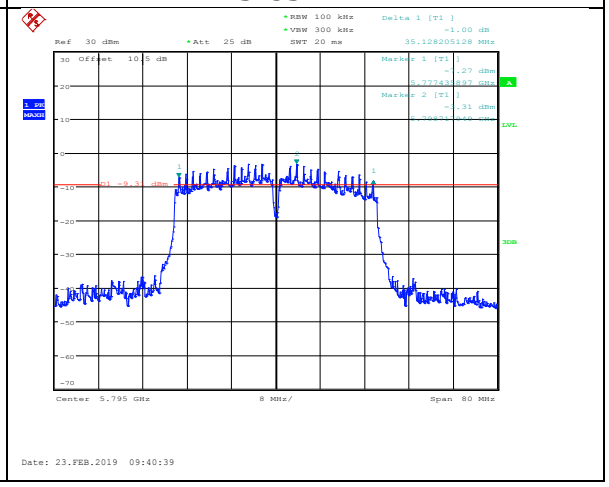



## <Chain 3>

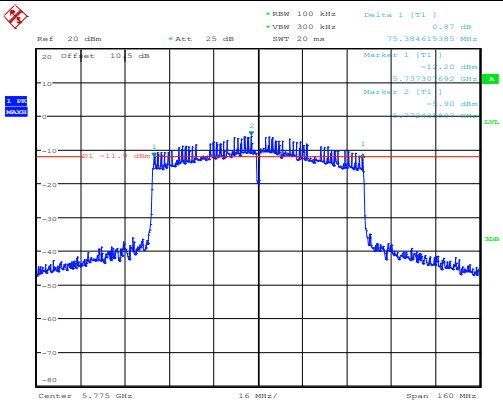
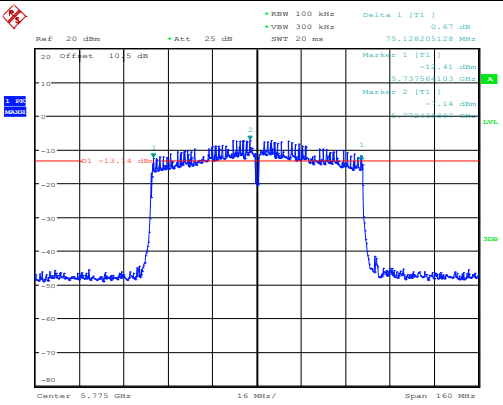
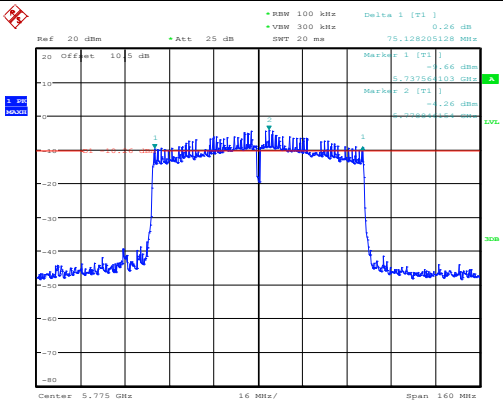
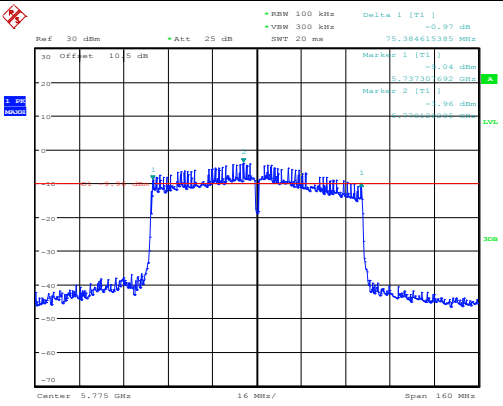
### 5755MHz




### 5795MHz



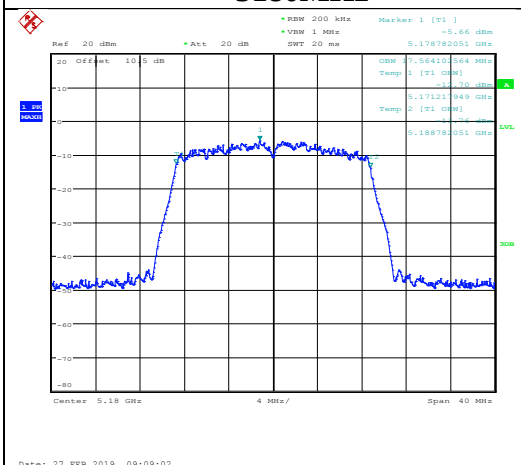
## IEEE 802.11ac VHT80 Mode / 5725 ~ 5850MHz

| <Chain 0> 5775MHz | <Chain 1> 5775MHz |
|---|---|
|  |  |
| Date: 23.FEB.2019 10:56:48 | Date: 23.FEB.2019 10:53:33 |
| **<Chain 2> 5775MHz** | **<Chain 3> 5775MHz** |
|  |  |
| Date: 23.FEB.2019 10:51:15 | Date: 23.FEB.2019 10:48:23 |

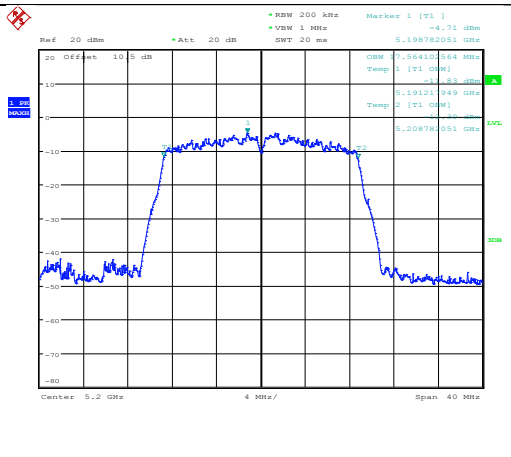
## UNII-1 Band I / OBW 99%
## IEEE 802.11a Mode / 5150 ~ 5250MHz

### <Chain 0>

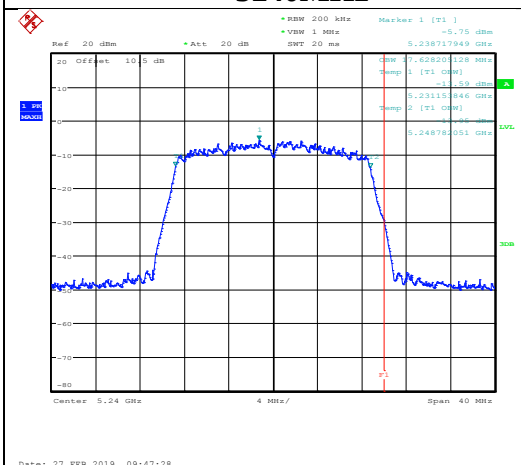
**5180MHz**




**5200MHz**

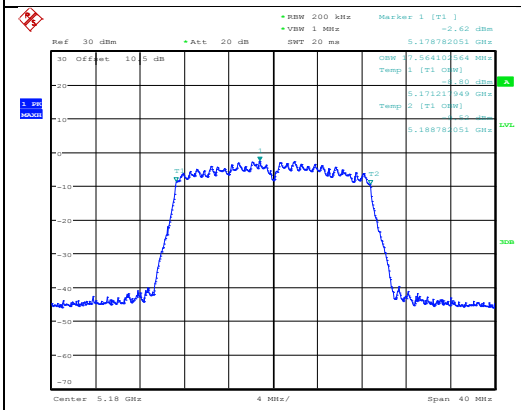



**5240MHz**



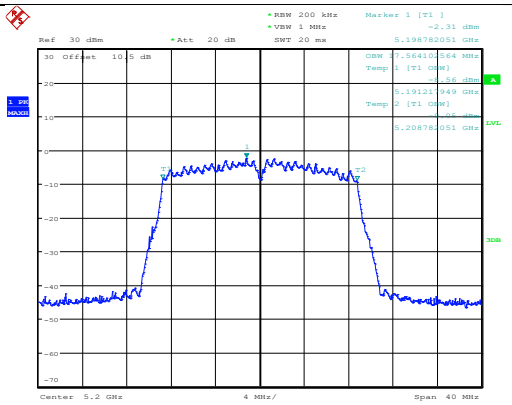
## <Chain 1>

### 5180MHz



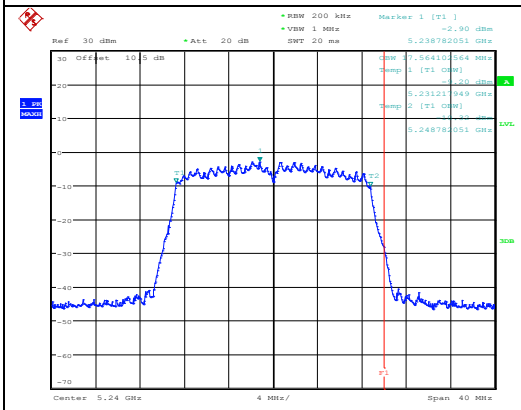

Date: 27.FEB.2019 09:12:31

### 5200MHz




Date: 27.FEB.2019 09:32:50

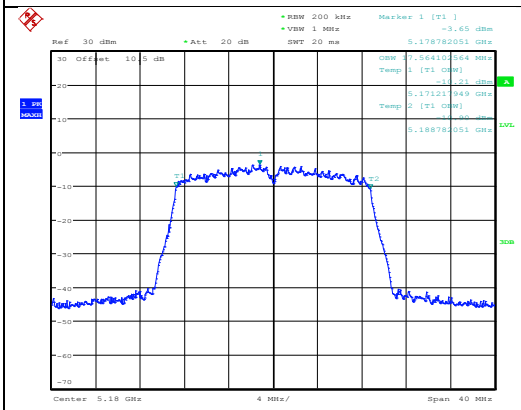
### 5240MHz




Date: 27.FEB.2019 09:49:34

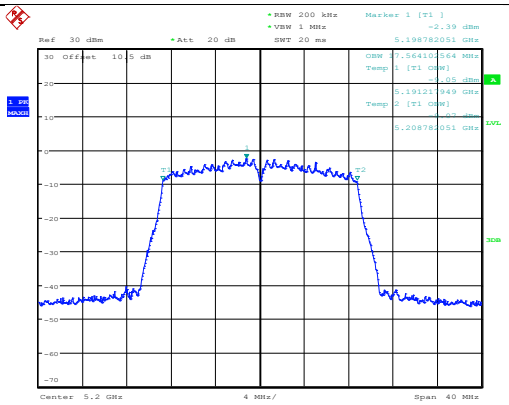
## <Chain 2>

### 5180MHz



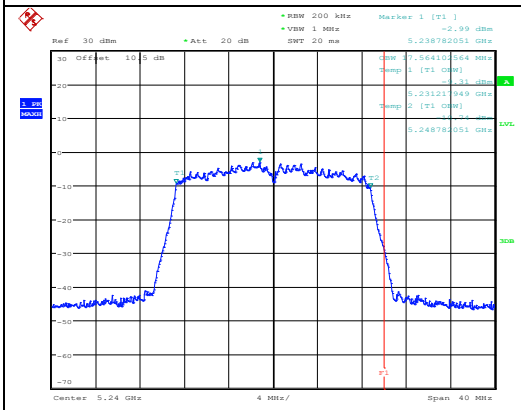

Date: 27.FEB.2019 09:14:30

### 5200MHz




Date: 27.FEB.2019 09:22:17

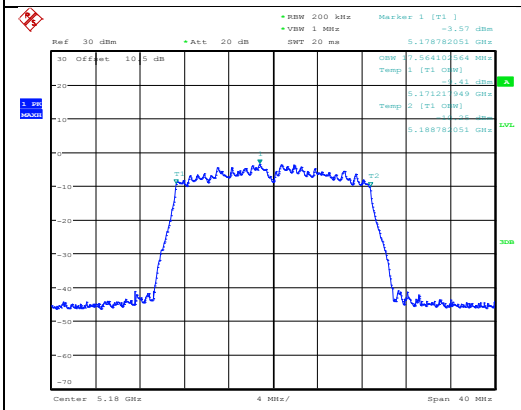
### 5240MHz




Date: 27.FEB.2019 09:52:25

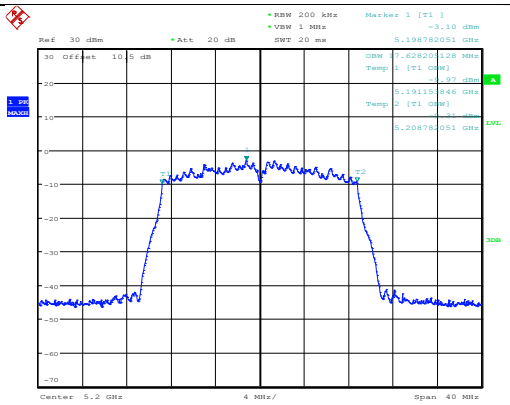
## <Chain 3>

### 5180MHz



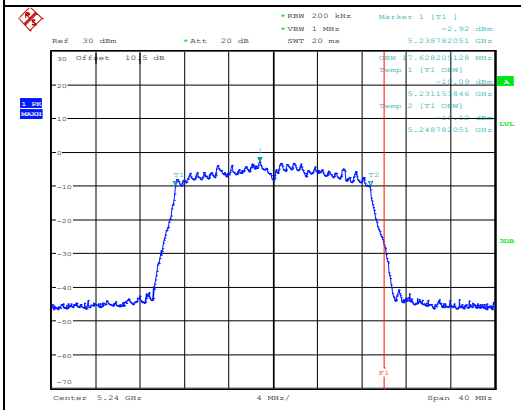

Date: 27.FEB.2019 09:17:02

### 5200MHz




Date: 27.FEB.2019 09:20:03

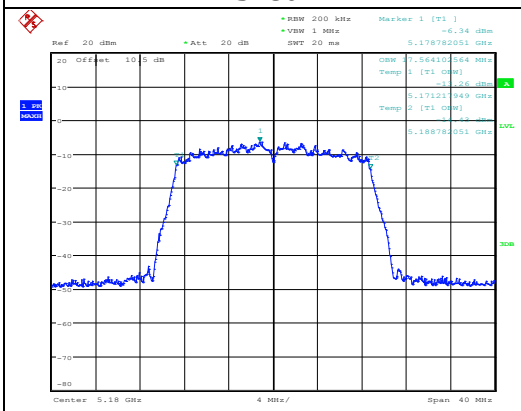
### 5240MHz



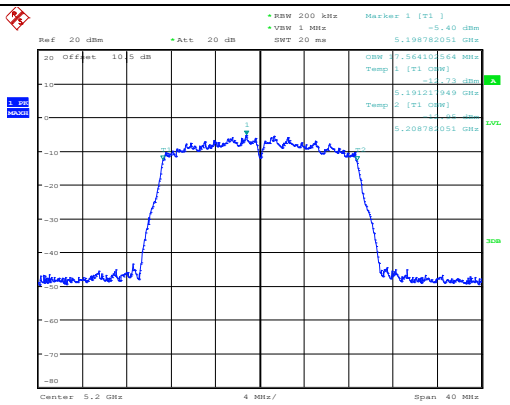

Date: 27.FEB.2019 09:54:54

## IEEE 802.11ac VHT20 Mode / 5150 ~ 5250MHz
## <Chain 0>

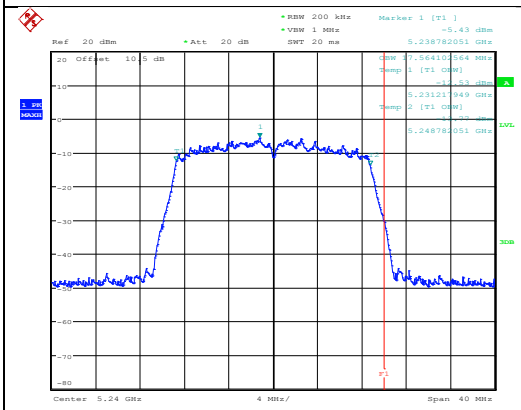
### 5180MHz




### 5200MHz

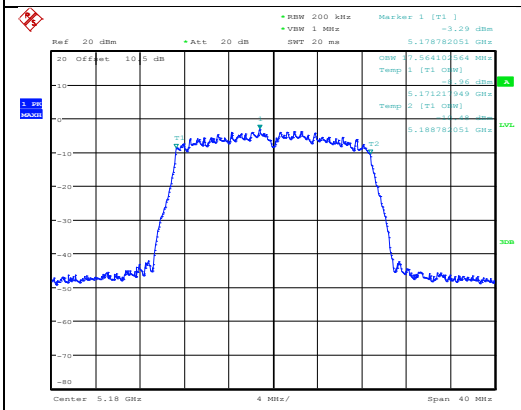



### 5240MHz



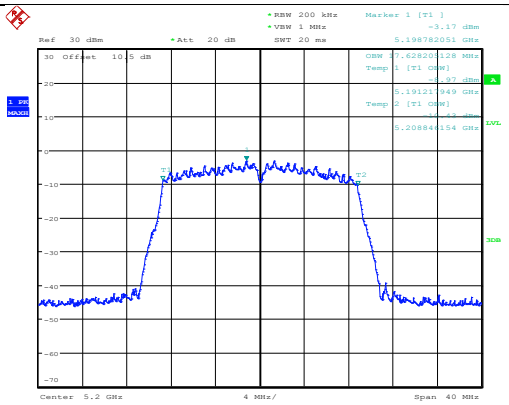
## <Chain 1>

### 5180MHz



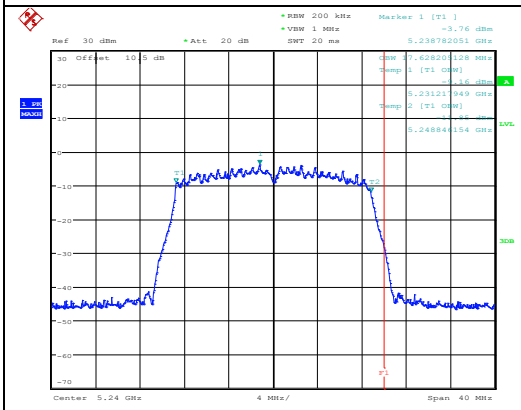

Date: 27.FEB.2019 14:24:59

### 5200MHz




Date: 27.FEB.2019 14:33:07

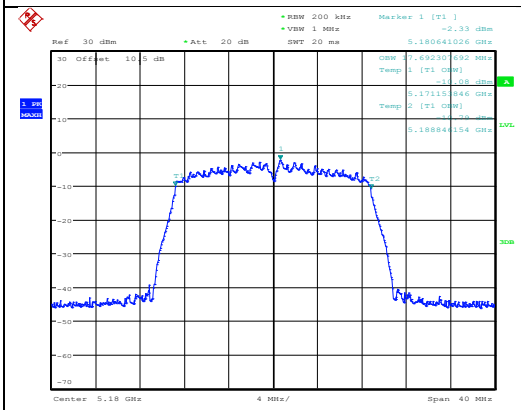
### 5240MHz




Date: 27.FEB.2019 14:46:31

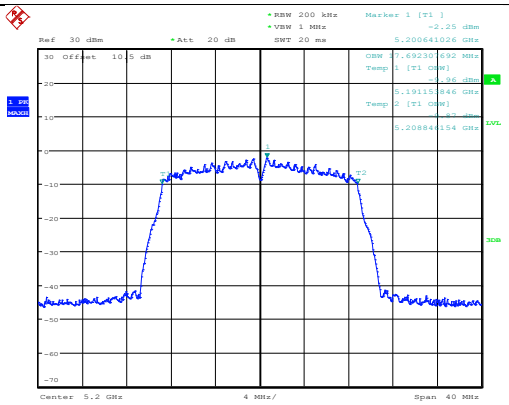
## <Chain 2>

### 5180MHz



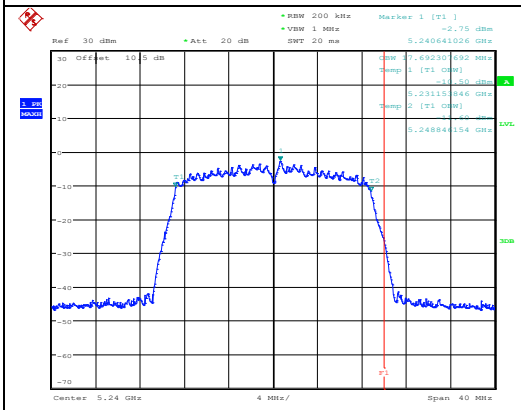

Date: 27.FEB.2019 14:19:15

### 5200MHz




Date: 27.FEB.2019 14:35:17

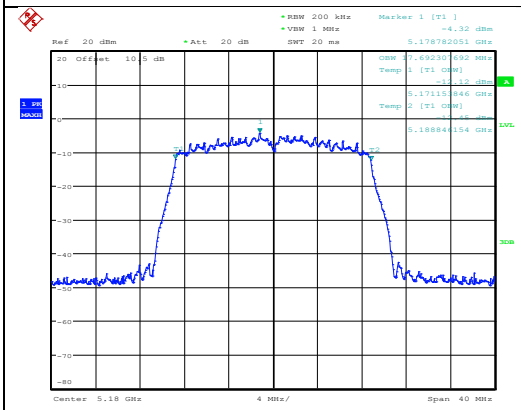
### 5240MHz




Date: 27.FEB.2019 14:44:07

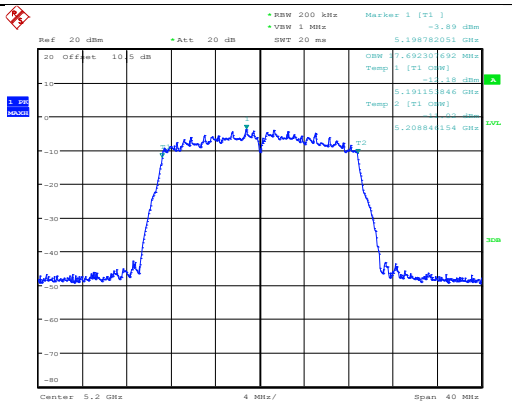
## <Chain 3>

### 5180MHz



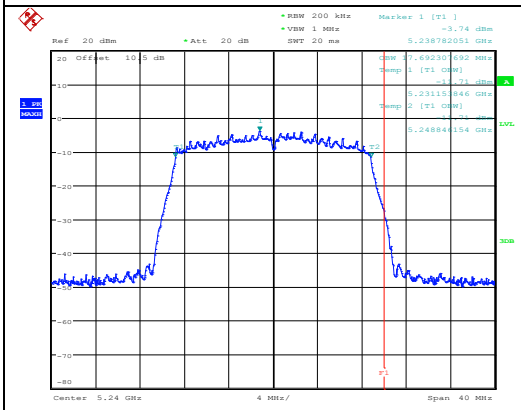

Date: 27.FEB.2019 14:22:33

### 5200MHz




Date: 27.FEB.2019 14:37:26

### 5240MHz




Date: 27.FEB.2019 14:39:55