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Report Template Version: V04
Report Template Revision Date: 2018-07-06

# Test Report

| | |
|---|---|
| **Report No.:** | CQASZ20231202287E-04 |
| **Applicant:** | Icarsoft Technology Inc. |
| **Address of Applicant:** | 1629 K St. Suite 300 N.W. Washington D.C., 20006 United States. |
| **Equipment Under Test (EUT):** | |
| **Product:** | Advanced Automotive Diagnostic Tool, THINKTOOL PROS+ |
| **Model No.:** | CR Ultra P, CR Ultra, TKT04 |
| **Teat Model No.:** | TKT04 |
| **Brand Name:** | iCarsoft |
| **FCC ID:** | 2AWD8CRULTRA |
| **Standards:** | 47 CFR Part 15, Subpart E |
| | KDB 789033 D02 General UNII Test Procedures New Rules v02 |
| | KDB 558074 D01 Meas Guidance v05 |
| **Date of Receipt**: | 2023-12-13 |
| **Date of Test:** | 2023-12-13 to 2023-12-26 |
| **Date of Issue:** | 2023-12-26 |
| **Test Result:** | **PASS*** |

***In the configuration tested, the EUT complied with the standards specified above**

***Tested By:*** lewis zhou
***( Lewis Zhou )***

***Reviewed By:*** Timo Lei
***( Timo Lei )***

***Approved By:***
***( Jack Ai )***

# 1 Version

## Revision History Of Report

| Report No. | Version | Description | Issue Date |
|---|---|---|---|
| CQASZ20201101374E-04 | Rev.01 | Initial report | 2020-12-16 |
| CQASZ20231202287E-04 | Rev.02 | Update report | 2023-12-26 |

Note:

This test report (Ref. No.: CQASZ20231202287E-01)

All test data comes from source test reports (Ref. No.: CQASZ20201101374E-01).

Only on the basis of the original report Change Applicant, Address of Applicant, Manufacturer, Address of Manufacturer, Product name, serial model No. the product appearance , trademark , color and the model name are changed. These changes is not affect RF function..

# 2 Test Summary

| Test Item | Test Requirement | Test method | Result |
|---|---|---|---|
| **Antenna Requirement** | 47 CFR Part 15 Subpart C Section 15.203 | ANSI C63.10-2013 | PASS |
| **AC Power Line Conducted Emission** | 47 CFR Part 15 Subpart E Section 15.407 (b)(6) | ANSI C63.10-2013 | PASS |
| **Conducted Output Power and transmit power control mechanism** | 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(4)(h)(1) | ANSI C63.10-2013 | PASS |
| **Emission Bandwidth** | 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2) | ANSI C63.10-2013 | PASS |
| **Peak Power Spectral Density** | 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(5) | ANSI C63.10-2013 | PASS |
| **Frequency stability** | 47 CFR Part 15 Subpart E Section 15.407 (g) | ANSI C63.10-2013 | PASS |
| **Operation in the absence of information to the transmit** | 47 CFR Part 15 Subpart E Section 15.407 (c) | 47 CFR Part 15 Subpart E | PASS |
| **Radiated Spurious Emissions** | 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(5)(6)(7)(8) | ANSI C63.10-2013 | PASS |
| **Restricted bands around fundamental frequency (Radiated Emission)** | 47 CFR Part 15 Subpart E Section 15.407 (b)(6)(7)(8) | ANSI C63.10-2013 | PASS |

Remark:

The tested sample(s) and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radiated Frequency.
CH: In this whole report CH means channel.
Volt: In this whole report Volt means Voltage.
Temp: In this whole report Temp means Temperature.
Humid: In this whole report Humid means humidity.
Press: In this whole report Press means Pressure.
N/A: In this whole report not application

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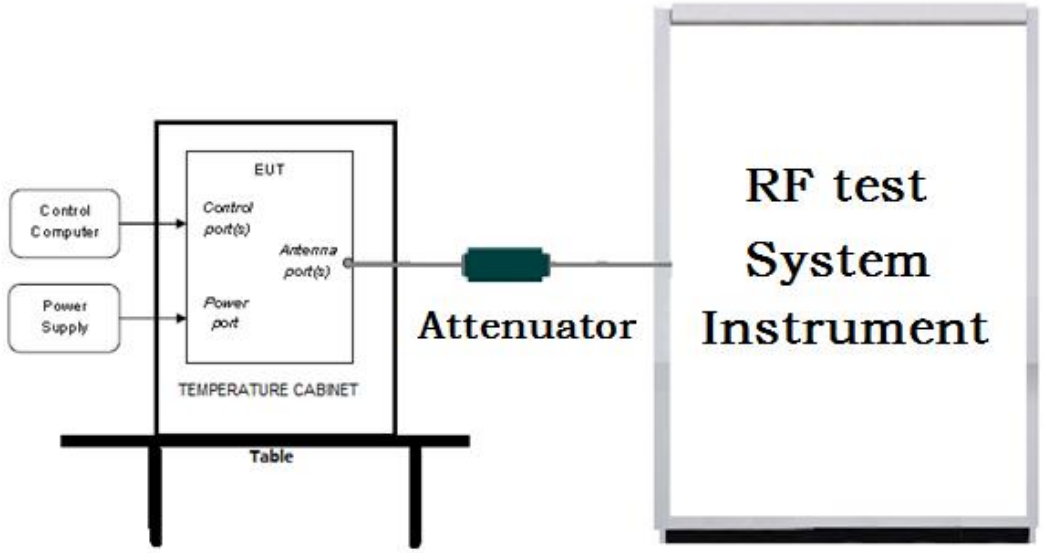
# 4 Test Requirement

## 4.1 Test setup

### 4.1.1 For Conducted test setup




### 4.1.2 For Radiated Emissions test setup

**Radiated Emissions setup:**

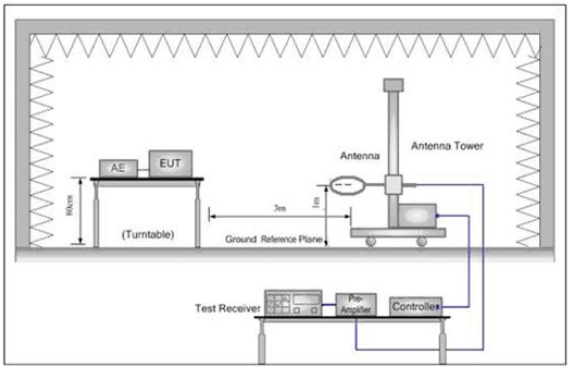



Figure 1. Below 30MHz

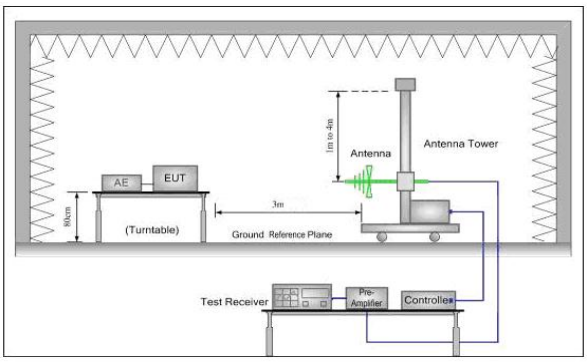



Figure 2. 30MHz to 1GHz

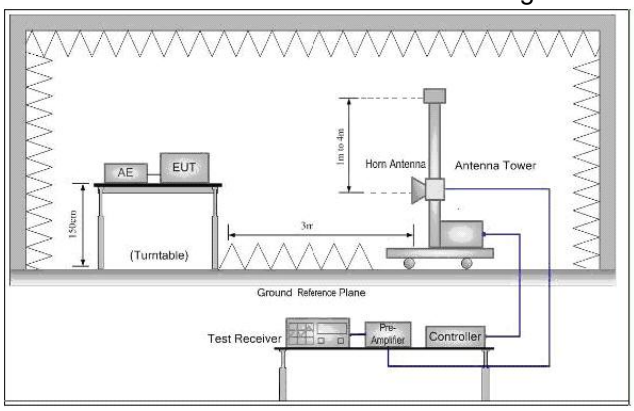
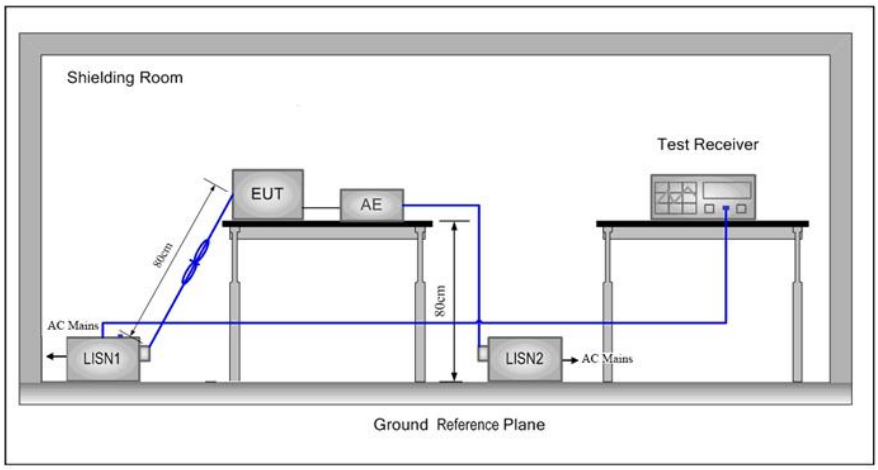



Figure 3. Above 1GHz

### 4.1.3 For Conducted Emissions test setup

**Conducted Emissions setup**




## 4.2 Test Environment

| | | |
|---|---|---|
| **Operating Environment:** | | |
| **Conducted Emissions:** | | |
| Temperature: | 25.6 °C | |
| Humidity: | 60 % RH | |
| Atmospheric Pressure: | 1009 mbar | |
| **Radiated Emissions:** | | |
| Temperature: | 25.5 °C | |
| Humidity: | 54 % RH | |
| Atmospheric Pressure: | 1009mbar | |
| **Radio conducted item test (RF Conducted test room):** | | |
| Temperature: | 25.3 °C | |
| Humidity: | 50 % RH | |
| Atmospheric Pressure: | 1009 mbar | |
| Test Condition | Temperature (°C) | Voltage (V) |
| TN/VN | +15 to +35 | 7.6 |
| TL/VL | 0 | 6.84 |
| TH/VL | 50 | 6.84 |
| TL/VH | 0 | 8.36 |
| TH/VH | 50 | 8.36 |

Remark:

1)The EUT just work in such extreme temperature of 0 °C to 50 °C and the extreme voltage of 6.84V to 8.36V, so here the EUT is tested in the temperature of 0 °C to 50 °C and the voltage of 6.84V to 8.36V.

2)VN: Normal Voltage; TN: Normal Temperature;

TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;

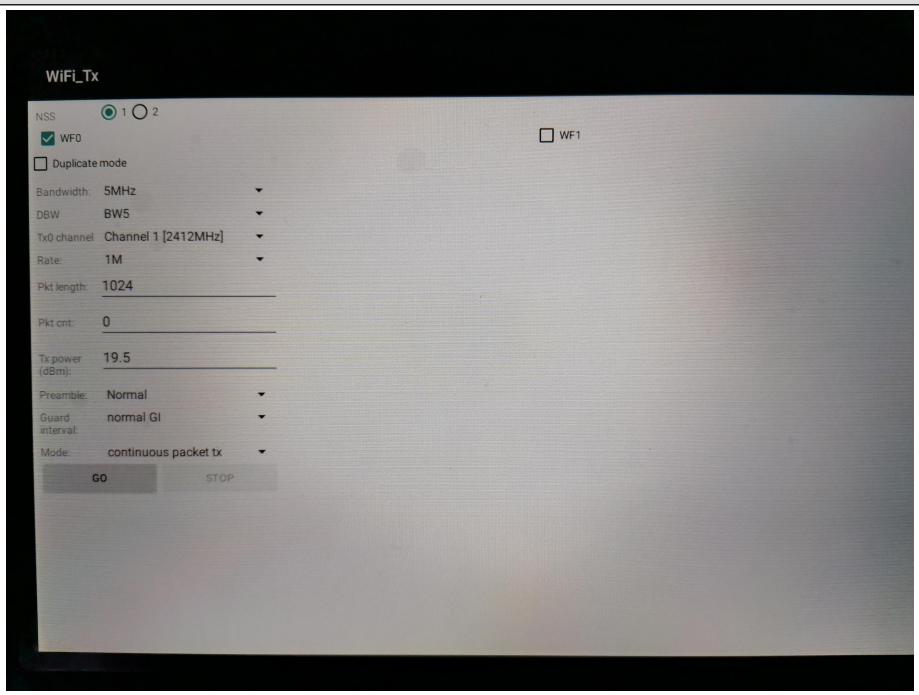
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

## 4.3 Test Condition

**Test channel:**

| Test Mode | Tx/Rx | RF Channel | | |
|---|---|---|---|---|
| | | Low(L) | Middle(M) | High(H) |
| 802.11a/n/ac(20M) | 5150MHz ~5250 MHz | Channel 36 | Channel 40 | Channel 48 |
| | | 5180MHz | 5200MHz | 5240MHz |
| 802.11n/ac(40M) | 5150MHz ~5250 MHz | Channel 38 | N/A | Channel 46 |
| | | 5190MHz | N/A | 5230MHz |
| 802.11ac(80M) | 5150MHz ~5250 MHz | N/A | Channel 42 | N/A |
| | | N/A | 5210MHz | N/A |
| 802.11a/n/ac(20M) | 5725MHz ~5850 MHz | Channel 149 | Channel 157 | Channel 165 |
| | | 5745MHz | 5785MHz | 5825MHz |
| 802.11n/ac(40M) | 5725MHz ~5850 MHz | Channel 151 | N/A | Channel 159 |
| | | 5755MHz | N/A | 5795MHz |
| 802.11ac(80M) | 5725MHz ~5850 MHz | N/A | Channel 155 | N/A |
| | | N/A | 5775MHz | N/A |

**Run Software:**




**Test mode:**

**Pre-scan under all rate at lowest channel for Ant1**

Through Pre-scan, 6Mbps is the worst case of 802.11a (20M); MCS0 is the worst case of 802.11n (20M); MCS0 is the worst case of 802.11ac (20M); MCS0 is the worst case of 802.11n(40M); MCS0 is the worst case of 802.11ac (40M); MCS0 is the worst case of 802.11ac(80M).

# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | Icarsoft Technology Inc. |
| Address of Applicant: | 1629 K St. Suite 300 N.W. Washington D.C., 20006 United States. |
| Manufacturer: | Icarsoft Technology Inc. |
| Address of Manufacturer: | 1629 K St. Suite 300 N.W. Washington D.C., 20006 United States. |
| Factory: | THINKCAR TECH CO., LTD. BanTian Branch |
| Address of Factory: | 2606, Building 4, Phase II, Tianan Yungu, Gangtou community, Bantian Longgang District, Shenzhen |

## 5.2 General Description of EUT

| | |
|---|---|
| Product Name: | Advanced Automotive Diagnostic Tool, THINKTOOL PROS+ |
| Model No.: | CR Ultra P, CR Ultra, TKT04 |
| Test Model No.: | TKT04 |
| Trade Mark: | iCarsoft |
| Hardware Version: | BSK-Y8-V3 |
| Software Version: | Y8_tool_proplus_20201023_1413_V1.8 |
| Test sample SN: | 850022568053 |
| EUT Power Supply: | lithium battery:DC7.6V, 6300mAh, Charge by DC5V<br>Adapter:<br>MODEL: PSYB0502500<br>INPUT: 100-240V~50/60Hz 0.6A Max<br>OUTPUT: 5V 2.5A, 12.5W |
| EUT Supports Radios application: | Bluetooth Dual mode: 2402-2480MHz<br>2.4GHz: Wi-Fi: 802.11b/g/n(HT20): 2412MHz~2462MHz;<br>802.11n(HT40): 2422MHz~2452MHz<br>5GHz: Wi-Fi: U-NII-1: 5.15-5.25GHz; U-NII-3: 5.725-5.850GHz |

## 5.3 Product Specification subjective to this standard

| | |
|---|---|
| Operation Frequency: | IEEE 802.11a/n/ac(20M): 5150MHz ~5250 MHz<br>IEEE802.11n/ac(40M): 5150MHz ~5250 MHz<br>IEEE802.11ac(80M): 5150MHz ~5250 MHz<br>IEEE 802.11a/n/ac(20M): 5725MHz ~5850 MHz<br>IEEE802.11n/ac(40M): 5725MHz ~5850 MHz<br>IEEE802.11ac(80M): 5725MHz ~5850 MHz |
| Channel Numbers: | IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel<br>IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel<br>IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel<br>IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel<br>IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel<br>IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel |
| Type of Modulation: | OFDM |
| Sample Type: | ☐ Mobile ☒ Portable ☐ Fix Location |
| Test Power Grade: | N/A |
| Test Software of EUT: | RF Test (manufacturer declare) |
| Antenna Type: | internal antenna with ipex connector |
| Antenna gain: | 3.68dBi@5GHz: Wi-Fi: U-NII-1, 5.46dBi@5GHz: Wi-Fi: U-NII-3 |

Operation Frequency each of channel

| For 802.11a/n/ac( 20M) Operation in the 5150MHz ~5250 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 44 | 5220MHz |
| 40 | 5200MHz | 48 | 5240MHz |
| For 802.11a/n/ac( 20M) Operation in the 5725MHz ~5850 MHz band | | | |
| Channel | Frequency | Channel | Frequency |
| 149 | 5745MHz | 161 | 5805MHz |
| 153 | 5765MHz | 165 | 5825MHz |
| 157 | 5785MHz | NA | NA |

| For 802.11n/ac(40M) Operation in the 5150MHz ~5250 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | Channel | Frequency |
| 38 | 5190MHz | 46 | 5230MHz |
| For 802.11n/ac(40M) Operation in the 5725MHz ~5850 MHz band | | | |
| Channel | Frequency | Channel | Frequency |
| 151 | 5755MHz | 159 | 5795MHz |

| For 802.11ac(80M) Operation in the 5150MHz ~5250 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | NA | NA |
| 42 | 5210MHz | NA | NA |
| For 802.11ac(80M) Operation in the 5725MHz ~5850 MHz band | | | |
| Channel | Frequency | NA | NA |
| 155 | 5775MHz | NA | NA |

## 5.4 Description of Support Units

The EUT has been tested with associated equipment below.

| Description | Manufacturer | Model No. | Certification | Supplied by |
|---|---|---|---|---|
| PC | Lenovo | ThinkPad E450c | FCC ID | CQA |

## 5.5 Test Location

All tests were performed at:

**Shenzhen Huaxia Testing Technology Co., Ltd.,**

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

## 5.6 Test Facility

**• A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

**• FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

## 5.7 Deviation from Standards

None.

## 5.8 Abnormalities from Standard Conditions

None.

## 5.9 Other Information Requested by the Customer

None.

## 5.10 Measurement Uncertainty (95% confidence levels, k=2)

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Radio Frequency | $3 \times 10^{-8}$ |
| 2 | RF power, conducted | 0.86dB |
| 3 | Radiated Spurious emission test | 5.12dB (Below 1GHz) |
| | | 4.6dB (Above 1GHz) |
| 4 | Conduction emission | 3.5dB (9kHz to 150kHz) |
| | | 3.1dB (150kHz to 30MHz) |
| 5 | Temperature test | 0.8°C |
| 6 | Humidity test | 2.0% |
| 7 | DC power voltages | 0.5% |

# 6 Equipment List

| Test Equipment | Manufacturer | Model No. | Instrument No. | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2023/09/08 | 2024/09/07 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2023/09/08 | 2024/09/07 |
| Spectrum analyzer | R&S | FSU40 | CQA-075 | 2023/09/08 | 2024/09/07 |
| Preamplifier | MITEQ | AFS4-00010300-18-10P-4 | CQA-035 | 2023/09/08 | 2024/09/07 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2023/09/08 | 2024/09/07 |
| Preamplifier | EMCI | EMC184055SE | CQA-089 | 2023/09/08 | 2024/09/07 |
| Loop antenna | Schwarzbeck | FMZB1516 | CQA-060 | 2021/09/16 | 2024/09/15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | CQA-088 | 2021/09/16 | 2024/09/15 |
| Coaxial Cable (Above 1GHz) | CQA | N/A | C007 | 2023/09/08 | 2024/09/07 |
| Coaxial Cable (Below 1GHz) | CQA | N/A | C013 | 2023/09/08 | 2024/09/07 |
| RF cable(9KHz~40GHz) | CQA | RF-01 | CQA-079 | 2023/09/08 | 2024/09/07 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2023/09/08 | 2024/09/07 |
| Power Sensor | KEYSIGHT | U2021XA | CQA-30 | 2023/09/08 | 2024/09/07 |
| N1918A Power Analysis Manager Power Panel | Agilent | N1918A | CQA-074 | 2023/09/08 | 2024/09/07 |
| Power meter | R&S | NRVD | CQA-029 | 2023/09/08 | 2024/09/07 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2023/09/08 | 2024/09/07 |
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2023/09/08 | 2024/09/07 |
| LISN | R&S | ENV216 | CQA-003 | 2023/09/08 | 2024/09/07 |
| Coaxial cable | CQA | N/A | CQA-C009 | 2023/09/08 | 2024/09/07 |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2023/09/08 | 2024/09/07 |

Test software:

| | Manufacturer | Software brand |
|---|---|---|
| Radiated Emissions test software | Tonscend | JS1120-3 |
| Conducted Emissions test software | Audix | e3 |
| RF Conducted test software | Audix | e3 |

# 7 Radio Technical Requirements Specification

**Reference documents for testing:**

| No. | Identity | Document Title |
|---|---|---|
| 1 | FCC Part15E | Subpart C-Intentional Radiators |
| 2 | ANSI C63.10-2013 | American National Standard for Testing Unlicesed Wireless Devices |
| 3 | KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 | Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15, subpart E |
| 4 | KDB 662911 D01 Multiple Transmitter Output v02r01 | Emissions Testing of Transmitters with Multiple Outputs in the Same Band |

**Test Results List:**

| Test Requirement | Test method | Test item | Verdict | Note |
|---|---|---|---|---|
| Part15E Section 15.407 (a)(1)(2) | KDB789033 | Emission Bandwidth and Occupied Bandwidth | PASS | Appendix A) |
| Part15E Section 15.407 (a)(1)(2)(4)(h)(1) | KDB789033 / KDB 662911 | Conducted Output Power and transmit power control mechanism | PASS | Appendix B) |
| Part15E Section 15.407 (a)(1)(2)(5) | KDB789033 / KDB 662911 | Power Spectral Density | PASS | Appendix C) |
| Part15E Section 15.407 (b)(1)to(6) | KDB789033 / KDB 662911 | Band Edge Measurements | PASS | Appendix D) |
| Part15E Section 15.407 (g) | KDB789033 | Frequency stability | PASS | Appendix E) |
| Part15C Section 15.203 | ANSI C63.10 | Antenna Requirement | PASS | Appendix F) |
| Part15E Section 15.407 (c) | Section 15.407 | Operation in the absence of information to the transmit | PASS | Appendix G) |
| Part15E Section 15.407 (b)(6) | ANSI C63.10 | AC Power Line Conducted Emission | PASS | Appendix H) |
| Part15E Section 15.407 (b)(6)(7)(8) | KDB789033 | Restricted bands around fundamental frequency(Radiated Emission) | PASS | Appendix I) |
| Part15E Section 15.407 (b)(1)(2)(3)(5)(6)(7)(8) | KDB789033 | Radiated Spurious Emissions | PASS | Appendix J) |

# Appendix A): Emission Bandwidth

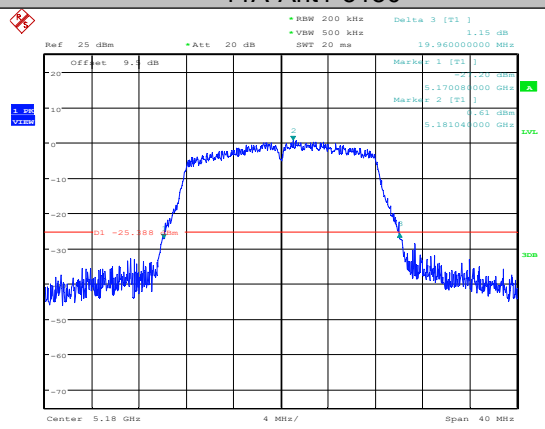
## Result Table

| Test Mode | Antenna | Channel | EBW[MHz] | Verdict |
|---|---|---|---|---|
| 11A | Ant1 | 5180 | 19.960 | PASS |
| 11A | Ant1 | 5200 | 20.200 | PASS |
| 11A | Ant1 | 5240 | 20.080 | PASS |
| 11A | Ant1 | 5745 | 15.040 | PASS |
| 11A | Ant1 | 5785 | 15.160 | PASS |
| 11A | Ant1 | 5825 | 15.160 | PASS |
| 11N20 | Ant1 | 5180 | 20.200 | PASS |
| 11N20 | Ant1 | 5200 | 20.360 | PASS |
| 11N20 | Ant1 | 5240 | 20.160 | PASS |
| 11N20 | Ant1 | 5745 | 14.200 | PASS |
| 11N20 | Ant1 | 5785 | 15.160 | PASS |
| 11N20 | Ant1 | 5825 | 15.120 | PASS |
| 11N40 | Ant1 | 5190 | 40.320 | PASS |
| 11N40 | Ant1 | 5230 | 40.960 | PASS |
| 11N40 | Ant1 | 5755 | 35.280 | PASS |
| 11N40 | Ant1 | 5795 | 35.200 | PASS |
| 11AC20 | Ant1 | 5180 | 20.200 | PASS |
| 11AC20 | Ant1 | 5200 | 20.480 | PASS |
| 11AC20 | Ant1 | 5240 | 20.320 | PASS |
| 11AC20 | Ant1 | 5745 | 15.200 | PASS |
| 11AC20 | Ant1 | 5785 | 15.200 | PASS |
| 11AC20 | Ant1 | 5825 | 15.080 | PASS |
| 11AC40 | Ant1 | 5190 | 40.480 | PASS |
| 11AC40 | Ant1 | 5230 | 40.880 | PASS |
| 11AC40 | Ant1 | 5755 | 35.280 | PASS |
| 11AC40 | Ant1 | 5795 | 35.200 | PASS |
| 11AC80 | Ant1 | 5210 | 81.600 | PASS |
| 11AC80 | Ant1 | 5775 | 75.520 | PASS |

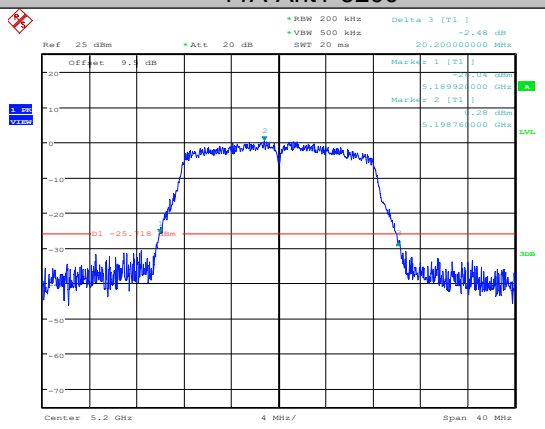
## Test Graph

### EBW:

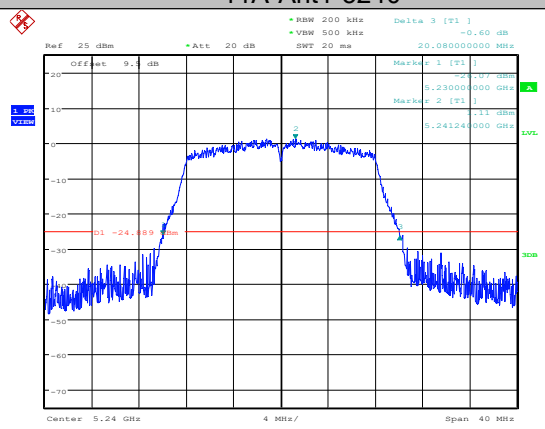
11A-Ant1-5180



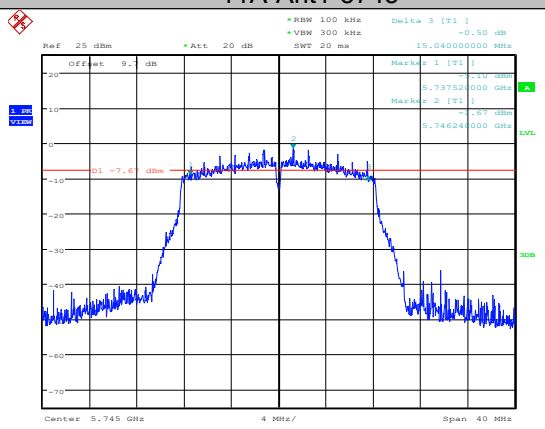

11A-Ant1-5200



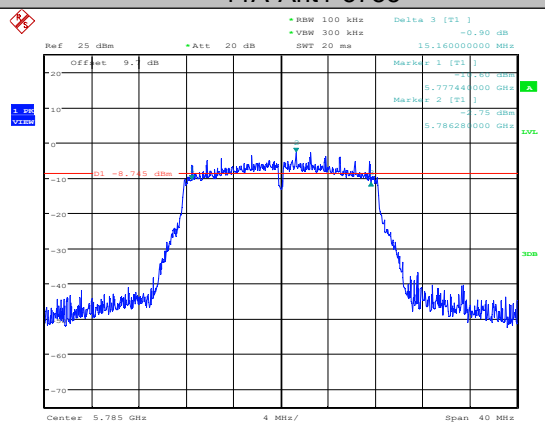

11A-Ant1-5240



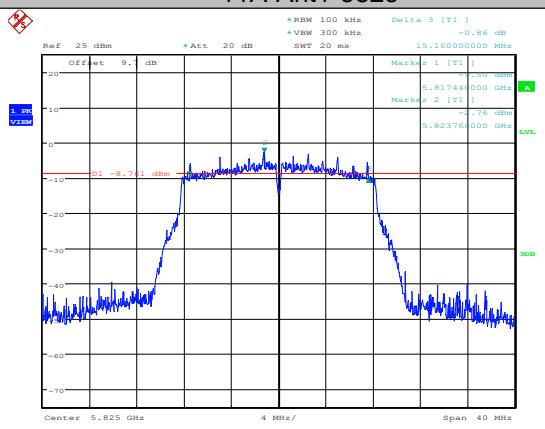

11A-Ant1-5745




11A-Ant1-5785




11A-Ant1-5825



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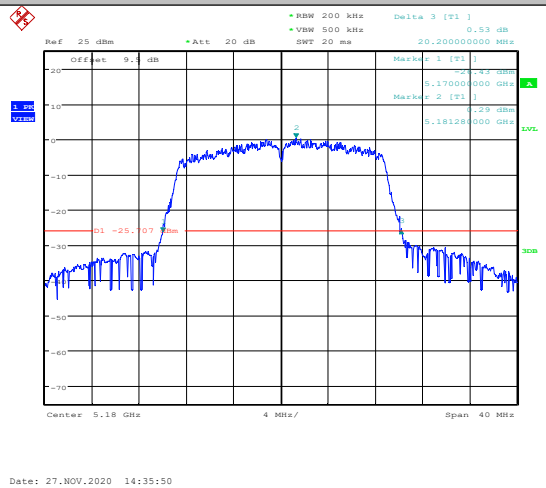
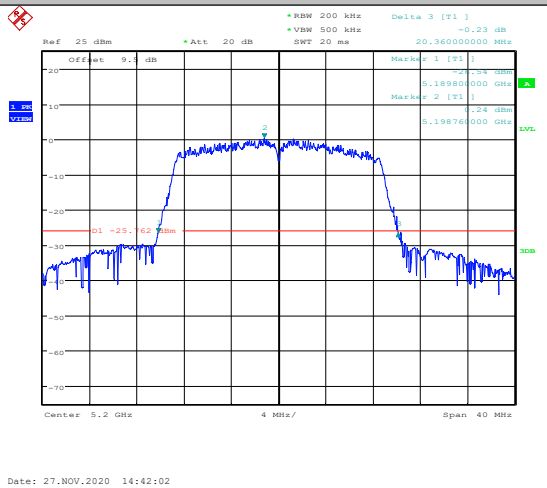
|---|---|
|  |  |
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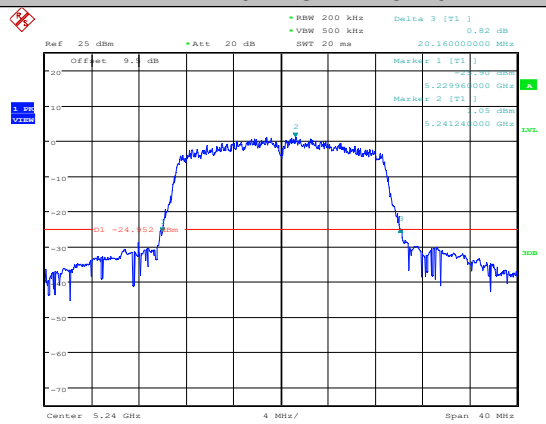
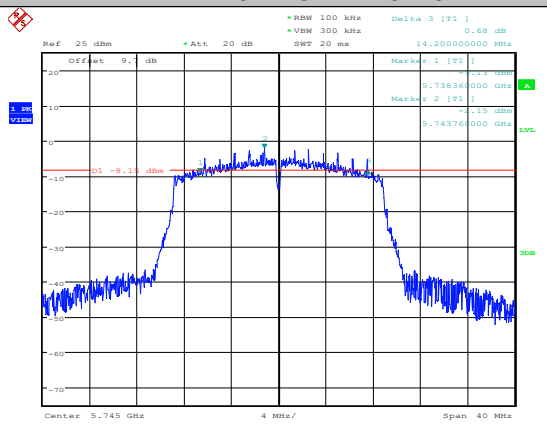
|  |  |
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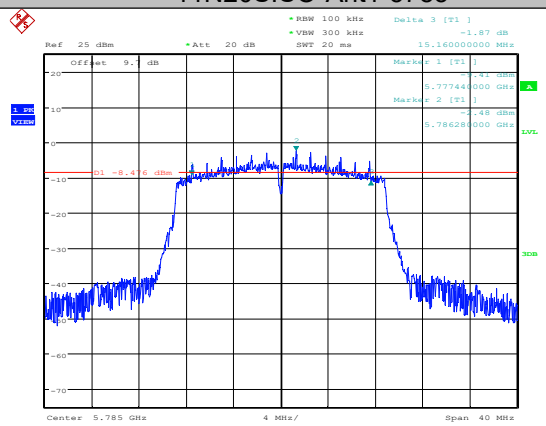
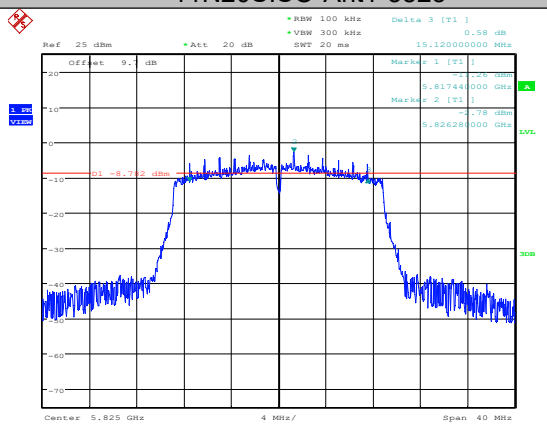
|  |  |
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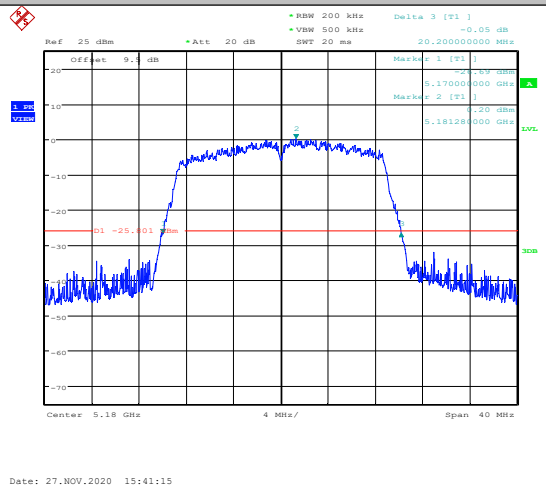
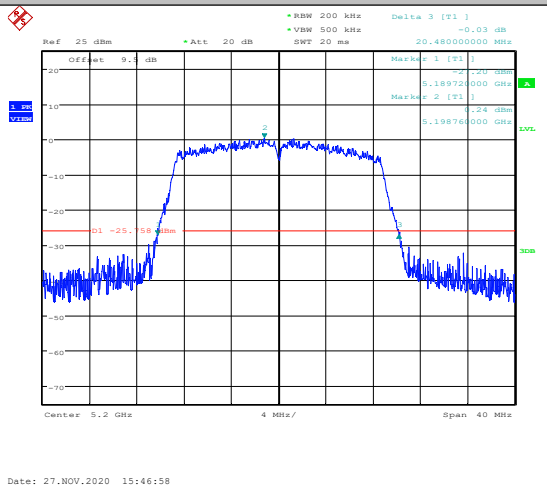
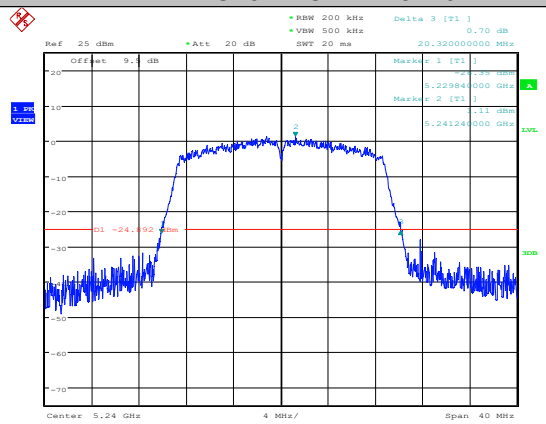
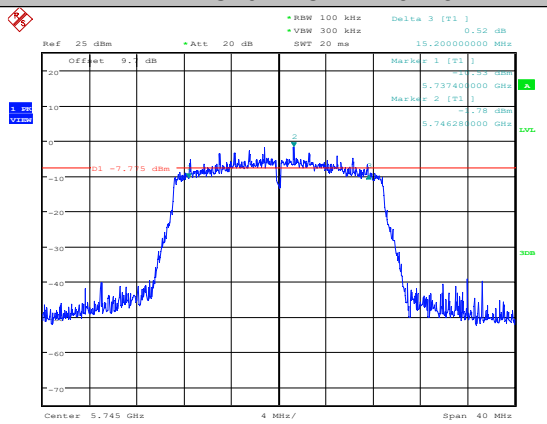
|  |  |
| Date: 27.NOV.2020 15:41:15 | Date: 27.NOV.2020 15:46:58 |
| **11AC20SISO-Ant1-5240** | **11AC20SISO-Ant1-5745** |
|  |  |
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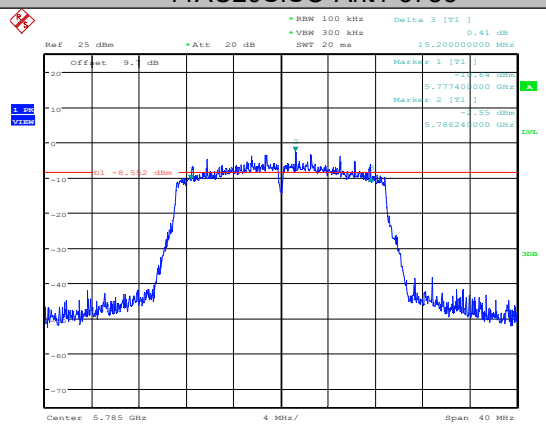
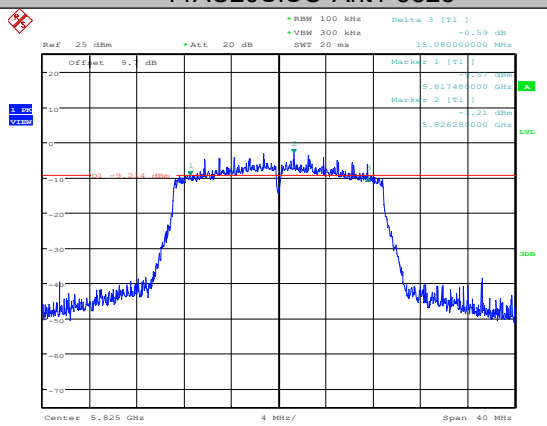
| **11AC20SISO-Ant1-5785** | **11AC20SISO-Ant1-5825** |
|  |  |
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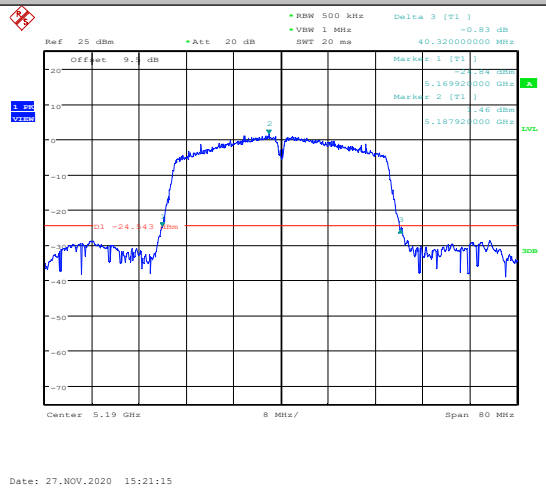
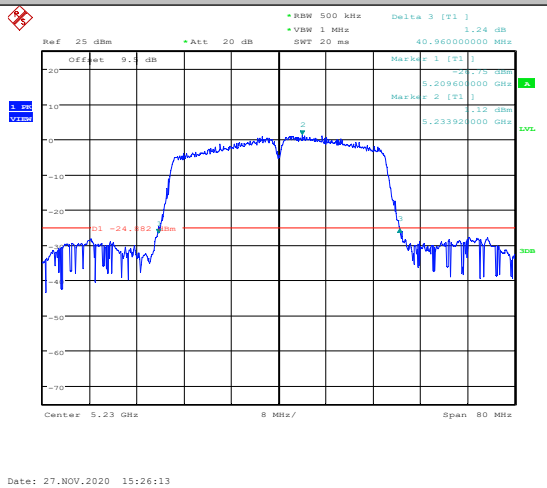
| 11N40SISO-Ant1-5190 | 11N40SISO-Ant1-5230 |
|---|---|
|  |  |
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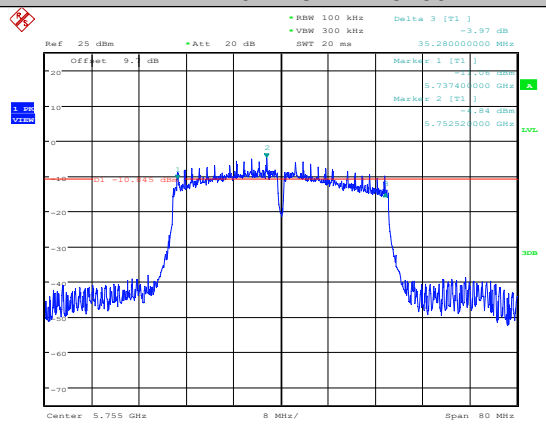
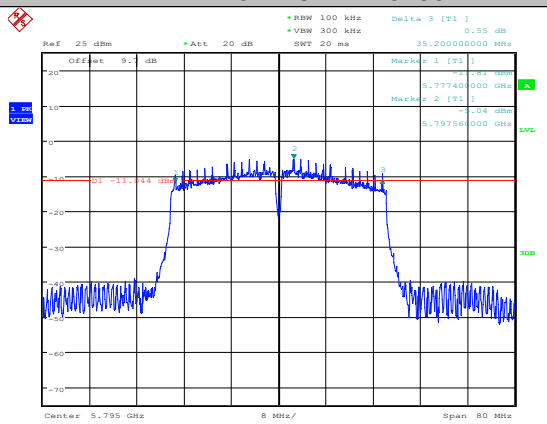
|  |  |
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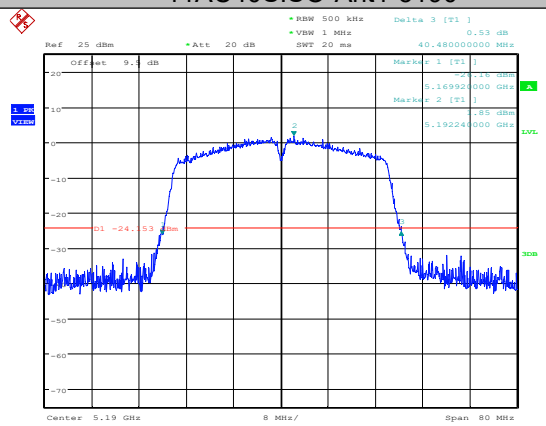
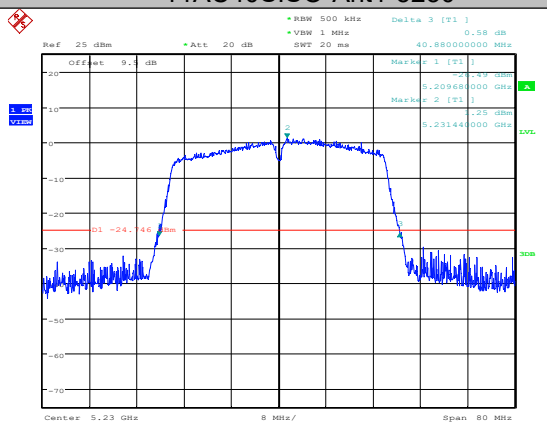
| **11AC40SISO-Ant1-5190** | **11AC40SISO-Ant1-5230** |
|  |  |
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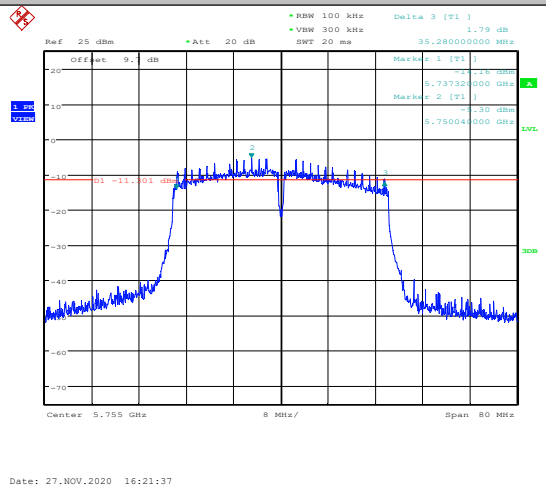
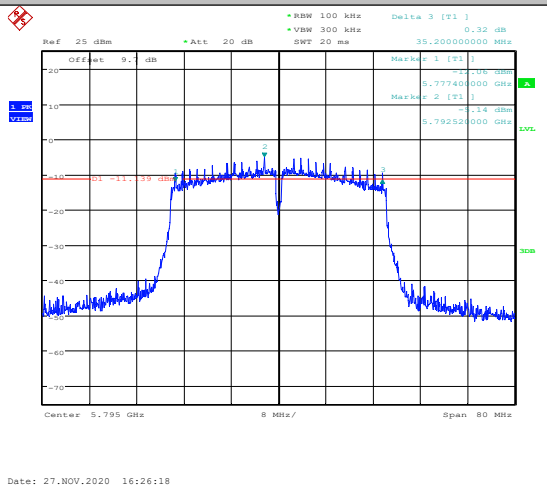
| 11AC40SISO-Ant1-5755 | 11AC40SISO-Ant1-5795 |
| --- | --- |
|  |  |
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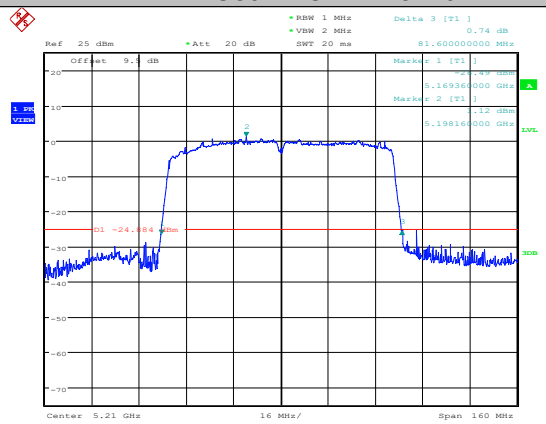
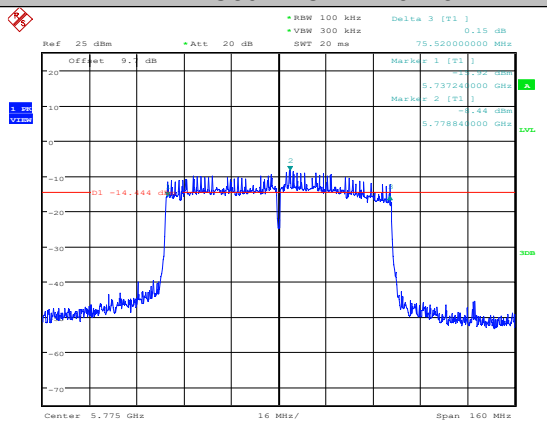
| **11AC80SISO-Ant1-5210** | **11AC80SISO-Ant1-5775** |
|  |  |
| Date: 27.NOV.2020 16:31:08 | Date: 27.NOV.2020 16:37:50 |

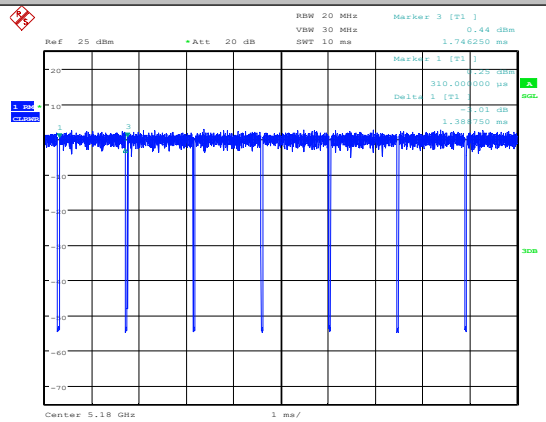
# Appendix B): Maximum Conduct Output Power

**1.Duty Cycle (x)**

**Measurement Data**

| Test Mode | Antenna | Channel | Duty Cycle[%] | 10log(1/x) Factor[dB] |
|---|---|---|---|---|
| 11A | Ant1 | 5180 | 96.69 | 0.15 |
| 11A | Ant1 | 5200 | 96.78 | 0.14 |
| 11A | Ant1 | 5240 | 96.69 | 0.15 |
| 11A | Ant1 | 5745 | 96.7 | 0.15 |
| 11A | Ant1 | 5785 | 96.7 | 0.15 |
| 11A | Ant1 | 5825 | 96.69 | 0.15 |
| 11N20 | Ant1 | 5180 | 96.47 | 0.16 |
| 11N20 | Ant1 | 5200 | 96.47 | 0.16 |
| 11N20 | Ant1 | 5240 | 96.47 | 0.16 |
| 11N20 | Ant1 | 5745 | 96.47 | 0.16 |
| 11N20 | Ant1 | 5785 | 96.56 | 0.15 |
| 11N20 | Ant1 | 5825 | 96.47 | 0.16 |
| 11AC20 | Ant1 | 5180 | 96.5 | 0.15 |
| 11AC20 | Ant1 | 5200 | 96.5 | 0.15 |
| 11AC20 | Ant1 | 5240 | 96.59 | 0.15 |
| 11AC20 | Ant1 | 5745 | 96.5 | 0.15 |
| 11AC20 | Ant1 | 5785 | 96.59 | 0.15 |
| 11AC20 | Ant1 | 5825 | 96.59 | 0.15 |
| 11N40 | Ant1 | 5190 | 93.32 | 0.30 |
| 11N40 | Ant1 | 5230 | 93.31 | 0.30 |
| 11N40 | Ant1 | 5755 | 93.31 | 0.30 |
| 11N40 | Ant1 | 5795 | 93.32 | 0.30 |
| 11AC40 | Ant1 | 5190 | 93.36 | 0.30 |
| 11AC40 | Ant1 | 5230 | 93.36 | 0.30 |
| 11AC40 | Ant1 | 5755 | 93.36 | 0.30 |
| 11AC40 | Ant1 | 5795 | 93.36 | 0.30 |
| 11AC80 | Ant1 | 5210 | 87.41 | 0.58 |
| 11AC80 | Ant1 | 5775 | 87.12 | 0.60 |

## 11A-Ant1-5180




Date: 27.NOV.2020 14:00:47

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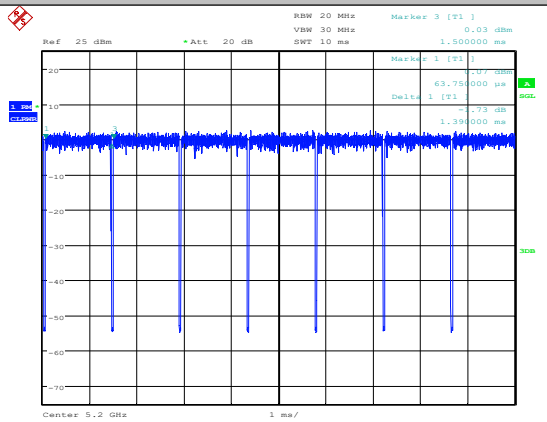
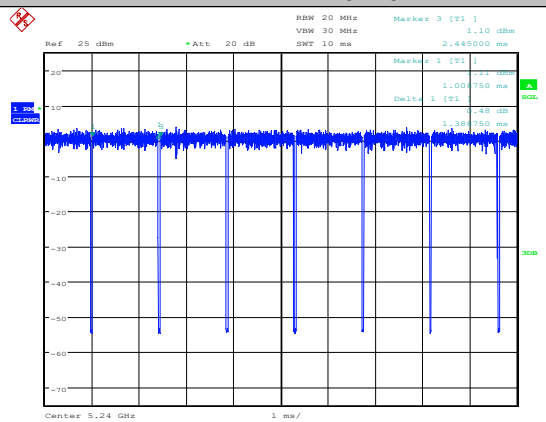


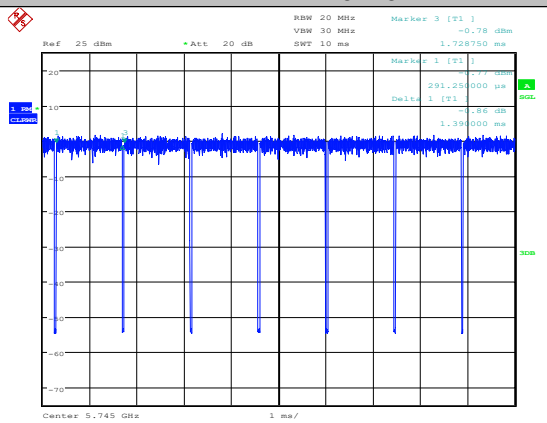

Date: 27.NOV.2020 14:05:58

## 11A-Ant1-5240



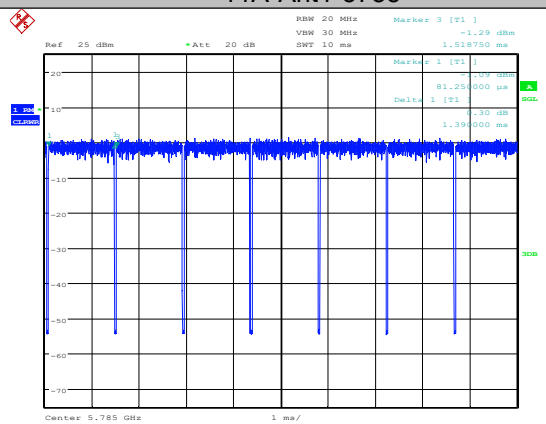

Date: 27.NOV.2020 14:10:37

## 11A-Ant1-5745



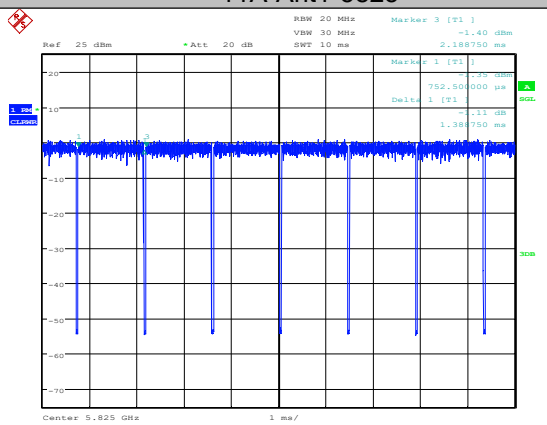

Date: 27.NOV.2020 14:16:10

## 11A-Ant1-5785




Date: 27.NOV.2020 14:20:27

## 11A-Ant1-5825




Date: 27.NOV.2020 14:24:28

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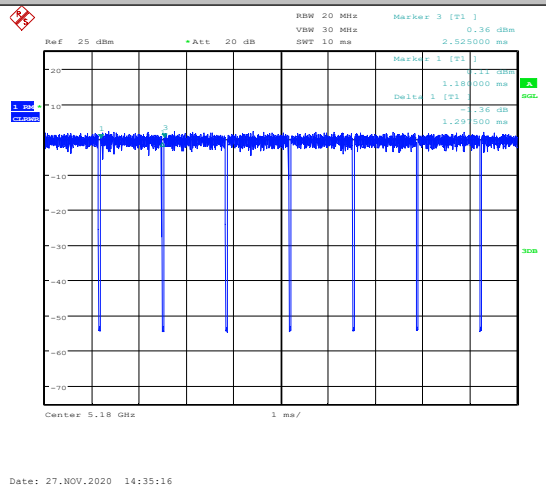
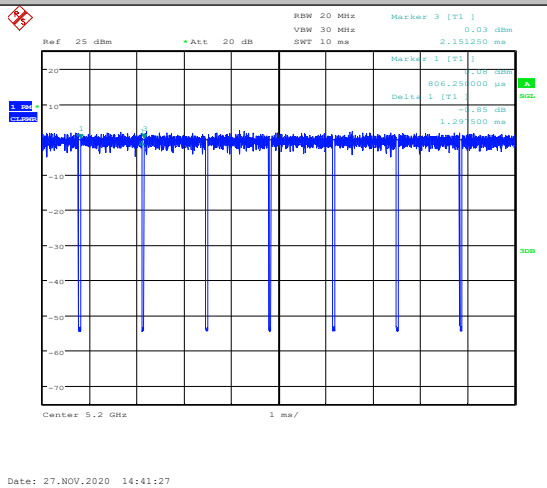
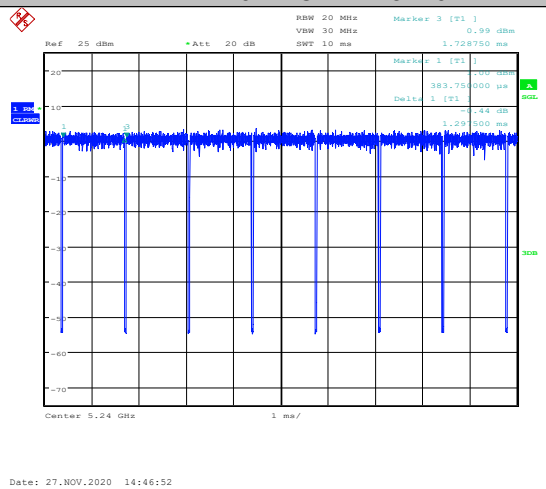
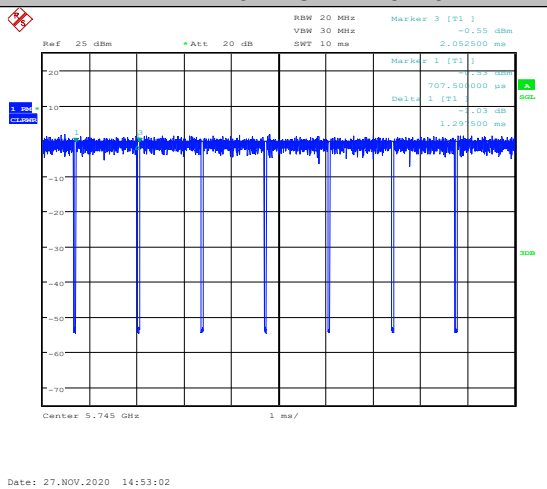
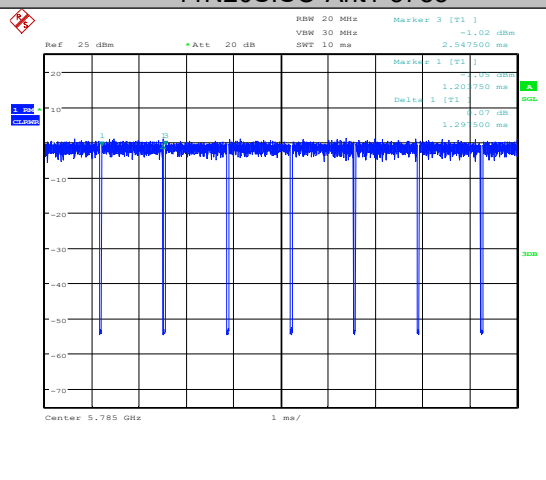
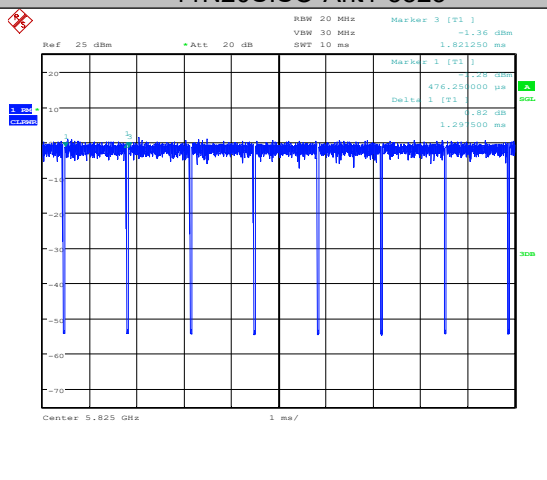
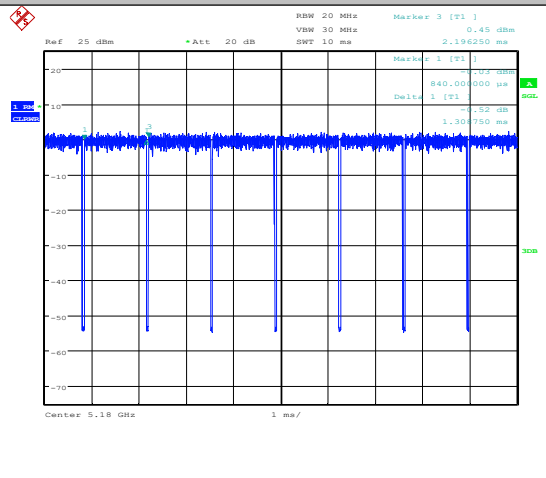
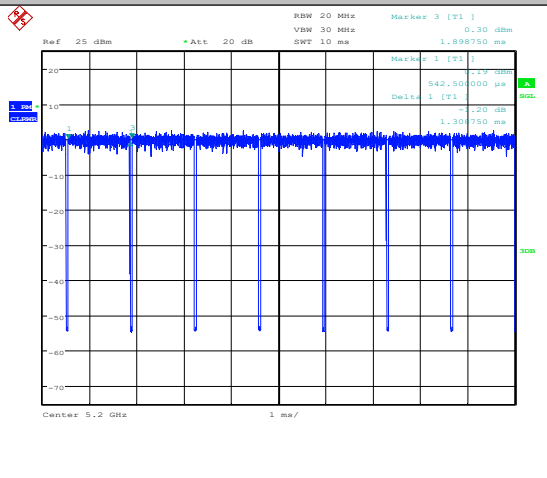
|  |  |
| 11N20SISO-Ant1-5240 | 11N20SISO-Ant1-5745 |
|  |  |
| 11N20SISO-Ant1-5785 | 11N20SISO-Ant1-5825 |
|  |  |

| 11AC20SISO-Ant1-5180 | 11AC20SISO-Ant1-5200 |
|---|---|
|  |  |
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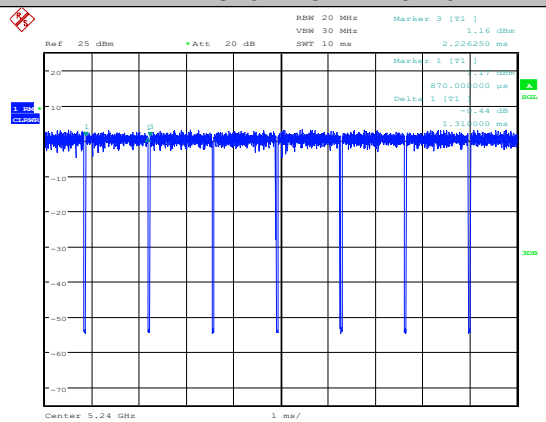
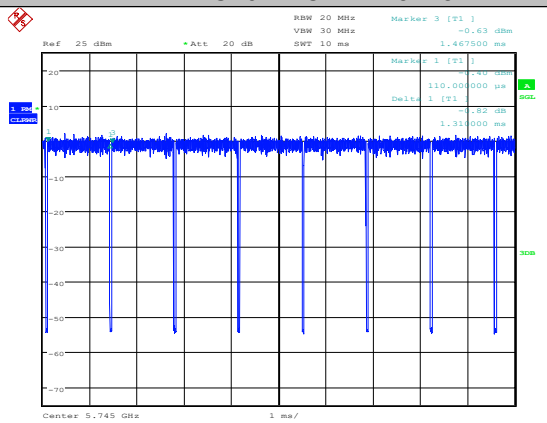
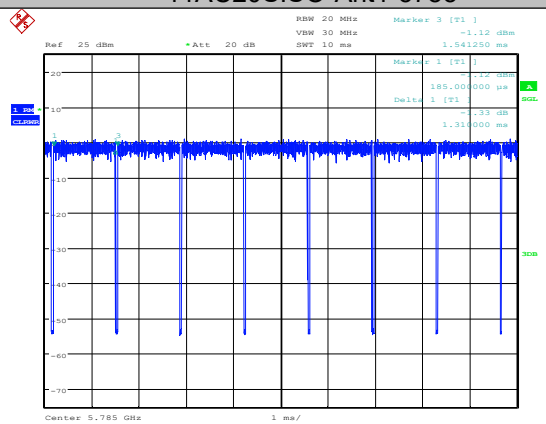
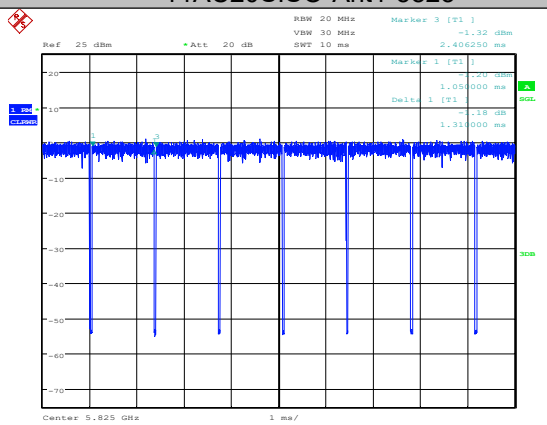
|  |  |
| Date: 27.NOV.2020 15:51:03 | Date: 27.NOV.2020 15:56:10 |
| **11AC20SISO-Ant1-5785** | **11AC20SISO-Ant1-5825** |
|  |  |
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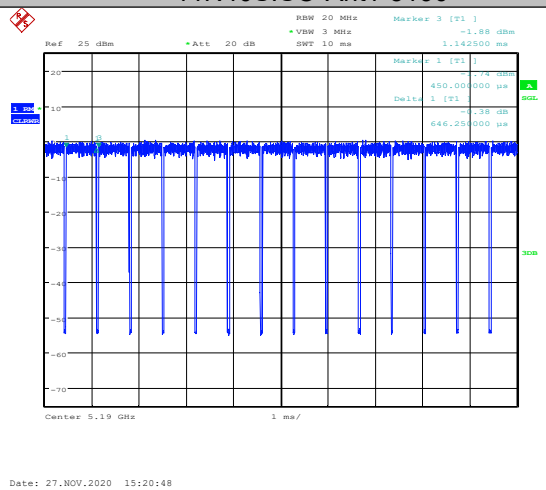
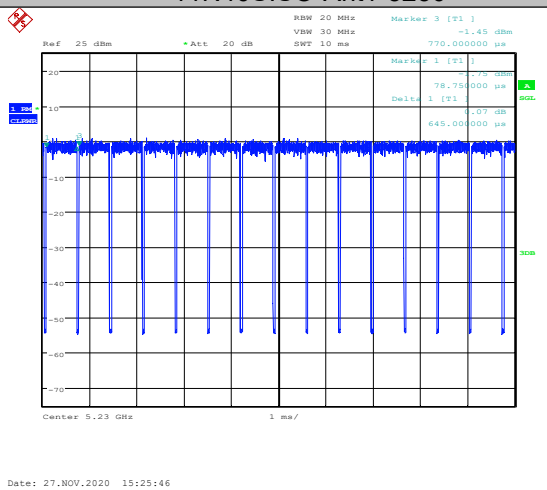
| 11N40SISO-Ant1-5190 | 11N40SISO-Ant1-5230 |
|---|---|
|  |  |
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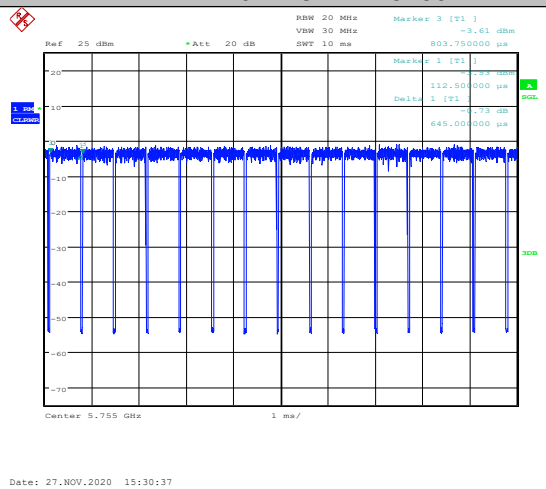
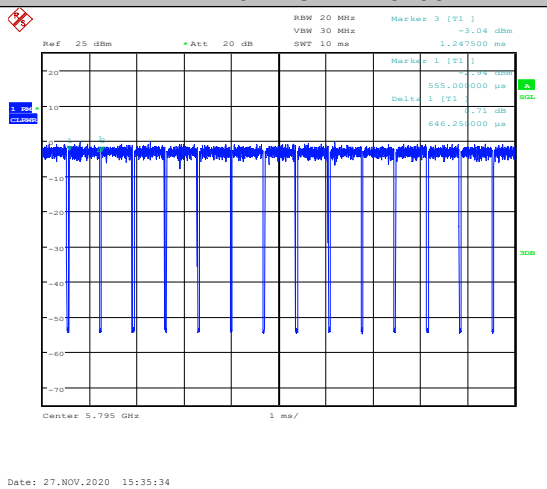
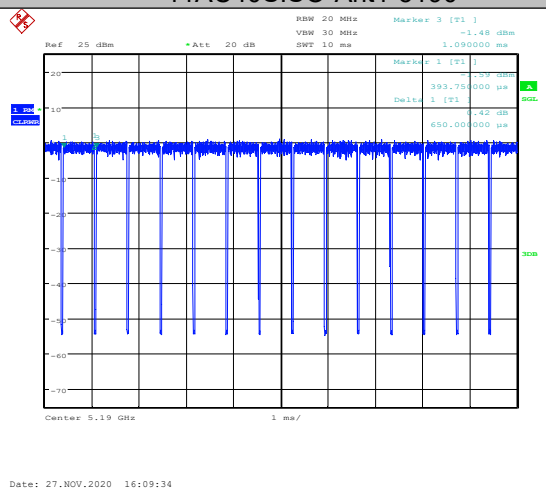
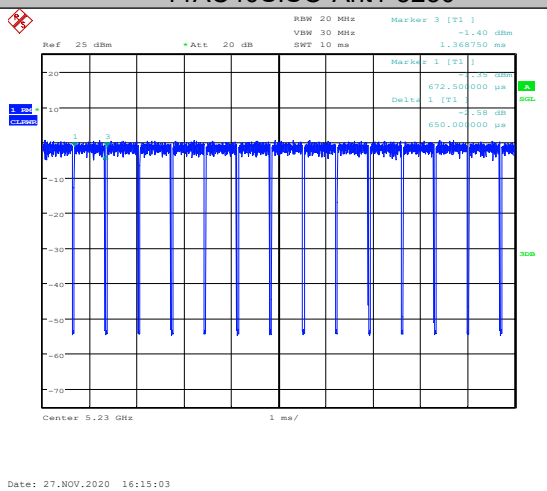
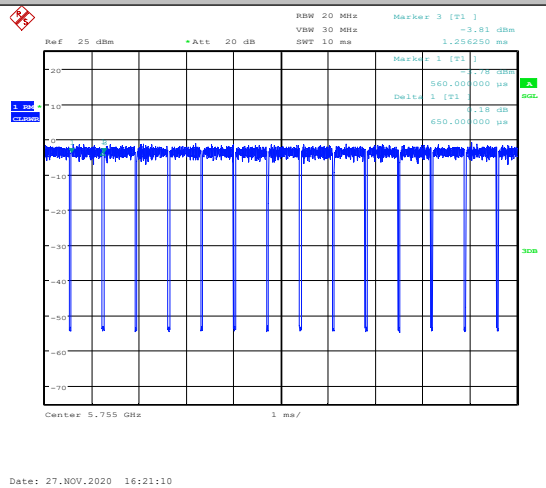
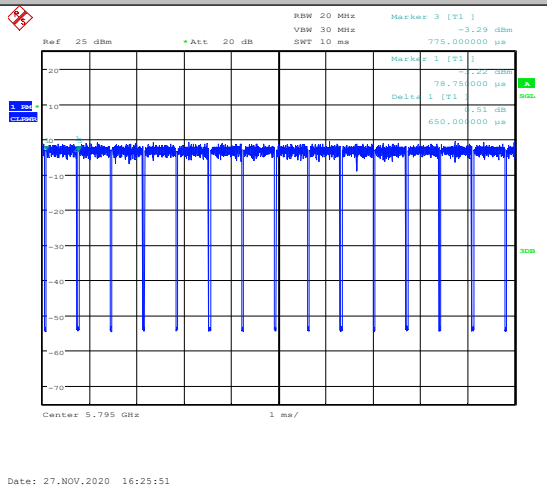
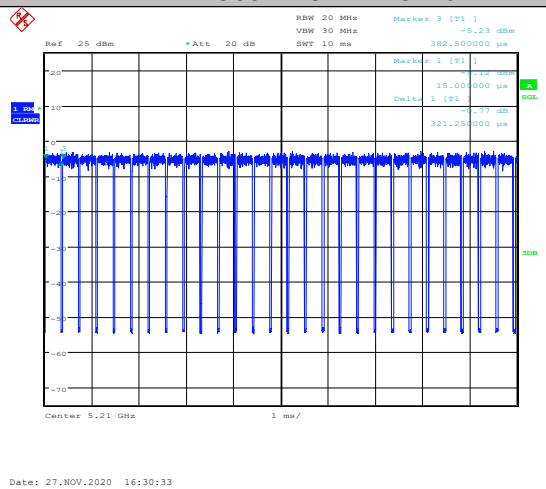
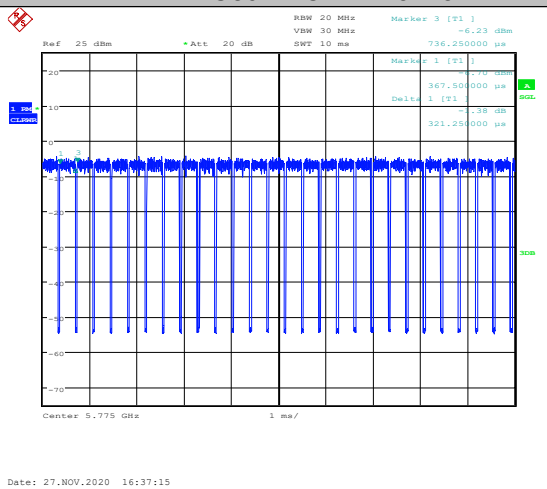
|  |  |
| 11AC40SISO-Ant1-5190 | 11AC40SISO-Ant1-5230 |
|  |  |

| 11AC40SISO-Ant1-5755 | 11AC40SISO-Ant1-5795 |
| --- | --- |
|  |  |
| 11AC80SISO-Ant1-5210 | 11AC80SISO-Ant1-5775 |
|  |  |

**2. Conducted Average Output Power**

**Measurement Data**

| Test Mode | Antenna | Channel | Meas.Level [dBm] | Av.Power [dBm] | Verdict |
|---|---|---|---|---|---|
| 11A | Ant1 | 5180 | 9.75 | 9.90 | PASS |
| 11A | Ant1 | 5200 | 9.84 | 9.98 | PASS |
| 11A | Ant1 | 5240 | 10.53 | 10.68 | PASS |
| 11A | Ant1 | 5745 | 8.88 | 9.03 | PASS |
| 11A | Ant1 | 5785 | 8.28 | 8.43 | PASS |
| 11A | Ant1 | 5825 | 7.98 | 8.13 | PASS |
| 11N20 | Ant1 | 5180 | 9.56 | 9.72 | PASS |
| 11N20 | Ant1 | 5200 | 9.72 | 9.88 | PASS |
| 11N20 | Ant1 | 5240 | 10.41 | 10.57 | PASS |
| 11N20 | Ant1 | 5745 | 8.35 | 8.51 | PASS |
| 11N20 | Ant1 | 5785 | 7.98 | 8.13 | PASS |
| 11N20 | Ant1 | 5825 | 7.69 | 7.85 | PASS |
| 11AC20 | Ant1 | 5180 | 9.65 | 9.80 | PASS |
| 11AC20 | Ant1 | 5200 | 9.7 | 9.85 | PASS |
| 11AC20 | Ant1 | 5240 | 10.43 | 10.58 | PASS |
| 11AC20 | Ant1 | 5745 | 8.55 | 8.70 | PASS |
| 11AC20 | Ant1 | 5785 | 7.97 | 8.12 | PASS |
| 11AC20 | Ant1 | 5825 | 7.69 | 7.84 | PASS |
| 11N40 | Ant1 | 5190 | 9.89 | 10.19 | PASS |
| 11N40 | Ant1 | 5230 | 9.91 | 10.21 | PASS |
| 11N40 | Ant1 | 5755 | 8.23 | 8.53 | PASS |
| 11N40 | Ant1 | 5795 | 8.52 | 8.82 | PASS |
| 11AC40 | Ant1 | 5190 | 9.83 | 10.13 | PASS |
| 11AC40 | Ant1 | 5230 | 9.9 | 10.20 | PASS |
| 11AC40 | Ant1 | 5755 | 8.23 | 8.53 | PASS |
| 11AC40 | Ant1 | 5795 | 8.52 | 8.82 | PASS |
| 11AC80 | Ant1 | 5210 | 9.78 | 10.36 | PASS |
| 11AC80 | Ant1 | 5775 | 8.33 | 8.93 | PASS |

Remark:
Av.Power=Meas.Level+10 log (1/duty cycle)
E.i.r.p=Av.Power+G,
G = antenna gain in dBi.

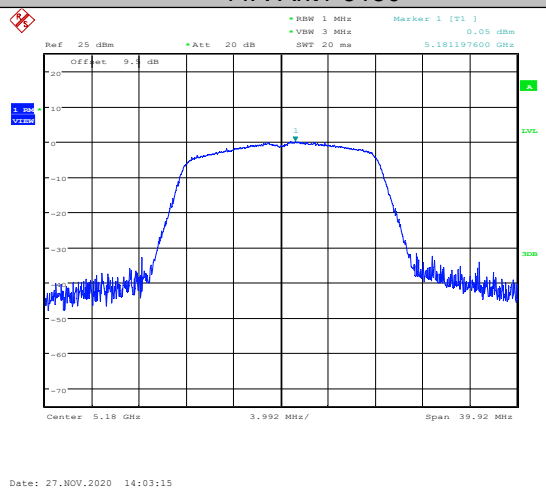
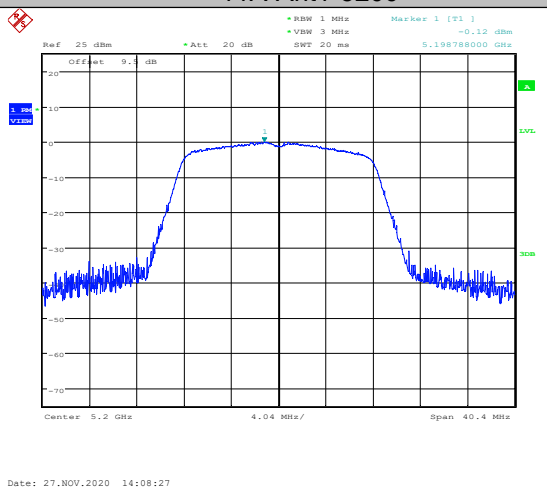
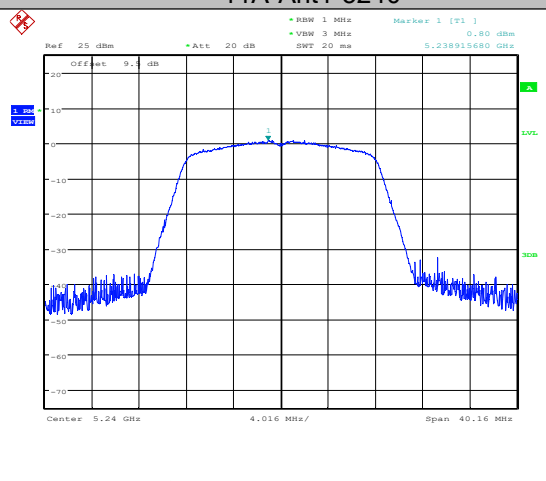
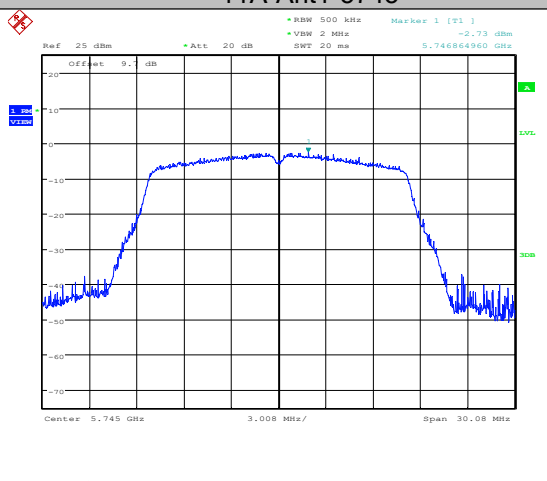
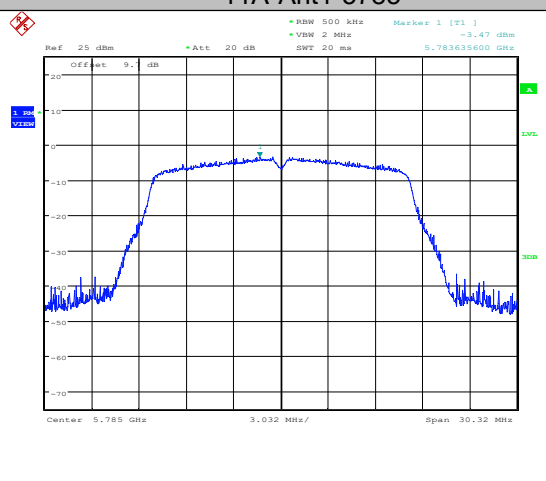
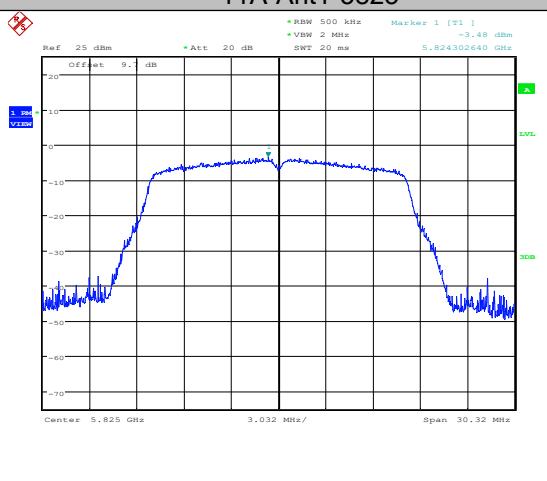
# Appendix C): Power Spectral Density

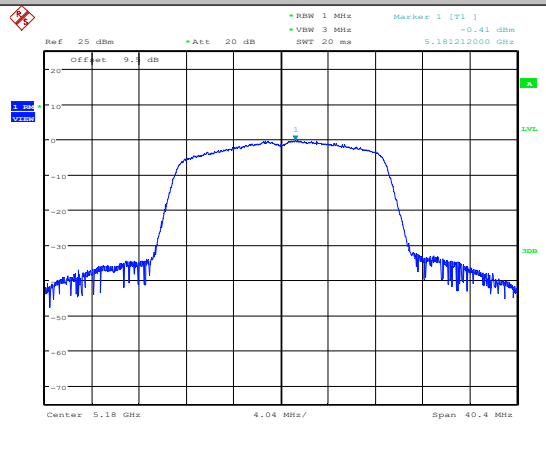
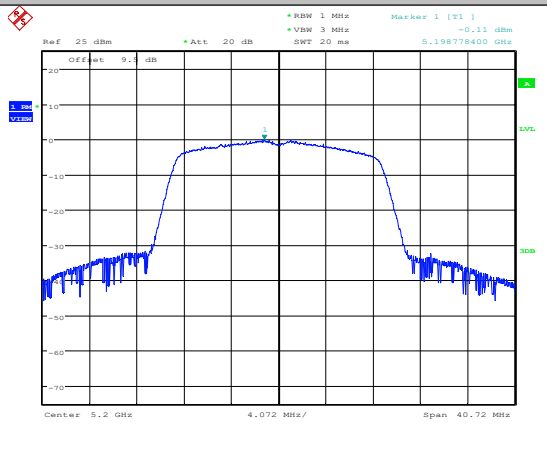
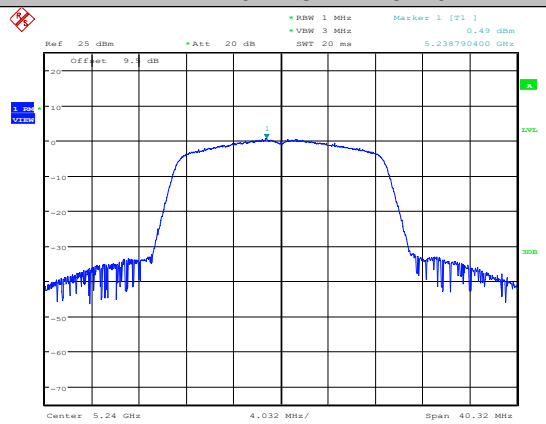
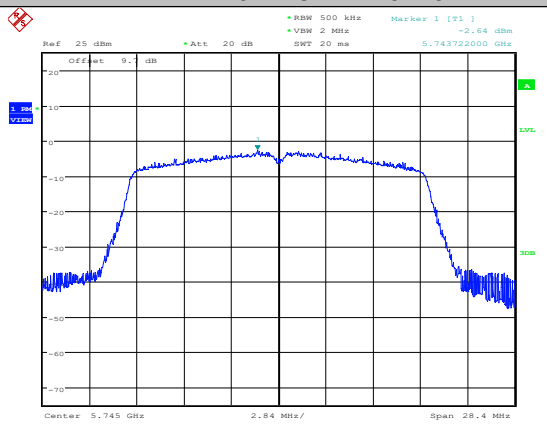
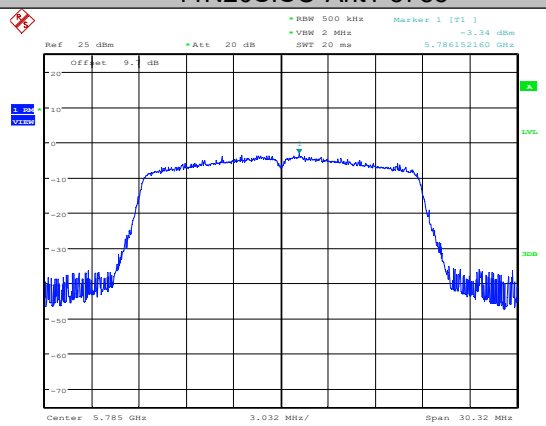
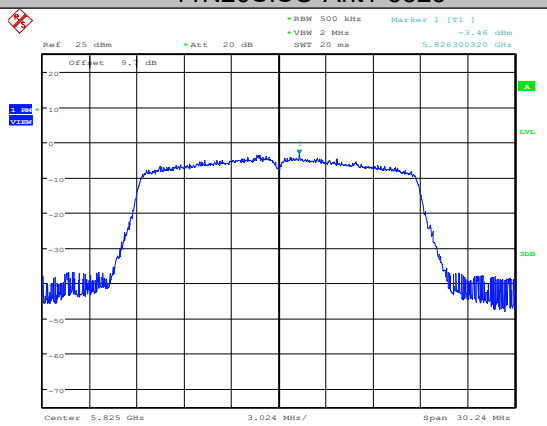
## Result Table

| Test Mode | Antenna | Channel | Meas.Level [dBm] | Duty Cycle Factor [dB] | PSD [dBm/MHz] | Limit [dBm/MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| 11A | Ant1 | 5180 | 0.05 | 0.15 | 0.20 | 11.00 | PASS |
| 11A | Ant1 | 5200 | -0.12 | 0.14 | 0.02 | 11.00 | PASS |
| 11A | Ant1 | 5240 | 0.80 | 0.15 | 0.95 | 11.00 | PASS |
| 11N20 | Ant1 | 5180 | -0.41 | 0.16 | -0.25 | 11.00 | PASS |
| 11N20 | Ant1 | 5200 | -0.11 | 0.16 | 0.05 | 11.00 | PASS |
| 11N20 | Ant1 | 5240 | 0.49 | 0.16 | 0.65 | 11.00 | PASS |
| 11N40 | Ant1 | 5190 | -2.38 | 0.30 | -2.08 | 11.00 | PASS |
| 11N40 | Ant1 | 5230 | -2.46 | 0.30 | -2.16 | 11.00 | PASS |
| 11AC20 | Ant1 | 5180 | -0.32 | 0.15 | -0.17 | 11.00 | PASS |
| 11AC20 | Ant1 | 5200 | -0.35 | 0.15 | -0.20 | 11.00 | PASS |
| 11AC20 | Ant1 | 5240 | 0.40 | 0.15 | 0.55 | 11.00 | PASS |
| 11AC40 | Ant1 | 5190 | -2.45 | 0.30 | -2.15 | 11.00 | PASS |
| 11AC40 | Ant1 | 5230 | -2.74 | 0.30 | -2.44 | 11.00 | PASS |
| 11AC80 | Ant1 | 5210 | -6.79 | 0.58 | -6.21 | 11.00 | PASS |
| Test Mode | Antenna | Channel | Meas.Level [dBm] | Duty Cycle Factor [dB] | PSD [dBm/MHz] | Limit [dBm/500kHz] | Verdict |
| 11A | Ant1 | 5745 | -2.73 | 0.15 | -2.58 | 30.00 | PASS |
| 11A | Ant1 | 5785 | -3.47 | 0.15 | -3.32 | 30.00 | PASS |
| 11A | Ant1 | 5825 | -3.48 | 0.15 | -3.33 | 30.00 | PASS |
| 11N20 | Ant1 | 5745 | -2.64 | 0.16 | -2.48 | 30.00 | PASS |
| 11N20 | Ant1 | 5785 | -3.34 | 0.15 | -3.19 | 30.00 | PASS |
| 11N20 | Ant1 | 5825 | -3.46 | 0.16 | -3.30 | 30.00 | PASS |
| 11N40 | Ant1 | 5755 | -6.19 | 0.30 | -5.89 | 30.00 | PASS |
| 11N40 | Ant1 | 5795 | -5.91 | 0.30 | -5.61 | 30.00 | PASS |
| 11AC20 | Ant1 | 5745 | -2.32 | 0.15 | -2.17 | 30.00 | PASS |
| 11AC20 | Ant1 | 5785 | -2.70 | 0.15 | -2.55 | 30.00 | PASS |
| 11AC20 | Ant1 | 5825 | -3.06 | 0.15 | -2.91 | 30.00 | PASS |
| 11AC40 | Ant1 | 5755 | -6.11 | 0.30 | -5.81 | 30.00 | PASS |
| 11AC40 | Ant1 | 5795 | -6.19 | 0.30 | -5.89 | 30.00 | PASS |
| 11AC80 | Ant1 | 5775 | -9.65 | 0.60 | -9.05 | 30.00 | PASS |

**Remark:**

PSD = Meas PSD + Duty Cycle Factor

| 11A-Ant1-5180 | 11A-Ant1-5200 |
|---|---|
|  |  |
| Date: 27.NOV.2020 14:03:15 | Date: 27.NOV.2020 14:08:27 |
| **11A-Ant1-5240** | **11A-Ant1-5745** |
|  |  |
| Date: 27.NOV.2020 14:13:06 | Date: 27.NOV.2020 14:17:50 |
| **11A-Ant1-5785** | **11A-Ant1-5825** |
|  |  |
| Date: 27.NOV.2020 14:22:07 | Date: 27.NOV.2020 14:26:04 |

| 11N20SISO-Ant1-5180 | 11N20SISO-Ant1-5200 |
|---|---|
|  |  |
| Date: 27.NOV.2020 14:37:44 | Date: 27.NOV.2020 14:43:56 |
| **11N20SISO-Ant1-5240** | **11N20SISO-Ant1-5745** |
|  |  |
| Date: 27.NOV.2020 14:49:20 | Date: 27.NOV.2020 14:54:42 |
| **11N20SISO-Ant1-5785** | **11N20SISO-Ant1-5825** |
|  |  |
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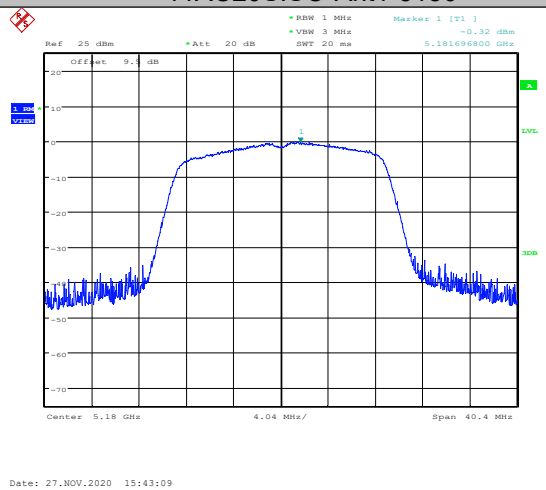
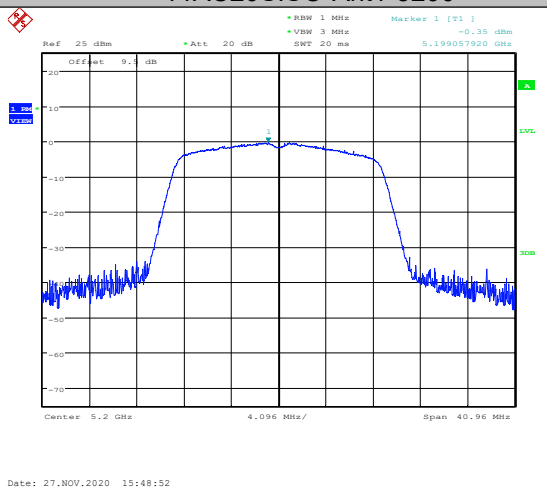
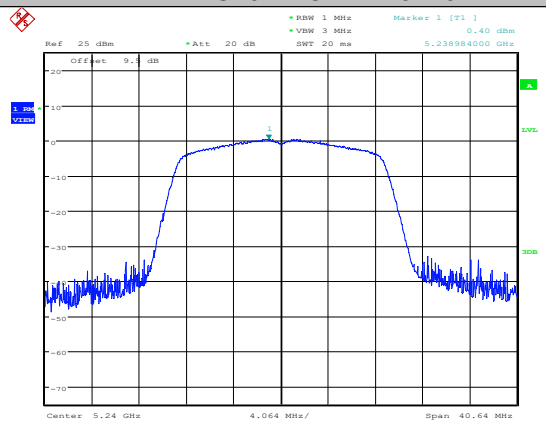
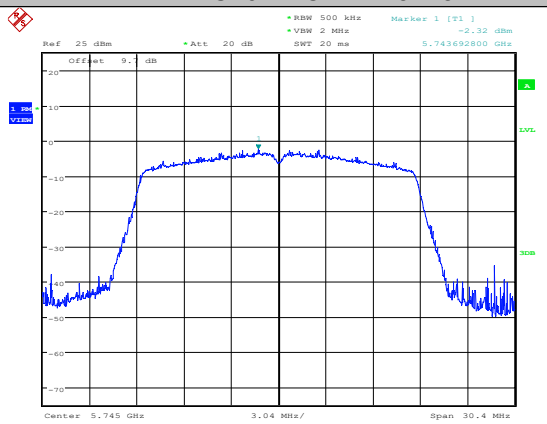
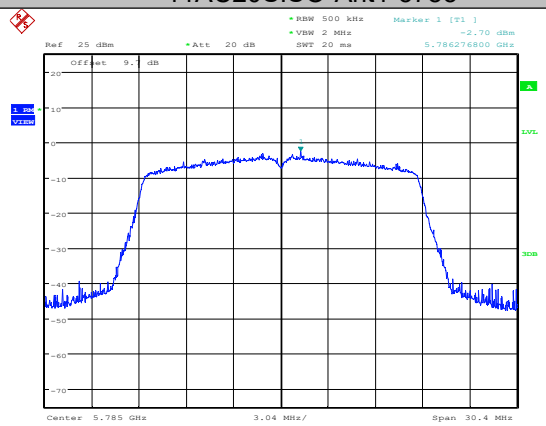
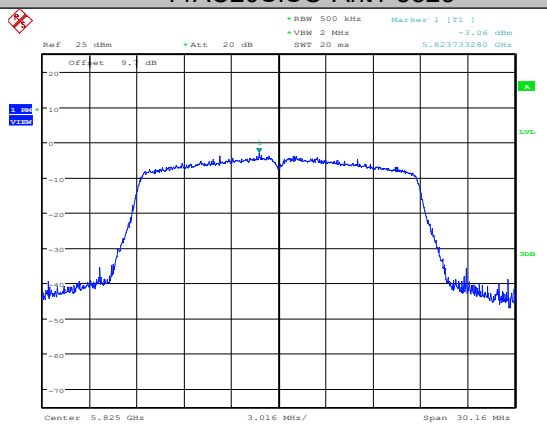
| 11AC20SISO-Ant1-5180 | 11AC20SISO-Ant1-5200 |
|---|---|
|  |  |
| Date: 27.NOV.2020 15:43:09 | Date: 27.NOV.2020 15:48:52 |
| **11AC20SISO-Ant1-5240** | **11AC20SISO-Ant1-5745** |
|  |  |
| Date: 27.NOV.2020 15:53:32 | Date: 27.NOV.2020 15:57:50 |
| **11AC20SISO-Ant1-5785** | **11AC20SISO-Ant1-5825** |
|  |  |
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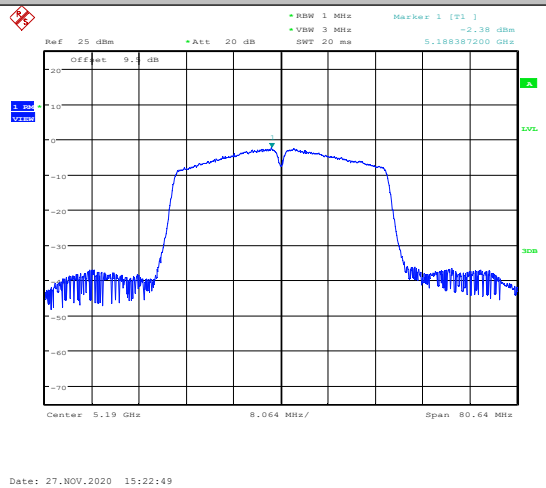
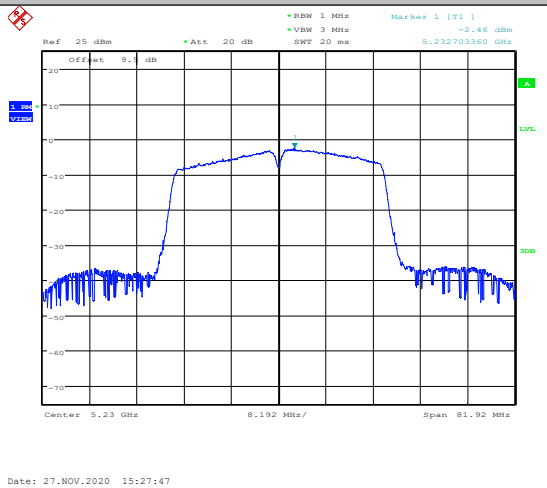
| 11N40SISO-Ant1-5190 | 11N40SISO-Ant1-5230 |
|---|---|
|  |  |
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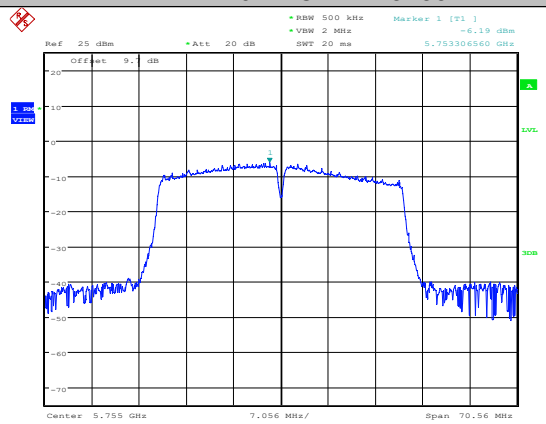
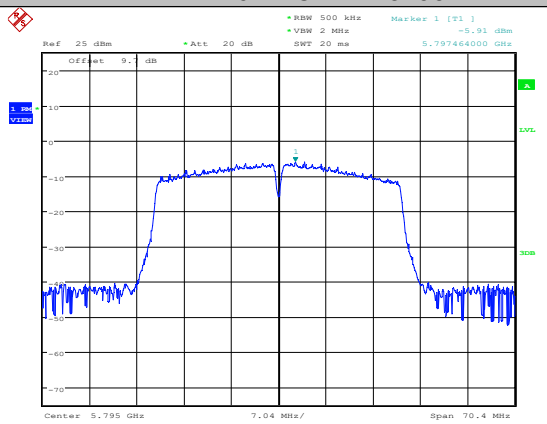
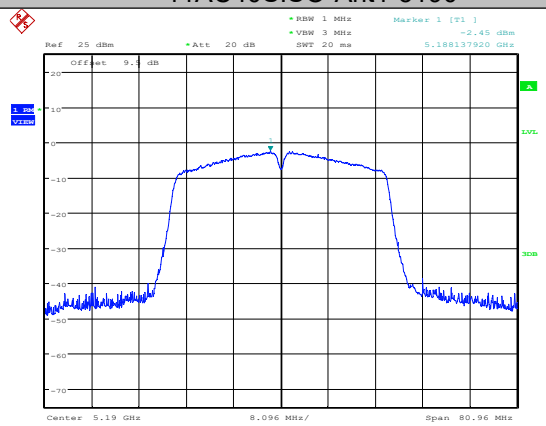
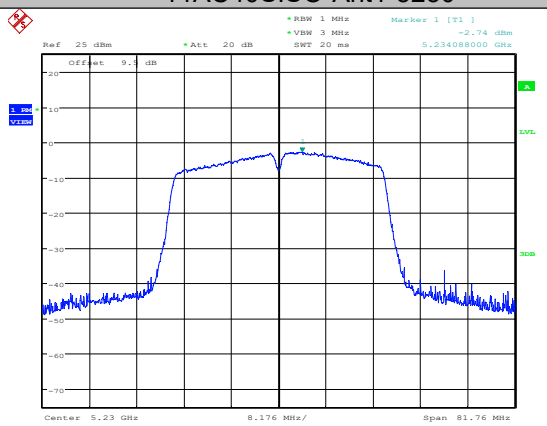
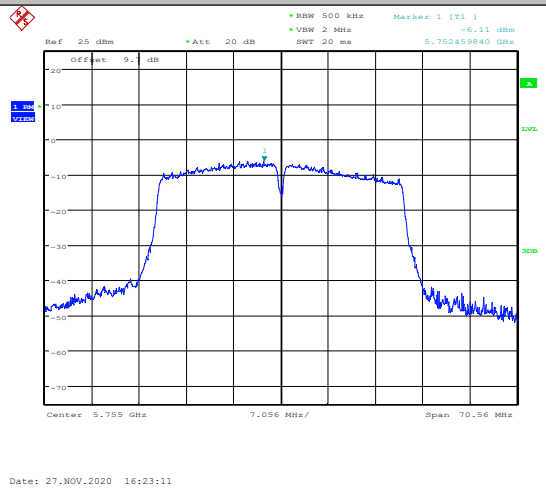
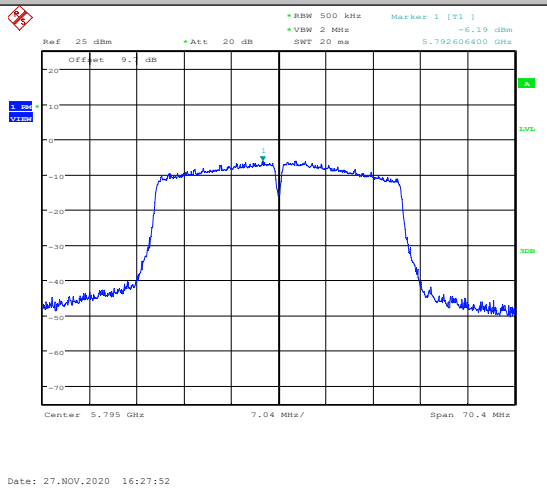
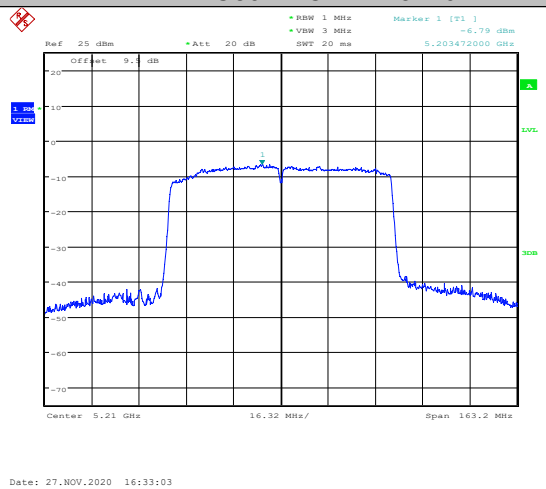
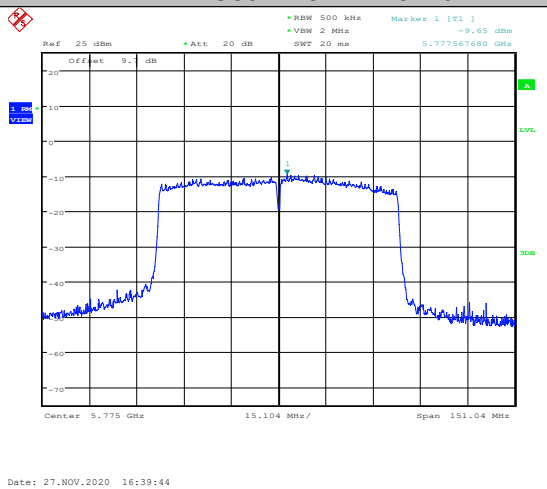
| **11N40SISO-Ant1-5755** | **11N40SISO-Ant1-5795** |
|  |  |
| Date: 27.NOV.2020 15:32:38 | Date: 27.NOV.2020 15:37:35 |
| **11AC40SISO-Ant1-5190** | **11AC40SISO-Ant1-5230** |
|  |  |
| Date: 27.NOV.2020 16:11:35 | Date: 27.NOV.2020 16:17:04 |

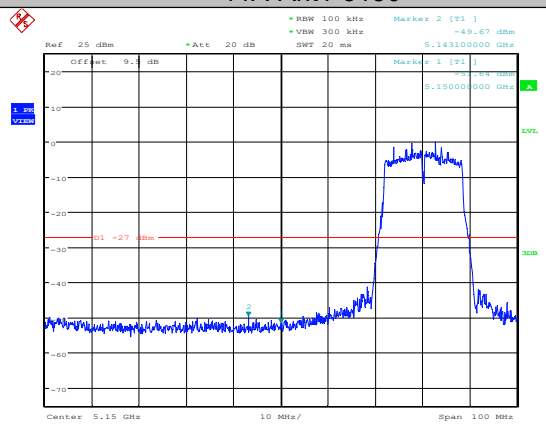
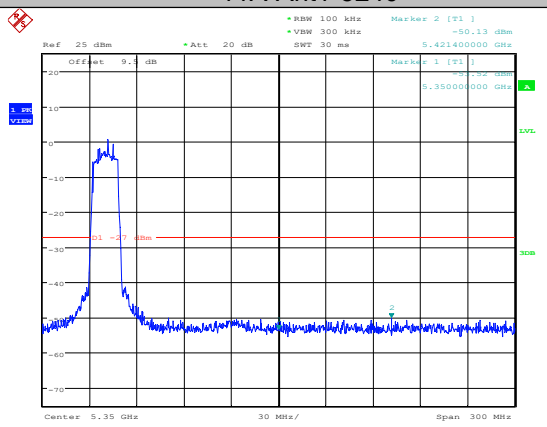
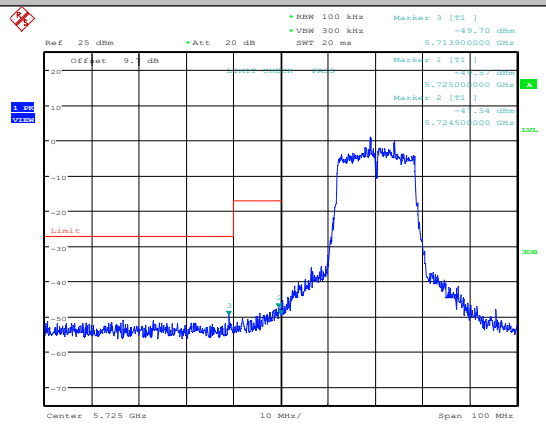
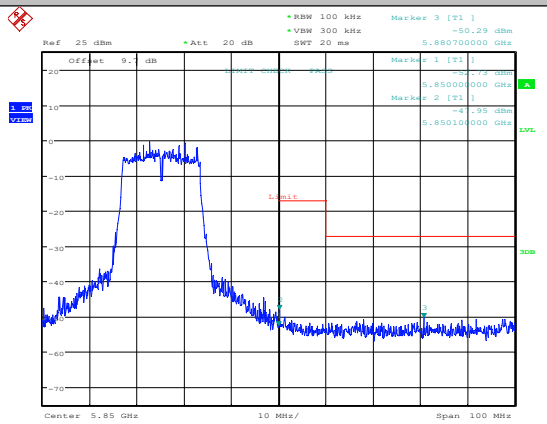
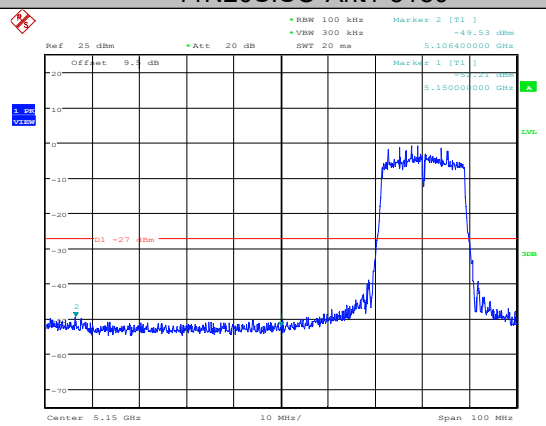
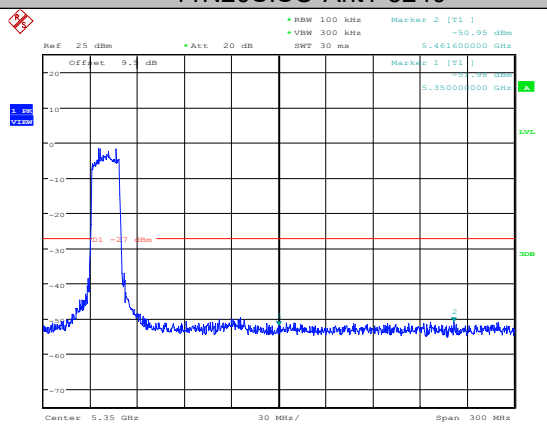
| 11AC40SISO-Ant1-5755 | 11AC40SISO-Ant1-5795 |
| --- | --- |
|  |  |
| 11AC80SISO-Ant1-5210 | 11AC80SISO-Ant1-5775 |
|  |  |

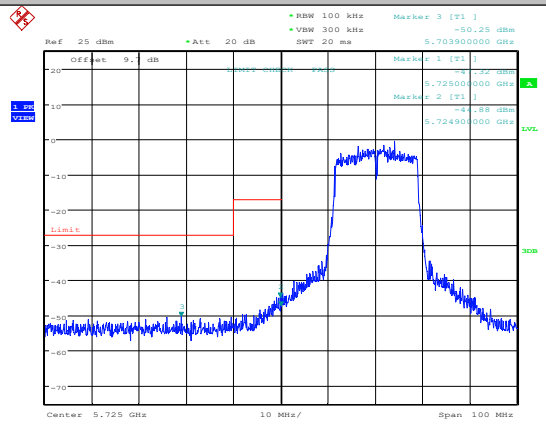
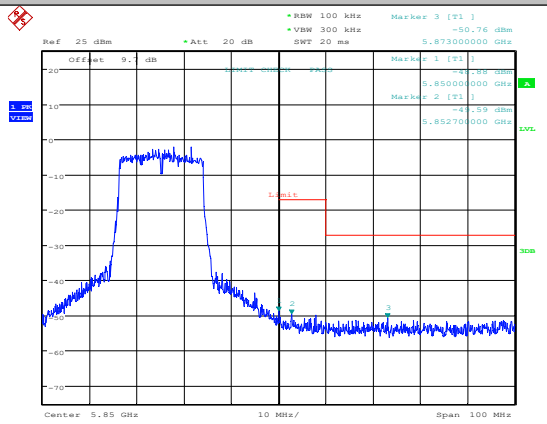
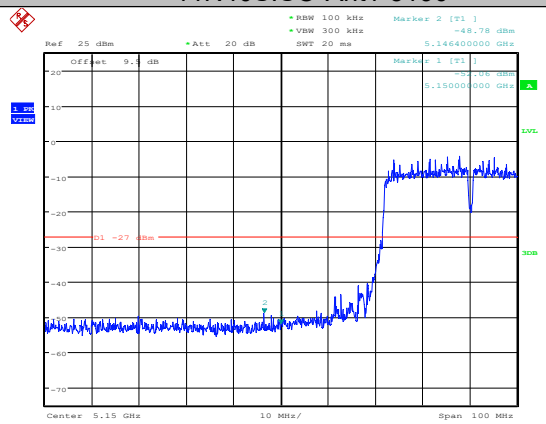
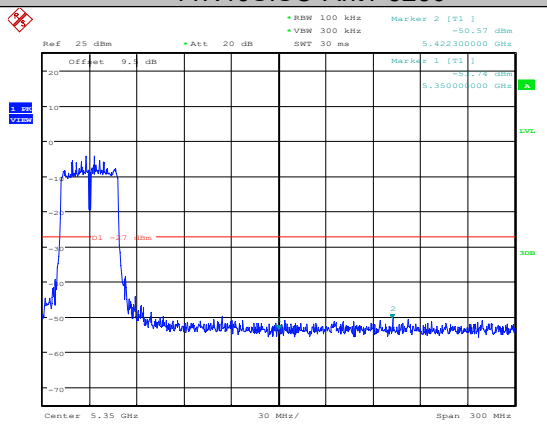
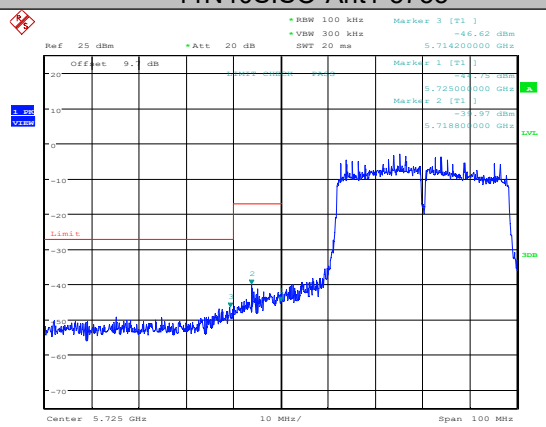
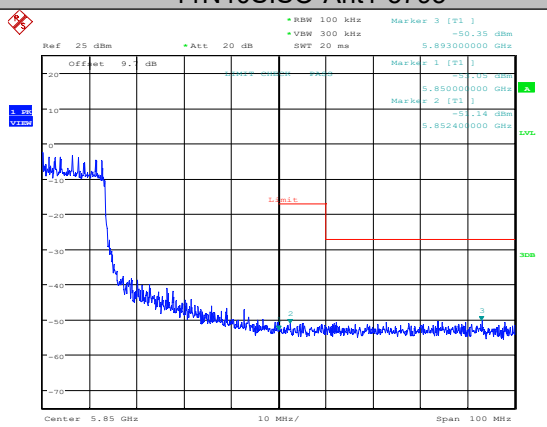
# Appendix D): Band Edge Measurements

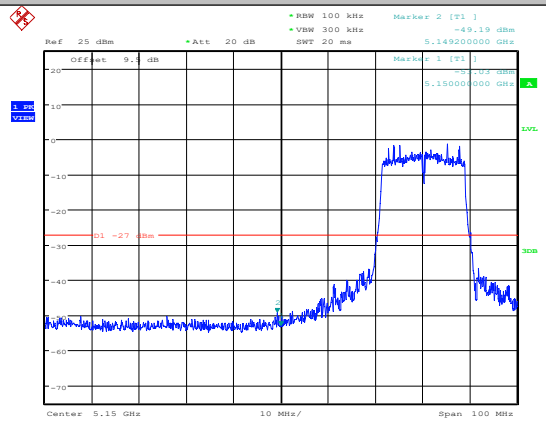
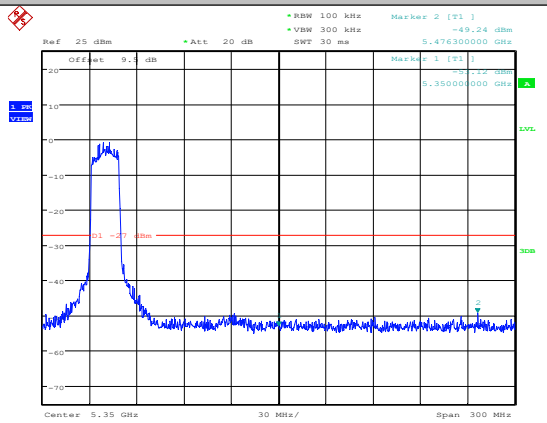
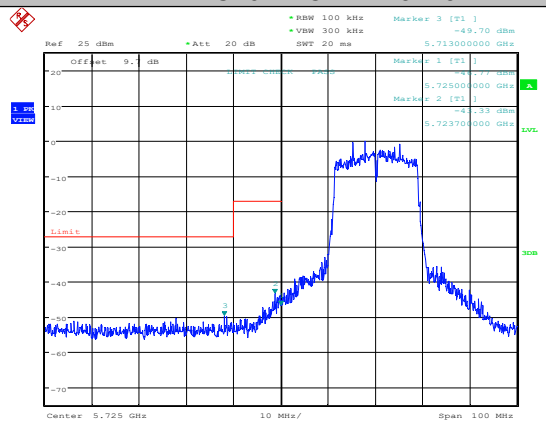
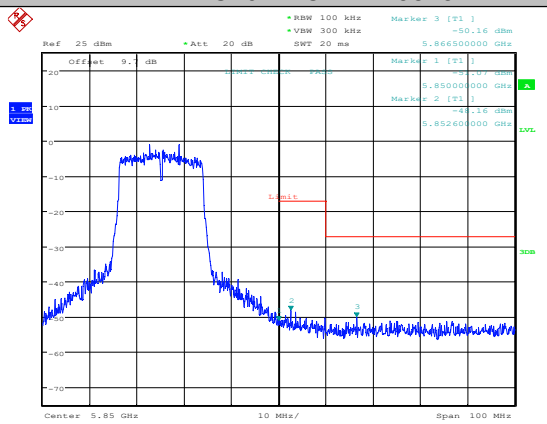
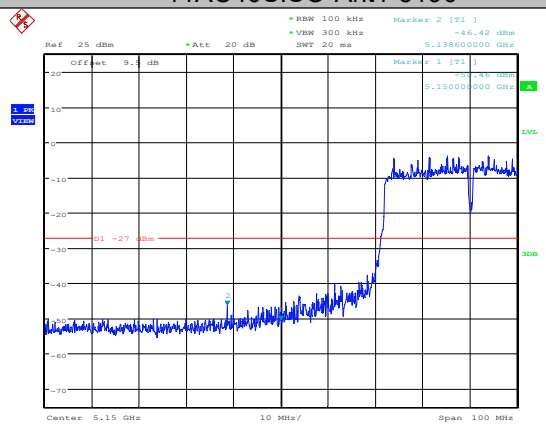
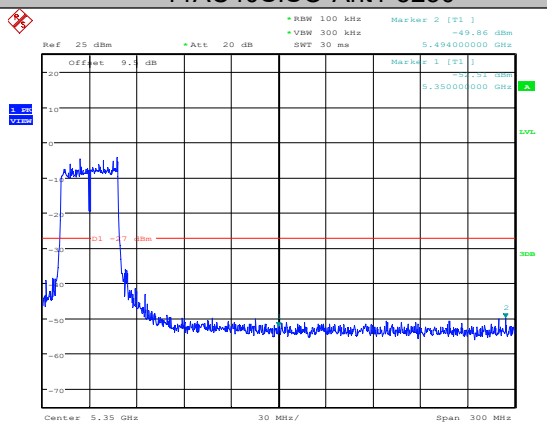
## Result Table

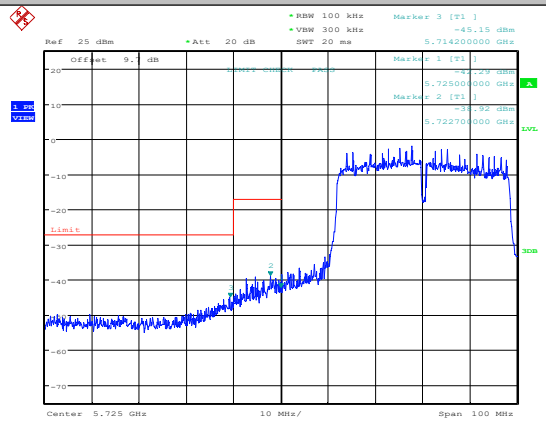
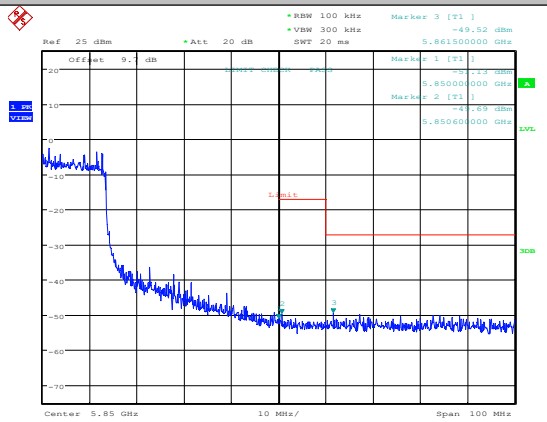
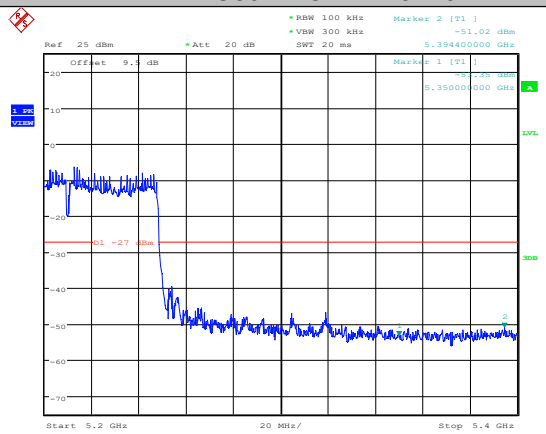
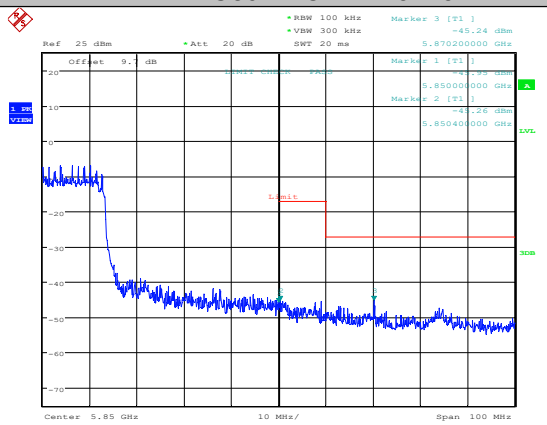
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
|---|---|---|---|---|---|
| 11A | Ant1 | 5180 | -49.67 | | PASS |
| 11A | Ant1 | 5240 | -50.13 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11A | Ant1 | 5745 | -49.7 | -47.54 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | 5850-5860 | Above 5860 | |
| 11A | Ant1 | 5825 | -47.95 | -50.29 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| 11N20 | Ant1 | 5180 | -49.53 | | PASS |
| 11N20 | Ant1 | 5240 | -50.95 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11N20 | Ant1 | 5745 | -50.25 | -44.88 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | 5850-5860 | Above 5860 | |
| 11N20 | Ant1 | 5825 | -49.59 | -50.76 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| 11N40 | Ant1 | 5190 | -52.06 | | PASS |
| 11N40 | Ant1 | 5230 | -53.74 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11N40 | Ant1 | 5755 | -46.62 | -39.97 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | 5850-5860 | Above 5860 | |
| 11N40 | Ant1 | 5795 | -51.14 | -50.35 | PASS |

| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
|---|---|---|---|---|---|
| 11AC20 | Ant1 | 5180 | -49.19 | | PASS |
| 11AC20 | Ant1 | 5240 | -49.24 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11AC20 | Ant1 | 5745 | -49.7 | -43.33 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | 5850-5860 | Above 5860 | |
| 11AC20 | Ant1 | 5825 | -48.16 | -50.16 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| 11AC40 | Ant1 | 5190 | -50.46 | | PASS |
| 11AC40 | Ant1 | 5230 | -52.51 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11AC40 | Ant1 | 5755 | -45.15 | -38.92 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | 5850-5860 | Above 5860 | |
| 11AC40 | Ant1 | 5795 | -49.69 | -49.52 | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| 11AC80 | Ant1 | 5210 | -53.35 | | PASS |
| Test Mode | Antenna | Channel | Max.Level [dBm] | | Verdict |
| | | | Below 5715 | 5715-5725 | |
| 11AC80 | Ant1 | 5775 | -45.26 | -45.24 | PASS |

| 11A-Ant1-5180 | 11A-Ant1-5240 |
|---|---|
|  |  |
| **11A-Ant1-5745** | **11A-Ant1-5825** |
|  |  |
| **11N20SISO-Ant1-5180** | **11N20SISO-Ant1-5240** |
|  |  |

| 11N20SISO-Ant1-5745 | 11N20SISO-Ant1-5825 |
| --- | --- |
|  |  |
| **11N40SISO-Ant1-5190** | **11N40SISO-Ant1-5230** |
|  |  |
| **11N40SISO-Ant1-5755** | **11N40SISO-Ant1-5795** |
|  |  |

| 11AC20SISO-Ant1-5180 | 11AC20SISO-Ant1-5240 |
|---|---|
|  |  |
| **11AC20SISO-Ant1-5745** | **11AC20SISO-Ant1-5825** |
|  |  |
| **11AC40SISO-Ant1-5190** | **11AC40SISO-Ant1-5230** |
|  |  |

| 11AC40SISO-Ant1-5755 | 11AC40SISO-Ant1-5795 |
| --- | --- |
|  |  |
| **11AC80SISO-Ant1-5210** | **11AC80SISO-Ant1-5775** |
|  |  |

# Appendix E): Frequency Stability

**Measurement Data**

| Frequency Stability Versus Temp. | | | |
|---|---|---|---|
| Operating Frequency: 5240 MHz | | | |
| Temp (℃) | Volta ge | Measured Frequency (MHz) | Frequency Drift (ppm) |
| 50 | VN | 5240.03 | 5.72519 |
| 40 | | 5240.03 | 5.72519 |
| 30 | | 5240.02 | 2.86260 |
| 20 | | 5240.02 | 2.86260 |
| 10 | | 5240.02 | 2.86260 |
| 0 | | 5240.02 | 2.86260 |
| -10 | | 5240.02 | 2.86260 |
| -20 | | 5240.03 | 5.72519 |

| Frequency Stability Versus Temp. | | | |
|---|---|---|---|
| Operating Frequency: 5210 MHz | | | |
| Temp. | Volta ge | Measured Frequency (MHz) | Frequency Drift (ppm) |
| TN | VL | 5240.00 | 0.00000 |
| | VN | 5240.03 | 5.72519 |
| | VH | 5240.02 | 2.86260 |

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

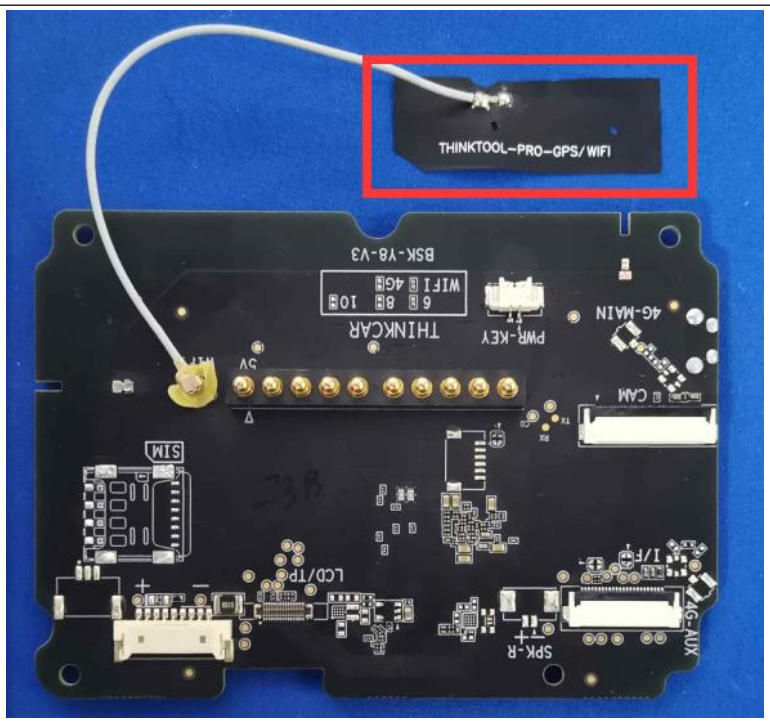
# Appendix F): Antenna Requirement

**15.203 requirement:**

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

**15.407(a)(1) (2) requirement:**

The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

| | |
|---|---|
| **EUT Antenna:** |  |
| The antenna is internal antenna with ipex connector.The best case gain of the 5G WiFi antenna is 3.68dBi@Band 1, 5.46dBi@Band 4. | |

# Appendix G): Operation in the absence of information to the transmit

| |
|---|
| **15.407(c) requirement:**<br>The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met. |
| **Operation in the absence of information to the transmit** |
| While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission. (manufacturer declare ) |

# Appendix H): AC Power Line Conducted Emission

| | |
|---|---|
| Test Procedure: | Test frequency range :150KHz-30MHz<br>1)The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.<br>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement. |
| Limit: | |

| Frequency range (MHz) | Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

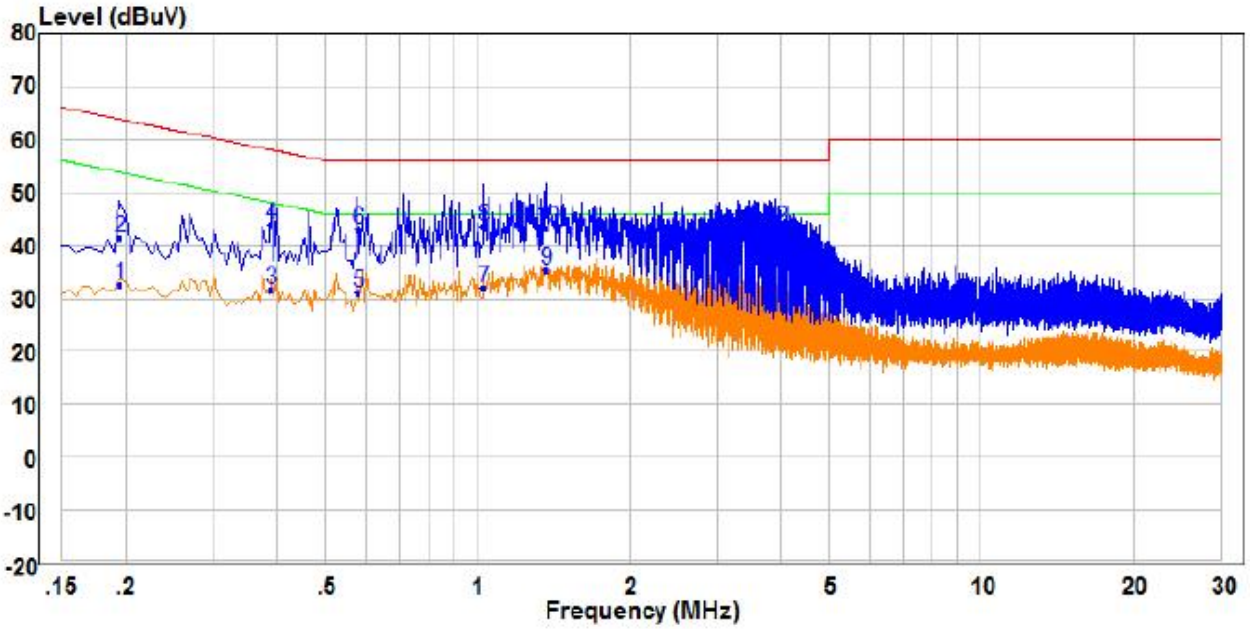
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency

**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

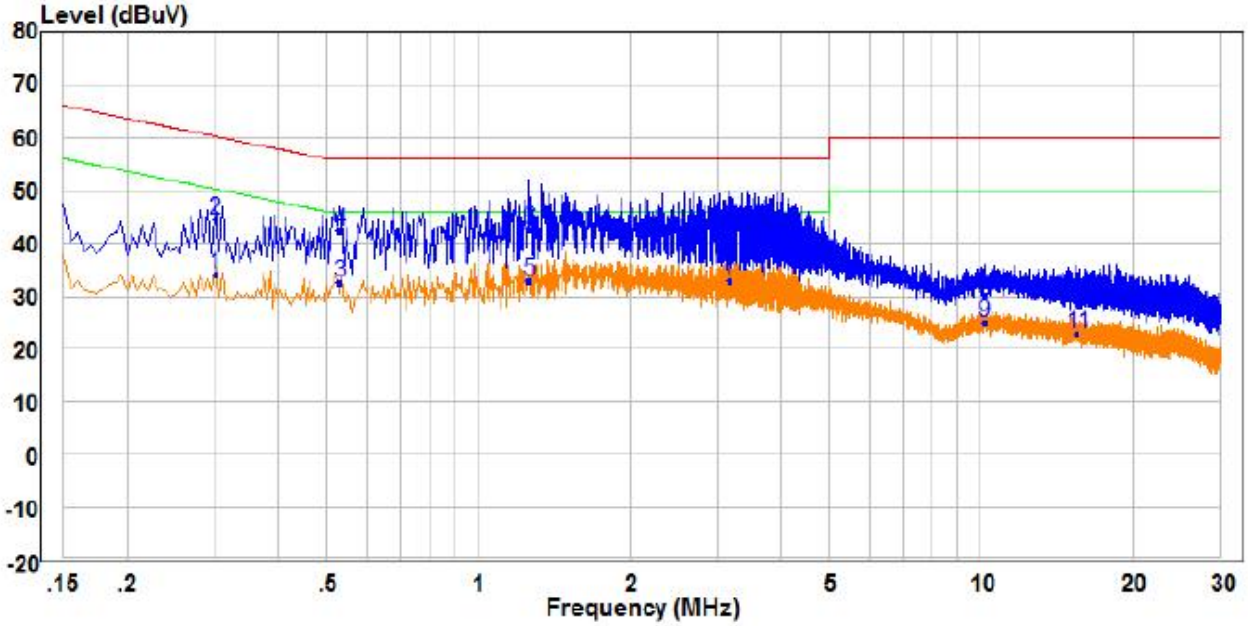
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:




| | | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.195 | 22.97 | 9.49 | 32.46 | 53.82 | -21.36 | Average | Line |
| 2 | | 0.195 | 31.99 | 9.49 | 41.48 | 63.82 | -22.34 | QP | Line |
| 3 | | 0.390 | 22.23 | 9.51 | 31.74 | 48.06 | -16.32 | Average | Line |
| 4 | | 0.390 | 34.34 | 9.51 | 43.85 | 58.06 | -14.21 | QP | Line |
| 5 | | 0.580 | 21.29 | 9.67 | 30.96 | 46.00 | -15.04 | Average | Line |
| 6 | | 0.580 | 33.25 | 9.67 | 42.92 | 56.00 | -13.08 | QP | Line |
| 7 | | 1.030 | 22.50 | 9.53 | 32.03 | 46.00 | -13.97 | Average | Line |
| 8 | QP | 1.030 | 34.07 | 9.53 | 43.60 | 56.00 | -12.40 | QP | Line |
| 9 | PP | 1.370 | 25.66 | 9.53 | 35.19 | 46.00 | -10.81 | Average | Line |
| 10 | | 1.370 | 33.74 | 9.53 | 43.27 | 56.00 | -12.73 | QP | Line |
| 11 | | 3.880 | 18.64 | 9.66 | 28.30 | 46.00 | -17.70 | Average | Line |
| 12 | | 3.880 | 33.44 | 9.66 | 43.10 | 56.00 | -12.90 | QP | Line |

Neutral line:




| | | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.300 | 24.61 | 9.48 | 34.09 | 50.24 | -16.15 | Average | Neutral |
| 2 | | 0.300 | 34.85 | 9.48 | 44.33 | 60.24 | -15.91 | QP | Neutral |
| 3 | | 0.530 | 22.97 | 9.63 | 32.60 | 46.00 | -13.40 | Average | Neutral |
| 4 | | 0.530 | 32.62 | 9.63 | 42.25 | 56.00 | -13.75 | QP | Neutral |
| 5 | AV | 1.265 | 23.29 | 9.71 | 33.00 | 46.00 | -13.00 | Average | Neutral |
| 6 | | 1.265 | 32.93 | 9.71 | 42.64 | 56.00 | -13.36 | QP | Neutral |
| 7 | | 3.170 | 23.15 | 9.75 | 32.90 | 46.00 | -13.10 | Average | Neutral |
| 8 | PP | 3.170 | 33.57 | 9.75 | 43.32 | 56.00 | -12.68 | QP | Neutral |
| 9 | | 10.165 | 14.94 | 9.95 | 24.89 | 50.00 | -25.11 | Average | Neutral |
| 10 | | 10.165 | 20.31 | 9.95 | 30.26 | 60.00 | -29.74 | QP | Neutral |
| 11 | | 15.530 | 12.86 | 9.93 | 22.79 | 50.00 | -27.21 | Average | Neutral |
| 12 | | 15.530 | 18.68 | 9.93 | 28.61 | 60.00 | -31.39 | QP | Neutral |

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. The 6Mbps of rate of 802.11A_5240 is the worst case, only the worst data recorded in the report.

# Appendix I): Restricted bands around fundamental frequency (Radiated Emission)

Receiver Setup:

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 30MHz-1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Test Procedure:

**Below 1GHz test procedure as below:**

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

**Above 1GHz test procedure as below:**

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

| Frequency | Limit (dBμV/m @3cm) | Remark |
|---|---|---|
| 30MHz-88MHz | 40.0 | Quasi-peak Value |
| 88MHz-216MHz | 43.5 | Quasi-peak Value |
| 216MHz-960MHz | 46.0 | Quasi-peak Value |
| 960MHz-1GHz | 54.0 | Quasi-peak Value |
| Above 1GHz | 54.0 | Average Value |
| | 74.0 | Peak Value |

**Test plot as follows:**

| Worse case mode: | | 802.11a(6Mbps) | | Test channel: | | 36 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150.00 | 53.99 | -3.63 | 50.36 | 74 | -23.64 | peak | H |
| 5150.00 | 42.81 | -3.63 | 39.18 | 54 | -14.82 | AVG | H |
| 5150.00 | 55.58 | -3.63 | 51.95 | 74 | -22.05 | peak | V |
| 5150.00 | 42.97 | -3.63 | 39.34 | 54 | -14.66 | AVG | V |

| Worse case mode: | | 802.11a(6Mbps) | | Test channel: | | 48 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5350.00 | 53.92 | -3.59 | 50.33 | 74 | -23.67 | peak | H |
| 5350.00 | 43.16 | -3.59 | 39.57 | 54 | -14.43 | AVG | H |
| 5350.00 | 56.21 | -3.59 | 52.62 | 74 | -21.38 | peak | V |
| 5350.00 | 44.68 | -3.59 | 41.09 | 54 | -12.91 | AVG | V |

| Worse case mode: | | 802.11a(6Mbps) | | Test channel: | | 149 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 56.12 | -3.46 | 52.66 | 68.2 | -15.54 | peak | H |
| 5738.38 | 96.10 | -3.44 | 92.66 | 122.2 | -29.54 | peak | H |
| 5650 | 58.59 | -3.46 | 55.13 | 68.2 | -13.07 | peak | V |
| 5742.65 | 97.85 | -3.44 | 94.41 | 122.2 | -27.79 | peak | V |

| Worse case mode: | | 802.11a(6Mbps) | | Test channel: | | 165 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5824.10 | 97.59 | -3.42 | 94.17 | 122.2 | -28.03 | peak | H |
| 5925 | 56.41 | -3.41 | 53.00 | 68.2 | -15.20 | peak | H |
| 5827.03 | 96.95 | -3.42 | 93.53 | 122.2 | -28.67 | peak | V |
| 5925 | 58.06 | -3.41 | 54.65 | 68.2 | -13.55 | peak | V |

| Worse case mode: | | 802.11n(HT20)(6.5Mbps) | | Test channel: | | 36 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150.00 | 58.93 | -3.63 | 50.28 | 74 | -23.72 | peak | H |
| 5150.00 | 44.56 | -3.63 | 40.60 | 54 | -13.40 | AVG | H |
| 5150.00 | 59.65 | -3.63 | 51.92 | 74 | -22.08 | peak | V |
| 5150.00 | 46.6 | -3.63 | 41.49 | 54 | -12.51 | AVG | V |

| Worse case mode: | | 802.11n(HT20)(6.5Mbps) | | Test channel: | | 48 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5350.00 | 54.62 | -3.59 | 51.03 | 74 | -22.97 | peak | H |
| 5350.00 | 43.37 | -3.59 | 39.78 | 54 | -14.22 | AVG | H |
| 5350.00 | 55.78 | -3.59 | 52.19 | 74 | -21.81 | peak | V |
| 5350.00 | 44.62 | -3.59 | 41.03 | 54 | -12.97 | AVG | V |

| Worse case mode: | | 802.11n(HT20)(6.5Mbps) | | Test channel: | | 149 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 57.44 | -3.46 | 53.98 | 68.2 | -14.22 | peak | H |
| 5738.25 | 97.20 | -3.44 | 93.76 | 122.2 | -28.44 | peak | H |
| 5650 | 55.75 | -3.46 | 52.29 | 68.2 | -15.91 | peak | V |
| 5742.95 | 96.44 | -3.44 | 93.00 | 122.2 | -29.20 | peak | V |

| Worse case mode: | | 802.11n(HT20)(6.5Mbps) | | Test channel: | | 165 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5823.48 | 98.52 | -3.42 | 95.10 | 122.2 | -27.10 | peak | H |
| 5925 | 57.03 | -3.41 | 53.62 | 68.2 | -14.58 | peak | H |
| 5820.43 | 98.37 | -3.42 | 94.95 | 122.2 | -27.25 | peak | V |
| 5925 | 57.78 | -3.41 | 54.37 | 68.2 | -13.83 | peak | V |

| Worse case mode: | | 802.11n(HT40)(13.5Mbps) | | Test channel: | | 38 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150 | 56.08 | -3.63 | 52.45 | 74 | -21.55 | peak | H |
| 5150 | 44.07 | -3.63 | 40.44 | 54 | -13.56 | AVG | H |
| 5150 | 54.40 | -3.63 | 50.77 | 74 | -23.23 | peak | V |
| 5150 | 45.53 | -3.63 | 41.90 | 54 | -12.10 | AVG | V |

| Worse case mode: | | 802.11n(HT40)(13.5Mbps) | | Test channel: | | 46 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5350.00 | 55.78 | -3.59 | 52.19 | 74 | -21.81 | peak | H |
| 5350.00 | 43.60 | -3.59 | 40.01 | 54 | -13.99 | AVG | H |
| 5350.00 | 55.84 | -3.59 | 52.25 | 74 | -21.75 | peak | V |
| 5350.00 | 45.08 | -3.59 | 41.49 | 54 | -12.51 | AVG | V |

| Worse case mode: | | 802.11n(HT40)(13.5Mbps) | | Test channel: | | 151 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 57.15 | -3.46 | 53.69 | 68.2 | -14.51 | peak | H |
| 5757.68 | 96.75 | -3.44 | 93.31 | 122.2 | -28.89 | peak | H |
| 5650 | 56.40 | -3.46 | 52.94 | 68.2 | -15.26 | peak | V |
| 5750.47 | 98.56 | -3.44 | 95.12 | 122.2 | -27.08 | peak | V |

| Worse case mode: | | 802.11n(HT40)(13.5Mbps) | | Test channel: | | 159 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5786.79 | 97.54 | -3.42 | 94.12 | 122.2 | -28.08 | peak | H |
| 5925 | 58.46 | -3.41 | 55.05 | 68.2 | -13.15 | peak | H |
| 5786.23 | 95.75 | -3.42 | 92.33 | 122.2 | -29.87 | peak | V |
| 5925 | 56.42 | -3.41 | 53.01 | 68.2 | -15.19 | peak | V |

| Worse case mode: | | 802.11ac(HT20)(6.5Mbps) | | Test channel: | | 36 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150.00 | 54.20 | -3.63 | 50.57 | 74 | -23.43 | peak | H |
| 5150.00 | 45.21 | -3.63 | 41.58 | 54 | -12.42 | AVG | H |
| 5150.00 | 54.70 | -3.63 | 51.07 | 74 | -22.93 | peak | V |
| 5150.00 | 44.54 | -3.63 | 40.91 | 54 | -13.09 | AVG | V |

| Worse case mode: | | 802.11ac(HT20)(6.5Mbps) | | Test channel: | | 48 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5350.00 | 56.22 | -3.59 | 52.63 | 74 | -21.37 | peak | H |
| 5350.00 | 43.52 | -3.59 | 39.93 | 54 | -14.07 | AVG | H |
| 5350.00 | 54.77 | -3.59 | 51.18 | 74 | -22.82 | peak | V |
| 5350.00 | 43.64 | -3.59 | 40.05 | 54 | -13.95 | AVG | V |

| Worse case mode: | | 802.11ac(HT20)(6.5Mbps) | | Test channel: | | 149 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 57.58 | -3.46 | 54.12 | 68.2 | -14.08 | peak | H |
| 5738.69 | 97.98 | -3.44 | 94.54 | 122.2 | -27.66 | peak | H |
| 5650 | 55.81 | -3.46 | 52.35 | 68.2 | -15.85 | peak | V |
| 5743.37 | 98.49 | -3.44 | 95.05 | 122.2 | -27.15 | peak | V |

| Worse case mode: | | 802.11ac(HT20)(6.5Mbps) | | Test channel: | | 165 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5820.70 | 96.40 | -3.42 | 92.98 | 122.2 | -29.22 | peak | H |
| 5925 | 56.85 | -3.41 | 53.44 | 68.2 | -14.76 | peak | H |
| 5827.28 | 97.23 | -3.42 | 93.81 | 122.2 | -28.39 | peak | V |
| 5925 | 57.74 | -3.41 | 54.33 | 68.2 | -13.87 | peak | V |

| Worse case mode: | | 802.11ac(VHT40)(13.5Mbps) | | Test channel: | | 38 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150.00 | 55.40 | -3.63 | 51.77 | 74 | -22.23 | peak | H |
| 5150.00 | 44.43 | -3.63 | 40.80 | 54 | -13.20 | AVG | H |
| 5150.00 | 56.51 | -3.63 | 52.88 | 74 | -21.12 | peak | V |
| 5150.00 | 42.86 | -3.63 | 39.23 | 54 | -14.77 | AVG | V |

| Worse case mode: | | 802.11ac(VHT40)(13.5Mbps) | | Test channel: | | 46 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5350.00 | 55.67 | -3.59 | 52.08 | 74 | -21.92 | peak | H |
| 5350.00 | 43.95 | -3.59 | 40.36 | 54 | -13.64 | AVG | H |
| 5350.00 | 56.18 | -3.59 | 52.59 | 74 | -21.41 | peak | V |
| 5350.00 | 45.13 | -3.59 | 41.54 | 54 | -12.46 | AVG | V |

| Worse case mode: | | 802.11ac(VHT40)(13.5Mbps) | | Test channel: | | 151 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 58.56 | -3.46 | 55.10 | 68.2 | -13.10 | peak | H |
| 5750.13 | 98.59 | -3.44 | 95.15 | 122.2 | -27.05 | peak | H |
| 5650 | 56.03 | -3.46 | 52.57 | 68.2 | -15.63 | peak | V |
| 5751.61 | 98.14 | -3.44 | 94.70 | 122.2 | -27.50 | peak | V |

| Worse case mode: | | 802.11ac(VHT40)(13.5Mbps) | | Test channel: | | 159 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5793.85 | 97.95 | -3.42 | 94.53 | 122.2 | -27.67 | peak | H |
| 5925 | 58.35 | -3.41 | 54.94 | 68.2 | -13.26 | peak | H |
| 5794.14 | 96.62 | -3.42 | 93.20 | 122.2 | -29.00 | peak | V |
| 5925 | 57.95 | -3.41 | 54.54 | 68.2 | -13.66 | peak | V |

| Worse case mode: | | 802.11ac(VHT80)(29.3Mbps) | | Test channel: | | 42 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5150.00 | 56.23 | -3.63 | 52.60 | 74 | -21.40 | peak | H |
| 5150.00 | 45.08 | -3.63 | 41.45 | 54 | -12.55 | AVG | H |
| 5150.00 | 55.25 | -3.63 | 51.62 | 74 | -22.38 | peak | V |
| 5150.00 | 42.67 | -3.63 | 39.04 | 54 | -14.96 | AVG | V |
| 5350.00 | 55.31 | -3.59 | 51.72 | 74 | -22.28 | peak | H |
| 5350.00 | 44.69 | -3.59 | 41.10 | 54 | -12.90 | AVG | H |
| 5350.00 | 54.62 | -3.59 | 51.03 | 74 | -22.97 | peak | V |
| 5350.00 | 43.24 | -3.59 | 39.65 | 54 | -14.35 | AVG | V |

| Worse case mode: | | 802.11ac(VHT80)(29.3Mbps) | | Test channel: | | 155 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 5650 | 56.33 | -3.46 | 52.87 | 68.2 | -15.33 | peak | H |
| 5773.45 | 96.39 | -3.44 | 92.95 | 122.2 | -29.25 | peak | H |
| 5925 | 58.54 | -3.46 | 55.08 | 68.2 | -13.12 | peak | H |
| 5650 | 55.63 | -3.41 | 52.22 | 68.2 | -15.98 | peak | V |
| 5774.91 | 96.80 | -3.42 | 93.38 | 122.2 | -28.82 | peak | V |
| 5925 | 56.52 | -3.41 | 53.11 | 68.2 | -15.09 | peak | V |

Note:
1) Through Pre-scan transmitting mode with all kind of modulation and data rate, find the 6Mbps is the worst case of 802.11a; MCS0 is the worst case of 802.11n(20M)(40M); MCS0 is the worst case of 802.11ac(20M)(40M)(80M); and then Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading - Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

# Appendix J): Radiated Spurious Emissions

**Receiver Setup:**

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 0.009MHz-0.090MHz | Peak | 10kHz | 30kHz | Peak |
| 0.009MHz-0.090MHz | Average | 10kHz | 30kHz | Average |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 0.110MHz-0.490MHz | Peak | 10kHz | 30kHz | Peak |
| 0.110MHz-0.490MHz | Average | 10kHz | 30kHz | Average |
| 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

**Test Procedure:**

**Below 1GHz test procedure as below:**

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre)
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

| Frequency | Field strength (microvolt/meter) | Limit (dBμV/cm) | Remark | Measurement distance (cm) |
|---|---|---|---|---|
| 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| 1.705MHz-30MHz | 30 | - | - | 30 |
| 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| Above 1GHz | 500 | 54.0 | Average | 3 |

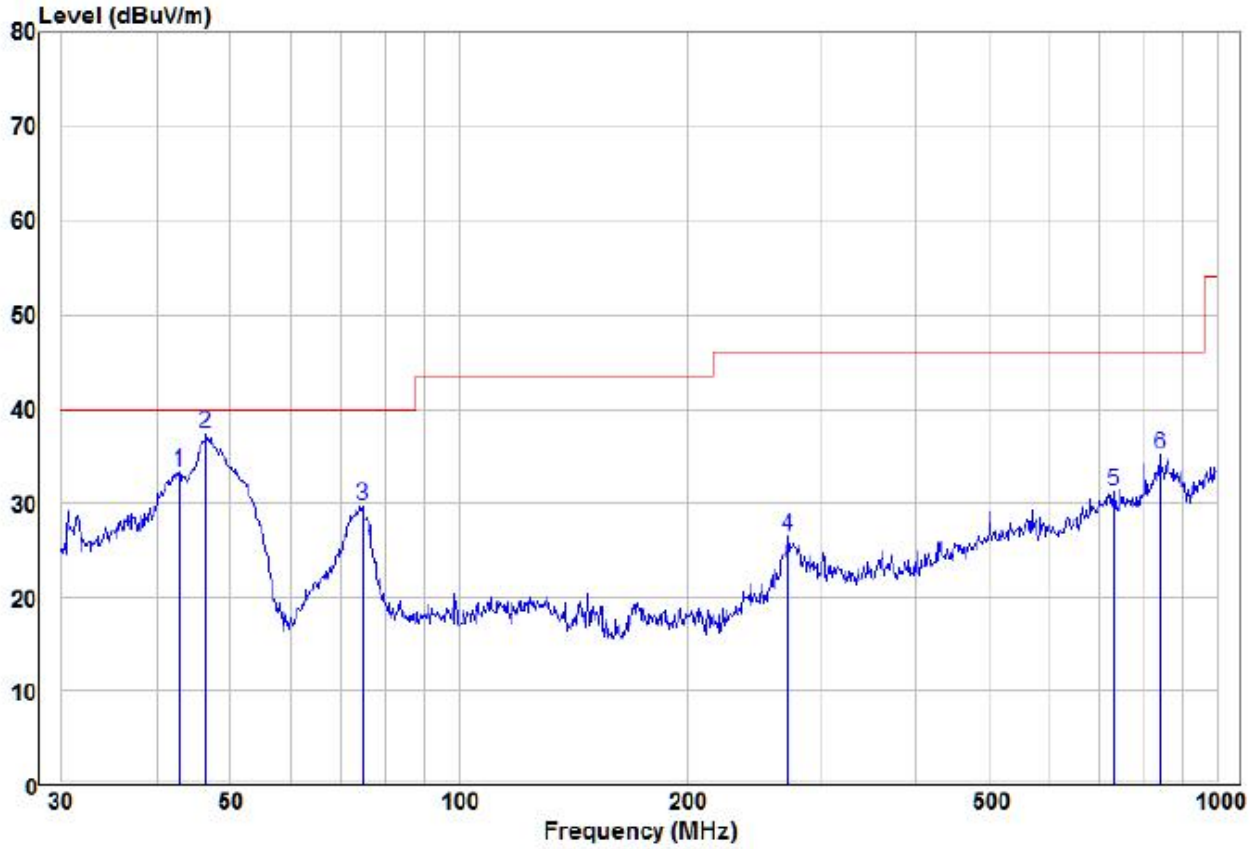
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test result: PASS

## Test Data:

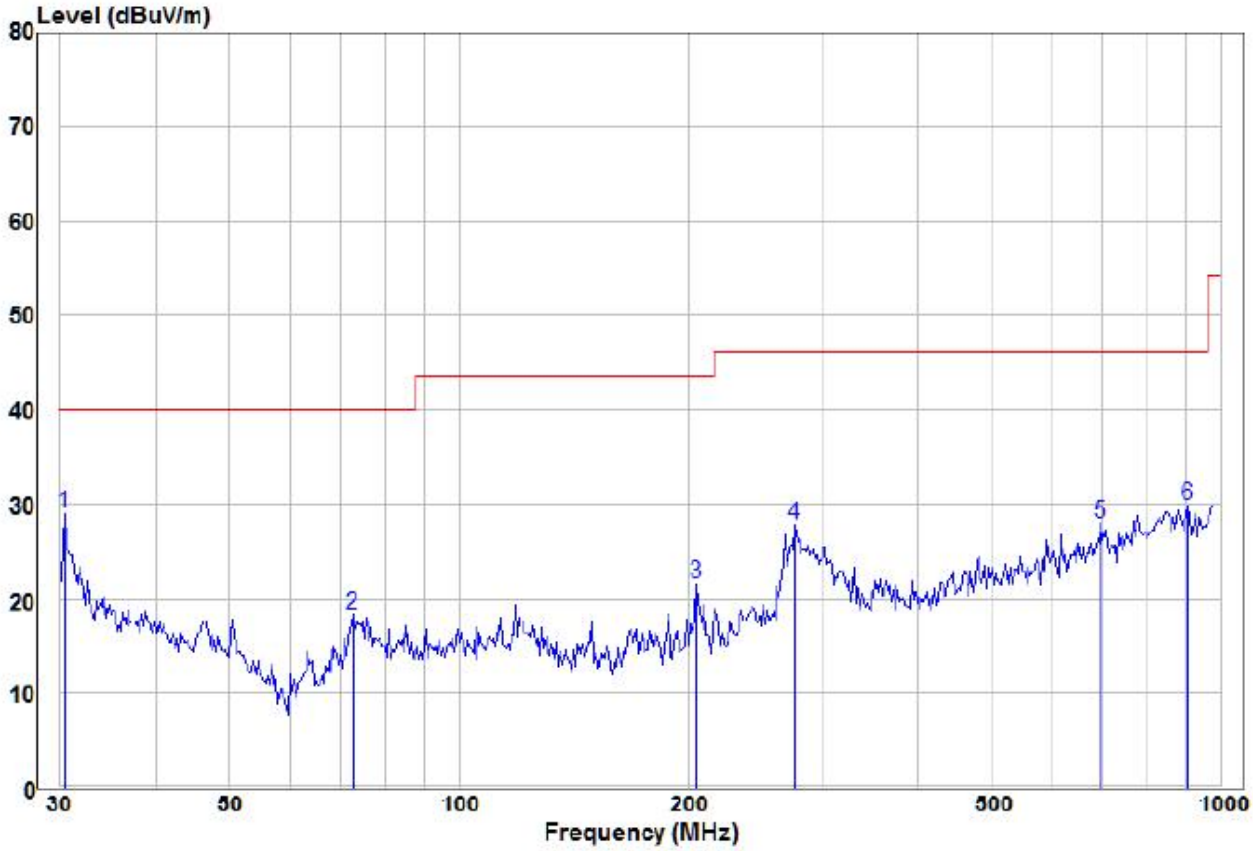
**Radiated Emission below 1GHz**

| 30MHz~1GHz | | |
|---|---|---|
| Test mode: | Transmitting | Vertical |




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 42.90 | 21.76 | 11.44 | 33.20 | 40.00 | -6.80 | Peak | VERTICAL |
| 2 pp | 46.50 | 27.60 | 9.73 | 37.33 | 40.00 | -2.67 | Peak | VERTICAL |
| 3 | 74.66 | 20.77 | 8.92 | 29.69 | 40.00 | -10.31 | Peak | VERTICAL |
| 4 | 272.28 | 13.71 | 12.81 | 26.52 | 46.00 | -19.48 | Peak | VERTICAL |
| 5 | 729.36 | 9.99 | 21.29 | 31.28 | 46.00 | -14.72 | Peak | VERTICAL |
| 6 | 839.18 | 11.00 | 24.10 | 35.10 | 46.00 | -10.90 | Peak | VERTICAL |

| Test mode: | Transmitting | Horizontal |
|---|---|---|




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 pp | 30.38 | 13.17 | 15.81 | 28.98 | 40.00 | -11.02 | Peak | HORIZONTAL |
| 2 | 72.48 | 9.84 | 8.56 | 18.40 | 40.00 | -21.60 | Peak | HORIZONTAL |
| 3 | 205.01 | 13.02 | 8.65 | 21.67 | 43.50 | -21.83 | Peak | HORIZONTAL |
| 4 | 276.16 | 14.86 | 12.94 | 27.80 | 46.00 | -18.20 | Peak | HORIZONTAL |
| 5 | 695.88 | 7.00 | 21.02 | 28.02 | 46.00 | -17.98 | Peak | HORIZONTAL |
| 6 | 903.82 | 6.77 | 23.06 | 29.83 | 46.00 | -16.17 | Peak | HORIZONTAL |

## Transmitter Emission above 1GHz

| Test mode: | 802.11a(6Mbps) | | | Test channel: | | 48 | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 10480 | 49.20 | 2.31 | 51.51 | 74 | -22.49 | peak | H |
| 10480 | 38.41 | 2.31 | 40.72 | 54 | -13.28 | AVG | H |
| 15720 | 46.68 | 3.79 | 50.47 | 74 | -23.53 | peak | H |
| 15720 | 35.86 | 3.79 | 39.65 | 54 | -14.35 | AVG | H |
| 10480 | 49.44 | 2.31 | 51.75 | 74 | -22.25 | peak | V |
| 10480 | 38.61 | 2.31 | 40.92 | 54 | -13.08 | AVG | V |
| 15720 | 47.36 | 3.79 | 51.15 | 74 | -22.85 | peak | V |
| 15720 | 37.75 | 3.79 | 41.54 | 54 | -12.46 | AVG | V |

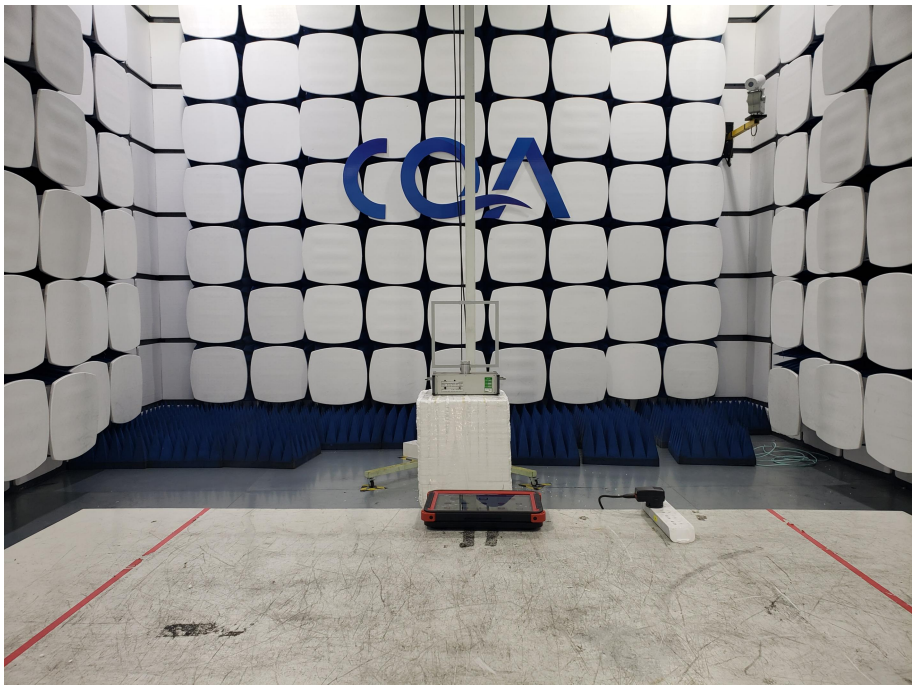
Remark:

1) The 6Mbps of rate of 802.11a at 48 channel is the worst case, only the worst data recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
3) Scan from 9kHz to 40GHz,The disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

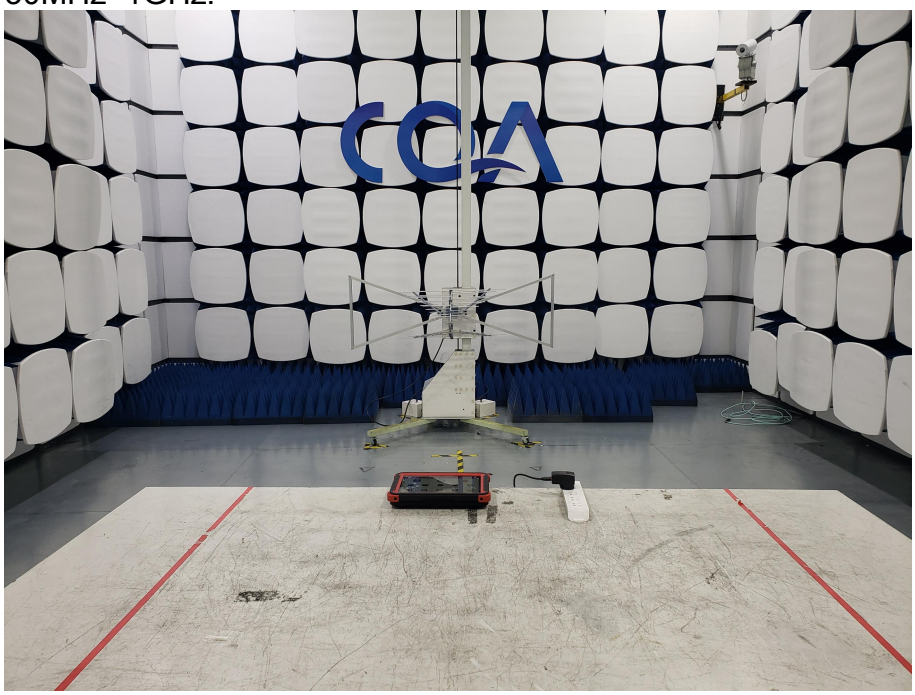
# 8 Photographs - EUT Test Setup

## 8.1 Radiated Spurious Emission

9kHz~30MHz:

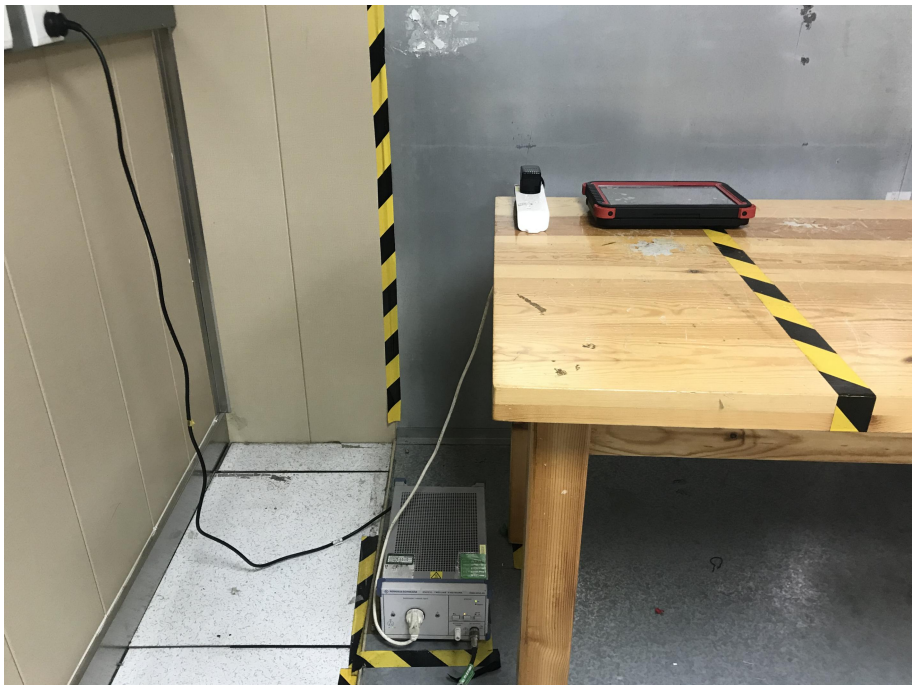


30MHz~1GHz:



Above 1GHz:

## 8.2 Conducted Emission



# 9 Photographs - EUT Constructional Details

Refer to PHOTOGRAPHS OF EUT for CQASZ20231202287E-01.

*** End of Report ***