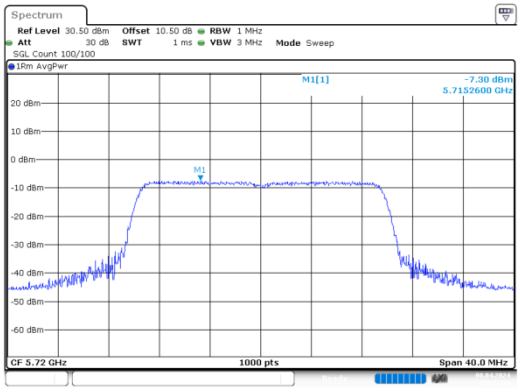
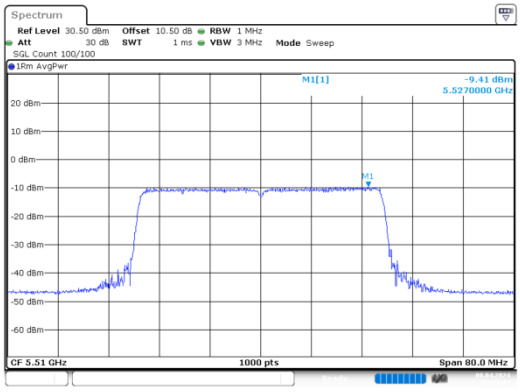
ax20_5720MHz_RU_Full_Chain 0



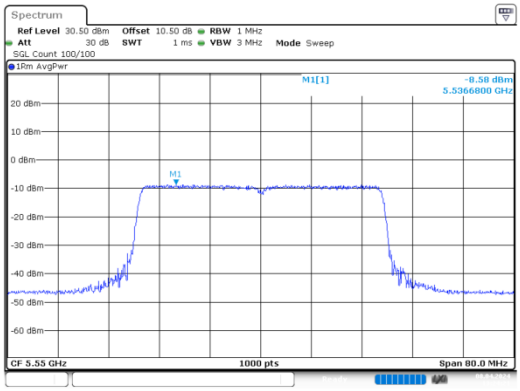

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:22:57

ax40_5510MHz_RU_Full_Chain 0



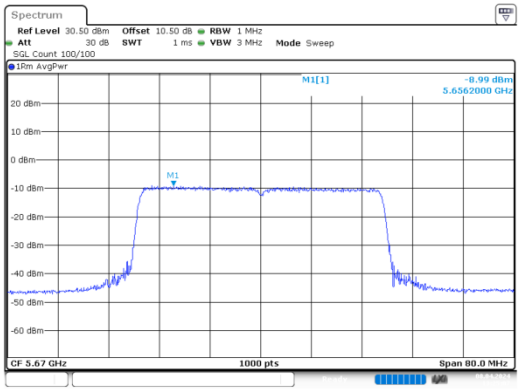

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:23:40

ax40_5550MHz_RU_Full_Chain 0



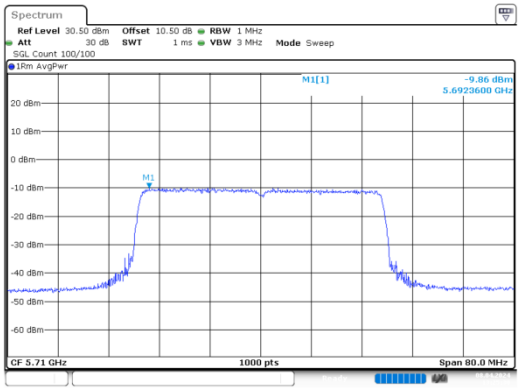

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:24:22

ax40_5670MHz_RU_Full_Chain 0



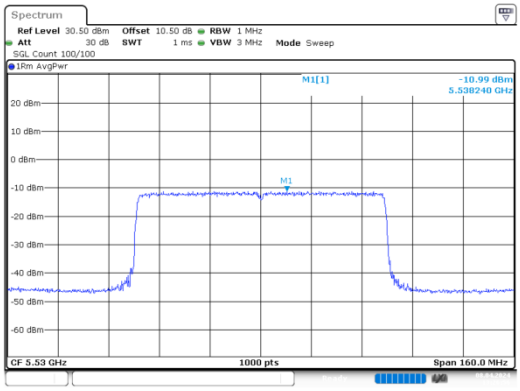

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:25:08

ax40_5710MHz_RU_Full_Chain 0



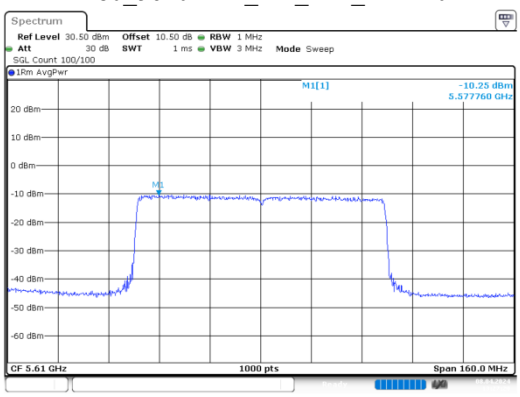

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:25:30

ax80_5530MHz_RU_Full_Chain 0



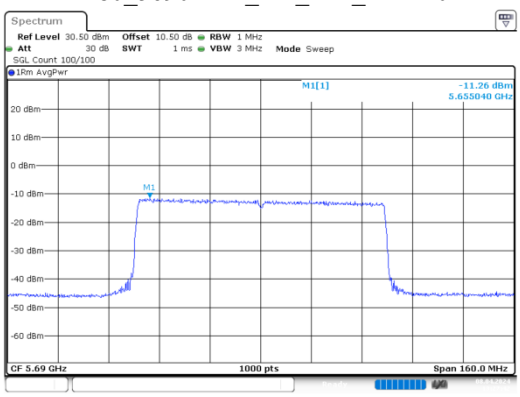

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:26:57

ax80_5610MHz_RU_Full_Chain 0




ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:27:21

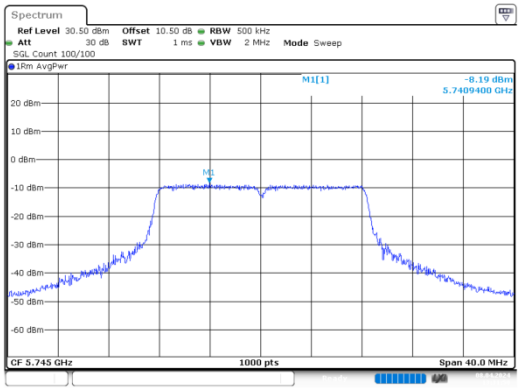
ax80_5690MHz_RU_Full_Chain 0




ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:27:43

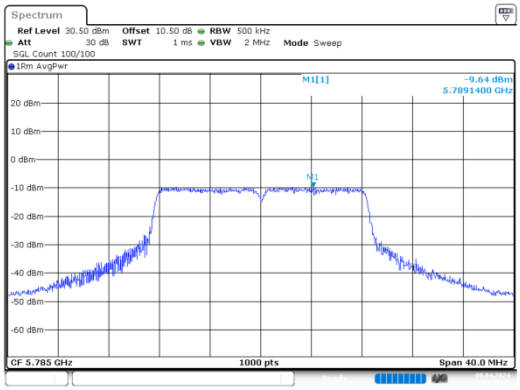
**5725-5850 MHz**

a_5745MHz_Chain 0



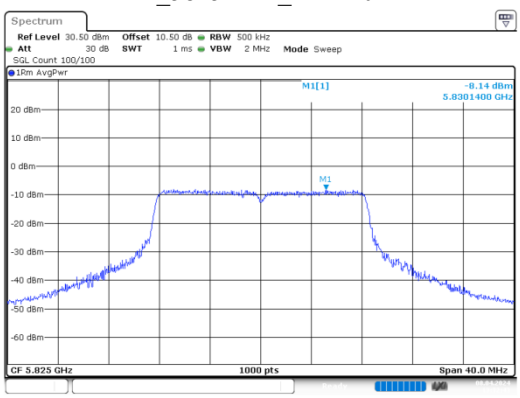

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:31:51

a_5785MHz_Chain 0



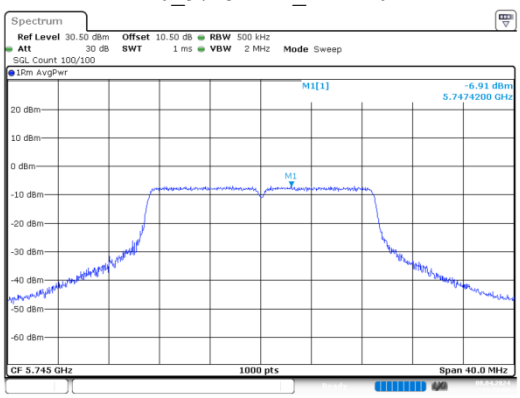

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:32:16

a_5825MHz_Chain 0



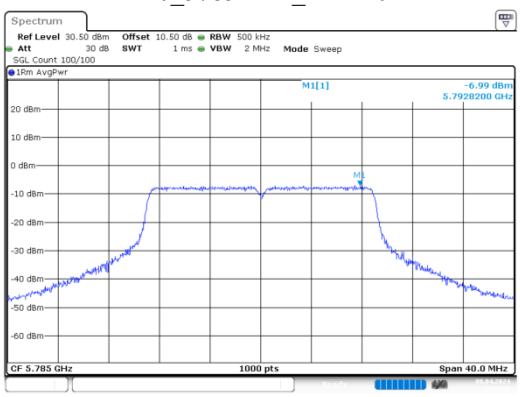

ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:32:44

n20_5745MHz_Chain 0

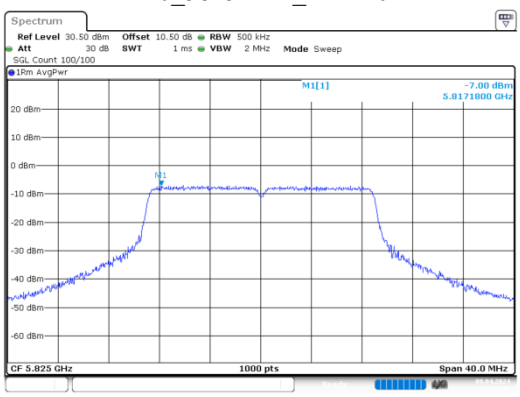



ProjectNo.:XMDN240206-08079E-RF Tester:Alice Tan
Date: 8.APR.2024 13:33:06

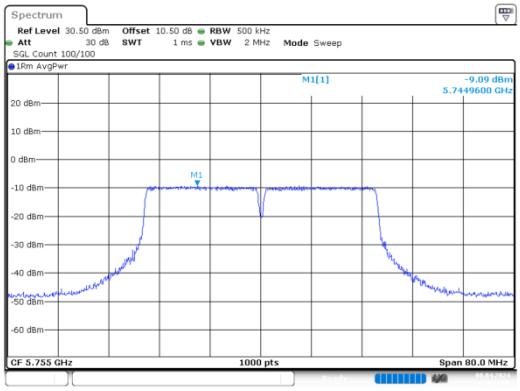
n20_5785MHz_Chain 0



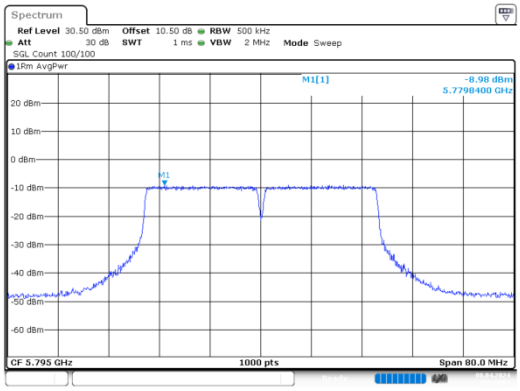

n20_5825MHz_Chain 0



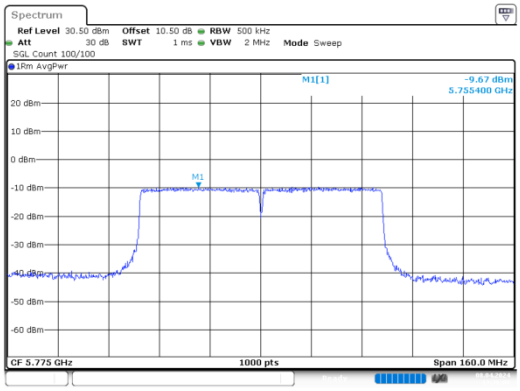

n40_5755MHz_Chain 0



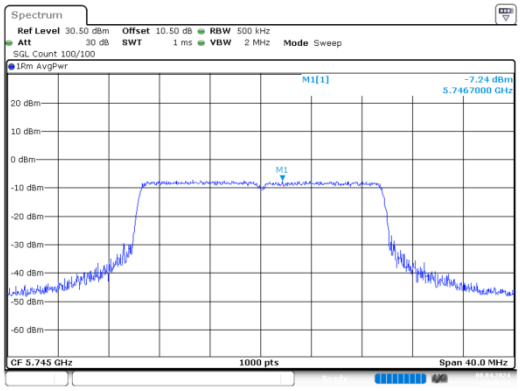

n40_5795MHz_Chain 0



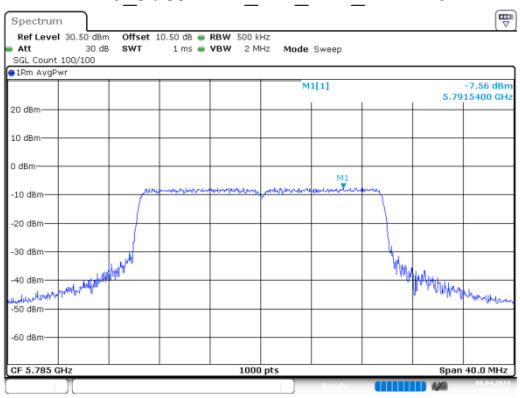

ac80_5775MHz_Chain 0



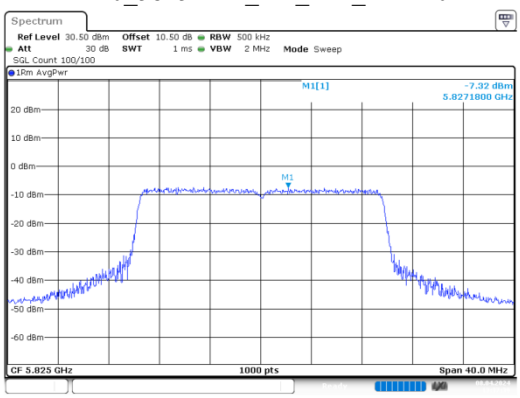

ax20_5745MHz_RU_Full_Chain 0



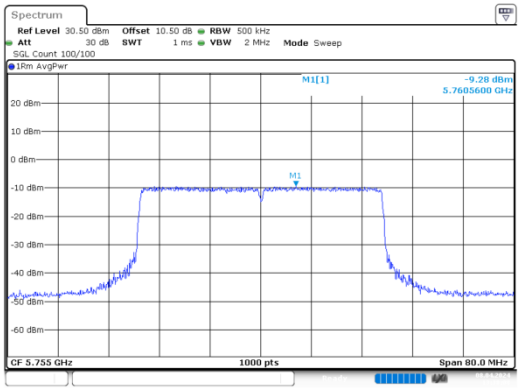
ax20_5785MHz_RU_Full_Chain 0



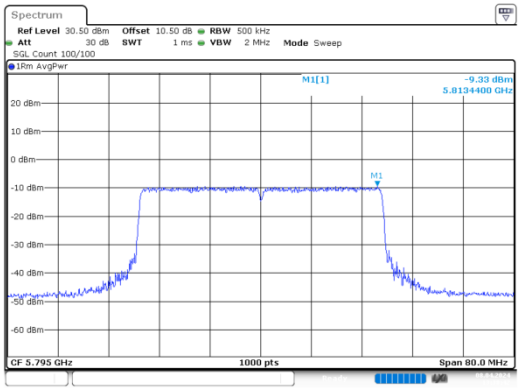

ax20_5825MHz_RU_Full_Chain 0



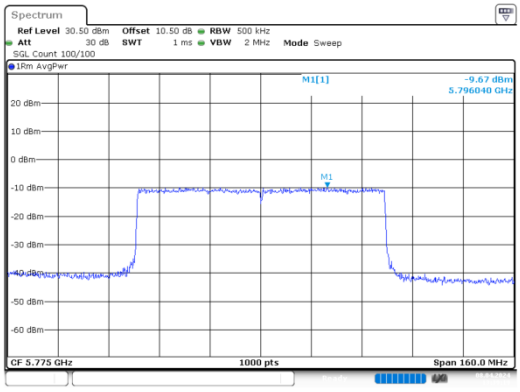

ax40_5755MHz_RU_Full_Chain 0




ax40_5795MHz_RU_Full_Chain 0




ax80_5775MHz_RU_Full_Chain 0



## 5.8 Duty Cycle

| Serial No.: | 2HP4-1 | Test Date: | 2024/04/08 |
|---|---|---|---|
| Test Site: | RF | Test Mode: | Transmitting |
| Tester: | Alice Tan | Test Result: | / |

**Environmental Conditions:**

| Temperature: (℃) | 25.9 | Relative Humidity: (%) | 52 | ATM Pressure: (kPa) | 100.4 |
|---|---|---|---|---|---|

**Test Equipment List and Details:**

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| R&S | Spectrum Analyzer | FSV40 | 101589 | 2023/10/18 | 2024/10/17 |
| Eastsheep | Coaxial Attenuator | 5W-N-JK-6G-10dB | F-08-EM488 | 2023/09/10 | 2024/09/09 |

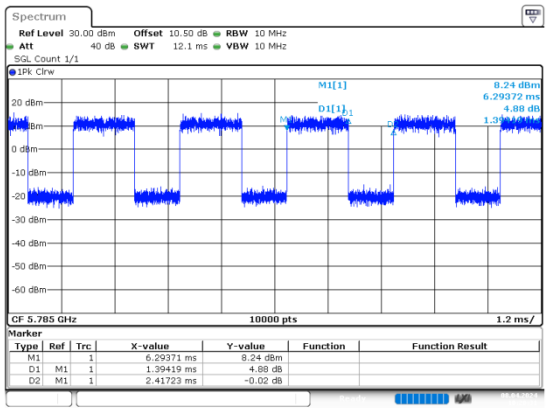
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

**Test Data:**

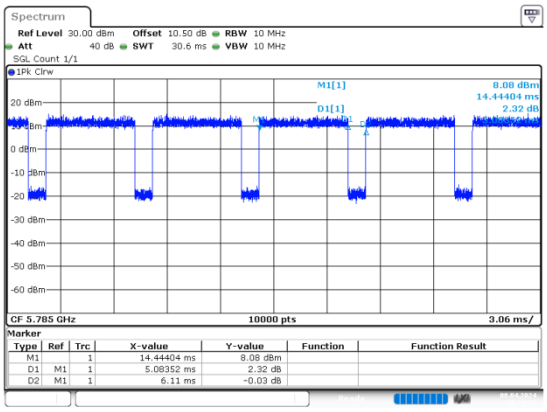
| Mode | Ton (ms) | Ton+Toff (ms) | Duty Cycle (%) | Duty Cycle Factor (dB) | 1/Ton (Hz) | VBW Setting (kHz) |
|---|---|---|---|---|---|---|
| a_Chain 0 | 1.394 | 2.417 | 57.67 | 2.39 | 717 | 1 |
| n20_Chain 0 | 5.084 | 6.110 | 83.21 | 0.80 | 197 | 0.20 |
| n40_Chain 0 | 4.891 | 5.919 | 82.63 | 0.83 | 204 | 0.30 |
| ac80_Chain 0 | 4.520 | 5.547 | 81.49 | 0.89 | 221 | 0.30 |
| ax20_Chain 0 | 3.870 | 4.897 | 79.03 | 1.02 | 258 | 0.30 |
| ax40_Chain 0 | 3.866 | 4.888 | 79.09 | 1.02 | 259 | 0.30 |
| ax80_Chain 0 | 3.693 | 4.718 | 78.27 | 1.06 | 271 | 0.30 |

**Duty Cycle = Ton/(Ton+Toff)*100%**

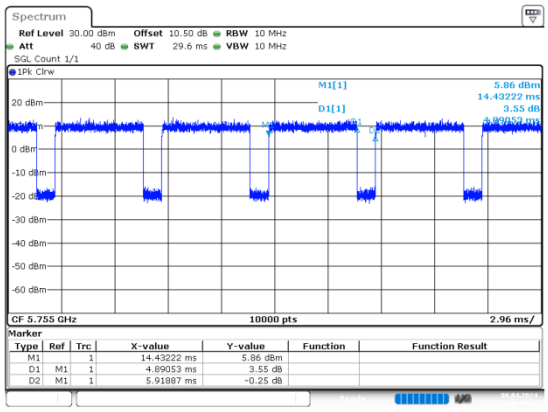
a_5785MHz_Chain 0



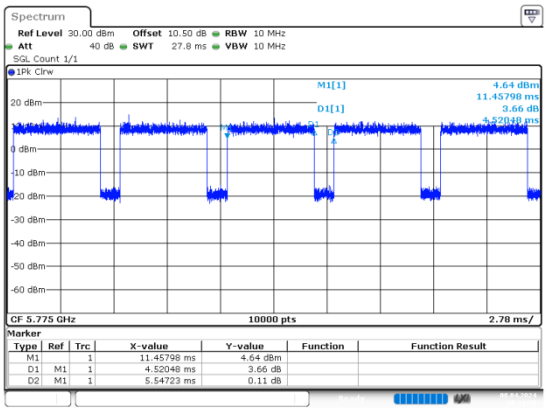

n20_5785MHz_Chain 0



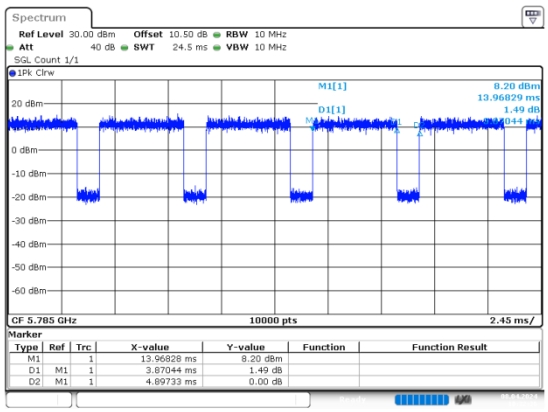

n40_5755MHz_Chain 0



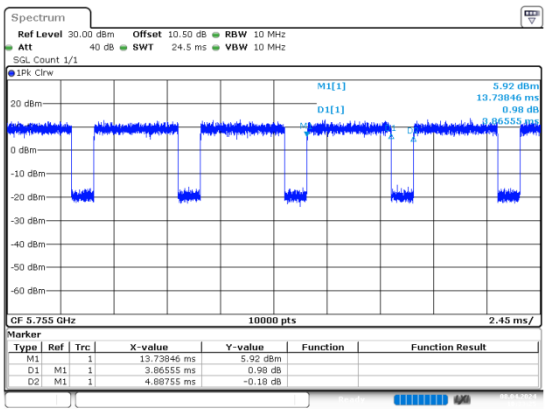

ac80_5775MHz_Chain 0



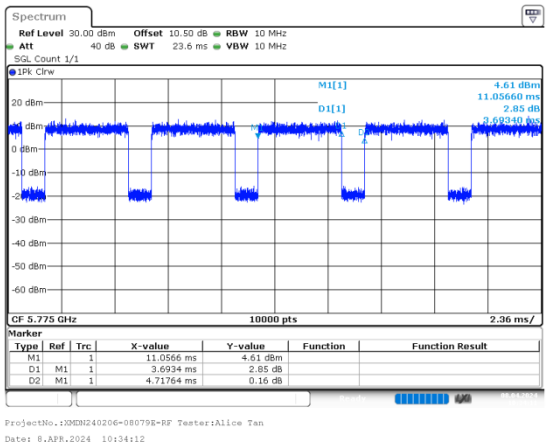

ax20_5785MHz_RU_Full_Chain 0




ax40_5755MHz_RU_Full_Chain 0



ax80_5775MHz_RU_Full_Chain 0



# APPENDIX A - EUT PHOTOGRAPHS

Please refer to the attachment XMDN240206-08079E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and XMDN240206-08079E-RF-INP EUT INTERNAL PHOTOGRAPHS.

# APPENDIX B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment XMDN240206-08079E-RF-00F-TSP TEST SETUP PHOTOGRAPHS.

# APPENDIX C - RF EXPOSURE EVALUATION

## Maximum Permissible Exposure (MPE)

### Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **Averaging Time (minutes)** |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/$f^2$) | 30 |
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1500 | / | / | f/1500 | 30 |
| 1500–100,000 | / | / | 1.0 | 30 |

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. $mW/cm^2$);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

**Calculated Data:**

| Operation Modes | Frequency (MHz) | Antenna Gain | | Conducted output power including Tune-up Tolerance | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|---|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| WiFi 2.4G | 2412-2462 | 5.73 | 3.74 | 24 | 251.18864 | 20.00 | 0.1870 | 1.0 |
| WiFi 5.2G | 5150-5250 | 4.21 | 2.64 | 13 | 19.95 | 20.00 | 0.0105 | 1.0 |
| WiFi 5.3G | 5250-5350 | 4.21 | 2.64 | 12 | 15.85 | 20.00 | 0.0083 | 1.0 |
| WiFi 5.6G | 5470-5725 | 6.45 | 4.42 | 12 | 15.85 | 20.00 | 0.0139 | 1.0 |
| WiFi 5.8G | 5725-5850 | 5.65 | 3.67 | 13 | 19.95 | 20.00 | 0.0146 | 1.0 |
| Bluetooth | 2402-2480 | 5.73 | 3.74 | 9 | 7.94 | 20.00 | 0.0059 | 1.0 |
| BLE | 2402-2480 | 5.73 | 3.74 | 9 | 7.94 | 20.00 | 0.0059 | 1.0 |
| NFC | 13.56 | / | / | -44.28 | 0.00004 | 20.00 | <<0.0001 | 0.98 |
| NFC field strength is 50.92BμV/m @ 3m = -44.28 dBm(0.00004mW) EIRP. That equal to antenna gain is 0dBi and used the EIRP value as conducted power. | | | | | | | | |

Note: The Conducted output power including Tune-up Tolerance provided by manufacturer

**Simultaneous transmission:**

BT, BLE, WiFi can't transmit simultaneously.WiFi/BLE/Bluetooth and NFC can transmit simultaneously:

$S_{BLE}/S_{limit-BLE} + S_{NFC}/S_{limit-NFC}$

=0.187/1+0.0001/0.98
=0.187
< 1.0

**Result:** The device meet FCC MPE at 20 cm distance

## Exemption Limits For Routine Evaluation-RF Exposure Evaluation

### Applicable Standard

According to RSS-102 § (2.5.2):

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

• below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

• at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where $f$ is in MHz;

• at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where $f$ is in MHz;

• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### Calculated Data:

| Mode | Frequency (MHz) | Antenna Gain | Conducted output power including Tune-up Tolerance | EIRP | | Exemption limits (mW) |
|---|---|---|---|---|---|---|
| | | (dBi) | (dBm) | (dBm) | (mW) | |
| WiFi 2.4G | 2412-2462 | 5.73 | 24 | 29.73 | 939.72 | 2684 |
| WiFi 5.2G | 5150-5250 | 4.21 | 13 | 17.21 | 52.60 | 4507 |
| WiFi 5.3G | 5250-5350 | 4.21 | 12 | 16.21 | 41.78 | 4567 |
| WiFi 5.6G | 5470-5725 | 6.45 | 12 | 18.45 | 69.98 | 4697 |
| WiFi 5.8G | 5725-5850 | 5.65 | 13 | 18.65 | 73.28 | 4845 |
| Bluetooth | 2402-2480 | 5.73 | 9 | 14.73 | 29.72 | 2676 |
| BLE | 2402-2480 | 5.73 | 9 | 14.73 | 29.72 | 2676 |
| NFC | 13.56 | / | / | -44.28 | 0.00004 | 1000 |
| NFC field strength is 50.92BμV/m @ 3m = -44.28 dBm(0.00004mW) EIRP. That equal to antenna gain is 0dBi and used the EIRP value as conducted power. | | | | | | |

Note:
1. The Conducted output power including Tune-up Tolerance was provided by manufacturer.
2. BT, BLE, WiFi can't transmit simultaneously.WiFi/BLE/Bluetooth and NFC can transmit simultaneously.

**Result:** Compliant, the device is compliance exemption from Routine Evaluation Limits –RF exposure Evaluation.

******* END OF REPORT *******