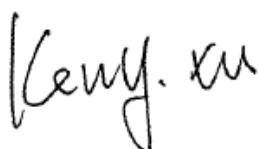


TEST REPORT

Application No.: SZCR2305001544AT
Applicant: Pozyx NV
Address of Applicant: Vrijdagmarkt 10/ 201, 9000, Gent, Belgium
Manufacturer: Pozyx NV
Address of Manufacturer: Vrijdagmarkt 10/ 201, 9000, Gent, Belgium
Factory: Page Electronica NV
Address of Factory: Frankrijklaan 22, 8970, Poperinge, Belgium
Equipment Under Test (EUT):
EUT Name: Industrial tag V1.2
Model No.: 250010001
FCC ID: 2AYPJ-250101-2
Trade Mark: POZYX
Standard(s) : 47 CFR Part 15 Subpart F
Date of Receipt: 2023-05-22
Date of Test: 2023-06-29 to 2023-07-26
Date of Issue: 2023-07-27

| | |
|---------------------|--------------|
| Test Result: | Pass* |
|---------------------|--------------|

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



Keny Xu
EMC Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Services LLC Laboratory.

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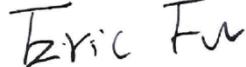
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SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZCR230500154402

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| Revision Record | | | | |
|------------------------|----------------|-------------|-----------------|---------------|
| Version | Chapter | Date | Modifier | Remark |
| 01 | | 2023-07-27 | | Original |
| | | | | |
| | | | | |

| | | | |
|---------------------------------|--|------------------------------|--|
| Authorized for issue by: | | | |
| |  | Calvin Weng | |
| | | Calvin Weng/Project Engineer | |
| |  | Eric Fu | |
| | | Eric Fu/Reviewer | |

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2 Test Summary

| Radio Spectrum Technical Requirement | | | | |
|---|--------------------------|---------------|---|---------------|
| Item | Standard | Method | Requirement | Result |
| Antenna Requirement | 47 CFR Part 15 Subpart F | N/A | 47 CFR Part 15F Section 15.519(a2), 15.521(b), 15.203 | Pass |

| Radio Spectrum Matter Part | | | | |
|---|--------------------------|--------------------------------|--|---------------|
| Item | Standard | Method | Requirement | Result |
| Dwell Time | 47 CFR Part 15 Subpart F | / | 47 CFR Part 15F Section 15.519(a)(1) | Pass |
| EIRP | | ANSI C63.10: 2013 section 10.3 | 47 CFR Part 15, Subpart F Section 15.519 (c)(e) 15.521(g) | Pass |
| Spurious Emissions Below 1GHz | | ANSI C63.10: 2013 section 10.2 | 47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209, 15.521(c)(d) (h) | Pass |
| Spurious Emissions Above 1GHz | | ANSI C63.10: 2013 section 10.3 | 47 CFR Part 15, Subpart F Section 15.519 (c)(d),15.209, 15.521(c)(d) (h) | Pass |
| UWB Bandwidth | | ANSI C63.10:2013 section 10.1 | 47 CFR Part 15F Section 15.503, 15.521(e) | Pass |
| Conducted Emissions at AC Power Line (150kHz-30MHz) | | ANSI C63.10 (2013) Section 6.2 | 47 CFR Part 15, Subpart F 15.207, 15.505, 15.521(j) | N/A |

Remark: This device is battery powered.

Remark: for 47 CFR Part 15.521 General Requirement, Section15.521(f)(i), is not applicable for this product, so it's not evaluated in the report.

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4 General Information

4.1 Details of E.U.T.

| | |
|----------------------|--|
| Power supply: | DC3V by CR2477 type battery(1000mAh) |
| Operating Frequency: | Channel2:3993.6MHz, Channel3:4492.8MHz, Channel5:6489.6MHz |
| Modulation Type: | PM |
| Number of Channels: | 3 |
| Sample Type: | Portable |
| Antenna Type: | Chip antenna |
| Antenna Gain: | Channel2:2.73dBi; Channel3:2.73dBi, Channel5:4.16dBi |

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|-------------|--------------|-----------|------------|
| -- | -- | -- | -- |

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

| Test Item | Measurement Uncertainty |
|-------------------------------|-------------------------------------|
| Dwell Time | ± 0.37% |
| EIRP | ± 4.8dB |
| Spurious Emissions Below 1GHz | ± 6.0dB for 3m; ± 5.0dB for 10M |
| Spurious Emissions Above 1GHz | ± 4.6dB(1-18GHz); ± 4.8dB(18-40GHz) |
| UWB Bandwidth | ± 3% |



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4.4 Test Location

All tests were performed at:

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Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

| Dwell Time | | | | | |
|---------------------|--------------|-----------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| MXA Signal Analyzer | KEYSIGHT | N9020A | SEM004-19 | 2023-03-21 | 2024-03-20 |
| Coaxial Cable | SGS | N/A | SEM031-01 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |

| EIRP | | | | | |
|----------------------------|-----------------|-----------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| 3m Semi-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2022-04-02 | 2025-04-01 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | SEM008-04 | 2023-03-20 | 2024-03-19 |
| Horn Antenna | Rohde&Schwarz | HF907 | SEM003-07 | 2022-07-24 | 2024-07-23 |
| Microwave system amplifier | Agilent | 83017A | SEM005-25 | 2022-09-21 | 2023-09-20 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |

| Spurious Emissions Below 1GHz | | | | | |
|-------------------------------|----------------------|-----------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| 3m Semi-Anechoic Chamber | ETS-LINDGREN | N/A | SEM001-01 | 2020-07-19 | 2023-07-18 |
| | | | | 2023-07-18 | 2026-07-17 |
| MXE EMI Receiver | Agilent Technologies | N9038A | SEM004-15 | 2022-10-20 | 2023-10-19 |
| BiConiLog Antenna | ETS-LINDGREN | 3142C | SEM003-01 | 2021-09-17 | 2023-09-16 |
| Pre-Amplifier | Agilent Technologies | 8447D | SEM005-01 | 2023-03-20 | 2024-03-19 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Loop Antenna | ETS-Lindgren | 6502 | SEM003-08 | 2021-11-30 | 2023-11-29 |
| Coaxial Cable | SGS | N/A | SEM025-01 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |

| Spurious Emissions Above 1GHz | | | | | |
|-------------------------------|-----------------|-----------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| 3m Semi-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2022-04-02 | 2025-04-01 |
| Signal Analyzer | Rohde & Schwarz | FSV40 | SEM008-04 | 2023-03-20 | 2024-03-19 |
| Horn Antenna | Rohde&Schwarz | HF907 | SEM003-07 | 2022-07-24 | 2024-07-23 |
| Microwave system | Agilent | 83017A | SEM005-25 | 2022-09-21 | 2023-09-20 |

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| | | | | | |
|----------------------|-------|-----------------|-----------|------------|------------|
| amplifier | | | | | |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |
| Coaxial Cable | SGS | N/A | SEM026-06 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |
| Coaxial Cable | SGS | N/A | SEM023-02 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |

| UWB Bandwidth | | | | | |
|----------------------|--------------|---------------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| DC Power Supply | Chroma | 62012P-80-60 | SEM011-11 | 2022-10-20 | 2023-10-19 |
| MXA Signal Analyzer | KEYSIGHT | N9020A | SEM004-19 | 2023-03-21 | 2024-03-20 |
| Measurement Software | TST PASS | TST PASS V2.0 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM031-01 | 2022-07-08 | 2023-07-07 |
| | | | | 2023-07-07 | 2024-07-06 |
| Attenuator | Huber+Suhner | 6620_SMA-50-1 | SEM021-09 | 2023-03-31 | 2024-03-30 |

| General used equipment | | | | | |
|---------------------------------|---|-----------|---------------|------------|--------------|
| Equipment | Manufacturer | Model No. | Inventory No. | Cal Date | Cal Due Date |
| Humidity/ Temperature Indicator | Mingle | N/A | SEM002-08 | 2022-09-04 | 2023-09-03 |
| Humidity/ Temperature Indicator | Anymetre | TH101B | SEM002-09 | 2022-09-04 | 2023-09-03 |
| Barometer | Changchun Meteorological Industry Factory | DYM3 | SEM002-01 | 2023-03-23 | 2024-03-22 |

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15F Section15.519(a2), 15.521(b), 15.203

6.1.2 Conclusion

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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of 15.211, 15.213, 15.217, 15.219, 15.221, or 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.519 requirement:

The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.



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7 Radio Spectrum Matter Test Results

7.1 Dwell Time

| | |
|------------------|---|
| Test Requirement | 47 CFR Part 15F Section 15.519(a)(1) |
| Test Method: | ANSI C63.10:2013 section 7.8.4 |
| Limit | A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting. |
| | |

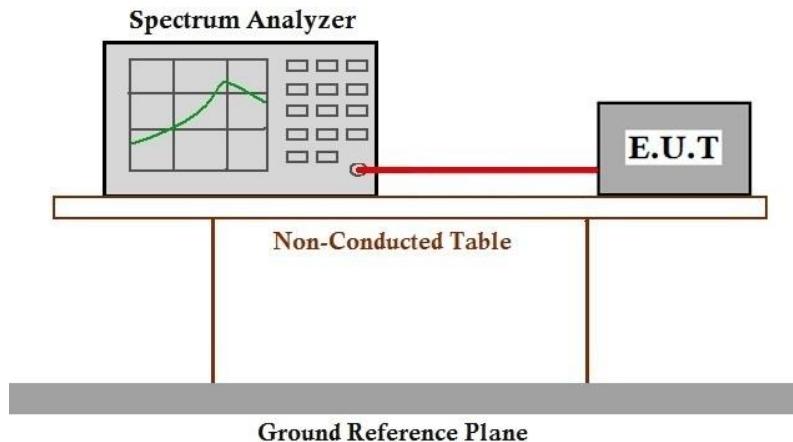
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 25.1 °C Humidity: 49.9 % RH Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|---|
| Final test | 01 | Normal Operating Mode: Keep the EUT Paring with Other Device and Operating Normally |

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data



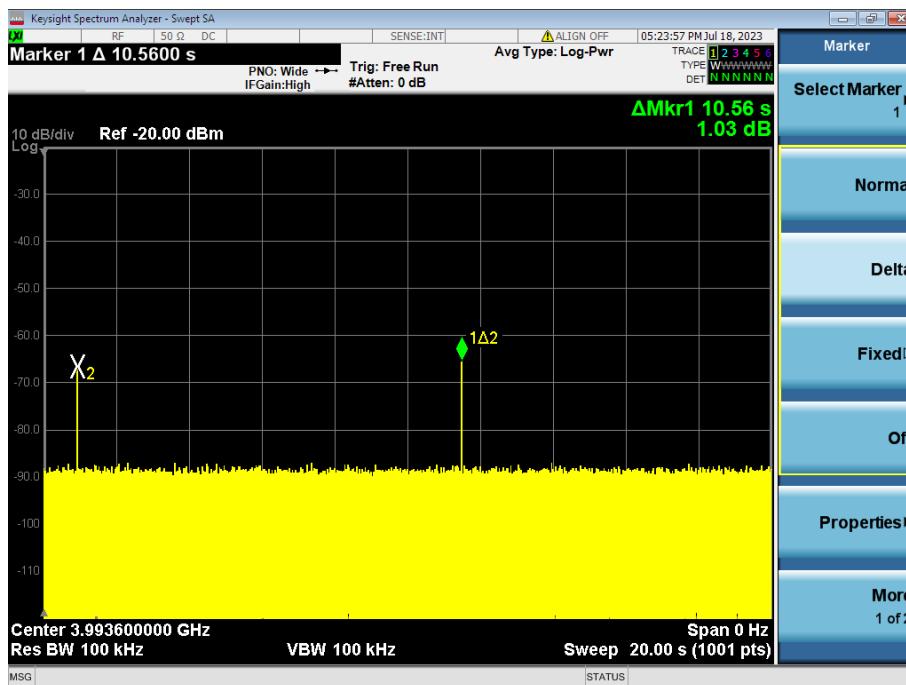
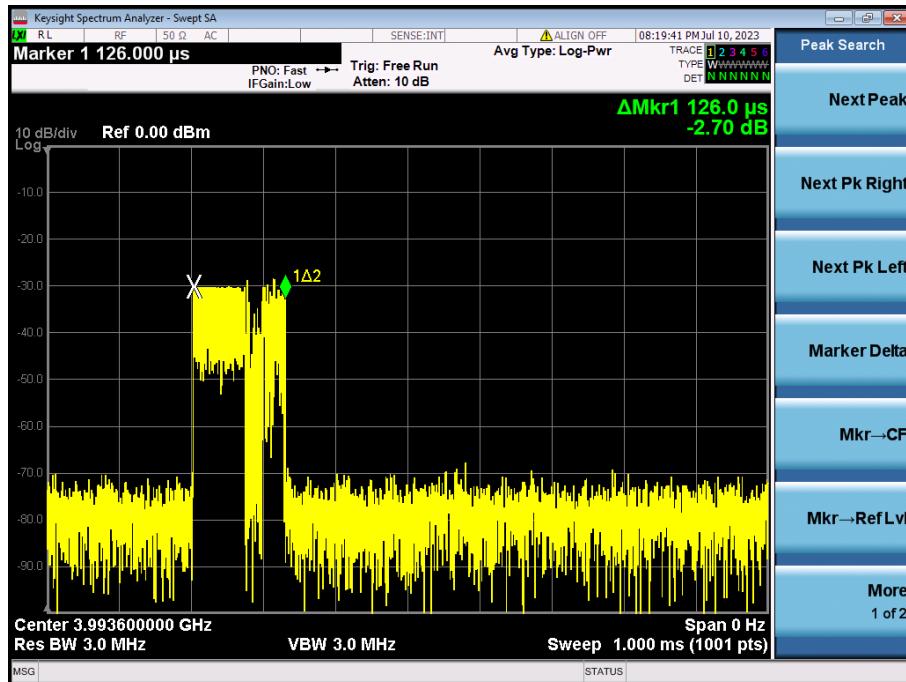
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3993.6MHz: (the EUT transmit every 10.56s, each transmit pulse is 126us.)



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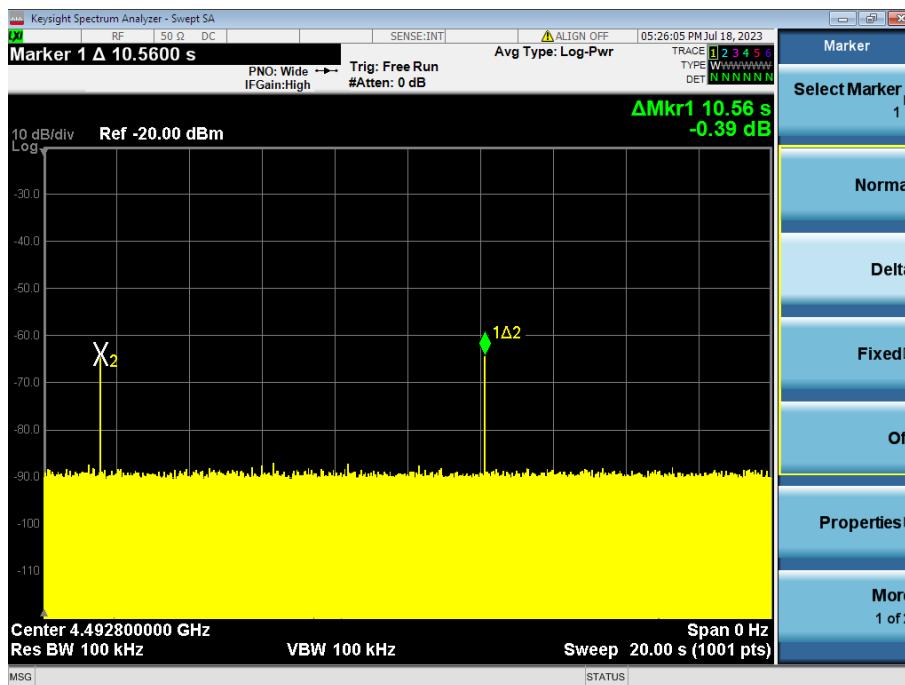
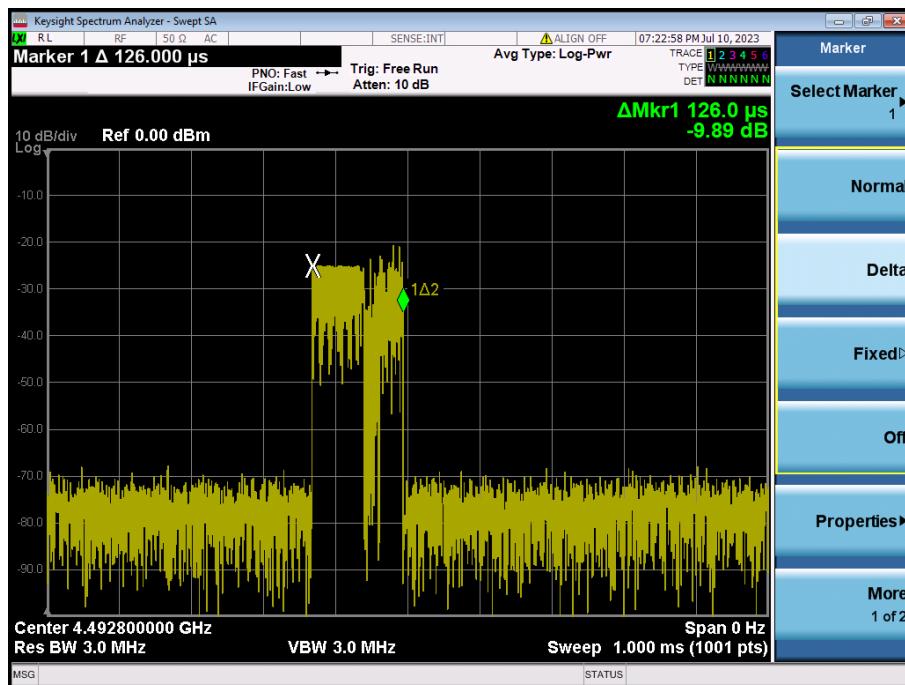
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4492.8MHz: (the EUT transmit every 10.56s, each transmit pulse is 126us.)

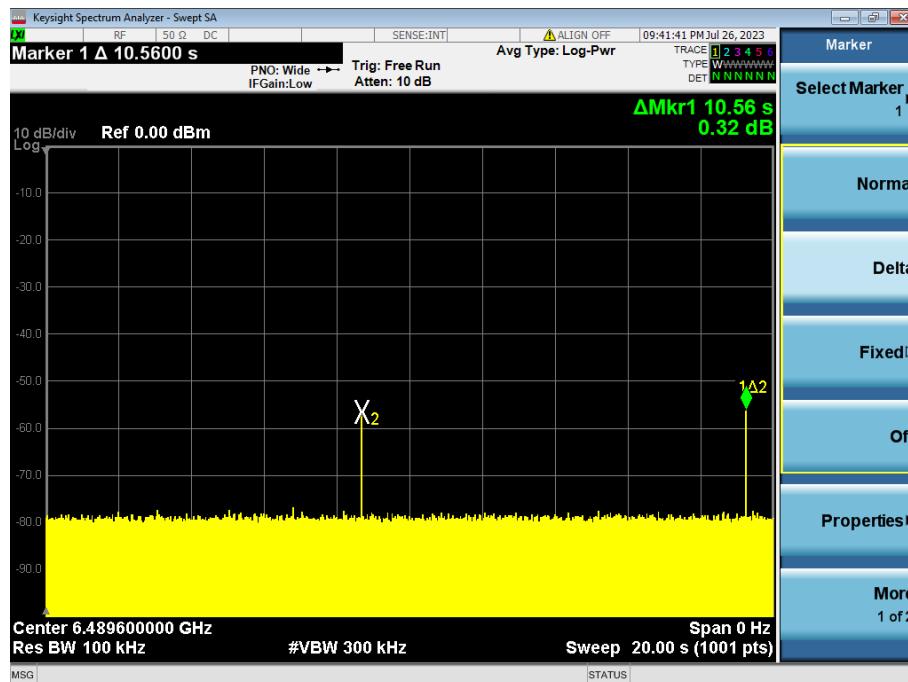
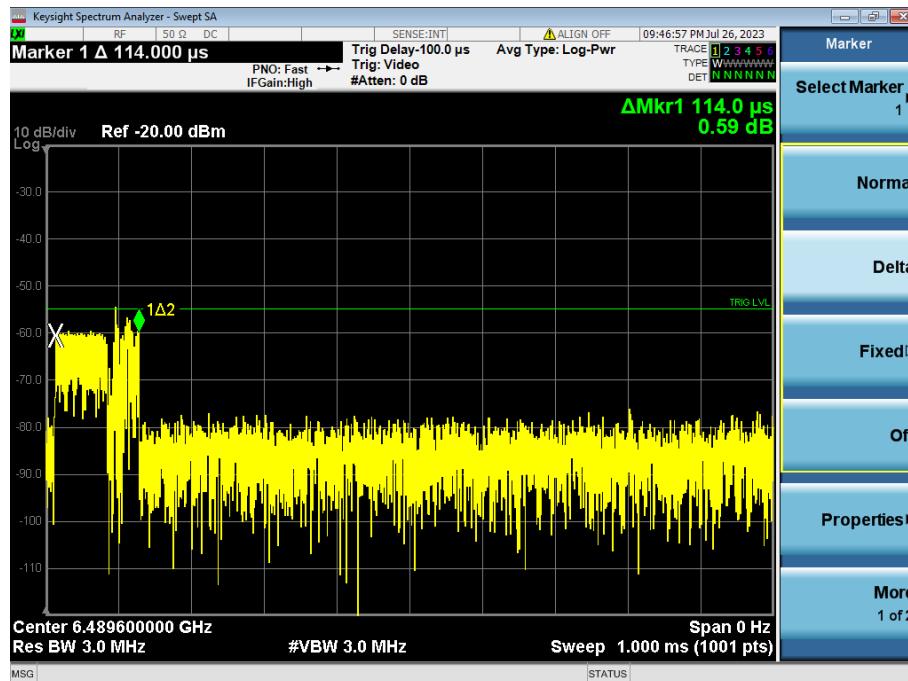


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6489.6MHz: (the EUT transmit every 10.56s, each transmit pulse is 114us.)



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7.2 EIRP

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(e)
 Test Method: ANSI C63.10: 2013 section 10.3

Limit:

| Frequency | Limit | Detector | Measurement distance (m) |
|------------------|----------------------------|----------|--------------------------|
| 960MHz-1610MHz | -75.3 dBm (EIRP, RBW=1MHz) | AV | 3 |
| 1610MHz-1990MHz | -63.3 dBm (EIRP, RBW=1MHz) | AV | 3 |
| 1990MHz-3100MHz | -61.3 dBm (EIRP, RBW=1MHz) | AV | 3 |
| 3100MHz-10600MHz | -41.3 dBm (EIRP, RBW=1MHz) | AV | 3 |
| Above 10600MHz | -61.3 dBm (EIRP, RBW=1MHz) | AV | 3 |
| Fundamental | 0 dBm (EIRP, RBW=50MHz) | Peak | 3 |

Remark: Due to some spectrum analyzer does not support 50MHz RBW setting, RBW set to the maximum value, and add a correction factor is allowed for Max Peak EIRP measurement. According to ANSI 63.10 Clause 10.3.9, the EIRP to field strength at a specified measurement distance of 3 m is below:

$$E (\text{dBuV/m}) = \text{EIRP(dBm)} + 95.3$$

For peak power test, the spectrum analyzer was set to RBW=10MHz, VBW=10MHz, and add a conversion factor of $20 \times \log(50\text{MHz}/10\text{MHz}) = 13.98\text{dB}$.

Thus, the field strength limit for the test above 1GHz is below:

| Frequency | Limit | Detector | Measurement Distance |
|------------------|-------------------------|----------|----------------------|
| | Field Strength (dBuV/m) | | |
| 960MHz-1610MHz | 20.00 | AV | 3 |
| 1610MHz-1990MHz | 32.00 | AV | 3 |
| 1990MHz-3100MHz | 34.00 | AV | 3 |
| 3100MHz-10600MHz | 54.00 | AV | 3 |
| Above 10600MHz | 34.00 | AV | 3 |
| Fundamental | 95.30 | Peak | 3 |

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 57.6 % RH Atmospheric Pressure: 1005 mbar

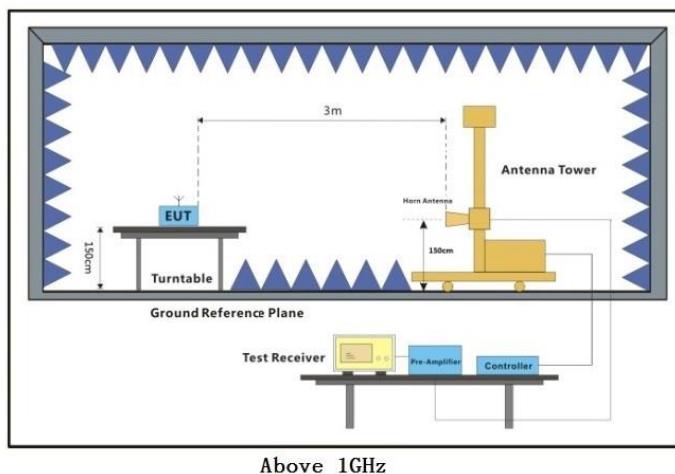
7.2.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|---|
| Final test | 00 | Continuous Tx Mode: Keep the EUT Transmitting with Modulation |

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7.2.3 Test Setup Diagram**7.2.4 Measurement Procedure and Data**

- 1) The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) 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.
- 4) 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode for Max Peak EIRP measurement and RMS/AV detector for Average EIRP measurement.
- 6) Test the EUT in the lowest channel, the middle channel, the Highest channel
- 7) 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.
- 8) Repeat above procedures until all frequencies measured was complete.

Remark: For peak power measurement, the test plot below were not include a correction factor, final result need to add a correction factor of $20 \times \log(50/10) \text{dB} = 13.98 \text{dB}$.



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Test frequency: 3993.6MHz

| Peak Field Strength for fundamental @ RBW=10MHz | | | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|---------------------|----------------------------|----------------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Test Level (dBuV/m) | Correction factor (dBuV/m) | Final Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 4070.344 | 32.94 | 6.35 | 34.38 | 68.66 | 73.57 | 13.98 | 87.55 | 95.30 | 7.75 | Horizontal |
| 4069.320 | 32.94 | 6.35 | 34.38 | 75.98 | 80.89 | 13.98 | 94.87 | 95.30 | 0.43 | Vertical |

| Average Field Strength for fundamental @ RBW=1MHz | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 3950.226 | 32.60 | 6.22 | 34.38 | 37.47 | 41.91 | 54.00 | 12.09 | Horizontal |
| 4023.485 | 32.79 | 6.30 | 34.35 | 48.04 | 52.78 | 54.00 | 1.22 | Vertical |

Test frequency: 4492.8MHz

| Peak Field Strength for fundamental @ RBW=10MHz | | | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|---------------------|----------------------------|----------------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Test Level (dBuV/m) | Correction factor (dBuV/m) | Final Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 4492.920 | 33.50 | 6.76 | 34.67 | 68.22 | 73.81 | 13.98 | 87.79 | 95.30 | 7.51 | Horizontal |
| 4492.920 | 33.50 | 6.76 | 34.67 | 74.99 | 80.58 | 13.98 | 94.56 | 95.30 | 0.74 | Vertical |

| Average Field Strength for fundamental @ RBW=1MHz | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 4496.939 | 33.50 | 6.77 | 34.67 | 38.85 | 44.45 | 54.00 | 9.55 | Horizontal |
| 4525.169 | 33.45 | 6.79 | 34.69 | 46.89 | 52.44 | 54.00 | 1.56 | Vertical |



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Test frequency: 6489.6MHz

| Peak Field Strength for fundamental @ RBW=10MHz | | | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|---------------------|----------------------------|----------------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Test Level (dBuV/m) | Correction factor (dBuV/m) | Final Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 6490.321 | 35.48 | 8.24 | 35.48 | 65.64 | 73.88 | 13.98 | 87.86 | 95.30 | 7.44 | Horizontal |
| 6488.317 | 35.48 | 8.24 | 35.48 | 72.6 | 80.84 | 13.98 | 94.82 | 95.30 | 0.48 | Vertical |

| Average Field Strength for fundamental @ RBW=1MHz | | | | | | | | |
|---|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|-----------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | Polarization |
| 6495.333 | 35.49 | 8.24 | 35.49 | 37.33 | 45.57 | 54.00 | 8.43 | Horizontal |
| 6465.317 | 35.43 | 8.24 | 35.46 | 44.34 | 52.55 | 54.00 | 1.45 | Vertical |

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7.3 Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(d), 15.209

Test Method: ANSI C63.10: 2013 section 10.2 & 10.3

Measurement Distance: 3m

Limit:

| Frequency | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
|-------------------|----------------------------------|----------------|------------|--------------------------|
| 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-1000MHz | - | 20 | AV | 3 |

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C

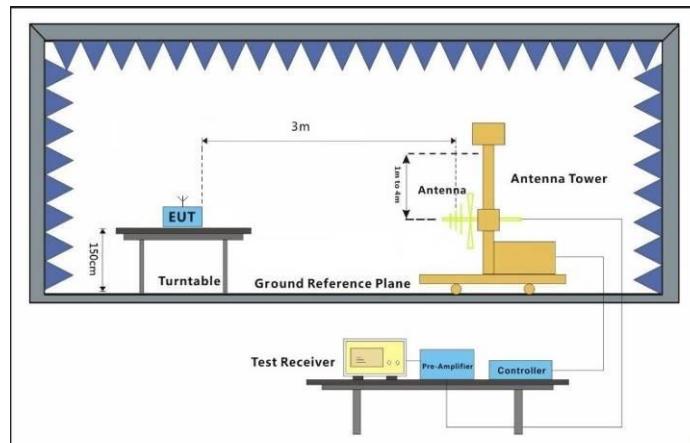
Humidity: 41.2 % RH

Atmospheric Pressure: 1005 mbar

7.3.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|---|
| Final test | 00 | Continuous Tx Mode: Keep the EUT Transmitting with Modulation |

7.3.3 Test Setup Diagram



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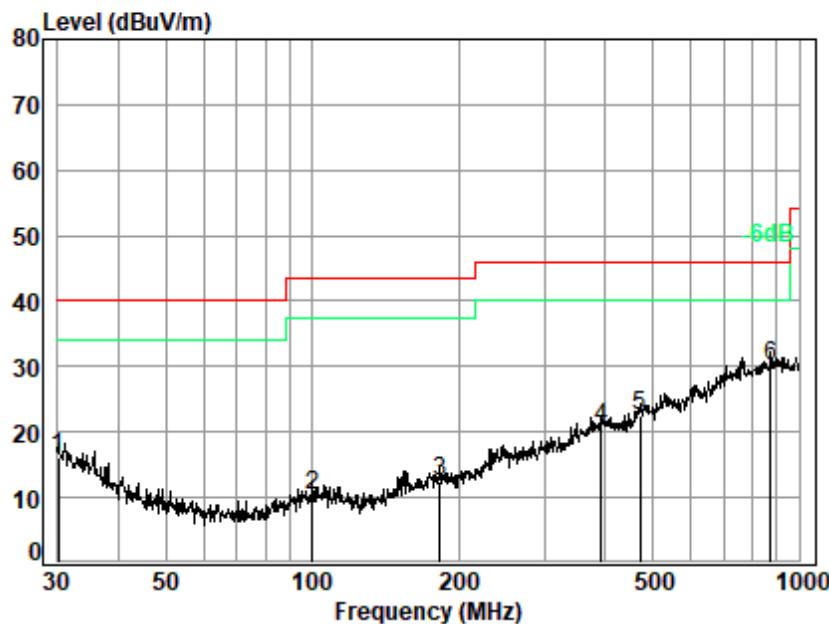
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7.3.4 Measurement Procedure and Data

- 1) 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.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) 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.
- 4) 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode. And use Quasi-Peak to measure the six highest frequencies.
- 6) Test the EUT in the lowest channel, the middle channel, the Highest channel and only recorded worst channel-Lowest channel in the test report.
- 7) 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.
- 8) Repeat above procedures until all frequencies measured was complete



Test Mode: 00; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : 01544AT
Test Mode: 00

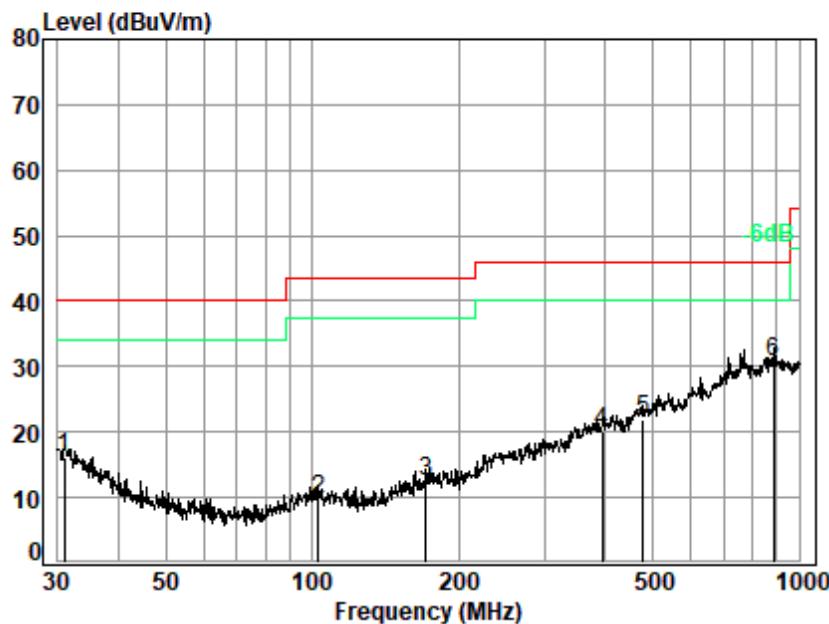
| Freq | Ant Factor | Cable Loss | Preamp Factor | Read Level | Limit | | Over Limit | Remark | |
|------|------------|------------|---------------|------------|-------|-------|------------|--------|--------|
| | | | | | MHz | dB/m | dB | dBuV | dBuV/m |
| 1 | 30.11 | 21.40 | 0.63 | 27.23 | 21.46 | 16.26 | 40.00 | -23.74 | QP |
| 2 | 100.23 | 13.03 | 1.14 | 27.00 | 23.25 | 10.42 | 43.50 | -33.08 | QP |
| 3 | 182.56 | 14.67 | 1.59 | 26.67 | 23.02 | 12.61 | 43.50 | -30.89 | QP |
| 4 | 392.10 | 21.51 | 2.45 | 26.48 | 23.13 | 20.61 | 46.00 | -25.39 | QP |
| 5 | 470.52 | 22.84 | 2.71 | 26.71 | 23.59 | 22.43 | 46.00 | -23.57 | QP |
| 6 q | 875.25 | 28.20 | 3.94 | 26.00 | 24.09 | 30.23 | 46.00 | -15.77 | QP |

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Test Mode: 00; Polarity: Vertical



Site : chamber
 Condition: 3m VERTICAL
 Job No. : 01544AT
 Test Mode: 00

| | Ant Freq | Cable Factor | Preamp Loss | Read Level | Limit Level | Line Limit | Over Limit | Remark |
|-----|----------|--------------|-------------|------------|-------------|------------|------------|-----------|
| | MHz | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 30.96 | 20.86 | 0.63 | 27.23 | 21.76 | 16.02 | 40.00 | -23.98 QP |
| 2 | 102.72 | 12.98 | 1.15 | 26.99 | 22.69 | 9.83 | 43.50 | -33.67 QP |
| 3 | 171.39 | 14.25 | 1.53 | 26.71 | 23.35 | 12.42 | 43.50 | -31.08 QP |
| 4 | 394.85 | 21.62 | 2.46 | 26.48 | 22.53 | 20.13 | 46.00 | -25.87 QP |
| 5 | 477.17 | 23.14 | 2.73 | 26.73 | 22.84 | 21.98 | 46.00 | -24.02 QP |
| 6 q | 887.61 | 28.86 | 3.98 | 25.95 | 23.81 | 30.70 | 46.00 | -15.30 QP |

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7.4 Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(d), 15.209

Test Method: ANSI C63.10: 2013 section 10.3

Limit:

| Frequency | Limit (dBuV/m) | RBW | Detector | Measurement distance (m) |
|------------------|----------------|------|----------|--------------------------|
| 1000MHz-1610MHz | 20.0 | 1MHz | AV | 0.5 |
| 1610MHz-1990MHz | 32.0 | 1MHz | AV | 0.5 |
| 1990MHz-3100MHz | 34.0 | 1MHz | AV | 0.5 |
| 3100MHz-10600MHz | 54.0 | 1MHz | AV | 0.5 |
| Above 10600MHz | 34.0 | 1MHz | AV | 0.5 |
| 1164MHz-1240MHz | 10.0 | 1KHz | AV | 3 |
| 1559MHz-1610MHz | 10.0 | 1KHz | AV | 3 |

Remark: The limit is based on measurement distance at 3m, for this case, spurious emission other than GPS band is measured at 0.5m distance.

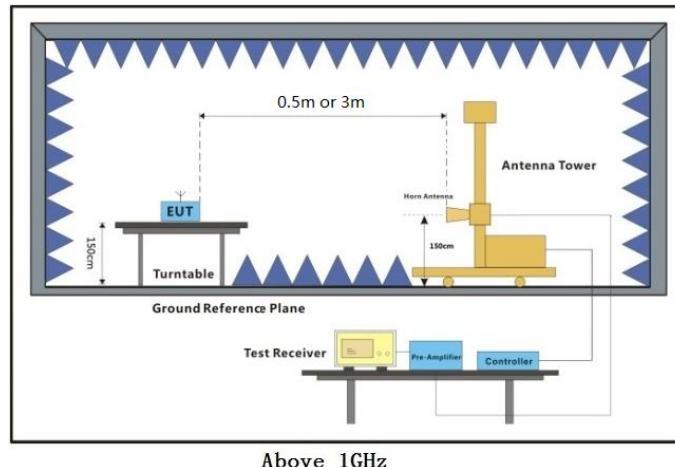
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C Humidity: 57.8 % RH Atmospheric Pressure: 1005 mbar

7.4.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|---|
| Final test | 00 | Continuous Tx Mode: Keep the EUT Transmitting with Modulation |

7.4.3 Test Setup Diagram

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7.4.4 Measurement Procedure and Data

- 1) The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) 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.
- 4) 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode.
- 6) Test the EUT in the lowest channel, the middle channel, the Highest channel
- 7) 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.
- 8) Repeat above procedures until all frequencies measured was complete

Remark: 1. For emission out of GPS band, measuring distance is 0.5meters, so the distance correction factor is $20 \times \log(3/0.5) = 15.56\text{dB}$

2. For emission of GPS band, measuring distance is 3meters
3. For emission above 18GHz, no spurious emission was found, so it's not recorded.



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Test frequency: 3993.6MHz

| Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1182.178 | 24.33 | 1 | 37.77 | 10.48 | -1.96 | 10 | -11.96 | Horizontal |
| 1196.924 | 24.39 | 1 | 37.72 | 13.73 | 1.4 | 10 | -8.6 | Horizontal |
| 1233.663 | 24.47 | 1.02 | 37.61 | 11.24 | -0.88 | 10 | -10.88 | Horizontal |
| 1590.426 | 26.39 | 1.15 | 36.65 | 6.77 | -2.34 | 10 | -12.34 | Horizontal |
| 1595.914 | 26.45 | 1.15 | 36.64 | 10.09 | 1.05 | 10 | -8.95 | Horizontal |
| 1604.258 | 26.52 | 1.16 | 36.62 | 7.39 | -1.55 | 10 | -11.55 | Horizontal |
| 1184.198 | 24.34 | 1 | 37.76 | 12.11 | -0.31 | 10 | -10.31 | Vertical |
| 1195.789 | 24.38 | 1 | 37.73 | 12.38 | 0.03 | 10 | -9.97 | Vertical |
| 1236.241 | 24.47 | 1.02 | 37.6 | 12.36 | 0.25 | 10 | -9.75 | Vertical |
| 1587.46 | 26.35 | 1.15 | 36.66 | 7.24 | -1.92 | 10 | -11.92 | Vertical |
| 1597.507 | 26.47 | 1.15 | 36.64 | 10.76 | 1.74 | 10 | -8.26 | Vertical |
| 1606.893 | 26.53 | 1.16 | 36.61 | 8.02 | -0.9 | 10 | -10.9 | Vertical |

| Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz | | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|------------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Distance factor (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1071.832 | 24.22 | 0.95 | 38.14 | 39.28 | -15.56 | 10.75 | 20 | -9.25 | Horizontal |
| 1426.916 | 25.11 | 1.09 | 37.06 | 37.12 | -15.56 | 10.7 | 20 | -9.3 | Horizontal |
| 1872.381 | 27.35 | 1.24 | 36.04 | 34.74 | -15.56 | 11.73 | 32 | -20.27 | Horizontal |
| 2543.625 | 29.49 | 1.44 | 35.59 | 33.69 | -15.56 | 13.47 | 34 | -20.53 | Horizontal |
| 6974.982 | 35.75 | 2.45 | 35.89 | 34.41 | -15.56 | 21.16 | 54 | -32.84 | Horizontal |
| 16600.64 | 42.5 | 1.97 | 37.55 | 35.65 | -15.56 | 27.01 | 34 | -6.99 | Horizontal |
| 1109.66 | 24.04 | 0.96 | 38.01 | 39.69 | -15.56 | 11.12 | 20 | -8.88 | Vertical |
| 1278.492 | 24.61 | 1.04 | 37.47 | 37.91 | -15.56 | 10.53 | 20 | -9.47 | Vertical |
| 1762.112 | 26.85 | 1.2 | 36.27 | 35.85 | -15.56 | 12.07 | 32 | -19.93 | Vertical |
| 2543.625 | 29.49 | 1.44 | 35.59 | 33.42 | -15.56 | 13.2 | 34 | -20.8 | Vertical |
| 9502.925 | 37.19 | 3.02 | 35.54 | 33.62 | -15.56 | 22.73 | 54 | -31.27 | Vertical |
| 17487.18 | 43.59 | 1.85 | 37.44 | 35.97 | -15.56 | 28.41 | 34 | -5.59 | Vertical |

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Test frequency: 4492.8MHz

| Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1196.319 | 24.39 | 1 | 37.73 | 13.38 | 1.04 | 10 | -8.96 | Horizontal |
| 1210.782 | 24.42 | 1.01 | 37.68 | 11.91 | -0.34 | 10 | -10.34 | Horizontal |
| 1236.241 | 24.47 | 1.02 | 37.6 | 10.68 | -1.43 | 10 | -11.43 | Horizontal |
| 1589.045 | 26.37 | 1.15 | 36.66 | 7.51 | -1.63 | 10 | -11.63 | Horizontal |
| 1597.713 | 26.47 | 1.15 | 36.64 | 10.4 | 1.38 | 10 | -8.62 | Horizontal |
| 1606.945 | 26.53 | 1.16 | 36.61 | 8.68 | -0.24 | 10 | -10.24 | Horizontal |
| 1187.949 | 24.35 | 1 | 37.75 | 11.73 | -0.67 | 10 | -10.67 | Vertical |
| 1199.956 | 24.4 | 1 | 37.71 | 12.46 | 0.15 | 10 | -9.85 | Vertical |
| 1236.241 | 24.47 | 1.02 | 37.6 | 10.95 | -1.16 | 10 | -11.16 | Vertical |
| 1589.147 | 26.37 | 1.15 | 36.66 | 7.42 | -1.72 | 10 | -11.72 | Vertical |
| 1596.684 | 26.46 | 1.15 | 36.64 | 10.47 | 1.44 | 10 | -8.56 | Vertical |
| 1607.256 | 26.53 | 1.16 | 36.61 | 8.86 | -0.06 | 10 | -10.06 | Vertical |

| Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz | | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|------------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Distance factor (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1053.404 | 24.37 | 0.94 | 38.2 | 37.4 | -15.56 | 8.95 | 20 | -11.05 | Horizontal |
| 1398.336 | 25 | 1.08 | 37.14 | 35.56 | -15.56 | 8.94 | 20 | -11.06 | Horizontal |
| 1921.727 | 27.53 | 1.25 | 35.94 | 37.07 | -15.56 | 14.35 | 32 | -17.65 | Horizontal |
| 2603.126 | 29.6 | 1.45 | 35.57 | 34.3 | -15.56 | 14.22 | 34 | -19.78 | Horizontal |
| 6640.542 | 35.6 | 2.41 | 35.61 | 33.71 | -15.56 | 20.55 | 54 | -33.45 | Horizontal |
| 16362.46 | 42.09 | 2.03 | 37.59 | 35.95 | -15.56 | 26.92 | 34 | -7.08 | Horizontal |
| 1041.295 | 24.5 | 0.93 | 38.25 | 40.15 | -15.56 | 11.77 | 20 | -8.23 | Vertical |
| 1426.916 | 25.11 | 1.09 | 37.06 | 37.5 | -15.56 | 11.08 | 20 | -8.92 | Vertical |
| 1921.727 | 27.53 | 1.25 | 35.94 | 34.42 | -15.56 | 11.7 | 32 | -20.3 | Vertical |
| 2618.218 | 29.6 | 1.46 | 35.56 | 33.41 | -15.56 | 13.35 | 34 | -20.65 | Vertical |
| 8153.195 | 36.4 | 2.47 | 35.99 | 33.69 | -15.56 | 21.01 | 54 | -32.99 | Vertical |
| 15942.3 | 41.54 | 2.14 | 37.63 | 35.86 | -15.56 | 26.35 | 34 | -7.65 | Vertical |



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Test frequency: 6489.6MHz

| Average Field Strength within 1164-1240MHz & 1559-1610MHz @ RBW=1KHz | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1165.621 | 24.26 | 0.99 | 37.82 | 10.92 | -1.65 | 10 | -11.65 | Horizontal |
| 1182.552 | 24.33 | 1 | 37.77 | 10.53 | -1.91 | 10 | -11.91 | Horizontal |
| 1199.956 | 24.4 | 1 | 37.71 | 11.64 | -0.67 | 10 | -10.67 | Horizontal |
| 1572.305 | 26.17 | 1.15 | 36.7 | 8.64 | -0.74 | 10 | -10.74 | Horizontal |
| 1597.507 | 26.47 | 1.15 | 36.64 | 9.9 | 0.88 | 10 | -9.12 | Horizontal |
| 1607.256 | 26.53 | 1.16 | 36.61 | 8.14 | -0.78 | 10 | -10.78 | Horizontal |
| 1172.127 | 24.29 | 0.99 | 37.8 | 11.05 | -1.47 | 10 | -11.47 | Vertical |
| 1180.982 | 24.32 | 1 | 37.77 | 11.67 | -0.78 | 10 | -10.78 | Vertical |
| 1199.956 | 24.4 | 1 | 37.71 | 12.79 | 0.48 | 10 | -9.52 | Vertical |
| 1592.527 | 26.41 | 1.15 | 36.65 | 8.61 | -0.48 | 10 | -10.48 | Vertical |
| 1604.206 | 26.52 | 1.16 | 36.62 | 7.46 | -1.48 | 10 | -11.48 | Vertical |
| 1606.945 | 26.53 | 1.16 | 36.61 | 8.12 | -0.8 | 10 | -10.8 | Vertical |

| Average Field Strength out of 1164-1240MHz & 1559-1610MHz @ RBW=1MHz | | | | | | | | | |
|--|-----------------------|-----------------|--------------------|-------------------|------------------------|----------------|----------------|---------------|--------------|
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Read Level (dBuV) | Distance factor (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dBuV) | Polarization |
| 1087.434 | 24.1 | 0.95 | 38.08 | 41.4 | -15.56 | 12.81 | 20 | -7.19 | Horizontal |
| 1426.916 | 25.11 | 1.09 | 37.06 | 37.99 | -15.56 | 11.57 | 20 | -8.43 | Horizontal |
| 1840.189 | 27.24 | 1.23 | 36.1 | 34.73 | -15.56 | 11.54 | 32 | -20.46 | Horizontal |
| 2442.751 | 29.06 | 1.41 | 35.62 | 33.69 | -15.56 | 12.98 | 34 | -21.02 | Horizontal |
| 4329.354 | 33.6 | 1.96 | 34.56 | 33.69 | -15.56 | 19.13 | 54 | -34.87 | Horizontal |
| 16409.82 | 42.22 | 2.02 | 37.58 | 36.13 | -15.56 | 27.23 | 34 | -6.77 | Horizontal |
| 1056.453 | 24.35 | 0.94 | 38.19 | 37.91 | -15.56 | 9.45 | 20 | -10.55 | Vertical |
| 1342.882 | 24.87 | 1.06 | 37.29 | 36.6 | -15.56 | 9.68 | 20 | -10.32 | Vertical |
| 1798.127 | 26.99 | 1.21 | 36.19 | 36.28 | -15.56 | 12.73 | 32 | -19.27 | Vertical |
| 2471.157 | 29.23 | 1.42 | 35.61 | 37.41 | -15.56 | 16.89 | 34 | -17.11 | Vertical |
| 4859.975 | 34.02 | 2.14 | 34.9 | 33.11 | -15.56 | 18.81 | 54 | -35.19 | Vertical |
| 16409.82 | 42.22 | 2.02 | 37.58 | 36.06 | -15.56 | 27.16 | 34 | -6.84 | Vertical |

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7.5 UWB Bandwidth

Test Requirement 47 CFR Part 15F Section 15.503,15.519(3)(b)

Test Method: ANSI C63.10:2013 section 10.1

7.5.1 E.U.T. Operation

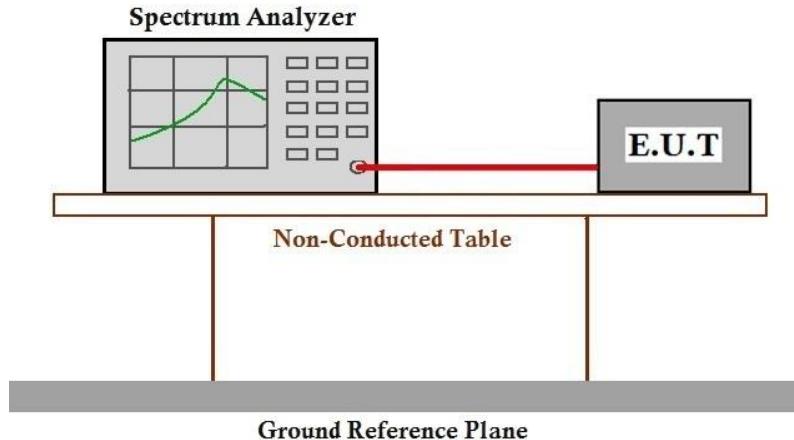
Operating Environment:

Temperature: 25.1 °C Humidity: 49.9 % RH Atmospheric Pressure: 1005 mbar

7.5.2 Test Mode Description

| Pre-scan / Final test | Mode Code | Description |
|-----------------------|-----------|---|
| Final test | 00 | Continuous Tx Mode: Keep the EUT Transmitting with Modulation |

7.5.3 Test Setup Diagram



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7.5.4 Measurement Procedure and Data

The frequency at which the maximum power level is measured with the peak detector is designated f_M . The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below f_M , where the peak power falls by 10 dB relative to the level at f_M , are designated as f_H and f_L , respectively:

- a) For the lowest frequency bound f_L , the emission is searched from a frequency lower than f_M that has, by inspection, a peak power much lower than 10 dB less than the power at f_M and increased toward f_M until the peak power indicates 10 dB less than the power at f_M . The frequency of that segment is recorded.
- b) This process is repeated for the highest frequency bound f_H , beginning at a frequency higher than f_M that has, by inspection, a peak power much lower than 10 dB below the power at f_M . The frequency of that segment is recorded.
- c) The two recorded frequencies represent the highest f_H and lowest f_L bounds of the UWB transmission, and the 10 dB bandwidth ($B - 10$) is defined as $(f_H - f_L)$. The center frequency (f_C) is mathematically determined from $(f_H - f_L) / 2$.
- d) The fractional bandwidth is defined as $2(f_H - f_L) / (f_H + f_L)$.
- e) Determine whether the -10 dB bandwidth ($f_H - f_L$) is ≥ 500 MHz, or whether the fractional bandwidth $2(f_H - f_L) / (f_H + f_L)$ is ≥ 0.2 .



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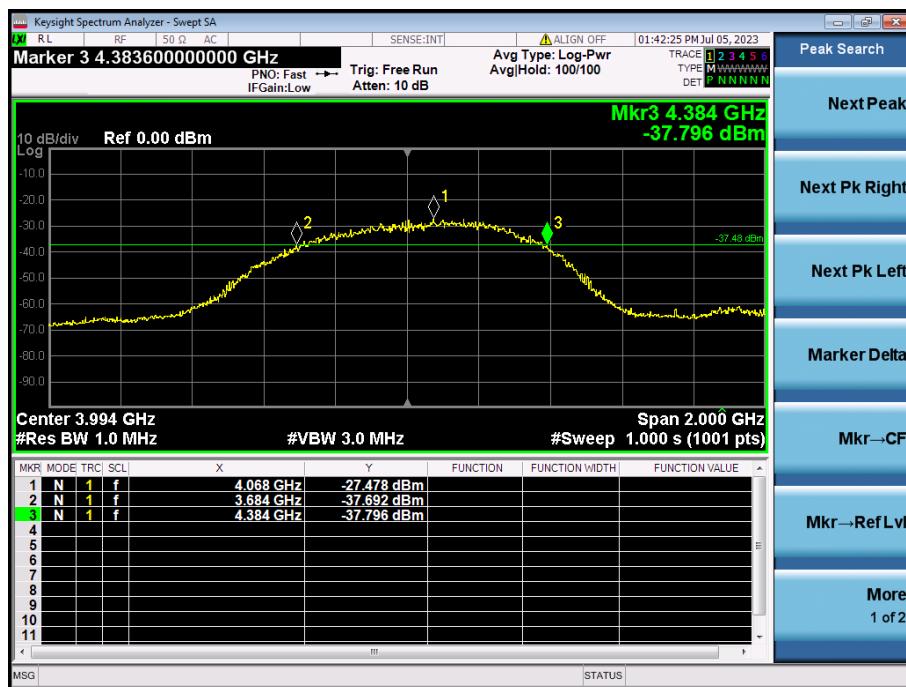
SZEMC-TRF-01 Rev. A/0 Aug01,2022

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| Test Frequency (MHz) | FM(MHz) | FL (MHz) | FH (MHz) | 10dB bandwidth (MHz) | Limit (MHz) | FL Limit (MHz) | FH Limit (MHz) | Results |
|----------------------|---------|----------|----------|----------------------|-------------|----------------|----------------|---------|
| 3993.6 | 4068 | 3684 | 4384 | 700 | ≥500 | >3100 | <10600 | Pass |

10dBc bandwidth



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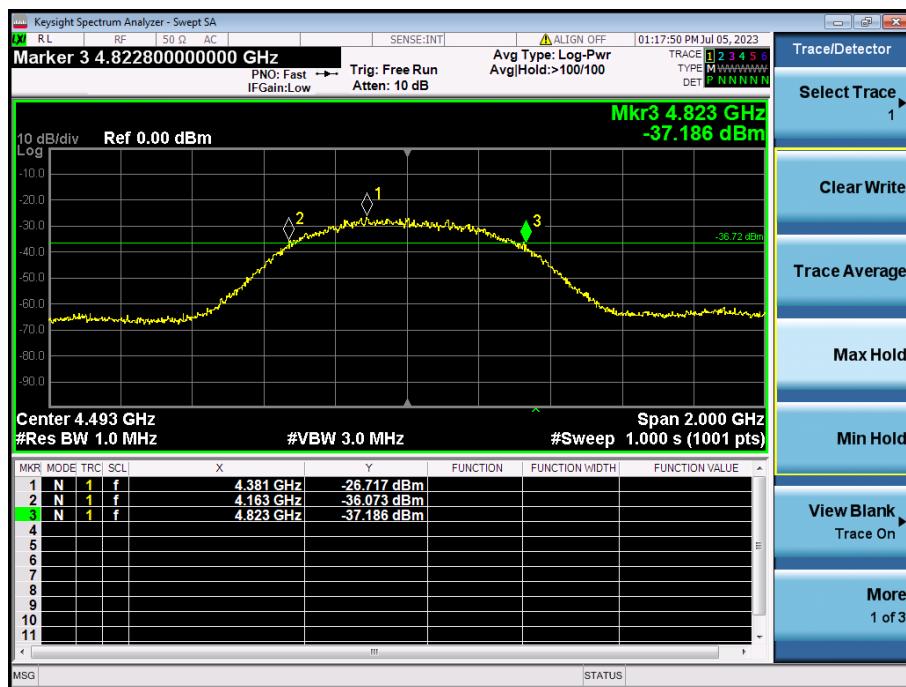
SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZCR230500154402

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| Test Frequency (MHz) | FM(MHz) | FL (MHz) | FH (MHz) | 10dB bandwidth (MHz) | Limit (MHz) | FL Limit (MHz) | FH Limit (MHz) | Results |
|----------------------|---------|----------|----------|----------------------|-------------|----------------|----------------|---------|
| 4492.8 | 4381 | 4163 | 4823 | 660 | ≥500 | >3100 | <10600 | Pass |

10dBc bandwidth



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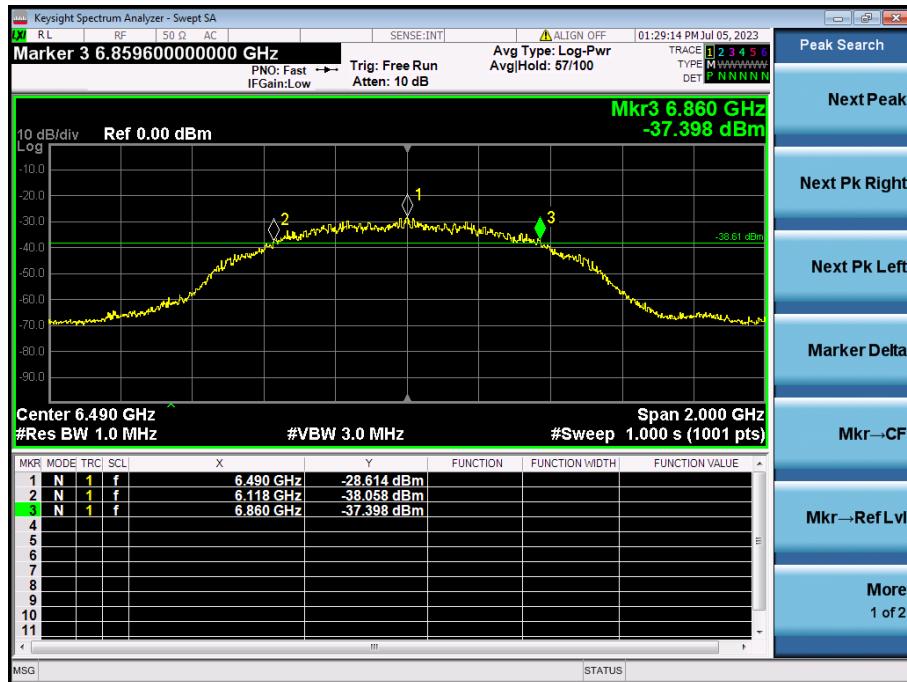
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| Test Frequency (MHz) | FM(MHz) | FL (MHz) | FH (MHz) | 10dB bandwidth (MHz) | Limit (MHz) | FL Limit (MHz) | FH Limit (MHz) | Results |
|----------------------|---------|----------|----------|----------------------|-------------|----------------|----------------|---------|
| 6489.6 | 6490 | 6118 | 6860 | 742 | ≥500 | >3100 | <10600 | Pass |

10dBc bandwidth



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2305001544AT.

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External & Internal Photographs for SZCR2305001544AT.

- End of the Report -



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