

# MEASUREMENTS OF SHURE MXW1X ANTENNAS FOR REGULATORY APPROVAL

**1.9GHZ ANTENNA A** 

**1.9GHZ ANTENNA B** 

**2.4GHZ BLUETOOTH ANTENNA** 

| Project:                               | Double Stuff | Revision: 1.0   | Date:   | March 31, 2023 |
|--|--------------|---|---------|----------------|
| Authors:                               | Eric Johnson |   | Page:   | 1 of 14        |
| Shure Incorporated © 2023              |              | It is the responsibility of any Associate using printed copies of this document |         |                |
| Proprietary and Confidential to ensure |              | to ensure that these copies are co  | urrent. |                |





# Contents

| 1.  | Overview and Reference Angles  | 3  |
|-----|--|----|
| 2.  | 1.9GHz Antenna A   | 5  |
| 3.  | 1.9GHz Antenna B   | 8  |
| 4.  | 2.4GHz Bluetooth Antenna   | 11 |
|     |  |    |
| _   |  |    |
| Ta  | ble of Figures   |    |
| Fig | gure 1-1. Shure MXW2X Internal Antennas Overview                                       | 3  |
|     | gure 1-2. Shure MXW2X Antennas Block Diagram   |    |
|     | gure 1-3. MXW2X Reference Angles   |    |
| Fig | gure 2-1. 1.9GHz Antenna A X-Y Plane.  | 5  |
|     | gure 2-2. 1.9GHz Antenna A Y-Z Plane   |    |
|     | gure 2-3. 1.9GHz Antenna A X-Z plane   |    |
|     | gure 2-4. 1.9GHz Antenna A 3D  |    |
|     | gure 3-1. 1.9GHz Antenna B X-Y Plane.  |    |
|     | gure 3-2. 1.9GHz Antenna B Y-Z Plane   |    |
|     | gure 3-3. 1.9GHz Antenna B X-Z Plane   |    |
|     | gure 3-4. 1.9GHz Antenna B 3D  |    |
|     | gure 4-1. 2.4GHz Antenna X-Y plane. 2442MHzgure 4-2. 2.4GHz Antenna Y-Z plane. 2442MHz |    |
| _   | gure 4-2. 2.4GHz Antenna X-Z plane. 2442MHzpure 4-3. 2.4GHz Antenna X-Z plane. 2442MHz |    |
|     | gure 4-4. 2.4GHz Antenna 3D. 2442MHz   |    |
| rig | juie 4-4. 2.401 iz Antenna 30. 2442ivii iz   | 14 |

| Project:                     | Double Stuff | Revision: 1.0                       | Date:   | March 31, 2023 |  |
|------------------------------|--------------|-------------------------------------|---|----------------|--|
| Authors:                     | Eric Johnson |                                     | Page:   | 2 of 14        |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Ass | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are     | to ensure that these copies are current.  |                |  |



# 1. Overview and Reference Angles

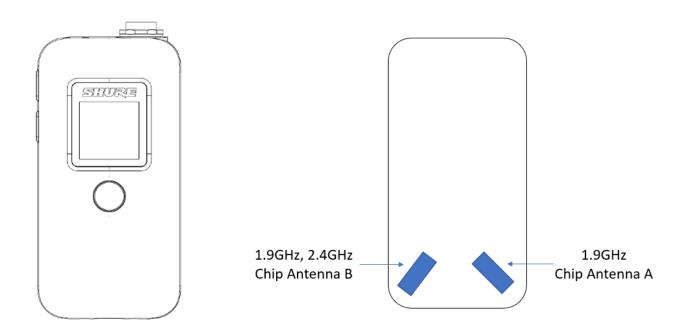


Figure 1-1. Shure MXW1X Internal Antennas Overview

| Project:                     | Double Stuff | Revision: 1.0                        | Date:   | March 31, 2023 |  |
|------------------------------|--------------|--------------------------------------|---|----------------|--|
| Authors:                     | Eric Johnson |                                      | Page:   | 3 of 14        |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Asso | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are c    | to ensure that these copies are current.  |                |  |



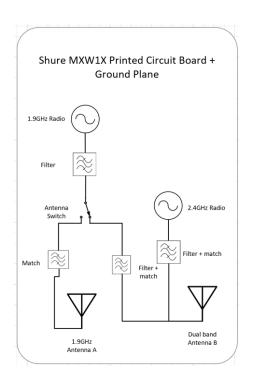


Figure 1-2. Shure MXW1X Antennas Block Diagram

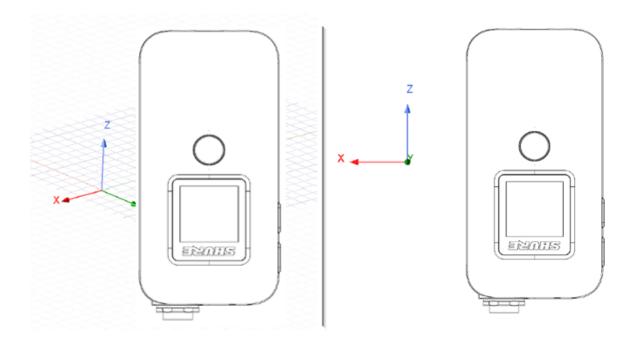


Figure 1-3. MXW1X Reference Angles

| Project:                        | Double Stuff | Revision: 1.0   | Date:  | March 31, 2023 |
|---------------------------------|--------------|---|--------|----------------|
| Authors:                        | Eric Johnson |   | Page:  | 4 of 14        |
| Shure Incorporated © 2023       |              | It is the responsibility of any Associate using printed copies of this document |        |                |
| Proprietary and Confidential to |              | to ensure that these copies are cu  | rrent. |                |



# 2. 1.9GHz Antenna A

| Peak Gain |                          |         |          |          |          |
|-----------|--------------------------|---------|----------|----------|----------|
| Parameter | Туре                     | Pattern | 1880 MHz | 1905 MHz | 1930 MHz |
| Antenna A | Internal Chip<br>Antenna | Omni    | 1.05 dBi | 1.27 dBi | 0.23 dBi |

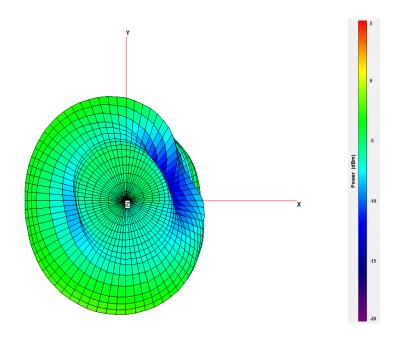


Figure 2-1. 1.9GHz Antenna A X-Y Plane.

| Project:                     | Double Stuff | Revision: 1.0   | Date: | March 31, 2023 |
|------------------------------|--------------|---|-------|----------------|
| Authors:                     | Eric Johnson |   | Page: | 5 of 14        |
| Shure Incorporated © 2023    |              | It is the responsibility of any Associate using printed copies of this document |       |                |
| Proprietary and Confidential |              | to ensure that these copies are current.  |       |                |



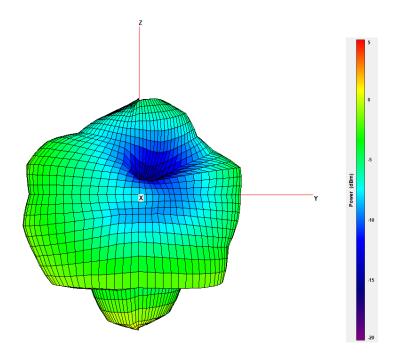


Figure 2-2. 1.9GHz Antenna A Y-Z Plane

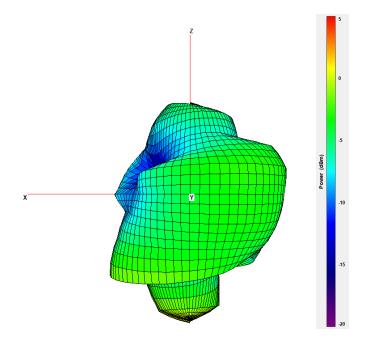


Figure 2-3. 1.9GHz Antenna A X-Z plane

| Project:                     | Double Stuff | Revision: 1.0                       | Date:   | March 31, 2023 |  |
|------------------------------|--------------|-------------------------------------|---|----------------|--|
| Authors:                     | Eric Johnson |                                     | Page:   | 6 of 14        |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Ass | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are     | to ensure that these copies are current.  |                |  |



### Shure MXW1X Antenna Measurements

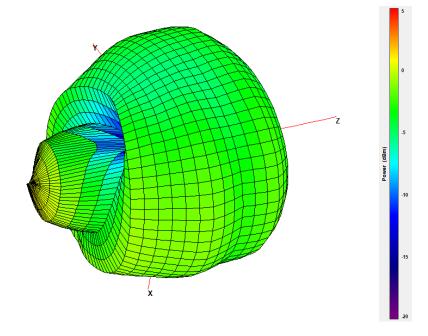


Figure 2-4. 1.9GHz Antenna A 3D

| Project:                     | Double Stuff | Revision: 1.0   | Date: | March 31, 2023 |
|------------------------------|--------------|---|-------|----------------|
| Authors:                     | Eric Johnson |   | Page: | 7 of 14        |
| Shure Incorporated © 2023    |              | It is the responsibility of any Associate using printed copies of this document |       |                |
| Proprietary and Confidential |              | to ensure that these copies are current.  |       |                |



# 3. 1.9GHz Antenna B

| Peak Gain |                          |         |           |           |           |
|-----------|--------------------------|---------|-----------|-----------|-----------|
| Parameter | Туре                     | Pattern | 1880 MHz  | 1905 MHz  | 1930 MHz  |
| Antenna B | Internal Chip<br>Antenna | Omni    | -0.80 dBi | -0.16 dBi | -0.29 dbi |

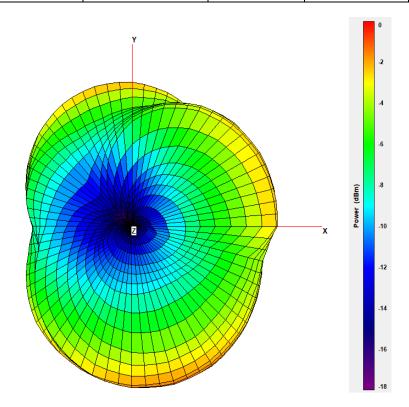


Figure 3-1. 1.9GHz Antenna B X-Y Plane.

| Project:                  | Double Stuff   | Revision: 1.0                           | Date:   | March 31, 2023 |  |
|---------------------------|----------------|---|---|----------------|--|
| Authors:                  | Eric Johnson   |   | Page:   | 8 of 14        |  |
| Shure Incorporated © 2023 |                | It is the responsibility of any Associa | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and           | d Confidential | to ensure that these copies are curre   | ent.  |                |  |



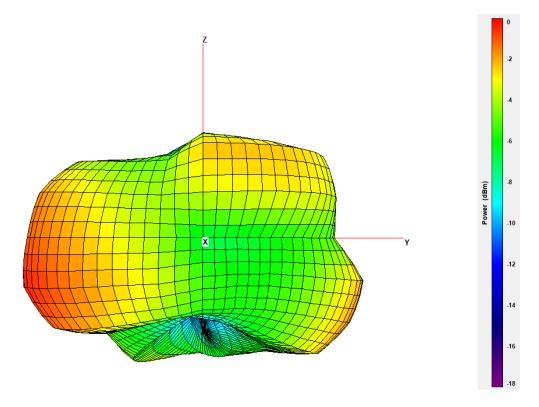
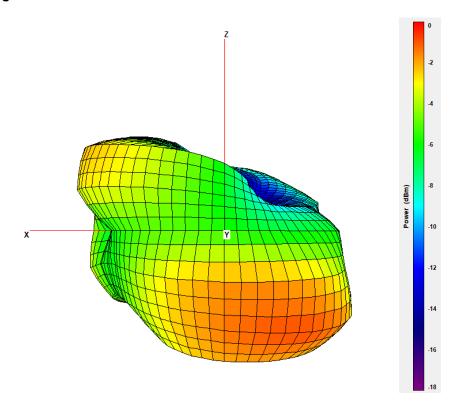


Figure 3-2. 1.9GHz Antenna B Y-Z Plane.



| Project:                     | Double Stuff | Revision: 1.0                               | Date:   | March 31, 2023 |  |
|------------------------------|--------------|---|---|----------------|--|
| Authors:                     | Eric Johnson |   | Page:   | 9 of 14        |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Association | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are cu          | ırrent.   |                |  |



Figure 3-3. 1.9GHz Antenna B X-Z Plane.

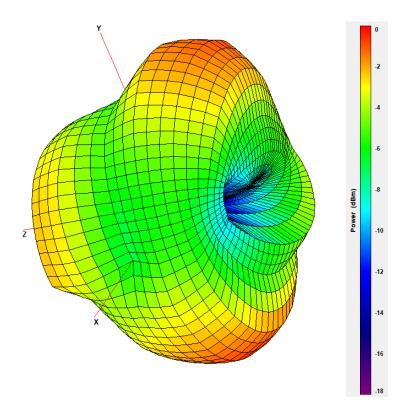


Figure 3-4. 1.9GHz Antenna B 3D

| Project:                     | Double Stuff | Revision: 1.0                          | Date:   | March 31, 2023 |  |
|------------------------------|--------------|--|---|----------------|--|
| Authors:                     | Eric Johnson |  | Page:   | 10 of 14       |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Associ | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are cur    | rent.   |                |  |



# 4. 2.4GHz Bluetooth Antenna

| Peak Gain |               |         |          |          |          |
|-----------|---------------|---------|----------|----------|----------|
| Parameter | Туре          | Pattern | 2412 MHz | 2442 MHz | 2482 MHz |
| 2.4GHz    | Internal Chip | Omni    | 1.99 dBi | 1.95 dBi | 1.85 dBi |
| Antenna   |               |         |          |          |          |

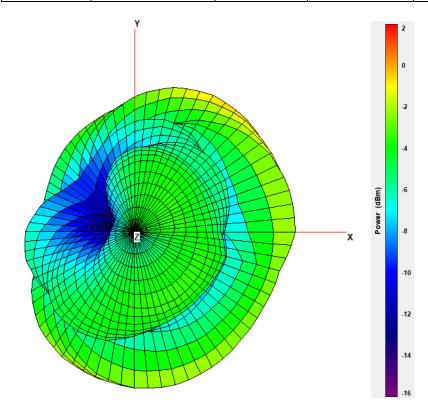


Figure 4-1. 2.4GHz Antenna X-Y plane. 2442MHz.

| Project:                     | Double Stuff | Revision: 1.0                            | Date:   | March 31, 2023 |  |
|------------------------------|--------------|--|---|----------------|--|
| Authors:                     | Eric Johnson |  | Page:   | 11 of 14       |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Asso     | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are current. |   |                |  |



### Shure MXW1X Antenna Measurements

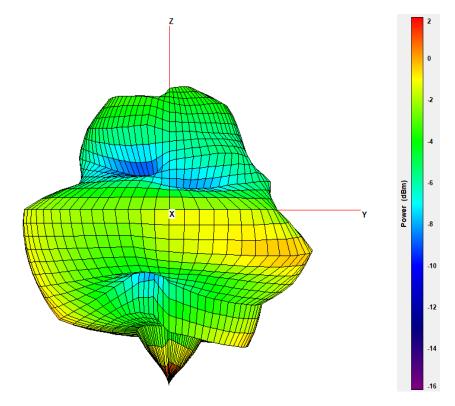


Figure 4-2. 2.4GHz Antenna Y-Z plane. 2442MHz

| Project:                     | Double Stuff | Revision: 1.0   | Date: | March 31, 2023 |
|------------------------------|--------------|---|-------|----------------|
| Authors:                     | Eric Johnson |   | Page: | 12 of 14       |
| Shure Incorporated © 2023    |              | It is the responsibility of any Associate using printed copies of this document |       |                |
| Proprietary and Confidential |              | to ensure that these copies are current.  |       |                |



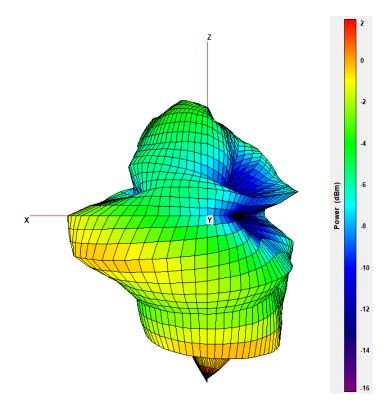
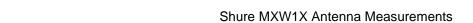


Figure 4-3. 2.4GHz Antenna X-Z plane. 2442MHz

| Project:                     | Double Stuff | Revision: 1.0                        | Date:   | March 31, 2023 |  |
|------------------------------|--------------|--------------------------------------|---|----------------|--|
| Authors:                     | Eric Johnson |                                      | Page:   | 13 of 14       |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Asso | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are co   | urrent.   |                |  |





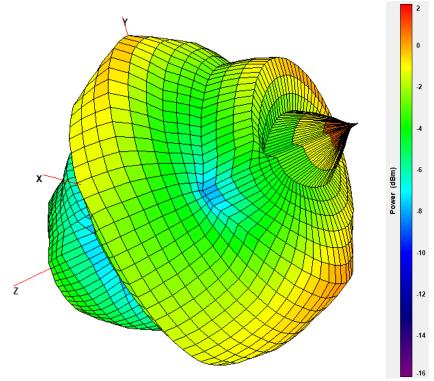


Figure 4-4. 2.4GHz Antenna 3D. 2442MHz

| Project:                     | Double Stuff | Revision: 1.0                          | Date:   | March 31, 2023 |  |
|------------------------------|--------------|--|---|----------------|--|
| Authors:                     | Eric Johnson |  | Page:   | 14 of 14       |  |
| Shure Incorporated © 2023    |              | It is the responsibility of any Associ | It is the responsibility of any Associate using printed copies of this document |                |  |
| Proprietary and Confidential |              | to ensure that these copies are cur    | rent.   |                |  |