

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                            |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
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|  <b>MOTOROLA SOLUTIONS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>MOTOROLA PENANG ADV. COMM. LABORATORY</b><br>Motorola Solutions Malaysia SDN BHD<br>Plot 2A, Medan Bayan Lepas,<br>Mukim 12 S.W.D., 11900 Bayan Lepas,<br>Penang, Malaysia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>FCC / IC TEST REPORT</b><br><b>Report Revision : Rev.A</b>                                                                                                                                                                                              |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <table><tr><td><b>Date/s Tested</b></td><td>: 11-December-2024 - 27-January-2025</td></tr><tr><td><b>Report Issue Date</b></td><td>: 07-February-2025</td></tr><tr><td><b>Manufacturer/Location</b></td><td>: Motorola Solutions Malaysia SDN BHD<br/>Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br/>11900 Bayan Lepas, Penang, Malaysia</td></tr><tr><td><b>Requestor</b></td><td>: WONG CHEW LOOI</td></tr><tr><td><b>Product Type</b></td><td>: Portable</td></tr><tr><td><b>Product Marketing Name (PMN)</b></td><td>: RMM2050</td></tr><tr><td><b>Hardware Version Identification Number (HVIN)</b></td><td>: RMM2050BHLAA</td></tr><tr><td><b>Frequency Band</b></td><td>: 151.82-154.6 MHz</td></tr><tr><td><b>Max. Output Power</b></td><td>: 2W</td></tr><tr><td><b>Firmware Version Identification Number (FVIN)</b></td><td>: R02.02</td></tr><tr><td><b>Applicant Name</b></td><td>: Motorola Solutions Inc</td></tr><tr><td><b>Applicant Address</b></td><td>: Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br/>11900 Bayan Lepas, Penang, Malaysia</td></tr><tr><td><b>FCC Registration</b></td><td>: 461337</td></tr><tr><td><b>IC Registrations</b></td><td>: MY0001</td></tr></table> <p><b>The equipment was tested accordance to the requirement listed below:</b></p> <table><tr><td><b>(MURS)</b><br/><b>FCC 47 CFR Part 2/95 J</b></td><td><b>PASS</b></td></tr></table> |                                                                                                                                                                                                                                                            | <b>Date/s Tested</b> | : 11-December-2024 - 27-January-2025 | <b>Report Issue Date</b> | : 07-February-2025 | <b>Manufacturer/Location</b> | : Motorola Solutions Malaysia SDN BHD<br>Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br>11900 Bayan Lepas, Penang, Malaysia | <b>Requestor</b> | : WONG CHEW LOOI | <b>Product Type</b> | : Portable | <b>Product Marketing Name (PMN)</b> | : RMM2050 | <b>Hardware Version Identification Number (HVIN)</b> | : RMM2050BHLAA | <b>Frequency Band</b> | : 151.82-154.6 MHz | <b>Max. Output Power</b> | : 2W | <b>Firmware Version Identification Number (FVIN)</b> | : R02.02 | <b>Applicant Name</b> | : Motorola Solutions Inc | <b>Applicant Address</b> | : Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br>11900 Bayan Lepas, Penang, Malaysia | <b>FCC Registration</b> | : 461337 | <b>IC Registrations</b> | : MY0001 | <b>(MURS)</b><br><b>FCC 47 CFR Part 2/95 J</b> | <b>PASS</b> |
| <b>Date/s Tested</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : 11-December-2024 - 27-January-2025                                                                                                                                                                                                                       |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Report Issue Date</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : 07-February-2025                                                                                                                                                                                                                                         |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Manufacturer/Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | : Motorola Solutions Malaysia SDN BHD<br>Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br>11900 Bayan Lepas, Penang, Malaysia                                                                                                                               |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Requestor</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | : WONG CHEW LOOI                                                                                                                                                                                                                                           |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Product Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | : Portable                                                                                                                                                                                                                                                 |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Product Marketing Name (PMN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | : RMM2050                                                                                                                                                                                                                                                  |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Hardware Version Identification Number (HVIN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : RMM2050BHLAA                                                                                                                                                                                                                                             |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Frequency Band</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | : 151.82-154.6 MHz                                                                                                                                                                                                                                         |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Max. Output Power</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : 2W                                                                                                                                                                                                                                                       |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Firmware Version Identification Number (FVIN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : R02.02                                                                                                                                                                                                                                                   |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Applicant Name</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | : Motorola Solutions Inc                                                                                                                                                                                                                                   |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>Applicant Address</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D.,<br>11900 Bayan Lepas, Penang, Malaysia                                                                                                                                                                      |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>FCC Registration</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | : 461337                                                                                                                                                                                                                                                   |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>IC Registrations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | : MY0001                                                                                                                                                                                                                                                   |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <b>(MURS)</b><br><b>FCC 47 CFR Part 2/95 J</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>PASS</b>                                                                                                                                                                                                                                                |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <p>This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |
| <p>Prepared By:</p> <br><hr/> <p><b>Farah Nur Arina</b><br/><b>Test Personnel</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Approved Signatory :</p> <br><hr/> <p><b>Maheshvaran A/L Rajagopal</b><br/><b>Responsible Engineer</b></p>                                                         |                      |                                      |                          |                    |                              |                                                                                                                              |                  |                  |                     |            |                                     |           |                                                      |                |                       |                    |                          |      |                                                      |          |                       |                          |                          |                                                                                       |                         |          |                         |          |                                                |             |

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| Revision History | Description    | Date        | Originator |
|------------------|----------------|-------------|------------|
| Rev. A           | Initial Report | 07-Feb-2025 | Farah      |
|                  |                |             |            |

## 1.0. General Information

### EUT Description:

| Tx Frequency range         |                   |
|----------------------------|-------------------|
| 151.8200MHz to 154.6000MHz |                   |
|                            |                   |
| Antenna type gain          | FIXED HELIX, 3dBi |
| Technologies               | LMR               |
| Device voltage             | 4.0VDC            |

The EUT contains following accessory devices and data cable:

| Item                            | Model or P/N |
|---------------------------------|--------------|
| M/RVA/XT HC BATT LIION-3000 KIT | PMNN4453AR   |

MURS channel list:

In § 95.2763 MURS channels: Five VHF channels are allotted for shared use in the MURS. These channels, designated by their center frequencies in megahertz, are as follows: 151.820, 151.880, 151.940, 154.570, and 154.600 MHz. Each MURS transmitter type must be designed to transmit on one or more of these channels.

### General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

#### ANSI C63.26

#### FCC Part 2 & 95 J

#### Deviation from standard

Not applicable as no deviation from standard test method

#### Modifications to EUT

For RF conducted measurements a pigtail was soldered out of the board while for radiated measurements there were no modifications to the device

#### Antenna gain disclaimer

Antenna gain information is provided by customer. The validity of the results is dependent upon this information. The lab will not be held accountable in the event the supplied information affects compliance.

## Test configuration of EUT

All relevant configurations involving radio models and accessories (including chargers, batteries, and antennas) were assessed. Only worst case configurations will be included in this report.

## 2.0. Summary of Test Results

| FCC Clause                     | Test Item                | Result | Remark                                     | Tested by    | Serial number | Environmental conditions |
|--------------------------------|--------------------------|--------|--------------------------------------------|--------------|---------------|--------------------------|
| Part 95.2767                   | Maximum Output Power     | Pass   | NA                                         | Farah        | 0245AX4528    | 25°C 50%RH               |
| Part 2.1047(b)                 | Modulation Limiting      | Pass   | NA                                         | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 2.1047(a)                 | Audio Frequency Response | Pass   | NA                                         | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 2.1047(a)<br>Part 95.2775 | Audio Low Pass Filter    | Pass   | NA                                         | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 2.1055<br>Part 95.2765(b) | Frequency Stability      | Pass   | NA                                         | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 95.2779                   | Emission Bandwidth       | Pass   | NA                                         | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 95.2773<br>Part 2.1049    | Occupied Bandwidth       | Pass   | 11K0F3E, 16K0F3E                           | Farah        | 0245AX4527    | 25°C 50%RH               |
| Part 95.2779(b)                | Unwanted Radiation       | Pass   | Worst Case: -43.03dBm<br>(margin: 23.03dB) | Rezza & Fuad | 0245AX4513    | 24.6°C 69.7%RH           |

### 3.0. Measurement Uncertainty

| Measurement                                         | Frequency       | Expanded Uncertainty<br>(k=1.96) (±dB) |
|-----------------------------------------------------|-----------------|----------------------------------------|
| Maximum Output Power                                | 462MHz ~ 468MHz | 5.01                                   |
| AC Power Line Conducted Spurious Emission           | 150KHz ~ 30MHz  | 3.48                                   |
| Radiated Emissions up to 1 GHz                      | 30MHz ~ 1000MHz | 5.88                                   |
| Radiated Emissions above 1 GHz                      | 1GHz ~ 18GHz    | 5.84                                   |
|                                                     | 18GHz ~ 40GHz   | 6.02                                   |
| Frequency Stability                                 | 9kHz ~ 12.75GHz | 0.0085 ppm                             |
| Audio Frequency Response / Low Pass Filter Response | 300Hz – 20kHz   | 4.09 %                                 |
| Modulation Limiting                                 | 300Hz – 3kHz    | 1.15 %                                 |
| Occupied Bandwidth                                  | 9kHz ~ 12.75GHz | 2.82 dB                                |

### 3.0. Equipment List

#### FCC Analog ATE #1

| Description                            | Model                | Serial Number | Calibration Date | Calibration Due Date |
|----------------------------------------|----------------------|---------------|------------------|----------------------|
| CHAMBER                                | SH-641               | 92009188      | 04-Mar-24        | 04-Mar-25            |
| POWER SUPPLY ( 0-20V / 0-120A, 1000W ) | 6031A                | 2729A00711    | 08-Jun-24        | 08-Jun-25            |
| POWER SENSOR                           | E4412A               | MY50000141    | 16-Aug-24        | 16-Aug-25            |
| POWER METER                            | E4416A               | MY45101448    | 23-Aug-24        | 23-Aug-25            |
| CXA SIGNAL ANALYZER                    | N9000B               | MY60250581    | 08-Jun-24        | 08-Jun-25            |
| AUDIO ANALYZER                         | U8903B               | MY61070007    | 17-Aug-24        | 17-Aug-25            |
| N to N RF cable # 1                    | SUCOFLEX 104         | NA            | NA               | NA                   |
| N to N RF cable # 2                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 3                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 4                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 5                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 6                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 7                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 8                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 9                    | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 10                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 11                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 12                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 13                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 14                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| N to N RF cable # 15                   | 84188418 H+S MY 0812 | NA            | NA               | NA                   |
| BNC to BNC RF cable # 1                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 2                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 3                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 4                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 5                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 6                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 7                | NA                   | NA            | NA               | NA                   |
| BNC to BNC RF cable # 8                | NA                   | NA            | NA               | NA                   |
| Test Software                          | FCC Analog ATE       |               |                  |                      |
| Version                                | 2.5.0                |               |                  |                      |

**FCC Transient ATE #1: (SW version: FCC Transient ATE\_R1.2.1)**

| Description                | Model             | Serial Number | Calibration Date | Calibration Due Date |
|----------------------------|-------------------|---------------|------------------|----------------------|
| SWITCH CONTROL UNIT        | 3488A             | 2719A36210    | Not Required     | Not Required         |
| ATTENUATOR / SWITCH DRIVER | 11713A            | 3748A09090    | Not Required     | Not Required         |
| POWER METER                | E4416A            | MY45101448    | 23-Aug-24        | 23-Aug-25            |
| AUDIO ANALYZER             | 8903B             | 2836A05866    | 09-Feb-24        | 09-Feb-25            |
| POWER SENSOR               | E9301B            | MY50180003    | 19-Jul-24        | 19-Jul-25            |
| SPECTRUM ANALYZER          | E4445A            | MY46181513    | 04-Jul-24        | 04-Jul-25            |
| ATTENUATOR/11DB            | 8494G             | MY52300223    | 15-Aug-24        | 15-Aug-25            |
| ATTENUATOR/110DB           | 8496G             | MY52300088    | 15-Aug-24        | 15-Aug-25            |
| MODULATION ANALYZER        | 8901B             | 3403A04772    | 18-Sep-24        | 18-Sep-25            |
| POWER SUPPLY               | 6031A             | 3506A03271    | 26-Sep-24        | 26-Sep-25            |
| SIGNAL GENERATOR           | 8657A             | 3250A05137    | 16-Aug-24        | 16-Aug-25            |
| CXA SIGNAL ANALYZER        | N9000B            | MY60250716    | 03-Dec-24        | 03-Dec-25            |
| AUDIO ANALYZER             | 8903B             | 3729A17612    | 14-Feb-24        | 14-Feb-25            |
| N to N RF Cable # 1        | SF126/11N/11N     | NA            | NA               | NA                   |
| N to N RF Cable # 2        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 3        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 4        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 5        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 6        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 7        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| N to N RF Cable # 8        | M17/128-<br>RG400 | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 1    | RG 58             | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 2    | RG 58             | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 3    | RG 58             | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 4    | RG 58             | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 5    | RG 58             | NA            | NA               | NA                   |
| BNC to BNC RF Cable # 6    | RG 58             | NA            | NA               | NA                   |
| BNC to N RF Cable # 1      | RG 58             | NA            | NA               | NA                   |
| Aeroflex Attenuator 10dB   | 49-10-43-LIM      | NA            | NA               | NA                   |
| Aeroflex Attenuator 10dB   | 33-10-34-LIM      | NA            | NA               | NA                   |

## EMC CHAMBER 1

| DESCRIPTION                     | MODEL                        | SERIAL NUMBER | CALIBRATION DATE | CALIBRATION DUE DATE |
|---------------------------------|------------------------------|---------------|------------------|----------------------|
| DRG HORN FREQ.                  | SAS-571                      | 1143          | 08-Mar-23        | 08-Mar-25            |
| DRG HORN FREQ.                  | SAS-571                      | 720           | 18-Apr-23        | 18-Apr-25            |
| DC Power Supply                 | 6623A                        | 3302A02585    | 30-Jul-24        | 30-Jul-25            |
| SIGNAL GENERATOR                | SMB 100A                     | 182511        | 04-Jun-21        | 04-Feb-25            |
| EMI TEST RECEIVER               | ESW44                        | 101750        | 08-Aug-24        | 07-Aug-25            |
| 5m SEMI-ANECHOIC CHAMBER        | S800-HX                      | J2308         | Not Required     | Not Required         |
| BILOG ANTENNA                   | CBL6112B                     | 2964          | 08-Oct-24        | 08-Oct-25            |
| BILOG ANTENNA                   | CBL6112D                     | 30991         | 05-Feb-24        | 05-Feb-25            |
| DATA LOGGER<br>THERMOHYGROMETER | SDL500                       | A.016800      | 26-Jun-24        | 26-Jun-25            |
| SYSTEM CONTROLLER               | SC104V                       | 050806-1      | Not Required     | Not Required         |
| TURNTABLE FLUSH MOUNT 2M        | FM2011                       | FM2011-001    | Not Required     | Not Required         |
| ANTENNA POSITIONING TOWER       | TLT2                         | NA            | Not Required     | Not Required         |
| BROAD-BAND HORN ANTENNA         | BBHA9170                     | BBHA9170255   | 13-Mar-2024      | 13-Mar-2025          |
| PREAMPLIFIER 18-40GHz           | Miteq Hi Gain<br>Sucoflex    | 002           | Not Required     | Not Required         |
| PREAMPLIFIER                    | PAM-0118P                    | 270           | 11-Jun-24        | 11-Jun-25            |
| LOOP ANTENNA                    | 6502                         | 00203479      | 06-Mac-24        | 06-Mac-25            |
| TEST SOFTWARE                   | EMC_FCC_IC_BLUETOOTH_RE_TEST |               |                  |                      |
| VERSION                         | EMC_FCC_RE_v1.6.5            |               |                  |                      |

## 4.0. Test Mode Applicability and Test Channel Detail

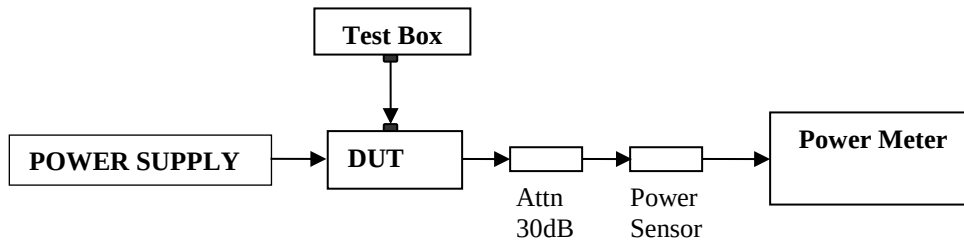
Test Frequency list:

| Channel | Frequency    | Channel Spacing |
|---------|--------------|-----------------|
| 1       | 154.5700 MHz | 25.0 kHz        |
| 2       | 154.6000 MHz | 25.0 kHz        |
| 3       | 151.8200 MHz | 12.5 kHz        |
| 4       | 151.8800 MHz | 12.5 kHz        |
| 5       | 151.9400 MHz | 12.5 kHz        |

## 5.0. Transmitter Test Parameters

### 5.1. Maximum Output Power

#### 5.1.1. Test Setup



- 1) The DUT transmitter connected to Power Meter using the 30 dB attenuator and power sensor with above setup.
- 2) Path loss for the measurement included.
- 3) All the measurement was done at low, mid, high frequency for each band.
- 4) Record the power into the test report.

#### 5.1.2. Test Limits

##### **§95.2767 MURS transmitting power limit.**

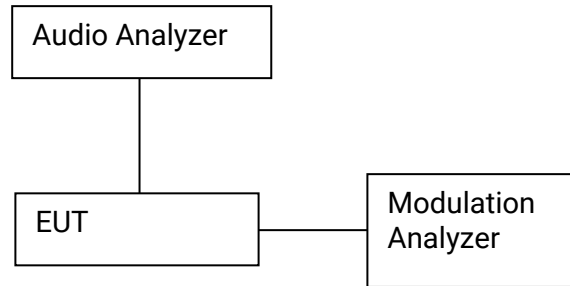
Each MURS transmitter type must be designed such that the transmitter power output does not exceed 2 Watts under normal operating conditions.

#### 5.1.3. Test Data

|                 |               |             |               |             |
|-----------------|---------------|-------------|---------------|-------------|
| Temperature     | 25°C          |             |               |             |
| Voltage (V)     | 7.5V          |             |               |             |
| Frequency (MHz) | Low Power (W) | Current (A) | Max Power (W) | Current (A) |
| 151.82000       | 0.95          | 1.08        | 1.92          | 1.56        |
| 151.88000       | 0.96          | 1.08        | 1.92          | 1.56        |
| 151.94000       | 0.95          | 1.08        | 1.92          | 1.56        |
| 154.57000       | 1.03          | 1.08        | 1.95          | 1.53        |
| 154.60000       | 1.04          | 1.08        | 1.96          | 1.53        |

## 5.2. Modulation Limiting

### 5.2.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the maximum deviation.
- 5) Record the frequency deviation as 0dB input level at 1kHz audio frequency.
- 6) Repeat the step and record the frequency deviation from -20dB to 20dB by 5dB increments and different audio freq 300Hz, 2.5 KHz and 3 KHz.

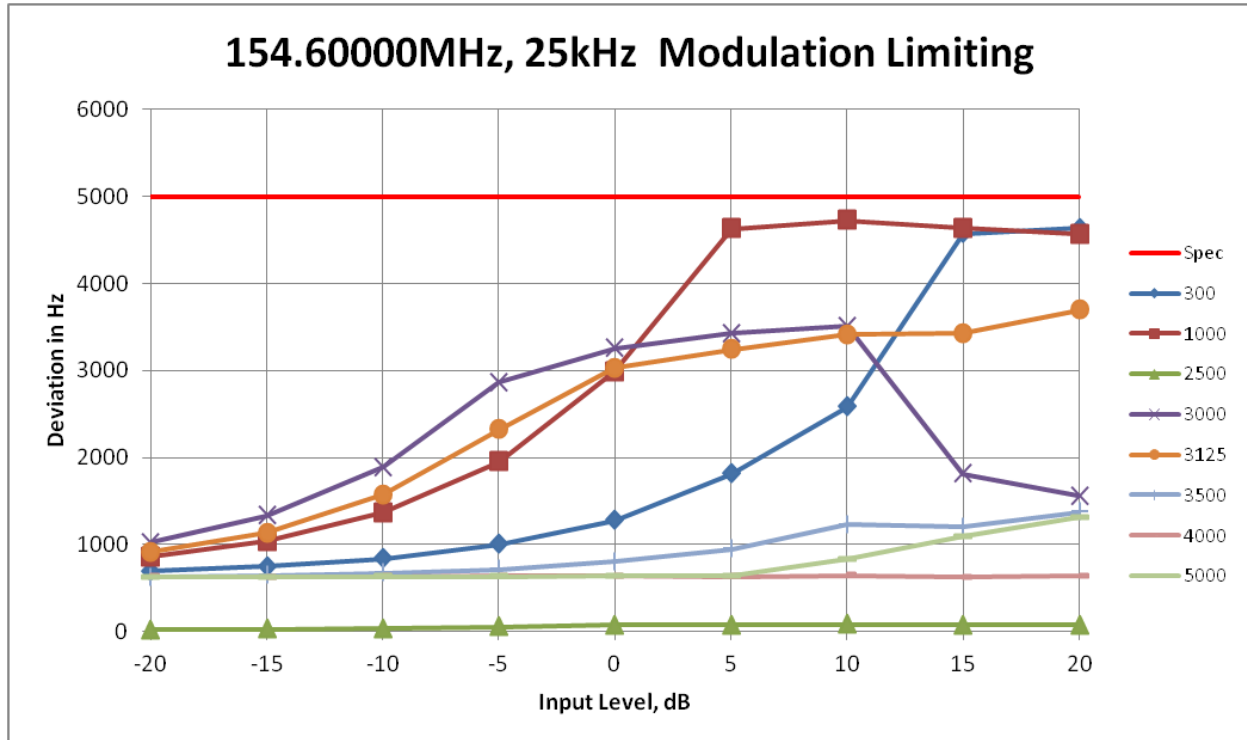
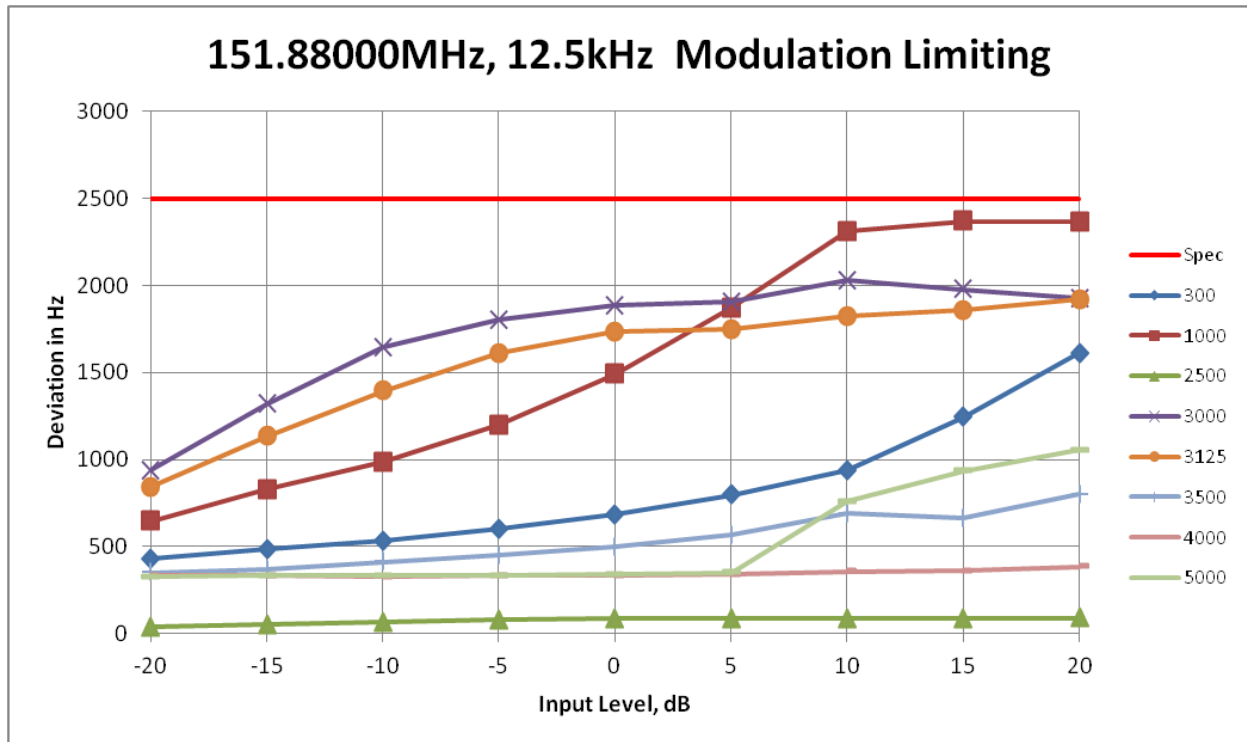
### 5.2.2. Test Limits

#### § 2.1047 Measurements required: Modulation characteristics.

- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

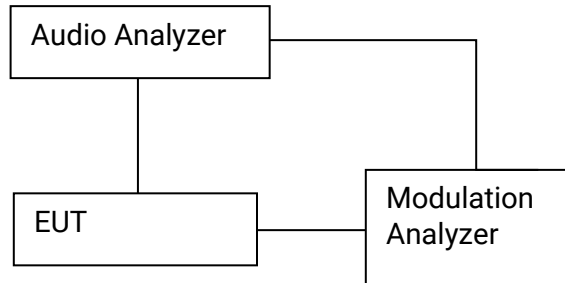
Note: Testing was done to the performance requirements of TIA-603-E. Compliance with this limit is not required by FCC Part 95 J.

### 5.2.3. Test Result



### 5.3. Audio Frequency Response

#### 5.3.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz and 50kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the maximum deviation.
- 5) On audio analyzer, set the rated level as reference to zero.
- 6) Vary the audio frequency from 300Hz to 3 kHz. Record the change in dB on the audio analyzer.

#### 5.3.2. Test Limits:

##### § 2.1047 Measurements required: Modulation characteristics.

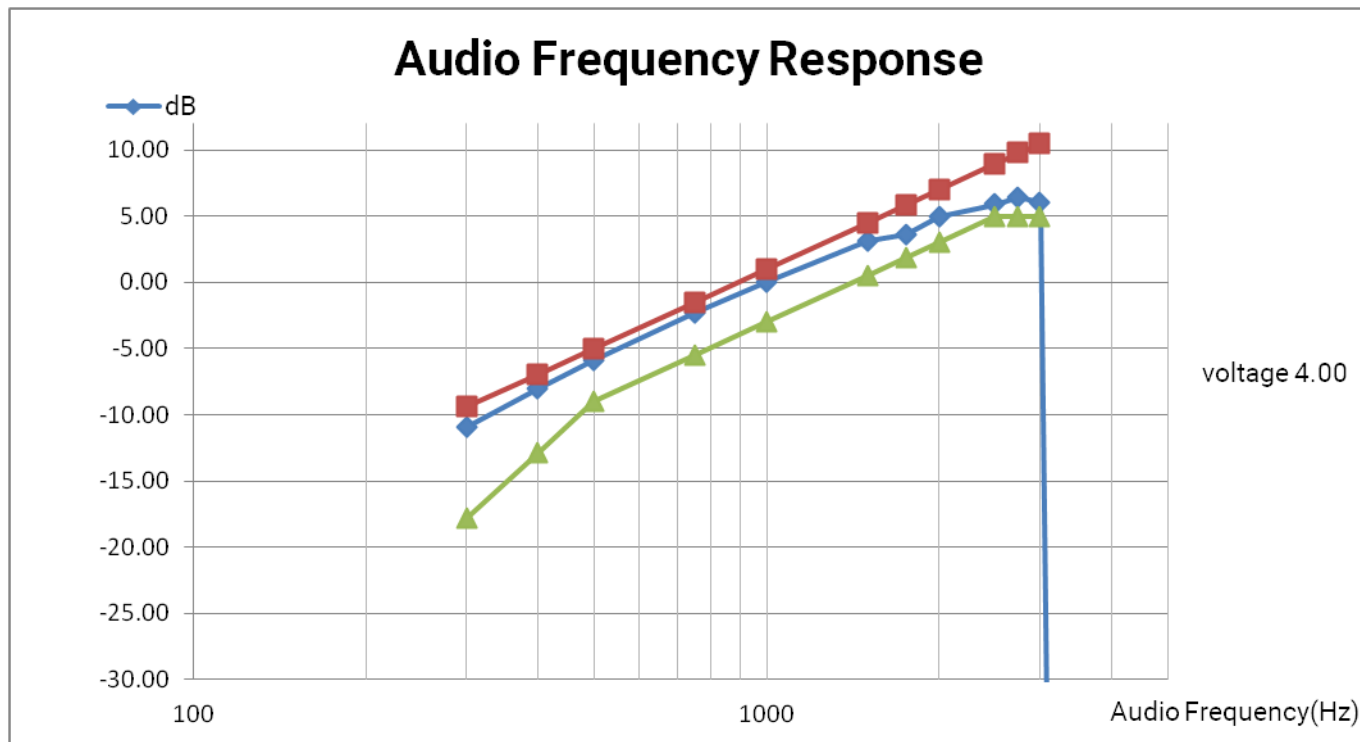
- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

Note: Testing was done to the performance requirements of TIA-603-E. Compliance with this limit is not required by FCC Part 95 J.

### 5.3.3. Test Result

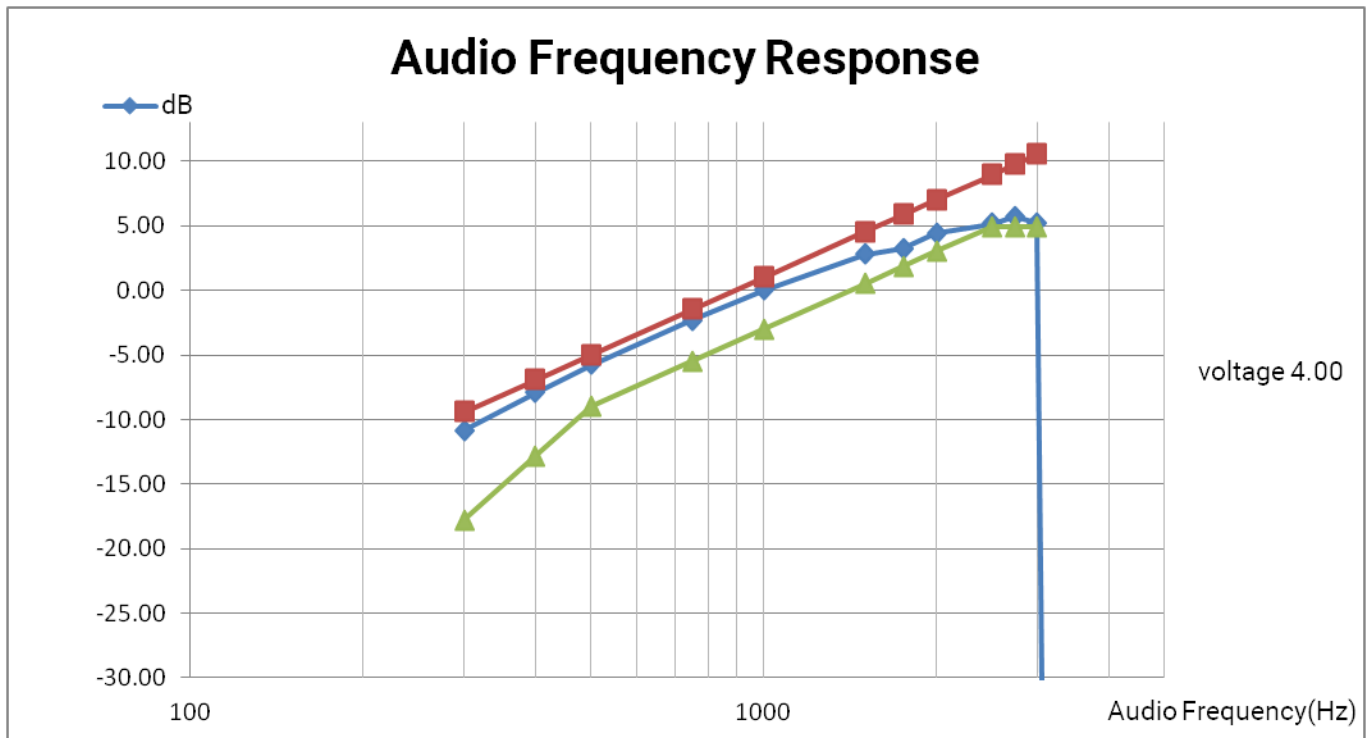
Frequency : 151.88 MHz 2.0W

| voltage             | 4.00   |                |               |
|---------------------|--------|----------------|---------------|
| Temp. (°C)          | 25     |                |               |
| Audio Frequency(Hz) | dB     | HighSide Specs | LowSide Specs |
| 100                 |        |                |               |
| 200                 |        |                |               |
| 300                 | -10.95 | -9.4218        | -17.8436      |
| 400                 | -8.03  | -6.9316        | -12.8631      |
| 500                 | -5.89  | -5.0000        | -9.0000       |
| 750                 | -2.31  | -1.4902        | -5.4902       |
| 1000                | 0.04   | 1.0000         | -3.0000       |
| 1500                | 3.09   | 4.5098         | 0.5098        |
| 1750                | 3.62   | 5.8441         | 1.8441        |
| 2000                | 4.93   | 7.0000         | 3.0000        |
| 2500                | 5.89   | 8.9316         | 4.9316        |
| 2750                | 6.42   | 9.7566         | 4.9316        |
| 3000                | 5.99   | 10.5098        | 4.9316        |
| 3125                | -56.26 |                |               |
| 3250                |        |                |               |
| 3500                |        |                |               |
| 4000                |        |                |               |
| 5000                |        |                |               |



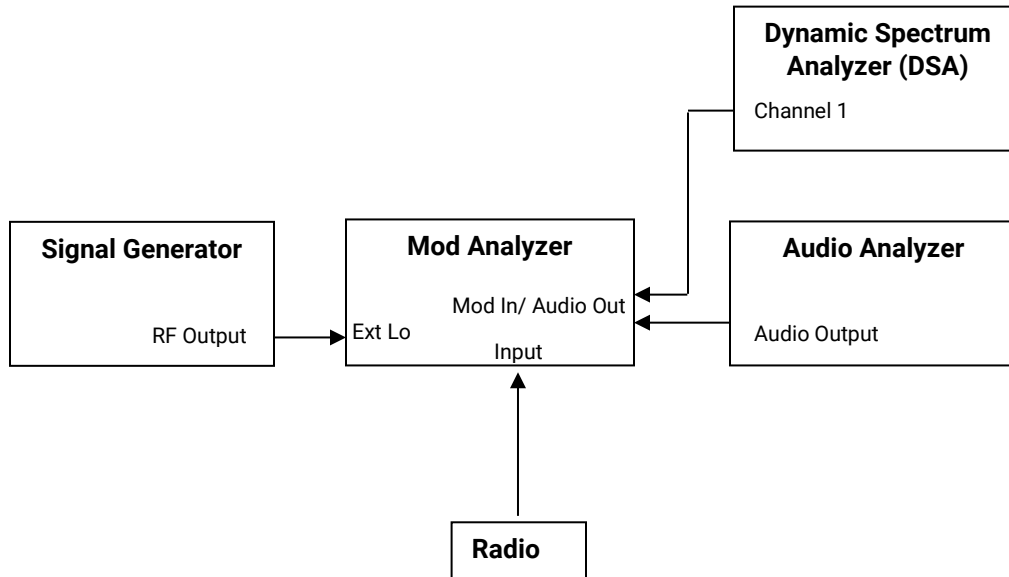
Frequency : 154.6 MHz 2.0W

|                     |        |                |               |
|---------------------|--------|----------------|---------------|
| voltage             | 4.00   |                |               |
| Temp. (°C)          | 25     |                |               |
| Audio Frequency(Hz) | dB     | HighSide Specs | LowSide Specs |
| 100                 |        |                |               |
| 200                 |        |                |               |
| 300                 | -10.86 | -9.4218        | -17.8436      |
| 400                 | -7.94  | -6.9316        | -12.8631      |
| 500                 | -5.77  | -5.0000        | -9.0000       |
| 750                 | -2.34  | -1.4902        | -5.4902       |
| 1000                | -0.02  | 1.0000         | -3.0000       |
| 1500                | 2.79   | 4.5098         | 0.5098        |
| 1750                | 3.24   | 5.8441         | 1.8441        |
| 2000                | 4.41   | 7.0000         | 3.0000        |
| 2500                | 5.15   | 8.9316         | 4.9316        |
| 2750                | 5.73   | 9.7566         | 4.9316        |
| 3000                | 5.21   | 10.5098        | 4.9316        |
| 3125                | -66.67 |                |               |
| 3250                |        |                |               |
| 3500                |        |                |               |
| 4000                |        |                |               |
| 5000                |        |                |               |



## 5.4. Audio Low Pass Filter

### 5.4.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Press 23.1SPCL on modulation analyzer to enable the external LO from SIgen.
- 4) Set the Sigen frequency to  $F_c + 1.5\text{MHz}$ , RF output level to 0dBm without modulation.
- 5) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the maximum deviation.
- 6) Up the amplitude by 20dB.
- 7) On DSA, get the reference point to 0dB.
- 8) Vary the frequency on audio analyzer from 3 kHz to 30 kHz, record the audio tone from DSA.

### 5.4.2. Test Limits:

#### §95.2775 MURS audio filter

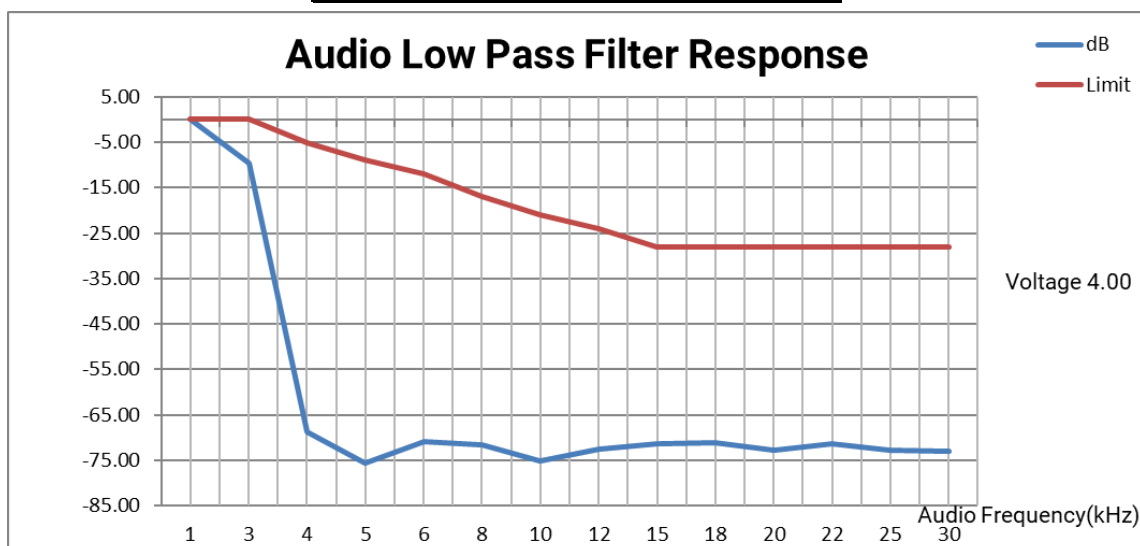
The audio filter referenced in § 95.2779 must satisfy the requirements in this section.

- (a) The audio filter must be between the modulation limiter and the modulated stage of the transmitter.
- (b) At any frequency (f in kHz) between 3 and 15 kHz, the filter must have an attenuation of at least 40 log (f/3) dB more than the attenuation at 1 kHz. Above 15 kHz, it must have an attenuation of at least 28 dB more than the attenuation at 1 kHz.

### 5.4.3. Test Result

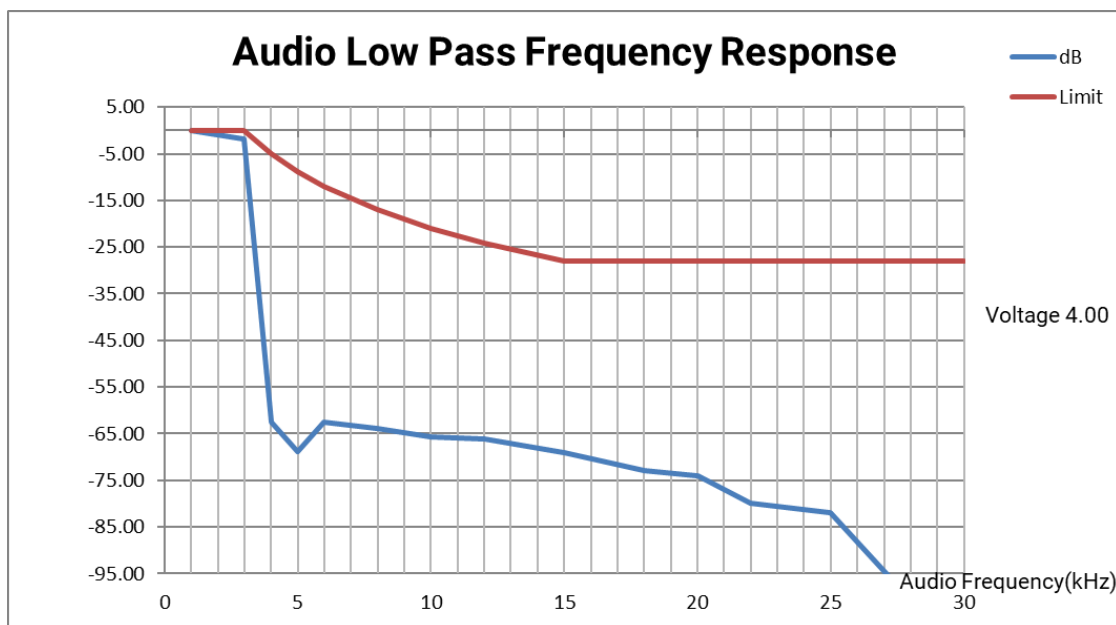
Frequency: 154.600MHz, 2W  
 Channel Spacing: 25.0kHz

|                      |        |        |
|----------------------|--------|--------|
| Voltage              | 4.00   |        |
| Temp. (°C)           | 25     |        |
| Audio Frequency(kHz) | dB     | Limit  |
| 1                    | 0.02   | 0.00   |
| 3                    | -9.70  | 0.00   |
| 4                    | -68.80 | -5.00  |
| 5                    | -75.61 | -8.87  |
| 6                    | -71.00 | -12.04 |
| 8                    | -71.68 | -17.04 |
| 10                   | -75.19 | -20.92 |
| 12                   | -72.46 | -24.08 |
| 15                   | -71.33 | -27.96 |
| 18                   | -71.11 | -28.00 |
| 20                   | -72.80 | -28.00 |
| 22                   | -71.28 | -28.00 |
| 25                   | -72.87 | -28.00 |
| 30                   | -73.00 | -28.00 |



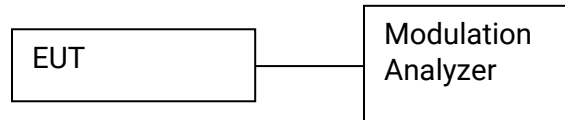
Frequency: 151.8800MHz, 2W  
 Channel Spacing: 12.5kHz

| Voltage              | 4.00    |        |
|----------------------|---------|--------|
| Temp. (°C)           | 25      |        |
| Audio Frequency(kHz) | dB      | Limit  |
| 1                    | 0.00    | 0.00   |
| 3                    | -1.90   | 0.00   |
| 4                    | -62.63  | -5.00  |
| 5                    | -68.86  | -8.87  |
| 6                    | -62.59  | -12.04 |
| 8                    | -63.91  | -17.04 |
| 10                   | -65.77  | -20.92 |
| 12                   | -66.17  | -24.08 |
| 15                   | -69.11  | -27.96 |
| 18                   | -72.85  | -28.00 |
| 20                   | -74.00  | -28.00 |
| 22                   | -80.00  | -28.00 |
| 25                   | -82.00  | -28.00 |
| 30                   | -113.00 | -28.00 |



## 5.5. Frequency Stability

### 5.5.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Transmit the DUT and record the freq in  $MCF_{MHz}$ .
- 3) Test in 2 conditions: Different Temperature & Supply Voltage input.
  - Temperature: Vary from  $-30^{\circ}C$  to  $+50^{\circ}C$  with Nominal supply voltage.
  - Supply Voltage: Vary  $\pm 15\%$  in room temperature
- 4) Calculate the ppm frequency error by the following:

$$ppm\ error = \left( \frac{MCF_{MHz}}{ACF_{MHz}} - 1 \right) * 10^6$$

Where:  $MCF_{MHz}$  is the Measured Carrier Frequency in MHz  
 $ACF_{MHz}$  is the Assigned Carrier Frequency in MHz

### 5.5.2. Test Limits:

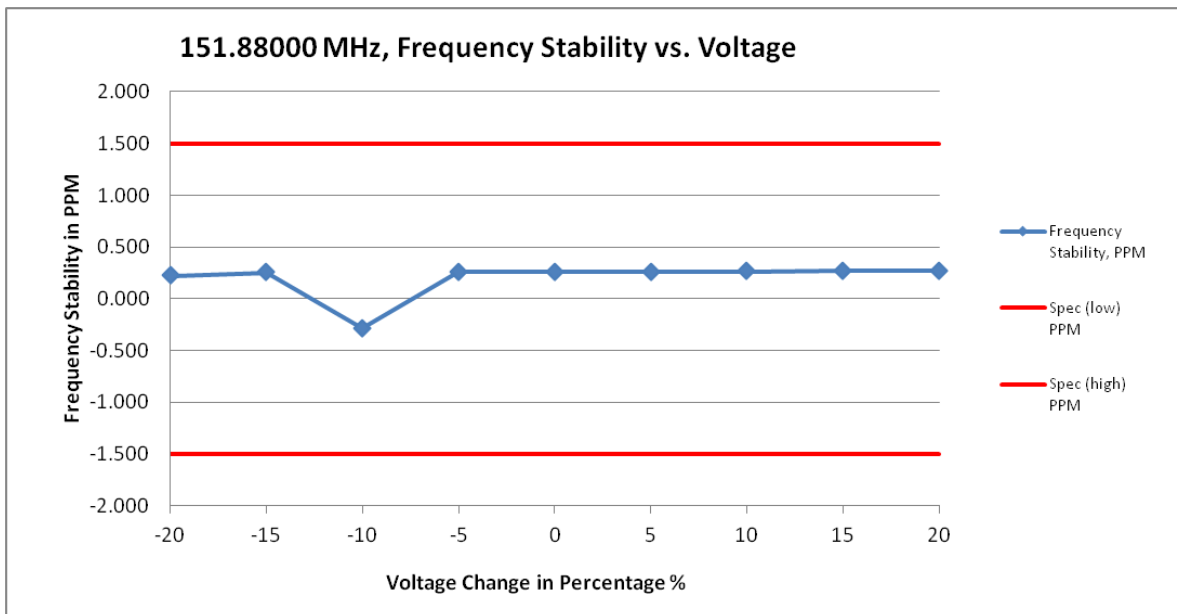
#### § 95.2765 MURS frequency accuracy

Each MURS transmitter type must be designed to meet the applicable frequency tolerance and stability requirements of this section.

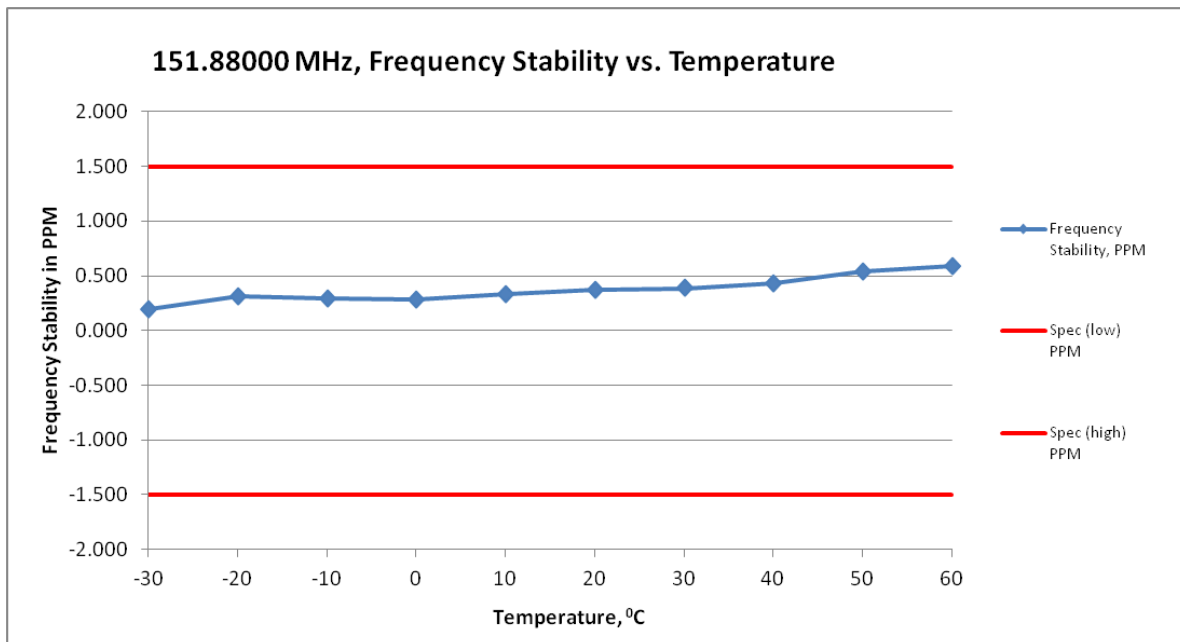
- (a) MURS transmitters that operate with an emission bandwidth of 6.25 kHz or less must be designed such that the carrier frequencies remain within  $\pm 2.0$  parts-per-million (ppm) of the channel center frequencies specified in § 95.2763 during normal operating conditions.
- (b) MURS transmitters that operate with an emission bandwidth greater than 6.25 kHz must be designed such that the carrier frequencies remain within  $\pm 5.0$  ppm of the channel center frequencies specified in § 95.2763 during normal operating conditions.

Note: The frequency stability limit is established as the most stringent value derived from the applicable regulatory requirements or the product-declared specifications.

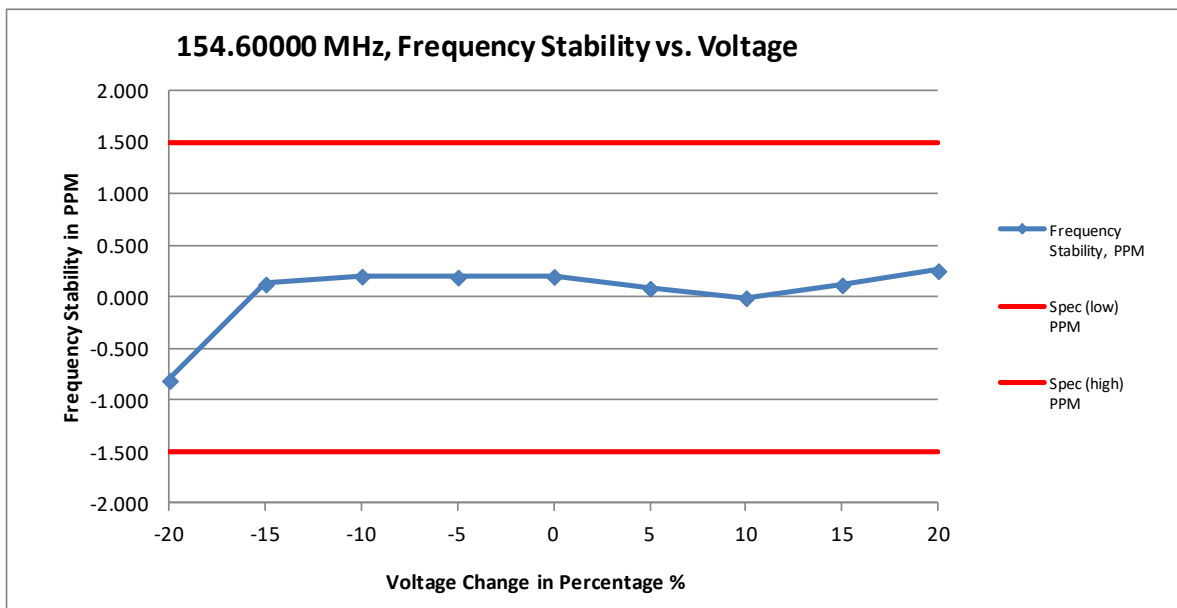
### 5.5.3. Test Result



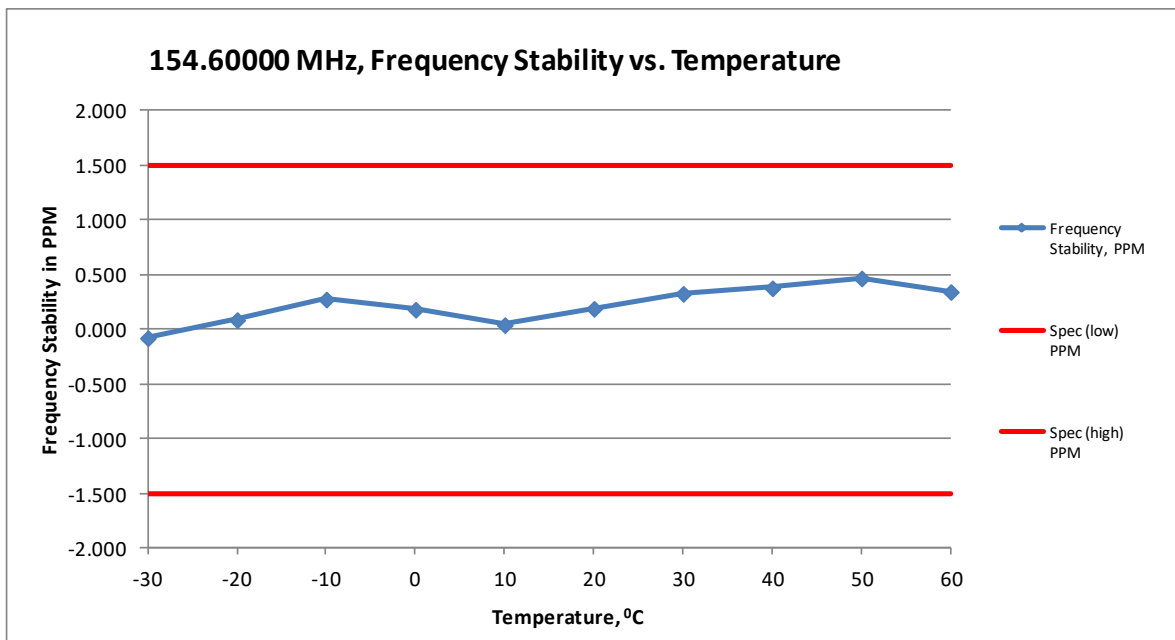
| Frequency / Channel Spacing | 151.88000 MHz / 12.50 kHz |                |                          |                |                 |
|-----------------------------|---------------------------|----------------|--------------------------|----------------|-----------------|
| Temperature, °C             | 25                        |                |                          |                |                 |
| Voltage %                   | Voltage, V                | Frequency, MHz | Frequency Stability, PPM | Spec (low) PPM | Spec (high) PPM |
| -20                         | 3.200                     | 151.880034     | 0.221                    | -1.500         | 1.500           |
| -15                         | 3.400                     | 151.880039     | 0.254                    | -1.500         | 1.500           |
| -10                         | 3.600                     | 151.879957     | -0.285                   | -1.500         | 1.500           |
| -5                          | 3.800                     | 151.880039     | 0.257                    | -1.500         | 1.500           |
| 0                           | 4.000                     | 151.880039     | 0.255                    | -1.500         | 1.500           |
| 5                           | 4.200                     | 151.880039     | 0.259                    | -1.500         | 1.500           |
| 10                          | 4.400                     | 151.880040     | 0.263                    | -1.500         | 1.500           |
| 15                          | 4.600                     | 151.880041     | 0.267                    | -1.500         | 1.500           |
| 20                          | 4.800                     | 151.880041     | 0.270                    | -1.500         | 1.500           |



| Frequency / Channel Spacing | 151.88000 MHz / 12.50 kHz |                          |                |                 |
|-----------------------------|---------------------------|--------------------------|----------------|-----------------|
| Voltage, V                  | 4.0V                      |                          |                |                 |
| Temperature, °C             | Frequency, MHz            | Frequency Stability, PPM | Spec (low) PPM | Spec (high) PPM |
| -30                         | 151.880029                | 0.194                    | -1.500         | 1.500           |
| -20                         | 151.880048                | 0.316                    | -1.500         | 1.500           |
| -10                         | 151.880044                | 0.290                    | -1.500         | 1.500           |
| 0                           | 151.880043                | 0.281                    | -1.500         | 1.500           |
| 10                          | 151.880050                | 0.332                    | -1.500         | 1.500           |
| 20                          | 151.880057                | 0.376                    | -1.500         | 1.500           |
| 30                          | 151.880059                | 0.387                    | -1.500         | 1.500           |
| 40                          | 151.880066                | 0.432                    | -1.500         | 1.500           |
| 50                          | 151.880081                | 0.535                    | -1.500         | 1.500           |
| 60                          | 151.880090                | 0.593                    | -1.500         | 1.500           |



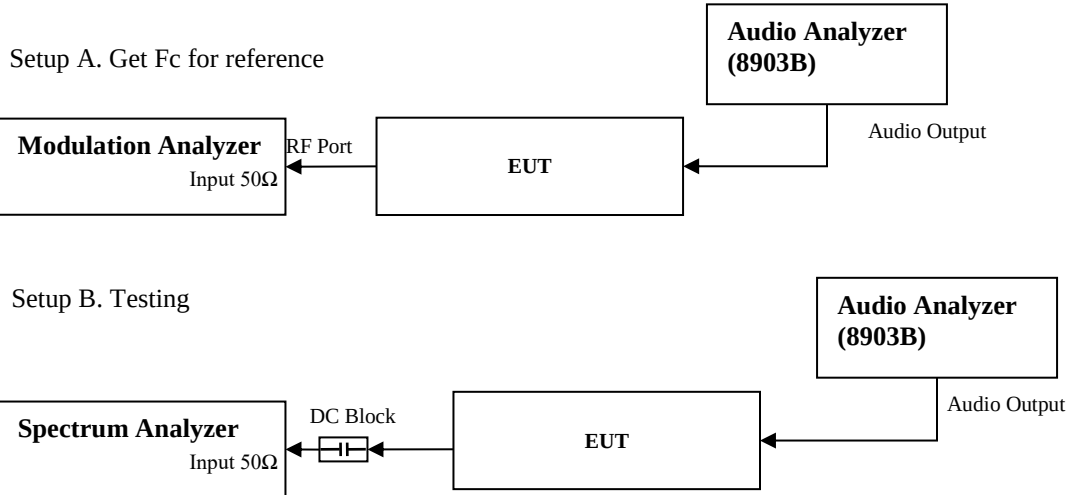
| Frequency / Channel Spacing | 154.60000 MHz / 25.00 kHz |                |                          |                |                 |
|-----------------------------|---------------------------|----------------|--------------------------|----------------|-----------------|
| Temperature, °C             | 25                        |                |                          |                |                 |
| Voltage %                   | Voltage, V                | Frequency, MHz | Frequency Stability, PPM | Spec (low) PPM | Spec (high) PPM |
| -20                         | 3.200                     | 154.599875     | -0.807                   | -1.500         | 1.500           |
| -15                         | 3.400                     | 154.600020     | 0.128                    | -1.500         | 1.500           |
| -10                         | 3.600                     | 154.600032     | 0.205                    | -1.500         | 1.500           |
| -5                          | 3.800                     | 154.600030     | 0.196                    | -1.500         | 1.500           |
| 0                           | 4.000                     | 154.600031     | 0.202                    | -1.500         | 1.500           |
| 5                           | 4.200                     | 154.600014     | 0.088                    | -1.500         | 1.500           |
| 10                          | 4.400                     | 154.599999     | -0.005                   | -1.500         | 1.500           |
| 15                          | 4.600                     | 154.600019     | 0.120                    | -1.500         | 1.500           |
| 20                          | 4.800                     | 154.600040     | 0.258                    | -1.500         | 1.500           |



| Frequency / Channel Spacing | 154.60000 MHz / 25.00 kHz |                          |                |                 |
|-----------------------------|---------------------------|--------------------------|----------------|-----------------|
| Voltage, V                  | 4.0V                      |                          |                |                 |
| Temperature, °C             | Frequency, MHz            | Frequency Stability, PPM | Spec (low) PPM | Spec (high) PPM |
| -30                         | 154.599989                | -0.072                   | -1.500         | 1.500           |
| -20                         | 154.600014                | 0.093                    | -1.500         | 1.500           |
| -10                         | 154.600043                | 0.281                    | -1.500         | 1.500           |
| 0                           | 154.600029                | 0.188                    | -1.500         | 1.500           |
| 10                          | 154.600007                | 0.047                    | -1.500         | 1.500           |
| 20                          | 154.600030                | 0.196                    | -1.500         | 1.500           |
| 30                          | 154.600051                | 0.333                    | -1.500         | 1.500           |
| 40                          | 154.600059                | 0.383                    | -1.500         | 1.500           |
| 50                          | 154.600073                | 0.473                    | -1.500         | 1.500           |
| 60                          | 154.600054                | 0.349                    | -1.500         | 1.500           |

## 5.6. Occupied Bandwidth

### 5.6.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Key in the  $F_c$  to assigned center frequency with the span 100 kHz.
- 4) Set the spectrum analyzer with RBW= 300Hz and VBW= 900Hz.
- 5) Transmit the UUT and record the result.
- 6) Set modulation analyzer audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 7) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 60% of the maximum deviation.
- 8) Up the amplitude by 16dB and remove the audio tone from audio analyzer.
- 9) Capture the screen shot with and without modulation.

## 5.6.2. Test Limits:

### § 95.2773 MURS authorized bandwidths.

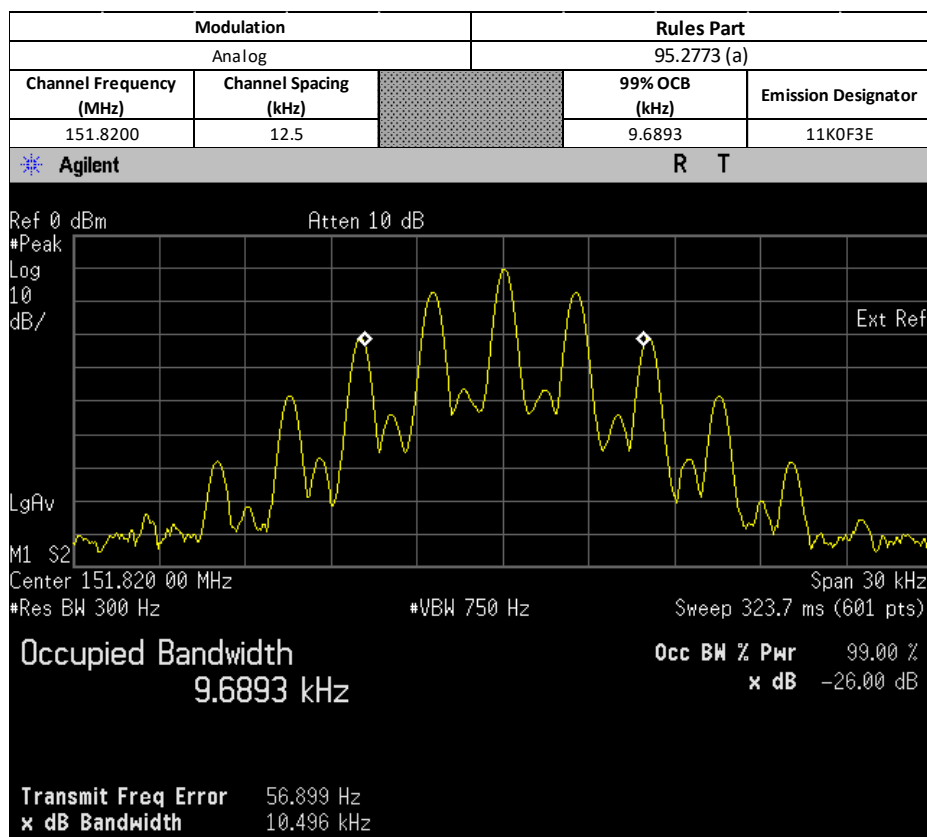
Each MURS transmitter type must be designed to meet the emission bandwidth limitations in this section.

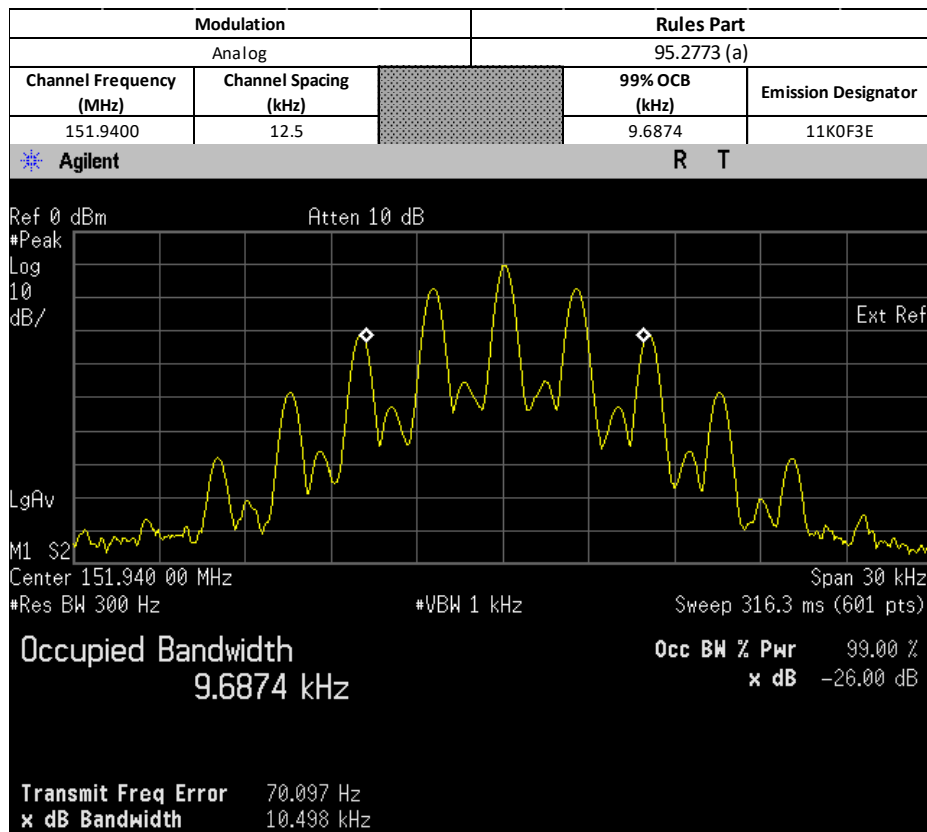
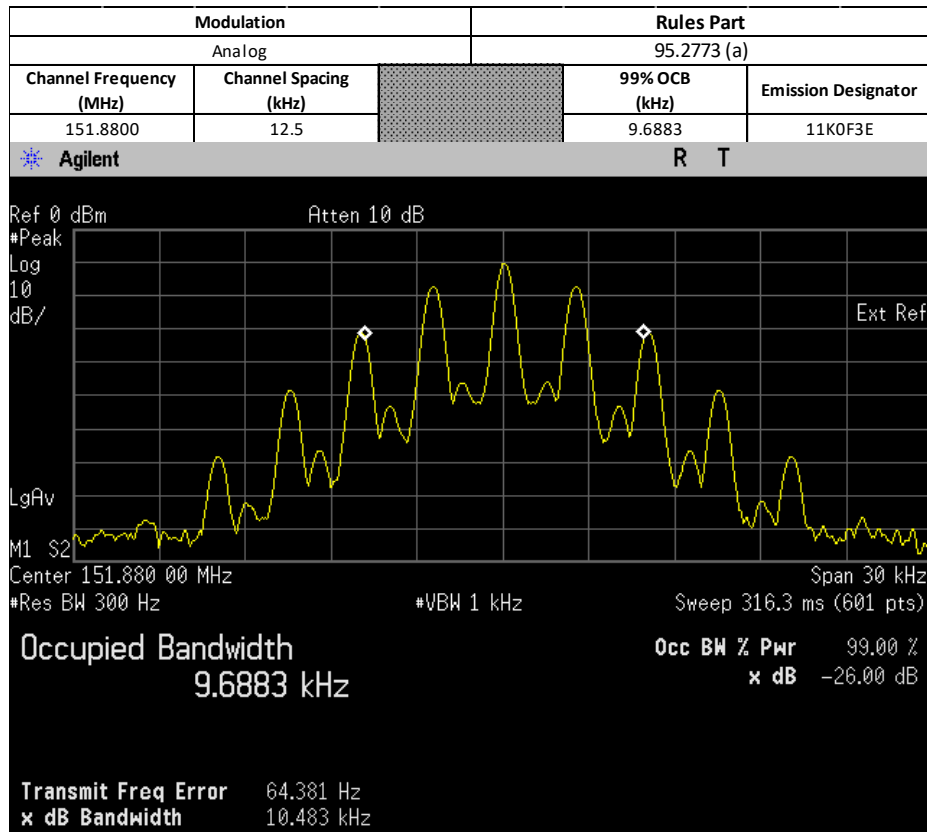
- (a) The occupied bandwidth of emissions transmitted on the center frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz must not exceed 11.25 kHz.
- (b) The occupied bandwidth of emissions transmitted on the center frequencies 154.570 MHz and 154.600 MHz must not exceed 20.0 kHz.
- (c) The occupied bandwidth of type A3E emissions must not exceed 8.0 kHz.

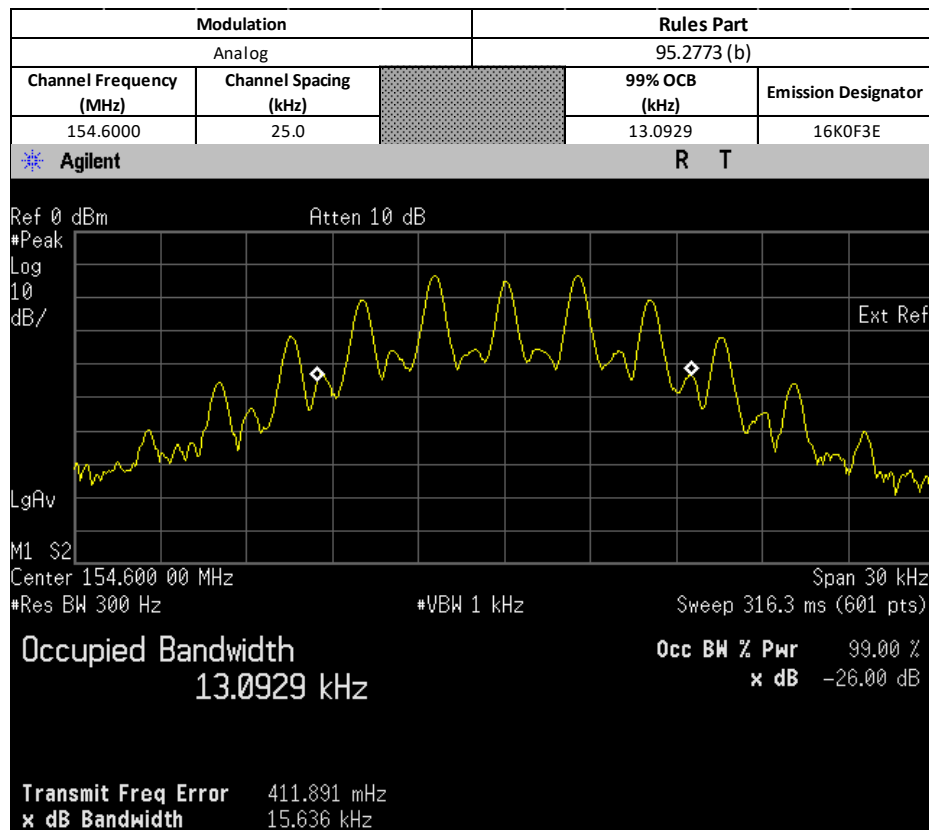
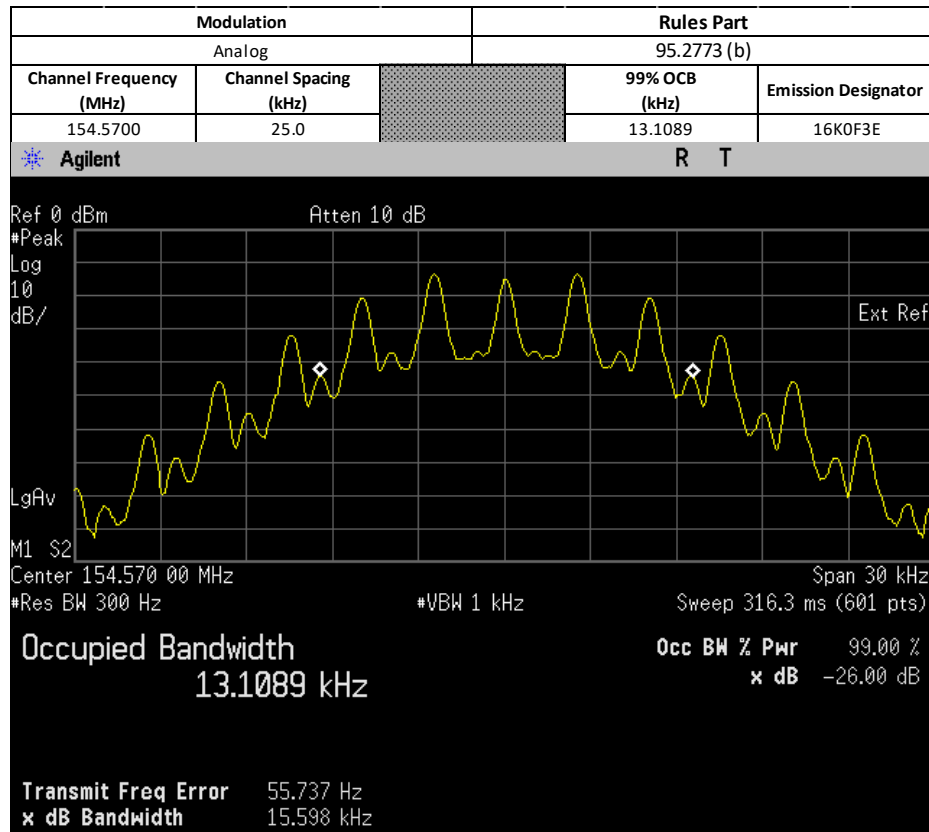
### § 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

### 5.6.3. Test Data







**BANDWIDTH CALCULATIONS:**

Carson's Rule for FM modulation is utilized to compute the bandwidth shown in the FCC emission designator. Carson's Rule is:

$$BW = 2 * (M + D)$$

where: BW = Bandwidth

M = Maximum modulating frequency

D = Deviation

**Standard Audio Modulation (12.5 kHz Channelization, Analog Voice):**

Emission Designator 11K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \rightarrow 11K0$$

F3E portion of the designator indicates voice.

Therefore, the entire designator for 12.5 kHz channelization analog voice is 11K0F3E.

**Standard Audio Modulation (25.0 kHz Channelization, Analog Voice):**

Emission Designator 16K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

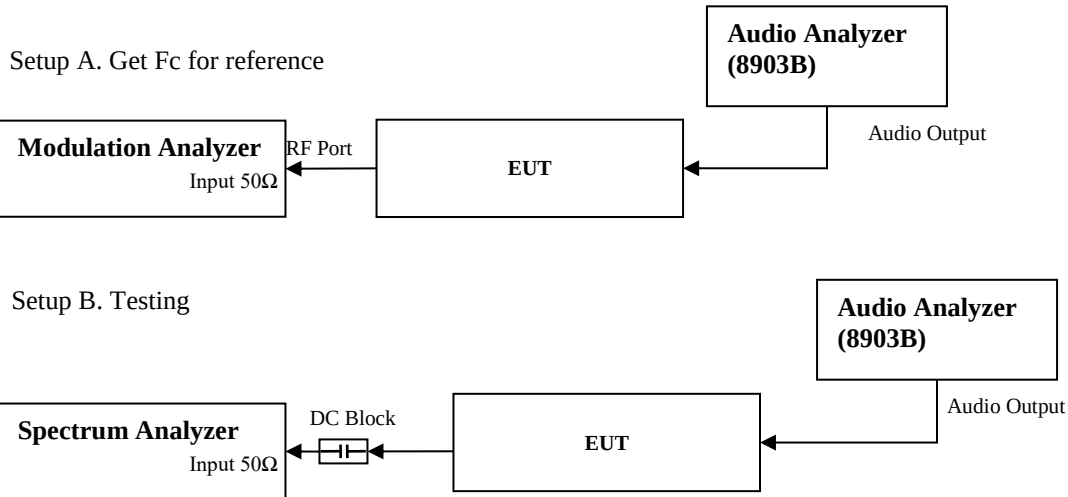
$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 5.0 \text{ kHz}) = 16 \text{ kHz} \rightarrow 16K0$$

F3E portion of the designator indicates voice.

Therefore, the entire designator for 25.0 kHz channelization analog voice is 16K0F3E.

## 5.7. Emission Mask

### 5.7.1. Test Setup



- 10) The DUT transmitter output port was connected to Modulation Analyzer.
- 11) Path loss for the measurement included.
- 12) Key in the Fc to assigned center frequency with the span 100 kHz.
- 13) Set the spectrum analyzer with RBW= 300Hz and VBW= 900Hz.
- 14) Transmit the UUT and record the result.
- 15) Set modulation analyzer audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 16) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 60% of the maximum deviation.
- 17) Up the amplitude by 16dB and remove the audio tone from audio analyzer.
- 18) Capture the screen shot with and without modulation.

### 5.7.2. Test Limits:

#### § 95.2779 MURS unwanted emissions limits.

The requirements in this section apply to each MURS transmitter type both with and without the connection of attachments, such as an external microphone, power cord and/or antenna.

(a) Emission masks. Emission masks applicable to transmitting equipment in the MURS are defined by the requirements in the following table. The numbers in the paragraphs column refer to attenuation requirement rule paragraph numbers under paragraph (b) of this section. The words “audio filter” refer to the audio filter described in § 95.2775.

| Channel center frequencies<br>(MHz)     | Paragraphs     |
|-----------------------------------------|----------------|
| 151.820, 151.880 and 151.940            | (1), (2).      |
| 154.570 & 154.600, with audio filter    | (3), (4), (7). |
| 154.570 & 154.600, without audio filter | (5), (6), (7). |

(1) Each MURS transmitter type that transmits F3E or G3E emissions on 154.570 MHz or 154.600 MHz and incorporates an audio filter satisfying the requirements of § 95.2775 in its design may comply with the less stringent unwanted emissions attenuation requirements set forth in paragraphs (b)(3), (4), and (7) of this section.

(2) Each MURS transmitter type that transmits on 154.570 MHz or 154.600 MHz, but does not incorporate an audio filter satisfying the requirements of § 95.2775 in its design, must comply with the unwanted emissions attenuation requirements set forth in paragraphs (b)(5) through (7) of this section.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(1)  $7.27(f_d - 2.88 \text{ kHz})$  dB on any frequency removed from the channel center frequency by a displacement frequency ( $f_d$  in kHz) that is more than 5.625 kHz, but not more than 12.5 kHz.

(2)  $50 + 10 \log(P)$  dB or 70 dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5 kHz.

(3) 25 dB on any frequency removed from the channel center frequency by more than 10 kHz, but not more than 20 kHz.

(4) 35 dB on any frequency removed from the channel center frequency by more than 20 kHz, but not more than 50 kHz.

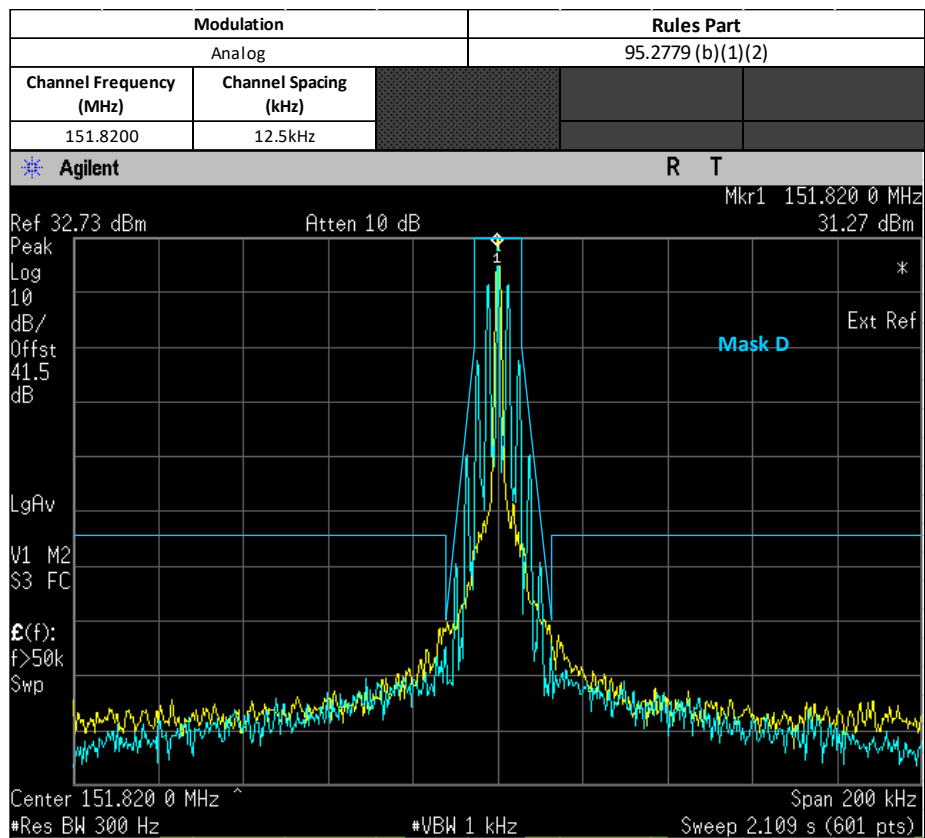
(5)  $83 \log (f_d \div 5)$  dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) that is more than 5 kHz, but not more than 10 kHz.

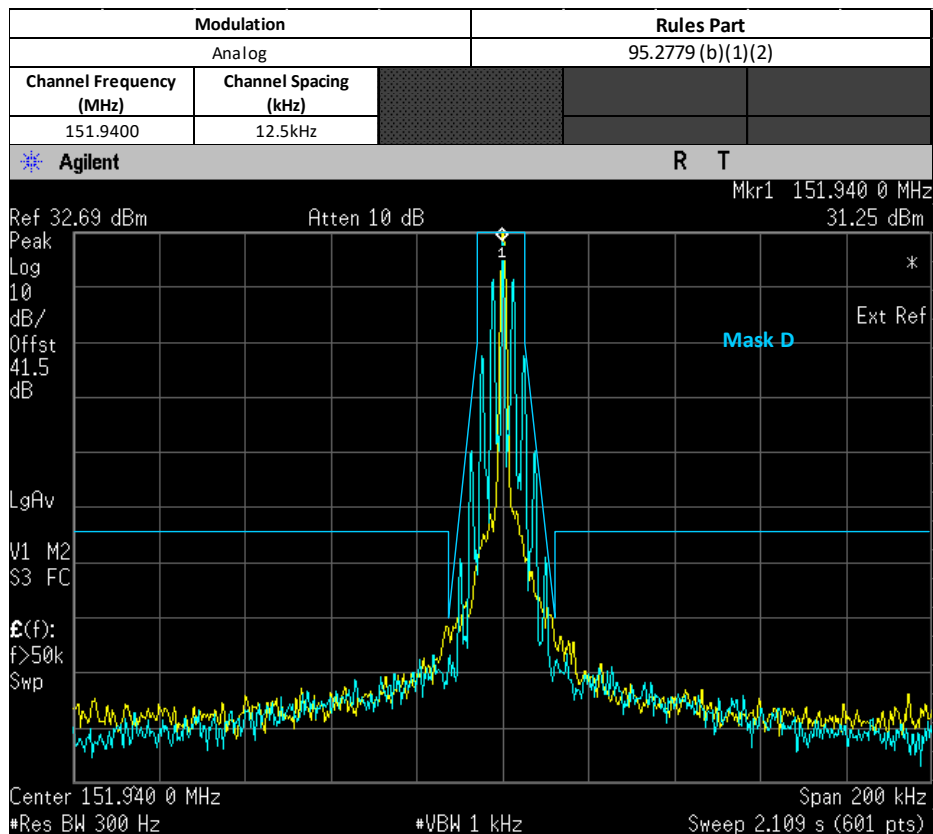
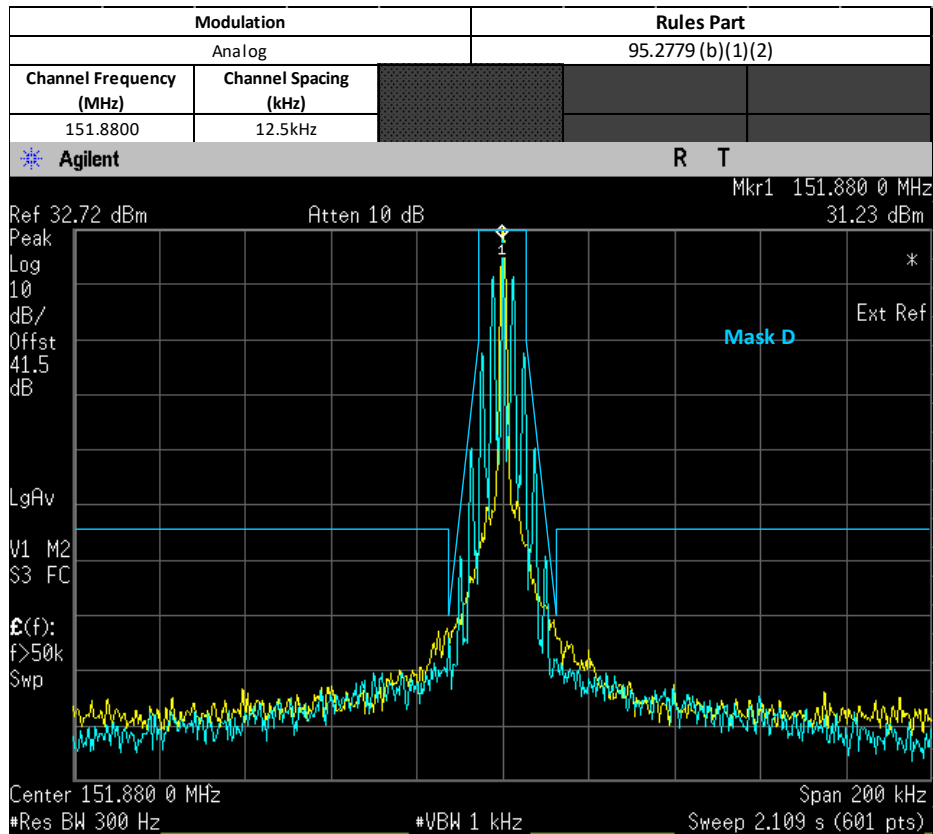
(6)  $29 \log (f_d^2 \div 11)$  dB or 50 dB, whichever is the lesser attenuation on any frequency removed from the channel center frequency by a displacement frequency ( $f_d$  in kHz) that is more than 10 kHz, but not more than 50 kHz.

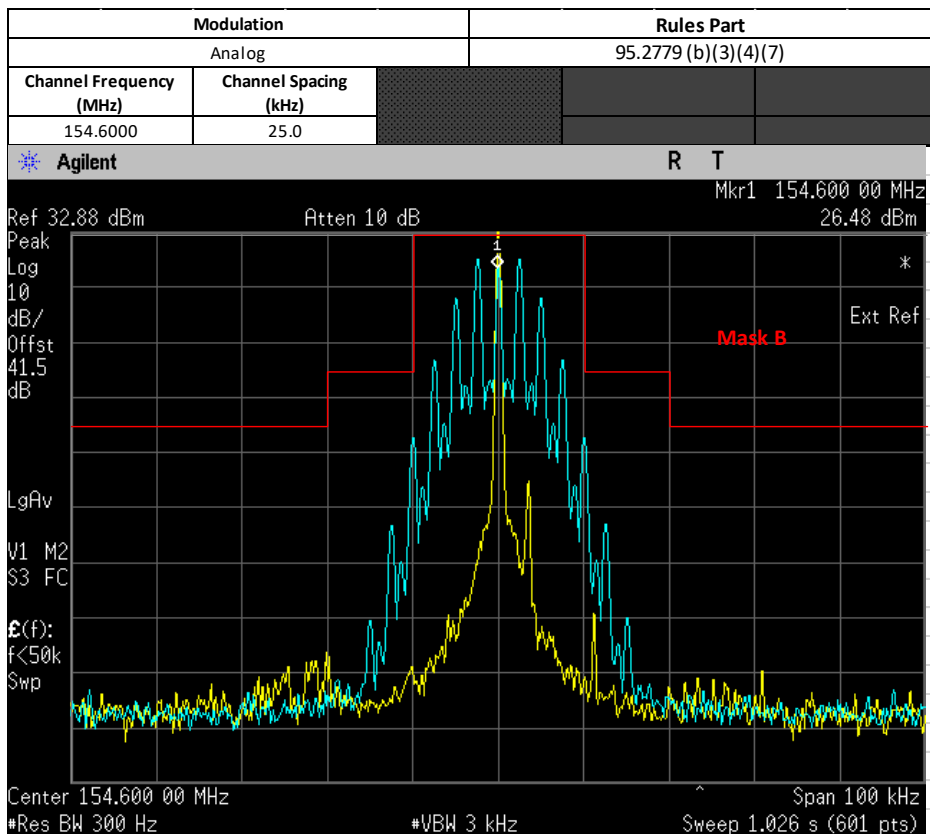
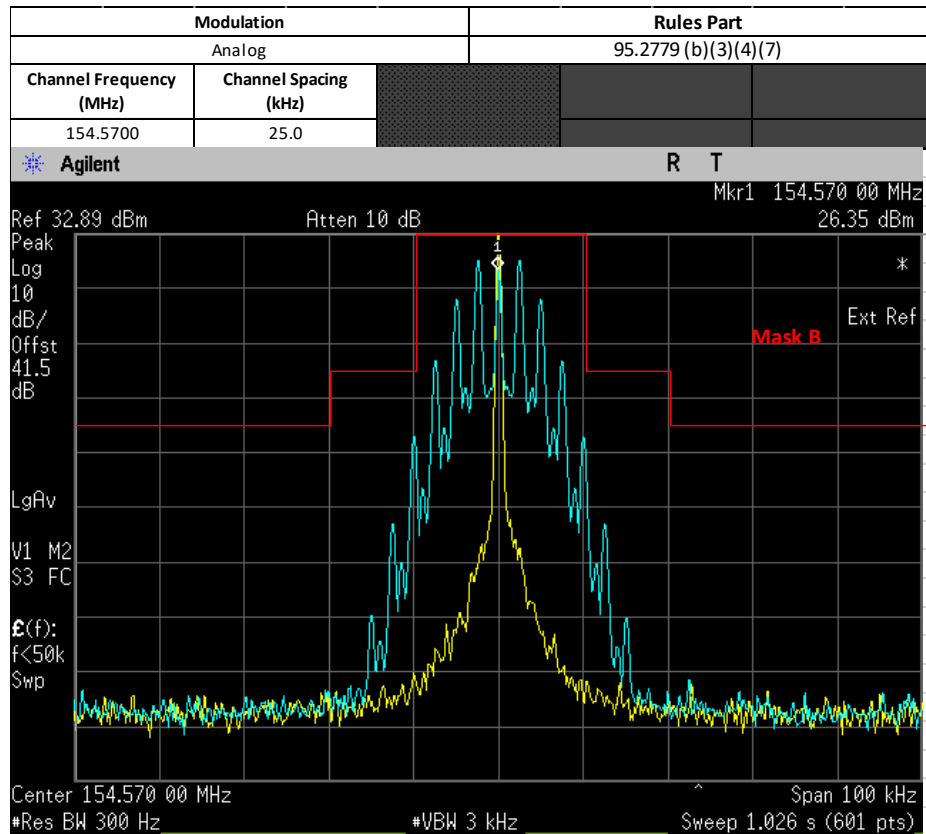
(7)  $43 + 10 \log(P)$  dB on any frequency removed from the channel center frequency by more than 50 kHz.

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) and (3) through (6) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (b)(2) and (7) of this section is measured with a reference bandwidth of at least 30 kHz.

### 5.7.3. Test Data

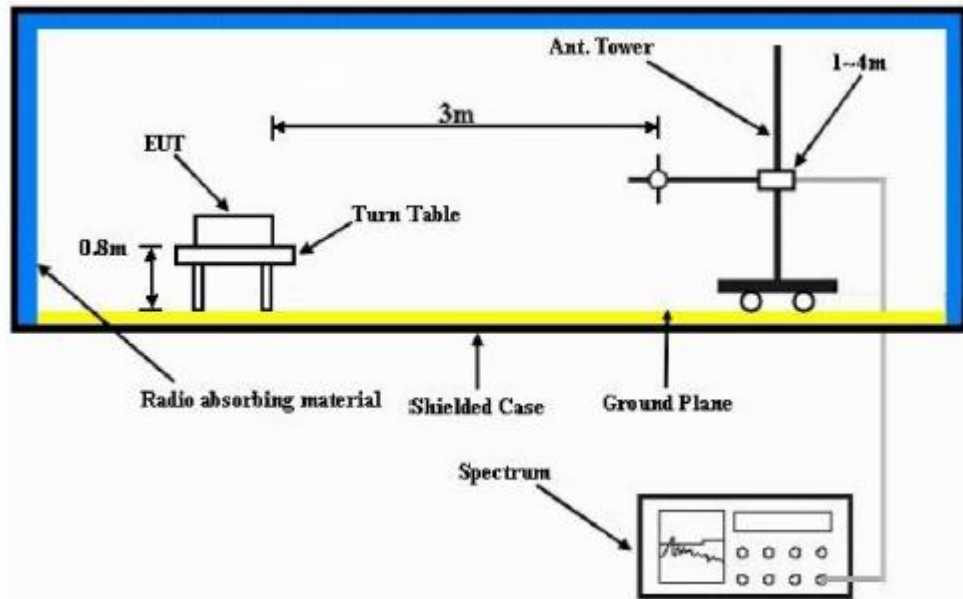






## 5.8. Radiated Spurious Emission

### 5.8.1. Test Setup



- 1) The spectrum setting for scanning Radiated Emission below 1 GHz is RBW = 100 kHz, VBW = 300 kHz and above 1 GHz is RBW = 1 MHz, VBW = 3 MHz. Detector mode is positive peak.
- 2) In the semi-anechoic chamber, setup as illustrated above the EUT placed on the 0.8m height (for frequencies < 1GHz) or 1.5m (for frequencies > 1GHz) of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- 3) The substitution antenna is substituted for EUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
- 4) Final Radiated Spurious Emission = "Read Value" + Measured substitution value.

## 5.8.2. Test limit

### § 95.2779 MURS unwanted emissions limits.

The requirements in this section apply to each MURS transmitter type both with and without the connection of attachments, such as an external microphone, power cord and/or antenna.

(a) Emission masks. Emission masks applicable to transmitting equipment in the MURS are defined by the requirements in the following table. The numbers in the paragraphs column refer to attenuation requirement rule paragraph numbers under paragraph (b) of this section. The words “audio filter” refer to the audio filter described in § 95.2775.

| Channel center frequencies<br>(MHz)     | Paragraphs     |
|-----------------------------------------|----------------|
| 151.820, 151.880 and 151.940            | (1), (2).      |
| 154.570 & 154.600, with audio filter    | (3), (4), (7). |
| 154.570 & 154.600, without audio filter | (5), (6), (7). |

(1) Each MURS transmitter type that transmits F3E or G3E emissions on 154.570 MHz or 154.600 MHz and incorporates an audio filter satisfying the requirements of § 95.2775 in its design may comply with the less stringent unwanted emissions attenuation requirements set forth in paragraphs (b)(3), (4), and (7) of this section.

(2) Each MURS transmitter type that transmits on 154.570 MHz or 154.600 MHz, but does not incorporate an audio filter satisfying the requirements of § 95.2775 in its design, must comply with the unwanted emissions attenuation requirements set forth in paragraphs (b)(5) through (7) of this section.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(1)  $7.27(f_d - 2.88 \text{ kHz})$  dB on any frequency removed from the channel center frequency by a displacement frequency ( $f_d$  in kHz) that is more than 5.625 kHz, but not more than 12.5 kHz.

(2)  $50 + 10 \log(P)$  dB or 70 dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5 kHz.

(3) 25 dB on any frequency removed from the channel center frequency by more than 10 kHz, but not more than 20 kHz.

(4) 35 dB on any frequency removed from the channel center frequency by more than 20 kHz, but not more than 50 kHz.

(5)  $83 \log (f_d \div 5)$  dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) that is more than 5 kHz, but not more than 10 kHz.

(6)  $29 \log (f_d^2 \div 11)$  dB or 50 dB, whichever is the lesser attenuation on any frequency removed from the channel center frequency by a displacement frequency ( $f_d$  in kHz) that is more than 10 kHz, but not more than 50 kHz.

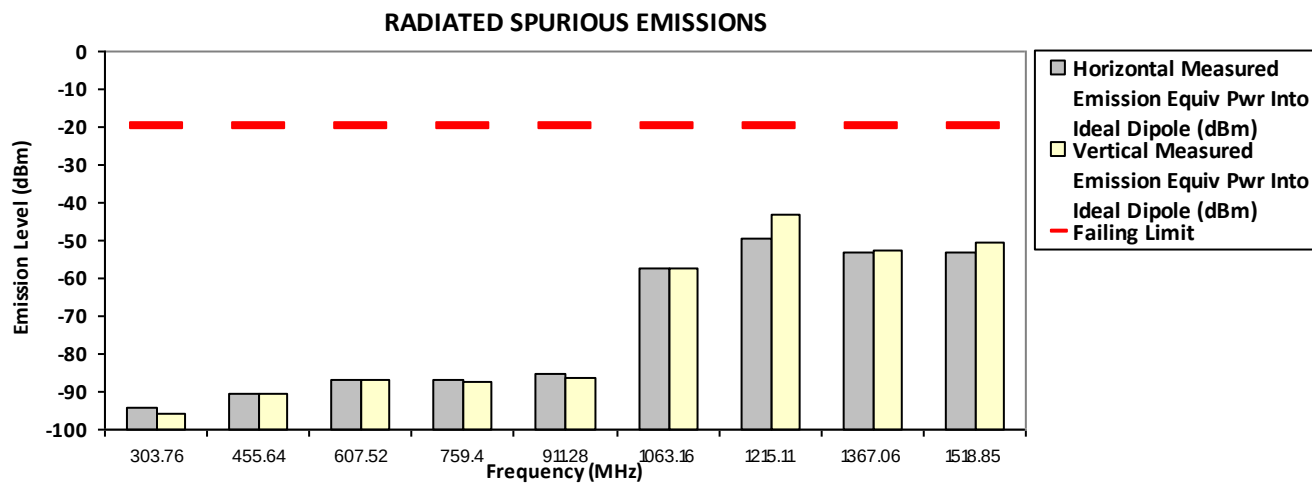
(7)  $43 + 10 \log(P)$  dB on any frequency removed from the channel center frequency by more than 50 kHz.

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) and (3) through (6) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (b)(2) and (7) of this section is measured with a reference bandwidth of at least 30 kHz.

### 5.8.3. Test Data

SAC Transmitter Radiated Emission:  
 Model Number: RMM2050BHLAA      S/N: 0245AX4513      SR: 1088P00-EMC-00001  
 Battery Part No: PMNN4453AR      Accy Part No: NA  
 Test Mode: TX Analog  
 151.880000 MHz      12.5 kHz      2.000 Watt(s) /Max Power

| Frequency (MHz) | Limit    | Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm) |
|-----------------|----------|----------------------------------------------------------------|--------------------------------------------------------------|
| 303.7600        | -20.0000 | -94.3099 **                                                    | -95.7336 **                                                  |
| 455.6400        | -20.0000 | -90.4412 **                                                    | -90.5646 **                                                  |
| 607.5200        | -20.0000 | -87.0895 **                                                    | -86.6814 **                                                  |
| 759.4000        | -20.0000 | -86.9087 **                                                    | -87.2397 **                                                  |
| 911.2800        | -20.0000 | -85.5229 **                                                    | -86.1730 **                                                  |
| 1063.1600       | -20.0000 | -57.3424 **                                                    | -57.5832 **                                                  |
| 1215.1140       | -20.0000 | -49.5400 *                                                     | -43.0300 *                                                   |
| 1367.0570       | -20.0000 | -53.1700 *                                                     | -52.8500 *                                                   |
| 1518.8490       | -20.0000 | -53.0400 *                                                     | -50.5000 *                                                   |
|                 |          |                                                                |                                                              |
|                 |          |                                                                |                                                              |
|                 |          |                                                                |                                                              |
|                 |          |                                                                |                                                              |



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Rezza & Fuad

Wed, 11 Dec, 2024

Remarks: \*\* Indicates the spurious emission could not be detected due to noise limitations or ambient.

\*Pursuant to CFR 47 Part 2.1057 ( c ), emissions attenuated more than 20 dB below the permissible limit are not reported  
Temp(Deg): 23.5 Hum(%RH): 68.1

System MU: 4.03 dB

Remarks: 

|                |                  |                |
|----------------|------------------|----------------|
| Passed Results | Marginal Results | Failed Results |
|----------------|------------------|----------------|

SAC Transmitter Radiated Emission:

Model Number: RMM2050BHLAA

S/N: 0245AX4513

SR: 1088P00-EMC-00001

Battery Part No: PMNN4453AR

Accy Part No: NA

Test Mode: TX Analog

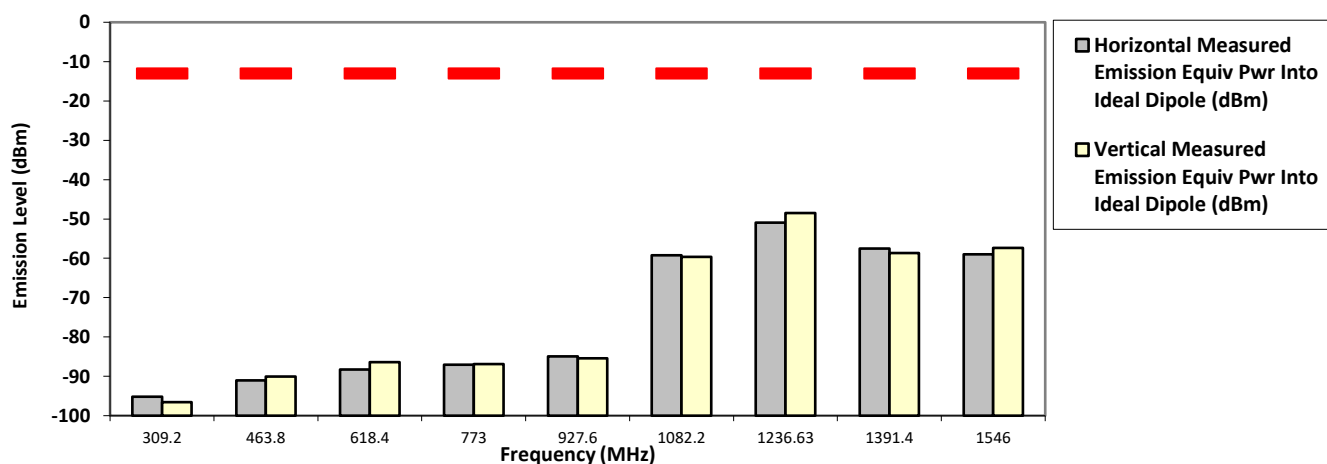
154.600000 MHz

25 kHz

2.000 Watt(s) /Max Power

| Frequency (MHz) | Limit    | Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm) |
|-----------------|----------|----------------------------------------------------------------|--------------------------------------------------------------|
| 309.2000        | -13.0000 | -95.1832 **                                                    | -96.5593 **                                                  |
| 463.8000        | -13.0000 | -91.0012 **                                                    | -90.0173 **                                                  |
| 618.4000        | -13.0000 | -88.2882 **                                                    | -86.4111 **                                                  |
| 773.0000        | -13.0000 | -87.0670 **                                                    | -86.9180 **                                                  |
| 927.6000        | -13.0000 | -84.9053 **                                                    | -85.4471 **                                                  |
| 1082.2000       | -13.0000 | -59.1958 **                                                    | -59.6001 **                                                  |
| 1236.6300       | -13.0000 | -50.9600 *                                                     | -48.4900 *                                                   |
| 1391.4000       | -13.0000 | -57.5049 **                                                    | -58.6298 **                                                  |
| 1546.0000       | -13.0000 | -59.0045 **                                                    | -57.3835 **                                                  |
|                 |          |                                                                |                                                              |
|                 |          |                                                                |                                                              |

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Rezza & Fuad

Wed, 11 Dec, 2024

Remarks: \*\* Indicates the spurious emission could not be detected due to noise limitations or ambient.

\*Pursuant to CFR 47 Part 2.1057 ( c ), emissions attenuated more than 20 dB below the permissible limit are not reported  
Temp(Deg): 23.5 Hum(%RH): 68.1

System MU: 4.03 dB

Remarks: 

|                |                  |                |
|----------------|------------------|----------------|
| Passed Results | Marginal Results | Failed Results |
|----------------|------------------|----------------|

End of Test Report -