

PMMN4156A WIFI BT ANTENNA GAIN MEASUREMENT REPORT

REPORT NO.: 2023-AG-PEN003

MODEL NO.: PMMN4156A

TESTED DATE: 2023.09.15

ISSUED: 2023.09.15

MANUFACTURER: Motorola Solutions Inc.

ADDRESS : 2000 Progress Parkway, SCHAUMBURG IL 60196, UNITED STATES

ISSUED BY: Motorola Solutions Malaysia Sdn Bhd.

ADDRESS : Motorola Solutions, 11900 Bayan Lepas, Penang, Malaysia

TEST LOCATION : Motorola Solutions, 11900 Bayan Lepas, Penang, Malaysia

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RELEASE CONTROL RECORD

| REPORT NO. | REASON FOR CHANGE | DATE ISSUED |
|----------------|-------------------|-------------|
| 2023-AG-PEN003 | Original release | 2023.09.15 |
| | | |
| | | |

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1 General Information

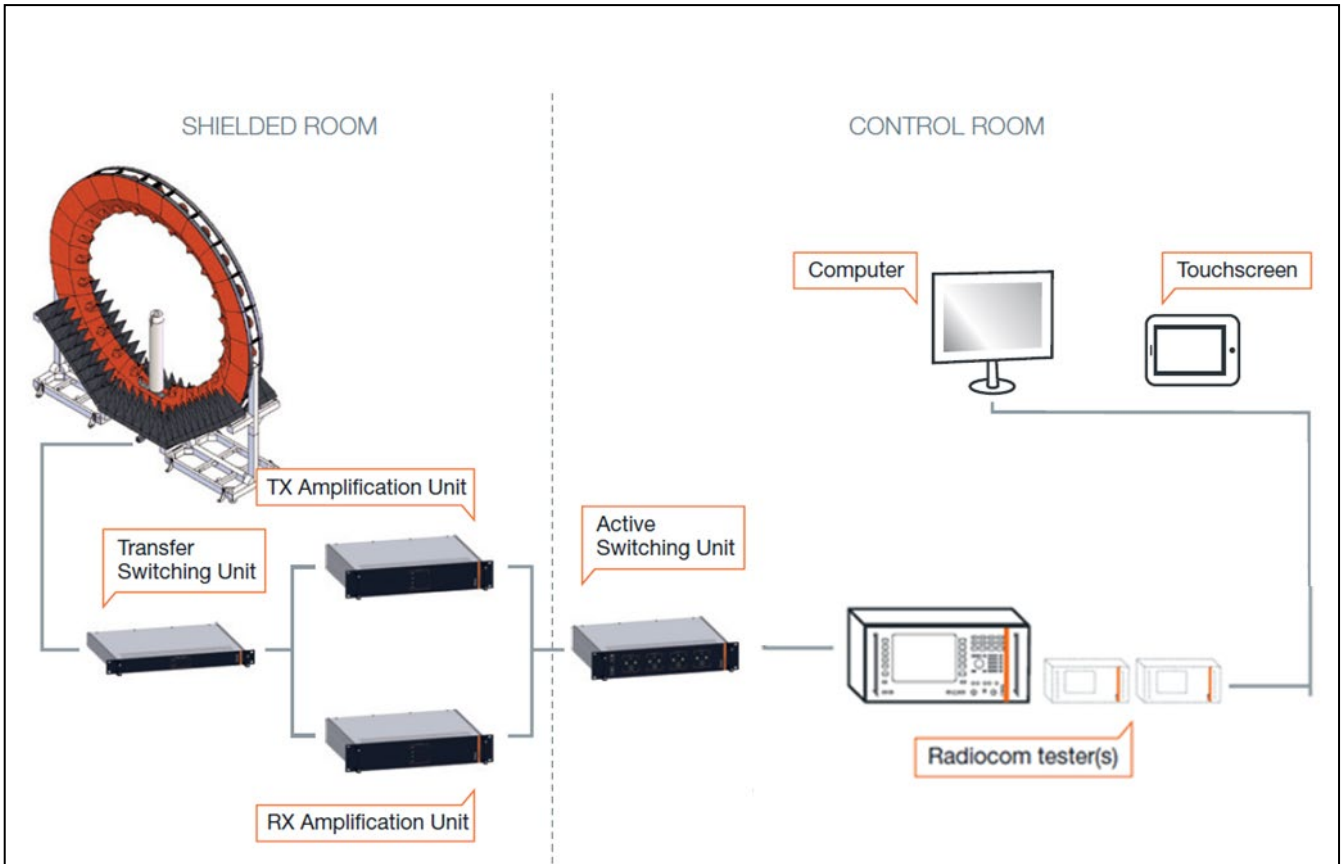
| | |
|--------------------------------|-------------------------|
| APPLICANT: | Motorola Solutions, Inc |
| MANUFACTURER: | Motorola Solutions, Inc |
| MODEL NO: | PMMN4156A |
| SERIAL NUMBER/ESN/IMEI: | CAB56WMA01P5 |
| HARDWARE VERSION: | Prepilot |
| SOFTWARE VERSION: | D01.00.60 |
| PRODUCT TYPE: | Portable Radio |
| BLUETOOTH ANTENNA: | AN000012A03, Embedded. |

The above equipment has been tested by **Motorola Solutions Malaysia Sdn Bhd**

PREPARED BY: Mohamad Jamadi Mohamad Sukeri

APPROVED BY: Teik Yang Goh

2 Measurement Setup



Overview of the SG24 multi-probe antenna measurement system from Microwave Vision Group.

3 Test Procedure

Device Under Test mounted on Antenna Chamber turntable. Measurements, including conducted power, TRP, and Peak EIRP and obtained by the MVG SG24 test system across low, mid and hi portions of the frequency band and across a 360 degree sphere. Peak antenna gain is determined from the maximum EIRP measured across the sphere with respect to the conducted power.

4 Test Lab Environment Conditions

| | |
|-------------|--------------|
| Temperature | 20°C to 30°C |
| Humidity | 30% to 70% |

5 Test Equipment List

| Type of Equipment | Model Number | Serial Number | Calibration Due Date |
|-------------------|--------------|---------------|----------------------|
| Antenna Chamber | MVG SG24 | | N/A |
| Call Box | R&S CMW500 | 141537 | 16 Aug 2024 |
| | | | |

6 Device Configuration

6.1 Bands and Protocols Supported by Each Antenna

| Antenna Label | Bands and Protocols for Which the Antenna Is Connected to RF front end |
|---------------|--|
| A | BT |

7 Evaluation Summary

7.1 Conducted Power, TRP, EIRP

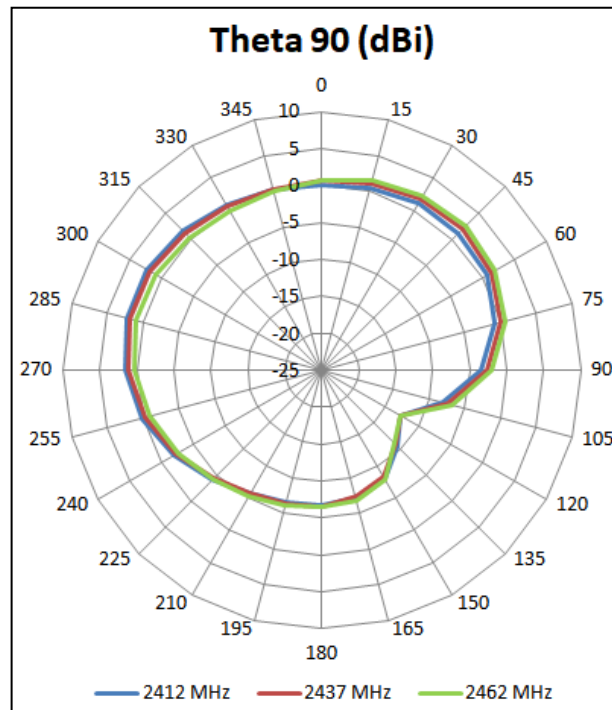
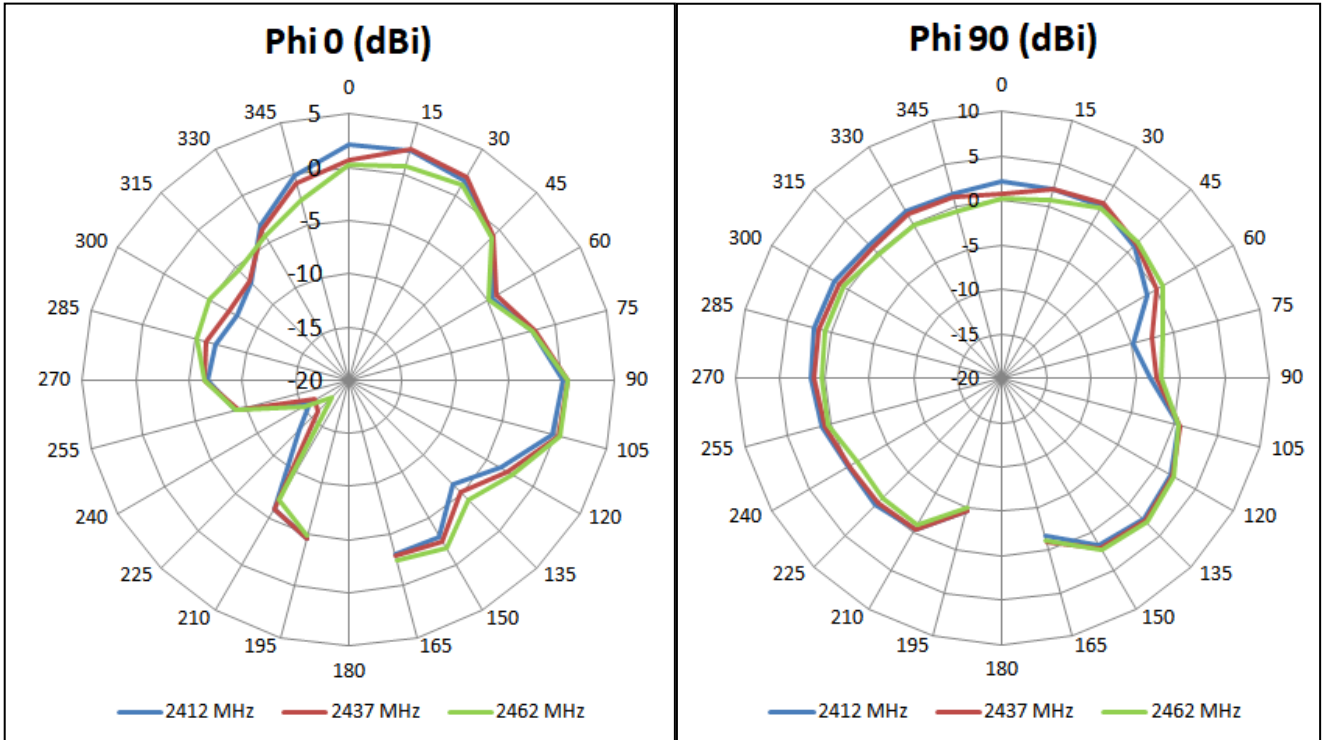
| Protocol | Frequency (MHz) | Conducted Power | TRP | EIRP | Peak Gain = EIRP – Conducted Power |
|----------|-----------------|-----------------|-------|-------|------------------------------------|
| BT, DH5 | 2402 | 11.97 | 11.01 | 14.54 | 2.57 |
| | 2441 | 11.72 | 10.98 | 14.62 | 2.9 |
| | 248 | 11.32 | 10.8 | 14.22 | 2.9 |

Measurement uncertainty for transmit parameters and antenna gain is as listed below, corresponding to 95% confidence level.

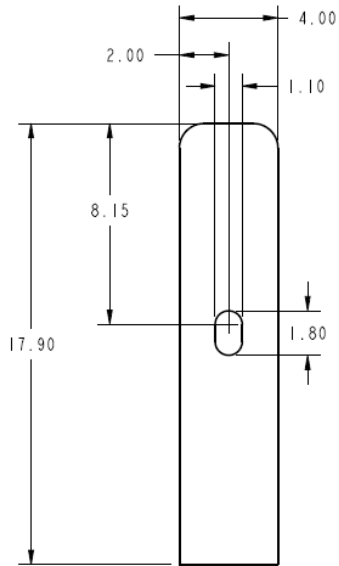
| | Measurement Uncertainty (dB) | |
|--------------------|------------------------------|------------------------|
| Test Configuration | LTE/WLAN 2300-2800 MHz | LTE/WLAN 5150-5925 MHz |
| Free Space | 1.60 | 1.72 |

7.2 Antenna patterns

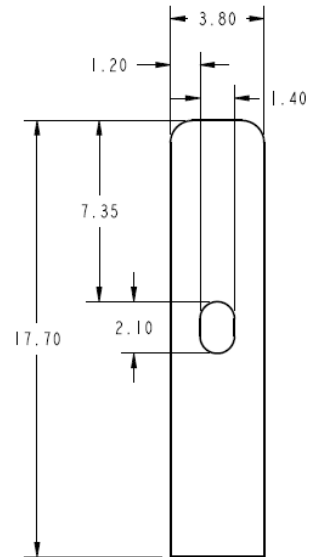
2.4GHz BT



8 Antenna Photographs / drawings



ANTENNA, BLUETOOTH ELEMENT



KAPTON TAPE

