



DECLARATION OF COMPLIANCE SAR ASSESSMENT

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Report Author:	Ch'ng Jian Sheng (EME Engineer)
Manufacturer:	Motorola Solutions Inc.
DUT Description:	Audio Accessory, Remote Speaker Microphone, WM800 IP68
Test TX mode(s):	BT, BT LE, MPP
Max. Power output:	Refer Table 1
Nominal Power:	Refer Table 1
Tx Frequency Bands:	2.402-2.480GHz (BT & BT LE), 0.125MHz (MPP)
Signaling type:	GFSK (BT & BT LE)
Model(s) Certified:	PMMN4156A
Classification:	Occupational/Controlled Environment
Firmware Version:	D01.00.39
Applicant Name:	Motorola Solutions Inc.
Applicant Address:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
FCC ID:	AZ489FT7173
FCC Test Firm Registration Number:	823256

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 4.0 of this report (no deviation from standard methods). This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc EME Laboratory. I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. This reporting format is consistent with the suggested guidelines of the TIA TSB-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

PeiLoo Tey (Approved Signatory)
Approval Date: 9/27/2023

Part 1 of 2

1.0 Introduction..... 3
 2.0 Abbreviations / Definitions..... 3
 3.0 Referenced Standards and Guidelines 4
 4.0 Description of Device 4
 5.0 Optional Accessories and Test Criteria 5
 5.1 Antenna..... 5
 5.2 Battery..... 5
 5.3 Body worn Accessories 5
 5.4 Audio Accessory..... 5
 6.0 Assessment for Bluetooth 6
 6.1 FCC Requirement 6
 7.0 Assessment for MPP..... 7
 8.0 Simultaneous transmission 7
 9.0 Result Summary..... 7

Appendix A – BT Duty Cycle

Appendix B – Photo for Tethering Accessory

Report Revision History

Date	Revision	Comments
08/04/2023	A	Initial release
09/27/2023	B	Updated DUT Description in cover page, Added simultaneous transmission info in section 8, Updated BT duty cycle justification (Appendix A) & tethering accessory info (Appendix B)

1.0 Introduction

This report details the RF Exposure assessment for Wireless RSM model number PMMN4156A.

2.0 Abbreviations / Definitions

BT:	Bluetooth
EME:	Electromagnetic Energy
DQPSK:	Differential Quadrature Phase Shift Keying
8DPSK:	Eight Differential Phase Shift Keying
GFSK:	Gaussian Frequency-Shift Keying
RSM:	Remote Speaker Microphone
SAR:	Specific Absorption Rate
MPP:	Motorola Proximity Pairing

Audio accessories: These accessories allow communication while the device is worn on the body.

Body worn accessories: These accessories allow the device to be worn on the body of the user.

Maximum Power: Defined as the upper limit of the production line final test station

3.0 Referenced Standards and Guidelines

This product is designed to comply with the following applicable national and international standards and guidelines.

- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, FCC, Washington, D.C.: 1997.
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2019
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2020
- Ministry of Health (Canada) Safety Code 6 (2015), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- RSS-102 (Issue 5) – Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2014)
- ANATEL, Brazil Regulatory Authority, Resolution No 700 of September 28, 2018 "Approves the Regulation on the Assessment of Human Exposure to Electric, Magnetic and Electromagnetic Fields Associated with the Operation of Radio communication Transmitting Stations.
- IEC/IEEE 62209-1528-2020- Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)
- FCC KDB - 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB - 865664 D02 RF Exposure Reporting v01r02
- FCC KDB - 447498 D04 Interim General RF Exposure Guidance v01

4.0 Description of Device

This device incorporates BT, BT LE & MPP technology which operate at the frequency spectrum per Table 1. Table 1 below summarizes the output power information.

Table 1

Technology	TX Frequency (MHz)	Modulation	Duty Cycle (%)	Nominal Power (mW)	Maximum Power (mW)
BT	2402-2480	GFSK	77*	19.055	19.055
BT LE		GFSK		4.955	4.955
MPP	0.125	NA	NA	0.50	0.50

*Refer to Appendix A for duty cycle justification

5.0 Optional Accessories and Test Criteria

This device is offered with the accessories listed as below.

5.1 Antenna

Table 2

No.	Model	Description
1	AN000012A03	ANTENNA, STAMPED METAL,BLUETOOTH ANTENNA, WM800 2400-2483.5GHz, ¼ wavelength, 2.9 dBi gain

5.2 Battery

Table 3

No.	Model	Description
1	PMNN4846A	BATTERY PACK,BATT LIION IP68 2050mAh Typical

5.3 Body worn Accessories

Table 4

No.	Model	Description	Remarks
1	0104083J48	Swivel clip, New J-Hook Design	
2	PMLN9066A	WM800 Tethering Accessory	Must be hooked to the swivel clip (Refer to Appendix B)

5.4 Audio Accessory

Table 5

No.	Model	Description
1	PMLN8120A	3.5mm Rx only secondary audio accessory

6.0 Assessment for Bluetooth

6.1 FCC Requirement

Per guidelines in KDB 447498 D04 Interim General RF Exposure Guidance v01, SAR-based thresholds are derived based on frequency, power and separation distance of the RF source.

The SAR-based exemption formula indicated below, applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, or less than or equal to the threshold P_{th} (mW) refer to Table B.2.

$$P_{th} \text{ (mW)} = ERP_{20cm} \left(\frac{d}{20}\right)^x \text{ for distance } d \leq 20 \text{ cm}$$

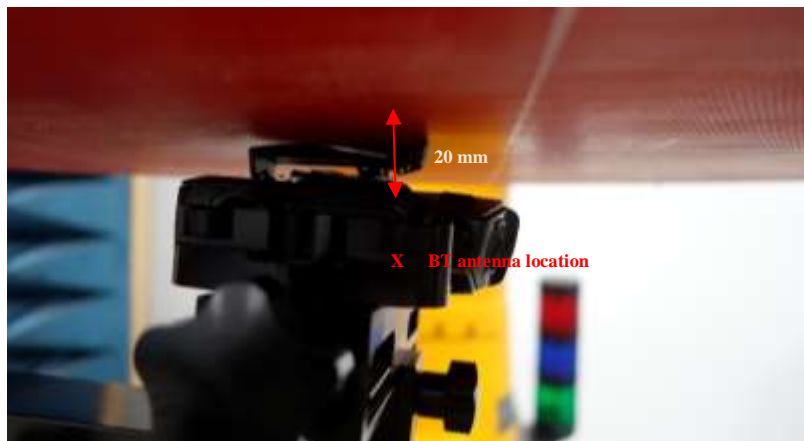
$$\text{Where } x = -\log_{10} \left(\frac{60}{ERP_{20}\sqrt{f}} \right)$$

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
	5	10	15	20	25	30	35	40	45	50	
300	39	65	88	110	129	148	166	184	201	217	
450	22	44	67	89	112	135	158	180	203	226	
835	9	25	44	66	90	116	145	175	207	240	
1900	3	12	26	44	66	92	122	157	195	236	
2450	3	10	22	38	59	83	111	143	179	219	
3600	2	8	18	32	49	71	96	125	158	195	
5800	1	6	14	25	40	58	80	106	136	169	

The closest separation distance from the outer housing to the phantom is 20 mm with a swivel clip, as indicated in the picture below. The separation distance is similar when the tethering accessory is in use since it needs to be used together with the swivel clip.



The BT maximum power of the device is 19.055 mW with 77% duty cycle, therefore the standalone Bluetooth transmitter operates at maximum time-averaged power:

$$= 19.055 \text{ mW} * 77\%$$

$$= 14.67 \text{ mW or } 11.66 \text{ dBm}$$

According to Table B.2, at the distance 20 mm, the power threshold, P_{th} at frequency 2450 MHz is 38 mW.

Since the maximum time-averaged power of the device is lower than the power threshold, routine evaluation can be exempted.

7.0 Assessment for MPP

Per guidelines in KDB 447498 D04 Interim General RF Exposure Guidance v01, routine evaluation can be exempted if the output power level is below 1mW. Since the output power level for MPP is 0.5 mW, routine evaluation can be exempted.

8.0 Simultaneous transmission

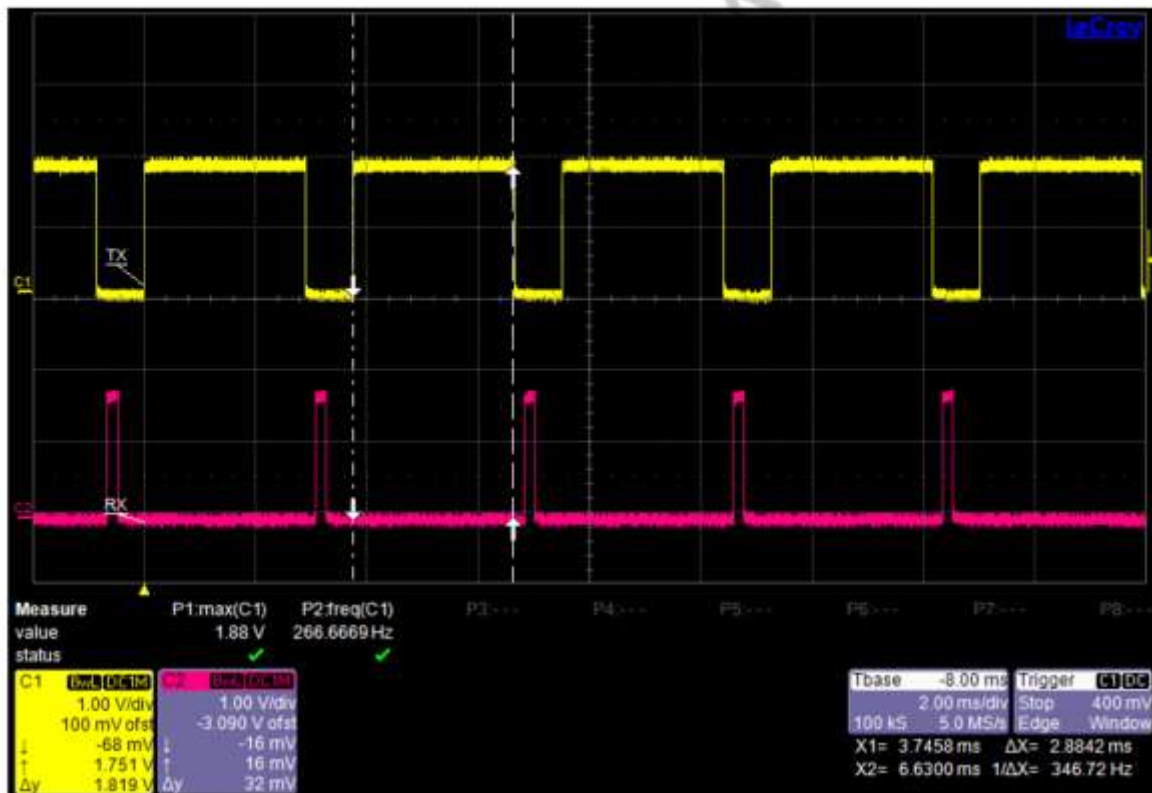
MPP is for pairing purpose only, BT will only activate after pairing is successful, hence simultaneous transmission is not possible.

9.0 Result Summary

Based on the assessments in section 6.0 and 7.0, SAR testing for BT and MPP are exempted.

Appendix A BT Duty Cycle Justification

Duty Cycle \approx 76.9%



Duty Cycle = on time (Tx) / total period of the waveform.

Appendix B Accessory Photo



*Tethering accessory (left) hooked to the swivel clip (right)