TEST REPORT

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Report No.: CTK-2025-01907

1. Applicant

◦ Name : Samsung Electronics Co., Ltd.

◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea

◦ Date of Receipt : 2025-06-04

2. Manufacturer

◦ Name : Samsung Electronics Co., Ltd.

◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea

3. Use of Report : For FCC Certification

4. Test Sample / Model: MMU (MT1602d) / MT1602d-48B

5. Date of Test : 2025-06-04 to 2025-07-21

6. Test Standard(method) used : FCCPart 1 (§1.1310) and Part 2 (§2.1091) KDB 447498 D01

7. Testing Environment: N/A

8. Test Results : Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

(Address : 5, Dongbu-ro 221 beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by Du-Jin Kim: (Signature)	Technical Manager Byung-Kwon In: (Signature)

2025-07-21

CTK Co., Ltd.

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1.0 REVISION RECORD

Issue Number	Issued Date	Revision History
CTK-2025-01907	07/21/2025	Initial Issue

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2.0 INTRODUCTION

2.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

2.2 Test Location

These measurement tests were conducted at the CTK Co., Ltd. facility located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

2.3 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

3.0 PRODUCT INFORMATION

3.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung MMU(MT1602d) FCC ID: A3LMT1602D-48B**.
The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 96.

Except when testing for equipment authorization purposes, the subject radio does not operate in standalone n48 (3.5 GHz) band mode.

3.2 Device Capabilities

This device supports the following conditional features and filter information:

FCC ID	A3LMT1602D-48B
EUT Type	MMU(MT1602d)
Model Name	MT1602d-48B
Device Capabilities:	5G NR
Operating Band/Frequency Range:	n48: 3 550 MHz to 3 700 MHz n77: 3 700 MHz to 3 980 MHz
Supported Modulation	QPSK, 16QAM, 64QAM, 256QAM
n48 Supported Number of Carriers and Channel Bandwidth	10, 20, 30, 40, 60 and 80MHz bandwidth for n48 with up to 4CC aggregated of Max. Bandwidth 80 MHz
n77 Supported Number of Carriers and Channel Bandwidth	40, 60, 80 and 100MHz bandwidth for n77 with up to 2CC aggregated of Max. Bandwidth 200 MHz
Multi-Band Supported Number of Carriers and Channel Bandwidth	n48 and n77 with up to 6CC aggregated of Max. Bandwidth 280 MHz
Maximum Output Power	n48 : Max 7.5W/unit n77 : Max 90W/unit Multi-Band: 90W/unit (n48: 7.5W + n77: 82.5W)
Occupied Bandwidth (OBW)/ Instantaneous Bandwidth (IBW)	n48: 80 MHz / 150 MHz n77: 200 MHz / 200 MHz
Number of Antenna ports	16T16R
Supported Configurations	Single carrier, Multi-carrier, Multi-Band
Input Voltage:	100~240V AC
Maximum antenna gain	n48: Max 20.3 dBi (19.8 dBi ± 0.5 dB tolerance) n77: Max 20.7 dBi (20.2 dBi ± 0.5 dB tolerance) Antenna gain declared by the manufacturer.

4.0 RF EXPOSURE EVALUATION - MPE

4.1 Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	…	…	f/300	6
1500-100,000	…	…	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

Table 4-1. Limits for Maximum Permissible Exposure (MPE)

4.2 MPE Requirements Overview

Three different categories of transmitters are defined by the FCC KDB 447498 D01. These categories are fixed installation, mobile and portable and are defined as follows:

- **Fixed Installations:** fixed location means that the device, including its antenna, is physically secured at a permanent location and is not able to be easily moved to another location. Additionally, distance to humans from the antenna is maintained to at least 2 meters.

- **Mobile Devices:** a mobile device is defined as a transmitting designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located, such as a wireless modem operating in a laptop computer, are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 46 CFR §2.1091.

- **Portable Devices:** a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. Portable device requirements are found in Section 2.1093 of the FCC's Rules (47 CFR §2.1093).

The FCC also categorizes the use of the device as based upon the user's awareness and ability to exercise control over his or her exposure. The two categories defined are Occupational/ Controlled Exposure and General Population/Uncontrolled Exposure. These two categories are defined as follows:

- **Occupational/Controlled Exposure:** In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks.

- **General Population/Uncontrolled Exposure:** The general population / uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

The **Samsung MMU(MT1602d) FCC ID: A3LMT1602D-48B** is professionally installed on poles or walls in fixed locations. The device is a fixed mounted base station and MPE is evaluated to the General Population/Uncontrolled Exposure limits per 1.1310.

4.3 Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by each operating mode used in this product was initially measured with a spectrum analyzer and powers were recored. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated for the safe distance which must be maintained during installation based on maximum power and antenna gain.

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out}*G) / (4\pi r^2)$

Where,

P_d = Power Density (mW/cm^2)
P_{out} = output power to antenna (mW)
G = gain of antenna in linear scale
π = 3.1416
r = distance between observation point and center of the radiator (cm)

4.4 Results of Maximum Permissible Exposure

Maximum Permissible Exposure			Result
Frequency (MHz)	3550 – 3980	MHz	Pass
Distance (R)	11	m	
Total MIMO Rated conducted power	49.54	dBm	
Tune-up tolerance	± 1	dBm	
Total MIMO Max Output Power (P) (The Output Power scaled to maximum tune-up tolerance)	50.54	dBm	
Max Antenna Gain (G) Typical	20.70	dBi	
Power density (S)	0.87	mW/m^2	
MPE Limit (W/m^2)	1.00	mW/m^2	

Table 4-2. Calculated Max MPE Data for Multi-Band n48+n77

Note. Except when testing for equipment authorization purposes, the subject radio does not operate in standalone n48 (3.5 GHz) band mode.

5.0 CONCLUSION

Samsung Electronics Co., Ltd. FCC ID: A3LMT1602D-48B meets the MPE Compliance requirements as specified in §2.1091 of the FCC Rules and Regulations with minimum safe distance of 11 m for operation. An appropriate RF exposure compliance statement will be placed in the user's manual.