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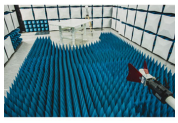

RF EXPOSURE EVALUATION
Maximum Permissible Exposure (MPE)

Applicant Name:
Samsung Electronics Co., Ltd.
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Gyeonggi-do, 16677, Korea

Date of Testing:
10/30 - 11/24/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2010290170-02.A3L

FCC ID:	**A3LSMH303V**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Class III Permissive Change
Model:	SM-H303V
EUT Type:	Outdoor Customer Premises Equipment (CPE)
FCC Classifications:	PCB, 5GT, DTS
FCC Rule Part:	FCC Part 1 (§1.1310) and Part 2 (§2.1091)
Test Procedure(s):	KDB 447498 D01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC KDB 447498 D01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

CERT #2041.01

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1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 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 and RSS-102: 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 1-1. Limits for Maximum Permissible Exposure (MPE)

1.2 EUT Description

The **Samsung Outdoor Customer Premises Equipment (CPE) FCC ID: A3LSMH303V** is a device that supports 5G NR (FR1/FR2), LTE, and Bluetooth LE operation. The EUT is fixed/mounted outdoors and is used to provide 5G coverage.

The worst case transmission scenario is determined with the following condition:

5G NR (mmWave) + LTE + Bluetooth LE

1.3 Test 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 transmitter used in this product was initially measured by a spectrum analyzer or call box and the powers were recorded. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated at a distance of 20cm.

Friis Transmission Formula

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

Where,

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

Simultaneous Transmission Analysis

Due to the co-location of all of the antennas within the EUT, a simultaneous transmission analysis is also provided to assess compliance with the power density requirement when all radios are on and transmitting at the maximum allowed power. This analysis is shown in the table below.

Simultaneous Tx (NR FR1 (Sub6) + LTE + BLE)									
Radio	Frequency (GHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Tolerance (±dB)	Maximum Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)
NR FR1 (Sub6)	0.824 - 0.849	23.5	2.4	25.9	1	26.9	20	0.097	0.549
LTE	1.85 - 1.91	23.5	6.2	29.7	1	30.7	20	0.234	1.000
BLE	2.4	1	1.1	-	1	3.1	20	0.000	1.000
							Total:	0.412	1.0

Table 1-2. Co-location MPE Data for Simultaneous Transmission with NR FR1 (20cm)

Simultaneous Tx (NR FR2 (mmWave) + LTE + BLE)									
Radio	Frequency (GHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Tolerance (±dB)	Maximum Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)
NR FR2 (mmWave)	27.5 - 28.35	-	-	49	4	53	20	39.694	1.000
LTE	1.85 - 1.91	23.5	6.2	29.7	1	30.7	20	0.234	1.000
BLE	2.4	1	1.1	-	1	3.1	20	0.000	1.000
							Total:	39.929	1.0

Table 1-3. Co-location MPE Data for Simultaneous Transmission with NR FR2 (20cm)

Simultaneous Tx (NR FR2 (mmWave) + LTE + BLE)									
Radio	Frequency (GHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Tolerance (±dB)	Maximum Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)
NR FR2 (mmWave)	27.5 - 28.35	-	-	49	4	53	127	0.984	1.000
LTE	1.85 - 1.91	23.5	6.2	29.7	1	30.7	127	0.006	1.000
BLE	2.4	1	1.1	-	1	3.1	127	0.000	1.000
							Total:	0.990	1.0

Table 1-4. Co-location MPE Data for Simultaneous Transmission with NR FR2 (127cm)

2.0 CONCLUSION

The device was found to meet the mobile RF exposure limit at a **127cm separation distance** as specified in §2.1091 of the FCC Rules and Regulations. An appropriate RF exposure compliance statement will be placed in the User's Manual.