

ELEMENT MATERIALS TECHNOLOGY

(formerly PCTEST)
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. +1.410.290.6652 / Fax +1.410.290.6654
<http://www.element.com>



COMPLIANCE SUMMARY REPORT

Applicant Name:

Samsung Electronics Co., Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Test Site/Location:

Element, Columbia, MD, USA
Element, Suwon, Korea

Document Serial No.:

1M2603110020-04.A3L

FCC ID: A3LSMF776B

APPLICANT: SAMSUNG ELECTRONICS CO., LTD

Report Type: Compliance Summary

DUT Type: Portable Handset

Model: SM-F776B



FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 1 of 8

REV 22.0
03/30/2022

TABLE OF CONTENTS

1	INTRODUCTION	3
1.1	Overview of RF Exposure Management	3
1.2	Samsung S.LSI C-TAS	3
1.3	Qualcomm® FastConnect™ TAS	3
1.4	TAS Manager	4
1.5	Bibliography	4
2	RF EXPOSURE EVALUATION STRATEGY	5
2.1	Part 0 – SAR Characterization	5
2.2	Part 1 – Static RF Exposure Evaluation	5
2.3	Part 2 – TAS Validation	5
3	RF EXPOSURE SYSTEM ARCHITECTURE	6
3.1	Design Target and Device Uncertainty	6
3.2	RF Exposure Management System Configuration	6
3.2.1	System overview and C-TAS algorithm	6
3.2.2	Operational Compliance	6
3.2.3	Transition Compliance	6
4	DUT DESCRIPTION	7
4.1	Device Overview	7
5	COMPLIANCE SUMMARY	8
5.1	RF Exposure Compliance Summary	8

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 2 of 8

REV 22.0
03/30/2022

1 INTRODUCTION

1.1 Overview of RF Exposure Management

This device implements a combined RF exposure management framework consisting of Samsung S.LSI C-TAS for Sub-6 GHz WWAN technologies (2G/3G/4G/5G NR) and Qualcomm® FastConnect™ TAS for WLAN technologies. Each TAS implementation independently performs real-time time-averaged RF exposure management and maintains its own validated TAS operation and transmit power control behavior. The overall framework is designed to maintain compliance with FCC RF exposure requirements through coordinated system-level RF exposure management and validation.

System-level coordination between WWAN and WLAN technologies is supported through the TAS Manager framework to maintain compliance with the Total Exposure Ratio (TER) constraint for validated simultaneous transmission scenarios.

1.2 Samsung S.LSI C-TAS

Samsung S.LSI C-TAS is a real-time time-averaged RF exposure management implementation for Sub-6 GHz WWAN technologies. The implementation continuously manages transmit power behavior over the applicable averaging interval while accounting for antenna location, RF exposure distribution characteristics, antenna group operation, and device operational states, including foldable configurations.

The TAS implementation allows instantaneous transmit power to temporarily exceed the corresponding average power limit (Plimit), up to the configured maximum transmit power (Pmax), when permitted by the applicable FCC time-averaging requirements, while ensuring that the corresponding time-averaged RF exposure remains compliant.

For simultaneous WWAN transmission scenarios, RF exposure contributions from active technologies within the same antenna group are managed through coordinated system-level RF exposure control and TER-based validation.

Detailed TAS algorithm operation, characterization methodology, and validation procedures are described in the corresponding RF Exposure Part 1 and Part 2 reports.

1.3 Qualcomm® FastConnect™ TAS

Qualcomm® FastConnect™ TAS independently manages WLAN RF exposure using real-time time-averaged transmit power control. WLAN average power limits (Plimit) are established through characterization procedures derived from static SAR measurements and subsequently validated under both static and dynamically varying transmission conditions.

The implementation allows instantaneous transmit power operation up to the configured maximum transmit power (Pmax) while maintaining compliant time-averaged WLAN RF exposure behavior over the applicable averaging interval.

Detailed FastConnect™ TAS implementation, characterization methodology, and validation procedures are described in the corresponding RF Exposure Part 1 and Part 2 reports.

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 3 of 8

REV 22.0
03/30/2022

1.4 TAS Manager

The TAS Manager, implemented in the Application Processor (AP), coordinates system-level RF exposure management across the WWAN and WLAN chipsets without modifying the underlying TAS algorithms implemented within the individual chipsets.

Based on the active transmission scenario and device operational state, including foldable Open and Closed configurations, the TAS Manager dynamically regulates the allowable RF exposure budget assigned to each chipset to maintain compliance with the Total Exposure Ratio (TER) constraint for validated simultaneous transmission scenarios.

Bluetooth (BT) does not operate with an independent TAS algorithm and is conservatively evaluated using Peak Mode (Pmax) assumptions. BT RF exposure contributions are included within the TER management framework.

NFC and WPT operate outside the TAS management framework and are treated as External Radios (ER), with their RF exposure contributions conservatively accounted for during simultaneous transmission evaluation.

1.5 Bibliography

Report Type	Report Serial Number
RF Exposure Part 0 Test Report	1M2603110020-02.A3L
RF Exposure Part 1 Test Report	1M2603110020-01.A3L
RF Exposure Part 2 WWAN Test Report	1M2603110020-03.A3L
RF Exposure Part 2 WLAN Test Report	1M2603110020-26.A3L

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 4 of 8

REV 22.0
03/30/2022

2 RF EXPOSURE EVALUATION STRATEGY

2.1 Part 0 – SAR Characterization

SAR characterization determines the Plimit corresponding to the RF exposure design target for each supported radio configuration, antenna configuration, technology, and usage condition after accounting for device-related uncertainties and manufacturing tolerances. For WWAN technologies, SAR characterization is derived from SAR measurements and conducted power measurements. WLAN Plimit values are determined through Qualcomm® FastConnect™ TAS characterization procedures. The resulting Plimit values are loaded into the device configuration and subsequently used by the TAS implementations during real-time operation.

2.2 Part 1 – Static RF Exposure Evaluation

Part 1 demonstrates compliance with FCC RF exposure requirements under static transmission conditions at the corresponding Plimit operating conditions. WWAN technologies are evaluated at the corresponding Sub-6 GHz Plimit conditions. WLAN technologies operating under Qualcomm® FastConnect™ TAS are evaluated at WLAN-specific Plimit conditions. Bluetooth (BT) is evaluated at Peak Mode (Pmax) conditions. Simultaneous transmission exposure conditions are evaluated in accordance with applicable FCC KDB simultaneous transmission guidance.

2.3 Part 2 – TAS Validation

Part 2 validates the TAS implementations under dynamically varying transmission conditions to confirm compliant RF exposure operation during representative steady-state and transient operating scenarios. The evaluation demonstrates that the combined TAS implementations maintain compliant system-level RF exposure operation under representative simultaneous transmission and device operating conditions. Detailed TAS validation methodologies, validation conditions, and test results are provided in the FCC RF Exposure Part 2 TAS Validation Report.

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo.	 Page 5 of 8

REV 22.0
03/30/2022

3 RF EXPOSURE SYSTEM ARCHITECTURE

3.1 Design Target and Device Uncertainty

The SAR Design Target is established below the FCC regulatory limit to account for device-related uncertainties and manufacturing tolerances during Plimit derivation and TAS validation.

Parameter	Value
FCC 1g SAR Regulatory Limit	1.6 W/kg
SAR Design Target	1.0 W/kg
Device Measurement Uncertainty	1.0 dB

3.2 RF Exposure Management System Configuration

3.2.1 System overview and C-TAS algorithm

The Device Under Test (DUT) implements a Combined-Time Average SAR (C-TAS) framework to coordinate RF exposure management across WWAN and WLAN/BT technologies while maintaining compliance with the Total Exposure Ratio (TER < 1.0) constraint.

The framework dynamically manages chipset-specific average transmit power limit (Plimit) policies under representative operating scenarios without modifying the independently validated TAS implementations within each chipset.

3.2.2 Operational Compliance

During simultaneous transmission operation, chipset-specific Plimit policies are dynamically managed according to active operating scenarios while maintaining compliance with the TER constraint.

Representative steady-state and transition-state validation scenarios are evaluated to confirm compliant RF exposure behavior during simultaneous transmission and dynamic operational transitions.

As a foldable device, TAS validation is additionally performed under representative Folder Open, Folder Closed, and foldable-state transition conditions.

3.2.3 Transition Compliance

To validate RF exposure compliance during dynamic technology transition conditions, a Tech Switch Compliance Test was performed under simultaneous transmission conditions involving WWAN, WLAN, and Bluetooth (BT) operation.

During the evaluation, transmit power behavior across the supported radio technologies was monitored under dynamically varying operating conditions. The validation confirmed that the C-TAS framework maintained compliance with applicable FCC RF exposure requirements, including the TER constraint (TER < 1.0).

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 6 of 8

REV 22.0
03/30/2022

4 DUT DESCRIPTION

4.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26	Voice/Data	814.7 - 848.3 MHz
LTE Band 5	Voice/Data	824.7 - 848.3 MHz
LTE Band 66	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
NR Band n71	Voice/Data	665.5 - 695.5 MHz
NR Band n5	Voice/Data	826.5 - 846.5 MHz
NR Band n66	Voice/Data	1712.5 - 1777.5 MHz
NR Band n25	Voice/Data	1852.5 - 1912.5 MHz
NR Band n2	Voice/Data	1852.5 - 1907.5 MHz
NR Band n41	Voice/Data	2501.01 - 2685 MHz
NR Band n77	Voice/Data	3455.01 - 3544.98 MHz; 3705 - 3975 MHz
2.4 GHz WIFI	Voice/Data	2412 - 2472 MHz
5 GHz WIFI	Voice/Data	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz U-NII-4: 5845 - 5885 MHz
6 GHz WIFI	Voice/Data	U-NII-5: 5935 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz
2.4 GHz Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
WPT	N/A	110 kHz - 145 kHz

This device implements Samsung S.LSI C-TAS for 2G/3G/4G/5G NR technologies and Qualcomm® FastConnect™ TAS for WLAN technologies to manage real-time time-averaged RF exposure operation. Bluetooth (BT) does not operate with an independent TAS algorithm and is conservatively evaluated at Peak Mode operation as part of the system-level TER management framework. NFC, WPT, and other supporting wireless technologies are treated as External Radios (ER), and their RF exposure contributions are conservatively accounted for during simultaneous transmission evaluation.

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT		Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo. 	Page 7 of 8

REV 22.0
03/30/2022

5 COMPLIANCE SUMMARY

5.1 RF Exposure Compliance Summary

All evaluated transmission configurations supported by the DUT comply with applicable FCC RF exposure requirements, as shown in Table.

	RFx Evaluation	Power Level	FCC Limit	<u>Reported</u> RF Exposure Level	Test Report
SAR (W/kg)	Standalone 1g SAR	P_{limit}	1.6	1.20	FCC SAR Evaluation Report (Part 1)
	Simultaneous Tx 1g SAR	P_{limit}	1.6	1.59	
TER	Total Exposure Ratio	P_{limit}	1.0	0.995	

RF exposure compliance is demonstrated through SAR characterization, static RF exposure evaluation, dynamic TAS validation, and system-level simultaneous transmission assessment performed under representative operating conditions.

Validation results demonstrate that the Samsung S.LSI C-TAS and Qualcomm® FastConnect™ TAS implementations effectively manage real-time RF exposure conditions to maintain compliant operation during validated simultaneous transmission and device operating scenarios.

FCC ID: A3LSMF776B	COMPLIANCE SUMMARY REPORT			Approved by: Technical Manager
Document S/N: 1M2603110020-04.A3L	DUT Type: Portable Handset	This report is Blockchain Verified. To verify the report authenticity, please visit https://www.blockchain-verified.com or by clicking on the Blockchain logo.		Page 8 of 8

REV 22.0
03/30/2022