FCC 47 CFR § 2.1093
IEEE Std 1528-2013

SAR EVALUATION REPORT
(SAR CHARACTERIZATION Report)

FOR

GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax and NFC

MODEL NUMBER: SC-53E, SCG27

FCC ID: A3LSMA556JPN

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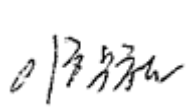
1. Attestation of SAR Characterization

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.
FCC ID	A3LSMA556JPN
Model Number	SC-53E, SCG27
Applicable Standards	FCC 47 CFR § 2.1093 IEEE Std 1528-2013 Published RF exposure KDB procedures
Report type	SAR Characterization Report
Date Tested	12/12/2023 to 1/30/2021
SAR Characterization Purpose	SAR Char is the procedures for determining P_{Limit} for WWAN (2G/3G/4G/5G-sub6) to satisfy *SAR_design_target* in order to FCC limit's requirement.

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government

Approved & Released By:	Prepared By:
	
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory	Hakchul Lee Laboratory Engineer UL Korea, Ltd. Suwon Laboratory

2. Introduction

The equipment under test (EUT) is SAMSUNG Tablet (FCC ID : A3LSMA556JPN), it contains both S.LSI TAS supporting WWAN technologies (2G/3G/4G/5G-Sub6). TAS chipset is enabled with TAS (Time Average SAR) algorithm has been designed to meet the compliance limits over the required duration, while still allowing dynamic control of transmit power for meeting system performance.

And The EUT has also supports to WLAN/BT/NFC technologies, but There are not support to TAS algorithm.

This purpose of the SAR Char report is to determine SAR char is derived from SAR test measurements and conducted power measurements to determine P_{Limit} for each technology/band. The P_{Limit} represents the maximum time-averaged power level for the corresponding radio/antenna configuration.

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

Suwon	
SAR 1 Room	SAR 6 Room
SAR 2 Room	SAR 7 Room
SAR 3 Room	SAR 8 Room
SAR 4 Room	SAR 9 Room
SAR 5 Room	

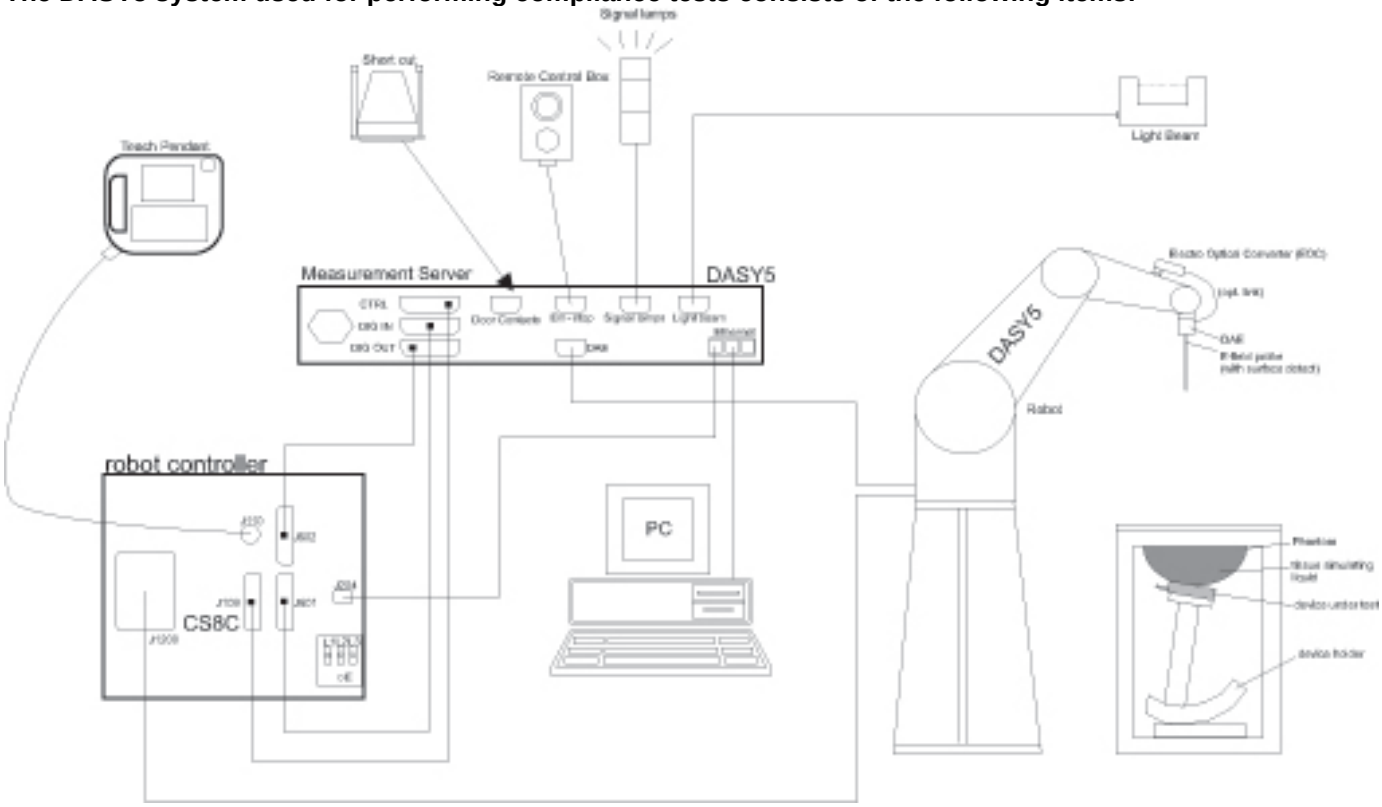
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at

https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. SAR Measurement System & Test Equipment

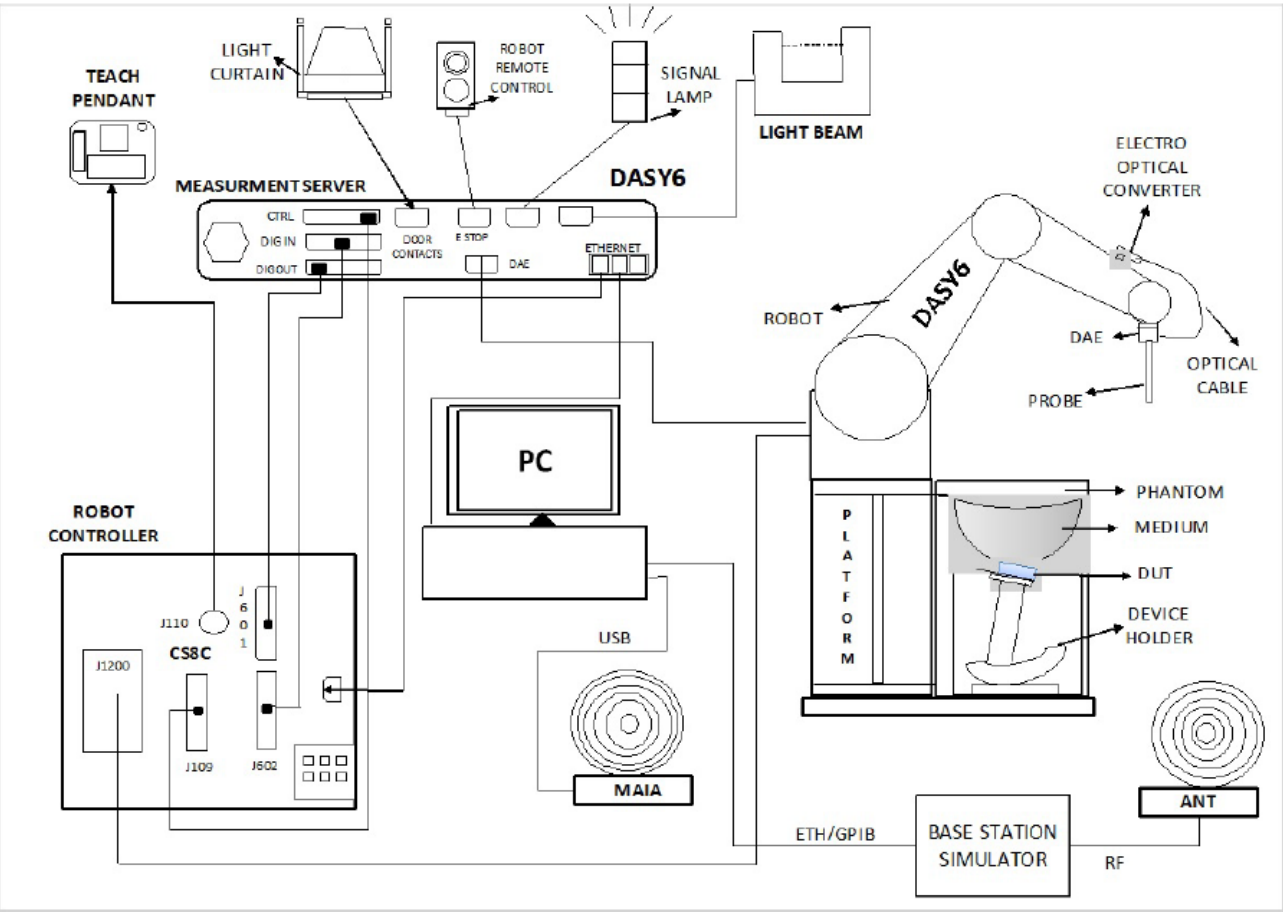
4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

The DASY6 & 8 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win10 and the DASY6 or 8 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MY46522054	7-24-2024
Network Analyzer	ROHDE & SCHWARZ	ZNB 20	102256	7-24-2024
Dielectric Assessment Kit	SPEAG	DAK-12	1158	9-20-2024
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	7-17-2024
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Shorting block	SPEAG	DAK-12 Short	SM DAK 220 AD	N/A
Thermometer	LKM	DTM3000	3851	7-25-2024
Thermometer	LKM	DTM3000	3862	7-25-2024

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Aglient	N5181A	MY50145882	7-26-2024
MXG Analog Signal Generator	Keysight	N5181B	MY59100587	7-26-2024
MXG Analog Signal Generator	Keysight	N5173B	MY59101083	7-27-2024
Power Sensor	KEYSIGHT	U2000A	MY61280010	1-3-2025
Power Sensor	KEYSIGHT	U2000A	MY60490008	7-25-2024
Power Sensor	KEYSIGHT	U2000A	MY60160004	7-25-2024
Power Sensor	KEYSIGHT	U2000A	MY61010010	7-25-2024
Power Amplifier	MINI-CIRCUITS	TVA-R5-13A+	2111006	**1-6-2024**
				1-3-2025
Power Amplifier	EXODUS	AMP2027ADB	10002	**1-6-2024**
				1-5-2025
Directional Coupler	Aglient	772D	MY52180193	7-25-2024
Directional Coupler	H.P	778D	16133	7-25-2024
Directional Coupler	MINI-CIRCUITS	ZMDC-30-1+	SF569102123	7-25-2024
Directional Coupler	KRYTAR	100318010	215541	1-4-2025
Low Pass Filter	FILTRON	L140012FL	1410003S	7-25-2024
Low Pass Filter	MICROLAB	LA-60N	3942	7-25-2024
Low Pass Filter	MINI-CIRCUITS	NLP-1200	VUU19301915	7-25-2024
Low Pass Filter	NUBICOM	WLKX10-11000-13640-21000-60TS	1	7-25-2024
Attenuator	KEYSIGHT	8491B/003	MY39272276	7-25-2024
Attenuator	KEYSIGHT	8491B/003	MY39272276	7-25-2024
Attenuator	KEYSIGHT	8491B/010	MY39272293	7-25-2024
Attenuator	KEYSIGHT	8491B/010	MY39271981	7-24-2024
Attenuator	KEYSIGHT	8491B/020	MY39271973	7-25-2024
Attenuator	KEYSIGHT	8491B/020	MY39272301	7-25-2024
E-Field Probe	SPEAG	EX3DV4	7651	5-30-2024
E-Field Probe	SPEAG	EX3DV4	7314	5-26-2024
E-Field Probe	SPEAG	EX3DV4	3871	8-25-2024
E-Field Probe	SPEAG	EX3DV4	7313	3-24-2024
E-Field Probe	SPEAG	EX3DV4	7545	8-25-2024
E-Field Probe	SPEAG	EX3DV4	7645	9-20-2024
E-Field Probe	SPEAG	EX3DV4	7646	3-23-2024
E-Field Probe	SPEAG	EX3DV4	7376	7-25-2024
Data Acquisition Electronics	SPEAG	DAE4	1671	5-25-2024
Data Acquisition Electronics	SPEAG	DAE4	1494	7-17-2024
Data Acquisition Electronics	SPEAG	DAE4	1668	4-26-2024
Data Acquisition Electronics	SPEAG	DAE4	1667	4-24-2024
Data Acquisition Electronics	SPEAG	DAE4	1591	3-22-2024
Data Acquisition Electronics	SPEAG	DAE4	1447	3-22-2024
Data Acquisition Electronics	SPEAG	DAE4	1468	8-24-2024
Data Acquisition Electronics	SPEAG	DAE4	1343	6-30-2024

Test Equipment (Continued)

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
System Validation Dipole	SPEAG	CLA-13	1015	8-22-2024
System Validation Dipole	SPEAG	D750V3	1205	4-18-2024
System Validation Dipole	SPEAG	D835V2	4d174	**9-21-2024**
System Validation Dipole	SPEAG	D835V2	4d194	**3-24-2024**
System Validation Dipole	SPEAG	D1750V2	1125	**11-30-2024**
System Validation Dipole	SPEAG	D1750V2	1180	**9-21-2024**
System Validation Dipole	SPEAG	D1900V2	5d190	**11-16-2024**
System Validation Dipole	SPEAG	D1900V2	5d199	**3-25-2024**
System Validation Dipole	SPEAG	D2450V2	960	**3-24-2024**
System Validation Dipole	SPEAG	D2600V2	1178	4-25-2024
System Validation Dipole	SPEAG	D2600V2	1097	9-26-2024
System Validation Dipole	SPEAG	D5GHzV2	1209	2-28-2024
System Validation Dipole	SPEAG	D5GHzV2	1325	4-21-2024
Thermometer	Lutron	MHB-382SD	AH.50215	1-4-2025
Thermometer	Lutron	MHB-382SD	AH.50213	1-4-2025
Thermometer	Lutron	MHB-382SD	AH.921463	1-4-2025
Thermometer	Lutron	MHB-382SD	AJ.45903	1-4-2025
Thermometer	Lutron	MHB-382SD	AK.12123	1-4-2025
Thermometer	Lutron	MHB-382SD	AJ.42446	7-26-2024
Thermometer	Lutron	MHB-382SD	AK.12102	7-31-2024
Thermometer	Lutron	MHB-382SD	AK.12103	7-31-2024
Thermometer	Lutron	MHB-382SD	AK.18789	7-27-2024

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	7-27-2024
Base Station Simulator	R & S	CMW500	150314	7-26-2024
Base Station Simulator	R & S	CMW500	162790	7-26-2024
Base Station Simulator	R & S	CMW500	169803	**1-5-2024**
Base Station Simulator	R & S	CMW500	169803	1-3-2025
Base Station Simulator	R & S	CMW500	169801	**1-5-2024**
Base Station Simulator	R & S	CMW500	169801	1-3-2025
Base Station Simulator	R & S	CMW500	169799	7-26-2024
Base Station Simulator	R & S	CMW500	169800	7-27-2024
Base Station Simulator	R & S	CMW500	169798	7-27-2024
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510596	7-27-2024
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY59150850	**1-9-2024**
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY59150850	1-3-2025
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58120110	**1-10-2024**
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58120110	1-3-2025
Radio Communication Test Station	Anritsu	MT8000A	6272466165	10-18-2024
Radio Communication Analyzer	Anritsu	MT8821C	6161094351	11-30-2024

Note(s):

1. For System Validation Dipole, Calibration interval applied every 2 years according to referencing KDB 865664 guidance.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (for blue box items)
3. All equipments were used until Cal.Due data.

5. Device Under Test (DUT) Information

5.1 Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Category 24) HSUPA (Category 6) DC-HSDPA (Category 24) HSPA+ (DL only)		100%
LTE	FDD Band 2 FDD Band 5 FDD Band 12 TDD Band 41 Power Class 3 FDD Band 66	QPSK 16QAM 64QAM Rel. 15 Carrier Aggregation (1 Uplink and 4 Downlinks)		100% (FDD) 63.3% (TDD) – PC3
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
5G NR (Sub 6)	FDD Band n5 TDD Band n41	DFT-s-ODFM: ■ π/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-ODFM: ■QPSK, 16QAM, 64QAM, 256QAM		100%
Wi-Fi	2.4 GHz	802.11b, 802.11g, 802.11n (HT20), 802.11ax (HE20)		98.6% (802.11b-SISO)
	5 GHz	802.11a / 802.11n (HT20/40) 802.11ac (VHT20/40/80) 802.11ax (HE20/40/80)		96.9% (802.11a -SISO) 98.1% (802.11n (HT 20 -SISO) 97.9% (802.11n (HT 40 -SISO) 94.0% (802.11ac (VHT80-SISO)
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 5.3 LE		77.2%(BDR-DH5)
NFC	13.56 MHz	Type A/B/F/V		100%

Notes

1. The Bluetooth protocol is considered source-based averaging. For duty used in Wi-Fi/BT SAR testing, Please refer to section.9.

5.2 Time-Averaging for SAR

This device is enabled with Samsung S.LSI proprietary TAS (Time Average SAR) algorithm to control and manage transmitting power in real time and to ensure that the time-averaged RF exposure from WWAN is compliance with FCC requirement. This SAR Char report shows SAR characterization of WWAN radios. Characterization is achieved by determining P_{limit} for WWAN radios that correspond to the *SAR_design_target* after accounting for all device design related uncertainty. The SAR Characterization is denoted as SAR Char in this report.

5.3 Nomenclature for SAR Characterization Report for WWAN

Term	Descroption
P_{max}	Maximum Tx power that can be transmitted physically from RFIC for a given RAT.
SAR_regulatory_limit	SAR value limit specified by FCC.
SAR_design_target	Target SAR level using in TAS algorithm. This SAR value should be less than SAR regulatory limit and should be determined after accounting for all uncertainties and other design considerations.
P_{limit}	Power level corresponds to the SAR design target.
SAR Char (SAR Characterization)	Table containing Plimit for all technologies and bands.

Table 5.3.1 Definitions for TAS algorithm

6. SAR Characterizations

6.1 SAR Design Target

SAR_Design_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer.

WWAN_SAR_design_target			
$SAR\_design\_target < SAR\_regulatory\_limit \times 10^{\frac{-Total\ Uncertainty}{10}}$			
1g SAR (W/kg)		**10g SAR (W/kg)**	
Total Uncertainty	**1.0 dB**	**Total Uncertainty**	**1.0 dB**
SAR_regulatory_limit	**1.6 W/kg**	***SAR_regulatory_limit***	**4.0 W/kg**
SAR_design_target	**1.0 W/kg**	***SAR_design_target***	**2.5 W/kg**

Table 6.1.1 Definitions of uncertainty and design target for WWAN techs.

6.2 SAR Determination

6.2.1 RSI and SAR Determination in WWAN techs

This device uses different Radio SAR Index (RSI) **via S.LSI TAS** to configure different time averaged power levels based on certain exposure scenarios. Depending on the detection scheme implemented in the wireless device, the worst-case SAR was determined by measurements for the relevant exposure conditions for that RSI. Detailed descriptions of the detection mechanisms are included in the operational description.

The radio SAR Index (RSI) conditions used in below table represent different exposure scenarios.

RF exposure Scenarios	RSI state	Descroption	KDB guide For SAR test
Head	RCV	1. Device positioned next to head. 2. Receiver Active.	KDB 648474 D04
Body-worn	Free	1. Device being used with a body-worn accessory.	KDB 648474 D04
Hotspot	Hotspot	1. Device transmits in hotspot mode near body. 2. Hotspot Mode Active.	KDB 941225 D06
Earjack	Earjack	1. Insert Earjack	KDB 648474 D04
Phablet-10g	Free	1. Device is held with hand.	KDB 648474 D04

Table 6.2.1.1 RSI and Corresponding Exposure Scenarios

6.3 Plimit determination

6.3.1 Plimit determination of RSI scenarios

SAR results corresponding to P_{max} for each antenna/technology/band/RSI can be found in Section.7.1. P_{limit} is calculated by linearly scaling with the P_{max} to correspond to *the SAR_ design_target*. P_{limit} determination for each exposure scenario corresponding to *SAR_design_target* are shown in table.
If Plimit is lower than Pmax, then Part.0's SAR data were referred to SAR data in Part.1 report.

Table 6.3.1.1 P_{Limit} Determination of WWAN's RSI scenarios

RSI state	Plimit Determination Scenarios
RCV	Plimit is calculated based on 1g Head exposure SAR results.
Hotspot & Earjack	Plimit is calculated based on 1g Hotspot exposure SAR results at 10 mm test distance.
Free	The worst-case SAR exposure is determine as maximum SAR normalized to the limit (i.e. lowest Plimit) among: 1. 1g Body worn SAR measured at 10 mm test distance. 2. 10g Phablet SAR measured at 0 mm test distance.

Table 6.3.1.2 Plimit result according to technologies and bands in each RSI

Exposure condition			Head (RCV)	Bodyworn & Hotspot	Phablet 10-g SAR	Pmax (Maximum tune-up Power) (dBm)
Spatial-average			1g	1g	10g	
Test distance (mm)			0	10	0	
DSI :			1	0	0	
RF Air Interface	Antenna	Antenna Group	Plimit corresponding to 1.0 W/kg (SAR_design_target) (1g) / 2.5 W/kg (SAR_design_target) (10g)			
GSM 850	Main.1	AG0	25.6	25.6	25.6	25.6
GSM 1900	Main.1	AG0	22.1	17.8	17.8	22.1
WCDMA 5	Main.1	AG0	24.5	24.5	24.5	24.5
LTE Band 2	Main.1	AG0	23.5	18.0	18.0	23.5
LTE Band 2	Sub.2	AG0	17.5	17.5	17.5	23.5
LTE Band 5	Main.1	AG0	24.5	24.5	24.5	24.5
LTE Band 12	Main.1	AG0	24.5	24.5	24.5	24.5
LTE Band 41	Main.2	AG0	21.5	17.0	17.0	21.5
LTE Band 41	Sub.2	AG0	16.5	16.5	16.5	21.0
LTE Band 66	Main.1	AG1	24.0	19.0	19.0	24.0
LTE Band 66	Sub.2	AG0	16.5	16.5	16.5	23.0
NR Band n5	Main.1	AG0	24.5	24.5	24.5	24.5
NR Band n41	Main.2	AG1	17.0	17.0	17.0	24.0
NR Band n41	Sub.2	AG0	17.0	17.0	17.0	23.0

Notes:

1. If P_{limit} is higher than P_{max} for some modes/bands, The modes/bands will operate at a power level up to P_{max}.
2. P_{max} (Maximum tune-up power) is specified in tune-up document. The maximum allowed power is equal to maximum tune up power + 1 dB device design uncertainty.
3. All P_{limit} NV and maximum tune up output P_{max} levels entered in above Table correspond to average power levels after accounting for duty cycle in the case of LTE TDD modulation schemes.
4. For NR FR1 TDD Bands, P_{limit} listed averaged power level, and P_{max} listed burst power level.

7. SAR Test results for Plimit calculations

7.1 SAR Test results for P_{limit} calculations in each RSI scenarios

Head exposure (RSI =RCV)

RF Exposure Conditions	DSI	band	Antenna	mode	RB	Ch.	Test distance (mm)	Test position	Output power (dbm)	meas SAR 1g (W/kg)	Plimit (dBm)	Minimum Plimit (dBm)
Head	RCV	GSM 850	Main.1	GPRS 3 Slots		190	0	Left Touch	25.75	0.160	33.71	31.42
							0	Left Tilt	25.75	0.116	35.11	
							0	Right Touch	25.75	0.271	31.42	
							0	Right Tilt	25.75	0.111	35.30	
Head	RCV	GSM 1900	Main.1	GPRS 3 Slots		810	0	Left Touch	21.82	0.041	35.69	35.69
							0	Left Tilt	21.82	0.017	39.65	
							0	Right Touch	21.82	0.017	39.44	
							0	Right Tilt	21.82	0.018	39.36	
Head	RCV	WCDMA 5	Main.1	Rel.99 RMC 12.2 kbps		4183	0	Left Touch	24.68	0.188	31.94	30.40
							0	Left Tilt	24.68	0.120	33.89	
							0	Right Touch	24.68	0.268	30.40	
							0	Right Tilt	24.68	0.133	33.44	
Head	RCV	LTE Band 2	Main.1	QPSK	1/0	19100	0	Left Touch	23.92	0.078	35.02	35.02
							0	Left Tilt	23.92	0.027	39.64	
							0	Right Touch	23.92	0.037	38.19	
							0	Right Tilt	23.92	0.018	41.46	
Head	RCV	LTE Band 2	Sub.2	QPSK	1/99	19100	0	Left Touch	17.84	0.428	21.53	18.29
							0	Left Tilt	17.84	0.483	21.00	
						18700	0	Right Touch	17.50	0.834	18.29	
							0	Right Tilt	17.50	0.792	18.51	
Head	RCV	LTE Band 5	Main.1	QPSK	1/0	20525	0	Left Touch	25.07	0.151	33.28	31.09
							0	Left Tilt	25.07	0.098	35.16	
							0	Right Touch	25.07	0.250	31.09	
							0	Right Tilt	25.07	0.128	34.00	
Head	RCV	LTE Band 12	Main.1	QPSK	1/0	23095	0	Left Touch	24.97	0.102	34.88	33.73
							0	Left Tilt	24.97	0.081	35.89	
							0	Right Touch	24.97	0.133	33.73	
							0	Right Tilt	24.97	0.062	37.05	
Head	RCV	LTE Band 41	Main.2	QPSK	1/99	40620	0	Left Touch	22.35	0.119	31.59	31.59
							0	Left Tilt	22.35	0.032	37.37	
							0	Right Touch	22.35	0.050	35.40	
							0	Right Tilt	22.35	0.034	37.05	
Head	RCV	LTE Band 41	Sub.2	QPSK	1/0	39750	0	Left Touch	17.39	0.291	22.75	18.53
							0	Left Tilt	17.39	0.328	22.23	
							0	Right Touch	17.39	0.722	18.80	
							0	Right Tilt	17.39	0.769	18.53	
Head	RCV	LTE Band 66	Main.1	QPSK	1/0	132072	0	Left Touch	24.69	0.177	32.21	32.21
							0	Left Tilt	24.69	0.115	34.08	
							0	Right Touch	24.69	0.120	33.90	
							0	Right Tilt	24.69	0.082	35.55	
Head	RCV	LTE Band 66	Sub.2	QPSK	1/0	132572	0	Left Touch	16.35	0.455	19.77	17.50
							0	Left Tilt	16.35	0.537	19.05	
							0	Right Touch	16.35	0.698	17.91	
							0	Right Tilt	16.35	0.768	17.50	
Head	RCV	NR Band n5	Main.1	QPSK	1/52	167300	0	Left Touch	24.79	0.141	33.30	31.29
							0	Left Tilt	24.79	0.096	34.97	
							0	Right Touch	24.79	0.224	31.29	
							0	Right Tilt	24.79	0.112	34.30	
Head	RCV	NR Band n41	Main.2	QPSK	1/136	518598	0	Left Touch	17.20	0.036	31.64	31.64
							0	Left Tilt	17.20	0.007	38.75	
							0	Right Touch	17.20	0.010	37.20	
							0	Right Tilt	17.20	0.008	38.17	
Head	RCV	NR Band n41	Sub.2	QPSK	1/271	518598	0	Left Touch	17.77	0.402	21.73	17.83
							0	Left Tilt	17.77	0.461	21.13	
							0	Right Touch	17.77	0.865	18.40	
							0	Right Tilt	17.77	0.987	17.83	

Notes:

1. The maximum allowed power is equal to maximum tune up power + 1 dB device design uncertainty
2. Measured Output power refer to Sec.9 in SAR report.

Body-worn & Hotspot exposure (RSI=Free&Hotspot&Earjack)

RF Exposure Conditions	DSI	band	Antenna	mode	RB	Ch.	Test distance (mm)	Test position	Output power (dbm)	meas SAR 1g (W/kg)	Plimit (dBm)	Minimum Plimit (dBm)
Bodyworn & Hotspot	0	GSM 850	Main.1	GRPS 3 Slots		190	10	Rear	25.75	0.502	28.74	28.74
							10	Front	25.75	0.428	29.44	
							10	Left	25.75	0.081	36.67	
							10	Bottom	25.75	0.316	30.75	
							10	Right	25.75	0.311	30.82	
Bodyworn & Hotspot	0	GSM 1900	Main.1	GRPS 2 Slots		810	10	Rear	18.31	0.318	23.29	20.04
							10	Front	18.31	0.274	23.93	
							10	Left	18.31	0.083	29.10	
							10	Bottom	18.31	0.672	20.04	
							10	Right	18.31	0.041	32.21	
Bodyworn & Hotspot	0	WCDMA 5	Main.1	Rel.99 RMC 12.2 kbps		4183	10	Rear	24.68	0.524	27.49	27.49
							10	Front	24.68	0.443	28.22	
							10	Left	24.68	0.089	35.19	
							10	Bottom	24.68	0.376	28.93	
							10	Right	24.68	0.195	31.78	
Bodyworn & Hotspot	0	LTE Band 2	Main.1	QPSK	1/0	19100	10	Rear	18.38	0.260	24.23	22.25
							10	Front	18.38	0.218	25.00	
							10	Left	18.38	0.040	32.36	
							10	Bottom	18.38	0.410	22.25	
							10	Right	18.38	0.052	31.22	
Bodyworn & Hotspot	0	LTE Band 2	Sub.2	QPSK	1/99	19100	10	Rear	17.84	0.147	26.17	23.11
							10	Front	17.84	0.098	27.93	
							10	Top	17.84	0.297	23.11	
							10	Left	17.84	0.016	35.80	
Bodyworn & Hotspot	0	LTE Band 5	Main.1	QPSK	1/0	20525	10	Rear	25.07	0.560	27.59	27.59
							10	Front	25.07	0.492	28.15	
							10	Left	25.07	0.075	36.32	
							10	Bottom	25.07	0.374	29.34	
							10	Right	25.07	0.189	32.31	
Bodyworn & Hotspot	0	LTE Band 12	Main.1	QPSK	1/0	23095	10	Rear	24.97	0.327	29.82	29.82
							10	Front	24.97	0.216	31.63	
							10	Left	24.97	0.058	37.34	
							10	Bottom	24.97	0.215	31.65	
							10	Right	24.97	0.114	34.40	
Bodyworn & Hotspot	0	LTE Band 41	Main.2	QPSK	1/99	40620	10	Rear	17.48	0.211	24.24	22.57
							10	Front	17.48	0.188	24.74	
							10	Left	17.48	0.130	26.34	
							10	Bottom	17.48	0.310	22.57	
Bodyworn & Hotspot	0	LTE Band 41	Sub.2	QPSK	1/0	39750	10	Rear	17.39	0.104	27.22	24.29
							10	Front	17.39	0.078	28.47	
							10	Top	17.39	0.204	24.29	
							10	Left	17.39	0.011	36.98	
Bodyworn & Hotspot	0	LTE Band 66	Main.1	QPSK	1/0	132072	10	Rear	18.64	0.321	23.57	20.39
							10	Front	18.64	0.271	24.31	
							10	Left	18.64	0.065	30.51	
							10	Bottom	18.64	0.668	20.39	
							10	Right	18.64	0.045	32.11	
Bodyworn & Hotspot	0	LTE Band 66	Sub.2	QPSK	1/0	132572	10	Rear	16.35	0.154	24.47	22.37
							10	Front	16.35	0.109	25.98	
							10	Top	16.35	0.250	22.37	
							10	Left	16.35	0.027	32.04	
Bodyworn & Hotspot	0	NR Band n5	Main.1	QPSK	1/52	167300	10	Rear	24.79	0.319	29.75	29.75
							10	Front	24.79	0.247	30.86	
							10	Left	24.79	0.018	42.24	
							10	Bottom	24.79	0.293	30.12	
							10	Right	24.79	0.079	35.81	
Bodyworn & Hotspot	0	NR Band n41	Main.2	QPSK	1/136	518598	10	Rear	17.20	0.204	24.10	23.19
							10	Front	17.20	0.143	25.65	
							10	Left	17.20	0.116	26.56	
							10	Bottom	17.20	0.252	23.19	
Bodyworn & Hotspot	0	NR Band n41	Sub.2	QPSK	1/271	518598	10	Rear	17.77	0.197	24.83	24.25
							10	Front	17.77	0.130	26.63	
							10	Top	17.77	0.225	24.25	
							10	Left	17.77	0.027	33.46	

Notes:

1. The maximum allowed power is equal to maximum tune up power + 1 dB device design uncertainty
2. Measured Output power refer to Sec.9 in SAR report.

Product Specific 10-g exposure (RSI=Free&Earjack)

RF Exposure Conditions	DSI	band	Antenna	mode	RB	Ch.	Test distance (mm)	Test position	Output power (dbm)	meas SAR 10g (W/kg)	Plimit (dBm)	Minimum Plimit (dBm)
Product Specific-10g	0	GSM 850	Main.1	GPRS 3 Slots		190	0	Rear	25.75	0.779	30.81	29.98
							0	Front	25.75	0.944	29.98	
							0	Left	25.75	0.468	33.03	
							0	Bottom	25.75	0.366	34.09	
							0	Right	25.75	0.301	34.94	
Product Specific-10g	0	GSM 1900	Main.1	GPRS 2 Slots		810	0	Rear	18.31	0.618	24.38	22.48
							0	Front	18.31	0.732	23.64	
							0	Left	18.31	0.264	28.07	
							0	Bottom	18.31	0.956	22.48	
							0	Right	18.31	0.080	33.26	
Product Specific-10g	0	WCDMA 5	Main.1	Rel.99 RMC 12.2 kbps		4183	0	Rear	24.68	1.140	28.09	27.26
							0	Front	24.68	1.380	27.26	
							0	Left	24.68	0.618	30.75	
							0	Bottom	24.68	0.591	30.94	
							0	Right	24.68	0.351	33.21	
Product Specific-10g	0	LTE Band 2	Main.1	QPSK	1/0	19100	0	Rear	18.38	0.457	25.76	22.36
							0	Front	18.38	0.616	24.46	
							0	Left	18.38	0.152	30.54	
							0	Bottom	18.38	1.000	22.36	
							0	Right	18.38	0.100	32.36	
Product Specific-10g	0	LTE Band 2	Sub.2	QPSK	1/99	19100	0	Rear	17.84	0.427	25.52	23.14
							0	Front	17.84	0.453	25.26	
							0	Top	17.84	0.738	23.14	
							0	Left	17.84	0.060	34.04	
Product Specific-10g	0	LTE Band 5	Main.1	QPSK	1/0	20525	0	Rear	25.07	0.971	29.18	27.94
							0	Front	25.07	1.290	27.94	
							0	Left	25.07	0.435	32.66	
							0	Bottom	25.07	0.609	31.20	
							0	Right	25.07	0.294	34.37	
Product Specific-10g	0	LTE Band 12	Main.1	QPSK	1/0	23095	0	Rear	24.97	1.030	28.82	28.70
							0	Front	24.97	0.958	29.14	
							0	Left	24.97	0.221	35.51	
							0	Bottom	24.97	1.060	28.70	
							0	Right	24.97	0.296	34.24	
Product Specific-10g	0	LTE Band 41	Main.2	QPSK	1/99	40620	0	Rear	17.48	1.250	20.49	20.49
							0	Front	17.48	0.682	23.12	
							0	Left	17.48	0.661	23.26	
							0	Bottom	17.48	1.240	20.53	
Product Specific-10g	0	LTE Band 41	Sub.2	QPSK	1/0	39750	0	Rear	17.39	0.322	26.29	21.08
							0	Front	17.39	0.403	25.32	
							0	Top	17.39	1.070	21.08	
							0	LeFt	17.39	0.045	34.84	
Product Specific-10g	0	LTE Band 66	Main.1	QPSK	1/0	132072	0	Rear	18.64	0.332	27.41	22.05
							0	Front	18.64	0.463	25.96	
							0	Left	18.64	0.212	29.36	
								Bottom	18.64	1.140	22.05	
							0	Right	18.64	0.056	35.14	
Product Specific-10g	0	LTE Band 66	Sub.2	QPSK	1/0	132572	0	Rear	16.35	0.385	24.47	22.39
							0	Front	16.35	0.525	23.13	
							0	Top	16.35	0.622	22.39	
							0	Left	16.35	0.067	32.07	
Product Specific-10g	0	NR Band n5	Main.1	QPSK	1/52	167300	0	Rear	24.79	1.680	26.52	26.12
							0	Front	24.79	1.840	26.12	
							0	Left	24.79	0.056	41.29	
							0	Bottom	24.79	1.370	27.40	
							0	Right	24.79	0.194	35.89	
Product Specific-10g	0	NR Band n41	Main.2	QPSK	1/136	518598	0	Rear	17.20	1.070	20.89	20.81
							0	Front	17.20	0.735	22.52	
							0	Left	17.20	0.263	26.98	
							0	Bottom	17.20	1.090	20.81	
Product Specific-10g	0	NR Band n41	Sub.2	QPSK	1/136	518598	0	Rear	17.77	0.477	24.96	20.71
							0	Front	17.77	0.468	25.05	
							0	Top	17.77	1.270	20.71	
							0	Left	17.77	0.079	32.77	

Notes:

1. The maximum allowed power is equal to maximum tune up power + 1 dB device design uncertainty
2. Measured Output power refer to Sec.9 in SAR report.

END OF REPORT