

TEST REPORT

Eurofins KCTL Co..Ltd.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea FAX: 82-505-299-8311 TEL: 82-70-5008-1021

KR23-SPF0036-A Page (1) of (102) www.kctl.co.kr



KCTL

1. Client

Name

: Intel Mobile Communications

Address

100 Center Point Circle, Suite 200 Columbia, South

Report No.:

Date of Receipt

: 2023-09-13

2. Use of Report

: Class II Permissive Change

3. Name of Product and Model

: WLAN and BT, 2x2 PCle M.2 1216 SD adapter card

Model Number

: AX211D2W

Manufacturer and Country of Origin : Intel Mobile Communications / USA

4. Host Product Name

Host Model Name

: Notebook PC : NP940XGK

Manufacturer

: Samsung Electronics Co., Ltd.

5. FCC ID

: PD9AX211D2

6. Date of Test

: 2023-10-06 ~ 2023-10-11

7. Location of Test

: ■ Permanent Testing Lab □ On Site Testing

(Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

8. Test Standards

: IEEE 1528-2013, ANSI/IEEE C95.1, KDB Publication

9. Test Results

: Refer to the test result in the test report

Tested by

Technical Manager

Affirmation

Name: Mungi Jeong

Name: Jongwon Ma

2023-11-10

Eurofins KCTL Co.,Ltd.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (2) of (102)



REPORT REVISION HISTORY

Date	Revision	Page No
2023-11-01	Originally issued	-
2023-11-10	General information revised	4

This report shall not be reproduced except in full, without the written approval of Eurofins KCTL Co., Ltd. This document may be altered or revised by Eurofins KCTL Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by Eurofins KCTL Co.,Ltd. will constitute fraud and shall nullify the document. This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

General remarks for test reports

cheral remarks for test reports
Statement concerning the uncertainty of the measurement systems used for the tests
(may be required by the product standard or client)
Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:
Procedure number, issue date and title: Calculations leading to the reported values are on file with the testing lab <mark>oratory th</mark> at conducted the testing.
☑ Statement not required by the standard or client used for type testing
1. Identification when information is provided by the customer: Information marked "#" is provided by the customer Disclaimer: This information is provided by the customer and can affect the validity of results.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (3) of (102)



CONTENTS

1.	General information	4
2.	Device information	5
3.	Specific Absorption Rate	9
4.	RF Exposure Limits	11
5.	RF Average Conducted Output Power	12
6.	System Verification	14
7.	SAR Test Results	17
8.	Power Density Test Results	19
9.	Simultaneous Transmission	20
10.	SAR Measurement Variability	22
11.	Measurement Uncertainty	23
12.	Test Equipment Information	25
13.	SAR Test System Verification and Test Results	
14.	PD Test System Verification and Test Results	
Appe	endixes List	45
Appe	endix A. Calibration certificate	46
Appe	endix B. #Antenna Location & Distance	99
Appe	endix C. EUT Photo	100
Арре	endix D. Test Setup Photo	101
End	of test report	101

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (4) of (102)



1. General information

Client : Intel Corporation SAS

Address : 425 Rue de Goa – Le Cargo B6 – 06600 Antibes, FRANCE

Manufacturer : Intel Corporation SAS

Address : 425 Rue de Goa – Le Cargo B6 – 06600 Antibes, FRANCE

Laboratory : Eurofins KCTL Co.,Ltd.

Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No.: R-3327, G-198, C-3706, T-1849

CAB Identifier: KR0040, ISED Number: 8035A

KOLAS No.: KT231

1.1 Report Overview

This report details the results of testing carried out on the samples listed in section 2, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this test report is used in any configuration other than that detailed in the test report, the manufacturer must ensure the new configuration complies with all relevant standards and certification requirements. Any mention of Eurofins KCTL Co.,Ltd. Wireless lab or testing done by Eurofins KCTL Co.,Ltd. Wireless lab made in connection with the distribution or use of the tested product must be approved in writing by Eurofins KCTL Co.,Ltd. Wireless lab.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (5) of (102)



2. Device information

2.1 Basic description

Product Name		WLAN and BT, 2x2 PCIe M.2 1216 SD adapter card		
Product Model Nu	ımber	AX211D2W		
Product Manufact	urer	Intel Mobile Communications		
Host Product Nan	ne	Notebook PC		
Host Model Name)	NP940XGK		
Derivative model		NP940XGQ, NP942XGK, NP944XGK		
Host Manufacture	r	Samsung Electronics Co., Ltd		
Product	Radiation	6J5Z9FMW900096T		
Serial Number	WLAN Conduction	6J5Z9FMW900096T		
Mode of Operatio	n	WLAN 802.11ax		
		U-NII-5: 5 955.0 MHz ~ 6 415.0 MHz		
Device Overview		U-NII-6: 6 435.0 MHz ~ 6 515.0 MHz		
		U-NII-7: 6 535.0 MHz ~ 6 855.0 MHz		
		U-NII-8: 6 875.0 MHz ~ 7 115.0 MHz		

2.1.1 Differences from Derivative Models

Main model	NP940XGK
Derivative model	NP940XGQ, NP942 <mark>XGK, N</mark> P944XGK
Differences	Model numbers are allocated for marketing and logistic purposes only.

2.2 Summary of SAR Test Results

Dand	Equipment Class	Highest Reported		
Band	Equipment Class	6 GHz 1g SAR (W/kg)	PD 4cm ² (W/m ²)	
U-NII-5	6XD	0.88	6.83	
U-NII-6	6XD	1.09	3.45	
U-NII-7	6XD	1.36	4.33	
U-NII-8	6XD	0.98	4.04	

2.3 #Antenna information

Antenna Type		PIFA antenna			
Е	Band	U-NII-5	U-NII-6	U-NII-7	U-NII-8
Peak gain	Main	3.75	3.75	3.94	3.95
(dBi)	Aux	3.06	3.44	3.44	1.28

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (6) of (102)



2.4 #Maximum Tune-up power

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D04.

2.4.1 #Maximum WLAN Output Power

Band	Ant.	Mode	Channal	Output Po	ower (dB m)
Бапо	, and Grainer	Channel	Target	Max. Allowed	
		SU 20 MHz	All Channel	4.50	5.50
	Main,	SU 40 MHz	All Channel	7.75	8.75
	Aux	SU 80 MHz	All Channel	10.25	11.25
U-NII-5		SU 160 MHz	All Channel	12.00	13.00
C-IIII-5		SU 20 MHz	All Channel	1.50	2.50
	MIMO	SU 40 MHz	All Channel	4.75	5.75
	MINO	SU 80 MHz	All Channel	7.25	8.25
		SU 160 MHz	All Channel	9.50	10.50
		SU 20 MHz	All Chan <mark>nel</mark>	4.50	5.50
	Main,	S <mark>U 40 MHz</mark>	All Channel	7.50	8.50
	Aux	SU 80 MHz	All Channel	10.25	11.25
U-NII-6		SU 160 MHz	All Channel	12.00	13.00
U-INII-6		SU 20 MHz	All Channel	1.50	2.50
	MIMO	SU 40 MHz	All Channel	4.75	5.75
	IVIIIVIO	SU 80 MHz	All Channel	7.25	8.25
		SU 160 MHz	All Channel	9.50	10.50
		SU 20 MHz	All Channel	3.75	4.75
	l	SU 40 MHz	All Channel	7.00	8.00
	Main, Aux	SU 80 MHz	Except 119	9.50	10.50
	, tur	30 60 MHZ	119	10.25	11.25
U-NII-7		SU 160 MHz	All Channel	12.00	13.00
U-MII-/		SU 20 MHz	All Channel	0.75	1.75
		SU 40 MHz	All Channel	4.00	5.00
	MIMO	SU 80 MHz	Except 119	6.50	7.50
		30 00 MIZ	119	7.25	8.25
		SU 160 MHz	All Channel	9.25	10.25

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (7) of (102)



Band	Ant.	Mode	ode Channel	Output Power (dB m)				
Danu	Ant.	Wode	Chamilei	Target	Max. Allowed			
		CLL OO WIL	Except 233	3.75	4.75			
		SU 20 MHz	233	-0.50	0.50			
	-NII-8 Main, SU 40 MHz SU 80 MHz SU 160 MHz SU 20 MHz	SU 40 MHz	All Channel	7.00	8.00			
		, tux	SU 80 MHz	All Channel	9.50	10.50		
LLAULO						SU 160 MHz	All Channel	12.00
U-MII-8		CLL OO WIL	Except 233	0.75	1.75			
		50 20 MHZ	233	-4.00	-3.00			
	МІМО	SU 40 MHz	All Channel	4.00	5.00			
		SU 80 MHz	All Channel	6.50	7.50			
		SU 160 MHz	All Channel	9.25	10.25			

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (8) of (102)



2.5 SAR Test Configurationsd

2.5.1 #DUT Antenna Locations

A diagram showing the location of the device antennas can be found in Appendix B.

Ant. / Band	Device Edge for SAR Testing (Rear View)					
Ant. / Band	Front	Rear	Left Edge	Right Edge	Тор	Bottom
WLAN & Bluetooth	No	Yes	No	No	No	No

2.6 SAR Test Methods and Procedures

The tests documented in this report were performed in accordance with IEEE 1528-2013 and the following published KDB procedures:

- IEEE 1528-2013
- IEC/IEEE 62209-1528:2020
- IEC 62479:2010
- IEC TR 63170:2018
- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D04 Interim General RF Exposure Guidance v01
- 865664 D01 SAR measurement 100 Mb to 6 Gb v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 616217 D04 SAR for laptop and tablets v01r02
- April 2019 TCB Workshop Notes (Tissue Simulating Liquids)
- TCB Workshop-October 2021: RF Exposure Policies and Procedures
- SPEAG DASY6 System Handbook (June 2020)
- SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz)

2.6.1 6-7 GHz Tested Conditions

The Device was operated utilizing proprietary software and each channel was measured using a broadband power meter to determine the maximum average power.

As per the Interim Procedures for 6-7GHz RF Exposure, explained in RF Exposure Policies and Procedures: TCB Workshop – October 2020, the testing has been performed on SAR following IEC/IEEE 62209-1528:2020 and then on Power Density for the highest SAR test configurations.

The testing has been in both chains and four considered bands U-NII-5, U-NII-6, U-NII-7 and U-NII-8 in SAR mode.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (9) of (102)



3. Specific Absorption Rate

3.1 Introduction

The SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational / controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (p). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |\mathbf{E}|^2}{\rho}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (10) of (102)



3.3 Peak Spatially Averaged Power Density Assessment Based on E-field Measu rements

Within a short distance from the transmitting source, power density was determined based on both electric and magnetic fields. Generally, the magnitude and phase of two components of either the Efield or H-field were needed on a sufficiently large surface to fully characterize the total E-field and H-field distributions. Nevertheless, solutions based on direct measurement of E-field and H-field can be used to compute power density. The general measurement approach used for this device was:

- a) The local E field on the measurement surface was measured at a reference location where the field is well above the noise level. This reference level was used at the end of this procedure to assess output power drift of the DUT during the measurement.
- b) The electric field on the measurement surface was scanned. Measurements are conducted according to the instructions provided by the measurement system manufacturer. Measurement spatial resolution can depend on the measured field characteristic and measurement methodology used by the system. The planar scan step size was configured at $\lambda/4$.
- c) For cDASY6, H-field was calculated from the measured E-field using a reconstruction algorithm. As the power density calculation requires knowledge of both amplitude and phase, reconstruction algorithms can also be used to obtain field information from the measured E-field data (e.g. the phase from the amplitude if only the amplitude is measured). H-field and phase data was reconstructed from repeated measurements (three per measurement point) on two measurement planes separated by $\lambda/4$.
- d) The total Peak spatially averaged power density (psPD) distribution on the evaluation surface is determined per the below equation. The spatial averaging area, A, is specified by the applicable exposure limits or regulatory requirements.

$$psPD = \frac{1}{2A_{av}} \qquad \iint_{A_{av}} ||Re\{E \times H^*\}||dA|$$

- e) The maximum spatial-average on the evaluation surface is the final quantity to determine compliance against applicable limits.
- f) The local E field reference value, at the same location as step 2, was re-measured after the scan was complete to calculate the power drift. If the drift deviated by more than 5%, the power density test and drift measurements were repeated.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021

FAX: 82-505-299-8311 www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (11) of (102)



RF Exposure Limits

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their 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.

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). 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.

Controlled Uncontrolled **Human Exposure** Environment **Environment General Population** Occupational Partial Peak SAR 1) 1.60 mW/g 8.00 mW/g (Partial) Partial Average SAR 2) 0.08 mW/g 0.40 mW/g (Whole Body) Partial Peak SAR 3) 4.00 mW/g 20.00 mW/g (Hands/Feet/Ankle/Wrist)

- 1) The spatial Peak value of the SAR averaged over any 1g gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
- 2) The spatial Average value of the SAR averaged over the whole body.
- 3) The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

RF Exposure Limits for Frequencies Above 6 GHz

Per §1.1310 (d)(3), the MPE limits are applied for frequencies above 6 GHz. Power Density is expressed in units of W/m² or mW/cm².

Peak Spatially Averaged Power Density was evaluated over a circular area of 4 cm² per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational	
Power Density	1.0 mW/cm ²	5.0 mW/cm ²	

Note: 1.0 mW/cm² is 10 W/m²

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 Report No.: KR23-SPF0036-A Page (12) of (102)



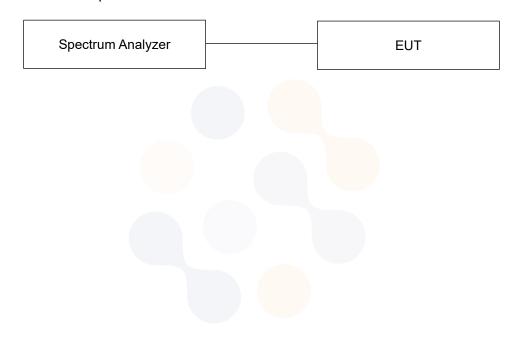
www.kctl.co.kr

RF Average Conducted Output Power

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported.

Power Measurement Setup



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (13) of (102)



5.1 WLAN Average Conducted Output Power

			Conducted Powers (dBm)				
Band	Ant.	Ant.	Mode	Freq. [Mtz] / Channel			
			6 025.0 / ch. 15	6 185.0 / ch. 47	6 345.0 / ch. 79		
	Main		12.20	12.23	12.01		
U-NII-5	Aux	SU 160 MHz	12.16	12.22	11.93		
U-INII-3	MIMO_Main	30 100 MHZ	9.70	9.66	9.46		
	MIMO_Aux		9.56	9.63	9.38		
Band	Ant.	Mode	Co	onducted Powers (dB	m)		
Bana	7	modo		6 505.0 / ch. 111			
	Main			12.17			
U-NII-6	Aux	SU 160 MHz	12.16				
O MII O	MIMO_Main		9.60				
	MIMO_Aux		9.49				
Band	Ant.	Mode	Conducted Powers (dBm)				
Bana	Aire	Wood	6 665.0 / ch. 1	6 8	25.0 / ch. 175		
	Main		12.03		12.20		
U-NII-7	Aux	SU 160 MHz	12.11		12.16		
O-INII-7	MIMO_Main	30 100 MIIZ	9.50		9.45		
	MIMO_Aux		9.33		9.37		
Band	Ant.	Mode	Co	onducted Powers (dB	m)		
	7		6 985.0 / ch. 207				
	Main			12.05			
U-NII-8	Aux	SU 160 MHz	12.21				
O WII O	MIMO_Main		9.36				
	MIMO_Aux		9.42				

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (14) of (102)



6. System Verification

6.1 Measurement date and environment

01:11	5 .	Environment						
Shield room	Date	Temperature (°C)	Humidity (%)					
	2023-10-06	21.1 ~ 21.2	51.4					
8F - 3	2023-10-10	21.1 ~ 21.2	53.8					
	2023-10-11	21.1 ~ 21.3	54.2					

6.2 Tissue Verification

The dielectric properties for this Tissue Simulant Liquids were measured by using the SPEAG Model DAK3.5 Dielectric Probe in conjunction with Agilent E5071B Network Analyzer (300 kHz - 8 500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1. For the SAR measurement given in this report. The temperature variation of the Tissue Simulant Liquids was (22 ± 2) $^{\circ}$ C.

Freq. (Mt/)	Limit/	Measured	Permittivity (ρ)	Conductivity (σ)	Temp. (°C)
6 500.0	Recomm	nended Limit	34.50 ± 5 % (32.78~36.23)	6.07 ± 5 % (5.77~6.37)	22 ± 2
	Measured	2023-10-06	34.70	5.97	20.85
6 025.0	Recomm	nended Limit	35.07 ± 5 % (33.32~36.82)	5.51 ± 5 % (5.23~5.79)	22 ± 2
	Measured	2023-10-06	35.90	5.32	20.85
6 185.0	Recomm	nended Limit	34. <mark>88 ± 5 %</mark> (33.14~36.62)	5.70 ± 5 % (5.42~5.99)	22 ± 2
	Measured	2023-10-06	35.50	5.52	20.85
6 345.0	Recomm	nended Limit	34.69 ± 5 % (32.96~36.42)	5.89 ± 5 % (5.60~6.18)	22 ± 2
	Measured	2023-10-06	35.10	5.75	20.85
6 505.0	Recomm	nended Limit	34.49 ± 5 % (32.77~36.21)	6.08 ± 5 % (5.78~6.38)	22 ± 2
	Measured	2023-10-06	34.70	5.98	20.85
6 665.0	Recomm	nended Limit	34.30 ± 5 % (32.59~36.02)	6.26 ± 5 % (5.95~6.57)	22 ± 2
	Measured	2023-10-06	34.40	6.19	20.85
6 825.0	Recomm	nended Limit	34.11 ± 5 % (32.40~35.82)	6.45 ± 5 % (6.13~6.77)	22 ± 2
	Measured	2023-10-06	34.40	6.38	20.85
6 985.0	Recomm	nended Limit	33.92 ± 5 % (32.22~35.62)	6.63 ± 5 % (6.30~6.96)	22 ± 2
	Measured	2023-10-06	34.20	6.53	20.85

<Table 1. Measurement result of Tissue electric parameters>

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021

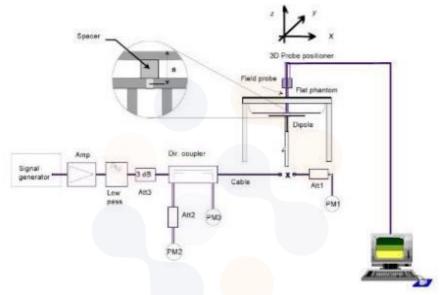
KR23-SPF0036-A Page (15) of (102) FAX: 82-505-299-8311 www.kctl.co.kr



6.2.1 SAR Test System Verification

The microwave circuit arrangement for system verification is sketched below picture. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within ± 10% from the t arget SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the Table 2. During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ℃, th e relative humidity was in the range(50 ± 20)% and the liquid depth Above the ear/grid refer ence points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

Report No.:



Verification Kit	Probe S/N	Frequency (MHz)	Tissue Type	Input Power (mW)	Date	Limit/Measured (Normalized to 1 W)
D6.5GHzV2	EX3DV4	6 500 0	(mw) Measured		Measured	293.00 ± 10 % (263.70~322.30)
SN: 1089	SN: 7540	0 6 500.0 HSL 100		2023-10-06	286.00	

<Table 2. System Verification Result>

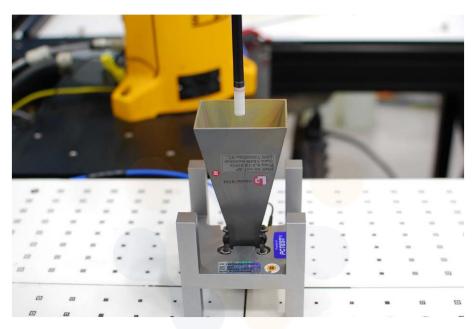
65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (16) of (102)



6..3 Power Density Test System Verification

The system was verified to be within \pm 0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.



[Figure 3. System Verification Setup Photo]

Source (S/N)	Probe (S/N)	Frequency	Date Prad To			m² psPD /m²)	Deviation	Limit
(3/14)	(3/14)	(GHz)		(IIIW)	Target	Measured	(dB)	(dB)
1023	9489	10	2023-10-10	86.1	55.7	57.9	0.17	± 0.66
1023	9489	10	2023-10-11	86.1	55.7	57.5	0.14	± 0.66

Notes

- 1) 10 mm distance spacing was used from the reference horn antenna aperture to the probe element.
- 2) According to IEC TR 63170, the power density measurement results should be normalized to the delivered input power to an input power level of 0 dB m and compared to the appropriate target values of the calibrated reference sources.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

FEL: 82-70-5008-1021 FAX: 82-505-299 <u>www.kctl.co.kr</u> Report No.: KR23-SPF0036-A Page (17) of (102)



7. SAR Test Results

7.1 Standalone Body SAR and Absorbed Power Density Test Results

						U-NII-5						
Mode	Ant.	EUT Position		Frequency (MHz)	Measured Conducted Power (dBm)	Max. Tune-up Power (dBm)	Power Scaling Factor	Duty Cycle Compensate Factor	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Estimated 4(m² APD (W/m²)	Plot No.
		Rear	0	6 185.0	12.23	13.00	1.194	1.015	0.701	0.850	4.26	
	Main	Rear	0	6 025.0	12.20	13.00	1.202	1.015	0.682	0.832	4.13	
		Rear	0	6 345.0	12.01	13.00	1.256	1.015	0.687	0.876	4.14	1
SU 160 MHz	Av	Rear	0	6 185.0	12.22	13.00	1.197	1.015	0.550	0.668	3.44	
	Aux	Rear	0	6 025.0	12.16	13.00	1.213	1.015	0.624	0.768	3.94	2
	MIMO	Rear	0	6 185.0	9.63	10.50	1.222	1.019	0.371	0.462	2.30	3
	MIMO	Rear	0	6 025.0	9.56	10.50	1.242	1.019	0.350	0.443	2.23	

						U-NII-6						
Mode	Ant.	EUT Position		Frequency (MHz)	Measured Conducted Power (dBm)	Max. Tune-up Power (dBm)	Power Scaling Factor	Duty Cycle Compensate Factor	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Estimated 4(m² APD (W/m²)	Plot No.
	Main	Rear	0	6 505.0	12.17	13.00	1.211	1.015	0.699	0.859	4.08	4
	Aux	Rear	0	6 505.0	12.16	13. <mark>00</mark>	1.213	1.015	0.885	1.090	5.07	5
SU 160 MHz	МІМО	Rear	0	6 505.0	9.49	10.50	1.262	1.019	0.427	0.549	2.44	6
	Repea	ated SAF	R Test									
	Aux	Rear	0	6 505.0	12.16	13.00	1.213	1.015	0.868	1.069	5.00	

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (18) of (102)



						U-NII-7						
Mode	Ant.	EUT Position		Frequency (MHz)	Measured Conducted Power (dBm)	Max. Tune-up Power (dBm)	Power Scaling Factor	Duty Cycle Compensate Factor	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Estimated 4(m² APD (W/m²)	Plot No.
	Main	Rear	0	6 825.0	12.20	13.00	1.202	1.015	1.060	1.293	6.33	7
	Main	Rear	0	6 665.0	12.03	13.00	1.250	1.015	0.952	1.208	5.49	
	Aux	Rear	0	6 825.0	12.16	13.00	1.213	1.015	0.725	0.893	3.98	
SU	Aux	Rear	0	6 665.0	12.11	13.00	1.227	1.015	1.090	1.357	6.05	8
160 MHz	MIMO	Rear	0	6 665.0	9.33	10.25	1.236	1.019	0.493	0.621	2.98	9
	Repea	ated SAF	R Test									
	Main	Rear	0	6 825.0	12.20	13.00	1.202	1.015	1.030	1.257	6.17	
	Aux	Rear	0	6 665.0	12.11	13.00	1.227	1.015	1.070	1.333	5.95	

						U-NII-8						
Mode	Ant.	EUT Position			Measured Conducted Power (dBm)		Power Scaling Factor	Duty Cycle Compensate Factor	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Estimated 4(m² APD (W/m²)	Plot No.
	Main	Rear	0	6 985.0	12.05	13.00	1.245	1.015	0.773	0.977	4.92	10
SU 160 MHz	Aux	Rear	0	6 985.0	12.21	13.00	1.199	1.015	0.604	0.735	3.29	11
	МІМО	Rear	0	6 985.0	9.36	10.25	1.227	1.019	0.365	0.456	2.34	12

General Notes:

- 1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D04.
- 2. Batteries are fully charged at the beginning of the SAR measurements.
- 3. Liquid tissue depth was at least 15.0 cm for all frequencies.
- 4. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04.
- 5. All modes of operation were investigated, and worst-case results are reported.
- 6. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
- 7. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors. Per October 2020 TCB Workshop notes, 5 channels were tested. Absorbed power density (APD) using a 4m² averaging area is reported based on SAR measurements.

WLAN Notes:

- 1. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance.
- 2. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
- 3. 6-7GHz transmission was verified using a spectrum analyzer.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (19) of (102)



8. Power Density Test Results

8.1 Standalone Body Power Density Test Results

						U-NI	I-5				
Mode	Ant.	EUT Position		Frequency (MHz)	Max. Tune-up Power (dBm)	iPD	Grid Step (λ)	Measurement Uncertainty	Measured Total 4cm ² psPD (W/m ²)	Scaled Total 4cm² psPD (W/m²)	Plot No.
		Rear	2	6 345.0	13.00	-	0.0625	1.462	4.16	6.08	
SU	Main	Rear	2	6 185.0	13.00	2.43	0.0625	1.462	4.67	6.83	13
160 MHz	IVIAIII	Rear	9.7	6 185.0	13.00	2.26	0.0625	1.462	1.29	1.89	
		Rear	2	6 025.0	13.00	-	0.0625	1.462	3.87	5.66	

	U-NII-6											
Mode	Ant.	EUT Position		Frequency	Max. Tune-up Power (dBm)	iPD	Grid Step (λ)	Measurement Uncertainty	Measured Total 4cm ² psPD (W/m ²)	Scaled Total 4cm ² psPD (W/m ²)	Plot No.	
SU 160 MHz	Aux	Rear	2	6 505.0	13.00	-	0.0625	1.462	2.36	3.45	14	

						U-NI	I-7				
Mode	Ant.	EUT Position		Frequency (MHz)	Max. Tune-up Power (dBm)	iPD	Grid Step (λ)	Measurement Uncertainty	Measured Total 4cm² psPD (W/m²)	Scaled Total 4cm ² psPD (W/m ²)	Plot No.
SU 160 MHz	Aux	Rear	2	6 665.0	13.00		0.0625	1.462	2.96	4.33	15

	U-NII-8											
Mode	Ant.	EUT Position		Frequency (MHz)	Max. Tune-up Power (dBm)	iPD	Grid Step (λ)	Measurement Uncertainty	Measured Total 4cm ² psPD (W/m ²)	Scaled Total 4cm ² psPD (W/m ²)	Plot No.	
SU 160 MHz	Main	Rear	2	6 985.0	13.00	-	0.0625	1.462	2.76	4.04	16	

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (20) of (102)



9. Simultaneous Transmission

9.1 #Simultaneous Transmission Configurations

No.	Scenario	Operation
1	WLAN 2.4 GHz Main + WLAN 2.4 GHz Aux	Yes
2	WLAN 2.4 ଖีซ Main + Bluetooth Aux	Yes
3	WLAN 5 GHz Main + WLAN 5 GHz Aux	Yes
4	WLAN 5 (Hz Main + Bluetooth Aux	Yes
5	WLAN 5 (Hz Aux + Bluetooth Aux	Yes
6	WLAN 5 (Hz Main + WLAN 5 (Hz Aux + Bluetooth Aux	Yes
7	WLAN 6 GHz Main + WLAN 6 GHz Aux	Yes
8	WLAN 6 (Hz Main + Bluetooth Aux	Yes
9	WLAN 6 GHz Aux + Bluetooth Aux	Yes
10	WLAN 6 GHz Main + WLAN 6 GHz Aux + Bluetooth Aux	Yes
11	WLAN 2.4 6Hz Main + WLAN 5 6Hz Aux + Bluetooth Aux (RSDB scenario)	No
12	WLAN 5 GHz Main + WLAN 2.4 GHz Aux + Bluetooth Aux (RSDB scenario)	No
13	WLAN 2.4 6Hz or 5 6Hz Main + WLAN 6 6Hz Aux + Bluetooth Aux (RSDB scenario)	No
14	WLAN 6 GHz Main + WLAN 2.4 GHz or 5 GHz Aux + Bluetooth Aux (RSDB scenario)	No

Notes:

- It does not transmit simultaneously the Bluetooth and WLAN 2.4 6Hz Aux Ant...
- It is to use the Bluetooth and WLAN same antenna path.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (21) of (102)



Simultaneous Transmission Analysis 9.2

		WLAN											
	Exposure	2.4 GHz				5 GHz			6 GHz			Blu	etooth
	Condition /Position	Main	Aux	МІМО	Main	Aux	МІМО	Maiı	ı A	ux	MIN	10	Aux
		[①]	[②]	[3]	[4]	[⑤]	[6]	[⑦]]	8]	[@)]	[10]
Ар	plicable Limit	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1	.6	1.	6	1.6
D	Reported Value	0.982	0.896	0.643	1.344	1.233	0.999	0.83	2 0.	768	0.4	43 ().181
Rear	Ratio to Limit	-	-	-	-	-	-	0.52	0 0.	480	0.2	77 (0.113
				•	Summa	tion			•				
	Scenario	[3]	[1+10]	[6]	[4+10]	[5+10] [6+0	0]	[9]	[⑦+	[0]	[8+10]	[9+10]
Ар	plicable Limit	1.6	1.6	1.6	1.6	1.6	1.6		1.0	1.	.0	1.0	1.0
Door	Reported Value	0.643	1.163	0.999	1.525	1.414	1.18	0	-	-		-	-
Rear	Ratio to Limit	-	-	-	-	-	-	C	.277	0.6	33	0.593	0.390

Notes:

- Simultaneous transmission SAR test exclusion considerations Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Per KDB Publication 447498 D04v01.
- When the sum of SAR1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR1g 1.6 W/kg), the SPLSR procedures is not required. When the sum of SAR1g is greater than the SAR limit (SAR1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.
- For WLAN 6GHz excluding value, refer to report "KR23-SPF0035".

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (22) of (102)



10. SAR Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was remounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

- 1) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 3) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Band	Mode	Ant.	EUT Position	Separation Distance	Frequency (Mt)	Measured 1 g SAR (W/kg)	Repeated 1 g SAR (W/kg)	Ratio
U-NII-6		Aux	Rear	0	6 505.0	0.885	0.868	1.02
U-NII-7	802.11ax SU 160 Mb	Main	Rear	0	6 825.0	1.060	1.030	1.03
U-INII-7		Aux	Rear	0	6 665.0	1.090	1.070	1.02

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (23) of (102)



11. Measurement Uncertainty

11.1 SAR Measurement Uncertainty

Per KDB 865664 D01 SAR measurement 100 Mb to 6 mb, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be \leq 30%, for a confidence interval of k=2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Standard 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (24) of (102)



KCTL

11.2 Power Density Measurement Uncertainty

Source f uncertainty	Uncertainty Value (± dB)	Probability distribution	Div.	C _i	Standard Uncertainty (± dB)	Vi
Measurement system						
Calibration	0.49	N	1.00	1.00	0.49	∞
Probe correction	0.00	R	1.73	1.00	0.00	∞
Frequency response (BW ≤ 1 GHz)	0.20	R	1.73	1.00	0.12	∞
Sensor cross coupling	0.00	R	1.73	1.00	0.00	∞
Isotropy	0.50	R	1.73	1.00	0.29	∞
Linearity	0.20	R	1.73	1.00	0.12	∞
Probe scattering	0.00	R	1.73	1.00	0.00	∞
Probe positioning offset	0.30	R	1.73	1.00	0.17	∞
Probe positioning repeatability	0.04	R	1.73	1.00	0.02	∞
Sensor mechanical offset	0.00	R	1.73	1.00	0.00	∞
Probe spatial resolution	0.00	R	1.73	1.00	0.00	∞
Field impedance dependance dependence	0.00	R	1.73	1.00	0.00	∞
Amplitude and phase drift	0.00	R	1.73	1.00	0.00	∞
Amplitude and phase noise	0.04	R	1.73	1.00	0.02	∞
Measurement area truncation	0.00	R	1.73	1.00	0.00	∞
Data acquisition	0.03	N	1.00	1.00	0.03	∞
Sampling	0.00	R	1.73	1.00	0.00	∞
Field reconstruction	1.77	R	1.73	1.00	1.02	∞
Forward transformation	0.00	R	1.73	1.00	0.00	∞
Power density scaling	-	R	1.73	1.00	-	∞
Spatial averaging	0.10	R	1.73	1.00	0.06	∞
System detection limit	0.04	R	1.73	1.00	0.02	∞
DUT and environmental factors						
Probe coupling with DUT	0.00	R	1.73	1.00	0.00	∞
Modulation response	0.40	R	1.73	1.00	0.23	∞
Integration time	0.00	R	1.73	1.00	0.00	∞
Response time	0.00	R	1.73	1.00	0.00	∞
Device holder influence	0.10	R	1.73	1.00	0.06	∞
DUT alignment	0.00	R	1.73	1.00	0.00	∞
RF ambient conditions	0.04	R	1.73	1.00	0.02	∞
Ambient reflections	0.04	R	1.73	1.00	0.02	∞
Immunity / secondary reception	0.00	R	1.73	1.00	0.00	∞
Drift of the DUT	0.22	R	1.73	1.00	0.13	∞
Combined standard uncertainty		RSS			1.23	
Expanded uncertainty (95 % confidence interval)		k = 2			2.46	

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (25) of (102)



12. Test Equipment Information

Test Platform	SPEAG DASY6 System							
Version	DASY6: 16.2.2.1588 / DASY6 mmWave: 3.0.0.841							
Location	Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea							
Manufacture	SPEAG							
Hardware Reference								
Equipment	Model	Serial Number	Date of Calibration	Due date of next Calibration				
Shield Room	-	8F - 3	-	-				
DASY6 Robot	TX90XL speag	F/18/0004968/A/001	-	-				
Phantom	2mm Oval Phantom ELI5	2097	-	-				
Phantom	mmWave Phantom	1090	-	-				
Mounting Device	Laptop Holder	-	-	-				
mmWave Device Holder	mmWave Device Holder	1140	-	-				
DAE	DAE4	134 <mark>2</mark>	2023-03-13	2024-03-13				
Probe	EX3DV4	7540	2023-05-04	2024-05-04				
Isotropic E-Field Probe	EUmmWV4	9489	2023-06-20	2024-06-20				
PSG Analog Signal Generator	E8257D	MY60020337	2023-01-29	2024-01-29				
Dual Power Meter	EPM-442A	GB37480680	2023-04-26	2024-04-26				
Power Sensor	8481H	2703A11902	2023-04-26	2024-04-26				
Power Sensor	8481H	3318A18090	2023-04-26	2024-04-26				
Attenuator	PE7005-10	2228-4	2022-12-15	2023-12-15				
Attenuator	PE7005-10	2228-5	2022-12-15	2023-12-15				
Attenuator	PE7005-10	2228-6	2022-12-15	2023-12-15				
Dual Directional Coupler	772D	2839A160504	2023-04-26	2024-04-26				
Power Amplifier	AMP2027ADB	10005	2023-04-26	2024-04-26				
Low Pass Filter	PE87FL1016	1928	2022-11-04	2023-11-04				
Low Pass Filter	PE87FL1017	2134	2023-01-04	2024-01-04				
Dipole Validation Kits	D6.5GHzV2	1089	2022-11-01	2024-11-01				
System Verification Device	5G Verification Source 10 GHz	1023	2023-01-20	2025-01-20				
ENA Series Network Analyzer	E5071B	MY42403524	2023-02-09	2024-02-09				
Dielectric Assessment Kit	DAK-3.5	1078	2023-05-24	2024-05-24				
Humidity/Temp	MHB-382SD	46307	2023-02-14	2024-02-14				
MXA SIGNAL ANALYZER	N9020A	MY520900024	2022-11-22	2023-11-22				

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (26) of (102)



Zoom Scan

2023-10-06

28.6

6.93

5.70 286

139

-0.01

Test System Verification and Test Results

Eurofins KCTL Co.,Ltd.

Measurement Report for Dipole D6.5GHzV2, FRONT, Validation band, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type	
Dipole D6.5GHzV2,	16.0 x 6.0 x 300.0	1089	Validation Dipole	
Speag				

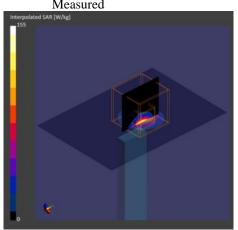
Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	FRONT,	Validation	CW,	6500.0,	5.35	5.97	34.7
HSL	5.00	band	0	6500			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Cali <mark>bration</mark> Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup			Measurement Results	
	Area Scan	Zoom Scan		Area
Grid Extents	60.0 x 85.0	22.0 x 22.0 x		Scan
[mm]		22.0	Date	2023-
Grid Steps	6.0 x 8.5	3.4 x 3.4 x 1.4		10-06
[mm]			psSAR1g [W/kg]	24.0
Sensor	3.0	1.4	psSAR8g [W/kg]	6.42
Surface [mm]			psSAR10g [W/kg]	5.34
Graded Grid	No	Yes	psAPD (1.0cm2, sq)	
Grading	N/A	1.4	[W/m2]	
Ratio			psAPD (4.0cm2, sq)	
MAIA	N/A	N/A	[W/m2]	
Surface	VMS + 6p	VMS + 6p	Power Drift [dB]	
Detection	•	•		
Scan Method	Measured	Measured		



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (27) of (102)



1)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 79 (6345.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Main Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6345.0,	5.35	5.75	35.1
HSL	0.00	Band	10755-AAC	79			

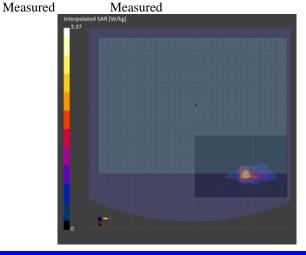
Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup		
•	Area Scan	Zoom Scan
Grid Extents	102.0 x 153.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		
Scan Method	Measured	Measured

Measurement	Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.554	0.687
psSAR8g [W/kg]	0.185	0.207
psSAR10g [W/kg]	0.159	0.177
psAPD (1.0cm2, sq)		6.87
[W/m2]		
psAPD (4.0cm2, sq)		4.14
[W/m2]		
Power Drift [dB]		-0.04



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (28) of (102)



2) KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 15 (6025.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Aux Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6025.0,	5.35	5.32	35.9
HSL	0.00	Band	10755-AAC	15			

Hardware Setup

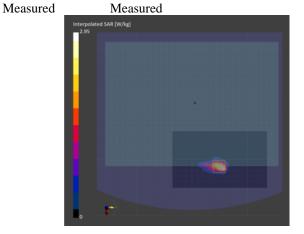
Scan Method

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2097	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup		
•	Area Scan	Zoom Scan
Grid Extents	102.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
~		

Grid Steps	8.5 x 8.5	$3.4 \times 3.4 \times 1.4$
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection	•	•

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.487	0.624
psSAR8g [W/kg]	0.182	0.197
psSAR10g [W/kg]	0.160	0.172
psAPD (1.0cm2, sq)		6.24
[W/m2]		
psAPD (4.0cm2, sq)		3.94
[W/m2]		
Power Drift [dB]		-0.02



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (29) of (102)



3

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 47 (6185.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + MIMO Antenna
SAMSUNG			

Exposure Conditions

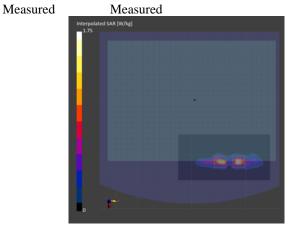
Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6185.0,	5.35	5.52	35.5
HSL	0.00	Band	10755-AAC	47			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - <mark>SN7540, 2</mark> 023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup		
•	Area Scan	Zoom Scan
Grid Extents	85.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		
Scan Method	Measured	Measured

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.325	0.371
psSAR8g [W/kg]	0.103	0.115
psSAR10g [W/kg]	0.090	0.099
psAPD (1.0cm2, sq)		3.71
[W/m2]		
psAPD (4.0cm2, sq)		2.30
[W/m2]		
Power Drift [dB]		-0.16



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (30) of (102)



4

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 111 (6505.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Main Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6505.0,	5.35	5.98	34.7
HSL	0.00	Band	10755-AAC	111			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

Scan Method

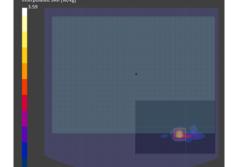
	Area Scan	Zoom Scan
Grid Extents	102.0 x 153.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		

Measured

Measurement Results

	Агеа	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.570	0.699
psSAR8g [W/kg]	0.183	0.204
psSAR10g [W/kg]	0.157	0.173
psAPD (1.0cm2, sq)		6.99
[W/m2]		
psAPD (4.0cm2, sq)		4.08
[W/m2]		
Power Drift [dB]		-0.06

Zoom Coon



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (31) of (102)



5

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 111 (6505.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Aux Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6505.0,	5.35	5.98	34.7
HSL	0.00	Band	10755-AAC	111			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

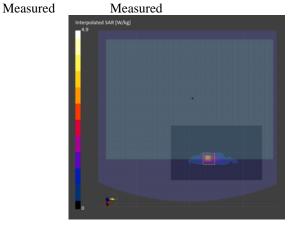
Scan Setup

-	Area Scan	Zoom Scan
Grid Extents	102.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		
Scan Method	Measured	Measured

Measurement Results

	Агеа	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.827	0.885
psSAR8g [W/kg]	0.249	0.254
psSAR10g [W/kg]	0.214	0.217
psAPD (1.0cm2, sq)		8.85
[W/m2]		
psAPD (4.0cm2, sq)		5.07
[W/m2]		
Power Drift [dB]		0.00

Zoom Coon



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (32) of (102)



KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 111 (6505.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + MIMO Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6505.0,	5.35	5.98	34.7
HSL	0.00	Band	10755-AAC	111			

Hardware Setup

Phantom	TSL, Mea <mark>sured Da</mark> te	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

Scan Method

	Area Scan	Zoom Scan
Grid Extents	85.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		

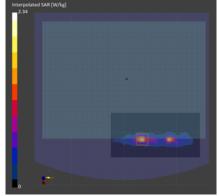
Measured

Measurement Results

	Агеа	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.397	0.427
psSAR8g [W/kg]	0.122	0.122
psSAR10g [W/kg]	0.105	0.104
psAPD (1.0cm2, sq)		4.27
[W/m2]		
psAPD (4.0cm2, sq)		2.44
[W/m2]		
Power Drift [dB]		0.04

Zoom Coon





65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (33) of (102)



7

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 175 (6825.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Main Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6825.0,	5.35	6.38	34.4
HSL	0.00	Band	10755-AAC	175			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

Scan Method

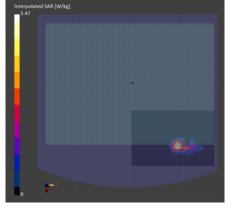
Scan Scrap		
_	Area Scan	Zoom Scan
Grid Extents	102.0 x 153.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection	_	_

Measured

Measurement Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.885	1.06
psSAR8g [W/kg]	0.286	0.317
psSAR10g [W/kg]	0.246	0.269
psAPD (1.0cm2, sq)		10.6
[W/m2]		
psAPD (4.0cm2, sq)		6.33
[W/m2]		
Power Drift [dB]		-0.16

Zoom Coon



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (34) of (102)



KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 143 (6665.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Aux Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6665.0,	5.35	6.19	34.4
HSL	0.00	Band	10755-AAC	143			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

Scan Method

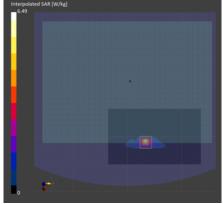
Scan Scrup		
_	Area Scan	Zoom Scan
Grid Extents	102.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection	•	•

Measured

Measurement Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	1.04	1.09
psSAR8g [W/kg]	0.304	0.303
psSAR10g [W/kg]	0.260	0.257
psAPD (1.0cm2, sq)		10.9
[W/m2]		
psAPD (4.0cm2, sq)		6.05
[W/m2]		
Power Drift [dB]		0.01

Zoom Scan



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (35) of (102)



Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 143 (6665.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + MIMO Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6665.0,	5.35	6.19	34.4
HSL	0.00	Band	10755-AAC	143			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

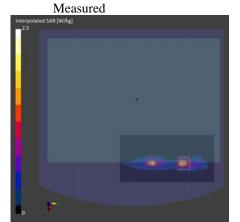
Scan Setup

-	Area Scan	Zoom Scan
Grid Extents	85.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		
Scan Method	Measured	Measured

Measurement Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.439	0.493
psSAR8g [W/kg]	0.134	0.149
psSAR10g [W/kg]	0.115	0.127
psAPD (1.0cm2, sq)		4.93
[W/m2]		
psAPD (4.0cm2, sq)		2.98
[W/m2]		
Power Drift [dB]		-0.04

Zoom Coon



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

TEL: 82-70-5008-1021 FAX: 82-505 www.kctl.co.kr Report No.: KR23-SPF0036-A Page (36) of (102)



10)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 207 (6985.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Main Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6985.0,	5.2	6.53	34.2
HSL	0.00	Band	10755-AAC	207			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

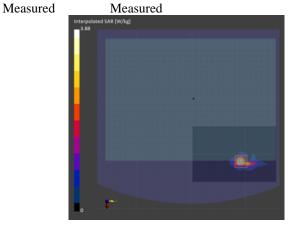
Scan Method

our stup		
	Area Scan	Zoom Scan
Grid Extents	102.0 x 153.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection	•	•

Measurement Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.662	0.773
psSAR8g [W/kg]	0.225	0.246
psSAR10g [W/kg]	0.194	0.211
psAPD (1.0cm2, sq)		7.73
[W/m2]		
psAPD (4.0cm2, sq)		4.92
[W/m2]		
Power Drift [dB]		-0.15

Zoom Coon



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (37) of (102)



11)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 207 (6985.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + Aux Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6985.0,	5.2	6.53	34.2
HSL	0.00	Band	10755-AAC	207			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

	Area Scan	Zoom Scan
Grid Extents	102.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection		
Scan Method	Measured	Measured

Measurement Results

Area	Zoom Scan
Scan	
2023-	2023-10-06
10-06	
0.559	0.604
0.168	0.164
0.144	0.140
	6.04
	3.29
	0.01
	Scan 2023- 10-06 0.559 0.168

Measured

Interpolated SAR [W/kg]

3.72

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (38) of (102)



12)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 207 (6985.0MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK,	312.0 x 224.0 x 11.0	6J5Z9FMW900096T	Laptop + MIMO Antenna
SAMSUNG			

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat,	BACK,	Custom	CW,	6985.0,	5.2	6.53	34.2
HSL	0.00	Band	10755-AAC	207			

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe	HBBL-600-10000	EX3DV4 - SN7540, 2023-	DAE4 Sn1342, 2023-03-
tilt) - 2097	Charge:xxxx, 2023-Oct-06	05-04	13

Scan Setup

Scan Method

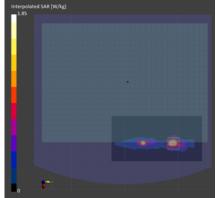
our stup		
	Area Scan	Zoom Scan
Grid Extents	85.0 x 170.0	22.0 x 22.0 x
[mm]		22.0
Grid Steps	8.5 x 8.5	3.4 x 3.4 x 1.4
[mm]		
Sensor	3.0	1.4
Surface [mm]		
Graded Grid	No	Yes
Grading	N/A	1.4
Ratio		
MAIA	N/A	N/A
Surface	VMS + 6p	VMS + 6p
Detection	•	•

Measured

Measurement Results

	Area	Zoom Scan
	Scan	
Date	2023-	2023-10-06
	10-06	
psSAR1g [W/kg]	0.342	0.365
psSAR8g [W/kg]	0.109	0.117
psSAR10g [W/kg]	0.093	0.100
psAPD (1.0cm2, sq)		3.65
[W/m2]		
psAPD (4.0cm2, sq)		2.34
[W/m2]		
Power Drift [dB]		-0.06

Zoom Scan



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea EL: 82-70-5008-1021 FAX: 82-505-299-8311

TEL: 82-70-5008-1021 FAX: 82-505www.kctl.co.kr Report No.: KR23-SPF0036-A Page (39) of (102)



14. PD Test System Verification and Test Results

Eurofins KCTL Co.,Ltd.

 $\label{eq:measurement} \textbf{Measurement Report for 10 GHz Verification Source, FRONT, Validation band, UID~0~-, Channel~10000~-, Channel~10000~$

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
10 GHz Verification Source, Speag	100.0 x 172.0 x 100.0	1023	Validation Dipole

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 10.00	10000.0, 10000	1.0

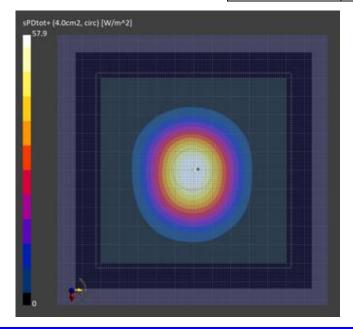
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-10
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	57.7
psPDtot+ [W/m²]	57.9
E _{max} [V/m]	158
Power Drift [dB]	0.01



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (40) of (102)



Eurofins KCTL Co.,Ltd.

$\label{eq:measurement} \textbf{Measurement Report for 10 GHz Verification Source, FRONT, Validation band, UID~0~-, Channel~10000~-, Channel~10000~$

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
10 GHz Verification Source, Speag	100.0 x 172.0 x 100.0	1023	Validation Dipole

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 10.00	10000.0, 10000	1.0

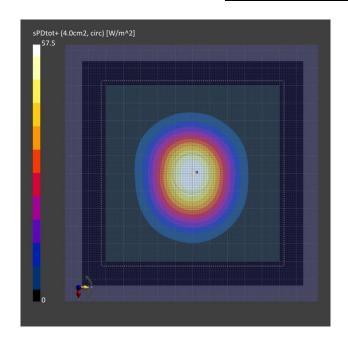
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Tricubul Cilicile Results	
Scan Type	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	10.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-11
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	57.3
psPDtot+ [W/m²]	57.5
E _{max} [V/m]	157
Power Drift [dB]	0.07



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea EL: 82-70-5008-1021 FAX: 82-505-299-831

TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (41) of (102)



13)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 47 (6185.0MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK, SAMSUNG	224.0 x 11.0 x 312.0	6J5Z9FMW900096T	Laptop + Main Antenna

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	BACK, 2.00	6185.0, 47	1.0

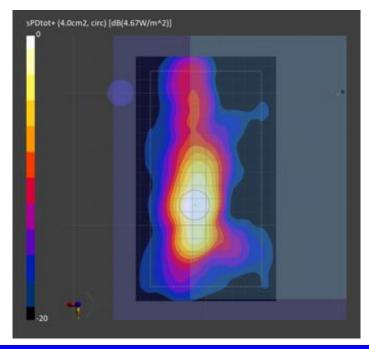
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	100.0 x 180.0
Grid Steps [lambda]	0.0625 x 0.0625
Sensor Surface [mm]	2.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-10
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	3.86
psPDtot+ [W/m²]	4.67
E _{max} [V/m]	65.8
Power Drift [dB]	-0.18



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

EL: 82-70-5008-1021 FAX: 82-5 <u>www.kctl.co.kr</u> Report No.: KR23-SPF0036-A Page (42) of (102)



14)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 111 (6505.0MHz)

Device Under Test Properties

zevice chaci restriction			
Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK, SAMSUNG	224.0 x 11.0 x 312.0	6J5Z9FMW900096T	Laptop + Aux Antenna

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	BACK, 2.00	6505.0, 111	1.0

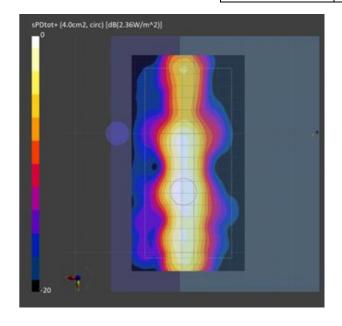
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	90.0 x 180.0
Grid Steps [lambda]	0.0625 x 0.0625
Sensor Surface [mm]	2.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-10
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	1.99
psPDtot+ [W/m ²]	2.36
E _{max} [V/m]	56.8
Power Drift [dB]	0.14



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (43) of (102)



15)

Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 143 (6665.0MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK, SAMSUNG	224.0 x 11.0 x 312.0	6J5Z9FMW900096T	Laptop + Aux Antenna

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	BACK, 2.00	6665.0, 143	1.0

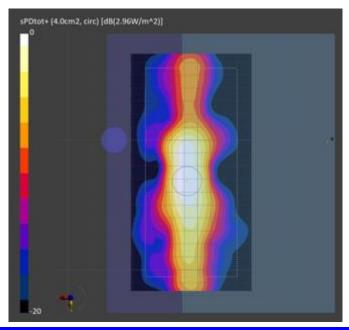
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	90.0 x 180.0
Grid Steps [lambda]	0.0625 x 0.0625
Sensor Surface [mm]	2.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-11
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	2.41
psPDtot+ [W/m ²]	2.96
E _{max} [V/m]	59.0
Power Drift [dB]	-0.14



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (44) of (102)



Eurofins KCTL Co.,Ltd.

Measurement Report for NP940XGK, BACK, Custom Band 802.11 ax, UID 10755 AAC, Channel 207 (6985.0MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	Serial Number	DUT Type
NP940XGK, SAMSUNG	224.0 x 11.0 x 312.0	6J5Z9FMW900096T	Laptop + Main Antenna

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor
5G	BACK, 2.00	6985.0, 207	1.0

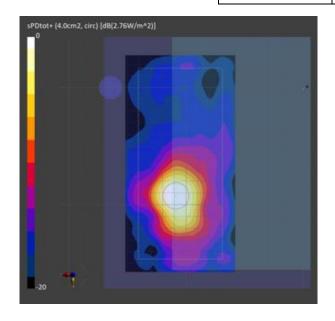
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air	EUmmWV4 - SN9489_F1-55GHz, 2023-06-20	DAE4 Sn1342, 2023-03-13

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	90.0 x 180.0
Grid Steps [lambda]	0.0625 x 0.0625
Sensor Surface [mm]	2.0
MAIA	N/A

Scan Type	5G Scan
Date	2023-10-10
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	2.21
psPDtot+ [W/m ²]	2.76
E _{max} [V/m]	63.5
Power Drift [dB]	-0.19



65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311

www.kctl.co.kr

Report No.: KR23-SPF0036-A Page (45) of (102)



Appendixes List

rippolidixoo E	
	A.1 Probe Calibration certificate (EX3DV4_7540)
A	A.2 Probe Calibration certificate (EUmmWV4_9489)
Appendix A	A.3 System Calibration certificate (5G Verification Source 10GHz_SN1023)
	A.4 Dipole Calibration certificate (D6.5GHzV2_SN1089)
Appendix B	#Antenna Location & Distance
Appendix C	EUT Photo
Appendix D	Test Setup Photo

