Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
Servizio svizzero di taratura
Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client

UL Korea (Dymstec)

Certificate No: 5G-Veri30-1047 Jan22

CALIBRATION	CERTIFICAT	ΓΕ				
Object	5G Verification	Source 30 GHz - SN: 1047				
Calibration procedure(s)	QA CAL-45.v3 Calibration prod	QA CAL-45.v3 Calibration procedure for sources in air above 6 GHz				
Calibration date:	January 28, 202	January 28, 2022				
The measurements and the unce	ertainties with confidence	ational standards, which realize the physical units of probability are given on the following pages and a ory facility: environment temperature $(22 \pm 3)^{\circ}$ C are	are part of the certificate.			
Calibration Equipment used (M&T						
Primary Standards	ID#	Cal Date (Certificate No.)	California de California			
Reference Probe EUmmWV3	SN: 9374	2021-12-21(No. EUmmWV3-9374_Dec21)	Scheduled Calibration Dec-22			
DAE4ip	SN: 1602	2021-06-25 (No. DAE4ip-1602_Jun21)	Jun-22			
Secondary Standards	ID#	Check Date (in house)	Scheduled Check			
Calibrated by: Approved by:	Name Leif Klysner Sven Kühn	Function Laboratory Technician Deputy Manager	Signature Sef Alpan			
			Issued: January 31, 2022			

Certificate No: 5G-Veri30-1047_Jan22

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Accreditation No.: SCS 0108

Glossary

CW

Continuous wave

Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45-5Gsources
- IEC TR 63170 ED1, "Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz", January 2018

Methods Applied and Interpretation of Parameters

- Coordinate System: z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- Measurement Conditions: (1) 10 GHz: The forward power to the horn antenna is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. (2) 30, 45, 60 and 90 GHz: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- Horn Positioning: The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- E- field distribution: E field is measured in two x-y-plane (10mm, 10mm + λ/4) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm² and 4cm²) power density values at 10mm in front of the horn.
- Field polarization: Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

 Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m²) averaged over the surface area of 1 cm² and 4cm² at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: 5G-Veri30-1047_Jan22

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	V C. T
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 2.5 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	
requency 30 GHz ± 10 MHz		

Calibration Parameters, 30 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane			Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	61.9	184	1.27 dB	78.1	68.7	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	Prad¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	61.9	184	1.27 dB	78.1	68.5	1.28 dB

¹ derived from far-field data

Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1047	-	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

Hardware Setup

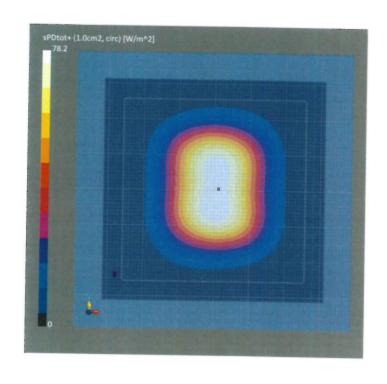
Phantom	Medium	Probe, Calibration Date	DAT Callbart B.
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE, Calibration Date DAE4ip Sn1602, 2021-06-25

Measurement Results

-0.01

Scan Setup

	5G Scan		
Grid Extents [mm]	60.0 x 60.0	Date	5G Scan
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm²]	2022-01-25, 19:08
Sensor Surface [mm]	5.55	psPDn+ [W/m²]	1.00
MAIA	MAIA not used	psPDtot+ [W/m²]	77.6
			78.2
		psPDmod+ [W/m²]	78.5
		E _{max} [V/m]	184
		Power Drift [dB]	-0.01



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUZ	
5G Verification Source 30 GHz		114121	DUT Type	
30 Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1047		

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0,	1.0
				30000	1.0

Hardware Setup

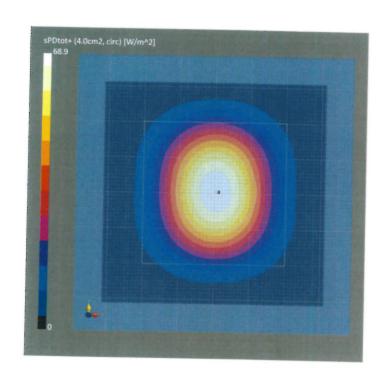
Phantom	Medium	Proho Calibration Date	CONTRACT STATE STATE OF THE STA
mmWave Phantom - 1002	Air	Probe, Calibration Date EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE, Calibration Date DAE4ip Sn1602, 2021-06-25

Scan Setup

0.115.4	ou ocan		FC C
Grid Extents [mm] Grid Steps [lambda] Sensor Surface [mm] MAIA	60.0 x 60.0 0.25 x 0.25 5.55 MAIA not used	Date Avg. Area [cm²] psPDn+ [W/m²] psPDtot+ [W/m²] psPDmod+ [W/m²]	5G Scar 2022-01-25, 19:08 4.00 68.2 68.9 69.1
		E _{max} [V/m] Power Drift [dB]	184

Measurement Results

-0.01



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Tune	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1047	DUT Type -	

Exposure Conditions

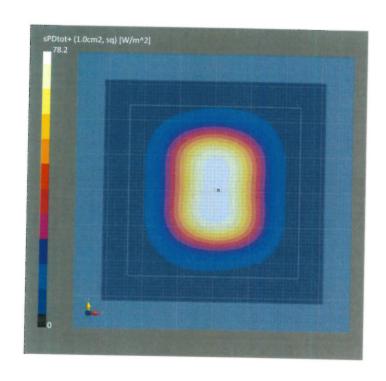
Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0,	1.0
				30000	

Hardware Setup

Phantom	Medium	Probe, Calibration Date	
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE, Calibration Date DAE4ip Sn1602, 2021-06-25

Scan Setup

Grid Extents [mm] Grid Steps [lambda] Sensor Surface [mm] MAIA	5G Scan 60.0 x 60.0 0.25 x 0.25 5.55 MAIA not used	Date Avg. Area [cm²] psPDn+ [W/m²] psPDtot+ [W/m²] psPDmod+ [W/m²] E _{max} [V/m]	5G Scan 2022-01-25, 19:08 1.00 77.6 78.2 78.4
			78.4 184
		Power Drift [dB]	-0.01



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	D.I.=
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1047	DUT Type

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0.	1.0
				30000.0,	1.0

Hardware Setup

Phantom	Medium	Probo Colibertion Do	
mmWave Phantom - 1002	Air	Probe, Calibration Date EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE, Calibration Date DAE4ip Sn1602, 2021-06-25

Measurement Results

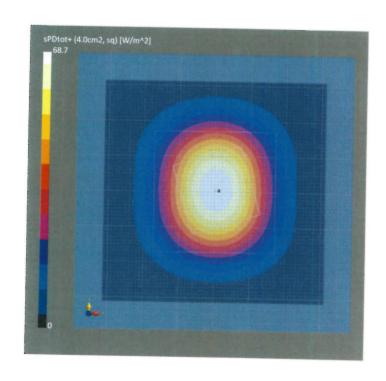
Power Drift [dB]

184

-0.01

Scan Setup

	5G Scan		FO.6
Grid Extents [mm] Grid Steps [lambda] Sensor Surface [mm] MAIA	60.0 x 60.0 0.25 x 0.25 5.55 MAIA not used	Date Avg. Area [cm²] psPDn+ [W/m²] psPDtot+ [W/m²]	5G Scan 2022-01-25, 19:08 4.00 68.0 68.7
		psPDmod+ [W/m²] E _{max} [V/m]	68.9 184



Appendix: Source Evaluation for Relative System Check

Measurement Equipment

DASY system configuration, as far as not given on page 1.

item		
item	ID#	Cal Date (Certificate No.)
Probe EUmmWV4	SN: 9493	January 27, 2022

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	• • • •
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 2.5 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	
Frequency	30 GHz ± 100 MHz	

Calibration Parameters, 30 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane	Prad¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	61.9	183	1.27 dB	76.8	67.4	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	Prad² (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	61.9	183	1.27 dB	76.8	67.2	1.28 dB

² derived from far-field data

Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manutacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN:	-	
Exposure Conditions				

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

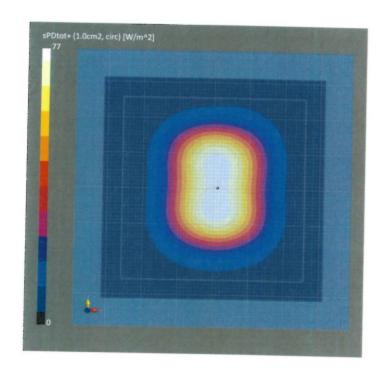
Hardware Setup

Phantom	Medium	Probe, Calibration Date	
mmWave Phantom - 1002	Air	EUmmWV4 - SN9493_F1-55GHz, 2022-01-27	DAE, Calibration Date DAE4 Sn1215, 2021-06-25

Scan Setup

0.115	5G Scan		
Grid Extents [mm]	60.0 x 60.0	Date	
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm²]	
Sensor Surface [mm] MAIA	5.55	psPDn+ [W/m²]	
	MAIA not used	psPDtot+ [W/m²]	
		psPDmod+ [W/m ²]	

Date	5G Scan
Date	2022-01-28, 15:27
Avg. Area [cm ²] psPDn+ [W/m ²]	1.00
psPDtot+ [W/m²]	76.3
psPDmod+ [W/m²]	77.0
E _{max} [V/m]	77.1
Power Drift [dB]	183
Total Britt [ub]	0.03



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

- Tooling	103			
Name, Manufacturer	Dimensions [mm]	IMEI	DII	
FC V- : 6		HAICI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN:		

Exposure Condition

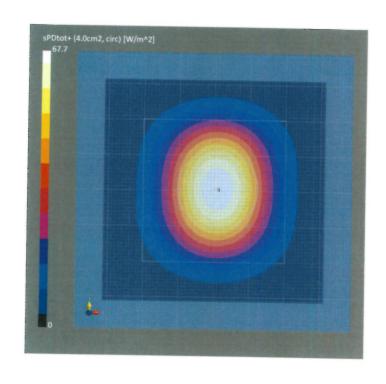
Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

Hardware Setup

Phantom	Medium	Probe, Calibration Date	
mmWave Phantom - 1002	Air	EUmmWV4 - SN9493_F1-55GHz, 2022-01-27	DAE, Calibration Date DAE4 Sn1215, 2021-06-25

Scan Setup

	5G Scan		FCC
Grid Extents [mm] Grid Steps [lambda] Sensor Surface [mm] MAIA	60.0 x 60.0 0.25 x 0.25 5.55 MAIA not used	Date Avg. Area [cm²] psPDn+ [W/m²]	5G Scan 2022-01-28, 15:27 4.00 66.8 67.7 67.8 183 0.03
		psPDn+ [W/m²] psPDtot+ [W/m²] psPDmod+ [W/m²] E _{max} [V/m] Power Drift (dB)	



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI		
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0		DUT Type	
	100.0 X 100.0 X 100.0	SN:	<u>-</u>	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

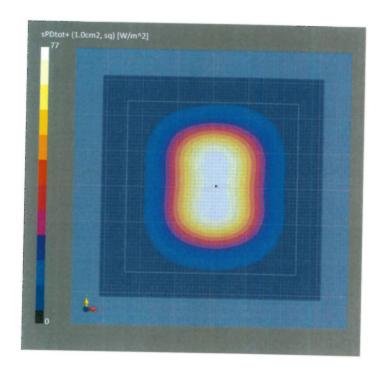
Hardware Setup

Phantom	Medium	Droho Caliburat D.	
mmWave Phantom - 1002	Air	Probe, Calibration Date EUmmWV4 - SN9493_F1-55GHz, 2022-01-27	DAE, Calibration Date DAE4 Sn1215, 2021-06-25

Scan Setup

Scan Setup		Measurement Results	
Grid Extents [mm] Grid Steps [lambda] Sensor Surface [mm] MAIA	5G Scan 60.0 x 60.0 0.25 x 0.25 5.55 MAIA not used	Date Avg. Area [cm²] psPDn+ [W/m²] psPDtot+ [W/m²] psPDmod+ [W/m²] E _{max} [V/m]	5G Scan 2022-01-28, 15:27 1.00 76.2 77.0 77.1 183
		Power Drift [dB]	0.03

183 0.03



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1047	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0,	1.0

Hardware Setup

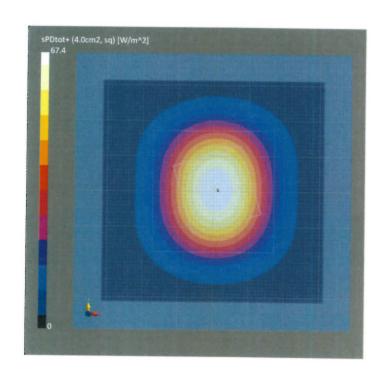
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date	
mmWave Phantom - 1002	Air	EUmmWV4 - SN9493_F1-55GHz, 2022-01-27	DAE4 Sn1215, 2021-06-25	

Scan Setup

		The same of the sa	
	5G Scan		5G Scan
Grid Extents [mm]	60.0 x 60.0	Date	2022-01-28, 15:27
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm ²]	4.00
Sensor Surface [mm]	5.55	psPDn+ [W/m²]	66.6
MAIA	MAIA not used	psPDtot+ [W/m ²]	67.4
		psPDmod+ [W/m²]	67.6
		E _{max} [V/m]	183
		Power Drift [dB]	0.03

Measurement Results

0.03



Calibration Laboratory of Schmid & Partner **Engineering AG** Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Certificate No: 5G-Veri30-1082_Mar22

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Client

UL Korea (Dymstec)

CAL	BRA	ATION	CERT	IFICATE

5G Verification Source 30 GHz - SN: 1082 Object

QA CAL-45.v3 Calibration procedure(s)

Calibration procedure for sources in air above 6 GHz

March 01, 2022 Calibration date:

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration	
Reference Probe EUmmWV3	SN: 9374	2021-12-21(No. EUmmWV3-9374_Dec21)	Dec-22	
DAE4ip	SN: 1602 2021-06-25 (No. DAE4ip-1602_Jun21)		Jun-22	

Calibrated by:

Name

Function

Signature

Leif Klysner

Laboratory Technician

Approved by:

Niels Kuster

Quality Manager

Issued: March 2, 2022

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Certificate No: 5G-Veri30-1082_Mar22

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Continuous wave

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- Internal procedure QA CAL-45-5Gsources
- IEC TR 63170 ED1, "Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz", January 2018

Methods Applied and Interpretation of Parameters

- Coordinate System: z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- Measurement Conditions: (1) 10 GHz: The forward power to the horn antenna is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. (2) 30, 45, 60 and 90 GHz: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- Horn Positioning: The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- E- field distribution: E field is measured in two x-y-plane (10mm, 10mm + λ/4) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm² and 4cm²) power density values at 10mm in front of the horn.
- Field polarization: Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

 Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m²) averaged over the surface area of 1 cm² and 4cm² at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: 5G-Veri30-1082_Mar22 Page 2 of 17

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 2.5 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	······································
Frequency	30 GHz ± 10 MHz	· · · · · · · · · · · · · · · · · · ·

Calibration Parameters, 30 GHz

Circular Averaging

Distance Horn Aperture	Prad1	Max E-field	Uncertainty	Avg Powe	er Density	Uncertainty
to Measured Plane	(mW)	(V/m)	(k = 2)	Avg (psPDn+, psF	Dtot+, psPDmod+)	(k = 2)
				(W/m²)		
				1 cm ²	4 cm ²	
10 mm	42.9	154	1.27 dB	55.2	48.6	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	Prad¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	42.9	154	1.27 dB	55.2	48.5	1.28 dB

Certificate No: 5G-Veri30-1082_Mar22

¹ derived from far-field data

Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Device ander reserropere	ics		
Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	-

Exposure Conditions

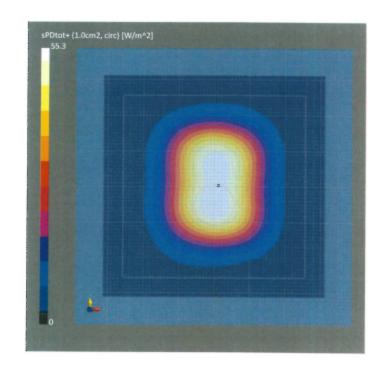
Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0	

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan		5G Scan
Grid Extents [mm]	60.0 x 60.0	Date	2022-03-01, 15:16
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm ²]	1.00
Sensor Surface [mm]	5.55	psPDn+ [W/m ²]	54.9
MAIA	MAIA not used	psPDtot+ [W/m ²]	55.3
		psPDmod+ [W/m²]	55.5
		E _{max} [V/m]	154
		Power Drift [dB]	-0.05



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	•	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

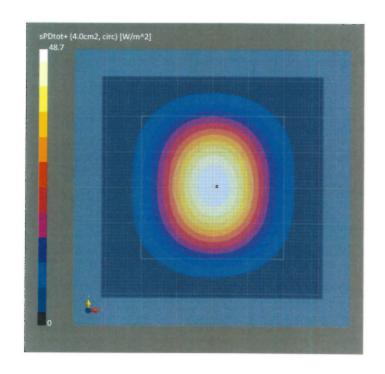
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz,	DAE4ip Sn1602,
		2021-12-21	2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	MAIA not used

	5G Scan
Date	2022-03-01, 15:16
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	48.2
psPDtot+ [W/m²]	48.7
psPDmod+ [W/m ²]	48.9
E _{max} [V/m]	154
Power Drift [dB]	-0.05



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	

Exposure Conditions

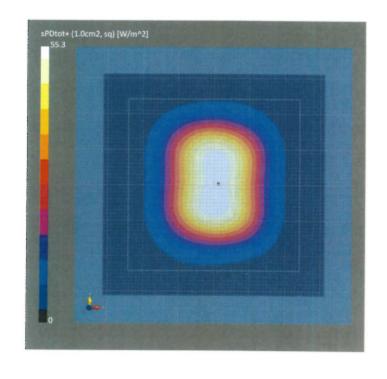
Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan		5G Scan
Grid Extents [mm]	60.0 x 60.0	Date	2022-03-01, 15:16
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm ²]	1.00
Sensor Surface [mm]	5.55	psPDn+ [W/m ²]	54.9
MAIA	MAIA not used	psPDtot+ [W/m ²]	55.3
		psPDmod+ [W/m ²]	55.5
		E _{max} [V/m]	154
		Power Drift [dB]	-0.05



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	-	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0	

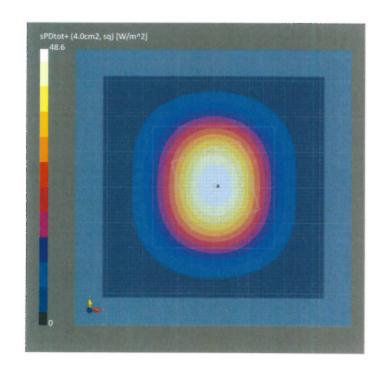
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2021-12-21	DAE4ip Sn1602, 2021-06-25

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	MAIA not used

	5G Scan
Date	2022-03-01, 15:16
Avg. Area [cm ²]	4.00
psPDn+ [W/m²]	48.0
psPDtot+ [W/m²]	48.6
psPDmod+ [W/m ²]	48.8
E _{max} [V/m]	154
Power Drift [dB]	-0.05



Appendix: Source Evaluation for Relative System Check

Measurement Equipment

DASY system configuration, as far as not given on page 1.

Item	ID#	Cal Date (Certificate No.)
Probe EUmmWV4	SN: 9536	February 28, 2022

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 2.5 mm	
Number of measured planes	2 (10mm, 10mm + \(\lambda\)4)	
Frequency	30 GHz ± 100 MHz	**************************************

Calibration Parameters, 30 GHz

Circular Averaging

Distance Horn Aperture	Prad ¹	Max E-field	Uncertainty	Avg Pow	er Density	Uncertainty
to Measured Plane	(mW)	(V/m)	(k = 2)	Avg (psPDn+, ps	PDtot+, psPDmod+)	(k = 2)
				(W	/m²)	
				1 cm ²	4 cm ²	
10 mm	42.9	153	1.27 dB	51.5	44.4	1.28 dB

Square Averaging

Distance Horn Aperture	Prad ²	Max E-field	Uncertainty	Avg Pow	er Density	Uncertainty
to Measured Plane	(mW)	(V/m)	(k = 2)	Avg (psPDn+, ps	PDtot+, psPDmod+)	(k = 2)
				(W	/m²)	
				1 cm ²	4 cm ²	
10 mm	42.9	153	1.27 dB	51.6	44.3	1.28 dB

Certificate No: 5G-Veri30-1082_Mar22

² derived from far-field data

Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082		

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

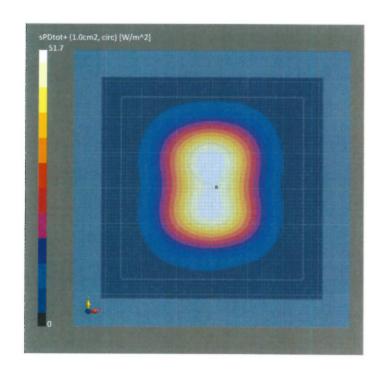
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9536_F1-55GHz,	DAE4 Sn908,
		2022-02-28	2021-06-24

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	MAIA not used

	5G Scan
Date	2022-03-01, 17:35
Avg. Area [cm ²]	1.00
psPDn+ [W/m²]	51.1
psPDtot+ [W/m²]	51.7
psPDmod+ [W/m²]	51.8
E _{max} [V/m]	153
Power Drift [dB]	-0.02



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	•	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0,	1.0

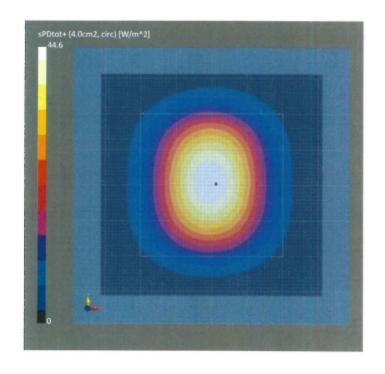
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9536_F1-55GHz,	DAE4 Sn908,
		2022-02-28	2021-06-24

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	MAIA not used

	5G Scan
Date	2022-03-01, 17:35
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	43.9
psPDtot+ [W/m ²]	44.6
psPDmod+ [W/m²]	44.7
E _{max} [V/m]	153
Power Drift [dB]	-0.02



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	5.55 mm	Validation band	CW	30000.0, 30000	1.0

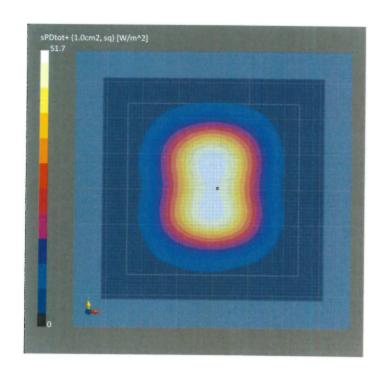
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9536_F1-55GHz, 2022-02-28	DAE4 Sn908, 2021-06-24

Scan Setup

5G Scan
60.0 x 60.0
0.25 x 0.25
5.55
MAIA not used

	5G Scan
Date	2022-03-01, 17:35
Avg. Area [cm²]	1.00
psPDn+ [W/m²]	51.2
psPDtot+ [W/m²]	51.7
psPDmod+ [W/m²]	51.8
E _{max} [V/m]	153
Power Drift [dB]	-0.02



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082		

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

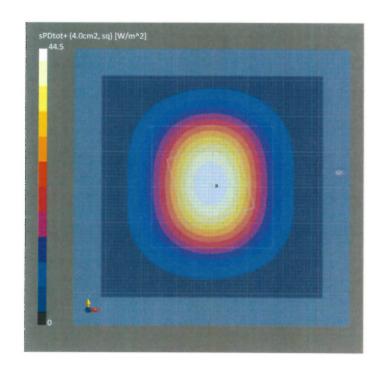
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9536_F1-55GHz, 2022-02-28	DAE4 Sn908, 2021-06-24

Scan Setup

	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55
MAIA	MAIA not used

	5G Scan
Date	2022-03-01, 17:35
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	43.8
psPDtot+ [W/m²]	44.5
psPDmod+ [W/m²]	44.6
E _{max} [V/m]	153
Power Drift [dB]	-0.02



Appendix: Source Evaluation for Relative System Check

Measurement Equipment

DASY system configuration, as far as not given on page 1.

Item	ID#	Cal Date (Certificate No.)
Probe EUmmWV4	SN: 9559	February 28, 2022

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	cDASY6 Module mmWave	V2.4
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
XY Scan Resolution	dx, dy = 2.5 mm	
Number of measured planes	2 (10mm, 10mm + <i>N</i> 4)	
Frequency	30 GHz ± 100 MHz	

Calibration Parameters, 30 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane	Prad¹ (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg (psPDn+, psi	er Density PDtot+, psPDmod+) /m²)	Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	42.9	151	1.27 dB	51.0	44.1	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	Prad² (mW)	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm ²	4 cm ²	
10 mm	42.9	151	1.27 dB	51.0	44.0	1.28 dB

Certificate No: 5G-Veri30-1082_Mar22

 $^{^{2}}$ derived from far-field data

Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	•	

Exposure Conditions

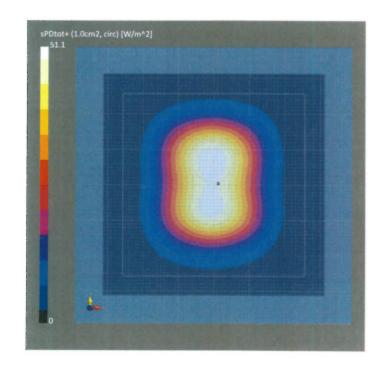
Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9559_F1-55GHz,	DAE4 Sn908,
		2022-02-28	2021-06-24

Scan Setup

	5G Scan		5G Scan
Grid Extents [mm]	60.0 x 60.0	Date	2022-03-01, 16:23
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm ²]	1.00
Sensor Surface [mm]	5.55	psPDn+ [W/m²]	50.6
MAIA	MAIA not used	psPDtot+ [W/m²]	51.1
		psPDmod+ [W/m ²]	51.2
		E _{max} [V/m]	151
		Power Drift [dB]	0.07



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type	
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	2	

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

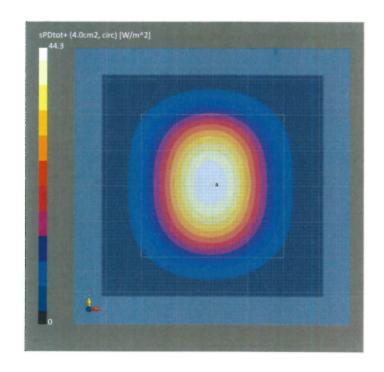
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9559_F1-55GHz,	DAE4 Sn908,
		2022-02-28	2021-06-24

Scan Setup

	5G Scan		
Grid Extents [mm]	60.0 x 60.0	Date	
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [d	
Sensor Surface [mm]	5.55	psPDn+ [W,	
MAIA	MAIA not used	psPDtot+ [V	

	5G Scan
Date	2022-03-01, 16:23
Avg. Area [cm ²]	4.00
psPDn+ [W/m²]	43.7
psPDtot+ [W/m²]	44.3
psPDmod+ [W/m²]	44.4
E _{max} [V/m]	151
Power Drift [dB]	0.07



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type		
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	-		

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

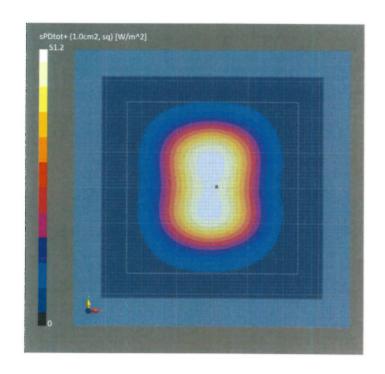
Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9559_F1-55GHz, 2022-02-28	DAE4 Sn908, 2021-06-24

Scan Setup

5G Scan
60.0 x 60.0
0.25 x 0.25
5.55
MAIA not used

	5G Scan
Date	2022-03-01, 16:23
Avg. Area [cm ²]	1.00
psPDn+ [W/m²]	50.6
psPDtot+ [W/m²]	51.2
psPDmod+ [W/m²]	51.2
E _{max} [V/m]	151
Power Drift [dB]	0.07



Measurement Report for 5G Verification Source 30 GHz, UID 0 -, Channel 30000 (30000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 30 GHz	100.0 x 100.0 x 100.0	SN: 1082	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor	
5G -	5.55 mm	Validation band	CW	30000.0,	1.0	

Hardware Setup

Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV4 - SN9559_F1-55GHz, 2022-02-28	DAE4 Sn908, 2021-06-24

Scan Setup

	5G Scan		5G Scan
Grid Extents [mm]	60.0 x 60.0	Date	2022-03-01, 16:23
Grid Steps [lambda]	0.25 x 0.25	Avg. Area [cm ²]	4.00
Sensor Surface [mm]	5.55	psPDn+ [W/m²]	43.5
MAIA	MAIA not used	psPDtot+ [W/m²]	44.2
		psPDmod+ [W/m²]	44.3
		E _{max} [V/m]	151
		Power Drift [dB]	0.07

