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NEAR-FIELD POWER DENSITY EVALUATION REPORT

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue :**May.13, 2022 **Test Report No.:** HCT-SR-2205-FC004 **Test Site: HCT CO., LTD.**

FCC ID: A3LSMG990U2

Equipment Type:	**Mobile Phone**
Application Type	**Certification**
FCC Rule Part(s):	**CFR §2.1093**
Model Name:	**SM-G990U2**
Additional Model Name:	**SM-G990U3/DS**
Date of Test:	**Apr. 06, 2022 ~ Apr. 18, 2022**

Band & Mode	Tx. Frequency	Measured psPD	Reported psPD
	MHz	mW/cm²	mW/cm²
5G NR - n261	27500 MHz - 28350 MHz	0.620	0.891
5G NR - n260	37000 MHz - 40000 MHz	0.560	0.891
Total Exposure Ratio		0.994	

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

Tested By

Moon-Pyung Choi
Test Engineer
SAR Team
Certification Division

Reviewed By

Yun-jeang, Heo
Technical Manager
SAR Team
Certification Division

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	May 13, 2022	Initial Release

CONTENTS

1. Test Location

1.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Telephone	031-645-6300
Fax.	031-645-6401

1.2 Test Facilities

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Korea	National Radio Research Agency (Designation No. KR0032)
	KOLAS (Testing No. KT197)

2. Information of the EUT

Model Name	SM-G990U2
Additional Model Name	SM-G990U3/DS
Equipment Type	Mobile Phone
FCC ID	A3LSMG990U2
Application Type	Certification
Applicant	SAMSUNG Electronics Co., Ltd.

2.1 Device Under Test Description

5G mmWave NR Device Overview

Item.			Description		
Frequency Range		NR Band n261	27500 ㎒ - 28350 ㎒		
		NR Band n260	37000 ㎒ - 40000 ㎒		
Channel Bandwidths		NR Band n261	50 ㎒, 100 ㎒		
		NR Band n260	50 ㎒, 100 ㎒		
Ch. No.& Freq.(㎒)		**Low**	**Mid**	**High**	
NR Band n261	50 ㎒	27525.00 (2071249)	27924.96 (2077915)	28324.92 (2084581)	
	100 ㎒	27550.08 (2071667)	27924.96 (2077915)	28299.96 (2084165)	
NR Band n260	50 ㎒	37026.00 (2229599)	38499.96 (2254165)	39975.00 (2278749)	
	100 ㎒	37050.00 (2229999)	38499.96 (2254165)	39949.92 (2278331)	
Subcarrier Spacing (kHz)			120		
Total Number of Supported Uplink CCs (SISO)			1CC, 2CC		
Total Number of Supported Uplink CCs (MIMO)			1CC, 2CC		
Modulations Supported in UL			DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM CP-OFDM: QPSK, 16QAM, 64QAM		
LTE Anchor Bands (n260)			LTE Band 2/5/12/13/14/30/48/66		
LTE Anchor Bands (n261)			LTE Band 2/5/12/13/48/66		
Duplex Type (mmWave)			TDD		
Device Serial Numbers			VD10475M The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.		

2.2 Time-Averaging Algorithm for RF Exposure Compliance

The equipment under test (EUT) contains:
This equipment contains the Qualcomm modem supporting 2G/3G/4G technologies and supporting mmW 5G NR bands. Both of these modems are enabled with Qualcomm SmartTransmit feature to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is in compliance with the FCC requirement.

Refer to Compliance Summary document for detailed of Qualcomm® Smart Transmit feature(Part 2)

Note that WLAN operations are not enabled with Smart Transmit.

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target or PD_design_target, below the predefined time-averaged power limit (i.e., Plimit for sub-6 radio, and input.power.limit for 5G mmW NR), for each characterized technology and band.
Smart Transmit allows the device to transmit at higher power instantaneously when needed, but manages power limiting to maintain time-averaged transmit power to *input.power.limit* listed in Tables 5-1 to 5-4

The purpose of this report (Part 1 test) is to demonstrate that the EUT meets FCC PD limits when transmitting instatic tra nsmission scenario at maximum allowable time-averaged power level given by *input.power.limit.*

2.3 Test Regulations

November 2017, October 2018, April 2019, November 2019 TCBC Workshop Notes
SPEAG DASY6 System Handbook (September 2019)
IEC TR 63170:2018
FCC KDB 865664 D02 v01r02
FCC KDB 447498 D01 v06

2.4 DUT Antenna Locations

The device has 2 patch antenna arrays (K Patch, L Patch) . Tablebelow indicates the surfaces evaluated for part 1 near field power density evaluation.

5G mmWave NR Device Surfaces

Band	Antenna	Rear(S2)	Front(S1)	Left(S3)	Right(S4)	Top(S5)	Bottom(S6)
5G NR Band n261	K Patch	Yes	Yes	No	Yes	No	No
	L Patch	Yes	Yes	Yes	No	Yes	No
5G NR Band n260	K Patch	Yes	Yes	No	Yes	No	No
	L Patch	Yes	Yes	Yes	No	Yes	No

Note:
1. All test configurations are based on front position view.
2. Additional surfaces were evaluated for simultaneous transmission analysis.

2.5 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.
This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

5G mmWave NR Simultaneous Transmission Scenarios				
Applicable Combination	**Head**	**Body-Worn**	**Wireless Router**	**Phablet**
LTE + 5G NR	Yes	Yes	N/A	Yes
LTE + 2.4 GHz WI-FI + 5G NR	Yes	Yes	Yes	Yes
LTE + 5 GHz WI-FI + 5G NR	Yes	Yes	Yes	Yes
LTE + 2.4 GHz Bluetooth + 5G NR	Yes^	Yes	Yes^	Yes^
LTE + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO + 5G NR	Yes^	Yes	Yes^	Yes^
LTE + 2.4 GHz WI-FI MIMO + 5G NR	Yes	Yes	Yes	Yes
LTE + 2.4 GHz WI-FI + 5 GHz WI-FI MIMO + 5G NR	Yes	Yes	Yes	Yes
LTE + 5 GHz WI-FI MIMO + 5G NR	Yes	Yes	Yes	Yes
LTE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO + 5G NR	Yes	Yes	Yes	Yes

Note:

1. 5G NR Operations are limited to Non-Standalone (EN-DC) operations only.
2. NR antenna arrays cannot transmit simultaneously.
3. Simultaneous 5G NR FR2 + LTE operations are possible only with LTE 2/5/12/13/48/66 for n261 and LTE 2/5/12/13/14/30/48/66 for n260
4. All non-5G NR licensed modes share the same antenna path and cannot transmit simultaneously.
5. 5G NR bands cannot transmit simultaneously.
6. This device supports time averaging smart transmit algorithm in WWAN. Smart transmit adds directly the time-averaged RF exposure from 4G and time-averaged RF exposure from 5G mmW NR to ensure that the normalized RF exposure from both 4G and 5G mmW NR does not exceed FCC limit.
7. ^ Bluetooth Tethering is considered

3. Description of test equipment

3.1 MEASUREMENT SETUP

Peak spatially averaged power density (psPD) measurements for mmWave frequencies were performed using the DASY6 with cDASY6 5G module.
The DASY6 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich,Switzerland and consists of a high precisi on robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the 5G phantom. The robot is a six-axis industrial robot, performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF)

3.2 SPEAG EUmmWV3 Probe / E-Field 5G Probe

The EUmmWV3 probe consists of two dipoles optimally arranged to obtain pseudo-vector information.

Frequency Range	750 MHz – 110 GHz
Dynamic Range	< 20 V/m – 10,000 V/m with PRE-10 (min < 50 V/m – 3,000 V/m)
Position Precision	< 0.2 mm (cDASY6)
Dimensions	Probe Overall Length: 320 mm Probe Body Diameter: 8 mm Probe Tip Length: 23 mm Probe Tip Diameter: Encapsulation 8 mm Distance from Probe Tip to Sensor X Calibration Point: 1.5 mm Distance from Probe Tip to Sensor Y Calibration Point: 1.5 mm
Applications	E-field measurements of 5G devices and other mm-wave transmitters operating above 10 GHz in < 2 mm distance from device (free-space) Power density, H-field and far-field analysis using total field reconstruction
Compatibility	cDASY6 + 5G-Module SW2.0.2.34

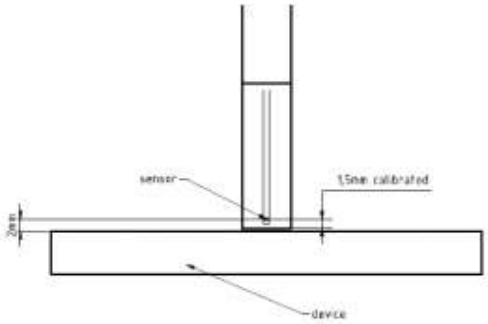


Figure 1. **EUmmWV3 Probe**

3.3 Peak Spatially Averaged Power Density Assessment Based on E-fieldMeasurements

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 E-field 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 λ/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 λ/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. A circular shape was used.

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

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.

3.4 Reconstruction Algorithm

Computation of the power density in general requires measurement information from the both E-field and H-field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible according to the manufacturer, as they are determined via Maxwell's equations. As such, the SPEAG reconstruction approach was based on the Gerchberg-Saxton algorithm, which benefits from the availability of the E-field polarization ellipse information obtained with the EUmmWV3 probe.

4. RF Exposure Limits

Per §1.1310 (d)(3), the MPE limits are applied for frequencies above 6 GHz. Power Density is expressed in unitsof W/m^2 or mW/cm^2.
Peak Spatially Averaged Power Density was evaluated over a circular area of 4 cm^2 per interim FCC Guidance
For near-field power density evaluations per October 2018 TCB Workshop notes.

HUMAN EXPOSURE	Limits For Occupational / Controlled Environments	Limits For General Population / Uncontrolled Environments
Frequency Range[MHz]	1,500 – 100,000	1,500 – 100,000
Power Density[mW/㎠]	5.0	1.0
Average Time[Minutes]	6	30

NOTES: 1.0 $mW/cm^2$is 10 W/m^2

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 mad 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.

5. Input Power Specifications

All power density measurements for this device were performed at the input.power.limit given in below tables.

Table 5-1 5G NR n261 K Patch input.power.limit

Antenna	Beam ID_1	Beam ID_2	Input.power.limit (dBm)
K Patch	0		**10.4**
	2		**8.7**
	4		**9.3**
	5		**7.0**
	6		**6.0**
	7		**8.0**
	8		**6.2**
	13		**5.8**
	14		**6.3**
	15		**7.2**
	19		**2.7**
	20		**2.0**
	21		**3.2**
	22		**3.6**
	23		**2.8**
	29		**2.5**
	30		**2.6**
	31		**4.3**
	32		**2.9**
	128		**7.7**
	130		**8.1**
	132		**9.2**
	133		**4.9**
	134		**5.0**
	135		**6.3**
	136		**7.8**
	141		**4.2**
	142		**5.1**
	143		**5.9**
	147		**0.8**
	148		**1.7**
	149		**1.0**
	150		**0.9**
	151		**4.2**
	157		**0.9**
	158		**1.3**
	159		**0.4**
	160		**2.1**
	0	128	**5.5**
	2	130	**5.1**
	4	132	**6.0**
	5	133	**2.4**
	6	134	**1.8**
	7	135	**4.8**
	8	136	**3.9**
	13	141	**1.6**
	14	142	**2.1**
	15	143	**3.0**
	19	147	**-2.0**
	20	148	**-1.4**
	21	149	**-1.5**
	22	150	**-1.7**
	23	151	**-0.5**
	29	157	**-1.8**
	30	158	**-1.5**
	31	159	**-1.5**
	32	160	**-1.4**

Table 5-2 5G NR n261 L Patch input.power.limit

Antenna	Beam ID_1	Beam ID_2	Input.power.limit (dBm)
L Patch	1		**8.6**
	3		**8.4**
	9		**5.5**
	10		**6.8**
	11		**6.3**
	12		**7.3**
	16		**5.3**
	17		**6.6**
	18		**5.8**
	24		**3.7**
	25		**2.5**
	26		**2.6**
	27		**2.5**
	28		**3.4**
	33		**2.9**
	34		**2.6**
	35		**2.7**
	36		**2.9**
	129		**7.8**
	131		**8.5**
	137		**5.5**
	138		**4.4**
	139		**4.2**
	140		**5.5**
	144		**3.9**
	145		**4.1**
	146		**4.4**
	152		**0.8**
	153		**0.5**
	154		**1.4**
	155		**0.7**
	156		**0.7**
	161		**0.4**
	162		**1.3**
	163		**1.1**
	164		**0.4**
	1	129	**4.0**
	3	131	**5.1**
	9	137	**2.4**
	10	138	**1.8**
	11	139	**1.8**
	12	140	**3.5**
	16	144	**1.2**
	17	145	**1.4**
	18	146	**1.4**
	24	152	**-2.0**
	25	153	**-1.8**
	26	154	**-1.8**
	27	155	**-2.1**
	28	156	**-2.2**
	33	161	**-2.1**
	34	162	**-1.7**
	35	163	**-1.9**
	36	164	**-2.3**

Table 5-3 5G NR n260 K Patch input.power.limit

Antenna	Beam ID_1	Beam ID_2	Input.power.limit (dBm)
K Patch	0		10.1
	2		9.1
	4		7.9
	6		9.0
	7		5.5
	8		5.8
	9		5.6
	10		5.5
	15		5.4
	16		6.6
	17		5.5
	21		2.8
	22		2.5
	23		2.8
	24		2.7
	25		3.1
	31		3.0
	32		2.3
	33		3.1
	34		2.6
	128		7.5
	130		8.1
	132		8.0
	134		9.6
	135		4.7
	136		5.5
	137		5.1
	138		4.7
	143		6.1
	144		5.5
	145		4.7
	149		1.8
	150		3.9
	151		1.9
	152		2.4
	153		1.6
	159		2.4
	160		2.9
	161		2.0
	162		2.0
	0	128	5.3
	2	130	5.3
	4	132	4.6
	6	134	5.9
	7	135	2.2
	8	136	3.3
	9	137	1.9
	10	138	1.8
	15	143	2.0
	16	144	3.5
	17	145	2.1
	21	149	-0.9
	22	150	-0.8
	23	151	-1.2
	24	152	-1.0
	25	153	-1.1
	31	159	-0.6
	32	160	-1.1
	33	161	-1.0
	34	162	-1.5

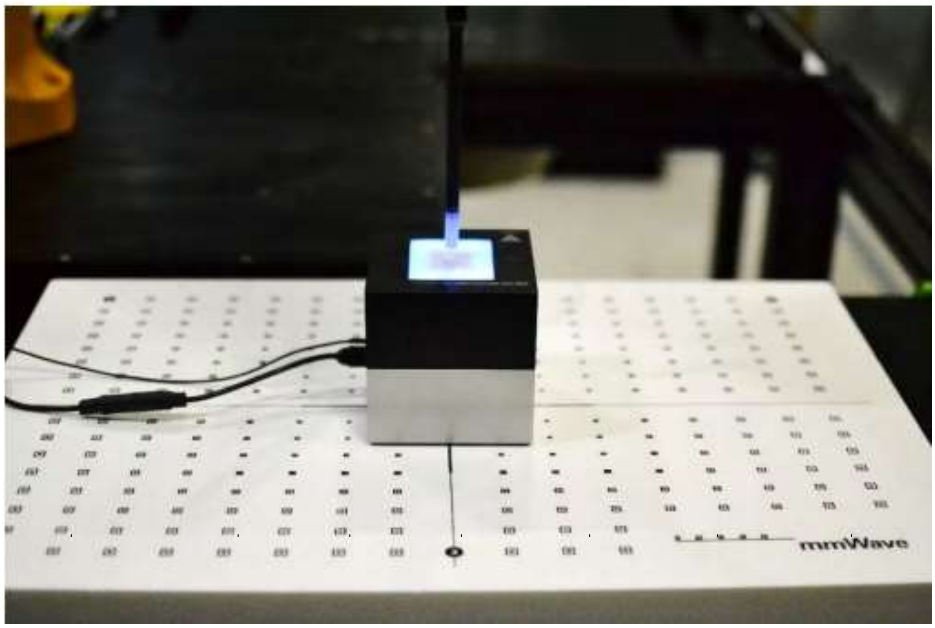
Table 5-4 5G NR n260 L Patch input.power.limit

Antenna	Beam ID_1	Beam ID_2	Input.power.limit (dBm)
L Patch	1		10.2
	3		8.8
	5		8.6
	11		6.7
	12		6.9
	13		6.5
	14		5.2
	18		6.6
	19		7.2
	20		5.4
	26		3.1
	27		2.5
	28		4.3
	29		3.5
	30		3.5
	35		2.9
	36		3.6
	37		5.2
	38		3.5
	129		7.9
	131		8.4
	133		9.3
	139		6.1
	140		5.1
	141		6.8
	142		6.4
	146		4.7
	147		5.5
	148		5.1
	154		2.6
	155		2.6
	156		2.9
	157		3.4
	158		2.9
	163		2.4
	164		2.8
	165		2.6
	166		3.3
	1	129	4.9
	3	131	5.1
	5	133	4.6
	11	135	3.3
	12	140	2.8
	13	141	3.0
	14	142	2.2
	18	143	2.8
	19	147	2.9
	20	148	2.0
	26	149	-0.7
	27	155	-0.9
	28	156	-0.3
	29	157	-0.6
	30	158	-0.9
	35	159	-0.7
	36	164	-0.7
	37	165	0.0
	38	166	-0.7

6. System Verification

The system was verified to be within ±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.



System Verification Setup Photo

6.1 System Check Results

System Verification									
Freq. (GHz)	Date	Source S/N	Probe SN	Normal psPD (W/m² over 4 cm²)		Deviation (dB)	Total psPD (W/m² over 4 cm²)		Deviation (dB)
				measured	target		measured	target	
30	04/06/2022	1011	9465	13.5	14.5	-0.31	13.6	14.6	-0.31
30	04/08/2022	1011	9465	13.5	14.5	-0.31	13.6	14.6	-0.31
30	04/12/2022	1011	9465	13.3	14.5	-0.38	13.5	14.6	-0.34
30	04/13/2022	1011	9465	13.5	14.5	-0.31	13.7	14.6	-0.28
30	04/15/2022	1011	9465	13.6	14.5	-0.28	13.7	14.6	-0.28
30	04/18/2022	1011	9465	13.2	14.5	-0.41	13.4	14.6	-0.37

Note: A **10 mm distance spacing** was used from the reference horn antenna aperture to the probe element. This includes 4.45 mm from the reference antenna horn aperture to the surface of the verification source plus5.55 mm from the surface to the probe. The SPEAG software requires a setting of "5.55 mm" for the correct setup.

7. Power Density Data Summary

7.1 Power Density Results

Power density measurements were performed with DUT transmitting at input.power.limit for one single beam for each polarization (H&V) and one beam pair, for each antenna on each worst surfaces

NR Band n261												
Frequency		Ant.	Beam ID1	Beam ID2	Input.power	Ant	Test Position	Distance	Power Drift	Normal psPD	Total psPD	Plot No.
MHz	Ch.		V	H	(dBm)			(mm)	dB	(mW/cm²)	(mW/cm²)	
28299.96	2084165	K Patch	20	-	2.0	SISO	Back(S2)	2	-0.03	0.221	0.227	-
28299.96	2084165		20	-	2.0	SISO	Front(S1)	2	0.01	0.302	0.313	-
28299.96	2084165		20	-	2.0	SISO	Right(S4)	2	0.04	0.554	0.572	-
27550.08	2071667		-	159	0.4	SISO	Back(S2)	2	-0.11	0.283	0.353	-
27924.95	2077915		-	159	0.4	SISO	Front(S1)	2	-0.02	0.139	0.218	-
27550.08	2071667		-	159	0.4	SISO	Right(S4)	2	-0.14	0.344	0.432	-
27550.08	2071667		19	147	-2.0	MIMO	Back(S2)	2	-0.11	0.349	0.395	-
27924.95	2077915		31	159	-1.5	MIMO	Front(S1)	2	0.06	0.144	0.207	-
27550.08	2071667		19	147	-2.0	MIMO	Right(S4)	2	0.19	0.476	**0.620**	1
28299.96	2084165	L Patch	36	-	2.9	SISO	Back(S2)	2	0.01	0.211	0.218	-
28299.96	2084165		25	-	2.5	SISO	Front(S1)	2	-0.05	0.223	0.233	-
28299.96	2084165		27	-	2.5	SISO	Left(S3)	2	-0.15	0.363	**0.415**	2
27550.08	2071667		-	164	0.4	SISO	Back(S2)	2	0.12	0.169	0.225	-
27924.95	2077915		-	164	0.4	SISO	Front(S1)	2	0.10	0.204	0.258	-
27550.08	2071667		-	164	0.4	SISO	Left(S3)	2	-0.17	0.298	0.379	-
27550.08	2071667		36	164	-2.3	MIMO	Back(S2)	2	-0.09	0.034	0.0528	-
27924.95	2077915		36	164	-2.3	MIMO	Front(S1)	2	0.07	0.143	0.175	-
27550.08	2071667		36	164	-2.3	MIMO	Left(S3)	2	-0.09	0.300	0.377	-
47 CFR §1.1310 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/ General Population							Power Density 1 mW/cm² Averaged over 4 cm²					

NR Band n260												
Frequency		Mode/ Ant.	Beam ID1	Beam ID2	Input power	Ant	Test Position	Distance	Power Drift	Normal psPD	Total psPD	Plot No.
MHz	Ch.		V	H	(dBm)			(mm)	dB	(mW/cm²)	(mW/cm²)	
37050.00	2229999	K Patch	32	-	2.3	SISO	Back(S2)	2	0.02	0.0953	0.134	-
38499.96	2254165		34	-	2.6	SISO	Front(S1)	2	0.06	0.106	0.183	-
37050.00	2229999		32	-	2.3	SISO	Right(S4)	2	-0.08	0.385	**0.452**	3
37050.00	2229999		-	162	2.0	SISO	Back(S2)	2	0.11	0.203	0.205	-
38499.96	2254165		-	153	1.6	SISO	Front(S1)	2	-0.01	0.280	0.292	-
38499.96	2254165		-	153	1.6	SISO	Right(S4)	2	0.14	0.182	0.360	-
37050.00	2229999		34	162	-1.5	MIMO	Back(S2)	2	0.13	0.115	0.140	-
38499.96	2254165		25	153	-1.1	MIMO	Front(S1)	2	-0.16	0.0873	0.117	-
37050.00	2229999		34	162	-1.5	MIMO	Right(S4)	2	0.03	0.305	0.346	-
38499.96	2254165	L Patch	36	-	3.6	SISO	Back(S2)	2	-0.00	0.0805	0.112	-
37050.00	2229999		27	-	2.5	SISO	Front(S1)	2	-0.16	0.132	0.237	-
37050.00	2229999		27	-	2.5	SISO	Left(S3)	2	0.00	0.414	0.465	-
38499.96	2254165		-	156	2.9	SISO	Back(S2)	2	0.08	0.167	0.185	-
38499.96	2254165		-	163	2.4	SISO	Front(S1)	2	-0.15	0.187	0.199	-
38499.96	2254165		-	163	2.4	SISO	Left(S3)	2	-0.08	0.261	0.322	-
37050.00	2229999		27	155	-0.9	MIMO	Back(S2)	2	-0.03	0.255	0.298	-
37050.00	2229999		27	155	-0.9	MIMO	Front(S1)	2	-0.09	0.116	0.147	-
39949.92	2278331		30	158	-0.9	MIMO	Left(S3)	2	0.18	0.459	**0.560**	4
47 CFR §1.1310 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/ General Population							Power Density 1 mW/cm² Averaged over 4 cm²					

5G mmWaveNR Band n261 Additional Surface											
Frequency		Mode/ Ant.	Beam ID1	Beam ID2	Input power	Ant	Test Position	Distance	Normal psPD	Total psPD	Plot No.
MHz	Ch.		V	H	**(dBm)**			(mm)	**(mW/cm²)**	**(mW/cm²)**	
27924.96	2077915	L Patch	27	155	-2.1	SISO	Back(S2)	10	0.0485	0.0531	-
28299.96	2084165		-	154	1.4	MIMO	Left(S3)	10	0.274	0.295	-
27924.96	2077915		24	152	-2.0	MIMO	Top(S5)	2	0.0276	0.0329	-
47 CFR §1.1310 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/ General Population							Power Density 1 mW/cm² Averaged over 4 cm²				

5G mmWaveNR Band n260 Additional Surface											
Frequency		Mode/ Ant.	Beam ID1	Beam ID2	Input power	Ant	Test Position	Distance	Normal psPD	Total psPD	Plot No.
MHz	Ch.		V	H	**(dBm)**			(mm)	**(mW/cm²)**	**(mW/cm²)**	
38499.96	2254165	L Patch	-	133	9.3	SISO	Back(S2)	10	0.128	0.137	-
37050.00	2229999		36	164	-0.7	MIMO	Left(S3)	10	0.307	0.322	-
38499.96	2254165		35	163	-0.7	MIMO	Top(S5)	2	0.0254	0.0280	-
47 CFR §1.1310 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/ General Population							Power Density 1 mW/cm² Averaged over 4 cm²				

7.2 Power density Test Notes

General Notes:

1. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
2. Batteries are fully charged at the beginning of the measurements. The DUT was connected to a wall charger for some measurements due to the test duration. It was confirmed that the charger plugged into this DUT did not impact the near-field PD test results.
3. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4. Please see Section 3.3 for more details of the evaluation process.
4. DUT was configured to transmit with a manufacturer provided test software to control specific antenna(s), Beam ID(s), and signal type to ensure the test configurations constant for the entire evaluation.
5. This device utilizes power reduction for some WLAN wireless modes and technologies for simultaneous transmission compliance. These mechanisms are assessed in the Part 1 SAR Test Report.
6. Per FCC TCBC Workshop Notes Apr.2020, When the device is using the Qualcomm-based method already approved by FCC there is no need to submit a pre-submission (pre-TCB) KDB to have the test plan approved
7. PD_design_target of 0.6166 mW/cm^2 was used with mmW device design related uncertainty of 2.1 dB.
8. Input.power.limit parameter for 5G mmW NR radio was calculated in Part 0 Power Density Char. Report.
9. This device is enabled with Qualcomm® Smart Transmit feature to control and manage transmitting power in real time and to ensure that the time-averaged RF exposure from WWAN is in compliance with FCC requirements. Per FCC guidance for devices enabled with Qualcomm® Smart Transmit feature, 4G LTE and 5G mmW NR simultaneous transmission scenario does not need to be evaluated under Total Exposure Ratio (TER). The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report
10. Per FCC guidance for devices enabled with Qualcomm® Smart Transmit feature, simultaneous transmission analysis is evaluated by combining the exposure from each WWAN and WLAN antenna. 5G mmW NR and WLAN simultaneous transmission scenario is evaluated under the Total Exposure Ratio (TER) in Section 8.
11. The Beam ID with one of the highest initial simulated power density for that surface and distance was selected for Part 1 Power Density measurements.
12. The device was configured to transmit CW wave signal for testing. Per FCC guidance for devices enabled with Qualcomm® Smart Transmit feature, additional testing was not required for different modulations (CP-OFDM QPSK, CP-OFDM 16QAM, CP-OFDM 64QAM, DFT-S-OFDM:PI/2BPSK,DFT-s-OFDMQPSK, DFT-s-OFDM 16QAM, DFT-s-OFDM 64QAM), RB configurations, component carriers, channel configurations (low channel, mid channel, high channel) since the smart transmit algorithm monitors powers on a per symbol basis, whichis independent of these signal characteristics.
13. The device was configured to MIMO configuration with H and V polarization beams transmitting together, as indicated in Section 7.1.
14. In some cases, the simulation vs. measurement for some surfaces can exceed the device's total uncertainty. Therefore, some additional tests were performed to support simultaneous transmission analysis. See Section 8.

8. The Total Exposure Ratio

The Total Exposure Ratio (TER) is calculated by combining all SAR measurements and power density measurements after normalizing to their respective limits. The general expression is below.

$$TER = \sum_{a=1}^{A} \frac{SAR_a}{SAR_a, limit} + \sum_{b=1}^{B} \frac{SAPD_b}{SAPD_b, limit} < 1$$

The TER shall be less than unity to ensure compliance with the limits.

$$\sum_{n=1}^{N} \frac{4G\ SAR_n}{4G\ SAR_n, limit} + \sum_{m=1}^{M} \frac{5G\ mmW\ NR\ SAPD_m}{5G\ mmW\ NR\ SAPD_m, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

Qualcomm® Smart Transmit algorithm for WWAN adds directly the time-averaged RF exposure from 4G and time-averaged RFexposure from 5G mmW NR. Smart Transmit algorithm controls the total RF exposure from both 4G and 5G mmW NR to not exceed FCC limit. Therefore, per FCC guidance, TER does not need to be evaluated directly for the 4G and 5G simultaneous compliance via summation. The following equations are derived in this section.. The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report

$$\sum_{n=1}^{N} \frac{4G\ SAR_n}{4G\ SAR_n, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

$$\sum_{m=1}^{M} \frac{5G\ mmW\ NR\ SAPD_m}{5G\ mmW\ NR\ SAPD_m, limit} + \sum_{p=1}^{P} \frac{WLAN\ SAR_p}{WLAN\ SAR_p, limit} < 1$$

For 5G mmW NR, since there is total design-related uncertainty arising from TxAGC and device-to-device variation, the worst-case RF exposure should be determined by accounting for this device uncertainty of 2.1 dB.
Due to the application of smart transmit EFS version 16 , it can provide maximum PD exposure up to 89%. For more information, please refer to the simulation report.

Reported_psPD = 89% x PD_Design_Target + 2.1dB = 0.89 mW/cm²

Note that since not all the beams supported by this EUT are measured, *reported_PSPD* cannot be computed based on limited *measured PSPD* data. Alternatively, since *measured PSPD* for all the beams will be ≤ *PD_design_target* + 2.1dB uncertainty, *reported_PSPD* is computed based on this worst-case PSPD as shown above.

The compliance analysis for simultaneous transmission scenarios of WWAN (4G LTE & 5G mmW NR) with Smart Transmit and 4G & WLAN can be found in two reports indicated in the table below. This section demonstrates compliance for the 5G + WLAN scenarios.

Simultaneous Transmission Scenarios	**Evaluation Report**
4G LTE WWAN + WLAN	Part 1 SAR Test Report
4G LTE WWAN + 5G mmW NR WWAN	Part2 RF Exposure Report

Note that the above *reported PSPD* applies to the worst-surface of the DUT at 2mm evaluation distance. For this DUT, the worst-surface(s) are listed in section 2.4

Worst-case PD on other surfaces of the DUT are calculated from simulated PD data (see Section 3.1 of Power Density Simulation Report Revision A) by multiplying reported PSPD with the highest proportion out of all beams and out of all three channels in each band, where the adjustment foreach beam/channel is computed as the proportion of “simulated PD on desired surface” to “simulated PD onworst-surface”. For example, to determine worst-case PD on front surface (needed for Head RF Exposureevaluation during simultaneous transmission), highest proportion of (simulated PD on front surface)/(simulated PDon worst surface) was determined out of all supported beams and out of all three channels by the DUT in eachband.

Similarly, worst-case PD at other evaluation distances from the DUT are calculated from simulated PD data (see Section 3.1 of Power Density Simulation Report Revision A), bymultiplying reported psPD with the highest proportion out of all beams and out of all three channels in each band.
The adjustment factor for each beam/channel is computed as proportion of “simulated PD on surface at desired evaluation distance” to “simulated PD on worst-surface at 2mm evaluation distance”. For example, to determine worst-case PD at 10mm evaluation distance for Rear(S2)side (needed for Hotspot RF Exposure evaluation during simultaneous transmission), highest proportion of (simulated PD on back side at 10mm)/(simulated PD on worst-surface at 2mm) was determined out of all supported beams and out of all three channels by the DUT in each band.
If K patch antennas are considered except for L patch antennas, psPD can be determined as follows.

In some cases, the simulation vs measurement for some surfaces can exceed the device's total uncertainty. Inthose cases, if the measured psPD > simulated adjusted psPD (assuming a linear congruency of the psPD across surfaces), then 70.8% of the measured value (based on the 1.5 dB Powerback-off power margin) should be used towards
the simultaneous TX analysis. Below Table lists the relevant worst-case reported psPD values based on the additional surfaces and evaluation distances needed to perform the TER analysis. The highest of the adjusted Reported_psPD and Measured Total psPD* 0.708 was chosen for TER analysis and the chosen values are indicated by bolded psPD values.

Simultaneous Transmission Summation Scenario with 5G mmW NR psPD							
NR Band	Antenna	Surface	Evaluation Distance	Adjustment Factor due to Simulation	adjusted Reported_psPD (mW/cm2)	Measured Total psPD (mW/cm2)	Reported Total psPD (mW/cm2)
n261 /n260	L	Rear	2 mm	1	0.708	0.298	0.708
	L	Front	2 mm	0.73	0.517	0.258	0.517
	L	Left	2 mm	1	0.708	0.560	0.708
	L	Right	2 mm	0.000	0.000	-	0.000
	L	Top	2 mm	0.193	0.137	0.0329	0.137
	L	Left	10 mm	0.716	0.507	0.322	0.507
	L	Left	15 mm *	0.716	0.507	0.322	0.507
	L	Rear	10 mm	0.38	0.269	0.137	0.269
	L	Rear	15 mm *	0.38	0.269	0.137	0.269
n261 /n260	K	Back	2 mm	1	0.891	0.395	0.891
	K	Front	2 mm	0.842	0.750	0.313	0.750
	K	Left	2 mm	0.000	0.000	-	0.000
	K	Right	2 mm	1	0.891	0.620	0.891
	K	Top	2 mm	0.065	0.058	-	0.058
	K	Left	10 mm	0.742	0.661	-	0.661
	K	Left	15 mm *	0.742	0.661	-	0.661
	K	Back	10 mm	0.320	0.285	-	0.285
	K	Back	15 mm *	0.320	0.285	-	0.285

*Value at 10mm/15mm is used for conservative evaluation.

1) Total Exposure Ratio for Module L

Table 8-1
5G mmwave NR Head Total Exposure Ratio

TER for Head		psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	2.4 GHz WLAN RSDB MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
		mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg
		1	2	3	4	5	6	7
Applicable Limit		1	1.6	1.6	1.6	1.6	1.6	1.6
Front	psPD	0.517	0.331	0.366	0.538	0.456	0.410	0.307
	Ratio to Limit	0.517	0.207	0.229	0.336	0.285	0.256	0.192

	psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
	1+2	1+3	1+4	1 + 5	1 + 6	1+2+7	1+3+7	1+5+7	1+6+7
	1	1	1	1	1	1	1	1	1
Front									
	0.724	0.746	0.853	0.773	0.709	0.916	0.938	**0.994**	0.965

Table 8-2
5G mmwave NR Body worn Total Exposure Ratio

Rear	psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
	mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
	1	2	3	4	5	6
Applicable Limit	1	1.6	1.6	1.6	1.6	1.6
psPD	0.269	0.056	0.026	0.074	0.063	0.014
Ratio to Limit	0.269	0.035	0.016	0.046	0.039	0.009

psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
1+2	1+3	1+4	1 + 5	1 + 6	1+2+6	1+3+6	1+4+6	1+5+6
1	1	1	1	1	1	1	1	1
0.304	0.285	0.315	0.308	0.278	0.313	0.294	0.324	0.317

Table 8-3
5G mmwave NR PhabletTotal Exposure Ratio

TER For Phablet Configuration		psPD	5 GHz WLAN MIMO Reported SAR	psPD + 5 GHz WLAN MIMO
		mW/cm²	W/kg	
		1	2	1 + 2
	Applicable Limit	1	4	1
Rear	psPD	0.708	0.138	
	Ratio to Limit	0.708	0.035	0.743
Front	psPD	0.517	0.140	
	Ratio to Limit	0.517	0.035	0.552
Left	psPD	0.708	0.266	
	Ratio to Limit	0.708	0.067	0.775
Top	psPD	0.137	0.063	
	Ratio to Limit	0.137	0.016	0.153

Table 8-4
5G mmwave NR Hotspot Total Exposure Ratio

TER for Hotspot		psPD	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth Reported SAR	5 GHz WLAN MIMO Reported SAR
		mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
		1	2	3	4	5	6
Applicable Limit		1	1.6	1.6	1.6	1.6	1.6
Rear Side at 10mm	psPD	0.708	0.125	0.044	0.146	0.115	0.081
	Ratio to Limit	0.708	0.078	0.028	0.091	0.072	0.051
Front Side at 10mm	psPD (2 mm)	0.517	0.103	0.059	0.106	0.067	0.043
	Ratio to Limit	0.517	0.064	0.037	0.066	0.042	0.027
Left Side at 10mm	psPD	0.708	0.007	0.103	0.136	0.003	0.060
	Ratio to Limit	0.708	0.004	0.064	0.085	0.002	0.038
Top Side at 10mm	psPD (2 mm)	0.137	0.220	0.019	0.385	0.171	0.002
	Ratio to Limit	0.137	0.138	0.012	0.241	0.107	0.001

psPD + 2.4 GHz WLAN Ant1	psPD + 2.4 GHz WLAN Ant2	psPD + 2.4 GHz WLAN MIMO	psPD + BT	psPD + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	psPD + BT + 5 GHz WLAN MIMO
1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 2 + 6	1 + 3 + 6	1 + 4 + 6	1 + 5 + 6
1	1	1	1	1	1	1	1	1
0.786	0.736	0.799	0.780	0.759	0.837	0.786	0.850	0.831
0.581	0.554	0.583	0.559	0.544	0.608	0.581	0.610	0.586
0.712	0.772	0.793	0.710	0.746	0.749	0.810	0.831	0.747
0.275	0.149	0.378	0.244	0.138	0.276	0.150	0.379	0.245

2) Total Exposure Ratio for module K

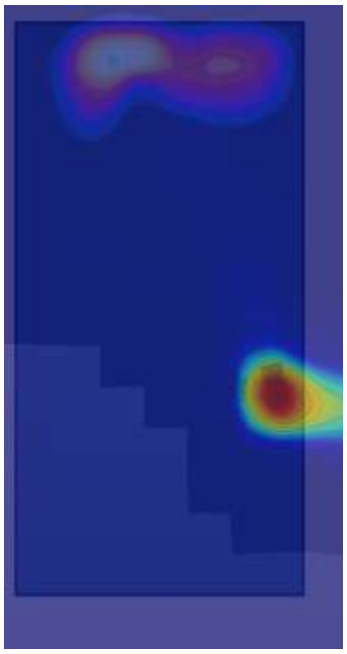
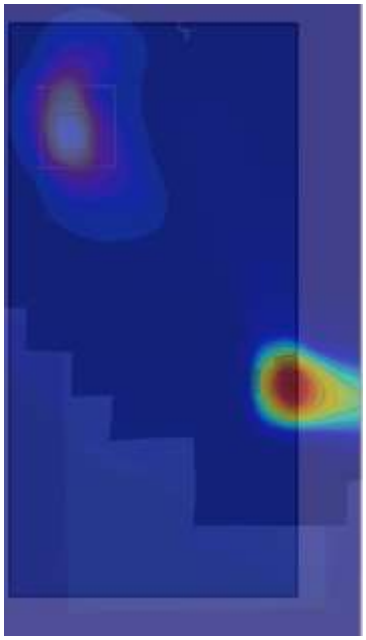
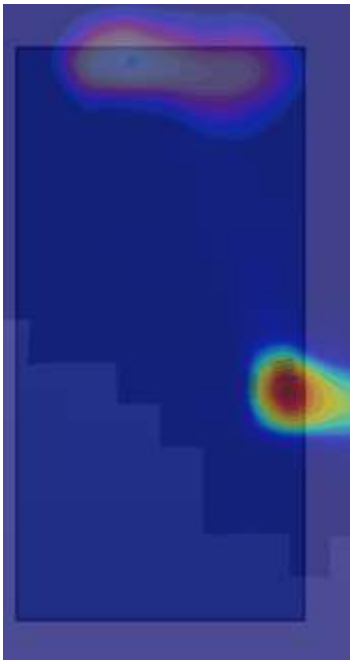
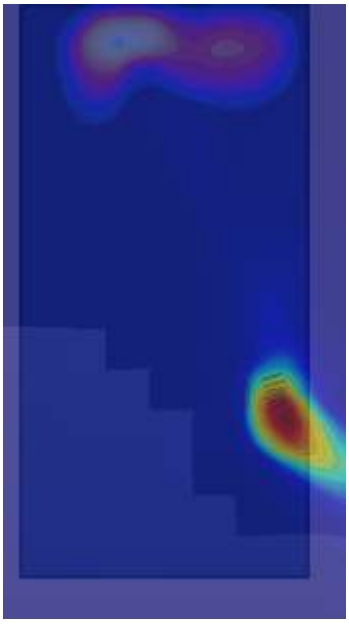
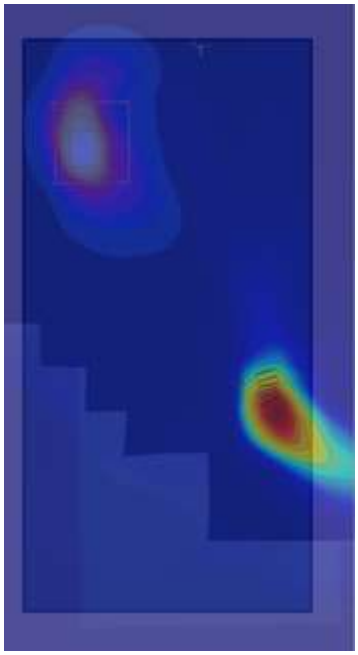
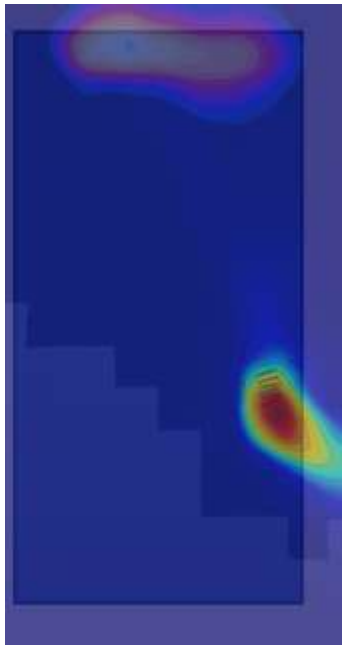
RF exposure compliance with 5G mmW NR WWAN+WLAN simultaneous transmission scenarios is demonstrated for various radio configurations below.

TER For K Antenna Module was excluded due to the spatial seperation of the antennas per FCC KDB 248227 Sec.6.1 and as described in 80-w2114-4 section G.1.3 In the below plots, it is demonstrated that the -10dB contours of the SAR distributions have no overlap with the simulated area for power density. It was confirmed that all beams for both n260 and n261 operations are fully contained within the simulated area. Appendix A of the simulation report includes plots for all beams. Additionally, the maximum TER contribution for power density for back and front side is 89% per the deserve power margin setting setting of 0.5 dB. The SAR contribution of TER for BT/WLAN Operations is < 0.9.

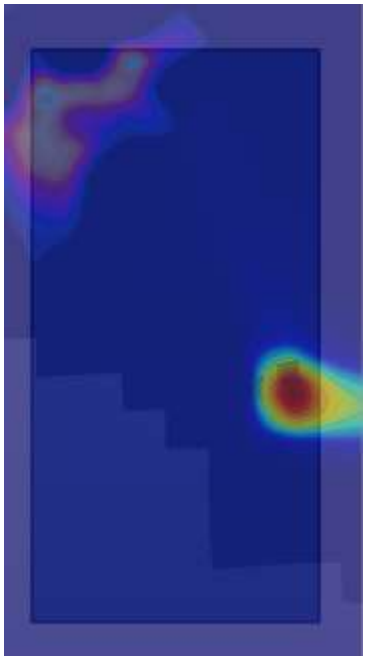
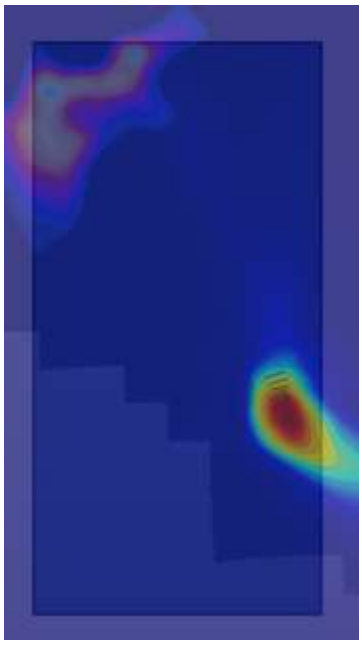
(*)The evaluation on the right side was excluded from the simultaneous transmission analysis with the mmWave module K because the WLAN antenna was located at the top left of the DUT and the Hotspot/Phablet SAR test was omitted..

1) TER at 4cm$_2$ PD hotspot = *reported* normalized 4cm2 PD + 10^$_{(-10dB/10)}$ **reported* normalized WiFi/BT SAR

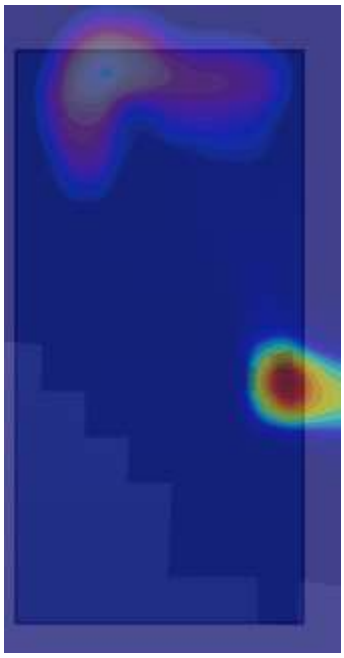
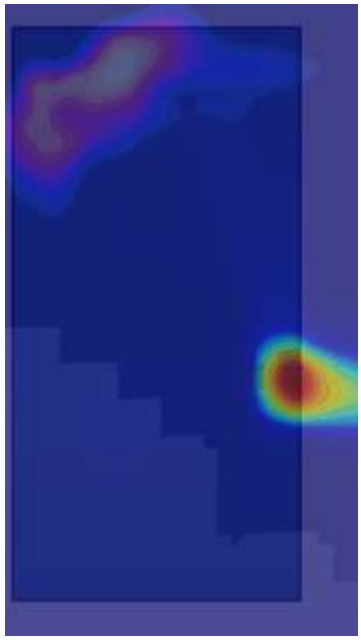
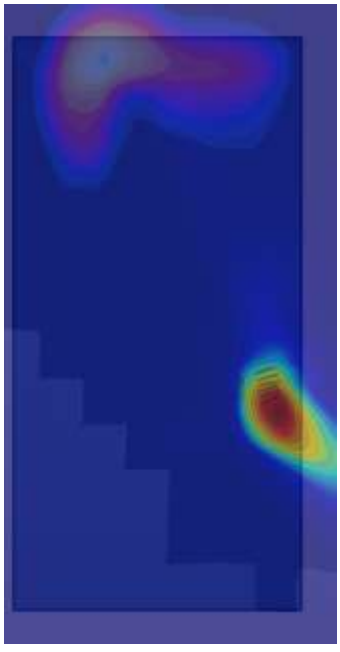
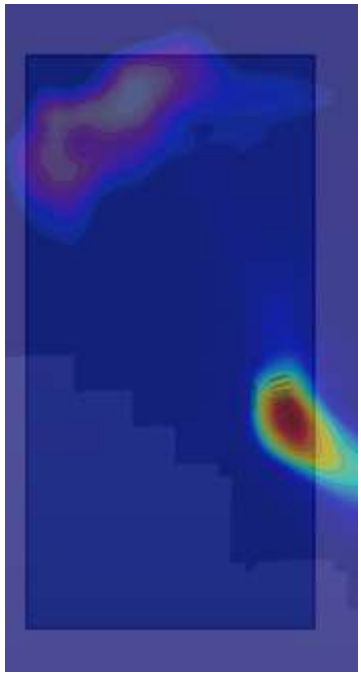
2). TER at WiFi/BT SAR hotspot = *reported* normalized WiFi/BT SAR + 10^$_{(-10dB/10)}$ * *reported* normalized 4cm2 PD

	2.4GHz Antenna 1	2.4GHz Antenna 2	2.4GHz MIMO
module K mmWave n261 (Beam ID20) +2.4GHz WLAN Front Side			
module K mmWave n260 (Beam ID153) +2.4GHz WLAN Front side			

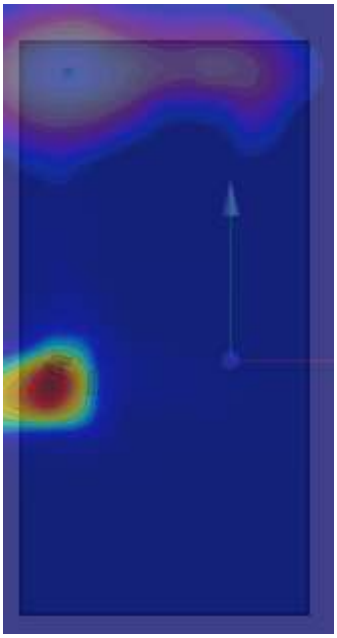
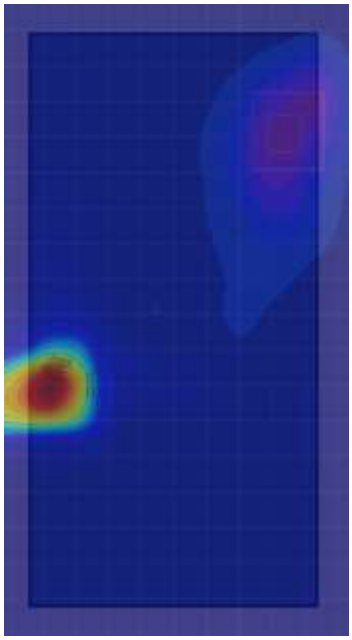
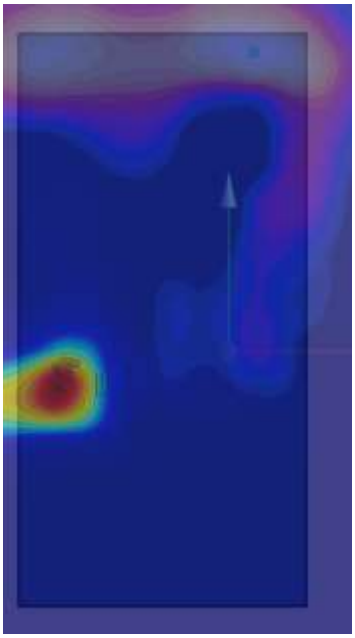
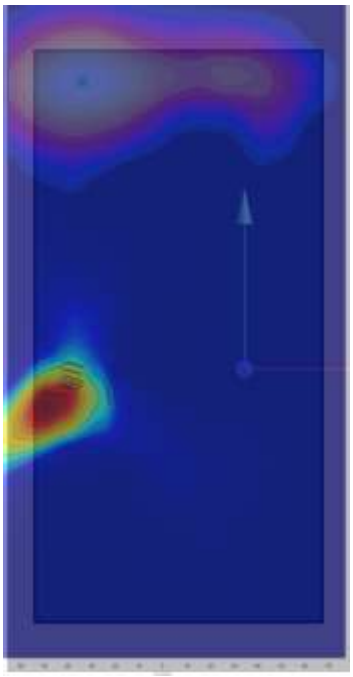
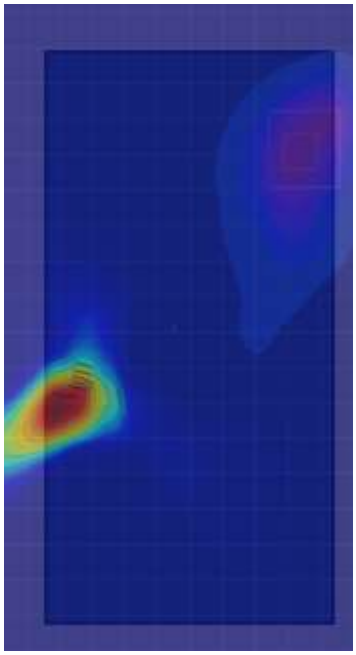
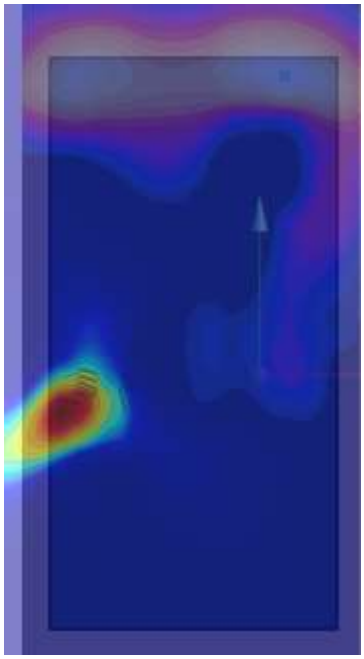
DUT Front side spatial separation of mmWave n261, n260 and 2.4GHz WLAN antennas (Head)

	5GHz MIMO
module K mmWave n261 (Beam ID20) +5GHz WLAN Front side	
module K mmWave n260 (Beam ID153) +5GHz WLAN Front side	

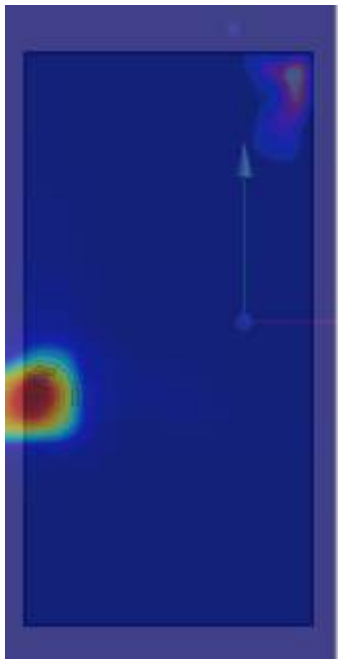
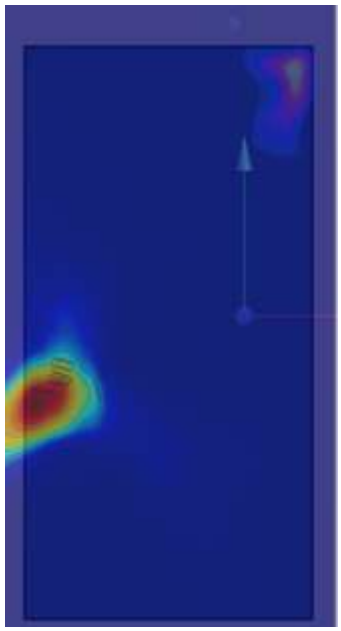
DUT Front side spatial separation of mmWave n261, n260 and 5GHz WLAN antennas (Head)

	Bluetooth		Bluetooth+ 5GHz MIMO
module K mmWave n261 (Beam ID20) + Bluetooth Front side		**module K mmWave n261 (Beam ID20) + Bluetooth +5GHz MIMO Front side**	
module K mmWave n260 (Beam ID153) + Bluetooth Front side		**module K mmWave n260 (Beam ID153) + Bluetooth +5GHz MIMO Front side**	

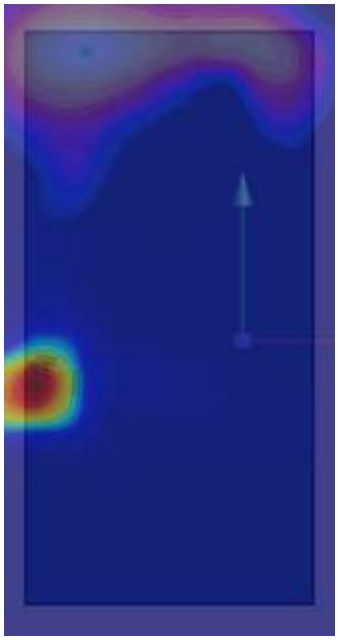
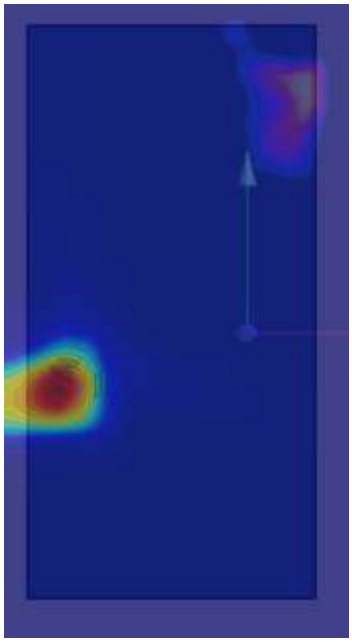
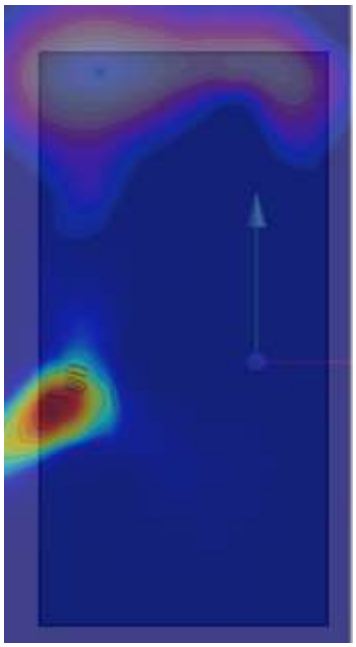
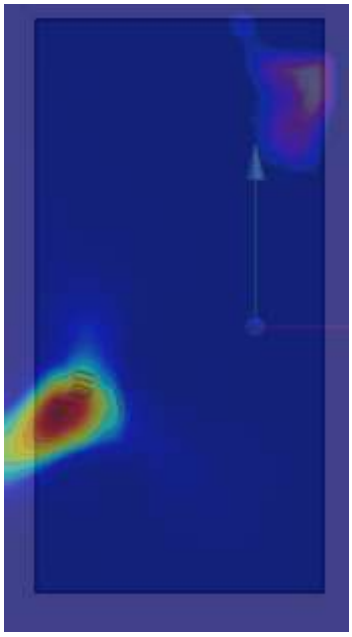
DUT Front side spatial separation of mmWave mmWave n261, n260 and **Bluetooth** antennas (Head)

	2.4GHz Antenna 1	2.4GHz Antenna 2	2.4GHz MIMO
module K mmWave n261 (Beam ID20) +2.4GHz Rear side			
module K mmWave n260 (Beam ID153) +2.4GHz Rear side			

DUT Back side spatial separation of mmWave n261, n260 and 2.4GHz WLAN antennas (Hotspot)

	5GHz MIMO
module K mmWave n261 (Beam ID20) +5GHz Rear side	
module K mmWave n260 (Beam ID153) +5GHz Rear side	

DUT Back side spatial separation of mmWave n261, n260 and 5GHz WLAN antennas (Hotspot)

	Bluetooth		Bluetooth+ 5GHz MIMO
module K mmWave n261 (Beam ID20) + Bluetooth Rear side		**module K mmWave n261 (Beam ID20) + Bluetooth +5GHzAntenna 1 + Antenna 2 Rear side**	
module K mmWave n260 (Beam ID153) + Bluetooth Rear side		**module K mmWave n260 (Beam ID153) + Bluetooth +5GHzAntenna 1 + Antenna 2 Rear side**	

DUTBack side spatial separation of mmWave n261, n260 and**Bluetooth** antennas (Hotspot)

Table 8-5
5G mmWave NR Front side Antenna K - Total Exposure Ratio at 4cm²PD Head Location

TER for Head		psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	2.4 GHz WLAN RSDB MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
		mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg
		1	2	3	4	5	6	7
Applicable Limit		1	1.6	1.6	1.6	1.6	1.6	1.6
Front	psPD	0.891	0.331	0.366	0.538	0.456	0.410	0.307
	Ratio to Limit	0.891	0.207	0.229	0.336	0.285	0.256	0.192
Adjusted Ratio to Limit		0.891	0.021	0.021	0.023	0.034	0.029	0.026

	psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
	1+2	1+3	1+4	1 + 5	1 + 6	1+2+7	1+3+7	1+5+7	1+6+7
	1	1	1	1	1	1	1	1	1
Front									
	0.912	0.914	0.925	0.917	0.910	0.931	0.933	0.939	**0.936**

Table 8-6
5G mmWave NR Front side Antenna K - Total Exposure Ratio at WLAN/BT SAR Head Location

TER for Head		psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	2.4 GHz WLAN RSDB MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
		mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg	W/kg
		1	2	3	4	5	6	7
Applicable Limit		1	1.6	1.6	1.6	1.6	1.6	1.6
Front	psPD	0.891	0.331	0.366	0.538	0.456	0.410	0.307
	Ratio to Limit	0.891	0.207	0.229	0.336	0.285	0.256	0.192
Adjusted Ratio to Limit		0.089	0.207	0.229	0.336	0.285	0.256	0.192

	psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
	1+2	1+3	1+4	1 + 5	1 + 6	1+2+7	1+3+7	1+5+7	1+6+7
	1	1	1	1	1	1	1	1	1
Front									
	0.296	0.318	0.425	0.345	0.281	0.488	0.510	0.566	**0.537**

Table 8-7
5G mmWave NR Antenna K - Total Exposure Ratio at WLAN/BT Body Worn Location

Rear	psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
	mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
	1	2	3	4	5	6
Applicable Limit	1	1.6	1.6	1.6	1.6	1.6
psPD	0.891	0.056	0.026	0.074	0.063	0.014
Ratio to Limit	0.891	0.035	0.016	0.046	0.039	0.009
Adjusted Ratio to Limit	0.089	0.035	0.016	0.046	0.039	0.009

psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
1+2	1+3	1+4	1 + 5	1 + 6	1+2+6	1+3+6	1+4+6	1+5+6
1	1	1	1	1	1	1	1	1
0.124	0.105	0.135	0.128	0.098	0.133	0.114	0.144	0.137

Table 8-8
5G mmWave NR Antenna K - Total Exposure Ratio at WLAN/BT SAR Body Worn Location

Rear	psPD	2.4 GHz WLAN 1 Reported SAR	2.4 GHz WLAN 2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth 1 Reported SAR	5 GHz WLAN MIMO Reported SAR
	mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
	1	2	3	4	5	6
Applicable Limit	1	1.6	1.6	1.6	1.6	1.6
psPD	0.891	0.056	0.026	0.074	0.063	0.014
Ratio to Limit	0.891	0.035	0.016	0.046	0.039	0.009
Adjusted Ratio to Limit	0.891	0.004	0.002	0.005	0.004	0.001

psPD + 2.4WLAN Ant1	psPD + 2.4WLAN Ant2	psPD + 2.4WLAN MIMO	psPD + BT 1	psPD + 5G WLAN MIMO	psPD + 2.4WLAN Ant1+5G WLAN MIMO	psPD + 2.4WLAN Ant2+5G WLAN MIMO	psPD + 2.4WLAN MIMO + 5G WLAN MIMO	psPD + BT + 5G WLAN MIMO
1+2	1+3	1+4	1 + 5	1 + 6	1+2+6	1+3+6	1+4+6	1+5+6
1	1	1	1	1	1	1	1	1
0.895	0.893	0.896	0.895	0.892	0.895	0.894	0.897	0.896

Table 8-9
5G mmWave NR Antenna K - Total Exposure Ratio at WLAN/BT PD Hotspot Body Location

TER for Hotspot	psPD	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth Reported SAR	5 GHz WLAN MIMO Reported SAR
	mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
	1	2	3	4	5	6
Applicable Limit	1	1.6	1.6	1.6	1.6	1.6
psPD	0.891	0.125	0.044	0.146	0.115	0.081
Ratio to Limit	0.891	0.078	0.028	0.091	0.072	0.051
Adjusted Ratio to Limit	0.089	0.078	0.028	0.091	0.072	0.051

psPD + 2.4 GHz WLAN Ant1	psPD + 2.4 GHz WLAN Ant2	psPD + 2.4 GHz WLAN MIMO	psPD + BT	psPD + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	psPD + BT + 5 GHz WLAN MIMO
1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 2 + 6	1 + 3 + 6	1 + 4 + 6	1 + 5 + 6
1	1	1	1	1	1	1	1	1
0.167	0.117	0.180	0.161	0.140	0.218	0.167	0.231	0.212

Table 8-10
5G mmWave NR Antenna K - Total Exposure Ratio at WLAN/BT SAR Hotspot Body Location

TER for Hotspot	psPD	2.4 GHz WLAN Ant1 Reported SAR	2.4 GHz WLAN Ant2 Reported SAR	2.4 GHz WLAN MIMO Reported SAR	Bluetooth Reported SAR	5 GHz WLAN MIMO Reported SAR
	mW/cm²	W/kg	W/kg	W/kg	W/kg	W/kg
	1	2	3	4	5	6
Applicable Limit	1	1.6	1.6	1.6	1.6	1.6
psPD	0.891	0.125	0.044	0.146	0.115	0.081
Ratio to Limit	0.891	0.078	0.028	0.091	0.072	0.051
Adjusted Ratio to Limit	0.891	0.008	0.003	0.009	0.007	0.005

psPD + 2.4 GHz WLAN Ant1	psPD + 2.4 GHz WLAN Ant2	psPD + 2.4 GHz WLAN MIMO	psPD + BT	psPD + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	psPD + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	psPD + BT + 5 GHz WLAN MIMO
1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 2 + 6	1 + 3 + 6	1 + 4 + 6	1 + 5 + 6
1	1	1	1	1	1	1	1	1
0.899	0.894	0.900	0.898	0.896	0.904	0.899	0.905	0.903

Note:
1. Worst case Power density results for each test configuration among all antenna arrays and among all supported bands were considered for TER Analysis.
2.Antenna K Module was not considered for TER analysis due to the -10dB contours of the SAR distributions of WLAN/BT Antennas have no overlap with the simulated area for power density of Antenna module K
3. For Front side ,Top edge, Right edge, power density results at 2mm were considered as a more conservative evaluation for 10mm hotspot mode
4.Power density results at 10mm were considered as a more conservative evaluation for 15mm body-worn
5.For Power density measurements, a test separation distance of 2mm was used for phablet configuration due to mmWave probe restraints.
6.Worst case front side reported psPD was considered for Head TER
7. The worst-case between Adjusted_Reported_psPD and measured Total psPD was chosen for TER analysis.
The above numerical summed PD and SAR for all the worst case simultaneous transmission conditions were Total Exposure Ratio.
Therefore, the above analysis is sufficient to determine no further test cases are required and that simultaneous transmission is compliant to the FCC RF exposure limit.

11. Measurement Uncertainty

Measurement Uncertainty for CDASY6 mmWave module						
a	*b*	*c*	*d*	*e*	*f* = *b x e / d*	*g*
Source of uncertainty	Uncertainty Value (± dB)	Probability distribution	Div.	*ci*	Standard Uncertainty (± dB)	*vi*
Probe calibration	0.49	N	1	1	0.49	∞
Probe correction	0.00	R	1.73	1	0.00	∞
Frequency Response(BW≤ 1GHz)	0.20	R	1.73	1	0.12	∞
Sensor cross coupling	0.00	R	1.73	1	0.00	∞
Istropy	0.50	R	1.73	1	0.29	∞
Linearity	0.20	R	1.73	1	0.12	∞
Probe scattering	0.00	R	1.73	1	0.00	∞
Probe positioning offset	0.30	R	1.73	1	0.17	∞
Probe positioning Repeatability	0.04	R	1.73	1	0.02	∞
Probe spatial Resolution	0.00	R	1.73	1	0.00	∞
Field Impedence Dependence	0.00	R	1.73	1	0.00	∞
Sensor Mechanical Offset	0.00	R	1.73	1	0.00	∞
Amplitude and Phase drift	0.00	R	1.73	1	0.00	∞
Amplitude and Phase noise	0.04	R	1.73	1	0.02	∞
Measurement area truncation	0.00	R	1.73	1	0.00	∞
System Detection Limit	0.04	R	1.73	1	0.02	∞
Data acquisition	0.03	N	1	1	0.03	∞
Field Reconstruction	0.60	R	1.73	1	0.35	∞
Forward Transformation	0.00	R	1.73	1	0.00	∞
Power density Scailing	0.00	R	1.73	1	0.00	∞
Spatial Averaging	0.10	R	1.73	1	0.06	∞
Test sample and Environmental Factors						
Probe coupling with DUT	0.00	R	1.73	1	0.00	∞
Modulation Response	0.40	R	1.73	1	0.23	∞
Integration time	0.00	R	1.73	1	0.00	∞
Response time	0.00	R	1.73	1	0.00	∞
Device holder influence	0.10	R	1.73	1	0.06	∞
DUT alignment	0.00	R	1.73	1	0.00	∞
RF Ambient Conditions	0.04	R	1.73	1	0.02	∞
RF ambient - reflections	0.04	R	1.73	1	0.02	∞
Immunity/Secondary Reception	0.00	R	1.73	1	0.00	∞
Power Drif of DUT	0.22	R	1.73	1	0.13	∞
Combined standard uncertainty (k = 1)		RSS			0.76	∞
Expanded uncertainty (95% confidence level)		*k = 2*			**1.52**	

12. SAR Test Equipment

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	5G Module Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	TX60 XLspeag	F/20/0018446/A/001	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142608A	N/A	N/A	N/A
SPEAG	DAE4	1686	06/21/2021	Annual	06/21/2022
SPEAG	E-Field Probe EUmmWV3	9465	08/23/2021	Annual	08/23/2022
SPEAG	Dipole 5G Verification Source 30 GHz	1011	07/27/2021	Annual	07/27/2022
TESTO	175-H1/Thermometer	44606559906	01/04/2022	Annual	01/04/2023

13. Conclusion

The power density measurements and total exposure ratio analysis indicate that the DUT complies with the RF radiation exposure limits of the FCC, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the RF Exposure and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

14. References

[1]ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

[2]IEC TR 63170:2018, Measurement Procedure for the Evaluation of Power Density Related to Human Exposure to Radiofrequency Fields from Wireless Communication Devices Operating between 6 GHz and 100 GHz.

[3] IEC TR 62630 : 2010, Guidance for Evaluating Exposure from Multiple Electromagnetic Sources

[4] K. Pokovic, T. Schmid, J. Frohlich, and N. Kuster. Novel Probes and Evaluation Procedures to Assess Field Magnitude and Polarization. IEEE Transactions on Electromagnetic Compatibility 42(2): 240 -244, 2000

[5] R. W. Gerchberg and W. O. Saxton. A Practical Algorithm for the Determination of Phase from Image and Diffraction Plane Pictures. Optik 35(2): 237 – 246, 1972.

[6] A. P. Anderson and S. Sali. New Possibilities for Phaseless Microwave Diagnostics. Part 1: Error Reduction Techniques. IEE Proceedings H – Microwaves, Antennas and Propagation 132(5): 290 – 298, 1985

[7] FCC KDB 865664 D02 v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz. Federal Communications Commission – Office of Engineering and Technology, Laboratory Division.

[8] FCC KDB 447498 D01 v02r01: RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices. Federal Communications Commission – Office of Engineering and Technology, Laboratory Division.

[9] November 2017 Telecommunications Certification Body Council (TCBC) Workshop Notes

[10] October 2018 Telecommunications Certification Body Council (TCBC) Workshop Notes

[11] April 2019 Telecommunications Certification Body Council (TCBC) Workshop Notes

[12] November 2019 Telecommunications Certification Body Council (TCBC) Workshop Notes

[13] SPEAG DASY6 System Handbook (September 2019)

Attachment 1. – Power Density Test Plots

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Room Temperature: 23.8℃
Test Date: 04/15/2022
Plot No.: 1

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	EDGE RIGHT, 2.00	Custom Band	CW, 0--	27550.08, 2071667	1.0

Hardware Setup

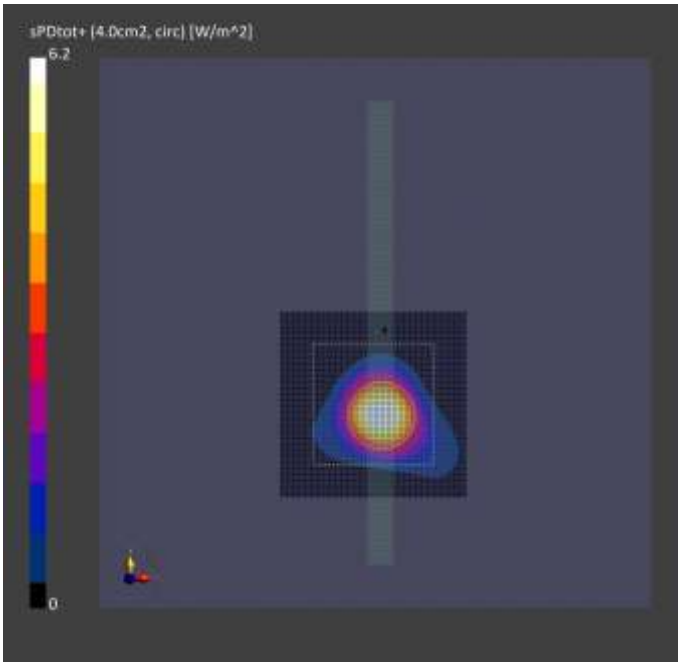
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave -	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	4.76
psPDtot+ [W/m^2]	6.20
psPDmod+ [W/m^2]	7.14
E_{max} [V/m]	108
Power Drift [dB]	0.19



Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Room Temperature: 23.7℃
Test Date: 04/18/2022
Plot No.: 2

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	EDGE LEFT, 2.00	Custom Band	CW, 0--	28299.96, 2084165	1.0

Hardware Setup

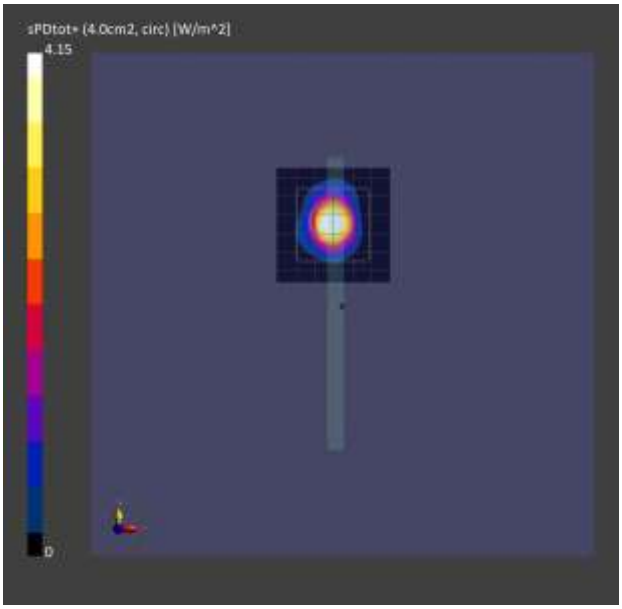
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	3.63
psPDtot+ [W/m^2]	4.15
psPDmod+ [W/m^2]	4.46
E_{max} [V/m]	99.1
Power Drift [dB]	-0.15



Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone

Room Temperature: 21.0 ℃
Test Date: 04/12/2022
Plot No.: 3

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	EDGE RIGHT, 2.00	Custom Band	CW, 0--	37050.0, 2229999	1.0

Hardware Setup

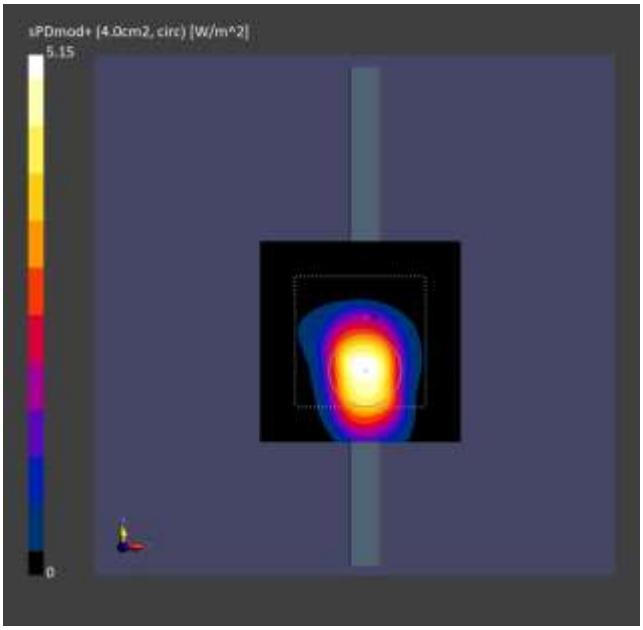
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	3.85
psPDtot+ [W/m^2]	4.52
psPDmod+ [W/m^2]	5.15
E_{max} [V/m]	100
Power Drift [dB]	-0.08



Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone

Room Temperature: 21.6℃
Test Date: 04/13/2022
Plot No.: 4

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	EDGE LEFT, 2.00	Custom Band	CW, 0--	39949.92, 2278331	1.0

Hardware Setup

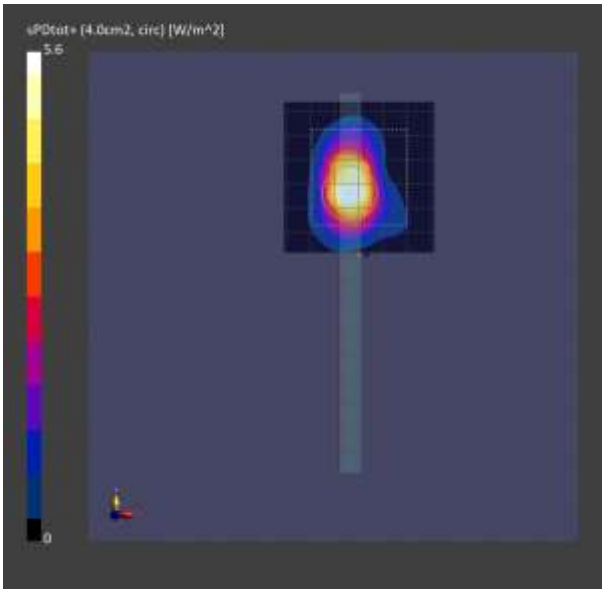
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave -	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	4.59
psPDtot+ [W/m^2]	5.60
psPDmod+ [W/m^2]	6.88
E_{max} [V/m]	112
Power Drift [dB]	0.18



Attachment 2. – Power Density System Verification Plots

System Verification Data

EUT Type: Mobile Phone
Room Temperature: 21.9℃
Test Date: 04/06/2022
Plot No.: V1

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

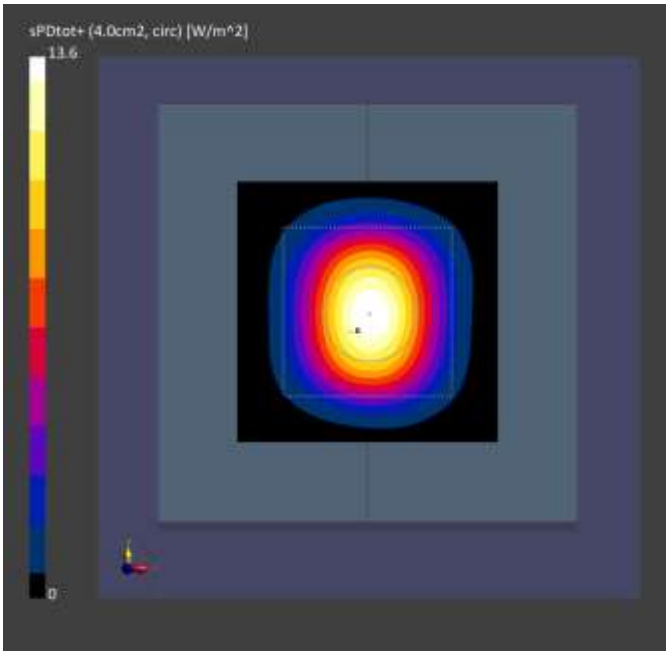
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.5
psPDtot+ [W/m^2]	13.6
psPDmod+ [W/m^2]	14.0
E_{max} [V/m]	86.1
Power Drift [dB]	-0.02



System Verification Data

EUT Type: Mobile Phone
Room Temperature: 20.4℃
Test Date: 04/08/2022
Plot No.: V2

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

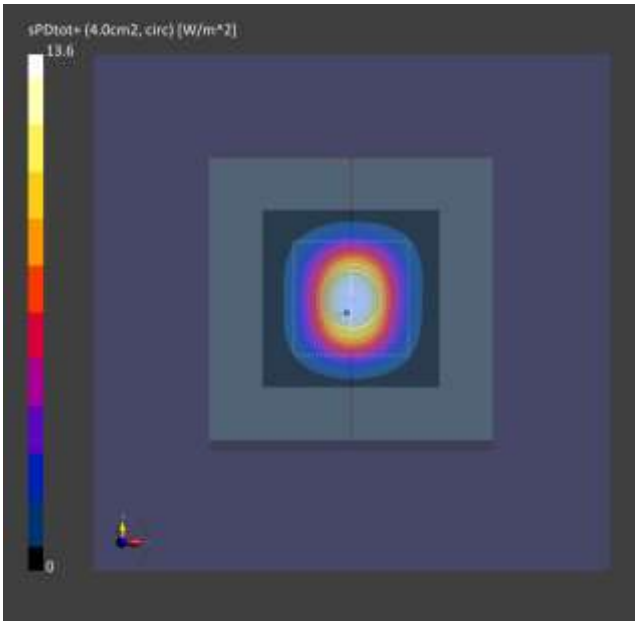
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.5
psPDtot+ [W/m^2]	13.6
psPDmod+ [W/m^2]	13.9
E_{max} [V/m]	86.1
Power Drift [dB]	-0.01



System Verification Data

EUT Type: Mobile Phone
Room Temperature: 21.0℃
Test Date: 04/12/2022
Plot No.: V3

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

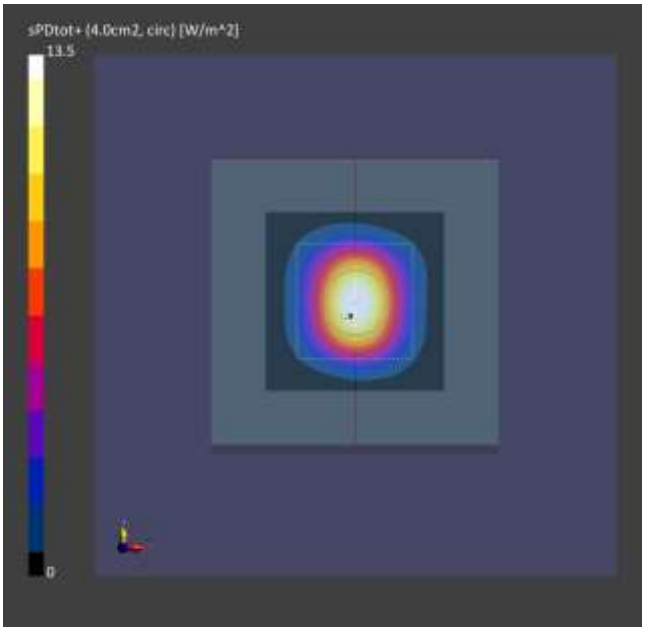
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.3
psPDtot+ [W/m^2]	13.5
psPDmod+ [W/m^2]	13.9
E_{max} [V/m]	86.3
Power Drift [dB]	-0.15



System Verification Data

EUT Type: **Mobile Phone**
Room Temperature: **21.6℃**
Test Date: **04/13/2022**
Plot No.: **V4**

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

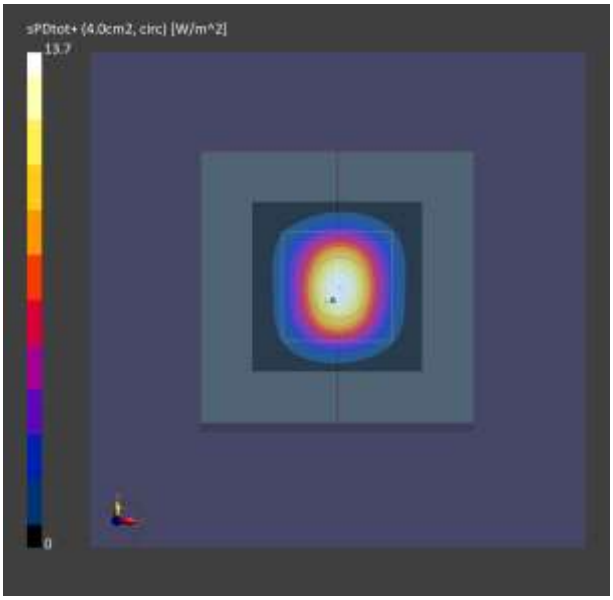
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.5
psPDtot+ [W/m^2]	13.7
psPDmod+ [W/m^2]	14.1
E_{max} [V/m]	87.4
Power Drift [dB]	-0.07



System Verification Data

EUT Type: **Mobile Phone**

Room Temperature: **23.8℃**
Test Date: **04/15/2022**
Plot No.: **V5**

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

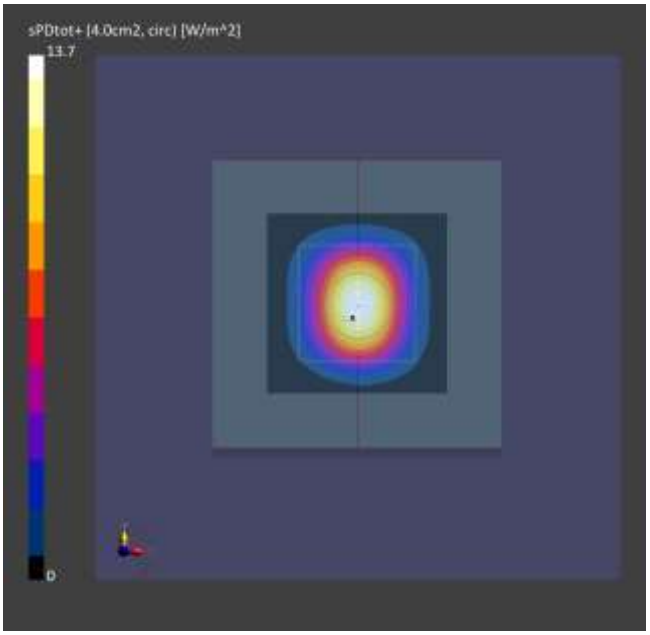
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.6
psPDtot+ [W/m^2]	13.7
psPDmod+ [W/m^2]	14.0
E_{max} [V/m]	86.5
Power Drift [dB]	0.01



System Verification Data

EUT Type: **Mobile Phone**
Room Temperature: **23.7℃**

Test Date: 04/18/2022
Plot No.: V6

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 5.55	Custom Band	CW, 0--	30000.0, 30000000	1.0

Hardware Setup

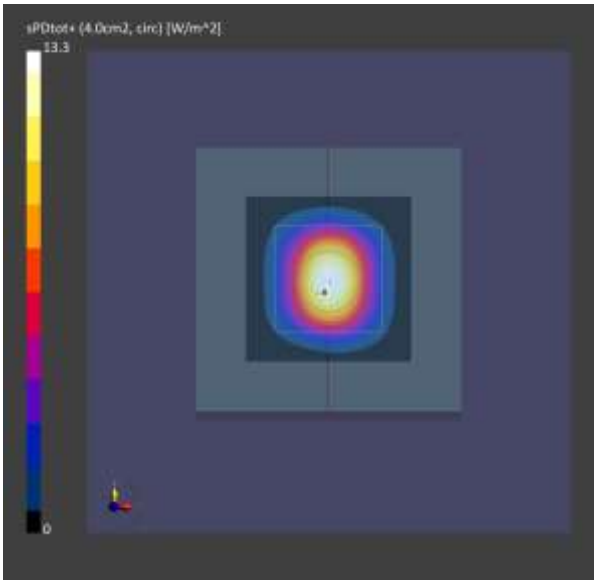
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9465_F1-55GHz, 2021-08-23	DAE4 Sn1686, 2021-06-21

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	5.55

Measurement Results

Scan Type	5G Scan
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	13.2
psPDtot+ [W/m^2]	13.4
psPDmod+ [W/m^2]	13.7
E_{max} [V/m]	86.3
Power Drift [dB]	-0.18



Attachment 3. –Probe Calibration Data

Schmid & Partner Engineering AG
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www.speag.swiss, info@speag.swiss

s p e a g

IMPORTANT NOTICE
PLEASE READ BEFORE USING THE EQUIPMENT

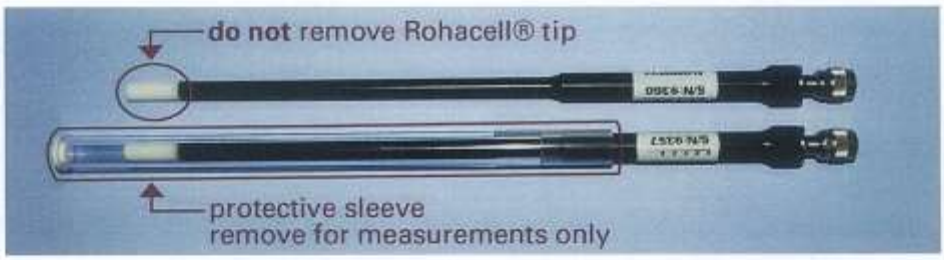
Care and Handling of EUmmWVx Probe

CAUTION!
The field sensors in the tip of the EUmmWVx probe are printed on very thin quartz glass in order to allow for outstanding performance with minimal scattering.

The glass tip is protected by the Rohacell® foam – **DO NOT REMOVE THE FOAM** as it is part of the probe design and removal will cause permanent probe damage!

Please note: despite the protective foam, the glass tip of the probe **is fragile and extremely sensitive to any mechanical stress, so please handle with care! If the glass tip breaks, the probe is damaged beyond economical repair.**

For storage, the probe is further protected with a transparent sleeve (see picture below); **the sleeve must be removed before connecting the probe to the DAE**; after using the probe, **carefully remove from the DAE and re-attach the sleeve and store the probe in a safe place.**



Note that probe usage is limited to free-space measurements; water, sugar-water solutions, nutrient solutions and glycol solutions will permanently damage the probe.

We at SPEAG do our best to increase the robustness of the probe as much as possible while allowing for maximum performance. For further questions and support, or to sign up to our probe care program, please contact us at: support@speag.swiss.

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결재	담당자	확인자
	DL 박정훈 2021. 09. 15	CJ 허윤경 2021. 09. 15

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

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

Accredited by the Swiss Accreditation Service (SAS)
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 HCT (Dymstec) Certificate No: EUmmWV4-9465_Aug21

CALIBRATION CERTIFICATE

Object EUmmWV4 - SN:9465

Calibration procedure(s) QA CAL-02.v9, QA CAL-25.v7, QA CAL-42.v2
Calibration procedure for E-field probes optimized for close near field evaluations in air

Calibration date: August 23, 2021

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
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/0292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
Reference Probe ER3DV6	SN: 2328	05-Oct-20 (No. ER3-2328_Oct20)	Oct-21
DAE4	SN: 789	23-Dec-20 (No. DAE4-789_Dec20)	Dec-21
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: September 7, 2021

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

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Swiss Calibration Service

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Accreditation No.: SCS 0108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system
Sensor Angles	sensor deviation from the probe axis, used to calculate the field orientation and polarization
k	is the wave propagation direction

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). For frequencies > 6 GHz, the far field in front of waveguide horn antennas is measured for a set of frequencies in various waveguide bands up to 110 GHz.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- The frequency sensor model parameters are determined prior to calibration based on a frequency sweep (sensor model involving resistors R, R_p, inductance L and capacitors C, C_p).
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Sensor Offset*: The sensor offset corresponds to the mechanical from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).
- *Equivalent Sensor Angle*: The two probe sensors are mounted in the same plane at different angles. The angles are assessed using the information gained by determining the *NORMx* (no uncertainty required).
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide / horn setup.

DASY - Parameters of Probe: EUmmWV4 - SN:9465

Basic Calibration Parameters

	Sensor X	Sensor Y	Unc (k=2)
Norm (μV/(V/m)^2)	0.02119	0.02455	± 10.1 %
DCP (mV)[B]	110.0	108.0	
Equivalent Sensor Angle	-60.9	34.6	

Calibration results for Frequency Response (750 MHz – 110 GHz)

Frequency GHz	Target E-Field V/m	Deviation Sensor X dB	Deviation Sensor Y dB	Unc (k=2) dB
0.75	77.2	-0.19	0.02	± 0.43 dB
1.8	140.4	0.09	0.12	± 0.43 dB
2	133.0	0.05	0.08	± 0.43 dB
2.2	124.8	0.04	0.04	± 0.43 dB
2.5	123.0	-0.01	-0.07	± 0.43 dB
3.5	256.2	0.23	-0.02	± 0.43 dB
3.7	249.8	0.24	-0.09	± 0.43 dB
6.6	41.8	0.45	0.48	± 0.98 dB
8	48.4	0.00	-0.25	± 0.98 dB
10	54.4	-0.03	0.02	± 0.98 dB
15	71.5	-0.17	-0.41	± 0.98 dB
18	85.3	-0.25	0.14	± 0.98 dB
26.6	96.9	-0.28	-0.07	± 0.98 dB
30	92.6	0.12	0.05	± 0.98 dB
35	93.7	-0.09	0.01	± 0.98 dB
40	91.5	-0.34	-0.30	± 0.98 dB
50	19.6	0.06	0.14	± 0.98 dB
55	22.4	0.80	0.44	± 0.98 dB
60	23.0	-0.03	-0.05	± 0.98 dB
65	27.4	-0.37	-0.20	± 0.98 dB
70	23.9	-0.15	-0.25	± 0.98 dB
75	20.0	0.00	0.02	± 0.98 dB
75	14.8	0.04	0.06	± 0.98 dB
80	22.5	0.17	0.34	± 0.98 dB
85	22.8	-0.07	0.03	± 0.98 dB
90	23.8	0.06	0.07	± 0.98 dB
92	23.9	-0.18	-0.26	± 0.98 dB
95	20.5	-0.21	-0.23	± 0.98 dB
97	24.4	-0.08	-0.17	± 0.98 dB
100	22.6	0.06	-0.02	± 0.98 dB
105	22.7	0.01	0.08	± 0.98 dB
110	19.7	0.07	0.19	± 0.98 dB

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%.

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY - Parameters of Probe: EUmmWV4 - SN:9465

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	143.8	± 3.8 %	± 4.7 %
		Y	0.00	0.00	1.00		78.5		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.55	60.00	13.26	10.00	6.0	± 1.4 %	± 9.6 %
		Y	1.44	60.00	14.34		6.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	4.00	74.00	17.00	6.99	12.0	± 1.0 %	± 9.6 %
		Y	0.96	60.00	13.46		12.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.62	60.00	11.09	3.98	23.0	± 1.2 %	± 9.6 %
		Y	0.59	60.00	12.44		23.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.38	60.00	10.51	2.22	27.0	± 0.9 %	± 9.6 %
		Y	0.45	60.00	11.43		27.0		
10387-AAA	QPSK Waveform, 1 MHz	X	0.90	60.00	11.19	1.00	22.0	± 1.6 %	± 9.6 %
		Y	0.99	60.00	11.24		22.0		
10388-AAA	QPSK Waveform, 10 MHz	X	1.23	60.00	11.66	0.00	22.0	± 1.0 %	± 9.6 %
		Y	1.36	60.00	11.67		22.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	1.77	60.00	13.46	3.01	17.0	± 0.7 %	± 9.6 %
		Y	1.81	60.00	13.74		17.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	2.08	60.00	12.20	0.00	19.0	± 0.9 %	± 9.6 %
		Y	2.15	60.00	12.30		19.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	3.08	60.00	12.65	0.00	12.0	± 0.7 %	± 9.6 %
		Y	3.14	60.00	12.72		12.0		

Note: For details on all calibrated UID parameters see Appendix

Calibration Results for Linearity Response

Frequency GHz	Target E-Field V/m	Deviation Sensor X dB	Deviation Sensor Y dB	Unc (k=2) dB
0.9	50.0	-0.13	-0.14	± 0.2 dB
0.9	100.0	-0.11	0.15	± 0.2 dB
0.9	500.0	0.06	0.06	± 0.2 dB
0.9	1000.0	0.06	0.07	± 0.2 dB
0.9	1500.0	0.04	0.06	± 0.2 dB
0.9	2000.0	-0.03	0.04	± 0.2 dB

Sensor Frequency Model Parameters (750 MHz – 55 GHz)

	Sensor X	Sensor Y
R (Ω)	81.75	76.74
R_p (Ω)	88.44	92.90
L (nH)	0.11144	0.10717
C (pF)	0.3112	0.2798
C_p (pF)	0.0815	0.0690

Sensor Frequency Model Parameters (55 GHz – 110 GHz)

	Sensor X	Sensor Y
R (Ω)	34.95	35.02
R_p (Ω)	95.02	94.99
L (nH)	0.03061	0.03387
C (pF)	0.2248	0.1973
C_p (pF)	0.1336	0.1227

DASY - Parameters of Probe: EUmmWV4 - SN:9465

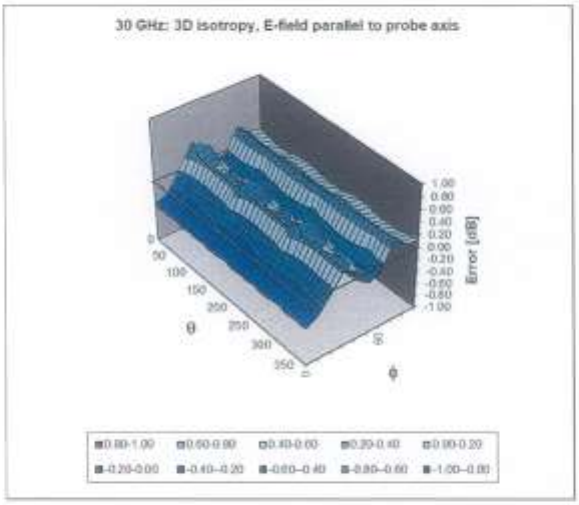
Sensor Model Parameters

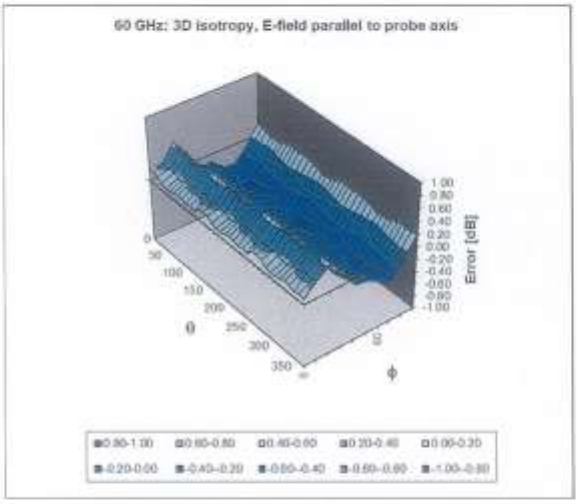
	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	26.3	190.95	33.59	0.92	2.34	4.98	0.00	0.65	1.01
Y	25.2	182.00	33.44	0.92	2.22	5.00	0.00	0.80	1.01

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	136.0
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	320 mm
Probe Body Diameter	8 mm
Tip Length	23 mm
Tip Diameter	8.0 mm
Probe Tip to Sensor X Calibration Point	1.5 mm
Probe Tip to Sensor Y Calibration Point	1.5 mm

Deviation from Isotropy in Air
f = 30, 60 GHz





Probe isotropy for E_{tot}: probe rotated φ = 0° to 360°, tilted from field propagation direction $\vec{k}$
Parallel to the field propagation (ψ =0° - 90°) at 30 GHz: deviation within ± 0.43 dB
Parallel to the field propagation (ψ =0° - 90°) at 60 GHz: deviation within ± 0.44 dB

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc[E] (k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	DAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %

10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	AAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %

10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAE	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	AAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAE	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAE	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	AAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAF	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAF	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
10220	AAF	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAD	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAD	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	DAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10248	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %

10260	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAD	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAD	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAD	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAG	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	CAG	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	CAG	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	CAG	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	CAG	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	CAG	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %
10300	CAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	CAC	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	± 9.6 %
10302	CAB	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3CTRL)	WiMAX	12.57	± 9.6 %
10303	CAB	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	± 9.6 %
10304	CAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	11.86	± 9.6 %
10305	CAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC)	WiMAX	15.24	± 9.6 %
10306	CAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC)	WiMAX	14.67	± 9.6 %
10307	AAB	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC)	WiMAX	14.49	± 9.6 %
10308	AAB	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAB	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM,AMC 2x3)	WiMAX	14.58	± 9.6 %
10310	AAB	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3	WiMAX	14.57	± 9.6 %
10311	AAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAD	iDEN 1:3	iDEN	10.51	± 9.6 %
10314	AAD	iDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAD	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.71	± 9.6 %
10316	AAD	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc)	WLAN	8.36	± 9.6 %
10317	AAA	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc dc)	WLAN	8.37	± 9.6 %
10401	AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc dc)	WLAN	8.60	± 9.6 %
10402	AAA	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc dc)	WLAN	8.53	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	± 9.6 %
10406	AAD	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %

10410	AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10417	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Long)	WLAN	8.14	± 9.6 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Short)	WLAN	8.19	± 9.6 %
10422	AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10423	AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	± 9.6 %
10424	AAE	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	± 9.6 %
10425	AAE	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	± 9.6 %
10426	AAE	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	± 9.6 %
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10430	AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	± 9.6 %
10431	AAC	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	± 9.6 %
10432	AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10434	AAG	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	± 9.6 %
10435	AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10447	AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	± 9.6 %
10448	AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	LTE-FDD	7.53	± 9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.51	± 9.6 %
10450	AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	± 9.6 %
10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10453	AAC	Validation (Square, 10ms, 1ms)	Test	10.00	± 9.6 %
10456	AAC	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc dc)	WLAN	8.63	± 9.6 %
10457	AAC	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	± 9.6 %
10458	AAC	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAC	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAC	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10462	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	± 9.6 %
10463	AAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	± 9.6 %
10464	AAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10467	AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10468	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10469	AAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	± 9.6 %
10470	AAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10471	AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10472	AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10473	AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10474	AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10475	AAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10477	AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10478	AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10479	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10480	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.18	± 9.6 %
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	± 9.6 %
10482	AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.71	± 9.6 %
10483	AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, Sub)	LTE-TDD	8.39	± 9.6 %
10484	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.47	± 9.6 %
10485	AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.59	± 9.6 %
10486	AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	± 9.6 %
10487	AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.60	± 9.6 %

10488	AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.70	± 9.6 %
10489	AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	± 9.6 %
10490	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.41	± 9.6 %
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	± 9.6 %
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.37	± 9.6 %
10496	AAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10497	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.67	± 9.6 %
10498	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.40	± 9.6 %
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.68	± 9.6 %
10500	AAF	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.67	± 9.6 %
10501	AAF	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.44	± 9.6 %
10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.52	± 9.6 %
10503	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.72	± 9.6 %
10504	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	± 9.6 %
10505	AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10506	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10507	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.36	± 9.6 %
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	± 9.6 %
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.99	± 9.6 %
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	± 9.6 %
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	± 9.6 %
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	± 9.6 %
10514	AAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	± 9.6 %
10515	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10516	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc dc)	WLAN	1.57	± 9.6 %
10517	AAF	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10518	AAF	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10519	AAF	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc)	WLAN	8.39	± 9.6 %
10520	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc)	WLAN	8.12	± 9.6 %
10521	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc)	WLAN	7.97	± 9.6 %
10522	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %
10523	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc)	WLAN	8.08	± 9.6 %
10524	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc)	WLAN	8.27	± 9.6 %
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	± 9.6 %
10526	AAF	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	± 9.6 %
10527	AAF	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	± 9.6 %
10528	AAF	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	± 9.6 %
10529	AAF	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	± 9.6 %
10531	AAF	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	± 9.6 %
10532	AAF	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10533	AAE	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	± 9.6 %
10534	AAE	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	± 9.6 %
10535	AAE	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	± 9.6 %
10536	AAF	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	± 9.6 %
10537	AAF	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	± 9.6 %
10538	AAF	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	± 9.6 %
10540	AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.39	± 9.6 %
10541	AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	± 9.6 %
10542	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	± 9.6 %
10543	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc)	WLAN	8.65	± 9.6 %
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.47	± 9.6 %
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.55	± 9.6 %

10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.35	± 9.6 %
10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.49	± 9.6 %
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.37	± 9.6 %
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.38	± 9.6 %
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc)	WLAN	8.50	± 9.6 %
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	± 9.6 %
10553	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc dc)	WLAN	8.45	± 9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc)	WLAN	8.47	± 9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc)	WLAN	8.50	± 9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc)	WLAN	8.52	± 9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc)	WLAN	8.61	± 9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc)	WLAN	8.73	± 9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.56	± 9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.69	± 9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc)	WLAN	8.77	± 9.6 %
10564	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.25	± 9.6 %
10565	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %
10566	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.13	± 9.6 %
10567	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc)	WLAN	8.00	± 9.6 %
10568	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc)	WLAN	8.37	± 9.6 %
10569	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc)	WLAN	8.10	± 9.6 %
10570	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc)	WLAN	8.30	± 9.6 %
10571	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc dc)	WLAN	1.99	± 9.6 %
10572	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc dc)	WLAN	1.99	± 9.6 %
10573	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc dc)	WLAN	1.98	± 9.6 %
10574	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc dc)	WLAN	1.98	± 9.6 %
10575	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	± 9.6 %
10576	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	± 9.6 %
10577	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10578	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	± 9.6 %
10579	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	± 9.6 %
10580	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	± 9.6 %
10581	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	± 9.6 %
10582	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	± 9.6 %
10583	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	± 9.6 %
10584	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	± 9.6 %
10585	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10586	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	± 9.6 %
10587	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	± 9.6 %
10588	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	± 9.6 %
10589	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	± 9.6 %
10590	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	± 9.6 %
10591	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc dc)	WLAN	8.63	± 9.6 %
10592	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10593	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc dc)	WLAN	8.64	± 9.6 %
10594	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10595	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc dc)	WLAN	8.74	± 9.6 %
10596	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc dc)	WLAN	8.71	± 9.6 %
10597	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc dc)	WLAN	8.72	± 9.6 %
10598	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc dc)	WLAN	8.50	± 9.6 %
10599	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc dc)	WLAN	8.79	± 9.6 %
10600	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10601	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc dc)	WLAN	8.82	± 9.6 %
10602	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc dc)	WLAN	8.94	± 9.6 %
10603	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc dc)	WLAN	9.03	± 9.6 %

10604	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc dc)	WLAN	8.76	± 9.6 %
10605	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc dc)	WLAN	8.97	± 9.6 %
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc)	WLAN	8.64	± 9.6 %
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc)	WLAN	8.77	± 9.6 %
10609	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.57	± 9.6 %
10610	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc dc)	WLAN	8.78	± 9.6 %
10611	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc)	WLAN	8.70	± 9.6 %
10612	AAC	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10613	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc)	WLAN	8.94	± 9.6 %
10614	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc)	WLAN	8.59	± 9.6 %
10615	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10616	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc dc)	WLAN	8.82	± 9.6 %
10617	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc)	WLAN	8.81	± 9.6 %
10618	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc)	WLAN	8.58	± 9.6 %
10619	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc)	WLAN	8.86	± 9.6 %
10620	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc)	WLAN	8.87	± 9.6 %
10621	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10622	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc)	WLAN	8.68	± 9.6 %
10623	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10624	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc)	WLAN	8.96	± 9.6 %
10625	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.96	± 9.6 %
10626	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10627	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10628	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc)	WLAN	8.71	± 9.6 %
10629	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10630	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc)	WLAN	8.72	± 9.6 %
10631	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc)	WLAN	8.81	± 9.6 %
10632	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10633	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc)	WLAN	8.83	± 9.6 %
10634	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc)	WLAN	8.80	± 9.6 %
10635	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc dc)	WLAN	8.86	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc dc)	WLAN	8.98	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc dc)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc dc)	WLAN	9.06	± 9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc dc)	WLAN	8.89	± 9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc dc)	WLAN	9.05	± 9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc dc)	WLAN	9.11	± 9.6 %
10646	AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10648	AAC	CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6 %
10652	AAC	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6 %
10653	AAC	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
10654	AAC	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	± 9.6 %
10655	AAC	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658	AAC	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAC	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAC	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6 %
10661	AAC	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAC	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAC	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %
10671	AAD	IEEE 802.11ax (20MHz, MCS0, 90pc dc)	WLAN	9.09	± 9.6 %

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10672	AAD	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.57	± 9.6 %
10673	AAD	IEEE 802.11ax (20MHz, MCS2, 90pc dc)	WLAN	8.78	± 9.6 %
10674	AAD	IEEE 802.11ax (20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10675	AAD	IEEE 802.11ax (20MHz, MCS4, 90pc dc)	WLAN	8.90	± 9.6 %
10676	AAD	IEEE 802.11ax (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10677	AAD	IEEE 802.11ax (20MHz, MCS6, 90pc dc)	WLAN	8.73	± 9.6 %
10678	AAD	IEEE 802.11ax (20MHz, MCS7, 90pc dc)	WLAN	8.78	± 9.6 %
10679	AAD	IEEE 802.11ax (20MHz, MCS8, 90pc dc)	WLAN	8.89	± 9.6 %
10680	AAD	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	8.80	± 9.6 %
10681	AAG	IEEE 802.11ax (20MHz, MCS10, 90pc dc)	WLAN	8.62	± 9.6 %
10682	AAF	IEEE 802.11ax (20MHz, MCS11, 90pc dc)	WLAN	8.83	± 9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10684	AAC	IEEE 802.11ax (20MHz, MCS1, 99pc dc)	WLAN	8.26	± 9.6 %
10685	AAC	IEEE 802.11ax (20MHz, MCS2, 99pc dc)	WLAN	8.33	± 9.6 %
10686	AAC	IEEE 802.11ax (20MHz, MCS3, 99pc dc)	WLAN	8.28	± 9.6 %
10687	AAE	IEEE 802.11ax (20MHz, MCS4, 99pc dc)	WLAN	8.45	± 9.6 %
10688	AAE	IEEE 802.11ax (20MHz, MCS5, 99pc dc)	WLAN	8.29	± 9.6 %
10689	AAD	IEEE 802.11ax (20MHz, MCS6, 99pc dc)	WLAN	8.55	± 9.6 %
10690	AAE	IEEE 802.11ax (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10691	AAB	IEEE 802.11ax (20MHz, MCS8, 99pc dc)	WLAN	8.25	± 9.6 %
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc dc)	WLAN	8.29	± 9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc dc)	WLAN	8.25	± 9.6 %
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc dc)	WLAN	8.57	± 9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc dc)	WLAN	8.78	± 9.6 %
10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc dc)	WLAN	8.91	± 9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc dc)	WLAN	8.61	± 9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc dc)	WLAN	8.89	± 9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc dc)	WLAN	8.82	± 9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc dc)	WLAN	8.73	± 9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc dc)	WLAN	8.86	± 9.6 %
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc dc)	WLAN	8.70	± 9.6 %
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc dc)	WLAN	8.56	± 9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc dc)	WLAN	8.69	± 9.6 %
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc dc)	WLAN	8.66	± 9.6 %
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc dc)	WLAN	8.32	± 9.6 %
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc dc)	WLAN	8.55	± 9.6 %
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc dc)	WLAN	8.33	± 9.6 %
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc dc)	WLAN	8.29	± 9.6 %
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc dc)	WLAN	8.39	± 9.6 %
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc dc)	WLAN	8.67	± 9.6 %
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc dc)	WLAN	8.33	± 9.6 %
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc dc)	WLAN	8.26	± 9.6 %
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc dc)	WLAN	8.45	± 9.6 %
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc dc)	WLAN	8.30	± 9.6 %
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc dc)	WLAN	8.48	± 9.6 %
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc dc)	WLAN	8.24	± 9.6 %
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc dc)	WLAN	8.81	± 9.6 %
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc dc)	WLAN	8.87	± 9.6 %
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc dc)	WLAN	8.76	± 9.6 %
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc dc)	WLAN	8.55	± 9.6 %
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc dc)	WLAN	8.70	± 9.6 %
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc dc)	WLAN	8.90	± 9.6 %
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc dc)	WLAN	8.72	± 9.6 %
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc dc)	WLAN	8.66	± 9.6 %

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10728	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc dc)	WLAN	8.65	± 9.6 %
10729	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc dc)	WLAN	8.64	± 9.6 %
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc dc)	WLAN	8.67	± 9.6 %
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc dc)	WLAN	8.46	± 9.6 %
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc dc)	WLAN	8.40	± 9.6 %
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc dc)	WLAN	8.25	± 9.6 %
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc dc)	WLAN	8.33	± 9.6 %
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc dc)	WLAN	8.27	± 9.6 %
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc dc)	WLAN	8.36	± 9.6 %
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc dc)	WLAN	8.42	± 9.6 %
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc dc)	WLAN	8.29	± 9.6 %
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc dc)	WLAN	8.48	± 9.6 %
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.40	± 9.6 %
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.43	± 9.6 %
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 90pc dc)	WLAN	8.94	± 9.6 %
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 90pc dc)	WLAN	9.16	± 9.6 %
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 90pc dc)	WLAN	8.93	± 9.6 %
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 90pc dc)	WLAN	9.11	± 9.6 %
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 90pc dc)	WLAN	9.04	± 9.6 %
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 90pc dc)	WLAN	8.93	± 9.6 %
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 90pc dc)	WLAN	8.90	± 9.6 %
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 90pc dc)	WLAN	8.79	± 9.6 %
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10753	AAC	IEEE 802.11ax (160MHz, MCS10, 90pc dc)	WLAN	9.00	± 9.6 %
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 90pc dc)	WLAN	8.94	± 9.6 %
10755	AAC	IEEE 802.11ax (160MHz, MCS0, 99pc dc)	WLAN	8.64	± 9.6 %
10756	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc dc)	WLAN	8.77	± 9.6 %
10757	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc dc)	WLAN	8.77	± 9.6 %
10758	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc dc)	WLAN	8.69	± 9.6 %
10759	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc dc)	WLAN	8.58	± 9.6 %
10760	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc dc)	WLAN	8.49	± 9.6 %
10761	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc dc)	WLAN	8.58	± 9.6 %
10762	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc dc)	WLAN	8.49	± 9.6 %
10763	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc dc)	WLAN	8.53	± 9.6 %
10764	AAC	IEEE 802.11ax (160MHz, MCS9, 99pc dc)	WLAN	8.54	± 9.6 %
10765	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc dc)	WLAN	8.54	± 9.6 %
10766	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc dc)	WLAN	8.51	± 9.6 %
10767	AAC	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	± 9.6 %
10768	AAC	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10769	AAC	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10770	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10771	AAC	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10772	AAC	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	± 9.6 %
10773	AAC	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	± 9.6 %
10774	AAC	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10775	AAC	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10776	AAC	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10777	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10778	AAC	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10779	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10780	AAC	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	± 9.6 %
10781	AAC	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	± 9.6 %
10782	AAC	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10783	AAC	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %

10784	AAC	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	± 9.6 %
10785	AAC	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10786	AAC	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10787	AAC	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	± 9.6 %
10788	AAC	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10789	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10790	AAC	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10791	AAC	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	± 9.6 %
10792	AAC	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	± 9.6 %
10793	AAC	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	± 9.6 %
10794	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10795	AAC	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	± 9.6 %
10796	AAC	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10797	AAC	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10798	AAC	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10799	AAC	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10801	AAC	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10802	AAC	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	± 9.6 %
10803	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10805	AAD	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10806	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10809	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10810	AAD	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10812	AAD	5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10817	AAD	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10818	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10819	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	± 9.6 %
10820	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10821	AAC	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10822	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10823	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10824	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10825	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10827	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10828	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	± 9.6 %
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	± 9.6 %
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	± 9.6 %
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	± 9.6 %
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10836	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	± 9.6 %
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	± 9.6 %
10839	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10840	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	± 9.6 %
10841	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	± 9.6 %
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	± 9.6 %
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %

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10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10863	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10864	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10865	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10866	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10868	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	± 9.6 %
10869	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10870	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	± 9.6 %
10871	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10872	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	± 9.6 %
10873	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10874	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10875	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10876	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	± 9.6 %
10877	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	± 9.6 %
10878	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10879	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	± 9.6 %
10880	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	± 9.6 %
10881	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10882	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	± 9.6 %
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	± 9.6 %
10884	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	± 9.6 %
10885	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10887	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10888	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	± 9.6 %
10889	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	± 9.6 %
10890	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	± 9.6 %
10891	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	± 9.6 %
10892	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10897	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	± 9.6 %
10898	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
10899	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
10900	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10902	AAD	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10904	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.76	± 9.6 %
10908	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10909	AAD	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	± 9.6 %
10910	AAD	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10911	AAD	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10912	AAD	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10914	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	± 9.6 %
10915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10918	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10919	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10920	AAD	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10921	AAD	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %

10922	AAD	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	± 9.6 %
10923	AAD	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10925	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	± 9.6 %
10926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10930	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10931	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10932	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10933	AAA	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10934	AAA	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10935	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10937	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	± 9.6 %
10938	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10939	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	± 9.6 %
10940	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	± 9.6 %
10941	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10942	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10943	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	± 9.6 %
10944	AAB	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	± 9.6 %
10945	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10947	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10948	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10949	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10950	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10951	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	± 9.6 %
10952	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	± 9.6 %
10953	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	± 9.6 %
10954	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	± 9.6 %
10955	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	± 9.6 %
10956	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	± 9.6 %
10957	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	± 9.6 %
10958	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	± 9.6 %
10959	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	± 9.6 %
10960	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	± 9.6 %
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	± 9.6 %
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	± 9.6 %
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10964	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	± 9.6 %
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	± 9.6 %
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	± 9.6 %
10972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	± 9.6 %
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	± 9.6 %
10974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	± 9.6 %

[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Attachment 4. – Verification Source Calibration Data

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

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

Accredited by the Swiss Accreditation Service (SAS)
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: HCT (Dymstec)

Certificate No: 5G-Veri30-1011_Jul21

CALIBRATION CERTIFICATE

Object: 5G Verification Source 30 GHz - SN: 1011

Calibration procedure(s): QA CAL-45.v3
Calibration procedure for sources in air above 6 GHz

Calibration date: July 27, 2021

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	2020-12-30 (No. EUmmWV3-9374_Dec20)	Dec-21
DAE4ip	SN: 1602	2021-06-25 (No. DAE4ip-1602_Jun21)	Jun-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 28, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: 5G-Veri30-1011_Jul21 Page 1 of 7

결재	담당자	확인자

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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 (1cm^2 and 4cm^2) 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/m^2) averaged over the surface area of 1 cm^2 and 4cm^2 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%.

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	*Prad*[1] *(mW)*	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg ($psPDn+$, $psPDtot+$, $psPDmod+$) (W/m^2)		Uncertainty (k = 2)
				1 cm^2	4 cm^2	
10 mm	13.6	**85.5**	1.27 dB	**16.9**	**14.6**	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	*Prad*[1] *(mW)*	Max E-field (V/m)	Uncertainty (k = 2)	Avg Power Density Avg ($psPDn+$, $psPDtot+$, $psPDmod+$) (W/m^2)		Uncertainty (k = 2)
				1 cm^2	4 cm^2	
10 mm	13.6	**85.5**	1.27 dB	**16.9**	**14.5**	1.28 dB

[1] derived from far-field data

DASY Report

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: 1011	-

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

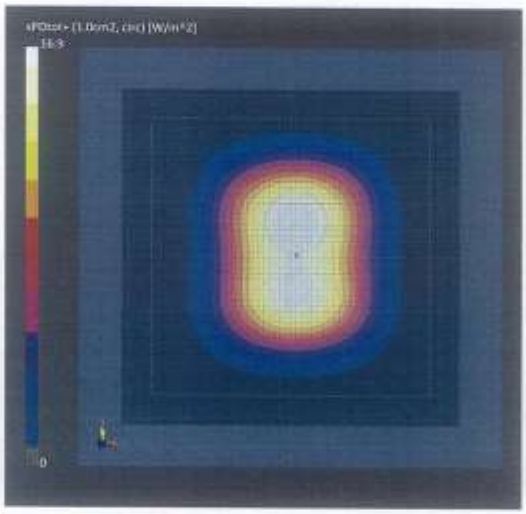
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

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

Measurement Results

	5G Scan
Date	2021-07-27, 14:25
Avg. Area [cm²]	1.00
psPDn+ [W/m²]	16.8
psPDtot+ [W/m²]	16.9
psPDmod+ [W/m²]	17.0
E_{max} [V/m]	85.5
Power Drift [dB]	-0.03



DASY Report

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: 1011	-

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

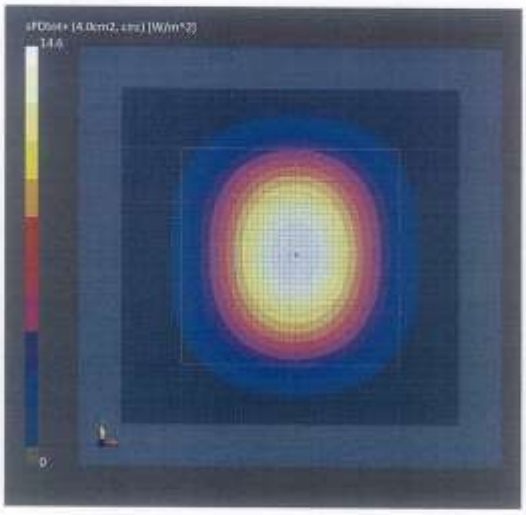
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

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

Measurement Results

	5G Scan
Date	2021-07-27, 14:25
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	14.5
psPDtot+ [W/m²]	14.6
psPDmod+ [W/m²]	14.7
E_{max} [V/m]	85.5
Power Drift [dB]	-0.03



DASY Report

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: 1011	-

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

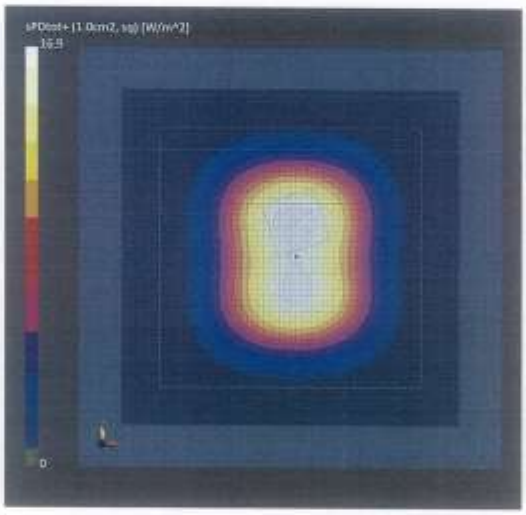
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-78GHz, 2020-12-30	DAE4ip Sn1602, 2021-06-25

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

Measurement Results

	5G Scan
Date	2021-07-27, 14:25
Avg. Area [cm²]	1.00
psPDn+ [W/m²]	16.8
psPDtot+ [W/m²]	16.9
psPDmod+ [W/m²]	17.0
E_{max} [V/m]	85.5
Power Drift [dB]	-0.03



DASY Report

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: 1011	-

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_F1-78GHz, 2020-12-30	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

Measurement Results

	5G Scan
Date	2021-07-27, 14:25
Avg. Area [cm²]	4.00
psPDn+ [W/m²]	14.4
psPDtot+ [W/m²]	14.6
psPDmod+ [W/m²]	14.6
E_{max} [V/m]	85.5
Power Drift [dB]	-0.03