



RF EXPOSURE EVALUATION REPORT

No. 24T04Z100387-001

For

TCL Communication Ltd.

Mobile Hot Spot

Model Name: MW513U

With

Hardware Version: 06

Software Version: MW513U_ZZ_02.00_06

FCC ID: 2ACCJB183

Issued Date: 2024-03-05

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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No. 24T04Z100387-001

REPORT HISTORY

Report Number	Revision	Issue Date	Description
24T04Z100387-001	Rev.0	2024-03-05	Initial creation of test report



TABLE OF CONTENT

1 TEST LABORATORY	4
1.1. INTRODUCTION & ACCREDITATION.....	4
1.2. TESTING LOCATION	4
1.3. TESTING ENVIRONMENT	4
1.4. PROJECT DATA.....	4
1.5. SIGNATURE	4
2 SUMMARY	5
3 CLIENT INFORMATION	5
3.1 APPLICANT INFORMATION	5
3.2 MANUFACTURER INFORMATION	5
4 EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
4.1 ABOUT EUT	6
4.2 INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	7
4.3 INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	7
5 GUIDANCE APPLIED	8
6 RF EXPOSURE LIMITS	9
6.1 UNCONTROLLED ENVIRONMENT	9
6.2 CONTROLLED ENVIRONMENT.....	9
7 SYSTEM VERIFICATION SOURCE	10
8 POWER DENSITY SYSTEM VERIFICATION	11
9 SYSTEM VERIFICATION RESULTS	12
10 POWER DENSITY ASSESSMENT	13
10.1 GENERAL DESCRIPTION.....	13
10.2 COMPUTATION OF THE ELECTRIC FIELD POLARIZATION ELLIPSE.....	13
10.3 TOTAL FIELD AND POWER FLUX DENSITY RECONSTRUCTION	14
10.4 TEST POSITIONS	14
10 RF EXPOSURE EVALUATION RESULTS	15
11 5G NR + LTE + WLAN + BT SIM-TX ANALYSIS	16
12 SIMULTANEOUS TX ANALYSIS	18
12.1 SIMULTANEOUS TRANSMISSION CONSIDERATION	18
12.2 TOTAL EXPOSURE RADIO ANALYSIS	18
12.3 SIMULTANEOUS TRANSMISSION ANALYSIS FOR WiFi/BT + 5G NR	19
13 MEASUREMENT UNCERTAINTY	20
14 MAIN TEST INSTRUMENTS	20
ANNEX A GRAPH RESULTS	21
ANNEX B SYSTEM VERIFICATION RESULTS	23
ANNEX C SYSTEM DESCRIPTION AND SETUP	24
ANNEX D PROBE CALIBRATION CERTIFICATE	27
ANNEX E DIPOLE CALIBRATION CERTIFICATE	46
ANNEX F ACCREDITATION CERTIFICATE	53

1 Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

1.3. Testing Environment

Normal Temperature: 15-35°C

Extreme Temperature: -10/+55°C

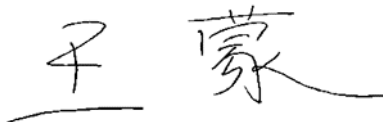
Relative Humidity: 20-75%

1.4. Project data

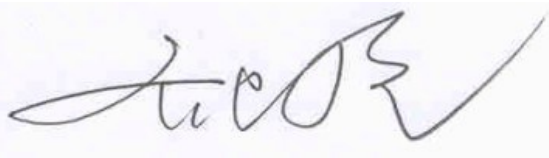
Testing Start Date: 2022-06-16

Testing End Date: 2022-06-21

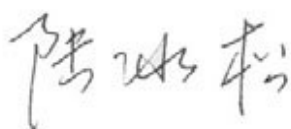
1.5. Signature



Wang Meng
(Prepared this test report)



Qi Dianyuan
(Reviewed this test report)



Lu Bingsong
Deputy Director of the laboratory
(Approved this test report)

2 Summary

The maximum results of PD found during testing for TCL Communication Ltd. Mobile Hot Spot MW513U are as follows:

Standalone transmission			Simultaneous transmission with other transmitters
RF Transmitter	Measured PD (mW/cm ²)	Reported PD (mW/cm ²)	Summation of Exposure Ratio
5G FR2	n260	8.42	0.873
	n261	5.33	
Result			PASS

3 Client Information

3.1 Applicant Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Annie Jiang
Contact Email:	nianxiang.jiang@tcl.com
Telephone:	+86 755 3661 1621
Fax:	/

3.2 Manufacturer Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Annie Jiang
Contact Email:	nianxiang.jiang@tcl.com
Telephone:	+86 755 3661 1621
Fax:	/

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Mobile Hot Spot	
Model name:	MW513U	
Operating mode(s):	LTE Band1/2/3/4/5/7/12/13/20/28/46/48/66 5G NR n2/5/48/66/77/n257/n260/261 Wi-Fi(2.4G), Wi-Fi(5G), Wi-Fi(6G)	
Tested Tx Frequency:	1850.7 – 1909.3 MHz (LTE Band 2)	
	824.7 – 848.3 MHz (LTE Band 5)	
	2500 – 2570 MHz (LTE Band 7)	
	699.7 – 715.3 MHz (LTE Band 12)	
	779.5 – 784.5 MHz (LTE Band 13)	
	3550 – 3700 MHz (LTE Band 48)	
	1710.7 – 1779.3 MHz (LTE Band 66)	
	2412 – 2462 MHz (WLAN 2.4G)	
	5150 – 5250 MHz	WLAN 5G
	5250 – 5350 MHz	
	5500 – 5720 MHz	
	5745 – 5825 MHz	
	5925 – 6425 MHz	WLAN 6G
	6425 – 6525 MHz	
	6525 – 6875 MHz	
	6875 – 7125 MHz	
	1850 – 1910 MHz(n2)	
	824 – 849 MHz(n5)	
	1710 – 1780 MHz (n66)	
	3450 – 3550 MHz (n77L)	
3700 – 3980 MHz (n77H)		
37000– 40000 MHz (n260)		
27500– 28350 MHz (n257/261)		
Test device Production information:	Production unit	
Device type:	Portable device	
Antenna type:	Integrated antenna	

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	/	06	MW513U_ZZ_02.00_06
EUT2	/	06	MW513U_ZZ_02.00_06

*EUT ID: is used to identify the test sample in the lab internally.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	TLi044A7	/	veken

*AE ID: is used to identify the test sample in the lab internally.

5 Guidance Applied

- [1] ANSI C95.1–1992:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- [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] 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
- [4] FCC KDB 865664 002 v01r04: SAR Measurement Requirements FOR 100 MHz to 6 GHz. Federal Communications Commission – Office of Engineering and Technology, Laboratory Division.
- [5] FCC KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
- [6] November 2017 Telecommunications Certification Body Council (TCBC) Workshop Notes
- [7] October 2018 Telecommunications Certification Body Council (TCBC) Workshop Notes
- [8] April 2019 Telecommunications Certification Body Council (TCBC) Workshop Notes
- [9] November 2019 Telecommunications Certification Body Council (TCBC) Workshop Notes



6 RF Exposure Limits

6.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

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. The 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.

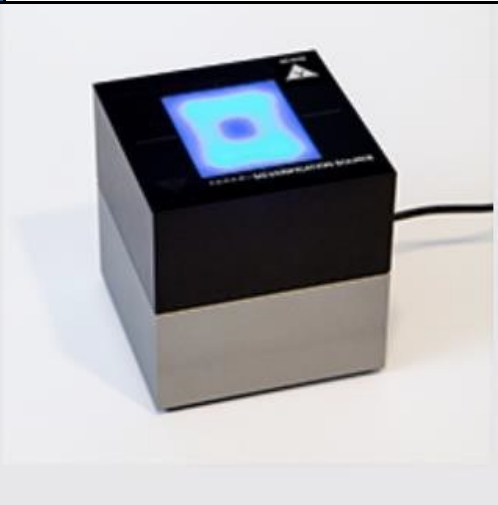
The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure above 6GHz to radio frequency (RF) radiation as specified in §1.1310.

General Population Basic restriction for power density for frequencies between 1.5GHz and 100 GHz is $1.0 \text{ mW/cm}^2 = 10 \text{ W/m}^2$.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

7 System Verification Source

The System Verification sources at 30 GHz and above comprise horn-antennas and very stable signal generators.

Model	Ka-band horn antenna
Calibrated frequency:	30 GHz at 10mm from the case surface
Frequency accuracy	± 100 MHz
E-field polarization	linear
Harmonics	-20 dBc
Total radiated power	14 dBm
Power stability	0.05 dB
Power consumption	5 W
Size	100 x 100 x 100 mm
Weight	1 kg
	

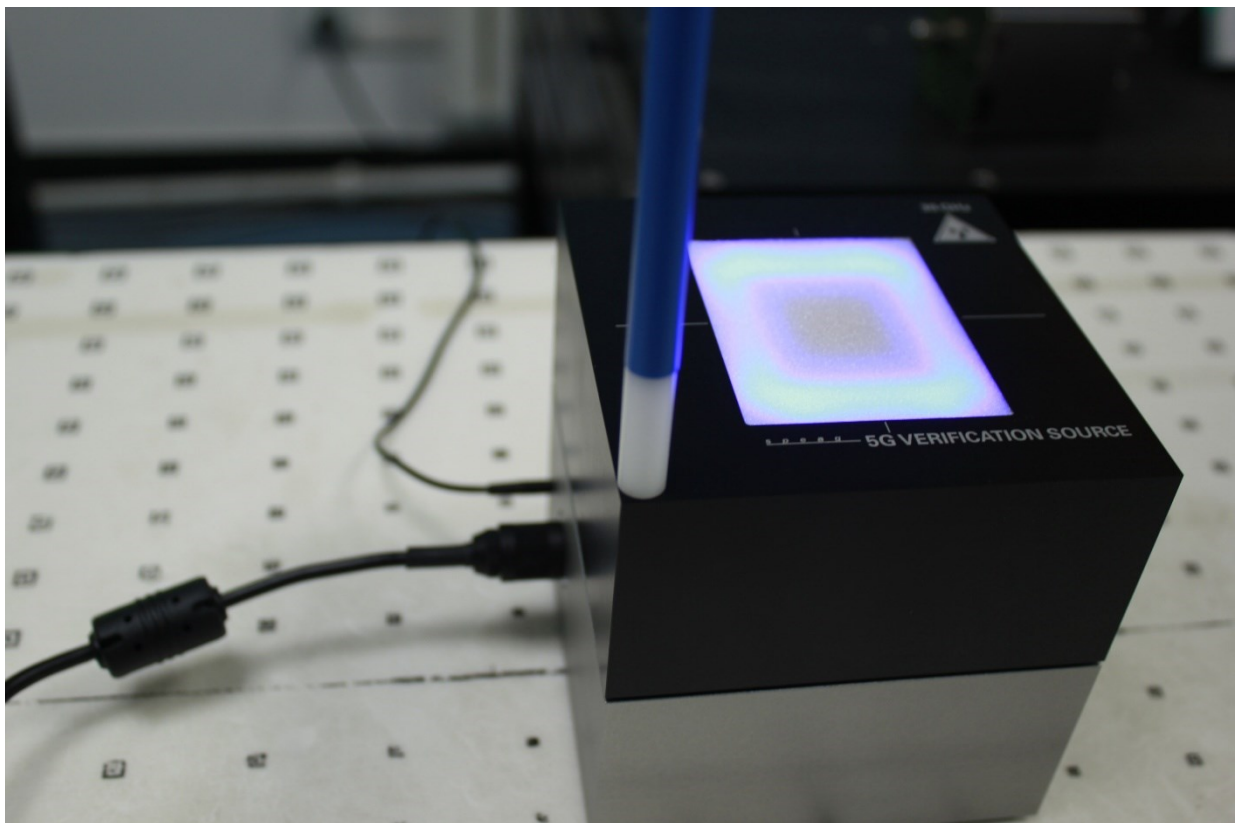
8 Power Density System Verification

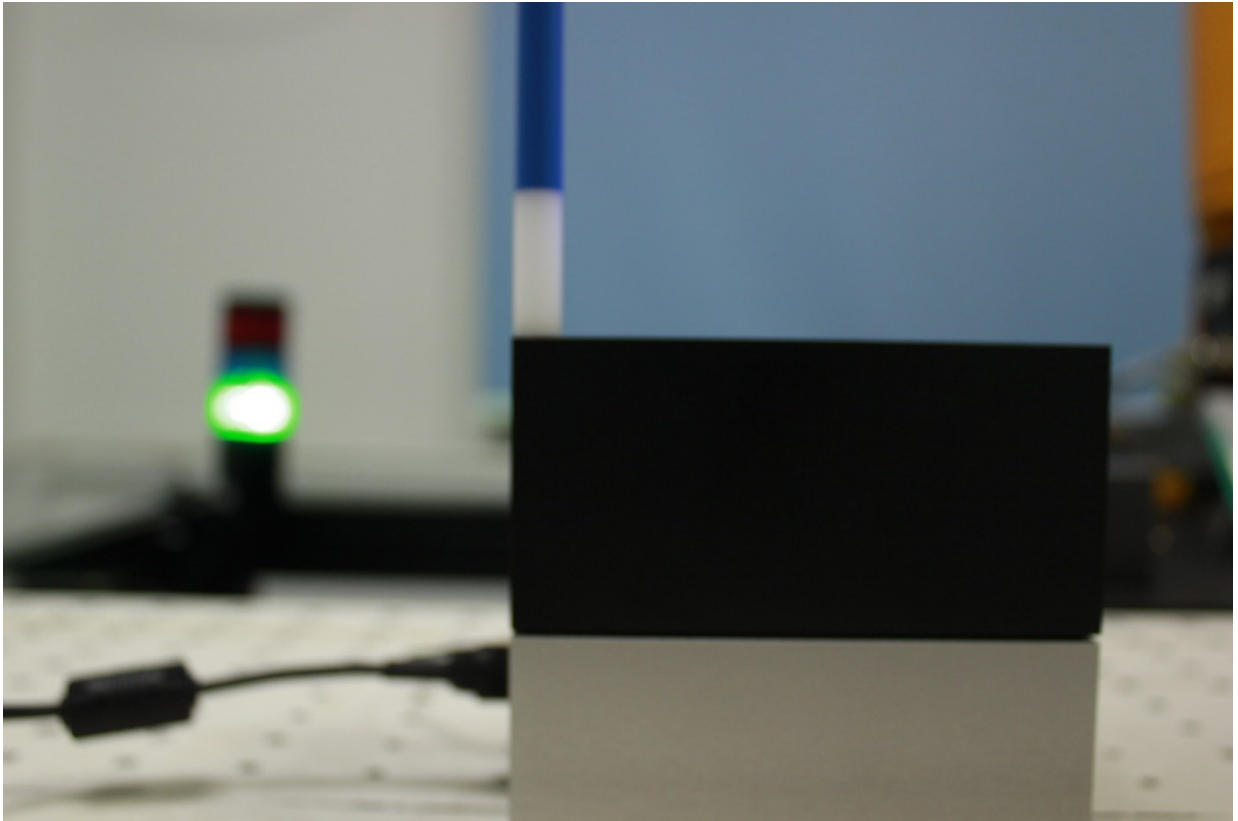
The system performance check verifies that the system operates within its specifications.

The EUT is replaced by a calibrated source, the same spatial resolution, measurement region and the test separation used in the calibration was applied to system check. Through visual inspection into the measured power density distribution, both spatially (shape) and numerically (level) have no noticeable difference. The measured results should be within 0.66dB of the calibrated targets.

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	0.25 ($\frac{\lambda}{4}$)	120/120	16 × 16
30	0.25 ($\frac{\lambda}{4}$)	60/60	24 × 24
60	0.25 ($\frac{\lambda}{4}$)	32.5/32.5	26 × 26
90	0.25 ($\frac{\lambda}{4}$)	30/30	36 × 36

Settings for measurement of verification sources





Verification Setup photo

9 System Verification Results

Date	Frequency (GHz)	5G Verification Source	Probe S/N	Distance (mm)	Measured 4cm ² (W/m ²)	Targeted 4cm ² (W/m ²)	Deviation (db)
2022/6/16	30G	30GHz_1052	9448	5.5	79.1	83.7	0.055

10 Power Density Assessment

10.1 General Description

1. The 5G NR mmWave signal under testing was configured by the test tool of Qualcomm Software, and it is only limited to operate at EN-DC for 5G NR implementation according to the character of the device.
2. This device would be configured to maximum power when transmitting and tested at 100% duty cycle for each RB configuration, modulation, bandwidth, and channel.
3. According to the manufacturer that summation for different antenna modules and exposure planes, the worst case would be selected for power density measurement.
4. According to TCBC workshop in October 2018 that 4cm^2 averaging area may now be considered.

10.2 Computation of the Electric Field Polarization Ellipse

For the numerical description of an arbitrarily oriented ellipse in three-dimensional space, five parameters are needed: the semi-major axis (a), the semi-minor axis (b), two angles describing the orientation of the normal vector of the ellipse (ϕ , θ), and one angle describing the tilt of the semi-major axis (ψ). For the two extreme cases, i.e., circular and linear polarizations, three parameters only (a , ϕ and θ) are sufficient for the description of the incident field.

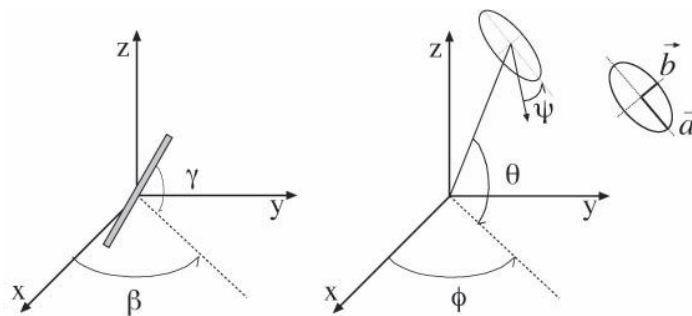


Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space.

For the reconstruction of the ellipse parameters from measured data, the problem can be reformulated as a nonlinear search problem. The semi-major and semi-minor axes of an elliptical field can be expressed as functions of the three angles (ϕ , θ and ψ). The parameters can be uniquely determined towards minimizing the error based on least-squares for the given set of angles and the measured data. In this way, the number of free parameters is reduced from five to three, which means that at least three sensor readings are necessary to gain sufficient information for the reconstruction of the ellipse parameters. However, to suppress the noise and increase the reconstruction accuracy, it is desirable that the system of equations be over determined. The solution to use a probe consisting of two sensors angled by r_1 and r_2 toward the probe axis and to perform measurements at three angular positions of the probe, i.e., at β_1 , β_2 and β_3 , results in over-determinations by a factor of

two. If there is a need for more information or increased accuracy, more rotation angles can be added. The reconstruction of the ellipse parameters can be separated into linear and non-linear parts that are best solved by the Givens algorithm combined with a downhill simplex algorithm. To minimize the mutual coupling, sensor angles are set with a shift of 90 degree ($r_2 = r_1 + 90$ degree), and to simplify, the first rotation angle of the probe (β_1) can be set to 0 degree

10.3 Total Field and Power Flux Density Reconstruction

Computation of the power density in general requires knowledge of the electric and magnetic field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible, as they are constrained by Maxwell's equations. SPEAG have developed a reconstruction approach based on the Gerchberg-Saxton algorithm, which benefits from the availability of the E-field polarization ellipse information obtained with the EUmmWV2 probe.

The average of the reconstructed power density is evaluated over a circular area in each measurement plane. Two average power density values can be computed, the average total power density and the average incident power density, and the average total power density is used to determine compliance.

- $|Re\{S\}|$ is the total Poything vector
- $n \cdot Re\{S\}$ is the normal Poything vector

The software post-processing reports to values, “S avg tot” and “S avg inc”. “S avg tot” represents average total power density (all three xyz components included), and “S avg inc” represents average normal power density. The average total power density “S avg tot” is reported to determine the device compliance.

10.4 Test Positions

Band	Antenna Module	Measurement Plane					
		Front	Rear	Left edge	Right edge	Top edge	Bottom edge
5G NR Band 260	0	Yes	No	No	No	No	No
	1	Yes	No	No	No	No	No
5G NR Band 261	0	Yes	No	No	No	No	No
	1	Yes	No	No	No	No	No

From the Part 0 Report, beam IDs with highest PD and corresponding input.power.limit were selected to be tested for each antenna module and for each frequency band.

10 RF Exposure Evaluation Results

1. The PD test was performed of a 2mm separation between sensor and EUT surface (the probe tip is 0.5mm to the EUT surface).
2. According to TCBC Workshop in October 2018, 4 cm² averaging area are used.
3. This device is enabled with Qualcomm® Smart Transmit feature, smart transmit will manage and ensure LTE and 5G simultaneous transmission is compliant. The validation of the time-averaging algorithm and compliance under the Tx varying transmission scenario for WWAN technologies are reported in Part 2 report.
4. The device was configured to transmit CW wave signal for testing, due to Qualcomm® Smart Transmit feature, additional testing was not required for different modulations (CP-OFDM QPSK, CP-OFDM 16QAM, CP-OFDM 64QAM), RB configurations, component carriers, channel configurations (low channel, mid channel, high channel).

Band	Beam ID		Antenna		Frequency (MHz)	Channel	Input power limit (dBm)	Worst Surface	Test separation	Modulation	Normal psPD (W/m ²)	Total psPD (W/m ²)	Test number	Note		
			Moudule	Type												
n260	31		QTM0	PATCH	37050.00	Low	6.78	Front	2mm	CW	8.42	8.67	01	/		
	31				37050.00	Low	6.78	Front	2mm	CW	2.51	2.59		B2		
		159			37050.00	Low	4.45	Front	2mm	CW	5.6	5.78		/		
		31	159	QTM1	PATCH	38499.96	Middle	1.19	Front	2mm	CW	3.95	4.16		/	
		25				38499.96	Middle	7.15	Front	2mm	CW	4.45	4.98		/	
			154			38499.96	Middle	7.50	Front	2mm	CW	4.39	4.71		/	
			163			38499.96	Middle	3.67	Front	2mm	CW	2.21	2.54		/	
n261	41		QTM0	PATCH	28299.96	High	5.26	Front	2mm	CW	5.33	5.55	02	/		
					157	28299.96	High	4.47	Front	2mm	CW	4.48	4.91		/	
					157	28299.96	High	1.03	Front	2mm	CW	2.96	3.35		/	
			36	QTM1	PATCH	28299.96	High	5.16	Front	2mm	CW	3.22	3.41		/	
						153	28299.96	High	5.83	Front	2mm	CW	4.27	4.52		/
			24			152	27924.96	Middle	1.48	Front	2mm	CW	2.31	2.55		/

11 5G NR + LTE + WLAN + BT Sim-Tx analysis

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \leq 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and $A \leq 1.0$; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for mmW NR or SAR exposure for sub6 NR), and $B \leq 1.0$.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \leq 1.0 \quad (1)$$

$$x\% * A + (100-x)\% * B \leq x\% * \max(A, B) + (100-x)\% * \max(A, B) \leq \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \leq \max(A, B) + C \leq 1.0 \quad (2)$$

if $A + C \leq 1.0$ and $B + C \leq 1.0$ can be proven, then “ $x\% * A + (100-x)\% * B + C \leq 1.0$ ” . Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1

Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

Step 1: it's justified in Part 1 SAR report

Step 2: it's justified in section 12.1

During TER analysis, the reported time-averaged PD (assuming input.power.limit for at least one beam < NV setting Pmax) applies only to the worst-surface of the device. For other surfaces, worst-case PD needs to be calculated to assess TER for the corresponding surface. To determine worst-case PD for other surfaces, using simulation results

1. Calculate ratio of simulated PD for desired surface to simulated PD of worst surface for a given beam
2. Repeat 1 to obtain ratios for all supported beams, and determine maximum ratio
3. Repeat 1~2 to obtain the corresponding worst-case PD for rest of surfaces (non worst-case surfaces) needed for TER analysis.

For example, if the back surface of device has highest PD and is determined as worst-surface, then,

- **Back surface worst-case PD = reported time-averaged PD**
where, **reported time-averaged PD** = PD_design_target + mmW device design related uncertainty
- **For other surfaces**
 - **front_surface_worst-case_PD = PD_ratio_front_to_back * reported timeaveraged PD**
where, PD_ratio_front_to_back = $\max \left\{ \frac{\text{simulated PD}_{\text{front}(i)}}{\text{simulated PD}_{\text{back}(i)}}, \text{beam } i = 1, 2 \dots N \right\}$, N = total N beams (all beams) supported by the mmW module being evaluated being evaluated.
 - Follow similar approach to determine worst-case PD for bottom/top/left/right (if applicable).
- **For body-worn and hotspot scenario, if SAR was measured at 15mm and 10mm, respectively, then the worst-case PD at 15mm and 10mm separation distance should be determined per surface as**
 - **15mm_worst-case_PD = PD_ratio_15mm_to_0mm * reported timeaveraged PD**
Here, PD_ratio_15 mm _to_0mm = $\max \left\{ \frac{\text{simulated Pd at 15 mm}(i)}{\text{simulated PD at 0 mm}(i)}, \text{beam } i = 1, 2 \dots N \right\}$, , N = total number of beams (all beams) supported by the mmW module being evaluated.
 - **10mm_worst-case_PD = PD_ratio_10mm_to_0mm * reported timeaveraged PD**
Here, PD_ratio_15 mm _to_0mm = $\max \left\{ \frac{\text{simulated Pd at 10 mm}(i)}{\text{simulated PD at 0 mm}(i)}, \text{beam } i = 1, 2 \dots N \right\}$, , N = total number of beams (all beams) supported by the mmW module being evaluated.
 - Note the validated model/simulation should be used in worst-case PD determination.

12 Simultaneous TX analysis

12.1 Simultaneous Transmission Consideration

No.	Simultaneous Transmission Consideration	Support
1	WWAN LTE Bands+5G NR FR2	Yes
2	WWAN LTE Bands+5G NR FR2+WLAN 2.4GHz/5GHz (MIMO)	Yes

Note:

Both the 2.4GHz & 5GHz WLAN cannot transmit simultaneously at the same time according to the user manual.

12.2 Total Exposure Radio Analysis

The fields generated by the antennas can be correlated or uncorrelated. At different frequencies, fields are always uncorrelated, and the aggregate power density contributions can be summed according to spatially averaged values of corresponding sources at any point in space, r , to determine the total exposure ratio (TER). Assuming I sources, the TER at each point in space is equal to

$$TER^{uncorr}(r) = \sum_{i=1}^I ER_i = \sum_{i=1}^I \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

Where $S_{av,i}$ is the power density for the source I operating at a frequency f_i and S_{lim} is the power density limit as specified by the relevant standard.

Exposure from transmitters operating above and below 6GHz, where 6GHz denotes the transmission frequency where the basic restrictions change from being defined in terms of SAR to being defined in terms of power density, therefore uncorrelated and the TER is determined as

$$TER^{uncorr}(r) = \sum_{i=1}^I ER_i = \sum_{i=1}^I \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

According to the FCC guidance in TCBC workshop and IEC TR 63170, the total exposure ratio calculated by taking ratio of maximum reported SAR divided by SAR limit and adding it to maximum measured power density by its limit. Numerical sum of the ratios should be less or equal to 1. Therefore the simultaneous transmission should be follows:

$$\sum \frac{\text{Max. SAR}}{1.6} + \sum \frac{\text{Max. PD}}{\text{Limit of MPE}} \leq 1$$

12.3 Simultaneous transmission analysis for WiFi/BT + 5G NR

NR Band	Antenna Module	Surface	Evaluation Distance (mm)	Ratio*	PD_Design_Target + Total uncertainty (W/m ²)	(PD_Design Target+ Total uncertainty) * Ratio (W/m ²)
n260/n261	0/1	Worst-surface	2	1	9.48	9.48
		Front	10	0.69	9.48	6.54
		Right	2	0.45	9.48	4.27

	1	2	3	4	5	6	7	8	9	10
	PD	WiFi2.4G ANT9	WiFi2.4G ANT10	WiFi2.4G MIMO	WiFi5G ANT9	WiFi5G ANT10	WiFi5G MIMO	WiFi6E ANT9	WiFi6E ANT10	WiFi6E MIMO
Front	6.54	0.05	0.06	0.00	0.08	0.16	0.07	0.00	0.05	0.00
Rear	6.54	0.07	0.05	0.02	0.23	0.22	0.14	0.00	0.03	0.01
Left	6.54	0.08	/	0.00	0.35	/	0.11	0.00	/	0.11
Right	4.27	/	0.06	0.02	/	0.64	0.24	/	0.17	0.00
Bottom	6.54	/	0.04	0.00	/	0.09	0.05	/	0.03	0.01
Top	6.54	/	/	/	/	/	/	/	/	/

	simultaneous transmission									
	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10	
Front	0.69	0.69	0.65	0.70	0.75	0.70	0.65	0.69	0.65	
Rear	0.70	0.69	0.67	0.80	0.79	0.74	0.65	0.67	0.66	
Left	0.70	0.65	0.65	0.87	0.65	0.72	0.65	0.65	0.72	
Right	0.43	0.46	0.44	0.43	0.83	0.58	0.43	0.53	0.43	
Bottom	0.65	0.68	0.65	0.65	0.71	0.69	0.65	0.67	0.66	
Top	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	

13 Measurement Uncertainty

The budget is valid for evaluation distance $> \lambda/2\pi$. For specific tests and configurations, the uncertainty can be considered smaller.

Error Description		Unc. Value (±dB)	Prob. Dist.	Div.	(C _i)	Std.Unc. (±dB)	(V _i) V _{eff}
Uncertainty terms dependent on the measurement system							
CAL	Calibration	0.49	N	1	1	0.49	∞
FRS	Frequency response	0.20	R	$\sqrt{3}$	1	0.12	∞
ISO	Isotropy	0.50	R	$\sqrt{3}$	1	0.29	∞
LIN	Linearity	0.20	R	$\sqrt{3}$	1	0.12	∞
PPO	Probe positioning offset	0.30	R	$\sqrt{3}$	1	0.17	∞
PPR	Probe positioning repeatability	0.04	R	$\sqrt{3}$	1	0.02	∞
APN	Amplitude and phase noise	0.04	R	$\sqrt{3}$	1	0.02	∞
DAQ	Data acquisition	0.03	N	1	1	0.03	∞
REC	Field reconstruction	0.60	R	$\sqrt{3}$	1	0.35	∞
SAV	Spatial averaging	0.10	R	$\sqrt{3}$	1	0.06	∞
SDL	System detection limit	0.04	R	$\sqrt{3}$	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors							
MOD	Modulation response	0.40	R	$\sqrt{3}$	1	0.23	∞
DH	Device holder influence	0.10	R	$\sqrt{3}$	1	0.06	∞
AC	RF ambient conditions	0.04	R	$\sqrt{3}$	1	0.02	∞
AR	Ambient reflections	0.04	R	$\sqrt{3}$	1	0.02	∞
DRI	Drift of the DUT	0.02	R	$\sqrt{3}$	1	0.01	∞
Combined Standard Uncertainty						0.76	∞
Expanded Standard Uncertainty (95%)						1.52	

14 MAIN TEST INSTRUMENTS

Table 14.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	EummWV Probe	EummWV4	9448	January 26,2022	One year
02	DAE	SPEAG DAE4	777	January 07, 2022	One year
03	5G Verification Source	30 GHz	1052	December 16,2021	One year

END OF REPORT BODY

ANNEX A Graph Results

Measurement Report for Device, FRONT, Validation band, CW, Channel 38500 (38500.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	158.2 x 77.9 x 20.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Validation band	CW, 0--	38500.0, 38500	1.0

Hardware Setup

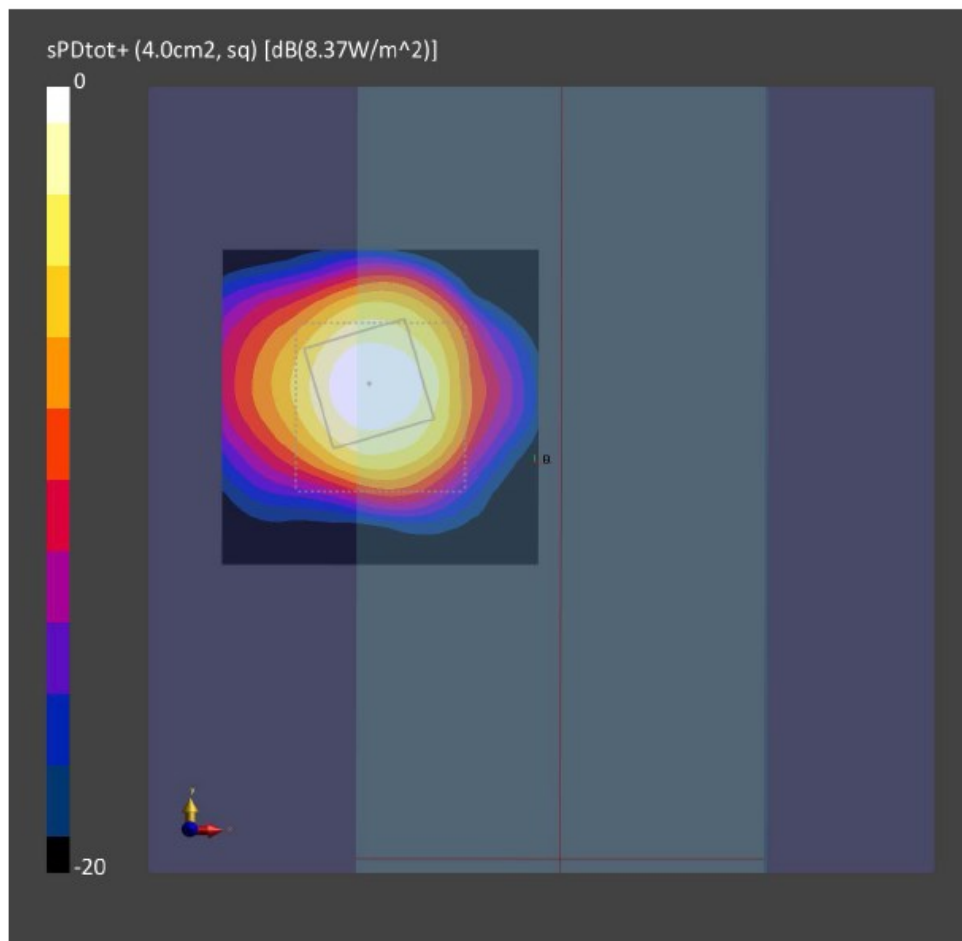
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9448_F1-55GHz, 2022-01-26	DAE4 Sn777, 2022-01-07

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
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2022-06-20, 19:48
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	7.20
psPDtot+ [W/m ²]	8.42
psPDmod+ [W/m ²]	8.67
E _{max} [V/m]	85.8
Power Drift [dB]	0.12



Measurement Report for Device, FRONT, Validation band, CW, Channel 28000 (28000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	170.0 x 90.0 x 20.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Validation band	CW, 0--	28000.0, 28000	1.0

Hardware Setup

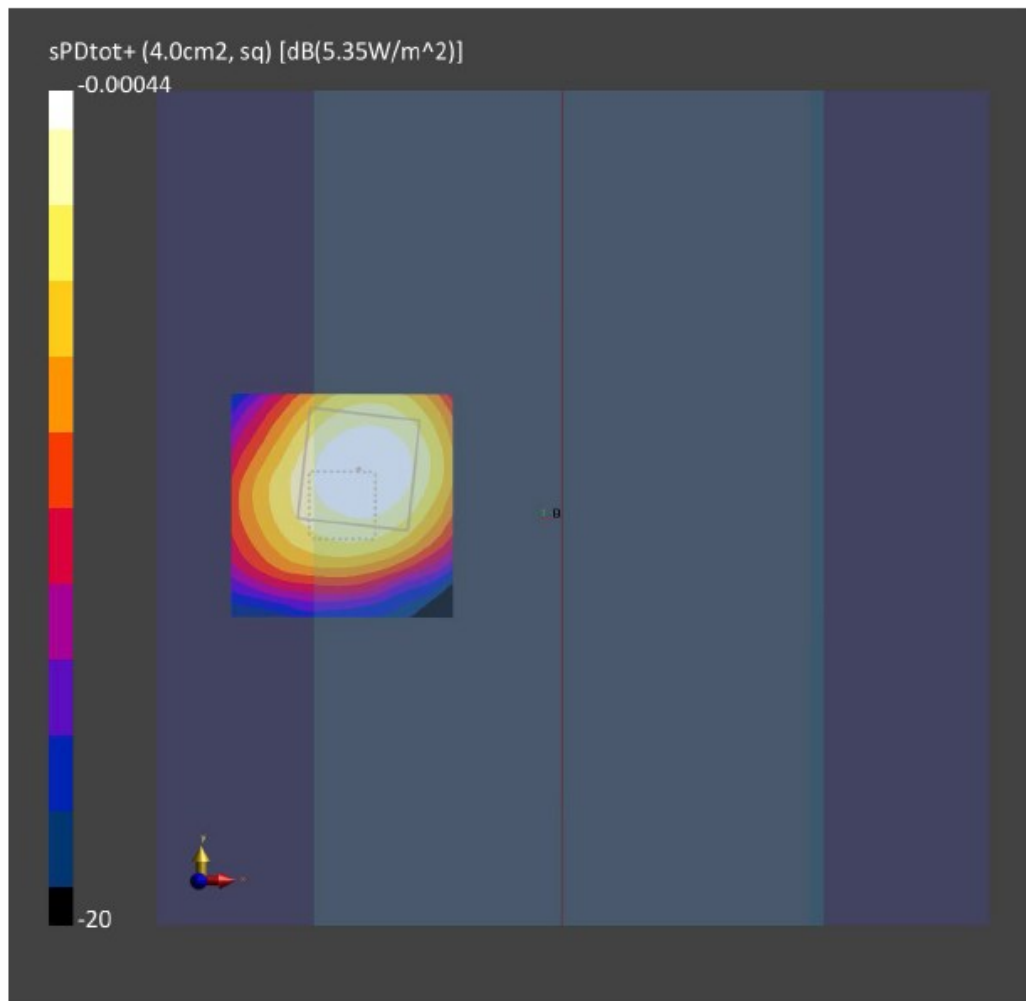
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9448_F1-55GHz, 2022-01-26	DAE4 Sn777, 2022-01-07

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	25.0 x 25.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2022-06-17, 14:36
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	3.25
psPDtot+ [W/m ²]	5.33
psPDmod+ [W/m ²]	5.55
E _{max} [V/m]	63.9
Power Drift [dB]	-0.01



ANNEX B System Verification Results

Measurement Report for Device, FRONT, Validation band, CW, Channel 30000 (30000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	100.0 x 100.0 x 100.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Validation band	CW, 0--	30000.0, 30000	1.0

Hardware Setup

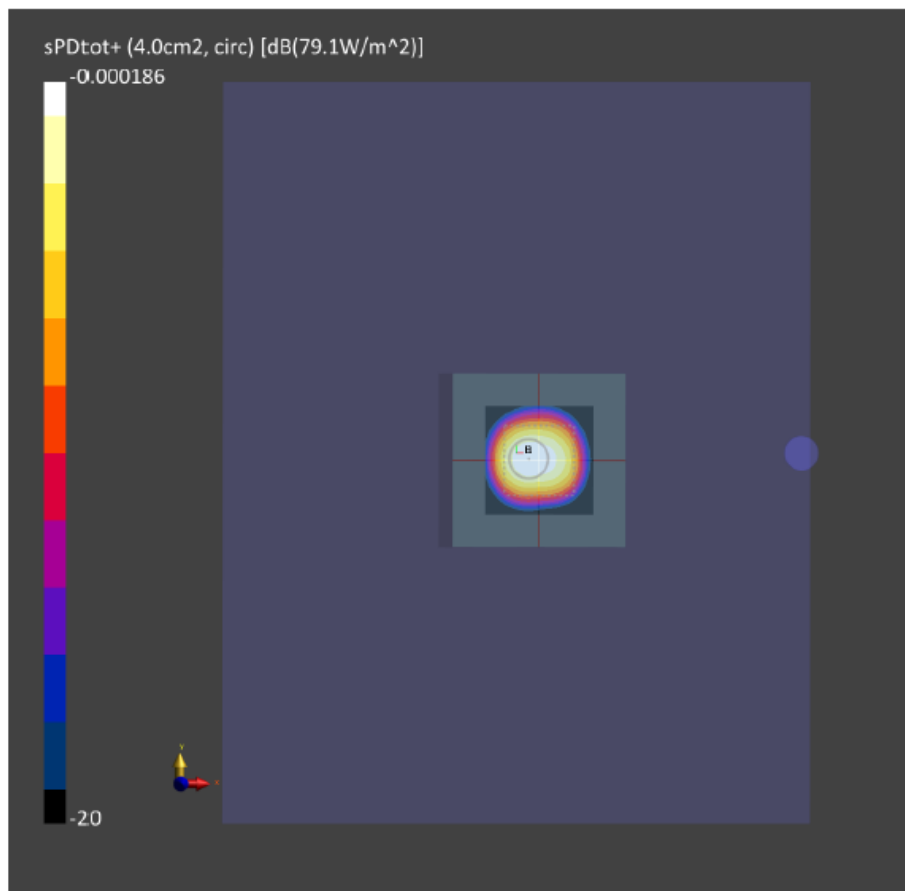
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9448_F1-55GHz, 2022-01-26	DAE4 Sn777, 2022-01-07

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
MAIA	N/A

Measurement Results

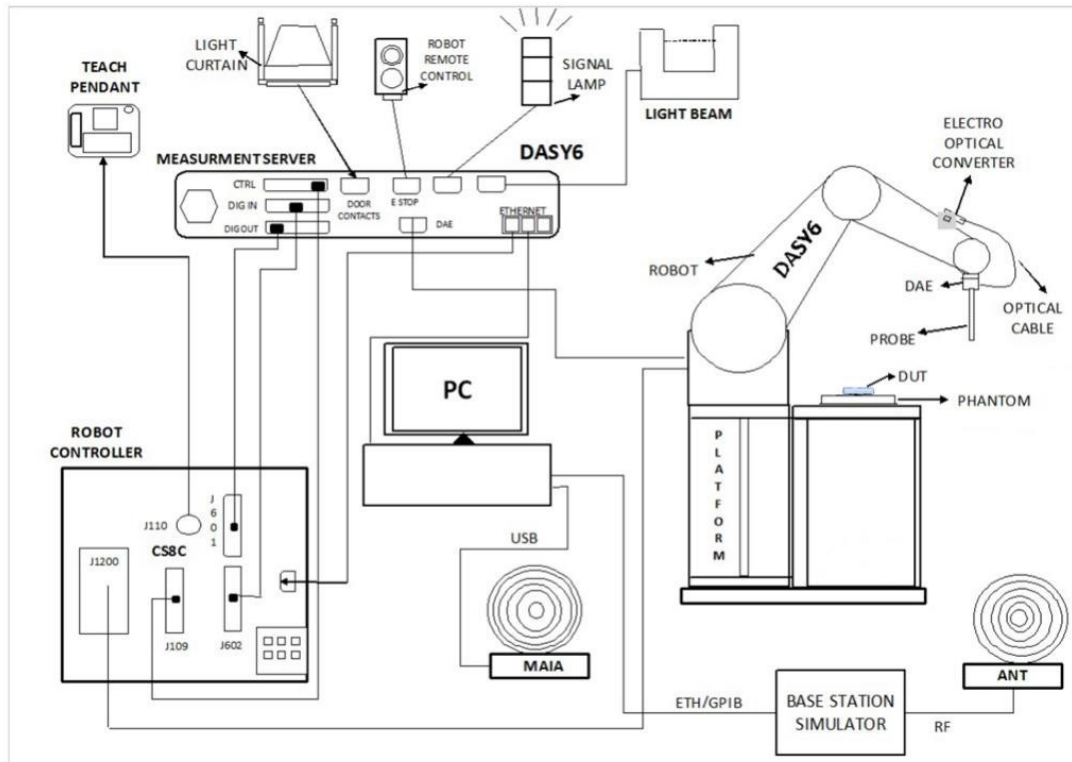
Scan Type	5G Scan
Date	2022-06-16, 18:35
Avg. Area [cm ²]	4.00
psPDn+ [W/m ²]	78.4
psPDtot+ [W/m ²]	79.1
psPDmod+ [W/m ²]	79.8
E _{max} [V/m]	222
Power Drift [dB]	-0.03



ANNEX C System Description and Setup

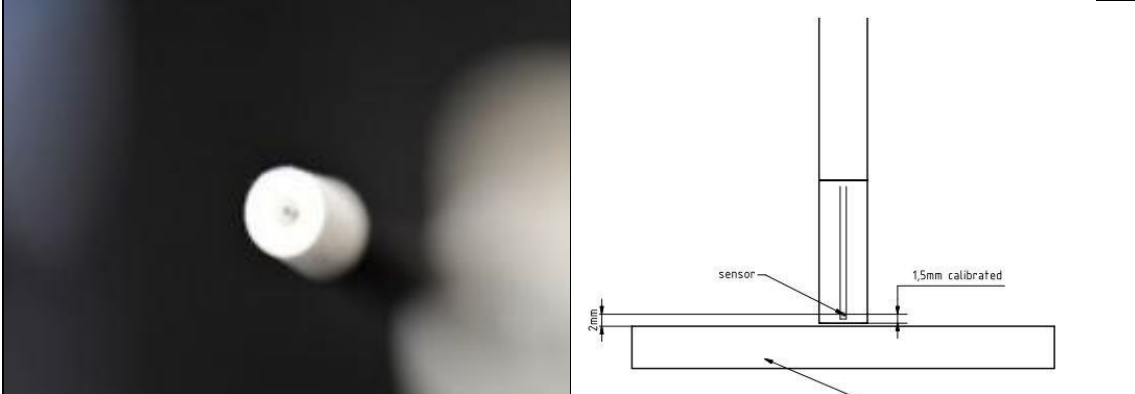
The system to be used for the near field power density measurement

- SPEAG DASY6 system
- SPEAG cDASY6 5G module software
- EUmmWVx probe
- 5G Phantom cover



C.1 E UmmWave Probe / E-Field 5G Probe

The probe design allows measurements at distances as small as 2 mm from the sensors to the surface of the device under test (DUT). The typical sensor to probe tip distance is 1.5 mm.

Frequency	750 MHz – 110 GHz
Probe Overall Length	320 mm
Probe Body Diameter	8.0 mm
Tip Length	23.0 mm
Tip Diameter	8.0 mm
Probe's two dipoles length	0.9 mm – Diode loaded
Dynamic Range	< 20 V/m - 10000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)
Position Precision	< 0.2 mm
Distance between diode	1.5 mm
Minimum Mechanical	0.5 mm
Applications	E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in < 2 mm distance from device (free-space) Power density, H-field and far-field analysis using total field reconstruction.
Compatibility	cDASY6 + 5G-Module SW1.0 and higher
	

C.2 Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Picture C.4: DAE

C.3 Scan configuration

Fine-resolution scans on 2 different planes are performed to reconstruct the E- and H-fields as well as the power density; the z-distance between the 2 planes is set to $\lambda/4$.

The (x, y) grid step is also set $\lambda/4$, the grid extent is set to sufficiently large to identify the field pattern and the peak.



ANNEX D Probe Calibration Certificate

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 **3IN (Auden)**

Certificate No: **EUMmWV4-9448_Jan22**

CALIBRATION CERTIFICATE

Object: **EUMmWV4 - SN:9448**

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: **January 26, 2022**

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	08-Oct-21 (No. ER3-2328_Oct21)	Oct-22
DAE4	SN: 789	24-Dec-20 (No. DAE4-789_Dec21)	Dec-22
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-22

	Name	Function	Signature
Calibrated by:	Leif Klynsner	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: January 28, 2022

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

**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**

Glossary:

NORM _{x,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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASYS system to align probe sensor X to the robot coordinate system
Sensor Angles k	sensor deviation from the probe axis, used to calculate the field orientation and polarization 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:

- **NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ 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.
- **DCP_{x,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).
- **A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,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 **NORM_x** (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 **NORM_x** (no uncertainty required).
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide / horn setup.



EUmmWV4 - SN: 9448

January 26, 2022

DASY - Parameters of Probe: EUmmWV4 - SN:9448

Basic Calibration Parameters

	Sensor X	Sensor Y	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$)	0.02119	0.02444	$\pm 10.1\%$
DCP (mV) ⁶	105.0	103.0	
Equivalent Sensor Angle	-60.5	36.1	

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	-0.04	0.12	± 0.43 dB
1.8	140.4	0.09	0.09	± 0.43 dB
2	133.0	0.03	0.08	± 0.43 dB
2.2	124.8	0.06	0.07	± 0.43 dB
2.5	123.0	-0.07	-0.07	± 0.43 dB
3.5	256.2	0.07	-0.03	± 0.43 dB
3.7	249.8	0.12	-0.02	± 0.43 dB
6.6	41.8	0.49	0.66	± 0.98 dB
8	48.4	0.03	-0.04	± 0.98 dB
10	54.4	-0.06	-0.03	± 0.98 dB
15	71.5	0.38	-0.34	± 0.98 dB
18	85.3	-0.06	0.21	± 0.98 dB
26.6	96.9	-0.29	-0.10	± 0.98 dB
30	92.6	0.04	0.04	± 0.98 dB
35	93.7	0.04	0.08	± 0.98 dB
40	91.5	-0.09	-0.20	± 0.98 dB
50	19.6	0.02	0.00	± 0.98 dB
55	22.4	-0.01	0.03	± 0.98 dB
60	23.0	-0.05	-0.05	± 0.98 dB
65	27.4	-0.14	-0.17	± 0.98 dB
70	23.9	0.05	-0.21	± 0.98 dB
75	20.0	-0.14	-0.01	± 0.98 dB
75	14.8	-0.22	-0.07	± 0.98 dB
80	22.5	-0.01	0.19	± 0.98 dB
85	22.8	-0.05	-0.09	± 0.98 dB
90	23.8	0.12	0.10	± 0.98 dB
92	23.9	-0.34	-0.31	± 0.98 dB
95	20.5	-0.27	-0.28	± 0.98 dB
97	24.4	-0.04	-0.12	± 0.98 dB
100	22.6	-0.12	-0.09	± 0.98 dB
105	22.7	0.03	0.06	± 0.98 dB
110	19.7	0.18	0.24	± 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%.

⁵ Numerical linearization parameter: uncertainty not required.

⁶ Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



EUmmWV4 - SN: 9448

January 26, 2022

DASY - Parameters of Probe: EUmmWV4 - SN:9448

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	114.7	± 2.7 %	± 4.7 %
		Y	0.00	0.00	1.00		99.5		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.94	60.00	13.99	10.00	6.0	± 1.1 %	± 9.6 %
		Y	2.08	60.00	14.32		6.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	1.32	60.00	12.88	6.99	12.0	± 0.9 %	± 9.6 %
		Y	1.41	60.00	13.24		12.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.78	60.00	11.66	3.98	23.0	± 1.0 %	± 9.6 %
		Y	0.84	60.00	12.02		23.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.48	60.00	10.84	2.22	27.0	± 0.9 %	± 9.6 %
		Y	0.54	60.00	11.12		27.0		
10387-AAA	QPSK Waveform, 1 MHz	X	1.12	60.00	11.63	1.00	22.0	± 1.6 %	± 9.6 %
		Y	1.15	60.00	11.64		22.0		
10388-AAA	QPSK Waveform, 10 MHz	X	1.31	60.00	11.66	0.00	22.0	± 0.7 %	± 9.6 %
		Y	1.35	60.00	11.65		22.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	2.24	61.53	14.37	3.01	17.0	± 0.7 %	± 9.6 %
		Y	2.09	60.00	13.53		17.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	2.14	60.00	12.23	0.00	19.0	± 0.8 %	± 9.6 %
		Y	2.18	60.00	12.24		19.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	3.26	60.00	12.69	0.00	12.0	± 0.8 %	± 9.6 %
		Y	3.31	60.00	12.69		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	-0.07	0.14	± 0.2 dB
0.9	100.0	-0.08	-0.02	± 0.2 dB
0.9	500.0	0.01	-0.01	± 0.2 dB
0.9	1000.0	0.04	0.01	± 0.2 dB
0.9	1500.0	0.01	0.00	± 0.2 dB
0.9	2000.0	-0.01	-0.01	± 0.2 dB

Sensor Frequency Model Parameters (750 MHz – 55 GHz)

	Sensor X	Sensor Y
R (Ω)	78.62	76.01
R _p (Ω)	91.22	93.55
L (nH)	0.12571	0.10640
C (pF)	0.2311	0.2818
C _p (pF)	0.0674	0.0686

Sensor Frequency Model Parameters (55 GHz – 110 GHz)

	Sensor X	Sensor Y
R (Ω)	34.71	35.28
R _p (Ω)	95.06	94.85
L (nH)	0.03212	0.03211
C (pF)	0.1970	0.2153
C _p (pF)	0.1316	0.1310



No. 24T04Z100387-001

EUmmWV4 - SN: 9448

January 26, 2022

DASY - Parameters of Probe: EUmmWV4 - SN:9448

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	41.4	302.74	34.09	0.92	3.77	4.99	0.00	1.25	1.01
Y	41.7	305.90	34.29	0.92	4.34	5.00	0.00	1.46	1.01

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-8.3
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

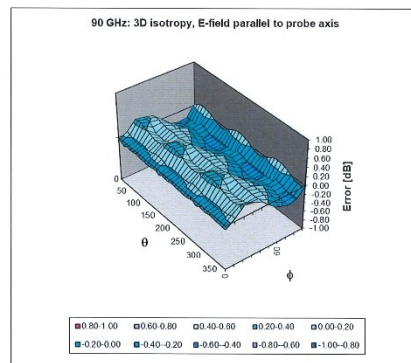
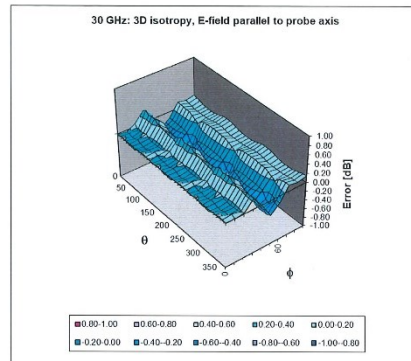
Certificate No: EUmmWV4-9448_Jan22

Page 5 of 19

EUmmWV4 - SN: 9448

January 26, 2022

Deviation from Isotropy in Air f = 30, 90 GHz



Probe isotropy for E_{tot} : probe rotated $\phi = 0^\circ$ to 360° , tilted from field propagation direction \vec{k}
 Parallel to the field propagation ($\psi = 0^\circ - 90^\circ$) at 30 GHz: deviation within ± 0.36 dB
 Parallel to the field propagation ($\psi = 0^\circ - 90^\circ$) at 90 GHz: deviation within ± 0.26 dB



EUmmWV4 - SN: 9448

January 26, 2022

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	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %

Certificate No: EUmmWV4-9448_Jan22

Page 7 of 19



EUmmWV4 - SN: 9448

January 26, 2022

10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAG	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	CAD	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAD	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAD	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAD	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	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAF	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	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAG	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	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	CAG	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	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %

Certificate No: EUmmWV4-9448_Jan22

Page 8 of 19



No. 24T04Z100387-001

EUmmWV4 - SN: 9448

January 26, 2022

10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAD	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAD	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAD	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAD	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
10220	CAD	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAD	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAD	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	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	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	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAB	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	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAD	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	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAG	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	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	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	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAB	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	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %

Certificate No: EUmmWV4-9448_Jan22

Page 9 of 19



EUmmWV4 - SN: 9448

January 26, 2022

10261	CAD	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	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAG	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	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	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	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %
10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WIMAX	12.03	± 9.6 %
10302	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3CTRL)	WIMAX	12.57	± 9.6 %
10303	AAA	IEEE 802.16e WIMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	12.52	± 9.6 %
10304	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	± 9.6 %
10305	AAA	IEEE 802.16e WIMAX (31:15, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	15.24	± 9.6 %
10306	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	14.67	± 9.6 %
10307	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, PUSC)	WIMAX	14.49	± 9.6 %
10308	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WIMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3)	WIMAX	14.58	± 9.6 %
10310	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3)	WIMAX	14.57	± 9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAA	IDEN 1:3	iDEN	10.51	± 9.6 %
10314	AAA	IDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WIFI 2.4 GHz (DSSS, 1 Mbps, 96pc dc)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WIFI 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc dc)	WLAN	8.36	± 9.6 %
10317	AAD	IEEE 802.11a WIFI 5 GHz (OFDM, 6 Mbps, 96pc 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	AAE	IEEE 802.11ac WIFI (20MHz, 64-QAM, 99pc dc)	WLAN	8.37	± 9.6 %
10401	AAE	IEEE 802.11ac WIFI (40MHz, 64-QAM, 99pc dc)	WLAN	8.60	± 9.6 %
10402	AAE	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	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10410	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %

Certificate No: EUmmWV4-9448_Jan22

Page 10 of 19