

TEST REPORT



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1. Report No : DRRFCC2511-0061(1)

2. Customer

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3. Use of Report : FCC Original Certification

4. Product Name / Model Name : PLC wireless USB communication device / RCPOR-PLC300A

FCC ID : 2APB6-PLC300A

5. FCC Regulation(s) : CFR 47 Part 2 subpart 2.1093

Test Method Used : IEEE 1528-2013, IEC/IEEE 62209-1528:2020,

IEC 62209-2 2010, IEC 62209-2 2010/AMD1:2019

FCC SAR KDB Publications (Details in test report)

6. Date of Test : 2025.10.24 ~ 2025.10.29

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : Refer to appended test report.

9. Test Result : Refer to attached test report.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Reviewed by
	Name : SeungMin Lim 	Name : HakMin Kim 

2025 . 11 . 20 .

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If this report is required to confirmation of authenticity, please contact to report@dtnc.net

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Test Report Version

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Table of Contents

1. DESCRIPTION OF DEVICE.....	4
1.1 General Information.....	4
1.2 Power Reduction for SAR.....	4
1.3 Nominal and Maximum Output Power Specifications.....	4
1.4 DUT Antenna Locations.....	4
1.5 Guidance Applied.....	5
1.6 Device Serial Numbers.....	5
1.7 Simultaneous Transmission Capabilities.....	5
2. INTROCUCTION.....	6
3. DOSIMETRIC ASSESSMENT	7
3.1 Measurement Procedure	7
4. TEST CONFIGURATION POSITIONS	12
4.1 Device Holder.....	12
4.2 Generic device.....	12
5. RF EXPOSURE LIMITS.....	13
6. FCC MEASUREMENT PROCEDURES	14
6.1 Measured and Reported SAR.....	14
6.2 Procedures Used to Establish RF Signal for SAR	14
6.3 DONGLES WITH EXTERNAL, SWIVEL OR ROTATING ANTENNAS.....	14
7. RF CONDUCTED POWERS.....	15
7.1 Nominal and Maximum Output Power Spec and Conducted Powers (WLAN 2.4 GHz).....	15
8. SYSTEM VERIFICATION.....	16
8.1 Tissue Verification.....	16
8.2 Test System Verification.....	16
9. SAR TEST RESULTS	17
9.1 Body SAR Results	17
9.2 SAR Test Notes	17
10. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS	19
10.1 Introduction.....	19
10.2 Simultaneous Transmission Procedures	19
10.3 Simultaneous Transmission Capabilities.....	19
10.4 Body Simultaneous Transmission Analysis	19
10.5 Simultaneous Transmission Conclusion.....	19
11. SAR MEASUREMENT VARIABILITY	20
11.1 Measurement Variability.....	20
11.2 Measurement Uncertainty	20
12. EQUIPMENT LIST	21
13. MEASUREMENT UNCERTAINTIES.....	22
14. CONCLUSION.....	24
15. REFERENCES.....	25
APPENDIX A. – Probe Calibration Data	27
APPENDIX B. – Dipole Calibration Data	71
APPENDIX C. – SAR Tissue Specifications.....	84
APPENDIX D. – SAR SYSTEM VALIDATION	89
APPENDIX E. – Description of Test Equipment.....	91

1. DESCRIPTION OF DEVICE

1.1 General Information

EUT type	PLC wireless USB communication device				
FCC ID	2APB6-PLC300A				
Equipment model name(s)	RCPORT-PLC300A				
PMN(Product Marketing Name)	RCPORT-PLC300A				
Equipment serial no.	Identical prototype				
FVIN (Firmware Version Identification Number)	1.0				
FCC & ISED MRA Designation No.	KR0034				
ISED#	5740A				
TX Frequency Range	Band	Mode	Operating Modes	Bandwidth	Frequency
	2.4 GHz WLAN	802.11b/g/n	Data	HT20	2 412 ~ 2 462 MHz
	NFC	-	Data	-	13.56 MHz
Equipment Class	Band	Reported SAR			
		1g SAR (W/kg)			
		Body			
DTS	2.4 GHz W-LAN	0.31			
DXX	NFC	<0.1			
Simultaneous SAR per KDB 690783 D01v01r03		0.31			
FCC Equipment Class	Digital Transmission System(DTS) Low Power Communications Device Transmitter (DXX)				
Date(s) of Tests	2025.10.24 ~ 2025.10.29				
Antenna Type	Internal Antenna				
Functions					
Note					

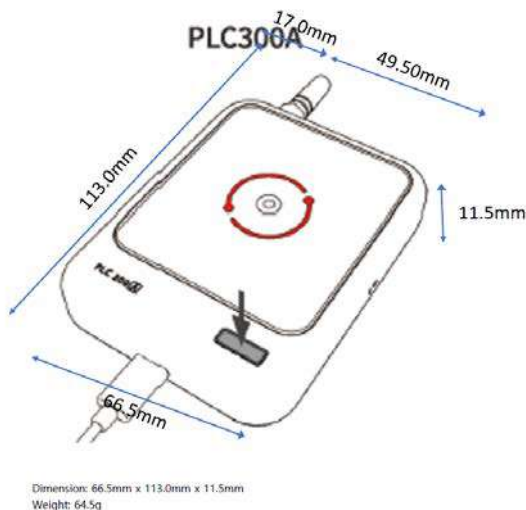
1.2 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

1.3 Nominal and Maximum Output Power Specifications

The Nominal and Maximum Output Power Specifications are in section 7 of this test report.

1.4 DUT Antenna Locations



Mode	Device Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
2.4 GHz W-LAN	X	X	O	O	O	O
NFC	X	X	O	O	O	O

Note 1: O - Test / X - Not test.

1.5 Guidance Applied

- IEEE 1528-2013
- IEC 62209-2 2010
- IEC 62209-2 2010/AMD1:2019
- IEC/IEEE 62209-1528:2020
- FCC KDB Publication 447498 D01v06 (General RF Exposure Guidance)
- FCC KDB Publication 248227 D01v02r02 (802.11 Wi-Fi SAR)
- FCC KDB Publication 447498 D02v2r01 (SAR Procedures for Dongle Xmtr)
- FCC KDB Publication 648474 D04v01r03 (Handset SAR)
- FCC KDB Publication 690783 D01v01r03 (SAR Listings on Grants)
- FCC KDB Publication 865664 D01v01r04 (SAR Measurement 100 MHz to 6 GHz)
- FCC KDB Publication 865664 D02v01r02 (RF Exposure Reporting)
- October 2016 TCB Workshop Notes (DUT Holder Perturbations)
- April 2019 TCB Workshop Notes (Tissue Simulating Liquids)

1.6 Device Serial Numbers

The serial numbers used for each test are indicated alongside the results in Section 9.

1.7 Simultaneous Transmission Capabilities

The Simultaneous Transmission Capabilities are in section 10 of this test report.

2. INTROCUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ) It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 2.1)

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

Fig. 2.1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

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

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m³)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

3. DOSIMETRIC ASSESSMENT

3.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4.1).
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4.1). On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
 - a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4.1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

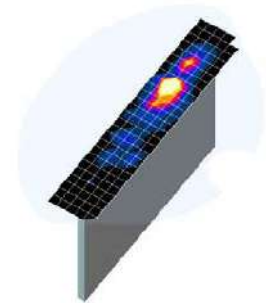


Figure 3.1
Sample SAR Area Scan

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm $\pm$ 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° $\pm$ 1°	20° $\pm$ 1°
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <u>area scan based 1-g SAR estimation</u> procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Table 3.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Replaced paragraph 6.3.1 d) of IEC 62209-2 2010 with the following:

Measure the three-dimensional SAR distribution at each of the local maxima locations identified in step c) (zoom scan procedure).

For frequencies at or below 3 GHz, the following procedure shall be applied (see Table 4.2):

The horizontal grid step shall be 8 mm or less. The grid step in the vertical direction shall be 5 mm or less if uniform spacing is used. If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell (M1 and M2, see Figure 4.2) shall be 4 mm or less and the spacing between farther points shall increase by a factor of 1.5 or less. The minimum size of the zoom scan volume shall be 30 mm by 30 mm by 30 mm. For other parameters, see Table 3.2 and Figure 4.2.

For frequencies above 3 GHz, the minimum size of the zoom scan volume may be reduced to 22 mm by 22 mm by 22 mm. The horizontal grid step shall be $(24/f \text{ [GHz]})$ mm or less. If uniform spacing in the vertical direction is used, the grid step in the vertical direction shall be $(10/(f \text{ [GHz]} - 1))$ mm or less. If variable spacing is used in the vertical direction, the maximum spacing between the two measured points closest to the phantom shell shall be $(12/f \text{ [GHz]})$ mm or less and the spacing between further points shall increase by a factor of 1.5 or less. For other parameters, see Table 4.2 and Figure 4.2.

When the highest 1 g or 10 g cube is touching the boundary of a zoom-scan volume, the entire zoom scan shall be repeated with the new centre located at the maximum psSAR location indicated by the preceding zoom scan measurement.

If the zoom scan measured as defined above complies with both of the following criteria, or if the peak spatial-average SAR is below 0.1 W/kg, no additional measurements are needed:

- 1) the smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x and y directions (Δx , Δy). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance z_{M1} . The minimum distance shall be recorded in the SAR test report;
- 2) the ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum SAR value shall be at least 30 % (see Figure 4.2). This ratio (in %) shall be recorded in the SAR test report.

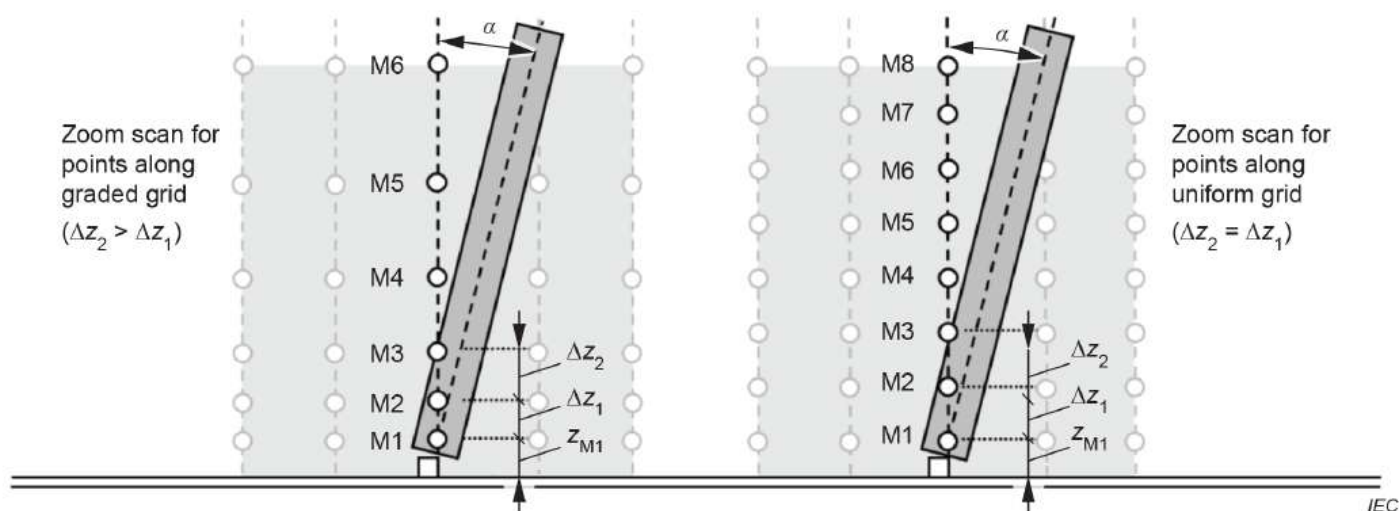


Figure 3.2 Orientation of the probe with respect to the line normal to the phantom surface, shown at two different locations

Note(s):

1. M1 to M8 are example measurement points used for extrapolation to the surface. The maximum of the angle α between the evaluation axis and the surface normal line is given in Table 4.2. The distance z_{M1} is from the phantom shell to the first measurement point M1, and its maximum value is given in Table 3.2. The distances Δz_i ($i = 1, 2, 3, \dots$) are the distances from measurement points M_i to M_{i-1} . For uniform grids, Δz_i are equal. For graded grids, $\Delta z_{i+1} > \Delta z_i$. $R_z = \Delta z_{i+1}/\Delta z_i$ is a ratio with a maximum value given in Table 4.2. The z direction corresponds to the vertical direction, the x direction is horizontal and the y direction is horizontal into the page.
2. The evaluation of the zoom scan is typically done by the post-processor by interpolation and extrapolation and without reconstruction of the field. More focused induced SAR distributions (e.g., for more localized sources such as capacitively coupled sources) require a more dense grid such that the same integration and extrapolation algorithms can be used for the same assessment uncertainty.
3. The minimum ratio of 30 % is derived from the plane wave penetration depth at 6 GHz.

If one or both of the above criteria are not met, the zoom scan measurement shall be repeated using a finer resolution while keeping the other zoom scan parameters compatible with Table 4.2. New horizontal and vertical grid steps shall be determined from the measured SAR distribution so that the above criteria are met. Compliance with the above two criteria shall be demonstrated for the new measured zoom scan. The size of the higher resolution zoom scan and other parameters of Table 4.2 shall apply. The closest point to the phantom shell shall be 2 mm or less for graded grids and the grading factor shall be 1.5 or less.

Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved if the distance between the phantom surface and physical tip of the probe is larger than the probe tip diameter. Other methods may utilize correction procedures to compensate for boundary effects that enable high precision measurements closer than half the probe tip diameter. For all measurement points, the angle of the probe normal to the flat phantom surface shall be less than 5° . If this cannot be achieved, an additional uncertainty evaluation according to 7.2.2.6 of IEC 62209-2 2010/AMD1 2019 is required.

Parameter	DUT transmit frequency being tested	
	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 6 \text{ GHz}$
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 14 and Table 2, in mm)	5	$\delta \ln(2)/2^a$
Maximum angle between the probe axis and the flat phantom surface normal (α in Figure 14)	5°	5°
Maximum spacing between measured points in the x- and y-directions (Δx and Δy , in mm)	8	$24/f^{b,c}$
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	5	$10/(f - 1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 14)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in 7.2.5.3, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in 7.2.5.3, in mm)	30	22
Tolerance in the probe angle	1°	1°
^a δ is the penetration depth for a plane-wave incident normally on a planar half-space. ^b This is the maximum spacing allowed, which may not work for all circumstances. ^c f is the frequency in GHz.		

Table 3.2 Zoom Scan Resolutions per IEC 62209-2 2010/AMD1 2019

4. TEST CONFIGURATION POSITIONS

4.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$.

4.2 Generic device

The SAR evaluation shall be performed for all surfaces of the DUT that are accessible during intended use, as indicated in Figure 5.1. The separation distance in testing shall correspond to the intended use distance as specified in the user instructions provided by the manufacturer. If the intended use is not specified, all surfaces of the DUT shall be tested directly against the flat phantom.

The surface of the generic device (or the surface of the carry accessory holding the DUT) pointing towards the flat phantom shall be parallel to the surface of the phantom.

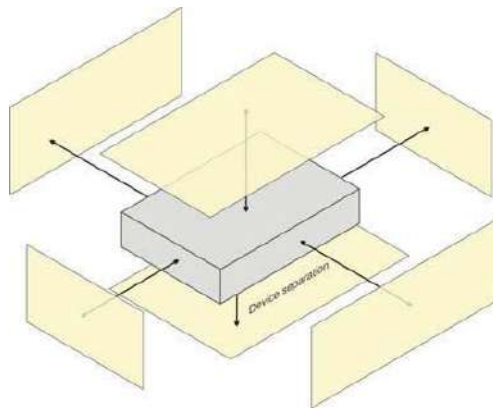


Figure 4.1 Test positions for a generic device

5. RF EXPOSURE LIMITS

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.

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 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.

Table 5.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-1992

	HUMAN EXPOSURE LIMITS	
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.0

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

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

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).

6. FCC MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

6.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

6.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01.

The device was placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test were evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device was tested throughout the SAR test at maximum output power, the SAR measurement system measures a "point SAR" at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviated by more than 5%, the SAR test and drift measurements were repeated.

6.3 DONGLES WITH EXTERNAL, SWIVEL OR ROTATING ANTENNAS

For dongles with external antennas or antennas that may swivel or rotate, a KDB inquiry should be submitted to the FCC Laboratory to determine the applicable test configurations. The inquiry should identify if the antenna may transmit in its stowed position, and if a swivel or rotating USB connector is also used. Depending on the antenna configurations used in the individual dongle design and its operating configurations, different test separation distances may apply and must be determined on a case-by-case basis.

7. RF CONDUCTED POWERS

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

7.1 Nominal and Maximum Output Power Spec and Conducted Powers (WLAN 2.4 GHz)

Band (GHz)	Mode	Ch	Modulated Average[dBm]	
			Maximum	Nominal
2.4	802.11b	1-11	15.60	14.60
	802.11g	1-11	10.80	9.80
	802.11n (HT20)	1-11	10.60	9.60
	802.11n (HT40)	3-9	8.00	7.00

Table 7.1.1 Nominal and Maximum Output Power Spec

Mode	Freq. (MHz)	Channel	IEEE 802.11 (2.4 GHz) Conducted Power[dBm]
802.11b	2 412	1	15.15
	2 437	6	14.54
	2 462	11	15.54
802.11g	2 412	1	9.96
	2 437	6	10.60
	2 462	11	10.76
802.11n (HT20)	2 412	1	9.33
	2 437	6	9.00
	2 462	11	10.57
802.11n (HT40)	2 422	3	7.96
	2 437	6	6.36
	2 452	9	7.39

Table 7.1.2 IEEE 802.11 Average RF Power

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, duo to an even number of channels, both channels were measured.
- Output Power and SAR is not required for 802.11 g/n HT20/n HT40 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjust SAR is ≤ 1.2 W/kg.
- The underlined data rate and channel above were tested for SAR.

The average output powers of this device were tested by below configuration.

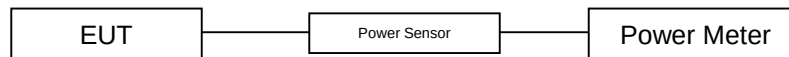


Figure 7.1.1 Power Measurement Setup

8. SYSTEM VERIFICATION

8.1 Tissue Verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, ϵ_r	Target Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ_r	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Oct. 24. 2025	13 Head	21.4	21.3	13.0	55.000	0.750	55.223	0.774	0.41	3.20
				13.6	55.000	0.750	55.396	0.774	0.72	3.20
				14.0	55.000	0.750	55.298	0.776	0.54	3.47
Oct. 29. 2025	2 450 Head	21.7	21.6	2 450.0	39.200	1.800	39.178	1.810	-0.06	0.56
				2 412.0	39.265	1.766	39.226	1.774	-0.10	0.43
				2 437.0	39.222	1.788	39.183	1.797	-0.10	0.48
				2 462.0	39.184	1.813	39.178	1.820	-0.02	0.40

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB 865664 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

Measurement Procedure for Tissue verification:.

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity, for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r'\epsilon_0)^{1/2}]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

8.2 Test System Verification

Prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at using the SAR Dipole kit(s). (Graphic Plots Attached)

Table 8.2.1 System Verification Results (1g)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR _{1g} (W/kg)	Measured SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation [%]
B	2 450	D2450V2, SN: 726	Oct. 29. 2025	Head	21.7	21.6	3933	100	52.2	5.16	53.6	-1.15

Table 8.2.2 System Verification Results (1g)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR _{1g} (W/kg)	Measured SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation [%]
B	13	CLA13, SN:1030	Oct. 24. 2025	Head	21.4	21.3	3916	250	0.520	0.124	0.496	-4.62

Note(s):

1. System Verification was measured with input 100 mW and 250 mW normalized to 1W.
2. Full system validation status and results can be found in Appendix D.

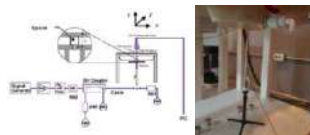


Figure 8.1 Dipole Verification Test Setup Diagram & Photo

9. SAR TEST RESULTS

9.1 Body SAR Results

Table 9.1.1 DTS Body SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode (Antenna)	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plot s #
MHz	Ch														
2 462.0	11	802.11b	15.60	15.54	-0.180	5 mm [Front]	FCC #1	0.279	1	99.2	0.302	1.014	1.008	0.309	A1
2 462.0	11	802.11b	15.60	15.54	0.020	5 mm [Rear]	FCC #1	0.285	1	99.2	0.295	1.014	1.008	0.302	
2 462.0	11	802.11b	15.60	15.54	-0.060	5 mm [Right]	FCC #1	0.132	1	99.2	0.139	1.014	1.008	0.142	
2 462.0	11	802.11b	15.60	15.54	0.170	5 mm [Left]	FCC #1	0.115	1	99.2	0.109	1.014	1.008	0.111	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 9.1.2 NFC Body SAR

FREQUENCY		MEASUREMENT RESULTS							
MHz	Ch	Mode	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle (%)	1g SAR (W/kg)	Plots #	
13.6	13600	NFC	0.030	5 mm [Front]	FCC #1	100	0.000454	A2	
13.6	13600	NFC	-0.110	5 mm [Rear]	FCC #1	100	0.000239		
13.6	13600	NFC	0.000	5 mm [Right]	FCC #1	100	0.0000275		
13.6	13600	NFC	0.000	5 mm [Left]	FCC #1	100	0.0000107		
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure							Body 1.6 W/kg (mW/g) averaged over 1 gram		

9.2 SAR Test Notes

General Notes:

- The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 447498 D01v06.
- Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
- Liquid tissue depth was at least 15.0 cm for all frequencies.
- The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units
- SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
- SAR measurements were performed using the DASY5 automated system. The procedure for spatial peak SAR evaluation has been implemented according to the IEEE 1528 standard. During a maximum search, global and local maxima searches are automatically performed in 2-D after each area scan measurement. The algorithm will find the global maximum and all local maxima within 2 dB of the global maxima for all SAR distributions. All local maxima within 2 dB of the global maximum were searched and passed for the Zoom Scan measurement.

WLAN Notes:

1. The initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output and the adjust SAR is ≤ 1.2 W/kg.
3. When the maximum reported 1g averaged SAR ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor to determine compliance.

10. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

10.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to handsets with built-in unlicensed transmitters such as Bluetooth LE devices which may simultaneously transmit with the licensed transmitter.

10.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the sum 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. The different test position in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

10.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

Table 10.3.1 Simultaneous SAR Cases

No.	Capable Transmit Configuration	Body SAR	Note
1	RFID + 2.4 GHz W-LAN	Yes	

10.4 Body Simultaneous Transmission Analysis

Table 10.4.1 Simultaneous Transmission Scenario : RFID + 2.4 GHz W-LAN

Exposure Condition	RFID SAR (W/kg)	2.4 GHz W-LAN SAR (W/kg)	Σ SAR (W/kg)
	1	2	1+2
Top			
Bottom			
Front	<0.1	0.309	0.309
Rear	<0.1	0.302	0.302
Right	<0.1	0.142	0.142
Left	<0.1	0.111	0.111

10.5 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

11. SAR MEASUREMENT VARIABILITY

11.1 Measurement Variability

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

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

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~10% from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
5. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure to the corresponding SAR thresholds.

11.2 Measurement Uncertainty

The measured SAR was < 1.5 W/kg for 1g and < 3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04 was not required.

12. EQUIPMENT LIST

Table 11.1 Test Equipment Calibration

	Type	Manufacturer	Model	Cal.Date	Next.Cal.Date	S/N
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	Robot	SPEAG	TX60L	N/A	N/A	F14/5VR2A1/A/01
☒	Robot Controller	SPEAG	CS8C	N/A	N/A	F14/5VR2A1/C/01
☒	Joystick	SPEAG	N/A	N/A	N/A	D21142605A
☒	Intel Xeon W-2 253 3.70 GHz Windows 11 Professional	N/A	N/A	N/A	N/A	N/A
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
☒	Device Holder	SPEAG	SD000H01KA	N/A	N/A	N/A
☒	2 mm Oval Phantom ELI6	SPEAG	QDIVA001BB	N/A	N/A	2008
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1783
☒	Data Acquisition Electronics	SPEAG	DAE4V1	2025-04-23	2026-04-23	1485
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2025-03-19	2026-03-19	3916
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2025-09-22	2026-09-22	3933
☒	Confined Loop Antenna (13 MHz)	SPEAG	CLA13	2024-11-19	2025-11-19	1030
☒	2 450MHz SAR Dipole	SPEAG	D2450V2	2025-04-15	2027-04-15	726
☒	Signal Generator	Agilent	E4438C	2025-05-28	2026-05-28	US41461520
☒	High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2025-05-30	2026-05-30	1005
☒	Power Meter	H/P	EPM-442A	2024-11-26	2025-11-26	GB37170267
☒	Power Meter	Anritsu	ML2488B	2024-11-27	2025-11-27	0846003
☒	Power Sensor	Anritsu	MA2472D	2024-11-27	2025-11-27	0845419
☒	Power Sensor	H/P	8481A	2024-11-29	2025-11-29	2702A65976
☒	Power Sensor	H/P	8481A	2024-11-29	2025-11-29	2702A61707
☒	Directional Coupler	H/P	772D	2024-11-25	2025-11-25	2839A00902
☒	Low Pass Filter 3.0 GHz	MICROLAB	LA-30N	2025-05-28	2026-05-28	2
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2024-11-25	2025-11-25	BP4387
☒	Attenuators	Saluki	3.5TS2-3dB-26.5G	2025-05-29	2026-05-29	21090703
☒	Dielectric Probe kit	SPEAG	DAK-3.5	2025-07-07	2026-07-07	1046
		SPEAG	R140	2025-07-17	2026-07-17	0101213

NOTE(S):

- The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by Dt&C before each test. The brain and muscle simulating material are calibrated by Dt&C using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain and muscle-equivalent material. Each equipment item was used solely within its respective calibration period.
- CBT(Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

13. MEASUREMENT UNCERTAINTIES

13 MHz

Error Description	Uncertainty value %	Probability Distribution	Divisor	(Ci) 1 g	(Ci) 10 g	Standard 1 g (%)	Standard 10 g (%)	Ci x U_i 1 g	Ci x U_i 10 g	vi 2 or Veff
Measurement System										
Probe calibration	13.3	Normal	2	1	1	6.65	6.65	6.65	6.65	∞
Probe Calibration Drift	1.7	Rectangular	$\sqrt{3}$	1	1	1.0	1.0	1.0	1.0	∞
Probe Linearity	4.7	Rectangular	$\sqrt{3}$	1	1	2.7	2.7	2.7	2.7	∞
Broadband Signal	0.6	Rectangular	$\sqrt{3}$	1	1	0.3	0.3	0.3	0.3	∞
Probe Isotropy	7.6	Rectangular	$\sqrt{3}$	1	1	4.4	4.4	4.4	4.4	∞
Other Probe+Electronic	0.8	Normal	1	1	1	0.8	0.8	0.8	0.8	∞
RF Ambient Conditions	1.8	Normal	1	1	1	1.8	1.8	1.8	1.8	∞
Probe Positioning	3.9	Normal	1	0.04	0.04	3.9	3.9	0.2	0.2	∞
Data Processing	1.2	Normal	1	1	1	1.2	1.2	1.2	1.2	∞
Phantom and Device										
Liquid conductivity (Target)	5.0	Rectangular	$\sqrt{3}$	0.64	0.43	2.89	2.89	1.85	1.24	∞
Liquid conductivity (Meas.)	3.2	Normal	1	0.78	0.71	3.20	3.20	2.50	2.27	∞
Liquid permittivity (Target)	5.0	Rectangular	$\sqrt{3}$	0.60	0.49	2.89	2.89	1.73	1.41	∞
Liquid permittivity (Meas.)	3.3	Normal	1	0.23	0.26	3.30	3.30	0.76	0.86	∞
Temp. unc. - Conductivity	2.0	Rectangular	$\sqrt{3}$	0.78	0.71	1.15	1.15	0.90	0.82	∞
Temp. unc. - Permittivity	2.0	Rectangular	$\sqrt{3}$	0.23	0.26	1.15	1.15	0.27	0.30	∞
Phantom Shell Permittivity	14.0	Rectangular	$\sqrt{3}$	0	0	8.1	8.1	0.0	0.0	∞
Distance DUT-TSL	2.0	Normal	1	2	2	2.0	2.0	4.0	4.0	∞
Device Positioning	2.3	Normal	1	1	1	2.3	2.3	2.3	2.3	∞
Device Holder	2.1	Normal	1	1	1	2.1	2.1	2.1	2.1	∞
DUT Modulation	2.4	Rectangular	$\sqrt{3}$	1	1	1.4	1.4	1.4	1.4	∞
Time-average SAR	1.7	Rectangular	$\sqrt{3}$	1	1	1.0	1.0	1.0	1.0	∞
DUT drift	2.5	Normal	1	1	1	2.5	2.5	2.5	2.5	∞
Validation Antenna	0.0	Normal	1	1	1	0.0	0.0	0.0	0.0	∞
Uncertainty in Accepted Power	0.0	Normal	1	1	1	0.0	0.0	0.0	0.0	∞
Correction to the SAR results										
Deviation to target	1.9	Normal	1	1	0.84	1.9	1.9	1.9	1.6	∞
SAR Scaling	0.0	Rectangular	$\sqrt{3}$	1	1	0.0	0.0	0.0	0.0	∞
Combined Standard Uncertainty										
Expanded Uncertainty (k=2)						11	11			∞
						22	22			

$$U(1\text{ g}) = k \cdot u_c$$

$$= 2 \cdot 11\%$$

$$= 22\% \text{ (The confidence level is about } 95\% \text{ } k=2)$$

$$U(10\text{ g}) = k \cdot u_c$$

$$= 2 \cdot 11\%$$

$$= 22\% \text{ (The confidence level is about } 95\% \text{ } k=2)$$

2 450 MHz

Error Description	Uncertainty value %	Probability Distribution	Divisor	(Ci) 1 g	(Ci) 10 g	Standard 1 g (%)	Standard 10 g (%)	Ci x U _i 1 g	Ci x U _i 10 g	vi 2 or Veff
Measurement System										
Probe calibration	11.0	Normal	2	1	1	5.50	5.50	5.50	5.50	∞
Probe Calibration Drift	1.7	Rectangular	√3	1	1	1.0	1.0	1.0	1.0	∞
Probe Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	2.7	2.7	∞
Broadband Signal	2.8	Rectangular	√3	1	1	1.6	1.6	1.6	1.6	∞
Probe Isotropy	7.6	Rectangular	√3	1	1	4.4	4.4	4.4	4.4	∞
Other Probe+Electronic	0.8	Normal	1	1	1	0.8	0.8	0.8	0.8	∞
RF Ambient Conditions	1.8	Normal	1	1	1	1.8	1.8	1.8	1.8	∞
Probe Positioning	3.9	Normal	1	0.14	0.14	3.9	3.9	0.5	0.5	∞
Data Processing	1.2	Normal	1	1	1	1.2	1.2	1.2	1.2	∞
Phantom and Device										
Liquid conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	2.89	2.89	1.85	1.24	∞
Liquid conductivity (Meas.)	3.2	Normal	1	0.78	0.71	3.20	3.20	2.50	2.27	∞
Liquid permittivity (Target)	5.0	Rectangular	√3	0.60	0.49	2.89	2.89	1.73	1.41	∞
Liquid permittivity (Meas.)	3.3	Normal	1	0.23	0.26	3.30	3.30	0.76	0.86	∞
Temp. unc. - Conductivity	2.0	Rectangular	√3	0.78	0.71	1.15	1.15	0.90	0.82	∞
Temp. unc. - Permittivity	2.0	Rectangular	√3	0.23	0.26	1.15	1.15	0.27	0.30	∞
Phantom Shell Permittivity	14.0	Rectangular	√3	0	0	8.1	8.1	0.0	0.0	∞
Distance DUT-TSL	2.0	Normal	1	2	2	2.0	2.0	4.0	4.0	∞
Device Positioning	2.3	Normal	1	1	1	2.3	2.3	2.3	2.3	∞
Device Holder	2.2	Normal	1	1	1	2.2	2.2	2.2	2.2	∞
DUT Modulation	2.4	Rectangular	√3	1	1	1.4	1.4	1.4	1.4	∞
Time-average SAR	1.7	Rectangular	√3	1	1	1.0	1.0	1.0	1.0	∞
DUT drift	2.5	Normal	1	1	1	2.5	2.5	2.5	2.5	∞
Validation Antenna	0.0	Normal	1	1	1	0.0	0.0	0.0	0.0	∞
Uncertainty in Accepted Power	0.0	Normal	1	1	1	0.0	0.0	0.0	0.0	∞
Correction to the SAR results										
Deviation to target	1.9	Normal	1	1	0.84	1.9	1.9	1.9	1.6	∞
SAR Scaling	0.0	Rectangular	√3	1	1	0.0	0.0	0.0	0.0	∞
Combined Standard Uncertainty						11	11			∞
Expanded Uncertainty (k=2)						22	22			

$$U(1\text{ g}) = k \cdot u_c$$

$$= 2 \cdot 11\%$$

$$= 22\% \text{ (The confidence level is about 95 \% } k = 2 \text{)}$$

$$U(10\text{ g}) = k \cdot u_c$$

$$= 2 \cdot 11\%$$

$$= 22\% \text{ (The confidence level is about 95 \% } k = 2 \text{)}$$

14. CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are every 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 impossible biological effect 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 innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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APPENDIX A. – Probe Calibration Data

Calibration Laboratory ofSchmid & 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

Dt&C

Gyeonggi-do, Republic of Korea

Certificate No.

EX-3916_Mar25**CALIBRATION CERTIFICATE**

Object

EX3DV4 - SN:3916

Calibration procedure(s)

QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8
Calibration procedure for dosimetric E-field probes

Calibration date

March 19, 2025

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	Calibration Date (Certificate No.)	Sched. Cal.
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Short [S6019i] + Attenuator [S6020i]	SN: L1119	26-Mar-24 (No. 217-04048)	Mar-25
OCP DAK-12	SN: 1016	24-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
Reference Probe EX3DV4	SN: 7349	10-Jan-25 (No. EX3-7349_Jan25)	Jan-26
DAE4	SN: 1301	07-Nov-24 (No. DAE4-1301_Nov24)	Nov-25

Secondary Standards	ID	Check Date (in house)	Sched. Check
ACAP 2020 Calibration Box	SN: L1404	30-Sept-24 (No. Report_ACAP2020E-Cave_20240930s)	Sep-25

	Name	Function	Signature
Calibrated by	Aidonia Georgiadou	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Issued: March 19, 2025

Calibration Laboratory ofSchmid & 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

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
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 DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. 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
- 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.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center 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).

EX3DV4 - SN:3916

March 19, 2025

Parameters of Probe: EX3DV4 - SN:3916**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.55	0.51	0.53	$\pm 10.1\%$
DCP (mV) ^B	101.4	102.1	103.7	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E k = 2
0	CW	X	0.00	0.00	1.00	0.00	140.3	$\pm 1.3\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		125.5		
		Z	0.00	0.00	1.00		135.8		
10352	Pulse Waveform (200Hz, 10%)	X	20.00	92.91	22.65	10.00	60.0	$\pm 3.1\%$	$\pm 9.6\%$
		Y	20.00	94.06	22.85		60.0		
		Z	20.00	91.47	21.51		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	20.00	93.17	21.80	6.99	80.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y	20.00	96.19	22.73		80.0		
		Z	20.00	91.72	20.80		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	20.00	96.18	22.00	3.98	95.0	$\pm 1.2\%$	$\pm 9.6\%$
		Y	20.00	100.66	23.41		95.0		
		Z	20.00	94.55	21.05		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	20.00	101.76	23.41	2.22	120.0	$\pm 1.2\%$	$\pm 9.6\%$
		Y	20.00	105.50	24.29		120.0		
		Z	20.00	99.54	22.25		120.0		
10387	QPSK Waveform, 1 MHz	X	1.81	66.60	15.54	1.00	150.0	$\pm 1.9\%$	$\pm 9.6\%$
		Y	1.54	64.45	13.94		150.0		
		Z	1.70	66.41	15.14		150.0		
10388	QPSK Waveform, 10 MHz	X	2.41	69.00	16.27	0.00	150.0	$\pm 1.1\%$	$\pm 9.6\%$
		Y	2.01	66.08	14.62		150.0		
		Z	2.25	68.21	15.83		150.0		
10396	64-QAM Waveform, 100 kHz	X	3.19	71.24	19.13	3.01	150.0	$\pm 0.7\%$	$\pm 9.6\%$
		Y	2.73	69.06	18.00		150.0		
		Z	3.04	71.36	19.21		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.65	67.68	16.08	0.00	150.0	$\pm 0.9\%$	$\pm 9.6\%$
		Y	3.38	66.32	15.22		150.0		
		Z	3.54	67.34	15.85		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.84	65.35	15.39	0.00	150.0	$\pm 2.0\%$	$\pm 9.6\%$
		Y	4.78	65.28	15.21		150.0		
		Z	4.71	65.21	15.26		150.0		

Note: For details on UID parameters see Appendix

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%.

^A The uncertainties of Norm X,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

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

EX3DV4 - SN:3916

March 19, 2025

Parameters of Probe: EX3DV4 - SN:3916

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	52.1	384.13	34.78	26.72	0.38	5.10	0.94	0.35	1.01
y	44.4	326.39	34.43	14.41	0.40	5.07	1.33	0.20	1.01
z	44.4	323.85	34.13	28.20	0.11	5.10	1.36	0.20	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	86.5°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

EX3DV4 - SN:3916

March 19, 2025

Parameters of Probe: EX3DV4 - SN:3916**Calibration Parameter Determined in HSL**

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
13	55.0	0.75	17.96	17.01	17.70	0.00	1.25	±13.3%
750	41.9	0.89	9.82	9.48	9.73	0.38	1.27	±11.0%
835	41.5	0.90	9.34	9.02	9.26	0.38	1.27	±11.0%
900	41.5	0.97	9.13	8.81	9.05	0.38	1.27	±11.0%
1750	40.1	1.37	8.13	7.85	8.06	0.37	1.27	±11.0%
1900	40.0	1.40	7.73	7.46	7.66	0.37	1.27	±11.0%
2450	39.2	1.80	7.28	7.03	7.22	0.37	1.27	±11.0%
2600	39.0	1.96	7.36	7.11	7.30	0.37	1.27	±11.0%
3300	38.2	2.71	6.83	6.59	6.77	0.36	1.27	±13.1%
3500	37.9	2.91	6.92	6.68	6.87	0.36	1.27	±13.1%
3700	37.7	3.12	6.88	6.64	6.82	0.36	1.27	±13.1%
3900	37.5	3.32	6.73	6.50	6.68	0.36	1.27	±13.1%
4100	37.2	3.53	6.48	6.26	6.43	0.35	1.27	±13.1%
4200	37.1	3.63	6.70	6.46	6.64	0.35	1.27	±13.1%
4400	36.9	3.84	6.65	6.42	6.59	0.35	1.27	±13.1%
4600	36.7	4.04	6.68	6.45	6.62	0.35	1.27	±13.1%
4800	36.4	4.25	6.75	6.52	6.70	0.35	1.27	±13.1%
4950	36.3	4.40	6.45	6.23	6.40	0.34	1.27	±13.1%
5200	36.0	4.66	5.36	5.18	5.32	0.31	1.27	±13.1%
5300	35.9	4.76	5.12	4.94	5.08	0.30	1.27	±13.1%
5500	35.6	4.96	5.09	4.91	5.05	0.29	1.27	±13.1%
5600	35.5	5.07	5.14	4.96	5.10	0.28	1.27	±13.1%
5800	35.3	5.27	5.11	4.93	5.07	0.26	1.27	±13.1%

^C Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

EX3DV4 - SN:3916

March 19, 2025

Parameters of Probe: EX3DV4 - SN:3916**Calibration Parameter Determined in HSL**

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
6500	34.5	6.07	5.60	5.41	5.55	0.20	1.27	±18.6%
7000	33.9	6.65	5.78	5.58	5.73	0.20	1.27	±18.6%
8000	32.7	7.84	5.95	5.74	5.90	0.20	1.27	±18.6%
9000	31.6	9.08	6.21	5.99	6.16	0.20	1.27	±18.6%

^C Frequency validity at 6.5 GHz is -600/+700 MHz, and ±700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±10% from the target values (typically better than ±6%) and are valid for TSL with deviations of up to ±10%.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3–6 GHz; and below ±4% for frequencies between 6–10 GHz at any distance larger than half the probe tip diameter from the boundary.

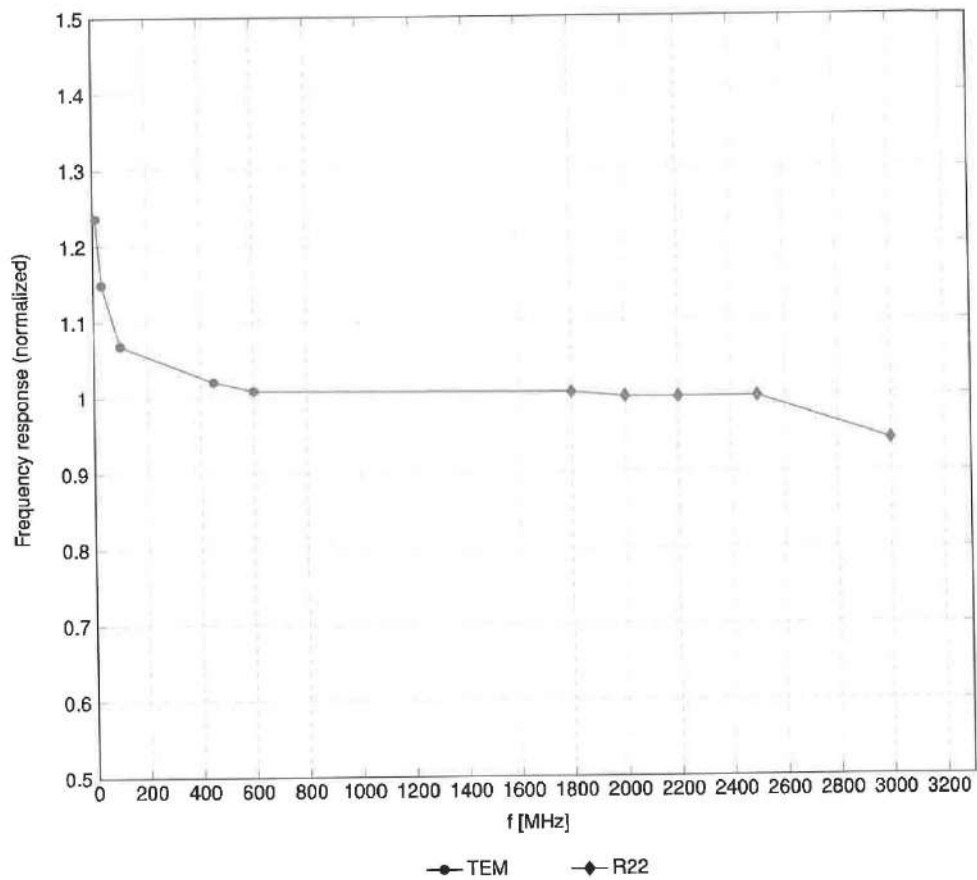
^H The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. This is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1526:2020.

EX3DV4 - SN:3916

March 19, 2025

Frequency Response of E-Field

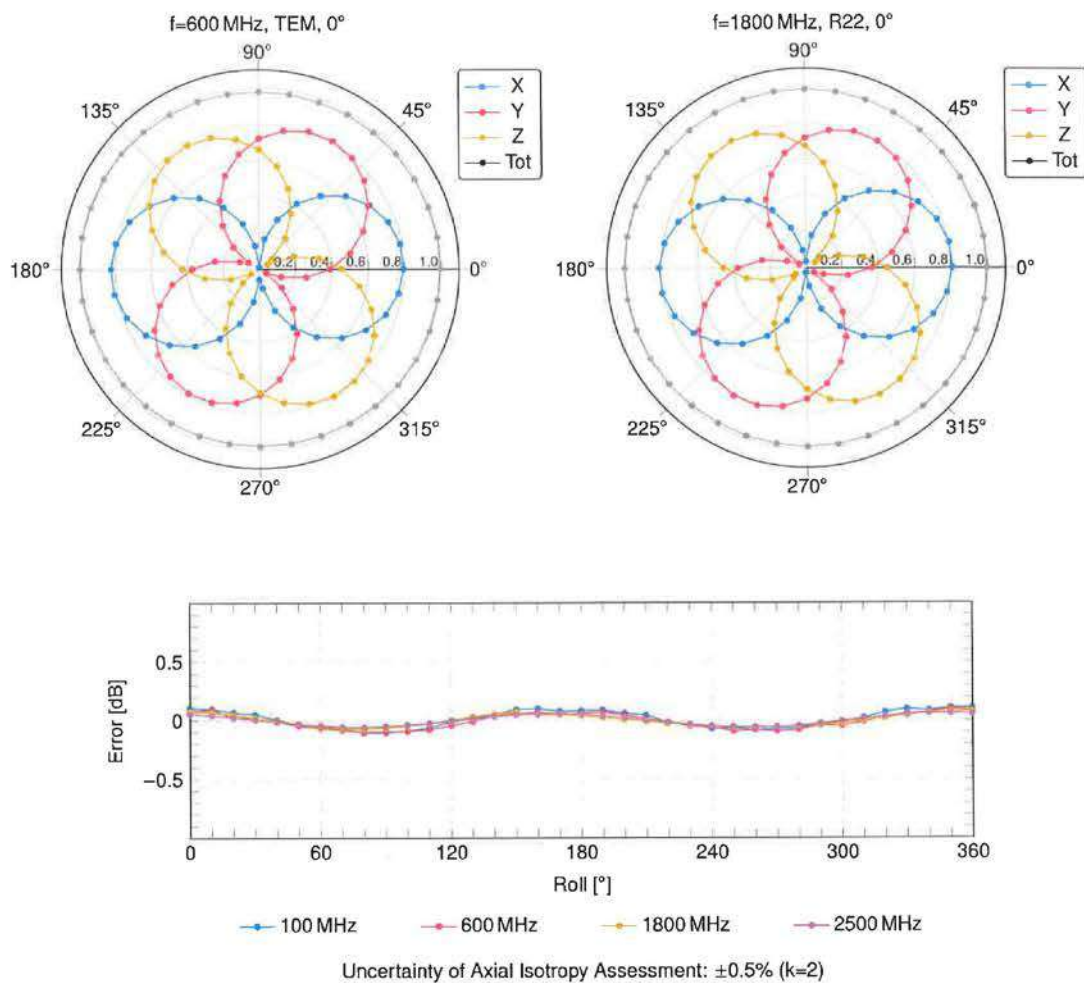
(TEM-Cell:ifl110 EXX, Waveguide:R22)



Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

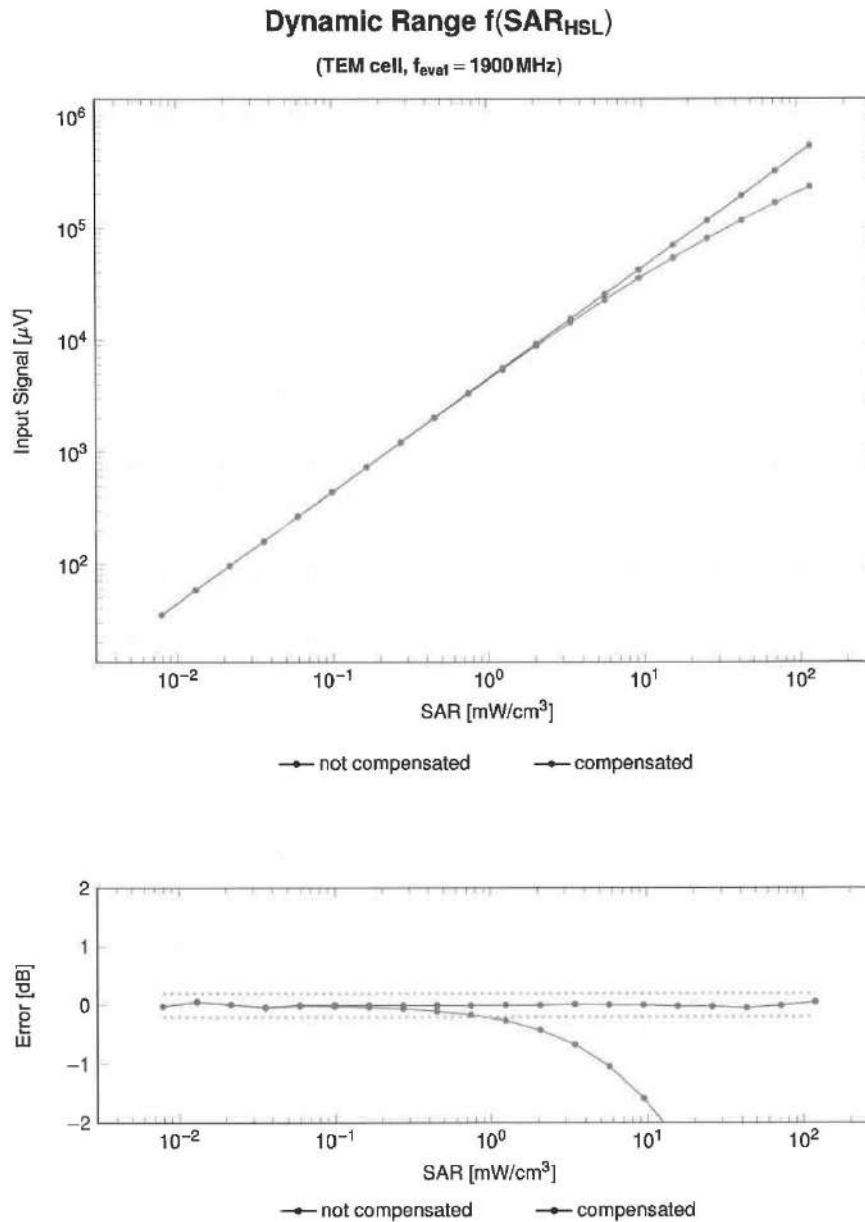
EX3DV4 - SN:3916

March 19, 2025

Receiving Pattern (ϕ), $\theta = 0^\circ$ 

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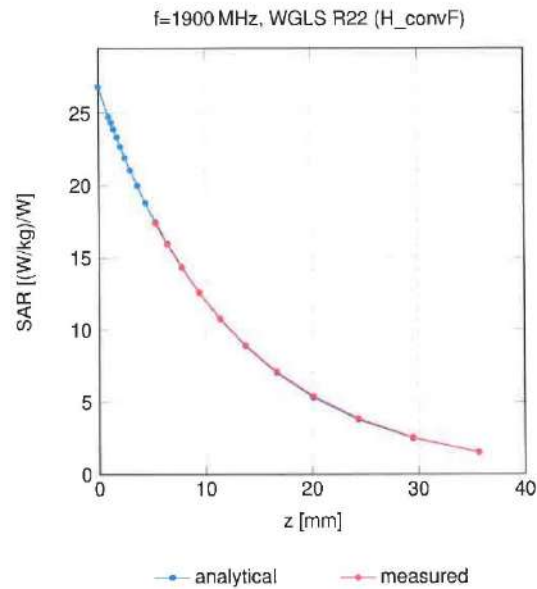
March 19, 2025

Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

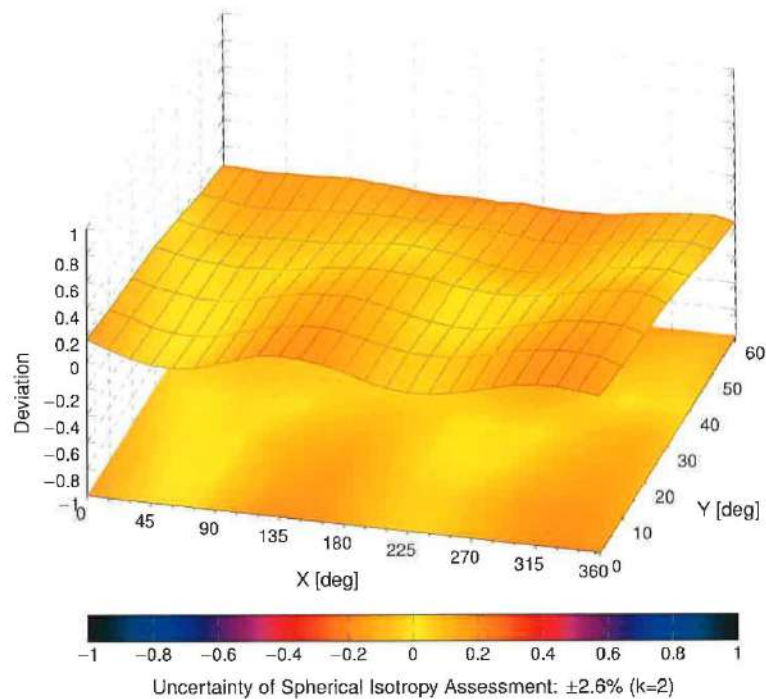
EX3DV4 - SN:3916

March 19, 2025

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz

EX3DV4 - SN:3916

March 19, 2025

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
0		CW	CW	0.00	±4.7
10010	CAB	SAR Validation (Square, 100 ms, 10 ms)	Test	10.00	±9.6
10011	CAC	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	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	±9.6
10063	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	±9.6
10064	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	±9.6
10065	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6
10066	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	±9.6
10067	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6
10068	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6
10069	CAE	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	CAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	±9.6
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6
10100	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	±9.6
10101	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10102	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10103	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±9.6
10104	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	±9.6
10105	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	±9.6
10108	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	±9.6
10109	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10110	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6
10111	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6

EX3DV4 - SN:3916

March 19, 2025

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E $k = 2$
10112	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	±9.6
10113	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	±9.6
10114	CAE	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	±9.6
10115	CAE	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	±9.6
10116	CAE	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	±9.6
10117	CAE	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	±9.6
10118	CAE	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	±9.6
10119	CAE	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	±9.6
10140	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10141	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±9.6
10142	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10143	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±9.6
10144	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±9.6
10145	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	±9.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6
10147	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±9.6
10149	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10150	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10151	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±9.6
10152	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±9.6
10153	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±9.6
10154	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±9.6
10155	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10156	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±9.6
10157	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10158	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	±9.6
10159	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10160	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6
10161	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10162	CAF	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	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6
10170	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10171	AAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±9.6
10172	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6
10173	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10174	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10175	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6
10176	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10177	CAJ	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6
10178	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10179	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10180	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10181	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6
10182	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10183	AAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10184	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10185	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6
10186	AAF	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	AAG	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	CAE	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	CAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	±9.6
10198	CAE	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	±9.6
10219	CAE	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	±9.6
10220	CAE	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	±9.6
10221	CAE	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	±9.6
10222	CAE	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	±9.6
10223	CAE	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	±9.6
10224	CAE	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	±9.6