FCC SAR TEST REPORT

FCC ID	: 2AJN7-TP00173AR
Equipment	: Notebook Computer
Brand Name	: Lenovo
Model Name	: TP00173AR
Applicant	: LC Future Center Limited Taiwan Branch 7F., No.780, Beian Rd., Zhongshan Dist., Taipei 104, Taiwan
Manufacturer	: Lenovo Ireland International LimitedViscount House, 6/7 Fitzwilliam Square East, Dublin, D02 Y447, Ireland
Standard	: FCC 47 CFR Part 2 (2.1093)

Equipment：Rolling Wireless RW220-GL and Intel BE211D2W tested inside of Notebook Computer.

The product was received on Jan. 27, 2026 and testing was started from Jan. 27, 2026 and completed on Jan. 27, 2026. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. Wensan Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA5N2701-02	01	Initial issue of report	Mar. 23, 2026

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for LC Future Center Limited Taiwan Branch, Notebook Computer, TP00173AR, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary Body (Separation 0mm) 1g SAR (W/kg)	Highest Body Simultaneous Transmission 1g SAR (W/kg)
Licensed	LTE Band 12	1.18	1.19
	LTE Band 5/26	1.19	
Date of Testing:		2026/01/27	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Paula Chen

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D05 SAR for LTE Devices v02r05

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Notebook Computer
Brand Name	Lenovo
Model Name	TP00173AR
FCC ID	2AJN7-TP00173AR
Integrated WWAN Module	Brand Name: Rolling Wireless Model Name: RW220-GL
Integrated WLAN Module	Brand Name: Intel Model Name: BE211D2W
Integrated NFC Module	Brand Name: Foxconn Model Name: T77H747
Wireless Technology and Frequency Range	LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz WLAN 6GHz Band: 5925 MHz~6425 MHz, 6425 MHz~6525 MHz, 6525 MHz~6875 MHz, 6875 MHz~7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC: 13.56 MHz
Mode	LTE: QPSK, 16QAM WLAN: 802.11a/b/g/n/ac/ax/be HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160/EHT20/EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE NFC: ASK
EUT Stage	Production Unit

Remark:

1. The FCC ID: PD9BE211D2, Intel BE211D2W WLAN/BT module is integrated into this host, and the Sim-Tx compliance include in section13.
2. NFC module is integrated into this host, and NFC with other transmitters which the maximum of overlapping transmission including network hand-offs is not greater than 30 seconds, therefore NFC with other transmitter for simultaneous transmission analysis and compliance is not required.

WWAN Antenna Information				
Main Antenna	Manufacturer	Speed	Peak gain(dBi)	-2.9
	Part number	DC33002BU00	Type	PIFA

Antenna Information					
Antenna 1	Manufacturer	SPEEDWIRE			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BT00		DC33002BT00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.67 dBi	BT/WLAN(2.4G):	1.49 dBi
		WLAN(5G B1):	2.10 dBi	WLAN(5G B1):	2.01 dBi
		WLAN(5G B2):	2.86 dBi	WLAN(5G B2):	2.13 dBi
		WLAN(5G B3):	2.76 dBi	WLAN(5G B3):	2.00 dBi
		WLAN(5G B4):	2.24 dBi	WLAN(5G B4):	2.28 dBi
		UNII-4	2.06 dBi	UNII-4	2.13 dBi
		UNII-5	2.25 dBi	UNII-5	2.56 dBi
		UNII-6	2.98 dBi	UNII-6	2.55 dBi
		UNII-7	2.17 dBi	UNII-7	2.61 dBi
		UNII-8	2.74 dBi	UNII-8	2.62 dBi
Antenna 2	Manufacturer	Amphenol Taiwan Corporation			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BK00		DC33002BK00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.67 dBi	BT/WLAN(2.4G):	1.49 dBi
		WLAN(5G B1):	2.10 dBi	WLAN(5G B1):	2.01 dBi
		WLAN(5G B2):	2.86 dBi	WLAN(5G B2):	2.13 dBi
		WLAN(5G B3):	2.76 dBi	WLAN(5G B3):	2.00 dBi
		WLAN(5G B4):	2.24 dBi	WLAN(5G B4):	2.28 dBi
		UNII-4	2.06 dBi	UNII-4	2.13 dBi
		UNII-5	2.25 dBi	UNII-5	2.56 dBi
		UNII-6	2.98 dBi	UNII-6	2.55 dBi
		UNII-7	2.17 dBi	UNII-7	2.61 dBi
		UNII-8	2.74 dBi	UNII-8	2.62 dBi
Antenna 3	Manufacturer	AWAN			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	DC33002BJ00		DC33002BJ00	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		BT/WLAN(2.4G):	1.67 dBi	BT/WLAN(2.4G):	1.49 dBi
		WLAN(5G B1):	2.10 dBi	WLAN(5G B1):	2.01 dBi
		WLAN(5G B2):	2.86 dBi	WLAN(5G B2):	2.13 dBi
		WLAN(5G B3):	2.76 dBi	WLAN(5G B3):	2.00 dBi
		WLAN(5G B4):	2.24 dBi	WLAN(5G B4):	2.28 dBi
		UNII-4	2.06 dBi	UNII-4	2.13 dBi
		UNII-5	2.25 dBi	UNII-5	2.56 dBi
		UNII-6	2.98 dBi	UNII-6	2.55 dBi
		UNII-7	2.17 dBi	UNII-7	2.61 dBi
		UNII-8	2.74 dBi	UNII-8	2.62 dBi

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	2AJN7-TP00173AR
Equipment Name	Notebook Computer
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 26: 824 MHz ~ 849 MHz
Channel Bandwidth	LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
uplink modulations used	QPSK / 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 12

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 26

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

4. RF Exposure Limits

4.1 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.

4.2 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.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

4.3 RF Exposure limit for above 6GHz

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm^2 per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

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/f2)	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/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

5. Specific Absorption Rate (SAR)

5.1 Introduction

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

5.2 SAR Definition

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

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

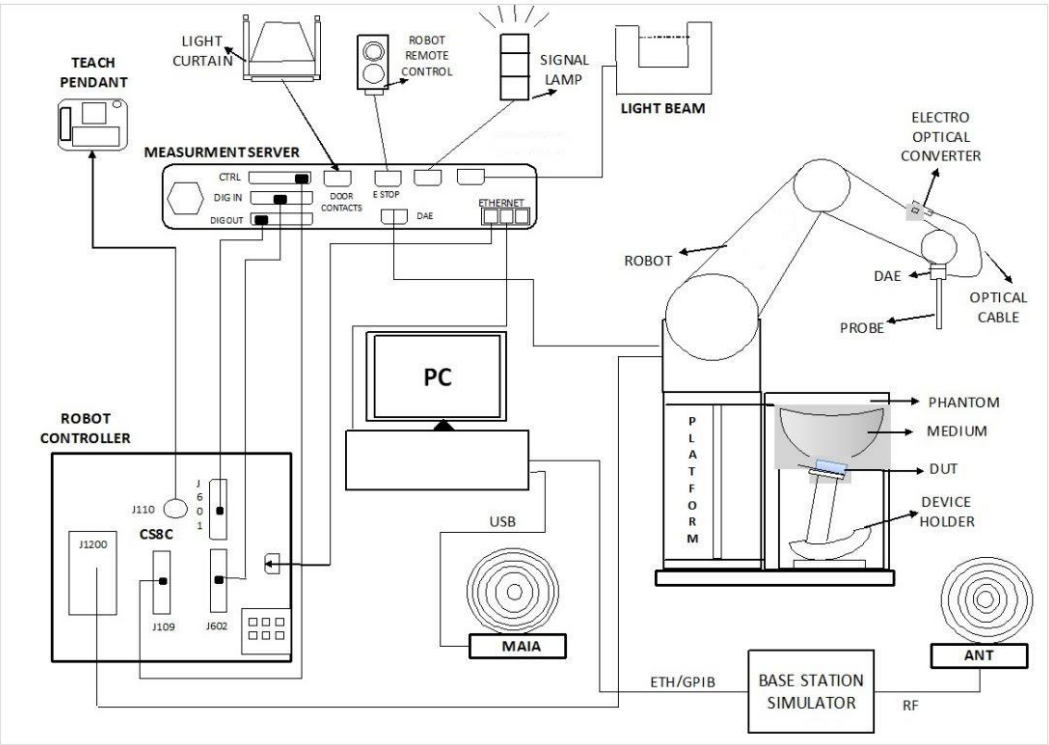
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

6. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:



- The DASY system in SAR Configuration is shown above
- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running windows software and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

6.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Laboratory	EMC & Wireless Communications Laboratory		Wensan Laboratory				
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	SAR18-HY	SAR21-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY	SAR19-HY	SAR22-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY	SAR20-HY	

6.2 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

< ES3DV3 Probe >

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μW/g – > 100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

< EX3DV4 Probe >

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – > 6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μW/g – > 100 mW/g Linearity: ±0.2 dB (noise: typically < 1 μW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

6.3 Data Acquisition Electronics (DAE)

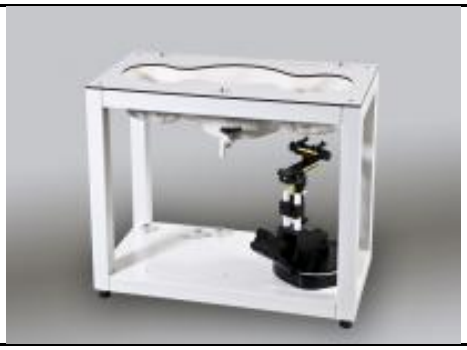
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

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

Fig 5.1 Photo of DAE

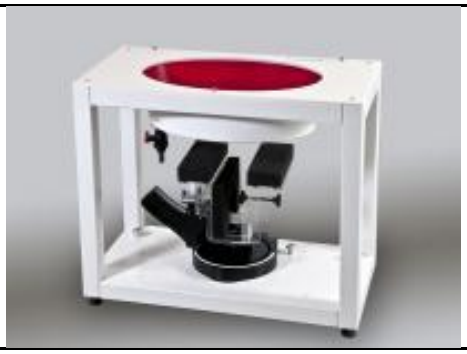
6.4 Phantom

< **SAM Twin Phantom** >

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

< **ELI Phantom** >

Shell Thickness	2 ± 0.2 mm (sagging: < 1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

6.5 Device Holder

< Mounting Device for Hand-Held Transmitter >

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

< Mounting Device for Laptops and other Body-Worn Transmitters >

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Mounting Device for Laptops

7. Measurement Procedures

The measurement procedures are as follows:

(a) Configure the device RF transmitters to be in continuous transmission mode., at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

7.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

7.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

7.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

7.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
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 1st 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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 draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 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.

7.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

7.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1107	Jun. 11, 2025	Jun. 10, 2026
SPEAG	835MHz System Validation Kit	D835V2	4d167	Dec. 02, 2025	Dec. 01, 2026
SPEAG	Data Acquisition Electronics	DAE4	1647	Oct. 20, 2025	Oct. 19, 2026
SPEAG	Dosimetric E-Field Probe	EX3DV4	7694	Oct. 23, 2025	Oct. 22, 2026
SPEAG	Dielectric Probe Kit	DAK-3.5	1270	May. 19, 2025	May. 18, 2026
Testo	Hygro meter	608-H1	45196600	Nov. 04, 2025	Nov. 03, 2026
Testo	Hygro meter	608-H1	45207528	Nov. 04, 2025	Nov. 03, 2026
Anritsu	Radio Communication Analyzer	MT8821C	6201074414	Aug. 19, 2025	Aug. 18, 2026
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 24, 2025	Sep. 23, 2026
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 14, 2025	Oct. 13, 2026
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 14, 2025	Aug. 13, 2026
Anritsu	Power Meter	ML2496A	2119003	Jul. 14, 2025	Jul. 13, 2026
Anritsu	Power Sensor	MA2411B	1911334	Jul. 14, 2025	Jul. 13, 2026
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 09, 2025	Jul. 08, 2026
Mini-Circuits	Power Amplifier	ZVE-3W-183+	031302302	Feb. 24, 2025	Feb. 23, 2026
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is＜ -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

9. System Verification

9.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

The SPEAG Dasy Measurement system implement a SAR error compensation algorithm as documented in IEEE Std 1528-2013 to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, according to KDB 865664 D01 and IEC/IEEE 62209-1528, the tolerance for "Delta (σ)" and "Delta (εr)" can be relaxed to ± 10%

< Tissue Dielectric Parameter Check Results >

Frequency (MHz)	Liquid Temp (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
750	22.5	0.931	43.8	0.89	41.9	4.61	4.53	±10.0	2026-01-27
835	22.5	0.96	43.6	0.9	41.5	6.67	5.06	±10.0	2026-01-27

9.2 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
SAR09	2026-01-27	750	251.19	D750V3 - 1107	EX3DV4 - SN7694	DAE4 Sn1647	2.190	8.840	8.718	-1.37	1.460	5.810	5.812	0.04
SAR09	2026-01-27	835	251.19	D835V2 - 4d167	EX3DV4 - SN7694	DAE4 Sn1647	2.450	9.360	9.754	4.20	1.610	6.050	6.409	5.94

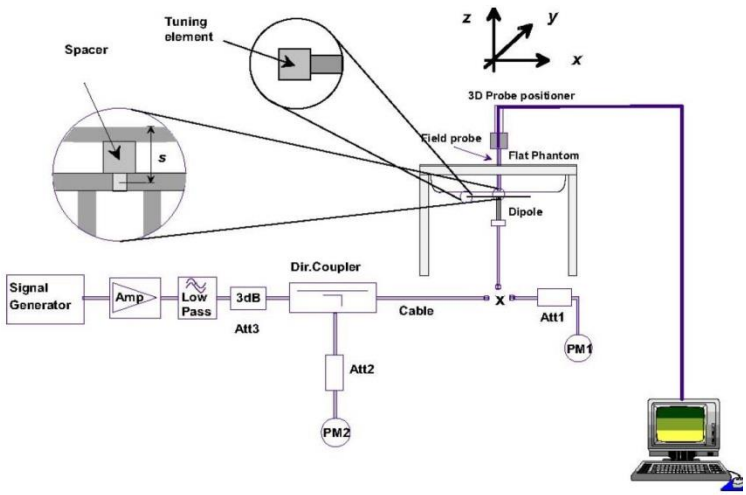


Fig 8.3.1 System Performance Check Setup

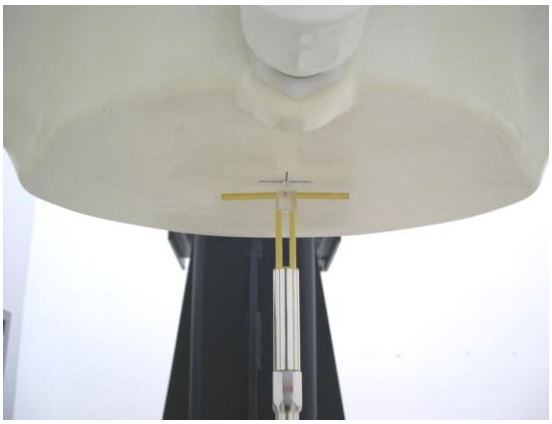


Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 SAR Testing for Tablet

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

11. LTE Output Power (Unit: dBm)

＜LTE Conducted Power＞

General Note:

1. A Base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
1. For LTE B5/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
2. LTE band 5 SAR test was covered by Band 26; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

【LTE Band 5】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	16.73	16.36	16.86	17.50
10	QPSK	1	25	17.30	17.03	17.50	17.50
10	QPSK	1	49	16.53	16.30	16.76	17.50
10	QPSK	25	0	17.05	16.69	17.11	17.50
10	QPSK	25	12	17.19	16.95	17.36	17.50
10	QPSK	25	25	17.23	16.88	17.33	17.50
10	QPSK	50	0	17.16	16.79	17.19	17.50
10	16QAM	1	0	16.58	16.26	16.69	17.50
10	16QAM	1	25	17.18	16.87	17.33	17.50
10	16QAM	1	49	16.56	16.23	16.67	17.50
10	16QAM	25	0	16.98	16.65	17.13	17.50
10	16QAM	25	12	17.12	16.88	17.35	17.50
10	16QAM	25	25	17.16	16.90	17.27	17.50
10	16QAM	50	0	17.05	16.73	17.21	17.50
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	16.69	16.31	16.75	17.50
5	QPSK	1	12	17.27	16.89	17.42	17.50
5	QPSK	1	24	16.43	16.20	16.65	17.50
5	QPSK	12	0	16.98	16.60	17.00	17.50
5	QPSK	12	7	17.14	16.94	17.35	17.50
5	QPSK	12	13	17.11	16.75	17.20	17.50
5	QPSK	25	0	17.12	16.77	17.05	17.50
5	16QAM	1	0	16.50	16.14	16.57	17.50
5	16QAM	1	12	17.14	16.83	17.27	17.50
5	16QAM	1	24	16.50	16.19	16.63	17.50
5	16QAM	12	0	16.84	16.60	17.06	17.50
5	16QAM	12	7	17.02	16.81	17.23	17.50
5	16QAM	12	13	17.05	16.89	17.18	17.50
5	16QAM	25	0	16.94	16.61	17.10	17.50
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	16.61	16.27	16.77	17.50
3	QPSK	1	8	17.24	16.89	17.43	17.50
3	QPSK	1	14	16.40	16.18	16.68	17.50
3	QPSK	8	0	16.92	16.59	16.97	17.50
3	QPSK	8	4	17.09	16.93	17.24	17.50
3	QPSK	8	7	17.16	16.83	17.19	17.50
3	QPSK	15	0	17.01	16.65	17.11	17.50
3	16QAM	1	0	16.43	16.21	16.57	17.50
3	16QAM	1	8	17.14	16.80	17.27	17.50
3	16QAM	1	14	16.44	16.10	16.61	17.50
3	16QAM	8	0	16.97	16.64	17.00	17.50
3	16QAM	8	4	17.02	16.75	17.21	17.50
3	16QAM	8	7	17.06	16.84	17.15	17.50
3	16QAM	15	0	17.00	16.60	17.16	17.50
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	16.60	16.35	16.73	17.50
1.4	QPSK	1	3	17.29	17.01	17.47	17.50
1.4	QPSK	1	5	16.49	16.15	16.61	17.50
1.4	QPSK	3	0	17.00	16.55	17.01	17.50
1.4	QPSK	3	1	17.15	16.86	17.30	17.50
1.4	QPSK	3	3	17.17	16.78	17.31	17.50
1.4	QPSK	6	0	17.09	16.67	17.08	17.50
1.4	16QAM	1	0	16.46	16.18	16.60	17.50
1.4	16QAM	1	3	17.09	16.77	17.24	17.50
1.4	16QAM	1	5	16.46	16.22	16.56	17.50
1.4	16QAM	3	0	16.94	16.55	17.02	17.50
1.4	16QAM	3	1	17.07	16.85	17.28	17.50
1.4	16QAM	3	3	17.07	16.87	17.25	17.50
1.4	16QAM	6	0	17.03	16.61	17.15	17.50

【LTE Band 12】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	19.20	19.70	19.38	20.50
10	QPSK	1	25	19.25	19.80	19.40	20.50
10	QPSK	1	49	18.53	19.13	18.76	20.50
10	QPSK	25	0	19.22	19.75	19.29	20.50
10	QPSK	25	12	19.05	19.67	19.34	20.50
10	QPSK	25	25	18.89	19.53	19.12	20.50
10	QPSK	50	0	18.97	19.59	19.23	20.50
10	16QAM	1	0	19.10	19.65	19.20	20.50
10	16QAM	1	25	19.08	19.67	19.31	20.50
10	16QAM	1	49	18.60	19.17	18.76	20.50
10	16QAM	25	0	19.04	19.69	19.30	20.50
10	16QAM	25	12	18.98	19.57	19.12	20.50
10	16QAM	25	25	18.82	19.42	19.03	20.50
10	16QAM	50	0	18.89	19.50	19.15	20.50
Channel				23035	23095	23115	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	19.09	19.64	19.23	20.50
5	QPSK	1	12	19.23	19.65	19.38	20.50
5	QPSK	1	24	18.50	18.99	18.63	20.50
5	QPSK	12	0	19.08	19.74	19.21	20.50
5	QPSK	12	7	18.93	19.54	19.21	20.50
5	QPSK	12	13	18.75	19.39	19.03	20.50
5	QPSK	25	0	18.91	19.46	19.12	20.50
5	16QAM	1	0	19.06	19.53	19.07	20.50
5	16QAM	1	12	19.03	19.63	19.25	20.50
5	16QAM	1	24	18.58	19.11	18.71	20.50
5	16QAM	12	0	18.90	19.60	19.23	20.50
5	16QAM	12	7	18.84	19.42	19.01	20.50
5	16QAM	12	13	18.71	19.37	18.99	20.50
5	16QAM	25	0	18.86	19.44	19.06	20.50
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	19.05	19.64	19.27	20.50
3	QPSK	1	8	19.23	19.67	19.33	20.50
3	QPSK	1	14	18.50	19.05	18.63	20.50
3	QPSK	8	0	19.11	19.70	19.27	20.50
3	QPSK	8	4	18.92	19.60	19.30	20.50
3	QPSK	8	7	18.86	19.43	19.07	20.50
3	QPSK	15	0	18.85	19.52	19.09	20.50
3	16QAM	1	0	19.07	19.56	19.13	20.50
3	16QAM	1	8	19.04	19.57	19.21	20.50
3	16QAM	1	14	18.50	19.04	18.71	20.50
3	16QAM	8	0	19.00	19.58	19.17	20.50
3	16QAM	8	4	18.94	19.46	19.02	20.50
3	16QAM	8	7	18.69	19.38	18.92	20.50
3	16QAM	15	0	18.76	19.42	19.05	20.50
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	19.13	19.69	19.29	20.50
1.4	QPSK	1	3	19.12	19.74	19.31	20.50
1.4	QPSK	1	5	18.52	19.03	18.61	20.50
1.4	QPSK	3	0	19.13	19.63	19.23	20.50
1.4	QPSK	3	1	19.00	19.62	19.32	20.50
1.4	QPSK	3	3	18.83	19.42	19.03	20.50
1.4	QPSK	6	0	18.95	19.57	19.10	20.50
1.4	16QAM	1	0	19.03	19.62	19.15	20.50
1.4	16QAM	1	3	19.06	19.54	19.21	20.50
1.4	16QAM	1	5	18.51	19.09	18.70	20.50
1.4	16QAM	3	0	18.93	19.62	19.24	20.50
1.4	16QAM	3	1	18.93	19.55	18.99	20.50
1.4	16QAM	3	3	18.74	19.29	18.95	20.50
1.4	16QAM	6	0	18.81	19.40	19.05	20.50

【LTE Band 26】

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	16.43	16.64	16.59	17.50
15	QPSK	1	37	16.51	16.74	16.55	17.50
15	QPSK	1	74	16.31	16.62	16.44	17.50
15	QPSK	36	0	16.30	16.64	16.46	17.50
15	QPSK	36	20	16.34	16.66	16.49	17.50
15	QPSK	36	39	16.32	16.63	16.55	17.50
15	QPSK	75	0	16.34	16.64	16.57	17.50
15	16QAM	1	0	16.35	16.60	16.49	17.50
15	16QAM	1	37	16.37	16.65	16.57	17.50
15	16QAM	1	74	16.27	16.60	16.43	17.50
15	16QAM	36	0	16.25	16.55	16.42	17.50
15	16QAM	36	20	16.34	16.66	16.48	17.50
15	16QAM	36	39	16.25	16.54	16.43	17.50
15	16QAM	75	0	16.34	16.62	16.42	17.50
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	16.34	16.54	16.51	17.50
10	QPSK	1	25	16.47	16.69	16.48	17.50
10	QPSK	1	49	16.21	16.57	16.30	17.50
10	QPSK	25	0	16.25	16.62	16.32	17.50
10	QPSK	25	12	16.19	16.56	16.42	17.50
10	QPSK	25	25	16.28	16.48	16.45	17.50
10	QPSK	50	0	16.26	16.53	16.50	17.50
10	16QAM	1	0	16.28	16.50	16.44	17.50
10	16QAM	1	25	16.22	16.57	16.44	17.50
10	16QAM	1	49	16.21	16.46	16.37	17.50
10	16QAM	25	0	16.17	16.50	16.40	17.50
10	16QAM	25	12	16.30	16.56	16.39	17.50
10	16QAM	25	25	16.20	16.47	16.33	17.50
10	16QAM	50	0	16.32	16.48	16.39	17.50
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	16.29	16.55	16.47	17.50
5	QPSK	1	12	16.42	16.73	16.50	17.50
5	QPSK	1	24	16.26	16.52	16.38	17.50
5	QPSK	12	0	16.23	16.60	16.34	17.50
5	QPSK	12	7	16.32	16.54	16.45	17.50
5	QPSK	12	13	16.18	16.53	16.54	17.50
5	QPSK	25	0	16.26	16.62	16.48	17.50
5	16QAM	1	0	16.23	16.58	16.38	17.50
5	16QAM	1	12	16.22	16.60	16.45	17.50
5	16QAM	1	24	16.16	16.54	16.42	17.50
5	16QAM	12	0	16.11	16.52	16.31	17.50
5	16QAM	12	7	16.33	16.62	16.41	17.50
5	16QAM	12	13	16.20	16.48	16.35	17.50
5	16QAM	25	0	16.28	16.55	16.40	17.50
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	16.29	16.59	16.51	17.50
3	QPSK	1	8	16.44	16.66	16.41	17.50
3	QPSK	1	14	16.24	16.61	16.43	17.50
3	QPSK	8	0	16.23	16.62	16.31	17.50
3	QPSK	8	4	16.22	16.52	16.47	17.50
3	QPSK	8	7	16.28	16.55	16.51	17.50
3	QPSK	15	0	16.22	16.59	16.53	17.50
3	16QAM	1	0	16.34	16.46	16.35	17.50
3	16QAM	1	8	16.31	16.60	16.56	17.50
3	16QAM	1	14	16.13	16.49	16.33	17.50
3	16QAM	8	0	16.20	16.49	16.40	17.50
3	16QAM	8	4	16.29	16.63	16.38	17.50
3	16QAM	8	7	16.22	16.44	16.39	17.50
3	16QAM	15	0	16.20	16.55	16.29	17.50
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	16.25	16.29	16.66	17.50
1.4	QPSK	1	3	16.37	16.61	16.46	17.50
1.4	QPSK	1	5	16.18	16.59	16.41	17.50
1.4	QPSK	3	0	16.21	16.47	16.39	17.50
1.4	QPSK	3	1	16.21	16.58	16.35	17.50
1.4	QPSK	3	3	16.25	16.47	16.53	17.50
1.4	QPSK	6	0	16.20	16.45	16.53	17.50

1.4	16QAM	1	0	16.28	16.24	16.35	17.50
1.4	16QAM	1	3	16.25	16.57	16.53	17.50
1.4	16QAM	1	5	16.14	16.25	16.39	17.50
1.4	16QAM	3	0	16.22	16.46	16.30	17.50
1.4	16QAM	3	1	16.29	16.56	16.45	17.50
1.4	16QAM	3	3	16.17	16.46	16.38	17.50
1.4	16QAM	6	0	16.24	16.46	16.37	17.50

< SAR test exclusion table >

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	LTE Band 5	LTE Band 12	LTE Band 26
	Calculated Frequency (MHz)	848	715	848
	Maximum Power (dBm)	24.7	23.7	24.7
	Maximum Rated Power (mW)	295.12	234.42	295.12
Bottom Side	Separation Distance (mm)	5.00		
	exclusion threshold	54.4	39.6	54.4
	Testing Required?	Yes	Yes	Yes
Back	Separation Distance (mm)	5.00		
	exclusion threshold	54.4	39.6	54.4
	Testing Required?	Yes	Yes	Yes
Left	Separation Distance (mm)	230.00		
	exclusion threshold	1180.0	1035.0	1180.0
	Testing Required?	No	No	No
Right	Separation Distance (mm)	5.00		
	exclusion threshold	54.4	39.6	54.4
	Testing Required?	Yes	Yes	Yes
Top	Separation Distance (mm)	5.00		
	exclusion threshold	54.4	39.6	54.4
	Testing Required?	Yes	Yes	Yes
Bottom	Separation Distance (mm)	205.00		
	exclusion threshold	1039.0	916.0	1039.0
	Testing Required?	No	No	No

12. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B5/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 5 SAR test was covered by Band 26; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

12.1 Body SAR

【LTE SAR】

Plot No	Band	BW	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 12	10M	QPSK	1	25	Bottom Side	0mm	Main	23095	707.5	19.80	20.50	1.175	-0.17	0.364	0.428
	LTE Band 12	10M	QPSK	25	0	Bottom Side	0mm	Main	23095	707.5	19.75	20.50	1.189	0.03	0.356	0.423
01	LTE Band 12	10M	QPSK	1	25	Back	0mm	Main	23095	707.5	19.80	20.50	1.175	-0.01	1.000	1.175
	LTE Band 12	10M	QPSK	25	0	Back	0mm	Main	23095	707.5	19.75	20.50	1.189	0.11	0.981	1.166
	LTE Band 12	10M	QPSK	50	0	Back	0mm	Main	23095	707.5	19.59	20.50	1.233	-0.01	0.944	1.164
	LTE Band 12	10M	QPSK	1	25	Top	0mm	Main	23095	707.5	19.80	20.50	1.175	-0.12	0.134	0.157
	LTE Band 12	10M	QPSK	25	0	Top	0mm	Main	23095	707.5	19.75	20.50	1.189	0.06	0.094	0.112
	LTE Band 12	10M	QPSK	1	25	Right	0mm	Main	23095	707.5	19.80	20.50	1.175	0.19	0.893	1.049
	LTE Band 12	10M	QPSK	25	0	Right	0mm	Main	23095	707.5	19.75	20.50	1.189	-0.14	0.878	1.044
	LTE Band 12	10M	QPSK	50	0	Right	0mm	Main	23095	707.5	19.59	20.50	1.233	-0.19	0.862	1.063
	LTE Band 26	15M	QPSK	1	37	Bottom Side	0mm	Main	26865	831.5	16.74	17.50	1.191	0.04	0.282	0.336
	LTE Band 26	15M	QPSK	36	20	Bottom Side	0mm	Main	26865	831.5	16.66	17.50	1.213	0.11	0.269	0.326
02	LTE Band 26	15M	QPSK	1	37	Back	0mm	Main	26865	831.5	16.74	17.50	1.191	-0.05	0.996	1.186
	LTE Band 26	15M	QPSK	36	20	Back	0mm	Main	26865	831.5	16.66	17.50	1.213	-0.10	0.953	1.156
	LTE Band 26	15M	QPSK	75	0	Back	0mm	Main	26865	831.5	16.64	17.50	1.219	-0.09	0.851	1.037
	LTE Band 26	15M	QPSK	1	37	Top	0mm	Main	26865	831.5	16.74	17.50	1.191	-0.18	0.149	0.177
	LTE Band 26	15M	QPSK	36	20	Top	0mm	Main	26865	831.5	16.66	17.50	1.213	-0.08	0.122	0.148
	LTE Band 26	15M	QPSK	1	37	Right	0mm	Main	26865	831.5	16.74	17.50	1.191	0.03	0.936	1.115
	LTE Band 26	15M	QPSK	36	20	Right	0mm	Main	26865	831.5	16.66	17.50	1.213	-0.03	0.919	1.115
	LTE Band 26	15M	QPSK	75	0	Right	0mm	Main	26865	831.5	16.64	17.50	1.219	0.01	0.876	1.068

12.2 Repeated SAR Measurement

【Repeat SAR 1g - FCC】

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Ratio
1st	LTE Band 12	10M_QPSK_1_25	Back	0.0	Main	DSI 1	23095	707.5	19.80	20.50	1.175	-0.01	1.000	1.175	-
2nd	LTE Band 12	10M_QPSK_1_25	Back	0.0	Main	DSI 1	23095	707.5	19.80	20.50	1.175	-0.06	0.980	1.152	1.02
1st	LTE Band 26	15M_QPSK_1_37	Back	0.0	Main	DSI 1	26865	831.5	16.74	17.50	1.191	-0.05	0.996	1.186	-
2nd	LTE Band 26	15M_QPSK_1_37	Back	0.0	Main	DSI 1	26865	831.5	16.74	17.50	1.191	0.14	0.954	1.136	1.04

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR < 1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

13. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + WLAN Main Ant + WLAN/BT Aux Ant	Yes

General Note:

1. The FCC ID: PD9BE211D2, Intel BE211D2W WLAN/BT module is integrated into this host, and the WLAN/Bluetooth SAR of 1.59 W/kg was used conservatively for the purpose of simultaneous transmission analysis.
2. The Scaled SAR summation is calculated based on the same configuration and test position.
3. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1g 1.6W/kg or 10g 4.0W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04 for 1g SAR, ≤ 0.1 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR＜1.6W/kg.
   v) The SPLSR calculated results please refer to section 13.2.

13.1 Body Conditions

Exposure Position	1	2	3	1+2+3 Summed 1g SAR (W/kg)	SPLSR	Case No.
	WWAN Max	WLAN/BT Main	WLAN/BT Aux			
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
Bottom Side at 0mm	0.428	1.590	1.590	3.608	**Case 1**	**0.010**
Back at 0mm	1.186	1.590	1.590	4.366	**Case 3**	**0.020**
Top at 0mm	0.177	1.590	1.590	3.357	**Case 5**	**0.010**
Right at 0mm	1.115	1.590	1.590	4.295	**Case 6**	**0.020**

13.2 SPLSR Evaluation and Analysis

General Note:

1. According to the antenna locations in Appendix D, the minimum distance between each transmit antenna is used for SPLSR analysis.
2. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary

	Band	Position	SAR (W/kg)	Gap (mm)	Min distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 1	WWAN Main	Bottom Side	0.428	0mm	220.0	2.02	0.01	Not required
	WLAN Main		1.59	0mm				
	WWAN Main	Bottom Side	0.428	0mm	220.0	2.02	0.01	Not required
	WLAN/BT Aux		1.59	0mm				
Case 3	Band	Position	SAR (W/kg)	Gap (mm)	Min distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WWAN Main	Back	1.186	0mm	220.0	2.78	0.02	Not required
	WLAN Main		1.59	0mm				
	WWAN Main	Back	1.186	0mm	220.0	2.78	0.02	Not required
	WLAN/BT Aux		1.59	0mm				
Case 5	Band	Position	SAR (W/kg)	Gap (mm)	Min distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WWAN Main	Top	0.177	0mm	220.0	1.77	0.01	Not required
	WLAN Main		1.59	0mm				
	WWAN Main	Top	0.177	0mm	220.0	1.77	0.01	Not required
	WLAN/BT Aux		1.59	0mm				
Case 6	Band	Position	SAR (W/kg)	Gap (mm)	Min distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WWAN Main	Right	1.115	0mm	220.0	2.71	0.02	Not required
	WLAN Main		1.59	0mm				
	WWAN Main	Right	1.115	0mm	220.0	2.71	0.02	Not required
	WLAN/BT Aux		1.59	0mm				

Test Engineer： Samy Lo

14. Uncertainty Assessment

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

Declaration of Conformity:

The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

15. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[6] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[7] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[8] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[9] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[10] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.