



Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

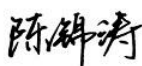
SAR TEST REPORT

PRODUCT	Smart POS System
BRAND	SUNMI
MODEL	T6831
FCC ID	2AH25T6831NA
IC	22621-T6831
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
ISSUE DATE	February 26, 2025
STANDARD(S)	FCC 47 CFR Part 2.1093, RSS 102:Issue 6/2023, ANSI/IEEE C95.1-1992, RSS-102.SAR.MEAS Issue 1 Amendment 1 December 15, 2023, IEEE Std 1528-2013, IEC/IEEE 62209-1528:2020

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1 Summary of Test Report

1.1 Test Standard (s)

No.	Test Standard(s)	Title	Version
1	FCC 47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices.	N/A
2	RSS 102	Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)	Issue 6/2023
3	ANSI/IEEE C95.1	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.	1992
4	RSS-102.SAR.MEAS Issue 1 Amendment 1	Measurement Procedure for Assessing Specific Absorption Rate (SAR) Compliance in Accordance with RSS-102	December 15, 2023
5	IEEE Std 1528	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques	2013
6	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-mounted wireless communication devices – Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)	2020
Note1: FCC adopts FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1-1992, IEEE Std 1528-2013 standards. ISED adopts RSS 102:Issue 6/2023, RSS-102.SAR.MEAS Issue 1 Amendment 1 December 15, 2023, IEC/IEEE 62209-1528:2020 standards. Note2: The standard of FCC 47 CFR Part 2.1093 has not been accredited by A2LA.			

1.2 Reference Documents

No.	Reference Document(s)	Title	Version
1	KDB 447498	General RF Exposure Guidance	D01 v06
2	KDB 865664	SAR Measurement 100 MHz to 6 GHz	D01 v01r04
3	KDB 865664	RF Exposure Reporting	D02 v01r02
4	KDB 941225	3G SAR Procedures	D01 v03r01
5	KDB 941225	SAR for LTE Devices	D05 v02r05
6	KDB 941225	Hotspot SAR	D06 v02r01

7	KDB 248227	802.11 Wi-Fi SAR	D01 v02r02
8	KDB 616217	SAR for laptop and tablets	D04 v01r02

1.3 Summary of Test Results

1.3.1 The maximum results of Specific Absorption Rate (SAR) in standalone mode are as follows.

Band	Reported SAR 1g(W/Kg)		Reported SAR 10g(W/Kg)	Detailed Results
	Body-worn (5mm)	Hotspot (5mm)	Limb (0mm)	
WCDMA Band II	0.60	0.68	0.79	See section 14.1
WCDMA Band IV	0.65	0.71	0.90	See section 14.1
WCDMA Band V	0.31	0.69	0.80	See section 14.1
LTE Band 7	0.63	0.71	0.74	See section 14.1
LTE Band 12	0.38	0.73	0.82	See section 14.1
LTE Band 13	0.41	0.70	0.97	See section 14.1
LTE Band 14	0.35	0.71	1.01	See section 14.1
LTE Band 25	0.52	0.63	0.64	See section 14.1
LTE Band 26	0.24	0.72	0.81	See section 14.1
LTE Band 30	0.52	0.68	0.67	See section 14.1
LTE Band 38	0.44	0.67	0.60	See section 14.1
LTE Band 41	0.33	0.64	0.67	See section 14.1
LTE Band 66	0.74	0.74	0.97	See section 14.1
LTE Band 71	0.34	0.57	0.38	See section 14.1
Wi-Fi 2.4G	0.15	0.84	0.44	See section 14.1
Wi-Fi 5G	0.11	0.54	0.43	See section 14.1
BT	0.04	0.27	0.13	See section 14.1

Band	Reported SAR 1g(W/Kg)		Reported SAR 10g(W/Kg)	Detailed Results
	Body-worn (5mm)	Hotspot (5mm)	Limb (0mm)	
NOTE1: The T6831 manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing. NOTE2: The device supports LTE Band 2/4/5/17 and LTE Band 25/66/26/12, since the supported frequency span for LTE Band 2/4/5/17 falls completely within the supports frequency span for LTE Band 25/66/26/12. The maximum output power(including tolerance) of LTE Band 2/4/5/17 is less than or equal to LTE Band 25/66/26/12, and both LTE bands share the same transmission path. According to TCB workshop April 2015 RF Exposure Procedures(Overlapping LTE Bands), LTE Band 2 is covered by LTE Band 25, LTE Band 4 is covered by LTE Band 66, LTE Band 5 is covered by LTE Band 26, LTE Band 17 is covered by LTE Band 12, therefore, SAR was only assessed for LTE Band 25/66/26/12. NOTE3: Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.				

1.3.2 The maximum results of Specific Absorption Rate (SAR) in simultaneous mode are as follows.

Highest Reported SAR 1g(W/kg)			
Mode	Position	Simultaneous Transmission SAR	Detailed Results
LTE Band 66&Wi-Fi 5G	Body-worn (5mm)	0.78	See section 14.2
LTE Band 12&Wi-Fi 2.4G	Hotspot (5mm)	1.57	See section 14.2
Highest Reported SAR 10g(W/kg)			
LTE Band 14&Wi-Fi 2.4G	Limb (0mm)	1.45	See section 14.2

2 General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4, No. 766, Jingang Road, Pudong, Shanghai, China
Telephone	021-68866880
FCC Registration No.	708870
FCC Designation No.	CN1364
IC Designation No.	10766A
CAB identifier	CN0067

2.2 Laboratory Environmental Requirements

Temperature	18°C~25°C
Relative Humidity	25%RH~75%RH

2.3 Project Information

Project Manager	Gao Hongning
Test Date	February 18, 2025 to February 26, 2025

3 General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
Telephone	18826519551

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
Telephone	18826519551

4 General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product	Smart POS System
Model	T6831
Date of Receipt	February 20, 2025
EUT ID*	S03aa/S04aa
SN/IMEI	S03aa:860309070007533/860309070008036 S04aa:860309070007707/860309070008200
Supported Radio Technology and Bands	WCDMA Band II /IV / V LTE Band 2/4/5/7/12/13/14/17/25/26/30/38/41/66/71 Wi-Fi 802.11a/b/g/n/ac BT5.0, BLE NFC
Tx Frequency	1850 MHz-1910 MHz (WCDMA Band II) 1710 MHz-1755 MHz (WCDMA Band IV) 824 MHz-849 MHz (WCDMA Band V) 1850 MHz-1910 MHz (LTE Band 2) 1710 MHz-1755 MHz (LTE Band 4) 824 MHz-849 MHz (LTE Band 5) 2500 MHz-2570 MHz (LTE Band 7) 699 MHz-716 MHz (LTE Band 12) 777 MHz-787 MHz (LTE Band 13) 788 MHz-798 MHz (LTE Band 14) 704 MHz-716 MHz (LTE Band 17) 1850 MHz-1915 MHz (LTE Band 25) 814 MHz-849 MHz (LTE Band 26) 824 MHz-849 MHz (LTE Band 26 ISD) 2305 MHz-2315 MHz (LTE Band 30) 2570 MHz-2620 MHz (LTE Band 38) 2496 MHz-2690 MHz (LTE Band 41) 2500 MHz-2690 MHz (LTE Band 41 ISD) 1710 MHz-1780 MHz (LTE Band 66) 663 MHz-698 MHz (LTE Band 71) 2412 MHz-2462 MHz (Wi-Fi 2.4G) 5180 MHz-5240 MHz (Wi-Fi 5G U-NII-1) 5260 MHz-5320 MHz (Wi-Fi 5G U-NII-2A) 5500 MHz-5700 MHz (Wi-Fi 5G U-NII-2C) 5745 MHz-5825 MHz (Wi-Fi 5G U-NII-3) 2402 MHz-2480 MHz (BT/BLE) 13.56 MHz (NFC)
HVIN	T6831
Hardware Version	V1.0(NA)
Software Version	V3.0.1

Dimension	200*80*17 mm(L*W*H)
NOTE1: EUT ID is the internal identification code of the laboratory. NOTE2: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

4.2 Description for Auxiliary Equipment (AE)

AE ID*	Description	Model	SN/Remark
BA03	Battery	HPPA	E150140424AS11303
BA04	Battery	HPPA	E150140424AS11790
NOTE: AE ID is the internal identification code of the laboratory.			

5 Test Configuration Information

5.1 Test Equipments Utilized

No.	Name	Model	S/N	Software Version	Hardware Version	Manufacturer	Cal. Date	Cal. Interval
1	Network analyzer	N5242A	MY51221755	A.09.33.09	N/A	Agilent	Oct.10, 2024	1 Year
2	Power meter	NRX	103851	02.50.21112602	20.00	R&S	Jul.25, 2024	1 Year
3	Power sensor	NRP18S-10	101841	N/A	N/A	R&S	Jul.25, 2024	1 Year
4	Power sensor	NRP18S-10	101842	N/A	N/A	R&S	Jul.25, 2024	1 Year
5	Signal Generator	E4438C	MY49072044	N/A	C.05.83	Agilent	Jul.25, 2024	1 Year
6	Amplifier	NTWPA-07605	22039018	N/A	N/A	RFLIGHT	Jul.25, 2024	1 Year
7	Test Software	DASY5	N/A	52.10.4.1527	N/A	SPEAG	N/A	N/A
8	DAE	DAE4	1244	N/A	N/A	SPEAG	Feb.17, 2025	1 Year
9	E-field Probe	EX3DV4	7634	N/A	N/A	SPEAG	Mar.20, 2024	1 Year
10	BTS	CMU 200	123102	V5.21	N/A	R&S	Jul.25, 2024	1 Year
11	BTS	MT8820C	6201240338	V3.8.10	N/A	Anritsu	Oct.10, 2024	1 Year
12	Dipole Validation Kit	D750 V3	1144	N/A	N/A	SPEAG	Sep.3, 2024	1 Year
13	Dipole Validation Kit	D835 V2	4d112	N/A	N/A	SPEAG	Feb.20, 2025	1 Year
14	Dipole Validation Kit	D1750 V2	1044	N/A	N/A	SPEAG	Sep.3, 2024	1 Year
15	Dipole Validation Kit	D1900 V2	5d232	N/A	N/A	SPEAG	Nov.8, 2024	1 Year
16	Dipole Validation Kit	D2300 V2	1021	N/A	N/A	SPEAG	Sep.3, 2024	1 Year
17	Dipole Validation Kit	D2450 V2	858	N/A	N/A	SPEAG	Sep.5, 2024	1 Year
18	Dipole Validation Kit	D2600 V2	1031	N/A	N/A	SPEAG	Feb.3, 2025	1 Year
19	Dipole Validation Kit	D5GHz V2	1172	N/A	N/A	SPEAG	Sep.4, 2024	1 Year

5.2 Measurement Uncertainty

Item	Uncertainty
SAR (IEEE Std 1528-2013)	$U_{SAR(1g)}=22.36\%$, $U_{SAR(10g)}=22.08\%$
SAR (IEC/IEEE 62209-1528:2020)	$U_{SAR(1g)}=23.34\%$, $U_{SAR(10g)}=23.18\%$
NOTE: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	

5.3 EUT Connection Diagram of Test System

5.3.1 SAR

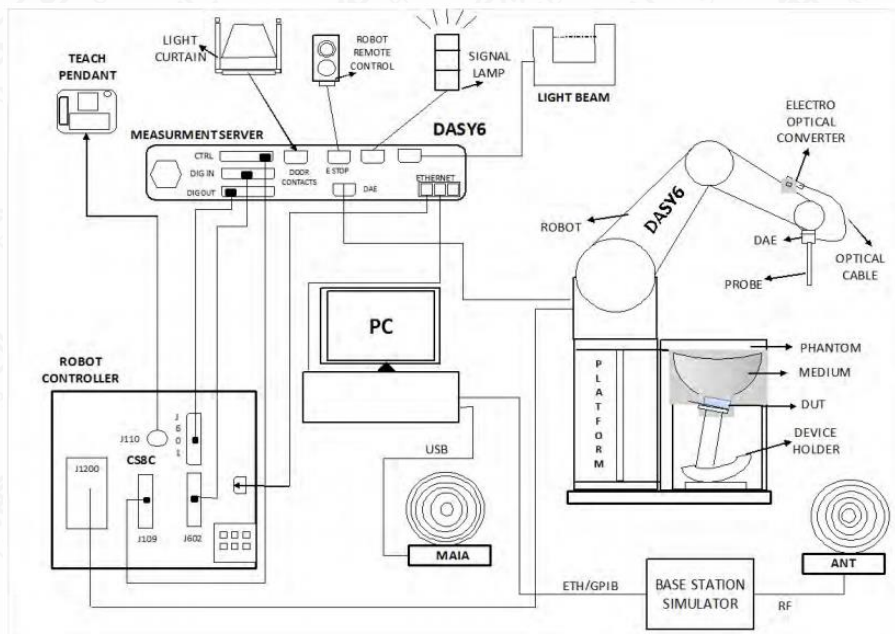


Figure 5.3.1-1 SAR Connection Diagram

6 Specific Absorption Rate(SAR)

6.1 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.

6.2 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:

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

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

SAR measurement can be either related to the temperature elevation in tissue by:

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by:

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

Where:

σ is the conductivity of the tissue

ρ is the mass density of tissue, which is normally set to $1g/cm^3$

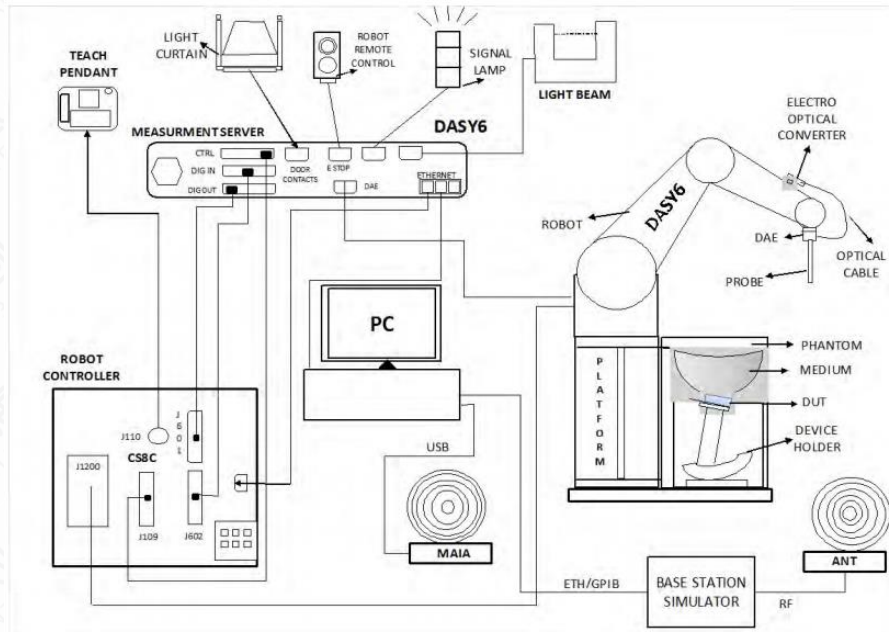
E is the RMS electrical field strength

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 SAR Measurement System Introduction

7.1 Measurement Set-up

The DASY6 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Figures 7.1-1 SAR Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) 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 WinXP 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.

7.2 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY software reads the reflection during a software approach and looks for the maximum using 2nd order curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications		
Model	EX3DV4	
Frequency Range	4 MHz – 10 GHz	
Calibration	In head simulating tissue at frequency from 650MHz to 5900MHz	
Linearity	±0.2 dB (30 MHz – 10 GHz)	
Dynamic Range	10 µW/g – >100 mW/g	
Probe Length	337 mm	
Probe Tip Length	20 mm	
Body Diameter	12 mm	
Tip Diameter	2.5 mm	
Tip-Center	1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better than 30%.	

Figure 7.2-1 Detail of Probe

Figure 7.2-2 E-field Probe

7.3 E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equate to 1 mW/cm².

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

7.4 Other Test Equipment

7.4.1 Data Acquisition Electronics (DAE)

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

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



Figure 7.4.1-1: DAE

7.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY6: TX90) type from Stäubli SA (France).

For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchronal motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

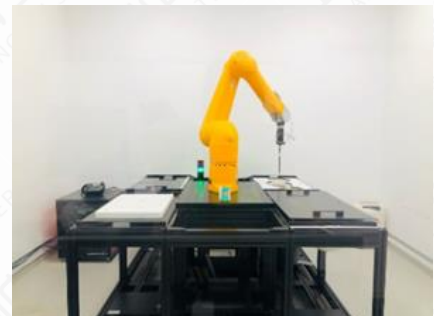


Figure 7.4.2-1: DASY6

7.4.3 Measurement Server

The DASY6 measurement server is based on a PC/104 CPU board with a 400 MHz intel ULV Celeron, 128 MB chipdisk and 128 MB RAM. The necessary circuits for communication with either the DAE4 (or DAE3) electronics box as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY6 I/O board, which is directly connected to the PC/104 bus of the CPU board.



Figure 7.4.3-1 Server for DASY6

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

7.4.4 Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of $\pm 0.5\text{mm}$ would produce a SAR uncertainty of $\pm 20\%$. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.



Figure 7.4.4-1: Device Holder

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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 positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



Figure 7.4.4-2: Laptop Extension Kit

7.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness	2 ± 0.2 mm
Available	Special
Filling Volume	Approx. 25 liters
Dimensions	810 mm x 1000 mm x 500 mm (H x L x W)



Figure 7.4.5-1: SAM Twin Phantom

8 Test Position in Relation to the Phantom

8.1 General considerations

This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.

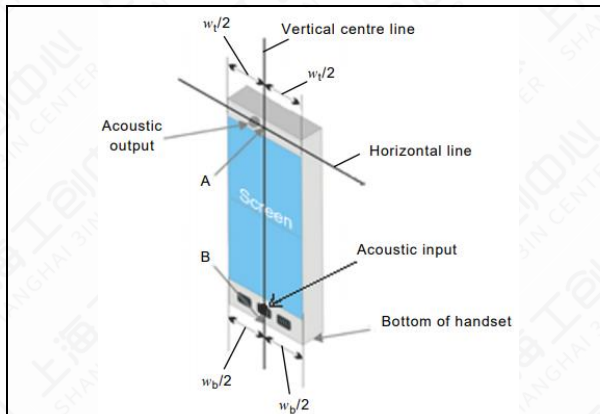


Figure 8.1-1 full touch screen smart phone (top)

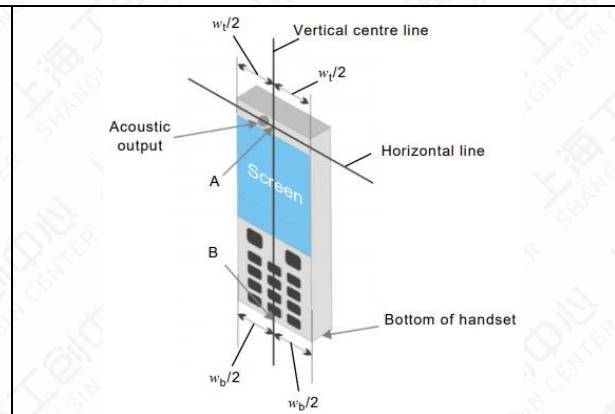


Figure 8.1-2 keyboard handset (bottom)

W_t	Width of the handset at the level of the acoustic output
W_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the DUT at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

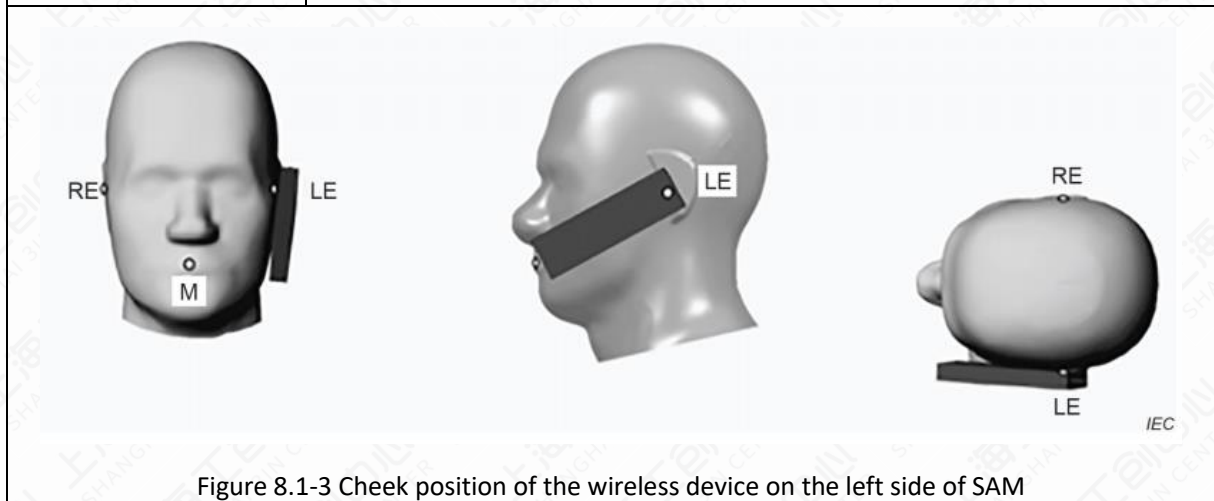


Figure 8.1-3 Cheek position of the wireless device on the left side of SAM

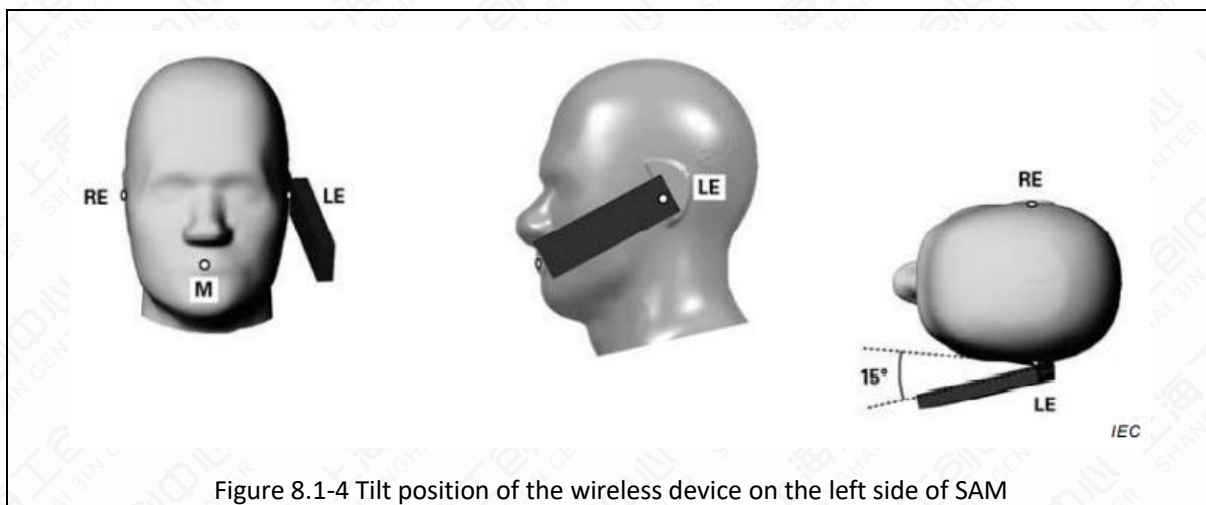


Figure 8.1-4 Tilt position of the wireless device on the left side of SAM

8.2 Body-worn device

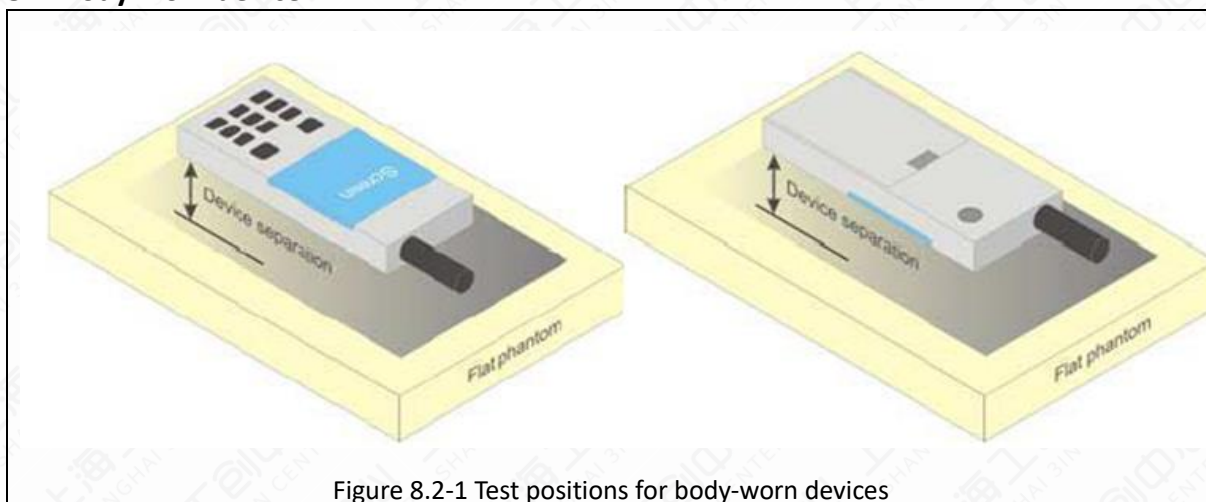


Figure 8.2-1 Test positions for body-worn devices

A typical example of a body-worn device is a mobile phone, wireless enabled PDA (personal digital assistant) or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

8.3 Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions.

Tests shall be performed for all antenna positions specified.

Picture 8-6 shows positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat

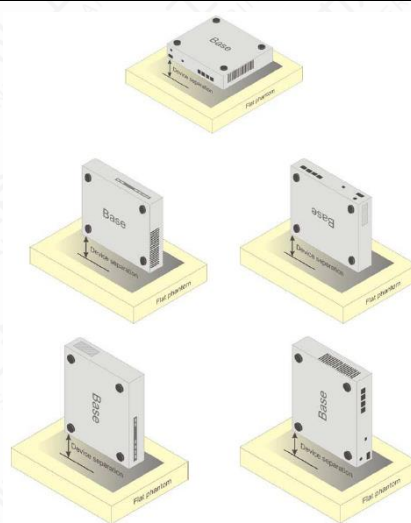


Figure 8.3-1 Test positions for desktop devices

9 Tissue Simulating Liquids

9.1 Equivalent Tissues Composition

The liquid used for the frequency range of 650-6000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 9.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE Std 1528.

Table 9.1-1: Composition of the Head Tissue Equivalent Matter

Frequency (MHz)	835	900	1800	1950	2300	2450	2600	5800
Ingredients (% by weight)								
Water	41.45	40.92	55.242	54.89	56.34	58.79	58.79	65.53
Sugar	56.0	56.5	/	/	/	/	/	/
Salt	1.45	1.48	0.306	0.18	0.14	0.06	0.06	/
Preventol	0.1	0.1	/	/	/	/	/	/
Cellulose	1.0	1.0	/	/	/	/	/	/
GlycolMonobutyl	/	/	44.452	44.93	43.52	41.15	41.15	/
Diethyleneglycol momohexylether	/	/	/	/	/	/	/	17.24
Triton X-100	/	/	/	/	/	/	/	17.23
Dielectric Parameters Target Value	$\epsilon=41.5$ $\sigma=0.90$	$\epsilon=41.5$ $\sigma=0.97$	$\epsilon=40.0$ $\sigma=1.40$	$\epsilon=40.0$ $\sigma=1.40$	$\epsilon=39.5$ $\sigma=1.67$	$\epsilon=39.2$ $\sigma=1.80$	$\epsilon=39.0$ $\sigma=1.96$	$\epsilon=35.3$ $\sigma=5.27$

Table 9.1-2: Targets for tissue simulating liquid

Frequency (MHz)	Liquid Type	Conductivity (σ)	$\pm 5\%$ Range	Permittivity (ϵ)	$\pm 5\%$ Range
750	Head	0.89	0.846~0.934	41.9	39.805~43.995
835	Head	0.90	0.855~0.945	41.5	39.425~43.575
900	Head	0.97	0.922~1.018	41.5	39.425~43.575
1450	Head	1.20	1.140~1.260	40.5	38.475~42.525
1750	Head	1.37	1.302~1.438	40.1	38.095~42.105
1800	Head	1.40	1.330~1.470	40.0	38.000~42.000
1900	Head	1.40	1.330~1.470	40.0	38.000~42.000
2000	Head	1.40	1.330~1.470	40.0	38.000~42.000
2100	Head	1.49	1.416~1.564	39.8	37.810~41.790
2300	Head	1.67	1.587~1.753	39.5	37.525~41.475
2450	Head	1.80	1.710~1.890	39.2	37.240~41.160
2600	Head	1.96	1.862~2.058	39.0	37.050~40.950
3000	Head	2.40	2.280~2.520	38.5	36.575~40.425
3500	Head	2.91	2.765~3.055	37.9	36.005~39.795
4000	Head	3.43	3.259~3.601	37.4	35.530~39.270
4500	Head	3.94	3.743~4.137	36.8	34.960~38.640
5000	Head	4.45	4.228~4.672	36.2	34.390~38.010
5200	Head	4.66	4.427~4.893	36.0	34.200~37.800
5400	Head	4.86	4.617~5.103	35.8	34.010~37.590
5600	Head	5.07	4.817~5.323	35.5	33.725~37.275
5800	Head	5.27	5.007~5.533	35.3	33.535~37.065
6000	Head	5.48	5.206~5.754	35.1	33.345~36.855

NOTE: For dielectric properties of head tissue-equivalent liquid at other frequencies within the frequency range, a linear interpolation method shall be used.

9.2 Liquid depth

The Measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: $2.0 \pm 0.2 \text{ mm}$ (bottom Plate) filled with Body or Head simulating Liquid.

The depth of tissue-equivalent liquid in a phantom must be $\geq 15.0 \text{ cm}$ with $\leq \pm 0.5 \text{ cm}$ variation for SAR measurements $\leq 3 \text{ GHz}$ and $\geq 10.0 \text{ cm}$ with $\leq \pm 0.5 \text{ cm}$ variation for measurements $> 3 \text{ GHz}$.

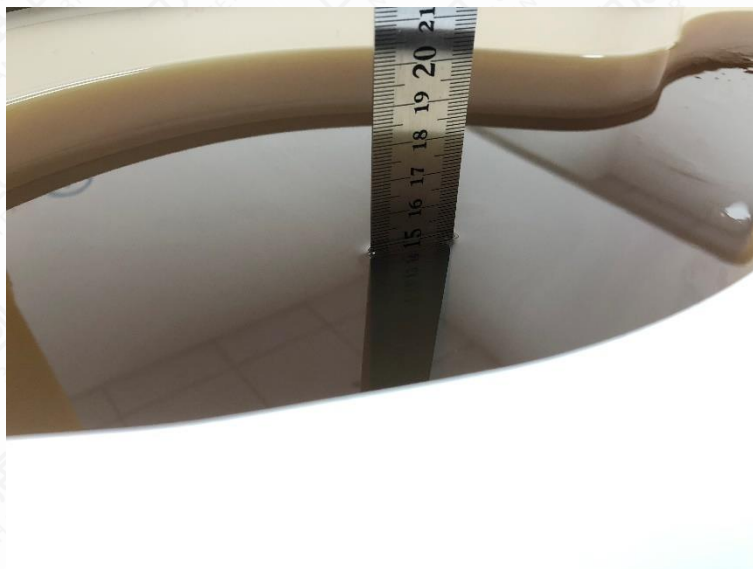


Figure 9.2-1 Liquid depth in the Flat Phantom for SAR measurements $\leq 3 \text{ GHz}$

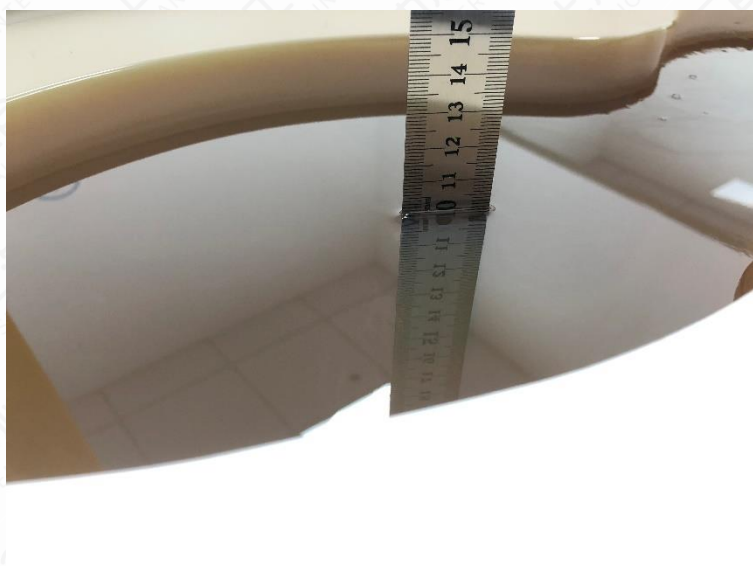


Figure 9.2-2 Liquid depth in the Flat Phantom for SAR measurements $> 3 \text{ GHz}$

9.3 Dielectric Performance of TSL

Table 9.3-1: Dielectric Performance of Head Tissue Simulating Liquid

Tissue Simulating Liquid								
Frequency (MHz)	Head(Standard)		Temperature	Date	Test Result		Deviation	
	Permittivity ϵ	Conductivity σ			Permittivity ϵ	Conductivity σ	Permittivity ϵ	Conductivity σ
750	41.90	0.89	20.5°C	February 18, 2025	42.111	0.866	0.50%	-2.70%
750	41.90	0.89	20.3°C	February 25, 2025	42.256	0.891	0.85%	0.11%
835	41.50	0.90	20.4°C	February 21, 2025	41.854	0.899	0.85%	-0.11%
1750	40.10	1.37	20.6°C	February 19, 2025	39.191	1.322	-2.27%	-3.50%
1900	40.00	1.40	20.4°C	February 22, 2025	38.592	1.406	-3.52%	0.43%
2300	39.50	1.67	20.3°C	February 23, 2025	37.865	1.671	-4.14%	0.06%
2450	39.20	1.80	20.5°C	February 24, 2025	37.779	1.848	-3.63%	2.67%
2600	39.00	1.96	20.5°C	February 20, 2025	39.74	1.957	1.90%	-0.15%
2600	39.00	1.96	20.3°C	February 25, 2025	37.518	1.964	-3.80%	0.20%
5200	36.00	4.66	20.5°C	February 26, 2025	36.107	4.732	0.30%	1.55%
5300	35.90	4.76	20.5°C	February 26, 2025	35.899	4.848	0.00%	1.85%
5600	35.50	5.07	20.5°C	February 26, 2025	35.233	5.213	-0.75%	2.82%
5800	35.30	5.27	20.5°C	February 26, 2025	34.874	5.459	-1.21%	3.59%

Table 9.3-2: Dielectric Performance of Head Tissue Simulating Liquid For ISED

Tissue Simulating Liquid								
Frequency (MHz)	Head(Standard)		Temperature	Date	Test Result		Deviation	
	Permittivity ϵ	Conductivity σ			Permittivity ϵ	Conductivity σ	Permittivity ϵ	Conductivity σ
704	42.145	0.887	20.5°C	February 18, 2025	42.273	0.850	0.30%	-4.17%
707.5	42.127	0.887	20.5°C	February 18, 2025	42.259	0.852	0.31%	-3.95%
711	42.108	0.887	20.5°C	February 18, 2025	42.252	0.853	0.34%	-3.83%
782	41.749	0.894	20.5°C	February 18, 2025	42.016	0.878	0.64%	-1.79%
793	41.698	0.895	20.3°C	February 25, 2025	42.145	0.907	1.07%	1.34%
673	42.311	0.885	20.3°C	February 25, 2025	42.596	0.873	0.67%	-1.36%
683	42.257	0.886	20.3°C	February 25, 2025	42.543	0.874	0.68%	-1.35%
688	42.231	0.886	20.3°C	February 25, 2025	42.516	0.874	0.67%	-1.35%
821.5	41.564	0.898	20.4°C	February 21, 2025	41.897	0.894	0.80%	-0.45%
831.5	41.516	0.900	20.4°C	February 21, 2025	41.865	0.898	0.84%	-0.22%
836.5	41.500	0.902	20.4°C	February 21, 2025	41.850	0.900	0.84%	-0.22%
841.5	41.500	0.907	20.4°C	February 21, 2025	41.837	0.902	0.81%	-0.55%
826.4	41.540	0.899	20.4°C	February 21, 2025	41.882	0.896	0.82%	-0.33%
836.6	41.500	0.902	20.4°C	February 21, 2025	41.848	0.900	0.84%	-0.22%
846.6	41.500	0.912	20.4°C	February 21, 2025	41.821	0.904	0.77%	-0.88%
1720	40.127	1.354	20.6°C	February 19, 2025	39.243	1.307	-2.20%	-3.47%
1745	40.105	1.367	20.6°C	February 19, 2025	39.199	1.320	-2.26%	-3.44%
1770	40.060	1.382	20.6°C	February 19, 2025	39.161	1.333	-2.24%	-3.55%

1712.4	40.134	1.349	20.6°C	February 19, 2025	39.259	1.303	-2.18%	-3.41%
1732.6	40.116	1.361	20.6°C	February 19, 2025	39.219	1.314	-2.24%	-3.45%
1752.6	40.095	1.372	20.6°C	February 19, 2025	39.187	1.324	-2.26%	-3.50%
1860	40.000	1.400	20.4°C	February 22, 2025	38.634	1.379	-3.42%	-1.50%
1882.5	40.000	1.400	20.4°C	February 22, 2025	38.615	1.394	-3.46%	-0.43%
1905	40.000	1.400	20.4°C	February 22, 2025	38.587	1.409	-3.53%	0.64%
1852.4	40.000	1.400	20.4°C	February 22, 2025	38.637	1.374	-3.41%	-1.86%
1880	40.000	1.400	20.4°C	February 22, 2025	38.617	1.392	-3.46%	-0.57%
1907.6	40.000	1.400	20.4°C	February 22, 2025	38.583	1.411	-3.54%	0.79%
2310	39.480	1.679	20.3°C	February 23, 2025	37.847	1.679	-4.14%	0.00%
2412	39.276	1.767	20.5°C	February 24, 2025	37.862	1.820	-3.60%	3.00%
2437	39.226	1.789	20.5°C	February 24, 2025	37.808	1.839	-3.61%	2.79%
2462	39.184	1.813	20.5°C	February 24, 2025	37.755	1.856	-3.65%	2.37%
2402	39.296	1.758	20.5°C	February 24, 2025	37.881	1.812	-3.60%	3.07%
2441	39.218	1.792	20.5°C	February 24, 2025	37.797	1.842	-3.62%	2.79%
2480	39.160	1.832	20.5°C	February 24, 2025	37.720	1.870	-3.68%	2.07%
2510	39.120	1.864	20.5°C	February 20, 2025	39.860	1.886	1.89%	1.18%
2535	39.087	1.891	20.5°C	February 20, 2025	39.823	1.906	1.88%	0.79%
2560	39.053	1.917	20.5°C	February 20, 2025	39.789	1.926	1.88%	0.47%
2580	39.027	1.939	20.3°C	February 25, 2025	37.548	1.947	-3.79%	0.41%
2595	39.007	1.955	20.3°C	February 25, 2025	37.524	1.960	-3.80%	0.26%

2610	38.988	1.971	20.3°C	February 25, 2025	37.499	1.972	-3.82%	0.05%
2510	39.120	1.864	20.3°C	February 25, 2025	37.665	1.893	-3.72%	1.56%
2549.5	39.067	1.906	20.3°C	February 25, 2025	37.589	1.924	-3.78%	0.94%
2593	39.009	1.953	20.3°C	February 25, 2025	37.529	1.958	-3.79%	0.26%
2636.5	38.954	2.000	20.3°C	February 25, 2025	37.445	1.994	-3.87%	-0.30%
2680	38.900	2.048	20.3°C	February 25, 2025	37.368	2.030	-3.94%	-0.88%
5180	36.020	4.639	20.5°C	February 26, 2025	36.147	4.711	0.35%	1.55%
5200	36.000	4.660	20.5°C	February 26, 2025	36.107	4.732	0.30%	1.55%
5240	35.960	4.700	20.5°C	February 26, 2025	36.023	4.779	0.18%	1.68%
5260	35.940	4.720	20.5°C	February 26, 2025	35.980	4.802	0.11%	1.74%
5280	35.920	4.740	20.5°C	February 26, 2025	35.938	4.825	0.05%	1.79%
5320	35.880	4.780	20.5°C	February 26, 2025	35.859	4.871	-0.06%	1.90%
5500	35.650	4.965	20.5°C	February 26, 2025	35.447	5.079	-0.57%	2.30%
5580	35.530	5.049	20.5°C	February 26, 2025	35.278	5.185	-0.71%	2.69%
5700	35.400	5.170	20.5°C	February 26, 2025	35.056	5.342	-0.97%	3.33%
5745	35.355	5.215	20.5°C	February 26, 2025	34.969	5.395	-1.09%	3.45%
5785	35.315	5.255	20.5°C	February 26, 2025	34.898	5.441	-1.18%	3.54%
5825	35.275	5.296	20.5°C	February 26, 2025	34.835	5.489	-1.25%	3.64%

10 System Check

10.1 System Check

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

10.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

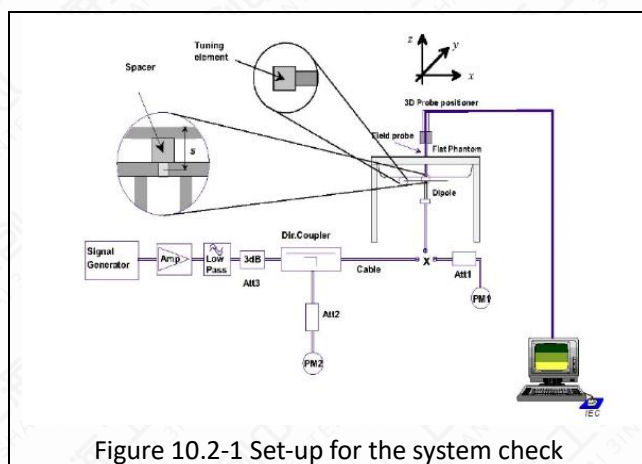


Figure 10.2-1 Set-up for the system check



Figure 10.2-2. Setup for Dipole

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

10.3 System Check Result

Table 10.3-1: System Check Result of SAR

SAR System Check								
Frequency (MHz)	Target Value (w/kg)		Temperature	Date	Test Result (w/kg)		Deviation	
	10g	1g			10g	1g	10g	1g
750	5.48	8.43	21.6°C	February 18, 2025	5.44	8.36	-0.73%	-0.83%
750	5.48	8.43	21.3°C	February 25, 2025	5.52	8.52	0.73%	1.07%
835	6.01	9.32	21.4°C	February 21, 2025	5.92	9.16	-1.50%	-1.72%
1750	19.40	36.70	21.5°C	February 19, 2025	19.72	37.20	1.65%	1.36%
1900	20.50	39.70	21.4°C	February 22, 2025	20.84	40.40	1.66%	1.76%
2300	23.90	50.30	21.3°C	February 23, 2025	23.68	50.00	-0.92%	-0.60%
2450	24.40	52.60	21.6°C	February 24, 2025	24.92	53.60	2.13%	1.90%
2600	25.20	56.50	21.5°C	February 20, 2025	25.48	56.40	1.11%	-0.18%
2600	25.20	56.50	21.3°C	February 25, 2025	25.84	57.20	2.54%	1.24%
5200	21.80	77.40	21.4°C	February 26, 2025	22.40	77.50	2.75%	0.13%
5300	22.50	79.40	21.4°C	February 26, 2025	23.40	81.50	4.00%	2.64%
5600	23.20	82.40	21.4°C	February 26, 2025	24.20	85.00	4.31%	3.16%
5800	22.00	78.60	21.4°C	February 26, 2025	22.80	80.00	3.64%	1.78%
NOTE 1: The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target. NOTE 2: The system verifies that the measured input power level is equivalent to 250mW for 0.6GHz to 3GHz and above 3GHz is equivalent to 100mW, and the measured results are compared with the target value by converting to 1W.								

11 Measurement Procedures

11.1 Test Steps

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

(a) Power reference measurement

The reference and drift jobs are useful for monitoring the power drift of the device under test in the batch process. Both jobs measure the electric field strength at a specified reference position, at a selectable distance from the phantom surface. The reference position can be either the selected section's grid reference point or a user point in this section. The reference job projects the selected point onto the phantom surface, orients the probe perpendicularly to the surface, and approaches the surface using the selected detection method.

(b) 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 finer measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. The scan area is defined by an editable grid. This grid is anchored at the grid reference point of the selected section in the phantom. When the area scan's property sheet is brought up, grid was at to 15mm * 15mm and can be edited by users.

(c) Zoom scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. The default zoom scan measures 5 * 5 * 7 points within a cube whose base faces are centered around the maximum found in a preceding area scan job within the same procedure. If the preceding Area Scan job indicates more than one maximum, the number of Zoom Scans has to be enlarged accordingly.

(d) Power drift measurement

The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same setting. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under within a batch process. In the properties of the drift job, the user can specify a limit for the drift and have DASY software stop the measurements if this limit is exceeded. This ensures that the power drift during one measurement is within 5%.

The SAR measurement procedures for each of test conditions are as follows:

- (a) Make EUT to transmit it maximum output power
- (b) Measure conducted output power through RF cable
- (c) Place the EUT in the specific position of phantom
- (d) Measure SAR results for Middle channel or the highest power channel on each testing position
- (e) 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
- (f) Record the SAR value

11.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE Std 1528 standard. It can be conducted for 1g and 10g.

The DASY system allows evaluations that combine measured data and robot positions, such as:

(a) Maximum Search

During a maximum search, global and local maximum searches are automatically performed in 2D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2dB of the global maxima for all SAR distributions.

(b) Extrapolation

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation.

Extrapolation routines require at least 10 measurement points in 3D space. They are used in the Cube Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 5*5*5 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10 cubes.

(c) Boundary effect

For measurements in the immediate vicinity of a phantom surface, the field coupling effects between the probe and the boundary influence the probe characteristics. Boundary effect errors of different dosi-metric probe types have been analyzed by measurements and using a numerical probe model. As expected, both methods showed an enhanced sensitivity in the immediate vicinity of the boundary. The effect strongly depends on the probe dimensions and disappears with increasing distance from the boundary. The sensitivity can be approximately given as:

$$S \approx S_0 + S_b * \exp\left(-\frac{Z}{a}\right) * \cos\left(\pi \frac{Z}{\lambda}\right)$$

Since the decay of the boundary effect dominates for small probe ($a \ll \lambda$), the cos-term can be omitted. Factors S_b (parameter Alpha in the DASY software) and a (parameter Delta in the DASY software) and assessed during probe calibration and used for numerical compensation of the boundary effect. Several simulations and measurements have confirmed that the compensation is valid for different field and boundary configurations.

This simple compensation procedure can largely reduce the probe uncertainty near boundaries. It works well as long as:

- The boundary curvature is small
- The probe axis is angled less than 30° to the boundary normal
- The distance between probe and boundary is larger than 25% of the probe diameter
- The probe is symmetric (all sensors have the same offset from the probe tip)

Since all of these requirements are fulfilled in a DASY system, the correction of the probe boundary effect in the vicinity of the phantom surface is performed in a fully automated manner via the

measurement data extraction during post processing.

11.3 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

Table 11.3-1: Test Resolution Requirement

Items			≤3GHz	>3GHz
Maximum Distance			5mm ±1mm	$\frac{1}{2} * \delta * \ln(2)$ mm ±0.5mm
Maximum probe angle			30±1°	20±1°
Maximum Area Scan spatial resolution: Δx_{Area} , Δy_{Area}			≤2GHz: ≤15mm	3-4GHz: ≤12mm
			2-3GHz: ≤12mm	4-6GHz: ≤10mm
			when the x or y dimension of the device , in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the device with at least one measurement point on the device	
Maximum Zoom Scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤2GHz: ≤8mm	3-4GHz: ≤5mm
			2-3GHz: ≤5mm	4-6GHz: ≤4mm
maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤5mm	3-4GHz: ≤4mm 4-5GHz: ≤3mm 5-6GHz: ≤2mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤4mm	3-4GHz: ≤3mm 4-5GHz: ≤2.5mm 5-6GHz: ≤2mm
		$\Delta z_{Zoom}(n > 1)$ between subsequent points	≤1.5*	
minimum zoom scan volume	x, y, z		≥30mm	3-4GHz: ≥28mm 4-5GHz: ≥25mm 5-6GHz: ≥22mm

Notes:

δ is the penetration depth of a plane-wave at normal incidence to the tissue medium in IEEE Std 1528-2013.

When Zoom Scan is required and reported SAR from the Area Scan based 1-g SAR estimation procedure of KDB publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm for 2GHz-3GHz, ≤ 7 mm for 3GHz-4GHz, ≤ 5 mm for 4GHz-6GHz Zoom Scan resolution may be applied.

11.4 GSM/GPRS Measurement Procedures

GSM/GPRS/EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Other configurations of GSM/GPRS/EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.

11.5 WCDMA Measurement Procedures

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCH), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

Table 11.5-1: HSDPA setting for Release 5

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs}	CM (dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	1.5	0.5
2	12/15	15/15	64	12/15	24/25	2.0	1
3	15/15	8/15	64	15/8	30/15	2.0	1
4	15/15	4/15	64	15/4	30/15	2.0	1

Table 11.5-2: HSUPA setting for Release 6

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
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1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	2.0	1.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	3.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	2.0	1.0	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	2.0	1.0	21	81

11.6 LTE Measurement Procedure

SAR tests for LTE are performed with a base station simulator. Closed loop power control was used so the UE transmits with maximum output power during SAR testing.

- KDB 941225 D05, 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.
- 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
- 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.
- 16QAM/64QAM output power for each RB allocation configuration is $> \text{not } \frac{1}{2}\text{dB}$ higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; 16QAM/64QAM SAR testing is not required.
- Smaller bandwidth output power for each RB allocation configuration is $> \text{not } \frac{1}{2}\text{dB}$ higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; smaller bandwidth SAR testing is not required.
- For LTE Band 12/26 the maximum bandwidth does not support three non-overlapping channels, 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.
- LTE band 17/2/5/38/4 SAR test was covered by Band 12/25/26/41/66; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

11.6.1 LTE Carrier Aggregation Conducted Power (Downlink)

Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

11.6.2 LTE Carrier Aggregation Conducted Power (Uplink)

UL CA shall be tested based on the worst-case SAR configuration determined from non-CA SAR testing result. The channel BW, channel number, RB allocation, etc. would be selected to allow contiguous CA of PCC and SCC. Uplink output power for UL CA is the total power measured across the PCC and SCC.

UL CA power measurements were performed for each antennas at with QPSK modulation based on the worst-case standalone SAR.

The UL CA mode power measurements represent the total power across both carriers. Measurements were made for all supported PCC bandwidths using the channel/RB combination resulting in the highest standalone output power at the least MPR (0 dB). SCCs were set to use configurations similar to the PCC to establish conservative or worst case equivalent SAR test conditions (highest maximum power with MPR of 0 dB).

The standalone power measurement is the power for the PCC in the non-CA mode (i.e. single carrier power). In all cases the UL CA power is less than or equal to the standalone power.

11.6.3 LTE TDD Considerations

Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special sub-frame configuration 7.

Table 11.6.3-1 Calculated Duty Cycle for LTE TDD

Uplink-Downlink Configuration		Sub-frame Number										Calculated
Config	Periodicity	1	2	3	4	5	6	7	8	9	10	Duty Cycle (%)
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67

6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33
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Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

$$\text{Calculated Duty Cycle} = (5120 \times T_s \times 2 + 6 \text{ ms}) / 10\text{ms} = 63.33\%$$

Where

$$T_s = 1/(15000 \times 2048) \text{ seconds}$$

11.7 Bluetooth & Wi-Fi Measurement Procedures

Normal network operating configurations are not suitable for measuring the SAR of IEEE 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is $\leq 1.2 \text{ W/kg}$.

Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is $\leq 1.2 \text{ W/kg}$, SAR is not required for U-NII-1 band. For all positions / configurations, when the reported SAR is $> 0.8 \text{ W/kg}$, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is $\leq 1.2 \text{ W/kg}$ or all required channels are tested.

11.8 Area Scan Based 1g SAR

According to the KDB447498 D01, a first class of fast SAR techniques is based on a modified measurement procedure and post processing algorithms. In practice, these methods require a special software, for example DASY52 form SPEAG.

When the implementation is based the specific polynomial fit algorithm as presented at the 29th Bio-electromagnetics Society meeting (2007) and the estimated 1-g SAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz) and for both 1-g and 10-g averaged SAR using a sample of 264 SAR measurements from 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30MHz-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

12 Simultaneous Transmission SAR Considerations

12.1 Reference Document

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as IEEE 802.11 a/b/g/n/ac/ax and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

12.2 Antenna Separation Distances

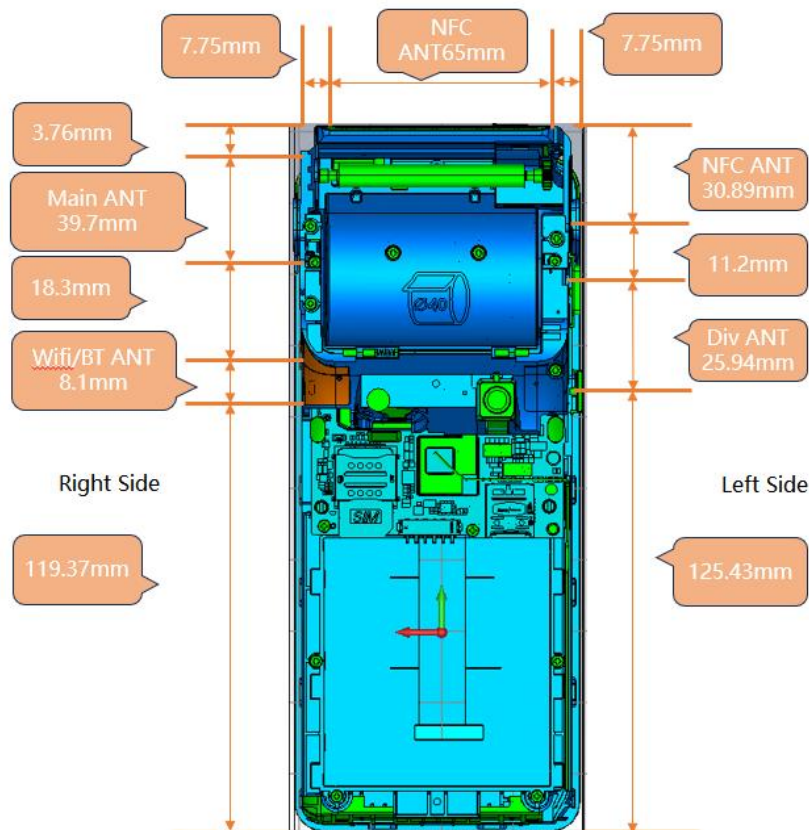


Figure 12.2-1 Antenna Locations (back view)

12.3 SAR Measurement Positions

The edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

Table 12.3-1: SAR measurement Positions

Antenna Mode	Front	Back	Left	Right	Top	Bottom
Main ANT	Yes	Yes	No	Yes	Yes	No
Wi-Fi/BT ANT	Yes	Yes	No	Yes	Yes	No

12.4 Low Power Transmitters SAR Consideration

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation for low power transmitters is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\frac{(\text{max. power of channel, including tune - up tolerance, mW})}{(\text{min. test separation distance, mm})} \times \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Where:

- Frequency (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

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW. That means the transmitters with tune-up power below 10mW are excluded for SAR measurement.

SAR test exclusion for NFC separation $< 50\text{mm} = [474 * (1 + \log(100/f_{\text{MHz}}))] / 2 = 443$ mW, the maximum tune up power of NFC is -22.00 dBm(0.006mW), NFC can be exempted.

For ISSED, according to RSS 102 issue6 section 6.3 Table 11 Power limits for exemption from routine SAR evaluation based on the separation distance:

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

SAR test exclusion for NFC separation $\leq 5\text{mm}$ is 45mW, the maximum tune up power of NFC is -22.00 dBm(0.006mW), NFC can be exempted.

12.5 Simultaneous Transmission Analysis

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SPLSR (SAR to Peak Location Ratio) between pairs of simultaneously transmitting antennas:

$$\text{SPLSR} = \sqrt{(\text{SAR1} + \text{SAR2})^3 / R_i}$$

Where:

- SAR1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition.
- SAR2 is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first.
- R_i is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of

$$(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2$$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$\sqrt{(\text{SAR1} + \text{SAR2})^3 / R_i} < 0.04$$

For ISED, simultaneous transmission testing may be exempted when the transmitters are considered to be spatially separated as follows:

SPLSR ≤ 0.02 for head, neck and trunk exposure conditions

SPLSR ≤ 0.013 for limb exposure conditions

12.6 Simultaneous Transmission Table

Table 12.6-1: Simultaneous Transmission Configurations

Items	Capable Transmit Configurations
1	WCDMA+BT
2	WCDMA+Wi-Fi 2.4G
3	WCDMA+Wi-Fi 5G
4	LTE+BT
5	LTE+Wi-Fi 2.4G
6	LTE+Wi-Fi 5G
NOTE: For the DUT, the following combination that can transmit signal simultaneously.	

13 Conducted Output Power

13.1 Power Reduction Procedures

The device uses a proximity sensor to reduce the maximum output power of main transmitting antenna in selected wireless modes and operating configurations to ensure SAR compliance. The procedures in KDB 616217 are applied to determine proximity sensor triggering distances, and sensor coverage for normal and tilt positions.

The following tables summarize the key power reduction information of main transmitting antenna triggered by specific use conditions.

Band	Mode	Full power MAX.Tune up(dBm)	Sensor on MAX.Tune up(dBm)	Power Reduction(dB)
WCDMA Band II	RMC	23.0	18.0	5.0
WCDMA Band IV	RMC	23.0	20.0	3.0
WCDMA Band V	RMC	23.5	19.0	4.5
LTE Band 2	QPSK	22.5	16.5	6.0
LTE Band 4	QPSK	22.5	19.0	3.5
LTE Band 5	QPSK	23.0	18.5	4.5
LTE Band 7	QPSK	21.5	16.0	5.5
LTE Band 12	QPSK	23.0	22.0	1.0
LTE Band 13	QPSK	23.0	22.0	1.0
LTE Band 14	QPSK	23.0	21.5	1.5
LTE Band 17	QPSK	23.0	22.0	1.0
LTE Band 25	QPSK	22.5	16.5	6.0
LTE Band 26	QPSK	23.0	18.5	4.5
LTE Band 30	QPSK	22.5	17.0	5.5
LTE Band 38	QPSK	22.5	17.5	5.0
LTE Band 41	QPSK	20.5	17.5	3.0
LTE Band 66	QPSK	22.5	19.0	3.5
LTE Band 71	QPSK	23.0	N/A	0.0
WiFi 2.4G	802.11b	17.5	N/A	0.0
WiFi5G UNII-1	802.11a	13.0	N/A	0.0
WiFi5G UNII-2A	802.11a	13.0	N/A	0.0
WiFi5G UNII-2C	802.11a	12.5	N/A	0.0
WiFi5G UNII-3	802.11a	12.0	N/A	0.0
BT	DH5	10.5	N/A	0.0

13.2 WCDMA Measurement result

Table 13.2-1: The conducted power for WCDMA Band II

Full power					
WCDMA Band II		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			9262/1852.4	9400/1880	9538/1907.6
WCDMA	RMC	23.00	22.17	22.10	22.02
HSDPA	Subtest1	22.50	21.61	21.62	21.62
	Subtest2	22.50	21.67	21.66	21.38
	Subtest3	22.00	21.29	21.14	21.10
	Subtest4	21.50	21.31	21.04	21.06
HSUPA	Subtest1	22.50	21.57	21.74	21.58
	Subtest2	21.50	20.57	20.44	20.36
	Subtest3	22.00	21.21	21.00	20.96
	Subtest4	21.50	20.81	20.48	20.50
	Subtest5	22.50	21.51	21.62	21.56

Sensor on					
WCDMA Band II		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			9262/1852.4	9400/1880	9538/1907.6
WCDMA	RMC	18.00	17.25	17.11	17.02
HSDPA	Subtest1	18.00	16.79	16.59	16.64
	Subtest2	18.00	16.77	16.77	16.66
	Subtest3	18.00	16.33	16.27	16.54
	Subtest4	18.00	16.67	16.55	15.88
HSUPA	Subtest1	18.00	16.71	16.71	16.40
	Subtest2	18.00	16.70	16.54	16.59
	Subtest3	18.00	16.55	16.52	16.61
	Subtest4	18.00	16.59	16.63	16.58
	Subtest5	18.00	16.73	16.71	16.46

Table 13.2-2: The conducted power for WCDMA Band IV

Full power					
WCDMA BandIV		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			1312/1712.4	1413/1732.6	1513/1752.6
WCDMA	RMC	23.00	22.08	22.07	22.15
HSDPA	Subtest1	22.50	21.68	21.51	21.75
	Subtest2	22.50	21.44	21.63	21.51
	Subtest3	22.00	20.96	21.13	21.27
	Subtest4	22.00	21.02	20.91	21.05
HSUPA	Subtest1	22.50	21.58	21.45	21.57
	Subtest2	21.50	20.60	20.71	20.53
	Subtest3	22.00	21.22	21.23	21.25
	Subtest4	21.50	20.68	20.61	20.69
	Subtest5	22.50	21.52	21.41	21.61
Sensor on					
WCDMA BandIV		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			1312/1712.4	1413/1732.6	1513/1752.6
WCDMA	RMC	20.00	18.99	18.98	19.12
HSDPA	Subtest1	20.00	18.37	18.58	18.76
	Subtest2	20.00	18.56	18.48	18.78
	Subtest3	20.00	18.59	18.65	18.65
	Subtest4	20.00	18.67	18.63	18.52
HSUPA	Subtest1	20.00	18.49	18.58	18.76
	Subtest2	20.00	18.66	18.62	18.63
	Subtest3	20.00	18.70	18.57	18.52
	Subtest4	20.00	18.49	18.76	18.71
	Subtest5	20.00	18.47	18.50	18.51

Table 13.2-3: The conducted power for WCDMA Band V

Full power					
WCDMA Band V		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			4132/826.4	4183/836.6	4233/846.6
WCDMA	RMC	23.50	22.67	22.69	22.68
HSDPA	Subtest1	23.00	22.25	22.21	22.26
	Subtest2	23.00	22.33	22.13	22.30
	Subtest3	22.50	21.75	21.57	21.72
	Subtest4	22.50	21.53	21.61	21.56
HSUPA	Subtest1	23.00	22.19	22.07	22.04
	Subtest2	22.00	21.25	21.03	21.22
	Subtest3	22.50	21.67	21.53	21.66
	Subtest4	22.00	21.33	21.09	21.34
	Subtest5	23.00	22.21	22.07	22.32

Sensor on					
WCDMA Band V		Maximum Conducted Power (dBm)			
Mode	Test Mode	Tune up	Channel/Frequency(MHz)		
			4132/826.4	4183/836.6	4233/846.6
WCDMA	RMC	19.00	18.12	18.10	18.08
HSDPA	Subtest1	19.00	17.62	17.54	17.54
	Subtest2	19.00	17.74	17.46	17.68
	Subtest3	19.00	17.58	17.62	17.63
	Subtest4	19.00	17.66	17.75	17.68
HSUPA	Subtest1	19.00	17.76	17.59	17.66
	Subtest2	19.00	17.64	17.56	17.69
	Subtest3	19.00	17.66	17.58	17.71
	Subtest4	19.00	17.65	17.62	17.72
	Subtest5	19.00	17.48	17.70	17.72

13.3 LTE Measurement result

Table 13.3-1: The conducted power for LTE Band 2

Full power						
LTE B2			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				18607/1850.7	18900/1880	19193/1909.3
QPSK	1	Low	22.50	21.11	21.18	21.11
		Middle		21.32	21.37	21.24
		High		21.09	20.90	20.92
	50%	Low	22.50	21.29	21.15	21.45
		Middle		21.21	21.15	21.22
		High		21.06	21.06	21.19
	100%	/	21.50	20.26	20.35	20.34
16QAM	1	Low	21.50	20.24	20.28	20.25
		Middle		20.26	20.44	20.22
		High		20.22	20.31	20.20
	50%	Low	21.50	20.19	20.24	20.16
		Middle		20.40	20.29	20.23
		High		20.30	20.25	20.22
	100%	/	20.50	19.27	19.35	19.28
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				18615/1851.5	18900/1880	19185/1908.5
QPSK	1	Low	22.50	21.13	21.06	21.01
		Middle		21.28	21.39	21.29
		High		21.06	20.90	20.90
	50%	Low	21.50	20.35	20.37	20.48
		Middle		20.27	20.39	20.35
		High		20.28	20.11	20.30
	100%	/	21.50	20.31	20.23	20.33
16QAM	1	Low	21.50	20.40	20.30	20.22
		Middle		20.39	20.51	20.18
		High		20.36	20.09	20.21
	50%	Low	20.50	19.34	19.32	19.26
		Middle		19.48	19.52	19.36
		High		19.41	19.47	19.28
	100%	/	20.50	19.33	19.42	19.38
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				18625/1852.5	18900/1880	19175/1907.5

QPSK	1	Low	22.50	21.03	21.08	21.09
		Middle		21.33	21.44	21.28
		High		21.13	20.95	20.80
	50%	Low	21.50	20.38	20.32	20.54
		Middle		20.29	20.36	20.28
		High		20.14	20.13	20.31
	100%	/	21.50	20.30	20.24	20.25
16QAM	1	Low	21.50	20.28	20.20	20.15
		Middle		20.30	20.47	20.21
		High		20.29	20.07	20.21
	50%	Low	20.50	19.26	19.38	19.25
		Middle		19.45	19.37	19.31
		High		19.38	19.52	19.29
	100%	/	20.50	19.41	19.38	19.30
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				18650/1855	18900/1880	19150/1905
QPSK	1	Low	22.50	21.14	21.07	21.02
		Middle		21.37	21.37	21.28
		High		21.07	20.91	20.89
	50%	Low	21.50	20.35	20.19	20.48
		Middle		20.36	20.18	20.28
		High		20.16	20.13	20.40
	100%	/	21.50	20.34	20.40	20.21
16QAM	1	Low	21.50	20.22	20.17	20.19
		Middle		20.35	20.33	20.14
		High		20.22	20.09	20.18
	50%	Low	20.50	19.35	19.44	19.21
		Middle		19.50	19.33	19.28
		High		19.41	19.25	19.25
	100%	/	20.50	19.24	19.21	19.26
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				18675/1857.5	18900/1880	19125/1902.5
QPSK	1	Low	22.50	21.11	21.11	21.04
		Middle		21.27	21.38	21.31
		High		21.06	20.96	20.92
	50%	Low	21.50	20.33	20.20	20.51
		Middle		20.29	20.36	20.32
		High		20.19	20.16	20.36
	100%	/	21.50	20.32	20.24	20.17
16QAM	1	Low	21.50	20.35	20.27	20.35

		Middle		20.37	20.46	20.24
		High		20.33	20.15	20.29
	50%	Low	20.50	19.32	19.29	19.34
		Middle		19.48	19.46	19.42
		High		19.39	19.43	19.36
	100%	/	20.50	19.31	19.38	19.36
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				18700/1860	18900/1880	19100/1900
QPSK	1	Low	22.50	21.18	21.15	21.07
		Middle		21.40	21.46	21.33
		High		21.12	21.01	20.98
	50%	Low	21.50	20.40	20.32	20.55
		Middle		20.31	20.36	20.35
		High		20.22	20.21	20.32
	100%	/	21.50	20.29	20.31	20.30
16QAM	1	Low	21.50	20.34	20.23	20.30
		Middle		20.33	20.48	20.24
		High		20.31	20.16	20.27
	50%	Low	20.50	19.29	19.37	19.31
		Middle		19.41	19.44	19.39
		High		19.36	19.38	19.32
	100%	/	20.50	19.29	19.34	19.33
Sensor on						
LTE B2			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				18607/1850.7	18900/1880	19193/1909.3
QPSK	1	Low	16.50	14.95	15.05	14.94
		Middle		15.12	15.26	15.24
		High		14.91	14.87	14.81
	50%	Low	16.50	15.13	15.22	15.22
		Middle		15.16	15.33	15.13
		High		15.10	15.01	15.17
	100%	/	16.50	15.12	14.99	15.17
16QAM	1	Low	16.50	15.27	15.17	15.13
		Middle		15.34	15.37	15.23
		High		15.23	15.07	15.12
	50%	Low	16.50	15.26	15.14	15.14
		Middle		15.30	15.35	15.13
		High		15.19	15.29	15.09
	100%	/	16.50	15.15	15.28	15.20

Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				18615/1851.5	18900/1880	19185/1908.5
QPSK	1	Low	16.50	15.02	15.09	14.97
		Middle		15.21	15.30	15.26
		High		14.93	14.88	14.87
	50%	Low	16.50	15.11	15.30	15.26
		Middle		15.14	15.29	15.16
		High		15.13	15.11	15.13
	100%	/	16.50	15.09	15.06	15.26
16QAM	1	Low	16.50	15.31	15.13	15.04
		Middle		15.30	15.39	15.19
		High		15.21	15.04	15.10
	50%	Low	16.50	15.23	15.18	15.11
		Middle		15.23	15.34	15.10
		High		15.16	15.29	15.05
	100%	/	16.50	15.13	15.29	15.17
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				18625/1852.5	18900/1880	19175/1907.5
QPSK	1	Low	16.50	14.92	15.11	15.00
		Middle		15.26	15.40	15.20
		High		14.99	14.98	14.72
	50%	Low	16.50	15.18	15.30	15.27
		Middle		15.20	15.26	15.09
		High		15.03	15.08	15.14
	100%	/	16.50	15.13	15.02	15.18
16QAM	1	Low	16.50	15.19	14.98	14.97
		Middle		15.21	15.30	15.22
		High		15.14	15.01	15.19
	50%	Low	16.50	15.15	15.28	15.14
		Middle		15.25	15.23	15.09
		High		15.18	15.34	15.06
	100%	/	16.50	15.26	15.25	15.09
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				18650/1855	18900/1880	19150/1905
QPSK	1	Low	16.50	15.03	15.10	14.98
		Middle		15.30	15.37	15.20
		High		14.89	14.94	14.77
	50%	Low	16.50	15.11	15.17	15.17
		Middle		15.23	15.13	15.00

		High		15.01	15.09	15.19
	100%	/	16.50	15.17	15.18	15.14
16QAM	1	Low	16.50	15.17	14.95	15.05
		Middle		15.30	15.16	15.19
		High		15.11	14.99	15.16
	50%	Low	16.50	15.24	15.30	15.15
		Middle		15.30	15.19	15.06
		High		15.21	15.11	15.02
	100%	/	16.50	15.09	15.12	15.05
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				18675/1857.5	18900/1880	19125/1902.5
QPSK	1	Low	16.50	15.00	15.14	15.00
		Middle		15.24	15.38	15.28
		High		14.97	14.94	14.80
	50%	Low	16.50	15.18	15.13	15.20
		Middle		15.25	15.26	15.04
		High		15.09	15.12	15.15
	100%	/	16.50	15.15	15.07	15.14
16QAM	1	Low	16.50	15.26	15.10	15.21
		Middle		15.28	15.34	15.29
		High		15.18	15.14	15.23
	50%	Low	16.50	15.21	15.19	15.24
		Middle		15.28	15.27	15.16
		High		15.19	15.20	15.13
	100%	/	16.50	15.16	15.20	15.15
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				18700/1860	18900/1880	19100/1900
QPSK	1	Low	16.50	15.07	15.18	15.03
		Middle		15.33	15.42	15.30
		High		14.99	15.00	14.91
	50%	Low	16.50	15.21	15.26	15.29
		Middle		15.23	15.27	15.12
		High		15.12	15.17	15.11
	100%	/	16.50	15.12	15.14	15.23
16QAM	1	Low	16.50	15.15	15.06	15.12
		Middle		15.24	15.36	15.25
		High		15.16	15.11	15.21
	50%	Low	16.50	15.18	15.23	15.21
		Middle		15.21	15.26	15.18
		High		15.16	15.20	15.14

	100%	/	16.50	15.14	15.21	15.17
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Table 13.3-2: The conducted power for LTE Band 4

Full power						
LTE B4			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
QPSK	1	Low	22.50	21.09	21.36	21.19
		Middle		21.34	21.47	21.34
		High		21.01	20.91	20.93
	50%	Low	22.50	21.28	21.20	21.22
		Middle		21.34	21.25	21.14
		High		21.26	21.11	21.01
	100%	/	21.50	20.38	20.40	20.33
16QAM	1	Low	21.50	20.26	20.26	20.26
		Middle		20.28	20.46	20.32
		High		20.34	20.39	20.32
	50%	Low	21.50	20.29	20.27	20.26
		Middle		20.34	20.22	20.17
		High		20.34	20.25	20.16
	100%	/	20.50	19.34	19.27	19.19
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
QPSK	1	Low	22.50	21.11	21.24	21.09
		Middle		21.30	21.45	21.39
		High		20.98	20.86	20.95
	50%	Low	21.50	20.39	20.37	20.29
		Middle		20.40	20.49	20.36
		High		20.44	20.16	20.21
	100%	/	21.50	20.39	20.28	20.32
16QAM	1	Low	21.50	20.33	20.33	20.23
		Middle		20.32	20.51	20.28
		High		20.39	20.29	20.24
	50%	Low	20.50	19.44	19.35	19.27
		Middle		19.42	19.45	19.26
		High		19.45	19.42	19.22
	100%	/	20.50	19.40	19.38	19.29
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		

				19975/1712.5	20175/1732.5	20375/1752.5
QPSK	1	Low	22.50	21.01	21.26	21.17
		Middle		21.30	21.50	21.38
		High		21.04	20.96	20.90
	50%	Low	21.50	20.41	20.37	20.40
		Middle		20.46	20.41	20.24
		High		20.39	20.13	20.17
	100%	/	21.50	20.43	20.24	20.19
16QAM	1	Low	21.50	20.26	20.18	20.11
		Middle		20.28	20.42	20.26
		High		20.32	20.36	20.33
	50%	Low	20.50	19.31	19.50	19.35
		Middle		19.34	19.39	19.25
		High		19.37	19.52	19.23
	100%	/	20.50	19.43	19.39	19.21
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20000/1715	20175/1732.5	20350/1750
QPSK	1	Low	22.50	21.12	21.20	21.10
		Middle		21.39	21.42	21.38
		High		20.99	20.87	20.95
	50%	Low	21.50	20.39	20.19	20.30
		Middle		20.54	20.23	20.25
		High		20.37	20.14	20.27
	100%	/	21.50	20.47	20.45	20.20
16QAM	1	Low	21.50	20.19	20.20	20.19
		Middle		20.32	20.33	20.23
		High		20.29	20.34	20.25
	50%	Low	20.50	19.45	19.52	19.26
		Middle		19.44	19.30	19.22
		High		19.45	19.24	19.24
	100%	/	20.50	19.31	19.21	19.22
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
QPSK	1	Low	22.50	21.09	21.29	21.07
		Middle		21.33	21.48	21.36
		High		21.02	20.92	20.93
	50%	Low	21.50	20.41	20.20	20.28
		Middle		20.51	20.41	20.29
		High		20.35	20.17	20.23
	100%	/	21.50	20.40	20.29	20.20

16QAM	1	Low	21.50	20.28	20.30	20.40
		Middle		20.30	20.46	20.33
		High		20.36	20.39	20.32
	50%	Low	20.50	19.42	19.36	19.35
		Middle		19.42	19.43	19.32
		High		19.43	19.38	19.30
	100%	/	20.50	19.38	19.39	19.27
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				20050/1720	20175/1732.5	20300/1745
QPSK	1	Low	22.50	21.16	21.33	21.15
		Middle		21.42	21.52	21.43
		High		21.04	20.98	21.04
	50%	Low	21.50	20.44	20.33	20.37
		Middle		20.49	20.42	20.32
		High		20.43	20.22	20.19
	100%	/	21.50	20.42	20.36	20.29
16QAM	1	Low	21.50	20.22	20.26	20.31
		Middle		20.31	20.48	20.34
		High		20.39	20.41	20.35
	50%	Low	20.50	19.39	19.45	19.37
		Middle		19.35	19.42	19.34
		High		19.40	19.38	19.31
	100%	/	20.50	19.36	19.35	19.29
Sensor on						
LTE B4			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
QPSK	1	Low	19.00	17.66	17.49	17.63
		Middle		17.67	17.76	17.88
		High		17.35	17.35	17.36
	50%	Low	19.00	17.77	17.81	17.67
		Middle		17.88	17.87	17.79
		High		17.86	17.62	17.69
	100%	/	19.00	17.93	17.57	17.65
16QAM	1	Low	19.00	17.80	17.81	17.70
		Middle		17.82	17.82	17.71
		High		17.88	17.62	17.70
	50%	Low	19.00	17.80	17.62	17.66
		Middle		17.83	17.92	17.79
		High		17.82	17.78	17.68

	100%	/	19.00	17.73	17.83	17.79
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
QPSK	1	Low	19.00	17.73	17.53	17.66
		Middle		17.76	17.80	17.86
		High		17.37	17.36	17.42
	50%	Low	19.00	17.80	17.89	17.71
		Middle		17.82	17.83	17.82
		High		17.89	17.71	17.69
	100%	/	19.00	17.90	17.64	17.78
16QAM	1	Low	19.00	17.79	17.77	17.61
		Middle		17.78	17.84	17.67
		High		17.86	17.59	17.68
	50%	Low	19.00	17.77	17.62	17.59
		Middle		17.76	17.86	17.72
		High		17.79	17.73	17.64
	100%	/	19.00	17.71	17.79	17.76
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
QPSK	1	Low	19.00	17.63	17.55	17.74
		Middle		17.81	17.85	17.85
		High		17.48	17.41	17.32
	50%	Low	19.00	17.87	17.80	17.77
		Middle		17.88	17.76	17.79
		High		17.79	17.69	17.70
	100%	/	19.00	17.89	17.65	17.70
16QAM	1	Low	19.00	17.67	17.67	17.54
		Middle		17.69	17.84	17.70
		High		17.79	17.65	17.72
	50%	Low	19.00	17.69	17.76	17.62
		Middle		17.73	17.75	17.71
		High		17.76	17.78	17.65
	100%	/	19.00	17.79	17.75	17.68
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20000/1715	20175/1732.5	20350/1750
QPSK	1	Low	19.00	17.74	17.54	17.67
		Middle		17.85	17.82	17.89
		High		17.38	17.37	17.41
	50%	Low	19.00	17.80	17.67	17.71

		Middle		17.91	17.58	17.75
		High		17.73	17.65	17.75
	100%	/	19.00	17.93	17.81	17.62
16QAM	1	Low	19.00	17.65	17.64	17.58
		Middle		17.78	17.66	17.63
		High		17.76	17.63	17.65
	50%	Low	19.00	17.78	17.78	17.58
		Middle		17.78	17.71	17.68
		High		17.79	17.55	17.61
	100%	/	19.00	17.62	17.62	17.64
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
QPSK	1	Low	19.00	17.71	17.58	17.69
		Middle		17.79	17.83	17.88
		High		17.41	17.42	17.40
	50%	Low	19.00	17.82	17.72	17.70
		Middle		17.88	17.76	17.75
		High		17.80	17.68	17.67
	100%	/	19.00	17.91	17.65	17.66
16QAM	1	Low	19.00	17.74	17.74	17.78
		Middle		17.76	17.79	17.77
		High		17.83	17.69	17.76
	50%	Low	19.00	17.75	17.67	17.71
		Middle		17.76	17.84	17.82
		High		17.77	17.69	17.76
	100%	/	19.00	17.69	17.75	17.78
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				20050/1720	20175/1732.5	20300/1745
QPSK	1	Low	19.00	17.78	17.62	17.72
		Middle		17.92	17.87	17.94
		High		17.47	17.43	17.50
	50%	Low	19.00	17.89	17.80	17.78
		Middle		17.90	17.76	17.82
		High		17.83	17.77	17.67
	100%	/	19.00	17.88	17.76	17.75
16QAM	1	Low	19.00	17.78	17.74	17.69
		Middle		17.72	17.85	17.73
		High		17.81	17.70	17.74
	50%	Low	19.00	17.72	17.71	17.68
		Middle		17.69	17.78	17.79

		High		17.74	17.64	17.72
	100%	/	19.00	17.67	17.71	17.75

Table 13.3-3: The conducted power for LTE Band 5

Full power						
LTE B5			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
QPSK	1	Low	23.00	22.01	22.15	22.10
		Middle		22.12	22.11	22.05
		High		22.04	21.91	21.95
	50%	Low	23.00	21.98	21.95	22.02
		Middle		21.95	21.90	21.96
		High		21.89	21.94	21.94
	100%	/	22.00	21.09	21.06	21.08
16QAM	1	Low	22.00	21.06	21.12	20.96
		Middle		21.08	21.15	21.07
		High		21.13	21.23	21.09
	50%	Low	22.00	21.03	21.08	21.04
		Middle		21.16	20.96	20.96
		High		21.08	21.00	21.06
	100%	/	21.00	20.09	19.99	20.00
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
QPSK	1	Low	23.00	22.04	22.04	22.01
		Middle		22.17	22.14	22.09
		High		22.02	21.95	21.92
	50%	Low	22.00	21.01	21.02	21.05
		Middle		21.07	20.93	21.02
		High		20.95	20.97	21.15
	100%	/	22.00	21.13	21.11	20.95
16QAM	1	Low	22.00	21.07	20.98	20.94
		Middle		21.20	20.94	21.03
		High		21.13	21.13	21.04
	50%	Low	21.00	20.19	20.28	20.09
		Middle		20.26	20.04	20.01
		High		20.19	20.04	20.12
	100%	/	21.00	20.06	19.98	20.01
Modulation	RB	RB Offset	Tune up	5MHz		

				Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
QPSK	1	Low	23.00	22.01	22.08	22.00
		Middle		22.11	22.15	22.09
		High		22.05	22.00	21.92
	50%	Low	22.00	21.06	21.03	21.05
		Middle		21.07	21.11	21.03
		High		20.98	21.00	21.11
	100%	/	22.00	21.11	20.95	20.95
16QAM	1	Low	22.00	21.13	21.08	21.10
		Middle		21.15	21.07	21.13
		High		21.20	21.23	21.14
	50%	Low	21.00	20.16	20.17	20.21
		Middle		20.24	20.17	20.11
		High		20.17	20.18	20.20
	100%	/	21.00	20.13	20.11	20.08
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20450/829	20525/836.5	20600/844
QPSK	1	Low	23.00	22.08	22.12	22.06
		Middle		22.20	22.19	22.14
		High		22.07	22.01	22.01
	50%	Low	22.00	21.09	21.11	21.12
		Middle		21.05	21.10	21.09
		High		21.04	21.08	21.07
	100%	/	22.00	21.11	21.05	21.04
16QAM	1	Low	22.00	21.09	21.07	21.01
		Middle		21.14	21.12	21.09
		High		21.18	21.20	21.12
	50%	Low	21.00	20.13	20.21	20.18
		Middle		20.17	20.11	20.11
		High		20.14	20.13	20.19
	100%	/	21.00	20.11	20.07	20.08

Sensor on						
LTE B5			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
QPSK	1	Low	18.50	17.12	17.32	17.22
		Middle		17.36	17.39	17.27
		High		17.31	17.27	17.07

	50%	Low	18.50	17.29	17.31	17.20
		Middle		17.26	17.40	17.26
		High		17.21	17.17	17.25
	100%	/	18.50	17.35	17.18	17.21
16QAM	1	Low	18.50	17.26	17.17	17.18
		Middle		17.28	17.31	17.30
		High		17.19	17.14	17.20
	50%	Low	18.50	17.19	17.32	17.16
		Middle		17.23	17.25	17.15
		High		17.33	17.37	17.20
	100%	/	18.50	17.36	17.31	17.18
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
QPSK	1	Low	18.50	17.23	17.31	17.15
		Middle		17.40	17.39	17.27
		High		17.21	17.26	17.09
	50%	Low	18.50	17.19	17.21	17.07
		Middle		17.26	17.22	17.19
		High		17.19	17.13	17.27
	100%	/	18.50	17.42	17.34	17.14
16QAM	1	Low	18.50	17.24	17.14	17.26
		Middle		17.37	17.14	17.30
		High		17.16	17.09	17.20
	50%	Low	18.50	17.28	17.31	17.15
		Middle		17.28	17.18	17.15
		High		17.36	17.11	17.19
	100%	/	18.50	17.19	17.15	17.14
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
QPSK	1	Low	18.50	17.20	17.35	17.17
		Middle		17.34	17.40	17.27
		High		17.24	17.31	17.12
	50%	Low	18.50	17.24	17.19	17.10
		Middle		17.26	17.37	17.26
		High		17.25	17.13	17.26
	100%	/	18.50	17.40	17.18	17.17
16QAM	1	Low	18.50	17.33	17.24	17.42
		Middle		17.35	17.30	17.37
		High		17.23	17.22	17.24
	50%	Low	18.50	17.25	17.23	17.21

		Middle		17.26	17.34	17.22
		High		17.34	17.28	17.30
	100%	/	18.50	17.26	17.31	17.24
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20450/829	20525/836.5	20600/844
QPSK	1	Low	18.50	17.27	17.39	17.20
		Middle		17.43	17.44	17.32
		High		17.26	17.32	17.21
	50%	Low	18.50	17.27	17.30	17.17
		Middle		17.24	17.36	17.29
		High		17.28	17.21	17.22
	100%	/	18.50	17.37	17.25	17.26
16QAM	1	Low	18.50	17.29	17.20	17.33
		Middle		17.31	17.32	17.36
		High		17.21	17.19	17.25
	50%	Low	18.50	17.22	17.27	17.21
		Middle		17.19	17.28	17.22
		High		17.31	17.23	17.26
	100%	/	18.50	17.24	17.27	17.21

Table 13.3-4: The conducted power for LTE Band 7

Full power						
LTE B7			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				20775/2502.5	21100/2535	21425/2567.5
QPSK	1	Low	21.50	20.12	20.24	20.28
		Middle		20.56	20.70	20.64
		High		20.47	20.51	20.18
	50%	Low	20.50	19.70	19.62	19.61
		Middle		19.71	19.74	19.64
		High		19.61	19.55	19.74
	100%	/	20.50	19.58	19.53	19.65
16QAM	1	Low	20.50	19.63	19.47	19.47
		Middle		19.65	19.80	19.80
		High		19.75	19.84	19.77
	50%	Low	19.50	18.62	18.76	18.76
		Middle		18.81	18.76	18.64
		High		18.73	18.78	18.67
	100%	/	19.50	18.77	18.64	18.61

Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20800/2505	21100/2535	21400/2565
QPSK	1	Low	21.50	20.23	20.19	20.21
		Middle		20.60	20.63	20.64
		High		20.37	20.43	20.23
	50%	Low	20.50	19.59	19.49	19.51
		Middle		19.70	19.56	19.60
		High		19.55	19.55	19.79
	100%	/	20.50	19.62	19.73	19.61
16QAM	1	Low	20.50	19.65	19.44	19.51
		Middle		19.78	19.66	19.73
		High		19.76	19.82	19.70
	50%	Low	19.50	18.75	18.74	18.72
		Middle		18.86	18.68	18.65
		High		18.76	18.51	18.67
	100%	/	19.50	18.60	18.51	18.61
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				20825/2507.5	21100/2535	21375/2562.5
QPSK	1	Low	21.50	20.20	20.27	20.23
		Middle		20.54	20.64	20.67
		High		20.40	20.48	20.26
	50%	Low	20.50	19.65	19.50	19.54
		Middle		19.67	19.74	19.64
		High		19.58	19.58	19.75
	100%	/	20.50	19.56	19.57	19.61
16QAM	1	Low	20.50	19.70	19.54	19.67
		Middle		19.76	19.75	19.83
		High		19.83	19.88	19.77
	50%	Low	19.50	18.68	18.67	18.81
		Middle		18.80	18.85	18.71
		High		18.70	18.69	18.74
	100%	/	19.50	18.67	18.64	18.71
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				20850/2510	21100/2535	21350/2560
QPSK	1	Low	21.50	20.27	20.31	20.26
		Middle		20.63	20.72	20.69
		High		20.42	20.53	20.32
	50%	Low	20.50	19.68	19.62	19.58
		Middle		19.69	19.74	19.67

		High		19.65	19.63	19.71
	100%	/	20.50	19.57	19.64	19.70
16QAM	1	Low	20.50	19.56	19.50	19.62
		Middle		19.72	19.81	19.83
		High		19.81	19.89	19.79
	50%	Low	19.50	18.69	18.71	18.82
		Middle		18.77	18.79	18.72
		High		18.71	18.64	18.74
	100%	/	19.50	18.65	18.60	18.68
Sensor on						
LTE B7			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				20775/2502.5	21100/2535	21425/2567.5
QPSK	1	Low	16.00	14.55	14.52	14.67
		Middle		14.98	15.05	14.99
		High		14.73	14.56	14.68
	50%	Low	16.00	14.91	14.93	14.84
		Middle		14.93	14.87	14.89
		High		14.82	14.73	14.92
	100%	/	16.00	14.91	14.77	14.84
16QAM	1	Low	16.00	14.67	14.76	14.66
		Middle		14.73	14.87	14.69
		High		14.82	14.85	14.81
	50%	Low	16.00	14.76	14.92	14.76
		Middle		14.92	14.89	14.82
		High		14.93	15.08	14.82
	100%	/	16.00	14.91	14.90	14.75
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				20800/2505	21100/2535	21400/2565
QPSK	1	Low	16.00	14.66	14.51	14.60
		Middle		15.02	15.06	14.99
		High		14.63	14.52	14.73
	50%	Low	16.00	14.84	14.80	14.74
		Middle		14.96	14.69	14.85
		High		14.80	14.73	14.97
	100%	/	16.00	14.95	14.93	14.80
16QAM	1	Low	16.00	14.69	14.73	14.74
		Middle		14.82	14.73	14.62
		High		14.75	14.83	14.78
	50%	Low	16.00	14.81	14.94	14.72

		Middle		14.93	14.85	14.79
		High		14.96	14.85	14.82
	100%	/	16.00	14.74	14.77	14.75
Modulation	RB	RB Offset	Tune up	15MHz		
				Channel/Frequency(MHz)		
				20825/2507.5	21100/2535	21375/2562.5
QPSK	1	Low	16.00	14.63	14.55	14.62
		Middle		14.96	15.03	15.02
		High		14.66	14.57	14.76
	50%	Low	16.00	14.86	14.81	14.77
		Middle		14.93	14.87	14.89
		High		14.87	14.76	14.93
	100%	/	16.00	14.97	14.77	14.80
16QAM	1	Low	16.00	14.74	14.83	14.86
		Middle		14.76	14.86	14.72
		High		14.82	14.93	14.85
	50%	Low	16.00	14.82	14.79	14.81
		Middle		14.95	14.94	14.89
		High		14.94	14.95	14.93
	100%	/	16.00	14.81	14.86	14.85
Modulation	RB	RB Offset	Tune up	20MHz		
				Channel/Frequency(MHz)		
				20850/2510	21100/2535	21350/2560
QPSK	1	Low	16.00	14.70	14.59	14.65
		Middle		15.05	15.11	15.04
		High		14.68	14.62	14.82
	50%	Low	16.00	14.89	14.93	14.81
		Middle		14.91	14.87	14.92
		High		14.90	14.81	14.89
	100%	/	16.00	14.94	14.84	14.89
16QAM	1	Low	16.00	14.78	14.79	14.81
		Middle		14.76	14.88	14.72
		High		14.84	14.90	14.87
	50%	Low	16.00	14.79	14.87	14.82
		Middle		14.88	14.92	14.90
		High		14.91	14.94	14.89
	100%	/	16.00	14.79	14.86	14.82

Table 13.3-5: The conducted power for LTE Band 12

Full power	
LTE B12	Maximum Conducted Power (dBm)

Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				23017/699.7	23095/707.5	23173/715.3
QPSK	1	Low	23.00	22.01	22.12	22.10
		Middle		22.13	22.24	22.13
		High		22.07	22.00	22.08
	50%	Low	23.00	22.04	22.02	22.14
		Middle		22.12	22.11	22.07
		High		22.07	22.11	22.12
	100%	/	22.00	21.16	21.25	21.27
16QAM	1	Low	22.00	21.18	21.12	21.04
		Middle		21.20	21.26	21.12
		High		21.14	21.30	21.20
	50%	Low	22.00	21.22	21.06	21.04
		Middle		21.28	21.02	20.97
		High		21.15	21.02	21.01
	100%	/	21.00	20.12	20.16	20.01
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				23025/700.5	23095/707.5	23165/714.5
QPSK	1	Low	23.00	22.04	22.01	22.01
		Middle		22.18	22.17	22.13
		High		22.05	22.01	22.01
	50%	Low	22.00	21.10	21.02	21.13
		Middle		21.27	21.10	21.09
		High		21.13	21.10	21.33
	100%	/	22.00	21.20	21.30	21.14
16QAM	1	Low	22.00	21.16	21.01	21.02
		Middle		21.29	21.12	21.04
		High		21.14	21.24	21.14
	50%	Low	21.00	20.38	20.30	20.09
		Middle		20.38	20.14	20.02
		High		20.26	20.10	20.04
	100%	/	21.00	20.09	20.15	20.03
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				23035/701.5	23095/707.5	23155/713.5
QPSK	1	Low	23.00	22.01	22.05	22.03
		Middle		22.12	22.21	22.20
		High		22.12	22.02	22.08
	50%	Low	22.00	21.16	21.03	21.20
		Middle		21.28	21.28	21.13

		High		21.20	21.17	21.25
	100%	/	22.00	21.14	21.18	21.10
16QAM	1	Low	22.00	21.21	21.15	21.14
		Middle		21.23	21.25	21.18
		High		21.17	21.34	21.25
	50%	Low	21.00	20.35	20.15	20.22
		Middle		20.36	20.23	20.16
		High		20.24	20.20	20.19
	100%	/	21.00	20.16	20.24	20.13
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				23060/704	23095/707.5	23130/711
QPSK	1	Low	23.00	22.08	22.09	22.06
		Middle		22.21	22.29	22.22
		High		22.14	22.07	22.14
	50%	Low	22.00	21.19	21.15	21.24
		Middle		21.26	21.28	21.20
		High		21.23	21.22	21.25
	100%	/	22.00	21.15	21.25	21.23
16QAM	1	Low	22.00	21.17	21.11	21.09
		Middle		21.23	21.27	21.14
		High		21.19	21.31	21.23
	50%	Low	21.00	20.32	20.23	20.19
		Middle		20.29	20.21	20.13
		High		20.21	20.19	20.15
	100%	/	21.00	20.14	20.24	20.10
Sensor on						
LTE B12			Maximum Conducted Power (dBm)			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				Channel/Frequency(MHz)		
				23017/699.7	23095/707.5	23173/715.3
QPSK	1	Low	22.00	21.04	21.14	21.08
		Middle		21.13	21.13	21.09
		High		21.15	21.06	21.05
	50%	Low	22.00	21.10	21.05	21.12
		Middle		21.11	21.02	21.13
		High		21.10	21.08	21.14
	100%	/	22.00	21.15	21.12	21.19
16QAM	1	Low	22.00	21.13	21.20	21.00
		Middle		21.15	21.17	21.15
		High		21.03	21.08	21.04
	50%	Low	22.00	21.04	21.09	21.03

		Middle		21.20	20.94	21.03
		High		21.14	21.12	21.12
	100%	/	21.00	20.12	20.11	20.07
Modulation	RB	RB Offset	Tune up	3MHz		
				Channel/Frequency(MHz)		
				23025/700.5	23095/707.5	23165/714.5
QPSK	1	Low	22.00	21.07	20.99	20.99
		Middle		21.18	21.13	21.13
		High		21.13	21.07	21.02
	50%	Low	22.00	21.04	20.95	21.08
		Middle		21.20	21.11	21.14
		High		21.01	21.11	21.13
	100%	/	22.00	21.19	21.12	21.06
16QAM	1	Low	22.00	21.15	21.09	21.02
		Middle		21.09	20.99	21.11
		High		21.07	20.98	21.02
	50%	Low	21.00	20.20	20.29	20.08
		Middle		20.30	20.06	20.04
		High		20.25	20.20	20.11
	100%	/	21.00	20.09	20.14	20.01
Modulation	RB	RB Offset	Tune up	5MHz		
				Channel/Frequency(MHz)		
				23035/701.5	23095/707.5	23155/713.5
QPSK	1	Low	22.00	21.04	21.03	21.01
		Middle		21.12	21.14	21.16
		High		21.16	21.12	21.05
	50%	Low	22.00	21.10	21.00	21.11
		Middle		21.14	21.11	21.18
		High		21.04	21.14	21.23
	100%	/	22.00	21.17	21.16	21.06
16QAM	1	Low	22.00	21.20	21.19	21.14
		Middle		21.13	21.12	21.21
		High		21.14	21.08	21.09
	50%	Low	21.00	20.17	20.14	20.21
		Middle		20.28	20.15	20.18
		High		20.23	20.30	20.26
	100%	/	21.00	20.16	20.27	20.15
Modulation	RB	RB Offset	Tune up	10MHz		
				Channel/Frequency(MHz)		
				23060/704	23095/707.5	23130/711
QPSK	1	Low	22.00	21.11	21.11	21.04
		Middle		21.21	21.22	21.18