DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
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C.I.F. A29 507 456

Test report No:

NIE: 67003RAN.009

Test report
IEEE Std 1528™-2013

(*) Identification of item tested	Telematic control unit with wireless technologies, used in automotive industry.
(*) Trademark	VW AG
(*) Model and /or type reference tested	TKCMOD12N00
(*) Derived model not tested	TKCMOD12E00, TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00, TKCMOD12T00 and TKCMOD13C00
(*) Other identification of the product	IMEI TAC : 35194028 HW version: C2.3, SW Version: X152 FCC ID: T8GCONMOD Contains FCC ID: LHJ-FE5NA0020 IC: 6434A-CONMOD Contains IC: 2807E-FE5NA0020
(*) Features	GSM, UMTS, LTE, 5G, GNSS, Wi-Fi, BTLE, BT_EDR
Manufacturer	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
Test method requested, standard	1. IEEE Std 1528™-2013: 2. FCC 47 CFR Part 2.1093.
Summary	Considering the results of the performed test, the item under test is IN COMPLIANCE with FCC 47CFR Part 2.1093 exposure limits. The maximum 1g volume averaged SAR found during this test have been 1.097 W/kg, for GPRS 850 MHz 2 slots mode.
Approved by (name / position & signature)	Miguel Lacave Antennas Lab Manager 2023.01.19 14:33:37 +01'00'
Date of issue	2023-01-19
Report template No	FDT08_24 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the following documents:

1. DEKRA Testing and Certification S.A.U. internal document PODT000.
2. FCC OET KDB 865664 D01 - SAR Measurement Requirements for 100 MHz to 6 GHz v01r04 (August 2015).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "Derived model not tested", “Other identification of the product”, “Features” and “Test sample description”).

2. Maximum output power, 5G conducted output power values and installation testing distance information.

3. Derived model not tested. These models have been declared by the supplier of the sample as being the same as the model under test.

HARMAN AUTOMOTIVE DIVISION
HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STRASSE 16
76307 KARLSBAD, GERMANY

Declaration of similarity

To whom it may concern,

We, **Harman Becker Automotive Systems GmbH**, located in **Becker-Goering-Str. 16; 76307 Karlsbad, Germany**

Hereby declare that the following units: TKCMOD12E00, TKCMOD12N00, TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00, TKCMOD12T00 and TKCMOD13C00

have integrated the same BT/Wifi chipset.

The different naming comes from country specific, features enabled or network access device type.

Targeted countries	Product Name	Type	NAD-HW	GNSS	Bluetooth WLAN	NAD Services	CV2X
Rest of the world (offline variant)	TKCMOD11000	V046	EU	x	x		
EU + some other countries	TKCMOD12E00	V037, V042, V043, V044, V049	EU	x	x	x	
Canada/Mexico/USA	TKCMOD12N00	V038, V039, V047	NA	x	x	x	
China (without CV2X)	TKCMOD12C00	V105	CN	x	x	x	
Japan	TKCMOD12J00	V045	RW	x	x	x	
Armenia/Belarus/Kazakhstan/Russia/Uzbekistan	TKCMOD12R00	V048	EU	x	x	x	
Turkey	TKCMOD12T00	V040	EU	x	x	x	
China (with CV2X)	TKCMOD13C00	V106	CN	x	x	x	x

This declaration is intended to be included in the test reports where applies

Regards

HARMAN AUTOMOTIVE DIVISION
Harman Becker Automotive Systems GmbH
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i.V.

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DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: the client

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
67003/071	Module	VW CONMOD	351940280094139	2021/12/10
67003/037	BT_WLAN 2-3 Antenna - Audi			2021/09/23
67003/278	Module	TKCMOD12N00	V04789N040900008	2022/05/18
67003/045	Roof antenna - Audi		85E.035.503.A Y9B	2021/09/23
67003/041	Roof antenna - Audi		85E.035.503.B Y9B	2021/09/23

1. Sample M/01 has undergone the test(s) specified in subclause “Test method requested”: Conducted average output power and SAR evaluation for 2G, 3G, LTE, 5G and WLAN modes.

Test sample description

Description of product ..... :	Telematic control unit with wireless technologies, used in automotive industry.		
Software version..... :	X152		
Hardware version ..... :	C2.3		
Mounting position ..... :	☐	Table top equipment	
	☐	Wall/Ceiling mounted equipment	
	☐	Equipment used next to the ear	
	☐	Hand-held equipment	
	☒	Other: Vehicular environment equipment	
Accessories (not part of the test item)..... :	Description	Type	Manufacturer
	Charging adapter	---	
	USB cable	---	

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH

BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start) / Date (finish)	2022-05-05 / 2022-09-21
Date (start) / Date (finish)	2022-12-23 / 2022-12-28

Document history

Report number	Date	Description
67003RAN.009	2023-01-19	First release

Environmental conditions

Date	Max. Temp. ºC	Min. Temp. ºC	Max. Hum. %	Min. Hum. %	Limit
From 2022-05-05 to 2022-09-21	24.99	20.01	69.91	33.93	18-25 ºC, 30-70%
From 2022-12-23 to 2022-12-28	22.73	20.12	55.56	44.52	18-25 ºC, 30-70%

Remarks and comments

1. Testing of GPRS EDGE mode is not required according to test reductions mentioned in FCC OET KDB 941225 D01 3G SAR Procedures, paragraph “5. GSM, GPRS and EDGE”.
2. Testing of HSDPA/HSPA/HSPA+/DC-HSPA modes are not required according to paragraph “2.1 3G SAR test reduction procedure” mentioned in FCC OET KDB 941225 D01 3G SAR Procedures.
3. Testing of Bluetooth mode is not required according to FCC OET KDB D01 General RF Exposure Guidance v06, paragraph “4.3.1. Standalone SAR test exclusion considerations”.
4. Only the plots of the highest reported SAR for each test position and mode/band are included in appendix C.
5. The tests have been performed by the technical personnel: Francisco J. Sánchez and Ismael Gamarro.
6. References:

   The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093 and the following FCC Published RF exposure KDB procedures:

   - FCC OET KDB 447498 D01 General RF Exposure Guidance v06 (October 2015)
   - FCC OET KDB 865664 D01 - SAR Measurement Requirements for 100 MHz to 6 GHz v01r04 (August 2015).
   - FCC OET KDB 865664 D02 RF Exposure Reporting v01r02 (October 2015)
   - FCC OET KDB 941225 D01 3G SAR Procedures v03r01 (October 2015).
   - FCC OET KDB 941225 D05 SAR for LTE Devices v02r05 (October 2015).
   - FCC OET KDB 248227 D01 802.11 Wi-Fi SAR v02r02 (October 2015).
   - FCC OET KDB 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02 (October 2015).
   - TCB Workshop Nov. 2017, TCB Workshop October 2018, TCB Workshop October 2020 and TCB Workshop February 2021.

7. LTE Rel.10 and 5G NR FR1 testing method and procedure was consulted and approved through FCC KDB inquiry.
8. The instrumentation utilized to perform the tests covered in this test report is listed in the following table:

Equipment	NC
Dosimetric E-field probe SPEAG EX3DV4	6125
Dosimetric E-field probe SPEAG ES3DV3	3431
Data acquisition device SPEAG DAE4	3430
Data acquisition device SPEAG DAE4	8876
SPEAG Mounting Device for Hand-held devices	3424
SPEAG Mounting Device for Laptop and Body-Worn Transmitters	3526
SAM head-body simulator TWIN SAM V4.0	3422
Oval flat phantom SPEAG ELI 4	3525
Electro-optical converter SPEAG EOC3	3438
Robot Stäubli RX60BL	3420
Robot controller Stäubli CS7MB	3436
Measurement server SPEAG DASY5 SE UMS 011 BS	3847
SAR measurement software SPEAG DASY52 V52.10.4.1527	3423
SAR postprocessing software SPEAG SEMCAD X	3423
Electro-optical converter SPEAG SE UMS 018 BB	8902
Robot Stäubli TX60L	8867
Robot controller STÄUBLI CS8C	8894
Measurement server SPEAG DASY6 SE UMS 028 CA	8895
SAR measurement software SPEAG cDASY6 16.0.0.116	8898
Head Tissue Equivalent Liquid for 750 MHz band	3920
Head Tissue Equivalent Liquid for 900 MHz band	3631
Head Tissue Equivalent Liquid for 1700 MHz band	6028
Head Tissue Equivalent Liquid for 1900 MHz band	8844
Head Tissue Equivalent Liquid for 2600 MHz band	4173
Head Tissue Equivalent Liquid for 3300 MHz band	3636
Head Tissue Equivalent Liquid for 3500 MHz band	3636
Head Tissue Equivalent Liquid for 3700 MHz band	3636
Head Tissue Equivalent Liquid for 4200 MHz band	3636
Head Tissue Equivalent Liquid for 5GHz bands	3636
750 MHz dipole validation kit SPEAG D750V3	3919
900 MHz dipole validation kit SPEAG D900V2	3426
1800 MHz dipole validation kit SPEAG D1800V2	3427
2600 MHz dipole validation kit SPEAG D2600V2	3527
3300 MHz dipole validation kit SPEAG D3300V2	8761
3500 MHz dipole validation kit SPEAG D3500V2	8762
3700 MHz dipole validation kit SPEAG D3700V2	8763
4200 MHz dipole validation kit SPEAG D4200V2	8765
5 GHZ dipole validation kit SPEAG D5GHzV2	1071
Vector network analyzer Agilent FieldFox N9923A	4482
Dielectric probe kit SPEAG DAK-3.5	4171
SPEAG DAK software V1.10.325.10	4859
RF Generator R&S SMU200	3346
Power amplifier MITEQ AMF-4D-00400600-50-30P	3485
DC Power supply Agilent U8002A	4835
Dual directional coupler HP 778D	1084
Dual directional coupler NARDA 4227-16	3630
Power sensor Agilent E9300A	4391
Power sensor Agilent E9300A	4392
Power meter Agilent E4419B	4393
Power sensor DC 50 MHz to 18 GHz R&S model NRP-Z81	4164
Digital thermometer LKM Electronics model DTM300-Spezial	4170
Temperature and humidity probe HUMIDIPROBE Pico Technology	3453
Wideband Radio Communication Tester R&S CMW 500	3934
Wideband Radio Communication Tester R&S CMW 500	4804
Wideband Radio Communication Tester R&S CMW 500	4948
Wideband Radio Communication Tester Keysight E7515A UXM	8066
Wideband Radio Communication Tester R&S CMW 500	8922
Wideband Radio Communication Tester R&S CMX 500	8923

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

FCC 47CFR Part 2.1093	VERDICT			
	N/A	P	F	NM
GSM 850		P		
GSM 1900		P		
WCDMA II		P		
WCDMA IV		P		
WCDMA V		P		
LTE 2		P		
LTE 4		P		
LTE 5		P		
LTE 7		P		
LTE 12		P		
LTE 13		P		
LTE 14		P		
LTE 17		P		
LTE 25		P		
LTE 26		P		
LTE 41		P		
LTE 66		P		
LTE 71		P		
n2		P		
n5		P		
n7		P		
n41		P		
n66		P		
n71		P		
n77		P		
n78		P		
802.11a/g/n/ac		P		
Bluetooth		P[1]		
Bluetooth Low Energy		P[1]		
1: Technology not subject to testing. Verdict has been determined through RF Exposure assessment (see Appendix B, 2.3 and 2.4 of this document for more details).				

Appendix A: Test configuration

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1. GENERAL INTRODUCTION

1.1. Application Standard

The Federal Communications Commission (FCC) sets the limits for General Population/Uncontrolled exposure to radio frequency electromagnetic fields for transmitting devices designed to be used within 20 centimetres of the body of the user under FCC 47 CFR Part 2.1093 - "Radiofrequency radiation exposure evaluation: portable devices", paragraph (d)(2).

1.2. General requirements

The SAR measurement has been performed continuing the following considerations and environment conditions:

The ambient temperature shall be in the range of 18ºC to 25ºC and the variation shall not exceed +/-2ºC during the test.

The ambient humidity shall be in the range of and 30% - 70%.

The device battery shall be fully charged before each measurement.

1.3. Measurement system requirements

The measurement system used for SAR tests fulfills the procedural and technical requirements described at the reference standards used.

1.4. Phantom requirements

The phantom model for head measurements is a simplified representation of the human anatomy and comprised of material with electrical properties similar to the corresponding tissues in human body. The human model has the following proportions:

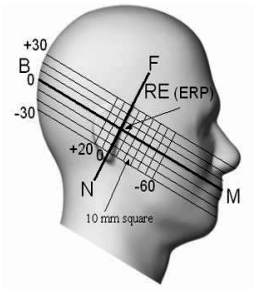


Figure 1: Proportions of Phantom

The shell model is a shaped container and it has the representation shown in the following figure:

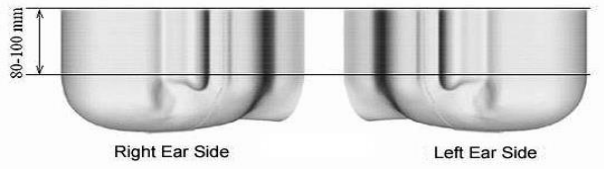


Figure 2: Proportions and shape of Phantom shell

The phantom model for body measurements is an elliptical open-top container with a flat bottom, with the following shape and dimensions:

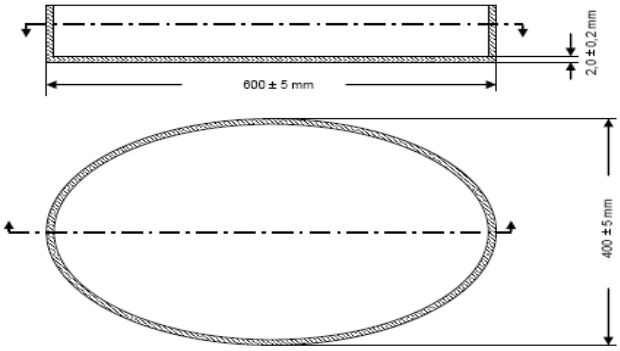


Figure 3: Proportions and shape of Phantom shell

a) Except as specified in item b), the shape of the phantom shall be an ellipse with length 600 mm ± 5 mm and width 400 mm ± 5 mm (see Figure 3).

b) For frequencies above 150 MHz and for separation distances less than or equal to 25 mm from the outer surface of the bottom of the phantom shell, phantoms with other shapes and smaller dimensions are allowed as follows:

- between 150 MHz and 800 MHz, the phantom flat bottom wall may have any shape that encompasses an ellipse with length 0,6 λ_0 and width 0,4 λ_0, where λ_0 is the wavelength in air.
- between 800 MHz and 6 GHz, the phantom may have any shape flat bottom wall that encompasses an ellipse with length 225 mm and width 150 mm.

1.5. Measurement Liquids requirements

The liquids used to simulate the human tissues, must fulfill the requirements of the dielectric properties required. These target dielectric properties are indicated into FCC OET KDB 865664 D01 Appendix A.

Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

Table 1: Liquid material requirements

To minimize the effect of reflections on peak spatial-average SAR values, from the upper surface of the tissue equivalent liquid, the depth of the liquid should be at least 15 cm.

Dielectric porperties values of the Tissue Simulant Liquids used for SAR measurements are included in Appendix B, Section 3, of this document.

2. MEASUREMENT SYSTEM

2.1. Measurement System

The DASY5 system for performing compliance tests consists of the following items:

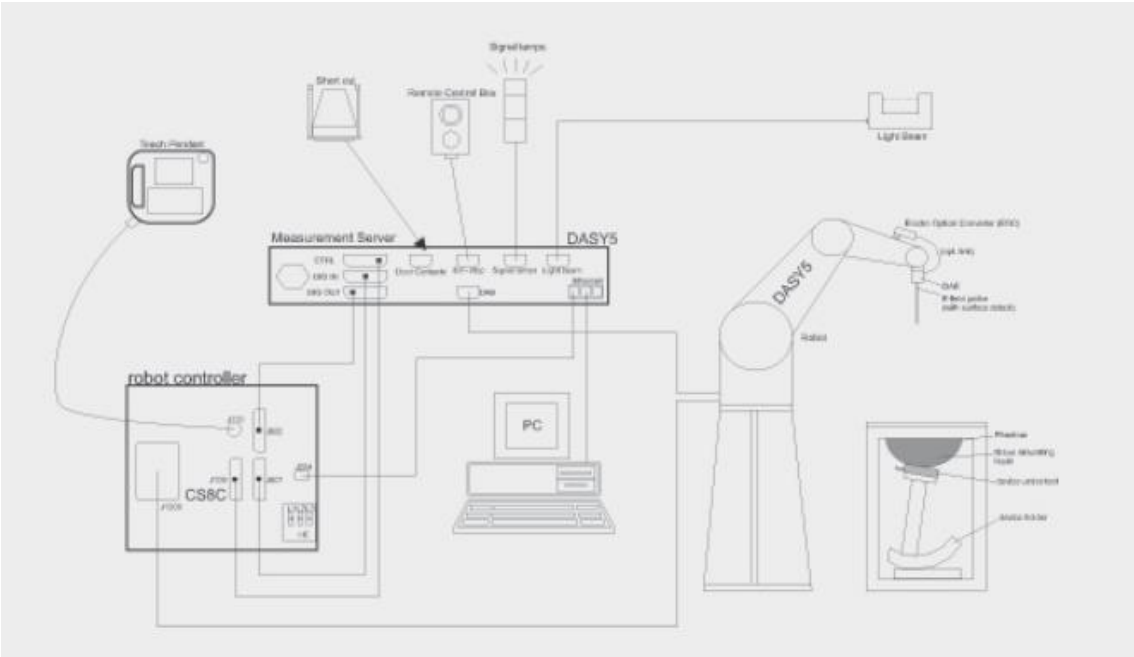


Figure 4: DASY5 SAR Measurement system

The DASY6 system for performing compliance tests consists of the following items:

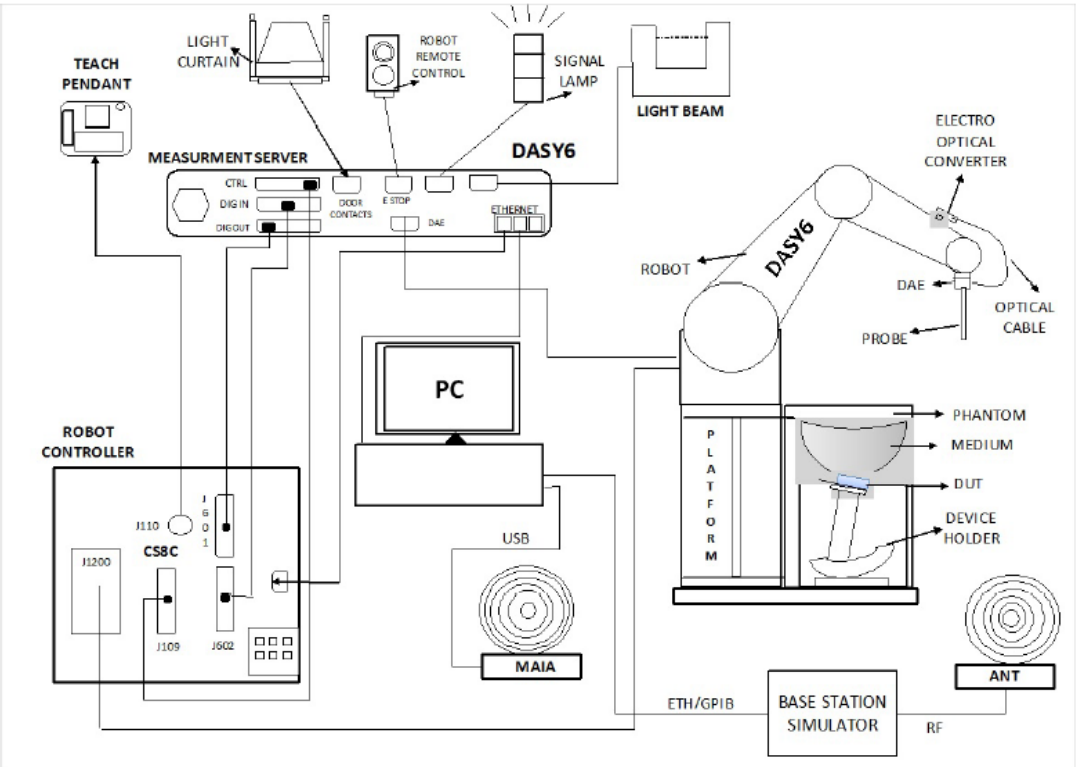
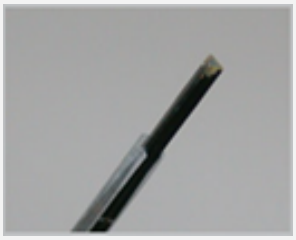


Figure 5: DASY6 SAR Measurement system

- 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 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.

	Model	EX3DV4
	**Construction**	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
	Frequency	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 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 to > 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: 1.0 mm

	Model	ES3DV3
	Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
	Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 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 to > 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: 2.0 mm

	Model	DAE4
	Construction	Signal amplifier, multiplexer, A/D converter, and control logic. Serial optical link communication with DASY4/5 embedded system (fully remote controlled). Two-step probe touch detector for mechanical surface detection and emergency robot stop.
	Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
	Input Offset Voltage	< 5 µV (with auto zero)
	Input Resistance	200 MOhm
	Input Blas Current	< 50 fA

	Model	Twin SAM
	Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
	Material	Vinylester, glass fiber reinforced (VE-GF)
	Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
	Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
	Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
	Filling Volume	Approx. 25 liters
	Wooden Support	SPEAG standard phantom table

	Model	ELI
	Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
	Material	Vinylester, glass fiber reinforced (VE-GF)
	Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
	Shell Thickness	2 ± 0.2 mm (bottom plate)
	Dimensions	Major axis: 600 mm, Minor axis: 400 mm
	Filling Volume	Approx. 30 liters
	Wooden Support	SPEAG standard phantom table

Model	Mounting Device for Hand-Held Transmitters
Construction	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).
Material	Polyoxymethylene (POM)

Model	Mounting Device for Laptop and Body-Worn Transmitters
Construction	In combination with the Twin SAM V5.0/V5.0c or ELI Phantoms, the Mounting Device (Body-worn) enables testing of transmitters devices according to IEC 62209-2 specifications. The device holder can be locked for positioning at flat phantom section.
Material	Polyoxymethylene (POM), PET-G, Foam

Model	System Validations Kits 450 MHz – 6 GHz
Construction	Symmetrical dipole with I/4 balun. Enables measurement of feedpoint impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.
Frequency	450 MHz to 5800 MHz
Return Loss	20 dB at specified validation position

Dimensions (length and overall height in mm)

Product	Dipole length	Overall height
D450V3	290.0	330.0
D750V3	179.0	330.0
D900V2	148.5	340.0
D1800V2	72.5	300.0
D2000V2	65.0	300.0
D2300V2	56.3	290.0
D2450V2	52.0	290.0
D2600V2	49.2	290.0
D3300V2	38.0	285.0
D3500V2	37.0	285.0
D3700V2	34.7	285.0
D3900V2	32.0	280.0
D4200V2	30.1	280.0
D4600V2	27.0	280.0
D4900V2	25.0	280.0
D5GHzV2	20.6	300.0

2.2. Device Holder

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 in 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. An 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 different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centre for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=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 DASY Laptop Holder extension is lightweight and made of POM, PET-G 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.

2.3. Test Positions of device relative to body

The device is a Telematics control unit with wireless technologies, used in automotive, equipped with one modem, OEM. This unit was designed for automotive usage and contains the following features: GSM, UMTS, LTE, 5G, GNSS, Wifi (a, b, g, n, ac), Bluetooth Low Energy (BTLE) and Bluetooth EDR.

The equipment supports several antennas that can be used for transmission. It supports different configurations in which different antennas can be used for different purposes and transmit simultaneously.

Only two antennas will be installed close to car passangers at a distance minor to 20 cm, these antennas will be named as “LTE1/LTE2/BTLE” (which are inside the external shark fin antenna)” and one of the WLAN antennas named as “BT_WLAN2” antenna, which will be installed into the “C/D pilar/frame window backside” of the car with the following minimum declared installation distances:

Antenna	Tx - Bands	Position on vehicle	Installation distance (mm)
Shark fin antenna “LTE1” (Main cellular antenna)	GSM 850/1900 WCDMA II/IV/V LTE 2/4/5/7/12/13/14/17/25/26/41/66/71 5G n2/n5/n7/n66/n71	Car roof	> 19.375mm
Shark fin antenna “LTE2” (Backup/e-call cellular antenna) *(Only for Backup/e-call mode)	n41/n77/n78 *(GSM 850/1900, WCDMA II/IV/V)		
Shark fin antenna “BTLE”	Bluetooth LE		
Bumper “LTE3” *(Additional Backup/e-call cellular antenna)	Only Rx *(GSM 850/1900, WCDMA II/IV/V)	Rear bumper	> 20cm
Internal backup antenna	GSM 850/1900 WCDMA II/IV/V	Trunk	> 20cm
“BT_WLAN1”	WLAN 2.4GHz	Rear mirror bracket	> 20cm
“BT_WLAN2”	Bluetooth EDR 2.4GHz WLAN 5GHz	C/D pilar/frame window backside	> 19mm

Table 2: Antenna specifications and location.

These two antennas antennas were tested placed at the centre of the flat phantom. The external Shark fin antenna was placed with its backside facing the flat phantom surface simulating its normal installation position at a conservative 15mm testing distance, and the ”BT_WLAN2” antenna was placed at a conservative 10 mm testing distance for both antenna faces.

The rest of supported antennas which will be installed more than 20 cm away from any nearby passenger will be assessed according to FCC 47 CFR part 2.1091 into DEKRA Testing and Certification, S.A.U. test report num. 67003RAN.010.

2.4. Test to be performed

Test shall be performed for each test position previously described, using the channel producing the highest rated output power.

Additionally the other applicable test frequency channels must be measured for the test configuration providing the highest SAR for each applicable transmitting band.

2.5. Description of interpolation/extrapolation scheme

The local SAR inside the Phantom is measured using small dipole sensing elements inside a probe element. The probe tip must not be in contact with the Phantoms surface in order to minimise measurement errors, but the highest local SAR is obtained from measurements at a certain distances from the shell trough extrapolation. The accurate assessment of the maximum SAR averaged over 10 gr. requires a very fine resolution in the three dimensional scanned data array. Since the measurements have to be performed over a limited time, the measured data have to be interpolated to provide an array of sufficient resolution.

The interpolation of 2D area scan is used after the initial area scan, at a fixed distance from the Phantom shell wall. The initial scan data is collected with approx. 15 mm spatial resolution and this interpolation is used to find the location of the local maximum for positioning the subsequent 3D scanning within a 1mm resolution.

For the 3D scan, data is collected on a spatially regular 3D grid having 5 mm steps in both directions. After the data collection by the SAR probe, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will be applicable right up to the shell wall boundary.

2.6. Determination of the largest peak spatial-average SAR

To determine the maximum value of the peak spatial-average SAR of a DUT, all device positions, configurations and operational modes should be tested for each frequency band.

The averaging volume shall be chosen as 1gr. of contiguous tissue. The cubic volumes, over which the SAR measurements are averaged after extrapolation and interpolation, are chosen in order to include the highest values of local SAR.

The maximum SAR level for the DUT will be the maximum level obtained of the performed measurements indicated in the previous points.

2.7. System Check

Prior to the SAR measurements, system verification is done to verify the system accuracy. As IEEE 1528-2013, Annex paragraph 8.2.1 “System Check - Purpose” specifies, a complete SAR evaluation is done using a half-wavelength dipole as source with the frequency of the mid-band channel of the operating band, or within 10% of this channel, whichever is greater.

The measured 1 gr. and 10 gr. SAR should be within 10% of the expected target values specified in the calibration certificate of the dipole, for the specific tissue and frequency used.

3. UNCERTAINTY

According to FCC OET KDB 865664 D01, if the highest measured 1-g SAR is < 1.5 W/kg, SAR measurement uncertainty analysis is not required to be included into SAR report, but it has been included for ISO 17025 accreditation.

Uncertainty for 300 MHz – 3 GHz

ERROR SOURCES (source of uncertainty)	Uncertainty value (%)	Prob. Dist.	Div.	*ci (1g)*	*ci (10g)*	*Standard uncertainty (1g) (%)*	*Standard uncertainty (10g) (%)*
Measurement Equipment							
Probe Calibration	13.30%	N	2	1	1	6.65%	6.65%
Probe calibration drift	11.35%	R	√3	1	1	6.55%	6.55%
Axial Isotropy	4.70%	R	√3	0.7	0.7	1.90%	1.90%
Hemisfericall Isotropy	9.60%	R	√3	0.7	0.7	3.88%	3.88%
Boundary effect	1.00%	R	√3	1	1	0.58%	0.58%
Linearity	4.70%	R	√3	1	1	2.71%	2.71%
System Detection limits	0.25%	R	√3	1	1	0.14%	0.14%
Probe modulation response	4.80%	N	1	1	1	4.80%	4.80%
Readout electronics	0.30%	N	1	1	1	0.30%	0.30%
Response time	1.01%	R	√3	1	1	0.58%	0.58%
Integration time	2.60%	R	√3	1	1	1.50%	1.50%
RF Ambient noise	3.00%	R	√3	1	1	1.73%	1.73%
RF Ambient reflections	3.00%	R	√3	1	1	1.73%	1.73%
Probe positioner mech. restrictions	0.40%	R	√3	1	1	0.23%	0.23%
Probe positioning with respect to phantom shell	2.90%	R	√3	1	1	1.67%	1.67%
Max. SAR Eval.	2.00%	R	√3	1	1	1.15%	1.15%
Test Sample Related							
Device holder uncertainty	3.60%	N	1	1	1	3.60%	3.60%
Test sample positioning	2.90%	N	1	1	1	2.90%	2.90%
Drift of output power	2.50%	N	1	1	1	2.50%	2.50%
System Validation source (dipole)							
Deviation of experimental dipole from numerical dipole	0.00%	N	1	0	0	0.00%	0.00%
Input power and SAR drift measurement	2.00%	R	√3	1	1	1.15%	1.15%
Dipole axis to liquid distance	3.40%	R	√3	1	1	1.96%	1.96%
Phantom and Setup							
Phantom uncertainty (shape and thickness tolerances)	6.10%	R	√3	1	1	3.52%	3.52%
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.90%	N	1	1	0.84	1.90%	1.60%
Liquid conductivity (meas.)	2.45%	N	1	0.78	0.71	1.91%	1.74%
Liquid permittivity (meas.)	2.45%	N	1	0.26	0.26	0.64%	0.64%
Liquid conductivity – temperature uncertainty	2.30%	R	√3	0.78	0.71	1.04%	0.94%
Liquid permittivity – temperature uncertainty	0.36%	R	√3	0.23	0.26	0.05%	0.05%
Combined standard uncertainty (Validation antenna)	$u_c = \sqrt{\sum_{1=1}^{m} c_i^2 \cdot u_i^2}$					11.62%	11.54%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**23.25%**	**23.09%**
Combined standard uncertainty (DUT)	$u_c = \sqrt{\sum_{1=1}^{m} c_i^2 \cdot u_i^2}$					14.08%	14.01%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**28.16%**	**28.03%**

Table 3: Uncertainty Assessment for 300 MHz - 3 GHz.

Uncertainty for 3 GHz – 6 GHz

ERROR SOURCES (source of uncertainty)	Uncertainty value (%)	Prob. Dist.	Div.	*ci (1g)*	*ci (10g)*	*Standard uncertainty (1g) (%)*	*Standard uncertainty (10g) (%)*
Measurement Equipment							
Probe Calibration	13.10%	N	2	1	1	6.55%	6.55%
Probe calibration drift	11.15%	R	√3	1	1	6.44%	6.44%
Axial Isotropy	4.70%	R	√3	0.7	0.7	1.90%	1.90%
Hemisfericall Isotropy	9.60%	R	√3	0.7	0.7	3.88%	3.88%
Boundary effect	2.00%	R	√3	1	1	1.15%	1.15%
Linearity	4.70%	R	√3	1	1	2.71%	2.71%
System Detection limits	0.25%	R	√3	1	1	0.14%	0.14%
Probe modulation response	4.80%	N	1	1	1	4.80%	4.80%
Readout electronics	0.30%	N	1	1	1	0.30%	0.30%
Response time	1.01%	R	√3	1	1	0.58%	0.58%
Integration time	2.60%	R	√3	1	1	1.50%	1.50%
RF Ambient noise	3.00%	R	√3	1	1	1.73%	1.73%
RF Ambient reflections	3.00%	R	√3	1	1	1.73%	1.73%
Probe positioner mech. restrictions	0.40%	R	√3	1	1	0.23%	0.23%
Probe positioning with respect to phantom shell	6.70%	R	√3	1	1	3.87%	3.87%
Max. SAR Eval.	4.00%	R	√3	1	1	2.31%	2.31%
Test Sample Related							
Device holder uncertainty	3.60%	N	1	1	1	3.60%	3.60%
Test sample positioning	2.90%	N	1	1	1	2.90%	2.90%
Drift of output power	2.50%	N	1	1	1	2.50%	2.50%
System Validation source (dipole)							
Deviation of experimental dipole from numerical dipole	0.00%	N	1	0	0	0.00%	0.00%
Input power and SAR drift measurement	2.00%	R	√3	1	1	1.15%	1.15%
Dipole axis to liquid distance	3.40%	R	√3	1	1	1.96%	1.96%
Phantom and Setup							
Phantom uncertainty (shape and thickness tolerances)	6.60%	R	√3	1	1	3.81%	3.81%
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.90%	N	1	1	0.84	1.90%	1.60%
Liquid conductivity (meas.)	2.45%	N	1	0.78	0.71	1.91%	1.74%
Liquid permittivity (meas.)	2.45%	N	1	0.26	0.26	0.64%	0.64%
Liquid conductivity – temperature uncertainty	3.36%	R	√3	0.78	0.71	1.51%	1.38%
Liquid permittivity – temperature uncertainty	0.40%	R	√3	0.23	0.26	0.05%	0.06%
Combined standard uncertainty (Validation antenna)	$u_c = \sqrt{\sum_{1=1}^{m} c_i^2 \cdot u_i^2}$					12.36%	12.28%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**24.72%**	**24.55%**
Combined standard uncertainty (DUT)	$u_c = \sqrt{\sum_{1=1}^{m} c_i^2 \cdot u_i^2}$					14.69%	14.62%
Expanded uncertainty (confidence interval of 95%)	*ue =2.00 uc*					**29.39%**	**29.25%**

Table 4: Uncertainty Assessment for 3 GHz – 6GHz.

4. SAR LIMIT

Having a worst-case measurement, the SAR limit is valid for general population/uncontrolled exposure.

The SAR values have to be averaged over a mass of 1 gr. (SAR 1 gr.) with the shape of a cube and averaged over a mass of 10 gr (Extremity SAR 10 gr). These levels could not exceed the values indicated in the application Standard:

Standard	Exposure	SAR	SAR Limit (W/kg)
FCC 47 CFR Part 1.1310, Paragraph (c)	General population/Uncontrolled	SAR 1-g.	1.6
FCC 47 CFR Part 1.1310, Paragraph (c)	General population/Uncontrolled Extremity	SAR 10-g.	4.0

Table 5: SAR limit

5. DEVICE UNDER TEST

5.1. Dimensions

Element	Length x Width x Height (mm)
TCU	260.0 x 130.0 x 25.0
Shark fin antenna 1	220.0 x 85.0 x 70.0
Shark fin antenna 2	220.0 x 85.0 x 70.0
BT_WLAN 2 antenna	110.0 x 20.0 x 15.0

Table 6: DUT dimensions

5.2. Wireless Technology

Wireless Technology	Frequency Bands	Modes	Duty Cycle used for SAR testing
GSM	850/1900	- Voice (GMSK) - GPRS (GMSK, Multi-slot class 33) - EGPRS (8PSK, Multi-slot class 33)	- GMSK: 12.5 % - GPRS/EGPRS 1 slot: 12.5 % - GPRS/EGPRS 2 slot: 25.0 % - GPRS/EGPRS 3 slot: 37.5 % - GPRS/EGPRS 4 slot: 50.0 %
WCDMA	II/IV/V	- UMTS Rel. 99 - HSDPA (Rel. 5) - HSPA (Rel. 6) - HSPA+ (Rel. 7)	- 100 %
LTE	2/4/5/7/12/13/14/17/25/26/41/66/71	- FDD and TDD Bands - CA Downlink - CA Uplink Intra-Band - QPSK and 16-QAM (Rel. 9)	- FDD: 100 % - TDD: 62.9 %
5G	n2/n5/n7/n41/n66/n71/n77/n78	- FDD and TDD Bands - SA mode - NSA-EN-DC mode	- FDD: 100 % - TDD: 50 %
WLAN	5 GHz	- 802.11b/g/n/ac (20MHz & 40MHz) - 802.11 ac (80MHz)	- 802.11a/n/ac/ax (20MHz): 80 % - 802.11a/n/ac/ax (40 MHz): 65 % - 802.11ac/ax(80): 45 %
Bluetooth	2.4 GHz	- Bluetooth	SAR Low-Power Exclusion compliant

Table 7: Supported modes

The supported transmitting technology for each antenna is:

Antenna	Wireless Technology	Frequency Bands	Modes
LTE1 (Shark fin antenna)	GSM	850/1900	- Voice (GMSK) - GPRS (GMSK, Multi-slot class 33) - EGPRS (8PSK, Multi-slot class 33)
	WCDMA	II/IV/V	- UMTS Rel. 99 - HSDPA (Rel. 5) - HSPA (Rel. 6) - HSPA+ (Rel. 7)
	LTE	2/4/5/7/12/13/14/17/25/26/41/66/71	- FDD and TDD Bands - CA Downlink - CA Uplink Intra-Band - QPSK and 16-QAM (Rel. 9)
	5G	n2/n5/n7/n66/n71	- FDD Bands - SA mode - NSA-EN-DC mode
LTE2 (Shark fin antenna)	GSM	850/1900	- Voice (GMSK) - GPRS (GMSK, Multi-slot class 33) - EGPRS (8PSK, Multi-slot class 33)
	WCDMA	II/IV/V	- UMTS Rel. 99 - HSDPA (Rel. 5) - HSPA (Rel. 6) - HSPA+ (Rel. 7)
	5G	n41/n77/n78	- TDD Bands - SA mode - NSA-EN-DC mode
BTLE (Shark fin antenna)	Bluetooth	2.4GHz	- BTLE
BT_WLAN 2	Bluetooth	2.4GHz	- BT_EDR
	WLAN	UNII-1 & UNII-3	- 802.11a/g/n(20MHz & 40MHz) - 802.11 ac(80MHz)

Table 8: Antenna supported transmitting modes

5.3. Simultaneous Transmission

Simultaneous transmission evaluation was performed according to FCC OET KDB 447498 D01 General RF Exposure Guidance v06 (October 2015). The detailed simultaneous transmission combination is:

RF Exposure Condition	Simultaneous transmission configurations
Head/Body	GPRS 850 MHz(LTE2) + BTLE(BTLE) + Wi-Fi 5GHz(BT_WLAN2) + BT EDR(BT_WLAN2)

Table 9: DUT simultaneous transmission

5.4. Antenna Location

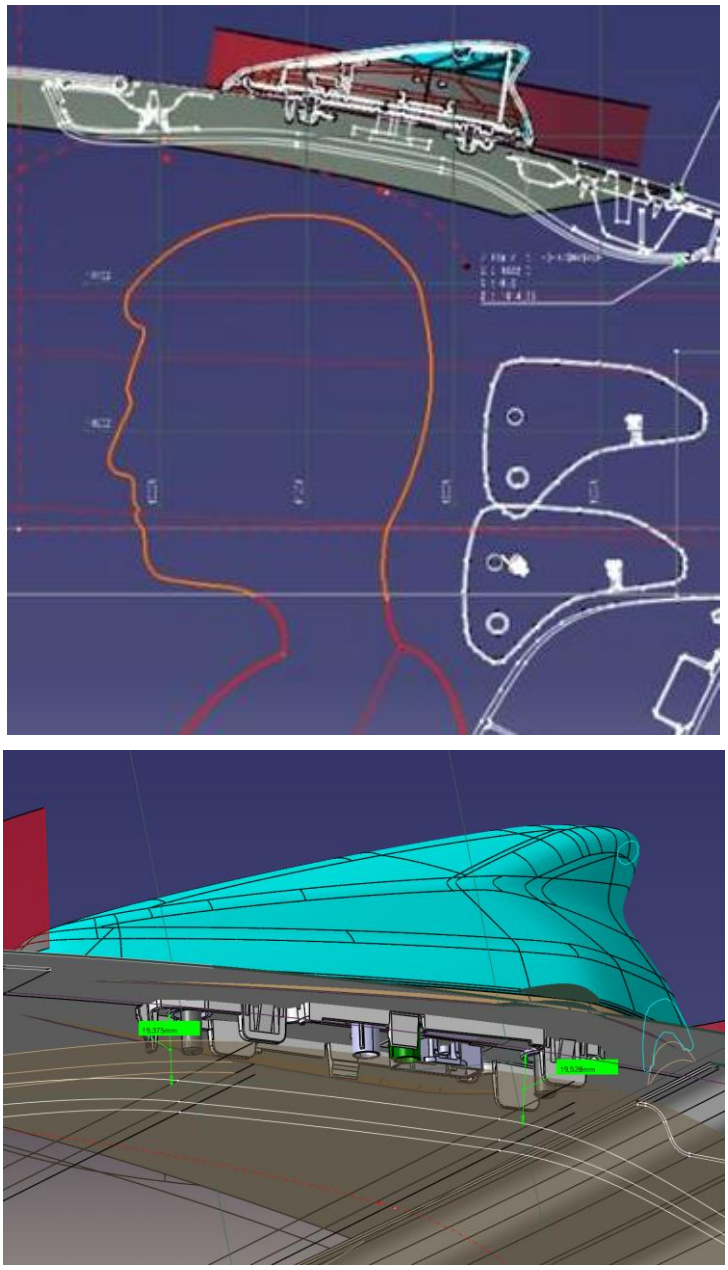


Figure 6: Shark fin (“LTE1”, “LTE2”, “BTLE”) antenna location.

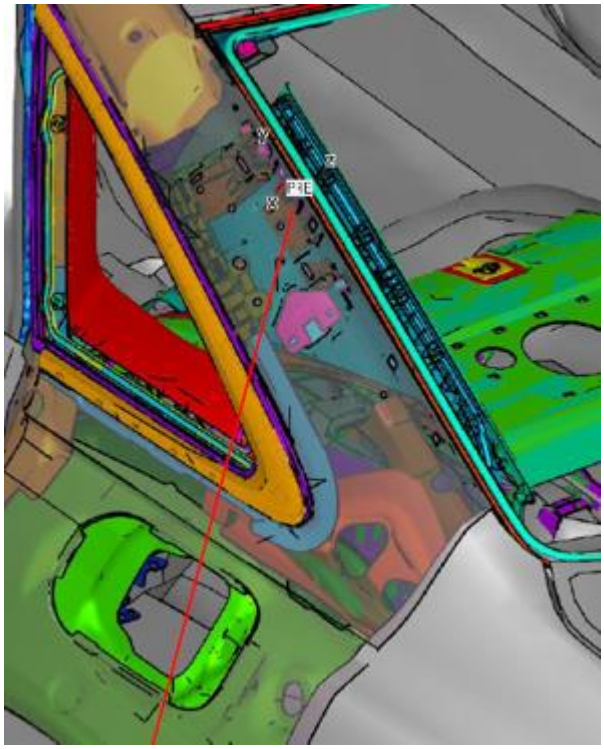


Figure 7: “BT_WLAN 2” antenna location.

Appendix B: Test results

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1. TEST CONDITIONS

1.1. Power supply (V):

Vn = 13.2 V
Type of power supply = DC Voltage from power supply.

1.2. Temperature (ºC):

Tn = +20.00 to +25.00
The subscript n indicates normal test conditions.

1.3. DUT information and test-site configurations

For all supported modes, the back face of the Shark fin antenna was placed facing the flat phantom surface using 15 mm test separation distance for measurements for the “LTE1” and “LTE2” antennas, and using 10 mm test separation distance for measurements with the “BT_WLAN2 antenna”.

1.4. Test signal, Output Power and Frequencies

The sample was put into operation by using an R&S CMW 500 as base station simulator for 2G, 3G and LTE transmitting technologies and an R&S CMX500 and a Keysight E7515A UXM was used to perform measurements for 5G transmitting technologies.

For the 802.11a/b/g/n/ac modes, the device was put into operation by using a manufacturer proprietary test mode, setting the maximum output power for each mode. The duty cycle was set to maximum (aprox. 100%).

In all operating bands and test positions, the measurements were performed using the channel producing the highest rated output power.

In each band, for those positions where the maximum averaged SAR was found, measurements were performed on the other applicable test frequency channels except those with applicable test reductions.

The maximum conducted time-averaged power of the device for each mode was measured with a power sensor R&S NRP-Z81.

The target power alignments, including tune-up tolerance, for RF components declared by the manufacturer for each supported technology are:

Technology / Mode	Band	Frequency (MHz)	Maximum Burst Averaged Output Power (Incl. Tune-Up) (dBm)	Maximum Frame Averaged Output Power (Incl. Tune-Up) (dBm)
GSM	850	824 - 849	34.0	25.0
GPRS 1TX	850	824 - 849	34.0	25.0
GPRS 2TX	850	824 - 849	34.0	28.0
GPRS 3TX	850	824 - 849	34.0	29.75
GPRS 4TX	850	824 - 849	34.0	31.0
GSM	1900	1850 - 1910	31.0	22.0
GPRS 1TX	1900	1850 - 1910	31.0	22.0
GPRS 2TX	1900	1850 - 1910	31.0	25.0
GPRS 3TX	1900	1850 - 1910	31.0	26.75
GPRS 4TX	1900	1850 - 1910	31.0	28.0

Technology / Mode	Band	Frequency (MHz)	Maximum Output Power (Incl. Tune-Up) (dBm)
UMTS	II	1850 - 1910	25.0
UMTS	IV	1710 - 1755	25.0
UMTS	V	826 - 847	25.0

Technology / Mode	Band	Frequency (MHz)	Maximum Output Power (Incl. Tune-Up) (dBm)
LTE	2	1850 - 1910	25.0
LTE	4	1710 - 1755	25.0
LTE	5	824 - 849	25.0
LTE	7	2500 - 2570	25.0
LTE	12	699 - 716	25.0
LTE	13	777 - 787	25.0
LTE	14	788 - 798	25.0
LTE	17	704 - 716	25.0
LTE	25	1850 - 1915	25.0
LTE	26	814 - 849	25.0
LTE	41	2496 - 2690	25.0
LTE	66	1710 - 1780	25.0
LTE	71	663 - 698	25.0

LTE CA Uplink Combination	PCC Band	Maximum Output Power (Incl. Tune-Up) (dBm)
5B	LTE 5	25.0
7C	LTE 7	25.0
41C	LTE 41	25.0
66B	LTE 66	25.0
66C	LTE 66	25.0

Technology / Mode	Band	Frequency (MHz)	Maximum Output Power (Incl. Tune-Up) (dBm)
5G SA	n41	2496 - 2690	25.0
	n66	1710 - 1780	25.0
	n77	3700 - 3980	25.0
	n78	3700 - 3800	25.0

Technology / Mode	Band Combination	Maximum Output Power (Incl. Tune-Up) (dBm)
5G NSA	26-n41	25.0
	7-n78	25.0
	71-n2	25.0
	5-n7	25.0
	12-n7	25.0
	2-n78	25.0
	5-n41	25.0
	12-n78	25.0
	66-n78	25.0
	71-n78	25.0
	5-n78	25.0
	7C-n78	25.0
	7-n71	25.0
	2-n71	25.0
	66-n71	25.0
	5-n66	25.0
	2-n2	25.0
	66-n5	25.0
	2-n5	25.0
	7-n5	25.0
	12-n2	25.0
	66C-n5	25.0
	66B-n5	25.0
	13-n2	25.0
	13-n66	25.0
	5-n66	25.0
	7-n77	25.0
	66-n77	25.0
	2-n77	25.0
	5-n2	25.0
	71-n66	25.0
	13-n77	25.0
	5-n77	25.0

Maximum Output Power (dBm)			
Band	**802.11a**	**802.11n20/n40**	**802.11ac40/ac80**
UNII-3	10.8	10.8	10.8

Maximum Output Power (dBm)		
Band	**Bluetooth EDR**	**Bluetooth LE**
2.4 GHz	6.5	1.5

2. CONDUCTED AVERAGE POWER MEASUREMENTS

2.1. LTE 1 ANTENNA

2.1.1. GSM/GPRS/EGPRS Bands

- GSM 850: For voice mode PCL 5 was set to allow max power transmission.

GSM 900 - Average Output Power					
Channel Number	Frequency (MHz)	Frame Average Output Power (dBm)	Average Burst Output Power (dBm)	PCL	Modulation
128	824.2	23.39	32.4	5	GMSK
190	836.6	23.60	32.6	5	GMSK
251	848.8	23.33	32.4	5	GMSK

- GPRS 850: For data mode. PCL 5. CS1 coding scheme and Gamma 3 were set to allow DUT's max power transmission for each slot.

GPRS 850 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	23.11	23.81	23.79	23.38	5	GMSK-CS1
190	836.6	23.24	23.89	23.83	23.78	5	GMSK-CS1
251	848.8	23.07	23.63	23.60	22.88	5	GMSK-CS1

GPRS 850 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	32.1	29.8	28.1	26.4	5	GMSK-CS1
190	836.6	32.3	29.9	28.1	26.8	5	GMSK-CS1
251	848.8	32.1	29.7	27.9	25.9	5	GMSK-CS1

- EGPRS 850: For data mode. PCL 8. MCS5 coding scheme and Gamma 6 were set to allow DUT's max power transmission for each slot.

EDGE 850 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	17.48	18.88	19.59	19.67	8	8PSK-MCS5
190	836.6	17.57	18.84	19.65	19.74	8	8PSK-MCS5
251	848.8	17.39	18.86	19.47	19.60	8	8PSK-MCS5

EDGE 850 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	26.5	24.9	23.9	22.7	8	8PSK-MCS5
190	836.6	26.4	24.9	23.9	22.8	8	8PSK-MCS5
251	848.8	26.4	24.9	23.7	22.6	8	8PSK-MCS5

- GSM 1900: For voice mode PCL 0 was set to allow max power transmission.

GSM 1800 - Average Output Power					
Channel Number	**Frequency (MHz)**	**Frame Average Output Power (dBm)**	**Average Burst OutputPower (dBm)**	**PCL**	**Modulation**
512	1850.2	19.20	28.2	0	GMSK
661	1880.0	19.26	28.3	0	GMSK
810	1909.8	18.85	27.9	0	GMSK

- GPRS 1900: For data mode. PCL 0. CS1 coding scheme and Gamma 3 were set to allow max power transmission for each slot.

GPRS 1900 - Frame Average Output Power							
Channel Number	**Frequency (MHz)**	**Power (dBm)**				**PCL**	**Modulation**
		1 Slot	**2 Slots**	**3 Slots**	**4 Slots**		
512	1850.2	19.02	19.04	19.28	19.70	0	GMSK-CS1
661	1880.0	19.13	18.92	19.30	19.84	0	GMSK-CS1
810	1909.8	18.65	18.42	18.94	19.50	0	GMSK-CS1

GPRS 1900 - Average Burst Output Power							
Channel Number	**Frequency (MHz)**	**Power (dBm)**				**PCL**	**Modulation**
		1 Slot	**2 Slots**	**3 Slots**	**4 Slots**		
512	1850.2	28.1	25.1	23.5	22.7	0	GMSK-CS1
661	1880.0	28.2	24.9	23.6	22.9	0	GMSK-CS1
810	1909.8	27.7	24.4	23.2	22.5	0	GMSK-CS1

- EGPRS 1900: For data mode. PCL 2. MCS5 coding scheme and Gamma 5 were set to allow max power transmission for each slot.

EDGE 1900 - Frame Average Output Power							
Channel Number	**Frequency (MHz)**	**Power (dBm)**				**PCL**	**Modulation**
		1 Slot	**2 Slots**	**3 Slots**	**4 Slots**		
512	1850.2	15.46	16.48	17.63	17.69	2	8PSK-MCS5
661	1880.0	15.13	16.56	17.41	17.50	2	8PSK-MCS5
810	1909.8	14.73	16.20	17.07	17.19	2	8PSK-MCS5

EDGE 1900 - Average Burst Output Power							
Channel Number	**Frequency (MHz)**	**Power (dBm)**				**PCL**	**Modulation**
		1 Slot	**2 Slots**	**3 Slots**	**4 Slots**		
512	1850.2	24.5	22.5	21.9	20.7	2	8PSK-MCS5
661	1880.0	24.2	22.6	21.7	20.5	2	8PSK-MCS5
810	1909.8	23.8	22.2	21.3	20.2	2	8PSK-MCS5

2.1.2. WCDMA/HSDPA/HSPA/HSPA+ Bands

- WCDMA: The DUT supports power Class 3, with a nominal maximum output power of 24 dBm. Tests were completed according to 3GPP TS34.121, section 5.

Mode	Subtest	Rel99
WCDMA	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2Kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD II 1900	WCDMA	9262	1852.4	23.35
FDD II 1900	WCDMA	9400	1880.0	23.20
FDD II 1900	WCDMA	9538	1907.6	23.01

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD IV 1700	WCDMA	1312	1712.4	23.17
FDD IV 1700	WCDMA	1412	1732.6	23.38
FDD IV 1700	WCDMA	1512	1752.6	23.49

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD V 850	WCDMA	4132	826.4	23.62
FDD V 850	WCDMA	4182	836.4	23.52
FDD V 850	WCDMA	4233	846.6	23.48

- HSDPA:

Mode	Subtest	1	2	3	4
HSDPA	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2Kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	HSUPA Loopback			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64	64	64	64
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
	Dack	8			
	Dnak	8			
	Ack-Nack repetition factor	3			
	DCQI	8			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs =βhs/βc	30/15			

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD II 1900	HSDPA	9262	1852.4	22.49	22.39	21.91	20.96
FDD II 1900	HSDPA	9400	1880.0	22.26	22.22	21.53	20.72
FDD II 1900	HSDPA	9538	1907.6	22.05	22.03	21.26	20.53

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD IV 1700	HSDPA	1312	1712.4	22.14	21.77	21.80	20.73
FDD IV 1700	HSDPA	1412	1732.6	22.25	22.24	21.73	20.83
FDD IV 1700	HSDPA	1512	1752.6	22.35	22.36	21.97	20.45

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD V 850	HSDPA	4132	826.4	22.60	22.61	22.10	22.10
FDD V 850	HSDPA	4182	836.4	22.19	22.16	21.73	21.74
FDD V 850	HSDPA	4233	846.6	22.48	22.49	22.00	21.98

- HSPA:

Mode	Subtest	1	2	3	4	5
HSPA	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2Kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm 2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15	56/75	134/15
	MPR (dB)	0	2	1	2	0
	Dack	8				
	Dnak	8				
	Ack-Nack repetition factor	3				
	DCQI	8				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	Ahs =βhs/βc	30/15				
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL DataRate Kbps	242.1	174.9	482.8	205.8	308.9

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD II 1900	HSPA	9262	1852.4	22.28	22.17	21.86	22.47	22.06
FDD II 1900	HSPA	9400	1880.0	22.16	22.05	21.67	22.23	22.03
FDD II 1900	HSPA	9538	1907.6	21.95	21.82	21.49	22.05	21.63

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD IV 1700	HSPA	1312	1712.4	22.11	21.91	21.60	22.17	21.75
FDD IV 1700	HSPA	1412	1732.6	22.27	21.98	21.63	22.36	21.89
FDD IV 1700	HSPA	1512	1752.6	22.35	22.13	21.89	22.49	21.86

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD V 850	HSPA	4132	826.4	22.60	22.53	22.04	21.41	22.09
FDD V 850	HSPA	4182	836.4	22.58	22.55	21.99	21.62	22.05
FDD V 850	HSPA	4233	846.6	22.50	22.51	21.92	21.50	22.08

- HSPA+

Mode	Subtest	1
HSPA+	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2Kbps RMC
	HSDPA FRC	H-Set1
	HSUPA Test	HSUPA Loopback
	Power Control Algorithm	Algorithm 2
	βc	1
	βd	0
	βec	30/15
	βhs	30/15
	βed (2xSF2)	βed1: 30/15
		βed2: 30/15
	βed (2xSF4)	βed3: 24/15
		βed4: 24/15
	CM (dB)	3.5
	MPR (dB)	2.5
	D E-DPCCH	7
	AG Index	14
	ETFCI	105

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD II 1900	HSPA+	9262	1852.4	23.20
FDD II 1900	HSPA+	9400	1880.0	23.35
FDD II 1900	HSPA+	9538	1907.6	23.01

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD IV 1700	HSPA+	1312	1712.4	23.17
FDD IV 1700	HSPA+	1412	1732.6	23.49
FDD IV 1700	HSPA+	1512	1752.6	23.38

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD V 850	HSPA+	4132	826.4	22.17
FDD V 850	HSPA+	4182	836.4	22.13
FDD V 850	HSPA+	4233	846.6	22.05

2.1.3. LTE Bands

LTE MPR is permanently implemented for the device. A-MPR was disabled for all SAR tests. The following power reductions are used for higher RB allocations and 16-QAM modulation:

Modulation	Channel bandwidth / Transmission bandwidth configuration [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

- <u>LTE B2</u>

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1860.0 MHz	**1880.0 MHz**	**1900.0 MHz**
LTE B2	20 MHz	QPSK	1RB Low	0	23.05	22.93	22.82
			1RB Mid	0	22.99	22.99	22.77
			1RB High	0	23.02	23.03	22.83
			50% Low	1	22.05	21.88	21.78
			50% Mid	1	22.14	22.00	21.97
			50% High	1	22.13	22.06	21.94
			100%	1	22.07	21.94	21.92
		16-QAM	1RB Low	1	22.47	22.28	22.55
			1RB Mid	1	22.16	22.43	22.63
			1RB High	1	22.13	22.44	22.52
			50% Low	2	21.06	20.89	20.79
			50% Mid	2	21.20	21.01	20.95
			50% High	2	21.15	21.06	20.92
			100%	2	21.12	20.97	20.93
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1857.5 MHz	**1880.0 MHz**	**1902.5 MHz**
LTE B2	15 MHz	QPSK	1RB Low	0	23.11	22.94	22.87
			1RB Mid	0	23.07	22.95	22.84
			1RB High	0	23.03	22.99	22.84
			50% Low	1	22.09	21.92	21.83
			50% Mid	1	22.20	22.00	21.89
			50% High	1	22.16	22.07	22.01
			100%	1	22.12	21.89	21.85
		16-QAM	1RB Low	1	22.47	22.23	22.38
			1RB Mid	1	22.25	22.30	21.94
			1RB High	1	22.21	22.25	21.94
			50% Low	2	21.13	20.93	20.85
			50% Mid	2	21.24	21.04	20.93
			50% High	2	21.22	21.13	21.02
			100%	2	21.14	21.01	20.85

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1855.0 MHz	**1880.0MHz**	**1905.0 MHz**
LTE B2	10 MHz	QPSK	1RB Low	0	22.84	22.63	22.90
			1RB Mid	0	23.15	23.00	22.97
			1RB High	0	22.92	22.78	22.92
			50% Low	1	22.14	21.95	21.80
			50% Mid	1	22.26	22.04	22.01
			50% High	1	22.15	22.03	21.88
			100%	1	22.18	21.96	21.92
		16-QAM	1RB Low	1	22.39	21.83	21.99
			1RB Mid	1	22.25	22.42	22.06
			1RB High	1	21.99	22.11	22.19
			50% Low	2	21.21	21.03	20.88
			50% Mid	2	21.33	21.09	21.09
			50% High	2	21.24	21.11	20.97
			100%	2	21.17	20.97	20.93
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1852.5 MHz	**1880.0 MHz**	**1907.5 MHz**
LTE B2	5 MHz	QPSK	1RB Low	0	23.09	22.98	22.81
			1RB Mid	0	22.91	23.01	22.91
			1RB High	0	23.02	22.98	22.82
			50% Low	1	22.25	22.05	21.94
			50% Mid	1	22.27	22.11	22.00
			50% High	1	22.19	22.04	21.98
			100%	1	22.21	21.98	21.91
		16-QAM	1RB Low	1	22.13	22.29	22.00
			1RB Mid	1	22.30	22.07	22.33
			1RB High	1	22.25	22.02	22.25
			50% Low	2	21.27	21.08	20.89
			50% Mid	2	21.37	21.27	20.95
			50% High	2	21.24	21.19	20.86
			100%	2	21.28	21.05	20.94

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1851.5 MHz	**1880.0 MHz**	**1908.5 MHz**
LTE B2	3 MHz	QPSK	1RB Low	0	23.18	23.01	22.94
			1RB Mid	0	23.11	23.00	22.92
			1RB High	0	23.06	22.98	22.85
			50% Low	1	22.26	22.05	22.00
			50% Mid	1	22.28	22.12	21.99
			50% High	1	22.18	22.07	21.94
			100%	1	22.22	22.03	21.96
		16-QAM	1RB Low	1	22.93	22.22	22.07
			1RB Mid	1	22.41	22.30	22.13
			1RB High	1	22.32	22.26	22.20
			50% Low	2	21.44	21.06	21.07
			50% Mid	2	21.43	21.27	21.10
			50% High	2	21.41	21.20	21.05
			100%	2	21.33	21.00	21.01
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1850.7 MHz	**1880.0 MHz**	**1909.3 MHz**
LTE B2	1.4 MHz	QPSK	1RB Low	0	23.08	22.93	22.83
			1RB Mid	0	23.15	23.01	22.83
			1RB High	0	23.02	22.91	22.78
			50% Low	1	23.13	22.90	22.82
			50% Mid	1	23.15	23.01	22.85
			50% High	1	23.12	23.02	22.84
			100%	1	22.17	21.99	21.86
		16-QAM	1RB Low	1	22.36	22.05	21.96
			1RB Mid	1	22.41	22.26	21.89
			1RB High	1	22.36	22.23	21.82
			50% Low	2	22.15	22.09	22.06
			50% Mid	2	22.23	22.06	21.89
			50% High	2	22.20	22.06	21.90
			100%	2	21.18	20.95	20.94

- **LTE B4**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1720.0 MHz	**1732.5 MHz**	**1745.0 MHz**
LTE B4	20 MHz	QPSK	1RB Low	0	22.65	22.70	23.03
			1RB Mid	0	22.90	23.00	22.87
			1RB High	0	22.72	22.76	22.71
			50% Low	1	21.83	21.88	21.91
			50% Mid	1	22.04	22.04	22.13
			50% High	1	21.99	21.98	22.04
			100%	1	21.98	21.97	22.05
		16-QAM	1RB Low	1	22.06	22.04	22.33
			1RB Mid	1	22.01	22.46	22.65
			1RB High	1	21.83	22.10	22.45
			50% Low	2	20.87	20.90	20.94
			50% Mid	2	21.07	21.06	21.06
			50% High	2	21.02	21.00	20.99
			100%	2	20.98	21.00	21.04
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1717.5 MHz	**1732.5 MHz**	**1747.5 MHz**
LTE B4	15 MHz	QPSK	1RB Low	0	22.65	22.78	22.83
			1RB Mid	0	22.86	22.89	23.04
			1RB High	0	22.79	22.91	22.89
			50% Low	1	21.88	21.91	21.98
			50% Mid	1	22.01	22.06	22.19
			50% High	1	21.98	22.05	22.12
			100%	1	21.92	22.02	22.04
		16-QAM	1RB Low	1	22.36	21.99	22.26
			1RB Mid	1	22.16	22.24	22.00
			1RB High	1	22.06	22.21	21.98
			50% Low	2	20.87	20.93	20.96
			50% Mid	2	21.10	21.09	21.18
			50% High	2	21.00	21.06	21.12
			100%	2	20.96	21.04	21.06

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1715.0 MHz	**1732.5MHz**	**1750.0 MHz**
LTE B4	10 MHz	QPSK	1RB Low	0	22.61	22.63	22.72
			1RB Mid	0	22.92	22.96	23.07
			1RB High	0	22.71	22.68	22.79
			50% Low	1	21.87	21.97	21.94
			50% Mid	1	22.02	22.08	22.03
			50% High	1	21.93	22.01	22.01
			100%	1	21.96	21.99	21.94
		16-QAM	1RB Low	1	22.23	21.87	21.73
			1RB Mid	1	22.08	22.36	22.18
			1RB High	1	21.85	22.08	22.04
			50% Low	2	20.94	20.98	21.03
			50% Mid	2	21.09	21.11	21.17
			50% High	2	21.01	21.04	21.06
			100%	2	21.00	21.06	21.02
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1712.5 MHz	**1732.5MHz**	**1752.5 MHz**
LTE B4	5 MHz	QPSK	1RB Low	0	22.82	22.93	22.99
			1RB Mid	0	22.70	22.98	23.04
			1RB High	0	22.80	22.95	23.01
			50% Low	1	22.03	22.04	22.01
			50% Mid	1	22.10	22.10	22.04
			50% High	1	22.01	22.06	22.07
			100%	1	21.99	22.10	22.04
		16-QAM	1RB Low	1	21.85	22.23	22.14
			1RB Mid	1	22.12	22.10	22.43
			1RB High	1	22.06	22.00	22.45
			50% Low	2	21.05	21.05	21.02
			50% Mid	2	21.15	21.23	21.03
			50% High	2	21.10	21.18	21.05
			100%	2	21.09	21.10	21.06

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1711.5 MHz	**1732.5MHz**	**1753.5 MHz**
LTE B4	3 MHz	QPSK	1RB Low	0	22.91	23.00	22.98
			1RB Mid	0	22.91	22.96	23.03
			1RB High	0	22.91	22.95	23.01
			50% Low	1	22.01	22.01	22.10
			50% Mid	1	22.09	22.12	22.08
			50% High	1	22.01	22.09	22.06
			100%	1	22.06	22.10	22.10
		16-QAM	1RB Low	1	22.51	22.16	22.13
			1RB Mid	1	22.16	22.27	22.24
			1RB High	1	22.13	22.25	22.30
			50% Low	2	21.22	21.02	21.17
			50% Mid	2	21.23	21.24	21.16
			50% High	2	21.20	21.19	21.18
			100%	2	21.14	21.02	21.12
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1710.7 MHz	**1732.5MHz**	**1754.3 MHz**
LTE B4	1.4 MHz	QPSK	1RB Low	0	22.81	22.91	22.95
			1RB Mid	0	22.92	22.91	23.04
			1RB High	0	22.84	22.84	22.92
			50% Low	1	22.82	22.89	22.95
			50% Mid	1	22.90	22.94	22.98
			50% High	1	22.94	22.94	22.99
			100%	1	21.92	21.94	22.04
		16-QAM	1RB Low	1	21.91	22.00	22.21
			1RB Mid	1	22.19	21.97	22.26
			1RB High	1	22.19	21.87	22.24
			50% Low	2	22.01	22.12	22.02
			50% Mid	2	21.95	21.98	22.08
			50% High	2	21.91	22.00	22.05
			100%	2	20.92	21.04	21.10

- **LTE B5**

Band	BW	Modulation	Mode	MPR	Average Output Power (dBm)		
					Low CH	Mid CH	High CH
					829.0 MHz	836.5 MHz	844.0 MHz
LTE B5	10 MHz	QPSK	1RB Low	0	23.66	23.57	23.61
			1RB Mid	0	23.55	23.51	23.56
			1RB High	0	23.59	23.56	23.52
			50% Low	1	22.59	22.58	22.51
			50% Mid	1	22.64	22.59	22.54
			50% High	1	22.69	22.60	22.62
			100%	1	22.71	22.62	22.60
		16-QAM	1RB Low	1	23.29	22.83	22.70
			1RB Mid	1	22.82	22.86	22.74
			1RB High	1	22.72	22.82	22.76
			50% Low	2	21.72	21.64	21.68
			50% Mid	2	21.76	21.66	21.68
			50% High	2	21.68	21.69	21.64
			100%	2	21.78	21.65	21.64
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					826.5 MHz	**836.5 MHz**	**846.5 MHz**
LTE B5	5 MHz	QPSK	1RB Low	0	23.53	23.54	23.47
			1RB Mid	0	23.55	23.61	23.57
			1RB High	0	23.56	23.58	23.52
			50% Low	1	22.59	22.53	22.55
			50% Mid	1	22.69	22.60	22.59
			50% High	1	22.71	22.66	22.62
			100%	1	22.76	22.70	22.65
		16-QAM	1RB Low	1	22.54	22.86	22.61
			1RB Mid	1	22.82	22.70	22.99
			1RB High	1	22.79	22.66	22.97
			50% Low	2	21.63	21.64	21.53
			50% Mid	2	21.78	21.71	21.53
			50% High	2	21.72	21.76	21.49
			100%	2	21.88	21.71	21.68

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					825.5 MHz	**836.5 MHz**	**847.4 MHz**
LTE B5	3 MHz	QPSK	1RB Low	0	23.60	23.55	23.47
			1RB Mid	0	23.60	23.57	23.58
			1RB High	0	23.58	23.61	23.50
			50% Low	1	22.59	22.62	22.53
			50% Mid	1	22.72	22.60	22.63
			50% High	1	22.67	22.65	22.57
			100%	1	22.80	22.73	22.68
		16-QAM	1RB Low	1	23.18	22.73	22.58
			1RB Mid	1	22.86	22.85	22.80
			1RB High	1	22.86	22.89	22.85
			50% Low	2	21.78	21.57	21.62
			50% Mid	2	21.87	21.78	21.71
			50% High	2	21.85	21.81	21.69
			100%	2	21.86	21.68	21.74
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					824.7 MHz	**836.5 MHz**	**848.2 MHz**
LTE B5	1.4 MHz	QPSK	1RB Low	0	23.51	23.42	23.45
			1RB Mid	0	23.64	23.57	23.51
			1RB High	0	23.54	23.51	23.42
			50% Low	1	23.50	23.39	23.43
			50% Mid	1	23.52	23.42	23.46
			50% High	1	23.56	23.44	23.48
			100%	1	22.71	22.63	22.59
		16-QAM	1RB Low	1	22.60	22.56	22.63
			1RB Mid	1	22.59	22.49	22.80
			1RB High	1	22.58	22.49	22.71
			50% Low	2	22.75	22.66	22.46
			50% Mid	2	22.63	22.50	22.51
			50% High	2	22.61	22.48	22.51
			100%	2	21.71	21.69	21.68

- **LTE B7**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2510.0 MHz	**2535.0 MHz**	**2560.0 MHz**
LTE B7	20 MHz	QPSK	1RB Low	0	23.19	23.19	23.21
			1RB Mid	0	23.20	23.22	23.22
			1RB High	0	23.24	23.23	23.18
			50% Low	1	22.12	22.19	22.22
			50% Mid	1	22.33	22.21	22.24
			50% High	1	22.25	22.25	22.35
			100%	1	22.22	22.18	22.24
		16-QAM	1RB Low	1	22.55	22.59	22.88
			1RB Mid	1	22.37	22.65	22.87
			1RB High	1	22.36	22.68	22.87
			50% Low	2	21.11	21.23	21.22
			50% Mid	2	21.34	21.28	21.32
			50% High	2	21.33	21.25	21.18
			100%	2	21.25	21.20	21.25
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2507.5 MHz	**2535.0 MHz**	**2562.5 MHz**
LTE B7	15 MHz	QPSK	1RB Low	0	23.11	23.18	23.23
			1RB Mid	0	23.22	23.14	23.21
			1RB High	0	23.24	23.17	23.23
			50% Low	1	22.14	22.21	22.25
			50% Mid	1	22.32	22.21	22.31
			50% High	1	22.30	22.22	22.33
			100%	1	22.26	22.15	22.20
		16-QAM	1RB Low	1	22.78	22.40	22.69
			1RB Mid	1	22.47	22.48	22.33
			1RB High	1	22.51	22.51	22.27
			50% Low	2	21.16	21.23	21.26
			50% Mid	2	21.38	21.28	21.35
			50% High	2	21.36	21.26	21.35
			100%	2	21.29	21.22	21.26

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2505.0 MHz	**2535.0 MHz**	**2565.0 MHz**
LTE B7	10 MHz	QPSK	1RB Low	0	23.11	23.18	23.23
			1RB Mid	0	23.22	23.14	23.21
			1RB High	0	23.24	23.17	23.23
			50% Low	1	22.14	22.21	22.25
			50% Mid	1	22.32	22.21	22.31
			50% High	1	22.30	22.22	22.33
			100%	1	22.26	22.15	22.20
		16-QAM	1RB Low	1	22.78	22.40	22.69
			1RB Mid	1	22.47	22.48	22.33
			1RB High	1	22.51	22.51	22.27
			50% Low	2	21.16	21.23	21.26
			50% Mid	2	21.38	21.28	21.35
			50% High	2	21.36	21.26	21.35
			100%	2	21.29	21.22	21.26
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2502.5 MHz	**2535.0 MHz**	**2567.5 MHz**
LTE B7	5 MHz	QPSK	1RB Low	0	23.08	23.17	23.27
			1RB Mid	0	23.02	23.08	23.29
			1RB High	0	23.20	23.20	23.29
			50% Low	1	22.18	22.19	22.33
			50% Mid	1	22.32	22.25	22.39
			50% High	1	22.27	22.27	22.31
			100%	1	22.24	22.18	22.32
		16-QAM	1RB Low	1	22.11	22.16	22.61
			1RB Mid	1	22.31	22.37	22.34
			1RB High	1	22.38	22.39	22.36
			50% Low	2	21.24	21.25	21.41
			50% Mid	2	21.23	21.33	21.52
			50% High	2	21.19	21.33	21.44
			100%	2	21.27	21.24	21.35

- **LTE B12**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**707.5 MHz**	**-**
LTE B12	10 MHz	QPSK	1RB Low	0	-	22.44	-
			1RB Mid	0	-	22.38	-
			1RB High	0	-	22.53	-
			50% Low	1	-	21.44	-
			50% Mid	1	-	21.58	-
			50% High	1	-	21.51	-
			100%	1	-	21.52	-
		16-QAM	1RB Low	1	-	22.03	-
			1RB Mid	1	-	21.64	-
			1RB High	1	-	21.66	-
			50% Low	2	-	20.49	-
			50% Mid	2	-	20.65	-
			50% High	2	-	20.53	-
			100%	2	-	20.53	-
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					701.5 MHz	**707.5 MHz**	**713.5 MHz**
LTE B12	5 MHz	QPSK	1RB Low	0	22.37	22.50	22.49
			1RB Mid	0	22.50	22.52	22.51
			1RB High	0	22.37	22.55	22.53
			50% Low	1	21.47	21.50	21.55
			50% Mid	1	21.57	21.59	21.52
			50% High	1	21.51	21.55	21.61
			100%	1	21.50	21.53	21.50
		16-QAM	1RB Low	1	21.36	21.77	21.62
			1RB Mid	1	21.62	21.56	21.93
			1RB High	1	21.60	21.61	22.02
			50% Low	2	20.51	20.58	20.51
			50% Mid	2	20.61	20.72	20.49
			50% High	2	20.58	20.71	20.48
			100%	2	20.63	20.57	20.53

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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.

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					700.5 MHz	**707.5 MHz**	**714.5 MHz**
LTE B12	3 MHz	QPSK	1RB Low	0	22.36	22.50	22.48
			1RB Mid	0	22.32	22.48	22.55
			1RB High	0	22.42	22.52	22.54
			50% Low	1	21.46	21.49	21.55
			50% Mid	1	21.57	21.61	21.62
			50% High	1	21.56	21.56	21.57
			100%	1	21.57	21.56	21.56
		16-QAM	1RB Low	1	22.02	21.68	21.62
			1RB Mid	1	21.63	21.77	21.75
			1RB High	1	21.71	21.82	21.91
			50% Low	2	20.67	20.51	20.63
			50% Mid	2	20.74	20.72	20.71
			50% High	2	20.72	20.74	20.70
			100%	2	20.59	20.54	20.56
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					699.7 MHz	**707.5 MHz**	**715.3 MHz**
LTE B12	1.4 MHz	QPSK	1RB Low	0	22.25	22.34	22.38
			1RB Mid	0	22.35	22.36	22.50
			1RB High	0	22.31	22.37	22.43
			50% Low	1	22.24	22.34	22.42
			50% Mid	1	22.33	22.47	22.45
			50% High	1	22.35	22.48	22.50
			100%	1	21.38	21.47	21.50
		16-QAM	1RB Low	1	21.34	21.45	21.58
			1RB Mid	1	21.64	21.41	21.76
			1RB High	1	21.62	21.42	21.72
			50% Low	2	21.43	21.60	21.48
			50% Mid	2	21.36	21.51	21.46
			50% High	2	21.38	21.47	21.54
			100%	2	20.31	20.53	20.54

- **LTE B13**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**782.0 MHz**	**-**
LTE B13	10 MHz	QPSK	1RB Low	0	-	23.20	-
			1RB Mid	0	-	23.27	-
			1RB High	0	-	23.29	-
			50% Low	1	-	22.37	-
			50% Mid	1	-	22.38	-
			50% High	1	-	22.39	-
			100%	1	-	22.33	-
		16-QAM	1RB Low	1	-	22.66	-
			1RB Mid	1	-	22.68	-
			1RB High	1	-	22.70	-
			50% Low	2	-	21.53	-
			50% Mid	2	-	21.50	-
			50% High	2	-	21.54	-
			100%	2	-	21.40	-
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					779.5 MHz	**782.0 MHz**	**784.5 MHz**
LTE B13	5 MHz	QPSK	1RB Low	0	-	23.03	-
			1RB Mid	0	-	23.17	-
			1RB High	0	-	23.12	-
			50% Low	1	-	22.16	-
			50% Mid	1	-	22.22	-
			50% High	1	-	22.25	-
			100%	1	-	22.19	-
		16-QAM	1RB Low	1	-	22.45	-
			1RB Mid	1	-	22.51	-
			1RB High	1	-	22.52	-
			50% Low	2	-	21.27	-
			50% Mid	2	-	21.33	-
			50% High	2	-	21.35	-
			100%	2	-	21.26	-

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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 B14**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**793.0 MHz**	**-**
LTE B14	10 MHz	QPSK	1RB Low	0	-	23.08	-
			1RB Mid	0	-	23.13	-
			1RB High	0	-	23.08	-
			50% Low	1	-	22.09	-
			50% Mid	1	-	22.15	-
			50% High	1	-	22.12	-
			100%	1	-	22.08	-
		16-QAM	1RB Low	1	-	22.42	-
			1RB Mid	1	-	22.41	-
			1RB High	1	-	22.36	-
			50% Low	2	-	21.12	-
			50% Mid	2	-	21.20	-
			50% High	2	-	21.18	-
			100%	2	-	21.05	-
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**793.0 MHz**	**-**
LTE B14	5 MHz	QPSK	1RB Low	0	-	22.96	-
			1RB Mid	0	-	23.12	-
			1RB High	0	-	23.04	-
			50% Low	1	-	22.17	-
			50% Mid	1	-	22.15	-
			50% High	1	-	22.16	-
			100%	1	-	22.14	-
		16-QAM	1RB Low	1	-	22.28	-
			1RB Mid	1	-	22.44	-
			1RB High	1	-	22.37	-
			50% Low	2	-	21.24	-
			50% Mid	2	-	21.22	-
			50% High	2	-	21.20	-
			100%	2	-	21.15	-

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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 B17**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**710.0 MHz**	**-**
LTE B17	10 MHz	QPSK	1RB Low	0	-	22.67	-
			1RB Mid	0	-	22.70	-
			1RB High	0	-	22.75	-
			50% Low	1	-	21.72	-
			50% Mid	1	-	21.73	-
			50% High	1	-	21.75	-
			100%	1	-	21.67	-
		16-QAM	1RB Low	1	-	21.71	-
			1RB Mid	1	-	21.82	-
			1RB High	1	-	22.01	-
			50% Low	2	-	20.78	-
			50% Mid	2	-	20.80	-
			50% High	2	-	20.86	-
			100%	2	-	20.72	-
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**710.0 MHz**	**-**
LTE B17	5 MHz	QPSK	1RB Low	0	-	22.65	-
			1RB Mid	0	-	22.70	-
			1RB High	0	-	22.70	-
			50% Low	1	-	21.69	-
			50% Mid	1	-	21.75	-
			50% High	1	-	21.78	-
			100%	1	-	21.72	-
		16-QAM	1RB Low	1	-	21.86	-
			1RB Mid	1	-	21.86	-
			1RB High	1	-	21.97	-
			50% Low	2	-	20.73	-
			50% Mid	2	-	20.82	-
			50% High	2	-	20.87	-
			100%	2	-	20.75	-

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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 B25**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1860.0 MHz	**1882.5 MHz**	**1905.0 MHz**
LTE B25	20 MHz	QPSK	1RB Low	0	23.35	23.15	23.11
			1RB Mid	0	23.25	23.09	23.05
			1RB High	0	23.24	23.06	22.98
			50% Low	1	22.35	22.20	22.07
			50% Mid	1	22.33	22.26	22.05
			50% High	1	22.26	22.22	22.08
			100%	1	22.23	22.17	21.97
		16-QAM	1RB Low	1	22.64	22.59	22.43
			1RB Mid	1	22.53	22.52	22.37
			1RB High	1	22.43	22.51	22.29
			50% Low	2	22.39	21.25	21.11
			50% Mid	2	21.36	21.31	21.09
			50% High	2	21.31	21.29	21.11
			100%	2	21.27	21.19	21.01
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1857.5 MHz	**1882.5 MHz**	**1907.5 MHz**
LTE B25	15 MHz	QPSK	1RB Low	0	22.90	23.06	22.90
			1RB Mid	0	23.11	23.05	22.99
			1RB High	0	23.05	23.09	22.92
			50% Low	1	22.09	22.00	21.90
			50% Mid	1	22.18	22.15	22.01
			50% High	1	22.15	22.13	22.05
			100%	1	22.08	22.07	21.93
		16-QAM	1RB Low	1	22.47	22.24	22.49
			1RB Mid	1	22.31	22.34	22.02
			1RB High	1	22.22	22.37	22.00
			50% Low	2	21.13	21.02	20.88
			50% Mid	2	21.22	21.20	21.02
			50% High	2	21.20	21.18	21.09
			100%	2	21.13	21.15	20.86

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1855.0 MHz	**1882.5 MHz**	**1910.0 MHz**
LTE B25	10 MHz	QPSK	1RB Low	0	22.92	22.73	22.89
			1RB Mid	0	23.06	22.98	22.88
			1RB High	0	22.88	22.76	22.96
			50% Low	1	22.07	21.94	21.79
			50% Mid	1	22.13	22.13	22.03
			50% High	1	22.12	22.07	21.94
			100%	1	22.08	22.05	21.94
		16-QAM	1RB Low	1	22.36	21.88	21.95
			1RB Mid	1	22.07	22.29	22.07
			1RB High	1	21.94	22.11	22.13
			50% Low	2	21.10	20.98	20.96
			50% Mid	2	21.21	21.18	21.09
			50% High	2	21.20	21.16	21.06
			100%	2	21.10	21.09	20.96
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1852.5 MHz	**1882.2 MHz**	**1912.5 MHz**
LTE B25	5 MHz	QPSK	1RB Low	0	23.02	22.99	22.96
			1RB Mid	0	23.02	23.02	23.02
			1RB High	0	23.03	23.10	23.00
			50% Low	1	22.08	21.98	21.93
			50% Mid	1	22.14	22.10	21.97
			50% High	1	22.16	22.12	22.02
			100%	1	22.14	22.11	21.95
		16-QAM	1RB Low	1	22.01	22.25	22.04
			1RB Mid	1	22.23	22.09	22.39
			1RB High	1	22.27	22.18	22.47
			50% Low	2	21.13	21.05	20.90
			50% Mid	2	21.20	21.22	20.89
			50% High	2	21.20	21.23	20.92
			100%	2	21.18	21.10	20.97

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1851.5 MHz	**1882.5 MHz**	**1913.5 MHz**
LTE B25	3 MHz	QPSK	1RB Low	0	23.01	23.03	22.90
			1RB Mid	0	23.00	22.98	22.92
			1RB High	0	23.08	23.08	22.93
			50% Low	1	22.10	22.05	21.97
			50% Mid	1	22.15	22.09	21.99
			50% High	1	22.13	22.10	21.98
			100%	1	22.13	22.10	22.02
		16-QAM	1RB Low	1	22.69	22.18	22.00
			1RB Mid	1	22.24	22.23	22.07
			1RB High	1	22.35	22.31	22.20
			50% Low	2	21.27	21.04	21.04
			50% Mid	2	21.29	21.27	21.13
			50% High	2	21.34	21.27	21.10
			100%	2	21.19	21.07	21.07
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1850.7 MHz	**1882.5 MHz**	**1914.3 MHz**
LTE B25	1.4 MHz	QPSK	1RB Low	0	22.91	22.88	22.74
			1RB Mid	0	23.02	22.90	22.87
			1RB High	0	22.95	22.89	22.84
			50% Low	1	22.98	22.89	22.80
			50% Mid	1	23.03	22.93	22.88
			50% High	1	23.03	22.97	22.86
			100%	1	22.04	21.94	21.85
		16-QAM	1RB Low	1	22.03	21.94	21.95
			1RB Mid	1	22.30	21.97	22.15
			1RB High	1	22.26	21.91	22.10
			50% Low	2	22.11	22.18	21.82
			50% Mid	2	22.07	21.98	21.92
			50% High	2	22.08	21.98	21.91
			100%	2	21.01	21.01	20.89

- **LTE B26**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					-	**831.5 MHz**	**-**
LTE B26	15 MHz	QPSK	1RB Low	0	-	22.94	-
			1RB Mid	0	-	22.97	-
			1RB High	0	-	22.96	-
			50% Low	1	-	21.94	-
			50% Mid	1	-	22.00	-
			50% High	1	-	22.01	-
			100%	1	-	21.91	-
		16-QAM	1RB Low	1	-	22.61	-
			1RB Mid	1	-	22.21	-
			1RB High	1	-	22.18	-
			50% Low	2	-	20.97	-
			50% Mid	2	-	21.09	-
			50% High	2	-	21.06	-
			100%	2	-	20.96	-
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					819.0 MHz	**831.5 MHz**	**844.0 MHz**
LTE B26	10 MHz	QPSK	1RB Low	0	23.01	22.95	23.00
			1RB Mid	0	23.03	22.98	22.94
			1RB High	0	23.09	22.97	22.87
			50% Low	1	22.00	21.96	21.79
			50% Mid	1	22.18	22.07	21.92
			50% High	1	22.16	22.06	21.94
			100%	1	22.09	21.97	21.87
		16-QAM	1RB Low	1	22.63	22.19	22.04
			1RB Mid	1	22.28	22.40	22.11
			1RB High	1	22.24	22.30	22.16
			50% Low	2	21.06	21.02	20.96
			50% Mid	2	21.26	21.08	21.07
			50% High	2	21.18	21.11	21.02
			100%	2	21.13	21.02	20.92

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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.

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					816.5 MHz	**831.5 MHz**	**846.5 MHz**
LTE B26	5 MHz	QPSK	1RB Low	0	22.94	23.01	22.91
			1RB Mid	0	22.90	23.09	22.97
			1RB High	0	23.03	23.13	22.85
			50% Low	1	22.07	22.04	21.93
			50% Mid	1	22.24	22.11	22.02
			50% High	1	22.21	22.12	21.99
			100%	1	22.15	22.03	21.91
		16-QAM	1RB Low	1	21.93	22.35	22.07
			1RB Mid	1	22.26	22.13	22.35
			1RB High	1	22.25	22.21	22.36
			50% Low	2	21.10	21.07	20.93
			50% Mid	2	21.24	21.21	20.91
			50% High	2	21.24	21.28	20.88
			100%	2	21.24	21.06	20.94
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					815.5 MHz	**831.5 MHz**	**847.5 MHz**
LTE B26	3 MHz	QPSK	1RB Low	0	23.00	23.03	22.92
			1RB Mid	0	23.01	23.04	22.87
			1RB High	0	23.06	23.06	22.85
			50% Low	1	22.13	22.03	21.93
			50% Mid	1	22.21	22.18	21.95
			50% High	1	22.19	22.12	21.92
			100%	1	22.20	22.09	21.92
		16-QAM	1RB Low	1	22.64	22.22	22.00
			1RB Mid	1	22.29	22.32	22.12
			1RB High	1	22.33	22.35	22.17
			50% Low	2	21.31	21.07	21.03
			50% Mid	2	21.39	21.33	21.09
			50% High	2	21.34	21.28	21.04
			100%	2	21.28	21.08	21.00
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					814.5 MHz	**831.5 MHz**	**848.3 MHz**
LTE B26	1.4 MHz	QPSK	1RB Low	0	22.93	22.87	22.80
			1RB Mid	0	23.01	23.06	22.79
			1RB High	0	22.98	22.95	22.77
			50% Low	1	22.92	22.93	22.81
			50% Mid	1	23.05	22.99	22.83
			50% High	1	23.06	23.05	22.82
			100%	1	22.10	22.01	21.83
		16-QAM	1RB Low	1	22.03	21.99	21.98
			1RB Mid	1	22.28	22.01	22.10
			1RB High	1	22.31	21.99	22.02
			50% Low	2	22.07	22.16	21.86
			50% Mid	2	22.09	22.02	21.87
			50% High	2	22.08	22.06	21.86
			100%	2	21.08	21.03	20.91

- **LTE B41**

Band	BW	Modulation	Mode	MPR	Average Output Power (dBm)		
					Low CH	Mid CH	High CH
					2506.0 MHz	2593.0MHz	2680.0 MHz
LTE B41	20 MHz	QPSK	1RB Low	0	22.15	21.77	21.82
			1RB Mid	0	22.11	22.12	21.73
			1RB High	0	22.14	21.84	21.92
			50% Low	1	20.96	20.91	20.95
			50% Mid	1	21.14	21.03	21.01
			50% High	1	21.13	21.07	21.03
			100%	1	21.10	20.94	20.96
		16-QAM	1RB Low	1	21.19	20.50	20.54
			1RB Mid	1	21.08	20.81	20.81
			1RB High	1	21.15	20.55	20.87
			50% Low	2	19.99	19.91	19.98
			50% Mid	2	20.22	20.05	20.06
			50% High	2	20.14	20.08	20.05
			100%	2	20.10	19.95	19.97
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2503.5.0 MHz	**2593.0MHz**	**2682.5 MHz**
LTE B41	15 MHz	QPSK	1RB Low	0	22.09	21.88	22.01
			1RB Mid	0	22.07	22.07	22.02
			1RB High	0	22.11	21.98	22.11
			50% Low	1	21.00	20.96	20.95
			50% Mid	1	21.17	21.07	20.94
			50% High	1	21.16	21.14	21.02
			100%	1	21.13	21.01	20.92
		16-QAM	1RB Low	1	21.33	20.94	20.87
			1RB Mid	1	20.86	20.95	21.27
			1RB High	1	21.12	20.78	21.36
			50% Low	2	20.02	19.96	19.97
			50% Mid	2	20.20	20.07	19.93
			50% High	2	20.17	20.13	19.98
			100%	2	20.13	19.94	19.96

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2501.0 MHz	**2593.0MHz**	**2685.0 MHz**
LTE B41	10 MHz	QPSK	1RB Low	0	22.14	21.81	21.97
			1RB Mid	0	22.13	22.11	21.99
			1RB High	0	22.16	21.83	22.06
			50% Low	1	21.18	20.99	20.93
			50% Mid	1	21.19	21.03	20.93
			50% High	1	21.19	21.04	21.05
			100%	1	21.10	20.96	20.96
		16-QAM	1RB Low	1	21.35	20.88	20.67
			1RB Mid	1	20.82	20.98	21.00
			1RB High	1	20.89	20.73	20.95
			50% Low	2	20.24	19.99	19.96
			50% Mid	2	20.22	20.02	19.94
			50% High	2	20.22	20.04	19.97
			100%	2	20.12	19.97	19.97
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					2498.5.0 MHz	**2593.0MHz**	**2687.5 MHz**
LTE B41	5 MHz	QPSK	1RB Low	0	22.18	22.01	21.93
			1RB Mid	0	22.10	22.08	21.59
			1RB High	0	22.15	22.04	21.96
			50% Low	1	21.15	21.03	21.03
			50% Mid	1	21.16	21.08	21.01
			50% High	1	21.12	21.06	21.01
			100%	1	21.14	21.04	21.03
		16-QAM	1RB Low	1	21.20	21.29	21.34
			1RB Mid	1	21.05	21.07	21.12
			1RB High	1	21.16	20.99	21.12
			50% Low	2	20.13	20.07	20.00
			50% Mid	2	20.16	20.22	20.11
			50% High	2	20.20	20.19	20.07
			100%	2	20.13	20.03	20.04

- **LTE B66**

Band	BW	Modulation	Mode	MPR	Average Output Power (dBm)		
					Low CH	Mid CH	High CH
					1720.0 MHz	1745.0 MHz	1770.0 MHz
LTE B66	20 MHz	QPSK	1RB Low	0	22.73	22.85	23.30
			1RB Mid	0	23.08	23.18	23.28
			1RB High	0	22.95	22.96	23.24
			50% Low	1	22.04	22.23	22.26
			50% Mid	1	22.18	22.24	22.39
			50% High	1	22.09	22.25	22.33
			100%	1	22.10	22.19	22.32
		16-QAM	1RB Low	1	22.04	22.25	22.65
			1RB Mid	1	22.33	22.61	22.59
			1RB High	1	22.23	22.43	22.56
			50% Low	2	21.06	21.28	21.27
			50% Mid	2	21.19	21.33	21.39
			50% High	2	21.13	21.31	21.33
			100%	2	21.17	21.25	21.33
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1717.5 MHz	**1745.0 MHz**	**1772.5 MHz**
LTE B66	15 MHz	QPSK	1RB Low	0	22.86	23.07	23.34
			1RB Mid	0	22.97	23.17	23.27
			1RB High	0	22.93	23.08	23.30
			50% Low	1	22.00	22.20	22.32
			50% Mid	1	22.09	22.21	22.30
			50% High	1	22.04	22.24	22.32
			100%	1	22.02	22.15	22.28
		16-QAM	1RB Low	1	22.01	22.29	22.61
			1RB Mid	1	22.13	22.46	22.59
			1RB High	1	22.01	22.42	22.56
			50% Low	2	20.98	21.22	21.31
			50% Mid	2	21.14	21.22	21.34
			50% High	2	21.06	21.24	21.34
			100%	2	21.06	21.16	21.28

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1715.0 MHz	**1745.0 MHz**	**1775.0 MHz**
LTE B66	10 MHz	QPSK	1RB Low	0	22.70	22.89	23.01
			1RB Mid	0	22.96	23.20	23.29
			1RB High	0	22.79	22.97	23.09
			50% Low	1	21.93	22.14	22.25
			50% Mid	1	22.06	22.19	22.31
			50% High	1	21.94	22.19	22.28
			100%	1	21.98	22.11	22.25
		16-QAM	1RB Low	1	21.92	22.02	22.17
			1RB Mid	1	22.13	22.30	22.41
			1RB High	1	20.98	22.12	22.24
			50% Low	2	20.95	21.14	21.26
			50% Mid	2	21.10	21.24	21.35
			50% High	2	21.00	22.20	21.30
			100%	2	20.99	21.13	21.24
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					1712.5 MHz	**1745.0 MHz**	**1777.5 MHz**
LTE B66	5 MHz	QPSK	1RB Low	0	22.88	23.10	23.24
			1RB Mid	0	23.01	23.24	23.28
			1RB High	0	22.90	23.12	23.21
			50% Low	1	22.00	22.19	22.34
			50% Mid	1	22.03	22.26	22.36
			50% High	1	21.98	22.20	22.33
			100%	1	22.00	22.15	22.33
		16-QAM	1RB Low	1	22.13	22.88	22.39
			1RB Mid	1	22.27	22.53	22.51
			1RB High	1	22.15	22.47	22.41
			50% Low	2	21.01	21.24	21.32
			50% Mid	2	21.12	21.31	21.39
			50% High	2	20.99	21.23	21.33
			100%	2	21.04	21.21	21.31

- **LTE B71**

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					673.0 MHz	**680.5 MHz**	**688.0 MHz**
LTE B71	20 MHz	QPSK	1RB Low	0	22.36	22.23	22.30
			1RB Mid	0	22.26	22.21	22.28
			1RB High	0	22.29	22.20	22.26
			50% Low	1	21.25	21.18	21.27
			50% Mid	1	21.37	21.32	21.33
			50% High	1	21.34	21.31	21.35
			100%	1	21.30	21.22	21.33
		16-QAM	1RB Low	1	21.55	21.44	21.61
			1RB Mid	1	21.40	21.44	21.57
			1RB High	1	21.43	21.41	21.55
			50% Low	2	20.28	20.20	20.25
			50% Mid	2	20.41	20.33	20.37
			50% High	2	20.35	20.35	20.33
			100%	2	20.33	20.23	20.35
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					670.5 MHz	**680.5 MHz**	**690.5 MHz**
LTE B71	15 MHz	QPSK	1RB Low	0	22.41	22.32	22.31
			1RB Mid	0	22.31	22.30	22.33
			1RB High	0	22.29	22.29	22.27
			50% Low	1	21.30	21.25	21.24
			50% Mid	1	21.36	21.32	21.30
			50% High	1	21.34	21.35	21.35
			100%	1	21.31	21.24	21.34
		16-QAM	1RB Low	1	21.52	21.58	21.43
			1RB Mid	1	21.48	21.55	21.44
			1RB High	1	21.40	21.53	21.38
			50% Low	2	20.29	20.27	20.26
			50% Mid	2	20.41	20.35	20.36
			50% High	2	20.33	20.35	20.37
			100%	2	20.35	20.31	20.36

					Average Output Power (dBm)		
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					668.0 MHz	**680.5 MHz**	**693.0 MHz**
LTE B71	10 MHz	QPSK	1RB Low	0	22.38	22.29	22.36
			1RB Mid	0	22.26	22.30	22.28
			1RB High	0	22.28	22.28	22.24
			50% Low	1	21.42	21.31	21.33
			50% Mid	1	21.36	21.29	21.38
			50% High	1	21.33	21.32	21.34
			100%	1	21.32	21.21	21.32
		16-QAM	1RB Low	1	21.50	21.42	21.55
			1RB Mid	1	21.37	21.42	21.52
			1RB High	1	21.42	21.41	21.47
			50% Low	2	20.44	20.31	20.35
			50% Mid	2	20.40	20.34	20.40
			50% High	2	20.35	20.35	20.36
			100%	2	20.33	20.22	20.28
Band	**BW**	**Modulation**	**Mode**	**MPR**	**Low CH**	**Mid CH**	**High CH**
					665.5 MHz	**680.5 MHz**	**695.5 MHz**
LTE B71	5 MHz	QPSK	1RB Low	0	22.40	22.15	22.17
			1RB Mid	0	22.39	22.33	22.34
			1RB High	0	22.35	22.30	22.25
			50% Low	1	21.41	21.25	21.29
			50% Mid	1	21.44	21.34	21.40
			50% High	1	21.41	21.40	21.35
			100%	1	21.41	21.28	21.30
		16-QAM	1RB Low	1	22.37	21.37	21.34
			1RB Mid	1	22.39	21.59	21.53
			1RB High	1	22.32	21.53	21.43
			50% Low	2	21.43	20.33	20.23
			50% Mid	2	20.47	20.39	20.45
			50% High	2	21.42	20.39	20.37
			100%	2	21.41	20.33	20.32

2.1.3.1. LTE CA Downlink

DL 5CA																					
Combination	UL Band	PCC (dBm)	PCC+SCCs (dBm)	Delta	Aggr. BW	PCC1				SCC1			SCC2			SCC3			SCC4		
						BW	CH	FREQ	RB	BW	CH	FREQ	BW	CH	FREQ	BW	CH	FREQ	BW	CH	FREQ
2-2-5-66-66	2	23.05																			
2-2-5-66-66	5	23.66	23.61	-0.05	90	20	18700	1860	1 Rb High	20	19100	1900	10	20450	829	20	132072	1720	20	132572	1770
2-2-5-66-66	66	23.3																			
2-2-5-66B	2	23.05																			
2-2-5-66B	5	23.66	23.59	-0.07	65	20	18700	1860	1 Rb High	20	19100	1900	10	20450	829	10	132572	1770	5	132644	1777.2
2-2-5-66B	66	23.3																			
2-2-5-66C	2	23.05																			
2-2-5-66C	5	23.66	23.62	-0.04	90	20	18700	1860	1 Rb High	20	19100	1900	10	20450	829	20	132374	1750.2	20	132572	1770
2-2-5-66C	66	23.3																			
2-5-5-66-66	2	23.05																			
2-5-5-66-66	5	23.66	23.55	-0.11	80	20	18700	1860	1 Rb Low	10	20450	829	10	20600	844	20	132072	1720	20	132572	1770
2-5-5-66-66	66	23.3																			
2-5B-66B	2	23.05																			
2-5B-66B	5	23.66	23.53	-0.13	55	20	18700	1860	1 Rb Low	10	20450	829	10	20549	838.9	10	132572	1770	5	132644	1777.2
2-5B-66B	66	23.3																			
2-5B-66C	2	23.05																			
2-5B-66C	5	23.66	23.68	0.02	80	20	18700	1860	1 Rb Low	10	20450	829	10	20549	838.9	20	132374	1750.2	20	132572	1770
2-5B-66C	66	23.3																			
2-2-4-4-5	2	23.05																			
2-2-4-4-5	4	23.03																			
2-2-4-4-5	5	23.66	23.58	-0.08	90	20	18700	1860	1 Rb High	20	19100	1900	20	20050	1720	20	20300	1745	10	20450	829
2-2-4-4-13	2	23.05																			
2-2-4-4-13	4	23.03																			
2-2-4-4-13	13	23.29	23.32	0.03	90	20	18700	1860	1 Rb High	20	19100	1900	20	20050	1720	20	20300	1745	10	23230	782
2-2-4-5B	2	23.05																			
2-2-4-5B	4	23.03																			
2-2-4-5B	5	23.66	23.62	-0.04	80	20	18700	1860	1 Rb High	20	19100	1900	20	20300	1745	10	20450	829	10	20549	838.9
2-2-13-66-66	2	23.05																			
2-2-13-66-66	13	23.29																			
2-2-13-66-66	66	23.3	23.41	0.11	90	20	18700	1860	1 Rb High	20	19100	1900	10	23230	782	20	132072	1720	20	132572	1770
2-4-4-5B	2	23.05																			
2-4-4-5B	4	23.03																			
2-4-4-5B	5	23.66	23.62	-0.04	80	20	18700	1860	1 Rb Low	20	20050	1720	20	20300	1745	10	20450	829	10	20549	838.9
2-13-66-66B	2	23.05																			
2-13-66-66B	13	23.29																			
2-13-66-66B	66	23.3	23.36	0.06	70	20	18700	1860	1 Rb Low	10	23230	782	20	132072	1720	10	67187	2185.1	10	67286	2195
2-5B-66-66	2	23.05																			
2-5B-66-66	5	23.66	23.6	-0.06	80	20	18700	1860	1 Rb Low	10	20450	829	10	20549	838.9	20	132072	1720	20	132572	1770
2-5B-66-66	66	23.3																			

DL 4CA																		
Combination	UL Band	PCC (dBm)	PCC+SCCs (dBm)	Delta	Aggr. BW	PCC1				SCC1			SCC2			SCC3		
						BW	CH	FREQ	RB	BW	CH	FREQ	BW	CH	FREQ	BW	CH	FREQ
2-2-4-5	2	23.05																
2-2-4-5	4	23.03																
2-2-4-5	5	23.66	23.65	-0.01	70	20	18700	1860	1 Rb High	20	19100	1900	20	20300	1745	10	20450	829
2-2-66-66	2	23.05																
2-2-66-66	66	23.3	23.15	-0.15	80	20	18700	1860	1 Rb High	20	19100	1900	20	132072	1720	20	132572	1770
2-2-66B	2	23.05	22.99	-0.06	55	20	18700	1860	1 Rb High	20	19100	1900	10	132572	1770	5	132644	1777.2
2-2-66B	66																	
2-2-66C	2	23.05	22.94	-0.11	80	20	18700	1860	1 Rb High	20	19100	1900	20	132374	1750.2	20	132572	1770
2-2-66C	66	23.3																
5-5-66B	5	23.66	23.68	0.02	35	10	20450	829	1 Rb Low	10	20600	844	10	132572	1770	5	132644	1777.2
5-5-66B	66	23.3																
5-5-66C	5	23.66	23.56	-0.1	60	10	20450	829	1 Rb Low	10	20600	844	20	132374	1750.2	20	132572	1770
5-5-66C	66	23.3																
5-5B-66	5	23.66	23.63	-0.03	50	10	20450	829	1 Rb Low	10	20450	829	10	20549	838.9	20	132575	1770
5-5B-66	66	23.3																
2-13-66C	2	23.05	22.97	-0.08	70	20	18700	1860	1 Rb Low	10	23230	782	20	132374	1750.2	20	132572	1770
2-13-66C	13	22.97																
2-13-66C	66	23.3																
2-66-66-66	2	23.05																
2-66-66-66	66	23.3	23.26	-0.04	80	20	18700	1860	1 Rb Low	20	132072	2120	20	66886	2155	20	67236	2190
13-66-66-66	13	23.29																
13-66-66-66	66	23.3	23.24	-0.06	70	10	23230	782	1 Rb High	20	132072	2120	20	66886	2155	20	67236	2190

DL 3CA															
Combination	UL Band	PCC (dBm)	PCC+SCCs (dBm)	Delta	Aggr. BW	PCC1				SCC1			SCC2		
						BW	CH	FREQ	RB	BW	CH	FREQ	BW	CH	FREQ
66-66C	66	23.3	23.39	0.09	60	20	132072	1720	1 Rb Low	20	67038	2170.2	20	67236	2190

2.1.3.2. LTE CA Uplink Intra-Band

LTE CA UPLINK	PCC Band
CA_5B	LTE 5
CA_7C	LTE 7
CA_41c	LTE 41
CA_66B	LTE 66
CA_66C	LTE 66

Following KDB 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02 and TCB Workshop Nov. 2017:

- SAR for UL CA is required in each exposure condition (highest standalone head test position, body, etc.) and frequency band combination.
- When the maximum output for UL CA is ≤ standalone LTE mode (without CA)
  - PCC is configured according to the highest standalone SAR configuration tested
  - SCC and subsequent CCs are configured according to 3GPP TS 36.508 V17.2.0 Release 17 procedures used for power measurement and parameters (BW, RB etc.).

- Reported SAR for UL CA configuration, described above, is > 1.2 W/kg, UL CA SAR is also required for all required test channels(PCC based)

- UL CA SAR is also required for standalone SAR configurations > 1.2 W/kg when they are scaled to the UL CA power level

All measured SAR values for the bands that supports Uplink CA Intraband are lower than, 1.2 W/kg, therefore all Uplink CA intraband combinations values are also < 1.2 W/kg.

LTE CA UPLINK BAND	Band	BW PCC (MHz)	Channel PCC	Freq PCC (MHz)	Configuration	BW (MHz) SCC	Channel SCC	Freq SCC (MHz)	Output power W/O CA	Output power with CA	Delta CA off/on
5B	LTE 5	10	20450	829	1RB High	10	20549	838.9	23.66	22.77	-0.89
7C	LTE 7	20	21152	2540.2	1RB High	20	21350	2560	23.23	23.18	-0.05
41C	LTE 41	20	41440	2675	1RB High	5	41557	2686.7	21.92	21.86	-0.06
66B	LTE 66	10	132373	1750.1	1RB High	10	132472	1760	23.18	23	-0.18
66C	LTE 66	20	132323	1745.1	1RB High	20	132521	1764.9	23.18	22.97	-0.21

LTE CA UPLINK BAND	PCC				SCC				Reported SAR
	BW	CH	FREQ	RB	BW	CH	FREQ	RB	
5B	10	20450	829	1RB High	10	20549	838.9	1RB Low	0.099
7C	20	21152	2540.2	1RB High	20	21350	2560	1RB Low	0.062
41C	20	41440	2675	1RB High	5	41557	2686.7	1RB Low	0.059
66B	10	132373	1750.1	1RB High	10	132472	1760	1RB Low	0.193
66C	20	132323	1745.1	1RB High	20	132521	1764.9	1RB Low	0.203

2.1.4. 5G Bands

2.1.4.1. 5G Stand-Alone Bands

MPR is permanently implemented for the device. A-MPR was disable for SAR measurements.

Maximum Power Reductions are specified in Table 6.2.3-1 of the 3GPP TS138.521-1.

Table 6.2.2.3-1: Maximum Power Reduction (MPR) for Power 3

Modulation	MPR (dB)		
	Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM PI/2 BPSK	≤ 3.5[1]	≤ 1.2[1]	≤ 0.2[1]
	≤ 0.5[2]		0[2]
DFT-s-OFDM QPSK	≤ 1		0
DFT-s-OFDM 16 QAM	≤ 2		≤ 1
DFT-s-OFDM 64 QAM	≤ 2.5		
DFT-s-OFDM 256 QAM	≤ 4.5		
CP-OFDM QPSK	≤ 3		≤ 1.5
CP-OFDM 16 QAM	≤ 3		≤ 2
CP-OFDM 64 QAM	≤ 3.5		
CP-OFDM 256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with PI/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.
NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

According to October 2020 TCB Workshop "Updates on Guidelines for 5G Equipment Authorization, Rev. 2", modulations and RB configurations with MPR > 0 have been excluded for SAR testing and conducted power measurements due to low power/SAR.

Test frequencies, test channel bandwiths, test SCS and uplink configurations for conducted output power have been set according to 3GPP TS 138.521-1, table 6.2.1.4.1-1:

Table 6.2.1.4.1-1: Test Configuration Table

Initial Conditions			
Test Environment as specified in TS 38.508-1 [5] subclause 4.1		Normal, TL/VL, TL/VH, TH/VL, TH/VH	
Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1		Low range, Mid range, High range	
Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1		Lowest, Mid, Highest	
Test SCS as specified in Table 5.3.5-1		Lowest, Highest	
Test Parameters			
Test ID	**Downlink Configuration**	**Uplink Configuration**	
	N/A for maximum output power test case	**Modulation (NOTE 2)**	**RB allocation (NOTE 1)**
1		DFT-s-OFDM PI/2 BPSK	Inner Full
2		DFT-s-OFDM PI/2 BPSK	Inner 1RB Left
3		DFT-s-OFDM PI/2 BPSK	Inner 1RB Right
4		DFT-s-OFDM QPSK	Inner Full
5		DFT-s-OFDM QPSK	Inner 1RB Left
6		DFT-s-OFDM QPSK	Inner 1RB Right

NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.
NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.

Additionally to Inner Full, Inner 1RB Left and Inner 1RB Right conducted output power measurements, Inner 1RB Mid configuration conducted output power measurement was also performed to complete all Inner 1RB allocation configurations.

Specific RB allocation is define in Table 6.1-1 of the 3GPP TS 138.521-1:

Channel Bandwidth	SCS(kHz)	OFDM	RB allocation							
			Edge_Full_Left	Edge_Full_Right	Edge_1RB_Left	Edge_1RB_Right	Outer_Full	Inner_Full	Inner_1RB_Left	Inner_1RB_Right
5MHz	15	DFT-s	2@0	2@23	1@0	1@24	25@0	12@6	1@1	1@23
		CP	2@0	2@23	1@0	1@24	25@0	13@6	1@1	1@23
	30	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2[1]	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2[1]	1@1	1@9
	60	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10MHz	15	DFT-s	2@0	2@50	1@0	1@51	50@0	25@12	1@1	1@50
		CP	2@0	2@50	1@0	1@51	52@0	26@13	1@1	1@50
	30	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
	60	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2[1]	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2[1]	1@1	1@9
15MHz	15	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19[1]	1@1	1@77
	30	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
	60	DFT-s	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
		CP	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
20MHz	15	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	30	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12[1]	1@1	1@49
	60	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
25MHz	15	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	30	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
	60	DFT-s	2@0	2@29	1@0	1@30	30@0	15@7[1]	1@1	1@29
		CP	2@0	2@29	1@0	1@30	31@0	15@7[1]	1@1	1@29
30MHz	15	DFT-s	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
		CP	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
	30	DFT-s	2@0	2@76	1@0	1@77	75@0	36@18	1@1	1@76
		CP	2@0	2@76	1@0	1@77	78@0	39@19	1@1	1@76
	60	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
40MHz	15	DFT-s	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
		CP	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
	30	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	60	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12[1]	1@1	1@49
50MHz	15	DFT-s	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
		CP	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
	30	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	60	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
60MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
		CP	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
	60	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19[1]	1@1	1@77
70MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@187	1@0	1@188	180@0	90@45	1@1	1@187
		CP	2@0	2@187	1@0	1@188	189@0	95@47	1@1	1@187
	60	DFT-s	2@0	2@91	1@0	1@92	90@0	45@22	1@1	1@91
		CP	2@0	2@91	1@0	1@92	93@0	47@23	1@1	1@91
80MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@215	1@0	1@216	216@0	108@54	1@1	1@215
		CP	2@0	2@215	1@0	1@216	217@0	109@54	1@1	1@215
	60	DFT-s	2@0	2@105	1@0	1@106	100@0	50@25	1@1	1@105
		CP	2@0	2@105	1@0	1@106	107@0	53@26[1]	1@1	1@105
90MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@243	1@0	1@244	243@0	120@60	1@1	1@243
		CP	2@0	2@243	1@0	1@244	245@0	123@61	1@1	1@243
	60	DFT-s	2@0	2@119	1@0	1@120	120@0	60@30	1@1	1@119
		CP	2@0	2@119	1@0	1@120	121@0	61@30	1@1	1@119
100MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@271	1@0	1@272	270@0	135@67	1@1	1@271
		CP	2@0	2@271	1@0	1@272	273@0	137@68	1@1	1@271
	60	DFT-s	2@0	2@133	1@0	1@134	135@0	64@32	1@1	1@133
		CP	2@0	2@133	1@0	1@134	135@0	67@33[1]	1@1	1@133

Note 1: The allocated RB number L_{CRB} is ceil(N_{RB}/2) -1 in order to meet Inner RB allocation definition ($RB_{Start,Low} \leq RB_{Start} \leq RB_{Start,High}$) described in subclause 6.2.2 of TS 38.101-1 [2].

- n2

NR Band 2 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**372000**	**376000**	**380000**
		Frequency (MHz)		**1860**	**1880**	**1900**
20 MHz	pi/2 BPSK	1	1	23.62	23.55	23.58
		1	52	23.70	23.62	23.64
		1	104	23.81	23.76	23.70
		50	25	23.71	23.69	23.68
	QPSK	1	1	23.56	23.57	23.47
		1	52	23.63	23.61	23.59
		1	104	23.71	23.68	23.66
		50	25	23.78	23.69	23.68

NR Band 2 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**371000**	**376000**	**381000**
		Frequency (MHz)		**1855**	**1880**	**1905**
10 MHz	pi/2 BPSK	1	1	23.56	23.48	23.53
		1	25	23.62	23.64	23.61
		1	50	23.74	23.71	23.68
		25	12	23.63	23.67	23.62
	QPSK	1	1	23.52	23.52	23.46
		1	25	23.61	23.60	23.55
		1	50	23.65	23.66	23.61
		25	12	23.71	23.64	23.66

NR Band 2 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**370500**	**376000**	**381500**
		Frequency (MHz)		**1852.5**	**1880**	**1907.5**
5 MHz	pi/2 BPSK	1	1	23.56	23.47	23.56
		1	12	23.67	23.56	23.58
		1	23	23.80	23.74	23.62
		12	6	23.66	23.61	23.62
	QPSK	1	1	23.50	23.55	23.42
		1	12	23.58	23.59	23.55
		1	23	23.64	23.63	23.64
		12	6	23.70	23.67	23.63

*Note: n2, n5, n7 5G bands are only supported into 5G NSA mode, so in order to measure SAR values for these bands the LTE CC was set reducing the output power for the LTE CC to the lowest output power that still allowed the DUT to be attached into EN-DC mode, lowering the LTE CC around 20 dBm, and having in this way the maximum 5G output power in the link to measure the conducted output power and SAR values for the 5G component for the n2, n5 and n7 bands.

- n5

NR Band 5 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**166800**	**167300**	**167800**
		Frequency (MHz)		**834**	**836.5**	**839**
20 MHz	pi/2 BPSK	1	1	23.33	23.28	23.37
		1	52	23.52	23.48	23.58
		1	104	23.70	23.65	23.74
		50	25	23.49	23.44	23.53
	QPSK	1	1	23.25	23.20	23.29
		1	52	23.49	23.41	23.51
		1	104	23.64	23.59	23.68
		50	25	23.51	23.46	23.55

NR Band 5 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**165800**	**167300**	**168800**
		Frequency (MHz)		**829**	**836.5**	**844**
10 MHz	pi/2 BPSK	1	1	23.27	23.26	23.32
		1	25	23.39	23.51	23.54
		1	50	23.63	23.60	23.72
		25	12	23.41	23.42	23.48
	QPSK	1	1	23.19	23.12	23.27
		1	25	23.37	23.41	23.42
		1	50	23.63	23.57	23.60
		25	12	23.46	23.38	23.49

NR Band 5 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**165300**	**167300**	**169300**
		Frequency (MHz)		**826.5**	**836.5**	**846.5**
5 MHz	pi/2 BPSK	1	1	23.29	23.23	23.36
		1	12	23.58	23.50	23.51
		1	23	23.64	23.63	23.69
		12	6	23.42	23.39	23.51
	QPSK	1	1	23.23	23.15	23.25
		1	12	23.38	23.38	23.47
		1	23	23.59	23.55	23.62
		12	6	23.49	23.41	23.51

*Note: n2, n5, n7 5G bands are only supported into 5G NSA mode, so in order to measure SAR values for these bands the LTE CC was set reducing the output power for the LTE CC to the lowest output power that still allowed the DUT to be attached into EN-DC mode, lowering the LTE CC around 20 dBm, and having in this way the maximum 5G output power in the link to measure the conducted output power and SAR values for the 5G component for the n2, n5 and n7 bands.

- n7

NR Band 7 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**502000**	**507000**	**512000**
		Frequency (MHz)		**2510**	**2535**	**2560**
20 MHz	pi/2 BPSK	1	1	22.94	23.07	22.77
		1	52	22.81	22.91	22.64
		1	104	22.70	22.83	22.53
		50	25	22.80	22.93	22.63
	QPSK	1	1	22.92	23.05	22.75
		1	52	22.75	22.93	22.64
		1	104	22.67	22.80	22.50
		50	25	22.83	22.96	22.66

NR Band 7 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**501000**	**507000**	**513000**
		Frequency (MHz)		**2505**	**2535**	**2565**
10 MHz	pi/2 BPSK	1	1	22.86	23.03	22.70
		1	25	22.71	22.92	22.59
		1	50	22.60	22.75	22.48
		25	12	22.75	22.94	22.61
	QPSK	1	1	22.88	22.99	22.75
		1	25	22.74	22.89	22.61
		1	50	22.69	22.81	22.45
		25	12	22.75	22.85	22.57

NR Band 7 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**500500**	**507000**	**513500**
		Frequency (MHz)		**2502.5**	**2535**	**2567.5**
5 MHz	pi/2 BPSK	1	1	22.92	23.02	22.73
		1	12	22.72	22.84	22.61
		1	23	22.65	22.79	22.47
		12	6	22.78	22.88	22.59
	QPSK	1	1	22.88	23.00	22.74
		1	12	22.73	22.88	22.62
		1	23	22.61	22.78	22.45
		12	6	22.76	22.91	22.64

*Note: n2, n5, n7 5G bands are only supported into 5G NSA mode, so in order to measure SAR values for these bands the LTE CC was set reducing the output power for the LTE CC to the lowest output power that still allowed the DUT to be attached into EN-DC mode, lowering the LTE CC around 20 dBm, and having in this way the maximum 5G output power in the link to measure the conducted output power and SAR values for the 5G component for the n2, n5 and n7 bands.

- n66

NR Band 66 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**346000**	**349000**	**352000**
		Frequency (MHz)		**1730**	**1745**	**1760**
40 MHz	pi/2 BPSK	1	1	22.78	22.68	22.85
		1	107	22.60	22.55	22.72
		1	214	22.57	22.47	22.64
		108	54	22.64	22.54	22.71
	QPSK	1	1	22.63	22.53	22.70
		1	107	22.58	22.48	22.69
		1	214	22.65	22.55	22.72
		108	54	22.68	22.58	22.75

NR Band 66 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**344000**	**349000**	**354000**
		Frequency (MHz)		**1720**	**1745**	**1770**
20 MHz	pi/2 BPSK	1	1	22.71	22.63	22.86
		1	52	22.66	22.52	22.68
		1	104	22.51	22.45	22.59
		50	25	22.60	22.49	22.70
	QPSK	1	1	22.57	22.46	22.65
		1	52	22.50	22.44	22.62
		1	104	22.58	22.50	22.70
		50	25	22.60	22.56	22.69

NR Band 66 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**342500**	**349000**	**355500**
		Frequency (MHz)		**1712.5**	**1745**	**1777.5**
5 MHz	pi/2 BPSK	1	1	22.76	22.67	22.81
		1	12	22.62	22.52	22.67
		1	23	22.50	22.39	22.58
		12	6	22.63	22.52	22.63
	QPSK	1	1	22.61	22.46	22.65
		1	12	22.60	22.45	22.66
		1	23	22.59	22.47	22.70
		12	6	22.67	22.56	22.67

- n71

NR Band 71(SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**134600**	**136100**	**137600**
		Frequency (MHz)		**673**	**680.5**	**688**
20 MHz	pi/2 BPSK	1	1	22.43	22.64	22.81
		1	52	22.47	22.67	22.76
		1	104	22.49	22.70	22.87
		50	25	22.40	22.61	22.78
	QPSK	1	1	22.38	22.59	22.76
		1	52	22.42	22.60	22.71
		1	104	22.48	22.69	22.86
		50	25	22.44	22.65	22.82

NR Band 71 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**133600**	**136100**	**138600**
		Frequency (MHz)		**668**	**680.5**	**693**
10 MHz	pi/2 BPSK	1	1	22.37	22.62	22.76
		1	25	22.40	22.61	22.79
		1	50	22.42	22.65	22.85
		25	12	22.32	22.59	22.73
	QPSK	1	1	22.32	22.51	22.74
		1	25	22.38	22.60	22.79
		1	50	22.47	22.67	22.78
		25	12	22.39	22.57	22.76

NR Band 71 (SCS 15kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**133100**	**136100**	**139100**
		Frequency (MHz)		**665.5**	**680.5**	**695.5**
5 MHz	pi/2 BPSK	1	1	22.39	22.59	22.80
		1	12	22.42	22.60	22.79
		1	23	22.43	22.68	22.82
		12	6	22.33	22.56	22.76
	QPSK	1	1	22.36	22.54	22.72
		1	12	22.40	22.58	22.77
		1	23	22.43	22.65	22.80
		12	6	22.42	22.60	22.78

According to February 2021 TCB Workshop:

- For 5G-FR1 SAR evaluations are being generally based on adapting the existing LTE SAR procedures (KDB 941225 D05A)

SAR testing has been performed based on FCC KDB 941225 D05, Paragraph 5.2 guidance, adapting LTE SAR procedure to 5G-FR1:

- 1RB allocation:
  Start with the largest channel bandwidth then measure SAR for PI/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle, and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

- 50% RB allocation
  The procedures required for 1 RB allocation are applied to measure the SAR for PI/2 BPSK with 50% RB allocation.

- 100% RB allocation
  For PI/2 BPSK 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.

- Higher order modulations
  SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

- Other channel bandwidth standalone SAR test requirements
  Measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration, or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

2.1.4.2. 5G NSA Bands

According to February 2021 TCB Workshop:

- For non-stand-alone configurations, both LTE and 5G-NR are added to derive a total SAR.

Following guidance from TCB Workshop October 2020:

- SAR testing for LTE and NR will be performed separately, and applying FCC KDB 447498 techniques for simultaneous LTE+NR:

  - If the single uplink 1-g SAR values for each band are both less than 0.8 W/kg and the algebraic summation of the 1-g SAR values are less than 1.45 W/kg, additional measurements are not needed.
  - If one of the single uplink 1-g SAR values is greater than 0.8 W/kg, instead of algebraically summing the 1-g SAR values, sum up the SAR distributions, similar to the enlarged zoom scan (volume scan) procedures KDB Pub. 865664 D01; PAG is required.
  - If the algebraic sum of the 1-g SAR values is greater than 1.45 W/kg, additional measurements might be needed; PAG is required and KDB inquiryis needed for additional testing guidance.

	CC1			CC2			NSA
NSA	**Band**	**Tune-up limit**	**Reported SAR**	**Band**	**Tune-up limit**	**Reported SAR**	**CA Summation**
71-n2	71	25	0.312	n2*	25	0.171	0.483
5-n7	5	25	0.165	n7*	25	0.055	0.220
12-n7	12	25	0.277	n7*	25	0.055	0.332
7-n71	7	25	0.073	n71	25	0.438	0.511
2-n71	2	25	0.199	n71	25	0.438	0.637
66-n71	66	25	0.281	n71	25	0.438	0.719
5-n66	5	25	0.165	n66	25	0.287	0.452
2-n2	2	25	0.199	n2*	25	0.171	0.370
66-n5	66	25	0.281	n5*	25	0.072	0.353
2-n5	2	25	0.199	n5*	25	0.072	0.271
7-n5	7	25	0.073	n5*	25	0.072	0.145
12-n2	12	25	0.277	n2*	25	0.171	0.448
66C-n5	66C	25	0.255	n5*	25	0.072	0.327
66B-n5	66B	25	0.242	n5*	25	0.072	0.314
13-n2	13	25	0.072	n2*	25	0.171	0.243
13-n66	13	25	0.072	n66	25	0.287	0.359
5-n66	5	25	0.165	n66	25	0.287	0.452
5-n2	5	25	0.165	n2*	25	0.171	0.336
71-n66	71	25	0.312	n66	25	0.287	0.599

*Note: n2, n5, n7 5G bands are only supported into 5G NSA mode, so in order to measure SAR values for these bands the LTE CC was set reducing the output power for the LTE CC to the lowest output power that still allowed the DUT to be attached into EN-DC mode, lowering the LTE CC around 20 dBm, and having in this way the maximum 5G output power in the link to measure the conducted output power and SAR values for the 5G component for the n2, n5 and n7 bands.

2.2. LTE 2 ANTENNA

2.2.1. GSM/GPRS/EGPRS Bands

- GSM 850: For voice mode PCL 5 was set to allow max power transmission.

GSM 900 - Average Output Power					
Channel Number	Frequency (MHz)	Frame Average Output Power (dBm)	Average Burst Output Power (dBm)	PCL	Modulation
128	824.2	23.39	32.4	5	GMSK
190	836.6	23.60	32.6	5	GMSK
251	848.8	23.33	32.4	5	GMSK

- GPRS 850: For data mode. PCL 5. CS1 coding scheme and Gamma 3 were set to allow DUT's max power transmission for each slot.

GPRS 850 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	23.11	23.81	23.79	23.38	5	GMSK-CS1
190	836.6	23.24	23.89	23.83	23.78	5	GMSK-CS1
251	848.8	23.07	23.63	23.60	22.88	5	GMSK-CS1

GPRS 850 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	32.1	29.8	28.1	26.4	5	GMSK-CS1
190	836.6	32.3	29.9	28.1	26.8	5	GMSK-CS1
251	848.8	32.1	29.7	27.9	25.9	5	GMSK-CS1

- EGPRS 850: For data mode. PCL 8. MCS5 coding scheme and Gamma 6 were set to allow DUT's max power transmission for each slot.

EDGE 850 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	17.48	18.88	19.59	19.67	8	8PSK-MCS5
190	836.6	17.57	18.84	19.65	19.74	8	8PSK-MCS5
251	848.8	17.39	18.86	19.47	19.60	8	8PSK-MCS5

EDGE 850 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
128	824.2	26.5	24.9	23.9	22.7	8	8PSK-MCS5
190	836.6	26.4	24.9	23.9	22.8	8	8PSK-MCS5
251	848.8	26.4	24.9	23.7	22.6	8	8PSK-MCS5

- GSM 1900: For voice mode PCL 0 was set to allow max power transmission.

GSM 1800 - Average Output Power					
Channel Number	Frequency (MHz)	Frame Average Output Power (dBm)	Average Burst OutputPower (dBm)	PCL	Modulation
512	1850.2	19.20	28.2	0	GMSK
661	1880.0	19.26	28.3	0	GMSK
810	1909.8	18.85	27.9	0	GMSK

- GPRS 1900: For data mode. PCL 0. CS1 coding scheme and Gamma 3 were set to allow max power transmission for each slot.

GPRS 1900 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
512	1850.2	19.02	19.04	19.28	19.70	0	GMSK-CS1
661	1880.0	19.13	18.92	19.30	19.84	0	GMSK-CS1
810	1909.8	18.65	18.42	18.94	19.50	0	GMSK-CS1

GPRS 1900 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
512	1850.2	28.1	25.1	23.5	22.7	0	GMSK-CS1
661	1880.0	28.2	24.9	23.6	22.9	0	GMSK-CS1
810	1909.8	27.7	24.4	23.2	22.5	0	GMSK-CS1

- EGPRS 1900: For data mode. PCL 2. MCS5 coding scheme and Gamma 5 were set to allow max power transmission for each slot.

EDGE 1900 - Frame Average Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
512	1850.2	15.46	16.48	17.63	17.69	2	8PSK-MCS5
661	1880.0	15.13	16.56	17.41	17.50	2	8PSK-MCS5
810	1909.8	14.73	16.20	17.07	17.19	2	8PSK-MCS5

EDGE 1900 - Average Burst Output Power							
Channel Number	Frequency (MHz)	Power (dBm)				PCL	Modulation
		1 Slot	2 Slots	3 Slots	4 Slots		
512	1850.2	24.5	22.5	21.9	20.7	2	8PSK-MCS5
661	1880.0	24.2	22.6	21.7	20.5	2	8PSK-MCS5
810	1909.8	23.8	22.2	21.3	20.2	2	8PSK-MCS5

2.2.2. WCDMA/HSDPA/HSPA/HSPA+ Bands

- WCDMA: The DUT supports power Class 3, with a nominal maximum output power of 24 dBm. Tests were completed according to 3GPP TS34.121, section 5.

Mode	Subtest	Rel99
WCDMA	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2Kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD II 1900	WCDMA	9262	1852.4	23.35
FDD II 1900	WCDMA	9400	1880.0	23.20
FDD II 1900	WCDMA	9538	1907.6	23.01

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD IV 1700	WCDMA	1312	1712.4	23.17
FDD IV 1700	WCDMA	1412	1732.6	23.38
FDD IV 1700	WCDMA	1512	1752.6	23.49

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD V 850	WCDMA	4132	826.4	23.62
FDD V 850	WCDMA	4182	836.4	23.52
FDD V 850	WCDMA	4233	846.6	23.48

- HSDPA:

Mode	Subtest	1	2	3	4
HSDPA	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2Kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	HSUPA Loopback			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64	64	64	64
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
	Dack	8			
	Dnak	8			
	Ack-Nack repetition factor	3			
	DCQI	8			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs =βhs/βc	30/15			

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD II 1900	HSDPA	9262	1852.4	22.49	22.39	21.91	20.96
FDD II 1900	HSDPA	9400	1880.0	22.26	22.22	21.53	20.72
FDD II 1900	HSDPA	9538	1907.6	22.05	22.03	21.26	20.53

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD IV 1700	HSDPA	1312	1712.4	22.14	21.77	21.80	20.73
FDD IV 1700	HSDPA	1412	1732.6	22.25	22.24	21.73	20.83
FDD IV 1700	HSDPA	1512	1752.6	22.35	22.36	21.97	20.45

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)			
				Subtest			
				1	2	3	4
FDD V 850	HSDPA	4132	826.4	22.60	22.61	22.10	22.10
FDD V 850	HSDPA	4182	836.4	22.19	22.16	21.73	21.74
FDD V 850	HSDPA	4233	846.6	22.48	22.49	22.00	21.98

- HSPA:

Mode	Subtest	1	2	3	4	5
HSPA	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2Kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm 2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15	56/75	134/15
	MPR (dB)	0	2	1	2	0
	Dack	8				
	Dnak	8				
	Ack-Nack repetition factor	3				
	DCQI	8				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	Ahs =βhs/βc	30/15				
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL DataRate Kbps	242.1	174.9	482.8	205.8	308.9

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD II 1900	HSPA	9262	1852.4	22.28	22.17	21.86	22.47	22.06
FDD II 1900	HSPA	9400	1880.0	22.16	22.05	21.67	22.23	22.03
FDD II 1900	HSPA	9538	1907.6	21.95	21.82	21.49	22.05	21.63

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD IV 1700	HSPA	1312	1712.4	22.11	21.91	21.60	22.17	21.75
FDD IV 1700	HSPA	1412	1732.6	22.27	21.98	21.63	22.36	21.89
FDD IV 1700	HSPA	1512	1752.6	22.35	22.13	21.89	22.49	21.86

Band	Mode	CH	Frequency (MHz)	Average Output Power (dBm)				
				Subtest				
				1	2	3	4	5
FDD V 850	HSPA	4132	826.4	22.60	22.53	22.04	21.41	22.09
FDD V 850	HSPA	4182	836.4	22.58	22.55	21.99	21.62	22.05
FDD V 850	HSPA	4233	846.6	22.50	22.51	21.92	21.50	22.08

- HSPA+

Mode	Subtest	1
HSPA+	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2Kbps RMC
	HSDPA FRC	H-Set1
	HSUPA Test	HSUPA Loopback
	Power Control Algorithm	Algorithm 2
	βc	1
	βd	0
	βec	30/15
	βhs	30/15
	βed (2xSF2)	βed1: 30/15
		βed2: 30/15
	βed (2xSF4)	βed3: 24/15
		βed4: 24/15
	CM (dB)	3.5
	MPR (dB)	2.5
	D E-DPCCH	7
	AG Index	14
	ETFCI	105

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD II 1900	HSPA+	9262	1852.4	23.20
FDD II 1900	HSPA+	9400	1880.0	23.35
FDD II 1900	HSPA+	9538	1907.6	23.01

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD IV 1700	HSPA+	1312	1712.4	23.17
FDD IV 1700	HSPA+	1412	1732.6	23.49
FDD IV 1700	HSPA+	1512	1752.6	23.38

Band	Mode	Channel Number	Frequency (MHz)	Average Output Power (dBm)
FDD V 850	HSPA+	4132	826.4	22.17
FDD V 850	HSPA+	4182	836.4	22.13
FDD V 850	HSPA+	4233	846.6	22.05

2.2.3. 5G Bands

2.2.3.1. 5G Stand-Alone Bands

MPR is permanently implemented for the device. A-MPR was disable for SAR measurements.

Maximum Power Reductions are specified in Table 6.2.3-1 of the 3GPP TS138.521-1.

Table 6.2.2.3-1: Maximum Power Reduction (MPR) for Power 3

Modulation	MPR (dB)		
	Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM PI/2 BPSK	≤ 3.5[1]	≤ 1.2[1]	≤ 0.2[1]
	≤ 0.5[2]		0[2]
DFT-s-OFDM QPSK	≤ 1		0
DFT-s-OFDM 16 QAM	≤ 2		≤ 1
DFT-s-OFDM 64 QAM	≤ 2.5		
DFT-s-OFDM 256 QAM	≤ 4.5		
CP-OFDM QPSK	≤ 3		≤ 1.5
CP-OFDM 16 QAM	≤ 3		≤ 2
CP-OFDM 64 QAM	≤ 3.5		
CP-OFDM 256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with PI/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.
NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

According to October 2020 TCB Workshop "Updates on Guidelines for 5G Equipment Authorization, Rev. 2", modulations and RB configurations with MPR > 0 have been excluded for SAR testing and conducted power measurements due to low power/SAR.

Test frequencies, test channel bandwiths, test SCS and uplink configurations for conducted output power have been set according to 3GPP TS 138.521-1, table 6.2.1.4.1-1:

Table 6.2.1.4.1-1: Test Configuration Table

Initial Conditions			
Test Environment as specified in TS 38.508-1 [5] subclause 4.1		Normal, TL/VL, TL/VH, TH/VL, TH/VH	
Test Frequencies as specified in TS 38.508-1 [5] subclause 4.3.1		Low range, Mid range, High range	
Test Channel Bandwidths as specified in TS 38.508-1 [5] subclause 4.3.1		Lowest, Mid, Highest	
Test SCS as specified in Table 5.3.5-1		Lowest, Highest	
Test Parameters			
Test ID	**Downlink Configuration**	**Uplink Configuration**	
	N/A for maximum output power test case	**Modulation (NOTE 2)**	**RB allocation (NOTE 1)**
1		DFT-s-OFDM PI/2 BPSK	Inner Full
2		DFT-s-OFDM PI/2 BPSK	Inner 1RB Left
3		DFT-s-OFDM PI/2 BPSK	Inner 1RB Right
4		DFT-s-OFDM QPSK	Inner Full
5		DFT-s-OFDM QPSK	Inner 1RB Left
6		DFT-s-OFDM QPSK	Inner 1RB Right

NOTE 1: The specific configuration of each RB allocation is defined in Table 6.1-1.
NOTE 2: DFT-s-OFDM PI/2 BPSK test applies only for UEs which supports half Pi BPSK in FR1.

Additionally to Inner Full, Inner 1RB Left and Inner 1RB Right conducted output power measurements, Inner 1RB Mid configuration conducted output power measurement was also performed to complete all Inner 1RB allocation configurations.

Specific RB allocation is define in Table 6.1-1 of the 3GPP TS 138.521-1:

Channel Bandwidth	SCS(kHz)	OFDM	RB allocation							
			Edge_Full_Left	Edge_Full_Right	Edge_1RB_Left	Edge_1RB_Right	Outer_Full	Inner_Full	Inner_1RB_Left	Inner_1RB_Right
5MHz	15	DFT-s	2@0	2@23	1@0	1@24	25@0	12@6	1@1	1@23
		CP	2@0	2@23	1@0	1@24	25@0	13@6	1@1	1@23
	30	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2[1]	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2[1]	1@1	1@9
	60	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10MHz	15	DFT-s	2@0	2@50	1@0	1@51	50@0	25@12	1@1	1@50
		CP	2@0	2@50	1@0	1@51	52@0	26@13	1@1	1@50
	30	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
	60	DFT-s	2@0	2@9	1@0	1@10	10@0	5@2[1]	1@1	1@9
		CP	2@0	2@9	1@0	1@10	11@0	5@2[1]	1@1	1@9
15MHz	15	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19[1]	1@1	1@77
	30	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
	60	DFT-s	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
		CP	2@0	2@16	1@0	1@17	18@0	9@4	1@1	1@16
20MHz	15	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	30	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12[1]	1@1	1@49
	60	DFT-s	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
		CP	2@0	2@22	1@0	1@23	24@0	12@6	1@1	1@22
25MHz	15	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	30	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
	60	DFT-s	2@0	2@29	1@0	1@30	30@0	15@7[1]	1@1	1@29
		CP	2@0	2@29	1@0	1@30	31@0	15@7[1]	1@1	1@29
30MHz	15	DFT-s	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
		CP	2@0	2@158	1@0	1@159	160@0	80@40	1@1	1@158
	30	DFT-s	2@0	2@76	1@0	1@77	75@0	36@18	1@1	1@76
		CP	2@0	2@76	1@0	1@77	78@0	39@19	1@1	1@76
	60	DFT-s	2@0	2@36	1@0	1@37	36@0	18@9	1@1	1@36
		CP	2@0	2@36	1@0	1@37	38@0	19@9	1@1	1@36
40MHz	15	DFT-s	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
		CP	2@0	2@214	1@0	1@215	216@0	108@54	1@1	1@214
	30	DFT-s	2@0	2@104	1@0	1@105	100@0	50@25	1@1	1@104
		CP	2@0	2@104	1@0	1@105	106@0	53@26	1@1	1@104
	60	DFT-s	2@0	2@49	1@0	1@50	50@0	25@12	1@1	1@49
		CP	2@0	2@49	1@0	1@50	51@0	25@12[1]	1@1	1@49
50MHz	15	DFT-s	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
		CP	2@0	2@268	1@0	1@269	270@0	135@67	1@1	1@268
	30	DFT-s	2@0	2@131	1@0	1@132	128@0	64@32	1@1	1@131
		CP	2@0	2@131	1@0	1@132	133@0	67@33	1@1	1@131
	60	DFT-s	2@0	2@63	1@0	1@64	64@0	32@16	1@1	1@63
		CP	2@0	2@63	1@0	1@64	65@0	33@16	1@1	1@63
60MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
		CP	2@0	2@160	1@0	1@161	162@0	81@40	1@1	1@160
	60	DFT-s	2@0	2@77	1@0	1@78	75@0	36@18	1@1	1@77
		CP	2@0	2@77	1@0	1@78	79@0	39@19[1]	1@1	1@77
70MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@187	1@0	1@188	180@0	90@45	1@1	1@187
		CP	2@0	2@187	1@0	1@188	189@0	95@47	1@1	1@187
	60	DFT-s	2@0	2@91	1@0	1@92	90@0	45@22	1@1	1@91
		CP	2@0	2@91	1@0	1@92	93@0	47@23	1@1	1@91
80MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@215	1@0	1@216	216@0	108@54	1@1	1@215
		CP	2@0	2@215	1@0	1@216	217@0	109@54	1@1	1@215
	60	DFT-s	2@0	2@105	1@0	1@106	100@0	50@25	1@1	1@105
		CP	2@0	2@105	1@0	1@106	107@0	53@26[1]	1@1	1@105
90MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@243	1@0	1@244	243@0	120@60	1@1	1@243
		CP	2@0	2@243	1@0	1@244	245@0	123@61	1@1	1@243
	60	DFT-s	2@0	2@119	1@0	1@120	120@0	60@30	1@1	1@119
		CP	2@0	2@119	1@0	1@120	121@0	61@30	1@1	1@119
100MHz	15	DFT-s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		CP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	DFT-s	2@0	2@271	1@0	1@272	270@0	135@67	1@1	1@271
		CP	2@0	2@271	1@0	1@272	273@0	137@68	1@1	1@271
	60	DFT-s	2@0	2@133	1@0	1@134	135@0	64@32	1@1	1@133
		CP	2@0	2@133	1@0	1@134	135@0	67@33[1]	1@1	1@133

Note 1: The allocated RB number L_{CRB} is ceil(N_{RB}/2) -1 in order to meet Inner RB allocation definition ($RB_{Start,Low} \leq RB_{Start} \leq RB_{Start,High}$) described in subclause 6.2.2 of TS 38.101-1 [2].

- n41

NR Band 41 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**509200**	**518600**	**528000**
		Frequency (MHz)		**2546**	**2593**	**2640**
100 MHz	pi/2 BPSK	1	1	23.80	23.72	23.72
		1	136	23.55	23.49	23.37
		1	271	23.14	23.05	23.05
		135	67	23.18	23.10	23.10
	QPSK	1	1	23.77	23.69	23.69
		1	136	23.52	23.42	23.37
		1	271	23.07	22.99	22.99
		135	67	23.22	23.14	23.14

NR Band 41 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**504200**	**518600**	**532999**
		Frequency (MHz)		**2521**	**2593**	**2665**
50 MHz	pi/2 BPSK	1	1	23.78	23.67	23.68
		1	66	23.25	23.32	23.34
		1	131	23.08	23.03	22.97
		64	32	23.16	23.05	23.06
	QPSK	1	1	23.73	23.64	23.68
		1	66	23.20	23.28	23.30
		1	131	23.01	22.97	22.94
		64	32	23.15	23.09	23.12

NR Band 41 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**501467**	**518600**	**535999**
		Frequency (MHz)		**2506**	**2593**	**2680**
20 MHz	pi/2 BPSK	1	1	23.78	23.65	23.67
		1	25	23.45	23.38	23.58
		1	49	23.07	22.97	23.03
		25	12	23.17	23.08	23.02
	QPSK	1	1	23.76	23.67	23.61
		1	25	23.40	23.34	23.50
		1	49	23.00	22.99	22.93
		25	12	23.20	23.13	23.10

- n77

NR Band 77 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**656667**	**656000**	**655333**
		Frequency (MHz)		**3750**	**3840**	**3930**
100 MHz	pi/2 BPSK	1	1	23.97	23.94	23.81
		1	136	23.80	23.74	23.57
		1	271	23.52	23.49	23.36
		135	67	23.49	23.46	23.33
	QPSK	1	1	23.77	23.74	23.61
		1	136	23.66	23.65	23.43
		1	271	23.35	23.32	23.19
		135	67	23.51	23.48	23.35

NR Band 77 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**651667**	**656000**	**660333**
		Frequency (MHz)		**3725**	**3840**	**3955**
50 MHz	pi/2 BPSK	1	1	23.91	23.87	23.75
		1	66	23.88	23.69	23.50
		1	131	23.50	23.44	23.29
		64	32	23.41	23.44	23.27
	QPSK	1	1	23.75	23.69	23.57
		1	66	23.42	23.55	23.49
		1	131	23.30	23.30	23.11
		64	32	23.49	23.43	23.31

NR Band 77 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**647334**	**656000**	**664666**
		Frequency (MHz)		**3710**	**3840**	**3970**
20 MHz	pi/2 BPSK	1	1	23.89	23.90	23.76
		1	25	23.70	23.55	23.60
		1	49	23.50	23.41	23.35
		25	12	23.41	23.42	23.28
	QPSK	1	1	23.75	23.67	23.56
		1	25	23.50	23.49	23.47
		1	49	23.29	23.24	23.17
		25	12	23.50	23.46	23.27

- n78

NR Band 78 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**630000**	**640000**	**650000**
		Frequency (MHz)		**3450**	**3600**	**3750**
100 MHz	pi/2 BPSK	1	1	23.00	23.30	23.30
		1	136	23.30	23.20	23.20
		1	271	24.10	23.30	23.30
		135	67	23.50	23.40	23.10
	QPSK	1	1	23.00	23.40	23.30
		1	136	23.30	23.10	23.20
		1	271	24.10	23.20	23.30
		135	67	23.60	23.40	23.10

NR Band 78 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**631667**	**640000**	**648333**
		Frequency (MHz)		**3425**	**3600**	**3775**
50 MHz	pi/2 BPSK	1	1	24.70	24.30	24.00
		1	66	24.60	24.30	23.90
		1	131	24.80	24.30	24.00
		64	32	24.80	24.40	24.20
	QPSK	1	1	24.80	24.40	23.90
		1	66	24.70	24.30	23.90
		1	131	24.80	24.30	24.00
		64	32	24.80	24.30	24.10

NR Band 78 (SCS 30kHz)				Average Output Power (dBm)		
BW	**MCS Index**	**RB Size**	**RB Offset**	**Low**	**Mid**	**High**
		Channel		**628667**	**640000**	**651333**
		Frequency (MHz)		**3410**	**3600**	**3790**
20 MHz	pi/2 BPSK	1	1	25.10	24.50	24.50
		1	25	25.00	24.50	24.40
		1	49	25.10	24.50	24.20
		25	12	25.10	24.60	24.40
	QPSK	1	1	25.10	24.50	24.50
		1	25	25.00	24.50	24.30
		1	49	25.10	24.60	24.20
		25	12	25.10	24.60	24.50

According to February 2021 TCB Workshop:

- For 5G-FR1 SAR evaluations are being generally based on adapting the existing LTE SAR procedures (KDB 941225 D05A)

SAR testing has been performed based on FCC KDB 941225 D05, Paragraph 5.2 guidance, adapting LTE SAR procedure to 5G-FR1:

- 1RB allocation:
  Start with the largest channel bandwidth then measure SAR for PI/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle, and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

- 50% RB allocation
  The procedures required for 1 RB allocation are applied to measure the SAR for PI/2 BPSK with 50% RB allocation.

- 100% RB allocation
  For PI/2 BPSK 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.

- Higher order modulations
  SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

- Other channel bandwidth standalone SAR test requirements
  Measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration, or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

2.2.3.2. 5G NSA Bands

According to February 2021 TCB Workshop:

- For non-stand-alone configurations, both LTE and 5G-NR are added to derive a total SAR.

Following guidance from TCB Workshop October 2020:

- SAR testing for LTE and NR will be performed separately, and applying FCC KDB 447498 techniques for simultaneous LTE+NR:

  - If the single uplink 1-g SAR values for each band are both less than 0.8 W/kg and the algebraic summation of the 1-g SAR values are less than 1.45 W/kg, additional measurements are not needed.
  - If one of the single uplink 1-g SAR values is greater than 0.8 W/kg, instead of algebraically summing the 1-g SAR values, sum up the SAR distributions, similar to the enlarged zoom scan (volume scan) procedures KDB Pub. 865664 D01; PAG is required.
  - If the algebraic sum of the 1-g SAR values is greater than 1.45 W/kg, additional measurements might be needed; PAG is required and KDB inquiryis needed for additional testing guidance

	CC1			CC2			NSA
NSA	**Band**	**Tune-up limit**	**Reported SAR**	**Band**	**Tune-up limit**	**Reported SAR**	**CA Summation**
26-n41	26	25	0.160	n41	25	0.025	0.185
7-n78	7	25	0.073	n78	25	0	0.073
2-n78	2	25	0.199	n78	25	0	0.199
5-n41	5	25	0.165	n41	25	0.025	0.190
5-n77	5	25	0.165	n77	25	0	0.165
12-n78	12	25	0.277	n78	25	0	0.277
66-n78	66	25	0.281	n78	25	0	0.281
71-n78	71	25	0.312	n78	25	0	0.312
5-n78	5	25	0.165	n78	25	0	0.165
7C-n78	7C	25	0.078	n78	25	0	0.078
13-n77	13	25	0.072	n77	25	0	0.072
7-n77	7	25	0.073	n77	25	0	0.073
66-n77	66	25	0.281	n77	25	0	0.281
2-n77	2	25	0.199	n77	25	0	0.199

2.3. BTLE ANTENNA

Band	Mode	Channel / Freq (MHz)	Max. Output Power (dBm)
2.4 GHz	Bluetooth LE	0 / 2402	1.00
		19 / 2440	1.48
		39 / 2480	0.63

Based on paragraph "4.3.1 Standalone SAR test exclusion considerations" of the KDB 447498 D01 - General RF Exposure Guidance:

[(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

Protocol	Max. Output Power		Min. Test separation distance (mm)	Frequency (GHz)	Result	Test Exclusion
	(dBm)	(mW)				
Bluetooth LE	1.48	1.41	19.0	2.44	0.12	√

The computed value for Bluetooth is < 3.0, so Bluetooth mode qualifies for Standalone SAR test exclusion for 1-g SAR and 10-g SAR.

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR and x= 18,75 for 10-g extremity SAR

Estimated SAR					
Protocol	Max. Output Power		Min. Test separation distance (mm)	Frequency (GHz)	Estimated 1-g SAR
	(dBm)	(mW)			
Bluetooth LE	5.98	3.963	19.0	2.44	0.02

2.4. BT_WLAN2 ANTENNA

2.4.1. WLAN

Band	Mode	Channel / Freq (MHz)	Average Output Power (dBm)
U-NII-3	802.11a	149 / 5745	8.89
		157 / 5785	8.50
		165 / 5825	8.41
	802.11n20	149 / 5745	8.67
		157 / 5785	8.33
		165 / 5825	8.10
	802.11ac20	149 / 5745	8.62
		157 / 5785	8.26
		165 / 5825	8.22
	802.11n40	142 / 5710	5.33
		151 / 5755	5.34
		159 / 5795	5.28
		142 / 5710	5.28
	802.11ac40	151 / 5755	5.41
		159 / 5795	5.35
		155 / 5775	5.35
		149 / 5745	8.89
	802.11ac80	157 / 5785	8.50
		165 / 5825	8.41

2.4.2. Bluetooth

Band	Mode	Channel / Freq (MHz)	Max. Output Power (dBm)
2.4 GHz	Bluetooth BR (GFSK)	0 / 2402	4.60
		39 / 2441	4.20
		78 / 2480	3.50
	Bluetooth EDR2 (π/4-DQPSK)	0 / 2402	6.50
		39 / 2441	5.70
		78 / 2480	5.20
	Bluetooth EDR3 (8-DPSK)	0 / 2402	6.50
		39 / 2441	6.20
		78 / 2480	5.30

Based on paragraph "4.3.1 Standalone SAR test exclusion considerations" of the KDB 447498 D01 - General RF Exposure Guidance:

[(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

Protocol	Max. Output Power		Min. Test separation distance (mm)	Frequency (GHz)	Result	Test Exclusion
	(dBm)	(mW)				
Bluetooth EDR	6.5	4.47	19.0	2.402	0.36	√

The computed value for Bluetooth is < 3.0, so Bluetooth mode qualifies for Standalone SAR test exclusion for 1-g SAR and 10-g SAR.

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR and x= 18,75 for 10-g extremity SAR

Estimated SAR					
Protocol	Max. Output Power		Min. Test separation distance (mm)	Frequency (GHz)	Estimated 1-g SAR
	(dBm)	(mW)			
Bluetooth EDR	6.54	4.47	19.0	2.402	0.05

3. TISSUE PARAMETERS MEASUREMENTS

Frequency (MHz)	Target Head Tissue		Measured Head Tissue		Deviation %		Measured Date
	Permittivity ε	Conductivity σ [S/m]	Permittivity ε	Conductivity σ [S/m]	Permittivity ε	Conductivity σ [S/m]	
750	41.94	0.89	40.79	0.87	-2.74	-2.64	2022-06-15
750	41.94	0.89	41.60	0.89	-0.81	-0.23	2022-09-12
750	41.94	0.89	41.93	0.91	-0.02	2.08	2022-09-21
835	41.55	0.91	40.85	0.89	-1.70	-2.79	2022-06-01
900	41.50	0.97	40.07	0.95	-3.44	-1.84	2022-06-01
835	41.55	0.91	41.29	0.90	-0.63	-0.84	2022-06-20
900	41.50	0.97	40.54	0.97	-2.31	0.07	2022-06-20
835	41.55	0.91	42.35	0.90	1.91	-1.65	2022-08-24
900	41.50	0.97	41.50	0.97	0.00	-0.43	2022-08-24
835	41.55	0.91	42.68	0.89	2.70	-2.38	2022-09-05
900	41.50	0.97	41.86	0.96	0.87	-1.18	2022-09-05
835	41.55	0.91	40.38	0.88	-2.83	-2.89	2022-12-27
900	41.50	0.97	39.73	0.95	-4.26	-2.41	2022-12-27
1750	40.07	1.37	38.91	1.40	-2.88	2.24	2022-06-06
1800	40.00	1.40	38.59	1.44	-3.53	2.74	2022-06-06
1750	40.07	1.37	39.23	1.35	-2.09	-1.51	2022-07-11
1800	40.00	1.40	39.01	1.40	-2.46	0.02	2022-07-11
1750	40.07	1.37	39.34	1.35	-1.83	-1.89	2022-08-01
1800	40.00	1.40	39.10	1.39	-2.24	-0.54	2022-08-01
1750	40.07	1.37	41.17	1.36	2.75	-1.17	2022-09-20
1800	40.00	1.40	41.03	1.39	2.58	-0.48	2022-09-20
1800	40.00	1.40	39.48	1.35	-1.30	-3.34	2022-06-09
1900	40.00	1.40	39.14	1.42	-2.14	1.16	2022-06-09
1800	40.00	1.40	41.32	1.38	3.30	-1.72	2022-09-06
1900	40.00	1.40	41.03	1.42	2.57	1.57	2022-09-06
1800	40.00	1.40	39.51	1.37	-1.23	-2.48	2022-13-23
1900	40.00	1.40	39.00	1.45	-2.49	3.39	2022-13-23
2600	39.01	1.96	39.98	1.97	2.49	0.1	2022-07-20
2600	39.01	1.96	38.11	2.00	-2.31	1.73	2022-09-13
2600	39.01	1.96	38.25	1.99	-1.95	1.09	2022-09-15
2600	39.01	1.96	39.89	2.06	2.25	4.79	2022-12-27
3330	38.16	2.71	36.83	2.80	-3.47	3.53	2022-08-09
3500	37.93	2.91	36.45	2.93	-3.90	0.52	2022-08-09
3700	37.70	3.12	36.15	3.08	-4.12	-1.26	2022-08-09
3900	37.47	3.32	35.95	3.24	-4.05	-2.48	2022-08-09
4200	37.13	3.63	35.81	3.52	-3.56	-3.08	2022-08-09
5800	35.30	5.27	35.79	5.33	1.40	1.22	2022-07-04

Note: The dielectric properties have been measured by the contact probe method at 22° C.

DASY5 and DASY6 measurement systems have a SAR error compensation algorithm to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, so the tolerance for εr and σ may be relaxed to ± 10%.

- Composition / Information on ingredients

Head and Muscle Tissue Simulation Liquids HSL750V2/MSL750V2

Water	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40 – 60%
NaCl	Sodium Chloride, 0 – 6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone, 0.1 – 0.7%

Head and Muscle Tissue Simulation Liquids HSL900/MSL900

Water	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40 – 60%
NaCl	Sodium Chloride, 0 – 6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone, 0.1 – 0.7%

Head and Muscle Tissue Simulation Liquids HBBL1350-1850V3/MBBL1350-1850V3

Water	50 – 73 %
Non-ionic detergents	27 – 50 % polyoxyethylenesorbitan monolaurate
NaCl	0 – 2 %
Preservative	0.05 – 0.1% Preventol-D7
Safety relevant ingredients:	
CAS-No. 55965-84-9	< 0.1 % aqueous preparation, containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone
CAS-No. 9005-64-5	<50 % polyoxyethylenesorbitan monolaurate

Head and Muscle Tissue Simulation Liquids HBBL1550-1900V3/MBBL1550-1900V3

Water	50 – 73 %
Non-ionic detergents	27 – 50 % polyoxyethylenesorbitan monolaurate
NaCl	0 – 2 %
Preservative	0.05 – 0.1% Preventol-D7
Safety relevant ingredients:	
CAS-No. 55965-84-9	< 0.1 % aqueous preparation, containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone
CAS-No. 9005-64-5	<50 % polyoxyethylenesorbitan monolaurate

Head and Muscle Tissue Simulation Liquids HBBL1900-3800V3/MBBL1900-3800V3

Water	50 – 73 %
Non-ionic detergents	27 – 50 % polyoxyethylenesorbitan monolaurate
NaCl	0 – 2 %
Preservative	0.05 – 0.1% Preventol-D7
Safety relevant ingredients:	
CAS-No. 55965-84-9	< 0.1 % aqueous preparation, containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone
CAS-No. 9005-64-5	<50 % polyoxyethylenesorbitan monolaurate

Head and Muscle Tissue Simulation Liquids HBBL5GHzV2

Water	76 – 80 %
Mineral Oil	10 – 12 %
Emulsifiers	8 – 10 %
Additives and Salt	1 – 3%

Head and Muscle Tissue Simulation Liquids HBBL3500-5800V5/MBBL3500-5800V5

H2O	50 – 65 %
Mineral Oil	10 – 30 %
Emulsifiers	8 – 25 %
Additives and Salt	0 – 1.5%

4. SYSTEM CHECK MEASUREMENTS

4.1. Validation results for Head TSL

Date	Frequency (MHz)	SAR over	Estimated SAR (W/kg)	SAR (W/kg)	1 W Target SAR (W/kg)	1 W Norm. SAR (W/kg)	Drift (%)
2022/06/15	750	1 gr.	2.11	2.06	8.43	8.27	-1.92
		10 gr.	1.41	1.35	5.51	5.42	-1.66
2022/09/12	750	1 gr.	2.18	2.15	8.43	8.60	2.02
		10 gr.	1.47	1.41	5.51	5.64	2.36
2022/09/21	750	1 gr.	2.18	2.20	8.43	8.80	4.39
		10 gr.	1.46	1.44	5.51	5.76	4.54
2022/06/01	900	1 gr.	2.84	2.78	11.10	11.12	0.18
		10 gr.	1.86	1.77	7.07	7.08	0.14
2022/06/20	900	1 gr.	2.87	2.79	11.10	11.16	0.54
		10 gr.	1.87	1.78	7.07	7.12	0.71
2022/08/24	900	1 gr.	2.80	2.72	11.10	10.88	-1.98
		10 gr.	1.81	1.74	7.07	6.96	-1.56
2022/09/05	900	1 gr.	2.79	2.73	11.10	10.92	-1.62
		10 gr.	1.83	1.75	7.07	7.00	-0.99
2022/12/27	900	1 gr.	2.81	2.75	11.10	11.00	-0.90
		10 gr.	1.83	1.77	7.07	7.08	0.14
2022/06/06	1800	1 gr.	10.50	9.96	39.30	39.84	1.37
		10 gr.	5.54	5.08	20.40	20.32	-0.39
2022/06/09	1800	1 gr.	9.45	9.13	39.30	36.69	-6.64
		10 gr.	4.95	4.77	20.40	19.17	-6.04
2022/07/11	1800	1 gr.	9.95	9.76	39.30	38.95	-0.89
		10 gr.	5.29	5.14	20.40	20.51	0.55
2022/08/01	1800	1 gr.	10.10	9.60	39.30	38.53	-1.95
		10 gr.	5.30	5.00	20.40	20.07	-1.62
2022/09/06	1800	1 gr.	10.10	9.63	39.30	38.52	-1.98
		10 gr.	5.31	5.02	20.40	20.08	-1.57
2022/09/20	1800	1 gr.	9.45	9.23	39.30	37.30	-5.08
		10 gr.	4.94	4.71	20.40	17.04	-6.69
2022/12/22	1800	1 gr.	9.85	9.68	39.30	38.72	-1.48
		10 gr.	5.25	5.07	20.40	20.28	-0.59
2022/07/20	2600	1 gr.	15.40	15.00	57.10	60.00	5.08
		10 gr.	6.88	6.61	25.60	26.44	3.28
2022/09/13	2600	1 gr.	15.80	15.20	57.10	60.80	6.48
		10 gr.	7.00	6.70	25.60	26.80	4.69

Date	Frequency (MHz)	SAR over	Estimated SAR (W/kg)	SAR (W/kg)	1 W Target SAR (W/kg)	1 W Norm. SAR (W/kg)	Drift (%)
2022/09/15	2600	1 gr.	15.00	14.50	57.10	58.00	1.58
		10 gr.	6.70	6.34	25.60	25.36	-0.94
2022/12/27	2600	1 gr.	14.70	14.50	57.10	58.80	1.58
		10 gr.	6.57	6.33	25.60	25.52	-1.09
2022/08/09	3300	1 gr.	6.33	6.21	65.90	62.31	-5.44
		10 gr.	2.48	2.39	25.00	23.98	-4.07
2022/08/09	3500	1 gr.	6.37	6.29	66.70	63.12	-5.37
		10 gr.	2.43	2.36	25.10	23.68	-5.65
2022/08/09	3700	1 gr.	6.23	6.28	67.70	63.24	-6.59
		10 gr.	2.31	2.28	24.50	22.95	-6.29
2022/08/09	4200	1 gr.	6.46	6.54	65.50	65.40	-0.15
		10 gr.	2.19	2.20	22.20	22.00	-0.90
2022/07/04	5800	1 gr.	7.01	7.47	81.90	75.74	-7.52
		10 gr.	1.89	2.11	22.80	21.39	-6.17

5. MEASUREMENT RESULTS FOR SAR (SPECIFIC ABSORPTION RATE)

5.1. Summary maximum results for 1-g Head SAR measurements.

Mode	Side / Position	Antenna	Channel (Frequency)	Reported SAR 1-g (W/kg)	Limit SAR 1-g (W/kg)
GPRS 2 slots 850 MHz	Back face/15 mm	LTE2 Antenna	CH 251 (848.8 MHz)	1.097	1.6
GPRS 4 slots 1900 MHz	Back face/15 mm	LTE1 Antenna	CH 512 (1850.2 MHz)	0.458	1.6
WCDMA Band II	Back face/15 mm	LTE1 Antenna	CH 9262 (1852.4 MHz)	0.206	1.6
WCDMA Band IV	Back face/15 mm	LTE2 Antenna	CH 1512 (1752.6 MHz)	0.229	1.6
WCDMA Band V	Back face/15 mm	LTE2 Antenna	CH 4233 (846.6 MHz)	0.543	1.6
LTE Band 4	Back face/15 mm	LTE1 Antenna	CH 20300 (1745 MHz)	0.217	1.6
LTE Band 5	Back face/15 mm	LTE1 Antenna	CH 20600 (844 MHz)	0.165	1.6
LTE Band 7	Back face/15 mm	LTE1 Antenna	CH 21100 (2535.0 MHz)	0.073	1.6
LTE Band 12	Back face/15 mm	LTE1 Antenna	CH 23090 (707.0 MHz)	0.277	1.6
LTE Band 13	Back face/15 mm	LTE1 Antenna	CH 23230 (782 MHz)	0.149	1.6
LTE Band 14	Back face/15 mm	LTE1 Antenna	CH 23330 (793.0 MHz)	0.191	1.6
LTE Band 25	Back face/15 mm	LTE1 Antenna	CH 26140 (1860.0 MHz)	0.199	1.6
LTE Band 26	Back face/15 mm	LTE1 Antenna	CH 26865 (831.5 MHz)	0.160	1.6
LTE Band 41	Back face/15 mm	LTE1 Antenna	CH 41490 (2680.0 MHz)	0.097	1.6
LTE Band 66	Back face/15 mm	LTE1 Antenna	CH 132322 (1745.0 MHz)	0.281	1.6
LTE Band 71	Back face/15 mm	LTE1 Antenna	CH 133297 (680.5 MHz)	0.312	1.6
5G NR Band n41	Back face/15 mm	LTE1 Antenna	CH 509202 (2546.0 MHz)	0.025	1.6
5G NR Band n66	Back face/15 mm	LTE1 Antenna	CH 346000 (1730.0 MHz)	0.287	1.6
5G NR Band n71	Back face/15 mm	LTE1 Antenna	CH 134600 (673.0 MHz)	0.420	1.6
5G NR Band n77	Back face/15 mm	LTE1 Antenna	-	0.0	1.6
5G NR Band n78	Back face/15 mm	LTE1 Antenna	-	0.0	1.6
WLAN U-NII-3	Front face/10 mm	BT_WLAN2	CH 165 (5825.0 MHz)	0.102	1.6
Bluetooth LE	19 mm	BTLE Antenna	Estimated SAR	0.02	1.6
Bluetooth EDR	19 mm	BT_WLAN2	Estimated SAR	0.05	1.6

5.2. Result for simultaneous multi-band transmission

.

Transmission Modes	Σ SARi (W/kg)	Limit SAR 1-g (W/kg)	Verdict
GPRS 850 MHz(LTE2) + BTLE(BTLE) + Wi-Fi 5GHz(BT_WLAN2) + BT EDR(BT_WLAN2)	1.269	1.6	Pass

5.3. Results for GPRS 850 MHz band – 2 slots

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 190 (836.6 MHz	0.084	0.099	-0.040	2.564	0.254	
Back face	15	CH 128 (824.2 MHz)	0.160	0.169	-0.050	2.612	0.441	1
Back face	15	CH 251 (848.8 MHz)	0.088	0.108	-0.220	2.723	0.294	

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 190 (836.6 MHz	0.316	0.307	-0.110	2.564	0.787	
Back face	15	CH 128 (824.2 MHz)	0.332	0.328	0.000	2.612	0.857	
Back face	15	CH 251 (848.8 MHz)	0.412	0.403	-0.010	2.723	1.097	2

5.4. Results for GPRS 1900 MHz Band – 4 slots

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 661 (1880 MHz)	0.057	0.056	-0.330	6.516	0.365	
Back face	15	CH 512 (1850.2 MHz)	0.066	0.068	-0.340	6.730	0.458	3
Back face	15	CH 810 (1909.8 MHz)	0.055	0.054	-0.420	7.047	0.381	

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 661 (1880 MHz)	0.031	0.030	-0.190	6.516	0.195	
Back face	15	CH 512 (1850.2 MHz)	0.031	0.031	-0.460	6.730	0.209	4
Back face	15	CH 810 (1909.8 MHz)	0.023	0.024	0.570	7.047	0.169	

5.5. Results for WCDMA Band II

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 9262 (1852.4 MHz)	0.138	0.141	0.020	1.462	0.206	5
Back face	15	CH 9400 (1880 MHz)	0.121	0.123	0.010	1.514	0.186	
Back face	15	CH 9538 (1907.6 MHz)	0.105	0.104	-0.020	1.581	0.164	

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 9262 (1852.4 MHz)	0.060	0.062	0.020	1.462	0.091	6
Back face	15	CH 9400 (1880 MHz)	0.051	0.053	0.000	1.514	0.080	
Back face	15	CH 9538 (1907.6 MHz)	0.044	0.044	0.020	1.581	0.070	

5.6. Results for WCDMA Band IV

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 1512 (1752.6 MHz)	0.132	0.127	-0.020	1.416	0.180	7
Back face	15	CH 1312 (1712.4 MHz)	0.089	0.087	0.040	1.524	0.133	
Back face	15	CH 1412 (1732.6 MHz)	0.120	0.117	-0.010	1.452	0.170	

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 1512 (1752.6 MHz)	0.106	0.162	-0.120	1.416	0.229	8
Back face	15	CH 1312 (1712.4 MHz)	0.095	0.138	-0.150	1.524	0.210	
Back face	15	CH 1412 (1732.6 MHz)	0.083	0.112	0.100	1.452	0.163	

5.7. Results for WCDMA Band V

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 4132 (826.4 MHz)	0.172	0.179	0.080	1.374	0.246	
Back face	15	CH 4183 (836.6 MHz)	0.134	0.189	-0.030	1.406	0.266	
Back face	15	CH 4233 (846.6 MHz)	0.137	0.200	0.040	1.419	0.284	9

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 4132 (826.4 MHz)	0.309	0.305	0.020	1.374	0.419	
Back face	15	CH 4183 (836.6 MHz)	0.325	0.320	0.030	1.406	0.450	
Back face	15	CH 4233 (846.6 MHz)	0.385	0.383	0.030	1.419	0.543	10

5.8. Results for LTE Band 2 (1 RB, 20 MHz, QPSK)

SAR for LTE Band 2 has not been measured because it is covered by LTE Band 25 due to overlapping frequency range (LTE Band 2 frequency range: 1850 – 1910 MHz, LTE Band 25 frequency range: 1850 – 1915 MHz) and same maximum tune-up and channel bandwidth.

5.9. Results for LTE Band 4 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 20300 (1745 MHz)	0.110	0.107	-0.030	1.574	0.168	
Back face	15	CH 20050 (1720 MHz)	0.108	0.106	-0.030	1.622	0.172	
Back face	15	CH 20175 (1732.5 MHz)	0.109	0.106	-0.010	1.585	0.168	

5.10. Results for LTE Band 4 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 20300 (1745 MHz)	0.149	0.141	0.010	1.538	0.217	11

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.11. Results for LTE Band 5 (1 RB, 10 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 20450 (829 MHz)	0.072	0.087	-0.070	1.361	0.118	
Back face	15	CH 20525 (836.5 MHz)	0.089	0.119	-0.110	1.390	0.165	12
Back face	15	CH 20600 (844 MHz)	0.084	0.115	-0.130	1.377	0.158	

5.12. Results for LTE Band 5 (50% RB, 10 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 20450 (829 MHz)	0.065	0.083	0.020	1.352	0.112	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.13. Results for LTE Band 7 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 20850 (2510.0 MHz)	0.045	0.038	0.115	1.500	0.058	
Back face	15	CH 21100 (2535.0 MHz)	0.050	0.049	0.462	1.503	0.073	13
Back face	15	CH 21350 (2560.0 MHz)	0.051	0.046	0.925	1.507	0.069	

5.14. Results for LTE Band 7 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 21100 (2535.0 MHz)	0.046	0.046	-3.617	1.462	0.068	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.15. Results for LTE Band 12 (1 RB, 10 MHz, QPSK)

- LTE1 Antenna

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, the middle channel of the group of overlapping channels should be selected for testing.

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23090 (707.0 MHz)	0.152	0.157	0.000	1.766	0.277	14

5.16. Results for LTE Band 12 (50% RB, 10 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23090 (707.0 MHz)	0.083	0.089	-0.010	1.746	0.155	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.17. Results for LTE Band 13 (1 RB, 10 MHz, QPSK)

- LTE1 Antenna

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, the middle channel of the group of overlapping channels should be selected for testing.

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23230 (782 MHz)	0.073	0.103	-0.010	1.449	0.149	15

5.18. Results for LTE Band 13 (50% RB, 10 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23230 (782 MHz)	0.064	0.095	-0.200	1.449	0.138	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.19. Results for LTE Band 14 (1 RB, 10 MHz, QPSK)

- LTE1 Antenna

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, the middle channel of the group of overlapping channels should be selected for testing.

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23330 (793.0 MHz)	0.083	0.124	0.020	1.538	0.191	16

5.20. Results for LTE Band 14 (50% RB, 10 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 23330 (793.0 MHz)	0.063	0.086	0.010	1.531	0.132	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.21. Results for LTE Band 17 (1 RB, 10 MHz, QPSK)

SAR for LTE Band 17 has not been measured because it is covered by LTE Band 12 due to overlapping frequency range ((LTE Band 17 frequency range: 704 – 716 MHz, LTE Band 12 frequency range: 699 – 716 MHz) and same maximum tune-up and channel bandwidth.

5.22. Results for LTE Band 25 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 26140 (1860.0 MHz)	0.133	0.136	-0.02	1.462	0.199	17
Back face	15	CH 26365 (1882.5 MHz)	0.118	0.122	-0.02	1.531	0.187	
Back face	15	CH 26590 (1905.0 MHz)	0.107	0.108	0	1.545	0.167	

5.23. Results for LTE Band 25 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 26140 (1860.0 MHz)	0.106	0.108	-0.050	1.449	0.156	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.24. Results for LTE Band 26 (1 RB, 15 MHz, QPSK)

- LTE1 Antenna

Note: According to KDB941225 D05 SAR for LTE Devices, for LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, the middle channel of the group of overlapping channels should be selected for testing.

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 26865 (831.5 MHz)	0.081	0.100	-0.060	1.596	0.160	18

5.25. Results for LTE Band 26 (50% RB, 15 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 26865 (831.5 MHz)	0.063	0.080	-0.010	1.581	0.126	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.26. Results for LTE Band 41 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 39750 (2506.0 MHz)	0.022	0.018	-3.949	1.928	0.035	
Back face	15	CH 40620 (2593.0 MHz)	0.035	0.035	-2.725	1.941	0.067	
Back face	15	CH 41490 (2680.0 MHz)	0.051	0.048	-2.725	2.032	0.097	19

5.27. Results for LTE Band 41 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 39750 (2506.0 MHz)	0.018	0.018	3.633	1.932	0.034	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.28. Results for LTE Band 66 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 132575 (1770.0 MHz)	0.129	0.127	0.000	1.479	0.188	
Back face	15	CH 132072 (1720.0 MHz)	0.150	0.140	0.000	1.556	0.218	
Back face	15	CH 132322 (1745.0 MHz)	0.196	0.185	0.010	1.521	0.281	20

5.29. Results for LTE Band 66 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Front face	15	CH 132575 (1770.0 MHz)	0.153	0.145	0.000	1.449	0.210	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.30. Results for LTE Band 71 (1 RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 133122 (673.0 MHz)	0.127	0.131	0.030	1.837	0.241	
Back face	15	CH 133297 (680.5 MHz)	0.160	0.165	0.000	1.892	0.312	21
Back face	15	CH 133471 (688.0 MHz)	0.142	0.146	-0.030	1.862	0.272	

5.31. Results for LTE Band 71 (50% RB, 20 MHz, QPSK)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 133122 (673.0 MHz)	0.127	0.132	0.000	1.832	0.242	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.32. Results for LTE Carrier Aggregation Intra-Band

- LTE1 Antenna

CA MODE	Position	Dist (mm)	PCC Config	SCC Config	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
5B	Back face	15	1RB High CH 20450 829.0 MHz 10MHz BW	1RB Low CH 20549 838.9 MHz 10MHz BW	0.039	0.042	-0.115	1.327	0.056	22
7C	Back face	15	1RB High CH 21152 2540.2 MHz 20MHz BW	1RB Low CH 21350 2560.0 MHz 20MHz BW	0.048	0.051	-1.145	1.521	0.078	23
41C	Back face	15	1RB High CH 41440 2675.0 MHz 10MHz BW	1RB Low CH 41557 2686.7 MHz 10MHz BW	0.039	0.036	-4.170	2.061	0.075	24
66B	Back face	15	1RB High CH 132373 1750.1 MHz 10MHz BW	1RB Low CH 132472 1760.0 MHz 10MHz BW	0.151	0.153	0.040	1.585	0.242	25
66C	Back face	15	1RB High CH 132323 1745.1 MHz 20MHz BW	1RB Low CH 132521 1764.9 MHz 20MHz BW	0.160	0.160	0.060	1.596	0.255	26

5.33. Results for n2 Band – NSA mode (1 RB, 100 MHz, π/2 BPSK, SCS 30 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 372000 (1860.0 MHz)	0.124	0.127	0.115	1.346	0.171	27
Back face	15	CH 376000 (1880.0 MHz)	0.112	0.116	-0.459	1.355	0.157	
Back face	15	CH 380000 (1900.0 MHz)	0.114	0.118	0.346	1.361	0.161	

5.34. Results for n2 Band – NSA mode (50% RB, 100 MHz, π/2 BPSK, SCS 30 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 376000 (1880.0 MHz)	0.094	0.097	0.000	1.324	0.128	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.35. Results for n5 Band – NSA mode (1 RB, 40 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 167800 (839.0 MHz)	0.069	0.042	-0.230	1.355	0.057	
Back face	15	CH 166800 (834.0 MHz)	0.065	0.042	0.000	1.368	0.057	
Back face	15	CH 167300 (836.5 MHz)	0.075	0.052	0.115	1.384	0.072	28

5.36. Results for n5 Band – NSA mode (50% RB, 40 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 166800 (834.0 MHz)	0.045	0.043	0.925	1.396	0.060	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.37. Results for n7 Band – NSA mode (1 RB, 20 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 507000 (2535.0 MHz)	0.036	0.035	0.462	1.567	0.055	29
Back face	15	CH 502000 (2510.0 MHz)	0.031	0.032	0.809	1.614	0.052	
Back face	15	CH 512000 (2560.0 MHz)	0.028	0.027	1.274	1.679	0.045	

5.38. Results for n7 Band – NSA mode (50% RB, 20 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 507000 (2535.0 MHz)	0.025	0.025	-3.949	1.600	0.040	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.39. Results for n41 Band (1 RB, 100 MHz, π/2 BPSK, SCS 30 kHz)

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 509202 (2546.0 MHz)	0.013	0.019	-0.670	1.327	0.025	30
Back face	15	CH 518600 (2593.0 MHz)	0.011	0.018	-0.260	1.352	0.024	
Back face	15	CH 527999 (2640.0 MHz)	0.011	0.012	0.010	1.343	0.016	

5.40. Results for n41 Band (50% RB, 100 MHz, π/2 BPSK, SCS 30 kHz)

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 509202 (2546.0 MHz)	0.007	0.010	0.160	1.507	0.015	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.41. Results for n66 Band (1 RB, 40 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 350000 (1760.0 MHz)	0.153	0.152	0.040	1.690	0.254	
Back face	15	CH 346000 (1730.0 MHz)	0.166	0.1657	0.030	1.718	0.287	31
Back face	15	CH 349000 (1745.0 MHz)	0.144	0.143	0.010	1.758	0.251	

5.42. Results for n66 Band (50% RB, 40 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 350000 (1760.0 MHz)	0.159	0.160	0.040	1.679	0.269	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.43. Results for n71 Band (1 RB, 20 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 137600 (688.0 MHz)	0.155	0.185	0.110	1.637	0.303	
Back face	15	CH 134600 (673.0 MHz)	0.200	0.235	0.040	1.786	0.420	32
Back face	15	CH 136100 (680.5 MHz)	0.149	0.180	-0.060	1.702	0.306	

5.44. Results for n71 Band (50% RB, 20 MHz, π/2 BPSK, SCS 15 kHz)

- LTE1 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 137600 (688.0 MHz)	0.160	0.194	0.010	1.652	0.320	

Testing of additional LTE configurations is not required due to the SAR test procedures mentioned in FCC OET KDB 941225 D05 – SAR for LTE Devices v02r05.

5.45. Results for n77 Band (1 RB, 20 MHz, π/2 BPSK, SCS 30 kHz)

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 650000 (3750.0 MHz)	0.0	0.0	0.0	0.0	0.0*	
Back face	15	CH 656000 (3840.0 MHz)	0.0	0.0	0.0	0.0	0.0*	
Back face	15	CH 655333 (3930.0 MHz)	0.0	0.0	0.0	0.0	0.0*	

5.46. Results for n77 Band (50% RB, 20 MHz, π/2 BPSK, SCS 30 kHz)

- LTE2 Antenna

Position	Dist (mm)	Channel (Frequency)	Estimated SAR 1-g (W/kg)	SAR 1-g (W/kg)	Power Drift (%)	Scale factor	Reported SAR 1-g (W/kg)	Plot No.
Back face	15	CH 650000 (3750.0 MHz)	0.0	0.0	0.0	0.0	0.0*	

*Note: Area scan, zoom scan and power drifts measurements have not been able to be performed by the measurement system due to very low SAR values under the noise level. Minimum distance was not able to be reduced due to Shark fin Antenna internal screws and plastic tabs.

5.47. Results for n78 Band (1 RB, 20 MHz, π/2 BPSK, SCS 30 kHz)

SAR for n78 Band has not been measured because it is covered by n77 Band due to overlapping frequency range (n77 Band frequency range: 3700 – 3980 MHz, n78 Band frequency range: 3700 – 3800 MHz) and same maximum tune-up and channel bandwidth.

5.48. Results for 802.11 Bands.

- BT_WLAN2 Antenna

  - U-NII-3 Band

Position	Dist (mm)	Mode	CH	Freq (MHz)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Duty Cycle (%)	Scale factor	Reported SAR 10-g (W/kg)	Plot No.
Front face	10	802.11a	157	5785	0.053	0.051	-1.145	80.0	1.216	0.077	
Back face	10	802.11a	157	5785	0.001	0.000	0.000	80.0	1.216	0.001	
Front face	10	802.11n20	157	5785	0.048	0.049	4.713	80.0	1.285	0.078	
Front face	10	802.11ac20	149	5745	0.046	0.042	0.231	80.0	1.245	0.065	
Front face	10	802.11n40	159	5795	0.006	0.006	-3.949	65.0	1.400	0.012	
Front face	10	802.11ac40	159	5795	0.009	0.005	4.232	65.0	2.877	0.023	
Front face	10	802.11ac80	155	5775	0.025	0.011	3.514	48.0	2.851	0.065	
Front face	10	802.11n20	149	5745	0.055	0.050	0.346	80.0	1.384	0.086	
Front face	10	802.11n20	165	5825	0.067	0.058	-2.389	80.0	1.406	0.102	33

5.49. Variability results

According to KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, paragraph “2.8.1. SAR measurement variability”, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements.

Repeated measurements are required only when the measured 1-g SAR is ≥ 0.80 W/kg, or 10-g SAR is ≥ 2.0 W/kg, using the highest measured SAR configuration for that tissue-equivalent medium.

As all measured SAR values are below these values, no Variability measurements are needed for this device.

5.50. SPOT-CHECK results.

A spot-check measurement for the antenna model 85E.035.503.A Y9B has been performed into the highest SAR measured configuration band found for the antenna model 85E.035.503.B Y9B between bands with same tissue-equivalent liquid.

- LTE1 Antenna

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
WCDMA II	85E.035.503.A Y9B	Back face	15	CH 9262 (1852.4 MHz)	0.138	0.141	-0.34	5
WCDMA II	85E.035.503.B Y9B	Back face	15	CH 9262 (1852.4 MHz	0.110	0.108	0.00	34

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
WCDMA V	85E.035.503.A Y9B	Back face	15	CH 4233 (846.6 MHz)	0.137	0.2	0.04	9
WCDMA V	85E.035.503.B Y9B	Back face	15	CH 4233 (846.6 MHz)	0.078	0.114	0.1	35

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
LTE 7	85E.035.503.A Y9B	Back face	15	CH 21110 (2535.0 MHz)	0.0497	0.0486	0.04	13
LTE 7	85E.035.503.B Y9B	Back face	15	CH 21110 (2535.0 MHz)	0.036	0.0299	0.18	36

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
LTE 66	85E.035.503.A Y9B	Back face	15	CH 132322 (1745.0 MHz)	0.196	0.185	0.01	20
LTE 66	85E.035.503.B Y9B	Back face	15	CH 132322 (1745.0 MHz)	0.079	0.079	0.02	37

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
LTE 71	85E.035.503.A Y9B	Back face	15	CH 133297 (680.5 MHz)	0.16	0.165	0	21
LTE 71	85E.035.503.B Y9B	Back face	15	CH 133297 (680.5 MHz)	0.109	0.113	0.04	38

- LTE 2 Antenna

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
GPRS 4 slots	85E.035.503.A Y9B	Back face	15	CH 251 (848.8 MHz)	0.412	0.403	-0.01	2
GPRS 4 slots	85E.035.503.B Y9B	Back face	15	CH 251 (848.8 MHz)	0.129	0.126	-0.3	39

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
WCDMA II	85E.035.503.A Y9B	Back face	15	CH 9262 (1852.4 MHz)	0.06	0.062	0.02	6
WCDMA II	85E.035.503.B Y9B	Back face	15	CH 9262 (1852.4 MHz	0.033	0.035	0	40

Band	Antenna Model	Position	Dist (mm)	Channel (Frequency)	Estimated SAR 10-g (W/kg)	SAR 10-g (W/kg)	Power Drift (%)	Plot No.
WCDMA IV	85E.035.503.A Y9B	Back face	15	CH 1512 (1752.6 MHz)	0.106	0.162	-0.12	8
WCDMA IV	85E.035.503.B Y9B	Back face	15	CH 1512 (1752.6 MHz)	0.056	0.059	0.03	41