FCC SAR TEST REPORT

FCC ID	:	**XHG-RG1000**
Equipment	:	**Mobile Hotspot**
Model Name	:	**RG1000**
Applicant	:	**Franklin Technology Inc. 906 JEI Platz, 186, Gasan digital 1-ro, Gumcheon-Gu, Seoul, South Korea, 08502**
Manufacturer	:	**Franklin Technology Inc. 906 JEI Platz, 186, Gasan digital 1-ro, Gumcheon-Gu, Seoul, South Korea, 08502**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on May 13, 2021 and testing was started from May 22, 2021 and completed on Aug. 12, 2021. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. EMC & Wireless Communications Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan

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History of this test report

Report No.	Version	Description	Issued Date
FA140849A	01	Initial issue of report	Sep. 14, 2021

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Franklin Technology Inc., Mobile Hotspot, RG1000**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary Hotspot (Separation 10mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA II	1.10	1.56
	WCDMA V	0.68	
	LTE Band 2	1.10	
	LTE Band 5	0.53	
	LTE Band 12	0.65	
	LTE Band 13	0.89	
	LTE Band 41	1.17	
	LTE Band 48	0.48	
	LTE Band 4/66	1.11	
	FR1 n2	1.12	
	FR1 n5	0.68	
	FR1 n66	1.10	
	FR1 n77/n78	0.60	
DTS	2.4GHz WLAN	0.45	1.37
NII	5GHz WLAN	0.79	1.56
Date of Testing:		2021/5/22 ~ 2021/8/12	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Hotspot
Model Name	RG1000
FCC ID	XHG-RG1000
IMEI Code	358507752005233
S / N	FVL4000024
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n77: 3700 MHz ~ 3980 MHz 5G NR n78: 3700 MHz ~ 3800 MHz 5G NR n260 : 37 GHz ~ 40 GHz 5G NR n261 : 27.5 GHz ~ 28.35 GHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz
Mode	RMC/AMR 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/HE20/HE40/HE80
HW Version	P1
EUT Stage	Identical Prototype
Remark: 1. The device implements the power management and sensor detection for SAR compliance at different exposure conditions (hotspot) and the Qualcomm Smart Transmit will manage to ensure the power level not exceeding the associated power table.	

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	XHG-RG1000
Equipment Name	Mobile Hotspot
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**

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

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to section 12.
LTE Carrier Aggregation Additional Information	This device supports maximum of 5 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711
LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
L M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680
LTE Band 48								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560
L M	55810	3607	55815	3607.5	55820	3608	55830	3609
M H	56170	3643	56165	3642.5	56160	3642	56150	3641
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690
LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

3.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
FCC ID	XHG-RG1000
Equipment Name	Mobile Hotspot
Operating Frequency Range of each 5G NR transmission band	5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n77: 3700 MHz ~ 3980 MHz 5G NR n78: 3700 MHz ~ 3800 MHz
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz,40MHz 5G NR n77: 10MHz, 15MHz, 20MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz 5G NR n78: 10MHz, 15MHz, 20MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz
SCS	FDD: SCS15KHz, TDD: SCS30KHz
uplink modulations used	DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM CP-OFDM QPSK / 16QAM / 64QAM / 256QAM
A-MPR (Additional MPR) disabled for SAR Testing?	Yes
LTE Anchor Bands for n2	LTE B5//13/66
LTE Anchor Bands for n5	LTE B2/66
LTE Anchor Bands for n66	LTE B2/5/13
LTE Anchor Bands for n77/78	LTE B2/13/66

NR Band 2

	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860
M	376000	1880	376000	1880	376000	1880	376000	1880
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900

NR Band 5

	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	165300	826.5	165800	829	166300	831.5	166800	834
M	167300	836.5	167300	836.5	167300	836.5	167300	836.5
H	169300	846.5	168800	844	168300	841.5	167800	839

NR Band 66

	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720	346000	1730
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	352000	1760

NR Band 77

	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	648000	3720	648334	3725.01	648668	3730.02	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	665000	3975	664832	3972.48	664668	3970.02	664000	3960	663668	3955.02	663334	3950.01	662668	3940.02	662334	3935.01	662000	3930

NR Band 78

	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	648000	3720	648334	3725.01	648668	3730.02	649334	3740.01	649668	3745.02		
M	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750
H	653000	3795	652832	3792.48	652666	3789.99	652000	3780	651666	3774.99	651332	3769.98	650666	3759.99	650332	3754.98		

4. Smart Transmit feature for RF Exposure compliance

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target or PD_design_target, below the predefined time-averaged power limit (i.e., input.power.limit for 5G mmW NR), for each characterized technology and band (refer to RF exposure part0 report)

Smart Transmit allows the device to transmit at higher power instantaneously, as high as Pmax, when needed, but enforces power limiting to maintain time-averaged transmit power to Plimit. Below table shows Plimit EFS settings and maximum tune up output power Pmax configured for this EUT for various transmit conditions (Device State Index DSI).

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

Band	Antenna	TDD duty cycle	Plimit*	Pmax * (dBm)
			Body (DSI:1)	
WCDMA II	TX0	100.00%	21.9	23.0
WCDMA V	TX0	100.00%	25.2	23.0
LTE B2	TX0	100.00%	22.1	23.0
LTE B2	TX1	100.00%	25.6	23.0
LTE B66/4	TX0	100.00%	21.5	23.0
LTE B66	TX1	100.00%	22.9	23.0
LTE B5	TX0	100.00%	26.5	23.0
LTE B12/B17	TX0	100.00%	25.6	23.0
LTE B13	TX0	100.00%	24.2	23.0
LTE B41(PC3)**	TX0	63.30%	15.7	21.0
LTE B48(PC3)**	TX0	63.30%	25.7	21.0
n2	TX0	100.00%	22.8	23.0
n2	TX1	100.00%	24.8	23.0
n5	TX0	100.00%	25.5	23.0
n66	TX0	100.00%	22.8	23.0
n66	TX1	100.00%	23.8	23.0
n77/n78(PC3)	TX0	100.00%	22.0	23.0
n77(PC2)	TX0	100.00%		25.0

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + 1dB uncertainty.

**All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The max allowed output power is the P_{limit} + 1dB device uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

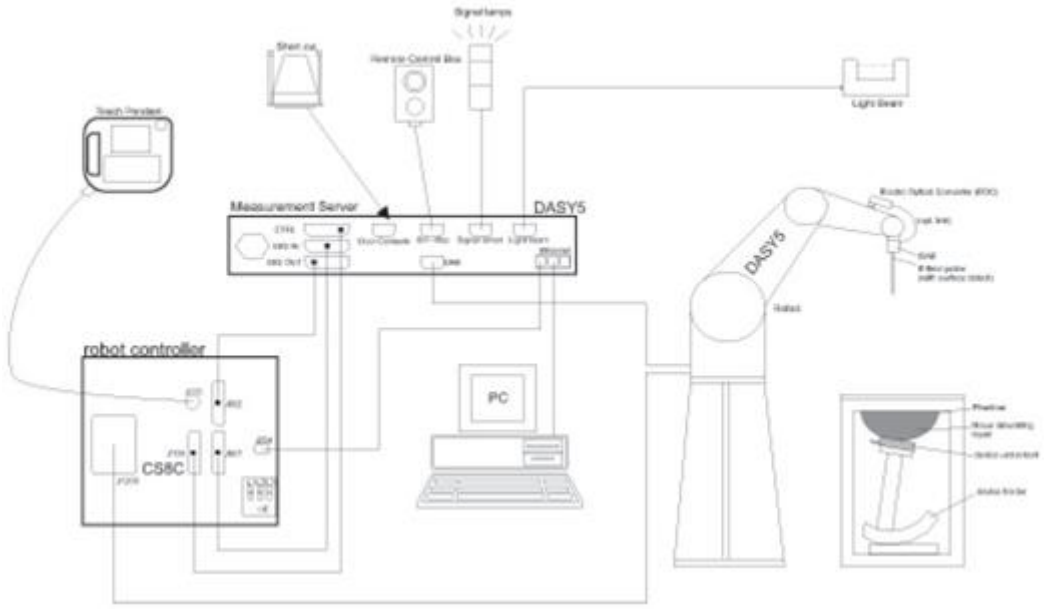
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. In system validation list test site number, if the test site number is include in the Wensan Laboratory, that's mean the test data are subcontracted to Sporton International Inc. Wensan Laboratory.

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

7.2 E-Field Probe

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

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

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

7.3 Data Acquisition Electronics (DAE)

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

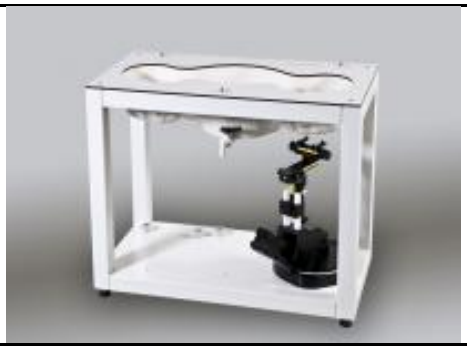
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.4 Phantom

<SAM Twin Phantom>

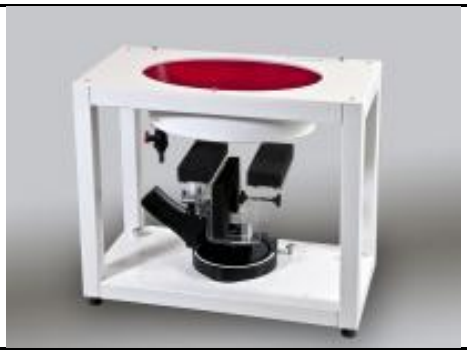
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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

<ELI Phantom>

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



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

7.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit(2)	D750V3	1107	Mar. 08, 2019	Mar. 05, 2022
SPEAG	835MHz System Validation Kit(2)	D835V2	4d167	Nov. 25, 2019	Nov. 23, 2021
SPEAG	1750MHz System Validation Kit(2)	D1750V2	1112	Mar. 07, 2019	Mar. 04, 2022
SPEAG	1900MHz System Validation Kit(2)	D1900V2	5d041	Sep. 11, 2018	Sep. 08, 2021
SPEAG	2450MHz System Validation Kit(2)	D2450V2	929	Nov. 21, 2019	Nov. 19, 2021
SPEAG	2600MHz System Validation Kit(2)	D2600V2	1008	Aug. 31, 2018	Aug. 28, 2021
SPEAG	3500MHz System Validation Kit(2)	D3500V2	1014	Jan. 29, 2019	Jan. 26, 2022
SPEAG	3700MHz System Validation Kit(2)	D3700V2	1006	Mar. 05, 2019	Mar. 02, 2022
SPEAG	3900MHz System Validation Kit(2)	D3900V2	1017	Apr. 29, 2019	Apr. 26, 2022
SPEAG	5GHz System Validation Kit	D5GHzV2	1128	Dec. 16, 2019	Dec. 14, 2021
SPEAG	Data Acquisition Electronics	DAE3	393	Apr. 09, 2021	Apr. 08, 2022
SPEAG	Data Acquisition Electronics	DAE4	699	Feb. 16, 2021	Feb. 15, 2022
SPEAG	Data Acquisition Electronics	DAE4	854	Apr. 08, 2021	Apr. 07, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	3976	Jan. 27, 2021	Jan. 26, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7306	Jul. 24, 2020	Jul. 23, 2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	7625	Jan. 19, 2021	Jan. 18, 2022
Testo	Hygro meter	608-H1	45196600	Nov. 10, 2020	Nov. 09, 2021
Testo	Hygro meter	608-H1	45207528	Nov. 10, 2020	Nov. 09, 2021
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 10, 2020	Nov. 09, 2021
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 10, 2020	Nov. 09, 2021
Keysight	Wireless Communication Test Set	E5515C	MY50267236	Mar. 21, 2021	Mar. 20, 2022
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 11, 2020	Nov. 10, 2021
Keysight	ENA Network Analyzer	E5071C	MY46104758	Sep. 03, 2020	Sep. 02, 2021
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 16, 2020	Sep. 15, 2021
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Nov. 06, 2020	Nov. 05, 2021
Anritsu	Power Meter	ML2495A	1419002	Aug. 19, 2020	Aug. 18, 2021
Anritsu	Power Meter	ML2495A	1804003	Oct. 21, 2020	Oct. 20, 2021
Anritsu	Power Sensor	MA2411B	1726150	Oct. 21, 2020	Oct. 20, 2021
R&S	Power Sensor	NRP8S	103999	Jan. 06, 2021	Jan. 05, 2022
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 16, 2021	Jul. 15, 2022
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Jan. 15, 2021	Jan. 14, 2022
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 21, 2020	Oct. 20, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	479102029	Aug. 26, 2020	Aug. 25, 2021
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

10. System Verification

10.1 Tissue Verification

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	22.4	0.888	43.087	0.89	41.90	-0.22	2.83	±5	2021/8/11
835	22.4	0.869	42.487	0.90	41.50	-3.44	2.38	±5	2021/5/22
835	22.4	0.926	42.880	0.90	41.50	2.89	3.33	±5	2021/5/31
1750	22.4	1.376	40.984	1.37	40.10	0.44	2.20	±5	2021/6/1
1750	22.4	1.376	40.984	1.37	40.10	0.44	2.20	±5	2021/6/1
1750	22.4	1.389	40.296	1.37	40.10	1.39	0.49	±5	2021/8/10
1900	22.5	1.404	39.891	1.40	40.00	0.29	-0.27	±5	2021/5/27
1900	22.4	1.395	39.811	1.40	40.00	-0.36	-0.47	±5	2021/5/31
1900	22.4	1.405	40.193	1.40	40.00	0.36	0.48	±5	2021/8/10
2450	22.4	1.798	39.076	1.80	39.20	-0.11	-0.32	±5	2021/7/7
2600	22.4	2.014	38.831	1.96	39.00	2.76	-0.43	±5	2021/8/10
3500	22.4	2.916	38.043	2.91	37.90	0.21	0.38	±5	2021/5/27
3500	22.4	2.924	38.008	2.91	37.90	0.48	0.28	±5	2021/8/12
3700	22.4	3.121	37.817	3.12	37.70	0.03	0.31	±5	2021/5/27
3700	22.4	3.130	37.778	3.12	37.70	0.32	0.21	±5	2021/8/12
3900	22.4	3.335	37.547	3.33	37.51	0.15	0.10	±5	2021/8/12
5250	22.4	4.601	35.923	4.71	35.95	-2.31	-0.08	±5	2021/7/7
5750	22.4	5.095	35.231	5.22	35.35	-2.39	-0.34	±5	2021/7/7

10.2 System Performance Check Results

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

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
SAR13-HY	2021/8/11	750	50	D750V3-1107	EX3DV4 - SN3976	DAE4 Sn699	0.39	8.32	7.8	-6.25
SAR04-HY	2021/5/22	835	50	D835V2-4d167	EX3DV4 - SN7306	DAE4 Sn699	0.48	9.55	9.52	-0.31
SAR15-HY	2021/5/31	835	250	D835V2-4d167	EX3DV4 - SN7625	DAE4 Sn854	2.43	9.55	9.72	1.78
SAR13-HY	2021/6/1	1750	50	D1750V2-1112	EX3DV4 - SN3976	DAE4 Sn854	1.84	36.70	36.8	0.27
SAR15-HY	2021/6/1	1750	250	D1750V2-1112	EX3DV4 - SN7625	DAE4 Sn854	8.85	36.70	35.4	-3.54
SAR13-HY	2021/8/10	1750	50	D1750V2-1112	EX3DV4 - SN3976	DAE4 Sn699	1.86	36.70	37.2	1.36
SAR13-HY	2021/5/27	1900	50	D1900V2-5d041	EX3DV4 - SN3976	DAE4 Sn854	1.98	40.20	39.6	-1.49
SAR15-HY	2021/5/31	1900	250	D1900V2-5d041	EX3DV4 - SN7625	DAE4 Sn854	9.88	40.20	39.52	-1.69
SAR13-HY	2021/8/10	1900	50	D1900V2-5d041	EX3DV4 - SN3976	DAE4 Sn699	1.97	40.20	39.4	-1.99
SAR15-HY	2021/7/7	2450	250	D2450V2-929	EX3DV4 - SN7625	DAE4 Sn699	12.80	53.10	51.2	-3.58
SAR13-HY	2021/8/10	2600	50	D2600V2-1008	EX3DV4 - SN3976	DAE4 Sn699	2.98	56.40	59.6	5.67
SAR13-HY	2021/5/27	3500	50	D3500V2-1014	EX3DV4 - SN3976	DAE4 Sn699	3.26	67.90	65.2	-3.98
SAR15-HY	2021/8/12	3500	100	D3500V2-1014	EX3DV4 - SN7625	DAE3 Sn393	6.34	67.90	63.4	-6.63
SAR13-HY	2021/5/27	3700	50	D3700V2-1006	EX3DV4 - SN3976	DAE4 Sn699	3.31	67.30	66.2	-1.63
SAR15-HY	2021/8/12	3700	100	D3700V2-1006	EX3DV4 - SN7625	DAE3 Sn393	6.87	67.30	68.7	2.08
SAR15-HY	2021/8/12	3900	100	D3900V2-1017-3900	EX3DV4 - SN7625	DAE3 Sn393	7.10	69.50	71	2.16
SAR15-HY	2021/7/7	5250	100	D5GHzV2-1128-5250	EX3DV4 - SN7625	DAE4 Sn699	7.95	80.00	79.5	-0.63
SAR15-HY	2021/7/7	5750	100	D5GHzV2-1128-5750	EX3DV4 - SN7625	DAE4 Sn699	7.53	79.10	75.3	-4.80

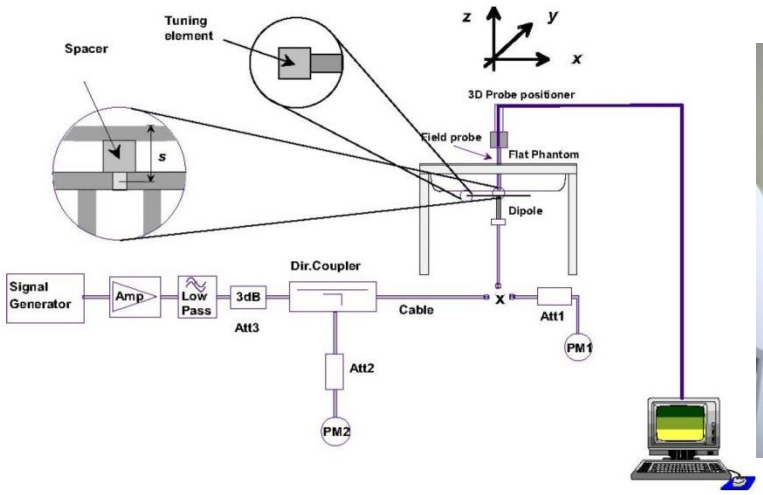


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

12. UMTS/LTE Output Power (Unit: dBm)

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

<WCDMA Conducted Power>

General Note:

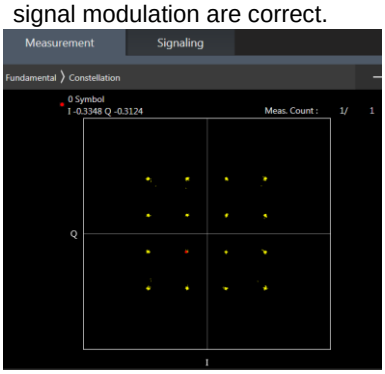
1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA , and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA .

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	22.66	22.73	22.72	22.90	23.09	23.22	23.54	24.00
3GPP Rel 6	HSDPA Subtest-1	21.27	21.46	21.27	21.90	22.05	22.35	22.66	23.00
3GPP Rel 6	HSDPA Subtest-2	21.53	21.72	21.67	21.90	22.16	22.45	22.82	23.00
3GPP Rel 6	HSDPA Subtest-3	21.03	21.23	21.19	21.40	21.66	21.85	22.26	22.50
3GPP Rel 6	HSDPA Subtest-4	20.99	21.15	21.17	21.40	21.62	21.87	22.25	22.50
3GPP Rel 6	HSUPA Subtest-1	21.60	21.61	21.68	21.90	22.05	22.31	22.62	23.00
3GPP Rel 6	HSUPA Subtest-2	19.44	19.73	19.70	19.90	20.07	20.31	20.57	21.00
3GPP Rel 6	HSUPA Subtest-3	20.53	20.69	20.60	20.90	21.19	21.42	21.62	22.00
3GPP Rel 6	HSUPA Subtest-4	19.60	19.66	19.73	19.90	20.15	20.44	20.66	21.00
3GPP Rel 6	HSUPA Subtest-5	21.52	21.69	21.64	21.90	22.06	22.32	22.57	23.00

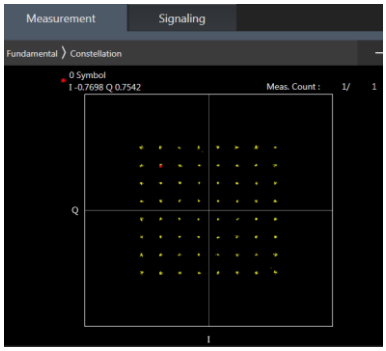
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B5/B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 4 SAR test was covered by Band 66; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 16QAM, 64QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



16QAM



64QAM

<LTE Band 2 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.74	22.81	22.69	23.1	0
20	QPSK	1	49	22.19	22.33	22.06		
20	QPSK	1	99	22.23	22.21	22.18		
20	QPSK	50	0	21.46	21.47	21.37	22.1	1
20	QPSK	50	24	21.40	21.37	21.31		
20	QPSK	50	50	21.33	21.45	21.32		
20	QPSK	100	0	21.38	21.39	21.22		
20	16QAM	1	0	21.54	21.59	21.49	22.1	1
20	16QAM	1	49	21.45	21.60	21.46		
20	16QAM	1	99	21.57	21.61	21.51		
20	16QAM	50	0	20.23	20.35	20.20	21.1	2
20	16QAM	50	24	20.42	20.39	20.30		
20	16QAM	50	50	20.36	20.47	20.29		
20	16QAM	100	0	20.30	20.34	20.21		
20	64QAM	1	0	20.38	20.46	20.37	21.1	2
20	64QAM	1	49	20.40	20.45	20.38		
20	64QAM	1	99	20.56	20.43	20.42		
20	64QAM	50	0	19.34	19.38	19.27	20.1	3
20	64QAM	50	24	19.43	19.39	19.34		
20	64QAM	50	50	19.43	19.42	19.34		
20	64QAM	100	0	19.38	19.37	19.20		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.76	22.65	22.62	23.1	0
15	QPSK	1	37	22.12	22.31	21.99		
15	QPSK	1	74	22.15	22.20	22.11		
15	QPSK	36	0	21.37	21.40	21.29	22.1	1
15	QPSK	36	20	21.32	21.31	21.23		
15	QPSK	36	39	21.26	21.45	21.32		
15	QPSK	75	0	21.32	21.30	21.14		
15	16QAM	1	0	21.46	21.50	21.48	22.1	1
15	16QAM	1	37	21.44	21.51	21.43		
15	16QAM	1	74	21.54	21.55	21.43		
15	16QAM	36	0	20.17	20.29	20.11	21.1	2
15	16QAM	36	20	20.35	20.35	20.25		
15	16QAM	36	39	20.34	20.39	20.19		
15	16QAM	75	0	20.20	20.33	20.14		
15	64QAM	1	0	20.34	20.42	20.29	21.1	2
15	64QAM	1	37	20.39	20.43	20.28		
15	64QAM	1	74	20.56	20.34	20.33		
15	64QAM	36	0	19.33	19.31	19.18	20.1	3
15	64QAM	36	20	19.42	19.38	19.31		
15	64QAM	36	39	19.36	19.33	19.24		
15	64QAM	75	0	19.35	19.35	19.10		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.70	22.57	22.61	23.1	0
10	QPSK	1	25	22.02	22.24	21.94		
10	QPSK	1	49	22.13	22.14	22.07		
10	QPSK	25	0	21.30	21.36	21.24	22.1	1
10	QPSK	25	12	21.22	21.26	21.16		

10	QPSK	25	25	21.21	21.37	21.25		
10	QPSK	50	0	21.24	21.25	21.22		
10	16QAM	1	0	21.36	21.50	21.39	22.1	1
10	16QAM	1	25	21.35	21.48	21.40		
10	16QAM	1	49	21.44	21.51	21.43		
10	16QAM	25	0	20.10	20.24	20.10	21.1	2
10	16QAM	25	12	20.28	20.27	20.15		
10	16QAM	25	25	20.27	20.38	20.10		
10	16QAM	50	0	20.20	20.32	20.09		
10	64QAM	1	0	20.26	20.39	20.28	21.1	2
10	64QAM	1	25	20.31	20.34	20.24		
10	64QAM	1	49	20.49	20.31	20.29		
10	64QAM	25	0	19.27	19.29	19.10	20.1	3
10	64QAM	25	12	19.37	19.37	19.28		
10	64QAM	25	25	19.34	19.33	19.20		
10	64QAM	50	0	19.26	19.32	19.00		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.63	22.48	22.53	23.1	0
5	QPSK	1	12	21.97	22.19	21.87		
5	QPSK	1	24	22.03	22.06	22.00		
5	QPSK	12	0	21.26	21.27	21.19	22.1	1
5	QPSK	12	7	21.21	21.16	21.16		
5	QPSK	12	13	21.19	21.34	21.16		
5	QPSK	25	0	21.21	21.19	21.11		
5	16QAM	1	0	21.26	21.47	21.29	22.1	1
5	16QAM	1	12	21.30	21.44	21.39		
5	16QAM	1	24	21.40	21.48	21.39		
5	16QAM	12	0	20.01	20.24	20.04	21.1	2
5	16QAM	12	7	20.18	20.17	20.06		
5	16QAM	12	13	20.23	20.35	20.04		
5	16QAM	25	0	20.10	20.30	20.05		
5	64QAM	1	0	20.24	20.32	20.22	21.1	2
5	64QAM	1	12	20.31	20.33	20.20		
5	64QAM	1	24	20.39	20.30	20.21		
5	64QAM	12	0	19.26	19.29	19.09	20.1	3
5	64QAM	12	7	19.27	19.35	19.25		
5	64QAM	12	13	19.24	19.24	19.14		
5	64QAM	25	0	19.20	19.26	19.24		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.67	22.45	22.56	23.1	0
3	QPSK	1	8	22.02	22.12	21.83		
3	QPSK	1	14	22.08	21.89	21.94		
3	QPSK	8	0	21.11	21.23	21.26	22.1	1
3	QPSK	8	4	21.14	21.15	21.15		
3	QPSK	8	7	21.14	21.30	21.16		
3	QPSK	15	0	21.24	21.20	21.24		
3	16QAM	1	0	21.27	21.37	21.20	22.1	1
3	16QAM	1	8	21.36	21.40	21.31		
3	16QAM	1	14	21.37	21.34	21.30		
3	16QAM	8	0	20.06	20.10	20.16	21.1	2
3	16QAM	8	4	20.21	20.24	20.11		
3	16QAM	8	7	20.18	20.28	20.10		
3	16QAM	15	0	20.06	20.23	20.24		
3	64QAM	1	0	20.11	20.24	20.27	21.1	2

3	64QAM	1	8	20.30	20.21	20.20		
3	64QAM	1	14	20.46	20.25	20.23		
3	64QAM	8	0	19.14	19.18	19.22	20.1	3
3	64QAM	8	4	19.27	19.19	19.10		
3	64QAM	8	7	19.23	19.13	19.08		
3	64QAM	15	0	19.26	19.23	19.03		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.55	22.45	22.43	23.1	0
1.4	QPSK	1	3	21.81	22.03	21.86		
1.4	QPSK	1	5	22.00	22.01	21.91		
1.4	QPSK	3	0	21.24	21.25	21.22		
1.4	QPSK	3	1	21.10	21.24	21.34		
1.4	QPSK	3	3	21.19	21.21	21.26		
1.4	QPSK	6	0	21.12	21.18	21.11	22.1	1
1.4	16QAM	1	0	21.35	21.25	21.26	22.1	1
1.4	16QAM	1	3	21.11	21.29	21.16		
1.4	16QAM	1	5	21.38	21.31	21.29		
1.4	16QAM	3	0	21.19	21.28	21.29		
1.4	16QAM	3	1	21.11	21.17	21.28		
1.4	16QAM	3	3	21.22	21.29	21.34		
1.4	16QAM	6	0	20.05	20.05	20.14	21.1	2
1.4	64QAM	1	0	20.10	20.25	20.20	21.1	2
1.4	64QAM	1	3	20.17	20.17	20.12		
1.4	64QAM	1	5	20.32	20.24	20.17		
1.4	64QAM	3	0	20.11	19.23	19.13		
1.4	64QAM	3	1	20.05	20.24	20.26		
1.4	64QAM	3	3	20.07	20.18	20.16		
1.4	64QAM	6	0	19.17	19.21	19.24	20.1	3

<LTE Band 2_TX1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	23.03	22.82	22.84	24	0
20	QPSK	1	49	22.71	22.70	22.56		
20	QPSK	1	99	22.73	22.86	22.59		
20	QPSK	50	0	22.01	21.99	21.78	23	1
20	QPSK	50	24	21.95	21.90	21.66		
20	QPSK	50	50	21.85	21.86	21.61		
20	QPSK	100	0	21.96	21.96	21.68		
20	16QAM	1	0	22.18	22.00	22.08	23	1
20	16QAM	1	49	21.91	21.92	21.74		
20	16QAM	1	99	21.63	21.56	21.72		
20	16QAM	50	0	20.84	20.81	21.67	22	2
20	16QAM	50	24	20.90	20.87	20.70		
20	16QAM	50	50	20.84	20.78	21.60		
20	16QAM	100	0	20.88	20.91	20.63		
20	64QAM	1	0	20.84	20.56	20.15	22	2
20	64QAM	1	49	20.91	21.00	20.97		
20	64QAM	1	99	20.99	20.97	20.89		
20	64QAM	50	0	19.78	19.84	19.72	21	3
20	64QAM	50	24	19.89	19.90	19.83		
20	64QAM	50	50	19.81	19.83	19.67		
20	64QAM	100	0	19.95	19.93	19.63		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.97	22.70	22.64	24	0
15	QPSK	1	37	22.63	22.53	22.54		
15	QPSK	1	74	22.56	22.78	22.53		
15	QPSK	36	0	21.90	21.87	21.72	23	1
15	QPSK	36	20	21.78	21.90	21.53		
15	QPSK	36	39	21.83	21.85	21.51		
15	QPSK	75	0	21.78	21.93	21.62		
15	16QAM	1	0	22.15	21.96	21.91	23	1
15	16QAM	1	37	21.74	21.74	21.73		
15	16QAM	1	74	21.62	21.37	21.56		
15	16QAM	36	0	20.83	20.70	21.59	22	2
15	16QAM	36	20	20.89	20.70	20.64		
15	16QAM	36	39	20.64	20.73	21.40		
15	16QAM	75	0	20.76	20.88	20.55		
15	64QAM	1	0	20.65	20.39	19.97	22	2
15	64QAM	1	37	20.87	20.92	20.97		
15	64QAM	1	74	20.92	20.80	20.71		
15	64QAM	36	0	19.72	19.79	19.65	21	3
15	64QAM	36	20	19.79	19.75	19.68		
15	64QAM	36	39	19.80	19.65	19.61		
15	64QAM	75	0	19.82	19.77	19.55		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.82	22.57	22.50	24	0
10	QPSK	1	25	22.48	22.47	22.38		
10	QPSK	1	49	22.37	22.69	22.43		
10	QPSK	25	0	21.70	21.79	21.62	23	1

10	QPSK	25	12	21.58	21.83	21.51		
10	QPSK	25	25	21.76	21.67	21.46		
10	QPSK	50	0	21.65	21.87	21.45		
10	16QAM	1	0	21.96	21.81	21.91		
10	16QAM	1	25	21.62	21.59	21.60	23	1
10	16QAM	1	49	21.49	21.20	21.51		
10	16QAM	25	0	20.77	20.61	21.50		
10	16QAM	25	12	20.82	20.52	20.59	22	2
10	16QAM	25	25	20.64	20.57	21.33		
10	16QAM	50	0	20.56	20.73	20.42		
10	64QAM	1	0	20.63	20.23	19.78		
10	64QAM	1	25	20.82	20.90	20.90	22	2
10	64QAM	1	49	20.90	20.60	20.58		
10	64QAM	25	0	19.72	19.77	19.48		
10	64QAM	25	12	19.59	19.56	19.56	21	3
10	64QAM	25	25	19.78	19.49	19.56		
10	64QAM	50	0	19.67	19.60	19.38		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.72	22.57	22.36		
5	QPSK	1	12	22.40	22.29	22.22	24	0
5	QPSK	1	24	22.25	22.62	22.39		
5	QPSK	12	0	21.61	21.76	21.42		
5	QPSK	12	7	21.42	21.77	21.36	23	1
5	QPSK	12	13	21.75	21.48	21.28		
5	QPSK	25	0	21.63	21.80	21.32		
5	16QAM	1	0	21.82	21.77	21.89		
5	16QAM	1	12	21.44	21.57	21.50	23	1
5	16QAM	1	24	21.32	21.02	21.47		
5	16QAM	12	0	20.69	20.45	21.48		
5	16QAM	12	7	20.75	20.45	20.58	22	2
5	16QAM	12	13	20.53	20.52	21.27		
5	16QAM	25	0	20.51	20.63	20.29		
5	64QAM	1	0	20.44	20.15	19.78		
5	64QAM	1	12	20.79	20.81	20.70	22	2
5	64QAM	1	24	20.70	20.57	20.49		
5	64QAM	12	0	19.59	19.59	19.28		
5	64QAM	12	7	19.46	19.54	19.50	21	3
5	64QAM	12	13	19.70	19.34	19.53		
5	64QAM	25	0	19.49	19.54	19.33		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.57	22.45	22.35		
3	QPSK	1	8	22.28	22.20	22.19	24	0
3	QPSK	1	14	22.19	22.43	22.38		
3	QPSK	8	0	21.47	21.58	21.38		
3	QPSK	8	4	21.29	21.74	21.29	23	1
3	QPSK	8	7	21.56	21.41	21.22		
3	QPSK	15	0	21.55	21.62	21.22		
3	16QAM	1	0	21.79	21.71	21.85		
3	16QAM	1	8	21.44	21.54	21.46	23	1
3	16QAM	1	14	21.32	20.94	21.36		
3	16QAM	8	0	20.52	20.43	21.43		
3	16QAM	8	4	20.73	20.31	20.44	22	2
3	16QAM	8	7	20.38	20.52	21.21		
3	16QAM	15	0	20.41	20.57	20.22		

3	64QAM	1	0	20.25	20.05	19.77	22	2
3	64QAM	1	8	20.78	20.73	20.61		
3	64QAM	1	14	20.57	20.52	20.38		
3	64QAM	8	0	19.56	19.41	19.23	21	3
3	64QAM	8	4	19.40	19.34	19.44		
3	64QAM	8	7	19.64	19.16	19.49		
3	64QAM	15	0	19.32	19.50	19.14		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.55	22.60	22.64	24	0
1.4	QPSK	1	3	22.56	22.62	22.56		
1.4	QPSK	1	5	22.57	22.58	22.58		
1.4	QPSK	3	0	22.59	22.55	22.64		
1.4	QPSK	3	1	22.55	22.58	22.55		
1.4	QPSK	3	3	22.63	22.62	22.64		
1.4	QPSK	6	0	21.85	21.84	21.86	23	1
1.4	16QAM	1	0	21.92	21.86	21.88	23	1
1.4	16QAM	1	3	21.92	21.91	21.91		
1.4	16QAM	1	5	21.93	21.94	21.90		
1.4	16QAM	3	0	21.86	21.92	21.88		
1.4	16QAM	3	1	21.88	21.89	21.93		
1.4	16QAM	3	3	21.92	21.84	21.84		
1.4	16QAM	6	0	20.91	20.95	20.94	22	2
1.4	64QAM	1	0	20.97	20.90	20.95	22	2
1.4	64QAM	1	3	20.97	20.99	20.90		
1.4	64QAM	1	5	21.00	20.95	20.91		
1.4	64QAM	3	0	20.93	20.97	20.94		
1.4	64QAM	3	1	20.93	20.94	20.93		
1.4	64QAM	3	3	20.98	20.96	20.95		
1.4	64QAM	6	0	19.57	19.68	19.88	21	3

<LTE Band 4 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	21.39	21.31	21.25	22.5	0
20	QPSK	1	49	21.16	21.14	21.06		
20	QPSK	1	99	21.33	21.25	21.24		
20	QPSK	50	0	21.38	21.30	21.28	22.5	0
20	QPSK	50	24	21.36	21.29	21.23		
20	QPSK	50	50	21.34	21.25	21.19		
20	QPSK	100	0	21.35	21.34	21.21		
20	16QAM	1	0	21.38	21.29	21.16	22.5	0
20	16QAM	1	49	21.31	21.25	21.18		
20	16QAM	1	99	21.32	21.29	21.18		
20	16QAM	50	0	20.18	20.30	20.20	21	1.5
20	16QAM	50	24	20.38	20.32	20.26		
20	16QAM	50	50	20.32	20.43	20.30		
20	16QAM	100	0	20.32	20.28	20.16		
20	64QAM	1	0	20.34	20.48	20.37	21	1.5
20	64QAM	1	49	20.40	20.39	20.37		
20	64QAM	1	99	20.49	20.46	20.41		
20	64QAM	50	0	19.30	19.38	19.26	20	2.5
20	64QAM	50	24	19.37	19.32	19.35		
20	64QAM	50	50	19.38	19.36	19.32		
20	64QAM	100	0	19.36	19.34	19.17		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.33	21.33	21.24	22.5	0
15	QPSK	1	37	21.18	21.17	21.07		
15	QPSK	1	74	21.27	21.20	21.20		
15	QPSK	36	0	21.39	21.27	21.11	22.5	0
15	QPSK	36	20	21.38	21.28	21.22		
15	QPSK	36	39	21.31	21.25	21.17		
15	QPSK	75	0	21.29	21.37	21.15		
15	16QAM	1	0	21.38	21.26	21.13	22.5	0
15	16QAM	1	37	21.27	21.25	21.21		
15	16QAM	1	74	21.27	21.31	21.14		
15	16QAM	36	0	20.12	20.31	20.22	21	1.5
15	16QAM	36	20	20.40	20.25	20.22		
15	16QAM	36	39	20.30	20.39	20.28		
15	16QAM	75	0	20.28	20.22	20.13		
15	64QAM	1	0	20.36	20.44	20.39	21	1.5
15	64QAM	1	37	20.40	20.32	20.40		
15	64QAM	1	74	20.46	20.44	20.38		
15	64QAM	36	0	19.27	19.33	19.27	20	2.5
15	64QAM	36	20	19.30	19.29	19.37		
15	64QAM	36	39	19.40	19.30	19.34		
15	64QAM	75	0	19.39	19.32	19.16		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.31	21.29	21.27	22.5	0
10	QPSK	1	25	21.16	21.16	21.01		
10	QPSK	1	49	21.29	21.13	21.20		
10	QPSK	25	0	21.38	21.21	21.13	22.5	0
10	QPSK	25	12	21.35	21.21	21.19		

10	QPSK	25	25	21.33	21.28	21.18		
10	QPSK	50	0	21.25	21.32	21.15		
10	16QAM	1	0	21.39	21.26	21.13	22.5	0
10	16QAM	1	25	21.21	21.20	21.23		
10	16QAM	1	49	21.30	21.28	21.14		
10	16QAM	25	0	20.07	20.27	20.20	21	1.5
10	16QAM	25	12	20.37	20.23	20.17		
10	16QAM	25	25	20.28	20.42	20.27		
10	16QAM	50	0	20.25	20.20	20.07		
10	64QAM	1	0	20.32	20.46	20.33	21	1.5
10	64QAM	1	25	20.37	20.27	20.35		
10	64QAM	1	49	20.39	20.45	20.39		
10	64QAM	25	0	19.22	19.30	19.26	20	2.5
10	64QAM	25	12	19.29	19.24	19.34		
10	64QAM	25	25	19.43	19.26	19.28		
10	64QAM	50	0	19.33	19.32	19.15		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	21.29	21.30	21.21	22.5	0
5	QPSK	1	12	21.19	21.13	20.99		
5	QPSK	1	24	21.24	21.07	21.15		
5	QPSK	12	0	21.36	21.17	21.16	22.5	0
5	QPSK	12	7	21.28	21.16	21.20		
5	QPSK	12	13	21.29	21.28	21.19		
5	QPSK	25	0	21.18	21.26	21.08		
5	16QAM	1	0	21.32	21.27	21.07	22.5	0
5	16QAM	1	12	21.21	21.19	21.19		
5	16QAM	1	24	21.24	21.31	21.16		
5	16QAM	12	0	20.00	20.22	20.16	21	1.5
5	16QAM	12	7	20.39	20.20	20.11		
5	16QAM	12	13	20.31	20.42	20.23		
5	16QAM	25	0	20.25	20.19	20.09		
5	64QAM	1	0	20.29	20.41	20.35	21	1.5
5	64QAM	1	12	20.39	20.22	20.28		
5	64QAM	1	24	20.34	20.39	20.36		
5	64QAM	12	0	19.15	19.27	19.29	20	2.5
5	64QAM	12	7	19.25	19.22	19.33		
5	64QAM	12	13	19.46	19.26	19.22		
5	64QAM	25	0	19.31	19.30	19.08		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	21.30	21.31	21.21	22.5	0
3	QPSK	1	8	21.18	21.13	20.97		
3	QPSK	1	14	21.24	21.02	21.10		
3	QPSK	8	0	21.35	21.19	21.14	22.5	0
3	QPSK	8	4	21.26	21.10	21.22		
3	QPSK	8	7	21.30	21.29	21.13		
3	QPSK	15	0	21.21	21.28	21.04		
3	16QAM	1	0	21.31	21.22	21.08	22.5	0
3	16QAM	1	8	21.22	21.12	21.13		
3	16QAM	1	14	21.19	21.32	21.11		
3	16QAM	8	0	20.03	20.20	20.10	21	1.5
3	16QAM	8	4	20.41	20.17	20.08		
3	16QAM	8	7	20.26	20.44	20.19		
3	16QAM	15	0	20.24	20.16	20.08		
3	64QAM	1	0	20.27	20.40	20.35	21	1.5

3	64QAM	1	8	20.33	20.24	20.30		
3	64QAM	1	14	20.29	20.35	20.38		
3	64QAM	8	0	19.15	19.24	19.28	20	2.5
3	64QAM	8	4	19.18	19.16	19.35		
3	64QAM	8	7	19.39	19.23	19.15		
3	64QAM	15	0	19.27	19.26	19.10		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.27	21.24	21.24	22.5	0
1.4	QPSK	1	3	21.14	21.13	21.00		
1.4	QPSK	1	5	21.20	21.02	21.03		
1.4	QPSK	3	0	21.28	21.12	21.16		
1.4	QPSK	3	1	21.21	21.13	21.16		
1.4	QPSK	3	3	21.29	21.29	21.12		
1.4	QPSK	6	0	21.19	21.26	20.99	22.5	0
1.4	16QAM	1	0	21.29	21.17	21.03	22.5	0
1.4	16QAM	1	3	21.24	21.12	21.14		
1.4	16QAM	1	5	21.15	21.34	21.11		
1.4	16QAM	3	0	21.27	21.19	21.04		
1.4	16QAM	3	1	21.19	21.09	21.07		
1.4	16QAM	3	3	21.08	21.37	21.12		
1.4	16QAM	6	0	20.01	20.08	20.13	22	0.5
1.4	64QAM	1	0	20.03	20.24	20.18	22	0.5
1.4	64QAM	1	3	20.17	20.18	20.07		
1.4	64QAM	1	5	20.35	20.22	20.13		
1.4	64QAM	3	0	20.08	20.11	20.10		
1.4	64QAM	3	1	20.08	20.24	20.19		
1.4	64QAM	3	3	20.10	20.20	20.15		
1.4	64QAM	6	0	19.10	19.20	19.18	21	1.5

<LTE Band 5 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.22	23.35	23.34	24	0
10	QPSK	1	25	23.11	23.20	23.33		
10	QPSK	1	49	23.17	23.30	23.29		
10	QPSK	25	0	22.31	22.52	22.51	23	1
10	QPSK	25	12	22.30	22.36	22.43		
10	QPSK	25	25	22.26	22.42	22.49		
10	QPSK	50	0	22.29	22.36	22.44		
10	16QAM	1	0	22.52	22.59	22.69	23	1
10	16QAM	1	25	22.52	22.66	22.75		
10	16QAM	1	49	22.65	22.71	22.03		
10	16QAM	25	0	21.20	21.33	21.44	22	2
10	16QAM	25	12	21.31	21.34	21.43		
10	16QAM	25	25	21.26	21.45	21.44		
10	16QAM	50	0	21.32	21.33	21.45		
10	64QAM	1	0	21.43	21.42	21.59	22	2
10	64QAM	1	25	21.13	21.56	20.89		
10	64QAM	1	49	21.13	21.57	20.01		
10	64QAM	25	0	20.10	20.35	19.98	21	3
10	64QAM	25	12	20.20	20.41	20.11		
10	64QAM	25	25	20.30	20.48	20.23		
10	64QAM	50	0	20.33	20.34	20.10		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.05	23.31	23.33	24	0
5	QPSK	1	12	23.09	23.12	23.30		
5	QPSK	1	24	23.13	23.24	23.20		
5	QPSK	12	0	22.31	22.35	22.34	23	1
5	QPSK	12	7	22.30	22.23	22.23		
5	QPSK	12	13	22.17	22.39	22.46		
5	QPSK	25	0	22.10	22.25	22.30		
5	16QAM	1	0	22.47	22.52	22.49	23	1
5	16QAM	1	12	22.44	22.47	22.73		
5	16QAM	1	24	22.63	22.51	22.00		
5	16QAM	12	0	21.10	21.22	21.26	22	2
5	16QAM	12	7	21.23	21.27	21.28		
5	16QAM	12	13	21.09	21.30	21.27		
5	16QAM	25	0	21.22	21.25	21.37		
5	64QAM	1	0	21.39	21.33	21.48	22	2
5	64QAM	1	12	21.11	21.44	20.89		
5	64QAM	1	24	21.12	21.40	19.98		
5	64QAM	12	0	20.05	20.21	19.96	21	3
5	64QAM	12	7	20.18	20.37	19.92		
5	64QAM	12	13	20.10	20.43	20.06		
5	64QAM	25	0	20.30	20.27	19.90		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.92	23.31	23.13	24	0
3	QPSK	1	8	23.09	23.01	23.30		
3	QPSK	1	14	23.06	23.10	23.05		
3	QPSK	8	0	22.26	22.27	22.14	23	1
3	QPSK	8	4	22.20	22.09	22.19		

3	QPSK	8	7	22.00	22.31	22.36		
3	QPSK	15	0	21.98	22.13	22.17		
3	16QAM	1	0	22.39	22.46	22.38	23	1
3	16QAM	1	8	22.40	22.42	22.67		
3	16QAM	1	14	22.59	22.42	21.96		
3	16QAM	8	0	21.04	21.21	21.23	22	2
3	16QAM	8	4	21.18	21.08	21.24		
3	16QAM	8	7	20.97	21.13	21.21		
3	16QAM	15	0	21.07	21.09	21.22		
3	64QAM	1	0	21.23	21.13	21.39	22	2
3	64QAM	1	8	20.94	21.36	20.70		
3	64QAM	1	14	21.06	21.28	19.81		
3	64QAM	8	0	20.03	20.13	19.81	21	3
3	64QAM	8	4	19.99	20.23	19.89		
3	64QAM	8	7	19.96	20.40	20.06		
3	64QAM	15	0	20.21	20.23	19.70		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.51	22.54	22.83	24	0
1.4	QPSK	1	3	22.83	22.62	22.69		
1.4	QPSK	1	5	22.62	22.47	22.76		
1.4	QPSK	3	0	22.55	22.74	22.53		
1.4	QPSK	3	1	22.69	22.63	22.43		
1.4	QPSK	3	3	22.59	22.70	22.44		
1.4	QPSK	6	0	21.51	21.87	21.48	23	1
1.4	16QAM	1	0	21.70	21.45	21.71	23	1
1.4	16QAM	1	3	21.52	21.64	21.55		
1.4	16QAM	1	5	21.60	21.59	21.67		
1.4	16QAM	3	0	21.87	21.75	21.68		
1.4	16QAM	3	1	21.66	21.49	21.64		
1.4	16QAM	3	3	21.58	21.68	21.46		
1.4	16QAM	6	0	20.92	20.77	20.80	22	2
1.4	64QAM	1	0	20.79	20.86	20.83	22	2
1.4	64QAM	1	3	20.86	20.85	20.85		
1.4	64QAM	1	5	20.89	20.85	20.87		
1.4	64QAM	3	0	20.81	20.83	20.99		
1.4	64QAM	3	1	20.77	20.88	20.72		
1.4	64QAM	3	3	20.99	20.93	20.69		
1.4	64QAM	6	0	20.99	20.91	20.71	21	3

<LTE Band 12 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	23.69	23.70	23.62	24	0
10	QPSK	1	25	23.64	23.58	23.53		
10	QPSK	1	49	23.66	23.58	23.57		
10	QPSK	25	0	22.90	22.79	22.78	23	1
10	QPSK	25	12	22.89	22.76	22.76		
10	QPSK	25	25	22.85	22.72	22.76		
10	QPSK	50	0	22.86	22.76	22.82		
10	16QAM	1	0	22.85	22.78	22.99	23	1
10	16QAM	1	25	22.68	22.85	22.93		
10	16QAM	1	49	22.92	22.92	22.90		
10	16QAM	25	0	21.81	21.76	21.78	22	2
10	16QAM	25	12	21.85	21.78	21.81		
10	16QAM	25	25	21.90	21.71	21.75		
10	16QAM	50	0	21.86	21.78	21.79		
10	64QAM	1	0	21.95	21.91	21.86	22	2
10	64QAM	1	25	21.92	21.96	21.78		
10	64QAM	1	49	21.92	21.85	21.73		
10	64QAM	25	0	20.86	20.81	20.83	21	3
10	64QAM	25	12	20.99	20.81	20.81		
10	64QAM	25	25	20.88	20.76	20.81		
10	64QAM	50	0	20.87	20.79	20.83		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.60	23.58	23.51	24	0
5	QPSK	1	12	23.54	23.45	23.33		
5	QPSK	1	24	23.58	23.52	23.44		
5	QPSK	12	0	22.70	22.67	22.60	23	1
5	QPSK	12	7	22.71	22.66	22.63		
5	QPSK	12	13	22.85	22.55	22.60		
5	QPSK	25	0	22.72	22.61	22.81		
5	16QAM	1	0	22.76	22.61	22.92	23	1
5	16QAM	1	12	22.49	22.73	22.84		
5	16QAM	1	24	22.77	22.79	22.86		
5	16QAM	12	0	21.72	21.62	21.61	22	2
5	16QAM	12	7	21.67	21.74	21.62		
5	16QAM	12	13	21.72	21.68	21.57		
5	16QAM	25	0	21.85	21.59	21.70		
5	64QAM	1	0	21.86	21.81	21.85	22	2
5	64QAM	1	12	21.83	21.76	21.58		
5	64QAM	1	24	21.84	21.77	21.72		
5	64QAM	12	0	20.67	20.67	20.72	21	3
5	64QAM	12	7	20.90	20.74	20.76		
5	64QAM	12	13	20.73	20.59	20.70		
5	64QAM	25	0	20.71	20.60	20.81		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.53	23.40	23.43	24	0
3	QPSK	1	8	23.41	23.32	23.18		
3	QPSK	1	14	23.52	23.39	23.39		
3	QPSK	8	0	22.68	22.52	22.42	23	1
3	QPSK	8	4	22.60	22.65	22.43		

3	QPSK	8	7	22.66	22.51	22.43		
3	QPSK	15	0	22.70	22.48	22.72		
3	16QAM	1	0	22.61	22.61	22.84	23	1
3	16QAM	1	8	22.30	22.65	22.71		
3	16QAM	1	14	22.58	22.72	22.85		
3	16QAM	8	0	21.54	21.59	21.54	22	2
3	16QAM	8	4	21.48	21.71	21.60		
3	16QAM	8	7	21.65	21.54	21.43		
3	16QAM	15	0	21.84	21.52	21.62		
3	64QAM	1	0	21.70	21.81	21.72	22	2
3	64QAM	1	8	21.79	21.58	21.38		
3	64QAM	1	14	21.83	21.65	21.64		
3	64QAM	8	0	20.52	20.56	20.62	21	3
3	64QAM	8	4	20.71	20.57	20.65		
3	64QAM	8	7	20.61	20.39	20.57		
3	64QAM	15	0	20.58	20.53	20.80		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	22.42	22.69	22.92	24	0
1.4	QPSK	1	3	22.78	22.61	22.88		
1.4	QPSK	1	5	22.62	22.64	22.93		
1.4	QPSK	3	0	22.56	22.66	22.50		
1.4	QPSK	3	1	22.73	22.62	22.26		
1.4	QPSK	3	3	22.53	22.60	22.60		
1.4	QPSK	6	0	21.37	21.79	21.68	23	1
1.4	16QAM	1	0	21.62	21.36	21.80	23	1
1.4	16QAM	1	3	21.49	21.69	21.68		
1.4	16QAM	1	5	21.43	21.65	21.82		
1.4	16QAM	3	0	21.84	21.55	21.56		
1.4	16QAM	3	1	21.52	21.68	21.64		
1.4	16QAM	3	3	21.56	21.51	21.39		
1.4	16QAM	6	0	20.88	20.66	20.91	22	2
1.4	64QAM	1	0	20.97	20.95	20.67	22	2
1.4	64QAM	1	3	20.88	20.67	20.76		
1.4	64QAM	1	5	20.97	20.69	20.99		
1.4	64QAM	3	0	20.96	21.03	20.83		
1.4	64QAM	3	1	20.67	20.93	20.76		
1.4	64QAM	3	3	20.89	20.74	20.89		
1.4	64QAM	6	0	21.18	20.86	20.86	21	3

<LTE Band 13 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					23230			
Frequency (MHz)					782			
10	QPSK	1	0		23.51		24	0
10	QPSK	1	25		23.49			
10	QPSK	1	49		23.46			
10	QPSK	25	0		21.93		23	1
10	QPSK	25	12		21.74			
10	QPSK	25	25		21.40			
10	QPSK	50	0		21.67			
10	16QAM	1	0		21.48		23	1
10	16QAM	1	25		21.60			
10	16QAM	1	49		21.84			
10	16QAM	25	0		20.41		22	2
10	16QAM	25	12		20.87			
10	16QAM	25	25		20.32			
10	16QAM	50	0		20.28			
10	64QAM	1	0		21.63		22	2
10	64QAM	1	25		21.52			
10	64QAM	1	49		21.76			
10	64QAM	25	0		20.75		21	3
10	64QAM	25	12		20.62			
10	64QAM	25	25		20.71			
10	64QAM	50	0		20.53			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.43	23.41	23.40	24	0
5	QPSK	1	12	23.46	23.41	23.41		
5	QPSK	1	24	23.42	23.36	23.42		
5	QPSK	12	0	21.87	21.87	21.85	23	1
5	QPSK	12	7	21.68	21.70	21.69		
5	QPSK	12	13	21.33	21.30	21.30		
5	QPSK	25	0	21.57	21.65	21.65		
5	16QAM	1	0	21.44	21.42	21.40	23	1
5	16QAM	1	12	21.58	21.51	21.51		
5	16QAM	1	24	21.78	21.75	21.74		
5	16QAM	12	0	20.35	20.33	20.33	22	2
5	16QAM	12	7	20.85	20.81	20.80		
5	16QAM	12	13	20.25	20.23	20.31		
5	16QAM	25	0	20.28	20.24	20.28		
5	64QAM	1	0	21.54	21.57	21.61	22	2
5	64QAM	1	12	21.46	21.42	21.45		
5	64QAM	1	24	21.67	21.66	21.67		
5	64QAM	12	0	20.72	20.65	20.65	21	3
5	64QAM	12	7	20.58	20.59	20.62		
5	64QAM	12	13	20.71	20.66	20.68		
5	64QAM	25	0	20.52	20.50	20.48		

<LTE Band 66 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	21.60	21.66	21.62	22.5	0
20	QPSK	1	49	21.32	21.44	21.44		
20	QPSK	1	99	21.54	21.60	21.47		
20	QPSK	50	0	21.59	21.64	21.63	22.5	0
20	QPSK	50	24	21.55	21.60	21.58		
20	QPSK	50	50	21.47	21.57	21.58		
20	QPSK	100	0	21.53	21.62	21.60		
20	16QAM	1	0	21.64	21.58	21.42	22.5	0
20	16QAM	1	49	21.57	21.55	21.48		
20	16QAM	1	99	21.65	21.60	21.47		
20	16QAM	50	0	20.50	20.54	20.44	21	1.5
20	16QAM	50	24	20.63	20.60	20.59		
20	16QAM	50	50	20.62	20.76	20.54		
20	16QAM	100	0	20.60	20.57	20.40		
20	64QAM	1	0	20.67	20.76	20.65	21	1.5
20	64QAM	1	49	20.65	20.72	20.69		
20	64QAM	1	99	20.77	20.76	20.70		
20	64QAM	50	0	19.55	19.65	19.54	20	2.5
20	64QAM	50	24	19.68	19.58	19.62		
20	64QAM	50	50	19.66	19.60	19.64		
20	64QAM	100	0	19.66	19.61	19.44		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	21.60	21.50	21.59	22.5	0
15	QPSK	1	37	21.45	21.42	21.28		
15	QPSK	1	74	21.55	21.44	21.49		
15	QPSK	36	0	21.58	21.64	21.42	22.5	0
15	QPSK	36	20	21.54	21.51	21.55		
15	QPSK	36	39	21.53	21.56	21.50		
15	QPSK	75	0	21.53	21.58	21.48		
15	16QAM	1	0	21.59	21.54	21.41	22.5	0
15	16QAM	1	37	21.55	21.49	21.51		
15	16QAM	1	74	21.62	21.54	21.45		
15	16QAM	36	0	20.46	20.53	20.45	21	1.5
15	16QAM	36	20	20.59	20.54	20.61		
15	16QAM	36	39	20.60	20.76	20.54		
15	16QAM	75	0	20.62	20.58	20.39		
15	64QAM	1	0	20.68	20.73	20.59	21	1.5
15	64QAM	1	37	20.64	20.72	20.64		
15	64QAM	1	74	20.78	20.70	20.64		
15	64QAM	36	0	19.48	19.64	19.52	20	2.5
15	64QAM	36	20	19.70	19.60	19.61		
15	64QAM	36	39	19.66	19.57	19.64		
15	64QAM	75	0	19.62	19.54	19.40		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	21.56	21.43	21.56	22.5	0
10	QPSK	1	25	21.42	21.42	21.23		
10	QPSK	1	49	21.52	21.43	21.50		
10	QPSK	25	0	21.56	21.60	21.40	22.5	0
10	QPSK	25	12	21.55	21.49	21.49		

10	QPSK	25	25	21.56	21.58	21.48		
10	QPSK	50	0	21.51	21.59	21.51		
10	16QAM	1	0	21.59	21.47	21.35	22.5	0
10	16QAM	1	25	21.50	21.44	21.45		
10	16QAM	1	49	21.60	21.51	21.47		
10	16QAM	25	0	20.39	20.49	20.44	21	1.5
10	16QAM	25	12	20.54	20.48	20.63		
10	16QAM	25	25	20.60	20.79	20.53		
10	16QAM	50	0	20.58	20.56	20.32		
10	64QAM	1	0	20.64	20.76	20.59	21	1.5
10	64QAM	1	25	20.63	20.68	20.65		
10	64QAM	1	49	20.71	20.63	20.60		
10	64QAM	25	0	19.49	19.65	19.50	20	2.5
10	64QAM	25	12	19.63	19.62	19.56		
10	64QAM	25	25	19.66	19.57	19.66		
10	64QAM	50	0	19.55	19.50	19.33		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	21.53	21.41	21.55	22.5	0
5	QPSK	1	12	21.39	21.42	21.18		
5	QPSK	1	24	21.53	21.41	21.48		
5	QPSK	12	0	21.49	21.54	21.34	22.5	0
5	QPSK	12	7	21.51	21.49	21.49		
5	QPSK	12	13	21.59	21.53	21.49		
5	QPSK	25	0	21.49	21.62	21.47		
5	16QAM	1	0	21.53	21.43	21.37	22.5	0
5	16QAM	1	12	21.49	21.40	21.38		
5	16QAM	1	24	21.56	21.52	21.48		
5	16QAM	12	0	20.38	20.51	20.43	21	1.5
5	16QAM	12	7	20.48	20.41	20.66		
5	16QAM	12	13	20.61	20.79	20.50		
5	16QAM	25	0	20.54	20.50	20.35		
5	64QAM	1	0	20.57	20.75	20.52	21	1.5
5	64QAM	1	12	20.61	20.61	20.58		
5	64QAM	1	24	20.70	20.65	20.60		
5	64QAM	12	0	19.46	19.61	19.49	20	2.5
5	64QAM	12	7	19.64	19.63	19.58		
5	64QAM	12	13	19.60	19.50	19.69		
5	64QAM	25	0	19.51	19.49	19.31		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	21.47	21.38	21.48	22.5	0
3	QPSK	1	8	21.38	21.40	21.19		
3	QPSK	1	14	21.51	21.36	21.43		
3	QPSK	8	0	21.51	21.49	21.32	22.5	0
3	QPSK	8	4	21.44	21.52	21.43		
3	QPSK	8	7	21.54	21.52	21.49		
3	QPSK	15	0	21.48	21.60	21.46		
3	16QAM	1	0	21.54	21.46	21.34	22.5	0
3	16QAM	1	8	21.52	21.42	21.31		
3	16QAM	1	14	21.51	21.50	21.44		
3	16QAM	8	0	20.31	20.54	20.38	21	1.5
3	16QAM	8	4	20.45	20.38	20.65		
3	16QAM	8	7	20.62	20.78	20.46		
3	16QAM	15	0	20.57	20.44	20.37		
3	64QAM	1	0	20.53	20.77	20.55	21	1.5

3	64QAM	1	8	20.57	20.59	20.60		
3	64QAM	1	14	20.68	20.64	20.59		
3	64QAM	8	0	19.49	19.54	19.43	20	2.5
3	64QAM	8	4	19.61	19.58	19.56		
3	64QAM	8	7	19.62	19.45	19.68		
3	64QAM	15	0	19.47	19.43	19.28		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	21.57	21.47	21.56	22.5	0
1.4	QPSK	1	3	21.37	21.43	21.28		
1.4	QPSK	1	5	21.52	21.28	21.31		
1.4	QPSK	3	0	21.54	21.43	21.43		
1.4	QPSK	3	1	21.47	21.43	21.45		
1.4	QPSK	3	3	21.62	21.60	21.37		
1.4	QPSK	6	0	21.44	21.58	21.32	22.5	0
1.4	16QAM	1	0	21.59	21.50	21.32	22.5	0
1.4	16QAM	1	3	21.57	21.41	21.44		
1.4	16QAM	1	5	21.41	21.58	21.42		
1.4	16QAM	3	0	21.52	21.48	21.37		
1.4	16QAM	3	1	21.44	21.36	21.35		
1.4	16QAM	3	3	21.38	21.50	21.43		
1.4	16QAM	6	0	20.32	20.31	20.42	22	0.5
1.4	64QAM	1	0	20.26	20.56	20.48	22	0.5
1.4	64QAM	1	3	20.44	20.51	20.37		
1.4	64QAM	1	5	20.59	20.52	20.38		
1.4	64QAM	3	0	20.40	20.37	20.41		
1.4	64QAM	3	1	20.39	20.51	20.50		
1.4	64QAM	3	3	20.33	20.45	20.39		
1.4	64QAM	6	0	19.38	19.45	19.48	21	1.5

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	22.73	22.74	22.99	23.9	0
20	QPSK	1	49	22.44	22.37	22.76		
20	QPSK	1	99	22.47	22.47	22.80		
20	QPSK	50	0	22.20	22.22	22.43	23	0.9
20	QPSK	50	24	22.19	22.12	22.30		
20	QPSK	50	50	22.14	22.01	22.35		
20	QPSK	100	0	22.12	22.02	22.30		
20	16QAM	1	0	21.81	21.78	22.33	23	0.9
20	16QAM	1	49	22.02	21.94	22.13		
20	16QAM	1	99	21.91	22.01	22.22		
20	16QAM	50	0	21.14	21.00	21.19	22	1.9
20	16QAM	50	24	21.11	21.04	21.25		
20	16QAM	50	50	21.06	20.99	21.32		
20	16QAM	100	0	21.18	21.03	21.29		
20	64QAM	1	0	21.18	21.14	21.40	22	1.9
20	64QAM	1	49	21.20	21.10	21.46		
20	64QAM	1	99	21.32	21.25	21.49		
20	64QAM	50	0	20.15	19.98	20.19	21	2.9
20	64QAM	50	24	20.12	20.04	20.16		
20	64QAM	50	50	20.04	19.99	20.30		
20	64QAM	100	0	20.13	20.04	20.28		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	22.68	22.69	22.93	23.9	0
15	QPSK	1	37	22.31	22.24	22.73		
15	QPSK	1	74	22.41	22.28	22.68		
15	QPSK	36	0	22.10	22.04	22.29	23	0.9
15	QPSK	36	20	22.03	21.99	22.29		
15	QPSK	36	39	22.04	21.86	22.22		
15	QPSK	75	0	21.99	21.91	22.28		
15	16QAM	1	0	21.74	21.77	22.17	23	0.9
15	16QAM	1	37	21.90	21.87	21.97		
15	16QAM	1	74	21.84	21.92	22.14		
15	16QAM	36	0	21.00	20.98	21.01	22	1.9
15	16QAM	36	20	21.09	20.86	21.08		
15	16QAM	36	39	20.95	20.90	21.28		
15	16QAM	75	0	21.01	21.03	21.21		
15	64QAM	1	0	21.14	21.06	21.33	22	1.9
15	64QAM	1	37	21.05	21.09	21.45		
15	64QAM	1	74	21.12	21.15	21.36		
15	64QAM	36	0	20.07	19.81	20.06	21	2.9
15	64QAM	36	20	19.99	19.98	20.03		
15	64QAM	36	39	19.94	19.88	20.30		
15	64QAM	75	0	20.06	19.95	20.11		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	22.59	22.55	22.77	23.9	0
10	QPSK	1	25	22.14	22.24	22.72		
10	QPSK	1	49	22.24	22.14	22.67		
10	QPSK	25	0	22.01	22.03	22.12	23	0.9
10	QPSK	25	12	21.91	21.79	22.17		

10	QPSK	25	25	21.98	21.83	22.22		
10	QPSK	50	0	21.86	21.71	22.22		
10	16QAM	1	0	21.55	21.60	22.04	23	0.9
10	16QAM	1	25	21.82	21.70	21.90		
10	16QAM	1	49	21.75	21.90	21.96		
10	16QAM	25	0	20.90	20.91	21.01	22	1.9
10	16QAM	25	12	21.02	20.85	20.96		
10	16QAM	25	25	20.91	20.78	21.24		
10	16QAM	50	0	20.85	20.98	21.06		
10	64QAM	1	0	21.14	20.96	21.29	22	1.9
10	64QAM	1	25	20.94	20.94	21.43		
10	64QAM	1	49	21.08	21.07	21.33		
10	64QAM	25	0	20.04	19.77	20.06	21	2.9
10	64QAM	25	12	19.94	19.81	19.95		
10	64QAM	25	25	19.78	19.81	20.16		
10	64QAM	50	0	20.06	19.95	20.06		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	22.49	22.40	22.76	23.9	0
5	QPSK	1	12	22.01	22.11	22.54		
5	QPSK	1	24	22.21	22.15	22.53		
5	QPSK	12	0	21.90	21.94	22.11	23	0.9
5	QPSK	12	7	21.75	21.77	22.14		
5	QPSK	12	13	21.78	21.71	22.16		
5	QPSK	25	0	21.67	21.71	22.22		
5	16QAM	1	0	21.51	21.41	22.03	23	0.9
5	16QAM	1	12	21.72	21.59	21.70		
5	16QAM	1	24	21.55	21.86	21.85		
5	16QAM	12	0	20.88	20.76	20.88	22	1.9
5	16QAM	12	7	20.91	20.80	20.77		
5	16QAM	12	13	20.90	20.71	21.04		
5	16QAM	25	0	20.65	20.90	21.00		
5	64QAM	1	0	21.04	20.86	21.17	22	1.9
5	64QAM	1	12	20.85	20.91	21.23		
5	64QAM	1	24	20.89	21.05	21.17		
5	64QAM	12	0	20.02	19.68	19.88	21	2.9
5	64QAM	12	7	19.87	19.67	19.79		
5	64QAM	12	13	19.78	19.70	20.00		
5	64QAM	25	0	19.88	19.87	19.86		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	22.43	22.31	22.74	23.9	0
3	QPSK	1	8	22.64	22.00	22.44		
3	QPSK	1	14	22.07	22.05	22.36		
3	QPSK	8	0	21.84	21.90	22.07	23	0.9
3	QPSK	8	4	21.64	21.69	22.08		
3	QPSK	8	7	21.75	21.62	22.10		
3	QPSK	15	0	21.52	21.52	22.07		
3	16QAM	1	0	21.40	21.37	21.98	23	0.9
3	16QAM	1	8	21.59	21.49	21.58		
3	16QAM	1	14	21.44	21.79	21.85		
3	16QAM	8	0	20.74	20.56	20.68	22	1.9
3	16QAM	8	4	20.72	20.66	20.67		
3	16QAM	8	7	20.73	20.62	20.85		
3	16QAM	15	0	20.53	20.80	20.80		
3	64QAM	1	0	20.89	20.74	21.07	22	1.9

3	64QAM	1	8	20.72	20.76	21.21		
3	64QAM	1	14	20.74	21.05	20.97		
3	64QAM	8	0	19.82	19.48	19.87	21	2.9
3	64QAM	8	4	19.82	19.56	19.69		
3	64QAM	8	7	19.70	19.53	19.99		
3	64QAM	15	0	19.72	19.71	19.78		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	22.47	22.55	22.53	23.9	0
1.4	QPSK	1	3	22.62	22.53	22.48		
1.4	QPSK	1	5	22.57	22.66	22.60		
1.4	QPSK	3	0	22.58	22.60	22.83		
1.4	QPSK	3	1	22.37	22.66	22.58		
1.4	QPSK	3	3	22.70	22.53	22.57		
1.4	QPSK	6	0	21.91	21.78	22.00	22.9	1
1.4	16QAM	1	0	21.99	21.80	21.80	22.9	1
1.4	16QAM	1	3	21.98	21.98	21.77		
1.4	16QAM	1	5	21.73	21.87	21.84		
1.4	16QAM	3	0	21.91	21.94	21.78		
1.4	16QAM	3	1	21.74	21.83	21.88		
1.4	16QAM	3	3	21.79	21.81	21.86		
1.4	16QAM	6	0	21.03	20.92	20.86	21.9	2
1.4	64QAM	1	0	20.86	21.03	20.84	21.9	2
1.4	64QAM	1	3	21.04	21.09	20.72		
1.4	64QAM	1	5	20.98	20.98	21.00		
1.4	64QAM	3	0	21.04	20.93	20.77		
1.4	64QAM	3	1	20.94	20.93	21.04		
1.4	64QAM	3	3	21.01	21.10	21.01		
1.4	64QAM	6	0	19.45	19.76	19.89	20.9	3

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations

b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS

c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

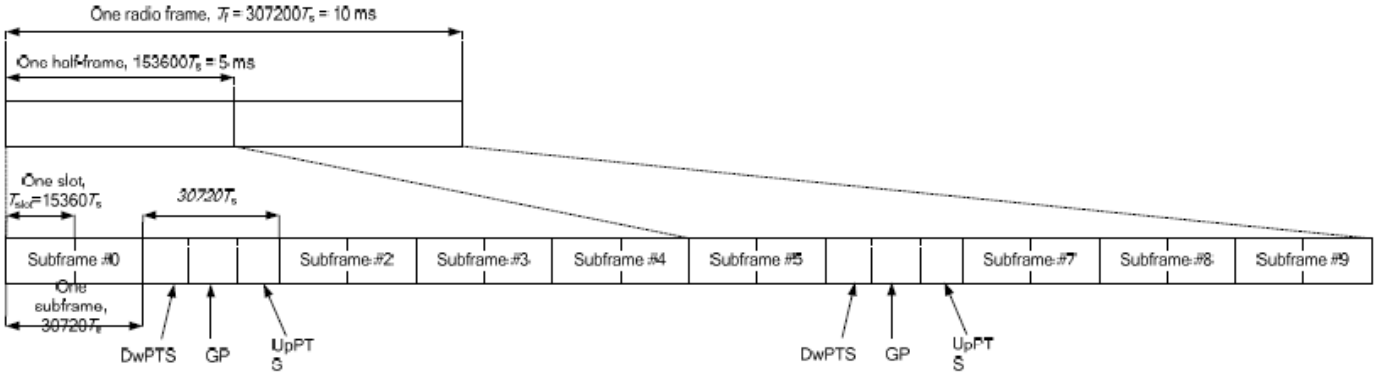


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

<LTE Band 41 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	18.37	17.75	17.90	18.35	18.39	18.7	0
20	QPSK	1	49	18.13	17.68	17.86	18.29	18.37		
20	QPSK	1	99	18.10	17.74	17.88	18.33	18.36		
20	QPSK	50	0	18.12	17.68	17.93	18.34	18.38	18.7	0
20	QPSK	50	24	18.10	17.62	17.90	18.28	18.36		
20	QPSK	50	50	18.08	17.60	17.88	18.30	18.32		
20	QPSK	100	0	18.14	17.70	17.93	18.21	18.22		
20	16QAM	1	0	18.16	17.78	17.89	18.31	18.33	18.7	0
20	16QAM	1	49	18.10	17.69	17.90	18.33	18.35		
20	16QAM	1	99	18.17	17.68	17.91	18.34	18.33		
20	16QAM	50	0	18.11	17.75	17.86	18.30	18.37	18.7	0
20	16QAM	50	24	18.17	17.73	17.88	18.33	18.28		
20	16QAM	50	50	18.12	17.77	17.91	18.31	18.37		
20	16QAM	100	0	18.08	17.70	17.83	18.32	18.33		
20	64QAM	1	0	18.14	17.74	17.85	18.38	18.35	18.7	0
20	64QAM	1	49	18.10	17.71	17.93	18.35	18.30		
20	64QAM	1	99	18.08	17.68	17.93	18.35	18.36		
20	64QAM	50	0	18.16	17.73	17.92	18.31	18.28	18.7	0
20	64QAM	50	24	18.13	17.72	17.86	18.36	18.38		
20	64QAM	50	50	18.09	17.78	17.83	18.32	18.32		
20	64QAM	100	0	18.16	17.73	17.84	18.34	18.35		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	18.13	17.71	17.84	18.34	18.35	18.70	0
15	QPSK	1	37	18.07	17.64	17.82	18.31	18.25		
15	QPSK	1	74	18.11	17.72	17.84	18.35	18.30		
15	QPSK	36	0	18.07	17.68	17.92	18.38	18.36	18.7	0
15	QPSK	36	20	18.06	17.62	17.92	18.33	18.31		
15	QPSK	36	39	18.05	17.58	17.88	18.25	18.24		
15	QPSK	75	0	18.08	17.63	17.96	18.20	18.21		
15	16QAM	1	0	18.17	17.79	17.90	18.25	18.36	18.7	0
15	16QAM	1	37	18.11	17.71	17.89	18.33	18.32		
15	16QAM	1	74	18.13	17.66	17.85	18.32	18.28		
15	16QAM	36	0	18.06	17.76	17.79	18.31	18.37	18.7	0
15	16QAM	36	20	18.14	17.66	17.89	18.30	18.22		
15	16QAM	36	39	18.05	17.79	17.92	18.28	18.35		
15	16QAM	75	0	18.10	17.63	17.78	18.26	18.34		
15	64QAM	1	0	18.12	17.77	17.86	18.35	18.38	18.7	0
15	64QAM	1	37	18.08	17.65	17.86	18.37	18.23		
15	64QAM	1	74	18.11	17.69	17.86	18.36	18.34		
15	64QAM	36	0	18.10	17.76	17.93	18.32	18.31	18.7	0
15	64QAM	36	20	18.10	17.71	17.81	18.35	18.37		
15	64QAM	36	39	18.11	17.74	17.85	18.30	18.28		
15	64QAM	75	0	18.19	17.67	17.84	18.29	18.31		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	18.15	17.65	17.83	18.37	18.29	18.7	0
10	QPSK	1	25	18.08	17.64	17.77	18.34	18.19		
10	QPSK	1	49	18.08	17.69	17.78	18.31	18.29		
10	QPSK	25	0	18.09	17.61	17.88	18.32	18.33	18.7	0
10	QPSK	25	12	18.07	17.60	17.95	18.33	18.32		

10	QPSK	25	25	18.06	17.54	17.91	18.23	18.19		
10	QPSK	50	0	18.06	17.65	17.96	18.21	18.21		
10	16QAM	1	0	18.17	17.80	17.91	18.19	18.31	18.7	0
10	16QAM	1	25	18.14	17.65	17.86	18.27	18.25		
10	16QAM	1	49	18.06	17.68	17.84	18.35	18.24		
10	16QAM	25	0	18.02	17.76	17.74	18.28	18.38	18.7	0
10	16QAM	25	12	18.15	17.60	17.92	18.26	18.17		
10	16QAM	25	25	17.99	17.82	17.94	18.31	18.32		
10	16QAM	50	0	18.13	17.60	17.80	18.24	18.33		
10	64QAM	1	0	18.06	17.75	17.83	18.36	18.34	18.7	0
10	64QAM	1	25	18.01	17.64	17.82	18.30	18.16		
10	64QAM	1	49	18.07	17.66	17.83	18.38	18.37		
10	64QAM	25	0	18.08	17.76	17.94	18.30	18.29	18.7	0
10	64QAM	25	12	18.11	17.64	17.84	18.31	18.33		
10	64QAM	25	25	18.08	17.76	17.84	18.31	18.23		
10	64QAM	50	0	18.20	17.66	17.85	18.30	18.26		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	18.15	17.66	17.78	18.37	18.27	18.7	0
5	QPSK	1	12	18.09	17.60	17.75	18.36	18.14		
5	QPSK	1	24	18.02	17.66	17.80	18.30	18.22		
5	QPSK	12	0	18.05	17.64	17.88	18.32	18.27	18.7	0
5	QPSK	12	7	18.05	17.53	17.89	18.33	18.35		
5	QPSK	12	13	18.00	17.49	17.92	18.26	18.21		
5	QPSK	25	0	18.04	17.63	17.93	18.18	18.23		
5	16QAM	1	0	18.12	17.74	17.92	18.15	18.30	18.7	0
5	16QAM	1	12	18.12	17.68	17.83	18.28	18.18		
5	16QAM	1	24	18.07	17.65	17.82	18.29	18.22		
5	16QAM	12	0	18.03	17.71	17.68	18.31	18.39	18.7	0
5	16QAM	12	7	18.10	17.59	17.92	18.25	18.11		
5	16QAM	12	13	18.02	17.80	17.89	18.33	18.33		
5	16QAM	25	0	18.15	17.61	17.80	18.19	18.35		
5	64QAM	1	0	18.03	17.72	17.84	18.38	18.34	18.7	0
5	64QAM	1	12	17.94	17.58	17.83	18.23	18.11		
5	64QAM	1	24	18.01	17.64	17.77	18.37	18.35		
5	64QAM	12	0	18.05	17.78	17.96	18.23	18.22	18.7	0
5	64QAM	12	7	18.09	17.62	17.85	18.30	18.38		
5	64QAM	12	13	18.08	17.71	17.82	18.34	18.17		
5	64QAM	25	0	18.13	17.68	17.85	18.29	18.23		

<LTE Band 48 TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				55340	55830	56150	56640		
Frequency (MHz)				3560	3609	3641	3690		
20	QPSK	1	0	23.45	23.12	22.98	23.03	24	0
20	QPSK	1	49	23.32	23.00	22.83	22.91		
20	QPSK	1	99	23.22	22.85	22.75	22.80		
20	QPSK	50	0	22.58	22.25	22.09	22.16	23	1
20	QPSK	50	24	22.55	22.19	22.06	22.10		
20	QPSK	50	50	22.38	22.01	21.99	22.01		
20	QPSK	100	0	22.43	22.15	22.01	22.11		
20	16QAM	1	0	22.57	22.26	22.11	22.15	23	1
20	16QAM	1	49	22.42	22.04	21.92	21.97		
20	16QAM	1	99	22.32	21.94	21.84	21.91		
20	16QAM	50	0	21.63	21.27	21.10	21.18	22	2
20	16QAM	50	24	21.56	21.19	21.06	21.10		
20	16QAM	50	50	21.40	21.03	20.96	21.05		
20	16QAM	100	0	21.47	21.16	21.03	21.09		
20	64QAM	1	0	21.28	21.01	20.83	20.92	22	2
20	64QAM	1	49	21.13	20.81	20.68	20.71		
20	64QAM	1	99	20.99	20.63	20.60	20.60		
20	64QAM	50	0	20.62	20.29	20.16	20.20	21	3
20	64QAM	50	24	20.56	20.21	20.08	20.12		
20	64QAM	50	50	20.41	20.05	20.01	20.03		
20	64QAM	100	0	20.43	20.18	20.05	20.12		
Channel				55315	55820	56160	56665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3557.5	3608	3642	3692.5		
15	QPSK	1	0	23.35	23.10	22.96	22.92	24	0
15	QPSK	1	37	23.16	22.97	22.68	22.88		
15	QPSK	1	74	23.20	22.73	22.71	22.75		
15	QPSK	36	0	22.43	22.17	21.94	21.98	23	1
15	QPSK	36	20	22.52	22.11	21.92	22.00		
15	QPSK	36	39	22.31	21.88	21.81	21.83		
15	QPSK	75	0	22.32	22.14	21.94	22.07		
15	16QAM	1	0	22.54	22.24	22.00	22.07	23	1
15	16QAM	1	37	22.23	21.91	21.77	21.96		
15	16QAM	1	74	22.17	21.80	21.76	21.90		
15	16QAM	36	0	21.56	21.16	20.94	21.17	22	2
15	16QAM	36	20	21.49	21.09	20.88	21.00		
15	16QAM	36	39	21.28	20.89	20.81	20.86		
15	16QAM	75	0	21.38	21.16	20.88	21.08		
15	64QAM	1	0	21.28	20.98	20.82	20.83	22	2
15	64QAM	1	37	21.02	20.66	20.53	20.67		
15	64QAM	1	74	20.90	20.44	20.47	20.59		
15	64QAM	36	0	20.57	20.15	20.07	20.07	21	3
15	64QAM	36	20	20.45	20.06	19.99	20.01		
15	64QAM	36	39	20.41	19.99	19.94	19.89		
15	64QAM	75	0	20.34	20.11	19.95	20.06		
Channel				55290	55815	56165	56690	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3555	3607.5	3642.5	3695		
10	QPSK	1	0	23.27	23.01	22.92	22.80	24	0
10	QPSK	1	25	23.11	22.82	22.52	22.80		
10	QPSK	1	49	23.15	22.68	22.59	22.61		
10	QPSK	25	0	22.32	22.13	21.93	21.97	23	1
10	QPSK	25	12	22.48	22.03	21.80	21.85		

10	QPSK	25	25	22.31	21.88	21.79	21.69		
10	QPSK	50	0	22.25	22.07	21.87	22.07		
10	16QAM	1	0	22.34	22.13	22.00	22.04	23	1
10	16QAM	1	25	22.15	21.84	21.57	21.80		
10	16QAM	1	49	22.10	21.60	21.69	21.76		
10	16QAM	25	0	21.46	21.13	20.94	21.06	22	2
10	16QAM	25	12	21.47	20.99	20.77	20.91		
10	16QAM	25	25	21.08	20.73	20.78	20.66		
10	16QAM	50	0	21.25	20.98	20.88	21.06		
10	64QAM	1	0	21.10	20.93	20.75	20.72	22	2
10	64QAM	1	25	20.93	20.62	20.40	20.50		
10	64QAM	1	49	20.78	20.38	20.43	20.55		
10	64QAM	25	0	20.48	19.95	20.02	19.89	21	3
10	64QAM	25	12	20.28	20.03	19.82	19.95		
10	64QAM	25	25	20.35	19.88	19.91	19.85		
10	64QAM	50	0	20.33	19.94	19.91	20.01		
Channel				55265	55810	56170	56715	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3552.5	3607	3643	3697.5		
5	QPSK	1	0	23.12	22.95	22.78	22.60	24	0
5	QPSK	1	12	23.01	22.82	22.44	22.77		
5	QPSK	1	24	23.15	22.65	22.57	22.55		
5	QPSK	12	0	22.28	22.13	21.79	21.85	23	1
5	QPSK	12	7	22.48	21.91	21.62	21.77		
5	QPSK	12	13	22.26	21.78	21.78	21.69		
5	QPSK	25	0	22.23	21.93	21.87	21.90		
5	16QAM	1	0	22.24	22.09	21.85	21.84	23	1
5	16QAM	1	12	22.13	21.76	21.54	21.75		
5	16QAM	1	24	22.06	21.40	21.66	21.72		
5	16QAM	12	0	21.27	21.03	20.78	21.06	22	2
5	16QAM	12	7	21.42	20.83	20.63	20.74		
5	16QAM	12	13	20.90	20.62	20.77	20.57		
5	16QAM	25	0	21.14	20.89	20.69	20.92		
5	64QAM	1	0	20.92	20.89	20.62	20.58	22	2
5	64QAM	1	12	20.89	20.51	20.36	20.41		
5	64QAM	1	24	20.66	20.22	20.28	20.37		
5	64QAM	12	0	20.47	19.94	19.96	19.83	21	3
5	64QAM	12	7	20.14	19.88	19.79	19.87		
5	64QAM	12	13	20.27	19.76	19.87	19.85		
5	64QAM	25	0	20.23	19.82	19.71	20.01		

<LTE Carrier Aggregation combinations>

General Note:

1. This device supports Carrier Aggregation on downlink only for inter and intra band, Uplink CA is not supported. For the device supports combination bands and configurations are according to 3GPP.
2. In applying the existing power measurement procedure of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of the frequency band and CCs in each row need consideration, and that configurations require power measurement should be highlighted in the below table.
3. All permutations exist. No restrictions on Pcell & Scell combinations. Only LTE Band 29A is limited to Scell.

3CC Downlink Carrier Aggregation			4CC Downlink Carrier Aggregation			5CC Downlink Carrier Aggregation		
Number	Combination	Covered by Measurement Superset	Number	Combination	Covered by Measurement Superset	Covered by Measurement Superset	Combination	Covered by Measurement Superset
1	2A-4A-5A	3	3	2A-2A-4A-5A		5	2A-2A-5A-66A-66A	
2	2A-4A-13A		4	2A-13A-48A-66A		6	2A-5B-66A-66A	
						7	2A-13A-66A-66B	
						8	2A-13A-48A-48A-66A	
						9	2A-13A-48A-48C	

<Power verification when LTE Carrier Aggregation Active>

General Note:

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. The device supports downlink two carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.

vi. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lfloor \frac{BW_{Channel(1)} + BW_{Channel(2)} - 0.1\left|BW_{Channel(1)} - BW_{Channel(2)}\right|}{0.6} \right\rfloor 0.3 \ \ [\text{MHz}]$$

<Three Carrier power verification>

Configure	PCC							SCC1				SCC2				Power	
	LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	13	10	751	5230	23.14	23.25

<Four Carrier power verification>

Configure	PCC							SCC1				SCC2				SCC3				Power	
	LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	2	20	1880	18900	QPSK	1	0	2	20	1980	1100	4	20	2132.5	2175	5	10	881.5	2525	23.11	23.25
	2	20	1880	18900	QPSK	1	0	13	10	751	5230	48	20	3641	56150	66	20	2155	66886	23.21	23.25

<Five Carrier power verification>

Configure	PCC							SCC1				SCC2				SCC3				SCC4				Power	
	LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	2	20	1880	18900	QPSK	1	0	2	20	1980	1100	5	10	881.5	2525	66	20	2155	66886	66	20	2190	67236	23.11	23.25
	2	20	1880	18900	QPSK	1	0	5	10	881.5	2525	5	10	891.4	2624	66	20	2155	66886	66	20	2190	67236	23.19	23.25
	2	20	1880	18900	QPSK	1	0	13	10	751	5230	66	20	2155	66886	66	20	2190	67236	66	20	2170.2	67038	23.20	23.25
	2	20	1880	18900	QPSK	1	0	13	10	751	5230	48	20	3641	56150	48	20	3690	56640	66	20	2155	66886	23.04	23.25
	2	20	1880	18900	QPSK	1	0	13	10	751	5230	48	20	3641	56150	48	20	3690	56640	48	20	3670.2	56442	23.17	23.25

<LTE Uplink carrier aggregation>

2CC Uplink Carrier Aggregation	
Number	Combination
1	CA_5B

<Intra-band>

General Note:

i. The device supports intra-band uplink carrier aggregation for LTE B66/B41/B48 with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.

ii. The device supports uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.

iii. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

iv. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

v. Additional SAR measurement for LTE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

CA_5B										
Combination 10MHz+10MHz (50RB+50RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm) Typ. target power with tolerance: +1dbm
			RB Size	RB offset	RB Size	RB offset				
20450	20549	QPSK	1	0	0	0	1	0	23.26	24
20575	20476	QPSK	1	0	1	49	2	0	23.87	24
20600	20501	QPSK	1	0	1	49	2	0	23.95	24

13. 5G NR Output Power (Unit: dBm)

General Note:

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below
   a. For DFT-OFDM output power measurement, full measurement was done for Pi/2 BPSK and QPSK and for the largest supported bandwidth, repeat test for 16QAM/64QAM/256QAM under 1RB 1Offset configuration. For smaller bandwidth, measure conducted power for Pi/2 BPSK and 1RB 1Offset configuration.
   b. According to the tune-up, CP-OFDM output power is not ½ dB higher than DFT-OFDM mode, and the reported SAR of DFT-OFDM mode reported SAR is ≤ 1.45 W/kg, SAR test and thus conducted power for CP-OFDM mode is not required.
   c. To start SAR test for the largest channel bandwidth for PI/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. Also do SAR test for 50% RB allocation for PI/2 BPSK SAR testing using 1RB PI/2 BPSK allocation procedure
   d. For PI/2 BPSK with 100% RB allocation, SAR test 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.
   e. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   f. Smaller bandwidth output power for each RB allocation configuration for this device is not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
2. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.

<3GPP 38.101 MPR for EN-DC>

Table 6.2.2-1 Maximum power reduction (MPR) for power class 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]	≤ 0.5[2]	0[2]
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	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 0 dB MPR is 26 dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation 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.

Table 6.2.2-2 Maximum power reduction (MPR) for power class 2

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

<n2_TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376000	380000		
Frequency (MHz)				1860	1880	1900		
20	PI/2 BPSK	1	1	23.20	23.20	23.33	23.8	0.0
20	PI/2 BPSK	1	53	23.16	23.31	23.38		
20	PI/2 BPSK	1	104	23.28	23.22	23.36		
20	PI/2 BPSK	50	0	22.66	22.67	22.78	23.5	0.3
20	PI/2 BPSK	50	28	23.18	23.31	23.30	23.8	0.0
20	PI/2 BPSK	50	56	22.75	22.31	22.90	23.5	0.3
20	PI/2 BPSK	100	0	22.65	22.76	22.75		
20	QPSK	1	1	23.20	23.20	23.37	23.8	0.0
20	QPSK	1	53	23.19	23.27	23.38		
20	QPSK	1	104	23.34	23.31	23.32		
20	QPSK	50	0	22.17	22.24	22.30	23.0	0.8
20	QPSK	50	28	23.15	23.33	23.33	23.8	0.0
20	QPSK	50	56	22.24	22.28	22.35	23.0	0.8
20	QPSK	100	0	22.17	22.30	22.30		
20	16QAM	1	1	21.96	21.94	21.94	23.0	0.8
20	64QAM	1	1	20.43	20.48	20.59	21.5	2.3
20	256QAM	1	1	18.72	18.80	18.79	19.5	4.3
Channel				371500	376000	380500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	PI/2 BPSK	1	1	23.12	23.21	23.29	23.8	0.0
Channel				371000	376000	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	PI/2 BPSK	1	1	23.06	23.24	23.34	23.8	0.0
Channel				370500	376000	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	PI/2 BPSK	1	1	23.16	23.23	23.32	23.8	0.0

<n2_TX1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376000	380000		
Frequency (MHz)				1860	1880	1900		
20	PI/2 BPSK	1	1	23.54	23.21	23.05	24.0	0.0
20	PI/2 BPSK	1	53	23.75	23.16	23.08		
20	PI/2 BPSK	1	104	23.11	23.27	22.82		
20	PI/2 BPSK	50	0	23.15	22.81	23.05	23.5	0.5
20	PI/2 BPSK	50	28	23.77	23.01	23.52	24.0	0.0
20	PI/2 BPSK	50	56	23.30	23.17	23.03	23.5	0.5
20	PI/2 BPSK	100	0	23.19	23.02	23.06		
20	QPSK	1	1	23.37	23.03	22.88	24.0	0.0
20	QPSK	1	53	23.69	23.14	22.94		
20	QPSK	1	104	23.04	23.21	22.75		
20	QPSK	50	0	22.74	22.63	22.51	23.0	1.0
20	QPSK	50	28	23.75	23.02	23.60	24.0	0.0
20	QPSK	50	56	22.75	22.74	22.54	23.0	1.0
20	QPSK	100	0	22.73	22.59	22.56		
20	16QAM	1	1	22.38	22.05	21.88	23.0	1.0
20	64QAM	1	1	20.84	20.86	20.77	21.5	2.5
20	256QAM	1	1	19.11	19.09	18.95	19.5	4.5
Channel				371500	376000	380500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	PI/2 BPSK	1	1	23.69	22.92	23.48	24.0	0.0
Channel				371000	376000	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	PI/2 BPSK	1	1	23.77	22.97	23.44	24.0	0.0
Channel				370500	376000	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	PI/2 BPSK	1	1	23.70	22.96	23.46	24.0	0.0

<n5_TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				166800	167300	167800		
Frequency (MHz)				834	836.5	839		
20	PI/2 BPSK	1	1	23.41	23.35	23.30	24.0	0.0
20	PI/2 BPSK	1	53	23.30	23.33	23.29		
20	PI/2 BPSK	1	104	23.31	23.16	23.10		
20	PI/2 BPSK	50	0	22.91	22.79	22.86	23.5	0.5
20	PI/2 BPSK	50	28	23.41	23.35	23.28	24.0	0.0
20	PI/2 BPSK	50	56	22.81	22.72	22.68	23.5	0.5
20	PI/2 BPSK	100	0	22.88	22.85	22.79		
20	QPSK	1	1	23.39	23.34	23.28	24.0	0.0
20	QPSK	1	53	23.32	23.34	23.27		
20	QPSK	1	104	23.36	23.21	23.11		
20	QPSK	50	0	22.37	22.29	22.35	23.0	1.0
20	QPSK	50	28	23.44	23.37	23.37	24.0	0.0
20	QPSK	50	56	22.36	22.27	22.21	23.0	1.0
20	QPSK	100	0	22.38	22.34	22.33		
20	16QAM	1	1	22.17	22.10	22.12	23.0	1.0
20	64QAM	1	1	20.77	20.72	20.63	21.5	2.5
20	256QAM	1	1	18.96	18.96	18.90	19.5	4.5
Channel				166300	167300	168300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				831.5	836.5	841.5		
15	PI/2 BPSK	1	1	23.33	23.30	23.21	24.0	0.0
Channel				165800	167300	168800	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				829	836.5	844		
10	PI/2 BPSK	1	1	23.40	23.30	23.26	24.0	0.0
Channel				165300	167300	169300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	PI/2 BPSK	1	1	23.41	23.27	23.25	24.0	0.0

<n66_TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				346000	349000	352000		
Frequency (MHz)				1730	1745	1760		
40	PI/2 BPSK	1	1	23.26	23.28	23.36	23.8	0.0
40	PI/2 BPSK	1	108	23.21	23.22	23.31		
40	PI/2 BPSK	1	214	23.28	23.32	23.42		
40	PI/2 BPSK	108	0	22.75	22.64	22.75	23.5	0.3
40	PI/2 BPSK	108	54	23.21	23.14	23.25	23.8	0.0
40	PI/2 BPSK	108	108	22.69	22.74	22.78	23.5	0.3
40	PI/2 BPSK	216	0	22.76	22.71	22.83		
40	QPSK	1	1	23.22	23.26	23.41	23.8	0.0
40	QPSK	1	108	23.25	23.24	23.29		
40	QPSK	1	214	23.23	23.35	23.46		
40	QPSK	108	0	22.22	22.16	22.26	23.0	0.8
40	QPSK	108	54	23.21	23.18	23.27	23.8	0.0
40	QPSK	108	108	22.22	22.24	22.32	23.0	0.8
40	QPSK	216	0	22.28	22.25	22.32		
40	16QAM	1	1	21.96	21.98	22.04	23.0	0.8
40	64QAM	1	1	20.63	21.60	20.62	21.5	2.3
40	256QAM	1	1	18.96	18.98	18.90	19.5	4.3
Channel				344500	349000	353500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1722.5	1745	1767.5		
25	PI/2 BPSK	1	1	23.23	23.27	23.39	23.8	0.0
Channel				344000	349000	354000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1720	1745	1770		
20	PI/2 BPSK	1	1	23.19	23.26	23.27	23.8	0.0
Channel				343500	349000	354500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	PI/2 BPSK	1	1	23.20	23.28	23.33	23.8	0.0
Channel				343000	349000	355000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	PI/2 BPSK	1	1	23.17	23.18	23.30	23.8	0.0
Channel				342500	349000	355500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	PI/2 BPSK	1	1	23.21	23.26	23.41	23.8	0.0

<n66>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				346000	349000	352000		
Frequency (MHz)				1730	1745	1760		
40	PI/2 BPSK	1	1	23.77	23.77	23.91	24.0	0.0
40	PI/2 BPSK	1	108	23.74	23.84	23.90		
40	PI/2 BPSK	1	214	23.90	23.99	24.02		
40	PI/2 BPSK	108	0	23.23	23.44	23.32	23.5	0.5
40	PI/2 BPSK	108	54	23.70	23.85	21.13	24.0	0.0
40	PI/2 BPSK	108	108	23.30	23.49	23.41	23.5	0.5
40	PI/2 BPSK	216	0	23.20	23.22	23.36		
40	QPSK	1	1	23.80	23.70	23.97	24.0	0.0
40	QPSK	1	108	23.77	23.78	22.90		
40	QPSK	1	214	23.88	23.92	24.04		
40	QPSK	108	0	22.72	22.90	22.90	23.0	1.0
40	QPSK	108	54	23.65	22.88	23.92	24.0	0.0
40	QPSK	108	108	22.82	22.99	22.90	23.0	1.0
40	QPSK	216	0	22.80	23.22	22.82		
40	16QAM	1	1	22.39	22.57	22.58	23.0	1.0
40	64QAM	1	1	20.21	21.00	21.33	21.5	2.5
40	256QAM	1	1	19.43	19.33	19.38	19.5	4.5
Channel				344500	349000	353500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1722.5	1745	1767.5		
25	PI/2 BPSK	1	1	23.64	23.79	23.85	24.0	0.0
Channel				344000	349000	354000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1720	1745	1770		
20	PI/2 BPSK	1	1	23.69	23.69	23.81	24.0	0.0
Channel				343500	349000	354500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	PI/2 BPSK	1	1	23.83	23.90	24.02	24.0	0.0
Channel				343000	349000	355000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	PI/2 BPSK	1	1	23.74	23.75	23.86	24.0	0.0
Channel				342500	349000	355500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	PI/2 BPSK	1	1	23.70	23.75	23.82	24.0	0.0

<n77 and n77 HPUE_TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				650000	656000	662000		
Frequency (MHz)				3750	3840	3930		
100	PI/2 BPSK	1	1	22.47	22.52	22.49	23.0	0.0
100	PI/2 BPSK	1	137	22.35	22.38	22.33		
100	PI/2 BPSK	1	271	22.26	22.31	22.22		
100	PI/2 BPSK	135	0	22.39	22.42	22.36	23.0	0.0
100	PI/2 BPSK	135	69	22.35	22.39	22.38	23.0	0.0
100	PI/2 BPSK	135	138	22.22	22.28	22.25	23.0	0.0
100	PI/2 BPSK	270	0	22.35	22.40	22.37		
100	QPSK	1	1	22.30	22.30	22.26	23.0	0.0
100	QPSK	1	137	22.23	22.26	22.25		
100	QPSK	1	271	22.14	22.15	22.15		
100	QPSK	135	0	21.17	21.24	21.16	22.0	1.0
100	QPSK	135	69	22.06	22.09	22.09	23.0	0.0
100	QPSK	135	138	21.06	21.11	21.05	22.0	1.0
100	QPSK	270	0	20.96	21.03	20.90		
100	16QAM	1	1	21.99	21.96	22.00	23.0	0.0
100	64QAM	1	1	20.85	20.88	20.81	21.5	1.5
100	256QAM	1	1	18.95	18.96	18.94	19.5	3.5
Channel				649668	656000	662332	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3745.02	3840	3934.98		
90	PI/2 BPSK	1	1	22.32	22.40	22.31	23.0	0.0
Channel				649334	656000	662666	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3740.01	3840	3939.99		
80	PI/2 BPSK	1	1	22.27	22.31	22.20	23.0	0.0
Channel				648668	656000	663332	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3730.02	3840	3949.98		
60	PI/2 BPSK	1	1	22.42	22.47	22.34	23.0	0.0
Channel				648334	656000	663666	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3725.01	3840	3954.99		
50	PI/2 BPSK	1	1	22.38	22.45	22.36	23.0	0.0
Channel				648000	656000	664000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3720	3840	3960		
40	PI/2 BPSK	1	1	22.31	22.40	22.30	23.0	0.0
Channel				647334	656000	664666	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3710.01	3840	3969.99		
20	PI/2 BPSK	1	1	22.17	22.21	22.15	23.0	0.0

<n78_TX0>

BW [MHz]	Modulation	RB Size	RB Offset	Power Middle Ch. / Freq.			Tune-up limit (dBm)	MPR (dB)
Channel				650000				
Frequency (MHz)				3750				
100	PI/2 BPSK	1	1	22.05			24.0	0.0
100	PI/2 BPSK	1	137	22.01				
100	PI/2 BPSK	1	271	22.00				
100	PI/2 BPSK	135	0	21.96			23.5	0.5
100	PI/2 BPSK	135	69	22.03			24.0	0.0
100	PI/2 BPSK	135	138	21.97			23.5	0.5
100	PI/2 BPSK	270	0	21.95				
100	QPSK	1	1	22.04			24.0	0.0
100	QPSK	1	137	22.03				
100	QPSK	1	271	22.01				
100	QPSK	135	0	22.04			24.0	0.0
100	QPSK	135	69	22.04				
100	QPSK	135	138	22.01				
100	QPSK	270	0	21.03			23.0	1.0
100	16QAM	1	1	21.00			23.0	1.0
100	64QAM	1	1	19.58			21.5	2.5
100	256QAM	1	1	17.69			19.5	4.5
Channel				649668	650000	650334	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3745.02	3750	3755.01		
90	PI/2 BPSK	1	1	21.95	22.03	22.00	24.0	0.0
Channel				649334	650000	650668	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3740.01	3750	3760.02		
80	PI/2 BPSK	1	1	21.92	21.96	21.99	24.0	0.0
Channel				648668	650000	651334	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3730.02	3750	3770.01		
60	PI/2 BPSK	1	1	21.95	21.97	21.90	24.0	0.0
Channel				648334	650000	651668	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3725.01	3750	3775.02		
50	PI/2 BPSK	1	1	21.86	21.99	21.91	24.0	0.0
Channel				648000	650000	652000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3720	3750	3780		
40	PI/2 BPSK	1	1	21.89	21.99	21.98	24.0	0.0
Channel				647334	650000	652668	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3710.01	3750	3790.02		
20	PI/2 BPSK	1	1	21.86	21.96	21.96	24.0	0.0

14. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

1. For each antenna, transmit power in SISO operation is larger than (or equal to) the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode.
2. Per KDB 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio ≤ 0.04, no additional SAR measurements for MIMO.
3. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, additional output power measurements were not necessary.
4. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
5. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
6. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
7. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
8. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA), and the SU maximum power also higher than RU (OFDMA)
9. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
10. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
11. When SAR testing for 802.11ax is required
    a. If the maximum output power is highest for OFDMA scenarios, choose the tone size with the maximum number of tones and the highest maximum output power
    b. Otherwise, consider the fully allocated channel for SAR testing
    c. When SAR testing is required on RU sizes less than the fully allocated channel, use the RU number closest to the middle of the channel, choosing the higher RU number when two RUs are equidistant to the middle of the channel

<2.4GHz WLAN>

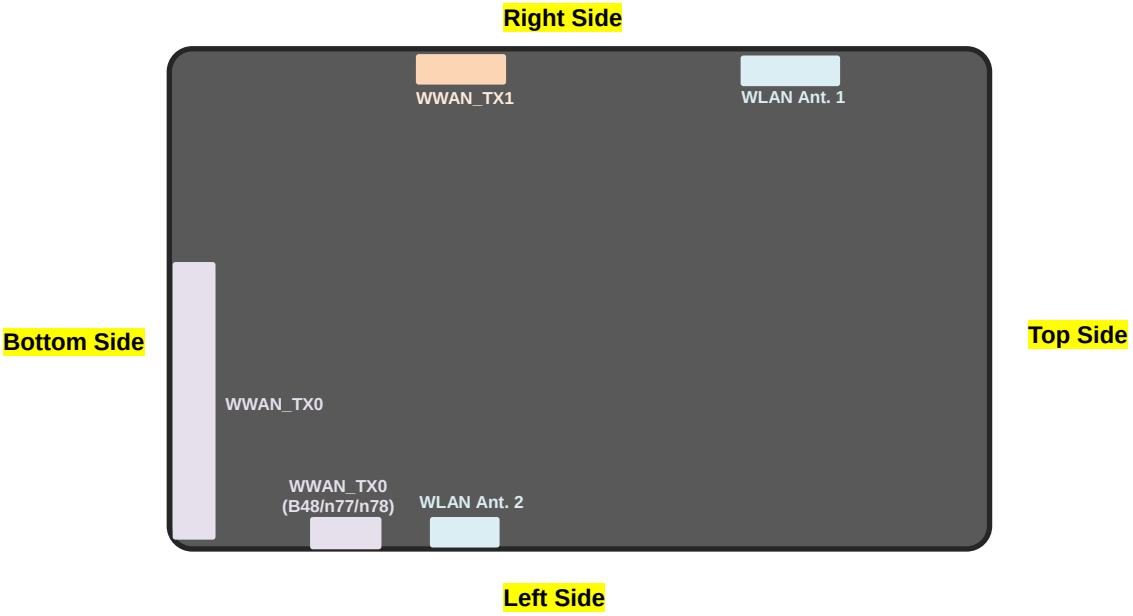
2.4GHz WLAN				Ant 1			Ant 2			Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	Not required	18.00	Not required	Not required	16.00	Not required	19.63	20.50	97.00
		6	2437		18.00			16.00		19.46	20.50	
		11	2462		18.00			16.00		19.32	20.50	
	802.11g 6Mbps	1	2412		16.00			14.00		Not required	18.00	Not required
		6	2437		16.00			14.00			18.00	
		11	2462		16.00			14.00			18.00	
	802.11n-HT20 MCS0	1	2412		14.00			12.00			16.00	
		6	2437		14.00			12.00			16.00	
		11	2462		14.00			12.00			16.00	
	802.11ax-HE20 MCS0	1	2412		14.00			12.00			16.00	
		6	2437		14.00			12.00			16.00	
		11	2462		14.00			12.00			16.00	

<5GHz WLAN>

5.2GHz WLAN				Ant 1			Ant 2			Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11n-HT20 MCS0	36	5180	Not required	14.00	Not required	Not required	14.00	Not required	Not required	17.00	Not required
		40	5200		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11n-HT40 MCS0	38	5190		14.00			14.00			17.00	
		46	5230		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	36	5180		14.00			14.00			17.00	
		40	5200		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	38	5190		14.00			14.00			17.00	
		46	5230		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	42	5210		14.00			14.00		16.62	17.00	99.00
	802.11ax-HE20 MCS0	36	5180		14.00			14.00		Not required	17.00	Not required
		40	5200		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	38	5190		14.00			14.00			17.00	
		46	5230		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	42	5210		14.00			14.00			17.00	

5.8GHz WLAN				Ant 1			Ant 2			Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11n-HT20 MCS0	149	5745	Not required	14.00	Not required	Not required	14.00	Not required	Not required	17.00	Not required
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11n-HT40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	149	5745		14.00			14.00			17.00	
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	155	5775		14.00			14.00		16.60	17.00	99.00
	802.11ax-HE20 MCS0	149	5745		14.00			14.00		Not required	17.00	Not required
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	155	5775		14.00			14.00			17.00	

15. Antenna Location



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16. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA , and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA .

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B5/B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 4 SAR test was covered by Band 66; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

5G NR Note:

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below:
   a. To start SAR test for the largest channel bandwidth for PI/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. Also do SAR test for 50% RB allocation for PI/2 BPSK SAR testing using 1RB PI/2 BPSK allocation procedure
   b. For PI/2 BPSK with 100% RB allocation, SAR test 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.
   c. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   d. Smaller bandwidth output power for each RB allocation configuration for this device is not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
   e. For 5G FR1 n5/n77, the maximum channel bandwidth does not support three non-overlapping channels in the frequency band, the middle channel of the group of overlapping channels were selected for testing.
   f. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.
   g. The 5G FRI n78 SAR was cover by n77, due to these band operating the same frequency and output power.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, WLAN5.2GHz SAR testing is not required when the WLAN5.3GHz band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for WLAN5.2GHz band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. For determination of the scaling factor for report SAR of MIMO mode, if the hot spots are separated the scaling factors are individually determined from each transmit chain. If the hot spots are not spatially separated, the scaling factor is determined from the worst number of each transmit chain
6. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

16.1 Hotspot SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II_TX0	RMC 12.2Kbps	Front	10mm	9400	1880	22.73	22.90	1.040	-0.11	0.718	0.747
	WCDMA II_TX0	RMC 12.2Kbps	Back	10mm	9400	1880	22.73	22.90	1.040	0.12	1.010	1.050
01	WCDMA II_TX0	RMC 12.2Kbps	Back	10mm	9262	1852.4	22.66	22.90	1.057	-0.12	1.040	1.099
	WCDMA II_TX0	RMC 12.2Kbps	Back	10mm	9538	1907.6	22.72	22.90	1.042	-0.12	0.987	1.029
	WCDMA II_TX0	RMC 12.2Kbps	Left Side	10mm	9400	1880	22.73	22.90	1.040	-0.16	0.262	0.272
	WCDMA II_TX0	RMC 12.2Kbps	Right Side	10mm	9400	1880	22.73	22.90	1.040	0.05	0.491	0.511
	WCDMA II_TX0	RMC 12.2Kbps	Top Side	10mm	9400	1880	22.73	22.90	1.040	0.12	0.001	0.001
	WCDMA II_TX0	RMC 12.2Kbps	Bottom Side	10mm	9400	1880	22.73	22.90	1.040	0.09	0.692	0.720
	WCDMA V_TX0	RMC 12.2Kbps	Front	10mm	4233	846.6	23.54	24.00	1.112	0.01	0.468	0.520
02	WCDMA V_TX0	RMC 12.2Kbps	Back	10mm	4233	846.6	23.54	24.00	1.112	-0.09	0.611	0.679
	WCDMA V_TX0	RMC 12.2Kbps	Left Side	10mm	4233	846.6	23.54	24.00	1.112	0.05	0.267	0.297
	WCDMA V_TX0	RMC 12.2Kbps	Right Side	10mm	4233	846.6	23.54	24.00	1.112	0.02	0.260	0.289
	WCDMA V_TX0	RMC 12.2Kbps	Top Side	10mm	4233	846.6	23.54	24.00	1.112	-0.05	0.001	0.001
	WCDMA V_TX0	RMC 12.2Kbps	Bottom Side	10mm	4233	846.6	23.54	24.00	1.112	0.05	0.131	0.146

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2_TX0	20M	QPSK	1	0	Front	10mm	18900	1880	22.81	23.10	1.069	-0.17	0.682	0.729
	LTE Band 2_TX0	20M	QPSK	50	0	Front	10mm	18900	1880	21.47	22.10	1.156	0.13	0.551	0.637
	LTE Band 2_TX0	20M	QPSK	1	0	Back	10mm	18900	1880	22.81	23.10	1.069	0.19	0.989	1.057
03	LTE Band 2_TX0	20M	QPSK	1	0	Back	10mm	18700	1860	22.74	23.10	1.086	-0.01	1.010	1.097
	LTE Band 2_TX0	20M	QPSK	1	0	Back	10mm	19100	1900	22.69	23.10	1.099	-0.03	0.905	0.995
	LTE Band 2_TX0	20M	QPSK	50	0	Back	10mm	18900	1880	21.47	22.10	1.156	0.05	0.793	0.917
	LTE Band 2_TX0	20M	QPSK	50	0	Back	10mm	18700	1860	21.46	22.10	1.159	0.16	0.774	0.897
	LTE Band 2_TX0	20M	QPSK	50	0	Back	10mm	19100	1900	21.37	22.10	1.183	0	0.756	0.894
	LTE Band 2_TX0	20M	QPSK	100	0	Back	10mm	18900	1880	21.39	22.10	1.178	-0.14	0.798	0.940
	LTE Band 2_TX0	20M	QPSK	1	0	Left Side	10mm	18900	1880	22.81	23.10	1.069	0.04	0.239	0.256
	LTE Band 2_TX0	20M	QPSK	50	0	Left Side	10mm	18900	1880	21.47	22.10	1.156	0.15	0.186	0.215
	LTE Band 2_TX0	20M	QPSK	1	0	Right Side	10mm	18900	1880	22.81	23.10	1.069	-0.14	0.405	0.433
	LTE Band 2_TX0	20M	QPSK	50	0	Right Side	10mm	18900	1880	21.47	22.10	1.156	-0.14	0.326	0.377
	LTE Band 2_TX0	20M	QPSK	1	0	Top Side	10mm	18900	1880	22.81	23.10	1.069	-0.09	0.001	0.001
	LTE Band 2_TX0	20M	QPSK	50	0	Top Side	10mm	18900	1880	21.47	22.10	1.156	0.08	0.001	0.001
	LTE Band 2_TX0	20M	QPSK	1	0	Bottom Side	10mm	18900	1880	22.81	23.10	1.069	0.06	0.628	0.671
	LTE Band 2_TX0	20M	QPSK	50	0	Bottom Side	10mm	18900	1880	21.47	22.10	1.156	0.15	0.507	0.586
	LTE Band 2_TX1	20M	QPSK	1	0	Front	10mm	18700	1860	23.03	24.00	1.250	-0.06	0.394	0.493
	LTE Band 2_TX1	20M	QPSK	50	0	Front	10mm	18700	1860	22.01	23.00	1.256	0.15	0.317	0.398
	LTE Band 2_TX1	20M	QPSK	1	0	Back	10mm	18700	1860	23.03	24.00	1.250	0.1	0.519	0.649
	LTE Band 2_TX1	20M	QPSK	50	0	Back	10mm	18700	1860	22.01	23.00	1.256	0.03	0.364	0.457
	LTE Band 2_TX1	20M	QPSK	1	0	Left Side	10mm	18700	1860	23.03	24.00	1.250	0.18	0.035	0.044
	LTE Band 2_TX1	20M	QPSK	50	0	Left Side	10mm	18700	1860	22.01	23.00	1.256	-0.13	0.029	0.036
	LTE Band 2_TX1	20M	QPSK	1	0	Right Side	10mm	18700	1860	23.03	24.00	1.250	0.04	0.311	0.389
	LTE Band 2_TX1	20M	QPSK	50	0	Right Side	10mm	18700	1860	22.01	23.00	1.256	0.01	0.274	0.344
	LTE Band 2_TX1	20M	QPSK	1	0	Top Side	10mm	18700	1860	23.03	24.00	1.250	-0.1	0.001	0.001
	LTE Band 2_TX1	20M	QPSK	50	0	Top Side	10mm	18700	1860	22.01	23.00	1.256	-0.14	0.001	0.001
	LTE Band 2_TX1	20M	QPSK	1	0	Bottom Side	10mm	18700	1860	23.03	24.00	1.250	-0.01	0.113	0.141
	LTE Band 2_TX1	20M	QPSK	50	0	Bottom Side	10mm	18700	1860	22.01	23.00	1.256	0.17	0.104	0.131

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 5_TX0	10M	QPSK	1	0	Front	10mm	20525	836.5	23.35	24.00	1.161	-0.1	0.424	0.492
	LTE Band 5_TX0	10M	QPSK	25	0	Front	10mm	20525	836.5	22.52	23.00	1.117	-0.19	0.385	0.430
04	LTE Band 5_TX0	10M	QPSK	1	0	Back	10mm	20525	836.5	23.35	24.00	1.161	-0.12	0.455	0.528
	LTE Band 5_TX0	10M	QPSK	25	0	Back	10mm	20525	836.5	22.52	23.00	1.117	0.1	0.465	0.519
	LTE Band 5_TX0	10M	QPSK	1	0	Left Side	10mm	20525	836.5	23.35	24.00	1.161	-0.14	0.296	0.344
	LTE Band 5_TX0	10M	QPSK	25	0	Left Side	10mm	20525	836.5	22.52	23.00	1.117	0.05	0.256	0.286
	LTE Band 5_TX0	10M	QPSK	1	0	Right Side	10mm	20525	836.5	23.35	24.00	1.161	0.17	0.209	0.243
	LTE Band 5_TX0	10M	QPSK	25	0	Right Side	10mm	20525	836.5	22.52	23.00	1.117	-0.16	0.171	0.191
	LTE Band 5_TX0	10M	QPSK	1	0	Top Side	10mm	20525	836.5	23.35	24.00	1.161	0.17	0.001	0.001
	LTE Band 5_TX0	10M	QPSK	25	0	Top Side	10mm	20525	836.5	22.52	23.00	1.117	0.17	0.001	0.001
	LTE Band 5_TX0	10M	QPSK	1	0	Bottom Side	10mm	20525	836.5	23.35	24.00	1.161	-0.13	0.214	0.249
	LTE Band 5_TX0	10M	QPSK	25	0	Bottom Side	10mm	20525	836.5	22.52	23.00	1.117	-0.03	0.171	0.191
	LTE Band 5B_TX0	10M	QPSK	1	0	Back	10mm	20600	844	23.95	24.00	1.012	0.02	0.417	0.422
	LTE Band 12_TX0	10M	QPSK	1	0	Front	10mm	23095	707.5	23.70	24.00	1.072	-0.05	0.496	0.531
	LTE Band 12_TX0	10M	QPSK	25	0	Front	10mm	23095	707.5	22.79	23.00	1.050	-0.13	0.407	0.427
05	LTE Band 12_TX0	10M	QPSK	1	0	Back	10mm	23095	707.5	23.70	24.00	1.072	-0.14	0.608	0.651
	LTE Band 12_TX0	10M	QPSK	25	0	Back	10mm	23095	707.5	22.79	23.00	1.050	-0.04	0.508	0.533
	LTE Band 12_TX0	10M	QPSK	1	0	Left Side	10mm	23095	707.5	23.70	24.00	1.072	-0.18	0.440	0.471
	LTE Band 12_TX0	10M	QPSK	25	0	Left Side	10mm	23095	707.5	22.79	23.00	1.050	0.02	0.341	0.358
	LTE Band 12_TX0	10M	QPSK	1	0	Right Side	10mm	23095	707.5	23.70	24.00	1.072	-0.04	0.275	0.295
	LTE Band 12_TX0	10M	QPSK	25	0	Right Side	10mm	23095	707.5	22.79	23.00	1.050	0.03	0.217	0.228
	LTE Band 12_TX0	10M	QPSK	1	0	Top Side	10mm	23095	707.5	23.70	24.00	1.072	-0.07	0.001	0.001
	LTE Band 12_TX0	10M	QPSK	25	0	Top Side	10mm	23095	707.5	22.79	23.00	1.050	-0.06	0.001	0.001
	LTE Band 12_TX0	10M	QPSK	1	0	Bottom Side	10mm	23095	707.5	23.70	24.00	1.072	-0.19	0.103	0.110
	LTE Band 12_TX0	10M	QPSK	25	0	Bottom Side	10mm	23095	707.5	22.79	23.00	1.050	0.05	0.062	0.065

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 13_TX0	10M	QPSK	1	0	Front	10mm	23230	782	23.51	24.00	1.119	0.1	0.689	0.771
	LTE Band 13_TX0	10M	QPSK	25	0	Front	10mm	23230	782	21.93	23.00	1.279	-0.03	0.553	0.707
06	LTE Band 13_TX0	10M	QPSK	1	0	Back	10mm	23230	782	23.51	24.00	1.119	-0.12	0.792	0.887
	LTE Band 13_TX0	10M	QPSK	25	0	Back	10mm	23230	782	21.93	23.00	1.279	-0.01	0.515	0.659
	LTE Band 13_TX0	10M	QPSK	50	0	Back	10mm	23230	782	21.67	23.00	1.358	0.02	0.558	0.758
	LTE Band 13_TX0	10M	QPSK	1	0	Left Side	10mm	23230	782	23.51	24.00	1.119	0.12	0.430	0.481
	LTE Band 13_TX0	10M	QPSK	25	0	Left Side	10mm	23230	782	21.93	23.00	1.279	0.18	0.333	0.426
	LTE Band 13_TX0	10M	QPSK	1	0	Right Side	10mm	23230	782	23.51	24.00	1.119	0.16	0.330	0.369
	LTE Band 13_TX0	10M	QPSK	25	0	Right Side	10mm	23230	782	21.93	23.00	1.279	0.13	0.266	0.340
	LTE Band 13_TX0	10M	QPSK	1	0	Top Side	10mm	23230	782	23.51	24.00	1.119	0.12	0.001	0.001
	LTE Band 13_TX0	10M	QPSK	25	0	Top Side	10mm	23230	782	21.93	23.00	1.279	-0.11	0.001	0.001
	LTE Band 13_TX0	10M	QPSK	1	0	Bottom Side	10mm	23230	782	23.51	24.00	1.119	-0.07	0.126	0.141
	LTE Band 13_TX0	10M	QPSK	25	0	Bottom Side	10mm	23230	782	21.93	23.00	1.279	0.15	0.112	0.143
	LTE Band 66_TX0	20M	QPSK	1	0	Front	10mm	132322	1745	21.66	22.50	1.213	-0.09	0.449	0.544
	LTE Band 66_TX0	20M	QPSK	50	0	Front	10mm	132322	1745	21.64	22.50	1.219	-0.15	0.390	0.475
	LTE Band 66_TX0	20M	QPSK	1	0	Back	10mm	132322	1745	21.66	22.50	1.213	-0.06	0.769	0.933
	LTE Band 66_TX0	20M	QPSK	1	0	Back	10mm	132072	1720	21.60	22.50	1.230	0.16	0.751	0.923
	LTE Band 66_TX0	20M	QPSK	1	0	Back	10mm	132572	1770	21.62	22.50	1.225	-0.07	0.836	1.024
	LTE Band 66_TX0	20M	QPSK	50	0	Back	10mm	132322	1745	21.64	22.50	1.219	-0.15	0.720	0.878
	LTE Band 66_TX0	20M	QPSK	50	0	Back	10mm	132072	1720	21.59	22.50	1.233	0.08	0.714	0.880
	LTE Band 66_TX0	20M	QPSK	50	0	Back	10mm	132572	1770	21.63	22.50	1.222	-0.11	0.728	0.889
	LTE Band 66_TX0	20M	QPSK	100	0	Back	10mm	132322	1745	21.62	22.50	1.225	-0.03	0.690	0.844
	LTE Band 66_TX0	20M	QPSK	1	0	Left Side	10mm	132322	1745	21.66	22.50	1.213	-0.18	0.103	0.125
	LTE Band 66_TX0	20M	QPSK	50	0	Left Side	10mm	132322	1745	21.64	22.50	1.219	0.09	0.090	0.109
	LTE Band 66_TX0	20M	QPSK	1	0	Right Side	10mm	132322	1745	21.66	22.50	1.213	0.11	0.155	0.188
	LTE Band 66_TX0	20M	QPSK	50	0	Right Side	10mm	132322	1745	21.64	22.50	1.219	0	0.136	0.166
	LTE Band 66_TX0	20M	QPSK	1	0	Top Side	10mm	132322	1745	21.66	22.50	1.213	0.15	0.001	0.001
	LTE Band 66_TX0	20M	QPSK	50	0	Top Side	10mm	132322	1745	21.64	22.50	1.219	-0.13	0.001	0.001
	LTE Band 66_TX0	20M	QPSK	1	0	Bottom Side	10mm	132322	1745	21.66	22.50	1.213	0.01	0.372	0.452
	LTE Band 66_TX0	20M	QPSK	50	0	Bottom Side	10mm	132322	1745	21.64	22.50	1.219	0.04	0.301	0.367
	LTE Band 66_TX1	20M	QPSK	1	0	Front	10mm	132572	1770	22.99	23.90	1.233	0.02	0.489	0.603
	LTE Band 66_TX1	20M	QPSK	50	0	Front	10mm	132572	1770	22.43	23.00	1.140	-0.17	0.439	0.501
07	LTE Band 66_TX1	20M	QPSK	1	0	Back	10mm	132572	1770	22.99	23.90	1.233	-0.02	0.902	1.112
	LTE Band 66_TX1	20M	QPSK	1	0	Back	10mm	132072	1720	22.73	23.90	1.309	0.03	0.731	0.957
	LTE Band 66_TX1	20M	QPSK	1	0	Back	10mm	132322	1745	22.74	23.90	1.306	-0.08	0.802	1.048
	LTE Band 66_TX1	20M	QPSK	50	0	Back	10mm	132572	1770	22.43	23.00	1.140	0.17	0.820	0.935
	LTE Band 66_TX1	20M	QPSK	50	0	Back	10mm	132072	1720	22.20	23.00	1.202	0.07	0.711	0.855
	LTE Band 66_TX1	20M	QPSK	50	0	Back	10mm	132322	1745	22.22	23.00	1.197	0.11	0.796	0.953
	LTE Band 66_TX1	20M	QPSK	100	0	Back	10mm	132572	1770	22.30	23.00	1.175	0.09	0.720	0.846
	LTE Band 66_TX1	20M	QPSK	1	0	Left Side	10mm	132572	1770	22.99	23.90	1.233	0.01	0.062	0.076
	LTE Band 66_TX1	20M	QPSK	50	0	Left Side	10mm	132572	1770	22.43	23.00	1.140	0	0.048	0.055
	LTE Band 66_TX1	20M	QPSK	1	0	Right Side	10mm	132572	1770	22.99	23.90	1.233	-0.01	0.399	0.492
	LTE Band 66_TX1	20M	QPSK	50	0	Right Side	10mm	132572	1770	22.43	23.00	1.140	0.14	0.327	0.373
	LTE Band 66_TX1	20M	QPSK	1	0	Top Side	10mm	132572	1770	22.99	23.90	1.233	0.14	0.001	0.001
	LTE Band 66_TX1	20M	QPSK	50	0	Top Side	10mm	132572	1770	22.43	23.00	1.140	0.1	0.001	0.001
	LTE Band 66_TX1	20M	QPSK	1	0	Bottom Side	10mm	132572	1770	22.99	23.90	1.233	-0.04	0.180	0.222
	LTE Band 66_TX1	20M	QPSK	50	0	Bottom Side	10mm	132572	1770	22.43	23.00	1.140	-0.16	0.129	0.147

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41_TX0	20M	QPSK	1	0	Front	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	0.01	0.318	0.344
	LTE Band 41_TX0	20M	QPSK	50	0	Front	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	-0.09	0.287	0.311
	LTE Band 41_TX0	20M	QPSK	1	0	Back	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	0.06	0.500	0.540
	LTE Band 41_TX0	20M	QPSK	50	0	Back	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	0.01	0.415	0.449
	LTE Band 41_TX0	20M	QPSK	1	0	Left Side	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	-0.09	0.192	0.207
	LTE Band 41_TX0	20M	QPSK	50	0	Left Side	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	0.12	0.175	0.190
	LTE Band 41_TX0	20M	QPSK	1	0	Right Side	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	0.15	0.078	0.084
	LTE Band 41_TX0	20M	QPSK	50	0	Right Side	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	-0.17	0.061	0.066
	LTE Band 41_TX0	20M	QPSK	1	0	Top Side	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	-0.09	0.047	0.051
	LTE Band 41_TX0	20M	QPSK	50	0	Top Side	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	0.05	0.039	0.042
	LTE Band 41_TX0	20M	QPSK	1	0	Bottom Side	10mm	41490	2680	18.39	18.70	1.074	62.9	1.006	-0.11	0.919	0.993
08	LTE Band 41_TX0	20M	QPSK	1	0	Bottom Side	10mm	39750	2506	18.37	18.70	1.079	62.9	1.006	-0.1	1.080	1.172
	LTE Band 41_TX0	20M	QPSK	1	0	Bottom Side	10mm	40185	2549.5	17.75	18.70	1.245	62.9	1.006	-0.04	0.895	1.121
	LTE Band 41_TX0	20M	QPSK	1	0	Bottom Side	10mm	40620	2593	17.90	18.70	1.202	62.9	1.006	0.04	0.923	1.116
	LTE Band 41_TX0	20M	QPSK	1	0	Bottom Side	10mm	41055	2636.5	18.35	18.70	1.084	62.9	1.006	0.16	1.010	1.101
	LTE Band 41_TX0	20M	QPSK	50	0	Bottom Side	10mm	41490	2680	18.38	18.70	1.076	62.9	1.006	-0.15	0.829	0.898
	LTE Band 41_TX0	20M	QPSK	50	0	Bottom Side	10mm	39750	2506	18.12	18.70	1.143	62.9	1.006	0.14	0.960	1.104
	LTE Band 41_TX0	20M	QPSK	50	0	Bottom Side	10mm	40185	2549.5	17.68	18.70	1.265	62.9	1.006	-0.18	0.715	0.910
	LTE Band 41_TX0	20M	QPSK	50	0	Bottom Side	10mm	40620	2593	17.93	18.70	1.194	62.9	1.006	0.11	0.883	1.061
	LTE Band 41_TX0	20M	QPSK	50	0	Bottom Side	10mm	41055	2636.5	18.34	18.70	1.086	62.9	1.006	0.06	0.870	0.951
	LTE Band 41_TX0	20M	QPSK	100	0	Bottom Side	10mm	41490	2680	18.22	18.70	1.117	62.9	1.006	-0.05	0.887	0.997
09	LTE Band 48_TX0	20M	QPSK	1	0	Front	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	-0.06	0.419	0.478
	LTE Band 48_TX0	20M	QPSK	50	0	Front	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	-0.14	0.283	0.314
	LTE Band 48_TX0	20M	QPSK	1	0	Back	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	-0.05	0.340	0.388
	LTE Band 48_TX0	20M	QPSK	50	0	Back	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	0.15	0.278	0.308
	LTE Band 48_TX0	20M	QPSK	1	0	Left Side	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	0.06	0.233	0.266
	LTE Band 48_TX0	20M	QPSK	50	0	Left Side	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	0.18	0.193	0.214
	LTE Band 48_TX0	20M	QPSK	1	0	Right Side	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	0.1	0.100	0.114
	LTE Band 48_TX0	20M	QPSK	50	0	Right Side	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	-0.03	0.085	0.094
	LTE Band 48_TX0	20M	QPSK	1	0	Top Side	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	0.17	0.001	0.001
	LTE Band 48_TX0	20M	QPSK	50	0	Top Side	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	0.19	0.001	0.001
	LTE Band 48_TX0	20M	QPSK	1	0	Bottom Side	10mm	55340	3560	23.45	24.00	1.135	62.9	1.006	0.01	0.172	0.196
	LTE Band 48_TX0	20M	QPSK	50	0	Bottom Side	10mm	55340	3560	22.58	23.00	1.102	62.9	1.006	-0.08	0.149	0.165

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n2_TX0	20M	BPSK	1	53	Front	10mm	380000	1900	23.38	23.80	1.102	0.17	0.763	0.840
	FR1 n2_TX0	20M	BPSK	1	104	Front	10mm	372000	1860	23.28	23.80	1.127	0.08	0.747	0.842
	FR1 n2_TX0	20M	BPSK	1	53	Front	10mm	376000	1880	23.31	23.80	1.119	-0.13	0.741	0.830
	FR1 n2_TX0	20M	BPSK	50	28	Front	10mm	376000	1880	23.31	23.80	1.119	-0.15	0.747	0.836
	FR1 n2_TX0	20M	BPSK	50	28	Front	10mm	372000	1860	23.18	23.80	1.153	0.11	0.735	0.848
	FR1 n2_TX0	20M	BPSK	50	28	Front	10mm	380000	1900	23.30	23.80	1.122	0.01	0.738	0.828
	FR1 n2_TX0	20M	BPSK	100	0	Front	10mm	376000	1880	22.76	23.50	1.186	0.19	0.727	0.862
	FR1 n2_TX0	20M	BPSK	1	53	Back	10mm	380000	1900	23.38	23.80	1.102	-0.09	0.893	0.984
	FR1 n2_TX0	20M	BPSK	1	104	Back	10mm	372000	1860	23.28	23.80	1.127	0	0.805	0.907
	FR1 n2_TX0	20M	BPSK	1	53	Back	10mm	376000	1880	23.31	23.80	1.119	-0.14	0.832	0.931
	FR1 n2_TX0	20M	BPSK	50	28	Back	10mm	376000	1880	23.31	23.80	1.119	0.19	0.941	1.053
10	FR1 n2_TX0	20M	BPSK	50	28	Back	10mm	372000	1860	23.18	23.80	1.153	-0.13	0.972	1.121
	FR1 n2_TX0	20M	BPSK	50	28	Back	10mm	380000	1900	23.30	23.80	1.122	-0.07	0.862	0.967
	FR1 n2_TX0	20M	BPSK	100	0	Back	10mm	376000	1880	22.76	23.50	1.186	-0.06	0.811	0.962
	FR1 n2_TX0	20M	BPSK	1	53	Left Side	10mm	380000	1900	23.38	23.80	1.102	0.17	0.211	0.232
	FR1 n2_TX0	20M	BPSK	50	28	Left Side	10mm	376000	1880	23.31	23.80	1.119	0.11	0.260	0.291
	FR1 n2_TX0	20M	BPSK	1	53	Right Side	10mm	380000	1900	23.38	23.80	1.102	-0.02	0.560	0.617
	FR1 n2_TX0	20M	BPSK	50	28	Right Side	10mm	376000	1880	23.31	23.80	1.119	-0.03	0.407	0.456
	FR1 n2_TX0	20M	BPSK	1	53	Top Side	10mm	380000	1900	23.38	23.80	1.102	-0.06	0.001	0.001
	FR1 n2_TX0	20M	BPSK	50	28	Top Side	10mm	376000	1880	23.31	23.80	1.119	-0.11	0.001	0.001
	FR1 n2_TX0	20M	BPSK	1	53	Bottom Side	10mm	380000	1900	23.38	23.80	1.102	-0.14	0.544	0.599
	FR1 n2_TX0	20M	BPSK	50	28	Bottom Side	10mm	376000	1880	23.31	23.80	1.119	-0.09	0.505	0.565
	FR1 n2_TX1	20M	BPSK	1	53	Front	10mm	372000	1860	23.75	24.00	1.059	-0.09	0.475	0.503
	FR1 n2_TX1	20M	BPSK	50	28	Front	10mm	372000	1860	23.77	24.00	1.054	-0.08	0.509	0.537
	FR1 n2_TX1	20M	BPSK	1	53	Back	10mm	372000	1860	23.75	24.00	1.059	0.12	0.664	0.703
	FR1 n2_TX1	20M	BPSK	50	28	Back	10mm	372000	1860	23.77	24.00	1.054	-0.07	0.741	0.781
	FR1 n2_TX1	20M	BPSK	1	53	Left Side	10mm	372000	1860	23.75	24.00	1.059	0.02	0.053	0.056
	FR1 n2_TX1	20M	BPSK	50	28	Left Side	10mm	372000	1860	23.77	24.00	1.054	0.16	0.064	0.067
	FR1 n2_TX1	20M	BPSK	1	53	Right Side	10mm	372000	1860	23.75	24.00	1.059	0.12	0.438	0.464
	FR1 n2_TX1	20M	BPSK	50	28	Right Side	10mm	372000	1860	23.77	24.00	1.054	0.09	0.414	0.437
	FR1 n2_TX1	20M	BPSK	1	53	Top Side	10mm	372000	1860	23.75	24.00	1.059	-0.15	0.001	0.001
	FR1 n2_TX1	20M	BPSK	50	28	Top Side	10mm	372000	1860	23.77	24.00	1.054	0.1	0.001	0.001
	FR1 n2_TX1	20M	BPSK	1	53	Bottom Side	10mm	372000	1860	23.75	24.00	1.059	-0.18	0.091	0.096
	FR1 n2_TX1	20M	BPSK	50	28	Bottom Side	10mm	372000	1860	23.77	24.00	1.054	0	0.173	0.182
	FR1 n5_TX0	20M	BPSK	1	1	Front	10mm	167300	836.5	23.35	24.00	1.161	0.19	0.426	0.495
	FR1 n5_TX0	20M	BPSK	50	28	Front	10mm	167300	836.5	23.35	24.00	1.161	0.13	0.392	0.455
	FR1 n5_TX0	20M	BPSK	1	1	Back	10mm	167300	836.5	23.35	24.00	1.161	0.09	0.413	0.480
11	FR1 n5_TX0	20M	BPSK	50	28	Back	10mm	167300	836.5	23.35	24.00	1.161	-0.01	0.582	0.676
	FR1 n5_TX0	20M	BPSK	1	1	Left Side	10mm	167300	836.5	23.35	24.00	1.161	-0.05	0.171	0.199
	FR1 n5_TX0	20M	BPSK	50	28	Left Side	10mm	167300	836.5	23.35	24.00	1.161	-0.17	0.288	0.334
	FR1 n5_TX0	20M	BPSK	1	1	Right Side	10mm	167300	836.5	23.35	24.00	1.161	0.02	0.074	0.086
	FR1 n5_TX0	20M	BPSK	50	28	Right Side	10mm	167300	836.5	23.35	24.00	1.161	-0.02	0.074	0.086
	FR1 n5_TX0	20M	BPSK	1	1	Top Side	10mm	167300	836.5	23.35	24.00	1.161	0.14	0.001	0.001
	FR1 n5_TX0	20M	BPSK	50	28	Top Side	10mm	167300	836.5	23.35	24.00	1.161	-0.19	0.001	0.001
	FR1 n5_TX0	20M	BPSK	1	1	Bottom Side	10mm	167300	836.5	23.35	24.00	1.161	-0.09	0.195	0.226
	FR1 n5_TX0	20M	BPSK	50	28	Bottom Side	10mm	167300	836.5	23.35	24.00	1.161	0.13	0.165	0.192

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n66_TX0	40M	BPSK	1	214	Front	10mm	349000	1745	23.32	23.80	1.117	0.13	0.680	0.759
	FR1 n66_TX0	40M	BPSK	108	54	Front	10mm	349000	1745	23.14	23.80	1.164	-0.01	0.627	0.730
12	FR1 n66_TX0	40M	BPSK	1	214	Back	10mm	349000	1745	23.32	23.80	1.117	-0.1	0.985	1.100
	FR1 n66_TX0	40M	BPSK	108	54	Back	10mm	349000	1745	23.14	23.80	1.164	-0.14	0.936	1.090
	FR1 n66_TX0	40M	BPSK	216	0	Back	10mm	349000	1745	22.71	23.50	1.199	0.12	0.900	1.080
	FR1 n66_TX0	40M	BPSK	1	214	Left Side	10mm	349000	1745	23.32	23.80	1.117	0.18	0.175	0.195
	FR1 n66_TX0	40M	BPSK	108	54	Left Side	10mm	349000	1745	23.14	23.80	1.164	-0.11	0.151	0.176
	FR1 n66_TX0	40M	BPSK	1	214	Right Side	10mm	349000	1745	23.32	23.80	1.117	-0.18	0.268	0.299
	FR1 n66_TX0	40M	BPSK	108	54	Right Side	10mm	349000	1745	23.14	23.80	1.164	-0.1	0.261	0.304
	FR1 n66_TX0	40M	BPSK	1	214	Top Side	10mm	349000	1745	23.32	23.80	1.117	-0.06	0.001	0.001
	FR1 n66_TX0	40M	BPSK	108	54	Top Side	10mm	349000	1745	23.14	23.80	1.164	0.01	0.001	0.001
	FR1 n66_TX0	40M	BPSK	1	214	Bottom Side	10mm	349000	1745	23.32	23.80	1.117	-0.1	0.582	0.650
	FR1 n66_TX0	40M	BPSK	108	54	Bottom Side	10mm	349000	1745	23.14	23.80	1.164	0.11	0.544	0.633
	FR1 n66_TX1	40M	BPSK	1	214	Front	10mm	349000	1745	23.99	24.00	1.002	-0.02	0.476	0.477
	FR1 n66_TX1	40M	BPSK	108	54	Front	10mm	349000	1745	23.85	24.00	1.035	-0.1	0.615	0.637
	FR1 n66_TX1	40M	BPSK	1	214	Back	10mm	349000	1745	23.99	24.00	1.002	-0.11	0.884	0.886
	FR1 n66_TX1	40M	BPSK	108	54	Back	10mm	349000	1745	23.85	24.00	1.035	-0.04	0.941	0.974
	FR1 n66_TX1	40M	BPSK	216	0	Back	10mm	349000	1745	23.22	23.50	1.067	0.02	0.854	0.911
	FR1 n66_TX1	40M	BPSK	1	214	Left Side	10mm	349000	1745	23.99	24.00	1.002	0.06	0.042	0.042
	FR1 n66_TX1	40M	BPSK	108	54	Left Side	10mm	349000	1745	23.85	24.00	1.035	-0.19	0.054	0.056
	FR1 n66_TX1	40M	BPSK	1	214	Right Side	10mm	349000	1745	23.99	24.00	1.002	-0.05	0.323	0.324
	FR1 n66_TX1	40M	BPSK	108	54	Right Side	10mm	349000	1745	23.85	24.00	1.035	-0.15	0.331	0.343
	FR1 n66_TX1	40M	BPSK	1	214	Top Side	10mm	349000	1745	23.99	24.00	1.002	-0.18	0.001	0.001
	FR1 n66_TX1	40M	BPSK	108	54	Top Side	10mm	349000	1745	23.85	24.00	1.035	0.04	0.001	0.001
	FR1 n66_TX1	40M	BPSK	1	214	Bottom Side	10mm	349000	1745	23.99	24.00	1.002	0.05	0.216	0.216
	FR1 n66_TX1	40M	BPSK	108	54	Bottom Side	10mm	349000	1745	23.85	24.00	1.035	0.03	0.196	0.203
	FR1 n77_TX0	100M	BPSK	1	1	Front	10mm	656000	3840	22.52	23.00	1.117	0.11	0.340	0.380
	FR1 n77_TX0	100M	BPSK	135	0	Front	10mm	656000	3840	22.42	23.00	1.143	0.14	0.308	0.352
13	FR1 n77_TX0	100M	BPSK	1	1	Back	10mm	656000	3840	22.52	23.00	1.117	0.02	0.533	0.595
	FR1 n77_TX0	100M	BPSK	135	0	Back	10mm	656000	3840	22.42	23.00	1.143	-0.16	0.475	0.543
	FR1 n77_TX0	100M	BPSK	270	0	Back	10mm	656000	3840	22.40	23.00	1.148	0.19	0.464	0.533
	FR1 n77_TX0	100M	BPSK	1	1	Left Side	10mm	656000	3840	22.52	23.00	1.117	-0.04	0.327	0.365
	FR1 n77_TX0	100M	BPSK	135	0	Left Side	10mm	656000	3840	22.42	23.00	1.143	0.12	0.309	0.353
	FR1 n77_TX0	100M	BPSK	1	1	Right Side	10mm	656000	3840	22.52	23.00	1.117	0.12	0.460	0.514
	FR1 n77_TX0	100M	BPSK	135	0	Right Side	10mm	656000	3840	22.42	23.00	1.143	0.19	0.422	0.482
	FR1 n77_TX0	100M	BPSK	1	1	Top Side	10mm	656000	3840	22.52	23.00	1.117	0.14	0.149	0.166
	FR1 n77_TX0	100M	BPSK	135	0	Top Side	10mm	656000	3840	22.42	23.00	1.143	0.07	0.127	0.145
	FR1 n77_TX0	100M	BPSK	1	1	Bottom Side	10mm	656000	3840	22.52	23.00	1.117	0.17	0.195	0.218
	FR1 n77_TX0	100M	BPSK	135	0	Bottom Side	10mm	656000	3840	22.42	23.00	1.143	-0.19	0.163	0.186
24	FR1 n77_TX0_HPUE	100M	BPSK	1	1	Back	10mm	656000	3840	22.52	23.00	1.117	0	0.531	0.593

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	0.01	0.168	0.212
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	0.03	0.197	0.248
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	0	0.088	0.111
14	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	-0.04	0.356	0.448
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	-0.08	0.127	0.160
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	10mm	Ant 1+2	1	2412	19.63	20.50	1.222	97	1.031	-0.14	0.038	0.048
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	0.02	0.120	0.132
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	0.01	0.261	0.288
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	0.03	0.336	0.370
15	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	-0.03	0.714	0.787
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	0.01	0.033	0.036
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	10mm	Ant 1+2	42	5210	16.62	17.00	1.091	99	1.010	-0.08	0.059	0.065
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	0.12	0.231	0.256
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	-0.16	0.396	0.439
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	0.14	0.529	0.586
16	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	-0.01	0.667	0.739
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	-0.09	0.072	0.080
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	10mm	Ant 1+2	155	5775	16.60	17.00	1.096	99	1.010	0.01	0.077	0.085

16.2 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA II_TX0	RMC 12.2Kbps	Back	10mm	9262	1852.4	22.66	22.90	1.057		1.000	-0.12	1.040		1.099
2nd	WCDMA II_TX0	RMC 12.2Kbps	Back	10mm	9262	1852.4	22.66	22.90	1.057		1.000	0.1	0.988	1.05	1.044
1st	LTE Band 41_TX0	20M_QPSK_1_0	Bottom Side	10mm	39750	2506	18.37	18.70	1.079	62.9	1.006	-0.1	1.080		1.172
2nd	LTE Band 41_TX0	20M_QPSK_1_0	Bottom Side	10mm	39750	2506	18.37	18.70	1.079	62.9	1.006	0.03	1.060	1.02	1.151
1st	FR1 n66_TX0	40M_BPSK_1_214	Back	10mm	349000	1745	23.32	23.80	1.117		1.000	-0.1	0.985		1.100
2nd	FR1 n66_TX0	40M_BPSK_1_214	Back	10mm	349000	1745	23.32	23.80	1.117		1.000	0.13	0.967	1.02	1.080

General Note:

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

17. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Hotspot
1.	WWAN + WLAN2.4GHz Ant 1+2	Yes
2.	WWAN + WLAN5GHz Ant 1+2	Yes

General Note:

1. The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
2. The Scaled SAR summation is calculated based on the same configuration and test position.
3. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

17.1 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1+2	5GHz WLAN Ant 1+2		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA	WCDMA II_TX 0	Front	0.747	0.212	0.256	**0.959**	**1.003**
		Back	1.099	0.248	0.439	**1.347**	**1.538**
		Left side	0.272	0.111	0.586	**0.383**	**0.858**
		Right side	0.511	0.448	0.787	**0.959**	**1.298**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.720	0.048	0.085	**0.768**	**0.805**
	WCDMA V_TX 0	Front	0.520	0.212	0.256	**0.732**	**0.776**
		Back	0.679	0.248	0.439	**0.927**	**1.118**
		Left side	0.297	0.111	0.586	**0.408**	**0.883**
		Right side	0.289	0.448	0.787	**0.737**	**1.076**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.146	0.048	0.085	**0.194**	**0.231**

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN Ant 1+2 1g SAR (W/kg)	3 5GHz WLAN Ant 1+2 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
LTE	LTE Band 2_TX 0	Front	0.729	0.212	0.256	**0.941**	**0.985**
		Back	1.097	0.248	0.439	**1.345**	**1.536**
		Left side	0.256	0.111	0.586	**0.367**	**0.842**
		Right side	0.433	0.448	0.787	**0.881**	**1.220**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.671	0.048	0.085	**0.719**	**0.756**
	LTE Band 2_TX 1	Front	0.493	0.212	0.256	**0.705**	**0.749**
		Back	0.649	0.248	0.439	**0.897**	**1.088**
		Left side	0.044	0.111	0.586	**0.155**	**0.630**
		Right side	0.389	0.448	0.787	**0.837**	**1.176**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.141	0.048	0.085	**0.189**	**0.226**
	LTE Band 5_TX 0	Front	0.492	0.212	0.256	**0.704**	**0.748**
		Back	0.528	0.248	0.439	**0.776**	**0.967**
		Left side	0.344	0.111	0.586	**0.455**	**0.930**
		Right side	0.243	0.448	0.787	**0.691**	**1.030**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.249	0.048	0.085	**0.297**	**0.334**
	LTE Band 12_TX 0	Front	0.531	0.212	0.256	**0.743**	**0.787**
		Back	0.651	0.248	0.439	**0.899**	**1.090**
		Left side	0.471	0.111	0.586	**0.582**	**1.057**
		Right side	0.295	0.448	0.787	**0.743**	**1.082**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.110	0.048	0.085	**0.158**	**0.195**
	LTE Band 13_TX 0	Front	0.771	0.212	0.256	**0.983**	**1.027**
		Back	0.887	0.248	0.439	**1.135**	**1.326**
		Left side	0.481	0.111	0.586	**0.592**	**1.067**
		Right side	0.369	0.448	0.787	**0.817**	**1.156**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.143	0.048	0.085	**0.191**	**0.228**
	LTE Band 41_TX 0	Front	0.344	0.212	0.256	**0.556**	**0.600**
		Back	0.540	0.248	0.439	**0.788**	**0.979**
		Left side	0.207	0.111	0.586	**0.318**	**0.793**
		Right side	0.084	0.448	0.787	**0.532**	**0.871**
		Top side	0.051	0.160	0.080	**0.211**	**0.131**
		Bottom side	1.172	0.048	0.085	**1.220**	**1.257**
	LTE Band 48_TX 0	Front	0.478	0.212	0.256	**0.690**	**0.734**
		Back	0.388	0.248	0.439	**0.636**	**0.827**
		Left side	0.266	0.111	0.586	**0.377**	**0.852**
		Right side	0.114	0.448	0.787	**0.562**	**0.901**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.196	0.048	0.085	**0.244**	**0.281**
	LTE Band 66_TX 0	Front	0.544	0.212	0.256	**0.756**	**0.800**
		Back	1.024	0.248	0.439	**1.272**	**1.463**
		Left side	0.125	0.111	0.586	**0.236**	**0.711**
		Right side	0.188	0.448	0.787	**0.636**	**0.975**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.452	0.048	0.085	**0.500**	**0.537**
	LTE Band 66_TX 1	Front	0.603	0.212	0.256	**0.815**	**0.859**
		Back	1.112	0.248	0.439	**1.360**	**1.551**
		Left side	0.076	0.111	0.586	**0.187**	**0.662**
		Right side	0.492	0.448	0.787	**0.940**	**1.279**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.222	0.048	0.085	**0.270**	**0.307**

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant 1+2	5GHz WLAN Ant 1+2		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
FR1	FR1 n2_TX 0	Front	0.862	0.212	0.256	**1.074**	**1.118**
		Back	1.121	0.248	0.439	**1.369**	**1.560**
		Left side	0.291	0.111	0.586	**0.402**	**0.877**
		Right side	0.617	0.448	0.787	**1.065**	**1.404**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.599	0.048	0.085	**0.647**	**0.684**
	FR1 n2_TX 1	Front	0.537	0.212	0.256	**0.749**	**0.793**
		Back	0.781	0.248	0.439	**1.029**	**1.220**
		Left side	0.067	0.111	0.586	**0.178**	**0.653**
		Right side	0.464	0.448	0.787	**0.912**	**1.251**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.182	0.048	0.085	**0.230**	**0.267**
	FR1 n5_TX 0	Front	0.495	0.212	0.256	**0.707**	**0.751**
		Back	0.676	0.248	0.439	**0.924**	**1.115**
		Left side	0.334	0.111	0.586	**0.445**	**0.920**
		Right side	0.086	0.448	0.787	**0.534**	**0.873**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.226	0.048	0.085	**0.274**	**0.311**
	FR1 n66_TX 0	Front	0.759	0.212	0.256	**0.971**	**1.015**
		Back	1.100	0.248	0.439	**1.348**	**1.539**
		Left side	0.195	0.111	0.586	**0.306**	**0.781**
		Right side	0.304	0.448	0.787	**0.752**	**1.091**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.650	0.048	0.085	**0.698**	**0.735**
	FR1 n66_TX 1	Front	0.637	0.212	0.256	**0.849**	**0.893**
		Back	0.974	0.248	0.439	**1.222**	**1.413**
		Left side	0.056	0.111	0.586	**0.167**	**0.642**
		Right side	0.343	0.448	0.787	**0.791**	**1.130**
		Top side	0.001	0.160	0.080	**0.161**	**0.081**
		Bottom side	0.216	0.048	0.085	**0.264**	**0.301**
	FR1 n77_TX 0	Front	0.380	0.212	0.256	**0.592**	**0.636**
		Back	0.595	0.248	0.439	**0.843**	**1.034**
		Left side	0.365	0.111	0.586	**0.476**	**0.951**
		Right side	0.514	0.448	0.787	**0.962**	**1.301**
		Top side	0.166	0.160	0.080	**0.326**	**0.246**
		Bottom side	0.218	0.048	0.085	**0.266**	**0.303**

Test Engineer： Ken Lin and Willie Huang

18. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.
Declaration of Conformity:
The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

19. References

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

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

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

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

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

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

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

[9] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

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

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