



TEST REPORT

APPLICANT : Nubia Technology Co.,Ltd.
PRODUCT NAME : 5G Mobile Phone
MODEL NAME : NX669J
BRAND NAME : REDMAGIC
FCC ID : 2AHJO-NX669J
STANDARD(S) : FCC 47 CFR Part 2(2.1093)
IEEE 1528-2013
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Changed History		
Version	Date	Reason for Change
1.0	2021-03-11	First edition



1. SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest Reported SAR Summary>

Frequency Band		Highest SAR Summary			
		Head (Gap 0mm)	Body-worn (Gap 10mm)	Hotspot (Gap 10mm)	Extremity (Gap 0mm)
		1g SAR (W/kg)			10g SAR (W/kg)
GSM	GSM850	0.671	0.681	0.713	N/A
	GSM1900	0.757	0.306	0.306	N/A
WCDMA	WCDMA Band II	0.812	0.382	0.382	N/A
	WCDMA Band IV	0.780	0.392	0.392	N/A
	WCDMA Band V	0.713	0.385	0.416	N/A
CDMA	CDMA2000 BC0	0.772	0.394	0.394	N/A
	CDMA2000 BC1	0.752	0.417	0.417	N/A
LTE	LTE Band 2	0.521	0.346	0.346	N/A
	LTE Band 4	0.542	0.282	0.282	N/A
	LTE Band 5	0.441	0.399	0.406	N/A
	LTE Band 7	0.503	0.487	1.014	N/A
	LTE Band 12/17	0.541	0.124	0.124	N/A
	LTE Band 18	0.584	0.282	0.306	N/A
	LTE Band 19	0.644	0.354	0.379	N/A
	LTE Band 26	0.571	0.308	0.335	N/A
	LTE Band 38	0.266	0.220	0.446	N/A
	LTE Band 40A	0.316	0.263	0.381	N/A
	LTE Band 40B	0.327	0.252	0.504	N/A
	LTE Band 66	0.615	0.317	0.317	N/A
5G NR	NR Band n41	0.406	0.067	0.154	N/A
WLAN	2.4GHz WLAN	0.639	0.123	0.126	N/A
	5GHz WLAN	0.575	1.041	1.041	1.350
2.4GHz Band	Bluetooth	N/A	0.093	0.093	N/A

Max Scaled SAR _{1g} (W/Kg):	Head:	0.812 W/kg	Limit(W/kg): 1.6 W/kg
	Body-worn:	1.041 W/kg	
	Hotspot:	1.041 W/kg	
Max Scaled SAR _{10g} (W/Kg):	Extremity	1.350 W/kg	Limit(W/kg): 4.0 W/kg



Highest Simultaneous Transmission SAR _{1g} (W/Kg):	1.552 W/kg	Limit(W/kg): 1.6 W/kg
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Note:

1. This device is in compliance with Specific Absorption Rate (SAR) for general population or uncontrolled exposure limits (1.6W/kg as averaged over any 1 gram of tissue; 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.
2. When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.



2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	Nubia Technology Co.,Ltd.
Applicant Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City,Guangdong Province, P. R. China
Manufacturer:	Nubia Technology Co.,Ltd.
Manufacturer Address:	Room 1801, Building 2, Chongwen Park, Nanshan Zhiyuan, No.3370, Liuxian Rd, Nanshan District, Shenzhen City, Guangdong Province, P. R. China

2.2. Equipment under Test (EUT) Description

Product Name:	5G Mobile Phone
Hardware Version:	NX669J_V1AMB
Software Version:	NX669J_EUCommon_V3.05
Frequency Bands:	GSM 850: 824 MHz ~ 849 MHz GSM 1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz CDMA2000 BC0: 824 MHz ~ 849 MHz CDMA2000 BC1: 1850 MHz ~ 1910 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 18: 815 MHz ~ 830MHz LTE Band 19: 830 MHz ~ 845MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 40A: 2305 MHz ~ 2315 MHz LTE Band 40B: 2350 MHz ~ 2360 MHz



	LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.3GHz: 5260 MHz ~ 5320 MHz WLAN 5.6GHz: 5500 MHz ~ 5720 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56MHz	
Modulation Mode:	GSM/GPRS: GMSK EDGE: 8PSK WCDMA: QPSK, 16QAM, 64QAM CDMA2000 1XRTT: QPSK CDMA2000 1XEV-DO: QPSK LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, PI/2 BPSK QPSK, 16QAM, 64QAM, 256QAM 802.11b: DSSS 802.11a/g/n-HT20/HT40/ac-VHT20/40/80: OFDM 802.11ax-HEW20/40/80/160: OFDMA BR+EDR: GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps), 8-DPSK(3Mbps) Bluetooth LE: GFSK(1Mbps) NFC : ASK	
Multi-slot Class:	GPRS: Multi-slot Class 33 EDGE: Multi-slot Class 33	
Operation Class:	Class B	
Carrier Aggregation:	Downlink Only	
VoLTE Mode:	Support	
Hotspot Mode:	WWAN/2.4G WLAN	
WWAN MIMO:	2 x 2	
WLAN MIMO:	2 x 2	
Antenna Type:	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna NFC: Loop Antenna	
Battery:	Manufacturer:	Dongguan Ampere Technology Limited
	Model Name:	Li3945T44P8h906455
	Capacity:	4960mAh
	Rated Voltage:	3.87V
SIM Cards Description:	SIM 1	GSM+ WCDMA+CDMA+LTE+5G NR



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	SIM 2	GSM+ WCDMA+CDMA+LTE+5G NR
	For dual SIM card version, both the SIM 1 and SIM 2 share the same chipset unit and tested as a single chipset, the SIM 1 was selected for testing.	

Note: For more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.



2.3. Environment of Test Site/Conditions

Normal Temperature (NT):	20-25 °C
Relative Humidity:	30-75 %
Air Pressure:	980-1020 hPa

Test Frequency:	GSM 850MHz/1900MHz WCDMA Band II/IV/V CDMA BC 0/1 FDD-LTE Band 2/4/5/7/12/17/18/19/26/66 TDD-LTE Band 38/40A/40B 5G NR n41 WLAN 2.4GHz WLAN 5GHz
Operation Mode:	Call established
Power Level:	GSM 850 MHz Maximum output power(level 5) GSM 1900MHz Maximum output power(level 0) WCDMA Band II/IV/V (All Up Bits) CDMA BC 0/1 (All Up Bits) FDD-LTE Band 2/4/5/7/12/17/18/19/26/66 (Maximum output power) TDD-LTE Band 38/40A/40B (Maximum output power) 5G NR n41(Maximum output power) WLAN 2.4GHz WLAN 5GHz

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the Factory. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.

The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

3. Specific Absorption Rate (SAR)

3.1. 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 or controlled and general population or uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational or controlled exposure limits are Middle than the limits for general population or uncontrolled.

3.2. SAR Definition

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

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

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

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

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

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

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

Where σ is the conductivity of the tissue, ρ is the mass density of the tissue and |E| is the rmselectrical field strength.

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



4. RF Exposure Limits

4.1. Uncontrolled Environment

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

4.2. Controlled Environment

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

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6 W/kg
Spatial Peak SAR (10g cube tissue for limbs)	4.0 W/kg
Spatial Peak SAR (1g cube tissue for whole body)	0.08 W/kg

Note:

1. Occupational/Uncontrolled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).
2. 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.



5. Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method Determination /Remark
FCC 47 CFR Part 2(2.1093)	Radio Frequency Radiation Exposure Evaluation: Portable Devices	No deviation
IEEE 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	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
KDB 248227 D01v02r02	SAR Measurement Procedures for 802.11 Transmitters	No deviation
KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz	No deviation
KDB 865664 D02v01r02	RF Exposure Reporting	No deviation
KDB 648474 D04v01r03	Handset SAR	No deviation
KDB 941225 D01v03r01	3G SAR MEAUREMENT PROCEDURES	No deviation
KDB 941225 D05v02r05	SAR Evaluation Consideration for LTE Devices	No deviation
KDB 941225 D06v02r01	SAR Evaluation Procedures For Portable Devices With Wireless Router Capabilities	No deviation
Note 1: The test item is not applicable.		
Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		

6. SAR Measurement System

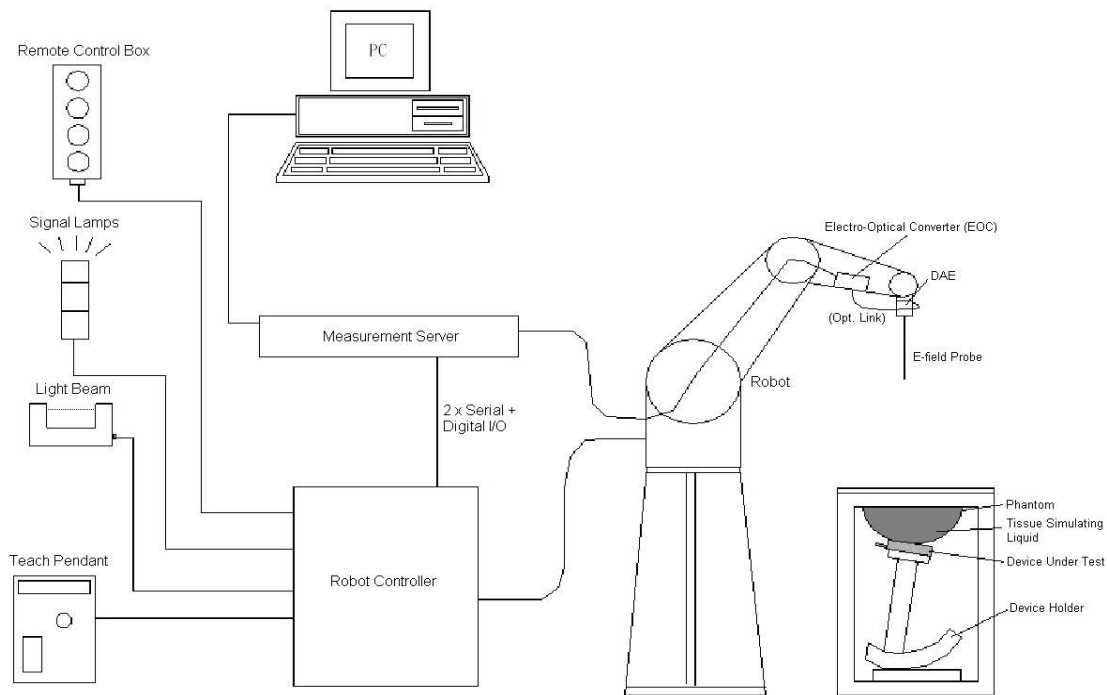


Fig 6.1 SPEAG DASY System Configurations

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

- A standard high precision 6-axis robot with controller, a teach pendant and software.
- A data acquisition electronic (DAE) attached to the robot arm extension.
- A dosimetric probe equipped with an optical surface detector system.
- The electro-optical converter (ECO) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning.
- A computer operating Windows XP.
- DASY software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom.
- A device holder.
- Tissue simulating liquid.
- Dipole for evaluating the proper functioning of the system.
- Some of the components are described in details in the following sub-sections.

6.1. 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.

➤ E-Field Probe Specification

<ES3DV3 Probe>

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μ W/g to 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm

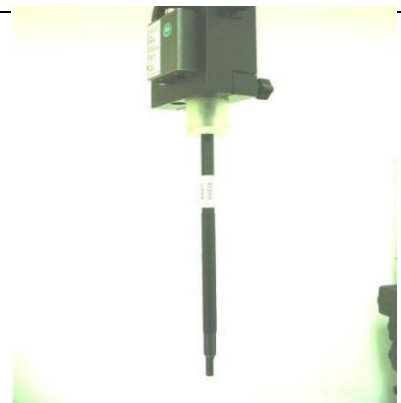


Fig 6.2 Photo of ES3DV3

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm



Fig 6.3 Photo of EX3DV4

➤ E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

6.2. 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. 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 6.4 Photo of DAE

6.3. Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

High precision (repeatability ± 0.035 mm)

High reliability (industrial design)

Jerk-free straight movements

Low ELF interference (the closed metallic construction shields against motor control fields)



Fig 6.5 Photo of DASY5

6.4. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chip disk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board. The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.



Fig 6.6 Photo of Server for DASY5

6.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



Fig. 6.7 Photo of Light Beam

6.6. Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%) 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 Head, Right Head, Flat Phantom



Fig. 6.8 Photo of SAM 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.

6.7. Device Holder

<Device Holder for SAM Twin Phantom>

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

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

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

<Laptop Extension Kit>

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.



Fig 6.9 Device Holder

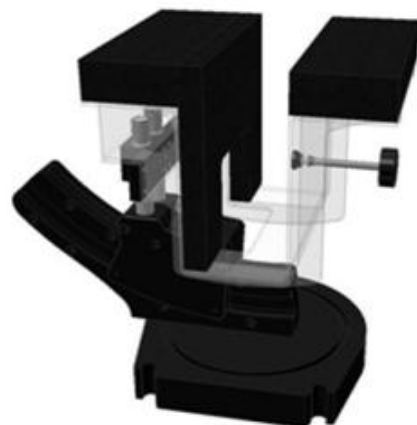


Fig 6.10 Laptop Extension Kit

6.8. Data Storage and Evaluation

➤ Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

➤ Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software.

Probe parameters:	- Sensitivity	$\text{Norm}_i, a_{i0}, a_{i1}, a_{i2}$
	- Conversion factor	ConvF_i
	- Diode compression point	dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the



exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \times \frac{cf}{dcp_i}$$

With V_i = compensated signal of channel i , ($i = x, y, z$)
 U_i = input signal of channel i , ($i = x, y, z$)
 cf = crest factor of exciting field (DASY parameter)
 dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated:

$$\text{E-field Probes: } E_i = \sqrt{\frac{V_i}{\text{Norm}_i \times \text{ConvF}}}$$

$$\text{H-field Probes: } H_i = \sqrt{V_i} \times \frac{a_{i0} + a_{i1} + a_{i2} f^2}{f}$$

With V_i = compensated signal of channel i , ($i = x, y, z$)
 Norm_i = sensor sensitivity of channel i , ($i = x, y, z$), $\mu\text{V}/(\text{V/m})^2$ for E-field
 Probes ConvF = sensitivity enhancement in solution
 a_{ij} = sensor sensitivity factors for H-field probes
 f = carrier frequency [GHz]
 E_i = electric field strength of channel i in V/m
 H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{\text{tot}} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$\text{SAR} = E_{\text{tot}}^2 \times \frac{\sigma}{\rho \times 1000}$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.



6.9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1173	2018.06.21	2021.06.20
SPEAG	835MHz System Validation Kit	D835V2	4d227	2018.06.22	2021.06.21
SPEAG	1750MHz System Validation Kit	D1750V2	1160	2018.06.25	2021.06.24
SPEAG	1900MHz System Validation Kit	D1900V2	5d221	2018.06.22	2021.06.21
SPEAG	2300MHz System Validation Kit	D2300V2	1107	2020.06.03	2023.06.02
SPEAG	2450MHz System Validation Kit	D2450V2	805	2018.10.26	2021.10.25
SPEAG	2600MHz System Validation Kit	D2600V2	1139	2018.06.25	2021.06.24
SPEAG	5000MHz System Validation Kit	D5GHzV2	1176	2018.11.06	2021.11.05
SPEAG	Dosimetric E-Field Probe	EX3DV4	7608	2020.11.27	2021.11.26
SPEAG	Data Acquisition Electronics	DAE4	1643	2020.11.30	2021.11.29
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2020.10.20	2021.10.19
SPEAG	SAM Twin Phantom	QD 000 P41 Ax	2020	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Network Emulator	CMW500	124534	2020.03.31	2021.03.30
Agilent	Network Analyzer	E5071B	MY42404762	2020.04.01	2021.03.31
mini-circuits	Amplifier	ZHL-42W+	608501717	NCR	NCR
mini-circuits	Amplifier	ZVE-8G+	754401735	NCR	NCR
Agilent	Signal Generator	N5182B	MY53050509	2020.03.31	2021.03.30
Agilent	Power Sensor	N8482A	MY41090849	2020.10.20	2021.10.19
Agilent	Power Meter	E4416A	MY45102093	2020.10.20	2021.10.19
Anritsu	Power Sensor	MA2411B	N/A	2020.10.20	2021.10.19
Anritsu	Power Meter	NRVD	101066	2020.10.20	2021.10.19
Agilent	Dual Directional Coupler	778D	50422	NA	NA
MCL	Attenuation1	351-218-010	N/A	NA	NA
KTJ	Thermo meter	TA298	N/A	2021.01.15	2022.01.14
N/A	Tissue Simulating Liquids	600-6000MHz	N/A	24H	

Note:

1. The calibration certificate of DASY can be referred to appendix E of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric



measurement. The specific procedure and calibration kit are provided by Speag.

4. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.
5. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
6. N.C.R means No Calibration Requirement.

7. Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm, which is shown in Fig. 7.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 7.2. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

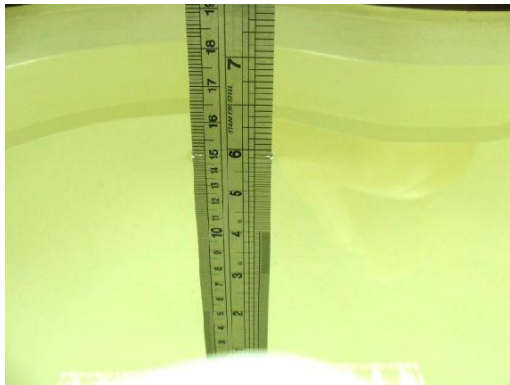


Fig 7.1 Photo of Liquid Height for Head SAR



Fig 7.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquids

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800,1900,2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800,1900,2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG.

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%



Note: Please refer to the validation results for dielectric parameters of each frequency band. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a SPEAG Dielectric Assessment KIT and an Agilent Network Analyzer.

Table 1: Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp.(°C)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
750	HSL	22.3	0.884	0.89	-0.67	±5	2021.02.29
835	HSL	22.1	0.892	0.90	-0.89	±5	2021.02.25
1750	HSL	22.4	1.366	1.37	-0.29	±5	2021.02.24
1900	HSL	22.2	1.397	1.40	-0.21	±5	2021.02.22
2300	HSL	22.5	1.691	1.67	1.26	±5	2021.02.19
2450	HSL	22.1	1.838	1.80	2.11	±5	2021.02.17
2600	HSL	22.2	1.979	1.96	0.97	±5	2021.03.05
5250	HSL	22.3	4.862	4.71	3.23	±5	2021.02.27
5600	HSL	22.5	5.140	5.07	1.38	±5	2021.03.01
5750	HSL	22.1	5.310	5.22	1.72	±5	2021.03.03
Frequency (MHz)	Tissue Type	Liquid Temp.(°C)	Permittivity (ϵ_r)	Permittivity Target (ϵ_r)	Delta (ϵ_r) (%)	Limit (%)	Date
750	HSL	22.3	41.638	41.90	-0.63	±5	2021.02.29
835	HSL	22.1	41.891	41.50	0.94	±5	2021.02.25
1750	HSL	22.4	39.999	40.10	-0.25	±5	2021.02.24
1900	HSL	22.2	40.121	40.00	0.30	±5	2021.02.22
2300	HSL	22.5	39.666	39.50	0.42	±5	2021.02.19
2450	HSL	22.1	39.331	39.20	0.33	±5	2021.02.17
2600	HSL	22.2	38.988	39.00	-0.03	±5	2021.03.05
5250	HSL	22.3	36.177	35.95	0.63	±5	2021.02.27
5600	HSL	22.5	35.721	35.50	0.62	±5	2021.03.01
5750	HSL	22.1	35.590	35.35	0.68	±5	2021.03.03

8. SAR System Verification

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

8.1. Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2. System Setup

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected. In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.



Fig 8.1 Photo of Dipole Setup

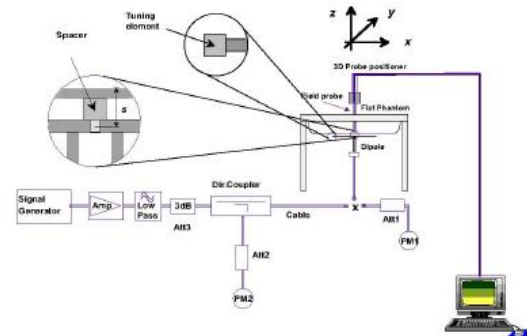


Fig 8.2 System Setup for System Evaluation



8.3. Validation Results

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

<Validation Setup>

Frequency (MHz)	Tissue Type	Input Power(mW)	Dipole S/N	Probe S/N	DAE S/N
750	HSL	250	D750V3-1173	7608	1643
835	HSL	250	D835V2-4d227	7608	1643
1750	HSL	250	D1750V2-	7608	1643
1900	HSL	250	D1900V2_5d221	7608	1643
2300	HSL	250	D2300V2-1107	7608	1643
2450	HSL	250	D2450V2-805	7608	1643
2600	HSL	250	D2600V2-1139	7608	1643
5250	HSL	100	D5GHzV2-1176-5250	7608	1643
5600	HSL	100	D5GHzV2-1176-5600	7608	1643
5750	HSL	100	D5GHzV2-1176-5750	7608	1643

<System Validation >

Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (ϵ_r)	CW Signal Validation		
				Sensitivity	Probe Linearity	Probe Isotropy
750	HSL	0.851	42.43	PASS	PASS	PASS
835	HSL	0.898	41.88	PASS	PASS	PASS
1750	HSL	1.386	39.91	PASS	PASS	PASS
1800	HSL	1.449	41.26	PASS	PASS	PASS
1900	HSL	1.435	39.65	PASS	PASS	PASS
2000	HSL	1.451	39.42	PASS	PASS	PASS
2300	HSL	1.764	38.99	PASS	PASS	PASS
2450	HSL	1.863	38.85	PASS	PASS	PASS
2600	HSL	1.973	38.58	PASS	PASS	PASS
5250	HSL	4.528	35.32	PASS	PASS	PASS
5600	HSL	4.905	34.89	PASS	PASS	PASS
5750	HSL	5.077	34.28	PASS	PASS	PASS



Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (ϵ_r)	Modulation Signal Validation		
				Mod. Type	Duty Factor	PAR
750	HSL	0.851	42.43	N/A	N/A	N/A
835	HSL	0.898	41.88	GMSK	PASS	N/A
1750	HSL	1.386	39.91	N/A	N/A	N/A
1800	HSL	1.449	41.26	N/A	N/A	N/A
1900	HSL	1.435	39.65	GMSK	PASS	N/A
2000	HSL	1.451	39.42	GMSK	PASS	N/A
2300	HSL	1.764	38.99	OFDM	PASS	PASS
2450	HSL	1.863	38.85	OFDM	PASS	PASS
2600	HSL	1.973	38.58	TDD	PASS	N/A
5250	HSL	4.528	35.32	OFDM	N/A	PASS
5600	HSL	4.905	34.89	OFDM	N/A	PASS
5750	HSL	5.077	34.28	OFDM	N/A	PASS

<Validation Results>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2021.02.29	750	HSL	250	2.13	8.26	8.52	3.15
2021.02.25	835	HSL	250	2.35	9.34	9.4	0.64
2021.02.24	1750	HSL	250	9.55	37.10	38.2	2.96
2021.02.22	1900	HSL	250	10.11	39.50	40.44	2.38
2021.02.19	2300	HSL	250	11.91	48.40	47.64	-1.57
2021.02.17	2450	HSL	250	13.18	52.00	52.72	1.38
2021.03.05	2600	HSL	250	13.66	54.00	54.64	1.19
2021.02.27	5250	HSL	100	7.92	78.90	79.2	0.38
2021.03.01	5600	HSL	100	8.13	80.90	81.3	0.49
2021.03.03	5750	HSL	100	8.28	80.00	82.8	3.50



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Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2021.02.29	750	HSL	250	1.38	5.45	5.52	1.28
2021.02.25	835	HSL	250	1.47	6.07	5.88	-3.13
2021.02.24	1750	HSL	250	5.13	20.00	20.52	2.60
2021.02.22	1900	HSL	250	5.26	20.60	21.04	2.14
2021.02.19	2300	HSL	250	5.55	23.00	22.2	-3.48
2021.02.17	2450	HSL	250	6.08	24.10	24.32	0.91
2021.03.05	2600	HSL	250	6.19	24.50	24.76	1.06
2021.02.27	5250	HSL	100	2.32	22.50	23.2	3.11
2021.03.01	5600	HSL	100	2.38	23.10	23.8	3.03
2021.03.03	5750	HSL	100	2.34	22.60	23.4	3.54

Note: System checks the specific test data please see Annex C.

9. EUT Testing Position

This EUT was tested in six different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back of the EUT with phantom 10 mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

9.1. Handset Reference Points

The vertical centre line passes through two points on the front side of the handset – the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

The horizontal line is perpendicular to the vertical centre line and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.

The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line.

Also note that the vertical centre line is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



Fig. 9.1 Illustration for Cheek Position

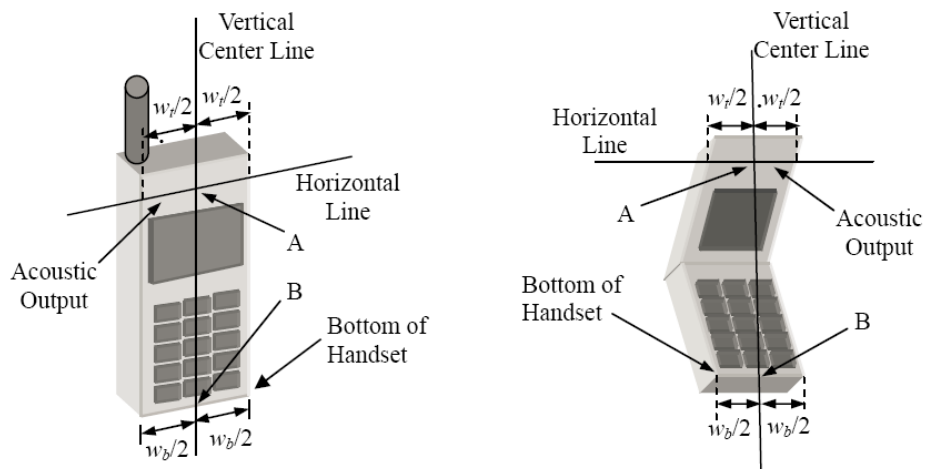


Fig. 9.2 Illustration for Handset Vertical and Horizontal Reference Lines

9.2. Positioning for Cheek / Touch

To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)

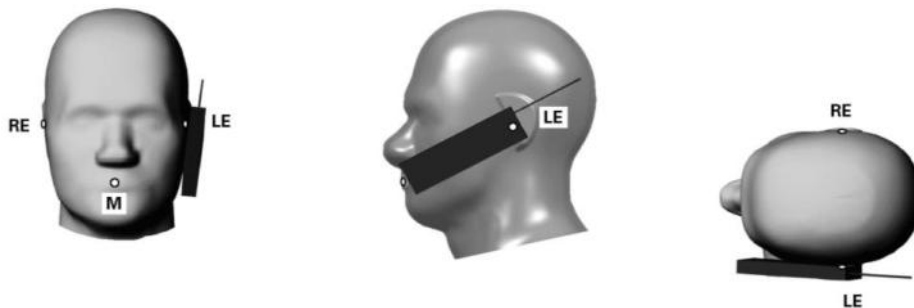


Fig 9.3 Illustration for Cheek Position

9.3. Positioning for Ear / 15° Tilt

To position the device in the “cheek” position described above.

While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).

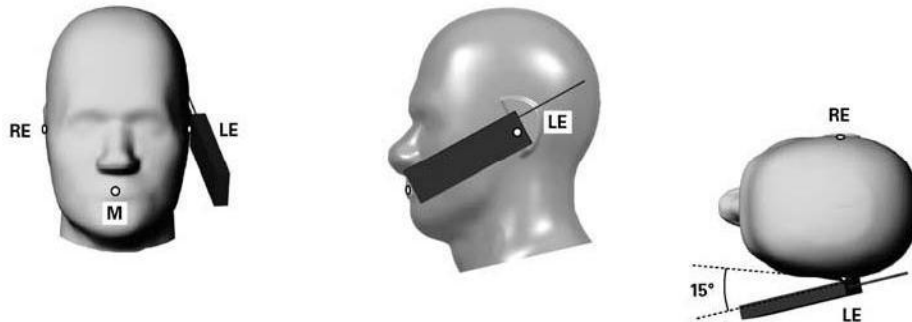


Fig 9.4 Illustration for Tilted Position

9.4. SAR Evaluation near the Mouth/Jaw Regions of the Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

9.5. Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

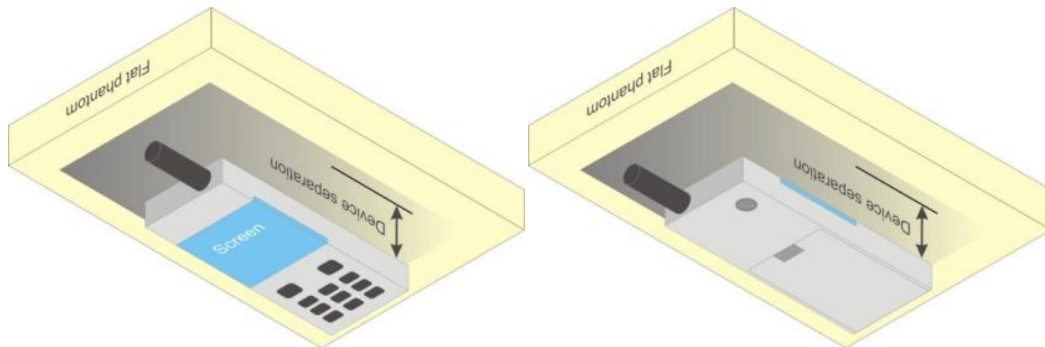


Fig 9.5 Illustration for Body Worn Position

9.6. Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).

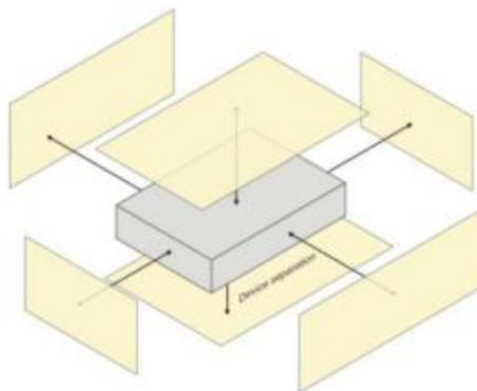


Fig 9.6 Illustration for Hotspot Position

10. 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.

10.1. 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 from 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.

10.2. 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.

10.3. Area Scan Procedures

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima founding the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE1528-2003.

10.4. Zoom Scan Procedures

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm, with the side



length of the 10 g cube 21,5mm. The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

10.5. SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Sheppard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

10.6. Power Drift Monitoring

All SAR testing is under the DUT 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 DUT 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 drift more than 5%, the SAR will be retested.

11. SAR Test Procedure

11.1. General Scan Requirements

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

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

11.2. Test Procedure

The Following steps are used for each test position

1. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
3. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
4. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

11.3. Description of Interpolation/Extrapolation Scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

11.4. 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 ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges,



determined from 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. SAR Test Configuration

<GSM Mode>

A summary of these settings are illustrated below:

For GSM850 frequency band, the power control is set to 5 for GSM/GPRS mode (GSMK-CS1) and set to 8 for EDGE mode (MCS5); For GSM1900 frequency band, the power control is set to 0 for GSM/GPRS mode (GSMK-CS1) and set to 2 for EDGE mode (MCS5).

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes.

Timeslot consignations:

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
The duty cycle "x" of different time slots as below:
1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
Based on the calculation formula:
Frame-averaged power = Burst averaged power + 10 log (x)
So,
Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

No. of Slots:	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation:	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle:	1:8.3	1:4.15	1:2.77	1:2.08
Correct Factor:	-9.03dB	-6.02dB	-4.26dB	-3.01dB

<WCDMA Mode>

Summary of UMTS conducted power measurement:

1. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
2. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
3. 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.
4. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
5. 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 / DC-HSDPA / HSPA+ is $\leq \frac{1}{4}$ 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 / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.
6. A fixed level power reduction is applied for WCDMA Band II when handset open Hotspot mode, the power reduction triggered.

HSDPA Setup Configuration

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5
Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ Note 2: CM = 1 for $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$. Note 3: 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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.						

HSUPA Setup Configuration

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note 3)	β_d	β_{hs} (Note 1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}: 30/15$ $\beta_{ed2}: 30/15$	$\beta_{ed3}: 24/15$ $\beta_{ed4}: 24/15$	3.5	2.5	14	105	105

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

DC-HSDPA Setup Configuration

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.

Table E.5.0: Levels for HSDPA connection setup

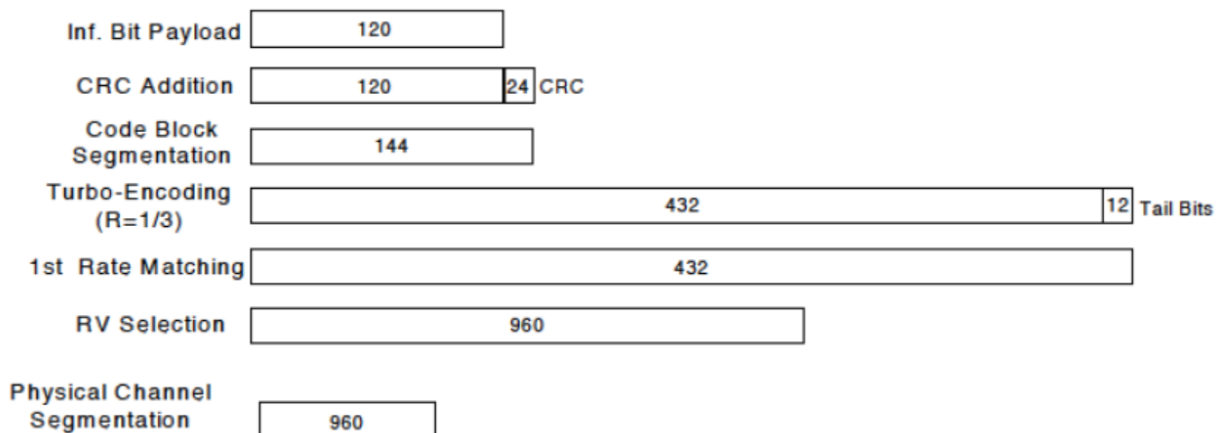
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)



<CDMA Mode>

1xEV-DO Rev. B

Call box setup procedure

1xEV-DO Release B

1> CMW 500 Signal Generator > 1xEV-DO Taskbar Enable

2> CMW 500 1xEV-DO Signaling Configuration Window >

3> 1xEV-DO Signaling On Window:

Under Access Network Control:

Band Class: BC0: US Cellular

RF Channel: 31

1xEV-DO Power: -70 dBm

4> 1xEV-DO Signaling Configuration Window

Under RF Frequency Band / Channel: Enter Ch. Frequency

- Under Carrier Configuration: RF Frequency
For Two Carriers: Low Channel (1013)

	<u>RF Channel</u>	<u>RF Channel Offset</u>
Carrier [0]	31	0
Carrier [1]	1013	982

- Under Carrier Configuration: RF Pilot
- | | <u>Carrier Sector</u> | <u>Active on AN</u> | <u>Assigned to AT</u> |
|-----------|-----------------------|---------------------|-----------------------|
| Pilot [0] | C0/S0 | ✓ | ✓ |
| | CA/S1 | ✓ | ✓ |

For Three Carriers: Low Channel (1013)

	<u>RF Channel</u>	<u>RF Channel Offset</u>
Carrier [0]	72	0
Carrier [1]	31	-41
Carrier [2]	1013	941

- Under Carrier Configuration: RF Pilot
- | | <u>Carrier Sector</u> | <u>Active on AN</u> | <u>Assigned to AT</u> |
|-----------|-----------------------|---------------------|-----------------------|
| Pilot [0] | C0/S0 | ✓ | ✓ |
| Pilot [1] | C1/S1 | ✓ | ✓ |
| Pilot [2] | C2/S2 | ✓ | ✓ |



<LTE Mode>

LTE Target MPR level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR	3GPP
	1.4	3.0	5	10	15	20	Target	MPR
	MHz	MHz	MHz	MHz	MHz	MHz	(dB)	(dB)
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected 0.5dB measurement tolerance

LTE Bands

LTE Bands	Channel bandwidth / Transmission bandwidth configuration [RB]					
	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
2	√	√	√	√	√	√
4	√	√	√	√	√	√
5	√	√	√	√	N/A	N/A
7	N/A	N/A	√	√	√	√
12	N/A	N/A	√	√	N/A	N/A
17	N/A	N/A	√	√	N/A	N/A
18	N/A	N/A	√	√	√	N/A
19	N/A	N/A	√	√	√	N/A
26	√	√	√	√	√	N/A
38	N/A	N/A	√	√	√	√
40	N/A	N/A	√	√	N/A	N/A
66	√	√	√	√	√	√

Note:

1. 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.
2. 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.
3. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK



allocation procedure.

4. 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.
5. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
6. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ Db higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported band width is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
7. For LTE B4 / B5 / B7 / B17 the maximum bandwidth does not support three non-overlapping channels, per KDB941225 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.
8. LTE band 2 / 12 SAR test was covered by Band 25 / 17; 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 $\leq$ 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.
9. According to 2017 TCB workshop, for 64 QAM and 16 QAM 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 CMW500 base station, therefore, the device 64QAM and 16QAM signal modulation are correct. Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards: b) A-MPR (additional MPR) must be disabled.
10. 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/Bluetooth: 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.
11. 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
12. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
13. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

<WLAN 2.4GHz>

1. SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
 - a. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
 - b. When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
2. 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test configuration Procedures should be followed.
3. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining

test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

4. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz WI-FI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSSSAR.
5. A fixed level power reduction is applied for WiFi when handset operates "held to the body" condition or "held to the ear" condition, the power reduction triggered by audio receiver detection and call establish status.
6. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
 - a. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
 - b. 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.

<WLAN 5GHz>

A) U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following:

1. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3. The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50.
4. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not

required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

B) U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures. When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

C) OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1. The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2. If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3. If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.

4. When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.
5. The channel closest to mid-band frequency is selected for SAR measurement.
6. For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

D) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

13. Conducted Power List

General Note:

1. The EUT respectively defined the top and bottom antenna maximum power in the software. The top and bottom antenna will switch automatically according to the receiver signal strength and maximum transmission power level.
2. There are two version power lists in this report, when the sensor described above is active the WWAN reduced power would be used to testing the top antenna SAR.
3. For WLAN, the worst wireless communication system of each band would be selected to perform SAR measurement.
4. For WLAN, the full power will be applied to single carrier transmitting, and reduced power applied when the MIMO is active. Therefore the full power would be used to single antenna SAR measurement and calculating the WWAN + WLAN (SISO) simultaneous transmissions, the reduced power would be applied when the simultaneous transmissions mode of WWAN + WLAN (MIMO) is active.
5. Per KDB 447498D01, the following should be applied to determine the number of required test channels. The test channels should be evenly spread across the transmission frequency band of each wireless mode.

$$N_c = Round \left\{ \left[100(f_{high} - f_{low}) / f_c \right]^{0.5} \times (f_c / 100)^{0.2} \right\}$$

Where

- N_c is the number of test channels, rounded to the nearest integer,
- f_{high} and f_{low} are the highest and lowest channel frequencies within the transmission band,
- f_c is the mid-band channel frequency,
- All frequencies are in MHz.



13.1. Full Power

➤ GSM Conducted Power

GSM850	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	128	189	251	Limit	128	189	251	Limit
Frequency (MHz)	824.2	836.4	848.8	(dBm)	824.2	836.4	848.8	(dBm)
GSM 1 Tx slot	32.71	32.83	32.77	33.50	23.71	23.83	23.77	24.50
GPRS 1 Tx slot	32.70	32.84	32.78	33.50	23.70	23.84	23.78	24.50
GPRS 2 Tx slots	30.76	30.82	30.71	31.50	24.76	24.82	24.71	25.50
GPRS 3 Tx slots	28.70	28.91	28.64	29.50	24.44	24.65	24.38	25.24
GPRS 4 Tx slots	26.67	26.79	26.71	27.50	23.67	23.79	23.71	24.50
EDGE 1 Tx slot	25.64	25.72	25.59	26.50	16.64	16.72	16.59	17.50
EDGE 2 Tx slots	24.61	24.55	24.55	25.50	18.61	18.55	18.55	19.50
EDGE 3 Tx slots	22.62	22.48	22.62	23.50	18.36	18.22	18.36	19.24
EDGE 4 Tx slots	21.63	21.62	21.52	22.50	18.63	18.62	18.52	19.50

GSM1900	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	512	661	810	Limit	512	661	810	Limit
Frequency (MHz)	1850.2	1880	1909.8	(dBm)	1850.2	1880	1909.8	(dBm)
GSM 1 Tx slot	30.32	30.51	30.42	31.50	21.32	21.51	21.42	22.50
GPRS 1 Tx slot	30.33	30.55	30.45	31.50	21.33	21.55	21.45	22.50
GPRS 2 Tx slots	28.52	28.65	28.62	29.50	22.52	22.65	22.62	23.50
GPRS 3 Tx slots	26.42	26.52	26.47	27.00	22.16	22.26	22.21	22.74
GPRS 4 Tx slots	24.52	24.42	24.33	25.00	21.52	21.42	21.33	22.00
EDGE 1 Tx slot	21.82	21.66	21.53	22.50	12.82	12.66	12.53	13.50
EDGE 2 Tx slots	21.64	21.39	21.43	22.50	15.64	15.39	15.43	16.50
EDGE 3 Tx slots	21.20	21.18	21.31	22.00	16.94	16.92	17.05	17.74
EDGE 4 Tx slots	20.21	20.32	20.22	21.00	17.21	17.32	17.22	18.00



➤ WCDMA Conducted Power

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	RMC 12.2Kbps	23.17	23.18	23.16	24.00
3GPP Rel 6	HSDPA Subtest-1	22.12	22.22	22.15	23.00
3GPP Rel 6	HSDPA Subtest-2	22.16	22.21	22.17	23.00
3GPP Rel 6	HSDPA Subtest-3	21.60	21.70	21.57	22.50
3GPP Rel 6	HSDPA Subtest-4	21.59	21.64	21.60	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.46	22.54	22.50	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.45	22.30	22.48	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.99	22.01	21.99	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.93	22.05	21.97	22.50
3GPP Rel 6	HSUPA Subtest-1	22.19	22.25	22.23	23.00
3GPP Rel 6	HSUPA Subtest-2	21.63	21.75	21.53	22.00
3GPP Rel 6	HSUPA Subtest-3	22.17	22.24	22.23	23.00
3GPP Rel 6	HSUPA Subtest-4	22.16	22.19	22.11	23.00
3GPP Rel 6	HSUPA Subtest-5	22.08	22.14	22.12	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	22.21	22.18	22.19	23.00

Band		WCDMA Band IV			Tune-up Limit (dBm)
TX Channel		1312	1413	1513	
Rx Channel		1537	1638	1738	
Frequency (MHz)		1712.4	1732.6	1752.6	
3GPP Rel 99	RMC 12.2Kbps	23.13	23.21	23.13	24.00
3GPP Rel 6	HSDPA Subtest-1	22.05	22.13	22.13	23.00
3GPP Rel 6	HSDPA Subtest-2	21.99	22.16	22.18	23.00
3GPP Rel 6	HSDPA Subtest-3	21.47	21.70	21.62	22.50
3GPP Rel 6	HSDPA Subtest-4	21.53	21.66	21.56	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.46	22.50	22.38	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.42	21.46	21.41	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.96	21.98	21.92	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.94	21.94	21.85	22.50
3GPP Rel 6	HSUPA Subtest-1	22.11	22.11	22.22	23.00
3GPP Rel 6	HSUPA Subtest-2	21.55	21.72	21.56	22.00
3GPP Rel 6	HSUPA Subtest-3	22.01	22.16	22.23	23.00



3GPP Rel 6	HSUPA Subtest-4	22.08	22.16	22.16	23.00
3GPP Rel 6	HSUPA Subtest-5	22.06	22.22	22.13	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	22.13	22.16	22.24	23.00

Band		WCDMA Band V			Tune-up Limit (dBm)
TX Channel		4132	4182	4233	
Rx Channel		4357	4408	4458	
Frequency (MHz)		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	23.12	23.24	23.18	24.00
3GPP Rel 6	HSDPA Subtest-1	23.07	23.12	22.66	24.00
3GPP Rel 6	HSDPA Subtest-2	23.12	23.04	22.59	24.00
3GPP Rel 6	HSDPA Subtest-3	22.62	22.50	22.14	23.50
3GPP Rel 6	HSDPA Subtest-4	22.61	22.55	22.13	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	23.23	23.22	22.84	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	23.16	22.24	22.81	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.79	22.76	22.34	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.76	22.75	22.34	23.50
3GPP Rel 6	HSUPA Subtest-1	23.05	23.04	22.59	24.00
3GPP Rel 6	HSUPA Subtest-2	22.55	22.54	22.15	23.00
3GPP Rel 6	HSUPA Subtest-3	23.01	23.04	22.61	24.00
3GPP Rel 6	HSUPA Subtest-4	23.14	23.07	22.66	24.00
3GPP Rel 6	HSUPA Subtest-5	23.04	23.13	22.59	24.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	23.05	23.09	22.67	24.00

➤ **CDMA Conducted Power**

Band	CDMA2000 BC0			Tune-up Limit (dBm)
TX Channel	1013	384	777	
Frequency (MHz)	824.7	836.52	848.31	
RC1 SO55	23.45	23.38	23.57	24.00
RC3 SO55	23.42	23.41	23.42	24.00
RC3 SO32 (F+SCH)	23.49	23.55	23.51	24.00
RC3 SO32 (+SCH)	23.56	23.55	23.51	24.00
RTAP 153.6Kbps	23.62	23.67	23.59	24.00
RETAP 4096Bits	23.55	23.54	23.51	24.00
RMCTAP 307.2 Kbps	23.22	23.31	23.19	24.00



Band	CDMA2000 BC1			Tune-up Limit (dBm)
TX Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	23.19	23.21	23.22	24.00
RC3 SO55	23.21	23.23	23.24	24.00
RC3 SO32 (F+SCH)	23.13	23.22	23.29	24.00
RC3 SO32 (+SCH)	23.28	23.31	23.22	24.00
RTAP 153.6Kbps	23.47	23.56	23.49	24.00
RETAP 4096Bits	23.42	23.48	23.51	24.00
RMCTAP 307.2 Kbps	23.19	23.21	23.22	24.00

➤ **LTE Conducted Power**

<FDD-LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	22.58	22.75	22.72	23.50
20	QPSK	1	49	22.54	22.62	22.55	
20	QPSK	1	99	22.52	22.68	22.66	
20	QPSK	50	0	21.63	21.72	21.65	22.50
20	QPSK	50	24	21.64	21.69	21.69	
20	QPSK	50	50	21.69	21.65	21.71	
20	QPSK	100	0	21.62	21.71	21.67	
20	16QAM	1	0	21.68	21.68	21.70	22.50
20	16QAM	1	49	21.52	21.82	21.78	
20	16QAM	1	99	21.77	21.62	22.02	
20	16QAM	50	0	21.70	21.67	21.65	22.50
20	16QAM	50	24	21.66	21.71	21.72	
20	16QAM	50	50	21.74	21.71	21.78	
20	16QAM	100	0	21.77	21.78	21.65	
20	64QAM	1	0	20.72	20.91	20.65	21.50
20	64QAM	1	49	20.67	20.85	20.76	
20	64QAM	1	99	20.62	20.95	20.95	
20	64QAM	50	0	20.72	20.64	20.69	21.50
20	64QAM	50	24	20.75	20.69	20.74	
20	64QAM	50	50	20.74	20.75	20.69	
20	64QAM	100	0	20.74	20.71	20.72	



Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	22.49	22.52	22.43	23.50
15	QPSK	1	37	22.28	22.64	22.52	
15	QPSK	1	74	22.65	22.57	22.65	
15	QPSK	36	0	21.61	21.70	21.69	22.50
15	QPSK	36	20	21.60	21.79	21.76	
15	QPSK	36	39	21.72	21.73	21.70	
15	QPSK	75	0	21.64	21.70	21.66	
15	16QAM	1	0	21.73	21.81	21.75	22.50
15	16QAM	1	37	21.86	21.89	21.75	
15	16QAM	1	74	21.81	21.93	21.93	
15	16QAM	36	0	21.60	21.65	21.68	22.50
15	16QAM	36	20	21.69	21.62	21.75	
15	16QAM	36	39	21.74	21.83	21.80	
15	16QAM	75	0	21.61	21.63	21.72	
15	64QAM	1	0	20.81	20.57	20.63	21.50
15	64QAM	1	37	20.80	20.61	21.03	
15	64QAM	1	74	20.69	20.73	20.88	
15	64QAM	36	0	20.54	20.71	20.59	21.50
15	64QAM	36	20	20.74	20.76	20.66	
15	64QAM	36	39	20.62	20.67	20.76	
15	64QAM	75	0	20.61	20.68	20.67	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	22.34	22.33	22.43	23.50
10	QPSK	1	25	22.45	22.55	22.43	
10	QPSK	1	49	22.34	22.42	22.34	
10	QPSK	25	0	21.60	21.61	21.57	22.50
10	QPSK	25	12	21.56	21.68	21.61	
10	QPSK	25	25	21.47	21.60	21.56	
10	QPSK	50	0	21.53	21.62	21.60	
10	16QAM	1	0	22.01	21.94	21.93	22.50
10	16QAM	1	25	21.70	21.66	21.73	
10	16QAM	1	49	21.65	21.73	21.52	
10	16QAM	25	0	21.55	21.54	21.09	22.50
10	16QAM	25	12	21.17	21.13	21.12	
10	16QAM	25	25	21.12	21.08	21.07	



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10	16QAM	50	0	21.08	21.01	21.05	
10	64QAM	1	0	20.59	20.64	20.64	21.50
10	64QAM	1	25	20.62	20.67	20.71	
10	64QAM	1	49	20.29	20.42	20.39	
10	64QAM	25	0	20.59	20.63	20.64	21.50
10	64QAM	25	12	20.62	20.60	20.61	
10	64QAM	25	25	20.55	20.33	20.55	
10	64QAM	50	0	20.56	20.56	20.53	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	22.48	22.53	22.47	23.50
5	QPSK	1	12	22.47	22.58	22.45	
5	QPSK	1	24	22.43	22.59	22.52	
5	QPSK	12	0	21.59	21.50	21.57	22.50
5	QPSK	12	7	21.60	21.65	21.57	
5	QPSK	12	13	21.59	21.58	21.61	
5	QPSK	25	0	21.58	21.56	21.58	
5	16QAM	1	0	21.71	21.61	21.99	22.50
5	16QAM	1	12	21.69	21.62	21.99	
5	16QAM	1	24	21.72	21.59	21.98	
5	16QAM	12	0	21.42	21.45	21.22	22.50
5	16QAM	12	7	21.14	21.16	21.10	
5	16QAM	12	13	21.17	21.06	21.01	
5	16QAM	25	0	21.09	21.07	21.05	
5	64QAM	1	0	20.98	20.53	20.58	21.50
5	64QAM	1	12	20.97	20.63	20.74	
5	64QAM	1	24	20.98	20.62	20.64	
5	64QAM	12	0	20.63	20.56	20.55	21.50
5	64QAM	12	7	20.69	20.53	20.53	
5	64QAM	12	13	20.66	20.62	20.60	
5	64QAM	25	0	20.73	20.53	20.60	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	22.53	22.31	22.43	23.50
3	QPSK	1	8	22.46	22.67	22.50	
3	QPSK	1	14	22.65	22.52	22.52	
3	QPSK	8	0	21.59	21.54	21.56	22.50
3	QPSK	8	4	21.65	21.59	21.60	



3	QPSK	8	7	21.65	21.59	21.55	
3	QPSK	15	0	21.57	21.65	21.58	
3	16QAM	1	0	21.73	21.64	21.58	
3	16QAM	1	8	21.77	21.71	21.67	22.50
3	16QAM	1	14	21.70	21.67	21.55	
3	16QAM	8	0	21.13	21.26	21.18	
3	16QAM	8	4	21.20	21.17	21.23	22.50
3	16QAM	8	7	21.10	21.15	21.18	
3	16QAM	15	0	21.13	21.17	21.12	
3	64QAM	1	0	20.66	20.59	20.62	21.50
3	64QAM	1	8	21.08	21.07	20.67	
3	64QAM	1	14	20.69	21.05	20.69	
3	64QAM	8	0	20.61	20.63	20.47	21.50
3	64QAM	8	4	20.71	20.61	20.61	
3	64QAM	8	7	20.81	20.70	20.56	
3	64QAM	15	0	20.66	20.66	20.64	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.40	22.42	22.38	23.50
1.4	QPSK	1	3	22.50	22.48	22.47	
1.4	QPSK	1	5	22.47	22.45	22.43	
1.4	QPSK	3	0	22.46	22.46	22.42	
1.4	QPSK	3	1	22.50	22.47	22.45	
1.4	QPSK	3	3	22.52	22.56	22.45	
1.4	QPSK	6	0	21.55	21.53	21.52	22.50
1.4	16QAM	1	0	21.58	21.58	21.52	22.50
1.4	16QAM	1	3	21.54	21.74	21.72	
1.4	16QAM	1	5	21.42	21.62	21.30	
1.4	16QAM	3	0	21.44	21.49	21.46	
1.4	16QAM	3	1	21.62	21.44	21.49	
1.4	16QAM	3	3	21.64	21.61	21.35	
1.4	16QAM	6	0	21.65	21.58	21.53	22.50
1.4	64QAM	1	0	20.53	20.45	20.48	21.50
1.4	64QAM	1	3	20.55	20.76	20.64	
1.4	64QAM	1	5	20.53	20.88	20.47	
1.4	64QAM	3	0	20.56	20.62	20.63	
1.4	64QAM	3	1	20.65	20.62	20.36	
1.4	64QAM	3	3	20.57	20.71	20.48	



1.4	64QAM	6	0	20.62	20.65	20.54	21.50
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<FDD-LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.44	22.56	22.51	23.00
20	QPSK	1	49	22.30	22.38	22.37	
20	QPSK	1	99	22.22	22.35	22.47	
20	QPSK	50	0	21.51	21.64	21.61	22.00
20	QPSK	50	24	21.51	21.59	21.59	
20	QPSK	50	50	21.40	21.51	21.52	
20	QPSK	100	0	21.50	21.54	21.61	
20	16QAM	1	0	21.37	21.45	21.34	22.00
20	16QAM	1	49	21.52	21.29	21.43	
20	16QAM	1	99	21.31	21.53	21.29	
20	16QAM	50	0	21.18	21.23	21.33	22.00
20	16QAM	50	24	21.14	21.25	21.14	
20	16QAM	50	50	21.10	21.11	21.11	
20	16QAM	100	0	21.12	21.20	21.21	
20	64QAM	1	0	20.48	20.59	20.81	21.00
20	64QAM	1	49	20.52	20.45	20.33	
20	64QAM	1	99	20.79	20.36	20.83	
20	64QAM	50	0	20.49	20.58	20.53	21.00
20	64QAM	50	24	20.51	20.62	20.56	
20	64QAM	50	50	20.55	20.50	20.52	
20	64QAM	100	0	20.58	20.56	20.65	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.31	22.35	22.45	23.00
15	QPSK	1	37	22.35	22.44	22.36	
15	QPSK	1	74	22.22	22.44	22.47	
15	QPSK	36	0	21.45	21.52	21.55	22.00
15	QPSK	36	20	21.49	21.62	21.58	
15	QPSK	36	39	21.54	21.53	21.62	
15	QPSK	75	0	21.49	21.51	21.52	
15	16QAM	1	0	21.19	21.41	21.13	22.00



15	16QAM	1	37	21.27	21.27	21.11	
15	16QAM	1	74	21.13	21.43	21.22	
15	16QAM	36	0	21.14	21.16	21.35	
15	16QAM	36	20	21.09	21.16	21.22	22.00
15	16QAM	36	39	21.05	21.14	21.20	
15	16QAM	75	0	21.16	21.17	21.26	
15	64QAM	1	0	20.35	20.66	20.71	21.00
15	64QAM	1	37	20.77	20.53	20.59	
15	64QAM	1	74	20.81	20.52	20.56	
15	64QAM	36	0	20.46	20.53	20.57	21.00
15	64QAM	36	20	20.52	20.54	20.56	
15	64QAM	36	39	20.55	20.51	20.53	
15	64QAM	75	0	20.48	20.59	20.52	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	22.23	22.42	22.25	23.00
10	QPSK	1	25	22.21	22.34	22.35	
10	QPSK	1	49	22.29	22.12	22.35	
10	QPSK	25	0	21.28	21.50	21.52	22.00
10	QPSK	25	12	21.40	21.46	21.50	
10	QPSK	25	25	21.29	21.40	21.47	
10	QPSK	50	0	21.35	21.45	21.37	
10	16QAM	1	0	21.10	21.25	21.01	22.00
10	16QAM	1	25	21.37	21.11	21.43	
10	16QAM	1	49	21.44	21.34	21.33	
10	16QAM	25	0	21.10	21.09	21.08	22.00
10	16QAM	25	12	21.02	21.12	21.09	
10	16QAM	25	25	21.36	21.27	21.36	
10	16QAM	50	0	21.30	21.34	21.46	
10	64QAM	1	0	20.40	20.48	20.38	21.00
10	64QAM	1	25	20.47	20.76	20.85	
10	64QAM	1	49	20.45	20.49	20.44	
10	64QAM	25	0	20.29	20.43	20.42	21.00
10	64QAM	25	12	20.38	20.49	20.53	
10	64QAM	25	25	20.26	20.38	20.40	
10	64QAM	50	0	20.32	20.39	20.38	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	



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5	QPSK	1	0	22.13	22.35	22.40	23.00
5	QPSK	1	12	22.19	22.34	22.31	
5	QPSK	1	24	22.14	22.26	22.25	
5	QPSK	12	0	21.36	21.36	21.40	22.00
5	QPSK	12	7	21.36	21.47	21.44	
5	QPSK	12	13	21.31	21.48	21.40	
5	QPSK	25	0	21.34	21.38	21.44	22.00
5	16QAM	1	0	21.00	21.41	21.09	
5	16QAM	1	12	21.11	21.46	21.05	
5	16QAM	1	24	21.05	21.40	21.00	22.00
5	16QAM	12	0	21.04	20.98	21.01	
5	16QAM	12	7	21.07	21.11	21.09	
5	16QAM	12	13	21.34	21.41	21.45	21.00
5	16QAM	25	0	21.35	21.46	21.39	
5	64QAM	1	0	20.36	20.80	20.78	
5	64QAM	1	12	20.74	20.50	20.77	21.00
5	64QAM	1	24	20.70	20.40	20.47	
5	64QAM	12	0	20.37	20.44	20.46	
5	64QAM	12	7	20.36	20.45	20.51	21.00
5	64QAM	12	13	20.37	20.43	20.42	
5	64QAM	25	0	20.32	20.46	20.37	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.25	22.26	22.38	23.00
3	QPSK	1	8	22.34	22.48	22.42	
3	QPSK	1	14	22.14	22.33	22.33	
3	QPSK	8	0	21.34	21.40	21.41	22.00
3	QPSK	8	4	21.40	21.48	21.50	
3	QPSK	8	7	21.36	21.46	21.46	
3	QPSK	15	0	21.36	21.42	21.36	22.00
3	16QAM	1	0	21.20	21.29	21.33	
3	16QAM	1	8	21.42	21.42	21.16	
3	16QAM	1	14	21.33	21.11	21.19	22.00
3	16QAM	8	0	21.12	21.13	21.22	
3	16QAM	8	4	21.22	21.22	21.23	
3	16QAM	8	7	21.44	21.52	21.56	21.00
3	16QAM	15	0	21.44	21.42	21.49	
3	64QAM	1	0	20.35	20.44	20.42	



3	64QAM	1	8	20.54	20.42	20.58	
3	64QAM	1	14	20.35	20.42	20.25	
3	64QAM	8	0	20.33	20.37	20.31	
3	64QAM	8	4	20.45	20.43	20.47	21.00
3	64QAM	8	7	20.39	20.46	20.58	
3	64QAM	15	0	20.35	20.43	20.34	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	22.00	22.21	22.22	23.00
1.4	QPSK	1	3	22.34	22.34	22.38	
1.4	QPSK	1	5	22.20	22.29	22.31	
1.4	QPSK	3	0	22.28	22.25	22.24	
1.4	QPSK	3	1	22.24	22.34	22.39	
1.4	QPSK	3	3	22.23	22.30	22.29	
1.4	QPSK	6	0	21.12	21.21	21.21	22.00
1.4	16QAM	1	0	21.09	21.56	21.22	22.00
1.4	16QAM	1	3	21.22	21.30	21.34	
1.4	16QAM	1	5	21.28	21.44	21.24	
1.4	16QAM	3	0	21.31	21.35	21.26	
1.4	16QAM	3	1	21.32	21.35	21.37	
1.4	16QAM	3	3	21.31	21.43	21.32	
1.4	16QAM	6	0	21.22	21.23	21.14	22.00
1.4	64QAM	1	0	20.24	20.18	20.32	21.00
1.4	64QAM	1	3	20.50	20.48	20.60	
1.4	64QAM	1	5	20.41	20.37	20.21	
1.4	64QAM	3	0	20.32	20.30	20.49	
1.4	64QAM	3	1	20.23	20.38	20.35	
1.4	64QAM	3	3	20.29	20.46	20.34	
1.4	64QAM	6	0	20.28	20.29	20.36	21.00



<FDD-LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	23.21	23.22	23.03	24.00
10	QPSK	1	25	23.07	23.10	22.90	
10	QPSK	1	49	22.99	23.11	22.79	
10	QPSK	25	0	22.30	22.32	22.13	23.00
10	QPSK	25	12	22.06	22.08	22.13	
10	QPSK	25	25	22.06	22.17	22.22	
10	QPSK	50	0	22.12	22.00	22.14	
10	16QAM	1	0	22.16	22.35	22.06	23.00
10	16QAM	1	25	22.39	22.42	22.10	
10	16QAM	1	49	22.22	22.28	22.35	
10	16QAM	25	0	22.31	22.32	22.14	23.00
10	16QAM	25	12	22.25	22.33	22.11	
10	16QAM	25	25	22.28	22.21	22.24	
10	16QAM	50	0	22.29	22.20	22.10	
10	64QAM	1	0	21.25	21.35	21.23	22.00
10	64QAM	1	25	21.22	21.42	21.22	
10	64QAM	1	49	21.11	21.33	21.24	
10	64QAM	25	0	21.22	21.33	21.00	22.00
10	64QAM	25	12	21.21	21.38	21.09	
10	64QAM	25	25	21.33	21.22	20.92	
10	64QAM	50	0	21.29	21.25	21.11	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	23.16	23.12	23.10	24.00
5	QPSK	1	12	23.06	23.17	23.01	
5	QPSK	1	24	23.06	23.01	23.01	
5	QPSK	12	0	22.21	22.26	22.12	23.00
5	QPSK	12	7	22.28	22.29	22.21	
5	QPSK	12	13	22.33	22.17	22.12	
5	QPSK	25	0	22.24	22.20	22.12	
5	16QAM	1	0	22.53	22.46	22.22	23.00
5	16QAM	1	12	22.23	22.45	22.21	
5	16QAM	1	24	22.10	22.45	22.28	



5	16QAM	12	0	22.19	22.28	22.27	23.00
5	16QAM	12	7	22.26	22.29	22.11	
5	16QAM	12	13	22.26	22.17	22.22	
5	16QAM	25	0	22.27	22.32	22.27	
5	64QAM	1	0	21.34	21.22	21.33	22.00
5	64QAM	1	12	21.22	21.16	21.30	
5	64QAM	1	24	21.36	21.20	21.14	
5	64QAM	12	0	21.08	21.22	21.02	22.00
5	64QAM	12	7	21.12	21.28	21.06	
5	64QAM	12	13	21.30	21.25	20.82	
5	64QAM	25	0	21.18	21.25	20.86	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.85	23.16	23.01	24.00
3	QPSK	1	8	23.11	23.12	23.03	
3	QPSK	1	14	23.12	23.10	22.84	
3	QPSK	8	0	22.14	22.27	22.25	23.00
3	QPSK	8	4	22.28	22.34	22.31	
3	QPSK	8	7	22.23	22.25	22.12	
3	QPSK	15	0	22.21	22.27	22.26	
3	16QAM	1	0	22.23	22.34	22.41	23.00
3	16QAM	1	8	22.16	22.42	22.26	
3	16QAM	1	14	22.21	22.47	22.22	
3	16QAM	8	0	22.17	22.26	22.00	23.00
3	16QAM	8	4	22.33	22.44	22.01	
3	16QAM	8	7	22.25	22.31	22.05	
3	16QAM	15	0	22.19	22.21	21.76	
3	64QAM	1	0	21.14	21.02	21.23	22.00
3	64QAM	1	8	21.02	21.26	21.02	
3	64QAM	1	14	21.04	21.22	21.03	
3	64QAM	8	0	21.14	21.24	21.22	22.00
3	64QAM	8	4	21.36	21.20	21.14	
3	64QAM	8	7	21.31	21.23	21.20	
3	64QAM	15	0	21.20	21.30	21.10	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	23.06	23.13	23.17	24.00
1.4	QPSK	1	3	23.19	23.12	23.19	



1.4	QPSK	1	5	23.08	23.02	23.03	
1.4	QPSK	3	0	23.09	23.15	23.11	
1.4	QPSK	3	1	23.15	23.02	23.12	
1.4	QPSK	3	3	23.16	23.08	23.08	
1.4	QPSK	6	0	22.19	22.18	22.17	23.00
1.4	16QAM	1	0	22.32	22.13	22.30	23.00
1.4	16QAM	1	3	22.12	22.36	22.25	
1.4	16QAM	1	5	22.51	22.19	22.25	
1.4	16QAM	3	0	22.04	22.02	22.16	
1.4	16QAM	3	1	22.07	22.34	22.20	
1.4	16QAM	3	3	22.15	22.26	22.14	23.00
1.4	16QAM	6	0	22.34	22.21	22.25	
1.4	64QAM	1	0	20.87	21.04	21.06	22.00
1.4	64QAM	1	3	21.18	21.19	21.14	
1.4	64QAM	1	5	21.13	21.12	21.00	
1.4	64QAM	3	0	20.79	21.06	21.07	
1.4	64QAM	3	1	21.07	21.01	21.02	
1.4	64QAM	3	3	20.97	21.14	21.18	22.00
1.4	64QAM	6	0	21.18	21.30	21.19	

<FDD-LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	22.36	22.37	22.29	23.00
20	QPSK	1	49	22.31	22.35	22.24	
20	QPSK	1	99	22.26	22.21	22.26	
20	QPSK	50	0	21.25	21.62	21.29	22.00
20	QPSK	50	24	21.31	21.28	21.18	
20	QPSK	50	50	21.41	21.44	21.41	
20	QPSK	100	0	21.36	21.38	21.35	
20	16QAM	1	0	21.17	21.27	21.45	22.00
20	16QAM	1	49	21.32	21.18	21.46	
20	16QAM	1	99	21.26	21.57	21.22	
20	16QAM	50	0	21.11	21.21	21.14	22.00
20	16QAM	50	24	21.16	21.08	21.19	
20	16QAM	50	50	21.24	21.29	21.12	



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20	16QAM	100	0	21.12	21.24	21.22	
20	64QAM	1	0	20.72	20.56	20.29	21.00
20	64QAM	1	49	20.66	20.63	20.68	
20	64QAM	1	99	20.64	20.69	20.60	
20	64QAM	50	0	20.38	20.39	20.44	21.00
20	64QAM	50	24	20.43	20.44	20.44	
20	64QAM	50	50	20.47	20.54	20.39	
20	64QAM	100	0	20.40	20.37	20.49	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	22.19	22.28	22.28	23.00
15	QPSK	1	37	22.29	22.26	22.30	
15	QPSK	1	74	22.23	22.30	22.30	
15	QPSK	36	0	21.34	21.43	21.45	22.00
15	QPSK	36	20	21.42	21.49	21.44	
15	QPSK	36	39	21.45	21.48	21.52	
15	QPSK	75	0	21.51	21.44	21.46	
15	16QAM	1	0	21.67	21.78	21.85	22.00
15	16QAM	1	37	21.49	21.60	21.58	
15	16QAM	1	74	21.53	21.53	21.75	
15	16QAM	36	0	21.12	21.23	21.25	22.00
15	16QAM	36	20	21.19	21.22	21.21	
15	16QAM	36	39	21.25	21.23	21.12	
15	16QAM	75	0	21.20	21.28	21.20	
15	64QAM	1	0	20.62	20.59	20.47	21.00
15	64QAM	1	37	20.52	20.67	20.76	
15	64QAM	1	74	20.51	20.63	20.69	
15	64QAM	36	0	20.36	20.44	20.43	21.00
15	64QAM	36	20	20.47	20.46	20.53	
15	64QAM	36	39	20.51	20.42	20.44	
15	64QAM	75	0	20.36	20.46	20.41	
Channel				20800	21100	21400	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	QPSK	1	0	22.18	22.05	22.08	23.00
10	QPSK	1	25	22.21	22.11	22.13	
10	QPSK	1	49	22.14	22.11	22.13	
10	QPSK	25	0	21.26	21.26	21.25	22.00
10	QPSK	25	12	21.22	21.34	21.39	



10	QPSK	25	25	21.15	21.33	21.33	
10	QPSK	50	0	21.24	21.36	21.35	
10	16QAM	1	0	21.29	21.47	21.32	
10	16QAM	1	25	21.28	21.30	21.35	22.00
10	16QAM	1	49	21.75	21.65	21.56	
10	16QAM	25	0	21.18	21.06	21.14	
10	16QAM	25	12	21.00	21.17	21.10	22.00
10	16QAM	25	25	21.05	21.08	21.00	
10	16QAM	50	0	21.08	21.17	21.02	
10	64QAM	1	0	20.62	20.58	20.56	21.00
10	64QAM	1	25	20.31	20.56	20.39	
10	64QAM	1	49	20.42	20.66	20.47	
10	64QAM	25	0	20.28	20.26	20.30	21.00
10	64QAM	25	12	20.30	20.41	20.34	
10	64QAM	25	25	20.23	20.13	20.12	
10	64QAM	50	0	20.17	20.23	20.15	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	22.22	22.13	22.03	23.00
5	QPSK	1	12	22.09	22.02	22.10	
5	QPSK	1	24	22.03	22.09	22.13	
5	QPSK	12	0	21.06	21.14	21.06	22.00
5	QPSK	12	7	21.13	21.28	21.20	
5	QPSK	12	13	21.15	21.31	21.16	
5	QPSK	25	0	21.16	21.17	21.12	
5	16QAM	1	0	21.14	21.12	21.18	22.00
5	16QAM	1	12	21.19	21.41	21.31	
5	16QAM	1	24	21.25	21.44	21.26	
5	16QAM	12	0	21.16	21.22	21.13	22.00
5	16QAM	12	7	21.05	21.07	21.03	
5	16QAM	12	13	21.05	21.11	21.24	
5	16QAM	25	0	21.02	21.07	21.09	
5	64QAM	1	0	20.38	20.43	20.39	21.00
5	64QAM	1	12	20.43	20.55	20.43	
5	64QAM	1	24	20.47	20.57	20.53	
5	64QAM	12	0	20.18	20.15	20.20	21.00
5	64QAM	12	7	20.27	20.32	20.11	
5	64QAM	12	13	20.22	20.31	20.17	



5	64QAM	25	0	20.17	20.16	20.21	
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<FDD-LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	23.26	23.42	23.31	24.00
10	QPSK	1	25	23.12	23.25	23.28	
10	QPSK	1	49	23.22	23.23	23.22	
10	QPSK	25	0	22.51	22.61	22.52	23.00
10	QPSK	25	12	22.48	22.42	22.21	
10	QPSK	25	25	22.53	22.59	22.52	
10	QPSK	50	0	22.54	22.56	22.47	
10	16QAM	1	0	22.47	22.02	22.15	23.00
10	16QAM	1	25	22.22	22.17	22.31	
10	16QAM	1	49	22.31	22.36	22.25	
10	16QAM	25	0	22.20	22.22	22.16	23.00
10	16QAM	25	12	22.24	22.28	22.17	
10	16QAM	25	25	22.29	22.30	22.24	
10	16QAM	50	0	22.19	22.27	22.32	
10	64QAM	1	0	21.34	21.46	21.80	22.00
10	64QAM	1	25	21.78	21.84	21.43	
10	64QAM	1	49	21.80	21.48	21.41	
10	64QAM	25	0	21.31	21.25	21.22	22.00
10	64QAM	25	12	21.36	21.39	21.31	
10	64QAM	25	25	21.41	21.38	21.38	
10	64QAM	50	0	21.33	21.26	21.37	
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	23.01	23.17	23.12	24.00
5	QPSK	1	12	23.17	23.33	23.17	
5	QPSK	1	24	23.13	23.32	23.18	
5	QPSK	12	0	22.24	22.31	22.30	23.00
5	QPSK	12	7	22.35	22.37	22.34	
5	QPSK	12	13	22.30	22.33	22.30	
5	QPSK	25	0	22.26	22.38	22.34	
5	16QAM	1	0	22.27	22.29	22.31	23.00



5	16QAM	1	12	22.44	22.39	22.40	
5	16QAM	1	24	22.40	22.38	22.34	
5	16QAM	12	0	22.14	22.11	22.14	
5	16QAM	12	7	22.28	22.33	22.17	23.00
5	16QAM	12	13	22.23	22.20	22.25	
5	16QAM	25	0	22.24	22.20	22.22	
5	64QAM	1	0	21.32	21.33	21.38	22.00
5	64QAM	1	12	21.77	21.47	21.40	
5	64QAM	1	24	21.75	21.44	21.49	
5	64QAM	12	0	21.29	21.31	21.26	22.00
5	64QAM	12	7	21.39	21.27	21.33	
5	64QAM	12	13	21.26	21.36	21.41	
5	64QAM	25	0	21.41	21.37	21.34	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	23.09	23.18	23.03	24.00
3	QPSK	1	8	23.27	23.26	23.36	
3	QPSK	1	14	23.21	23.32	23.27	
3	QPSK	8	0	22.32	22.30	22.30	23.00
3	QPSK	8	4	22.35	22.38	22.39	
3	QPSK	8	7	22.30	22.38	22.32	
3	QPSK	15	0	22.29	22.37	22.23	
3	16QAM	1	0	22.30	22.66	22.25	23.00
3	16QAM	1	8	22.50	22.48	22.43	
3	16QAM	1	14	22.33	22.38	22.24	
3	16QAM	8	0	22.30	22.19	22.22	23.00
3	16QAM	8	4	22.35	22.32	22.43	
3	16QAM	8	7	22.19	22.22	22.28	
3	16QAM	15	0	22.17	22.10	22.09	
3	64QAM	1	0	21.33	21.67	21.66	22.00
3	64QAM	1	8	21.62	21.52	21.53	
3	64QAM	1	14	21.55	21.40	21.51	
3	64QAM	8	0	21.22	21.30	21.21	22.00
3	64QAM	8	4	21.31	21.35	21.34	
3	64QAM	8	7	21.30	21.22	21.37	
3	64QAM	15	0	21.29	21.31	21.23	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	



1.4	QPSK	1	0	23.12	23.16	23.09	24.00
1.4	QPSK	1	3	23.23	23.22	23.24	
1.4	QPSK	1	5	23.12	23.17	23.13	
1.4	QPSK	3	0	23.07	23.20	23.18	
1.4	QPSK	3	1	23.28	23.28	23.29	
1.4	QPSK	3	3	23.23	23.25	23.21	
1.4	QPSK	6	0	22.29	22.26	22.24	23.00
1.4	16QAM	1	0	22.33	22.27	22.12	23.00
1.4	16QAM	1	3	22.14	22.57	22.24	
1.4	16QAM	1	5	22.26	22.27	22.26	
1.4	16QAM	3	0	22.10	22.13	22.14	
1.4	16QAM	3	1	22.26	22.34	22.18	
1.4	16QAM	3	3	22.09	22.23	22.23	
1.4	16QAM	6	0	22.02	22.22	22.12	23.00
1.4	64QAM	1	0	21.17	21.32	21.16	22.00
1.4	64QAM	1	3	21.29	21.22	21.27	
1.4	64QAM	1	5	21.45	21.48	21.44	
1.4	64QAM	3	0	21.35	21.36	21.19	
1.4	64QAM	3	1	21.33	21.57	21.42	
1.4	64QAM	3	3	21.35	21.19	21.35	
1.4	64QAM	6	0	21.31	21.32	21.19	22.00

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BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	23.12	23.25	22.90	24.00
10	QPSK	1	25	23.11	23.02	23.11	
10	QPSK	1	49	23.08	22.92	23.08	
10	QPSK	25	0	22.34	22.42	22.22	23.00
10	QPSK	25	12	22.26	22.25	22.31	
10	QPSK	25	25	22.32	22.19	22.27	
10	QPSK	50	0	22.30	22.32	22.32	
10	16QAM	1	0	22.20	22.28	22.22	23.00
10	16QAM	1	25	22.32	22.32	22.32	
10	16QAM	1	49	22.56	22.58	22.24	
10	16QAM	25	0	22.32	22.02	22.36	23.00



10	16QAM	25	12	21.92	22.23	22.07	
10	16QAM	25	25	22.06	22.23	21.94	
10	16QAM	50	0	22.03	22.06	22.09	
10	64QAM	1	0	21.73	21.42	21.68	22.00
10	64QAM	1	25	21.71	21.38	21.38	
10	64QAM	1	49	21.61	21.34	21.42	
10	64QAM	25	0	21.38	21.38	21.38	22.00
10	64QAM	25	12	21.26	21.34	21.30	
10	64QAM	25	25	21.38	21.08	21.42	
10	64QAM	50	0	21.12	21.29	21.13	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	22.66	22.83	22.85	24.00
5	QPSK	1	12	23.10	23.14	23.14	
5	QPSK	1	24	22.98	22.92	22.94	
5	QPSK	12	0	22.09	22.06	22.10	23.00
5	QPSK	12	7	22.20	22.24	22.25	
5	QPSK	12	13	22.17	22.19	22.16	
5	QPSK	25	0	22.18	22.07	22.11	
5	16QAM	1	0	22.09	22.02	22.22	23.00
5	16QAM	1	12	22.14	22.06	22.12	
5	16QAM	1	24	22.12	22.03	22.11	
5	16QAM	12	0	22.05	22.10	22.08	23.00
5	16QAM	12	7	22.20	22.10	22.22	
5	16QAM	12	13	22.16	22.15	22.15	
5	16QAM	25	0	22.17	22.11	22.15	
5	64QAM	1	0	21.22	21.33	21.16	22.00
5	64QAM	1	12	21.21	21.32	21.17	
5	64QAM	1	24	21.22	21.22	21.22	
5	64QAM	12	0	21.32	21.09	21.10	22.00
5	64QAM	12	7	21.19	21.12	21.26	
5	64QAM	12	13	21.17	21.19	21.12	
5	64QAM	25	0	21.13	21.17	21.18	



<FDD-LTE Band 18>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23925			
Frequency (MHz)				822.5			
15	QPSK	1	0	23.34			24.00
15	QPSK	1	37	23.26			
15	QPSK	1	74	23.21			
15	QPSK	36	0	22.51			23.00
15	QPSK	36	20	22.42			
15	QPSK	36	39	22.34			
15	QPSK	75	0	22.22			
15	16QAM	1	0	22.31			23.00
15	16QAM	1	37	22.22			
15	16QAM	1	74	22.34			
15	16QAM	36	0	22.46			23.00
15	16QAM	36	20	22.24			
15	16QAM	36	39	22.19			
15	16QAM	75	0	22.34			
15	64QAM	1	0	21.33			22.00
15	64QAM	1	25	21.22			
15	64QAM	1	49	21.42			
15	64QAM	25	0	21.38			22.00
15	64QAM	25	12	21.29			
15	64QAM	25	25	21.37			
15	64QAM	50	0	21.28			
Channel				23900	23925	23950	Tune-up limit (dBm)
Frequency (MHz)				820	822.5	825	
10	QPSK	1	0	23.02	23.27	23.28	24.00
10	QPSK	1	25	23.09	23.02	22.89	
10	QPSK	1	49	23.20	22.96	22.84	
10	QPSK	25	0	22.17	22.31	22.13	23.00
10	QPSK	25	12	22.12	22.16	22.22	
10	QPSK	25	25	22.11	22.09	22.10	
10	QPSK	50	0	22.20	22.17	22.16	
10	16QAM	1	0	22.24	22.15	22.30	23.00
10	16QAM	1	25	22.30	22.18	22.17	
10	16QAM	1	49	22.50	22.19	22.19	



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10	16QAM	25	0	22.23	22.16	22.20	23.00
10	16QAM	25	12	22.24	22.04	22.27	
10	16QAM	25	25	22.04	22.05	22.00	
10	16QAM	50	0	22.07	22.18	22.23	
10	64QAM	1	0	21.33	21.23	21.34	22.00
10	64QAM	1	25	21.23	21.22	21.22	
10	64QAM	1	49	21.25	21.15	21.23	
10	64QAM	25	0	21.25	21.22	21.12	22.00
10	64QAM	25	12	21.05	21.11	21.10	
10	64QAM	25	25	21.00	21.15	21.06	
10	64QAM	50	0	21.14	21.14	21.12	
Channel				23875	23925	23975	Tune-up limit (dBm)
Frequency (MHz)				817.5	822.5	827.5	
5	QPSK	1	0	22.88	22.99	23.00	24.00
5	QPSK	1	12	23.05	23.09	22.96	
5	QPSK	1	24	23.05	23.09	23.11	
5	QPSK	12	0	22.09	22.13	22.13	23.00
5	QPSK	12	7	22.21	22.17	22.17	
5	QPSK	12	13	22.25	22.19	22.18	
5	QPSK	25	0	22.19	22.16	22.14	
5	16QAM	1	0	22.21	22.34	22.21	23.00
5	16QAM	1	12	22.12	22.24	22.36	
5	16QAM	1	24	22.16	22.19	22.13	
5	16QAM	12	0	22.13	22.09	22.08	23.00
5	16QAM	12	7	22.15	22.10	22.25	
5	16QAM	12	13	22.34	22.14	22.14	
5	16QAM	25	0	22.20	22.21	22.09	
5	64QAM	1	0	21.21	21.16	21.12	22.00
5	64QAM	1	12	21.17	21.19	21.28	
5	64QAM	1	24	21.12	21.34	21.16	
5	64QAM	12	0	21.26	21.25	21.11	22.00
5	64QAM	12	7	21.18	21.17	21.21	
5	64QAM	12	13	21.34	21.25	21.20	
5	64QAM	25	0	21.09	21.16	21.12	



<FDD-LTE Band 19>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				24075			
Frequency (MHz)				837.5			
15	QPSK	1	0	23.32			24.00
15	QPSK	1	37	23.22			
15	QPSK	1	74	23.16			
15	QPSK	36	0	22.31			23.00
15	QPSK	36	20	22.28			
15	QPSK	36	39	22.23			
15	QPSK	75	0	22.31			
15	16QAM	1	0	22.29			23.00
15	16QAM	1	37	22.20			
15	16QAM	1	74	22.31			
15	16QAM	36	0	22.42			23.00
15	16QAM	36	20	22.22			
15	16QAM	36	39	22.26			
15	16QAM	75	0	22.24			
15	64QAM	1	0	21.51			22.00
15	64QAM	1	25	21.42			
15	64QAM	1	49	21.34			
15	64QAM	25	0	21.55			22.00
15	64QAM	25	12	21.46			
15	64QAM	25	25	21.34			
15	64QAM	50	0	21.22			
Channel				24050	24075	24100	Tune-up limit
Frequency (MHz)				835	837.5	840	(dBm)
10	QPSK	1	0	23.12	23.16	22.99	24.00
10	QPSK	1	25	23.00	23.11	22.99	
10	QPSK	1	49	22.99	22.81	22.92	
10	QPSK	25	0	22.16	22.18	22.18	23.00
10	QPSK	25	12	22.13	22.23	22.10	
10	QPSK	25	25	22.28	22.10	22.19	
10	QPSK	50	0	22.18	22.20	22.17	
10	16QAM	1	0	22.14	22.25	22.30	23.00
10	16QAM	1	25	22.14	22.09	22.20	
10	16QAM	1	49	22.18	22.15	22.21	



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10	16QAM	25	0	22.03	22.17	22.22	23.00
10	16QAM	25	12	22.09	21.97	21.98	
10	16QAM	25	25	22.07	22.01	22.08	
10	16QAM	50	0	21.99	22.10	22.06	
10	64QAM	1	0	21.16	21.15	21.26	22.00
10	64QAM	1	25	21.24	21.26	21.34	
10	64QAM	1	49	21.16	21.34	21.22	
10	64QAM	25	0	21.20	21.24	21.15	22.00
10	64QAM	25	12	21.27	21.11	21.23	
10	64QAM	25	25	21.22	21.14	21.22	
10	64QAM	50	0	21.19	21.24	21.12	
Channel				24025	24075	24125	Tune-up limit (dBm)
Frequency (MHz)				832.5	837.5	842.5	
5	QPSK	1	0	23.01	22.93	23.04	24.00
5	QPSK	1	12	23.10	23.07	23.07	
5	QPSK	1	24	23.16	23.11	23.01	
5	QPSK	12	0	22.07	22.10	22.10	23.00
5	QPSK	12	7	22.22	22.21	22.25	
5	QPSK	12	13	22.21	22.23	22.13	
5	QPSK	25	0	22.15	22.17	22.09	
5	16QAM	1	0	22.02	22.09	22.24	23.00
5	16QAM	1	12	22.22	22.22	22.14	
5	16QAM	1	24	22.17	22.25	22.25	
5	16QAM	12	0	21.93	21.96	22.03	23.00
5	16QAM	12	7	22.12	22.14	22.06	
5	16QAM	12	13	22.07	22.06	22.11	
5	16QAM	25	0	21.96	22.07	22.00	
5	64QAM	1	0	21.20	21.22	21.17	22.00
5	64QAM	1	12	21.13	21.34	21.24	
5	64QAM	1	24	21.26	21.24	21.36	
5	64QAM	12	0	21.03	21.12	21.22	22.00
5	64QAM	12	7	21.17	21.22	21.19	
5	64QAM	12	13	21.26	21.13	21.06	
5	64QAM	25	0	21.14	21.16	20.97	



<FDD-LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	22.88	23.15	23.11	23.50
15	QPSK	1	37	22.81	22.77	22.84	
15	QPSK	1	74	22.91	22.87	22.64	
15	QPSK	36	0	22.16	22.24	22.18	22.50
15	QPSK	36	20	22.13	22.05	22.03	
15	QPSK	36	39	22.12	21.99	21.99	
15	QPSK	75	0	21.91	22.02	22.01	
15	16QAM	1	0	22.11	22.14	22.13	22.50
15	16QAM	1	37	22.10	22.06	21.94	
15	16QAM	1	74	22.06	22.36	22.00	
15	16QAM	36	0	21.02	21.17	21.06	22.00
15	16QAM	36	20	21.15	21.12	21.15	
15	16QAM	36	39	21.22	21.25	21.02	
15	16QAM	75	0	21.00	21.02	21.01	
15	64QAM	1	0	21.24	21.32	21.14	22.00
15	64QAM	1	37	21.12	21.14	21.13	
15	64QAM	1	74	21.22	21.11	21.16	
15	64QAM	36	0	21.42	21.04	21.15	22.00
15	64QAM	36	20	21.22	20.97	21.01	
15	64QAM	36	39	21.00	21.03	21.04	
15	64QAM	75	0	21.02	21.10	21.15	
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	22.87	22.99	22.99	23.50
10	QPSK	1	25	22.95	22.68	22.88	
10	QPSK	1	49	22.71	22.89	22.92	
10	QPSK	25	0	21.93	22.01	22.10	22.50
10	QPSK	25	12	22.00	21.99	22.08	
10	QPSK	25	25	21.92	22.08	22.06	
10	QPSK	50	0	21.99	21.96	22.06	
10	16QAM	1	0	22.06	22.42	22.21	22.50
10	16QAM	1	25	22.12	22.27	22.15	
10	16QAM	1	49	22.22	22.04	22.05	



10	16QAM	25	0	21.65	21.62	21.55	22.00
10	16QAM	25	12	21.66	21.55	21.67	
10	16QAM	25	25	21.63	21.62	21.66	
10	16QAM	50	0	21.00	21.04	21.06	
10	64QAM	1	0	21.26	21.24	21.16	22.00
10	64QAM	1	25	21.22	21.12	21.25	
10	64QAM	1	49	21.23	21.22	21.22	
10	64QAM	25	0	21.05	21.11	21.18	22.00
10	64QAM	25	12	21.22	21.01	21.11	
10	64QAM	25	25	21.01	21.12	21.02	
10	64QAM	50	0	20.92	21.03	21.03	
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	22.53	22.67	22.77	23.50
5	QPSK	1	12	22.83	22.77	23.02	
5	QPSK	1	24	22.80	22.81	22.93	
5	QPSK	12	0	21.72	21.83	21.83	22.50
5	QPSK	12	7	21.83	21.91	21.91	
5	QPSK	12	13	21.90	21.97	22.00	
5	QPSK	25	0	21.78	21.88	21.91	
5	16QAM	1	0	22.26	21.97	22.18	22.50
5	16QAM	1	12	21.96	22.24	22.03	
5	16QAM	1	24	21.96	22.04	21.85	
5	16QAM	12	0	21.24	21.29	21.38	22.00
5	16QAM	12	7	21.46	21.44	21.43	
5	16QAM	12	13	21.42	21.49	21.53	
5	16QAM	25	0	21.39	21.42	21.42	
5	64QAM	1	0	21.22	21.33	21.12	22.00
5	64QAM	1	12	21.39	21.23	21.09	
5	64QAM	1	24	21.19	21.22	21.19	
5	64QAM	12	0	21.13	21.03	21.13	22.00
5	64QAM	12	7	21.21	21.20	21.23	
5	64QAM	12	13	21.21	21.16	21.14	
5	64QAM	25	0	21.11	21.26	21.21	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	22.57	22.73	22.78	23.50
3	QPSK	1	8	22.73	22.82	22.78	



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3	QPSK	1	14	22.77	22.82	22.87	
3	QPSK	8	0	22.08	22.20	22.23	22.50
3	QPSK	8	4	22.14	22.26	22.30	
3	QPSK	8	7	22.10	22.20	22.24	
3	QPSK	15	0	21.76	21.82	21.83	
3	16QAM	1	0	21.95	22.22	22.29	22.50
3	16QAM	1	8	22.20	22.25	22.36	
3	16QAM	1	14	22.22	22.23	22.31	
3	16QAM	8	0	21.21	21.27	21.15	22.00
3	16QAM	8	4	21.22	21.32	21.27	
3	16QAM	8	7	21.08	21.19	21.28	
3	16QAM	15	0	21.17	21.24	21.22	
3	64QAM	1	0	21.48	21.45	21.57	
3	64QAM	1	8	21.49	21.56	21.56	22.00
3	64QAM	1	14	21.56	21.50	21.49	
3	64QAM	8	0	21.47	21.15	21.27	
3	64QAM	8	4	21.11	21.26	21.19	22.00
3	64QAM	8	7	21.16	21.22	21.26	
3	64QAM	15	0	21.16	21.08	21.25	
Channel				26697	26865	27033	
Frequency (MHz)				814.7	831.5	848.3	Tune-up limit (dBm)
1.4	QPSK	1	0	22.56	22.72	22.77	23.50
1.4	QPSK	1	3	22.72	22.81	22.77	
1.4	QPSK	1	5	22.76	22.81	22.86	
1.4	QPSK	3	0	22.07	22.19	22.22	
1.4	QPSK	3	1	22.13	22.25	22.29	
1.4	QPSK	3	3	22.09	22.19	22.23	
1.4	QPSK	6	0	22.06	22.12	22.13	22.50
1.4	16QAM	1	0	22.04	22.21	22.28	22.50
1.4	16QAM	1	3	22.19	22.24	22.35	
1.4	16QAM	1	5	22.21	22.22	22.30	
1.4	16QAM	3	0	21.20	21.26	21.14	
1.4	16QAM	3	1	21.21	21.31	21.26	
1.4	16QAM	3	3	21.07	21.18	21.27	
1.4	16QAM	6	0	21.16	21.23	21.21	22.00
1.4	64QAM	1	0	20.89	21.22	20.91	22.00
1.4	64QAM	1	3	20.96	21.13	20.96	
1.4	64QAM	1	5	21.49	21.10	20.92	



1.4	64QAM	3	0	20.89	21.02	21.26	
1.4	64QAM	3	1	21.10	21.25	21.18	
1.4	64QAM	3	3	21.15	21.21	20.87	
1.4	64QAM	6	0	21.15	21.07	21.24	22.00

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BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				37850	38000	38150	
Frequency (MHz)				2580	2595	2610	
20	QPSK	1	0	22.61	22.77	22.72	23.50
20	QPSK	1	49	22.60	22.67	22.65	
20	QPSK	1	99	22.56	22.54	22.54	
20	QPSK	50	0	21.48	21.54	21.41	22.50
20	QPSK	50	24	21.44	21.51	21.51	
20	QPSK	50	50	21.51	21.36	21.35	
20	QPSK	100	0	21.48	21.58	21.54	
20	16QAM	1	0	21.59	21.68	21.59	22.50
20	16QAM	1	49	21.55	21.54	21.68	
20	16QAM	1	99	21.65	21.61	21.57	
20	16QAM	50	0	21.19	21.12	21.29	22.50
20	16QAM	50	24	21.22	21.22	21.22	
20	16QAM	50	50	21.26	21.19	21.18	
20	16QAM	100	0	21.00	21.16	21.01	
20	64QAM	1	0	20.90	20.90	21.01	21.50
20	64QAM	1	49	21.02	21.02	20.94	
20	64QAM	1	99	20.90	20.87	21.01	
20	64QAM	50	0	20.81	20.84	20.80	21.50
20	64QAM	50	24	20.79	20.84	20.85	
20	64QAM	50	50	20.76	20.86	20.71	
20	64QAM	100	0	20.88	20.88	20.80	
Channel				37825	38000	38175	Tune-up limit (dBm)
Frequency (MHz)				2577.5	2595	2612.5	
15	QPSK	1	0	22.63	22.72	22.71	23.50
15	QPSK	1	37	22.73	22.65	22.74	
15	QPSK	1	74	22.56	22.59	22.64	



15	QPSK	36	0	21.49	21.49	21.45	22.50
15	QPSK	36	20	21.51	21.55	21.55	
15	QPSK	36	39	21.35	21.58	21.49	
15	QPSK	75	0	21.47	21.60	21.50	
15	16QAM	1	0	21.59	21.66	21.58	22.50
15	16QAM	1	37	21.69	21.53	21.58	
15	16QAM	1	74	21.55	21.48	21.52	
15	16QAM	36	0	21.22	21.11	21.33	22.50
15	16QAM	36	20	21.32	21.31	21.37	
15	16QAM	36	39	21.33	21.39	21.36	
15	16QAM	75	0	21.34	21.42	21.23	
15	64QAM	1	0	20.64	20.58	20.66	21.50
15	64QAM	1	37	20.89	20.62	20.72	
15	64QAM	1	74	20.99	20.69	20.89	
15	64QAM	36	0	20.84	20.98	20.88	21.50
15	64QAM	36	20	20.86	20.93	20.88	
15	64QAM	36	39	20.96	20.96	20.83	
15	64QAM	75	0	20.89	20.85	20.87	
Channel				37800	38000	38200	Tune-up limit (dBm)
Frequency (MHz)				2575	2595	2615	
10	QPSK	1	0	22.40	22.60	22.44	23.50
10	QPSK	1	25	22.35	22.47	22.45	
10	QPSK	1	49	22.33	22.48	22.46	
10	QPSK	25	0	21.34	21.48	21.35	22.50
10	QPSK	25	12	21.35	21.41	21.35	
10	QPSK	25	25	21.36	21.46	21.39	
10	QPSK	50	0	21.35	21.40	21.36	
10	16QAM	1	0	21.31	21.47	21.44	22.50
10	16QAM	1	25	21.37	21.54	21.41	
10	16QAM	1	49	21.34	21.42	21.46	
10	16QAM	25	0	21.18	21.19	21.27	22.50
10	16QAM	25	12	21.17	21.17	21.14	
10	16QAM	25	25	21.17	21.23	21.23	
10	16QAM	50	0	20.92	20.66	20.67	
10	64QAM	1	0	20.65	20.64	20.54	21.50
10	64QAM	1	25	20.55	20.24	20.57	
10	64QAM	1	49	20.55	20.56	20.62	



10	64QAM	25	0	20.62	20.72	20.59	21.50
10	64QAM	25	12	20.74	20.70	20.65	
10	64QAM	25	25	20.65	20.65	20.68	
10	64QAM	50	0	20.68	20.73	20.74	
Channel				37775	38000	38225	Tune-up limit (dBm)
Frequency (MHz)				2572.5	2595	2617.5	
5	QPSK	1	0	22.25	22.55	22.47	23.50
5	QPSK	1	12	22.42	22.67	22.55	
5	QPSK	1	24	22.49	22.56	22.44	
5	QPSK	12	0	21.28	21.34	21.33	22.50
5	QPSK	12	7	21.37	21.52	21.43	
5	QPSK	12	13	21.33	21.41	21.43	
5	QPSK	25	0	21.40	21.29	21.26	
5	16QAM	1	0	21.36	21.47	21.40	22.50
5	16QAM	1	12	21.51	21.64	21.47	
5	16QAM	1	24	21.45	21.50	21.46	
5	16QAM	12	0	21.03	21.02	21.06	22.50
5	16QAM	12	7	21.08	21.14	21.16	
5	16QAM	12	13	21.07	21.11	21.11	
5	16QAM	25	0	21.02	21.02	21.05	
5	64QAM	1	0	20.65	20.63	20.58	21.50
5	64QAM	1	12	20.66	20.72	20.69	
5	64QAM	1	24	20.59	20.59	20.66	
5	64QAM	12	0	20.60	20.59	20.73	21.50
5	64QAM	12	7	20.66	20.78	20.74	
5	64QAM	12	13	20.70	20.80	20.73	
5	64QAM	25	0	20.68	20.64	20.63	



<TDD-LTE Band 40A>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				38750			
Frequency (MHz)				2310			
10	QPSK	1	0	22.79			23.50
10	QPSK	1	25	22.73			
10	QPSK	1	49	22.55			
10	QPSK	25	0	21.91			22.50
10	QPSK	25	12	21.81			
10	QPSK	25	25	21.82			
10	QPSK	50	0	21.84			
10	16QAM	1	0	21.72			22.50
10	16QAM	1	25	21.90			
10	16QAM	1	49	21.76			
10	16QAM	25	0	20.93			21.50
10	16QAM	25	12	20.91			
10	16QAM	25	25	20.86			
10	16QAM	50	0	20.94			
10	64QAM	1	0	20.62			21.50
10	64QAM	1	25	20.63			
10	64QAM	1	49	20.82			
10	64QAM	25	0	20.76			21.50
10	64QAM	25	12	20.72			
10	64QAM	25	25	20.69			
10	64QAM	50	0	20.59			
Channel				38725	38750	38775	Tune-up
Frequency (MHz)				2307.5	2310	2312.5	limit (dBm)
5	QPSK	1	0	22.66	22.73	22.75	23.50
5	QPSK	1	12	22.67	22.78	22.66	
5	QPSK	1	24	22.63	22.71	22.70	
5	QPSK	12	0	21.86	21.93	21.90	22.50
5	QPSK	12	7	21.93	22.01	22.07	
5	QPSK	12	13	21.87	21.96	22.02	
5	QPSK	25	0	21.93	21.96	21.99	
5	16QAM	1	0	22.01	22.13	22.05	22.50



5	16QAM	1	12	22.00	22.06	22.13	
5	16QAM	1	24	21.83	21.93	21.94	
5	16QAM	12	0	20.95	21.02	21.01	
5	16QAM	12	7	20.98	21.05	21.02	21.50
5	16QAM	12	13	20.99	21.05	21.06	
5	16QAM	25	0	21.07	20.98	21.06	
5	64QAM	1	0	20.86	20.88	20.67	21.50
5	64QAM	1	12	20.77	20.88	20.69	
5	64QAM	1	24	20.88	20.62	20.67	
5	64QAM	12	0	20.93	20.69	20.68	21.50
5	64QAM	12	7	20.93	20.99	20.98	
5	64QAM	12	13	20.93	20.94	20.92	
5	64QAM	25	0	20.98	21.01	20.99	

<TDD-LTE Band 40B>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				39200			
Frequency (MHz)				2355			
10	QPSK	1	0	22.75			23.50
10	QPSK	1	25	22.66			
10	QPSK	1	49	22.69			
10	QPSK	25	0	21.88			22.50
10	QPSK	25	12	21.85			
10	QPSK	25	25	21.77			
10	QPSK	50	0	21.85			
10	16QAM	1	0	21.62			22.50
10	16QAM	1	25	21.66			
10	16QAM	1	49	21.76			
10	16QAM	25	0	20.66			21.50
10	16QAM	25	12	20.88			
10	16QAM	25	25	20.76			
10	16QAM	50	0	20.62			
10	64QAM	1	0	20.81			21.50
10	64QAM	1	25	20.64			
10	64QAM	1	49	20.69			
10	64QAM	25	0	20.83			21.50



10	64QAM	25	12	20.66			
10	64QAM	25	25	20.67			
10	64QAM	50	0	20.65			
Channel				39175	39200	39225	Tune-up limit (dBm)
Frequency (MHz)				2352.5	2355	2357.5	
5	QPSK	1	0	22.83	22.80	22.86	23.50
5	QPSK	1	12	22.84	22.75	22.88	
5	QPSK	1	24	22.60	22.76	22.75	
5	QPSK	12	0	21.92	22.05	22.09	22.50
5	QPSK	12	7	21.99	21.97	22.02	
5	QPSK	12	13	21.93	21.94	22.01	
5	QPSK	25	0	21.94	21.95	22.00	
5	16QAM	1	0	22.03	22.05	22.12	22.50
5	16QAM	1	12	22.08	22.06	22.03	
5	16QAM	1	24	21.93	21.99	21.97	
5	16QAM	12	0	20.66	20.86	20.67	21.50
5	16QAM	12	7	20.64	20.85	20.71	
5	16QAM	12	13	20.96	20.99	20.69	
5	16QAM	25	0	20.74	20.85	20.89	
5	64QAM	1	0	20.89	20.97	20.85	21.50
5	64QAM	1	12	20.99	20.89	20.82	
5	64QAM	1	24	20.62	20.96	20.99	
5	64QAM	12	0	20.64	20.75	20.68	21.50
5	64QAM	12	7	20.68	20.48	20.67	
5	64QAM	12	13	20.68	20.55	20.96	
5	64QAM	25	0	20.94	20.92	20.67	

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BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	22.77	23.12	23.09	23.50
20	QPSK	1	49	22.79	22.76	22.84	
20	QPSK	1	99	22.70	22.86	22.63	
20	QPSK	50	0	22.12	22.24	22.08	22.50
20	QPSK	50	24	22.22	22.04	22.02	
20	QPSK	50	50	22.12	21.98	21.98	



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20	QPSK	100	0	21.90	22.01	22.00	
20	16QAM	1	0	22.10	22.13	22.12	22.50
20	16QAM	1	49	22.09	22.05	21.93	
20	16QAM	1	99	22.05	22.35	21.99	
20	16QAM	50	0	21.01	20.96	21.05	22.00
20	16QAM	50	24	21.24	21.11	21.32	
20	16QAM	50	50	21.33	21.34	21.22	
20	16QAM	100	0	21.22	21.16	21.34	
20	64QAM	1	0	21.35	21.39	21.26	22.00
20	64QAM	1	49	21.22	21.22	21.22	
20	64QAM	1	99	21.22	21.36	21.42	
20	64QAM	50	0	20.97	21.03	21.03	22.00
20	64QAM	50	24	20.95	20.96	21.00	
20	64QAM	50	50	20.99	21.02	21.03	
20	64QAM	100	0	21.01	21.09	21.14	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	22.86	22.98	22.98	23.50
15	QPSK	1	37	22.94	22.67	22.87	
15	QPSK	1	74	22.70	22.88	22.91	
15	QPSK	36	0	21.92	22.00	22.09	22.50
15	QPSK	36	20	21.99	21.98	22.07	
15	QPSK	36	39	21.91	22.07	22.05	
15	QPSK	75	0	21.98	21.95	22.05	
15	16QAM	1	0	22.05	22.41	22.20	22.50
15	16QAM	1	37	21.94	22.26	22.14	
15	16QAM	1	74	21.82	22.03	22.44	
15	16QAM	36	0	20.95	21.07	21.12	22.00
15	16QAM	36	20	20.90	21.01	21.10	
15	16QAM	36	39	21.00	21.12	21.02	
15	16QAM	75	0	20.99	21.03	21.05	
15	64QAM	1	0	21.22	21.32	21.25	22.00
15	64QAM	1	37	21.42	21.52	21.34	
15	64QAM	1	74	21.22	21.44	21.26	
15	64QAM	36	0	21.16	21.35	21.22	22.00
15	64QAM	36	20	21.00	21.11	21.01	
15	64QAM	36	39	20.91	21.02	21.02	
15	64QAM	75	0	20.84	20.98	20.97	



Channel				132022	132322	132622	Tune-up limit
Frequency (MHz)				1715	1745	1775	(dBm)
10	QPSK	1	0	22.52	22.66	22.76	23.50
10	QPSK	1	25	22.82	22.76	23.01	
10	QPSK	1	49	22.79	22.80	22.92	
10	QPSK	25	0	21.71	21.82	21.82	22.50
10	QPSK	25	12	21.82	21.90	21.90	
10	QPSK	25	25	21.89	21.96	21.99	
10	QPSK	50	0	21.77	21.87	21.90	
10	16QAM	1	0	22.25	21.96	22.08	22.50
10	16QAM	1	25	21.89	22.23	22.02	
10	16QAM	1	49	21.99	21.83	21.72	
10	16QAM	25	0	21.52	21.52	21.66	22.00
10	16QAM	25	12	21.53	21.34	21.12	
10	16QAM	25	25	21.62	21.26	21.00	
10	16QAM	50	0	21.52	21.33	21.12	
10	64QAM	1	0	21.32	21.26	21.12	22.00
10	64QAM	1	25	21.39	21.33	21.22	
10	64QAM	1	49	21.53	21.63	21.52	
10	64QAM	25	0	20.81	20.71	20.81	22.00
10	64QAM	25	12	20.89	20.88	20.91	
10	64QAM	25	25	20.89	20.84	20.82	
10	64QAM	50	0	20.79	20.94	20.89	
Channel				131997	132322	132647	Tune-up limit
Frequency (MHz)				1712.5	1745	1777.5	(dBm)
5	QPSK	1	0	22.52	22.66	22.76	23.50
5	QPSK	1	12	22.82	22.76	23.01	
5	QPSK	1	24	22.79	22.80	22.92	
5	QPSK	12	0	21.71	21.82	21.82	22.50
5	QPSK	12	7	21.82	21.90	21.90	
5	QPSK	12	13	21.89	21.96	21.99	
5	QPSK	25	0	21.77	21.87	21.90	
5	16QAM	1	0	21.89	21.62	21.86	22.50
5	16QAM	1	12	21.95	21.88	22.02	
5	16QAM	1	24	21.95	21.83	22.12	
5	16QAM	12	0	21.55	21.12	21.22	22.00
5	16QAM	12	7	21.16	21.14	21.13	
5	16QAM	12	13	21.12	21.19	21.23	



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5	16QAM	25	0	21.09	21.12	21.12	
5	64QAM	1	0	21.12	21.11	21.22	22.00
5	64QAM	1	12	21.02	21.09	21.06	
5	64QAM	1	24	21.06	20.92	20.99	
5	64QAM	12	0	20.81	20.71	20.81	22.00
5	64QAM	12	7	20.89	20.88	20.91	
5	64QAM	12	13	20.89	20.84	20.82	
5	64QAM	25	0	20.79	20.94	20.89	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	22.67	22.79	22.79	23.50
3	QPSK	1	8	22.75	22.48	22.68	
3	QPSK	1	14	22.51	22.69	22.72	
3	QPSK	8	0	21.73	21.81	21.90	22.50
3	QPSK	8	4	21.80	21.79	21.88	
3	QPSK	8	7	21.72	21.88	21.86	
3	QPSK	15	0	21.79	21.76	21.86	
3	16QAM	1	0	21.86	22.22	22.01	22.50
3	16QAM	1	8	21.75	22.07	21.95	
3	16QAM	1	14	21.63	21.84	22.25	
3	16QAM	8	0	20.76	20.88	20.93	22.00
3	16QAM	8	4	20.71	20.82	20.91	
3	16QAM	8	7	20.81	20.93	20.83	
3	16QAM	15	0	20.80	20.84	20.86	
3	64QAM	1	0	21.03	21.13	21.06	22.00
3	64QAM	1	8	21.23	21.33	21.15	
3	64QAM	1	14	21.03	21.25	21.07	
3	64QAM	8	0	20.97	21.16	21.03	22.00
3	64QAM	8	4	20.81	20.92	20.82	
3	64QAM	8	7	20.72	20.83	20.83	
3	64QAM	15	0	20.65	20.79	20.78	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	22.29	22.43	22.53	23.50
1.4	QPSK	1	3	22.59	22.53	22.78	
1.4	QPSK	1	5	22.56	22.57	22.69	
1.4	QPSK	3	0	22.14	22.25	22.25	
1.4	QPSK	3	1	22.25	22.33	22.33	



1.4	QPSK	3	3	22.32	22.39	22.42	
1.4	QPSK	6	0	21.54	21.64	21.67	22.50
1.4	16QAM	1	0	22.02	21.73	21.85	22.50
1.4	16QAM	1	3	21.66	22.00	21.79	
1.4	16QAM	1	5	21.76	21.60	21.49	
1.4	16QAM	3	0	21.29	21.29	21.43	
1.4	16QAM	3	1	21.30	21.11	20.89	
1.4	16QAM	3	3	21.39	21.03	20.77	
1.4	16QAM	6	0	21.29	21.10	20.89	22.00
1.4	64QAM	1	0	21.09	21.03	20.89	22.00
1.4	64QAM	1	3	21.16	21.10	20.99	
1.4	64QAM	1	5	21.30	21.40	21.29	
1.4	64QAM	3	0	20.58	20.48	20.58	
1.4	64QAM	3	1	20.66	20.65	20.68	
1.4	64QAM	3	3	20.66	20.61	20.59	
1.4	64QAM	6	0	20.56	20.71	20.66	22.00

➤ 5G NR Conducted Power

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BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle-Low Channel	Middle Channel	Middle-High Channel	High Channel	Tune-up limit (dBm)
Channel				509202	515460	518598	521742	528000	
Frequency (MHz)				2546.01	257.3	2592.99	2608.71	2640	
100	DFT-s-OFDM PI/2 BPSK	1	1	23.29	23.25	23.42	23.26	23.28	24.00
100		1	136	23.17	23.22	23.30	23.20	23.21	
100		1	272	23.01	23.10	23.19	23.02	23.03	
100		135	1	21.12	21.20	21.31	21.28	21.29	22.00
100		135	67	20.30	21.21	21.35	21.24	20.00	
100		135	136	20.24	20.27	20.30	20.22	20.29	
100		270	0	20.21	20.22	20.29	20.18	20.20	
100	DFT-s-OFDM QPSK	1	1	23.19	23.23	23.43	23.20	23.33	24.00
100		1	136	23.11	23.20	23.34	23.15	23.10	
100		1	272	23.00	23.24	23.10	23.08	23.02	
100		135	1	23.26	23.20	23.32	23.21	23.18	24.00
100		135	67	23.24	23.14	23.30	23.29	23.15	
100		135	136	23.08	23.10	23.21	23.19	23.11	
100		270	0	22.87	22.79	23.01	22.98	22.81	



100	DFT-s-OFDM 16QAM	1	1	22.93	23.10	23.16	23.21	23.35	24.00	
100		1	136	22.96	23.02	23.19	23.20	23.35		
100		1	272	22.98	22.89	22.96	22.92	22.83		
100			135	1	23.26	23.10	23.37	23.19	23.15	24.00
100			135	67	23.24	23.00	23.35	23.14	23.10	
100			135	136	23.19	22.98	23.28	23.01	23.00	
100			270	0	23.10	22.88	23.17	22.98	22.84	
100	DFT-s-OFDM 64QAM	1	1	23.11	23.23	23.36	23.35	23.34	24.00	
100		1	136	23.08	23.20	23.38	23.31	23.30		
100		1	272	23.11	23.19	23.40	23.30	23.28		
100			135	1	23.30	23.34	23.37	23.32	23.24	24.00
100			135	67	23.29	23.31	23.34	23.30	23.20	
100			135	136	23.24	23.29	23.30	23.25	23.18	
100			270	0	23.12	23.18	23.24	23.20	23.00	
100	DFT-s-OFDM 256QAM	1	1	22.95	23.02	23.27	23.11	23.27	24.00	
100		1	136	23.15	23.15	23.15	23.05	23.34		
100		1	272	23.26	23.06	22.96	23.00	23.26		
100			135	1	23.35	23.41	23.12	23.17	23.20	24.00
100			135	67	23.33	23.39	23.37	23.28	23.17	
100			135	136	23.20	23.31	23.28	23.19	23.08	
100			270	0	23.12	23.24	23.21	23.08	23.01	
Channel				507204	514800	518598	522402	529998	Tune-up limit (dBm)	
Frequency (MHz)				2536.02	2574	2592.99	2612.01	2649.99		
80	DFT-s-OFDM PI/2 BPSK	1	1	23.06	23.02	23.19	23.03	23.05	24.00	
80		1	108	22.94	22.99	23.07	22.97	22.98		
80		1	215	22.78	22.87	22.96	22.79	22.80		
80			108	1	20.89	20.97	21.08	21.05	21.06	24.00
80			108	54	20.07	20.98	21.12	21.01	19.77	
80			108	108	20.01	20.04	20.07	19.99	20.06	
80			216	0	19.98	19.99	20.06	19.95	19.97	
80	DFT-s-OFDM QPSK	1	1	22.96	23.00	23.20	22.97	23.10	24.00	
80		1	108	22.88	22.97	23.11	22.92	22.87		
80		1	215	22.77	23.01	22.87	22.85	22.79		
80			108	1	23.03	22.97	23.09	22.98	22.95	23.00
80			108	54	23.01	22.91	23.07	23.06	22.92	
80			108	108	22.85	22.87	22.98	22.96	22.88	
80			216	0	22.64	22.56	22.78	22.75	22.58	



80	DFT-s-OFDM 16QAM	1	1	22.70	22.87	22.93	22.98	23.12	24.00	
80		1	108	22.73	22.79	22.96	22.97	23.12		
80		1	215	22.75	22.66	22.73	22.69	22.60		
80		64QAM	108	1	23.03	22.87	23.14	22.96	22.92	24.00
80			108	54	23.01	22.77	23.12	22.91	22.87	
80			108	108	22.96	22.75	23.05	22.78	22.77	
80			216	0	22.87	22.65	22.94	22.75	22.61	
80	DFT-s-OFDM 256QAM	1	1	22.88	23.00	23.13	23.12	23.11	24.00	
80		1	108	22.85	22.97	23.15	23.08	23.07		
80		1	215	22.88	22.96	23.17	23.07	23.05		
80		PI/2 BPSK	108	1	23.07	23.11	23.14	23.09	23.01	24.00
80			108	54	23.06	23.08	23.11	23.07	22.97	
80			108	108	23.01	23.06	23.07	23.02	22.95	
80			216	0	22.89	22.95	23.01	22.97	22.77	
80	DFT-s-OFDM QPSK	1	1	22.72	22.79	23.04	22.88	23.04	24.00	
80		1	108	22.92	22.92	22.92	22.82	23.11		
80		1	215	23.03	22.83	22.73	22.77	23.03		
80		256QAM	108	1	23.12	23.18	22.89	22.94	22.97	24.00
80			108	54	23.10	23.16	23.14	23.05	22.94	
80			108	108	22.97	23.08	23.05	22.96	22.85	
80			216	0	22.89	23.01	22.98	22.85	22.78	
Channel				505200	514140	518598	523080	531996	Tune-up	
Frequency (MHz)				2526.01	2570.7	2592.99	2615.40	2659.98	limit (dBm)	
60	DFT-s-OFDM PI/2 BPSK	1	1	23.40	23.36	23.53	23.37	23.39	24.00	
60		1	80	23.28	23.33	23.41	23.31	23.32		
60		1	160	23.12	23.21	23.30	23.13	23.14		
60		256QAM	81	1	21.23	21.31	21.42	21.39	21.40	24.00
60			81	40	20.41	21.32	21.46	21.35	20.11	
60			81	81	20.35	20.38	20.41	20.33	20.40	
60			162	0	20.32	20.33	20.40	20.29	20.31	
60	DFT-s-OFDM QPSK	1	1	23.30	23.34	23.54	23.31	23.44	24.00	
60		1	80	23.22	23.31	23.45	23.26	23.21		
60		1	160	23.11	23.35	23.21	23.19	23.13		
60		256QAM	81	1	23.37	23.31	23.43	23.32	23.29	23.00
60			81	40	23.35	23.25	23.41	23.40	23.26	
60			81	81	23.19	23.21	23.32	23.30	23.22	
60			162	0	22.98	22.90	23.12	23.09	22.92	



60	DFT-s-OFDM 16QAM	1	1	23.04	23.21	23.27	23.32	23.46	24.00
60		1	80	23.07	23.13	23.30	23.31	23.46	
60		1	160	23.09	23.00	23.07	23.03	22.94	
60		81	1	23.37	23.21	23.48	23.30	23.26	24.00
60		81	40	23.35	23.11	23.46	23.25	23.21	
60		81	81	23.30	23.09	23.39	23.12	23.11	
60		162	0	23.21	22.99	23.28	23.09	22.95	
60	DFT-s-OFDM 64QAM	1	1	23.22	23.34	23.47	23.46	23.45	24.00
60		1	80	23.19	23.31	23.49	23.42	23.41	
60		1	160	23.22	23.30	23.51	23.41	23.39	
60		81	1	23.41	23.45	23.48	23.43	23.35	24.00
60		81	40	23.40	23.42	23.45	23.41	23.31	
60		81	81	23.35	23.40	23.41	23.36	23.29	
60		162	0	23.23	23.29	23.35	23.31	23.11	
60	DFT-s-OFDM 256QAM	1	1	23.06	23.13	23.38	23.22	23.38	24.00
60		1	80	23.26	23.26	23.26	23.16	23.45	
60		1	160	23.37	23.17	23.07	23.11	23.37	
60		81	1	23.46	23.52	23.23	23.28	23.31	24.00
60		81	40	23.44	23.50	23.48	23.39	23.28	
60		81	81	23.31	23.42	23.39	23.30	23.19	
60		162	0	23.23	23.35	23.32	23.19	23.12	
Channel				503202	510900	518598	526302	534000	Tune-up limit (dBm)
Frequency (MHz)				2516.01	2554.55	2592.99	2631.55	2670	
40	DFT-s-OFDM PI/2 BPSK	1	1	23.08	23.04	23.21	23.05	23.07	24.00
40		1	53	22.96	23.01	23.09	22.99	23.00	
40		1	105	22.80	22.89	22.98	22.81	22.82	
40		50	1	20.91	20.99	21.10	21.07	21.08	24.00
40		50	25	20.09	21.00	21.14	21.03	19.79	
40		50	50	20.03	20.06	20.09	20.01	20.08	
40		100	0	20.00	20.01	20.08	19.97	19.99	
40	DFT-s-OFDM QPSK	1	1	22.98	23.02	23.22	22.99	23.12	24.00
40		1	53	22.90	22.99	23.13	22.94	22.89	
40		1	105	22.79	23.03	22.89	22.87	22.81	
40		50	1	23.05	22.99	23.11	23.00	22.97	23.00
40		50	25	23.03	22.93	23.09	23.08	22.94	
40		50	50	22.87	22.89	23.00	22.98	22.90	
40		100	0	22.66	22.58	22.80	22.77	22.60	



40	DFT-s-OFDM 16QAM	1	1	22.72	22.89	22.95	23.00	23.14	24.00
40		1	53	22.75	22.81	22.98	22.99	23.14	
40		1	105	22.77	22.68	22.75	22.71	22.62	
40		50	1	23.05	22.89	23.16	22.98	22.94	24.00
40		50	25	23.03	22.79	23.14	22.93	22.89	
40		50	50	22.98	22.77	23.07	22.80	22.79	
40		100	0	22.89	22.67	22.96	22.77	22.63	
40		DFT-s-OFDM 64QAM	1	1	22.90	23.02	23.15	23.14	23.13
40	1		53	22.87	22.99	23.17	23.10	23.09	
40	1		105	22.90	22.98	23.19	23.09	23.07	
40	50		1	23.09	23.13	23.16	23.11	23.03	24.00
40	50		25	23.08	23.10	23.13	23.09	22.99	
40	50		50	23.03	23.08	23.09	23.04	22.97	
40	100		0	22.91	22.97	23.03	22.99	22.79	
40	DFT-s-OFDM 256QAM	1	1	22.74	22.81	23.06	22.90	23.06	24.00
40		1	53	22.94	22.94	22.94	22.84	23.13	
40		1	105	23.05	22.85	22.75	22.79	23.05	
40		50	1	23.14	23.20	22.91	22.96	22.99	24.00
40		50	25	23.12	23.18	23.16	23.07	22.96	
40		50	50	22.99	23.10	23.07	22.98	22.87	
40		100	0	22.91	23.03	23.00	22.87	22.80	
Channel				501204	509898	518598	527298	535998	Tune-up limit (dBm)
Frequency (MHz)				2506.02	2549.49	2592.99	2636.49	2679.99	
20	DFT-s-OFDM PI/2 BPSK	1	1	23.44	23.40	23.57	23.41	23.43	24.00
20		1	25	23.32	23.37	23.45	23.35	23.36	
20		1	49	23.16	23.25	23.34	23.17	23.18	
20		25	1	21.27	21.35	21.46	21.43	21.44	24.00
20		25	12	20.45	21.36	21.50	21.39	20.15	
20		25	24	20.39	20.42	20.45	20.37	20.44	
20		50	0	20.36	20.37	20.44	20.33	20.35	
20	DFT-s-OFDM QPSK	1	1	23.34	23.38	23.58	23.35	23.48	24.00
20		1	25	23.26	23.35	23.49	23.30	23.25	
20		1	49	23.15	23.39	23.25	23.23	23.17	
20		25	1	23.41	23.35	23.47	23.36	23.33	23.00
20		25	12	23.39	23.29	23.45	23.44	23.30	
20		25	24	23.23	23.25	23.36	23.34	23.26	
20		50	0	23.02	22.94	23.16	23.13	22.96	



20	DFT-s-OFDM 16QAM	1	1	23.08	23.25	23.31	23.36	23.50	24.00
20		1	25	23.11	23.17	23.34	23.35	23.50	
20		1	49	23.13	23.04	23.11	23.07	22.98	
20		25	1	23.41	23.25	23.52	23.34	23.30	24.00
20		25	12	23.39	23.15	23.50	23.29	23.25	
20		25	24	23.34	23.13	23.43	23.16	23.15	
20		50	0	23.25	23.03	23.32	23.13	22.99	
20	DFT-s-OFDM 64QAM	1	1	23.26	23.38	23.51	23.50	23.49	24.00
20		1	25	23.23	23.35	23.53	23.46	23.45	
20		1	49	23.26	23.34	23.55	23.45	23.43	
20		25	1	23.45	23.49	23.52	23.47	23.39	24.00
20		25	12	23.44	23.46	23.49	23.45	23.35	
20		25	24	23.39	23.44	23.45	23.40	23.33	
20		50	0	23.27	23.33	23.39	23.35	23.15	
20	DFT-s-OFDM 256QAM	1	1	23.10	23.17	23.42	23.26	23.42	24.00
20		1	25	23.30	23.30	23.30	23.20	23.49	
20		1	49	23.41	23.21	23.11	23.15	23.41	
20		25	1	23.50	23.56	23.27	23.32	23.35	24.00
20		25	12	23.48	23.54	23.52	23.43	23.32	
20		25	24	23.35	23.46	23.43	23.34	23.23	
20		50	0	23.27	23.39	23.36	23.23	23.16	

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BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle-Low Channel	Middle Channel	Middle-High Channel	High Channel	Tune-up limit (dBm)
Channel				509202	515460	518598	521742	528000	
Frequency (MHz)				2546.01	257.3	2592.99	2608.71	2640	
100	CP-OFDM PI/2 BPSK	1	1	23.18	22.43	23.31	22.41	23.1	24.00
100		1	136	23.07	22.39	23.19	22.4	23.08	
100		1	272	22.86	22.37	23.08	22.38	22.15	
100		137	1	20.94	22.52	20.41	22.48	20.39	24.00
100		137	68	20.07	22.48	20.39	22.51	19.36	
100		137	136	20.1	22.47	20.26	22.45	19.28	
100		273	0	20.14	22.39	20.1	22.43	19.24	
100	CP-OFDM QPSK	1	1	23.1	22.48	23.23	22.5	23.23	24.00
100		1	136	23	22.28	23.24	22.34	23.01	
100		1	272	22.86	22.15	23.03	22.24	22.82	



100		137	1	23.18	22.22	23.1	22.26	23.01	24.00
100		137	68	23.14	22.14	23.21	22.32	23.04	
100		137	136	23.02	22.17	23.17	22.24	23.05	
100		273	0	22.71	22.14	22.15	22.16	22.05	
100	CP-OFDM 16QAM	1	1	22.85	22.37	23.06	22.34	23.24	24.00
100		1	136	22.9	22.35	23.04	22.32	22.1	
100		1	272	22.93	22.14	22.08	22.16	22.68	
100		137	1	23.2	22.44	23.32	22.45	23.05	24.00
100		137	68	23.16	22.42	23.12	22.44	23.01	
100		137	136	23.1	22.38	23.19	22.4	22.9	
100		273	0	23	22.31	23.02	22.33	22	
100	CP-OFDM 64QAM	1	1	23.01	22.44	23.32	22.42	23.3	24.00
100		1	136	23	22.42	23.3	22.4	23.24	
100		1	271	22.98	22.15	23.14	22.24	23.18	
100		137	1	23.14	22.45	23.3	22.44	23.18	24.00
100		137	68	23.21	22.44	23.23	22.42	23.17	
100		137	136	23.14	22.42	23.1	22.41	23.08	
100		273	0	23.02	22.34	23.04	22.35	22	
100	CP-OFDM 256QAM	1	1	22.83	22.45	23	22.15	23.17	24.00
100		1	136	23.07	22.42	22.05	22.17	23.1	
100		1	272	22.17	22.16	22.14	22.22	23.05	
100		137	1	23.28	22.44	22.4	22.48	23.11	24.00
100		137	68	23.21	22.41	23.3	22.44	23.02	
100		137	136	23.09	22.34	23.21	22.42	23.01	
100		273	0	23.01	22.28	23.16	22.35	22.95	
Channel				507204	514800	518598	522402	529998	Tune-up limit (dBm)
Frequency (MHz)				2536.02	2574	2592.99	2612.01	2649.99	
80	CP-OFDM PI/2 BPSK	1	1	22.38	22.28	22.41	22.26	22.4	24.00
80		1	108	22.37	22.24	22.39	22.25	22.38	
80		1	215	22.14	22.22	20.38	22.23	22.2	
80		109	1	20	22.37	20.51	22.33	19.49	24.00
80		109	54	20.57	22.33	20.01	22.36	19.46	
80		109	108	19.8	22.32	19.47	22.3	19.98	
80		217	0	20.34	22.24	19.4	22.28	19.34	
80	CP-OFDM QPSK	1	1	22.26	22.33	22.53	22.35	22.43	24.00
80		1	108	22.1	22.13	22.34	22.19	22.28	
80		1	215	22.06	22	22.23	22.09	22.12	



80		109	1	22.38	22.07	22.2	22.11	22.21	24.00
80		109	54	22.34	21.99	22.41	22.17	22.24	
80		109	108	22.22	22.02	22.37	22.09	22.18	
80		217	0	22.02	21.99	22.25	22.01	21.91	
80	CP-OFDM 16QAM	1	1	22.05	22.22	22.26	22.19	22.54	24.00
80		1	108	22.06	22.2	22.34	22.17	22.2	
80		1	215	22.03	21.99	22.1	22.01	21.78	
80		109	1	22.37	22.29	22.42	22.3	22.25	24.00
80		109	54	22.36	22.27	22.46	22.29	22.19	
80		109	108	22.3	22.23	22.39	22.25	22.11	
80		217	0	22.2	22.16	22.3	22.18	21.95	
80	CP-OFDM 64QAM	1	1	22.22	22.29	22.42	22.27	22.4	24.00
80		1	108	22.18	22.27	22.4	22.25	22.34	
80		1	215	22.08	22	22.24	22.09	22.28	
80		109	1	22.44	22.3	22.45	22.29	22.28	24.00
80		109	54	22.41	22.29	22.43	22.27	22.27	
80		109	108	22.24	22.27	22.4	22.26	22.18	
80		217	0	22.22	22.19	22.34	22.2	22.1	
80	CP-OFDM 256QAM	1	1	22.03	22.3	22.1	22	22.37	24.00
80		1	108	22.27	22.27	22.15	22.02	22.2	
80		1	215	22.3	22.01	22.04	22.07	22.15	
80		109	1	22.38	22.29	22.3	22.33	22.31	24.00
80		109	54	22.31	22.26	22.48	22.29	22.29	
80		109	108	22.29	22.19	22.41	22.27	22.2	
80		217	0	22.2	22.13	22.34	22.2	22.15	
Channel				505200	514140	518598	523080	531996	Tune-up limit (dBm)
Frequency (MHz)				2526.01	2570.7	2592.99	2615.40	2659.98	
60	CP-OFDM PI/2 BPSK	1	1	21.98	22.08	22.01	22.06	22	24.00
60		1	81	21.97	22.04	21.99	22.05	21.98	
60		1	160	21.96	22.02	21.98	22.03	21.85	
60		81	1	22.04	22.17	22.11	22.13	21.09	24.00
60		81	40	22.07	22.13	22.09	22.16	20.06	
60		81	81	21	22.12	20.07	22.1	20.28	
60		162	0	21.94	22.04	20	22.08	20.04	
60	CP-OFDM QPSK	1	1	21.86	22.13	22.13	22.15	22.03	23.18
60		1	81	21.7	21.93	21.94	21.99	21.88	
60		1	160	21.66	21.8	21.83	21.89	21.72	



60		81	1	21.98	21.87	21.8	21.91	21.81	24.00
60		81	40	21.94	21.79	22.01	21.97	21.84	
60		81	81	21.82	21.82	21.97	21.89	21.78	
60		162	0	21.71	21.79	21.85	21.81	21.75	
60	CP-OFDM 16QAM	1	1	21.75	22.02	21.96	21.99	22.34	24.00
60		1	81	21.7	22	21.94	21.97	21.8	
60		1	160	21.63	21.79	21.78	21.81	21.38	
60		81	1	21.97	22.09	22.02	22.1	21.85	24.00
60		81	40	21.96	22.07	22.06	22.09	21.79	
60		81	81	21.9	22.03	21.99	22.05	21.71	
60		162	0	21.8	21.96	21.9	21.98	21.7	
60	CP-OFDM 64QAM	1	1	21.98	22.09	22.02	22.07	22	24.00
60		1	81	21.9	22.07	22	22.05	21.94	
60		1	160	21.68	21.8	21.84	21.89	21.88	
60		81	1	22.04	22.1	22.05	22.09	21.88	24.00
60		81	40	22.01	22.09	22.03	22.07	21.87	
60		81	81	21.94	22.07	22	22.06	21.78	
60		162	0	21.82	21.99	21.94	22	21.7	
60	CP-OFDM 256QAM	1	1	21.73	22.1	21.7	21.8	21.97	24.00
60		1	81	21.97	22.07	21.75	21.82	21.8	
60		1	160	21.9	21.81	21.81	21.87	21.75	
60		81	1	21.98	22.09	21.92	22.13	21.91	24.00
60		81	40	21.91	22.06	22.08	22.09	21.89	
60		81	81	21.89	21.99	22.01	22.07	21.8	
60		162	0	21.8	21.93	21.94	22	21.75	
Channel				503202	510900	518598	526302	534000	Tune-up limit (dBm)
Frequency (MHz)				2516.01	2554.55	2592.99	2631.55	2670	
40	CP-OFDM PI/2 BPSK	1	1	21.68	22.11	21.71	22.09	21.7	24.00
40		1	53	21.67	22.07	21.69	22.08	21.68	
40		1	104	21.46	22.05	21.58	22.06	21.45	
40		53	1	20.74	22.2	20.81	22.16	21.01	24.00
40		53	26	20.77	22.16	21.01	22.19	20.43	
40		53	52	20.11	22.15	20.01	22.13	20.19	
40		106	0	19.94	22.07	20.44	22.11	19.84	
40	CP-OFDM QPSK	1	1	21.56	22.16	21.83	22.18	21.73	24.00
40		1	53	21.4	21.96	21.64	22.02	21.58	
40		1	104	21.36	21.83	21.53	21.92	21.42	



40		53	1	21.68	21.9	21.5	21.94	21.51	24.00
40		53	26	21.64	21.82	21.71	22	21.54	
40		53	52	21.52	21.85	21.67	21.92	21.48	
40		106	0	21.21	21.82	21.45	21.84	21.25	
40	CP-OFDM 16QAM	1	1	21.45	22.05	21.56	22.02	21.84	24.00
40		1	53	21.4	22.03	21.64	22	21.5	
40		1	104	21.33	21.82	21.38	21.84	21.08	
40		53	1	21.67	22.12	21.72	22.13	21.55	24.00
40		53	26	21.66	22.1	21.76	22.12	21.49	
40		53	52	21.6	22.06	21.69	22.08	21.41	
40		106	0	21.5	21.99	21.6	22.01	21.2	
40	CP-OFDM 64QAM	1	1	21.68	22.12	21.72	22.1	21.7	24.00
40		1	53	21.5	22.1	21.7	22.08	21.64	
40		1	104	21.38	21.83	21.54	21.92	21.58	
40		53	1	21.74	22.13	21.75	22.12	21.58	24.00
40		53	26	21.71	22.12	21.73	22.1	21.57	
40		53	52	21.64	22.1	21.7	22.09	21.48	
40		106	0	21.52	22.02	21.64	22.03	21.4	
40	CP-OFDM 256QAM	1	1	21.33	22.13	21.4	21.83	21.67	24.00
40		1	53	21.47	22.1	21.45	21.85	21.5	
40		1	104	21.6	21.84	21.34	21.9	21.45	
40		53	1	21.68	22.12	21.5	22.16	21.61	24.00
40		53	26	21.61	22.09	21.78	22.12	21.59	
40		53	52	21.59	22.02	21.71	22.1	21.5	
40		106	0	21.5	21.96	21.64	22.03	21.45	
Channel				501204	509898	518598	527298	535998	Tune-up limit (dBm)
Frequency (MHz)				2506.02	2549.49	2592.99	2636.49	2679.99	
20	CP-OFDM PI/2 BPSK	1	1	21.38	22.02	21.41	22	21.4	24.00
20		1	25	21.27	21.98	21.39	21.99	21.38	
20		1	49	21.16	21.96	21.38	21.97	21.2	
20		25	1	21.1	22.11	21.21	22.07	21.09	24.00
20		25	12	20.07	22.07	21.39	22.1	20.01	
20		25	24	20.1	22.06	20.8	22.04	20.28	
20		51	0	20.01	21.98	20.32	22.02	19.89	
20	CP-OFDM QPSK	1	1	21.26	22.07	21.53	22.09	21.43	24.00
20		1	25	21.1	21.87	21.34	21.93	21.28	
20		1	49	21.06	21.74	21.23	21.83	21.12	



20		25	1	21.38	21.81	21.2	21.85	21.21	24.00
20		25	12	21.34	21.73	21.41	21.91	21.24	
20		25	24	21.22	21.76	21.37	21.83	21.18	
20		51	0	21.01	21.73	21.09	21.75	20.91	
20	CP-OFDM 16QAM	1	1	21.03	21.96	21.33	21.93	21.56	24.00
20		1	25	21.05	21.94	21.34	21.91	21.3	
20		1	49	21.03	21.73	21.1	21.75	20.88	
20		25	1	21.37	22.03	21.42	22.04	21.25	24.00
20		25	12	21.36	22.01	21.46	22.03	21.19	
20		25	24	21.3	21.97	21.39	21.99	21.11	
20		51	0	21.2	21.9	21.3	21.92	20.98	
20	CP-OFDM 64QAM	1	1	21.38	22.03	21.42	22.01	21.4	24.00
20		1	25	21.3	22.01	21.4	21.99	21.34	
20		1	49	21.08	21.74	21.24	21.83	21.28	
20		25	1	21.44	22.04	21.45	22.03	21.28	24.00
20		25	12	21.41	22.03	21.43	22.01	21.27	
20		25	24	21.34	22.01	21.4	22	21.18	
20		51	0	21.22	21.93	21.34	21.94	21.1	
20	CP-OFDM 256QAM	1	1	21.01	22.04	21.1	21.74	21.37	24.00
20		1	25	21.3	22.01	21.15	21.76	21.2	
20		1	49	21.3	21.75	21.06	21.81	21.15	
20		25	1	21.38	22.03	21.22	22.07	21.31	24.00
20		25	121	21.31	22	21.48	22.03	21.29	
20		25	25	21.29	21.93	21.41	22.01	21.2	
20		51	0	21.2	21.87	21.34	21.94	21.15	


➤ **WLAN Conducted Power**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN CH 0	802.11b 1Mbps	CH 1	2412	12.31	12.50	100.00
		CH 6	2437	12.35	12.50	
		CH 11	2462	11.61	12.00	
	802.11g 6Mbps	CH 1	2412	11.20	11.50	100.00
		CH 6	2437	11.24	11.50	
		CH 11	2462	11.21	11.50	
	802.11n-HT20 MCS0	CH 1	2412	9.82	10.50	100.00
		CH 6	2437	9.98	10.50	
		CH 11	2462	9.76	10.50	
	802.11ax-HEW20 MCS0(RU242)	CH 1	2412	10.17	10.50	100.00
		CH 6	2437	10.28	10.50	
		CH 11	2462	10.12	10.50	
	802.11ax-HEW20 MCS0(RU26)	CH 1	2412	9.51	10.00	100.00
		CH 6	2437	9.31	10.00	
		CH 11	2462	9.42	10.00	
	802.11ax-HEW20 MCS0(RU52)	CH 1	2412	9.12	10.00	100.00
		CH 6	2437	9.21	10.00	
		CH 11	2462	9.13	10.00	
	802.11ax-HEW20 MCS0(RU106)	CH 1	2412	8.79	9.00	100.00
		CH 6	2437	8.83	9.00	
		CH 11	2462	8.64	9.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN CH 1	802.11b 1Mbps	CH 1	2412	16.69	17.50	100.00
		CH 6	2437	16.91	17.50	
		CH 11	2462	16.82	17.50	
	802.11g 6Mbps	CH 1	2412	16.31	17.00	100.00
		CH 6	2437	16.38	17.00	
		CH 11	2462	16.34	17.00	
	802.11n-HT20 MCS0	CH 1	2412	15.10	16.00	100.00
		CH 6	2437	15.05	16.00	



	802.11ax-HEW20 MCS0(RU242)	CH 11	2462	15.33	16.00	100.00
		CH 1	2412	15.25	16.00	
		CH 6	2437	15.34	16.00	
	802.11ax-HEW20 MCS0(RU26)	CH 11	2462	15.44	16.00	100.00
		CH 1	2422	13.21	14.00	
		CH 6	2437	13.15	14.00	
	802.11ax-HEW20 MCS0(RU52)	CH 11	2452	13.26	14.00	100.00
		CH 1	2412	11.21	12.00	
		CH 6	2437	11.22	12.00	
	802.11ax-HEW20 MCS0(RU106)	CH 11	2462	11.30	12.00	100.00
		CH 1	2412	9.74	10.00	
		CH 6	2437	9.62	10.00	
		CH 11	2462	9.55	10.00	100.00

2.4GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 1	2412	16.23	17.00
		CH 6	2437	16.23	17.00
		CH 11	2462	16.43	17.00
	802.11ax-HEW20 MCS0(RU242)	CH 1	2412	16.43	17.00
		CH 6	2437	16.53	17.00
		CH 11	2462	16.53	17.00
	802.11ax-HEW20 MCS0(RU26)	CH 1	2422	14.77	15.00
		CH 6	2437	14.62	15.00
		CH 11	2452	14.77	15.00
	802.11ax-HEW20 MCS0(RU52)	CH 1	2412	13.22	14.00
		CH 6	2437	13.42	14.00
		CH 11	2462	13.42	14.00
	802.11ax-HEW20 MCS0(RU106)	CH 1	2412	12.30	13.00
		CH 6	2437	12.30	13.00
		CH 11	2462	12.04	13.00



5.2GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 36	5180	12.20	12.50	100.00
		CH 44	5220	12.15	12.50	
		CH 48	5240	12.96	13.50	
	802.11n-HT20 MCS0	CH 36	5180	12.32	12.50	100.00
		CH 44	5220	12.25	12.50	
		CH 48	5240	12.13	12.50	
	802.11n-HT40 MCS0	CH 38	5190	12.20	12.50	100.00
		CH 46	5230	12.14	12.50	
	802.11ac-VHT20 MCS0	CH 36	5180	10.98	11.50	100.00
		CH 44	5220	10.88	11.50	
		CH 48	5240	10.79	11.50	
	802.11ac-VHT40 MCS0	CH 38	5190	10.85	11.50	100.00
		CH 46	5230	10.87	11.50	
	802.11ac-VHT80 MCS0	CH 42	5210	10.81	11.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 36	5180	11.15	11.50	100.00
		CH 44	5220	11.21	11.50	
		CH 48	5240	11.18	11.50	
	802.11ax-HEW20 MCS0(RU26)	CH 36	5180	8.39	9.00	100.00
		CH 44	5220	8.29	9.00	
		CH 48	5240	8.42	9.00	
	802.11ax-HEW20 MCS0(RU52)	CH 36	5180	8.22	9.00	100.00
		CH 44	5220	8.54	9.00	
		CH 48	5240	8.46	9.00	
	802.11ax-HEW20 MCS0(RU106)	CH 36	5180	8.06	9.00	100.00
		CH 44	5220	8.29	9.00	
		CH 48	5240	8.39	9.00	
	802.11ax-HEW40 MCS0(RU242)	CH 38	5190	10.92	11.50	100.00
		CH 46	5230	10.85	11.50	
	802.11ax-HEW80 MCS0(RU242)	CH 42	5210	10.93	11.50	100.00



5.2GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 36	5180	12.92	13.50	100.00
		CH 44	5220	12.96	13.50	
		CH 48	5240	12.95	13.50	
	802.11n-HT20 MCS0	CH 36	5180	12.87	13.50	100.00
		CH 44	5220	12.95	13.50	
		CH 48	5240	12.86	13.50	
	802.11n-HT40 MCS0	CH 38	5190	12.93	13.50	100.00
		CH 46	5230	12.33	12.50	
	802.11ac-VHT20 MCS0	CH 36	5180	10.20	10.50	100.00
		CH 44	5220	10.01	10.50	
		CH 48	5240	10.00	10.50	
	802.11ac-VHT40 MCS0	CH 38	5190	10.23	10.50	100.00
		CH 46	5230	10.02	10.50	
	802.11ac-VHT80 MCS0	CH 42	5210	10.03	10.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 36	5180	9.18	9.50	100.00
		CH 44	5220	8.87	9.50	
		CH 48	5240	8.81	9.50	
	802.11ax-HEW20 MCS0(RU26)	CH 36	5180	10.31	10.50	100.00
		CH 44	5220	10.28	10.50	
		CH 48	5240	10.13	10.50	
	802.11ax-HEW20 MCS0(RU52)	CH 36	5180	8.09	8.50	100.00
		CH 44	5220	8.30	8.50	
		CH 48	5240	8.36	8.50	
	802.11ax-HEW20 MCS0(RU106)	CH 36	5180	7.99	8.50	100.00
		CH 44	5220	7.86	8.50	
		CH 48	5240	8.27	8.50	
	802.11ax-HEW40 MCS0(RU242)	CH 38	5190	10.15	10.50	100.00
		CH 46	5230	10.25	10.50	
	802.11ax-HEW80 MCS0(RU242)	CH 42	5210	10.06	10.50	100.00



5.2GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 36	5180	15.56	16.00
		CH 44	5220	15.68	16.00
		CH 48	5240	15.56	16.00
	802.11n-HT40 MCS0	CH 38	5190	15.56	16.00
		CH 46	5230	15.19	16.00
	802.11ac-VHT20 MCS0	CH 36	5180	13.62	14.00
		CH 44	5220	13.42	14.00
		CH 48	5240	13.42	14.00
	802.11ac-VHT40 MCS0	CH 38	5190	13.62	14.00
		CH 46	5230	13.42	14.00
	802.11ac-VHT80 MCS0	CH 42	5210	13.42	14.00
	802.11ax-HEW 20MCS0(RU242)	CH 36	5180	13.22	14.00
		CH 44	5220	13.22	14.00
		CH 48	5240	13.22	14.00
	802.11ax-HEW 20 MCS0(RU26)	CH 36	5180	12.55	13.00
		CH 44	5220	12.30	13.00
		CH 48	5240	12.30	13.00
	802.11ax-HEW 20 MCS0(RU52)	CH 36	5180	11.14	12.00
		CH 44	5220	11.46	12.00
		CH 48	5240	11.46	12.00
	802.11ax-HEW 20MCS0(RU106)	CH 36	5180	11.14	12.00
		CH 44	5220	11.14	12.00
		CH 48	5240	11.46	12.00
	802.11ax-HEW 40 MCS0	CH 38	5190	13.62	14.00
		CH 46	5230	13.62	14.00
	802.11ax-HEW 80 MCS0	CH 42	5210	13.62	14.00



5.3GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 52	5260	10.26	11.00	100.00
		CH 60	5300	10.35	11.00	
		CH 64	5320	10.37	11.00	
	802.11n-HT20 MCS0	CH 52	5260	10.12	10.50	100.00
		CH 60	5300	10.23	10.50	
		CH 64	5320	10.18	10.50	
	802.11n-HT40 MCS0	CH 54	5270	10.14	10.50	100.00
		CH 62	5310	10.11	10.50	
	802.11ac-VHT20 MCS0	CH 52	5260	7.96	8.50	100.00
		CH 60	5300	8.02	8.50	
		CH 64	5320	8.09	8.50	
	802.11ac-VHT40 MCS0	CH 54	5270	8.08	8.50	100.00
		CH 62	5310	8.12	8.50	
	802.11ac-VHT80 MCS0	CH 58	5290	8.01	8.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 52	5260	8.01	8.50	100.00
		CH 60	5300	7.97	8.50	
		CH 64	5320	7.96	8.50	
	802.11ax-HEW20 MCS0(RU26)	CH 52	5260	9.33	10.00	100.00
		CH 60	5300	9.38	10.00	
		CH 64	5320	9.24	10.00	
	802.11ax-HEW20 MCS0(RU52)	CH 52	5260	9.28	10.00	100.00
		CH 60	5300	9.30	10.00	
		CH 64	5320	9.21	10.00	
	802.11ax-HEW20 MCS0(RU106)	CH 52	5260	9.30	10.00	100.00
		CH 60	5300	9.54	10.00	
		CH 64	5320	9.31	10.00	
	802.11ax-HEW40 MCS0(RU242)	CH 54	5270	7.97	8.50	100.00
		CH 62	5310	7.99	8.50	
	802.11ax-HEW80 MCS0(RU242)	CH 58	5290	8.14	8.50	100.00



5.3GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 52	5260	13.26	13.50	100.00
		CH 60	5300	14.20	14.50	
		CH 64	5320	13.96	14.50	
	802.11n-HT20 MCS0	CH 52	5260	13.32	13.50	100.00
		CH 60	5300	13.51	14.00	
		CH 64	5320	13.34	14.00	
	802.11n-HT40 MCS0	CH 54	5270	13.24	13.50	100.00
		CH 62	5310	12.97	13.50	
	802.11ac-VHT20 MCS0	CH 52	5260	10.64	11.00	100.00
		CH 60	5300	10.63	11.00	
		CH 64	5320	10.62	11.00	
	802.11ac-VHT40 MCS0	CH 54	5270	10.68	11.00	100.00
		CH 62	5310	10.62	11.00	
	802.11ac-VHT80 MCS0	CH 58	5290	10.62	11.00	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 52	5260	10.80	11.00	100.00
		CH 60	5300	10.63	11.00	
		CH 64	5320	10.37	11.00	
	802.11ax-HEW20 MCS0(RU26)	CH 52	5260	9.13	9.50	100.00
		CH 60	5300	9.20	9.50	
		CH 64	5320	9.11	9.50	
	802.11ax-HEW20 MCS0(RU52)	CH 52	5260	9.08	9.50	100.00
		CH 60	5300	9.16	9.50	
		CH 64	5320	9.04	9.50	
	802.11ax-HEW20 MCS0(RU106)	CH 52	5260	9.21	9.50	100.00
		CH 60	5300	9.24	9.50	
		CH 64	5320	9.05	9.50	
	802.11ax-HEW40 MCS0(RU242)	CH 54	5270	10.62	11.00	100.00
		CH 62	5310	12.42	13.00	
	802.11ax-HEW80 MCS0(RU242)	CH 58	5290	10.85	11.00	100.00



5.3GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 52	5260	15.05	16.00
		CH 60	5300	15.19	16.00
		CH 64	5320	15.05	16.00
	802.11n-HT40 MCS0	CH 54	5270	14.91	15.50
		CH 62	5310	14.77	15.50
	802.11ac-VHT20 MCS0	CH 52	5260	12.55	13.00
		CH 60	5300	12.55	13.00
		CH 64	5320	12.55	13.00
	802.11ac-VHT40 MCS0	CH 54	5270	12.55	13.00
		CH 62	5310	12.55	13.00
	802.11ac-VHT80 MCS0	CH 58	5290	12.55	13.00
	802.11ax-HEW20 MCS0(RU242)	CH 52	5260	12.55	13.00
		CH 60	5300	12.55	13.00
		CH 64	5320	12.30	13.00
	802.11ax-HEW20 MCS0(RU26)	CH 52	5260	12.30	13.00
		CH 60	5300	12.30	13.00
		CH 64	5320	12.30	13.00
	802.11ax-HEW20 MCS0(RU52)	CH 52	5260	12.30	13.00
		CH 60	5300	12.30	13.00
		CH 64	5320	12.04	13.00
	802.11ax-HEW20 MCS0(RU106)	CH 52	5260	12.30	13.00
		CH 60	5300	12.30	13.00
		CH 64	5320	12.30	13.00
	802.11ax-HEW40 MCS0(RU242)	CH 54	5270	12.55	13.00
		CH 62	5310	13.80	14.00
	802.11ax-HEW80 MCS0(RU242)	CH 58	5290	12.79	13.00



5.5GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 100	5500	10.37	10.50	100.00
		CH 120	5600	10.28	10.50	
		CH 144	5720	10.28	10.50	
	802.11n-HT20 MCS0	CH 100	5500	10.16	10.50	100.00
		CH 120	5600	10.19	10.50	
		CH 144	5720	10.26	10.50	
	802.11n-HT40 MCS0	CH 102	5510	10.15	10.50	100.00
		CH 126	5630	10.19	10.50	
		CH 142	5710	10.13	10.50	
	802.11ac-VHT20 MCS0	CH 100	5500	7.92	8.50	100.00
		CH 120	5600	8.01	8.50	
		CH 144	5720	7.86	8.50	
	802.11ac-VHT40 MCS0	CH 102	5510	8.02	8.50	100.00
		CH 126	5630	8.11	8.50	
		CH 142	5710	8.03	8.50	
	802.11ac-VHT80 MCS0	CH 106	5530	8.05	8.50	100.00
		CH 122	5610	7.54	8.00	
		CH 138	5690	7.72	8.00	
	802.11ax-HEW20 MCS0(RU242)	CH 100	5500	8.06	8.50	100.00
		CH 120	5600	8.08	8.50	
		CH 144	5720	7.99	8.50	
	802.11ax-HEW20 MCS0(RU26)	CH 100	5500	9.46	10.00	100.00
		CH 120	5600	9.52	10.00	
		CH 144	5720	9.57	10.00	
	802.11ax-HEW20 MCS0(RU52)	CH 100	5500	9.42	10.00	100.00
		CH 120	5600	9.47	10.00	
		CH 144	5720	9.58	10.00	
	802.11ax-HEW20 MCS0(RU106)	CH 100	5500	9.39	10.00	100.00
		CH 120	5600	9.16	9.50	
		CH 144	5720	9.08	9.50	
	802.11ax-HEW40 MCS0(RU242)	CH 102	5510	8.01	8.50	100.00
		CH 126	5630	8.06	8.50	
		CH 142	5710	8.07	8.50	
	802.11ax-HEW80	CH 106	5530	8.11	8.50	100.00



	MCS0(RU242)	CH 122	5610	8.09	8.50	
		CH 138	5690	8.13	8.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN CH 1	802.11a 6Mbps	CH 100	5500	15.30	15.50	100.00
		CH 120	5600	15.23	15.50	
		CH 144	5720	15.15	15.50	
	802.11n-HT20 MCS0	CH 100	5500	13.29	13.50	100.00
		CH 120	5600	13.15	13.50	
		CH 144	5720	13.09	13.50	
	802.11n-HT40 MCS0	CH 102	5510	15.08	15.50	100.00
		CH 126	5630	15.01	15.50	
		CH 142	5710	15.06	15.50	
	802.11ac-VHT20 MCS0	CH 100	5500	12.97	13.50	100.00
		CH 120	5600	12.77	13.50	
		CH 144	5720	11.16	11.50	
	802.11ac-VHT40 MCS0	CH 102	5510	12.98	13.50	100.00
		CH 126	5630	12.88	13.50	
		CH 142	5710	12.75	13.50	
	802.11ac-VHT80 MCS0	CH 106	5530	12.88	13.50	100.00
		CH 122	5610	12.45	13.00	
		CH 138	5690	12.33	13.00	
	802.11ax-HEW20 MCS0(RU242)	CH 100	5500	13.05	13.50	100.00
		CH 120	5600	12.57	13.00	
		CH 144	5720	11.85	12.00	
	802.11ax-HEW20 MCS0(RU26)	CH 100	5500	9.27	9.50	100.00
		CH 120	5600	9.36	9.50	
		CH 144	5720	9.14	9.50	
	802.11ax-HEW20 MCS0(RU52)	CH 100	5500	9.15	9.50	100.00
		CH 120	5600	9.17	9.50	
		CH 144	5720	9.29	9.50	
	802.11ax-HEW20 MCS0(RU106)	CH 100	5500	6.06	6.50	100.00
		CH 120	5600	6.06	6.50	
		CH 144	5720	6.15	6.50	
	802.11ax-HEW40	CH 102	5510	12.90	13.50	100.00



	MCS0(RU242)	CH 126	5630	11.42	12.00	100.00
		CH 142	5710	10.72	11.00	
	802.11ax-HEW80 MCS0(RU242)	CH 106	5530	12.94	13.00	
		CH 122	5610	11.32	12.00	
		CH 138	5690	10.85	11.00	

5.5GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 100	5500	15.05	15.50
		CH 120	5600	14.91	15.50
		CH 144	5720	14.91	15.50
	802.11n-HT40 MCS0	CH 102	5510	16.33	17.00
		CH 126	5630	16.23	17.00
		CH 142	5710	16.23	17.00
	802.11ac-VHT20 MCS0	CH 100	5500	14.15	14.50
		CH 120	5600	13.98	14.50
		CH 144	5720	12.79	13.00
	802.11ac-VHT40 MCS0	CH 102	5510	14.15	14.50
		CH 126	5630	14.15	14.50
		CH 142	5710	13.98	14.50
	802.11ac-VHT80 MCS0	CH 106	5530	14.15	14.50
		CH 122	5610	13.62	14.00
		CH 138	5690	13.62	14.00
	802.11ax-HEW2 0 MCS0(RU242)	CH 100	5500	14.31	15.00
		CH 120	5600	13.80	14.50
		CH 144	5720	13.42	14.00
	802.11ax-HEW2 0 MCS0(RU26)	CH 100	5500	12.30	13.00
		CH 120	5600	12.55	13.00
		CH 144	5720	12.30	13.00
	802.11ax-HEW2 0 MCS0(RU52)	CH 100	5500	12.30	13.00
		CH 120	5600	12.30	13.00
		CH 144	5720	12.55	13.00
	802.11ax-HEW2 0 MCS0(RU106)	CH 100	5500	11.14	11.50
		CH 120	5600	10.79	11.00
		CH 144	5720	10.79	11.00
	802.11ax-HEW4	CH 102	5510	14.15	14.50



	0 MCS0(RU242)	CH 126	5630	13.01	13.50
		CH 142	5710	12.55	13.00
	802.11ax-HEW8 0 MCS0(RU242)	CH 106	5530	14.15	14.50
		CH 122	5610	13.01	13.50
		CH 138	5690	12.79	13.00

5.8GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	CH 149	5745	10.25	10.50	100.00
		CH 157	5785	10.23	10.50	
		CH 165	5825	10.16	10.50	
	802.11n-HT20 MCS0	CH 149	5745	10.16	10.50	100.00
		CH 157	5785	10.14	10.50	
		CH 165	5825	10.17	10.50	
	802.11n-HT40 MCS0	CH 151	5755	10.11	10.50	100.00
		CH 159	5795	10.12	10.50	
	802.11ac-VHT20 MCS0	CH 149	5745	7.88	8.00	100.00
		CH 157	5785	7.85	8.00	
		CH 165	5825	8.05	8.50	
	802.11ac-VHT40 MCS0	CH 151	5755	8.04	8.50	100.00
		CH 159	5795	8.15	8.50	
	802.11ac-VHT80 MCS0	CH 155	5775	10.03	10.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 149	5745	10.05	10.50	100.00
		CH 157	5785	10.08	10.50	
		CH 165	5825	10.06	10.50	
	802.11ax-HEW20 MCS0(RU26)	CH 149	5745	7.94	8.50	100.00
		CH 157	5785	8.30	8.50	
		CH 165	5825	8.39	8.50	
	802.11ax-HEW20 MCS0(RU52)	CH 149	5745	8.07	8.50	100.00
		CH 157	5785	8.30	8.50	
		CH 165	5825	8.20	8.50	
	802.11ax-HEW20 MCS0(RU106)	CH 149	5745	7.89	8.50	100.00
		CH 157	5785	7.96	8.50	
		CH 165	5825	8.04	8.50	
	802.11ax-HEW40	CH 151	5755	10.05	10.50	100.00



	MCS0(RU242)	CH 159	5795	10.09	10.50	
	802.11ax-HEW80 MCS0(RU242)	CH 155	5775	10.03	10.50	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN CH 1	802.11a MCS0	CH 149	5745	12.28	13.00	100.00
		CH 157	5785	12.38	13.00	
		CH 165	5825	12.24	13.00	
	802.11n-HT20 MCS0	CH 149	5745	12.17	12.50	100.00
		CH 157	5785	12.19	12.50	
		CH 165	5825	12.05	12.50	
	802.11n-HT40 MCS0	CH 151	5755	10.41	11.00	100.00
		CH 159	5795	9.44	10.00	
	802.11ac-VHT20 MCS0	CH 149	5745	9.31	10.00	100.00
		CH 157	5785	9.20	10.00	
		CH 165	5825	9.35	10.00	
	802.11ac-VHT40 MCS0	CH 151	5755	8.94	9.50	100.00
		CH 159	5795	8.62	9.50	
	802.11ac-VHT80 MCS0	CH 155	5775	9.12	9.50	100.00
	802.11ax-HEW2 0 MCS0(RU242)	CH 149	5745	9.12	10.00	100.00
		CH 157	5785	8.71	9.50	
		CH 165	5825	9.06	9.50	
	802.11ax-HEW2 0 MCS0(RU26)	CH 149	5745	6.24	6.50	100.00
		CH 157	5785	6.09	6.50	
		CH 165	5825	6.15	6.50	
	802.11ax-HEW2 0 MCS0(RU52)	CH 149	5745	6.11	6.50	100.00
		CH 157	5785	6.16	6.50	
		CH 165	5825	6.14	6.50	
	802.11ax-HEW2 0 MCS0(RU106)	CH 149	5745	6.19	6.50	100.00
		CH 157	5785	6.39	6.50	
		CH 165	5825	6.50	7.00	
	802.11ax-HEW4 0 MCS0(RU242)	CH 151	5755	8.94	9.50	100.00
		CH 159	5795	8.67	9.50	
	802.11ax-HEW8	CH 155	5775	9.33	9.50	100.00



	0 MCS0(RU242)					
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5.8GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 149	5745	14.31	15.00
		CH 157	5785	14.31	15.00
		CH 165	5825	14.15	15.00
	802.11n-HT40 MCS0	CH 151	5755	13.22	14.00
		CH 159	5795	12.79	13.00
	802.11ac-VHT20 MCS0	CH 149	5745	11.76	12.00
		CH 157	5785	11.46	12.00
		CH 165	5825	11.76	12.00
	802.11ac-VHT40 MCS0	CH 151	5755	11.46	12.00
		CH 159	5795	11.46	12.00
	802.11ac-VHT80 MCS0	CH 155	5775	12.50	13.00
	802.11ax-HEW2 0 MCS0(RU242)	CH 149	5745	12.55	13.00
		CH 157	5785	12.55	13.00
		CH 165	5825	12.55	13.00
	802.11ax-HEW2 0 MCS0(RU26)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	11.00
		CH 165	5825	10.41	11.00
	802.11ax-HEW2 0 MCS0(RU52)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	11.00
		CH 165	5825	10.41	11.00
	802.11ax-HEW2 0 MCS0(RU106)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	11.00
		CH 165	5825	10.41	11.00
	802.11ax-HEW4 0 MCS0(RU242)	CH 151	5755	12.55	13.00
		CH 159	5795	12.55	13.00
	802.11ax-HEW8 0 MCS0(RU242)	CH 155	5775	12.79	13.00

➤ **Bluetooth Conducted Power**

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	15.10	11.09	11.06
	CH 39	2441	17.24	13.27	13.58
	CH 78	2480	14.54	10.59	10.50
Tune-up Limit (dBm)			18.00	14.00	14.00
Duty Cycle %			76.80	77.20	77.20

Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	5.25	2.19
	CH 19	2440	6.01	3.50
	CH 39	2480	4.89	2.27
Tune-up Limit (dBm)			6.50	4.00
Duty Cycle %			62.68	62.02



13.2. Reduced Power

➤ GSM Conducted Power

GSM850	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	128	189	251	Limit	128	189	251	Limit
Frequency (MHz)	824.2	836.4	848.8	(dBm)	824.2	836.4	848.8	(dBm)
GSM 1 Tx slot	25.66	25.20	25.60	26.00	16.66	16.20	16.60	17.00
GPRS 1 Tx slot	25.36	25.02	25.33	26.00	16.36	16.02	16.33	17.00
GPRS 2 Tx slots	24.27	24.30	24.13	25.00	18.27	18.30	18.13	19.00
GPRS 3 Tx slots	22.72	22.75	22.74	23.00	18.46	18.49	18.48	18.74
GPRS 4 Tx slots	20.65	20.64	20.61	21.00	17.65	17.64	17.61	18.00
EDGE 1 Tx slot	19.75	19.66	19.73	20.50	10.75	10.66	10.73	11.50
EDGE 2 Tx slots	18.44	18.47	18.63	19.00	12.44	12.47	12.63	13.00
EDGE 3 Tx slots	16.71	16.61	16.48	17.00	12.45	12.35	12.22	12.74
EDGE 4 Tx slots	15.55	15.38	15.47	16.00	12.55	12.38	12.47	13.00

GSM1900	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	512	661	810	Limit	512	661	810	Limit
Frequency (MHz)	1850.2	1880	1909.8	(dBm)	1850.2	1880	1909.8	(dBm)
GSM 1 Tx slot	23.87	23.81	23.76	24.50	14.87	14.81	14.76	15.50
GPRS 1 Tx slot	23.31	23.30	23.21	24.00	14.31	14.30	14.21	15.00
GPRS 2 Tx slots	22.17	22.25	22.13	23.50	16.17	16.25	16.13	17.50
GPRS 3 Tx slots	19.82	17.34	19.98	20.50	15.56	13.08	15.72	16.24
GPRS 4 Tx slots	20.26	18.54	20.25	20.50	17.26	15.54	17.25	17.50
EDGE 1 Tx slot	21.78	21.60	22.42	22.50	12.78	12.60	13.42	13.50
EDGE 2 Tx slots	20.63	20.22	21.10	21.50	14.63	14.22	15.10	15.50
EDGE 3 Tx slots	18.36	17.86	18.50	19.00	14.10	13.60	14.24	14.74
EDGE 4 Tx slots	16.50	16.32	16.01	17.00	13.50	13.32	13.01	14.00

**➤ WCDMA Conducted Power**

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	RMC 12.2Kbps	15.85	15.88	15.86	16.50
3GPP Rel 6	HSDPA Subtest-1	14.62	14.72	14.65	15.50
3GPP Rel 6	HSDPA Subtest-2	14.66	14.71	14.67	15.50
3GPP Rel 6	HSDPA Subtest-3	14.10	14.20	14.07	15.00
3GPP Rel 6	HSDPA Subtest-4	14.09	14.14	14.10	15.00
3GPP Rel 8	DC-HSDPA Subtest-1	14.96	15.04	15.00	15.50
3GPP Rel 8	DC-HSDPA Subtest-2	14.95	14.80	14.98	15.50
3GPP Rel 8	DC-HSDPA Subtest-3	14.49	14.51	14.49	15.00
3GPP Rel 8	DC-HSDPA Subtest-4	14.43	14.55	14.47	15.00
3GPP Rel 6	HSUPA Subtest-1	14.69	14.75	14.73	15.50
3GPP Rel 6	HSUPA Subtest-2	14.13	14.25	14.03	15.50
3GPP Rel 6	HSUPA Subtest-3	14.67	14.74	14.73	15.50
3GPP Rel 6	HSUPA Subtest-4	14.66	14.69	14.61	15.50
3GPP Rel 6	HSUPA Subtest-5	14.58	14.64	14.62	15.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	14.71	14.68	14.69	15.50

Band		WCDMA Band IV			Tune-up Limit (dBm)
TX Channel		1312	1413	1513	
Rx Channel		1537	1638	1738	
Frequency (MHz)		1712.4	1732.6	1752.6	
3GPP Rel 99	RMC 12.2Kbps	15.33	15.34	15.30	16.00
3GPP Rel 6	HSDPA Subtest-1	14.05	14.13	14.13	15.00
3GPP Rel 6	HSDPA Subtest-2	13.99	14.16	14.18	15.00
3GPP Rel 6	HSDPA Subtest-3	13.47	13.70	13.62	14.50
3GPP Rel 6	HSDPA Subtest-4	13.53	13.66	13.56	14.50
3GPP Rel 8	DC-HSDPA Subtest-1	14.46	14.50	14.38	15.50
3GPP Rel 8	DC-HSDPA Subtest-2	14.42	13.46	13.41	15.50
3GPP Rel 8	DC-HSDPA Subtest-3	13.96	13.98	13.92	15.00
3GPP Rel 8	DC-HSDPA Subtest-4	13.94	13.94	13.85	15.00
3GPP Rel 6	HSUPA Subtest-1	14.11	14.11	14.22	15.00
3GPP Rel 6	HSUPA Subtest-2	13.55	13.72	13.56	14.00
3GPP Rel 6	HSUPA Subtest-3	14.01	14.16	14.23	15.00



3GPP Rel 6	HSUPA Subtest-4	14.08	14.16	14.16	15.00
3GPP Rel 6	HSUPA Subtest-5	14.06	14.22	14.13	15.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	14.13	14.16	14.24	15.00

Band		WCDMA Band V			Tune-up Limit (dBm)
TX Channel		4132	4182	4233	
Rx Channel		4357	4408	4458	
Frequency (MHz)		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	18.14	18.27	18.16	19.00
3GPP Rel 6	HSDPA Subtest-1	18.07	18.12	17.66	18.50
3GPP Rel 6	HSDPA Subtest-2	18.12	18.04	17.59	18.50
3GPP Rel 6	HSDPA Subtest-3	17.62	17.50	17.14	18.00
3GPP Rel 6	HSDPA Subtest-4	17.61	17.55	17.13	18.00
3GPP Rel 8	DC-HSDPA Subtest-1	18.23	18.22	17.84	18.50
3GPP Rel 8	DC-HSDPA Subtest-2	18.16	17.24	17.81	18.50
3GPP Rel 8	DC-HSDPA Subtest-3	17.79	17.76	17.34	18.00
3GPP Rel 8	DC-HSDPA Subtest-4	17.76	17.75	17.34	18.00
3GPP Rel 6	HSUPA Subtest-1	18.05	18.04	17.59	18.50
3GPP Rel 6	HSUPA Subtest-2	17.55	17.54	17.15	18.00
3GPP Rel 6	HSUPA Subtest-3	18.01	18.04	17.61	18.50
3GPP Rel 6	HSUPA Subtest-4	18.14	18.07	17.66	18.50
3GPP Rel 6	HSUPA Subtest-5	18.04	18.13	17.59	18.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	18.05	18.09	17.67	18.50

➤ CDMA Conducted Power

Band	CDMA2000 BC0			Tune-up Limit (dBm)
TX Channel	1013	384	777	
Frequency (MHz)	824.7	836.52	848.31	
RC1 SO55	17.47	17.46	17.41	18.50
RC3 SO55	18.24	18.23	18.22	18.50
RC3 SO32 (F+SCH)	18.23	18.21	18.20	18.50
RC3 SO32 (+SCH)	18.18	18.19	18.21	18.50
RTAP 153.6Kbps	18.14	18.25	17.93	18.50
RETAP 4096Bits	18.08	17.90	17.87	18.50
RMCTAP 307.2 Kbps	17.95	17.68	17.85	18.50



Band	CDMA2000 BC1			Tune-up Limit (dBm)
TX Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	15.19	15.07	15.25	16.50
RC3 SO55	16.06	16.10	16.09	16.50
RC3 SO32 (F+SCH)	16.02	16.08	16.04	16.50
RC3 SO32 (+SCH)	16.05	16.09	16.08	16.50
RTAP 153.6Kbps	15.67	16.11	15.64	16.50
RETAP 4096Bits	15.51	15.59	15.61	16.50
RMCTAP 307.2 Kbps	15.25	15.24	15.20	16.00

➤ LTE Conducted Power

<FDD-LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	14.02	14.07	13.93	14.50
20	QPSK	1	49	13.91	13.96	13.80	
20	QPSK	1	99	13.86	14.01	13.94	
20	QPSK	50	0	13.01	13.15	13.06	13.50
20	QPSK	50	24	13.12	13.06	12.99	
20	QPSK	50	50	13.05	13.02	13.03	
20	QPSK	100	0	13.09	13.06	13.02	
20	16QAM	1	0	13.69	13.67	13.17	14.00
20	16QAM	1	49	13.55	13.04	13.05	
20	16QAM	1	99	13.37	13.48	13.53	
20	16QAM	50	0	12.06	12.04	12.03	12.50
20	16QAM	50	24	12.08	12.06	12.12	
20	16QAM	50	50	12.01	12.18	12.15	
20	16QAM	100	0	12.15	12.07	12.08	
20	64QAM	1	0	12.30	12.38	11.89	12.50
20	64QAM	1	49	11.90	12.33	12.38	
20	64QAM	1	99	12.19	12.39	11.81	
20	64QAM	50	0	11.09	11.01	11.03	11.50
20	64QAM	50	24	11.22	11.12	10.97	
20	64QAM	50	50	11.15	11.16	11.23	
20	64QAM	100	0	11.20	11.12	11.13	



Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	14.01	14.07	14.02	14.50
15	QPSK	1	37	13.93	14.02	13.79	
15	QPSK	1	74	14.06	14.01	14.06	
15	QPSK	36	0	12.97	13.04	12.95	13.50
15	QPSK	36	20	13.18	13.03	13.12	
15	QPSK	36	39	13.04	13.16	13.11	
15	QPSK	75	0	13.14	13.01	13.09	
15	16QAM	1	0	12.92	13.16	13.32	14.00
15	16QAM	1	37	13.36	13.22	12.91	
15	16QAM	1	74	13.23	12.86	13.15	
15	16QAM	36	0	12.11	12.02	11.93	12.50
15	16QAM	36	20	12.19	12.02	12.09	
15	16QAM	36	39	12.15	12.16	12.06	
15	16QAM	75	0	12.16	12.08	12.19	
15	64QAM	1	0	12.21	12.40	12.21	12.50
15	64QAM	1	37	11.94	12.33	12.06	
15	64QAM	1	74	12.01	12.26	12.04	
15	64QAM	36	0	11.24	11.10	11.07	11.50
15	64QAM	36	20	11.40	11.13	11.14	
15	64QAM	36	39	14.01	11.20	11.13	
15	64QAM	75	0	11.11	11.05	11.07	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	14.18	14.02	13.90	14.50
10	QPSK	1	25	13.86	13.93	13.89	
10	QPSK	1	49	13.86	13.98	13.96	
10	QPSK	25	0	12.91	12.98	13.00	13.50
10	QPSK	25	12	13.06	12.95	13.13	
10	QPSK	25	25	13.09	13.08	13.21	
10	QPSK	50	0	13.11	13.02	13.14	
10	16QAM	1	0	13.50	13.45	13.52	14.00
10	16QAM	1	25	13.49	13.01	13.50	
10	16QAM	1	49	13.25	13.57	13.26	
10	16QAM	25	0	12.03	12.08	11.90	12.50



10	16QAM	25	12	12.13	12.00	12.10	
10	16QAM	25	25	12.20	12.14	12.09	
10	16QAM	50	0	12.09	12.02	12.06	
10	64QAM	1	0	12.25	11.60	12.11	12.50
10	64QAM	1	25	12.31	12.45	12.25	
10	64QAM	1	49	12.24	11.99	12.33	
10	64QAM	25	0	10.93	11.03	10.93	11.50
10	64QAM	25	12	11.11	11.11	11.16	
10	64QAM	25	25	11.08	11.22	11.23	
10	64QAM	50	0	11.08	10.99	11.08	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	13.88	13.90	13.95	14.50
5	QPSK	1	12	14.07	14.06	13.94	
5	QPSK	1	24	14.05	14.11	14.02	
5	QPSK	12	0	13.11	13.00	13.04	13.50
5	QPSK	12	7	13.16	13.14	13.11	
5	QPSK	12	13	13.15	13.13	13.12	
5	QPSK	25	0	13.07	13.05	12.99	
5	16QAM	1	0	13.02	13.54	13.38	14.00
5	16QAM	1	12	13.07	13.51	13.48	
5	16QAM	1	24	13.60	13.65	13.27	
5	16QAM	12	0	12.12	12.09	12.09	12.50
5	16QAM	12	7	12.14	12.10	12.17	
5	16QAM	12	13	12.16	12.13	12.17	
5	16QAM	25	0	12.15	11.99	12.14	
5	64QAM	1	0	12.25	12.27	12.29	12.50
5	64QAM	1	12	12.28	11.88	12.36	
5	64QAM	1	24	12.37	12.19	12.42	
5	64QAM	12	0	11.16	11.02	11.22	11.50
5	64QAM	12	7	11.26	11.31	11.07	
5	64QAM	12	13	11.24	11.18	11.09	
5	64QAM	25	0	11.18	11.11	11.16	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	13.89	13.90	13.99	14.50



3	QPSK	1	8	14.04	14.08	14.02	
3	QPSK	1	14	13.94	14.09	14.00	
3	QPSK	8	0	13.05	12.99	13.05	
3	QPSK	8	4	13.14	13.10	13.12	13.50
3	QPSK	8	7	13.03	13.06	13.10	
3	QPSK	15	0	13.09	12.97	13.07	
3	16QAM	1	0	13.52	13.13	13.42	14.00
3	16QAM	1	8	13.31	13.31	13.60	
3	16QAM	1	14	13.21	13.27	13.54	
3	16QAM	8	0	11.96	12.04	12.10	12.50
3	16QAM	8	4	12.04	12.16	12.07	
3	16QAM	8	7	12.17	12.09	12.12	
3	16QAM	15	0	12.19	11.98	12.00	
3	64QAM	1	0	12.10	12.08	12.04	12.50
3	64QAM	1	8	12.42	12.42	12.39	
3	64QAM	1	14	12.33	11.90	12.26	
3	64QAM	8	0	11.12	11.04	11.17	11.50
3	64QAM	8	4	11.14	11.15	11.03	
3	64QAM	8	7	11.19	11.13	11.12	
3	64QAM	15	0	11.17	11.07	11.16	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	13.83	13.84	13.91	14.50
1.4	QPSK	1	3	13.96	14.09	13.98	
1.4	QPSK	1	5	13.82	13.88	13.84	
1.4	QPSK	3	0	13.98	13.93	13.91	
1.4	QPSK	3	1	13.96	13.93	14.00	
1.4	QPSK	3	3	13.96	13.98	13.91	
1.4	QPSK	6	0	12.97	13.06	13.02	13.50
1.4	16QAM	1	0	13.43	12.97	13.24	14.00
1.4	16QAM	1	3	13.41	13.63	12.97	
1.4	16QAM	1	5	12.99	13.15	13.19	
1.4	16QAM	3	0	13.03	13.03	12.95	
1.4	16QAM	3	1	13.06	13.17	13.15	
1.4	16QAM	3	3	13.02	13.02	13.10	
1.4	16QAM	6	0	12.05	12.26	12.04	12.50
1.4	64QAM	1	0	12.22	12.31	12.18	12.50



1.4	64QAM	1	3	12.35	12.47	12.26	
1.4	64QAM	1	5	12.03	11.80	12.36	
1.4	64QAM	3	0	12.21	12.22	12.25	
1.4	64QAM	3	1	12.30	12.25	12.24	
1.4	64QAM	3	3	12.13	12.16	12.21	
1.4	64QAM	6	0	11.05	10.99	11.03	11.50

<FDD-LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	13.93	14.10	13.91	14.50
20	QPSK	1	49	13.85	13.88	13.84	
20	QPSK	1	99	13.74	13.74	13.94	
20	QPSK	50	0	12.94	13.08	13.05	13.50
20	QPSK	50	24	13.05	12.91	13.02	
20	QPSK	50	50	12.98	12.88	12.94	
20	QPSK	100	0	13.01	12.96	13.06	
20	16QAM	1	0	12.99	13.56	13.33	14.00
20	16QAM	1	49	13.24	13.17	13.16	
20	16QAM	1	99	13.44	12.82	12.80	
20	16QAM	50	0	12.07	12.08	12.11	12.50
20	16QAM	50	24	12.09	12.02	12.08	
20	16QAM	50	50	12.11	12.03	12.00	
20	16QAM	100	0	11.99	11.98	11.99	
20	64QAM	1	0	12.09	12.27	12.03	12.50
20	64QAM	1	49	12.14	12.21	11.81	
20	64QAM	1	99	12.19	12.01	12.23	
20	64QAM	50	0	11.15	11.08	11.03	11.50
20	64QAM	50	24	11.10	10.96	11.06	
20	64QAM	50	50	10.96	11.03	10.91	
20	64QAM	100	0	10.99	10.94	11.12	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	14.11	14.02	14.05	14.50
15	QPSK	1	37	13.91	13.94	13.76	



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15	QPSK	1	74	13.83	13.84	13.83	
15	QPSK	36	0	12.98	13.10	13.08	13.50
15	QPSK	36	20	13.10	12.94	13.03	
15	QPSK	36	39	12.91	13.01	12.93	
15	QPSK	75	0	13.07	12.99	13.06	
15	16QAM	1	0	13.42	13.03	13.15	14.00
15	16QAM	1	37	13.23	13.24	13.40	
15	16QAM	1	74	13.14	13.17	13.18	
15	16QAM	36	0	12.14	12.08	12.14	12.50
15	16QAM	36	20	12.09	11.99	12.02	
15	16QAM	36	39	12.03	11.99	12.08	
15	16QAM	75	0	12.08	11.97	11.96	
15	64QAM	1	0	12.05	12.09	12.14	12.50
15	64QAM	1	37	12.16	11.74	11.87	
15	64QAM	1	74	12.25	12.25	11.71	
15	64QAM	36	0	11.15	11.04	11.15	11.50
15	64QAM	36	20	11.11	11.05	11.09	
15	64QAM	36	39	11.07	11.05	11.06	
15	64QAM	75	0	11.03	10.96	11.02	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	14.09	14.11	14.03	14.50
10	QPSK	1	25	13.91	13.98	13.88	
10	QPSK	1	49	13.96	13.87	13.92	
10	QPSK	25	0	13.00	13.09	13.08	13.50
10	QPSK	25	12	13.19	13.12	13.10	
10	QPSK	25	25	13.03	12.99	12.97	
10	QPSK	50	0	13.14	13.09	13.13	
10	16QAM	1	0	13.67	13.51	13.39	14.00
10	16QAM	1	25	13.56	13.57	13.48	
10	16QAM	1	49	13.50	13.24	13.04	
10	16QAM	25	0	12.20	12.13	12.13	12.50
10	16QAM	25	12	12.15	12.04	12.13	
10	16QAM	25	25	12.10	12.05	12.05	
10	16QAM	50	0	12.03	11.99	12.04	
10	64QAM	1	0	11.83	12.30	12.35	13.00
10	64QAM	1	25	12.27	12.33	12.35	



10	64QAM	1	49	12.31	12.04	12.23	
10	64QAM	25	0	11.17	11.11	11.13	11.50
10	64QAM	25	12	11.21	11.10	11.17	
10	64QAM	25	25	11.08	11.12	11.04	
10	64QAM	50	0	11.17	10.99	11.17	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	14.14	14.09	14.05	14.50
5	QPSK	1	12	13.98	13.88	13.87	
5	QPSK	1	24	13.83	13.85	13.86	
5	QPSK	12	0	13.17	13.15	13.15	13.50
5	QPSK	12	7	13.16	12.98	13.15	
5	QPSK	12	13	12.98	12.96	12.93	
5	QPSK	25	0	13.08	13.08	13.10	
5	16QAM	1	0	13.45	13.29	13.51	14.00
5	16QAM	1	12	13.09	13.25	13.20	
5	16QAM	1	24	13.00	13.23	13.43	
5	16QAM	12	0	12.09	12.12	12.04	12.50
5	16QAM	12	7	12.13	11.98	12.01	
5	16QAM	12	13	12.14	12.06	12.08	
5	16QAM	25	0	12.09	12.08	12.10	
5	64QAM	1	0	12.13	12.31	12.32	13.00
5	64QAM	1	12	12.17	12.10	12.22	
5	64QAM	1	24	12.22	12.12	11.93	
5	64QAM	12	0	11.18	11.25	11.10	11.50
5	64QAM	12	7	11.15	11.06	11.13	
5	64QAM	12	13	11.08	11.08	11.11	
5	64QAM	25	0	11.12	11.03	11.12	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	13.93	14.15	14.11	14.50
3	QPSK	1	8	13.96	13.98	13.93	
3	QPSK	1	14	13.90	14.02	13.83	
3	QPSK	8	0	13.16	13.12	13.03	13.50
3	QPSK	8	4	13.13	13.04	13.13	
3	QPSK	8	7	12.95	13.05	13.02	



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3	QPSK	15	0	13.15	13.05	13.08	
3	16QAM	1	0	13.31	13.65	13.69	14.00
3	16QAM	1	8	13.53	13.14	13.05	
3	16QAM	1	14	13.20	12.86	13.16	
3	16QAM	8	0	12.09	12.14	12.03	12.50
3	16QAM	8	4	12.15	12.10	12.11	
3	16QAM	8	7	12.19	12.03	12.10	
3	16QAM	15	0	12.03	12.04	12.07	
3	64QAM	1	0	12.12	12.15	12.18	12.50
3	64QAM	1	8	11.98	11.85	12.21	
3	64QAM	1	14	12.29	12.29	11.96	
3	64QAM	8	0	11.25	11.16	11.20	11.50
3	64QAM	8	4	11.13	11.01	11.07	
3	64QAM	8	7	11.10	11.08	11.10	
3	64QAM	15	0	11.20	11.08	11.10	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	14.02	14.02	14.04	14.50
1.4	QPSK	1	3	13.99	13.99	13.98	
1.4	QPSK	1	5	13.94	13.89	13.87	
1.4	QPSK	3	0	13.14	13.08	13.11	
1.4	QPSK	3	1	13.19	13.13	13.10	
1.4	QPSK	3	3	13.04	13.01	13.00	
1.4	QPSK	6	0	13.13	13.02	13.14	13.50
1.4	16QAM	1	0	13.57	13.30	13.40	14.00
1.4	16QAM	1	3	13.31	13.56	13.57	
1.4	16QAM	1	5	13.53	13.22	13.23	
1.4	16QAM	3	0	13.13	13.23	13.11	
1.4	16QAM	3	1	13.10	13.02	13.14	
1.4	16QAM	3	3	13.09	13.07	13.12	
1.4	16QAM	6	0	12.14	12.01	12.04	12.50
1.4	64QAM	1	0	12.34	12.31	12.26	12.50
1.4	64QAM	1	3	12.15	12.22	12.35	
1.4	64QAM	1	5	12.15	11.96	12.07	
1.4	64QAM	3	0	12.04	11.82	12.03	
1.4	64QAM	3	1	12.09	11.74	11.80	
1.4	64QAM	3	3	12.07	11.67	11.85	



1.4	64QAM	6	0	11.17	11.10	11.17	11.50
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<FDD-LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	16.89	16.99	16.96	17.50
10	QPSK	1	25	16.85	16.98	16.87	
10	QPSK	1	49	16.83	16.97	16.72	
10	QPSK	25	0	16.54	16.65	16.40	17.00
10	QPSK	25	12	16.31	16.42	16.29	
10	QPSK	25	25	16.28	16.24	16.21	
10	QPSK	50	0	16.20	16.18	16.10	
10	16QAM	1	0	16.43	16.54	16.42	17.00
10	16QAM	1	25	16.35	16.49	16.38	
10	16QAM	1	49	16.26	16.29	16.24	
10	16QAM	25	0	15.12	15.24	15.14	15.50
10	16QAM	25	12	14.96	14.97	14.95	
10	16QAM	25	25	14.88	14.94	14.58	
10	16QAM	50	0	14.78	14.87	14.55	
10	64QAM	1	0	16.65	16.40	16.41	17.00
10	64QAM	1	25	16.59	16.41	16.43	
10	64QAM	1	49	16.52	16.43	16.56	
10	64QAM	25	0	15.68	15.63	15.77	16.00
10	64QAM	25	12	15.47	15.26	15.39	
10	64QAM	25	25	15.36	15.24	15.40	
10	64QAM	50	0	15.21	15.18	15.38	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	15.69	15.77	15.76	16.50
5	QPSK	1	12	15.65	15.79	15.67	
5	QPSK	1	24	15.63	15.78	15.52	
5	QPSK	12	0	15.24	15.25	15.20	15.50
5	QPSK	12	7	14.71	14.70	14.73	
5	QPSK	12	13	14.69	14.58	14.70	
5	QPSK	25	0	14.61	14.54	14.65	



5	16QAM	1	0	15.21	15.24	15.22	15.50
5	16QAM	1	12	15.00	15.12	15.18	
5	16QAM	1	24	15.13	15.09	14.94	
5	16QAM	12	0	13.92	14.04	13.94	14.50
5	16QAM	12	7	13.76	13.77	13.75	
5	16QAM	12	13	13.68	13.74	13.38	
5	16QAM	25	0	13.58	13.67	13.35	
5	64QAM	1	0	15.45	15.20	15.21	16.00
5	64QAM	1	12	15.39	15.21	15.23	
5	64QAM	1	24	15.32	15.23	15.36	
5	64QAM	12	0	13.88	13.91	13.89	14.50
5	64QAM	12	7	13.76	13.76	13.79	
5	64QAM	12	13	13.65	13.67	13.50	
5	64QAM	25	0	13.55	13.49	13.38	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	15.19	15.27	15.26	16.50
3	QPSK	1	8	15.15	15.29	15.17	
3	QPSK	1	14	15.13	15.28	15.02	
3	QPSK	8	0	14.84	14.95	14.70	15.50
3	QPSK	8	4	14.21	14.20	14.23	
3	QPSK	8	7	14.19	14.08	14.20	
3	QPSK	15	0	14.11	14.04	14.15	
3	16QAM	1	0	14.52	14.84	14.72	15.50
3	16QAM	1	8	14.50	13.79	14.68	
3	16QAM	1	14	14.63	14.59	14.44	
3	16QAM	8	0	13.42	13.54	13.44	14.00
3	16QAM	8	4	13.26	13.27	13.25	
3	16QAM	8	7	13.18	13.24	12.88	
3	16QAM	15	0	13.08	13.17	12.85	
3	64QAM	1	0	14.95	14.70	14.71	15.50
3	64QAM	1	8	14.89	14.71	14.73	
3	64QAM	1	14	14.82	14.73	14.86	
3	64QAM	8	0	14.28	13.93	14.07	14.00
3	64QAM	8	4	13.26	13.26	13.29	
3	64QAM	8	7	13.15	13.17	13.00	
3	64QAM	15	0	13.05	12.99	12.88	



Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	14.99	15.07	15.06	15.50
1.4	QPSK	1	3	14.95	15.09	14.97	
1.4	QPSK	1	5	14.93	15.08	14.82	
1.4	QPSK	3	0	14.64	14.75	14.50	
1.4	QPSK	3	1	14.01	14.00	14.03	
1.4	QPSK	3	3	13.99	13.88	14.00	
1.4	QPSK	6	0	13.91	13.84	13.95	14.50
1.4	16QAM	1	0	14.21	14.12	14.10	14.50
1.4	16QAM	1	3	14.30	13.59	14.48	
1.4	16QAM	1	5	14.43	14.39	14.24	
1.4	16QAM	3	0	13.86	13.76	13.90	
1.4	16QAM	3	1	13.75	13.67	13.69	
1.4	16QAM	3	3	12.98	13.04	12.68	
1.4	16QAM	6	0	12.88	12.97	12.65	13.50
1.4	64QAM	1	0	14.65	14.50	14.51	15.00
1.4	64QAM	1	3	14.59	14.51	14.53	
1.4	64QAM	1	5	14.52	14.53	14.46	
1.4	64QAM	3	0	14.34	14.41	14.35	
1.4	64QAM	3	1	14.30	14.26	14.31	
1.4	64QAM	3	3	14.26	14.21	14.18	
1.4	64QAM	6	0	12.85	12.79	12.68	13.50

<FDD-LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	13.35	13.64	13.41	14.00
20	QPSK	1	49	13.48	13.39	13.41	
20	QPSK	1	99	13.58	13.49	13.35	
20	QPSK	50	0	12.60	12.73	12.59	13.00
20	QPSK	50	24	12.62	12.64	12.50	
20	QPSK	50	50	12.70	12.68	12.50	
20	QPSK	100	0	12.59	12.71	12.56	
20	16QAM	1	0	12.55	12.82	12.89	13.00



20	16QAM	1	49	12.70	12.44	12.72	
20	16QAM	1	99	12.51	12.73	12.65	
20	16QAM	50	0	11.57	11.62	11.43	
20	16QAM	50	24	11.65	11.64	11.63	12.50
20	16QAM	50	50	11.70	11.73	11.58	
20	16QAM	100	0	11.73	11.68	11.45	
20	64QAM	1	0	11.45	11.60	11.51	12.00
20	64QAM	1	49	11.30	11.51	11.30	
20	64QAM	1	99	11.29	11.38	11.20	
20	64QAM	50	0	10.65	10.67	10.55	11.50
20	64QAM	50	24	10.76	10.61	10.55	
20	64QAM	50	50	10.71	10.72	10.59	
20	64QAM	100	0	10.76	10.44	10.50	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	13.47	13.42	13.20	14.00
15	QPSK	1	37	13.65	13.38	13.32	
15	QPSK	1	74	13.62	13.45	13.40	
15	QPSK	36	0	12.64	12.55	12.57	13.00
15	QPSK	36	20	12.54	12.54	12.48	
15	QPSK	36	39	12.41	12.67	12.50	
15	QPSK	75	0	12.56	12.60	12.41	
15	16QAM	1	0	12.68	12.53	12.57	13.00
15	16QAM	1	37	12.50	12.64	12.40	
15	16QAM	1	74	12.78	12.85	12.49	
15	16QAM	36	0	11.55	11.55	11.49	12.00
15	16QAM	36	20	11.72	11.59	11.56	
15	16QAM	36	39	11.61	11.63	11.63	
15	16QAM	75	0	11.74	11.69	11.50	
15	64QAM	1	0	11.74	11.82	11.91	12.50
15	64QAM	1	37	11.58	11.51	11.51	
15	64QAM	1	74	11.43	11.77	11.57	
15	64QAM	36	0	10.68	10.56	10.54	11.00
15	64QAM	36	20	10.69	10.63	10.55	
15	64QAM	36	39	10.66	10.62	10.53	
15	64QAM	75	0	10.56	10.52	10.50	
Channel				20800	21100	21400	Tune-up



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Frequency (MHz)				2505	2535	2565	limit (dBm)
10	QPSK	1	0	13.40	13.42	13.21	14.00
10	QPSK	1	25	13.50	13.45	13.29	
10	QPSK	1	49	13.48	13.40	13.36	
10	QPSK	25	0	12.58	12.61	12.55	13.00
10	QPSK	25	12	12.70	12.50	12.44	
10	QPSK	25	25	12.78	12.62	12.47	
10	QPSK	50	0	12.67	12.55	12.50	
10	16QAM	1	0	12.75	12.80	12.63	13.00
10	16QAM	1	25	12.45	13.03	12.92	
10	16QAM	1	49	12.99	12.80	12.29	
10	16QAM	25	0	11.66	11.53	11.51	12.00
10	16QAM	25	12	11.63	11.59	11.58	
10	16QAM	25	25	11.69	11.73	11.53	
10	16QAM	50	0	11.75	11.50	11.59	
10	64QAM	1	0	11.39	11.56	11.81	12.00
10	64QAM	1	25	11.64	11.65	11.41	
10	64QAM	1	49	11.67	11.50	11.34	
10	64QAM	25	0	10.62	10.55	10.59	11.00
10	64QAM	25	12	10.60	10.59	10.51	
10	64QAM	25	25	10.56	10.65	10.55	
10	64QAM	50	0	10.50	10.55	10.57	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	13.59	13.36	13.39	14.00
5	QPSK	1	12	13.41	13.42	13.30	
5	QPSK	1	24	13.59	13.53	13.40	
5	QPSK	12	0	12.58	12.62	12.55	13.00
5	QPSK	12	7	12.60	12.63	12.57	
5	QPSK	12	13	12.68	12.63	12.47	
5	QPSK	25	0	12.66	12.57	12.63	
5	16QAM	1	0	12.81	12.60	12.75	13.50
5	16QAM	1	12	12.93	12.79	12.63	
5	16QAM	1	24	12.86	12.74	13.01	
5	16QAM	12	0	11.67	11.58	11.51	12.00
5	16QAM	12	7	11.63	11.55	11.59	



5	16QAM	12	13	11.74	11.72	11.53	
5	16QAM	25	0	11.69	11.66	11.59	
5	64QAM	1	0	11.66	11.58	11.62	
5	64QAM	1	12	11.55	11.29	11.49	12.00
5	64QAM	1	24	11.63	11.45	11.52	
5	64QAM	12	0	10.64	10.56	10.60	
5	64QAM	12	7	10.74	10.59	10.60	11.00
5	64QAM	12	13	10.74	10.68	10.71	
5	64QAM	25	0	10.72	10.55	10.49	

<FDD-LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	17.73	17.86	17.83	18.50
10	QPSK	1	25	17.82	17.81	17.82	
10	QPSK	1	49	17.77	17.85	17.73	
10	QPSK	25	0	16.98	17.05	16.96	17.50
10	QPSK	25	12	17.02	16.96	17.02	
10	QPSK	25	25	17.00	17.00	17.04	
10	QPSK	50	0	17.04	16.98	17.00	
10	16QAM	1	0	17.15	17.50	17.21	18.00
10	16QAM	1	25	17.53	16.97	17.19	
10	16QAM	1	49	17.55	17.02	17.57	
10	16QAM	25	0	15.93	16.05	16.03	16.50
10	16QAM	25	12	16.15	16.06	15.89	
10	16QAM	25	25	16.11	16.04	16.05	
10	16QAM	50	0	16.11	16.03	16.03	
10	64QAM	1	0	16.49	16.32	16.33	17.00
10	64QAM	1	25	16.33	16.49	16.25	
10	64QAM	1	49	16.21	16.12	16.13	
10	64QAM	25	0	15.01	15.08	15.07	15.50
10	64QAM	25	12	15.06	14.99	14.89	
10	64QAM	25	25	15.05	15.03	15.04	
10	64QAM	50	0	15.11	15.04	14.97	
Channel				23035	23095	23155	Tune-up limit
Frequency (MHz)				701.5	707.5	713.5	



							(dBm)
5	QPSK	1	0	17.68	17.96	17.87	18.50
5	QPSK	1	12	17.85	17.86	17.95	
5	QPSK	1	24	17.95	17.83	17.76	
5	QPSK	12	0	17.12	17.11	17.07	17.50
5	QPSK	12	7	17.01	16.98	16.92	
5	QPSK	12	13	16.97	16.89	17.01	
5	QPSK	25	0	17.08	17.07	17.09	
5	16QAM	1	0	17.51	16.87	16.91	18.00
5	16QAM	1	12	16.99	17.11	17.11	
5	16QAM	1	24	17.12	17.50	17.27	
5	16QAM	12	0	15.93	16.11	16.04	16.50
5	16QAM	12	7	16.18	15.99	16.02	
5	16QAM	12	13	16.12	16.00	16.16	
5	16QAM	25	0	16.15	15.98	16.08	
5	64QAM	1	0	15.71	16.07	15.81	17.00
5	64QAM	1	12	16.19	16.30	16.30	
5	64QAM	1	24	16.43	15.96	16.44	
5	64QAM	12	0	15.05	15.16	15.08	15.50
5	64QAM	12	7	14.97	15.10	15.04	
5	64QAM	12	13	15.07	15.10	15.00	
5	64QAM	25	0	15.13	15.03	14.98	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	17.94	18.10	17.96	18.50
3	QPSK	1	8	17.99	17.97	18.00	
3	QPSK	1	14	17.89	17.97	17.88	
3	QPSK	8	0	16.99	16.99	16.98	17.50
3	QPSK	8	4	17.00	17.02	17.00	
3	QPSK	8	7	16.92	16.99	16.99	
3	QPSK	15	0	17.00	16.95	16.97	
3	16QAM	1	0	17.11	17.41	17.43	18.00
3	16QAM	1	8	17.33	17.04	17.21	
3	16QAM	1	14	16.87	16.91	17.14	
3	16QAM	8	0	16.05	15.97	16.00	16.50
3	16QAM	8	4	16.11	16.03	16.06	
3	16QAM	8	7	16.02	16.03	16.08	



3	16QAM	15	0	15.85	16.00	15.97	
3	64QAM	1	0	16.31	16.26	16.35	17.00
3	64QAM	1	8	16.02	15.98	16.15	
3	64QAM	1	14	16.01	15.91	16.06	
3	64QAM	8	0	15.06	15.05	14.91	15.50
3	64QAM	8	4	14.99	15.00	15.03	
3	64QAM	8	7	15.00	15.11	15.04	
3	64QAM	15	0	15.07	15.04	14.99	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	17.90	17.84	17.83	18.50
1.4	QPSK	1	3	17.88	17.92	17.90	
1.4	QPSK	1	5	17.94	17.77	17.91	
1.4	QPSK	3	0	17.85	17.83	17.81	
1.4	QPSK	3	1	17.89	17.84	17.79	
1.4	QPSK	3	3	17.89	17.82	17.88	
1.4	QPSK	6	0	16.87	16.90	16.95	17.50
1.4	16QAM	1	0	16.74	16.95	17.14	17.50
1.4	16QAM	1	3	17.29	17.17	17.26	
1.4	16QAM	1	5	16.99	16.77	17.34	
1.4	16QAM	3	0	16.88	16.94	17.03	
1.4	16QAM	3	1	16.88	16.90	16.90	
1.4	16QAM	3	3	16.90	17.04	16.85	
1.4	16QAM	6	0	15.94	16.07	16.11	16.50
1.4	64QAM	1	0	16.06	16.21	16.04	16.50
1.4	64QAM	1	3	16.26	16.18	15.99	
1.4	64QAM	1	5	15.94	16.10	16.21	
1.4	64QAM	3	0	16.08	15.75	16.01	
1.4	64QAM	3	1	16.17	15.94	16.15	
1.4	64QAM	3	3	15.98	16.00	16.14	
1.4	64QAM	6	0	15.11	14.86	14.92	15.50



<FDD-LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	17.87	18.05	17.92	18.50
10	QPSK	1	25	17.92	17.86	17.81	
10	QPSK	1	49	17.80	17.86	17.72	
10	QPSK	25	0	16.97	17.11	16.96	17.50
10	QPSK	25	12	17.07	17.05	17.01	
10	QPSK	25	25	17.01	17.01	17.05	
10	QPSK	50	0	17.05	17.04	16.97	
10	16QAM	1	0	17.15	17.10	17.12	17.50
10	16QAM	1	25	17.05	17.09	17.06	
10	16QAM	1	49	16.96	17.03	16.90	
10	16QAM	25	0	16.17	16.14	16.10	16.50
10	16QAM	25	12	16.10	16.14	15.97	
10	16QAM	25	25	16.02	15.97	15.87	
10	16QAM	50	0	16.09	16.07	16.04	
10	64QAM	1	0	16.45	16.51	16.58	17.00
10	64QAM	1	25	16.40	16.36	16.38	
10	64QAM	1	49	16.42	16.50	16.43	
10	64QAM	25	0	14.98	15.01	15.00	15.50
10	64QAM	25	12	15.11	15.07	15.01	
10	64QAM	25	25	15.11	15.14	15.11	
10	64QAM	50	0	15.17	15.06	15.02	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	17.86	17.91	17.95	18.50
5	QPSK	1	12	17.90	17.91	17.82	
5	QPSK	1	24	18.03	18.20	18.02	
5	QPSK	12	0	17.12	17.10	17.00	17.50
5	QPSK	12	7	16.97	16.92	16.97	
5	QPSK	12	13	17.03	17.09	16.93	
5	QPSK	25	0	17.01	16.96	16.90	
5	16QAM	1	0	17.13	17.18	17.06	17.50
5	16QAM	1	12	17.17	17.19	17.12	



5	16QAM	1	24	17.21	17.20	17.04	16.50
5	16QAM	12	0	16.04	16.15	16.08	
5	16QAM	12	7	16.15	16.07	15.95	
5	16QAM	12	13	16.00	16.01	15.97	
5	16QAM	25	0	16.05	15.97	16.07	
5	64QAM	1	0	16.12	16.16	16.20	16.50
5	64QAM	1	12	16.07	16.24	15.95	
5	64QAM	1	24	15.97	16.22	15.92	
5	64QAM	12	0	15.06	15.04	15.06	15.50
5	64QAM	12	7	15.11	15.06	14.95	
5	64QAM	12	13	15.07	15.12	15.00	
5	64QAM	25	0	15.01	14.95	15.00	

<FDD-LTE Band 18>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				23925			
Frequency (MHz)				822.5			
15	QPSK	1	0	17.73			18.50
15	QPSK	1	37	17.58			
15	QPSK	1	74	17.43			
15	QPSK	36	0	16.74			17.50
15	QPSK	36	20	16.68			
15	QPSK	36	39	16.67			
15	QPSK	75	0	16.71			
15	16QAM	1	0	17.22			17.50
15	16QAM	1	37	16.85			
15	16QAM	1	74	16.97			
15	16QAM	36	0	15.72			16.50
15	16QAM	36	20	15.76			
15	16QAM	36	39	15.77			
15	16QAM	75	0	15.71			
15	64QAM	1	0	15.95			16.50
15	64QAM	1	25	15.85			
15	64QAM	1	49	15.62			
15	64QAM	25	0	14.88			15.50
15	64QAM	25	12	14.68			
15	64QAM	25	25	14.78			



15	64QAM	50	0	14.80			Tune-up limit (dBm)
Channel				23900	23925	23950	
Frequency (MHz)				820	822.5	825	
10	QPSK	1	0	18.00	17.99	17.96	18.50
10	QPSK	1	25	17.99	17.94	17.90	
10	QPSK	1	49	17.75	17.86	17.88	
10	QPSK	25	0	17.69	17.55	17.49	18.00
10	QPSK	25	12	17.52	17.35	17.38	
10	QPSK	25	25	17.42	17.29	17.24	
10	QPSK	50	0	17.35	17.21	17.23	
10	16QAM	1	0	17.38	17.41	17.41	18.00
10	16QAM	1	25	17.35	17.29	17.25	
10	16QAM	1	49	17.28	17.19	17.21	
10	16QAM	25	0	16.90	15.89	15.88	16.50
10	16QAM	25	12	15.93	15.92	15.94	
10	16QAM	25	25	15.89	15.90	15.93	
10	16QAM	50	0	15.84	15.79	15.77	
10	64QAM	1	0	17.51	17.58	17.58	18.00
10	64QAM	1	25	17.49	17.45	17.46	
10	64QAM	1	49	17.42	17.40	17.45	
10	64QAM	25	0	16.19	16.12	16.11	16.50
10	64QAM	25	12	15.90	15.89	15.95	
10	64QAM	25	25	15.89	15.85	15.79	
10	64QAM	50	0	15.80	15.77	15.79	
Channel				23875	23925	23975	Tune-up limit (dBm)
Frequency (MHz)				817.5	822.5	827.5	
5	QPSK	1	0	15.90	15.89	15.86	16.50
5	QPSK	1	12	15.89	15.84	15.80	
5	QPSK	1	24	15.65	15.76	15.78	
5	QPSK	12	0	15.59	15.45	15.39	16.00
5	QPSK	12	7	15.49	15.35	15.31	
5	QPSK	12	13	15.33	15.39	15.26	
5	QPSK	25	0	15.29	15.26	15.20	
5	16QAM	1	0	15.28	15.31	15.31	16.00
5	16QAM	1	12	15.25	15.19	15.15	
5	16QAM	1	24	15.18	15.09	15.11	



5	16QAM	12	0	13.85	13.79	13.78	14.50
5	16QAM	12	7	13.83	13.82	13.84	
5	16QAM	12	13	13.79	13.80	13.83	
5	16QAM	25	0	13.74	13.69	13.67	
5	64QAM	1	0	15.41	15.48	15.48	16.00
5	64QAM	1	12	15.39	15.35	15.36	
5	64QAM	1	24	15.32	15.30	15.35	
5	64QAM	12	0	13.79	13.82	13.81	14.50
5	64QAM	12	7	13.80	13.79	13.85	
5	64QAM	12	13	13.79	13.75	13.69	
5	64QAM	25	0	13.70	13.67	13.69	

<FDD-LTE Band 19>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				24075			
Frequency (MHz)				837.5			
15	QPSK	1	0	17.59			18.50
15	QPSK	1	37	17.55			
15	QPSK	1	74	17.57			
15	QPSK	36	0	16.81			17.50
15	QPSK	36	20	16.68			
15	QPSK	36	39	16.70			
15	QPSK	75	0	16.79			
15	16QAM	1	0	16.92			17.50
15	16QAM	1	37	16.98			
15	16QAM	1	74	17.05			
15	16QAM	36	0	15.85			16.50
15	16QAM	36	20	15.75			
15	16QAM	36	39	15.79			
15	16QAM	75	0	15.84			
15	64QAM	1	0	16.00			16.50
15	64QAM	1	25	16.06			
15	64QAM	1	49	16.13			
15	64QAM	25	0	14.83			15.50
15	64QAM	25	12	14.88			
15	64QAM	25	25	14.81			
15	64QAM	50	0	14.71			



Channel				24050	24075	24100	Tune-up limit (dBm)
Frequency (MHz)				835	837.5	840	
10	QPSK	1	0	17.93	17.86	17.93	18.50
10	QPSK	1	25	17.91	17.79	17.89	
10	QPSK	1	49	17.90	17.74	17.86	
10	QPSK	25	0	16.94	16.90	16.89	17.50
10	QPSK	25	12	16.87	16.86	16.85	
10	QPSK	25	25	16.85	16.80	16.77	
10	QPSK	50	0	16.80	16.81	16.79	
10	16QAM	1	0	17.30	17.33	17.40	18.00
10	16QAM	1	25	17.30	17.29	17.33	
10	16QAM	1	49	17.31	17.30	17.26	
10	16QAM	25	0	15.89	15.81	15.79	16.50
10	16QAM	25	12	15.92	15.93	15.89	
10	16QAM	25	25	15.87	15.82	15.84	
10	16QAM	50	0	15.80	15.77	15.71	
10	64QAM	1	0	17.48	17.52	17.49	17.50
10	64QAM	1	25	17.49	17.50	17.48	
10	64QAM	1	49	17.50	17.38	17.46	
10	64QAM	25	0	16.12	16.10	16.12	16.50
10	64QAM	25	12	15.89	15.97	15.89	
10	64QAM	25	25	15.85	15.79	15.89	
10	64QAM	50	0	15.74	15.65	15.80	
Channel				24025	24075	24125	Tune-up limit (dBm)
Frequency (MHz)				832.5	837.5	842.5	
5	QPSK	1	0	16.03	15.96	16.03	16.50
5	QPSK	1	12	16.01	15.89	15.99	
5	QPSK	1	24	16.00	15.84	15.96	
5	QPSK	12	0	15.04	15.00	14.99	15.50
5	QPSK	12	7	14.97	14.96	14.95	
5	QPSK	12	13	14.95	14.90	14.87	
5	QPSK	25	0	14.90	14.91	14.89	
5	16QAM	1	0	15.40	15.43	15.50	16.00
5	16QAM	1	12	15.40	15.39	15.43	
5	16QAM	1	24	15.41	15.40	15.36	
5	16QAM	12	0	14.19	14.09	14.11	14.50



5	16QAM	12	7	14.02	14.03	13.99	
5	16QAM	12	13	13.97	13.92	13.94	
5	16QAM	25	0	13.90	13.87	13.81	
5	64QAM	1	0	15.58	15.62	15.59	16.50
5	64QAM	1	12	15.59	15.60	15.58	
5	64QAM	1	24	15.60	15.48	15.56	
5	64QAM	12	0	14.10	14.14	14.02	14.50
5	64QAM	12	7	13.99	14.07	13.99	
5	64QAM	12	13	13.95	13.89	13.99	
5	64QAM	25	0	13.84	13.75	13.90	

<FDD-LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	17.61	17.73	17.71	18.50
15	QPSK	1	37	17.59	17.69	17.61	
15	QPSK	1	74	17.58	17.66	17.60	
15	QPSK	36	0	16.96	16.98	16.97	17.50
15	QPSK	36	20	16.80	16.81	16.80	
15	QPSK	36	39	16.79	16.89	16.77	
15	QPSK	75	0	16.56	16.75	16.60	
15	16QAM	1	0	17.19	17.23	17.24	17.50
15	16QAM	1	37	17.17	17.13	17.12	
15	16QAM	1	74	17.15	17.16	17.10	
15	16QAM	36	0	15.92	15.97	15.99	16.50
15	16QAM	36	20	15.86	15.87	15.88	
15	16QAM	36	39	15.81	15.84	15.87	
15	16QAM	75	0	15.65	15.69	15.70	
15	64QAM	1	0	17.28	17.25	17.15	17.50
15	64QAM	1	37	17.17	17.13	17.13	
15	64QAM	1	74	17.12	17.12	17.10	
15	64QAM	36	0	15.98	15.91	15.89	16.50
15	64QAM	36	20	15.88	15.91	14.89	
15	64QAM	36	39	15.84	15.81	15.77	
15	64QAM	75	0	15.80	15.74	15.70	
Channel				26740	26865	26990	Tune-up



Frequency (MHz)				819	831.5	844	limit (dBm)
10	QPSK	1	0	17.47	17.59	17.57	18.00
10	QPSK	1	25	17.45	17.55	17.47	
10	QPSK	1	49	17.44	17.52	17.46	
10	QPSK	25	0	16.82	16.77	16.83	17.50
10	QPSK	25	12	16.66	16.67	16.66	
10	QPSK	25	25	16.65	16.75	16.63	
10	QPSK	50	0	16.42	16.61	16.46	
10	16QAM	1	0	17.15	17.19	17.10	17.50
10	16QAM	1	25	17.13	17.16	17.09	
10	16QAM	1	49	17.11	17.12	16.96	
10	16QAM	25	0	15.78	15.83	15.85	16.50
10	16QAM	25	12	15.72	15.73	15.74	
10	16QAM	25	25	15.67	15.70	15.73	
10	16QAM	50	0	15.51	15.55	15.56	
10	64QAM	1	0	17.14	17.11	16.01	17.50
10	64QAM	1	25	17.13	17.09	15.99	
10	64QAM	1	49	17.12	17.06	15.96	
10	64QAM	25	0	15.84	15.77	15.75	16.50
10	64QAM	25	12	15.74	15.77	14.75	
10	64QAM	25	25	15.70	15.67	15.63	
10	64QAM	50	0	15.66	15.60	15.56	
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	16.21	16.33	16.31	17.00
5	QPSK	1	12	16.19	16.29	16.21	
5	QPSK	1	24	16.18	16.26	16.20	
5	QPSK	12	0	15.56	15.51	15.57	16.00
5	QPSK	12	7	15.40	15.41	15.40	
5	QPSK	12	13	15.39	15.49	15.37	
5	QPSK	25	0	15.16	15.35	15.20	
5	16QAM	1	0	15.89	15.93	15.84	16.50
5	16QAM	1	12	15.87	15.90	15.83	
5	16QAM	1	24	15.85	15.86	15.70	
5	16QAM	12	0	14.52	14.57	14.59	15.00
5	16QAM	12	7	14.46	14.47	14.48	



5	16QAM	12	13	14.41	14.44	14.47	
5	16QAM	25	0	14.25	14.29	14.30	
5	64QAM	1	0	15.88	15.85	14.75	
5	64QAM	1	12	15.87	15.83	14.73	15.50
5	64QAM	1	24	15.86	15.80	14.70	
5	64QAM	12	0	14.58	14.51	14.49	
5	64QAM	12	7	14.48	14.51	14.39	15.00
5	64QAM	12	13	14.44	14.41	14.37	
5	64QAM	25	0	14.40	14.34	14.30	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	16.01	16.13	16.11	16.50
3	QPSK	1	8	15.99	16.09	16.01	
3	QPSK	1	14	15.98	16.06	16.00	
3	QPSK	8	0	15.16	15.11	15.17	15.50
3	QPSK	8	4	15.20	15.21	15.20	
3	QPSK	8	7	15.19	15.29	15.17	
3	QPSK	15	0	14.96	15.15	15.00	
3	16QAM	1	0	15.69	15.73	15.64	17.50
3	16QAM	1	8	15.67	15.70	15.63	
3	16QAM	1	14	15.65	15.66	15.50	
3	16QAM	8	0	14.32	14.37	14.39	15.00
3	16QAM	8	4	14.26	14.27	14.28	
3	16QAM	8	7	14.21	14.24	14.27	
3	16QAM	15	0	14.05	14.09	14.10	
3	64QAM	1	0	15.68	15.65	15.55	16.00
3	64QAM	1	8	15.67	15.63	15.53	
3	64QAM	1	14	15.66	15.60	15.50	
3	64QAM	8	0	14.38	14.31	14.29	15.00
3	64QAM	8	4	14.28	14.31	14.29	
3	64QAM	8	7	14.24	14.21	14.17	
3	64QAM	15	0	14.20	14.14	14.26	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	15.81	15.93	15.91	16.50
1.4	QPSK	1	3	15.79	15.89	15.81	



1.4	QPSK	1	5	15.78	15.86	15.80	
1.4	QPSK	3	0	15.46	15.59	15.57	
1.4	QPSK	3	1	15.36	15.42	15.42	
1.4	QPSK	3	3	15.19	15.09	15.32	
1.4	QPSK	6	0	14.76	14.95	14.80	15.50
1.4	16QAM	1	0	15.49	15.53	15.44	16.00
1.4	16QAM	1	3	15.47	15.50	15.43	
1.4	16QAM	1	5	15.45	15.46	15.30	
1.4	16QAM	3	0	14.12	14.17	14.19	
1.4	16QAM	3	1	14.06	14.07	14.08	
1.4	16QAM	3	3	14.01	14.04	14.07	
1.4	16QAM	6	0	13.85	13.89	13.90	14.50
1.4	64QAM	1	0	15.48	15.45	15.35	16.00
1.4	64QAM	1	3	15.47	15.43	15.33	
1.4	64QAM	1	5	15.46	15.40	15.30	
1.4	64QAM	3	0	15.32	15.41	15.29	
1.4	64QAM	3	1	15.28	15.31	15.12	
1.4	64QAM	3	3	15.22	15.21	15.27	
1.4	64QAM	6	0	14.00	13.94	13.90	14.50

<TDD-LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				37850	38000	38150	
Frequency (MHz)				2580	2595	2610	
20	QPSK	1	0	15.57	15.58	15.36	16.00
20	QPSK	1	49	15.54	15.48	15.44	
20	QPSK	1	99	15.43	15.38	15.51	
20	QPSK	50	0	14.64	14.75	14.59	15.00
20	QPSK	50	24	14.71	14.65	14.65	
20	QPSK	50	50	14.73	14.66	14.63	
20	QPSK	100	0	14.75	14.71	14.68	
20	16QAM	1	0	14.92	14.87	14.78	15.50
20	16QAM	1	49	14.75	14.83	14.81	
20	16QAM	1	99	14.89	14.86	14.86	
20	16QAM	50	0	13.66	13.67	13.64	14.00
20	16QAM	50	24	13.76	13.66	13.68	



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20	16QAM	50	50	13.75	13.71	13.68	
20	16QAM	100	0	13.69	13.66	13.74	
20	64QAM	1	0	13.71	13.63	13.67	
20	64QAM	1	49	13.72	13.65	13.64	14.00
20	64QAM	1	99	13.73	13.68	13.73	
20	64QAM	50	0	12.69	12.74	12.63	
20	64QAM	50	24	12.74	12.70	12.59	13.50
20	64QAM	50	50	12.65	12.75	12.69	
20	64QAM	100	0	12.78	12.70	12.77	
Channel				37825	38000	38175	Tune-up limit (dBm)
Frequency (MHz)				2577.5	2595	2612.5	
15	QPSK	1	0	15.49	15.55	15.36	16.00
15	QPSK	1	37	15.50	15.50	15.41	
15	QPSK	1	74	15.49	15.48	15.38	
15	QPSK	36	0	14.62	14.61	14.68	15.00
15	QPSK	36	20	14.72	14.61	14.72	
15	QPSK	36	39	14.73	14.71	14.67	
15	QPSK	75	0	14.75	14.65	14.75	
15	16QAM	1	0	14.92	14.88	14.95	15.50
15	16QAM	1	37	14.82	14.91	14.75	
15	16QAM	1	74	14.84	14.83	14.73	
15	16QAM	36	0	13.67	13.60	13.71	14.50
15	16QAM	36	20	13.76	13.66	13.60	
15	16QAM	36	39	13.76	13.66	13.70	
15	16QAM	75	0	13.73	13.68	13.75	
15	64QAM	1	0	13.72	13.67	13.70	14.50
15	64QAM	1	37	13.66	13.68	13.77	
15	64QAM	1	74	13.61	13.71	13.73	
15	64QAM	36	0	12.75	12.77	12.69	13.50
15	64QAM	36	20	12.81	12.69	12.71	
15	64QAM	36	39	12.72	12.77	12.72	
15	64QAM	75	0	12.76	12.59	12.73	
Channel				37800	38000	38200	
Frequency (MHz)				2575	2595	2615	Tune-up limit (dBm)
10	QPSK	1	0	15.53	15.51	15.47	16.00
10	QPSK	1	25	15.58	15.34	15.47	



10	QPSK	1	49	15.48	15.46	15.41	15.00
10	QPSK	25	0	14.66	14.70	14.72	
10	QPSK	25	12	14.78	14.69	14.66	
10	QPSK	25	25	14.75	14.69	14.60	
10	QPSK	50	0	14.74	14.62	14.70	
10	16QAM	1	0	14.89	14.76	14.81	15.50
10	16QAM	1	25	14.88	14.65	14.72	
10	16QAM	1	49	14.81	14.82	14.87	
10	16QAM	25	0	13.70	13.64	13.64	14.50
10	16QAM	25	12	13.77	13.75	13.73	
10	16QAM	25	25	13.65	13.75	13.67	
10	16QAM	50	0	13.76	13.65	13.72	
10	64QAM	1	0	13.71	13.71	13.65	14.50
10	64QAM	1	25	13.75	13.74	13.62	
10	64QAM	1	49	13.61	13.69	13.73	
10	64QAM	25	0	12.70	12.75	12.64	13.00
10	64QAM	25	12	12.80	12.59	12.68	
10	64QAM	25	25	12.70	12.71	12.69	
10	64QAM	50	0	12.71	12.61	12.51	
Channel				37775	38000	38225	Tune-up limit (dBm)
Frequency (MHz)				2572.5	2595	2617.5	
5	QPSK	1	0	15.48	15.51	15.51	16.00
5	QPSK	1	12	15.49	15.49	15.39	
5	QPSK	1	24	15.51	15.52	15.47	
5	QPSK	12	0	14.69	14.66	14.68	15.00
5	QPSK	12	7	14.72	14.64	14.62	
5	QPSK	12	13	14.72	14.75	14.66	
5	QPSK	25	0	14.69	14.68	14.65	
5	16QAM	1	0	14.87	14.82	14.83	15.00
5	16QAM	1	12	14.95	14.90	14.87	
5	16QAM	1	24	14.82	14.77	14.86	
5	16QAM	12	0	13.75	13.72	13.64	14.50
5	16QAM	12	7	13.75	13.67	13.72	
5	16QAM	12	13	13.70	13.78	13.76	
5	16QAM	25	0	13.70	13.72	13.72	
5	64QAM	1	0	13.77	13.69	13.68	14.50
5	64QAM	1	12	13.73	13.71	13.75	



5	64QAM	1	24	13.59	13.74	13.68	13.00
5	64QAM	12	0	12.68	12.61	12.68	
5	64QAM	12	7	12.50	12.67	12.67	
5	64QAM	12	13	12.43	12.65	12.51	
5	64QAM	25	0	12.52	12.69	12.59	

<TDD-LTE Band 40A>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				38750			
Frequency (MHz)				2310			
10	QPSK	1	0	15.62			16.00
10	QPSK	1	25	15.40			
10	QPSK	1	49	15.27			
10	QPSK	25	0	14.78			15.00
10	QPSK	25	12	14.69			
10	QPSK	25	25	14.66			
10	QPSK	50	0	14.76			
10	16QAM	1	0	14.94			15.50
10	16QAM	1	25	14.75			
10	16QAM	1	49	14.92			
10	16QAM	25	0	13.72			14.00
10	16QAM	25	12	13.74			
10	16QAM	25	25	13.68			
10	16QAM	50	0	13.69			
10	64QAM	1	0	13.68			14.00
10	64QAM	1	25	13.72			
10	64QAM	1	49	13.67			
10	64QAM	25	0	12.86			13.50
10	64QAM	25	12	12.90			
10	64QAM	25	25	12.81			
10	64QAM	50	0	12.78			
Channel				38725	38750	38775	Tune-up limit (dBm)
Frequency (MHz)				2307.5	2310	2312.5	
5	QPSK	1	0	15.43	15.52	15.49	16.00
5	QPSK	1	12	15.52	15.58	15.51	



5	QPSK	1	24	15.56	15.58	15.62	15.00
5	QPSK	12	0	14.66	14.62	14.69	
5	QPSK	12	7	14.67	14.64	14.60	
5	QPSK	12	13	14.68	14.62	14.58	
5	QPSK	25	0	14.69	14.55	14.61	
5	16QAM	1	0	14.91	14.94	14.91	15.50
5	16QAM	1	12	14.86	14.84	14.89	
5	16QAM	1	24	14.91	14.94	14.98	
5	16QAM	12	0	13.80	13.84	13.80	14.50
5	16QAM	12	7	13.73	13.76	13.72	
5	16QAM	12	13	13.00	13.74	13.69	
5	16QAM	25	0	13.77	13.71	13.76	
5	64QAM	1	0	13.89	13.79	13.86	14.50
5	64QAM	1	12	13.72	13.79	13.75	
5	64QAM	1	24	13.87	13.88	13.73	
5	64QAM	12	0	12.78	12.77	12.75	13.50
5	64QAM	12	7	12.82	12.82	12.77	
5	64QAM	12	13	12.73	12.78	12.74	
5	64QAM	25	0	12.77	12.75	12.81	

<TDD-LTE Band 40B>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				39200			
Frequency (MHz)				2355			
10	QPSK	1	0	15.58			16.00
10	QPSK	1	25	15.49			
10	QPSK	1	49	15.49			
10	QPSK	25	0	14.77			15.00
10	QPSK	25	12	14.74			
10	QPSK	25	25	14.62			
10	QPSK	50	0	14.69			
10	16QAM	1	0	14.90			15.50
10	16QAM	1	25	14.78			
10	16QAM	1	49	14.66			
10	16QAM	25	0	13.76			14.00
10	16QAM	25	12	13.66			



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10	16QAM	25	25	13.64			
10	16QAM	50	0	13.60			
10	64QAM	1	0	13.92			
10	64QAM	1	25	13.97			14.50
10	64QAM	1	49	13.86			
10	64QAM	25	0	12.92			
10	64QAM	25	12	12.80			13.50
10	64QAM	25	25	12.67			
10	64QAM	50	0	12.78			
Channel				39175	39200	39225	Tune-up limit (dBm)
Frequency (MHz)				2352.5	2355	2357.5	
5	QPSK	1	0	15.53	15.62	15.41	16.00
5	QPSK	1	12	15.46	15.43	15.35	
5	QPSK	1	24	15.51	15.37	15.40	
5	QPSK	12	0	14.71	14.70	14.72	15.00
5	QPSK	12	7	14.61	14.69	14.62	
5	QPSK	12	13	14.69	14.64	14.59	
5	QPSK	25	0	14.63	14.61	14.63	
5	16QAM	1	0	14.91	14.80	14.93	15.50
5	16QAM	1	12	14.75	14.96	14.78	
5	16QAM	1	24	14.83	14.80	14.83	
5	16QAM	12	0	13.71	13.71	13.73	14.00
5	16QAM	12	7	13.72	13.69	13.73	
5	16QAM	12	13	13.68	13.64	13.69	
5	16QAM	25	0	13.65	13.64	13.66	
5	64QAM	1	0	13.65	13.61	13.53	14.00
5	64QAM	1	12	13.60	13.58	13.61	
5	64QAM	1	24	13.67	13.85	13.68	
5	64QAM	12	0	12.76	12.66	12.69	13.00
5	64QAM	12	7	12.68	12.71	12.60	
5	64QAM	12	13	12.65	12.63	12.68	
5	64QAM	25	0	12.62	12.61	12.52	


<FDD-LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Low channel	Middle channel	High channel	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	14.66	14.68	14.53	15.00
20	QPSK	1	49	14.54	14.50	14.48	
20	QPSK	1	99	14.36	14.42	14.46	
20	QPSK	50	0	13.59	13.61	13.56	14.00
20	QPSK	50	24	13.65	13.53	13.60	
20	QPSK	50	50	13.54	13.55	13.59	
20	QPSK	100	0	13.60	13.48	13.50	
20	16QAM	1	0	14.11	13.94	13.97	14.50
20	16QAM	1	49	13.68	14.04	13.78	
20	16QAM	1	99	13.36	13.76	14.02	
20	16QAM	50	0	12.69	12.61	12.54	13.50
20	16QAM	50	24	12.69	12.58	12.62	
20	16QAM	50	50	12.53	12.66	12.57	
20	16QAM	100	0	12.60	12.47	12.49	
20	64QAM	1	0	12.76	12.92	12.69	13.50
20	64QAM	1	49	12.94	12.62	12.83	
20	64QAM	1	99	12.63	12.71	12.76	
20	64QAM	50	0	11.55	11.67	11.56	12.00
20	64QAM	50	24	11.63	11.60	11.55	
20	64QAM	50	50	11.60	11.65	11.59	
20	64QAM	100	0	11.59	11.45	11.54	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	14.44	14.51	14.51	15.00
15	QPSK	1	37	14.51	14.49	14.52	
15	QPSK	1	74	14.35	14.29	14.51	
15	QPSK	36	0	13.58	13.61	13.58	14.00
15	QPSK	36	20	13.64	13.60	13.61	
15	QPSK	36	39	13.52	13.53	13.57	
15	QPSK	75	0	13.58	13.57	13.59	
15	16QAM	1	0	13.58	13.65	13.65	14.00
15	16QAM	1	37	13.43	13.51	13.55	



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15	16QAM	1	74	13.38	13.50	13.46	
15	16QAM	36	0	12.57	12.59	12.57	13.00
15	16QAM	36	20	12.63	12.65	12.59	
15	16QAM	36	39	12.69	12.52	12.56	
15	16QAM	75	0	12.57	12.56	12.59	
15	64QAM	1	0	12.82	12.91	12.84	13.50
15	64QAM	1	37	12.85	12.75	12.73	
15	64QAM	1	74	12.70	12.77	12.79	
15	64QAM	36	0	11.56	11.59	11.62	12.00
15	64QAM	36	20	11.60	11.60	11.58	
15	64QAM	36	39	11.64	11.64	11.56	
15	64QAM	75	0	11.57	11.67	11.63	
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	14.67	14.51	14.48	15.00
10	QPSK	1	25	14.59	14.54	14.55	
10	QPSK	1	49	14.52	14.41	14.46	
10	QPSK	25	0	13.56	13.58	13.63	14.00
10	QPSK	25	12	13.69	13.58	13.48	
10	QPSK	25	25	13.50	13.50	13.54	
10	QPSK	50	0	13.56	13.54	13.55	
10	16QAM	1	0	14.07	14.01	13.80	14.50
10	16QAM	1	25	13.82	13.78	13.70	
10	16QAM	1	49	13.73	13.66	13.69	
10	16QAM	25	0	12.61	12.59	12.64	13.00
10	16QAM	25	12	12.59	12.63	12.62	
10	16QAM	25	25	12.60	12.60	12.53	
10	16QAM	50	0	12.58	12.44	12.55	
10	64QAM	1	0	12.51	12.68	12.64	13.00
10	64QAM	1	25	12.62	12.64	12.44	
10	64QAM	1	49	12.59	12.65	12.69	
10	64QAM	25	0	11.20	11.66	11.61	12.00
10	64QAM	25	12	11.59	11.55	11.53	
10	64QAM	25	25	11.59	11.59	11.55	
10	64QAM	50	0	11.65	11.58	11.62	
Channel				131997	132322	132647	Tune-up limit
Frequency (MHz)				1712.5	1745	1777.5	



							(dBm)
5	QPSK	1	0	14.60	14.51	14.45	15.00
5	QPSK	1	12	14.41	14.32	14.37	
5	QPSK	1	24	14.47	14.43	14.33	
5	QPSK	12	0	13.63	13.53	13.51	14.00
5	QPSK	12	7	13.68	13.57	13.55	
5	QPSK	12	13	13.67	13.47	13.60	
5	QPSK	25	0	13.58	13.51	13.53	
5	16QAM	1	0	13.69	13.68	13.84	14.50
5	16QAM	1	12	13.85	14.08	14.02	
5	16QAM	1	24	14.04	13.84	13.72	
5	16QAM	12	0	12.66	12.60	12.58	13.00
5	16QAM	12	7	12.67	12.54	12.65	
5	16QAM	12	13	12.72	12.59	12.62	
5	16QAM	25	0	12.65	12.54	12.66	
5	64QAM	1	0	12.85	12.95	12.65	13.50
5	64QAM	1	12	12.75	12.58	12.91	
5	64QAM	1	24	12.75	12.72	12.85	
5	64QAM	12	0	11.67	11.59	11.68	12.00
5	64QAM	12	7	11.73	11.71	11.53	
5	64QAM	12	13	11.66	11.58	11.60	
5	64QAM	25	0	11.68	11.47	11.69	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	14.48	14.48	14.61	15.00
3	QPSK	1	8	14.50	14.49	14.51	
3	QPSK	1	14	14.49	14.34	14.27	
3	QPSK	8	0	13.63	13.64	13.58	14.00
3	QPSK	8	4	13.67	13.55	13.65	
3	QPSK	8	7	13.56	13.56	13.60	
3	QPSK	15	0	13.48	13.60	13.52	
3	16QAM	1	0	13.77	14.12	13.85	14.50
3	16QAM	1	8	14.17	13.83	13.82	
3	16QAM	1	14	13.70	14.08	13.57	
3	16QAM	8	0	12.66	12.52	12.59	13.00
3	16QAM	8	4	12.68	12.62	12.62	
3	16QAM	8	7	12.61	12.65	12.58	



3	16QAM	15	0	12.52	12.54	12.52	
3	64QAM	1	0	12.82	12.88	12.70	13.50
3	64QAM	1	8	12.50	12.74	12.86	
3	64QAM	1	14	12.78	12.78	12.76	
3	64QAM	8	0	11.62	11.63	11.69	12.00
3	64QAM	8	4	11.65	11.63	11.60	
3	64QAM	8	7	11.66	11.58	11.61	
3	64QAM	15	0	11.61	11.48	11.63	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	14.66	14.47	14.63	15.00
1.4	QPSK	1	3	14.49	14.39	14.51	
1.4	QPSK	1	5	14.37	14.43	14.26	
1.4	QPSK	3	0	14.31	14.53	14.60	
1.4	QPSK	3	1	14.46	14.36	14.56	
1.4	QPSK	3	3	14.21	14.26	14.39	
1.4	QPSK	6	0	13.65	13.50	13.54	14.00
1.4	16QAM	1	0	14.18	14.13	14.03	14.50
1.4	16QAM	1	3	14.05	13.95	14.12	
1.4	16QAM	1	5	13.70	13.72	14.01	
1.4	16QAM	3	0	13.62	13.64	13.85	
1.4	16QAM	3	1	13.71	13.46	13.61	
1.4	16QAM	3	3	13.50	13.55	13.50	
1.4	16QAM	6	0	12.62	12.50	12.62	13.00
1.4	64QAM	1	0	12.89	12.97	13.00	13.50
1.4	64QAM	1	3	12.72	13.01	12.86	
1.4	64QAM	1	5	12.85	12.83	12.68	
1.4	64QAM	3	0	12.61	12.78	12.57	
1.4	64QAM	3	1	12.64	12.70	12.63	
1.4	64QAM	3	3	12.68	12.65	12.67	
1.4	64QAM	6	0	11.72	11.87	11.80	12.50



➤ WLAN Conducted Power

2.4GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b 1Mbps	CH 1	2412	11.09	11.50	100.00
		CH 6	2437	11.87	12.50	
		CH 11	2462	11.04	11.50	
	802.11g 6Mbps	CH 1	2412	10.16	10.50	100.00
		CH 6	2437	10.77	11.00	
		CH 11	2462	10.54	11.00	
	802.11n-HT20 MCS0	CH 1	2412	9.01	9.50	100.00
		CH 6	2437	9.47	10.00	
		CH 11	2462	9.30	9.50	
	802.11ax-HEW20 MCS0(RU242)	CH 1	2412	9.24	9.50	100.00
		CH 6	2437	9.67	10.00	
		CH 11	2462	9.43	10.00	
	802.11ax-HEW20 MCS0(RU26)	CH 1	2412	8.57	9.00	100.00
		CH 6	2437	9.14	9.50	
		CH 11	2462	10.03	10.50	

2.4GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b 1Mbps	CH 1	2412	16.69	17.00	100.00
		CH 6	2437	16.91	17.50	
		CH 11	2462	16.82	17.50	
	802.11g 6Mbps	CH 1	2412	16.31	16.50	100.00
		CH 6	2437	16.38	16.50	
		CH 11	2462	16.34	16.50	
	802.11n-HT20 MCS0	CH 1	2412	15.10	15.50	100.00
		CH 6	2437	15.05	15.50	
		CH 11	2462	15.33	15.50	
	802.11ax-HEW20 MCS0(RU242)	CH 1	2412	15.25	15.50	100.00
		CH 6	2437	15.34	15.50	
		CH 11	2462	15.44	16.00	
	802.11ax-HEW20 MCS0(RU26)	CH 1	2422	14.26	14.50	100.00
		CH 6	2437	13.82	14.50	



		CH 11	2452	15.92	16.50	
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2.4GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 1	2412	16.02	16.50
		CH 6	2437	16.13	16.50
		CH 11	2462	16.33	16.50
	802.11ax-HEW2 0 MCS0(RU242)	CH 1	2412	16.23	16.50
		CH 6	2437	16.33	16.50
		CH 11	2462	16.43	16.50
	802.11ax-HEW2 0 MCS0(RU26)	CH 1	2422	15.31	15.50
		CH 6	2437	15.05	15.50
		CH 11	2452	16.90	17.50

5.2GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 36	5180	10.74	11.50	100.00
		CH 44	5220	10.84	11.50	
		CH 48	5240	11.08	11.50	
	802.11n-HT20 MCS0	CH 36	5180	10.51	11.00	100.00
		CH 44	5220	10.51	11.00	
		CH 48	5240	10.37	11.00	
	802.11n-HT40 MCS0	CH 38	5190	10.31	11.00	100.00
		CH 46	5230	10.25	10.50	
	802.11ac-VHT20 MCS0	CH 36	5180	8.18	8.50	100.00
		CH 44	5220	8.42	9.00	
		CH 48	5240	8.21	8.50	
	802.11ac-VHT40 MCS0	CH 38	5190	7.98	8.50	100.00
		CH 46	5230	8.17	8.50	
	802.11ac-VHT80 MCS0	CH 42	5210	8.14	8.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 36	5180	8.96	9.50	100.00
		CH 44	5220	9.17	9.50	
		CH 48	5240	9.07	9.50	
	802.11ax-HEW20	CH 36	5180	8.39	8.50	100.00



	MCS0(RU26)	CH 44	5220	8.29	8.50	
		CH 48	5240	8.42	8.50	
	802.11ax-HEW20 MCS0(RU242)	CH 36	5180	8.22	8.50	100.00
		CH 44	5220	8.54	9.00	
		CH 48	5240	8.46	9.00	
	802.11ax-HEW20 MCS0(RU26)	CH 36	5180	8.06	8.50	100.00
		CH 44	5220	8.29	8.50	
		CH 48	5240	8.39	8.50	
	802.11ax-HEW40 MCS0(RU242)	CH 38	5190	12.64	13.00	100.00
		CH 46	5230	12.79	13.00	
	802.11ax-HEW80 MCS0(RU242)	CH 42	5210	12.88	13.50	100.00

5.2GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 36	5180	13.87	14.50	100.00
		CH 44	5220	14.12	14.50	
		CH 48	5240	14.09	14.50	
	802.11n-HT20 MCS0	CH 36	5180	13.71	14.00	100.00
		CH 44	5220	13.40	13.50	
		CH 48	5240	13.25	13.50	
	802.11n-HT40 MCS0	CH 38	5190	13.52	14.00	100.00
		CH 46	5230	13.03	13.50	
	802.11ac-VHT20 MCS0	CH 36	5180	11.43	12.00	100.00
		CH 44	5220	11.19	11.50	
		CH 48	5240	11.08	11.50	
	802.11ac-VHT40 MCS0	CH 38	5190	11.14	11.50	100.00
		CH 46	5230	10.90	11.50	
	802.11ac-VHT80 MCS0	CH 42	5210	10.79	11.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 36	5180	9.18	9.50	100.00
		CH 44	5220	8.87	9.50	
		CH 48	5240	8.81	9.50	
	802.11ax-HEW20 MCS0(RU26)	CH 36	5180	8.26	8.50	100.00
		CH 44	5220	8.29	8.50	
		CH 48	5240	8.20	8.50	



	802.11ax-HEW20 MCS0(RU52)	CH 36	5180	8.09	8.50	100.00
		CH 44	5220	8.30	8.50	
		CH 48	5240	8.34	8.50	
	802.11ax-HEW20 MCS0(RU106)	CH 36	5180	7.99	8.50	100.00
		CH 44	5220	7.86	8.50	
		CH 48	5240	8.27	8.50	
	802.11ax-HEW40 MCS0(RU242)	CH 38	5190	12.88	13.50	100.00
		CH 46	5230	12.52	13.00	
	802.11ax-HEW80 MCS0(RU242)	CH 42	5210	12.77	13.00	100.00

5.2GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 36	5180	15.44	16.00
		CH 44	5220	15.19	15.50
		CH 48	5240	15.05	15.50
	802.11n-HT40 MCS0	CH 38	5190	15.19	15.50
		CH 46	5230	14.91	15.50
	802.11ac-VHT20 MCS0	CH 36	5180	13.01	13.50
		CH 44	5220	13.01	13.50
		CH 48	5240	12.79	13.50
	802.11ac-VHT40 MCS0	CH 38	5190	12.79	13.50
		CH 46	5230	12.79	13.50
	802.11ac-VHT80 MCS0	CH 42	5210	12.79	13.50
	802.11ax-HEW 20MCS0(RU242)	CH 36	5180	12.04	12.50
		CH 44	5220	12.04	12.50
		CH 48	5240	12.04	12.50
	802.11ax-HEW 20 MCS0(RU26)	CH 36	5180	11.46	12.00
		CH 44	5220	11.14	11.50
		CH 48	5240	11.46	12.00
	802.11ax-HEW 20 MCS0(RU52)	CH 36	5180	11.14	11.50
		CH 44	5220	11.46	12.00
		CH 48	5240	11.46	12.00
	802.11ax-HEW 20MCS0(RU106)	CH 36	5180	11.14	11.50
		CH 44	5220	11.14	11.50



		CH 48	5240	11.46	12.00
	802.11ax-HEW40 MCS0	CH 38	5190	15.80	16.50
		CH 46	5230	15.68	16.50
	802.11ax-HEW80 MCS0	CH 42	5210	15.80	16.50

5.3GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 52	5260	9.06	9.50	100.00
		CH 60	5300	9.04	9.50	
		CH 64	5320	9.07	9.50	
	802.11n-HT20 MCS0	CH 52	5260	8.93	9.50	100.00
		CH 60	5300	8.81	9.50	
		CH 64	5320	8.88	9.50	
	802.11n-HT40 MCS0	CH 54	5270	8.69	9.50	100.00
		CH 62	5310	8.59	9.50	
	802.11ac-VHT20 MCS0	CH 52	5260	6.47	7.00	100.00
		CH 60	5300	6.36	7.00	
		CH 64	5320	6.76	7.00	
	802.11ac-VHT40 MCS0	CH 54	5270	6.34	7.00	100.00
		CH 62	5310	6.59	7.00	
	802.11ac-VHT80 MCS0	CH 58	5290	6.09	7.00	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 52	5260	9.30	10.00	100.00
		CH 60	5300	9.15	10.00	
		CH 64	5320	9.56	10.00	
	802.11ax-HEW20 MCS0(RU26)	CH 52	5260	9.33	10.00	100.00
		CH 60	5300	9.38	10.00	
		CH 64	5320	9.24	10.00	
	802.11ax-HEW20 MCS0(RU52)	CH 52	5260	9.28	10.00	100.00
		CH 60	5300	9.30	10.00	
		CH 64	5320	9.21	10.00	
	802.11ax-HEW20 MCS0(RU106)	CH 52	5260	9.30	10.00	100.00
		CH 60	5300	9.54	10.00	
		CH 64	5320	9.31	10.00	
	802.11ax-HEW40	CH 54	5270	12.93	13.50	100.00



	MCS0(RU242)	CH 62	5310	13.16	13.50	
	802.11ax-HEW80 MCS0(RU242)	CH 58	5290	12.84	13.00	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN CH 1	802.11a 6Mbps	CH 52	5260	14.09	14.50	100.00
		CH 60	5300	14.51	15.00	
		CH 64	5320	14.34	14.50	
	802.11n-HT20 MCS0	CH 52	5260	14.02	14.50	100.00
		CH 60	5300	13.76	14.00	
		CH 64	5320	14.20	14.50	
	802.11n-HT40 MCS0	CH 54	5270	13.74	14.00	100.00
		CH 62	5310	13.97	14.50	
	802.11ac-VHT20 MCS0	CH 52	5260	11.47	12.00	100.00
		CH 60	5300	11.23	11.50	
		CH 64	5320	11.22	11.50	
	802.11ac-VHT40 MCS0	CH 54	5270	11.21	11.50	100.00
		CH 62	5310	10.82	11.50	
	802.11ac-VHT80 MCS0	CH 58	5290	10.97	11.50	100.00
	802.11ax-VHT20 MCS0(RU242)	CH 52	5260	9.39	9.50	100.00
		CH 60	5300	9.06	9.50	
		CH 64	5320	8.67	9.50	
	802.11ax-HEW20 MCS0(RU26)	CH 52	5260	9.13	9.50	100.00
		CH 60	5300	9.20	9.50	
		CH 64	5320	9.11	9.50	
	802.11ax-HEW20 MCS0(RU52)	CH 52	5260	9.08	9.50	100.00
		CH 60	5300	9.16	9.50	
		CH 64	5320	9.04	9.50	
	802.11ax-HEW20 MCS0(RU106)	CH 52	5260	9.21	9.50	100.00
		CH 60	5300	9.24	9.50	
		CH 64	5320	9.05	9.50	
	802.11ax-HEW40 MCS0(RU242)	CH 54	5270	12.99	13.50	100.00
		CH 62	5310	12.42	13.00	
	802.11ax-HEW8	CH 58	5290	12.72	13.50	100.00



	0 MCS0(RU242)					
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5.3GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 52	5260	15.19	15.50
		CH 60	5300	14.91	15.50
		CH 64	5320	15.31	15.50
	802.11n-HT40 MCS0	CH 54	5270	14.91	15.50
		CH 62	5310	15.05	15.50
	802.11ac-VHT20 MCS0	CH 52	5260	12.55	13.00
		CH 60	5300	12.55	13.00
		CH 64	5320	12.55	13.00
	802.11ac-VHT40 MCS0	CH 54	5270	12.55	13.00
		CH 62	5310	12.30	12.50
	802.11ac-VHT80 MCS0	CH 58	5290	12.30	12.50
	802.11ax-VHT20 MCS0(RU242)	CH 52	5260	12.30	12.50
		CH 60	5300	12.04	12.50
		CH 64	5320	12.04	12.50
	802.11ax-VHT20 MCS0(RU26)	CH 52	5260	12.30	12.50
		CH 60	5300	12.30	12.50
		CH 64	5320	12.30	12.50
	802.11ax-HEW2 0 MCS0(RU52)	CH 52	5260	12.30	12.50
		CH 60	5300	12.30	12.50
		CH 64	5320	12.04	12.50
	802.11ax-HEW2 0 MCS0(RU106)	CH 52	5260	12.30	12.50
		CH 60	5300	12.30	12.50
		CH 64	5320	12.30	12.50
	802.11ax-HEW4 0 MCS0(RU242)	CH 54	5270	16.02	16.50
		CH 62	5310	15.80	16.50
	802.11ax-HEW8 0 MCS0(RU242)	CH 58	5290	15.80	16.50



5.5GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 100	5500	5.71	6.0	100.00
		CH 120	5600	5.13	6.0	
		CH 144	5720	4.82	5.5	
	802.11n-HT20 MCS0	CH 100	5500	5.56	6.0	100.00
		CH 120	5600	4.99	5.5	
		CH 144	5720	4.53	5.0	
	802.11n-HT40 MCS0	CH 102	5510	5.36	6.0	100.00
		CH 126	5630	4.44	5.0	
		CH 142	5710	4.66	5.0	
	802.11ac-VHT20 MCS0	CH 100	5500	3.39	4.0	100.00
		CH 120	5600	2.92	3.5	
		CH 144	5720	2.40	3.0	
	802.11ac-VHT40 MCS0	CH 102	5510	3.25	4.0	100.00
		CH 126	5630	2.50	3.0	
		CH 142	5710	2.51	3.0	
	802.11ac-VHT80 MCS0	CH 106	5530	2.98	3.5	100.00
		CH 138	5690	2.22	3.0	
	802.11ax-HEW20 MCS0(RU242)	CH 100	5500	10.15	10.50	100.00
		CH 120	5600	9.76	10.00	
		CH 144	5720	9.21	9.50	
	802.11ax-HEW20 MCS0(RU26)	CH 100	5500	9.46	10.00	100.00
		CH 120	5600	9.52	10.00	
		CH 144	5720	9.57	10.00	
	802.11ax-HEW20 MCS0(RU52)	CH 100	5500	9.42	10.00	100.00
		CH 120	5600	9.47	10.00	
		CH 144	5720	9.58	10.00	
	802.11ax-HEW20 MCS0(RU106)	CH 100	5500	9.39	10.00	100.00
		CH 120	5600	9.16	9.50	
		CH 144	5720	9.08	9.50	
	802.11ax-HEW40 MCS0(RU242)	CH 102	5510	13.93	14.50	100.00
		CH 126	5630	13.13	13.50	
		CH 142	5710	13.06	13.50	
	802.11ax-HEW80 MCS0(RU242)	CH 106	5530	13.77	14.00	100.00
		CH 138	5690	13.09	13.50	



5.5GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	CH 100	5500	15.71	16.00	100.00
		CH 120	5600	15.35	15.50	
		CH 144	5720	13.55	14.00	
	802.11n-HT20 MCS0	CH 100	5500	15.68	16.00	100.00
		CH 120	5600	15.24	15.50	
		CH 144	5720	13.39	13.50	
	802.11n-HT40 MCS0	CH 102	5510	15.51	16.00	100.00
		CH 126	5630	13.90	14.50	
		CH 142	5710	13.34	13.50	
	802.11ac-VHT20 MCS0	CH 100	5500	13.52	14.00	100.00
		CH 120	5600	12.77	13.50	
		CH 144	5720	11.16	11.50	
	802.11ac-VHT40 MCS0	CH 102	5510	13.43	14.00	100.00
		CH 126	5630	11.88	12.50	
		CH 142	5710	11.25	11.50	
	802.11ac-VHT80 MCS0	CH 106	5530	13.20	13.50	100.00
		CH 138	5690	11.03	11.50	
	802.11ax-HEW20 MCS0(RU242)	CH 100	5500	10.07	10.50	100.00
		CH 120	5600	9.57	10.00	
		CH 144	5720	7.85	8.00	
	802.11ax-HEW20 MCS0(RU26)	CH 100	5500	9.27	9.50	100.00
		CH 120	5600	9.36	9.50	
		CH 144	5720	9.14	9.50	
	802.11ax-HEW20 MCS0(RU52)	CH 100	5500	9.15	9.50	100.00
		CH 120	5600	9.17	9.50	
		CH 144	5720	9.29	9.50	
	802.11ax-HEW20 MCS0(RU106)	CH 100	5500	6.06	6.50	100.00
		CH 120	5600	6.06	6.50	
		CH 144	5720	6.15	6.50	
	802.11ax-HEW40 MCS0(RU242)	CH 102	5510	14.03	14.50	100.00
		CH 126	5630	12.42	13.00	
		CH 142	5710	11.72	12.50	
	802.11ax-HEW80	CH 106	5530	13.32	13.50	100.00



	MCS0(RU242)	CH 138	5690	11.85	12.50	
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5.5GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 100	5500	16.13	16.50
		CH 120	5600	15.68	16.50
		CH 144	5720	13.98	14.50
	802.11n-HT40 MCS0	CH 102	5510	15.91	16.50
		CH 126	5630	14.31	14.50
		CH 142	5710	13.98	14.50
	802.11ac-VHT20 MCS0	CH 100	5500	13.98	14.50
		CH 120	5600	13.22	13.50
		CH 144	5720	11.76	12.50
	802.11ac-VHT40 MCS0	CH 102	5510	13.80	14.50
		CH 126	5630	12.30	13.00
		CH 142	5710	11.76	12.00
	802.11ac-VHT80 MCS0	CH 106	5530	13.62	14.00
		CH 138	5690	11.46	12.00
	802.11ax-HEW2 0 MCS0(RU242)	CH 100	5500	13.22	14.00
		CH 120	5600	12.79	13.50
		CH 144	5720	11.46	12.00
	802.11ax-HEW2 0 MCS0(RU26)	CH 100	5500	12.30	13.00
		CH 120	5600	12.55	13.00
		CH 144	5720	12.30	12.50
	802.11ax-HEW2 0 MCS0(RU52)	CH 100	5500	12.30	12.50
		CH 120	5600	12.30	12.50
		CH 144	5720	12.55	13.00
	802.11ax-HEW2 0 MCS0(RU106)	CH 100	5500	11.14	11.50
		CH 120	5600	10.79	11.50
		CH 144	5720	10.79	11.50
	802.11ax-HEW4 0 MCS0(RU242)	CH 102	5510	16.99	17.50
		CH 126	5630	15.80	16.50
		CH 142	5710	15.44	16.00
	802.11ax-HEW8 0 MCS0(RU242)	CH 106	5530	16.90	17.50
		CH 138	5690	15.56	16.00



5.8GHz WLAN CH 0	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	CH 149	5745	11.67	12.00	100.00
		CH 157	5785	11.99	12.50	
		CH 165	5825	12.21	12.50	
	802.11n-HT20 MCS0	CH 149	5745	11.57	12.00	100.00
		CH 157	5785	11.90	12.50	
		CH 165	5825	12.16	12.50	
	802.11n-HT40 MCS0	CH 151	5755	11.60	12.00	100.00
		CH 159	5795	11.85	12.50	
	802.11ac-VHT20 MCS0	CH 149	5745	9.30	10.00	100.00
		CH 157	5785	9.79	10.00	
		CH 165	5825	9.89	10.00	
	802.11ac-VHT40 MCS0	CH 151	5755	9.38	10.00	100.00
		CH 159	5795	9.86	10.50	
	802.11ac-VHT80 MCS0	CH 155	5775	9.57	10.00	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 149	5745	9.10	9.50	100.00
		CH 157	5785	9.64	10.00	
		CH 165	5825	9.66	10.00	
	802.11ax-HEW20 MCS0(RU26)	CH 149	5745	7.94	8.50	100.00
		CH 157	5785	8.30	8.50	
		CH 165	5825	8.39	8.50	
	802.11ax-HEW20 MCS0(RU52)	CH 149	5745	8.07	8.50	100.00
		CH 157	5785	8.30	8.50	
		CH 165	5825	8.20	8.50	
	802.11ax-HEW20 MCS0(RU106)	CH 149	5745	7.89	8.50	100.00
		CH 157	5785	7.96	8.50	
		CH 165	5825	8.04	8.50	
	802.11ax-HEW40 MCS0(RU242)	CH 151	5755	12.97	13.50	100.00
		CH 159	5795	13.39	13.50	
	802.11ax-HEW80 MCS0(RU242)	CH 155	5775	13.34	13.50	100.00



5.8GHz WLAN CH 1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	CH 149	5745	10.68	11.00	100.00
		CH 157	5785	10.73	11.00	
		CH 165	5825	10.64	11.00	
	802.11n-HT20 MCS0	CH 149	5745	10.61	11.00	100.00
		CH 157	5785	10.66	11.00	
		CH 165	5825	10.51	11.00	
	802.11n-HT40 MCS0	CH 151	5755	9.49	10.00	100.00
		CH 159	5795	10.44	11.00	
	802.11ac-VHT20 MCS0	CH 149	5745	7.28	7.50	100.00
		CH 157	5785	7.03	7.50	
		CH 165	5825	7.32	7.50	
	802.11ac-VHT40 MCS0	CH 151	5755	7.26	7.50	100.00
		CH 159	5795	6.84	7.50	
	802.11ac-VHT80 MCS0	CH 155	5775	6.75	7.50	100.00
	802.11ax-HEW20 MCS0(RU242)	CH 149	5745	9.12	9.50	100.00
		CH 157	5785	8.71	9.50	
		CH 165	5825	9.06	9.50	
	802.11ax-HEW20 MCS0(RU26)	CH 149	5745	6.24	6.50	100.00
		CH 157	5785	6.09	6.50	
		CH 165	5825	6.15	6.50	
	802.11ax-HEW20 MCS0(RU52)	CH 149	5745	6.11	6.50	100.00
		CH 157	5785	6.16	6.50	
		CH 165	5825	6.14	6.50	
	802.11ax-HEW20 MCS0(RU106)	CH 149	5745	6.19	6.50	100.00
		CH 157	5785	6.39	6.50	
		CH 165	5825	6.50	7.00	
	802.11ax-HEW40 MCS0(RU242)	CH 151	5755	12.82	13.50	100.00
		CH 159	5795	12.47	13.00	
	802.11ax-HEW80 MCS0(RU242)	CH 155	5775	12.55	13.00	100.00



5.8GHz WLAN CH 0+1	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
	802.11n-HT20 MCS0	CH 149	5745	14.15	14.50
		CH 157	5785	14.31	14.50
		CH 165	5825	14.47	15.00
	802.11n-HT40 MCS0	CH 151	5755	13.62	14.00
		CH 159	5795	14.15	14.50
	802.11ac-VHT20 MCS0	CH 149	5745	11.46	13.00
		CH 157	5785	11.76	12.50
		CH 165	5825	11.76	12.50
	802.11ac-VHT40 MCS0	CH 151	5755	11.46	12.00
		CH 159	5795	11.76	12.50
	802.11ac-VHT80 MCS0	CH 155	5775	11.46	12.00
	802.11ax-HEW2 0 MCS0(RU242)	CH 149	5745	12.04	12.50
		CH 157	5785	12.30	12.50
		CH 165	5825	12.30	12.50
	802.11ax-HEW2 0 MCS0(RU26)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	10.50
		CH 165	5825	10.41	10.50
	802.11ax-HEW2 0 MCS0(RU52)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	10.50
		CH 165	5825	10.41	10.50
	802.11ax-HEW2 0 MCS0(RU106)	CH 149	5745	10.00	10.50
		CH 157	5785	10.41	10.50
		CH 165	5825	10.41	10.50
	802.11ax-HEW4 0 MCS0(RU242)	CH 151	5755	15.91	16.50
		CH 159	5795	15.91	16.50
	802.11ax-HEW8 0 MCS0(RU242)	CH 155	5775	16.02	16.50

14. LTE Carrier Aggregation

14.1. LTE Downlink Carrier Aggregation

➤ Carrier Aggregation Configuration

For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.

2CC Downlink Carrier Aggregation				
No.	Combination	4X4 MIMO	Restriction	Completely Covered by Measurement Superset
1	CA_2A-2A	2A-2A	-	No
2	CA_4A-4A	4A-4A	-	No
3	CA_5A-5A	-	-	No

➤ LTE Downlink Carrier Aggregation Conducted Power

1. 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 $\frac{1}{4}$ dB higher than the maximum output measured without downlink carrier aggregation active.
2. Uplink maximum output power with downlink carrier aggregation active does not show more than $\frac{1}{4}$ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
3. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
4. 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 $\frac{1}{4}$ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
5. 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.
6. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy
7. 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.



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

➤ **Output power of CA downlink**

2CC LTE Downlink for Full Power (Intra-band)											
CA Configuration	PCC					SCC				Power	
	Band	BW (MHz)	UL Channel	UL Fre. (MHz)	UL Mode (Modulation/ RB/Offset)	Band	BW (MHz)	DL Channel	DL Fre. (MHz)	CA TX (dBm)	Rel.8 TX (dBm)
CA_2A-2A	2	20	18900	1880	QPSK/1#0	2	5	1175	1987.5	22.35	22.75
CA_4A-4A	4	20	20175	1732.5	QPSK/1#0	4	5	2375	2152.5	22.31	22.56
CA_5A-5A	5	10	20450	829	QPSK/1#0	5	5	2522	881.2	23.04	23.22

2CC LTE Downlink for Reduced Power (Intra-band)											
CA Configuration	PCC					SCC				Power	
	Band	BW (MHz)	UL Channel	UL Fre. (MHz)	UL Mode (Modulation/ RB/Offset)	Band	BW (MHz)	DL Channel	DL Fre. (MHz)	CA TX (dBm)	Rel.8 TX (dBm)
CA_2A-2A	2	20	18900	1880	QPSK/1#0	2	5	1175	1987.5	13.89	14.07
CA_4A-4A	4	20	20175	1732.5	QPSK/1#0	4	5	2375	2152.5	13.94	14.10
CA_5A-5A	5	10	20450	829	QPSK/1#0	5	5	2522	881.2	16.71	16.99

15. 5G NR EN-DC Consideration

➤ General Guidance

1. It can be operated at EN-DC (NSA) for 5G NR implementation according to the character of the device. SAR measurement should be performed separately for the limitations of the probe calculation factors.
2. When the EN-DC is active the output power of the LTE anchors is equal or less than the standalone carrier, therefore the LTE output power and SAR were estimated based on the standalone carrier to performed sim-TX analysis with 5G NR, WLAN and Bluetooth.
3. According to October 2020 TCB Workshop publication, EN-DC SAR assessment should follow:
 - a. If the signal uplink 1-g SAR values for each band are both less than 0.8 W/kg and the algebraic summation of the 1-g SAR values are less than 1.45 W/kg no additional measurements need to be performed.
 - b. If one or the signal uplink 1-g SAR values is greater than 0.8 W/kg, instead of algebraically summing the 1-g SAR values, sum up the SAR distributions, similar to the enlarged zoom scan (volume scan) procedures found in FCC KDB Publication 865664 D01. And PAG is required for this case.
 - c. If the algebraic sum of the 1-g SAR values is > 1.45 W/kg additional measurements may have to be made. Submit a KDB inquiry for additional guidance and PAG is required for this case.
 - d. When the algebraic sum of the 1-g SAR values is > 1.6 W/kg, SPLSR analysis procedure should be applied.

➤ 5G NR anchor combination

5G-NR	EN-DC Combination	LTE Uplink	5G-NR Uplink	SCS (kHz)	Maximum Bandwidth (MHz)
TDD	2A-n41	2A	n41	30	100
TDD	2C-n41	2C	n41	30	100
TDD	66A-n41	66A	n41	30	100

➤ Maximum Power for EN-DC

EN-DC Configuration	LTE Signal Carrier				5G NR		
	Band	BW (MHz)	Maximum Power(dBm)		Band	BW (MHz)	Maximum Power(dBm)
			Standalone	EN-DC Active			EN-DC Active
EN-DC_2A-n41	2	20	23.5	23.5	n41	100	24.0
EN-DC_2C-n41	2	20	23.0	23.0	n41	100	24.0
EN-DC_66A-n41	66	20	23.5	23.5	n41	100	24.0

16. Hotspot Mode Evaluation Procedure

➤ EUT Antenna Location

The EUT Antenna Location in Annex B.

➤ EUT Antenna Distance

Antenna Location	Front	Back	Left	Right	Top	Bottom
Bottom main Antenna	<5mm	<5mm	<25mm	<5mm	>25mm	<5mm
Top div Antenna	<5mm	<5mm	<5mm	<25mm	<5mm	>25mm
WLAN 2.4GHz/5GHz CH0/BT	<5mm	<5mm	>25mm	<5mm	<5mm	>25mm
WLAN 2.4GHz CH1 Antenna	<5mm	<5mm	>25mm	<5mm	>25mm	>25mm
WLAN 5GHz CH1 Antenna	<5mm	<5mm	>25mm	<5mm	<25mm	>25mm
TRX1 Antenna	<5mm	<5mm	>25mm	<5mm	<25mm	>25mm

➤ Hotspot Evaluation

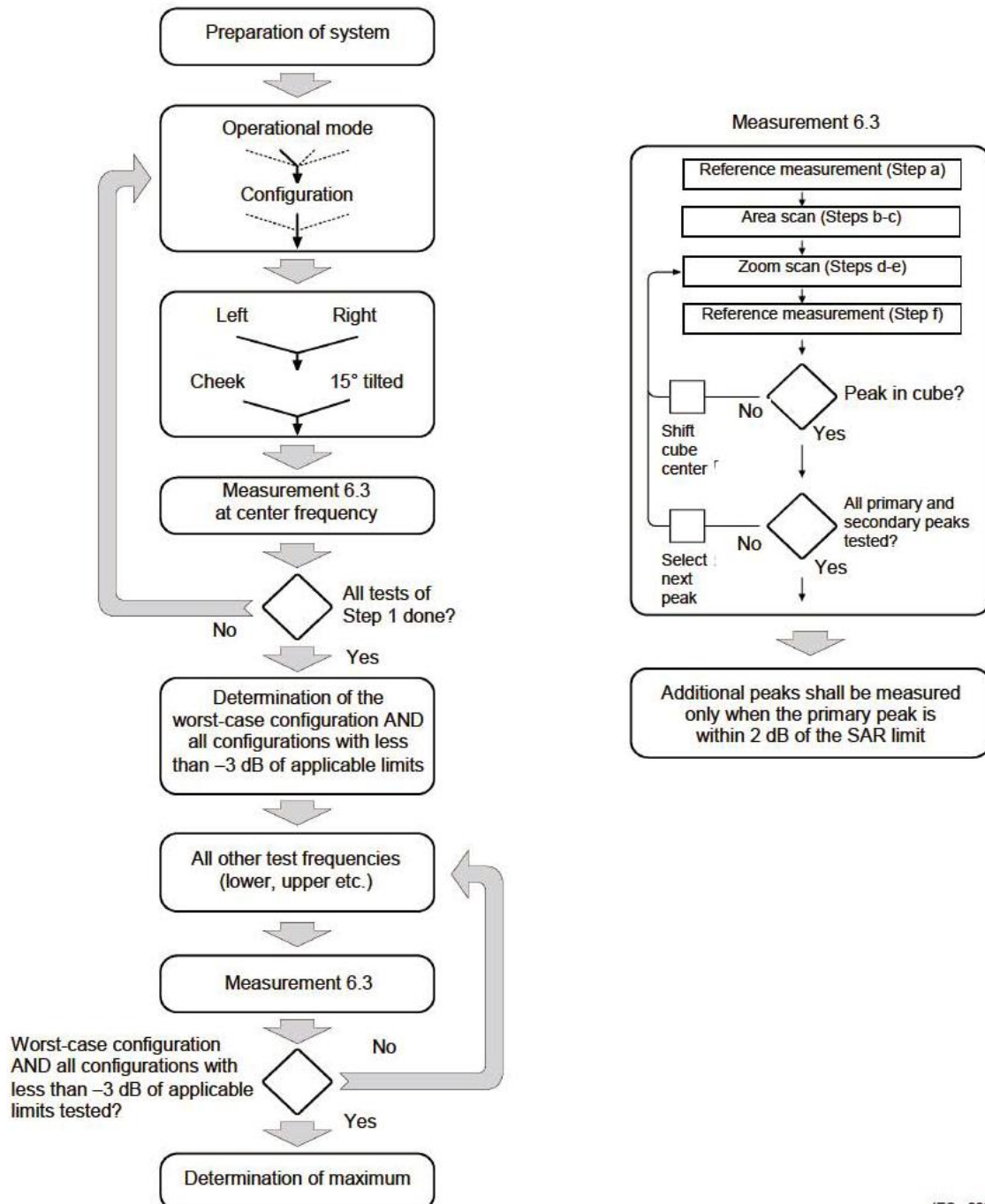
Assessment	Hotspot side for SAR Test distance: 10mm					
Antennas	Front	Back	Left	Right	Top	Bottom
Bottom main Antenna	Yes	Yes	Yes	Yes	No	Yes
Top div Antenna	Yes	Yes	Yes	Yes	Yes	No
WLAN 2.4GHz/5GHz CH0/BT	Yes	Yes	No	Yes	Yes	No
WLAN 2.4GHz CH1 Antenna	Yes	Yes	No	Yes	No	No
WLAN 5GHz CH1 Antenna	Yes	Yes	No	Yes	Yes	No
TRX1 Antenna	Yes	Yes	No	Yes	Yes	No

Note :

1. The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hotspot SAR v02r01.
2. Head/Body-worn/Hotspot mode SAR assessments are required.
3. Referring to KDB 941225 D06, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
4. For the WWAN top antenna, all of the surfaces or edges will be tested except the bottom side though they are greater than 25mm between the antennas and surfaces or edges in this report.

17. Block Diagram of the Tests to be Performed

17.1. Head



IEC 228/05

17.2. Body

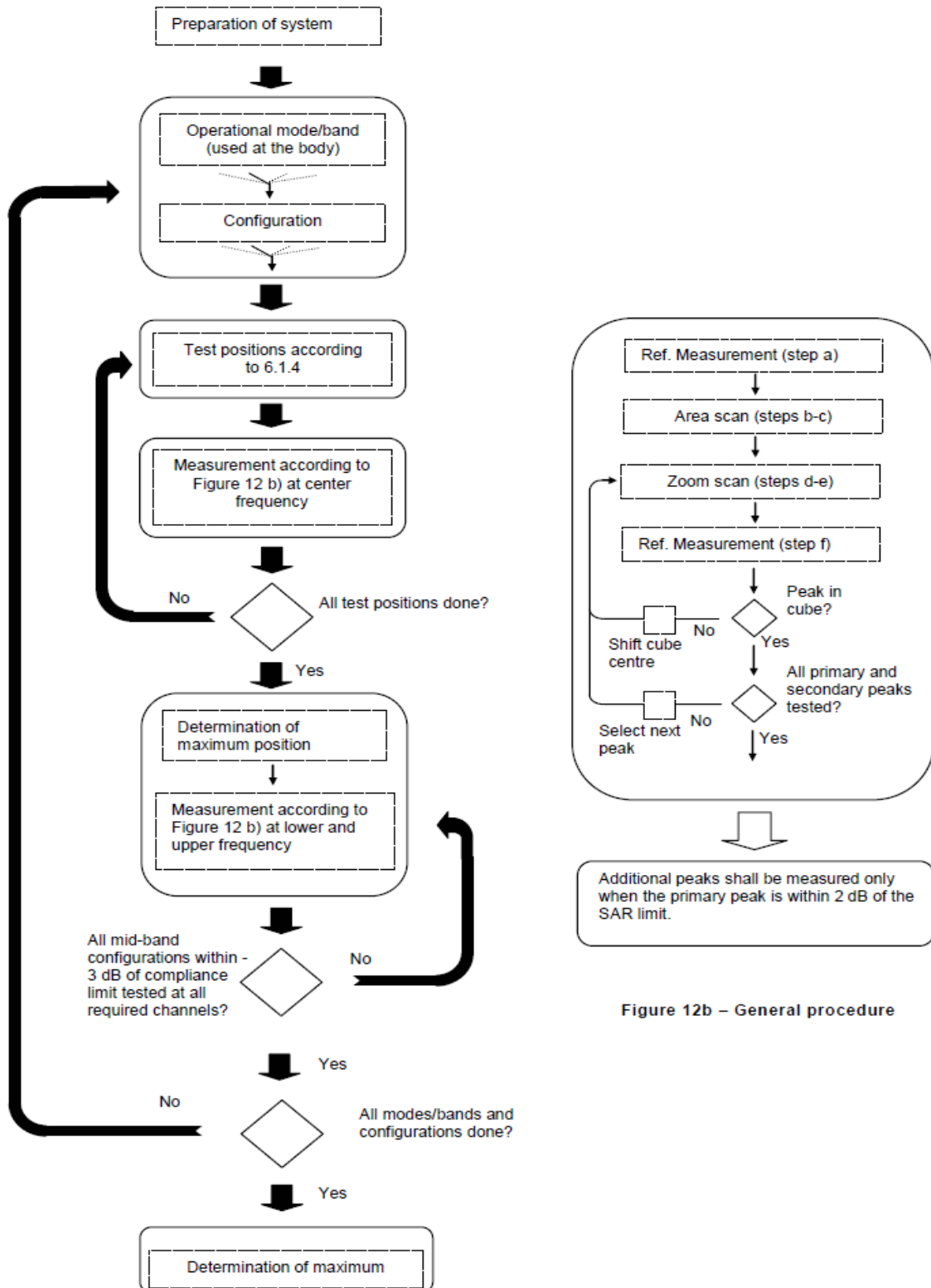


Figure 12b – General procedure