

FCC SAR TEST REPORT

FCC ID : QYLFN990B
Equipment : 5G NR Module
Brand Name : Getac
Model Name : FN990A28
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1, Nangang Rd., Nangang
Dist., Taipei City 115018, Taiwan, R.O.C.
Standard : FCC 47 CFR Part 2 (2.1093)

The product was installed into Notebook (Brand Name: Getac, Model Name: B360, B360 Pro, B360G3, B360 ProG3, B360 Plus, B360Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, “-”, “_” or blank for marketing purpose and no impact safety related critical components and constructions.)) during test.

The product was received on Apr. 24, 2025 and testing was started from Apr. 25, 2025 and completed on May 29, 2025. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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


Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description		Issued Date
FA531705B	01	Initial issue of report		Jun. 25, 2025

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for Getac Technology Corporation., 5G NR Module, FN990A28, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	Highest Simultaneous Transmission 1g SAR (W/kg)
		Body (Separation 0mm)	
		1g SAR (W/kg)	
Licensed	LTE Band 42	0.28	1.58
	LTE Band 43	0.84	
	LTE Band 48	0.78	
	FR1 n48	0.82	
	FR1 n77/78	0.84	
Date of Testing:		2025/04/25 ~ 2025/05/29	

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

Reviewed by: Jason Wang
Report Producer: Paula Chen

2. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02



3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	5G NR Module
Brand Name	Getac
Model Name	FN990A28
FCC ID	QYLFN990B
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3550 MHz ~ 3600 MHz, 3450 MHz ~ 3550MHz LTE Band 43: 3650 MHz ~ 3675 MHz, 3600 MHz ~ 3700MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n13 : 777 MHz ~ 787 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n26 : 814 MHz ~ 849 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM
EUT Stage	Production Unit
Remark: 1. According to the section 14 antenna location, the distance of WWAN Main and Aux transmit antenna to the bottom side is larger than 200mm; SAR testing is not necessary 2. This device has three kinds of SKUs; RF exposure evaluation is selected SKU L as the main test, SKU M and SKU N will spot check worst case found in SKU L.	

Host Information	
Equipment Name	Notebook Computer
Brand Name	Getac
Model Name	B360, B360 Pro, B360G3, B360 ProG3, B360 Plus, B360Y (Y= 10 characters, Y can be 0-9, a-z, A-Z, "-", "_" or blank for marketing purpose and no impact safety related critical components and constructions.)"
Integrated WLAN Module	Brand Name: Intel Model Name: BE201NGW
Integrated RFID Module	Brand Name: Getac Model Name: SN-NSVG7-C01
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz RFID : 13.56 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax/be HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160/EHT20/EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE RFID: ASK
EUT Stage	Production Unit
Remark: - The Intel BE201NGW WLAN/BT module is integrated into this host, the WLAN2.4GHz/5GHz maximum output power and WLAN evaluation result is referenced from Intel test report, report no.: 231109-06.TR07 (FCC ID: PD9BE201NG); WLAN 6GHz refers to report no.: 231109-06.TR01 (FCC ID: PD9BE201NG); the SAR result is used to do simultaneous transmission analysis. - The RFID module is integrated into this host, the RFID test report is referenced from Sporton FCC SAR report, report no.: FA417922 (FCC ID: QYLSNNSVG7C01B); the SAR result is used to do simultaneous transmission analysis. - The device will have different models of the three SUKs depending on the different markets.	

DVT SKUs	SKU L	SKU M	SKU N
CPU	Ultra 5, 125H	Ultra 7, 165H	Ultra 7 268V vPro
Display	ADP 13.3",FHD	ADP 13.3",FHD	ADP 13.3",FHD
Touch screen	Support	Support	Support
Memory	kingston 8GB*2	kingston 32GB*2	kingston 32GB*2
Main storage	SSD 256GB	SSD 1TB	SSD 1TB
Second storage	SSD 256GB	SSD 1TB	Not Support
Wifi+BT	BE200NGW	BE200NGW	BE201NGW
WWAN	FN990A28	FN990A28	FN990A28
GPS/GNSS	FN990A28	MC-1010-V2b	MC-1010-V2b
AC adapter	FSP, 90W , FSP090-ABBN3	Chicony, 120W,A17-120P1A	FSP, 90W , FSP090-ABBN3
FINGERPRINT	Support	Not Support	Not Support
RFID	Support (SN-NSVG7-C01)	Support (SN-NSVG7-C01)	Support (SN-NSVG7-C01)
BCR	Support	Support	Support
Smart Card	Support	Support	Support
SD Card Reader	Support	Support	Support
Battery	BP2S1P4060S-01	BP3S2P3450P-01 BP3S2P2100S-04	BP2S1P4060S-01
Optional ports	RS232/2nd TBT4	RS232/2nd TBT4	RS232/2nd TBT4
ODD (Expansion)	Not Support	Support (3rd battery pack:BP3S2P2100S-04)	Not Support
MXM/PCMCIA/Express	Not Support	ADLINK,91-7C006-110E	Not Support
Expansion optional port	Not Support	Not Support	Not Support

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05								
FCC ID	QYLFN990B							
Equipment Name	5G NR Module							
Operating Frequency Range of each LTE transmission band	LTE Band 42: 3550 MHz ~ 3600 MHz, 3450 MHz ~ 3550MHz LTE Band 43: 3650 MHz ~ 3675 MHz, 3600 MHz ~ 3700MHz LTE Band 48: 3550 MHz ~ 3700 MHz							
Channel Bandwidth	LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 43: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used	QPSK / 16QAM / 64QAM / 256QAM							
LTE Voice / Data requirements	Data only							
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3							
	Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)
		1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5	
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)							
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.							
LTE Carrier Aggregation Combinations	UL CA referred to section 12.							
LTE Carrier Aggregation Additional Information	Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.							
Transmission (H, M, L) channel numbers and frequencies in each LTE band								
LTE Band 42 Part 96								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	43315	3552.5	43140	3555	43165	3557.5	43190	3560
M	43340	3575	43340	3575	43340	3575	43340	3575
H	43565	3597.5	43540	3595	43515	3592.5	43490	3590
LTE Band 42 Part 27Q								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	42114.1	3452.5	42140	3455	42165	3457.5	42190	3460
M	42589.1	3500	42589.1	3500	42589.1	3500	42589.1	3500
H	43064.1	3547.5	43040	3545	43015	3542.5	42990	3540
LTE Band 43								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	44115	3652.5	44140	3655	44165	3657.5	44190	3660
M	44215	3662.5	44215	3662.5	44215	3662.5	44215	3662.5
H	44315	3672.5	44290	3670	44265	3667.5	44240	3665
LTE Band 43 Part 96								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	43615	3602.5	43640	3605	43665	3607.5	43690	3610
M	44090	3650	44090	3650	44090	3650	44090	3650
H	44565	3697.5	44540	3695	44515	3692.5	44490	3690
LTE Band 48								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	55265	3552.5	55290	3555	55315	3557.5	55340	3560
L M M H	55810	3607	55815	3607.5	55820	3608	55830	3609
	56170	3643	56165	3642.5	56160	3642	56150	3641
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690



3.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information																						
FCC ID	QYLFN990B																					
Equipment Name	5G NR Module																					
Operating Frequency Range of each 5G NR transmission band	5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz, 3450MHz ~ 3550MHz																					
Channel Bandwidth	5G NR n48: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz 5G NR n77/78: 10MHz, 15MHz, 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz																					
SCS	FDD: SCS15KHz, TDD: SCS30KHz																					
uplink modulations used	DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM CP-OFDM QPSK / 16QAM / 64QAM / 256QAM																					
A-MPR (Additional MPR) disabled for SAR Testing?	Yes																					
LTE Anchor Bands for n77	LTE B2/13/66																					
NR Band 48																						
	Bandwidth10MHz		Bandwidth 15MHz		Bandwidth20MHz		Bandwidth30MHz		Bandwidth 40MHz													
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)												
L	637000	3555	637168	3557.52	637334	3560.01	637668	3565.02	638000	3570												
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99												
H	646332	3694.98	646166	3692.49	646000	3690	645666	3684.99	645332	3679.98												
NR Band 77 Part 27O																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	665000	3975	664832	3972.48	664666	3969.99	664332	3964.98	664000	3960	663666	3954.99	663332	3949.98	663000	3945	662666	3939.99	662332	3934.98	662000	3930
NR Band 78 Part 27O																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750
H	653000	3795	652832	3792.48	652666	3789.99	652332	3784.98	652000	3780	651666	3774.99	651332	3769.98	651000	3765	650666	3759.99	650332	3754.98	650000	3750
NR Band 77/78 Part 27Q																						
	Bandwidth10MHz		Bandwidth15MHz		Bandwidth 20MHz		Bandwidth30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495	633332	3499.98
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98
H	636332	3544.98	636166	3542.49	636000	3540	635666	3534.99	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99	633332	3499.98

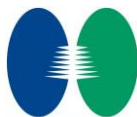
4. Smart Transmit feature for RF Exposure compliance

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit, for each characterized technology and band (refer to RF exposure part0 report).

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

<Plimit for supported technologies and bands (Plimit in EFS file)>

Band	Antenna	1g SAR design target (W/kg)	TDD duty cycle	Plimit*	Pmax * (dBm)	Power Tolerance (dB)
				Body		
WCDMA II	Main(Ant 0)	0.95	100.00%	28.4	23.5	1
WCDMA IV	Main(Ant 0)	0.95	100.00%	28.6	23.5	1
WCDMA V	Main(Ant 0)	0.95	100.00%	29.1	23.5	1
LTE Band 7	Main(Ant 0)	0.95	100.00%	31.4	23.0	1
LTE Band 7	Aux(Ant 2)	0.95	100.00%	31.5	23.0	1
LTE Band 12/17	Main(Ant 0)	0.95	100.00%	30.4	23.0	1
LTE Band 13	Main(Ant 0)	0.95	100.00%	30.7	23.0	1
LTE Band 14	Main(Ant 0)	0.95	100.00%	30.1	23.0	1
LTE Band 25/2	Main(Ant 0)	0.95	100.00%	28.8	23.0	1
LTE Band 25/2	Aux(Ant 2)	0.95	100.00%	29.5	23.0	1
LTE Band 26/5	Main(Ant 0)	0.95	100.00%	30.7	23.0	1
LTE Band 38	Main(Ant 0)	0.95	63.30%	29.3	21.0	1
LTE Band 38	Aux(Ant 2)	0.95	63.30%	30.3	21.0	1
LTE Band 41 (PC3)	Main(Ant 0)	0.95	63.30%	29.3	20.5	1
LTE Band 41 (PC2)**	Main(Ant 0)	0.95	43.30%		21.9	1
LTE Band 41 (PC3)	Aux(Ant 2)	0.95	63.30%	31.0	20.5	1
LTE Band 41 (PC2)**	Aux(Ant 2)	0.95	43.30%		21.9	1
LTE Band 42	MIMO2(Ant 3)	0.95	63.30%	11.8	19.5	1
LTE Band 43	MIMO2(Ant 3)	0.95	63.30%	11.9	19.5	1
LTE Band 48	MIMO1(Ant 1)	0.95	63.30%	10.5	19.5	1
LTE Band 48	MIMO2(Ant 3)	0.95	63.30%	11.8	19.5	1
LTE Band 66/4	Main(Ant 0)	0.95	100.00%	29.7	23.0	1
LTE Band 71	Main(Ant 0)	0.95	100.00%	30.6	23.0	1
n5	Main(Ant 0)	0.95	100.00%	30.3	23.5	1
n7	Main(Ant 0)	0.95	100.00%	30.6	23.0	1
n7	Aux(Ant 2)	0.95	100.00%	30.7	23.0	1
n12	Main(Ant 0)	0.95	100.00%	30.6	23.0	1
n13	Main(Ant 0)	0.95	100.00%	30.7	23.0	1
n14	Main(Ant 0)	0.95	100.00%	30.5	23.0	1
n25/2	Main(Ant 0)	0.95	100.00%	27.6	23.5	1
n25/2	Aux(Ant 2)	0.95	100.00%	29.8	23.5	1
n26	Main(Ant 0)	0.95	100.00%	30.3	23.0	1
n41/38 (PC3)	Main(Ant 0)	0.95	100.00%	30.3	23.0	1
n41 (PC2)**	Main(Ant 0)	0.95	50.00%		23.0	1
n41/38 (PC3)	Aux(Ant 2)	0.95	100.00%	28.4	23.0	1
n41 (PC2)**	Aux(Ant 2)	0.95	50.00%		23.0	1
n48	MIMO1(Ant 1)	0.95	100.00%	11.2	21.5	1
n48	MIMO2(Ant 3)	0.95	100.00%	11.2	21.5	1
n66	Main(Ant 0)	0.95	100.00%	28.8	23.5	1
n71	Main(Ant 0)	0.95	100.00%	31.1	23.5	1
n77/n78 (PC3)	MIMO1(Ant 1)	0.95	100.00%	10.7	23.0	1
n77/n78 (PC2)**	MIMO1(Ant 1)	0.95	50.00%		23.0	1



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n77/n78 (PC3)	MIMO2(Ant 3)	0.95	100.00%	11.9	23.0	1
n77/n78 (PC2)**	MIMO2(Ant 3)	0.95	50.00%		23.0	1

*Pmax is used for the RF tune-up procedure. The maximum allowed output power is equal to Pmax + device uncertainty.

**All Plimit power levels entered in the table correspond to average power levels after accounting for the duty cycle in the case of TDD modulation schemes (e.g., GSM TDD, LTE TDD, and NR TDD).

The maximum allowed output power is Plimit + device uncertainty. However, if Plimit is higher than Pmax, the device output power will be limited to Pmax.

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

5.3 RF Exposure limit for above 6GHz

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

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm² per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

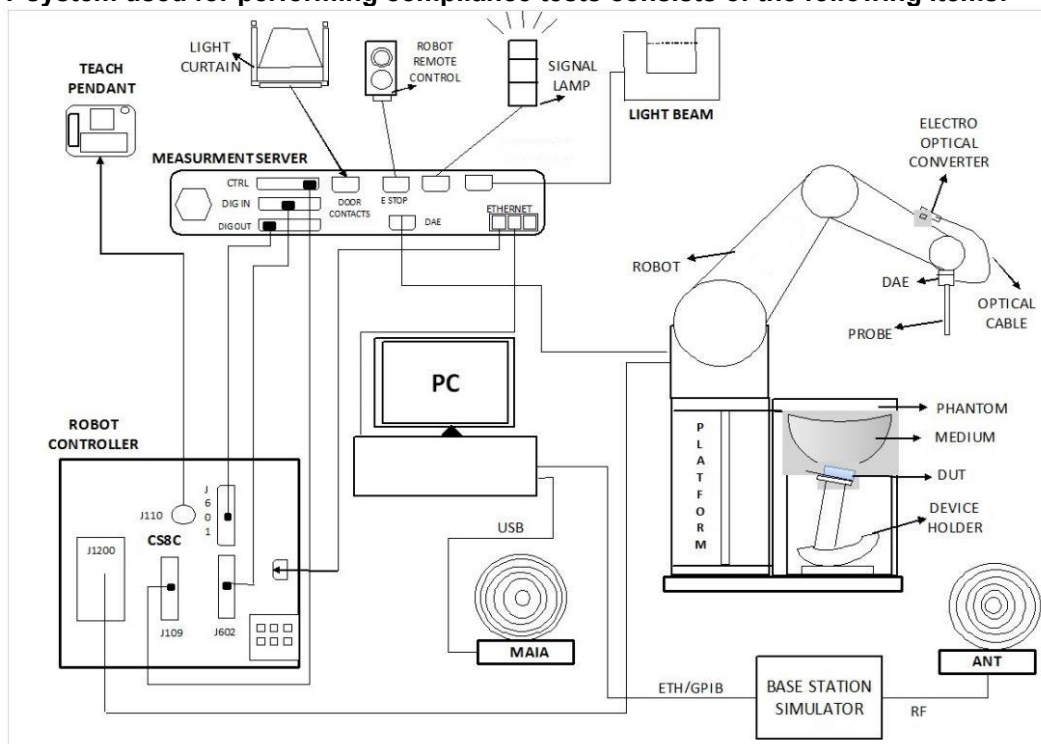
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



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

7.1 Test Site Location

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

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

7.2 E-Field Probe

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

<ES3DV3 Probe>

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

<EX3DV4 Probe>

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

7.3 Data Acquisition Electronics (DAE)

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

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



Fig 5.1 Photo of DAE

7.4 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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

7.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

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



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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



Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values 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

8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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.	

8.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: 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
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit ⁽²⁾	D750V3	1107	Jun. 22, 2022	Jun. 19, 2025
SPEAG	835MHz System Validation Kit ⁽²⁾	D835V2	4d167	Nov. 24, 2022	Nov. 21, 2025
SPEAG	1750MHz System Validation Kit	D1750V2	1112	Feb. 20, 2025	Feb. 19, 2026
SPEAG	1750MHz System Validation Kit ⁽²⁾	D1750V2	1068	Nov. 21, 2022	Nov. 18, 2025
SPEAG	1900MHz System Validation Kit ⁽²⁾	D1900V2	5d185	Jun. 17, 2022	Jun. 14, 2025
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Aug. 15, 2024	Aug. 14, 2025
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 15, 2024	Aug. 14, 2025
SPEAG	2600MHz System Validation Kit ⁽²⁾	D2600V2	1078	Jun. 23, 2022	Jun. 20, 2025
SPEAG	3500MHz System Validation Kit	D3500V2	1014	Jan. 15, 2025	Jan. 14, 2026
SPEAG	3500MHz System Validation Kit	D3500V2	1036	Mar. 11, 2025	Mar. 10, 2026
SPEAG	3700MHz System Validation Kit ⁽²⁾	D3700V2	1006	Jun. 20, 2022	Jun. 17, 2025
SPEAG	3900MHz System Validation Kit ⁽²⁾	D3900V2	1092	May. 15, 2023	May. 13, 2025
SPEAG	Data Acquisition Electronics	DAE4	1647	Oct. 15, 2024	Oct. 14, 2025
SPEAG	Data Acquisition Electronics	DAE4	1696	Sep. 03, 2024	Sep. 02, 2025
SPEAG	Data Acquisition Electronics	DAE4	1707	Dec. 04, 2024	Dec. 03, 2025
SPEAG	Data Acquisition Electronics	DAE4ip	1800	Jun. 18, 2024	Jun. 17, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7625	Dec. 13, 2024	Dec. 12, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7791	Feb. 19, 2025	Feb. 18, 2026
SPEAG	Dosimetric E-Field Probe	EX3DV4	7814	Jun. 20, 2024	Jun. 19, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	3728	Mar. 19, 2025	Mar. 18, 2026
Testo	Hygro meter	608-H1	45196600	Oct. 28, 2024	Oct. 27, 2025
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 12, 2024	Nov. 11, 2025
R&S	Wideband Radio Communication Tester	CMX500	101931	Sep. 23, 2024	Sep. 22, 2025
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 24, 2024	Sep. 23, 2025
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 20, 2024	Oct. 19, 2025
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 17, 2024	Sep. 16, 2025
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 07, 2024	Aug. 06, 2025
Anritsu	Power Meter	ML2495A	1419002	Aug. 13, 2024	Aug. 12, 2025
Anritsu	Power Sensor	MA2411B	1911176	Aug. 13, 2024	Aug. 12, 2025
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 09, 2024	Jul. 08, 2025
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 23, 2024	Oct. 22, 2025
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

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

10. System Verification

10.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18°C to 25°C, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.

The liquid tissue depth was at least 15cm in the phantom for all SAR testing

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
750	22.6	0.875	42.608	0.89	41.90	-1.69	1.69	± 5	2025/4/26
835	22.6	0.907	42.312	0.90	41.50	0.78	1.96	± 5	2025/4/26
1750	22.7	1.359	40.467	1.37	40.10	-0.80	0.92	± 5	2025/4/27
1750	22.7	1.359	40.467	1.37	40.10	-0.80	0.92	± 5	2025/4/27
1750	22.8	1.368	40.665	1.37	40.10	-0.15	1.41	± 5	2025/5/29
1900	22.7	1.435	38.919	1.40	40.00	2.50	-2.70	± 5	2025/4/27
1900	22.7	1.435	38.919	1.40	40.00	2.50	-2.70	± 5	2025/4/27
1900	22.8	1.445	39.117	1.40	40.00	3.21	-2.21	± 5	2025/5/29
2600	22.5	1.977	38.876	1.96	39.00	0.87	-0.32	± 5	2025/4/25
2600	22.6	1.980	37.700	1.96	39.00	1.02	-3.33	± 5	2025/4/29
2600	22.8	2.013	38.414	1.96	39.00	2.70	-1.50	± 5	2025/5/29
3500	22.6	2.910	37.900	2.91	37.90	0.00	0.00	± 5	2025/4/28
3500	22.6	2.890	37.800	2.91	37.90	-0.69	-0.26	± 5	2025/4/29
3500	22.4	2.910	37.500	2.91	37.90	0.00	-1.06	± 5	2025/5/3
3500	22.5	2.940	37.400	2.91	37.90	1.03	-1.32	± 5	2025/5/4
3500	22.8	2.966	38.728	2.91	37.90	1.92	2.18	± 5	2025/5/29
3700	22.6	3.090	37.600	3.12	37.70	-0.96	-0.27	± 5	2025/4/28
3700	22.9	3.070	37.600	3.12	37.70	-1.60	-0.27	± 5	2025/4/29
3700	22.4	3.100	37.200	3.12	37.70	-0.64	-1.33	± 5	2025/5/3
3700	22.5	3.120	37.100	3.12	37.70	0.00	-1.59	± 5	2025/5/4
3700	22.8	3.113	38.440	3.12	37.70	-0.22	1.96	± 5	2025/5/29
3900	22.6	3.250	37.300	3.33	37.51	-2.40	-0.56	± 5	2025/4/28
3900	22.6	3.240	37.200	3.33	37.51	-2.70	-0.83	± 5	2025/4/29
3900	22.4	3.330	36.800	3.33	37.51	0.00	-1.89	± 5	2025/5/3
3900	22.5	3.330	36.900	3.33	37.51	0.00	-1.63	± 5	2025/5/4

10.2 System Performance Check Results

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

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
SAR-11	2025/4/26	750	250	D750V3-1107	EX3DV4 - SN7814	DAE4 Sn1647	2.030	8.540	8.12	-4.92
SAR-11	2025/4/26	835	250	D835V2-4d167	EX3DV4 - SN7814	DAE4 Sn1647	2.590	9.800	10.36	5.71
SAR-11	2025/4/27	1750	50	D1750V2-1112	EX3DV4 - SN7814	DAE4 Sn1647	1.700	36.300	34	-6.34
SAR-11	2025/4/27	1750	50	D1750V2-1112	EX3DV4 - SN7814	DAE4 Sn1647	1.640	36.300	32.8	-9.64
SAR-15	2025/5/29	1750	50	D1750V2-1068	EX3DV4 - SN3728	DAE4 Sn1707	1.690	36.700	33.8	-7.90
SAR-11	2025/4/27	1900	50	D1900V2-5d185	EX3DV4 - SN7814	DAE4 Sn1647	1.860	39.000	37.2	-4.62
SAR-11	2025/4/27	1900	50	D1900V2-5d185	EX3DV4 - SN7814	DAE4 Sn1647	1.780	39.000	35.6	-8.72
SAR-15	2025/5/29	1900	50	D1900V2-5d041	EX3DV4 - SN3728	DAE4 Sn1707	1.850	39.200	37	-5.61
SAR-11	2025/4/25	2600	50	D2600V2-1078	EX3DV4 - SN7814	DAE4 Sn1647	2.700	55.400	54	-2.53
SAR-16	2025/4/29	2600	50	D2600V2-1008	EX3DV4 - SN7791	DAE4 Sn1696	2.580	55.700	51.6	-7.36
SAR-15	2025/5/29	2600	50	D2600V2-1008	EX3DV4 - SN3728	DAE4 Sn1707	2.550	55.700	51	-8.44
SAR-16	2025/4/28	3500	50	D3500V2-1014	EX3DV4 - SN7791	DAE4 Sn1696	3.190	65.700	63.8	-2.89
SAR-16	2025/4/29	3500	50	D3500V2-1014	EX3DV4 - SN7791	DAE4 Sn1696	3.150	65.700	63	-4.11
SAR-18	2025/5/3	3500	50	D3500V2-1014	EX3DV4 - SN7625	DAE4ip Sn1800	3.230	65.700	64.6	-1.67
SAR-18	2025/5/4	3500	50	D3500V2-1014	EX3DV4 - SN7625	DAE4ip Sn1800	3.250	65.700	65	-1.07
SAR-15	2025/5/29	3500	50	D3500V2-1036	EX3DV4 - SN3728	DAE4 Sn1707	2.990	65.600	59.8	-8.84
SAR-16	2025/4/28	3700	50	D3700V2-1006	EX3DV4 - SN7791	DAE4 Sn1696	3.110	65.600	62.2	-5.18
SAR-16	2025/4/29	3700	50	D3700V2-1006	EX3DV4 - SN7791	DAE4 Sn1696	3.100	65.600	62	-5.49
SAR-18	2025/5/3	3700	50	D3700V2-1006	EX3DV4 - SN7625	DAE4ip Sn1800	3.360	65.600	67.2	2.44
SAR-18	2025/5/4	3700	50	D3700V2-1006	EX3DV4 - SN7625	DAE4ip Sn1800	3.350	65.600	67	2.13
SAR-15	2025/5/29	3700	50	D3700V2-1006	EX3DV4 - SN3728	DAE4 Sn1707	3.050	65.600	61	-7.01
SAR-16	2025/4/28	3900	50	D3900V2-1092	EX3DV4 - SN7791	DAE4 Sn1696	3.030	67.000	60.6	-9.55
SAR-16	2025/4/29	3900	50	D3900V2-1092	EX3DV4 - SN7791	DAE4 Sn1696	3.020	67.000	60.4	-9.85
SAR-18	2025/5/3	3900	50	D3900V2-1092	EX3DV4 - SN7625	DAE4ip Sn1800	3.120	67.000	62.4	-6.87
SAR-18	2025/5/4	3900	50	D3900V2-1092	EX3DV4 - SN7625	DAE4ip Sn1800	3.140	67.000	62.8	-6.27

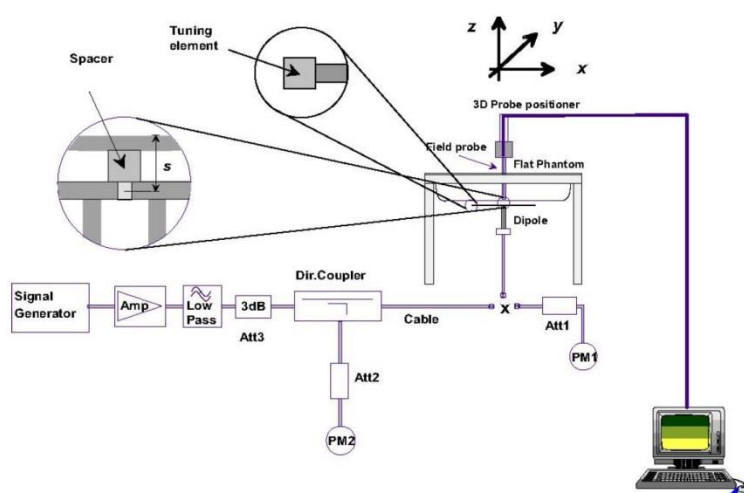


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo



11. LTE Output Power (Unit: dBm)

<LTE Conducted Power>

General Note:

1. A Base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

- 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- “special subframe S” contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Base station simulator was used for LTE output power measurements and SAR testing.

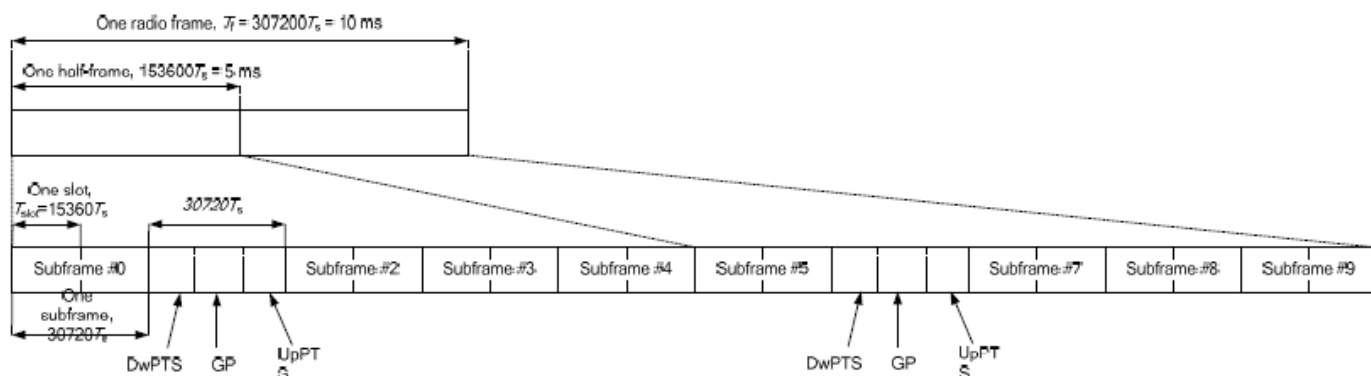


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
- vi. The device supports Power Class 3 uplink-downlink configurations 0 and 6, and Power Class 2 uplink-downlink configurations 1 to 5 operations for LTE Band 41.
- vii. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1, for Power Class 3 operation is 63.3% using UL-DL configuration 0. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR among all exposure condition.



FCC SAR TEST REPORT

Report No. : FA531705B

<LTE Band 42_Ant MIMO2> Part 96

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				43190	43340	43490	
Frequency (MHz)				3560	3575	3590	
20	QPSK	1	0	14.04	14.05	13.97	14.8
20	QPSK	1	49	13.96	13.95	13.90	
20	QPSK	1	99	13.86	13.79	13.78	
20	QPSK	50	0	14.02	14.04	13.96	14.8
20	QPSK	50	24	13.94	14.02	13.95	
20	QPSK	50	50	14.01	14.01	13.92	
20	QPSK	100	0	13.98	14.03	13.92	14.8
20	16QAM	1	0	13.96	14.04	13.94	
20	16QAM	1	49	14.00	14.02	13.94	
20	16QAM	1	99	13.88	13.85	13.80	14.8
20	16QAM	50	0	14.02	14.03	13.92	
20	16QAM	50	24	14.01	14.02	13.95	
20	16QAM	50	50	14.03	14.02	13.96	14.8
20	16QAM	100	0	14.02	14.04	13.95	
20	64QAM	1	0	13.93	14.04	13.92	
20	64QAM	1	49	13.96	13.83	13.90	14.8
20	64QAM	1	99	13.77	13.77	13.70	
20	64QAM	50	0	13.99	14.03	13.94	
20	64QAM	50	24	13.98	14.04	13.92	14.8
20	64QAM	50	50	14.03	14.01	13.93	
20	64QAM	100	0	14.02	14.03	13.94	
20	256QAM	1	0	14.00	14.02	13.95	14.8
20	256QAM	1	49	13.92	13.92	13.88	
20	256QAM	1	99	13.82	13.76	13.76	
20	256QAM	50	0	13.98	14.01	13.94	14.8
20	256QAM	50	24	13.90	13.99	13.93	
20	256QAM	50	50	13.97	13.98	13.90	
20	256QAM	100	0	13.94	14.00	13.90	
Channel				43165	43340	43515	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3575	3592.5	
15	QPSK	1	0	13.99	13.96	13.91	14.8
15	QPSK	1	37	13.87	13.88	13.80	
15	QPSK	1	74	13.76	13.69	13.71	
15	QPSK	36	0	13.93	13.96	13.87	14.8
15	QPSK	36	20	13.86	13.96	13.90	
15	QPSK	36	39	13.96	13.94	13.84	
15	QPSK	75	0	13.90	13.93	13.86	14.8
15	16QAM	1	0	13.88	13.98	13.89	
15	16QAM	1	37	13.93	13.96	13.85	
15	16QAM	1	74	13.79	13.79	13.71	14.8
15	16QAM	36	0	13.95	13.97	13.85	
15	16QAM	36	20	13.95	13.94	13.87	
15	16QAM	36	39	13.97	13.97	13.90	14.8
15	16QAM	75	0	13.92	13.95	13.88	
15	64QAM	1	0	13.85	13.98	13.85	
15	64QAM	1	37	13.90	13.78	13.83	14.8
15	64QAM	1	74	13.67	13.71	13.62	
15	64QAM	36	0	13.90	13.93	13.88	
15	64QAM	36	20	13.91	13.98	13.87	14.8
15	64QAM	36	39	13.97	13.91	13.87	
15	64QAM	75	0	13.93	13.93	13.84	
15	256QAM	1	0	13.90	13.96	13.90	14.8
15	256QAM	1	37	13.83	13.85	13.82	
15	256QAM	1	74	13.76	13.71	13.69	
15	256QAM	36	0	13.93	13.96	13.89	14.8
15	256QAM	36	20	13.82	13.94	13.84	
15	256QAM	36	39	13.90	13.93	13.85	



FCC SAR TEST REPORT

Report No. : FA531705B

15	256QAM	75	0	13.85	13.93	13.80	Tune-up limit (dBm)
Channel				43140	43340	43540	
Frequency (MHz)				3555	3575	3595	
10	QPSK	1	0	13.94	13.95	13.89	14.8
10	QPSK	1	25	13.86	13.88	13.81	
10	QPSK	1	49	13.78	13.72	13.70	
10	QPSK	25	0	13.94	13.98	13.89	14.8
10	QPSK	25	12	13.86	13.95	13.90	
10	QPSK	25	25	13.95	13.95	13.84	
10	QPSK	50	0	13.91	13.96	13.84	
10	16QAM	1	0	13.88	13.99	13.84	14.8
10	16QAM	1	25	13.91	13.93	13.85	
10	16QAM	1	49	13.78	13.79	13.71	
10	16QAM	25	0	13.96	13.98	13.83	14.8
10	16QAM	25	12	13.95	13.96	13.87	
10	16QAM	25	25	13.95	13.92	13.86	
10	16QAM	50	0	13.97	13.95	13.86	
10	64QAM	1	0	13.85	13.95	13.86	14.8
10	64QAM	1	25	13.89	13.75	13.81	
10	64QAM	1	49	13.71	13.71	13.60	
10	64QAM	25	0	13.93	13.97	13.89	14.8
10	64QAM	25	12	13.93	13.94	13.83	
10	64QAM	25	25	13.95	13.94	13.83	
10	64QAM	50	0	13.93	13.94	13.89	
10	256QAM	1	0	13.93	13.96	13.86	14.8
10	256QAM	1	25	13.83	13.84	13.78	
10	256QAM	1	49	13.74	13.69	13.71	
10	256QAM	25	0	13.92	13.92	13.87	14.8
10	256QAM	25	12	13.82	13.94	13.86	
10	256QAM	25	25	13.88	13.93	13.80	
10	256QAM	50	0	13.88	13.95	13.82	
Channel				43115	43340	43565	Tune-up limit (dBm)
Frequency (MHz)				3552.5	3575	3597.5	
5	QPSK	1	0	13.99	13.98	13.89	14.8
5	QPSK	1	12	13.91	13.86	13.83	
5	QPSK	1	24	13.77	13.70	13.70	
5	QPSK	12	0	13.95	13.97	13.87	14.8
5	QPSK	12	7	13.84	13.94	13.85	
5	QPSK	12	13	13.94	13.93	13.85	
5	QPSK	25	0	13.89	13.96	13.83	
5	16QAM	1	0	13.88	13.95	13.88	14.8
5	16QAM	1	12	13.91	13.95	13.87	
5	16QAM	1	24	13.81	13.75	13.74	
5	16QAM	12	0	13.93	13.93	13.86	14.8
5	16QAM	12	7	13.91	13.97	13.90	
5	16QAM	12	13	13.95	13.95	13.87	
5	16QAM	25	0	13.94	13.97	13.85	
5	64QAM	1	0	13.87	13.95	13.82	14.8
5	64QAM	1	12	13.86	13.78	13.80	
5	64QAM	1	24	13.69	13.72	13.60	
5	64QAM	12	0	13.94	13.94	13.89	14.8
5	64QAM	12	7	13.90	13.98	13.84	
5	64QAM	12	13	13.94	13.91	13.86	
5	64QAM	25	0	13.97	13.94	13.86	
5	256QAM	1	0	13.91	13.95	13.86	14.8
5	256QAM	1	12	13.83	13.82	13.79	
5	256QAM	1	24	13.77	13.71	13.68	
5	256QAM	12	0	13.89	13.92	13.87	14.8
5	256QAM	12	7	13.81	13.90	13.86	
5	256QAM	12	13	13.87	13.88	13.84	
5	256QAM	25	0	13.88	13.93	13.83	



<LTE Band 42_Ant MIMO2> Part 27Q

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				42190	42590	42990	
Frequency (MHz)				3460	3500	3540	
20	QPSK	1	0	14.42	14.23	14.08	
20	QPSK	1	49	14.24	14.12	13.94	14.8
20	QPSK	1	99	14.19	13.98	13.82	
20	QPSK	50	0	14.38	14.22	14.07	
20	QPSK	50	24	14.36	14.20	14.05	14.8
20	QPSK	50	50	14.35	14.16	14.01	
20	QPSK	100	0	14.34	14.21	14.06	
20	16QAM	1	0	14.31	14.21	14.02	14.8
20	16QAM	1	49	14.28	14.08	13.99	
20	16QAM	1	99	14.19	14.08	13.85	
20	16QAM	50	0	14.41	14.22	14.07	14.8
20	16QAM	50	24	14.36	14.21	14.06	
20	16QAM	50	50	14.34	14.16	14.02	
20	16QAM	100	0	14.35	14.19	14.04	14.8
20	64QAM	1	0	14.32	14.11	14.03	
20	64QAM	1	49	14.27	14.02	13.91	
20	64QAM	1	99	14.11	13.96	13.77	14.8
20	64QAM	50	0	14.37	14.18	14.05	
20	64QAM	50	24	14.36	14.18	14.02	
20	64QAM	50	50	14.33	14.14	13.96	14.8
20	64QAM	100	0	14.35	14.15	14.01	
20	256QAM	1	0	14.38	14.21	14.05	
20	256QAM	1	49	14.20	14.10	13.91	14.8
20	256QAM	1	99	14.15	13.96	13.79	
20	256QAM	50	0	14.34	14.20	14.04	
20	256QAM	50	24	14.32	14.18	14.02	14.8
20	256QAM	50	50	14.31	14.14	13.98	
20	256QAM	100	0	14.30	14.19	14.03	
Channel				42165	42590	43015	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3500	3542.5	
15	QPSK	1	0	14.34	14.15	14.02	
15	QPSK	1	37	14.14	14.03	13.89	14.8
15	QPSK	1	74	14.09	13.89	13.72	
15	QPSK	36	0	14.28	14.14	14.01	
15	QPSK	36	20	14.29	14.10	13.95	14.8
15	QPSK	36	39	14.29	14.07	13.91	
15	QPSK	75	0	14.25	14.16	14.01	
15	16QAM	1	0	14.21	14.15	13.96	14.8
15	16QAM	1	37	14.19	14.00	13.91	
15	16QAM	1	74	14.11	14.01	13.80	
15	16QAM	36	0	14.32	14.17	13.99	14.8
15	16QAM	36	20	14.28	14.16	13.97	
15	16QAM	36	39	14.25	14.09	13.93	
15	16QAM	75	0	14.27	14.11	13.94	14.8
15	64QAM	1	0	14.24	14.05	13.94	
15	64QAM	1	37	14.22	13.92	13.84	
15	64QAM	1	74	14.02	13.91	13.67	14.8
15	64QAM	36	0	14.32	14.09	13.98	
15	64QAM	36	20	14.26	14.12	13.94	
15	64QAM	36	39	14.27	14.05	13.90	14.8
15	64QAM	75	0	14.29	14.07	13.94	
15	256QAM	1	0	14.29	14.12	13.95	
15	256QAM	1	37	14.12	14.01	13.86	14.8
15	256QAM	1	74	14.05	13.88	13.70	
15	256QAM	36	0	14.25	14.15	13.96	
15	256QAM	36	20	14.27	14.12	13.94	14.8
15	256QAM	36	39	14.24	14.07	13.90	



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15	256QAM	75	0	14.23	14.13	13.98	Tune-up limit (dBm)
Channel				42140	42590	43040	
Frequency (MHz)				3455	3500	3545	
10	QPSK	1	0	14.35	14.13	14.02	14.8
10	QPSK	1	25	14.15	14.02	13.87	
10	QPSK	1	49	14.11	13.90	13.74	
10	QPSK	25	0	14.29	14.15	13.97	14.8
10	QPSK	25	12	14.29	14.11	14.00	
10	QPSK	25	25	14.29	14.08	13.96	
10	QPSK	50	0	14.29	14.14	13.98	
10	16QAM	1	0	14.26	14.15	13.92	14.8
10	16QAM	1	25	14.21	13.99	13.89	
10	16QAM	1	49	14.09	14.01	13.75	
10	16QAM	25	0	14.32	14.12	13.98	14.8
10	16QAM	25	12	14.29	14.16	13.98	
10	16QAM	25	25	14.29	14.07	13.92	
10	16QAM	50	0	14.27	14.11	13.98	
10	64QAM	1	0	14.24	14.06	13.98	14.8
10	64QAM	1	25	14.20	13.93	13.82	
10	64QAM	1	49	14.03	13.91	13.68	
10	64QAM	25	0	14.29	14.08	13.97	14.8
10	64QAM	25	12	14.26	14.11	13.94	
10	64QAM	25	25	14.27	14.07	13.90	
10	64QAM	50	0	14.25	14.05	13.95	
10	256QAM	1	0	14.28	14.12	13.96	14.8
10	256QAM	1	25	14.11	14.01	13.84	
10	256QAM	1	49	14.05	13.89	13.69	
10	256QAM	25	0	14.24	14.15	13.98	14.8
10	256QAM	25	12	14.22	14.12	13.93	
10	256QAM	25	25	14.23	14.05	13.89	
10	256QAM	50	0	14.23	14.13	13.94	
Channel				42114.1	42589.1	43064.1	Tune-up limit (dBm)
Frequency (MHz)				3452.5	3500	3547.5	
5	QPSK	1	0	14.33	14.16	14.01	14.8
5	QPSK	1	12	14.14	14.06	13.85	
5	QPSK	1	24	14.12	13.88	13.73	
5	QPSK	12	0	14.30	14.12	14.02	14.8
5	QPSK	12	7	14.26	14.12	13.99	
5	QPSK	12	13	14.26	14.10	13.95	
5	QPSK	25	0	14.24	14.11	13.98	
5	16QAM	1	0	14.21	14.13	13.96	14.8
5	16QAM	1	12	14.20	13.98	13.90	
5	16QAM	1	24	14.13	13.99	13.78	
5	16QAM	12	0	14.31	14.13	13.97	14.8
5	16QAM	12	7	14.26	14.13	14.01	
5	16QAM	12	13	14.25	14.11	13.94	
5	16QAM	25	0	14.26	14.09	13.95	
5	64QAM	1	0	14.25	14.01	13.98	14.8
5	64QAM	1	12	14.20	13.92	13.81	
5	64QAM	1	24	14.03	13.91	13.67	
5	64QAM	12	0	14.32	14.12	13.97	14.8
5	64QAM	12	7	14.28	14.09	13.96	
5	64QAM	12	13	14.28	14.06	13.88	
5	64QAM	25	0	14.30	14.06	13.91	
5	256QAM	1	0	14.32	14.13	13.95	14.8
5	256QAM	1	12	14.10	14.02	13.85	
5	256QAM	1	24	14.05	13.91	13.74	
5	256QAM	12	0	14.27	14.11	13.98	14.8
5	256QAM	12	7	14.23	14.08	13.97	
5	256QAM	12	13	14.26	14.08	13.89	
5	256QAM	25	0	14.23	14.14	13.93	

**<LTE Band 43_Ant MIMO2>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				44190	44215	44240	
Frequency (MHz)				3660	3662.5	3665	
20	QPSK	1	0	14.33	14.40	14.25	
20	QPSK	1	49	14.13	14.20	14.05	14.9
20	QPSK	1	99	13.97	14.01	13.86	
20	QPSK	50	0	14.32	14.38	14.23	
20	QPSK	50	24	14.18	14.33	14.18	14.9
20	QPSK	50	50	14.11	14.17	14.02	
20	QPSK	100	0	14.15	14.28	14.13	
20	16QAM	1	0	14.32	14.35	14.20	14.9
20	16QAM	1	49	14.27	14.29	14.14	
20	16QAM	1	99	14.01	14.05	13.90	
20	16QAM	50	0	14.32	14.39	14.24	14.9
20	16QAM	50	24	14.28	14.25	14.10	
20	16QAM	50	50	14.13	14.19	14.04	
20	16QAM	100	0	14.26	14.23	14.08	14.9
20	64QAM	1	0	14.28	14.30	14.15	
20	64QAM	1	49	14.12	14.19	14.04	
20	64QAM	1	99	13.95	14.03	13.88	14.9
20	64QAM	50	0	14.31	14.38	14.23	
20	64QAM	50	24	14.25	14.24	14.09	
20	64QAM	50	50	14.13	14.18	14.03	14.9
20	64QAM	100	0	14.25	14.23	14.08	
20	256QAM	1	0	14.30	14.35	14.22	
20	256QAM	1	49	14.10	14.15	14.02	14.9
20	256QAM	1	99	13.94	13.96	13.83	
20	256QAM	50	0	14.29	14.33	14.20	14.9
20	256QAM	50	24	14.15	14.28	14.15	
20	256QAM	50	50	14.08	14.12	13.99	
20	256QAM	100	0	14.12	14.23	14.10	
Channel				44165	44215	44265	Tune-up limit (dBm)
Frequency (MHz)				3657.5	3662.5	3667.5	
15	QPSK	1	0	14.26	14.30	14.19	
15	QPSK	1	37	14.04	14.12	13.95	14.9
15	QPSK	1	74	13.91	13.92	13.76	
15	QPSK	36	0	14.27	14.32	14.17	14.9
15	QPSK	36	20	14.11	14.25	14.12	
15	QPSK	36	39	14.04	14.11	13.96	
15	QPSK	75	0	14.09	14.19	14.08	14.9
15	16QAM	1	0	14.24	14.30	14.10	
15	16QAM	1	37	14.20	14.21	14.09	
15	16QAM	1	74	13.94	13.98	13.81	14.9
15	16QAM	36	0	14.22	14.32	14.19	
15	16QAM	36	20	14.19	14.16	14.01	
15	16QAM	36	39	14.05	14.13	13.98	14.9
15	16QAM	75	0	14.20	14.14	13.98	
15	64QAM	1	0	14.19	14.25	14.07	
15	64QAM	1	37	14.05	14.10	13.95	14.9
15	64QAM	1	74	13.87	13.94	13.78	
15	64QAM	36	0	14.23	14.33	14.15	
15	64QAM	36	20	14.20	14.14	14.00	14.9
15	64QAM	36	39	14.07	14.08	13.96	
15	64QAM	75	0	14.17	14.16	14.02	
15	256QAM	1	0	14.22	14.29	14.15	14.9
15	256QAM	1	37	14.05	14.09	13.95	
15	256QAM	1	74	13.88	13.89	13.76	
15	256QAM	36	0	14.20	14.25	14.11	14.9
15	256QAM	36	20	14.09	14.18	14.09	
15	256QAM	36	39	14.00	14.06	13.89	



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15	256QAM	75	0	14.02	14.15	14.01	Tune-up limit (dBm)
Channel				44140	44215	44290	
Frequency (MHz)				3655	3662.5	3670	
10	QPSK	1	0	14.27	14.35	14.15	14.9
10	QPSK	1	25	14.06	14.11	14.00	
10	QPSK	1	49	13.90	13.91	13.77	
10	QPSK	25	0	14.26	14.33	14.18	14.9
10	QPSK	25	12	14.10	14.24	14.12	
10	QPSK	25	25	14.05	14.08	13.95	
10	QPSK	50	0	14.09	14.23	14.08	
10	16QAM	1	0	14.23	14.25	14.11	14.9
10	16QAM	1	25	14.19	14.24	14.09	
10	16QAM	1	49	13.91	13.95	13.82	
10	16QAM	25	0	14.22	14.29	14.16	14.9
10	16QAM	25	12	14.21	14.17	14.01	
10	16QAM	25	25	14.06	14.13	13.96	
10	16QAM	50	0	14.19	14.15	13.98	
10	64QAM	1	0	14.21	14.22	14.07	14.9
10	64QAM	1	25	14.03	14.14	13.98	
10	64QAM	1	49	13.90	13.95	13.83	
10	64QAM	25	0	14.21	14.30	14.16	14.9
10	64QAM	25	12	14.17	14.17	14.03	
10	64QAM	25	25	14.03	14.13	13.96	
10	64QAM	50	0	14.15	14.17	14.02	
10	256QAM	1	0	14.23	14.30	14.13	14.9
10	256QAM	1	25	14.00	14.05	13.96	
10	256QAM	1	49	13.84	13.87	13.78	
10	256QAM	25	0	14.23	14.23	14.15	14.9
10	256QAM	25	12	14.10	14.21	14.09	
10	256QAM	25	25	14.01	14.07	13.92	
10	256QAM	50	0	14.02	14.16	14.01	
Channel				44115	44215	44315	Tune-up limit (dBm)
Frequency (MHz)				3652.5	3662.5	3672.5	
5	QPSK	1	0	14.25	14.31	14.20	14.9
5	QPSK	1	12	14.06	14.11	13.95	
5	QPSK	1	24	13.88	13.91	13.77	
5	QPSK	12	0	14.25	14.33	14.13	14.9
5	QPSK	12	7	14.08	14.23	14.13	
5	QPSK	12	13	14.01	14.08	13.95	
5	QPSK	25	0	14.05	14.19	14.04	
5	16QAM	1	0	14.22	14.27	14.11	14.9
5	16QAM	1	12	14.19	14.21	14.07	
5	16QAM	1	24	13.92	13.95	13.80	
5	16QAM	12	0	14.25	14.30	14.18	14.9
5	16QAM	12	7	14.20	14.18	14.01	
5	16QAM	12	13	14.05	14.11	13.97	
5	16QAM	25	0	14.21	14.16	14.03	
5	64QAM	1	0	14.23	14.22	14.05	14.9
5	64QAM	1	12	14.04	14.10	13.98	
5	64QAM	1	24	13.90	13.96	13.81	
5	64QAM	12	0	14.23	14.30	14.14	14.9
5	64QAM	12	7	14.19	14.15	14.01	
5	64QAM	12	13	14.04	14.13	13.93	
5	64QAM	25	0	14.16	14.14	14.03	
5	256QAM	1	0	14.22	14.25	14.14	14.9
5	256QAM	1	12	14.01	14.05	13.93	
5	256QAM	1	24	13.85	13.89	13.76	
5	256QAM	12	0	14.23	14.24	14.15	14.9
5	256QAM	12	7	14.08	14.22	14.05	
5	256QAM	12	13	14.00	14.06	13.92	
5	256QAM	25	0	14.04	14.14	14.05	



<LTE Band 43_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				43690	44090	44490	
Frequency (MHz)				3610	3650	3690	
20	QPSK	1	0	14.45	14.30	14.26	
20	QPSK	1	49	14.29	14.12	13.99	14.9
20	QPSK	1	99	14.07	13.93	13.80	
20	QPSK	50	0	14.44	14.27	14.19	
20	QPSK	50	24	14.32	14.23	14.13	14.9
20	QPSK	50	50	14.23	14.08	13.98	
20	QPSK	100	0	14.29	14.13	14.10	
20	16QAM	1	0	14.35	14.21	14.23	14.9
20	16QAM	1	49	14.24	14.08	14.09	
20	16QAM	1	99	14.07	13.99	13.90	
20	16QAM	50	0	14.38	14.28	14.19	14.9
20	16QAM	50	24	14.37	14.24	14.17	
20	16QAM	50	50	14.21	14.09	14.02	
20	16QAM	100	0	14.34	14.16	14.17	14.9
20	64QAM	1	0	14.36	14.26	14.25	
20	64QAM	1	49	14.22	14.13	14.14	
20	64QAM	1	99	14.07	13.87	13.85	14.9
20	64QAM	50	0	14.38	14.29	14.23	
20	64QAM	50	24	14.32	14.23	14.15	
20	64QAM	50	50	14.19	14.07	14.01	14.9
20	64QAM	100	0	14.31	14.14	14.15	
20	256QAM	1	0	14.38	14.24	14.22	
20	256QAM	1	49	14.22	14.06	13.95	14.9
20	256QAM	1	99	14.00	13.87	13.76	
20	256QAM	50	0	14.37	14.21	14.15	
20	256QAM	50	24	14.25	14.17	14.09	14.9
20	256QAM	50	50	14.16	14.02	13.94	
20	256QAM	100	0	14.22	14.07	14.06	
Channel				43665	44090	44515	Tune-up limit (dBm)
Frequency (MHz)				3607.5	3650	3692.5	
15	QPSK	1	0	14.35	14.24	14.20	
15	QPSK	1	37	14.19	14.05	13.90	14.9
15	QPSK	1	74	13.97	13.85	13.74	
15	QPSK	36	0	14.39	14.19	14.13	
15	QPSK	36	20	14.26	14.15	14.08	14.9
15	QPSK	36	39	14.14	14.00	13.90	
15	QPSK	75	0	14.23	14.08	14.02	
15	16QAM	1	0	14.27	14.16	14.18	14.9
15	16QAM	1	37	14.16	13.98	14.04	
15	16QAM	1	74	14.00	13.92	13.80	
15	16QAM	36	0	14.31	14.19	14.10	14.9
15	16QAM	36	20	14.31	14.18	14.08	
15	16QAM	36	39	14.11	13.99	13.96	
15	16QAM	75	0	14.28	14.09	14.07	14.9
15	64QAM	1	0	14.30	14.21	14.16	
15	64QAM	1	37	14.17	14.08	14.07	
15	64QAM	1	74	13.99	13.79	13.75	14.9
15	64QAM	36	0	14.31	14.19	14.15	
15	64QAM	36	20	14.25	14.15	14.09	
15	64QAM	36	39	14.09	14.00	13.95	14.9
15	64QAM	75	0	14.25	14.09	14.07	
15	256QAM	1	0	14.30	14.14	14.15	
15	256QAM	1	37	14.17	13.99	13.88	14.9
15	256QAM	1	74	13.92	13.77	13.68	
15	256QAM	36	0	14.32	14.12	14.10	
15	256QAM	36	20	14.16	14.10	13.99	14.9
15	256QAM	36	39	14.10	13.95	13.89	



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Report No. : FA531705B

15	256QAM	75	0	14.17	13.98	13.98	Tune-up limit (dBm)
Channel				43640	44090	44540	
Frequency (MHz)				3605	3650	3695	
10	QPSK	1	0	14.37	14.24	14.17	14.9
10	QPSK	1	25	14.19	14.05	13.92	
10	QPSK	1	49	13.98	13.86	13.75	
10	QPSK	25	0	14.39	14.20	14.13	14.9
10	QPSK	25	12	14.26	14.17	14.05	
10	QPSK	25	25	14.17	14.01	13.89	
10	QPSK	50	0	14.19	14.08	14.04	
10	16QAM	1	0	14.30	14.11	14.14	14.9
10	16QAM	1	25	14.14	14.03	14.00	
10	16QAM	1	49	14.02	13.93	13.84	
10	16QAM	25	0	14.33	14.18	14.13	14.9
10	16QAM	25	12	14.29	14.17	14.08	
10	16QAM	25	25	14.14	14.00	13.94	
10	16QAM	50	0	14.26	14.09	14.09	
10	64QAM	1	0	14.31	14.19	14.19	14.9
10	64QAM	1	25	14.14	14.06	14.08	
10	64QAM	1	49	13.98	13.77	13.75	
10	64QAM	25	0	14.33	14.20	14.18	14.9
10	64QAM	25	12	14.23	14.18	14.08	
10	64QAM	25	25	14.11	13.97	13.94	
10	64QAM	50	0	14.22	14.08	14.10	
10	256QAM	1	0	14.28	14.18	14.15	14.9
10	256QAM	1	25	14.12	13.99	13.89	
10	256QAM	1	49	13.90	13.78	13.67	
10	256QAM	25	0	14.32	14.12	14.05	14.9
10	256QAM	25	12	14.15	14.12	14.02	
10	256QAM	25	25	14.06	13.95	13.86	
10	256QAM	50	0	14.16	13.98	13.98	
Channel				43615	44090	44565	Tune-up limit (dBm)
Frequency (MHz)				3602.5	3650	3697.5	
5	QPSK	1	0	14.40	14.22	14.18	14.9
5	QPSK	1	12	14.23	14.03	13.93	
5	QPSK	1	24	14.00	13.87	13.71	
5	QPSK	12	0	14.38	14.20	14.11	14.9
5	QPSK	12	7	14.25	14.18	14.08	
5	QPSK	12	13	14.17	14.01	13.88	
5	QPSK	25	0	14.20	14.08	14.01	
5	16QAM	1	0	14.25	14.14	14.14	14.9
5	16QAM	1	12	14.16	14.02	14.00	
5	16QAM	1	24	14.01	13.94	13.84	
5	16QAM	12	0	14.28	14.18	14.13	14.9
5	16QAM	12	7	14.32	14.16	14.12	
5	16QAM	12	13	14.12	14.02	13.93	
5	16QAM	25	0	14.24	14.08	14.10	
5	64QAM	1	0	14.30	14.17	14.15	14.9
5	64QAM	1	12	14.12	14.03	14.09	
5	64QAM	1	24	14.01	13.80	13.77	
5	64QAM	12	0	14.33	14.24	14.15	14.9
5	64QAM	12	7	14.26	14.16	14.06	
5	64QAM	12	13	14.12	13.99	13.96	
5	64QAM	25	0	14.26	14.08	14.08	
5	256QAM	1	0	14.33	14.19	14.16	14.9
5	256QAM	1	12	14.12	13.96	13.89	
5	256QAM	1	24	13.94	13.82	13.67	
5	256QAM	12	0	14.32	14.13	14.08	14.9
5	256QAM	12	7	14.19	14.07	14.01	
5	256QAM	12	13	14.07	13.93	13.88	
5	256QAM	25	0	14.15	13.97	14.00	

**<LTE Band 48_Ant MIMO2>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				55340	55830	56150	56640	
Frequency (MHz)				3560	3609	3641	3690	
20	QPSK	1	0	14.49	14.54	14.59	14.40	14.8
20	QPSK	1	49	14.28	14.36	14.32	14.21	
20	QPSK	1	99	14.25	14.27	14.08	13.94	
20	QPSK	50	0	14.48	14.53	14.54	14.38	14.8
20	QPSK	50	24	14.38	14.46	14.51	14.34	
20	QPSK	50	50	14.43	14.47	14.34	14.17	
20	QPSK	100	0	14.37	14.45	14.46	14.28	
20	16QAM	1	0	14.39	14.44	14.57	14.38	14.8
20	16QAM	1	49	14.38	14.45	14.35	14.28	
20	16QAM	1	99	14.25	14.31	14.11	14.02	
20	16QAM	50	0	14.39	14.45	14.53	14.39	14.8
20	16QAM	50	24	14.45	14.53	14.50	14.35	
20	16QAM	50	50	14.43	14.48	14.34	14.20	
20	16QAM	100	0	14.43	14.50	14.50	14.33	
20	64QAM	1	0	14.29	14.33	14.50	14.36	14.8
20	64QAM	1	49	14.31	14.36	14.32	14.18	
20	64QAM	1	99	14.18	14.24	14.06	13.93	
20	64QAM	50	0	14.35	14.44	14.47	14.36	14.8
20	64QAM	50	24	14.41	14.47	14.44	14.29	
20	64QAM	50	50	14.36	14.45	14.31	14.13	
20	64QAM	100	0	14.41	14.45	14.44	14.29	
20	256QAM	1	0	14.45	14.50	14.51	14.33	14.8
20	256QAM	1	49	14.24	14.32	14.24	14.14	
20	256QAM	1	99	14.21	14.23	14.00	14.02	
20	256QAM	50	0	14.44	14.49	14.46	14.31	14.8
20	256QAM	50	24	14.34	14.42	14.43	14.27	
20	256QAM	50	50	14.39	14.43	14.26	14.10	
20	256QAM	100	0	14.33	14.41	14.38	14.21	
Channel				55315	55820	56160	56665	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3608	3642	3692.5	
15	QPSK	1	0	14.42	14.48	14.53	14.32	14.8
15	QPSK	1	37	14.21	14.31	14.22	14.11	
15	QPSK	1	74	14.17	14.20	14.03	13.86	
15	QPSK	36	0	14.38	14.44	14.48	14.30	14.8
15	QPSK	36	20	14.28	14.37	14.44	14.26	
15	QPSK	36	39	14.37	14.37	14.24	14.07	
15	QPSK	75	0	14.30	14.35	14.41	14.22	
15	16QAM	1	0	14.31	14.38	14.47	14.33	14.8
15	16QAM	1	37	14.33	14.40	14.26	14.18	
15	16QAM	1	74	14.15	14.22	14.06	13.93	
15	16QAM	36	0	14.31	14.39	14.45	14.33	14.8
15	16QAM	36	20	14.37	14.45	14.44	14.30	
15	16QAM	36	39	14.38	14.40	14.27	14.11	
15	16QAM	75	0	14.33	14.41	14.42	14.28	
15	64QAM	1	0	14.20	14.26	14.40	14.29	14.8
15	64QAM	1	37	14.24	14.31	14.25	14.09	
15	64QAM	1	74	14.08	14.16	13.99	13.88	
15	64QAM	36	0	14.26	14.35	14.37	14.27	14.8
15	64QAM	36	20	14.35	14.40	14.36	14.24	
15	64QAM	36	39	14.28	14.40	14.21	14.06	
15	64QAM	75	0	14.31	14.36	14.35	14.21	
15	256QAM	1	0	14.39	14.43	14.45	14.27	14.8
15	256QAM	1	37	14.18	14.27	14.15	14.08	
15	256QAM	1	74	14.16	14.14	14.04	14.05	
15	256QAM	36	0	14.34	14.40	14.39	14.25	14.8
15	256QAM	36	20	14.26	14.36	14.35	14.19	
15	256QAM	36	39	14.29	14.35	14.18	14.05	



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15	256QAM	75	0	14.28	14.31	14.31	14.11	Tune-up limit (dBm)
Channel				55290	55815	56165	56690	
Frequency (MHz)				3555	3607.5	3642.5	3695	
10	QPSK	1	0	14.43	14.44	14.50	14.32	14.8
10	QPSK	1	25	14.21	14.29	14.25	14.14	
10	QPSK	1	49	14.15	14.18	13.99	13.85	
10	QPSK	25	0	14.40	14.43	14.44	14.28	14.8
10	QPSK	25	12	14.32	14.36	14.42	14.25	
10	QPSK	25	25	14.35	14.37	14.24	14.10	
10	QPSK	50	0	14.30	14.35	14.36	14.22	
10	16QAM	1	0	14.33	14.34	14.47	14.29	14.8
10	16QAM	1	25	14.32	14.36	14.25	14.21	
10	16QAM	1	49	14.20	14.23	14.05	13.95	
10	16QAM	25	0	14.32	14.35	14.44	14.29	14.8
10	16QAM	25	12	14.40	14.48	14.40	14.25	
10	16QAM	25	25	14.35	14.40	14.25	14.13	
10	16QAM	50	0	14.35	14.40	14.40	14.24	
10	64QAM	1	0	14.20	14.25	14.41	14.31	14.8
10	64QAM	1	25	14.26	14.27	14.25	14.09	
10	64QAM	1	49	14.12	14.17	13.96	13.88	
10	64QAM	25	0	14.26	14.35	14.37	14.28	14.8
10	64QAM	25	12	14.34	14.42	14.38	14.22	
10	64QAM	25	25	14.27	14.36	14.24	14.05	
10	64QAM	50	0	14.32	14.38	14.38	14.20	
10	256QAM	1	0	14.36	14.42	14.42	14.23	14.8
10	256QAM	1	25	14.17	14.26	14.18	14.09	
10	256QAM	1	49	14.14	14.15	14.05	14.06	
10	256QAM	25	0	14.34	14.44	14.36	14.26	14.8
10	256QAM	25	12	14.25	14.34	14.35	14.17	
10	256QAM	25	25	14.34	14.35	14.16	14.00	
10	256QAM	50	0	14.25	14.33	14.29	14.15	
Channel				55265	55810	56170	56715	Tune-up limit (dBm)
Frequency (MHz)				3552.5	3607	3643	3697.5	
5	QPSK	1	0	14.39	14.46	14.51	14.31	14.8
5	QPSK	1	12	14.20	14.30	14.22	14.15	
5	QPSK	1	24	14.16	14.22	14.02	13.88	
5	QPSK	12	0	14.39	14.48	14.46	14.28	14.8
5	QPSK	12	7	14.30	14.38	14.42	14.24	
5	QPSK	12	13	14.36	14.39	14.25	14.10	
5	QPSK	25	0	14.27	14.38	14.41	14.21	
5	16QAM	1	0	14.32	14.39	14.50	14.30	14.8
5	16QAM	1	12	14.30	14.40	14.28	14.23	
5	16QAM	1	24	14.16	14.26	14.06	13.96	
5	16QAM	12	0	14.32	14.38	14.47	14.30	14.8
5	16QAM	12	7	14.40	14.47	14.43	14.26	
5	16QAM	12	13	14.33	14.42	14.29	14.10	
5	16QAM	25	0	14.38	14.43	14.42	14.26	
5	64QAM	1	0	14.20	14.27	14.40	14.30	14.8
5	64QAM	1	12	14.24	14.28	14.25	14.13	
5	64QAM	1	24	14.08	14.14	13.96	13.84	
5	64QAM	12	0	14.28	14.37	14.41	14.31	14.8
5	64QAM	12	7	14.32	14.38	14.37	14.24	
5	64QAM	12	13	14.26	14.37	14.23	14.05	
5	64QAM	25	0	14.31	14.35	14.38	14.20	
5	256QAM	1	0	14.40	14.43	14.42	14.25	14.8
5	256QAM	1	12	14.14	14.22	14.19	14.08	
5	256QAM	1	24	14.16	14.14	14.03	14.05	
5	256QAM	12	0	14.34	14.43	14.40	14.26	14.8
5	256QAM	12	7	14.24	14.33	14.37	14.18	
5	256QAM	12	13	14.34	14.37	14.19	14.05	
5	256QAM	25	0	14.23	14.31	14.33	14.14	



<LTE Band 48_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				55340	55830	56150	56640	
Frequency (MHz)				3560	3609	3641	3690	
20	QPSK	1	0	12.92	12.99	13.01	12.85	13.5
20	QPSK	1	49	12.80	12.82	12.83	12.68	
20	QPSK	1	99	12.74	12.81	12.89	12.72	
20	QPSK	50	0	12.85	12.96	12.99	12.81	13.5
20	QPSK	50	24	12.82	12.82	12.91	12.73	
20	QPSK	50	50	12.77	12.86	12.82	12.67	
20	QPSK	100	0	12.76	12.88	12.96	12.80	
20	16QAM	1	0	12.72	12.84	12.84	12.71	13.5
20	16QAM	1	49	12.66	12.72	12.69	12.51	
20	16QAM	1	99	12.61	12.71	12.72	12.52	
20	16QAM	50	0	12.72	12.80	12.89	12.69	13.5
20	16QAM	50	24	12.65	12.71	12.74	12.54	
20	16QAM	50	50	12.61	12.73	12.64	12.52	
20	16QAM	100	0	12.59	12.69	12.85	12.67	
20	64QAM	1	0	12.73	12.79	12.85	12.65	13.5
20	64QAM	1	49	12.70	12.68	12.67	12.54	
20	64QAM	1	99	12.54	12.67	12.70	12.54	
20	64QAM	50	0	12.66	12.82	12.87	12.66	13.5
20	64QAM	50	24	12.65	12.68	12.72	12.57	
20	64QAM	50	50	12.59	12.71	12.68	12.48	
20	64QAM	100	0	12.57	12.68	12.81	12.68	
20	256QAM	1	0	12.73	12.87	12.91	12.71	13.5
20	256QAM	1	49	12.70	12.69	12.70	12.58	
20	256QAM	1	99	12.63	12.64	12.77	12.55	
20	256QAM	50	0	12.65	12.82	12.79	12.68	13.5
20	256QAM	50	24	12.69	12.67	12.77	12.53	
20	256QAM	50	50	12.63	12.68	12.62	12.55	
20	256QAM	100	0	12.65	12.73	12.78	12.65	
Channel				55315	55820	56160	56665	Tune-up limit (dBm)
Frequency (MHz)				3557.5	3608	3642	3692.5	
15	QPSK	1	0	12.76	12.79	12.87	12.67	13.5
15	QPSK	1	37	12.70	12.65	12.64	12.49	
15	QPSK	1	74	12.62	12.71	12.78	12.53	
15	QPSK	36	0	12.71	12.83	12.86	12.68	13.5
15	QPSK	36	20	12.71	12.70	12.74	12.56	
15	QPSK	36	39	12.57	12.74	12.70	12.48	
15	QPSK	75	0	12.58	12.77	12.81	12.70	
15	16QAM	1	0	12.56	12.72	12.74	12.59	13.5
15	16QAM	1	37	12.52	12.52	12.56	12.38	
15	16QAM	1	74	12.45	12.58	12.59	12.38	
15	16QAM	36	0	12.61	12.60	12.73	12.54	13.5
15	16QAM	36	20	12.52	12.51	12.59	12.43	
15	16QAM	36	39	12.43	12.62	12.51	12.37	
15	16QAM	75	0	12.44	12.52	12.71	12.47	
15	64QAM	1	0	12.54	12.59	12.68	12.45	13.5
15	64QAM	1	37	12.55	12.58	12.55	12.37	
15	64QAM	1	74	12.36	12.56	12.57	12.39	
15	64QAM	36	0	12.54	12.70	12.77	12.49	13.5
15	64QAM	36	20	12.55	12.57	12.56	12.43	
15	64QAM	36	39	12.40	12.54	12.57	12.38	
15	64QAM	75	0	12.37	12.57	12.70	12.56	
15	256QAM	1	0	12.58	12.76	12.75	12.52	13.5
15	256QAM	1	37	12.53	12.56	12.55	12.46	
15	256QAM	1	74	12.43	12.53	12.66	12.42	
15	256QAM	36	0	12.46	12.72	12.65	12.57	13.5
15	256QAM	36	20	12.51	12.56	12.59	12.37	



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15	256QAM	36	39	12.47	12.58	12.49	12.39	Tune-up limit (dBm)
15	256QAM	75	0	12.46	12.62	12.68	12.53	
Channel				55290	55815	56165	56690	Tune-up limit (dBm)
Frequency (MHz)				3555	3607.5	3642.5	3695	
10	QPSK	1	0	12.74	12.79	12.88	12.68	13.5
10	QPSK	1	25	12.68	12.62	12.68	12.49	
10	QPSK	1	49	12.63	12.67	12.72	12.60	
10	QPSK	25	0	12.65	12.76	12.84	12.70	13.5
10	QPSK	25	12	12.66	12.72	12.76	12.56	
10	QPSK	25	25	12.66	12.74	12.65	12.47	
10	QPSK	50	0	12.60	12.68	12.76	12.65	
10	16QAM	1	0	12.53	12.67	12.66	12.53	13.5
10	16QAM	1	25	12.56	12.59	12.58	12.40	
10	16QAM	1	49	12.45	12.51	12.60	12.42	
10	16QAM	25	0	12.62	12.67	12.73	12.58	13.5
10	16QAM	25	12	12.51	12.58	12.55	12.34	
10	16QAM	25	25	12.43	12.63	12.45	12.36	
10	16QAM	50	0	12.44	12.55	12.71	12.47	
10	64QAM	1	0	12.56	12.61	12.70	12.53	13.5
10	64QAM	1	25	12.52	12.55	12.49	12.38	
10	64QAM	1	49	12.37	12.47	12.60	12.41	
10	64QAM	25	0	12.54	12.63	12.67	12.55	13.5
10	64QAM	25	12	12.55	12.54	12.55	12.45	
10	64QAM	25	25	12.39	12.60	12.53	12.28	
10	64QAM	50	0	12.41	12.48	12.61	12.57	
10	256QAM	1	0	12.58	12.70	12.81	12.56	13.5
10	256QAM	1	25	12.55	12.49	12.53	12.43	
10	256QAM	1	49	12.52	12.53	12.65	12.38	
10	256QAM	25	0	12.47	12.71	12.68	12.55	13.5
10	256QAM	25	12	12.52	12.56	12.65	12.40	
10	256QAM	25	25	12.52	12.58	12.50	12.43	
10	256QAM	50	0	12.50	12.53	12.62	12.45	
Channel				55265	55810	56170	56715	Tune-up limit (dBm)
Frequency (MHz)				3552.5	3607	3643	3697.5	
5	QPSK	1	0	12.81	12.83	12.81	12.69	13.5
5	QPSK	1	12	12.63	12.64	12.69	12.54	
5	QPSK	1	24	12.58	12.62	12.78	12.58	
5	QPSK	12	0	12.66	12.79	12.88	12.68	13.5
5	QPSK	12	7	12.67	12.72	12.75	12.54	
5	QPSK	12	13	12.58	12.74	12.65	12.57	
5	QPSK	25	0	12.59	12.71	12.84	12.68	
5	16QAM	1	0	12.52	12.64	12.70	12.53	13.5
5	16QAM	1	12	12.51	12.53	12.58	12.36	
5	16QAM	1	24	12.46	12.61	12.56	12.40	
5	16QAM	12	0	12.61	12.60	12.78	12.59	13.5
5	16QAM	12	7	12.47	12.52	12.56	12.43	
5	16QAM	12	13	12.49	12.61	12.45	12.42	
5	16QAM	25	0	12.48	12.56	12.67	12.47	
5	64QAM	1	0	12.53	12.68	12.72	12.52	13.5
5	64QAM	1	12	12.57	12.54	12.51	12.42	
5	64QAM	1	24	12.44	12.53	12.55	12.42	
5	64QAM	12	0	12.50	12.70	12.76	12.54	13.5
5	64QAM	12	7	12.55	12.57	12.57	12.40	
5	64QAM	12	13	12.42	12.60	12.49	12.36	
5	64QAM	25	0	12.39	12.52	12.68	12.55	
5	256QAM	1	0	12.53	12.67	12.72	12.52	13.5
5	256QAM	1	12	12.52	12.59	12.58	12.40	
5	256QAM	1	24	12.52	12.53	12.61	12.44	
5	256QAM	12	0	12.54	12.72	12.67	12.53	13.5
5	256QAM	12	7	12.58	12.53	12.60	12.38	
5	256QAM	12	13	12.47	12.57	12.49	12.37	
5	256QAM	25	0	12.51	12.56	12.59	12.55	

12. UL Carrier aggregation

<LTE UL carrier aggregation>

2CC Uplink Carrier Aggregation	
Number	Combination
1	42C
2	43C
3	48C

General Note:

1. The device supports intra-band uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.
2. The device supports uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.
3. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
4. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
5. Additional SAR measurement for LTE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

CA_42C Part 96_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43190	43388	QPSK	1	0	0	0	1	0	13.91	14.8
43340	43538	QPSK	1	0	0	0	1	0	13.89	14.8
43292	43490	QPSK	1	0	0	0	1	0	13.91	14.8

CA_42C 27Q_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
42190	42388	QPSK	1	0	0	0	1	0	14.09	14.8
42590	42788	QPSK	1	0	0	0	1	0	13.72	14.8
42792	42990	QPSK	1	0	0	0	1	0	13.75	14.8

CA_43C_MIMO2										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
44190	44307	QPSK	1	0	0	0	1	0	14.4	14.9

CA_43C Part96_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
43690	43888	QPSK	1	0	0	0	1	0	14.09	14.9
44090	44288	QPSK	1	0	0	0	1	0	14.31	14.9
44292	44490	QPSK	1	0	0	0	1	0	14.35	14.9

CA_48C Part 96_MIMO2										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
55340	55538	QPSK	1	0	0	0	1	0	14.09	14.8
55830	56028	QPSK	1	0	0	0	1	0	14.27	14.8
56150	56348	QPSK	1	0	0	0	1	0	14.43	14.8
56442	56640	QPSK	1	0	0	0	1	0	14.09	14.8

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

<5G NR Note>

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below
 - a. For DFT-OFDM output power measurement, full measurement was done for Pi/2 BPSK and QPSK and for the largest supported bandwidth, repeat test for 16QAM/64QAM/256QAM under 1RB 1Offset configuration. For smaller bandwidth, measure conducted power for Pi/2 BPSK and 1RB 1Offset configuration.
 - b. According to the tune-up, CP-OFDM output power is not ½ dB higher than DFT-OFDM mode, and the reported SAR of DFT-OFDM mode reported SAR is ≤ 1.45 W/kg, SAR test and thus conducted power for CP-OFDM mode is not required.
 - c. To start SAR test for the largest channel bandwidth for Pi/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. Also do SAR test for 50% RB allocation for Pi/2 BPSK SAR testing using 1RB Pi/2 BPSK allocation procedure
 - d. For Pi/2 BPSK with 100% RB allocation, SAR test is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
 - e. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not ½ dB higher than the same configuration in Pi/2 BPSK, also reported SAR for the Pi/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
 - f. Smaller bandwidth output power for each RB allocation configuration for this device is not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
2. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission. And only for TDD power class2 was performed using Factory Test Mode software to establish the connection and perform SAR with 50% transmission

<3GPP 38.101 MPR for EN-DC>

Table 6.2.2-1 Maximum power reduction (MPR) for power class 3

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

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

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

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

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



<FR1 n48_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				638000	641666	645332	12.2
Frequency (MHz)				3570	3624.99	3679.98	
40	PI/2 BPSK	1	1	11.09	11.10	11.09	
40	PI/2 BPSK	1	53	10.91	11.02	10.89	12.2
40	PI/2 BPSK	1	104	10.96	11.08	10.93	
40	PI/2 BPSK	50	0	10.89	10.99	10.87	
40	PI/2 BPSK	50	28	10.90	11.03	10.91	12.2
40	PI/2 BPSK	50	56	10.87	11.01	10.89	12.2
40	PI/2 BPSK	100	0	10.89	11.01	10.89	
40	QPSK	1	1	10.87	11.02	10.92	
40	QPSK	1	53	10.90	11.02	10.92	12.2
40	QPSK	1	104	10.93	11.03	10.93	
40	QPSK	50	0	10.87	11.02	10.88	
40	QPSK	50	28	10.87	11.00	10.88	12.2
40	QPSK	50	56	10.85	10.99	10.86	12.2
40	QPSK	100	0	10.87	11.01	10.89	
40	16QAM	1	1	10.93	11.05	10.92	
40	64QAM	1	1	10.94	11.06	10.95	12.2
40	256QAM	1	1	10.98	11.08	10.98	12.2
Channel				637668	641666	645666	Tune-up limit (dBm)
Frequency (MHz)				3565.02	3624.99	3684.99	
30	PI/2 BPSK	1	1	10.94	10.98	10.90	
Channel				637334	641666	646000	Tune-up limit (dBm)
Frequency (MHz)				3560.01	3624.99	3690	
20	PI/2 BPSK	1	1	10.96	10.98	10.90	
Channel				637168	641666	646166	Tune-up limit (dBm)
Frequency (MHz)				3557.52	3624.99	3692.49	
15	PI/2 BPSK	1	1	10.99	10.96	10.93	
Channel				637000	641666	646332	Tune-up limit (dBm)
Frequency (MHz)				3555	3624.99	3694.98	
10	PI/2 BPSK	1	1	10.97	10.97	10.94	



<FR1 n48_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				638000	641666	645332	12.2
Frequency (MHz)				3570	3624.99	3679.98	
40	PI/2 BPSK	1	1	11.36	11.35	11.38	
40	PI/2 BPSK	1	53	11.15	11.16	11.17	12.2
40	PI/2 BPSK	1	104	11.21	11.17	11.21	
40	PI/2 BPSK	50	0	11.08	11.09	11.13	
40	PI/2 BPSK	50	28	11.10	11.10	11.14	12.2
40	PI/2 BPSK	50	56	11.03	10.99	11.04	12.2
40	PI/2 BPSK	100	0	11.07	11.08	11.12	
40	QPSK	1	1	11.33	11.35	11.37	
40	QPSK	1	53	11.15	11.17	11.19	12.2
40	QPSK	1	104	11.18	11.20	11.20	
40	QPSK	50	0	11.27	11.26	11.27	
40	QPSK	50	28	11.10	11.11	11.15	12.2
40	QPSK	50	56	11.01	10.99	11.02	12.2
40	QPSK	100	0	11.10	11.10	11.14	
40	16QAM	1	1	11.30	11.32	11.32	
40	64QAM	1	1	11.18	11.17	11.21	12.2
40	256QAM	1	1	11.19	11.18	11.22	12.2
Channel				637668	641666	645666	Tune-up limit (dBm)
Frequency (MHz)				3565.02	3624.99	3684.99	
30	PI/2 BPSK	1	1	11.25	11.25	11.28	
Channel				637334	641666	646000	Tune-up limit (dBm)
Frequency (MHz)				3560.01	3624.99	3690	
20	PI/2 BPSK	1	1	11.26	11.20	11.23	
Channel				637168	641666	646166	Tune-up limit (dBm)
Frequency (MHz)				3557.52	3624.99	3692.49	
15	PI/2 BPSK	1	1	11.25	11.21	11.27	
Channel				637000	641666	646332	Tune-up limit (dBm)
Frequency (MHz)				3555	3624.99	3694.98	
10	PI/2 BPSK	1	1	11.24	11.20	11.30	



<FR1 n77_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	11.7
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	10.31	10.89	10.82	
100	PI/2 BPSK	1	137	10.26	10.87	10.75	11.7
100	PI/2 BPSK	1	271	10.28	10.85	10.71	
100	PI/2 BPSK	135	0	10.25	10.84	10.72	
100	PI/2 BPSK	135	69	10.34	10.88	10.73	11.7
100	PI/2 BPSK	135	138	10.29	10.81	10.66	11.7
100	PI/2 BPSK	270	0	10.26	10.82	10.72	
100	QPSK	1	1	10.28	10.79	10.66	
100	QPSK	1	137	10.24	10.78	10.66	11.7
100	QPSK	1	271	10.28	10.80	10.66	
100	QPSK	135	0	10.30	10.80	10.70	
100	QPSK	135	69	10.19	10.77	10.64	11.7
100	QPSK	135	138	10.23	10.79	10.69	11.7
100	QPSK	270	0	10.21	10.78	10.67	
100	16QAM	1	1	10.22	10.80	10.70	
100	64QAM	1	1	10.17	10.73	10.61	11.7
100	256QAM	1	1	10.26	10.85	10.75	11.7
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	10.27	10.85	10.80	
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	10.28	10.87	10.78	
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	10.29	10.85	10.78	
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	10.29	10.87	10.80	
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	10.28	10.85	10.79	
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	10.27	10.85	10.79	
Channel				647668	656000	664332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3840.00	3964.98	
30	PI/2 BPSK	1	1	10.27	10.85	10.78	
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	10.28	10.87	10.78	
Channel				647168	656000	664832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	10.28	10.86	10.79	
Channel				647000	656000	665000	Tune-up limit (dBm)
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	10.29	10.86	10.78	



<FR1 n77_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	12.9
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	11.54	11.66	11.57	
100	PI/2 BPSK	1	137	11.53	11.65	11.52	12.9
100	PI/2 BPSK	1	271	11.50	11.60	11.46	
100	PI/2 BPSK	135	0	11.49	11.64	11.51	
100	PI/2 BPSK	135	69	11.50	11.65	11.52	12.9
100	PI/2 BPSK	135	138	11.48	11.58	11.45	12.9
100	PI/2 BPSK	270	0	11.46	11.61	11.47	
100	QPSK	1	1	11.46	11.60	11.48	
100	QPSK	1	137	11.47	11.58	11.43	12.9
100	QPSK	1	271	11.40	11.55	11.42	
100	QPSK	135	0	11.52	11.62	11.50	
100	QPSK	135	69	11.47	11.60	11.49	12.9
100	QPSK	135	138	11.42	11.53	11.38	12.9
100	QPSK	270	0	11.47	11.61	11.50	
100	16QAM	1	1	11.46	11.60	11.45	
100	64QAM	1	1	11.53	11.63	11.52	12.9
100	256QAM	1	1	11.44	11.59	11.49	12.9
Channel				649668	656000	662332	12.9
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	11.35	11.53	11.44	
Channel				649334	656000	662666	12.9
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	11.35	11.54	11.44	
Channel				649000	656000	663000	12.9
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	11.38	11.51	11.45	
Channel				648668	656000	663332	12.9
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	11.39	11.50	11.47	
Channel				648334	656000	663666	12.9
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	11.37	11.54	11.41	
Channel				648000	656000	664000	12.9
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	11.36	11.55	11.44	
Channel				647668	656000	664332	12.9
Frequency (MHz)				3715.02	3840.00	3964.98	
30	PI/2 BPSK	1	1	11.34	11.50	11.45	
Channel				647334	656000	664666	12.9
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	11.36	11.54	11.42	
Channel				647168	656000	664832	12.9
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	11.36	11.55	11.44	
Channel				647000	656000	665000	12.9
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	11.34	11.51	11.45	



<FR1 n77_HPUE_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	14.7
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	13.47	13.97	13.86	
100	PI/2 BPSK	1	137	13.46	13.96	13.83	14.7
100	PI/2 BPSK	1	271	13.53	13.94	13.84	
100	PI/2 BPSK	135	0	13.48	13.90	13.76	
100	PI/2 BPSK	135	69	13.50	13.95	13.81	14.7
100	PI/2 BPSK	135	138	13.40	13.88	13.76	14.7
100	PI/2 BPSK	270	0	13.40	13.86	13.75	
100	QPSK	1	1	13.48	13.96	13.85	
100	QPSK	1	137	13.45	13.94	13.84	14.7
100	QPSK	1	271	13.45	13.91	13.79	
100	QPSK	135	0	13.44	13.86	13.73	
100	QPSK	135	69	13.40	13.90	13.80	14.7
100	QPSK	135	138	13.43	13.88	13.75	14.7
100	QPSK	270	0	13.36	13.85	13.71	
100	16QAM	1	1	13.51	13.93	13.81	
100	64QAM	1	1	13.46	13.88	13.76	14.7
100	256QAM	1	1	13.47	13.92	13.81	14.7
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	13.44	13.94	13.82	
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	13.45	13.95	13.82	
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	13.45	13.95	13.83	
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	13.45	13.94	13.83	
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	13.45	13.95	13.82	
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	13.44	13.93	13.83	
Channel				647668	656000	664332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3840.00	3964.98	
30	PI/2 BPSK	1	1	13.44	13.95	13.84	
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	13.44	13.93	13.84	
Channel				647168	656000	664832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	13.45	13.93	13.83	
Channel				647000	656000	665000	Tune-up limit (dBm)
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	13.44	13.94	13.83	



<FR1 n77_HPUE_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				650000	656000	662000	15.9
Frequency (MHz)				3750	3840	3930	
100	PI/2 BPSK	1	1	14.51	14.64	14.52	
100	PI/2 BPSK	1	137	14.50	14.62	14.51	15.9
100	PI/2 BPSK	1	271	14.47	14.57	14.43	
100	PI/2 BPSK	135	0	14.46	14.58	14.46	
100	PI/2 BPSK	135	69	14.49	14.59	14.44	15.9
100	PI/2 BPSK	135	138	14.40	14.53	14.39	15.9
100	PI/2 BPSK	270	0	14.39	14.53	14.43	
100	QPSK	1	1	14.43	14.57	14.43	
100	QPSK	1	137	14.50	14.62	14.52	15.9
100	QPSK	1	271	14.44	14.55	14.41	
100	QPSK	135	0	14.45	14.57	14.47	
100	QPSK	135	69	14.44	14.55	14.44	15.9
100	QPSK	135	138	14.36	14.51	14.39	15.9
100	QPSK	270	0	14.38	14.52	14.40	
100	16QAM	1	1	14.31	14.45	14.32	
100	64QAM	1	1	14.19	14.33	14.20	15.9
100	256QAM	1	1	14.37	14.49	14.39	15.9
Channel				649668	656000	662332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3840	3934.98	
90	PI/2 BPSK	1	1	14.28	14.46	14.32	
Channel				649334	656000	662666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3840	3939.99	
80	PI/2 BPSK	1	1	14.25	14.49	14.33	
Channel				649000	656000	663000	Tune-up limit (dBm)
Frequency (MHz)				3735	3840	3945	
70	PI/2 BPSK	1	1	14.21	14.52	14.34	
Channel				648668	656000	663332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3840	3949.98	
60	PI/2 BPSK	1	1	14.27	14.52	14.33	
Channel				648334	656000	663666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3840	3954.99	
50	PI/2 BPSK	1	1	14.24	14.54	14.36	
Channel				648000	656000	664000	Tune-up limit (dBm)
Frequency (MHz)				3720	3840	3960	
40	PI/2 BPSK	1	1	14.22	14.51	14.33	
Channel				647668	656000	664332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3840.00	3964.98	
30	PI/2 BPSK	1	1	14.21	14.46	14.31	
Channel				647334	656000	664666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3840	3969.99	
20	PI/2 BPSK	1	1	14.22	14.47	14.34	
Channel				647168	656000	664832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3840	3972.48	
15	PI/2 BPSK	1	1	14.24	14.52	14.36	
Channel				647000	656000	665000	Tune-up limit (dBm)
Frequency (MHz)				3705	3840	3975	
10	PI/2 BPSK	1	1	14.21	14.46	14.29	



<FR1 n77_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		11.05		
100	PI/2 BPSK	1	137		10.97		11.7
100	PI/2 BPSK	1	271		10.85		
100	PI/2 BPSK	135	0		10.93		
100	PI/2 BPSK	135	69		10.96		11.7
100	PI/2 BPSK	135	138		10.77		11.7
100	PI/2 BPSK	270	0		10.75		
100	QPSK	1	1		10.93		
100	QPSK	1	137		10.89		11.7
100	QPSK	1	271		10.74		
100	QPSK	135	0		11.03		
100	QPSK	135	69		10.84		11.7
100	QPSK	135	138		10.70		11.7
100	QPSK	270	0		10.77		
100	16QAM	1	1		10.97		
100	64QAM	1	1		10.86		11.7
100	256QAM	1	1		10.95		11.7
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	10.88	10.95	10.89	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	10.86	10.91	10.86	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	10.86	10.93	10.85	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	10.86	10.92	10.85	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	10.86	10.92	10.85	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	10.85	10.92	10.87	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	10.84	10.93	10.86	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	10.86	10.92	10.86	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	10.85	10.91	10.85	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	10.84	10.93	10.87	



<FR1 n77_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		12.9
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		11.81		
100	PI/2 BPSK	1	137		11.49		12.9
100	PI/2 BPSK	1	271		11.40		
100	PI/2 BPSK	135	0		11.50		
100	PI/2 BPSK	135	69		11.51		12.9
100	PI/2 BPSK	135	138		11.45		12.9
100	PI/2 BPSK	270	0		11.50		
100	QPSK	1	1		11.80		
100	QPSK	1	137		11.55		12.9
100	QPSK	1	271		11.50		
100	QPSK	135	0		11.74		
100	QPSK	135	69		11.51		12.9
100	QPSK	135	138		11.44		12.9
100	QPSK	270	0		11.52		
100	16QAM	1	1		11.80		
100	64QAM	1	1		11.69		12.9
100	256QAM	1	1		11.79		12.9
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	11.70	11.80	11.76	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	11.63	11.70	11.68	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	11.63	11.71	11.67	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	11.64	11.72	11.66	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	11.65	11.73	11.67	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	11.61	11.71	11.68	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	11.65	11.74	11.68	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	11.64	11.72	11.67	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	11.61	11.75	11.66	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	11.60	11.80	11.72	



<FR1 n77_HPUE_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		14.03		
100	PI/2 BPSK	1	137		13.81		14.7
100	PI/2 BPSK	1	271		13.73		
100	PI/2 BPSK	135	0		13.71		
100	PI/2 BPSK	135	69		13.88		14.7
100	PI/2 BPSK	135	138		13.58		14.7
100	PI/2 BPSK	270	0		13.74		
100	QPSK	1	1		13.95		
100	QPSK	1	137		13.62		14.7
100	QPSK	1	271		13.60		
100	QPSK	135	0		13.93		
100	QPSK	135	69		13.73		14.7
100	QPSK	135	138		13.59		14.7
100	QPSK	270	0		13.75		
100	16QAM	1	1		13.92		
100	64QAM	1	1		13.53		14.7
100	256QAM	1	1		14.00		14.7
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	13.83	13.91	13.86	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	13.81	13.88	13.84	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	13.79	13.88	13.84	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	13.79	13.88	13.82	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	13.79	13.87	13.83	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	13.80	13.87	13.83	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	13.80	13.87	13.82	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	13.80	13.88	13.83	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	13.80	13.89	13.82	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	13.79	13.89	13.83	



<FR1 n77_HPUE_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		14.73		
100	PI/2 BPSK	1	137		14.55		15.9
100	PI/2 BPSK	1	271		14.39		
100	PI/2 BPSK	135	0		14.53		
100	PI/2 BPSK	135	69		14.54		15.9
100	PI/2 BPSK	135	138		14.42		15.9
100	PI/2 BPSK	270	0		14.46		
100	QPSK	1	1		14.70		
100	QPSK	1	137		14.61		15.9
100	QPSK	1	271		14.44		
100	QPSK	135	0		14.59		
100	QPSK	135	69		14.51		15.9
100	QPSK	135	138		14.42		15.9
100	QPSK	270	0		14.49		
100	16QAM	1	1		14.56		
100	64QAM	1	1		14.58		15.9
100	256QAM	1	1		14.71		15.9
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	14.58	14.66	14.59	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	14.52	14.62	14.57	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	14.51	14.62	14.57	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	14.54	14.58	14.55	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	14.54	14.62	14.56	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	14.55	14.61	14.54	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	14.56	14.59	14.57	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	14.53	14.57	14.57	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	14.51	14.58	14.56	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	14.53	14.57	14.55	



<FR1 n78_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					650000		
Frequency (MHz)					3750		
100	PI/2 BPSK	1	1		10.45		11.7
100	PI/2 BPSK	1	137		10.40		
100	PI/2 BPSK	1	271		10.43		
100	PI/2 BPSK	135	0		10.24		11.7
100	PI/2 BPSK	135	69		10.35		11.7
100	PI/2 BPSK	135	138		10.28		11.7
100	PI/2 BPSK	270	0		10.35		
100	QPSK	1	1		10.13		11.7
100	QPSK	1	137		10.38		
100	QPSK	1	271		10.43		
100	QPSK	135	0		10.24		11.7
100	QPSK	135	69		10.33		11.7
100	QPSK	135	138		10.35		11.7
100	QPSK	270	0		10.33		
100	16QAM	1	1		10.41		11.7
100	64QAM	1	1		10.35		11.7
100	256QAM	1	1		10.33		11.7
Channel				649668	650000	650332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3750	3754.98	
90	PI/2 BPSK	1	1	10.31	10.33	10.26	11.7
Channel				649334	650000	650666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3750	3759.99	
80	PI/2 BPSK	1	1	10.27	10.31	10.23	11.7
Channel				649000	650000	651000	Tune-up limit (dBm)
Frequency (MHz)				3735	3750	3765	
70	PI/2 BPSK	1	1	10.28	10.29	10.24	11.7
Channel				648668	650000	651332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3750	3769.98	
60	PI/2 BPSK	1	1	10.28	10.30	10.23	11.7
Channel				648334	650000	651666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3750	3774.99	
50	PI/2 BPSK	1	1	10.28	10.31	10.24	11.7
Channel				648000	650000	652000	Tune-up limit (dBm)
Frequency (MHz)				3720	3750	3780	
40	PI/2 BPSK	1	1	10.28	10.31	10.23	11.7
Channel				647668	650000	652332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3750.00	3784.98	
30	PI/2 BPSK	1	1	10.28	10.29	10.23	11.7
Channel				647334	650000	652666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3750	3789.99	
20	PI/2 BPSK	1	1	10.27	10.31	10.22	11.7
Channel				647168	650000	652832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3750	3792.48	
15	PI/2 BPSK	1	1	10.27	10.29	10.22	11.7
Channel				647000	650000	653000	Tune-up limit (dBm)
Frequency (MHz)				3705	3750	3795	
10	PI/2 BPSK	1	1	10.28	10.30	10.23	11.7



<FR1 n78_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					650000		
Frequency (MHz)					3750		
100	PI/2 BPSK	1	1		11.57		
100	PI/2 BPSK	1	137		11.73		12.9
100	PI/2 BPSK	1	271		11.71		
100	PI/2 BPSK	135	0		11.70		
100	PI/2 BPSK	135	69		11.75		12.9
100	PI/2 BPSK	135	138		11.70		12.9
100	PI/2 BPSK	270	0		11.71		
100	QPSK	1	1		11.70		
100	QPSK	1	137		11.72		12.9
100	QPSK	1	271		11.70		
100	QPSK	135	0		11.66		
100	QPSK	135	69		11.72		12.9
100	QPSK	135	138		11.70		12.9
100	QPSK	270	0		11.69		
100	16QAM	1	1		11.64		
100	64QAM	1	1		11.61		12.9
100	256QAM	1	1		11.68		12.9
Channel				649668	650000	650332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3750	3754.98	
90	PI/2 BPSK	1	1	11.70	11.66	11.69	
Channel				649334	650000	650666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3750	3759.99	
80	PI/2 BPSK	1	1	11.60	11.65	11.56	
Channel				649000	650000	651000	Tune-up limit (dBm)
Frequency (MHz)				3735	3750	3765	
70	PI/2 BPSK	1	1	11.54	11.61	11.55	
Channel				648668	650000	651332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3750	3769.98	
60	PI/2 BPSK	1	1	11.59	11.61	11.60	
Channel				648334	650000	651666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3750	3774.99	
50	PI/2 BPSK	1	1	11.52	11.62	11.63	
Channel				648000	650000	652000	Tune-up limit (dBm)
Frequency (MHz)				3720	3750	3780	
40	PI/2 BPSK	1	1	11.57	11.57	11.58	
Channel				647668	650000	652332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3750.00	3784.98	
30	PI/2 BPSK	1	1	11.55	11.64	11.61	
Channel				647334	650000	652666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3750	3789.99	
20	PI/2 BPSK	1	1	11.58	11.65	11.56	
Channel				647168	650000	652832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3750	3792.48	
15	PI/2 BPSK	1	1	11.53	11.62	11.56	
Channel				647000	650000	653000	Tune-up limit (dBm)
Frequency (MHz)				3705	3750	3795	
10	PI/2 BPSK	1	1	11.54	11.58	11.63	



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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					650000		
Frequency (MHz)					3750		
100	PI/2 BPSK	1	1		13.52		
100	PI/2 BPSK	1	137		13.48		14.7
100	PI/2 BPSK	1	271		13.45		
100	PI/2 BPSK	135	0		13.36		
100	PI/2 BPSK	135	69		13.45		14.7
100	PI/2 BPSK	135	138		13.42		14.7
100	PI/2 BPSK	270	0		13.44		
100	QPSK	1	1		13.29		
100	QPSK	1	137		13.39		14.7
100	QPSK	1	271		13.37		
100	QPSK	135	0		13.36		
100	QPSK	135	69		13.43		14.7
100	QPSK	135	138		13.47		14.7
100	QPSK	270	0		13.45		
100	16QAM	1	1		13.31		
100	64QAM	1	1		13.16		14.7
100	256QAM	1	1		13.33		14.7
Channel				649668	650000	650332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3750	3754.98	
90	PI/2 BPSK	1	1	13.31	13.33	13.24	
Channel				649334	650000	650666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3750	3759.99	
80	PI/2 BPSK	1	1	13.25	13.27	13.18	
Channel				649000	650000	651000	Tune-up limit (dBm)
Frequency (MHz)				3735	3750	3765	
70	PI/2 BPSK	1	1	13.25	13.29	13.19	
Channel				648668	650000	651332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3750	3769.98	
60	PI/2 BPSK	1	1	13.27	13.28	13.19	
Channel				648334	650000	651666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3750	3774.99	
50	PI/2 BPSK	1	1	13.25	13.27	13.20	
Channel				648000	650000	652000	Tune-up limit (dBm)
Frequency (MHz)				3720	3750	3780	
40	PI/2 BPSK	1	1	13.25	13.27	13.19	
Channel				647668	650000	652332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3750.00	3784.98	
30	PI/2 BPSK	1	1	13.25	13.29	13.20	
Channel				647334	650000	652666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3750	3789.99	
20	PI/2 BPSK	1	1	13.25	13.29	13.18	
Channel				647168	650000	652832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3750	3792.48	
15	PI/2 BPSK	1	1	13.27	13.27	13.19	
Channel				647000	650000	653000	Tune-up limit (dBm)
Frequency (MHz)				3705	3750	3795	
10	PI/2 BPSK	1	1	13.27	13.29	13.19	



<FR1 n78_HPUE_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					650000		
Frequency (MHz)					3750		
100	PI/2 BPSK	1	1		14.56		
100	PI/2 BPSK	1	137		14.83		15.9
100	PI/2 BPSK	1	271		14.82		
100	PI/2 BPSK	135	0		14.70		
100	PI/2 BPSK	135	69		14.81		15.9
100	PI/2 BPSK	135	138		14.75		15.9
100	PI/2 BPSK	270	0		14.79		
100	QPSK	1	1		14.64		
100	QPSK	1	137		14.80		15.9
100	QPSK	1	271		14.79		
100	QPSK	135	0		14.76		
100	QPSK	135	69		14.79		15.9
100	QPSK	135	138		14.78		15.9
100	QPSK	270	0		14.81		
100	16QAM	1	1		14.66		
100	64QAM	1	1		14.72		15.9
100	256QAM	1	1		14.61		15.9
Channel				649668	650000	650332	Tune-up limit (dBm)
Frequency (MHz)				3745.02	3750	3754.98	
90	PI/2 BPSK	1	1	14.48	14.58	14.56	15.9
Channel				649334	650000	650666	Tune-up limit (dBm)
Frequency (MHz)				3740.01	3750	3759.99	
80	PI/2 BPSK	1	1	14.36	14.48	14.44	15.9
Channel				649000	650000	651000	Tune-up limit (dBm)
Frequency (MHz)				3735	3750	3765	
70	PI/2 BPSK	1	1	14.35	14.53	14.49	15.9
Channel				648668	650000	651332	Tune-up limit (dBm)
Frequency (MHz)				3730.02	3750	3769.98	
60	PI/2 BPSK	1	1	14.43	14.47	14.45	15.9
Channel				648334	650000	651666	Tune-up limit (dBm)
Frequency (MHz)				3725.01	3750	3774.99	
50	PI/2 BPSK	1	1	14.38	14.46	14.44	15.9
Channel				648000	650000	652000	Tune-up limit (dBm)
Frequency (MHz)				3720	3750	3780	
40	PI/2 BPSK	1	1	14.38	14.50	14.46	15.9
Channel				647668	650000	652332	Tune-up limit (dBm)
Frequency (MHz)				3715.02	3750.00	3784.98	
30	PI/2 BPSK	1	1	14.42	14.53	14.44	15.9
Channel				647334	650000	652666	Tune-up limit (dBm)
Frequency (MHz)				3710.01	3750	3789.99	
20	PI/2 BPSK	1	1	14.40	14.50	14.50	15.9
Channel				647168	650000	652832	Tune-up limit (dBm)
Frequency (MHz)				3707.52	3750	3792.48	
15	PI/2 BPSK	1	1	14.40	14.50	14.42	15.9
Channel				647000	650000	653000	Tune-up limit (dBm)
Frequency (MHz)				3705	3750	3795	
10	PI/2 BPSK	1	1	14.38	14.45	14.42	15.9



<FR1 n78_Ant MIMO1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		10.88		11.7
100	PI/2 BPSK	1	137		10.71		
100	PI/2 BPSK	1	271		10.69		
100	PI/2 BPSK	135	0		10.64		11.7
100	PI/2 BPSK	135	69		10.84		11.7
100	PI/2 BPSK	135	138		10.62		11.7
100	PI/2 BPSK	270	0		10.61		
100	QPSK	1	1		10.85		11.7
100	QPSK	1	137		10.70		
100	QPSK	1	271		10.68		
100	QPSK	135	0		10.79		11.7
100	QPSK	135	69		10.66		11.7
100	QPSK	135	138		10.63		11.7
100	QPSK	270	0		10.65		
100	16QAM	1	1		10.87		11.7
100	64QAM	1	1		10.81		11.7
100	256QAM	1	1		10.83		11.7
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	10.81	10.83	10.76	11.7
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	10.75	10.73	10.65	11.7
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	10.73	10.75	10.70	11.7
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	10.75	10.76	10.69	11.7
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	10.70	10.77	10.69	11.7
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	10.70	10.74	10.65	11.7
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	10.75	10.76	10.70	11.7
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	10.70	10.72	10.66	11.7
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	10.74	10.73	10.68	11.7
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	10.74	10.75	10.69	11.7



<FR1 n78_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		11.65		
100	PI/2 BPSK	1	137		11.48		12.9
100	PI/2 BPSK	1	271		11.24		
100	PI/2 BPSK	135	0		11.63		
100	PI/2 BPSK	135	69		11.60		12.9
100	PI/2 BPSK	135	138		11.35		12.9
100	PI/2 BPSK	270	0		11.49		
100	QPSK	1	1		11.60		
100	QPSK	1	137		11.47		12.9
100	QPSK	1	271		11.36		
100	QPSK	135	0		11.61		
100	QPSK	135	69		11.53		12.9
100	QPSK	135	138		11.41		12.9
100	QPSK	270	0		11.56		
100	16QAM	1	1		11.61		
100	64QAM	1	1		11.47		12.9
100	256QAM	1	1		11.58		12.9
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	11.48	11.55	11.60	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	11.43	11.58	11.53	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	11.45	11.59	11.54	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	11.42	11.60	11.48	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	11.44	11.62	11.56	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	11.40	11.60	11.51	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	11.45	11.60	11.49	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	11.44	11.59	11.56	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	11.47	11.54	11.54	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	11.40	11.61	11.56	



<FR1 n78_HPUE_Ant MIMO1>

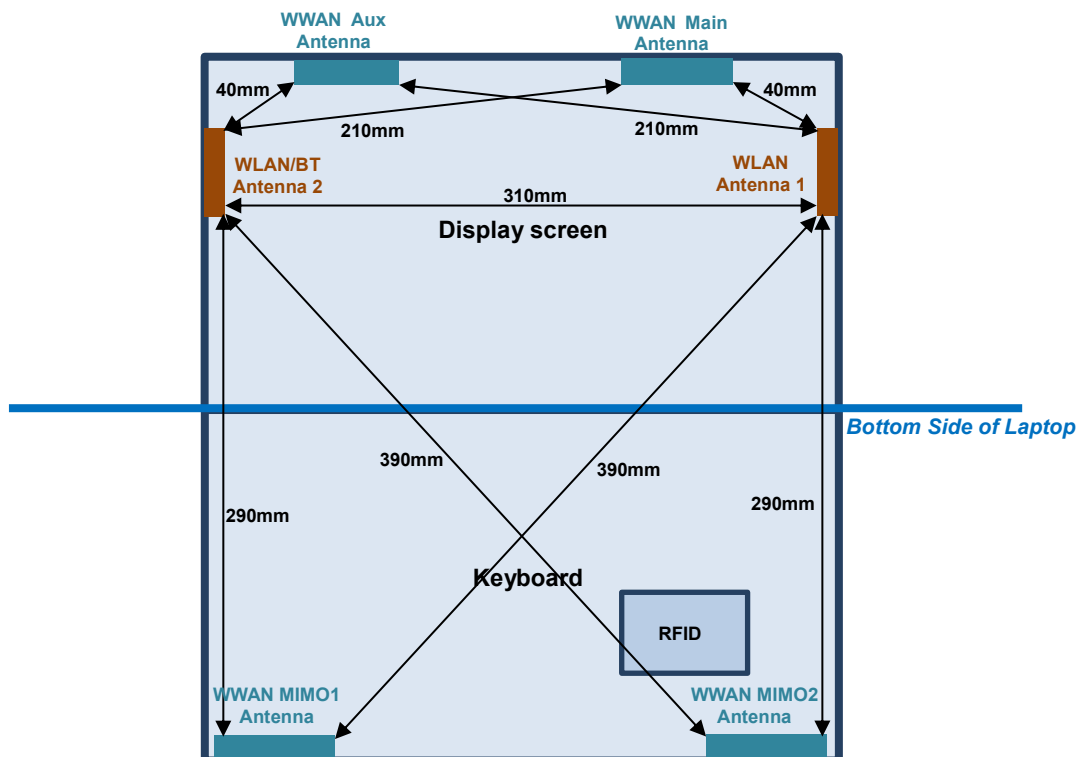
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		14.16		
100	PI/2 BPSK	1	137		13.62		14.7
100	PI/2 BPSK	1	271		13.40		
100	PI/2 BPSK	135	0		13.57		
100	PI/2 BPSK	135	69		13.60		14.7
100	PI/2 BPSK	135	138		13.50		14.7
100	PI/2 BPSK	270	0		13.51		
100	QPSK	1	1		13.55		
100	QPSK	1	137		13.54		14.7
100	QPSK	1	271		13.35		
100	QPSK	135	0		13.61		
100	QPSK	135	69		13.58		14.7
100	QPSK	135	138		13.52		14.7
100	QPSK	270	0		13.52		
100	16QAM	1	1		13.63		
100	64QAM	1	1		13.35		14.7
100	256QAM	1	1		13.65		14.7
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	14.00	14.10	14.08	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	13.95	14.01	14.03	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	13.90	14.03	13.99	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	13.93	14.04	14.03	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	13.93	14.03	13.98	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	13.90	14.02	13.98	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	13.92	14.02	14.01	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	13.90	14.02	13.98	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	13.90	14.05	13.99	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	13.90	14.05	13.99	



<FR1 n78_HPUE_Ant MIMO2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633332		
Frequency (MHz)					3499.98		
100	PI/2 BPSK	1	1		14.91		
100	PI/2 BPSK	1	137		14.70		15.9
100	PI/2 BPSK	1	271		14.52		
100	PI/2 BPSK	135	0		14.79		
100	PI/2 BPSK	135	69		14.76		15.9
100	PI/2 BPSK	135	138		14.60		15.9
100	PI/2 BPSK	270	0		14.74		
100	QPSK	1	1		14.88		
100	QPSK	1	137		14.84		15.9
100	QPSK	1	271		14.47		
100	QPSK	135	0		14.83		
100	QPSK	135	69		14.75		15.9
100	QPSK	135	138		14.61		15.9
100	QPSK	270	0		14.69		
100	16QAM	1	1		14.65		
100	64QAM	1	1		14.88		15.9
100	256QAM	1	1		14.86		15.9
Channel				633000	633332	633666	Tune-up limit (dBm)
Frequency (MHz)				3495	3499.98	3504.99	
90	PI/2 BPSK	1	1	14.59	14.75	14.66	
Channel				632668	633332	634000	Tune-up limit (dBm)
Frequency (MHz)				3490.02	3499.98	3510	
80	PI/2 BPSK	1	1	14.52	14.68	14.54	
Channel				632334	633332	634332	Tune-up limit (dBm)
Frequency (MHz)				3485.01	3499.98	3514.98	
70	PI/2 BPSK	1	1	14.55	14.70	14.59	
Channel				632000	633332	634666	Tune-up limit (dBm)
Frequency (MHz)				3480	3499.98	3519.99	
60	PI/2 BPSK	1	1	14.47	14.66	14.52	
Channel				631668	633332	635000	Tune-up limit (dBm)
Frequency (MHz)				3475.02	3499.98	3525	
50	PI/2 BPSK	1	1	14.47	14.62	14.55	
Channel				631334	633332	635332	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3499.98	3529.98	
40	PI/2 BPSK	1	1	14.56	14.65	14.51	
Channel				631000	633332	635666	Tune-up limit (dBm)
Frequency (MHz)				3465	3499.98	3534.99	
30	PI/2 BPSK	1	1	14.55	14.69	14.56	
Channel				630668	633332	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3499.98	3540	
20	PI/2 BPSK	1	1	14.57	14.62	14.59	
Channel				630500	633332	636166	Tune-up limit (dBm)
Frequency (MHz)				3457.5	3499.98	3542.49	
15	PI/2 BPSK	1	1	14.52	14.64	14.50	
Channel				630334	633332	636332	Tune-up limit (dBm)
Frequency (MHz)				3455.01	3499.98	3544.98	
10	PI/2 BPSK	1	1	14.56	14.61	14.54	

14. Antenna Location



The separation distance for antenna to edge :

Antenna	To Bottom Side (mm)
WWAN Main antenna	235
WWAN MIMO1 antenna	5
WWAN MIMO2 antenna	5
WWAN Aux antenna	235
WLAN Antenna 1	140
WLAN/BT Antenna 2	140

<SAR test exclusion table>
General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR}$$
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
 - a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
 - b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz

<Main>

	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 71	LTE Band 12/17/n12	LTE Band 13/n13	LTE Band 14/n14	FR1 Band n71	LTE Band 5/26	FR1 Band n5/n26	FR1 Band n66	LTE Band 4/66	LTE Band 2/25	FR1 Band n2/n25	FR1 Band n38	LTE Band 7/n7	LTE Band 38/41	FR1 Band n41
Exposure Position	Calculated Frequency (MHz)	846	1750	1907	695	715	784	795	695	848	848	1779	1779	1914	1914	2690	2567	2617	2690
	Maximum power (dBm)	24.5	24.5	24.5	27.0	24.0	24.0	24.0	24.5	24.0	24.5	24.5	24.0	24.0	24.5	24.0	24.0	26.5	27.0
	Maximum rated power(mW)	281.84	281.84	281.84	501.19	251.19	251.19	251.19	281.84	251.19	281.84	281.84	251.19	251.19	281.84	251.19	251.19	446.68	501.19
	Separation distance(mm)	235.0																	
Bottom Side	exclusion threshold	1206.0	1963.0	1959.0	1037.0	1059.0	1136.0	1149.0	1037.0	1209.0	1209.0	1962.0	1962.0	1958.0	1958.0	1941.0	1944.0	1943.0	1941.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

<MIMO1>

	Wireless Interface	LTE Band 48	FR1 Band n48	FR1 Band n77	FR1 Band n78
Exposure Position	Calculated Frequency (MHz)	3700	3700	3980	3800
	Maximum power (dBm)	13.5	11.5	15.0	15.0
	Maximum rated power(mW)	22.39	14.13	31.62	31.62
	Separation distance(mm)	5.0			
Bottom Side	exclusion threshold	8.6	5.4	12.6	12.3
	Testing required?	Yes	Yes	Yes	Yes

<MIMO2>

Exposure Position	Wireless Interface	LTE Band 42	LTE Band 43	LTE Band 48	FR1 Band n48	FR1 Band n77	FR1 Band n78
	Calculated Frequency (MHz)	3600	3800	3700	3700	3980	3800
	Maximum power (dBm)	15.0	15.0	15.0	12.5	15.5	15.5
	Maximum rated power(mW)	31.62	31.62	31.62	17.78	35.48	35.48
Bottom Side	Separation distance(mm)	5.0					
	exclusion threshold	12.0	12.3	12.2	6.8	14.2	13.8
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes

<Aux>

Exposure Position	Wireless Interface	LTE Band 2 / 25	FR1 Band n2 / 25	LTE Band 7	FR1 Band n7	LTE Band 38	LTE Band 41	FR1 Band n38	FR1 Band n41
	Calculated Frequency (MHz)	1914	1912	2567	2567	2617	2687	2690	2690
	Maximum power (dBm)	24.0	24.5	24.0	24.0	24.0	26.5	24.0	27.0
	Maximum rated power(mW)	251.19	281.84	251.19	251.19	251.19	446.68	251.19	501.19
Bottom Side	Separation distance(mm)	235.0							
	exclusion threshold	1958.0	1958.0	1944.0	1944.0	1943.0	1942.0	1941.0	1941.0
	Testing required?	No	No	No	No	No	No	No	No

15. SAR Test Results

General Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.

5G NR Note:

1. Referencing the procedure in KDB 941225, the test procedures are outlined as below:
 - a. To start SAR test for the largest channel bandwidth for PI/2 BPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. Also do SAR test for 50% RB allocation for PI/2 BPSK SAR testing using 1RB PI/2 BPSK allocation procedure
 - b. For PI/2 BPSK with 100% RB allocation, SAR test is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
 - c. For higher modulation QPSK/16QAM/64QAM/256QAM, according to tune-up document the power level is not $\frac{1}{2}$ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
 - d. Smaller bandwidth output power for each RB allocation configuration for this device is not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
 - e. For 5G FR1 n77, the maximum channel bandwidth does not support three non-overlapping channels in the frequency band, the middle channel of the group of overlapping channels were selected for testing.
 - f. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission. And only for TDD power class2 was performed using Factory Test Mode software to establish the connection and perform SAR with 50% transmission.

**15.1 Body SAR****<LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 42_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	42190	3460	SKU L	14.42	14.80	1.091	62.9	1.006	0.08	0.205	0.225
	LTE Band 42_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	42190	3460	SKU L	14.38	14.80	1.102	62.9	1.006	0.01	0.223	0.247
	LTE Band 42C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	42190+42388	3460	SKU L	14.09	14.80	1.178	62.9	1.006	-0.09	0.205	0.243
	LTE Band 42_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	42190	3460	SKU M	14.38	14.80	1.102	62.9	1.006	0.03	0.075	0.083
1	LTE Band 42_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	42190	3460	SKU N	14.38	14.80	1.102	62.9	1.006	-0.07	0.254	0.282
	LTE Band 43_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	44215	3662.5	SKU L	14.40	14.90	1.122	62.9	1.006	0.05	0.718	0.810
2	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44215	3662.5	SKU L	14.38	14.90	1.127	62.9	1.006	0.16	0.743	0.842
	LTE Band 43_Ant MIMO2	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	44215	3662.5	SKU L	14.28	14.90	1.153	62.9	1.006	0.02	0.724	0.840
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44215	3662.5	SKU M	14.38	14.90	1.127	62.9	1.006	-0.13	0.204	0.231
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44215	3662.5	SKU N	14.38	14.90	1.127	62.9	1.006	0.17	0.602	0.683
	LTE Band 43_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	43690	3610	SKU L	14.45	14.90	1.109	62.9	1.006	-0.15	0.666	0.743
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	43690	3610	SKU L	14.44	14.90	1.112	62.9	1.006	0.1	0.700	0.783
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44090	3650	SKU L	14.27	14.90	1.156	62.9	1.006	0.04	0.659	0.766
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44490	3690	SKU L	14.19	14.90	1.178	62.9	1.006	0.13	0.705	0.835
	LTE Band 43_Ant MIMO2	20M	QPSK	100	0	Bottom Side	0mm	MIMO2	43690	3610	SKU L	14.29	14.90	1.151	62.9	1.006	-0.18	0.672	0.778
	LTE Band 43C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	44292+44490	3670.2	SKU L	14.35	14.90	1.135	62.9	1.006	0.08	0.704	0.804
	LTE Band 43C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	43690+43888	3610	SKU L	14.09	14.90	1.205	62.9	1.006	-0.1	0.688	0.834
	LTE Band 43C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	44090+44288	3650	SKU L	14.31	14.90	1.146	62.9	1.006	0.05	0.719	0.829
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44490	3690	SKU M	14.19	14.90	1.178	62.9	1.006	-0.11	0.182	0.216
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44490	3690	SKU N	14.19	14.90	1.178	62.9	1.006	0.19	0.707	0.838
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	43690	3610	SKU N	14.44	14.90	1.112	62.9	1.006	-0.16	0.655	0.733
	LTE Band 43_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	44090	3650	SKU N	14.27	14.90	1.156	62.9	1.006	-0.15	0.708	0.823
	LTE Band 48_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	56150	3641	SKU L	14.59	14.80	1.050	62.9	1.006	-0.02	0.634	0.670
	LTE Band 48_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	55340	3560	SKU L	14.49	14.80	1.074	62.9	1.006	-0.05	0.524	0.566
	LTE Band 48_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	55830	3609	SKU L	14.54	14.80	1.062	62.9	1.006	-0.13	0.608	0.650
	LTE Band 48_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	56640	3690	SKU L	14.40	14.80	1.096	62.9	1.006	0.08	0.623	0.687
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	56150	3641	SKU L	14.54	14.80	1.062	62.9	1.006	0.16	0.638	0.682
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	55340	3560	SKU L	14.48	14.80	1.076	62.9	1.006	0.01	0.541	0.586
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	55830	3609	SKU L	14.53	14.80	1.064	62.9	1.006	-0.16	0.627	0.671
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	56640	3690	SKU L	14.38	14.80	1.102	62.9	1.006	0.1	0.686	0.761
	LTE Band 48C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	56150+56348	3641	SKU L	14.43	14.80	1.089	62.9	1.006	-0.03	0.620	0.679
	LTE Band 48C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	55340+55538	3560	SKU L	14.09	14.80	1.178	62.9	1.006	0.14	0.624	0.739
	LTE Band 48C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	55830+56028	3609	SKU L	14.27	14.80	1.130	62.9	1.006	0.11	0.635	0.722
	LTE Band 48C_Ant MIMO2	20M	QPSK	1	0	Bottom Side	0mm	MIMO2	56442+56640	3670.2	SKU L	14.09	14.80	1.178	62.9	1.006	-0.05	0.632	0.749
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	56640	3690	SKU M	14.38	14.80	1.102	62.9	1.006	-0.01	0.179	0.198
3	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	56640	3690	SKU N	14.38	14.80	1.102	62.9	1.006	0.02	0.705	0.782
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	55340	3560	SKU N	14.48	14.80	1.076	62.9	1.006	0	0.522	0.565
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	55830	3609	SKU N	14.53	14.80	1.064	62.9	1.006	-0.11	0.654	0.700
	LTE Band 48_Ant MIMO2	20M	QPSK	50	0	Bottom Side	0mm	MIMO2	56150	3641	SKU N	14.54	14.80	1.062	62.9	1.006	-0.06	0.712	0.761
	LTE Band 48_Ant MIMO1	20M	QPSK	1	0	Bottom Side	0mm	MIMO1	56150	3641	SKU L	13.01	13.50	1.119	62.9	1.006	0.08	0.365	0.411
	LTE Band 48_Ant MIMO1	20M	QPSK	50	0	Bottom Side	0mm	MIMO1	56150	3641	SKU L	12.99	13.50	1.125	62.9	1.006	-0.08	0.453	0.513
	LTE Band 48_Ant MIMO1	20M	QPSK	50	0	Bottom Side	0mm	MIMO1	56150	3641	SKU M	12.99	13.50	1.125	62.9	1.006	0.1	0.277	0.313
	LTE Band 48_Ant MIMO1	20M	QPSK	50	0	Bottom Side	0mm	MIMO1	56150	3641	SKU N	12.99	13.50	1.125	62.9	1.006	-0.18	0.251	0.284



FCC SAR TEST REPORT

Report No. : FA531705B

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n48_Ant MIMO1	40M	BPSK	1	1	Bottom Side	0mm	MIMO1	641666	3624.99	SKU L	11.10	12.20	1.288	-0.12	0.541	0.697
	FR1 n48_Ant MIMO1	40M	BPSK	1	1	Bottom Side	0mm	MIMO1	638000	3570	SKU L	11.09	12.20	1.291	-0.15	0.459	0.593
	FR1 n48_Ant MIMO1	40M	BPSK	1	1	Bottom Side	0mm	MIMO1	645332	3679.98	SKU L	11.09	12.20	1.291	-0.15	0.464	0.599
	FR1 n48_Ant MIMO1	40M	BPSK	50	28	Bottom Side	0mm	MIMO1	641666	3624.99	SKU L	11.03	12.20	1.309	0.11	0.508	0.665
	FR1 n48_Ant MIMO1	40M	BPSK	50	28	Bottom Side	0mm	MIMO1	638000	3570	SKU L	10.90	12.20	1.349	-0.08	0.508	0.685
	FR1 n48_Ant MIMO1	40M	BPSK	50	28	Bottom Side	0mm	MIMO1	645332	3679.98	SKU L	10.91	12.20	1.346	-0.17	0.458	0.616
	FR1 n48_Ant MIMO1	40M	BPSK	1	1	Bottom Side	0mm	MIMO1	641666	3624.99	SKU M	11.10	12.20	1.288	-0.08	0.110	0.142
	FR1 n48_Ant MIMO1	40M	BPSK	1	1	Bottom Side	0mm	MIMO1	641666	3624.99	SKU N	11.10	12.20	1.288	-0.04	0.427	0.550
	FR1 n48_Ant MIMO2	40M	BPSK	1	1	Bottom Side	0mm	MIMO2	645332	3679.98	SKU L	11.38	12.20	1.208	-0.15	0.623	0.753
	FR1 n48_Ant MIMO2	40M	BPSK	1	1	Bottom Side	0mm	MIMO2	638000	3570	SKU L	11.36	12.20	1.213	0.03	0.563	0.683
	FR1 n48_Ant MIMO2	40M	BPSK	1	1	Bottom Side	0mm	MIMO2	641666	3624.99	SKU L	11.35	12.20	1.216	-0.13	0.633	0.770
	FR1 n48_Ant MIMO2	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	645332	3679.98	SKU L	11.14	12.20	1.276	0.16	0.580	0.740
	FR1 n48_Ant MIMO2	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	638000	3570	SKU L	11.10	12.20	1.288	-0.15	0.579	0.746
4	FR1 n48_Ant MIMO2	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	641666	3624.99	SKU L	11.10	12.20	1.288	0.14	0.637	0.820
	FR1 n48_Ant MIMO2	40M	BPSK	100	0	Bottom Side	0mm	MIMO2	645332	3679.98	SKU L	11.12	12.20	1.282	-0.02	0.626	0.803
	FR1 n48_Ant MIMO2	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	641666	3624.99	SKU M	11.10	12.20	1.288	-0.09	0.211	0.272
	FR1 n48_Ant MIMO2	40M	BPSK	50	28	Bottom Side	0mm	MIMO2	641666	3624.99	SKU N	11.10	12.20	1.288	0.14	0.432	0.556
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	656000	3840	SKU L	10.89	11.70	1.205	0.05	0.475	0.572
	FR1 n77_Ant MIMO1	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	656000	3840	SKU L	10.88	11.70	1.208	0.02	0.424	0.512
	FR1 n77_HPUE_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	656000	3840	SKU L	13.97	14.70	1.183	0.07	0.467	0.552
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	656000	3840	SKU M	10.89	11.70	1.205	0.16	0.112	0.135
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	656000	3840	SKU N	10.89	11.70	1.205	0.13	0.354	0.427
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	633332	3499.98	SKU L	11.05	11.70	1.161	-0.18	0.326	0.378
	FR1 n77_Ant MIMO1	100M	BPSK	135	69	Bottom Side	0mm	MIMO1	633332	3499.98	SKU L	10.96	11.70	1.186	0.02	0.317	0.376
	FR1 n77_HPUE_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	633332	3499.98	SKU L	14.03	14.70	1.167	0.16	0.319	0.372
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	633332	3499.98	SKU M	11.05	11.70	1.161	-0.03	0.107	0.124
	FR1 n77_Ant MIMO1	100M	BPSK	1	1	Bottom Side	0mm	MIMO1	633332	3499.98	SKU N	11.05	11.70	1.161	0.15	0.362	0.420
5	FR1 n77_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	656000	3840	SKU L	11.66	12.90	1.330	0.12	0.633	0.842
	FR1 n77_Ant MIMO2	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	656000	3840	SKU L	11.65	12.90	1.334	0.18	0.608	0.811
	FR1 n77_HPUE_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	656000	3840	SKU L	14.64	15.90	1.337	-0.17	0.628	0.840
	FR1 n77_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	656000	3840	SKU M	11.66	12.90	1.330	-0.04	0.169	0.225
	FR1 n77_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	656000	3840	SKU N	11.66	12.90	1.330	-0.05	0.305	0.406
	FR1 n77_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	633332	3499.98	SKU L	11.81	12.90	1.285	0	0.394	0.506
	FR1 n77_Ant MIMO2	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	633332	3499.98	SKU L	11.51	12.90	1.377	0.15	0.450	0.620
	FR1 n77_HPUE_Ant MIMO2	100M	BPSK	1	1	Bottom Side	0mm	MIMO2	633332	3499.98	SKU L	14.73	15.90	1.309	-0.13	0.417	0.546
	FR1 n77_Ant MIMO2	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	633332	3499.98	SKU M	11.51	12.90	1.377	-0.01	0.133	0.183
	FR1 n77_Ant MIMO2	100M	BPSK	135	69	Bottom Side	0mm	MIMO2	633332	3499.98	SKU N	11.51	12.90	1.377	-0.09	0.234	0.322

15.2 Power Class 2 and Power Class 3 Linearity

General Note:

This device support Power Class 2 and Power Class 3 operations. Per FCC Guidance based on the device behavior, all SAR tests were performed using Power Class 3. Power Class 2 is tested using the highest SAR test configuration in Power Class 3 for each LTE and FR1 configuration and exposure condition combination, according to the highest time averaged power for Power Class 2. When the reported SAR vs. output power is linearly scaled with < 10% discrepancy between power classes and all reported SAR are < 1.4 W/kg, Separate SAR testing for Power Class 2 is not required. Use PC3 power level and SAR to estimated PC2 SAR linearly, and check if the deviation from the measured PC2 SAR is <10%

	FR1 n77_Ant 1(MIMO1)	FR1 n77_HPUE_Ant 1(MIMO1)
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	11.7	14.7
Reported 1g SAR (W/kg)	0.572	0.552
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	14.79	14.76
Linearity SAR(W/kg)	0.57	
% deviation from expected linearity		-3.27%

	FR1 n77_Ant 3(MIMO2)	FR1 n77_HPUE_Ant 3(MIMO2)
	(Power Class 3)	(Power Class 2)
Maximum Tune up Power (dBm)	12.9	15.9
Reported 1g SAR (W/kg)	0.842	0.84
Duty Cycle	100.00%	50.00%
Frame Averaged (mW)	19.50	19.45
Linearity SAR(W/kg)	0.84	
% deviation from expected linearity		0.00%

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + WLAN 2.4GHz Ant 1 + WLAN 2.4GHz Ant 2 + RFID	Yes
2.	WWAN + WLAN 2.4GHz Ant 1 + Bluetooth Ant 2 + RFID	Yes
3.	WWAN + WLAN 5G/6GHz Ant 1 + WLAN 5G/6GHz Ant 2 + Bluetooth Ant 2 + RFID	Yes

General Note:

1. The Intel BE201NGW WLAN/BT module is integrated into this host, the WLAN2.4GHz/5GHz maximum output power and WLAN evaluation result is referenced from Intel test report, report no.: 231109-06.TR07 (FCC ID: PD9BE201NG); WLAN 6GHz refers to report no.: 231109-06.TR01 (FCC ID: PD9BE201NG); the SAR result is used to do simultaneous transmission analysis.
2. The RFID module is integrated into this host, the RFID test report is referenced from Sporton FCC SAR report, report no.: FA417922 (FCC ID: QYLSNNSVG7C01B); the SAR result is used to do simultaneous transmission analysis.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
 - v) The SPLSR calculated results please refer to section 16.3.

**16.1 5G NR + LTE + WLAN + BT Sim-Tx analysis**

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

$$x\% * A + (100-x)\% * B \leq 1.0,$$

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and $A \leq 1.0$; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for 5G FR2 or SAR exposure for 5G FR1), and $B \leq 1.0$.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

$$x\% * A + (100-x)\% * B + C \leq 1.0 \quad (1)$$

$$x\% * A + (100-x)\% * B \leq x\% * \max(A, B) + (100-x)\% * \max(A, B) \leq \max(A, B)$$

$$x\% * A + (100-x)\% * B + C \leq \max(A, B) + C \leq 1.0 \quad (2)$$

if $A + C \leq 1.0$ and $B + C \leq 1.0$ can be proven, then " $x\% * A + (100-x)\% * B + C \leq 1.0$ ". Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1

Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

16.2 Body Exposure Conditions

WWAN Band	Exposure Position	0	4	5	6	7	8	9	0+4+8+9 Summed 1g SAR (W/kg)	0+4+5+9 Summed 1g SAR (W/kg)	0+6+7+8+9 Summed 1g SAR (W/kg)	0+4+8+9 SPLSR	0+4+8+9 Case No.	0+4+5+9 SPLSR	0+4+5+9 Case No.	0+6+7+8+9 SPLSR	0+6+7+8+9 Case No.
		Maximum WWAN	WLAN 2.4GHz Ant 1	WLAN 2.4GHz Ant 2	WLAN 5/6GHz Ant 1	WLAN 5/6GHz Ant 2	Bluetooth Ant 2	RFID									
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)									
WWAN Main	Bottom Side at 0mm		0.800	0.780	0.800	0.800	0.340	0.001	1.141	1.581	1.941					0.010	Case 7
WWAN Aux	Bottom Side at 0mm		0.800	0.780	0.800	0.800	0.340	0.001	1.141	1.581	1.941					0.010	Case 8
WWAN MIMO 1	Bottom Side at 0mm	0.697	0.800	0.780	0.800	0.800	0.340	0.001	1.838	2.278	2.638	0.000	Case 1	0.010	Case 5	0.010	Case 9
WWAN MIMO 2	Bottom Side at 0mm	0.842	0.800	0.780	0.800	0.800	0.340	0.001	1.983	2.423	2.783	0.010	Case 2	0.010	Case 6	0.010	Case 10

16.3 SPLSR Evaluation and Analysis

General Note:

1. According to antenna location, the minimum distance between each transmit antenna is using for SPLSR analysis.
2. $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.

	Band	Position	SAR (W/kg)	Gap	Minimum Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)				
Case 1	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	390.0	1.50	0.00	Not required
	WLAN2.4GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	290.0	1.04	0.00	Not required
	Bluetooth Ant 2		0.34	0				
	WLAN2.4GHz Ant 1+RFID	Bottom Side	0.697	0	310.0	1.04	0.00	Not required
	Bluetooth Ant 2		0.34	0				
Case 2	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	290.0	1.64	0.01	Not required
	WLAN2.4GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	390.0	1.18	0.00	Not required
	Bluetooth Ant 2		0.34	0				
	WLAN2.4GHz Ant 1	Bottom Side	0.801	0	310.0	1.14	0.00	Not required
	Bluetooth Ant 2		0.34	0				
Case 5	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	390.0	1.50	0.00	Not required
	WLAN2.4GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	290.0	1.48	0.01	Not required
	WLAN2.4GHz Ant 2		0.78	0				
	WLAN2.4GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.58	0.01	Not required
	WLAN2.4GHz Ant 2		0.78	0				
Case 6	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	290.0	1.64	0.01	Not required
	WLAN2.4GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	390.0	1.62	0.01	Not required
	WLAN2.4GHz Ant 2		0.78	0				
	WLAN2.4GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.58	0.01	Not required
	WLAN2.4GHz Ant 2		0.78	0				

Case 7	Band	Position	SAR (W/kg)	Gap (mm)	Minimum Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 7	WLAN5/6GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.94	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				
Case 8	Band	Position	SAR (W/kg)	Gap (mm)	Minimum Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 8	WLAN5/6GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.94	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				
Case 9	Band	Position	SAR (W/kg)	Gap (mm)	Minimum Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	390.0	1.50	0.00	Not required
	WLAN5/6GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO1)	Bottom Side	0.697	0	290.0	1.84	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				
	WLAN5/6GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.94	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				
Case 10	Band	Position	SAR (W/kg)	Gap (mm)	Minimum Distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	290.0	1.64	0.01	Not required
	WLAN5/6GHz Ant 1+RFID		0.801	0				
	Maximum WWAN (MIMO2)	Bottom Side	0.842	0	390.0	1.98	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				
	WLAN5/6GHz Ant 1+RFID	Bottom Side	0.801	0	310.0	1.94	0.01	Not required
	WLAN5/6GHz Ant 2+Bluetooth Ant 2		1.14	0				

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17. Uncertainty Assessment

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

Declaration of Conformity:

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

Comments and Explanations:

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

18. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [6] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [7] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [8] FCC KDB 941225 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [9] FCC KDB 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", Oct 2015
- [10] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [11] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.