FCC SAR TEST REPORT

APPLICANT	:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	:	Portable Tablet Computer
BRAND NAME	:	Lenovo
MODEL NAME	:	TB360ZJ
FCC ID	:	O57TB360ZJ
STANDARD	:	FCC 47 CFR PART 2 (2.1093)

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Approved by: Si Zhang

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

Table of Contents

1. Statement of Compliance 4
2. Administration Data 5
3. Guidance Applied 5
4. Equipment Under Test (EUT) Information 6
4.1 General Information 6
4.2 General LTE SAR Test and Reporting Considerations 7
4.3 General 5G NR SAR Test and Reporting Considerations 9
5. Proximity Sensor Triggering Test 11
6. RF Exposure Limits 24
6.1 Uncontrolled Environment 24
6.2 Controlled Environment 24
7. Specific Absorption Rate (SAR) 25
7.1 Introduction 25
7.2 SAR Definition 25
8. System Description and Setup 26
8.1 E-Field Probe 27
8.2 Data Acquisition Electronics (DAE) 27
8.3 Phantom 28
8.4 Device Holder 29
9. Measurement Procedures 30
9.1 Spatial Peak SAR Evaluation 30
9.2 Power Reference Measurement 31
9.3 Area Scan 31
9.4 Zoom Scan 32
9.5 Volume Scan Procedures 32
9.6 Power Drift Monitoring 32
10. Test Equipment List 33
11. System Verification 34
11.1 Tissue Simulating Liquids 34
11.2 Tissue Verification 35
11.3 System Performance Check Results 36
12. RF Exposure Positions 37
12.1 SAR Testing for Tablet 37
13. UMTS/LTE Output Power (Unit: dBm) 38
14. WiFi/Bluetooth Output Power (Unit: dBm) 49
15. Antenna Location 51
16. SAR Test Results 55
16.1 Body SAR 58
16.2 Repeated SAR Measurement 62
16.3 TDD LTE Linearity Data Analysis 62
17. Simultaneous Transmission Analysis 63
17.1 Body Exposure Conditions 64
17.2 SPLSR Evaluation and Analysis 68
18. Uncertainty Assessment 74
19. References 75
Appendix A. Plots of System Performance Check
Appendix B. Plots of High SAR Measurement
Appendix C. DASY Calibration Certificate
Appendix D. Test Setup Photos
Appendix E. Conducted RF Output Power Table

History of this test report

Report No.	Version	Description	Issued Date
FA312017	Rev. 01	Initial issue of report	May 15, 2023
FA312017	Rev. 02	Updated the relevant data of 5GNR n77/n78	May 18, 2023

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Lenovo(Shanghai) Electronics Technology Co., Ltd., Portable Tablet Computer, TB360ZJ,** are as follows.

Highest Standalone 1g SAR Summary				
Equipment Class	Frequency Band		Body (Separation 0mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA	WCDMA V	1.09	1.59
	LTE	LTE Band 26/5	**1.17**	
		LTE Band 41	1.13	
		LTE Band 42	0.72	
	FR1	FR1 n77/78	1.16	
DTS	WLAN	2.4GHz WLAN	0.59	1.59
NII		5GHz WLAN	0.76	1.59
DSS	Bluetooth	Bluetooth	0.11	1.59
Date of Testing:		2023/3/28 ~ 2023/5/16		

Remark:
1. This device supports LTE B5 and B26. Since the supported frequency span for LTE B5 falls completely within the supports frequency span for LTE B26, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for B26.
2. This device supports 5GNR n78 and 5GNR n77. Since the supported frequency span for 5GNR n78 falls completely within the supports frequency span for 5GNR n77, both 5GNR bands have the same target power, and both 5GNR bands share the same transmission path; therefore, SAR was only assessed for 5GNR n77.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are 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.

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.

2. Administration Data

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR05-KS	CN1257	314309

Applicant	
Company Name	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer	
Company Name	Lenovo PC HK Limited
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 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

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Portable Tablet Computer
Brand Name	Lenovo
Model Name	TB360ZJ
FCC ID	O57TB360ZJ
IMEI or S/N Code	Sample 1: 861392060007001 Sample 2: 861392060007605
Wireless Technology and Frequency Range	WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz 5G NR n77: 3450 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3800 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	RMC 12.2Kbps HSDPA/HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	TB360ZJ
SW Version	TB360ZJ_RF01_0316
EUT Stage	Identical Prototype

Remark:

1. This device does not support voice function.
2. The device implements Proximity sensors mechanism for the power management for SAR compliance at different exposure conditions (body). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.
3. This device supports HPUE for LTE band 41 with class 2 level, HPUE power have been measured separately. For HPUE power is higher than power class 3 but with lower duty cycle, the maximum average power for class 2 and class 3 is almost the same, so we chose power class 3 full SAR testing and power class 2 verify the worst case of power class 3 SAR.
4. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
5. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
6. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
7. NSA and SA mode should perform SAR separately. For the maximum power of SA mode is the same as NSA total power level, so SA standalone total power level SAR can represent NSA mode SAR.
8. 5GNR NSA mode, the power level is the same as 5GNR SA mode, so 5GNR NSA mode and SA mode power table only show one time.
9. For 5GNR EN-DC mode, standalone SAR performed for 5GNR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5GNR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.
10. There are two samples. The different between them refer to the TB360ZJ_Operational Description of Product Equality Declaration which is exhibit separately. According to the difference, we choose sample 1 to full test and

sample 2 to verify the worst case of sample 1.
11. This device supports 5GNR FR1 bands as following table, including NSA mode and SA mode.

<5G NR>

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
NSA	n77	TDD	30	20, 40, 100
	n78	TDD	30	60, 100
SA	n77	TDD	30	20, 40, 100

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	O57TB360ZJ
Equipment Name	Portable Tablet Computer
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824 MHz ~ 849 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz
Channel Bandwidth	LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Data only
LTE release	R15, Cat 15
CA support	Yes, Downlink only
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
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.
Power reduction applied to satisfy SAR compliance	Yes, Proximity Sensor. Power reduction will be active at bottom face, edge 1 for Ant1/3/10, and bottom face, edge 1, edge 2 for Ant2.
LTE Carrier Aggregation Combinations	Inter-Band possible combinations and the detail power verification please referred to section 13.
LTE Carrier Aggregation Additional Information	This device supports maximum of 4 carriers in the downlink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

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

Transmission (H, M, L) channel numbers and frequencies in each LTE band								
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

LTE Band 42								
	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	42115	3452.5	42140	3455	42165	3457.5	42190	3460
M	42590	3500	42590	3500	42590	3500	42590	3500
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540

<For LTE Overlap Bands Description>

1) LTE Bands BW

Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
LTE Band 5	Yes	Yes	Yes	Yes		
LTE Band 26	Yes	Yes	Yes	Yes	Yes	

2) LTE Bands tune up:

Band	Antenna	Body Sensor on Tune-up Limit	Body Sensor off Tune-up Limit	Default Tune-up Limit
LTE Band 5	Ant 1	21.5	25	25
LTE Band 26	Ant 1	21.5	25	25

4.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
Operating Frequency Range of each 5G NR transmission band	5G NR n77: 3450 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3800 MHz
Channel Bandwidth	The detail please refers to section 4.1 5GNR FR1 bands table.
SCS	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 B41
LTE Anchor Bands for n78	LTE B41

NR Band 77						
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647334	3710.01	648000	3720	650000	3750
M	656000	3840	656000	3840	656000	3840
H	664666	3970.02	664000	3960	662000	3930

NR Band 78				
	Bandwidth 60MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	648668	3730.02		
M	650000	3750	650000	3750
H	651334	3770.01		

For <3450 MHz ~ 3550 MHz >

NR Band 77						
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630668	3460.02	631334	3470.01		
M	633334	3500.01	633334	3500.01	633334	3500.01
H	636000	3540	635334	3530.01		

NR Band 78				
	Bandwidth 60MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	632000	3480		
M	633334	3500.01	633334	3500.01
H	634668	3520.02		

For <3550 MHz ~ 3700 MHz >

NR Band 77						
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637334	3560.01	638000	3570	640000	3600
M	641666	3624.99	641666	3624.99	641666	3624.99
H	646000	3690	645332	3679.98	643332	3649.98

NR Band 78				
	Bandwidth 60MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	638668	3580.02	640000	3600
M	641666	3624.99	641666	3624.99
H	644666	3669.99	643332	3649.98

<For NR Overlap Bands Description>

1) NR Bands BW

Band	Duplex	SCS(KHz)	Bandwidths(BW)
N77	TDD	30	20,40,100
N78	TDD	30	60, 100

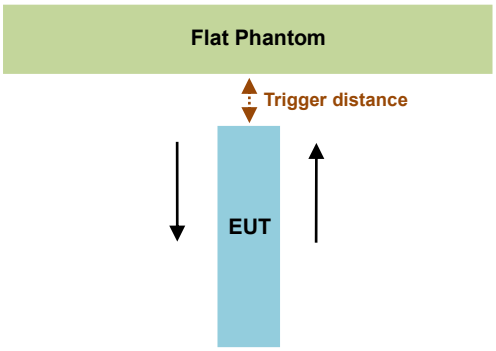
2) NR Bands Tune up:

Band	Antenna	Body Sensor on	Body for ENDC	Body Sensor off	Default
		Tune-up Limit	Tune-up Limit	Tune-up Limit	Tune-up Limit
5G NR Part27O n77&78 PC3	Ant 3	11.5	11.5	25.0	25.0
5G NR Part27Q n77&78 PC3	Ant 3	11.5	11.5	25.0	25.0
5G NR Part96 n77&78 PC3	Ant 3	11.5	11.5	20.0	20.0
5G NR Part27O n77&78 PC3	Ant 4			15.0	15.0
5G NR Part27Q n77&78 PC3	Ant 4			18.0	18.0
5G NR Part96 n77&78 PC3	Ant 4			16.0	16.0
5G NR Part27O n77&78 PC3	Ant 7			16.0	16.0
5G NR Part27Q n77&78 PC3	Ant 7			9.5	9.5
5G NR Part96 n77&78 PC3	Ant 7			14.0	14.0
5G NR Part27O n77&78 PC3	Ant 11			12.5	12.5
5G NR Part27Q n77&78 PC3	Ant 11			16.0	16.0
5G NR Part96 n77&78 PC3	Ant 11			15.0	15.0

5. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance (KDB 616217 D04 section 6.2)>:

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency 5825MHz and lowest 835MHz frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensor placed coincident with antenna elements at the Bottom Face, Edge 1, and Edge 2 of the device are utilized to determine when the device comes in proximity of the user's body at the Bottom Face or Edge 1 or Edge 2 side of the device. There is no need to do sensor coverage testing for the proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antenna.
3. When the sensor is active, all WWAN/WLAN bands reduced power will be active.
4. The sensors used to detect the proximity of the user's body at the Bottom Face or Edge 1 side for Ant1/3/10 of the device use a detection threshold distance. The data shown in the sections below shows the distance(s).
5. The sensors used to detect the proximity of the user's body at the Bottom Face or Edge 1 or Edge 2 side for Ant2 of the device use a detection threshold distance. The data shown in the sections below shows the distance(s).



<Ant1 Frequency Bands>

Proximity Sensor Triggering Distance (mm)				
Position	Bottom Face		Edge 1	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	12	15	12	16

< Ant2 Frequency Bands>

Proximity Sensor Triggering Distance (mm)						
Position	Bottom Face		Edge 1		Edge 2	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	21	23	12	16	21	25

<Ant3 Frequency Bands>

Proximity Sensor Triggering Distance (mm)				
Position	Bottom Face		Edge 1	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	19	25	17	20

<Ant10 Frequency Bands>

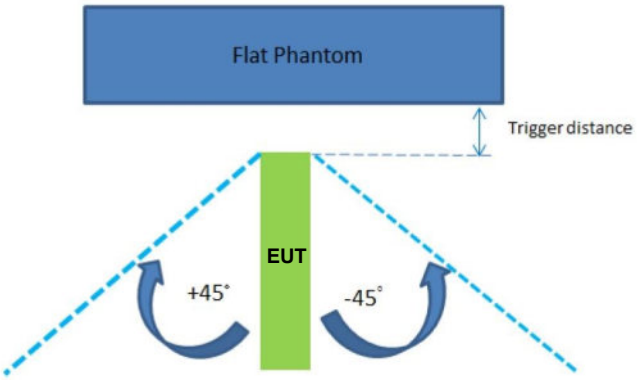
Proximity Sensor Triggering Distance (mm)				
Position	Bottom Face		Edge 1	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	12	17	12	20

<Proximity Sensor Triggering Coverage (KDB 616217 D04 section 6.3)>:

If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and “along the direction of maximum antenna and sensor offset”.
Illustrated in the internal photo exhibit, although the senor is spatially offset, there is no trigger condition where the antenna is next to the user but the sensor is laterally further away, therefore proximity sensor coverage testing is not required.
This procedure is not required because antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

<Tablet Tilt angle influences to proximity sensor triggering (KDB 616217 D04 section 6.4)>:

The influence of table tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, the detail please refers to following tables. Rotating the tablet around the edge next to the phantom in ≤ 10° increments until the tablet is ± 45° from the vertical position at 0°, and the maximum output power remains in the reduced mode.



<Ant1/10 Frequency Bands>

The Sensor Trigger Distance (mm)	
Position	Edge 1
Minimum	12

<Ant2 Frequency Bands>

The Sensor Trigger Distance (mm)		
Position	Edge 1	Edge 2
Minimum	12	21

<Ant3 Frequency Bands>

The Sensor Trigger Distance (mm)	
Position	Edge 1
Minimum	17

Proximity sensor power reduction

Exposure Position / wireless mode for ANT1	Bottom Face(1)	Edge 1(1)	Edge 2	Edge 3	Edge 4
WCDMA Band V	2.50 dB	2.50 dB	0 dB	0 dB	0 dB
LTE Band 26/5	3.50 dB	3.50 dB	0 dB	0 dB	0 dB

Exposure Position / wireless mode for ANT2	Bottom Face(1)	Edge 1(1)	Edge 2(1)	Edge 3	Edge 4
LTE Band 41	14.00 dB	14.00 dB	14.00 dB	0 dB	0 dB
LTE Band 41 HPUE	14.00 dB	14.00 dB	14.00 dB	0 dB	0 dB

Exposure Position / wireless mode for ANT3	Bottom Face(1)	Edge 1(1)	Edge 2	Edge 3	Edge 4
LTE Band 42	10.00 dB	10.00 dB	0 dB	0 dB	0 dB
Part27O FR1 n77/78	13.50 dB	13.50 dB	0 dB	0 dB	0 dB
Part27Q FR1 n77/78	13.50 dB	13.50 dB	0 dB	0 dB	0 dB
Part96 FR1 n77&78	8.50 dB	8.50 dB	0 dB	0 dB	0 dB

Exposure Position / wireless mode for ANT10	Bottom Face(1)	Edge 1(1)	Edge 2	Edge 3	Edge 4
WLAN 2.4GHz	5.50 dB	5.50 dB	0 dB	0 dB	0 dB
WLAN 5.2&5.3GHz	5.00 dB	5.00 dB	0 dB	0 dB	0 dB
WLAN 5.5GHz	10.50 dB	10.50 dB	0 dB	0 dB	0 dB
WLAN 5.8GHz	8.50 dB	8.50 dB	0 dB	0 dB	0 dB

Remark:

1. (1): Reduced maximum limit applied by activation of proximity sensor.
2. Power reduction is not applicable for Bluetooth.
3. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown and described in exhibit “P-Sensor operational description
4. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:
   For ANT1:
   - Bottom Face: 11 mm
   - Edge 1: 11 mm

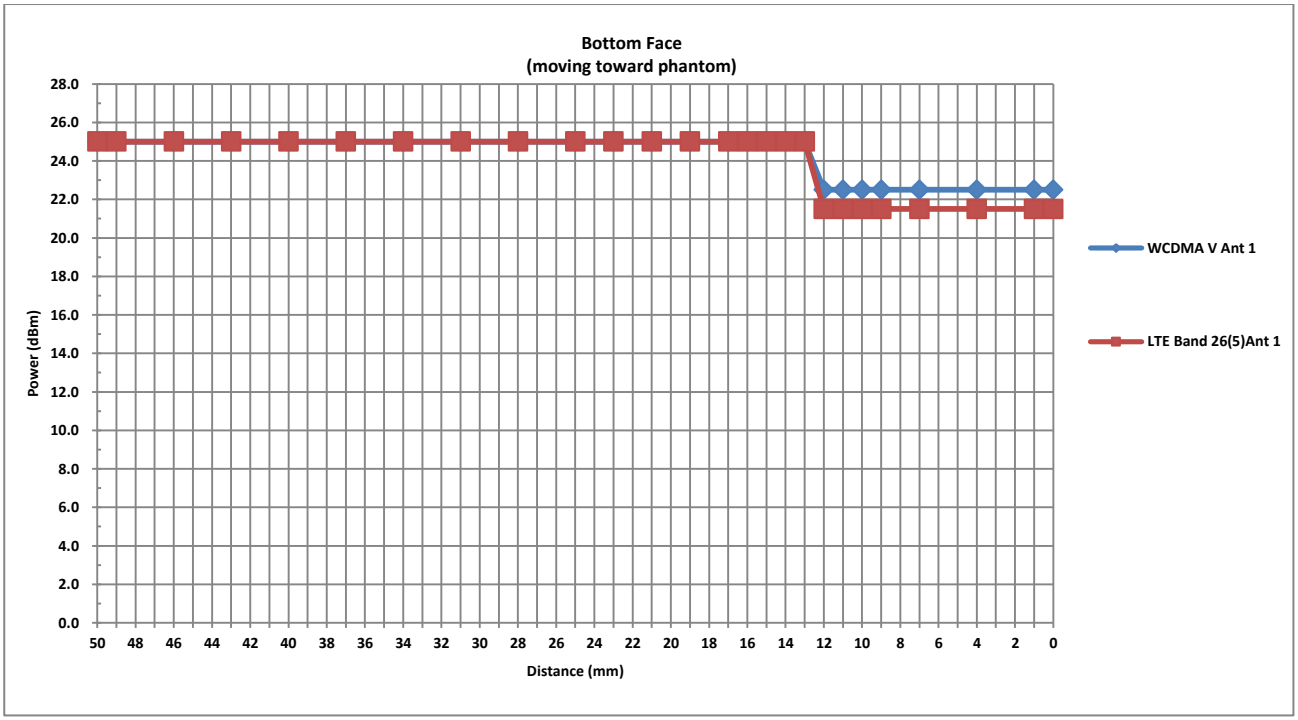
   For ANT2:
   - Bottom Face: 20 mm
   - Edge 1: 11 mm
   - Edge 2: 20 mm

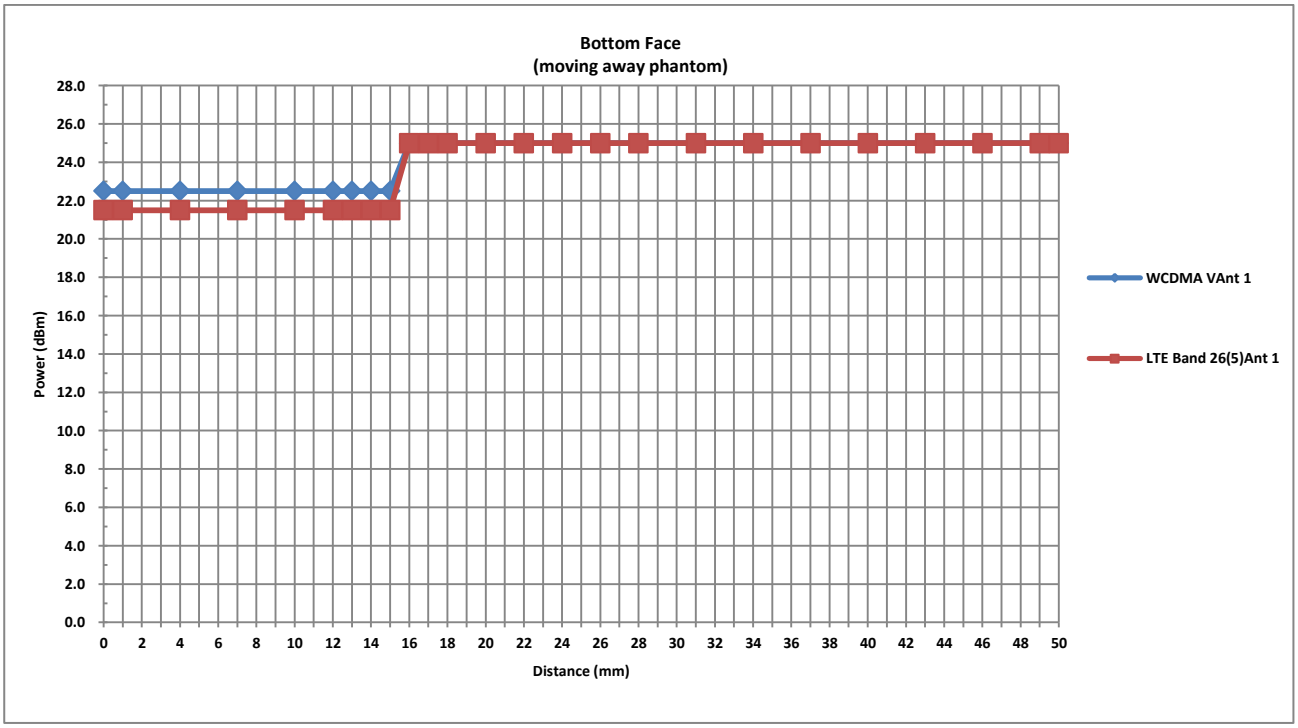
   For ANT3:
   - Bottom Face: 18 mm
   - Edge 1: 16 mm

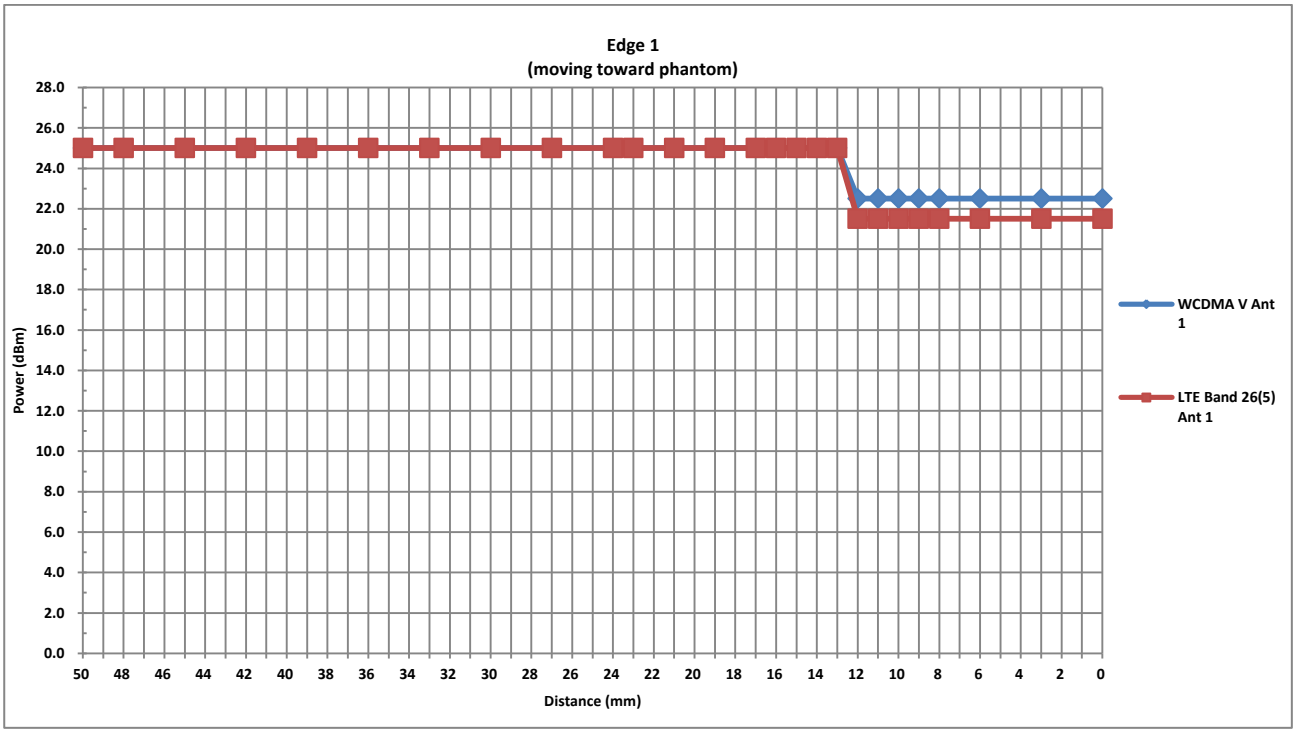
   For ANT10:
   - Bottom Face: 11 mm
   - Edge 1: 11 mm

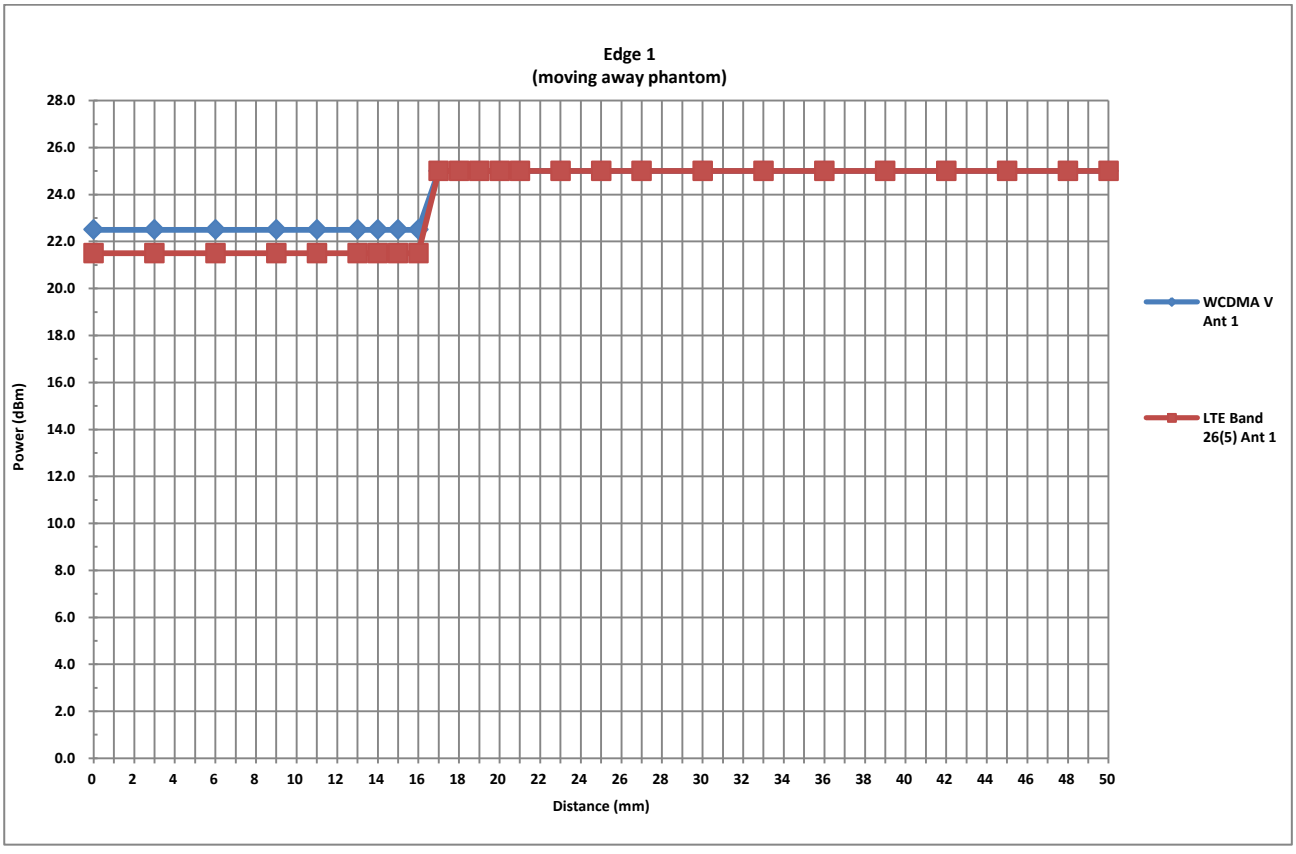
Power Measurement during Sensor Trigger distance testing

Band/Mode for ANT1	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
WCDMA Band V	25.00	22.50	2.50
LTE Band 26/5	25.00	21.50	3.50



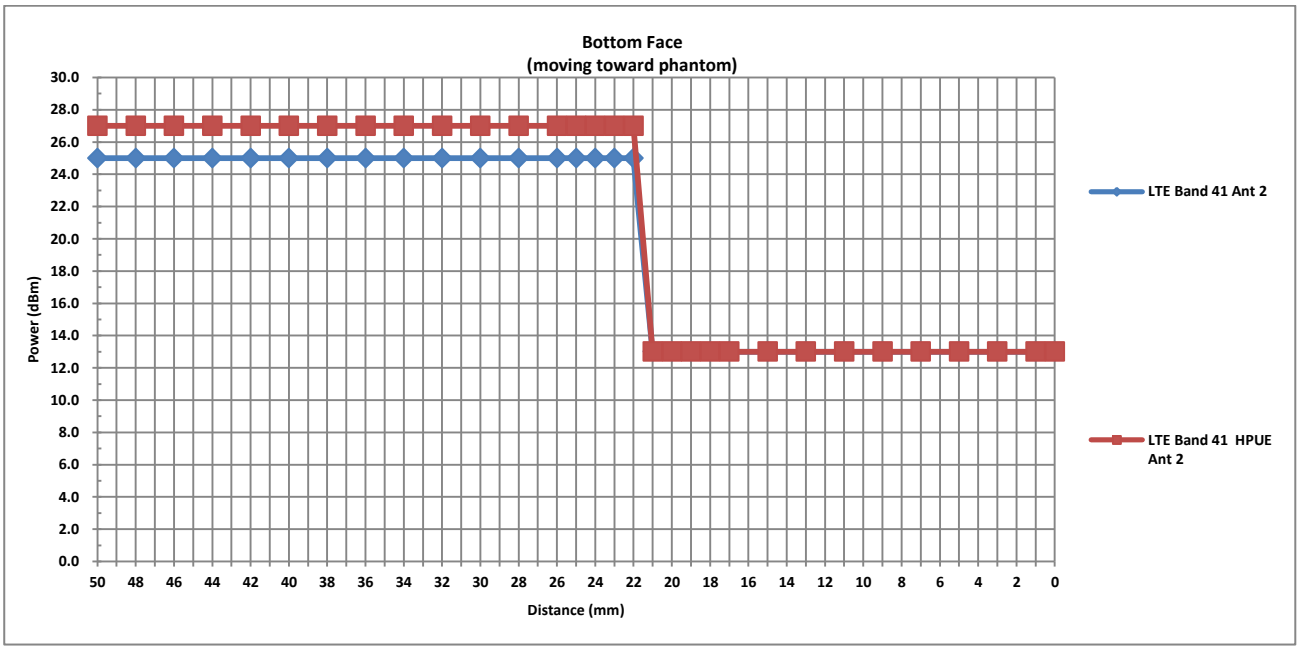


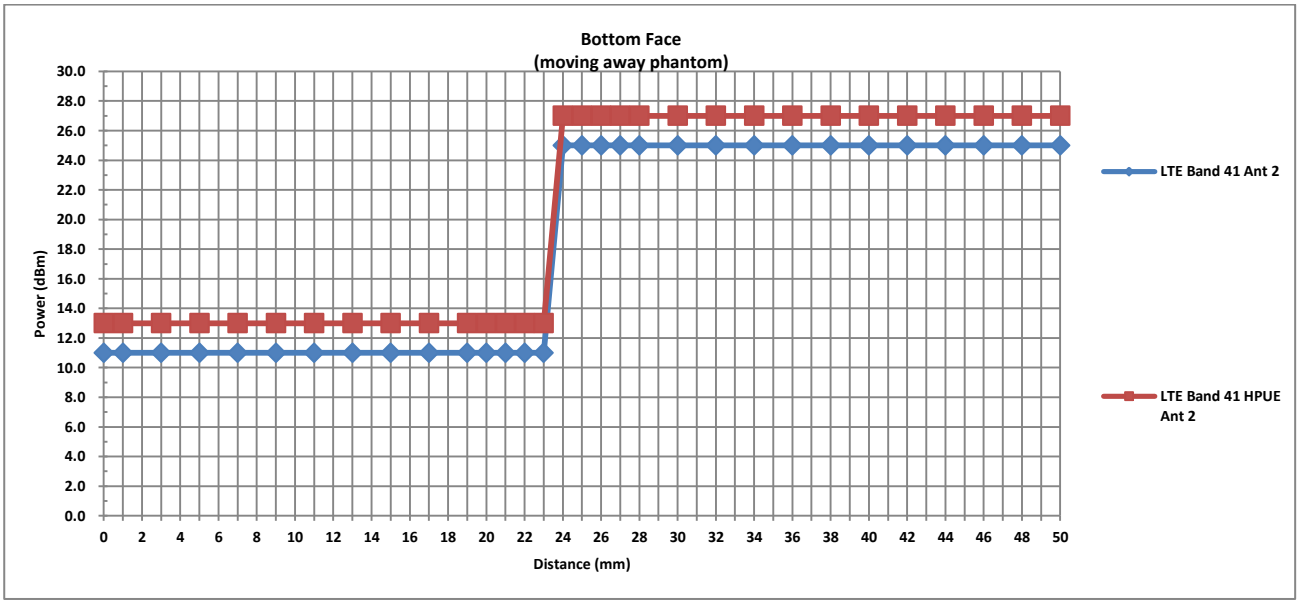

Edge 1
(moving toward phantom)
Power (dBm)
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
Distance (mm)
WCDMA V Ant 1
LTE Band 26(5) Ant 1

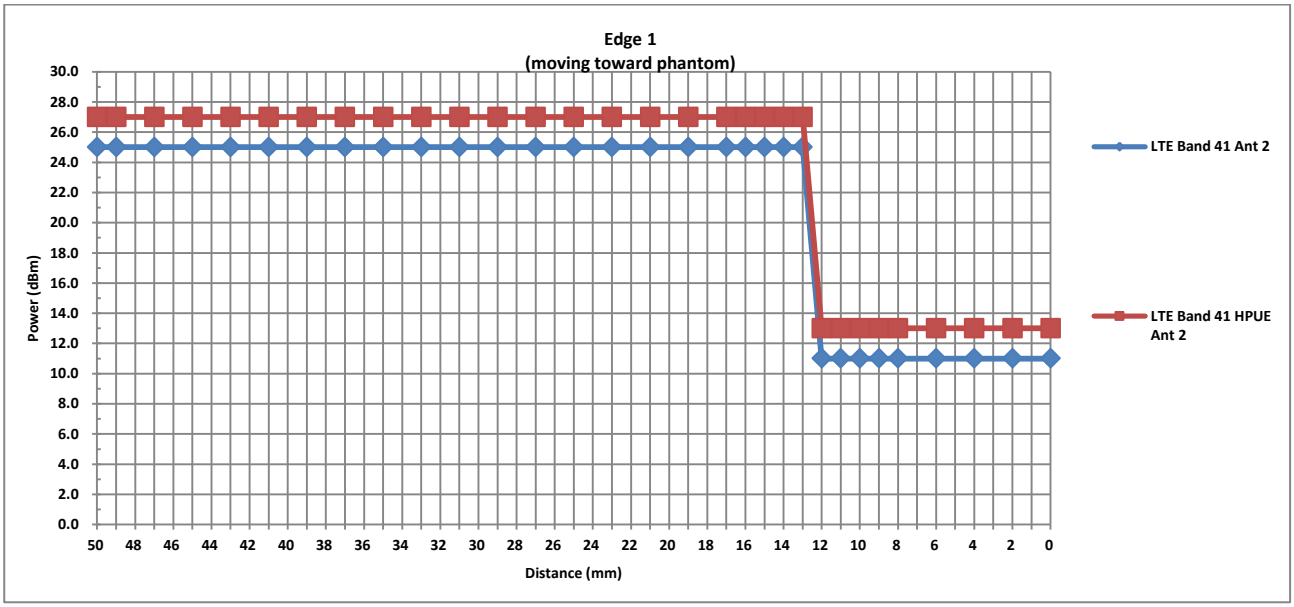

Edge 1
(moving away phantom)
Power (dBm)
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Distance (mm)
WCDMA V Ant 1
LTE Band 26(5) Ant 1

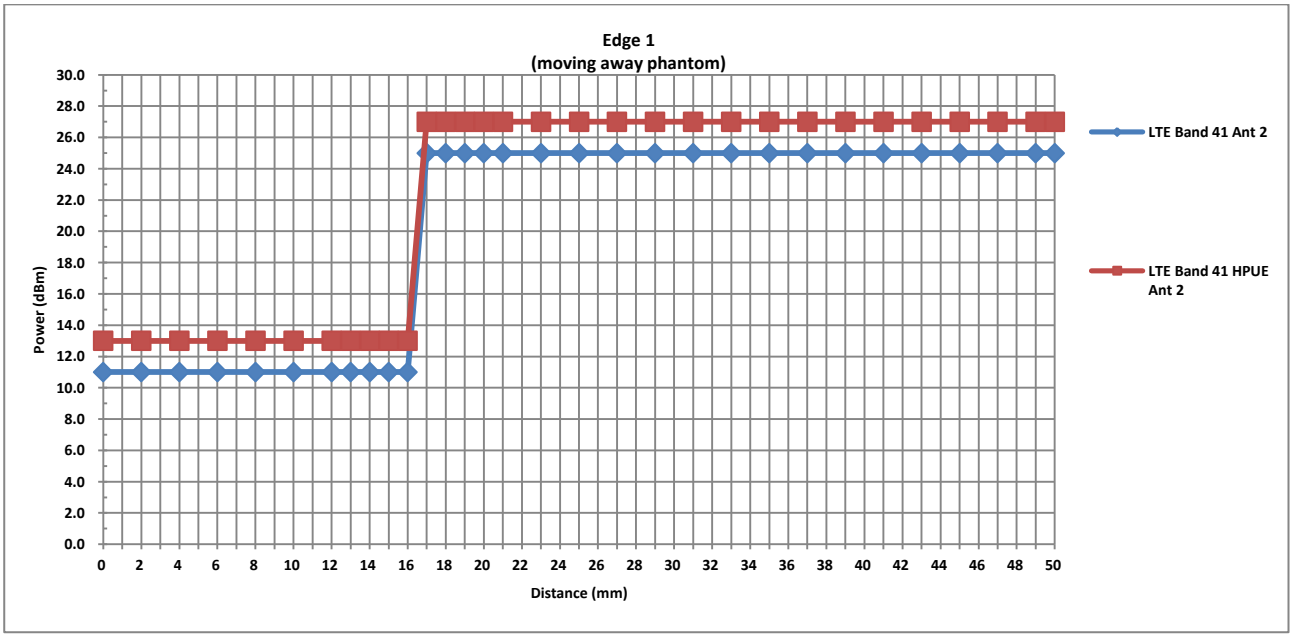
Power Measurement during Sensor Trigger distance testing

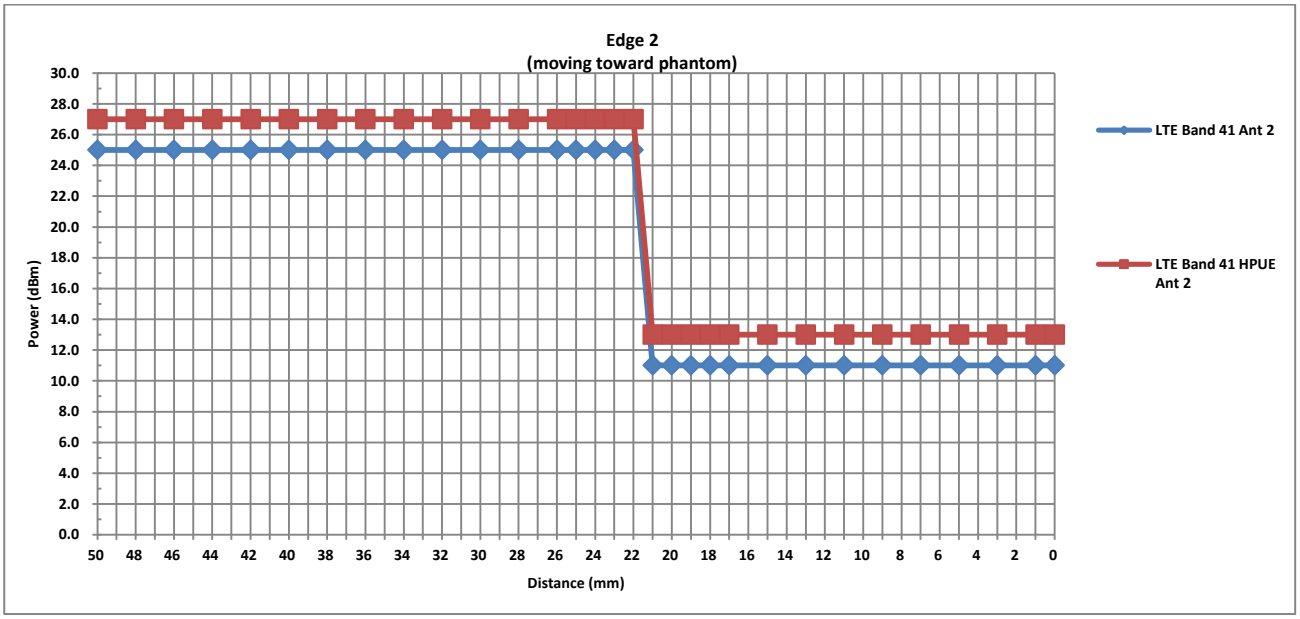
Band/Mode for ANT2	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
LTE Band 41	25.00	11.00	14.00
LTE Band 41 HPUE	27.00	13.00	14.00

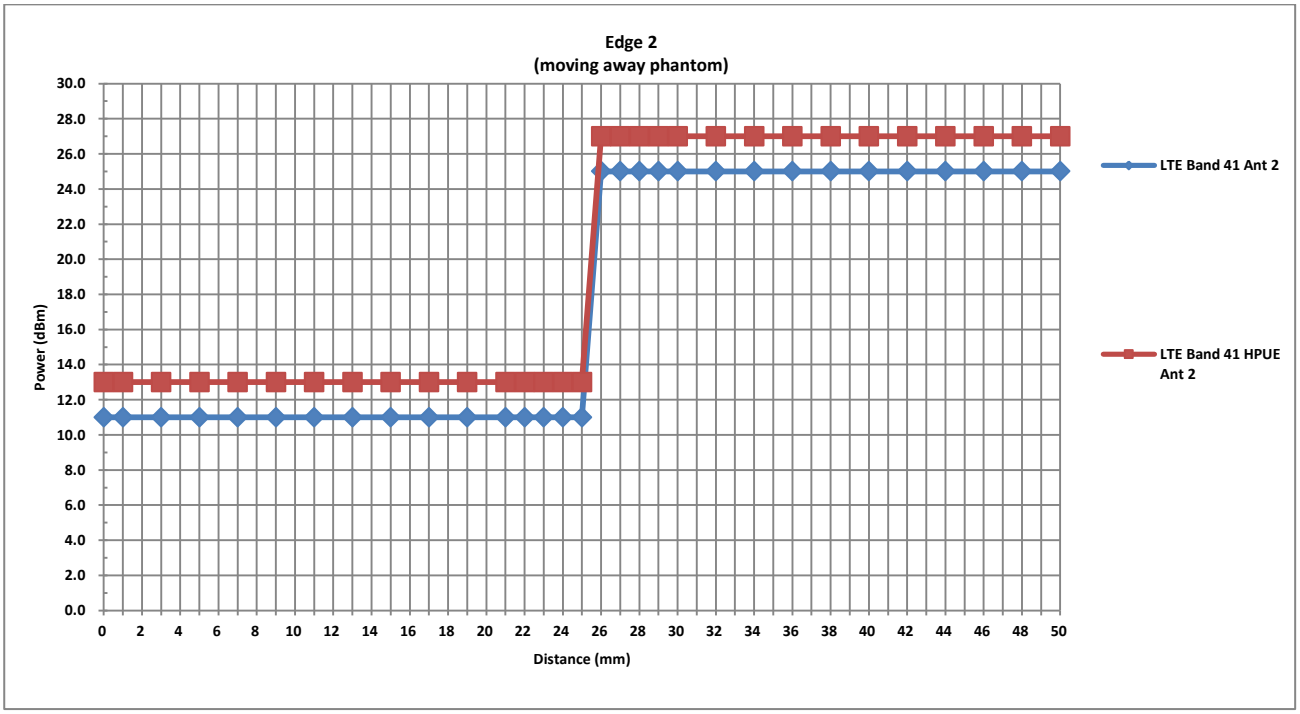





Edge 1
(moving toward phantom)
Power (dBm)
30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
Distance (mm)
LTE Band 41 Ant 2
LTE Band 41 HPUE Ant 2

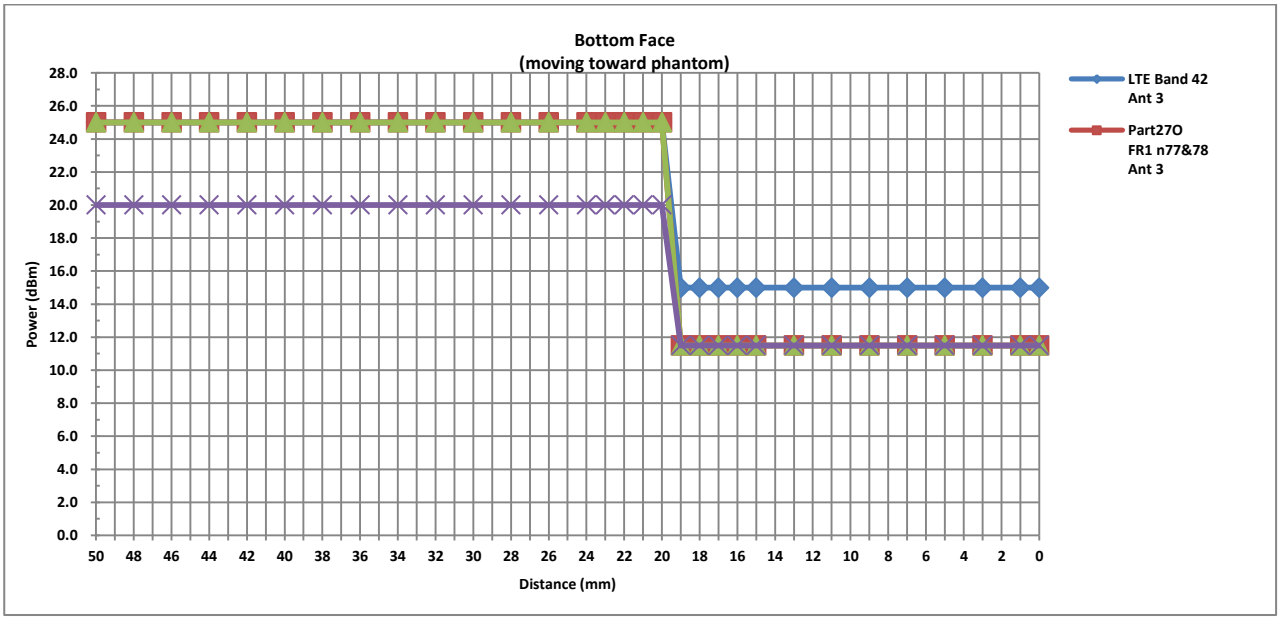

Edge 1
(moving away phantom)
Power (dBm)
30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Distance (mm)
LTE Band 41 Ant 2
LTE Band 41 HPUE Ant 2

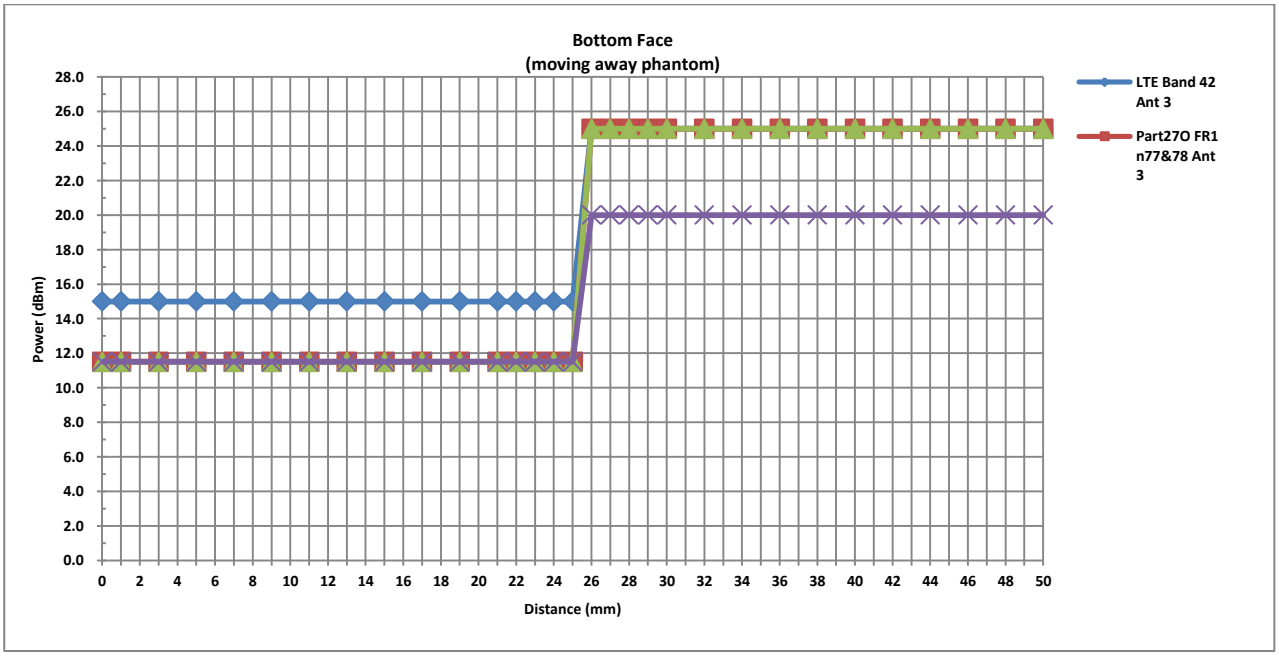

Edge 2
(moving toward phantom)
Power (dBm)
Distance (mm)
LTE Band 41 Ant 2
LTE Band 41 HPUE Ant 2

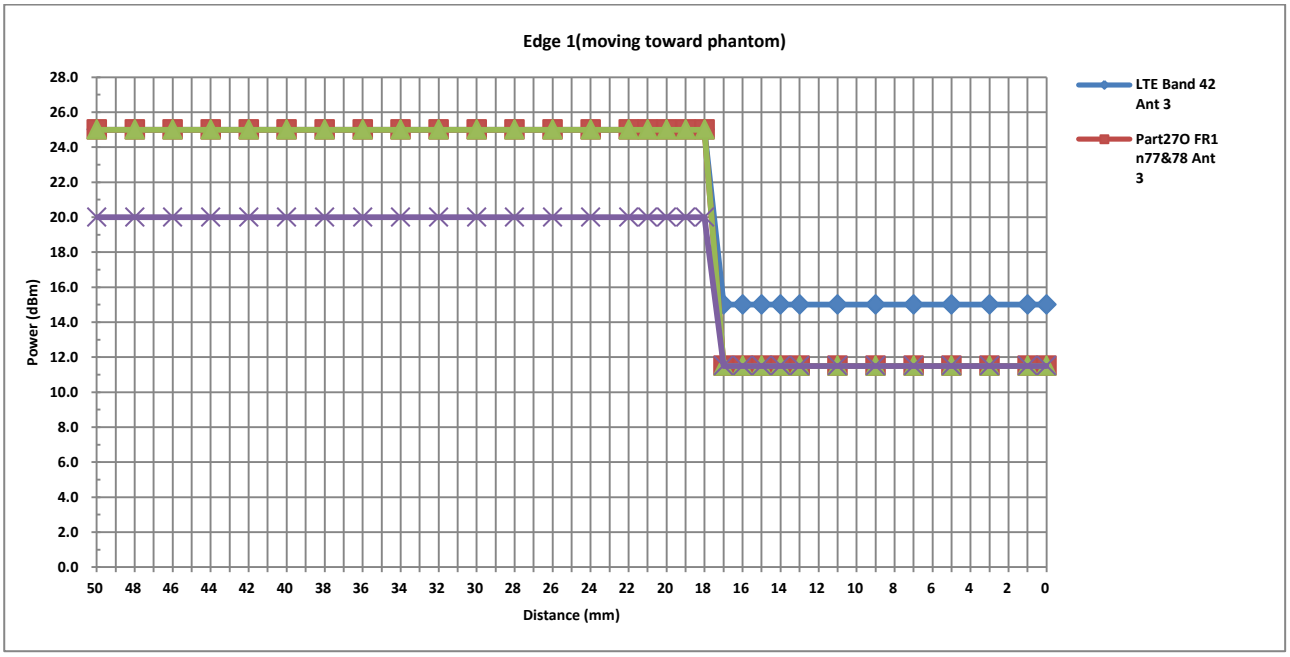

Edge 2
(moving away phantom)
Power (dBm)
Distance (mm)
LTE Band 41 Ant 2
LTE Band 41 HPUE Ant 2

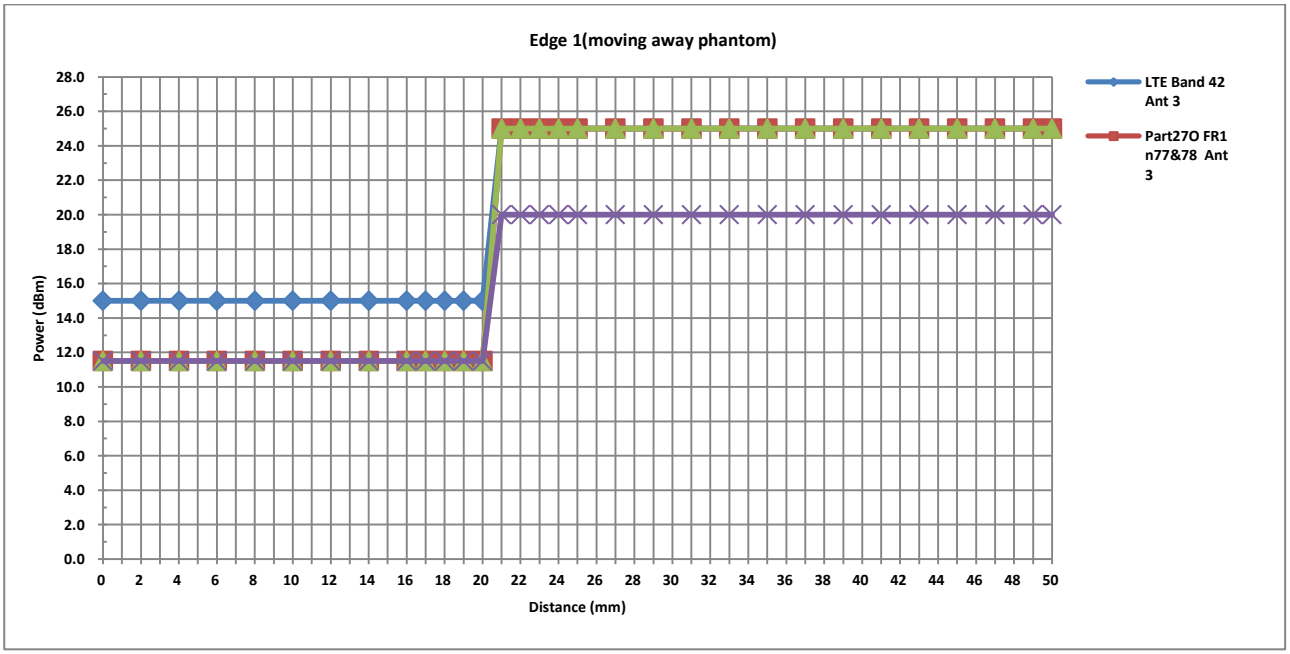
Power Measurement during Sensor Trigger distance testing

Band/Mode for ANT3	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
LTE Band 42	25.00	15.00	10.00
Part27O FR1 n77/78	25.00	11.50	13.50
Part27Q FR1 n77/78	25.00	11.50	13.50
Part96 FR1 n77&78	20.00	11.50	8.50



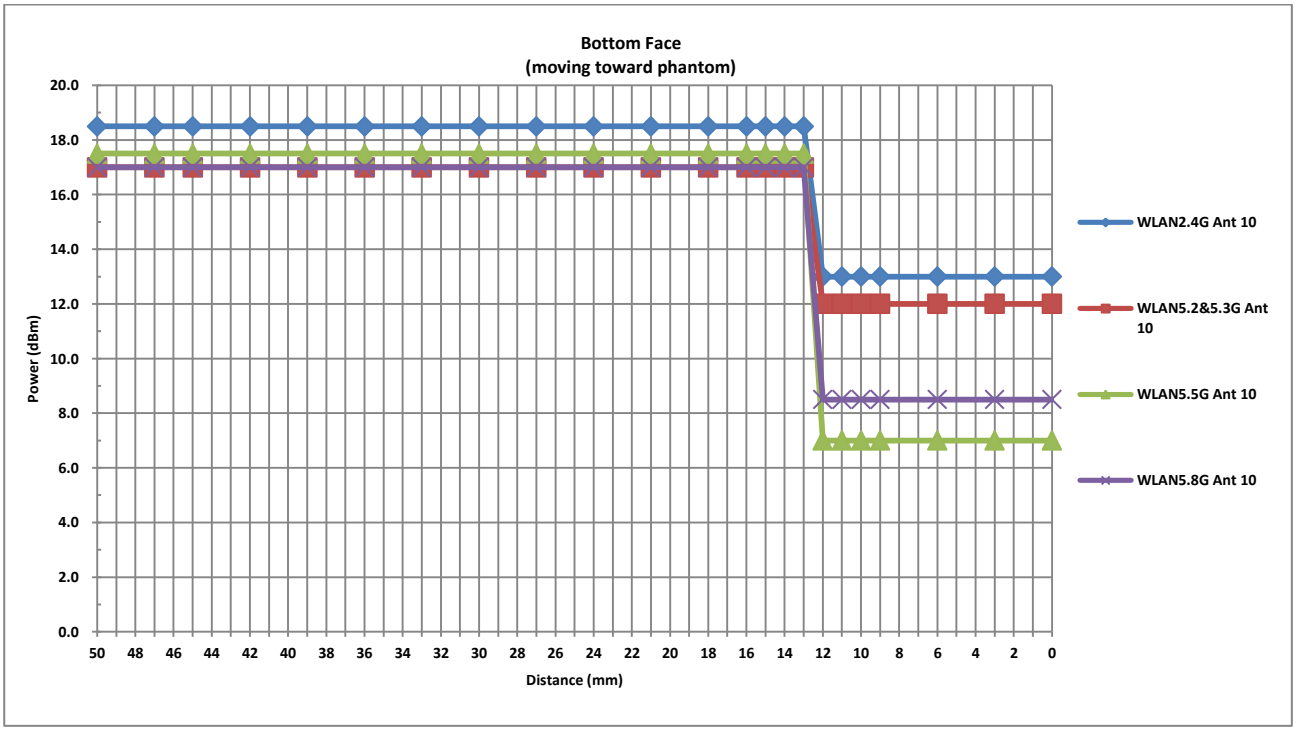


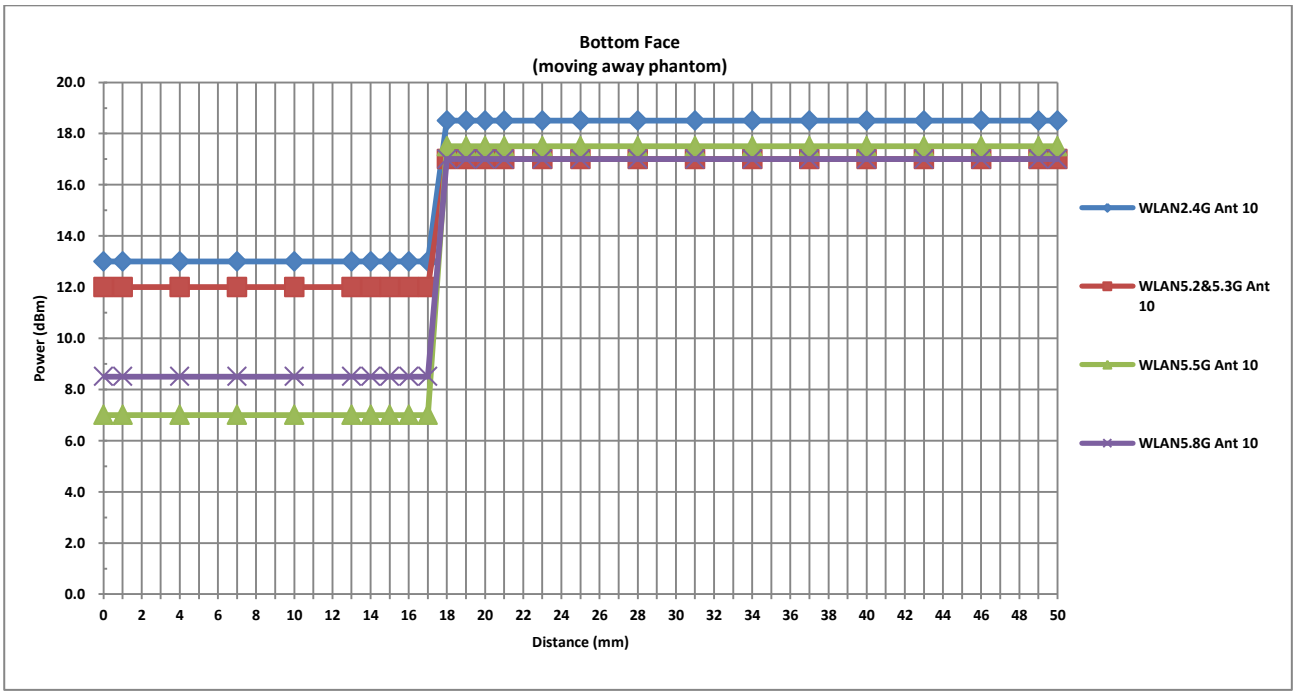

Edge 1(moving toward phantom)
Power (dBm)
Distance (mm)
LTE Band 42 Ant 3
Part27O FR1 n77&78 Ant 3

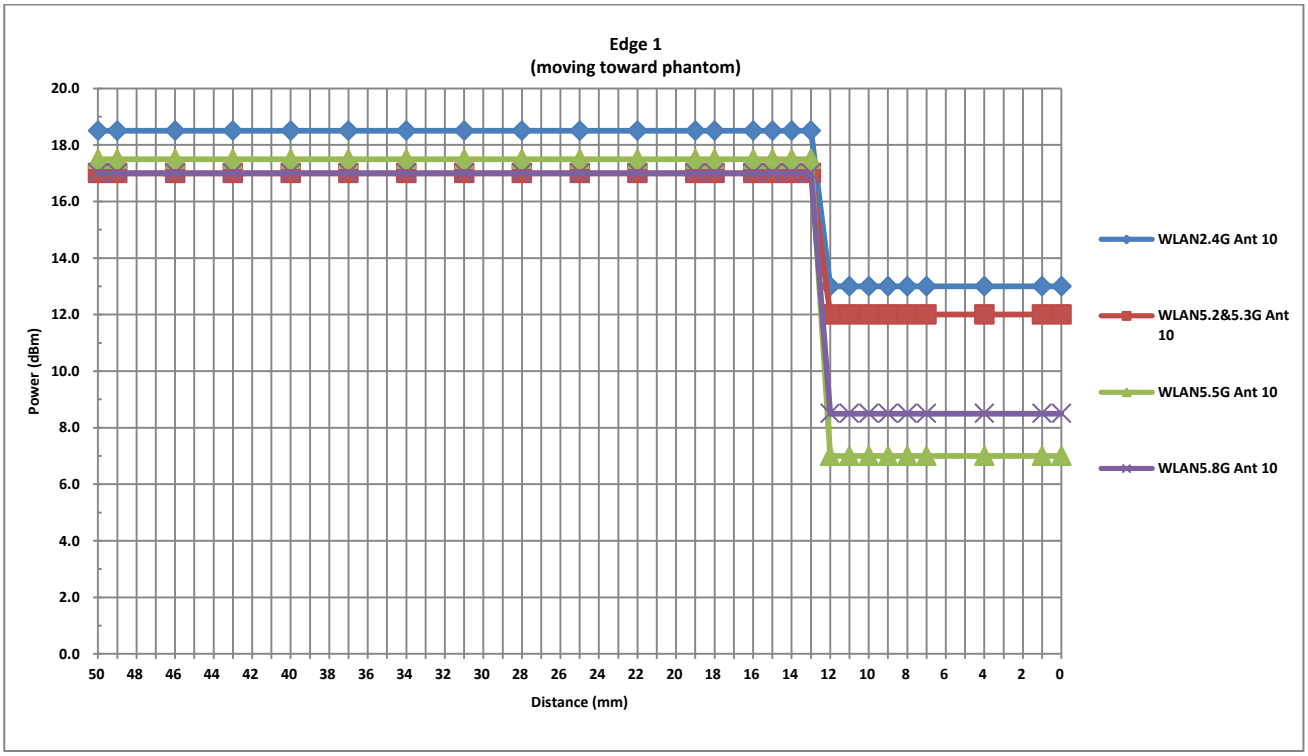

Edge 1(moving away phantom)
Power (dBm)
Distance (mm)
LTE Band 42 Ant 3
Part27O FR1 n77&78 Ant 3

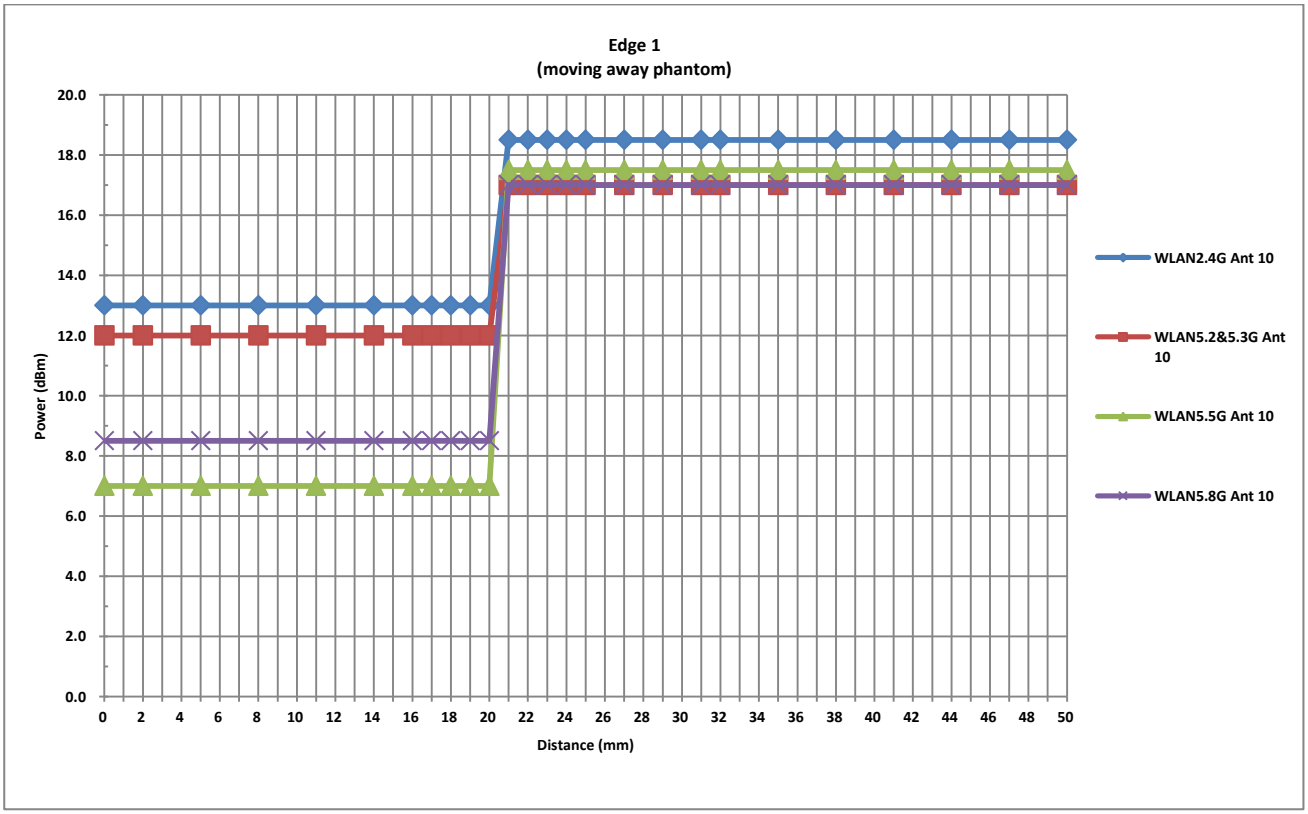
Power Measurement during Sensor Trigger distance testing

Band/Mode for ANT10	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
WLAN 2.4GHz	18.50	13.00	5.50
WLAN 5.2&5.3GHz	17.00	12.00	5.00
WLAN 5.5GHz	17.50	7.00	10.50
WLAN 5.8GHz	17.00	8.50	8.50






Edge 1
(moving toward phantom)
Power (dBm)
Distance (mm)
WLAN2.4G Ant 10
WLAN5.2&5.3G Ant 10
WLAN5.5G Ant 10
WLAN5.8G Ant 10


Edge 1
(moving away phantom)
Power (dBm)
Distance (mm)
WLAN2.4G Ant 10
WLAN5.2&5.3G Ant 10
WLAN5.5G Ant 10
WLAN5.8G Ant 10

6. RF Exposure Limits

6.1 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.

6.2 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

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.

7. Specific Absorption Rate (SAR)

7.1 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.

7.2 SAR Definition

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

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

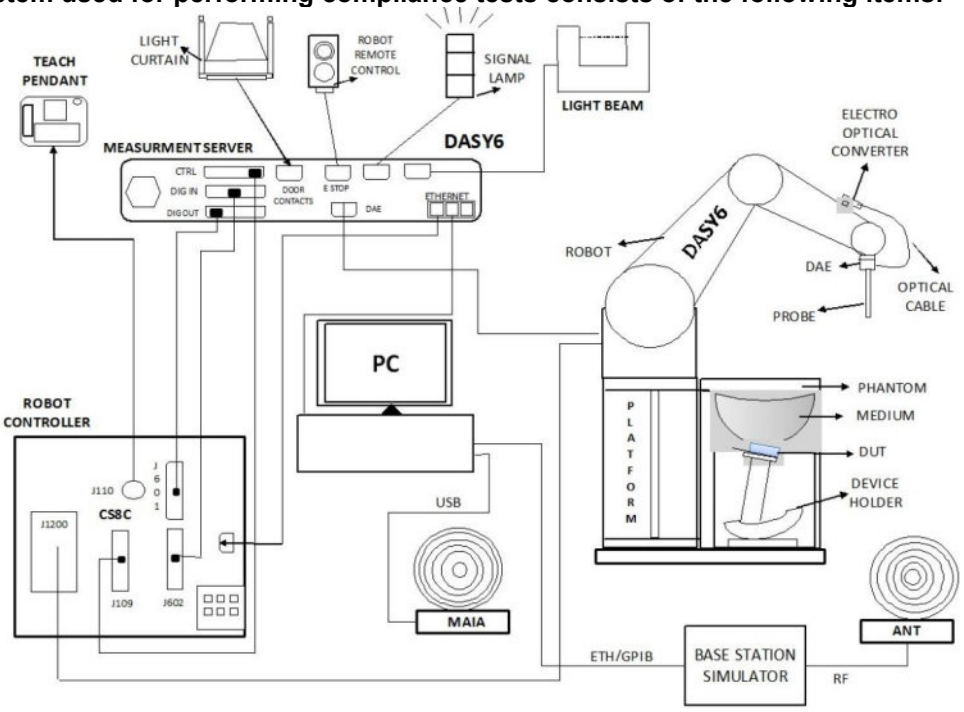
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Windows 10 and the DASY6 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.

8.1 E-Field Probe

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

<EX3DV4 Probe>

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

8.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. 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.

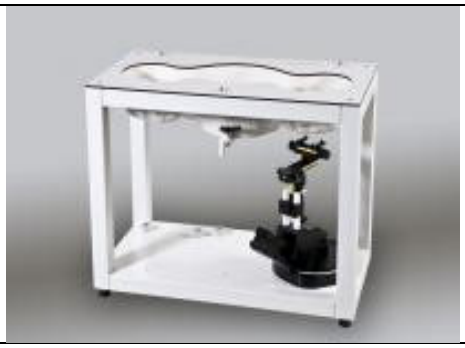
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

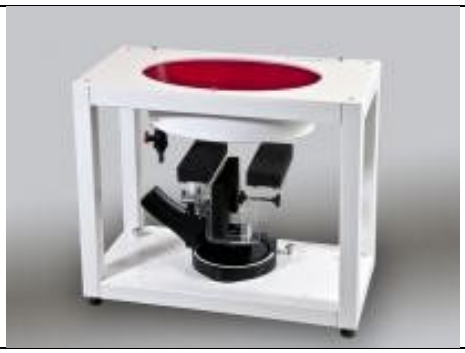
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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



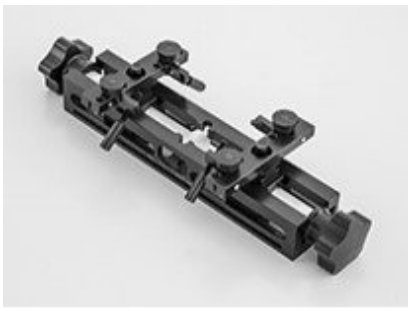
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

8.4 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

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

9.1 Spatial Peak SAR Evaluation

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

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

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

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

9.2 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.

9.3 Area Scan

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

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

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

9.4 Zoom Scan

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

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

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

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

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

9.5 Volume Scan Procedures

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

9.6 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.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d091	2022/8/19	2023/8/18
SPEAG	2450MHz System Validation Kit	D2450V2	1040	2020/5/6	2023/5/4
SPEAG	2600MHz System Validation Kit	D2600V2	1061	2020/11/26	2023/11/24
SPEAG	3500MHz System Validation Kit	D3500V2	1037	2020/11/25	2023/11/23
SPEAG	3700MHz System Validation Kit	D3700V2	1008	2020/11/25	2023/11/23
SPEAG	3900MHz System Validation Kit	D3900V2	1048	2023/3/9	2024/3/8
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2022/9/23	2023/9/22
SPEAG	Data Acquisition Electronics	DAE4	1279	2022/10/26	2023/10/25
SPEAG	Dosimetric E-Field Probe	EX3DV4	7764	2022/9/30	2023/9/29
SPEAG	ELI4 Phantom	ELI V8.0	TP-2151	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio Communication Analyzer	MT8821C	6262306175	2022/7/14	2023/7/13
Agilent	ENA Series Network Analyzer	E5071C	MY46104587	2022/5/24	2023/5/23
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	2022/8/15	2023/8/14
Anritsu	Vector Signal Generator	MG3710A	6201682672	2023/1/5	2024/1/4
Rohde & Schwarz	Power Meter	NRVD	102081	2022/7/14	2023/7/13
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2022/7/14	2023/7/13
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2022/7/14	2023/7/13
R&S	BLUETOOTH TESTER	CBT	101246	2022/5/24	2023/5/23
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2022/10/12	2023/10/11
TES	DIGITAC THERMOMETER	1310	220305411	2023/1/8	2024/1/7
Testo	Thermo-Hygrometer	608-H1	1241332126	2022/7/20	2023/7/19
ARRA	Power Divider	A3200-2	N/A	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	

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. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

11. System Verification

11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.

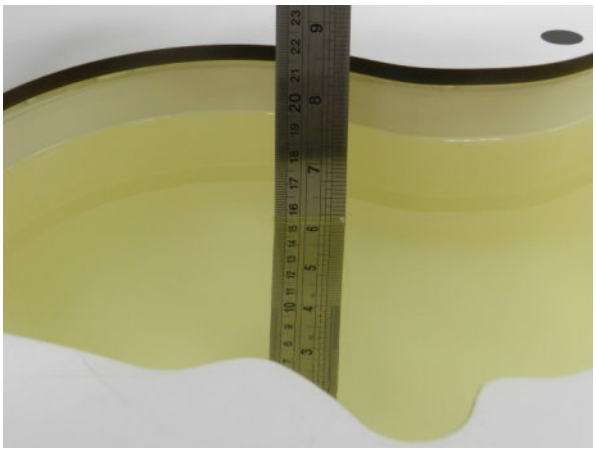


Fig 11.1 Photo of Liquid Height for Head SAR

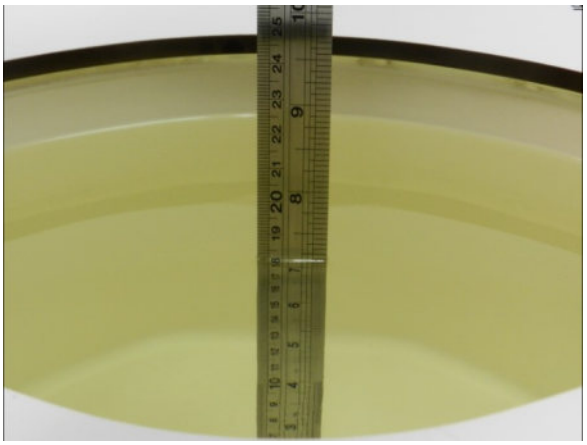


Fig 11.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
835	Head	22.6	0.930	40.900	0.90	41.50	3.33	-1.45	±5	2023/3/28
2450	Head	22.8	1.840	39.200	1.80	39.20	2.22	0.00	±5	2023/4/1
2600	Head	22.9	2.010	40.600	1.96	39.00	2.55	4.10	±5	2023/3/29
3500	Head	22.6	2.810	39.000	2.91	37.90	-3.44	2.90	±5	2023/3/30
3700	Head	22.7	3.000	38.700	3.12	37.70	-3.85	2.65	±5	2023/4/8
3900	Head	22.8	3.190	38.400	3.32	37.50	-3.92	2.40	±5	2023/3/31
5250	Head	22.7	4.640	36.500	4.71	35.90	-1.49	1.67	±5	2023/4/2
5600	Head	22.8	4.980	35.900	5.07	35.50	-1.78	1.13	±5	2023/4/2
5750	Head	22.9	5.210	35.600	5.22	35.40	-0.19	0.56	±5	2023/4/2
3500	Head	22.9	2.790	39.600	2.91	37.90	-4.12	4.49	±5	2023/5/16
3900	Head	22.9	3.180	38.100	3.32	37.50	-4.22	1.60	±5	2023/5/16

11.3 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.

Date	Frequency (MHz)	Tissue Type	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 (%)
2023/3/28	835	Head	50	4d091	7764	1279	0.454	9.45	9.08	-3.92
2023/4/1	2450	Head	50	1040	7764	1279	2.500	51.80	50	-3.47
2023/3/29	2600	Head	50	1061	7764	1279	2.670	56.60	53.4	-5.65
2023/3/30	3500	Head	50	1037	7764	1279	3.170	68.00	63.4	-6.76
2023/4/8	3700	Head	50	1008	7764	1279	3.390	67.60	67.8	0.30
2023/3/31	3900	Head	50	1048	7764	1279	3.460	69.10	69.2	0.14
2023/4/2	5250	Head	50	1113	7764	1279	3.790	81.50	75.8	-6.99
2023/4/2	5600	Head	50	1113	7764	1279	4.150	82.60	83	0.48
2023/4/2	5750	Head	50	1113	7764	1279	3.770	80.80	75.4	-6.68
2023/5/16	3500	Head	50	1037	7764	1279	3.180	68.00	63.6	-6.47
2023/5/16	3900	Head	50	1048	7764	1279	3.490	69.10	69.8	1.01

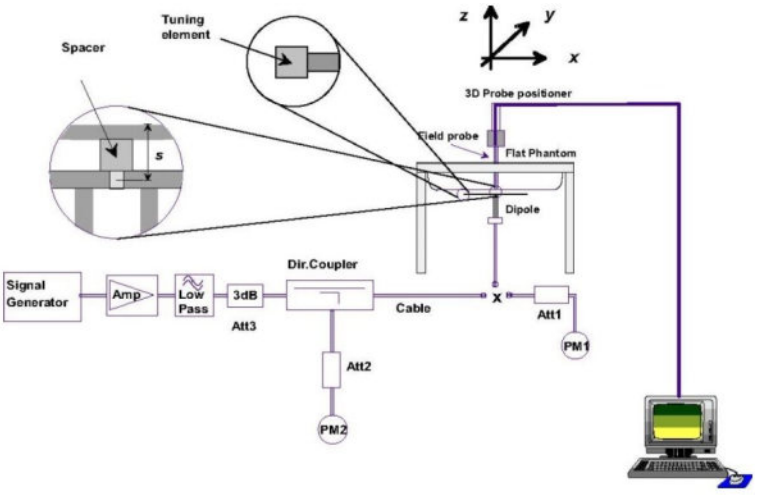


Fig 8.3.1 System Performance Check Setup

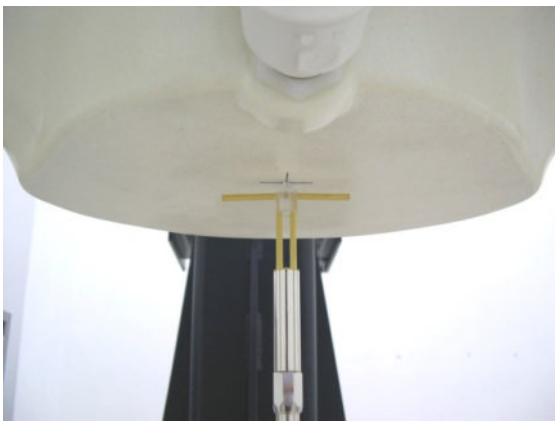


Fig 8.3.2 Setup Photo

12. RF Exposure Positions

12.1 SAR Testing for Tablet

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

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

The detailed conducted power table can refer to Appendix E.

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

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

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

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

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

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

Setup Configuration

HSUPA Setup Configuration:

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

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

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

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

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

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

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

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

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

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

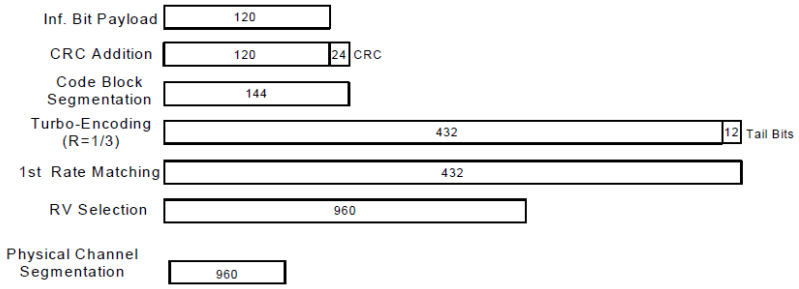


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

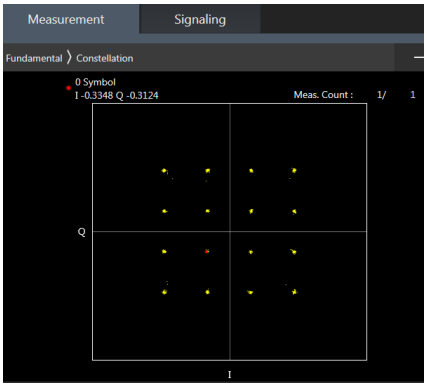
General Note:

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

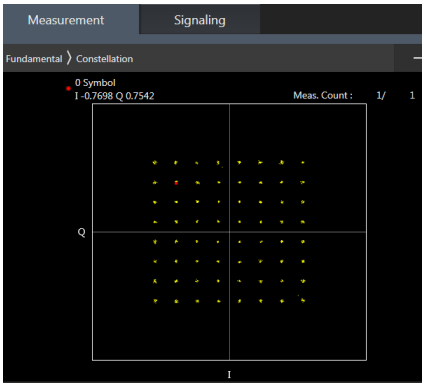
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B5 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 5 SAR test was covered by Band 26; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to May 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



16QAM



64QAM

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

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

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

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

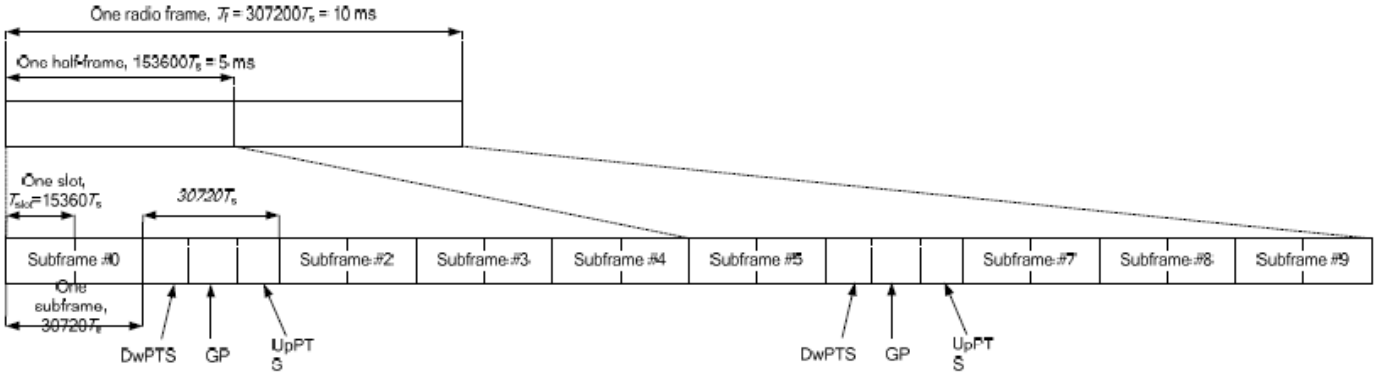


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

For LTE TDD Power class 2

i. Uplink-downlink configuration: 1. In a half-frame consisted of 5 subfames, uplink operation is in 2 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: (2+0.167)/5 = 43.3%
iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (2+0.143)/5 = 42.9%
v. For TDD LTE SAR measurement, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 43.3%/42.9% = 1.009 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.

For LTE TDD Power class 3

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.
ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%
iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%
v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

The device can adjust uplink/downlink configuration automatically according to the transmitting power class level, as followings:

LTE TDD Band	Power Class level	support uplink/downlink configuration
LTE Band 41	> 23	1,2,3,4,5
	=23	0,1,2,3,4,5,6
	< 23	0,1,2,3,4,5,6

<LTE Carrier Aggregation>

General Note:

1. This device supports Carrier Aggregation on downlink for inter and intra band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.
3. The gray color table is covered by other combinations and no need to verify power.

2CC Downlink Carrier Aggregation				3CC Downlink Carrier Aggregation				4CC Downlink Carrier Aggregation			
Number	Combination	4X4 MIMO	Covered by Measurement Superset	Number	Combination	4X4 MIMO	Covered by Measurement Superset	Number	Combination	4X4 MIMO	Covered by Measurement Superset
1	CA_41A-42A			1	CA_41A-42C			1	CA_41C-42C		
2	CA_41C		3CC#2	2	CA_41C-42A						
3	CA_42C		3CC#1								

LTE Carrier Aggregation Conducted Power (Downlink)

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

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

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

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

v. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.

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

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

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

LTE 4x4 MIMO (Downlink)

This device supports downlink 4x4 MIMO operations for LTE Band 41/42 only. Uplink transmission is limited to a single output stream. Power measurements were performed with downlink 4x4 MIMO active for the configuration with highest measured maximum conducted power with 4x4 downlink MIMO inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive. When carrier aggregation is applicable, power measurements were performed with the downlink carrier aggregation and 4x4 DL MIMO active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

4X4 MIMO	Band
	LTE Band 41/42

5G NR Output Power (Unit: dBm)

General Note:

1. 5G NR n77/n78 is NSA mode.
2. 5G NR n77 is SA mode.
3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, the CP-OFDM mode will not higher than DFT-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-s QPSK and the reported SAR for the DFT-s QPSK configuration is ≤ 1.45 W/kg; CP-OFDM testing is not required.
   b. For DFT-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, for 16QAM/64QAM/256QAM and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the 16QAM/64QAM/256QAM and smaller bandwidth output power will not ½ dB higher than the same configuration in the largest supported bandwidth.
   c. SAR testing 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
   d. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
   e. 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
   f. PI/2 BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, PI/2 BPSK /16QAM/64QAM/256QAM SAR testing are not required.
   g. Smaller bandwidth output power for each RB allocation configuration for this device will 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
4. 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.
5. NSA and SA mode should perform SAR separately. For the maximum power of NSA mode is the same as SA total power level, so SA SAR can represent NSA mode SAR.
6. 5GNR NSA mode, the power level is the same as 5GNR SA mode, so 5GNR NSA mode and SA mode power table only show one time.
7. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
8. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
9. For 5GNR EN-DC mode, standalone SAR performed for 5GNR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5GNR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.

<3GPP 38.101 MPR for EN-DC>

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

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

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

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

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

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

<EN-DC combination and combine Total Power>

EN-DC Combination	4G UL Band	LTE TX ANT Port	5G UL Band	NR TX ANT Port
DC_41A_n77A	41A	2	n77A	3
DC_41A_n78A	41A	2	n78A	3

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

General Note:

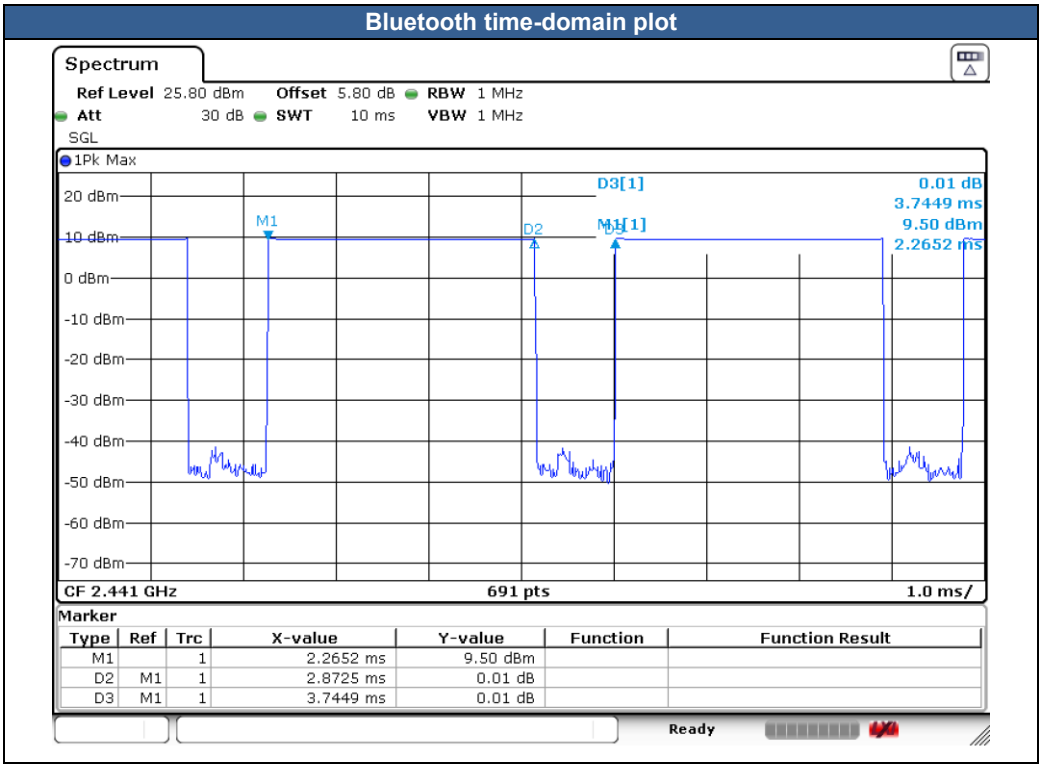
1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration. Additional output power measurements were not necessary.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
    a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
    b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
    c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.7% as following figure, according to Oct. 2016 TCB workshop for Bluetooth SAR scaling need further consideration and the duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the value of Bluetooth reported SAR calculation.

Bluetooth time-domain plot



15. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

<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:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - 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

<ANT1>

Exposure Position	Wireless Interface	WCDMA Band V	LTE Band 26(5)
	Calculated Frequency (MHz)	846.6	841.5
	Maximum power (dBm)	25.0	25.0
	Maximum rated power(mW)	316.23	316.23
Bottom Face	Separation distance(mm)	5.0	
	exclusion threshold	58.2	58.0
	Testing required?	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.0	
	exclusion threshold	58.2	58.0
	Testing required?	**Yes**	**Yes**
Edge 2	Separation distance(mm)	12.2	
	exclusion threshold	23.9	23.8
	Testing required?	**Yes**	**Yes**
Edge 3	Separation distance(mm)	147.5	
	exclusion threshold	640.0	638.0
	Testing required?	**No**	**No**
Edge 4	Separation distance(mm)	183.3	
	exclusion threshold	915.0	911.0
	Testing required?	**No**	**No**

<ANT2>

Exposure Position	Wireless Interface	LTE Band 41	LTE Band 41 HPUE
	Calculated Frequency (MHz)	2680	2680
	Maximum power (dBm)	25.0	27.0
	Maximum rated power(mW)	316.23	501.19
Bottom Face	Separation distance(mm)	5.0	
	exclusion threshold	103.5	164.1
	Testing required?	Yes	Yes
Edge 1	Separation distance(mm)	10.6	
	exclusion threshold	44.3	70.1
	Testing required?	Yes	Yes
Edge 2	Separation distance(mm)	5.0	
	exclusion threshold	103.5	164.1
	Testing required?	Yes	Yes
Edge 3	Separation distance(mm)	120.6	
	exclusion threshold	668.0	668.0
	Testing required?	No	No
Edge 4	Separation distance(mm)	243.2	
	exclusion threshold	2024.0	2024.0
	Testing required?	No	No

<ANT3>

Exposure Position	Wireless Interface	LTE Band 42	Part27O FR1 n77&78	Part27Q FR1 n77&78	Part96 FR1 n77&78
	Calculated Frequency (MHz)	3540	3930	3500.01	3624.99
	Maximum power (dBm)	25.0	25.0	25.0	20.0
	Maximum rated power(mW)	316.23	316.23	316.23	100.00
Bottom Face	Separation distance(mm)	5.0			
	exclusion threshold	119.0	125.4	118.3	38.1
	Testing required?	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	5.0			
	exclusion threshold	119.0	125.4	118.3	38.1
	Testing required?	Yes	Yes	Yes	Yes
Edge 2	Separation distance(mm)	131.6			
	exclusion threshold	896.0	892.0	896.0	895.0
	Testing required?	No	No	No	No
Edge 3	Separation distance(mm)	147.5			
	exclusion threshold	1055.0	1051.0	1055.0	1054.0
	Testing required?	No	No	No	No
Edge 4	Separation distance(mm)	111.4			
	exclusion threshold	694.0	690.0	694.0	693.0
	Testing required?	No	No	No	No

<ANT4>

Exposure Position	Wireless Interface	Part27O FR1 n77&78	Part27Q FR1 n77&78	Part96 FR1 n77&78
	Calculated Frequency (MHz)	3930	3500.01	3624.99
	Maximum power (dBm)	15.0	18.0	16.0
	Maximum rated power(mW)	31.62	63.10	39.81
Bottom Face	Separation distance(mm)	5.0		
	exclusion threshold	12.5	23.6	15.2
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)	87.9		
	exclusion threshold	455.0	459.0	458.0
	Testing required?	No	No	No
Edge 2	Separation distance(mm)	5.0		
	exclusion threshold	12.5	23.6	15.2
	Testing required?	Yes	Yes	Yes
Edge 3	Separation distance(mm)	41.0		
	exclusion threshold	1.5	2.9	1.9
	Testing required?	No	No	No
Edge 4	Separation distance(mm)	243.2		
	exclusion threshold	2008.0	2012.0	2011.0
	Testing required?	No	No	No

<ANT7>

Exposure Position	Wireless Interface	Part27O FR1 n77&78	Part27Q FR1 n77&78	Part96 FR1 n77&78
	Calculated Frequency (MHz)	3930	3500.01	3624.99
	Maximum power (dBm)	16.0	9.5	14.0
	Maximum rated power(mW)	39.81	8.91	25.12
Bottom Face	Separation distance(mm)	5.0		
	exclusion threshold	15.8	3.3	9.6
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)	5.0		
	exclusion threshold	15.8	3.3	9.6
	Testing required?	Yes	Yes	Yes
Edge 2	Separation distance(mm)	72.1		
	exclusion threshold	297.0	301.0	300.0
	Testing required?	No	No	No
Edge 3	Separation distance(mm)	147.5		
	exclusion threshold	1051.0	1055.0	1054.0
	Testing required?	No	No	No
Edge 4	Separation distance(mm)	168.5		
	exclusion threshold	1261.0	1265.0	1264.0
	Testing required?	No	No	No

<ANT10>

Exposure Position	Wireless Interface	BT	2.4GHz WLAN	5GHz WLAN
	Calculated Frequency (MHz)	2480.0	2462.0	5825.0
	Maximum power (dBm)	6.0	18.5	17.5
	Maximum rated power(mW)	3.98	70.79	56.23
Bottom Face	Separation distance(mm)	5.0	5.0	5.0
	exclusion threshold	1.3	22.2	27.1
	Testing required?	No	Yes	Yes
Edge 1	Separation distance(mm)	5.0	5.0	5.0
	exclusion threshold	1.3	22.2	27.1
	Testing required?	No	Yes	Yes
Edge 2	Separation distance(mm)	193.3	193.3	193.3
	exclusion threshold	1528.0	1529.0	1495.0
	Testing required?	No	No	No
Edge 3	Separation distance(mm)	147.5	147.5	147.5
	exclusion threshold	1070.0	1071.0	1037.0
	Testing required?	No	No	No
Edge 4	Separation distance(mm)	42.2	42.2	42.2
	exclusion threshold	0.2	2.6	3.2
	Testing required?	No	No	Yes

<ANT11>

Exposure Position	Wireless Interface	Part27O FR1 n77&78	Part27Q FR1 n77&78	Part96 FR1 n77&78
	Calculated Frequency (MHz)	3930	3500.01	3624.99
	Maximum power (dBm)	12.5	16.0	15.0
	Maximum rated power(mW)	17.78	39.81	31.62
Bottom Face	Separation distance(mm)	5.0		
	exclusion threshold	7.1	14.9	12.0
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)	54.1		
	exclusion threshold	117.0	121.0	120.0
	Testing required?	No	No	No
Edge 2	Separation distance(mm)	5.0		
	exclusion threshold	7.1	14.9	12.0
	Testing required?	Yes	Yes	Yes
Edge 3	Separation distance(mm)	87.7		
	exclusion threshold	453.0	457.0	456.0
	Testing required?	No	No	No
Edge 4	Separation distance(mm)	243.2		
	exclusion threshold	2008.0	2012.0	2011.0
	Testing required?	No	No	No

16. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN/BT signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For SAR testing of Bluetooth signal with 83.3% theoretical duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle) *83.3%".
   d. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   e. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   f. 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.
   g. For TDD LTE SAR measurement of power class 2, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 43.3%/42.9% = 1.009 is applied to scale-up the measured SAR result. The reported TDD LTE SAR (W/kg) = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   · ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   · ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   · ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. The device implements Proximity sensors mechanism for the power management for SAR compliance at different exposure conditions (body). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.
5. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
6. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
7. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
8. NSA and SA mode should perform SAR separately. For the maximum power of SA mode is the same as NSA total power level, so SA standalone total power level SAR can represent NSA mode SAR.
9. 5GNR NSA mode, the power level is the same as 5GNR SA mode, so 5GNR NSA mode and SA mode power table only show one time.
10. For 5GNR EN-DC mode, standalone SAR performed for 5GNR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5GNR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.
11. This device supports HPUE for LTE band 41 with class 2 level, HPUE power have been measured separately. For HPUE power is higher than power class 3 but with lower duty cycle, the maximum average power for class 2 and class 3 is almost the same, so we chose power class 3 full SAR testing and power class 2 verify the worst case of power class 3 SAR.
12. For EN-DC mode distance SAR co-located analysis, chose Bottom Face/Edge 1 at 11mm SAR as Bottom Face/Edge 1 at 16mm at WWAN Ant 2, and chose Bottom Face/Edge 1 at 0mm SAR as Bottom Face/Edge 1 at 11mm SAR at WWAN Ant 3 and Bottom Face at 16mm as Bottom Face at 20mm SAR at WWAN Ant 3 is only for simultaneous transmission analysis with WLAN.
13. For WLAN Ant 10 distance SAR test at Bottom Face 11mm is only for simultaneous transmission analysis with WWAN.
14. Chose Bluetooth Bottom Face/ Edge 1 at 0mm as distance SAR to do co-located with WWAN analysis.

UMTS Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B5 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 5 SAR test was covered by Band 26; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

5G NR Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. SAR testing 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.
   b. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
   c. 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.
   d. PI/2 BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, PI/2 BPSK /16QAM/64QAM/256QAM SAR testing are not required.
   e. Smaller bandwidth output power for each RB allocation configuration for this device will 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
   f. For 5G FR1 n77 the maximum bandwidth does not support three non-overlapping channels, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

16.1 Body SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Sample	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
835MHZ																					
01	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 1	1	Reduced	4182	836.4	21.78	22.50	1.180	-	-	0.12	0.921	**1.087**
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 1	1	Reduced	4132	826.4	21.71	22.50	1.199	-	-	0.18	0.794	0.952
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	0mm	Ant 1	1	Reduced	4233	846.6	21.70	22.50	1.202	-	-	-0.04	0.815	0.980
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 1	1	Reduced	4182	836.4	21.78	22.50	1.180	-	-	0.11	0.779	0.919
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 1	1	Reduced	4132	826.4	21.71	22.50	1.199	-	-	0.08	0.688	0.825
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	0mm	Ant 1	1	Reduced	4233	846.6	21.70	22.50	1.202	-	-	-0.08	0.696	0.837
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 2	0mm	Ant 1	1	Full	4182	836.4	24.32	25.00	1.169	-	-	-0.12	0.178	0.208
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Face	11mm	Ant 1	1	Full	4182	836.4	24.32	25.00	1.169	-	-	0.1	0.326	0.381
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Edge 1	11mm	Ant 1	1	Full	4182	836.4	24.32	25.00	1.169	-	-	0.01	0.302	0.353
02	LTE Band 26(5)	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 1	1	Reduced	26865	831.5	20.57	21.50	1.239	-	-	0.17	0.943	**1.168**
	LTE Band 26(5)	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 1	2	Reduced	26865	831.5	20.57	21.50	1.239	-	-	0.06	0.849	1.052
	LTE Band 26(5)	15M	QPSK	36	0	-	Bottom Face	0mm	Ant 1	1	Reduced	26865	831.5	20.43	21.50	1.279	-	-	0.08	0.731	0.935
	LTE Band 26(5)	15M	QPSK	75	0	-	Bottom Face	0mm	Ant 1	1	Reduced	26865	831.5	20.38	21.50	1.294	-	-	0.02	0.740	0.958
	LTE Band 26(5)	15M	QPSK	1	0	-	Edge 1	0mm	Ant 1	1	Reduced	26865	831.5	20.57	21.50	1.239	-	-	-0.18	0.722	0.894
	LTE Band 26(5)	15M	QPSK	36	0	-	Edge 1	0mm	Ant 1	1	Reduced	26865	831.5	20.43	21.50	1.279	-	-	-0.14	0.687	0.879
	LTE Band 26(5)	15M	QPSK	75	0	-	Edge 1	0mm	Ant 1	1	Reduced	26865	831.5	20.38	21.50	1.294	-	-	-0.11	0.675	0.874
	LTE Band 26(5)	15M	QPSK	1	0	-	Edge 2	0mm	Ant 1	1	Full	26865	831.5	24.10	25.00	1.230	-	-	-0.12	0.250	0.308
	LTE Band 26(5)	15M	QPSK	36	0	-	Edge 2	0mm	Ant 1	1	Full	26865	831.5	23.12	24.00	1.225	-	-	0.12	0.204	0.250
	LTE Band 26(5)	15M	QPSK	1	0	-	Bottom Face	11mm	Ant 1	1	Full	26865	831.5	24.10	25.00	1.230	-	-	-0.1	0.127	0.156
	LTE Band 26(5)	15M	QPSK	1	0	-	Edge 1	11mm	Ant 1	1	Full	26865	831.5	24.10	25.00	1.230	-	-	0.02	0.068	0.084
2600MHZ																					
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	40620	2593	10.55	11.00	1.109	62.9	1.006	0.04	0.743	0.829
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	39750	2506	10.32	11.00	1.169	62.9	1.006	-0.15	0.710	0.835
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	40185	2549.5	10.51	11.00	1.119	62.9	1.006	0.08	0.704	0.793
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41055	2636.5	10.37	11.00	1.156	62.9	1.006	-0.01	0.710	0.826
	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41490	2680	10.20	11.00	1.202	62.9	1.006	0.04	0.728	0.880
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 2	1	Reduced	40620	2593	10.43	11.00	1.140	62.9	1.006	0.09	0.701	0.804
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 2	1	Reduced	39750	2506	10.42	11.00	1.143	62.9	1.006	0.02	0.729	0.838
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 2	1	Reduced	40185	2549.5	10.20	11.00	1.202	62.9	1.006	0.09	0.689	0.833
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41055	2636.5	10.11	11.00	1.227	62.9	1.006	-0.08	0.682	0.842
	LTE Band 41	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41490	2680	10.18	11.00	1.208	62.9	1.006	-0.1	0.703	0.854
	LTE Band 41	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 2	1	Reduced	40620	2593	10.48	11.00	1.127	62.9	1.006	0.03	0.710	0.805
	LTE Band 41	20M	QPSK	1	0	-	Edge 1	0mm	Ant 2	1	Reduced	40620	2593	10.55	11.00	1.109	62.9	1.006	-0.15	0.093	0.104
	LTE Band 41	20M	QPSK	50	0	-	Edge 1	0mm	Ant 2	1	Reduced	40620	2593	10.43	11.00	1.140	62.9	1.006	0.06	0.085	0.098
	LTE Band 41	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	10.55	11.00	1.109	62.9	1.006	0.04	0.856	0.955
	LTE Band 41	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	39750	2506	10.32	11.00	1.169	62.9	1.006	-0.07	0.741	0.872
	LTE Band 41	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40185	2549.5	10.51	11.00	1.119	62.9	1.006	-0.1	0.747	0.841
	LTE Band 41	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	41055	2636.5	10.37	11.00	1.156	62.9	1.006	-0.1	0.776	0.903
	LTE Band 41	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	41490	2680	10.20	11.00	1.202	62.9	1.006	-0.12	0.732	0.885
	LTE Band 41	20M	QPSK	50	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	10.43	11.00	1.140	62.9	1.006	0.11	0.715	0.820
	LTE Band 41	20M	QPSK	50	0	-	Edge 2	0mm	Ant 2	1	Reduced	39750	2506	10.42	11.00	1.143	62.9	1.006	0.15	0.714	0.821
	LTE Band 41	20M	QPSK	50	0	-	Edge 2	0mm	Ant 2	1	Reduced	40185	2549.5	10.20	11.00	1.202	62.9	1.006	0.07	0.652	0.789
	LTE Band 41	20M	QPSK	50	0	-	Edge 2	0mm	Ant 2	1	Reduced	41055	2636.5	10.11	11.00	1.227	62.9	1.006	0.05	0.625	0.772
	LTE Band 41	20M	QPSK	50	0	-	Edge 2	0mm	Ant 2	1	Reduced	41490	2680	10.18	11.00	1.208	62.9	1.006	0.1	0.633	0.769
	LTE Band 41	20M	QPSK	100	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	10.48	11.00	1.127	62.9	1.006	-0.1	0.666	0.755
	LTE Band 41 HPUE	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41490	2680	12.27	13.00	1.183	42.9	1.009	0.07	0.925	1.104
	LTE Band 41 HPUE	20M	QPSK	1	0	-	Edge 1	0mm	Ant 2	1	Reduced	40620	2593	12.51	13.00	1.119	42.9	1.009	0.07	0.123	0.139
03	LTE Band 41 HPUE	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	12.51	13.00	1.119	42.9	1.009	-0.13	0.999	**1.128**
	LTE Band 41 HPUE	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	2	Reduced	40620	2593	12.51	13.00	1.119	42.9	1.009	0.02	0.943	1.065
	LTE Band 41 HPUE ENDC	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 2	1	Reduced	41490	2680	10.76	11.50	1.186	42.9	1.009	0.04	0.560	0.670
	LTE Band 41 HPUE ENDC	20M	QPSK	1	0	-	Edge 1	0mm	Ant 2	1	Reduced	40620	2593	10.90	11.50	1.148	42.9	1.009	0.01	0.074	0.086
	LTE Band 41 HPUE ENDC	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	10.90	11.50	1.148	42.9	1.009	0.02	0.605	0.701

	LTE Band 41	20M	QPSK	1	0	-	Bottom Face	20mm	Ant 2	1	Full	40620	2593	24.20	25.00	1.202	62.9	1.006	0.17	0.332	0.402
	LTE Band 41 HPUE	20M	QPSK	1	0		Bottom Face	20mm	Ant 2	1	Full	40620	2593	25.88	27.00	1.294	42.9	1.009	0.02	0.475	0.620
	LTE Band 41 HPUE	20M	QPSK	50	0		Bottom Face	11mm	Ant 2	1	Reduced	39750	2506	12.27	13.00	1.183	42.9	1.009	0.06	0.302	0.360
	LTE Band 41	20M	QPSK	1	0		Edge 1	11mm	Ant 2	1	Full	40620	2593	24.20	25.00	1.202	62.9	1.006	0.12	0.049	0.059
	LTE Band 41 HPUE	20M	QPSK	1	0		Edge 1	11mm	Ant 2	1	Full	40620	2593	25.88	27.00	1.294	42.9	1.009	0.07	0.114	0.149
	LTE Band 41	20M	QPSK	1	0		Edge 2	20mm	Ant 2	1	Full	40620	2593	24.20	25.00	1.202	62.9	1.006	0.02	0.285	0.345
	LTE Band 41 HPUE	20M	QPSK	1	0		Edge 2	20mm	Ant 2	1	Full	40620	2593	25.88	27.00	1.294	42.9	1.009	0.07	0.405	0.529
3500MHZ																					
04	LTE Band 42	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42590	3500	14.63	15.00	1.089	62.9	1.006	0.03	0.655	**0.718**
	LTE Band 42	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	2	Reduced	42590	3500	14.63	15.00	1.089	62.9	1.006	0.01	0.620	0.679
	LTE Band 42	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42190	3460	14.55	15.00	1.109	62.9	1.006	0.02	0.630	0.703
	LTE Band 42	20M	QPSK	1	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42990	3540	14.60	15.00	1.096	62.9	1.006	0.09	0.642	0.708
	LTE Band 42	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42590	3500	14.58	15.00	1.102	62.9	1.006	0.01	0.545	0.604
	LTE Band 42	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42190	3460	14.57	15.00	1.104	62.9	1.006	0.02	0.529	0.588
	LTE Band 42	20M	QPSK	50	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42990	3540	14.50	15.00	1.122	62.9	1.006	0.02	0.537	0.606
	LTE Band 42	20M	QPSK	100	0	-	Bottom Face	0mm	Ant 3	1	Reduced	42590	3500	14.49	15.00	1.125	62.9	1.006	0.17	0.526	0.595
	LTE Band 42	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	1	Reduced	42590	3500	14.63	15.00	1.089	62.9	1.006	0.08	0.643	0.704
	LTE Band 42	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	1	Reduced	42190	3460	14.55	15.00	1.109	62.9	1.006	-0.02	0.617	0.688
	LTE Band 42	20M	QPSK	1	0	-	Edge 1	0mm	Ant 3	1	Reduced	42990	3540	14.60	15.00	1.096	62.9	1.006	0.01	0.622	0.686
	LTE Band 42	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	1	Reduced	42590	3500	14.58	15.00	1.102	62.9	1.006	-0.05	0.567	0.628
	LTE Band 42	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	1	Reduced	42190	3460	14.57	15.00	1.104	62.9	1.006	0.07	0.518	0.575
	LTE Band 42	20M	QPSK	50	0	-	Edge 1	0mm	Ant 3	1	Reduced	42990	3540	14.50	15.00	1.122	62.9	1.006	0.05	0.530	0.598
	LTE Band 42	20M	QPSK	100	0	-	Edge 1	0mm	Ant 3	1	Reduced	42590	3500	14.49	15.00	1.125	62.9	1.006	0.06	0.524	0.593
	LTE Band 42	20M	QPSK	1	0	-	Bottom Face	18mm	Ant 3	1	Full	42590	3500	23.44	25.00	1.432	62.9	1.006	0.13	0.301	0.434
	LTE Band 42	20M	QPSK	1	0	-	Edge 1	16mm	Ant 3	1	Full	42590	3500	23.44	25.00	1.432	62.9	1.006	-0.09	0.240	0.346
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	656000	3840	10.04	11.50	1.400	-	-	-0.14	0.513	0.718
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	2	Reduced	656000	3840	10.04	11.50	1.400	-	-	0.08	0.502	0.703
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	656000	3840	10.02	11.50	1.406	-	-	0.09	0.506	0.711
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	656000	3840	10.04	11.50	1.400	-	-	0.05	0.425	0.595
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	656000	3840	10.02	11.50	1.406	-	-	-0.04	0.414	0.582
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	18mm	Ant 3	1	Full	656000	3840	24.00	25.00	1.259	-	-	0.02	0.355	0.447
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	16mm	Ant 3	1	Full	656000	3840	24.00	25.00	1.259	-	-	0.01	0.338	0.426
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	641666	3624.99	10.15	11.50	1.365			0.02	0.333	0.454
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	2	Reduced	641666	3624.99	10.15	11.50	1.365			-0.09	0.315	0.430
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	641666	3624.99	10.12	11.50	1.374			0.02	0.304	0.418
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	641666	3624.99	10.15	11.50	1.365			0.16	0.304	0.415
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	641666	3624.99	10.12	11.50	1.374			0.05	0.296	0.407
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	18mm	Ant 3	1	Full	641666	3624.99	19.38	20.00	1.153			0.14	0.155	0.179
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	16mm	Ant 3	1	Full	641666	3624.99	19.38	20.00	1.153			-0.09	0.111	0.128
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	633334	3500.01	10.26	11.50	1.330	-	-	-0.19	0.348	0.463
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	1	Reduced	633334	3500.01	10.22	11.50	1.343	-	-	0.04	0.331	0.444
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	633334	3500.01	10.26	11.50	1.330	-	-	0.08	0.329	0.438
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 3	1	Reduced	633334	3500.01	10.22	11.50	1.343	-	-	0.07	0.310	0.416
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	18mm	Ant 3	1	Full	633334	3500.01	24.09	25.00	1.233	-	-	0.09	0.370	0.456
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	16mm	Ant 3	1	Full	633334	3500.01	24.09	25.00	1.233	-	-	0.02	0.349	0.430
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	656000	3840	14.55	15.00	1.109	-	-	-0.06	0.883	0.979
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	656000	3840	14.51	15.00	1.119	-	-	0.08	0.893	1.000
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	2	Full	656000	3840	14.51	15.00	1.119	-	-	0.05	0.883	0.988
	Part27O FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	656000	3840	14.50	15.00	1.122	-	-	0.11	0.865	0.971
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	656000	3840	14.55	15.00	1.109	-	-	-0.12	0.594	0.659
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	656000	3840	14.51	15.00	1.119	-	-	0.14	0.489	0.547
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Eage 3	0mm	Ant 4	1	Full	656000	3840	14.55	15.00	1.109	-	-	-0.15	0.033	0.037
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Eage 3	0mm	Ant 4	1	Full	656000	3840	14.51	15.00	1.119	-	-	-0.02	0.024	0.027
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	641666	3624.99	15.41	16.00	1.146	-	-	-0.15	0.834	0.955
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	2	Full	641666	3624.99	15.41	16.00	1.146	-	-	0.02	0.784	0.898
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	641666	3624.99	15.40	16.00	1.148	-	-	0.03	0.713	0.819
	Part96 FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	641666	3624.99	15.25	16.00	1.189	-	-	-0.01	0.700	0.832

	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	641666	3624.99	15.41	16.00	1.146	-	-	0.13	0.301	0.345
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	641666	3624.99	15.40	16.00	1.148	-	-	-0.16	0.320	0.367
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 3	0mm	Ant 4	1	Full	641666	3624.99	15.41	16.00	1.146	-	-	-0.06	0.052	0.060
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 3	0mm	Ant 4	1	Full	641666	3624.99	15.40	16.00	1.148	-	-	0.08	0.048	0.055
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	633334	3500.01	17.44	18.00	1.138	-	-	0.02	0.775	0.882
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	633334	3500.01	17.40	18.00	1.148	-	-	-0.04	0.870	0.999
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	2	Full	633334	3500.01	17.40	18.00	1.148	-	-	0.08	0.860	0.987
	Part27Q FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 4	1	Full	633334	3500.01	17.38	18.00	1.153	-	-	0.07	0.775	0.894
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	633334	3500.01	17.44	18.00	1.138	-	-	-0.05	0.650	0.739
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 4	1	Full	633334	3500.01	17.40	18.00	1.148	-	-	0.04	0.544	0.625
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Eage 3	0mm	Ant 4	1	Full	633334	3500.01	17.44	18.00	1.138	-	-	0.02	0.057	0.065
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Eage 3	0mm	Ant 4	1	Full	633334	3500.01	17.40	18.00	1.148	-	-	0.02	0.073	0.084
05	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	656000	3840	14.94	16.00	1.276	-	-	0.05	0.911	**1.163**
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	2	Full	656000	3840	14.94	16.00	1.276	-	-	0.01	0.854	1.090
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	656000	3840	14.92	16.00	1.282	-	-	0.12	0.850	1.090
	Part27O FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	656000	3840	14.86	16.00	1.300	-	-	-0.08	0.833	1.083
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	656000	3840	14.94	16.00	1.276	-	-	0.08	0.493	0.629
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	656000	3840	14.92	16.00	1.282	-	-	0.03	0.292	0.374
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	641666	3624.99	13.55	14.00	1.109	-	-	0.09	0.849	0.942
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	2	Full	641666	3624.99	13.55	14.00	1.109	-	-	0.03	0.821	0.911
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	641666	3624.99	13.41	14.00	1.146	-	-	0.07	0.804	0.921
	Part96 FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	641666	3624.99	13.39	14.00	1.151	-	-	0.13	0.811	0.933
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	641666	3624.99	13.55	14.00	1.109	-	-	-0.18	0.354	0.393
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	641666	3624.99	13.41	14.00	1.146	-	-	0.04	0.311	0.356
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	633334	3500.01	9.08	9.50	1.102	-	-	0.08	0.798	0.879
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	633334	3500.01	9.06	9.50	1.107	-	-	-0.09	0.973	1.077
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	2	Full	633334	3500.01	9.06	9.50	1.107	-	-	0.04	0.901	0.997
	Part27Q FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	633334	3500.01	8.97	9.50	1.130	-	-	-0.1	0.778	0.879
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	633334	3500.01	9.08	9.50	1.102	-	-	0.07	0.435	0.479
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	1	Full	633334	3500.01	9.06	9.50	1.107	-	-	0.16	0.321	0.355
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	656000	3840	11.13	12.50	1.371	-	-	0.02	0.808	1.108
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	656000	3840	11.09	12.50	1.384	-	-	0.06	0.838	1.159
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	2	Full	656000	3840	11.09	12.50	1.384	-	-	0.01	0.786	1.087
	Part27O FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	656000	3840	11.05	12.50	1.396	-	-	0.05	0.779	1.088
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	656000	3840	11.13	12.50	1.371	-	-	-0.04	0.009	0.012
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	656000	3840	11.09	12.50	1.384	-	-	-0.18	0.004	0.006
	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	656000	3840	11.13	12.50	1.371	-	-	0.09	0.121	0.166
	Part27O FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	656000	3840	11.09	12.50	1.384	-	-	-0.1	0.112	0.155
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	641666	3624.99	13.94	15.00	1.276	-	-	0.07	0.733	0.936
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	2	Full	641666	3624.99	13.94	15.00	1.276	-	-	0.02	0.715	0.913
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	641666	3624.99	13.83	15.00	1.309	-	-	0.01	0.683	0.894
	Part96 FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	641666	3624.99	13.81	15.00	1.315	-	-	0.08	0.658	0.865
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	641666	3624.99	13.94	15.00	1.276	-	-	0.08	0.051	0.065
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	641666	3624.99	13.83	15.00	1.309	-	-	0.03	0.031	0.041
	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	641666	3624.99	13.94	15.00	1.276	-	-	-0.09	0.114	0.146
	Part96 FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	641666	3624.99	13.83	15.00	1.309	-	-	-0.06	0.125	0.164
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	633334	3500.01	15.63	16.00	1.089	-	-	-0.19	0.735	0.800
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	633334	3500.01	15.52	16.00	1.117	-	-	0.15	0.981	1.096
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	2	Full	633334	3500.01	15.52	16.00	1.117	-	-	0.03	0.922	1.030
	Part27Q FR1 n77&78	100M	QPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	633334	3500.01	15.59	16.00	1.099	-	-	-0.07	0.931	1.023
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	633334	3500.01	15.63	16.00	1.089	-	-	0.08	0.005	0.005
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 11	1	Full	633334	3500.01	15.52	16.00	1.117	-	-	0.02	0.009	0.010
	Part27Q FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	633334	3500.01	15.63	16.00	1.089	-	-	0.05	0.284	0.309
	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 11	1	Full	633334	3500.01	15.52	16.00	1.117	-	-	0.13	0.168	0.188

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN/BT																	
06	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 10	1	Reduced	11	2462	11.31	13.00	1.476	100	1.000	0.02	0.397	**0.586**
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 10	2	Reduced	11	2462	11.31	13.00	1.476	100	1.000	0.08	0.354	0.522
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0mm	Ant 10	1	Reduced	11	2462	11.31	13.00	1.476	100	1.000	-0.18	0.170	0.251
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	11mm	Ant 10	1	Full	11	2462	17.24	18.50	1.337	100	1.000	-0.02	0.224	0.299
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	11mm	Ant 10	1	Full	11	2462	17.24	18.50	1.337	100	1.000	0.11	0.215	0.287
07	Bluetooth	1Mbps	Bottom Face	0mm	Ant 10	1	Full	0	2402	5.13	6.00	1.222	76.7	1.086	-0.08	0.084	**0.111**
	Bluetooth	1Mbps	Edge 1	0mm	Ant 10	1	Full	0	2402	5.13	6.00	1.222	76.7	1.086	0.16	0.067	0.089
08	WLAN5.3GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	1	Reduced	58	5290	10.59	12.00	1.384	93.00	1.075	0.16	0.509	**0.757**
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	2	Reduced	58	5290	10.59	12.00	1.384	93.00	1.075	0.07	0.480	0.714
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 10	1	Reduced	58	5290	10.59	12.00	1.384	93.00	1.075	-0.07	0.186	0.277
	WLAN5.3GHz	802.11n-HT40 MCS0	Edge 4	0mm	Ant 10	1	Full	62	5310	15.53	17.00	1.402	96.32	1.038	0.06	0.193	0.281
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	11mm	Ant 10	1	Full	62	5310	15.53	17.00	1.402	96.32	1.038	0.05	0.277	0.403
	WLAN5.3GHz	802.11n-HT40 MCS0	Edge 1	11mm	Ant 10	1	Full	62	5310	15.53	17.00	1.402	96.32	1.038	0.07	0.197	0.287
09	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	1	Reduced	106	5530	5.96	7.00	1.271	93.00	1.075	0.02	0.543	**0.742**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	2	Reduced	106	5530	5.96	7.00	1.271	93.00	1.075	0.08	0.511	0.698
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 10	1	Reduced	106	5530	5.96	7.00	1.271	93.00	1.075	-0.16	0.330	0.451
	WLAN5.5GHz	802.11n-HT40 MCS0	Edge 4	0mm	Ant 10	1	Full	110	5550	15.97	17.50	1.421	96.32	1.038	0.05	0.184	0.271
	WLAN5.5GHz	802.11n-HT40 MCS0	Bottom Face	11mm	Ant 10	1	Full	110	5550	15.97	17.50	1.421	96.32	1.038	-0.09	0.119	0.176
	WLAN5.5GHz	802.11n-HT40 MCS0	Edge 1	11mm	Ant 10	1	Full	110	5550	15.97	17.50	1.421	96.32	1.038	-0.13	0.102	0.150
10	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	1	Reduced	155	5775	7.23	8.50	1.340	93.00	1.075	0.07	0.518	**0.746**
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 10	2	Reduced	155	5775	7.23	8.50	1.340	93.00	1.075	0.03	0.495	0.713
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 10	1	Reduced	155	5775	7.23	8.50	1.340	93.00	1.075	0.08	0.250	0.360
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	0mm	Ant 10	1	Full	149	5745	15.59	17.00	1.385	98.28	1.018	-0.11	0.067	0.094
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	11mm	Ant 10	1	Full	149	5745	15.59	17.00	1.385	98.28	1.018	-0.16	0.110	0.155
	WLAN5.8GHz	802.11a 6Mbps	Edge 1	11mm	Ant 10	1	Full	149	5745	15.59	17.00	1.385	98.28	1.018	-0.02	0.094	0.133

16.2 Repeated SAR Measurement

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Sample	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 26(5)	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 1	1	Reduced	26865	831.5	20.57	21.50	1.239	-	-	0.17	0.943	1	1.168
2nd	LTE Band 26(5)	15M	QPSK	1	0	-	Bottom Face	0mm	Ant 1	1	Reduced	26865	831.5	20.57	21.50	1.239	-	-	0.04	0.901	1.047	1.116
1st	LTE Band 41 HPUE	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	12.51	13.00	1.119	42.9	1.009	-0.13	0.999	1	1.128
2nd	LTE Band 41 HPUE	20M	QPSK	1	0	-	Edge 2	0mm	Ant 2	1	Reduced	40620	2593	12.51	13.00	1.119	42.9	1.009	0.02	0.922	1.084	1.041
1st	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	656000	3840	14.94	16.00	1.276	-	-	0.05	0.911	1	1.163
2nd	Part27O FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	656000	3840	14.94	16.00	1.276	-	-	0.07	0.879	1.036	1.122
1st	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	633334	3500.01	15.52	16.00	1.117	-	-	0.15	0.981	1	1.096
2nd	Part27Q FR1 n77&78	100M	QPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 11	1	Full	633334	3500.01	15.52	16.00	1.117	-	-	-0.19	0.922	1.064	1.030
1st	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	641666	3624.99	13.55	14.00	1.109	-	-	0.09	0.849	1	0.942
2nd	Part96 FR1 n77&78	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	1	Full	641666	3624.99	13.55	14.00	1.109	-	-	0.06	0.825	1.029	0.915

General Note:

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

16.3 TDD LTE Linearity Data Analysis

General Note:

This device support Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1. 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 configuration and exposure condition combination, according to the highest time averaged power for all applicable uplink-downlink configurations in 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 for 1g and < 3.5 W/kg for 10g, Separate SAR testing for Power Class 2 is not required.

LTE Band 41(HPUE)-Linearity Data for Body		
	LTE Band 41 (Power Class 3)	LTE Band 41 (Power Class 2)
Maximum Tune up Power (dBm)	11.00	13.00
Reported 1g SAR (W/kg)	0.955	1.128
Duty Cycle	63.30%	43.30%
Frame Averaged (mW)	7.97	8.64
Linearity SAR (W/kg)	1.035	
% deviation from expected linearity		8.95%

17. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Tablet
		Body
1.	WWAN + 2.4GHz WLAN	Yes
2.	WWAN + 5GHz WLAN	Yes
3.	WWAN + Bluetooth	Yes
4.	WWAN + 5GHz WLAN+ Bluetooth	Yes

General Note:

1. The EUT has voice function, but limited to speakerphone mode.
2. EUT will choose each WCDMA, LTE and NR according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
4. According to the EUT character, WLAN 5GHz and Bluetooth can transmit simultaneously.
5. According to the EUT character, WLAN 2.4GHz and Bluetooth can't transmit simultaneously.
6. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
7. When stand-alone SAR is not required for a transmitter or antenna, its SAR is considered zero in the SAR summing process to assess Multi-band transmission SAR compliance.
8. For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
9. The reported SAR summation is calculated based on the same configuration and test position.
10. All licensed modes share the same antenna part and cannot transmit simultaneously.
11. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
    i) Scalar SAR summation < 1.6W/kg.
    ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
    iii) If SPLSR ≤ 0.04 for 1g SAR, simultaneously transmission SAR measurement is not necessary.
    iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg.
    v) The SPLSR calculated results please refer to section 17.2.

17.1 Body Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	1+2	1+3+4	SPLSR
		WWAN	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
WCDMA V Ant 1	Bottom Face	1.087	0.586	0.757	0.111	**1.67**	**1.96**	**1&2**
	Edge 1	0.919	0.251	0.451	0.089	1.17	1.46	
	Edge 2	0.208				0.21	0.21	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
LTE Band 26(5) Ant 1	Bottom Face	1.168	0.586	0.757	0.111	**1.75**	**2.04**	**3&4**
	Edge 1	0.894	0.251	0.451	0.089	1.15	1.43	
	Edge 2	0.308				0.31	0.31	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
LTE Band 41 Ant 2	Bottom Face	1.104	0.586	0.757	0.111	**1.69**	**1.97**	**20&5**
	Edge 1	0.139	0.251	0.451	0.089	0.39	0.68	
	Edge 2	1.128				1.13	1.13	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
LTE Band 42 Ant 3	Bottom Face	0.718	0.586	0.757	0.111	1.30	**1.59**	
	Edge 1	0.704	0.251	0.451	0.089	0.96	1.24	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	

WWAN Band	Exposure Position	1	2	3	4	1+2	1+3+4	SPLSR
		FR1	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Part27O FR1 n77&78 Ant 4	Bottom Face	1.000	0.586	0.757	0.111	**1.59**	**1.87**	**6**
	Edge 1		0.251	0.451	0.089	0.25	0.54	
	Edge 2	0.659				0.66	0.66	
	Edge 3	0.037				0.04	0.04	
	Edge 4			0.281		0.00	0.28	
Part27Q FR1 n77&78 Ant 4	Bottom Face	0.999	0.586	0.757	0.111	1.59	**1.87**	**7**
	Edge 1		0.251	0.451	0.089	0.25	0.54	
	Edge 2	0.739				0.74	0.74	
	Edge 3	0.084				0.08	0.08	
	Edge 4			0.281		0.00	0.28	
Part27O FR1 n77&78 Ant 7	Bottom Face	1.163	0.586	0.757	0.111	**1.75**	**2.03**	**8&9**
	Edge 1	0.629	0.251	0.451	0.089	0.88	1.17	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part27Q FR1 n77&78 Ant 7	Bottom Face	1.077	0.586	0.757	0.111	**1.66**	**1.95**	**10&11**
	Edge 1	0.479	0.251	0.451	0.089	0.73	1.02	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part27O FR1 n77&78 Ant 11	Bottom Face	1.159	0.586	0.757	0.111	**1.75**	**2.03**	**12&13**
	Edge 1	0.012	0.251	0.451	0.089	0.26	0.55	
	Edge 2	0.166				0.17	0.17	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part27Q FR1 n77&78 Ant 11	Bottom Face	1.096	0.586	0.757	0.111	**1.68**	**1.96**	**14&15**
	Edge 1	0.010	0.251	0.451	0.089	0.26	0.55	
	Edge 2	0.309				0.31	0.31	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part27O FR1 n77&78 Ant 3	Bottom Face	0.718	0.586	0.757	0.111	1.30	**1.59**	
	Edge 1	0.595	0.251	0.451	0.089	0.85	1.14	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part27Q FR1 n77&78 Ant 3	Bottom Face	0.463	0.586	0.757	0.111	1.05	1.33	
	Edge 1	0.438	0.251	0.451	0.089	0.69	0.98	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	

FR1	Exposure Position	1	2	3	4	1+2	1+3+4	SPLSR
		FR1	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Part96 FR1 n77&78 Ant 4	Bottom Face	0.955	0.586	0.757	0.111	1.54	**1.82**	**21**
	Edge 1		0.251	0.451	0.089	0.25	0.54	
	Edge 2	0.367				0.37	0.37	
	Edge 3	0.060				0.06	0.06	
	Edge 4			0.281		0.00	0.28	
Part96 FR1 n77&78 Ant 7	Bottom Face	0.942	0.586	0.757	0.111	1.53	**1.81**	**22**
	Edge 1	0.393	0.251	0.451	0.089	0.64	0.93	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part96 FR1 n77&78 Ant 11	Bottom Face	0.936	0.586	0.757	0.111	1.52	**1.80**	**23**
	Edge 1	0.065	0.251	0.451	0.089	0.32	0.61	
	Edge 2	0.164				0.16	0.16	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	
Part96 FR1 n77&78 Ant 3	Bottom Face	0.454	0.586	0.757	0.111	1.04	1.32	
	Edge 1	0.415	0.251	0.451	0.089	0.67	0.96	
	Edge 2					0.00	0.00	
	Edge 3					0.00	0.00	
	Edge 4			0.281		0.00	0.28	

<EN-DC SAR>

WWAN Band	FR1	Exposure Position	1	2	3	4	5	1+2+3	1+2+4+5	SPLSR
			WWAN	FR1	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed	
			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)	
LTE Band 41 Ant 2	Part27O FR1 n77&78 Ant 3	Bottom Face	0.670	0.718	0.586	0.757	0.111	**1.97**	**2.26**	**16&17**
		Edge 1	0.086	0.595	0.251	0.451	0.089	0.93	1.22	
		Edge 2	0.701					0.70	0.70	
		Edge 3						0.00	0.00	
		Edge 4				0.281		0.00	0.28	
LTE Band 41 Ant 2	Part27Q FR1 n77&78 Ant 3	Bottom Face	0.670	0.463	0.586	0.757	0.111	**1.72**	**2.00**	**18&19**
		Edge 1	0.086	0.438	0.251	0.451	0.089	0.78	1.06	
		Edge 2	0.701					0.70	0.70	
		Edge 3						0.00	0.00	
		Edge 4				0.281		0.00	0.28	
LTE Band 41 Ant 2	Part96 FR1 n77&78 Ant 3	Bottom Face	0.670	0.454	0.586	0.757	0.111	**1.71**	**1.99**	**24&25**
		Edge 1	0.086	0.415	0.251	0.451	0.089	0.75	1.04	
		Edge 2	0.701					0.70	0.70	
		Edge 3						0.00	0.00	
		Edge 4				0.281		0.00	0.28	

<Sensor Off SAR>

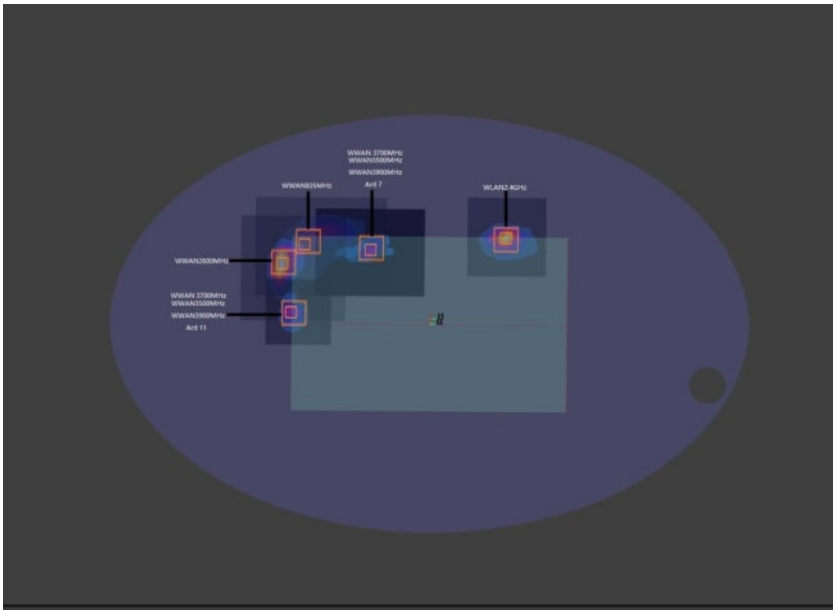
WWAN Band	Exposure Position	1	2	3	4	1+2	1+3+4
		WWAN	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
WCDMA V Ant 1	Bottom Face	0.381	0.299	0.403	0.111	0.68	0.90
	Edge 1	0.353	0.287	0.287	0.089	0.64	0.73
LTE Band 26(5) Ant 1	Bottom Face	0.156	0.299	0.403	0.111	0.46	0.67
	Edge 1	0.084	0.287	0.287	0.089	0.37	0.46
LTE Band 41 Ant 2	Bottom Face	0.620	0.299	0.403	0.111	0.92	1.13
	Edge 1	0.149	0.287	0.287	0.089	0.44	0.53
	Edge 2	0.529				0.53	0.53
LTE Band 42 Ant 3	Bottom Face	0.718	0.287	0.287	0.089	1.01	1.09
	Edge 1	0.704	0.299	0.403	0.111	1.00	1.22
Part27O FR1 n77&78 Ant 3	Bottom Face	0.718	0.299	0.403	0.111	1.02	1.23
	Edge 1	0.595	0.287	0.287	0.089	0.88	0.97
Part27Q FR1 n77&78 Ant 3	Bottom Face	0.463	0.299	0.403	0.111	0.76	0.98
	Edge 1	0.438	0.287	0.287	0.089	0.73	0.81
Part96 FR1 n77&78 Ant 3	Bottom Face	0.454	0.299	0.403	0.111	0.75	0.97
	Edge 1	0.415	0.287	0.287	0.089	0.70	0.79

WWAN Band	FR1	Exposure Position	1	2	3	4	5	1+2+3	1+2+4+5
			WWAN	FR1	WLAN2.4GHz Ant 10	WLAN5GHz Ant 10	Bluetooth Ant 10	Summed	Summed
			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)
LTE Band 41 Ant 2	Part27O FR1 n77&78 Ant 3	Bottom Face	0.620	0.447	0.299	0.403	0.111	1.37	1.58
		Edge 1	0.149	0.595	0.287	0.287	0.089	1.03	1.12
		Edge 2	0.529					0.53	0.53
LTE Band 41 Ant 2	Part27O FR1 n77&78 Ant 3	Bottom Face	0.360	0.447	0.299	0.403	0.111	1.11	1.32
		Edge 1	0.149	0.426	0.287	0.287	0.089	0.86	0.95
LTE Band 41 Ant 2	Part27O FR1 n77&78 Ant 3	Bottom Face	0.360	0.718	0.299	0.403	0.111	1.38	1.59
		Edge 1	0.149	0.595	0.287	0.287	0.089	1.03	1.12
LTE Band 41 Ant 2	Part27Q FR1 n77&78 Ant 3	Bottom Face	0.620	0.456	0.299	0.403	0.111	1.38	1.59
		Edge 1	0.149	0.438	0.287	0.287	0.089	0.87	0.96
		Edge 2	0.529					0.53	0.53
LTE Band 41 Ant 2	Part27Q FR1 n77&78 Ant 3	Bottom Face	0.360	0.456	0.299	0.403	0.111	1.12	1.33
		Edge 1	0.149	0.430	0.287	0.287	0.089	0.87	0.96
LTE Band 41 Ant 2	Part27Q FR1 n77&78 Ant 3	Bottom Face	0.360	0.463	0.299	0.403	0.111	1.12	1.34
		Edge 1	0.149	0.438	0.287	0.287	0.089	0.87	0.96
LTE Band 41 Ant 2	Part96 FR1 n77&78 Ant 3	Bottom Face	0.620	0.179	0.299	0.403	0.111	1.10	1.31
		Edge 1	0.149	0.454	0.287	0.287	0.089	0.89	0.98
		Edge 2	0.529					0.53	0.53
LTE Band 41 Ant 2	Part96 FR1 n77&78 Ant 3	Bottom Face	0.360	0.179	0.299	0.403	0.111	0.84	1.05
		Edge 1	0.149	0.128	0.287	0.287	0.089	0.56	0.65
LTE Band 41 Ant 2	Part96 FR1 n77&78 Ant 3	Bottom Face	0.360	0.454	0.299	0.403	0.111	1.11	1.33
		Edge 1	0.149	0.415	0.287	0.287	0.089	0.85	0.94

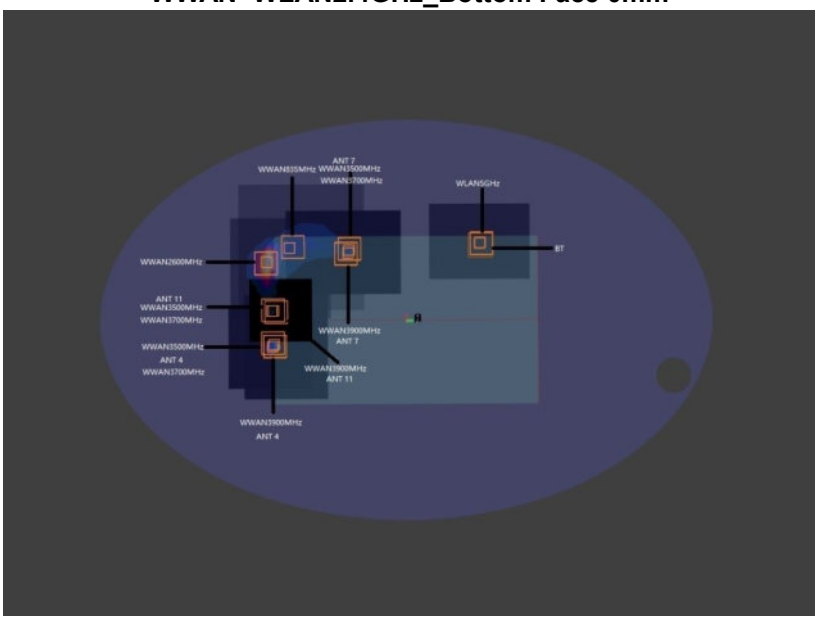
17.2 SPLSR Evaluation and Analysis

General Note:

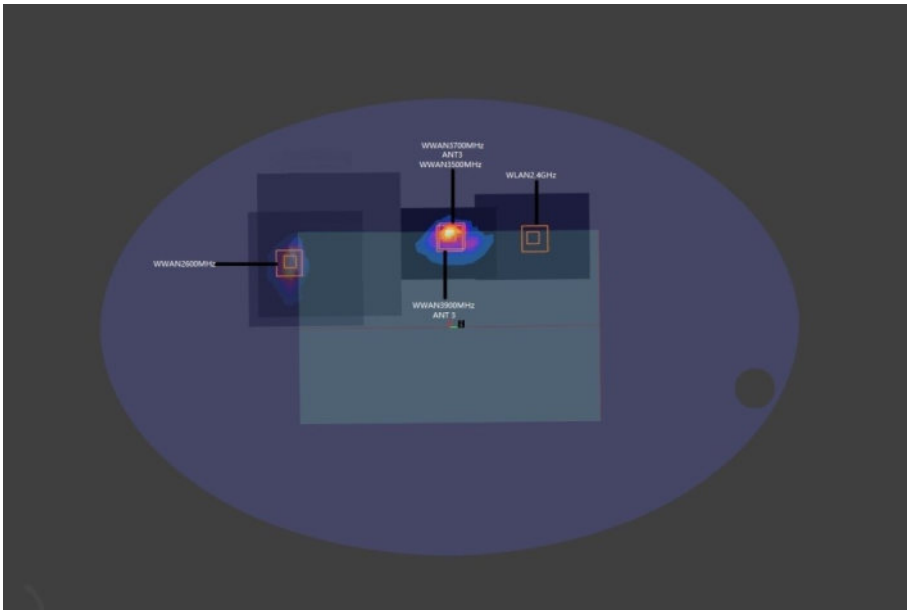
1. When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of [(x1−x2)2 + (y1−y2)2 + (z1−z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2. SPLSR = (SAR1 + SAR2)1.5 / (min. separation distance, mm). If SPLSR ≤ 0.04 for 1g SAR, simultaneously transmission SAR measurement is not necessary.
3. Per April 2022 TCB Workshop Notes, WWAN band antenna 3 was summed algebraically with the BT/WIFI Antenna 10 separately for the purposes of hybrid SPLSR combination and they are located at the top of the device.
4. Per April 2022 TCB Workshop, instead of doing a small volume scan over a co-located antenna pair, used summing the SAR values of the co-located pair and using that value in SPLSR calculation. In the calculation used the minimum distance between the spatially separated antenna and the closest antenna of the co-located antenna pair to be conservative.



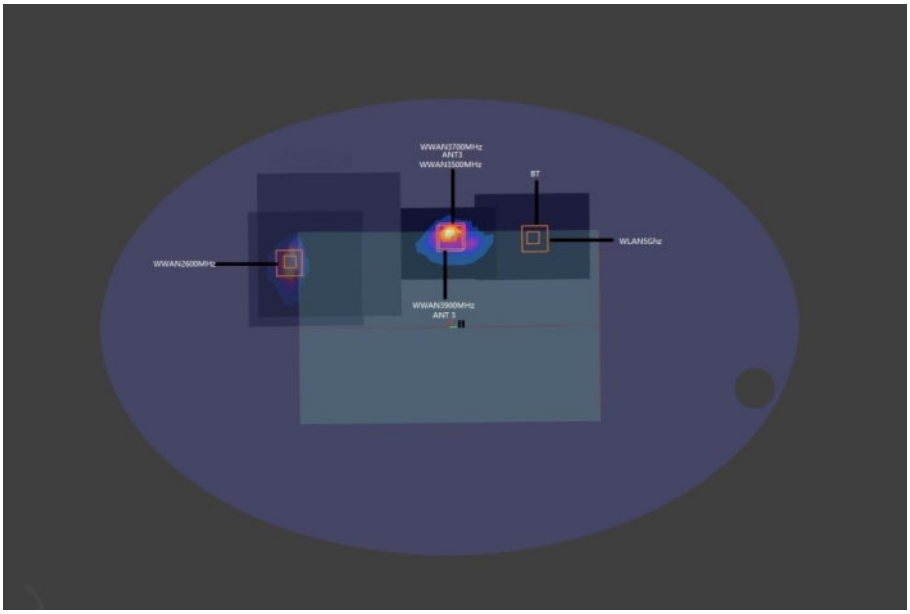
WWAN+WLAN2.4GHz_Bottom Face 0mm



WWAN+WLAN5GHz+Bluetooth_Bottom Face 0mm



WWAN(ENDC)+WLAN2.4GHz_Bottom Face 0mm



WWAN(ENDC)+WLAN5GHz+Bluetooth_Bottom Face 0mm

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 1	WCDMA V Ant 1	Bottom Face	1.087		0mm	-73.1	-98.5	-178	167.6	1.67	0.01	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 2	WCDMA V Ant 1	Bottom Face	1.087	1.087	0mm	-73.1	-98.5	-178	164.9	1.96	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	WCDMA V Ant 1		1.087	1.087	0mm	-73.1	-98.5	-178	169.5	1.96	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 3	LTE Band 26(5) Ant 1	Bottom Face	1.168		0mm	-78.8	-98.4	-178	167.4	1.75	0.01	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 4	LTE Band 26(5) Ant 1	Bottom Face	1.168	1.168	0mm	-78.8	-98.4	-178	164.8	2.04	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 26(5) Ant 1		1.168	1.168	0mm	-78.8	-98.4	-178	169.4	2.04	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 5	LTE Band 41 Ant 2	Bottom Face	1.104	1.104	0mm	-78.8	-98.4	-178	164.8	1.97	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		1.104	1.104	0mm	-78.8	-98.4	-178	169.4	1.97	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 6	Part27O FR1 n77&78 Ant 4	Bottom Face	1.000	1.000	0mm	22.6	-127.4	-178.1	217.5	1.87	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27O FR1 n77&78 Ant 4		1.000	1.000	0mm	22.6	-127.4	-178.1	221.1	1.87	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 7	Part27Q FR1 n77&78 Ant 4	Bottom Face	0.999	0.999	0mm	19.8	-127.8	-178.3	216.6	1.87	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27Q FR1 n77&78 Ant 4		0.999	0.999	0mm	19.8	-127.8	-178.3	220.2	1.87	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 8	Part27O FR1 n77&78 Ant 7	Bottom Face	1.163		0mm	-67.2	-54	-178.1	123.5	1.75	0.02	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
Case 9	Part27O FR1 n77&78 Ant 7	Bottom Face	1.163	1.163	0mm	-67.2	-54	-178.1	120.7	2.03	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27O FR1 n77&78 Ant 7		1.163	1.163	0mm	-67.2	-54	-178.1	125.2	2.03	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
Case 10	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27Q FR1 n77&78 Ant 7	Bottom Face	1.077		0mm	-70.3	-51.3	-178.1	120.5	1.66	0.02	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
Case 11	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27Q FR1 n77&78 Ant 7	Bottom Face	1.077	1.077	0mm	-70.3	-51.3	-178.1	117.8	1.95	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27Q FR1 n77&78 Ant 7		1.077	1.077	0mm	-70.3	-51.3	-178.1	122.4	1.95	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
Case 12	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27O FR1 n77&78 Ant 11	Bottom Face	1.159		0mm	-7.6	-127.4	-178.1	208.6	1.75	0.01	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
Case 13	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27O FR1 n77&78 Ant 11	Bottom Face	1.159	1.159	0mm	-7.6	-127.4	-178.1	205.6	2.03	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27O FR1 n77&78 Ant 11		1.159	1.159	0mm	-7.6	-127.4	-178.1	209.5	2.03	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
Case 14	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27Q FR1 n77&78 Ant 11	Bottom Face	1.096		0mm	-10	-129	-178.2	209.3	1.68	0.01	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
Case 15	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous Reduced SAR
					(mm)	X	Y	Z				
	Part27Q FR1 n77&78 Ant 11	Bottom Face	1.096	1.096	0mm	-10	-129	-178.2	206.3	1.96	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part27Q FR1 n77&78 Ant 11		1.096	1.096	0mm	-10	-129	-178.2	210.3	1.96	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 20	LTE Band 41 Ant 2	Bottom Face	1.104		0mm	-55.2	-134.2	-178	204.5	1.69	0.01	Not required
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 21	Part96 FR1 n77&78 Ant 4	Bottom Face	0.955	0.955	0mm	19.7	-127.8	-178.2	216.6	1.82	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part96 FR1 n77&78 Ant 4		0.955	0.955	0mm	19.7	-127.8	-178.2	220.2	1.82	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 22	Part96 FR1 n77&78 Ant 7	Bottom Face	0.942	0.942	0mm	-70.1	-51.4	-178.3	118.0	1.81	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part96 FR1 n77&78 Ant 7		0.942	0.942	0mm	-70.1	-51.4	-178.3	122.5	1.81	0.02	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 23	Part96 FR1 n77&78 Ant 11	Bottom Face	0.936	0.936	0mm	-10.2	-129.1	-178.3	206.3	1.80	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	Part96 FR1 n77&78 Ant 11		0.936	0.936	0mm	-10.2	-129.1	-178.3	210.3	1.80	0.01	Not required
	WLAN5GHz Ant 10		0.757	0.868	0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 16	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	139.4	1.97	0.02	Not required
	Part27O FR1 n77&78 Ant 3		0.718	1.304	0mm	-79	3.2	-178.1				
	WLAN2.4GHz Ant 10		0.586		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	204.5	1.97	0.01	Not required
	Part27O FR1 n77&78 Ant 3		0.718	1.304	0mm							
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 17	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	139.4	2.26	0.02	Not required
	Part27O FR1 n77&78 Ant 3		0.718	1.586	0mm	-79	3.2	-178.1				
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	201.7	2.26	0.02	Not required
	Part27O FR1 n77&78 Ant 3		0.718	1.586	0mm							
	WLAN5GHz Ant 10		0.757		0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	206.2	2.26	0.02	Not required
	Part27O FR1 n77&78 Ant 3		0.718	1.586	0mm							
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				
	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 18	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	138.2	1.72	0.02	Not required
	Part27Q FR1 n77&78 Ant 3		0.463	1.049	0mm	-76.4	2.4	-178.1				
	WLAN2.4GHz Ant 10		0.586		0mm							

	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	204.5	1.72	0.01	Not required
	Part27Q FR1 n77&78 Ant 3		0.463	1.049	0mm							
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 19	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	138.2	2.00	0.02	Not required
	Part27Q FR1 n77&78 Ant 3		0.463	1.331	0mm	-76.4	2.4	-178.1				
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	201.7	2.00	0.01	Not required
	Part27Q FR1 n77&78 Ant 3		0.463	1.331	0mm							
	WLAN5GHz Ant 10		0.757		0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	206.2	2.00	0.01	Not required
	Part27Q FR1 n77&78 Ant 3		0.463	1.331	0mm							
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 24	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	138.3	1.71	0.02	Not required
	Part96 FR1 n77&78 Ant 3		0.454	1.040	0mm	-76.2	2.5	-178.1				
	WLAN2.4GHz Ant 10		0.586		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	204.5	1.71	0.01	Not required
	Part96 FR1 n77&78 Ant 3		0.454	1.040	0mm							
	WLAN2.4GHz Ant 10		0.586		0mm	-77.8	69	-178.2				

	Band	Position	SAR (W/kg)		Gap	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					(mm)	X	Y	Z				
Case 25	LTE Band 41 Ant 2	Bottom Face	0.670	0.670	0mm	-55.2	-134.2	-178	138.3	1.99	0.02	Not required
	Part96 FR1 n77&78 Ant 3		0.454	1.322	0mm	-76.2	2.5	-178.1				
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	201.7	1.99	0.01	Not required
	Part96 FR1 n77&78 Ant 3		0.454	1.322	0mm							
	WLAN5GHz Ant 10		0.757		0mm	-76.2	66.4	-178.2				
	Bluetooth Ant 10		0.111		0mm							
	LTE Band 41 Ant 2		0.670	0.670	0mm	-55.2	-134.2	-178	206.2	1.99	0.01	Not required
	Part96 FR1 n77&78 Ant 3		0.454	1.322	0mm							
	WLAN5GHz Ant 10		0.757		0mm							
	Bluetooth Ant 10		0.111		0mm	-75	71	-178.3				

Test Engineer : Martin Li, Varus Wang, Ricky Gu, Light Wang

18. Uncertainty Assessment

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

19. References

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

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

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

[4] SPEAG DASY System Handbook

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

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

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

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

[9] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

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

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

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

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