FCC SAR Test Report

APPLICANT	:	**Lenovo (Shanghai) Electronics Technology Co., Ltd.**
EQUIPMENT	:	**Portable Tablet Computer**
BRAND NAME	:	**Lenovo**
MODEL NAME	:	**TB336ZJ**
FCC ID	:	**O57TB336ZJ**
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.

Si Zhang

Approved by: Si Zhang

ilac-MRA

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)

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

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA553003	Rev. 01	Initial issue of report	Jul. 14, 2025

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, TB336ZJ,** are as follows.

<table>
<tr><th colspan="5">Highest 1g SAR Summary</th></tr>
<tr><th rowspan="2">Equipment Class</th><th rowspan="2" colspan="2">Frequency Band</th><th>Body (Separation 0mm)</th><th rowspan="2">Highest Simultaneous Transmission 1g SAR (W/kg)</th></tr>
<tr><th>1g SAR (W/kg)</th></tr>
<tr><td rowspan="5">Licensed</td><td>WCDMA</td><td>WCDMA V</td><td>0.64</td><td rowspan="5">1.59</td></tr>
<tr><td rowspan="3">LTE</td><td>LTE Band 5</td><td>0.73</td></tr>
<tr><td>LTE Band 41/38</td><td>0.73</td></tr>
<tr><td>LTE Band 42</td><td>0.35</td></tr>
<tr><td>5G NR</td><td>FR1 n78</td><td>1.11</td></tr>
<tr><td>DTS</td><td rowspan="2">WLAN</td><td>2.4GHz WLAN</td><td>0.74</td><td>1.47</td></tr>
<tr><td>NII</td><td>5GHz WLAN</td><td>1.10</td><td>1.57</td></tr>
<tr><td>DSS</td><td>Bluetooth</td><td>2.4GHz Bluetooth</td><td>0.48</td><td>1.59</td></tr>
<tr><td colspan="2">Date of Testing:</td><td colspan="3">2025/6/7 ~ 2025/7/13</td></tr>
<tr><td colspan="5">Remark:
1. This device supports LTE B38 and B41. Since the supported frequency span for LTE B38 falls completely within the supports frequency span for LTE B41, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B41.</td></tr>
</table>

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.

<table>
<tr><th colspan="4">Testing Laboratory</th></tr>
<tr><td>Test Firm</td><td colspan="3">Sporton International Inc. (Kunshan)</td></tr>
<tr><td>Test Site Location</td><td colspan="3">No. 1098, Pengxi North Road, Kunshan Economic Development Zone
Jiangsu Province 215300 People’s Republic of China
TEL : +86-512-57900158</td></tr>
<tr><td rowspan="2">Test Site No.</td><td>Sporton Site No.</td><td>FCC Designation No.</td><td>FCC Test Firm Registration No.</td></tr>
<tr><td>SAR07-KS</td><td>CN1257</td><td>314309</td></tr>
</table>

<table>
<tr><th colspan="2">Applicant</th></tr>
<tr><td>Company Name</td><td>Lenovo(Shanghai) Electronics Technology Co., Ltd.</td></tr>
<tr><td>Address</td><td>Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone</td></tr>
</table>

<table>
<tr><th colspan="2">Manufacturer</th></tr>
<tr><td>Company Name</td><td>Lenovo PC HK Limited</td></tr>
<tr><td>Address</td><td>23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China</td></tr>
</table>

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 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

4. Equipment Under Test (EUT) Information

4.1 General Information

<table>
<tr><th colspan="2">Product Feature & Specification</th></tr>
<tr><td>Equipment Name</td><td>Portable Tablet Computer</td></tr>
<tr><td>Brand Name</td><td>Lenovo</td></tr>
<tr><td>Model Name</td><td>TB336ZJ</td></tr>
<tr><td>FCC ID</td><td>O57TB336ZJ</td></tr>
<tr><td>IMEI Code</td><td>Sample 1: 860228080001718/860228080001726, 860228080001411/860228080001429
Sample 2: 860228080003839/860228080003847</td></tr>
<tr><td>Wireless Technology and Frequency Range</td><td>WCDMA Band V: 824 MHz ~ 849 MHz
LTE Band 5: 824 MHz ~ 849 MHz
LTE Band 38: 2570 MHz ~ 2620 MHz
LTE Band 41: 2496 MHz ~ 2690 MHz
LTE Band 42: 3450 MHz ~ 3550 MHz
5G NR n78: 3550 MHz ~ 3700 MHz, 3450MHz ~ 3550MHz
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</td></tr>
<tr><td>Mode</td><td>RMC 12.2Kbps
HSDPA
HSUPA
DC-HSDPA
HSPA+(16QAM uplink is not supported)
LTE: QPSK, 16QAM, 64QAM
5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM
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</td></tr>
<tr><td>HW Version</td><td>TB336ZJ</td></tr>
<tr><td>SW Version</td><td>Lenovo ZUI 17.0</td></tr>
<tr><td>EUT Stage</td><td>Identical Prototype</td></tr>
</table>

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. The maximum power that this device transmits in the field is limited among the 3 power tables (default, sensor off, sensor on). Full power (default power) is available only in the conducted setup.
3. This device supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active).
4. For 5G NR bands, using FTM to perform SAR with default 100% transmission.
5. There are four samples, the difference between them could be referred to the TB336ZJ_Product Equality Declaration which is exhibited separately. According to the difference, so sample 1 was chosen to perform full SAR testing and sample 2 verified the worst case of sample 1 For sample 3/4, the differences do not affect the test, so sample 3/4 are not tested.
6. This device supports 5GNR FR1 bands as following table, including SA mode. SA mode performed SAR separately.

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
SA	n78	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	O57TB336ZJ
Equipment Name	Portable Tablet Computer
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 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 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz
Uplink Modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Voice and Data
LTE Release Version	R15
CA Support	Not Supported
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, when operating in Proximity sensors detect mechanism; body will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to section 13.

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 38								
	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	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610

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 38			Yes	Yes	Yes	Yes
LTE Band 41			Yes	Yes	Yes	Yes

2) LTE Bands tune up:

Band	Antenna	Sensor on Tune-up Limit	Sensor Off Tune-up Limit	Default Tune-up Limit
LTE Band 38	Ant 4	15.50	24.50	24.50
LTE Band 41	Ant 4	15.50	24.50	24.50

4.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
Operating Frequency Range of each 5G NR transmission band	5G NR n78: 3550 MHz ~ 3700 MHz, 3450MHz ~ 3550MHz
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 CP-OFDM: QPSK / 16QAM / 64QAM
A-MPR (Additional MPR) disabled for SAR Testing?	Yes

Transmission (H, M, L) channel numbers and frequencies in each 5G NR band

NR Band 78 SCS30KHz

	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495		
M	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98	633332	3499.98
H	636000	3540	635668	3535.02	635334	3530.01	635000	3525	634668	3520.02	634334	3515.01	634000	3510	633668	3505.02		

For Part96

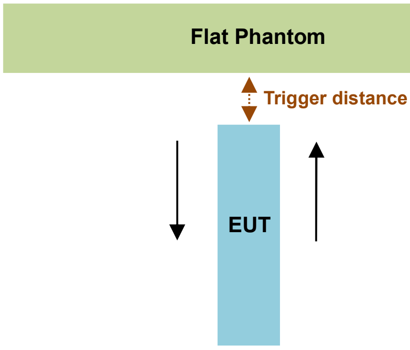
NR Band 78

	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	637334	3560.01	637668	3565.02	638000	3570	638334	3575.01	638668	3580.02	639000	3585	639334	3590.01	639668	3595.02	640000	3600
M	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99	641666	3624.99
H	646000	3690	645666	3684.99	645332	3624.99	645000	3675	644666	3669.99	644332	3664.98	644000	3660	643666	3654.99	643332	3649.98

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 frequency (835MHz) 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 for Ant1 and Bottom Face or Edge 1 side for Ant4 and Bottom Face or Edge 1 or Edge 2 side for Ant6/7of 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	
	Moving towards	Moving away
Minimum	21	24

<Ant4 Frequency Bands>

Proximity Sensor Triggering Distance (mm)				
Position	Bottom Face		Edge 1	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	21	23	24	27

< Ant6/7 Frequency Bands>

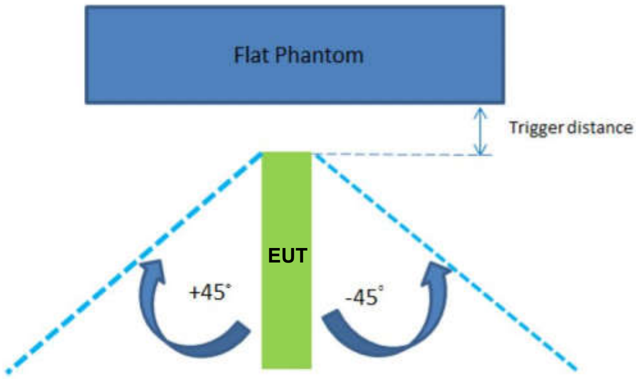
Proximity Sensor Triggering Distance (mm)						
Position	Bottom Face		Edge 1		Edge 2	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	23	25	15	16	21	24

<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.



<Ant4 Frequency Bands>

The Sensor Trigger Distance (mm)	
Position	Edge 1
Minimum	24

< Ant6/7 Frequency Bands>

The Sensor Trigger Distance (mm)		
Position	Edge 1	Edge 2
Minimum	15	21

Proximity sensor power reduction

Exposure Position / wireless mode for Ant1	Bottom Face[(1)]	Edge 1	Edge 2	Edge 3	Edge 4
WLAN 2.4GHz	8.0 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.2GHz	10.5 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.3GHz	10.5 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.5GHz	11.0 dB	0 dB	0 dB	0 dB	0 dB
WLAN 5.8GHz	10.0 dB	0 dB	0 dB	0 dB	0 dB

Exposure Position / wireless mode for Ant4	Bottom Face[(1)]	Edge 1[(1)]	Edge 2	Edge 3	Edge 4
WCDMA Band V Ant 4	8.50 dB	8.50 dB	0 dB	0 dB	0 dB
LTE Band 5 Ant 4	7.50 dB	7.50 dB	0 dB	0 dB	0 dB
LTE Band 41(38) Ant 4	9.00 dB	9.00 dB	0 dB	0 dB	0 dB

Exposure Position / wireless mode for Ant6/7	Bottom Face[(1)]	Edge 1[(1)]	Edge 2[(1)]	Edge 3	Edge 4
5G NR n78 Ant 6	10.00 dB	10.00 dB	10.00 dB	0 dB	0 dB
5G NR n78 Ant 7	12.50 dB	12.50 dB	12.50 dB	0 dB	0 dB

Remark:

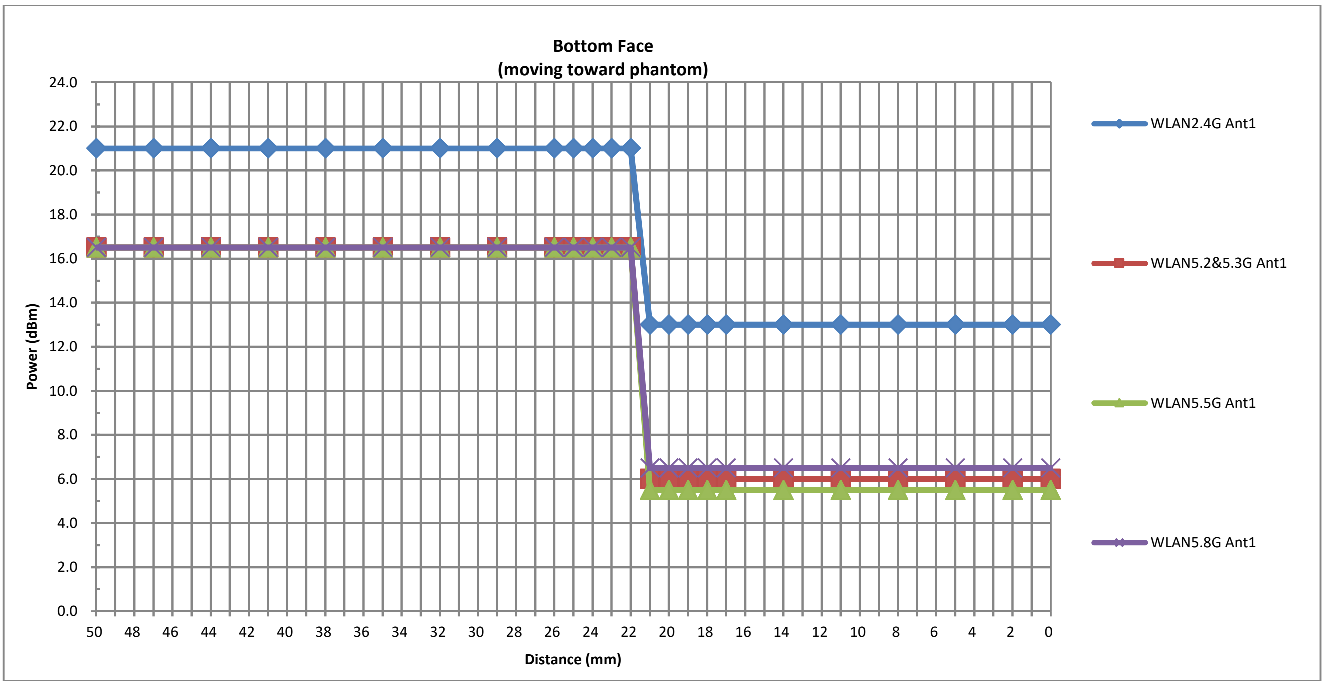
1. [(1)]: Reduced maximum limit applied by activation of proximity sensor.
2. Power reduction is not applicable for Bluetooth.
3. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown and described in exhibit “P-Sensor operational description
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: 20mm

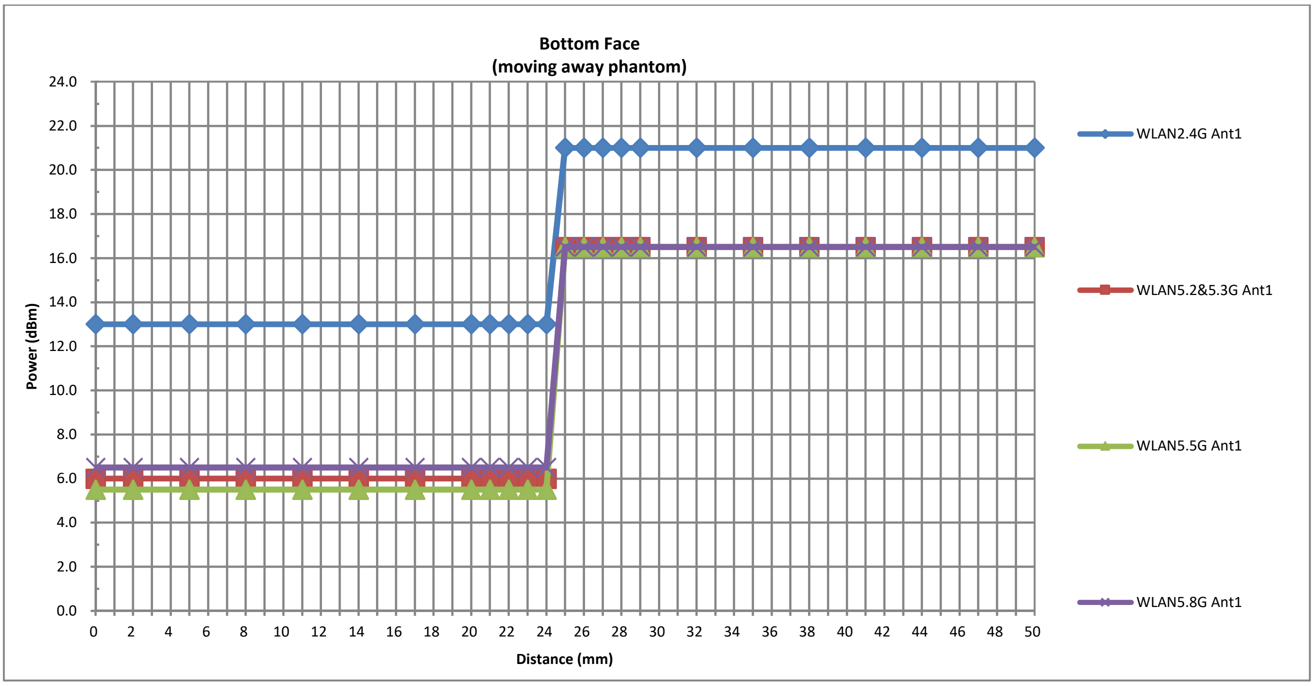
   For Ant4:
   - Bottom Face: 20mm
   - Edge 1: 23mm

   For Ant6/7:
   - Bottom Face: 22mm
   - Edge 1: 14mm
   - Edge 2: 20mm

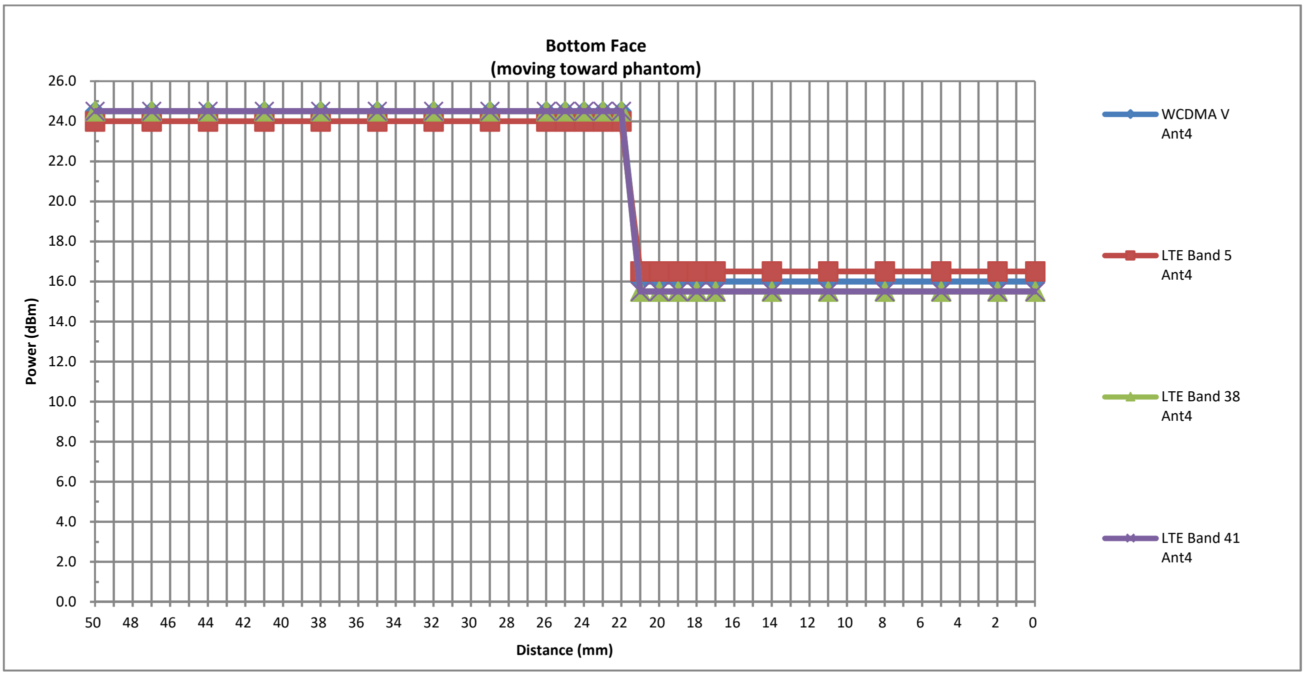
Power Measurement during Sensor Trigger distance testing

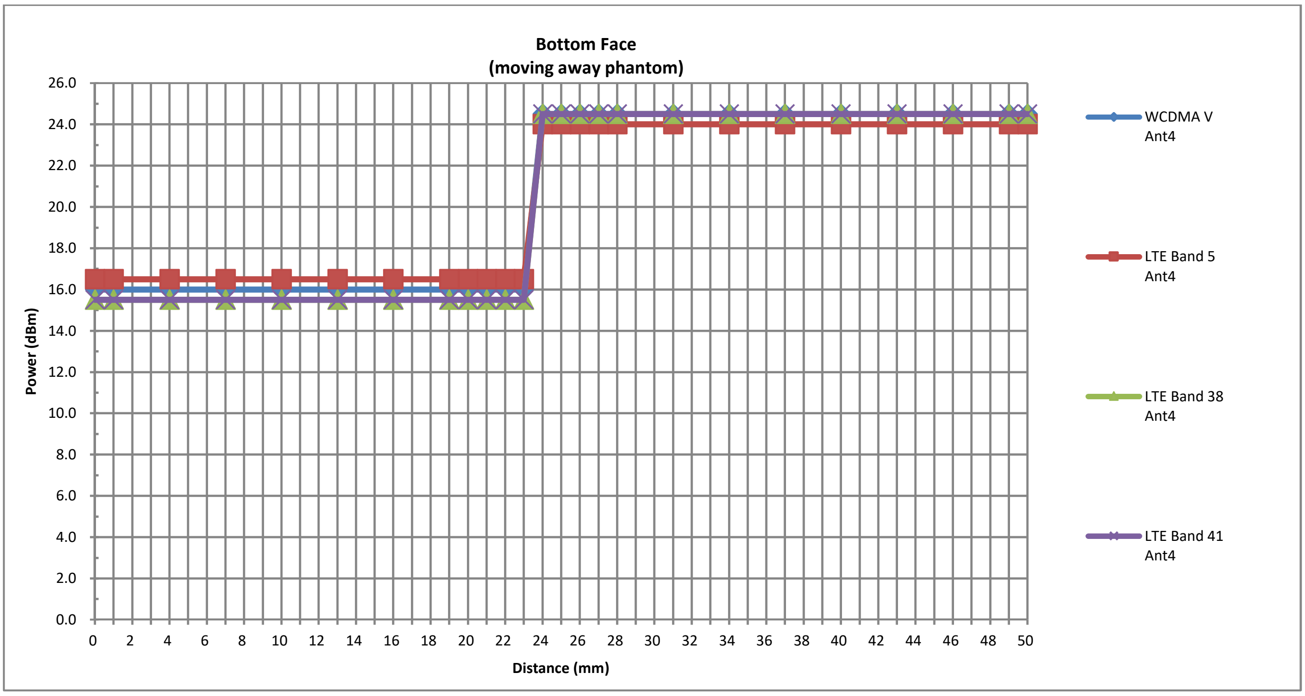
Band/Mode for Ant1	Measured power reduction (dBm)		Reduction Levels (dB)
	w/o power back-off	w/ power back-off	
WLAN 2.4GHz	21.00	13.00	8.0
WLAN 5.2GHz	16.50	6.00	10.5
WLAN 5.3GHz	16.50	6.00	10.5
WLAN 5.5GHz	16.50	5.50	11.0
WLAN 5.8GHz	16.50	6.50	10.0

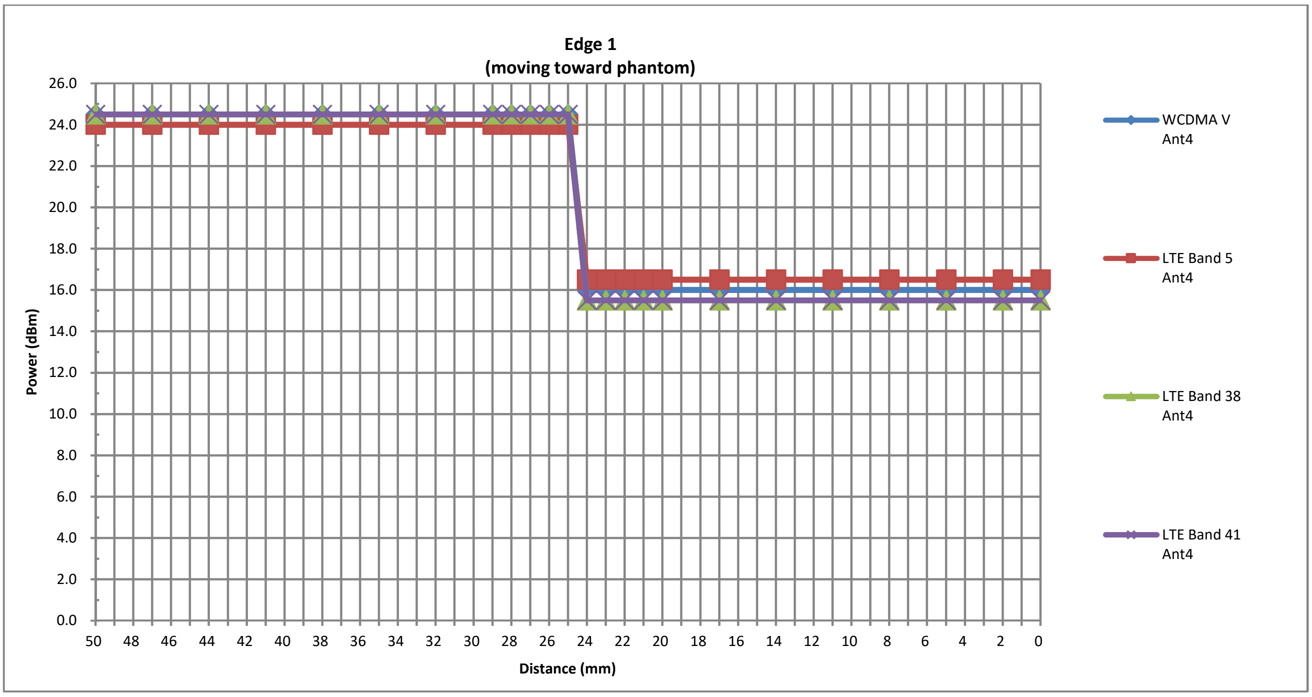


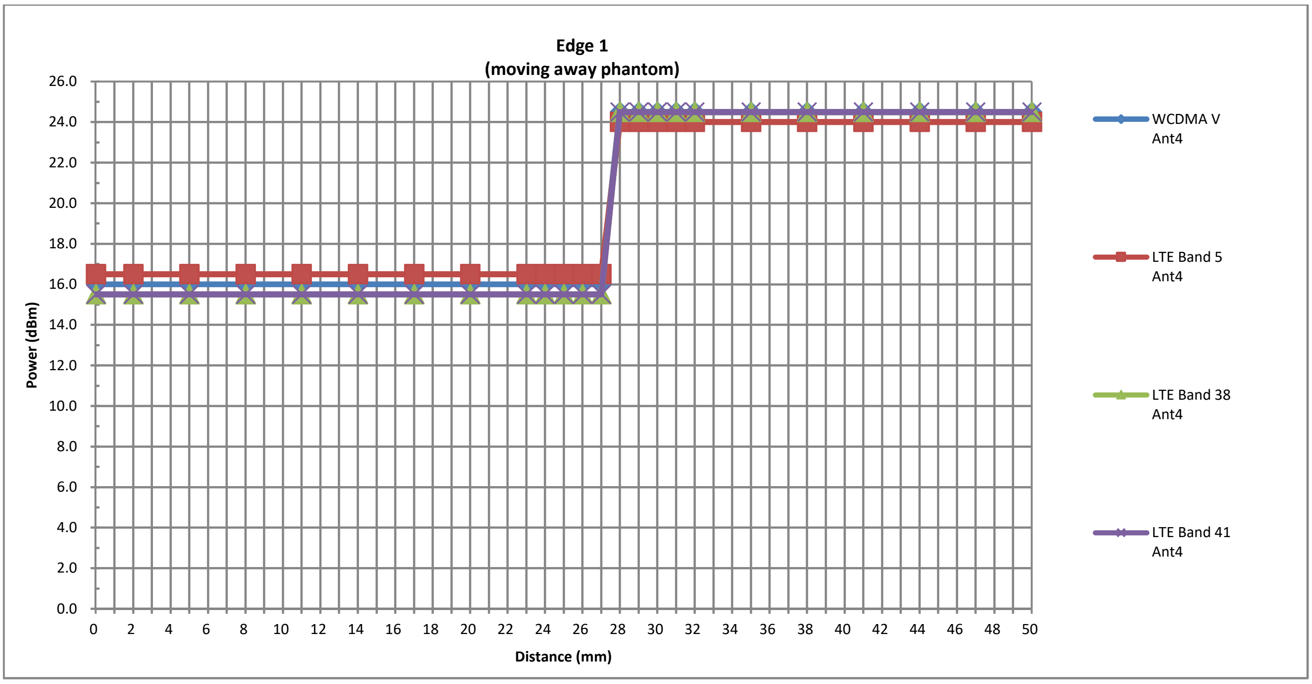


Band/Mode for Ant Ant4	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
WCDMA Band V Ant 4	24.50	16.00	8.5
LTE Band 5 Ant 4	24.00	16.50	7.5
LTE Band 41(38) Ant 4	24.50	15.50	9.0

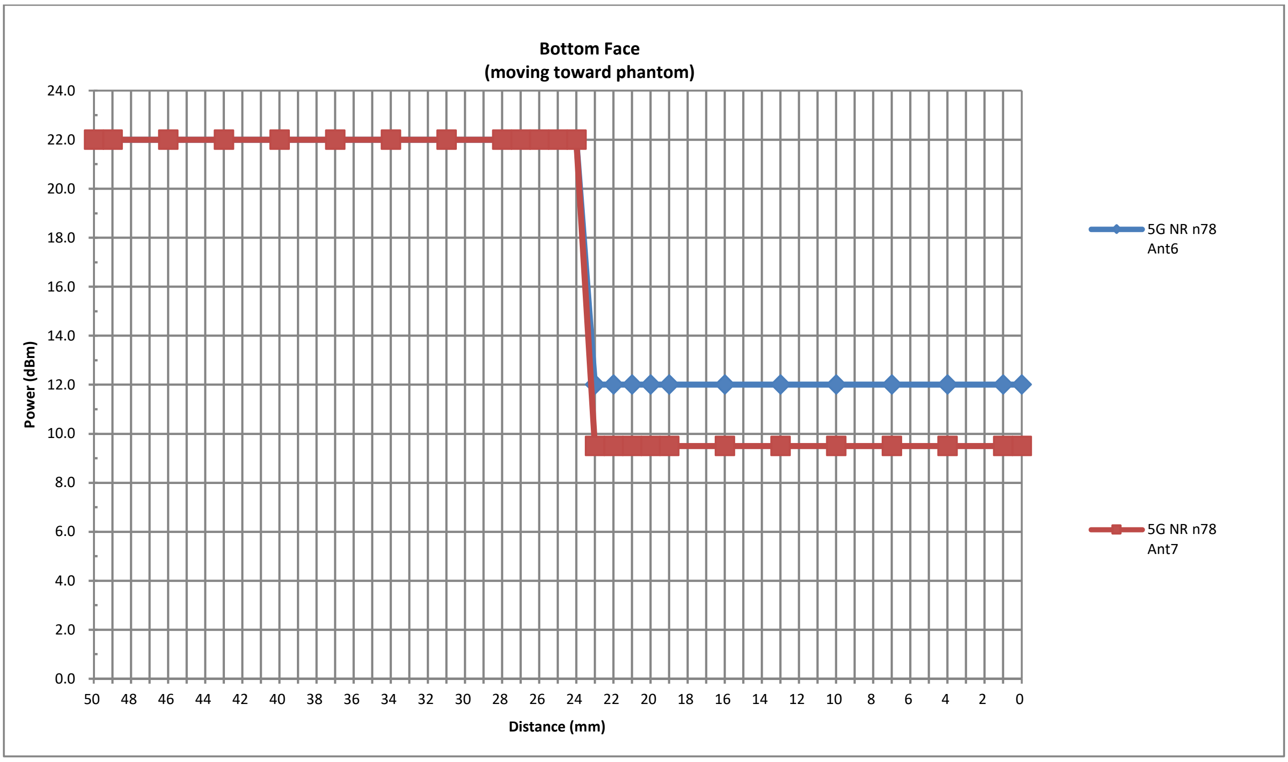


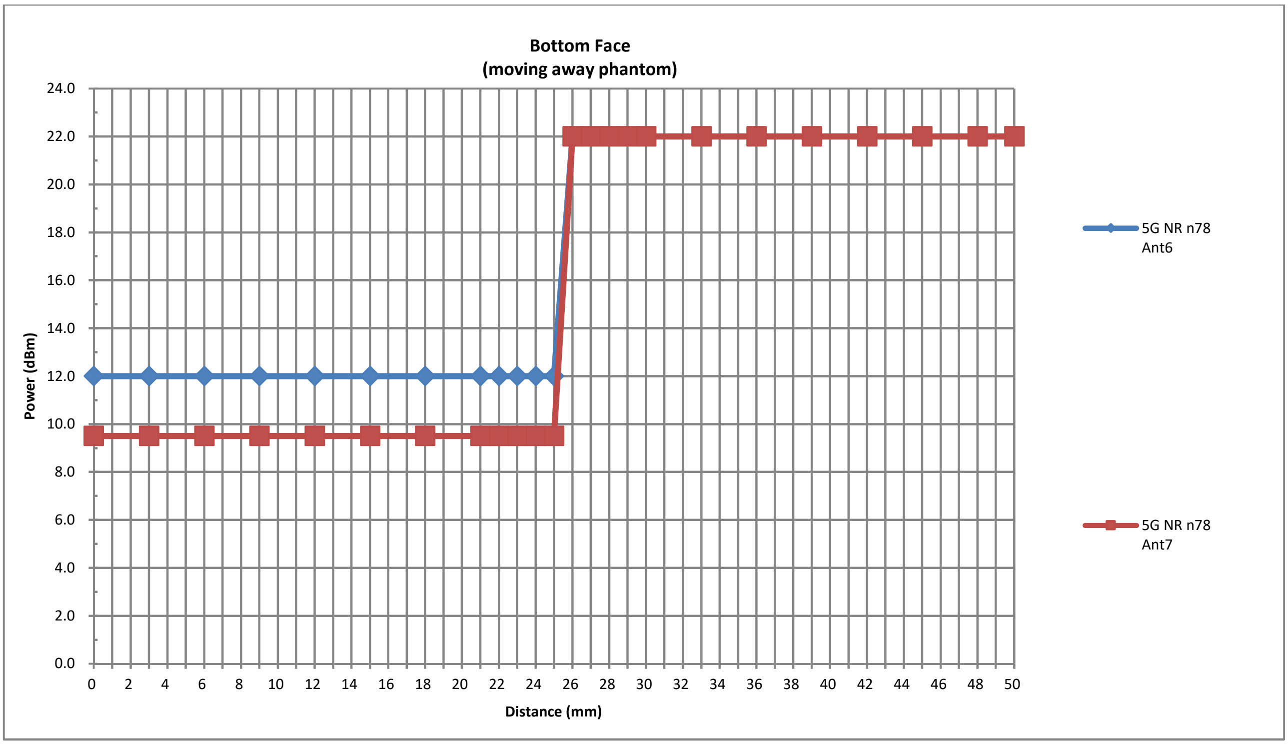


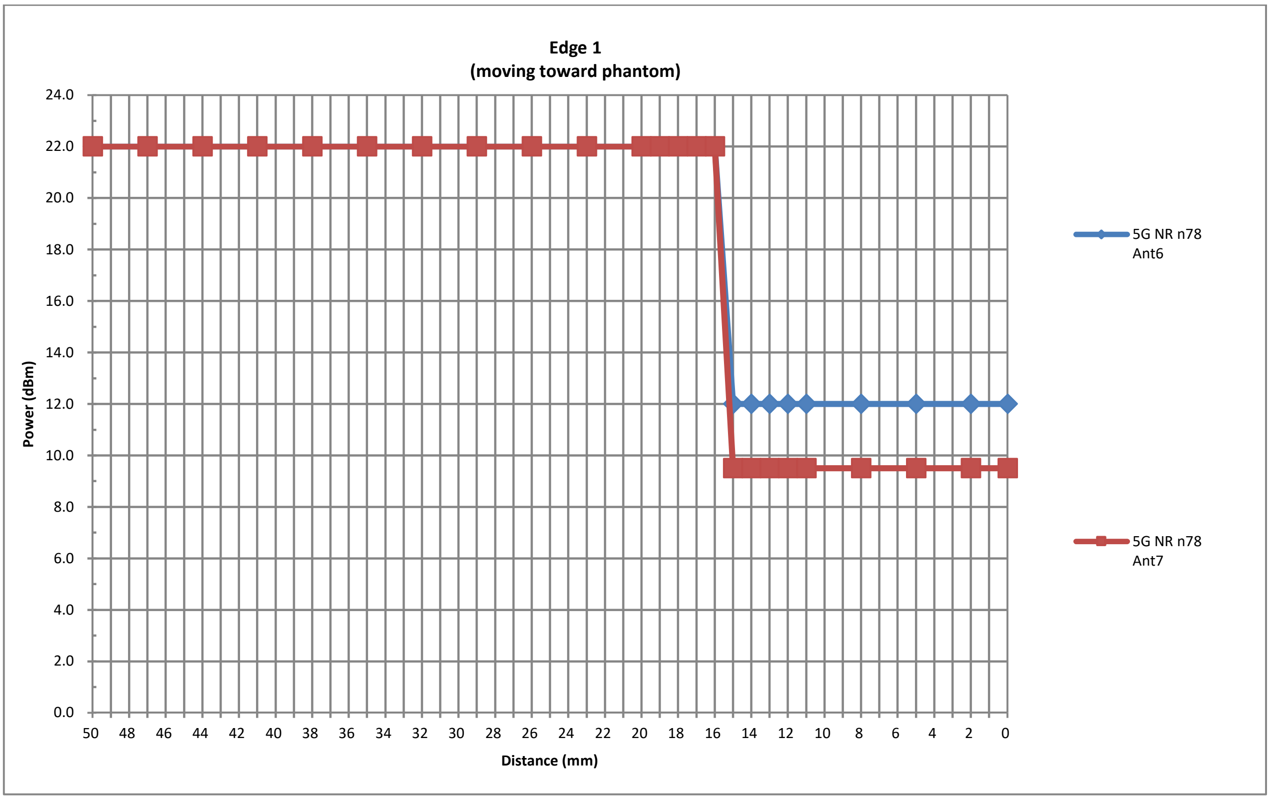

Edge 1
(moving toward phantom)
Power (dBm)
Distance (mm)
WCDMA V Ant4
LTE Band 5 Ant4
LTE Band 38 Ant4
LTE Band 41 Ant4

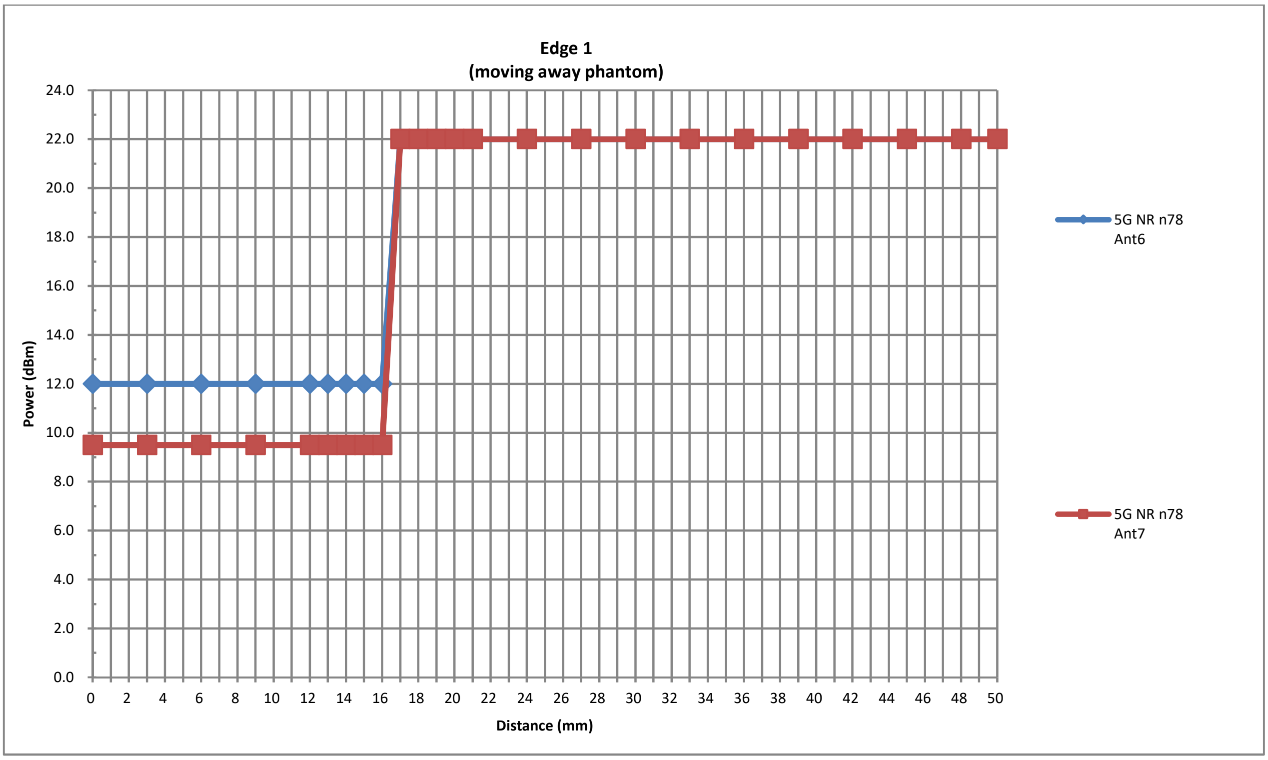

Edge 1
(moving away phantom)
Power (dBm)
Distance (mm)
WCDMA V Ant4
LTE Band 5 Ant4
LTE Band 38 Ant4
LTE Band 41 Ant4

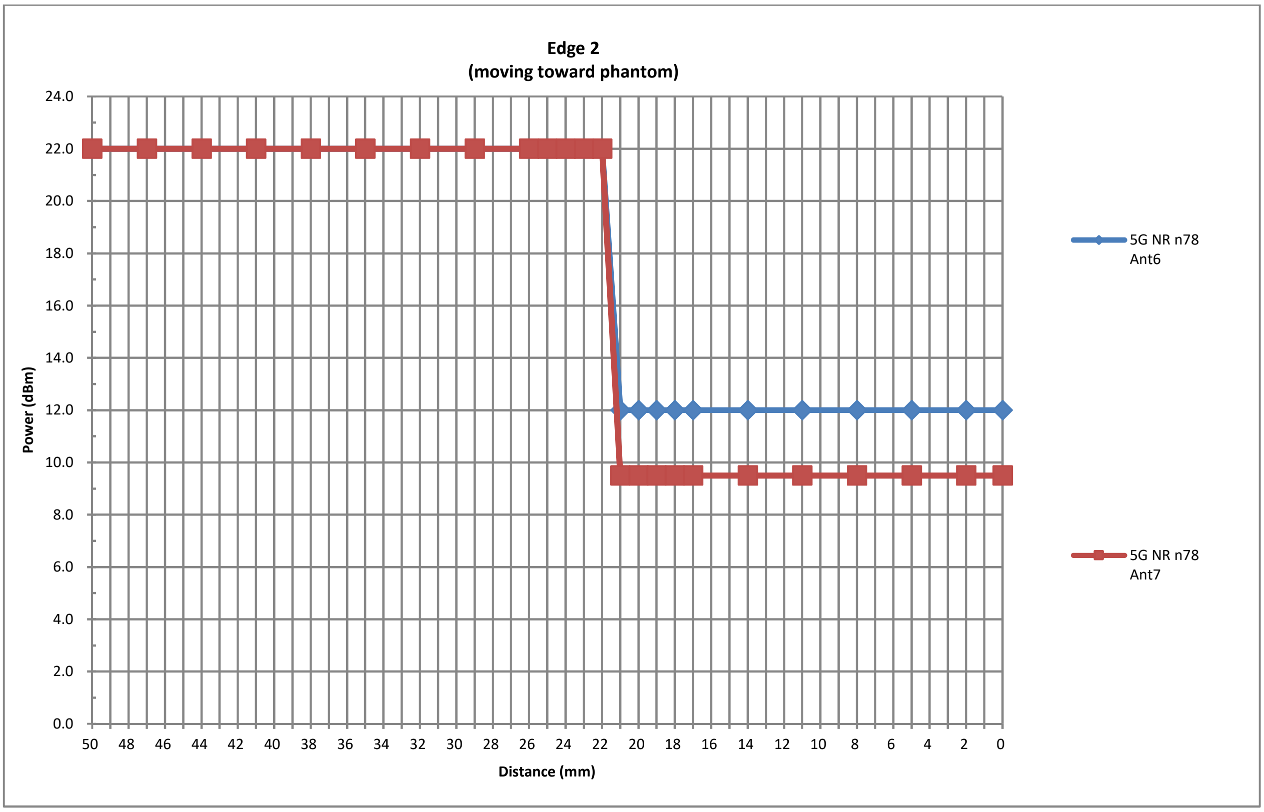
Band/Mode for Ant Ant6/7	Measured power reduction (dBm)		Reduction Levels
	w/o power back-off	w/ power back-off	(dB)
5G NR n78 Ant 6	22.00	12.00	10.0
5G NR n78 Ant 7	22.00	9.50	12.5

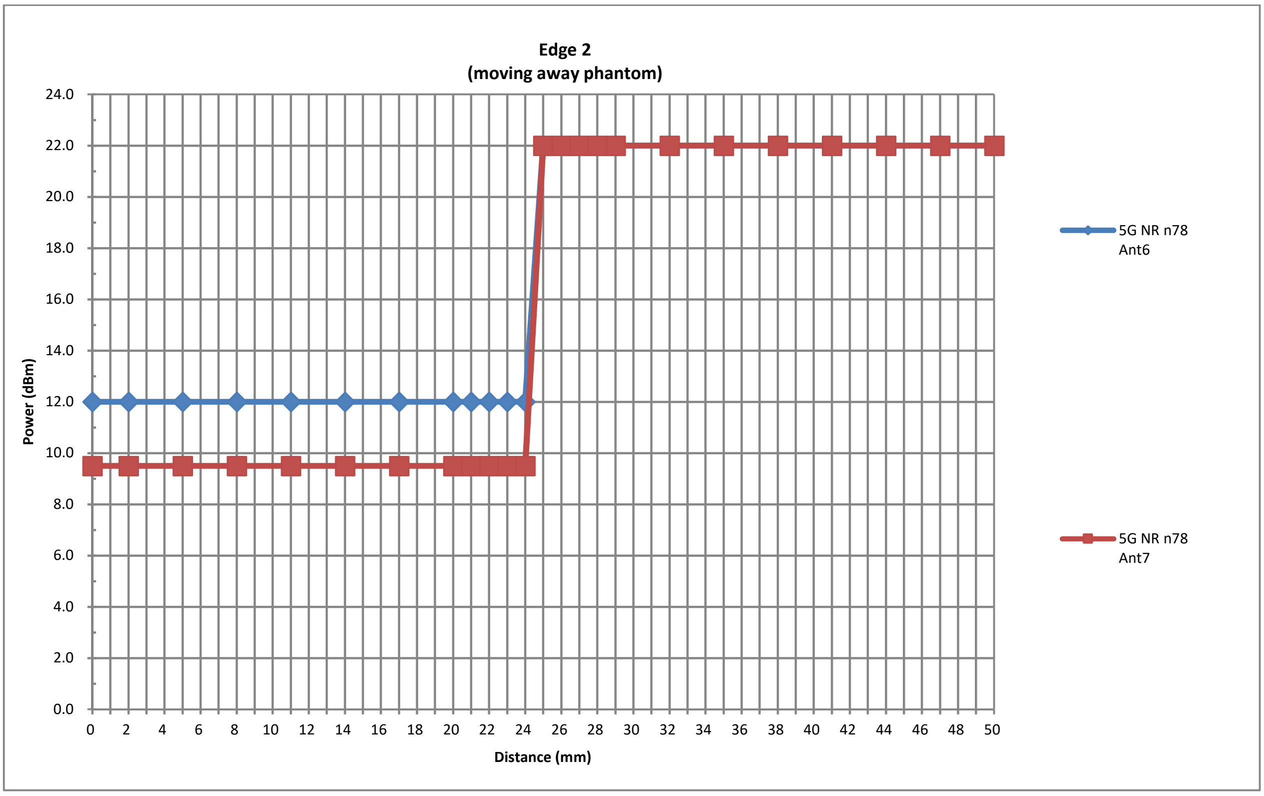





Edge 1
(moving toward phantom)
Power (dBm)
Distance (mm)
5G NR n78 Ant6
5G NR n78 Ant7


Edge 1
(moving away phantom)
Power (dBm)
Distance (mm)
5G NR n78 Ant6
5G NR n78 Ant7


Edge 2
(moving toward phantom)
Power (dBm)
Distance (mm)
5G NR n78 Ant6
5G NR n78 Ant7


Edge 2
(moving away phantom)
Power (dBm)
Distance (mm)
5G NR n78 Ant6
5G NR n78 Ant7

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:

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

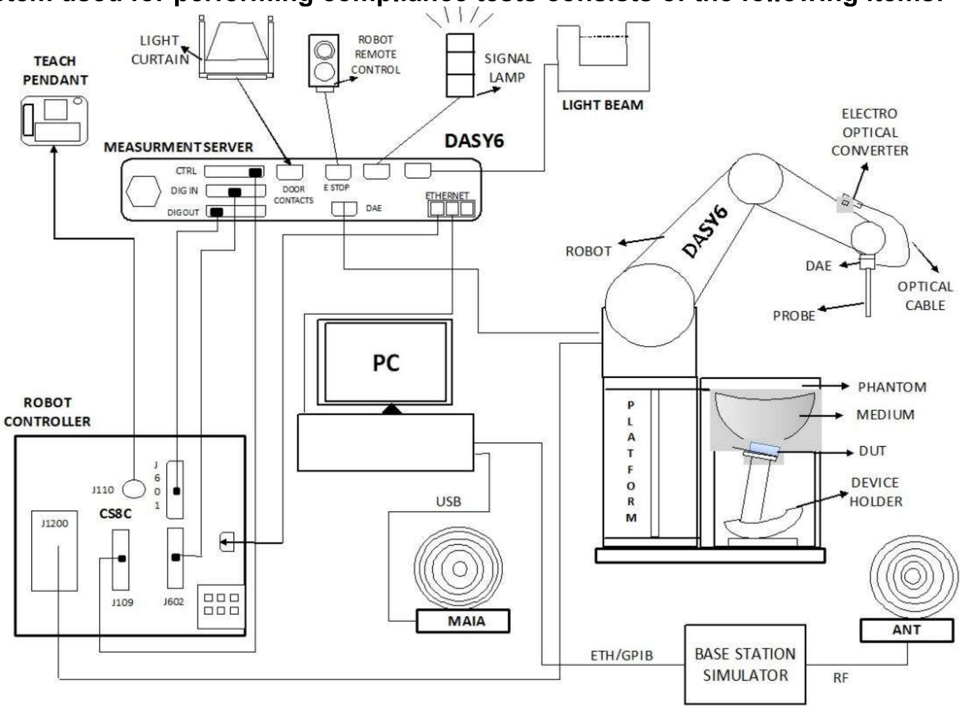
SAR is expressed in units of Watts per kilogram (W/kg)

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

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 Win7 or Win10 and the DASY5 or 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	4 MHz – 10 GHz Linearity: ±0.2 dB (30 MHz – 10 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.

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	

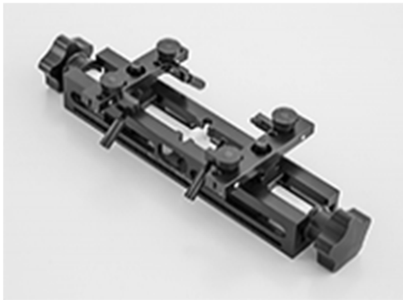
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

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.

<table>
<tr><th></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
</table>

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.

<table>
<tr><th colspan="3"></th><th>$\leq$ 3 GHz</th><th>$>$ 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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.</td></tr>
</table>

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	Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d298	Jan. 26, 2024	Jan. 24, 2026
SPEAG	2450MHz System Validation Kit	D2450V2	1095	Feb. 08, 2024	Feb. 06, 2026
SPEAG	2600MHz System Validation Kit	D2600V2	1112	Dec. 18, 2023	Dec. 16, 2025
SPEAG	3500MHz System Validation Kit	D3500V2	1037	Nov. 20, 2023	Nov. 18, 2025
SPEAG	3700MHz System Validation Kit	D3700V2	1008	Nov. 20, 2023	Nov. 18, 2025
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Sep. 23, 2022	Sep. 21, 2025
SPEAG	Data Acquisition Electronics	DAE4	1650	Nov. 25, 2024	Nov. 24, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7630	Aug. 22, 2024	Aug. 21, 2025
SPEAG	ELI Phantom	ELI V8.0	TP-2134	NCR	NCR
SPEAG	ELI Phantom	ELI V8.0	TP-2135	NCR	NCR
Beichuang	Thermo-Hygrometer	HTC-1	1949244	Jan. 11, 2025	Jan. 10, 2026
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio Communication Analyzer	MT8821C	6262306175	Jul. 04, 2024	Jul. 03, 2025
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	Jul. 04, 2024	Jul. 03, 2025
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	Jul. 02, 2025	Jul. 01, 2026
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	Aug. 20, 2024	Aug. 19, 2025
Anritsu	Vector Signal Generator	MG3710A	6201682672	Jan. 03, 2025	Jan. 02, 2026
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	NCR	NCR
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	NCR	NCR
Agilent	Dual Directional Coupler	778D	20500	Jul. 04, 2024	Jul. 03, 2025
Agilent	Dual Directional Coupler	778D	20500	Jul. 02, 2025	Jul. 01, 2026
Agilent	Dual Directional Coupler	11691D	MY48151020	Jul. 04, 2024	Jul. 03, 2025
Agilent	Dual Directional Coupler	11691D	MY48151020	Jul. 02, 2025	Jul. 01, 2026
Rohde & Schwarz	Power Meter	NRVD	102081	Jul. 04, 2024	Jul. 03, 2025
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	Jul. 04, 2024	Jul. 03, 2025
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	Jul. 04, 2024	Jul. 03, 2025
Rohde & Schwarz	Power Meter	NRVD	102081	Jul. 02, 2025	Jul. 01, 2026
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	Jul. 02, 2025	Jul. 01, 2026
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	Jul. 02, 2025	Jul. 01, 2026
ARRA	Power Divider	A3200-2	N/A	NCR	NCR
MCL	Attenuation1	BW-S10W5+	N/A	NCR	NCR
R&S	BLUETOOTH TESTER	CBT	101246	Jul. 04, 2024	Jul. 03, 2025
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	Oct. 11, 2024	Oct. 10, 2025
TES	DIGITAC THERMOMETER	TYPE-K	220305411	Jan. 02, 2025	Jan. 01, 2026

Note:

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

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 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. 10.1.

Fig 10.1 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								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	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 (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
835	Head	22.7	0.92	42.5	0.9	41.5	2.22	2.41	±5.0	2025-06-07
2450	Head	22.7	1.76	39.3	1.8	39.2	-2.22	0.26	±5.0	2025-06-17
2600	Head	22.8	1.92	38.9	1.96	39.0	-2.04	-0.26	±5.0	2025-06-12
3500	Head	22.9	2.96	37.7	2.91	37.9	1.72	-0.53	±5.0	2025-06-14
3700	Head	22.7	3.18	37.6	3.12	37.7	1.92	-0.27	±5.0	2025-06-16
5250	Head	22.7	4.71	36.4	4.71	35.95	0.0	1.25	±5.0	2025-06-18
5600	Head	22.7	5.04	35.8	5.07	35.5	-0.59	0.85	±5.0	2025-06-19
5750	Head	22.7	5.14	35.7	5.22	35.35	-1.53	0.99	±5.0	2025-06-19
2450	Head	22.7	1.75	39.4	1.8	39.2	-2.78	0.51	±5.0	2025-07-13

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)	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 (%)
2025-06-07	835	50.00	D835V2 - 4d298	EX3DV4 - SN7630	DAE4 Sn1650	0.521	9.89	10.42	5.36
2025-06-17	2450	50.00	D2450V2 - 1095	EX3DV4 - SN7630	DAE4 Sn1650	2.5	52.6	50.0	-4.94
2025-06-12	2600	50.00	D2600V2 - 1112	EX3DV4 - SN7630	DAE4 Sn1650	2.85	55.1	57.0	3.45
2025-06-14	3500	50.00	D3500V2 - 1037	EX3DV4 - SN7630	DAE4 Sn1650	3.25	65.4	65.0	-0.61
2025-06-16	3700	50.00	D3700V2 - 1008	EX3DV4 - SN7630	DAE4 Sn1650	3.43	67.2	68.6	2.08
2025-06-18	5250	50.00	D5GHzV2 - 1113	EX3DV4 - SN7630	DAE4 Sn1650	3.82	81.5	76.4	-6.26
2025-06-19	5600	50.00	D5GHzV2 - 1113	EX3DV4 - SN7630	DAE4 Sn1650	4.01	82.6	80.2	-2.91
2025-06-19	5750	50.00	D5GHzV2 - 1113	EX3DV4 - SN7630	DAE4 Sn1650	3.68	80.8	73.6	-8.91
2025-07-13	2450	50.00	D2450V2 - 1095	EX3DV4 - SN7630	DAE4 Sn1650	2.74	52.6	54.8	4.18

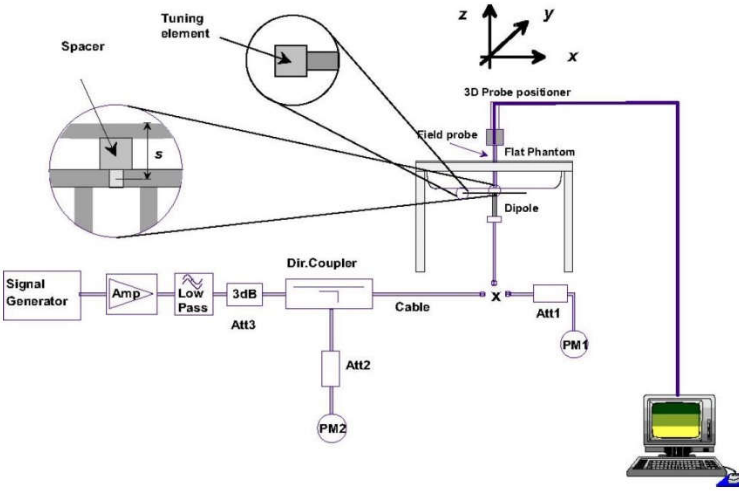


Fig 10.3.1 System Performance Check Setup

Fig 10.3.2 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. Conducted RF 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 $\beta_{hs} = 30/15 * \beta_c$.

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 $\beta_{hs} = 30/15 * \beta_c$, and Δ_{CQI} = 24/15 with $\beta_{hs} = 24/15 * \beta_c$.

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 $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with $\beta_{hs} = 5/15 * \beta_c$.

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.		

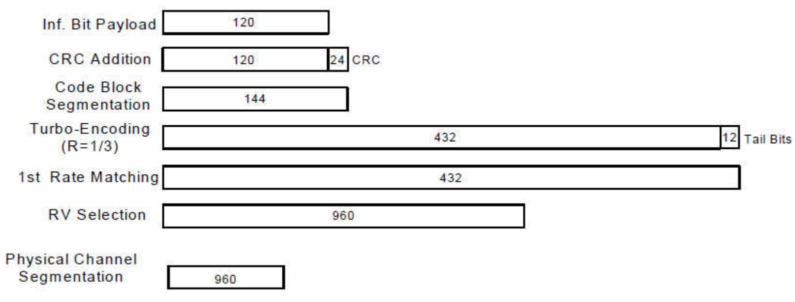


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

WCDMA Conducted Power

General Note:

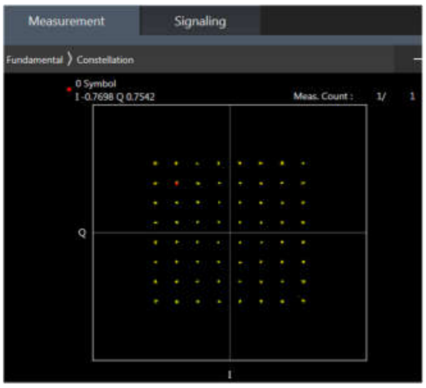
1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ 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/64QAM 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/64QAM 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 / B38 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. According to May 2017 TCB workshop, for 16QAM and 64QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement Modulation Analysis constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.

16QAM



64QAM

TDD LTE SAR Measurement

TDD LTE configuration setup for SAR measurement

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

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
b. “special subframe S” contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

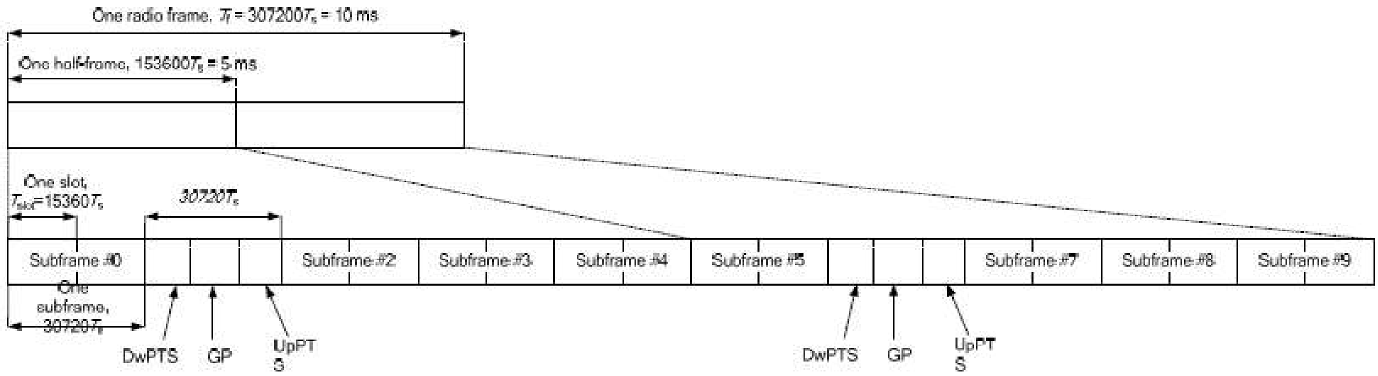


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

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

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

The highest duty factor is resulted from:

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

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

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

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

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

5G NR Output Power (Unit: dBm)

General Note:

1. 5G NR n78 is SA mode.
2. 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 and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the 16QAM/64QAM 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 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 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
3. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
4. SA mode should perform SAR separately.
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.

3GPP 38.101 MPR

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		

WLAN Conducted Power

General Note:

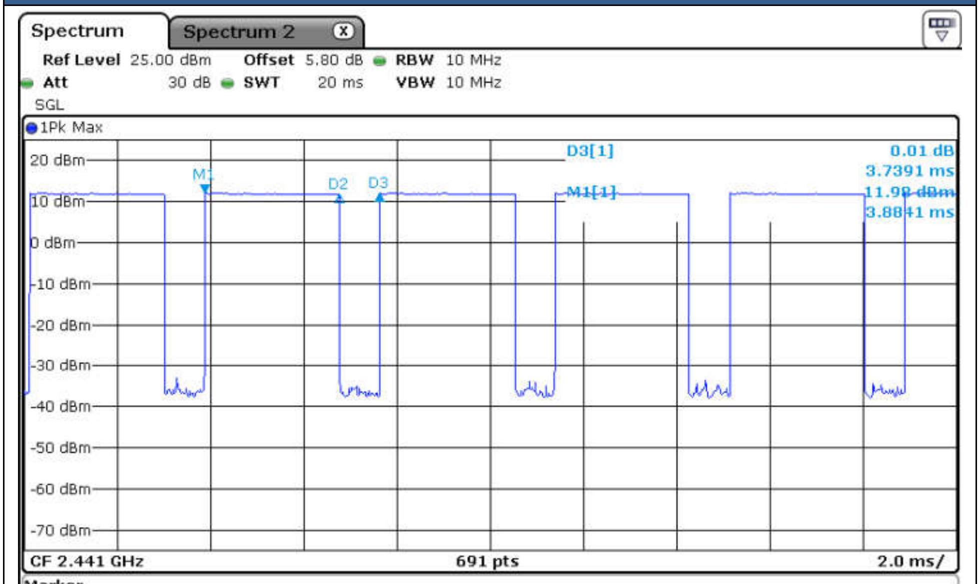
1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default 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 76.75 % as following figure, Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation.

Bluetooth time-domain plot



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	3.8841 ms	11.98 dBm		
D2	M1	1	2.8696 ms	-0.08 dB		
D3	M1	1	3.7391 ms	0.01 dB		

14. 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

For Ant 1

Exposure Position	Wireless Interface	BT	2.4GHz WLAN	5GHz WLAN
	Calculated Frequency (MHz)	2480	2462	5825
	Maximum power (dBm)	13.0	21.0	16.5
	Maximum rated power(mW)	19.95	125.89	44.67
Bottom Face	Separation distance(mm)	5.0	5.0	5.0
	exclusion threshold	6.3	39.5	21.6
	Testing required?	**Yes**	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.0	5.0	5.0
	exclusion threshold	6.3	39.5	21.6
	Testing required?	**Yes**	**Yes**	**Yes**
Edge 2	Separation distance(mm)	200.8	200.8	200.8
	exclusion threshold	1603.0	1604.0	1570.0
	Testing required?	**No**	**No**	**No**
Edge 3	Separation distance(mm)	143.6	143.6	143.6
	exclusion threshold	1032.0	1032.0	999.0
	Testing required?	**No**	**No**	**No**
Edge 4	Separation distance(mm)	24.8	24.8	24.8
	exclusion threshold	1.3	8.0	4.3
	Testing required?	**No**	**Yes**	**Yes**

For Ant 3

Exposure Position	Wireless Interface	LTE Band 42	Part96 FR1 n78	Part27Q FR1 n78
	Calculated Frequency (MHz)	3550	3650	3500.01
	Maximum power (dBm)	24.0	22.0	22.0
	Maximum rated power(mW)	251.19	158.49	158.49
Bottom Face	Separation distance(mm)	5.0		
	exclusion threshold	94.7	60.6	59.3
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)	147.3		
	exclusion threshold	1053.0	1051.0	1053.0
	Testing required?	No	No	No
Edge 2	Separation distance(mm)	231.7		
	exclusion threshold	1896.0	1895.0	1897.0
	Testing required?	No	No	No
Edge 3	Separation distance(mm)	5.0		
	exclusion threshold	94.7	60.6	59.3
	Testing required?	Yes	Yes	Yes
Edge 4	Separation distance(mm)	5.0		
	exclusion threshold	94.7	60.6	59.3
	Testing required?	Yes	Yes	Yes

For Ant 4

Exposure Position	Wireless Interface	WCDMA Band V	LTE Band 5	LTE Band 38	LTE Band 41
	Calculated Frequency (MHz)	846	848	848	2687
	Maximum power (dBm)	24.5	24.0	24.5	24.5
	Maximum rated power(mW)	281.84	251.19	281.84	281.84
Bottom Face	Separation distance(mm)	5.0			
	exclusion threshold	51.9	46.3	51.9	92.4
	Testing required?	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	5.0			
	exclusion threshold	51.9	46.3	51.9	92.4
	Testing required?	Yes	Yes	Yes	Yes
Edge 2	Separation distance(mm)	138.3			
	exclusion threshold	661.0	662.0	1046.0	974.0
	Testing required?	No	No	No	No
Edge 3	Separation distance(mm)	166.1			
	exclusion threshold	818.0	820.0	1324.0	1253.0
	Testing required?	No	No	No	No
Edge 4	Separation distance(mm)	53.2			
	exclusion threshold	181.0	181.0	194.0	123.0
	Testing required?	Yes	Yes	Yes	Yes

For Ant 6

Exposure Position	Wireless Interface	Part96 FR1 n78	Part27Q FR1 n78
	Calculated Frequency (MHz)	3650	3500.01
	Maximum power (dBm)	22.0	22.0
	Maximum rated power(mW)	158.49	158.49
Bottom Face	Separation distance(mm)	5.0	
	exclusion threshold	60.6	59.3
	Testing required?	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.0	
	exclusion threshold	60.6	59.3
	Testing required?	**Yes**	**Yes**
Edge 2	Separation distance(mm)	18.8	
	exclusion threshold	16.1	15.8
	Testing required?	**Yes**	**Yes**
Edge 3	Separation distance(mm)	166.1	
	exclusion threshold	1240.0	1242.0
	Testing required?	**No**	**No**
Edge 4	Separation distance(mm)	186.1	
	exclusion threshold	1439.0	1441.0
	Testing required?	**No**	**No**

For Ant 7

Exposure Position	Wireless Interface	Part96 FR1 n78	Part27Q FR1 n78
	Calculated Frequency (MHz)	3650	3500.01
	Maximum power (dBm)	22.0	22.0
	Maximum rated power(mW)	158.49	158.49
Bottom Face	Separation distance(mm)	5.0	
	exclusion threshold	60.6	59.3
	Testing required?	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.0	
	exclusion threshold	60.6	59.3
	Testing required?	**Yes**	**Yes**
Edge 2	Separation distance(mm)	5.0	
	exclusion threshold	60.6	59.3
	Testing required?	**Yes**	**Yes**
Edge 3	Separation distance(mm)	130.2	
	exclusion threshold	881.0	883.0
	Testing required?	**No**	**No**
Edge 4	Separation distance(mm)	254.0	
	exclusion threshold	2119.0	2120.0
	Testing required?	**No**	**No**

For Ant 8

Exposure Position	Wireless Interface	Part96 FR1 n78	Part27Q FR1 n78
	Calculated Frequency (MHz)	3650	3500.01
	Maximum power (dBm)	14.0	14.0
	Maximum rated power(mW)	25.12	25.12
Bottom Face	Separation distance(mm)	5.0	
	exclusion threshold	9.6	9.4
	Testing required?	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.0	
	exclusion threshold	9.6	9.4
	Testing required?	**Yes**	**Yes**
Edge 2	Separation distance(mm)	254.0	
	exclusion threshold	2119.0	2120.0
	Testing required?	**No**	**No**
Edge 3	Separation distance(mm)	127.2	
	exclusion threshold	850.0	852.0
	Testing required?	**No**	**No**
Edge 4	Separation distance(mm)	5.0	
	exclusion threshold	9.6	9.4
	Testing required?	**Yes**	**Yes**

15. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For 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 (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.

WCDMA 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 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/64QAM 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/64QAM 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 / B38 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.

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 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 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

WLAN/Bluetooth 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.

15.1 Body SAR

【WCDMA SAR】

Plot No	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	WCDMA V	RMC 12.2Kbps	Bottom Face	0mm	Ant 4	Sensor on	4182	836.4	1	14.90	16.00	1.288	0.02	0.500	0.644
	WCDMA V	RMC 12.2Kbps	Bottom Face	20mm	Ant 4	Full Power	4182	836.4	1	23.35	24.50	1.303	0.08	0.243	0.317
	WCDMA V	RMC 12.2Kbps	Edge 1	0mm	Ant 4	Sensor on	4182	836.4	1	14.90	16.00	1.288	0.08	0.478	0.616
	WCDMA V	RMC 12.2Kbps	Edge 1	23mm	Ant 4	Full Power	4182	836.4	1	23.35	24.50	1.303	0.01	0.216	0.281
	WCDMA V	RMC 12.2Kbps	Edge 4	0mm	Ant 4	Full Power	4182	836.4	1	23.35	24.50	1.303	0.01	0.031	0.040

【LTE SAR】

Plot No	Band	BW	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
02	LTE Band 5	10M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	20525	836.5	1	15.38	16.50	1.294			-0.02	0.563	0.729
	LTE Band 5	10M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	20525	836.5	2	15.38	16.50	1.294			0.01	0.511	0.661
	LTE Band 5	10M	QPSK	25	0	Bottom Face	0mm	Ant 4	Sensor on	20525	836.5	1	15.34	16.50	1.306			0.03	0.444	0.580
	LTE Band 5	10M	QPSK	1	0	Bottom Face	20mm	Ant 4	Full Power	20525	836.5	1	22.78	24.00	1.324			0.01	0.356	0.471
	LTE Band 5	10M	QPSK	1	0	Edge 1	0mm	Ant 4	Sensor on	20525	836.5	1	15.38	16.50	1.294			-0.08	0.369	0.477
	LTE Band 5	10M	QPSK	25	0	Edge 1	0mm	Ant 4	Sensor on	20525	836.5	1	15.34	16.50	1.306			-0.08	0.292	0.381
	LTE Band 5	10M	QPSK	1	0	Edge 1	23mm	Ant 4	Full Power	20525	836.5	1	22.78	24.00	1.324			-0.08	0.217	0.287
	LTE Band 5	10M	QPSK	1	0	Edge 4	0mm	Ant 4	Full Power	20525	836.5	1	22.78	24.00	1.324			0.10	0.046	0.061
	LTE Band 5	10M	QPSK	25	0	Edge 4	0mm	Ant 4	Full Power	20525	836.5	1	21.80	23.00	1.318			-0.18	0.036	0.047
03	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	40620	2593.0	1	14.40	15.50	1.288	62.9	1.006	0.06	0.563	0.729
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	40620	2593	2	14.40	15.50	1.288	62.9	1.006	-0.01	0.509	0.660
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	39750	2506.0	1	14.32	15.50	1.312	62.9	1.006	0.08	0.511	0.674
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	40185	2549.5	1	14.39	15.50	1.291	62.9	1.006	0.01	0.509	0.661
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	41055	2636.5	1	14.35	15.50	1.303	62.9	1.006	0.03	0.531	0.696
	LTE Band 41	20M	QPSK	1	0	Bottom Face	0mm	Ant 4	Sensor on	41490	2680.0	1	14.31	15.50	1.315	62.9	1.006	-0.08	0.525	0.695
	LTE Band 41	20M	QPSK	50	0	Bottom Face	0mm	Ant 4	Sensor on	40620	2593.0	1	14.32	15.50	1.312	62.9	1.006	0.14	0.444	0.586
	LTE Band 41	20M	QPSK	1	0	Bottom Face	20mm	Ant 4	Full Power	40620	2593.0	1	23.26	24.50	1.330	62.9	1.006	-0.08	0.159	0.213
	LTE Band 41	20M	QPSK	1	0	Edge 1	0mm	Ant 4	Sensor on	40620	2593.0	1	14.40	15.50	1.288	62.9	1.006	0.11	0.299	0.387
	LTE Band 41	20M	QPSK	50	0	Edge 1	0mm	Ant 4	Sensor on	40620	2593.0	1	14.32	15.50	1.312	62.9	1.006	-0.05	0.232	0.306
	LTE Band 41	20M	QPSK	1	0	Edge 1	23mm	Ant 4	Full Power	40620	2593.0	1	23.26	24.50	1.330	62.9	1.006	0.01	0.094	0.126
	LTE Band 41	20M	QPSK	1	0	Edge 4	0mm	Ant 4	Full Power	40620	2593.0	1	23.26	24.50	1.330	62.9	1.006	0.18	0.038	0.051
	LTE Band 41	20M	QPSK	50	0	Edge 4	0mm	Ant 4	Full Power	40620	2593.0	1	22.15	23.50	1.365	62.9	1.006	0.14	0.031	0.043
	LTE Band 42	20M	QPSK	1	0	Bottom Face	0mm	Ant 3	Sensor off	42590	3500.0	1	18.20	19.00	1.202	62.9	1.006	-0.17	0.044	0.053
	LTE Band 42	20M	QPSK	50	0	Bottom Face	0mm	Ant 3	Sensor off	42590	3500.0	1	18.15	19.00	1.216	62.9	1.006	0.17	0.035	0.043
04	LTE Band 42	20M	QPSK	1	0	Edge 3	0mm	Ant 3	Sensor off	42590	3500.0	1	18.20	19.00	1.202	62.9	1.006	0.07	0.292	0.353
	LTE Band 42	20M	QPSK	1	0	Edge 3	0mm	Ant 3	Sensor off	42590	3500	2	18.20	19.00	1.202	62.9	1.006	0.01	0.257	0.311
	LTE Band 42	20M	QPSK	50	0	Edge 3	0mm	Ant 3	Sensor off	42590	3500.0	1	18.15	19.00	1.216	62.9	1.006	-0.05	0.235	0.287
	LTE Band 42	20M	QPSK	1	0	Edge 4	0mm	Ant 3	Sensor off	42590	3500.0	1	18.20	19.00	1.202	62.9	1.006	0.01	0.253	0.306
	LTE Band 42	20M	QPSK	50	0	Edge 4	0mm	Ant 3	Sensor off	42590	3500.0	1	18.15	19.00	1.216	62.9	1.006	0.10	0.202	0.247

【FR1 SAR】

Plot No	Band	BW	Modulation	RB Size	RB Offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	Sensor off	641666	3624.99	1	16.43	17.00	1.140	0.11	0.028	0.032
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	Sensor off	641666	3624.99	1	16.37	17.00	1.156	-0.05	0.027	0.031
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 3	0mm	Ant 3	Sensor off	641666	3624.99	1	16.43	17.00	1.140	-0.08	0.159	0.181
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 3	0mm	Ant 3	Sensor off	641666	3624.99	1	16.37	17.00	1.156	0.16	0.182	0.210
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 4	0mm	Ant 3	Sensor off	641666	3624.99	1	16.43	17.00	1.140	-0.03	0.219	0.250
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 4	0mm	Ant 3	Sensor off	641666	3624.99	1	16.37	17.00	1.156	0.05	0.205	0.237
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	641666	3624.99	1	10.92	12.00	1.282	0.09	0.714	0.915
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	641666	3624.99	1	10.89	12.00	1.291	0.05	0.685	0.884
	FR1 n78	100M	BPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	641666	3624.99	1	10.83	12.00	1.309	-0.03	0.650	0.851
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	22mm	Ant 6	Full Power	641666	3624.99	1	20.84	22.00	1.306	0.10	0.187	0.244
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 6	Sensor on	641666	3624.99	1	10.92	12.00	1.282	-0.15	0.248	0.318
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 6	Sensor on	641666	3624.99	1	10.89	12.00	1.291	0.02	0.173	0.223
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	14mm	Ant 6	Full Power	641666	3624.99	1	20.84	22.00	1.306	0.01	0.096	0.125
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 6	Sensor on	641666	3624.99	1	10.92	12.00	1.282	0.07	0.102	0.131
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 6	Sensor on	641666	3624.99	1	10.89	12.00	1.291	0.16	0.088	0.114
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	20mm	Ant 6	Full Power	641666	3624.99	1	20.84	22.00	1.306	-0.03	0.057	0.074
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	641666	3624.99	1	8.05	9.50	1.396	0.13	0.727	1.015
05	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	641666	3624.99	1	7.99	9.50	1.416	0.09	0.785	1.112
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	641666	3624.99	2	7.99	9.50	1.416	-0.04	0.711	1.007
	FR1 n78	100M	BPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	641666	3624.99	1	7.98	9.50	1.419	-0.18	0.701	0.995
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	22mm	Ant 7	Full Power	641666	3624.99	1	20.38	22.00	1.452	0.05	0.161	0.234
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	Sensor on	641666	3624.99	1	8.05	9.50	1.396	0.02	0.012	0.017
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	Sensor on	641666	3624.99	1	7.99	9.50	1.416	0.16	0.007	0.010
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	14mm	Ant 7	Full Power	641666	3624.99	1	20.38	22.00	1.452	0.01	0.053	0.077
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 7	Sensor on	641666	3624.99	1	8.05	9.50	1.396	-0.03	0.311	0.434
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 7	Sensor on	641666	3624.99	1	7.99	9.50	1.416	0.07	0.349	0.494
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	20mm	Ant 7	Full Power	641666	3624.99	1	20.38	22.00	1.452	0.06	0.147	0.213
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 8	Sensor off	641666	3624.99	1	13.35	14.00	1.161	0.06	0.190	0.221
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 8	Sensor off	641666	3624.99	1	13.39	14.00	1.151	0.01	0.253	0.291
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 8	Sensor off	641666	3624.99	1	13.35	14.00	1.161	0.02	0.055	0.064
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 8	Sensor off	641666	3624.99	1	13.39	14.00	1.151	0.10	0.058	0.067
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 4	0mm	Ant 8	Sensor off	641666	3624.99	1	13.35	14.00	1.161	0.06	0.352	0.409
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 4	0mm	Ant 8	Sensor off	641666	3624.99	1	13.39	14.00	1.151	-0.04	0.378	0.435
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	Sensor off	633332	3499.98	1	16.27	17.00	1.183	0.03	0.035	0.041
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 3	Sensor off	633332	3499.98	1	16.25	17.00	1.189	0.18	0.034	0.040
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 3	0mm	Ant 3	Sensor off	633332	3499.98	1	16.27	17.00	1.183	0.02	0.230	0.272
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 3	0mm	Ant 3	Sensor off	633332	3499.98	1	16.25	17.00	1.189	0.16	0.216	0.257
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 4	0mm	Ant 3	Sensor off	633332	3499.98	1	16.27	17.00	1.183	-0.10	0.215	0.254
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 4	0mm	Ant 3	Sensor off	633332	3499.98	1	16.25	17.00	1.189	0.07	0.197	0.234
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	633332	3499.98	1	10.72	12.00	1.343	0.02	0.693	0.931
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	633332	3499.98	2	10.72	12.00	1.343	-0.04	0.651	0.874
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	633332	3499.98	1	10.79	12.00	1.321	-0.18	0.677	0.894
	FR1 n78	100M	BPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 6	Sensor on	633332	3499.98	1	10.67	12.00	1.358	0.03	0.653	0.887
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	22mm	Ant 6	Full Power	633332	3499.98	1	20.69	22.00	1.352	0.02	0.132	0.178
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 6	Sensor on	633332	3499.98	1	10.72	12.00	1.343	-0.15	0.176	0.236
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 6	Sensor on	633332	3499.98	1	10.79	12.00	1.321	-0.15	0.199	0.263
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	14mm	Ant 6	Full Power	633332	3499.98	1	20.69	22.00	1.352	0.06	0.072	0.097
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 6	Sensor on	633332	3499.98	1	10.72	12.00	1.343	0.11	0.029	0.039
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 6	Sensor on	633332	3499.98	1	10.79	12.00	1.321	-0.08	0.046	0.061
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	20mm	Ant 6	Full Power	633332	3499.98	1	20.69	22.00	1.352	0.01	0.045	0.061
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	633332	3499.98	1	7.77	9.50	1.489	-0.08	0.614	0.914
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	633332	3499.98	1	7.75	9.50	1.496	0.04	0.663	0.992

	FR1 n78	100M	BPSK	270	0	DFT-SCS-30KHz	Bottom Face	0mm	Ant 7	Sensor on	633332	3499.98	1	7.76	9.50	1.493	-0.13	0.533	0.796
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	22mm	Ant 7	Full Power	633332	3499.98	1	20.35	22.00	1.462	0.03	0.146	0.213
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	Sensor on	633332	3499.98	1	7.77	9.50	1.489	0.01	0.010	0.015
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 7	Sensor on	633332	3499.98	1	7.75	9.50	1.496	0.06	0.006	0.009
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	14mm	Ant 7	Full Power	633332	3499.98	1	20.35	22.00	1.462	0.02	0.071	0.104
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	0mm	Ant 7	Sensor on	633332	3499.98	1	7.77	9.50	1.489	-0.03	0.263	0.392
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 2	0mm	Ant 7	Sensor on	633332	3499.98	1	7.75	9.50	1.496	-0.03	0.295	0.441
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 2	20mm	Ant 7	Full Power	633332	3499.98	1	20.35	22.00	1.462	0.01	0.106	0.155
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Bottom Face	0mm	Ant 8	Sensor off	633332	3499.98	1	13.41	14.00	1.146	0.03	0.250	0.286
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Bottom Face	0mm	Ant 8	Sensor off	633332	3499.98	1	13.40	14.00	1.148	-0.16	0.333	0.382
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 1	0mm	Ant 8	Sensor off	633332	3499.98	1	13.41	14.00	1.146	-0.02	0.072	0.083
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 1	0mm	Ant 8	Sensor off	633332	3499.98	1	13.40	14.00	1.148	0.15	0.076	0.087
	FR1 n78	100M	BPSK	1	1	DFT-SCS-30KHz	Edge 4	0mm	Ant 8	Sensor off	633332	3499.98	1	13.41	14.00	1.146	-0.09	0.463	0.531
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 4	0mm	Ant 8	Sensor off	633332	3499.98	1	13.40	14.00	1.148	-0.06	0.497	0.571
	FR1 n78	100M	BPSK	135	69	DFT-SCS-30KHz	Edge 4	0mm	Ant 8	Sensor off	633332	3499.98	2	13.40	14.00	1.148	0.01	0.455	0.522

【WLAN 2.4GHz_5GHz SAR】

Plot No	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
06	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1	Sensor on	6	2437.0	1	12.20	13.00	1.202	100.0	1.000	0.02	0.616	0.740
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1	Sensor on	6	2437	2	12.20	13.00	1.202	100	1.000	0.09	0.534	0.642
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	20mm	Ant 1	Full power	1	2412	1	20.15	21.00	1.216	100	1.000	0.08	0.178	0.216
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0mm	Ant 1	Full power	1	2412	1	20.15	21.00	1.216	100	1.000	0.01	0.533	0.648
	WLAN2.4GHz	802.11b 1Mbps	Edge 4	0mm	Ant 1	Full power	1	2412	1	20.15	21.00	1.216	100	1.000	0.03	0.193	0.235
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1	Sensor on	58	5290.0	1	5.21	6.00	1.199	89.66	1.115	-0.04	0.594	0.794
07	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	20mm	Ant 1	Full power	54	5270.0	1	15.41	16.50	1.285	94.74	1.056	-0.08	0.809	1.098
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	20mm	Ant 1	Full power	54	5270	2	15.41	16.50	1.285	94.74	1.056	-0.11	0.756	1.026
	WLAN5.3GHz	802.11n-HT40 MCS0	Edge 1	0mm	Ant 1	Full power	54	5270.0	1	15.41	16.50	1.285	94.74	1.056	-0.17	0.498	0.676
	WLAN5.3GHz	802.11n-HT40 MCS0	Edge 4	0mm	Ant 1	Full power	54	5270.0	1	15.41	16.50	1.285	94.74	1.056	-0.03	0.466	0.632
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	20mm	Ant 1	Full power	62	5310.0	1	12.44	13.50	1.276	94.74	1.056	0.08	0.411	0.554
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1	Sensor on	138	5690.0	1	4.66	5.50	1.213	89.66	1.115	0.01	0.538	0.728
08	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	20mm	Ant 1	Full power	138	5690.0	1	15.64	16.50	1.219	89.66	1.115	0.01	0.765	1.040
	WLAN5.3GHz	802.11ac-VHT80 MCS0	Bottom Face	20mm	Ant 1	Full power	138	5690	2	15.64	16.50	1.219	89.66	1.115	0.04	0.711	0.966
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	20mm	Ant 1	Full power	122	5610.0	1	15.53	16.50	1.250	89.66	1.115	0.01	0.662	0.923
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 1	Full power	138	5690.0	1	15.64	16.50	1.219	89.66	1.115	0.14	0.521	0.708
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Edge 4	0mm	Ant 1	Full power	138	5690.0	1	15.64	16.50	1.219	89.66	1.115	0.17	0.011	0.015
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1	Sensor on	155	5775.0	1	5.49	6.50	1.262	89.66	1.115	0.06	0.564	0.794
09	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	20mm	Ant 1	Full power	155	5775.0	1	15.18	16.50	1.355	89.66	1.115	0.01	0.670	1.012
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	20mm	Ant 1	Full power	155	5775	2	15.18	16.50	1.355	89.66	1.115	-0.04	0.611	0.923
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Edge 1	0mm	Ant 1	Full power	155	5775.0	1	15.18	16.50	1.355	89.66	1.115	0.10	0.538	0.813
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Edge 4	0mm	Ant 1	Full power	155	5775.0	1	15.18	16.50	1.355	89.66	1.115	-0.17	0.159	0.240

【Bluetooth SAR】

Plot No	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-Up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	Full power	39	2441.0	1	12.20	13.00	1.202	76.75	1.085	-0.04	0.366	0.477
	Bluetooth	1Mbps	Edge 1	0mm	Ant 1	Full power	39	2441.0	1	12.20	13.00	1.202	76.75	1.085	0.12	0.057	0.074
	Bluetooth	1Mbps	Edge 4	0mm	Ant 1	Full power	39	2441.0	1	12.20	13.00	1.202	76.75	1.085	0.08	0.001	0.001

15.2 Repeated SAR Measurement

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	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	WLAN5.3GHz	-	-	-	-	802.11n-HT40 MCS0	Bottom Face	20mm	Ant 1	Full power	54	5270	15.41	16.50	1.285	94.74	1.056	-0.08	0.809	1	1.098
2nd	WLAN5.3GHz	-	-	-	-	802.11n-HT40 MCS0	Bottom Face	20mm	Ant 1	Full power	54	5270	15.41	16.50	1.285	94.74	1.056	0.02	0.801	1.010	1.087

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. Simultaneous Transmission Analysis

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

General Note:

1. EUT will choose each WCDMA, LTE and 5GNR according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. 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 though they have independent antenna.
3. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
4. According to the EUT characteristic, WLAN 5GHz and Bluetooth can't transmit simultaneously.
5. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
6. 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.
7. All licensed modes share the same antenna part and cannot transmit simultaneously.
8. The reported SAR summation is calculated based on the same configuration and test position.
9. For standalone WWAN, always choose the highest SAR among all WWAN bands within the selected antenna for each exposure position to perform simultaneous transmission analysis with WLAN/BT. This is the worst co-located analysis and can represent each band. If the co-located analysis within standalone SAR is higher SAR limit (1.6W/kg for 1g SAR), always choose the highest SAR among the selected WWAN bands within the selected antenna for each exposure position to perform simultaneous transmission analysis with WLAN/BT.
10. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
    i) 1g Scalar SAR summation 1.6W/kg and 10g Scalar SAR summation 4.0W/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 and SPLSR≤ 0.10 for 10g 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 16.2.

16.1 Body Exposure Conditions

WWAN Antenna	Exposure Position	1	3	4	5	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)	Case No
		WWAN1	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1	Bluetooth Ant 1				
		1g SAR	1g SAR	1g SAR	1g SAR				
WCDMA 5 Ant4	Edge 4	0.040	0.235	0.632	0.001	0.275	0.672	0.041	-
	Bottom Face	0.644	0.740	0.794	0.477	1.384	1.438	1.121	-
	Edge 1	0.616	0.648	0.813	0.074	1.264	1.429	0.690	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-
LTE Band 5 Ant4	Edge 4	0.061	0.235	0.632	0.001	0.296	0.693	0.062	-
	Bottom Face	0.729	0.740	0.794	0.477	1.469	1.523	1.206	-
	Edge 1	0.477	0.648	0.813	0.074	1.125	1.29	0.551	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-
LTE Band 41 Ant4	Edge 4	0.051	0.235	0.632	0.001	0.286	0.683	0.052	-
	Bottom Face	0.729	0.740	0.794	0.477	1.469	1.523	1.206	-
	Edge 1	0.387	0.648	0.813	0.074	1.035	1.2	0.461	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-
LTE Band 42 Ant3	Edge 4	0.306	0.235	0.632	0.001	0.541	0.938	0.307	-
	Bottom Face	0.053	0.740	0.794	0.477	0.793	0.847	0.530	-
	Edge 1	-	0.648	0.813	0.074	0.648	0.813	0.074	-
	Edge 3	0.353	-	-	-	0.353	0.353	0.353	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-
FR1 n78 Ant3	Edge 4	0.254	0.235	0.632	0.001	0.489	0.886	0.255	-
	Bottom Face	0.041	0.740	0.794	0.477	0.781	0.835	0.518	-
	Edge 1	-	0.648	0.813	0.074	0.648	0.813	0.074	-
	Edge 3	0.272	-	-	-	0.272	0.272	0.272	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-
FR1 n78 Ant6	Edge 4	-	0.235	0.632	0.001	0.235	0.632	0.001	-
	Bottom Face	0.931	0.740	0.794	0.477	**1.671**	**1.725**	1.408	**1&2**
	Edge 1	0.318	0.648	0.813	0.074	0.966	1.131	0.392	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	0.131	-	-	-	0.131	0.131	0.131	-
FR1 n78 Ant7	Edge 4	-	0.235	0.632	0.001	0.235	0.632	0.001	-
	Bottom Face	1.112	0.740	0.794	0.477	**1.852**	**1.906**	1.589	**3&4**
	Edge 1	0.017	0.648	0.813	0.074	0.665	0.83	0.091	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	0.494	-	-	-	0.494	0.494	0.494	-
FR1 n78 Ant8	Edge 4	0.571	0.235	0.632	0.001	0.806	1.203	0.572	-
	Bottom Face	0.382	0.740	0.794	0.477	1.122	1.176	0.859	-
	Edge 1	0.087	0.648	0.813	0.074	0.735	0.9	0.161	-
	Edge 3	-	-	-	-	0.000	0.000	0.000	-
	Edge 2	-	-	-	-	0.000	0.000	0.000	-

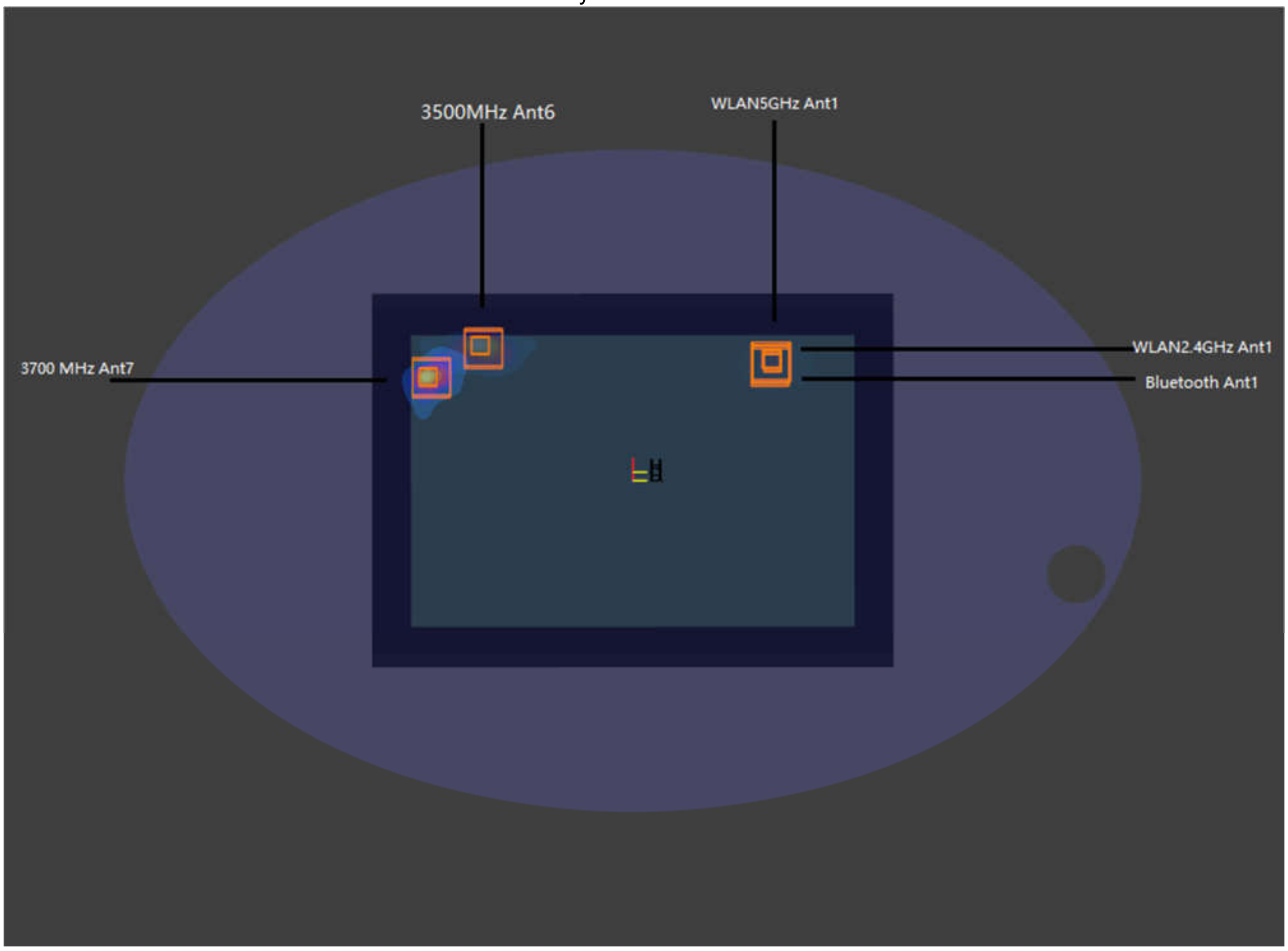
Sensor Off

WWAN Antenna	Exposure Position	1	3	4	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
		WWAN1	2.4GHz WLAN Ant 1	5GHz WLAN Ant 1		
		1g SAR	1g SAR	1g SAR		
WCDMA 5 Ant4	Bottom Face at 20mm	0.317	0.216	1.098	0.533	1.415
	Edge 1 at 23mm	0.281	-	-	0.281	0.281
	Bottom Face at 22mm	-	-	-	0.000	0.000
	Edge 1 at 14mm	-	-	-	0.000	0.000
	Edge 2 at 20mm	-	-	-	0.000	0.000
LTE Band 5 Ant4	Bottom Face at 20mm	0.471	0.216	1.098	0.687	1.569
	Edge 1 at 23mm	0.287	-	-	0.287	0.287
	Bottom Face at 22mm	-	-	-	0.000	0.000
	Edge 1 at 14mm	-	-	-	0.000	0.000
	Edge 2 at 20mm	-	-	-	0.000	0.000
LTE Band 41 Ant4	Bottom Face at 20mm	0.213	0.216	1.098	0.429	1.311
	Edge 1 at 23mm	0.126	-	-	0.126	0.126
	Bottom Face at 22mm	-	-	-	0.000	0.000
	Edge 1 at 14mm	-	-	-	0.000	0.000
	Edge 2 at 20mm	-	-	-	0.000	0.000
FR1 n78(96) Ant6	Bottom Face at 20mm	-	0.216	1.098	0.216	1.098
	Edge 1 at 23mm	-	-	-	0.000	0.000
	Bottom Face at 22mm	0.244	0.216	1.098	0.46	1.342
	Edge 1 at 14mm	0.125	-	-	0.125	0.125
	Edge 2 at 20mm	0.074	-	-	0.074	0.074
FR1 n78(96) Ant7	Bottom Face at 20mm	-	0.216	1.098	0.216	1.098
	Edge 1 at 23mm	-	-	-	0.000	0.000
	Bottom Face at 22mm	0.234	0.216	1.098	0.45	1.332
	Edge 1 at 14mm	0.077	-	-	0.076	0.076
	Edge 2 at 20mm	0.213	-	-	0.211	0.211
FR1 n78(27Q) Ant6	Bottom Face at 20mm	-	0.216	1.098	0.216	1.098
	Edge 1 at 23mm	-	-	-	0.000	0.000
	Bottom Face at 22mm	0.178	0.216	1.098	0.394	1.276
	Edge 1 at 14mm	0.097	-	-	0.097	0.097
	Edge 2 at 20mm	0.061	-	-	0.061	0.061
FR1 n78(27Q) Ant7	Bottom Face at 20mm	-	0.216	1.098	0.216	1.098
	Edge 1 at 23mm	-	-	-	0.000	0.000
	Bottom Face at 22mm	0.213	0.216	1.098	0.429	1.311
	Edge 1 at 14mm	0.104	-	-	0.100	0.100
	Edge 2 at 20mm	0.155	-	-	0.149	0.149

16.2 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.



WWAN+WLAN+BT Bottom Face 0mm

Case No	Band	Position	SAR 1g SAR (W/kg)	Gap (mm)	SAR peak location (mm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 1	FR1 n78 Ant 6	Bottom Face	0.931	0mm	-77.6	-86.6	-177	164.0	1.671	0.01	Not required
	WLAN2.4GHz Ant 1	Bottom Face	0.74	0mm	-67.9	77.1	-177				
Case No	Band	Position	SAR 1g SAR (W/kg)	Gap (mm)	SAR peak location (mm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 2	FR1 n78 Ant 6	Bottom Face	0.931	0mm	-77.6	-86.6	-177	167.7	1.725	0.01	Not required
	WLAN5GHz Ant 1	Bottom Face	0.794	0mm	-64.4	80.6	-177				
Case No	Band	Position	SAR 1g SAR (W/kg)	Gap (mm)	SAR peak location (mm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 3	FR1 n78 Ant 7	Bottom Face	1.112	0mm	-62	-116	-177	193.2	1.852	0.01	Not required
	WLAN2.4GHz Ant 1	Bottom Face	0.74	0mm	-67.9	77.1	-177				
Case No	Band	Position	SAR 1g SAR (W/kg)	Gap (mm)	SAR peak location (mm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 4	FR1 n78 Ant 7	Bottom Face	1.112	0mm	-62	-116	-177	196.6	1.906	0.01	Not required
	WLAN5GHz Ant 1	Bottom Face	0.794	0mm	-64.4	80.6	-177				

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17. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 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 and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

18. References

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

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

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

[4] SPEAG DASY System Handbook

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

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

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

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

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

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

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

Appendixes

Please refer to separated files for the following appendixes

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

------THE END------