On your side

TEST REPORT

FCC SAR Test for certification of A3LSMT727U

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-SR-1906-FC003-R3

DATE OF ISSUE
Jul. 11, 2019

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 F ax. +82 31 645 6401

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401

TEST REPORT

FCC SAR Test for certification

REPORT NO.
HCT-SR-1906-FC003-R3

DATE OF ISSUE
Jul. 11, 2019

Applicant	SAMSUNG Electronics Co., Ltd 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea
Equipment Type	Tablet
Model Name	SM-T727U
Additional Model Name	SM-T727P
FCC ID	A3LSMT727U
Date of Test	Jun 17, 2019 ~ Jul. 10, 2019
FCC Rule Part(s)	CFR §2.1093

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The result shown in this test report refer only to the sample(s) tested unless

Tested by
In Ho Park

Technical Manager
Yun Jeang Heo

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Jun. 26, 2019	Initial Release
1	Jun. 28, 2019	Revised Sec 4.3. page 7, 19, 20, 27, 114, 117, 119, 128, 129, 133
2	Jul. 04, 2019	Revised LTE Up CA, DC-HSDPA notes and SAR results of LTE B71.
3	Jul. 11, 2019	Revised LTE B12 and B26 SAR results and Page 128, 131

CONTENTS

1. Test Regulations 5
2. Test Location 6
3. Information of the EUT 6
4. Device Under Test Description 8
5. Introduction 29
6. Description of test equipment 30
7. SAR Measurement Procedure 31
8. Description of Test Position 33
9. RF Exposure Limits 34
10. FCC SAR General Measurement Procedures 35
11. Output Power Specifications 40
12. System Verification 118
13. SAR Test Data Summary 120
14. Simultaneous SAR Analysis 132
15. SAR Measurement Variability and Uncertainty 142
16. Device Holder Perturbation Verification. 143
17. Measurement Uncertainty 144
18. SAR Test Equipment 146
19. Conclusion 148
20. References 149
Attachment 1. – SAR Test Plots 151
Attachment 2. – Dipole Verification Plots 159
Attachment 3. – SAR Tissue Characterization 172
Attachment 4. – SAR System Validation 173
Attachment 5. – Probe Calibration Data
Attachment 6. – Dipole Calibration Data

1. Test Regulations

The tests were performed according to the following regulations:

Test Standard	IEEE Standard 1528-2013 & KDB procedures
Test Method	- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01 - FCC KDB Publication 941225 D05 SAR for LTE Devices v02r05 - FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r02 -- FCC KDB Publication 447498 D01 General SAR Guidance v06 - FCC KDB Publication 616217 D04 SAR Tablet v01r02 - FCC KDB Publication 865664 D01 SAR measurement 100 ㎒ to 6 GHz v01r04 - FCC KDB Publication 865664 D02 SAR Reporting v01r02 - April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified) - May 2017 TCBC Workshop Notes(LTE Band 41 Power Class 2) - Fall 2017 TCBC Workshop Notes(LTE Carrier Aggregation)

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Telephone	031-645-6300
Fax.	031-645-6401

3. Information of the EUT

3.1 General Information of the EUT

Model Name	SM-T727U
Additional Model Name	SM-T727P
Equipment Type	Tablet
FCC ID	A3LSMT727U
Applicant	SAMSUNG Electronics Co., Ltd.

3.2 Attestation of test result of device under test

Band	Tx. Frequency	Equipment Class	SAR (W/kg)
			Reported 1g Body SAR
UMTS 1700	1 712.4 ~ 1 752.6	PCB	0.77
LTE Band 12	699.7 ~ 715.3	PCB	0.43
LTE Band 14	790.5 ~ 795.5	PCB	0.70
LTE Band 17	706.5 ~ 713.5	PCB	0.28
LTE Band 25	1 850.7 ~ 1 914.3	PCB	0.78
LTE Band 26	814.7 ~ 848.3	PCB	0.64
LTE Band 30	2307.5 ~ 2312.5	PCB	1.33
LTE Band 41	2 498.5 ~ 2 687.5	PCB	1.33
LTE Band 71	665.5 ~ 695.5	PCB	0.53
Simultaneous SAR per KDB 690783 D01v01r03			1.53
Date(s) of Tests:	Jun 17, 2019 ~ Jul. 10, 2019		

This report covers the models SM-T727U and SM-T727P. These models are identical in hardware and the only difference is that the model SM-T727P does not support operations in all frequency bands and the some bands are disabled by software.

SM- T727U model has same Hardware with SM- T727V (Report No: HCT-SR-1905-FC002-R5) and enabled some Bands (WCDMA1700, LTE B1, B8, B9, B12, B14, B17, B25, B26, B30, B41, B71) and support DC-HSDPA.
-LTE B41 UL CA and HPUE.
SM-T727P model has same Hardware with SM-T727U and disabled some bands (WCDMA850/1700/1900, LTE B13, B14, B17 and B30).

4. Device Under Test Description

4.1 DUT specification

Device Wireless specification overview		
Band & Mode	Operating Mode	Tx Frequency
UMTS 850	Data	826.4 ~ 846.6 ㎒
UMTS 1700	Data	1 712.4 ~ 1 752.6 ㎒
UMTS 1900	Data	1 852.4 ~ 1 907.6 ㎒
LTE Band 2 (PCS)	Data	1 850.7 ~ 1 909.3 ㎒
LTE Band 4 (AWS)	Data	1 710.7 ~ 1 754.3 ㎒
LTE Band 5 (Cell)	Data	824.7 ~ 848.3 ㎒
LTE Band 7	Data	2 502.5 ~ 2 567.5 ㎒
LTE Band 12	Data	699.7 ~ 715.3 ㎒
LTE Band 13	Data	779.5 ~ 784.5 ㎒
LTE Band 14	Data	790.5 ~ 795.5 ㎒
LTE Band 17	Data	706.5 ~ 713.5 ㎒
LTE Band 25	Data	1 850.7 ~ 1 914.3 ㎒
LTE Band 26	Data	814.7 ~ 848.3 ㎒
LTE Band 30	Data	2 307.5 ~ 2312.5 ㎒
LTE Band 41	Data	2 498.5 ~ 2 687.5 ㎒
LTE Band 66 (AWS)	Data	1 712.5 ~ 1 777.5 ㎒
LTE Band 71	Data	665.5 ~ 695.5 ㎒
2.4 GHz WLAN	Data	2 412 ~ 2 462 ㎒
U-NII-1	Data	5 180 ~ 5 240 ㎒
U-NII-2A	Data	5 260 ~ 5 320 ㎒
U-NII-2C	Data	5 500 ~ 5 720 ㎒
U-NII-3	Data	5 745 ~ 5 825 ㎒
Bluetooth / LE 5.0	Data	2 402 ~ 2 480 ㎒
ANT+	Data	2 402 ~ 2 480 ㎒

Device Description		
Device Dimension	Overall (Length x Width): 245 mm x 160 mm Overall Diagonal: 286 mm Display Diagonal: 268 mm	
Battery Options:	Standard (Li-ion Polymer Battery)	
	Battery Model Name: EB-BT725ABU	
Device Serial Numbers:	Mode	Serial Number
	LTE 14, LTE 17	SE81662M
	UMTS1700, LTE 25, LTE 30, LTE 41, LTE 71	SE81663M
	LTE 12, LTE 26	SMT727VZSA
	The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.	

4.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under some conditions when the device is being used in close proximity to the user's hand. FCC KDB Publication 616217 D04v01r02 Sec.6 was used as a guideline for selection SAR test distances for device when being used in phablet use conditions.

The reduced powers for the power reduction mechanisms were conformed via conducted power measurements at the RF Port .

4.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB publication 447498 D01v06.

4.3.1 Maximum Output Power

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 ㎒)	Maximum	25.0	24.0	24.0	24.0
	Nominal	24.0	23.0	23.0	23.0
UMTS Band 4 (1700 ㎒)	Maximum	25.0	24.0	24.0	24.0
	Nominal	24.0	23.0	23.0	23.0
UMTS Band 2 (1900 ㎒)	Maximum	25.0	24.0	24.0	24.0
	Nominal	24.0	23.0	23.0	23.0

Mode / Band		Modulated Average (dBm)
LTE Band 2 (PCS)	Maximum	25.5
	Nominal	24.5
LTE Band 4 (AWS)	Maximum	25.5
	Nominal	24.5
LTE Band 5 (Cell)	Maximum	25.0
	Nominal	24.0
LTE Band 7	Maximum	24.0
	Nominal	23.0
LTE Band 12	Maximum	25.0
	Nominal	24.0
LTE Band 13	Maximum	25.0
	Nominal	24.0
LTE Band 14	Maximum	25.0
	Nominal	24.0
LTE Band 17	Maximum	25.0
	Nominal	24.0
LTE Band 25	Maximum	25.0
	Nominal	24.0

Mode / Band		Modulated Average (dBm)
LTE Band 26	Maximum	25.0
	Nominal	24.0
LTE Band 30	Maximum	23.0
	Nominal	22.0
LTE Band 41	Maximum	25.5
	Nominal	24.5
LTE Band 41 (HPUE)	Maximum	26.8
	Nominal	25.8
LTE Band 66 (AWS)	Maximum	25.5
	Nominal	24.5
LTE Band 71	Maximum	25.0
	Nominal	24.0

4.3.2 Reduced Main Output Power

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 ㎒)	Maximum	18.0	18.0	18.0	18.0
	Nominal	17.0	17.0	17.0	17.0
UMTS Band 4 (1700 ㎒)	Maximum	14.0	14.0	14.0	14.0
	Nominal	13.0	13.0	13.0	13.0
UMTS Band 2 (1900 ㎒)	Maximum	14.0	14.0	14.0	14.0
	Nominal	13.0	13.0	13.0	13.0

Mode / Band		Modulated Average (dBm)
LTE Band 2 (PCS)	Maximum	13.5
	Nominal	12.5
LTE Band 4 (AWS)	Maximum	13.5
	Nominal	12.5
LTE Band 5 (Cell)	Maximum	18.0
	Nominal	17.0
LTE Band 7	Maximum	14.5
	Nominal	13.5
LTE Band 12	Maximum	17.5
	Nominal	16.5
LTE Band 13	Maximum	18.5
	Nominal	17.5
LTE Band 14	Maximum	16.0
	Nominal	15.0
LTE Band 17	Maximum	17.0
	Nominal	16.0
LTE Band 25	Maximum	13.5
	Nominal	12.5
LTE Band 26	Maximum	17.5
	Nominal	16.5
LTE Band 30	Maximum	14.5
	Nominal	13.5
LTE Band 41	Maximum	15.0
	Nominal	14.0
LTE Band 41 (HUPE)	Maximum	15.0
	Nominal	14.0
LTE Band 66	Maximum	14.0
	Nominal	13.0
LTE Band 71	Maximum	15.0
	Nominal	14.0

4.3.3 Maximum WLAN/ Bluetooth Power

Mode / Band			Modulated Average (dBm)		
Mode	Channel		802.11b	802.11g	802.11n
2.4 GHz WIFI (Inactive)	Ch.1	Maximum	20	20	19
		Nominal	19	19	18
	Ch.2~ Ch.11	Maximum	20	20	20
		Nominal	19	19	19

Mode / Band			Modulated Average (dBm)		
Mode	Channel		802.11b	802.11g	802.11n
2.4 GHz WIFI (Active)	Ch.1~11	Maximum	13	13	13
		Nominal	12	12	12

Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	10.0
	Nominal	9.0
Bluetooth LE	Maximum	7.0
	Nominal	6.0

Mode / Band			Modulated Average (dBm)				
Mode			11a	11b	11g	11n	11ac
5 GHz WIFI (20 ㎒) (Inactive)	(U-NII-1) 5180 ㎒~5240 ㎒	Maximum	18	N/A	N/A	18	18
		Nominal	17	N/A	N/A	17	17
	(U-NII-2A) 5260 ㎒	Maximum	19	N/A	N/A	18	18
		Nominal	18	N/A	N/A	17	17
	(U-NII-2A) 5280 ㎒~5320 ㎒	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
	(U-NII-2C) 5500 ㎒~5720 ㎒	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
	(U-NII-3) 5745 ㎒~5825 ㎒	Maximum	19	N/A	N/A	19	18
		Nominal	18	N/A	N/A	18	17
5 GHz WIFI (40 ㎒) (Inactive)	(U-NII-1) 5190 ㎒	Maximum	N/A	N/A	N/A	17.5	17.5
		Nominal	N/A	N/A	N/A	16.5	16.5
	(U-NII-1) 5230 ㎒	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-2A) 5270 ㎒~5310 ㎒	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-2C) 5510 ㎒~5710 ㎒	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
	(U-NII-3) 5755 ㎒~5795 ㎒	Maximum	N/A	N/A	N/A	18	18
		Nominal	N/A	N/A	N/A	17	17
5 GHz WIFI (80 ㎒) (Inactive)	(U-NII-1) 5210 ㎒	Maximum	N/A	N/A	N/A	N/A	17
		Nominal	N/A	N/A	N/A	N/A	16
	(U-NII-2A) 5290 ㎒	Maximum	N/A	N/A	N/A	N/A	15.5
		Nominal	N/A	N/A	N/A	N/A	14.5
	(U-NII-2C) 5530 ㎒~5690 ㎒	Maximum	N/A	N/A	N/A	N/A	18
		Nominal	N/A	N/A	N/A	N/A	17
	(U-NII-3) 5775 ㎒	Maximum	N/A	N/A	N/A	N/A	18
		Nominal	N/A	N/A	N/A	N/A	17

Mode / Band			Modulated Average (dBm)				
Mode			11a	11b	11g	11n	11ac
5 GHz WIFI (20 ㎒) (Active)	(U-NII-1) 5200 ㎒	Maximum	9.5	N/A	N/A	9.5	9.5
		Nominal	8.5	N/A	N/A	8.5	8.5
	(U-NII-2A) 5300 ㎒	Maximum	9.5	N/A	N/A	9.5	9.5
		Nominal	8.5	N/A	N/A	8.5	8.5
	(U-NII-2C) 5500 ㎒	Maximum	9.5	N/A	N/A	9.5	9.5
		Nominal	8.5	N/A	N/A	8.5	8.5
	(U-NII-3) 5800 ㎒	Maximum	9.5	N/A	N/A	9.5	9.5
		Nominal	8.5	N/A	N/A	8.5	8.5
5 GHz WIFI (40 ㎒) (Active)	(U-NII-1) 5200 ㎒	Maximum	N/A	N/A	N/A	9.5	9.5
		Nominal	N/A	N/A	N/A	8.5	8.5
	(U-NII-2A) 5300 ㎒	Maximum	N/A	N/A	N/A	9.5	9.5
		Nominal	N/A	N/A	N/A	8.5	8.5
	(U-NII-2C) 5500 ㎒	Maximum	N/A	N/A	N/A	9.5	9.5
		Nominal	N/A	N/A	N/A	8.5	8.5
	(U-NII-3) 5800 ㎒	Maximum	N/A	N/A	N/A	9.5	9.5
		Nominal	N/A	N/A	N/A	8.5	8.5
5 GHz WIFI (80 ㎒) (Active)	(U-NII-1) 5200 ㎒	Maximum	N/A	N/A	N/A	N/A	9.5
		Nominal	N/A	N/A	N/A	N/A	8.5
	(U-NII-2A) 5300 ㎒	Maximum	N/A	N/A	N/A	N/A	9.5
		Nominal	N/A	N/A	N/A	N/A	8.5
	(U-NII-2C) 5500 ㎒	Maximum	N/A	N/A	N/A	N/A	9.5
		Nominal	N/A	N/A	N/A	N/A	8.5
	(U-NII-3) 5800 ㎒	Maximum	N/A	N/A	N/A	N/A	9.5
		Nominal	N/A	N/A	N/A	N/A	8.5

4.4 LTE Information

Item.		Description
Frequency Range	LTE Band 2 (PCS)	1 850.7 ㎒ ~ 1 909.3 ㎒
	LTE Band 4 (AWS)	1 710.7 ㎒ ~ 1 754.3 ㎒
	LTE Band 5 (Cell)	824.7 ㎒ – 848.3 ㎒
	LTE Band 12	699.7 ㎒~ 715.3 ㎒
	LTE Band 13	779.5 ㎒ ~ 784.5 ㎒
	LTE Band 14	790.5 ㎒ ~ 795.5 ㎒
	LTE Band 17	706.5 ㎒ ~ 713.5 ㎒
	LTE Band 25	1850.7 ㎒ ~ 1914.3 ㎒
	LTE Band 26	814.7 ㎒ ~ 848.3 ㎒
	LTE Band 30	2307.5 ㎒ ~ 2312.5 ㎒
	LTE TDD Band 41	2 498.5 ㎒ ~ 2 687.5 ㎒
	LTE Band 66 (AWS)	1 710.7 ㎒ ~ 1 779.3 ㎒
	LTE Band 71	665.5 ㎒ ~ 695.5 ㎒
Channel Bandwidths	LTE Band 2 (PCS)	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
	LTE Band 4 (AWS)	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
	LTE Band 5 (Cell)	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒
	LTE Band 12	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒
	LTE Band 13	5 ㎒, 10 ㎒
	LTE Band 14	5 ㎒, 10 ㎒
	LTE Band 17	5 ㎒, 10 ㎒
	LTE Band 25	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
	LTE Band 26	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒, 15 ㎒
	LTE Band 30	5 ㎒, 10 ㎒
	LTE TDD Band 41	5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
	LTE Band 66 (AWS)	1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
	LTE Band 71	5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒

Ch. No.& Freq.(MHz)		Low	Mid	High
LTE Band 2	1.4 MHz	1 850.7 (18607)	1 880.0 (18900)	1 909.3 (19193)
	3 MHz	1 851.5 (18615)	1 880.0 (18900)	1 908.5 (19185)
	5 MHz	1 852.5 (18625)	1 880.0 (18900)	1 907.5 (19175)
	10 MHz	1 855.0 (18650)	1 880.0 (18900)	1 905.0 (19150)
	15 MHz	1 857.5 (18675)	1 880.0 (18900)	1 902.5 (19125)
	20 MHz	1 860.0 (18700)	1 880.0 (18900)	1 900.0 (19100)
LTE Band 4	1.4 MHz	1 710.7 (19957)	1 732.5 (20175)	1 754.3 (20393)
	3 MHz	1 711.5 (19965)	1 732.5 (20175)	1 753.5 (20385)
	5 MHz	1 712.5 (19975)	1 732.5 (20175)	1 752.5 (20375)
	10 MHz	1 715.0 (20000)	1 732.5 (20175)	1 750.0 (20350)
	15 MHz	1 717.5 (20025)	1 732.5 (20175)	1 747.5 (20325)
	20 MHz	1 720.0 (20050)	1 732.5 (20175)	1 745.0 (20300)
LTE Band 5	1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
	3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
	5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
	10 MHz	829.0 (20450)	836.5 (20525)	844.0 (20600)
LTE Band 12	1.4 MHz	699.7 (23017)	707.5 (23095)	715.3 (23173)
	3 MHz	700.5 (23025)	707.5 (23095)	714.5 (23165)
	5 MHz	701.5 (23035)	707.5 (23095)	713.5 (23155)
	10 MHz	704.0 (23060)	707.5 (23095)	711.0 (23130)
LTE Band 13	5 MHz	779.5 (23205)	782 (23230)	784.5 (23255)
	10 MHz		782 (23230)	
LTE Band 14	5 MHz	790.5 (23305	793 (23330)	795.5 23355
	10 MHz		793 (23330	
LTE Band 17	5 MHz	706.5 (23755)	710 (23790)	713.5 (23825)
	10 MHz	709.0 (23780)	710 (23790)	711.0 (23800)
LTE Band 25	1.4 MHz	1850.7 (26047)	1882.5 (26365)	1914.3 (26683)
	3 MHz	1851.5 (26055)	1882.5 (26365)	1913.5 (26675)
	5 MHz	1852.5 (26065)	1882.5 (26365)	1912.5 (26665)
	10 MHz	1855 (26090)	1882.5 (26365)	1910 (26640)
	15 MHz	1857.5 (26115)	1882.5 (26365)	1907.5 (26615)
	20 MHz	1860 (26140)	1882.5 (26365)	1905 (26590)

Ch. No.& Freq.(MHz)		Low		Mid		High	
LTE Band 26	1.4 MHz	814.7 (26697)		831.5 (26865)		848.3 (27033)	
	3 MHz	815.5 (26705)		831.5 (26865)		847.5 (27025)	
	5 MHz	816.5 (26715)		831.5 (26865)		846.5 (27015)	
	10 MHz	819.0 (26740)		831.5 (26865)		844.0 (26990)	
	15 MHz	821.5 (26765)		831.5 (26865)		841.5 (26965)	
LTE Band 30	5 MHz	2307.5 (27685)		2310 (27710)		2312.5 (27735)	
	10 MHz			2310 (27710)			
LTE Band 66 (AWS)	1.4 MHz	1 710.7 (131979)		1 745 (132322)		1 779.3 (132665)	
	3 MHz	1 711.5 (131987)		1 745 (132322)		1 778.5 (132657)	
	5 MHz	1 712.5 (131997)		1 745 (132322)		1 777.5 (132647)	
	10 MHz	1 715.0 (132022)		1 745 (132322)		1 775.0 (132622)	
	15 MHz	1 717.5 (132047)		1 745 (132322)		1 772.5 (132597)	
	20 MHz	1 720.0 (132072)		1 745 (132322)		1 770.0 (132572)	
LTE Band 71	5 MHz	665.5 (133147)		680.5(133297)		695.5 (133447)	
	10 MHz	668 (133172)		680.5 (133297)		693 (133422)	
	15 MHz	670.5(133197)		680.5 (133297)		690.5 (133397)	
	20 MHz	673 (133222)		680.5 (133297)		688 (133372)	
LTE TDD Band 41	5 MHz	2498.5(39675)	2545.8(40148)	2593.0(40620)	2640.3(41093)	2687.5(41565)	
	10 MHz	2501.0(39700)	2547.0(40160)	2593.0(40620)	2639.0(41080)	2685.0(41540)	
	15 MHz	2503.5(39725)	2548.3(41073)	2593.0(40620)	2637.8(41068)	2682.5(41515)	
	20 MHz	2506.0(39750)	2549.5(40185)	2593.0(40620)	2636.5(41055)	2680.0(41490)	

Item.	Description	
HPUE Power Class	TDD 41 Power Class 3 :(Duty: 63.3%) Power Class 2 : (Duty:43.3%) (See 10.2.6)	
UE Category	LTE Rel. 12, DL: Category 11, UL: Category 5	
Modulations Supported in UL	QPSK, 16QAM, 64QAM	
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3	Yes	
A-MPR disabled for SAR Testing.	Yes	
LTE Carrier Aggregation	Down-Link CA	This device supports DL-link Intra-band and Inter-band Carrier aggregations
		Reversible: 2A-2A, 2A-4A, 2A-5A, 2A-12A, 2A-13A, 2A-30A, 2A-66A, 2A-71A, 4A-4A, 4A-5A, 4A-12A, 4A-13A, 4A-71A, 5B, 5A-30A, 5A-66A, 12A-30A,12A-66A, 12B, 13A-66A, 25A-25A, 25A-26A, 30A-66A, 41A-41A, 41C, 66A-66A, 66B, 66C Not Reversible 25A-41A, 26A-41A (B41 SCC only)
		Reversible: 2A-2A-5A, 2A-2A-12A, 2A-2A-13A, 2A-2A-30A, 2A-2A-66A, 2A-4A-4A, 2A-4A-5A, 2A-4A-12A, 2A-4A-13A, 2A-4A-71A, 2A-5A-30A, 2A-5A-66A, 2A-5B, 2A-12A-30A, 2A-12A-66A, 2A-13A-66A, 2A-30A-66A, 2A-66A-66A, 2A-12B, 2A-66B, 2A-66C, 4A-4A-5A, 4A-4A-12A, 4A-4A-13A, 5A-30A-66A, 5A-66A-66A, 5B-30A, 5A-66B, 5A-66C, 5B-66A, 12A-66A-66A, 13A-66A-66A, 13A-66B, 13A-66C, 25A-25A-26A, 30A-66A-66A, 41A-41C, 41D, 66A-66C Not Reversible:: 4A-12B (B12B SCC only)) 12A-30A-66A(B12A SCC only) 25A-41C, 26A-41C(B41 SCC only)
	Up-Link CA	41C (Power Class 3 only)
LTE Release 10 information	This device does not support full CA features on 3GPP Release 10. The following LTE Release 10 features are not supported. Relay, HetNet, Enhanced MIMO, eICI, WiFi offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.	

4.5 SAR Test Configurations

Since the Dedicated Host Approach is applied, the standalone SAR test exclusion procedure in KDB447498 4.3.1 is applied in conjunction with KDB 616217 4.3 to determine the minimum test separation distance:

When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the separation distance from the antenna to an adjacent edge is > 5 mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion

Maximum Power Condition: Sensor Inactive

Ant.	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					SAR Test Exclusion Thresholds (test separation distances <50mm threshold value <3					SAR Test Exclusion Thresholds (test separation distances >50mm Power (mW)				
			(dBm)	(mW)	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
Main	WCDMA B4	1752.6	25	316.23	0	0	46	0	234	83.73	83.73	9.10	83.73	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1953.31
Main	LTE B12	715.30	25	316.23	0	0	46	0	234	53.49	53.49	5.81	53.49	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1054.79
Main	LTE B17	713.50	25	316.23	0	0	46	0	234	53.42	53.42	5.81	53.42	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1052.81
Main	LTE B14	795.50	25	316.23	0	0	46	0	234	56.41	56.41	6.13	56.41	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1143.99
Main	LTE B25	1914.3	25	316.23	0	0	46	0	234	87.51	87.51	9.51	87.51	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1948.41
Main	LTE B26	848.3	25	316.23	0	0	46	0	234	58.25	58.25	6.33	58.25	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1203.44
Main	LTE B30	2312.5	23	199.53	0	0	46	0	234	60.68	60.68	6.60	60.68	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1938.64
Main	LTE B41 PC3	2687.5	25.5	354.81	0	0	46	0	234	116.33	116.33	12.64	116.33	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1931.50
Main	LTE B41 PC2	2687.5	26.8	478.63	0	0	46	0	234	156.93	156.93	17.06	156.93	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1931.50
Main	LTE B 71	695.5	25.0	316.23	0	0	46	0	234	52.74	52.74	5.73	52.74	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1033.01

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					Device Configurations for SAR Testing				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
Main	WCDMA B4	1752.6	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B12	715.3	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B17	713.5	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B14	795.5	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B25	1914.3	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B26	848.3	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B30	2312.5	23.0	199.53	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B41 PC3	2687.5	25.5	354.81	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B41 PC2	2687.5	26.8	478.63	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No
Main	LTE B71	695.5	25.0	316.23	0	0	46.00	0	234.00	Yes	Yes	Yes	Yes	No

Reduction Power Condition: Sensor Active

(Proximity sensor power reduction is not applied to the main band on the left side and Bottom of the DUT.)

Ant.	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					SAR Test Exclusion Thresholds (test separation distances <50mm threshold value <3					SAR Test Exclusion Thresholds (test separation distances >50mm Power (mW)				
			(dBm)	(mW)	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
Main	WCDMA B4	1752.60	14	25.12	0	0	46	0	234	6.65	6.65	N/A	6.65	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1953.31
Main	LTE B12	715.30	17.5	56.23	0	0	46	0	234	9.51	9.51	N/A	9.51	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1054.79
Main	LTE B17	713.50	17	50.12	0	0	46	0	234	8.47	8.47	N/A	8.47	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1052.81
Main	LTE B14	795.50	16	39.81	0	0	46	0	234	7.10	7.10	N/A	7.10	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1143.99
Main	LTE B25	1914.30	13.5	22.39	0	0	46	0	234	6.19	6.19	N/A	6.19	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1948.41
Main	LTE B26	848.30	17.5	56.23	0	0	46	0	234	10.36	10.36	N/A	10.36	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1203.44
Main	LTE B30	2312.50	14.5	28.18	0	0	46	0	234	8.57	8.57	N/A	8.57	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1938.64
Main	LTE B41 PC3	2687.50	15	31.62	0	0	46	0	234	10.37	10.37	N/A	10.37	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1931.50
Main	LTE B41 PC2	2687.50	15	31.62	0	0	46	0	234	10.37	10.37	N/A	10.37	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1931.50
Main	LTE B71	695.50	15	31.62	0	0	46	0	234	5.27	5.27	N/A	5.27	distances > 50 mm	distances <50 mm	distances <50 mm	distances <50 mm	distances <50 mm	1033.01

Antenna	Band	Freq. [MHz]	Max. Power		Separation Distances (mm)					Device Configurations for SAR Testing				
			dBm	mW	Rear	Top	Left	Right	Bottom	Rear	Top	Left	Right	Bottom
Main	WCDMA B4	1752.6	14	25.12	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B12	715.3	17.5	56.23	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B17	713.5	17	50.12	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B14	795.5	16	39.81	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B25	1914.3	13.5	22.39	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B26	848.3	17.5	56.23	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B30	2312.5	14.5	28.18	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B41 PC3	2687.5	15	31.62	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B41 PC2	2687.5	15	31.62	0	0	46	0	234	Yes	Yes	No	Yes	No
Main	LTE B71	695.5	15	31.62	0	0	46	0	234	Yes	Yes	No	Yes	No

Antennas <50mm to adjacent edges: According to KDB 447498 D01v06, if the calculated threshold value >3 then SAR test is required.
Antennas >50mm to adjacent edges: According to KDB 447498 D01v06, if the power threshold is less than the output power, SAR is required.
Per FCC KDB 447498 D01v06, The SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1\text{g SAR}), 7.5(10\text{g SAR})$$

Antennas >50mm to adjacent edges: According to KDB 447498 D01v06, if the power threshold is less than the output power ,SAR is required.

Per KDB 447498 D01v06 Sec 4.3.1 b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B)
1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

Additional Test Scenarios

Test Configurations	SAR Required	Note
Right Corner	Yes	Main Band : WCDMA B4 LTE B12, B14, B17, B25, B26, B30, B41, B71

Note; All test configurations are based on front view.
Per FCC KDB Publication 616217 D04v01r02, the rear surface and edges of 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 closet 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.

4.6 SAR Summation Scenario

According to FCC KDB 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown below paths and are mode in same rectangle to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Simultaneous transmission paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB 447498 D01v06.

Simultaneous Transmission Scenarios	
Applicable Combination	Body
UMTS + 2.4 GHz WiFi Antenna	Yes
UMTS + 5 GHz WiFi Antenna	Yes
UMTS + 2.4 GHz Bluetooth	Yes
LTE + 2.4 GHz WiFi Antenna	Yes
LTE + 5 GHz WiFi Antenna	Yes
LTE + 2.4 GHz Bluetooth	Yes

4.7 SAR Test Considerations

4.7.1 WiFi

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg for 1g SAR and is less than 3.0 W/kg for 10g SAR, SAR is not required for U-NII-1 band according to FCC KDB 248227D01v02r02.

This device supports IEEE 802.11 ac with the following features:

a) Up to 80 ㎒ Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) TDWR channels are supported.
f) Straddle channels are supported

4.7.2 Bluetooth LE

Per FCC KDB 447498 D01v06, The SAR exclusion threshold for distance < 50mm is defined by the following equation:

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1g\ \ SAR), 7.5(10g\ \ SAR)$$

Mode		Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0
		[㎒]	[mW]	[mm]	1-g SAR
Bluetooth LE	Body SAR	2 480	5.0	5	1.6

Based on the maximum conducted power of Bluetooth LE and antenna to use separation distance, Bluetooth LE SAR was not required [(5/5)*√2.480] = 1.6≤3.0 for 1-g SAR.

The Reported SAR for WLAN and Bluetooth
The Reported SAR = The Measured SAR *-$\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$ * Duty factor

4.7.3 Licensed Transmitter(s)

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r05.

This device supports LTE Carrier Aggregation(CA) in Uplink for LTE 41 with two component carriers in the uplink. SAR measurements and conducted powers were evaluated per Fall 2017 TCBC Workshop notes (LTE Carrier aggregation).
Because the maximum output for UL CA of LTE 41 is ≤ standalone LTE mode (without CA),
SAR for LTE B41 Up link CA was performed at the highest standalone SAR configuration without CA and also UL CA SAR is not required for all required test channels, Because the reported SAR for UL CA configuration is > 1.2 W/kg, .

This device supports LTE Carrier Aggregation (CA) in the downlink Per FCC KDB publication 941225 D05A v01r02, SAR for LTE DL CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

Per FCC KDB 941225 D01v03r01, 12.2 kbps RMC is the primary mode and HSPA (HSUPA/HSDPA with RMC) is the secondary mode.

Per FCC KDB 941225 D01v03r01, The SAR test exclusion is applied to the secondary mode by the following equation.

$$Adjusted\ \ SAR = Highest\ \ Reported\ \ SAR * \frac{Secondary\ \ Max\ \ tune-up\ \ (mW)}{Primary\ \ Max\ \ tune\ \ tune-up(mW)} \leq 1.2\ \ \mathrm{W/kg}.$$

Based on the highest Reported SAR, the secondary mode is not required.

Per FCC KDB 690783 1 D01 SAR Listings on Grants v01r03 and KDB 447498 D01 General RF Exposure Guidance v06 The SAR numbers listed must be consistent with the highest reported test results required by the published RF exposure KDB procedures. When the measured SAR is not at the maximum tune-up tolerance limit or maximum output power allowed for production units, the measured results are scaled to the maximum conditions to determine compliance; the scaled results are referred to as the reported SAR.

The Reported SAR = The Measured SAR *-$\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$

FCC KDB 447498 D01v06 General RF Exposure Guidance introduces a new formula for calculating the SAR a Peak Location Separation Ratio(SPLSR) between pairs of simultaneously transmitting antennas:

$SPLSR_i = (SAR_1 + SAR_2)^{1.5}/R_i$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured of estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri_i is the separation distance between the pair of simultaneous transmitting antennas, When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(X_1 - X_2)^2 + (Y_1 - Y_2)^2 + (Z_1 - Z_2)^2]$

In order for a pair of simultaneous transmitting antennas with the sum 1-g of SAR> 1.6 W/kg and with the sum 10-g of SAR >4W/Kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04$ for 1g SAR and $(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.1$ for 10g SAR.

5. Introduction

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right)$$

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma E^2 / \rho$$

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/m³)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

6. Description of test equipment

6.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY4 & DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

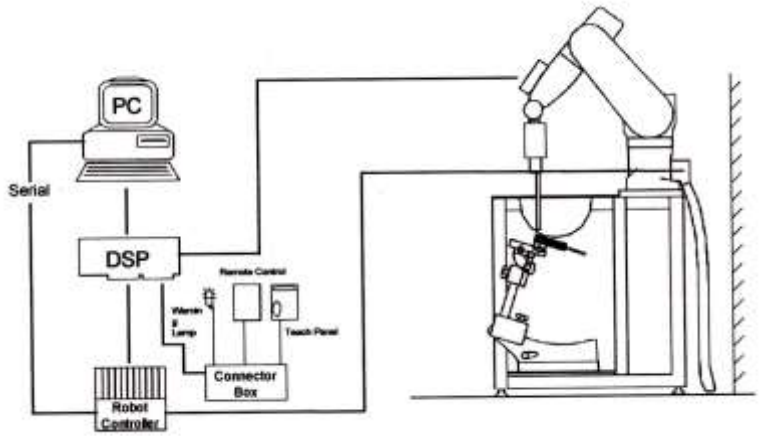


Figure 2. HCT SAR Lab. Test Measurement Set-up

The 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 PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

7. SAR Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013

1. The SAR distribution at the exposed side of the head or body was measured at a distance no more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.

2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.

3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 table 4-1 and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (reference from the DASY manual.)

   a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5±1 mm	$^1/_2 \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30°±1°	20°±1°
Maximum area scan Spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤15 mm 2-3 GHz: ≤12 mm	3-4 GHz: ≤12 mm 4-6 GHz: ≤10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan Spatial resolution: Δx_{zoom}, Δy_{zoom}			≤ 2 GHz: ≤8mm 2-3 GHz: ≤5mm*	3-4 GHz: ≤5 mm* 4-6 GHz: ≤4 mm*
Maximum zoom scan Spatial resolution normal to phantom surface	uniform grid: $\Delta z_{zoom}(n)$		≤ 5 mm	3-4 GHz: ≤4 mm 4-5 GHz: ≤3 mm 5-6 GHz: ≤2 mm
	graded grid	$\Delta z_{zoom}(1)$: between 1st two Points closest to phantom surface	≤ 4 mm	3-4 GHz: ≤3 mm 4-5 GHz: ≤2.5 mm 5-6 GHz: ≤2 mm
		$\Delta z_{zoom}(n>1)$: between subsequent Points	$\leq 1.5 \cdot \Delta z_{zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3-4 GHz: ≥28 mm 4-5 GHz: ≥25 mm 5-6 GHz: ≥22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8. Description of Test Position

8.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε and loss tangent δ=0.02

8.2 SAR Testing for Tablet Per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, 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 configuration. 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.

8.3 Proximity Sensor Considerations.

This device uses a sensor to reduce output powers in certain use conditions when the device is used close the user's body.

When the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power However, the proximity sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, an additional exposure condition is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level.

FCC KDB 616217 D04 Section 8 and additional FCC guidance were used as a guideline for selecting SAR test distances for this device at these additional exposure conditions. The smallest separation distance determined by the sensor triggering and sensor coverage for each applicable edge, minus 1 mm. was used as the test separation distance for SAR testing. Sensor triggering distance evaluation is provided in a separate document.

The required separation distance to evaluate SAR at full powers were:
WWAN: Rear 16mm, top edge 17mm, right edge 10mm, right corner 6mm, left edge 0mm (no sensor coverage)

Additional Guidance KDB inquiry:

- Additional SAR test for corner side – KDB guidance to identify that SAR test when sensor and Antenna is located near the corner side

9. RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Head)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

*** The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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 mad 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.

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. This 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.

10. FCC SAR General Measurement Procedures

Power Measurements for licensed transmitters are performed using a base simulator under digital average power.

10.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as Reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

10.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB 941225 D01v03r01-3G SAR Measurement Procedures
The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to Cheek for power drifts. If conducted Power deviations of more than 5 % occurred, the tests were repeated.

10.3 SAR Measurement Conditions for UMTS

3GPP UMTS modes are tested according to FCC KDB 941225 D01v03r01 publication

10.3.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in sec. 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all "1s" or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

10.3.2 Body SAR measurements

SAR for body exposure configurations is measured using the 12.2kbps RMC with the TPC bits all "1s". the 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2kbps RMC.

10.3.3 SAR Measurements with Rel. 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using and FRC with H-SET 1 in Sub-test and a 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to release 6 HSPA test procedures. 8.4.5 SAR Measurement with Rel.6 HSUPA The 3G SAR test Reduction Procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, Using H-Set 1 and QPSK for FRC and a 12.2kbps RMC configured in Test Loop Mode 1 and Power Control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

10.3.4 SAR Measurements with Rel. 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

10.3.5 DC-HSDPA

SAR is required for Rel.8 DC-HSDPA when SAR is required for Rel.5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in table C.8.1.12 of 3GPP TS34.121-1 to determine SAR test reduction. Primary and secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK)was conformed to be used during DC-HSDPA measurements.

10.4 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r05 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

10.4.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

10.4.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

10.4.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

10.4.4 Required RB Size and RB offsets for SAR testing

According to FCC KDB 941225 D05v02r05

a. Per sec 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/Kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Sec 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Sec 4.2.1.
c. Per Sec. 4.2.3, QPSK SAR is not required for the 100% all0cation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Sec. 4.2.4 and 4.3, SAR test for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sec. 4.2.1 through 4.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/Kg.

10.4.5 Downlink Carrier Aggregation

Conducted power measurements with LTE Carrier aggregation (CA) downlink only active are made in accordance to KDB publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output Powers are measured with downlink carrier aggregation active for the configuration with highest measured maximum conducted power with the downlink carrier aggregation inactive measured

among the channel bandwidth, modulation and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25dB higher than the average output power with downlink only carrier aggregation inactive.

10.4.6 LTE Uplink Carrier Aggregation SAR Measurement Procedure

This device is specified with the same maximum output power and Tune-up tolerances for intra-band contiguous up-link LTE CA_41C and the single carrier LTE 41. Both Uplink carrier aggregation and single carrier are operating with Power class 3.
This device support intra-band contiguous UL CA: LTE CA_41C with a maximum of 20MHz component carriers
For intra-band contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that aggregate maximum allowed output power is equivalent to the single carrier scenario.

This device does not have any operating restrictions, Power reduction or variations among the different LTE operating mode configurations on single carrier LTE 41 and intra-band contiguous up-link LTE CA_41C operations.

The measured power results of single carrier LTE41 and intra-band contiguous up-link LTE CA_41C satisfy Maximum output power and Tune-up tolerances.

Per Fall 2017 TCB Workshop Notes, the output Power with uplink CA active was measured for the configuration with the Highest Reported SAR with standalone condition.

Because the maximum output for UL CA of LTE 41 is ≤ standalone LTE mode (without CA),
SAR for LTE B41 Up link CA was performed at the highest standalone SAR configuration without CA and also UL CA SAR is not required for all required test channels, Because the reported SAR for UL CA configuration is > 1.2 W/kg

10.4.7 LTE(TDD) Considerations

According to KDB 941225 D05v02r05, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.
SAR was tested with the highest transmission duty factor (63.33 %) using Uplink-downlink configuration 0 and Special subframe configuration 6. The configuration with the highest duty cycle was used for Power class 3(uplink- downlink configuration 0 at 63.3%). Power class 2(HPUE) does not support uplink-downlink configuration 0 and 6, therefore the highest available duty cycle was used for Power class 2(uplink-downlink configuration 1 at 43.3%).
LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special sub frame configurations.

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	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle – Extended cyclic prefix in uplink x (T_s) x # of S + # of U

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

Example for calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = (5120 x (1/(15000 x 2048)) x 2 + 0.006)/0.01 = 63.33 %
Where
T_s = 1/(15000 x 2048) seconds
HPUE :
Calculated Duty Cycle for Uplink-Downlink Configuration 1:
Calculated Duty Cycle =5120*(1/(15000*2048))*2+0.004)/0.01 = 43.33 %

11. Output Power Specifications

Licensed bands

Test Description	Test Procedure Used
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2

Test Overview

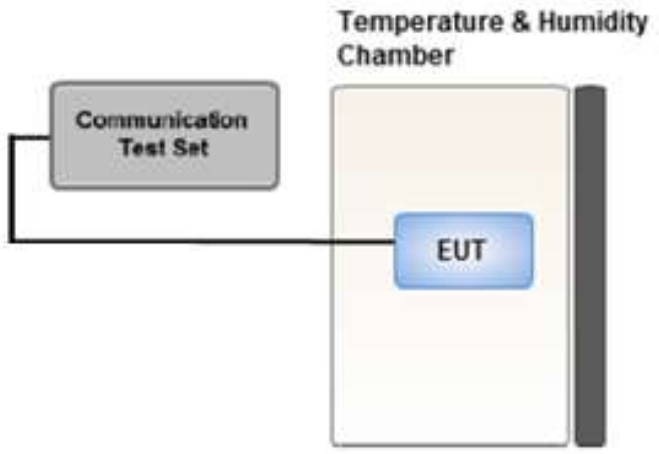
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

Test Procedure

1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup



11.1 UMTS Maximum Conducted Output Power

3GPP UMTS modes are tested according to FCC KDB 941225 D01v03r01 publication

HSPA+
This DUT is only capable of QPSK HSPA+ in uplink. Therefore, the RF conducted power is not measured according to 941225 D01 3G SAR.

11.1.1 UMTS Maximum Conducted Output Power

WCDMA Band 4

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 4 [dBm]			3GPP MPR
		Subtest	UL 1312 DL 1537	UL 1412 DL 1637	UL 1513 DL 1738	
99	WCDMA	12.2 kbps RMC	24.12	24.36	24.18	-
99	WCDMA	12.2 kbps AMR				-
5	HSDPA	Subtest 1	22.95	23.20	23.05	0
5		Subtest 2	22.96	23.21	23.04	0
5		Subtest 3	22.44	22.71	22.53	0.5
5		Subtest 4	22.46	22.70	22.52	0.5
6	HSUPA	Subtest 1	22.94	23.17	23.01	0
6		Subtest 2	20.95	21.18	21.03	2
6		Subtest 3	21.94	22.14	22.02	1
6		Subtest 4	20.93	21.17	21.03	2
6		Subtest 5	22.95	23.15	23.03	0
8	DC-HSDPA	Subtest 1	23.46	23.51	23.23	0
8		Subtest 2	23.48	23.52	23.23	0
8		Subtest 3	22.98	23.01	22.73	0.5
8		Subtest 4	22.96	23.02	22.73	0.5

WCDMA Average Conducted output powers

WCDMA Band 2

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
8	DC-HSDPA	Subtest 1	22.46	22.34	22.39	0
8		Subtest 2	22.47	22.35	22.40	0
8		Subtest 3	21.97	21.85	21.89	0.5
8		Subtest 4	21.97	21.80	21.90	0.5

WCDMA Average Conducted output powers

WCDMA Band 5

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]			3GPP MPR
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458	
8	DC-HSDPA	Subtest 1	22.60	22.73	22.95	0
8		Subtest 2	22.61	22.73	22.96	0
8		Subtest 3	22.08	22.24	22.46	0.5
8		Subtest 4	22.10	22.21	22.45	0.5

WCDMA Average Conducted output powers

11.1.2 UMTS Reduced Conducted Output Power

WCDMA Band 4

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]			3GPP MPR
		Subtest	UL 1312 DL 1537	UL 1412 DL 1637	UL 1513 DL 1738	
99	WCDMA	12.2 kbps RMC	13.09	13.31	13.11	-
99	WCDMA	12.2 kbps AMR				-
5	HSDPA	Subtest 1	11.95	12.18	12.01	0
5		Subtest 2	11.96	12.19	12.00	0
5		Subtest 3	11.46	11.68	11.50	0.5
5		Subtest 4	11.45	11.68	11.49	0.5
6	HSUPA	Subtest 1	11.95	12.18	12.01	0
6		Subtest 2	9.95	10.09	10.01	2
6		Subtest 3	10.95	11.12	11.02	1
6		Subtest 4	9.96	10.18	10.02	2
6		Subtest 5	11.93	12.17	12.00	0
8	DC-HSDPA	Subtest 1	12.48	12.52	12.21	0
8		Subtest 2	12.50	12.52	12.22	0
8		Subtest 3	12.00	12.01	11.75	0.5
8		Subtest 4	11.99	12.01	11.73	0.5

WCDMA Average Conducted output powers

WCDMA Band 2

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
8	DC-HSDPA	Subtest 1	11.44	11.31	11.37	0
8		Subtest 2	11.42	11.31	11.38	0
8		Subtest 3	10.95	10.81	10.87	0.5
8		Subtest 4	10.94	10.78	10.89	0.5

WCDMA Average Conducted output powers

WCDMA Band 5

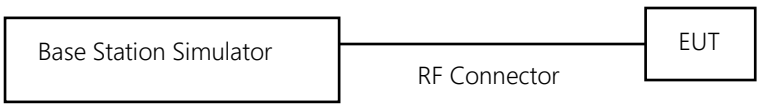
3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]			3GPP MPR
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458	
8	DC-HSDPA	Subtest 1	15.81	15.94	16.03	0
8		Subtest 2	15.90	16.01	16.07	0
8		Subtest 3	15.42	15.57	15.68	0.5
8		Subtest 4	15.43	15.55	15.62	0.5

WCDMA Average Conducted output powers

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK)was conformed to be used during DC-HSDPA measurements.

It is expected by the manufacturer that MPR for some HSPA Subtests may be up to 2 dB more than specified by 3GPP, But also as low as 1 dB according to the chipset implementation in this model to match manufacturer.



11.2 LTE Maximum Output Power

11.2.1 LTE Maximum Conducted Output Power

[LTE Band 12 Conducted Power]

LTE Band 12 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23017 Ch. 699.7 ㎒	23095 Ch. 707.5 ㎒	23173 Ch. 715.3 ㎒		
1.4 ㎒	QPSK	1	0	23.83	23.72	23.60	0	0
		1	3	23.85	23.76	23.70	0	0
		1	5	23.78	23.69	23.56	0	0
		3	0	23.82	23.72	23.65	0	0
		3	1	23.85	23.76	23.66	0	0
		3	3	23.79	23.72	23.63	0	0
		6	0	22.85	22.72	22.64	0-1	1
	16QAM	1	0	23.13	23.04	23.00	0-1	1
		1	3	23.23	23.03	23.07	0-1	1
		1	5	23.14	23.08	23.00	0-1	1
		3	0	22.92	22.85	22.68	0-1	1
		3	1	22.92	22.89	22.81	0-1	1
		3	3	22.87	22.79	22.77	0-1	1
		6	0	21.98	21.85	21.82	0-2	2
	64QAM	1	0	22.03	22.03	21.84	0-2	2
		1	3	22.07	22.01	21.98	0-2	2
		1	5	22.02	21.87	21.80	0-2	2
		3	0	21.97	21.92	21.85	0-2	2
		3	1	22.05	22.01	21.88	0-2	2
		3	3	22.02	21.87	21.90	0-2	2
		6	0	20.88	20.81	20.69	0-3	3

LTE Band 12 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23025 Ch. 700.5 ㎒	23095 Ch. 707.5 ㎒	23165 Ch. 714.5 ㎒		
3 ㎒	QPSK	1	0	23.86	23.84	23.67	0	0
		1	7	23.94	23.92	23.78	0	0
		1	14	23.85	23.73	23.67	0	0
		8	0	22.94	22.80	22.69	0-1	1
		8	3	22.88	22.86	22.77	0-1	1
		8	7	22.84	22.80	22.73	0-1	1
		15	0	22.92	22.80	22.71	0-1	1
	16QAM	1	0	23.22	23.05	22.99	0-1	1
		1	7	23.32	23.16	23.14	0-1	1
		1	14	23.08	23.14	23.02	0-1	1
		8	0	22.04	21.95	21.85	0-2	2
		8	3	22.06	21.98	21.83	0-2	2
		8	7	21.98	21.93	21.83	0-2	2
		15	0	21.99	21.86	21.78	0-2	2
	64QAM	1	0	22.14	22.06	21.96	0-2	2
		1	7	22.21	22.09	22.04	0-2	2
		1	14	22.10	21.94	21.93	0-2	2
		8	0	21.06	20.93	20.84	0-3	3
		8	3	21.02	20.96	20.83	0-3	3
		8	7	20.96	20.89	20.84	0-3	3
		15	0	21.01	20.91	20.79	0-3	3

LTE Band 12 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23035 Ch. 701.5 ㎒	23095 Ch. 707.5 ㎒	23155 Ch. 713.5 ㎒		
5 ㎒	QPSK	1	0	23.92	23.84	23.78	0	0
		1	12	23.83	23.78	23.68	0	0
		1	24	23.82	23.72	23.67	0	0
		12	0	22.91	22.85	22.75	0-1	1
		12	6	22.90	22.83	22.78	0-1	1
		12	11	22.87	22.79	22.76	0-1	1
		25	0	22.84	22.83	22.76	0-1	1
	16QAM	1	0	23.31	23.17	22.99	0-1	1
		1	12	23.17	23.02	23.06	0-1	1
		1	24	23.15	23.03	22.95	0-1	1
		12	0	22.01	21.93	21.84	0-2	2
		12	6	22.02	21.94	21.85	0-2	2
		12	11	21.93	21.92	21.80	0-2	2
		25	0	21.94	21.90	21.81	0-2	2
	64QAM	1	0	22.11	21.98	22.07	0-2	2
		1	12	22.11	22.01	22.06	0-2	2
		1	24	22.04	22.04	21.83	0-2	2
		12	0	21.01	21.00	20.94	0-3	3
		12	6	21.02	20.97	20.86	0-3	3
		12	11	20.96	20.94	20.85	0-3	3
		25	0	21.00	20.91	20.84	0-3	3

LTE Band 12 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23095 Ch. 707.5 ㎒		
10 ㎒	QPSK	1	0	23.86	0	0
		1	24	23.79	0	0
		1	49	23.67	0	0
		25	0	22.90	0-1	1
		25	12	22.83	0-1	1
		25	24	22.77	0-1	1
		50	0	22.79	0-1	1
	16QAM	1	0	23.17	0-1	1
		1	24	23.16	0-1	1
		1	49	22.97	0-1	1
		25	0	21.97	0-2	2
		25	12	21.91	0-2	2
		25	24	21.86	0-2	2
		50	0	21.90	0-2	2
	64QAM	1	0	22.18	0-2	2
		1	24	22.08	0-2	2
		1	49	22.00	0-2	2
		25	0	20.96	0-3	3
		25	12	20.95	0-3	3
		25	24	20.92	0-3	3
		50	0	20.94	0-3	3

Note: LTE Band 12 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 14 Conducted Power]
LTE Band 14 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23305 Ch. 790.5 ㎒	23330 Ch. 793 ㎒	23355 Ch. 795.5 ㎒		
5 ㎒	QPSK	1	0	23.68	23.71	23.80	0	0
		1	12	23.68	23.77	23.85	0	0
		1	24	23.79	23.72	23.82	0	0
		12	0	22.80	22.86	22.85	0-1	1
		12	6	22.78	22.87	22.80	0-1	1
		12	11	22.87	22.84	22.92	0-1	1
		25	0	22.78	22.84	22.79	0-1	1
	16QAM	1	0	23.08	23.09	23.24	0-1	1
		1	12	23.11	23.21	23.20	0-1	1
		1	24	23.16	23.18	23.19	0-1	1
		12	0	21.91	22.00	21.92	0-2	2
		12	6	21.87	21.95	21.93	0-2	2
		12	11	21.94	21.91	21.99	0-2	2
		25	0	21.86	21.91	21.88	0-2	2
	64QAM	1	0	21.99	22.09	22.04	0-2	2
		1	12	22.00	22.10	22.15	0-2	2
		1	24	22.02	22.06	22.18	0-2	2
		12	0	20.93	20.98	20.93	0-3	3
		12	6	20.95	21.03	20.95	0-3	3
		12	11	20.97	20.92	21.01	0-3	3
		25	0	20.88	20.91	20.89	0-3	3

LTE Band 14 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23330 Ch. 793 ㎒		
10 ㎒	QPSK	1	0	23.65	0	0
		1	24	23.72	0	0
		1	49	23.81	0	0
		25	0	22.74	0-1	1
		25	12	22.87	0-1	1
		25	24	22.80	0-1	1
		50	0	22.83	0-1	1
	16QAM	1	0	22.99	0-1	1
		1	24	23.18	0-1	1
		1	49	23.13	0-1	1
		25	0	21.91	0-2	2
		25	12	21.98	0-2	2
		25	24	21.85	0-2	2
		50	0	21.90	0-2	2
	64QAM	1	0	21.93	0-2	2
		1	24	21.98	0-2	2
		1	49	22.10	0-2	2
		25	0	20.90	0-3	3
		25	12	20.97	0-3	3
		25	24	20.91	0-3	3
		50	0	20.94	0-3	3

Note: LTE Band 14 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 17 Conducted Power]

LTE Band 17 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23790 Ch. 710 ㎒		
5 ㎒	QPSK	1	0	23.76	0	0
		1	12	23.78	0	0
		1	24	23.73	0	0
		12	0	22.78	0-1	1
		12	6	22.79	0-1	1
		12	11	22.78	0-1	1
		25	0	22.82	0-1	1
	16QAM	1	0	23.15	0-1	1
		1	12	23.14	0-1	1
		1	24	22.92	0-1	1
		12	0	21.91	0-2	2
		12	6	21.93	0-2	2
		12	11	21.84	0-2	2
		25	0	21.88	0-2	2
	64QAM	1	0	22.02	0-2	2
		1	12	21.99	0-2	2
		1	24	21.99	0-2	2
		12	0	20.98	0-3	3
		12	6	20.97	0-3	3
		12	11	20.92	0-3	3
		25	0	20.88	0-3	3

LTE Band 17 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23790 Ch. 710 ㎒		
10 ㎒	QPSK	1	0	23.83	0	0
		1	24	23.74	0	0
		1	49	23.61	0	0
		25	0	22.82	0-1	1
		25	12	22.84	0-1	1
		25	24	22.75	0-1	1
		50	0	22.84	0-1	1
	16QAM	1	0	23.05	0-1	1
		1	24	23.14	0-1	1
		1	49	22.95	0-1	1
		25	0	21.93	0-2	2
		25	12	21.93	0-2	2
		25	24	21.86	0-2	2
		50	0	21.90	0-2	2
	64QAM	1	0	22.19	0-2	2
		1	24	22.04	0-2	2
		1	49	21.97	0-2	2
		25	0	20.90	0-3	3
		25	12	20.94	0-3	3
		25	24	20.84	0-3	3
		50	0	20.95	0-3	3

Note: LTE Band 17 at 5 ㎒ &10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 25 Conducted Power]

LTE Band 25 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26047 Ch. 1850.7 ㎒	26365 Ch. 1882.5 ㎒	26683 Ch. 1914.3 ㎒		
1.4 ㎒	QPSK	1	0	23.44	23.16	23.28	0	0
		1	3	23.49	23.26	23.39	0	0
		1	5	23.44	23.10	23.30	0	0
		3	0	23.43	23.14	23.27	0	0
		3	1	23.47	23.20	23.36	0	0
		3	3	23.42	23.12	23.29	0	0
		6	0	22.47	22.17	22.30	0-1	1
	16QAM	1	0	22.85	22.50	22.66	0-1	1
		1	3	22.87	22.54	22.71	0-1	1
		1	5	22.80	22.55	22.60	0-1	1
		3	0	22.49	22.31	22.47	0-1	1
		3	1	22.57	22.31	22.46	0-1	1
		3	3	22.54	22.28	22.36	0-1	1
		6	0	21.57	21.33	21.52	0-2	2
	64QAM	1	0	21.77	21.43	21.56	0-2	2
		1	3	21.77	21.47	21.61	0-2	2
		1	5	21.64	21.42	21.56	0-2	2
		3	0	21.67	21.41	21.48	0-2	2
		3	1	21.71	21.40	21.58	0-2	2
		3	3	21.67	21.36	21.52	0-2	2
		6	0	20.55	20.31	20.40	0-3	3

LTE Band 25 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26055 Ch. 1851.5 ㎒	26365 Ch. 1882.5 ㎒	26675Ch. 1913.5 ㎒		
3 ㎒	QPSK	1	0	23.51	23.27	23.36	0	0
		1	7	23.58	23.37	23.45	0	0
		1	14	23.49	23.23	23.37	0	0
		8	0	22.50	22.27	22.35	0-1	1
		8	3	22.51	22.28	22.41	0-1	1
		8	7	22.48	22.30	22.36	0-1	1
		15	0	22.49	22.30	22.40	0-1	1
	16QAM	1	0	22.81	22.65	22.76	0-1	1
		1	7	22.90	22.68	22.77	0-1	1
		1	14	22.79	22.60	22.73	0-1	1
		8	0	21.70	21.47	21.53	0-2	2
		8	3	21.70	21.48	21.58	0-2	2
		8	7	21.62	21.48	21.53	0-2	2
		15	0	21.62	21.41	21.51	0-2	2
	64QAM	1	0	21.79	21.56	21.57	0-2	2
		1	7	21.76	21.65	21.72	0-2	2
		1	14	21.76	21.57	21.69	0-2	2
		8	0	20.68	20.47	20.50	0-3	3
		8	3	20.69	20.47	20.54	0-3	3
		8	7	20.67	20.44	20.48	0-3	3
		15	0	20.60	20.37	20.51	0-3	3

LTE Band 25 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26065 Ch. 1852.5 ㎒	26365 Ch. 1882.5 ㎒	26665 Ch. 1912.5 ㎒		
5 ㎒	QPSK	1	0	23.53	23.32	23.41	0	0
		1	12	23.55	23.25	23.34	0	0
		1	24	23.54	23.30	23.36	0	0
		12	0	22.54	22.34	22.39	0-1	1
		12	6	22.56	22.33	22.42	0-1	1
		12	11	22.49	22.28	22.39	0-1	1
		25	0	22.52	22.29	22.36	0-1	1
	16QAM	1	0	22.85	22.72	22.78	0-1	1
		1	12	22.82	22.62	22.78	0-1	1
		1	24	22.94	22.55	22.74	0-1	1
		12	0	21.70	21.45	21.54	0-2	2
		12	6	21.66	21.46	21.52	0-2	2
		12	11	21.59	21.39	21.51	0-2	2
		25	0	21.64	21.39	21.50	0-2	2
	64QAM	1	0	21.85	21.67	21.74	0-2	2
		1	12	21.72	21.58	21.55	0-2	2
		1	24	21.75	21.59	21.59	0-2	2
		12	0	20.66	20.48	20.58	0-3	3
		12	6	20.65	20.45	20.59	0-3	3
		12	11	20.66	20.47	20.53	0-3	3
		25	0	20.63	20.41	20.52	0-3	3

LTE Band 25 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26090 Ch. 1855 ㎒	26365 Ch. 1882.5 ㎒	26640 Ch. 1910 ㎒		
10 ㎒	QPSK	1	0	23.76	23.59	23.36	0	0
		1	24	23.51	23.30	23.36	0	0
		1	49	23.60	23.52	23.34	0	0
		25	0	22.54	22.37	22.35	0-1	1
		25	12	22.53	22.37	22.30	0-1	1
		25	24	22.42	22.30	22.38	0-1	1
		50	0	22.45	22.35	22.33	0-1	1
	16QAM	1	0	23.06	22.88	22.66	0-1	1
		1	24	22.82	22.74	22.77	0-1	1
		1	49	22.97	22.79	22.69	0-1	1
		25	0	21.64	21.44	21.50	0-2	2
		25	12	21.66	21.46	21.46	0-2	2
		25	24	21.53	21.43	21.53	0-2	2
		50	0	21.60	21.48	21.41	0-2	2
	64QAM	1	0	22.09	21.83	21.64	0-2	2
		1	24	21.74	21.61	21.61	0-2	2
		1	49	21.95	21.77	21.70	0-2	2
		25	0	20.68	20.47	20.45	0-3	3
		25	12	20.65	20.49	20.47	0-3	3
		25	24	20.55	20.42	20.56	0-3	3
		50	0	20.60	20.44	20.44	0-3	3

LTE Band 25 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26115 Ch. 1857.5 ㎒	26365 Ch. 1882.5 ㎒	26615 Ch. 1907.5 ㎒		
15 ㎒	QPSK	1	0	23.69	23.46	23.50	0	0
		1	36	23.46	23.27	23.31	0	0
		1	74	23.43	23.40	23.43	0	0
		36	0	22.61	22.36	22.37	0-1	1
		36	18	22.49	22.37	22.33	0-1	1
		36	39	22.48	22.30	22.33	0-1	1
		75	0	22.46	22.35	22.33	0-1	1
	16QAM	1	0	23.06	22.80	22.87	0-1	1
		1	36	22.93	22.67	22.61	0-1	1
		1	74	22.68	22.84	22.77	0-1	1
		36	0	21.73	21.47	21.50	0-2	2
		36	18	21.56	21.44	21.47	0-2	2
		36	39	21.55	21.46	21.42	0-2	2
		75	0	21.59	21.47	21.44	0-2	2
	64QAM	1	0	21.91	21.70	21.80	0-2	2
		1	36	21.79	21.55	21.59	0-2	2
		1	74	21.77	21.62	21.65	0-2	2
		36	0	20.79	20.52	20.50	0-3	3
		36	18	20.59	20.52	20.51	0-3	3
		36	39	20.61	20.43	20.44	0-3	3
		75	0	20.58	20.48	20.42	0-3	3

LTE Band 25 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26140 Ch. 1860 ㎒	26365 Ch. 1882.5 ㎒	26590 Ch. 1905 ㎒		
20 ㎒	QPSK	1	0	23.80	23.67	23.42	0	0
		1	49	23.38	23.26	23.33	0	0
		1	99	23.57	23.49	23.41	0	0
		50	0	22.52	22.45	22.34	0-1	1
		50	25	22.51	22.33	22.39	0-1	1
		50	49	22.48	22.36	22.35	0-1	1
		100	0	22.50	22.34	22.42	0-1	1
	16QAM	1	0	23.20	23.06	22.85	0-1	1
		1	49	22.78	22.55	22.60	0-1	1
		1	99	22.99	22.91	22.83	0-1	1
		50	0	21.66	21.57	21.41	0-2	2
		50	25	21.64	21.47	21.46	0-2	2
		50	49	21.57	21.48	21.46	0-2	2
		100	0	21.58	21.45	21.49	0-2	2
	64QAM	1	0	22.07	22.03	21.66	0-2	2
		1	49	21.68	21.66	21.59	0-2	2
		1	99	21.86	21.82	21.66	0-2	2
		50	0	20.61	20.57	20.47	0-3	3
		50	25	20.61	20.49	20.50	0-3	3
		50	49	20.53	20.48	20.50	0-3	3
		100	0	20.59	20.51	20.54	0-3	3

[LTE Band 26 Conducted Power]

LTE Band 26 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26697 Ch. 814.7 ㎒	26865 Ch. 831.5 ㎒	27033 Ch. 848.3 ㎒		
1.4 ㎒	QPSK	1	0	24.03	23.97	24.20	0	0
		1	3	24.07	24.08	24.23	0	0
		1	5	24.00	23.96	24.19	0	0
		3	0	24.04	24.02	24.21	0	0
		3	1	24.08	23.99	24.21	0	0
		3	3	24.04	24.00	24.19	0	0
		6	0	23.02	23.00	23.17	0-1	1
	16QAM	1	0	23.43	23.36	23.47	0-1	1
		1	3	23.39	23.29	23.49	0-1	1
		1	5	23.29	23.27	23.49	0-1	1
		3	0	23.16	23.11	23.26	0-1	1
		3	1	23.23	23.15	23.30	0-1	1
		3	3	23.11	23.12	23.32	0-1	1
		6	0	22.13	22.18	22.43	0-2	2
	64QAM	1	0	22.31	22.23	22.39	0-2	2
		1	3	22.41	22.32	22.52	0-2	2
		1	5	22.24	22.26	22.48	0-2	2
		3	0	22.25	22.19	22.43	0-2	2
		3	1	22.31	22.26	22.44	0-2	2
		3	3	22.25	22.19	22.47	0-2	2
		6	0	21.10	21.08	21.31	0-3	3

LTE Band 26 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26705 Ch. 815.5 ㎒	26865 Ch. 831.5 ㎒	27025 Ch. 847.5 ㎒		
3 ㎒	QPSK	1	0	24.20	24.01	24.25	0	0
		1	7	24.26	24.14	24.35	0	0
		1	14	24.14	23.99	24.20	0	0
		8	0	23.21	23.09	23.29	0-1	1
		8	3	23.17	23.08	23.27	0-1	1
		8	7	23.18	23.07	23.27	0-1	1
		15	0	23.20	23.06	23.26	0-1	1
	16QAM	1	0	23.47	23.46	23.60	0-1	1
		1	7	23.60	23.41	23.66	0-1	1
		1	14	23.40	23.32	23.52	0-1	1
		8	0	22.30	22.22	22.41	0-2	2
		8	3	22.31	22.20	22.46	0-2	2
		8	7	22.24	22.18	22.39	0-2	2
		15	0	22.25	22.15	22.39	0-2	2
	64QAM	1	0	22.48	22.35	22.66	0-2	2
		1	7	22.56	22.46	22.55	0-2	2
		1	14	22.33	22.36	22.56	0-2	2
		8	0	21.27	21.15	21.39	0-3	3
		8	3	21.31	21.23	21.42	0-3	3
		8	7	21.27	21.15	21.41	0-3	3
		15	0	21.27	21.19	21.39	0-3	3

LTE Band 26 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26715 Ch. 816.5 ㎒	26865 Ch. 831.5 ㎒	27015 Ch. 846.5 ㎒		
5 ㎒	QPSK	1	0	24.20	24.07	24.34	0	0
		1	12	24.14	24.05	24.27	0	0
		1	24	24.17	24.14	24.27	0	0
		12	0	23.19	23.06	23.36	0-1	1
		12	6	23.23	23.10	23.32	0-1	1
		12	11	23.21	23.08	23.30	0-1	1
		25	0	23.17	23.07	23.30	0-1	1
	16QAM	1	0	23.58	23.36	23.65	0-1	1
		1	12	23.62	23.49	23.64	0-1	1
		1	24	23.54	23.46	23.60	0-1	1
		12	0	22.31	22.16	22.46	0-2	2
		12	6	22.29	22.23	22.41	0-2	2
		12	11	22.28	22.15	22.38	0-2	2
		25	0	22.30	22.15	22.41	0-2	2
	64QAM	1	0	22.52	22.39	22.61	0-2	2
		1	12	22.46	22.33	22.53	0-2	2
		1	24	22.49	22.36	22.47	0-2	2
		12	0	21.30	21.25	21.44	0-3	3
		12	6	21.30	21.24	21.51	0-3	3
		12	11	21.27	21.18	21.46	0-3	3
		25	0	21.25	21.16	21.43	0-3	3

LTE Band 26 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26740 Ch. 819 ㎒	26865 Ch. 831.5 ㎒	26990 Ch. 844 ㎒		
10 ㎒	QPSK	1	0	24.17	24.16	24.20	0	0
		1	24	24.19	24.03	24.34	0	0
		1	49	24.06	24.05	24.22	0	0
		25	0	23.24	23.16	23.17	0-1	1
		25	12	23.21	23.11	23.25	0-1	1
		25	24	23.15	23.07	23.32	0-1	1
		50	0	23.17	23.13	23.29	0-1	1
	16QAM	1	0	23.53	23.54	23.60	0-1	1
		1	24	23.45	23.49	23.72	0-1	1
		1	49	23.34	23.35	23.61	0-1	1
		25	0	22.31	22.23	22.27	0-2	2
		25	12	22.29	22.23	22.42	0-2	2
		25	24	22.24	22.15	22.44	0-2	2
		50	0	22.26	22.22	22.39	0-2	2
	64QAM	1	0	22.45	22.39	22.47	0-2	2
		1	24	22.33	22.34	22.61	0-2	2
		1	49	22.37	22.37	22.53	0-2	2
		25	0	21.30	21.20	21.26	0-3	3
		25	12	21.32	21.23	21.37	0-3	3
		25	24	21.27	21.17	21.42	0-3	3
		50	0	21.30	21.17	21.34	0-3	3

LTE Band 26 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26765 Ch. 821.5 ㎒	26865 Ch. 831.5 ㎒	26965 Ch. 841.5 ㎒		
15 ㎒	QPSK	1	0	24.26	24.15	24.18	0	0
		1	36	24.13	24.11	24.29	0	0
		1	74	24.05	24.15	24.23	0	0
		36	0	23.27	23.20	23.15	0-1	1
		36	18	23.25	23.14	23.25	0-1	1
		36	39	23.17	23.11	23.23	0-1	1
		75	0	23.15	23.11	23.23	0-1	1
	16QAM	1	0	23.67	23.55	23.62	0-1	1
		1	36	23.51	23.34	23.58	0-1	1
		1	74	23.49	23.46	23.62	0-1	1
		36	0	22.31	22.21	22.22	0-2	2
		36	18	22.26	22.19	22.37	0-2	2
		36	39	22.24	22.21	22.38	0-2	2
		75	0	22.24	22.17	22.32	0-2	2
	64QAM	1	0	22.53	22.49	22.39	0-2	2
		1	36	22.42	22.30	22.53	0-2	2
		1	74	22.36	22.38	22.52	0-2	2
		36	0	21.37	21.26	21.25	0-3	3
		36	18	21.29	21.23	21.33	0-3	3
		36	39	21.19	21.23	21.38	0-3	3
		75	0	21.26	21.18	21.32	0-3	3

[LTE Band 30 Conducted Power]

LTE Band 30 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				27685 Ch. 2307.5 ㎒	27710 Ch. 2310 ㎒	27735 Ch. 2312.5 ㎒		
5 ㎒	QPSK	1	0	21.43	21.51	21.50	0	0
		1	12	21.47	21.47	21.62	0	0
		1	24	21.47	21.55	21.57	0	0
		12	0	20.46	20.54	20.54	0-1	1
		12	6	20.55	20.57	20.50	0-1	1
		12	11	20.59	20.52	20.64	0-1	1
		25	0	20.52	20.53	20.50	0-1	1
	16QAM	1	0	20.65	20.86	20.71	0-1	1
		1	12	20.76	20.75	20.81	0-1	1
		1	24	20.81	20.88	20.76	0-1	1
		12	0	19.51	19.62	19.60	0-2	2
		12	6	19.62	19.64	19.62	0-2	2
		12	11	19.59	19.55	19.69	0-2	2
		25	0	19.60	19.59	19.58	0-2	2
	64QAM	1	0	19.64	19.74	19.66	0-2	2
		1	12	19.61	19.62	19.71	0-2	2
		1	24	19.66	19.75	19.68	0-2	2
		12	0	18.54	18.63	18.63	0-3	3
		12	6	18.63	18.64	18.61	0-3	3
		12	11	18.61	18.60	18.69	0-3	3
		25	0	18.60	18.59	18.61	0-3	3

LTE Band 30 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				27710 Ch. 2310 ㎒		
10 ㎒	QPSK	1	0	21.47	0	0
		1	24	21.44	0	0
		1	49	21.57	0	0
		25	0	20.59	0-1	1
		25	12	20.58	0-1	1
		25	24	20.54	0-1	1
		50	0	20.57	0-1	1
	16QAM	1	0	20.70	0-1	1
		1	24	20.77	0-1	1
		1	49	20.81	0-1	1
		25	0	19.64	0-2	2
		25	12	19.66	0-2	2
		25	24	19.58	0-2	2
		50	0	19.66	0-2	2
	64QAM	1	0	19.70	0-2	2
		1	24	19.71	0-2	2
		1	49	19.65	0-2	2
		25	0	18.63	0-3	3
		25	12	18.62	0-3	3
		25	24	18.60	0-3	3
		50	0	18.63	0-3	3

Note: LTE Band 14 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 41 Conducted Power] - PC3

LTE Band 41 _ 5 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39675 Ch. 2498.5 ㎒	40148 Ch. 2545.8 ㎒	40620 Ch. 2593.0 ㎒	41093 Ch. 2640.3 ㎒	41565 Ch. 2687.5 ㎒		
5 ㎒	QPSK	1	0	24.22	24.34	24.25	24.35	24.22	0	0
		1	12	24.22	24.36	24.22	24.32	24.23	0	0
		1	24	24.18	24.22	24.19	24.28	24.21	0	0
		12	0	23.28	23.38	23.28	23.38	23.31	0-1	1
		12	6	23.24	23.39	23.29	23.40	23.28	0-1	1
		12	11	23.25	23.30	23.24	23.37	23.26	0-1	1
		25	0	23.22	23.31	23.26	23.40	23.29	0-1	1
	16QAM	1	0	23.32	23.48	23.37	23.43	23.43	0-1	1
		1	12	23.37	23.54	23.37	23.49	23.41	0-1	1
		1	24	23.31	23.37	23.31	23.46	23.35	0-1	1
		12	0	22.26	22.43	22.30	22.46	22.33	0-2	2
		12	6	22.29	22.46	22.33	22.43	22.33	0-2	2
		12	11	22.28	22.37	22.29	22.44	22.32	0-2	2
		25	0	22.34	22.37	22.33	22.46	22.37	0-2	2
	64QAM	1	0	21.96	22.12	21.99	22.09	22.02	0-2	2
		1	12	21.98	22.10	21.95	22.11	22.00	0-2	2
		1	24	21.92	21.97	21.98	22.09	21.94	0-2	2
		12	0	21.34	21.55	21.36	21.51	21.44	0-3	3
		12	6	21.37	21.53	21.40	21.51	21.42	0-3	3
		12	11	21.37	21.42	21.34	21.52	21.40	0-3	3
		25	0	21.39	21.45	21.40	21.55	21.43	0-3	3

LTE Band 41 _ 10 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39700 Ch. 2501 ㎒	40160 Ch. 2547 ㎒	40620 Ch. 2593 ㎒	41080 Ch. 2639 ㎒	41540 Ch. 2685 ㎒		
10 ㎒	QPSK	1	0	24.23	24.35	24.31	24.43	24.35	0	0
		1	24	24.17	24.36	24.25	24.41	24.27	0	0
		1	49	24.13	24.20	24.21	24.32	24.23	0	0
		25	0	23.25	23.44	23.27	23.42	23.36	0-1	1
		25	12	23.26	23.33	23.27	23.41	23.33	0-1	1
		25	24	23.20	23.30	23.21	23.38	23.30	0-1	1
		50	0	23.22	23.34	23.29	23.41	23.35	0-1	1
	16QAM	1	0	23.38	23.53	23.41	23.54	23.51	0-1	1
		1	24	23.31	23.50	23.40	23.51	23.43	0-1	1
		1	49	23.26	23.41	23.35	23.43	23.40	0-1	1
		25	0	22.33	22.48	22.36	22.52	22.41	0-2	2
		25	12	22.33	22.41	22.36	22.49	22.39	0-2	2
		25	24	22.28	22.38	22.32	22.46	22.36	0-2	2
		50	0	22.34	22.43	22.37	22.53	22.43	0-2	2
	64QAM	1	0	21.99	22.14	22.08	22.20	22.13	0-2	2
		1	24	21.96	22.12	22.00	22.12	22.04	0-2	2
		1	49	21.91	22.00	21.92	22.11	21.97	0-2	2
		25	0	21.37	21.56	21.41	21.58	21.50	0-3	3
		25	12	21.37	21.46	21.39	21.56	21.50	0-3	3
		25	24	21.36	21.44	21.34	21.52	21.45	0-3	3
		50	0	21.32	21.44	21.35	21.52	21.44	0-3	3

LTE Band 41 _ 15 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39725 Ch. 2503.5 ㎒	40173 Ch. 2548.3 ㎒	40620 Ch. 2593.0 ㎒	41068 Ch. 2637.8 ㎒	41515 Ch. 2682.5 ㎒		
15 ㎒	QPSK	1	0	24.30	24.41	24.31	24.41	24.40	0	0
		1	36	24.17	24.22	24.18	24.31	24.22	0	0
		1	74	24.16	24.25	24.16	24.26	24.21	0	0
		36	0	23.29	23.39	23.35	23.46	23.40	0-1	1
		36	18	23.31	23.37	23.28	23.43	23.35	0-1	1
		36	39	23.25	23.29	23.22	23.38	23.30	0-1	1
		75	0	23.22	23.35	23.27	23.41	23.34	0-1	1
	16QAM	1	0	23.44	23.57	23.47	23.61	23.55	0-1	1
		1	36	23.31	23.39	23.35	23.46	23.39	0-1	1
		1	74	23.30	23.42	23.32	23.47	23.35	0-1	1
		36	0	22.32	22.41	22.34	22.47	22.40	0-2	2
		36	18	22.29	22.39	22.31	22.46	22.36	0-2	2
		36	39	22.24	22.35	22.24	22.42	22.32	0-2	2
		75	0	22.31	22.43	22.38	22.51	22.43	0-2	2
	64QAM	1	0	22.03	22.18	22.09	22.22	22.16	0-2	2
		1	36	21.92	21.99	21.98	22.11	22.00	0-2	2
		1	74	21.94	22.03	21.95	22.06	21.96	0-2	2
		36	0	21.30	21.41	21.36	21.52	21.47	0-3	3
		36	18	21.33	21.41	21.36	21.49	21.41	0-3	3
		36	39	21.28	21.38	21.29	21.46	21.37	0-3	3
		75	0	21.35	21.45	21.37	21.54	21.44	0-3	3

LTE Band 41 _ 20 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39750 Ch. 2506.0 ㎒	40185 Ch. 2549.5 ㎒	40620 Ch. 2593.0 ㎒	41055 Ch. 2636.5 ㎒	41490 Ch. 2680.0 ㎒		
20 ㎒	QPSK	1	0	24.30	24.48	24.36	24.50	24.43	0	0
		1	49	24.17	24.25	24.20	24.36	24.27	0	0
		1	99	24.18	24.28	24.18	24.29	24.19	0	0
		50	0	23.30	23.40	23.34	23.47	23.44	0-1	1
		50	25	23.29	23.37	23.33	23.44	23.41	0-1	1
		50	49	23.24	23.34	23.26	23.41	23.34	0-1	1
		100	0	23.32	23.38	23.31	23.49	23.40	0-1	1
	16QAM	1	0	23.48	23.60	23.55	23.65	23.63	0-1	1
		1	49	23.33	23.40	23.36	23.46	23.40	0-1	1
		1	99	23.34	23.38	23.30	23.44	23.34	0-1	1
		50	0	22.42	22.49	22.46	22.58	22.52	0-2	2
		50	25	22.39	22.45	22.39	22.56	22.47	0-2	2
		50	49	22.38	22.43	22.34	22.49	22.40	0-2	2
		100	0	22.36	22.46	22.41	22.55	22.46	0-2	2
	64QAM	1	0	22.08	22.21	22.15	22.25	22.22	0-2	2
		1	49	21.93	21.98	21.96	22.09	22.05	0-2	2
		1	99	21.95	21.99	21.90	22.03	21.95	0-2	2
		50	0	21.41	21.48	21.45	21.60	21.52	0-3	3
		50	25	21.37	21.46	21.39	21.55	21.48	0-3	3
		50	49	21.33	21.45	21.34	21.50	21.41	0-3	3
		100	0	21.35	21.46	21.39	21.53	21.47	0-3	3

Note;
LTE Band 41 has 5 required test channels per FCC KDB 447498 D01v06.

LTE Band 41 Power Class 2 Conducted Power

LTE Band 41 _ 5 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39675 Ch. 2498.5 ㎒	40148 Ch. 2545.8 ㎒	40620 Ch. 2593.0 ㎒	41093 Ch. 2640.3 ㎒	41565 Ch. 2687.5 ㎒		
5 ㎒	QPSK	1	0	25.85	25.68	25.67	25.52	25.60	0	0
		1	12	25.89	25.70	25.62	25.52	25.58	0	0
		1	24	25.83	25.55	25.61	25.49	25.53	0	0
		12	0	24.94	24.73	24.70	24.50	24.60	0-1	1
		12	6	24.90	24.72	24.69	24.50	24.60	0-1	1
		12	11	24.90	24.60	24.70	24.51	24.57	0-1	1
		25	0	24.90	24.63	24.70	24.48	24.60	0-1	1
	16QAM	1	0	25.17	24.98	24.91	24.78	24.88	0-1	1
		1	12	25.21	25.01	24.90	24.80	24.91	0-1	1
		1	24	25.15	24.84	24.84	24.75	24.87	0-1	1
		12	0	24.00	23.88	23.84	23.64	23.74	0-2	2
		12	6	24.03	23.87	23.84	23.65	23.70	0-2	2
		12	11	24.02	23.75	23.77	23.58	23.70	0-2	2
		25	0	24.01	23.72	23.76	23.62	23.70	0-2	2
	64QAM	1	0	23.93	23.77	23.75	23.58	23.71	0-2	2
		1	12	23.97	23.76	23.73	23.57	23.67	0-2	2
		1	24	23.92	23.63	23.68	23.56	23.63	0-2	2
		12	0	23.04	22.90	22.86	22.69	22.77	0-3	3
		12	6	23.03	22.89	22.88	22.69	22.78	0-3	3
		12	11	23.00	22.76	22.80	22.63	22.74	0-3	3
		25	0	23.02	22.77	22.83	22.62	22.75	0-3	3

LTE Band 41 _ 10 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39700 Ch. 2501 ㎒	40160 Ch. 2547 ㎒	40620 Ch. 2593 ㎒	41080 Ch. 2639 ㎒	41540 Ch. 2685 ㎒		
10 ㎒	QPSK	1	0	25.83	25.74	25.69	25.56	25.73	0	0
		1	24	25.82	25.71	25.63	25.55	25.63	0	0
		1	49	25.80	25.53	25.59	25.47	25.57	0	0
		25	0	24.94	24.75	24.72	24.56	24.66	0-1	1
		25	12	24.91	24.65	24.72	24.54	24.63	0-1	1
		25	24	24.91	24.64	24.64	24.52	24.63	0-1	1
		50	0	24.92	24.65	24.70	24.52	24.67	0-1	1
	16QAM	1	0	25.22	25.09	24.96	24.89	25.06	0-1	1
		1	24	25.16	25.03	24.88	24.84	24.93	0-1	1
		1	49	25.13	24.88	24.89	24.80	24.90	0-1	1
		25	0	24.03	23.84	23.83	23.66	23.76	0-2	2
		25	12	24.00	23.75	23.81	23.63	23.77	0-2	2
		25	24	24.01	23.73	23.78	23.58	23.72	0-2	2
		50	0	24.01	23.77	23.80	23.63	23.78	0-2	2
	64QAM	1	0	23.95	23.85	23.82	23.63	23.81	0-2	2
		1	24	23.90	23.77	23.72	23.59	23.69	0-2	2
		1	49	23.90	23.66	23.66	23.53	23.63	0-2	2
		25	0	23.07	22.92	22.85	22.72	22.83	0-3	3
		25	12	23.07	22.83	22.89	22.69	22.84	0-3	3
		25	24	23.05	22.74	22.84	22.66	22.75	0-3	3
		50	0	23.02	22.72	22.82	22.64	22.76	0-3	3

LTE Band 41 _ 15 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39725 Ch. 2503.5 ㎒	40173 Ch. 2548.3 ㎒	40620 Ch. 2593.0 ㎒	41068 Ch. 2637.8 ㎒	41515 Ch. 2682.5 ㎒		
15 ㎒	QPSK	1	0	25.95	25.77	25.74	25.60	25.71	0	0
		1	36	25.89	25.54	25.61	25.44	25.54	0	0
		1	74	25.89	25.56	25.59	25.51	25.52	0	0
		36	0	24.95	24.71	24.75	24.59	24.70	0-1	1
		36	18	24.93	24.65	24.76	24.58	24.66	0-1	1
		36	39	24.90	24.59	24.67	24.52	24.62	0-1	1
		75	0	24.94	24.67	24.72	24.54	24.65	0-1	1
	16QAM	1	0	25.24	25.11	25.03	24.91	25.07	0-1	1
		1	36	25.15	24.86	24.87	24.77	24.84	0-1	1
		1	74	25.17	24.90	24.86	24.77	24.87	0-1	1
		36	0	23.96	23.71	23.78	23.61	23.78	0-2	2
		36	18	23.96	23.70	23.75	23.60	23.71	0-2	2
		36	39	23.93	23.66	23.71	23.56	23.67	0-2	2
		75	0	24.03	23.75	23.81	23.63	23.74	0-2	2
	64QAM	1	0	24.00	23.88	23.82	23.68	23.79	0-2	2
		1	36	23.91	23.62	23.71	23.51	23.65	0-2	2
		1	74	23.93	23.64	23.68	23.53	23.64	0-2	2
		36	0	23.02	22.76	22.84	22.64	22.76	0-3	3
		36	18	23.00	22.75	22.80	22.63	22.73	0-3	3
		36	39	22.97	22.68	22.75	22.57	22.67	0-3	3
		75	0	23.02	22.75	22.78	22.62	22.77	0-3	3

LTE Band 41 _ 20 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39750 Ch. 2506.0 ㎒	40185 Ch. 2549.5 ㎒	40620 Ch. 2593.0 ㎒	41055 Ch. 2636.5 ㎒	41490 Ch. 2680.0 ㎒		
20 ㎒	QPSK	1	0	25.98	25.82	25.79	25.69	25.74	0	0
		1	49	25.88	25.55	25.64	25.52	25.58	0	0
		1	99	25.87	25.53	25.59	25.43	25.49	0	0
		50	0	24.98	24.74	24.80	24.57	24.74	0-1	1
		50	25	24.97	24.68	24.76	24.56	24.68	0-1	1
		50	49	24.94	24.65	24.67	24.52	24.62	0-1	1
		100	0	24.96	24.69	24.74	24.57	24.68	0-1	1
	16QAM	1	0	25.29	25.13	25.05	24.98	25.07	0-1	1
		1	49	25.18	24.88	24.96	24.78	24.90	0-1	1
		1	99	25.16	24.85	24.84	24.73	24.84	0-1	1
		50	0	24.09	23.84	23.89	23.71	23.85	0-2	2
		50	25	24.08	23.78	23.84	23.65	23.80	0-2	2
		50	49	24.06	23.74	23.78	23.61	23.73	0-2	2
		100	0	24.07	23.78	23.84	23.66	23.78	0-2	2
	64QAM	1	0	24.05	23.90	23.91	23.73	23.84	0-2	2
		1	49	23.93	23.64	23.74	23.56	23.69	0-2	2
		1	99	23.93	23.63	23.66	23.52	23.61	0-2	2
		50	0	23.08	22.80	22.86	22.70	22.82	0-3	3
		50	25	23.08	22.78	22.82	22.65	22.77	0-3	3
		50	49	23.01	22.72	22.75	22.59	22.70	0-3	3
		100	0	23.04	22.76	22.81	22.66	22.76	0-3	3

Note;
LTE Band 41 has 5 required test channels per FCC KDB 447498 D01v06.

[LTE Band 71]

LTE Band 71 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133147 Ch. 665.5 ㎒	133297 Ch. 680.5 ㎒	133447 Ch. 695.5 ㎒		
5 ㎒	QPSK	1	0	24.37	24.47	24.26	0	0
		1	12	24.29	24.41	24.08	0	0
		1	24	24.33	24.46	24.03	0	0
		12	0	23.37	23.54	23.26	0-1	1
		12	6	23.45	23.52	23.11	0-1	1
		12	11	23.38	23.44	23.10	0-1	1
		25	0	23.39	23.48	23.21	0-1	1
	16QAM	1	0	23.68	23.81	23.51	0-1	1
		1	12	23.65	23.63	23.39	0-1	1
		1	24	23.68	23.77	23.34	0-1	1
		12	0	22.44	22.65	22.34	0-2	2
		12	6	22.54	22.60	22.19	0-2	2
		12	11	22.44	22.57	22.17	0-2	2
		25	0	22.54	22.56	22.28	0-2	2
	64QAM	1	0	22.51	22.79	22.48	0-2	2
		1	12	22.60	22.70	22.30	0-2	2
		1	24	22.67	22.62	22.22	0-2	2
		12	0	21.48	21.68	21.33	0-3	3
		12	6	21.58	21.63	21.24	0-3	3
		12	11	21.55	21.57	21.22	0-3	3
		25	0	21.54	21.58	21.30	0-3	3

LTE Band 71 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133172 Ch. 668 ㎒	133297 Ch. 680.5 ㎒	133422 Ch. 693 ㎒		
10 ㎒	QPSK	1	0	24.33	24.47	24.27	0	0
		1	24	24.35	24.45	24.20	0	0
		1	49	24.42	24.25	24.02	0	0
		25	0	23.44	23.53	23.27	0-1	1
		25	12	23.49	23.52	23.26	0-1	1
		25	24	23.44	23.46	23.21	0-1	1
		50	0	23.36	23.53	23.19	0-1	1
	16QAM	1	0	23.59	23.79	23.60	0-1	1
		1	24	23.71	23.67	23.56	0-1	1
		1	49	23.64	23.57	23.23	0-1	1
		25	0	22.59	22.64	22.39	0-2	2
		25	12	22.50	22.64	22.36	0-2	2
		25	24	22.57	22.57	22.29	0-2	2
		50	0	22.49	22.62	22.34	0-2	2
	64QAM	1	0	22.71	22.74	22.52	0-2	2
		1	24	22.62	22.72	22.50	0-2	2
		1	49	22.68	22.54	22.22	0-2	2
		25	0	21.52	21.67	21.33	0-3	3
		25	12	21.52	21.63	21.34	0-3	3
		25	24	21.56	21.56	21.26	0-3	3
		50	0	21.54	21.63	21.35	0-3	3

LTE Band 71 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133197 Ch. 670.5 ㎒	133297 Ch. 680.5 ㎒	133397 Ch. 690.5 ㎒		
15 ㎒	QPSK	1	0	24.38	24.47	24.47	0	0
		1	36	24.38	24.48	24.26	0	0
		1	74	24.36	24.20	24.05	0	0
		36	0	23.43	23.55	23.43	0-1	1
		36	18	23.56	23.58	23.30	0-1	1
		36	39	23.45	23.43	23.22	0-1	1
		75	0	23.47	23.52	23.28	0-1	1
	16QAM	1	0	23.69	23.87	23.72	0-1	1
		1	36	23.74	23.79	23.53	0-1	1
		1	74	23.68	23.58	23.38	0-1	1
		36	0	22.56	22.73	22.51	0-2	2
		36	18	22.64	22.69	22.35	0-2	2
		36	39	22.54	22.53	22.32	0-2	2
		75	0	22.60	22.60	22.34	0-2	2
	64QAM	1	0	22.70	22.78	22.64	0-2	2
		1	36	22.64	22.85	22.58	0-2	2
		1	74	22.61	22.54	22.27	0-2	2
		36	0	21.59	21.76	21.56	0-3	3
		36	18	21.71	21.72	21.43	0-3	3
		36	39	21.56	21.53	21.28	0-3	3
		75	0	21.62	21.62	21.35	0-3	3

LTE Band 71 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133222 Ch. 673 ㎒	133297 Ch. 680.5 ㎒	133372 Ch. 688 ㎒		
20 ㎒	QPSK	1	0	24.41	24.44	24.57	0	0
		1	49	24.47	24.45	24.25	0	0
		1	99	24.39	24.25	23.99	0	0
		50	0	23.47	23.63	23.52	0-1	1
		50	25	23.52	23.55	23.46	0-1	1
		50	49	23.54	23.48	23.26	0-1	1
		100	0	23.49	23.52	23.43	0-1	1
	16QAM	1	0	23.80	23.79	23.90	0-1	1
		1	49	23.81	23.76	23.58	0-1	1
		1	99	23.67	23.44	23.32	0-1	1
		50	0	22.59	22.66	22.61	0-2	2
		50	25	22.63	22.63	22.52	0-2	2
		50	49	22.61	22.50	22.30	0-2	2
		100	0	22.57	22.58	22.51	0-2	2
	64QAM	1	0	22.72	22.72	22.81	0-2	2
		1	49	22.75	22.79	22.53	0-2	2
		1	99	22.63	22.44	22.25	0-2	2
		50	0	21.59	21.75	21.58	0-3	3
		50	25	21.62	21.69	21.54	0-3	3
		50	49	21.61	21.54	21.34	0-3	3
		100	0	21.58	21.62	21.48	0-3	3

The EUT enables maximum power reduction in accordance with 3GPP 36.101. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

11.2.2 LTE Reduced Conducted Power

[LTE Band 12 Conducted Power]

LTE Band 12 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23017 Ch. 699.7 ㎒	23095 Ch. 707.5 ㎒	23173 Ch. 715.3 ㎒		
1.4 ㎒	QPSK	1	0	16.32	16.24	16.17	0	0
		1	3	16.43	16.34	16.20	0	0
		1	5	16.33	16.18	16.15	0	0
		3	0	16.37	16.28	16.15	0	0
		3	1	16.39	16.27	16.20	0	0
		3	3	16.32	16.19	16.16	0	0
		6	0	16.36	16.24	16.17	0-1	0
	16QAM	1	0	16.58	16.62	16.48	0-1	0
		1	3	16.66	16.54	16.54	0-1	0
		1	5	16.65	16.55	16.55	0-1	0
		3	0	16.54	16.42	16.28	0-1	0
		3	1	16.50	16.46	16.38	0-1	0
		3	3	16.48	16.31	16.27	0-1	0
		6	0	16.53	16.43	16.39	0-2	0
	64QAM	1	0	16.74	16.42	16.21	0-2	0
		1	3	16.64	16.49	16.41	0-2	0
		1	5	16.57	16.37	16.17	0-2	0
		3	0	16.54	16.44	16.37	0-2	0
		3	1	16.56	16.53	16.40	0-2	0
		3	3	16.50	16.44	16.35	0-2	0
		6	0	16.45	16.35	16.13	0-3	0

LTE Band 12 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23025 Ch. 700.5 ㎒	23095 Ch. 707.5 ㎒	23165 Ch. 714.5 ㎒		
3 ㎒	QPSK	1	0	16.45	16.35	16.25	0	0
		1	7	16.53	16.37	16.33	0	0
		1	14	16.41	16.32	16.18	0	0
		8	0	16.44	16.34	16.27	0-1	0
		8	3	16.43	16.31	16.29	0-1	0
		8	7	16.42	16.30	16.22	0-1	0
		15	0	16.42	16.30	16.23	0-1	0
	16QAM	1	0	16.72	16.59	16.64	0-1	0
		1	7	16.81	16.79	16.63	0-1	0
		1	14	16.75	16.56	16.53	0-1	0
		8	0	16.54	16.51	16.37	0-2	0
		8	3	16.57	16.52	16.41	0-2	0
		8	7	16.54	16.45	16.34	0-2	0
		15	0	16.51	16.45	16.33	0-2	0
	64QAM	1	0	16.63	16.64	16.31	0-2	0
		1	7	16.65	16.63	16.52	0-2	0
		1	14	16.62	16.59	16.45	0-2	0
		8	0	16.48	16.44	16.36	0-3	0
		8	3	16.55	16.48	16.45	0-3	0
		8	7	16.54	16.30	16.32	0-3	0
		15	0	16.52	16.44	16.33	0-3	0

LTE Band 12 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23035 Ch. 701.5 ㎒	23095 Ch. 707.5 ㎒	23155 Ch. 713.5 ㎒		
5 ㎒	QPSK	1	0	16.41	16.34	16.30	0	0
		1	12	16.33	16.33	16.24	0	0
		1	24	16.39	16.25	16.18	0	0
		12	0	16.45	16.34	16.31	0-1	0
		12	6	16.46	16.37	16.32	0-1	0
		12	11	16.39	16.37	16.28	0-1	0
		25	0	16.41	16.36	16.29	0-1	0
	16QAM	1	0	16.73	16.66	16.67	0-1	0
		1	12	16.65	16.56	16.55	0-1	0
		1	24	16.84	16.61	16.63	0-1	0
		12	0	16.51	16.44	16.38	0-2	0
		12	6	16.50	16.42	16.36	0-2	0
		12	11	16.46	16.45	16.37	0-2	0
		25	0	16.52	16.45	16.36	0-2	0
	64QAM	1	0	16.67	16.55	16.49	0-2	0
		1	12	16.57	16.44	16.49	0-2	0
		1	24	16.53	16.47	16.32	0-2	0
		12	0	16.58	16.51	16.43	0-3	0
		12	6	16.57	16.52	16.42	0-3	0
		12	11	16.51	16.41	16.39	0-3	0
		25	0	16.49	16.41	16.36	0-3	0

LTE Band 12 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23095 Ch. 707.5 ㎒		
10 ㎒	QPSK	1	0	16.40	0	0
		1	24	16.31	0	0
		1	49	16.23	0	0
		25	0	16.39	0-1	0
		25	12	16.40	0-1	0
		25	24	16.33	0-1	0
		50	0	16.33	0-1	0
	16QAM	1	0	16.62	0-1	0
		1	24	16.70	0-1	0
		1	49	16.64	0-1	0
		25	0	16.49	0-2	0
		25	12	16.46	0-2	0
		25	24	16.45	0-2	0
		50	0	16.47	0-2	0
	64QAM	1	0	16.66	0-2	0
		1	24	16.63	0-2	0
		1	49	16.55	0-2	0
		25	0	16.51	0-3	0
		25	12	16.46	0-3	0
		25	24	16.36	0-3	0
		50	0	16.46	0-3	0

Note: LTE Band 12 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 14 Conducted Power]
LTE Band 14 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23305 Ch. 790.5 ㎒	23330 Ch. 793 ㎒	23355 Ch. 795.5 ㎒		
5 ㎒	QPSK	1	0	14.62	14.72	14.73	0	0
		1	12	14.65	14.77	14.80	0	0
		1	24	14.73	14.70	14.79	0	0
		12	0	14.75	14.81	14.78	0-1	0
		12	6	14.73	14.80	14.78	0-1	0
		12	11	14.84	14.80	14.85	0-1	0
		25	0	14.73	14.75	14.76	0-1	0
	16QAM	1	0	14.97	15.06	15.16	0-1	0
		1	12	14.97	15.12	15.19	0-1	0
		1	24	15.04	15.04	15.20	0-1	0
		12	0	14.80	14.91	14.91	0-2	0
		12	6	14.84	14.91	14.86	0-2	0
		12	11	14.89	14.87	14.92	0-2	0
		25	0	14.83	14.88	14.84	0-2	0
	64QAM	1	0	14.88	14.99	14.98	0-2	0
		1	12	14.96	14.99	15.16	0-2	0
		1	24	15.10	14.98	15.09	0-2	0
		12	0	14.91	14.93	14.91	0-3	0
		12	6	14.88	14.95	14.87	0-3	0
		12	11	14.90	14.89	14.99	0-3	0
		25	0	14.84	14.93	14.87	0-3	0

LTE Band 14 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23330 Ch. 793 ㎒		
10 ㎒	QPSK	1	0	14.61	0	0
		1	24	14.73	0	0
		1	49	14.76	0	0
		25	0	14.71	0-1	0
		25	12	14.82	0-1	0
		25	24	14.79	0-1	0
		50	0	14.76	0-1	0
	16QAM	1	0	14.96	0-1	0
		1	24	15.10	0-1	0
		1	49	15.17	0-1	0
		25	0	15.06	0-2	0
		25	12	15.01	0-2	0
		25	24	14.99	0-2	0
		50	0	15.02	0-2	0
	64QAM	1	0	15.02	0-2	0
		1	24	15.01	0-2	0
		1	49	15.04	0-2	0
		25	0	14.85	0-3	0
		25	12	14.92	0-3	0
		25	24	14.85	0-3	0
		50	0	14.88	0-3	0

Note: LTE Band 14 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 17 Conducted Power]

LTE Band 17 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23790 Ch. 710 ㎒		
5 ㎒	QPSK	1	0	15.70	0	0
		1	12	15.66	0	0
		1	24	15.65	0	0
		12	0	15.74	0-1	0
		12	6	15.75	0-1	0
		12	11	15.71	0-1	0
		25	0	15.71	0-1	0
	16QAM	1	0	16.02	0-1	0
		1	12	15.94	0-1	0
		1	24	15.94	0-1	0
		12	0	15.86	0-2	0
		12	6	15.85	0-2	0
		12	11	15.79	0-2	0
		25	0	15.85	0-2	0
	64QAM	1	0	15.96	0-2	0
		1	12	15.95	0-2	0
		1	24	15.86	0-2	0
		12	0	15.89	0-3	0
		12	6	15.90	0-3	0
		12	11	15.87	0-3	0
		25	0	15.85	0-3	0

LTE Band 17 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23790 Ch. 710 ㎒		
10 ㎒	QPSK	1	0	15.78	0	0
		1	24	15.68	0	0
		1	49	15.62	0	0
		25	0	15.76	0-1	0
		25	12	15.73	0-1	0
		25	24	15.72	0-1	0
		50	0	15.73	0-1	0
	16QAM	1	0	16.08	0-1	0
		1	24	15.96	0-1	0
		1	49	15.99	0-1	0
		25	0	15.85	0-2	0
		25	12	15.82	0-2	0
		25	24	15.77	0-2	0
		50	0	15.80	0-2	0
	64QAM	1	0	15.94	0-2	0
		1	24	15.89	0-2	0
		1	49	15.84	0-2	0
		25	0	15.87	0-3	0
		25	12	15.89	0-3	0
		25	24	15.79	0-3	0
		50	0	15.84	0-3	0

Note: LTE Band 17 at 5 ㎒ &10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 25 Conducted Power]

LTE Band 25 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26047 Ch. 1850.7 ㎒	26365 Ch. 1882.5 ㎒	26683 Ch. 1914.3 ㎒		
1.4 ㎒	QPSK	1	0	11.94	11.63	11.76	0	0
		1	3	12.00	11.70	11.86	0	0
		1	5	11.92	11.63	11.77	0	0
		3	0	11.93	11.65	11.83	0	0
		3	1	11.97	11.69	11.86	0	0
		3	3	11.93	11.65	11.81	0	0
		6	0	11.96	11.66	11.85	0-1	0
	16QAM	1	0	12.26	11.89	12.06	0-1	0
		1	3	12.22	12.05	12.06	0-1	0
		1	5	12.13	11.89	11.99	0-1	0
		3	0	11.97	11.70	11.83	0-1	0
		3	1	12.04	11.74	11.95	0-1	0
		3	3	12.03	11.67	11.87	0-1	0
		6	0	12.09	11.80	11.94	0-2	0
	64QAM	1	0	12.16	11.88	12.08	0-2	0
		1	3	12.15	11.85	12.06	0-2	0
		1	5	12.14	11.83	11.91	0-2	0
		3	0	12.11	11.85	12.00	0-2	0
		3	1	12.14	11.84	12.08	0-2	0
		3	3	12.14	11.80	11.98	0-2	0
		6	0	12.06	11.69	11.83	0-3	0

LTE Band 25 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26055 Ch. 1851.5 ㎒	26365 Ch. 1882.5 ㎒	26675Ch. 1913.5 ㎒		
3 ㎒	QPSK	1	0	11.97	11.73	11.88	0	0
		1	7	12.11	11.87	11.98	0	0
		1	14	11.98	11.72	11.84	0	0
		8	0	12.05	11.76	11.93	0-1	0
		8	3	12.04	11.79	11.90	0-1	0
		8	7	12.02	11.77	11.92	0-1	0
		15	0	12.01	11.79	11.91	0-1	0
	16QAM	1	0	12.26	12.01	12.15	0-1	0
		1	7	12.43	12.09	12.25	0-1	0
		1	14	12.36	12.05	12.07	0-1	0
		8	0	12.15	11.85	11.93	0-2	0
		8	3	12.14	11.88	12.02	0-2	0
		8	7	12.07	11.84	11.99	0-2	0
		15	0	12.11	11.83	11.97	0-2	0
	64QAM	1	0	12.20	12.00	12.02	0-2	0
		1	7	12.28	11.99	12.15	0-2	0
		1	14	12.21	11.97	11.97	0-2	0
		8	0	12.14	11.85	11.97	0-3	0
		8	3	12.15	11.91	12.00	0-3	0
		8	7	12.08	11.84	11.97	0-3	0
		15	0	12.08	11.88	11.99	0-3	0

LTE Band 25 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26065 Ch. 1852.5 ㎒	26365 Ch. 1882.5 ㎒	26665 Ch. 1912.5 ㎒		
5 ㎒	QPSK	1	0	12.07	11.81	11.96	0	0
		1	12	12.03	11.81	11.85	0	0
		1	24	12.01	11.78	11.86	0	0
		12	0	12.11	11.83	11.96	0-1	0
		12	6	12.08	11.84	11.96	0-1	0
		12	11	12.05	11.80	11.91	0-1	0
		25	0	12.06	11.80	11.93	0-1	0
	16QAM	1	0	12.33	12.09	12.14	0-1	0
		1	12	12.16	12.01	12.16	0-1	0
		1	24	12.23	12.04	12.20	0-1	0
		12	0	12.17	11.85	11.98	0-2	0
		12	6	12.13	11.86	11.95	0-2	0
		12	11	12.06	11.84	11.93	0-2	0
		25	0	12.10	11.87	11.97	0-2	0
	64QAM	1	0	12.32	12.01	12.05	0-2	0
		1	12	12.27	11.91	11.98	0-2	0
		1	24	12.25	12.00	12.08	0-2	0
		12	0	12.13	11.92	12.01	0-3	0
		12	6	12.16	11.91	12.02	0-3	0
		12	11	12.14	11.90	11.97	0-3	0
		25	0	12.13	11.87	11.98	0-3	0

LTE Band 25 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26090 Ch. 1855 ㎒	26365 Ch. 1882.5 ㎒	26640 Ch. 1910 ㎒		
10 ㎒	QPSK	1	0	12.26	12.03	11.83	0	0
		1	24	12.01	11.74	11.86	0	0
		1	49	12.14	11.95	11.86	0	0
		25	0	12.12	11.86	11.88	0-1	0
		25	12	12.08	11.84	11.87	0-1	0
		25	24	11.97	11.83	11.93	0-1	0
		50	0	11.98	11.89	11.86	0-1	0
	16QAM	1	0	12.59	12.32	12.11	0-1	0
		1	24	12.24	12.02	12.11	0-1	0
		1	49	12.33	12.27	12.24	0-1	0
		25	0	12.20	11.95	11.93	0-2	0
		25	12	12.16	11.89	11.89	0-2	0
		25	24	12.03	11.86	11.97	0-2	0
		50	0	12.07	11.88	11.93	0-2	0
	64QAM	1	0	12.50	12.25	12.13	0-2	0
		1	24	12.21	12.04	12.13	0-2	0
		1	49	12.32	12.23	12.05	0-2	0
		25	0	12.20	11.93	11.95	0-3	0
		25	12	12.16	11.91	11.96	0-3	0
		25	24	12.00	11.88	12.01	0-3	0
		50	0	12.08	11.94	11.96	0-3	0

LTE Band 25 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26115 Ch. 1857.5 ㎒	26365 Ch. 1882.5 ㎒	26615 Ch. 1907.5 ㎒		
15 ㎒	QPSK	1	0	12.10	11.87	11.95	0	0
		1	36	12.05	11.77	11.82	0	0
		1	74	11.91	11.88	11.96	0	0
		36	0	12.12	11.87	11.95	0-1	0
		36	18	12.01	11.86	11.91	0-1	0
		36	39	11.96	11.81	11.85	0-1	0
		75	0	11.98	11.84	11.91	0-1	0
	16QAM	1	0	12.39	12.16	12.18	0-1	0
		1	36	12.30	12.09	12.11	0-1	0
		1	74	12.21	12.17	12.20	0-1	0
		36	0	12.17	11.91	11.96	0-2	0
		36	18	12.00	11.89	11.94	0-2	0
		36	39	12.01	11.87	11.90	0-2	0
		75	0	12.04	11.88	11.91	0-2	0
	64QAM	1	0	12.35	12.04	12.18	0-2	0
		1	36	12.17	11.93	12.02	0-2	0
		1	74	12.14	12.06	12.05	0-2	0
		36	0	12.22	11.95	11.98	0-3	0
		36	18	12.04	11.95	11.96	0-3	0
		36	39	12.03	11.92	11.94	0-3	0
		75	0	12.03	11.92	11.92	0-3	0

LTE Band 25 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26140 Ch. 1860 ㎒	26365 Ch. 1882.5 ㎒	26590 Ch. 1905 ㎒		
20 ㎒	QPSK	1	0	12.25	12.14	11.89	0	0
		1	49	11.87	11.75	11.77	0	0
		1	99	12.07	11.94	11.93	0	0
		50	0	12.05	11.92	11.84	0-1	0
		50	25	12.03	11.89	11.91	0-1	0
		50	49	11.99	11.84	11.91	0-1	0
		100	0	12.02	11.89	11.94	0-1	0
	16QAM	1	0	12.54	12.45	12.20	0-1	0
		1	49	12.08	11.94	12.07	0-1	0
		1	99	12.27	12.27	12.08	0-1	0
		50	0	12.13	11.94	11.93	0-2	0
		50	25	12.07	11.93	11.95	0-2	0
		50	49	12.03	11.91	11.92	0-2	0
		100	0	12.05	11.91	11.96	0-2	0
	64QAM	1	0	12.53	12.40	12.05	0-2	0
		1	49	12.01	11.99	11.96	0-2	0
		1	99	12.20	12.17	12.12	0-2	0
		50	0	12.14	12.01	11.90	0-3	0
		50	25	12.11	11.95	11.99	0-3	0
		50	49	12.07	11.92	11.95	0-3	0
		100	0	12.06	11.94	11.98	0-3	0

[LTE Band 26 Conducted Power]

LTE Band 26 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26697 Ch. 814.7 ㎒	26865 Ch. 831.5 ㎒	27033 Ch. 848.3 ㎒		
1.4 ㎒	QPSK	1	0	16.46	16.44	16.70	0	0
		1	3	16.56	16.55	16.76	0	0
		1	5	16.49	16.47	16.66	0	0
		3	0	16.51	16.49	16.72	0	0
		3	1	16.54	16.52	16.74	0	0
		3	3	16.53	16.49	16.71	0	0
		6	0	16.53	16.50	16.73	0-1	0
	16QAM	1	0	16.81	16.78	17.05	0-1	0
		1	3	16.83	16.88	17.08	0-1	0
		1	5	16.92	16.78	16.98	0-1	0
		3	0	16.65	16.59	16.77	0-1	0
		3	1	16.76	16.67	16.85	0-1	0
		3	3	16.62	16.56	16.74	0-1	0
		6	0	16.68	16.66	16.86	0-2	0
	64QAM	1	0	16.77	16.56	16.90	0-2	0
		1	3	16.79	16.79	17.06	0-2	0
		1	5	16.79	16.66	16.88	0-2	0
		3	0	16.75	16.71	16.88	0-2	0
		3	1	16.72	16.74	16.95	0-2	0
		3	3	16.64	16.72	16.83	0-2	0
		6	0	16.64	16.59	16.79	0-3	0

LTE Band 26 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26705 Ch. 815.5 ㎒	26865 Ch. 831.5 ㎒	27025 Ch. 847.5 ㎒		
3 ㎒	QPSK	1	0	16.66	16.56	16.75	0	0
		1	7	16.76	16.65	16.82	0	0
		1	14	16.66	16.56	16.80	0	0
		8	0	16.70	16.57	16.82	0-1	0
		8	3	16.67	16.56	16.85	0-1	0
		8	7	16.67	16.56	16.76	0-1	0
		15	0	16.72	16.57	16.80	0-1	0
	16QAM	1	0	16.99	16.94	17.09	0-1	0
		1	7	17.05	17.01	17.11	0-1	0
		1	14	16.97	16.73	17.12	0-1	0
		8	0	16.84	16.71	16.91	0-2	0
		8	3	16.89	16.74	16.93	0-2	0
		8	7	16.79	16.73	16.90	0-2	0
		15	0	16.76	16.67	16.87	0-2	0
	64QAM	1	0	16.92	16.85	16.95	0-2	0
		1	7	17.07	16.90	17.15	0-2	0
		1	14	17.03	16.77	16.87	0-2	0
		8	0	16.79	16.68	16.90	0-3	0
		8	3	16.86	16.73	16.92	0-3	0
		8	7	16.83	16.67	16.91	0-3	0
		15	0	16.80	16.67	16.86	0-3	0

LTE Band 26 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26715 Ch. 816.5 ㎒	26865 Ch. 831.5 ㎒	27015 Ch. 846.5 ㎒		
5 ㎒	QPSK	1	0	16.68	16.56	16.86	0	0
		1	12	16.64	16.52	16.80	0	0
		1	24	16.56	16.62	16.73	0	0
		12	0	16.73	16.61	16.83	0-1	0
		12	6	16.75	16.60	16.82	0-1	0
		12	11	16.70	16.60	16.85	0-1	0
		25	0	16.69	16.57	16.86	0-1	0
	16QAM	1	0	16.93	16.95	17.16	0-1	0
		1	12	16.91	16.81	17.03	0-1	0
		1	24	17.08	16.95	17.09	0-1	0
		12	0	16.79	16.67	16.92	0-2	0
		12	6	16.78	16.73	16.92	0-2	0
		12	11	16.81	16.64	16.90	0-2	0
		25	0	16.67	16.68	16.89	0-2	0
	64QAM	1	0	16.97	16.76	17.01	0-2	0
		1	12	16.93	16.80	17.01	0-2	0
		1	24	16.85	16.84	16.90	0-2	0
		12	0	16.77	16.72	16.97	0-3	0
		12	6	16.83	16.74	16.96	0-3	0
		12	11	16.86	16.66	16.95	0-3	0
		25	0	16.79	16.70	16.89	0-3	0

LTE Band 26 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26740 Ch. 819 ㎒	26865 Ch. 831.5 ㎒	26990 Ch. 844 ㎒		
10 ㎒	QPSK	1	0	16.66	16.63	16.65	0	0
		1	24	16.64	16.59	16.80	0	0
		1	49	16.58	16.56	16.77	0	0
		25	0	16.71	16.65	16.74	0-1	0
		25	12	16.72	16.64	16.76	0-1	0
		25	24	16.62	16.52	16.85	0-1	0
		50	0	16.72	16.59	16.79	0-1	0
	16QAM	1	0	16.94	17.03	16.99	0-1	0
		1	24	16.93	16.81	17.17	0-1	0
		1	49	16.96	16.90	17.06	0-1	0
		25	0	16.83	16.72	16.84	0-2	0
		25	12	16.80	16.68	16.85	0-2	0
		25	24	16.73	16.68	16.94	0-2	0
		50	0	16.80	16.69	16.85	0-2	0
	64QAM	1	0	17.02	16.85	16.95	0-2	0
		1	24	16.88	16.74	17.00	0-2	0
		1	49	16.89	16.82	16.95	0-2	0
		25	0	16.83	16.69	16.82	0-3	0
		25	12	16.81	16.70	16.88	0-3	0
		25	24	16.75	16.67	16.94	0-3	0
		50	0	16.82	16.73	16.86	0-3	0

LTE Band 26 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26765 Ch. 821.5 ㎒	26865 Ch. 831.5 ㎒	26965 Ch. 841.5 ㎒		
15 ㎒	QPSK	1	0	16.72	16.66	16.66	0	0
		1	36	16.64	16.57	16.76	0	0
		1	74	16.57	16.64	16.78	0	0
		36	0	16.75	16.63	16.69	0-1	0
		36	18	16.68	16.62	16.74	0-1	0
		36	39	16.67	16.68	16.73	0-1	0
		75	0	16.69	16.60	16.75	0-1	0
	16QAM	1	0	17.06	16.99	17.00	0-1	0
		1	36	16.97	16.90	17.08	0-1	0
		1	74	16.82	17.03	17.02	0-1	0
		36	0	16.85	16.75	16.79	0-2	0
		36	18	16.78	16.76	16.88	0-2	0
		36	39	16.69	16.80	16.84	0-2	0
		75	0	16.79	16.71	16.81	0-2	0
	64QAM	1	0	16.91	16.95	16.99	0-2	0
		1	36	16.85	16.97	16.94	0-2	0
		1	74	16.74	16.93	17.02	0-2	0
		36	0	16.90	16.77	16.81	0-3	0
		36	18	16.88	16.75	16.90	0-3	0
		36	39	16.77	16.81	16.86	0-3	0
		75	0	16.80	16.74	16.82	0-3	0

[LTE Band 30 Conducted Power]
LTE Band 30 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				27685 Ch. 2307.5 ㎒	27710 Ch. 2310 ㎒	27735 Ch. 2312.5 ㎒		
5 ㎒	QPSK	1	0	12.93	13.03	13.06	0	0
		1	12	13.00	12.96	13.07	0	0
		1	24	12.99	13.06	13.06	0	0
		12	0	12.94	13.01	13.01	0-1	0
		12	6	13.09	13.09	13.03	0-1	0
		12	11	13.03	12.98	13.12	0-1	0
		25	0	13.05	13.04	13.00	0-1	0
	16QAM	1	0	13.24	13.41	13.38	0-1	0
		1	12	13.22	13.33	13.39	0-1	0
		1	24	13.29	13.43	13.36	0-1	0
		12	0	13.00	13.10	13.08	0-2	0
		12	6	13.14	13.15	13.08	0-2	0
		12	11	13.11	13.06	13.16	0-2	0
		25	0	13.07	13.09	13.07	0-2	0
	64QAM	1	0	13.21	13.27	13.37	0-2	0
		1	12	13.29	13.27	13.29	0-2	0
		1	24	13.20	13.28	13.36	0-2	0
		12	0	13.01	13.16	13.16	0-3	0
		12	6	13.19	13.17	13.11	0-3	0
		12	11	13.11	13.08	13.22	0-3	0
		25	0	13.15	13.09	13.06	0-3	0

LTE Band 30 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				27710 Ch. 2310 ㎒		
10 ㎒	QPSK	1	0	12.93	0	0
		1	24	13.01	0	0
		1	49	13.03	0	0
		25	0	13.11	0-1	0
		25	12	13.10	0-1	0
		25	24	13.04	0-1	0
		50	0	13.03	0-1	0
	16QAM	1	0	13.25	0-1	0
		1	24	13.24	0-1	0
		1	49	13.30	0-1	0
		25	0	13.13	0-2	0
		25	12	13.12	0-2	0
		25	24	13.11	0-2	0
		50	0	13.10	0-2	0
	64QAM	1	0	13.19	0-2	0
		1	24	13.24	0-2	0
		1	49	13.34	0-2	0
		25	0	13.19	0-3	0
		25	12	13.13	0-3	0
		25	24	13.10	0-3	0
		50	0	13.09	0-3	0

Note: LTE Band 14 at 10 ㎒ 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 mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 41 Conducted Power]

LTE Band 41 _ 5 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Reduced Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39675 Ch. 2498.5 ㎒	40148 Ch. 2545.8 ㎒	40620 Ch. 2593.0 ㎒	41093 Ch. 2640.3 ㎒	41565 Ch. 2687.5 ㎒		
5 ㎒	QPSK	1	0	13.72	13.85	13.71	13.86	13.78	0	0
		1	12	13.69	13.90	13.68	13.88	13.75	0	0
		1	24	13.62	13.71	13.65	13.83	13.71	0	0
		12	0	13.71	13.88	13.76	13.89	13.81	0-1	0
		12	6	13.75	13.89	13.77	13.93	13.80	0-1	0
		12	11	13.74	13.80	13.76	13.92	13.81	0-1	0
		25	0	13.72	13.78	13.72	13.91	13.81	0-1	0
	16QAM	1	0	13.87	14.05	13.93	14.05	13.96	0-1	0
		1	12	13.91	14.05	13.92	14.07	13.92	0-1	0
		1	24	13.85	13.91	13.86	14.03	13.90	0-1	0
		12	0	13.80	13.95	13.82	13.97	13.87	0-2	0
		12	6	13.78	13.97	13.84	13.97	13.88	0-2	0
		12	11	13.77	13.82	13.83	13.93	13.82	0-2	0
		25	0	13.87	13.92	13.87	14.03	13.92	0-2	0
	64QAM	1	0	13.62	13.66	13.54	13.67	13.58	0-2	0
		1	12	13.62	13.63	13.49	13.68	13.56	0-2	0
		1	24	13.57	13.58	13.52	13.66	13.54	0-2	0
		12	0	13.82	14.00	13.94	14.05	13.94	0-3	0
		12	6	13.81	14.03	13.94	14.05	14.00	0-3	0
		12	11	13.92	13.94	13.87	14.04	13.92	0-3	0
		25	0	13.87	13.96	13.90	14.07	13.98	0-3	0

LTE Band 41 _ 10 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Reduced Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39700 Ch. 2501 ㎒	40160 Ch. 2547 ㎒	40620 Ch. 2593 ㎒	41080 Ch. 2639 ㎒	41540 Ch. 2685 ㎒		
10 ㎒	QPSK	1	0	13.71	13.89	13.78	13.95	13.90	0	0
		1	24	13.64	13.89	13.66	13.93	13.79	0	0
		1	49	13.67	13.73	13.64	13.87	13.78	0	0
		25	0	13.76	13.95	13.73	13.95	13.88	0-1	0
		25	12	13.71	13.87	13.75	13.91	13.82	0-1	0
		25	24	13.67	13.76	13.72	13.89	13.82	0-1	0
		50	0	13.74	13.82	13.79	13.93	13.87	0-1	0
	16QAM	1	0	13.93	14.12	13.98	14.13	14.09	0-1	0
		1	24	13.91	14.08	13.93	14.06	13.97	0-1	0
		1	49	13.82	13.90	13.84	14.01	13.93	0-1	0
		25	0	13.83	14.04	13.89	14.06	13.98	0-2	0
		25	12	13.86	13.94	13.90	14.02	13.92	0-2	0
		25	24	13.84	13.92	13.83	14.02	13.91	0-2	0
		50	0	13.85	13.91	13.91	14.08	13.98	0-2	0
	64QAM	1	0	13.55	13.68	13.61	13.75	13.71	0-2	0
		1	24	13.50	13.66	13.53	13.70	13.57	0-2	0
		1	49	13.43	13.60	13.51	13.68	13.55	0-2	0
		25	0	13.87	14.09	13.97	14.09	14.04	0-3	0
		25	12	13.91	13.99	13.96	14.07	13.98	0-3	0
		25	24	13.89	13.97	13.90	14.09	13.95	0-3	0
		50	0	13.82	13.91	13.88	14.06	13.97	0-3	0

LTE Band 41 _ 15 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Reduced Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39725 Ch. 2503.5 ㎒	40173 Ch. 2548.3 ㎒	40620 Ch. 2593.0 ㎒	41068 Ch. 2637.8 ㎒	41515 Ch. 2682.5 ㎒		
15 ㎒	QPSK	1	0	13.82	13.92	13.86	14.02	13.91	0	0
		1	36	13.68	13.73	13.72	13.85	13.71	0	0
		1	74	13.69	13.75	13.71	13.82	13.71	0	0
		36	0	13.78	13.90	13.81	13.98	13.89	0-1	0
		36	18	13.78	13.89	13.79	13.95	13.89	0-1	0
		36	39	13.71	13.80	13.70	13.92	13.81	0-1	0
		75	0	13.79	13.80	13.74	13.90	13.85	0-1	0
	16QAM	1	0	13.98	14.14	14.06	14.19	14.13	0-1	0
		1	36	13.88	13.96	13.94	14.04	13.95	0-1	0
		1	74	13.85	13.95	13.91	14.05	13.90	0-1	0
		36	0	13.87	13.92	13.89	14.02	13.92	0-2	0
		36	18	13.85	13.91	13.86	14.01	13.94	0-2	0
		36	39	13.82	13.84	13.81	13.98	13.85	0-2	0
		75	0	13.86	13.96	13.94	14.03	13.94	0-2	0
	64QAM	1	0	13.59	13.72	13.65	13.78	13.76	0-2	0
		1	36	13.47	13.56	13.53	13.65	13.54	0-2	0
		1	74	13.46	13.59	13.52	13.63	13.50	0-2	0
		36	0	13.89	13.95	13.92	14.06	13.98	0-3	0
		36	18	13.86	13.94	13.92	14.02	13.95	0-3	0
		36	39	13.84	13.93	13.84	13.99	13.87	0-3	0
		75	0	13.87	13.98	13.91	14.05	13.96	0-3	0

LTE Band 41 _ 20 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Reduced Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39750 Ch. 2506.0 ㎒	40185 Ch. 2549.5 ㎒	40620 Ch. 2593.0 ㎒	41055 Ch. 2636.5 ㎒	41490 Ch. 2680.0 ㎒		
20 ㎒	QPSK	1	0	13.79	13.99	13.90	13.98	13.98	0	0
		1	49	13.67	13.76	13.69	13.85	13.79	0	0
		1	99	13.67	13.80	13.69	13.81	13.76	0	0
		50	0	13.81	13.89	13.88	13.97	13.96	0-1	0
		50	25	13.81	13.88	13.83	13.95	13.87	0-1	0
		50	49	13.79	13.86	13.73	13.91	13.80	0-1	0
		100	0	13.81	13.87	13.80	13.94	13.89	0-1	0
	16QAM	1	0	14.01	14.21	14.11	14.22	14.16	0-1	0
		1	49	13.90	13.95	13.91	14.06	14.00	0-1	0
		1	99	13.88	13.96	13.86	14.01	13.91	0-1	0
		50	0	13.96	13.98	13.99	14.11	14.08	0-2	0
		50	25	13.90	13.96	13.94	14.06	13.98	0-2	0
		50	49	13.86	13.94	13.88	14.05	13.91	0-2	0
		100	0	13.93	13.96	13.95	14.08	13.98	0-2	0
	64QAM	1	0	13.64	13.78	13.70	13.82	13.79	0-2	0
		1	49	13.46	13.60	13.53	13.64	13.60	0-2	0
		1	99	13.47	13.59	13.48	13.63	13.52	0-2	0
		50	0	13.93	14.00	13.97	14.14	14.07	0-3	0
		50	25	13.88	13.95	13.90	14.09	14.02	0-3	0
		50	49	13.86	13.92	13.88	14.04	13.90	0-3	0
		100	0	13.91	13.96	13.91	14.08	14.01	0-3	0

Note;
LTE Band 41 has 5 required test channels per FCC KDB 447498 D01v06.

[LTE Band 71]

LTE Band 71 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133147 Ch. 665.5 ㎒	133297 Ch. 680.5 ㎒	133447 Ch. 695.5 ㎒		
5 ㎒	QPSK	1	0	14.18	14.37	14.03	0	0
		1	12	14.15	14.26	13.94	0	0
		1	24	14.23	14.28	13.91	0	0
		12	0	14.26	14.39	14.08	0-1	0
		12	6	14.31	14.40	14.03	0-1	0
		12	11	14.33	14.35	13.99	0-1	0
		25	0	14.33	14.38	14.07	0-1	0
	16QAM	1	0	14.43	14.56	14.27	0-1	0
		1	12	14.47	14.50	14.11	0-1	0
		1	24	14.47	14.53	14.09	0-1	0
		12	0	14.20	14.41	14.10	0-2	0
		12	6	14.39	14.48	13.99	0-2	0
		12	11	14.35	14.41	13.99	0-2	0
		25	0	14.38	14.48	14.14	0-2	0
	64QAM	1	0	14.51	14.60	14.25	0-2	0
		1	12	14.45	14.63	14.03	0-2	0
		1	24	14.51	14.63	14.09	0-2	0
		12	0	14.37	14.55	14.14	0-3	0
		12	6	14.52	14.54	14.08	0-3	0
		12	11	14.47	14.52	14.00	0-3	0
		25	0	14.40	14.49	14.18	0-3	0

LTE Band 71 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133172 Ch. 668 ㎒	133297 Ch. 680.5 ㎒	133422 Ch. 693 ㎒		
10 ㎒	QPSK	1	0	14.22	14.31	14.14	0	0
		1	24	14.28	14.33	14.00	0	0
		1	49	14.24	14.14	13.84	0	0
		25	0	14.38	14.43	14.20	0-1	0
		25	12	14.35	14.38	14.17	0-1	0
		25	24	14.37	14.35	14.06	0-1	0
		50	0	14.33	14.37	14.14	0-1	0
	16QAM	1	0	14.50	14.50	14.29	0-1	0
		1	24	14.58	14.52	14.21	0-1	0
		1	49	14.43	14.49	14.20	0-1	0
		25	0	14.42	14.49	14.22	0-2	0
		25	12	14.40	14.47	14.19	0-2	0
		25	24	14.43	14.40	14.17	0-2	0
		50	0	14.35	14.28	14.16	0-2	0
	64QAM	1	0	14.47	14.53	14.31	0-2	0
		1	24	14.57	14.63	14.26	0-2	0
		1	49	14.50	14.26	14.08	0-2	0
		25	0	14.48	14.55	14.20	0-3	0
		25	12	14.44	14.52	14.22	0-3	0
		25	24	14.41	14.49	14.15	0-3	0
		50	0	14.42	14.53	14.20	0-3	0

LTE Band 71 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133197 Ch. 670.5 ㎒	133297 Ch. 680.5 ㎒	133397 Ch. 690.5 ㎒		
15 ㎒	QPSK	1	0	14.30	14.31	14.31	0	0
		1	36	14.21	14.33	14.08	0	0
		1	74	14.18	14.10	13.83	0	0
		36	0	14.35	14.43	14.31	0-1	0
		36	18	14.40	14.38	14.19	0-1	0
		36	39	14.27	14.28	14.05	0-1	0
		75	0	14.38	14.37	14.13	0-1	0
	16QAM	1	0	14.44	14.52	14.67	0-1	0
		1	36	14.47	14.67	14.42	0-1	0
		1	74	14.45	14.39	14.14	0-1	0
		36	0	14.42	14.47	14.33	0-2	0
		36	18	14.45	14.45	14.16	0-2	0
		36	39	14.30	14.42	14.11	0-2	0
		75	0	14.47	14.41	14.18	0-2	0
	64QAM	1	0	14.53	14.58	14.58	0-2	0
		1	36	14.50	14.69	14.22	0-2	0
		1	74	14.46	14.29	14.08	0-2	0
		36	0	14.53	14.58	14.42	0-3	0
		36	18	14.52	14.60	14.25	0-3	0
		36	39	14.43	14.44	14.15	0-3	0
		75	0	14.41	14.50	14.17	0-3	0

LTE Band 71 _ 20 ㎒ Bandwidth

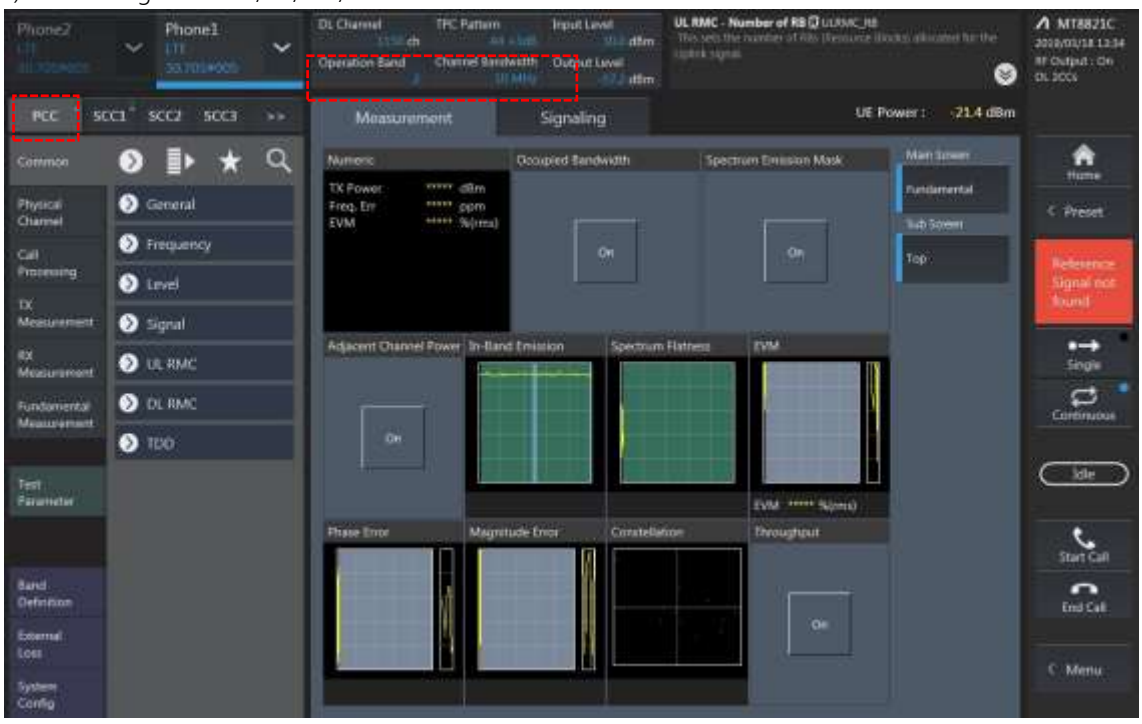
Bandwidth	Modulation	RB Size	RB Offset	Reduced Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				133222 Ch. 673 ㎒	133297 Ch. 680.5 ㎒	133372 Ch. 688 ㎒		
20 ㎒	QPSK	1	0	14.30	14.29	14.36	0	0
		1	49	14.24	14.34	14.07	0	0
		1	99	14.25	14.05	13.79	0	0
		50	0	14.39	14.49	14.39	0-1	0
		50	25	14.39	14.43	14.33	0-1	0
		50	49	14.40	14.34	14.13	0-1	0
		100	0	14.35	14.40	14.27	0-1	0
	16QAM	1	0	14.63	14.41	14.67	0-1	0
		1	49	14.45	14.61	14.33	0-1	0
		1	99	14.47	14.32	14.12	0-1	0
		50	0	14.44	14.54	14.46	0-2	0
		50	25	14.48	14.52	14.40	0-2	0
		50	49	14.45	14.42	14.18	0-2	0
		100	0	14.45	14.44	14.34	0-2	0
	64QAM	1	0	14.57	14.58	14.65	0-2	0
		1	49	14.53	14.64	14.37	0-2	0
		1	99	14.53	14.26	14.14	0-2	0
		50	0	14.44	14.60	14.49	0-3	0
		50	25	14.48	14.55	14.40	0-3	0
		50	49	14.52	14.42	14.16	0-3	0
		100	0	14.45	14.51	14.40	0-3	0

The EUT enables maximum power reduction in accordance with 3GPP 36.101. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

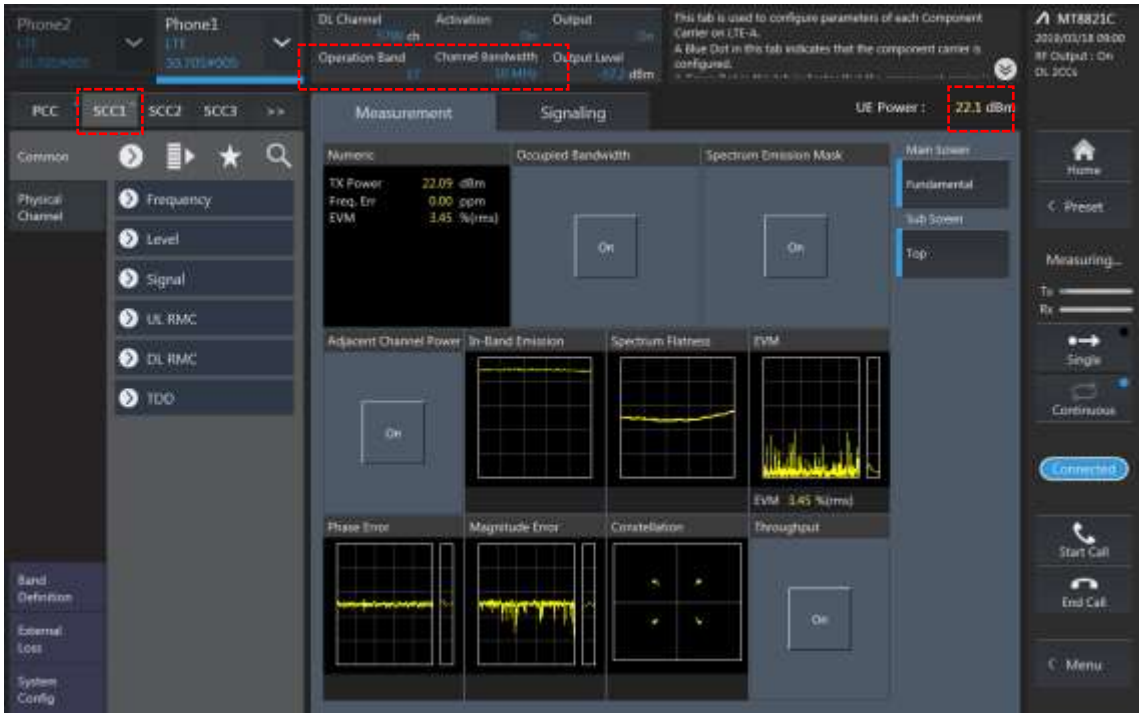
11.2.3 LTE Down-link Carrier Aggregation Conducted Powers

LTE Down Link 2CA Call Setup

1) PCC Setting :Channel /RB/BW/Modulation

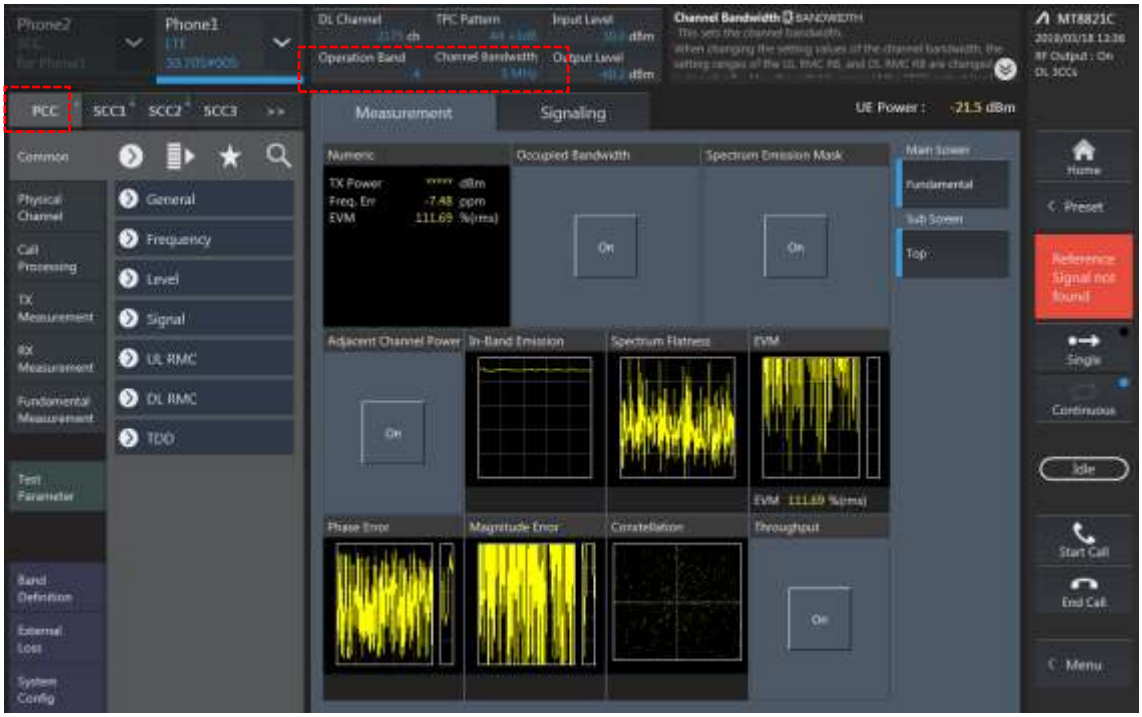


2) SCC Setting (Channel /RB/BW/Modulation) and call Connection

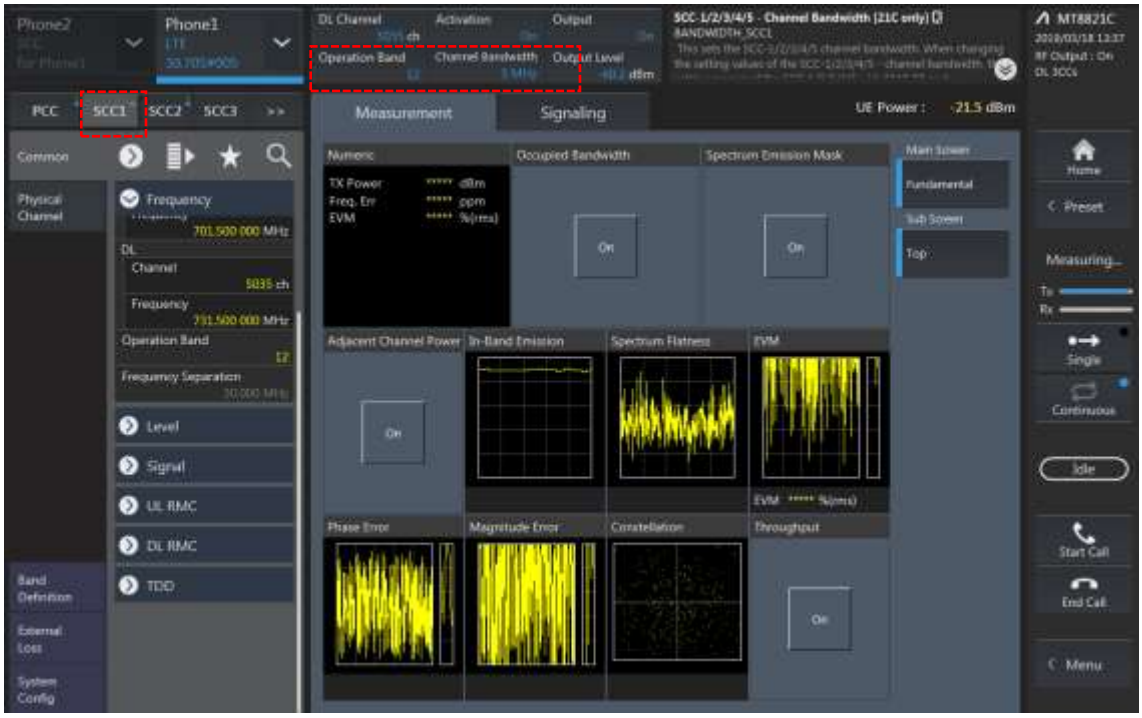


LTE Down Link 3CA Call Setup

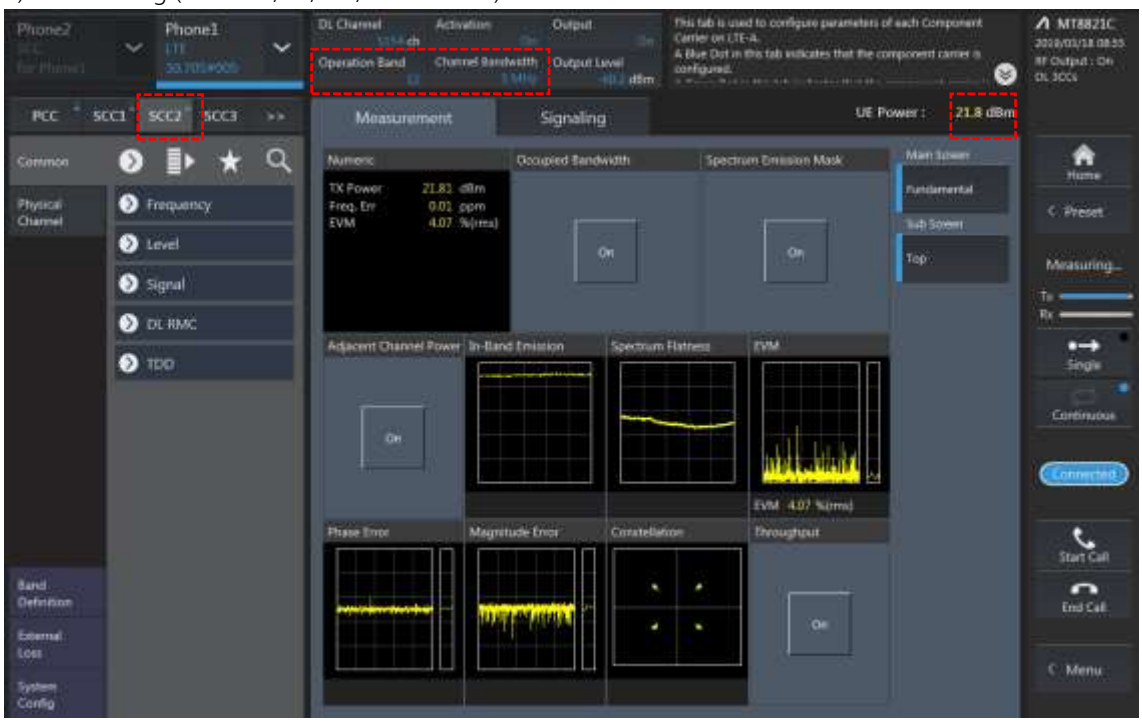
1) PCC Setting: Channel /RB/BW/Modulation



2) SCC1 Setting : Channel /RB/BW/Modulation

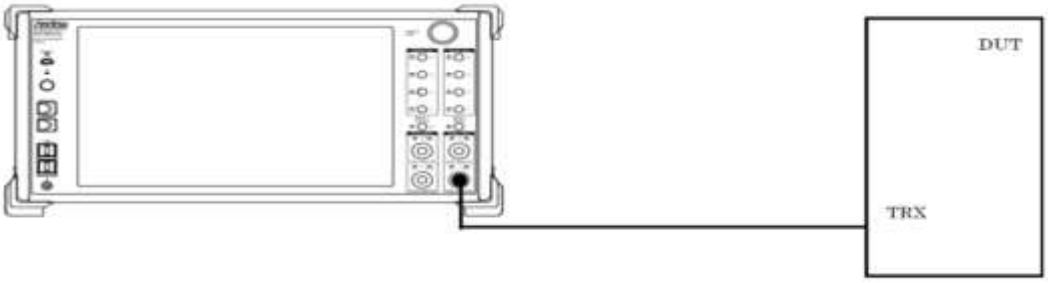


3) SCC2 Setting (Channel /RB/BW/Modulation)and call Connection



11.2.4 LTE Up-link Carrier Aggregation Conducted Powers Setup

To measure the LTE UP CA power of this device, Anritsu's MT8821C was used to check the power as follows.



Power Measurement setup

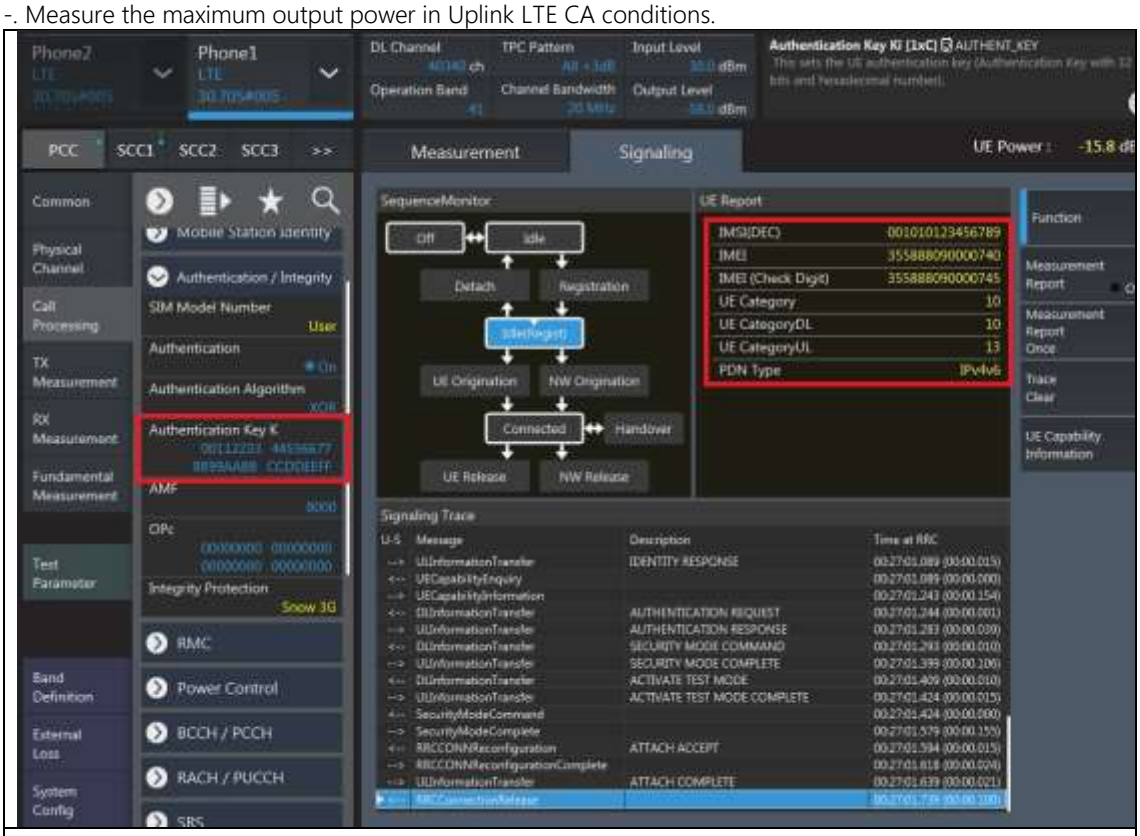
.TDD CA_41C Intra-Band Contiguous Call Connection

Set to MT8821C with following parameters:

-. Set up the call box for PCC Configuration for LTE Uplink CA

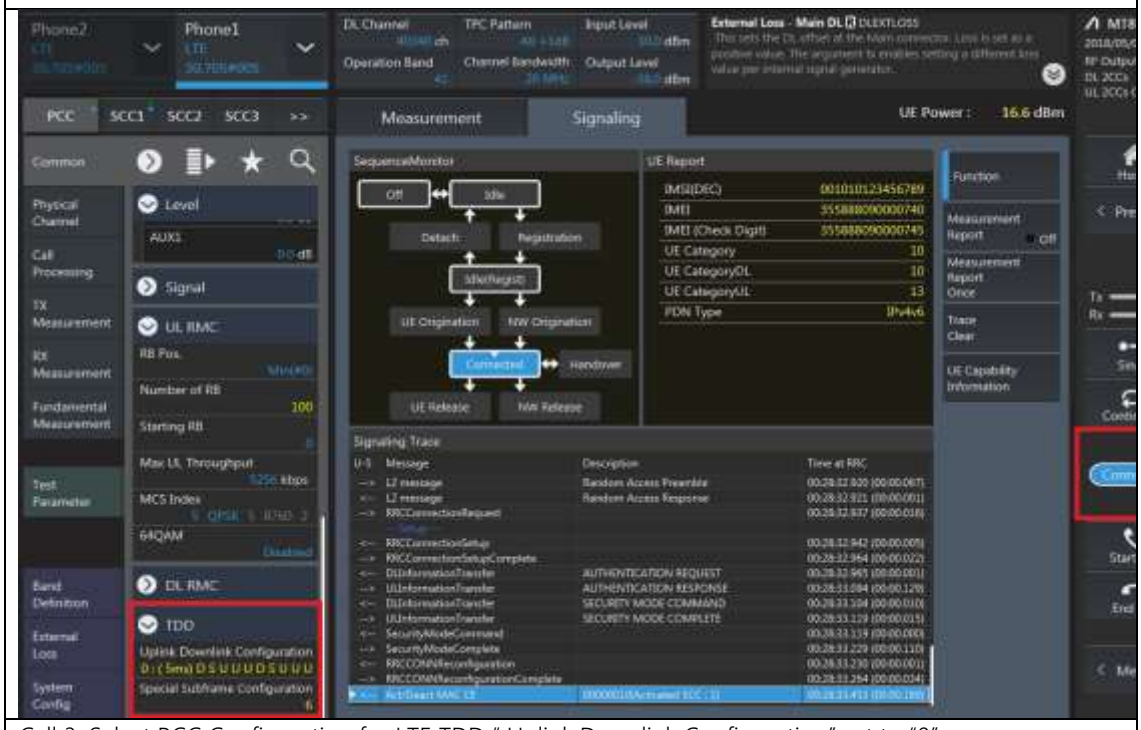
-. Set up the call box for SCC Configuration for LTE Uplink CA

-. Measure the maximum output power in Uplink LTE CA conditions.



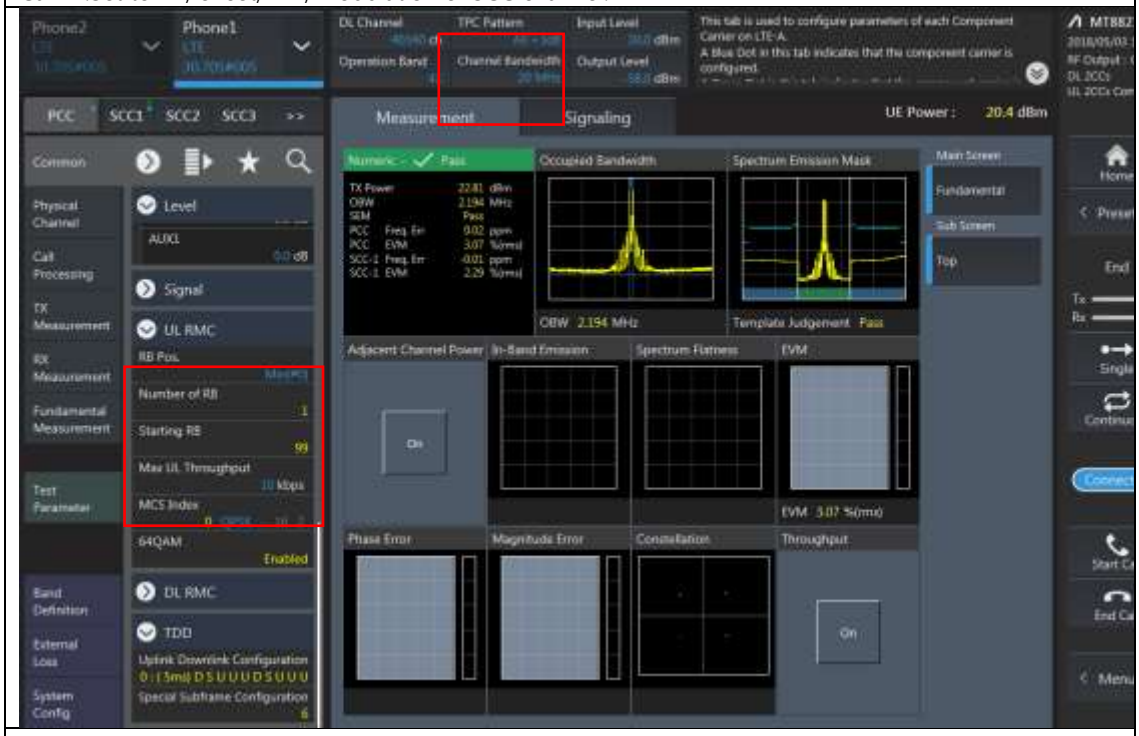
Call 1 :Select PCC Configuration for Authentication key to Register

Call 2 :Select PCC Configuration for LTE UL CA and Cable loss



Call 3 :Select PCC Configuration for LTE TDD " Uplink Downlink Configuration" set to "0"
And then Select "connect"button.

Call 4 :Set to RB, offset, BW, modulation of SCC channel.



Call 5: Set to RB, offset, BW, modulation and Max Power conditions of PCC required test channel.

2CA Downlink Carrier aggregation Maximum Conducted Powers

PCC										SCC				Tx Power		Deviation
Band	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	SCC1 Band	SCC1 BW	SCC1 DL Channel	SCC1 DL Frequency	LTE Single	LTE DL CA	
2A-2A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980	24.19	24.34	0.15
2A-4A	2	10	18650	1855	650	1935	QPSK	1	0	4	20	2175	2132.5	24.19	24.38	0.19
	4	15	20185	1732.5	2175	2132.5	QPSK	1	0	2	20	900	1960	24.39	24.63	0.24
2A-5A	2	10	18650	1855	650	1935	QPSK	1	0	5	10	2525	881.5	24.19	24.34	0.15
	5	5	20625	846.5	2625	891.5	QPSK	1	12	2	20	900	1960	23.59	23.82	0.23
2A-12A	2	10	18650	1855	650	1935	QPSK	1	0	12	10	5095	737.5	24.19	24.42	0.23
	12	10	23095	707.5	5095	737.5	QPSK	1	0	2	20	900	1960	23.95	23.92	-0.03
2A-13A	2	10	18650	1855	650	1935	QPSK	1	0	13	5	5230	751	24.19	24.36	0.17
	13	10	23230	782	5230	751	QPSK	1	24	2	20	900	1960	23.47	23.7	0.23
2A-30A	2	10	18650	1855	650	1935	QPSK	1	0	30	10	9820	2355	24.19	24.38	0.19
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	2	20	900	1960	21.62	21.62	0
2A-66A	2	10	18650	1855	650	1935	QPSK	1	0	66	20	66536	2120	24.19	24.38	0.19
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	900	1960	24.38	24.62	0.24
2A-71A	2	10	18650	1855	650	1935	QPSK	1	0	71	20	68761	634.5	24.19	24.41	0.22
	71	20	133372	688	68836	642	QPSK	1	0	2	20	900	1960	24.57	24.47	-0.1
4A-4A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	4	20	2300	2145	24.39	24.45	0.06
4A-5A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	5	10	2525	881.5	24.39	24.48	0.09
	5	5	20625	846.5	2625	891.5	QPSK	1	12	4	20	2175	2132.5	23.59	23.83	0.24
4A-12A	4	15	20025	1717.5	2025	2117.5	QPSK	1	7	12	10	5095	737.5	24.39	24.5	0.11
	12	10	23095	707.5	5095	737.5	QPSK	1	0	4	20	2175	2132.5	23.95	23.95	0
4A-13A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	13	10	5230	751	24.39	24.46	0.07
	13	10	23230	782	5230	751	QPSK	1	24	4	20	2175	2132.5	23.47	23.7	0.23
4A-71A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	71	20	68761	634.5	24.39	24.62	0.23
	71	20	133372	688	68836	642	QPSK	1	0	4	20	2175	2132.5	24.57	24.79	0.22
5A-30A	5	5	20625	846.5	2625	891.5	QPSK	1	12	30	10	9820	2355	23.59	23.81	0.22
	30	10	27710	2310	9820	2355	QPSK	1	0	5	10	2525	881.5	21.57	21.56	-0.01
5A-66A	5	5	20625	846.5	2625	891.5	QPSK	1	12	66	20	1372656	132732	23.59	23.81	0.22
	66	20	132072	1720	66536	2120	QPSK	1	0	5	10	2525	881.5	24.38	24.54	0.16
5B	5	3	20586	842.6	2586	887.6	QPSK	1	7	5	5	2625	891.5	23.6	23.48	-0.12
12A-30A	12	10	23095	707.5	5095	737.5	QPSK	1	0	30	10	9820	2355	23.95	23.92	-0.03
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	12	10	5095	737.5	21.62	21.57	-0.05
12A-66A	12	10	23095	707.5	5095	737.5	QPSK	1	0	66	20	66786	2145	23.95	23.92	-0.03
	66	20	132072	1720	66536	2120	QPSK	1	0	12	10	5095	737.5	24.38	24.53	0.15
12B	12	5	23035	701.5	5035	731.5	QPSK	1	0	12	10	5107	738.7	23.85	23.66	-0.19
13A-66A	13	5	23230	782	5230	752	QPSK	1	0	66	20	66786	2145	23.52	23.75	0.23
	66	20	132072	1720	66536	2120	QPSK	1	0	13	10	5230	751	24.38	24.56	0.18
25A-25A	25	20	26140	1860	8140	1940	QPSK	1	0	25	20	8365	1962.5	23.8	23.91	0.11
25A-26A	25	20	26140	1860	8140	1940	QPSK	1	0	26	15	8865	876.5	23.8	23.91	0.11
	26	3	26705	815.5	8705	860.5	QPSK	1	7	25	20	8365	1962.5	24.2	24.17	-0.03
25A-41A	25	20	26140	1860	8140	1940	QPSK	1	0	41	20	40620	2593	23.8	23.9	0.1
26A-41A	26	10	26740	819	8740	864	QPSK	1	0	41	20	40620	2593	24.17	24.11	-0.06
41A-41A	41	20	41055	2636.5	41055	2636.5	QPSK	1	0	41	20	40620	2593	24.5	24.27	-0.23
41C (Power Class 3)	41	20	41055	2636.5	41055	2636.5	QPSK	1	0	41	20	40620	2593	24.5	24.27	-0.23
41C (Power Class 2)	41	20	39750	2506	39750	2506	QPSK	1	0	41	20	39948	2525.8	25.98	25.81	-0.17
30A-66A	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	66	20	66786	2145	21.62	21.52	-0.1
	66	20	132072	1720	66536	2120	QPSK	1	0	30	10	9820	2355	24.38	24.46	0.08
66A-66A	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67036	2170	24.38	24.56	0.18
66B	66	15	132047	1717.5	66511	2117.5	QPSK	1	0	66	5	66786	2145	24.36	24.55	0.19
66C	66	20	132072	1720	66536	2120	QPSK	1	0	66	10	66680	2134.4	24.38	24.59	0.21

3CA Downlink Carrier aggregation Maximum Conducted Powers

Combination	PCC									SCC1					SCC2					Tx Power		Deviation
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	SCC1 Band	SCC1 BW	SCC1 DL Channel	SCC1 DL Frequency		SCC2 Band	SCC2 BW	SCC2 DL Channel	SCC2 DL Frequency		LTE Single	LTE DL CA	
2A-2A-5A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980		5	10	2525	881.5		24.19	24.39	0.2
	5	5	20625	846.5	2625	891.5	QPSK	1	12	2	10	650	1935		2	20	1100	1980		23.59	23.8	0.21
2A-2A-12A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980		12	10	5095	737.5		24.19	24.41	0.22
	12	10	23095	707.5	5095	737.5	QPSK	1	0	2	10	650	1935		2	20	1100	1980		23.95	24.01	0.06
2A-2A-13A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980		13	10	5230	751		24.19	24.33	0.14
	13	10	23230	782	5230	751	QPSK	1	24	2	10	650	1935		2	20	1100	1980		23.47	23.71	0.24
2A-2A-30A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980		30	10	9820	2355		24.19	24.39	0.2
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	2	10	650	1935		2	20	1100	1980		21.62	21.79	0.17
2A-2A-66A	2	10	18650	1855	650	1935	QPSK	1	0	2	20	1100	1980		66	20	66786	2145		24.19	24.24	0.05
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	1100	1980		5	10	2525	881.5		24.38	24.58	0.2
2A-4A-4A	2	10	18650	1855	650	1935	QPSK	1	0	4	15	2025	2117.5		4	20	2300	2145		24.19	24.33	0.14
	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	4	20	2300	2145		2	20	900	1960		24.39	24.45	0.06
2A-4A-5A	2	10	18650	1855	650	1935	QPSK	1	0	4	20	2175	2132.5		5	10	2525	881.5		24.19	24.35	0.16
	4	15	20175	1732.5	2175	2132.5	QPSK	1	0	2	20	900	1960		5	10	2525	881.5		24.39	24.5	0.11
	5	5	20625	846.5	2625	891.5	QPSK	1	12	2	20	900	1960		4	20	2175	2132.5		23.59	23.8	0.21
2A-4A-12A	2	10	18650	1855	650	1935	QPSK	1	0	4	20	2300	2145		12	10	5095	737.5		24.19	24.28	0.09
	4	15	20175	1732.5	2175	2132.5	QPSK	1	0	2	20	900	1960		12	10	5095	737.5		24.39	24.58	0.19
	12	10	23095	707.5	5095	737.5	QPSK	1	0	2	20	900	1960		4	20	2175	2132.5		23.95	24	0.05
2A-4A-13A	2	10	18650	1855	650	1935	QPSK	1	0	4	20	2175	2132.5		13	10	5230	751		24.19	24.38	0.19
	4	15	20175	1732.5	2175	2132.5	QPSK	1	0	2	20	900	1960		13	10	5230	751		24.39	24.5	0.11
	13	10	23230	782	5230	751	QPSK	1	24	2	20	900	1960		4	20	2175	2132.5		23.47	23.7	0.23
2A-4A-71A	2	10	18650	1855	650	1935	QPSK	1	0	4	20	2175	2132.5		71	20	68761	634.5		24.19	24.31	0.12
	4	15	20175	1732.5	2175	2132.5	QPSK	1	0	2	20	900	1960		71	20	68761	634.5		24.39	24.44	0.05
	71	20	133372	688	68836	642	QPSK	1	0	2	20	900	1960		4	20	2175	2132.5		24.57	24.36	-0.21
2A-5A-30A	2	10	18650	1855	650	1935	QPSK	1	0	5	10	2525	881.5		30	10	9820	2355		24.19	24.23	0.04
	5	5	20625	846.5	2625	891.5	QPSK	1	12	2	20	900	1960		30	10	9820	2355		23.59	23.62	0.03
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	2	20	900	1960		5	10	2525	881.5		21.62	21.72	0.1
2A-5A-66A	2	10	18650	1855	650	1935	QPSK	1	0	5	10	2525	881.5		66	20	66786	2145		24.19	24.39	0.2
	5	5	20625	846.5	2625	891.5	QPSK	1	12	2	20	900	1960		66	20	66786	2145		23.59	23.8	0.21
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	900	1960		5	10	2525	881.5		24.38	24.54	0.16
2A-5B	2	10	18650	1855	650	1935	QPSK	1	0	5	5	2625	891.5		5	10	2553	884.3		24.19	24.35	0.16
	5	5	20625	846.5	2625	891.5	QPSK	1	12	5	10	2553	884.3		2	20	900	1960		23.59	23.65	0.06
2A-12A-30A	2	10	18650	1855	650	1935	QPSK	1	0	12	10	5095	737.5		30	10	9820	2355		24.19	24.31	0.12
	12	10	23095	707.5	5095	737.5	QPSK	1	0	2	20	900	1960		30	10	9820	2355		23.95	23.94	-0.01
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	2	20	900	1960		12	10	5095	737.5		21.62	21.78	0.16
2A-12A-66A	2	10	18650	1855	650	1935	QPSK	1	0	12	10	5095	737.5		66	20	66786	2145		24.19	24.39	0.2
	12	10	23095	707.5	5095	737.5	QPSK	1	0	2	20	900	1960		66	20	66786	2145		23.95	24	0.05
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	900	1960		12	10	5095	737.5		24.38	24.49	0.11
2A-13A-66A	2	10	18650	1855	650	1935	QPSK	1	0	13	10	5230	751		66	20	66786	2145		24.19	24.41	0.22
	13	5	23230	782	5230	752	QPSK	1	0	2	20	900	1960		66	20	66786	2145		23.52	23.72	0.2
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	900	1960		13	10	5230	751		24.38	24.51	0.13
2A-30A-66A	2	10	18650	1855	650	1935	QPSK	1	0	30	10	9820	2355		66	20	66786	2145		24.19	24.31	0.12
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	2	20	900	1960		66	20	66786	2145		21.62	21.79	0.17
	66	20	132072	1720	66536	2120	QPSK	1	0	2	20	900	1960		30	10	9820	2355		24.38	24.51	0.13
2A-66A-66A	2	10	18650	1855	650	1935	QPSK	1	0	66	20	66536	52120		66	20	67036	2170		24.19	24.3	0.11
	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67036	2170		2	20	900	1960		24.38	24.5	0.12
2A-12B	2	10	18650	1855	650	1935	QPSK	1	0	12	5	5035	731.5		12	10	5107	738.7		24.19	24.03	-0.16
	12	5	23035	701.5	5035	731.5	QPSK	1	0	12	10	5107	738.7		2	20	900	1960		23.85	23.96	0.11
2A-66B	2	10	18650	1855	650	1935	QPSK	1	0	66	15	66511	2117.5		66	5	66786	2145		24.19	24.35	0.16
	66	15	132047	1717.5	66511	2117.5	QPSK	1	0	66	5	66786	2145		2	20	900	1960		24.36	24.42	0.06
2A-66C	2	10	18650	1855	650	1935	QPSK	1	0	66	20	66536	2120		66	10	66680	2134.4		24.19	24.34	0.15
	66	20	132072	1720	66536	2120	QPSK	1	0	66	10	66680	2134.4		2	20	900	1960		24.38	24.58	0.2
4A-4A-5A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	4	20	2300	2145		5	10	2525	881.5		24.39	24.47	0.08
	5	5	20625	846.5	2625	891.5	QPSK	1	12	4	15	2025	2117.5		4	20	2300	2145		23.59	23.81	0.22
4A-4A-12A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	4	20	2300	2145		12	10	5095	737.5		24.39	24.52	0.13
	12	10	23095	707.5	5095	737.5	QPSK	1	0	4	15	2025	2117.5		4	20	2300	2145		23.95	23.96	0.01
4A-4A-13A	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	4	20	2300	2145		13	10	5230	751		24.39	24.5	0.11
	13	10	23230	782	5230	751	QPSK	1	24	4	15	2025	2117.5		4	20	2300	2145		23.47	23.7	0.23
4A-12B	4	15	20025	1717.5	2025	2117.5	QPSK	1	0	12	5	5035	731.5		12	10	5107	738.7		24.39	24.36	-0.03
5A-30A-66A	5	5	20625	846.5	2625	891.5	QPSK	1	12	30	10	9820	2355		66	20	66786	2145		23.59	23.81	0.22
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	5	10	2525	881.5		66	20	66786	2145		21.62	21.84	0.22
	66	20	132072	1720	66536	2120	QPSK	1	0	5	10	2525	881.5		30	10	9820	2355		24.38	24.51	0.13
5A-66A-66A	5	5	20625	846.5	2625	891.5	QPSK	1	12	66	20	66536	52120		66	20	67036	2170		23.59	23.48	-0.11
	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67036	2170		5	10	2525	881.5		24.38	24.55	0.17
5B-30A	5	5	20625	846.5	2625	891.5	QPSK	1	12	5	10	2553	884.3		30	10	9820	2355		23.59	23.79	0.2
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	5	5	2625	891.5		5	10	2553	884.3		21.62	21.78	0.16
5A-66B	5	5	20625	846.5	2625	891.5	QPSK	1	12	66	15	66511	2117.5		66	5	66786	2145		23.59	23.81	0.22
	66	15	132047	1717.5	66511	2117.5	QPSK	1	0	66	5	66786	2145		5	10	2525	881.5		24.36	24.57	0.21
5A-66C	5	5	20625	846.5	2625	891.5	QPSK	1	12	66	20	66536	52120		66	10	66680	2134.4		23.59	23.8	0.21
	66	20	132072	1720	66536	2120	QPSK	1	0	66	10	66680	2134.4		5	10	2525	881.5		24.38	24.52	0.14
5B-66A	5	3	20501	834.1	2501	879.1	QPSK	1	7	5	5	2540	883		66	20	66786	2145		23.6	23.45	-0.15
	66	20	132072	1720	66536	2120	QPSK	1	0	5	3	2501	879.1		5	5	2540	883		24.38	24.26	-0.12
12A-30A-66A	66	20	132072	1720	66536	2120	QPSK	1	0	30	10	9820	2355		12	10	5095	737.5		24.38	24.13	-0.25
	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	66	20	67036	2170		12	10	5095	737.5		21.62	21.59	-0.03
12A-66A-66A	12	10	23095	707.5	5095	737.5	QPSK	1	0	66	20	66536	2120		66	20	67236	2190		23.95	23.94	-0.01
	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67236	2190		12	10	5095	737.5		24.38	24.56	0.18
13A-66A-66A	13	5	23230	782	5230	752	QPSK	1	0	66	20	66536	52120		66	20	67036	2170		23.52	23.74	0.22
	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67036	2170		13	10	5230	751		24.38	24.54	0.16
13A-66B	13	5	23230	782	5230	752	QPSK	1	0	66	15	66511	2117.5		66	5	66786	2145		23.52	23.67	0.15
	66	15	132047	1717.5	66511	2117.5	QPSK	1	0	66	5	66786	2145		13	10	5230	751		24.36	24.22	-0.14
13A-66C	13	5	23230	782	5230	752	QPSK	1	0	66	20	66536	52120		66	10	66680	2134.4		23.52	23.74	0.22
	66	20	132072	1720	66536	2120	QPSK	1	0	66	10	66680	2134.4		13	10	5230	751		24.38	24.26	-0.12
25A-25A-26A	25	20	26140	1860	8140	1940	QPSK	1	0	25	20	8365	1962.5		26	3	8705	860.5		23.8	23.57	-0.23
	26	3	26705	815.5	8705	860.5	QPSK	1	7	25	20	8140	1940		25	20	8365	1962.5		24.2	24.4	0.2
25A-41C	25	20	26140	1860	8140	1940	QPSK	1	0	41	20	41055	2636.5		41	20	39987	2529.7		23.8	23.53	-0.27
26A-41C	26	10	26740	819	8740	864	QPSK	1	0	41	20	41055	2636.5		41	20	39987	2529.7		24.17	24.07	-0.1
30A-66A-66A	30	5	27735	2312.5	9845	2357.5	QPSK	1	12	66	20	66536	2120		66	20	67236	2190		21.62	21.81	0.19
	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	67236	2190		30	10	9820	2355		24.38	24.53	0.15
41A-41C (Power class 3)	41	20	41055	2636.5	41055	2636.5	QPSK	1	0	41	20	39713	2502.3		41	20	39911	2522.1		24.5	24.41	-0.09
	41	20	41055	2636.5	41055	2636.5	QPSK	1	0	41	20	41253	2656.3		41	20	39911	2522.1		24.5	24.42	-0.08
41D(Power class 3)	41	20	40422	2573.2	40422	2573.2	QPSK	1	0	41	20	40620	2593		41	20	40818	2612.8		24.5	24.43	-0.07
441A-41C(Power class 2)	41	20	39750	2506	39750	2506	QPSK	1	0	41	20	41292	2660.2		41	20	41490	2680		25.98	25.91	-0.07
	41	20	39750	2506	39750	2506	QPSK	1	0	41	20	39948	2525.8		41	20	41490	2680		25.98	25.89	-0.09
41D(Power class 2)	41	20	39750	2506	39750	2506	QPSK	1	0	41	20	39948	2525.8		41	20	40146	2545.6		25.98	25.83	-0.15
66A-66C	66	20	132072	1720	66536	52120	QPSK	1	0	66	20	667038	2170.1		66	20	67236	2190		24.38	24.49	0.11
66C-66A	66	20	132072	1720	66536	2120	QPSK	1	0	66	20	66734	2139.8		66	20	27236	2190		24.38	24.5	0.12

2CA Downlink Carrier aggregation Reduced Conducted Powers

PCC										SCC1				Tx Power		
Band	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	SCC1 Band	SCC1 BW	SCC1 DL Channel	SCC1 DL Frequency	LTE Single	LTE DL CA	Deviation
2A-2A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	12.46	12.69	0.23
2A-4A	2	10	18650	1855	650	1935	16QAM	1	0	4	20	2300	2145	12.46	12.31	-0.15
	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	2	20	900	1960	12.61	12.61	0
2A-5A	2	10	18650	1855	650	1935	16QAM	1	0	5	10	650	881.5	12.46	12.68	0.22
	5	5	20625	846.5	2625	891.5	16QAM	1	12	2	20	900	1960	17.21	17.06	-0.15
2A-12A	2	10	18650	1855	650	1935	16QAM	1	0	12	10	5095	737.5	12.46	12.68	0.22
	12	5	23035	701.5	5035	731.5	16QAM	1	24	2	20	900	1960	16.67	16.8	0.13
2A-13A	2	10	18650	1855	650	1935	16QAM	1	0	13	10	5230	751	12.46	12.64	0.18
	13	5	23230	782	5230	751	16QAM	1	0	2	20	900	1960	17.46	17.54	0.08
2A-30A	2	10	18650	1855	650	1935	16QAM	1	0	30	10	9820	2355	12.46	12.68	0.22
	30	5	27710	2310	9820	2355	16QAM	1	24	2	20	900	1960	13.43	13.59	0.16
2A-66A	2	10	18650	1855	650	1935	16QAM	1	0	66	20	66786	2145	12.46	12.52	0.06
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	20	900	1960	13.19	13.4	0.21
2A-71A	2	10	18650	1855	650	1935	16QAM	1	0	71	20	68761	634.5	12.46	12.66	0.2
	71	15	133297	680.5	68761	634.5	64QAM	1	36	2	10	900	1960	14.69	14.82	0.13
4A-4A	4	10	20000	1715	2000	2115	16QAM	1	0	4	20	2300	2145	12.61	12.64	0.03
4A-5A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	5	10	650	881.5	12.61	12.8	0.19
	5	5	20625	846.5	2625	891.5	16QAM	1	12	4	20	2300	2145	17.21	17.3	0.09
4A-12A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	12	10	5095	737.5	12.61	12.81	0.2
	12	5	23035	701.5	5035	731.5	16QAM	1	24	4	20	2175	2132.5	16.67	16.82	0.15
4A-13A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	13	10	5230	751	12.61	12.49	-0.12
	13	5	23230	782	5230	751	16QAM	1	0	4	20	2300	2145	17.46	17.4	-0.06
4A-71A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	71	20	68761	634.5	12.61	12.82	0.21
	71	15	133297	680.5	68761	634.5	64QAM	1	36	4	10	2175	2132.5	14.69	14.72	0.03
5A-30A	5	5	20625	846.5	2625	891.5	16QAM	1	12	30	10	9820	2355	17.21	17.43	0.22
	30	5	27710	2310	9820	2355	16QAM	1	24	5	10	2525	881.5	13.43	13.56	0.13
5A-66A	5	5	20625	846.5	2625	891.5	16QAM	1	12	66	20	66786	2145	17.21	17.35	0.14
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	5	10	650	881.5	13.19	13.13	-0.06
5B	5	5	20625	846.5	2625	871.5	16QAM	1	12	5	10	2553	884.3	17.21	17.06	-0.15
12A-30A	12	5	23035	701.5	5035	731.5	16QAM	1	24	30	10	9820	2355	16.67	16.81	0.14
	30	5	27710	2310	9820	2355	16QAM	1	24	12	10	5095	737.5	13.43	13.64	0.21
12A-66A	12	5	23035	701.5	5035	731.5	16QAM	1	24	66	20	66786	2145	16.67	16.81	0.14
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	12	10	5095	737.5	13.19	13.37	0.18
12B	12	5	23035	701.5	5035	731.5	16QAM	1	24	12	10	5107	738.7	16.67	16.6	-0.07
13A-66A	13	5	23230	782	5230	751	16QAM	1	0	66	20	66786	2145	17.46	17.36	-0.1
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	13	10	5230	751	13.19	13.22	0.03
25A-25A	25	10	26090	1855	8090	1935	16QAM	1	0	25	20	8590	1985	12.59	12.81	0.22
25A-26A	25	10	26090	1855	8090	1935	16QAM	1	0	26	15	8865	876.5	12.59	12.79	0.2
	26	3	26705	815.5	8705	860.5	16QAM	1	7	25	20	8365	1962.5	17.07	17.14	0.07
25A-41A	25	10	26090	1855	8090	1935	16QAM	1	0	41	20	40620	2593	12.59	12.62	0.03
26A-41A	26	5	27015	846.5	9015	891.5	16QAM	1	12	41	20	40620	2593	16.96	16.75	-0.21
41A-41A	41	20	41055	2636.5	41055	2636.5	16QAM	1	0	41	20	40620	2593	14.22	14.28	0.06
41C	41	20	41055	2636.5	41055	2636.5	16QAM	1	0	41	20	40620	2593	14.22	14.28	0.06
30A-66A	30	5	27710	2310	9820	2355	16QAM	1	24	66	20	66786	2145	13.43	13.57	0.14
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	30	10	9820	2355	13.19	13.36	0.17
66A-66A	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67236	2190	13.19	13.42	0.23
66B	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	5	66604	2132.5	13.19	13.39	0.2
66C	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	13.19	13.4	0.21

3CA Downlink Carrier aggregation Reduced Conducted Powers

Combination	PCC								SCC1				SCC2				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	SCC1 Band	SCC1 BW	SCC1 DL Channel	SCC1 DL Frequency	SCC2 Band	SCC2 BW	SCC2 DL Channel	SCC2 DL Frequency	LTE Single	LTE DL CA	Deviation
2A-2A-5A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	5	10	2525	881.5	12.46	12.46	0
	5	5	20625	846.5	2625	891.5	16QAM	1	12	2	10	650	1935	2	20	1100	1900	17.21	16.96	-0.25
2A-2A-12A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	12	10	5095	737.5	12.46	12.48	0.02
	12	5	23035	701.5	5035	731.5	16QAM	1	24	2	10	650	1935	2	20	1100	1900	16.67	16.43	-0.24
2A-2A-13A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	13	10	5230	751	12.46	12.37	-0.09
	13	5	23230	782	5230	751	16QAM	1	0	2	10	650	1935	2	20	1100	1900	17.46	17.37	-0.09
2A-2A-30A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	30	10	9820	2355	12.46	12.44	-0.02
	30	5	27710	2310	9820	2355	16QAM	1	24	2	10	650	1935	2	20	1100	1900	13.43	13.35	-0.08
2A-2A-66A	2	10	18650	1855	650	1935	16QAM	1	0	2	20	1100	1900	66	20	66786	2145	12.46	12.38	-0.08
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	10	650	1935	2	20	1100	1900	13.19	13.12	-0.07
2A-4A-4A	2	10	18650	1855	650	1935	16QAM	1	0	4	10	2000	2115	4	20	2300	2145	12.46	12.06	-0.4
	4	10	20000	1715	2000	2115	16QAM	1	0	4	20	2300	2145	2	20	900	1960	12.61	12.22	-0.39
2A-4A-5A	2	10	18650	1855	650	1935	16QAM	1	0	4	20	2300	2145	5	10	2525	881.5	12.46	12.36	-0.1
	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	2	20	900	1960	5	10	2525	881.5	12.61	12.44	-0.17
	5	5	20625	846.5	2625	891.5	16QAM	1	12	2	20	900	1960	4	20	2300	2145	17.21	17.23	0.02
2A-4A-12A	2	10	18650	1855	650	1935	16QAM	1	0	4	20	2300	2145	12	10	5095	737.5	12.46	12.53	0.07
	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	2	20	900	1960	12	10	5095	737.5	12.61	12.68	0.07
	12	5	23035	701.5	5035	731.5	16QAM	1	24	2	20	900	1960	4	20	2300	2145	16.67	16.48	-0.19
2A-4A-13A	2	10	18650	1855	650	1935	16QAM	1	0	4	20	2300	2145	13	10	5230	751	12.46	12.34	-0.12
	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	2	20	900	1960	13	10	5230	751	12.61	12.51	-0.1
	13	5	23230	782	5230	751	16QAM	1	0	2	20	900	1960	4	20	2300	2145	17.46	17.34	-0.12
2A-4A-71A	2	10	18650	1855	650	1935	16QAM	1	0	4	20	2300	2145	71	20	68761	634.5	12.46	12.5	0.04
	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	2	20	900	1960	71	20	68761	634.5	12.61	12.6	-0.01
	71	15	133297	680.5	68761	634.5	64QAM	1	36	2	20	900	1960	4	20	2300	2145	14.69	14.6	-0.09
2A-5A-30A	2	10	18650	1855	650	1935	16QAM	1	0	5	10	2525	881.5	30	10	9820	2355	12.46	12.5	0.04
	5	5	20625	846.5	2625	891.5	16QAM	1	12	2	20	900	1960	30	10	9820	2355	17.21	17.36	0.15
	30	5	27710	2310	9820	2355	16QAM	1	24	2	20	900	1960	5	10	650	881.5	13.43	13.41	-0.02
2A-5A-66A	2	10	18650	1855	650	1935	16QAM	1	0	5	10	650	881.5	66	20	66786	2145	12.46	12.35	-0.11
	5	5	20625	846.5	2625	891.5	16QAM	1	12	2	20	900	1960	66	20	66786	2145	17.21	16.91	-0.3
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	20	900	1960	5	10	650	881.5	13.19	13.05	-0.14
2A-5B	2	10	18650	1855	650	1935	16QAM	1	0	5	5	2625	871.5	5	10	2553	884.3	12.46	12.03	-0.43
	5	5	20625	846.5	2625	871.5	16QAM	1	12	5	10	2553	884.3	2	20	900	1960	17.21	17.12	-0.09
2A-12A-30A	2	10	18650	1855	650	1935	16QAM	1	0	12	10	5095	737.5	30	10	9820	2355	12.46	12.44	-0.02
	12	5	23035	701.5	5035	731.5	16QAM	1	24	2	20	900	1960	30	10	9820	2355	16.67	16.49	-0.18
	30	5	27710	2310	9820	2355	16QAM	1	24	2	20	900	1960	12	10	5095	737.5	13.43	13.35	-0.08
2A-12A-66A	2	10	18650	1855	650	1935	16QAM	1	0	12	10	5095	737.5	66	20	66786	2145	12.46	12.56	0.1
	12	5	23035	701.5	5035	731.5	16QAM	1	24	2	20	900	1960	66	20	66786	2145	16.67	16.6	-0.07
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	20	900	1960	12	10	5095	737.5	13.19	13.11	-0.08
2A-13A-66A	2	10	18650	1855	650	1935	16QAM	1	0	13	10	5230	751	66	20	66786	2145	12.46	12.31	-0.15
	13	5	23230	782	5230	751	16QAM	1	0	2	20	900	1960	66	20	66786	2145	17.46	17.39	-0.07
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	20	900	1960	13	10	5230	751	13.19	13.04	-0.15
2A-30A-66A	2	10	18650	1855	650	1935	16QAM	1	0	30	10	9820	2355	66	20	66786	2145	12.46	12.5	0.04
	30	5	27710	2310	9820	2355	16QAM	1	24	2	20	900	1960	66	20	66786	2145	13.43	13.4	-0.03
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	2	20	900	1960	30	10	9820	2355	13.19	13.09	-0.1
2A-66A-66A	2	10	18650	1855	650	1935	16QAM	1	0	66	15	66511	2117.5	66	20	67236	2190	12.46	12.37	-0.09
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67236	2190	2	20	900	1960	13.19	12.89	-0.3
2A-12B	2	10	18650	1855	650	1935	16QAM	1	0	12	5	5035	731.5	12	10	5095	737.5	12.46	12.09	-0.37
	12	5	23035	701.5	5035	731.5	16QAM	1	24	12	10	5095	737.5	2	20	900	1960	16.67	16.52	-0.15
2A-66B	2	10	18650	1855	650	1935	16QAM	1	0	66	15	66511	2117.5	66	5	66604	2132.5	12.46	12.53	0.07
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	5	66604	2132.5	2	20	900	1960	13.19	12.81	-0.38
2A-66C	2	10	18650	1855	650	1935	16QAM	1	0	66	15	66511	2117.5	66	15	66661	2132.5	12.46	12.53	0.07
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	2	20	900	1960	13.19	13.04	-0.15
4A-4A-5A	4	10	20000	1715	2000	2115	16QAM	1	0	4	20	2300	2145	2	20	900	1960	12.61	12.13	-0.48
	5	5	20625	846.5	2625	891.5	16QAM	1	12	4	20	2300	2145	2	20	900	1960	17.21	16.62	-0.59
4A-4A-12A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	4	20	2175	2132.5	12	10	5095	737.5	12.61	12.27	-0.34
	12	5	23035	701.5	5035	731.5	16QAM	1	24	4	10	2175	2132.5	4	20	2175	2132.5	16.67	16.17	-0.5
4A-4A-13A	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	4	20	2175	2132.5	13	10	5230	751	12.61	12.09	-0.52
	13	5	23230	782	5230	751	16QAM	1	0	4	10	2175	2132.5	4	20	2175	2132.5	17.46	17.1	-0.36
4A-12B	4	10	20175	1732.5	2175	2132.5	16QAM	1	0	12	5	5035	731.5	12	10	5107	738.7	12.61	12.31	-0.3
5A-30A-66A	5	5	20625	846.5	2625	891.5	16QAM	1	12	30	10	9820	2355	66	20	66786	2145	17.21	17.05	-0.16
	30	5	27710	2310	9820	2355	16QAM	1	24	5	10	650	881.5	66	20	66786	2145	13.43	13.36	-0.07
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	5	10	650	881.5	30	10	9820	2355	13.19	13.02	-0.17
5A-66A-66A	5	5	20625	846.5	2625	891.5	16QAM	1	12	66	15	66511	2117.5	66	20	67236	2190	17.21	17.03	-0.18
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67236	2190	5	10	2525	881.5	13.19	13.09	-0.1
5B-30A	5	5	20625	846.5	2625	871.5	16QAM	1	12	5	10	2553	884.3	30	10	9820	2355	17.21	17.09	-0.12
	30	5	27710	2310	9820	2355	16QAM	1	24	5	5	2625	871.5	5	10	2553	884.3	13.43	13.24	-0.19
5A-66B	5	5	20625	846.5	2625	891.5	16QAM	1	12	66	15	66511	2117.5	66	5	66604	2132.5	17.21	16.94	-0.27
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	5	66604	2132.5	5	10	2525	881.5	13.19	13.09	-0.1
5A-66C	5	5	20625	846.5	2625	891.5	16QAM	1	12	66	15	66511	2117.5	66	15	66661	2132.5	17.21	16.94	-0.27
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	5	10	2525	881.5	13.19	12.93	-0.26
5B-66A	5	5	20625	846.5	2625	871.5	16QAM	1	12	5	10	2553	884.3	66	20	66786	2145	17.22	16.6	-0.62
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	5	3	2635	892.5	5	5	2525	881.5	13.19	12.98	-0.21
12A-30A-66A	30	5	27710	2310	9820	2355	16QAM	1	24	66	20	66786	2145	12	10	5107	738.7	13.43	13.41	-0.02
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	30	10	9820	2355	12	10	5107	738.7	13.19	13.15	-0.04
12A-66A-66A	12	5	23035	701.5	5035	731.5	16QAM	1	24	66	15	66511	2117.5	66	20	67236	2190	16.67	16.56	-0.11
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67236	2190	12	10	5095	737.5	13.19	13.2	0.01
13A-66A-66A	13	5	23230	782	5230	751	16QAM	1	0	66	15	66511	2117.5	66	20	67036	2170	17.46	17.4	-0.06
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67036	2170	13	10	5230	751	13.19	13	-0.19
13A-66B	13	5	23230	782	5230	751	16QAM	1	0	66	15	66511	2117.5	66	15	66661	2132.5	17.46	17.37	-0.09
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	13	10	5230	751	13.19	13.09	-0.1
13A-66C	13	5	23230	782	5230	751	16QAM	1	0	66	15	66511	2117.5	66	15	66661	2132.5	17.46	17.37	-0.09
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	13	10	5230	751	13.19	13.09	-0.1
25A-25A-26A	25	10	26090	1855	8090	1935	16QAM	1	0	25	20	8590	1985	26	5	8865	876.5	12.59	12.09	-0.5
	26	3	26705	815.5	8705	860.5	16QAM	1	7	25	10	8090	1935	25	20	8590	1985	17.07	17.05	-0.02
25A-41C	25	10	26090	1855	8090	1935	16QAM	1	0	41	20	41055	2636.5	41	20	39987	2529.7	12.59	12.48	-0.11
26A-41C	26	5	27015	846.5	9015	891.5	16QAM	1	12	41	20	41055	2636.5	41	20	39987	2529.7	16.96	17.09	0.13
30A-66A-66A	30	5	27710	2310	9820	2355	16QAM	1	24	66	15	66511	2117.5	66	20	67236	2190	13.43	13.43	0
	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	20	67236	2190	30	10	9820	2355	13.19	13.05	-0.14
41A-41C	41	20	41055	2636.5	41055	2636.5	16QAM	1	0	41	20	41055	2636.5	41	20	39987	2529.7	14.22	13.92	-0.3
	41	20	41055	2636.5	41055	2636.5	16QAM	1	0	41	20	39987	2529.7	41	20	40620	2593	14.22	14	-0.22
41D	41	20	40620	2573.2	40620	2573.2	16QAM	1	0	41	20	40620	2593	41	20	40818	2612.8	14.22	14.05	-0.17
66A-66C	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66511	2117.5	66	15	66661	2132.5	13.19	12.74	-0.45
66C-66A	66	15	132047	1717.5	66511	2117.5	16QAM	1	0	66	15	66661	2132.5	66	20	66786	2145	13.19	12.8	-0.39

2CA 41C Uplink Carrier aggregation Conducted Powers- Maximum Power Mode

PCC									SCC							Tx Power		Deviation
Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Modulation	RB	offset	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with UL CA Enabled(dBm)	
41	20	41490	2680	41490	2680	QPSK	1	0	41	20	41292	2660.2	QPSK	1	99	24.43	24.41	-0.02

Notes :

Downlink Carrier aggregation:

1. This device supports intra-downlink and inter-downlink carrier aggregation. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Per FCC KDB publication 941225 D05A v01r02, Section C)3)b)ii), PCC uplink channel was selected at downlink carrier aggregation combinations. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
4. For continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to multiple of 300kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521.
5. For non-continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
6. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

Uplink Carrier aggregation :

1. This device supports uplink carrier aggregation for LTE CA_41C with a maximum of 20MHz component carriers. For intra-band contiguous carrier aggregation scenarios, 3GPP36.101 Table 6.2.2A-1 specifies that aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted Powers and MPR setting in this device are permanently implemented per the above 3GPP requirements.
2. Per Fall 2017 TCBC Workshop Notes, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

Power Measurement setup

12. System Verification

12.1 Tissue Verification

The body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity.

Table for Body Tissue Verification									
Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (㎒)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε	Target Conductivity σ (S/m)	Target Dielectric Constant, ε	% dev σ	% dev ε
07/03/2019	21.8	750B	680	0.923	55.890	0.958	55.806	-3.65%	0.15%
			700	0.948	55.879	0.959	55.730	-1.15%	0.27%
			750	1.000	55.385	0.963	55.530	3.84%	-0.26%
06/20/2019	22.5	750B	695	0.918	56.656	0.959	55.749	-4.28%	1.63%
			705	0.920	56.629	0.959	55.710	-4.07%	1.65%
			710	0.926	56.598	0.960	55.690	-3.54%	1.63%
			750	0.976	55.931	0.963	55.530	1.35%	0.72%
07/10/2019	20.0	750B	705	0.917	55.675	0.959	55.710	-4.38%	-0.06%
			710	0.922	55.618	0.960	55.690	-3.96%	-0.13%
			750	0.959	55.355	0.963	55.530	-0.42%	-0.32%
06/19/2019	21.4	835B	820	0.973	55.824	0.969	55.260	0.41%	1.02%
			835	0.988	55.581	0.970	55.200	1.86%	0.69%
			850	1.001	55.366	0.988	55.150	1.32%	0.39%
07/09/2019	20.1	835B	820	0.939	55.630	0.969	55.260	-3.10%	0.67%
			835	0.951	55.485	0.970	55.200	-1.96%	0.52%
			850	0.968	55.399	0.988	55.150	-2.02%	0.45%
06/21/2019	21.8	1800B	1710	1.442	53.384	1.463	53.534	-1.44%	-0.28%
			1750	1.481	53.322	1.488	53.430	-0.47%	-0.20%
			1 800	1.528	53.125	1.520	53.300	0.53%	-0.33%
06/20/2019	21.3	1900B	1850	1.480	53.660	1.520	53.300	-2.63%	0.68%
			1900	1.521	53.529	1.520	53.300	0.07%	0.43%
			1910	1.537	53.656	1.520	53.300	1.12%	0.67%
06/21/2019	21.8	2300B	2300	1.770	53.148	1.807	52.900	-2.05%	0.47%
			2307.5	1.771	53.103	1.814	52.890	-2.37%	0.40%
			2310	1.772	53.088	1.816	52.886	-2.42%	0.38%
			2312.5	1.778	53.084	1.819	52.882	-2.25%	0.38%
06/17/2019	22.7	2600B	2500	2.030	53.332	2.021	52.640	0.45%	1.31%
			2600	2.147	53.138	2.163	52.510	-0.74%	1.20%
			2690	2.261	52.966	2.291	52.394	-1.31%	1.09%
06/18/2019	22.4	2600B	2500	2.002	53.458	2.021	52.640	-0.94%	1.55%
			2600	2.103	53.038	2.163	52.510	-2.77%	1.01%
			2690	2.226	52.956	2.291	52.394	-2.84%	1.07%

12.2 System Verification

* Input Power: 50 mW

Freq. [㎒]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) [W/kg]	50mW Measured SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Limit [%]
750	07/03/2019	3797	1014	Body	22.1	21.8	8.58	0.417	8.34	- 2.80	± 10
750	06/20/2019	3903	1014	Body	22.8	22.5	8.58	0.418	8.36	- 2.56	± 10
750	07/10/2019	3863	1014	Body	20.3	20.0	8.58	0.446	8.92	+ 3.96	± 10
835	06/19/2019	3903	4d165	Body	21.7	21.4	9.50	0.496	9.92	+ 4.42	± 10
835	07/09/2019	3863	4d165	Body	20.4	20.1	9.50	0.490	9.80	+ 3.16	± 10
1 800	06/21/2019	3797	2d007	Body	22.1	21.8	38.4	2.01	40.2	+ 4.69	± 10
1 900	06/20/2019	3797	5d032	Body	21.6	21.3	39.7	2.01	40.2	+ 1.26	± 10
2 300	06/21/2019	3797	1010	Body	22.1	21.8	47.7	2.27	45.4	- 4.82	± 10
2 600	06/17/2019	3797	1015	Body	23.0	22.7	54.8	2.87	57.4	+ 4.74	± 10
2 600	06/18/2019	3797	1015	Body	22.7	22.4	54.8	2.65	53.0	- 3.28	± 10

12.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system verification kit. (Graphic Plots Attached)

- Cabling the system, using the verification kit equipment.
- Generate about 50 mW Input level from the signal generator to the Dipole Antenna.
- Dipole antenna was placed below the flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

Note;
SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

13. SAR Test Data Summary

13.1 SAR Measurement Results

UMTS 1700 Body SAR													
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.												
1 732.4	1412	RMC	14.0	13.31	0.01	Rear	Active	1:1	0	0.659	1.172	**0.772**	1
1 732.4	1412	RMC	14.0	13.31	-0.19	Right	Active	1:1	0	0.139	1.172	0.163	-
1 732.4	1412	RMC	14.0	13.31	-0.18	Top	Active	1:1	0	0.437	1.172	0.512	-
1 732.4	1412	RMC	14.0	13.31	-0.16	Right Corner	Active	1:1	0	0.060	1.172	0.070	-
1 732.4	1412	RMC	25.0	24.36	0.03	Rear	Inactive	1:1	16	0.425	1.159	0.493	-
1 732.4	1412	RMC	25.0	24.36	0.04	Right	Inactive	1:1	10	0.122	1.159	0.141	-
1 732.4	1412	RMC	25.0	24.36	0.04	Left	Inactive	1:1	0	0.331	1.159	0.384	-
1 732.4	1412	RMC	25.0	24.36	0.03	Top	Inactive	1:1	17	0.413	1.159	0.479	-
1 732.4	1412	RMC	25.0	24.36	0.01	Right Corner	Inactive	1:1	6	0.156	1.159	0.181	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram					

LTE Band 12 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
707.5	23095	QPSK	10	17.5	16.40	0.01	Rear	Active	0	1	0	1:1	0	0.273	1.288	0.352	-
707.5	23095	QPSK	10	17.5	16.40	-0.03	Rear	Active	0	25	12	1:1	0	0.262	1.288	0.337	-
707.5	23095	QPSK	10	17.5	16.40	-0.01	Right	Active	0	1	0	1:1	0	0.028	1.288	0.036	-
707.5	23095	QPSK	10	17.5	16.40	0.01	Right	Active	0	25	12	1:1	0	0.027	1.288	0.035	-
707.5	23095	QPSK	10	17.5	16.40	-0.09	Top	Active	0	1	0	1:1	0	0.152	1.288	0.196	-
707.5	23095	QPSK	10	17.5	16.40	-0.05	Top	Active	0	25	12	1:1	0	0.148	1.288	0.191	-
707.5	23095	QPSK	10	17.5	16.40	-0.03	Right Corner	Active	0	1	0	1:1	0	0.036	1.288	0.046	-
707.5	23095	QPSK	10	17.5	16.40	0.09	Right Corner	Active	0	25	12	1:1	0	0.033	1.288	0.043	-
707.5	23095	QPSK	10	25.0	23.86	-0.12	Rear	Inactive	0	1	0	1:1	16	0.327	1.300	**0.425**	2
707.5	23095	QPSK	10	24.0	22.90	-0.02	Rear	Inactive	1	25	0	1:1	16	0.217	1.288	0.279	-
707.5	23095	QPSK	10	25.0	23.86	-0.04	Right	Inactive	0	1	0	1:1	10	0.038	1.300	0.049	-
707.5	23095	QPSK	10	24.0	22.90	0.10	Right	Inactive	1	25	0	1:1	10	0.030	1.288	0.039	-
707.5	23095	QPSK	10	25.0	23.86	0.01	Left	Inactive	0	1	0	1:1	0	0.022	1.300	0.029	-
707.5	23095	QPSK	10	24.0	22.90	-0.02	Left	Inactive	1	25	0	1:1	0	0.020	1.288	0.026	-
707.5	23095	QPSK	10	25.0	23.86	-0.03	Top	Inactive	0	1	0	1:1	17	0.201	1.300	0.261	-
707.5	23095	QPSK	10	24.0	22.90	0.01	Top	Inactive	1	25	0	1:1	17	0.147	1.288	0.189	-
707.5	23095	QPSK	10	25.0	23.86	0.06	Right Corner	Inactive	0	1	0	1:1	6	0.054	1.300	0.070	-
707.5	23095	QPSK	10	24.0	22.90	0.06	Right Corner	Inactive	1	25	0	1:1	6	0.040	1.288	0.052	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

LTE Band 14 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
793	23330	QPSK	10	16.0	14.76	-0.09	Rear	Active	0	1	49	1:1	0	0.407	1.330	0.541	-
793	23330	QPSK	10	16.0	14.82	-0.08	Rear	Active	0	25	12	1:1	0	0.414	1.312	0.543	-
793	23330	QPSK	10	16.0	14.76	0.17	Right	Active	0	1	49	1:1	0	0.044	1.330	0.059	-
793	23330	QPSK	10	16.0	14.82	0.15	Right	Active	0	25	12	1:1	0	0.045	1.312	0.059	-
793	23330	QPSK	10	16.0	14.76	-0.02	Top	Active	0	1	49	1:1	0	0.308	1.330	0.410	-
793	23330	QPSK	10	16.0	14.82	-0.01	Top	Active	0	25	12	1:1	0	0.314	1.312	0.412	-
793	23330	QPSK	10	16.0	14.76	-0.07	Right Corner	Active	0	1	49	1:1	0	0.042	1.330	0.056	-
793	23330	QPSK	10	16.0	14.82	-0.09	Right Corner	Active	0	25	12	1:1	0	0.047	1.312	0.062	-
793	23330	QPSK	10	25.0	23.81	0.15	Rear	Inactive	0	1	49	1:1	16	0.446	1.315	0.586	-
793	23330	QPSK	10	24.0	22.87	0.10	Rear	Inactive	1	25	12	1:1	16	0.343	1.297	0.445	-
793	23330	QPSK	10	25.0	23.81	0.03	Right	Inactive	0	1	49	1:1	10	0.083	1.315	0.109	-
793	23330	QPSK	10	24.0	22.87	0.07	Right	Inactive	1	25	12	1:1	10	0.065	1.297	0.084	-
793	23330	QPSK	10	25.0	23.81	0.08	Left	Inactive	0	1	49	1:1	0	0.133	1.315	0.175	-
793	23330	QPSK	10	24.0	22.87	0.09	Left	Inactive	1	25	12	1:1	0	0.109	1.297	0.141	-
793	23330	QPSK	10	25.0	23.81	-0.02	Top	Inactive	0	1	49	1:1	17	0.529	1.315	**0.696**	3
793	23330	QPSK	10	24.0	22.87	0.02	Top	Inactive	1	25	12	1:1	17	0.408	1.297	0.529	-
793	23330	QPSK	10	25.0	23.81	0.05	Right Corner	Inactive	0	1	49	1:1	6	0.075	1.315	0.099	-
793	23330	QPSK	10	24.0	22.87	0.04	Right Corner	Inactive	1	25	12	1:1	6	0.064	1.297	0.083	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

LTE Band 17 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
710	23790	QPSK	10	17.0	15.78	-0.06	Rear	Active	0	1	0	1:1	0	0.211	1.324	**0.279**	4
710	23790	QPSK	10	17.0	15.76	-0.11	Rear	Active	0	25	0	1:1	0	0.209	1.330	0.278	-
710	23790	QPSK	10	17.0	15.78	0.11	Right	Active	0	1	0	1:1	0	0.023	1.324	0.030	-
710	23790	QPSK	10	17.0	15.76	0.12	Right	Active	0	25	0	1:1	0	0.024	1.330	0.032	-
710	23790	QPSK	10	17.0	15.78	-0.08	Top	Active	0	1	0	1:1	0	0.195	1.324	0.258	-
710	23790	QPSK	10	17.0	15.76	-0.10	Top	Active	0	25	0	1:1	0	0.202	1.330	0.269	-
710	23790	QPSK	10	17.0	15.78	-0.10	Right Corner	Active	0	1	0	1:1	0	0.028	1.324	0.037	-
710	23790	QPSK	10	17.0	15.76	-0.12	Right Corner	Active	0	25	0	1:1	0	0.028	1.330	0.037	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

Note: SAR For Full power (Sensor Inactive mode) for LTE band 17 (Frequency range: 706.5 ~ 713.5MHz) is covered by LTE Band 12 (Frequency range : 699.7 ~ 715.3 MHz) due to overlapping frequency range, same maximum tune-up limit.

LTE Band 25 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
1 860	26140	QPSK	20	13.5	12.25	0.10	Rear	Active	0	1	0	1:1	0	0.235	1.334	0.313	-
1 860	26140	QPSK	20	13.5	12.05	-0.05	Rear	Active	0	50	0	1:1	0	0.236	1.396	0.329	-
1 860	26140	QPSK	20	13.5	12.25	-0.10	Right	Active	0	1	0	1:1	0	0.045	1.334	0.060	-
1 860	26140	QPSK	20	13.5	12.05	0.17	Right	Active	0	50	0	1:1	0	0.044	1.396	0.061	-
1 860	26140	QPSK	20	13.5	12.25	0.14	Top	Active	0	1	0	1:1	0	0.318	1.334	0.424	-
1 860	26140	QPSK	20	13.5	12.05	0.13	Top	Active	0	50	0	1:1	0	0.308	1.396	0.430	-
1 860	26140	QPSK	20	13.5	12.25	-0.03	Right Corner	Active	0	1	0	1:1	0	0.076	1.334	0.101	-
1 860	26140	QPSK	20	13.5	12.05	0.10	Right Corner	Active	0	50	0	1:1	0	0.070	1.396	0.098	-
1 860	26140	QPSK	20	25.0	23.80	0.04	Rear	Inactive	0	1	0	1:1	16	0.592	1.318	**0.780**	5
1 860	26140	QPSK	20	24.0	22.52	0.10	Rear	Inactive	1	50	0	1:1	16	0.468	1.406	0.658	-
1 860	26140	QPSK	20	25.0	23.80	-0.09	Right	Inactive	0	1	0	1:1	10	0.094	1.318	0.124	-
1 860	26140	QPSK	20	24.0	22.52	-0.16	Right	Inactive	1	50	0	1:1	10	0.069	1.406	0.097	-
1 860	26140	QPSK	20	25.0	23.80	0.13	Left	Inactive	0	1	0	1:1	0	0.378	1.318	0.498	-
1 860	26140	QPSK	20	24.0	22.52	0.17	Left	Inactive	1	50	0	1:1	0	0.307	1.406	0.432	-
1 860	26140	QPSK	20	25.0	23.80	-0.03	Top	Inactive	0	1	0	1:1	17	0.554	1.318	0.730	-
1 860	26140	QPSK	20	24.0	22.52	-0.07	Top	Inactive	1	50	0	1:1	17	0.438	1.406	0.616	-
1 860	26140	QPSK	20	25.0	23.80	0.17	Right Corner	Inactive	0	1	0	1:1	6	0.215	1.318	0.283	-
1 860	26140	QPSK	20	24.0	22.52	0.12	Right Corner	Inactive	1	50	0	1:1	6	0.162	1.406	0.228	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

LTE Band 26 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
841.5	26965	QPSK	15	17.5	16.78	0.10	Rear	Active	0	1	74	1:1	0	0.509	1.180	0.601	-
821.5	26765	QPSK	15	17.5	16.75	0.02	Rear	Active	0	36	0	1:1	0	0.536	1.189	**0.637**	6
841.5	26965	QPSK	15	17.5	16.78	-0.14	Right	Active	0	1	74	1:1	0	0.058	1.180	0.068	-
821.5	26765	QPSK	15	17.5	16.75	-0.01	Right	Active	0	36	0	1:1	0	0.046	1.189	0.055	-
841.5	26965	QPSK	15	17.5	16.78	-0.05	Top	Active	0	1	74	1:1	0	0.167	1.180	0.197	-
821.5	26765	QPSK	15	17.5	16.75	-0.03	Top	Active	0	36	0	1:1	0	0.177	1.189	0.210	-
841.5	26965	QPSK	15	17.5	16.78	-0.14	Right Corner	Active	0	1	74	1:1	0	0.052	1.180	0.061	-
821.5	26765	QPSK	15	17.5	16.75	0.14	Right Corner	Active	0	36	0	1:1	0	0.049	1.189	0.058	-
841.5	26965	QPSK	15	25.0	24.29	-0.06	Rear	Inactive	0	1	36	1:1	16	0.470	1.178	0.554	-
821.5	26765	QPSK	15	24.0	23.27	-0.03	Rear	Inactive	1	36	0	1:1	16	0.353	1.183	0.418	-
841.5	26965	QPSK	15	25.0	24.29	-0.03	Right	Inactive	0	1	36	1:1	10	0.088	1.178	0.104	-
821.5	26765	QPSK	15	24.0	23.27	-0.04	Right	Inactive	1	36	0	1:1	10	0.059	1.183	0.070	-
841.5	26965	QPSK	15	25.0	24.29	-0.01	Left	Inactive	0	1	36	1:1	0	0.028	1.178	0.033	-
821.5	26765	QPSK	15	24.0	23.27	0.01	Left	Inactive	1	36	0	1:1	0	0.030	1.183	0.035	-
841.5	26965	QPSK	15	25.0	24.29	-0.01	Top	Inactive	0	1	36	1:1	17	0.360	1.178	0.424	-
821.5	26765	QPSK	15	24.0	23.27	-0.03	Top	Inactive	1	36	0	1:1	17	0.199	1.183	0.235	-
841.5	26965	QPSK	15	25.0	24.29	0.03	Right Corner	Inactive	0	1	36	1:1	6	0.127	1.178	0.150	-
821.5	26765	QPSK	15	24.0	23.27	0.02	Right Corner	Inactive	1	36	0	1:1	6	0.092	1.183	0.109	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

LTE Band 30 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
2 310	27710	QPSK	10	14.5	13.03	0.13	Rear	Active	0	1	49	1:1	0	0.843	1.403	1.183	-
2 310	27710	QPSK	10	14.5	13.11	0.07	Rear	Active	0	25	0	1:1	0	0.904	1.377	1.245	-
2 310	27710	QPSK	10	14.5	13.03	0.05	Rear	Active	0	50	0	1:1	0	0.948	1.403	**1.330**	7
2 310	27710	QPSK	10	14.5	13.03	0.19	Right	Active	0	1	49	1:1	0	0.750	1.403	1.052	-
2 310	27710	QPSK	10	14.5	13.11	0.10	Right	Active	0	25	0	1:1	0	0.781	1.377	1.075	-
2 310	27710	QPSK	10	14.5	13.03	0.10	Right	Active	0	50	0	1:1	0	0.784	1.403	1.100	-
2 310	27710	QPSK	10	14.5	13.03	-0.11	Top	Active	0	1	49	1:1	0	0.551	1.403	0.773	-
2 310	27710	QPSK	10	14.5	13.11	-0.12	Top	Active	0	25	0	1:1	0	0.590	1.377	0.812	-
2 310	27710	QPSK	10	14.5	13.03	0.03	Top	Active	0	50	0	1:1	0	0.594	1.403	0.833	-
2 310	27710	QPSK	10	14.5	13.03	0.15	Right Corner	Active	0	1	49	1:1	0	0.319	1.403	0.448	-
2 310	27710	QPSK	10	14.5	13.11	0.17	Right Corner	Active	0	25	0	1:1	0	0.338	1.377	0.465	-
2 310	27710	QPSK	10	23.0	21.57	-0.16	Rear	Inactive	0	1	49	1:1	16	0.212	1.390	0.295	-
2 310	27710	QPSK	10	22.0	20.59	-0.14	Rear	Inactive	1	25	0	1:1	16	0.183	1.384	0.253	-
2 310	27710	QPSK	10	23.0	21.57	0.19	Right	Inactive	0	1	49	1:1	10	0.750	1.390	1.043	-
2 310	27710	QPSK	10	22.0	20.59	0.19	Right	Inactive	1	25	0	1:1	10	0.490	1.384	0.678	-
2 310	27710	QPSK	10	22.0	20.57	0.14	Right	Inactive	1	50	0	1:1	10	0.517	1.390	0.719	-
2 310	27710	QPSK	10	23.0	21.57	0.17	Left	Inactive	0	1	49	1:1	0	0.304	1.390	0.423	-
2 310	27710	QPSK	10	22.0	20.59	0.15	Left	Inactive	1	25	0	1:1	0	0.254	1.384	0.352	-
2 310	27710	QPSK	10	23.0	21.57	0.13	Top	Inactive	0	1	49	1:1	17	0.168	1.390	0.234	-
2 310	27710	QPSK	10	22.0	20.59	-0.10	Top	Inactive	1	25	0	1:1	17	0.139	1.384	0.192	-
2 310	27710	QPSK	10	23.0	21.57	0.13	Right Corner	Inactive	0	1	49	1:1	6	0.633	1.390	0.880	-
2 310	27710	QPSK	10	22.0	20.59	0.10	Right Corner	Inactive	1	25	0	1:1	6	0.530	1.384	0.734	-
2 310	27710	QPSK	10	22.0	20.57	0.19	Right Corner	Inactive	1	50	0	1:1	6	0.594	1.390	0.826	-
2 310	27710	QPSK	10	14.5	13.03	0.07	Rear	Active	0	50	0	1:1	0	0.894	1.403	1.254	**
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

Note: ** Data entry indicate Variability measurement.

LTE Band 41 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
2 506.0	39750	QPSK	20	15.0	13.79	-0.19	Rear	Active	0	1	0	1:1.58	0	0.603	1.321	0.797	-
2 549.5	40185	QPSK	20	15.0	13.99	-0.14	Rear	Active	0	1	0	1:1.58	0	0.582	1.262	0.734	-
2 593.0	40620	QPSK	20	15.0	13.90	-0.12	Rear	Active	0	1	0	1:1.58	0	0.554	1.288	0.714	-
2 636.5	41055	QPSK	20	15.0	13.98	-0.11	Rear	Active	0	1	0	1:1.58	0	0.546	1.265	0.691	-
2 680.0	41490	QPSK	20	15.0	13.98	-0.16	Rear	Active	0	1	0	1:1.58	0	0.551	1.265	0.697	-
2 506.0	39750	QPSK	20	15.0	13.81	-0.13	Rear	Active	0	50	0	1:1.58	0	0.614	1.315	0.807	-
2 549.5	40185	QPSK	20	15.0	13.89	0.14	Rear	Active	0	50	0	1:1.58	0	0.580	1.291	0.749	-
2 593.0	40620	QPSK	20	15.0	13.88	-0.10	Rear	Active	0	50	0	1:1.58	0	0.536	1.294	0.694	-
2 636.5	41055	QPSK	20	15.0	13.97	0.18	Rear	Active	0	50	0	1:1.58	0	0.536	1.268	0.680	-
2 680.0	41490	QPSK	20	15.0	13.96	-0.16	Rear	Active	0	50	0	1:1.58	0	0.676	1.271	0.859	-
2 636.5	41055	QPSK	20	15.0	13.94	0.14	Rear	Active	0	100	0	1:1.58	0	0.682	1.276	0.870	-
2 549.5	40185	QPSK	20	15.0	13.99	-0.10	Right	Active	0	1	0	1:1.58	0	0.450	1.262	0.568	-
2 636.5	41055	QPSK	20	15.0	13.97	-0.12	Right	Active	0	50	0	1:1.58	0	0.409	1.268	0.519	-
2 549.5	40185	QPSK	20	15.0	13.99	-0.14	Top	Active	0	1	0	1:1.58	0	0.290	1.262	0.366	-
2 636.5	41055	QPSK	20	15.0	13.97	-0.18	Top	Active	0	50	0	1:1.58	0	0.291	1.268	0.369	-
2 549.5	40185	QPSK	20	15.0	13.99	0.16	Right Corner	Active	0	1	0	1:1.58	0	0.285	1.262	0.360	-
2 636.5	41055	QPSK	20	15.0	13.97	0.10	Right Corner	Active	0	50	0	1:1.58	0	0.266	1.268	0.337	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

LTE Band 41 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
2 636.5	41055	QPSK	20	25.5	24.50	0.01	Rear	Inactive	0	1	0	1:1.58	16	0.382	1.259	0.481	-
2 636.5	41055	QPSK	20	24.5	23.47	0.05	Rear	Inactive	1	50	0	1:1.58	16	0.298	1.268	0.378	-
2 506.0	39750	QPSK	20	25.5	24.30	0.15	Right	Inactive	0	1	0	1:1.58	10	0.847	1.318	1.116	-
2 549.5	40185	QPSK	20	25.5	24.48	0.17	Right	Inactive	0	1	0	1:1.58	10	0.903	1.265	1.142	-
2 593.0	40620	QPSK	20	25.5	24.36	0.19	Right	Inactive	0	1	0	1:1.58	10	0.876	1.300	1.139	-
2 636.5	41055	QPSK	20	25.5	24.50	0.20	Right	Inactive	0	1	0	1:1.58	10	0.894	1.259	1.126	-
2 680.0	41490	QPSK	20	25.5	24.43	0.11	Right	Inactive	0	1	0	1:1.58	10	0.973	1.279	1.244	-
2 506.0	39750	QPSK	20	24.5	23.30	0.12	Right	Inactive	1	50	0	1:1.58	10	0.695	1.318	0.916	-
2 549.5	40185	QPSK	20	24.5	23.40	0.11	Right	Inactive	1	50	0	1:1.58	10	0.716	1.288	0.922	-
2 593.0	40620	QPSK	20	24.5	23.34	0.12	Right	Inactive	1	50	0	1:1.58	10	0.687	1.306	0.897	-
2 636.5	41055	QPSK	20	24.5	23.47	0.11	Right	Inactive	1	50	0	1:1.58	10	0.716	1.268	0.908	-
2 680.0	41490	QPSK	20	24.5	23.44	0.12	Right	Inactive	1	50	0	1:1.58	10	0.725	1.276	0.925	-
2 636.5	41055	QPSK	20	24.5	23.49	0.15	Right	Inactive	1	100	0	1:1.58	10	0.791	1.262	0.998	-
2 636.5	41055	QPSK	20	25.5	24.50	-0.17	Left	Inactive	0	1	0	1:1.58	0	0.022	1.259	0.028	-
2 636.5	41055	QPSK	20	24.5	23.47	-0.07	Left	Inactive	1	50	0	1:1.58	0	0.018	1.268	0.023	-
2 636.5	41055	QPSK	20	25.5	24.50	0.18	Top	Inactive	0	1	0	1:1.58	17	0.153	1.259	0.193	-
2 636.5	41055	QPSK	20	24.5	23.47	0.13	Top	Inactive	1	50	0	1:1.58	17	0.106	1.268	0.134	-
2 506.0	39750	QPSK	20	25.5	24.30	0.17	Right Corner	Inactive	0	1	0	1:1.58	6	0.852	1.318	1.123	-
2 549.5	40185	QPSK	20	25.5	24.48	0.12	Right Corner	Inactive	0	1	0	1:1.58	6	0.706	1.268	0.895	-
2 593.0	40620	QPSK	20	25.5	24.36	0.10	Right Corner	Inactive	0	1	0	1:1.58	6	0.628	1.300	0.816	-
2 636.5	41055	QPSK	20	25.5	24.50	0.07	Right Corner	Inactive	0	1	0	1:1.58	6	0.644	1.259	0.811	-
2 680.0	41490	QPSK	20	25.5	24.43	0.09	Right Corner	Inactive	0	1	0	1:1.58	6	0.600	1.279	0.767	-
2 506.0	39750	QPSK	20	24.5	23.30	0.15	Right Corner	Inactive	1	50	0	1:1.58	6	0.656	1.268	0.832	-
2 549.5	40185	QPSK	20	24.5	23.40	0.16	Right Corner	Inactive	1	50	0	1:1.58	6	0.548	1.288	0.706	-
2 593.0	40620	QPSK	20	24.5	23.34	0.15	Right Corner	Inactive	1	50	0	1:1.58	6	0.490	1.306	0.640	-
2 636.5	41055	QPSK	20	24.5	23.47	0.09	Right Corner	Inactive	1	50	0	1:1.58	6	0.500	1.268	0.634	-
2 680.0	41490	QPSK	20	24.5	23.44	0.19	Right Corner	Inactive	1	50	0	1:1.58	6	0.483	1.276	0.616	-
2 636.5	41055	QPSK	20	24.5	23.49	0.14	Right Corner	Inactive	1	100	0	1:1.58	6	0.488	1.262	0.616	-
2 680.0(PC2)	41490	QPSK	20	26.8	25.74	0.12	Right	Inactive	0	1	0	1:2.31	10	1.04	1.276	**1.327**	8
2 680.0(PC2)	41490	QPSK	20	26.8	25.74	0.13	Right	Inactive	0	1	0	1:2.31	10	1.00	1.276	1.276	*
PCC 2 680.0	41490	QPSK	20	25.5	24.41	0.13	Right	Inactive	0	1	0	1:1.58	10	0.868	1.285	1.115	**
SCC 2 660.2	41292									1	99						
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

Note: * Data entry indicate Variability measurement.

** Data entry indicate 2CC UP link measurement result at sensor inactive mode

LTE Band 71 Body SAR																	
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.																
688.0	133372	QPSK	20	15.0	14.36	0.02	Rear	Active	0	1	0	1:1	0	0.275	1.159	0.319	-
680.5	133297	QPSK	20	15.0	14.49	0.02	Rear	Active	0	50	0	1:1	0	0.279	1.125	0.314	-
688.0	133372	QPSK	20	15.0	14.36	0.17	Right	Active	0	1	0	1:1	0	0.020	1.159	0.023	-
680.5	133297	QPSK	20	15.0	14.49	0.17	Right	Active	0	50	0	1:1	0	0.020	1.125	0.023	-
688.0	133372	QPSK	20	15.0	14.36	-0.03	Top	Active	0	1	0	1:1	0	0.421	1.159	0.488	-
680.5	133297	QPSK	20	15.0	14.49	0.01	Top	Active	0	50	0	1:1	0	0.472	1.125	**0.531**	9
688.0	133372	QPSK	20	15.0	14.36	-0.19	Right Corner	Active	0	1	0	1:1	0	0.038	1.159	0.044	-
680.5	133297	QPSK	20	15.0	14.49	0.01	Right Corner	Active	0	50	0	1:1	0	0.035	1.125	0.039	-
688.0	133372	QPSK	20	25.0	24.57	-0.13	Rear	Inactive	0	1	0	1:1	16	0.028	1.104	0.031	-
680.5	133297	QPSK	20	24.0	23.63	-0.15	Rear	Inactive	1	50	0	1:1	16	0.025	1.089	0.027	-
688.0	133372	QPSK	20	25.0	24.57	0.13	Right	Inactive	0	1	0	1:1	10	0.044	1.104	0.049	-
680.5	133297	QPSK	20	24.0	23.63	0.13	Right	Inactive	1	50	0	1:1	10	0.034	1.089	0.037	-
688.0	133372	QPSK	20	25.0	24.57	-0.03	Left	Inactive	0	1	0	1:1	0	0.120	1.104	0.132	-
680.5	133297	QPSK	20	24.0	23.63	0.07	Left	Inactive	1	50	0	1:1	0	0.093	1.089	0.101	-
688.0	133372	QPSK	20	25.0	24.57	-0.04	Top	Inactive	0	1	0	1:1	17	0.241	1.104	0.266	-
680.5	133297	QPSK	20	24.0	23.63	-0.04	Top	Inactive	1	50	0	1:1	17	0.181	1.089	0.197	-
688.0	133372	QPSK	20	25.0	24.57	-0.18	Right Corner	Inactive	0	1	0	1:1	6	0.00639	1.104	0.007	-
680.5	133297	QPSK	20	24.0	23.63	0.10	Right Corner	Inactive	1	50	0	1:1	6	0.059	1.089	0.064	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg Averaged over 1 gram								

13.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 and KDB Publication 447498 D01v06
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v06.
6. Per FCC KDB 865664 D01v01r04, variability SAR measurement were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg for 1g SAR and >2 for 10g SAR Please see Section 15 for variability analysis. the maximum tune-up tolerance limit.
7. This device utilizes power reduction for some wireless mode and technologies, as outlined in sec. 4.3 The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous scenarios.
8. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v06 was applied to determine SAR test exclusion for adjacent edge configurations.

UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. UMTS SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB publication 941225 D01v03r01. AMR and HSPA(HSDPA/HSUPA/DC-HSDPA) SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
3. Per FCC KDB 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the channel highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Consideration for LTE Devices in FCC KDB 941225 D05v02r05.
2. According to FCC KDB 941225 D05v02r05:
   When the reported SAR is ≤ 0.8 W/kg, testing of the 100% RB allocation and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the 1RB, 50%RB and 100%RB allocation with highest output power for that channel.
   Only one channel, and as reported SAR values for 1RB allocation and 50%RB allocation were less than 1.45W/Kg only the highest power RB offset for each allocation was required.
3. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to target MPR is indicated alongside the SAR results.
4. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
5. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) LTE TDD Band 41 SAR measured at the highest output power channel for each test configuration is ≤ 0.6 W/kg then testing at the other channels is not required for such test configurations.
6. TDD LTE (Power Class 3) was tested using UL-DL configuration 0 with 6 UL sub frames and 2S subframes using extended cyclic prefix only and special sub frame configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4**,** the duty factor using extended cyclic prefix is 0.633(cf=1.58).
7. SAR test reduction is applied using the following criteria:
   Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is >0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are >0.8 W/kg, testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation <1.45 W/kg. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is <1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is <1.45 W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
8. This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The Highest available duty cycle for Power Class 2 operations is 43.3% using UL-DL configuration 1. Per May TCB Workshop notes, all SAR tests were performed using Power Class 3. SAR with power class 2 at the available duty factor was additionally performed for the power class 3 configuration with the highest SAR configuration for each exposure conditions.
9. This device supports LTE Carrier Aggregation(CA) in Uplink for LTE 41 with two component carriers in the uplink. SAR measurements and conducted powers were evaluated per Fall 2017 TCBC Workshop notes (LTE Carrier aggregation).
   Because the maximum output for UL CA of LTE 41 is ≤ standalone LTE mode (without CA),
   SAR for LTE B41 Up link CA was performed at the highest standalone SAR configuration without CA and also UL CA SAR is not required for all required test channels, Because the reported SAR for UL CA configuration is < 1.4 W/kg, .
10. This device supports LTE Carrier Aggregation (CA) in the downlink Per FCC KDB publication 941225 D05A v01r02, SAR for LTE DL CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

14. Simultaneous SAR Analysis

For LTE B17 simultaneous evaluation is for power back-off active mode only.

14.1 Simultaneous Transmission Scenario with 2.4 GHz WLAN

Simultaneous Tx	Configurations	UMTS1700(W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.772	0.647	1.419	No
	Left	0.384	0.984	1.368	No
	Right	0.163	0.0086	0.172	No
	Top	0.512	0.300	0.812	No
	Right Corner	0.181	0.400	0.581	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 12 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.425	0.647	1.072	No
	Left	0.029	0.984	1.013	No
	Right	0.049	0.0086	0.058	No
	Top	0.261	0.300	0.561	No
	Right Corner	0.070	0.400	0.470	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 14 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.586	0.647	1.233	No
	Left	0.175	0.984	1.159	No
	Right	0.109	0.0086	0.118	No
	Top	0.696	0.300	0.996	No
	Right Corner	0.099	0.400	0.499	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 17 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.279	0.647	0.926	No
	Left	0.400	0.984	1.384	No
	Right	0.032	0.0086	0.041	No
	Top	0.269	0.300	0.569	No
	Right Corner	0.037	0.400	0.437	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 25 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.780	0.647	1.427	No
	Left	0.498	0.984	1.482	No
	Right	0.124	0.0086	0.133	No
	Top	0.730	0.300	1.030	No
	Right Corner	0.283	0.400	0.683	No
	Left Corner	0.400	0.288	0.688	No

Simultaneous Tx	Configurations	LTE 26 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.637	0.647	1.284	No
	Left	0.035	0.984	1.019	No
	Right	0.104	0.0086	0.113	No
	Top	0.424	0.300	0.724	No
	Right Corner	0.150	0.400	0.550	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 30 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	1.330	0.647	1.977	**Yes**
	Left	0.423	0.984	1.407	No
	Right	1.100	0.0086	1.109	No
	Top	0.833	0.300	1.133	No
	Right Corner	0.880	0.400	1.280	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 41 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.870	0.647	1.517	No
	Left	0.028	0.984	1.012	No
	Right	1.327	0.0086	1.336	No
	Top	0.369	0.300	0.669	No
	Right Corner	1.123	0.400	1.523	No
	Left Corner	0.400	0.288	0.688	No
Simultaneous Tx	Configurations	LTE 71 (W/kg)	2.4 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.319	0.647	0.966	No
	Left	0.132	0.984	1.116	No
	Right	0.049	0.0086	0.058	No
	Top	0.531	0.300	0.831	No
	Right Corner	0.064	0.400	0.464	No
	Left Corner	0.400	0.288	0.688	No

14.2 Simultaneous Transmission Scenario with 5 GHz WLAN

Simultaneous Tx	Configurations	UMTS1700(W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.772	0.392	1.164	No
	Left	0.384	1.033	1.417	No
	Right	0.163	0.151	0.314	No
	Top	0.512	0.522	1.034	No
	Right Corner	0.181	0.400	0.581	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 12 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.425	0.392	0.817	No
	Left	0.029	1.033	1.062	No
	Right	0.049	0.151	0.200	No
	Top	0.261	0.522	0.783	No
	Right Corner	0.070	0.400	0.470	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 14 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.586	0.392	0.978	No
	Left	0.175	1.033	1.208	No
	Right	0.109	0.151	0.260	No
	Top	0.696	0.522	1.218	No
	Right Corner	0.099	0.400	0.499	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 17 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.279	0.392	0.671	No
	Left	0.400	1.033	1.433	No
	Right	0.032	0.151	0.183	No
	Top	0.269	0.522	0.791	No
	Right Corner	0.037	0.400	0.437	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 25 (W/kg))	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.780	0.392	1.172	No
	Left	0.498	1.033	**1.531**	No
	Right	0.124	0.151	0.275	No
	Top	0.730	0.522	1.252	No
	Right Corner	0.283	0.400	0.683	No
	Left Corner	0.400	0.496	0.896	No

Simultaneous Tx	Configurations	LTE 26 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.637	0.392	1.029	No
	Left	0.035	1.033	1.068	No
	Right	0.104	0.151	0.255	No
	Top	0.424	0.522	0.946	No
	Right Corner	0.150	0.400	0.550	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 30 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	1.330	0.392	1.722	Yes
	Left	0.423	1.033	1.456	No
	Right	1.100	0.151	1.251	No
	Top	0.833	0.522	1.355	No
	Right Corner	0.880	0.400	1.280	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 41 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.870	0.392	1.262	No
	Left	0.028	1.033	1.061	No
	Right	1.327	0.151	1.478	No
	Top	0.369	0.522	0.891	No
	Right Corner	1.123	0.400	1.523	No
	Left Corner	0.400	0.496	0.896	No
Simultaneous Tx	Configurations	LTE 71 (W/kg)	5 GHz Ant.(W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.319	0.392	0.711	No
	Left	0.132	1.033	1.165	No
	Right	0.049	0.151	0.200	No
	Top	0.531	0.522	1.053	No
	Right Corner	0.064	0.400	0.464	No
	Left Corner	0.400	0.496	0.896	No

14.3 Simultaneous Transmission Scenario with Bluetooth

Simultaneous Tx	Configurations	UMTS1700(W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.772	0.342	1.114	No
	Left	0.384	0.292	0.676	No
	Right	0.163	0.002	0.165	No
	Top	0.512	0.120	0.632	No
	Right Corner	0.181	0.400	0.581	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 12 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.425	0.342	0.767	No
	Left	0.029	0.292	0.321	No
	Right	0.049	0.002	0.051	No
	Top	0.261	0.120	0.381	No
	Right Corner	0.070	0.40	0.470	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 14 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.586	0.342	0.928	No
	Left	0.175	0.292	0.467	No
	Right	0.109	0.002	0.111	No
	Top	0.696	0.120	0.816	No
	Right Corner	0.099	0.400	0.499	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 25 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.780	0.342	1.122	No
	Left	0.498	0.292	0.790	No
	Right	0.124	0.002	0.126	No
	Top	0.730	0.120	0.850	No
	Right Corner	0.283	0.400	0.683	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 26 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.637	0.342	0.979	No
	Left	0.035	0.292	0.327	No
	Right	0.104	0.002	0.106	No
	Top	0.424	0.120	0.544	No
	Right Corner	0.150	0.400	0.550	No
	Left Corner	0.400	0.097	0.497	No

Simultaneous Tx	Configurations	LTE 30 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	1.330	0.342	1.672	Yes
	Left	0.423	0.292	0.715	No
	Right	1.100	0.002	1.102	No
	Top	0.833	0.120	0.953	No
	Right Corner	0.880	0.400	1.280	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 41 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.870	0.342	1.212	No
	Left	0.028	0.292	0.320	No
	Right	1.327	0.002	1.329	No
	Top	0.369	0.120	0.489	No
	Right Corner	1.123	0.400	1.523	No
	Left Corner	0.400	0.097	0.497	No
Simultaneous Tx	Configurations	LTE 71 (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR(W/kg)	SPLSR(Yes/No)
Body SAR	Rear	0.319	0.342	0.661	No
	Left	0.132	0.292	0.424	No
	Right	0.049	0.002	0.051	No
	Top	0.531	0.120	0.651	No
	Right Corner	0.064	0.400	0.464	No
	Left Corner	0.400	0.097	0.497	No

Note:
When the antenna separation distance was >50 mm, an estimated SAR of 0.4 W/kg was used to determine the simultaneous transmission SAR exclusion for test positions exclude per FCC KDB Publication 447498D01v06

14.4 SAR to Peak Location Separation Ratio (SPLSR)

FCC KDB 447498 D01v06 General RF Exposure Guidance introduces a new formula for calculating the SAR a Peak Location Separation Ratio(SPLSR) between pairs of simultaneously transmitting antennas:

$$\boldsymbol{SPLSR} = (\boldsymbol{SAR_1} + \boldsymbol{SAR_2})^{1.5} / \boldsymbol{R_i}$$

Where:

$\boldsymbol{SAR_1}$ is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

$\boldsymbol{SAR_2}$ is the highest measured of estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

$\boldsymbol{Ri}$ is the separation distance between the pair of simultaneous transmitting antennas, When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(\mathbf{X_1} - \mathbf{X_2})^2 + (\mathbf{Y_1} - \mathbf{Y_2})^2 + (\mathbf{Z_1} - \mathbf{Z_2})^2]$

In order for a pair of simultaneous transmitting antennas with the sum 1-g of SAR> 1.6 W/kg and with the sum 10-g of SAR >4 W/Kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$(\boldsymbol{SAR_1} + \boldsymbol{SAR_2})^{1.5} / \boldsymbol{R_i} \leq \mathbf{0.04}$ for 1g SAR and $(\boldsymbol{SAR_1} + \boldsymbol{SAR_2})^{1.5} / \boldsymbol{R_i} \leq \mathbf{0.1}$ for 10g SAR

Per Sec. 13, below simultaneous transmission summations need to be calculated SPLSR.

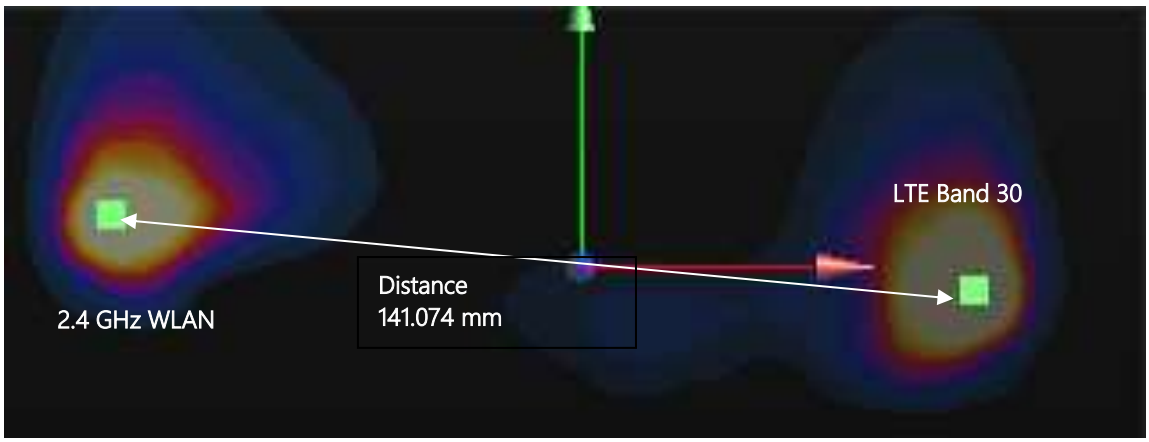
14.4.1 SPLSR Evaluation

Peak location for SAR Rear side

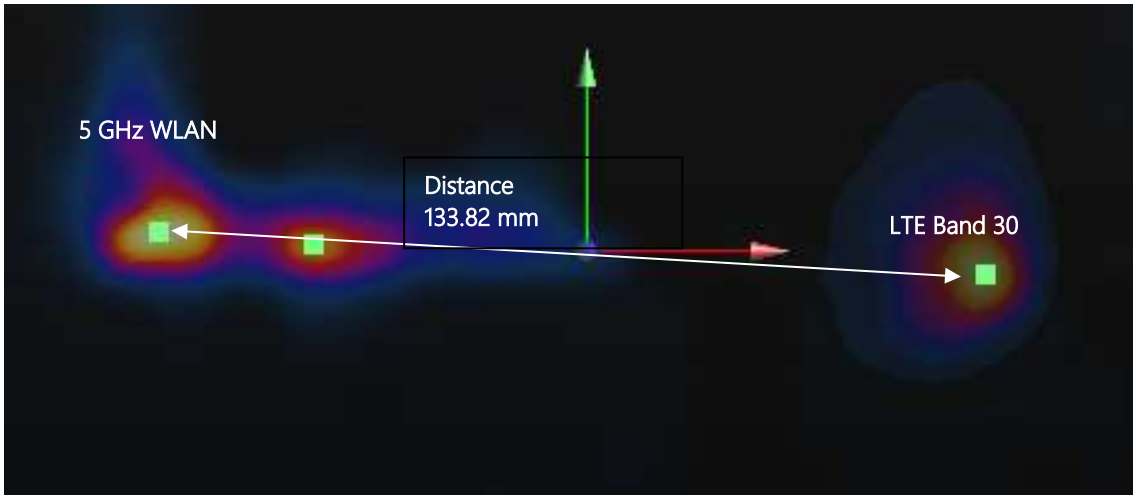
Mode/Band	X(mm)	Y(mm)	Z(mm)
LTE Band 30	0.0644	-0.0036	-0.172
2.4 GHz WLAN	-0.0765	0.0034	-0.172
5 GHz WLAN	-0.069	0.007	-0.172
Bluetooth	-0.0894	-0.0012	-0.171

14.4.2 SAR to Peak Location Ratio (SPLSR) Figures

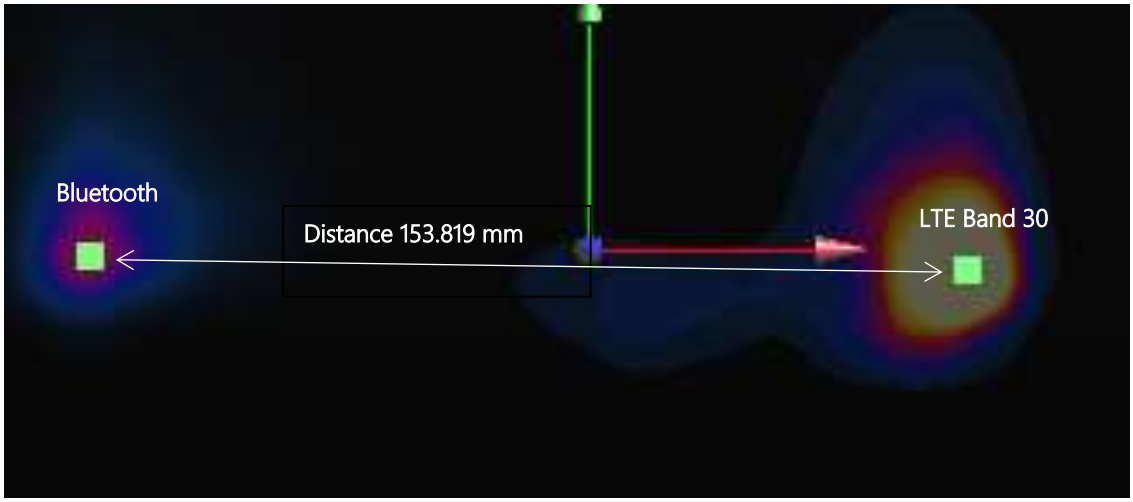
LTE Band 30 SAR 1g (W/kg)	2.4 GHz WLAN SAR 1g (W/kg)	Sum 1g SAR 1+2	Peak SAR Separation Distance (mm)	SPLSR
1	2			
1.330	0.647	1.977	141.074	0.020



LTE Band 30 SAR 1g (W/kg)	5 GHz WLAN SAR 1g (W/kg)	Sum 1g SAR 1+2	Peak SAR Separation Distance (mm)	SPLSR
1	2			
1.330	0.392	1.722	133.82	0.020



LTE Band 30 SAR 1g (W/kg)	Bluetooth SAR 1g (W/kg)	Sum 1g SAR 1+2	Peak SAR Separation Distance (mm)	SPLSR
1	2			
1.330	0.342	1.672	153.819	0.01



14.5 Simultaneous Transmission Conclusion

The above numerical summed SAR Results are sufficient to determine that simultaneous transmission cases will not exceed the SAR Limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE1528-2013.

15. SAR Measurement Variability and Uncertainty

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 ㎒ to 6 GHz, SAR additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement variability was assessed using the following procedures for each frequency band:

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg for 1g SAR or < 2.0 W/kg for 10g SAR; steps 2) through 4) do not apply.

2) When the original highest measured 1g SAR is ≥ 0.80 W/kg or 10g SAR ≥ 2.0W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg for 1g SAR or ≥ 3.625 W/kg for 10g SAR (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg for 1g SAR or ≥3.75 W/kg for 10g SAR and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Body SAR measurement variability Results

Frequency		Mode/Band	Configuration	Measured SAR (W/kg)	Repeated SAR (W/kg)	SAR Ratio
㎒	Channel					
2 310	27710	LTE B30	Rear(Active)	0.948	0.894	1.06
2 680.0(PC2)	41490	LTE B41	Right(Inactive)	1.04	1.00	1.04

16. Device Holder Perturbation Verification.

In accordance with published DUT Holder Perturbations in Oct.2016 TCB Workshop.
When Highest reported SAR is over 1.2 W/kg, Holder Perturbation Verification is required for each antenna, using the highest configuration among all applicable frequency bands.

Frequency		Mode/Band	Configuration	Highest Reported SAR		Deviation (%)
				(without Device Holder)	(with Device Holder)	
MHz	Channel			(W/kg)	(W/kg)	
2 310	27710	LTE B30	Rear (50RB)	1.330	1.236	1.08

17. LTE Band 41 Power Class 2 and Power class 3 Linearity

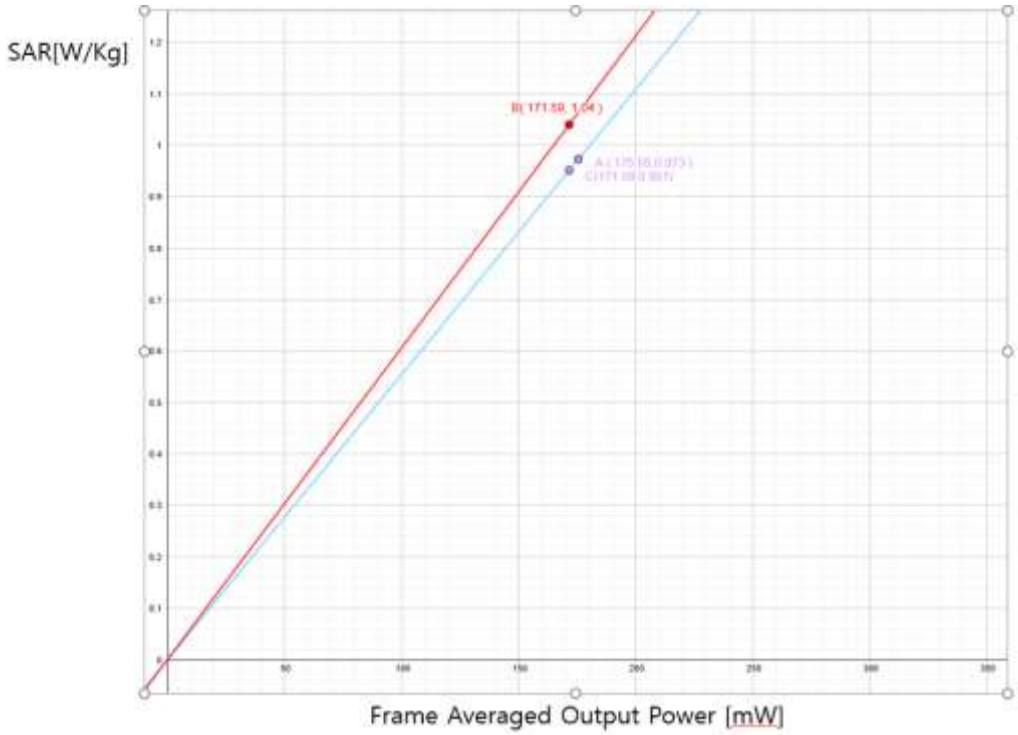
This Device Supports Power Class 2 and Power Class 3 operations for LTE band 41. The Highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL Configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power class 3. SAR with power class 2 at the highest power and available duty factor was additionally performed for the power class 2 configuration with the Highest SAR for each exposure condition.

The linearity between the power class 3and Power class 2 SAR Results and the respective frame averaged powers was calculated to determine the results were linear.

Per May 2017 TCB Workshop, no additional SAR measurements were required since the linearity between power classes as less than 10 % and all reported SAR values were were < 1.4 W/kg

LTE Band 41 Body Rear Linearity Data Table

	LTE Band41 PC3	LTE Band41 PC2
Maximum Allowed Output Power[dBm]	25.5	26.8
Measured Output Power[dBm]	24.43	25.98
Measured SAR[W/kg]	0.973	1.04
Measured Power[mW]	153.46	312.61
Duty Cycle	63.30%	43.30%
Frame Averaged Output Power[mW]	175.5511	171.588
	0.005542546	0.00606103
deviation from expected linearity(%)		2.63%



18. Measurement Uncertainty

The measured SAR was <1.5 W/Kg for 1g SAR and <3.75 W/Kg For 10g SAR for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04,the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

19. SAR Test Equipment

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F13/5R4XF1/C/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F13/5R4XF1/A/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1338 1332	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1203 0309	N/A	N/A	N/A
SPEAG	DAE3	504	02/22/2019	Annual	02/22/2020
SPEAG	DAE4	1225	11/16/2018	Annual	11/16/2019
SPEAG	DAE4	869	09/19/2018	Annual	09/19/2019
SPEAG	E-Field Probe EX3DV4	3797	11/22/2018	Annual	11/22/2019
SPEAG	E-Field Probe EX3DV4	3903	09/24/2018	Annual	09/24/2019
SPEAG	E-Field Probe EX3DV4	3863	05/15/2019	Annual	05/15/2020
SPEAG	Dipole D750V3	1014	08/14/2018	Annual	08/14/2019
SPEAG	Dipole D835V2	4d165	09/18/2018	Annual	09/18/2019
SPEAG	Dipole D1800V2	2d007	11/19/2018	Annual	11/19/2019
SPEAG	Dipole D1900V2	5d032	02/21/2019	Annual	02/21/2020
SPEAG	Dipole D2300V2	1010	09/26/2018	Annual	09/26/2019
SPEAG	Dipole D2600V2	1015	11/20/2018	Annual	11/20/2019
Agilent	Power Meter E4419B	MY41291386	10/11/2018	Annual	10/11/2019
Agilent	Power Meter N1911A	MY45101406	09/06/2018	Annual	09/06/2019
Agilent	Power Sensor 8481A	SG1091286	10/11/2018	Annual	10/11/2019
Agilent	Power Sensor 8481A	MY41090873	10/11/2018	Annual	10/11/2019
Agilent	Power Sensor N1921A	MY55220026	09/06/2018	Annual	09/06/2019
SPEAG	DAKS 3.5	1031	04/16/2019	Annual	04/16/2020
SPEAG	VNA-R140	0050813	03/11/2019	Annual	03/11/2020
Agilent	WIRELESS COMMUNICATION E5515C	MY48361100	10/02/2018	Annual	10/02/2019
Agilent	Signal Generator N5182A	MY47070230	05/08/2019	Annual	05/08/2020
Agilent	11636B/Power Divider	58698	02/28/2019	Annual	03/06/2020

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
TESTO	175-H1/Thermometer	40332651310	01/29/2019	Annual	01/29/2020
TESTO	175-H1/Thermometer	40331949309	01/29/2019	Annual	01/29/2020
EMPOWER	RF Power Amplifier	1011	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-15N	10453	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-30N	-	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-60N	32011	10/11/2018	Annual	10/11/2019
Apitech	Attenuator (3dB) 18B-03	1	06/04/2019	Annual	06/04/2020
Agilent	Attenuator (20dB) 33340C	1642	05/08/2019	Annual	05/08/2020
Agilent	Directional Bridge	3140A03878	06/12/2019	Annual	06/12/2020
Agilent	MXA Signal Analyzer N9020A	MY50510407	10/31/2018	Annual	10/31/2019
HP	Dual Directional Coupler	16072	10/11/2018	Annual	10/11/2019
Anritsu	Radio Communication Tester MT8820C	6200628628	07/19/2018	Annual	07/19/2019
Anritsu	Radio Communication Tester MT8821C	6201502997	08/13/2018	Annual	08/13/2019

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

20. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 - 2005.

These measurements were taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the abortion and distribution of electromagnetic energy in the body are very complex phenomena the depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

21. References

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1 - 2005 , American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 kHz to 300 GHz, New York: IEEE, Sept. 1992

[3] ANSI/IEEE C 95.1 - 2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz, New York: IEEE, 2006

[4 ANSI/IEEE C95.3 - 2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: December 2002.

[5] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice or Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 ㎒, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 ㎒, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectro magnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10 kHz-300 GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, EidgenØssische Technische Hoschschule Zòrich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation and procedures – Part 1:Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 ㎒ to 3 GHz), July. 2016..

[21] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 ㎒ to 6 GHz) Mar. 2010.

[22] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radio Communication Apparatus (All Frequency Band) Issue 5, March 2015.

[23] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Rage from 3 kHz – 300 GHz, 2009

[24] FCC SAR Test procedures for 2G-3G Devices, Mobile Hotspot and UMPC Device KDB 941225 D01.

[25] SAR Measurement Guidance for IEEE 802.11 transmitters, KDB 248227 D01v02r02

[26] SAR Evaluation of Handsets with Multiple Transmitters and Antennas KDB 648474 D03, D04.

[27] SAR Evaluation for Laptop, Notebook, Netbook and Tablet computers KDB 616217 D04.

[28] SAR Measurement and Reporting Requirements for 100 ㎒ – 6 GHz, KDB 865664 D01, D02.

[29] FCC General RF Exposure Guidance and SAR procedures for Dongles, KDB 447498 D01,D02.

Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.8 ℃
Ambient Temperature:	22.1 ℃
Test Date:	06/21/2019
Plot No.:	1

DUT: SM-T727U

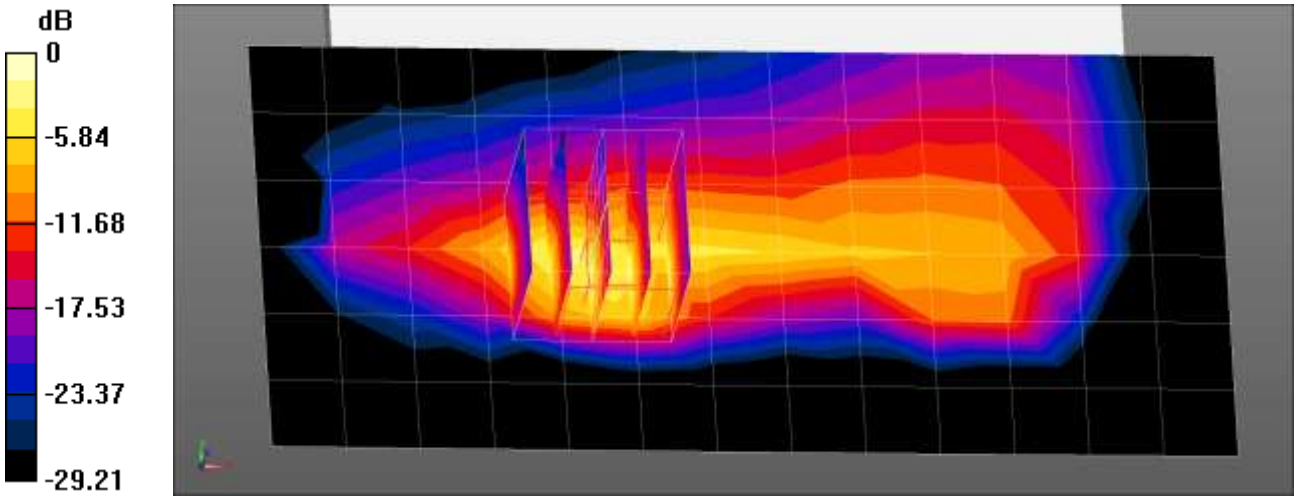
Communication System: UID 0, WCDMA IV (0); Frequency: 1732.4 ㎒;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.4 ㎒; σ = 1.462 S/m; ε_r = 53.384; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.86, 7.86, 7.86) ; Calibrated: 2018-11-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1700 Body Rear 1412ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.689 W/kg

WCDMA1700 Body Rear 1412ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.90 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.252 W/kg
Maximum value of SAR (measured) = 1.38 W/kg



0 dB = 1.38 W/kg = 1.40 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.0 °C
Ambient Temperature:	20.3 °C
Test Date:	07/10/2019
Plot No.:	2

DUT: SM-T727U

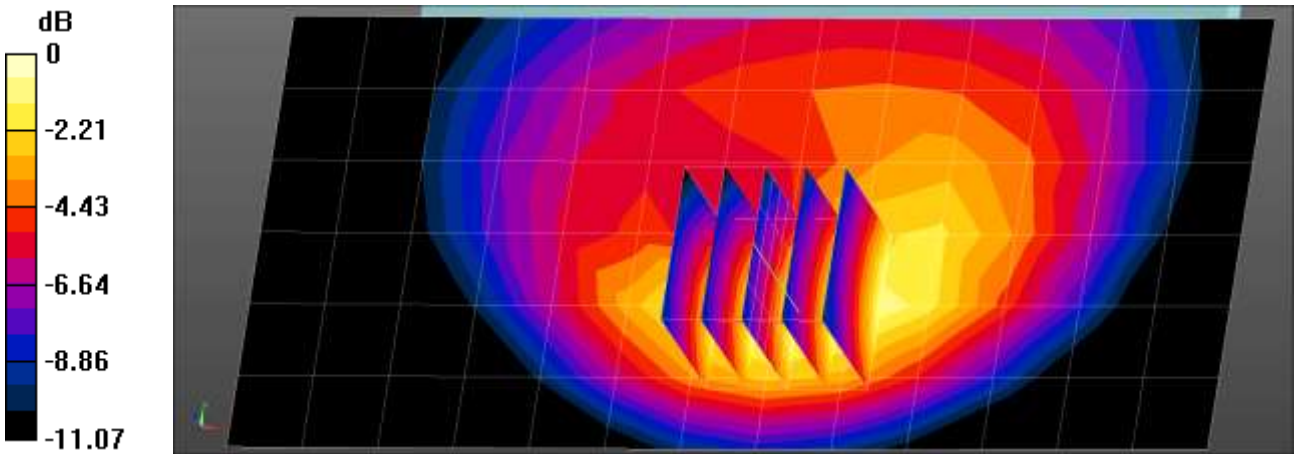
Communication System: UID 0, LTE 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.92 S/m; ε_r = 55.647; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.421 W/kg

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.43 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.327 W/kg; SAR(10 g) = 0.216 W/kg
Maximum value of SAR (measured) = 0.436 W/kg



0 dB = 0.436 W/kg = −3.61 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.7 ℃
Test Date:	06/19/2019
Plot No.:	3

DUT: SM-T727U

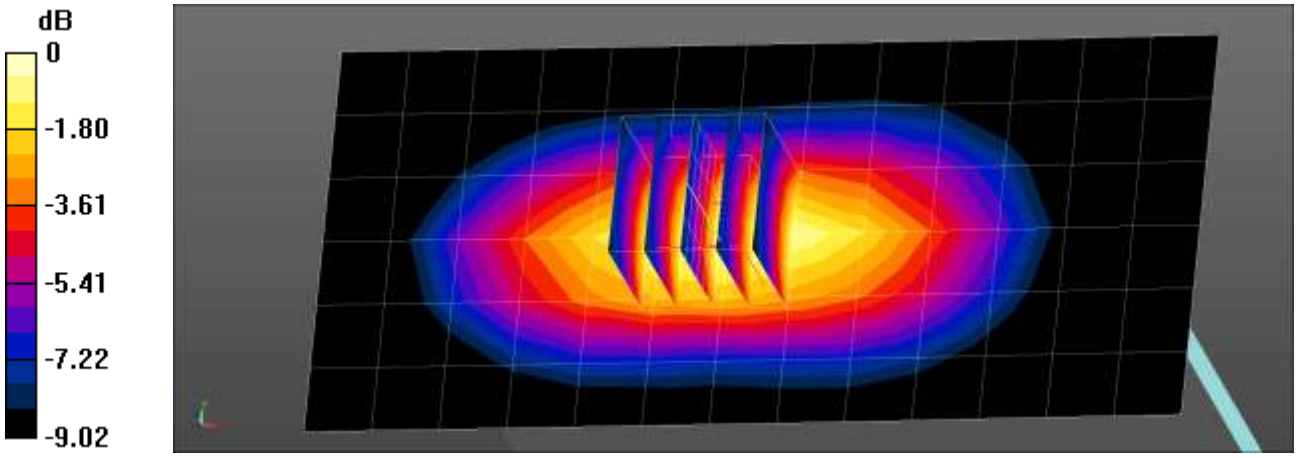
Communication System: UID 0, LTE 14 (0); Frequency: 793 ㎒;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 793 ㎒; σ = 0.944 S/m; ε_r = 56.21; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 14 Body Top QPSK 10 ㎒ 1RB 49offset 23330ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.683 W/kg

LTE Band 14 Body Top QPSK 10 ㎒ 1RB 49offset 23330ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.04 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.763 W/kg
SAR(1 g) = 0.529 W/kg; SAR(10 g) = 0.358 W/kg
Maximum value of SAR (measured) = 0.688 W/kg



0 dB = 0.688 W/kg = -1.62 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	22.5 °C
Ambient Temperature:	22.8 °C
Test Date:	06/20/2019
Plot No.:	4

DUT: SM-T727U

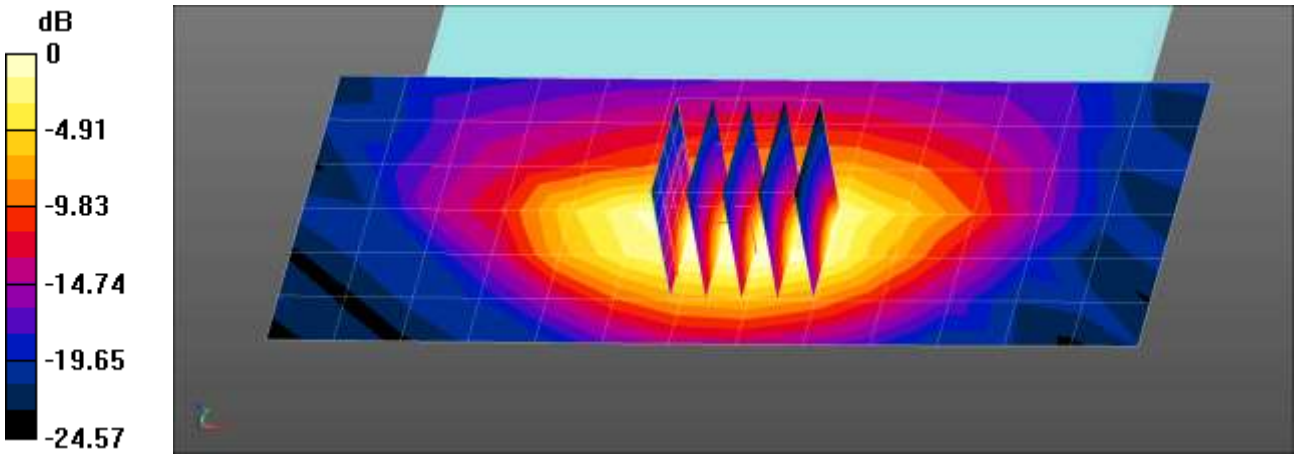
Communication System: UID 0, LTE 17 (0); Frequency: 710 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 710 ㎒; σ = 0.926 S/m; ε_r = 56.598; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 17 Body Rear QPSK 10 ㎒ 1RB 0offset 23790ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.238 W/kg

LTE Band 17 Body Rear QPSK 10 ㎒ 1RB 0offset 23790ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.27 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.663 W/kg
SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.109 W/kg
Maximum value of SAR (measured) = 0.426 W/kg



0 dB = 0.238 W/kg = -6.23 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.6 ℃
Test Date:	06/20/2019
Plot No.:	5

DUT: SM-T727U

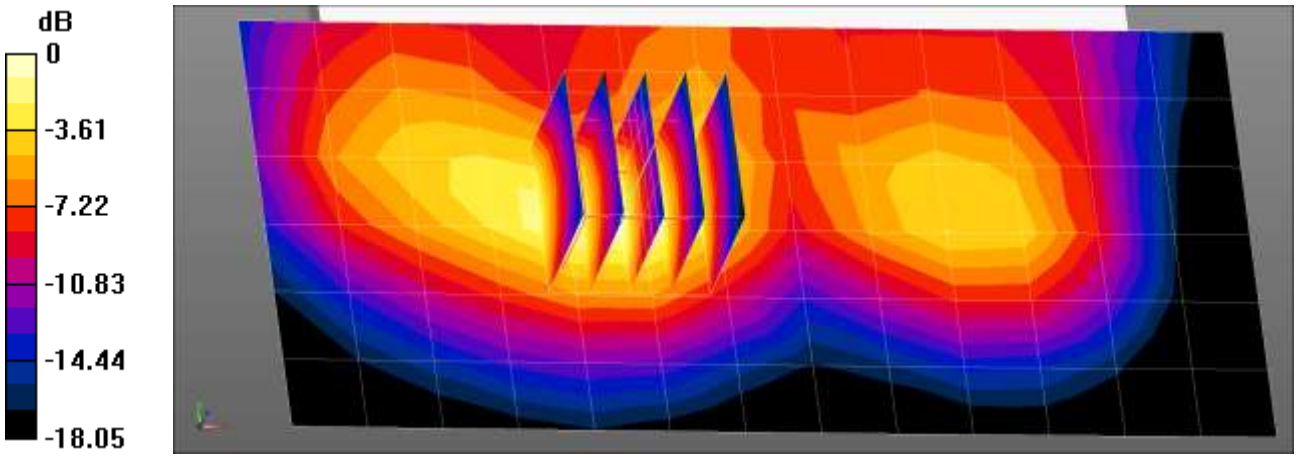
Communication System: UID 0, LTE Band 25 (0); Frequency: 1860 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 1860 ㎒; σ = 1.49 S/m; ε_r = 53.646; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 25 Body Rear QPSK 20 ㎒ 1RB 0offset 26140ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.772 W/kg

LTE Band 25 Body Rear QPSK 20 ㎒ 1RB 0offset 26140ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.69 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.592 W/kg; SAR(10 g) = 0.320 W/kg
Maximum value of SAR (measured) = 0.866 W/kg



0 dB = 0.866 W/kg = -0.62 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	20.1 ℃
Ambient Temperature:	20.4 ℃
Test Date:	07/09/2019
Plot No.:	6

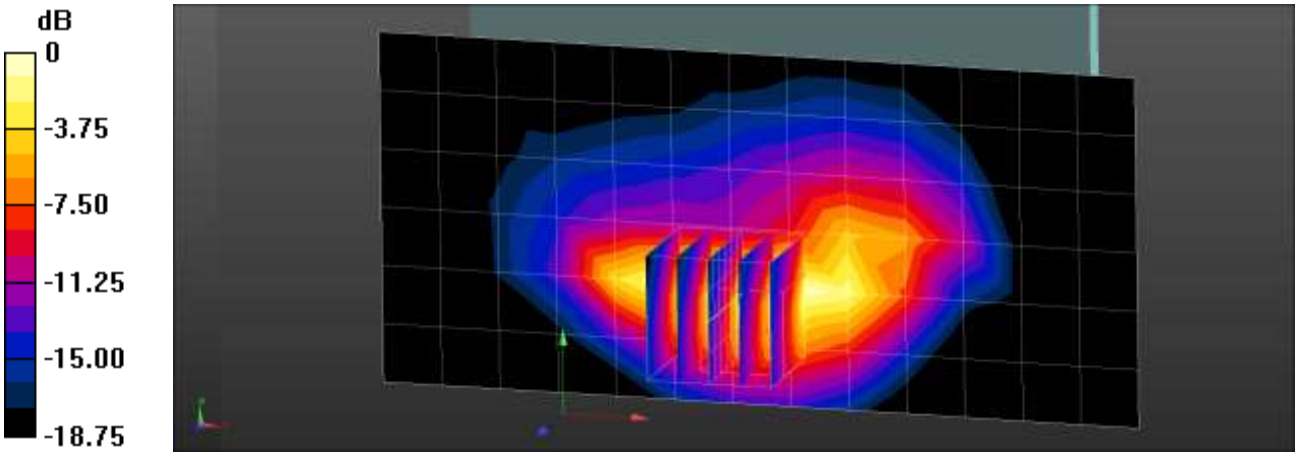
DUT: SM-T727U

Communication System: UID 0, LTE Band 26 (0); Frequency: 821.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 821.5 MHz; σ = 0.941 S/m; ε_r = 55.621; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 26 Body Rear QPSK 15MHz 36RB 0offset 26765ch/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.02 W/kg
LTE Band 26 Body Rear QPSK 15MHz 36RB 0offset 26765ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.23 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.536 W/kg; SAR(10 g) = 0.259 W/kg
Maximum value of SAR (measured) = 1.05 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.8 ℃
Ambient Temperature:	22.1 ℃
Test Date:	06/21/2019
Plot No.:	7

DUT: SM-T727U

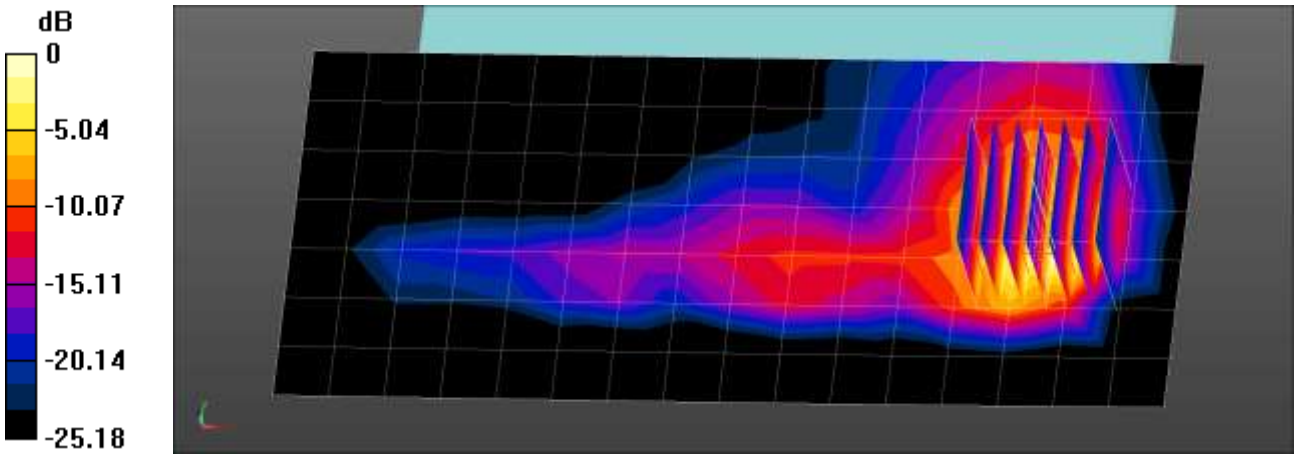
Communication System: UID 0, LTE Band 30 (0); Frequency: 2310 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2310 MHz; σ = 1.774 S/m; ε_r = 53.088; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.26, 7.26, 7.26); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 30 Body Rear QPSK 10MHz 50RB 0offset 27710ch/Area Scan (8x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.65 W/kg

LTE Band 30 Body Rear QPSK 10MHz 50RB 0offset 27710ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.008 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.80 W/kg
SAR(1 g) = 0.948 W/kg; SAR(10 g) = 0.406 W/kg
Maximum value of SAR (measured) = 1.93 W/kg



0 dB = 1.93 W/kg = 2.86 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	22.7 °C
Ambient Temperature:	23.0°C
Test Date:	06/17/2019
Plot No.:	8

DUT: SM-T727U

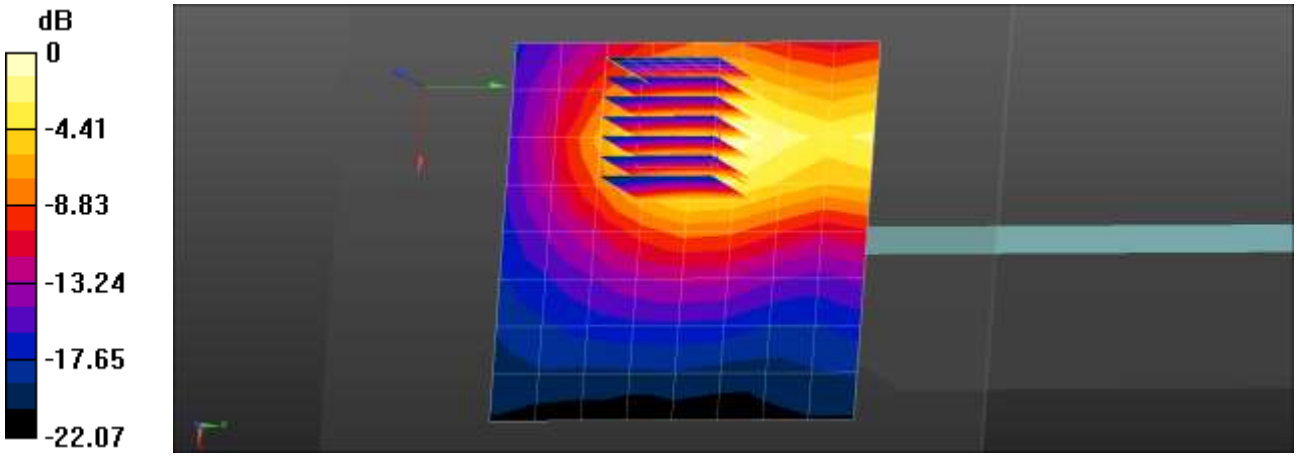
Communication System: UID 0, LTE Band 41 (FCC) (0); Frequency: 2680 ㎒;Duty Cycle: 1:2.31047
Medium parameters used: f = 2680 ㎒; σ = 2.212 S/m; ε_r = 52.97; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 41 Body Right QPSK 20 ㎒ 1RB 0offset 41490ch/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.71 W/kg

LTE Band 41 Body Right QPSK 20 ㎒ 1RB 0offset 41490ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.73 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.22 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.508 W/kg
Maximum value of SAR (measured) = 1.75 W/kg



0 dB = 1.71 W/kg = 2.33 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Tablet
Liquid Temperature:	21.8 ℃
Ambient Temperature:	22.1 ℃
Test Date:	07/03/2019
Plot No.:	9

DUT: SM-T727U

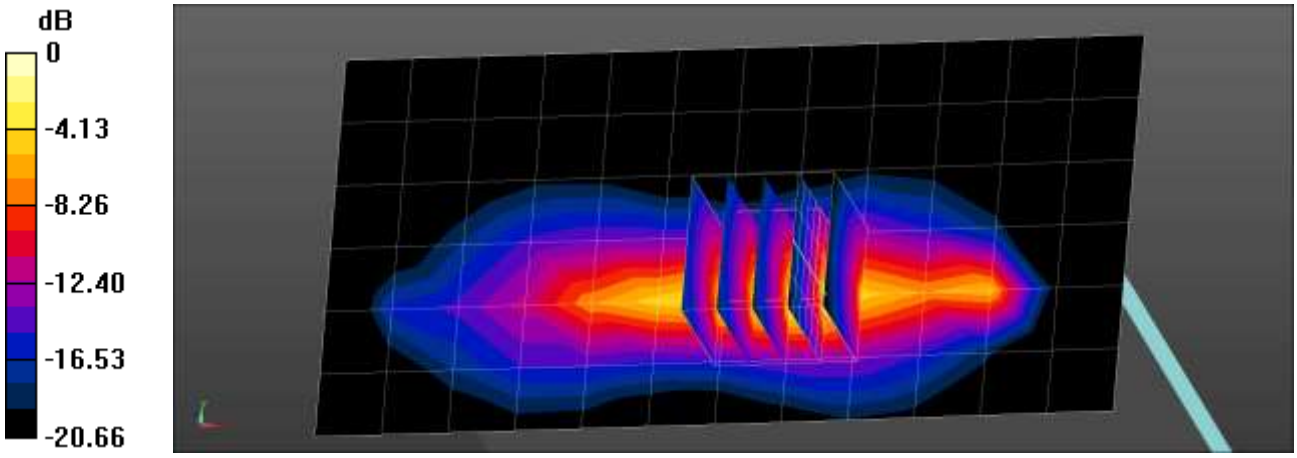
Communication System: UID 0, LTE Band 71 (0); Frequency: 680.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 680.5 MHz; σ = 0.924 S/m; ε_r = 55.89; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.55, 9.55, 9.55); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 71 Body Top QPSK 20MHz 50RB 0offset 133297ch/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.17 W/kg

LTE Band 71 Body Top QPSK 20MHz 50RB 0offset 133297ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.150 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.23 W/kg
SAR(1 g) = 0.472 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.40 W/kg = 1.46 dBW/kg

Attachment 2. – Dipole Verification Plots

■ Verification Data (750 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.8 ℃
Test Date:	07/03/2019

DUT: Dipole 750 MHz; Type: D750V3

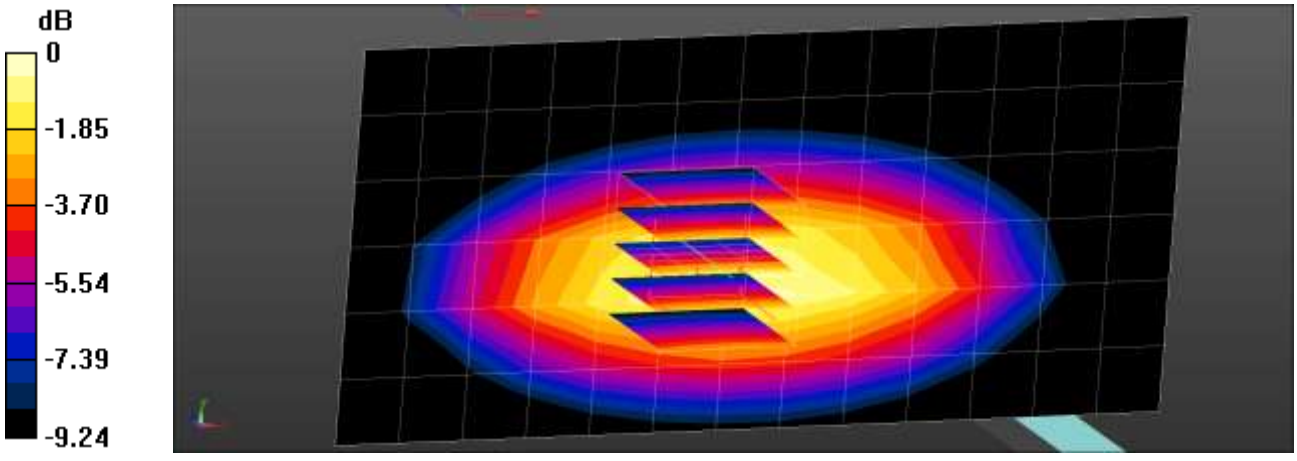
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 1 S/m; ε_r = 55.385; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.55, 9.55, 9.55); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/750MHz Body Verification/Area Scan (14x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.512 W/kg

Dipole/750MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.17 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.627 W/kg
SAR(1 g) = 0.417 W/kg; SAR(10 g) = 0.288 W/kg
Maximum value of SAR (measured) = 0.553 W/kg



0 dB = 0.553 W/kg = −2.57 dBW/kg

■ Verification Data (750 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	22.5 ℃
Test Date:	06/20/2019

DUT: Dipole 750 ㎒; Type: D750V3

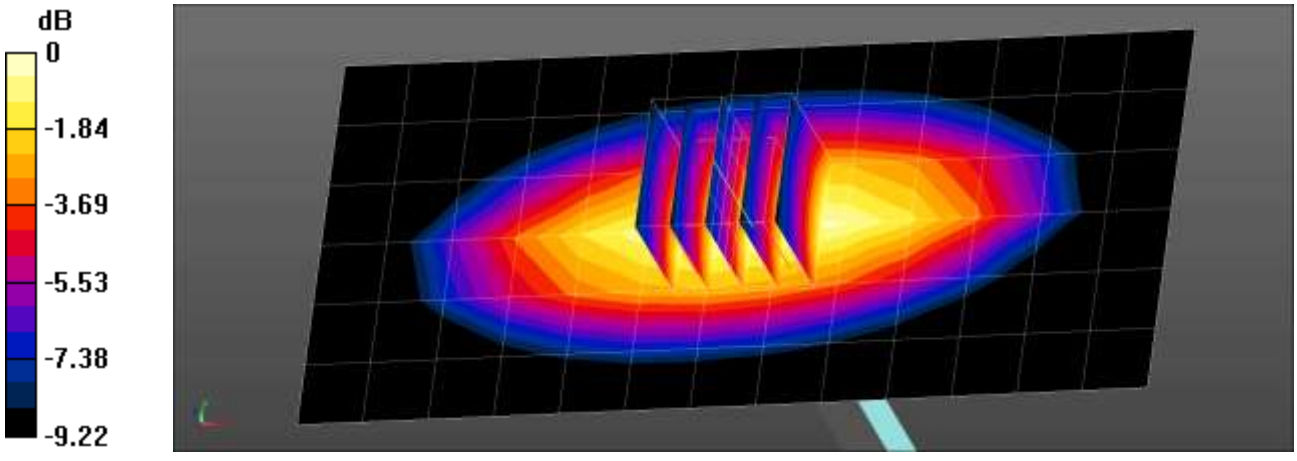
Communication System: UID 0, CW (0); Frequency: 750 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 750 ㎒; σ = 0.976 S/m; ε_r = 55.931; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/750 ㎒ Body Verification/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.550 W/kg

Dipole/750 ㎒ Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.68 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.630 W/kg
SAR(1 g) = 0.418 W/kg; SAR(10 g) = 0.284 W/kg
Maximum value of SAR (measured) = 0.557 W/kg



0 dB = 0.557 W/kg = −2.54 dBW/kg

■ Verification Data (750 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.0 ℃
Test Date: 07/10/2019

DUT: Dipole 750 MHz ; Type: D750V3

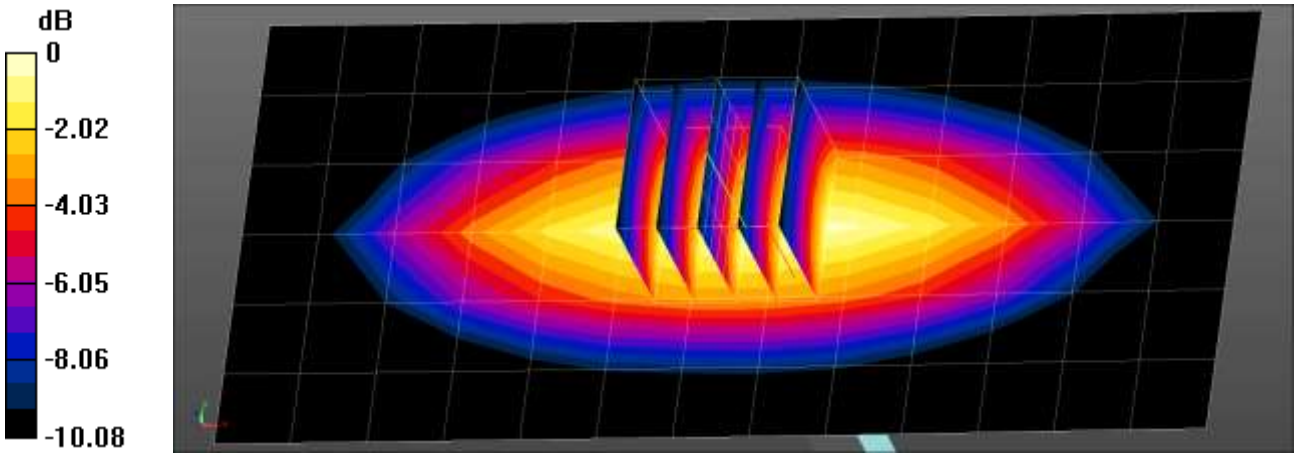
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.959 S/m; ε_r = 55.355; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/750MHz Body Verification/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.593 W/kg

Dipole/750MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.68 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.688 W/kg
SAR(1 g) = 0.446 W/kg; SAR(10 g) = 0.292 W/kg
Maximum value of SAR (measured) = 0.606 W/kg



0 dB = 0.606 W/kg = −2.18 dBW/kg

■ Verification Data (835 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.4 ℃
Test Date:	06/19/2019

DUT: Dipole 835 ㎒; Type: D835V2

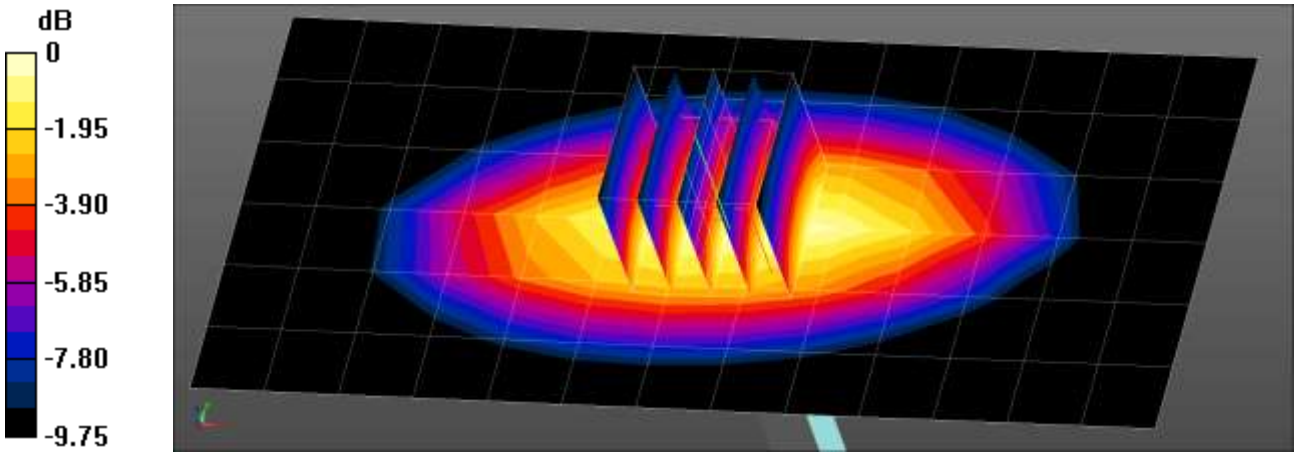
Communication System: UID 0, CW (0); Frequency: 835 ㎒;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 ㎒; σ = 0.988 S/m; ε_r = 55.581; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10, 10, 10); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

835 ㎒ Body Verification/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.644 W/kg

835 ㎒ Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.02 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.718 W/kg
SAR(1 g) = 0.496 W/kg; SAR(10 g) = 0.329 W/kg
Maximum value of SAR (measured) = 0.650 W/kg



0 dB = 0.650 W/kg = −1.87 dBW/kg

■ Verification Data (835 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.1 ℃
Test Date: 07/09/2019

DUT: Dipole 835 MHz ; Type: D835V2

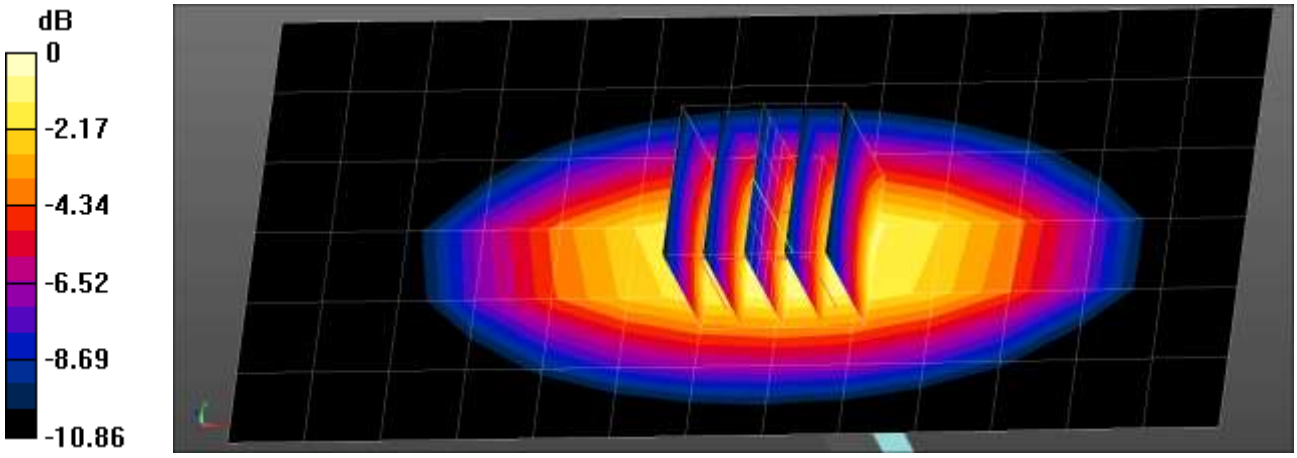
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.951 S/m; ε_r = 55.485; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

835MHz Body Verification/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.569 W/kg

835MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.00 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.490 W/kg; SAR(10 g) = 0.316 W/kg
Maximum value of SAR (measured) = 0.674 W/kg



0 dB = 0.674 W/kg = −1.71 dBW/kg

■ Verification Data (1 800 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.8 ℃
Test Date:	06/21/2019

DUT: Dipole 1800 ㎒; Type: D1800V2

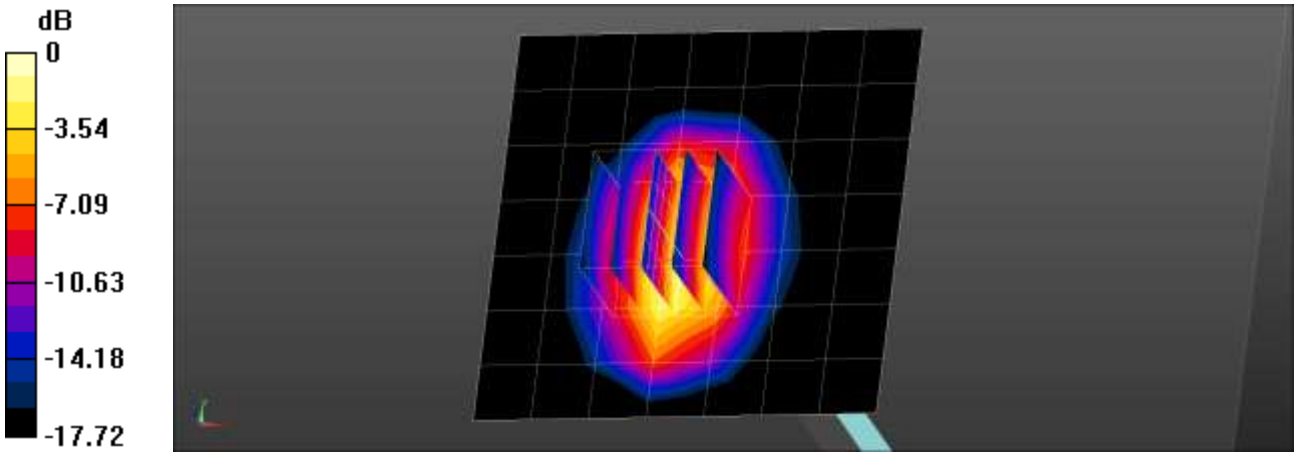
Communication System: UID 0, CW (0); Frequency: 1800 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 1800 ㎒; σ = 1.528 S/m; ε_r = 53.125; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.86, 7.86, 7.86); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1800 ㎒ Verification/Area Scan (8x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.60 W/kg

Dipole/1800 ㎒ Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 42.20 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.01 W/kg; SAR(10 g) = 1.04 W/kg
Maximum value of SAR (measured) = 3.15 W/kg



0 dB = 3.15 W/kg = 4.98 dBW/kg

■ Verification Data (1 900 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.3 ℃
Test Date:	06/20/2019

DUT: Dipole 1900 ㎒; Type: D1900V2

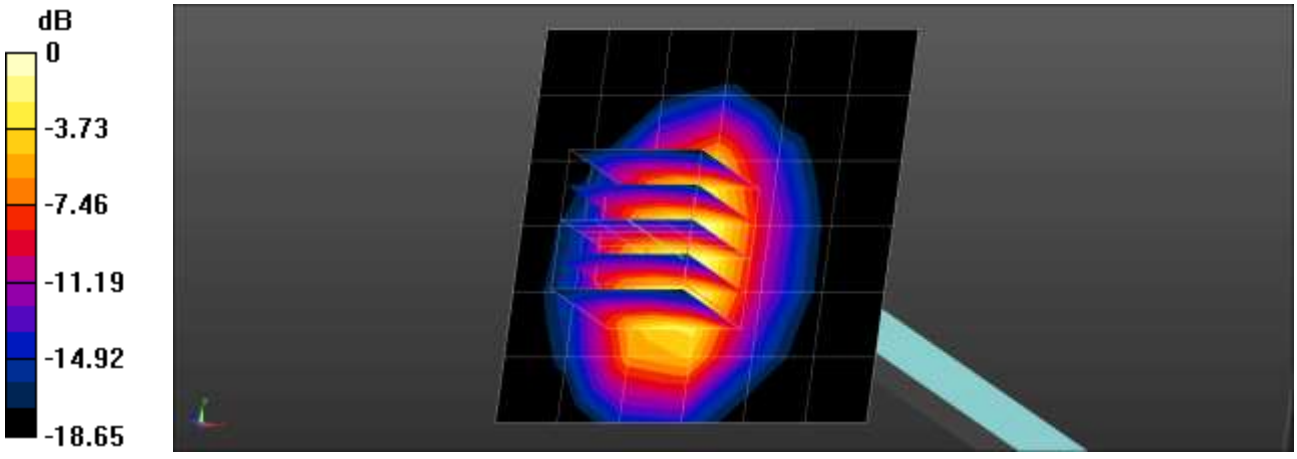
Communication System: UID 0, CW (0); Frequency: 1900 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 1900 ㎒; σ = 1.521 S/m; ε_r = 53.529; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1900 ㎒ Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.44 W/kg

Dipole/1900 ㎒ Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.88 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 3.78 W/kg
SAR(1 g) = 2.01 W/kg; SAR(10 g) = 1.01 W/kg
Maximum value of SAR (measured) = 3.14 W/kg



0 dB = 3.14 W/kg = 4.97 dBW/kg

■ Verification Data (2 300 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.8 ℃
Test Date: 06/21/2019

DUT: Dipole 2300 ㎒; Type: D2300V3

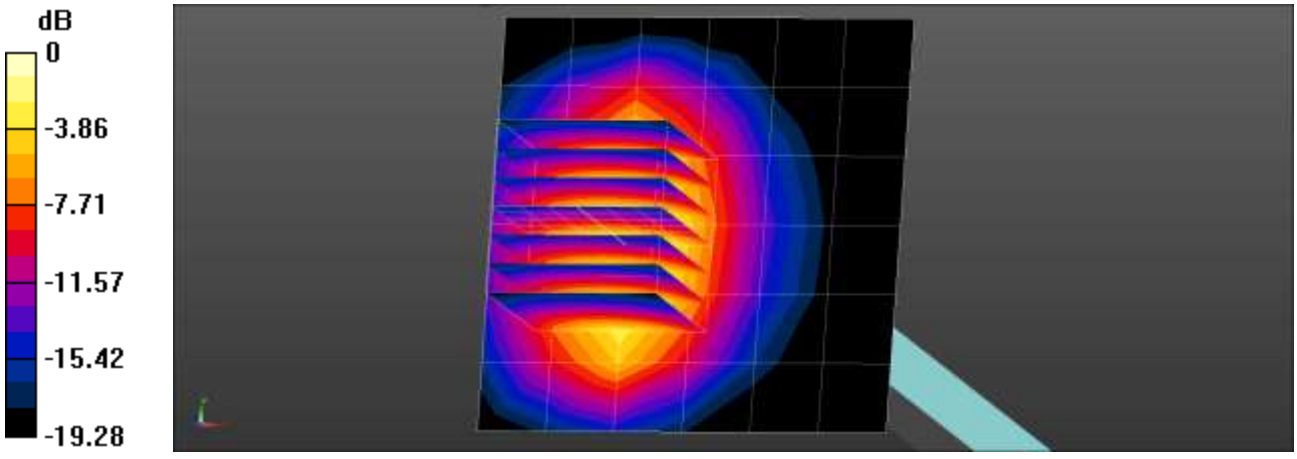
Communication System: UID 0, CW (0); Frequency: 2300 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 2300 ㎒; σ = 1.77 S/m; ε_r = 53.148; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.26, 7.26, 7.26); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2300 ㎒ Body Verification/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.39 W/kg

Dipole/2300 ㎒ Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.07 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 4.16 W/kg
SAR(1 g) = 2.27 W/kg; SAR(10 g) = 1.1 W/kg
Maximum value of SAR (measured) = 3.46 W/kg



0 dB = 3.46 W/kg = 5.39 dBW/kg

■ Verification Data (2 600 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 22.7 ℃
Test Date: 06/17/2019

DUT: Dipole 2600 ㎒; Type: D2600V2

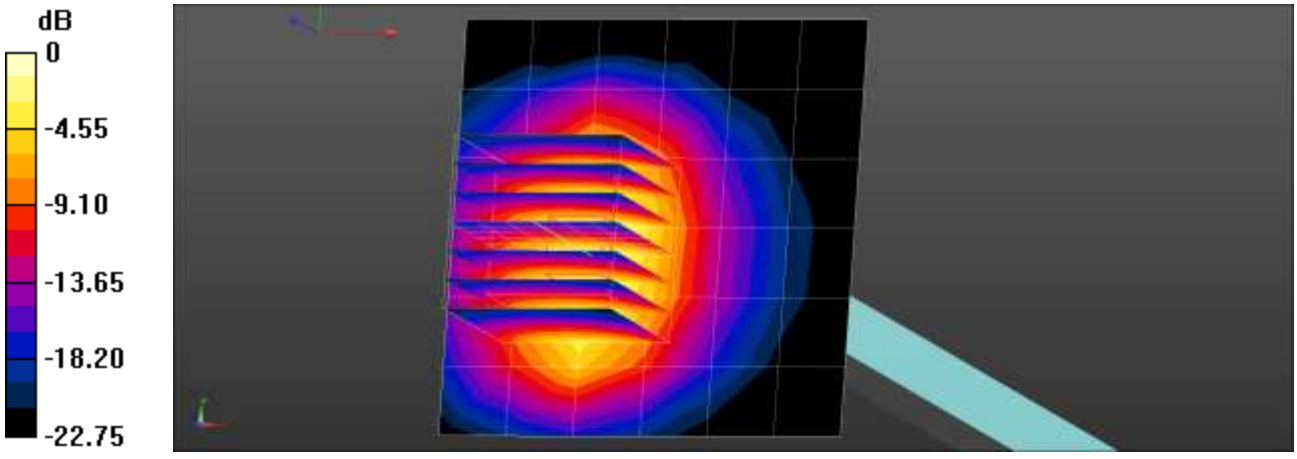
Communication System: UID 0, CW (0); Frequency: 2600 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 2600 ㎒; σ = 2.147 S/m; ε_r = 53.138; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2600 ㎒ Body Verification/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 4.32 W/kg

Dipole/2600 ㎒ Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.00 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 5.95 W/kg
SAR(1 g) = 2.87 W/kg; SAR(10 g) = 1.29 W/kg
Maximum value of SAR (measured) = 4.73 W/kg



0 dB = 4.73 W/kg = 6.75 dBW/kg

■ Verification Data (2 600 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	22.4 ℃
Test Date:	06/18/2019

DUT: Dipole 2600 ㎒; Type: D2600V2

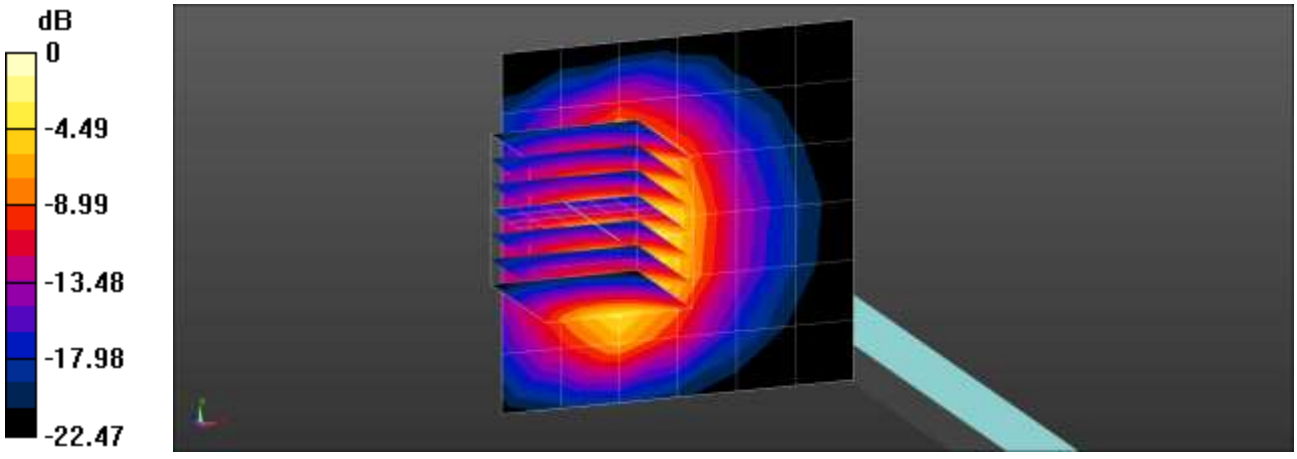
Communication System: UID 0, CW (0); Frequency: 2600 ㎒;Duty Cycle: 1:1
Medium parameters used: f = 2600 ㎒; σ = 2.103 S/m; ε_r = 53.038; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2600 ㎒ Body Verification/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 4.18 W/kg

Dipole/2600 ㎒ Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.22 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 5.36 W/kg
SAR(1 g) = 2.65 W/kg; SAR(10 g) = 1.2 W/kg
Maximum value of SAR (measured) = 4.25 W/kg



0 dB = 4.25 W/kg = 6.28 dBW/kg

Attachment 3. – SAR Tissue Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Harts grove.

Ingredients (% by weight)	Frequency (㎒)											
	750		835		1 750		1 900		2 450 – 2 700		5 200 - 5 800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.1	51.7	40.45	53.06	52.6	68.8	54.9	70.17	71.88	73.2	65.52	78.66
Salt (NaCl)	1.4	0.9	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1	0.0	0.0
Sugar	57.0	47.2	57.0	44.9	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
HEC	0.2	0	1.0	1.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Bactericide	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.97	0.0	17.24	10.67
DGBE	0.0	0.0	0.0	0.0	47	31	44.92	29.44	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	-	-	-	-	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra-pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Composition of the Tissue Equivalent Matter

Attachment 4. – SAR System Validation

Per FCC KCB 865664 D02v01r02, SAR system validation status should be document to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in IEEE 1528-2013 and FCC KDB 865664 D01v01r04. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.
A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
3	3797	EX3DV4	Body	750	1014	2019-06-10	55.6	0.98	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	750	1014	2019-06-10	55.6	0.98	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Body	750	1014	2019-06-10	55.6	0.98	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	835	4d165	2019-05-27	55.3	0.97	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Body	835	4d165	2019-05-27	55.3	0.97	PASS	PASS	PASS	N/A	N/A	N/A
3	3797	EX3DV4	Body	1750	2d007	2018-12-04	53.1	1.50	PASS	PASS	PASS	GMSK	PASS	N/A
3	3797	EX3DV4	Body	1900	5d032	2019-03-04	53.3	1.53	PASS	PASS	PASS	N/A	N/A	N/A
3	3797	EX3DV4	Body	2300	1010	2018-12-04	52.9	1.82	PASS	PASS	PASS	N/A	N/A	N/A
3	3797	EX3DV4	Body	2600	1015	2018-12-04	52.3	2.17	PASS	PASS	PASS	TDD	PASS	N/A

SAR System Validation Summary 1g

Note;
All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r04.