

FCC MPE REPORT

FCC Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
November 28, 2017

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-R-1711-E001-4

FCC ID: A3LSOL230-48D

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model(s): SOL230-48D

EUT Type: Small cell (SOL230)

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Se Wook Park
Engineer of Telecommunication Testing Center



Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1711-E001	November 09, 2017	- First Approval Report
HCT-R-1711-E001-1	November 13, 2017	- Revised the typo (Max. Peak -> Max. Average) - Added the CBRS(2Tx *1Carrier) – AB and CD
HCT-R-1711-E001-2	November 15, 2017	- Revised output power of the WLAN 2.4 MIMO operation
HCT-R-1711-E001-3	November 23, 2017	- Revised output power of the CBRS operations
HCT-R-1711-E001-4	November 28, 2017	- Revised power density of the CBRS(2Tx *1Carrier) – CD / 20 MHz BW.

Result of Test

CONTENTS

RF Exposure Statement	4
1. LIMITS	4
2. MAXIMUM PERMISSIBLE EXPOSURE Prediction.....	4
3. RESULTS	5

RF Exposure Statement

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
0.3 - 1.34.....	614	1.63	*(100)	30
1.34 - 30.....	824/f	2.19/f	*(180/ f ²)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....	f/1500	30
1500 - 100.000.....	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

3. RESULTS

Omni Antenna (WLAN 4TX, CBRS 2TX)

WLAN 2.4 MIMO		
Max. Average output Power at antenna input terminal	26.50	dBm
Max. Average output Power at antenna input terminal	446.68	mW
Prediction distance	100.00	cm
Prediction frequency	2412–2462	MHz
Antenna Gain(typical)	9.40	dB
Antenna Gain(numeric)	8.71	–
EIRP	3.89	W
Power density at prediction frequency (S)	0.03	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII1)		
Max. Average output Power at antenna input terminal	23.00	dBm
Max. Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	5180–5240	MHz
Antenna Gain(typical)	7.13	dB
Antenna Gain(numeric)	5.16	–
EIRP	1.03	W
Power density at prediction frequency (S)	0.00820	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 2A)		
Max. Average output Power at antenna input terminal	23.00	dBm
Max Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	5260–5320	MHz
Antenna Gain(typical)	7.43	dB
Antenna Gain(numeric)	5.53	–
EIRP	1.10	W
Power density at prediction frequency (S)	0.00879	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 2C)		
Max. Average output Power at antenna input terminal	23.00	dBm
Max. Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	5500–5720	MHz
Antenna Gain(typical)	7.14	dB
Antenna Gain(numeric)	5.18	–
EIRP	1.03	W
Power density at prediction frequency (S)	0.00822	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 3)		
Max. Average output Power at antenna input terminal	23.50	dBm
Max. Average output Power at antenna input terminal	223.87	mW
Prediction distance	100.00	cm
Prediction frequency	5745–5825	MHz
Antenna Gain(typical)	8.57	dB
Antenna Gain(numeric)	7.19	–
EIRP	1.61	W
Power density at prediction frequency (S)	0.01282	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

CBRS(2Tx *1Carrier) – AB / 20 MHz BW		
Max. Average output Power at antenna input terminal	33.01	dBm
Max. Average output Power at antenna input terminal	1999.86	mW
Prediction distance	100.00	cm
Prediction frequency	3550–3700	MHz
Antenna Gain(typical)	6.01	dB
Antenna Gain(numeric)	3.99	–
EIRP	7.98	W
Power density at prediction frequency (S)	0.06	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

CBRS(2Tx *1Carrier) – CD / 20 MHz BW		
Max. Average output Power at antenna input terminal	33.01	dBm
Max. Average output Power at antenna input terminal	1999.86	mW
Prediction distance	100.00	cm
Prediction frequency	3550–3700	MHz
Antenna Gain(typical)	6.01	dBi
Antenna Gain(numeric)	3.99	–
EIRP	7.98	W
Power density at prediction frequency (S)	0.06	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

Simultaneous transmission operations

1. The power density level at 100 cm is **0.1708 mW/cm²**, which is below the uncontrolled exposure limit of **1.0 mW/cm²** at **WLAN(2.4 GHz) and WLAN(5GHz) and CBRS summation**.

Directional Antenna (WLAN 4TX, CBRS 2TX)

WLAN 2.4 MIMO		
Max. Average output Power at antenna input terminal	23.00	dBm
Max. Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	2412–2462	MHz
Antenna Gain(typical)	10.11	dBi
Antenna Gain(numeric)	10.26	–
EIRP	2.05	W
Power density at prediction frequency (S)	0.02	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 1)		
Max. Average output Power at antenna input terminal	23.00	dBm
Max. Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	5180–5240	MHz
Antenna Gain(typical)	9.06	dBi
Antenna Gain(numeric)	8.05	–
EIRP	1.61	W
Power density at prediction frequency (S)	0.01279	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 2A)		
Max. Average output Power at antenna input terminal	21.50	dBm
Max. Average output Power at antenna input terminal	141.25	mW
Prediction distance	100.00	cm
Prediction frequency	5260–5320	MHz
Antenna Gain(typical)	9.43	dBi
Antenna Gain(numeric)	8.77	–
EIRP	1.24	W
Power density at prediction frequency (S)	0.00986	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII 2C)		
Max. Average output Power at antenna input terminal	22.00	dBm
Max. Average output Power at antenna input terminal	158.49	mW
Prediction distance	100.00	cm
Prediction frequency	5500–5720	MHz
Antenna Gain(typical)	9.20	dBi
Antenna Gain(numeric)	8.32	–
EIRP	1.32	W
Power density at prediction frequency (S)	0.01049	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

WLAN 5G MIMO (UNII3)		
Max. Average output Power at antenna input terminal	23.00	dBm
Max. Average output Power at antenna input terminal	199.53	mW
Prediction distance	100.00	cm
Prediction frequency	5745–5825	MHz
Antenna Gain(typical)	9.93	dBi
Antenna Gain(numeric)	9.84	–
EIRP	1.96	W
Power density at prediction frequency (S)	0.01562	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

CBRS(2Tx *1Carrier) – AB / 20 MHz BW		
Max. Average output Power at antenna input terminal	29.51	dBm
Max. Average output Power at antenna input terminal	893.31	mW
Prediction distance	100.00	cm
Prediction frequency	3600.00	MHz
Antenna Gain(typical)	10.01	dBi
Antenna Gain(numeric)	10.02	–
EIRP	8.95	W
Power density at prediction frequency (S)	0.07	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

CBRS(2Tx *1Carrier) – CD / 20 MHz BW		
Max. Average output Power at antenna input terminal	29.51	dBm
Max. Average output Power at antenna input terminal	893.31	mW
Prediction distance	100.00	cm
Prediction frequency	3600.00	MHz
Antenna Gain(typical)	10.01	dBi
Antenna Gain(numeric)	10.02	–
EIRP	8.95	W
Power density at prediction frequency (S)	0.07	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	1.00	mW/cm ²

Simultaneous transmission operations

1. The power density level at 100 cm is **0.1744 mW/cm²**, which is below the uncontrolled exposure limit of **1.0 mW/cm²** at **WLAN(2.4 GHz) and WLAN(5GHz) and CBRS summation.**