

RF Exposure Evaluation

(Mobile Condition)

FCC ID : A4RGVU6C
Equipment : Phone
Applicant : Google LLC
1600 Amphitheatre Parkway,
Mountain View, California, 94043 USA
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

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



Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA1O2843-18	Rev. 01	Initial issue of report	Nov. 17, 2022

**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
Equipment Name	Phone
FCC ID	A4RGVU6C
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n14 : 788 MHz ~ 798 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n30 : 2305 MHz ~ 2315 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3450MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.8G UNII4 Band: 5850 MHz ~ 5895 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz WPT: 110KHz ~ 148.5KHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE NFC : ASK WPT: ASK
Remark: 1. Enable SP mode for UNII-5 and UNII-7	

Reviewed by: **Jason Wang**Report Producer: **Paula Chen**



2. Maximum Tune-up Limit (unit: dBm)

General Note:

1. The maximum power of the WWAN antenna will be selected to evaluate the power density
2. For MPE calculation is using the highest output among 2Tx switching antennas for each frequency band.
3. In n41 PC1.5, the device only supports UL MIMO mode.

<WWAN Maximum Power>

Maximum Transmit Burst Average Power (dBm)			
Band	Antenna	Duty cycle	Mobile Condition
			Index 1
GSM850 GSM/GPRS 1TX	0	12.50%	33.50
GSM850 GPRS 2TX	0	25.00%	32.50
GSM850 GPRS 3TX	0	37.50%	31.50
GSM850 GPRS 4TX	0	50.00%	30.50
GSM850 EDGE 1TX	0	12.50%	28.00
GSM850 EDGE 2TX	0	25.00%	27.50
GSM850 EDGE 3TX	0	37.50%	27.50
GSM850 EDGE 4TX	0	50.00%	25.50
GSM1900 GSM/GPRS 1TX	2	12.50%	31.00
GSM1900 GPRS 2TX	2	25.00%	29.50
GSM1900 GPRS 3TX	2	37.50%	29.00
GSM1900 GPRS 4TX	2	50.00%	28.00
GSM1900 EDGE 1TX	2	12.50%	26.00
GSM1900 EDGE 2TX	2	25.00%	25.00
GSM1900 EDGE 3TX	2	37.50%	25.00
GSM1900 EDGE 4TX	2	50.00%	24.00
WCDMA B2	2	100.00%	25.40
WCDMA B4	2	100.00%	25.40
WCDMA B5	0	100.00%	25.40
LTE B7	2	100.00%	25.40
LTE B12/B17	0	100.00%	25.40
LTE B13	0	100.00%	25.40
LTE B14	0	100.00%	25.40
LTE B25/B2	2	100.00%	25.40
LTE B26/B5	0	100.00%	25.40
LTE B30	2	100.00%	24.30
LTE-B38 PC3	2	63.30%	25.40
LTE-B38 PC2	2	43.30%	26.90
LTE B41 PC3	2	63.30%	25.40
LTE B41 PC2	2	43.30%	26.90
LTE B48 PC3	6	63.30%	25.40
LTE B66/B4	2	100.00%	25.40
LTE B71	0	100.00%	25.40
FR1 n5	0	100.00%	25.40
FR1 n7	2	100.00%	25.40
FR1 n12	0	100.00%	25.40
FR1 n14	0	100.00%	25.40
FR1 n25/n2	2	100.00%	25.40
FR1 n30	2	100.00%	24.30
FR1 n38 PC3	2	100.00%	25.40
FR1 n41 PC3	2	100.00%	25.40
FR1 n41 PC2	2	50.00%	26.90



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FR1 n41 PC1.5 MIMO	2	25.00%	25.90
FR1 n48 PC3	6	100.00%	25.40
FR1 n66	2	100.00%	25.40
FR1 n71	0	100.00%	25.40
FR1 n77 PC3	6	100.00%	24.10
FR1 n77 PC2	6	50.00%	27.10
LTE B2 Sub	1	100.00%	25.40
LTE B66/B4 Sub	1	100.00%	25.40
FR1 n2 Sub	1	100.00%	25.40
FR1 n38 PC3 Sub	1	100.00%	25.40
FR1 n41 PC3 Sub	1	100.00%	25.40
FR1 n41 PC2 Sub	1	50.00%	26.90
FR1 n41 PC1.5 Sub MIMO	1	25.00%	25.90
FR1 n48 PC3 Sub MIMO	1	100.00%	20.50
FR1 n66 Sub	1	100.00%	25.40
FR1 n77 Sub	1	100.00%	25.40

Maximum Transmit Burst Average Power (dBm)			
Band	Antenna	Duty cycle	Mobile Condition
			Index 1
GSM850 GSM/GPRS 1TX	1	12.50%	33.50
GSM850 GPRS 2TX	1	25.00%	32.50
GSM850 GPRS 3TX	1	37.50%	31.50
GSM850 GPRS 4TX	1	50.00%	30.50
GSM850 EDGE 1TX	1	12.50%	28.00
GSM850 EDGE 2TX	1	25.00%	27.50
GSM850 EDGE 3TX	1	37.50%	27.50
GSM850 EDGE 4TX	1	50.00%	25.50
GSM1900 GSM/GPRS 1TX	0	12.50%	30.80
GSM1900 GPRS 2TX	0	25.00%	29.30
GSM1900 GPRS 3TX	0	37.50%	28.80
GSM1900 GPRS 4TX	0	50.00%	27.80
GSM1900 EDGE 1TX	0	12.50%	25.80
GSM1900 EDGE 2TX	0	25.00%	24.80
GSM1900 EDGE 3TX	0	37.50%	24.80
GSM1900 EDGE 4TX	0	50.00%	23.80
WCDMA B2	0	100.00%	25.20
WCDMA B4	0	100.00%	25.20
WCDMA B5	1	100.00%	25.40
LTE B7	0	100.00%	25.00
LTE B12/B17	1	100.00%	25.40
LTE B13	1	100.00%	25.40
LTE B14	1	100.00%	25.40
LTE B25/B2	0	100.00%	25.20
LTE B26/B5	1	100.00%	25.40
LTE B30	0	100.00%	24.50
LTE-B38 PC3	0	63.30%	25.40
LTE-B38 PC2	0	43.30%	26.90
LTE B41 PC3	0	63.30%	25.40
LTE B41 PC2	0	43.30%	26.90
LTE B48 PC3	7	63.30%	24.80
LTE B66/B4	0	100.00%	25.20
LTE B71	1	100.00%	25.40
FR1 n5	1	100.00%	25.40



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FR1 n7	0	100.00%	25.00
FR1 n12	1	100.00%	25.40
FR1 n14	1	100.00%	25.40
FR1 n25/n2	0	100.00%	25.20
FR1 n30	0	100.00%	24.50
FR1 n38 PC3	0	100.00%	25.40
FR1 n41 PC3	0	100.00%	25.40
FR1 n41 PC2	0	50.00%	26.90
FR1 n41 PC1.5 MIMO	0	25.00%	25.90
FR1 n48 PC3	7	100.00%	24.80
FR1 n66	0	100.00%	25.20
FR1 n71	1	100.00%	25.40
FR1 n77 PC3	7	100.00%	23.50
FR1 n77 PC2	7	50.00%	26.50
LTE B2 Sub	5	100.00%	25.20
LTE B66/B4 Sub	5	100.00%	25.20
FR1 n2 Sub	5	100.00%	25.20
FR1 n38 PC3 Sub	5	100.00%	24.40
FR1 n41 PC3 Sub	5	100.00%	24.40
FR1 n41 PC2 Sub	5	50.00%	25.90
FR1 n41 PC1.5 Sub MIMO	5	25.00%	25.90
FR1 n48 PC3 Sub MIMO	5	100.00%	19.20
FR1 n66 Sub	5	100.00%	25.20
FR1 n77 Sub	5	100.00%	24.80

**<WLAN Maximum Power>****<2.4GHz WLAN>**

Burst Average Power (dBm)						
Transmit Antenna				SISO		
2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3 Tune-Up Limit
	802.11b 1Mbps	1	2412	23.00	22.00	-
		6	2437	23.00	23.00	-
		11	2462	23.00	23.00	-
		12	2467	23.00	23.00	-
		13	2472	23.00	21.00	-

Burst Average Power (dBm)						
Transmit Antenna				MIMO		
2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
	802.11g 6Mbps	1	2412	21.00	21.00	24.00
		6	2437	23.00	23.00	26.00
		11	2462	22.00	22.00	25.00
		12	2467	20.00	20.00	23.00
		13	2472	18.50	18.50	21.50
	802.11n-HT20 MCS0	1	2412	20.50	20.50	23.50
		6	2437	23.00	23.00	26.00
		11	2462	20.50	20.50	23.50
		12	2467	20.00	20.00	23.00
		13	2472	18.50	18.50	21.50
	802.11ac-VHT20 MCS0	1	2412	20.50	20.50	23.50
		6	2437	23.00	23.00	26.00
		11	2462	20.50	20.50	23.50
		12	2467	20.00	20.00	23.00
		13	2472	18.50	18.50	21.50
	802.11ax-HE20 MCS0	1	2412	20.50	20.50	23.50
		6	2437	23.00	23.00	26.00
		11	2462	20.50	20.50	23.50
		12	2467	20.00	20.00	23.00
		13	2472	18.50	18.50	21.50

**<5GHz WLAN>**

Burst Average Power (dBm)						
Transmit Antenna				MIMO Ant 4+3		
5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11a 6Mbps	36	5180	18.00	18.00	21.00
		40	5200	20.00	20.00	23.00
		44	5220	20.00	20.00	23.00
		48	5240	20.00	20.00	23.00
	802.11n-HT20 MCS0	36	5180	17.00	17.00	20.00
		40	5200	21.00	21.00	24.00
		44	5220	21.00	21.00	24.00
		48	5240	21.00	21.00	24.00
	802.11n-HT40 MCS0	38	5190	15.00	15.00	18.00
		46	5230	20.50	20.50	23.50
	802.11ac-VHT20 MCS0	36	5180	17.00	17.00	20.00
		40	5200	21.00	21.00	24.00
		44	5220	21.00	21.00	24.00
		48	5240	21.00	21.00	24.00
	802.11ac-VHT40 MCS0	38	5190	15.00	15.00	18.00
		46	5230	20.50	20.50	23.50
	802.11ac-VHT80 MCS0	42	5210	15.50	15.50	18.50
	802.11ax-HE20 MCS0	36	5180	17.00	17.00	20.00
		40	5200	21.00	21.00	24.00
		44	5220	21.00	21.00	24.00
		48	5240	21.00	21.00	24.00
	802.11ax-HE40 MCS0	38	5190	15.00	15.00	18.00
		46	5230	20.50	20.50	23.50
	802.11ax-HE80 MCS0	42	5210	15.50	15.50	18.50



Burst Average Power (dBm)						
Transmit Antenna				MIMO Ant 4+3		
5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11a 6Mbps	52	5260	20.00	20.00	23.00
		56	5280	20.00	20.00	23.00
		60	5300	20.00	20.00	23.00
		64	5320	18.50	18.50	21.50
	802.11n-HT20 MCS0	52	5260	21.00	21.00	24.00
		56	5280	21.00	21.00	24.00
		60	5300	21.00	21.00	24.00
		64	5320	17.50	17.50	20.50
	802.11n-HT40 MCS0	54	5270	21.00	21.00	24.00
		62	5310	16.50	16.50	19.50
	802.11ac-VHT20 MCS0	52	5260	21.00	21.00	24.00
		56	5280	21.00	21.00	24.00
		60	5300	21.00	21.00	24.00
		64	5320	17.50	17.50	20.50
	802.11ac-VHT40 MCS0	54	5270	21.00	21.00	24.00
		62	5310	16.50	16.50	19.50
	802.11ac-VHT80 MCS0	58	5290	15.50	15.50	18.50
	802.11ac-VHT160 MCS0	50	5250	14.5	14.5	17.5
	802.11ax-HE20 MCS0	52	5260	21.00	21.00	24.00
		56	5280	21.00	21.00	24.00
		60	5300	21.00	21.00	24.00
		64	5320	17.50	17.50	20.50
	802.11ax-HE40 MCS0	54	5270	21.00	21.00	24.00
		62	5310	16.50	16.50	19.50
	802.11ax-HE80 MCS0	58	5290	15.50	15.50	18.50
	802.11ax-HE160 MCS0	50	5250	14.5	14.5	17.5



Burst Average Power (dBm)						
Transmit Antenna				MIMO Ant 4+3		
	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
5.5GHz WLAN	802.11a 6Mbps	100	5500	20.00	20.00	23.00
		116	5580	20.00	20.00	23.00
		124	5620	20.00	20.00	23.00
		132	5660	20.00	20.00	23.00
		140	5700	19.50	19.50	22.50
		144	5720	20.00	20.00	23.00
	802.11n-HT20 MCS0	100	5500	20.00	20.00	23.00
		116	5580	20.50	20.50	23.50
		124	5620	20.50	20.50	23.50
		132	5660	20.50	20.50	23.50
		140	5700	18.50	18.50	21.50
		144	5720	20.50	20.50	23.50
	802.11n-HT40 MCS0	102	5510	17.50	17.50	20.50
		110	5550	21.00	21.00	24.00
		126	5630	21.00	21.00	24.00
		134	5670	20.50	20.50	23.50
		142	5710	21.00	21.00	24.00
	802.11ac-VHT20 MCS0	100	5500	20.00	20.00	23.00
		116	5580	20.50	20.50	23.50
		124	5620	20.50	20.50	23.50
		132	5660	20.50	20.50	23.50
		140	5700	18.50	18.50	21.50
		144	5720	20.50	20.50	23.50
	802.11ac-VHT40 MCS0	102	5510	17.50	17.50	20.50
		110	5550	21.00	21.00	24.00
		126	5630	21.00	21.00	24.00
		134	5670	20.50	20.50	23.50
		142	5710	21.00	21.00	24.00
	802.11ac-VHT80 MCS0	106	5530	15.50	15.50	18.50
		122	5610	21.00	21.00	24.00
		138	5690	21.00	21.00	24.00
	802.11ac-VHT160 MCS0	114	5570	16.00	16.00	19.00
	802.11ax-HE20 MCS0	100	5500	20.00	20.00	23.00
		116	5580	20.50	20.50	23.50
		124	5620	20.50	20.50	23.50
		132	5660	20.50	20.50	23.50
		140	5700	18.50	18.50	21.50
		144	5720	20.50	20.50	23.50
	802.11ax-HE40 MCS0	102	5510	17.50	17.50	20.50
		110	5550	21.00	21.00	24.00
		126	5630	21.00	21.00	24.00
		134	5670	20.50	20.50	23.50
		142	5710	21.00	21.00	24.00
	802.11ax-HE80 MCS0	106	5530	15.50	15.50	18.50
		122	5610	21.00	21.00	24.00
		138	5690	21.00	21.00	24.00
	802.11ax-HE160 MCS0	114	5570	16.00	16.00	19.00

Burst Average Power (dBm)						
Transmit Antenna				MIMO Ant 4+3		
5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11a 6Mbps	149	5745	23.00	23.00	26.00
		157	5785	23.00	23.00	26.00
		165	5825	23.00	23.00	26.00
	802.11n-HT20 MCS0	149	5745	23.00	23.00	26.00
		157	5785	23.00	23.00	26.00
		165	5825	23.00	23.00	26.00
	802.11n-HT40 MCS0	151	5755	22.00	22.00	25.00
		159	5795	22.00	22.00	25.00
	802.11ac-VHT20 MCS0	149	5745	23.00	23.00	26.00
		157	5785	23.00	23.00	26.00
		165	5825	23.00	23.00	26.00
	802.11ac-VHT40 MCS0	151	5755	22.00	22.00	25.00
		159	5795	22.00	22.00	25.00
	802.11ac-VHT80 MCS0	155	5775	22.00	22.00	25.00
	802.11ax-HE20 MCS0	149	5745	23.00	23.00	26.00
		157	5785	23.00	23.00	26.00
		165	5825	23.00	23.00	26.00
	802.11ax-HE40 MCS0	151	5755	22.00	22.00	25.00
		159	5795	22.00	22.00	25.00
	802.11ax-HE80 MCS0	155	5775	22.00	22.00	25.00

Burst Average Power (dBm)						
Transmit Antenna				MIMO Ant 4+3		
5.8GHz WLAN UNII4	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11a 6Mbps	169	5845	22.00	22.00	25.00
		173	5865	22.00	22.00	25.00
		177	5885	22.00	22.00	25.00
	802.11n-HT20 MCS0	169	5845	22.00	22.00	25.00
		173	5865	22.00	22.00	25.00
		177	5885	22.00	22.00	25.00
	802.11n-HT40 MCS0	167	5835	22.00	22.00	25.00
		175	5875	22.00	22.00	25.00
	802.11ac-VHT20 MCS0	169	5845	22.00	22.00	25.00
		173	5865	22.00	22.00	25.00
		177	5885	22.00	22.00	25.00
	802.11ac-VHT40 MCS0	167	5835	22.00	22.00	25.00
		175	5875	22.00	22.00	25.00
	802.11ac-VHT80 MCS0	171	5855	20.50	20.50	23.50
	802.11ac-VHT160 MCS0	163	5815	19.50	19.50	22.50
	802.11ax-HE20 MCS0	169	5845	22.00	22.00	25.00
		173	5865	22.00	22.00	25.00
		177	5885	22.00	22.00	25.00
	802.11ax-HE40 MCS0	167	5835	22.00	22.00	25.00
		175	5875	22.00	22.00	25.00
	802.11ax-HE80 MCS0	171	5855	20.50	20.50	23.50
	02.11ax-HE160 MCS0	163	5815	19.50	19.50	22.50

**<6E WLAN>**

Burst Average Power (dBm)						
Transmit Antenna				MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
WiFi 6E	802.11a 6Mbps	1	5955	21.5	21.5	24.5
		49	6195	21.5	21.5	24.5
		93	6415	21	21	24
		117	6535	21	21	24
		149	6695	21	21	24
		181	6855	21	21	24
	802.11ax-HE20 MCS0	1	5955	21.5	21.5	24.5
		49	6195	21.5	21.5	24.5
		93	6415	21.5	21.5	24.5
		117	6535	21.5	21.5	24.5
		149	6695	21	21	24
		181	6855	21	21	24
	802.11ax-HE40 MCS0	3	5965	21	21	24
		51	6205	21.5	21.5	24.5
		91	6405	21.5	21.5	24.5
		123	6565	21.5	21.5	24.5
		147	6685	22	22	25
		179	6845	21.5	21.5	24.5
	802.11ax-HE80 MCS0	7	5985	19.5	19.5	22.5
		55	6225	21.5	21.5	24.5
		87	6385	21.5	21.5	24.5
		135	6625	22	22	25
		151	6705	22	22	25
		167	6785	21	21	24
	802.11ax-HE160 MCS0	15	6025	19.5	19.5	22.5
		47	6185	21	21	24
		79	6345	20.5	20.5	23.5
		143	6665	20.5	20.5	23.5



<Bluetooth Maximum Power>

Mode	Burst Average Power (dBm)				
	Ant 4			Ant 4	
	BR / EDR			LE	
	1Mbps	2Mbps	3Mbps	1Mbps	2Mbps
Tune-up Limit	19.5	18.5	18.5	19.5	19.5

Mode	Burst Average Power (dBm)				
	Ant 3			Ant 3	
	BR / EDR			LE	
	1Mbps	2Mbps	3Mbps	1Mbps	2Mbps
Tune-up Limit	19.5	18.5	18.5	19.5	19.5

Mode	BR / EDR	Burst Average Power (dBm)								
		1Mbps			2Mbps			3Mbps		
		Ant 4+3(4)	Ant 4+3(3)	Ant 4+3	Ant 4+3(4)	Ant 4+3(3)	Ant 4+3	Ant 4+3(4)	Ant 4+3(3)	Ant 4+3
Tune-up Limit		18	18	21	15	15	18	15	15	18

Mode	LE	Burst Average Power (dBm)					
		1Mbps			2Mbps		
		Ant 4+3(4)	Ant 4+3(3)	Ant 4+3	Ant 4+3(4)	Ant 4+3(3)	Ant 4+3
Tune-up Limit		18	18	21	18	18	21

3. RF Exposure Limit Introduction

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

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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



4. Radio Frequency Radiation Exposure Evaluation

4.1. Power Density Calculation

Band	Antenna	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
GSM850 GSM/GPRS 1TX	0	-3.60	33.50	29.9	0.98	123.03	0.024	0.549	0.045
GSM850 GPRS 2TX	0	-3.60	32.50	28.9	0.78	194.06	0.039	0.549	0.070
GSM850 GPRS 3TX	0	-3.60	31.50	27.9	0.62	231.21	0.046	0.549	0.084
GSM850 GPRS 4TX	0	-3.60	30.50	26.9	0.49	245.47	0.049	0.549	0.089
GSM850 EDGE 1TX	0	-3.60	28.00	24.4	0.28	34.67	0.007	0.549	0.013
GSM850 EDGE 2TX	0	-3.60	27.50	23.9	0.25	61.37	0.012	0.549	0.022
GSM850 EDGE 3TX	0	-3.60	27.50	23.9	0.25	92.05	0.018	0.549	0.033
GSM850 EDGE 4TX	0	-3.60	25.50	21.9	0.15	77.44	0.015	0.549	0.028
GSM1900 GSM/GPRS 1TX	2	0.40	31.00	31.4	1.38	173.78	0.035	1.000	0.035
GSM1900 GPRS 2TX	2	0.40	29.50	29.9	0.98	244.31	0.049	1.000	0.049
GSM1900 GPRS 3TX	2	0.40	29.00	29.4	0.87	326.59	0.065	1.000	0.065
GSM1900 GPRS 4TX	2	0.40	28.00	28.4	0.69	346.74	0.069	1.000	0.069
GSM1900 EDGE 1TX	2	0.40	26.00	26.4	0.44	54.95	0.011	1.000	0.011
GSM1900 EDGE 2TX	2	0.40	25.00	25.4	0.35	86.68	0.017	1.000	0.017
GSM1900 EDGE 3TX	2	0.40	25.00	25.4	0.35	130.03	0.026	1.000	0.026
GSM1900 EDGE 4TX	2	0.40	24.00	24.4	0.28	137.71	0.027	1.000	0.027
WCDMA B2	2	0.40	25.40	25.8	0.38	380.19	0.076	1.000	0.076
WCDMA B4	2	-0.40	25.40	25.0	0.32	316.23	0.063	1.000	0.063
WCDMA B5	0	-3.60	25.40	21.8	0.15	151.36	0.030	0.549	0.055
LTE B7	2	-2.10	25.40	23.3	0.21	213.80	0.043	1.000	0.043
LTE B12/B17	0	-4.30	25.40	21.1	0.13	128.82	0.026	0.466	0.055
LTE B13	0	-2.90	25.40	22.5	0.18	177.83	0.035	0.518	0.068
LTE B14	0	-3.10	25.40	22.3	0.17	169.82	0.034	0.525	0.064
LTE B25/B2	2	0.40	25.40	25.8	0.38	380.19	0.076	1.000	0.076
LTE B26/B5	0	-3.50	25.40	21.9	0.15	154.88	0.031	0.543	0.057
LTE B30	2	-0.30	24.30	24.0	0.25	251.19	0.050	1.000	0.050
LTE-B38 PC3	2	-1.80	25.40	23.6	0.23	229.09	0.046	1.000	0.046
LTE-B38 PC2	2	-1.80	26.90	25.1	0.32	323.59	0.064	1.000	0.064
LTE B41 PC3	2	-1.80	25.40	23.6	0.23	229.09	0.046	1.000	0.046
LTE B41 PC2	2	-1.80	26.90	25.1	0.32	323.59	0.064	1.000	0.064
LTE B48 PC3	6	-3.90	25.40	21.5	0.14	141.25	0.028	1.000	0.028
LTE B66/B4	2	-0.40	25.40	25.0	0.32	316.23	0.063	1.000	0.063
LTE B71	0	-5.10	25.40	20.3	0.11	107.15	0.021	0.442	0.048
FR1 n5	0	-3.60	25.40	21.8	0.15	151.36	0.030	0.549	0.055
FR1 n7	2	-2.10	25.40	23.3	0.21	213.80	0.043	1.000	0.043
FR1 n12	0	-4.30	25.40	21.1	0.13	128.82	0.026	0.466	0.055
FR1 n14	0	-3.10	25.40	22.3	0.17	169.82	0.034	0.525	0.064
FR1 n25/n2	2	0.40	25.40	25.8	0.38	380.19	0.076	1.000	0.076
FR1 n30	2	-0.30	24.30	24.0	0.25	251.19	0.050	1.000	0.050
FR1 n38 PC3	2	-3.60	25.40	21.8	0.15	151.36	0.030	1.000	0.030
FR1 n41 PC3	2	-1.80	25.40	23.6	0.23	229.09	0.046	1.000	0.046
FR1 n41 PC2	2	-1.80	26.90	25.1	0.32	323.59	0.064	1.000	0.064
FR1 n41 PC1.5 UL MIMO	2	-1.80	25.90	24.1	0.26	257.04	0.051	1.000	0.051
FR1 n48 PC3	6	-3.90	25.40	21.5	0.14	141.25	0.028	1.000	0.028
FR1 n66	2	-0.40	25.40	25.0	0.32	316.23	0.063	1.000	0.063
FR1 n71	0	-5.10	25.40	20.3	0.11	107.15	0.021	0.442	0.048
FR1 n77 PC3	6	-4.70	24.10	19.4	0.09	87.10	0.017	1.000	0.017
FR1 n77 PC2	6	-4.70	27.10	22.4	0.17	173.78	0.035	1.000	0.035
LTE B2 Sub	1	-3.10	25.40	22.3	0.17	169.82	0.034	1.000	0.034



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LTE B66/B4 Sub	1	-8.10	25.40	17.3	0.05	53.70	0.011	1.000	0.011
FR1 n2 Sub	1	-3.10	25.40	22.3	0.17	169.82	0.034	1.000	0.034
FR1 n38 PC3 Sub	1	-4.40	25.40	21.0	0.13	125.89	0.025	1.000	0.025
FR1 n41 PC3 Sub	1	-5.00	25.40	20.4	0.11	109.65	0.022	1.000	0.022
FR1 n41 PC2 Sub	1	-5.00	26.90	21.9	0.15	154.88	0.031	1.000	0.031
FR1 n41 PC1.5 Sub UL MIMO	1	-5.00	25.90	20.9	0.12	123.03	0.024	1.000	0.024
FR1 n48 PC3 Sub UL MIMO	1	-6.20	20.50	14.3	0.03	26.92	0.005	1.000	0.005
FR1 n66 Sub	1	-8.10	25.40	17.3	0.05	53.70	0.011	1.000	0.011
FR1 n77 Sub	1	-8.60	25.40	16.8	0.05	47.86	0.010	1.000	0.010

Band	Antenna	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit
GSM850 GSM/GPRS 1TX	1	-4.50	33.50	29.0	0.79	100.00	0.020	0.549	0.036
GSM850 GPRS 2TX	1	-4.50	32.50	28.0	0.63	157.74	0.031	0.549	0.057
GSM850 GPRS 3TX	1	-4.50	31.50	27.0	0.50	187.93	0.037	0.549	0.068
GSM850 GPRS 4TX	1	-4.50	30.50	26.0	0.40	199.53	0.040	0.549	0.072
GSM850 EDGE 1TX	1	-4.50	28.00	23.5	0.22	28.18	0.006	0.549	0.010
GSM850 EDGE 2TX	1	-4.50	27.50	23.0	0.20	49.88	0.010	0.549	0.018
GSM850 EDGE 3TX	1	-4.50	27.50	23.0	0.20	74.82	0.015	0.549	0.027
GSM850 EDGE 4TX	1	-4.50	25.50	21.0	0.13	62.95	0.013	0.549	0.023
GSM1900 GSM/GPRS 1TX	0	-1.30	30.80	29.5	0.89	112.20	0.022	1.000	0.022
GSM1900 GPRS 2TX	0	-1.30	29.30	28.0	0.63	157.74	0.031	1.000	0.031
GSM1900 GPRS 3TX	0	-1.30	28.80	27.5	0.56	210.86	0.042	1.000	0.042
GSM1900 GPRS 4TX	0	-1.30	27.80	26.5	0.45	223.87	0.045	1.000	0.045
GSM1900 EDGE 1TX	0	-1.30	25.80	24.5	0.28	35.48	0.007	1.000	0.007
GSM1900 EDGE 2TX	0	-1.30	24.80	23.5	0.22	55.97	0.011	1.000	0.011
GSM1900 EDGE 3TX	0	-1.30	24.80	23.5	0.22	83.95	0.017	1.000	0.017
GSM1900 EDGE 4TX	0	-1.30	23.80	22.5	0.18	88.91	0.018	1.000	0.018
WCDMA B2	0	-1.30	25.20	23.9	0.25	245.47	0.049	1.000	0.049
WCDMA B4	0	-0.50	25.20	24.7	0.30	295.12	0.059	1.000	0.059
WCDMA B5	1	-4.50	25.40	20.9	0.12	123.03	0.024	0.549	0.045
LTE B7	0	-0.60	25.00	24.4	0.28	275.42	0.055	1.000	0.055
LTE B12/B17	1	-4.30	25.40	21.1	0.13	128.82	0.026	0.466	0.055
LTE B13	1	-2.90	25.40	22.5	0.18	177.83	0.035	0.518	0.068
LTE B14	1	-3.10	25.40	22.3	0.17	169.82	0.034	0.525	0.064
LTE B25/B2	0	-1.30	25.20	23.9	0.25	245.47	0.049	1.000	0.049
LTE B26/B5	1	-4.50	25.40	20.9	0.12	123.03	0.024	0.543	0.045
LTE B30	0	-0.50	24.50	24.0	0.25	251.19	0.050	1.000	0.050
LTE-B38 PC3	0	-0.80	25.40	24.6	0.29	288.40	0.057	1.000	0.057
LTE-B38 PC2	0	-0.80	26.90	26.1	0.41	407.38	0.081	1.000	0.081
LTE B41 PC3	0	-1.10	25.40	24.3	0.27	269.15	0.054	1.000	0.054
LTE B41 PC2	0	-1.10	26.90	25.8	0.38	380.19	0.076	1.000	0.076
LTE B48 PC3	7	-4.70	24.80	20.1	0.10	102.33	0.020	1.000	0.020
LTE B66/B4	0	-0.10	25.20	25.1	0.32	323.59	0.064	1.000	0.064
LTE B71	1	-7.80	25.40	17.6	0.06	57.54	0.011	0.442	0.026
FR1 n5	1	-4.50	25.40	20.9	0.12	123.03	0.024	0.549	0.045
FR1 n7	0	-0.60	25.00	24.4	0.28	275.42	0.055	1.000	0.055
FR1 n12	1	-5.40	25.40	20.0	0.10	100.00	0.020	0.466	0.043
FR1 n14	1	-4.20	25.40	21.2	0.13	131.83	0.026	0.525	0.050
FR1 n25/n2	0	-1.30	25.20	23.9	0.25	245.47	0.049	1.000	0.049
FR1 n30	0	-0.50	24.50	24.0	0.25	251.19	0.050	1.000	0.050
FR1 n38 PC3	0	-0.80	25.40	24.6	0.29	288.40	0.057	1.000	0.057
FR1 n41 PC3	0	-1.10	25.40	24.3	0.27	269.15	0.054	1.000	0.054

FR1 n41 PC2	0	-1.10	26.90	25.8	0.38	380.19	0.076	1.000	0.076
FR1 n41 PC1.5 UL MIMO	0	-1.10	25.90	24.8	0.30	302.00	0.060	1.000	0.060
FR1 n48 PC3	7	-4.70	24.80	20.1	0.10	102.33	0.020	1.000	0.020
FR1 n66	0	-0.10	25.20	25.1	0.32	323.59	0.064	1.000	0.064
FR1 n71	1	-7.80	25.40	17.6	0.06	57.54	0.011	0.442	0.026
FR1 n77 PC3	7	-5.30	23.50	18.2	0.07	66.07	0.013	1.000	0.013
FR1 n77 PC2	7	-5.30	26.50	21.2	0.13	131.83	0.026	1.000	0.026
LTE B2 Sub	5	-4.40	25.20	20.8	0.12	120.23	0.024	1.000	0.024
LTE B66/B4 Sub	5	-5.20	25.20	20.0	0.10	100.00	0.020	1.000	0.020
FR1 n2 Sub	5	-4.40	25.20	20.8	0.12	120.23	0.024	1.000	0.024
FR1 n38 PC3 Sub	5	-3.60	24.40	20.8	0.12	120.23	0.024	1.000	0.024
FR1 n41 PC3 Sub	5	-3.90	24.40	20.5	0.11	112.20	0.022	1.000	0.022
FR1 n41 PC2 Sub	5	-3.90	25.90	22.0	0.16	158.49	0.032	1.000	0.032
FR1 n41 PC1.5 Sub UL MIMO	5	-3.90	25.90	22.0	0.16	158.49	0.032	1.000	0.032
FR1 n48 PC3 Sub UL MIMO	5	-1.80	19.20	17.4	0.05	54.95	0.011	1.000	0.011
FR1 n66 Sub	5	-5.20	25.20	20.0	0.10	100.00	0.020	1.000	0.020
FR1 n77 Sub	5	-4.40	24.80	20.4	0.11	109.65	0.022	1.000	0.022

WLAN / BT

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WLAN2.4GHz Band	1.6	26.0	27.6	0.58	575.44	0.115	1.000	0.115
WLAN5GHz/6GHz Band	-0.4	26.0	25.6	0.36	363.08	0.072	1.000	0.072
Bluetooth	1.6	19.5	21.1	0.13	128.82	0.026	1.000	0.026



WWAN Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz/6GHz WLAN Power Density / Limit	WPT	Σ (Power Density / Limit)
0.089	0.115	0.072	0.01	0.286
WWAN Power Density / Limit	5GHz/6GHz WLAN Power Density / Limit	Bluetooth Power Density / Limit	WPT	Σ (Power Density / Limit)
0.089	0.072	0.026	0.01	0.197

Note:

1. Above power density calculation was selected highest output power and antenna from all transmit antenna to be evaluation.
2. In simultaneous transmission for this device, 5G NR including uplink MIMO and LTE transmission are managed and controlled by Samsung S.LSI TAS, while the RF exposure from WLAN,WPT, BT radios are managed using legacy approach, therefore simultaneous transmission compliance can be assessed on LTE+WLAN+WPT+BT or NR+WLAN+WPT+BT, above power density calculation selected highest power density between LTE and 5G NR for simultaneous transmission analysis with other transmitters.
3. The uplink MIMO only operate in 5G FR1 n41/48/77
4. WPT ratio is, from Sporton WPT evaluation report (FCC ID: A4RGVU6C, Report No.: FA102843-06B), Ratio of 0.01 = 0.0152 / 1.63 for calculation.
5. For colocation analysis, the highest (power density/limit) among all WWAN wireless modes is chosen for summation.
6. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)], for all transmission configuration was consider and list above table.
7. Considering the all the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.