



RF EXPOSURE EVALUATION REPORT

FCC ID : A4RG025I
Equipment : Phone
Model Name : G025I, G025H
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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1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
Equipment Name	Phone
Model Name	G025I, G025H
FCC ID	A4RG025I
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 n5 : 824 MHz ~ 849 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC:ASK
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Reviewed by: Jason Wang

Report Producer: Daisy Peng



2. Maximum Tune-up Limit

General Note:

1. For each cellular band, the device has several WWAN antennas, the antenna selection is based on the connection quality condition, and only one antenna will transmit at a time.
2. The maximum power of the WWAN antenna will be selected to evaluate the power density

<WWAN Maximum Power>

Config0			Primary Transmitter Maximum Transmit Power Level (dBm)
Radio Tech	Band Number	Antenna name	DSI_0
			Default
GSM/GPRS 1Tx	850	ANT0	33.50
GPRS 2Tx	850	ANT0	32.50
GPRS 3Tx	850	ANT0	30.50
GPRS 4Tx	850	ANT0	29.50
EDGE 1Tx	850	ANT0	27.50
EDGE 2Tx	850	ANT0	27.00
EDGE 3Tx	850	ANT0	25.00
EDGE 4Tx	850	ANT0	23.00
GSM/GPRS 1Tx	1900	ANT2	30.50
GPRS 2Tx	1900	ANT2	29.70
GPRS 3Tx	1900	ANT2	28.00
GPRS 4Tx	1900	ANT2	27.00
EDGE 1Tx	1900	ANT2	26.50
EDGE 2Tx	1900	ANT2	26.00
EDGE 3Tx	1900	ANT2	25.00
EDGE 4Tx	1900	ANT2	24.00
WCDMA	B2	ANT2	25.70
WCDMA	B4	ANT2	25.70
WCDMA	B5	ANT0	25.00



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Config0			Primary Transmitter Maximum Transmit Power Level (dBm)
Radio Tech	Band Number	Antenna name	DSI_0
			Default
LTE	B2	ANT2	25.70
LTE	B4	ANT2	25.70
LTE	B5	ANT0	25.70
LTE	B7	ANT2	25.70
LTE	B12	ANT0	25.70
LTE	B13	ANT0	25.20
LTE	B14	ANT0	25.70
LTE	B17	ANT0	25.70
LTE	B25	ANT2	25.70
LTE	B26	ANT0	25.70
LTE	B30	ANT2	23.70
LTE	B38	ANT2	25.70
LTE	B38HPUE	ANT2	27.50
LTE	B41	ANT2	25.70
LTE	B48	ANT7	24.20
LTE	B66	ANT2	25.70
LTE	B71	ANT0	25.70
FR1	n5	ANT0	25.00

Config1			Secondary Transmitter Maximum Transmit Power Level (dBm)
Radio Tech	Band Number	Antenna name	DSI_0
			Default
GSM/GPRS 1Tx	850	ANT1	33.50
GPRS 2Tx	850	ANT1	32.50
GPRS 3Tx	850	ANT1	30.50
GPRS 4Tx	850	ANT1	29.50
EDGE 1Tx	850	ANT1	27.50
EDGE 2Tx	850	ANT1	27.00
EDGE 3Tx	850	ANT1	25.00
EDGE 4Tx	850	ANT1	23.00
WCDMA	B5	ANT1	25.00
LTE	B5	ANT1	25.70
LTE	B12	ANT1	25.70
LTE	B13	ANT1	25.20
LTE	B14	ANT1	25.70
LTE	B17	ANT1	25.70
LTE	B26	ANT1	25.70
LTE	B71	ANT1	25.70
FR1	n5	ANT1	25.00



Config1			Secondary Transmitter Maximum Transmit Power Level (dBm)
Radio Tech	Band Number	Antenna name	DSI_0
			Default
GSM/GPRS 1Tx	1900	ANT0	30.00
GPRS 2Tx	1900	ANT0	29.20
GPRS 3Tx	1900	ANT0	27.50
GPRS 4Tx	1900	ANT0	26.50
EDGE 1Tx	1900	ANT0	26.00
EDGE 2Tx	1900	ANT0	25.50
EDGE 3Tx	1900	ANT0	24.50
EDGE 4Tx	1900	ANT0	23.50
WCDMA	B2	ANT0	25.70
WCDMA	B4	ANT0	25.70
LTE	B2	ANT0	25.70
LTE	B4	ANT0	25.70
LTE	B7	ANT0	25.70
LTE	B25	ANT0	25.70
LTE	B30	ANT0	23.70
LTE	B38	ANT0	25.70
LTE	B38HPUE	ANT0	27.50
LTE	B41	ANT0	25.70
LTE	B48	ANT2	22.60
LTE	B66	ANT0	25.70

<WLAN Maximum Power>

<2.4GHz WLAN>

	Transmit Antenna			SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	19.50	19.50	19.50	19.50	22.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	19.50	19.50	19.50	19.50	22.5
	802.11g 6Mbps	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	18.00	18.00	18.00	18.00	21.0
	802.11n-HT20 MCS0	1	2412	16.50	16.50	16.50	16.50	19.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.50	16.50	16.50	16.50	19.5
	802.11ac-VHT20 MCS0	1	2412	16.50	16.50	16.50	16.50	19.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.50	16.50	16.50	16.50	19.5



<5GHz WLAN>

5.2GHz WLAN	Transmit Antenna			SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
802.11a 6Mbps		36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
802.11n-HT20 MCS0		36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
802.11n-HT40 MCS0		38	5190	13.50	13.50	13.50	13.50	16.5
		46	5230	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT20 MCS0		36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT40 MCS0		48	5240	17.50	17.50	17.50	17.50	20.5
		38	5190	13.50	13.50	13.50	13.50	16.5
802.11ac-VHT80 MCS0		46	5230	17.50	17.50	17.50	17.50	20.5
		42	5210	13.00	13.00	13.00	13.00	16.0

5.3GHz WLAN	Transmit Antenna			SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
802.11a 6Mbps		52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
802.11n-HT20 MCS0		52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
802.11n-HT40 MCS0		64	5320	17.50	17.50	17.50	17.50	20.5
		54	5270	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT20 MCS0		62	5310	14.00	14.00	14.00	14.00	17.0
		52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT40 MCS0		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT80 MCS0		54	5270	17.50	17.50	17.50	17.50	20.5
		62	5310	14.00	14.00	14.00	14.00	17.0
		58	5290	12.00	12.00	12.00	12.00	15.0



	Transmit Antenna			SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	17.50	17.50	17.50	17.50	20.5
		140	5700	17.50	17.50	17.50	17.50	20.5
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	18.00	18.00	18.00	18.00	21.0
		140	5700	18.00	18.00	18.00	18.00	21.0
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	102	5510	16.00	16.00	16.00	16.00	19.0
		110	5550	17.50	17.50	17.50	17.50	20.5
		126	5630	17.50	17.50	17.50	17.50	20.5
		134	5670	17.50	17.50	17.50	17.50	20.5
		142	5710	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	18.00	18.00	18.00	18.00	21.0
		140	5700	18.00	18.00	18.00	18.00	21.0
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	102	5510	16.00	16.00	16.00	16.00	19.0
		110	5550	17.50	17.50	17.50	17.50	20.5
		126	5630	17.50	17.50	17.50	17.50	20.5
		134	5670	17.50	17.50	17.50	17.50	20.5
		142	5710	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	106	5530	12.50	12.50	12.50	12.50	15.5
		122	5610	17.00	17.00	17.00	17.00	20.0
138		5690	17.00	17.00	17.00	17.00	20.0	



5.8GHz WLAN	Transmit Antenna			SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
802.11a 6Mbps		149	5745	18.50	18.50	18.50	18.50	21.5
		157	5785	18.50	18.50	18.50	18.50	21.5
		165	5825	18.50	18.50	18.50	18.50	21.5
802.11n-HT20 MCS0		149	5745	18.50	18.50	18.50	18.50	21.5
		157	5785	18.50	18.50	18.50	18.50	21.5
		165	5825	18.50	18.50	18.50	18.50	21.5
802.11n-HT40 MCS0		151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT20 MCS0		149	5745	18.50	18.50	18.50	18.50	21.5
		157	5785	18.50	18.50	18.50	18.50	21.5
		165	5825	18.50	18.50	18.50	18.50	21.5
802.11ac-VHT40 MCS0		151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
802.11ac-VHT80 MCS0		155	5775	17.00	17.00	17.00	17.00	20.0

<Bluetooth Maximum Power>

Mode	Average power (dBm)				
	BR / EDR			LE	
	1Mbps	2Mbps	3Mbps	1Mbps	2Mbps
Tune-up Limit	18	18	18	12.5	12.5



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

Table with 9 columns: 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. Rows include GSM 850, GPRS 850, EGPRS 850, GSM 1900, GPRS 1900, EGPRS 1900, WCDMA Bands 2, 4, 5, LTE Bands 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 38 HPUE, 41, 48, 66, 71, 5G NR n5, 2.4GHz WLAN, 5GHz WLAN, and Bluetooth.



WWAN Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Σ (Power Density / Limit)
0.123	0.039	0.027	0.189
WWAN Power Density / Limit	5GHz WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit)
0.123	0.027	0.014	0.164

Note:

1. For colocation analysis, the highest (power density/limit) among all WWAN wireless modes is chosen for summation.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + 2.4GHz WLAN + 5GHz WLAN low power transmitter or WWAN + 5GHz WLAN + Bluetooth low power transmitter.
3. Considering the WWAN collocation with the WLAN / Bluetooth low power transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Conclusion:

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