

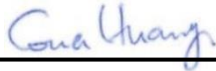
# RF EXPOSURE EVALUATION REPORT

**FCC ID** : GKREXMG1A  
**Equipment** : LTE Module  
**Brand Name** : COMPAL  
**Model Name** : EXM-G1A  
**Applicant** : Compal Electronics, Inc.  
No.581 & 581-1, Ruiguang Rd., Neihu District,  
Taipei, (114) Taiwan  
**Manufacturer** : Compal Electronics, Inc.  
No.581 & 581-1, Ruiguang Rd., Neihu District,  
Taipei, (114) Taiwan  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

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



Approved by: Cona Huang / Deputy Manager



**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
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### History of this test report

Report No.	Version	Description	Issued Date
FA3D1840-01	Rev. 01	Initial issue of report	Mar. 14, 2024



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

Product Feature & Specification	
EUT Type	LTE Module
Brand Name	COMPAL
Model Name	EXM-G1A
FCC ID	GKREXMG1A
Wireless Technology and Frequency Range	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 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 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
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM
EUT Stage	Identical Prototype

Reviewed by: Jason Wang

Report Producer: Paula Chen



**2. Maximum RF average output power among production units**

Band	Maximum Tune-up Power (dBm)
WCDMA B2	25.00
WCDMA B4	25.00
WCDMA B5	25.00
LTE B2	24.50
LTE B4	24.50
LTE B5	25.50
LTE B7	24.50
LTE B12	25.50
LTE B13	25.50
LTE B14	25.50
LTE B25	24.50
LTE B26	25.50
LTE B38	24.50
LTE B41	24.50
LTE B48	22.00
LTE B66	24.50
LTE B71	25.50



### **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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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. Standalone Power Density Calculation**

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum Output Power Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WCDMA Band 2	8.00	25.00	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
WCDMA Band 4	5.00	25.00	27.850	0.610	30.000	1.000	1.000	1000.000	0.199	1.000
WCDMA Band 5	5.50	25.00	28.350	0.684	30.500	1.122	7.000	1122.018	0.223	0.549
LTE Band 2	8.00	24.50	30.350	1.084	32.500	1.778	2.000	1778.279	0.354	1.000
LTE Band 4	5.00	24.50	27.350	0.543	29.500	0.891	1.000	891.251	0.177	1.000
LTE Band 5	5.50	25.50	28.850	0.767	31.000	1.259	7.000	1258.925	0.251	0.549
LTE Band 7	8.50	24.50	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
LTE Band 12	5.00	25.50	28.350	0.684	30.500	1.122	3.000	1122.018	0.223	0.466
LTE Band 13	5.00	25.50	28.350	0.684	30.500	1.122	3.000	1122.018	0.223	0.518
LTE Band 14	5.00	25.50	28.350	0.684	30.500	1.122	3.000	1122.018	0.223	0.525
LTE Band 25	8.00	24.50	30.350	1.084	32.500	1.778	2.000	1778.279	0.354	1.000
LTE Band 26	5.50	25.50	28.850	0.767	31.000	1.259	7.000	1258.925	0.251	0.543
LTE Band 38	8.50	24.50	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
LTE Band 41	8.50	24.50	30.850	1.216	33.000	1.995	2.000	1995.262	0.397	1.000
LTE Band 48	1.00	22.00	20.850	0.122	23.000	0.200	0.200	199.526	0.040	1.000
LTE Band 66	5.00	24.50	27.350	0.543	29.500	0.891	1.000	891.251	0.177	1.000
LTE Band 71	4.50	25.50	27.850	0.610	30.000	1.000	3.000	1000.000	0.199	0.442



**4.2. Collocated Power Density Calculation**

**Note:**

1. This MPE analysis is applicable to any collocated transmitters with transmit power for WLAN is less than or equal to 26dBm and for Bluetooth is less than or equal to 15dBm.
2. A maximum antenna gain of 5 dBi for WLAN/BT has been assumed for all collocated antennas.

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
WCDMA Band 2	5.00	25.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 4	5.00	25.00	30.0	1.00	1000.00	0.199	1.000	0.199
WCDMA Band 5	2.50	25.00	27.5	0.56	562.34	0.112	0.536	0.209
LTE Band 2	5.00	24.50	29.5	0.89	891.25	0.177	1.000	0.177
LTE Band 4	5.00	24.50	29.5	0.89	891.25	0.177	1.000	0.177
LTE Band 5	2.50	25.50	28.0	0.63	630.96	0.126	0.549	0.229
LTE Band 7	6.50	24.50	31.0	1.26	1258.93	0.251	1.000	0.251
LTE Band 12	2.00	25.50	27.5	0.56	562.34	0.112	0.466	0.240
LTE Band 13	2.00	25.50	27.5	0.56	562.34	0.112	0.518	0.216
LTE Band 14	2.00	25.50	27.5	0.56	562.34	0.112	0.525	0.213
LTE Band 25	5.00	24.50	29.5	0.89	891.25	0.177	1.000	0.177
LTE Band 26	2.50	25.50	28.0	0.63	630.96	0.126	0.543	0.231
LTE Band 38	6.50	24.50	31.0	1.26	1258.93	0.251	1.000	0.251
LTE Band 41	6.50	24.50	31.0	1.26	1258.93	0.251	1.000	0.251
LTE Band 48	1.00	22.00	23.0	0.20	199.53	0.040	1.000	0.040
LTE Band 66	5.00	24.50	29.5	0.89	891.25	0.177	1.000	0.177
LTE Band 71	1.50	25.50	27.0	0.50	501.19	0.100	0.442	0.226
WLAN2.4GHz Band	5.0	26.0	31.0	1.26	1258.93	0.251	1.000	0.251
WLAN5GHz Band	5.0	26.0	31.0	1.26	1258.93	0.251	1.000	0.251
Bluetooth	5.0	15.0	20.0	0.10	100.00	0.020	1.000	0.020

Maximum WWAN Power Density / Limit	Maximum WLAN Power Density / Limit	Maximum Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN+Bluetooth
0.251	0.251	0.02	0.522

**Note:**

1. 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 + WLAN + Bluetooth.
2. Considering the WWAN module collocation with the WLAN and Bluetooth 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:**

Based on FCC 47 CFR §1.1307, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Band	Maximum Conducted Power (dBm)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
EXM-G1A	UMTS	WCDMA Band 2	25.0	8.0	5.0
		WCDMA Band 4	25.0	5.0	5.0
		WCDMA Band 5	25.0	5.5	2.5
	LTE	LTE Band 2	24.5	8.0	5.0
		LTE Band 4	24.5	5.0	5.0
		LTE Band 5	25.5	5.5	2.5
		LTE Band 7	24.5	8.5	6.5
		LTE Band 12	25.5	5.0	2.0
		LTE Band 13	25.5	5.0	2.0
		LTE Band 14	25.5	5.0	2.0
		LTE Band 25	24.5	8.0	5.0
		LTE Band 26	25.5	5.5	2.5
		LTE Band 38	24.5	8.5	6.5
		LTE Band 41	24.5	8.5	6.5
		LTE Band 48	22.0	1.0	1.0
		LTE Band 66	24.5	5.0	5.0
LTE Band 71	25.5	4.5	1.5		