

## RF EXPOSURE REPORT



**Applicant:** Aperia Technologies  
3160 Corporate Place, Hayward, California 94545, United States

**Manufacturer:** Aperia Technologies  
3160 Corporate Place, Hayward, California 94545, United States

**Product Name:** Halo Connect

**Brand Name:** Aperia Technologies

**Model No.:** GW-35

**Model Difference:** N/A

**Report Number:** TESA2307000402ES

**FCC ID** 2ARY2-HCGW3

**Date of EUT Received:** July 4, 2023

**Issue Date:** April 17, 2024

**Approved By** \_\_\_\_\_

**John Yeh**

**We hereby certify that:**

The above equipment was evaluated by SGS Taiwan Ltd. The evaluation in this report is in compliance with FCC Rule Part §2.1091.

The results of this report relate only to the sample identified in this report.

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Revision History					
Report Number	Revision	Description	Issue Date	Revised By	Remark
TESA2307000402ES	00	Original.	January 3, 2024	Susan Lin	
TESA2307000402ES	01	Update applicant's address, antenna information and MPE data	April 9, 2024	Susan Lin	*
TESA2307000402ES	02	Update MPE data	April 17, 2024	Susan Lin	*

**Note:**

- 1、The remark "\*" indicates modification of the report upon requests from certification body.

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## 1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

### 1.1 Product Description

Product Name:	Halo Connect
Brand Name:	Aperia Technologies
Model No.:	GW-35
Model Difference:	N/A
Hardware Version:	V1.0
Firmware Version:	V1.0
EUT Series No.:	31-00001001
Power Supply:	12Vdc

### 1.2 Evaluation site

Laboratory	Site Address	FCC Designation number	ISED Company Number	CAB Identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	<input type="checkbox"/> No. 134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, 24803, Taiwan.	TW0027	4620A	TW3702
	<input checked="" type="checkbox"/> No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 333 Taiwan.	TW0028	4620E	
	<input type="checkbox"/> 1F, No. 8, Alley 15, Lane 120, Sec. 1, Nei Hu Road, Nei Hu District, Taipei City, 222 Taiwan.	TW0029	23862	

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### 1.3 Antenna Information:

#### 1.3.1 BT

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)
External Whip Antenna	Taoglas	GW.34.5153	2402~2480	5.89
Primary Embedded Ceramic Antenna	Taoglas	WLA.01	2402~2480	2.57
Secondary Embedded Ceramic Antenna	Taoglas	GWLA.05	2402~2480	1.70

#### 1.3.2 WWAN

Operating Frequency (MHz)				Ant 0 Peak Gain (dBi)
LTE-Band 2	1850	~	1910	4.82
LTE-Band 4	1710	~	1755	4.69
LTE-Band 5	824	~	849	-1.81
LTE-Band 12	699	~	716	2.64
LTE-Band 13	777	~	787	2.64
LTE-Band 25	1850	~	1915	4.69
LTE-Band 26	824	~	849	2.22
LTE-Band 66	1710	~	1780	4.69

**Note:** Antenna information is provided by the applicant.

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## 1.4 Rated Power

### 1.4.1 Bluetooth

Mode	Freq. Range (MHz)	Channels	Modulation Technology	Max Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
BLE	2402-2480	40	GFSK	4.5	5.89	<b>10.39</b>	V

### 1.4.2 WWAN

Operating Frequency (MHz)	Max. Output Power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (W)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Density / Limit	FCC Worst Case
LTE-Band 2	1850 ~ 1910	25.70	4.82	28.37	0.69	0.22	1.00	0.22
LTE-Band 4	1710 ~ 1755	25.24	4.69	27.78	0.60	0.20	1.00	0.20
LTE-Band 5	824 ~ 849	25.70	-1.81	21.74	0.15	0.05	0.55	0.09
LTE-Band 12	699 ~ 716	25.70	2.64	26.19	0.42	0.14	0.47	0.30
LTE-Band 13	777 ~ 787	25.70	2.64	26.19	0.42	0.14	0.52	0.27
LTE-Band 25	1850 ~ 1915	25.70	4.69	28.24	0.67	0.22	1.00	0.22
LTE-Band 26	824 ~ 849	25.70	2.22	25.77	0.38	0.12	0.55	0.22
LTE-Band 66	1710 ~ 1780	25.22	4.69	27.76	0.60	0.19	1.00	0.19

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## 2 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### 2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission’s guideline.

This is a Mobile device, the MPE is required.

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

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
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 <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equipment power density

Prediction of MPE limit at a given distance

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

Where: 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

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## 2.2 Power Density Calculation (Worst Case)

### FCC Standalone MPE

Operation Mode	Evaluation Frequency (MHz)	Operation Distance (cm)	Max. Output Power Include Tolerance (dBm)	Antenna Gain (dBi)	Max. EIRP (mW)	Power Density (PD) (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Pass / Fail	Power Density / Limit	Collocated MPE
BLE	2480	20	4.5	5.89	10.94	0.0022	1.000	Pass	0.002	V
WWAN	699	20	25.7	2.64	682.34	0.136	0.466	Pass	0.292	V

**Note:** For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

## 2.3 Collocated Power Density Calculation

### FCC Collocated MPE

Operation Mode	Power Density / Limit	$\Sigma$ (Power Density / Limit)
BLE	0.002	0.294
WWAN	0.292	

**Note:**

1.  $\Sigma$ (Power Density / Limit): This is a summation of [(Power Density for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)].
2. Considering the collocated transmitters, the aggregated (Power Density /limit) is smaller than 1, and MPE of collocated transmitters is compliant.

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## 2.4 Maximum Allowable Antenna Gain

Operation Mode	Freq. (MHz)	Operation Distance (cm)	Max. output Power include tolerance (dBm)	Max. Allowable Antenna Gain (dBi)	EIRP (ERP) Limit (dBm)	Max. output Power (mW)	Power Density (PD) (mW/cm <sup>2</sup> )	PD Limit (mW/cm <sup>2</sup> )	Allowable Gain according to EIRP (dBi)	Allowable Gain according to PD (dBi)	Power Density / Limit
LTE-Band 2	1880.0	20	25.70	4.82	33.00	1127.20	0.224	1.000	7.30	11.31	0.224
LTE-Band 4	1732.5	20	25.24	4.69	30.00	984.01	0.196	1.000	4.76	11.77	0.196
LTE-Band 5	824.0	20	25.70	-1.81	38.45	244.91	0.049	0.549	38.45	8.71	0.089
LTE-Band 12	707.7	20	25.70	2.64	34.77	682.34	0.136	0.472	9.07	8.05	0.288
LTE-Band 13	782.0	20	25.70	2.64	34.77	682.34	0.136	0.521	9.07	8.48	0.261
LTE-Band 25	1850.0	20	25.70	4.69	33.00	1093.96	0.218	1.000	33.00	11.31	0.218
LTE-Band 26	824.0	20	25.70	2.22	50.00	619.44	0.123	0.549	50.00	8.71	0.224
LTE-Band 66	1745.00	20	25.22	4.69	30.00	979.49	0.195	1.000	4.78	11.79	0.195

~ End of Report ~

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