



## RF Exposure Evaluation Declaration

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**FCC ID:** 2AJ23-HY-W20

**APPLICANT:** QUANZHOU HEYI ELECTRONICS CO., LTD.

**Application Type:** Certification

**Product:** Network Alarm System

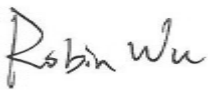
**Model No.:** HY-W20, HY-W5, HY-W6, HY-W7, HY-W21, HY-G20,  
HY-L20, HY-W30, HY-G30, HY-L30

**Brand Name:** HEYI

**FCC Classification:** FCC Part 15 Security/Remote Control Transmitter  
(DSC)  
PCS Licensed Transmitter (PCB)  
Digital Transmission System (DTS)

**FCC Rule Part(s):** FCC CFR 47 §2.1091

**Test Date:** August 14 ~ November 16, 2016

Reviewed By :   
( Robin Wu )

Approved By :   
( Marlin Chen )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2009. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

| Report No.   | Version | Description    | Issue Date | Note  |
|--------------|---------|----------------|------------|-------|
| 1608RSU02209 | Rev. 01 | Initial report | 11-16-2016 | Valid |
|              |         |                |            |       |

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

|                                |                                                                             |
|--------------------------------|-----------------------------------------------------------------------------|
| Product Name                   | Network Alarm System                                                        |
| Model No.                      | HY-W20, HY-W5, HY-W6, HY-W7, HY-W21, HY-G20, HY-L20, HY-W30, HY-G30, HY-L30 |
| 433.92MHz Specification        |                                                                             |
| Frequency Range                | 433.92 MHz                                                                  |
| Type of Modulation             | ASK                                                                         |
| Antenna Type                   | Integral Antenna                                                            |
| Antenna Gain                   | 1.0dBi                                                                      |
| WLAN Specification             |                                                                             |
| Frequency Range                | 802.11b/g/n-HT20: 2412 ~ 2462 MHz<br>802.11n-HT40: 2422 ~ 2452 MHz          |
| Type of Modulation             | 802.11b: DSSS<br>802.11g/n: OFDM                                            |
| Antenna Gain                   | 2.0dBi                                                                      |
| GSM Specification              |                                                                             |
| T <sub>x</sub> Frequency Range | GPRS 900: 880 ~ 915MHz<br>GPRS 1800: 1710 ~ 1785MHz                         |
| R <sub>x</sub> Frequency Range | GPRS 900: 925 ~ 960MHz<br>GPRS 1800: 1805 ~ 1880MHz                         |
| Antenna Gain                   | 2.0dBi                                                                      |
| Type of Modulation             | GPRS: GMSK                                                                  |

### 1.2. Antenna Description

| Antenna Type     | Frequency Band (MHz)  | Manufacturer                         | Max Peak Gain (dBi) |
|------------------|-----------------------|--------------------------------------|---------------------|
| PCB Antenna      | 2400~2500             | DONGGUAN SENLING INDUSTRIAL CO., LTD | 2.0                 |
| PIFA Antenna     | 698~960,<br>1710~2700 | PCTEL, Inc                           | 2.0                 |
| Integral Antenna | 433.92MHz             | PCTEL, Inc                           | 1.0                 |

## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range<br>(MHz)                                  | Electric Field<br>Strength (V/m) | Magnetic Field<br>Strength (A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Average Time<br>(Minutes) |
|-----------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------------|---------------------------|
| (A) Limits for Occupational/ Control Exposures            |                                  |                                  |                                        |                           |
| 300-1500                                                  | --                               | --                               | f/300                                  | 6                         |
| 1500-100,000                                              | --                               | --                               | 5                                      | 6                         |
| (B) Limits for General Population/ Uncontrolled Exposures |                                  |                                  |                                        |                           |
| 300-1500                                                  | --                               | --                               | f/1500                                 | 6                         |
| 1500-100,000                                              | --                               | --                               | 1                                      | 30                        |

**Formula as follows:**

f= Frequency in MHz

Calculation Formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in  $mW/cm^2$

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$r$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE,  $1mW/cm^2$ . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

## 2.2. Test Result of RF Exposure Evaluation

|           |                        |
|-----------|------------------------|
| Product   | Network Alarm System   |
| Test Item | RF Exposure Evaluation |

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0dBi for Wi-Fi band and 2.0dBi for GSM band in logarithm scale.

### For 2.4GHz Band:

| Test Mode    | Frequency Band (MHz) | Maximum Average Output Power (dBm) | Power Density at r = 20 cm (mW/cm <sup>2</sup> ) | FCC Limit (mW/cm <sup>2</sup> ) |
|--------------|----------------------|------------------------------------|--------------------------------------------------|---------------------------------|
| 802.11b      | 2412 ~ 2462          | 20.00                              | 0.0315                                           | 1                               |
| 802.11g      | 2412 ~ 2462          | 16.50                              | 0.0141                                           | 1                               |
| 802.11n-HT20 | 2412 ~ 2462          | 16.00                              | 0.0126                                           | 1                               |
| 802.11n-HT40 | 2422 ~ 2452          | 15.50                              | 0.0112                                           | 1                               |

### For 2G Band:

| Test Mode | Frequency Band (MHz) | Maximum Output Power to Antenna (dBm) | Duty Cycle Factor (dB) | Power Density at r = 20 cm (mW/cm <sup>2</sup> ) | FCC Limit (mW/cm <sup>2</sup> ) |
|-----------|----------------------|---------------------------------------|------------------------|--------------------------------------------------|---------------------------------|
| GPRS 850  | 824 ~ 849            | 33.00                                 | -6                     | 0.1580                                           | 0.549                           |
| GPRS 1900 | 1850 ~ 1910          | 30.00                                 | -6                     | 0.0792                                           | 1                               |

**CONCULISON:**

Both of the WLAN and 2G can transmit simultaneously. Therefore, the Max Power Density at r (20 cm) =  $0.0315\text{mW/cm}^2 + 0.1580\text{mW/cm}^2 = 0.1895\text{ mW/cm}^2 < 0.549\text{mW/cm}^2$ .

So the EUT complies with the FCC requirement.

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The End

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