



**ETS Dr.GenZ Taiwan PS Co., Ltd.**

**FCC Registration No.: 930600**

**Accredited Testing Laboratory**



**A2LA Cert.No.: 2300.01**

**PTCRB Accredited Type Certification Test House**

# **TEST - REPORT**

**FCC RULES PART 15 / SUBPART C**

**FCC ID:TMZ620**

**Test report no.:**

**W6M20509-6156-C-1**

# **FCC**

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**1 General Information****1.1 Notes**

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has Passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

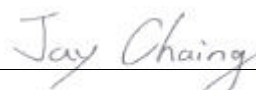
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**Tester:**

28. 09.2005

Jay Chaing



Date

ETS-Lab.

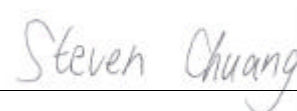
Name

Signature

**Technical responsibility for area of testing:**

28. 09.2005

Steven Chuang



Date

ETS

Name

Signature

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## **1.2 Testing laboratory**

### **1.2.1 Location**

OATS

No.5-1, Shuang Sing Village,  
LiShuei Rd., Wanli Township,  
Taipei County 207, Taiwan (R.O.C.)

Company

ETS DR. GENZ TAIWAN PS CO., LTD.

6F, NO. 58, LANE 188, RUEY-KUANG RD.

NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

### **1.2.2 Details of accreditation status**

#### **Accredited testing laboratory**

**A2LA-registration number: 2300.01**

**FCC filed test laboratory Reg. No. 930600**

**Industry Canada filed test laboratory Reg. No. IC 5679**

#### **PTCRB Accredited Type Certification Test House**

Test location, where different from ETS:

Name: ./.

Street: ./.

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.

## **1.3 Details of approval holder**

Name : Pongee Industries Co.,Ltd.

Street : 5F., NO.738, CHUNG-CHENG ROAD

Town : CHUNG-HO CITY, TAIPEI HSIEN

Country : TAIWAN, R.O.C.

Telephone : +886-2-82280198

Fax : +886-2-82280191

Contact : Mr. George Chang

Telephone : +886-2-82280198

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## 1.4 Application details

Date of receipt of application : 02.09.2005  
Date of receipt of test item : 08.09.2005  
Date of test : 08.09.2005 – 08.09.2005

## 1.5 Test item

Description of test item : Long Range Auto Identification Card  
Type identification : PFH-620  
Brand name : Pegasus  
Serial number : Test sample without serial number  
Transmitting frequency : 433.9 MHz  
Operation mode : duplex  
Transmitting mode : K1D  
Voltage supply  
    Transmitter : 6 V DC ( Battery )  
    Receiver : 6 VDC ( Battery )

(If the device is using battery, please check if the device is tested under fresh battery condition.)

Highest clock frequency : 433.9 MHz  
Antenna type : loop Antenna  
Photos : see Annex

### Manufacturer: (if applicable)

Name : ./.  
Street : ./.  
Town : ./.  
Country : ./.

Additional information : ./.

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## **1.6 Test standards**

Technical standard : FCC RULES PART 15 / SUBPART B § 15.109/ SUBPART C  
§ 15.203, § 15.209, § 15.231 (a)

## **2 Technical test**

### **2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



**or**

The deviations as specified in 2.5 were ascertained in the course of the tests performed.



### **2.2 Test environment**

Temperature : 23 °C

Relative humidity content : 20 ... 75 %

Air pressure : 86 ... 103 kPa

Details of power supply : Transmitter : 6 V DC ( Battery )

Receiver : 6 V DC ( Battery )

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## 2.3 Test equipment utilized

| No.          | Test equipment                                  | Type                | Serial No.            | Manufacturer                  | Next Cal. Date |
|--------------|-------------------------------------------------|---------------------|-----------------------|-------------------------------|----------------|
| ETSTW-CE 001 | EMI TEST RECEIVER                               | ESHS10              | 842121/013            | R&S                           | 2005/11/8      |
| ETSTW-CE 002 | PREREULATOR MODE DC POWER SUPPLY                |                     |                       |                               |                |
| ETSTW-CE 003 | AC POWER SOURCE                                 | APS-9102            | D161137               | GW                            |                |
| ETSTW-CE 004 | ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK | ESH3-Z5             | 840731/011            | R&S                           | 2006/11/8      |
| ETSTW-CE 005 | Line-Impedance Stabilisation Network            | NNBM 8126D          | 137                   | Schwarzbeck                   | 2006/11/3      |
| ETSTW-CE 006 | IMPULS-BEGRENZER PULSE LIMITER                  | ESH3-Z2             | 100226                | R&S                           | 2006/11/10     |
| ETSTW-CE 007 | SPECTRUM ANALYZER 5GHz                          | FSB                 | 849670/001            | R&S                           |                |
| ETSTW-CE 008 | ABSORBING CLAMP                                 | MDS 21              | 3469                  | ABSORPTIONS-MESSWANDLER-ZANGE | 2006/11/4      |
| ETSTW-CE 009 | TEMP.&HUMIDITY CHAMBER                          | GTH-225-40-1P-U     | MAA0305-009           | GIANT FORCE                   | 2005/5/10      |
| ETSTW-CE 010 | Comb Generator-conducted                        |                     |                       | ETS                           |                |
| ETSTW-CE 011 | Power Line Conducted Emission Only              |                     |                       | ETS                           |                |
| ETSTW-CE 012 | Dual-Phase-V-Network                            | NNB-2/16Z           | 03/10201              | Telemeter                     | 2006/4/11      |
| ETSTW-CS 001 | SIGNAL GENERATOR                                | SMX                 | 849254/003            | R&S                           | 2005/10/31     |
| ETSTW-CS 002 | COUPLING AND DECOUPLING NETWORK                 | CDN S751            | 19263                 | SCHAFFNER                     | 2006/11/3      |
| ETSTW-CS 003 | COUPLING AND DECOUPLING NETWORK                 | CDN T400            | 19820                 | SCHAFFNER                     | 2006/11/3      |
| ETSTW-CS 004 | COUPLING AND DECOUPLING NETWORK                 | CDN M016            | 20053                 | SCHAFFNER                     | 2006/11/3      |
| ETSTW-CS 005 | RF Power Amplifier                              | 100A250A            | 306547                | AR                            | 2005/11/3      |
| ETSTW-CS 006 | Terminal 500 Load                               | 50T-116 M           |                       | JFW                           |                |
| ETSTW-CS 007 | Terminal 500 Load                               | 50T-116 F           |                       | JFW                           |                |
| ETSTW-CS 008 | 6 dB Attenuator                                 | HFP-5100-3/06 N M/F | 2010876106            |                               |                |
| ETSTW-RE 001 | Controller                                      | CD 1000             | C01000/154/867 /004/L | Heinrich Deisel               |                |
| ETSTW-RE 002 | Function Generator                              | 33220A              | MY43004982            | Agilent                       | 2005/11/3      |
| ETSTW-RE 003 | EMI TEST RECEIVER                               | ESI                 | 831438/001            | R&S                           | 2005/11/16     |
| ETSTW-RE 004 | EMI TEST RECEIVER                               | ESI                 | 831459/012            | R&S                           | 2005/11/9      |
| ETSTW-RE 005 | EMI TEST RECEIVER                               | ESVS10              | 843207/020            | R&S                           | 2005/11/1      |
| ETSTW-RE 008 | Controller                                      | HD100               | C0100-L/047/6670703/L | Heinrich Deisel               |                |
| ETSTW-RE 009 | Controller                                      | HD100               | 100/341               | Heinrich Deisel               |                |
| ETSTW-RE 010 | PROGRAMMABLE LINEAR POWER SUPPLY                | LPS-305             | 30503070181           | MOTECH                        |                |
| ETSTW-RE 011 | PROGRAMMABLE LINEAR POWER SUPPLY                | LPS-305             | 30503070165           | MOTECH                        |                |
| ETSTW-RE 012 | TUNABLE BANDREJECT FILTER                       | D.C 0309            | 146                   | K&L                           |                |
| ETSTW-RE 013 | TUNABLE BANDREJECT FILTER                       | D.C 0036            | 397                   | K&L                           |                |
| ETSTW-RE 014 | DUAL TRACKING WITH 5V FIXED                     | GPC-3030D           |                       | GW                            |                |
| ETSTW-RE 015 | ANTENNA                                         | HK116               | 841489/003            | R&S                           |                |
| ETSTW-RE 016 | ANTENNA                                         | HL223               | 848953/006            | R&S                           |                |
| ETSTW-RE 017 | ANTENNA                                         | HL025               | 352886/001            | R&S                           |                |

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|               |                                          |                     |                |             |            |
|---------------|------------------------------------------|---------------------|----------------|-------------|------------|
| ETSTW-RE 018  | ANTENNA                                  | AT4560              | 27212          | AR          | 2006/11/7  |
| ETSTW-RE 019  | ANTENNA , HORN                           | 22240-25            | 121074         | FM          |            |
| ETSTW-RE 020  | MICROWAVE HORN ANTENNA                   | AT4002A             | 306915         | AR          |            |
| ETSTW-RE 021  | SWEEP GENERATOR                          | SWM05               | 835130/010     | R&S         | 2005/11/10 |
| ETSTW-RE 022  | AMPLIFIER                                | 8447D               | 2944A09837     | Agilent     | 2005/11/1  |
| ETSTW-RE 023  | Shielded room                            | SR 1                |                | Frankonia   |            |
| ETSTW-RE 024  | Anechoic Chamber                         | CHC 1               |                | Frankonia   |            |
| ETSTW-RE 025  | Anechoic Chamber                         | CHC 2               |                | Frankonia   |            |
| ETSTW-RE 026  | Open Area Test Site                      | 10m                 |                | ETS         |            |
| ETSTW-RE 027  | Passive Loop Antenna                     | 6512                | 34563          | EMCO        | 2006/6/29  |
| ETSTW-RE 028  | Log-Periodic DipoleArray Antenna         | 3148                | 34429          | EMCO        | 2006/6/14  |
| ETSTW-RE 029  | Biconical Antenna                        | 3109                | 33524          | EMCO        | 2006/6/16  |
| ETSTW-RE 030  | Double-Ridged Waveguide Horn Antenna     | 3117                | 35224          | EMCO        | 2006/5/4   |
| ETSTW-RE 031  | Comb Generator-radiated                  |                     |                | ETS         |            |
| ETSTW-RE 032  | Millivoltmeter                           | URV 55              | 849086/013     | R&S         | 2005/11/17 |
| ETSTW-RE 033  | 4CH 1GHz 5GS/s DSO                       | WAVERUNNER<br>6100A | LCRY0604P14508 | LeCory      |            |
| ETSTW-RE 034  | Power Sensor                             | URV5-Z4             | 839313/006     | R&S         | 2005/11/17 |
| ETSTW-RE 035  | 1.5GHz Active Voltage Probe              | HFP1500             | 2332           | LeCory      |            |
| ETSTW-RE 036  | 100MHz High Voltage Diff Probe           | ADP305              | 3305           | LeCory      |            |
| ETSTW-RE 037  | Log-Periodic DipoleArray Antenna         | 3148                | 00034546       | EMCO        | 2006/11/17 |
| ETSTW-RE 038  | Log-Periodic DipoleArray Antenna         | 3148                | 00034547       | EMCO        | 2006/11/17 |
| ETSTW-RE 039  | Biconical Antenna                        | 3110B               | 41760          | EMCO        | 2006/11/17 |
| ETSTW-RE 040  | Biconical Antenna                        | 3110B               | 41761          | EMCO        | 2006/11/17 |
| ETSTW-RE 041  | Anechoic Chamber                         | CHC 3               |                | Frankonia   |            |
| ETSTW-RE 042  | ANTENNA                                  | HK116               | 100172         | R&S         | 2007/1/13  |
| ETSTW-RE 043  | ANTENNA                                  | HL223               | 100166         | R&S         | 2006/4/15  |
| ETSTW-RE 044  | ANTENNA                                  | HL050               | 100094         | R&S         |            |
| ETSTW-RE 048  | Triple Loop Antenna                      | HXYZ 9170           | HXYZ 9170-134  | Schwarzbeck | 2006/3/21  |
| ETSTW-RE 049  | TRILOG Super Broadband test Antenna      | VULB 9160           | 9160-3185      | Schwarzbeck | 2007/5/18  |
| ETSTW-EMI 001 | HARMONICS 1000                           | HAR1000-1P          | 93             | EMC-PARTNER | 2005/11/17 |
| ETSTW-EMS 001 | Clamp BASELSTRASSE 160 CH-4242<br>LAUFEN | CN-EFT1000          | 354            | EMC-PARTNER | 2005/11/1  |
| ETSTW-EMS 002 | Frequency Converter                      | YF-6020             | 0308014        |             |            |
| ETSTW-EMS 003 | EMC Immunity Test System                 | TRA2000IN6          | 579            | EMC-PARTNER | 2005/11/1  |
| ETSTW-EMS 004 | ESD generator minizap                    | ESD2000             | 016            | EMC-PARTNER | 2005/11/1  |
| ETSTW-EMS 005 | Attenaur (500)                           | VERI50              | 051            | EMC-PARTNER | 2006/8/30  |
| ETSTW-EMS 006 | Attenaur (1 KO)                          | VERI1K              | 019            | EMC-PARTNER | 2006/10/20 |
| ETSTW-EMS 007 | 20GO Divider                             | ESD-VERI-V          | 021            | EMC-PARTNER | 2006/3/16  |
| ETSTW-RS 001  | 14" COLOR VIDEO MONITOR                  | TP-1480HR           | P009799        | TOPICA      |            |
| ETSTW-RS 002  | 14" COLOR VIDEO MONITOR                  | TP-1480HR           | P009814        | TOPICA      |            |
| ETSTW-RS 003  | RF Power Amplifier                       | 30S1G3              | 306933         | AR          |            |
| ETSTW-RS 004  | RF Power Amplifier                       | 150W1000            | 307009         | AR          | 2005/11/18 |



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|               |                                      |                                              |             |                |            |
|---------------|--------------------------------------|----------------------------------------------|-------------|----------------|------------|
| ETSTW-RS 005  | Electric Field Probe Type 8.3        | EMR-20                                       | BN 2244/20  | GW             | 2005/9/3   |
| ETSTW-RS 006  | SIGNAL GENERATOR                     | SML03                                        | 101551      | R&S            | 2005/11/15 |
| ETSTW-RS 007  | AUDIO ANALYZER                       | UPA3                                         | 843458/029  | R&S            | 2005/11/15 |
| ETSTW-EMS 008 | Safety Test Solutions                | ELT-400                                      | E-0039      | Narda          | 2006/1/3   |
| ETSTW-EMS 009 | Magnetic Field Antenna               | MF1000-1                                     | 104         | EMC-PARTNER    | 2006/12/2  |
| ETSTW-GSM 01  | SIM Simulator                        | IT3                                          | B2004-50106 | ORGA           |            |
| ETSTW-GSM 02  | Universal Radio Communication Tester | CMU 200                                      | 103489      | R&S            |            |
| ETSTW-GSM 03  | Agilent 8960 Test Set 1              | E5515C                                       | GB44052675  | Agilent        | 2006/7/13  |
| ETSTW-GSM 04  | Agilent 8960 Test Set 2              | E5515C                                       | GB44052665  | Agilent        | 2006/7/13  |
| ETSTW-GSM 05  | Agilent 8960 Test Set 3              | E5515C                                       | GB44052652  | Agilent        | 2006/7/16  |
| ETSTW-GSM 06  | Agilent 8960 Test Set 4              | E5515C                                       | GB44052684  | Agilent        | 2006/7/15  |
| ETSTW-GSM 07  | Agilent 8960 Test Set 5              | E5515C                                       | GB44052658  | Agilent        | 2006/7/13  |
| ETSTW-GSM 08  | Agilent 8960 Test Set 6              | E5515C                                       | GB44052666  | Agilent        | 2006/7/15  |
| ETSTW-GSM 09  | Controler PC                         | Dell GX 270                                  | 700F61J     | Dell           |            |
| ETSTW-GSM 10  | Combiner Wessex / Anite              | B4605/100                                    | 053         | Wessex / Anite | 2006/7/13  |
| ETSTW-GSM 11  | GSM 850,900,1800,1900 Test system    | TS8950G                                      |             | R&S            | 2005/10/31 |
| ETSTW-GSM 12  | Acoustical Calibrator                | 4231                                         | 2463874     | Brüel&Kjær     | 2005/11/17 |
| ETSTW-GSM 13  | Conditioning Amplifier               | 2690--0S2                                    | 2437856     | Brüel&Kjær     |            |
| ETSTW-GSM 14  | Telephone Test Head                  | 4602B                                        | 2465324     | Brüel&Kjær     |            |
| ETSTW-GSM 15  | Mouth Simulator                      | 4227                                         | 2462516     | Brüel&Kjær     |            |
| ETSTW-GSM 16  | TEMP.&HUMIDITY CHAMBER               | GTH-120-40-1P-U                              | MAA0501002  | GIANT FORCE    | 2005/12/29 |
| ETSTW-GSM 17  | ANTENNT COPLER                       | CMU-Z10                                      | 100988      | R&S            |            |
| ETSTW-GSM 18  | AUDIO ANALYZER                       | UPL16                                        | 100173      | R&S            | 2005/9/23  |
| ETSTW-GSM 19  | Band Reject Filter                   | WRCTF824/<br>849-822/851-40<br>/12+9SS       | 3           | WI             |            |
| ETSTW-GSM 20  | Band Reject Filter                   | WRCD1747/1748-<br>1743/1752-32/5SS           | 1           | WI             |            |
| ETSTW-GSM 21  | Band Reject Filter                   | WRCD1879.5/ 1880.5-<br>1875.5/ 1884.5-32/5SS | 3           | WI             |            |
| ETSTW-GSM 22  | Band Reject Filter                   | WRCT901.9/903.1 -<br>904.25-50/8SS           | 1           | WI             |            |

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## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 $\mu$ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was the 100 kHz and the video bandwidth was 300 kHz. The ambient temperature of the UUT was 23°C with a humidity of 40 %.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

|            |                                                            |
|------------|------------------------------------------------------------|
| Freq (MHz) | METER READING + ACF + CABLE LOSS (to the receiver) = FS    |
| 33         | 20 dB $\mu$ V + 10.36 dB/m + 6 dB = 36.36 dB $\mu$ V/m @3m |

**ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES:** The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by ETS Dr. Genz Taiwan PS Co., Ltd. at the registered open field test site located at. The Registration Number: **930600**

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

**ANTENNA & GROUND:**

This unit uses loop antenna. (see photo).

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### 3 Test results (enclosure)

☒ 1st test

☐ test after modification

☐ production test

| TEST CASE                                    | Para. Number  | Required                            | Test passed                         | Test failed              |
|----------------------------------------------|---------------|-------------------------------------|-------------------------------------|--------------------------|
| Transmission Requirements                    | FCC 15.231(a) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emission                            | FCC 15.231(b) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Bandwidth of Emission                        | FCC 15.231(c) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Frequency Tolerance                          | FCC 15.231(d) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Period Alternate Field Strength Requirements | FCC 15.231(e) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Antenna Requirement                          | FCC 15.203    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Radiated Emission from Receiver              | FCC 15.109    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emission from Digital Part          | FCC 15.109    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| Conducted Measurement at (AC) Power Line     | FCC 15.207    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |

The follows is intended to leave blank.

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### **3.1 Transmission Requirements**

FCC 15.231(a)

#### **3.1.1 Limit of Transmission Time**

According to 15.231(a)(2), a transmitter activated automatically shall cease transmission within 5 seconds after activation.

#### **3.1.2 Active Time**

This transmitter is operated by automatic activation and active will cease transmission in 2.3 second after activation.

Remark: See attached appendix A

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**3.2 Output Power (Field Strength)**

| Test condition                         |                          | Transmitter field strength (dB $\mu$ V/m) |
|----------------------------------------|--------------------------|-------------------------------------------|
| $T_{nom} = 23\text{ }^{\circ}\text{C}$ | $V_{nom} = 6\text{V DC}$ | 55.05                                     |
| Measurement uncertainty                |                          | < 3 dB                                    |

Limit 15.231(b)

| Fundamental Frequency (MHz) | Field strength of fundamental, limit $\mu\text{V/m}$                           |
|-----------------------------|--------------------------------------------------------------------------------|
| 40.66 – 40.70               | 2,250                                                                          |
| 70 – 130                    | 1,250                                                                          |
| 130 – 174                   | 1,250 to 3,750                                                                 |
| 174 – 260                   | 3,750                                                                          |
| 260 – 470                   | 3,750 to 12,500**<br>(433.92 MHz: 80.8 dB $\mu$ V/m = 10,965 $\mu\text{V/m}$ ) |
| Above 470                   | 12,500                                                                         |

\*\* linear interpolation

Remarks: see attached diagrams

Test equipment used: ETSTW-RE 003, ETSTW-RE 012, ETSTW-RE 016, ETSTW-RE 024

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### **3.3 Out of Band Radiated Emissions**

FCC Rule: 15.231(b) , 15.35

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Limits:

For frequencies below 1GHz :

Max permitted average Limits = Max. reading – 20 dB

80.80 dB $\mu$ V/m- 20 dB= 60.80 dB $\mu$ V/m

Guidance on Measurement of pulsed emission: 815.231 (b), §15.35(c)

“If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.” Here the correction was added to the limit instead subtracted from the reading.

Duty Cycle correction = 20 log (dwell time/100ms)

For frequencies above 1GHz (Peak measurements).

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)

80.80 dB $\mu$ V/m

For frequencies above 1GHz (Average measurements).

Correction factor conform 15.35 (c) (Average measurements)

Duty cycle correction :

Max. reading – 20 dB – duty cycle correction:

No duty cycle correction was added to the reading

80.80 dB $\mu$ V/m- 20 dB= 60.80 dB $\mu$ V/m

Remarks: See attached diagrams.

Test equipment used: ETSTW-RE 003, ETSTW-RE 012, ETSTW-RE 024

Registration number: W6M20509-6156-C-1  
FCC ID: TMZ620

### 3.4 Transmitter Radiated Emissions in restricted Bands

FCC Rules: 15.231 (b), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 8000 MHz.

For radiated emission tests, the analyzer setting was as followings:

RES BW VID BW

Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)

Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)

1 MHz 1 MHz (Average measurements)

Limits:

For frequencies below 1GHz :

| Frequency of Emission<br>(MHz) | Field strength<br>(microvolts/meter) | Field Strength<br>(dB microvolts/meter) |
|--------------------------------|--------------------------------------|-----------------------------------------|
| 30 – 88                        | 100                                  | 40.0                                    |
| 88 – 216                       | 150                                  | 43.5                                    |
| 216 – 960                      | 200                                  | 46.0                                    |
| Above 960                      | 500                                  | 54.0                                    |

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of pulsed emission:

“If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

For frequencies above 1GHz (Average measurements).

The correction factor, based on the channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty cycle correction =  $20 \log (\text{dwell time}/100\text{ms})$

No duty cycle correction was added to the reading

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)

Above 960 MHz

For mode DSSS CW:  $54 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 74 \text{ dB}\mu\text{V/m}$

Remarks: See attached diagrams.

Test equipment used: ETSTW-RE 003 , ETSTW-RE 012 , ETSTW-RE 015 , ETSTW-RE 016 , ETSTW-RE 017 , ETSTW-RE 024

Registration number: W6M20509-6156-C-1

FCC ID: TMZ620

### 3.5 Spurious Emission radiated, Transmitter

Spurious emission was measured with modulation (declared by manufacturer).

The limits on the field strength of the spurious emission in the table § 15.231(b) are based on the fundamental frequency of the intentional radiator. Spurious emission shall be attenuated to the average (or alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

In addition, radiated emission which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to point 2.3.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

Summary table with radiated data of the test plots

| Freq | Used Ch | Frequency Marker [MHz] | Polarization | corrections dB | Corrected Reading [dBuV/m] | Compliance Limit [dBuV/m] | Detector | BW [MHz] | Margin |
|------|---------|------------------------|--------------|----------------|----------------------------|---------------------------|----------|----------|--------|
| 1    |         | 104.609                | H            |                | 36.24                      | 43.5                      | PK       | 0.1      | 7.26   |
| 1    |         | 116.533                | H            |                | 36.18                      | 43.5                      | PK       | 0.1      | 7.32   |
| 2    |         | 620.04                 | H            |                | 31.22                      | 46                        | PK       | 0.1      | 14.78  |
| 2    |         | 903.807                | H            |                | 35.38                      | 46                        | PK       | 0.1      | 10.62  |
| 3    |         | 2436.873               | H            |                | 38.2                       | 54                        | PK       | 1        | 15.8   |
| 3    |         | 3374.749               | H            |                | 41.09                      | 54                        | PK       | 1        | 12.91  |
| 4    |         | 5659.318               | H            |                | 48.5                       | 54                        | PK       | 1        | 5.5    |
| 4    |         | 7182.364               | H            |                | 51.66                      | 54                        | PK       | 1        | 2.34   |
| 1    |         | 104.609                | V            |                | 42.62                      | 43.5                      | PK       | 0.1      | 0.88   |
| 1    |         | 116.533                | V            |                | 41.30                      | 43.5                      | PK       | 0.1      | 2.2    |
| 2    |         | 620.04                 | V            |                | 31.86                      | 46                        | PK       | 0.1      | 14.14  |
| 2    |         | 903.807                | V            |                | 35.43                      | 46                        | PK       | 0.1      | 10.57  |
| 3    |         | 1745.490               | V            |                | 52.05                      | 54                        | PK       | 1        | 1.95   |
| 3    |         | 2899.799               | V            |                | 41.89                      | 54                        | PK       | 1        | 12.11  |
| 4    |         | 6132.264               | V            |                | 48.09                      | 54                        | PK       | 1        | 5.91   |
| 4    |         | 6228.456               | V            |                | 48.18                      | 54                        | PK       | 1        | 5.82   |



Registration number: W6M20509-6156-C-1  
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**Freq. – Frequency Range:**

1: 30 - 200 MHz  
2: 200 - 1000MHz  
3: 1 - 4 GHz  
4: 4 - 8 GHz

All other not noted test plots do not contain significant test results in relation to the limits

Test results: The unit meet the FCC requirements.

Comment: See attached diagrams.

Test equipment used: ETSTW-RE 003 , ETSTW-RE 012 , ETSTW-RE 015 , ETSTW-RE 016 , ETSTW-RE 017 , ETSTW-RE 024

Registration number: W6M20509-6156-C-1

FCC ID: TMZ620

### 3.6 Channel Bandwidth

Measurement of Necessary Bandwidth (BN)

| Used frequency          | Bandwidth  | Limit      |
|-------------------------|------------|------------|
| 433.9 MHz               | 53.525 kHz | 1.0828 MHz |
| Measurement uncertainty | < 10 Hz    |            |

Remarks: The bandwidth fulfills the requirements of FCC § 15.231,  
see attached diagrams

Limits:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test equipment used: ETSTW-RE 003 , ETSTW-RE 012

Registration number: W6M20509-6156-C-1

FCC ID: TMZ620

**3.7 Spurious Emission radiated, Receiver**

FCC 15.109

| Freq | Used Ch | Frequency Marker [MHz] | Polarization | corrections dB | Corrected Reading [dBuV/m] | Compliance Limit [dBuV/m] | Detector | BW [MHz] | Margin |
|------|---------|------------------------|--------------|----------------|----------------------------|---------------------------|----------|----------|--------|
| 1    |         | 104.609                | H            |                | 34.71                      | 43.5                      | PK       | 0.1      | 8.79   |
| 1    |         | 116.873                | H            |                | 35.88                      | 43.5                      | PK       | 0.1      | 7.62   |
| 2    |         | 244.889                | H            |                | 30.1                       | 46                        | PK       | 0.1      | 15.9   |
| 2    |         | 313.827                | H            |                | 29.27                      | 46                        | PK       | 0.1      | 16.73  |
| 1    |         | 104.609                | V            |                | 40.82                      | 43.5                      | PK       | 0.1      | 2.68   |
| 1    |         | 116.873                | V            |                | 40.79                      | 43.5                      | PK       | 0.1      | 2.71   |
| 2    |         | 244.889                | V            |                | 23.75                      | 46                        | PK       | 0.1      | 22.25  |
| 2    |         | 313.827                | V            |                | 31.24                      | 46                        | PK       | 0.1      | 14.76  |

Limits:

| Frequency (MHz) | E-field field strength limit dBuV/m      |
|-----------------|------------------------------------------|
| 30 – 88         | 40.00                                    |
| 88 – 216        | 43.52                                    |
| 216 – 960       | 46.02                                    |
| Above 960       | 53.98 (73.98 dBuV/m 20 dB peak detector) |

Above 960 MHz: limit line 74 dBuV/m 20 dB peak detector

Remarks: see attached diagram.

Test equipment used: ETSTW-RE 003 , ETSTW-RE 012 , ETSTW-RE 015 , ETSTW-RE 016 , ETSTW-RE 017 , ETSTW-RE 024

Registration number: W6M20509-6156-C-1

FCC ID: TMZ620

### 3.8 Conducted Measurement at (AC) Power Line

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

| Frequency | Level        |              |
|-----------|--------------|--------------|
|           | quasi-peak   | average      |
| 150 kHz   | dB $\mu$ V/m | dB $\mu$ V/m |

#### Limits:

| Frequency of Emission (MHz) | Conducted Limit (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi Peak                   | Average  |
| 0.15-0.5                    | 66 to 56                     | 56 to 46 |
| 0.5-5                       | 56                           | 46       |
| 5-30                        | 60                           | 50       |

Test is not required the sample is using a battery.

Test equipment used: ETSTW-CE 004, ETSTW-CE 001, ETSTW-RE 023

Comment: not required

Registration number: W6M20509-6156-C-1  
FCC ID: TMZ620

## **Appendix**

- A Active Time
- B Output Power
- C Spurious Emissions radiated - Transmitter
- D Bandwidth
- E Spurious Emission radiated - Receiver
- F Pictures



Registration number: W6M20509-6156-C-1  
FCC ID: TMZ620

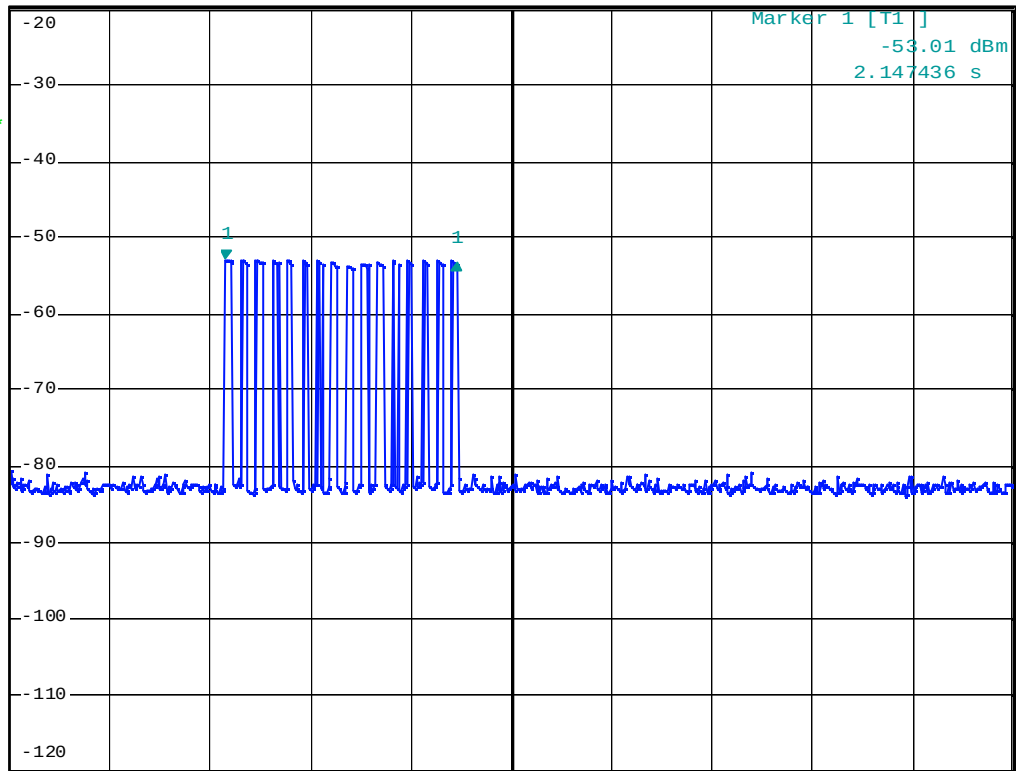
## **Appendix A**

Active Time



Ref -20 dBm Att 5 dB RBW 300 kHz Delta 1 [T1 ]  
\*VBW 300 kHz -0.77 dB  
SWT 10 s 2.307692 s

1 PK \*  
VIEW



Transmission Requirement

Date: 28.SEP.2005 12:10:18

## **Appendix B**

### Output Power

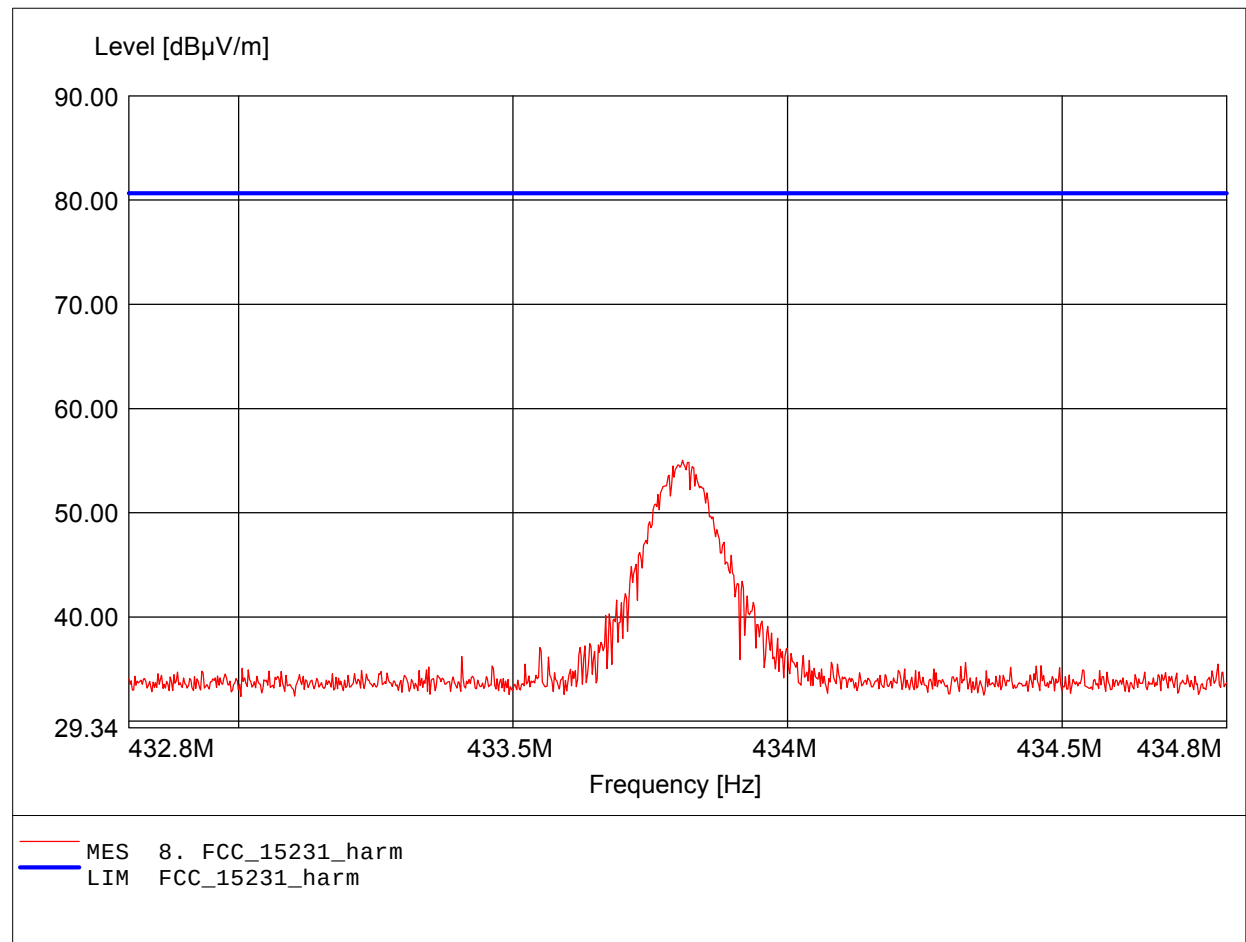
The measurement diagrams are wideband pre-scan results; only for reference



# Field Strength of Fundamental

## FCC RULES PART 15, SUBPART C

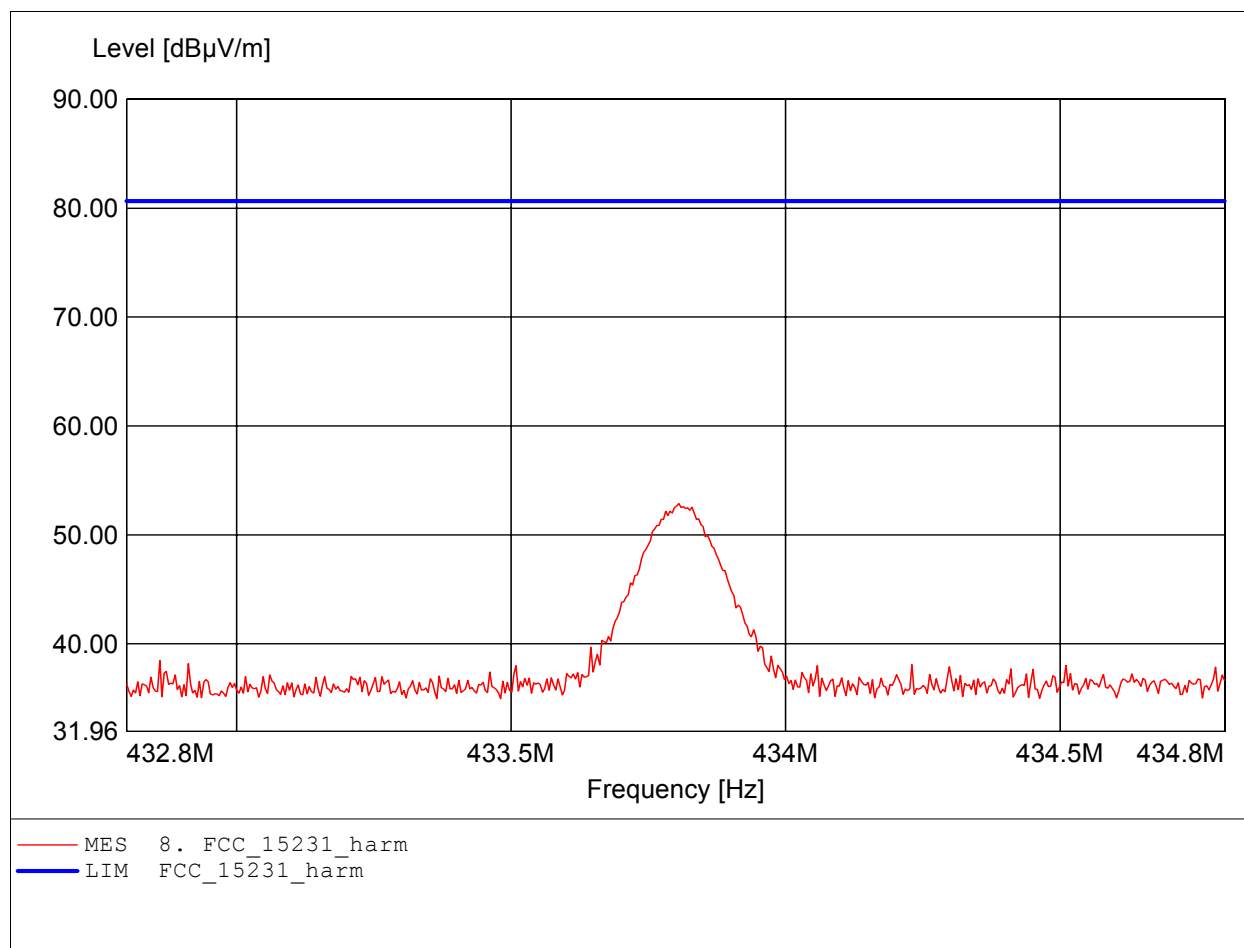
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC ( BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 2: Dist.: 3m, Ant.: HL223  
Freq: 433.809MHz, Emax: 55.05dBμV/m, RBW: 100kHz



## Field Strength of Fundamental

### FCC RULES PART 15, SUBPART C

EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Ponjee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC ( BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 2: Dist.: 3m, Ant.: HL223  
Freq: 433.806MHz, Emax: 52.88dBµV/m, RBW: 100kHz



## **Appendix C**

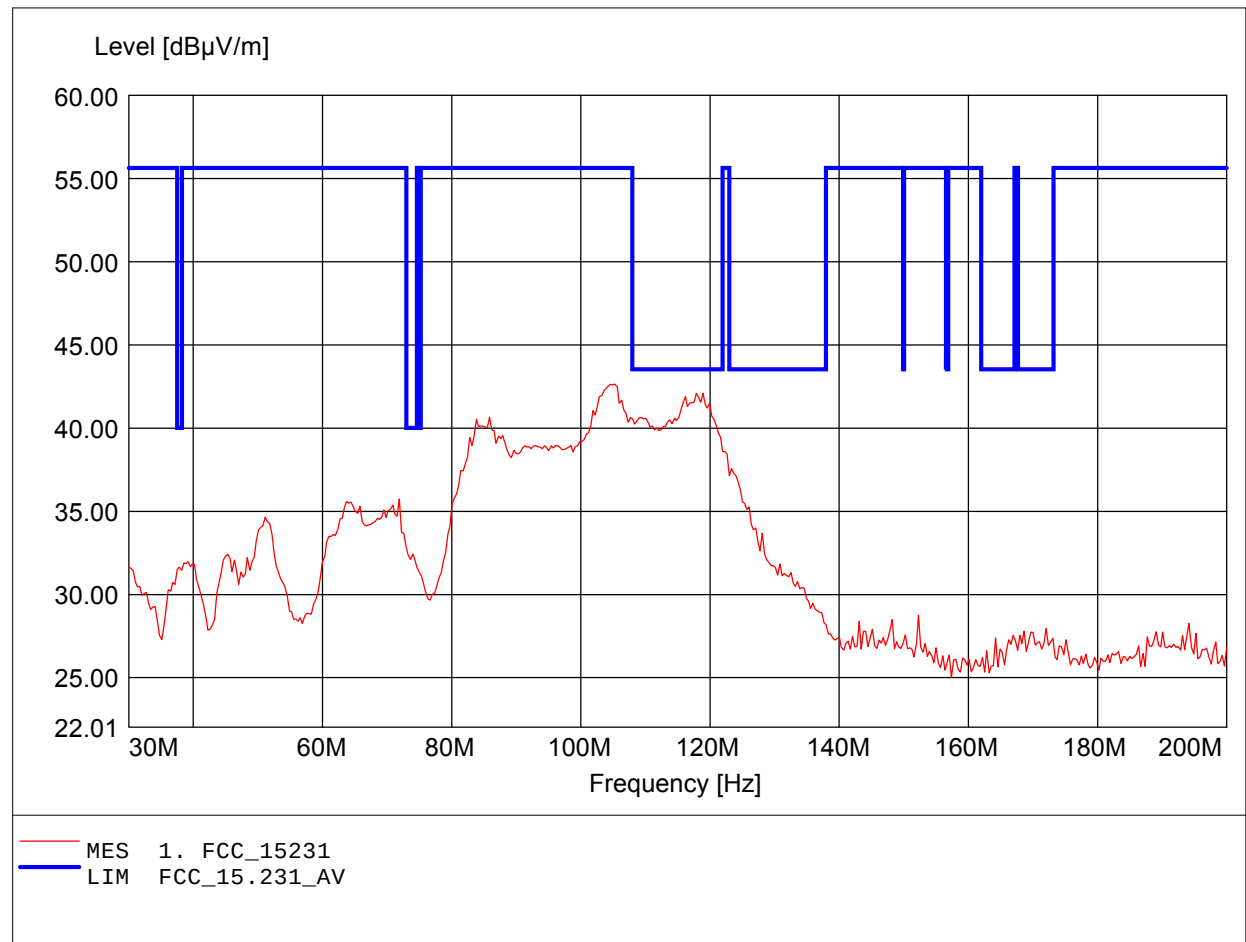
### Spurious Emissions radiated - Transmitter

(The measurement diagrams are wideband pre-scan results; only for reference)

## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

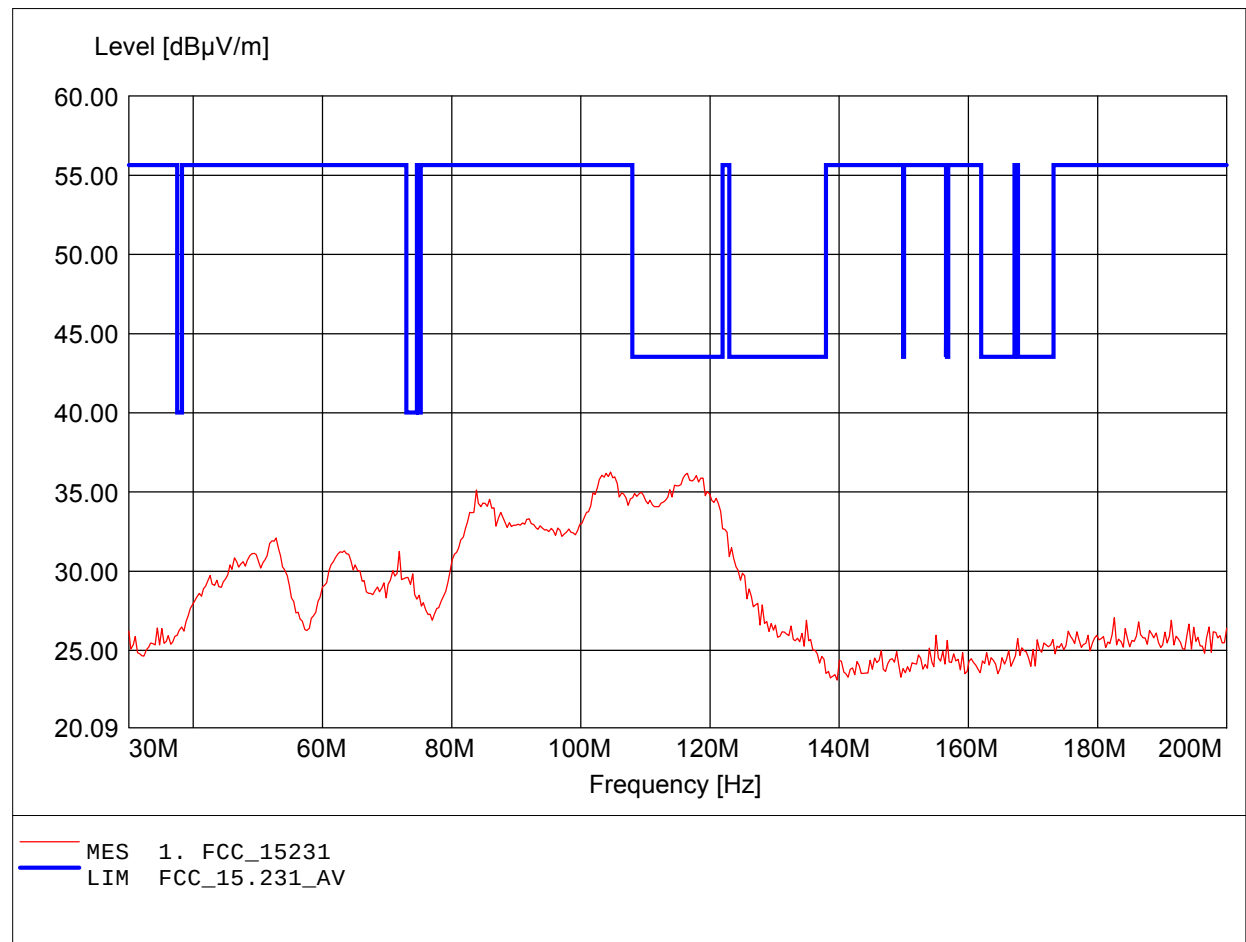
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 1: Dist.: 3m, Ant.: HK 116  
Freq: 105.291MHz, Emax: 42.65dBμV/m, RBW: 100kHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

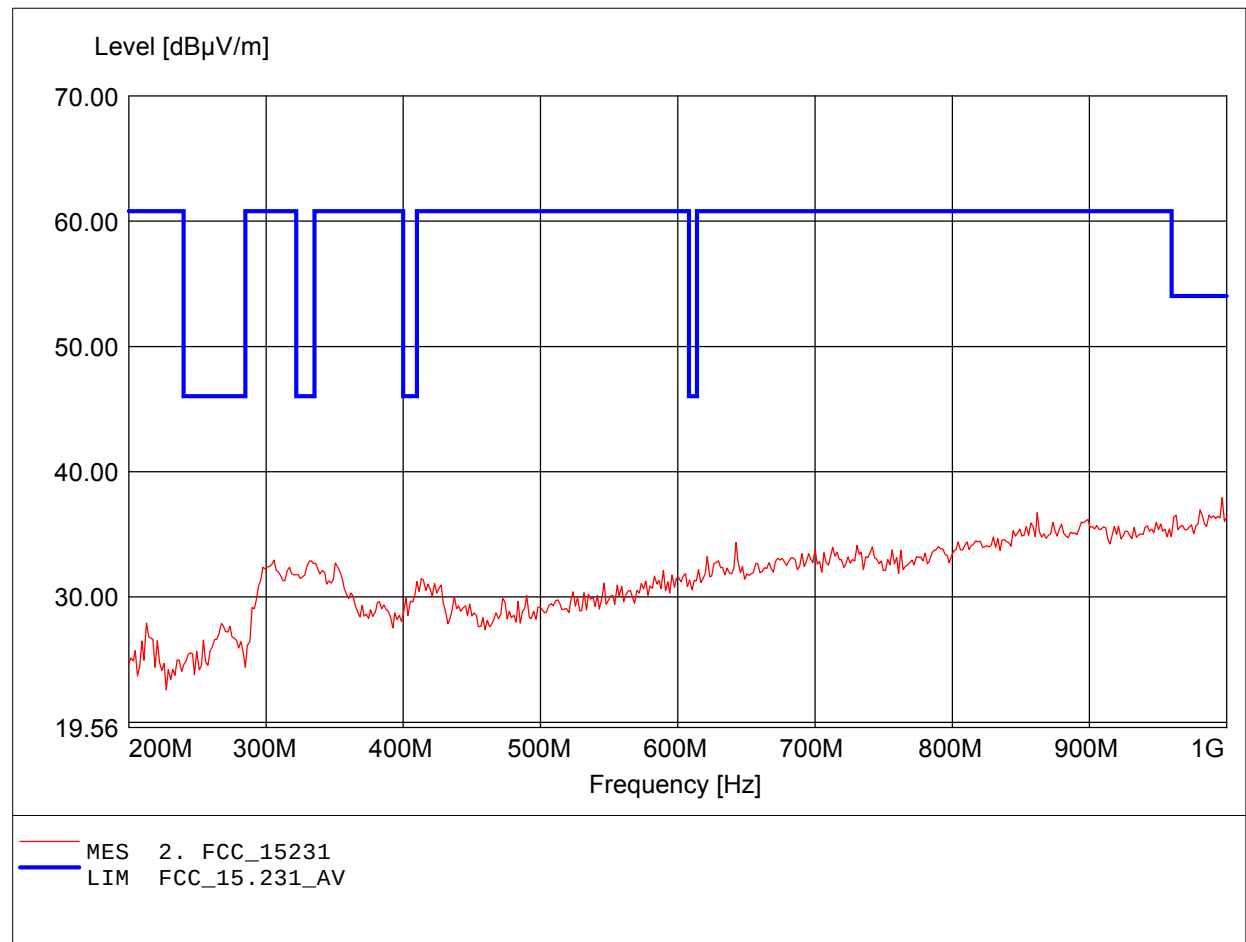
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 1: Dist.: 3m, Ant.: HK 116  
Freq: 104.609MHz, Emax: 36.24dBμV/m, RBW: 100kHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

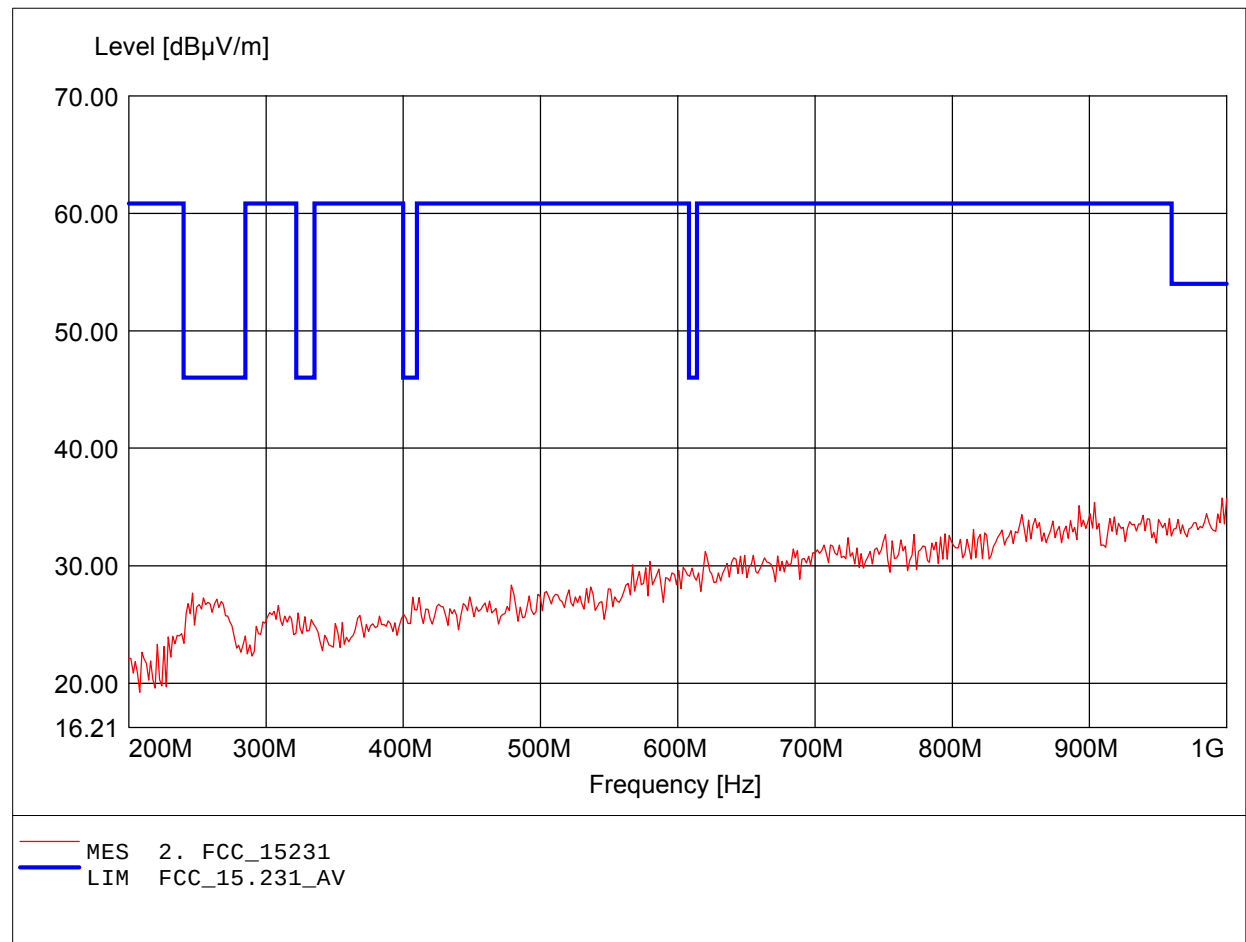
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.  
Freq: 996.794MHz, Emax: 37.92dBμV/m, RBW: 100kHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

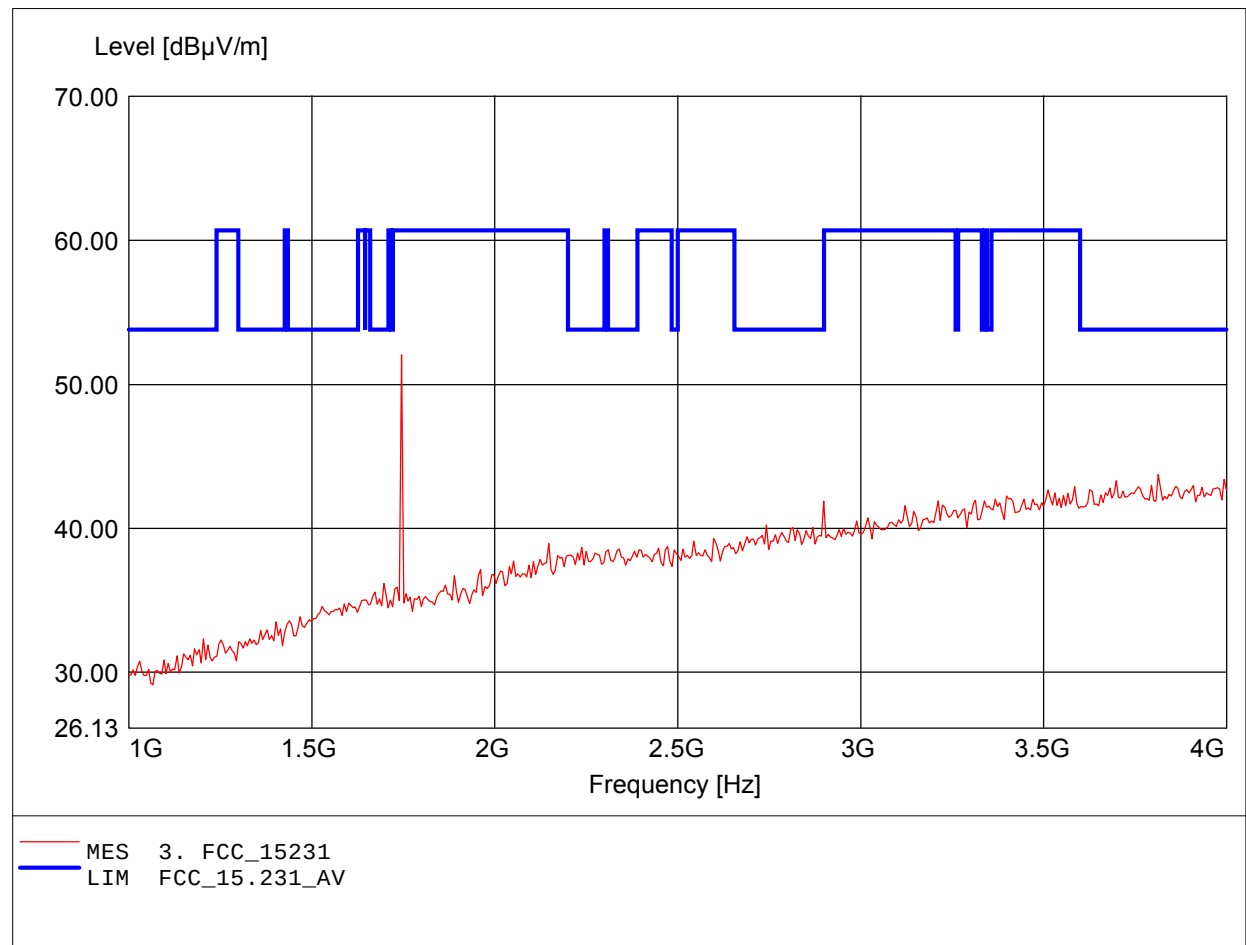
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section15.231  
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.  
Freq: 996.794MHz, Emax: 35.75dBμV/m, RBW: 100kHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section 15.231, peak detector  
Comment 1: Dist.: 3m, Ant.: HL025, amplif.  
Freq: 1.745GHz, Emax: 52.05dBμV/m, RBW: 1MHz

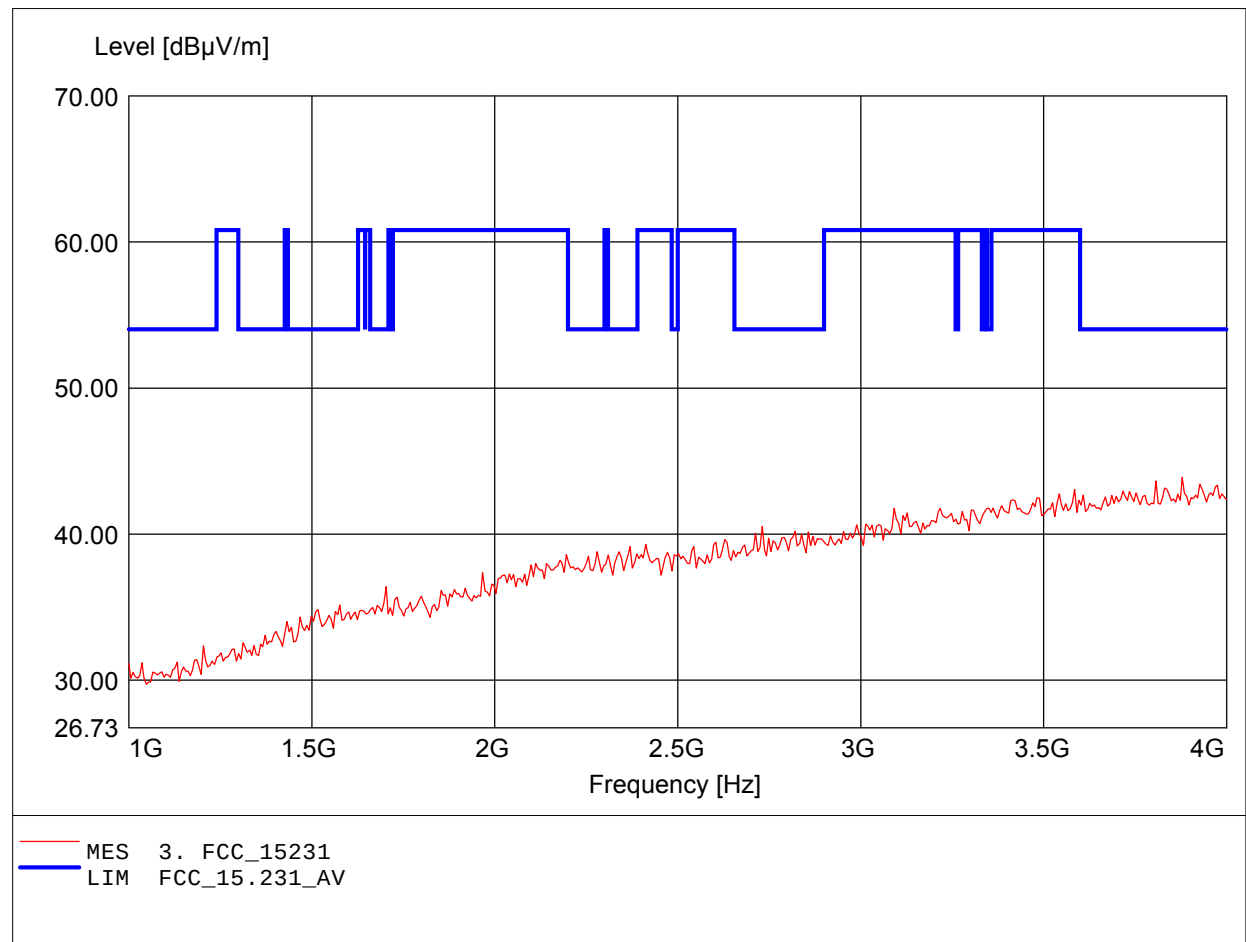




## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

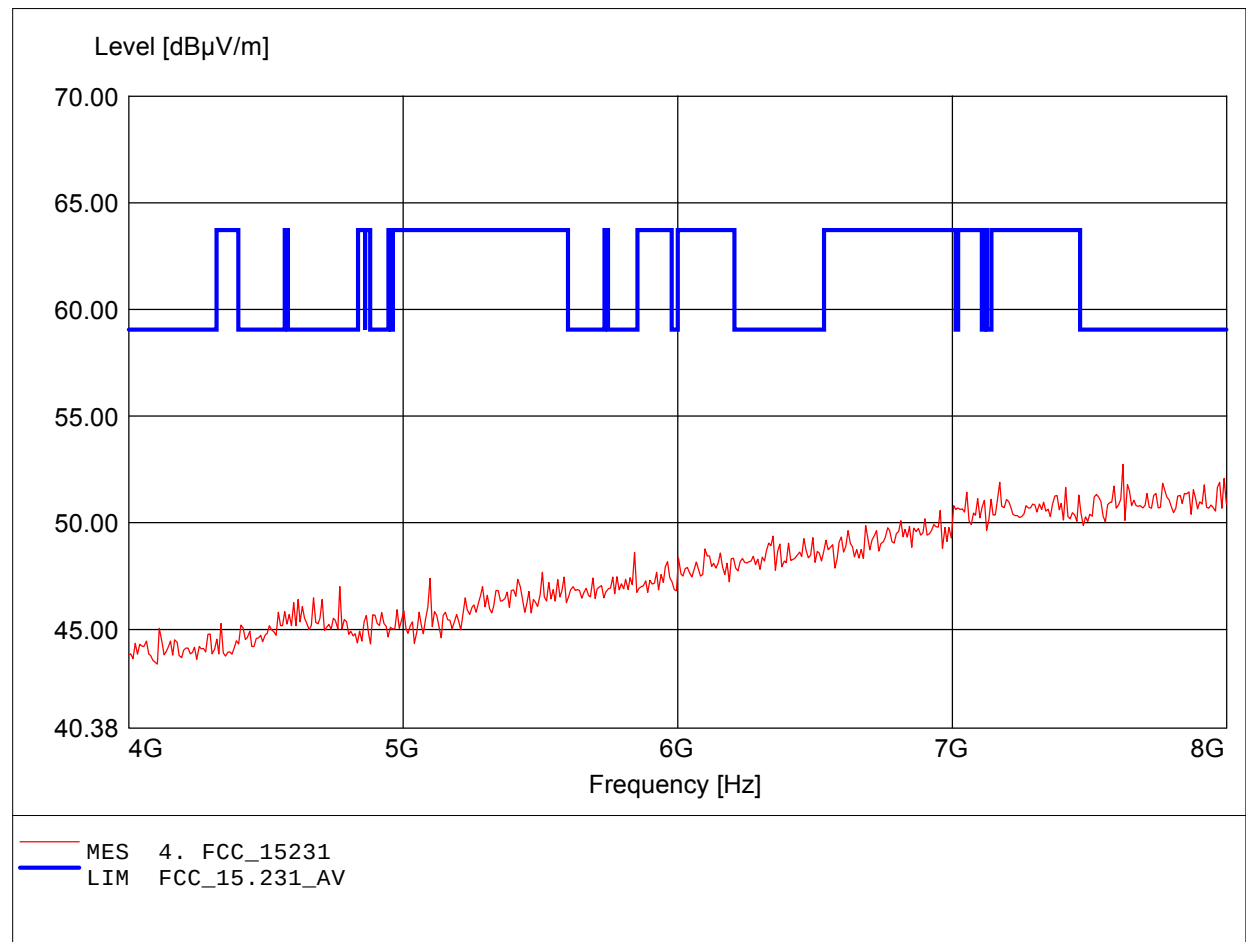
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section 15.231, peak detector  
Comment 1: Dist.: 3m, Ant.: HL025, amplif.  
Freq: 3.880GHz, Emax: 43.89dB $\mu$ V/m, RBW: 1MHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

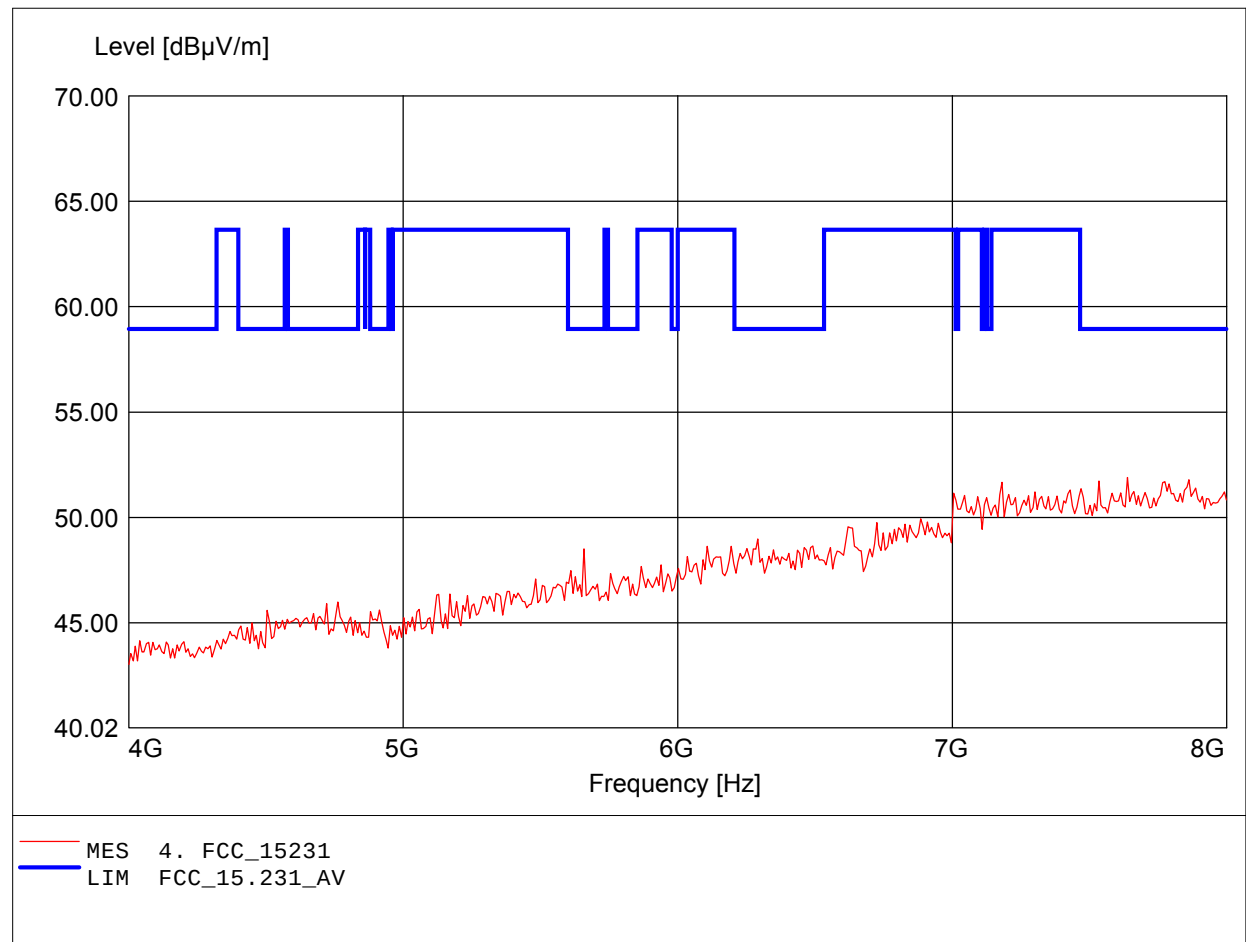
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section 15.231, peak detector  
Comment 1: Dist.: 3m, Ant.: HL025, ampl.+HP.  
Freq: 7.623GHz, Emax: 52.74dBμV/m, RBW: 1MHz



## Spurious emissions Field Strength

### FCC RULES PART 15, SUBPART C

EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to Section 15.231, peak detector  
Comment 1: Dist.: 3m, Ant.: HL025, ampl.+HP.  
Freq: 7.639GHz, Emax: 51.90dBμV/m, RBW: 1MHz

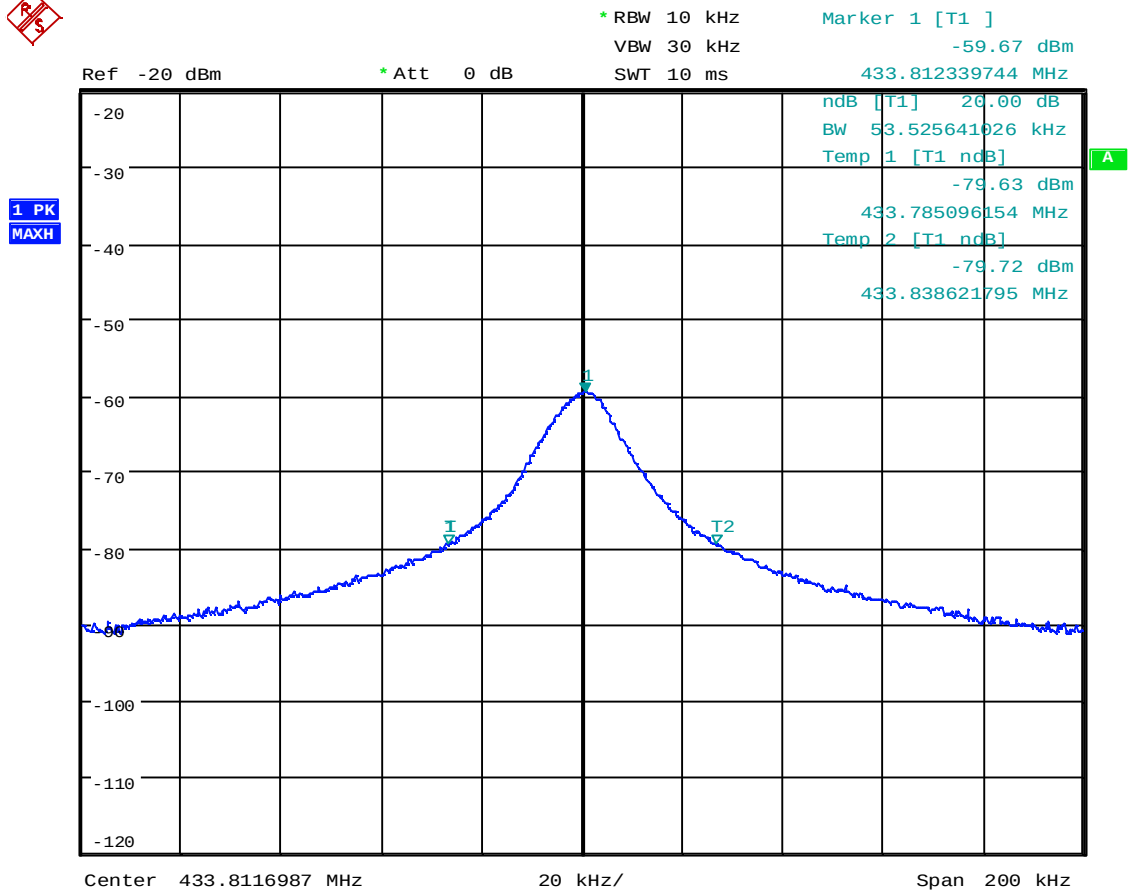




Registration number: W6M20509-6156-C-1  
FCC ID: TMZ620

## **Appendix D**

Bandwidth



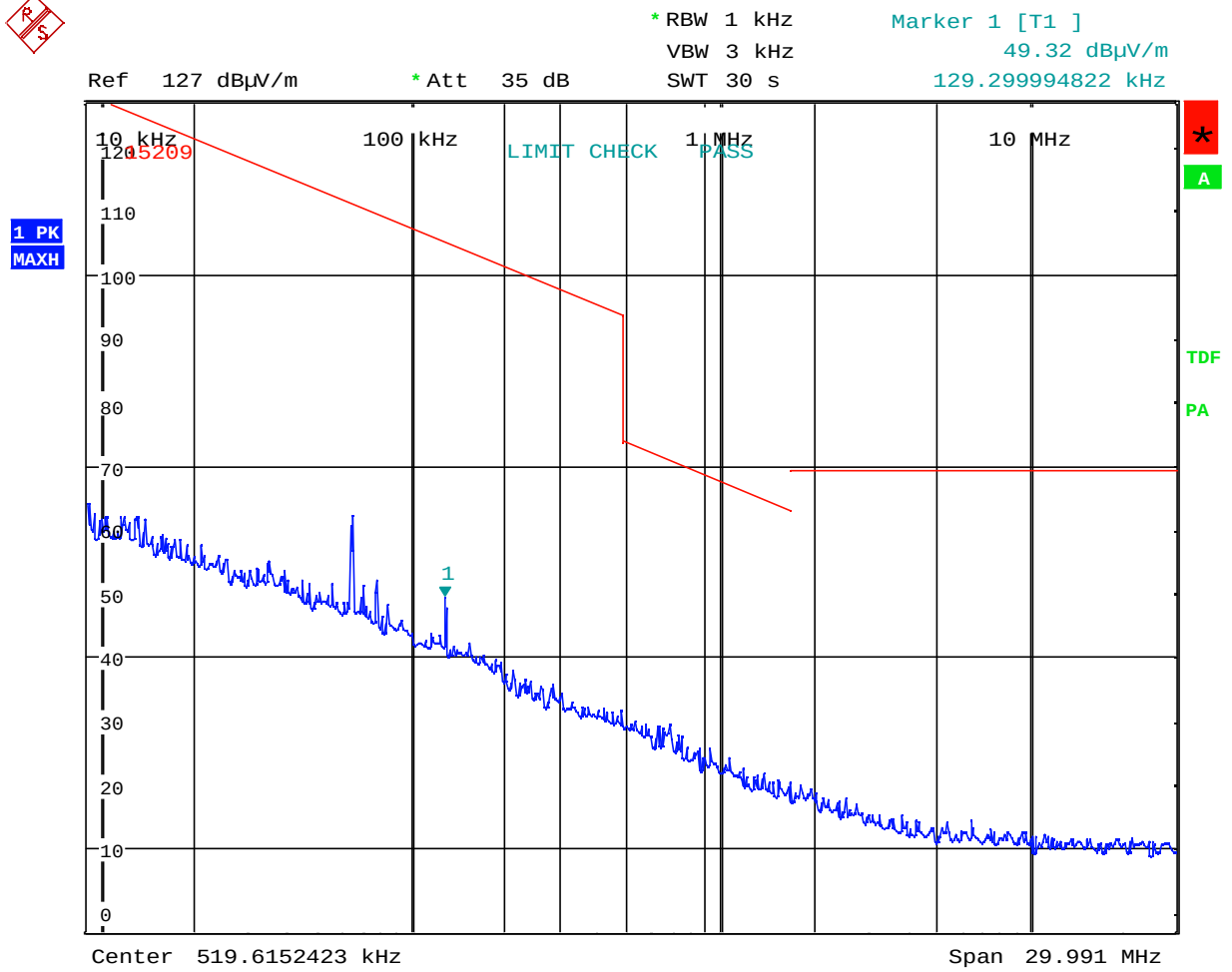
20dB Bandwidth

Date: 28.SEP.2005    11:25:18

## **Appendix E**

### Spurious Emission radiated - Receiver

(The measurement diagrams are wideband pre-scan results; only for reference)

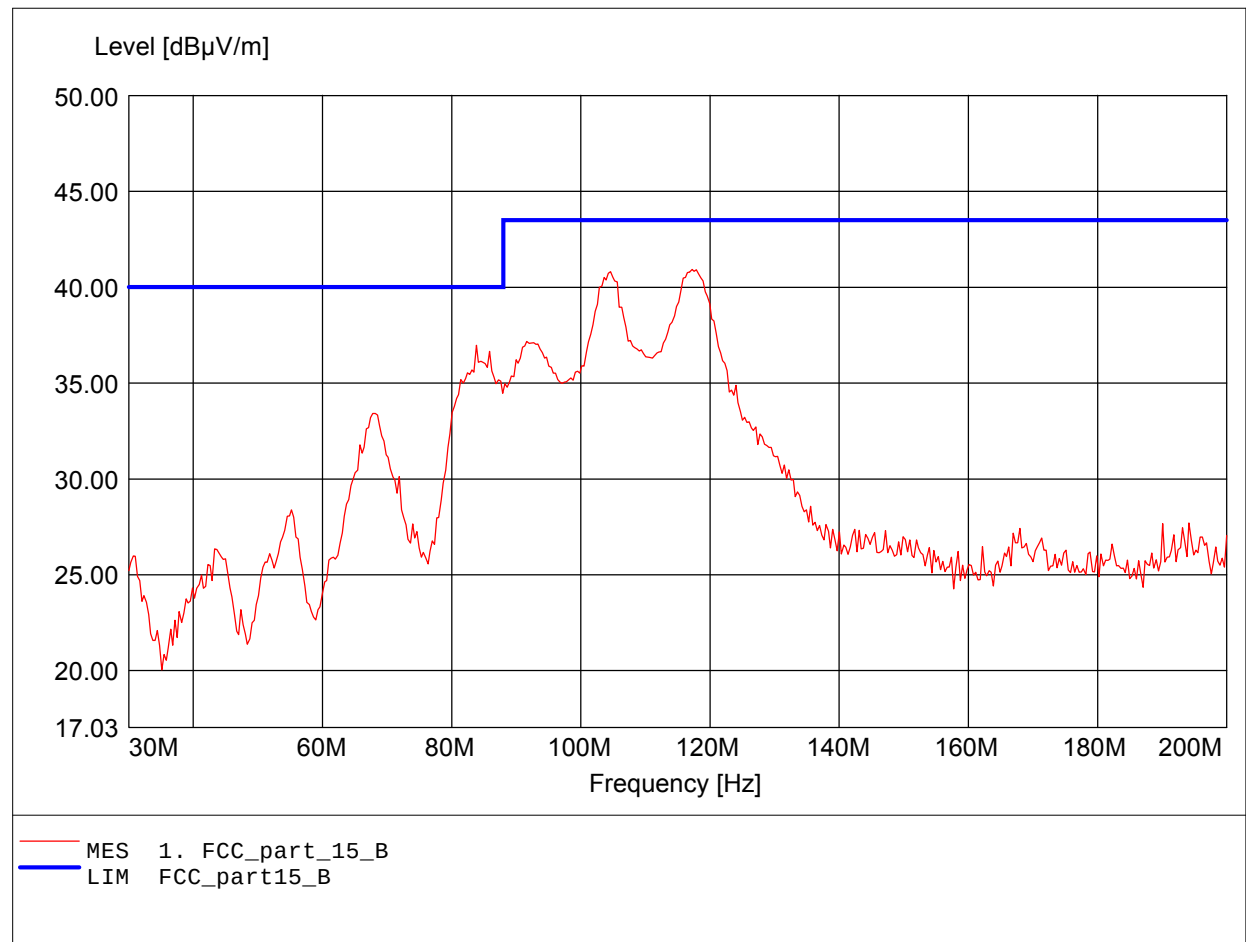


Date: 26.SEP.2005 11:01:51

## Field Strength under normal conditions

### FCC RULES PART 15, SUBPART B

EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to subpart B  
Comment 1: Dist.: 3m, Ant.: HK 116  
Freq:117.214MHz Emax:40.92dBμV/m RBW: 100 kHz

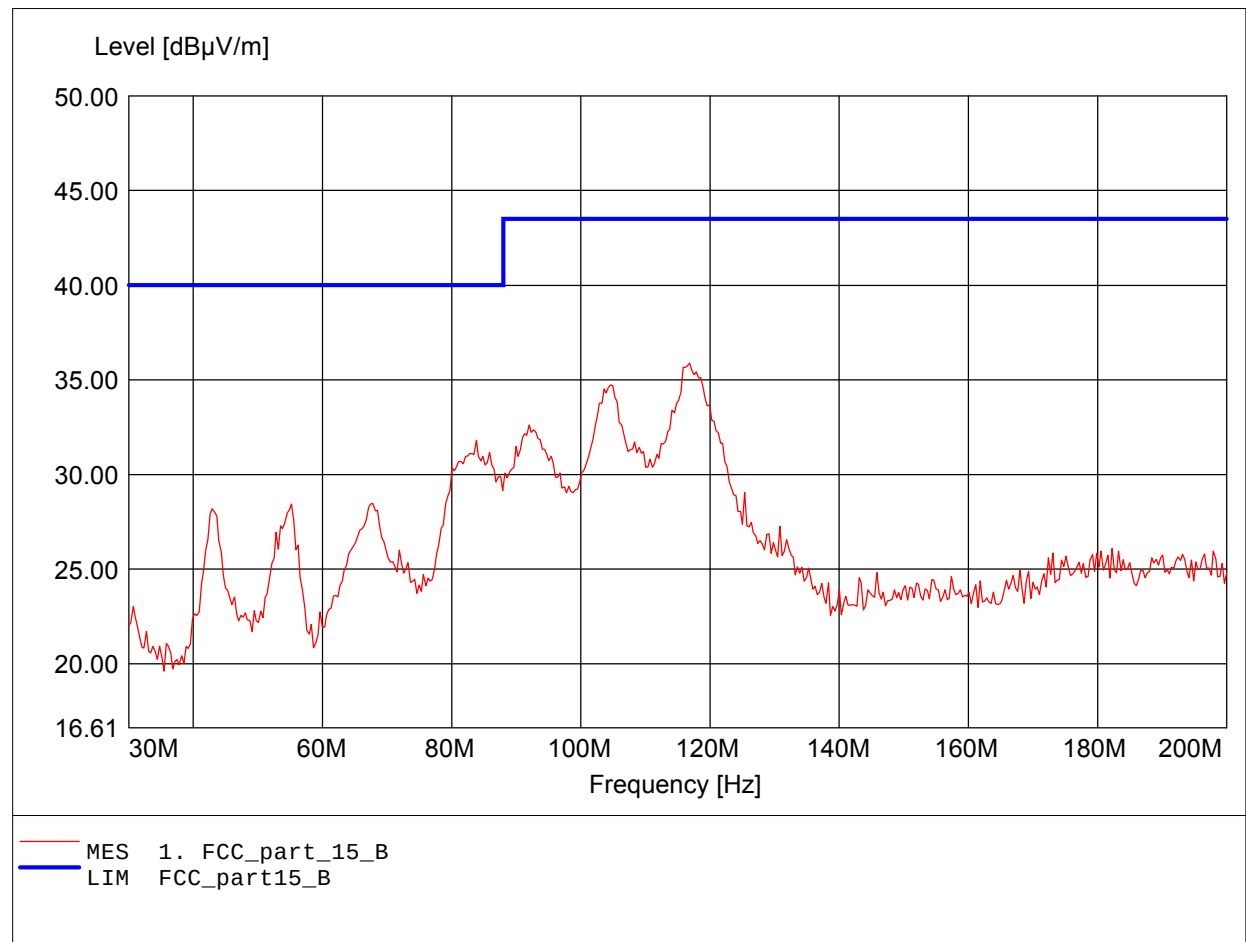




## Field Strength under normal conditions

### FCC RULES PART 15, SUBPART B

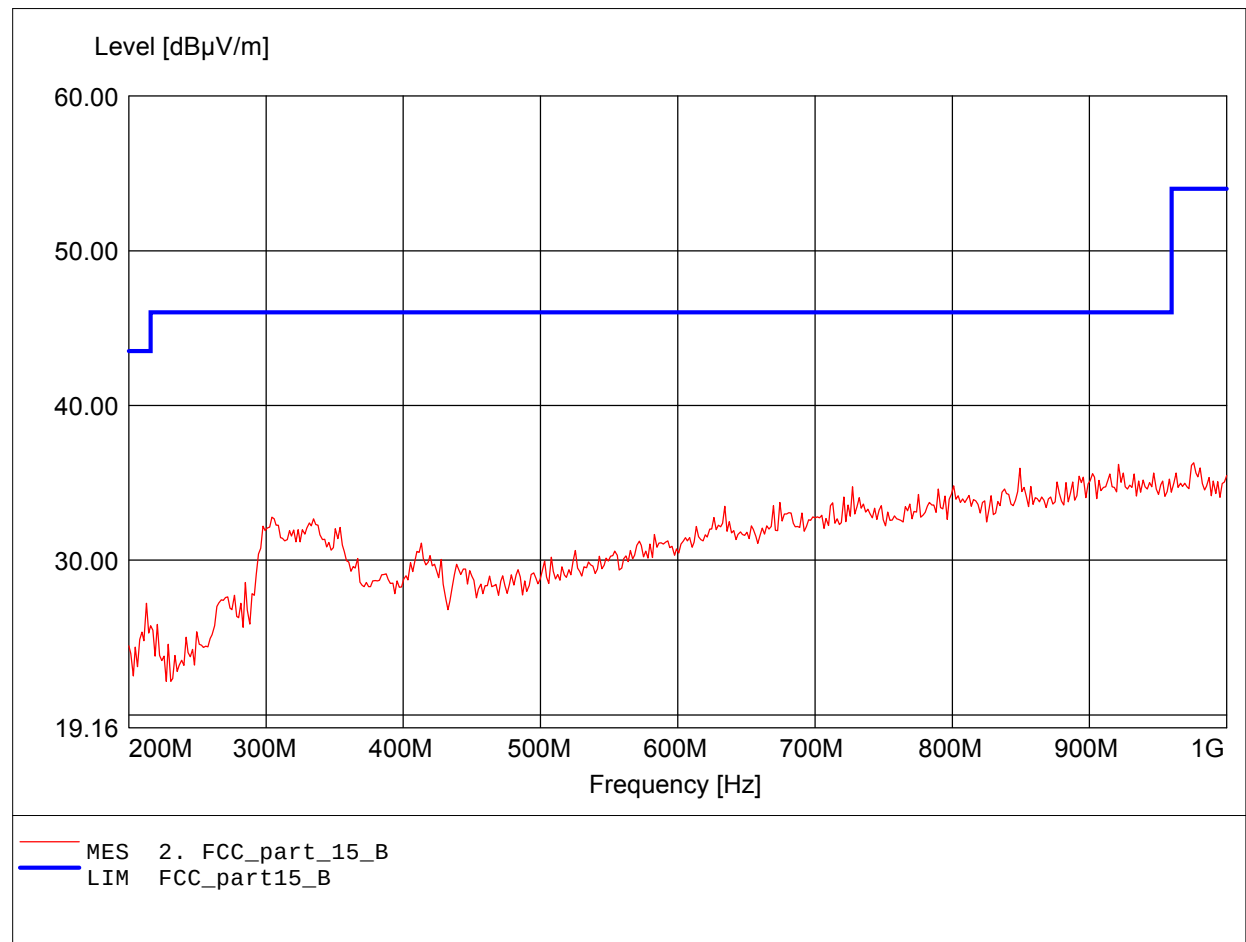
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to subpart B  
Comment 1: Dist.: 3m, Ant.: HK 116  
Freq:116.874MHz Emax:35.88dBμV/m RBW: 100 kHz



## Field Strength under normal conditions

### FCC RULES PART 15, SUBPART B

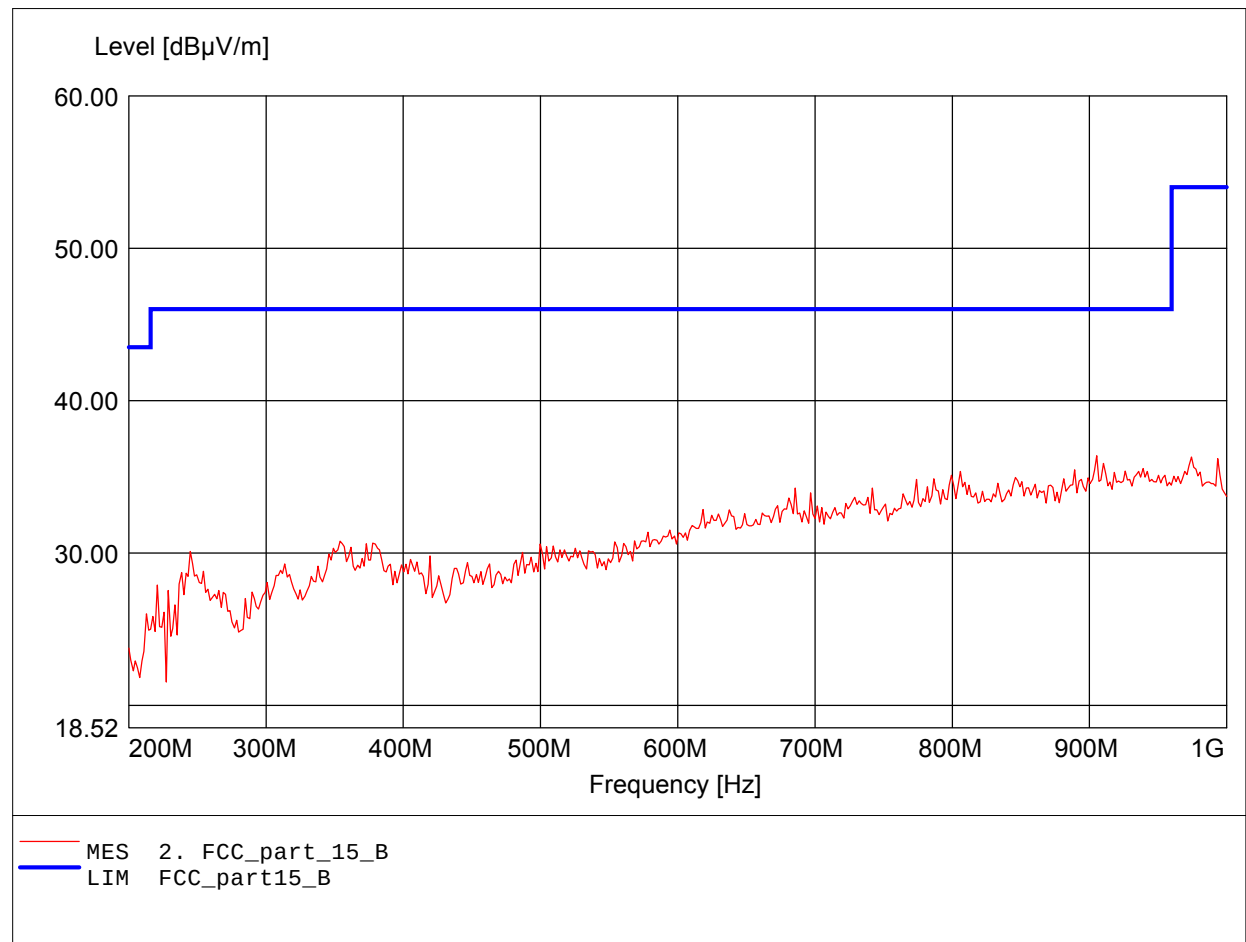
EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to subpart B  
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.  
Freq:975.952MHz Emax:36.29dBμV/m RBW: 100 kHz



## Field Strength under normal conditions

### FCC RULES PART 15, SUBPART B

EUT: Long Range Auto Identification Card  
MODEL NO.: PFH-620  
Approval Holder: Pongee Industries Co.,Ltd.  
Test Site / Operator: ETS / Eric  
Temperature/Voltage: Temp.: 23°C/ Unom.: 3VDC (BATTERY \* 2)  
Test Specification: according to subpart B  
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.  
Freq:905.411MHz Emax:36.39dBμV/m RBW: 100 kHz





Registration number: W6M20509-6156-C-1  
FCC ID: TMZ620

## **Appendix F**

Pictures