

FCC Report (Mobile Phone)

Applicant: Alilo Digital Technology Co., Limited

Address of Applicant: 907-908, 9/F, Changhong Technology Building, Hi-Tech Industrial Park, Nanshan, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Children's GPS Cell Phone

Model No.: M1

Trade Mark: alilo

FCC ID: 2ACQ3-M1

Applicable standards: FCC CFR Title 47 Part 2: 2013
FCC CFR Title 47 Part22 Subpart H: 2013
FCC CFR Title 47 Part24 Subpart E: 2013

Date of sample receipt: July 02, 2014

Date of Test: July 03-04, 2014

Date of report issued: July 04, 2014

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.

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2 Version

| Version No. | Date | Description |
|-------------|---------------|-------------|
| 00 | July 04, 2014 | Original |
| | | |
| | | |
| | | |
| | | |

Prepared By:

Edward.Pan

Date:

July 04, 2014

Project Engineer

Check By:

Hank.yan

Date:

July 04, 2014

Reviewer

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4 Test Summary

| Test Item | Section in CFR 47 | Result |
|--|--|--|
| RF Exposure (SAR) | Part 1.1307 Part 2.1093 | Pass* (Please refer to SAR Report) |
| RF Output Power | Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c) | Pass |
| Modulation Characteristics | Part 2.1047 | Pass |
| 99% & -26 dB Occupied Bandwidth | Part 2.1049 Part 22.917 Part 24.238 | Pass |
| Spurious Emissions at Antenna Terminal | Part 2.1051 Part 22.917 (a) Part 24.238 (a) | Pass |
| Field Strength of Spurious Radiation | Part 2.1053 Part 22.917 (a) Part 24.238 (a) | Pass |
| Out of band emission, Band Edge | Part 22.917 (a) Part 24.238 (a) | Pass |
| Frequency stability vs. temperature | Part 2.1055(a)(1)(b) | Pass |
| Frequency stability vs. voltage | Part 2.1055(d)(1)(2) | Pass |

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

| | |
|--------------------------|--|
| Applicant: | Alilo Digital Technology Co., Limited |
| Address of Applicant: | 907-908, 9/F, Changhong Technology Building, Hi-Tech Industrial Park, Nanshan, Shenzhen, China |
| Manufacturer: | Alilo Digital Technology Co., Limited |
| Address of Manufacturer: | 907-908, 9/F, Changhong Technology Building, Hi-Tech Industrial Park, Nanshan, Shenzhen, China |

5.2 General Description of EUT

| | |
|-------------------|---|
| Product Name: | Children's GPS Cell Phone |
| Model No.: | M1 |
| Support Networks: | GSM, GPRS |
| Support Bands: | GSM850, PCS1900 |
| TX Frequency: | GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz |
| GPRS Class: | 12 |
| Modulation type: | GSM/GPRS: GMSK |
| IMEI: | 860694000000546 |
| Hardware Version: | V1.0 |
| Software Version: | M1_60A_BY_EC_V0.0.22 |
| Antenna type: | Integral antenna |
| Antenna gain: | 1.74dBi(GSM850) 2.63dBi(DCS1900) |
| AC adapter: | DC 3.7V Li-ion Battery |

Operation Frequency List:

| GSM 850 | | PCS1900 | |
|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 |
| 129 | 824.40 | 513 | 1850.40 |
| ⋮ | ⋮ | ⋮ | ⋮ |
| 189 | 836.40 | 660 | 1879.80 |
| 190 | 836.60 | 661 | 1880.00 |
| 191 | 836.80 | 662 | 1880.20 |
| ⋮ | ⋮ | ⋮ | ⋮ |
| 250 | 848.60 | 809 | 1909.60 |
| 251 | 848.80 | 810 | 1909.80 |

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Final test channel:

| GSM 850 | | PCS1900 | |
|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 |
| 190 | 836.60 | 661 | 1880.00 |
| 251 | 848.80 | 810 | 1909.80 |

5.3 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

5.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|------|--------------------------------------|-----------------------------|-----------------------------|---------------|---------------------|-------------------------|
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | Mar. 28 2014 | Mar. 27 2015 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | July 01 2014 | June 30 2015 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | July 01 2014 | June 30 2015 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June 27 2014 | June 26 2015 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | Mar. 28 2014 | Mar. 27 2015 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | Mar. 29 2014 | Mar. 28 2015 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | Mar. 29 2014 | Mar. 28 2015 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | Mar. 29 2014 | Mar. 28 2015 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | Mar. 29 2014 | Mar. 28 2015 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | July 01 2014 | June 30 2015 |
| 13 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | July 01 2014 | June 30 2015 |
| 14 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 27 2014 | June 26 2015 |
| 15 | Band filter | Amindeon | 82346 | GTS219 | Mar. 29 2014 | Mar. 28 2015 |
| 16 | Universal radio communication tester | Rohde & Schwarz | CMU200 | GTS235 | May 09 2014 | May 08 2015 |
| 17 | Signal Generator | Rohde & Schwarz | SML03 | GTS236 | May 09 2014 | May 08 2015 |
| 18 | Temp. Humidity/ Barometer | Oregon Scientific | BA-888 | GTS248 | May 09 2014 | May 08 2015 |
| 19 | D.C. Power Supply | Insteek | PS-3030 | GTS232 | NA | NA |
| 20 | Splitter | Agilent | 11636B | GTS237 | May 09 2014 | May 08 2015 |
| 21 | Power meter | Rohde & Schwarz | NRVS | GTS238 | May 09 2014 | May 08 2015 |
| 22 | Spectrum Analyzer | Agilent | E4440A | GTS533 | Dec. 5, 2013 | Dec. 4 2014 |

7 System test configuration

7.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

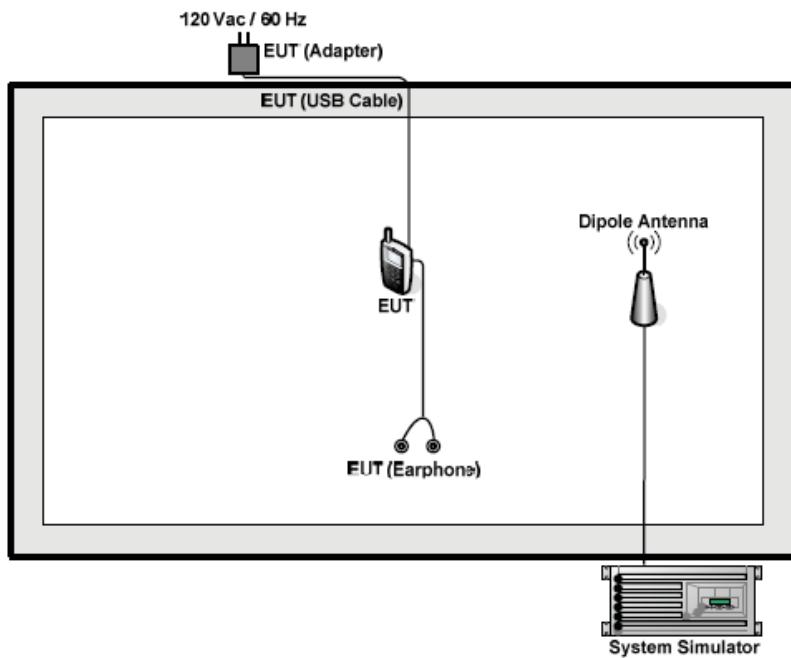
| Test modes | | |
|-----------------|-----------------------------|-----------------------------|
| Band | Radiated | Conducted |
| GSM 850 | ■ GSM link ■ GPRS 4 link | ■ GSM link ■ GPRS 4 link |
| PCS 1900 | ■ GSM link ■ GPRS 4 link | ■ GSM link ■ GPRS 4 link |

Note: The maximum power levels are GSM mode for GMSK link, GPRS mode for GMSK link. only these modes were used for all tests.

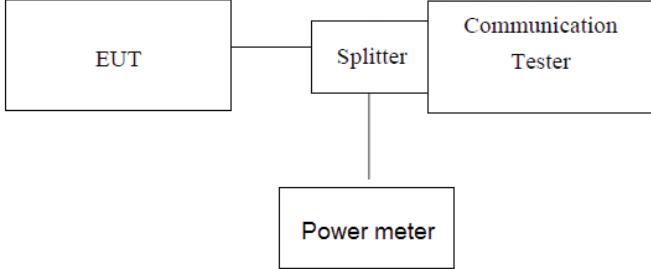
The conducted power tables are as follows:

| Band | Conducted Power (dBm) | | | | | |
|------------------------|-----------------------|-------|-------|---------|-------|-------|
| | GSM850 | | | PCS1900 | | |
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| GSM (GMSK, 1 TX slot) | 32.63 | 32.38 | 32.20 | 29.10 | 29.40 | 29.39 |
| GPRS (GMSK, 1 TX slot) | 32.66 | 32.42 | 32.41 | 29.19 | 29.51 | 29.48 |
| GPRS (GMSK, 2 TX slot) | 32.30 | 31.42 | 31.29 | 28.13 | 28.38 | 29.04 |
| GPRS (GMSK, 3 TX slot) | 31.40 | 31.11 | 30.76 | 27.98 | 28.20 | 28.25 |
| GPRS (GMSK, 4 TX slot) | 28.79 | 29.34 | 29.07 | 26.27 | 26.41 | 26.53 |

7.2 Configuration of Tested System



7.3 Conducted Peak Output Power

| | |
|-------------------|--|
| Test Requirement: | FCC part22.913(a) and FCC part24.232(b) |
| Test Method: | FCC part2.1046 |
| Limit: | GSM850: 7W PCS1900: 2W |
| Test setup: |  <p><i>Note: Measurement setup for testing on Antenna connector</i></p> |
| Test Procedure: | <ol style="list-style-type: none"> 1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Measurement Data

| EUT Mode | Channel | Frequency (MHz) | PK power (dBm) | Limit (dBm) | Result |
|---------------------------|---------|-----------------|----------------|-------------|--------|
| GSM 850 (GSM link) | 128 | 824.20 | 32.63 | 38.45 | Pass |
| | 190 | 836.60 | 32.38 | | |
| | 251 | 848.80 | 32.20 | | |
| GSM 850 (GPRS 4 link) | 128 | 824.20 | 28.79 | 38.45 | Pass |
| | 190 | 836.60 | 29.34 | | |
| | 251 | 848.80 | 29.07 | | |
| PCS 1900 (GSM link) | 512 | 1850.20 | 29.10 | 33.01 | Pass |
| | 661 | 1880.00 | 29.40 | | |
| | 810 | 1909.80 | 29.39 | | |
| PCS 1900 (GPRS 4 link) | 512 | 1850.20 | 26.27 | 33.01 | Pass |
| | 661 | 1880.00 | 26.41 | | |
| | 810 | 1909.80 | 26.53 | | |

7.4 Occupy Bandwidth

| | |
|--|--|
| Test Requirement: | FCC part22.913(a) and FCC part24.232(b) |
| Test Method: | FCC part2.1049 |
| Test setup: | <pre> graph LR EUT[EUT] --- Splitter[Splitter] Splitter --- SPA[SPA] Splitter --- Tester[Communication Tester] </pre> |
| <p><i>Note: Measurement setup for testing on Antenna connector</i></p> | |
| Test Procedure: | <ol style="list-style-type: none"> 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Measurement Data

| EUT Mode | Channel | Frequency (MHz) | 99% Occupy bandwidth (KHz) | -26dB bandwidth (KHz) |
|---------------------------|---------|-----------------|----------------------------|-----------------------|
| GSM 850 (GSM link) | 128 | 824.20 | 244.146 | 315.554 |
| | 190 | 836.60 | 240.929 | 316.526 |
| | 251 | 848.80 | 237.944 | 314.687 |
| GSM 850 (GPRS 4 link) | 128 | 824.20 | 241.767 | 317.911 |
| | 190 | 836.60 | 236.123 | 318.168 |
| | 251 | 848.80 | 244.217 | 305.550 |
| PCS 1900 (GSM link) | 512 | 1850.20 | 239.601 | 312.645 |
| | 661 | 1880.00 | 245.556 | 319.654 |
| | 810 | 1909.80 | 250.785 | 320.345 |
| PCS 1900 (GPRS 4 link) | 512 | 1850.20 | 244.745 | 302.325 |
| | 661 | 1880.00 | 238.999 | 308.683 |
| | 810 | 1909.80 | 241.313 | 310.655 |

Test plot as follows:





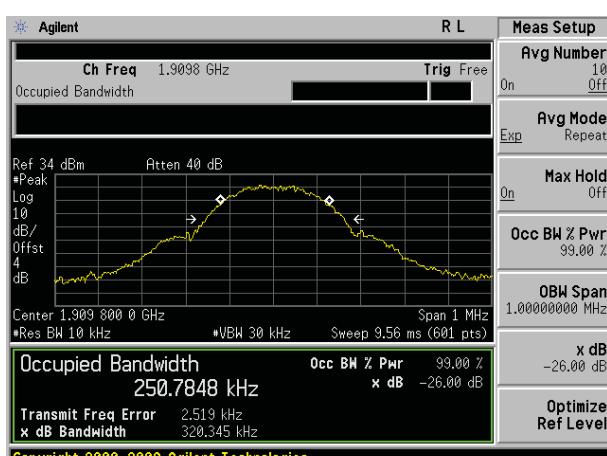
| Test band: | PCS 1900 (GSM link) |
|------------|---------------------|
|------------|---------------------|



Lowest channel



Middle channel



Highest channel:

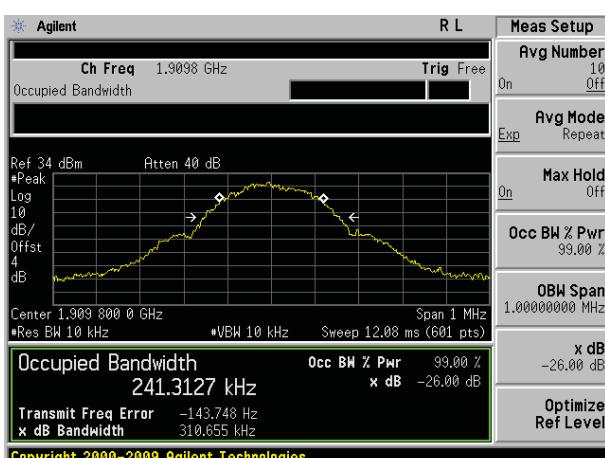
| | |
|------------|------------------------|
| Test band: | PCS 1900 (GPRS 4 link) |
|------------|------------------------|



Lowest channel



Middle channel



Highest channel:

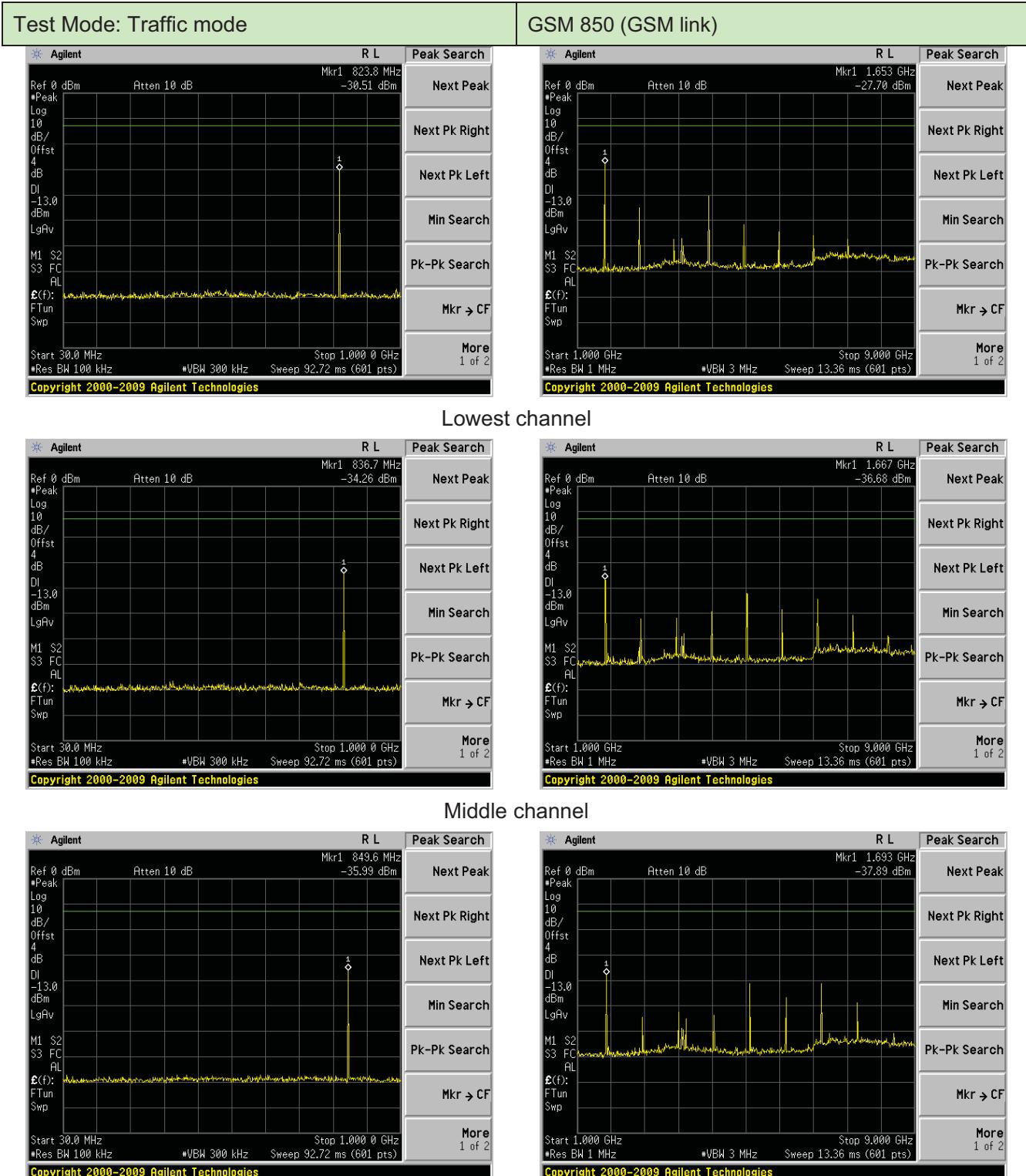
7.5 MODULATION CHARACTERISTIC

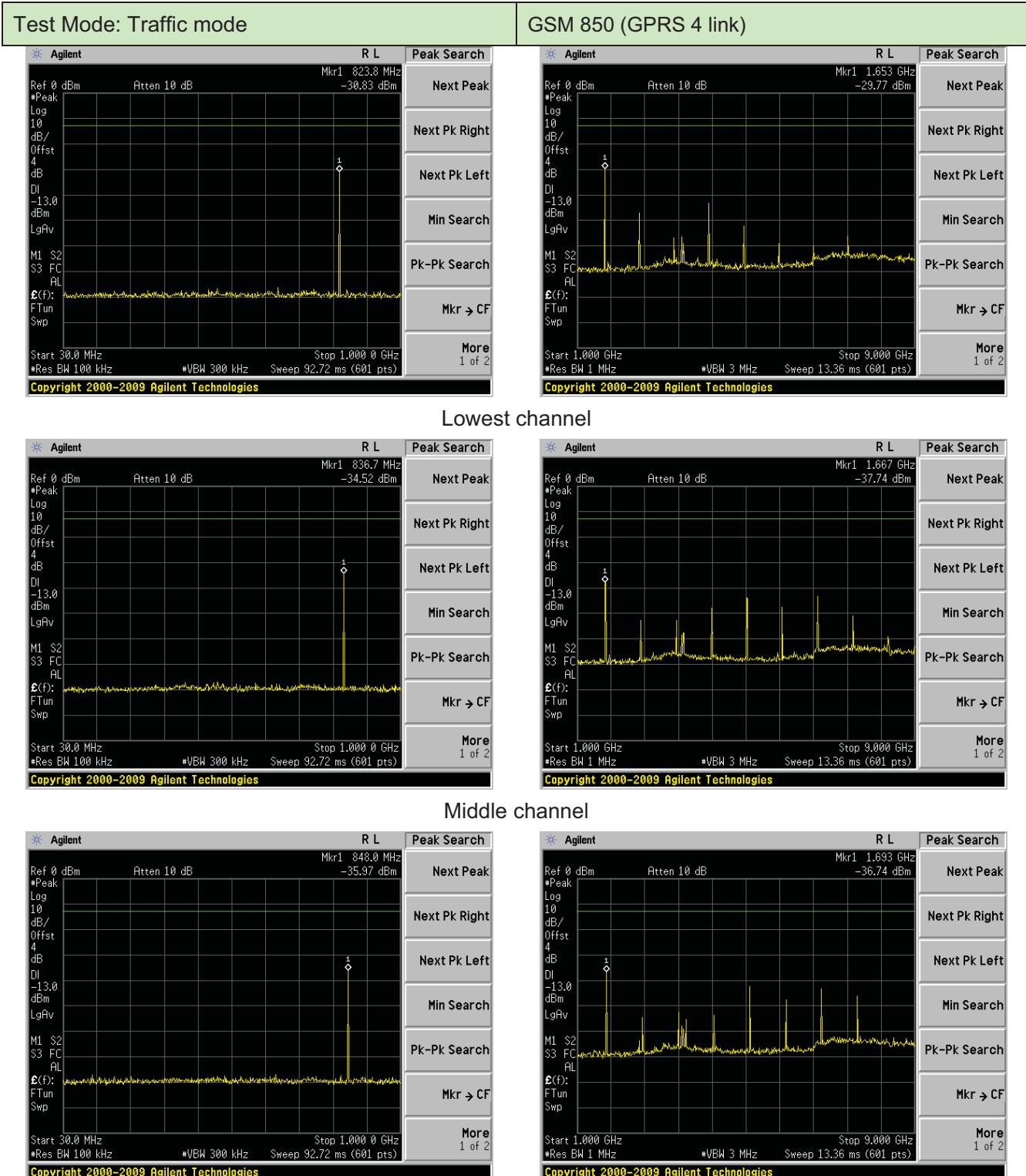
According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

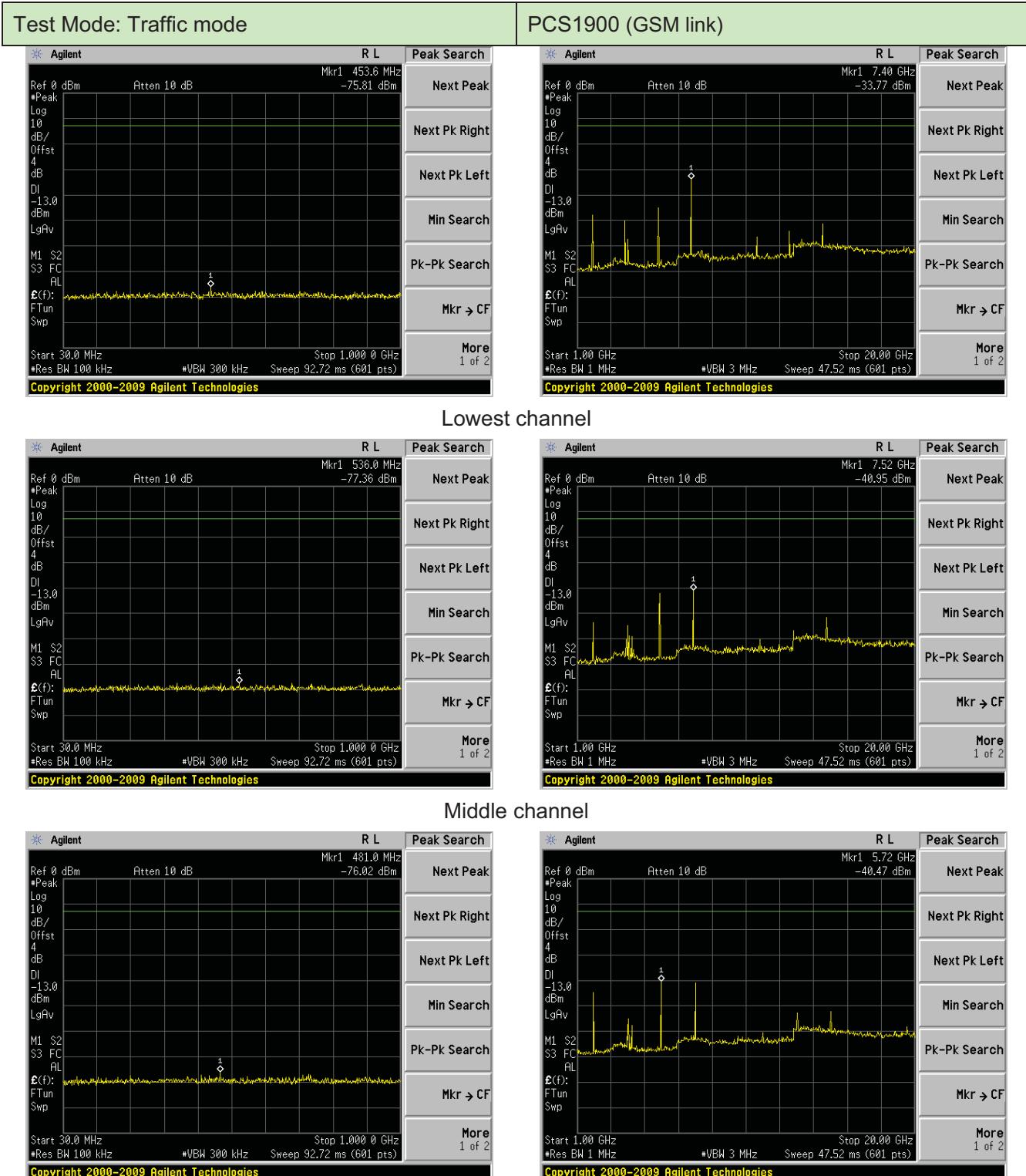
7.6 Out of band emission at antenna terminals

| | |
|--|--|
| Test Requirement: | FCC part22.917(a) and FCC part24.238(a) |
| Test Method: | FCC part2.1051 |
| Limit: | -13dBm |
| Test setup: | <p><i>Note: Measurement setup for testing on Antenna connector</i></p> |
| <p>Test Procedure:</p> <ol style="list-style-type: none"> 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. | |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Test plot as follows:

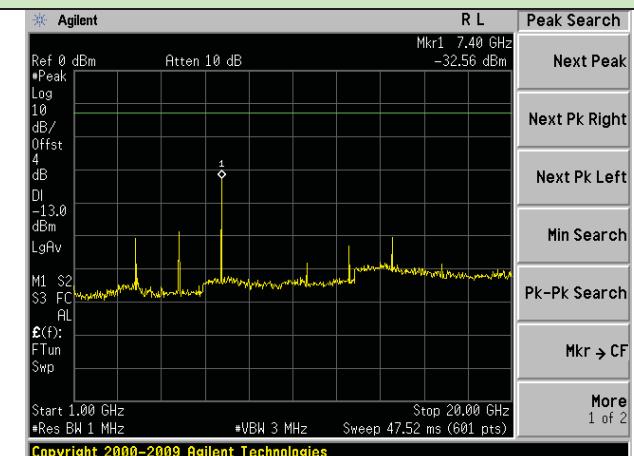
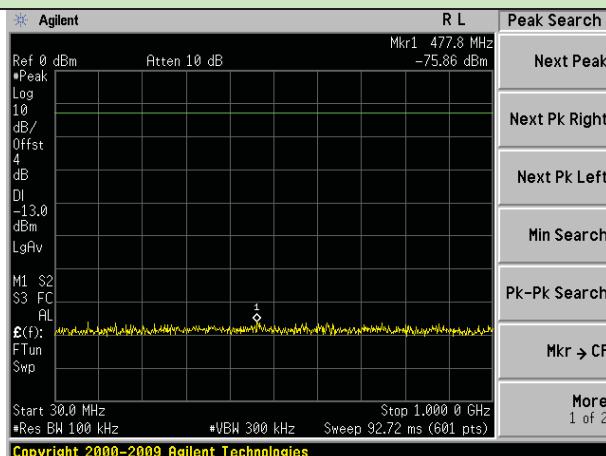




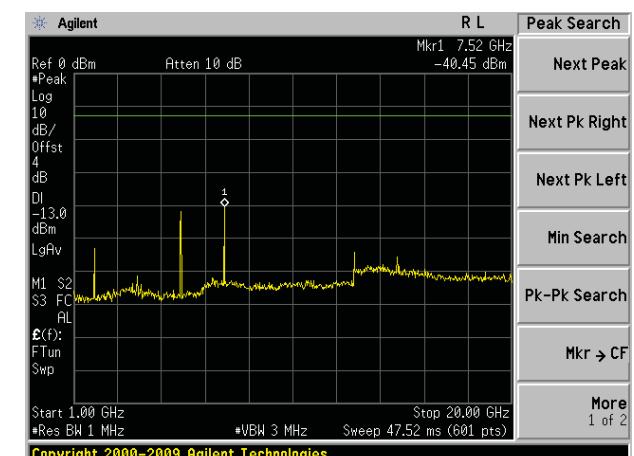
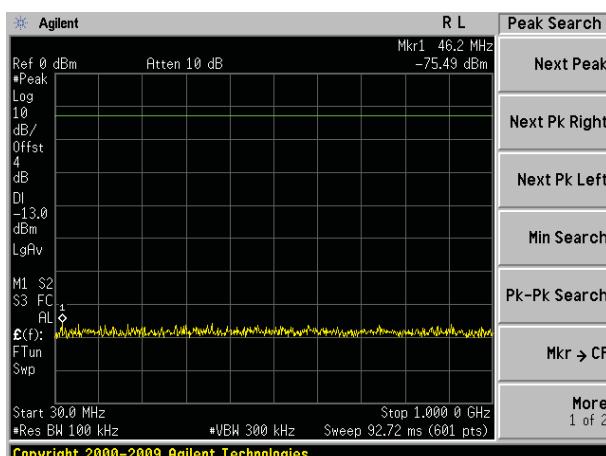


Test Mode: Traffic mode

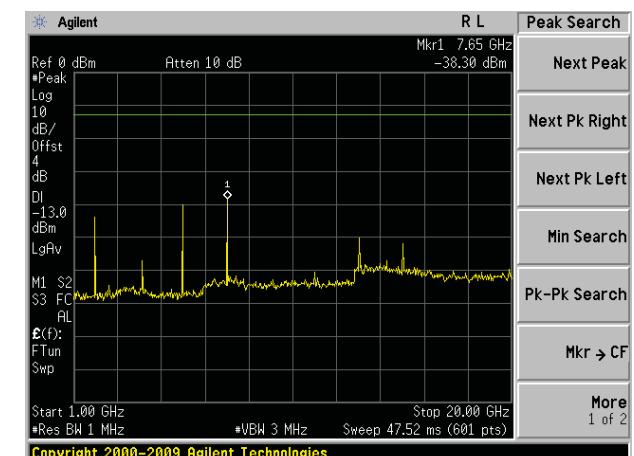
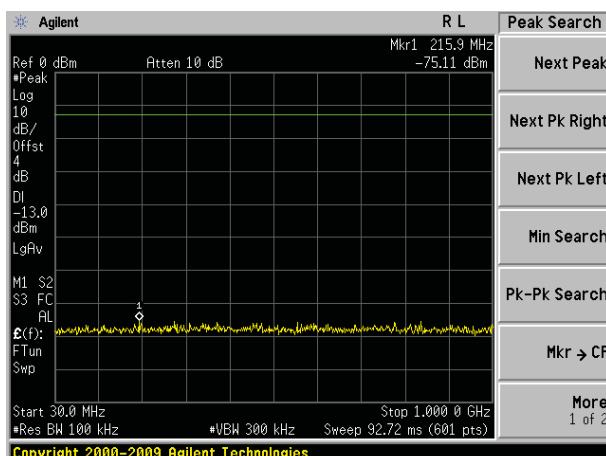
PCS1900 (GPRS 4 link)



Lowest channel

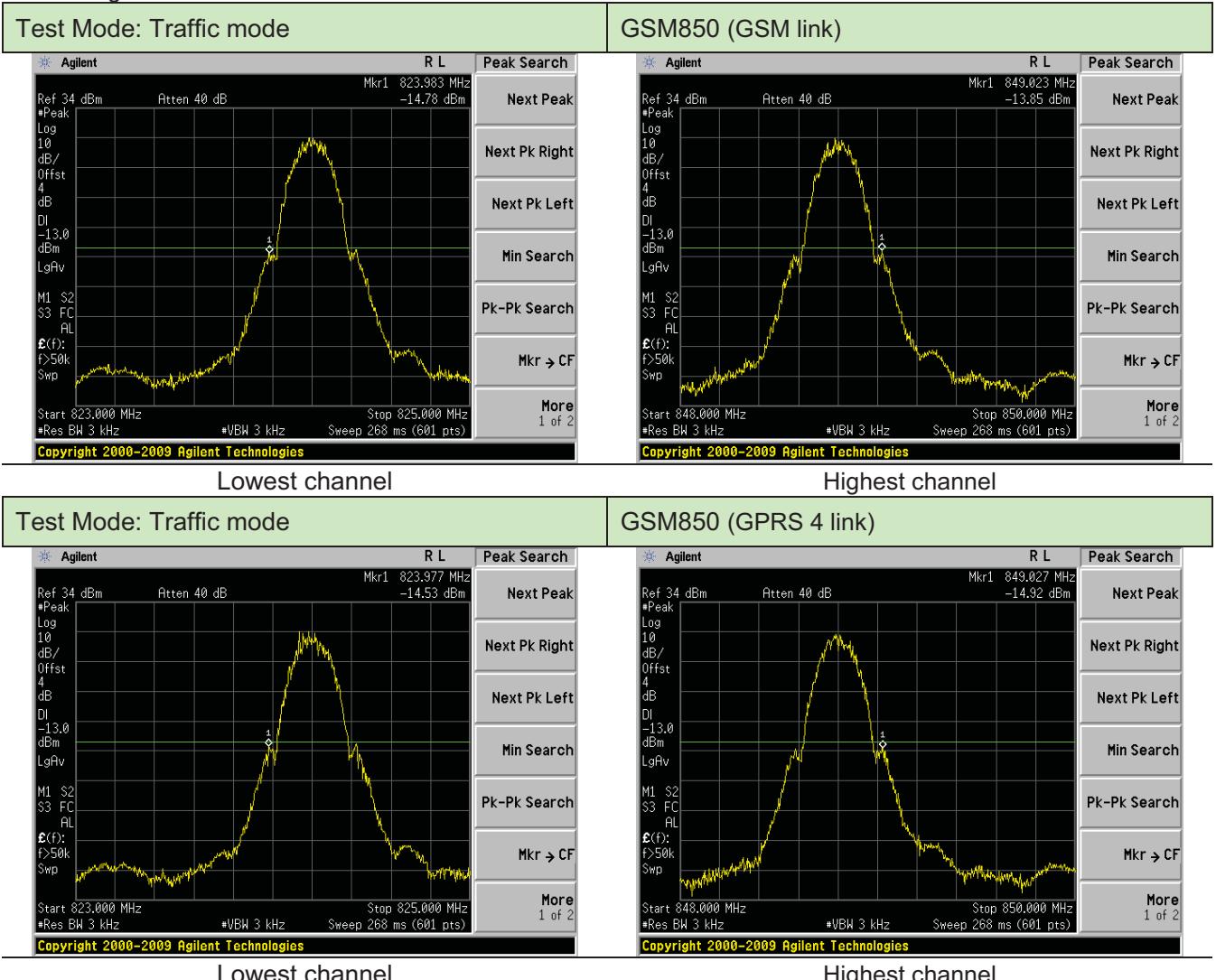


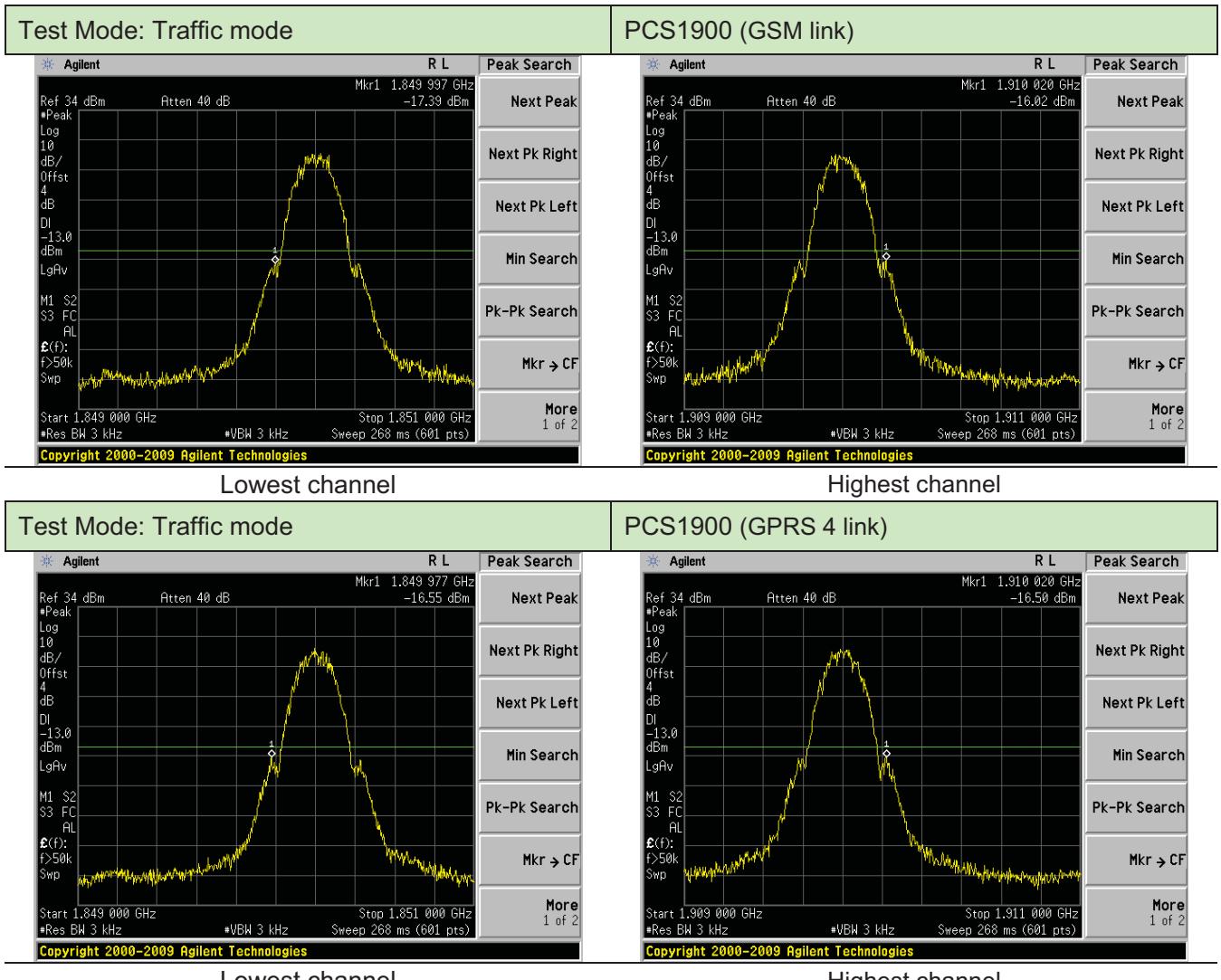
Middle channel



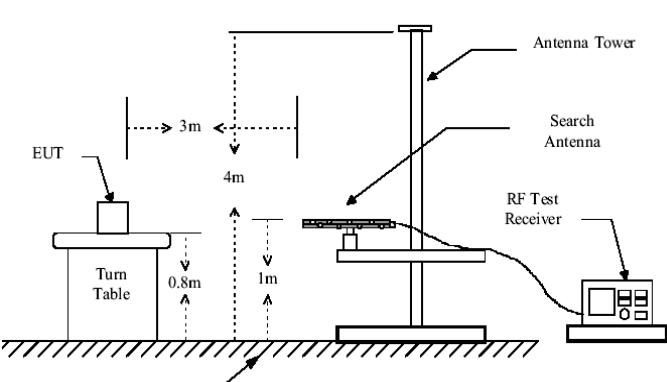
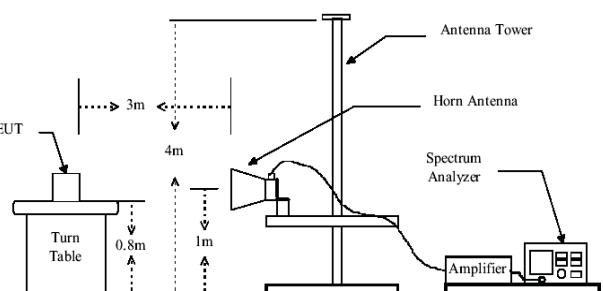
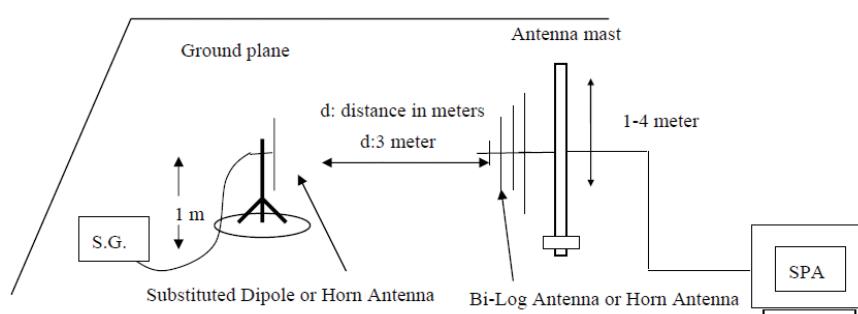
Highest channel

Band Edge:





7.7 ERP, EIRP Measurement

| | |
|-------------------|--|
| Test Requirement: | FCC part22.913(a) and FCC part24.232(b) |
| Test Method: | FCC part2.1046 |
| Limit: | GSM850 7W ERP PCS1900 2W EIRP |
| Test setup: | <p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p>  |

| | |
|-------------------|---|
| Test Procedure: | <ol style="list-style-type: none">1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: $\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: $\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$ |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Measurement Data

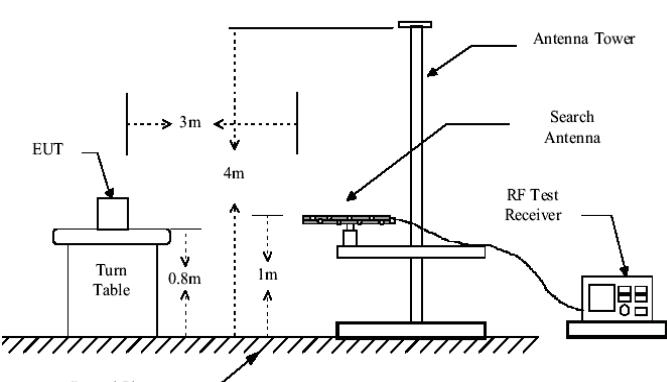
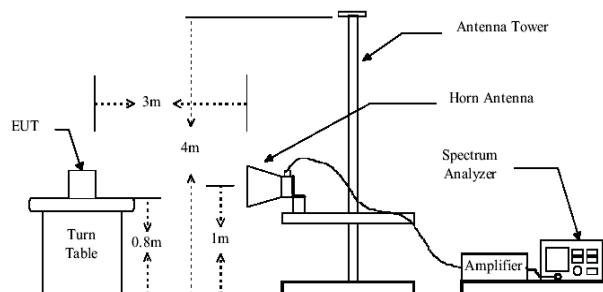
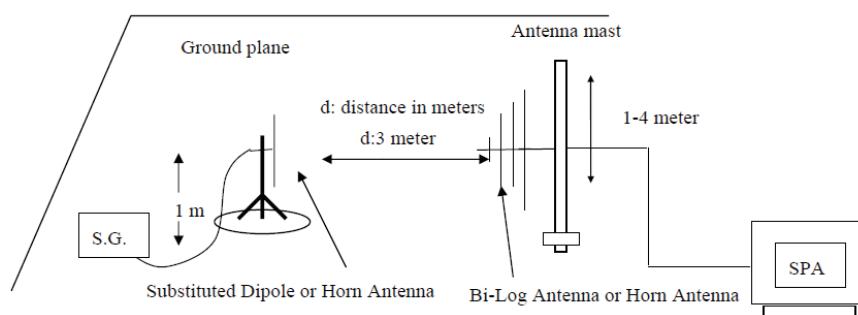
| EUT mode | Channel | EUT Pol. | Antenna Pol. | ERP(dBm) | Limit (dBm) | Result |
|----------------------|---------|----------|--------------|----------|-------------|--------|
| GSM850 (GSM link) | Lowest | H | V | 33.48 | 38.45 | Pass |
| | | | H | 29.92 | | |
| | | E1 | V | 25.70 | | |
| | | | H | 31.30 | | |
| | | E2 | V | 25.10 | | |
| | | | H | 29.08 | | |
| | Middle | H | V | 33.23 | 38.45 | Pass |
| | | | H | 29.35 | | |
| | | E1 | V | 25.63 | | |
| | | | H | 30.60 | | |
| | | E2 | V | 26.23 | | |
| | | | H | 28.62 | | |
| | Highest | H | V | 33.21 | 38.45 | Pass |
| | | | H | 28.54 | | |
| | | E1 | V | 25.23 | | |
| | | | H | 29.12 | | |
| | | E2 | V | 23.62 | | |
| | | | H | 28.32 | | |

| EUT mode | Channel | EUT Pol. | Antenna Pol. | ERP(dBm) | Limit (dBm) | Result |
|----------------------------|---------|----------|--------------|----------|-------------|--------|
| GSM850 (GPRS 4 link) | Lowest | H | V | 31.36 | 38.45 | Pass |
| | | | H | 26.26 | | |
| | | E1 | V | 23.30 | | |
| | | | H | 26.53 | | |
| | | E2 | V | 22.49 | | |
| | | | H | 24.73 | | |
| | Middle | H | V | 31.21 | 38.45 | Pass |
| | | | H | 25.88 | | |
| | | E1 | V | 23.35 | | |
| | | | H | 26.08 | | |
| | | E2 | V | 23.75 | | |
| | | | H | 24.49 | | |
| | Highest | H | V | 31.17 | 38.45 | Pass |
| | | | H | 25.04 | | |
| | | E1 | V | 22.93 | | |
| | | | H | 24.55 | | |
| | | E2 | V | 21.11 | | |
| | | | H | 24.15 | | |

| EUT mode | Channel | EUT Pol. | Antenna Pol. | EIRP (dBm) | Limit (dBm) | Result |
|-----------------------|---------|----------|--------------|------------|-------------|--------|
| PCS1900 (GSM link) | Lowest | H | V | 30.90 | 33.01 | Pass |
| | | | H | 30.07 | | |
| | | E1 | V | 24.41 | | |
| | | | H | 30.17 | | |
| | | E2 | V | 24.21 | | |
| | | | H | 30.50 | | |
| | Middle | H | V | 30.49 | 33.01 | Pass |
| | | | H | 29.20 | | |
| | | E1 | V | 24.14 | | |
| | | | H | 30.08 | | |
| | | E2 | V | 24.98 | | |
| | | | H | 29.67 | | |
| | Highest | H | V | 30.28 | 33.01 | Pass |
| | | | H | 28.14 | | |
| | | E1 | V | 23.59 | | |
| | | | H | 30.31 | | |
| | | E2 | V | 22.42 | | |
| | | | H | 29.00 | | |

| EUT mode | Channel | EUT Pol. | Antenna Pol. | EIRP (dBm) | Limit (dBm) | Result |
|-----------------------------|---------|----------|--------------|------------|-------------|--------|
| PCS1900 (GPRS 4 link) | Lowest | H | V | 28.46 | 33.01 | Pass |
| | | | H | 26.05 | | |
| | | E1 | V | 21.69 | | |
| | | | H | 28.01 | | |
| | | E2 | V | 21.27 | | |
| | | | H | 25.77 | | |
| | Middle | H | V | 28.39 | 33.01 | Pass |
| | | | H | 25.76 | | |
| | | E1 | V | 21.80 | | |
| | | | H | 27.65 | | |
| | | E2 | V | 22.46 | | |
| | | | H | 25.61 | | |
| | Highest | H | V | 28.02 | 33.01 | Pass |
| | | | H | 24.42 | | |
| | | E1 | V | 21.07 | | |
| | | | H | 25.53 | | |
| | | E2 | V | 19.69 | | |
| | | | H | 24.62 | | |

7.8 Field strength of spurious radiation measurement

| | |
|-------------------|---|
| Test Requirement: | FCC part22.917(a) and FCC part24.238(a) |
| Test Method: | FCC part2.1053 |
| Limit: | -13dBm |
| Test setup: | <p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p>  |

| | |
|-------------------|--|
| Test Procedure: | <ol style="list-style-type: none">1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$ |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Measurement Data

| Test mode: | GSM850 | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1648.40 | Vertical | -33.99 | -13.00 | Pass |
| 2472.60 | V | -36.81 | | |
| 3296.80 | V | -39.15 | | |
| 4121.00 | V | -41.36 | | |
| 4945.20 | V | --- | | |
| 1648.40 | Horizontal | -39.49 | | |
| 2472.60 | H | -43.20 | | |
| 3296.80 | H | -44.85 | | |
| 4121.00 | H | -47.67 | | |
| 4945.20 | H | --- | | |
| Test mode: | GSM850 | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1673.20 | Vertical | -35.58 | -13.00 | Pass |
| 2509.80 | V | -37.93 | | |
| 3346.40 | V | -39.89 | | |
| 4183.00 | V | -41.74 | | |
| 5019.60 | V | --- | | |
| 1673.20 | Horizontal | -40.19 | | |
| 2509.80 | H | -43.26 | | |
| 3346.40 | H | -44.64 | | |
| 4183.00 | H | -46.99 | | |
| 5019.60 | H | --- | | |
| Test mode: | GSM850 | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1697.60 | Vertical | -35.76 | -13.00 | Pass |
| 2546.40 | V | -37.86 | | |
| 3395.20 | V | -39.60 | | |
| 4244.00 | V | -41.26 | | |
| 5092.80 | V | --- | | |
| 1697.60 | Horizontal | -39.90 | | |
| 2546.40 | H | -42.60 | | |
| 3395.20 | H | -43.82 | | |
| 4244.00 | H | -45.92 | | |
| 5092.80 | H | --- | | |

Remark :

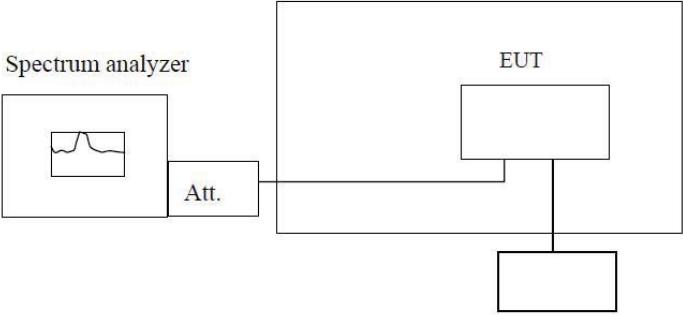
1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

| Test mode: | PCS1900 | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3700.40 | Vertical | -34.64 | -13.00 | Pass |
| 5550.60 | V | -37.11 | | |
| 7400.80 | V | -39.18 | | |
| 9251.00 | V | -41.13 | | |
| 11101.20 | V | --- | | |
| 3700.40 | Horizontal | -39.51 | | Pass |
| 5550.60 | H | -42.74 | | |
| 7400.80 | H | -44.18 | | |
| 9251.00 | H | -46.67 | | |
| 11101.20 | H | --- | | |
| Test mode: | PCS1900 | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3760.00 | Vertical | -31.90 | -13.00 | Pass |
| 5640.00 | V | -34.47 | | |
| 7520.00 | V | -36.63 | | |
| 9400.00 | V | -38.66 | | |
| 11280.00 | V | --- | | |
| 3760.00 | Horizontal | -36.95 | | Pass |
| 5640.00 | H | -40.33 | | |
| 7520.00 | H | -41.87 | | |
| 9400.00 | H | -44.46 | | |
| 11280.00 | H | --- | | |
| Test mode: | PCS1900 | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3819.60 | Vertical | -33.18 | -13.00 | Pass |
| 5729.40 | V | -35.68 | | |
| 7639.20 | V | -37.77 | | |
| 9549.00 | V | -39.74 | | |
| 11458.80 | V | --- | | |
| 3819.60 | Horizontal | -38.10 | | Pass |
| 5729.40 | H | -41.34 | | |
| 7639.20 | H | -42.81 | | |
| 9549.00 | H | -45.32 | | |
| 11458.80 | H | --- | | |

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

7.9 Frequency stability V.S. Temperature measurement

| | |
|--|--|
| Test Requirement: | FCC Part2.1055(a)(1)(b) |
| Test Method: | FCC Part2.1055(a)(1)(b) |
| Limit: | 2.5ppm |
| Test setup: | <p style="text-align: center;">Temperature Chamber</p>  <p style="text-align: center;">Variable Power Supply</p> <p>Note : Measurement setup for testing on Antenna connector</p> |
| <p>Test procedure:</p> <ol style="list-style-type: none"> 1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached. | |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

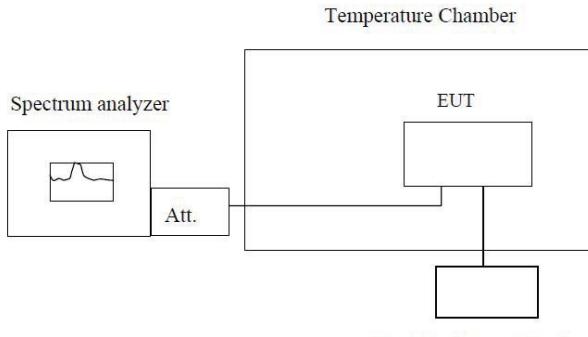
Measurement Data

| Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz | | | | | |
|--|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 30 | 0.0353 | 2.5 | Pass |
| | -20 | 33 | 0.0392 | | |
| | -10 | 28 | 0.0339 | | |
| | 0 | 24 | 0.0287 | | |
| | 10 | 27 | 0.0326 | | |
| | 20 | 24 | 0.0287 | | |
| | 30 | 37 | 0.0445 | | |
| | 40 | 34 | 0.0405 | | |
| | 50 | 33 | 0.0392 | | |

| Reference Frequency: GSM850 (GPRS 4 link) Middle channel=190 channel=836.6MHz | | | | | |
|---|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 25 | 0.0300 | 2.5 | Pass |
| | -20 | 27 | 0.0326 | | |
| | -10 | 24 | 0.0287 | | |
| | 0 | 22 | 0.0261 | | |
| | 10 | 23 | 0.0274 | | |
| | 20 | 21 | 0.0247 | | |
| | 30 | 33 | 0.0392 | | |
| | 40 | 28 | 0.0339 | | |
| | 50 | 27 | 0.0326 | | |

| Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz | | | | | |
|---|------------------|-----------------|--------|--------|------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Result | |
| | | Hz | ppm | | |
| 3.70 | -30 | 41 | 0.0215 | 2.5 | Pass |
| | -20 | 47 | 0.0251 | | |
| | -10 | 41 | 0.0215 | | |
| | 0 | 35 | 0.0186 | | |
| | 10 | 41 | 0.0215 | | |
| | 20 | 36 | 0.0192 | | |
| | 30 | 55 | 0.0291 | | |
| | 40 | 48 | 0.0256 | | |
| | 50 | 48 | 0.0256 | | |
| Reference Frequency: PCS1900 (GPRS 4 link) Middle channel=661 channel=1880MHz | | | | | |
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Result | |
| | | Hz | ppm | | |
| 3.70 | -30 | 39 | 0.0210 | 2.5 | Pass |
| | -20 | 45 | 0.0239 | | |
| | -10 | 37 | 0.0198 | | |
| | 0 | 32 | 0.0169 | | |
| | 10 | 38 | 0.0204 | | |
| | 20 | 32 | 0.0169 | | |
| | 30 | 50 | 0.0268 | | |
| | 40 | 43 | 0.0227 | | |
| | 50 | 45 | 0.0239 | | |

7.10 Frequency stability V.S. Voltage measurement

| | |
|-------------------|---|
| Test Requirement: | FCC Part2.1055(d)(1)(2) |
| Test Method: | FCC Part2.1055(d)(1)(2) |
| Limit: | 2.5ppm |
| Test setup: |  <p>Note : Measurement setup for testing on Antenna connector</p> |
| Test procedure: | <ol style="list-style-type: none"> 1. Set chamber temperature to 25° C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

Measurement Data

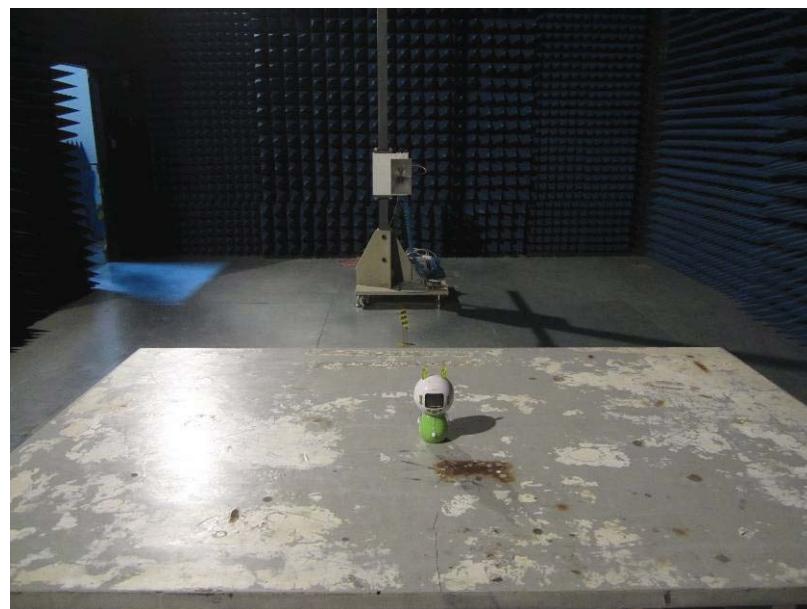
| Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz | | | | | |
|---|----------------------|-----------------|--------|-------------|--------|
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 20 | 0.0234 | 2.5 | Pass |
| | 3.70 | 22 | 0.0261 | | |
| | 3.40 | 24 | 0.0287 | | |
| Reference Frequency: GSM850 (GPRS 4 link) Middle channel=190 channel=836.6MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 30 | 0.0353 | 2.5 | Pass |
| | 3.70 | 23 | 0.0274 | | |
| | 3.40 | 25 | 0.0300 | | |

| Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz | | | | | |
|--|----------------------|-----------------|--------|-------------|--------|
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 31 | 0.0163 | 2.5 | Pass |
| | 3.70 | 36 | 0.0192 | | |
| | 3.40 | 36 | 0.0192 | | |

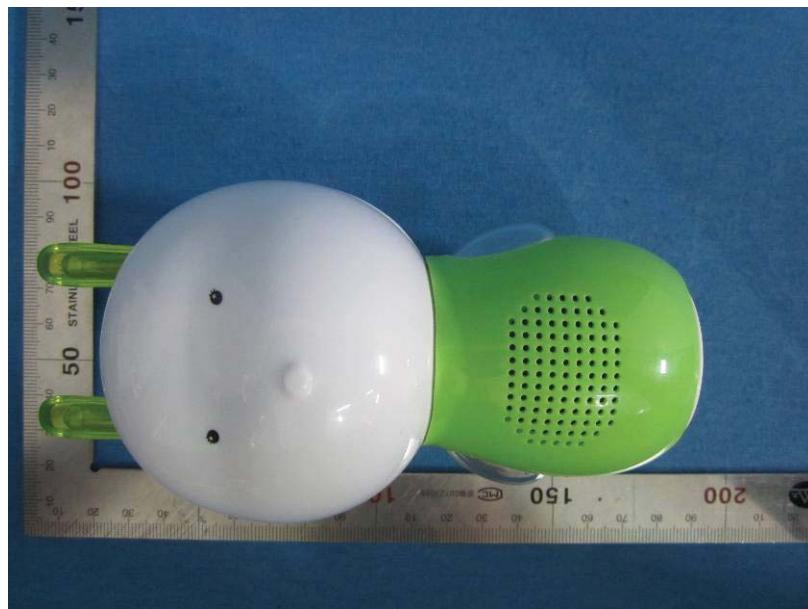
| Reference Frequency: PCS1900 (GPRS 4 link) Middle channel=661 channel=1880MHz | | | | | |
|---|----------------------|-----------------|--------|-------------|--------|
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 48 | 0.0256 | 2.5 | Pass |
| | 3.70 | 37 | 0.0198 | | |
| | 3.40 | 39 | 0.0210 | | |

8 Test Setup Photo

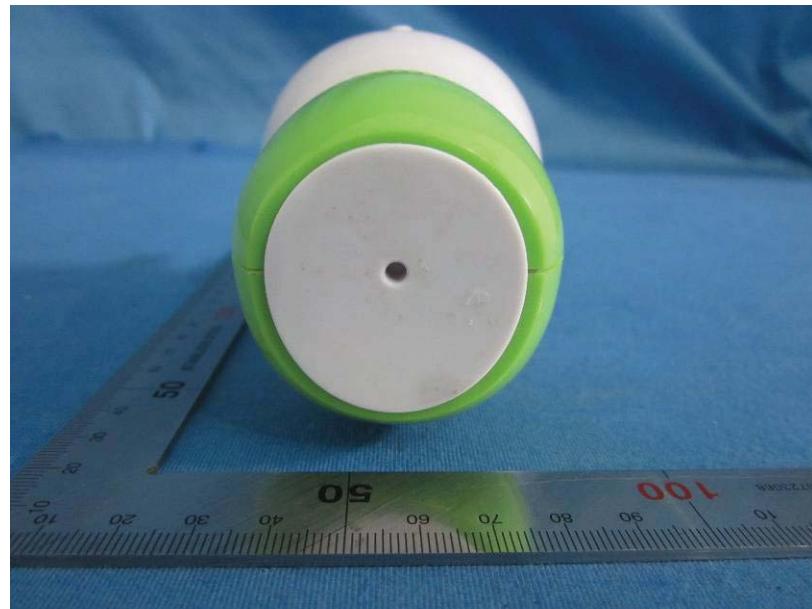
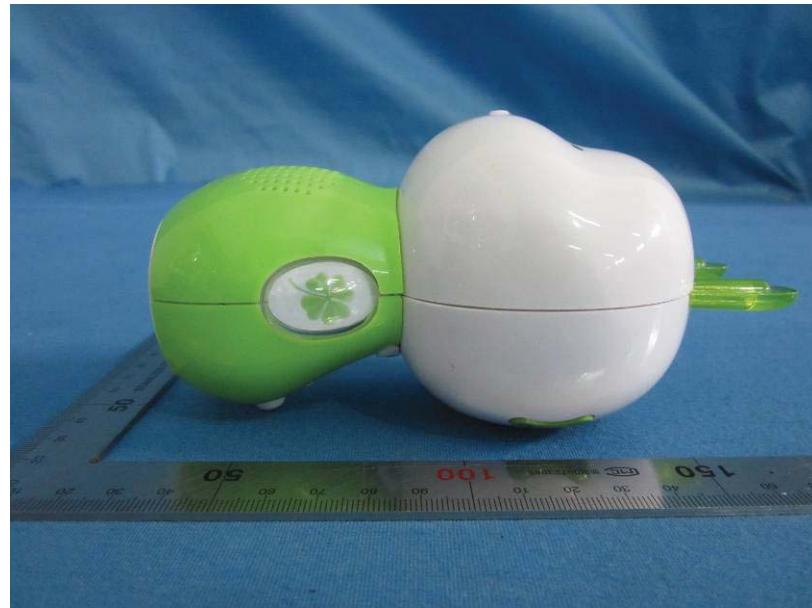
Radiated Emission

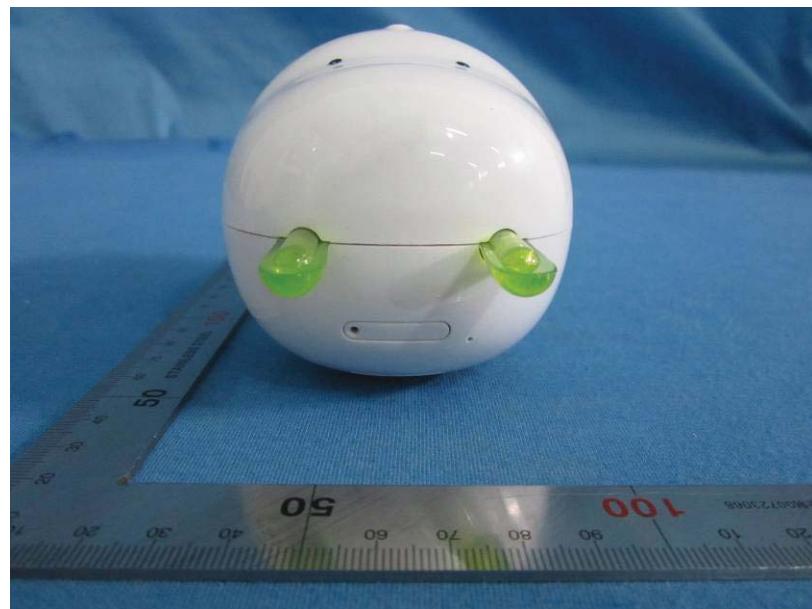


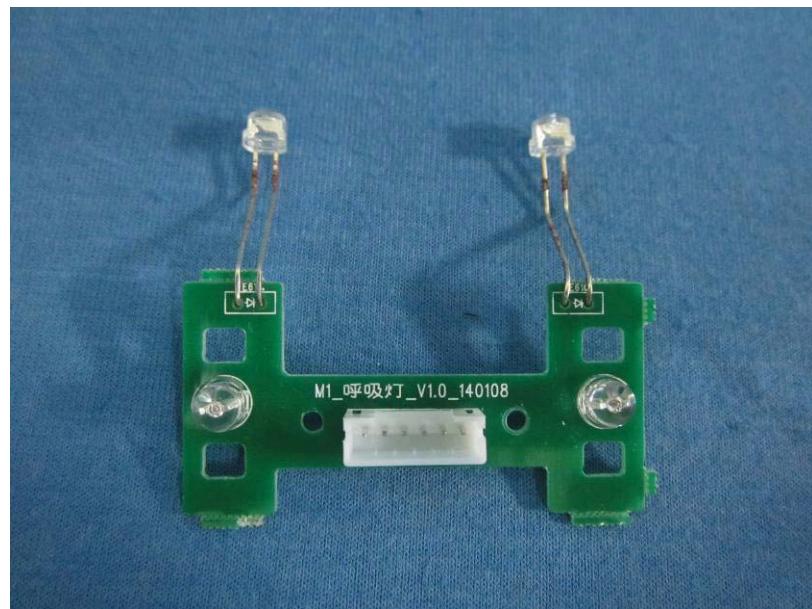
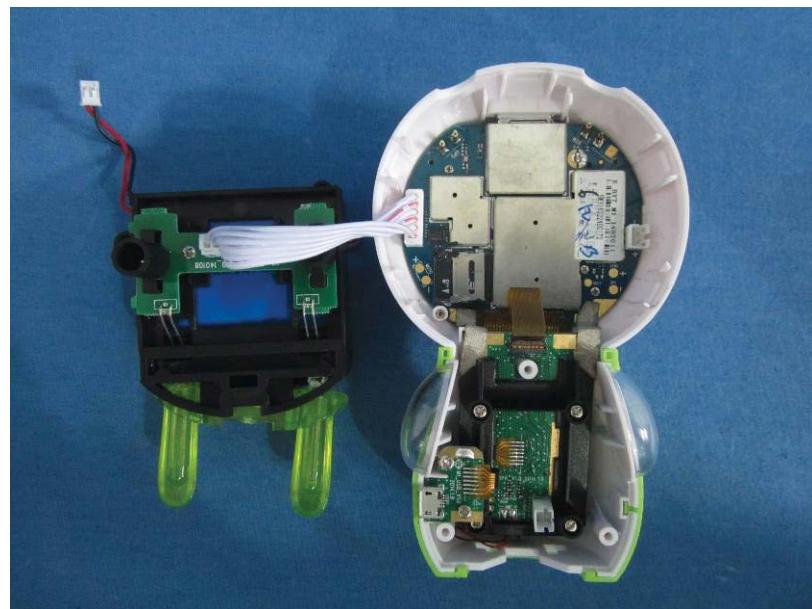
9 EUT Constructional Details

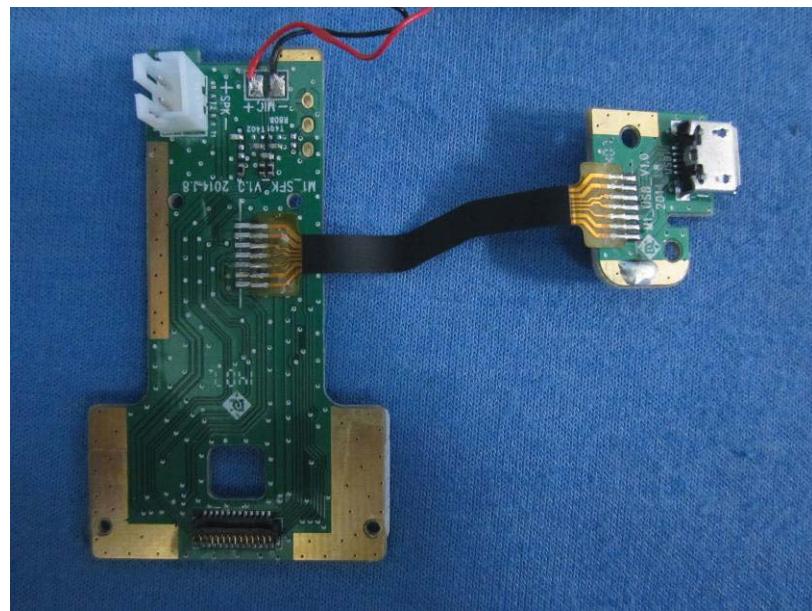
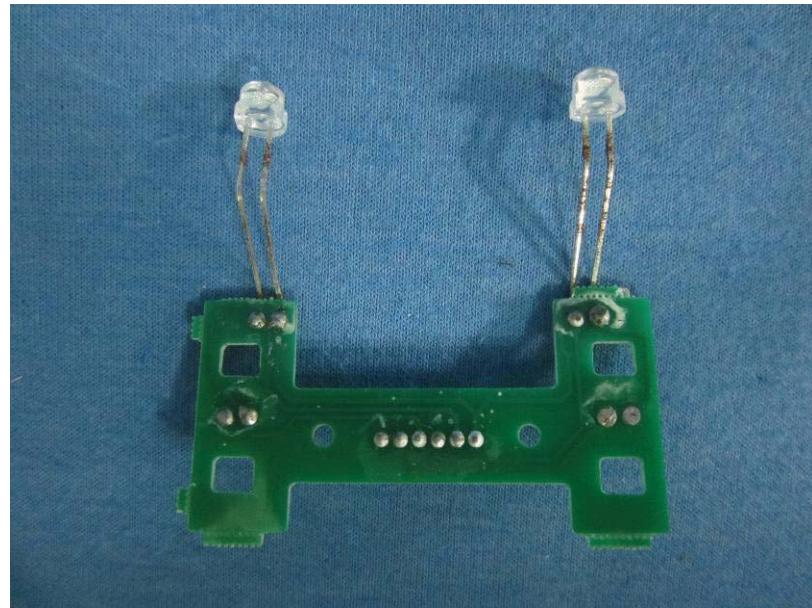


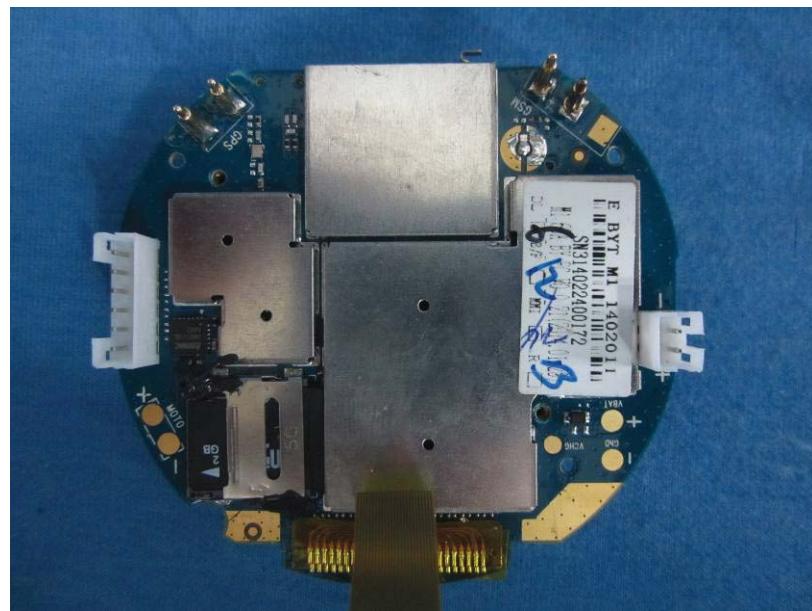
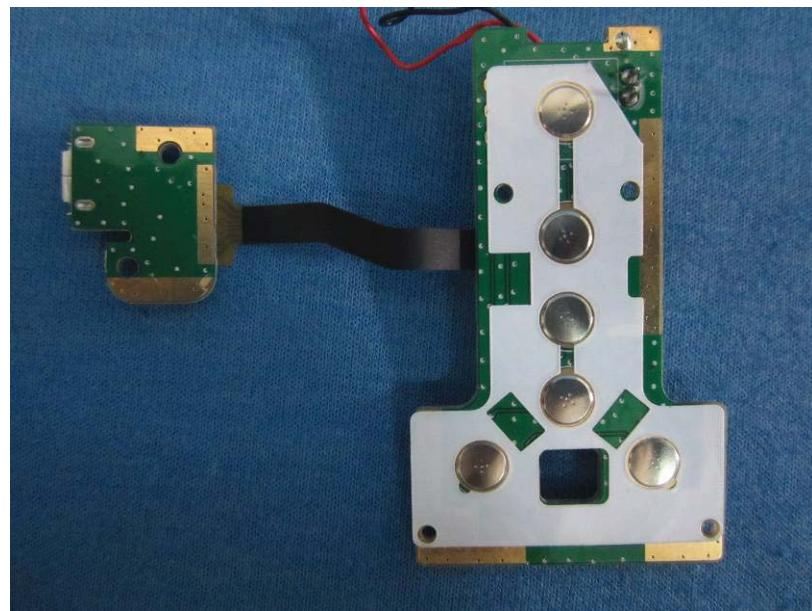


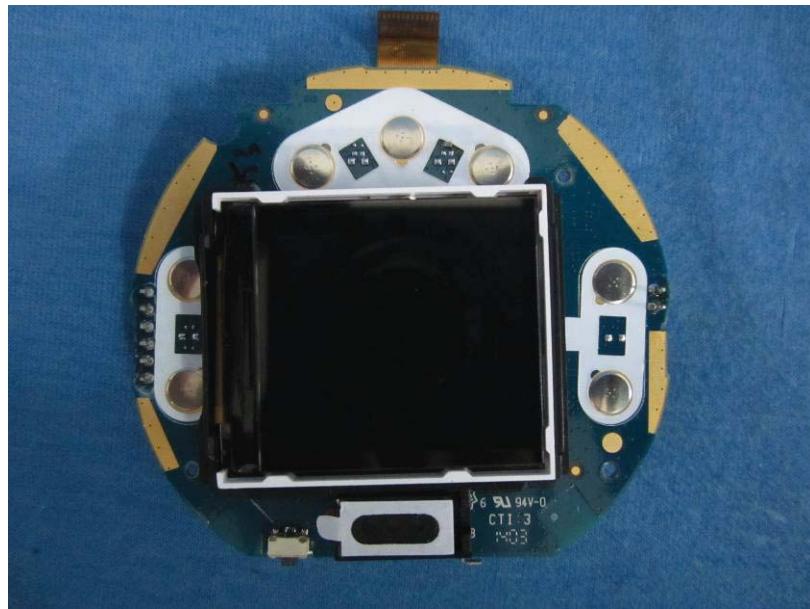
















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