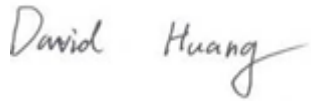


# RF TEST REPORT



Report No.: 17070412-FCC-R1

Supersede Report No.: N/A

|                                                                                                                                      |                                                                                     |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Applicant                                                                                                                            | PCD, LLC                                                                            |                                                                                       |
| Product Name                                                                                                                         | 3G Feature Phone                                                                    |                                                                                       |
| Model No.                                                                                                                            | PH201Q                                                                              |                                                                                       |
| Serial No.                                                                                                                           | N/A                                                                                 |                                                                                       |
| Test Standard                                                                                                                        | FCC Part 22(H):2016 ;FCC Part 24(E):2016; ANSI/TIA-603-D: 2010                      |                                                                                       |
| Test Date                                                                                                                            | June 13 to June 29, 2017                                                            |                                                                                       |
| Issue Date                                                                                                                           | June 30, 2017                                                                       |                                                                                       |
| Test Result                                                                                                                          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail              |                                                                                       |
| Equipment complied with the specification <input checked="" type="checkbox"/>                                                        |                                                                                     |                                                                                       |
| Equipment did not comply with the specification <input type="checkbox"/>                                                             |                                                                                     |                                                                                       |
|                                                   |  |  |
| Loren Luo<br>Test Engineer                                                                                                           | David Huang<br>Checked By                                                           |                                                                                       |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |                                                                                     |                                                                                       |

Issued by:

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## Laboratories Introduction

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### Accreditations for Conformity Assessment

| Country/Region | Scope                              |
|----------------|------------------------------------|
| USA            | EMC, RF/Wireless, SAR, Telecom     |
| Canada         | EMC, RF/Wireless, SAR, Telecom     |
| Taiwan         | EMC, RF, Telecom, SAR, Safety      |
| Hong Kong      | RF/Wireless, SAR, Telecom          |
| Australia      | EMC, RF, Telecom, SAR, Safety      |
| Korea          | EMI, EMS, RF, SAR, Telecom, Safety |
| Japan          | EMI, RF/Wireless, SAR, Telecom     |
| Singapore      | EMC, RF, SAR, Telecom              |
| Europe         | EMC, RF, SAR, Telecom, Safety      |

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## 1. Report Revision History

| Report No.      | Report Version | Description | Issue Date    |
|-----------------|----------------|-------------|---------------|
| 17070412-FCC-R1 | NONE           | Original    | June 30, 2017 |
|                 |                |             |               |
|                 |                |             |               |
|                 |                |             |               |
|                 |                |             |               |
|                 |                |             |               |

## 2. Customer information

|                  |                                                                         |
|------------------|-------------------------------------------------------------------------|
| Applicant Name   | PCD, LLC                                                                |
| Applicant Add    | 1500 Tradeport Drive, Suite A, Orlando, Florida, United States, 32824   |
| Manufacturer     | Shenzhen Haierhea Telecom Co.,Ltd.                                      |
| Manufacturer Add | Room 418,Block M-3,Middle of Hi-Tech Park,Nanshan,Shenzhen,China 518057 |

## 3. Test site information

|                      |                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Lab performing tests | SIEMIC (Shenzhen-China) LABORATORIES                                                                                                         |
| Lab Address          | Zone A, Floor 1, Building 2 Wan Ye Long Technology Park<br>South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China<br>518108 |
| FCC Test Site No.    | 718246                                                                                                                                       |
| IC Test Site No.     | 4842E-1                                                                                                                                      |
| Test Software        | Radiated Emission Program-To Shenzhen(ICP-03A1)                                                                                              |

## 4. Equipment under Test (EUT) Information

|                               |                                                                                                                                                                                                                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description of EUT:           | 3G Feature Phone                                                                                                                                                                                                                                                                    |
| Main Model:                   | PH201Q                                                                                                                                                                                                                                                                              |
| Serial Model:                 | N/A                                                                                                                                                                                                                                                                                 |
| Date EUT received:            | June 12, 2017                                                                                                                                                                                                                                                                       |
| Test Date(s):                 | June 13 to June 29, 2017                                                                                                                                                                                                                                                            |
| Equipment Category :          | PCE                                                                                                                                                                                                                                                                                 |
| Antenna Gain:                 | GSM850: -3dBi<br>PCS1900: -3dBi<br>UMTS-FDD Band V: -3dBi<br>UMTS-FDD Band II: -3dBi<br>Bluetooth: -1dBi                                                                                                                                                                            |
| Antenna Type:                 | BT: Monopole antenna<br>GSM: PIFA antenna                                                                                                                                                                                                                                           |
| Type of Modulation:           | GSM / GPRS: GMSK<br>EGPRS: GMSK<br>UMTS-FDD: QPSK<br>Bluetooth: GFSK, $\pi$ /4DQPSK, 8DPSK                                                                                                                                                                                          |
| RF Operating Frequency (ies): | GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz<br>PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz<br>UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz<br>UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;<br>RX: 1932.4 ~ 1987.6 MHz<br>Bluetooth: 2402-2480 MHz |
| Maximum Conducted             | GSM Voice: GSM850: 31.99 dBm<br>PCS1900: 29.47 dBm                                                                                                                                                                                                                                  |
| AV Power to Antenna:          | GPRS: GSM850: 31.98 dBm<br>PCS1900: 29.39 dBm                                                                                                                                                                                                                                       |

|                     |                                        |
|---------------------|----------------------------------------|
|                     | EGPRS(MCS1):GSM850: 31.91 dBm          |
|                     | PCS1900: 29.35 dBm                     |
|                     | RMC:UMTS-FDD Band 5: 23.31 dBm         |
|                     | UMTS-FDD Band 2: 23.73 dBm             |
|                     | HSUPA:UMTS-FDD Band 5: 22.26 dBm       |
|                     | UMTS-FDD Band 2: 22.89 dBm             |
|                     | HSDPA:UMTS-FDD Band 5: 22.28 dBm       |
|                     | UMTS-FDD Band 2: 22.73 dBm             |
|                     | GSM Voce:GSM850: 26.89 dBm / ERP       |
|                     | PCS1900: 26.47 dBm / EIRP              |
|                     | GPRS:GSM850: 26.88 dBm / ERP           |
|                     | PCS1900: 26.39 dBm / EIRP              |
|                     | EGPRS(MCS1):GSM850: 26.81 dBm / ERP    |
| ERP/EIRP:           | PCS1900: 26.35 dBm / EIRP              |
|                     | RMC:UMTS-FDD Band 5: 18.21 dBm / ERP   |
|                     | UMTS-FDD Band 2: 20.73 dBm / EIRP      |
|                     | HSDPA:UMTS-FDD Band 5: 17.18 dBm / ERP |
|                     | UMTS-FDD Band 2: 19.73 dBm / EIRP      |
|                     | HSUPA:UMTS-FDD Band 5: 17.16 dBm / ERP |
|                     | UMTS-FDD Band 2: 19.89 dBm / EIRP      |
|                     | GSM 850: 124CH                         |
|                     | PCS1900: 299CH                         |
| Number of Channels: | UMTS-FDD Band V : 102CH                |
|                     | UMTS-FDD Band II : 277CH               |
|                     | Bluetooth: 79CH                        |
| Port:               | USB Port, Earphone Port                |
|                     | Adapter:                               |
|                     | Model: PH201Q                          |
|                     | Input: AC100-240V~50/60Hz,0.2A         |
| Input Power:        | Output: DC 5.0V, 500mA                 |
|                     | Battery:                               |
|                     | Model: PH201Q                          |
|                     | Spec : 3.7V,600mAh,2.22Wh              |

---

Trade Name : N/A

GPRS/EGPRS Multi-slot class 8/10/12

FCC ID: 2ALJJPH201Q

## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

| FCC Rules                                             | Description of Test                                                    | Result     |
|-------------------------------------------------------|------------------------------------------------------------------------|------------|
| § 1.1307; § 2.1093                                    | RF Exposure (SAR)                                                      | Compliance |
| §2.1046; § 22.913(a); § 24.232(c);<br>§ 27.50(c.10) ; | RF Output Power                                                        | Compliance |
| § 24.232 (d) ;                                        | Peak-Average Ratio                                                     | Compliance |
| § 2.1049; § 22.905; § 22.917;<br>§ 24.238;            | 99% & -26 dB Occupied Bandwidth                                        | Compliance |
| § 2.1051; § 22.917(a);<br>§ 24.238(a);                | Spurious Emissions at Antenna Terminal                                 | Compliance |
| § 2.1053; § 22.917(a);<br>§ 24.238(a);                | Field Strength of Spurious Radiation                                   | Compliance |
| § 22.917(a); § 24.238(a);                             | Out of band emission, Band Edge                                        | Compliance |
| § 2.1055; § 22.355; § 24.235;                         | Frequency stability vs. temperature<br>Frequency stability vs. voltage | Compliance |

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different

### Measurement Uncertainty

| Emissions                                    |                                                                                                                                                 |               |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Test Item                                    | Description                                                                                                                                     | Uncertainty   |
| Band Edge and Radiated<br>Spurious Emissions | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/-4.5dB |
| -                                            | -                                                                                                                                               | -             |

## 6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

### 6.1 RF Exposure (SAR)

Test Result: Pass

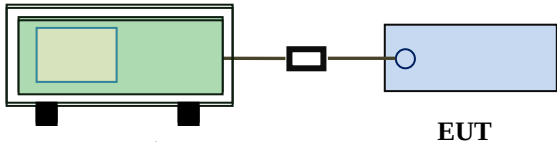
The EUT is a portable device, thus requires SAR evaluation;  
Please refer to RF Exposure Evaluation Report: 17070412-FCC-H.

## 6.2 RF Output Power

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 52%           |
| Atmospheric Pressure | 1019mbar      |
| Test date :          | June 19, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec        | Item | Requirement  | Applicable                          |
|-------------|------|--------------|-------------------------------------|
| §22.913 (a) | a)   | ERP:38.45dBm | <input checked="" type="checkbox"/> |
| §24.232 (c) | b)   | EIRP:33dBm   | <input checked="" type="checkbox"/> |

|            |                                                                                                                                                              |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Setup |  <p style="text-align: center;">Base Station                      EUT</p> |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Procedure | <p>For Conducted Power:</p> <ul style="list-style-type: none"> <li>- The transmitter output port was connected to base station.</li> <li>- Set EUT at maximum power through base station.</li> <li>- Select lowest, middle, and highest channels for each band and different test mode.</li> </ul> <p>For ERP/EIRP:</p> <p>According with KDB 971168 v02r02</p> <ul style="list-style-type: none"> <li>- The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>- The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>- The frequency range up to tenth harmonic of the fundamental frequency was investigated.</li> </ul> |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <ul style="list-style-type: none"> <li>- Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</li> <li>- Spurious emissions in dB = <math>10 \log (\text{TX power in Watts}/0.001)</math> – the absolute level</li> <li>- Spurious attenuation limit in dB = <math>43 + 10 \log_{10} (\text{power out in Watts})</math>.</li> </ul> |
| Remark |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

## Conducted Power

## GSM Mode:

| Burst Average Power (dBm);                           |              |       |       |                              |         |       |              |                              |
|------------------------------------------------------|--------------|-------|-------|------------------------------|---------|-------|--------------|------------------------------|
| Band                                                 | GSM850       |       |       |                              | PCS1900 |       |              |                              |
| Channel                                              | 128          | 190   | 251   | Tune up<br>Power<br>tolerant | 512     | 661   | 810          | Tune up<br>Power<br>tolerant |
| Frequency (MHz)                                      | 824.2        | 836.6 | 848.8 | /                            | 1850.2  | 1880  | 1909.8       | /                            |
| GSM Voice<br>(1 uplink),GMSK                         | <b>31.99</b> | 31.76 | 31.58 | 31.5±1                       | 29.34   | 29.35 | <b>29.47</b> | 29±1                         |
| GPRS Multi-Slot Class<br>8 (1 uplink),GMSK           | <b>31.98</b> | 31.7  | 31.52 | 31.5±1                       | 29.27   | 29.28 | <b>29.39</b> | 29±1                         |
| GPRS Multi-Slot Class<br>10 (2 uplink) GMSK          | 31.19        | 30.95 | 30.78 | 30.5±1                       | 28.48   | 28.49 | 28.65        | 28.5±1                       |
| GPRS Multi-Slot Class<br>12 (4 uplink) GMSK          | 28.37        | 28.06 | 27.89 | 28±1                         | 25.42   | 25.47 | 25.65        | 25.5±1                       |
| EGPRS Multi-Slot<br>Class 8 (1 uplink)<br>GMSK MCS1  | <b>31.91</b> | 31.67 | 31.51 | 31.5±1                       | 29.23   | 29.24 | <b>29.35</b> | 29±1                         |
| EGPRS Multi-Slot<br>Class 10 (2 uplink)<br>GMSK MCS1 | 31.18        | 30.93 | 30.73 | 30.5±1                       | 28.44   | 28.47 | 28.64        | 28.5±1                       |
| EGPRS Multi-Slot<br>Class 12 (4 uplink)<br>GMSK MCS1 | 28.23        | 27.98 | 27.84 | 28±1                         | 25.32   | 25.4  | 25.57        | 25.5±1                       |

Remark :

GPRS, CS1 coding scheme.

EGPRS, MCS1 coding scheme.

Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link

Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link

Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link

## UMTS Mode:

### UMTS-FDD Band V

| Band/ Time Slot configuration | Channel | Frequency | Average power (dBm) | Tune up Power tolerant |
|-------------------------------|---------|-----------|---------------------|------------------------|
| RMC<br>12.2kbps               | 4132    | 826.4     | <b>23.31</b>        | 23±1                   |
|                               | 4175    | 835       | 23.27               | 23±1                   |
|                               | 4233    | 846.6     | 23.28               | 23±1                   |
| HSDPA<br>Subtest1             | 4132    | 826.4     | 22.06               | 22±1                   |
|                               | 4175    | 835       | 22.17               | 22±1                   |
|                               | 4233    | 846.6     | 22.09               | 22±1                   |
| HSDPA<br>Subtest2             | 4132    | 826.4     | 22.15               | 22±1                   |
|                               | 4175    | 835       | 22.18               | 22±1                   |
|                               | 4233    | 846.6     | 22.12               | 22±1                   |
| HSDPA<br>Subtest3             | 4132    | 826.4     | 22.09               | 22±1                   |
|                               | 4175    | 835       | 22.06               | 22±1                   |
|                               | 4233    | 846.6     | 22.04               | 22±1                   |
| HSDPA<br>Subtest4             | 4132    | 826.4     | 22.26               | 22±1                   |
|                               | 4175    | 835       | <b>22.28</b>        | 22±1                   |
|                               | 4233    | 846.6     | 22.22               | 22±1                   |
| HSUPA<br>Subtest1             | 4132    | 826.4     | 21.96               | 22±1                   |
|                               | 4175    | 835       | 21.93               | 22±1                   |
|                               | 4233    | 846.6     | 21.99               | 22±1                   |
| HSUPA<br>Subtest2             | 4132    | 826.4     | 22.18               | 22±1                   |
|                               | 4175    | 835       | 22.12               | 22±1                   |
|                               | 4233    | 846.6     | 22.11               | 22±1                   |
| HSUPA<br>Subtest3             | 4132    | 826.4     | 22.13               | 22±1                   |
|                               | 4175    | 835       | 22.1                | 22±1                   |
|                               | 4233    | 846.6     | 22.09               | 22±1                   |
| HSUPA<br>Subtest4             | 4132    | 826.4     | <b>22.26</b>        | 22±1                   |
|                               | 4175    | 835       | 22.19               | 22±1                   |
|                               | 4233    | 846.6     | 22.23               | 22±1                   |
| HSUPA<br>Subtest5             | 4132    | 826.4     | 22.09               | 22±1                   |
|                               | 4175    | 835       | 22.16               | 22±1                   |
|                               | 4233    | 846.6     | 22.12               | 22±1                   |

## UMTS-FDD Band II

| Band/ Time Slot configuration | Channel | Frequency | Average power (dBm) | Tune up Power tolerant |
|-------------------------------|---------|-----------|---------------------|------------------------|
| RMC<br>12.2kbps               | 9262    | 1852.4    | <b>23.73</b>        | 23±1                   |
|                               | 9400    | 1880      | 23.03               | 23±1                   |
|                               | 9538    | 1907.6    | 22.92               | 23±1                   |
| HSDPA<br>Subtest1             | 9262    | 1852.4    | 22.62               | 22.3±1                 |
|                               | 9400    | 1880      | 22.34               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.13               | 22.3±1                 |
| HSDPA<br>Subtest2             | 9262    | 1852.4    | 22.57               | 22.3±1                 |
|                               | 9400    | 1880      | 22.06               | 22.3±1                 |
|                               | 9538    | 1907.6    | 21.93               | 22.3±1                 |
| HSDPA<br>Subtest3             | 9262    | 1852.4    | <b>22.73</b>        | 22.3±1                 |
|                               | 9400    | 1880      | 22.16               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.08               | 22.3±1                 |
| HSDPA<br>Subtest4             | 9262    | 1852.4    | 22.62               | 22.3±1                 |
|                               | 9400    | 1880      | 22.24               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.13               | 22.3±1                 |
| HSUPA<br>Subtest1             | 9262    | 1852.4    | <b>22.89</b>        | 22.3±1                 |
|                               | 9400    | 1880      | 22.42               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.35               | 22.3±1                 |
| HSUPA<br>Subtest2             | 9262    | 1852.4    | 22.43               | 22.3±1                 |
|                               | 9400    | 1880      | 21.95               | 22.3±1                 |
|                               | 9538    | 1907.6    | 21.83               | 22.3±1                 |
| HSUPA<br>Subtest3             | 9262    | 1852.4    | 22.66               | 22.3±1                 |
|                               | 9400    | 1880      | 22.13               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.06               | 22.3±1                 |
| HSUPA<br>Subtest4             | 9262    | 1852.4    | 22.73               | 22.3±1                 |
|                               | 9400    | 1880      | 22.28               | 22.3±1                 |
|                               | 9538    | 1907.6    | 22.19               | 22.3±1                 |
| HSUPA<br>Subtest5             | 9262    | 1852.4    | 22.55               | 22.3±1                 |
|                               | 9400    | 1880      | 22.09               | 22.3±1                 |
|                               | 9538    | 1907.6    | 21.93               | 22.3±1                 |

## ERP & EIRP

### GSM Voice

#### ERP for Cellular Band (Part 22H)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 824.2           | 20.62                   | V                    | 6.8                           | 0.53            | <b>26.89</b>         | 38.45       |
| 824.2           | 18.68                   | H                    | 6.8                           | 0.53            | 24.95                | 38.45       |
| 836.6           | 20.39                   | V                    | 6.8                           | 0.53            | 26.66                | 38.45       |
| 836.6           | 18.46                   | H                    | 6.8                           | 0.53            | 24.73                | 38.45       |
| 848.8           | 20.11                   | V                    | 6.9                           | 0.53            | 26.48                | 38.45       |
| 848.8           | 18.19                   | H                    | 6.9                           | 0.53            | 24.56                | 38.45       |

#### EIRP for PCS Band (Part 24E)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1850.2          | 19.31                   | V                    | 7.88                          | 0.85            | 26.34                | 33          |
| 1850.2          | 17.35                   | H                    | 7.88                          | 0.85            | 24.38                | 33          |
| 1880            | 19.32                   | V                    | 7.88                          | 0.85            | 26.35                | 33          |
| 1880            | 17.36                   | H                    | 7.88                          | 0.85            | 24.39                | 33          |
| 1909.8          | 19.46                   | V                    | 7.86                          | 0.85            | <b>26.47</b>         | 33          |
| 1909.8          | 17.51                   | H                    | 7.86                          | 0.85            | 24.52                | 33          |

**GPRS:**

**ERP for Cellular Band (Part 22H)**

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 824.2           | 20.61                   | V                    | 6.8                           | 0.53            | <b>26.88</b>         | 38.45       |
| 824.2           | 18.66                   | H                    | 6.8                           | 0.53            | 24.93                | 38.45       |
| 836.6           | 20.33                   | V                    | 6.8                           | 0.53            | 26.6                 | 38.45       |
| 836.6           | 18.37                   | H                    | 6.8                           | 0.53            | 24.64                | 38.45       |
| 848.8           | 20.05                   | V                    | 6.9                           | 0.53            | 26.42                | 38.45       |
| 848.8           | 18.12                   | H                    | 6.9                           | 0.53            | 24.49                | 38.45       |

**EIRP for PCS Band (Part 24E)**

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1850.2          | 19.24                   | V                    | 7.88                          | 0.85            | 26.27                | 33          |
| 1850.2          | 17.23                   | H                    | 7.88                          | 0.85            | 24.26                | 33          |
| 1880            | 19.25                   | V                    | 7.88                          | 0.85            | 26.28                | 33          |
| 1880            | 17.28                   | H                    | 7.88                          | 0.85            | 24.31                | 33          |
| 1909.8          | 19.38                   | V                    | 7.86                          | 0.85            | <b>26.39</b>         | 33          |
| 1909.8          | 17.44                   | H                    | 7.86                          | 0.85            | 24.45                | 33          |

## EGPRS (MCS1):

### ERP for Cellular Band (Part 22H)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 824.2           | 20.54                   | V                    | 6.8                           | 0.53            | <b>26.81</b>         | 38.45       |
| 824.2           | 18.6                    | H                    | 6.8                           | 0.53            | 24.87                | 38.45       |
| 836.6           | 20.3                    | V                    | 6.8                           | 0.53            | 26.57                | 38.45       |
| 836.6           | 18.36                   | H                    | 6.8                           | 0.53            | 24.63                | 38.45       |
| 848.8           | 20.04                   | V                    | 6.9                           | 0.53            | 26.41                | 38.45       |
| 848.8           | 18.1                    | H                    | 6.9                           | 0.53            | 24.47                | 38.45       |

### EIRP for PCS Band (Part 24E)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1850.2          | 19.2                    | V                    | 7.88                          | 0.85            | 26.23                | 33          |
| 1850.2          | 17.24                   | H                    | 7.88                          | 0.85            | 24.27                | 33          |
| 1880            | 19.21                   | V                    | 7.88                          | 0.85            | 26.24                | 33          |
| 1880            | 17.28                   | H                    | 7.88                          | 0.85            | 24.31                | 33          |
| 1909.8          | 19.34                   | V                    | 7.86                          | 0.85            | <b>26.35</b>         | 33          |
| 1909.8          | 17.39                   | H                    | 7.86                          | 0.85            | 24.4                 | 33          |

## RMC

### ERP for UMTS-FDD Band V (Part 22H)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 826.4           | 11.94                   | V                    | 6.8                           | 0.53            | <b>18.21</b>         | 38.45       |
| 826.4           | 10.96                   | H                    | 6.8                           | 0.53            | 17.23                | 38.45       |
| 835             | 11.9                    | V                    | 6.8                           | 0.53            | 18.17                | 38.45       |
| 835             | 10.93                   | H                    | 6.8                           | 0.53            | 17.2                 | 38.45       |
| 846.6           | 11.81                   | V                    | 6.9                           | 0.53            | 18.18                | 38.45       |
| 846.6           | 10.85                   | H                    | 6.9                           | 0.53            | 17.22                | 38.45       |

### EIRP for UMTS-FDD Band II (Part 24E)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1852.4          | 13.7                    | V                    | 7.88                          | 0.85            | <b>20.73</b>         | 33          |
| 1852.4          | 12.72                   | H                    | 7.88                          | 0.85            | 19.75                | 33          |
| 1880            | 13                      | V                    | 7.88                          | 0.85            | 20.03                | 33          |
| 1880            | 12.06                   | H                    | 7.88                          | 0.85            | 19.09                | 33          |
| 1907.6          | 12.91                   | V                    | 7.86                          | 0.85            | 19.92                | 33          |
| 1907.6          | 12.01                   | H                    | 7.86                          | 0.85            | 19.02                | 33          |

## HSDPA

### ERP for UMTS-FDD Band V (Part 22H)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 826.4           | 10.89                   | V                    | 6.8                           | 0.53            | 17.16                | 38.45       |
| 826.4           | 9.97                    | H                    | 6.8                           | 0.53            | 16.24                | 38.45       |
| 835             | 10.91                   | V                    | 6.8                           | 0.53            | <b>17.18</b>         | 38.45       |
| 835             | 9.98                    | H                    | 6.8                           | 0.53            | 16.25                | 38.45       |
| 846.6           | 10.75                   | V                    | 6.9                           | 0.53            | 17.12                | 38.45       |
| 846.6           | 9.82                    | H                    | 6.9                           | 0.53            | 16.19                | 38.45       |

### EIRP for UMTS-FDD Band II (Part 24E)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1852.4          | 12.7                    | V                    | 7.88                          | 0.85            | <b>19.73</b>         | 33          |
| 1852.4          | 11.83                   | H                    | 7.88                          | 0.85            | 18.86                | 33          |
| 1880            | 12.31                   | V                    | 7.88                          | 0.85            | 19.34                | 33          |
| 1880            | 11.39                   | H                    | 7.88                          | 0.85            | 18.42                | 33          |
| 1907.6          | 12.12                   | V                    | 7.86                          | 0.85            | 19.13                | 33          |
| 1907.6          | 11.22                   | H                    | 7.86                          | 0.85            | 18.23                | 33          |

## HSUPA

### ERP for UMTS-FDD Band V (Part 22H)

| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 826.4           | 10.89                   | V                    | 6.8                           | 0.53            | <b>17.16</b>         | 38.45       |
| 826.4           | 9.96                    | H                    | 6.8                           | 0.53            | 16.23                | 38.45       |
| 835             | 10.82                   | V                    | 6.8                           | 0.53            | 17.09                | 38.45       |
| 835             | 9.88                    | H                    | 6.8                           | 0.53            | 16.15                | 38.45       |
| 846.6           | 10.76                   | V                    | 6.9                           | 0.53            | 17.13                | 38.45       |
| 846.6           | 9.8                     | H                    | 6.9                           | 0.53            | 16.17                | 38.45       |

### EIRP for UMTS-FDD Band II (Part 24E)

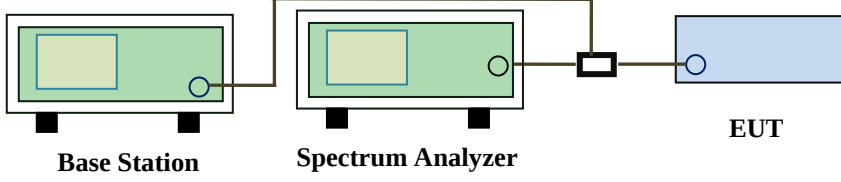
| Frequency (MHz) | Substituted level (dBm) | Antenna Polarization | Antenna Gain correction (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) |
|-----------------|-------------------------|----------------------|-------------------------------|-----------------|----------------------|-------------|
| 1852.4          | 12.86                   | V                    | 7.88                          | 0.85            | <b>19.89</b>         | 33          |
| 1852.4          | 11.91                   | H                    | 7.88                          | 0.85            | 18.94                | 33          |
| 1880            | 12.39                   | V                    | 7.88                          | 0.85            | 19.42                | 33          |
| 1880            | 11.43                   | H                    | 7.88                          | 0.85            | 18.46                | 33          |
| 1907.6          | 12.34                   | V                    | 7.86                          | 0.85            | 19.35                | 33          |
| 1907.6          | 11.37                   | H                    | 7.86                          | 0.85            | 18.38                | 33          |

### 6.3 Peak-Average Ratio

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 52%           |
| Atmospheric Pressure | 1019mbar      |
| Test date :          | June 19, 2017 |
| Tested By :          | Loren Luo     |

Requirement(s):

| Spec       | Item | Requirement                                                              | Applicable                          |
|------------|------|--------------------------------------------------------------------------|-------------------------------------|
| §24.232(d) | a)   | The peak-to-average ratio (PAR) of the transmission may not exceed 13dB. | <input checked="" type="checkbox"/> |

|            |                                                                                                                                                                     |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Setup |  <p style="text-align: center;">Base Station      Spectrum Analyzer      EUT</p> |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Procedure | <p><b>According with KDB 971168 v02r02</b></p> <p><b>5.7.2 Alternate procedure for PAPR</b></p> <p><b>5.1.2 Peak power measurements with a peak power meter</b></p> <p>The total peak output power may be measured using a broadband peak RF power meter. The power meter must have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.</p> <p><b>5.2.3 Average power measurement with average power meter</b></p> <p>As an alternative to the use of a spectrum/signal analyzer or EMI receiver to perform a measurement of the total in-band average output power, a wideband RF average power meter with a thermocouple detector or equivalent can be used under certain conditions</p> <p>If the EUT can be configured to transmit continuously (i.e., the burst duty cycle <math>\geq 98\%</math>) and at all times the EUT is transmitting at its maximum output</p> |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | <p>power level, then a conventional wide-band RF power meter can be used.</p> <p>If the EUT cannot be configured to transmit continuously (i.e., the burst duty cycle &lt; 98%), then there are two options for the use of an average power meter. First, a gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only over active transmission bursts at maximum output power levels. A conventional average power meter can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than <math>\pm 2</math> percent) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to <math>10\log(1/\text{duty cycle})</math></p> |
| Remark |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Test Data ☒ Yes ☐ N/A  
 Test Plot ☐ Yes (See below) ☒ N/A

#### GSM : GSM 1900 PK-AV POWER (PART 24E)

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1850.2             | 29.68                | 29.34   | 0.34                       |
| 1880               | 29.72                | 29.35   | 0.37                       |
| 1909.8             | 29.78                | 29.47   | 0.31                       |

#### GPRS 1900 PK-AV POWER (PART 24E)

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1850.2             | 29.59                | 29.27   | 0.32                       |
| 1880               | 29.6                 | 29.28   | 0.32                       |
| 1909.8             | 29.64                | 29.39   | 0.25                       |

#### EGPRS (MSC1) 1900 PK-AV POWER (PART 24E)

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1850.2             | 29.56                | 29.23   | 0.33                       |
| 1880               | 29.63                | 29.24   | 0.39                       |
| 1909.8             | 29.6                 | 29.35   | 0.25                       |

#### RMC : UMTS-FDD Band 2 PK-AV POWER (PART 24E)

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1852.4             | 24.1                 | 23.73   | 0.37                       |
| 1880               | 23.31                | 23.03   | 0.28                       |
| 1907.6             | 23.21                | 22.92   | 0.29                       |

#### HSDPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1852.4             | 22.95                | 22.62   | 0.33                       |
| 1880               | 22.63                | 22.34   | 0.29                       |
| 1907.6             | 22.4                 | 22.13   | 0.27                       |

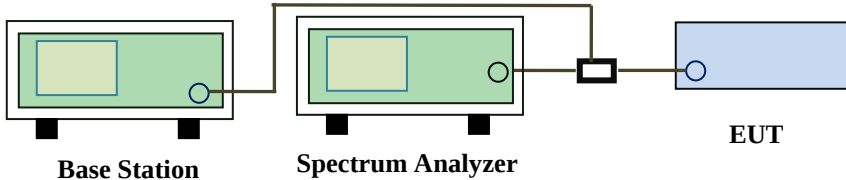
**HSUPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)**

| Frequency<br>(MHz) | Conducted power(dBm) |         | Peak-Average<br>Ratio(PAR) |
|--------------------|----------------------|---------|----------------------------|
|                    | Peak                 | Average |                            |
| 1852.4             | 23.05                | 22.89   | 0.16                       |
| 1880               | 22.76                | 22.42   | 0.34                       |
| 1907.6             | 22.68                | 22.35   | 0.33                       |

## 6.4 Occupied Bandwidth

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1020mbar      |
| Test date :          | June 20, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec                                       | Item                                                                                                                                                                                                                                     | Requirement                 | Applicable                          |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------|
| §2.1049,<br>§22.917,<br>§22.905<br>§24.238 | a)                                                                                                                                                                                                                                       | 99% Occupied Bandwidth(kHz) | <input checked="" type="checkbox"/> |
|                                            | b)                                                                                                                                                                                                                                       | 26 dB Bandwidth(kHz)        | <input checked="" type="checkbox"/> |
| Test Setup                                 |                                                                                                                                                      |                             |                                     |
| Test Procedure                             | <ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.</li> </ul> |                             |                                     |
| Remark                                     |                                                                                                                                                                                                                                          |                             |                                     |
| Result                                     | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                   |                             |                                     |

Test Data    ☒ Yes      ☐ N/A

Test Plot    ☒ Yes (See below)      ☐ N/A

## GSM Voice:

### Cellular Band (Part 22H) result

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Bandwidth (kHz) |
|---------|-----------------|------------------------------|-----------------------|
| 128     | 824.2           | 246.6102                     | 319.668               |
| 190     | 836.6           | 247.9914                     | 317.035               |
| 251     | 848.8           | 244.2251                     | 317.918               |

### PCS Band (Part 24E) result

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Bandwidth (kHz) |
|---------|-----------------|------------------------------|-----------------------|
| 512     | 1850.2          | 248.5655                     | 320.106               |
| 661     | 1880.0          | 247.0460                     | 319.597               |
| 810     | 1909.8          | 243.2543                     | 319.749               |

## GPRS:

### Cellular Band (Part 22H) result

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Bandwidth (kHz) |
|---------|-----------------|------------------------------|-----------------------|
| 128     | 824.2           | 243.7910                     | 318.634               |
| 190     | 836.6           | 246.4037                     | 320.047               |
| 251     | 848.8           | 246.2153                     | 317.861               |

### PCS Band (Part 24E) result

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Bandwidth (kHz) |
|---------|-----------------|------------------------------|-----------------------|
| 512     | 1850.2          | 244.4955                     | 319.380               |
| 661     | 1880.0          | 247.3781                     | 324.302               |
| 810     | 1909.8          | 246.1877                     | 321.986               |

## EGPRS (MCS 1):

### Cellular Band (Part 22H) result

| Channel | Frequency<br>(MHz) | 99% Occupied<br>Bandwidth (kHz) | 26 dB Bandwidth<br>(kHz) |
|---------|--------------------|---------------------------------|--------------------------|
| 128     | 824.2              | 243.0178                        | 323.077                  |
| 190     | 836.6              | 244.8582                        | 323.106                  |
| 251     | 848.8              | 246.4225                        | 322.806                  |

### PCS Band (Part 24E) result

| Channel | Frequency<br>(MHz) | 99% Occupied<br>Bandwidth (kHz) | 26 dB Bandwidth<br>(kHz) |
|---------|--------------------|---------------------------------|--------------------------|
| 512     | 1850.2             | 244.2251                        | 317.918                  |
| 661     | 1880.0             | 247.2077                        | 320.267                  |
| 810     | 1909.8             | 246.6539                        | 322.831                  |

**RMC:**

**UMTS-FDD Band V (Part 22H)**

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|---------|-----------------|------------------------------|-----------------------|
| 4132    | 826.4           | 4.1607                       | 4.707                 |
| 4175    | 835.0           | 4.1605                       | 4.704                 |
| 4233    | 846.6           | 4.1504                       | 4.706                 |

**UMTS-FDD Band II (Part 24E)**

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|---------|-----------------|------------------------------|-----------------------|
| 9262    | 1852.4          | 4.1737                       | 4.716                 |
| 9400    | 1880.0          | 4.1710                       | 4.719                 |
| 9538    | 1907.6          | 4.1746                       | 4.726                 |

**HSDPA:**

**UMTS-FDD Band V (Part 22H)**

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|---------|-----------------|------------------------------|-----------------------|
| 4132    | 826.4           | 4.1640                       | 4.717                 |
| 4175    | 835.0           | 4.1587                       | 4.738                 |
| 4233    | 846.6           | 4.1619                       | 4.702                 |

**UMTS-FDD Band II (Part 24E)**

| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|---------|-----------------|------------------------------|-----------------------|
| 9262    | 1852.4          | 4.1737                       | 4.720                 |
| 9400    | 1880.0          | 4.1665                       | 4.711                 |
| 9538    | 1907.6          | 4.1687                       | 4.732                 |

**HSUPA:**

**UMTS-FDD Band V (Part 22H)**

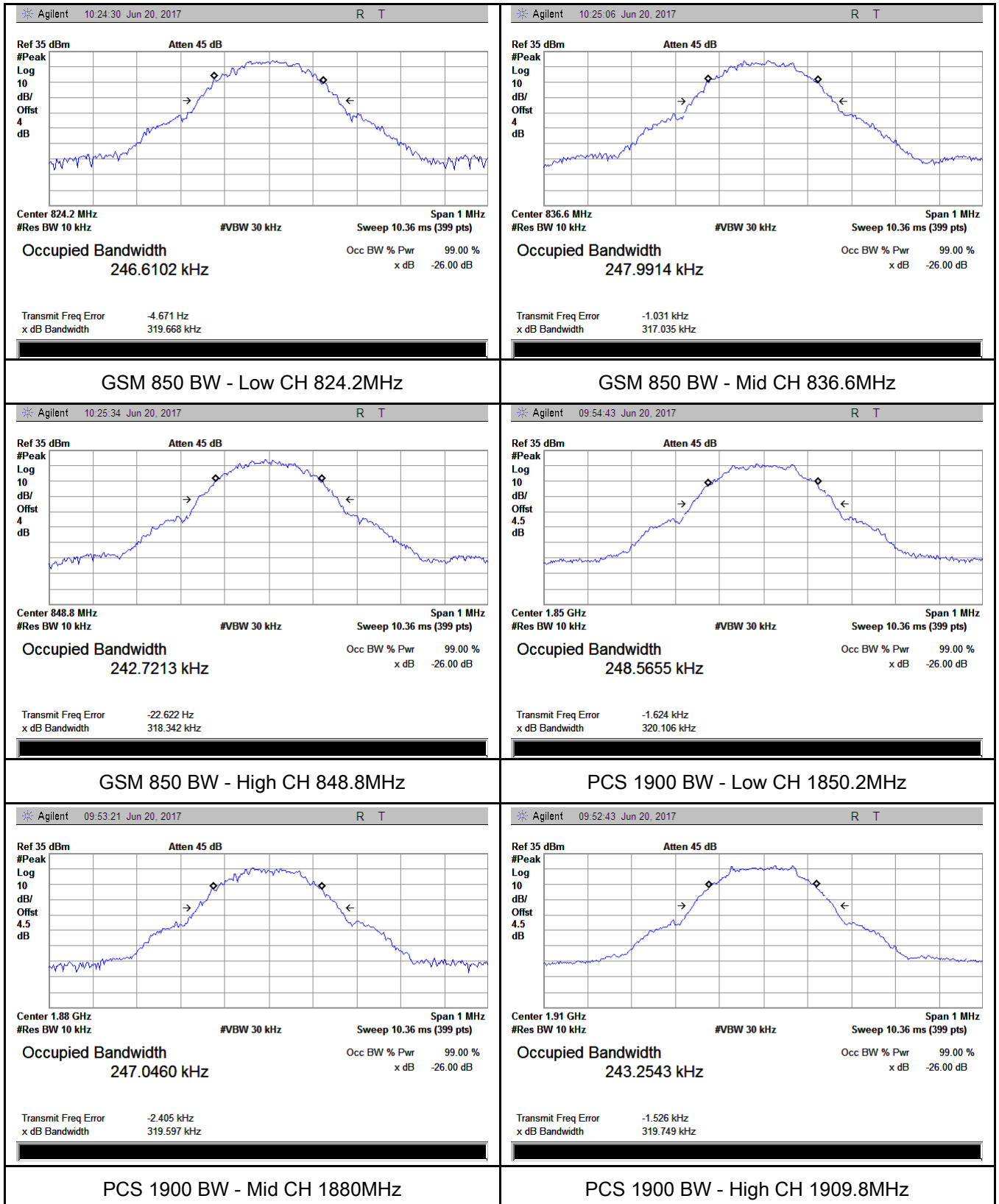
| Channel | Frequency<br>(MHz) | 99% Occupied<br>Bandwidth (MHz) | 26 dB Bandwidth<br>(MHz) |
|---------|--------------------|---------------------------------|--------------------------|
| 4132    | 826.4              | 4.1630                          | 4.712                    |
| 4175    | 835.0              | 4.1612                          | 4.761                    |
| 4233    | 846.6              | 4.1732                          | 4.708                    |

**UMTS-FDD Band II (Part 24E)**

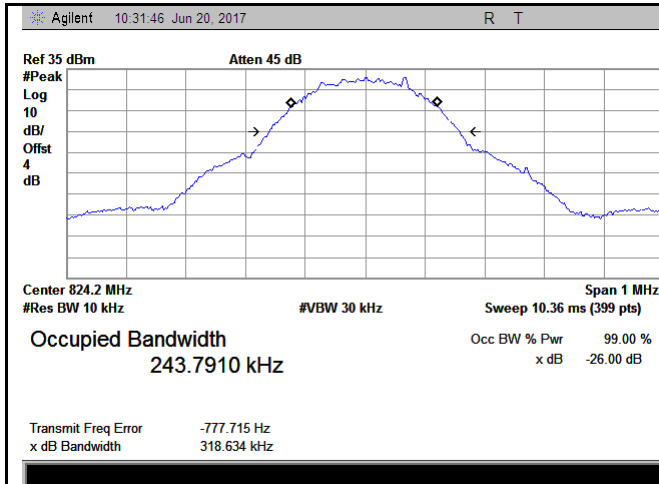
| Channel | Frequency<br>(MHz) | 99% Occupied<br>Bandwidth (MHz) | 26 dB Bandwidth<br>(MHz) |
|---------|--------------------|---------------------------------|--------------------------|
| 9262    | 1852.4             | 4.1761                          | 4.720                    |
| 9400    | 1880.0             | 4.1659                          | 4.727                    |
| 9538    | 1907.6             | 4.1613                          | 4.724                    |

## Test Plots

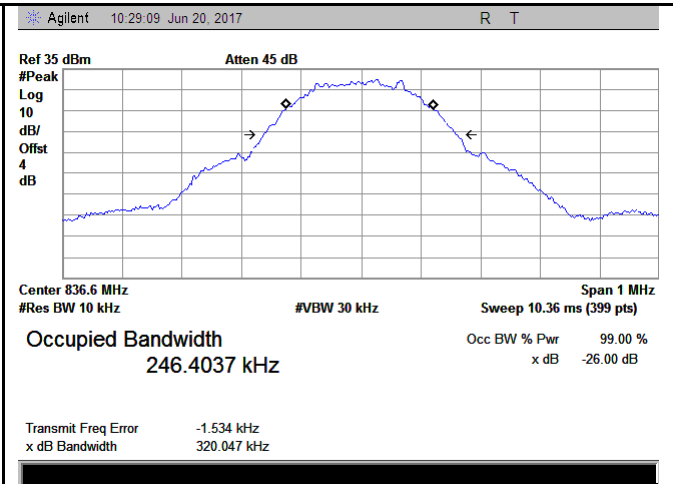
### GSM Voice:



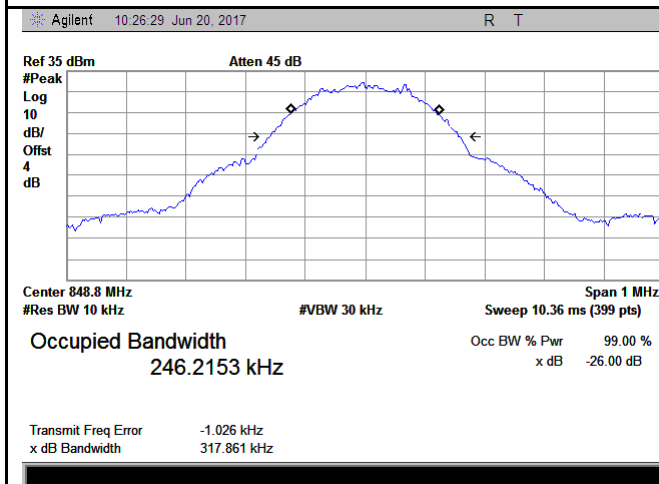
## GPRS:



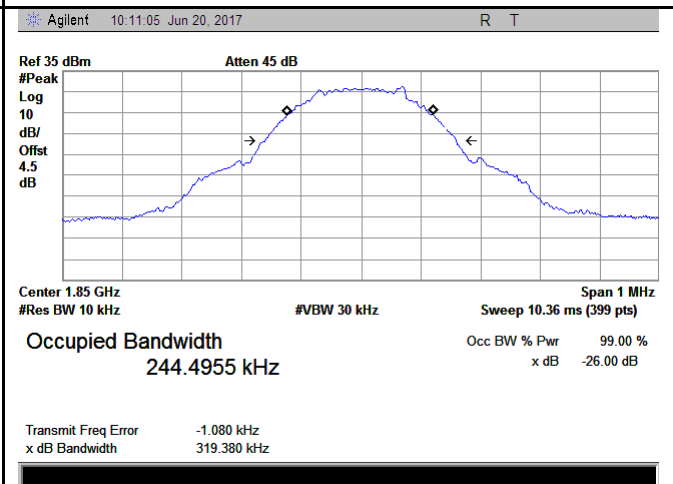
GSM 850 BW - Low CH 824.2MHz



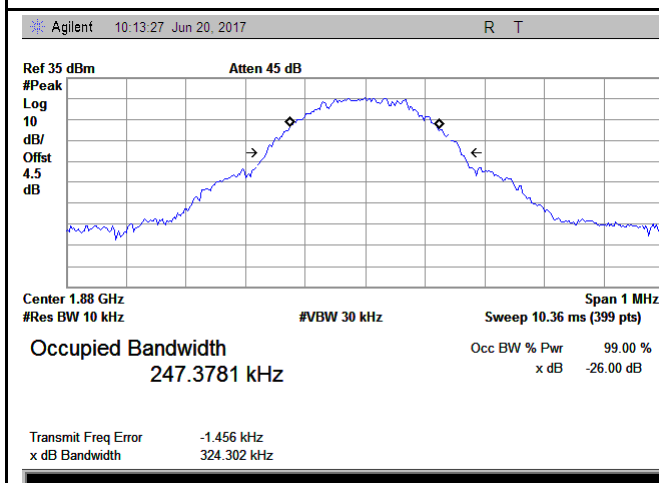
GSM 850 BW - Mid CH 836.6MHz



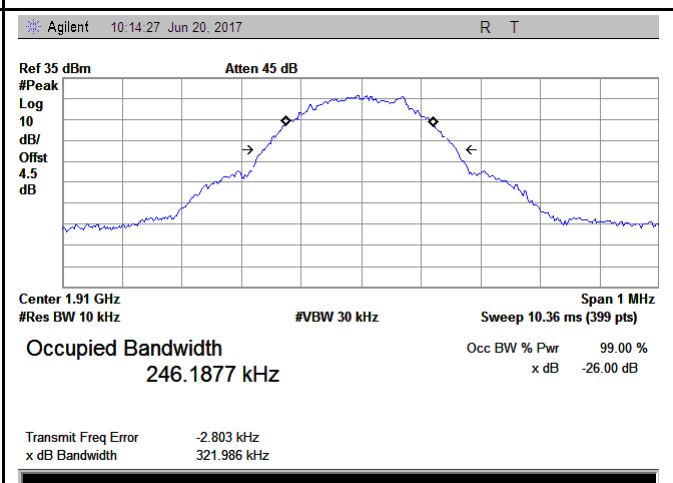
GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850.2MHz

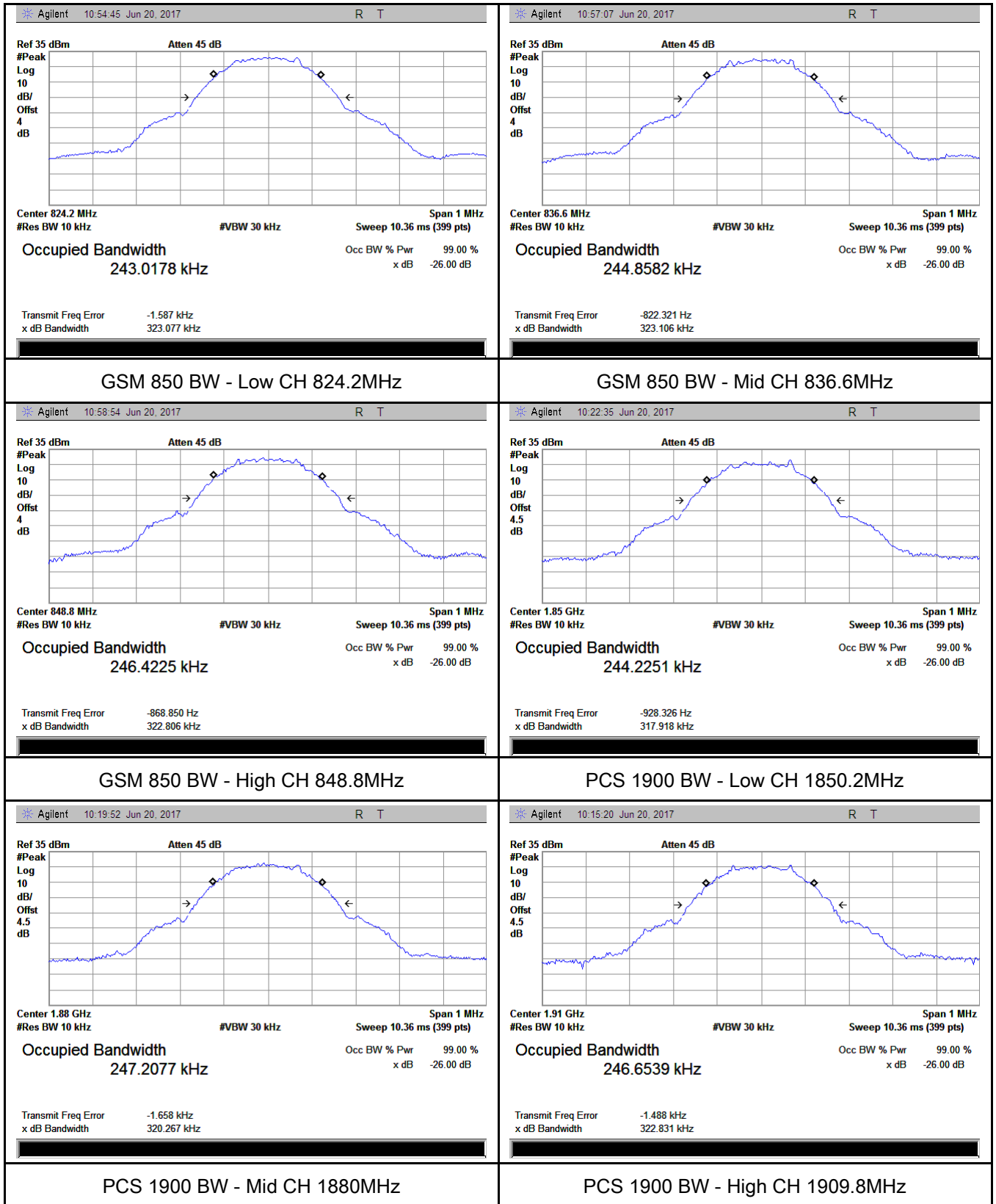


PCS 1900 BW - Mid CH 1880MHz

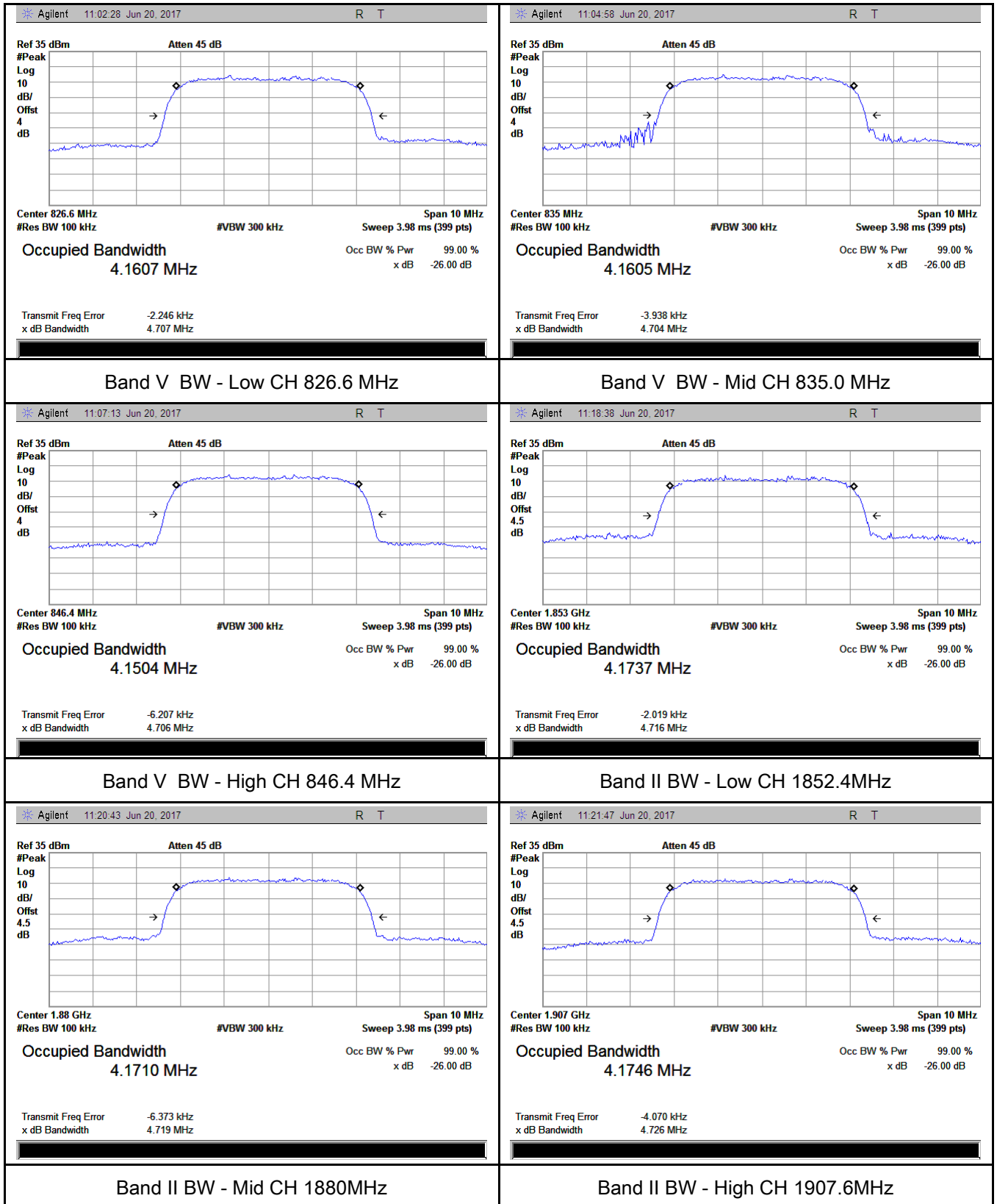


PCS 1900 BW - High CH 1909.8MHz

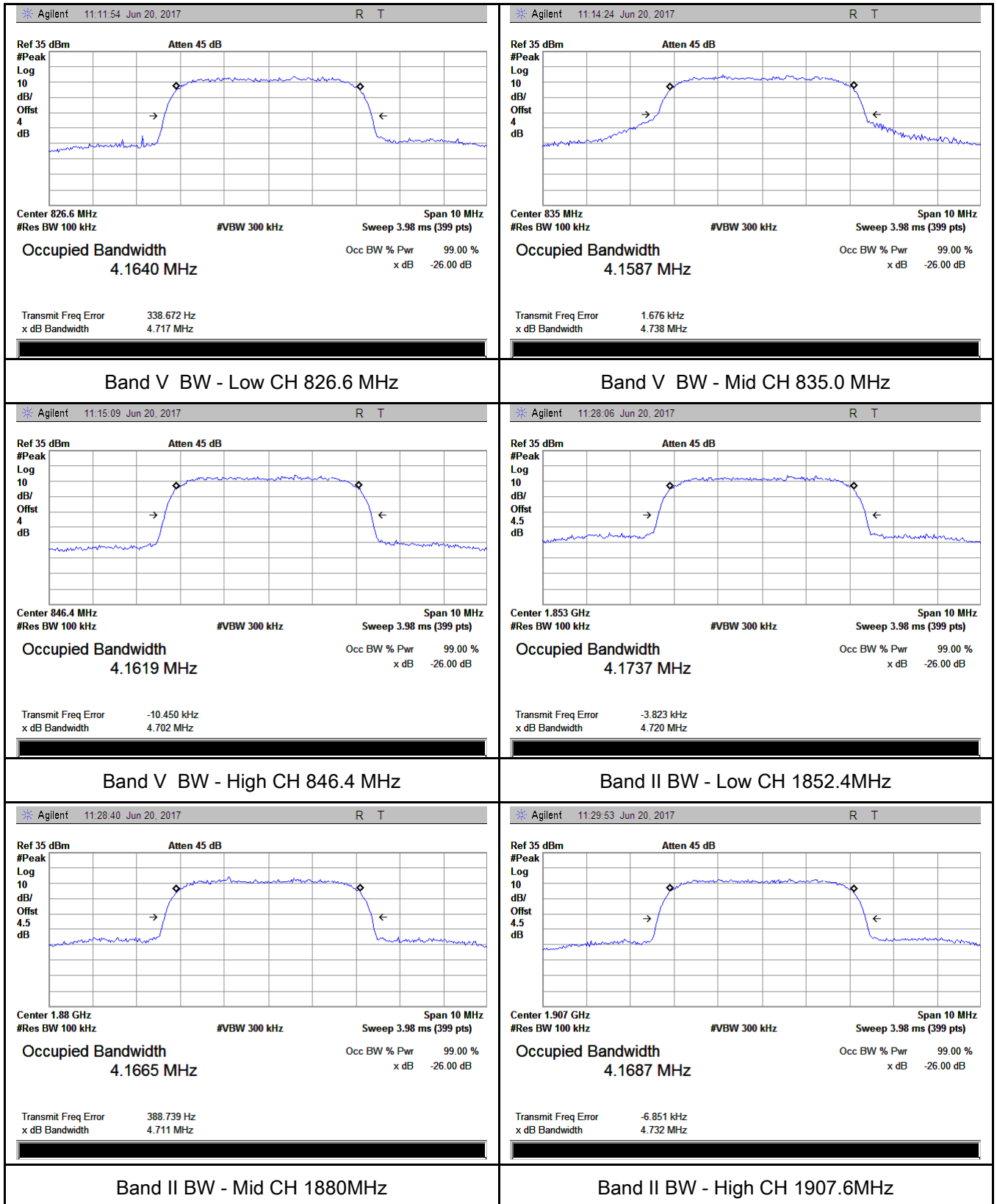
## EGPRS (MCS1):



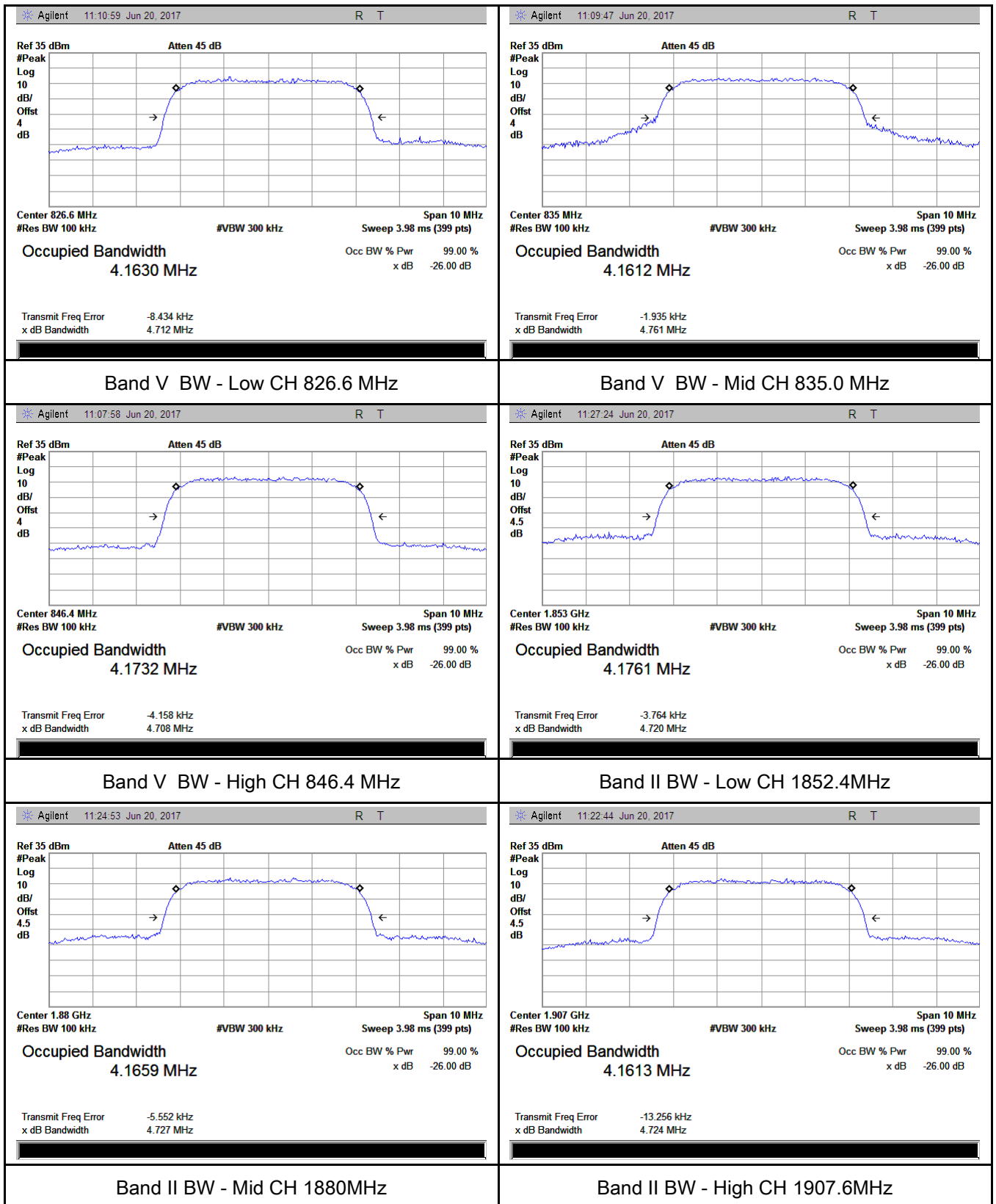
RMC:



### HSDPA:



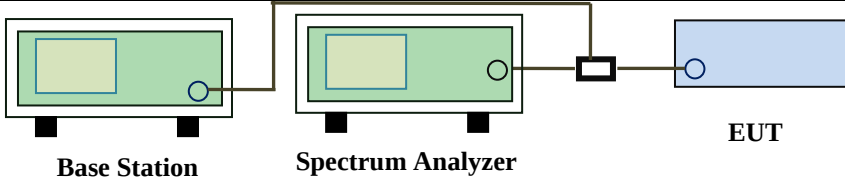
### HSUPA:



## 6.5 Spurious Emissions at Antenna Terminals

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1020mbar      |
| Test date :          | June 20, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

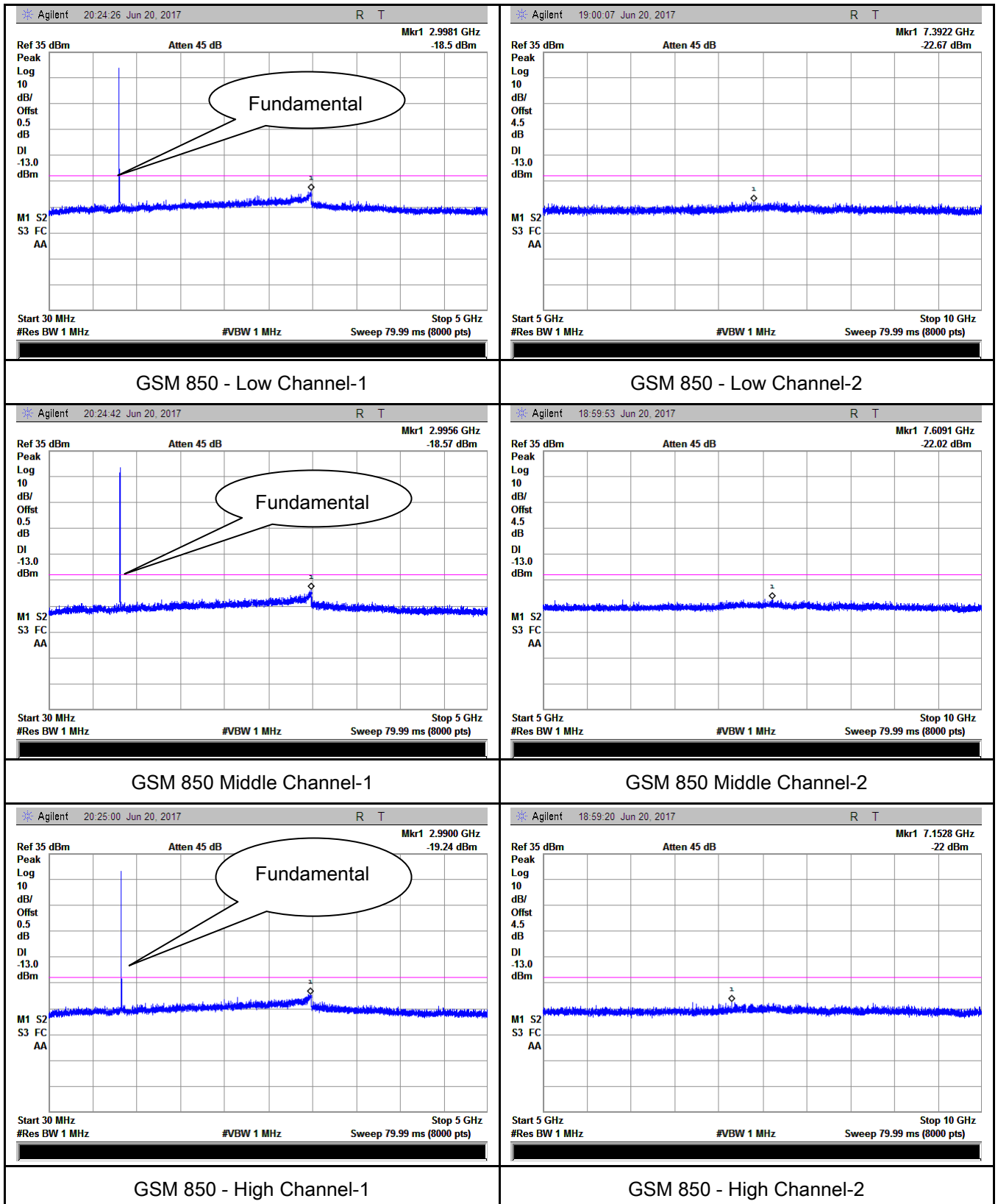
| Spec                                  | Item                                                                                                                                                                                                                                                                     | Requirement                                                                                                                                                               | Applicable                          |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §2.1051,<br>§22.917(a)&<br>§24.238(a) | a)                                                                                                                                                                                                                                                                       | The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB | <input checked="" type="checkbox"/> |
| Test Setup                            |                                                                                                                                                                                      |                                                                                                                                                                           |                                     |
| Test Procedure                        | <ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The Band Edges of low and high channels for the highest RF powers were measured.</li> <li>- Setting RBW as roughly BW/100.</li> </ul> |                                                                                                                                                                           |                                     |
| Remark                                |                                                                                                                                                                                                                                                                          |                                                                                                                                                                           |                                     |
| Result                                | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                   |                                                                                                                                                                           |                                     |

Test Data    ☒ Yes      ☐ N/A  
 Test Plot    ☒ Yes (See below)      ☐ N/A

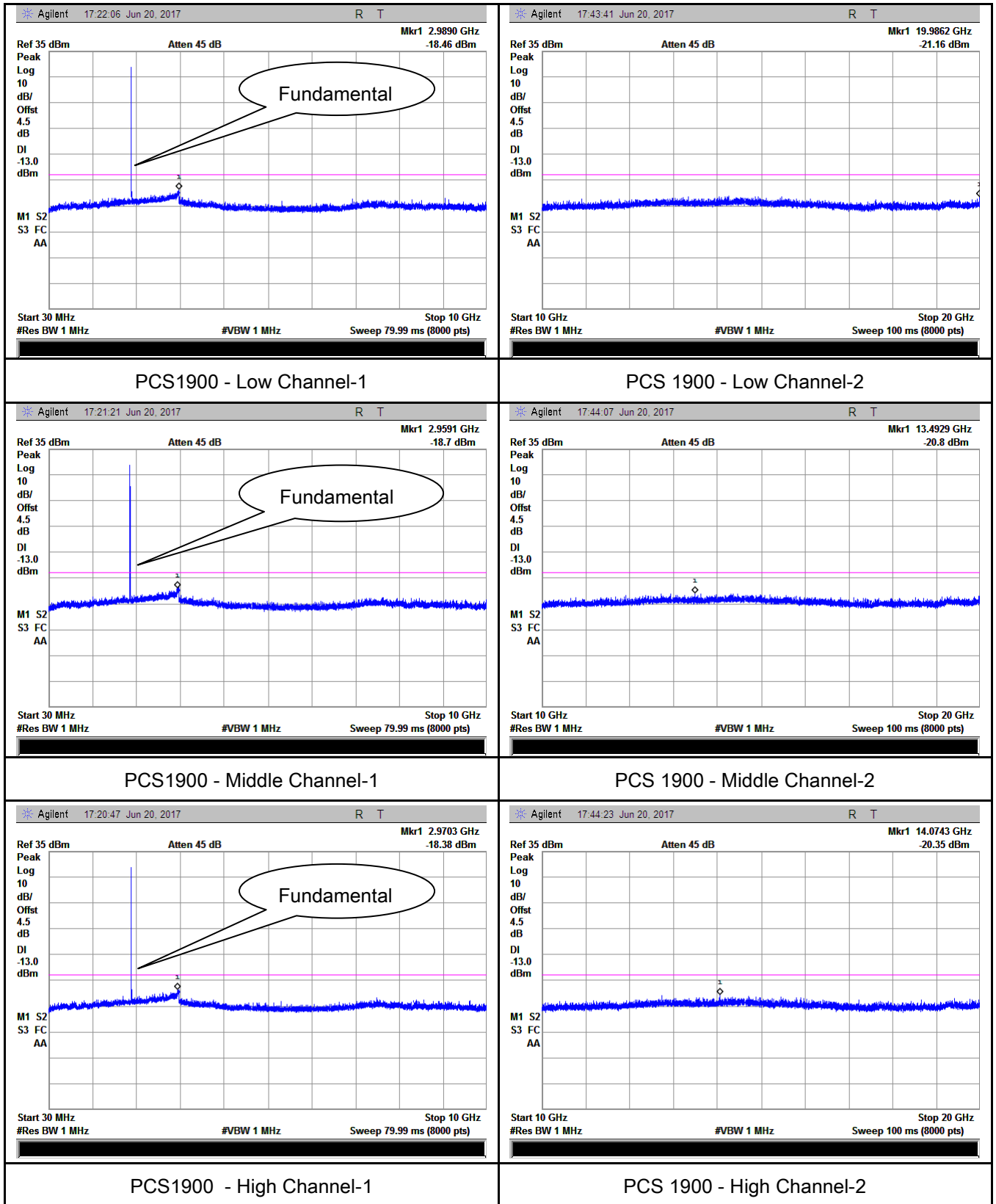
## Test Plots

### GSM Voice:

### Cellular Band (Part 22H) result

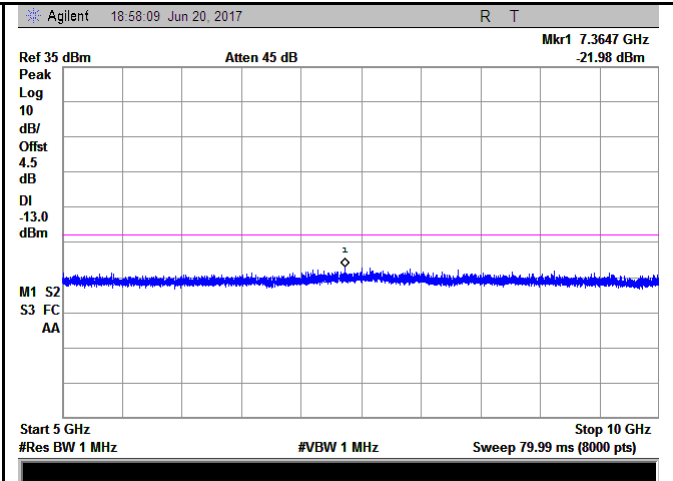
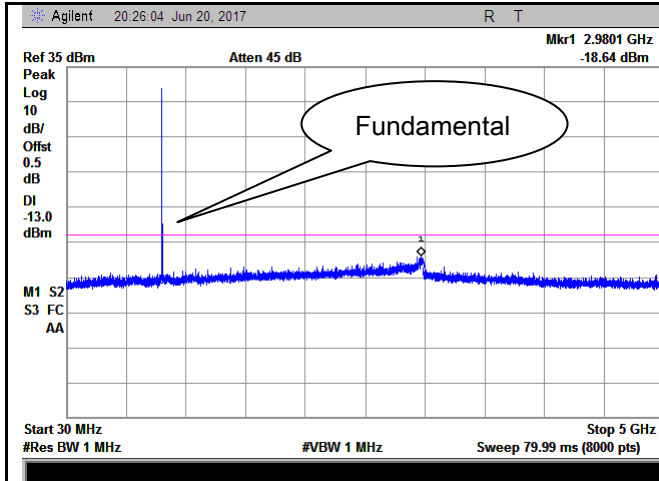


## PCS Band (Part24E) result

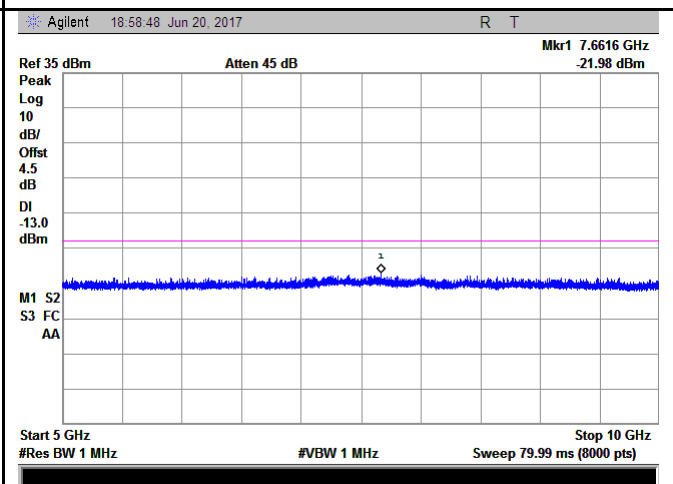
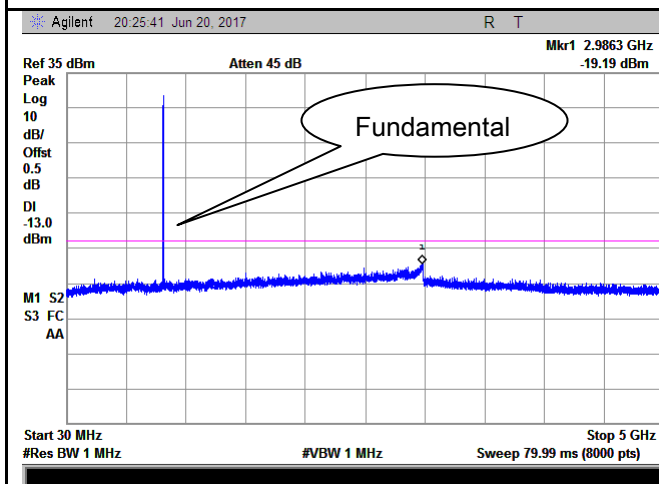


## GPRS:

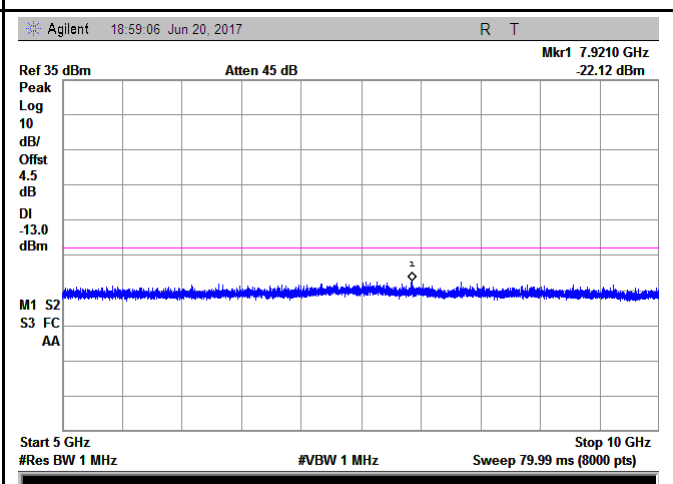
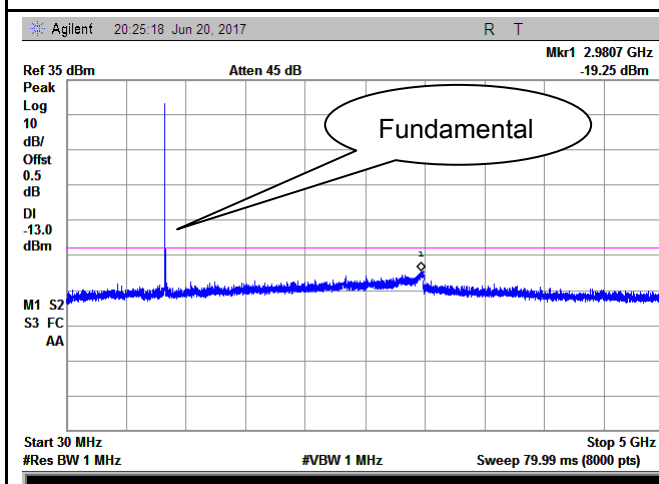
### Cellular Band (Part 22H) result



### GSM 850 - Low Channel-1



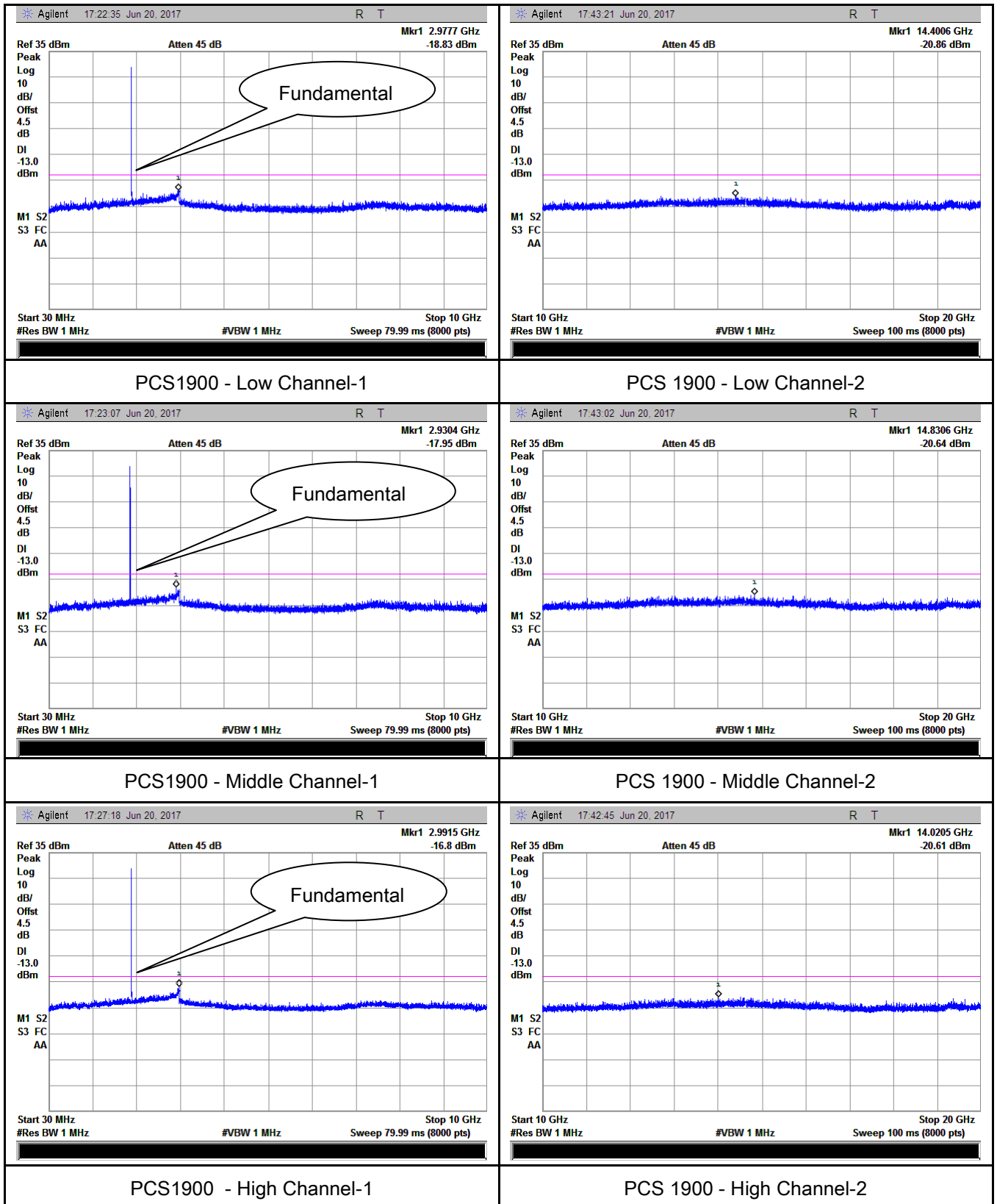
### GSM 850 Middle Channel-1



### GSM 850 - High Channel-1

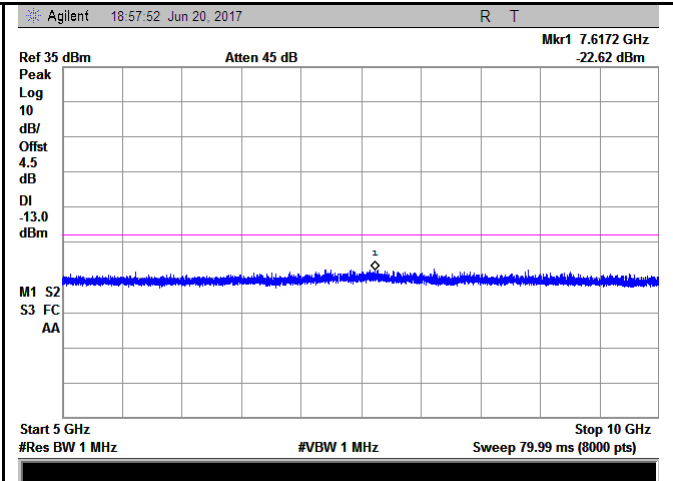
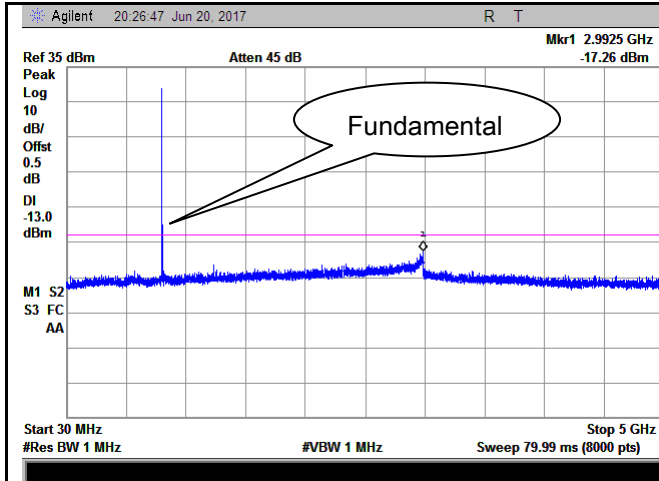
### GSM 850 - High Channel-2

## PCS Band (Part24E) result

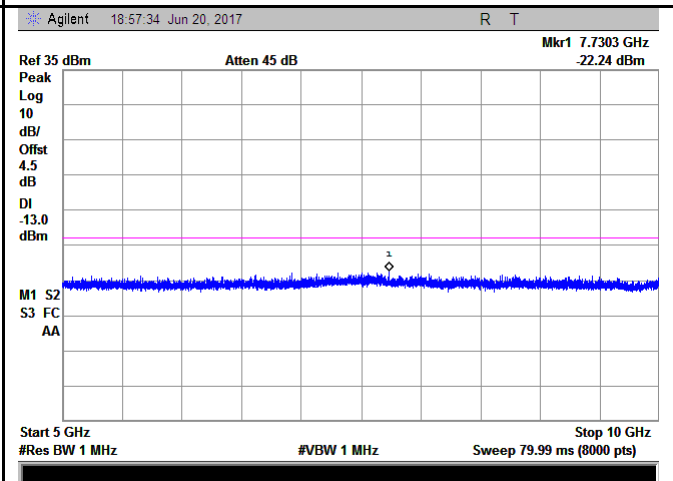
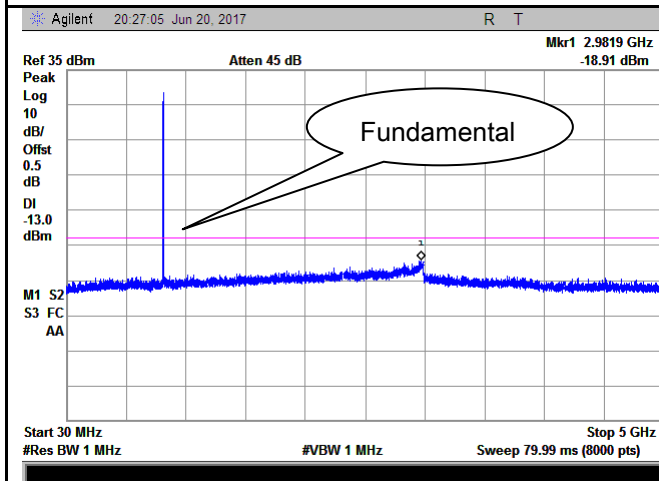


## EGPRS (MCS1):

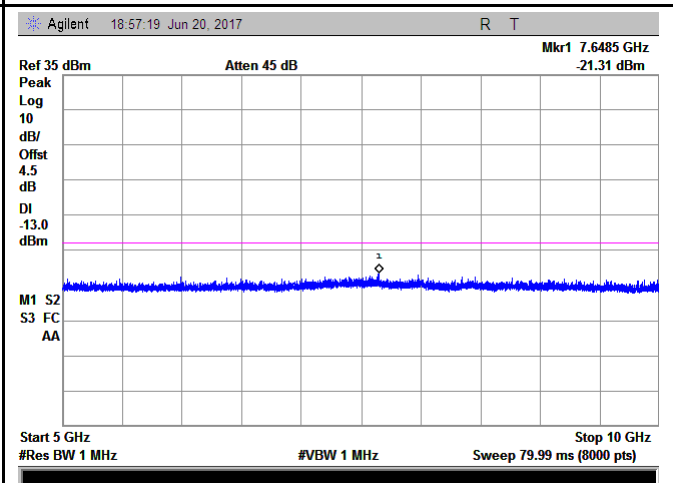
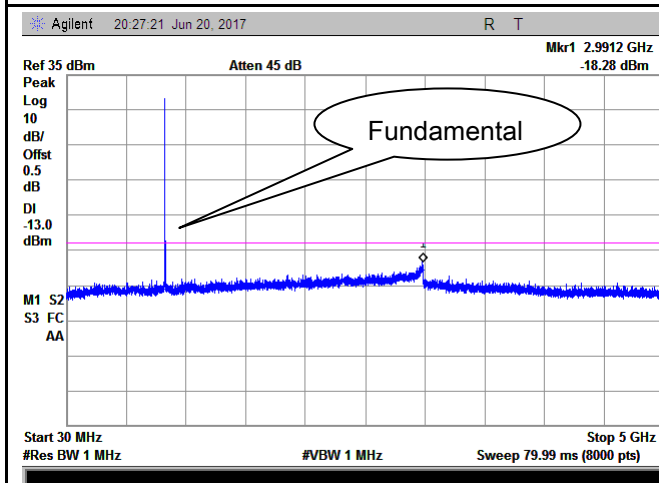
### Cellular Band (Part 22H) result



#### GSM 850 - Low Channel-1



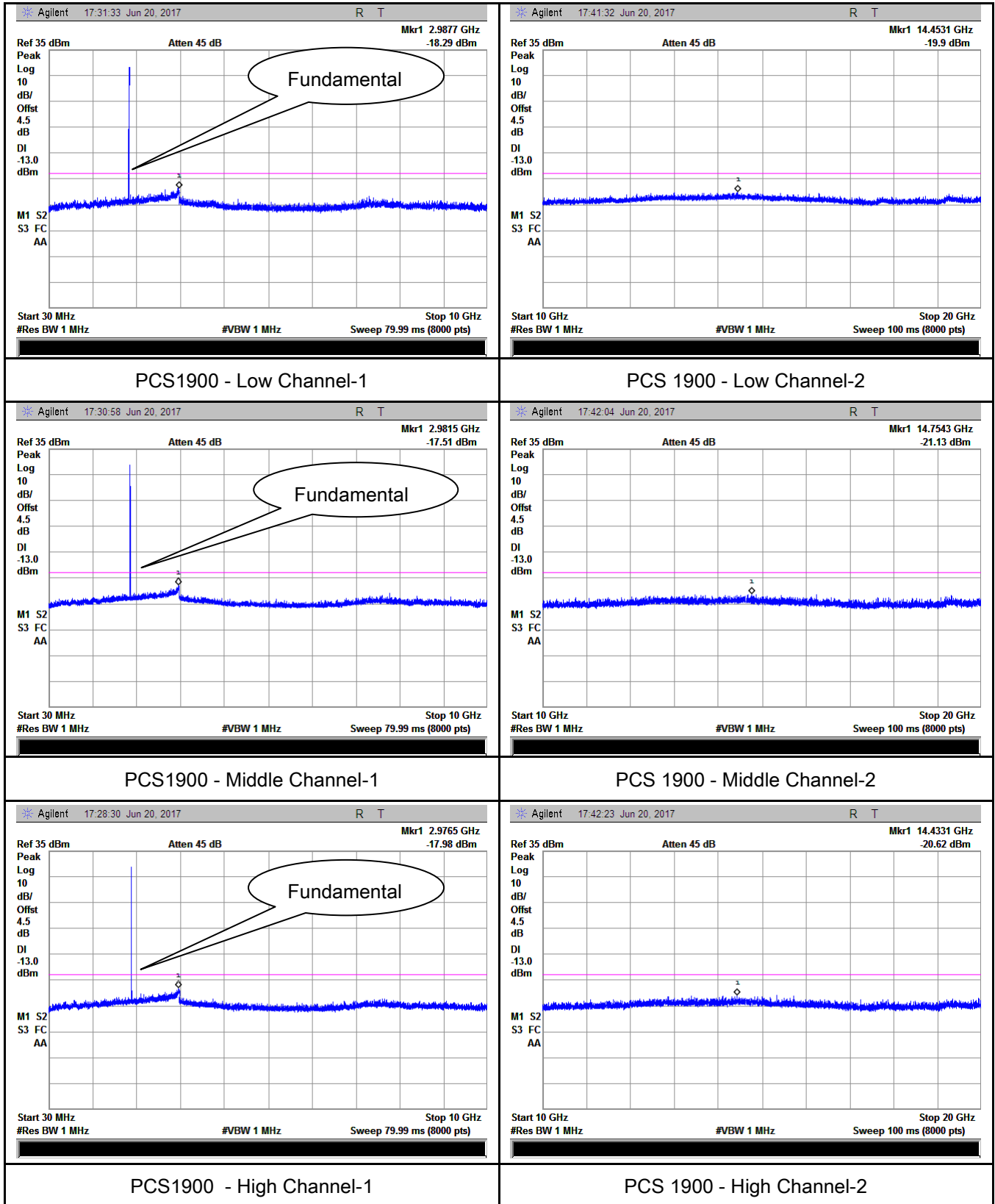
#### GSM 850 Middle Channel-1



#### GSM 850 - High Channel-1

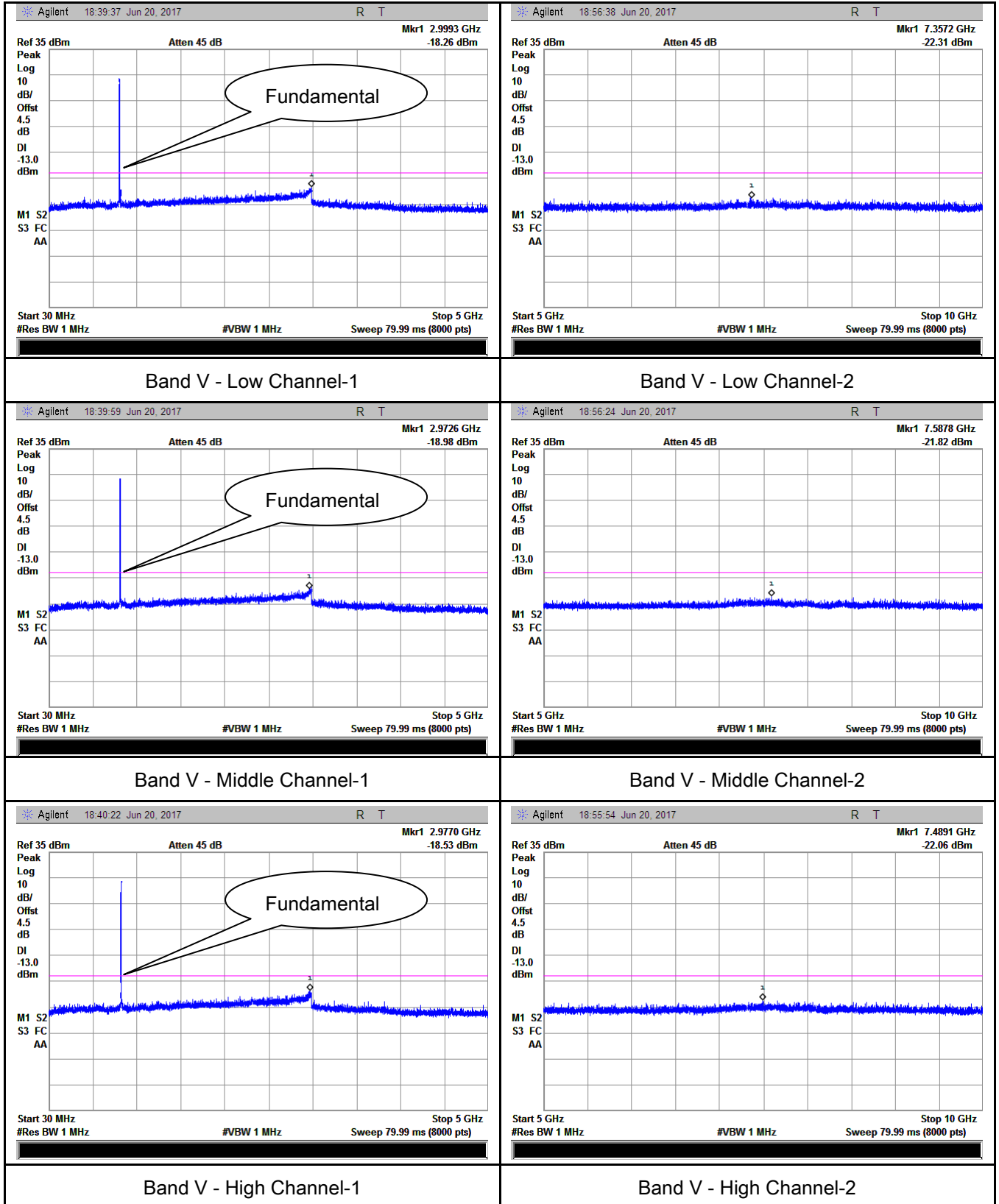
#### GSM 850 - High Channel-2

## PCS Band (Part24E) result

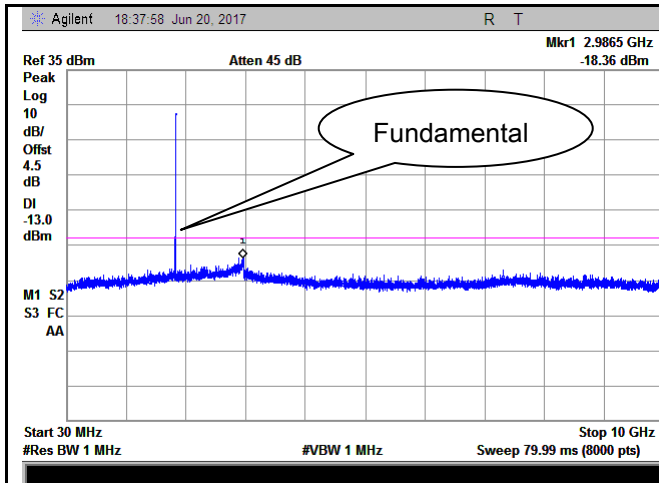


## RMC

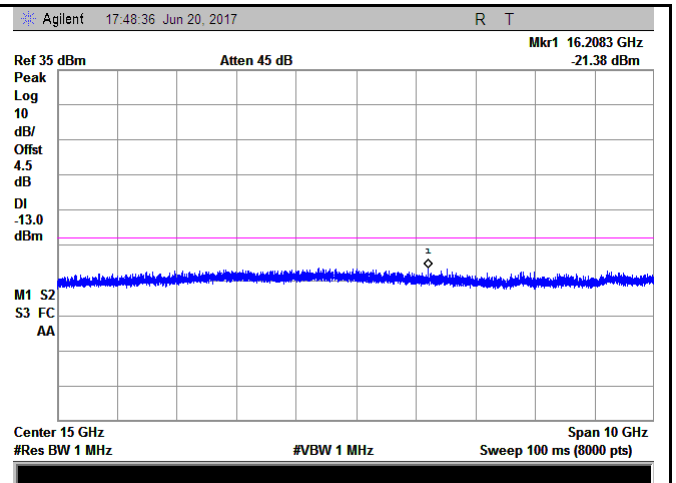
### UMTS-FDD Band V (Part 22H)



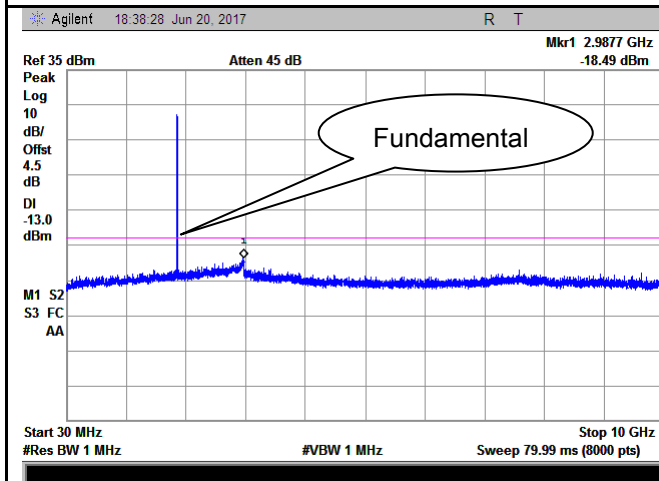
## UMTS-FDD Band II (Part 24E)



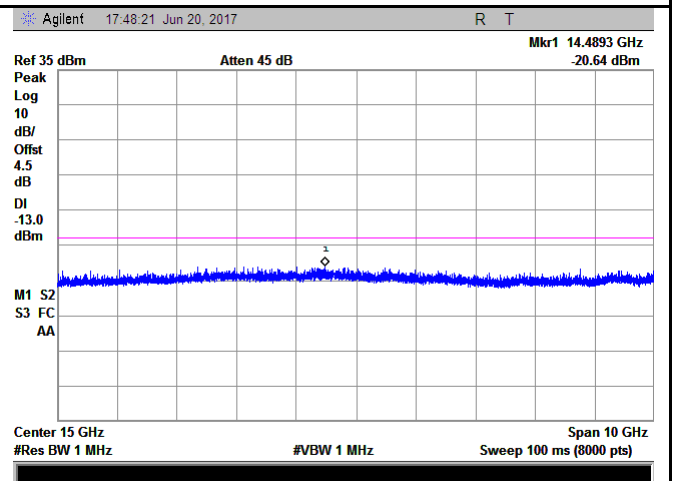
Band II - Low Channel-1



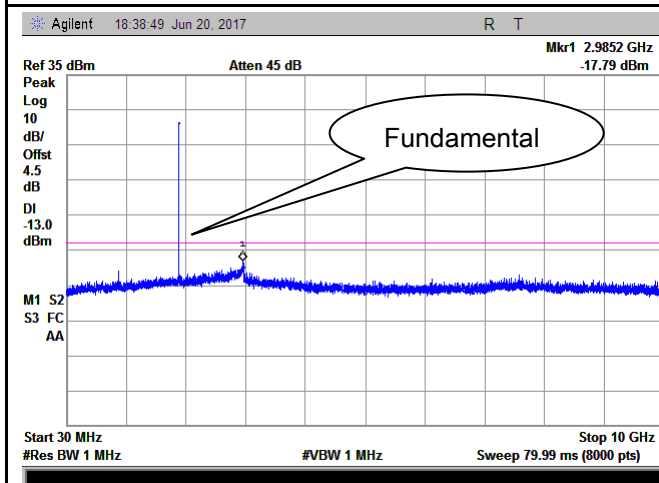
Band II - Low Channel-2



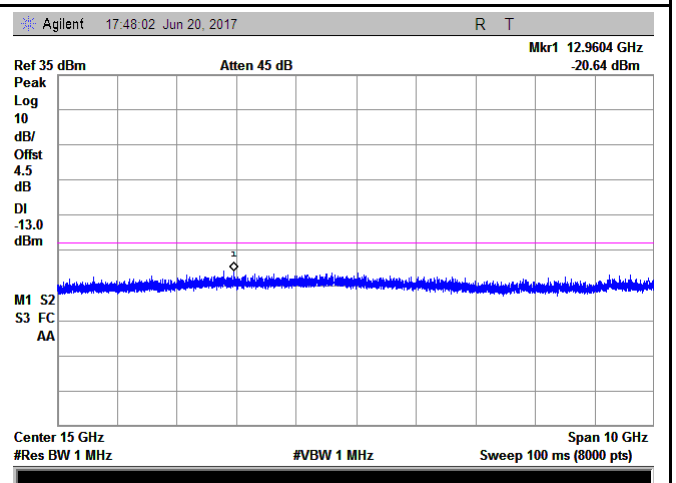
Band II - Middle Channel-1



Band II - Middle Channel-2



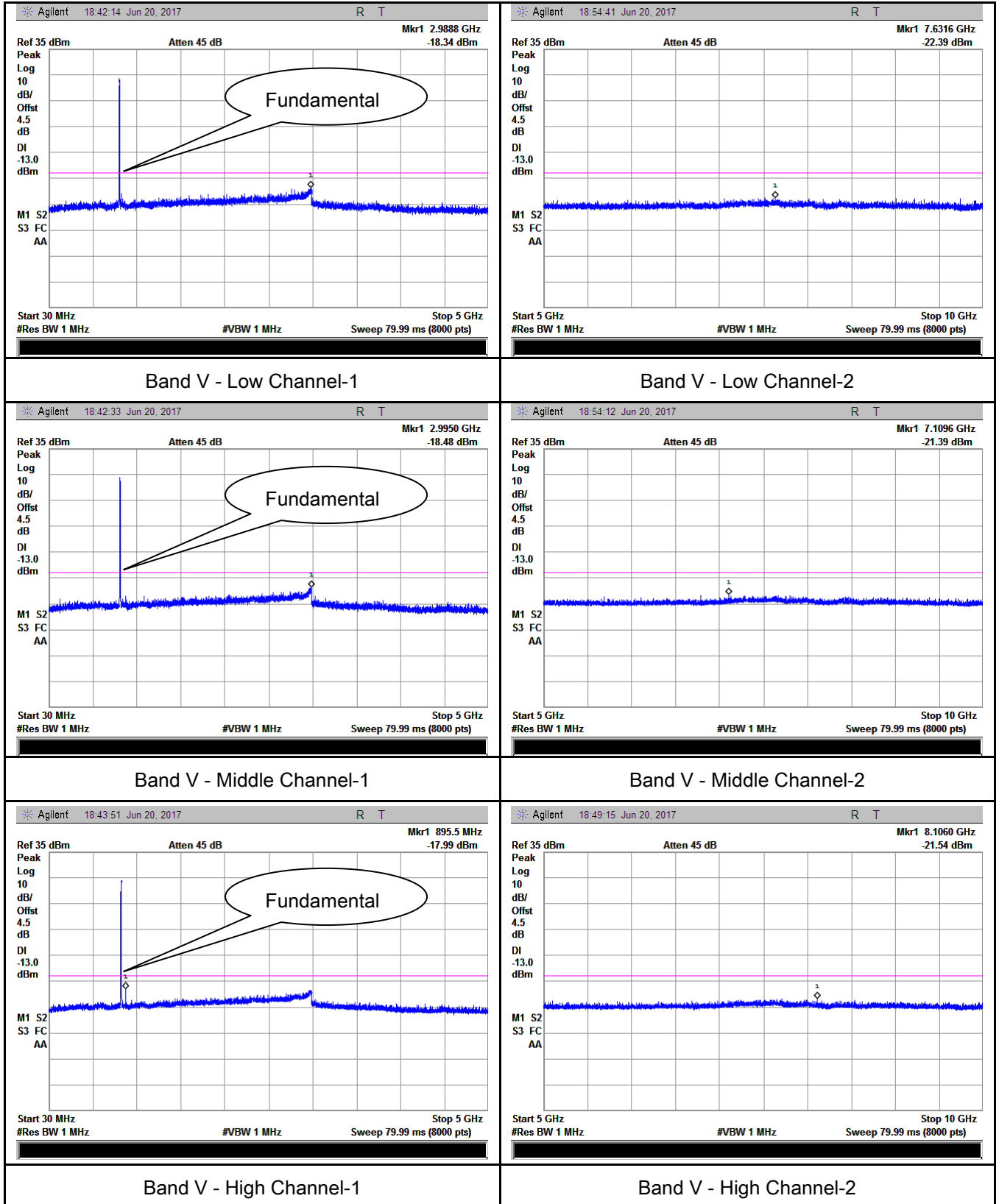
Band II - High Channel-1



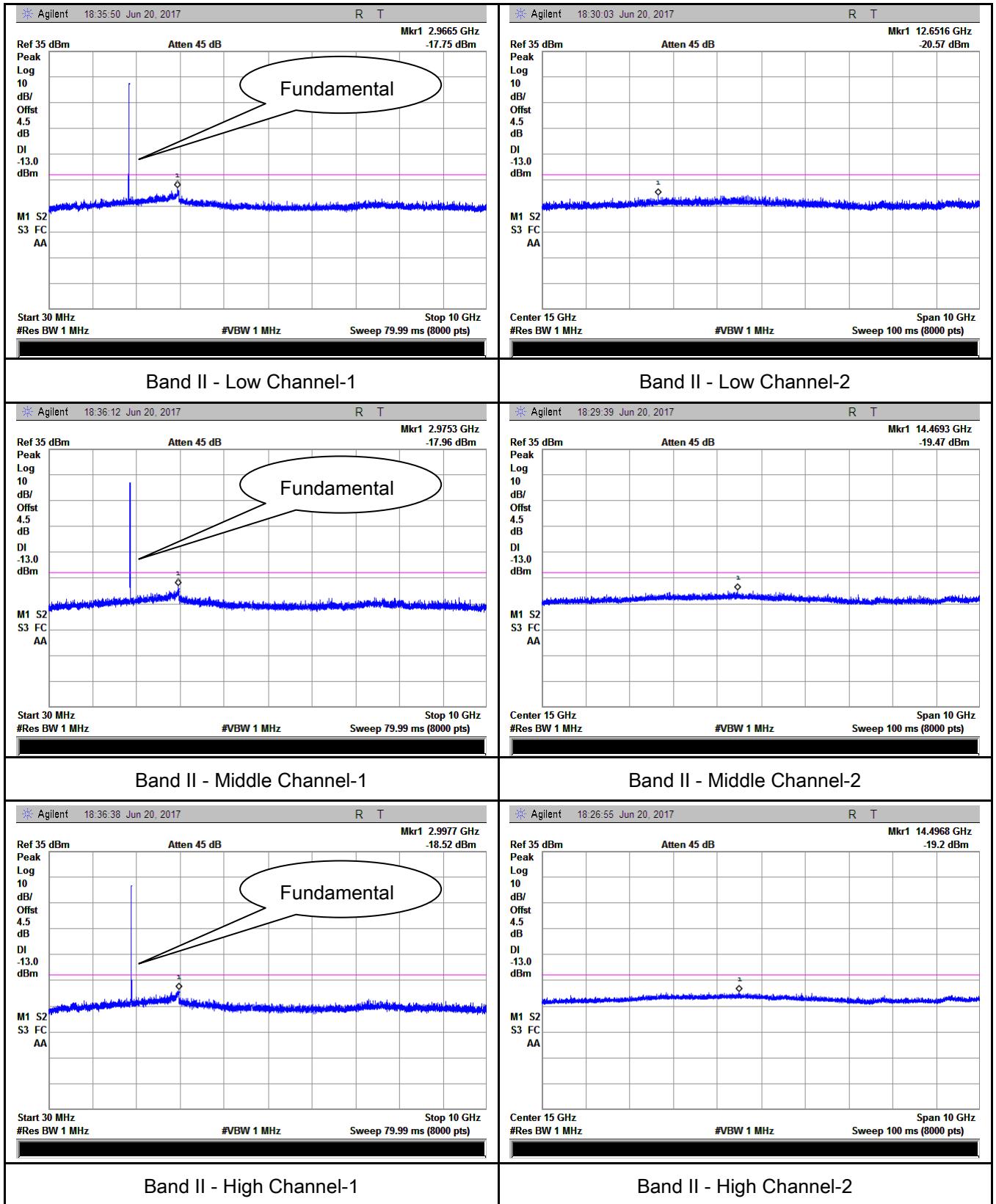
Band II - High Channel-2

## HSDPA:

### UMTS-FDD Band V (Part 22H)

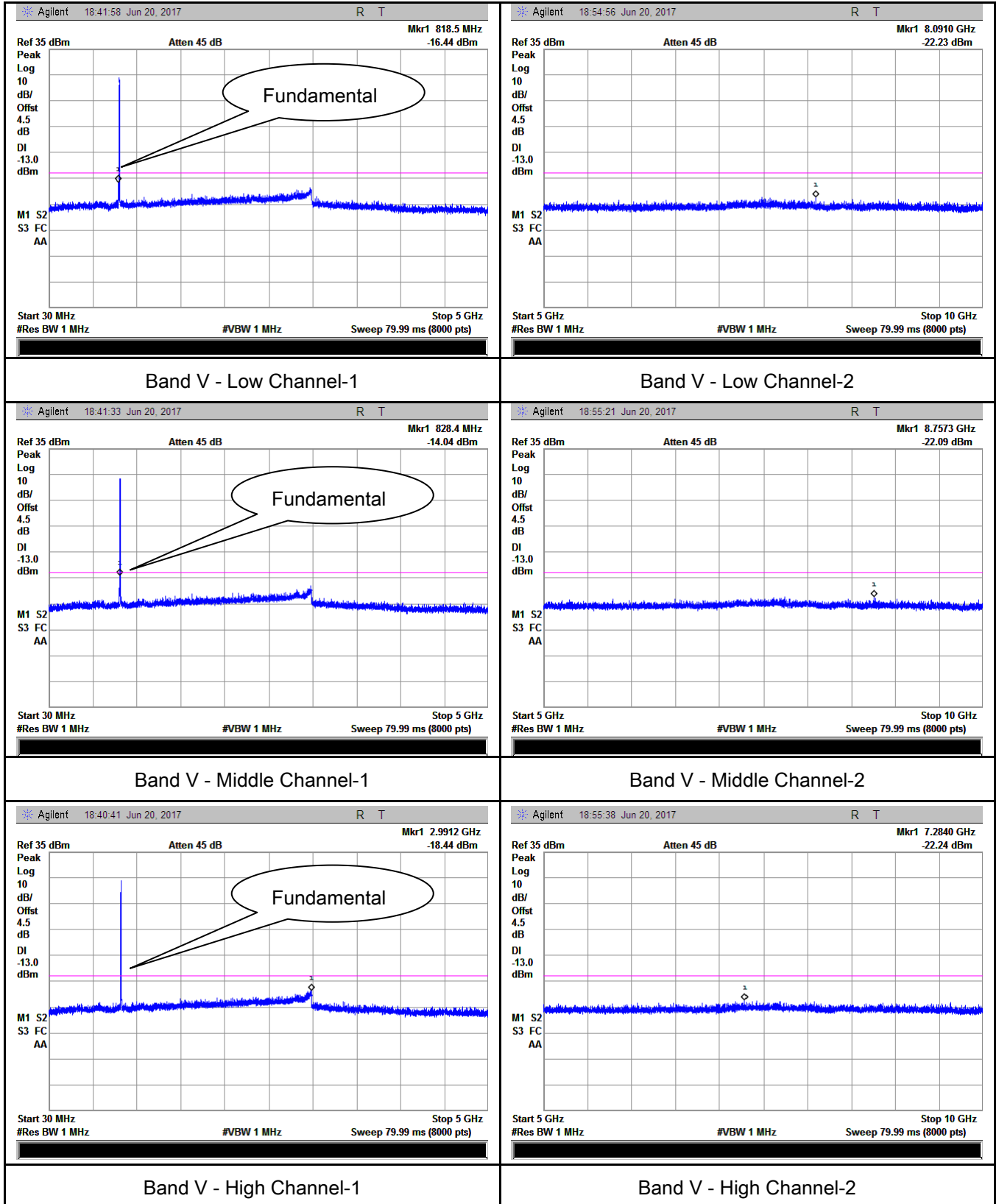


## UMTS-FDD Band II (Part 24E)

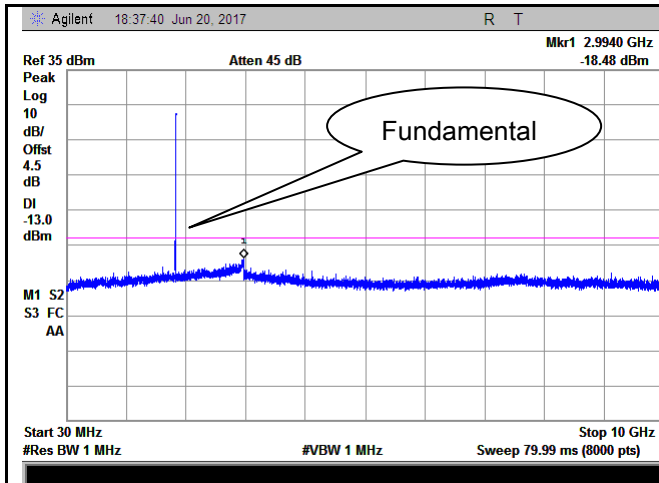


## HSUPA:

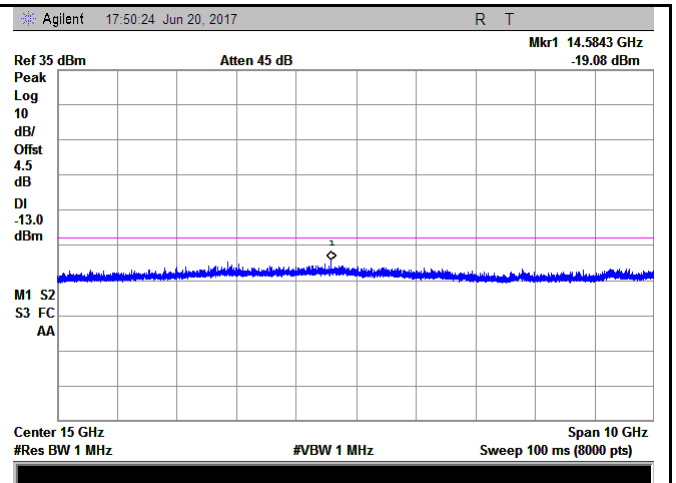
### UMTS-FDD Band V (Part 22H)



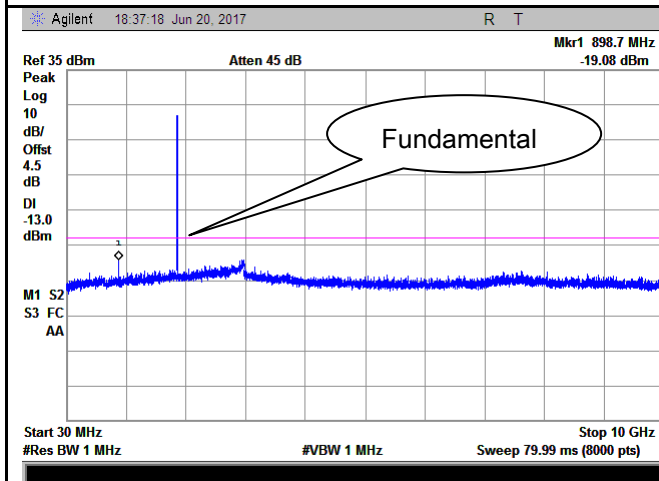
## UMTS-FDD Band II (Part 24E)



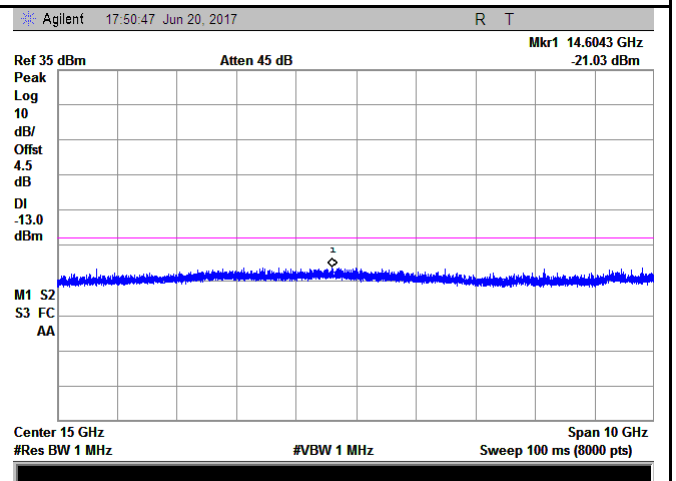
Band II - Low Channel-1



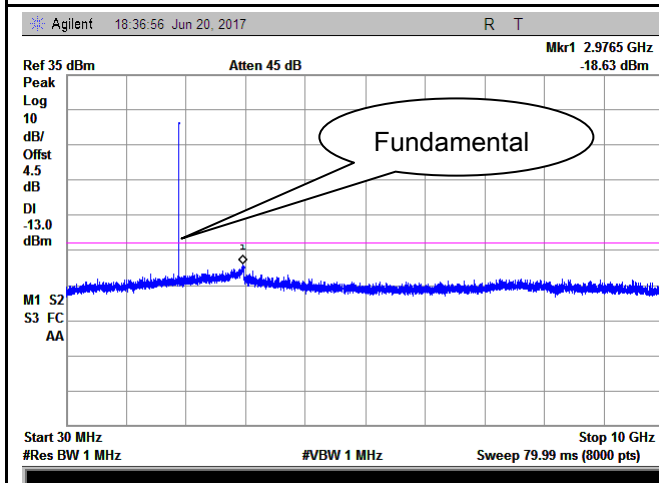
Band II - Low Channel-2



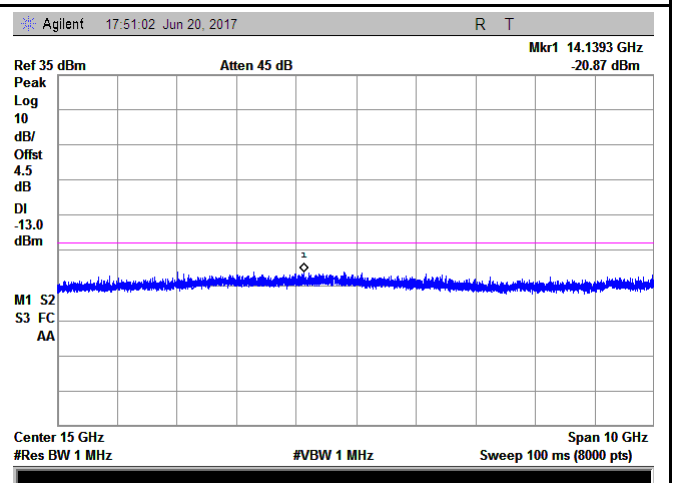
Band II - Middle Channel-1



Band II - Middle Channel-2



Band II - High Channel-1



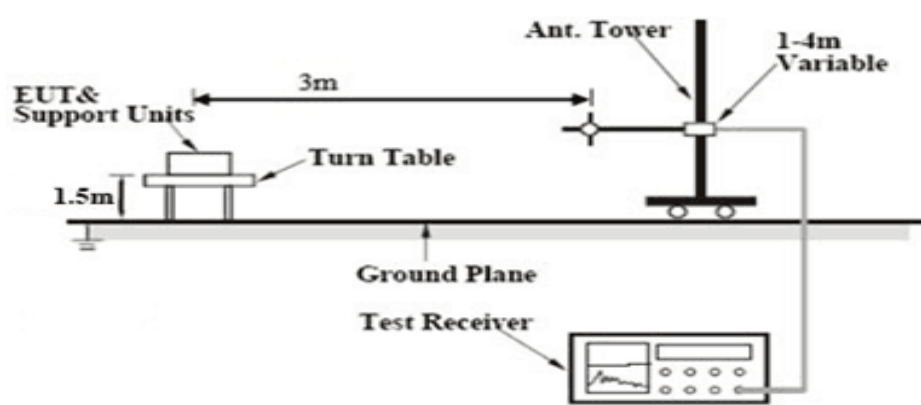
Band II - High Channel-2

## 6.6 Spurious Radiated Emissions

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 52%           |
| Atmospheric Pressure | 1019mbar      |
| Test date :          | June 19, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec                             | Item | Requirement                                                                                                                                                                                                                                                         | Applicable                          |
|----------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §2.1053,<br>§22.917 &<br>§24.238 | a)   | The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic. | <input checked="" type="checkbox"/> |

|            |                                                                                      |
|------------|--------------------------------------------------------------------------------------|
| Test setup |  |
|------------|--------------------------------------------------------------------------------------|

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Procedure | <ol style="list-style-type: none"> <li>The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</li> </ol> <p>Sample Calculation:</p> <p>EUT Field Strength = Raw Amplitude (dBμV/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)</p> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|             |                 |
|-------------|-----------------|
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|        |                                                                        |
|--------|------------------------------------------------------------------------|
| Remark |                                                                        |
| Result | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

## Cellular Band (Part 22H) result

### Low channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1648.4          | -43.78                  | V              | 7.95                         | 0.78            | -36.61                  | -13         | -23.61      |
| 1648.4          | -44.32                  | H              | 7.95                         | 0.78            | -37.15                  | -13         | -24.15      |
| 325.6           | -53.61                  | V              | 6.4                          | 0.26            | -47.47                  | -13         | -34.47      |
| 604.2           | -52.98                  | H              | 6.8                          | 0.37            | -46.55                  | -13         | -33.55      |

### Middle channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1673.2          | -46.28                  | V              | 7.95                         | 0.78            | -39.11                  | -13         | -26.11      |
| 1673.2          | -44.06                  | H              | 7.95                         | 0.78            | -36.89                  | -13         | -23.89      |
| 327.9           | -52.97                  | V              | 6.4                          | 0.26            | -46.83                  | -13         | -33.83      |
| 608.3           | -53.62                  | H              | 6.8                          | 0.37            | -47.19                  | -13         | -34.19      |

### High channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1697.6          | -43.67                  | V              | 7.95                         | 0.78            | -36.5                   | -13         | -23.5       |
| 1697.6          | -44.65                  | H              | 7.95                         | 0.78            | -37.48                  | -13         | -24.48      |
| 325.1           | -53.16                  | V              | 6.4                          | 0.26            | -47.02                  | -13         | -34.02      |
| 604.2           | -52.68                  | H              | 6.8                          | 0.37            | -46.25                  | -13         | -33.25      |

#### Note:

1, The testing has been conformed to  $10 \times 848.8 \text{ MHz} = 8,488 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

3, GSM voice, GPRS and EGPRS mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

## PCS Band (Part24E) result

### Low channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3700.4          | -48.76                  | V              | 10.25                        | 2.73            | -41.24                  | -13         | -28.24      |
| 3700.4          | -49.25                  | H              | 10.25                        | 2.73            | -41.73                  | -13         | -28.73      |
| 325.9           | -53.64                  | V              | 6.4                          | 0.26            | -47.5                   | -13         | -34.5       |
| 605.3           | -54.12                  | H              | 6.8                          | 0.37            | -47.69                  | -13         | -34.69      |

### Middle channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3760            | -48.69                  | V              | 10.25                        | 2.73            | -41.17                  | -13         | -28.17      |
| 3760            | -49.67                  | H              | 10.25                        | 2.73            | -42.15                  | -13         | -29.15      |
| 326.7           | -53.64                  | V              | 6.4                          | 0.26            | -47.5                   | -13         | -34.5       |
| 609.3           | -54.28                  | H              | 6.8                          | 0.37            | -47.85                  | -13         | -34.85      |

### High channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3819.6          | -48.76                  | V              | 10.36                        | 2.73            | -41.13                  | -13         | -28.13      |
| 3819.6          | -50.21                  | H              | 10.36                        | 2.73            | -42.58                  | -13         | -29.58      |
| 321.7           | -53.94                  | V              | 6.4                          | 0.26            | -47.8                   | -13         | -34.8       |
| 608.2           | -52.03                  | H              | 6.8                          | 0.37            | -45.6                   | -13         | -32.6       |

#### Note:

1, The testing has been conformed to 10\*1909.8MHz=19,098MHz

2, All other emissions more than 30 dB below the limit

3, GSM voice , GPRS and EGPRS mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

## UMTS-FDD Band V (Part 22H)

### Low channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1652.8          | -46.89                  | V              | 7.95                         | 0.78            | -39.72                  | -13         | -26.72      |
| 1652.8          | -56.02                  | H              | 7.95                         | 0.78            | -48.85                  | -13         | -35.85      |
| 325.5           | -52.63                  | V              | 6.4                          | 0.26            | -46.49                  | -13         | -33.49      |
| 604.2           | -53.97                  | H              | 6.8                          | 0.37            | -47.54                  | -13         | -34.54      |

### Middle channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1670            | -46.87                  | V              | 7.95                         | 0.78            | -39.7                   | -13         | -26.7       |
| 1670            | -45.86                  | H              | 7.95                         | 0.78            | -38.69                  | -13         | -25.69      |
| 326.8           | -52.91                  | V              | 6.4                          | 0.26            | -46.77                  | -13         | -33.77      |
| 604.3           | -52.84                  | H              | 6.8                          | 0.37            | -46.41                  | -13         | -33.41      |

### High channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 1693.2          | -46.98                  | V              | 7.95                         | 0.78            | -39.81                  | -13         | -26.81      |
| 1693.2          | -45.67                  | H              | 7.95                         | 0.78            | -38.5                   | -13         | -25.5       |
| 326.4           | -52.64                  | V              | 6.4                          | 0.26            | -46.5                   | -13         | -33.5       |
| 604.2           | -53.04                  | H              | 6.8                          | 0.37            | -46.61                  | -13         | -33.61      |

#### Note:

1, The testing has been conformed to  $10 \times 846.6 \text{ MHz} = 8,466 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

## UMTS-FDD Band II (Part 24E)

### Low channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3704.8          | -49.65                  | V              | 10.25                        | 2.73            | -42.13                  | -13         | -29.13      |
| 3704.8          | -50.47                  | H              | 10.25                        | 2.73            | -42.95                  | -13         | -29.95      |
| 327.9           | -53.48                  | V              | 6.4                          | 0.26            | -47.34                  | -13         | -34.34      |
| 605.3           | -53.67                  | H              | 6.8                          | 0.37            | -47.24                  | -13         | -34.24      |

### Middle channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3760            | -49.86                  | V              | 10.25                        | 2.73            | -42.34                  | -13         | -29.34      |
| 3760            | -49.72                  | H              | 10.25                        | 2.73            | -42.2                   | -13         | -29.2       |
| 324.1           | -53.62                  | V              | 6.4                          | 0.26            | -47.48                  | -13         | -34.48      |
| 603.7           | -53.87                  | H              | 6.8                          | 0.37            | -47.44                  | -13         | -34.44      |

### High channel

| Frequency (MHz) | Substituted level (dBm) | Polarity (H/V) | Antenna Gain Correction (dB) | Cable Loss (dB) | Corrected Reading (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------|----------------|------------------------------|-----------------|-------------------------|-------------|-------------|
| 3815.2          | -49.22                  | V              | 10.36                        | 2.73            | -41.59                  | -13         | -28.59      |
| 3815.2          | -49.87                  | H              | 10.36                        | 2.73            | -42.24                  | -13         | -29.24      |
| 328.6           | -53.16                  | V              | 6.4                          | 0.26            | -47.02                  | -13         | -34.02      |
| 603.8           | -54.28                  | H              | 6.8                          | 0.37            | -47.85                  | -13         | -34.85      |

#### Note:

1, The testing has been conformed to  $10 \times 1907.6 \text{ MHz} = 19,076 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

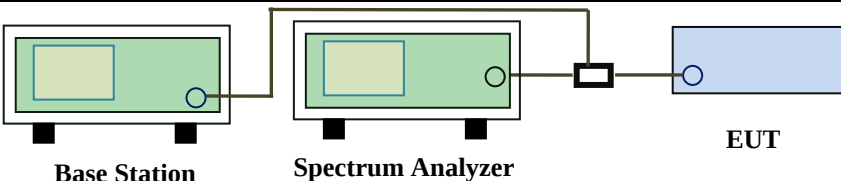
3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case

## 6.7 Band Edge

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 53%           |
| Atmospheric Pressure | 1020mbar      |
| Test date :          | June 20, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec                     | Item                                                                                                                                                                                                                                                          | Requirement                                                                                                                                                                | Applicable                          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §22.917(a)<br>§24.238(a) | a)                                                                                                                                                                                                                                                            | The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. | <input checked="" type="checkbox"/> |
| Test setup               |  <p>Base Station      Spectrum Analyzer      EUT</p>                                                                                                                      |                                                                                                                                                                            |                                     |
| Procedure                | <ul style="list-style-type: none"> <li>- The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>- The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.</li> </ul> |                                                                                                                                                                            |                                     |
| Remark                   |                                                                                                                                                                                                                                                               |                                                                                                                                                                            |                                     |
| Result                   | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                        |                                                                                                                                                                            |                                     |

Test Data    ☒ Yes      ☐ N/A

Test Plot    ☒ Yes (See below)      ☐ N/A

**GSM Voice:**

**Cellular Band (Part 22H) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.9975        | -15.12         | -13         |
| 849.0025        | -17.60         | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -16.08         | -13         |
| 1910.0225       | -18.33         | -13         |

**GPRS:**

**Cellular Band (Part 22H) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.9800        | -17.05         | -13         |
| 849.0200        | -17.82         | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -16.19         | -13         |
| 1910.0250       | -18.10         | -13         |

**EGPRS (MCS1):**

**Cellular Band (Part 22H) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.9989        | -17.34         | -13         |
| 849.0025        | -17.05         | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -16.61         | -13         |
| 1910.0200       | -18.60         | -13         |

**RMC:**

**UMTS-FDD Band V (Part 22H)**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 824.000         | -20.98         | -13         |
| 849.275         | -26.42         | -13         |

**UMTS-FDD Band II (Part 24E)**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.925        | -19.74         | -13         |
| 1910.075        | -20.60         | -13         |

**HSDPA:**

**UMTS-FDD Band V (Part 22H)**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.550         | -20.99         | -13         |
| 849.200         | -25.16         | -13         |

**UMTS-FDD Band II (Part 24E)**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.900        | -19.26         | -13         |
| 1910.050        | -21.07         | -13         |

**HSUPA:**

**UMTS-FDD Band V (Part 22H)**

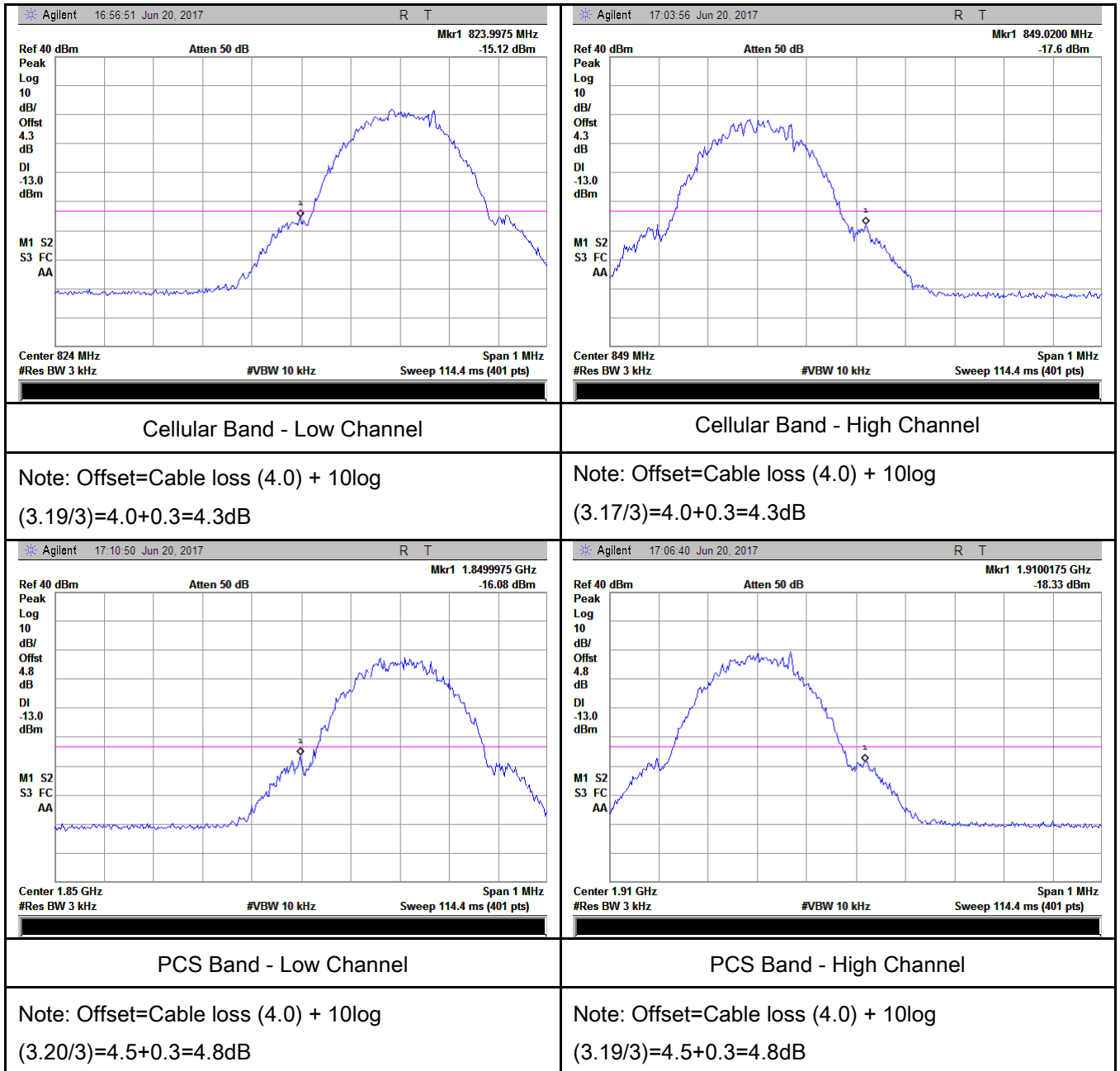
| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.825         | -21.22         | -13         |
| 849.875         | -27.27         | -13         |

**UMTS-FDD Band II (Part 24E)**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.925        | -19.99         | -13         |
| 1910.025        | -20.29         | -13         |

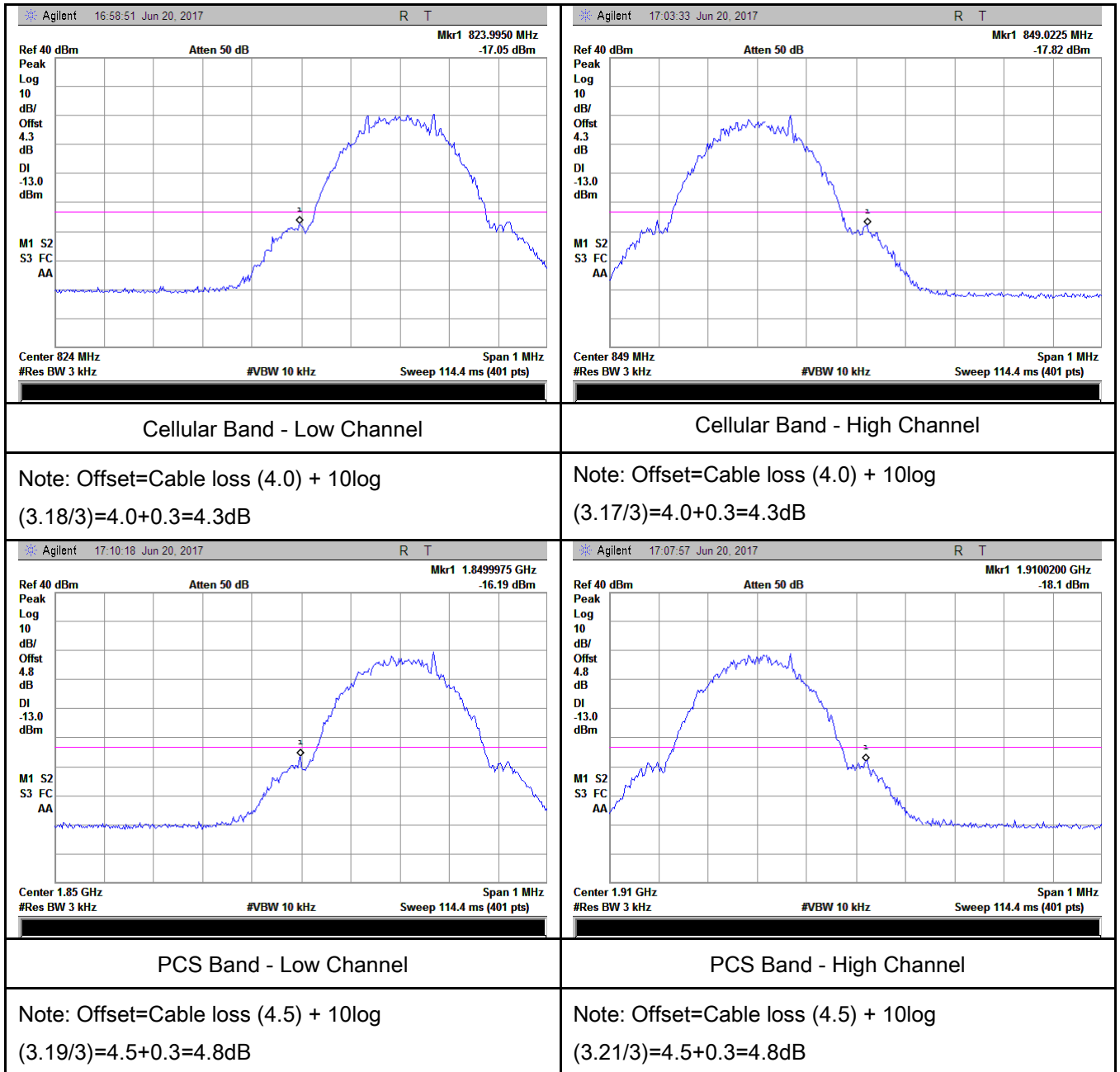
## GSM Voice:

### Test Plots



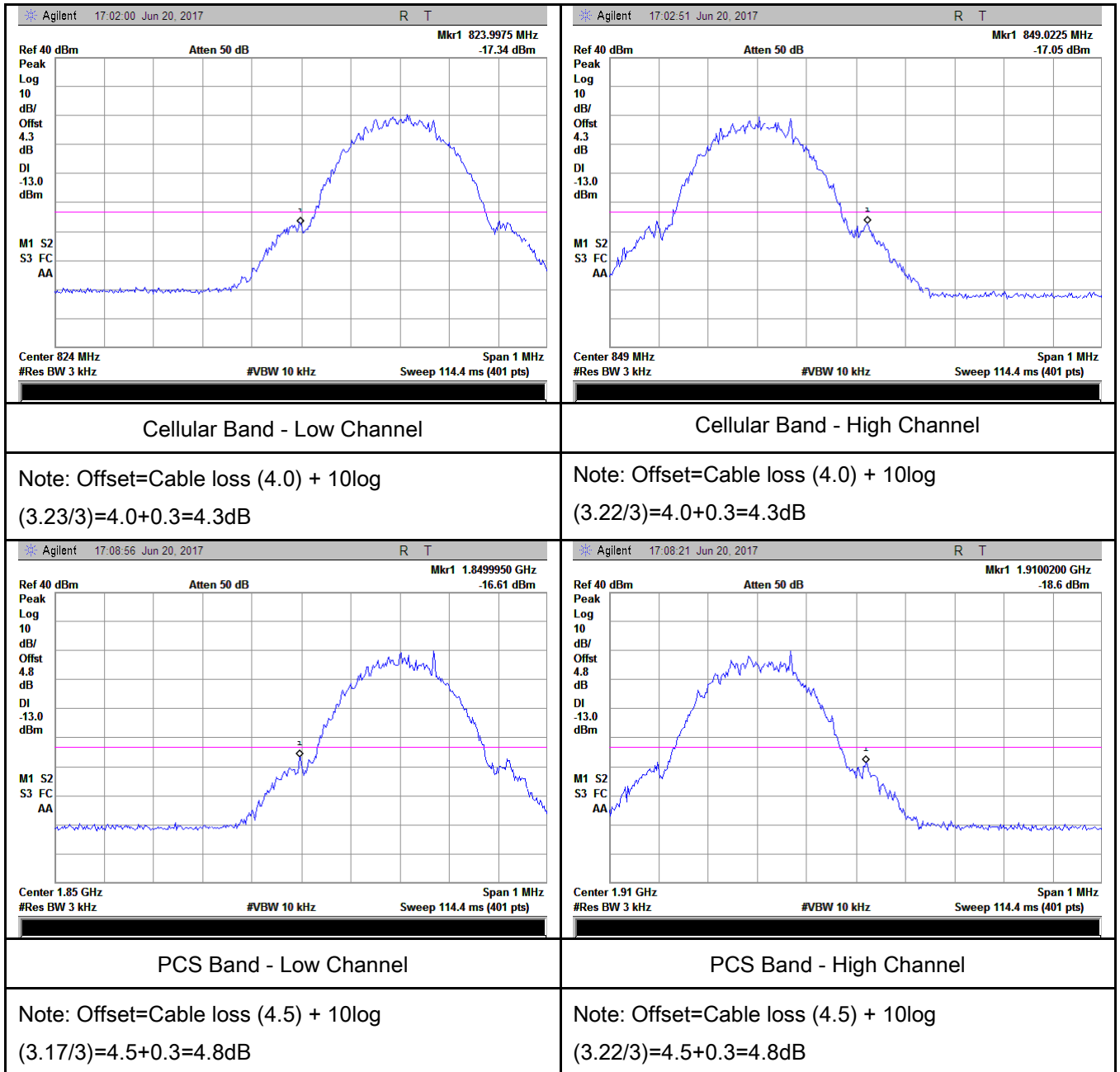
## GPRS:

### Test Plots

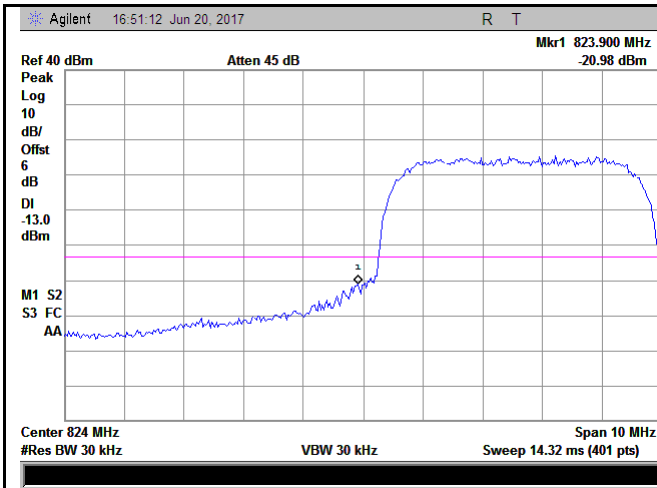


## EGPRS (MCS1):

### Test Plots

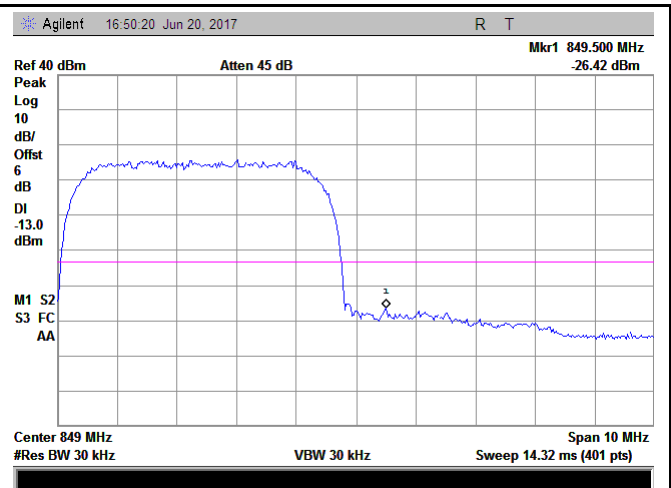


# RMC:



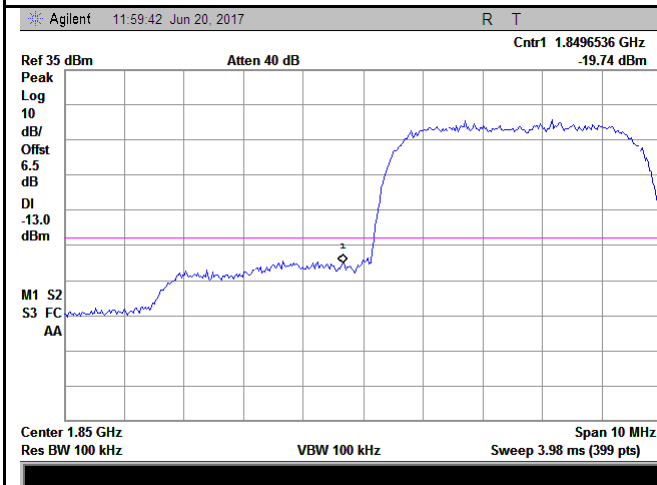
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.07/30)=4.0+2.0=6.0 dB



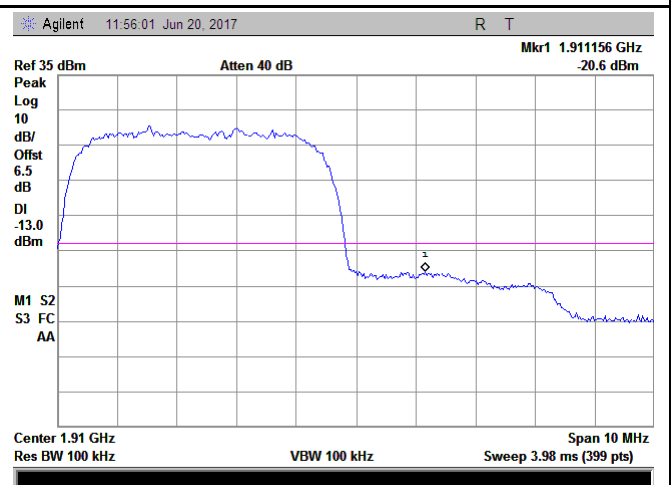
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.06/30)=4.0+2.0=6.0 dB



UMTS-FDD Band II - Low Channel

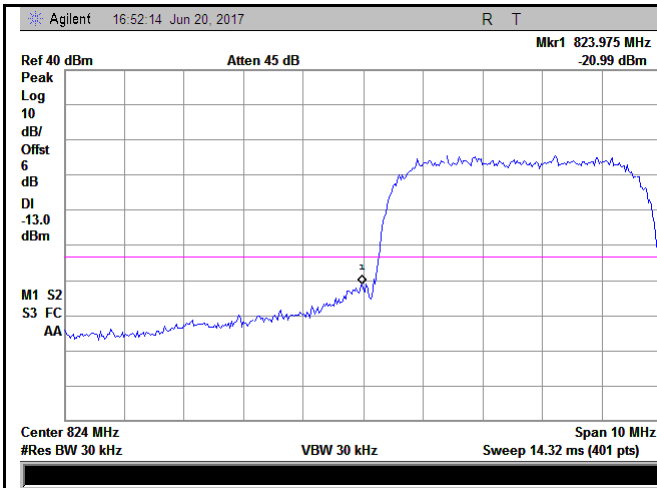
Note: Offset=Cable loss (4.5) + 10log  
(47.16/30)=4.5+2.0=6.5 dB



UMTS-FDD Band II - High Channel

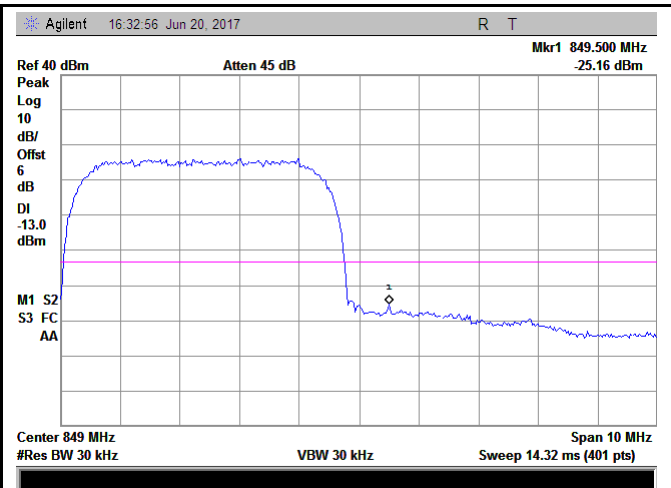
Note: Offset=Cable loss (4.5) + 10log  
(47.26/30)=4.5+2.0=6.5 dB

### HSDPA:



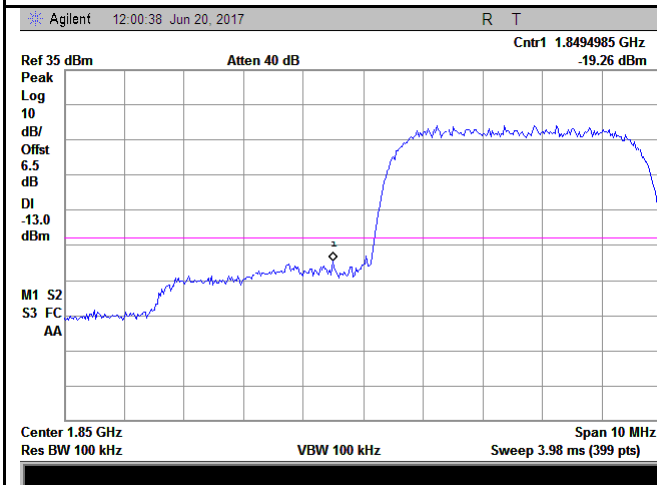
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.17/30)=4.0+2.0=6.0 dB



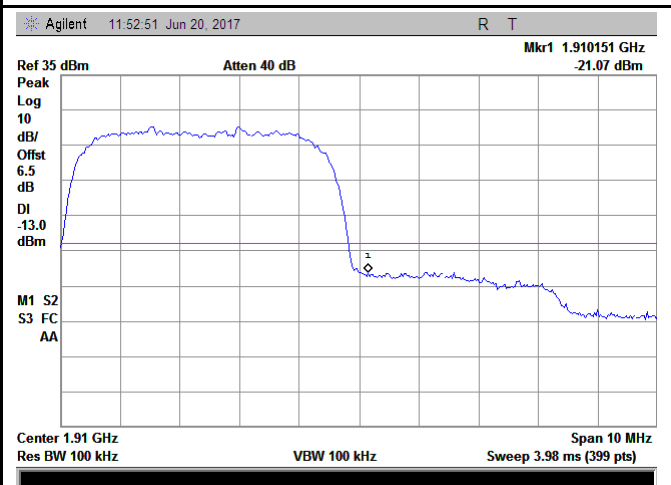
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.02/30)=4.0+2.0=6.0 dB



UMTS-FDD Band II - Low Channel

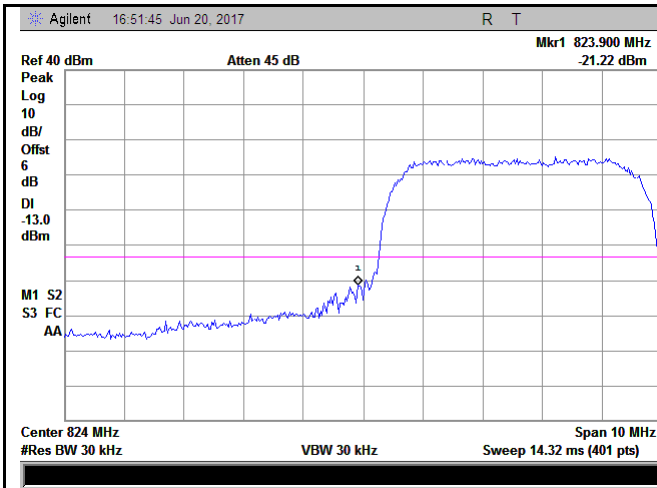
Note: Offset=Cable loss (4.5) + 10log  
(47.20/30)=4.5+2.0=6.5 dB



UMTS-FDD Band II - High Channel

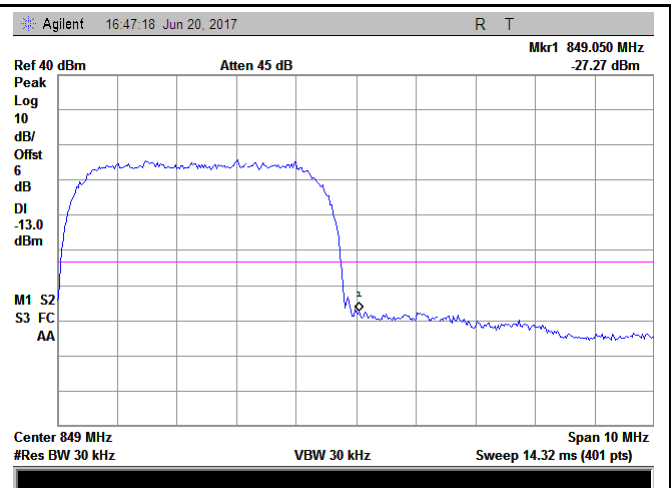
Note: Offset=Cable loss (4.5) + 10log  
(47.32/30)=4.5+2.0=6.5 dB

## HSUPA:



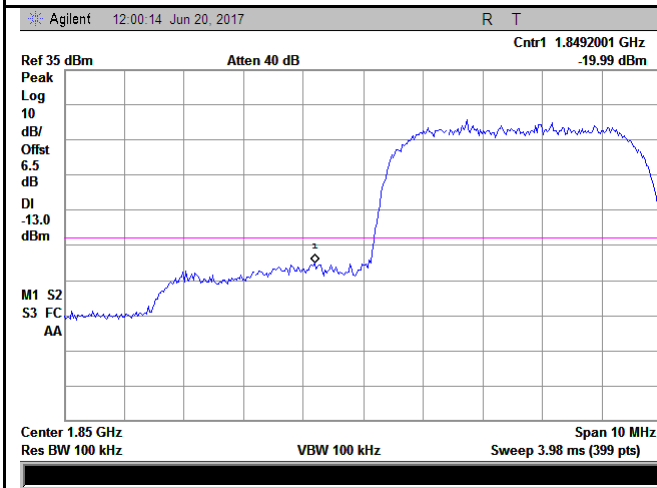
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.12/30)=4.0+2.0=6.0 dB



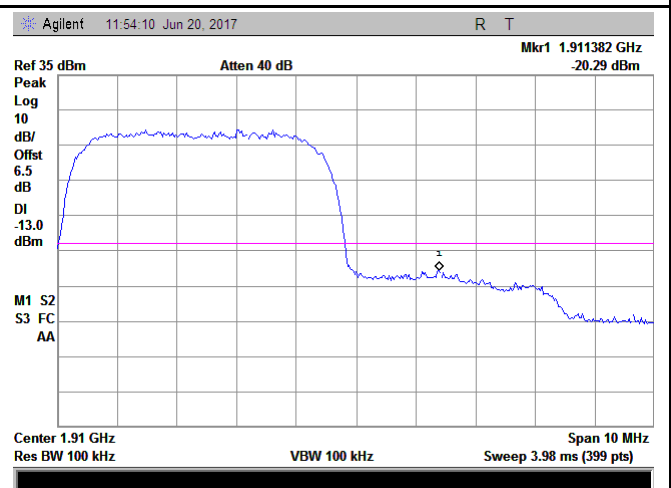
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(47.08/30)=4.0+2.0=6.0 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(47.20/30)=4.5+2.0=6.5 dB



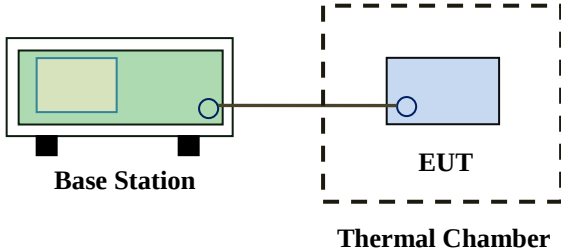
UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(47.24/30)=4.5+2.0=6.5 dB

## 6.8 Frequency Stability

|                      |               |
|----------------------|---------------|
| Temperature          | 24 °C         |
| Relative Humidity    | 52%           |
| Atmospheric Pressure | 1019mbar      |
| Test date :          | June 19, 2017 |
| Tested By :          | Loren Luo     |

### Requirement(s):

| Spec                             | Item                                                                                                                                                               | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicable             |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------|------------------------|------------------------|----------|------|------|------|-----------|-----|-----|------|-----------|-----|-----|----|------------|-----|-----|-----|------------|-----|-----|-----|-------------|-----|-----|-----|--------------|------|-----|-----|---------------------------------------------------------------------------------------|
| §2.1055,<br>§22.355 &<br>§24.235 | a)                                                                                                                                                                 | <p>According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:</p> <p>Frequency Tolerance for Transmitters in the Public Mobile Services</p> <table border="1"> <thead> <tr> <th>Frequency Range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile ≤ 3 watts (□□m)</th><th>Mobile ≤ 3 watts (ppm)</th></tr> </thead> <tbody> <tr> <td>25 to 50</td><td>20.0</td><td>20.0</td><td>50.0</td></tr> <tr> <td>50 to 450</td><td>5.0</td><td>5.0</td><td>50.0</td></tr> <tr> <td>45□to 512</td><td>2.5</td><td>5.0</td><td>□0</td></tr> <tr> <td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr> <td>928 to 929</td><td>5.0</td><td>N/A</td><td>N/A</td></tr> <tr> <td>929 to 960.</td><td>1.5</td><td>N/A</td><td>N/A</td></tr> <tr> <td>2110 to 2220</td><td>10.0</td><td>N/A</td><td>N/A</td></tr> </tbody> </table> <p>According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.</p> | Frequency Range (MHz)  | Base, fixed (ppm) | Mobile ≤ 3 watts (□□m) | Mobile ≤ 3 watts (ppm) | 25 to 50 | 20.0 | 20.0 | 50.0 | 50 to 450 | 5.0 | 5.0 | 50.0 | 45□to 512 | 2.5 | 5.0 | □0 | 821 to 896 | 1.5 | 2.5 | 2.5 | 928 to 929 | 5.0 | N/A | N/A | 929 to 960. | 1.5 | N/A | N/A | 2110 to 2220 | 10.0 | N/A | N/A |  |
| Frequency Range (MHz)            | Base, fixed (ppm)                                                                                                                                                  | Mobile ≤ 3 watts (□□m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Mobile ≤ 3 watts (ppm) |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 25 to 50                         | 20.0                                                                                                                                                               | 20.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.0                   |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 50 to 450                        | 5.0                                                                                                                                                                | 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50.0                   |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 45□to 512                        | 2.5                                                                                                                                                                | 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | □0                     |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 821 to 896                       | 1.5                                                                                                                                                                | 2.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2.5                    |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 928 to 929                       | 5.0                                                                                                                                                                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                    |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 929 to 960.                      | 1.5                                                                                                                                                                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                    |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 2110 to 2220                     | 10.0                                                                                                                                                               | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                    |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| Test setup                       |  <p style="text-align: center;">Base Station      EUT      Thermal Chamber</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |    |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |

|           |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Procedure | <p>A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage.</p> <p>Limit: The frequency stability of the transmitter shall be maintained within <math>\pm 0.00025\%</math> (<math>\pm 2.5\text{ppm}</math>) of the center frequency.</p> |
| Remark    |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Result    | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                            |

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

**GSM Voice:**

**Cellular Band (Part 22H) result**

| Middle Channel, $f_0 = 836.6$ MHz |                                   |                      |                       |             |
|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                  | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                               | 3.7                               | 21                   | 0.0251                | 2.5         |
| 0                                 |                                   | 19                   | 0.0227                | 2.5         |
| 10                                |                                   | 15                   | 0.0179                | 2.5         |
| 20                                |                                   | 13                   | 0.0155                | 2.5         |
| 30                                |                                   | 16                   | 0.0191                | 2.5         |
| 40                                |                                   | 15                   | 0.0179                | 2.5         |
| 50                                |                                   | 21                   | 0.0251                | 2.5         |
| 55                                |                                   | 18                   | 0.0215                | 2.5         |
| 25                                | 4.2                               | 20                   | 0.0239                | 2.5         |
|                                   | 3.5                               | 19                   | 0.0227                | 2.5         |

**PCS Band (Part 24E) result**

| Middle Channel, $f_0 = 1880$ MHz |                                   |                      |                       |             |
|----------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                 | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                              | 3.7                               | 11                   | 0.0059                | 2.5         |
| 0                                |                                   | 13                   | 0.0069                | 2.5         |
| 10                               |                                   | 12                   | 0.0064                | 2.5         |
| 20                               |                                   | 13                   | 0.0069                | 2.5         |
| 30                               |                                   | 14                   | 0.0074                | 2.5         |
| 40                               |                                   | 16                   | 0.0085                | 2.5         |
| 50                               |                                   | 15                   | 0.0080                | 2.5         |
| 55                               |                                   | 16                   | 0.0085                | 2.5         |
| 25                               | 4.2                               | 14                   | 0.0074                | 2.5         |
|                                  | 3.5                               | 21                   | 0.0112                | 2.5         |

RMC:

**UMTS-FDD Band V (Part 22H)**

| Middle Channel, $f_0 = 835$ MHz |                                   |                      |                       |             |
|---------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                             | 3.7                               | 12                   | 0.0144                | 2.5         |
| 0                               |                                   | 13                   | 0.0156                | 2.5         |
| 10                              |                                   | 14                   | 0.0168                | 2.5         |
| 20                              |                                   | 15                   | 0.0180                | 2.5         |
| 30                              |                                   | 12                   | 0.0144                | 2.5         |
| 40                              |                                   | 11                   | 0.0132                | 2.5         |
| 50                              |                                   | 18                   | 0.0216                | 2.5         |
| 55                              |                                   | 14                   | 0.0168                | 2.5         |
| 25                              | 4.2                               | 17                   | 0.0204                | 2.5         |
|                                 | 3.5                               | 11                   | 0.0132                | 2.5         |

**UMTS-FDD Band II (Part 24E)**

| Middle Channel, $f_0 = 1880$ MHz |                                   |                      |                       |             |
|----------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                 | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -10                              | 3.7                               | 16                   | 0.0085                | 2.5         |
| 0                                |                                   | 15                   | 0.0080                | 2.5         |
| 10                               |                                   | 13                   | 0.0069                | 2.5         |
| 20                               |                                   | 11                   | 0.0059                | 2.5         |
| 30                               |                                   | 12                   | 0.0064                | 2.5         |
| 40                               |                                   | 15                   | 0.0080                | 2.5         |
| 50                               |                                   | 11                   | 0.0059                | 2.5         |
| 55                               |                                   | 15                   | 0.0080                | 2.5         |
| 25                               | 4.2                               | 16                   | 0.0085                | 2.5         |
|                                  | 3.5                               | 12                   | 0.0064                | 2.5         |

## Annex A. TEST INSTRUMENT

| Instrument                             | Model                | Serial #   | Cal Date   | Cal Due    | In use                              |
|----------------------------------------|----------------------|------------|------------|------------|-------------------------------------|
| <b>RF Conducted Test</b>               |                      |            |            |            |                                     |
| Agilent ESA-E SERIES SPECTRUM ANALYZER | E4407B               | MY45108319 | 09/15/2016 | 09/14/2017 | <input checked="" type="checkbox"/> |
| Power Splitter                         | 1#                   | 1#         | 08/31/2016 | 08/30/2017 | <input checked="" type="checkbox"/> |
| Universal Radio Communication Tester   | CMU200               | 121393     | 09/24/2016 | 09/23/2017 | <input checked="" type="checkbox"/> |
| Temperature/Humidity Chamber           | UHL-270              | 001        | 10/08/2016 | 10/07/2017 | <input checked="" type="checkbox"/> |
| DC Power Supply                        | E3640A               | MY40004013 | 09/16/2016 | 09/15/2017 | <input checked="" type="checkbox"/> |
| RF Power Sensor                        | Dare<br>RPR3006C/P/W | AY554013   | 09/16/2016 | 09/15/2017 | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>              |                      |            |            |            |                                     |
| EMI test receiver                      | ESL6                 | 100262     | 09/16/2016 | 09/15/2017 | <input checked="" type="checkbox"/> |
| OPT 010 AMPLIFIER (0.1-1300MHz)        | 8447E                | 2727A02430 | 08/31/2016 | 08/30/2017 | <input checked="" type="checkbox"/> |
| Microwave Preamplifier (1 ~ 26.5GHz)   | 8449B                | 3008A02402 | 03/23/2017 | 03/22/2018 | <input checked="" type="checkbox"/> |
| Bilog Antenna (30MHz~6GHz)             | JB6                  | A110712    | 09/20/2016 | 09/19/2017 | <input checked="" type="checkbox"/> |
| Bilog Antenna (30MHz~2GHz)             | JB1                  | A112017    | 09/20/2016 | 09/19/2017 | <input checked="" type="checkbox"/> |
| Double Ridge Horn Antenna (1 ~18GHz)   | AH-118               | 71259      | 09/23/2016 | 09/22/2017 | <input checked="" type="checkbox"/> |
| Double Ridge Horn Antenna (1 ~18GHz)   | AH-118               | 71283      | 09/23/2016 | 09/22/2017 | <input checked="" type="checkbox"/> |
| SYNTHESIZED SIGNAL GENERATOR           | 8665B                | 3744A01293 | 09/16/2016 | 09/15/2017 | <input checked="" type="checkbox"/> |
| Power Amplifier                        | SMC150D              | R1553-0313 | 03/08/2017 | 03/07/2018 | <input checked="" type="checkbox"/> |
| Power Amplifier                        | S41-25D              | R1553-0314 | 05/26/2017 | 05/25/2018 | <input checked="" type="checkbox"/> |
| Tunable Notch Filter                   | 3NF-800/1000-S       | AA4        | 08/31/2016 | 08/30/2017 | <input checked="" type="checkbox"/> |

|             |                 |
|-------------|-----------------|
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|                      |                     |      |            |            |                                     |
|----------------------|---------------------|------|------------|------------|-------------------------------------|
| Tunable Notch Filter | 3NF-<br>1000/2000-S | AM 4 | 08/31/2016 | 08/30/2017 | <input checked="" type="checkbox"/> |
|----------------------|---------------------|------|------------|------------|-------------------------------------|

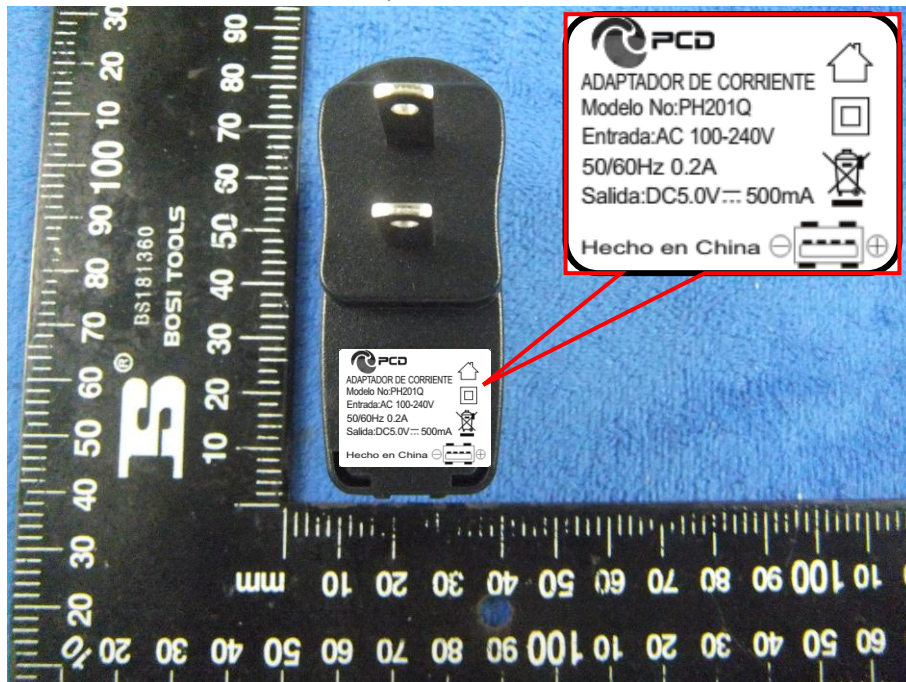
## Annex B. EUT And Test Setup Photographs

### Annex B.i. Photograph: EUT External Photo

Whole Package View



Adapter - Front View



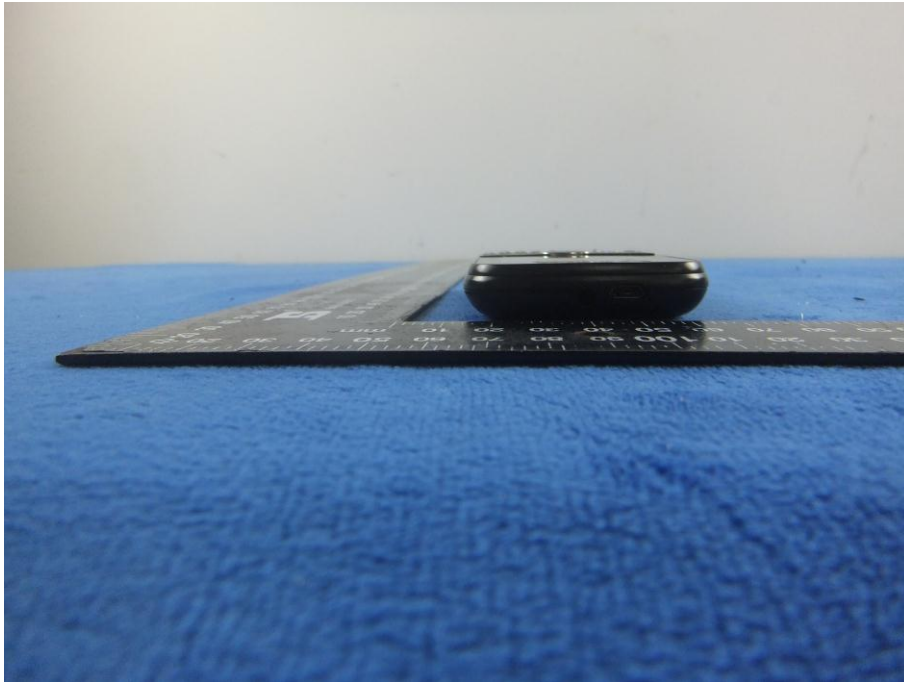
EUT - Front View



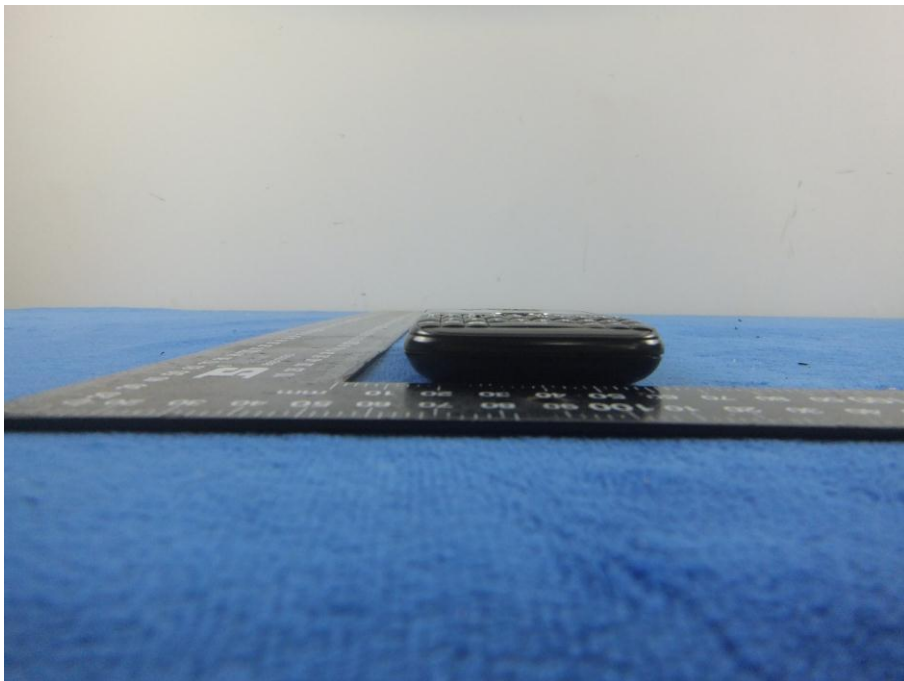
EUT - Rear View



EUT - Top View



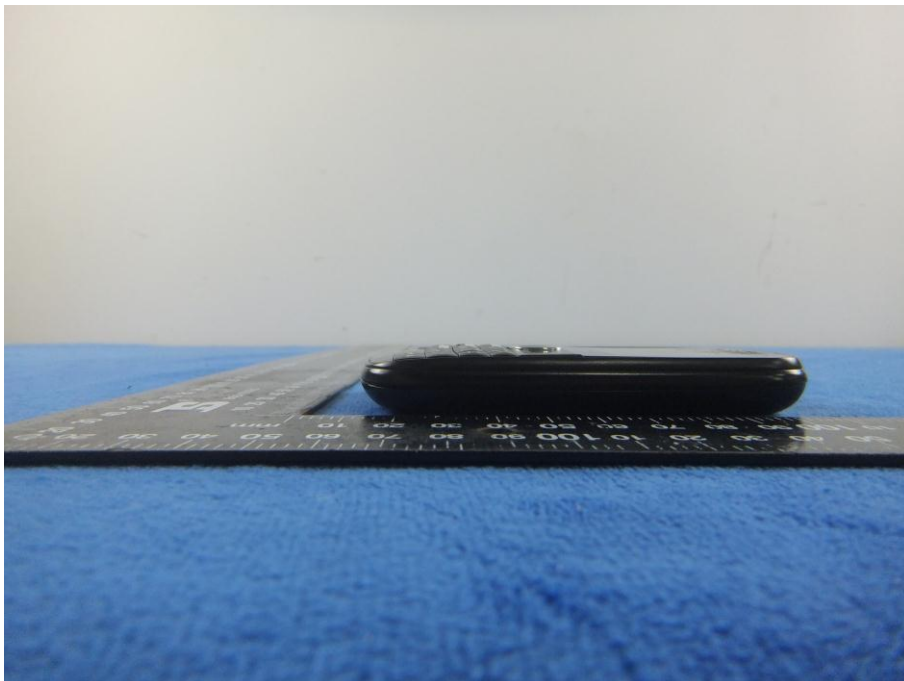
EUT - Bottom View



EUT - Left View



EUT - Right View



**Annex B.ii. Photograph: EUT Internal Photo**

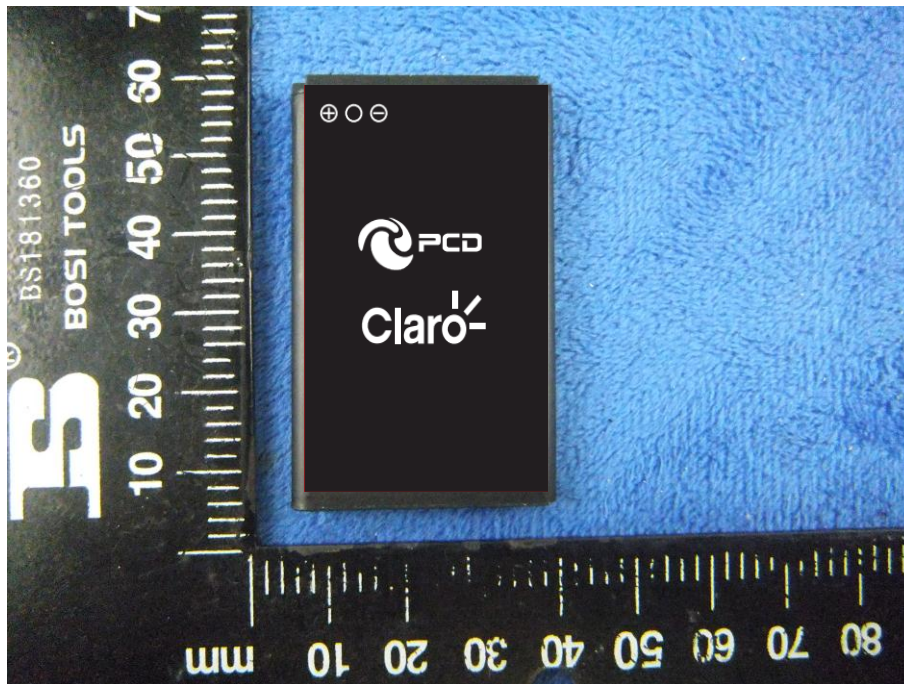
Cover Off - Top View 1



Cover Off - Top View 2



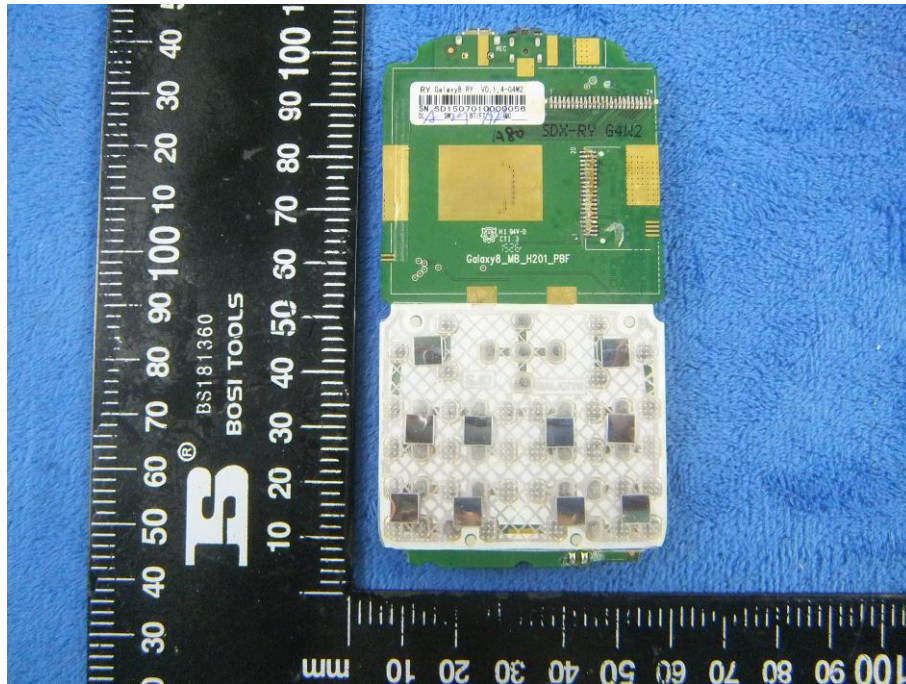
Battery - Front View



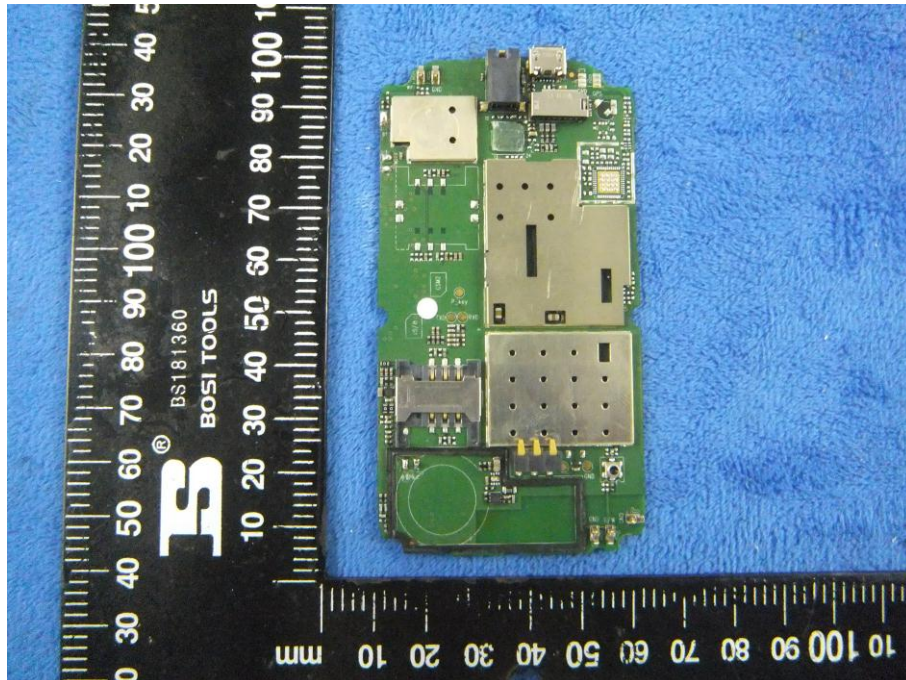
Battery - Rear View



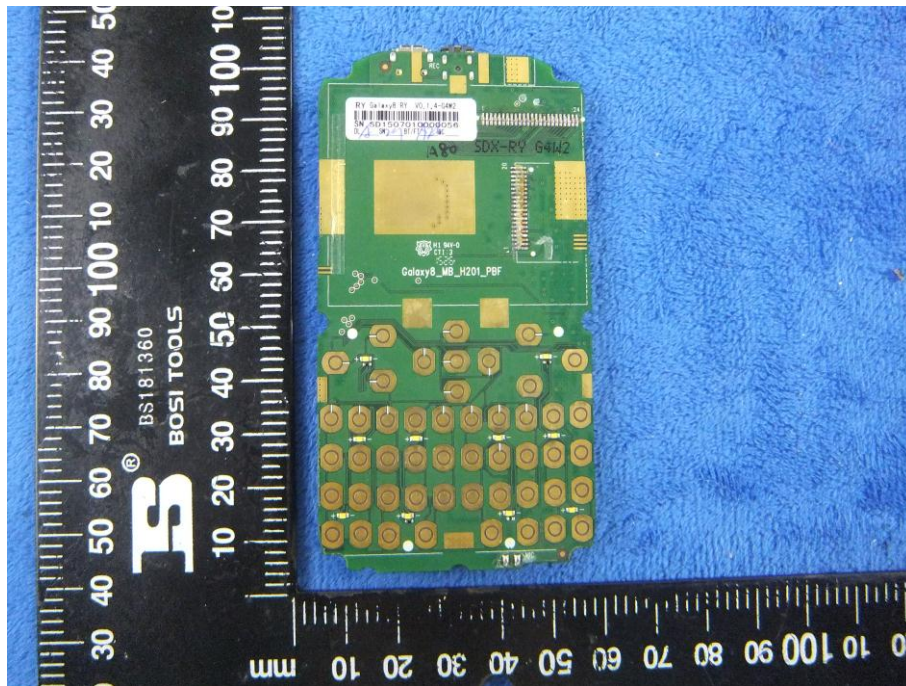
Mainboard with button - Front View



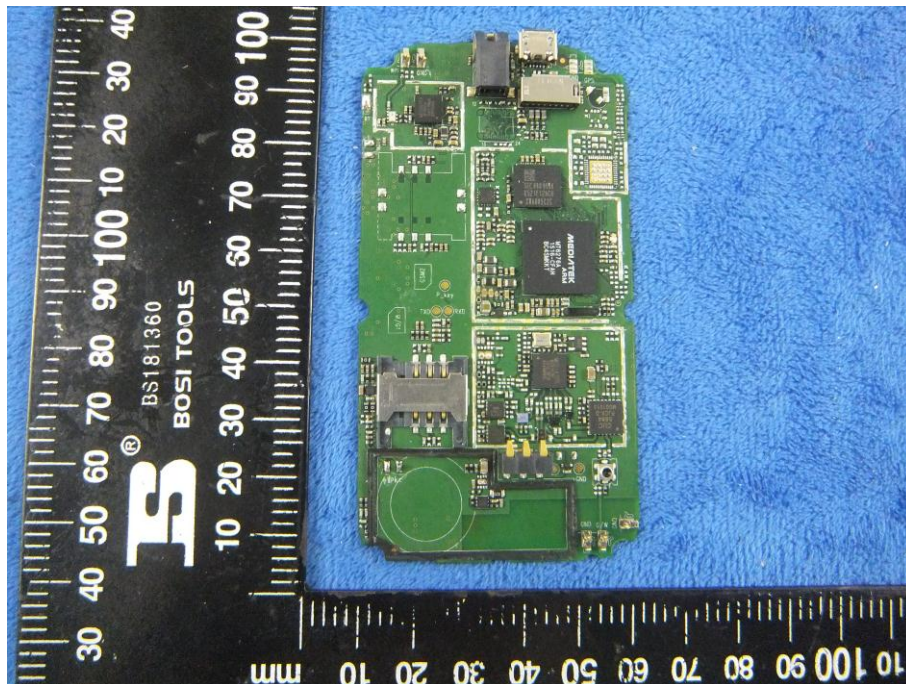
Mainboard with Shielding - Rear View



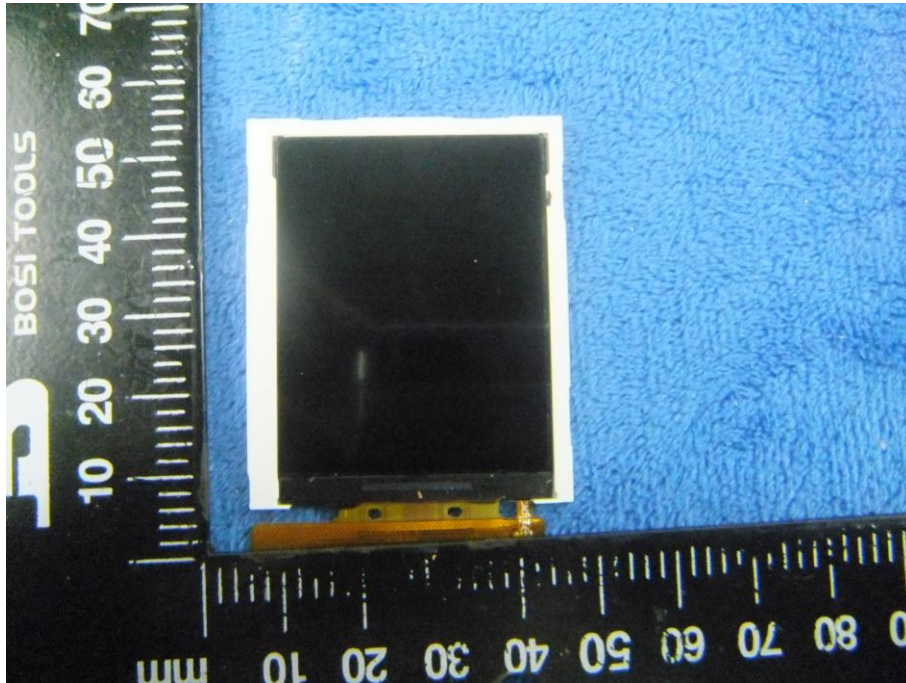
Mainboard without button - Front View



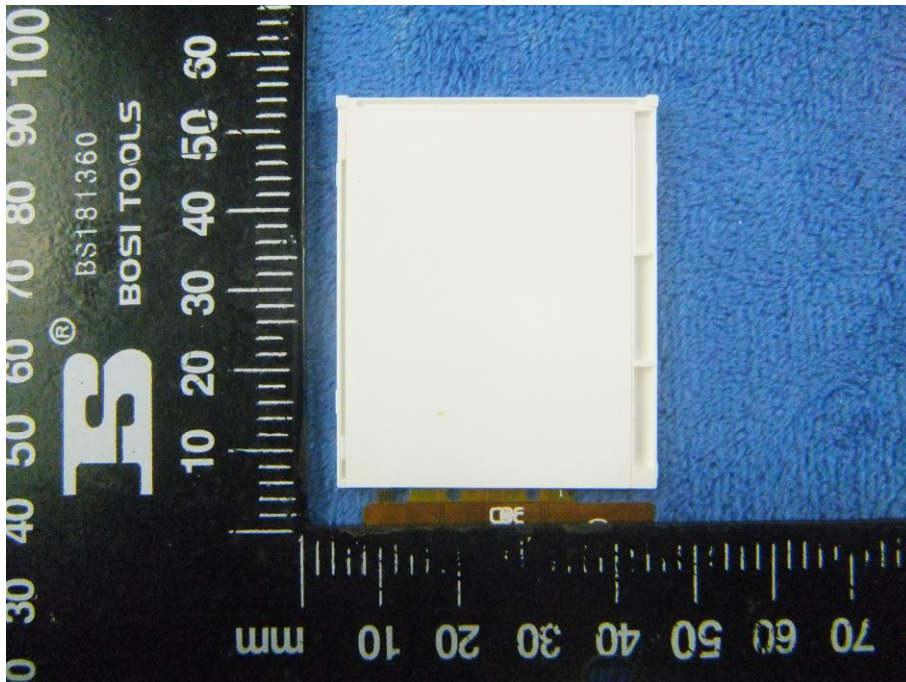
Mainboard without Shielding - Rear View



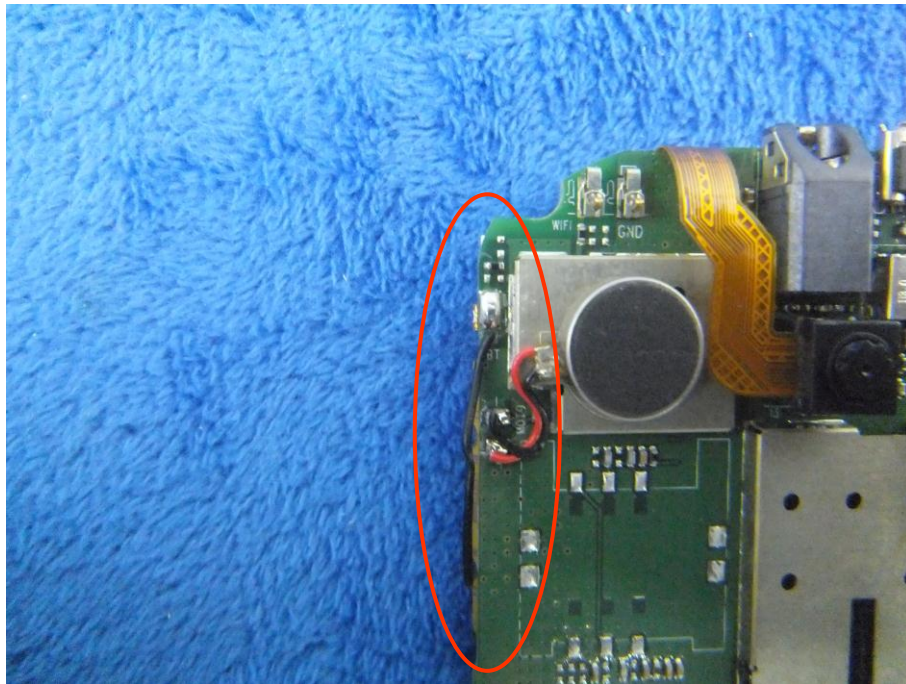
LCD – Front View



LCD – Rear View



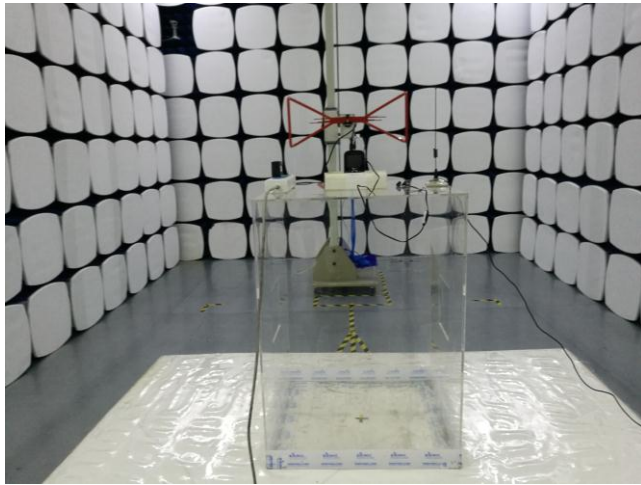
BT - Antenna View



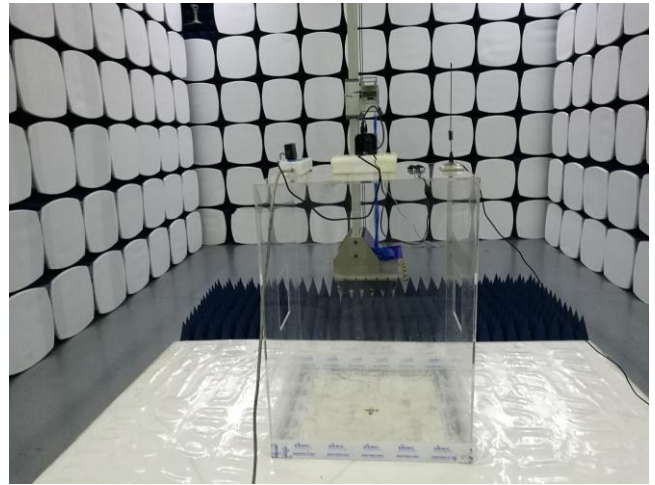
GSM/WCDMA - Antenna View



**Annex B.iii. Photograph: Test Setup Photo**



Radiated Spurious Emissions Test Setup Below 1GHz

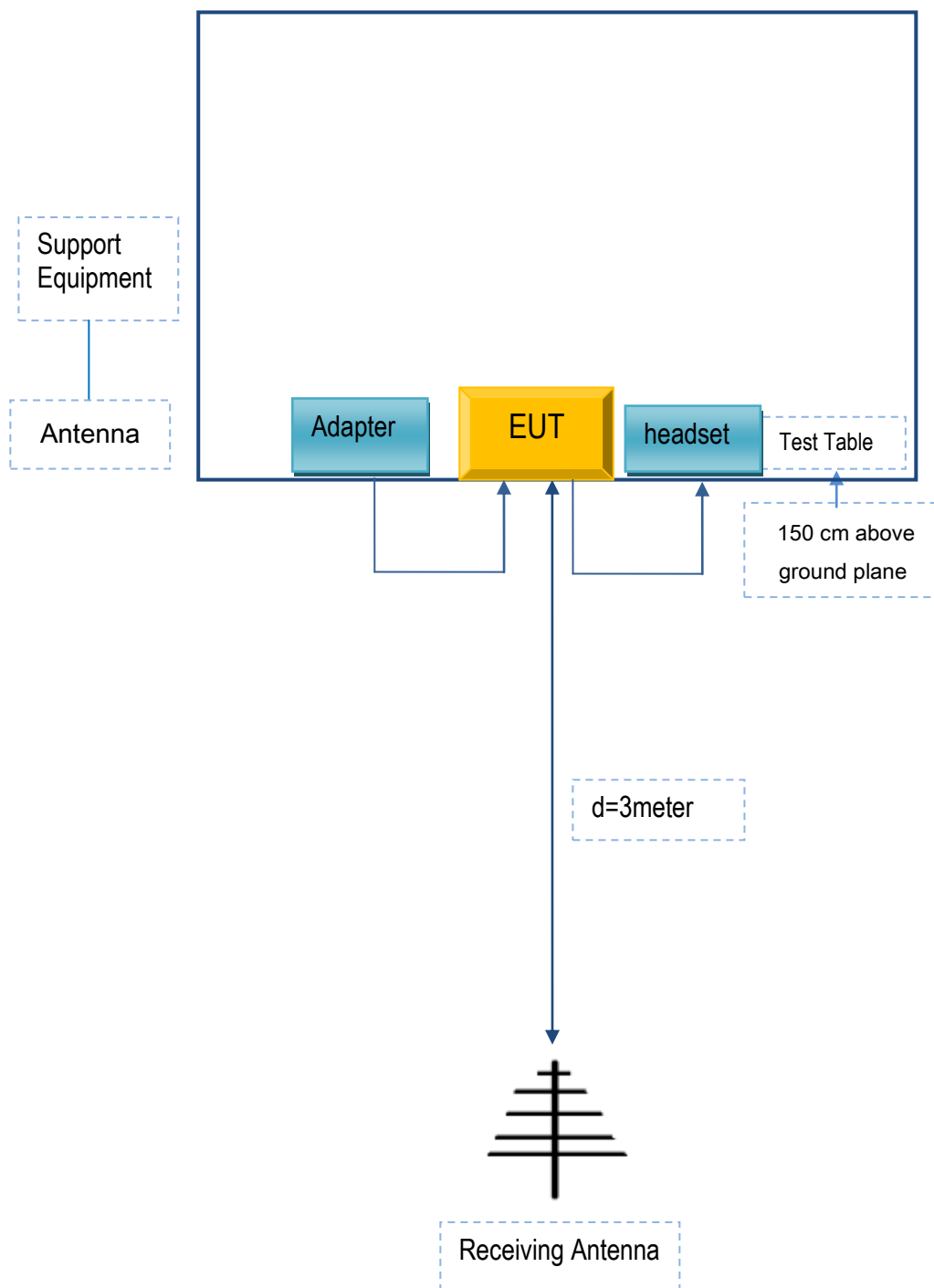


Radiated Spurious Emissions Test Setup Above  
1GHz

## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

### Annex C.ii. TEST SET UP BLOCK

#### Block Configuration Diagram for Radiated Emissions



## **Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION**

The following is a description of supporting equipment and details of cables used with the EUT.

### **Supporting Equipment:**

| Manufacturer | Equipment Description | Model  | Serial No |
|--------------|-----------------------|--------|-----------|
| PCD, LLC     | Adapter               | PH201Q | N/A       |
| PCD, LLC     | headset               | PH201Q | N/A       |

### **Supporting Cable:**

| Cable type | Shield Type  | Ferrite Core | Length | Serial No |
|------------|--------------|--------------|--------|-----------|
| USB Cable  | Un-shielding | No           | 0.8m   | N/A       |

## Annex C.ii. EUT OPERATING CONKITIONS

N/A

## Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see the attachment

## Annex E. DECLARATION OF SIMILARITY

N/A