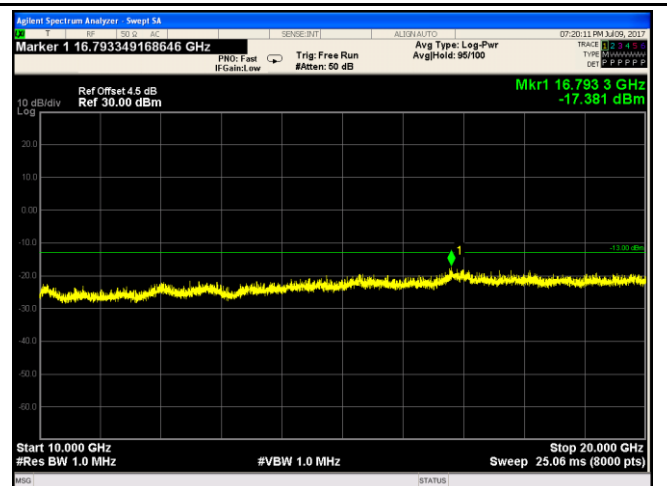
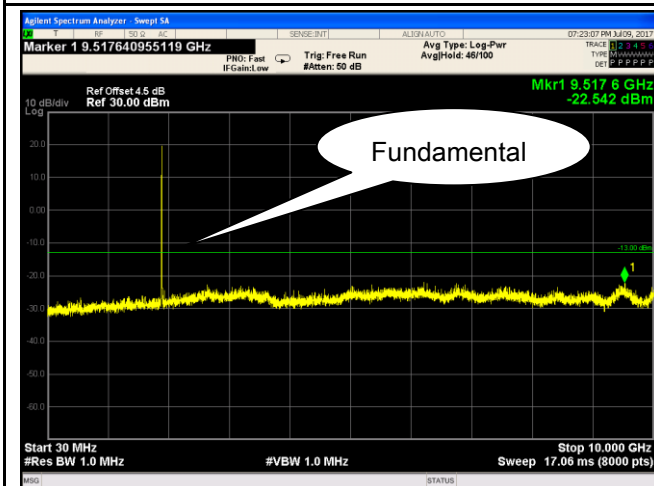
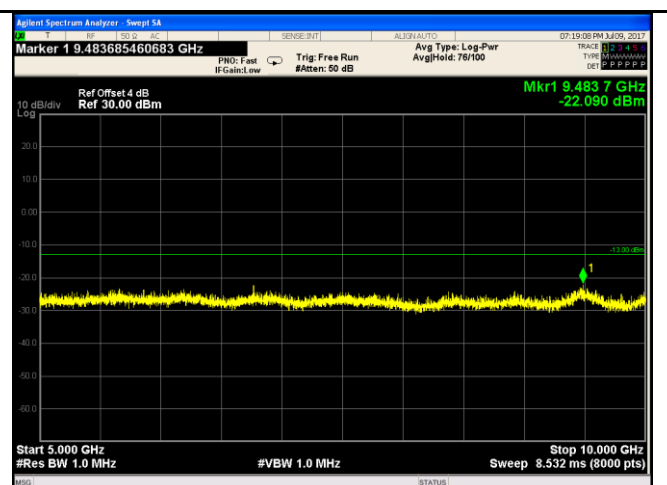
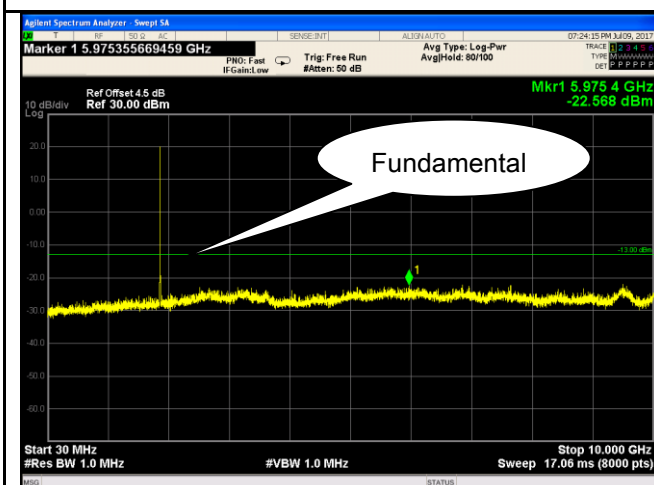
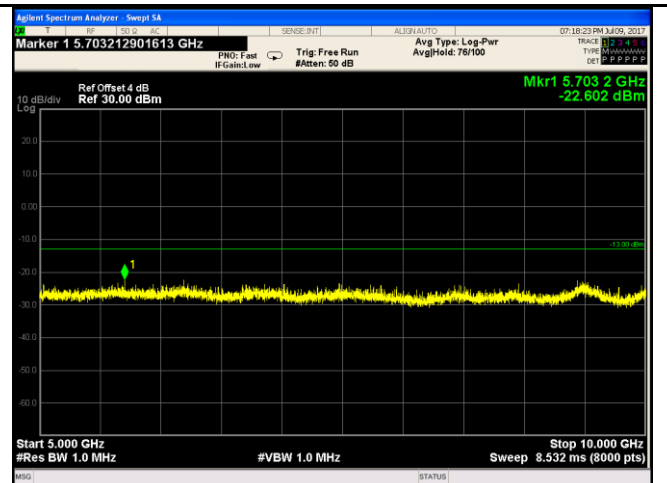
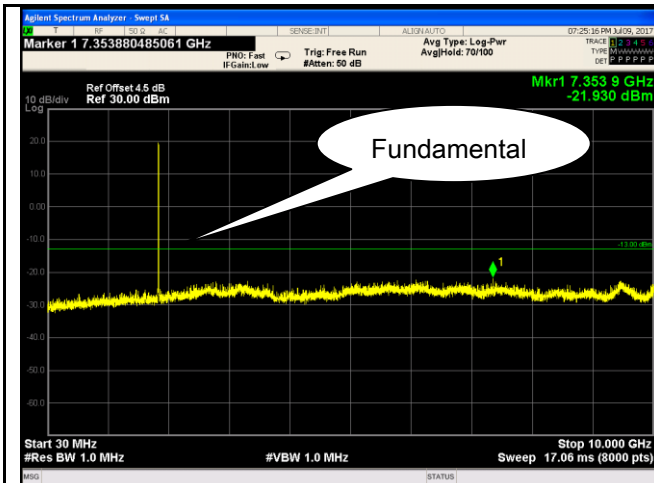
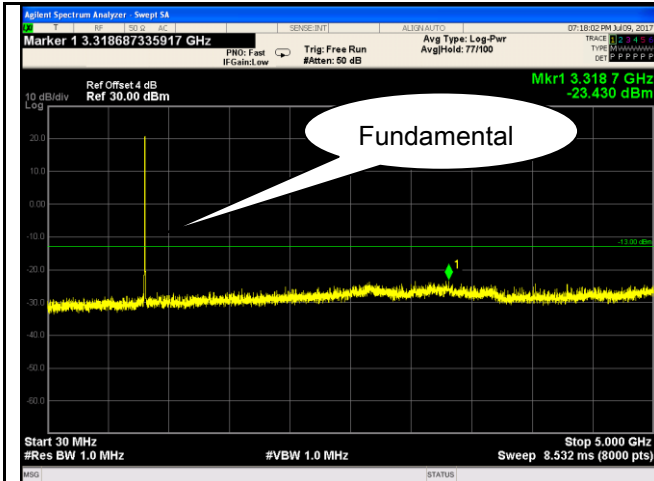


## UMTS-FDD Band II (Part 24E)

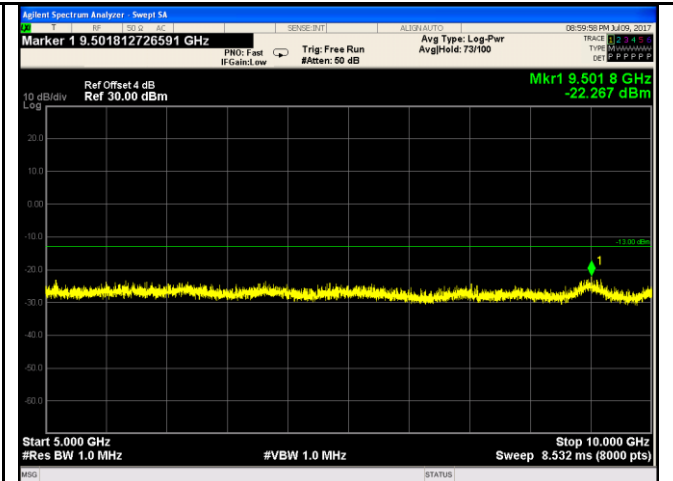


HSDPA:

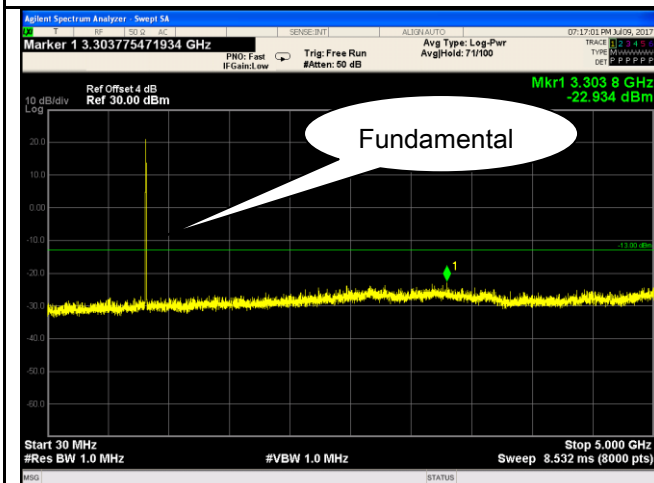
UMTS-FDD Band V (Part 22H)



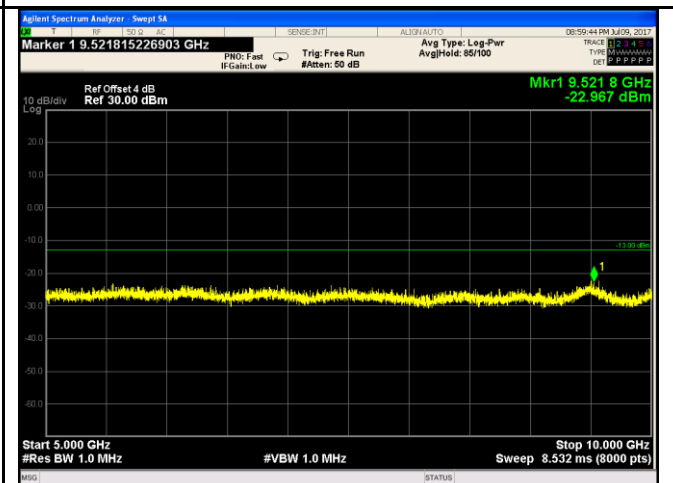
Band V - Low Channel-1



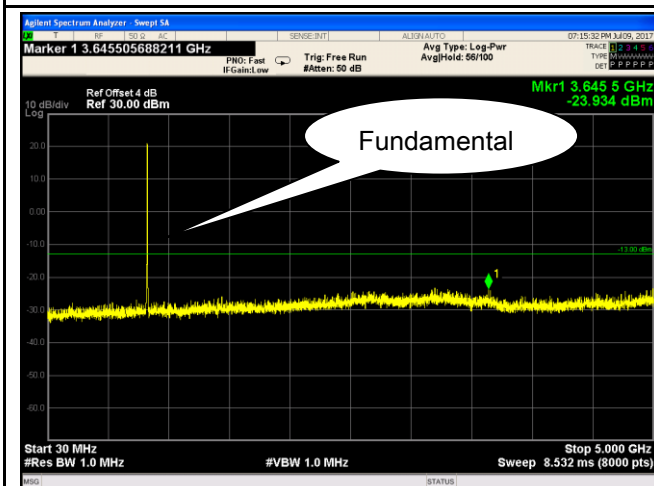
Band V - Low Channel-2



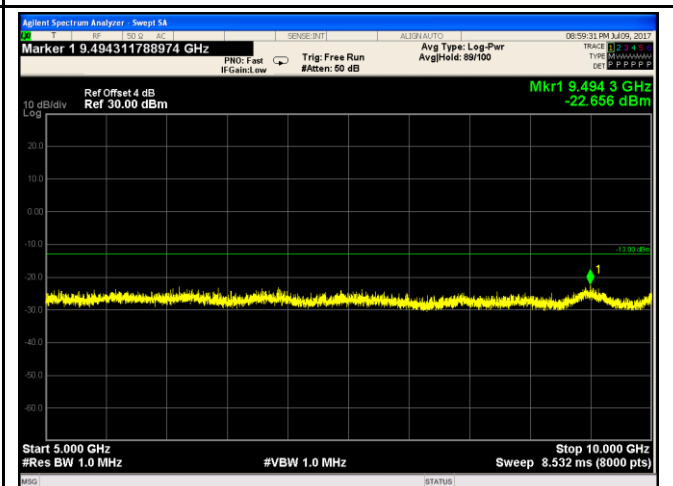
Band V - Middle Channel-1



Band V - Middle Channel-2

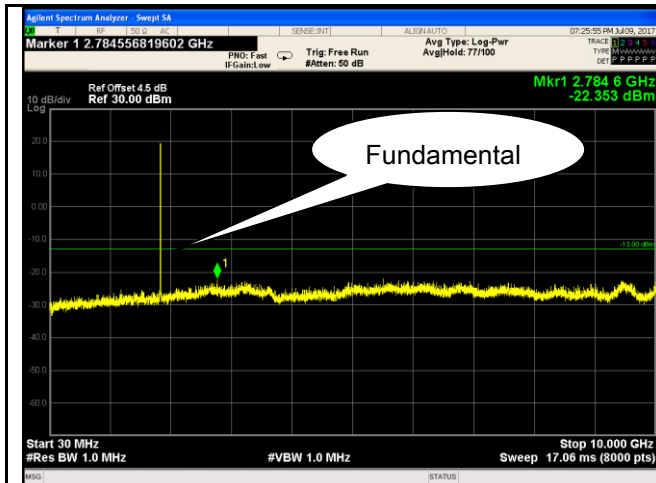


Band V - High Channel-1

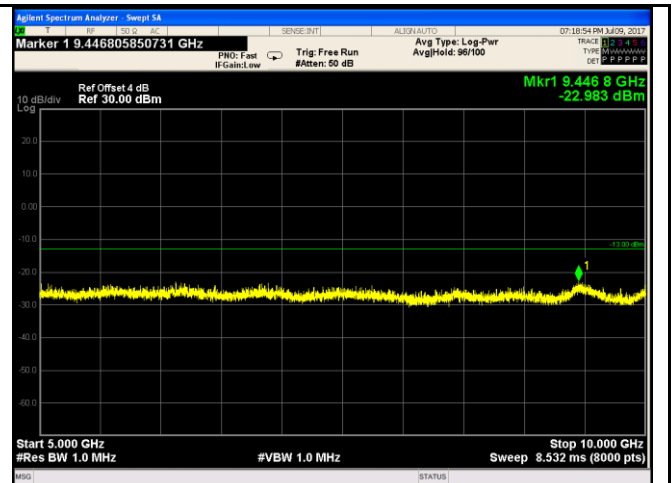


Band V - High Channel-2

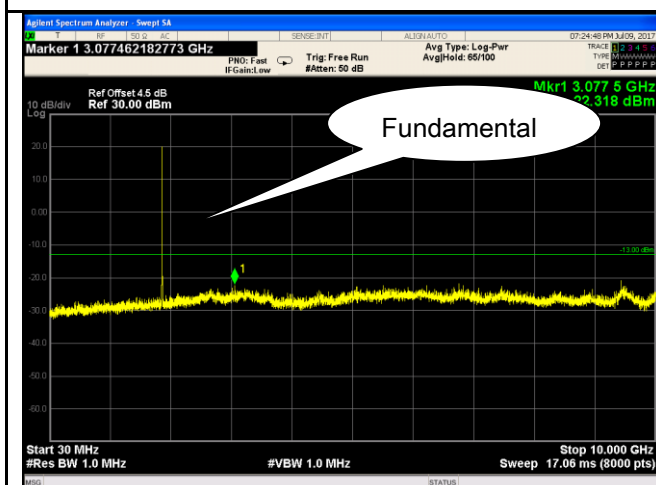
## UMTS-FDD Band II (Part 24E)



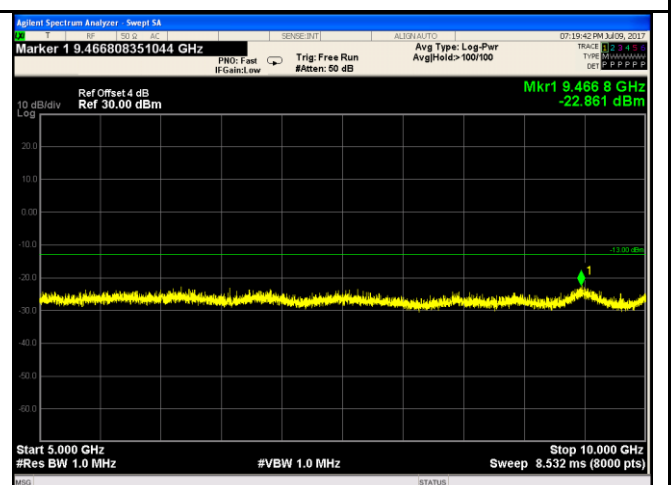
Band II - Low Channel-1



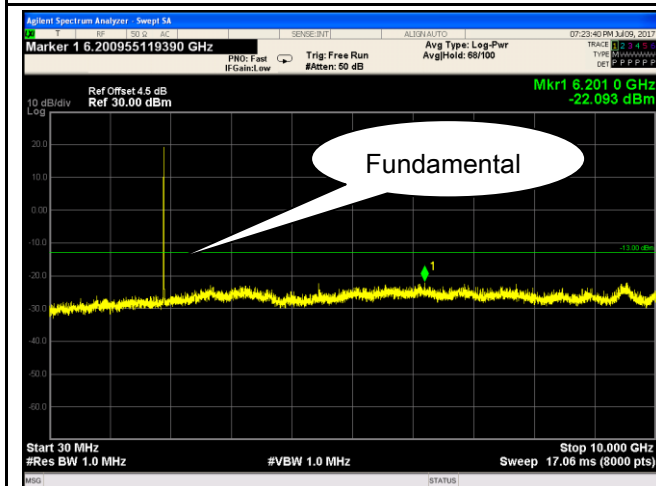
Band II - Low Channel-2



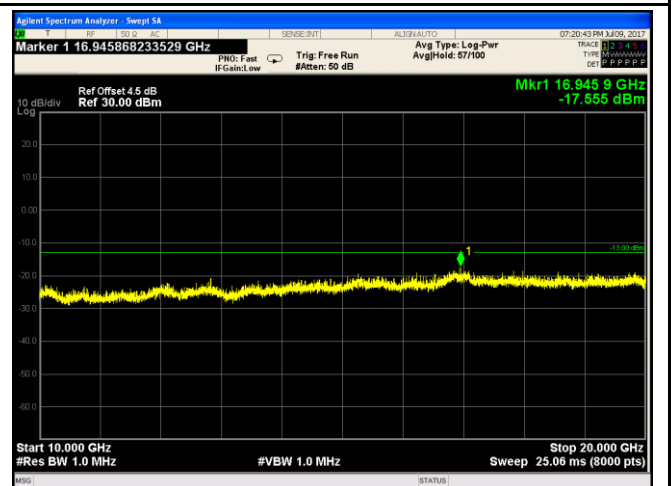
Band II - Middle Channel-1



Band II - Middle Channel-2



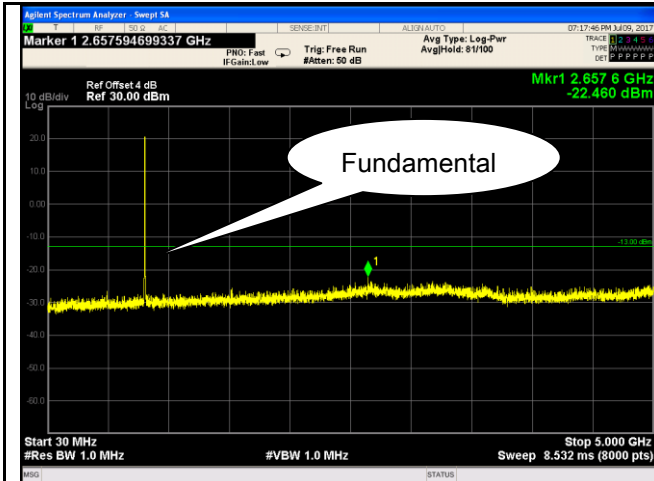
Band II - High Channel-1



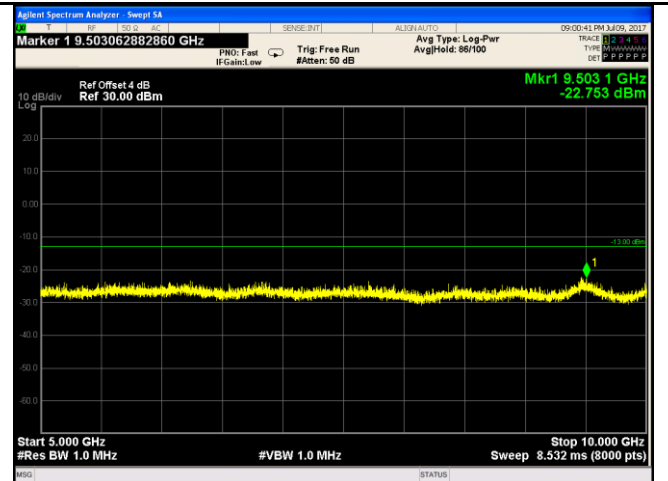
Band II - High Channel-2

HSUPA:

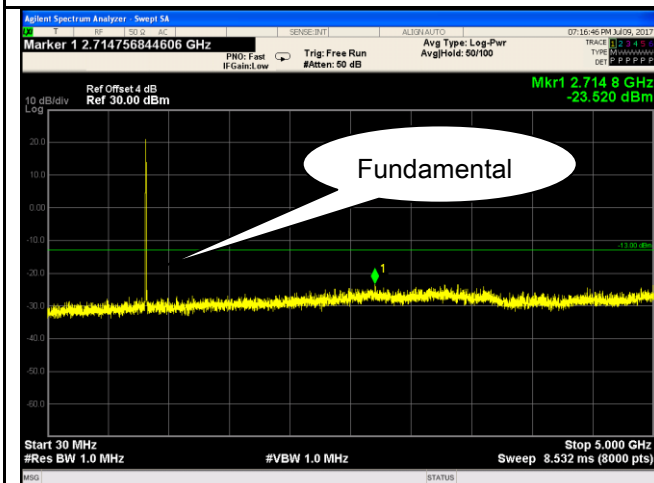
UMTS-FDD Band V (Part 22H)



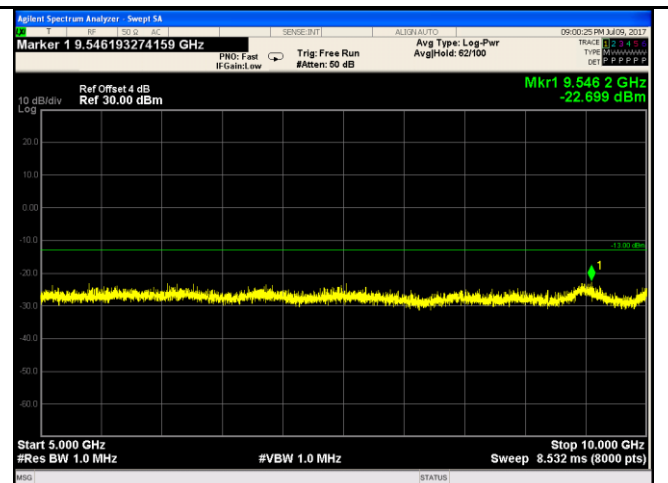
Band V - Low Channel-1



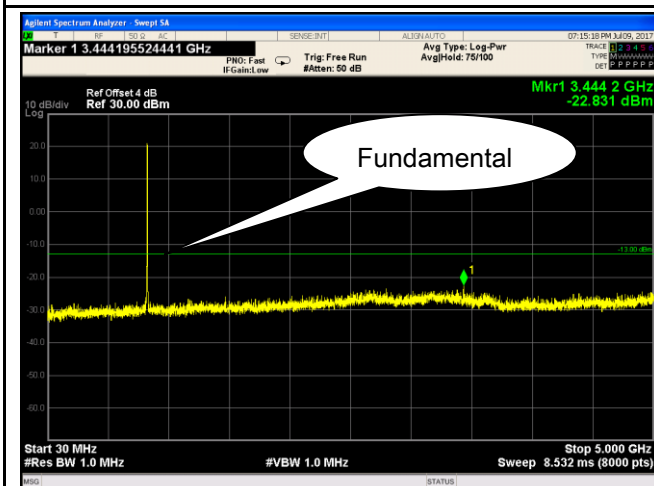
Band V - Low Channel-2



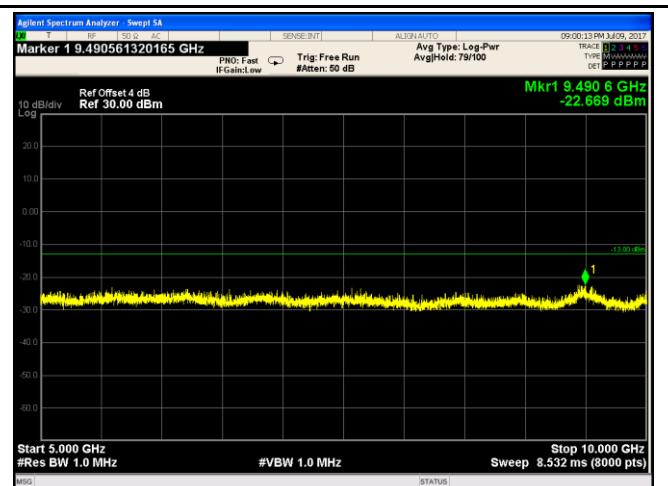
Band V - Middle Channel-1



Band V - Middle Channel-2

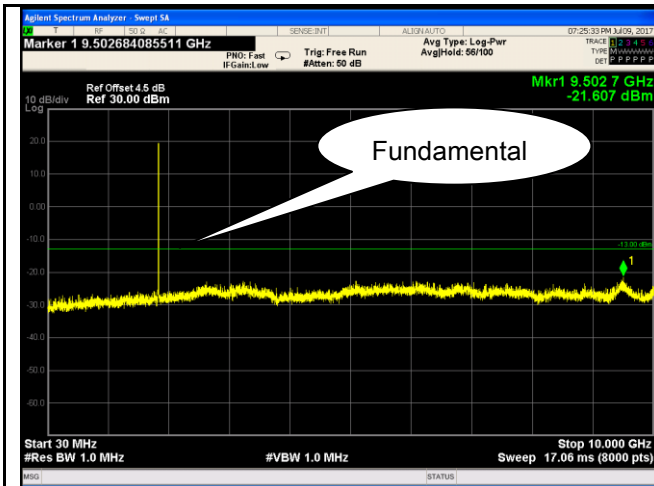


Band V - High Channel-1

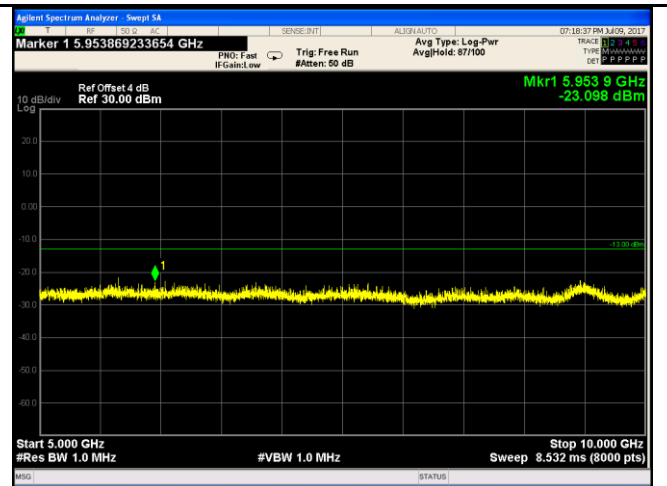


Band V - High Channel-2

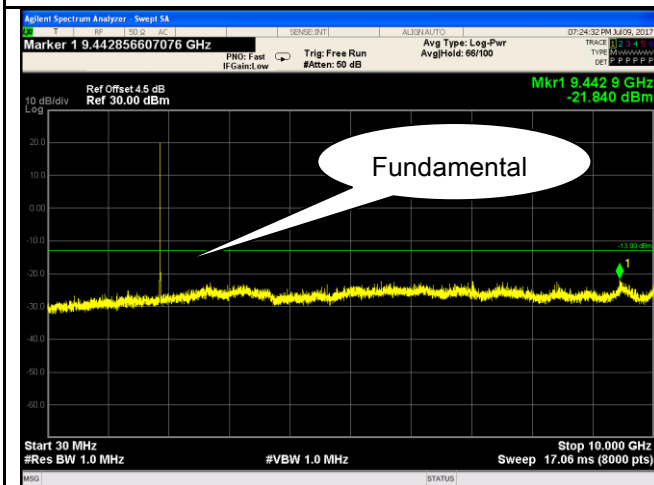
## UMTS-FDD Band II (Part 24E)



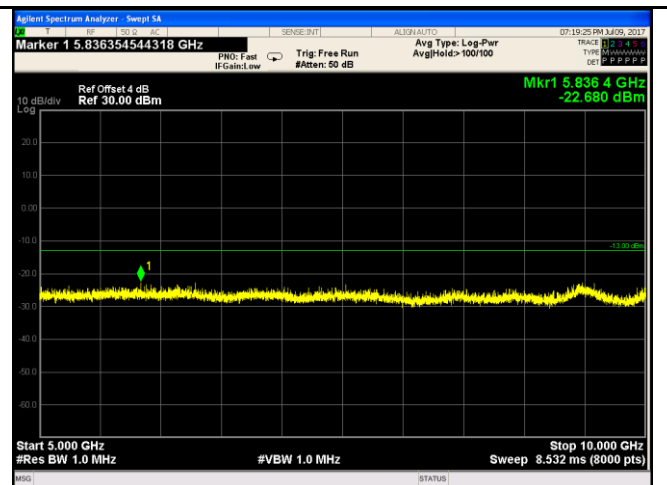
Band II - Low Channel-1



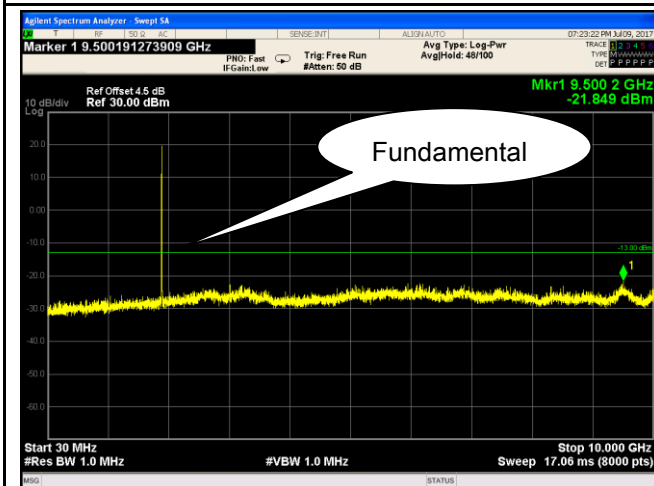
Band II - Low Channel-2



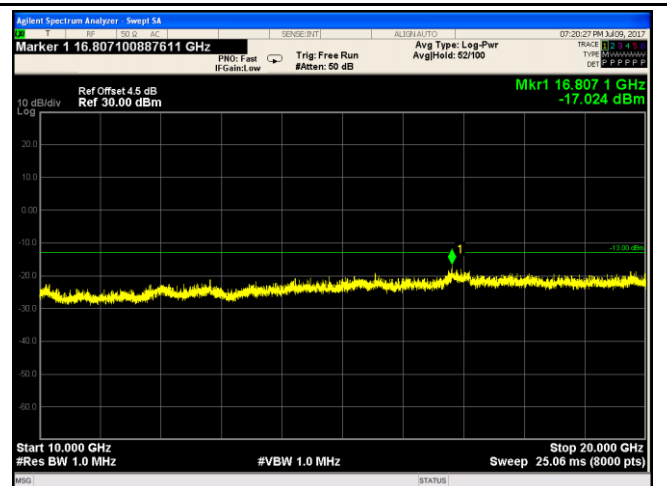
Band II - Middle Channel-1



Band II - Middle Channel-2



Band II - High Channel-1



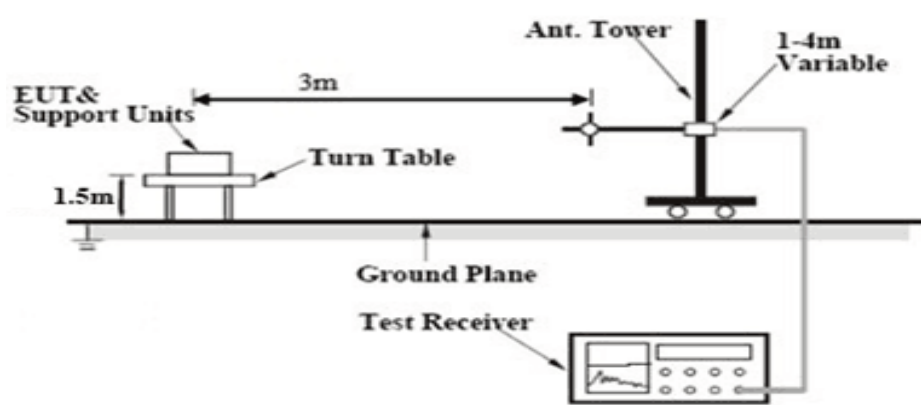
Band II - High Channel-2

## 6.6 Spurious Radiated Emissions

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 55%           |
| Atmospheric Pressure | 1012mbar      |
| Test date :          | July 10, 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          | -42.63                  | V              | 7.95                         | 0.67            | -35.35                  | -13         | -22.35      |
| 1648.4          | -44.05                  | H              | 7.95                         | 0.67            | -36.77                  | -13         | -23.77      |
| 704.9           | -52.57                  | V              | 6.3                          | 0.4             | -46.67                  | -13         | -33.67      |
| 602.7           | -52.26                  | H              | 6.8                          | 0.37            | -45.83                  | -13         | -32.83      |

### 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          | -41.91                  | V              | 7.95                         | 0.67            | -34.63                  | -13         | -21.63      |
| 1673.2          | -44.09                  | H              | 7.95                         | 0.67            | -36.81                  | -13         | -23.81      |
| 330.7           | -53.72                  | V              | 6.4                          | 0.26            | -47.58                  | -13         | -34.58      |
| 611.9           | -53.55                  | H              | 6.8                          | 0.37            | -47.12                  | -13         | -34.12      |

### 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          | -42.36                  | V              | 7.95                         | 0.68            | -35.09                  | -13         | -22.09      |
| 1697.6          | -44.05                  | H              | 7.95                         | 0.68            | -36.78                  | -13         | -23.78      |
| 457.8           | -51.02                  | V              | 6                            | 0.29            | -45.31                  | -13         | -32.31      |
| 924.2           | -53.36                  | H              | 6.2                          | 0.44            | -47.6                   | -13         | -34.6       |

#### 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          | -49.21                  | V              | 10.25                        | 1               | -39.96                  | -13         | -26.96      |
| 3700.4          | -49.9                   | H              | 10.25                        | 1               | -40.65                  | -13         | -27.65      |
| 83.1            | -53.4                   | V              | 0.4                          | 0.12            | -53.12                  | -13         | -40.12      |
| 600.6           | -53.44                  | H              | 6.8                          | 0.37            | -47.01                  | -13         | -34.01      |

### 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            | -47.26                  | V              | 10.25                        | 1.01            | -38.02                  | -13         | -25.02      |
| 3760            | -50.41                  | H              | 10.25                        | 1.01            | -41.17                  | -13         | -28.17      |
| 329.4           | -53.4                   | V              | 6.4                          | 0.26            | -47.26                  | -13         | -34.26      |
| 603.3           | -52.99                  | H              | 6.8                          | 0.37            | -46.56                  | -13         | -33.56      |

### 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          | -49                     | V              | 10.36                        | 1.02            | -39.66                  | -13         | -26.66      |
| 3819.6          | -47.92                  | H              | 10.36                        | 1.02            | -38.58                  | -13         | -25.58      |
| 751.5           | -54.71                  | V              | 6.4                          | 0.43            | -48.74                  | -13         | -35.74      |
| 924.5           | -51.24                  | H              | 6.2                          | 0.44            | -45.48                  | -13         | -32.48      |

#### Note:

1, The testing has been conformed to  $10 \times 1909.8 \text{ MHz} = 19,098 \text{ MHz}$

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.

## 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          | -46.49                  | V              | 7.95                         | 0.67            | -39.21                  | -13         | -26.21      |
| 1652.8          | -46.56                  | H              | 7.95                         | 0.67            | -39.28                  | -13         | -26.28      |
| 323.9           | -51.3                   | V              | 6.4                          | 0.26            | -45.16                  | -13         | -32.16      |
| 599.5           | -53.15                  | H              | 6.8                          | 0.37            | -46.72                  | -13         | -33.72      |

### 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            | -45.1                   | V              | 7.95                         | 0.67            | -37.82                  | -13         | -24.82      |
| 1670            | -47.23                  | H              | 7.95                         | 0.67            | -39.95                  | -13         | -26.95      |
| 785.6           | -51.57                  | V              | 6.2                          | 0.44            | -45.81                  | -13         | -32.81      |
| 325.1           | -53.37                  | H              | 6.4                          | 0.26            | -47.23                  | -13         | -34.23      |

### 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          | -48.29                  | V              | 7.95                         | 0.68            | -41.02                  | -13         | -28.02      |
| 1693.2          | -46.92                  | H              | 7.95                         | 0.68            | -39.65                  | -13         | -26.65      |
| 325.6           | -53.64                  | V              | 6.4                          | 0.26            | -47.5                   | -13         | -34.5       |
| 601.5           | -51.59                  | H              | 6.8                          | 0.37            | -45.16                  | -13         | -32.16      |

#### 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          | -49.7                   | V              | 10.25                        | 1               | -40.45                  | -13         | -27.45      |
| 3704.8          | -49.3                   | H              | 10.25                        | 1               | -40.05                  | -13         | -27.05      |
| 328.7           | -53.27                  | V              | 6.4                          | 0.26            | -47.13                  | -13         | -34.13      |
| 606.1           | -54                     | H              | 6.8                          | 0.37            | -47.57                  | -13         | -34.57      |

### 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            | -50.1                   | V              | 10.25                        | 1.01            | -40.86                  | -13         | -27.86      |
| 3760            | -50.57                  | H              | 10.25                        | 1.01            | -41.33                  | -13         | -28.33      |
| 507.9           | -52.64                  | V              | 6.1                          | 0.34            | -46.88                  | -13         | -33.88      |
| 606.2           | -52.68                  | H              | 6.8                          | 0.37            | -46.25                  | -13         | -33.25      |

### 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          | -48.92                  | V              | 10.36                        | 1.02            | -39.58                  | -13         | -26.58      |
| 3815.2          | -49.84                  | H              | 10.36                        | 1.02            | -40.5                   | -13         | -27.5       |
| 214.4           | -54.96                  | V              | 3.7                          | 0.18            | -51.44                  | -13         | -38.44      |
| 865.2           | -53.07                  | H              | 6.2                          | 0.44            | -47.31                  | -13         | -34.31      |

#### 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

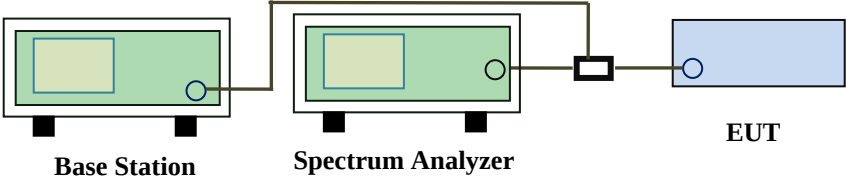
3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases

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    | 56%           |
| Atmospheric Pressure | 1018mbar      |
| Test date :          | July 09, 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        | -16.802        | -13         |
| 849.0025        | -15.682        | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -19.775        | -13         |
| 1910.0225       | -18.339        | -13         |

**GPRS:**

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.9800        | -15.398        | -13         |
| 849.0200        | -16.204        | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -20.639        | -13         |
| 1910.0250       | -18.569        | -13         |

**EGPRS (MCS 5):**

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.9989        | -15.148        | -13         |
| 849.0025        | -17.058        | -13         |

**PCS Band (Part24E) result**

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.9975       | -19.452        | -13         |
| 1910.0200       | -19.093        | -13         |

**RMC:**

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 824.000         | -24.835        | -13         |
| 849.275         | -25.409        | -13         |

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.925        | -23.496        | -13         |
| 1910.075        | -20.987        | -13         |

**HSDPA:**

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.550         | -25.240        | -13         |
| 849.200         | -25.355        | -13         |

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.900        | -24.977        | -13         |
| 1910.050        | -20.438        | -13         |

**HSUPA:**

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

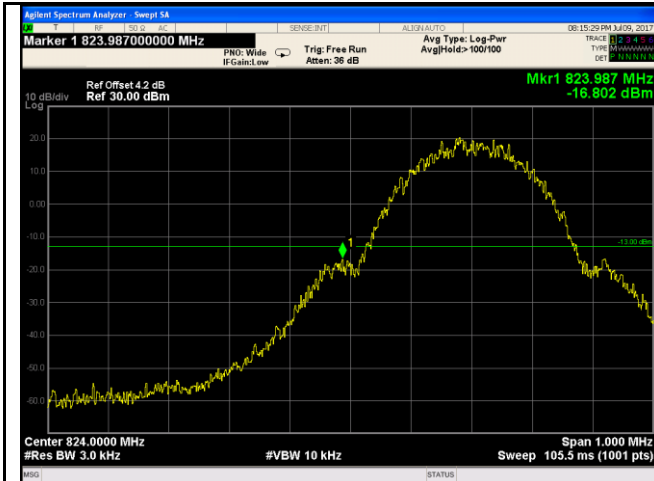
| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 823.825         | -25.188        | -13         |
| 849.875         | -24.957        | -13         |

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

| Frequency (MHz) | Emission (dBm) | Limit (dBm) |
|-----------------|----------------|-------------|
| 1849.925        | -23.003        | -13         |
| 1910.025        | -20.661        | -13         |

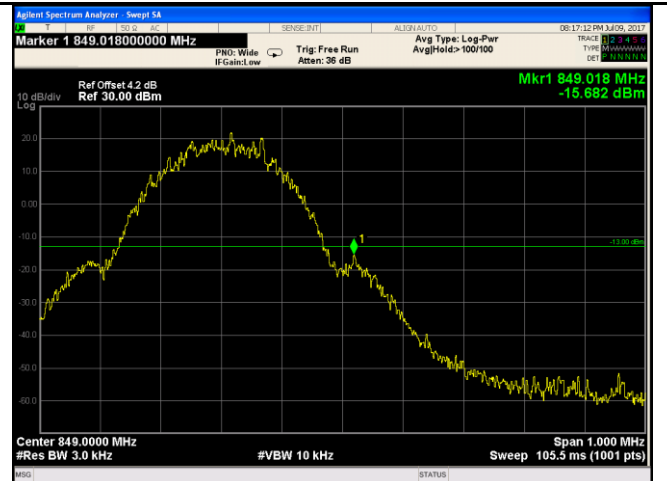
## GSM Voice:

### Test Plots



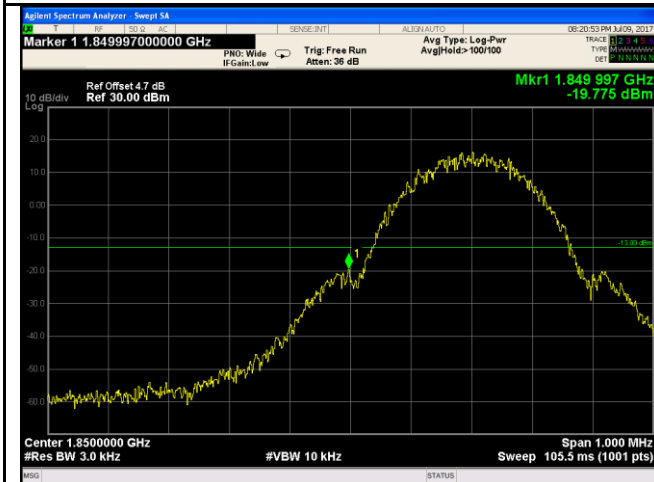
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.16/3)=4.0+0.2=4.2dB



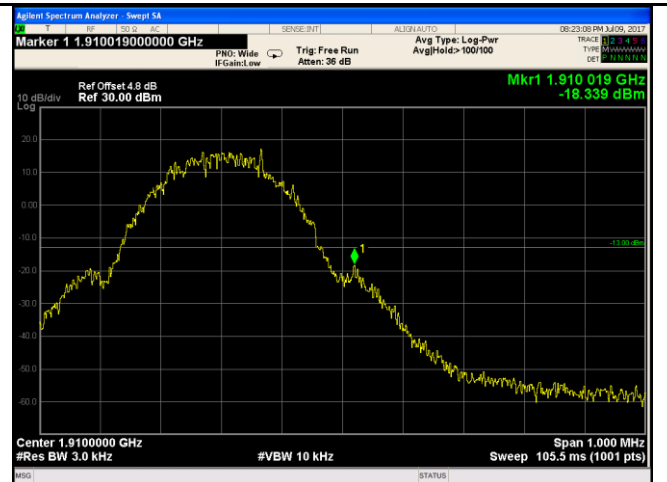
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.09/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.17/3)=4.5+0.2=4.7dB

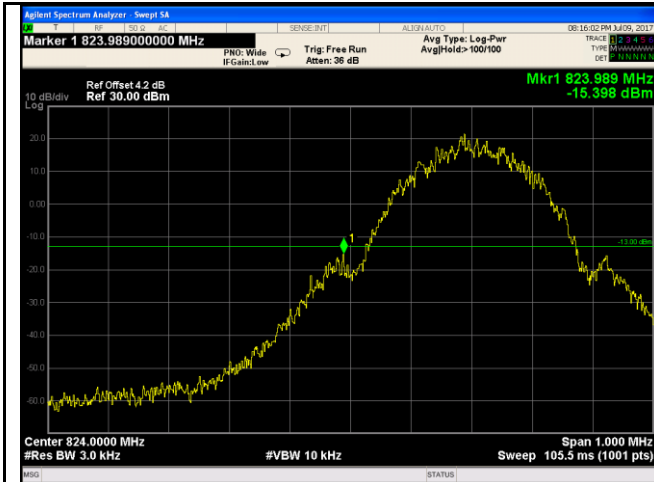


PCS Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.19/3)=4.5+0.3=4.8dB

## GPRS:

### Test Plots



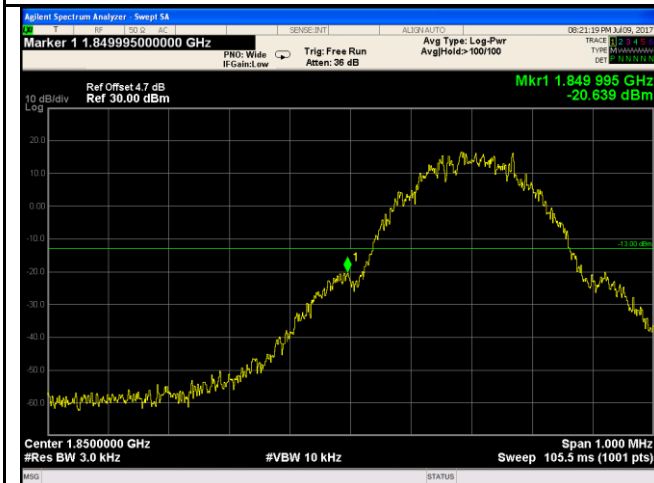
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.13/3)=4.0+0.2=4.2dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.13/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(3.14/3)=4.5+0.2=4.7dB

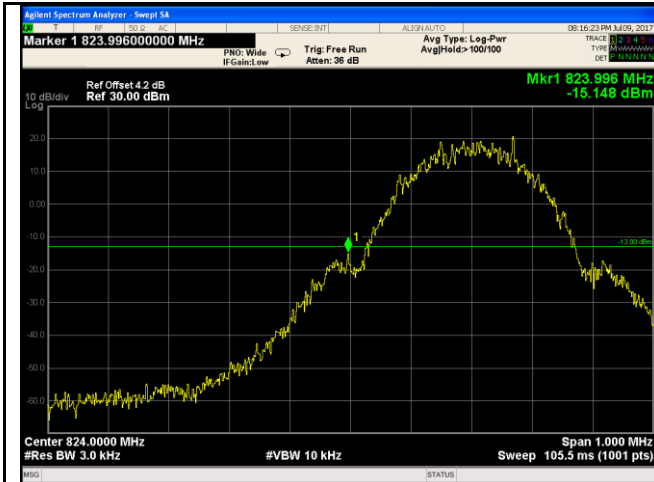


PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(3.21/3)=4.5+0.3=4.8dB

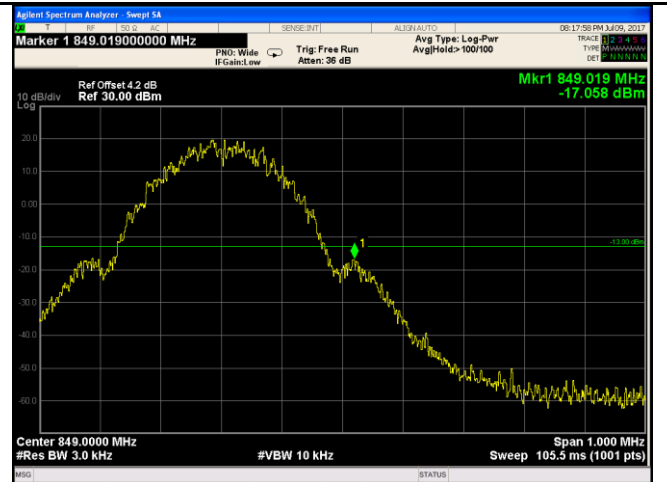
## EGPRS (MCS 1):

### Test Plots



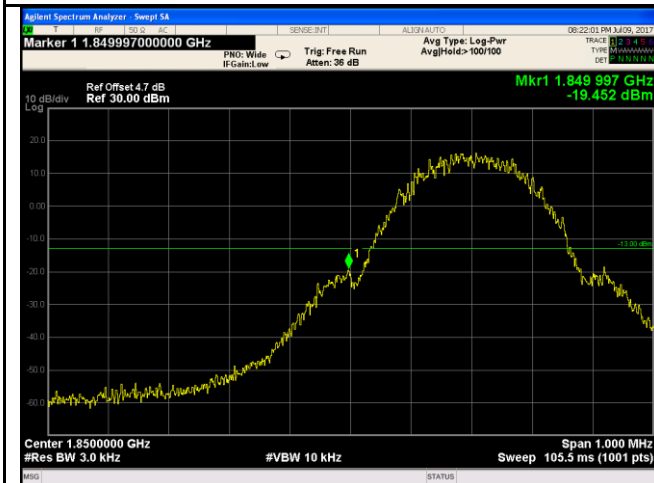
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.11/3)=4.0+0.2=4.2dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.13/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

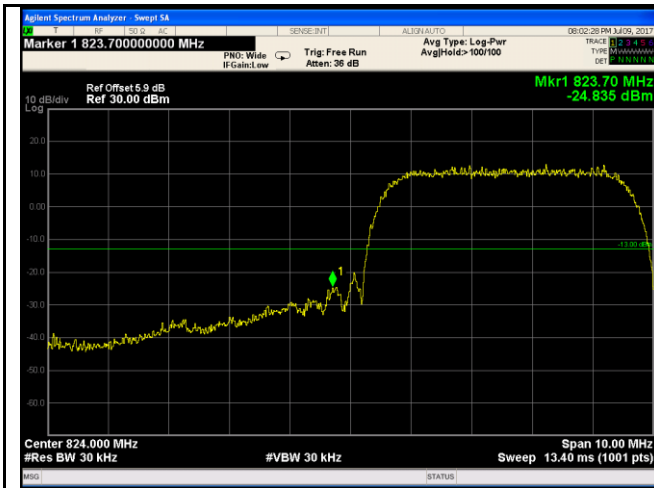
Note: Offset=Cable loss (4.5) + 10log  
(3.11/3)=4.5+0.2=4.7dB



PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(3.12/3)=4.5+0.2=4.7dB

# RMC:



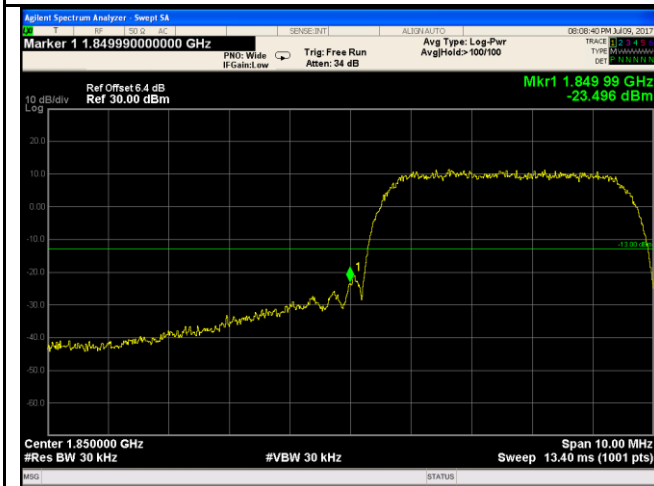
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.58/30)=4.0+1.9=5.9 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.65/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

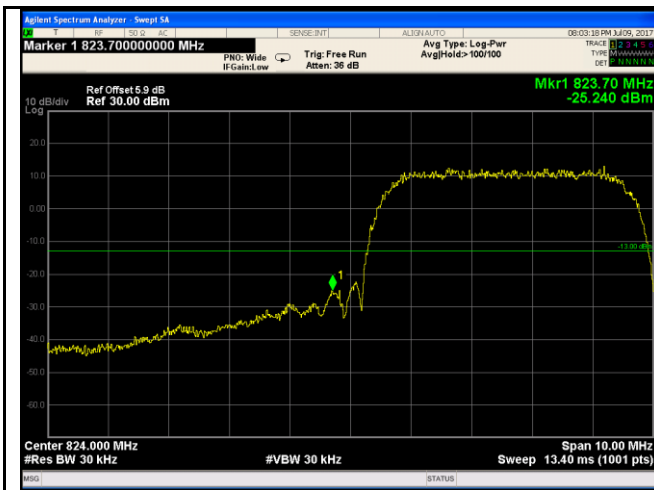
Note: Offset=Cable loss (4.5) + 10log  
(46.56/30)=4.5+1.9=6.4 dB



UMTS-FDD Band II - High Channel

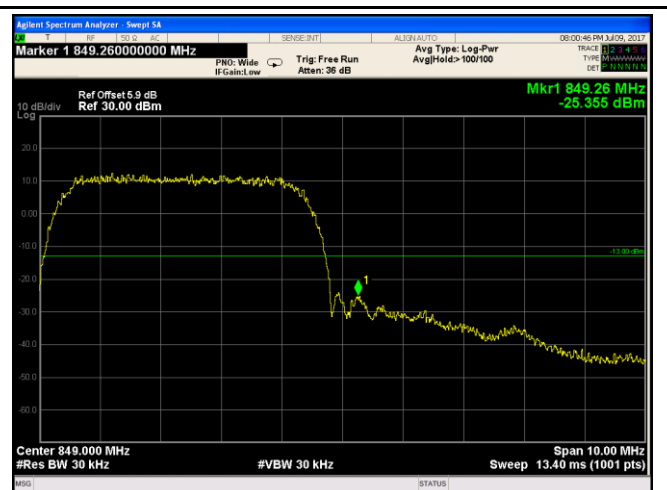
Note: Offset=Cable loss (4.5) + 10log  
(47.37/30)=4.5+2.0=6.5 dB

## HSDPA:



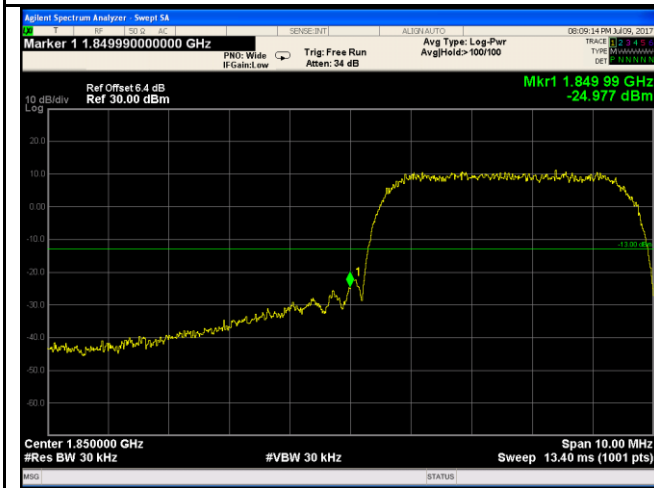
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.70/30)=4.0+1.9=5.9 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.71/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

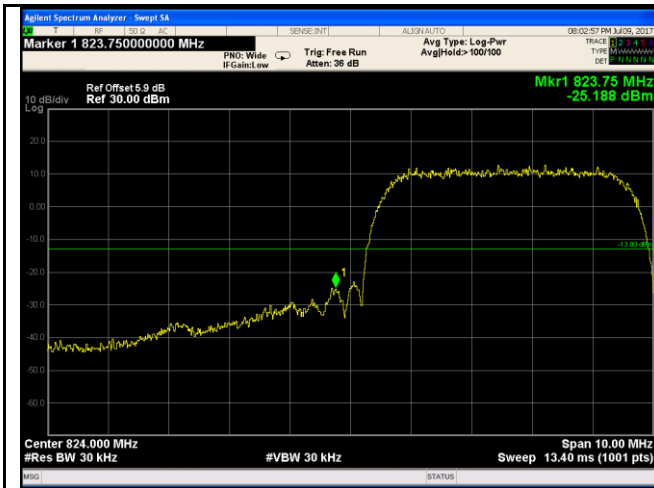
Note: Offset=Cable loss (4.5) + 10log  
(46.37/30)=4.5+1.9=6.4 dB



UMTS-FDD Band II - High Channel

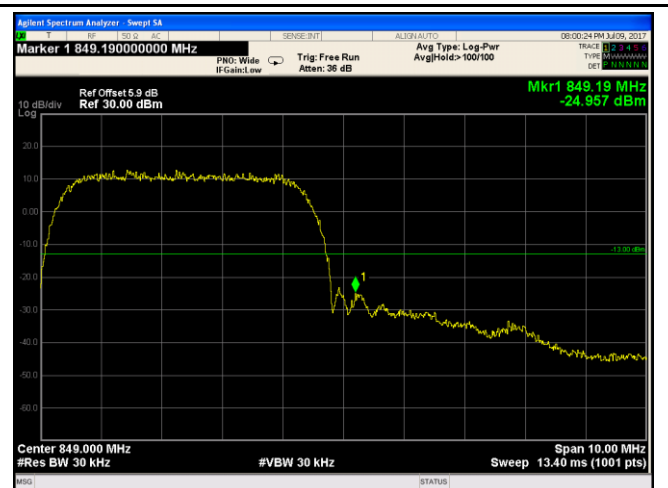
Note: Offset=Cable loss (4.5) + 10log  
(47.70/30)=4.5+2.0=6.5 dB

## HSUPA:



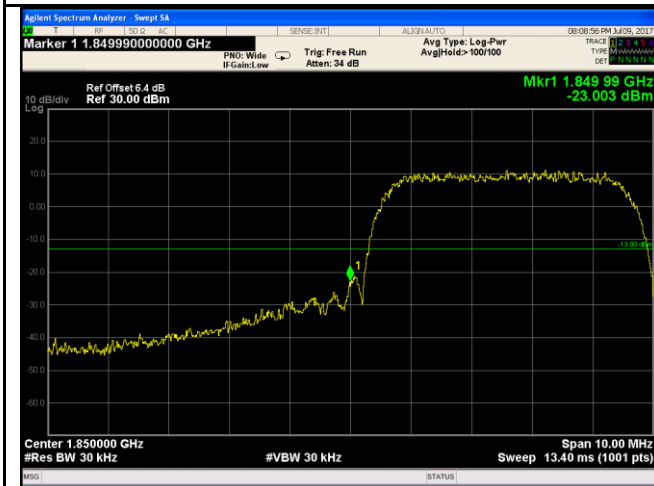
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.75/30)=4.0+1.9=5.9 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(46.58/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(46.75/30)=4.5+1.9=6.4 dB



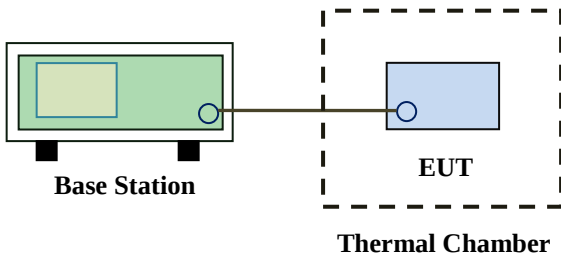
UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(47.40/30)=4.5+2.0=6.5 dB

## 6.8 Frequency Stability

|                      |               |
|----------------------|---------------|
| Temperature          | 25 °C         |
| Relative Humidity    | 55%           |
| Atmospheric Pressure | 1012mbar      |
| Test date :          | July 10, 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>50.0</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 | 50.0 | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50.0                   |                   |                        |                        |          |      |      |      |           |     |     |      |           |     |     |      |            |     |     |     |            |     |     |     |             |     |     |     |              |      |     |     |                                                                                       |
| 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                               | 17                   | 0.0203                | 2.5         |
| 0                                 |                                   | 18                   | 0.0215                | 2.5         |
| 10                                |                                   | 20                   | 0.0239                | 2.5         |
| 20                                |                                   | 16                   | 0.0191                | 2.5         |
| 30                                |                                   | 14                   | 0.0167                | 2.5         |
| 40                                |                                   | 18                   | 0.0215                | 2.5         |
| 50                                |                                   | 10                   | 0.0120                | 2.5         |
| 55                                |                                   | 16                   | 0.0191                | 2.5         |
| 25                                | 4.2                               | 19                   | 0.0227                | 2.5         |
|                                   | 3.5                               | 15                   | 0.0179                | 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                               | 18                   | 0.0096                | 2.5         |
| 0                                |                                   | 9                    | 0.0048                | 2.5         |
| 10                               |                                   | 12                   | 0.0064                | 2.5         |
| 20                               |                                   | 17                   | 0.0090                | 2.5         |
| 30                               |                                   | 12                   | 0.0064                | 2.5         |
| 40                               |                                   | 17                   | 0.0090                | 2.5         |
| 50                               |                                   | 20                   | 0.0106                | 2.5         |
| 55                               |                                   | 15                   | 0.0080                | 2.5         |
| 25                               | 4.2                               | 9                    | 0.0048                | 2.5         |
|                                  | 3.5                               | 13                   | 0.0069                | 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                               | 14                   | 0.0168                | 2.5         |
| 0                               |                                   | 20                   | 0.0240                | 2.5         |
| 10                              |                                   | 9                    | 0.0108                | 2.5         |
| 20                              |                                   | 12                   | 0.0144                | 2.5         |
| 30                              |                                   | 9                    | 0.0108                | 2.5         |
| 40                              |                                   | 14                   | 0.0168                | 2.5         |
| 50                              |                                   | 20                   | 0.0240                | 2.5         |
| 55                              |                                   | 16                   | 0.0192                | 2.5         |
| 25                              | 4.2                               | 17                   | 0.0204                | 2.5         |
|                                 | 3.5                               | 10                   | 0.0120                | 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                               | 18                   | 0.0096                | 2.5         |
| 0                                |                                   | 14                   | 0.0074                | 2.5         |
| 10                               |                                   | 14                   | 0.0074                | 2.5         |
| 20                               |                                   | 19                   | 0.0101                | 2.5         |
| 30                               |                                   | 9                    | 0.0048                | 2.5         |
| 40                               |                                   | 20                   | 0.0106                | 2.5         |
| 50                               |                                   | 11                   | 0.0059                | 2.5         |
| 55                               |                                   | 20                   | 0.0106                | 2.5         |
| 25                               | 4.2                               | 9                    | 0.0048                | 2.5         |
|                                  | 3.5                               | 16                   | 0.0085                | 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 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**

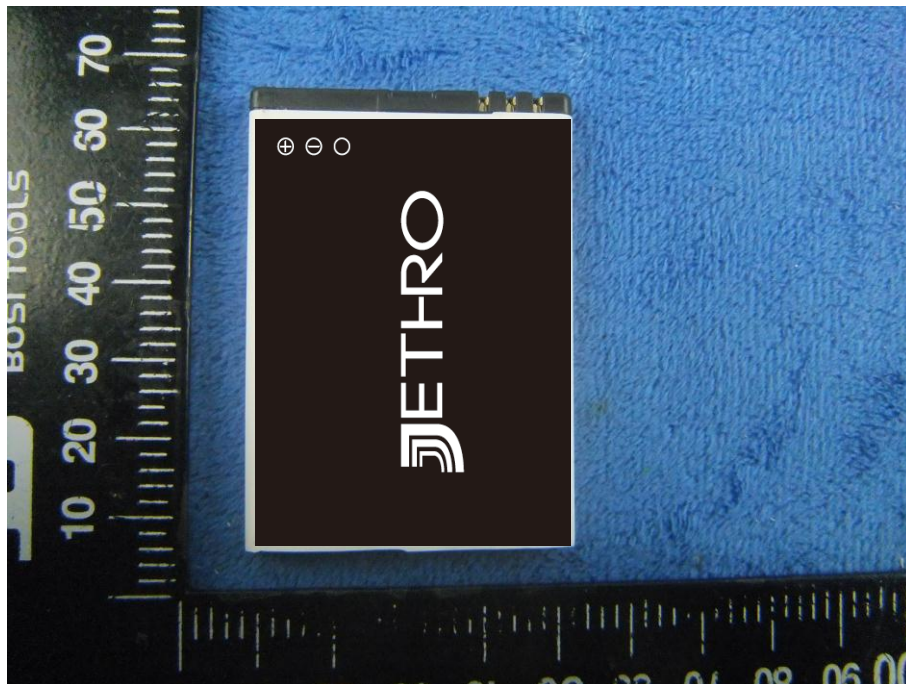
Cover Off - Top View 1



Cover Off - Top View 2



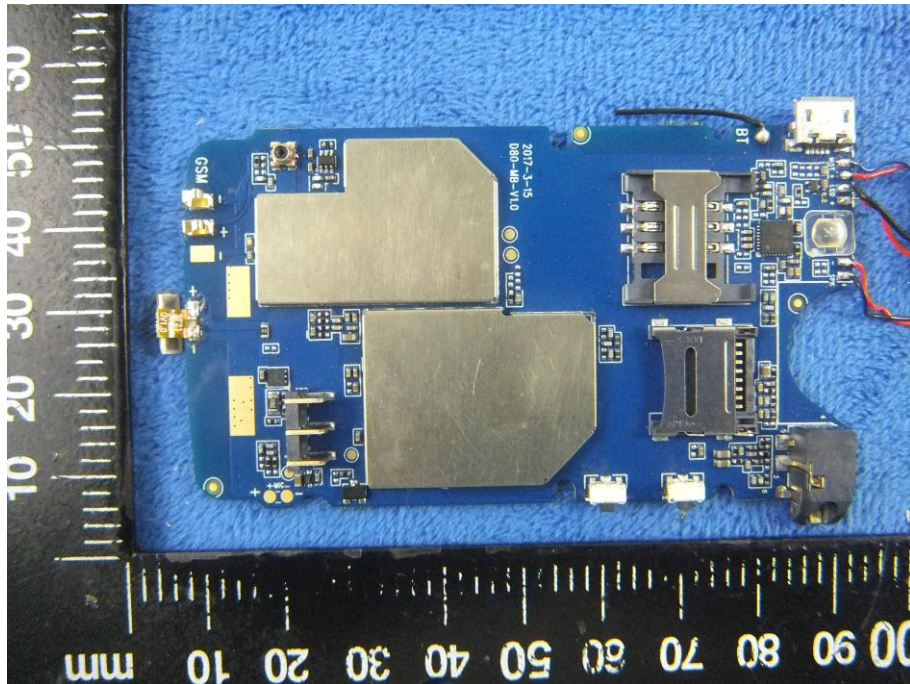
Battery - Front View



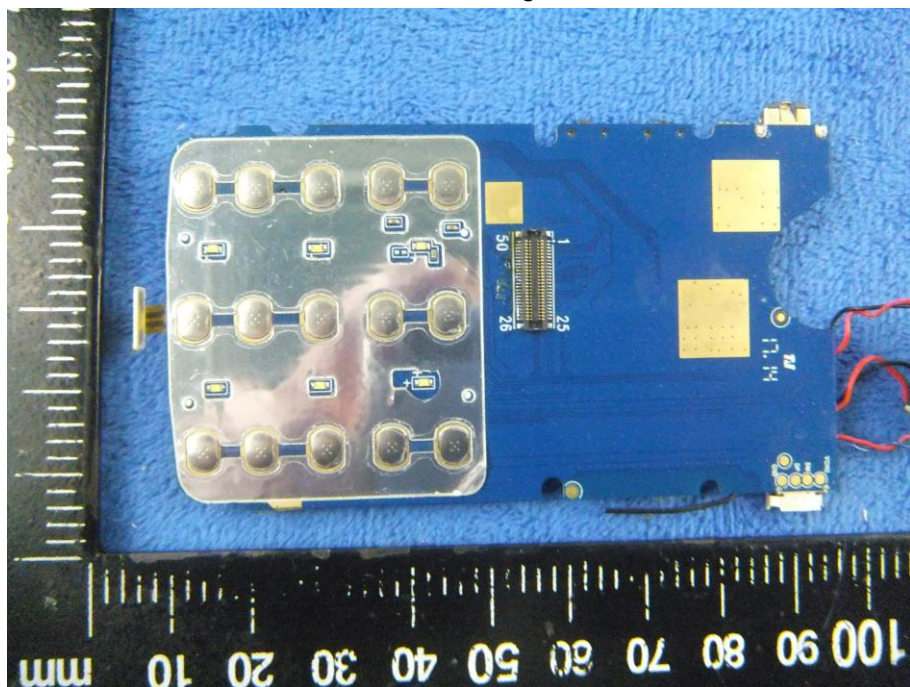
Battery - Rear View



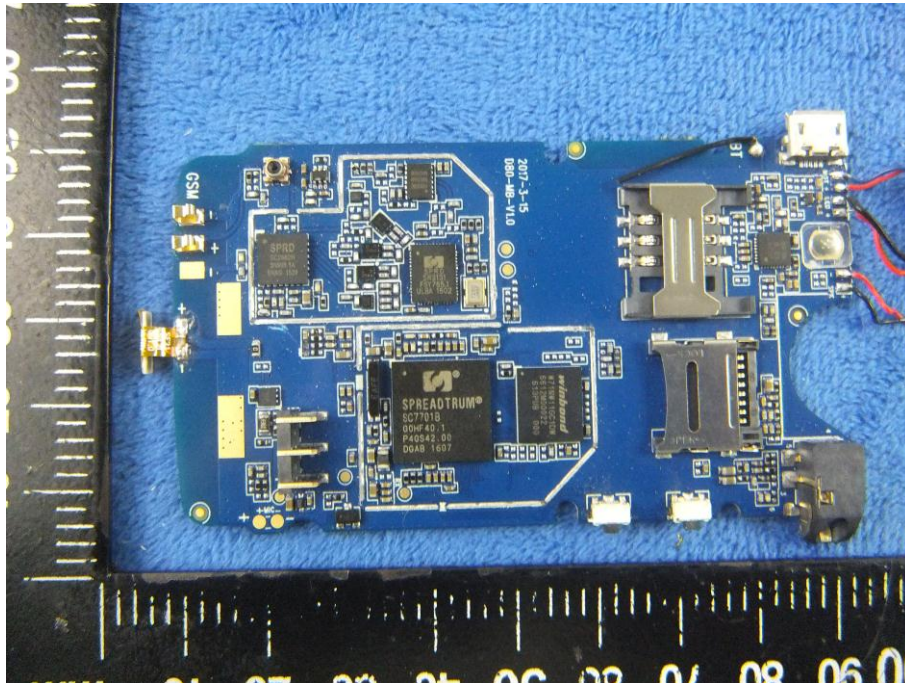
Mainboard with Shielding - Front View



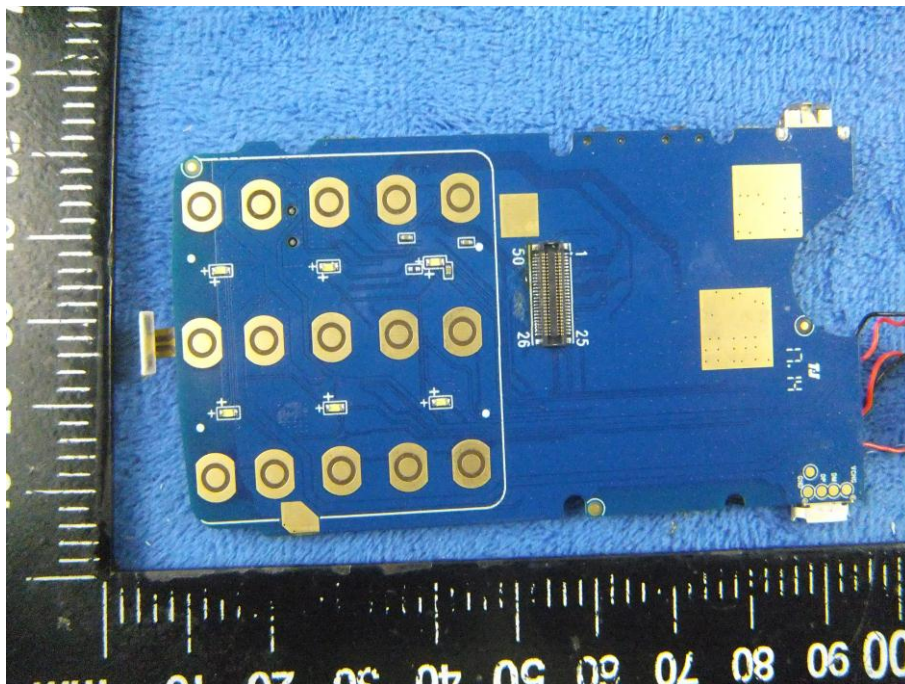
Mainboard with Shielding - Rear View



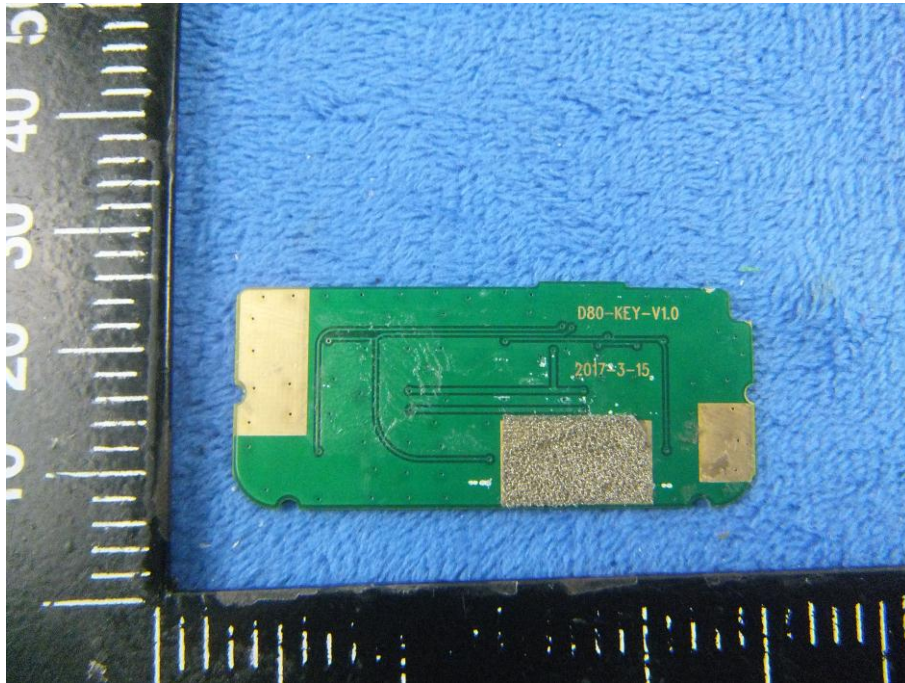
Mainboard without Shielding - Front View



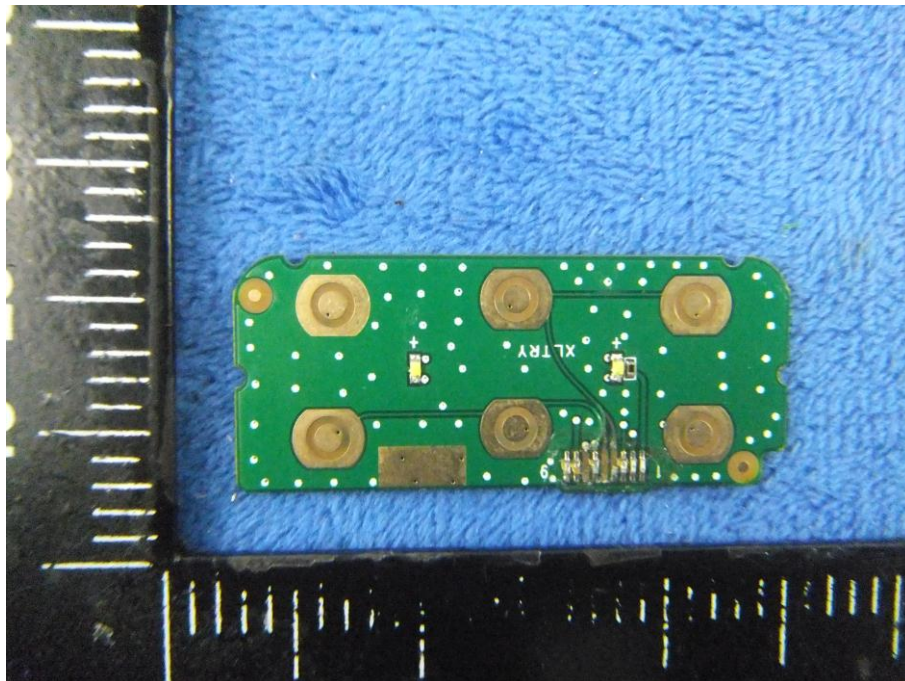
Mainboard without Shielding - Rear View



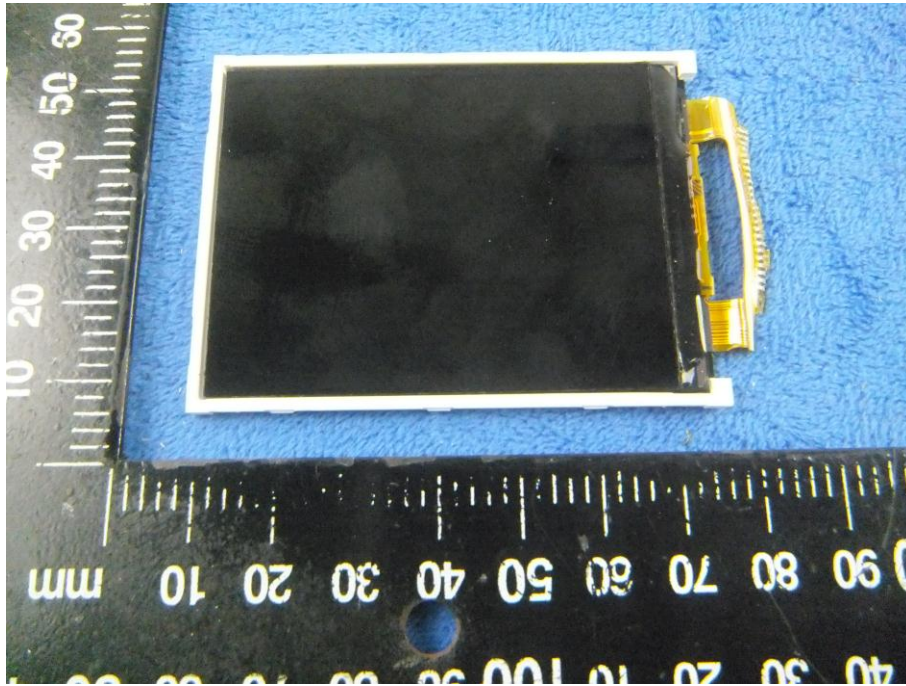
Small Mainboard - Front View



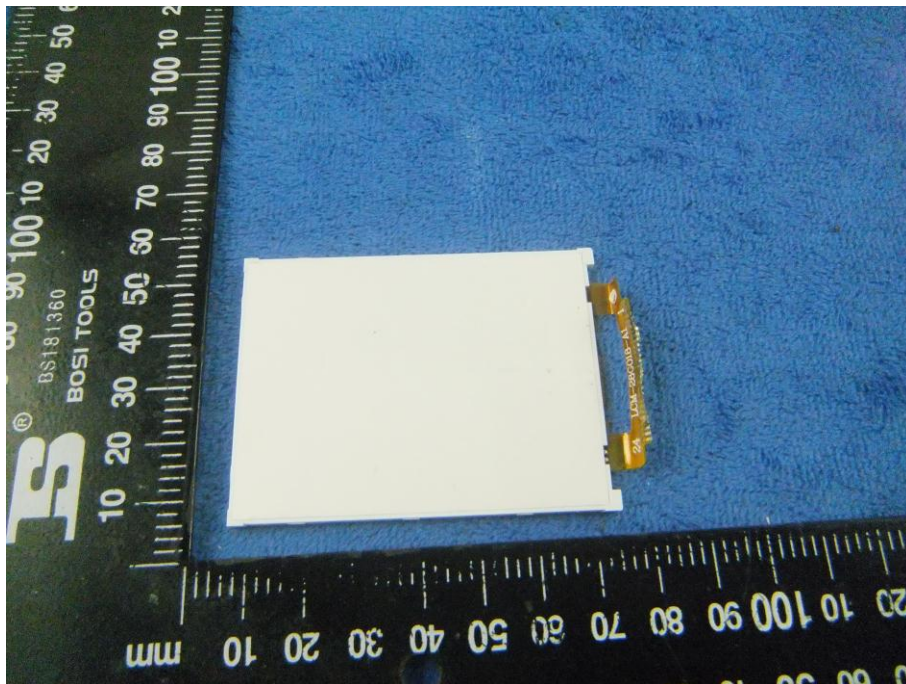
Small Mainboard - Rear View



LCD – Front View



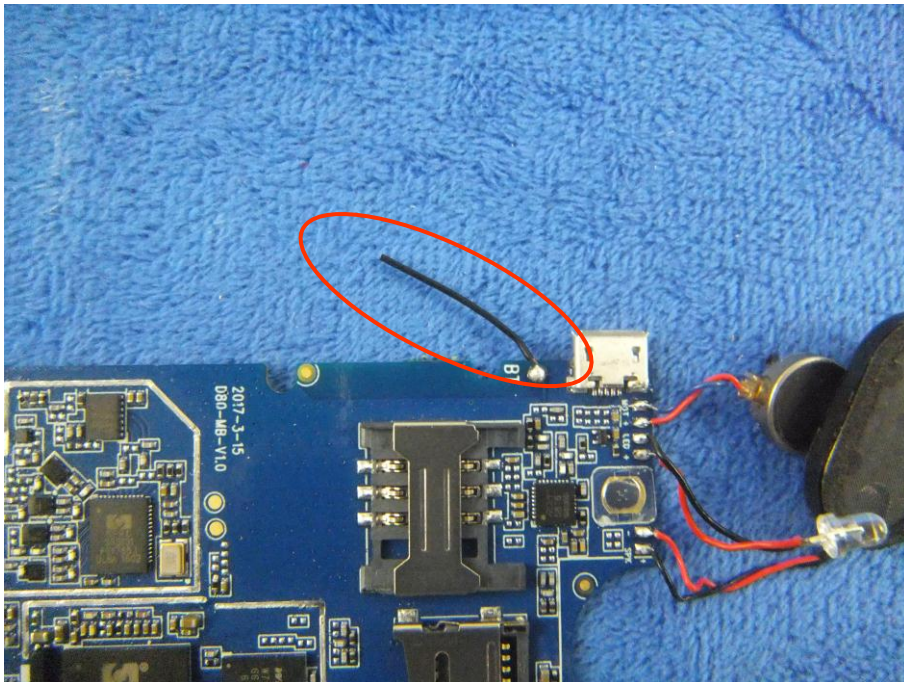
LCD – Rear View



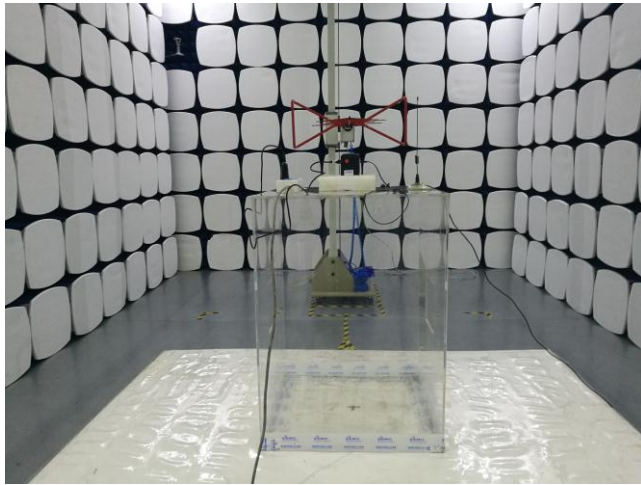
GSM/PCS/UMTS - Antenna View



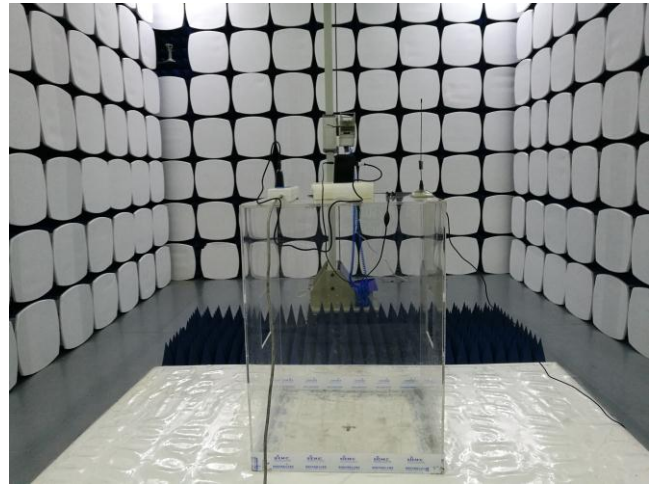
BT - Antenna View



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



Radiated Spurious Emissions Test Setup Below 1GHz

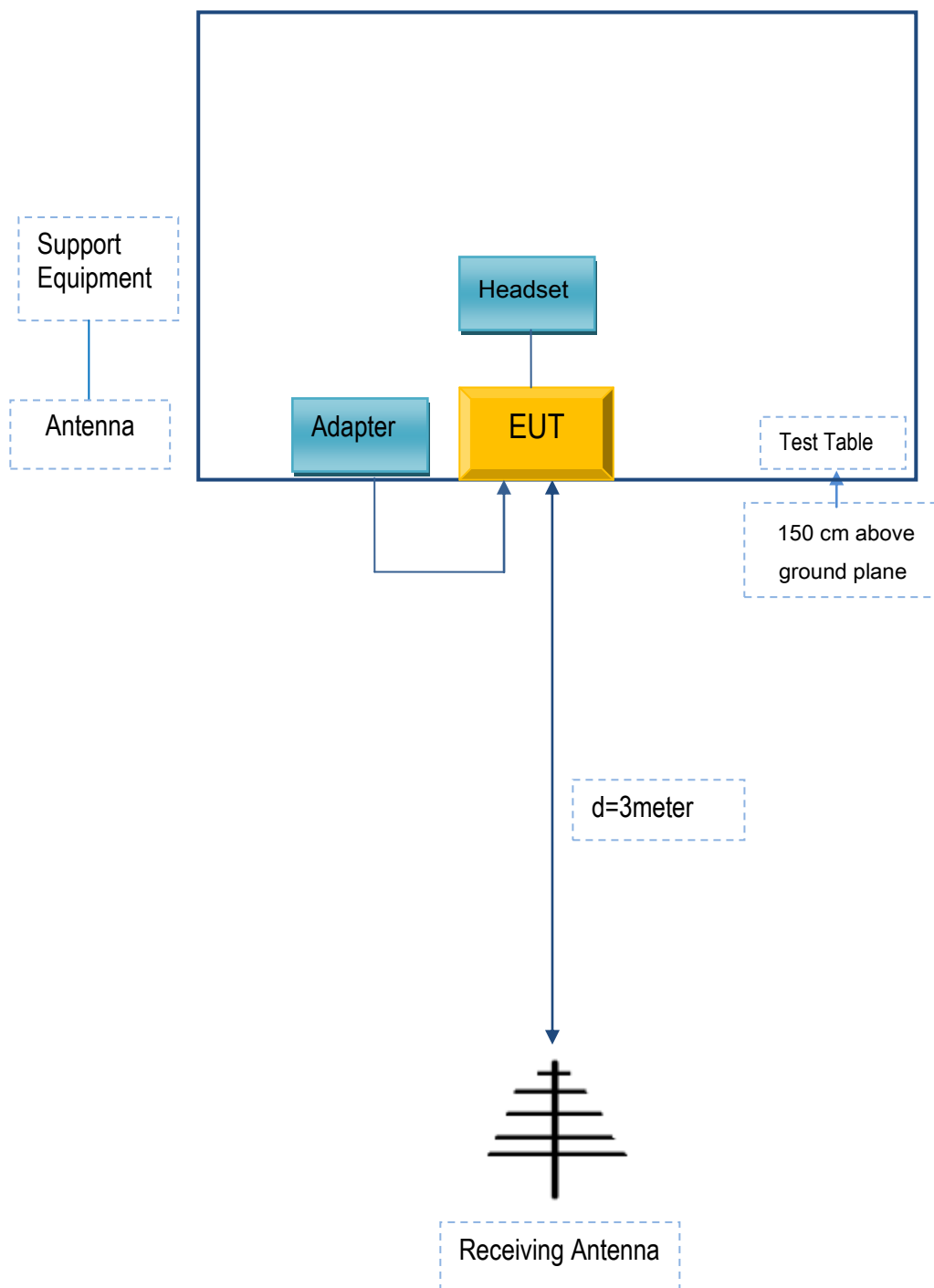


Radiated Spurious Emissions Test Setup Above  
1GHz

## 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 |
|---------------------|--------------------------------|--------------|-----------|
| Jethro Trading LTD. | Adapter                        | HJ-050050-US | N/A       |
| SAMSUNG             | headset                        | HS330        | N/A       |
| Agilent             | Wireless Connectivity Test Set | N4010A       | N/A       |
| OEM                 | omnidirectional antenna        | AntSuck      | 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