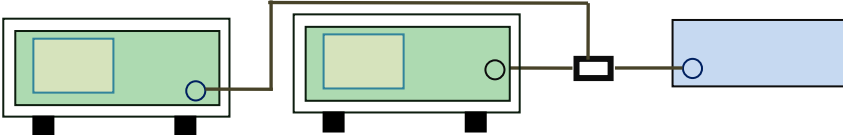


## 6.5 Spurious Emissions at Antenna Terminals

Temperature	24°C
Relative Humidity	57%
Atmospheric Pressure	1015mbar
Test date :	August 15, 2016
Tested By :	Loren Luo

### Requirement(s):

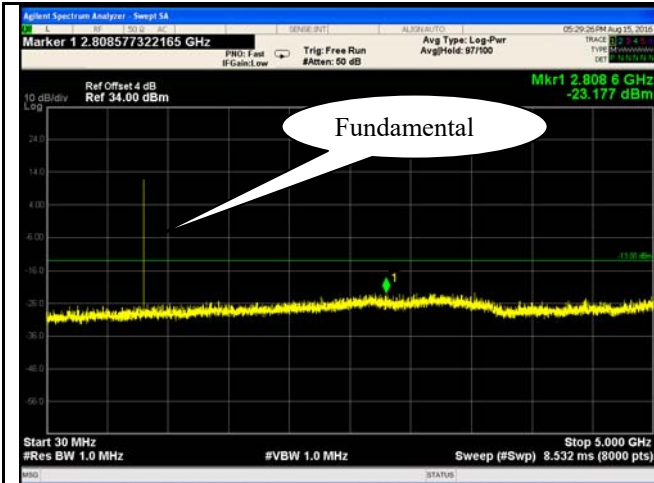
Spec	Item	Requirement	Applicable
§2.1051, §22.917(a)& §24.238(a) § 27.53(h)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB	<input checked="" type="checkbox"/>
Test Setup			
Test 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

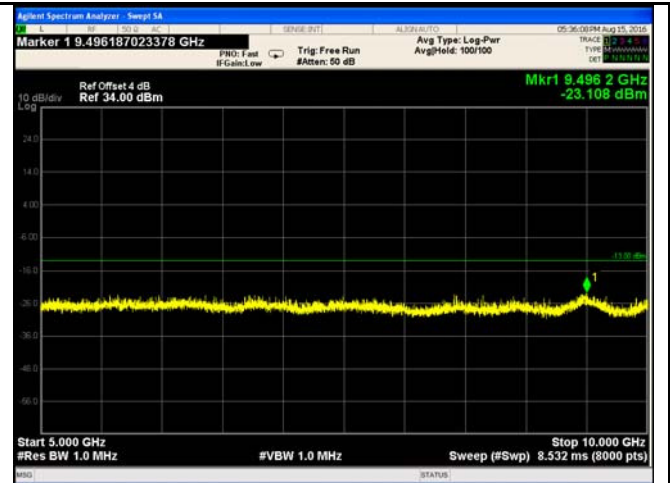
**Test Plots**

**GSM Voice:**

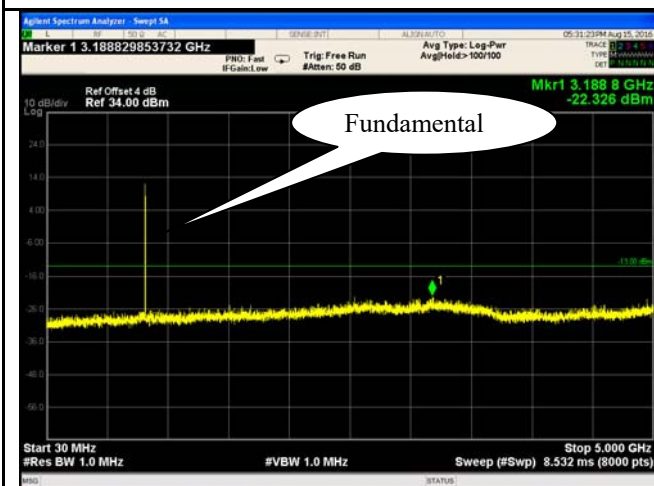
**Cellular Band (Part 22H) result**



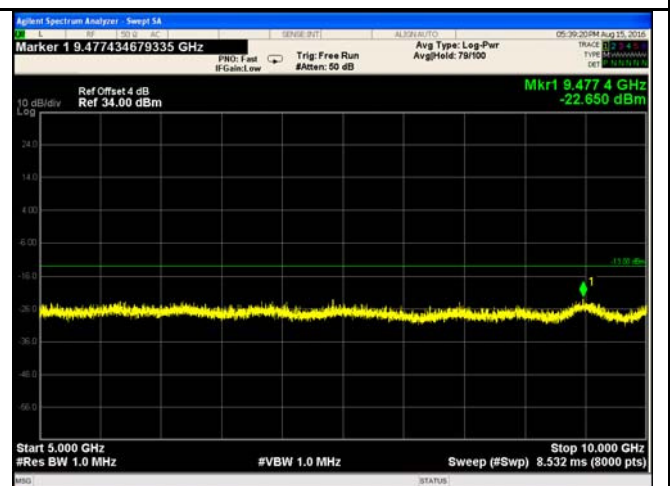
GSM 850 - Low Channel-1



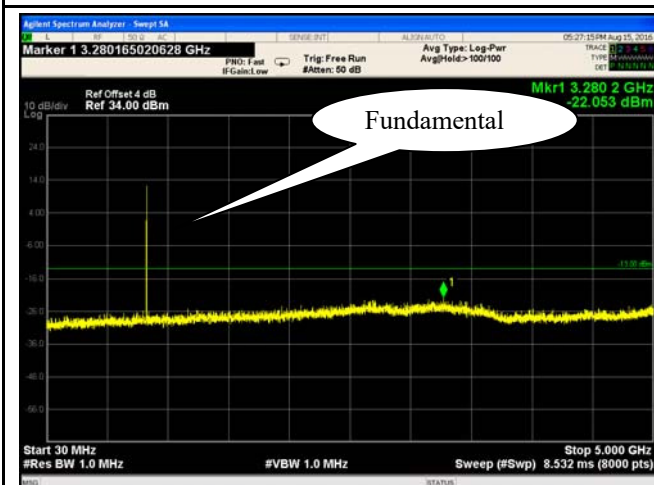
GSM 850 - Low Channel-2



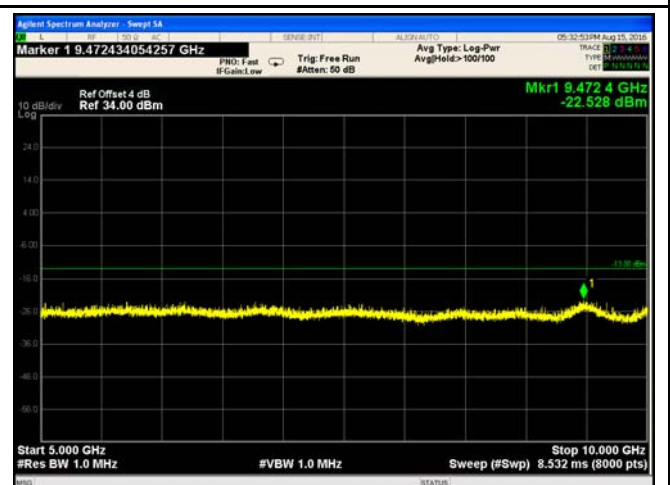
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

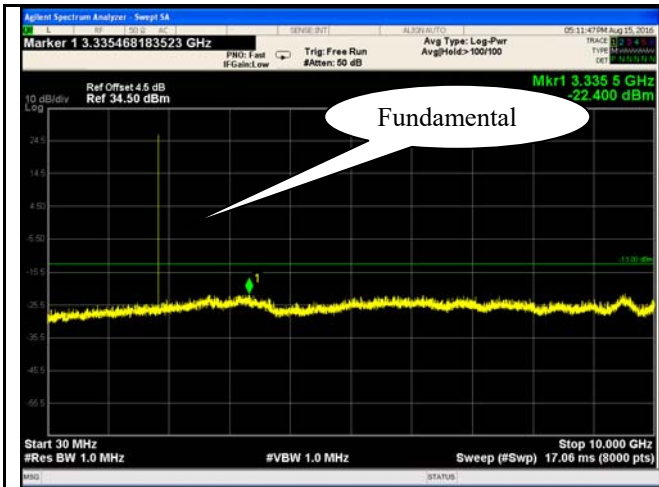


GSM 850 - High Channel-1

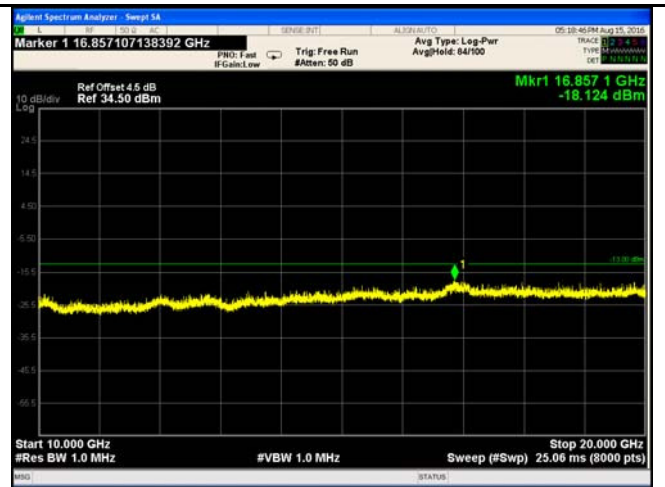


GSM 850 - High Channel-2

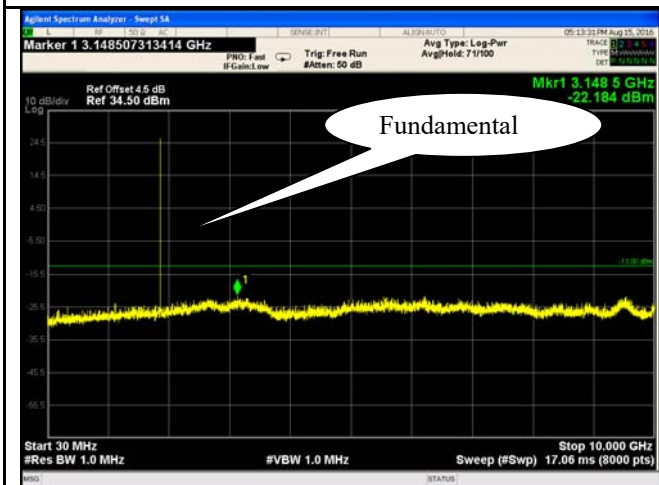
### PCS Band (Part24E) result



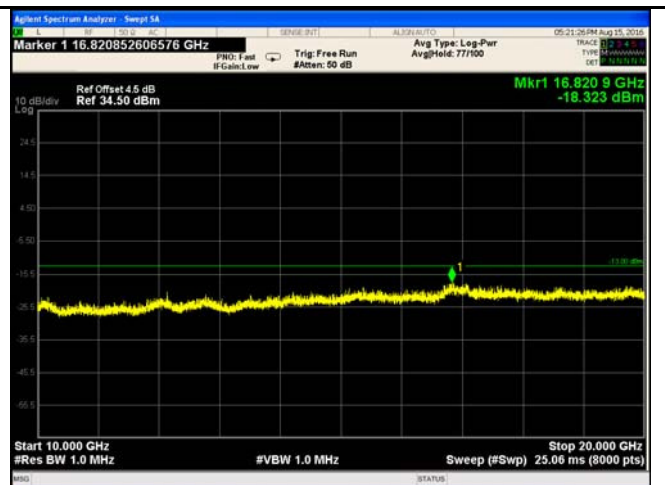
PCS1900 - Low Channel-1



PCS 1900 - Low Channel-2



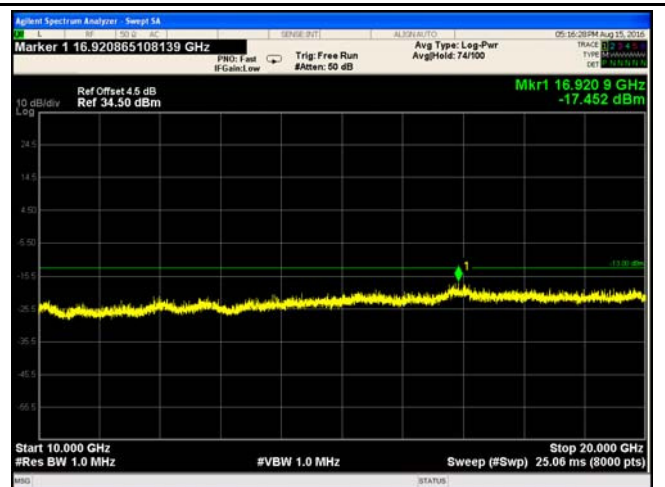
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



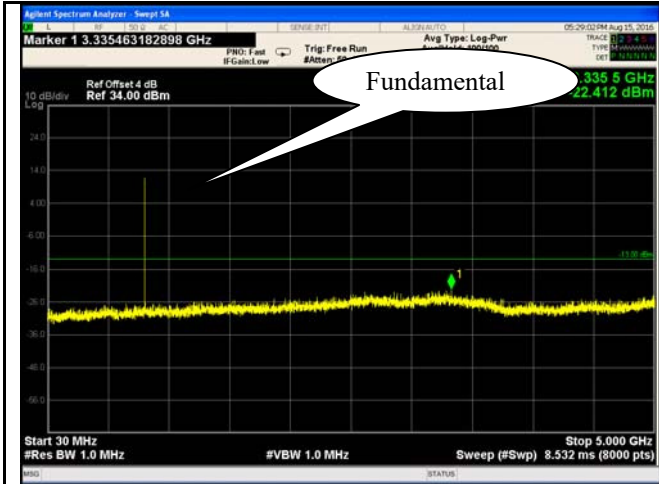
PCS1900 - High Channel-1



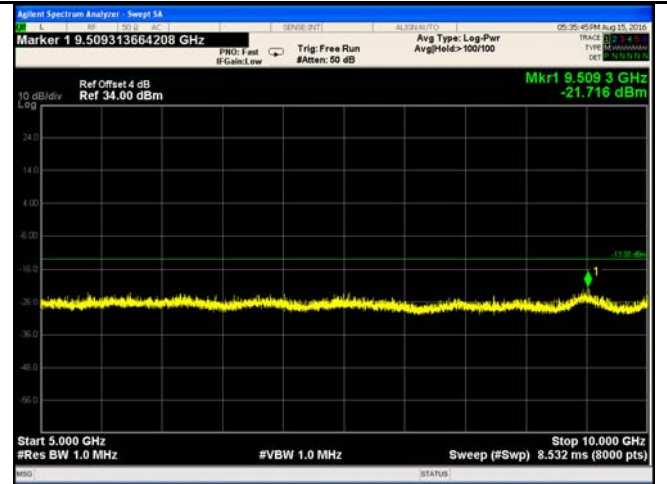
PCS 1900 - High Channel-2

**GPRS:**

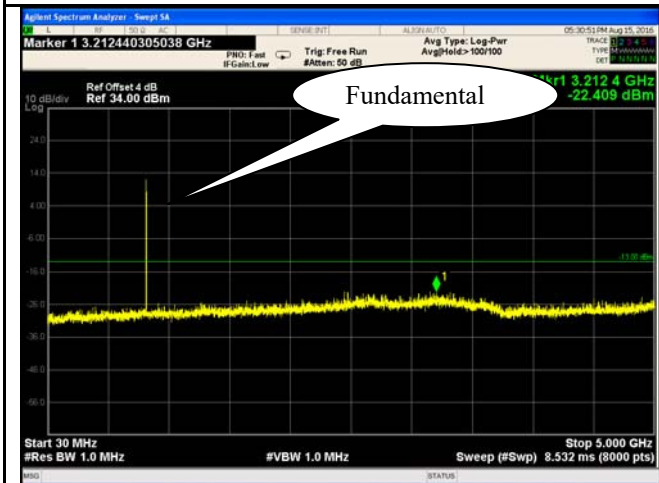
**Cellular Band (Part 22H) result**



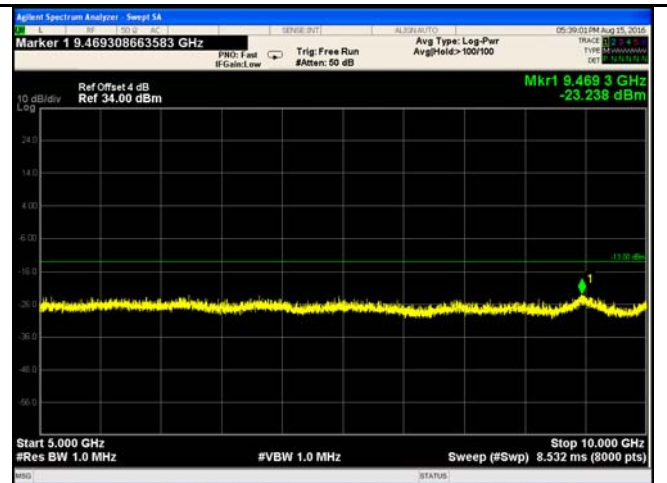
GSM 850 - Low Channel-1



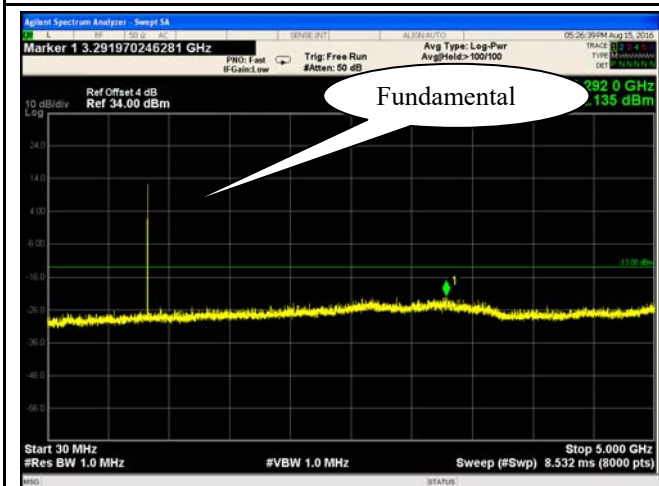
GSM 850 - Low Channel-2



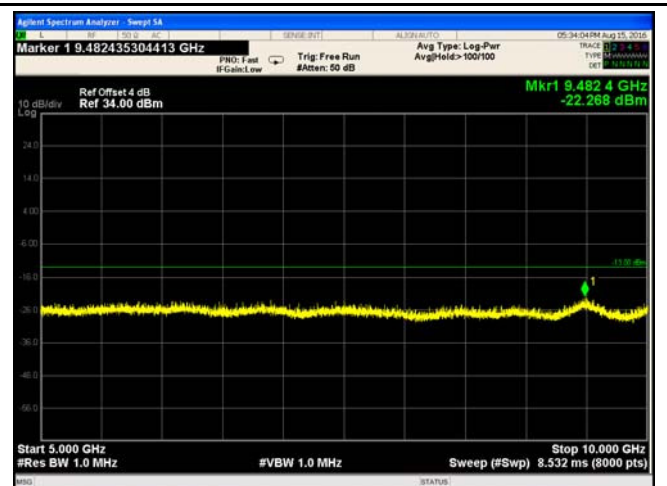
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

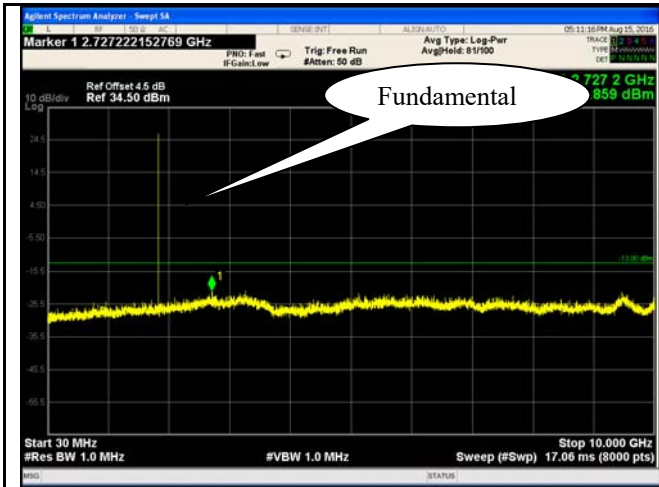


GSM 850 - High Channel-1

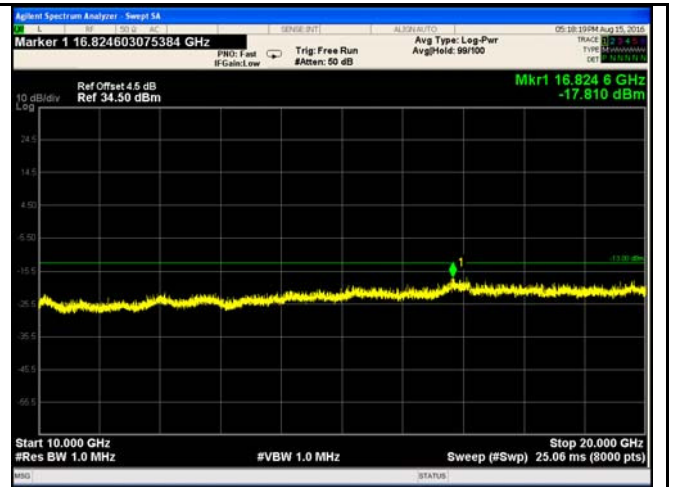


GSM 850 - High Channel-2

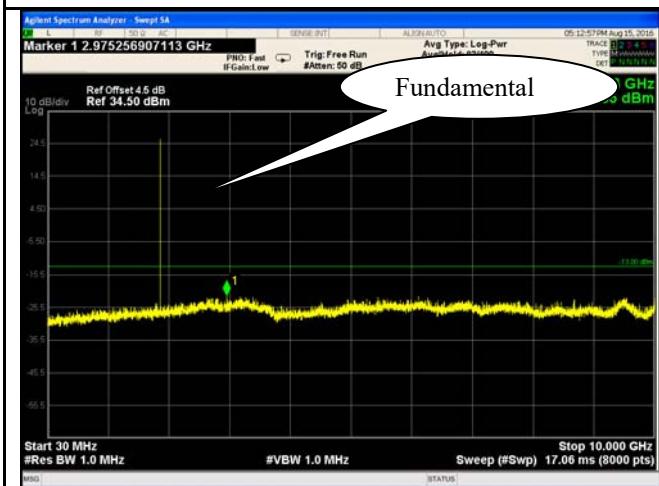
**PCS Band (Part24E) result**



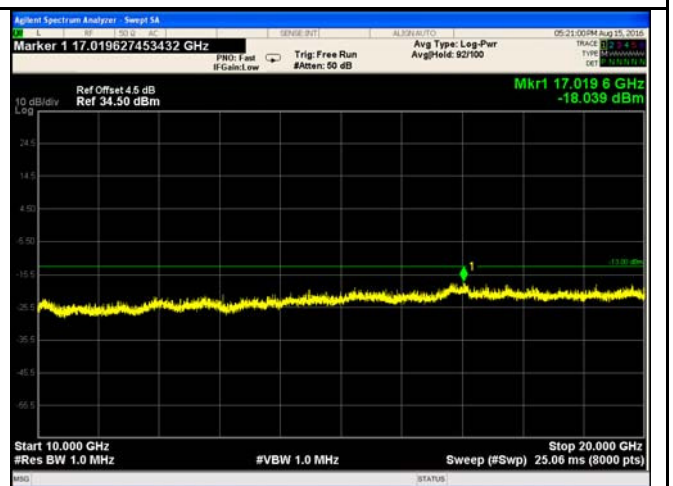
PCS1900 - Low Channel-1



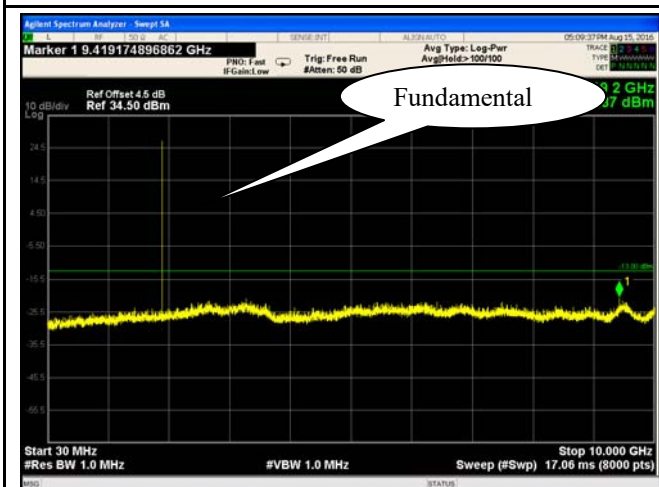
PCS 1900 - Low Channel-2



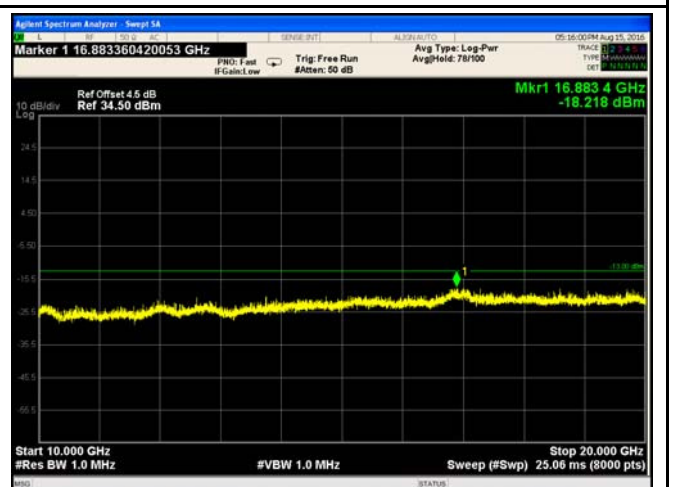
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2

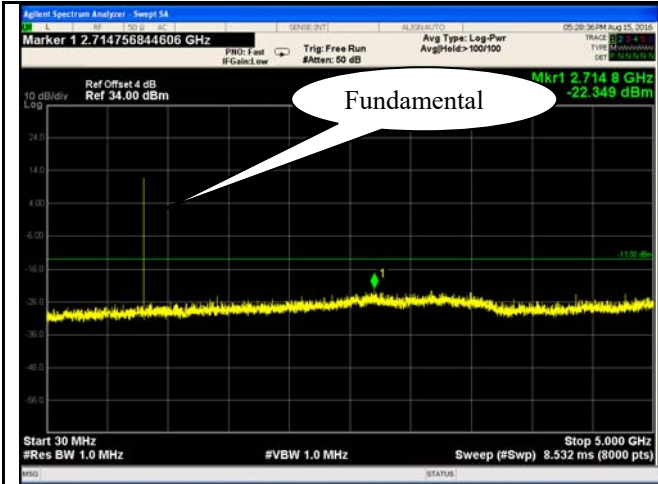


PCS1900 - High Channel-1

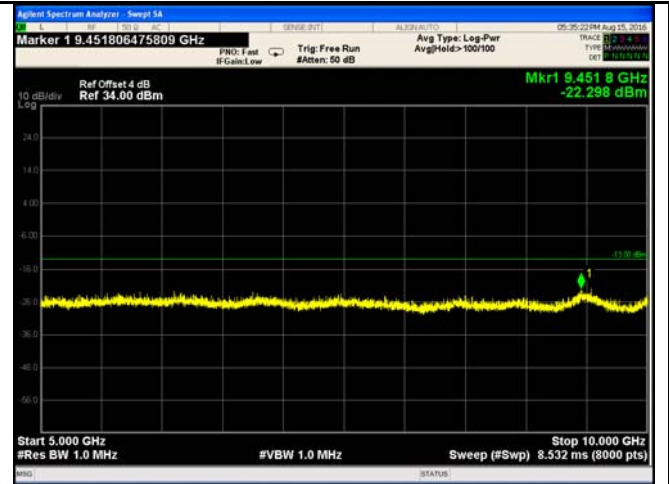


PCS 1900 - High Channel-2

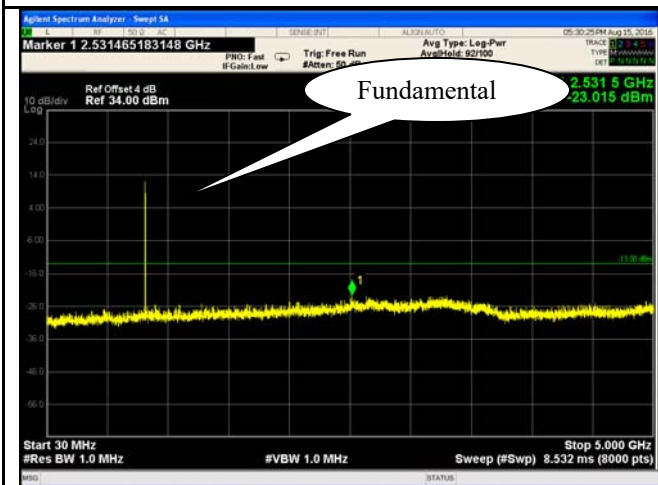
**EGPRS (MCS 5):  
 Cellular Band (Part 22H) result**



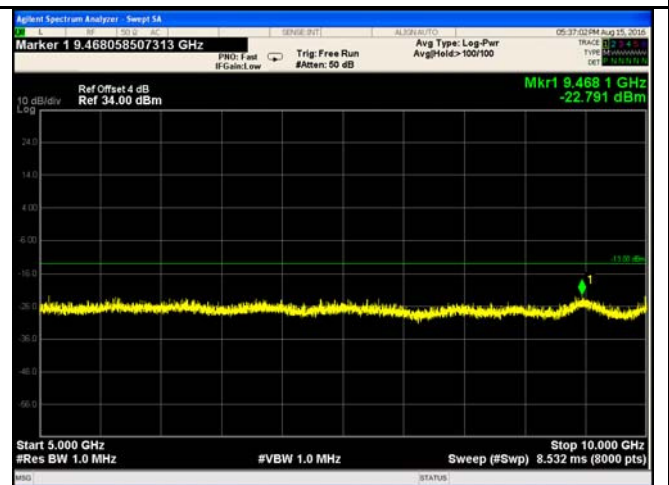
GSM 850 - Low Channel-1



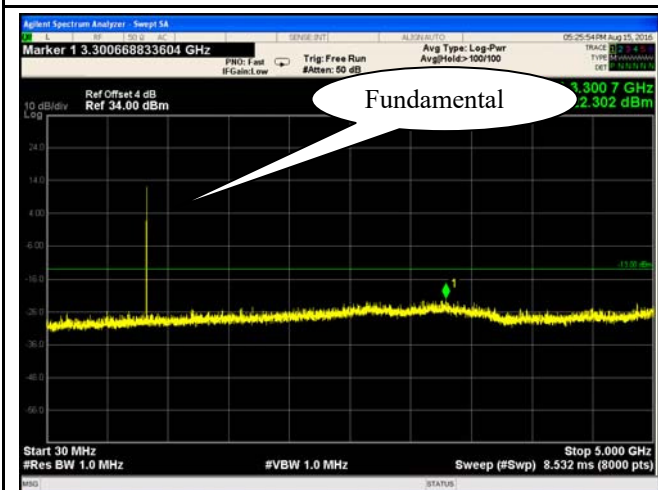
GSM 850 - Low Channel-2



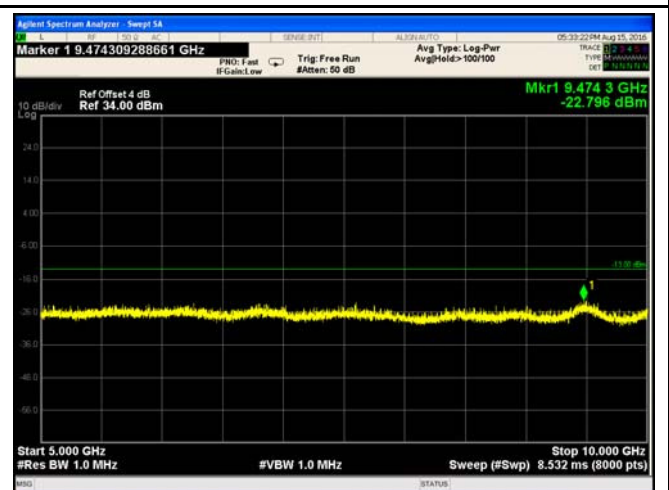
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

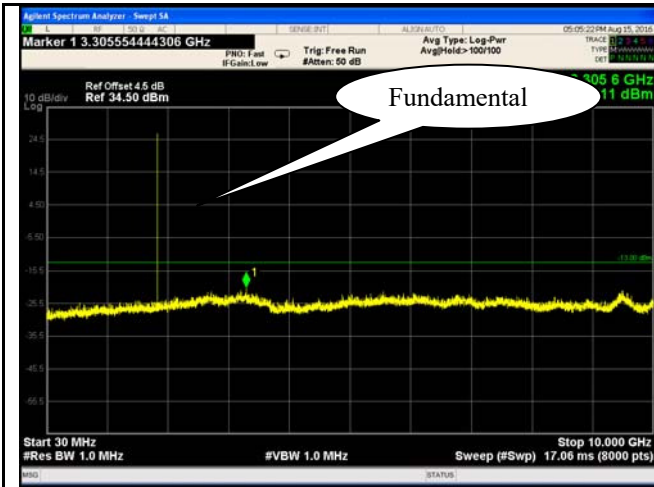


GSM 850 - High Channel-1



GSM 850 - High Channel-2

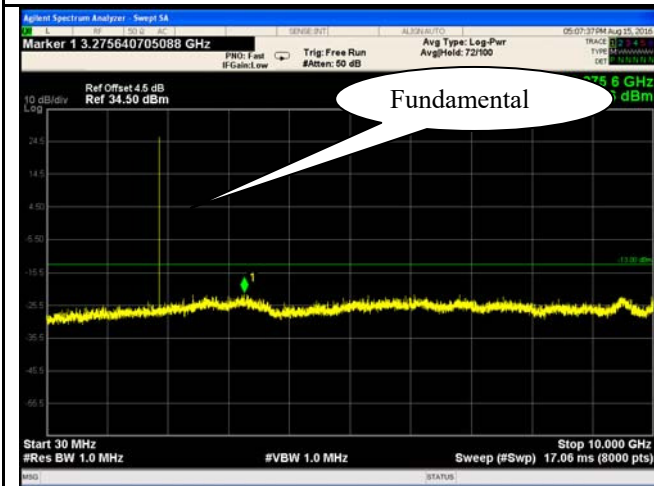
**PCS Band (Part24E) result**



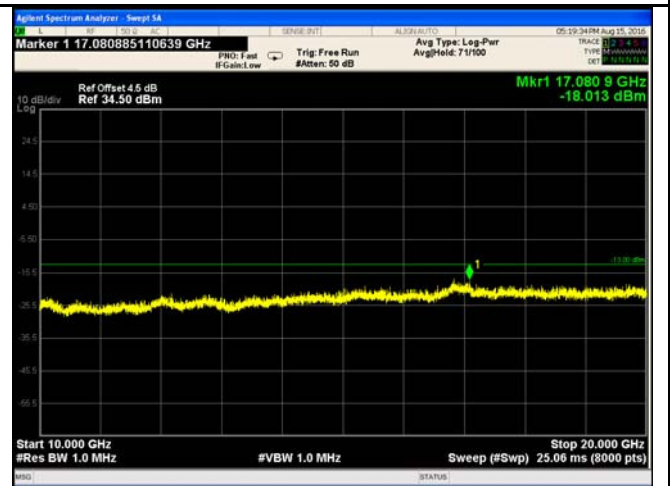
PCS1900 - Low Channel-1



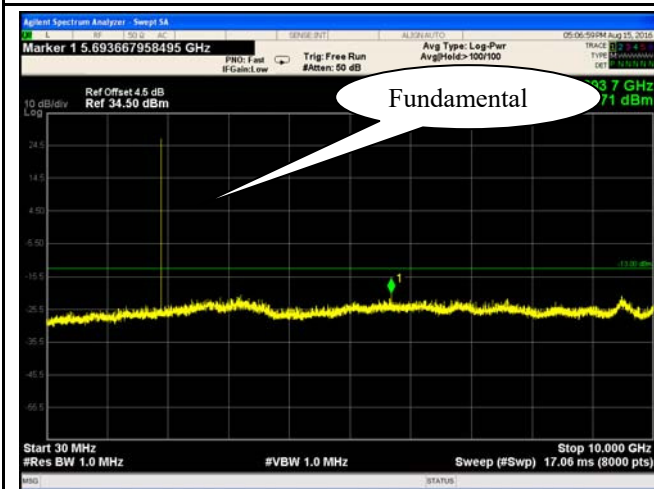
PCS 1900 - Low Channel-2



PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



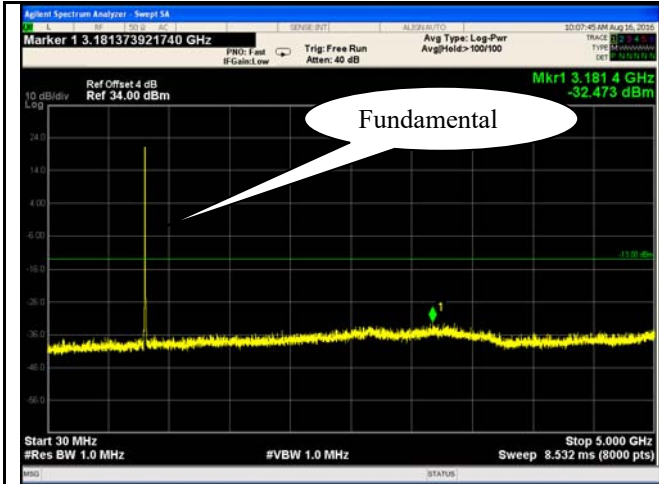
PCS1900 - High Channel-1



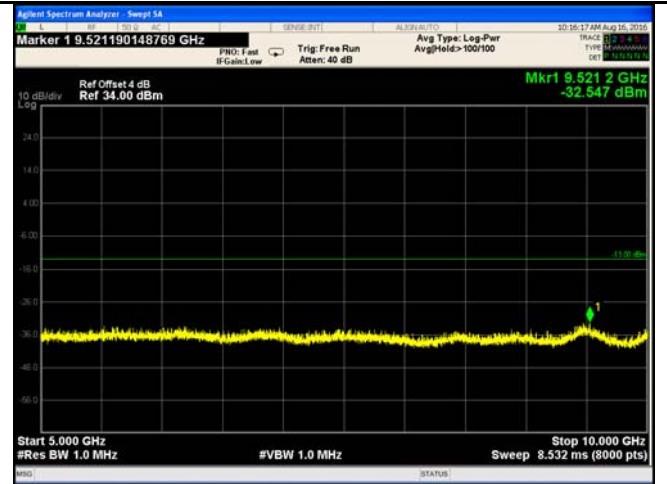
PCS 1900 - High Channel-2

RMC

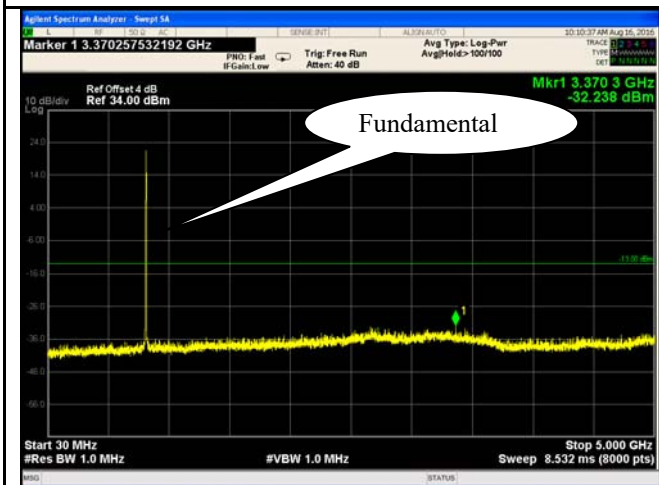
UMTS-FDD Band V (Part 22H)



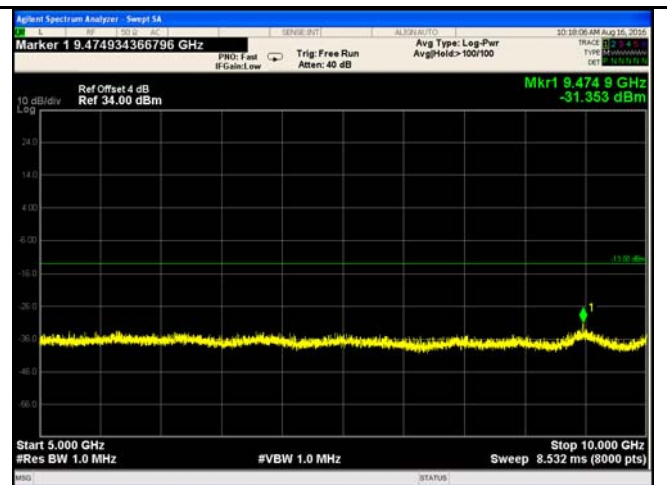
Band V - Low Channel-1



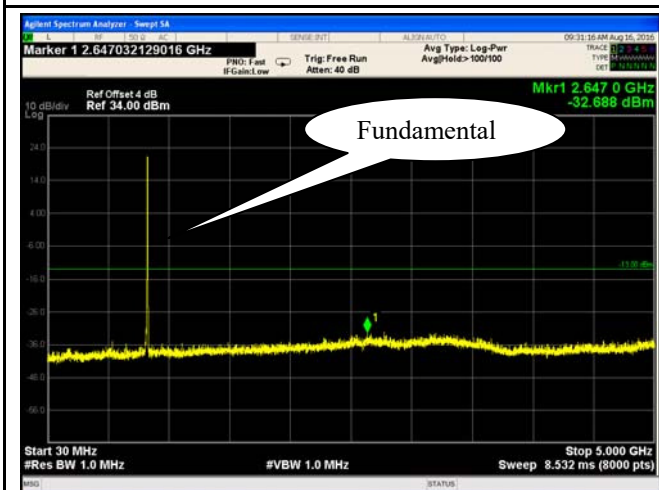
Band V - Low Channel-2



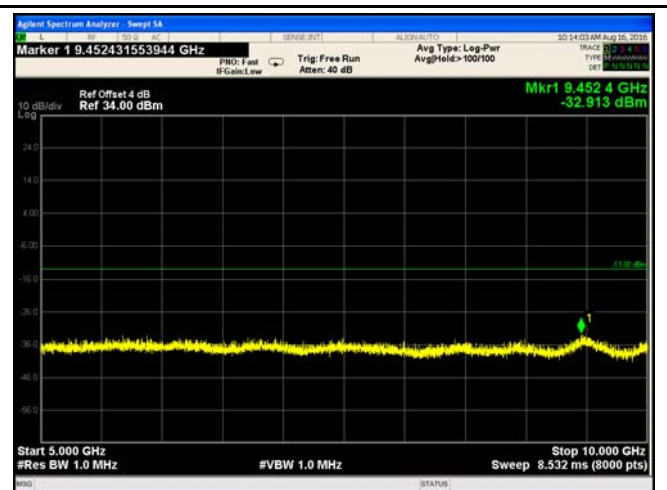
Band V - Middle Channel-1



Band V - Middle Channel-2



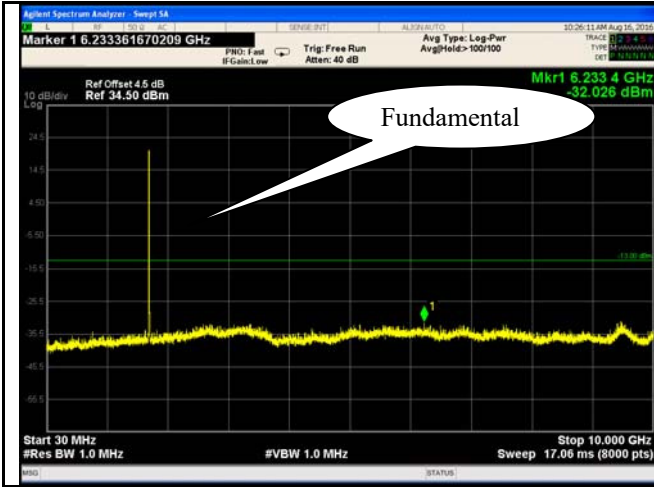
Band V - High Channel-1



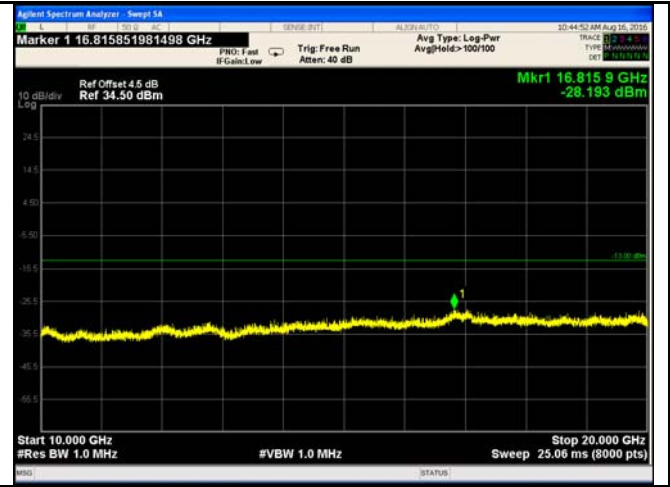
Band V - High Channel-2



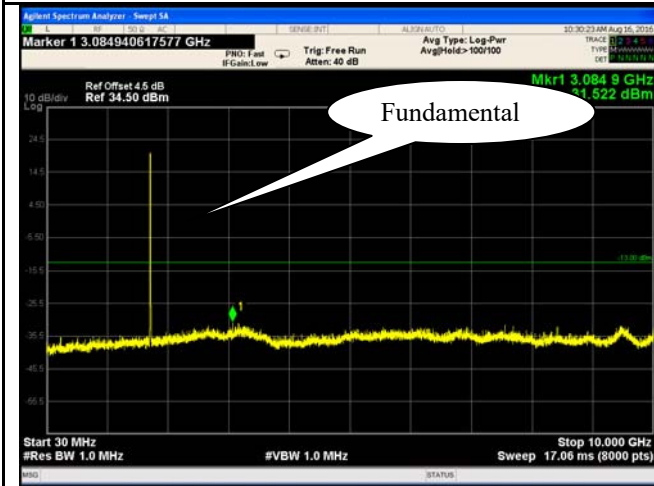
**UMTS-FDD Band IV (Part 27)**



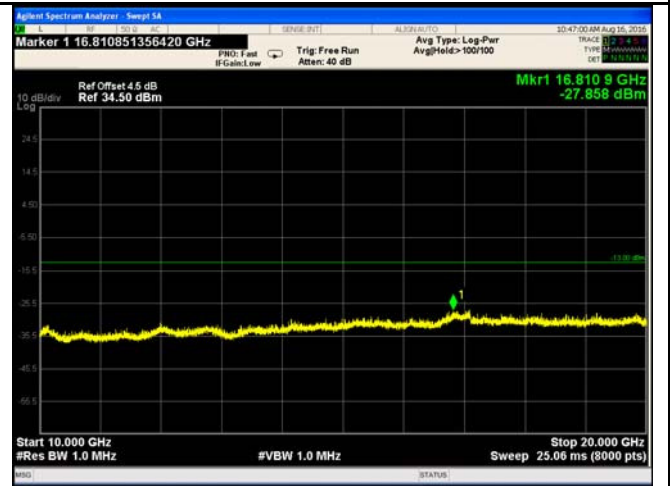
Band IV - Low Channel-1



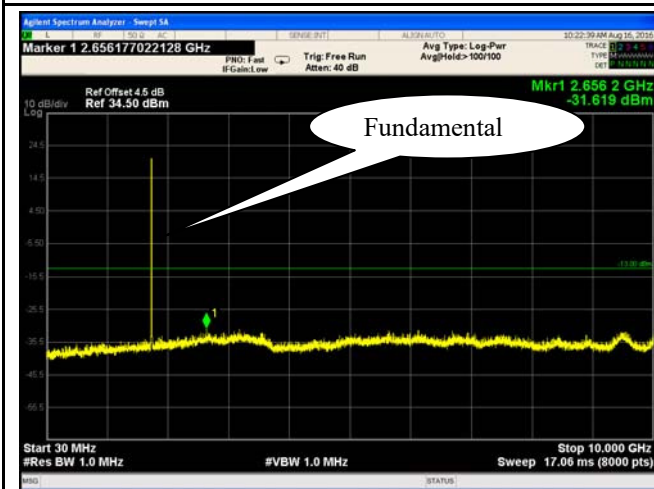
Band IV - Low Channel-2



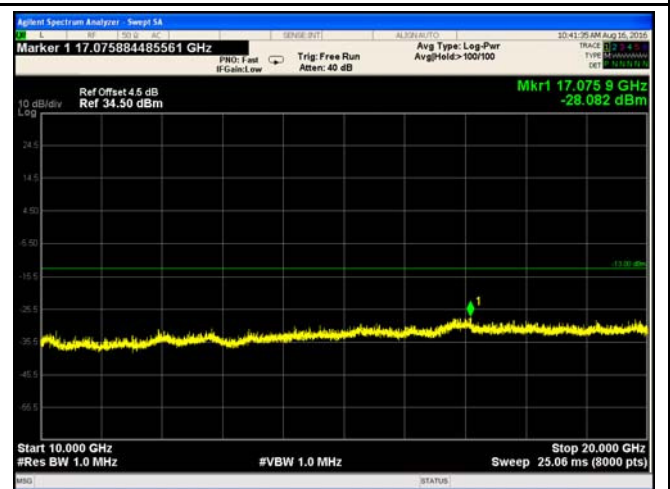
Band IV - Middle Channel-1



Band IV - Middle Channel-2

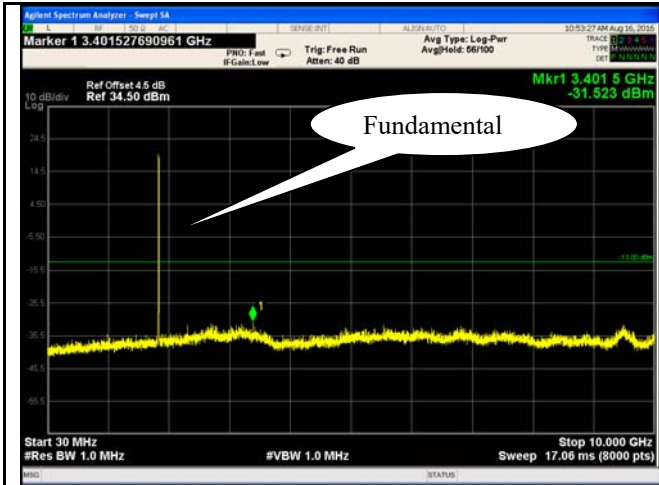


Band IV - High Channel-1

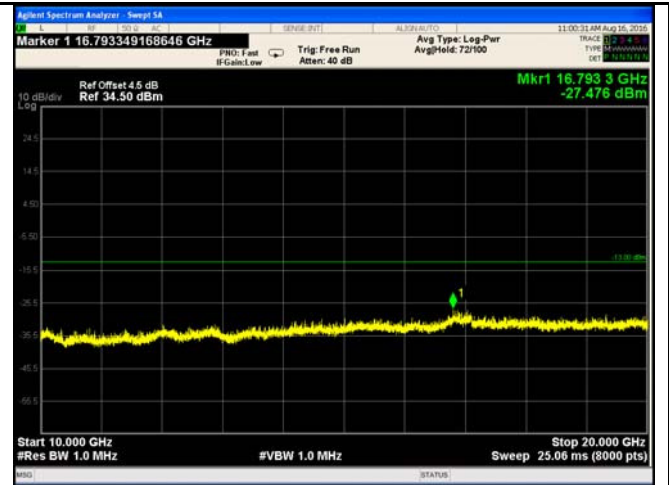


Band IV - High Channel-2

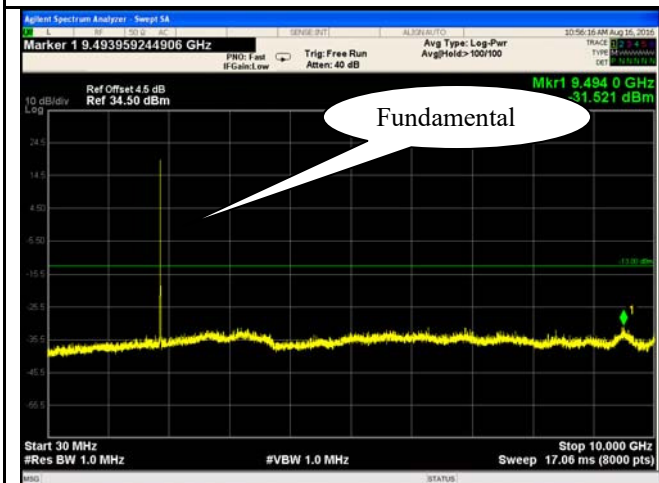
**UMTS-FDD Band II (Part 24E)**



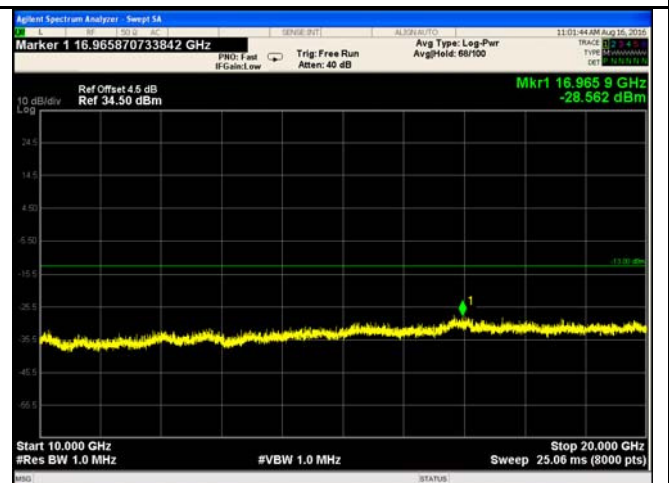
Band II - Low Channel-1



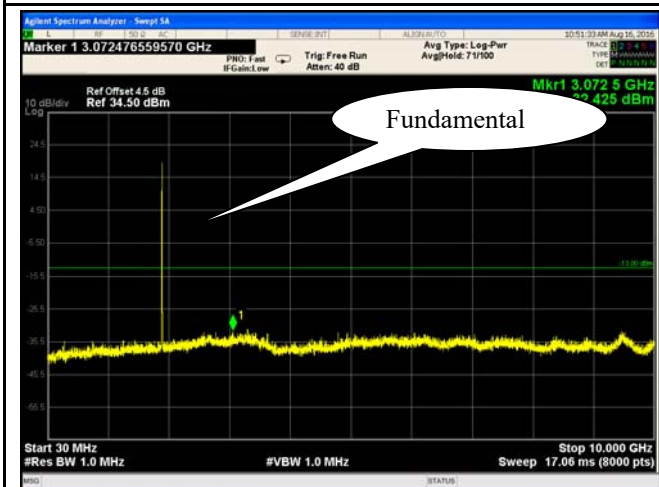
Band II - Low Channel-2



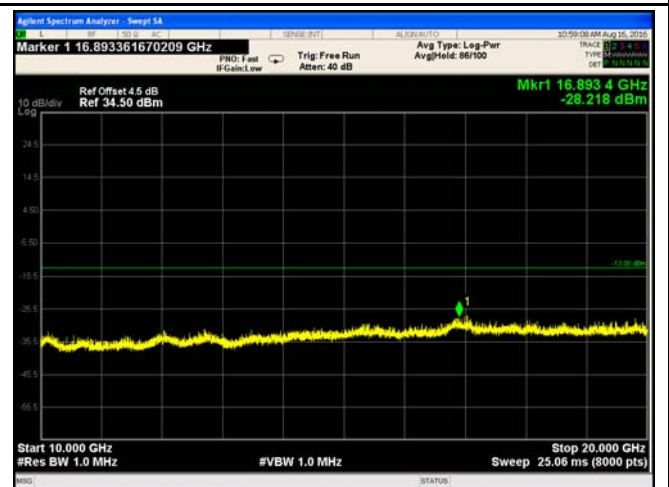
Band II - Middle Channel-1



Band II - Middle Channel-2



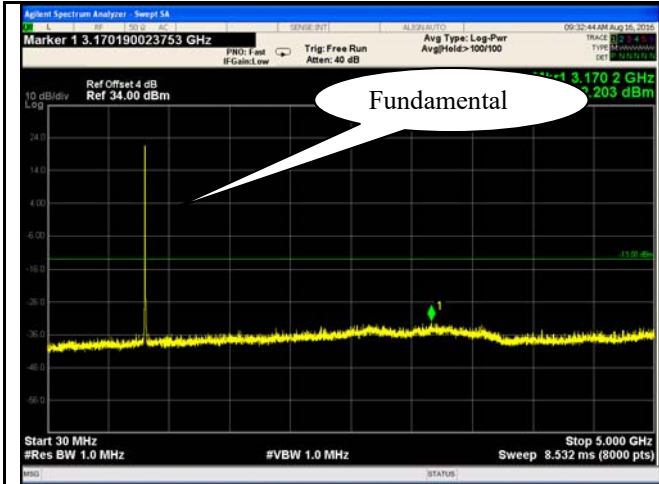
Band II - High Channel-1



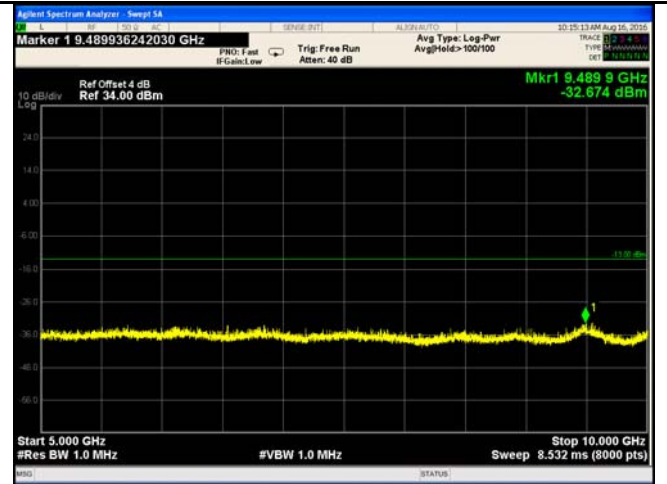
Band II - High Channel-2

**HSDPA:**

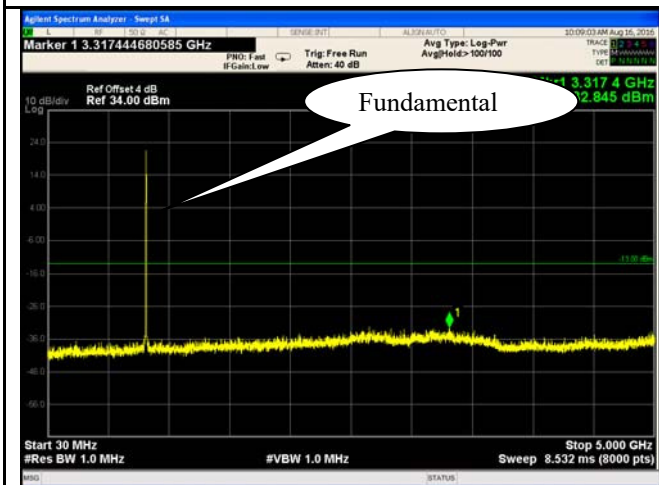
**UMTS-FDD Band V (Part 22H)**



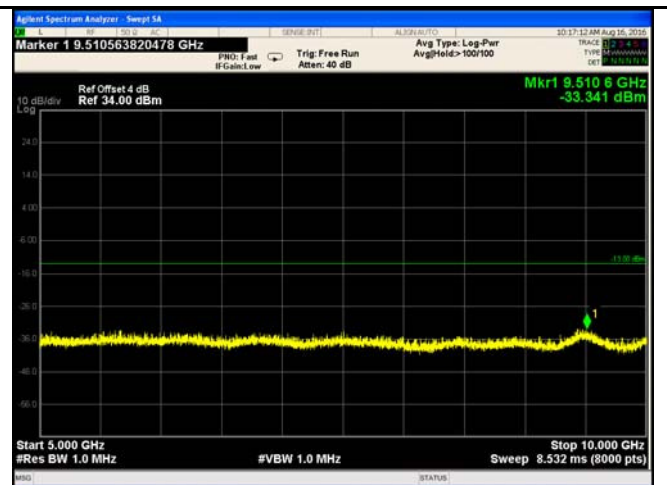
Band V - Low Channel-1



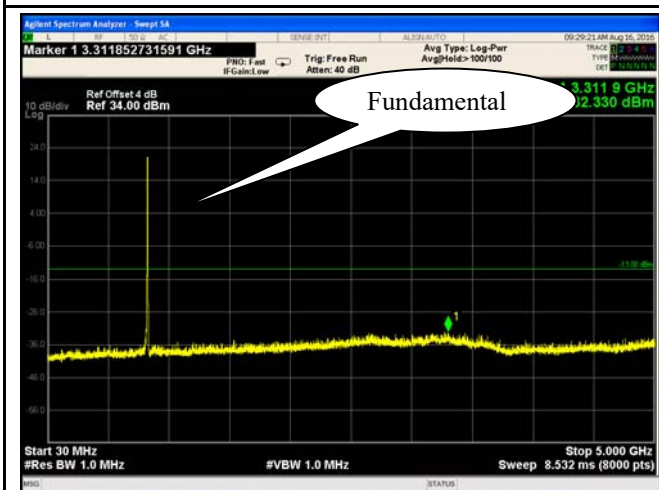
Band V - Low Channel-2



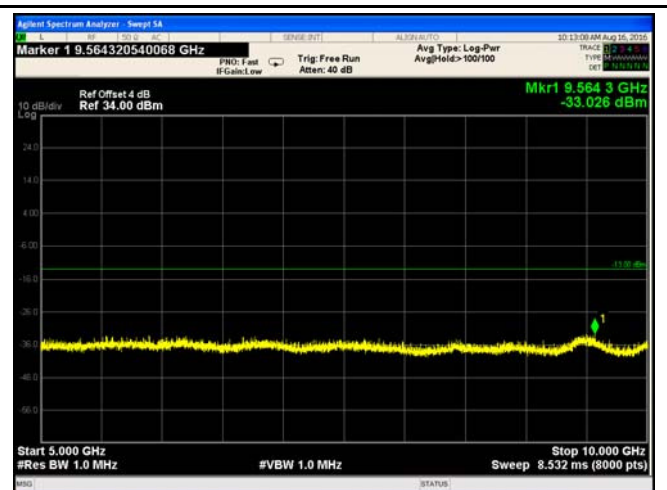
Band V - Middle Channel-1



Band V - Middle Channel-2

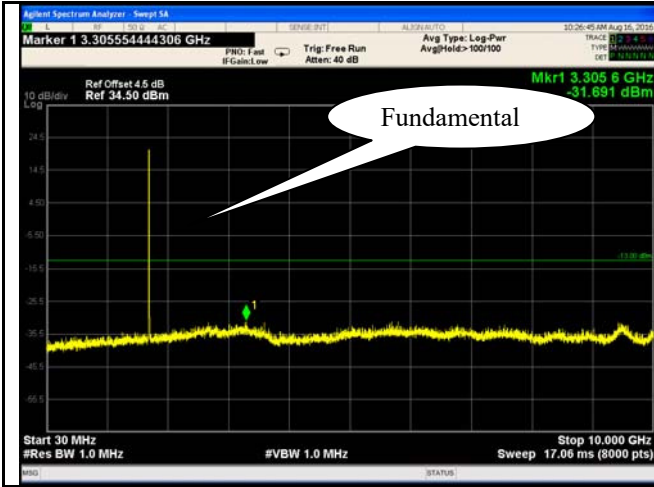


Band V - High Channel-1

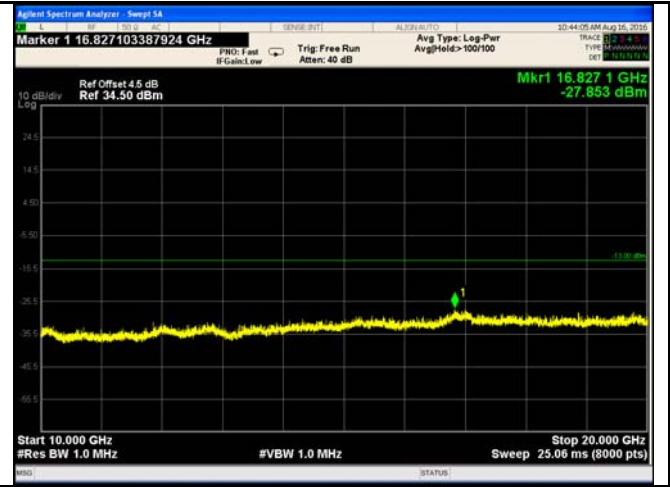


Band V - High Channel-2

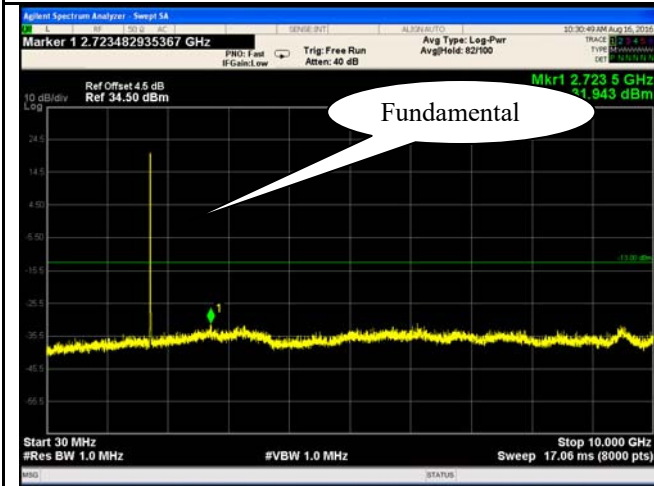
**UMTS-FDD Band IV (Part 27)**



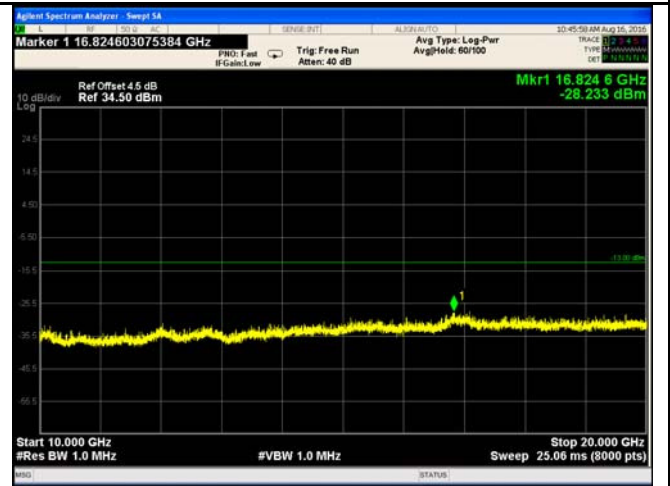
Band IV - Low Channel-1



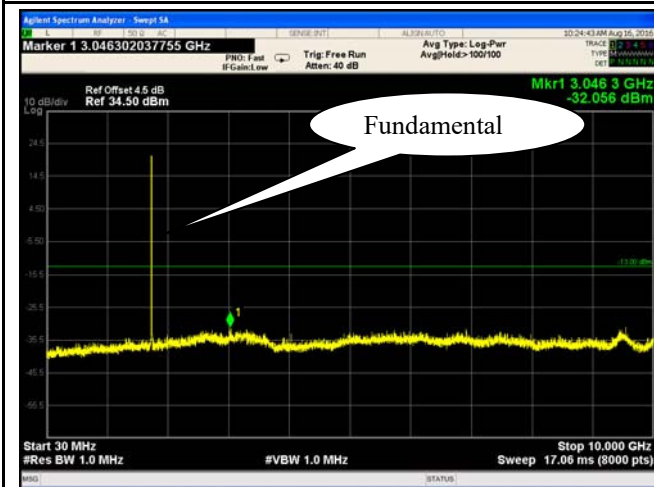
Band IV - Low Channel-2



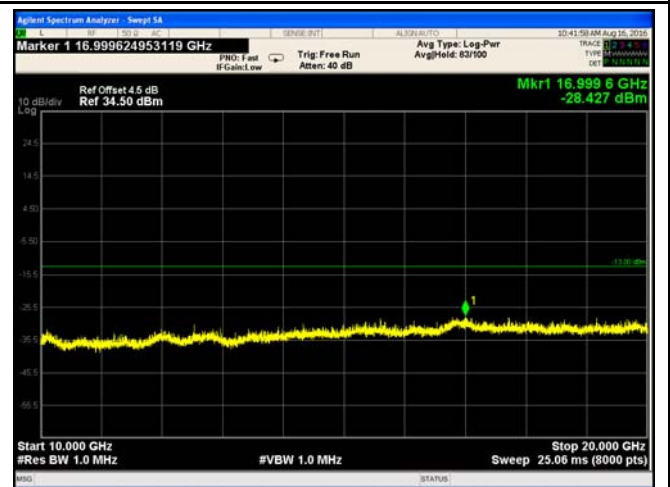
Band IV - Middle Channel-1



Band IV - Middle Channel-2

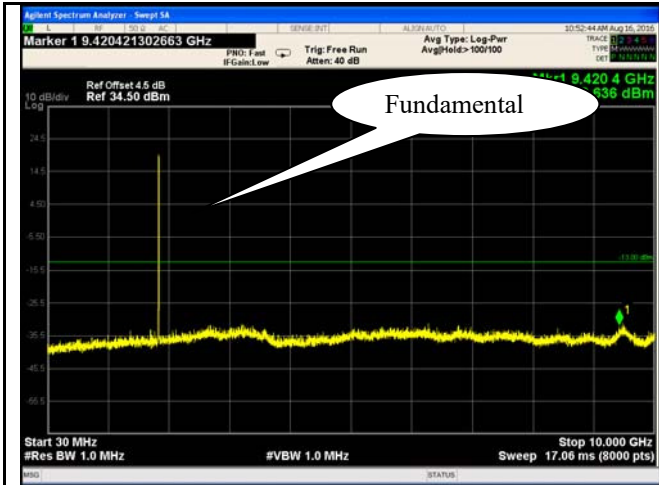


Band IV - High Channel-1

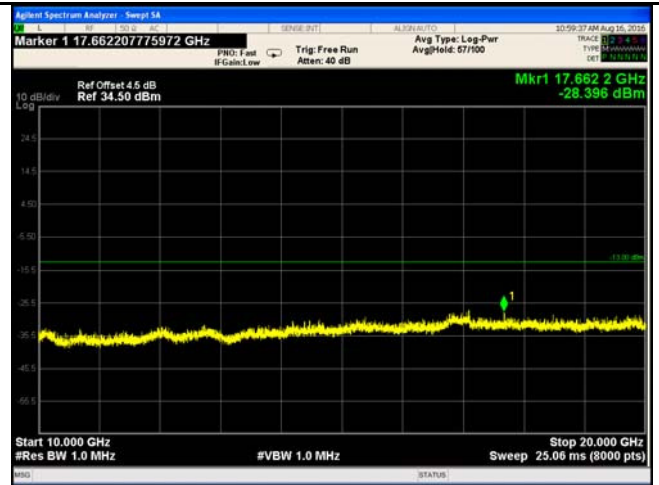


Band IV - High Channel-2

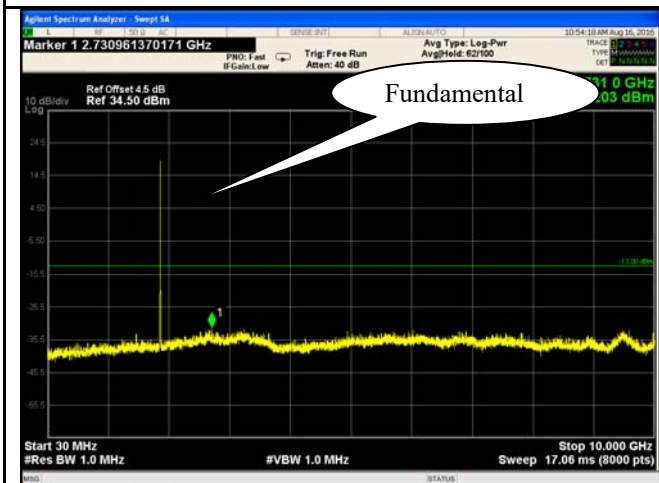
**UMTS-FDD Band II (Part 24E)**



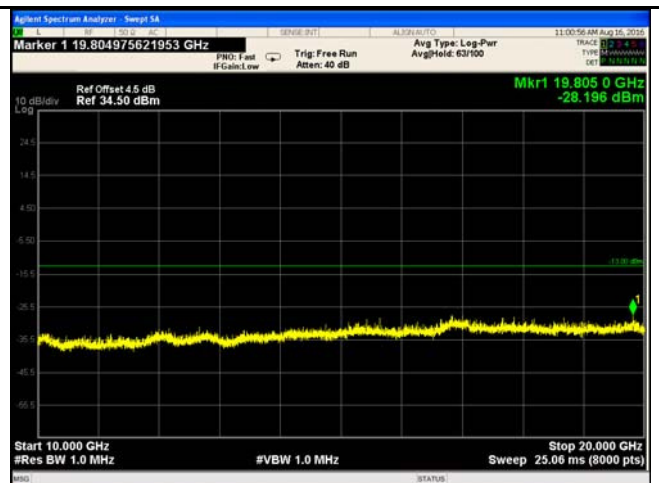
Band II - Low Channel-1



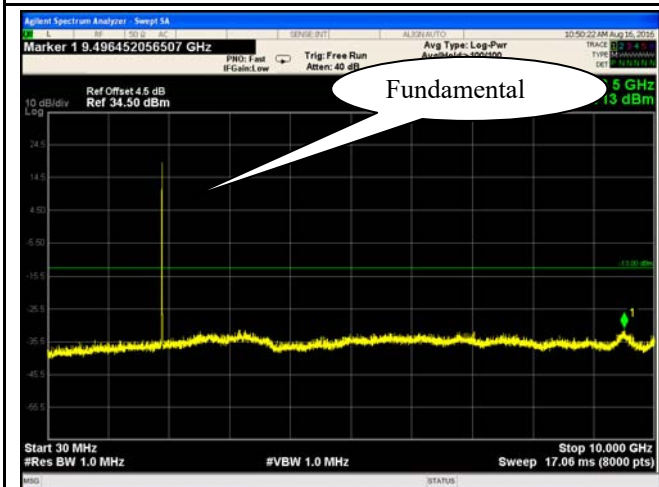
Band II - Low Channel-2



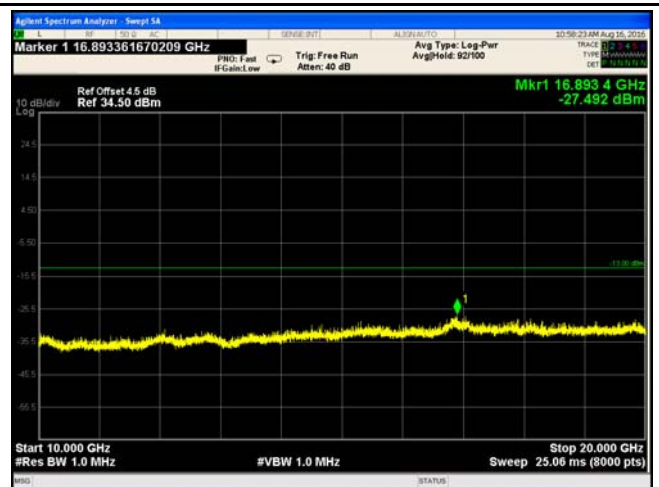
Band II - Middle Channel-1



Band II - Middle Channel-2



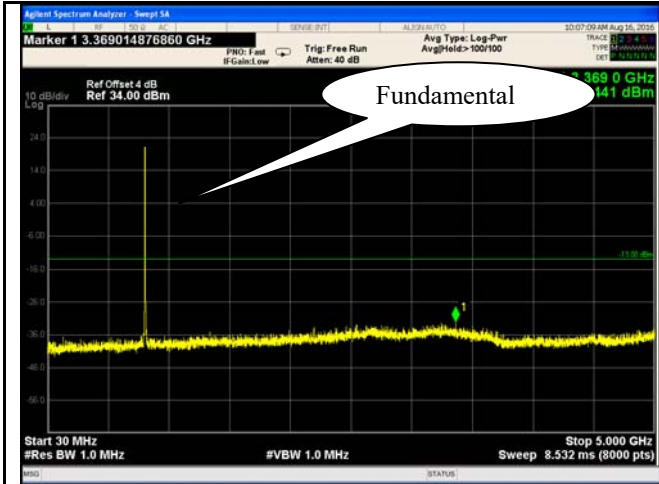
Band II - High Channel-1



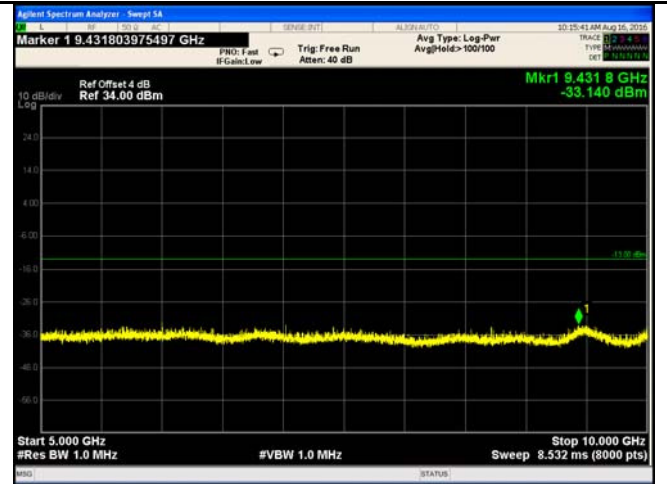
Band II - High Channel-2

HSUPA:

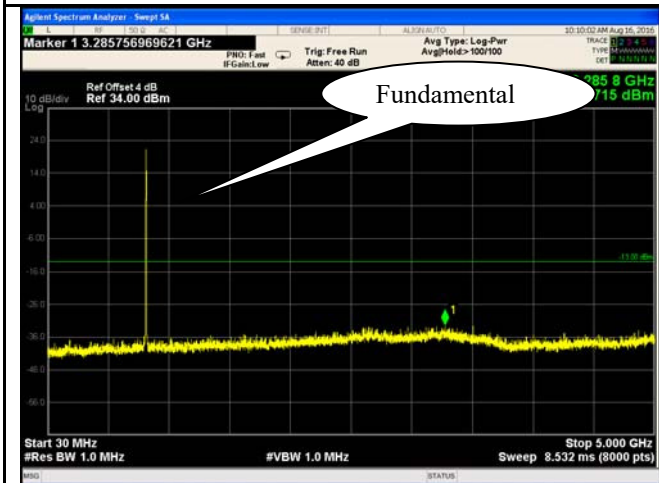
UMTS-FDD Band V (Part 22H)



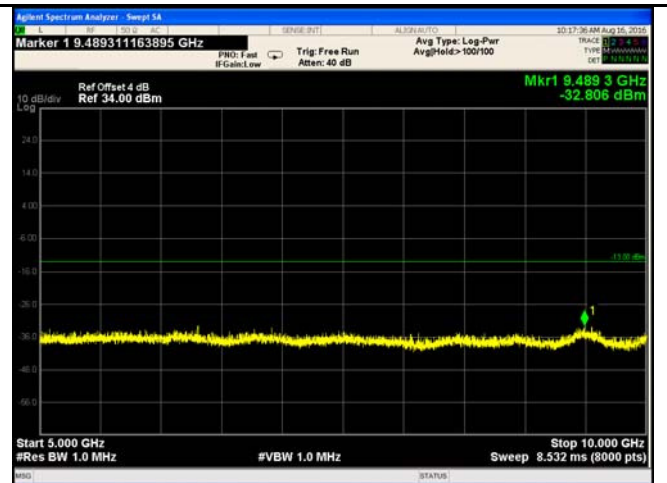
Band V - Low Channel-1



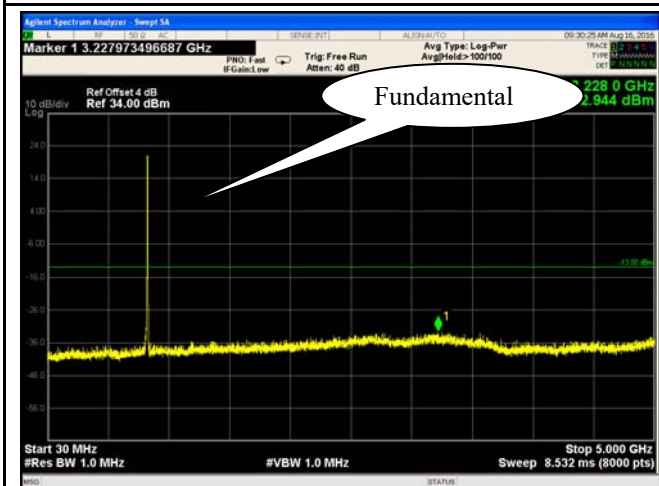
Band V - Low Channel-2



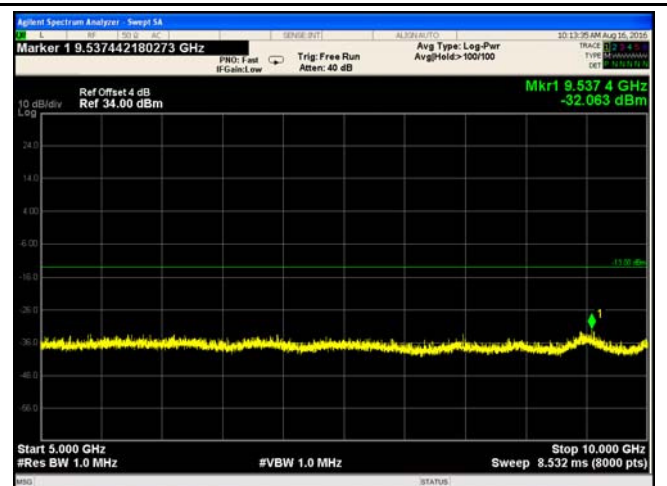
Band V - Middle Channel-1



Band V - Middle Channel-2

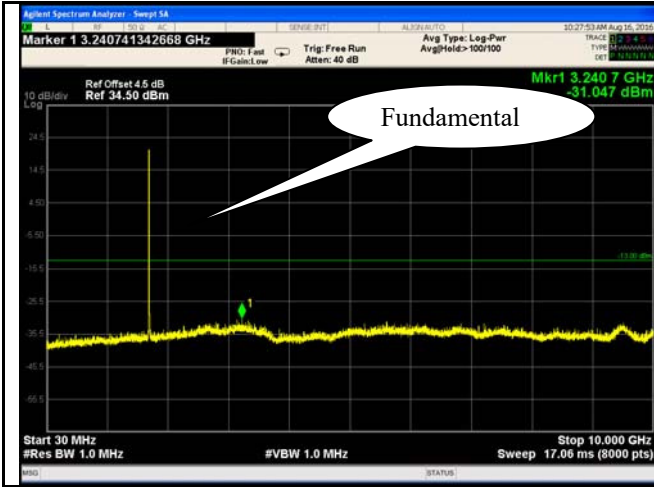


Band V - High Channel-1

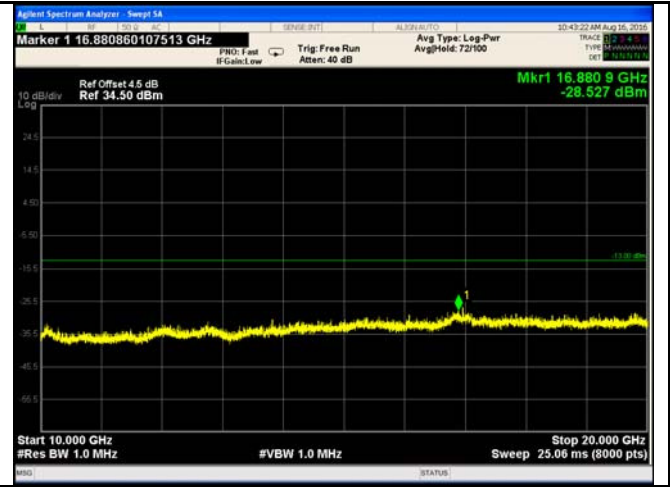


Band V - High Channel-2

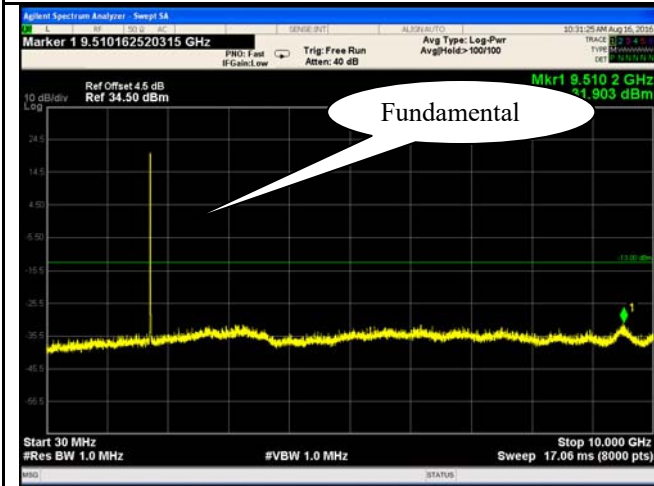
**UMTS-FDD Band IV (Part 27)**



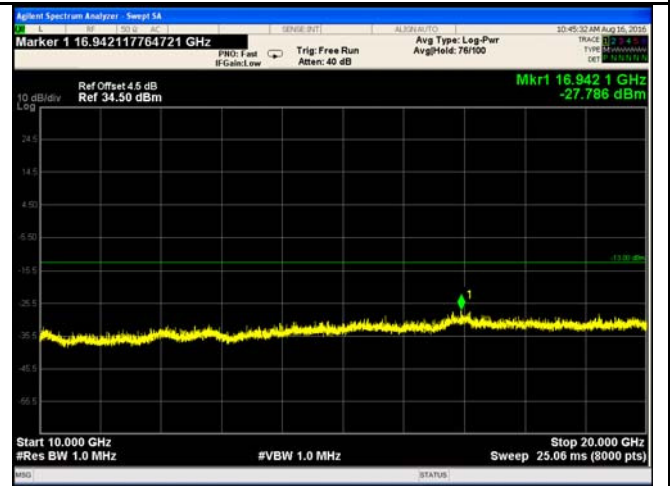
Band IV - Low Channel-1



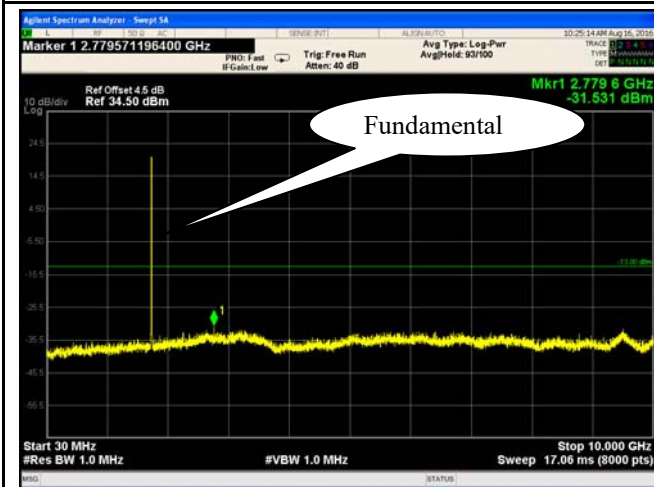
Band IV - Low Channel-2



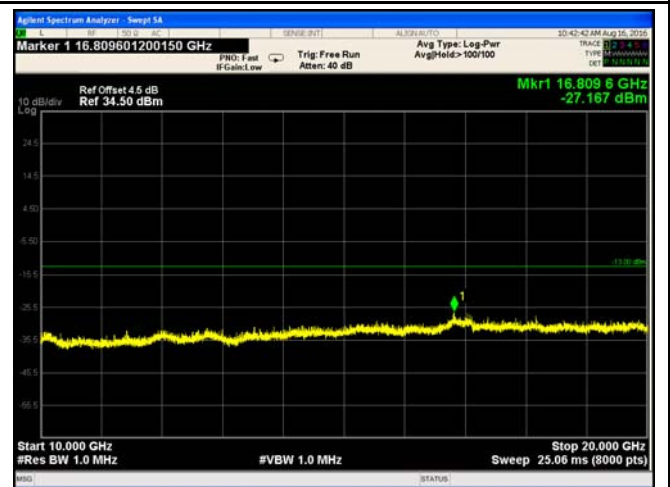
Band IV - Middle Channel-1



Band IV - Middle Channel-2

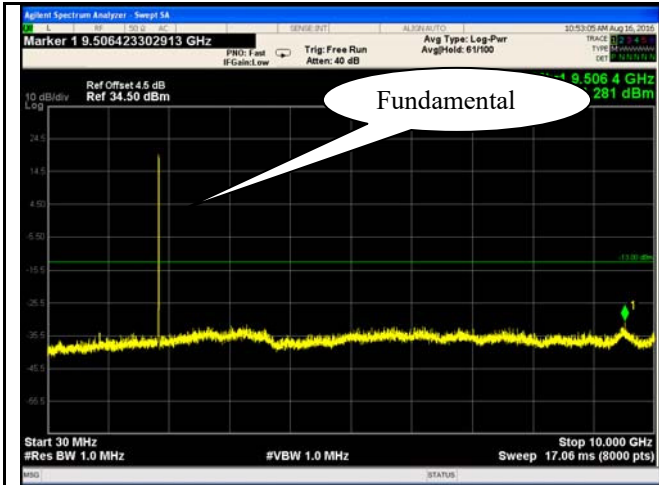


Band IV - High Channel-1

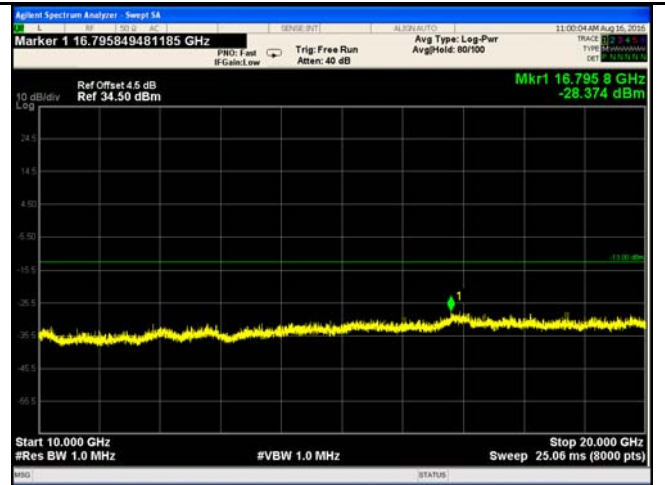


Band IV - High Channel-2

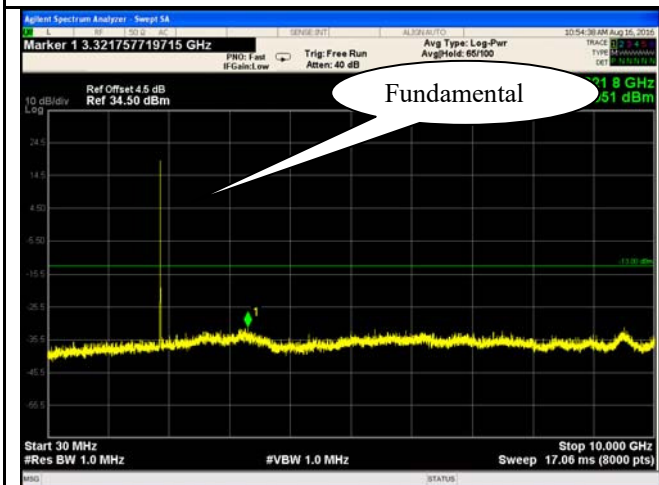
**UMTS-FDD Band II (Part 24E)**



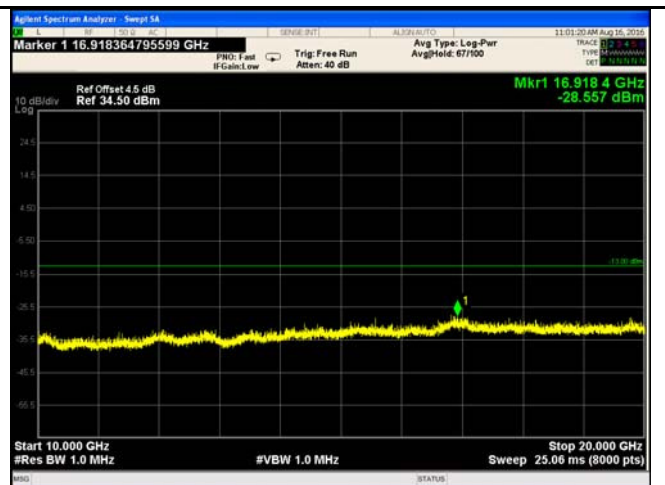
Band II - Low Channel-1



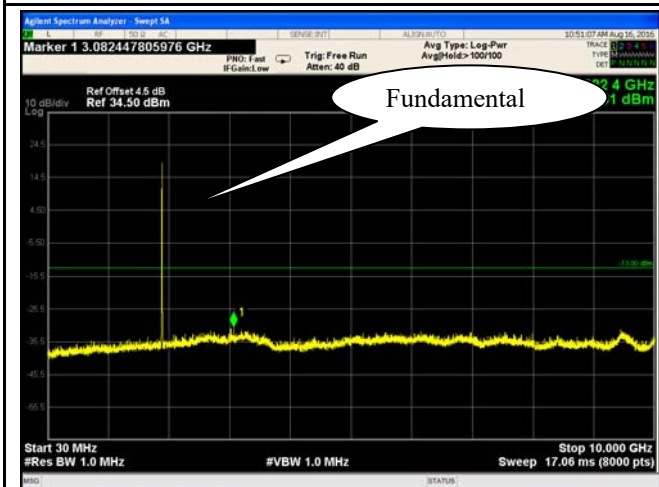
Band II - Low Channel-2



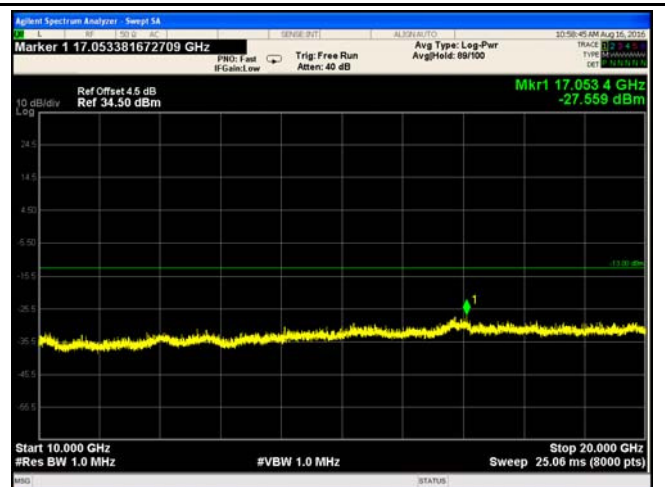
Band II - Middle Channel-1



Band II - Middle Channel-2



Band II - High Channel-1



Band II - High Channel-2



## 6.6 Spurious Radiated Emissions

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	August 13, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §24.238 § 27.53(h)	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. Sample Calculation: EUT Field Strength = Raw Amplitude (dBµV/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)</li> </ol>
----------------	---

Test Report	16070896-FCC-R1
Page	62 of 98

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	-42.36	V	7.95	0.78	-35.19	-13	-22.19
1648.4	-43.67	H	7.95	0.78	-36.5	-13	-23.5
319.5	-52.46	V	6.4	0.26	-46.32	-13	-33.32
598.2	-53.01	H	6.8	0.37	-46.58	-13	-33.58

### 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	-42.42	V	7.95	0.78	-35.25	-13	-22.25
1673.2	-43.95	H	7.95	0.78	-36.78	-13	-23.78
319.8	-52.64	V	6.4	0.26	-46.5	-13	-33.5
599.1	53.06	H	6.8	0.37	59.49	-13	72.49

### 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	-42.89	V	7.95	0.78	-35.72	-13	-22.72
1697.6	43.56	H	7.95	0.78	50.73	-13	63.73
319.4	52.74	V	6.4	0.26	58.88	-13	71.88
599.8	53.05	H	6.8	0.37	59.48	-13	72.48

#### 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	-48.35	V	10.25	2.73	-40.83	-13	-27.83
3700.4	-49.26	H	10.25	2.73	-41.74	-13	-28.74
320.1	-53.14	V	6.4	0.26	-47	-13	-34.00
601.5	-53.69	H	6.8	0.37	-47.26	-13	-34.26

### 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	-48.47	V	10.25	2.73	-40.95	-13	-27.95
3760	-49.32	H	10.25	2.73	-41.8	-13	-28.8
320.4	-53.16	V	6.4	0.26	-47.02	-13	-34.02
601.9	-53.67	H	6.8	0.37	-47.24	-13	-34.24

### 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	-48.56	V	10.36	2.73	-40.93	-13	-27.93
3819.6	-49.42	H	10.36	2.73	-41.79	-13	-28.79
320.8	-53.41	V	6.4	0.26	-47.27	-13	-34.27
602.1	-53.94	H	6.8	0.37	-47.51	-13	-34.51

#### 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	-46.82	V	7.95	0.78	-39.65	-13	-26.65
1652.8	-45.73	H	7.95	0.78	-38.56	-13	-25.56
321.1	-52.84	V	6.4	0.26	-46.7	-13	-33.7
602.2	-53.12	H	6.8	0.37	-46.69	-13	-33.69

### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1670	-46.79	V	7.95	0.78	-39.62	-13	-26.62
1670	-45.61	H	7.95	0.78	-38.44	-13	-25.44
321.5	-52.68	V	6.4	0.26	-46.54	-13	-33.54
602.4	-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)
1693.2	-46.36	V	7.95	0.78	-39.19	-13	-26.19
1693.2	-47.21	H	7.95	0.78	-40.04	-13	-27.04
321.8	-52.31	V	6.4	0.26	-46.17	-13	-33.17
602.5	-52.64	H	6.8	0.37	-46.21	-13	-33.21

**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 IV (Part 27E)

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3424.8	-45.62	V	10.07	2.52	-38.07	-13	-25.07
3424.8	-47.51	H	10.07	2.52	-39.96	-13	-26.96
332.4	-58.36	V	6.4	0.26	-52.22	-13	-39.22
745.8	-53.14	H	7.1	0.42	-46.46	-13	-33.46

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3480	-45.32	V	10.09	2.52	-37.75	-13	-24.75
3480	-46.84	H	10.09	2.52	-39.27	-13	-26.27
331.9	-56.44	V	6.4	0.26	-50.3	-13	-37.3
747.3	-52.39	H	7.1	0.42	-45.71	-13	-32.71

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3505.2	-45.12	V	10.09	2.52	-37.55	-13	-24.55
3505.2	-46.56	H	10.09	2.52	-38.99	-13	-25.99
332.8	-58.59	V	6.4	0.26	-52.45	-13	-39.45
748.7	-52.46	H	7.1	0.42	-45.78	-13	-32.78

**Note:**

- 1, The testing has been conformed to  $10 \times 1712.4 \text{ MHz} = 17,124 \text{ MHz}$
- 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	-49.74	V	10.25	2.73	-42.22	-13	-29.22
3704.8	-50.06	H	10.25	2.73	-42.54	-13	-29.54
320.4	-53.26	V	6.4	0.26	-47.12	-13	-34.12
601.3	-53.69	H	6.8	0.37	-47.26	-13	-34.26

### 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	-49.26	V	10.25	2.73	-41.74	-13	-28.74
3760	-49.61	H	10.25	2.73	-42.09	-13	-29.09
320.5	-53.35	V	6.4	0.26	-47.21	-13	-34.21
601.4	-53.97	H	6.8	0.37	-47.54	-13	-34.54

### 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	-49.52	V	10.36	2.73	-41.89	-13	-28.89
3815.2	-49.83	H	10.36	2.73	-42.2	-13	-29.2
320.9	-53.24	V	6.4	0.26	-47.1	-13	-34.1
601.7	-53.78	H	6.8	0.37	-47.35	-13	-34.35

**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

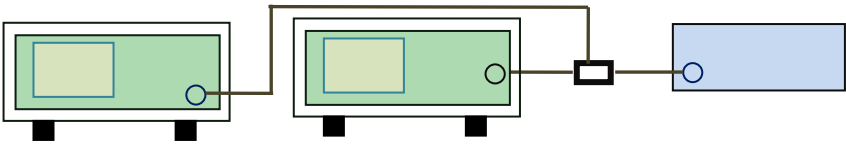
3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases

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

## 6.7 Band Edge

Temperature	24°C
Relative Humidity	57%
Atmospheric Pressure	1015mbar
Test date :	August 15, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §24.238(a) § 27.53(h)	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			
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)
823.978	-23.010	-13
849.021	-21.203	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.976	-18.769	-13
1910.023	-18.724	-13

**GPRS:**

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.979	-22.910	-13
849.020	-21.107	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.982	-18.051	-13
1910.021	-17.544	-13

**EGPRS (MCS5):**

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.966	-23.371	-13
849.021	-21.050	-13

**PCS Band (Part24E) result**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.988	-17.947	-13
1910.026	-18.563	-13

**RMC:**

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.183	-35.651	-13
850.100	-23.396	-13

**UMTS-FDD Band IV (Part 27)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1709.250	-31.970	-13
1756.267	-30.766	-13

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.483	-27.533	-13
1710.717	-27.250	-13

**HSDPA:**

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.367	-35.967	-13
850.367	-29.678	-13

**UMTS-FDD Band IV (Part 27)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1709.267	-31.785	-13
1755.867	-29.708	-13

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.500	-27.337	-13
1911.050	-27.483	-13

### HSUPA:

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.533	-35.218	-13
850.367	-29.292	-13

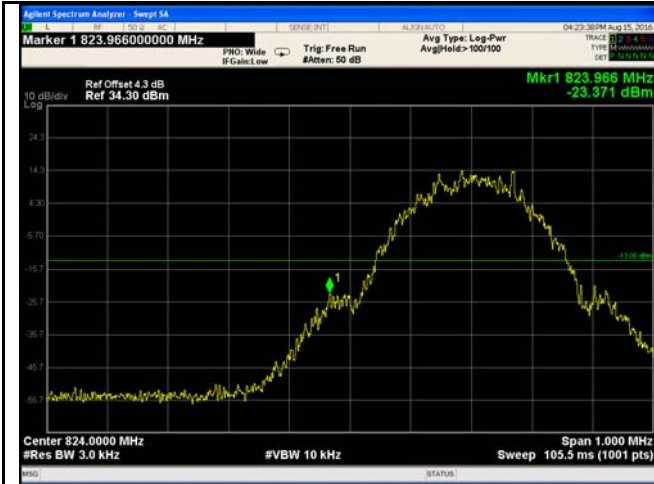
### UMTS-FDD Band IV (Part 27)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1709.017	-31.015	-13
1755.633	-30.981	-13

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

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.350	-27.029	-13
1911.117	-27.355	-13

**GSM Voice:  
Test Plots**



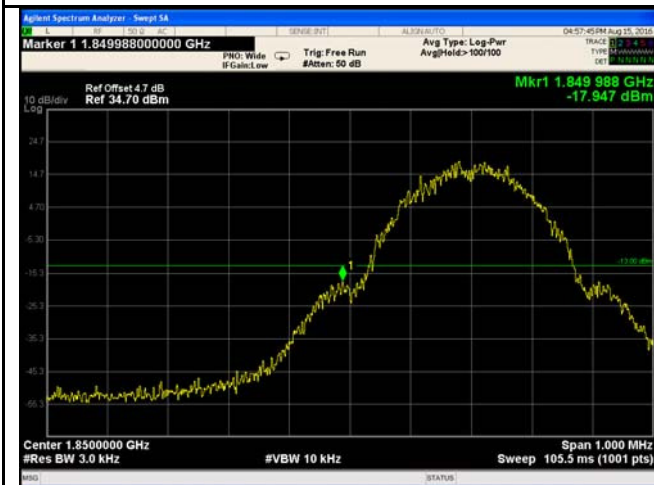
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.15/3)=4.0+0.3=4.3dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.21/3)=4.0+0.3=4.3dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.19/3)=4.5+0.2=4.7dB

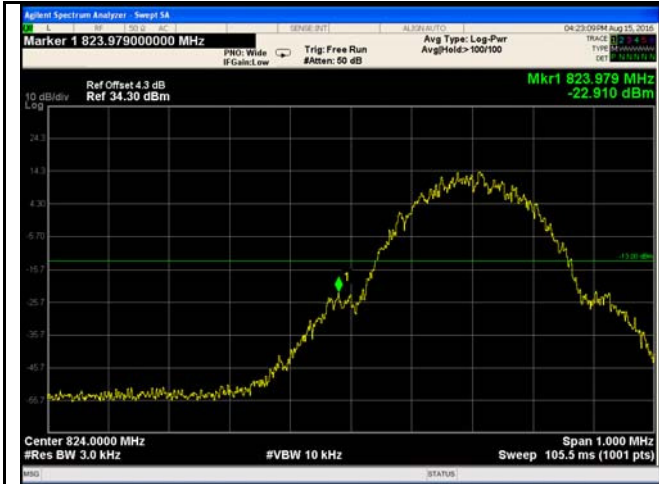


PCS Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.18/3)=4.5+0.1=4.6dB

**GPRS:**

**Test Plots**



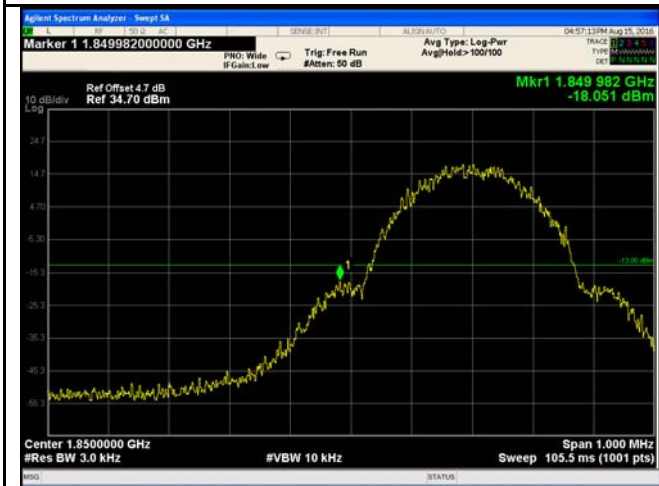
Cellular Band - Low Channel



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.16/3)=4.0+0.3=4.3dB

Note: Offset=Cable loss (4.0) + 10log  
(3.15/3)=4.0+0.3=4.3dB



PCS Band - Low Channel



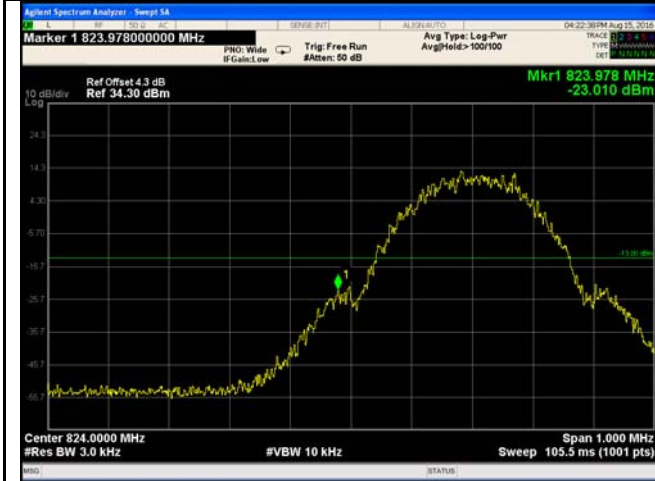
PCS Band - High Channel

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

Note: Offset=Cable loss (4.5) + 10log  
(3.03/3)=4.5+0.1=4.6dB

## EGPRS (MCS5):

### Test Plots



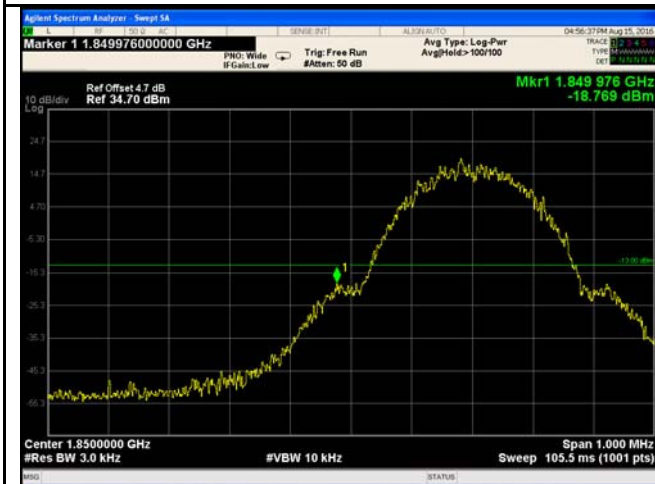
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.19/3)=4.0+0.3=4.3dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.22/3)=4.0+0.3=4.3dB



PCS Band - Low Channel

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



PCS Band - High Channel

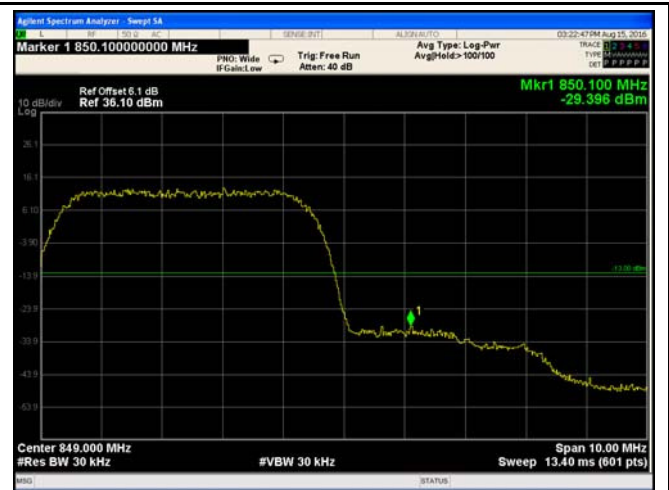
Note: Offset=Cable loss (4.5) + 10log  
(3.04/3)=4.5+0.1=4.6dB

RMC:



UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.91/30)=4.0+2.1=6.1dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.90/30)=4.0+2.1=6.1dB



UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.87/30)=4.0+2.1=6.6dB



UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.72/30)=4.0+2.1=6.6dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
 (49.00/30)4.5+2.2=6.7dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log  
 (48.90/30)=4.5+2.2=6.7dB



**HSDPA:**



UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.90/30)=4.0+2.1=6.1dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.91/30)=4.0+2.1=6.1dB



UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.68/30)=4.5+2.1=6.6dB



UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.53/30)=4.5+2.1=6.6dB



UMTS-FDD Band II - Low Channel

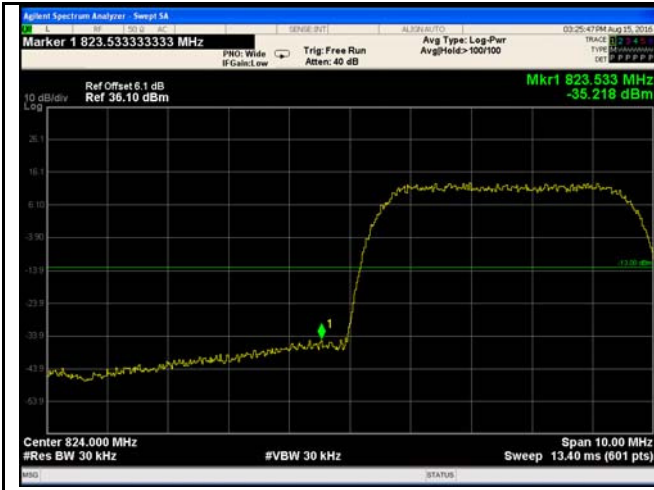
Note: Offset=Cable loss (4.5) + 10log  
 (49.53/30)=4.5+2.2=6.7dB



UMTS-FDD Band II - High Channel

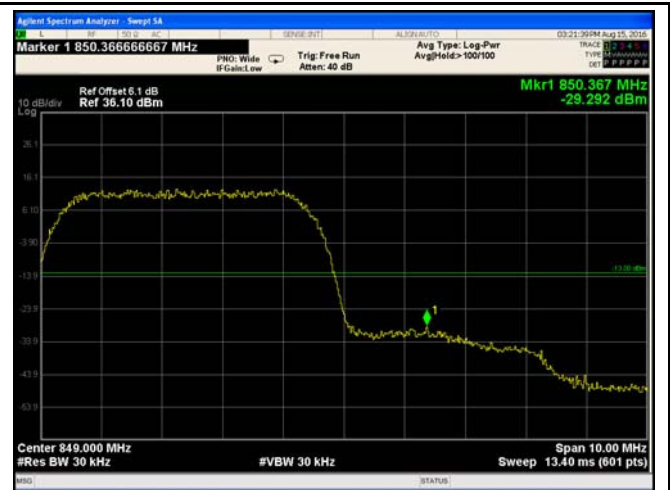
Note: Offset=Cable loss (4.5) + 10log  
 (49.59/30)=4.5+2.2=6.7dB

**HSUPA:**



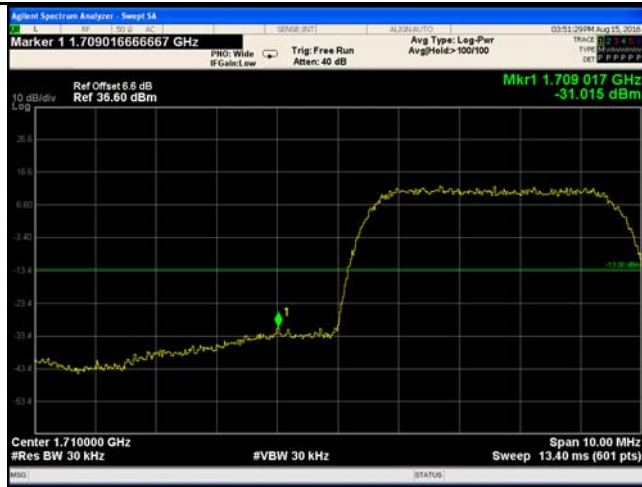
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.91/30)=4.0+2.1=6.1dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(48.69/30)=4.0+2.1=6.1dB



UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.71/30)=4.5+2.1=6.6dB



UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(48.56/30)=4.5+2.1=6.6dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
 (49.19/30)=4.5+2.2=6.7dB



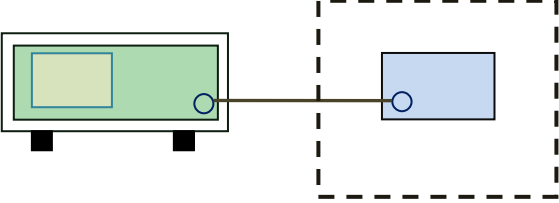
UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log  
 (49.59/30)=4.5+2.2=6.7dB

## 6.8 Frequency Stability

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	August 13, 2016
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54	a)	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:  Frequency Tolerance for Transmitters in the Public Mobile Services	<input checked="" type="checkbox"/>																																
		<table border="1"> <thead> <tr> <th>Frequency Range (MHz)</th> <th>Base, fixed (ppm)</th> <th>Mobile ≤ 3 watts (ppm)</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 29.</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>		Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	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 29.	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 (ppm)	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 29.		5.0	N/A	N/A																													
929 to 960.	1.5	N/A	N/A																																
2110 to 2220	10.0	N/A	N/A																																
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.																																			
																																			
Test setup																																			

Test Report	16070896-FCC-R1
Page	82 of 98

Procedure	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.  Limit: The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ( $\pm 2.5\text{ppm}$ ) of the center frequency.
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	20	0.0239	2.5
0		17	0.0203	2.5
10		16	0.0191	2.5
20		17	0.0203	2.5
30		13	0.0155	2.5
40		17	0.0203	2.5
50		19	0.0227	2.5
55		21	0.0251	2.5
25	4.2	20	0.0239	2.5
	3.5	18	0.0215	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	12	0.0064	2.5
0		13	0.0069	2.5
10		14	0.0074	2.5
20		13	0.0069	2.5
30		15	0.0080	2.5
40		16	0.0085	2.5
50		16	0.0085	2.5
55		18	0.0096	2.5
25	4.2	17	0.0090	2.5
	3.5	20	0.0106	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	15	0.0180	2.5
0		14	0.0168	2.5
10		14	0.0168	2.5
20		15	0.0180	2.5
30		13	0.0156	2.5
40		12	0.0144	2.5
50		17	0.0204	2.5
55		15	0.0180	2.5
25	4.2	15	0.0180	2.5
	3.5	14	0.0168	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		12	0.0064	2.5
10		15	0.0080	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		13	0.0069	2.5
25	4.2	16	0.0085	2.5
	3.5	14	0.0074	2.5



**UMTS-FDD Band IV (Part 27E)**

Middle Channel, $f_0 = 1732.6$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	16	0.0192	2.5
0		15	0.0180	2.5
10		16	0.0192	2.5
20		18	0.0216	2.5
30		15	0.0180	2.5
40		12	0.0144	2.5
50		15	0.0180	2.5
55		16	0.0192	2.5
25		4.2	12	0.0144
	3.5	18	0.0216	2.5

## Annex A. TEST INSTRUMENT

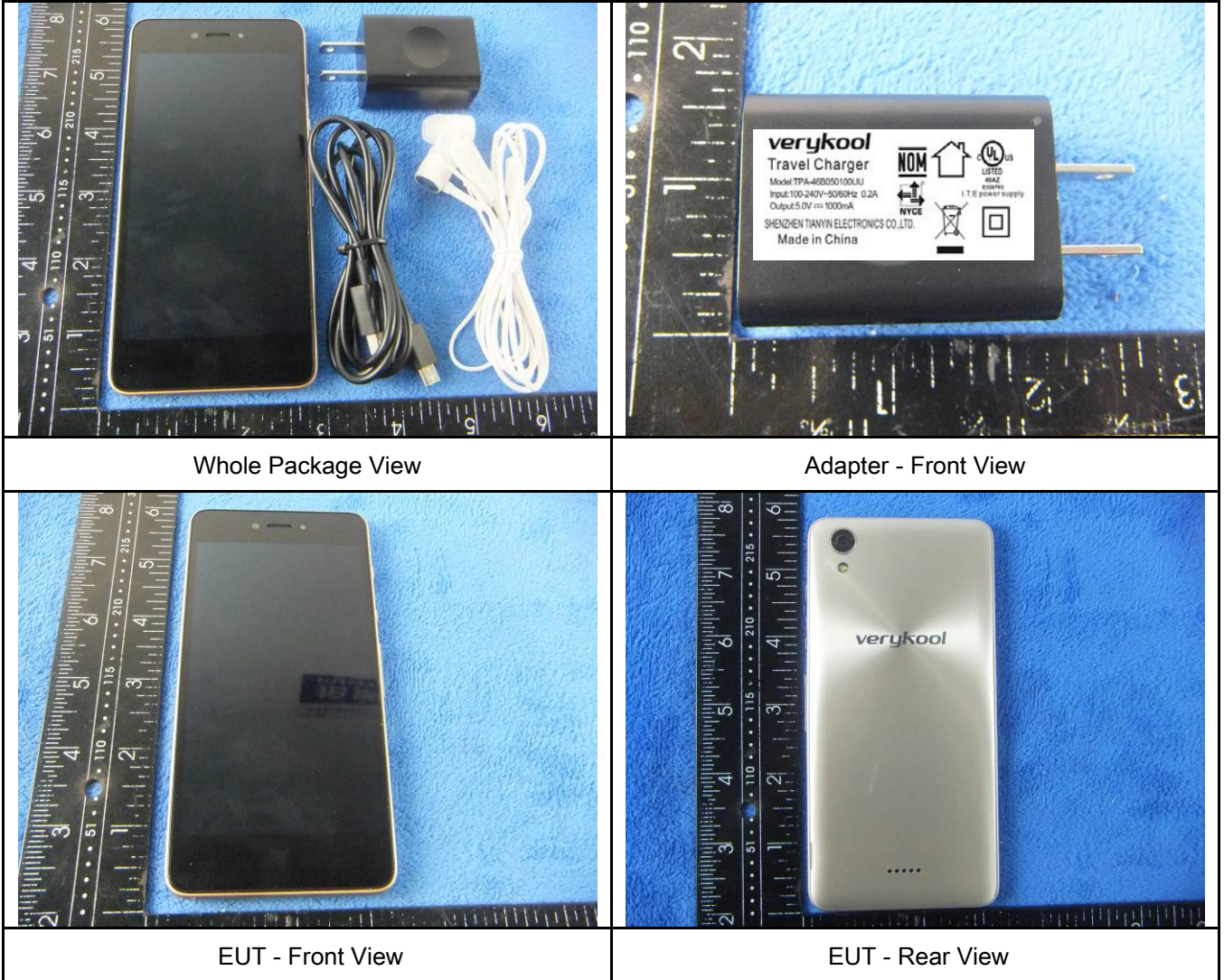
Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/16/2015	09/15/2016	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	<input checked="" type="checkbox"/>
Temperature/Humidity Chamber	UHL-270	001	10/09/2015	10/08/2016	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/21/2015	09/20/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	<input checked="" type="checkbox"/>
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/17/2015	09/16/2016	<input checked="" type="checkbox"/>
Power Amplifier	SMC150D	R1553-0313	03/09/2016	03/08/2017	<input checked="" type="checkbox"/>
Power Amplifier	S41-25D	R1553-0314	05/27/2016	05/26/2017	<input checked="" type="checkbox"/>

Test Report	16070896-FCC-R1
Page	87 of 98

Tunable Notch Filter	3NF-800/1000-S	AA4	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Tunable Notch Filter	3NF-1000/2000-S	AM 4	09/01/2015	08/31/2016	<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



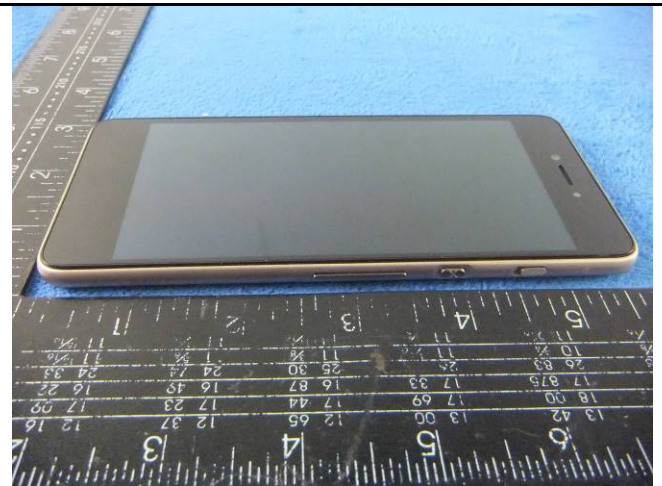
EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

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



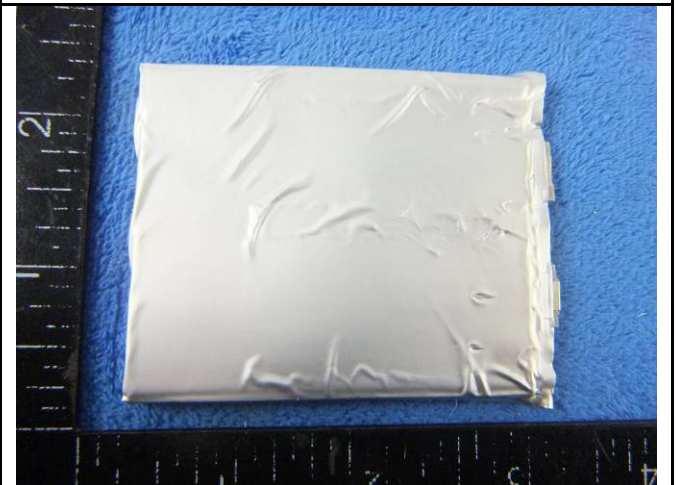
Cover Off - Top View 1



Cover Off - Top View 2



Battery - Front View



Battery - Rear View



Mainboard with Shielding - Front View



Mainboard without Shielding - Front View



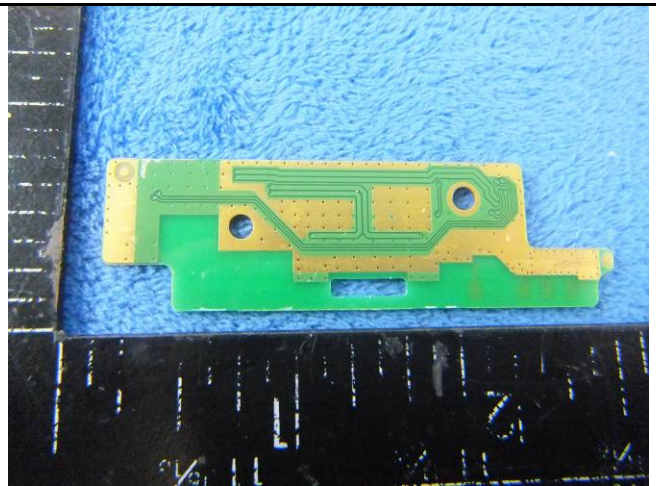
Mainboard with Shielding - Rear View



Mainboard without Shielding - Rear View



Small Board - Front View



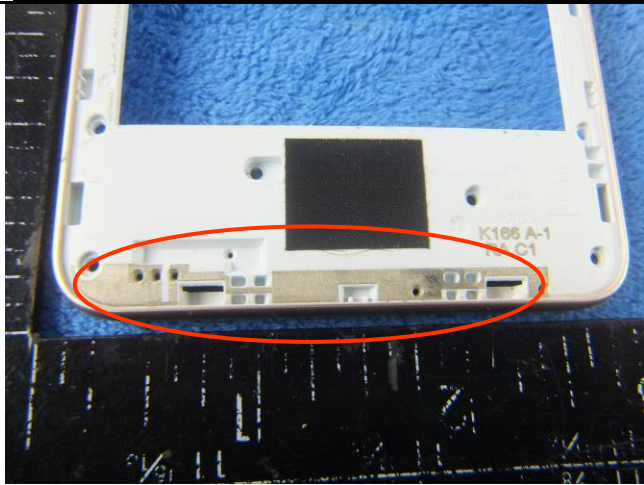
Small Board - Rear View



LCD - Front View



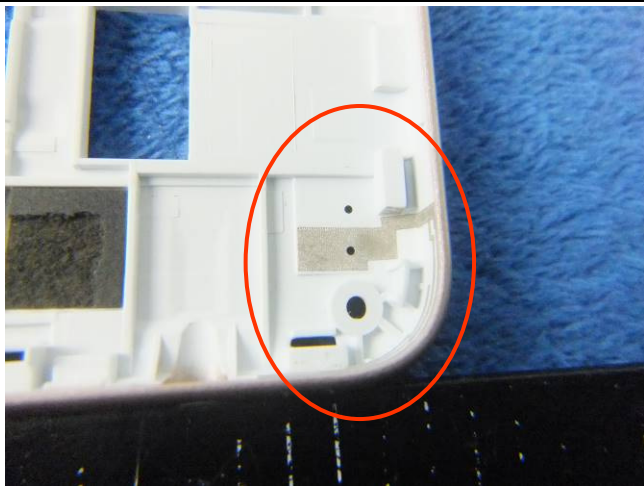
LCD - Rear View



GSM/PCS/UMTS-FDD-Antenna View



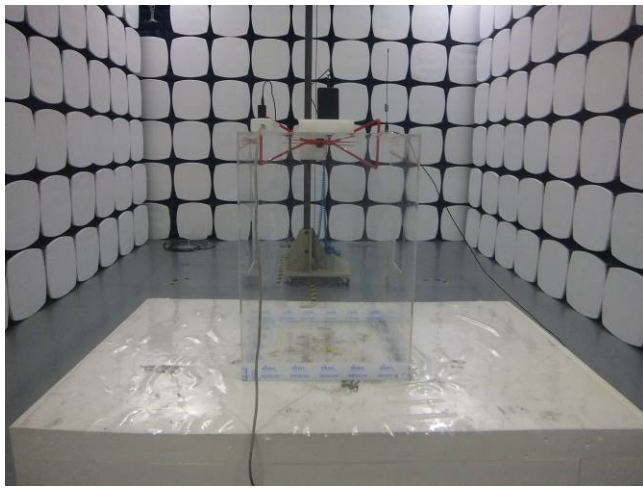
WIFI/BT/BLE/GPS - Antenna View



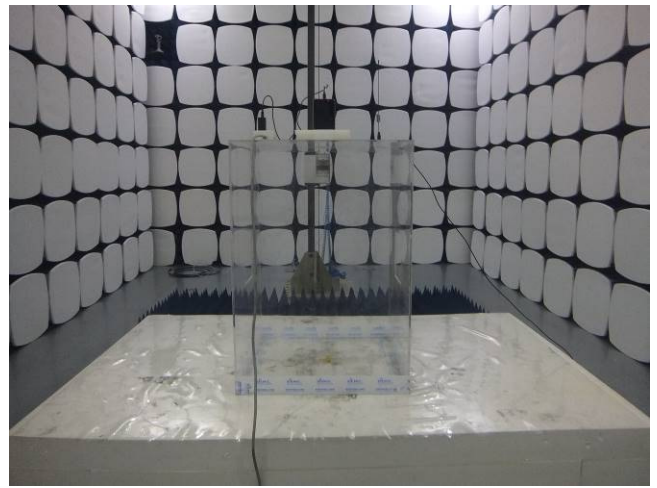
LTE - Antenna View



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



Radiated Spurious Emissions Test Setup Below 1GHz

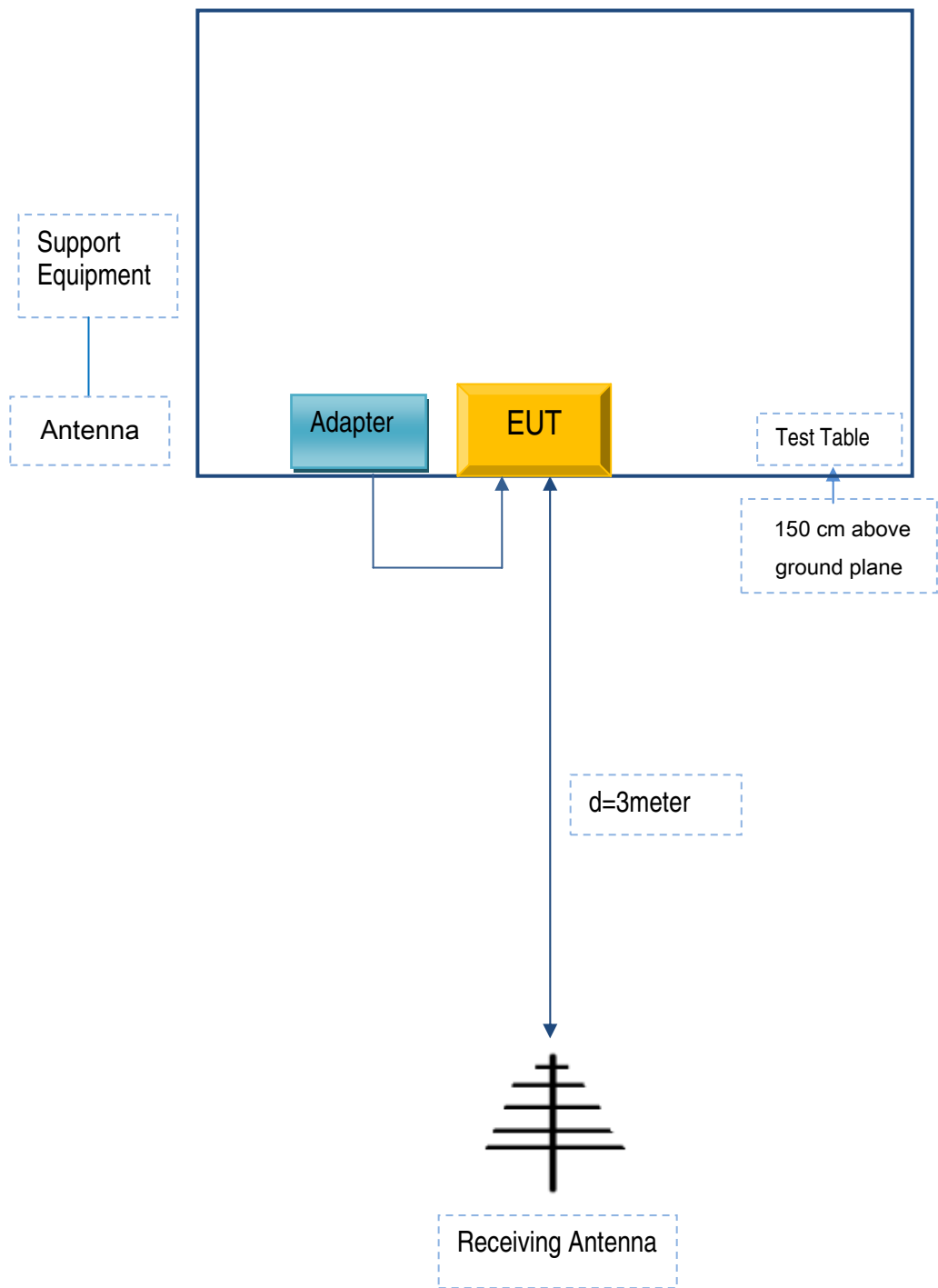


Radiated Spurious Emissions Test Setup Above  
1GHz

## 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
Verykool USA Inc	Adapter	TPA-46B050100UU	SL-010

### Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	SL-010

Test Report	16070896-FCC-R1
Page	96 of 98

## Annex C.ii. EUT OPERATING CONKITIONS

N/A

Test Report	16070896-FCC-R1
Page	97 of 98

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

**Please see attachment**

Test Report	16070896-FCC-R1
Page	98 of 98

## Annex E. DECLARATION OF SIMILARITY

N/A