

# RF TEST REPORT



Report No.: 15050042-FCC-R1

Supersede Report No.:N/A

Applicant	Quectel Wireless Solutions Co., Ltd.	
Product Name	GSM/GPRS Module	
Model No.	M85	
Serial No.	N/A	
Test Standard	FCC Part 22(H), FCC Part 24(E): 2014; ANSI/TIAC603 D: 2010	
Test Date	November 07 to November 20, 2015	
Issue Date	November 23, 2015	
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Equipment complied with the specification <input checked="" type="checkbox"/>		
Equipment did not comply with the specification <input type="checkbox"/>		
<i>Winnie Zhang</i>	<i>David Huang</i>	
Winnie Zhang Test Engineer	David Huang Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

**SIEMIC (SHENZHEN-CHINA) LABORATORIES**

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## Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

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

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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15050042-FCC-R1	NONE	Original	November 23, 2015

## 2. Customer information

Applicant Name	Quectel Wireless Solutions Co., Ltd.
Applicant Add	RM501,Building 13,No.99 TianZhou Road,Xuhui District,Shanghai,China
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Manufacturer Add	RM501,Building 13,No.99 TianZhou Road,Xuhui District,Shanghai,China

## 3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

## 4. Equipment under Test (EUT) Information

Description of EUT:	GSM/GPRS Module
Main Model:	M85
Serial Model:	N/A
Date EUT received:	November 06,2015
Test Date(s):	November 07 to November 20, 2015
Equipment Category :	PCB
Antenna Gain:	GSM850: 1dBi PCS1900: 1dBi
Type of Modulation:	GSM / GPRS: GMSK
RF Operating Frequency (ies):	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz
Maximum Conducted AV Power to Antenna:	GSM850: 32.21 dBm PCS1900: 30.20 dBm
ERP/EIRP:	GSM850: 31.09 dBm / ERP PCS1900: 31.24 dBm / EIRP
Number of Channels:	GSM 850: 124CH PCS1900: 299CH
Port:	N/A
Input Power:	Spec: DC 4.0V, 540mA
Trade Name :	Quectel
GPRS Multi-slot class	8/10/12

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FCC ID:

XMR201511M85

## 5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§ 1.1307; § 2.1093	RF Exposure (SAR)	Compliance
§2.1046; § 22.913(a); § 24.232(c)	RF Output Power	Compliance
§ 24.232 (d)	Peak-Average Ratio	Compliance
§ 2.1047	Modulation Characteristics	Compliance
§ 2.1049; § 22.905; § 22.917; § 24.238	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a)	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a)	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

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

### Measurement Uncertainty

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



## **6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS**

### **6.1 Maximum Permissible Exposure (MPE)**

Test Result: Pass

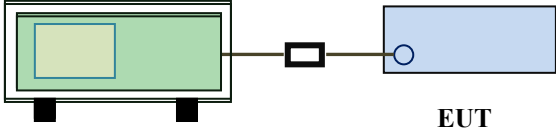
The EUT is a mobile device, Please refer to MPE Evaluation Report: 15050053-FCC-H.

## 6.2 RF Output Power

Temperature	23°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	November 10, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.913 (a)	a)	ERP:38.45dBm	<input checked="" type="checkbox"/>
§24.232 (c)	b)	EIRP:33dBm	<input checked="" type="checkbox"/>
	c)	EIRP: 30dBm	<input checked="" type="checkbox"/>

Test Setup	 <p style="text-align: center;">Base Station                      EUT</p>
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Test Procedure	<p>For Conducted Power:</p> <ul style="list-style-type: none"> <li>- The transmitter output port was connected to base station.</li> <li>- Set EUT at maximum power through base station.</li> <li>- Select lowest, middle, and highest channels for each band and different test mode.</li> </ul> <p>For ERP/EIRP:</p> <ul style="list-style-type: none"> <li>- The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.</li> <li>- The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.</li> <li>- The frequency range up to tenth harmonic of the fundamental frequency was investigated.</li> <li>- Remove the EUT and replace it with substitution antenna. A signal</li> </ul>
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	<p>generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.</p> <ul style="list-style-type: none"> <li>- Spurious emissions in dB = <math>10 \log (\text{TX power in Watts}/0.001)</math> – the absolute level</li> <li>- Spurious attenuation limit in dB = <math>43 + 10 \text{ Log}_{10} (\text{power out in Watts})</math>.</li> </ul>
Remark	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

## Conducted Power

### GSM Mode:

Burst Average Power (dBm);								
Band	GSM850				PCS1900			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice (1 uplink),GMSK	<b>32.21</b>	32.16	32.19	32±1	30.06	29.91	<b>30.20</b>	30±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	32.19	32.15	32.18	32±1	30.04	29.89	30.18	30±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	32.16	32.12	32.17	32±1	30.02	29.87	30.14	30±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	29.66	29.64	29.68	29±1	29.86	29.68	29.93	29±1
Remark : GPRS, CS1 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link								

**Note:** Since GSM mode has higher power, so the test items below were not performed to GPRS mode.

## UMTS Mode:

### ERP & EIRP

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

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	24.68	V	6.8	0.53	30.95	38.45
824.2	23.91	H	6.8	0.53	30.18	38.45
836.6	24.63	V	6.8	0.53	30.90	38.45
836.6	23.87	H	6.8	0.53	30.14	38.45
848.8	24.72	V	6.9	0.53	<b>31.09</b>	38.45
848.8	23.95	H	6.9	0.53	30.32	38.45

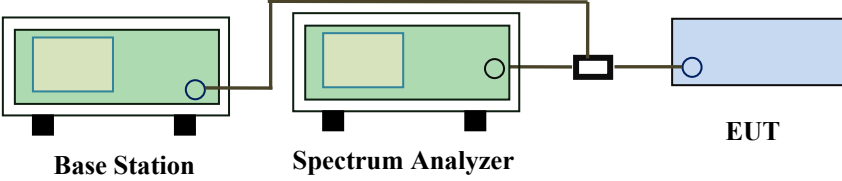
#### EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	24.15	V	7.88	0.85	31.18	33
1850.2	23.58	H	7.88	0.85	30.61	33
1880	24.19	V	7.88	0.85	31.22	33
1880	23.62	H	7.88	0.85	30.65	33
1909.8	24.23	V	7.86	0.85	<b>31.24</b>	33
1909.8	23.59	H	7.86	0.85	30.60	33

### 6.3 Peak-Average Ratio

Temperature	23°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	November 10, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable
§24.232(d)	a)	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p><b>According with KDB 971168</b></p> <ol style="list-style-type: none"> <li>1. The signal analyzer' s CCDF measurement profile is enabled</li> <li>2. Frequency = carrier center frequency</li> <li>3. Measurement BW &gt; Emission bandwidth of signal</li> <li>4. The signal analyzer was set to collect one million samples to generate the CCDF curve</li> <li>5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (&gt;98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal “ RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “ on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power</li> </ol>		
Remark			
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

## PCS1900

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.59	30.06	0.53
1880	30.11	29.91	0.20
1909.8	30.67	30.20	0.47

## 6.4 Modulation Characteristic

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



## 6.5 Occupied Bandwidth

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	November 13, 2015
Tested By :	Winnie Zhang

### Requirement(s):

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

Test Data    ☒ Yes      ☐ N/A

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

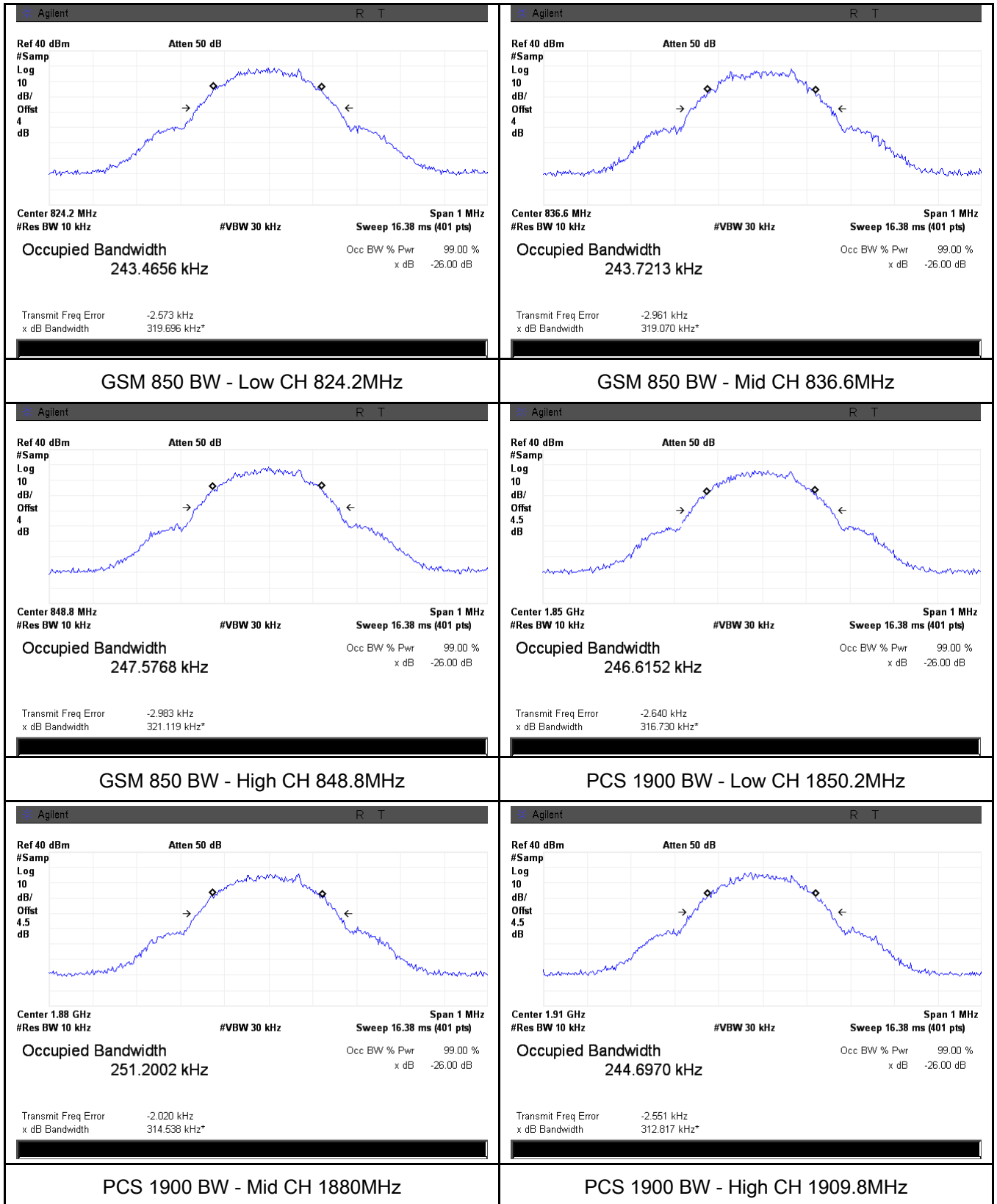
### Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	243.4656	319.696
190	836.6	243.7213	319.070
251	848.8	247.5768	321.119

### PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	246.6152	316.730
661	1880.0	251.202	314.538
810	1909.8	244.6970	312.817

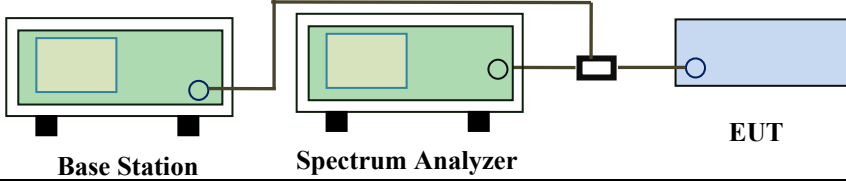
## Test Plots



## 6.6 Spurious Emissions at Antenna Terminals

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	November 13, 2015
Tested By :	Winnie Zhang

### Requirement(s):

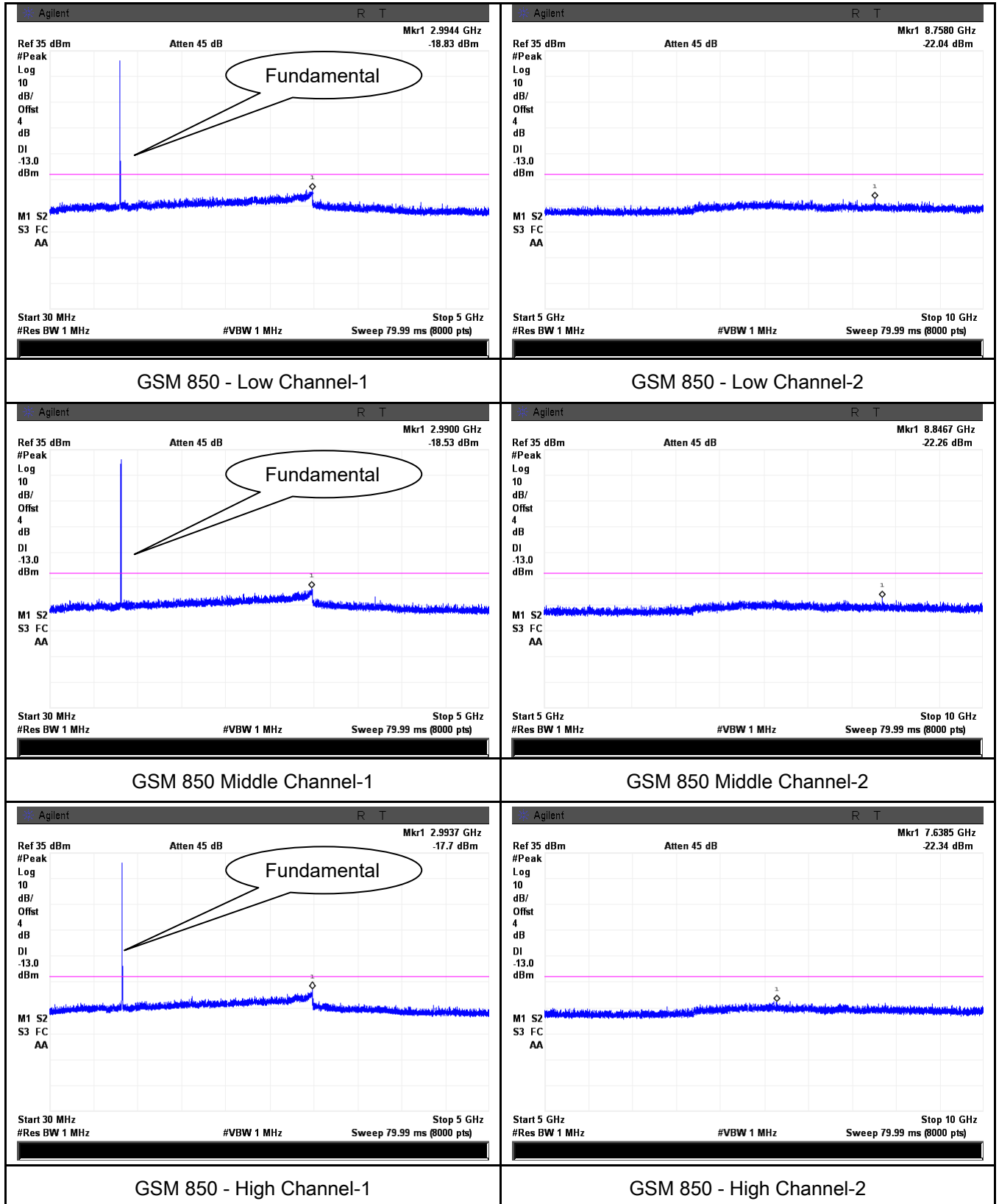
Spec	Item	Requirement	Applicable
§2.1051, §22.917(a)& §24.238(a)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Base Station      Spectrum Analyzer      EUT</p>		
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

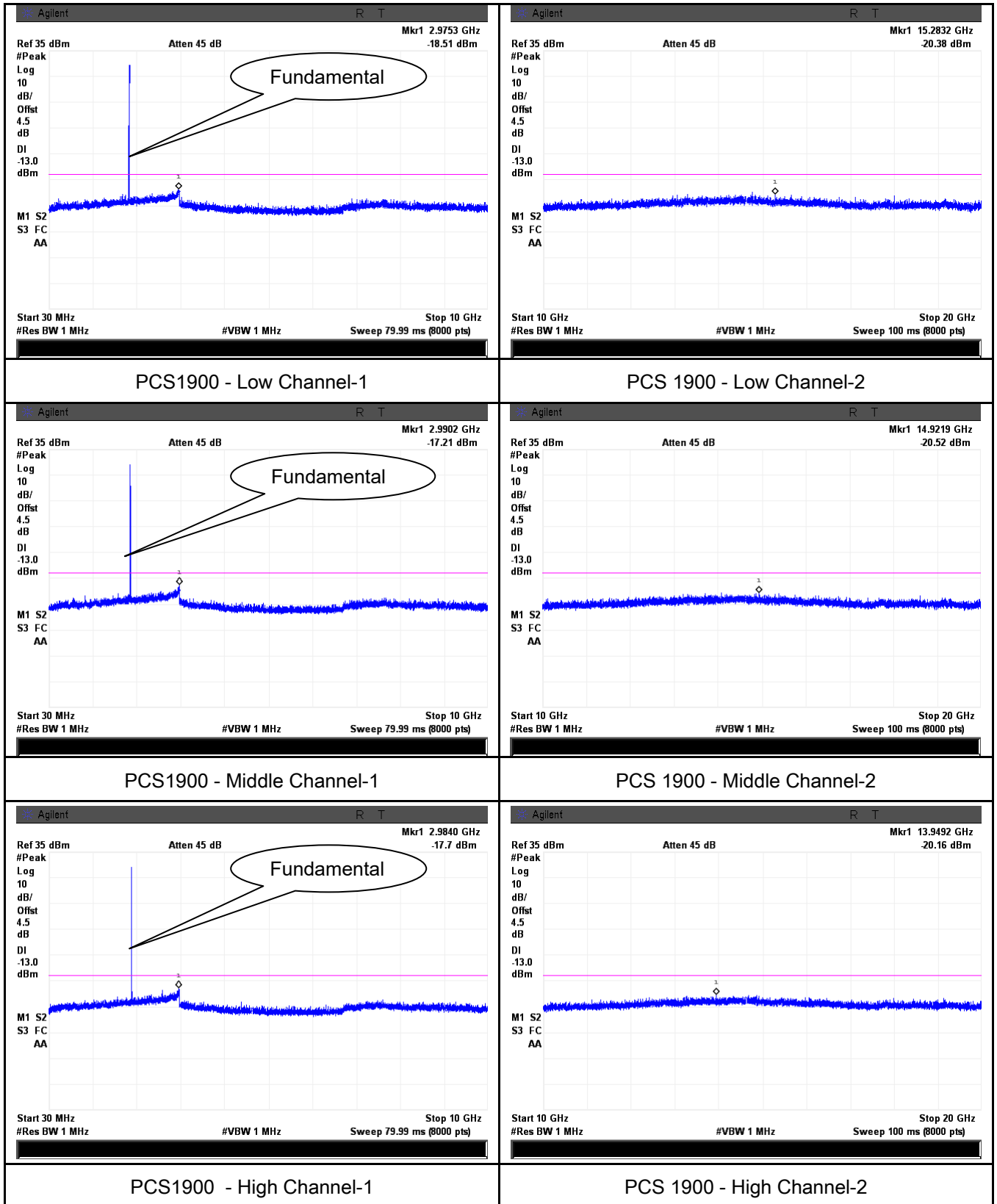
Test Plot    ☒ Yes (See below)      ☐ N/A

## Test Plots

### Cellular Band (Part 22H) result



## PCS Band (Part24E) result

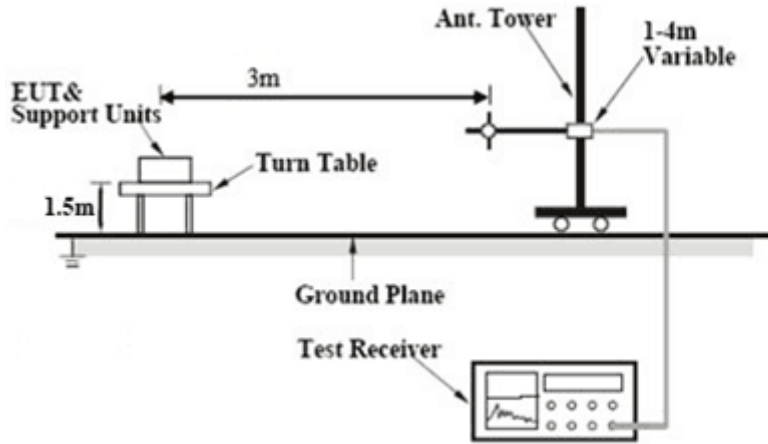


## 6.7 Spurious Radiated Emissions

Temperature	23°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	November 10, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §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	
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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	-42.53	V	7.95	0.78	-35.36	-13	-22.36
1648.4	-43.22	H	7.95	0.78	-36.05	-13	-23.05
425.3	-51.49	V	6.5	0.30	-45.29	-13	-32.29
791.8	-51.96	H	6.9	0.44	-45.50	-13	-32.50

#### 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	-42.65	V	7.95	0.78	-35.48	-13	-22.48
1673.2	-43.18	H	7.95	0.78	-36.01	-13	-23.01
425.6	-51.53	V	6.5	0.30	-45.33	-13	-32.33
791.5	-51.97	H	6.9	0.44	-45.51	-13	-32.51

#### 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	-42.57	V	7.95	0.78	-35.40	-13	-22.40
1697.6	-43.14	H	7.95	0.78	-35.97	-13	-22.97
425.2	-51.49	V	6.5	0.30	-45.29	-13	-32.29



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791.6	-51.88	H	6.9	0.44	-45.42	-13	-32.42
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## 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	-48.61	V	10.25	2.73	-41.09	-13	-28.09
3700.4	-49.27	H	10.25	2.73	-41.75	-13	-28.75
424.5	-53.15	V	6.5	0.30	-46.95	-13	-33.95
792.1	-53.56	H	6.9	0.44	-47.10	-13	-34.10

### 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	-48.58	V	10.25	2.73	-41.06	-13	-28.06
3760	-49.31	H	10.25	2.73	-41.79	-13	-28.79
424.8	-53.09	V	6.5	0.30	-46.89	-13	-33.89
792.5	-53.44	H	6.9	0.44	-46.98	-13	-33.98

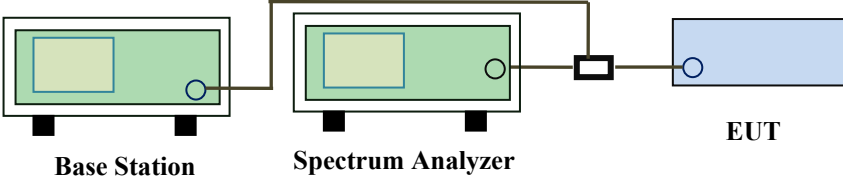
### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3819.6	-48.55	V	10.36	2.73	-40.92	-13	-27.92
3819.6	-49.27	H	10.36	2.73	-41.64	-13	-28.64
424.7	-53.12	V	6.5	0.30	-46.92	-13	-33.92
792.2	-53.38	H	6.9	0.44	-46.92	-13	-33.92

## 6.8 Band Edge

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	November 13, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §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 style="text-align: center;">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

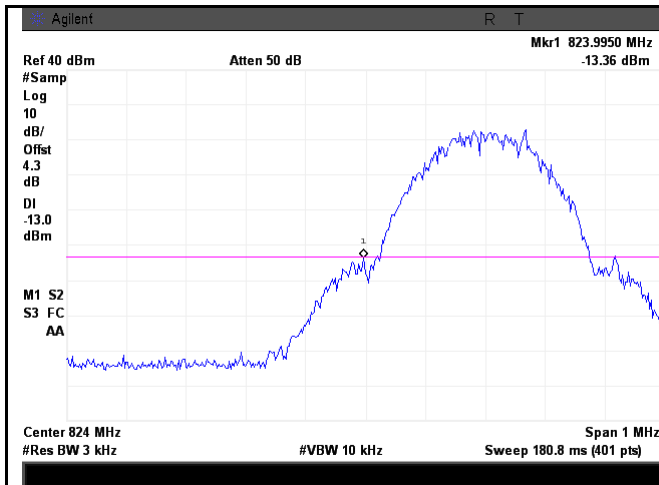
### Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9775	-13.36	-13
849.0200	-13.72	-13

### PCS Band (Part 24E) result

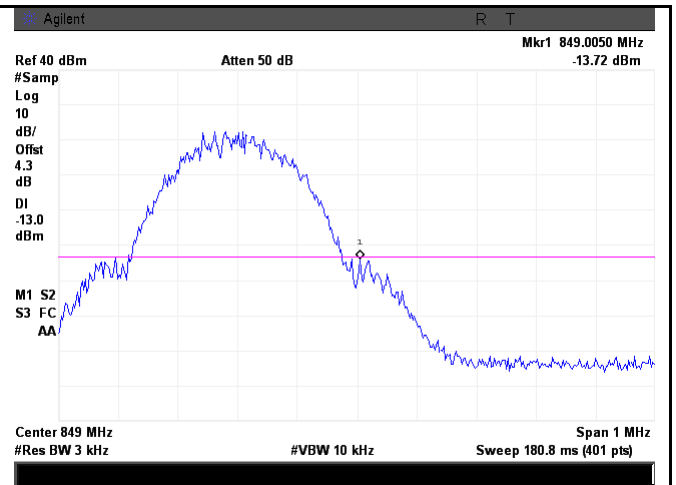
Frequency (MHz)	Emission (dBm)	Limit (dBm)
1850.0000	-15.52	-13
1910.0200	-15.76	-13

## Test Plots



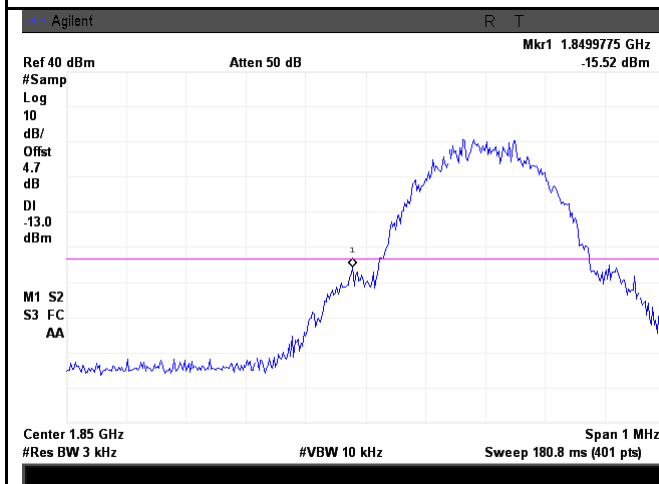
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.20/3)=4.0+0.3=4.3 dB



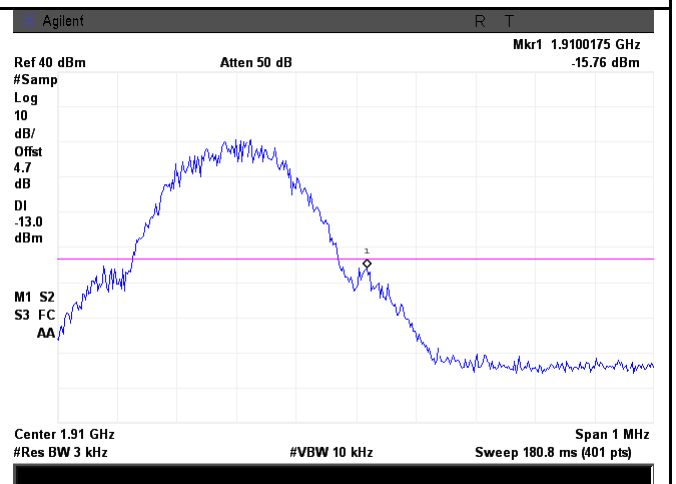
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
(3.21/3)=4.0+0.3=4.2 dB



PCS Band - Low Channel

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




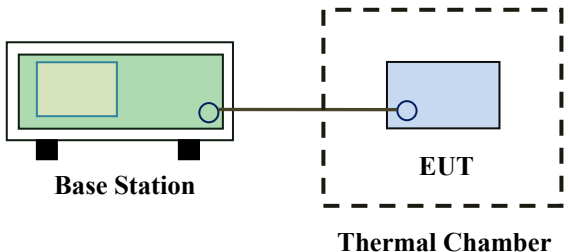
PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log  
(3.13/3)=4.5+0.2=4.7 dB

## 6.9 Frequency Stability

Temperature	23°C
Relative Humidity	52%
Atmospheric Pressure	1010mbar
Test date :	November 10, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §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 (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>450 to 512</td><td>2.5</td><td>5.0</td><td>5.0</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> <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 (ppm)	Mobile ≤ 3 watts (ppm)	25 to 50	20.0	20.0	50.0	50 to 450	5.0	5.0	50.0	450 to 512	2.5	5.0	5.0	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																																
450 to 512	2.5	5.0	5.0																																
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																																
Test setup	 <p style="text-align: center;">Base Station                      EUT Thermal Chamber</p>																																		

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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

### 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	16	0.0191	2.5
0		14	0.0167	2.5
10		18	0.0215	2.5
20		20	0.0239	2.5
30		17	0.0203	2.5
40		19	0.0227	2.5
50		15	0.0179	2.5
55		28	0.0335	2.5
25	4.2	22	0.0263	2.5
	3.5	24	0.0287	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	28	0.0149	2.5
0		27	0.0144	2.5
10		23	0.0122	2.5
20		20	0.0106	2.5
30		18	0.0096	2.5
40		12	0.0064	2.5
50		19	0.0101	2.5
55		14	0.0074	2.5
25	4.2	21	0.0112	2.5
	3.5	26	0.0138	2.5

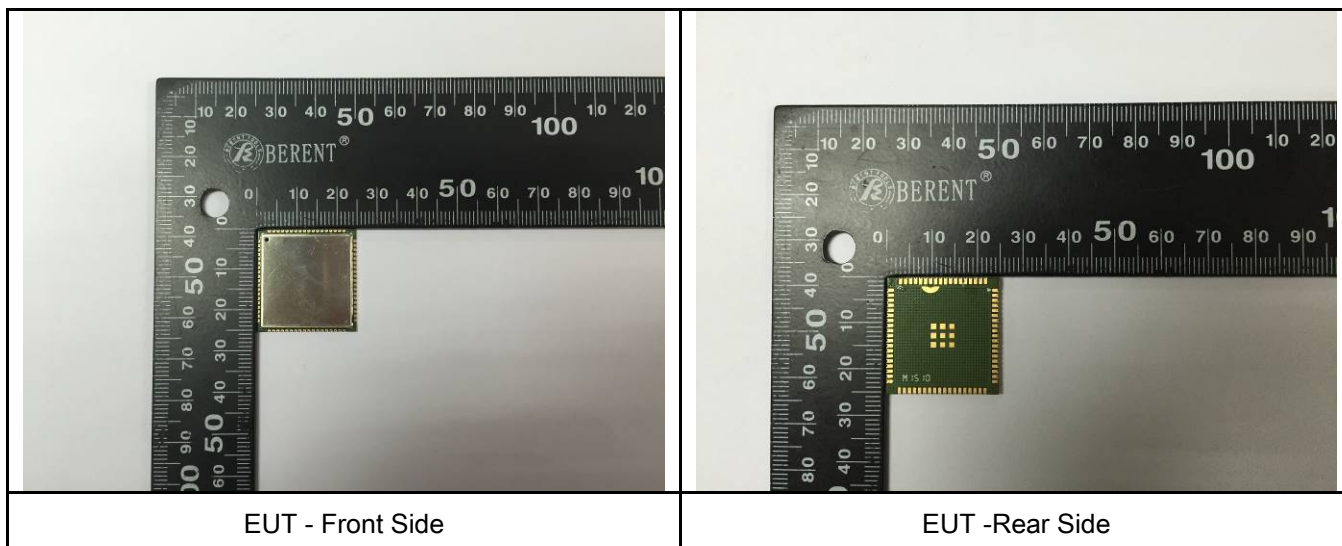


## Annex A. TEST INSTRUMENT

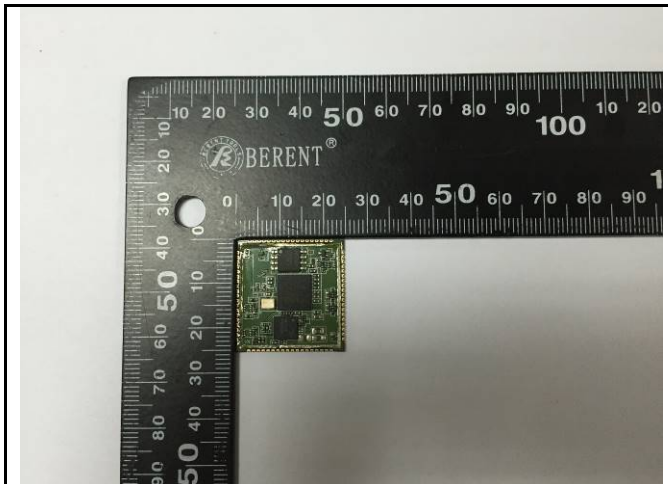
Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/16/2015	09/15/2016	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/01/2015	08/31/2016	<input checked="" type="checkbox"/>
Universal Radio Communication 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"/>
<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	03/25/2015	03/24/2016	<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"/>
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

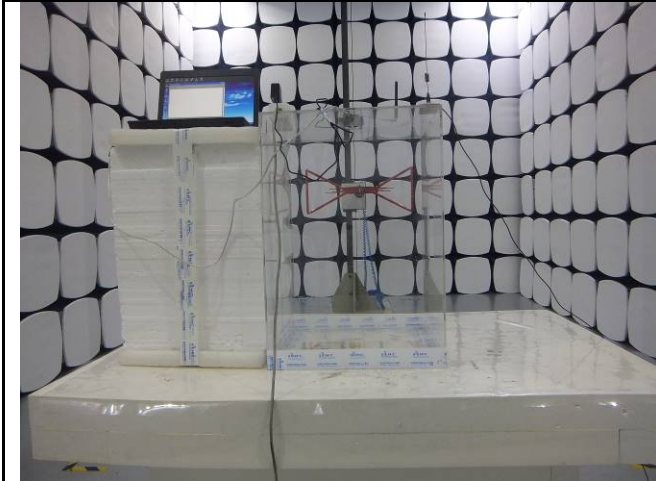


**Annex B.ii. Photograph: EUT Internal Photo**

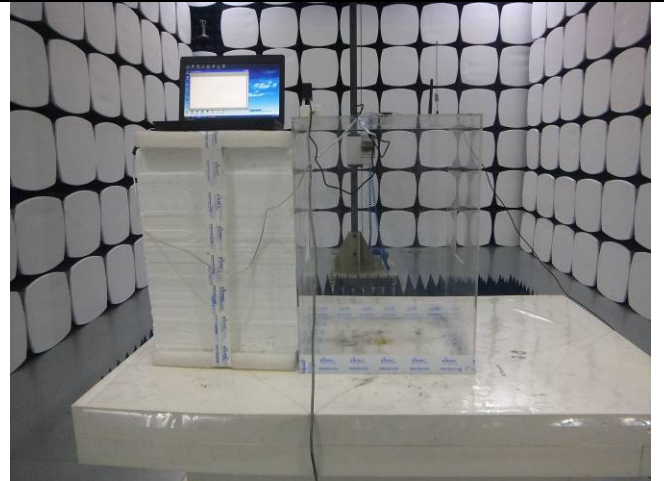


EUT - No sheilding- Front Side

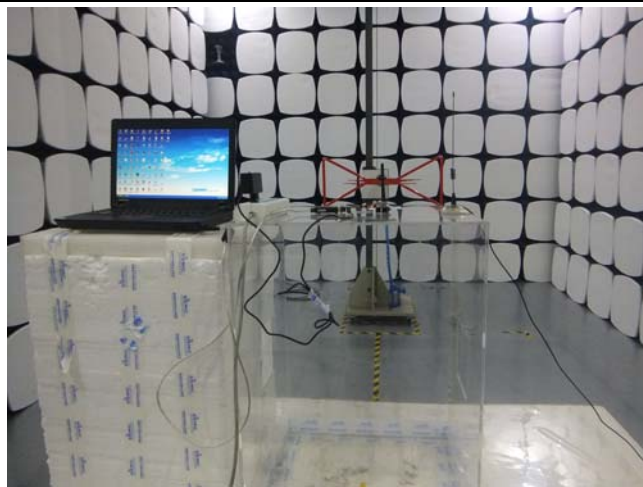
**Annex B.iii. Photograph: Test Setup Photo**



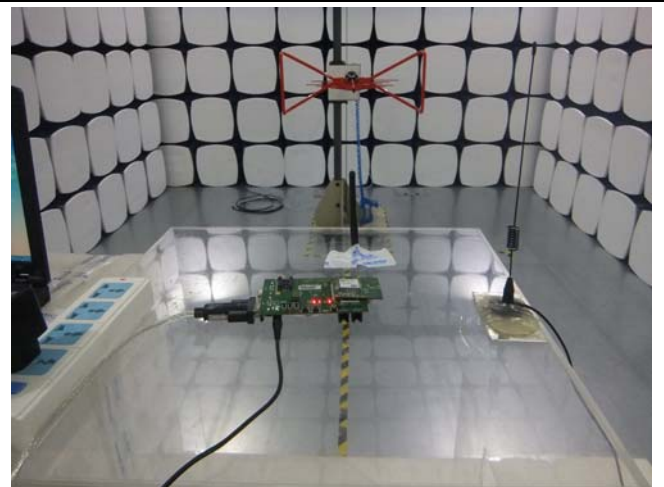
**Radiated Spurious Emissions Test Setup  
Below 1GHz - 1**



**Radiated Spurious Emissions Test Setup  
Above 1GHz**



**Radiated Spurious Emissions Test Setup  
Below 1GHz - 2**

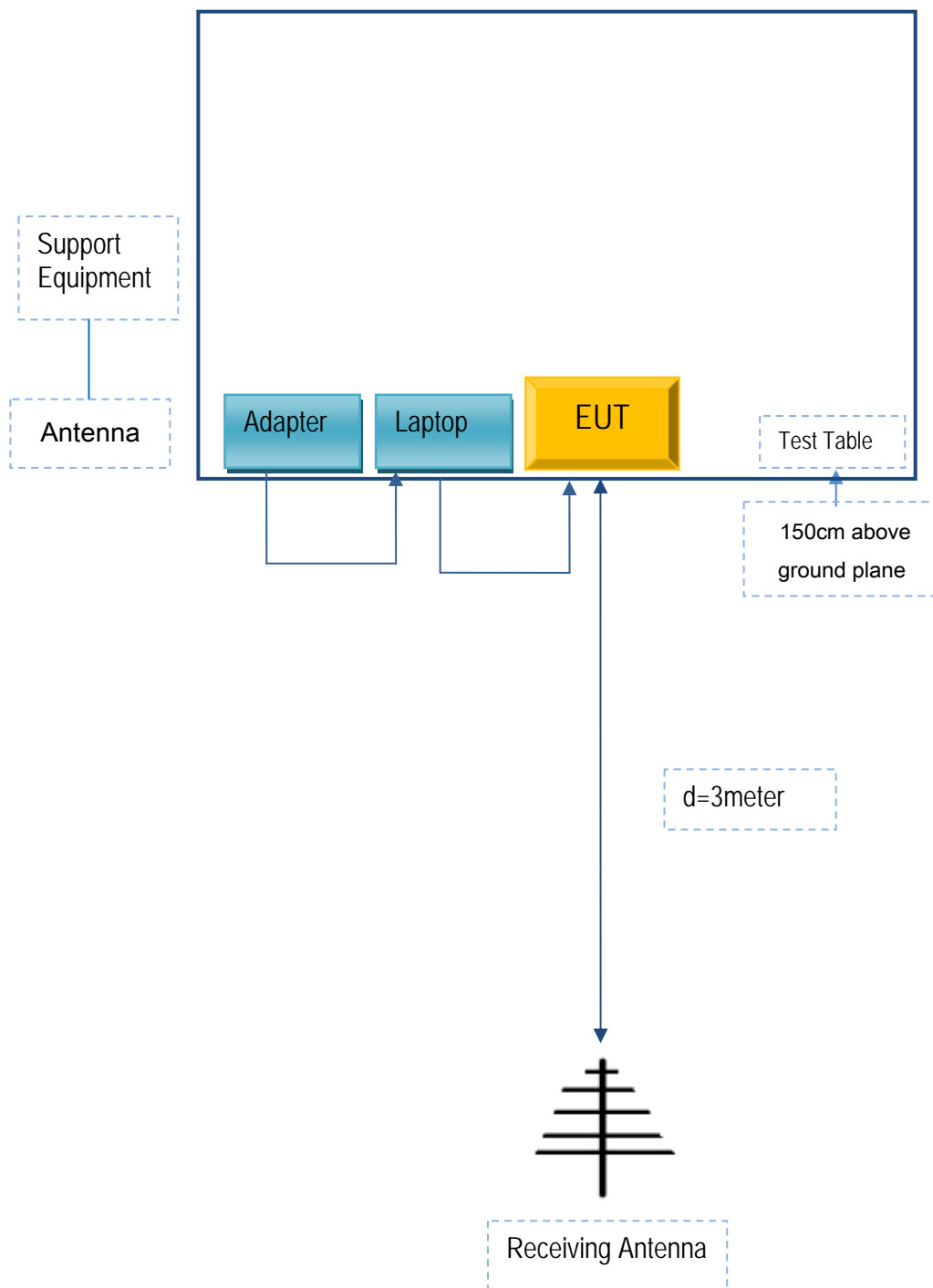


**Radiated Spurious Emissions Test Setup Above  
1GHz - 3**

## 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.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
Lenovo	Lenovo Laptop	E40& 0579A52	N/A	N/A

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## Annex C.ii. EUT OPERATING CONKITIONS

N/A

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

Please see attachment



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## Annex E. DECLARATION OF SIMILARITY

N/A