

# RF TEST REPORT



Report No.: 15070741-FCC-R

Supersede Report No.: N/A

Applicant	Shenzhen Neoway Technology Co.,Ltd	
Product Name	GPRS Module	
Model No.	M590	
Serial No.	N/A	
Test Standard	FCC Part 22(H):2014 ;FCC Part 24(E):2014; ANSI/TIAC603 D: 2013	
Test Date	August 27 to August 31, 2015	
Issue Date	September 09, 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	
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Issued by:

**SIEMIC (SHENZHEN-CHINA) LABORATORIES**

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## Laboratories Introduction

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### Accreditations for Conformity Assessment

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

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## 1. Report Revision History

Report No.	Report Version	Description	Issue Date
15070741-FCC-R	NONE	Original	September 09, 2015

## 2. Customer information

Applicant Name	Shenzhen Neoway Technology Co.,Ltd
Applicant Add	4F-2#,Lian Jian Science & Industry Park,Huarong Road,Dalang Street,Longhua New Disrrict,Shenzhen City,Guandong Province P.R.China
Manufacturer	Shenzhen Neoway Technology Co.,Ltd
Manufacturer Add	4F-2#,Lian Jian Science & Industry Park,Huarong Road,Dalang Street,Longhua New Disrrict,Shenzhen City,Guandong Province P.R.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:	GPRS Module
Main Model:	M590
Serial Model:	N/A
Date EUT received:	August 27, 2015
Test Date(s):	August 27 to August 31, 2015
Equipment Category :	PCB
Antenna Gain:	GSM850: 1.0dBi PCS1900: 0.6dBi
Type of Modulation:	GSM / GPRS: GMSK EGPRS: 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: 31.62dBm PCS1900: 29.12dBm
ERP/EIRP:	GSM850: 24.09dBm / ERP PCS1900: 21.77 dBm / EIRP
Number of Channels:	GSM 850: 124CH PCS1900: 299CH
Port:	N/A
Input Power:	Spec: DC 3.9V
Trade Name :	NEOWAY

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

FCC ID:                                      PJ7M590

## 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); § 27.50(c.10) ; § 27.50(d.4)	RF Output Power	Compliance
§ 24.232 (d) ; § 27.50(d)	Peak-Average Ratio	Compliance
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049; § 22.905; § 22.917; § 24.238; § 27.53(a.5)	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a); § 27.53(h)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a); § 27.53(h)	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a); § 27.53(h)	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; § 27.5(h); § 27.54	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
-	-	-



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## 6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

### 6.1 MPE Evaluation

Test Result: Pass

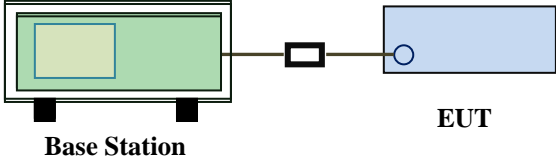
The EUT is a mobile device, thus requires MPE evaluation;  
Please refer to MPE Evaluation Report: 15070741-FCC-H.

## 6.2 RF Output Power

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 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"/>
§27.50 (c)	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 = 10 log (TX power in Watts/0.001) – the absolute level</li> <li>- Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts).</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	31.11	31.38	<b>31.62</b>	32±1	<b>29.12</b>	29.08	29.11	29±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	31.09	31.36	31.59	32±1	29.1	29.06	29.07	29±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	30.09	30.33	30.68	30±1	28.57	28.49	28.53	28±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	26.98	27.07	27.38	27±1	25.79	25.68	25.61	26±1
EGPRS Multi-Slot Class 8 (1 uplink) GMSK MCS1	31.08	31.32	31.54	32±1	29.11	29.07	29.08	29±1
EGPRS Multi-Slot Class 10 (2 uplink) GMSK MCS1	30.07	30.29	30.58	30±1	28.59	28.52	28.51	28±1
EGPRS Multi-Slot Class 12 (4 uplink) GMSK MCS1	27.13	27.35	27.51	27±1	25.62	25.54	25.53	26±1

**Remark :**

GPRS, CS1 coding scheme.

EGPRS, MCS1 coding scheme.

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

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

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

**Note: Since GSM mode has higher power, so the test items below were not performed to GPRS and EGPRS 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	17.49	V	6.8	0.53	22.86	38.45
824.2	19.16	H	6.8	0.53	23.51	38.45
836.6	17.65	V	6.8	0.53	22.97	38.45
836.6	18.94	H	6.8	0.53	23.84	38.45
848.8	17.21	V	6.9	0.53	22.73	38.45
848.8	19.55	H	6.9	0.53	<b>24.09</b>	38.45

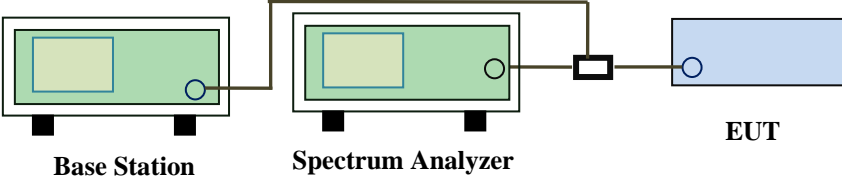
### EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	14.15	V	7.88	0.85	21.59	33
1850.2	15.41	H	7.88	0.85	20.71	33
1880	14.37	V	7.88	0.85	21.56	33
1880	15.62	H	7.88	0.85	20.93	33
1909.8	14.32	V	7.86	0.85	<b>21.77</b>	33
1909.8	15.97	H	7.86	0.85	20.85	33

### 6.3 Peak-Average Ratio

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	Item	Requirement	Applicable
§24.232(d) § 27.50(d)	a)	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Base Station      Spectrum Analyzer      EUT</p>		
Test Procedure	<p><b>According with KDB 971168</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

**GSM 1900 PK-AV POWER(PART 22H)**

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.45	29.12	1.33
1880	30.67	29.08	1.59
1909.8	30.79	29.11	1.68

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## 6.4 Modulation Characteristic

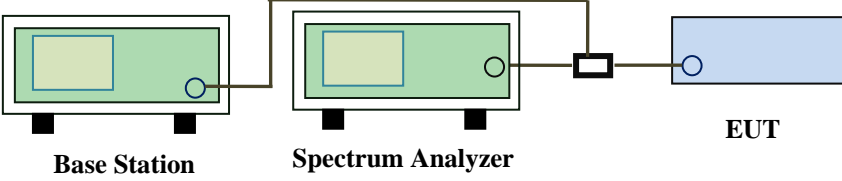
According to FCC § 2.1047(d), Part 22H, 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.



## 6.5 Occupied Bandwidth

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

### Requirement(s):

Spec	Item	Requirement	Applicable
§2.1049, §22.917, §22.905 §24.238 §27.53(a)	a)	99% Occupied Bandwidth(kHz)	<input checked="" type="checkbox"/>
	b)	26 dB Bandwidth(kHz)	<input checked="" type="checkbox"/>
Test Setup	 <p>The diagram illustrates the test setup. On the left is a green box labeled 'Base Station'. A line connects it to a central green box labeled 'Spectrum Analyzer'. From the Spectrum Analyzer, a line goes to a small black box representing a power divider. From the power divider, two lines branch out: one goes back to the Base Station and the other goes to a blue box on the right labeled '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

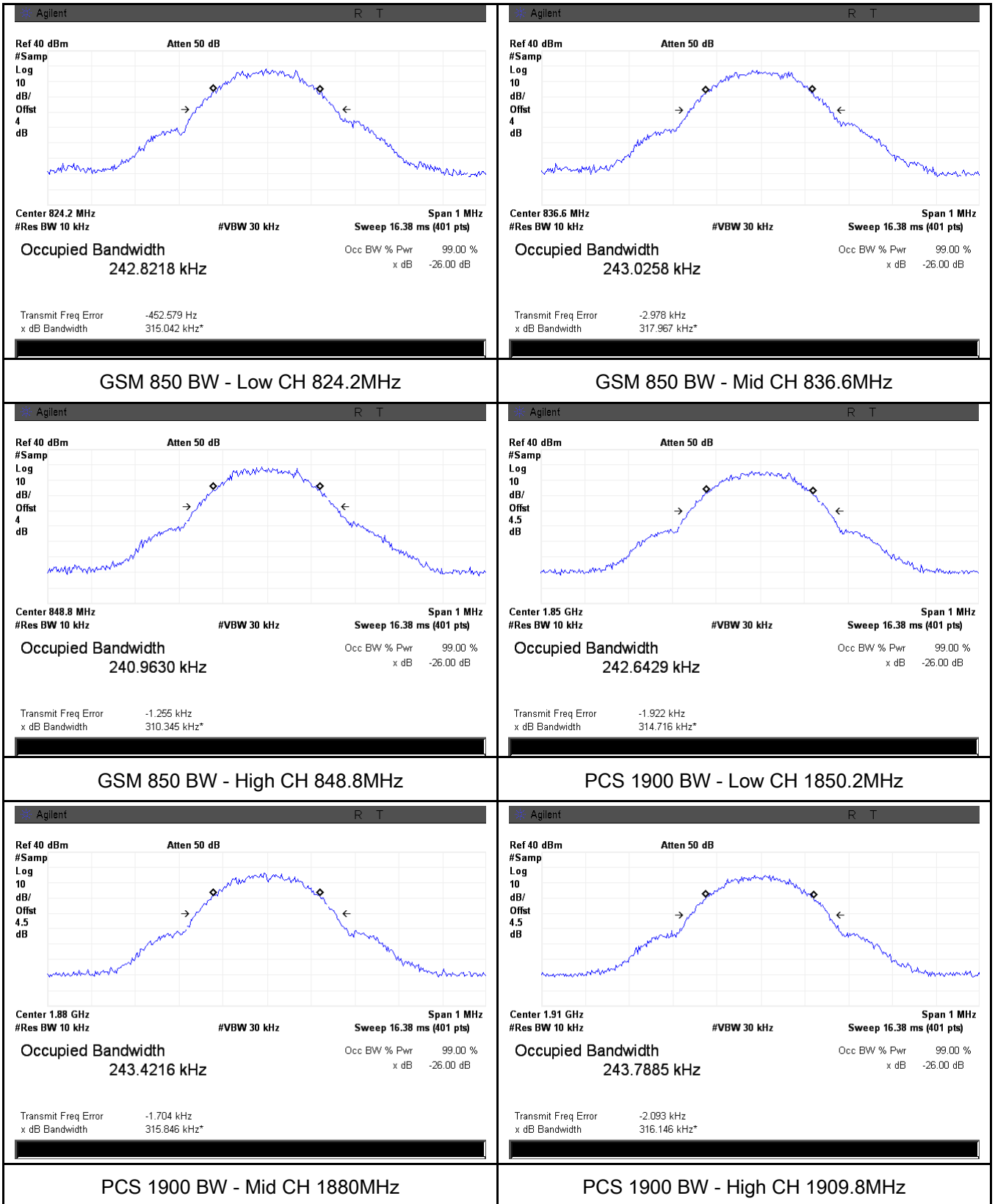
**Cellular Band (Part 22H) result**

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	242.8218	315.042
190	836.6	243.0258	317.967
251	848.8	240.9630	310.345

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

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	242.6429	314.716
661	1880.0	243.4216	315.846
810	1909.8	243.7885	316.146

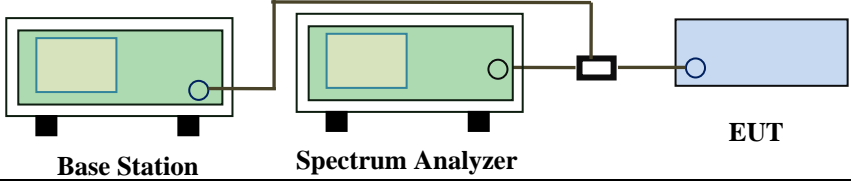
### Test Plots



## 6.6 Spurious Emissions at Antenna Terminals

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

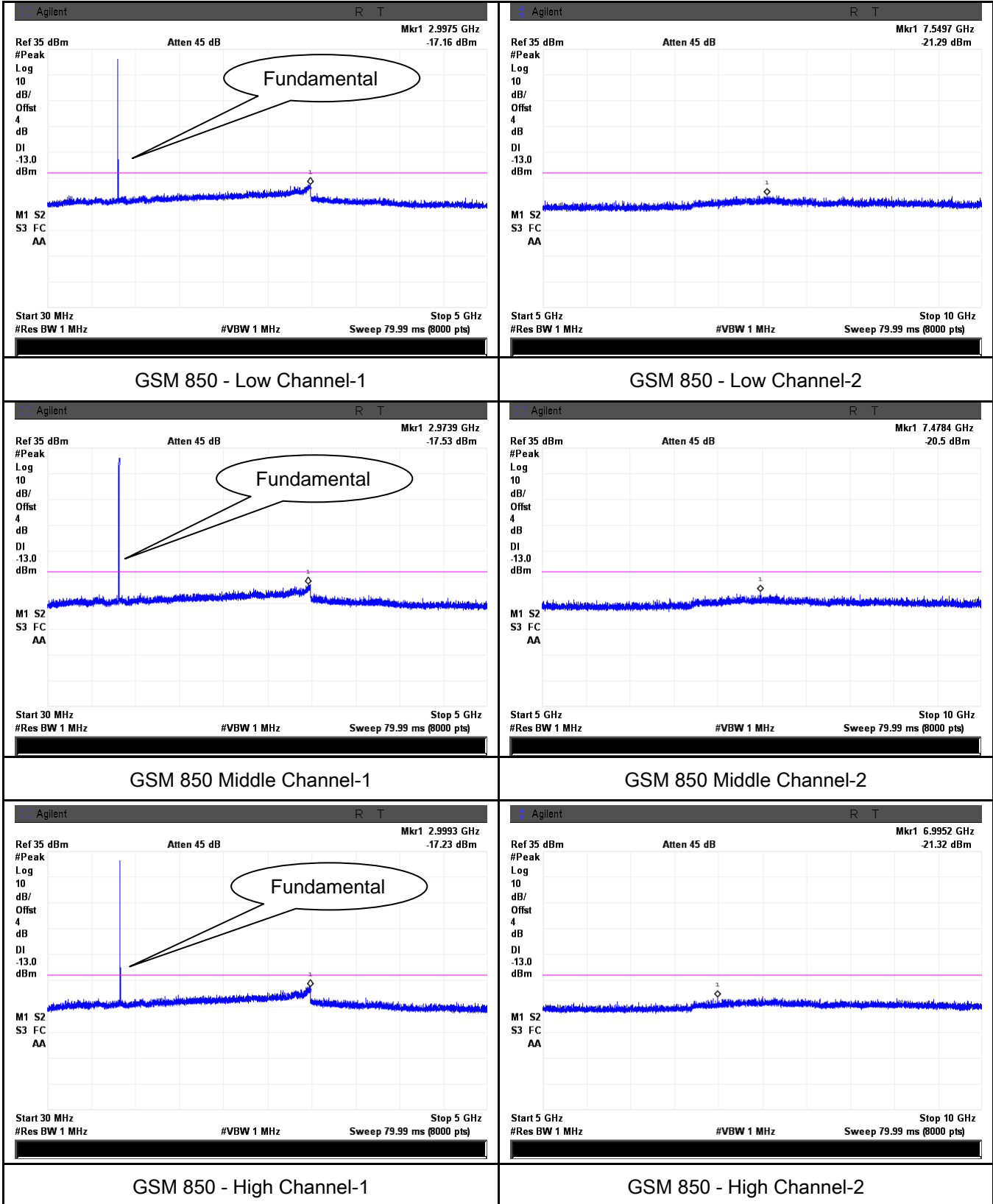
### Requirement(s):

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	 <p>The diagram illustrates the test setup. On the left is a green box labeled 'Base Station'. In the middle is another green box labeled 'Spectrum Analyzer'. On the right is a blue box labeled 'EUT'. A power divider is connected between the Spectrum Analyzer and the EUT. The Base Station is connected to the Spectrum Analyzer.</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		

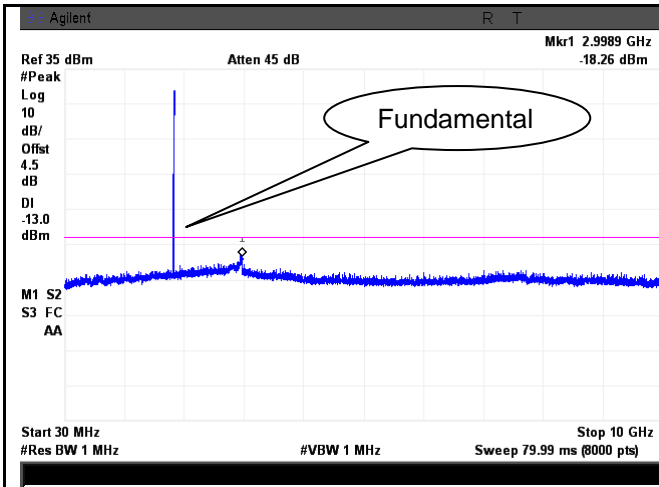
Test Data     Yes       N/A  
 Test Plot     Yes (See below)       N/A

**Test Plots**

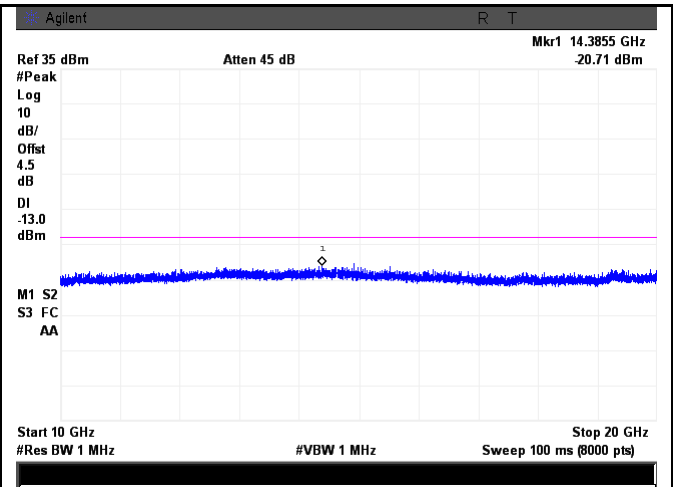
**Cellular Band (Part 22H) result**



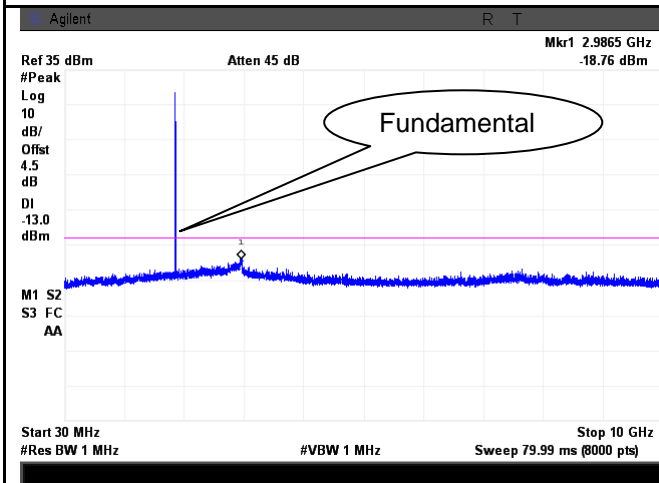
**PCS Band (Part24E) result**



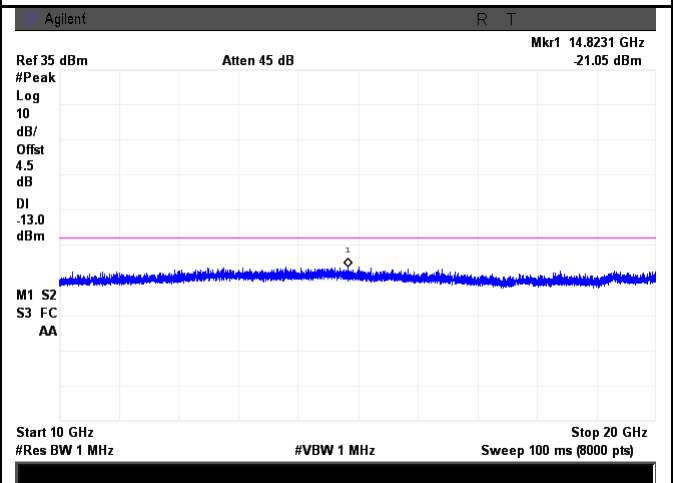
PCS1900 - Low Channel-1



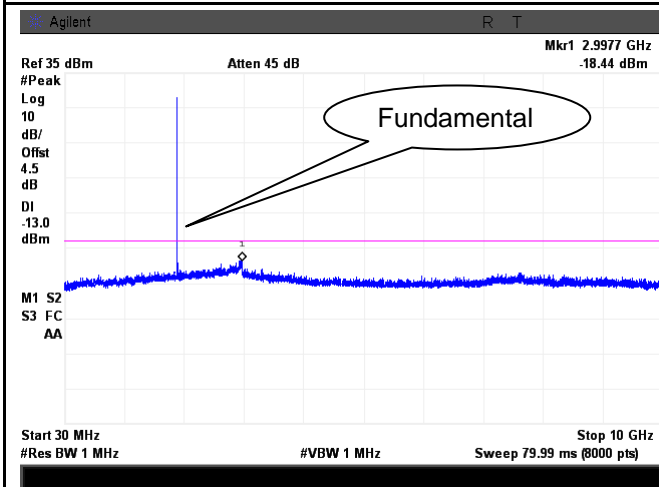
PCS 1900 - Low Channel-2



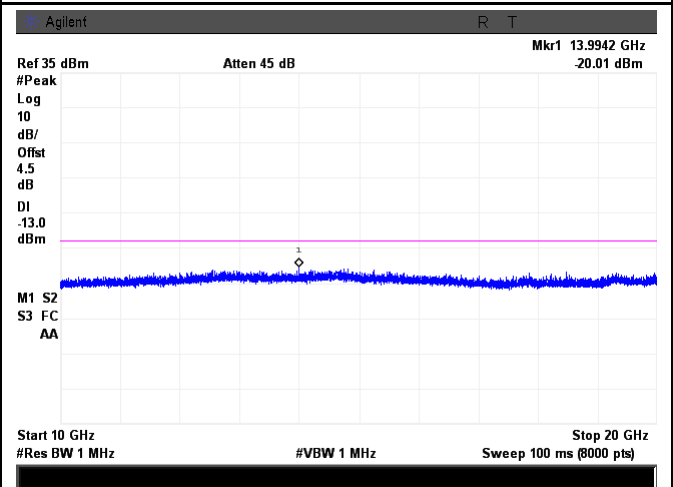
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



PCS1900 - High Channel-1



PCS 1900 - High Channel-2

## 6.7 Spurious Radiated Emissions

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

### 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	
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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. 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>
----------------	---

Remark	
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Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
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Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

### Cellular Band (Part 22H) result

#### Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1648.4	-43.85	V	7.95	0.78	-36.68	-13	-23.68
1648.4	-44.12	H	7.95	0.78	-36.95	-13	-23.95
338.4	-52.77	V	6.60	0.26	-46.43	-13	-33.43
143.3	-48.23	H	0.70	0.19	-47.72	-13	-34.72

#### Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1673.2	-43.59	V	7.95	0.78	-36.42	-13	-23.42
1673.2	-44.36	H	7.95	0.78	-37.19	-13	-24.19
338.9	-52.18	V	6.60	0.26	-45.84	-13	-32.84
143.5	-48.69	H	0.70	0.19	-48.18	-13	-35.18

#### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1697.6	-43.51	V	7.95	0.78	-36.34	-13	-23.34
1697.6	-44.85	H	7.95	0.78	-37.68	-13	-24.68
338.1	-52.63	V	6.60	0.26	-46.29	-13	-33.29
143.7	-48.57	H	0.70	0.19	-48.06	-13	-35.06



## 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	-48.36	V	10.25	2.73	-40.84	-13	-27.84
3700.4	-49.21	H	10.25	2.73	-41.69	-13	-28.69
339.2	-53.45	V	6.60	0.26	-47.11	-13	-34.11
142.3	-49.28	H	0.70	0.19	-48.77	-13	-35.77

### 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	-48.31	V	10.25	2.73	-40.79	-13	-27.79
3760	-49.57	H	10.25	2.73	-42.05	-13	-29.05
339.5	-53.88	V	6.60	0.26	-47.54	-13	-34.54
142.8	-49.24	H	0.70	0.19	-48.73	-13	-35.73

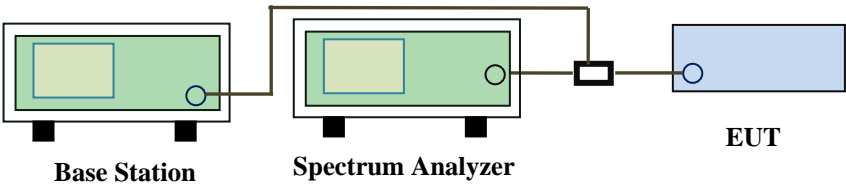
### High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3819.6	-48.57	V	10.36	2.73	-40.94	-13	-27.94
3819.6	-49.72	H	10.36	2.73	-42.09	-13	-29.09
339.6	-53.46	V	6.60	0.26	-47.12	-13	-34.12
142.7	-49.83	H	0.70	0.19	-49.32	-13	-36.32

## 6.8 Band Edge

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

### 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	 <p>The diagram shows a Base Station (green box) connected to a Spectrum Analyzer (green box) and an EUT (blue box). A power divider is used to connect the Spectrum Analyzer and the EUT to the Base Station.</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

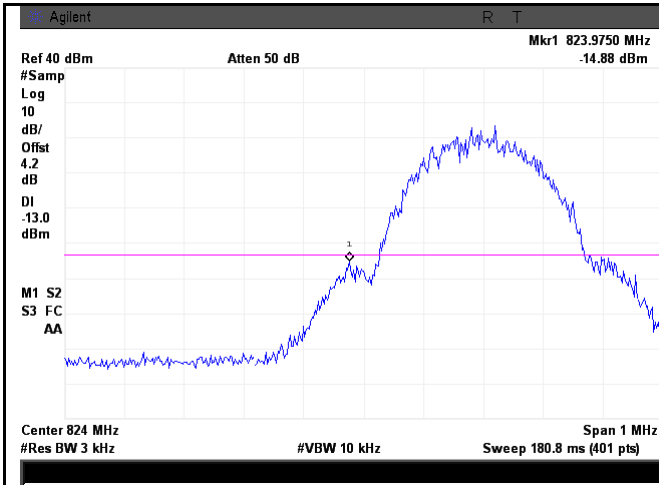
**Cellular Band (Part 22H)**

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9950	-14.88	-13
849.0175	-14.47	-13

**PCS Band (Part 24E)**

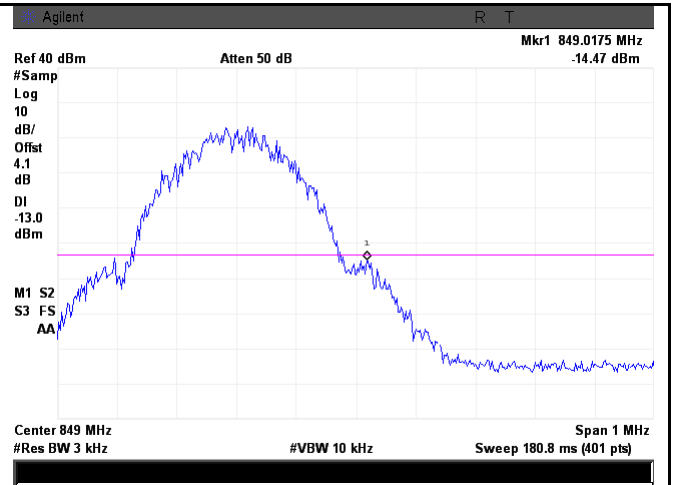
Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9950	-16.67	-13
1910.0175	-16.73	-13

**Test Plots**



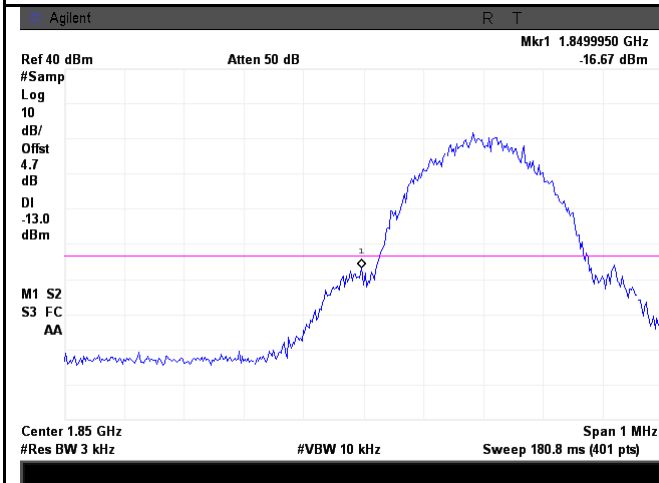
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log  
 (3.15/3)=4.0+0.2=4.2dB



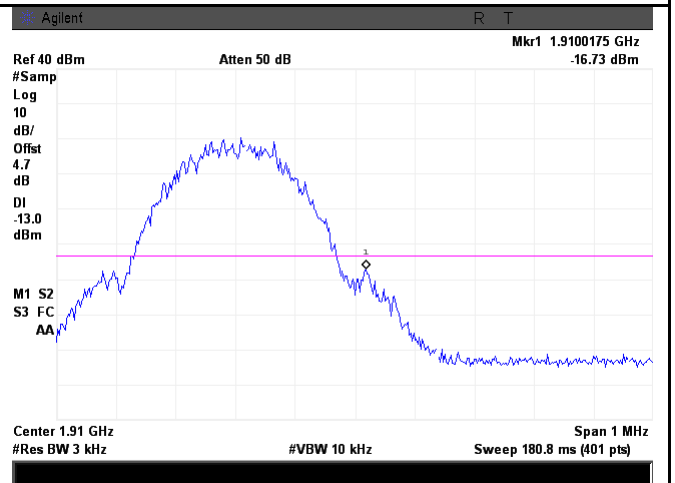
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log  
 (3.10/3)=4.0+0.1=4.1dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log  
 (3.15/3)=4.5+0.2=4.7dB



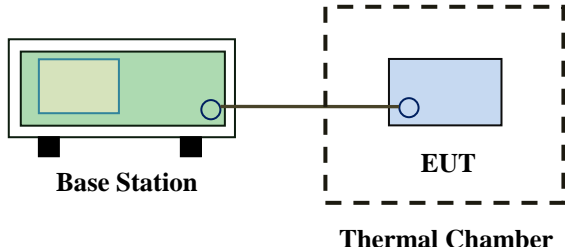
PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log  
 (3.16/3)=4.5+0.2=4.7dB

## 6.9 Frequency Stability

Temperature	25°C
Relative Humidity	52%
Atmospheric Pressure	1028mbar
Test date :	August 28, 2015
Tested By :	Winnie Zhang

### 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.																																			
 <p style="text-align: center;"> <span>Base Station</span> <span style="margin-left: 150px;">EUT</span>  <span style="margin-left: 150px;">Thermal Chamber</span> </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	14	0.0167	2.5
0		18	0.0215	2.5
10		15	0.0179	2.5
20		19	0.0227	2.5
30		20	0.0239	2.5
40		13	0.0155	2.5
50		22	0.0263	2.5
55		23	0.0275	2.5
25	4.2	21	0.0251	2.5
	3.5	25	0.0299	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	27	0.0144	2.5
0		22	0.0117	2.5
10		21	0.0112	2.5
20		16	0.0085	2.5
30		15	0.0080	2.5
40		11	0.0059	2.5
50		19	0.0101	2.5
55		18	0.0096	2.5
25	4.2	22	0.0117	2.5
	3.5	23	0.0122	2.5

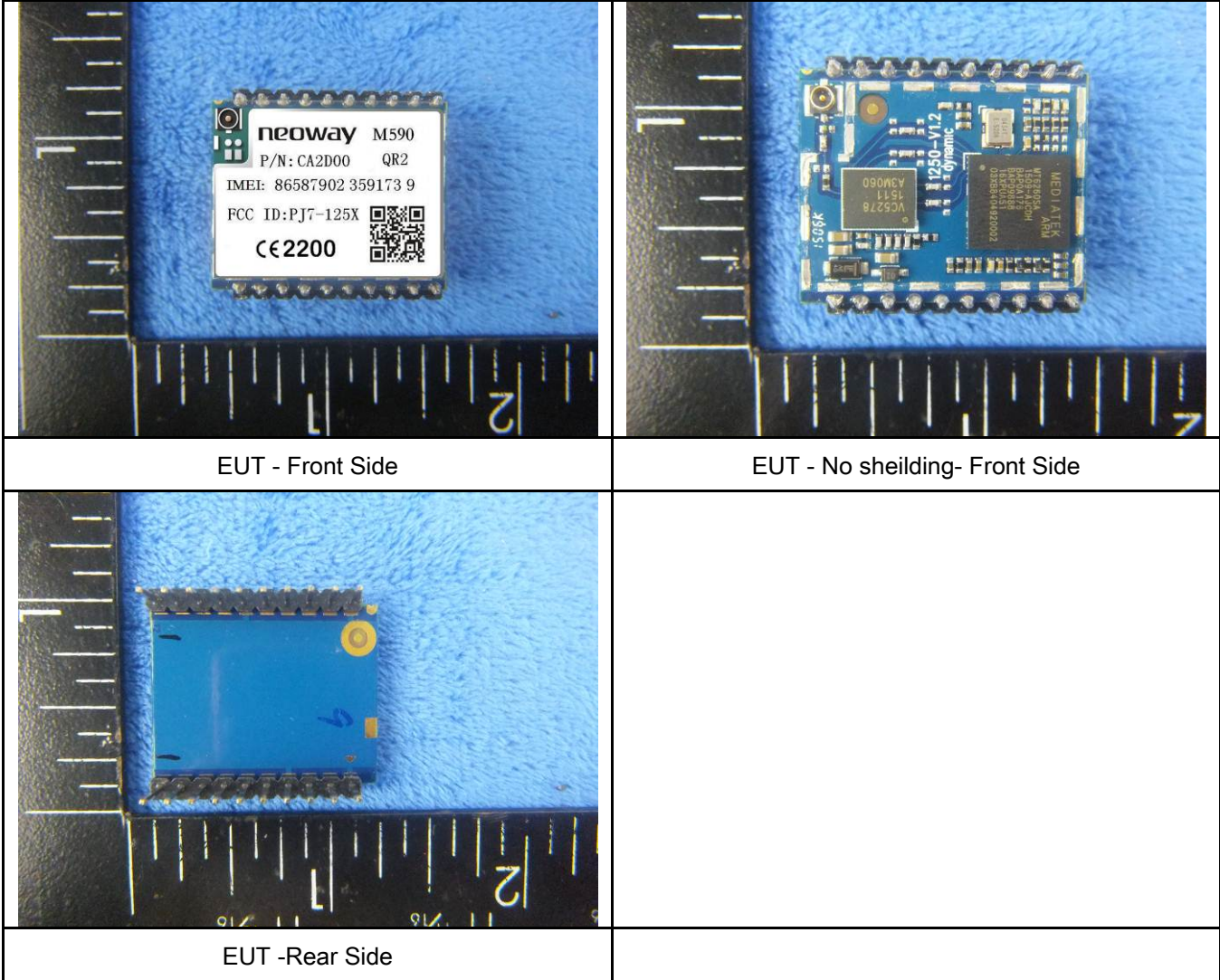
## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/17/2014	09/16/2015	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/26/2014	09/25/2015	<input checked="" type="checkbox"/>
Temperature/Humidity Chamber	UHL-270	001	10/10/2014	10/09/2015	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/02/2014	09/01/2015	<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	09/22/2014	09/21/2015	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/22/2014	09/21/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/25/2014	09/24/2015	<input checked="" type="checkbox"/>
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/18/2014	09/17/2015	<input checked="" type="checkbox"/>
Tunable Notch Filter	3NF-800/1000-S	AA4	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>
Tunable Notch Filter	3NF-1000/2000-S	AM 4	09/02/2014	09/01/2015	<input checked="" type="checkbox"/>

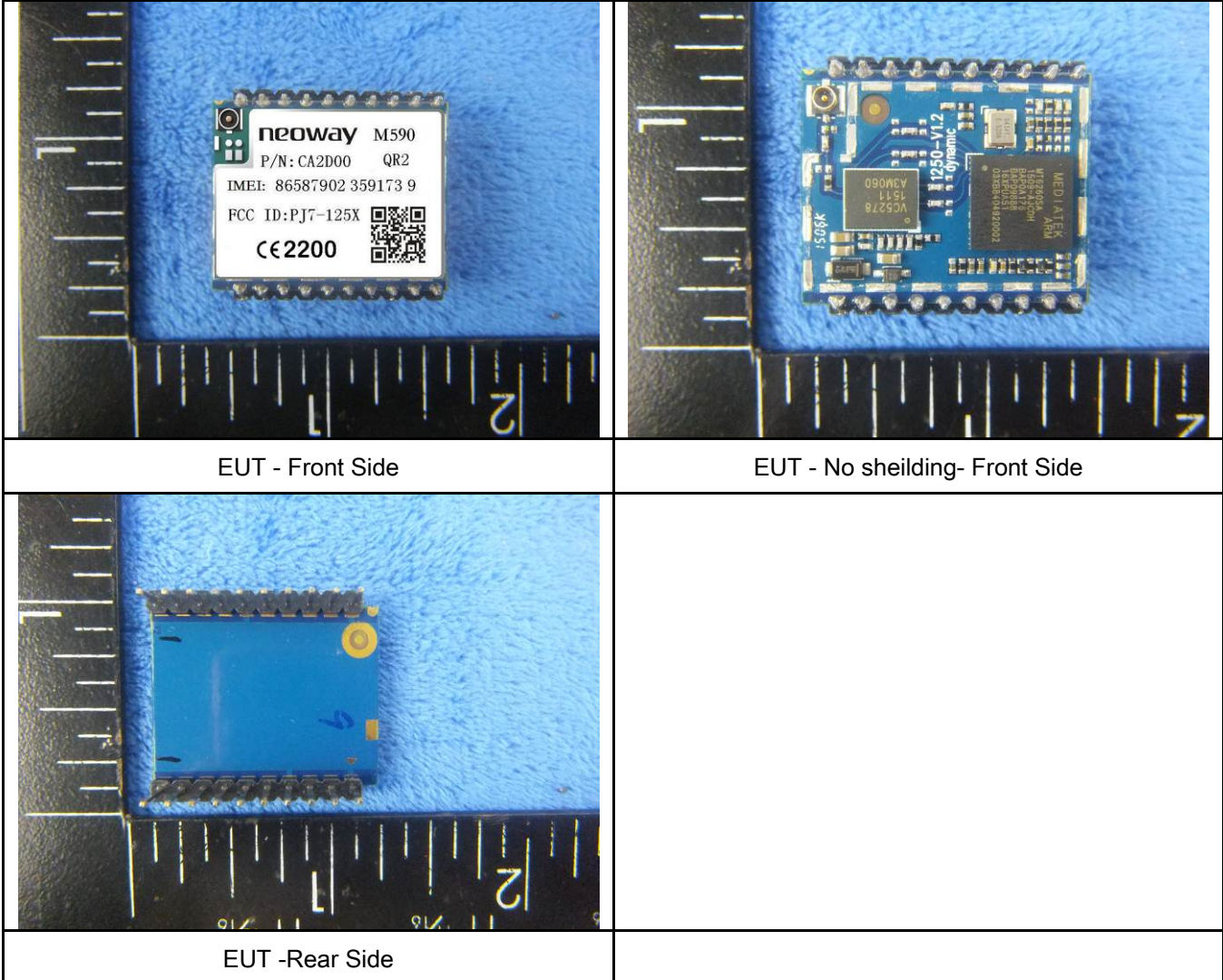


**Annex B. EUT And Test Setup Photographs**

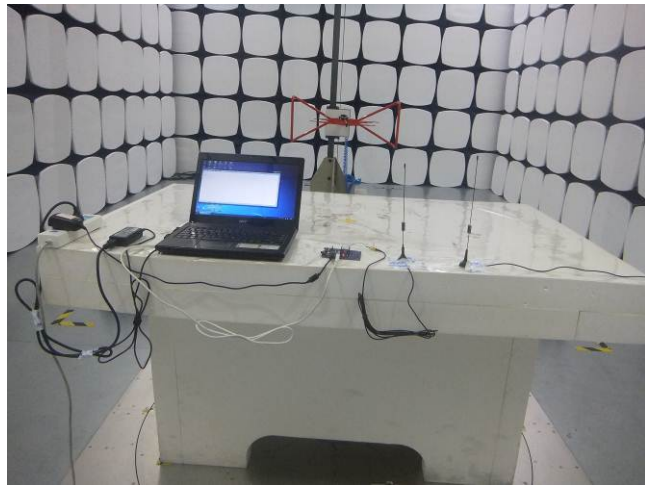
**Annex B.i. Photograph: EUT External Photo**



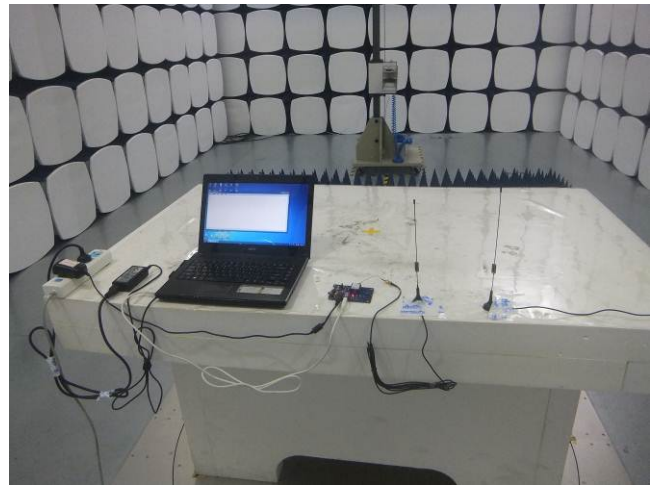
**Annex B.ii. Photograph: EUT Internal Photo**



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



Radiated Spurious Emissions Test Setup Below 1GHz

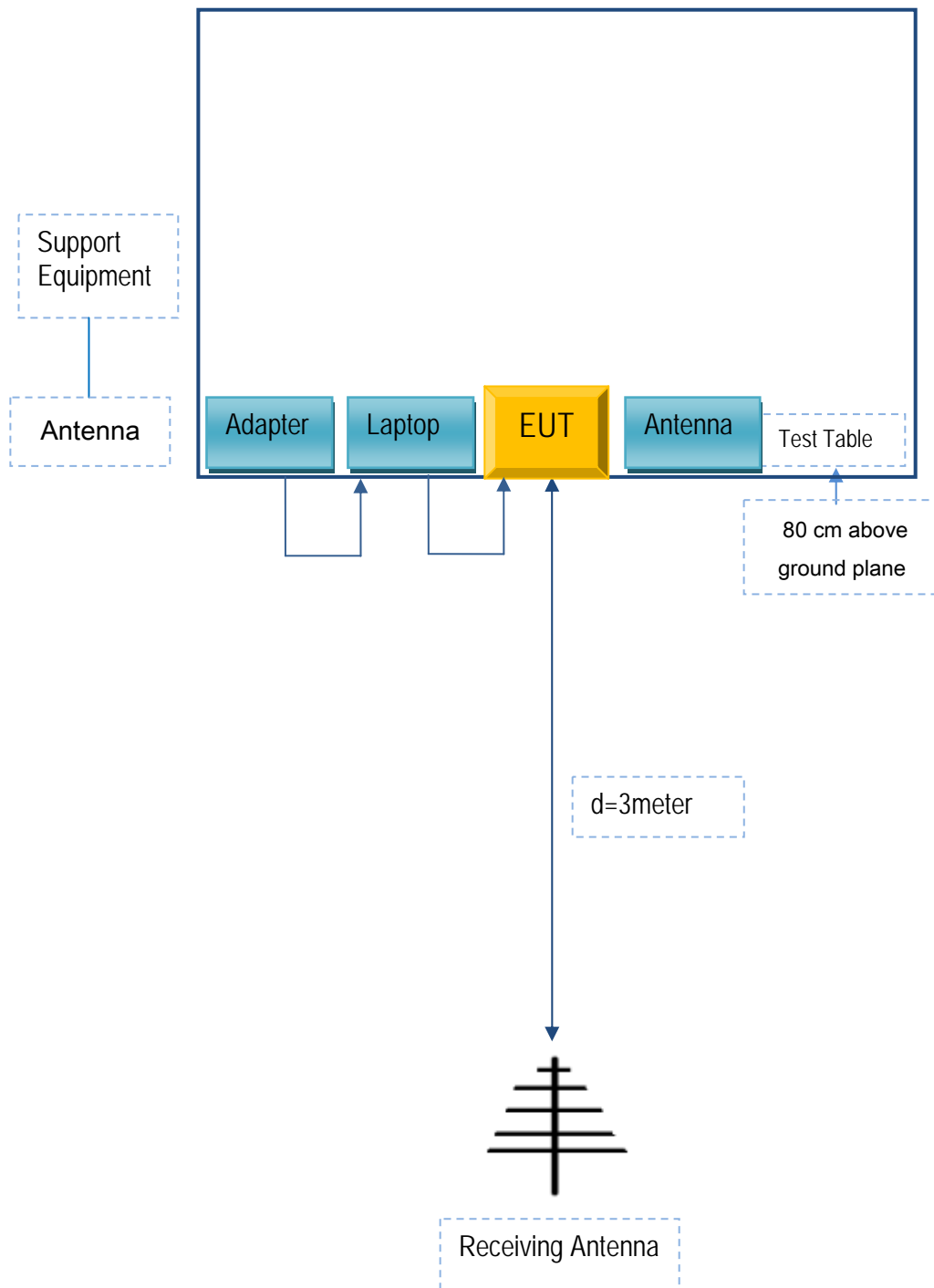


Radiated Spurious Emissions Test Setup Above  
1GHz

## Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

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

#### Block Configuration Diagram for Radiated Emissions



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**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