

LTE band IV - Low Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(147/100)=4.5+1.7=6.2 dB



LTE band IV - High Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(148/100)=4.5+1.7=6.2 dB



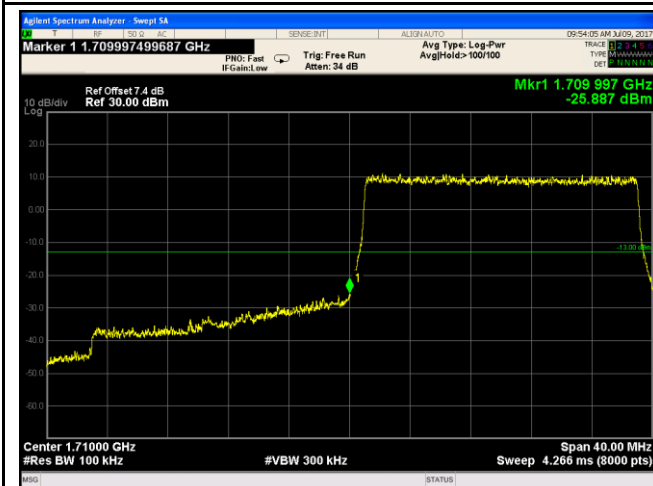
LTE band IV - Low Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(148/100)=4.5+1.7=6.2 dB

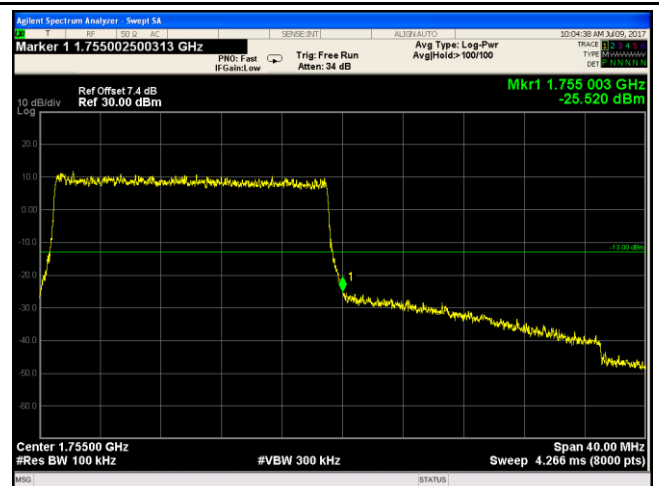


LTE band IV - High Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(148/100)=4.5+1.7=6.2 dB

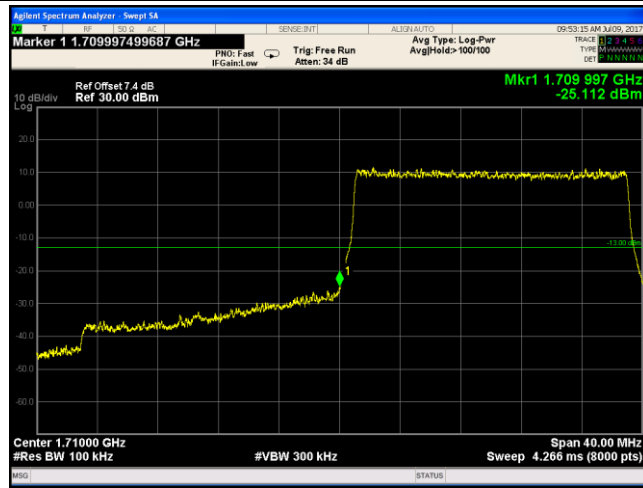


LTE band IV - Low Channel QPSK-20



LTE band IV - High Channel QPSK-20

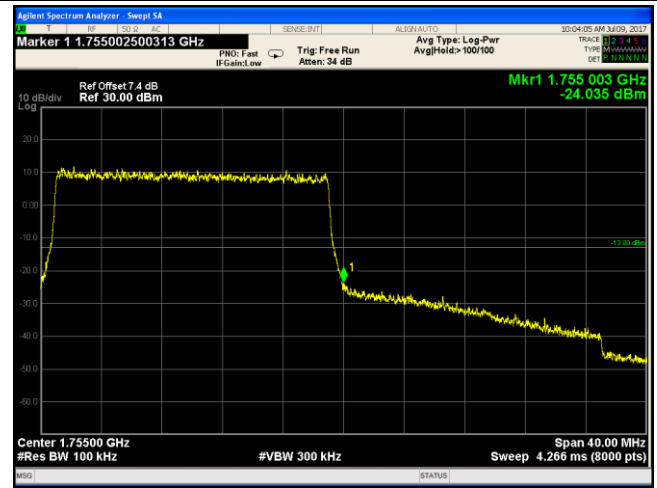
Note: Offset=Cable loss (4.5) + 10log  
(193/100)=4.5+2.9=7.4 dB



LTE band IV - Low Channel 16QAM-20

Note: Offset=Cable loss (4.5) + 10log  
(193/100)=4.5+2.9=7.4dB

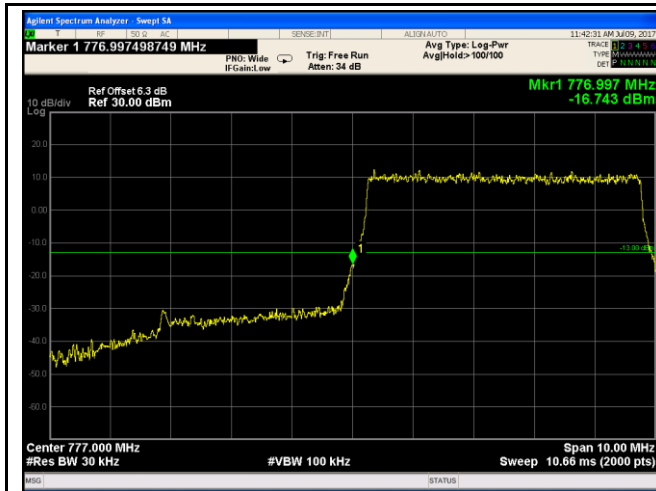
Note: Offset=Cable loss (4.5) + 10log  
(194/100)=4.5+2.9=7.4 dB



LTE band IV - High Channel 16QAM-20

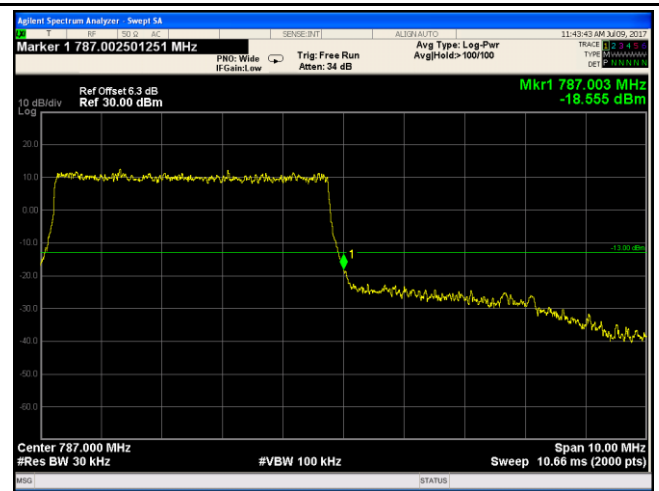
Note: Offset=Cable loss (4.5) + 10log  
(193/100)=4.5+2.9=7.4 dB

## LTE band XIII (Part 27)



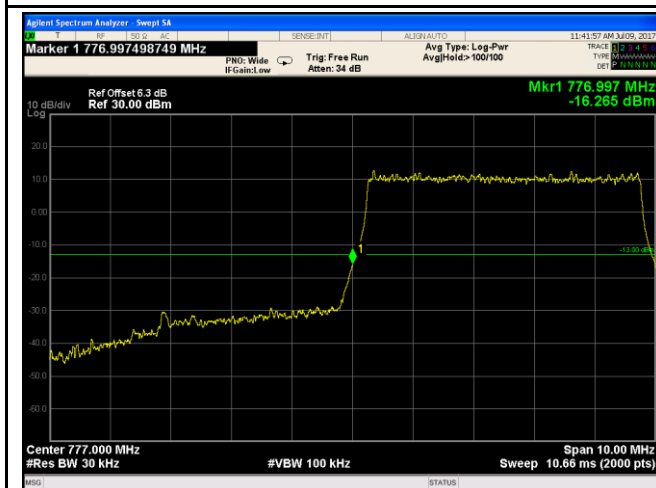
LTE band XIII - Low Channel QPSK-5

Note: Offset=Cable loss (4.0) + 10log  
(50.71/30)=4.0+2.3=6.3 dB



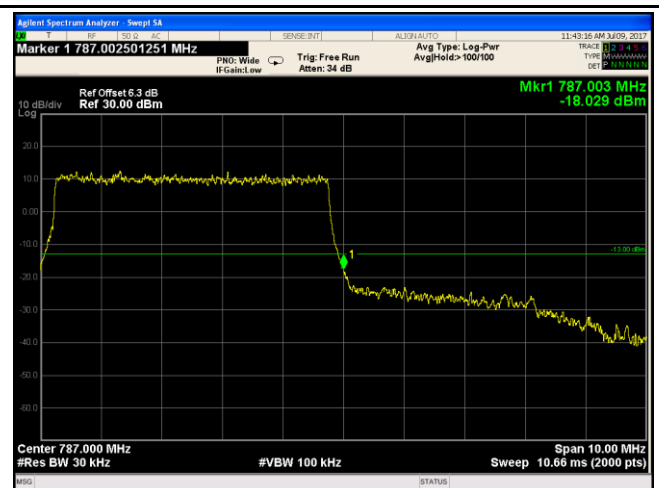
LTE band XIII - High Channel QPSK-5

Note: Offset=Cable loss (4.0) + 10log  
(50.56/30)=4.0+2.3=6.3 dB



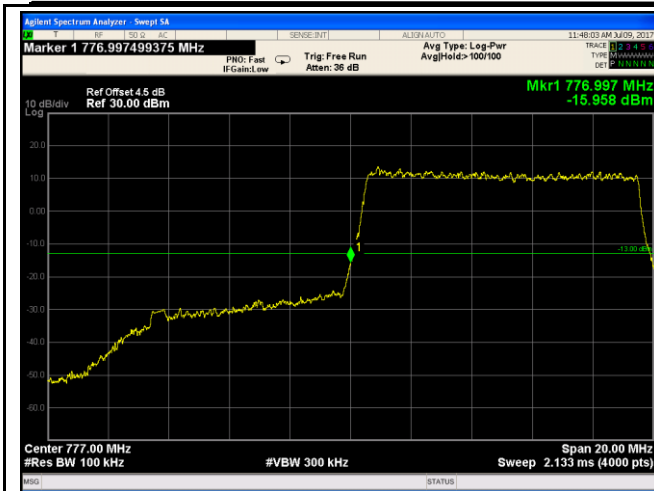
LTE band XIII - Low Channel 16QAM-5

Note: Offset=Cable loss (4.0) + 10log  
(50.71/30)=4.0+2.3=6.3 dB

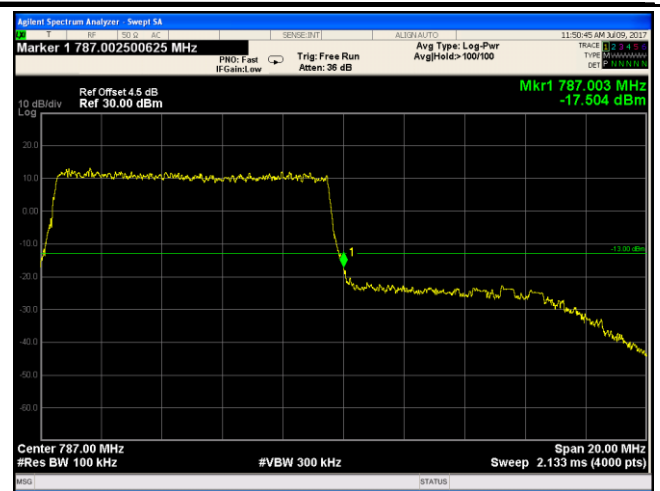


LTE band XIII - High Channel 16QAM-5

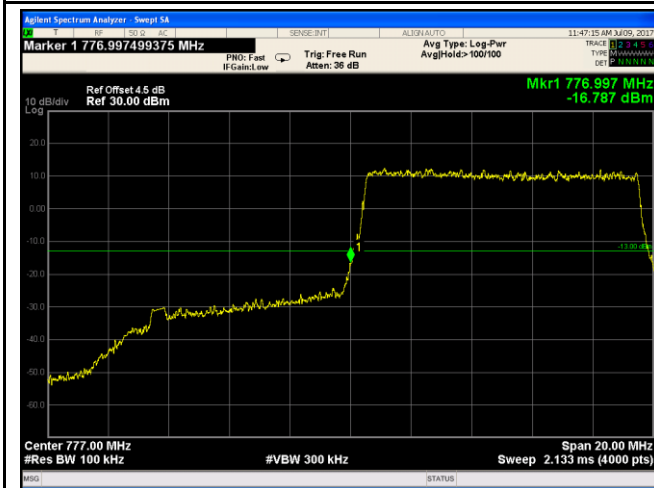
Note: Offset=Cable loss (4.0) + 10log  
(50.56/30)=4.0+2.3=6.3 dB



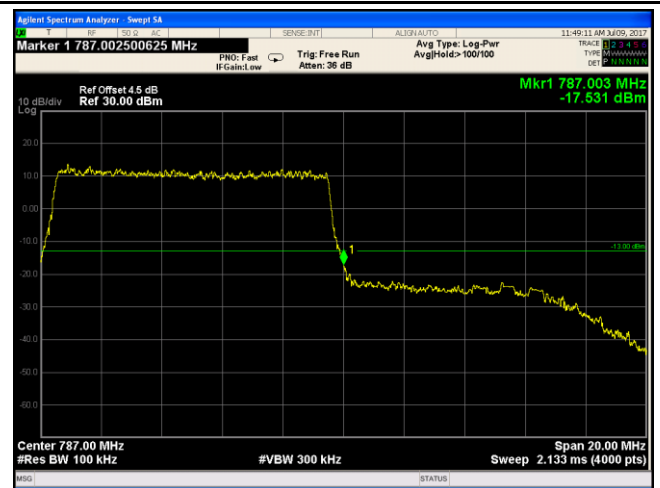
LTE band XIII - Low Channel QPSK-10



LTE band XIII - High Channel QPSK-10



LTE band XIII - Low Channel 16QAM-10

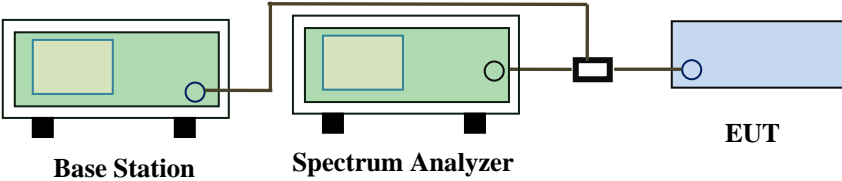


LTE band XIII - High Channel 16QAM-10

## 6.8 Band Edge 27.53(m)

Temperature	25°C
Relative Humidity	55%
Atmospheric Pressure	1012mbar
Test date :	July 10, 2017
Tested By :	Loren Luo

### Requirement(s):

Spec	Requirement	Applicable
§27.53(m)	According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power(P) by a factor shall be not less than $43+10\log(P)$ dB at the channel edge, the limit of emission equal to -13dBm. And $55+10\log(P)$ dB at 5.5MHz from the channel edges, the limit of emission equal to -25dBm. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.	<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 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	

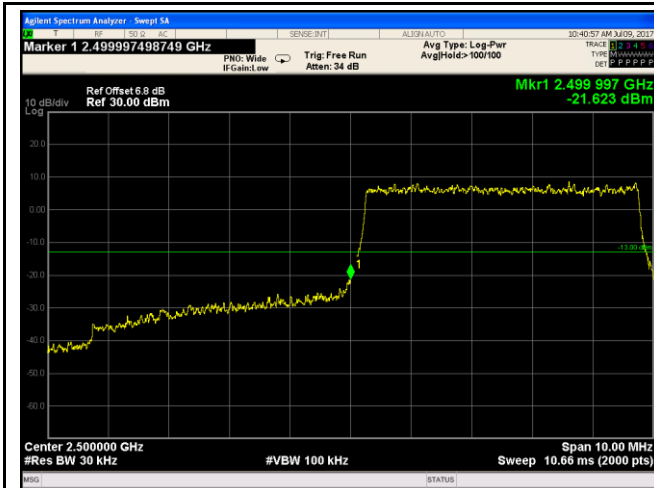
Test Data    ☒ Yes      ☐ N/A

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

### LTE band VII (Part 27) result

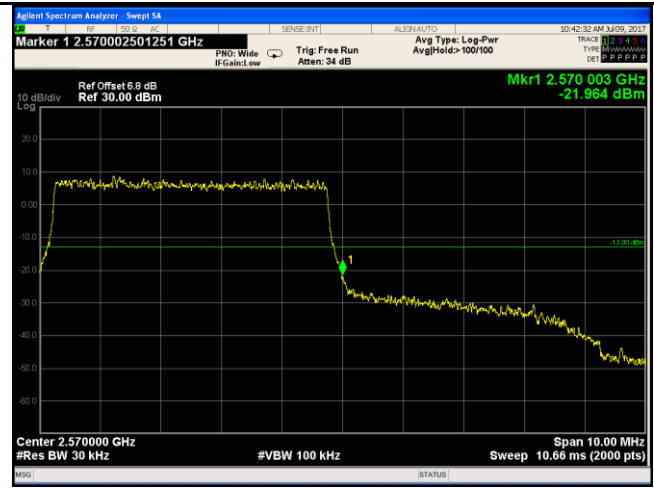
BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
5	20775	2500	QPSK	-21.623	-13
			16QAM	-21.698	-13
5	21425	2570	QPSK	-21.964	-13
			16QAM	-21.897	-13
10	20800	2500	QPSK	-21.942	-13
			16QAM	-21.391	-13
10	21400	2570	QPSK	-23.925	-13
			16QAM	-22.500	-13
15	20825	2500	QPSK	-21.343	-13
			16QAM	-22.016	-13
15	21400	2570	QPSK	-23.776	-13
			16QAM	-25.603	-13
20	20850	2500	QPSK	-26.750	-13
			16QAM	-26.111	-13
20	21350	2570	QPSK	-29.373	-13
			16QAM	-28.177	-13

## LTE band VII (Part 27)



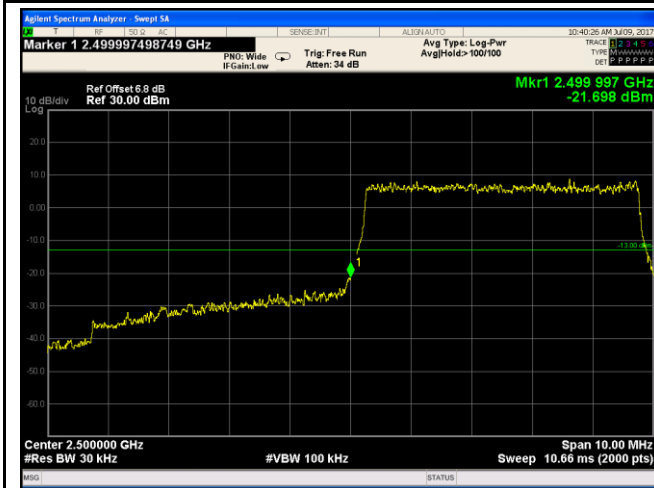
LTE band VII - Low Channel QPSK-5

Note: Offset=Cable loss (4.5) + 10log  
(50.97/30)=4.5+2.3=6.8 dB



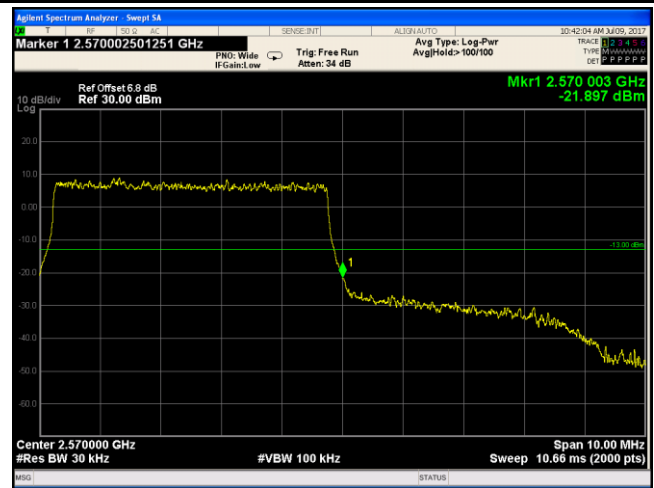
LTE band VII - High Channel QPSK-5

Note: Offset=Cable loss (4.5) + 10log  
(50.65/30)=4.5+2.3=6.8 dB



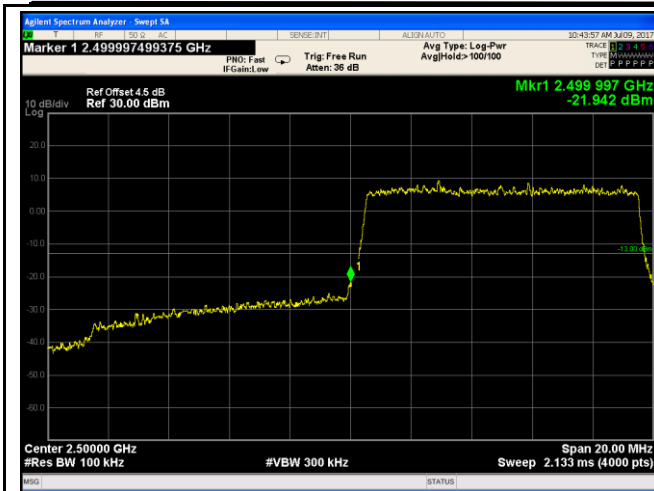
LTE band VII - Low Channel 16QAM-5

Note: Offset=Cable loss (4.5) + 10log  
(51.02/30)=4.5+2.3=6.8 dB

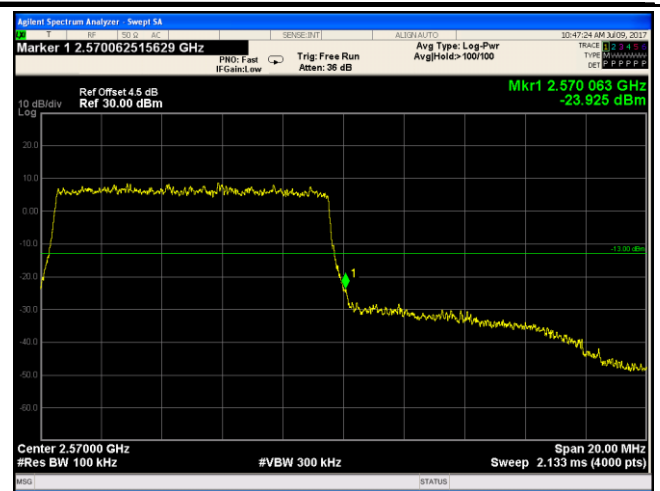


LTE band VII - High Channel 16QAM-5

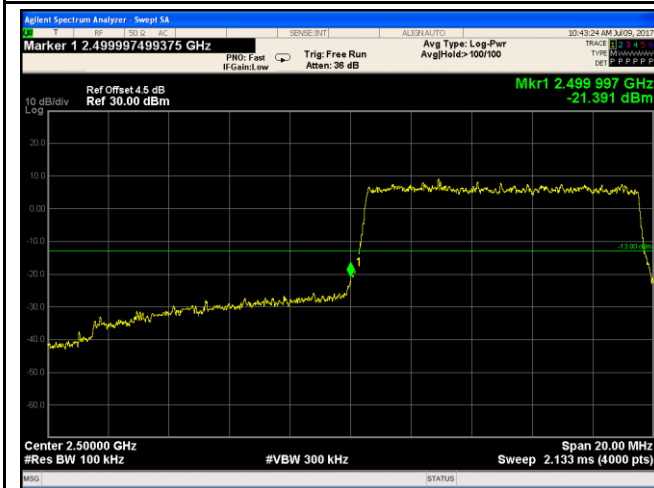
Note: Offset=Cable loss (4.5) + 10log  
(50.65/30)=4.5+2.3=6.8 dB



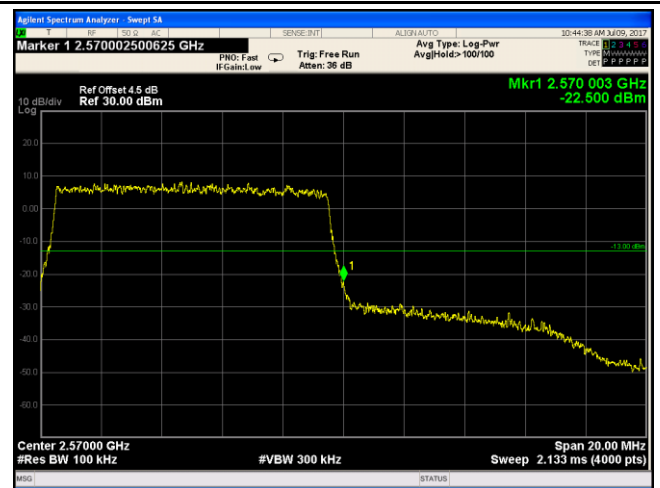
LTE band VII - Low Channel QPSK-10



LTE band VII - High Channel QPSK-10

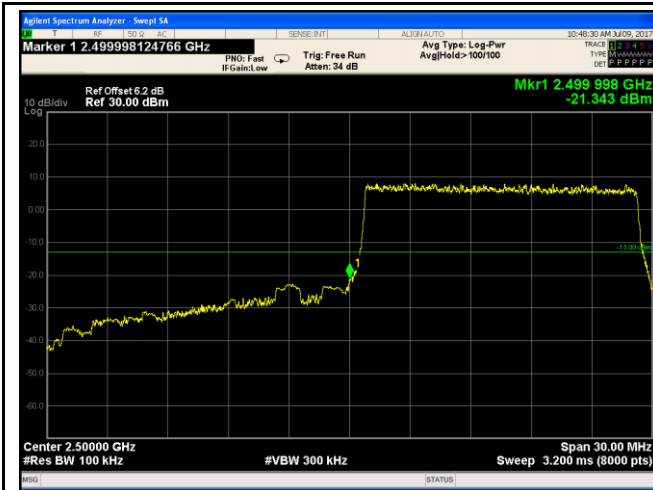


LTE band VII - Low Channel 16QAM-10



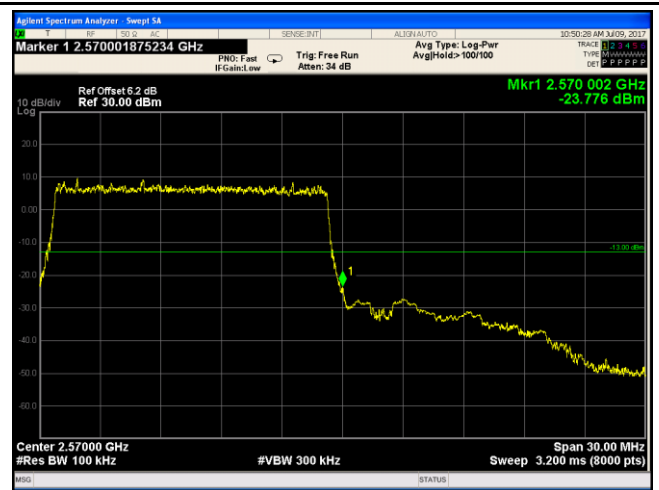
LTE band VII - High Channel 16QAM-10





LTE band VII - Low Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(149/100)=4.5+1.7=6.2 dB



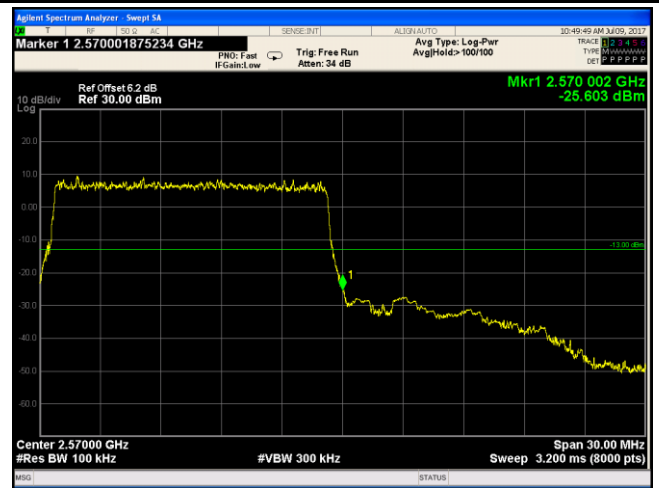
LTE band VII - High Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(149/100)=4.5+1.7=6.2 dB



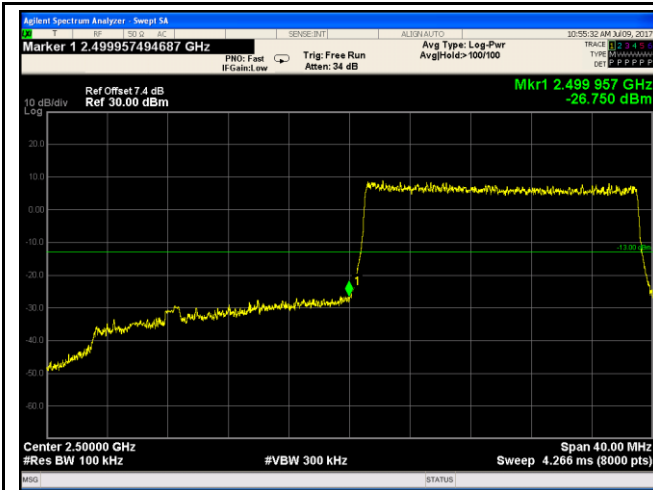
LTE band VII - Low Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(148/100)=4.5+1.7=6.2 dB



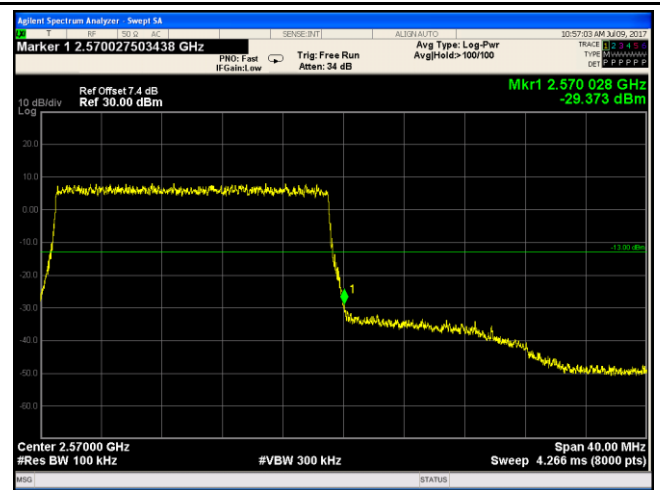
LTE band VII - High Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(149/100)=4.5+1.7=6.2 dB



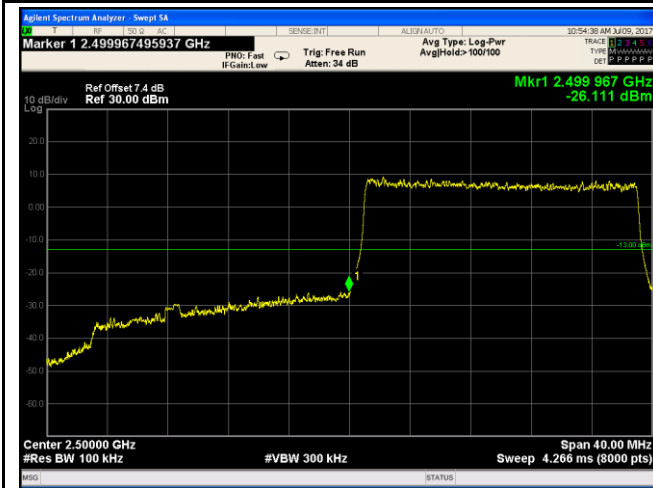
LTE band VII - Low Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log  
(193/100)=4.5+2.9=7.4 dB



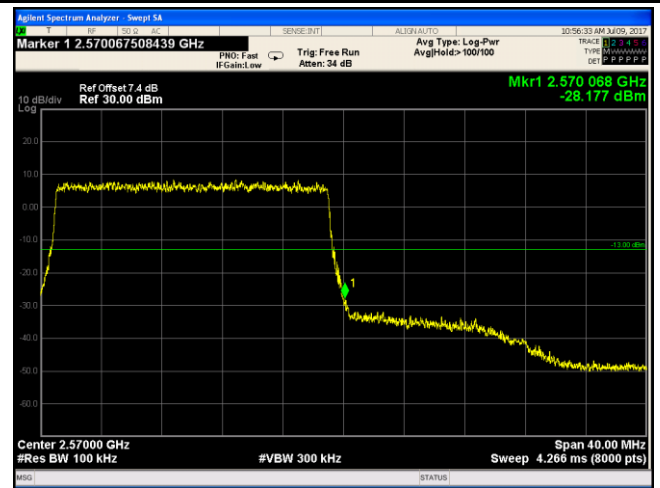
LTE band VII - High Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log  
(193/100)=4.5+2.9=7.4dB



LTE band VII - Low Channel 16QAM-20

Note: Offset=Cable loss (4.5) + 10log  
(194/100)=4.5+2.9=7.4 dB



LTE band VII - High Channel 16QAM-20

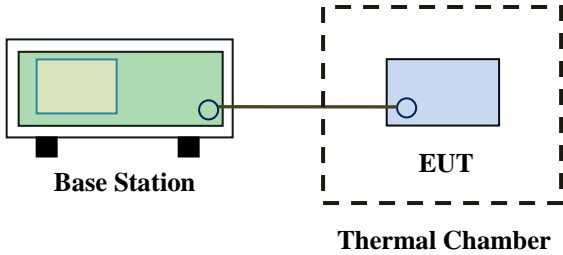
Note: Offset=Cable loss (4.5) + 10log  
(195/100)=4.5+2.9=7.4 dB

## 6.9 Frequency Stability

Temperature	25°C
Relative Humidity	55%
Atmospheric Pressure	1012mbar
Test date :	July 10, 2017
Tested By :	Loren Luo

### Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54	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>□□ 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□□</td></tr> <tr> <td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr> <td>928 to 929.</td><td>5.0</td><td>N/A</td><td>N/A</td></tr> <tr> <td>929 to 960.</td><td>1.5</td><td>N/A</td><td>N/A</td></tr> <tr> <td>2110 to 2220</td><td>10.0</td><td>N/A</td><td>N/A</td></tr> </tbody> </table> <p>According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.</p> <p>According to §27.54, The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.</p>	Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)	25 to 50	20.0	20.0	50.0	□□ to 450	5.0	5.0	50.0	450 to 512	2.5	5.0	5□□	821 to 896	1.5	2.5	2.5	928 to 929.	5.0	N/A	N/A	929 to 960.	1.5	N/A	N/A	2110 to 2220	10.0	N/A	N/A	<input checked="" type="checkbox"/>
Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)																																
25 to 50	20.0	20.0	50.0																																
□□ to 450	5.0	5.0	50.0																																
450 to 512	2.5	5.0	5□□																																
821 to 896	1.5	2.5	2.5																																
928 to 929.	5.0	N/A	N/A																																
929 to 960.	1.5	N/A	N/A																																
2110 to 2220	10.0	N/A	N/A																																

Test setup	 <p style="text-align: center;">Base Station                      EUT Thermal Chamber</p>
Procedure	<p>A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage.</p> <p>Limit: The frequency stability of the transmitter shall be maintained within <math>\pm 0.00025\%</math> (<math>\pm 2.5\text{ppm}</math>) of the center frequency.</p>
Remark	<p>Frequency Stability versus Temperature: The Frequency tolerance of the carrier signal shall be maintained within 2.5ppm of the operating frequency over a temperature variation of <math>-10^{\circ}\text{C}</math> to <math>+55^{\circ}\text{C}</math> at normal supply voltage.</p>
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

Test Data    ☒ Yes                      ☐ N/A

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

### LTE band II (Part 24E) result

Middle Channel, $f_o = 1880$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.85	-15	0.0080	2.5
0		-10	0.0053	2.5
10		-11	0.0059	2.5
20		-16	0.0085	2.5
30		-16	0.0085	2.5
40		-13	0.0069	2.5
50		-16	0.0085	2.5
55		-20	0.0106	2.5
25	4.2	-16	0.0085	2.5
	3.6	-18	0.0096	2.5

### LTE band IV (Part 27) result

Middle Channel, $f_o = 1732.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.85	-16	0.0092	2.5
0		-16	0.0092	2.5
10		-14	0.0081	2.5
20		-20	0.0115	2.5
30		-19	0.0110	2.5
40		-17	0.0098	2.5
50		-14	0.0081	2.5
55		-20	0.0115	2.5
25	4.2	-16	0.0092	2.5
	3.6	-21	0.0121	2.5

### LTE band VII (Part 27) result

Middle Channel, $f_0 = 2535$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.85	-12	0.0047	2.5
0		-14	0.0055	2.5
10		-17	0.0067	2.5
20		-10	0.0039	2.5
30		-9	0.0036	2.5
40		-15	0.0059	2.5
50		-12	0.0047	2.5
55		-15	0.0059	2.5
25	4.2	-9	0.0036	2.5
	3.6	-10	0.0039	2.5

### LTE band XIII (Part 27) result

Middle Channel, $f_0 = 782$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.85	-12	0.0047	2.5
0		-15	0.0059	2.5
10		-10	0.0039	2.5
20		-16	0.0063	2.5
30		-14	0.0055	2.5
40		-14	0.0055	2.5
50		-14	0.0055	2.5
55		-9	0.0036	2.5
25	4.2	-17	0.0067	2.5
	3.6	-9	0.0036	2.5

## Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/15/2016	09/14/2017	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMW500	121393	09/24/2016	09/23/2017	<input checked="" type="checkbox"/>
Temperature/Humidity Chamber	UHL-270	001	10/08/2016	10/07/2017	<input checked="" type="checkbox"/>
DC Power Supply	E3640A	MY40004013	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
<b>Radiated Emissions</b>					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	<input checked="" type="checkbox"/>
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/20/2016	09/19/2017	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/23/2016	09/22/2017	<input checked="" type="checkbox"/>
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	<input checked="" type="checkbox"/>
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/16/2016	09/15/2017	<input checked="" type="checkbox"/>
Power Amplifier	SMC150D	R1553-0313	03/08/2017	03/07/2018	<input checked="" type="checkbox"/>
Power Amplifier	S41-25D	R1553-0314	05/26/2017	05/25/2018	<input checked="" type="checkbox"/>
Tunable Notch Filter	3NF-800/1000-S	AA4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>

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Tunable Notch Filter	3NF- 1000/2000-S	AM 4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
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## Annex B. EUT And Test Setup Photographs

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

Whole Package View



Adapter - Label View



EUT - Front View

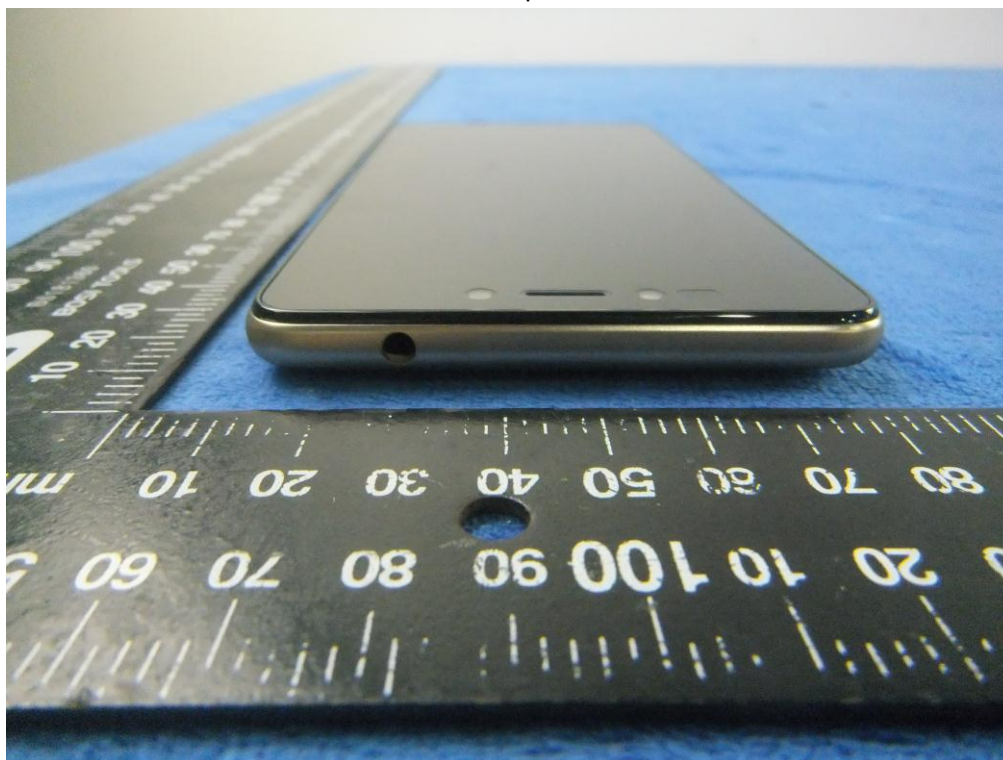


EUT - Rear View

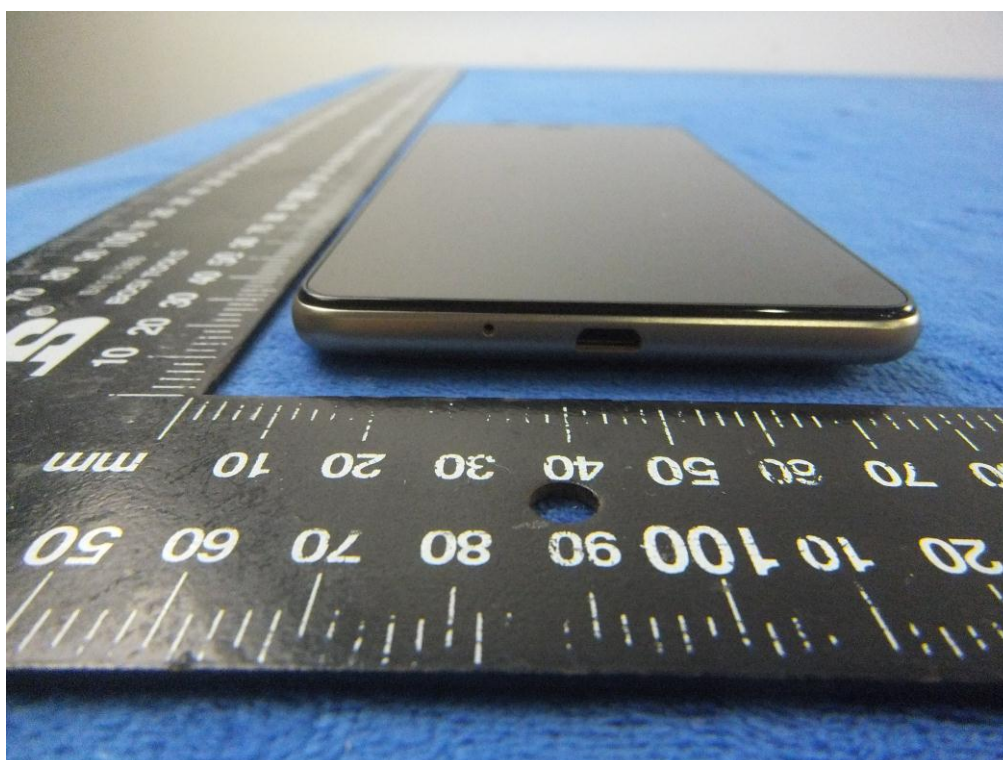




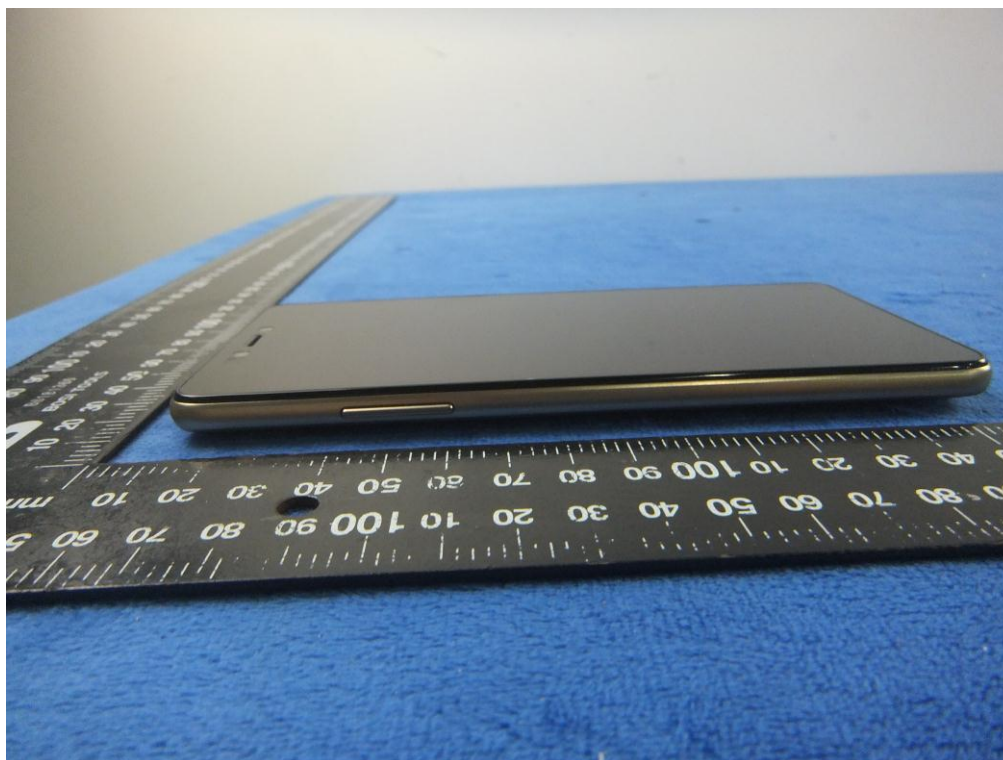
EUT - Top View



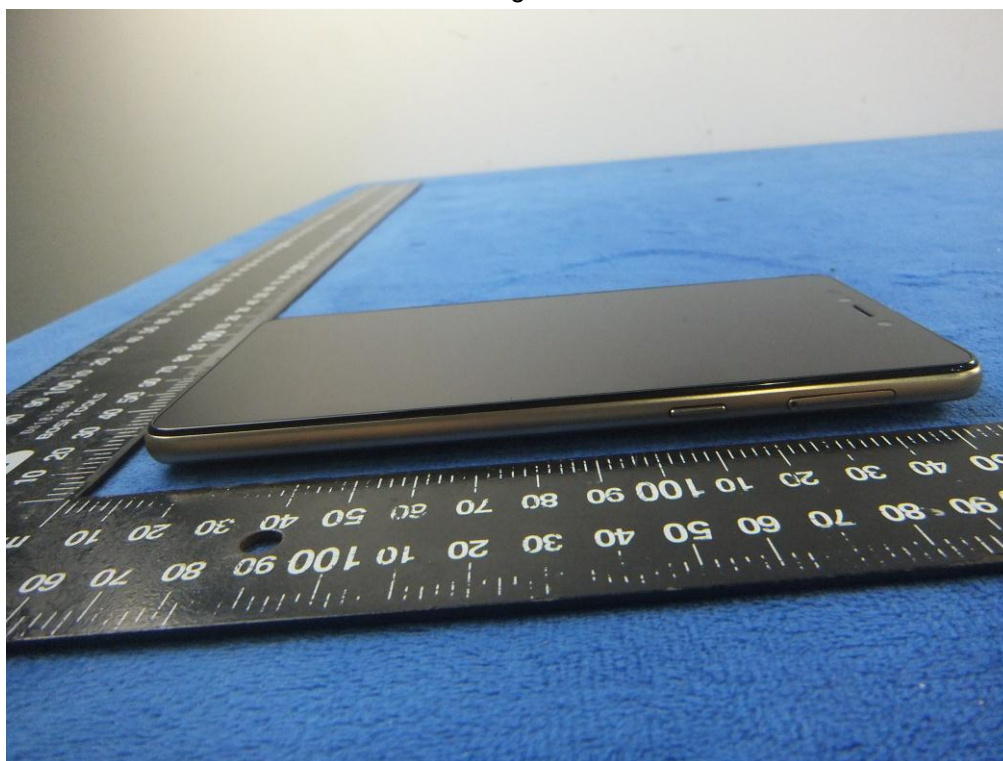
EUT - Bottom View



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

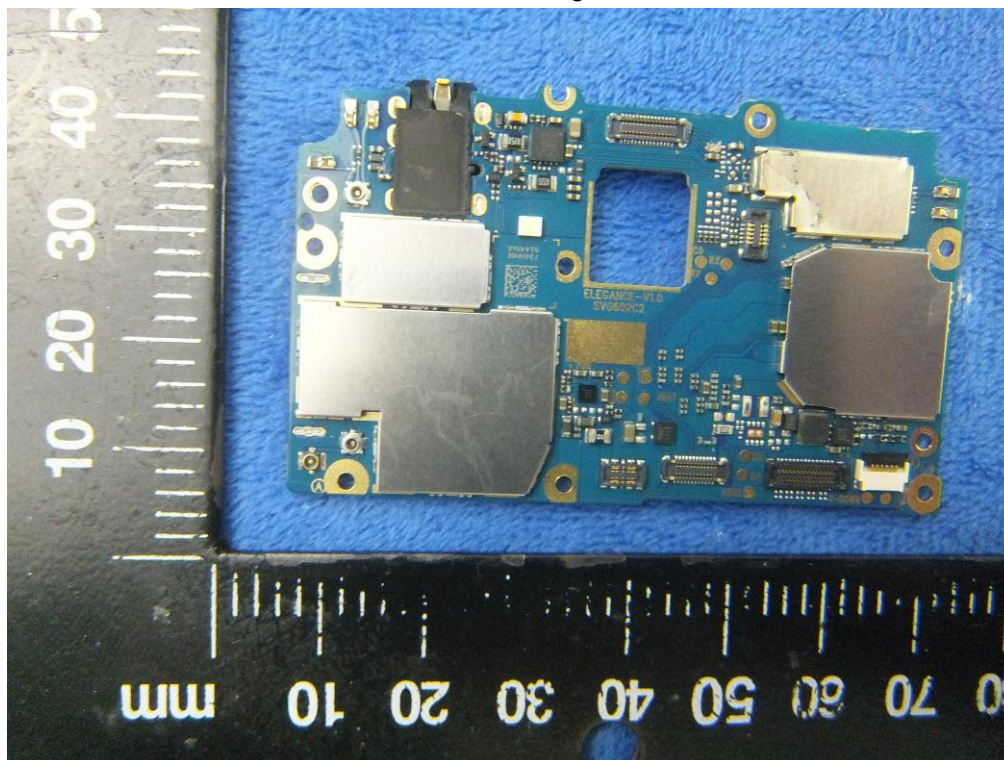


Battery - Rear View

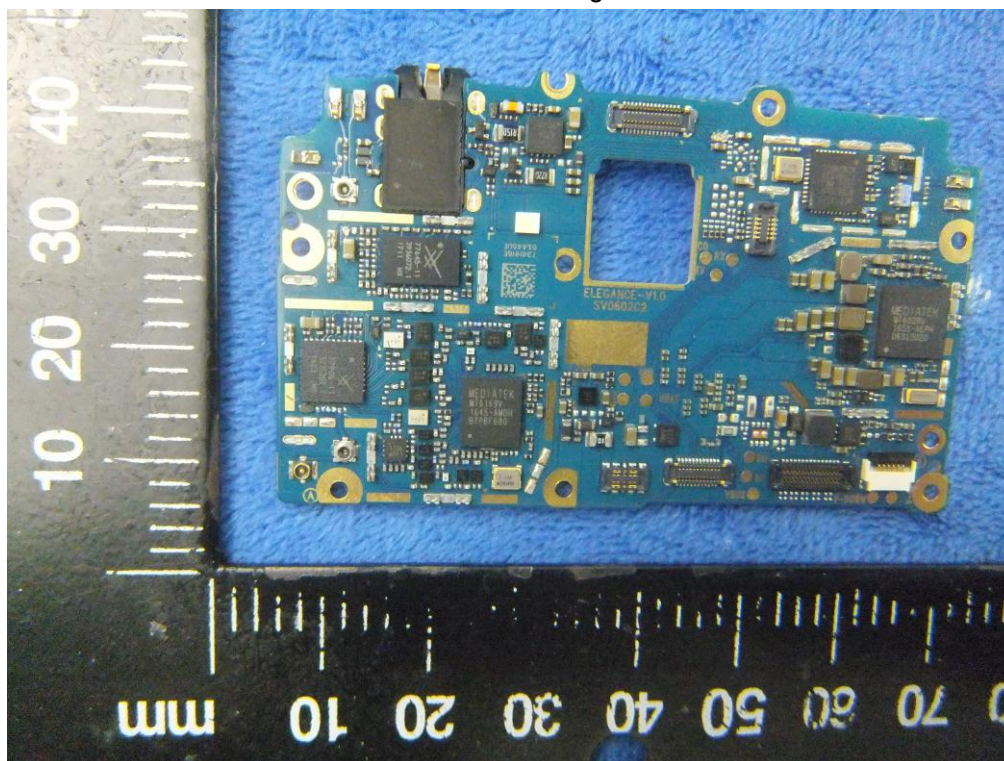




Mainboard with Shielding - Front View

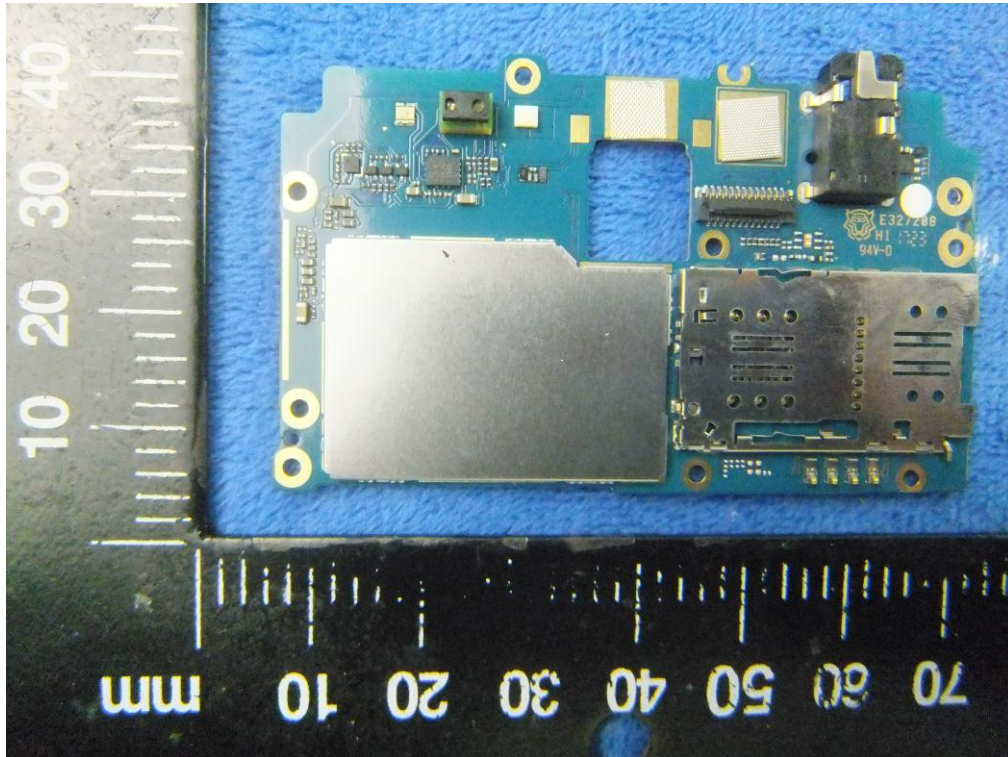


Mainboard without Shielding - Front View

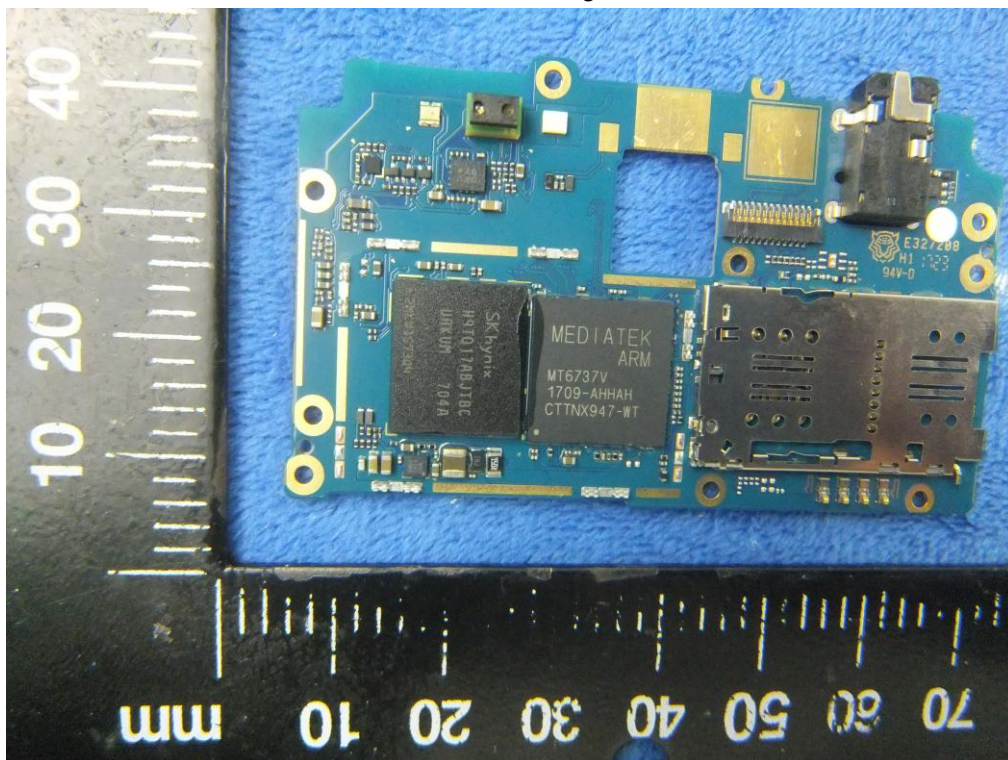




Mainboard with Shielding – Rear View



Mainboard without Shielding – Rear View

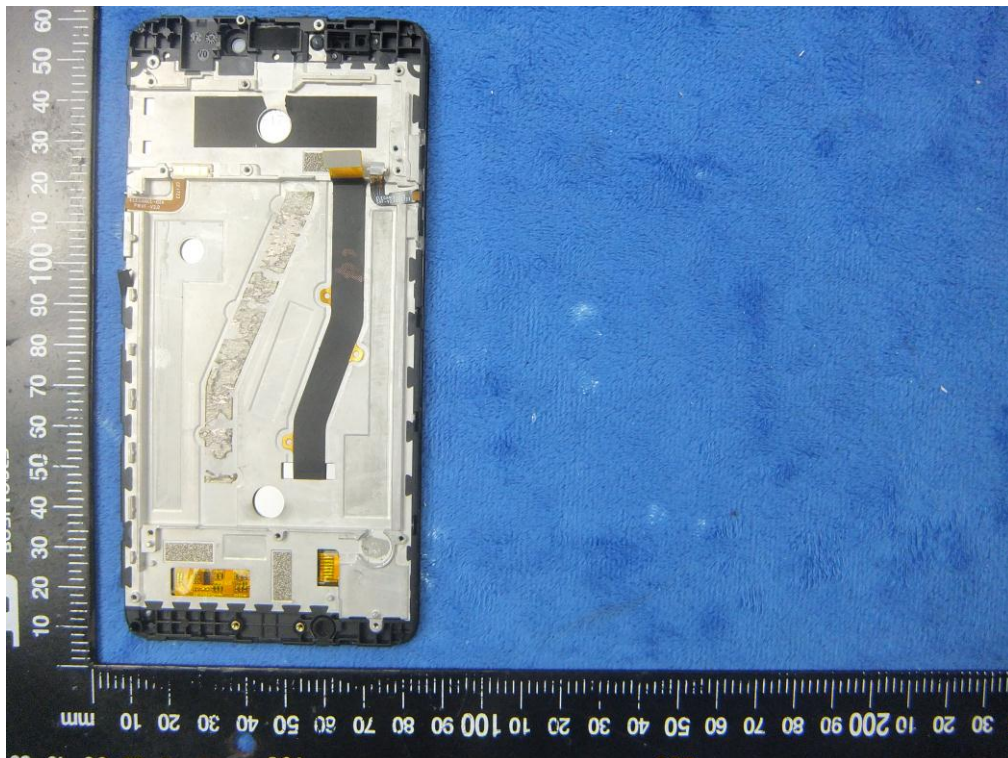




LCD – Front View



LCD – Rear View





GSM/PCS/UMTS-FDD Antenna View



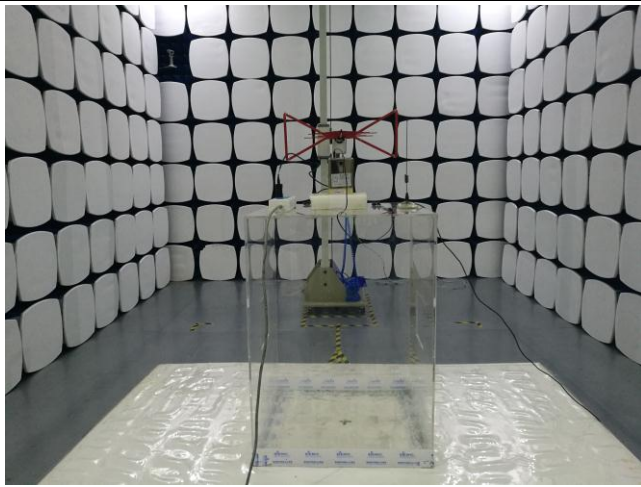
WIFI/BT/BLE/GPS - Antenna View



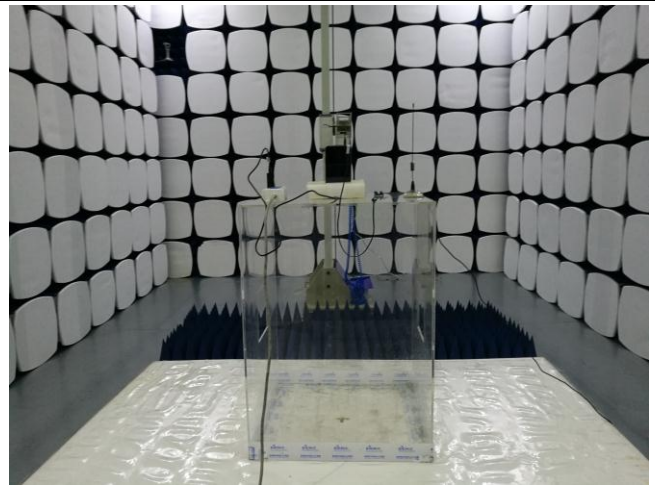
LTE - Antenna View



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



Radiated Spurious Emissions Test Setup Below 1GHz

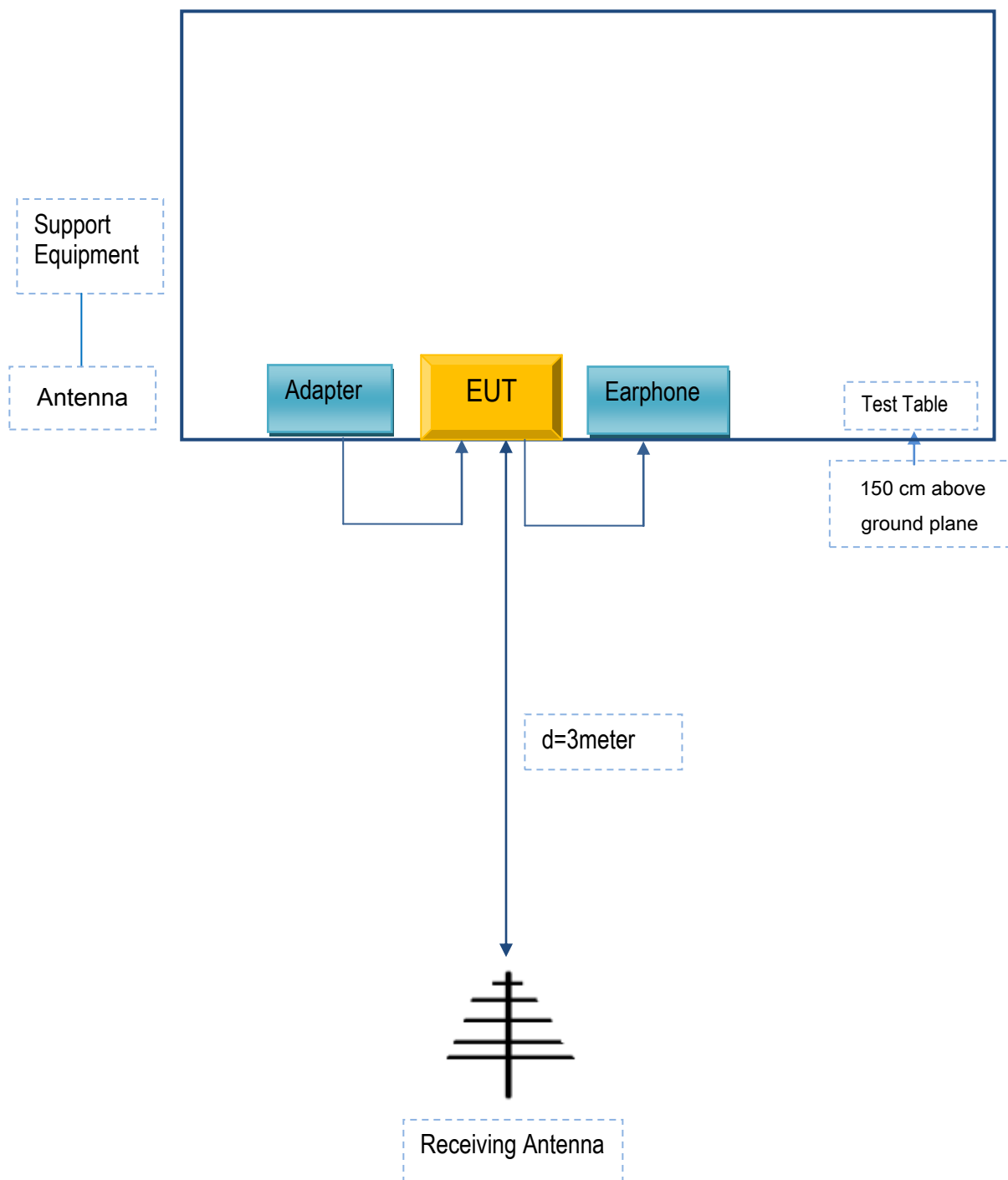


Radiated Spurious Emissions Test Setup Above  
1GHz

## 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
MFOURTEL MEXICO S.A. DE C.V.	Adapter	A8-501000	N/A
MFOURTEL MEXICO S.A. DE C.V.	Earphone	M4 SS4453-R	N/A

### **Supporting Cable:**

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



## Annex C.ii. EUT OPERATING CONKITIONS

N/A

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

Please see the attachment



## Annex E. DECLARATION OF SIMILARITY

N/A