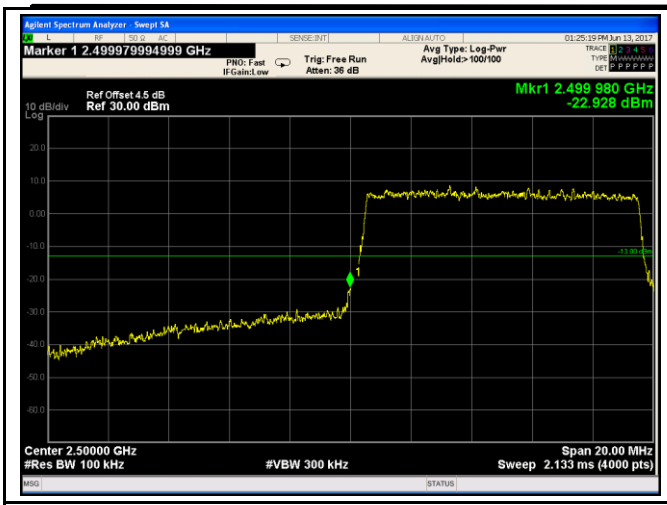
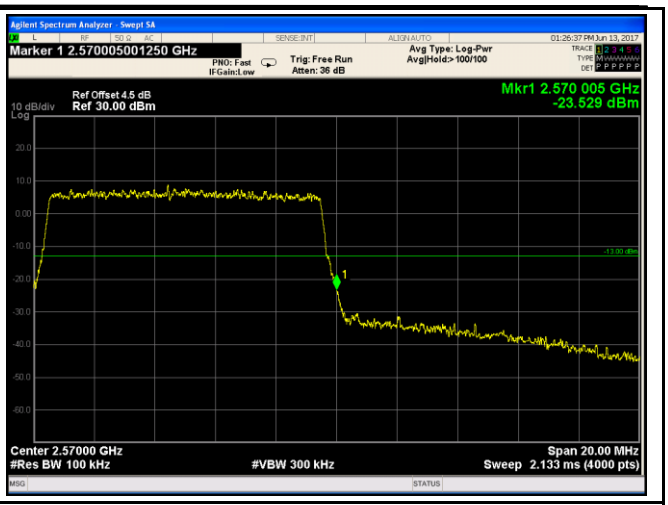
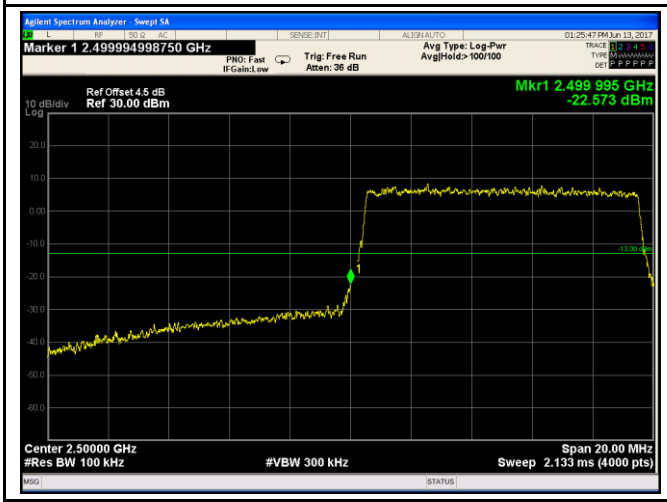


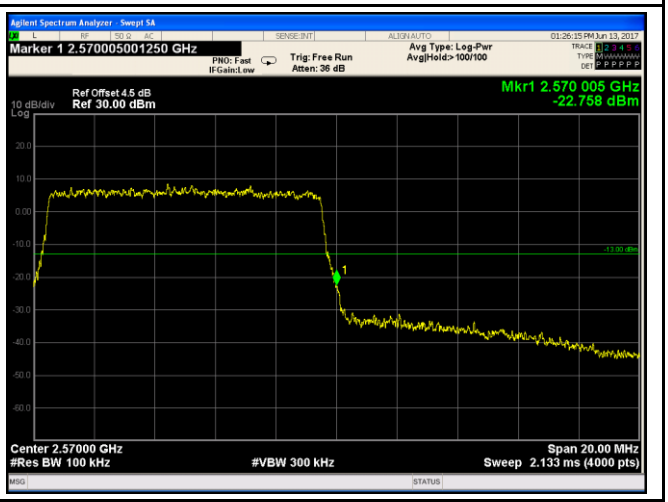
LTE Band VII - Low Channel QPSK-10



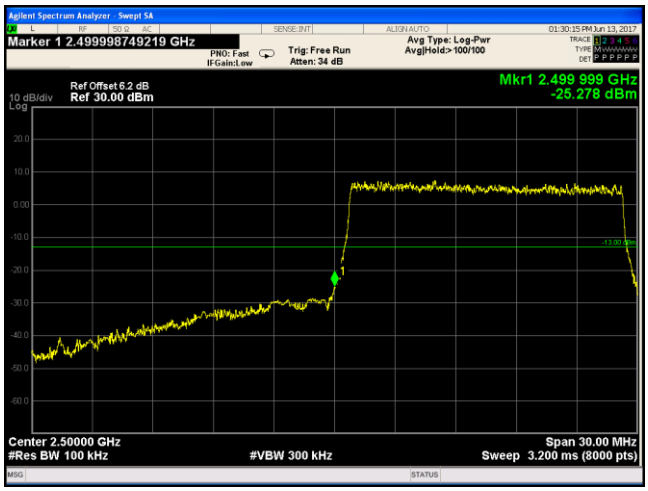
LTE Band VII - High Channel QPSK-10



LTE Band VII - Low Channel 16QAM-10

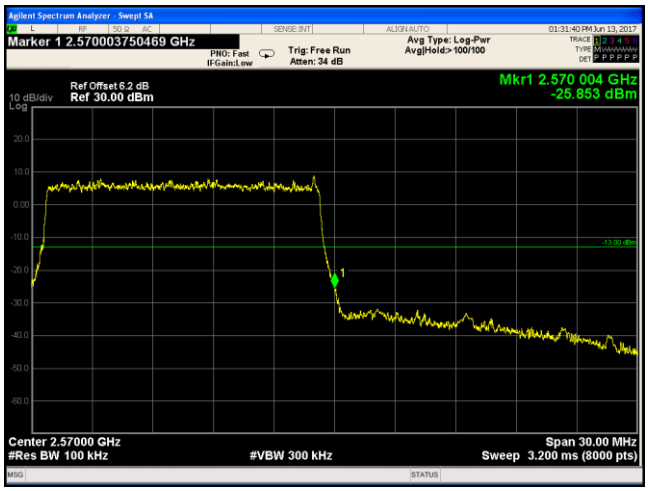


LTE Band VII - High Channel 16QAM-10



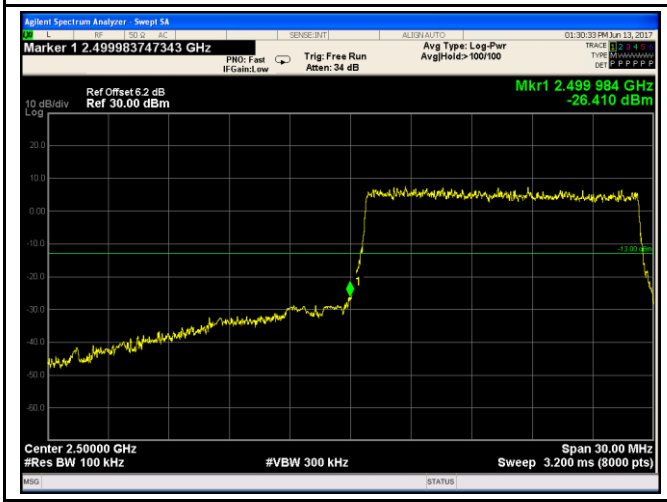
LTE Band VII - Low Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log (148.0/100)=4.5+1.7=6.2 dB



LTE Band VII - High Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log (148.2/100)=4.5+1.7=6.2 dB

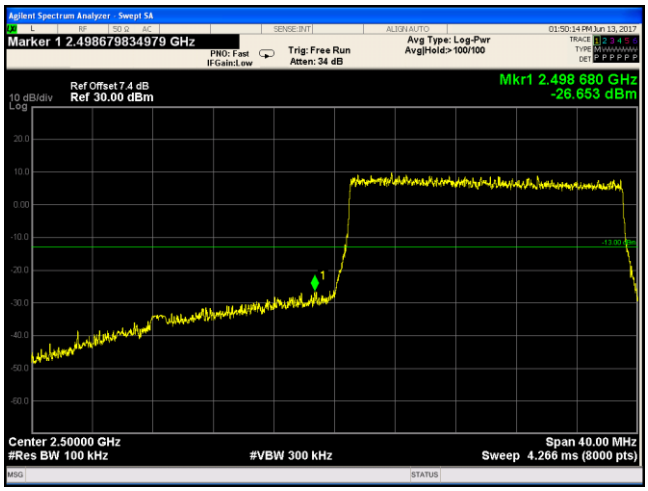


LTE Band VII - Low Channel 16QAM-15

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

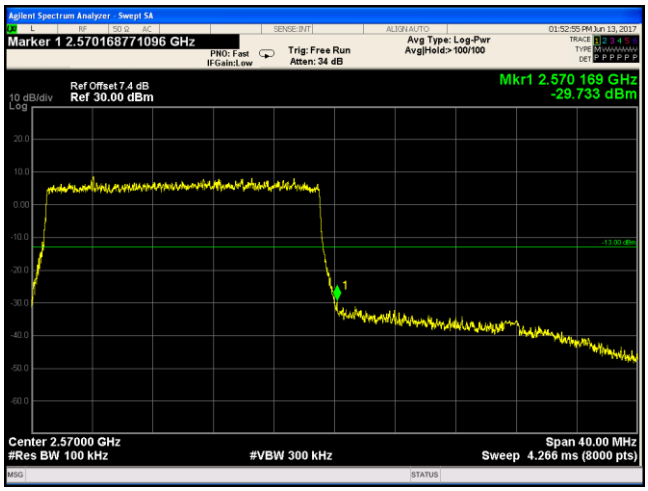
LTE Band VII - High Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log (147.4/100)=4.5+1.7=6.2 dB



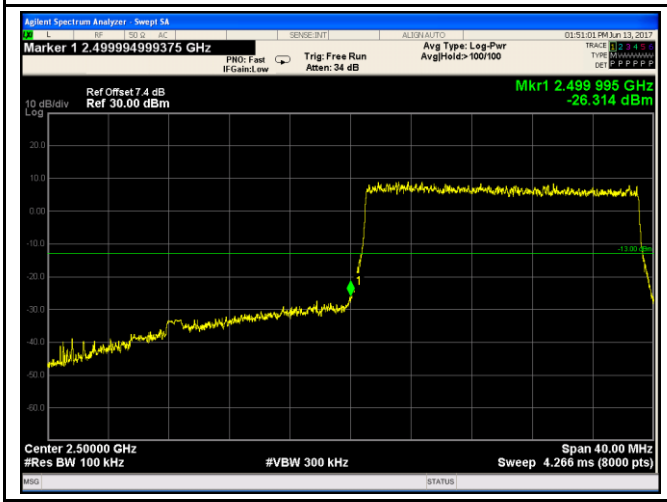
LTE Band VII - Low Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log (193.4/100)=4.5+2.9=7.4 dB



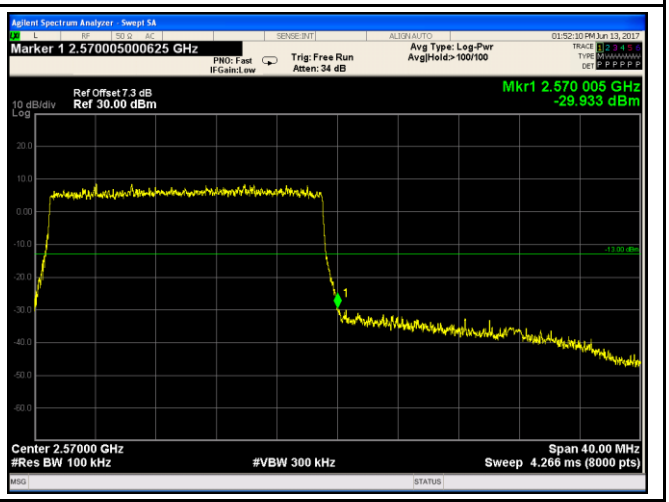
LTE Band VII - High Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log (195.4 /100)=4.5+2.9=7.4dB



LTE Band VII - Low Channel 16QAM-20

Note: Offset=Cable loss (4.5) + 10log (193.6/100)=4.5+2.9=7.4 dB



LTE Band VII - High Channel 16QAM-20

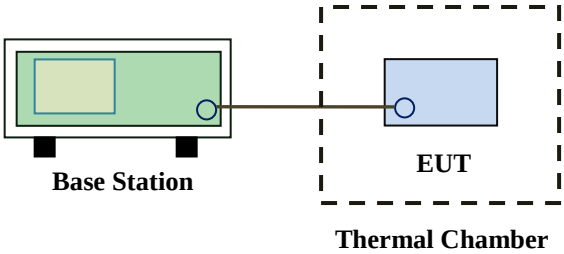
Note: Offset=Cable loss (4.5) + 10log (192.7/100)=4.5+2.8=7.3 dB

6.9 Frequency Stability

Temperature	23 °C
Relative Humidity	53%
Atmospheric Pressure	1010mbar
Test date :	June 12, 2017
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54</td><td>a)</td><td>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
<table>
<tr><th>Frequency Range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile ≤ 3 watts (ppm)</th><th>Mobile ≤ 3 watts (ppm)</th></tr>
<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□0</td></tr>
<tr><td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr>
<tr><td>928 to 929.</td><td>□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>
</table>
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.
According to §27.54, The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.</td><td>☑</td></tr>
</table>

Test setup	
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 ±0.00025% (±2.5ppm) of the center frequency.
Remark	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 -10ºC to +55ºC at normal supply voltage.
Result	☑ Pass ☐ 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_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	-6	0.0032	2.5
0		-8	0.0043	2.5
10		-9	0.0048	2.5
20		-11	0.0059	2.5
30		-12	0.0064	2.5
40		-8	0.0043	2.5
50		-7	0.0037	2.5
55		-10	0.0053	2.5
25	3.5	-12	0.0064	2.5
	4.3	-12	0.0064	2.5

LTE Band IV (Part 27) result

Middle Channel, f_o = 1732.5 MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	-11	0.0063	2.5
0		-9	0.0052	2.5
10		-14	0.0081	2.5
20		-10	0.0058	2.5
30		-9	0.0052	2.5
40		-9	0.0052	2.5
50		-11	0.0063	2.5
55		-12	0.0069	2.5
25	3.5	-13	0.0075	2.5
	4.3	-19	0.0110	2.5

LTE Band VII (Part 27) result

Middle Channel, f_o = 2535 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	-9	0.0036	2.5
0		-7	0.0028	2.5
10		-8	0.0032	2.5
20		-8	0.0032	2.5
30		-11	0.0043	2.5
40		-9	0.0036	2.5
50		-10	0.0039	2.5
55		-4	0.0016	2.5
25	3.5	-10	0.0039	2.5
	4.3	-9	0.0036	2.5

LTE Band XII (Part 27) result

Middle Channel, f_o = 707.5MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	-9	0.0027	2.5
0		-10	0.0059	2.5
10		-9	0.0037	2.5
20		-11	0.0053	2.5
30		-11	0.0064	2.5
40		-8	0.0048	2.5
50		-10	0.0064	2.5
55		-9	0.0032	2.5
25	3.5	-10	0.0059	2.5
	4.3	-9	0.0053	2.5

LTE Band XVII (Part 27) result

Middle Channel, f_o = 710 MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	9	0.0127	2.5
0		5	0.0070	2.5
10		5	0.0070	2.5
20		4	0.0056	2.5
30		7	0.0099	2.5
40		5	0.0070	2.5
50		11	0.0155	2.5
55		10	0.0141	2.5
25	3.5	11	0.0155	2.5
	4.3	10	0.0141	2.5

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
RF Conducted Test					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/15/2016	09/14/2017	☑
Power Splitter	1#	1#	08/31/2016	08/30/2017	☑
Universal Radio Communication Tester	CMU200	121393	09/24/2016	09/23/2017	☑
Wideband Radio Communication Tester	CMW500	120906	03/26/2017	03/25/2018	☑
Temperature/Humidity Chamber	UHL-270	001	10/08/2016	10/07/2017	☑
DC Power Supply	E3640A	MY40004013	09/16/2016	09/15/2017	☑
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/16/2016	09/15/2017	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	☑
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	08/31/2016	08/30/2017	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	☑
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/20/2016	09/19/2017	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/23/2016	09/22/2017	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	☑
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/16/2016	09/15/2017	☑
Tunable Notch Filter	3NF-800/1000-S	AA4	08/31/2016	08/30/2017	☑

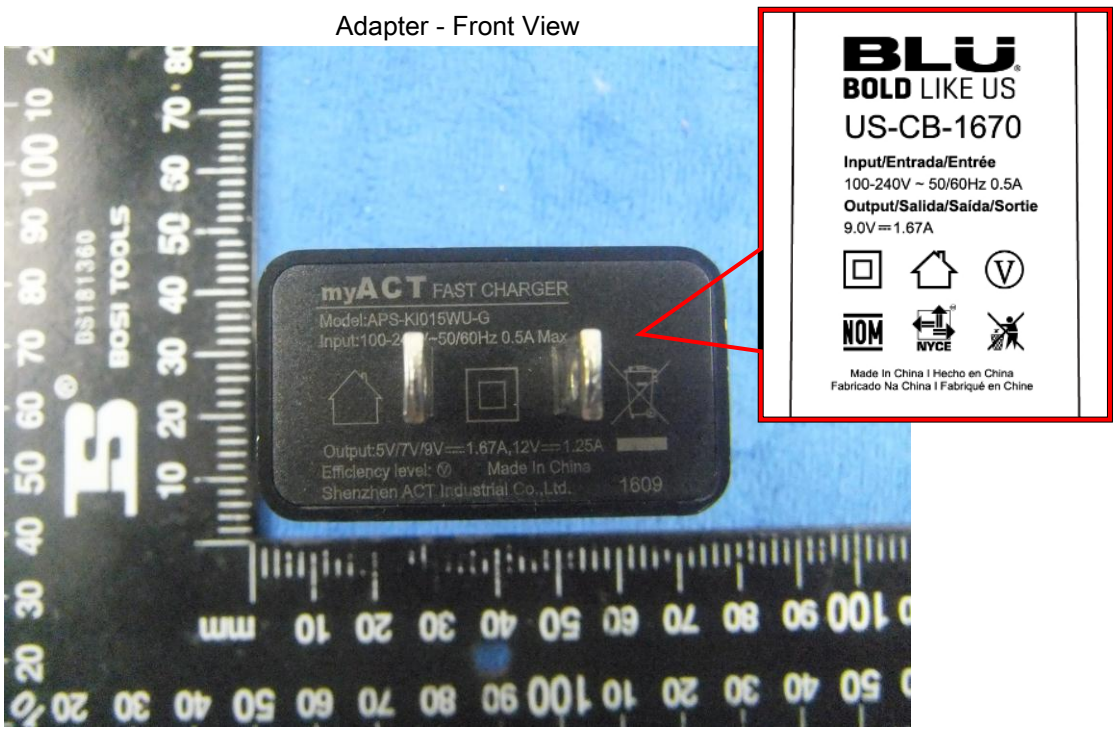
Tunable Notch Filter	3NF-1000/2000-S	AM 4	08/31/2016	08/30/2017	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Whole Package View

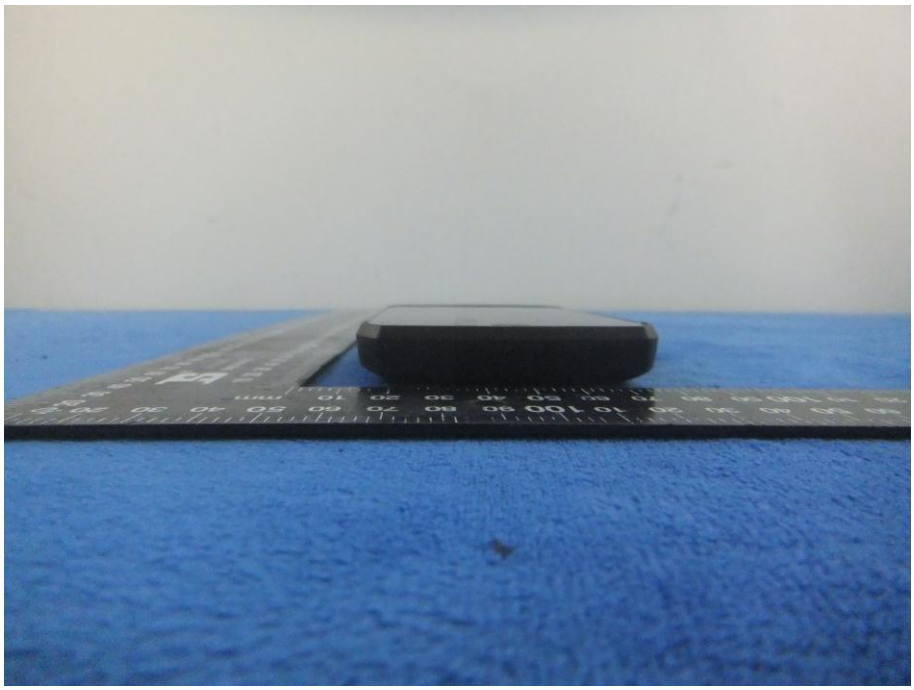
Adapter - Front View



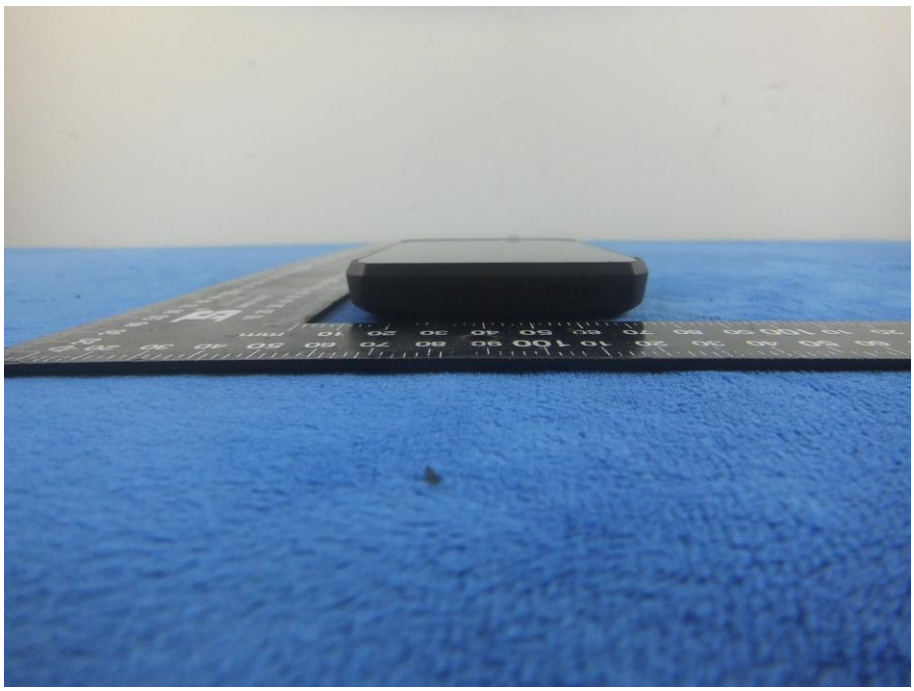
EUT - Front View

EUT - Rear View

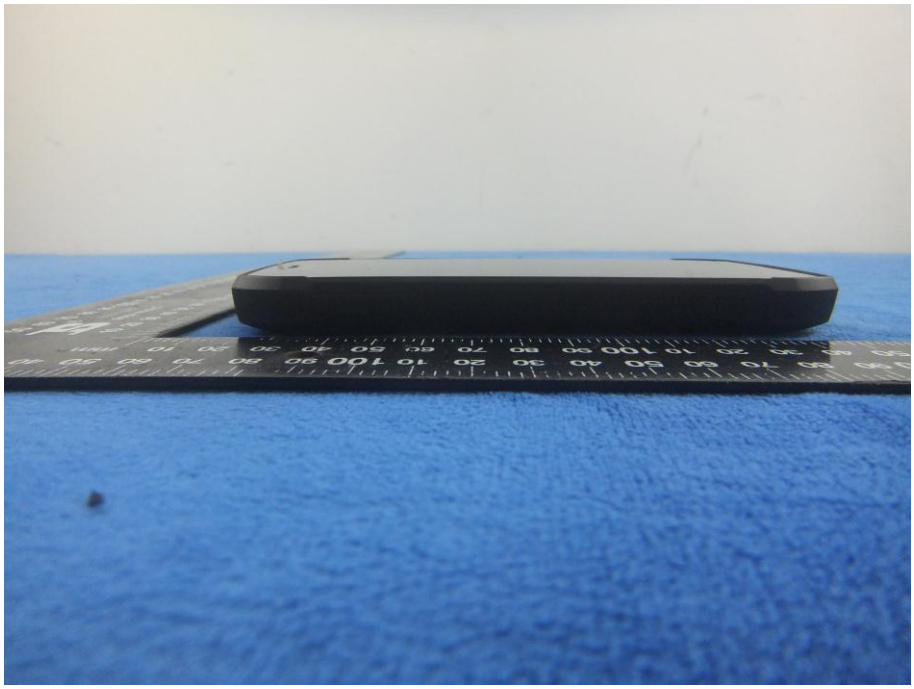
EUT - Top View



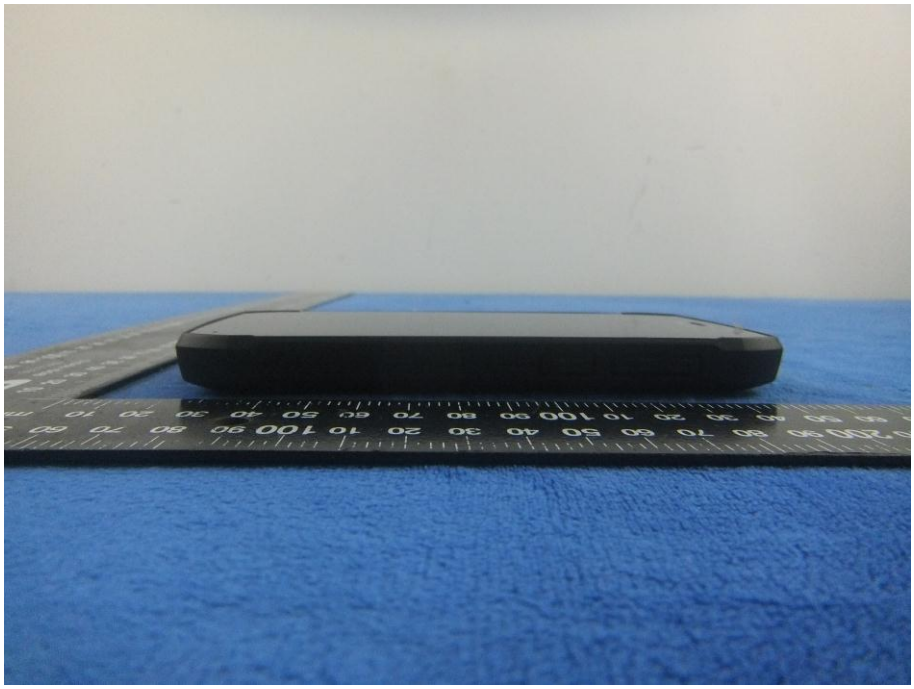
EUT - Bottom View



EUT - Left View



EUT - Right View

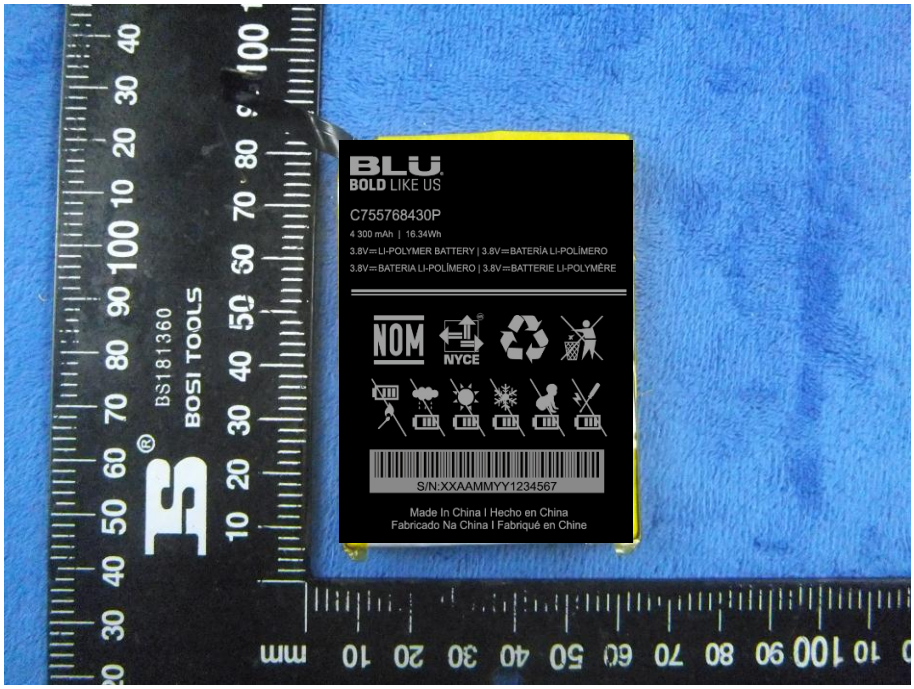


Annex B.ii. Photograph: EUT Internal Photo

Cover Off - Top View 1

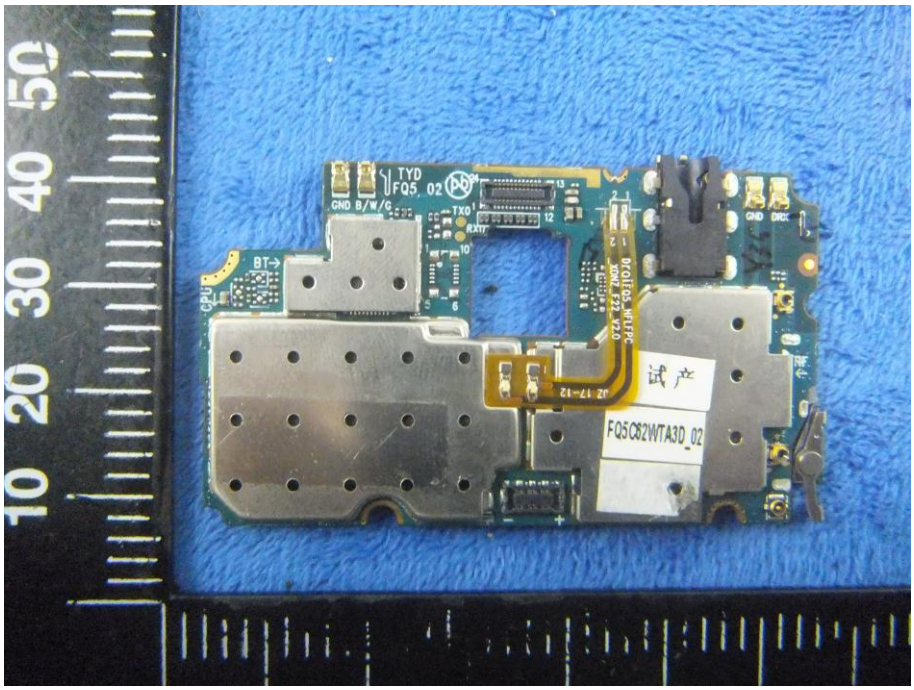
Cover Off - Top View 2

Battery - Front View

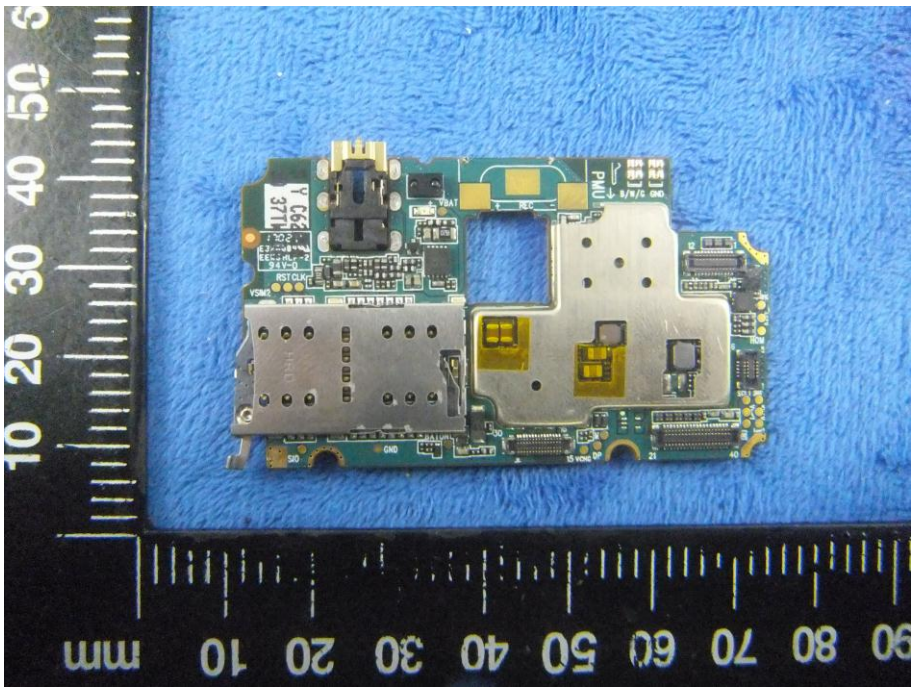


Battery - Rear View

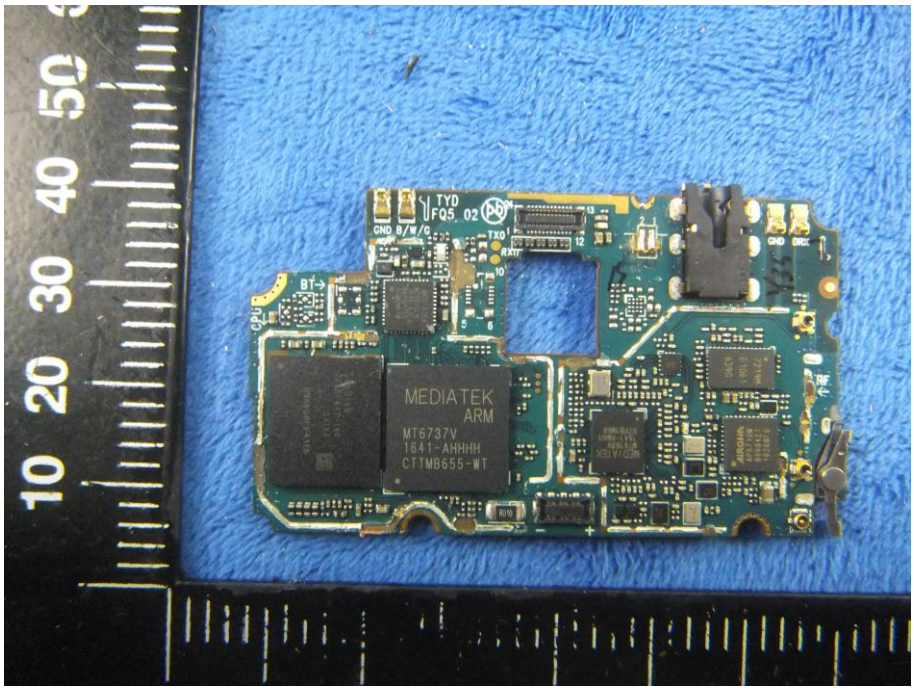
Mainboard with Shielding - Front View



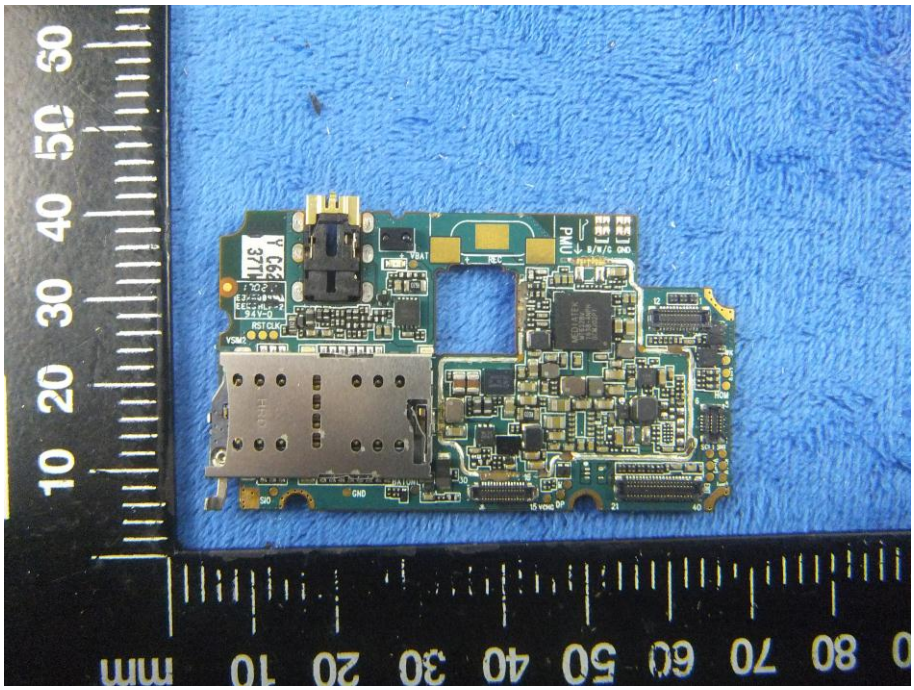
Mainboard without Shielding - Rear View



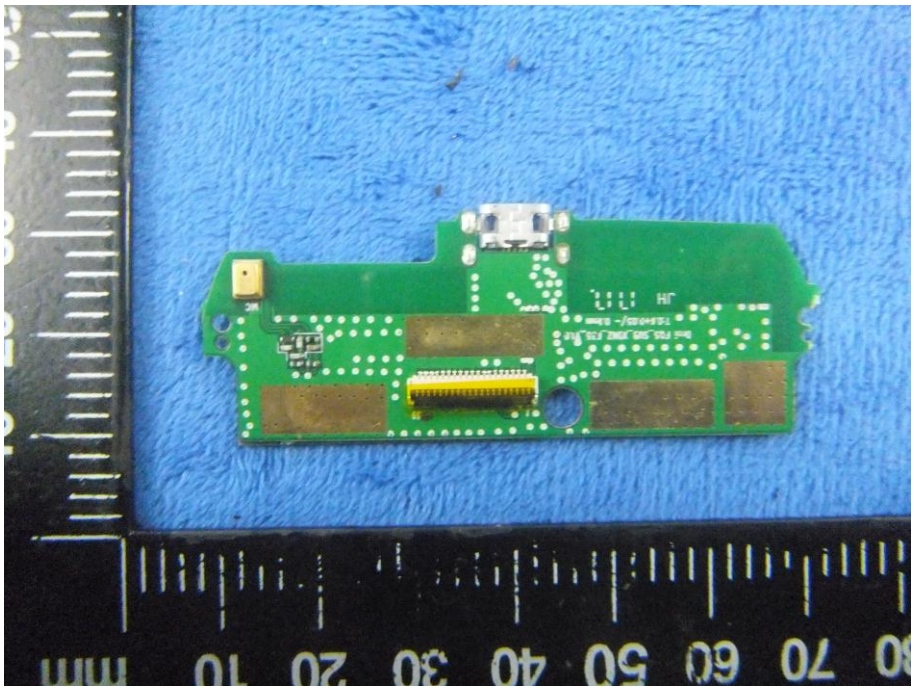
Mainboard without Shielding - Front View



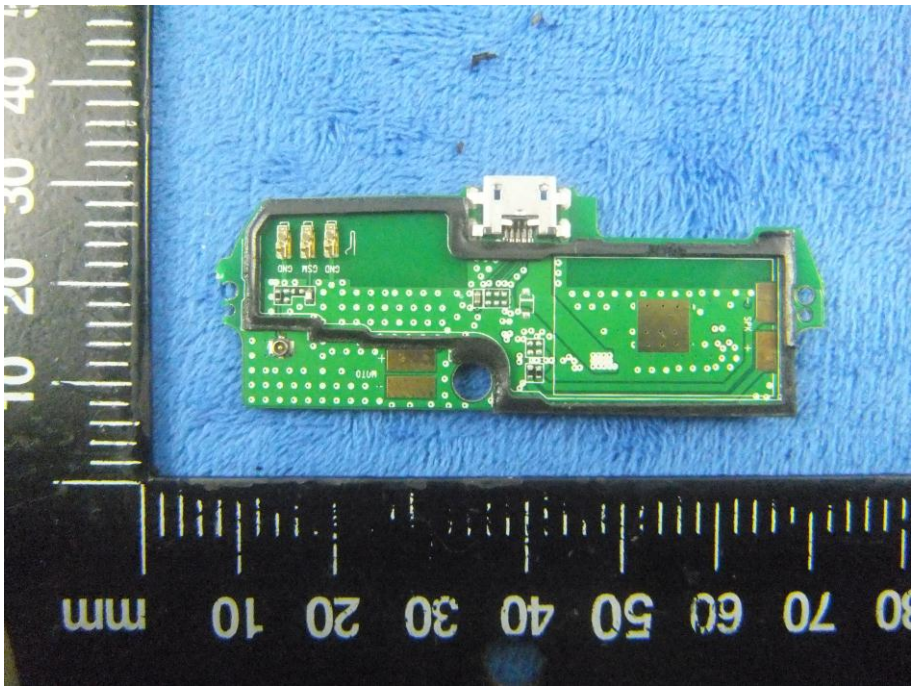
Mainboard without Shielding - Rear View



Small Mainboard - Front View

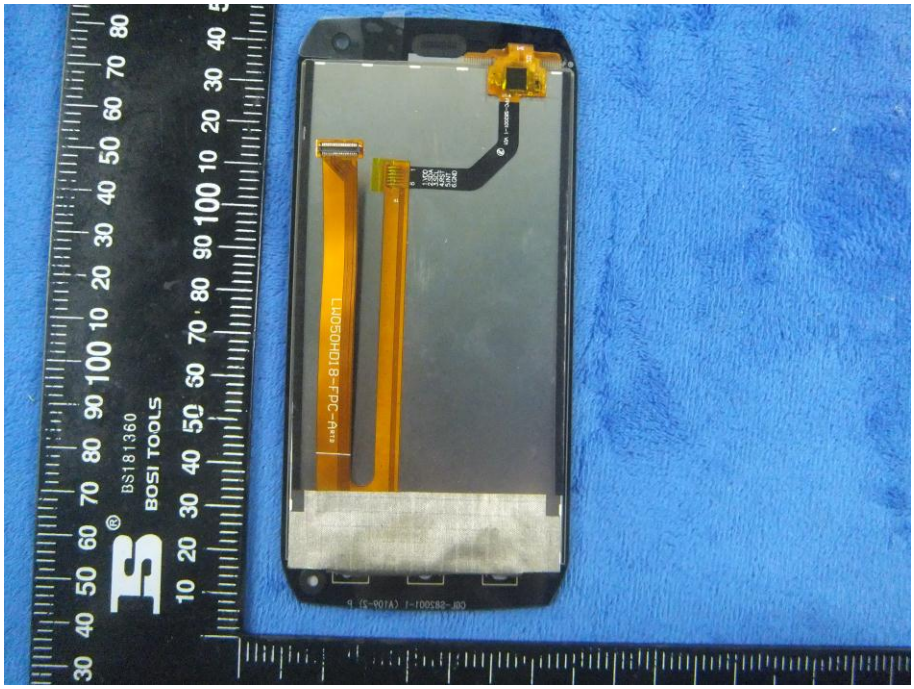


Small Mainboard - Rear View

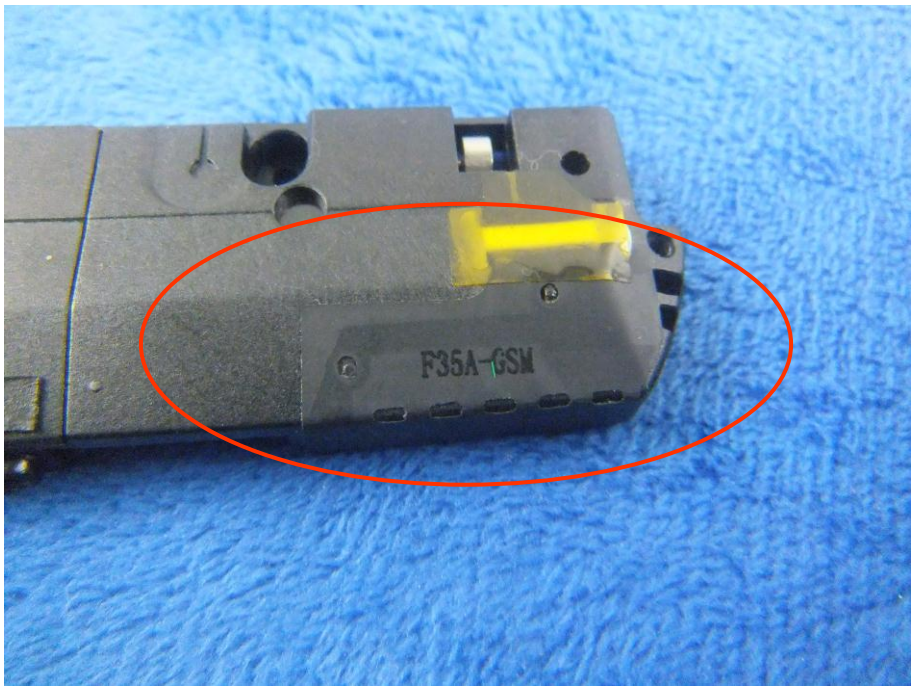


LCD – Front View

LCD – Rear View

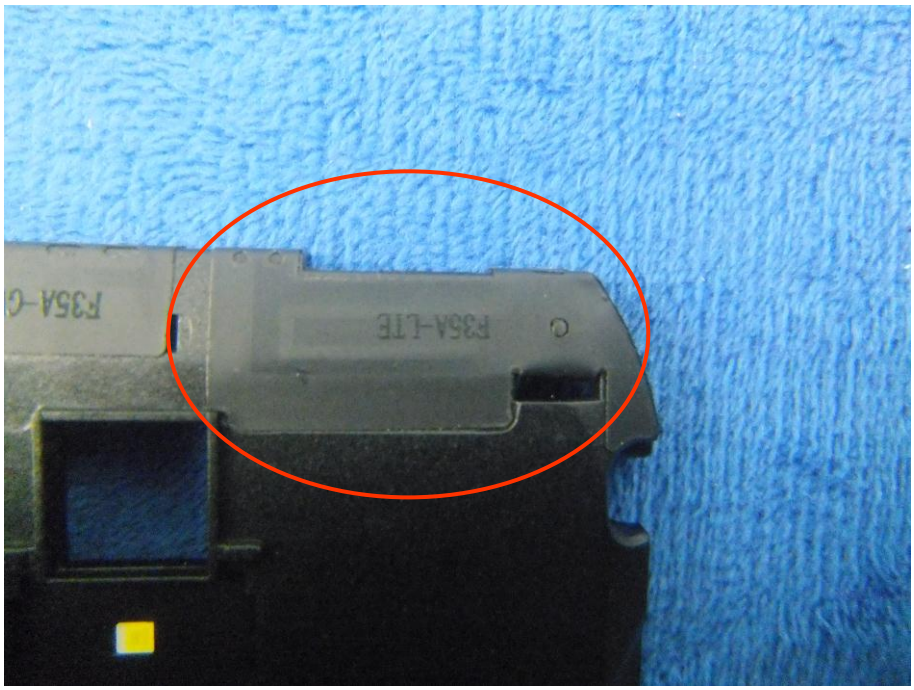


GSM/PCS/UMTS - Antenna View

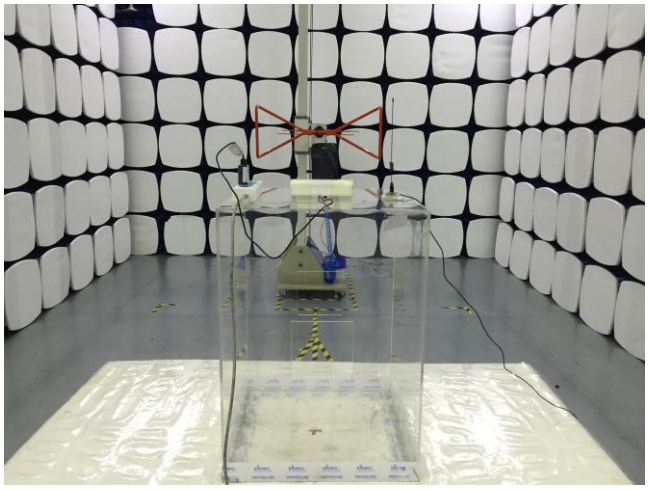
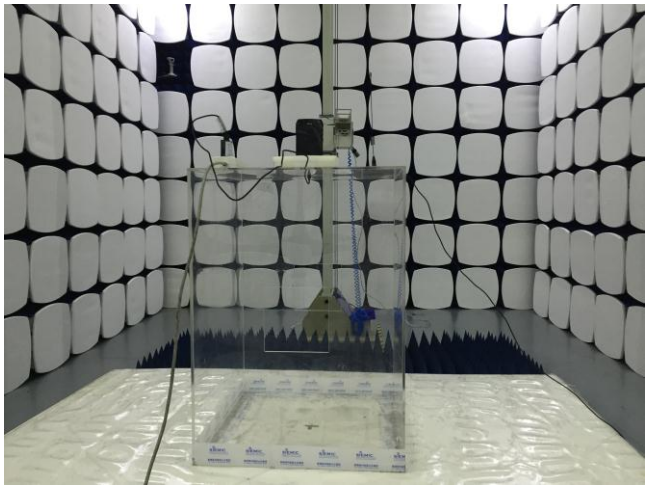


BT/WIFI - Antenna View

LTE - Antenna View



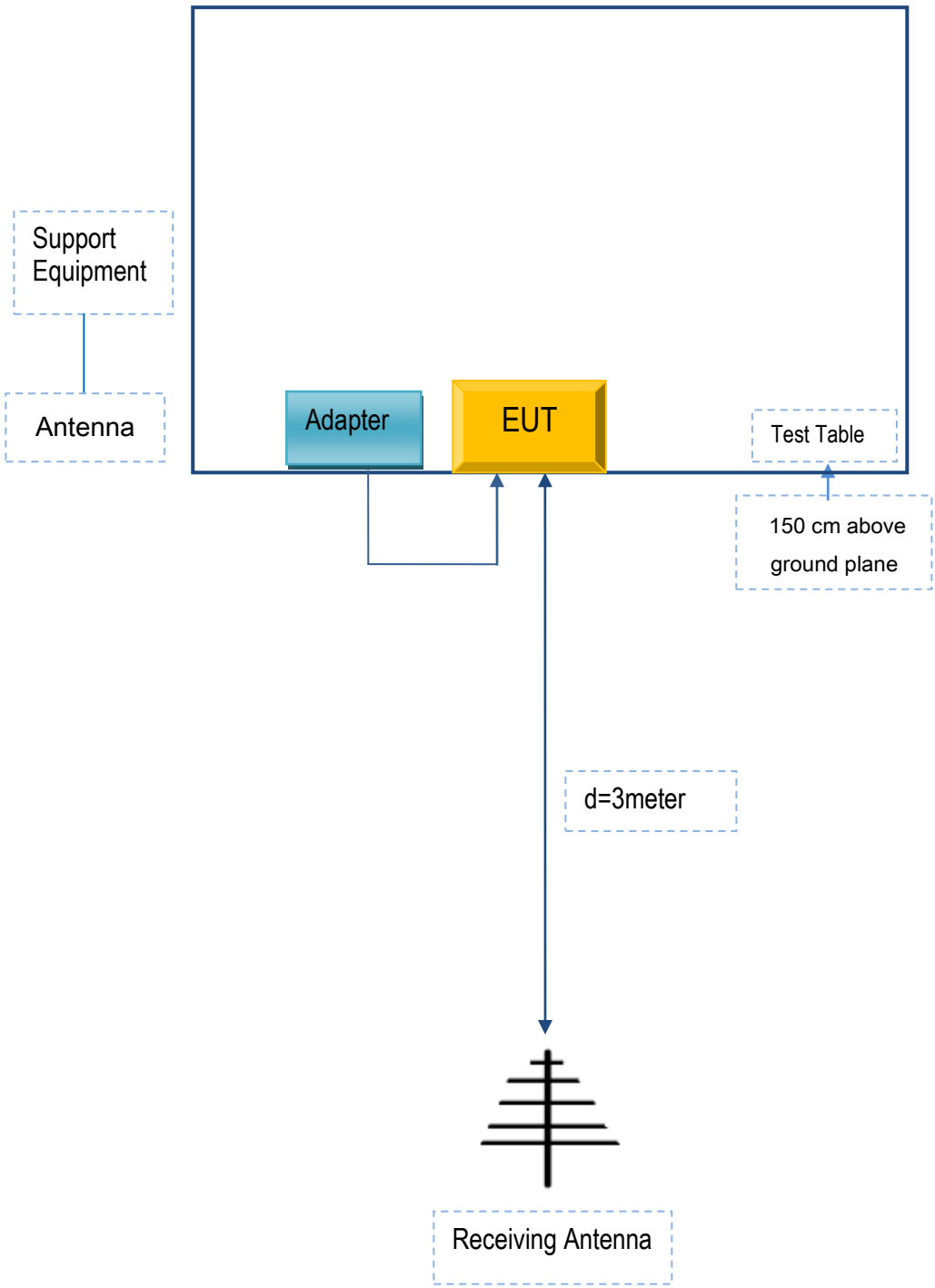
Annex B.iii. Photograph: Test Setup Photo

	
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
BLU Products, Inc.	Adapter	US-CB-1670	SO542

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	SO542

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