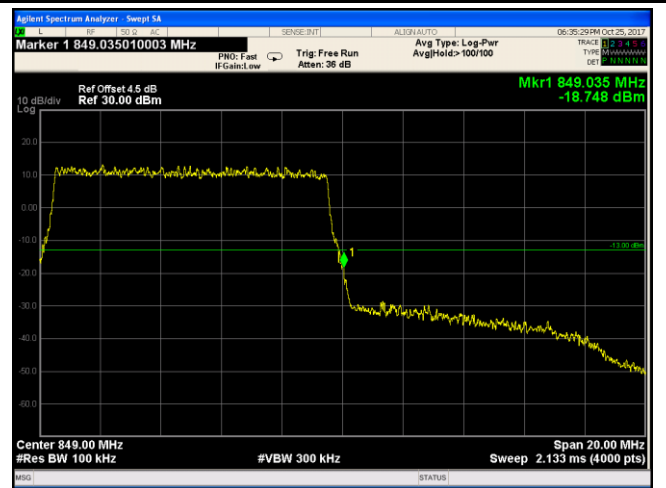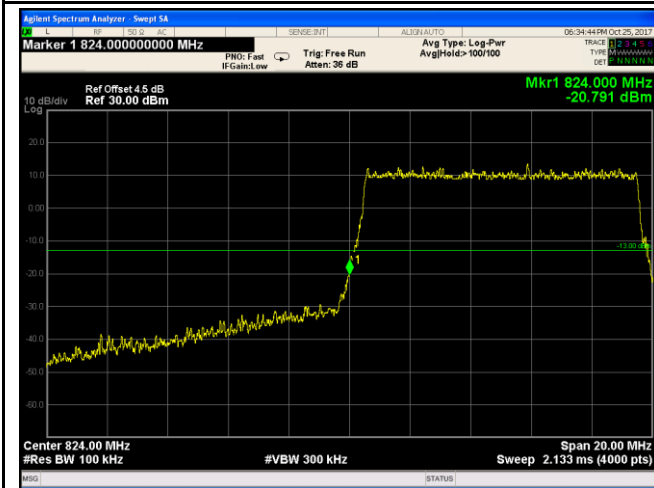SIEMIC
A Bureau Veritas Group Company

LTE Band 5 - Low Channel QPSK-10

LTE Band 5 - High Channel QPSK-10
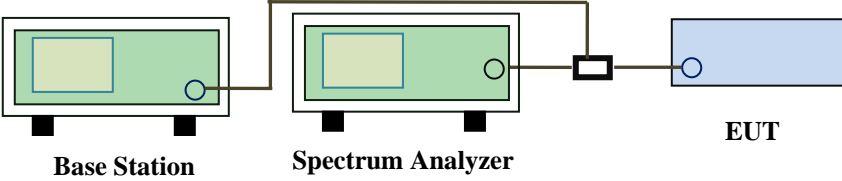

LTE Band 5 - Low Channel 16QAM-10

LTE Band 5 - High Channel 16QAM-10

6.8 Band Edge 27.53(m)

|	
Temperature	26 ºC
Relative Humidity	57%
Atmospheric Pressure	1025mbar
Test date :	October 25, 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 emmission ouutside of the channel edge must be attenuated below the transmitting power(P) by a factor shall be not less than 43+10log (P)dB at the channel edge, the limit of emission equal to -13dBm. And 55+10log (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 frenqency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.	☑
Test Setup	**Base Station** **Spectrum Analyzer** **EUT**	
Test Procedure	- The EUT was connected to Spectrum Analyzer and Base Station via power divider. - The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.	
Remark		
Result	☑ Pass ☐ Fail	

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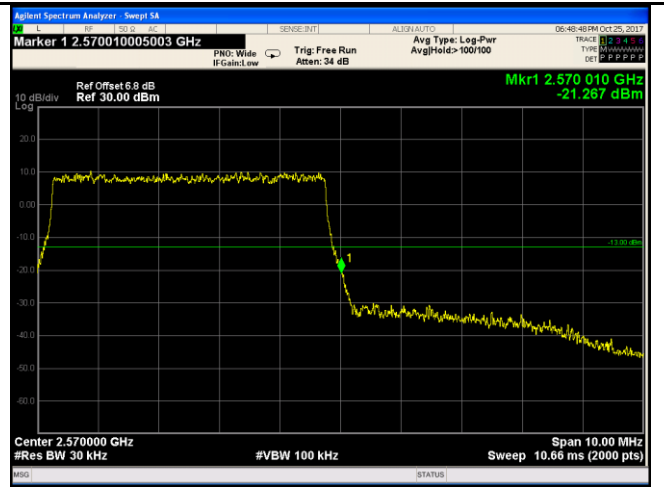
Test Plot　☑ Yes (See below)　　☐ N/A

LTE Band 7 (Part 27) result

| BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
5	20775	2502.5	QPSK	-18.780	-13
			16QAM	-18.780	-13
5	21425	2567.5	QPSK	-21.267	-13
			16QAM	-19.769	-13
10	20800	2505	QPSK	-21.147	-13
			16QAM	-21.142	-13
10	21400	2562.5	QPSK	-20.309	-13
			16QAM	-23.881	-13
15	20825	2507.5	QPSK	-21.633	-13
			16QAM	-21.595	-13
15	21400	2562.5	QPSK	-23.035	-13
			16QAM	-23.308	-13
20	20850	2510	QPSK	-27.327	-13
			16QAM	-27.466	-13
20	21350	2560	QPSK	-29.650	-13
			16QAM	-29.650	-13

LTE Band 7 (Part 27)
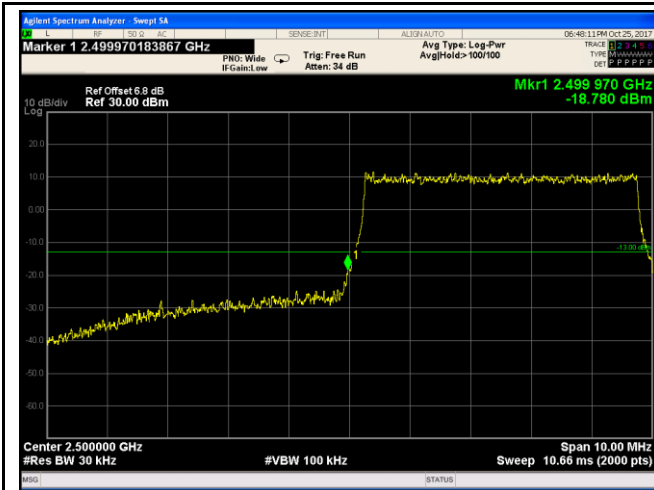
LTE Band 7 - Low Channel QPSK-5	LTE Band 7 - High Channel QPSK-5

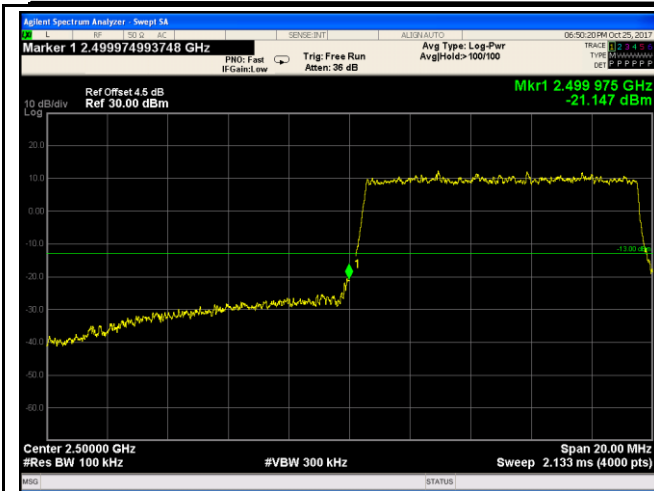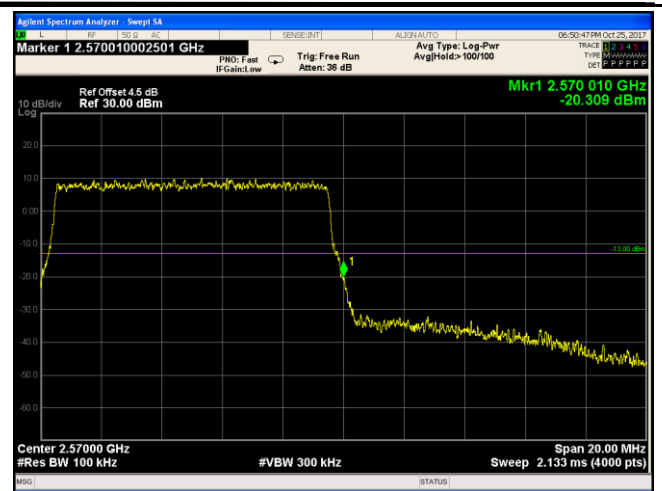| Note: Offset=Cable loss (4.5) + 10log (50.70/30)=4.5+2.3=6.8dB	Note: Offset=Cable loss (4.5) + 10log (50.54/30)=4.5+2.3=6.8dB
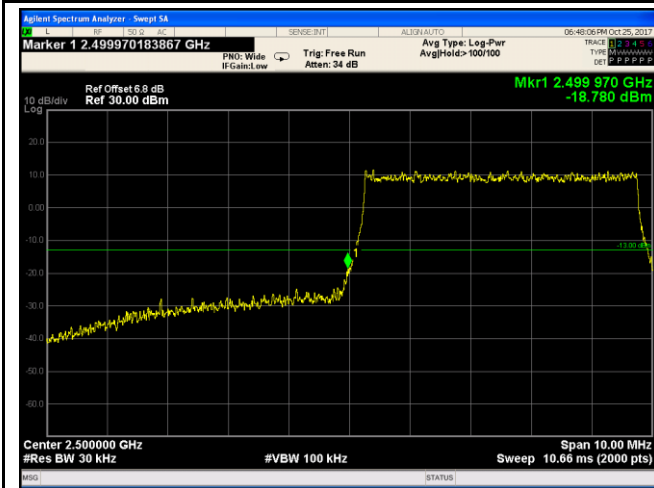
LTE Band 7 - Low Channel 16QAM-5	LTE Band 7 - High Channel 16QAM-5

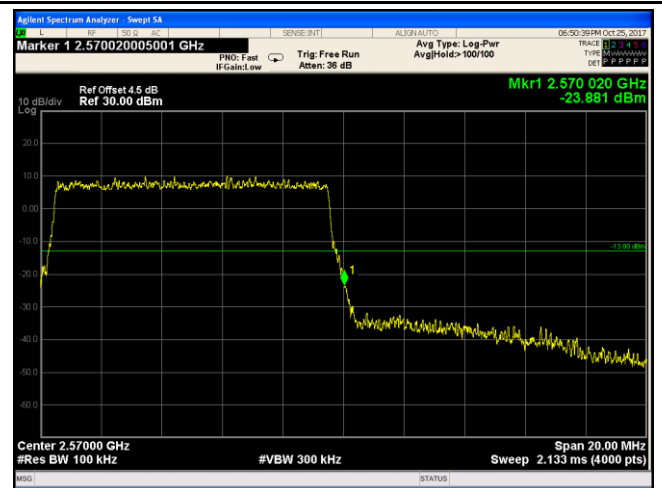| Note: Offset=Cable loss (4.5) + 10log (50.64/30)=4.5+2.3=6.8dB	Note: Offset=Cable loss (4.5) + 10log (50.54/30)=4.5+2.3=6.8dB

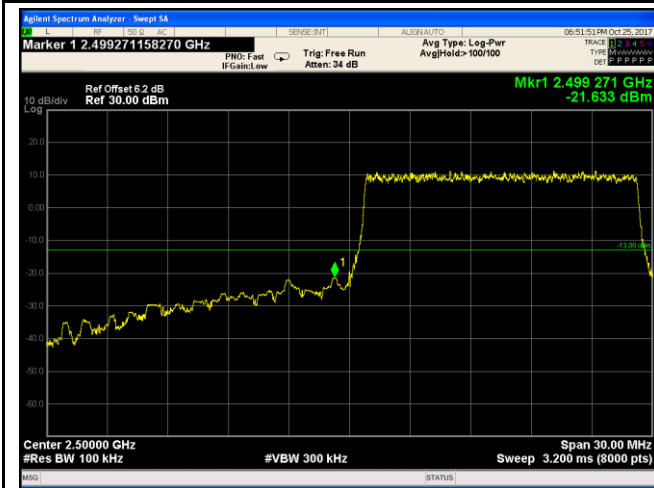LTE Band 7 - Low Channel QPSK-10

LTE Band 7 - High Channel QPSK-10

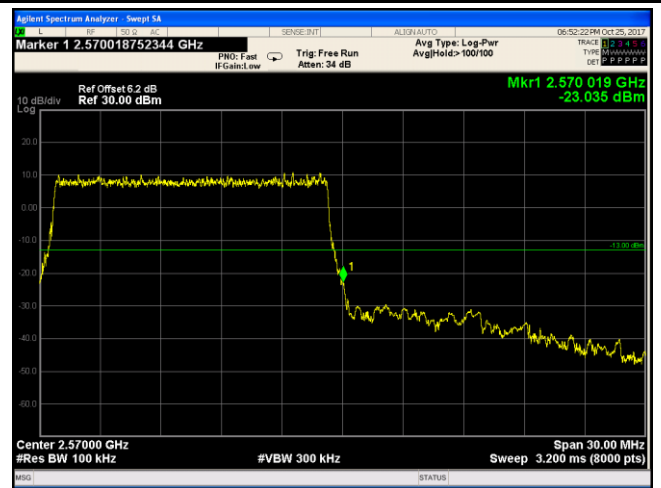LTE Band 7 - Low Channel 16QAM-10
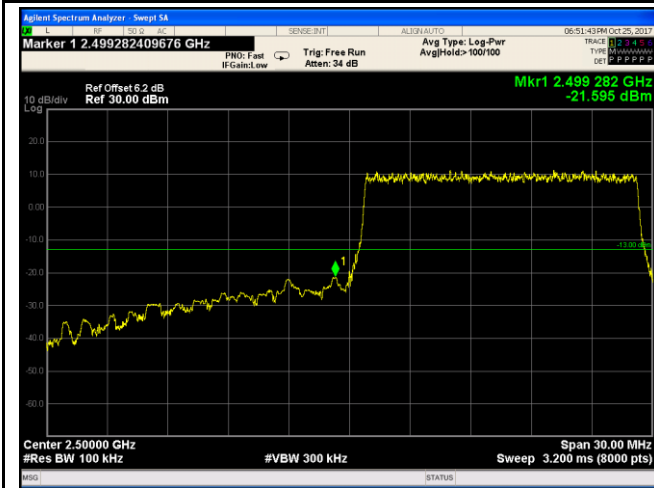

LTE Band 7 - High Channel 16QAM-10

LTE Band 7 - Low Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log

(147.5/100)=4.5+1.7=6.2dB

LTE Band 7 - High Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log
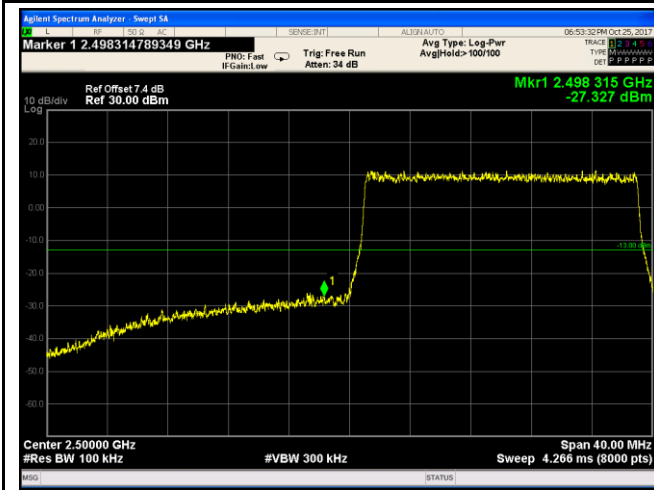
(147.9/100)=4.5+1.7=6.2dB

LTE Band 7 - Low Channel 16QAM-15

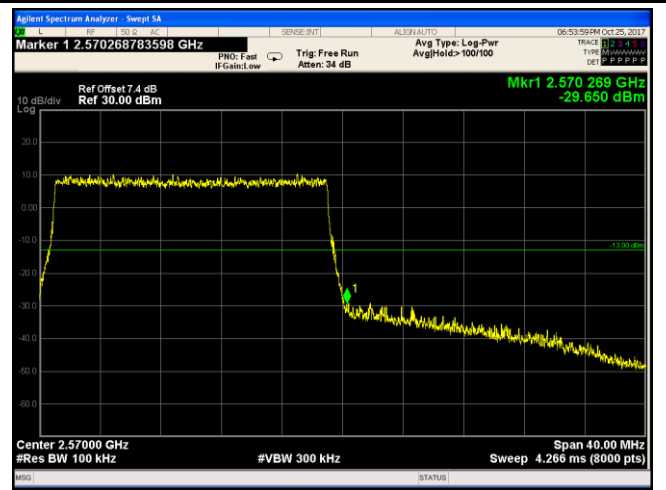Note: Offset=Cable loss (4.5) + 10log

(146.6/100)=4.5+1.7=6.2dB

LTE Band 7 - High Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log
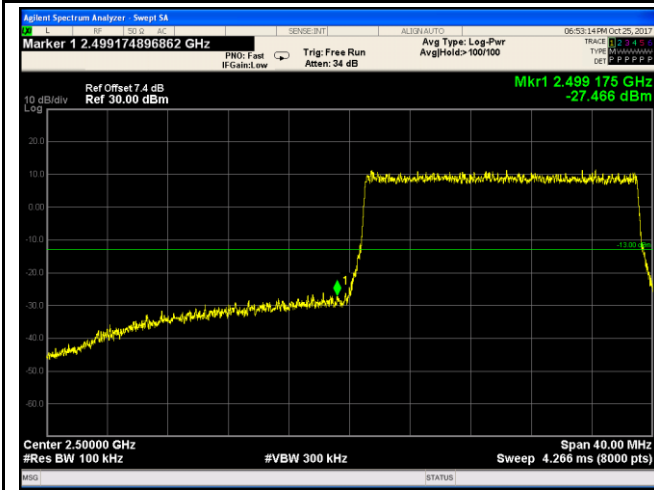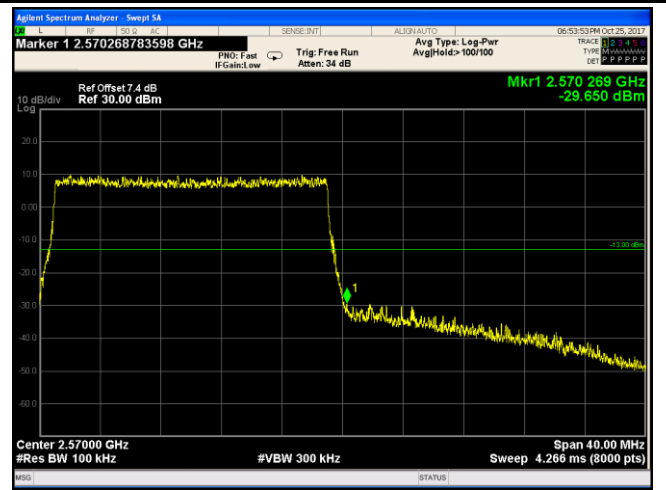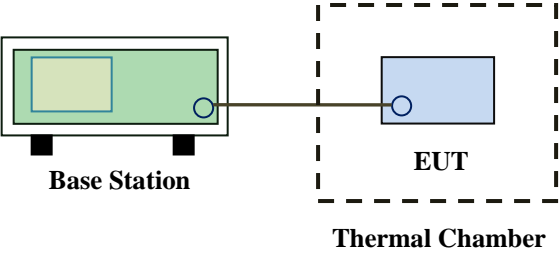
(147.0/100)=4.5+1.7=6.2dB

LTE Band 7 - Low Channel QPSK-20	LTE Band 7 - High Channel QPSK-20
Note: Offset=Cable loss (4.5) + 10log (193.0/100)=4.5+2.9=7.4dB	Note: Offset=Cable loss (4.5) + 10log (192.5/100)=4.5+2.9=7.4dB

LTE Band 7 - Low Channel 16QAM-20	LTE Band 7 - High Channel 16QAM-20
Note: Offset=Cable loss (4.5) + 10log (191.8/100)=4.5+2.9=7.4dB	Note: Offset=Cable loss (4.5) + 10log (192.5/100)=4.5+2.9=7.4dB

6.9 Frequency Stability

Temperature	26 ºC
Relative Humidity	56%
Atmospheric Pressure	1022mbar
Test date :	October 26, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54	a)	According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below: Frequency Tolerance for Transmitters in the Public Mobile Services See table below 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.	☑

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 0
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	
	Base Station **EUT** **Thermal Chamber**
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 5 (Part 22H) result

Middle Channel, f_o =836.5 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	-12	0.0069	2.5
0		-9	0.0052	2.5
10		-10	0.0058	2.5
20		-8	0.0046	2.5
30		-15	0.0087	2.5
40		-8	0.0046	2.5
50		-14	0.0081	2.5
55		-15	0.0087	2.5
25	4.2	-12	0.0069	2.5
	3.5	-15	0.0087	2.5

LTE Band 7 (Part 27) result

Middle Channel, f_o = 2535 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	-12	0.0069	2.5
0		-14	0.0081	2.5
10		-15	0.0087	2.5
20		-12	0.0069	2.5
30		-8	0.0046	2.5
40		-15	0.0087	2.5
50		-7	0.0040	2.5
55		-13	0.0075	2.5
25	4.2	-12	0.0069	2.5
	3.5	-17	0.0098	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	09/14/2017	09/13/2018	☑
Power Splitter	1#	1#	08/30/2017	08/29/2018	☑
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☑
Wideband Radio Communication Tester	CMW500	120906	03/26/2017	03/25/2018	☑
Temperature/Humidity Chamber	UHL-270	001	10/07/2017	10/06/2018	☑
DC Power Supply	E3640A	MY40004013	09/15/2017	09/14/2018	☑
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/15/2017	09/14/2018	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	☑
Microwave Preamplifier (0.5 ~ 18GHz)	PAM-118	443008	08/30/2017	08/29/2018	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	☑
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/19/2017	09/18/2018	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/22/2017	09/21/2018	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☑
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/15/2017	09/14/2018	☑
Tunable Notch Filter	3NF-800/1000-S	AA4	08/30/2017	08/29/2018	☑

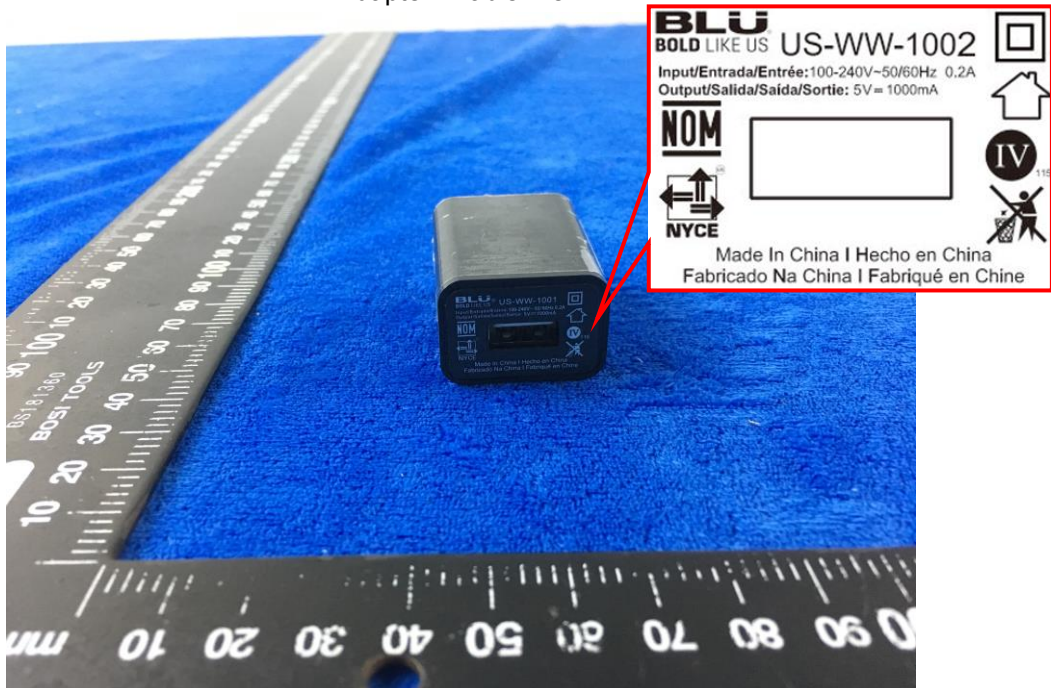| Tunable Notch Filter	3NF-1000/2000-S	AM 4	08/31/2016	08/29/2018	☑

Annex B. EUT And Test Setup Photographs

Annex B.i.   Photograph: EUT External Photo

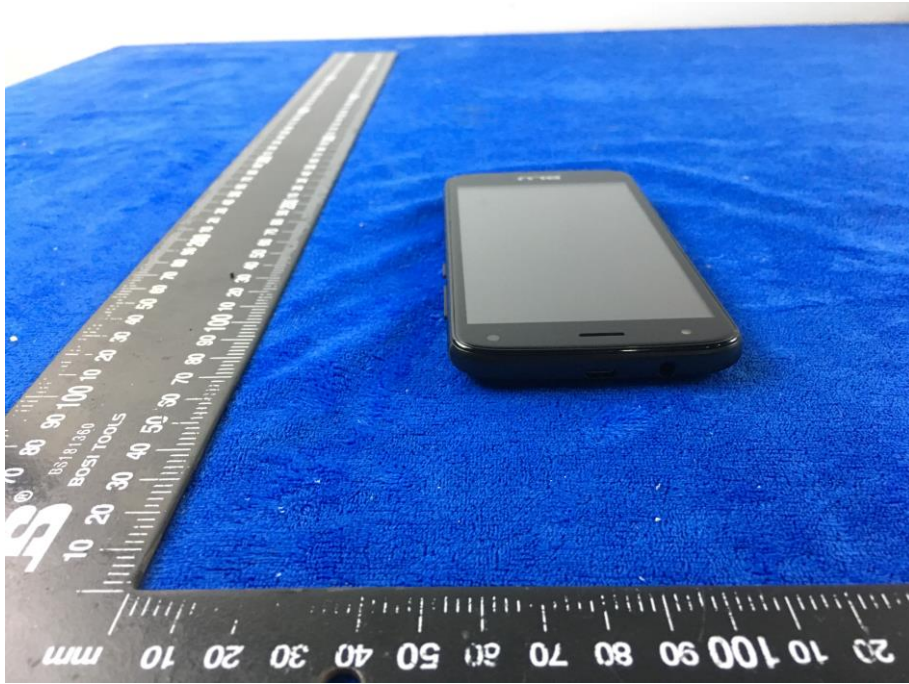Whole Package View

Adapter - Lable View

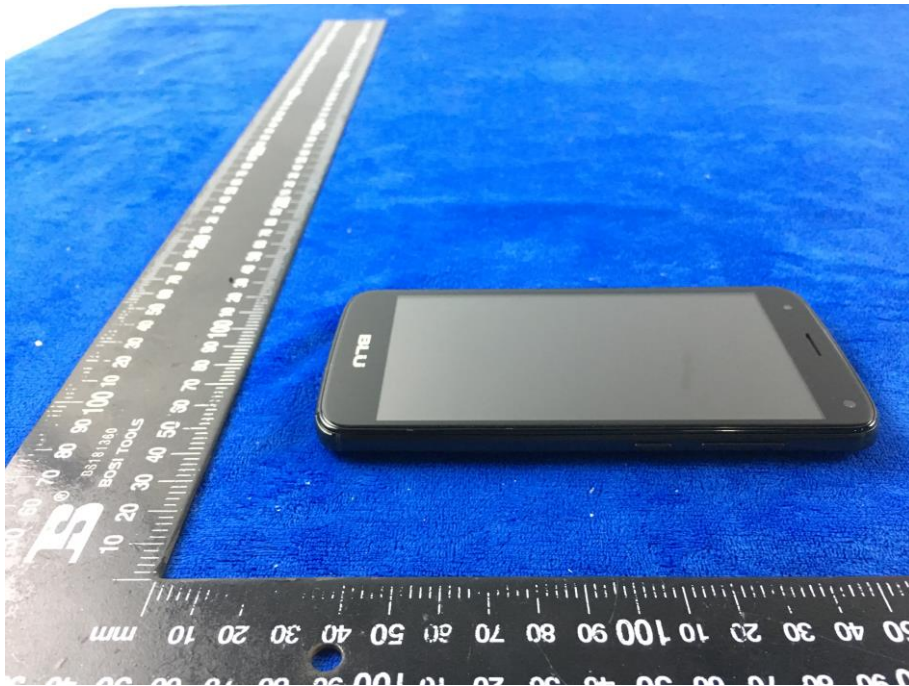EUT - Front View

EUT - Rear View

EUT - Top View

EUT - Bottom View

EUT - Left View

EUT - Right View

Annex B.ii.   Photograph: EUT Internal Photo
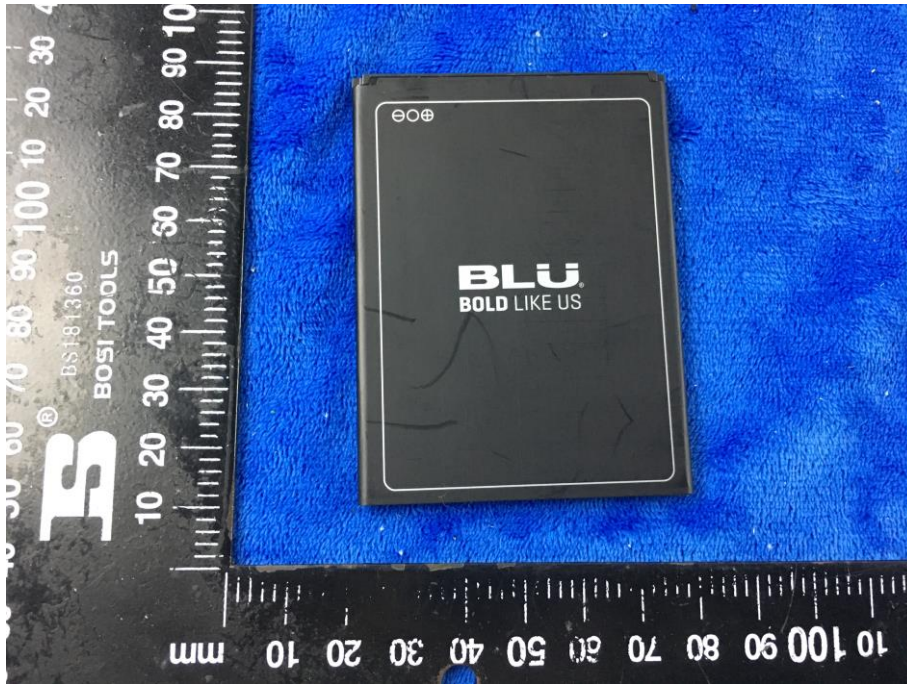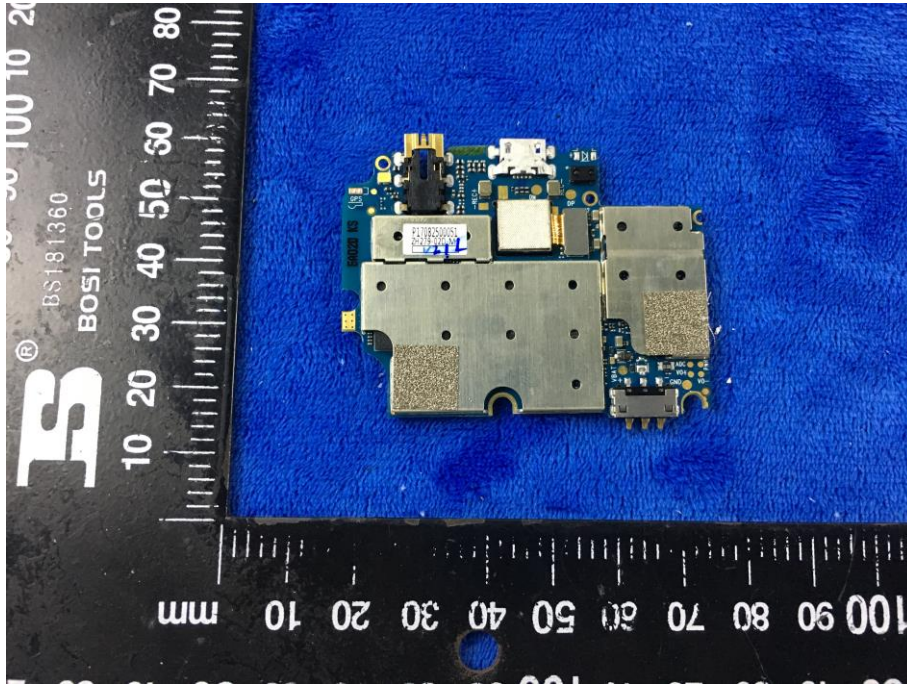
Cover Off - Top View 1
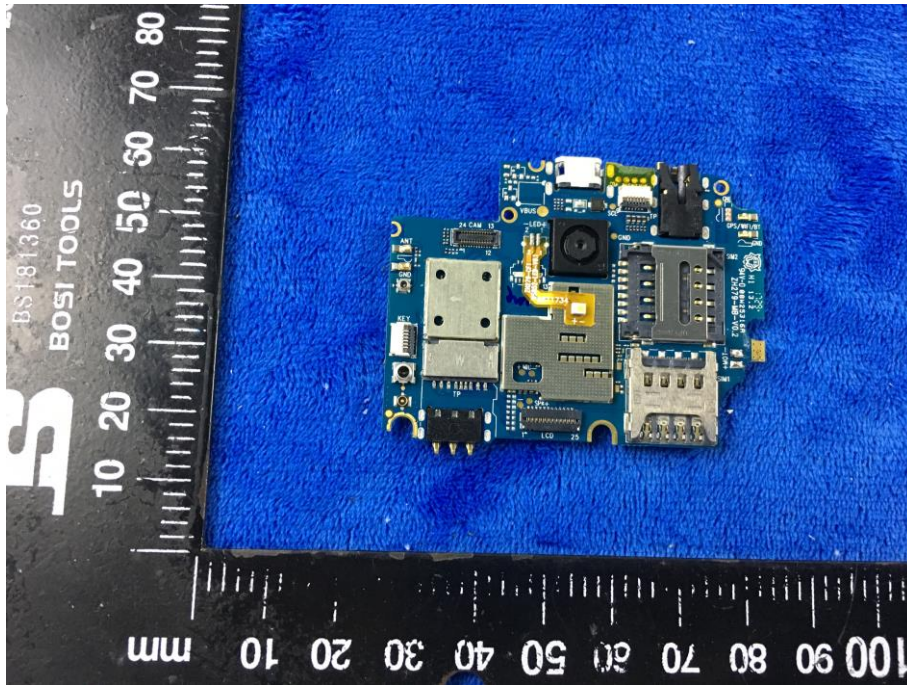

Cover Off - Top View 2

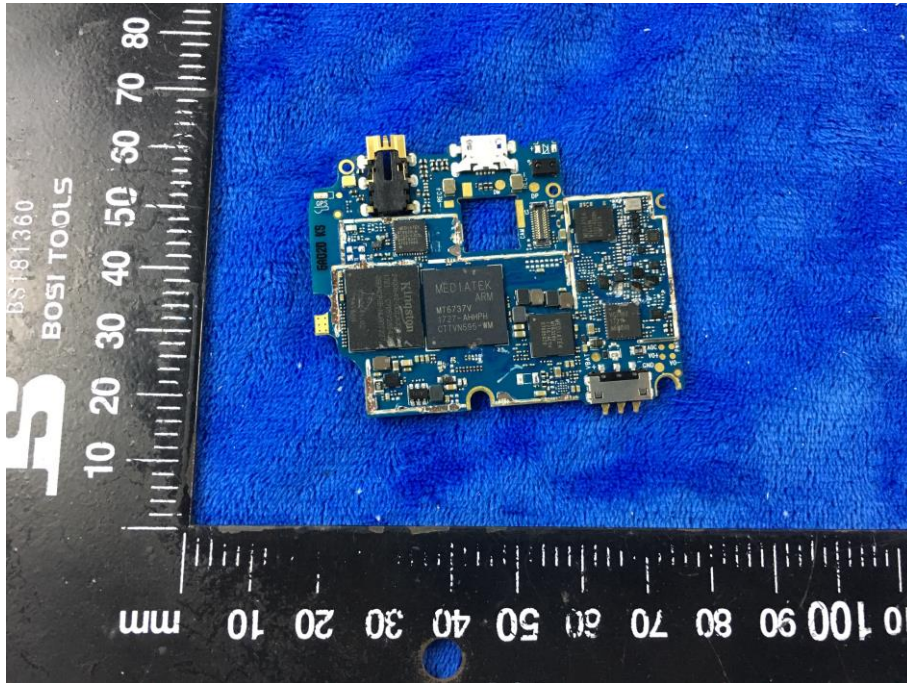Battery - Front View

Battery - Rear View

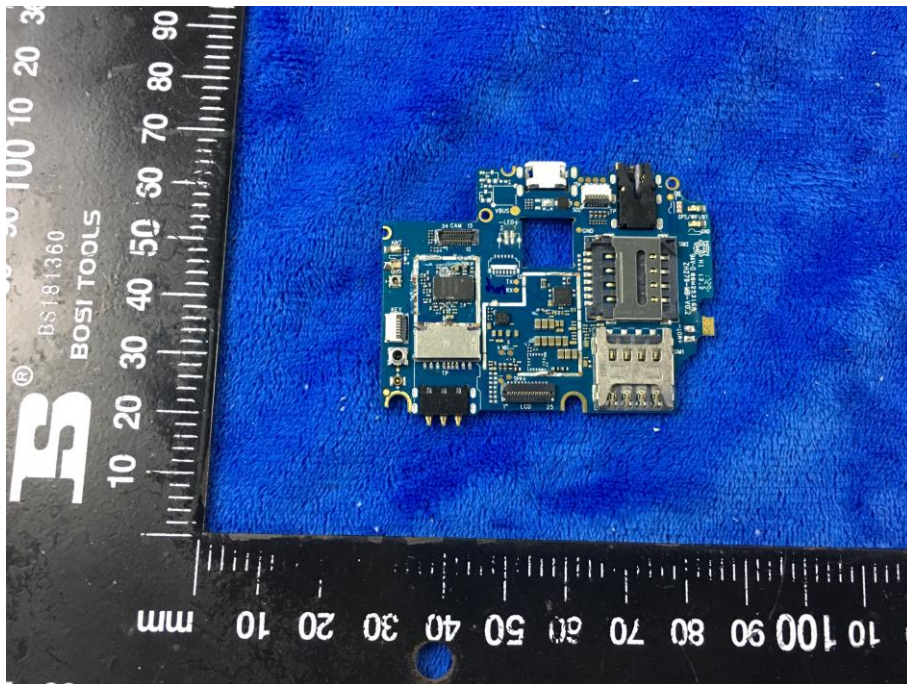Mainboard with Shielding – Front View

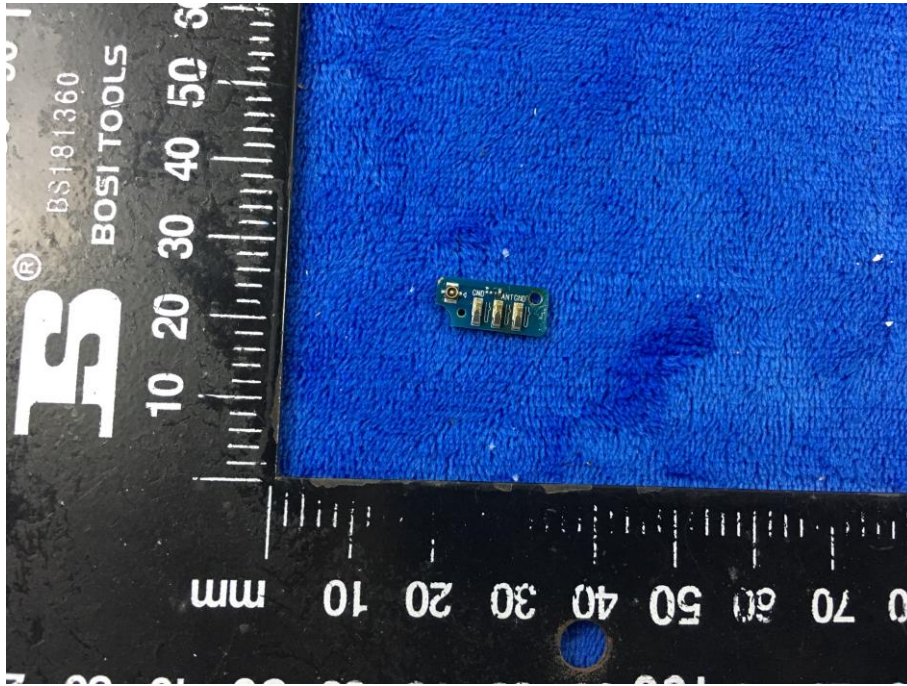Mainboard with Shielding – Rear View

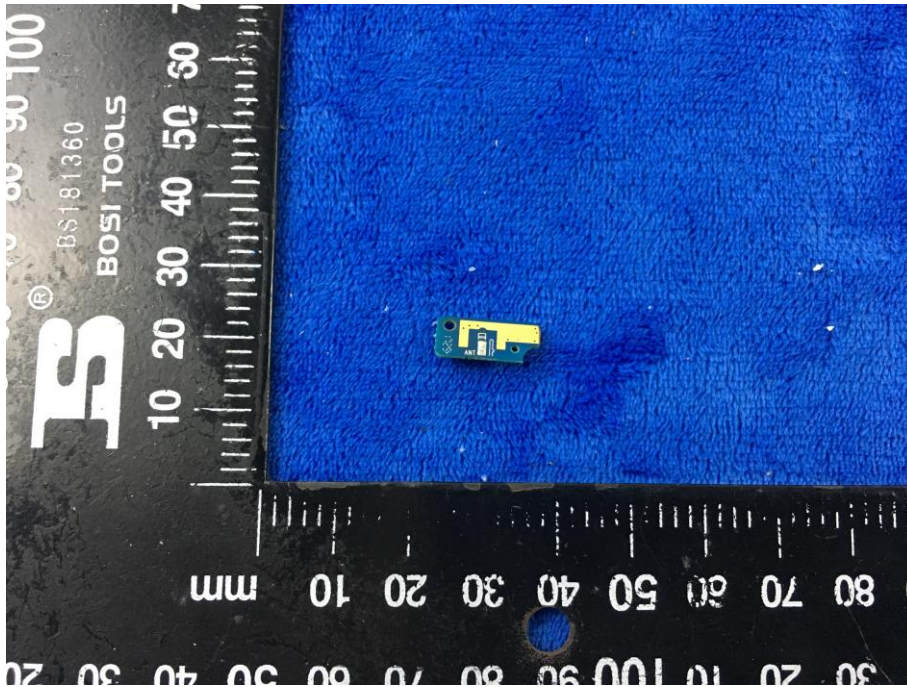Mainboard without Shielding – Front View

Mainboard without Shielding – Rear View

Connected Mainboard – Front View

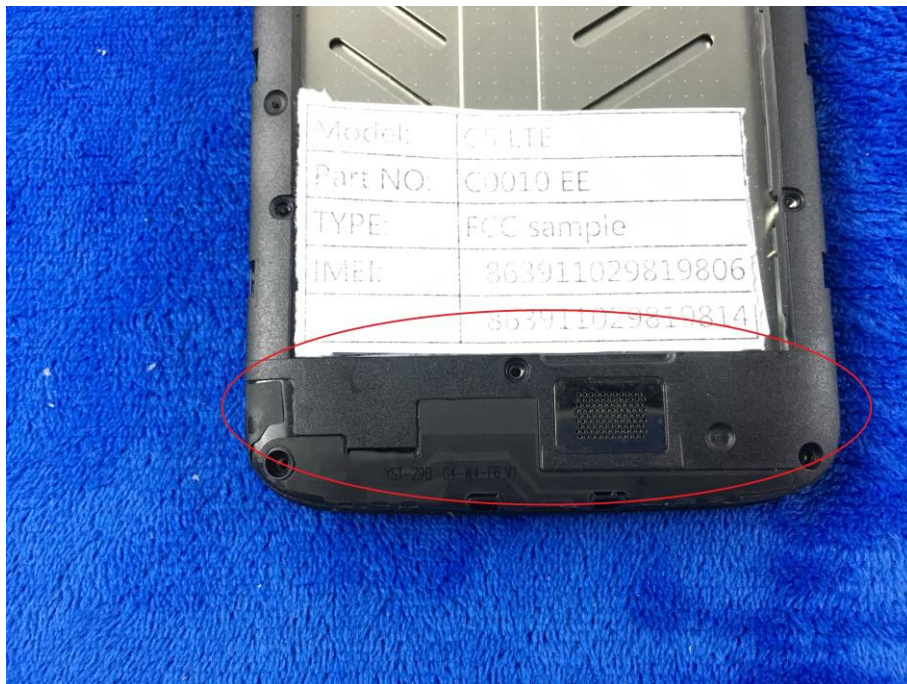Connected Mainboard – Rear View
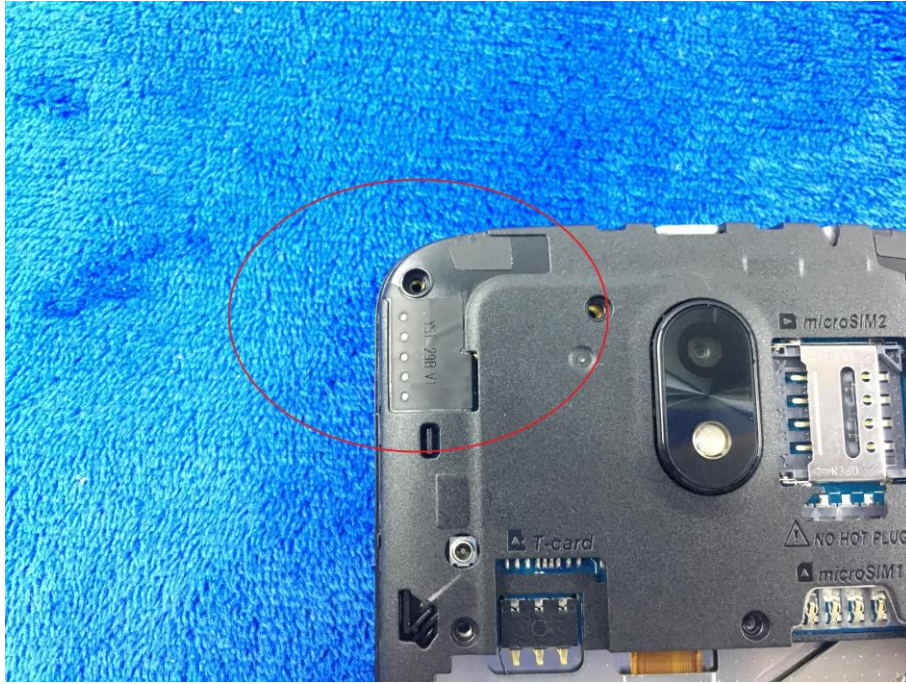
LCD – Front View

LCD – Rear View
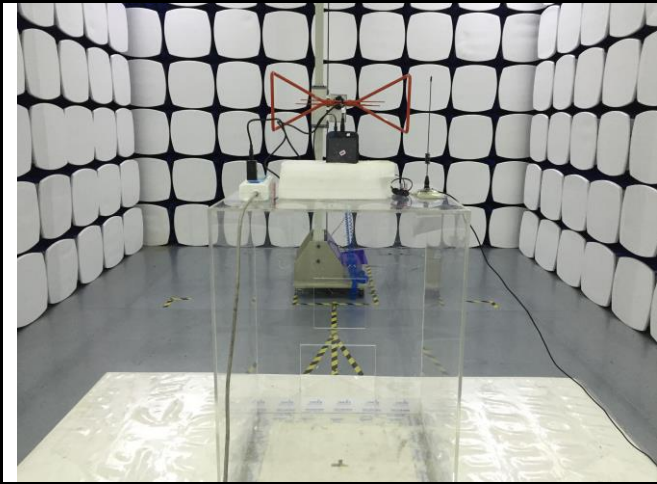
GSM/PCS/UMTS-FDD/LTE - Antenna View
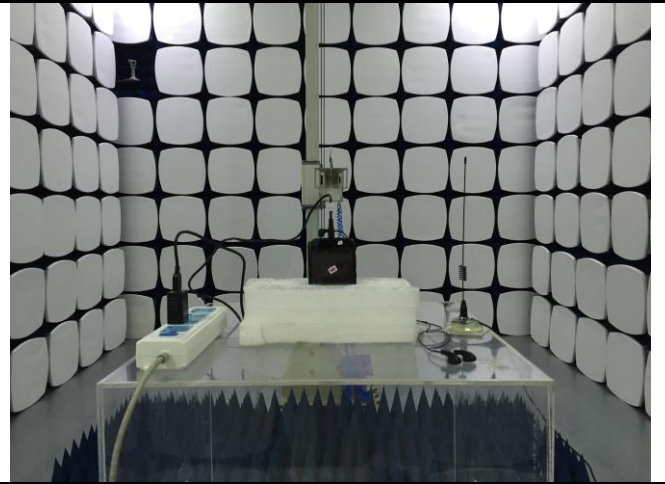

WIFI/BT/BLE/GPS - Antenna View

RXD- Antenna View

Annex B.iii. Photograph: Test Setup Photo

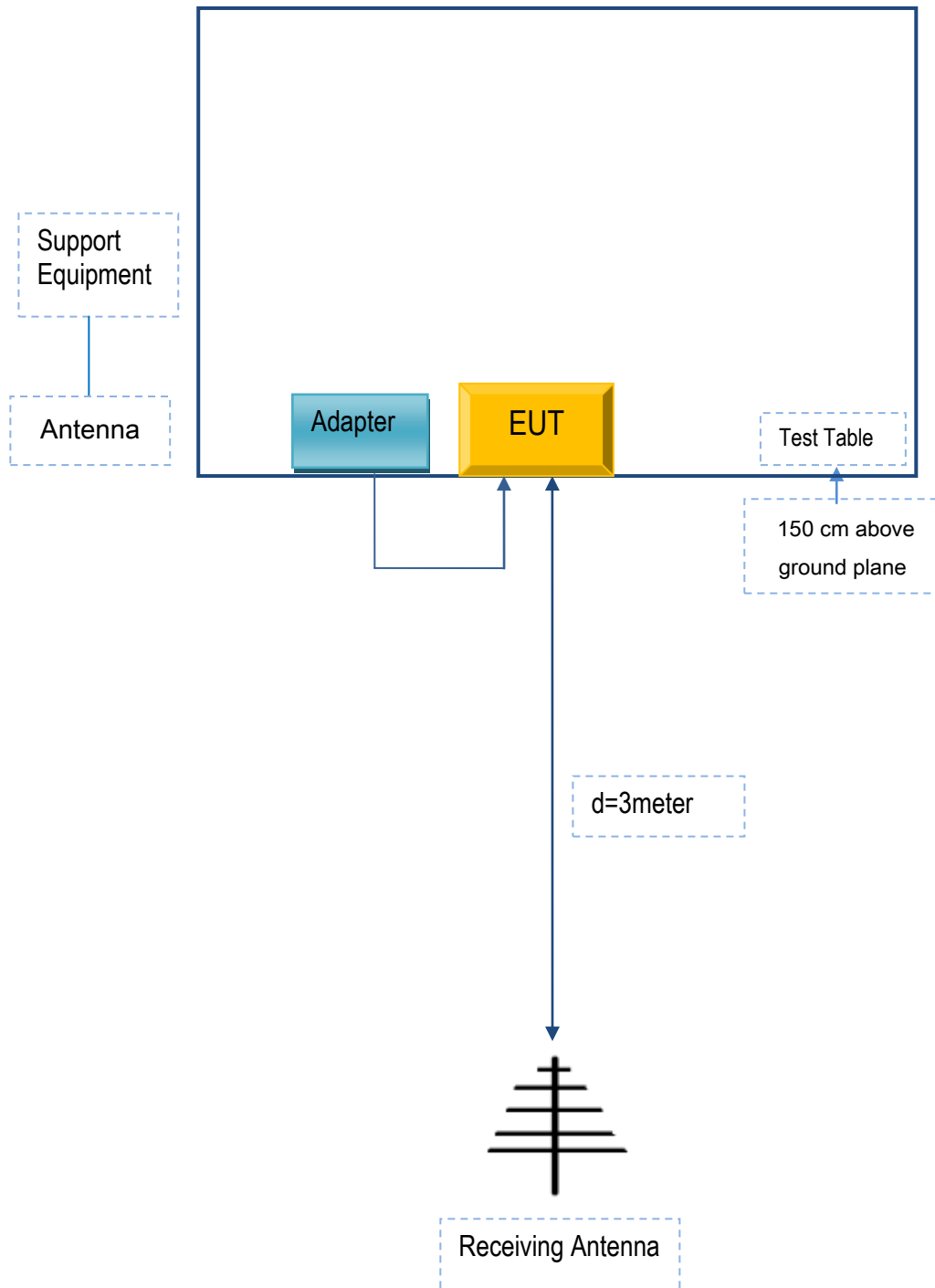| Radiated Spurious Emissions Test Setup Below 1GHz | Radiated Spurious Emissions Test Setup Above 1GHz |

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii.   TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions

Support Equipment

Antenna

Adapter

EUT

Test Table

150 cm above ground plane

d=3meter

Receiving Antenna

Annex C. il.   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-WW-1002	N/A
SAMSUNG	headset	HS330	N/A
Agilent	Wireless Connectivity Test Set	N4010A	N/A
OEM	omnidirectional antenna	AntSuck	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	Y1124222

Annex C.ii. EUT OPERATING CONKITIONS

N/A

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

N/A

Annex E. DECLARATION OF SIMILARITY

N/A