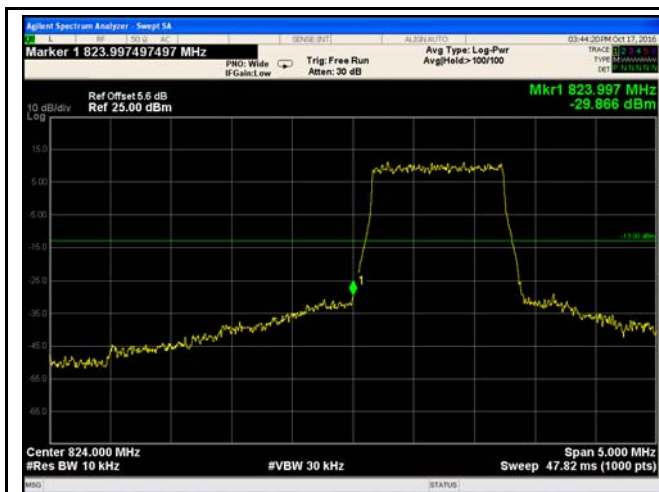


## LTE Band V (Part 22H)



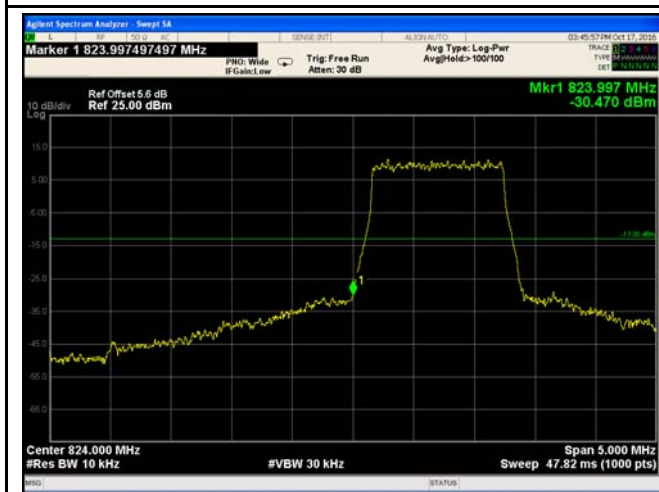
LTE Band V - Low Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
(12.77/10)=4.5+1.1=5.6 dB



LTE Band V - High Channel QPSK-1.4

Note: Offset=Cable loss (4.5) + 10log  
(12.83/10)=4.5+1.1=5.6 dB



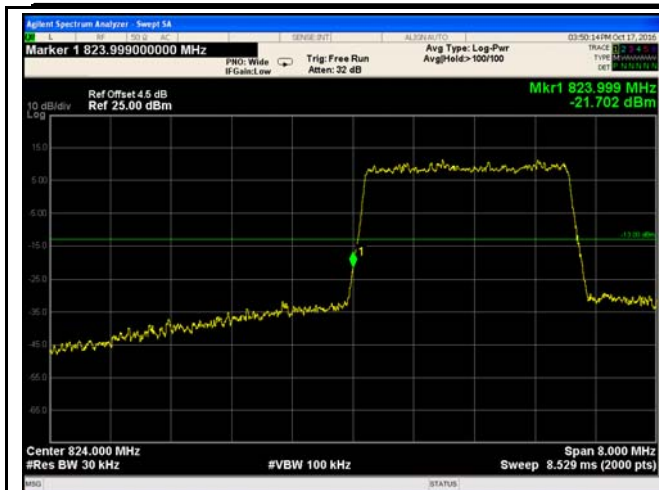
LTE Band V - Low Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
(12.90/10)=4.5+1.1=5.6 dB



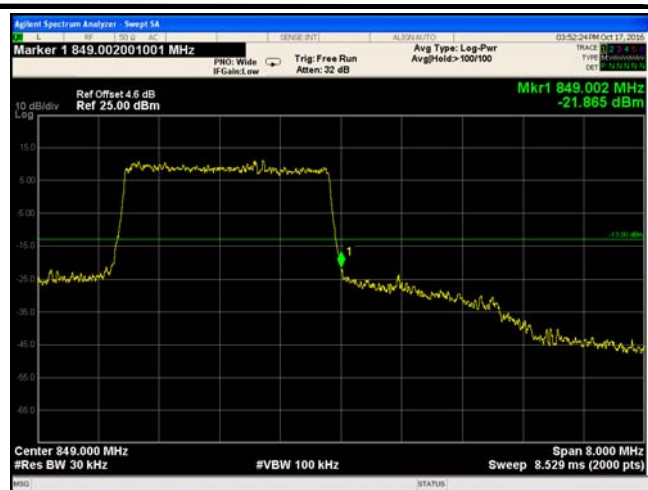
LTE Band V - High Channel 16QAM-1.4

Note: Offset=Cable loss (4.5) + 10log  
(12.77/10)=4.5+1.1=5.6 dB



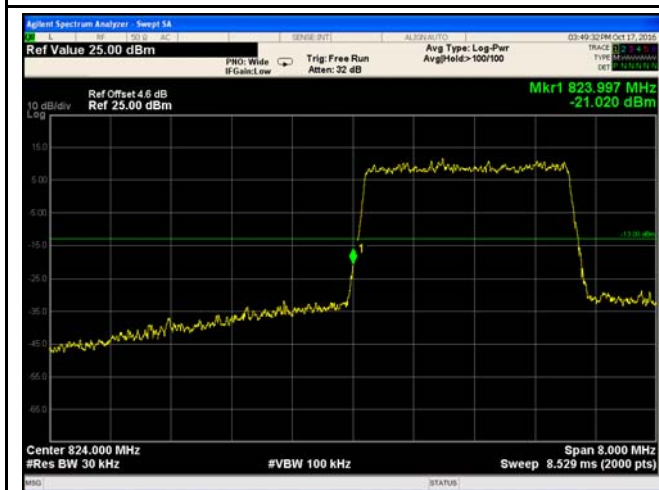
LTE Band V - Low Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
(30.24/30)=4.5+0.0=4.5 dB



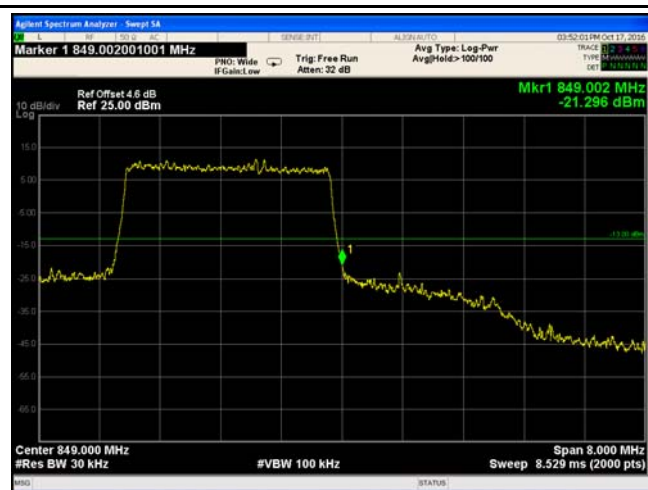
LTE Band V - High Channel QPSK-3

Note: Offset=Cable loss (4.5) + 10log  
(30.38/30)=4.5+0.1=4.6 dB



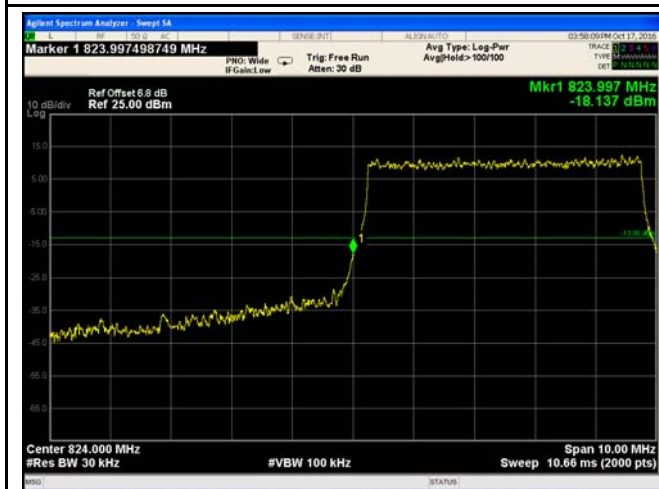
LTE Band V - Low Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
(30.43/30)=4.5+0.1=4.6 dB



LTE Band V - High Channel 16QAM-3

Note: Offset=Cable loss (4.5) + 10log  
(30.56/30)=4.5+0.1=4.6 dB

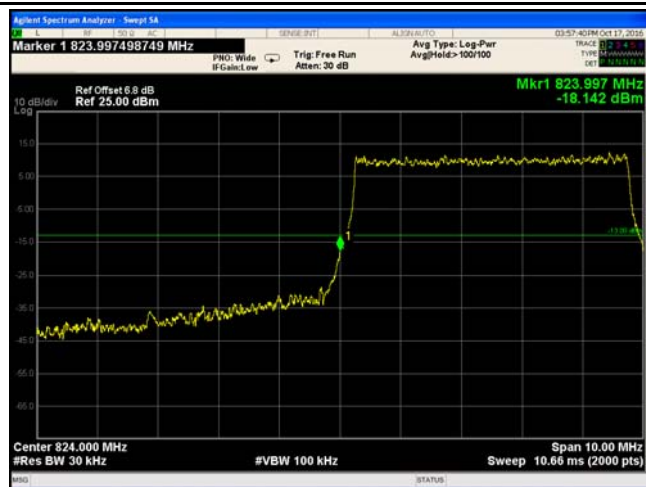


LTE Band V - Low Channel QPSK-5



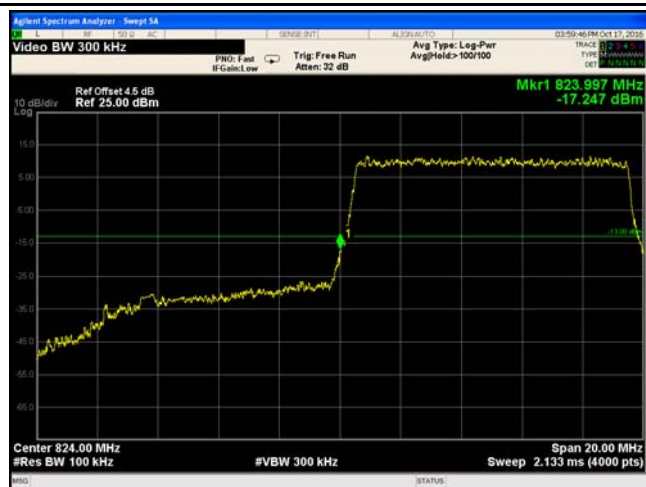
LTE Band V - High Channel QPSK-5

Note: Offset=Cable loss (4.5) + 10log  
(50.45/30)=4.5+2.3=6.8 dB

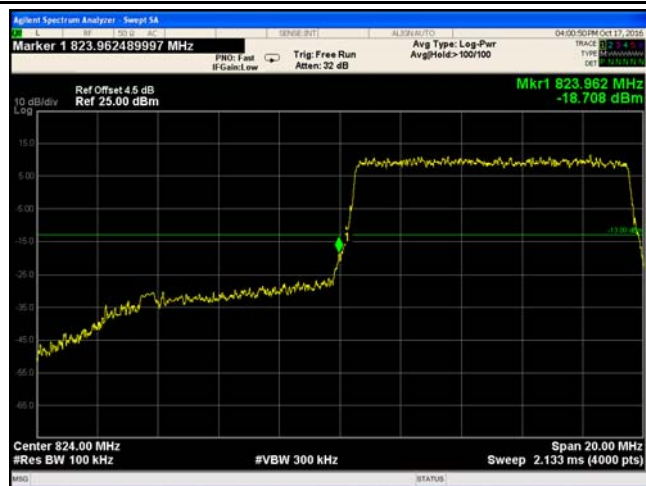


LTE Band V - Low Channel 16QAM-5

Note: Offset=Cable loss (4.5) + 10log  
(50.47/30)=4.5+2.3=6.8 dB



LTE Band V - Low Channel QPSK-10



LTE Band V - Low Channel 16QAM-10

Note: Offset=Cable loss (4.5) + 10log  
(50.33/30)=4.5+2.2=6.7 dB



LTE Band V - High Channel 16QAM-5

Note: Offset=Cable loss (4.5) + 10log  
(50.44/30)=4.5+2.3=6.8 dB



LTE Band V - High Channel QPSK-10



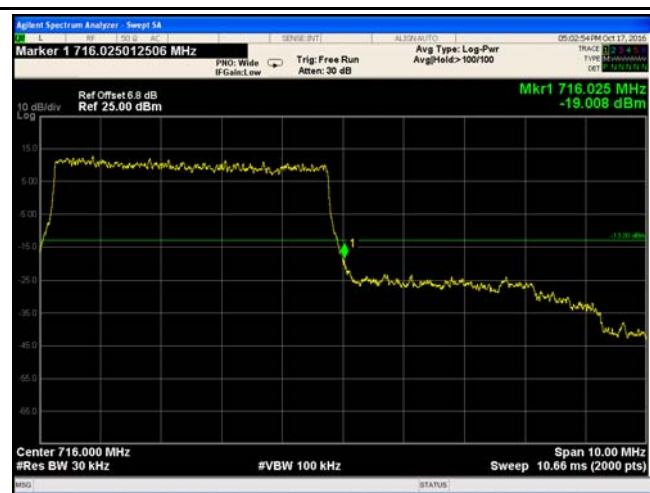
LTE Band V - High Channel 16QAM-10

## LTE Band XVII (Part 27)



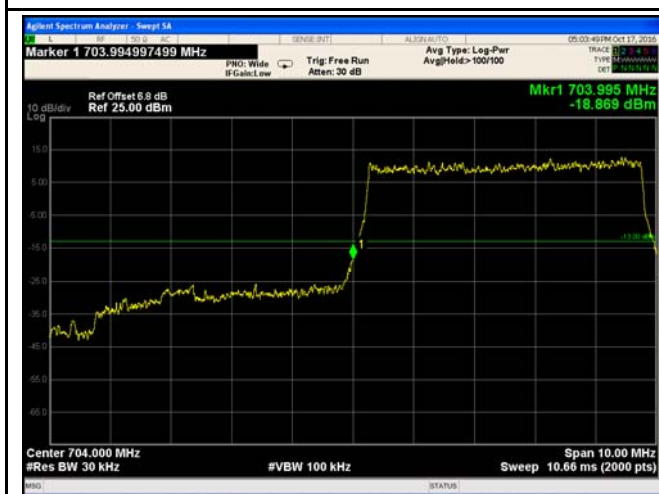
LTE Band XVII - Low Channel QPSK-5

Note: Offset=Cable loss (4.0) + 10log  
(50.71/30)=4.5+2.3=6.7 dB



LTE Band XVII - High Channel QPSK-5

Note: Offset=Cable loss (4.0) + 10log  
(50.38/30)=4.5+2.3=6.8 dB



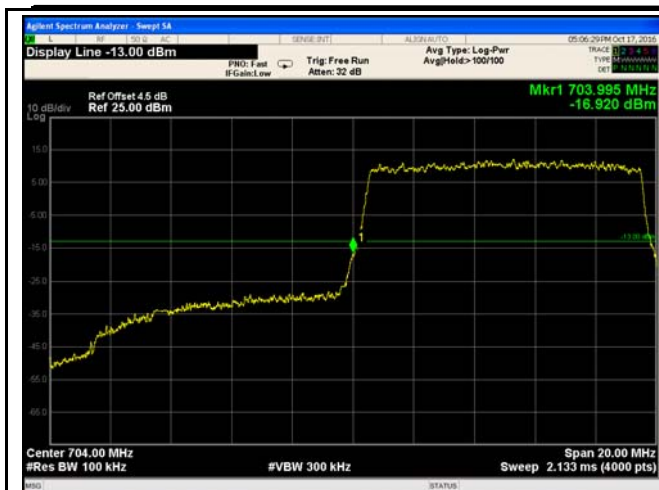
LTE Band XVII - Low Channel 16QAM-5

Note: Offset=Cable loss (4.0) + 10log  
(50.71/30)=4.5+2.3=6.8 dB



LTE Band XVII - High Channel 16QAM-5

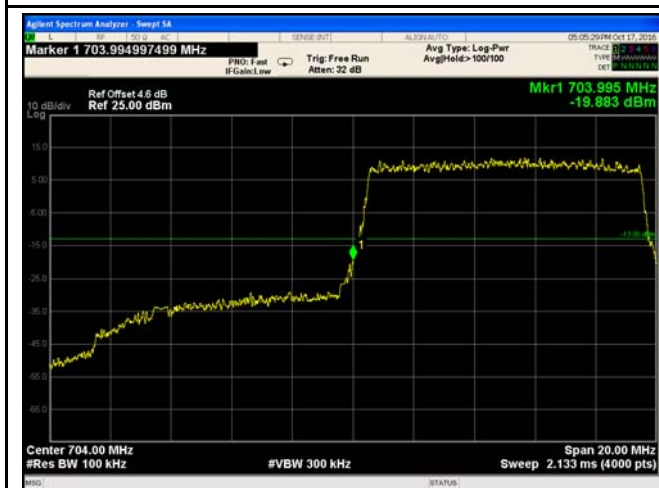
Note: Offset=Cable loss (4.0) + 10log  
(50.25/30)=4.5+2.2=6.7 dB



LTE Band XVII - Low Channel QPSK-10



LTE Band XVII - High Channel QPSK-10



LTE Band XVII - Low Channel 16QAM-10

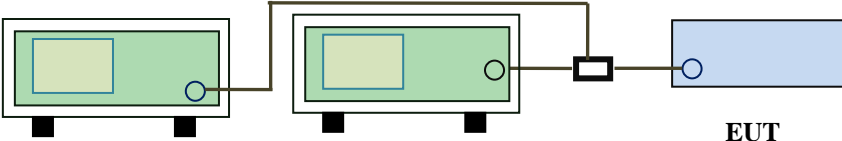


LTE Band XVII - High Channel 16QAM-10

## 6.8 Band Edge 27.53(m)

Temperature	22°C
Relative Humidity	59%
Atmospheric Pressure	1017mbar
Test date :	October 17, 2016
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

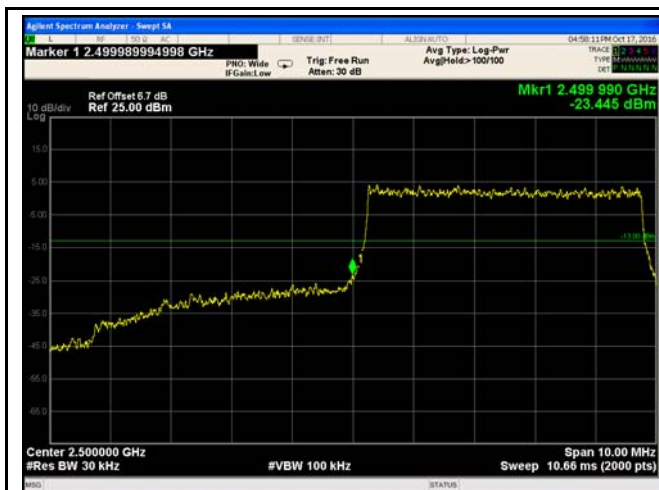
Test Plot    ☒ Yes (See below)      ☐ N/A



### LTE Band VII (Part 27) result

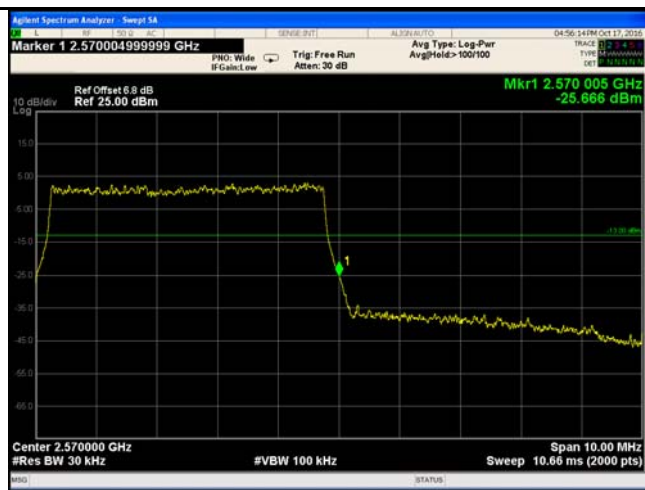
BW(MHz)	Channel	Frequency (MHz)	Mode	Emission (dBm)	Limit (dBm)
5	20775	2499.9	QPSK	-23.445	-13
			16QAM	-24.630	-13
5	21425	2570	QPSK	-25.666	-13
			16QAM	-25.760	-13
10	20800	2499.9	QPSK	-23.970	-13
			16QAM	-24.159	-13
10	21400	2570	QPSK	-26.380	-13
			16QAM	-26.050	-13
15	20825	2499.9	QPSK	-24.411	-13
			16QAM	-24.056	-13
15	21400	2570	QPSK	-27.218	-13
			16QAM	-27.297	-13
20	20850	2499.9	QPSK	-24.255	-13
			16QAM	-25.653	-13
20	21350	2570	QPSK	-32.184	-13
			16QAM	-33.279	-13

## LTE Band VII (Part 27)



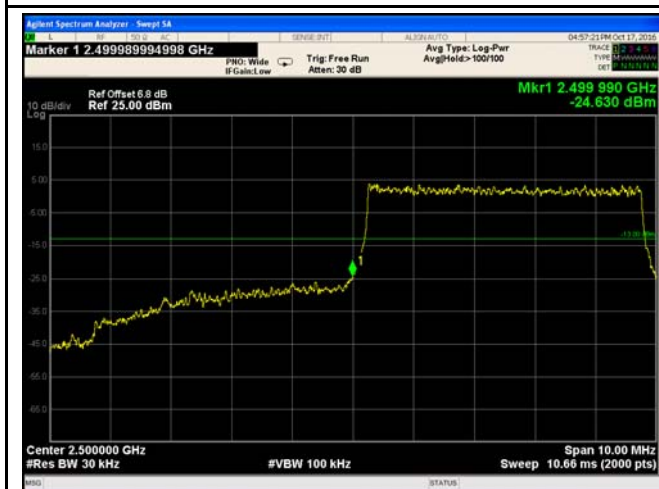
LTE Band VII - Low Channel QPSK-5

Note: Offset=Cable loss (4.5) + 10log  
(50.26/30)=4.5+2.2=6.7 dB



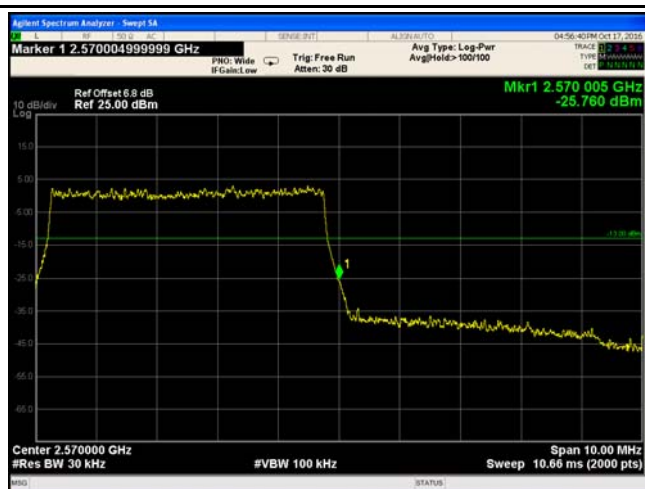
LTE Band VII - High Channel QPSK-5

Note: Offset=Cable loss (4.5) + 10log  
(50.57/30)=4.5+2.3=6.8 dB



LTE Band VII - Low Channel 16QAM-5

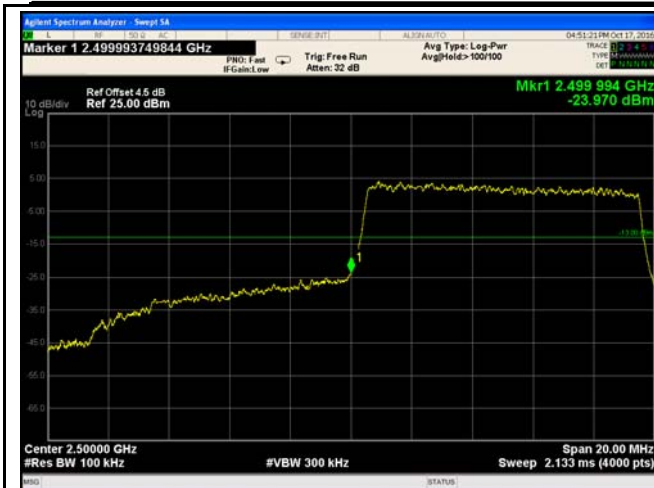
Note: Offset=Cable loss (4.5) + 10log  
(50.67/30)=4.5+2.3=6.8 dB



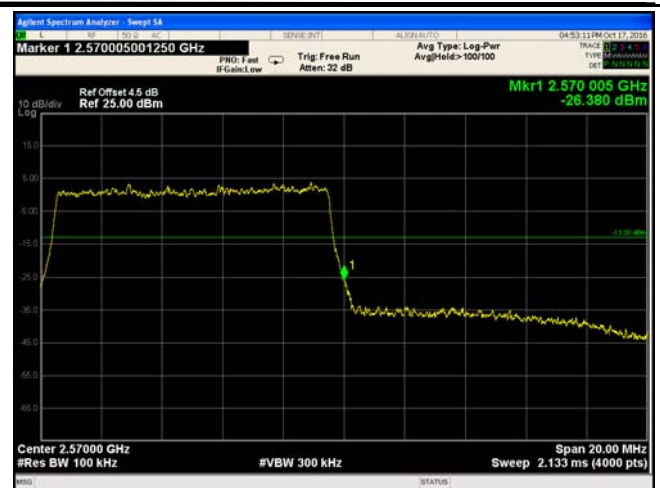
LTE Band VII - High Channel 16QAM-5

Note: Offset=Cable loss (4.5) + 10log  
(50.98/30)=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

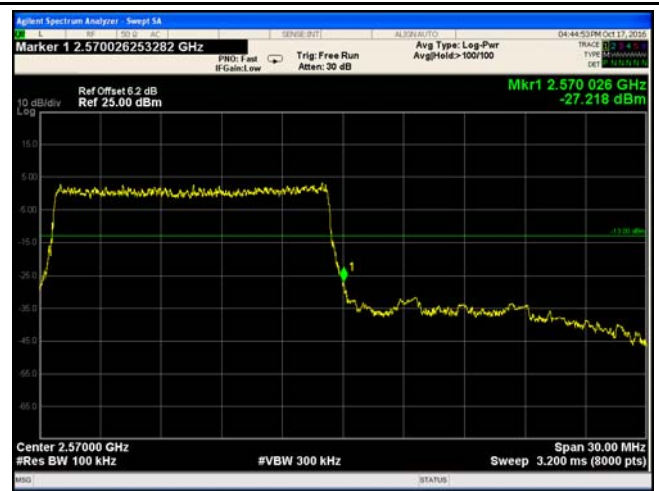


LTE Band VII - High Channel 16QAM-10



LTE Band VII - Low Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(148.7/100)=4.5+1.7=6.2 dB



LTE Band VII - High Channel QPSK-15

Note: Offset=Cable loss (4.5) + 10log  
(148.6/100)=4.5+1.7=6.2 dB



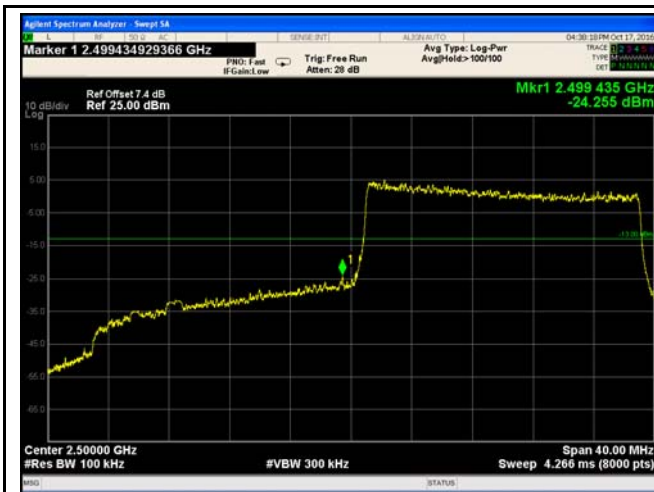
LTE Band VII - Low Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(149.3/100)=4.5+1.7=6.2dB



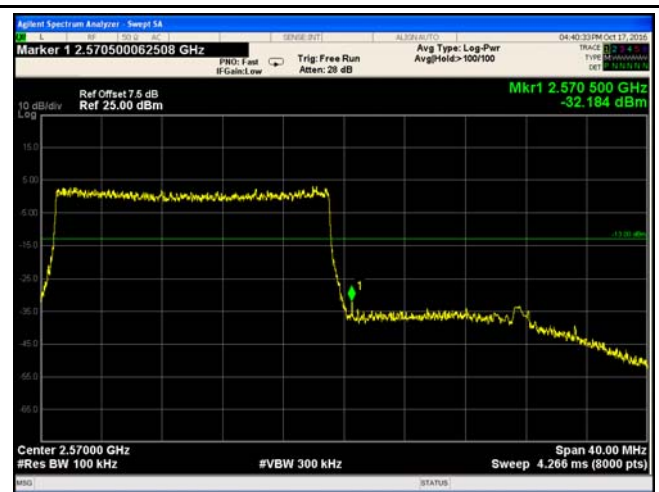
LTE Band VII - High Channel 16QAM-15

Note: Offset=Cable loss (4.5) + 10log  
(148.9/100)=4.5+1.7=6.2 dB



LTE Band VII - Low Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log  
(193.3/100)=4.5+2.9=7.4 dB



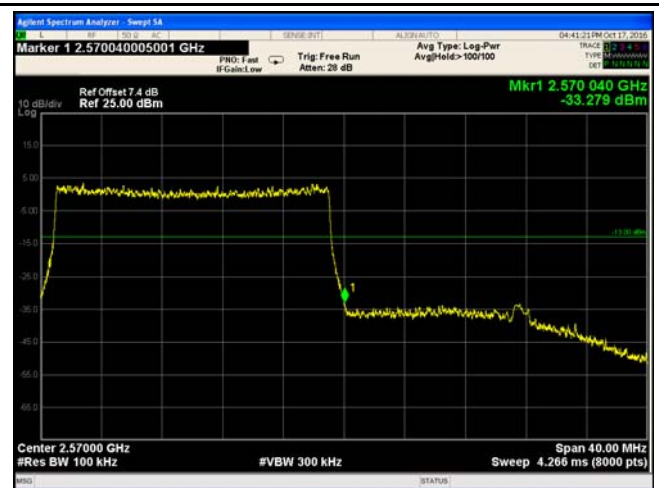
LTE Band VII - High Channel QPSK-20

Note: Offset=Cable loss (4.5) + 10log  
(198/100)=4.5+3.0=7.5dB



LTE Band VII - Low Channel 16QAM-20

Note: Offset=Cable loss (4.5) + 10log  
(193.2/100)=4.5+2.9=7.4 dB



LTE Band VII - High Channel 16QAM-20

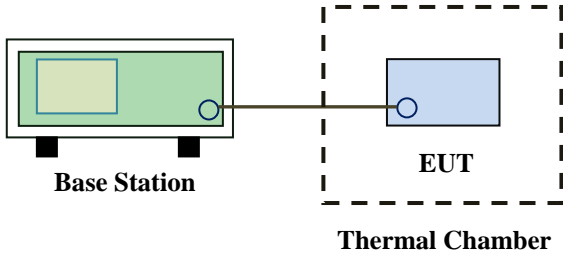
Note: Offset=Cable loss (4.5) + 10log  
(196.3/100)=4.5+2.9=7.4 dB

## 6.9 Frequency Stability

Temperature	22°C
Relative Humidity	59%
Atmospheric Pressure	1017mbar
Test date :	October 17, 2016
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 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>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 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	<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 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	 <p>Base Station</p> <p>EUT</p> <p>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 IV (Part 27) result

Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	-13	0.0075	2.5
0		-15	0.0087	2.5
10		-14	0.0081	2.5
20		-11	0.0063	2.5
30		-8	0.0046	2.5
40		-10	0.0058	2.5
50		-12	0.0069	2.5
55		-12	0.0069	2.5
25	4.2	-14	0.0081	2.5
	3.5	-15	0.0087	2.5



### LTE Band V (Part 22H) result

Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	-5	0.0060	2.5
0		-4	0.0048	2.5
10		-6	0.0072	2.5
20		-8	0.0096	2.5
30		-14	0.0167	2.5
40		-5	0.0060	2.5
50		-10	0.0120	2.5
55		-5	0.0060	2.5
25	4.2	-11	0.0132	2.5
	3.5	-13	0.0155	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	3.7	-12	0.0047	2.5
0		-10	0.0039	2.5
10		-8	0.0032	2.5
20		-6	0.0024	2.5
30		-12	0.0047	2.5
40		-10	0.0039	2.5
50		-9	0.0036	2.5
55		-4	0.0016	2.5
25	4.2	-9	0.0036	2.5
	3.5	-11	0.0043	2.5

### LTE Band XVII (Part 27) result

Middle Channel, $f_0 = 710$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	8	0.0113	2.5
0		6	0.0085	2.5
10		6	0.0085	2.5
20		5	0.0070	2.5
30		4	0.0056	2.5
40		6	0.0085	2.5
50		12	0.0169	2.5
55		7	0.0099	2.5
25	4.2	10	0.0141	2.5
	3.5	9	0.0127	2.5

## Annex A. TEST INSTRUMENT

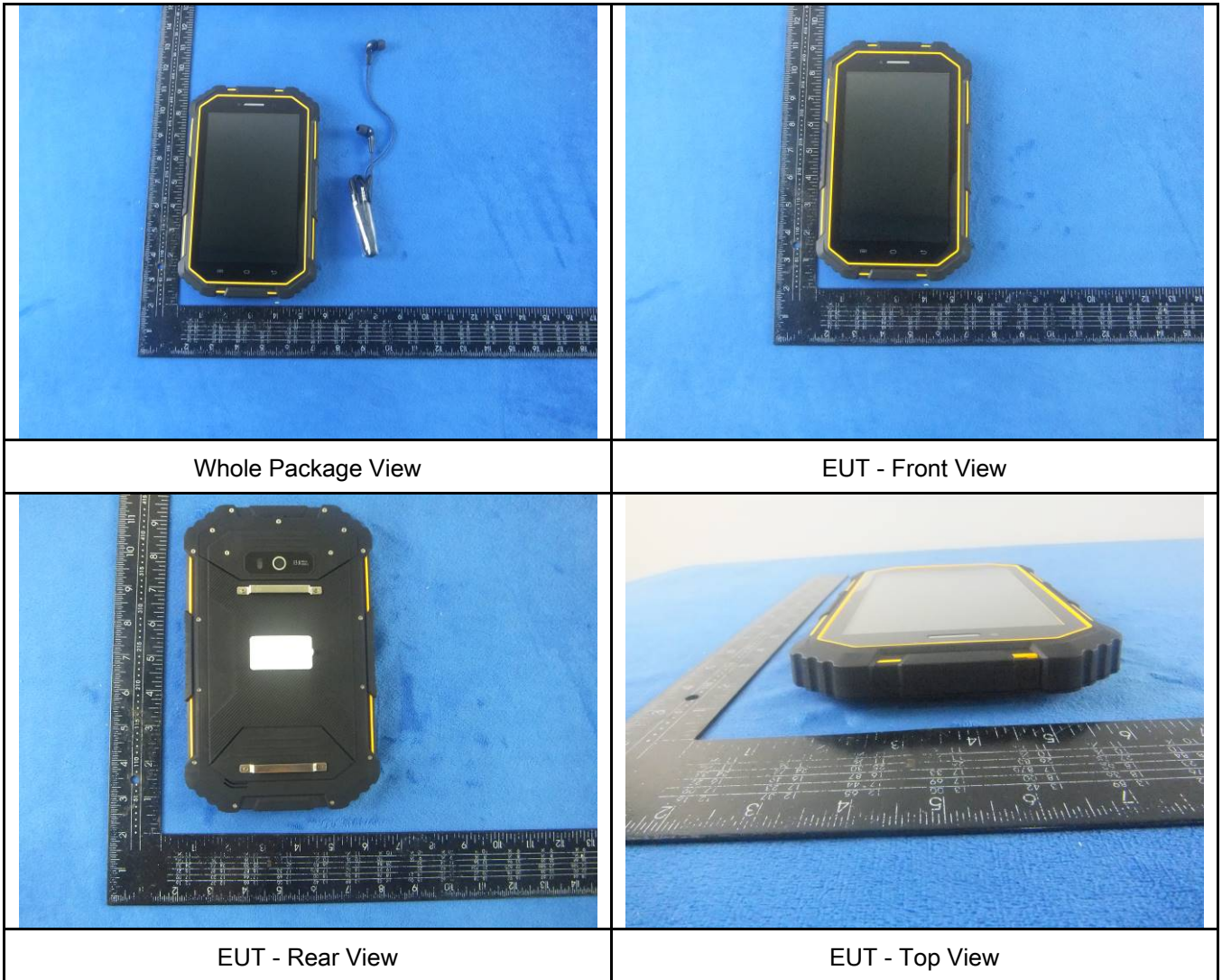
Instrument	Model	Serial #	Cal Date	Cal Due	In use
<b>RF Conducted Test</b>					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/15/2016	09/14/2017	<input checked="" type="checkbox"/>
Power Splitter	1#	1#	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
Universal Radio Communication Tester	CMU200	121393	09/24/2016	09/23/2017	<input checked="" type="checkbox"/>
Wideband Radio Communication Tester	CMW500	120906	03/27/2016	03/26/2017	<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 (0.5 ~ 18GHz)	PAM-118	443008	08/31/2016	08/30/2017	<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"/>
Tunable Notch Filter	3NF-800/1000-S	AA4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>

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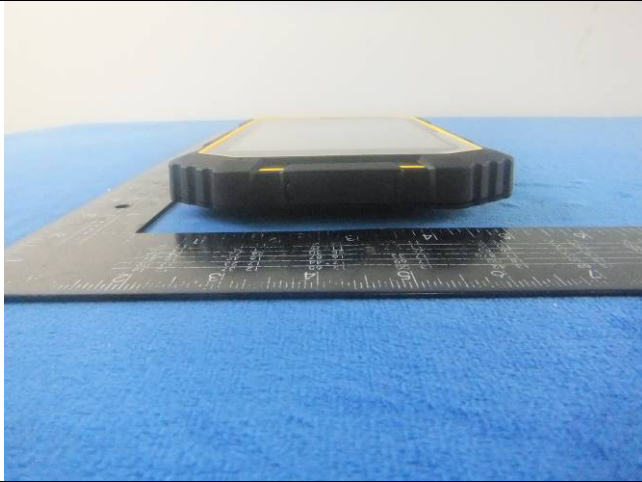
Tunable Notch Filter	3NF- 1000/2000-S	AM 4	08/31/2016	08/30/2017	<input checked="" type="checkbox"/>
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## Annex B. EUT And Test Setup Photographs

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



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EUT - Bottom View



EUT - Left View



EUT - Right View



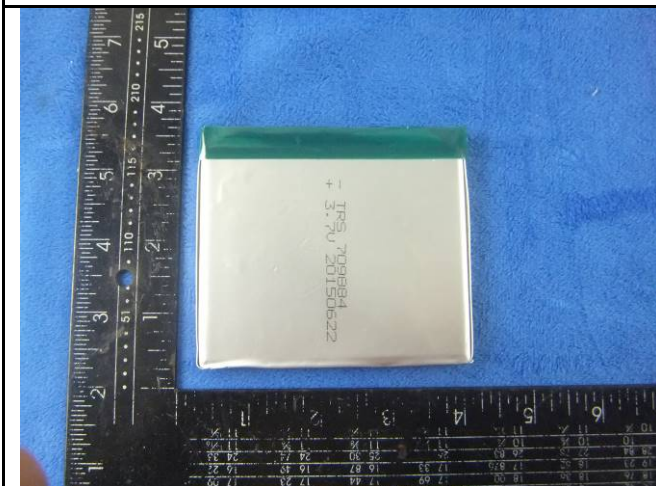
**Annex B.ii. Photograph: EUT Internal Photo**



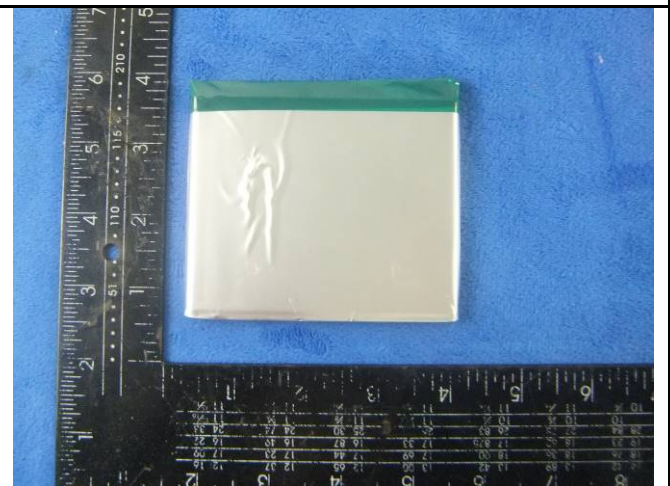
Cover Off - Top View 1



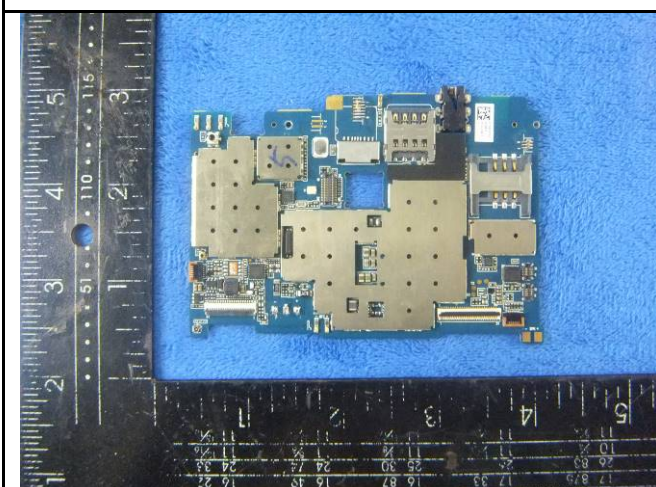
Cover Off - Top View 2



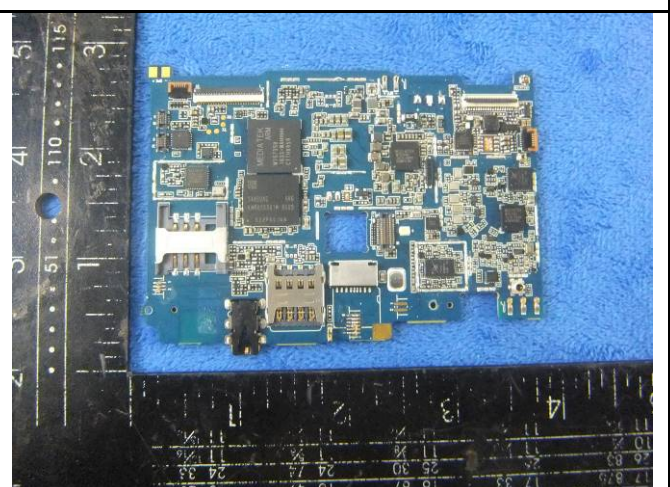
Battery - Front View



Battery - Rear View

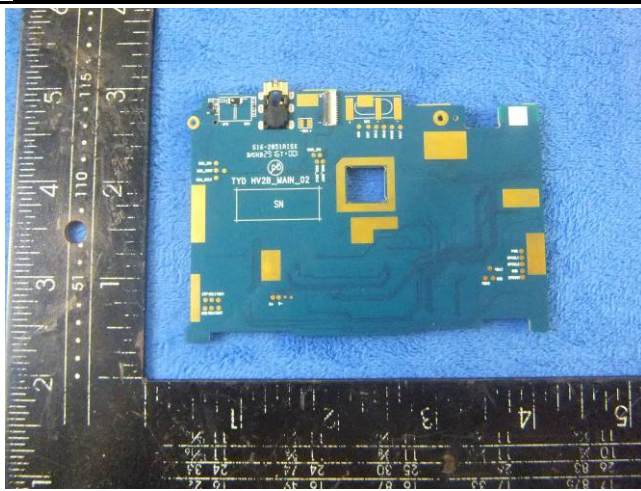


Mainboard with sheilding - Front View

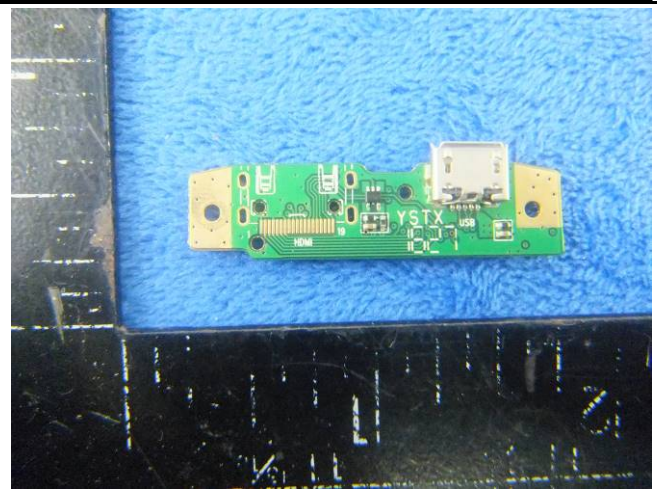


Mainboard without sheilding - Front View

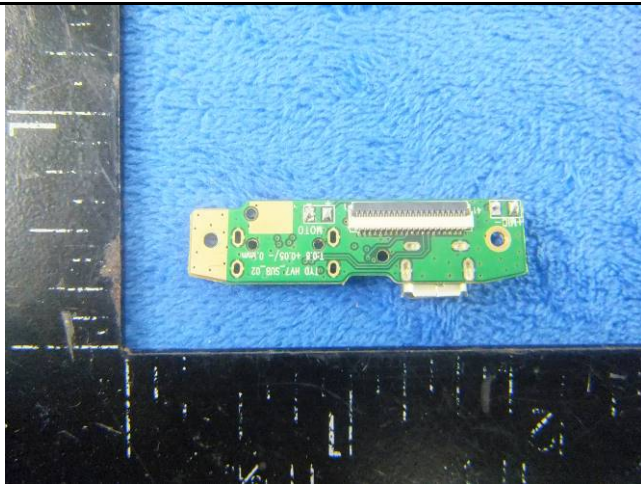




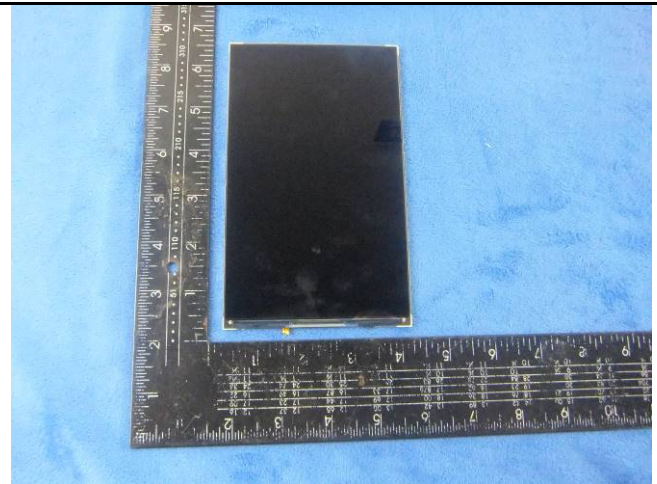
Mainboard – Rear View



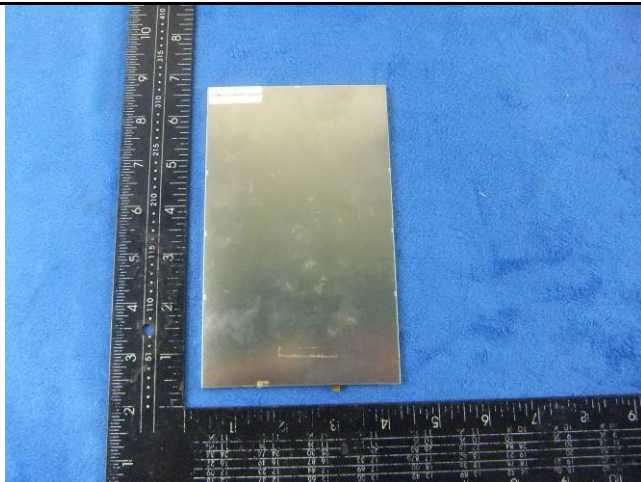
USB board – Front View



USB board - Rear View



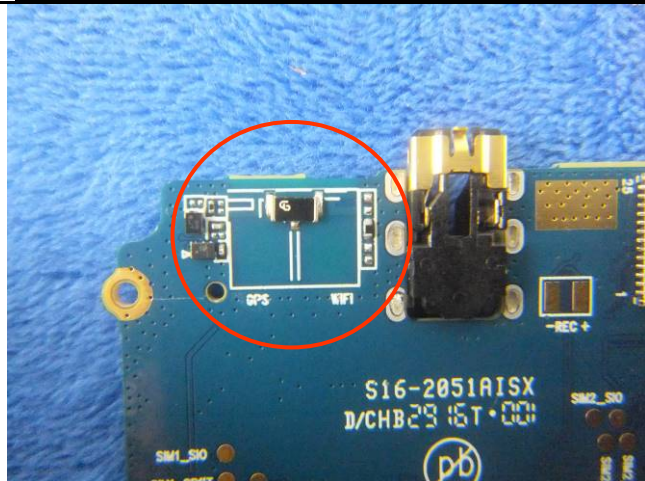
LCD – Front View



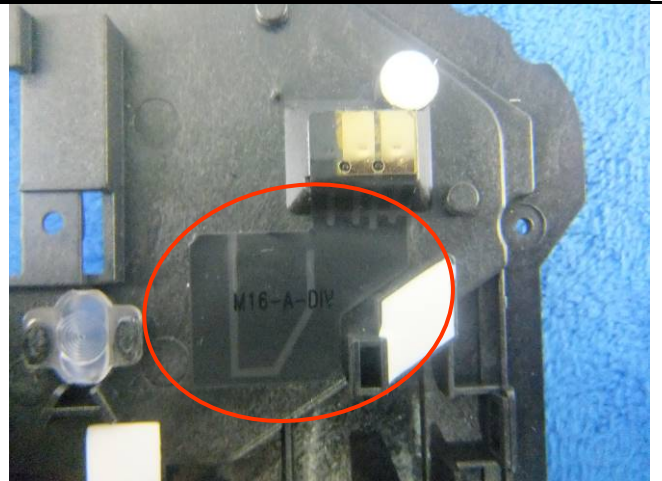
LCD – Rear View



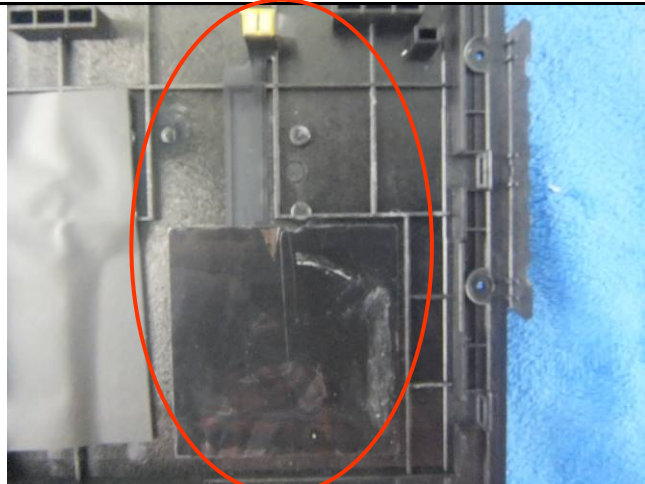
GSM/PCS/UMTS-FDD Antenna View



WIFI/BT/BLE/GPS - Antenna View



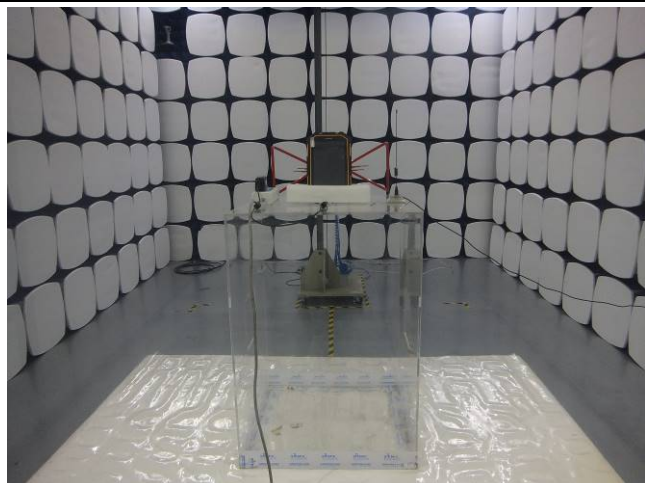
LTE Antenna View



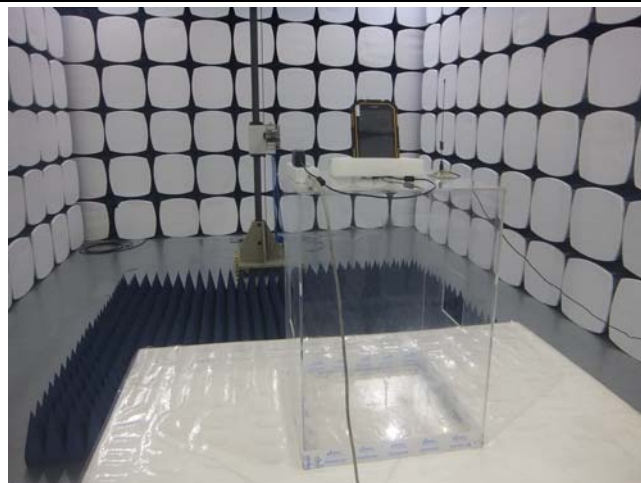
NFC - Antenna View



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



Radiated Spurious Emissions Test Setup Below 1GHz

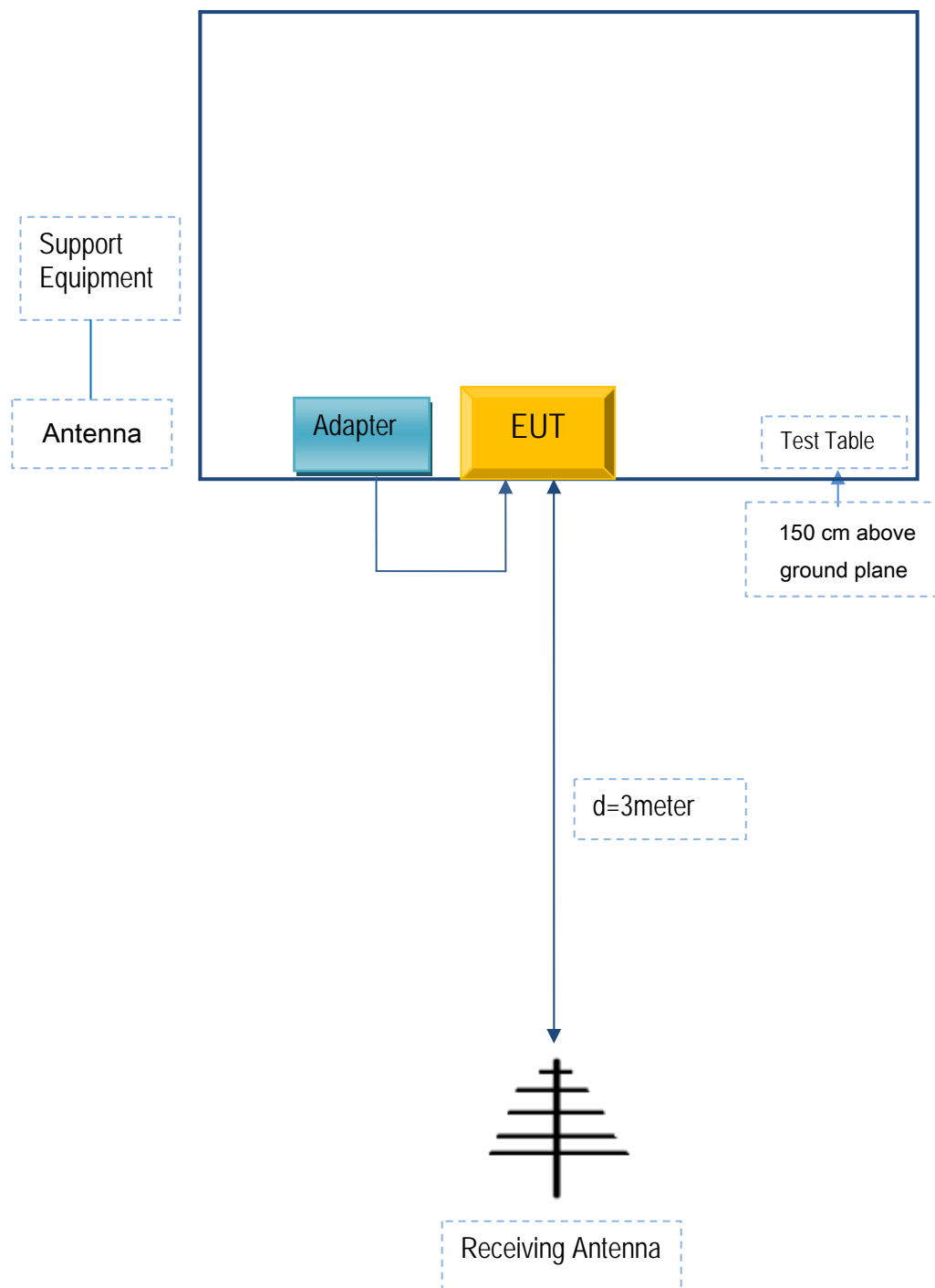


Radiated Spurious Emissions Test Setup Above  
1GHz

## 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
Lenovo	AC Adapter	42T4416	21D9JU

### **Supporting Cable:**

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	GT211032



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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 the attachment

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## Annex E. DECLARATION OF SIMILARITY

N/A