

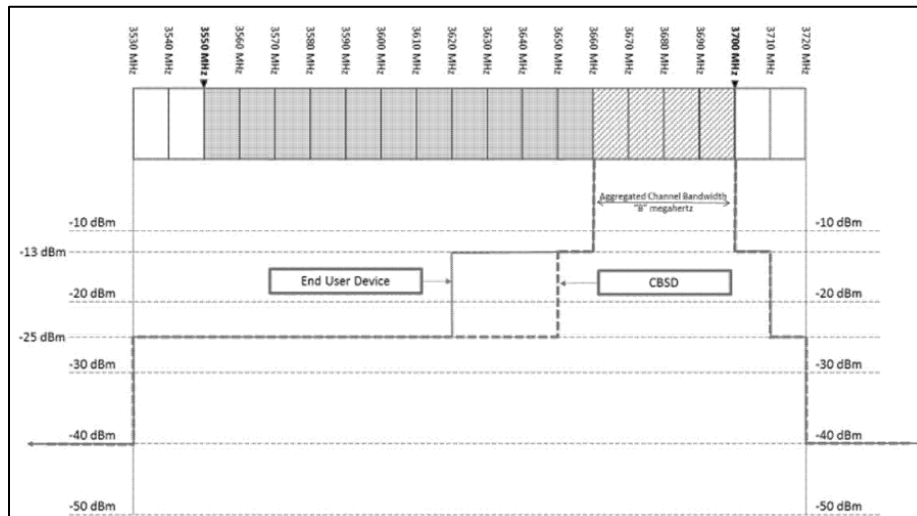
### 9.3. OUT OF BAND EMISSIONS

#### RULE PART(S)

FCC: §2.1051, and §96.41(e)

#### LIMITS

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.



#### TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

- Set the RBW = 100kHz for emission below 1GHz and 1MHz for emissions above 1GHz (Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)
- Set VBW  $\geq 3 \times$  RBW
- Sweep time = auto couple;
- Detector = RMS;
- Ensure that the number of measurement points = Max (40001);
- Trace mode = Average(FDD), Max hold(TDD);

#### OUT OF BAND EMISSIONS RESULTS

See the following pages.

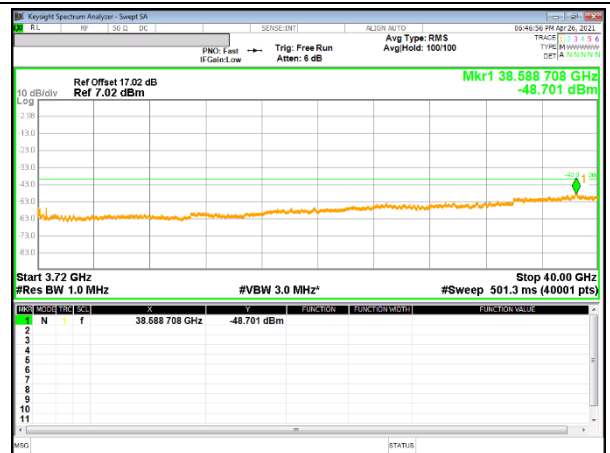
NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

**LTE Band 48**

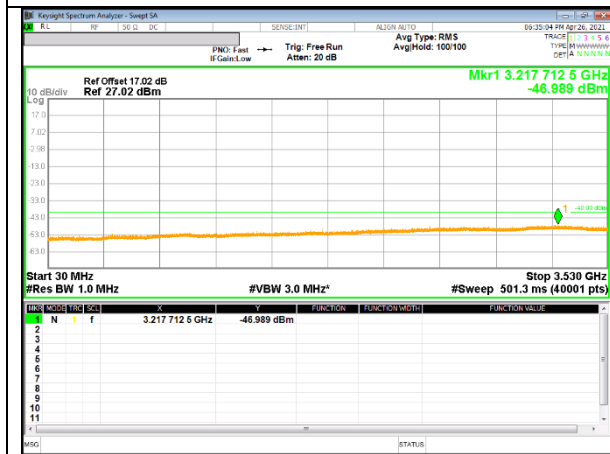
5 MHz QPSK



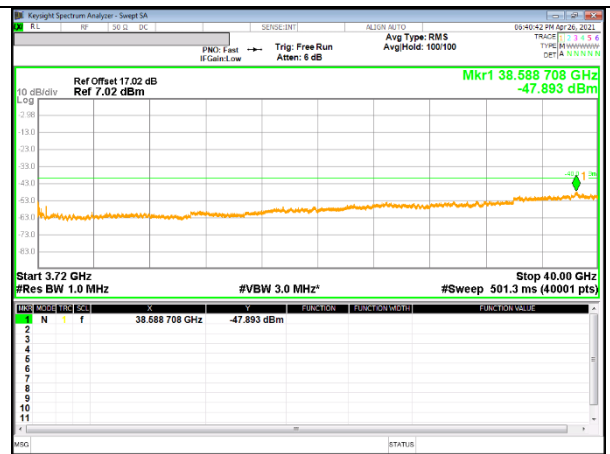
Low channel



Low channel



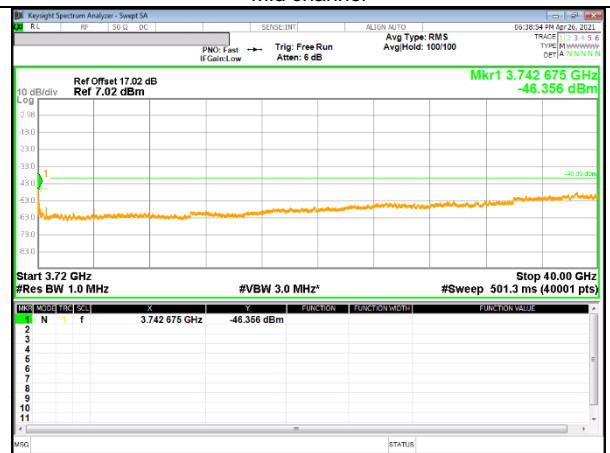
Mid channel



Mid channel



High channel



High channel

**9.4. FREQUENCY STABILITY**

**RULE PART(S)**

FCC: §2.1055

**LIMITS**

For Part 96, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v03r01

**RESULTS**

**LTE Band 48(Lowest Frequency: 16QAM / Highest Frequency: QPSK)**

Limit		3550	3700	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	3550.2579	3699.7486		
Extreme (50C)		3550.2579	3699.7486	48.2	0.013
Extreme (40C)		3550.2579	3699.7486	29.3	0.008
Extreme (30C)		3550.2579	3699.7486	25.4	0.007
Extreme (10C)		3550.2579	3699.7486	21.5	0.006
Extreme (0C)		3550.2579	3699.7486	30.1	0.008
Extreme (-10C)		3550.2579	3699.7486	25.4	0.007
Extreme (-20C)		3550.2579	3699.7486	29.0	0.008
Extreme (-30C)		3550.2579	3699.7486	22.6	0.006
20C	15%	3550.2579	3699.7486	30.8	0.008
	-15%	3550.2579	3699.7486	20.6	0.006
	End Point	3550.2579	3699.7486	21.5	0.006

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## **9.5. END USER DEVICE(CBSD PROTOCOL)**

### **RULE PART(S)**

FCC: §96.47

### **LIMITS**

End user devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

An end user device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

### **TEST PROCEDURE**

Per KDB 940660 D01 Part 96 CBRS Eqpt v03

### **RESULTS**

Not performed.

Please refer to test report(Report number: 4789867826-E10)

## 9.6. RADIATED POWER (ERP & EIRP)

### RULE PART(S)

FCC: §96.41(b)

### LIMITS

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD <sup>1</sup>	47	37

### TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03r01

For radiated output power measurement with a ESU40:

- a) Set the RBW  $\geq$  OBW;
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 2 \times$  RBW;
- d) Sweep time = auto couple;
- e) Detector = rms;
- f) Ensure that the number of measurement points  $\geq 2 \times$  span/RBW;
- g) Trace mode = Average(LTE);

### TEST RESULTS

**9.6.1. ERP/EIRP Results**

**LTE Band 48**

Band	BW [MHz]	Mode	RB Size/ RB Offset	f [MHz]	ERP / EIRP	
					[dBm]	[mW]
Band 48	20	QPSK	1/0	3560.0	20.46	111.17
			1/99	3625.0	<b>20.93</b>	<b>123.88</b>
			1/0	3690.0	20.80	120.23
		16QAM	1/0	3560.0	<b>20.84</b>	<b>121.34</b>
			1/99	3625.0	20.71	117.76
			1/0	3690.0	20.30	107.15
	15	QPSK	1/74	3557.5	<b>21.51</b>	<b>141.58</b>
			1/74	3625.0	20.92	123.59
			1/0	3692.5	21.10	128.82
		16QAM	1/0	3557.5	<b>21.03</b>	<b>126.77</b>
			1/74	3625.0	20.74	118.58
			1/0	3692.5	20.88	122.46
	10	QPSK	1/49	3555.0	<b>21.96</b>	<b>157.04</b>
			1/49	3625.0	21.47	140.28
			1/49	3695.0	21.02	126.47
		16QAM	1/49	3555.0	<b>21.18</b>	<b>131.22</b>
			1/49	3625.0	20.58	114.29
			1/49	3695.0	20.73	118.30
	5	QPSK	1/12	3552.5	<b>21.71</b>	<b>148.25</b>
			1/24	3625.0	21.34	136.14
			1/24	3697.5	21.39	137.72
		16QAM	1/12	3552.5	<b>21.61</b>	<b>144.88</b>
			1/24	3625.0	21.17	130.92
			1/12	3697.5	20.99	125.60

**9.6.2. ERP/EIRP DATA**

**LTE Band 48**

20MHz  QPSK	<b>UL Verification Services, Inc.</b> <b>High Frequency Substitution Measurement</b>																																																																																									
	<p> <b>Company:</b> Samsung  <b>Project #:</b> 4789867826  <b>Date:</b> 2021-05-11  <b>Test Engineer:</b> 19227  <b>Configuration:</b> EUT, X-Position  <b>Location:</b> Chamber 2  <b>Mode:</b> LTE_QPSK Band 48 Fundamentals, 20MHz Bandwidth                 </p> <p> <b>Test Equipment:</b>                      Receiving: Horn 3117[00168724], and Chamber 2 SMA Cables                      Substitution: Horn 3115[00161451], 8.5m SMA-type Cable                 </p> <table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Delta (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>3560.00</td> <td>14.35</td> <td>V</td> <td>6.3</td> <td>11.0</td> <td>18.99</td> <td>23.0</td> <td>-4.0</td> <td></td> </tr> <tr> <td>3560.00</td> <td>15.83</td> <td>H</td> <td>6.3</td> <td>11.0</td> <td>20.46</td> <td>23.0</td> <td>-2.5</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>3625.00</td> <td>15.99</td> <td>V</td> <td>6.4</td> <td>10.9</td> <td>20.50</td> <td>23.0</td> <td>-2.5</td> <td></td> </tr> <tr> <td>3625.00</td> <td>16.42</td> <td>H</td> <td>6.4</td> <td>10.9</td> <td>20.93</td> <td>23.0</td> <td>-2.1</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>3690.00</td> <td>13.62</td> <td>V</td> <td>6.4</td> <td>10.7</td> <td>17.93</td> <td>23.0</td> <td>-5.1</td> <td></td> </tr> <tr> <td>3690.00</td> <td>16.50</td> <td>H</td> <td>6.4</td> <td>10.7</td> <td>20.80</td> <td>23.0</td> <td>-2.2</td> <td></td> </tr> </tbody> </table>	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes	Low Ch									3560.00	14.35	V	6.3	11.0	18.99	23.0	-4.0		3560.00	15.83	H	6.3	11.0	20.46	23.0	-2.5		Mid Ch									3625.00	15.99	V	6.4	10.9	20.50	23.0	-2.5		3625.00	16.42	H	6.4	10.9	20.93	23.0	-2.1		High Ch									3690.00	13.62	V	6.4	10.7	17.93	23.0	-5.1		3690.00	16.50	H	6.4	10.7	20.80	23.0	-2.2
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## 9.7. FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

FCC: §2.1053 and §96.41(e)

### LIMIT

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

### TEST PROCEDURE

ANSI / TIA / EIA 603 E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03r01  
For peak power measurement with a ESU40:

- a) Set the RBW = 100 kHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Sweep time = auto couple;
- d) Detector = rms;
- e) Ensure that the number of measurement points  $\geq$  span/RBW;
- f) Trace mode = Average(FDD), Max hold(TDD);

### RESULTS

See the following pages.

NOTE : Please refer to section 5.4 for bandwidth and RB setting about LTE.

**9.7.1. SPURIOUS RADIATION PLOTS**

**LTE Band 48**

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
<b>Company:</b>		Samsung							
<b>Project #:</b>		4789867826							
<b>Date:</b>		2021-05-12							
<b>Test Engineer:</b>		20882							
<b>Configuration:</b>		EUT / AC Adapter, Z-Position							
<b>Location:</b>		Chamber 1							
<b>Mode:</b>		LTE_QPSK Band 48 Harmonics, 10MHz Bandwidth							
<b>Test Voltage:</b>		AC 120 V, 60 Hz							
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 3555MHz</b>									
7110.00	-12.7	V	3.0	44.4	1.0	-56.0	-40.0	-16.0	
10665.00	-16.4	V	3.0	42.4	1.0	-57.9	-40.0	-17.9	
14220.00	-14.4	V	3.0	44.7	1.0	-58.1	-40.0	-18.1	
7110.00	-11.5	H	3.0	44.4	1.0	-54.8	-40.0	-14.8	
10665.00	-16.9	H	3.0	42.4	1.0	-58.3	-40.0	-18.3	
14220.00	-14.6	H	3.0	44.7	1.0	-58.3	-40.0	-18.3	
<b>Mid Ch, 3625MHz</b>									
7250.00	-9.9	V	3.0	44.3	1.0	-53.2	-40.0	-13.2	
10875.00	-13.4	V	3.0	42.5	1.0	-54.9	-40.0	-14.9	
14500.00	-14.9	V	3.0	45.0	1.0	-58.9	-40.0	-18.9	
7250.00	-7.4	H	3.0	44.3	1.0	-50.7	-40.0	-10.7	
10875.00	-14.0	H	3.0	42.5	1.0	-55.6	-40.0	-15.6	
14500.00	-15.0	H	3.0	45.0	1.0	-58.9	-40.0	-18.9	
<b>High Ch, 3695MHz</b>									
7390.00	-11.8	V	3.0	44.2	1.0	-55.0	-40.0	-15.0	
11085.00	-14.0	V	3.0	42.6	1.0	-55.5	-40.0	-15.5	
14780.00	-14.8	V	3.0	45.2	1.0	-59.0	-40.0	-19.0	
7390.00	-9.9	H	3.0	44.2	1.0	-53.2	-40.0	-13.2	
11085.00	-14.5	H	3.0	42.6	1.0	-56.1	-40.0	-16.1	
14780.00	-13.6	H	3.0	45.2	1.0	-57.8	-40.0	-17.8	

**END OF TEST REPORT**