

### 7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(c) §27.53(g) §27.53(h) §27.53(m) §27.53(a.4)

### **Test Overview**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level for Band 30 is > 43 + 10log10 (P[Watts] at 2300-2305MHz & 2345-2360MHz, > 55 + 10log10 (P[Watts]) at 2320-2324MHz & 2341-2345MHz, > 61 + 10log10 (P[Watts]) at 2324-2328MHz & 2337-2341MHz, > 67 + 10log10 (P[Watts]) at 2288-2292MHz & 2328-2337MHz, and > 70 + 10log10 (P[Watts]) at frequencies < 2288MHz & >2365MHz.

# The minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

# The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

### **Test Procedure Used**

KDB 971168 D01 v02r02- Section 6.0

### Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-3. Test Instrument & Measurement Setup

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Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz 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 to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is  $65 + 10log_{10}(P) = -35dBm$  in a 6.25kHz bandwidth.

Per 27.53(a)(5) in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

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Plot 7-116. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-117. Lower Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-118. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-119. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-120. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-121. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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			IFGain:Low	Atten: 36	dB			D		
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#Res BW	30 kHz		#VBW	91 kHz			Sweep	5.533 ms (	(1001 pts)	
MSG							STAT	US		

Plot 7-122. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-123. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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Plot 7-124. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-125. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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Agilent Spectru	ım Analyzer - Sı	wept SA								
LXIRL	RF !	50 Ω AC	CORREC	SEN	ISE:INT		ALIGN AUTO	02:49:06 Pf	MDec 10, 2015	Fraguanay
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			IFGain:Low	Atten: 36	dB			Di		
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-b5.U										
Center 71	6.000 MH	z						Span 4	.000 MHz	
#Res BW	51 kHz		#VBW	150 kHz			Sweep	1.933 ms (	1001 pts)	
MSG							STAT	US		

Plot 7-126. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-127. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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Plot 7-128. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-129. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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Plot 7-130. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-131. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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Plot 7-132. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-133. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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Plot 7-134. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-135. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager		
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Plot 7-136. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-137. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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Plot 7-138. Lower Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)



Plot 7-139. Lower Extended Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)

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Plot 7-140. Upper Band Edge Plot (Band 5/26 – 1.4MHz QPSK – RB Size 6)



Plot 7-141. Upper Extended Band Edge Plot (Band 5/26 - 1.4MHz QPSK - RB Size 6)

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Plot 7-142. Lower Band Edge Plot (Band 5/26 - 3.0MHz QPSK - RB Size 15)



Plot 7-143. Lower Extended Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)

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-65.0										
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#Res BW	JO KHZ		#VBW	91 kHz			Sweep	5.533 ms (	1001 pts)	
MSG							STAT	บร		

Plot 7-144. Upper Band Edge Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)



Plot 7-145. Upper Extended Band Edge Plot (Band 5/26 - Band 5 - 3.0MHz QPSK - RB Size 15)

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Plot 7-146. Lower Band Edge Plot (Band 5/26 - 5.0MHz QPSK - RB Size 25)



Plot 7-147. Lower Extended Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)

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Plot 7-148. Upper Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)



Plot 7-149. Upper Extended Band Edge Plot (Band 5/26 – 5.0MHz QPSK – RB Size 25)

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Plot 7-150. Lower Band Edge Plot (Band 5/26 - 10.0MHz QPSK - RB Size 50)



Plot 7-151. Upper Band Edge Plot (Band 5/26 – 10.0MHz QPSK – RB Size 50)

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Plot 7-152. Lower Band Edge Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



Plot 7-153. Upper Band Edge Plot (Band 26 - 15.0MHz QPSK - RB Size 75)

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Plot 7-154. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-155. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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Plot 7-156. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-157. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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Plot 7-158. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-159. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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Agilent Spec	trum Analyzer - Swep	t SA							
L <mark>XI</mark> RL	RF 50 S	AC CORREC	SE	NSE:INT		ALIGN AUTO	12:59:25 P	MDec 02, 2015	Fraguancy
				_	#Avg Typ	e: RMS	TRA	<sup>CE</sup> 123456	Frequency
		PNO: W	ide 😱 Trig: Fre	e Run			IY		
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10 dB/dr	V Ref 25.00	aBM					-2-4.	oq abiii	
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									1.753000000 GHz
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10.0									Stop Freq
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-45.0									
									Eron Offert
-55.0									Frequiser
-33.0									0 Hz
-65.0									
Contor	4 755000 CH-						Enon 4		
Center	1.7 33000 GHZ		0 (DW A4 1.11-			<b></b>	Span 4		
#Res B	VV JU KHZ	7	FV 6W 91 KHZ			sweep :	5.553 ms (	1001 pts)	
And and a subscription of the local division									

Plot 7-160. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-161. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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Plot 7-162. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-163. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Baga 101 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 101 01 190
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Plot 7-164. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-165. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 102 of 100	
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Agilent Spectru	ım Analyzer - Swept SA									
LXI RL	RF 50 Ω AC	CORREC	SEN	SE:INT		ALIGN AUTO	12:31:05 P	MDec 02, 2015	Freque	ancy
			Tuin Fue	<b>D</b>	#Avg Typ	e: RMS	TRA		Fiequ	ency
		PNO: Wide 😱	Atten: 36	dB			D	TANNNN		
		IFGam.LUW	Theten. 00	40					Au	to Tune
						WIK	1 1.710 (	UU GHZ	, , , , , , , , , , , , , , , , , , , ,	lo rune
10 dB/div	Ref 25.00 dBm						-31.5	03 dBm		
									Cent	ter Freq
15.0								I	1.710000	000 GHz
5.00										
3.88				$\sim$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~		Sta	art Freg
									1 706000	
-5.00									1.700000	000 0112
								-13.00 dBm		
-15.0								10.00 abii	C+	on From
									50	opried
									1.714000	000 GHz
-25.0				1						
				<i>,1</i>						E Ston
-35.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						I	800	000 kHz
	m								Auto	Man
-45.0										
									Free	Offset
-55.0										0 Hz
-65.0										
Center 1.	710000 GHz						Span 8	.000 MHz		
#Res BW	100 kHz	#VBW	300 kHz			Sweep	1.000 ms	1001 pts)		
MSC						STAT	10			
MoG						STAT	33			

Plot 7-166. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

Agilent Spectrum Analyzer - Swept SA					
LXX RL RF 50Ω AC	CORREC SEN	ISE:INT /	ALIGN AUTO 12:31:18 P	MDec 02, 2015	Frequency
	PNO: Fast +++ Trig: Free	Run	TY	PE A WWWWW	
	IFGain:Low Atten: 36	dB	D	ET <mark>A NINININ</mark>	
			Mkr1 1.708 9	68 GHz	Auto Tune
10 dB/div Ref 25.00 dBm			-23.	28 dBm	
Log					
					Center Freq
15.0					1.707000000 GHz
5.00					
					Start Freq
-5.00					1.705000000 GHz
				-13.00 dBm	
-15.0					Stop Fred
				1	1 70900000 GHz
-25.0				and the second	1.705000000 0112
	man and the second and the second	and the second	and a second sec		
-35.0					CF Step
					400.000 KHZ Auto Man
-45.0					<u>riato</u> mari
55.0					Freq Offset
-33.0					0 Hz
cz. o.					
-89.0					
Center 1.707000 GHz			Span 4	.000 MHz	
#Res BW 1.0 MHz	#VBW 3.0 MHz	\$	Sweep 1.000 ms (	(1001 pts)	
MSG			STATUS		

Plot 7-167. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 102 of 100
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Plot 7-168. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-169. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 104 of 100
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Plot 7-170. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-171. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG930US	<u> <u> <u> PCTEST</u> </u></u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 105 of 100	
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Agilent	Spectrun	n Analyz	er - Swept S	5A								
L <mark>XI</mark> RI	L	RF	50 Ω	AC	CORREC	SE	VSE:INT		ALIGN AUTO	12:22:48 F	MDec 02, 2015	Frequency
						Tria: Ero	. D	#Avg Typ	e: RMS	TRA		requency
					PNO: Wide 🖵	Atten: 36	dB			C	ET A N N N N N	
	-				IFGam:Low	Atten. vo						
									MK	1 1.755 (	JOO GHZ	Autorune
10 dE	3/div	Ref	25.00 d	lВm						-25.	76 dBm	
Log												
												Center Frea
15.0												1 755000000 GHz
												1.100000000000112
5.00	m	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim \sim $	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m						Stort From
												StartFreq
-5.00												1.749000000 GHz
15.0											-13.00 dBm	
-15.0												Stop Freq
							1					1.761000000 GHz
-25.0	<u> </u>					- Vily	<u></u>					
							- market	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
25.0											~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	CF Step
-35.0												1.200000 MHz
												<u>Auto</u> Man
-45.0												
<i>75</i> 0												Freq Offset
-33.0												0 Hz
-65.0												
Cen	ter 1.7	5500	0 GHz							Span 1	2.00 MHz	
#Res	s BW	150 k	Hz		#VBW	430 kHz			Sweep	1.000 ms	(1001 pts)	
MSG									STAT	US		

Plot 7-172. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-173. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG930US	<u> <u> <u> PCTEST</u> </u></u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 106 of 100		
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Plot 7-174. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

Agilent Spectru	gilent Spectrum Analyzer - Swept SA								
L <mark>XI</mark> RL	RF 50 Ω	AC CORREC	SENSE:INT	ALIGN AUTO	11:54:42 AM Dec 02, 2015 TRACE 12, 2, 4, 5, 6	Frequency			
		PNO: Fast 🔸	Trig: Free Run		TYPE A WWWWWW				
		IFGain:Low	Atten: 36 dB		DEL				
				Mkr	1 1.708 976 GHz	Autorune			
10 dB/div	Ref 25.00 d	IBm			-17.86 aBm				
						Contor From			
15.0									
10.0						1.707000000 GH2			
5.00									
						Start Freq			
-5 00						1.705000000 GHz			
-15.0					-13.00 °	Stop From			
					unprene management	1 70000000 CH-			
-25.0	and the second					1.709000000 GH2			
-35.0						CF Step			
						Auto Man			
-45.0									
						Eron Offect			
-55.0									
						0112			
-65.0									
Center 4	707000 CH-				Spap 4 000 MHz				
#Res BW	1.0 MHz	#VBW	3.0 MHz	Sweep	1.000 ms (1001 pts)				
MSG				STAT	us				

Plot 7-175. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 107 of 100	
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 107 01 190	
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Agilent Spectr	rum Analyzer - Swept SA								
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SEN	ISE:INT		ALIGN AUTC	12:03:28 P	MDec 02, 2015	Fraguanov
				_	#Avg Type	e: RMS	TRA	<sup>E</sup> 123456	Frequency
		PNO: Fast 😱	Irig: Free	Run			D		
	_	IFGain:Low	Atten: 36	aD			5	- ,	Auto Tuno
						Mkr	1 1.755 4	16 GHz	Auto Tune
	Def 25.00 dBm						-26.	22 dBm	
	Kei 23.00 ubili								
									0
									Center Freq
15.0									1.755000000 GHz
E 00									
5.00 - www.	······································	www.	~1						Start Eron
									StartFrey
-5 00									1.747000000 GHz
								-13.00 dBm	
-15.0									Stop Fred
									Stopfreq
			L,	1					1.763000000 GHz
-25.0			french	mon					
				V	en many	~~~~~ ^ ~			
25.0							mmmm	www.	CF Step
-35.0									1.600000 MHz
									<u>Auto</u> Man
-45.0									
									Freq Offset
-55.0								<u> </u>	. 0 47
									0112
-65.0									
Center 1	.755000 GHz						Span 1	6.00 MHz	
#Res BM	V 200 kHz	#VBW	560 kHz			Sweep	1.000 ms (	1001 pts)	
MSG						STAT	US		

Plot 7-176. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-177. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 109 of 100	
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 106 01 190	
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Plot 7-178. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-179. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 100 of 100		
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 109 01 190		
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Plot 7-180. Upper Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-181. Upper Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 110 of 100		
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 110 01 190		
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Plot 7-182. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-183. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 111 of 100		
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 11101 190		
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Agilent Spectrur	m Analyzer	- Swept SA								
LXI RL	RF	50 Ω AC	CORREC	SEN	JSE:INT		ALIGN AUTO	) 12:39:18 P	MDec 10, 2015	Fraguanay
					_	#Avg Typ	e: RMS	TRA	<sup>CE</sup> 123456	Frequency
			PNO: Wide 😱	Trig: Free	Run			IY	ET A N N N N N	
			IFGain:Low	Atten: 36	dB			b		
							Mki	1 1.915 (	000 GHz	Auto Tune
								-24	70 dBm	
10 dB/div	Ref 2	5.VV aBm						-24.	70 ubiii	
- ° 9										
										Center Freq
15.0										1 91500000 GHz
										1.51000000 0112
5.00	-	www.	mon when when when when when when when whe	And the second					<u> </u>	
										Start Freq
										1 913000000 GHz
-5.00									<u> </u>	1.01000000000112
45.0				{					-13.00 dBm	
- 15.0										Stop Freq
				শ	1					1 917000000 GHz
-25.0				<u> </u>						1.01100000000112
20.0					L.					
					my.					CE Stop
-35.0					*~~··	mannen	mmmm	www.	⊢	
								~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mon	400.000 KHZ
										<u>Auto</u> Man
-45.0										
										Freq Offset
-55.0										0 Hz
65.0										
-03.0										
Center 1.9	915000	GHz						Span 4	.000 MHz	
#Res BW	30 kHz		#VBW	91 kHz			Sweep	5.533 ms	(1001 pts)	
100							0			
MSG							STAT	los		

Plot 7-184. Upper Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-185. Upper Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 112 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 112 01 190			
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Plot 7-186. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-187. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 112 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 113 01 190			
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Agilent Spectrum Ana	alyzer - Swept SA								
LXIRL R	F 50 Ω AC	CORREC	SEN	ISE:INT		ALIGN AUTC	12:46:51 P	MDec 10, 2015	Frequency
			Trin Eros	Dun	#Avg Typ	e: RMS	TRA/		riequency
		PNO: Wide 😱	Atten: 36	dB			D	ET A N N N N N	
		IFGam.LOW	Theefil. 00	40					Auto Tune
						Mkr	1 1.915 (	000 GHz	Autorune
10 dB/div Re	ef 25.00 dBm						-24.9	85 dBm	
									Center Frea
15.0									1 915000000 CH7
									1.91000000 0H2
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~						
									Start Freq
-5 00									1.913000000 GHz
-3.00									
								-13.00 dBm	
-15.0									Stop Fred
			4	1					4 047000000 CU-
25.0			Ly.	)					1.917000000 GHZ
-25.0				mm					
					$\sim$	$\sim$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		CE Stop
-35.0									
									Auto Man
(5.0									Adro
-45.0									
									Fred Offset
-55.0									
									UHZ
-65.0									
Center 1.915	000 GHz						Span 4	.000 MHz	
#Res BW 511	kHz	#VBW	150 kHz			Sweep	1.933 ms (	(1001 pts)	
MSG						STAT	US		

Plot 7-188. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-189. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 114 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 114 01 190			
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Agilent	Spectrum	Analyze	er - Swept	SA								
l <b>XI</b> RI	-	RF	50 Ω	AC	CORREC	SEN	VSE:INT		ALIGN AUTO	01:04:47 P	MDec 10, 2015	Frequency
						Taim Free		#Avg Typ	e: RMS	TRA		riequency
					PNO: Wide 🖵	Atten: 20	dB			L Y	ETANNNN	
					IFGaIn:Low	Atten: 30	40				_	
									Mkr	1 1.850 (	000 GHz	Autorune
10 dF	Sidiv	Ref 3	25.00 c	IBm						-30.	67 dBm	
Log												
												Center Fred
15.0												Centerrieq
15.0												1.850000000 GHz
5.00							~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	James and the second se		
												Start Freq
5.00												1.846000000 GHz
-5.00												
											-13.00 dBm	
-15.0												Stop From
												StopFreq
							ľ					1.854000000 GHz
-25.0							1 🗸					
-35.0		~ ~ ~ ~ ~				م م م						CF Step
00.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~									800.000 kHz
												<u>Auto</u> Man
-45.0											<u> </u>	
-55 O												FreqOffset
-33.0												0 Hz
-65.0												
Cen	ter 1.8	5000	0 GHz							Span 8	3.000 MHz	
#Res	s BW	00 k	Hz		#VBW	300 kHz			Sweep	1.000 ms	(1001 pts)	
MEG									CTAT	110		
MSG									STAT	05		

Plot 7-190. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-191. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dego 115 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 115 01 190			
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Agilent S	Spectrun	Analyzei	r - Swept S	5A								
IXI RL		RF	50 Ω	AC	CORREC	SE	VSE:INT		ALIGN AUTO	01:09:30 F	MDec 10, 2015	Frequency
						Tria: Ero	. D	#Avg Typ	e: RMS	TRA		riequency
					PNO: Wide 🕞	Atten: 36	dB				ANNNN N	
					II Gam.com				Miles	4 4 045 4		Auto Tune
									IVIKI	11.915	J40 GHZ	
10 dB	l/div	Ref 2	5.00 d	Bm						-24.	69 aBm	
Log												
												Center Freq
15.0												1.915000000 GHz
5.00	<u>~~~</u>		<u></u>									
3.00			č									Start Fred
												1 011000000 CH-
-5.00												1.911000000 GH2
											12.00 dBm	
-15.0											-13100 0.011	
							. 4					StopFreq
							🍐 '					1.919000000 GHz
-25.0						~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-35.0												CF Step
												800.000 KHZ
												Auto
-45.0												
												Fred Offset
-55.0												i requiser
												0 HZ
-65.U												
<b>A</b> und		45000								0		
Cent	er 1.9		GHZ		-43 (15)4	200 kU-			0	span a	5.000 MHZ	
#Res		TOO KI	12		#VBV	500 KHZ			Sweep	1.000 ms	(1001 pts)	
MSG									STAT	TUS		

Plot 7-192. Upper Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-193. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dega 116 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 116 01 190			
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Plot 7-194. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-195. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 117 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 117 01 190			
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Plot 7-196. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-197. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 119 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 110 01 190			
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Plot 7-198. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-199. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 110 of 100			
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Plot 7-200. Upper Band Edge Plot (Band 2/25 - 20.0MHz QPSK - RB Size 100)



Plot 7-201. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 120 of 100			
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Plot 7-202. Lower Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)



Plot 7-203. Lower Extended Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 121 of 100			
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Agilent	Spectrur	n Analyze	er - Swept	SA												
l <mark>XI</mark> RL	-	RF	50 Ω	DC	CORREC		- 9	ENSE:INT			ALIGN AUT	0 07	7:16:50 AM	1 Dec 14, 2015	Fred	iency
							Tria: Er			#Avg Typ	e: RMS		TRAC TYP		110q	activy
					PNO: W	fide ⊆ <sub>⊫</sub> … Low	Atten: 3	36 dB					DE	ANNNN		
					II Odili	LON					5.4	land o	245	00.00	A	uto Tune
											IVI	KET 2	.315			
10 dE	3/div	Ref 2	25.00 0	dBm									-55.0	оч авт		
- <sup>20</sup>																
															Cer	nter Freq
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	groom	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Anna	mathene	-	n	-and man								S	tart Freg
															2 31000	0000 GHz
-5.00																
														-13.00 dBm		
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	1							ξ I							2.32000	0000 GHz
-25.0								1								
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-35.0								- <u>\</u>							1.00	
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-40.0														mbe .		
														and comment	Fre	eq Offset
-55.0																0 Hz
-65.0																
Cent	ter 2.3	15000	GHz									s	pan 1	0.00 MHz		
#Res	BW	51 kH	z			#VBW	150 kH	z			Sween	5.00	0 ms (	1001 pts)		
LUGO .												71.10	, en 1	pro/		
MSG											STA	105				

Plot 7-204. Upper Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)



Plot 7-205. Upper Extended Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dega 122 of 100			
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Agilent Spec	ctrum Analyze	r - Swept SA										
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SEN	JSE:INT			ALIGN AUTO	07:25:35 Al	M Dec 14, 2015	Erequency	
					_		#Avg Type	e: RMS	TRA	<sup>CE</sup> 123456	Frequency	
			PNO: Wide 🖵	Trig: Free	Run				IY D			
	_		IFGain:Low	Atten: 36	dB	_			Đ		A	
								Mkr'	1 2.304 2	56 GHz	Auto Tu	Ine
	<b>D</b> -6.0								_33	97 dBm		
10 dB/div	Ref 2	:5.UU aBM							-00.	or abili		
-°9												
											Center F	reg
15.0											2 30500000 0	3117
											2.000000000	5112
5.00												
											Start Fr	rea
							monen	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man	2 30100000 0	20-
-5.00						-					2.5010000000	
										-13.00 dBm		
-15.0											Stop Fr	rea
											2 20000000 0	
											2.309000000	P
-25.0					Ŵ							
				<u> </u>	لمهر							
35.0					فكممس						CF St	tep
-35.0	- marine	mon	why we wanted and a second stand								800.000	kHz
											Auto N	Man
-45 0												
											Freg Off	set
-55.0												
											0	HZ
-65.0												
Center	2 305000	CH7							Snan 8	000 MHz		
#Doo B	2.303000	- GHIZ	#\/D\A	150 14				Buroon	5 paris	1001 mm2		
#Res D	W 51 KH2		#VDVV	150 KHZ				sweep	4.000 MIS (	TOOT PLS)		
MSG								STATU	IS			
					_	_						_

Plot 7-206. Lower Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)



Plot 7-207. Lower Extended Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 122 of 100			
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Agilent Spectru	m Analyzer - Swept S	A							
LXI RL	RF 50 Ω	DC CORREC	SEN	ISE:INT		ALIGN AUTO	07:28:19 A	M Dec 14, 2015	Frequency
					#Avg Type	e: RMS	TRA	<sup>CE</sup> 123456	Frequency
		PNO: Wide 😱	' Trig: Free	Run			TY		
		IFGain:Low	Atten: 36	dB			U		
						Mk	r1 2 315	00 GHz	Auto Tune
		_					20	02 dBm	
10 dB/div	Ref 25.00 di	3m					-00.	02 UBIII	
									Center Freq
15.0									2 315000000 CH7
10.0									2.315000000 GHz
5.00									
									Start Freq
marphan	monther	anoral moran a	Mar						2 31000000 GHz
-5.00									2.01000000000112
45.0								-13.00 dBm	
-15.0									Stop Freq
									2 320000000 GHz
25.0									2.020000000000112
-23.0									
			M.,						OF Otom
-35.0				1					Cr Step
			5	/					1.000000 MHz
			v	han					<u>Auto</u> Man
-45.0				- My Marine	and the America	matheratur	March on a		
							0 Nord do dan	marria	
									Freq Offset
-55.0									0 Hz
05.0									
-65.0									
Center 2.3	315000 GHz						Span 1	0.00 MHz	
#Res BW	51 kHz	#VBW	150 kHz			Sweep	5.000 ms (	1001 pts)	
MSG						STATU	JS		

Plot 7-208. Upper Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)



Plot 7-209. Upper Extended Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dego 124 of 100			
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Plot 7-210. Lower ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



Plot 7-211. Upper ACP Plot (Band 41 – 5.0MHz QPSK – RB Size 25)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo 125 of 100			
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 125 01 190			
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Agilent S	pectrum Ana	alyzer - Spurious E	missions					
LXI RL	F	F 50Ω A	AC CORREC		SENSE:INT	ALIGN AUT		03:33:01 PMDec 02, 2015
					Center Freq: 2	2.501000000 GHz		Radio Std: None
PASS	8	Gate: LO	IF	Gain:Low	#Atten: 28 dB			Radio Device: BTS
10 dB/	/div	Ref 40.00 c	IBm					
20 0 L								
30.0								
20.0								
10.0						يرون برواني والمراجع	Alternation and a	
0.00					<i>\</i> /	a han a ka an	walk a da da	
-10.0						<u> </u>		
20.0								
-20.0								
-30.0				and the prover			With the state of	Mahma Artemathathata
-40.0			and and the state of the state		<b>The second second</b>			
-50.0		A CONTRACTOR OF THE OWNER			<sup>ي</sup> زلي			<b>*</b>
4, <b>7</b>	mandandaran							
Start	2.475 (	GHz						Stop 2.517 GHz
Spur	Range	Start Fred	Stop Freg	RBW	Frequency	Amplitude	∆ Limit	
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488691667 GH	z -29.75 dBm	-4.753 dB	
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494962500 GH	lz -28.47 dBm	-15.47 dB	
3	3	2.4950 GHz	2.4960 GHz	100.0 kHz	2.495850000 GH	lz -29.23 dBm	-16.23 dB	
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.498660000 GH	lz 8.986 dBm	-16.01 dB	
MSG						STA	TUS	

Plot 7-212. Lower ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



Plot 7-213. Upper ACP Plot (Band 41 – 10.0MHz QPSK – RB Size 50)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 126 of 100
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Plot 7-214. Lower ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 7-215. Upper ACP Plot (Band 41 – 15.0MHz QPSK – RB Size 75)

FCC ID: A3LSMG930US	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 107 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 127 01 190
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Plot 7-216. Lower ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-217. Upper ACP Plot (Band 41 – 20.0MHz QPSK – RB Size 100)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 100 of 100
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#### 7.5 Peak-Average Ratio §24.232(d)

#### **Test Overview**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

#### Test Procedure Used

KDB 971168 D01 v02r02- Section 5.7.1

#### Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-4. Test Instrument & Measurement Setup

### Test Notes

None.

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager			
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Plot 7-219. PAR Plot (Band 2/25 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 120 of 100	
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Plot 7-220. PAR Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-221. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: A3LSMG930US	G930US     FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		SAMSUNG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 121 of 100	
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 131 01 190	
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Plot 7-222. PAR Plot (Band 2/25 - 5.0MHz QPSK - RB Size 25)



Plot 7-223. PAR Plot (Band 2/25 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 122 of 100	
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Plot 7-225. PAR Plot (Band 2/25 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 122 of 100	
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Plot 7-227. PAR Plot (Band 2/25 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 124 of 100	
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Fage 134 01 190	
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Plot 7-229. PAR Plot (Band 2/25 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: A3LSMG930US	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 125 of 100	
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## 7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.10) §27.50(c.10) §27.50(d.4) §27.50(a.3)

#### **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 D01 v02r02- Section 5.2.1

ANSI/TIA-603-C-2004 - Section 2.2.17

#### Test Settings

- Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 126 of 100
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#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-6. Radiated Test Setup >1GHz

#### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

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# 7.6.1 Antenna-A Radiated Power (ERP/EIRP)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	1.68	81	1 / 0	16.88	0.92	17.80	34.77	-16.97
707.50	1.4	QPSK	V	1.64	76	1 / 0	17.55	1.07	18.62	34.77	-16.15
715.30	1.4	QPSK	V	1.54	55	1 / 0	17.19	1.23	18.42	34.77	-16.36
699.70	1.4	16-QAM	V	1.68	81	3 / 2	16.30	0.92	17.22	34.77	-17.55
707.50	1.4	16-QAM	V	1.64	76	3 / 2	17.12	1.07	18.19	34.77	-16.58
715.30	1.4	16-QAM	V	1.54	55	3 / 2	16.79	1.23	18.02	34.77	-16.76
700.50	3	QPSK	V	1.64	75	1 / 0	17.52	0.92	18.44	34.77	-16.33
707.50	3	QPSK	V	1.64	54	1 / 0	17.58	1.07	18.65	34.77	-16.12
714.50	3	QPSK	V	1.51	40	1 / 0	17.36	1.21	18.57	34.77	-16.20
700.50	3	16-QAM	V	1.64	75	1 / 0	17.05	0.92	17.97	34.77	-16.80
707.50	3	16-QAM	V	1.64	54	1 / 14	17.23	1.07	18.30	34.77	-16.47
714.50	3	16-QAM	V	1.51	40	1 / 0	16.93	1.21	18.14	34.77	-16.63
701.50	5	QPSK	V	1.69	72	1 / 0	16.89	0.94	17.83	34.77	-16.94
707.50	5	QPSK	V	1.71	41	1 / 0	17.34	1.07	18.41	34.77	-16.36
713.50	5	QPSK	V	1.47	60	1 / 0	17.69	1.19	18.88	34.77	-15.89
701.50	5	16-QAM	V	1.69	72	1 / 24	16.77	0.94	17.71	34.77	-17.06
707.50	5	16-QAM	V	1.71	41	1 / 24	17.31	1.07	18.38	34.77	-16.39
713.50	5	16-QAM	V	1.47	60	1 / 24	17.54	1.19	18.73	34.77	-16.04
704.00	10	QPSK	V	1.71	58	1 / 49	17.61	1.00	18.61	34.77	-16.16
707.50	10	QPSK	V	1.71	63	1 / 0	17.29	1.07	18.36	34.77	-16.41
711.00	10	QPSK	V	1.66	64	1 / 0	18.10	1.14	19.24	34.77	-15.53
704.00	10	16-QAM	V	1.71	58	1 / 49	17.31	1.00	18.31	34.77	-16.46
707.50	10	16-QAM	V	1.71	63	1 / 49	17.05	1.07	18.12	34.77	-16.65
711.00	10	16-QAM	V	1.66	64	1/0	17.66	1.14	18.80	34.77	-15.97

Table 7-2. ERP Data (Band 12)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	1.36	254	1 / 0	16.70	3.64	20.34	34.77	-14.43
782.00	5	QPSK	V	1.36	254	1 / 0	17.56	3.67	21.23	34.77	-13.54
784.50	5	QPSK	V	1.36	254	1 / 0	16.48	3.70	20.18	34.77	-14.59
779.50	5	16QAM	V	1.36	254	1 / 0	15.95	3.64	19.59	34.77	-15.18
782.00	5	16QAM	V	1.36	254	1 / 0	17.00	3.67	20.67	34.77	-14.10
784.50	5	16QAM	V	1.36	254	1 / 0	15.76	3.70	19.46	34.77	-15.31
782.00	10	QPSK	V	1.41	285	1/0	17.78	3.67	21.45	34.77	-13.32
782.00	10	16QAM	V	1.41	285	1 / 0	17.20	3.67	20.87	34.77	-13.90

Table 7-3. ERP Data (Band 13)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 120 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 139 01 190
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Н	1.59	201	1 / 5	14.42	4.62	19.06	38.45	-19.39
836.50	1.4	QPSK	Н	1.59	201	1 / 5	16.14	4.82	20.96	38.45	-17.49
848.30	1.4	QPSK	Н	1.59	201	1 / 5	16.07	5.02	21.09	38.45	-17.36
824.70	1.4	16-QAM	Н	1.59	201	1 / 5	13.66	4.62	18.29	38.45	-20.16
836.50	1.4	16-QAM	Н	1.59	201	1 / 5	14.69	4.82	19.51	38.45	-18.94
848.30	1.4	16-QAM	Н	1.59	201	1 / 0	15.10	5.02	20.12	38.45	-18.33
825.50	3	QPSK	Н	1.64	212	1 / 14	15.15	4.64	19.79	38.45	-18.67
836.50	3	QPSK	Н	1.64	212	1 / 0	16.02	4.82	20.84	38.45	-17.61
847.50	3	QPSK	Н	1.64	212	1 / 0	15.40	5.00	20.40	38.45	-18.05
825.50	3	16-QAM	Н	1.64	212	1 / 14	13.88	4.64	18.52	38.45	-19.93
836.50	3	16-QAM	Н	1.64	212	1 / 0	15.03	4.82	19.86	38.45	-18.59
847.50	3	16-QAM	Н	1.64	212	1 / 0	14.91	5.00	19.91	38.45	-18.54
826.50	5	QPSK	Н	1.78	183	1 / 24	14.94	2.99	17.92	38.45	-20.53
836.50	5	QPSK	Н	1.78	183	1 / 0	16.05	3.04	19.09	38.45	-19.36
846.50	5	QPSK	н	1.78	183	1 / 0	15.26	3.09	18.35	38.45	-20.10
826.50	5	16-QAM	Н	1.78	183	1 / 24	13.41	2.99	16.40	38.45	-22.05
836.50	5	16-QAM	Н	1.78	183	1 / 0	14.75	3.04	17.79	38.45	-20.66
846.50	5	16-QAM	Н	1.78	183	1 / 0	15.03	3.09	18.12	38.45	-20.33
829.00	10	QPSK	Н	1.67	176	1 / 49	15.31	4.70	20.01	38.45	-18.44
836.50	10	QPSK	н	1.67	176	1 / 0	15.88	4.82	20.70	38.45	-17.75
844.00	10	QPSK	Н	1.67	176	1 / 0	15.86	4.95	20.81	38.45	-17.64
829.00	10	16-QAM	Н	1.67	176	1 / 49	14.46	4.70	19.16	38.45	-19.29
836.50	10	16-QAM	Н	1.67	176	1 / 0	14.92	4.82	19.74	38.45	-18.71
844.00	10	16-QAM	Н	1.67	176	1 / 0	15.28	4.95	20.23	38.45	-18.22
831.50	15	QPSK	Н	1.74	179	1 / 0	15.24	4.74	19.98	38.45	-18.47
836.50	15	QPSK	Н	1.74	179	1/0	15.75	4.82	20.57	38.45	-17.88
841.50	15	QPSK	Н	1.74	179	1/0	16.38	4.91	21.29	38.45	-17.17
831.50	15	16-QAM	н	1.74	179	36 / 18	13.40	4.74	18.14	38.45	-20.31
836.50	15	16-QAM	Н	1.74	179	1/0	14.76	4.82	19.58	38.45	-18.87
841.50	15	16-QAM	Н	1.74	179	1/0	16.02	4.91	20.93	38.45	-17.53

Table 7-4. ERP Data (Band 5/26)

FCC ID: A3LSMG930US		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 140 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset	Fage 140 01 190
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	Н	1.23	153	1 / 0	12.96	9.84	22.80	30.00	-7.20
1732.50	1.4	QPSK	Н	1.23	153	1 / 0	13.75	9.78	23.54	30.00	-6.46
1754.30	1.4	QPSK	Н	1.23	153	1 / 0	11.19	9.73	20.92	30.00	-9.08
1710.70	1.4	16-QAM	н	1.23	153	1 / 0	12.50	9.84	22.34	30.00	-7.66
1732.50	1.4	16-QAM	н	1.23	153	1 / 0	12.69	9.78	22.48	30.00	-7.52
1754.30	1.4	16-QAM	Н	1.23	153	1 / 0	10.34	9.73	20.07	30.00	-9.93
1711.50	3	QPSK	Н	1.15	168	1 / 0	13.05	9.84	22.89	30.00	-7.11
1732.50	3	QPSK	н	1.15	168	1/0	13.14	9.78	22.92	30.00	-7.08
1753.50	3	QPSK	Н	1.15	168	1 / 0	11.17	9.74	20.90	30.00	-9.10
1711.50	3	16-QAM	н	1.15	168	1 / 0	12.78	9.84	22.62	30.00	-7.38
1732.50	3	16-QAM	Н	1.15	168	1 / 0	13.17	9.78	22.96	30.00	-7.04
1753.50	3	16-QAM	н	1.15	168	1 / 0	10.65	9.74	20.39	30.00	-9.61
1712.50	5	QPSK	Н	1.20	165	1 / 0	12.99	9.83	22.83	30.00	-7.17
1732.50	5	QPSK	н	1.20	165	1 / 0	13.41	9.78	23.19	30.00	-6.81
1752.50	5	QPSK	н	1.20	165	1 / 0	11.61	9.74	21.34	30.00	-8.66
1712.50	5	16-QAM	н	1.20	165	1 / 0	12.08	9.83	21.91	30.00	-8.09
1732.50	5	16-QAM	н	1.20	165	1/0	12.62	9.78	22.40	30.00	-7.60
1752.50	5	16-QAM	н	1.20	165	1 / 0	10.63	9.74	20.36	30.00	-9.64
1715.00	10	QPSK	Н	1.17	162	1 / 49	13.11	9.83	22.94	30.00	-7.06
1732.50	10	QPSK	н	1.17	162	1/0	14.16	9.78	23.94	30.00	-6.06
1750.00	10	QPSK	Н	1.17	162	1 / 0	9.89	9.74	19.63	30.00	-10.37
1715.00	10	16-QAM	Н	1.17	162	1 / 49	12.92	9.83	22.75	30.00	-7.25
1732.50	10	16-QAM	Н	1.17	162	1 / 0	13.55	9.78	23.33	30.00	-6.67
1750.00	10	16-QAM	н	1.17	162	1 / 0	9.05	9.74	18.79	30.00	-11.21
1717.50	15	QPSK	н	1.17	157	1 / 0	11.60	9.19	20.79	30.00	-9.21
1732.50	15	QPSK	н	1.17	157	1 / 0	11.33	9.00	20.32	30.00	-9.68
1747.50	15	QPSK	н	1.17	157	1 / 0	9.65	8.80	18.45	30.00	-11.55
1717.50	15	16-QAM	н	1.17	157	1 / 0	11.53	9.19	20.72	30.00	-9.28
1732.50	15	16-QAM	н	1.17	157	1 / 0	11.40	9.00	20.39	30.00	-9.61
1747.50	15	16-QAM	н	1.17	157	1 / 0	8.82	8.80	17.63	30.00	-12.37
1720.00	20	QPSK	Н	1.26	166	1/0	11.62	9.81	21.43	30.00	-8.57
1732.50	20	QPSK	н	1.26	166	1/0	11.60	9.78	21.38	30.00	-8.62
1745.00	20	QPSK	н	1.26	166	1/0	9.71	9.76	19.47	30.00	-10.53
1720.00	20	16-QAM	н	1.26	166	1/0	11.53	9.81	21.34	30.00	-8.66
1732.50	20	16-QAM	н	1.26	166	1/0	11.92	9.78	21.70	30.00	-8.30
1745.00	20	16-QAM	н	1.26	166	1/0	9.60	9.76	19.35	30.00	-10.65
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 Table 7-5.
 EIRP Data (Band 4)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 141 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 141 01 190
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	v	1.00	86	1 / 0	13.48	8.34	21.82	33.01	-11.19
1882.50	1.4	QPSK	~	1.00	86	1 / 0	12.41	8.47	20.88	33.01	-12.13
1914.30	1.4	QPSK	V	1.00	86	1 / 0	11.90	8.70	20.60	33.01	-12.41
1850.70	1.4	16-QAM	V	1.00	86	1 / 0	12.54	8.34	20.88	33.01	-12.13
1882.50	1.4	16-QAM	V	1.00	86	1 / 0	11.49	8.47	19.96	33.01	-13.05
1914.30	1.4	16-QAM	V	1.00	86	1 / 0	11.07	8.70	19.77	33.01	-13.24
1851.50	3	QPSK	V	1.00	87	1 / 0	13.25	8.35	21.60	33.01	-11.41
1882.50	3	QPSK	V	1.00	87	1 / 0	12.58	8.47	21.05	33.01	-11.96
1913.50	3	QPSK	V	1.00	87	1 / 0	12.88	8.69	21.57	33.01	-11.44
1851.50	3	16-QAM	V	1.00	87	1 / 0	12.33	8.35	20.68	33.01	-12.33
1882.50	3	16-QAM	V	1.00	87	1/0	11.89	8.47	20.36	33.01	-12.65
1913.50	3	16-QAM	V	1.00	87	1 / 0	12.04	8.69	20.73	33.01	-12.28
1852.50	5	QPSK	V	1.00	92	1 / 0	14.40	8.35	22.75	33.01	-10.26
1882.50	5	QPSK	V	1.00	92	1 / 0	13.76	8.47	22.23	33.01	-10.78
1912.50	5	QPSK	V	1.00	92	1 / 0	12.96	8.68	21.64	33.01	-11.37
1852.50	5	16-QAM	V	1.00	92	1 / 0	13.45	8.35	21.80	33.01	-11.21
1882.50	5	16-QAM	V	1.00	92	1 / 0	12.97	8.47	21.44	33.01	-11.57
1912.50	5	16-QAM	V	1.00	92	1/0	11.96	8.68	20.64	33.01	-12.37
1855.00	10	QPSK	V	1.00	90	1 / 0	13.54	8.36	21.90	33.01	-11.11
1882.50	10	QPSK	V	1.00	90	1 / 0	13.52	8.47	21.99	33.01	-11.02
1910.00	10	QPSK	V	1.00	90	1 / 0	13.16	8.65	21.81	33.01	-11.20
1855.00	10	16-QAM	V	1.00	90	1 / 0	12.99	8.36	21.35	33.01	-11.66
1882.50	10	16-QAM	V	1.00	90	1 / 0	12.25	8.47	20.72	33.01	-12.29
1910.00	10	16-QAM	V	1.00	90	1/0	12.29	8.65	20.94	33.01	-12.07
1857.50	15	QPSK	V	1.00	84	1 / 0	14.40	8.37	22.77	33.01	-10.24
1882.50	15	QPSK	V	1.00	84	1 / 0	13.35	8.47	21.82	33.01	-11.19
1907.50	15	QPSK	V	1.00	84	1 / 0	13.20	8.62	21.82	33.01	-11.19
1857.50	15	16-QAM	V	1.00	84	1 / 0	13.41	8.37	21.78	33.01	-11.23
1882.50	15	16-QAM	V	1.00	84	1 / 0	12.15	8.47	20.62	33.01	-12.39
1907.50	15	16-QAM	V	1.00	84	1 / 0	12.26	8.62	20.88	33.01	-12.13
1860.00	20	QPSK	V	1.00	86	1/0	14.72	8.38	23.10	33.01	-9.91
1882.50	20	QPSK	V	1.00	86	1/0	13.29	8.47	21.76	33.01	-11.25
1905.00	20	QPSK	V	1.00	86	1/0	13.68	8.59	22.27	33.01	-10.74
1860.00	20	16-QAM	V	1.00	86	1/0	13.69	8.38	22.07	33.01	-10.94
1882.50	20	16-QAM	V	1.00	86	1 / 0	12.36	8.47	20.83	33.01	-12.18
1905.00	20	16-QAM	V	1.00	86	1/0	12.65	8.59	21.24	33.01	-11.77

# Table 7-6. EIRP Data (Band 2/25)

FCC ID: A3LSMG930US	<u> <u> <u> PCTEST</u> </u></u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 142 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 142 01 190
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	V	1.00	261	1 / 0	11.94	8.00	19.94	23.98	-4.04
2310.00	5	QPSK	V	1.00	261	12 / 6	12.87	8.00	20.87	23.98	-3.11
2312.50	5	QPSK	V	1.00	261	12 / 6	13.58	8.00	21.58	23.98	-2.40
2307.50	5	16-QAM	V	1.00	261	1 / 0	11.25	8.00	19.25	23.98	-4.73
2310.00	5	16-QAM	V	1.00	261	12 / 6	11.85	8.00	19.85	23.98	-4.13
2312.50	5	16-QAM	V	1.00	261	12 / 6	12.63	8.00	20.63	23.98	-3.35
2310.00	10	QPSK	V	1.00	262	25 / 12	12.90	8.00	20.90	23.98	-3.08
2310.00	10	16-QAM	V	1.00	261	25 / 12	11.91	8.00	19.91	23.98	-4.07

Table 7-7. EIRP Data (Band 30)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 142 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 143 01 190
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	V	1.23	200	1 / 0	12.75	7.09	19.84	33.01	-13.17
2593.00	5	QPSK	V	1.23	200	1 / 0	12.91	7.55	20.46	33.01	-12.55
2687.50	5	QPSK	V	1.23	200	1 / 0	11.19	7.82	19.01	33.01	-14.00
2498.50	5	16-QAM	V	1.23	200	1 / 0	11.52	7.09	18.61	33.01	-14.40
2593.00	5	16-QAM	V	1.23	200	1 / 0	11.58	7.55	19.13	33.01	-13.88
2687.50	5	16-QAM	V	1.23	200	1 / 0	10.58	7.82	18.40	33.01	-14.61
2501.00	10	QPSK	V	1.20	207	1 / 0	13.36	7.08	20.44	33.01	-12.57
2593.00	10	QPSK	V	1.20	207	1 / 0	14.62	7.55	22.17	33.01	-10.84
2685.00	10	QPSK	V	1.20	207	1 / 0	11.91	7.81	19.72	33.01	-13.29
2501.00	10	16-QAM	V	1.20	207	1 / 0	12.43	7.08	19.51	33.01	-13.50
2593.00	10	16-QAM	V	1.20	207	1 / 0	13.53	7.55	21.08	33.01	-11.93
2685.00	10	16-QAM	V	1.20	207	1 / 0	10.98	7.81	18.79	33.01	-14.22
2503.50	15	QPSK	V	1.37	220	1 / 0	15.11	7.10	22.21	33.01	-10.80
2593.00	15	QPSK	V	1.37	220	1 / 0	12.89	7.55	20.44	33.01	-12.57
2682.50	15	QPSK	V	1.37	220	1 / 0	12.62	7.81	20.43	33.01	-12.58
2503.50	15	16-QAM	V	1.37	220	1 / 0	14.36	7.10	21.46	33.01	-11.55
2593.00	15	16-QAM	V	1.37	220	1 / 0	11.54	7.55	19.09	33.01	-13.92
2682.50	15	16-QAM	V	1.37	220	1 / 0	12.36	7.81	20.17	33.01	-12.84
2506.00	20	QPSK	V	1.00	195	1 / 0	13.68	7.11	20.79	33.01	-12.22
2593.00	20	QPSK	V	1.00	195	1 / 0	13.48	7.55	21.03	33.01	-11.98
2680.00	20	QPSK	V	1.10	89	1/0	12.51	7.80	20.31	33.01	-12.70
2506.00	20	16-QAM	V	1.00	195	1/0	12.87	7.11	19.98	33.01	-13.03
2593.00	20	16-QAM	V	1.00	195	1/0	13.39	7.55	20.94	33.01	-12.07
2680.00	20	16-QAM	V	1.10	89	1 / 0	11.82	7.80	19.62	33.01	-13.39

Table 7-8. EIRP Data (Band 41)

FCC ID: A3LSMG930US	<u> <u> <u> PCTEST</u> </u></u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 144 of 100
0Y1512012035-R1.A3L	12/1 - 12/29/15, 1/26/16	Portable Handset		Page 144 01 190
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# 7.6.2 Antenna-B Radiated Power (ERP/EIRP)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	1.41	65	1 / 0	14.37	3.00	17.37	34.77	-17.40
707.50	1.4	QPSK	V	1.46	74	1 / 5	15.24	1.07	16.31	34.77	-18.46
715.30	1.4	QPSK	V	1.44	78	1 / 5	15.15	1.23	16.38	34.77	-18.40
699.70	1.4	16-QAM	V	1.43	68	1 / 0	13.55	3.00	16.55	34.77	-18.22
707.50	1.4	16-QAM	V	1.37	69	1 / 5	14.44	1.07	15.51	34.77	-19.26
715.30	1.4	16-QAM	V	1.28	74	1 / 5	14.31	1.23	15.54	34.77	-19.24
700.50	3	QPSK	V	1.20	84	1 / 0	14.61	0.92	15.53	34.77	-19.24
707.50	3	QPSK	V	1.11	88	1 / 14	15.78	1.07	16.85	34.77	-17.92
714.50	3	QPSK	V	1.20	95	1 / 14	15.40	1.21	16.61	34.77	-18.16
700.50	3	16-QAM	V	1.15	92	1 / 0	13.77	0.92	14.69	34.77	-20.08
707.50	3	16-QAM	V	1.19	84	1 / 14	15.06	1.07	16.13	34.77	-18.64
714.50	3	16-QAM	V	1.23	76	1 / 14	14.57	1.21	15.78	34.77	-18.99
701.50	5	QPSK	V	1.19	80	1 / 0	14.68	0.94	15.62	34.77	-19.15
707.50	5	QPSK	V	1.16	88	1 / 24	15.36	1.07	16.43	34.77	-18.34
713.50	5	QPSK	V	1.16	85	1 / 24	15.56	1.19	16.75	34.77	-18.02
701.50	5	16-QAM	V	1.20	94	1 / 0	13.90	0.94	14.84	34.77	-19.93
707.50	5	16-QAM	V	1.30	102	1 / 24	14.83	1.07	15.90	34.77	-18.87
713.50	5	16-QAM	V	1.64	63	1 / 24	14.78	1.19	15.97	34.77	-18.80
704.00	10	QPSK	V	1.63	60	1 / 49	15.12	1.00	16.12	34.77	-18.65
707.50	10	QPSK	V	1.47	61	1 / 49	14.77	1.07	15.84	34.77	-18.93
711.00	10	QPSK	V	1.56	52	1 / 0	15.11	1.14	16.25	34.77	-18.52
704.00	10	16-QAM	V	1.59	43	1 / 49	15.03	1.00	16.03	34.77	-18.74
707.50	10	16-QAM	V	1.64	39	1 / 49	14.03	1.07	15.10	34.77	-19.67
711.00	10	16-QAM	V	1.64	42	1/0	14.35	1.14	15.49	34.77	-19.28

Table 7-9. ERP Data (Band 12)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	1.42	275	1 / 24	13.57	2.47	16.04	34.77	-18.73
782.00	5	QPSK	V	1.42	275	1 / 24	13.59	2.51	16.10	34.77	-18.67
784.50	5	QPSK	V	1.42	275	1 / 24	14.18	2.56	16.74	34.77	-18.03
779.50	5	16QAM	V	1.42	275	1 / 24	12.96	2.47	15.43	34.77	-19.34
782.00	5	16QAM	V	1.42	275	1 / 24	12.92	2.51	15.43	34.77	-19.34
784.50	5	16QAM	V	1.42	275	1 / 24	13.42	2.56	15.98	34.77	-18.79
782.00	10	QPSK	V	1.42	275	1 / 49	13.87	2.51	16.38	34.77	-18.39
782.00	10	16QAM	V	1.42	275	1 / 49	13.19	2.51	15.70	34.77	-19.07

Table 7-10. ERP Data (Band 13)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	1.35	259	1/0	13.03	2.98	16.01	38.45	-22.44
836.50	1.4	QPSK	V	1.35	259	1 / 0	14.39	3.04	17.43	38.45	-21.02
848.30	1.4	QPSK	V	1.35	259	1 / 0	13.15	3.10	16.25	38.45	-22.20
824.70	1.4	16-QAM	V	1.35	259	1 / 0	12.50	2.98	15.48	38.45	-22.97
836.50	1.4	16-QAM	V	1.35	259	1 / 0	13.85	3.04	16.89	38.45	-21.56
848.30	1.4	16-QAM	V	1.35	259	1 / 0	12.63	3.10	15.73	38.45	-22.72
825.50	3	QPSK	V	1.34	257	1 / 0	13.57	2.98	16.55	38.45	-21.90
836.50	3	QPSK	V	1.34	257	1 / 0	14.68	3.04	17.72	38.45	-20.73
847.50	3	QPSK	V	1.34	257	1 / 0	13.75	3.10	16.85	38.45	-21.60
825.50	3	16-QAM	V	1.34	257	1 / 0	13.02	2.98	16.00	38.45	-22.45
836.50	3	16-QAM	V	1.34	257	1 / 0	14.22	3.04	17.26	38.45	-21.19
847.50	3	16-QAM	V	1.34	257	1 / 0	13.29	3.10	16.39	38.45	-22.06
826.50	5	QPSK	V	1.44	242	1 / 0	13.50	2.99	16.49	38.45	-21.96
836.50	5	QPSK	V	1.44	242	1 / 0	14.90	3.04	17.94	38.45	-20.51
846.50	5	QPSK	V	1.44	242	1 / 0	14.36	3.09	17.45	38.45	-21.00
826.50	5	16-QAM	V	1.44	242	1 / 0	13.09	2.99	16.08	38.45	-22.37
836.50	5	16-QAM	V	1.44	242	1 / 0	14.45	3.04	17.49	38.45	-20.96
846.50	5	16-QAM	V	1.44	242	1 / 0	13.88	3.09	16.97	38.45	-21.48
829.00	10	QPSK	V	1.48	253	1 / 0	14.00	3.00	17.00	38.45	-21.45
836.50	10	QPSK	V	1.48	253	1 / 0	14.87	3.04	17.91	38.45	-20.54
844.00	10	QPSK	V	1.48	253	1 / 0	15.15	3.08	18.23	38.45	-20.22
829.00	10	16-QAM	V	1.48	253	1 / 0	13.42	3.00	16.42	38.45	-22.03
836.50	10	16-QAM	V	1.48	253	1 / 0	14.70	3.04	17.74	38.45	-20.71
844.00	10	16-QAM	V	1.48	253	1 / 0	14.45	3.08	17.53	38.45	-20.92
831.50	15	QPSK	V	1.55	260	1 / 0	14.60	3.01	17.61	38.45	-20.84
836.50	15	QPSK	V	1.55	260	1 / 0	14.60	3.04	17.64	38.45	-20.81
841.50	15	QPSK	V	1.55	260	1 / 0	15.10	3.07	18.17	38.45	-20.28
831.50	15	16-QAM	V	1.55	260	1 / 0	13.78	3.01	16.79	38.45	-21.66
836.50	15	16-QAM	V	1.55	260	1 / 0	14.14	3.04	17.18	38.45	-21.27
841.50	15	16-QAM	V	1.55	260	1 / 0	14.24	3.07	17.31	38.45	-21.14

#### Table 7-11. ERP Data (Band 5/26)

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## 7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §27.53(h) §27.53(m) §27.53(a.4)

### **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 D01 v02r02- Section 5.8

ANSI/TIA-603-C-2004 - Section 2.2.12

### Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points  $\geq$  2 x span / RBW
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. The trace was allowed to stabilize

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Figure 7-7. Test Instrument & Measurement Setup

### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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## 7.7.1 Antenna-A Radiated Spurious Emissions Measurements



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1408.00	Н	-	-	-62.39	5.69	-56.69	75.3
2112.00	Н	-	-	-61.75	6.67	-55.08	73.7
2816.00	Н	-	-	-61.56	7.82	-53.74	72.3

Table 7-12. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707	7.50	MHz
CHANNEL:	230	095	_
MEASURED OUTPUT POWER:	18.36	dBm =	0.069 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.36	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	-	-	-63.35	5.73	-57.61	76.0
2122.50	Н	-	-	-61.35	6.73	-54.62	73.0
2830.00	Н	-	-	-61.99	7.80	-54.19	72.6

Table 7-13. Radiated Spurious Data (Band 12 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1422.00	Н	-	-	-63.05	5.77	-57.28	76.5
2133.00	Н	-	-	-61.53	6.79	-54.74	74.0
2844.00	Н	-	-	-61.23	7.78	-53.45	72.7

Table 7-14. Radiated Spurious Data (Band 12 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1422.00	Н	-	-	-66.47	5.77	-60.70	79.9
2133.00	Н	-	-	-62.40	6.79	-55.61	74.8
2844.00	Н	-	-	-67.64	7.78	-59.86	79.1

Table 7-15. Radiated Spurious Data with WCP (Band 12 – High Channel)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	Н	-	-	-63.93	7.26	-56.67	78.1
3128.00	Н	-	-	-60.49	7.26	-53.23	74.7

Table 7-16. Radiated Spurious Data (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz
-		-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	Н	-	-	-65.47	6.44	-59.03	-19.0

Table 7-17. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMG930US	<u>«NPCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	782	2.00	MHz
CHANNEL:	232	230	
MEASURED OUTPUT POWER:	21.45	dBm =	0.140 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log10 (W)	33.90	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	Н	1.35	266	-61.93	7.26	-54.67	76.1
3128.00	Н	-	-	-61.28	7.26	-54.02	75.5

Table 7-18. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	Н	1.00	246	-62.97	6.44	-56.53	-16.5

Table 7-19. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
1658.00	Н	-	-	-66.41	6.56	-59.85	79.9
2487.00	Н	-	-	-63.92	7.33	-56.59	76.6
3316.00	Н	-	-	-63.39	7.41	-55.99	76.0

Table 7-20. Radiated Spurious Data (Band 5/26 – Low Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	-	-	-66.69	6.55	-60.14	80.8
2509.50	Н	-	-	-65.53	7.34	-58.18	78.9
3346.00	Н	-	-	-63.09	7.44	-55.65	76.4

Table 7-21. Radiated Spurious Data (Band 5/26 – Mid Channel)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1688.00	Н	-	-	-66.87	6.55	-60.32	81.1
2532.00	Н	-	-	-66.02	7.35	-58.67	79.5
3376.00	Н	-	-	-63.42	7.47	-55.95	76.8

Table 7-22. Radiated Spurious Data (Band 5/26 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1688.00	Н	1.83	0	-64.76	6.55	-58.21	79.0
2532.00	Н	-	-	-66.16	7.35	-58.81	79.6
3376.00	Н	-	-	-63.27	7.47	-55.80	76.6

Table 7-23. Radiated Spurious Data with WCP (Band 5/26 – High Channel)

FCC ID: A3LSMG930US	PCTEST'	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	V	1.05	157	-58.37	9.69	-48.68	71.4
5137.50	V	3.26	171	-58.63	10.67	-47.96	70.7
6850.00	V	-	-	-57.05	11.74	-45.31	68.0

Table 7-24. Radiated Spurious Data (Band 4 – Low Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	V	1.19	166	-55.55	9.71	-45.85	70.1
5197.50	V	3.09	160	-57.17	10.59	-46.59	70.8
6930.00	V	-	-	-56.90	11.75	-45.15	69.4

Table 7-25. Radiated Spurious Data (Band 4 – Mid Channel)

FCC ID: A3LSMG930US	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager			
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	V	1.24	176	-57.52	9.73	-47.79	67.5
5257.50	V	3.26	168	-58.16	10.63	-47.53	67.3
7010.00	V	-	-	-56.62	11.76	-44.87	64.6

Table 7-26. Radiated Spurious Data (Band 4 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	Н	1.83	22	-59.86	9.69	-50.17	72.9
5137.50	Н	1.83	22	-57.46	10.67	-46.79	69.5
6850.00	Н	-	-	-56.57	11.74	-44.83	67.5

Table 7-27. Radiated Spurious Data with WCP (Band 4 – Low Channel)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	UNG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	V	2.31	184	-53.68	9.39	-44.29	67.4
5580.00	V	2.87	195	-56.51	10.85	-45.66	68.8
7440.00	V	2.95	116	-53.00	10.79	-42.22	65.3
9300.00	V	-	-	-51.63	11.60	-40.03	63.1

Table 7-28. Radiated Spurious Data (Band 2/25 – Low Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	V	3.78	198	-54.50	9.27	-45.23	67.0
5647.50	V	2.57	55	-56.83	11.06	-45.77	67.5
7530.00	V	3.14	17	-54.12	10.99	-43.12	64.9
9412.50	V	-	-	-52.81	11.55	-41.25	63.0

Table 7-29. Radiated Spurious Data (Band 2/25 – Mid Channel)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SUNG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3810.00	V	2.23	346	-51.88	9.19	-42.69	65.0
5715.00	V	2.42	221	-57.33	11.26	-46.07	68.3
7620.00	V	3.63	94	-54.88	11.16	-43.72	66.0
9525.00	V	-	-	-52.17	11.76	-40.41	62.7

Table 7-30. Radiated Spurious Data (Band 2/25 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	Н	-	-	-58.07	9.39	-48.68	71.8
5580.00	Н	-	-	-56.37	10.85	-45.52	68.6
7440.00	Н	-	-	-53.34	10.79	-42.56	65.7

 Table 7-31. Radiated Spurious Data with WCP (Band 2/25 – Low Channel)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 150 of 100		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
4615.00	Н	1.23	270	-59.55	10.88	-48.67	68.6
6922.50	Н	3.14	135	-67.67	11.75	-55.92	75.9
9230.00	Н	1.99	190	-60.72	11.57	-49.15	69.1
11537.50	Н	2.14	100	-62.41	12.61	-49.80	69.7

Table 7-32. Radiated Spurious Data (Band 30 – Low Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
4620.00	Н	1.50	150	-64.83	10.87	-53.96	74.8
6930.00	Н	1.35	160	-66.24	11.75	-54.49	75.4
9240.00	Н	2.89	125	-57.50	11.57	-45.93	66.8
11550.00	Н	1.94	300	-62.42	12.59	-49.83	70.7

Table 7-33. Radiated Spurious Data (Band 30 – Mid Channel)

FCC ID: A3LSMG930US		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager				
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
4625.00	Н	1.71	200	-62.78	10.87	-51.91	73.5
6937.50	Н	1.56	180	-62.61	11.75	-50.86	72.4
9250.00	Н	1.23	251	-58.79	11.58	-47.21	68.8
11562.50	Н	1.45	310	-62.42	12.56	-49.86	71.4

Table 7-34. Radiated Spurious Data (Band 30 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
4625.00	Н	1.29	100	-57.72	10.87	-46.85	68.4
6937.50	Н	1.85	200	-66.14	11.75	-54.39	76.0
9250.00	Н	1.75	125	-59.72	11.58	-48.14	69.7
11562.50	Н	2.10	160	-62.34	12.56	-49.78	71.4

Table 7-35. Radiated Spurious Data with WCP (Band 30 – High Channel)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5007.00	Н	1.54	273	-54.08	10.92	-43.16	65.4
7510.50	Н	1.54	273	-55.09	10.95	-44.13	66.3
10014.00	Н	-	-	-53.37	12.04	-41.33	63.5

 Table 7-36. Radiated Spurious Data (Band 41 – Low Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5186.00	Н	1.58	239	-49.59	10.60	-38.99	59.4
7779.00	Н	1.58	239	-54.36	11.22	-43.14	63.6
10372.00	Н	-	-	-53.16	12.36	-40.80	61.2

Table 7-37. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: A3LSMG930US	<u>«NPCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5365.00	Н	1.21	221	-45.25	10.60	-34.66	55.1
8047.50	Н	1.21	221	-53.71	11.10	-42.61	63.0
10730.00	Н	-	-	-54.13	12.56	-41.56	62.0

Table 7-38. Radiated Spurious Data (Band 41 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5007.00	Н	1.21	221	-55.72	10.92	-44.80	67.0
7510.50	Н	1.21	221	-55.30	10.95	-44.34	66.6
10014.00	Н	-	-	-54.60	12.04	-42.56	64.8

Table 7-39. Radiated Spurious Data with WCP (Band 41 – Low Channel)

FCC ID: A3LSMG930US	<u>«NPCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager			
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## 7.7.2 Antenna-B Radiated Spurious Emissions Measurements



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1399.40	Н	2.04	354	-58.47	7.53	-50.93	69.5
2103.40	Н	1.00	294	-54.74	8.03	-46.71	65.3
2807.40	Н	-	-	-57.78	8.68	-49.11	67.7

Table 7-40. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707	7.50	MHz
CHANNEL:	230	095	
MEASURED OUTPUT POWER:	16.31	dBm =	0.043 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	29.31	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	2.11	0	-58.76	7.56	-51.20	69.6
2122.50	Н	1.00	44	-56.63	8.17	-48.46	66.8
2830.00	Н	-	-	-56.85	8.70	-48.16	66.5

Table 7-41. Radiated Spurious Data (Band 12 – Mid Channel)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1430.60	Н	1.54	300	-58.31	7.58	-50.73	70.0
2141.60	Н	-	-	-58.60	8.32	-50.28	69.5

Table 7-42. Radiated Spurious Data (Band 12 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1399.40	Н	2.00	0	-63.50	5.64	-57.86	77.1
2110.40	Н	-	-	-67.33	6.66	-60.66	79.9

Table 7-43. Radiated Spurious Data with WCP (Band 12 - Low Channel)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2338.50	Н	1.85	30	-61.03	7.28	-53.75	70.0
3120.50	Н	-	-	-63.68	7.26	-56.43	72.6

Table 7-44. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY:	782	2.00	MHz	
CHANNEL:	232	230		
MEASURED OUTPUT POWER:	16.10	dBm =	0.041	W
MODULATION SIGNAL:	QPSK	_		
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	29.10	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	Н	2.77	360	-59.82	7.26	-52.56	68.8
3128.00	Н	-	-	-62.33	7.26	-55.07	71.3

Table 7-45. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager	
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NA



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	Н	1.00	88	-61.93	7.25	-54.68	71.4
3138.00	Н	-	-	-62.66	7.27	-55.39	72.1

Table 7-46. Radiated Spurious Data (Band 13 – High Channel)

_	QPSK	MODULATION SIGNAL:
MHz	5.00	BANDWIDTH:
meters	3	DISTANCE:
dBm	-50	RROWBAND EMISSION LIMIT:
dBm/MHz	-40	WIDEBAND EMISSION LIMIT:
=		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	Н	2.94	360	-65.19	6.42	-58.77	-18.8
1564.00	Н	4.00	360	-65.23	6.44	-58.79	-18.8
1569.00	Н	2.27	0	-64.73	6.46	-58.27	-18.3

Table 7-47. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	Н	1.33	37	-61.32	7.25	-54.07	70.3
3135.50	Н	-	-	-61.98	7.27	-54.71	70.9

Table 7-48. Radiated Spurious Data with WCP (Band 13 – High Channel)

MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz
		-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1569.00	Н	1.11	89	-63.59	6.46	-57.13	-17.1

Table 7-49. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1658.00	Н	1.00	360	-61.18	6.56	-54.62	71.6
2487.00	Н	1.00	48	-56.41	7.33	-49.08	66.1

Table 7-50. Radiated Spurious Data (Band 5/26 – Low Channel)

OPERATING FREQUENCY:	836	.50		MHz		
CHANNEL:	205	525		_		
MEASURED OUTPUT POWER:	17.91	dBm	=	0.06	62	W
MODULATION SIGNAL:	QPSK					-
BANDWIDTH:	10.0	MHz				
DISTANCE:	3	meters				
LIMIT:	43 + 10 log <sub>10</sub> (W) =	3	30.91	dBc		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	1.00	0	-58.82	6.55	-52.27	70.2
2509.50	Н	1.00	360	-60.73	7.34	-53.38	71.3

 Table 7-51. Radiated Spurious Data (Band 5/26 – Mid Channel)

FCC ID: A3LSMG930US	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1688.00	Н	1.00	360	-58.39	6.55	-51.84	70.1
2532.00	Н	1.00	0	-62.68	7.35	-55.33	73.6

Table 7-52. Radiated Spurious Data (Band 5/26 – High Channel)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1688.00	н	1.00	0	-61.30	6.55	-54.75	73.0

Table 7-53. Radiated Spurious Data with WCP (Band 5/26 – High Channel)

FCC ID: A3LSMG930US	<u> <u> PCTEST</u> </u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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## 7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

#### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### **Test Procedure Used**

#### ANSI/TIA-603-C-2004

#### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### Test Notes

None

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# Band 12 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,500,196	196	0.0000277
100 %		- 30	707,500,459	459	0.0000649
100 %		- 20	707,500,209	209	0.0000295
100 %		- 10	707,499,613	-387	-0.0000547
100 %		0	707,499,878	-122	-0.0000172
100 %		+ 10	707,499,989	-11	-0.0000016
100 %		+ 20	707,500,206	206	0.0000291
100 %		+ 30	707,499,984	-16	-0.0000023
100 %		+ 40	707,499,968	-32	-0.0000045
100 %		+ 50	707,500,131	131	0.0000185
BATT. ENDPOINT	3.45	+ 20	707,499,968	-32	-0.0000045

Table 7-54. Frequency Stability Data (Band 12)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 12 Frequency Stability Measurements §2.1055 §27.54



Figure 7-8. Frequency Stability Graph (Band 12)

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# Band 13 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	782,000,021	21	0.0000027
100 %		- 30	782,000,207	207	0.0000265
100 %		- 20	781,999,590	-410	-0.0000524
100 %		- 10	781,999,791	-209	-0.0000267
100 %		0	781,999,717	-283	-0.0000362
100 %		+ 10	781,999,883	-117	-0.0000150
100 %		+ 20	781,999,886	-114	-0.0000146
100 %		+ 30	782,000,087	87	0.0000111
100 %		+ 40	781,999,610	-390	-0.0000499
100 %		+ 50	782,000,216	216	0.0000276
BATT. ENDPOINT	3.45	+ 20	781,999,962	-38	-0.0000049

Table 7-55. Frequency Stability Data (Band 13)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 13 Frequency Stability Measurements §2.1055 §27.54



Figure 7-9. Frequency Stability Graph (Band 13)

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## Band 5 Frequency Stability Measurements §22.1055 §22.355

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,599	-401	-0.0000479
100 %		- 30	836,499,954	-46	-0.0000055
100 %		- 20	836,499,670	-330	-0.0000395
100 %		- 10	836,500,177	177	0.0000212
100 %		0	836,500,176	176	0.0000210
100 %		+ 10	836,499,836	-164	-0.0000196
100 %		+ 20	836,500,046	46	0.0000055
100 %		+ 30	836,500,380	380	0.0000454
100 %		+ 40	836,500,197	197	0.0000236
100 %		+ 50	836,500,087	87	0.0000104
BATT. ENDPOINT	3.45	+ 20	836,500,129	129	0.0000154

Table 7-56. Frequency Stability Data (Band 5)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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# Band 5 Frequency Stability Measurements §2.1055 §22.355



Figure 7-10. Frequency Stability Graph (Band 5)

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## Band 26 Frequency Stability Measurements §22.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	831,500,052	52	0.0000063
100 %		- 30	831,500,197	197	0.0000237
100 %		- 20	831,499,910	-90	-0.0000108
100 %		- 10	831,499,861	-139	-0.0000167
100 %		0	831,500,060	60	0.0000072
100 %		+ 10	831,500,224	224	0.0000269
100 %		+ 20	831,500,051	51	0.0000061
100 %		+ 30	831,500,099	99	0.0000119
100 %		+ 40	831,500,101	101	0.0000121
100 %		+ 50	831,500,005	5	0.0000006
BATT. ENDPOINT	3.45	+ 20	831,499,729	-271	-0.0000326

Table 7-57. Frequency Stability Data (Band 26)

FCC ID: A3LSMG930US	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
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# Band 26 Frequency Stability Measurements §2.1055 §22.355



Figure 7-11. Frequency Stability Graph (Band 26)

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# Band 4 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,499,744	-256	-0.0000148
100 %		- 30	1,732,499,743	-257	-0.0000148
100 %		- 20	1,732,499,832	-168	-0.0000097
100 %		- 10	1,732,500,180	180	0.0000104
100 %		0	1,732,499,989	-11	-0.0000006
100 %		+ 10	1,732,499,926	-74	-0.0000043
100 %		+ 20	1,732,500,347	347	0.0000200
100 %		+ 30	1,732,499,643	-357	-0.0000206
100 %		+ 40	1,732,500,067	67	0.0000039
100 %		+ 50	1,732,499,940	-60	-0.0000035
BATT. ENDPOINT	3.45	+ 20	1,732,499,991	-9	-0.0000005

Table 7-58. Frequency Stability Data (Band 4)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 4 Frequency Stability Measurements §2.1055 §§27.54



Figure 7-12. Frequency Stability Graph (Band 4)

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# Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,999	-1	-0.0000001
100 %		- 30	1,879,999,774	-226	-0.0000120
100 %		- 20	1,879,999,754	-246	-0.0000131
100 %		- 10	1,879,999,967	-33	-0.0000018
100 %		0	1,880,000,021	21	0.0000011
100 %		+ 10	1,879,999,660	-340	-0.0000181
100 %		+ 20	1,880,000,269	269	0.0000143
100 %		+ 30	1,879,999,831	-169	-0.0000090
100 %		+ 40	1,880,000,188	188	0.0000100
100 %		+ 50	1,879,999,963	-37	-0.0000020
BATT. ENDPOINT	3.45	+ 20	1,880,000,384	384	0.0000204

Table 7-59. Frequency Stability Data (Band 2)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 2 Frequency Stability Measurements §2.1055 §24.235



Figure 7-13. Frequency Stability Graph (Band 2)

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### Band 25 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	-
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,882,500,117	117	0.0000062
100 %		- 30	1,882,499,978	-22	-0.0000012
100 %		- 20	1,882,499,877	-123	-0.0000065
100 %		- 10	1,882,500,270	270	0.0000143
100 %		0	1,882,500,257	257	0.0000137
100 %		+ 10	1,882,500,175	175	0.0000093
100 %		+ 20	1,882,499,905	-95	-0.0000050
100 %		+ 30	1,882,500,259	259	0.0000138
100 %		+ 40	1,882,500,215	215	0.0000114
100 %		+ 50	1,882,500,120	120	0.0000064
BATT. ENDPOINT	3.45	+ 20	1,882,499,615	-385	-0.0000205

Table 7-60. Frequency Stability Data (Band 25)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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### Band 25 Frequency Stability Measurements §2.1055 §24.235



Figure 7-14. Frequency Stability Graph (Band 25)

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## Band 30 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	2,310,000,000	Hz
CHANNEL:	27710	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,310,000,114	114	0.0000049
100 %		- 30	2,309,999,761	-239	-0.0000103
100 %		- 20	2,309,999,833	-167	-0.0000072
100 %		- 10	2,310,000,273	273	0.0000118
100 %		0	2,309,999,543	-457	-0.0000198
100 %		+ 10	2,309,999,933	-67	-0.0000029
100 %		+ 20	2,309,999,947	-53	-0.0000023
100 %		+ 30	2,309,999,955	-45	-0.0000019
100 %		+ 40	2,310,000,383	383	0.0000166
100 %		+ 50	2,310,000,076	76	0.0000033
BATT. ENDPOINT	3.45	+ 20	2,309,999,944	-56	-0.0000024

Table 7-61. Frequency Stability Data (Band 30)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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## Band 30 Frequency Stability Measurements §2.1055 §24.235



Figure 7-15. Frequency Stability Graph (Band 30)

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### Band 41 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,660	-340	-0.0000131
100 %		- 30	2,593,000,010	10	0.0000004
100 %		- 20	2,593,000,423	423	0.0000163
100 %		- 10	2,592,999,769	-231	-0.0000089
100 %		0	2,592,999,782	-218	-0.0000084
100 %		+ 10	2,592,999,878	-122	-0.0000047
100 %		+ 20	2,592,999,767	-233	-0.0000090
100 %		+ 30	2,592,999,951	-49	-0.0000019
100 %		+ 40	2,592,999,993	-7	-0.0000003
100 %		+ 50	2,592,999,846	-154	-0.0000059
BATT. ENDPOINT	3.45	+ 20	2,593,000,101	101	0.0000039

Table 7-62. Frequency Stability Data (Band 41)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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# Band 41 Frequency Stability Measurements §2.1055 §27.54



Figure 7-16. Frequency Stability Graph (Band 41)

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#### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG930US** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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