

Plot 7-105. Low End Spectrum Channel Hopping Plot (Bluetooth) – ANT2



Plot 7-106. High End Spectrum Channel Hopping Plot (Bluetooth) – ANT2

FCC ID: A3LSMG998JPN	PCTEST*	MEASUREMENT REPORT (Certification)	SAMSUNG	Approved by: Quality Manager
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7.8 Conducted Spurious Emissions §15.247 (d); RSS-247 [5.5]

Test Overview and Limit

Conducted out-of-band spurious emissions were investigated from 30MHz up to 25GHz to include the 10th harmonic of the fundamental transmit frequency. *The maximum permissible out-of-band emission level is 20 dBc.*

Test Procedure Used

ANSI C63.10-2013 - Section 7.8.8

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
- 2. RBW = 1MHz* (See note below)
- 3. VBW = 3MHz
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

Test Setup

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



Figure 7-7. Test Instrument & Measurement Setup

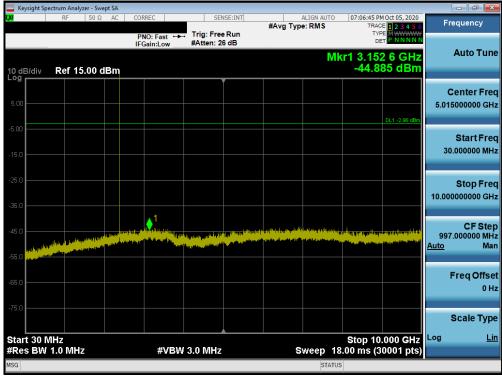
Test Notes

Out-of-band conducted spurious emissions were investigated for all data rates and the worst case emissions were found with the EUT transmitting at 3Mbps. The display line shown in the following plots is the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, the traces in the following plots are measured with a 1MHz RBW to reduce test time, so the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

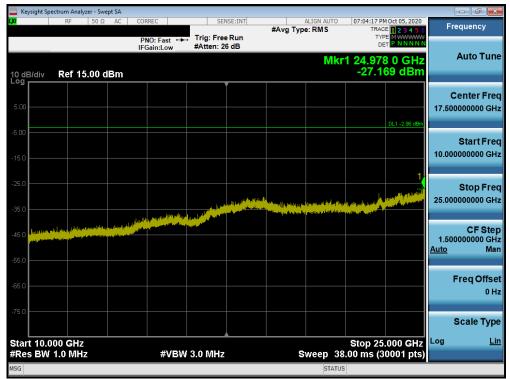
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Antenna 1



Plot 7-107. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 0)



Plot 7-108. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 0)

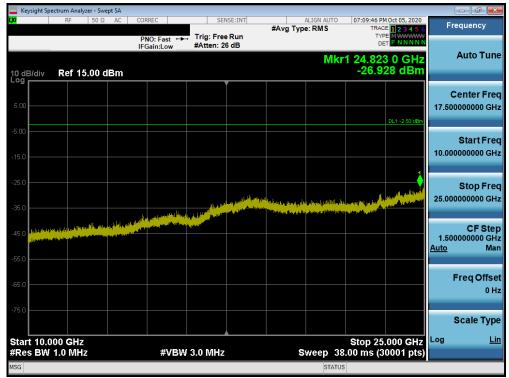
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							n Analyzer - Swept S	Keysight Spect
Frequency	08:57 PM Oct 05, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N		ALIGN AU vg Type: RMS		RREC	Р	F 50Ω A	
Auto Tun	3.180 2 GHz 43.105 dBm	Mkr1 3		Witten: 2	Gam.Low		ef 15.00 dBr	dB/div
Center Fre 5.015000000 GH	DL1 -2.50 dBm							
Start Fre 30.000000 MH								
Stop Fre 10.000000000 GH								o ———
CF Ste 997.000000 MH <u>Auto</u> Ma	r fannsenger par gerelen fan fan fan Nederlen se	Constant of the second	te og å gener statte skan besøger bene å Samer som en statte skan som er se skan					epidebala (C
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Plot 7-109. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 39)



Plot 7-110. Conducted Spurious Plot (Bluetooth, 3Mbps – Ch. 39)

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Keysight Sp														- 6 ×
u l	RF	50 Ω	AC	CORF	REC	Т	SEN		#Avg Typ	ALIGN AUTO	TRA	M Oct 05, 2020 CE 1 2 3 4 5 6 PE M WWWWW	Fr	equency
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15.0													30	Start Fre .000000 MH
35.0													10.000	Stop Fre
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5.0													ŀ	Freq Offs 0 H
75.0														Scale Typ
tart 30 N Res BW		Iz			#VB	W 3.0) MHz		s	weep 18	Stop 10 3.00 ms (3).000 GHz 30001 pts)	Log	
SG										STATUS				

Plot 7-111. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 78)



Plot 7-112. Conducted Spurious Plot (Bluetooth, 3Mbps – Ch. 78)

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Antenna 2



Plot 7-113. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 0)



Plot 7-114. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 0)

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🛶 Keysight Sp	ectrum A	nalyzer - Swe											_	- 6 - ×
<mark>XI</mark>	RF	50 Ω	AC		RREC		SEI		#Avg Typ	ALIGN AUTO e: RMS	TRA	M Oct 05, 2020 CE 1 2 3 4 5 6 PE M WWWWW ET P N N N N N	Free	quency
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SG										STATU	s			

Plot 7-115. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 39)



Plot 7-116. Conducted Spurious Plot (Bluetooth, 3Mbps – Ch. 39)

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										sight Spectrum /	🔤 Key
Frequency	51:07 PM Oct 05, 2020 TRACE 1 2 3 4 5 6	TO 07:	ALIGN AUT Avg Type: RMS	NSE:INT			COR	AC	50 Ω	RF	<mark>XI</mark>
					Trig: Free #Atten: 20): Fast ↔ in:Low					
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Center Fre											.09
5.015000000 GH											5.00
	DL1 -3.21 dBm										5.00
Start Fre 30.000000 MH											
											15.0
Stop Fre											25.0
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	nie (eneer pro)	ATUS	7		ore miniz						SG

Plot 7-117. Conducted Spurious Plot (Bluetooth, 3Mbps - Ch. 78)



Plot 7-118. Conducted Spurious Plot (Bluetooth, 3Mbps – Ch. 78)

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7.9 Radiated Spurious Emission Measurements – Above 1GHz §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-10 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [µV/m]	Measured Distance [Meters]	
Above 960.0 MHz	500	3	

Table 7-10. Radiated Limits

Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3

Test Settings Average Field Strength Measurements per Section 4.1.4.2.3 of ANSI C63.10-2013

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = $1kHz \ge 1/\tau$ Hz, where τ = pulse width in seconds
- 4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
- 5. Detector = peak
- 6. Sweep time = auto
- 7. Trace mode = max hold
- 8. Trace was allowed to stabilize

Peak Field Strength Measurements per Section 4.1.4.2.2 of ANSI C63.10-2013

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW is set depending on measurement frequency, as specified in Table 7-11 below
- 3. VBW = 3MHz
- 4. Detector = peak
- 5. Sweep time = auto couple
- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize

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Frequency	RBW					
9 – 150kHz	200 – 300Hz					
0.15 – 30MHz	9 – 10kHz					
30 – 1000MHz	100 – 120kHz					
> 1000MHz	1MHz					
Table 7-11. RBW as a Function of Frequency						

Test Setup

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

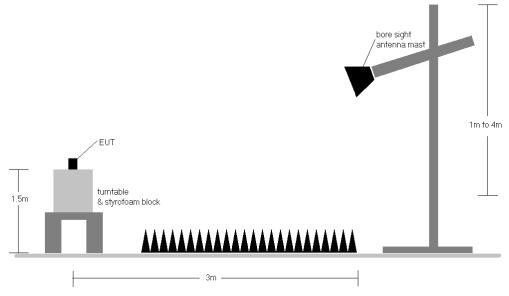


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

- 1. All emissions lying in restricted bands specified in §15.205 and Section 8.10 of RSS-Gen are below the limit shown in Table 7-10.
- 2. No significant radiated emissions were found in the 2310 2390MHz restricted band.
- 3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- 4. This unit was tested with its standard battery.
- 5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
- 6. The duty cycle correction factor was not applied to noise floor measurements.
- 7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
- 8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Sample Calculation

- ο Field Strength Level [dBµV/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + Duty Cycle Correction [dB]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- $\circ \quad \text{Margin}_{[dB]} = \text{Field Strength Level}_{[dB\mu V/m]} \text{Limit}_{[dB\mu V/m]}$

Duty Cycle Correction Factor Calculation

- Channel hop rate = #REF! hops/second (#REF! Mode)
- Adjusted channel hop rate for DH5 mode = #REF! hops/second
- Time per channel hop = 1 / #REF! hops/second = #REF! ms
- Time to cycle through all channels = #REF! x #REF! channels = #REF! ms
- Number of times transmitter hits on one channel = 100 ms / #REF! ms = #REF! time(s)
- Worst case dwell time = #REF! ms
- Duty cycle correction factor = 20log₁₀(#REF!ms/100ms) = #REF! dB

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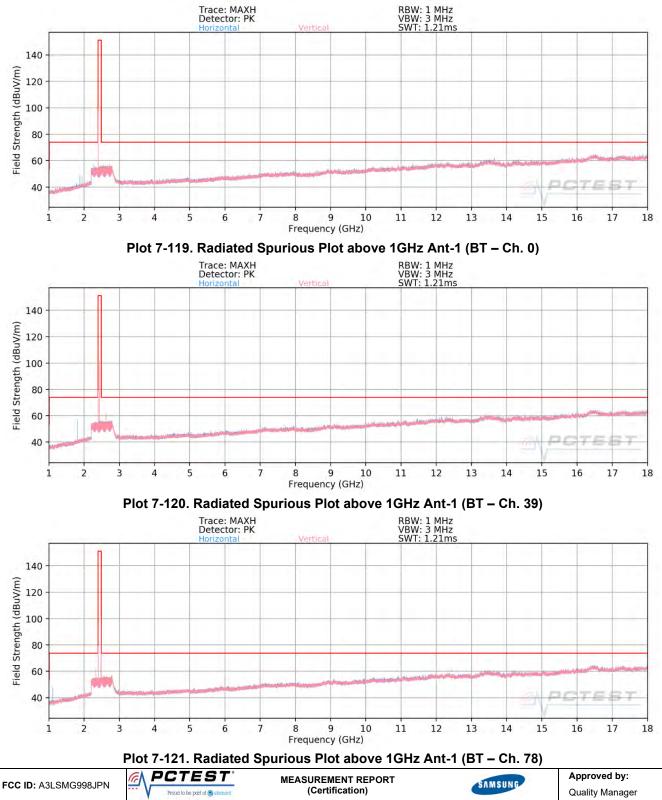


Radiated Spurious Emission Measurements (1 – 18GHz) §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Antenna 1

Test Report S/N:

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EUT Type:

Portable Handset

Test Dates:

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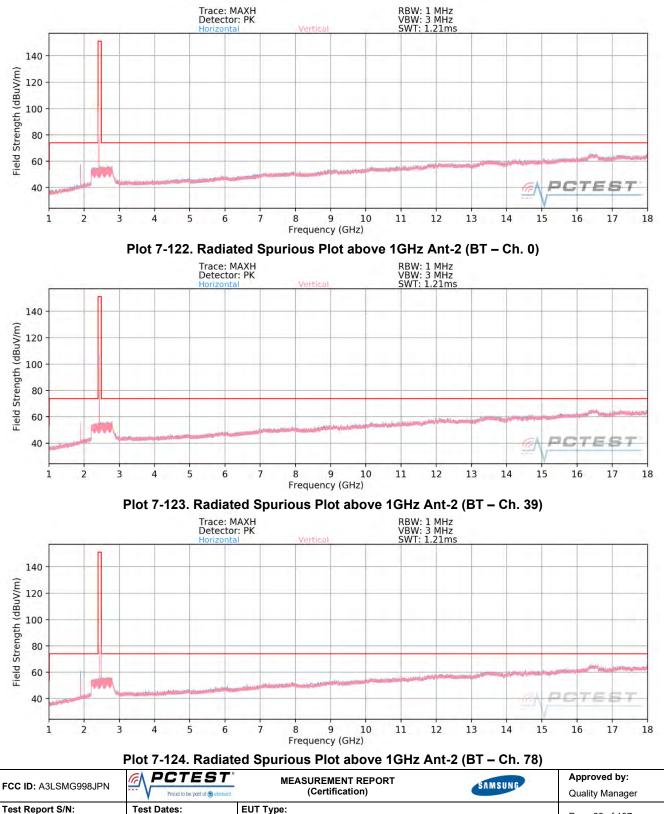


Radiated Spurious Emission Measurements (1 – 18GHz) §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Antenna 2

1M2101110003-12.A3L

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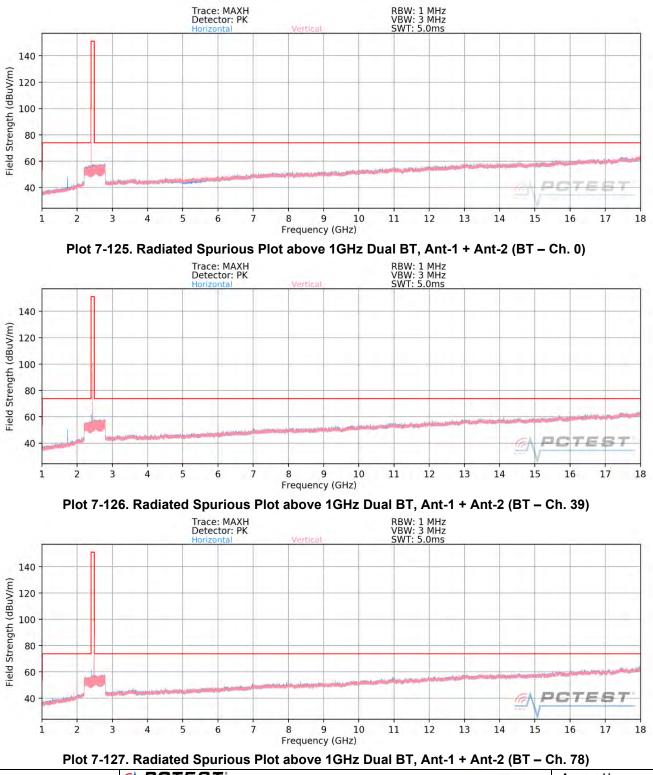
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Radiated Spurious Emission Measurements (1 – 18GHz) §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

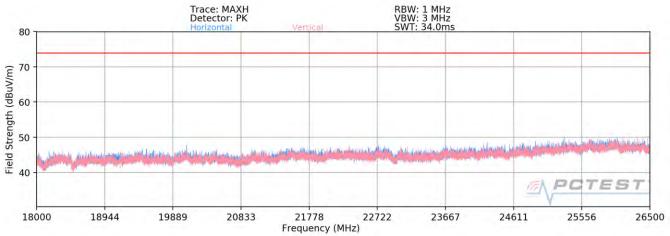
Dual BT



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Radiated Spurious Emissions Measurements (Above 18GHz) §15.209; RSS-Gen [8.9]



Plot 7-128. Radiated Spurious Plot above 18GHz

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Radiated Spurious Emission Measurements §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

ANT1

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	Н	-	-	-82.09	9.23	34.14	53.98	-19.84
4804.00	Peak	Н	-	-	-69.98	9.23	46.25	73.98	-27.73
12010.00	Avg	Н	-	-	-85.18	22.67	44.49	53.98	-9.49
12010.00	Peak	Н	-	-	-72.87	22.67	56.80	73.98	-17.18

Table 7-12. Radiated Measurements-ANT1

Worst Case Mode: Worst Case Data Rate: Measurement Distance: Operating Frequency: Channel:

Bluetooth
1 Mbps
3 Meters
2441MHz
39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	Н	-	-	-82.23	9.37	34.14	53.98	-19.84
4882.00	Peak	н	-	-	-70.39	9.37	45.98	73.98	-28.00
7323.00	Avg	н	-	-	-84.01	14.98	37.97	53.98	-16.01
7323.00	Peak	н	-	-	-72.42	14.98	49.56	73.98	-24.42
12205.00	Avg	Н	-	-	-85.02	22.08	44.06	53.98	-9.92
12205.00	Peak	Н	-	-	-73.30	22.08	55.78	73.98	-18.20

Table 7-13. Radiated Measurements-ANT1

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Radiated Spurious Emission Measurements §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Bluetooth			
l Mbps			
3 Meters			
2480MHz			
78			

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	Н	-	-	-82.36	9.40	34.04	53.98	-19.94
4960.00	Peak	н	-	-	-70.74	9.40	45.66	73.98	-28.32
7440.00	Avg	н	-	-	-84.46	15.58	38.12	53.98	-15.85
7440.00	Peak	н	-	-	-71.88	15.58	50.70	73.98	-23.27
12400.00	Avg	н	-	-	-85.25	22.81	44.56	53.98	-9.42
12400.00	Peak	Н	-	-	-72.75	22.81	57.06	73.98	-16.92

Table 7-14. Radiated Measurements-ANT1

Worst Case Mode: Worst Case Data Rate: Measurement Distance: Operating Frequency: Channel:

Bluetooth
1 Mbps
3 Meters
2402MHz
0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	Н	-	-	-82.46	9.23	33.77	53.98	-20.21
4804.00	Peak	Н	-	-	-69.62	9.23	46.61	73.98	-27.37
12010.00	Avg	Н	-	-	-85.19	22.67	44.48	53.98	-9.50
12010.00	Peak	Н	-	-	-72.92	22.67	56.75	73.98	-17.23

Table 7-15. Radiated Measurements with WCP-ANT1

FCC ID: A3LSMG998JPN	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (Certification)	SAMSUNG	Approved by: Quality Manager
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ANT2

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	Н	-	-	-79.38	7.22	34.84	53.98	-19.14
4804.00	Peak	Н	-	-	-67.79	7.22	46.43	73.98	-27.55
12010.00	Avg	Н	-	-	-80.89	18.11	44.22	53.98	-9.76
12010.00	Peak	Н	-	-	-69.13	18.11	55.98	73.98	-18.00

Table 7-16. Radiated Measurements-ANT2

Worst Case Mode: Worst Case Data Rate: Measurement Distance: Operating Frequency: Channel:

Bluetooth	
1 Mbps	
3 Meters	
2441MHz	
39	

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	Н	-	-	-79.77	7.86	35.09	53.98	-18.89
4882.00	Peak	н	-	-	-67.68	7.86	47.18	73.98	-26.80
7323.00	Avg	Н	-	-	-79.67	12.08	39.41	53.98	-14.57
7323.00	Peak	н	-	-	-67.17	12.08	51.91	73.98	-22.07
12205.00	Avg	Н	-	-	-80.81	18.16	44.35	53.98	-9.63
12205.00	Peak	Н	-	-	-68.63	18.16	56.53	73.98	-17.45

Table 7-17. Radiated Measurements-ANT2

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Radiated Spurious Emission Measurements §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Bluetooth			
1 Mbps			
3 Meters			
2480MHz			
78			

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	Н	-	-	-79.66	7.13	34.47	53.98	-19.51
4960.00	Peak	н	-	-	-68.27	7.13	45.86	73.98	-28.12
7440.00	Avg	н	-	-	-79.91	12.17	39.26	53.98	-14.72
7440.00	Peak	Н	-	-	-68.17	12.17	51.00	73.98	-22.98
12400.00	Avg	Н	-	-	-81.06	18.09	44.03	53.98	-9.95
12400.00	Peak	Н	-	-	-69.67	18.09	55.42	73.98	-18.56

Table 7-18. Radiated Measurements-ANT2

FCC ID: A3LSMG998JPN	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (Certification)	SAMSUNG	Approved by: Quality Manager
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Dual BT

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2402MHz
Channel:	0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	Н	251	76	-79.00	7.22	-22.50	12.72	53.98	-41.26
4804.00	Peak	н	251	76	-67.21	7.22	0.00	47.01	73.98	-26.97
7206.00	Avg	н	379	266	-79.60	11.45	-22.50	16.35	53.98	-37.63
7206.00	Peak	н	379	266	-67.17	11.45	0.00	51.28	73.98	-22.70
12010.00	Avg	н	-	-	-80.61	18.11	0.00	44.50	53.98	-9.48
12010.00	Peak	Н	-	-	-68.24	18.11	0.00	56.87	73.98	-17.11

Table 7-19. Radiated Measurements-Dual

Worst Case Mode: Worst Case Data Rate: Measurement Distance: Operating Frequency: Channel:

Bluetooth
1 Mbps
3 Meters
2441MHz
39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4882.00	Avg	Н	-	-	-79.80	7.86	0.00	35.06	53.98	-18.92
4882.00	Peak	Н	-	-	-67.36	7.86	0.00	47.50	73.98	-26.48
7323.00	Avg	Н	-	-	-79.71	12.08	0.00	39.37	53.98	-14.61
7323.00	Peak	Н	-	-	-66.61	12.08	0.00	52.47	73.98	-21.51
12205.00	Avg	Н	-	-	-80.80	18.16	0.00	44.36	53.98	-9.62
12205.00	Peak	Н	-	-	-68.91	18.16	0.00	56.25	73.98	-17.73

Table 7-20. Radiated Measurements-Dual

FCC ID: A3LSMG998JPN	PCTEST Projud to be part of @ element	MEASUREMENT REPORT (Certification)	SAMSUNG	Approved by: Quality Manager
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Radiated Spurious Emission Measurements §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

Bluetooth
1 Mbps
3 Meters
2480MHz
78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Strength	Limit [dBµV/m]	Margin [dB]
4960.00	Avg	Н	114	343	-79.56	7.13	-22.50	12.07	53.98	-41.90
4960.00	Peak	н	114	343	-67.80	7.13	0.00	46.33	73.98	-27.65
7440.00	Avg	н	387	234	-79.84	12.17	-22.50	16.83	53.98	-37.15
7440.00	Peak	н	387	234	-67.34	12.17	0.00	51.83	73.98	-22.15
12400.00	Avg	Н	-	-	-81.08	18.09	0.00	44.01	53.98	-9.97
12400.00	Peak	Н	-	-	-69.21	18.09	0.00	55.88	73.98	-18.10

Table 7-21. Radiated Measurements-Dual

Worst Case Mode: Worst Case Data Rate: Measurement Distance: Operating Frequency: Channel:

Bluetooth
1 Mbps
3 Meters
2402MHz
0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4804.00	Avg	Н	207	282	-79.67	7.22	-22.50	12.05	53.98	-41.93
4804.00	Peak	Н	207	282	-68.04	7.22	0.00	46.18	73.98	-27.80
7206.00	Avg	н	265	180	-79.59	11.45	-22.50	16.36	53.98	-37.62
7206.00	Peak	н	265	180	-68.01	11.45	0.00	50.44	73.98	-23.54
12010.00	Avg	Н	-	-	-80.67	18.11	0.00	44.44	53.98	-9.54
12010.00	Peak	Н	-	-	-68.51	18.11	0.00	56.60	73.98	-17.38

Table 7-22. Radiated Measurements with WCP-Dual

FCC ID: A3LSMG998JPN	PCTEST Projud to be part of @ element	MEASUREMENT REPORT (Certification)	SAMSUNG	Approved by: Quality Manager
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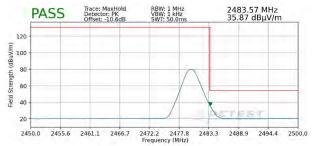
7.10 Radiated Restricted Band Edge Measurements §15.205 §15.209 §15.247 (d); RSS-Gen [8.9]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting. Two different amplitude offsets were used depending on whether peak or average measurements were measured. The average measurements use a duty cycle correction factor (DCCF).

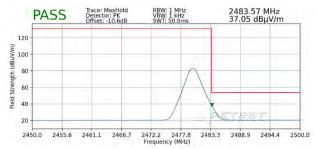
The amplitude offset shown in the following plots for average measurements was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) - Preamplifier Gain + DCCF

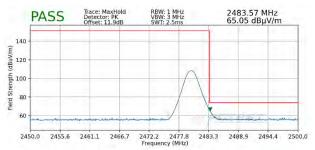
Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



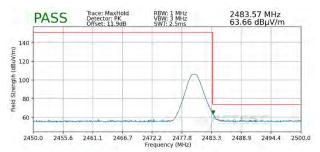
Plot 7-129. Radiated Restricted Upper Band Edge Measurement (Average) – ANT1



Plot 7-131. Radiated Restricted Upper Band Edge Measurement with WCP (Average) – ANT1



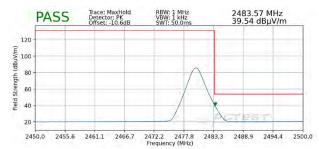
Plot 7-130. Radiated Restricted Upper Band Edge Measurement (Peak) – ANT1



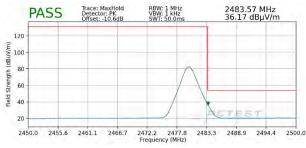
Plot 7-132. Radiated Restricted Upper Band Edge Measurement with WCP (Peak) – ANT1

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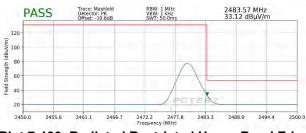
Plot 7-133. Radiated Restricted Upper Band Edge Measurement (Average) – ANT2



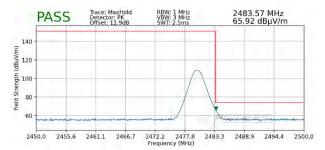
Plot 7-135. Radiated Restricted Upper Band Edge Measurement with WCP (Average) – ANT2



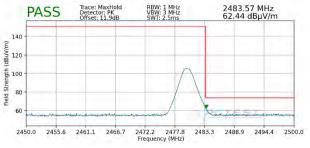
Plot 7-137. Radiated Restricted Upper Band Edge Measurement (Average) – Dual BT



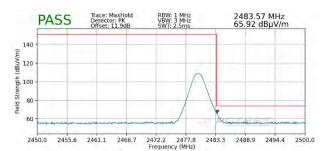
Plot 7-139. Radiated Restricted Upper Band Edge Measurement with WCP (Average) – Dual BT



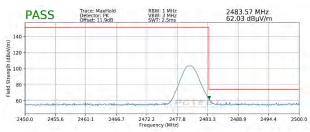
Plot 7-134. Radiated Restricted Upper Band Edge Measurement (Peak) – ANT2



Plot 7-136. Radiated Restricted Upper Band Edge Measurement with WCP (Peak) – ANT2



Plot 7-138. Radiated Restricted Upper Band Edge Measurement (Peak) – DUAL BT



Plot 7-140. Radiated Restricted Upper Band Edge Measurement with WCP (Peak) – Dual BT

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7.11 Radiated Spurious Emissions Measurements – Below 1GHz §15.209; RSS-Gen [8.9]

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR and Table 6 of RSS-Gen (8.10) must not exceed the limits shown in Table 7-23 per Section 15.209 and RSS-Gen (8.9).

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-23. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 120kHz (for emissions from 30MHz 1GHz)
- 3. Detector = quasi-peak
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

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Test Setup

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

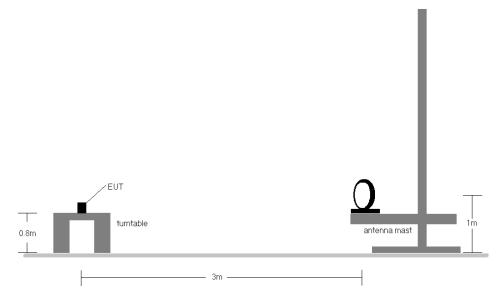
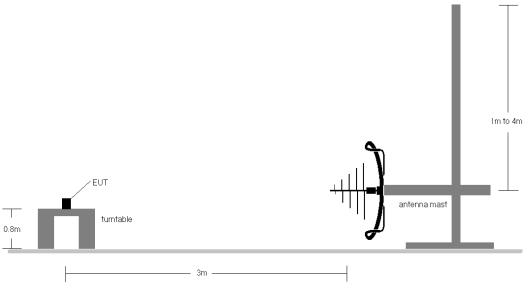


Figure 7-9. Radiated Test Setup < 30Mhz





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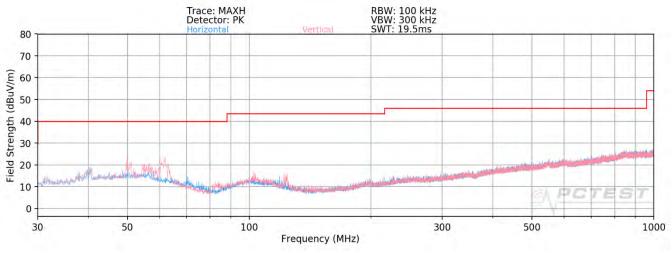
Test Notes

- 1. All emissions lying in restricted bands specified in §15.205 and RSS-Gen (8.10) are below the limit shown in Table 7-23.
- 2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
- 3. This unit was tested with its standard battery.
- 4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
- 5. Emissions were measured at a 3 meter test distance.
- 6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
- 7. No spurious emissions were detected within 20dB of the limit below 30MHz.
- 8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
- The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

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Radiated Spurious Emissions Measurements (Below 1GHz) §15.209; RSS-Gen [8.9]



Plot 7-141. Radiated Spurious Plot below 1GHz

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7.12 Line Conducted Measurement Data §15.207; RSS-Gen [8.8]

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207 and RSS-Gen (8.8).

Frequency of emission (MHz)	Conducted	Limit (dBµV)
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-24. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Section 6.2

Test Settings

Quasi-Peak Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the spurious emission of interest
- 2. RBW = 9kHz (for emissions from 150kHz 30MHz)
- 3. Detector = quasi-peak
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

Average Field Strength Measurements

- 1. Analyzer center frequency was set to the frequency of the spurious emission of interest
- 2. RBW = 9kHz (for emissions from 150kHz 30MHz)
- 3. Detector = RMS
- 4. Sweep time = auto couple
- 5. Trace mode = max hold
- 6. Trace was allowed to stabilize

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Test Setup

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

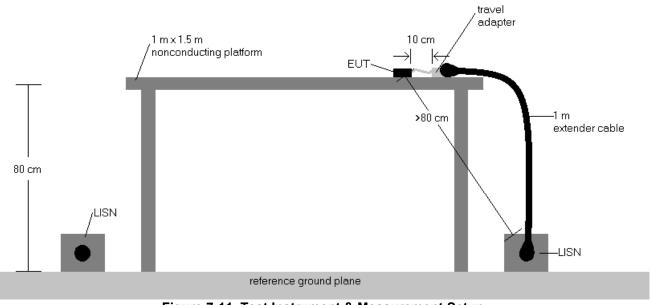


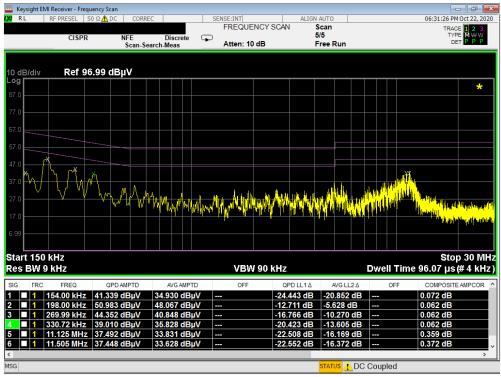
Figure 7-11. Test Instrument & Measurement Setup

Test Notes

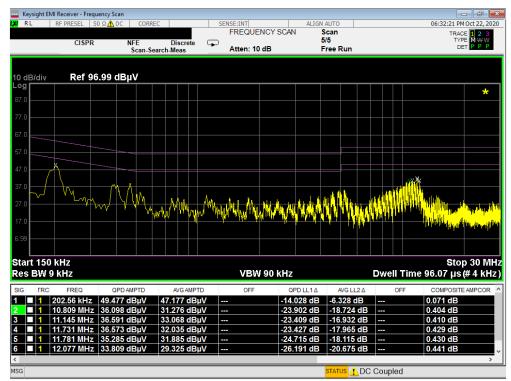
- 1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
- 2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207 and RSS-Gen (8.8).
- 3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
- 4. QP/AV Level (dB μ V) = QP/AV Analyzer/Receiver Level (dB μ V) + Corr. (dB)
- 5. Margin (dB) = QP/AV Limit (dBµV) QP/AV Level (dBµV)
- 6. Traces shown in plot are made using a peak detector.
- 7. Deviations to the Specifications: None.

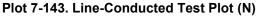
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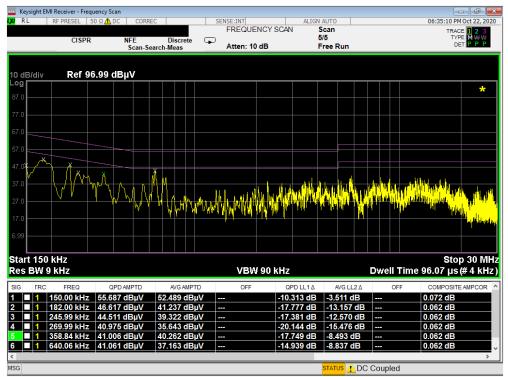




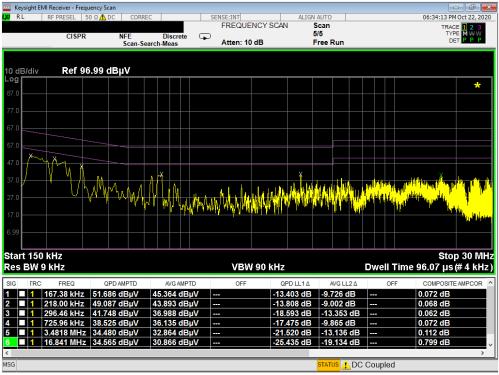


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Plot 7-144. Line-Conducted Test Plot (L1) with WCP



Plot 7-145. Line-Conducted Test Plot (N) with WCP

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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: A3LSMG998JPN** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

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