

Sector	Zone	Port	Measurement Range	Level (dBm)	Limit (dBm)	Worst Margin
			20 MU = to 2 52 CU =	QPSK	. ,	(dB)
			30 MHz to 3.53 GHz	-59.10	-49.03	-10.07
		1	3.72 GHz to 10 GHz	-56.65	-49.03	-7.62
			10 GHz to 18 GHz	-54.93	-49.03	-5.90
	1		18 GHz to 40 GHz	-70.51	-49.03	-21.48
			30 MHz to 3.53 GHz	-58.99	-49.03	-9.96
		2	3.72 GHz to 10 GHz	-56.50	-49.03	-7.47
			10 GHz to 18 GHz	-54.79	-49.03	-5.76
1			18 GHz to 40 GHz	-69.82	-49.03	-20.79
			30 MHz to 3.53 GHz	-59.41	-49.03	-10.38
		3	3.72 GHz to 10 GHz	-56.74	-49.03	-7.71
		Ũ	10 GHz to 18 GHz	-56.35	-49.03	-7.32
	2		18 GHz to 40 GHz	-68.88	-49.03	-19.85
	2	4	30 MHz to 3.53 GHz	-59.14	-49.03	-10.11
			3.72 GHz to 10 GHz	-55.35	-49.03	-6.32
			10 GHz to 18 GHz	-54.91	-49.03	-5.88
			18 GHz to 40 GHz	-69.72	-49.03	-20.69
		5	30 MHz to 3.53 GHz	-58.43	-49.03	-9.40
	3		3.72 GHz to 10 GHz	-54.67	-49.03	-5.64
			10 GHz to 18 GHz	-52.54	-49.03	-3.51
			18 GHz to 40 GHz	-68.99	-49.03	-19.96
			30 MHz to 3.53 GHz	-57.82	-49.03	-8.79
		0	3.72 GHz to 10 GHz	-54.23	-49.03	-5.20
		6	10 GHz to 18 GHz	-52.93	-49.03	-3.90
			18 GHz to 40 GHz	-69.76	-49.03	-20.73
2			30 MHz to 3.53 GHz	-58.44	-49.03	-9.41
		_	3.72 GHz to 10 GHz	-54.64	-49.03	-5.61
		7	10 GHz to 18 GHz	-53.65	-49.03	-4.62
			18 GHz to 40 GHz	-69.96	-49.03	-20.93
	4		30 MHz to 3.53 GHz	-58.02	-49.03	-8.99
		_	3.72 GHz to 10 GHz	-54.91	-49.03	-5.88
		8	10 GHz to 18 GHz	-53.96	-49.03	-4.93
			18 GHz to 40 GHz	-69.69	-49.03	-20.66
Table (	·				. <b>O</b> outinu	

Table 8-31. Conducted Spurious Emission Summary Data (n48\_3C\_10M+20M+10M\_ Non-Contiguous\_8T)

FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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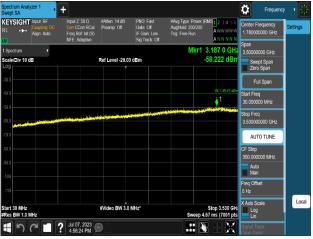


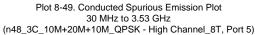
Sector	Zone	Port	Measurement Range	Level (dBm)	Limit (dBm)	Worst Margin
				QPSK	、 <i>,</i>	(dB)
			30 MHz to 3.53 GHz	-59.10	-49.03	-10.07
		1	3.72 GHz to 10 GHz	-55.81	-49.03	-6.78
			10 GHz to 18 GHz	-55.24	-49.03	-6.21
	1		18 GHz to 40 GHz	-70.58	-49.03	-21.55
			30 MHz to 3.53 GHz	-59.44	-49.03	-10.41
		2	3.72 GHz to 10 GHz	-56.68	-49.03	-7.65
		-	10 GHz to 18 GHz	-55.83	-49.03	-6.80
1			18 GHz to 40 GHz	-69.49	-49.03	-20.46
1			30 MHz to 3.53 GHz	-58.43	-49.03	-9.40
		3	3.72 GHz to 10 GHz	-55.92	-49.03	-6.89
		3	10 GHz to 18 GHz	-55.34	-49.03	-6.31
	2		18 GHz to 40 GHz	-69.92	-49.03	-20.89
	2	4	30 MHz to 3.53 GHz	-59.20	-49.03	-10.17
			3.72 GHz to 10 GHz	-55.93	-49.03	-6.90
			10 GHz to 18 GHz	-54.85	-49.03	-5.82
			18 GHz to 40 GHz	-70.07	-49.03	-21.03
	3	5	30 MHz to 3.53 GHz	-57.94	-49.03	-8.91
			3.72 GHz to 10 GHz	-54.63	-49.03	-5.60
			10 GHz to 18 GHz	-53.37	-49.03	-4.34
			18 GHz to 40 GHz	-70.34	-49.03	-21.30
			30 MHz to 3.53 GHz	-58.21	-49.03	-9.18
		0	3.72 GHz to 10 GHz	-54.73	-49.03	-5.70
		6	10 GHz to 18 GHz	-53.53	-49.03	-4.50
			18 GHz to 40 GHz	-68.24	-49.03	-19.20
2			30 MHz to 3.53 GHz	-58.32	-49.03	-9.29
		_	3.72 GHz to 10 GHz	-54.97	-49.03	-5.93
		7	10 GHz to 18 GHz	-54.07	-49.03	-5.04
			18 GHz to 40 GHz	-69.94	-49.03	-20.91
	4		30 MHz to 3.53 GHz	-58.10	-49.03	-9.07
			3.72 GHz to 10 GHz	-54.68	-49.03	-5.65
		8	10 GHz to 18 GHz	-54.13	-49.03	-5.10
			18 GHz to 40 GHz	-69.89	-49.03	-20.86
Table (			d Omericano Englacian	Commence Data (n. 10, 00, 00M, 00M, 00M, No.	0	

Table 8 30. Conducted Spurious Emission Summary Data (n48\_3C\_20M+20M+20M\_ Non-Contiguous\_8T)

FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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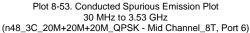






Plot 8-51. Conducted Spurious Emission Plot 10 GHz to 18 GHz (n48\_3C\_10M+20M+10M\_QPSK - High Channel\_8T, Port 5)



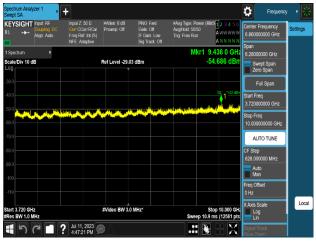




Plot 8-50. Conducted Spurious Emission Plot 3.72 GHz to 10 GHz (n48\_3C\_10M+20M+10M\_QPSK - High Channel\_8T, Port 5)



Plot 8-52. Conducted Spurious Emission Plot 18 GHz to 40 GHz (n48\_3C\_10M+20M+10M\_QPSK - High Channel\_8T, Port 5)

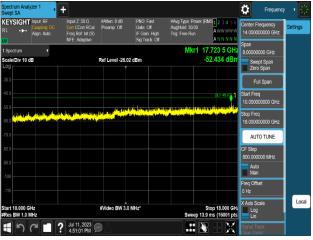


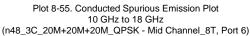
Plot 8-54. Conducted Spurious Emission Plot 3.72 GHz to 10 GHz

(n48\_3C\_20M+20M+20M\_QPSK - Mid Channel\_8T, Port 6)

FCC: A3LSOG2201	element)	MEASUREMENT REPORT (Class II Permissive Change)	SAMSUNG	Approved by: Technical Manager
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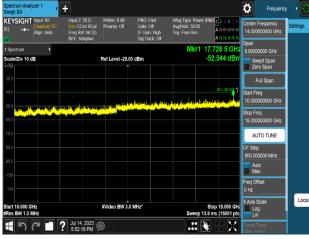








Plot 8-57. Conducted Spurious Emission Plot 30 MHz to 3.53 GHz (n48\_3C\_10M+20M+10M\_QPSK - Non-Contiguous\_8T, Port 5)



Plot 8-59. Conducted Spurious Emission Plot 10 GHz to 18 GHz (n48\_3C\_10M+20M+10M\_QPSK - Non-Contiguous \_8T, Port 5)



Plot 8-56. Conducted Spurious Emission Plot 18 GHz to 40 GHz (n48\_3C\_20M+20M+20M\_QPSK - Mid Channel\_8T, Port 6)



Plot 8-58. Conducted Spurious Emission Plot 3.72 GHz to 10 GHz (n48\_3C\_10M+20M+10M\_QPSK - Non-Contiguous\_8T, Port 5)

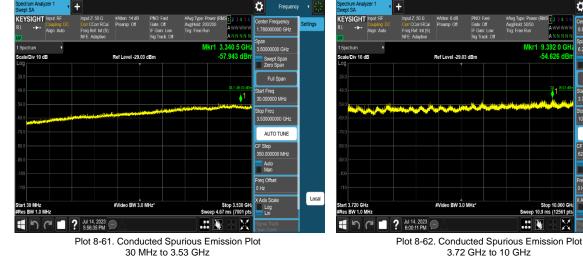


Plot 8-60. Conducted Spurious Emission Plot 18 GHz to 40 GHz

(n48\_3C\_10M+20M+10M\_QPSK - Non-Contiguous\_8T, Port 5)

FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	SAMSUNG	Approved by: Technical Manager
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Frequency

30 MHz to 3.53 GHz (n48\_3C\_20M+20M+20M\_QPSK - Non-Contiguous\_8T, Port 5)



Ref Level -29.03 dBr

#Video BW 3.0 MHz\*

38,348.0

70 335

Swept Span Zero Span

Full Spar 0 GH

AUTO TUNE

Local

Auto Man

Freq Offset 0 Hz

X Axis Sca



Plot 8-63. Conducted Spurious Emission Plot 10 GHz to 18 GHz (n48\_3C\_20M+20M+20M\_QPSK - Non-Contiguous\_8T, Port 5)



(n48\_3C\_20M+20M+20M\_QPSK - Non-Contiguous \_8T, Port 5)

FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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## 8.8 Radiated spurious emission

### **Test Overview**

Radiated spurious emissions measurements are performed using the field strength method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized broadband tri-log antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally and horizontally polarized broadband tri-log antennas.

### Test Procedure Used

ANSI C63.26 - Section 5.5.4 KDB 971168 D01 v03r01 - Section 7

### Test Setting

- 1. Start frequency was set to 30 MHz and stop frequency was set to at least 10 \* the fundamental frequency
- 2. RBW = 1 MHz
- 3. VBW  $\geq$  3 x RBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Max Hold (In cases where the level is within 2 dB of the limit, the final measurement is taken using triggering/gating and trace averaging.)
- 7. The trace was allowed to stabilize.

### <u>Limit</u>

- Within 0 MHz to 10 MHz above and below the assigned channel ≤ -13 dBm/MHz
- Greater than 10 MHz above and below the assigned channel ≤ −25 dBm/MHz
- Any emission below 3530 MHz and above 3720 MHz ≤ −40 dBm/MHz

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

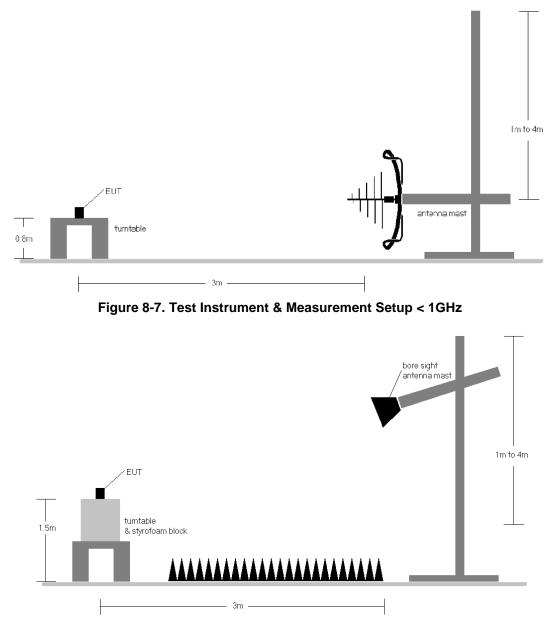


Figure 8-8. Test Instrument & Measurement Setup > 1GHz

FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	SAMSUNG	Approved by: Technical Manager
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### Test Notes

1. The average EIRP reported below is calculated per 5.2.7 of ANSI C63.26-2015 which states:

The measured e.i.r.p is converted to E-field in V/m. Then the distance correction is applied before converted back to calculated e.i.r.p.as explained in KDB 971168 D01 D01 v03r01.

## **Effective Isotropic Radiated Power Sample Calculation**

Field Strength [dBµV/m]	= Measured Value [dBm] + AFCL [dB/m] + 107	
	= -84.25 dBm + 24.65 dBm + 107 = 47.40 dBµV/m	
e.i.r.p. [dBm]	= E[dB μV/m] + 20 log <sub>10</sub> (d[m]) - 104.8	
	= 47.40 + (20*log (3)) - 104.8	
	= -47.85 dBm e.i.r.p.	

#### \*AFCL (dB/m) contains measurement antenna factor(dB/m) and cable loss(dB) as below:

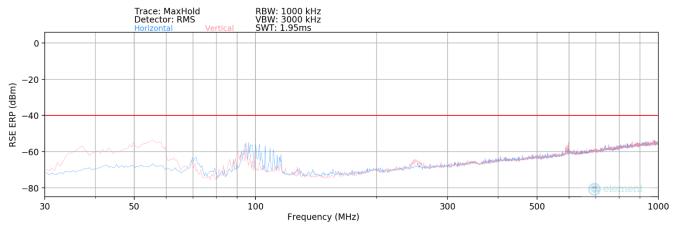
Frequency [MHz]	Antenna Factor (dB/m)	Chamber measurement cable loss + amplifier [dB]	AFCL (dB/m)
55.38	13.60	-35.59	-21.99
17982.39	49.02	-24.37	24.65

### Table 8-32. Adopted AFCL value in the calculation

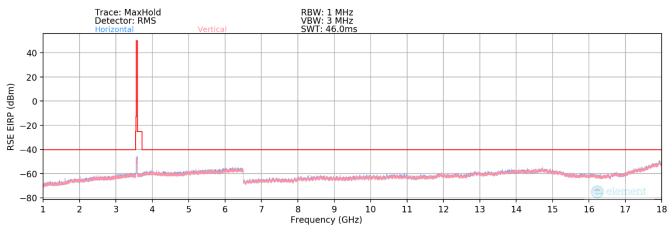
- 2. The EUT was tested in both horizontal and vertical antenna polarizations and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, channel bandwidth configurations shown in the tables below.
- 3. The spectrum is measured from 30 MHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4. All emissions were measured at a 3-meter test distance.
- 5. Spurious emissions were measured with all EUT antennas transmitting simultaneously and all antenna ports terminated.
- 6. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

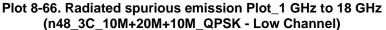
FCC: A3LSOG2201	element)	MEASUREMENT REPORT (Class II Permissive Change)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 66 of 70
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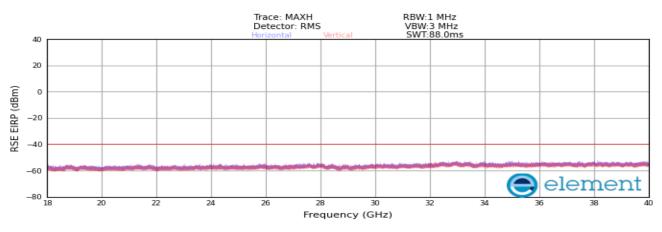








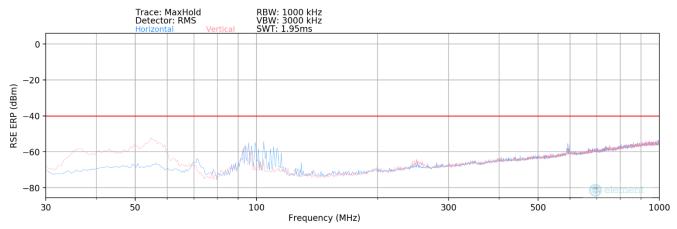




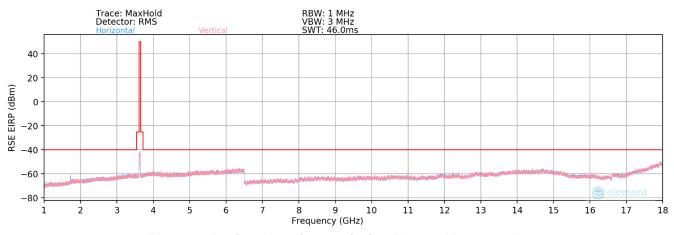
Plot 8-67. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3C\_10M+20M+10M\_QPSK - Low Channel)

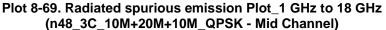
FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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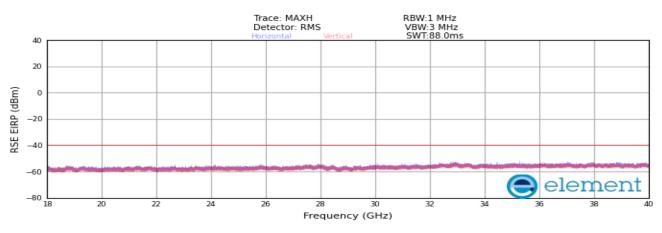








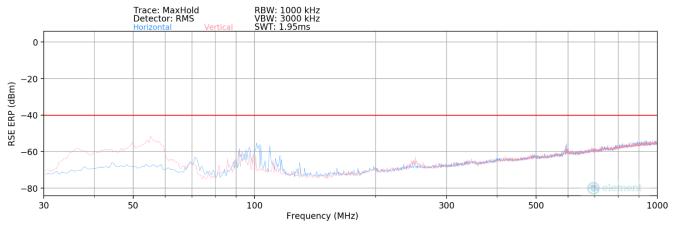




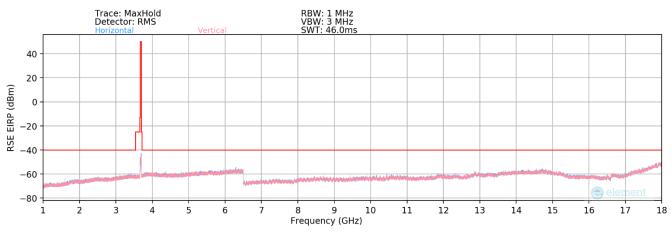
Plot 8-70. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3C\_10M+20M+10M\_QPSK - Mid Channel)

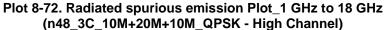
FCC: A3LSOG2201	element)	MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 68 of 79
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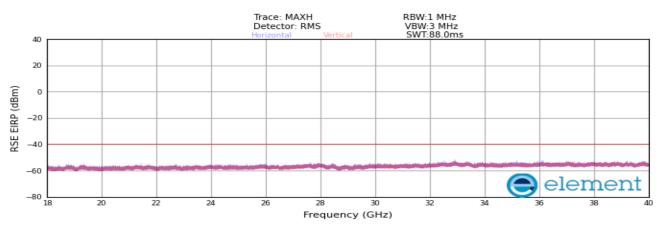








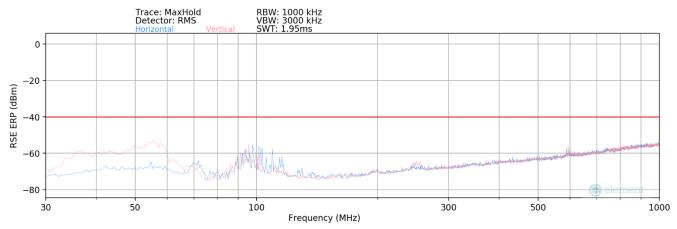




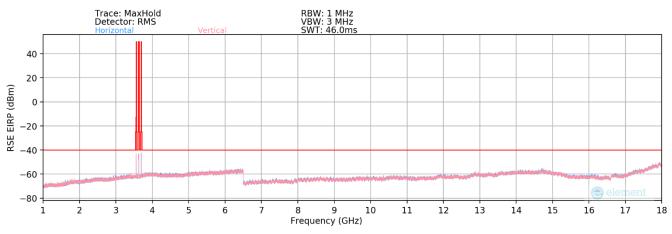
Plot 8-73. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3C\_10M+20M+10M\_QPSK - High Channel)

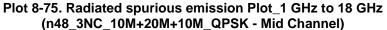
FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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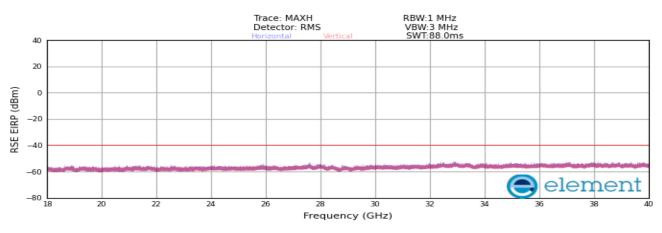








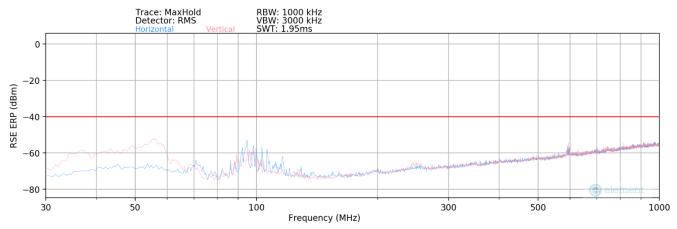




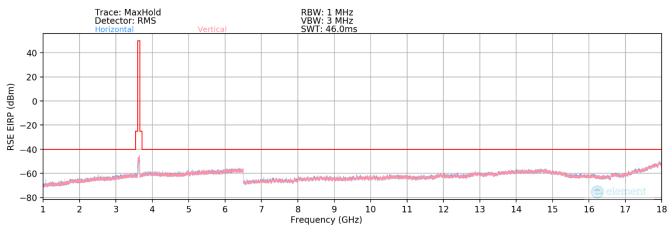
Plot 8-76. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3NC\_10M+20M+10M\_QPSK - Mid Channel)

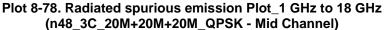
FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
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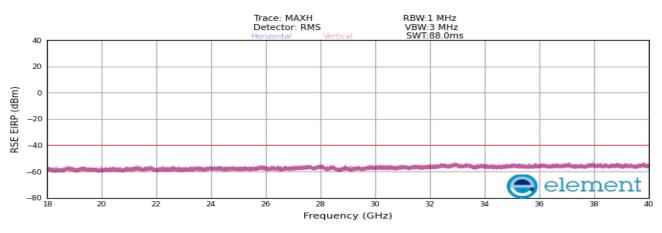








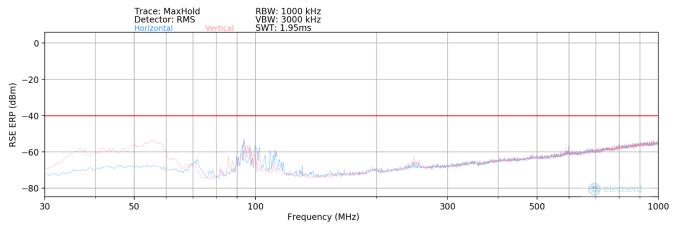




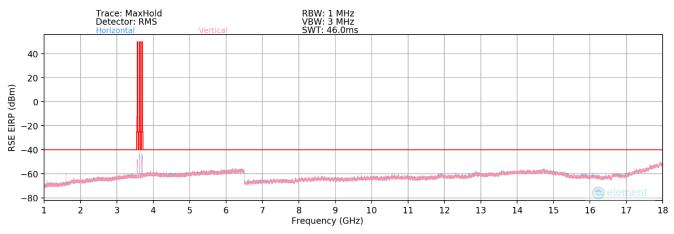
Plot 8-79. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3C\_20M+20M+20M\_QPSK - Mid Channel)

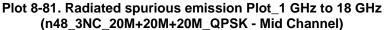
FCC: A3LSOG2201	element	MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 71 of 79
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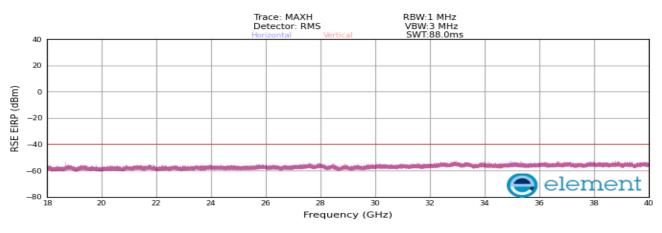












Plot 8-82. Radiated spurious emission Plot\_18 GHz to 40 GHz (n48\_3NC\_20M+20M+20M\_QPSK - Mid Channel)

FCC: A3LSOG2201	element)	MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
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Bandwidth (MHz):	n48_3C_10M+20M+10M_QPSK - Mid Channel	
Frequency (MHz):	3560 + 3625 + 3690 MHz	
Modulation Signal:	QPSK	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Heigh [cm]	Turntable azimuth [degree]	Analyzer Level [dBm/MHz]	AFCL [dBm]	Field Strength [dB,⊮/m]	RSE EIRP [dBm/MHz]	Limit [dBm/MHz]	Margin [dB]
55.38	V	100	60	-44.27	-21.99	40.74	-54.52	-40.00	-14.52
110.223	Н	150	100	-45.11	-23.88	38.01	-57.24	-40.00	-17.24
17982.39	Н	150	60	-84.25	24.65	47.40	-47.85	-40.00	-7.85
17978.25	V	150	80	-85.11	24.66	46.55	-48.70	-40.00	-8.70

Table 8-33. Radiated spurious emission Worst mode Summary Data

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# 9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics Co., Ltd. CBSD FCC ID: A3LSOG2201** complies with all of the requirements of Part 96 of the FCC Rules.

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## 10.0 APPENDIX. A

## 10.1 Conducted Average Output Power

### Test Overview

A transmitter port of EUT is connected to the input of a signal analyzer. 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 Description

KDB 971168 D01 v03r01 – Section 5 KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements ANSI C63.26-2015 – Section 5.2.4.4.1

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

- 1. Conducted power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW =  $1 \sim 5\%$  of the expected OBW
- 3. VBW ≥ 3 x RBW
- 4. Span = 2 ~ 3 x OBW
- 5. No. of sweep points > 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger Settings is set to "RF Power" for signals with non-continuous operation with the sweep times set

to "auto". Refer test note 3 for details.

- 8. Trace mode = Trace-Averaging (RMS) set to average over 100 sweeps
- 9. The trace was allowed to stabilize

### Test Setup

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

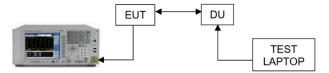


Figure 10-1. Test Instrument & Measurement Setup

# <u>Limit</u> N/A

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#### Note

- 1. Result for reference maximum output power of Grant of Authorization is under section 10.1.
- 2. Periodic trigger was used with gating ON. Gate sweeptime, Gate delay and gate length were set accordingly to capture ON time of the transmission.
- 3. MIMO Calculations are done considering output channel power for all ports and respective margins are calculated according to procedures in section 6.4 of ANSI C63.26 and section D of KDB 971168 D01 v03r01.
- Consider the following factors for MIMO Power: Conducted power for each port is measured in dBm. Powers are summed up in linear using the measure-and-sum technique defined in KDB 971168 D01 v03r01- Section D. Conducted power per port (dBm) is converted to a linear value (mW). A summation of linear powers for all ports gives us the total MIMO conducted power in milliWatts (mW).
- 5. Antenna Gains (dBi) control value provided by the client.
- 6. Directional gain calculations were performed on the individual gains in specific direction across all directions.
- 7. Applied antenna gain as below:

Mode	Rated Conductive Power		Total Directional	Rated EIRP	
Active Antenna path	Path (dBm)	Unit (dBm)	Antenna Gain(dBi)	(dBm/Unit)	
8T	25	34	7 ±1	42	

8. Sample Calculation:

Let us assume the following numbers:

- a) Total MIMO Conducted Power as 2653.19 mW
- b) Antenna Gain = 8.00 dBi

Factors		Value	Unit
Summed MIMO Conducted Power (linear sum)		2653.19	mW
Summed MIMO Conducted Power (dBm)	= 10 * log (2653.19) =	34.24	dBm
Antenna Gain		8.00	dBi
Total MIMO EIRP		42.24	dBm

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Sector	Zone	Port	QPSK	16QAM
		1	25.19	25.54
1	1	2	25.35	25.45
I	2	3	25.18	25.29
	2	4	25.27	25.54
		5	25.13	25.38
2	3	6	25.20	25.43
2	4	7	25.20	25.47
	4	8	25.13	25.46
Total Conducted Power (mW)		2653.19	2803.22	
Total Conducted Power (dBm)		34.24	34.48	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		42.24	42.48

Table 10-1. Conducted Average Output Power Table (n48\_3C\_10M+20M+10M\_Low Channel\_8T)

Sector	Zone	Port	QPSK	16QAM
	1	1	25.01	25.13
	1	2	25.31	25.28
1	2	3	25.12	25.06
	2	4	25.60	25.26
	3	5	25.18	25.31
2	3	6	25.27	25.35
2	4	7	25.19	25.17
	4	8	25.21	25.30
Total C	Total Conducted Power (mW)		2673.13	2669.58
Total Conducted Power (dBm)		34.27	34.26	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		42.27	42.26

### Table 10-2. Conducted Average Output Power Table (n48\_3C\_10M+20M+10M\_Middle Channel\_8T)

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Sector	Zone	Port	QPSK	16QAM
		1	24.77	25.06
1	1	2	24.83	25.19
I	2	3	24.59	25.00
	2	4	24.90	25.33
		5	24.84	25.17
2	3	6	24.88	25.22
2	4	7	24.79	25.16
		8	24.82	25.20
Total C	Total Conducted Power (mW)		2417.86	2629.15
Total Conducted Power (dBm)		33.83	34.20	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		41.83	42.20

Table 10-3. Conducted Average Output Power Table (n48\_3C\_10M+20M+10M\_High Channel\_8T)

Sector	Zone	Port	QPSK	16QAM
	1	1	24.74	24.98
4	1	2	24.87	25.14
1	2	3	24.69	24.91
	2	4	24.95	25.19
	3	5	24.86	25.08
2	3	6	24.93	25.13
2	4	7	24.90	25.12
	4	8	24.84	25.07
Total Conducted Power (mW)		2442.99	2575.87	
Total Conducted Power (dBm)		33.88	34.11	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		41.88	42.11

Table 10-4. Conducted Average Output Power Table (n48\_3C\_20M+20M+20M\_Low Channel\_8T)

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Sector	Zone	Port	QPSK	16QAM
		1	24.93	24.89
1	1	2	25.11	25.09
I	2	3	24.89	24.86
	2	4	25.06	25.14
		5	25.05	25.03
2	3	6	25.12	25.08
2	4	7	25.00	24.95
	4	8	25.06	25.04
Total Conducted Power (mW)		2546.29	2536.24	
Total Conducted Power (dBm)		34.06	34.04	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		42.06	42.04

Table 10-5. Conducted Average Output Power Table (n48\_3C\_20M+20M+20M\_Middle Channel\_8T)

Sector	Zone	Port	QPSK	16QAM
	1	1	24.83	24.79
4	1	2	24.98	24.93
1	2	3	24.80	24.76
	2	4	25.07	25.00
	2	5	24.89	24.86
2	3	6	24.97	24.94
2	4	7	24.88	24.85
	4	8	24.93	24.88
Total C	Total Conducted Power (mW)		2483.38	2459.11
Total Conducted Power (dBm)		33.95	33.91	
Ant. Gain (dBi)		8.00	8.00	
	e.i.r.p (dBm)		41.95	41.91

Table 10-6. Conducted Average Output Power Table (n48\_3C\_20M+20M+20M\_High Channel\_8T)

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