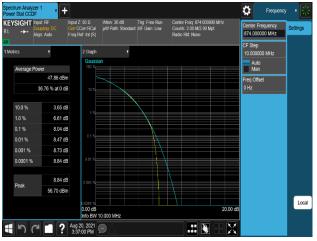


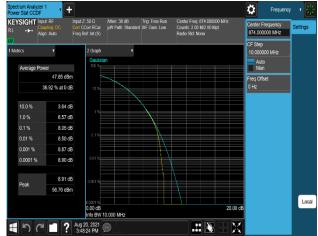
Plot 7-505. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - Low Channel, Port 0)



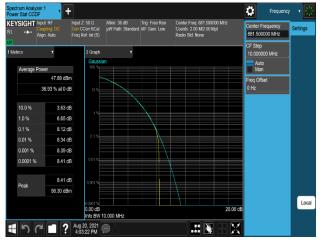
Plot 7-506. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T \_16QAM - Low Channel, Port 0)



Plot 7-507. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM - Low Channel, Port 0)



Plot 7-508. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM - Low Channel, Port 0)



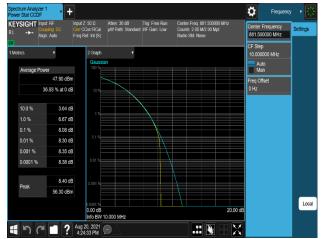
Plot 7-509. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - Middle Channel, Port 0)



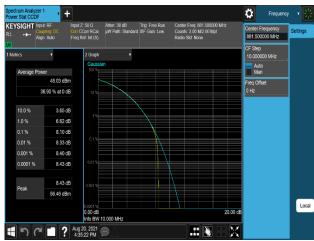
Plot 7-510. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_16QAM- Middle Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINESRING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 165 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 165 01 367





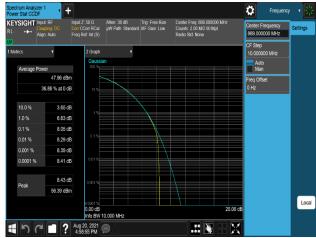
Plot 7-511. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM -Middle Channel, Port 0)



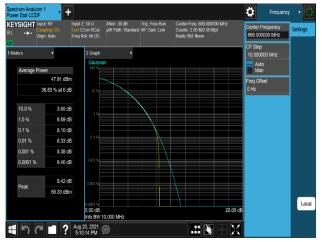
Plot 7-512. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM-Middle Channel,Port 0)



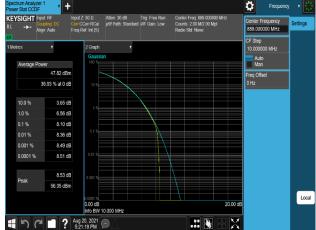
Plot 7-513. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - High Channel, Port 0)



Plot 7-514. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_16QAM - High Channel, Port 1)



Plot 7-515. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM - High Channel, Port 1)



Plot 7-516. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM -High Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST SEGING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 166 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 100 01 307

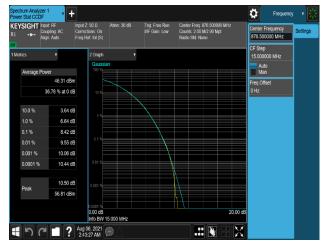


DSS	DSS Channel	Dort		Limit			
Ratio Channel	Port	QPSK	16QAM	64QAM	256QAM	(dB)	
		0	8.38	8.49	8.37	8.48	< 13
	Low	1	8.42	8.47	8.41	8.45	< 13
	Low	2	8.07	8.07	8.09	8.06	< 13
		3	8.08	8.08	8.07	8.10	< 13
		0	8.40	8.46	8.39	8.41	< 13
LTE 5 :	Middle	1	8.36	8.45	8.39	8.43	< 13
NR 5	Middle	2	8.10	8.09	8.10	8.08	< 13
		3	8.05	8.05	8.04	8.12	< 13
	High	0	8.39	8.46	8.39	8.50	< 13
		1	8.44	8.41	8.41	8.47	< 13
		2	8.10	8.07	8.09	8.11	< 13
		3	8.11	8.03	8.09	8.14	< 13

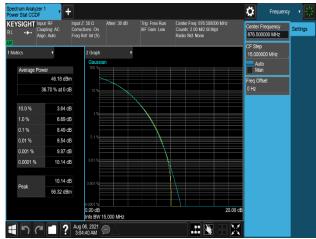
Table 7-115. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+5M\_2C\_4T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogg 467 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)		Page 167 of 367
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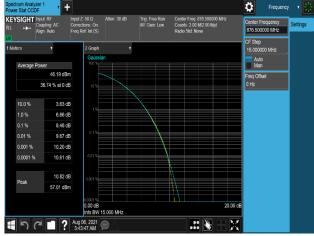
Plot 7-517. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_QPSK - Low Channel, Port 1)



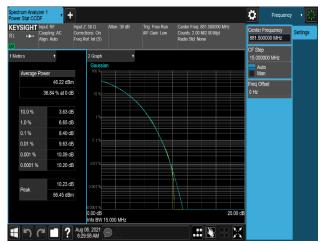
Plot 7-518. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_16QAM - Low Channel, Port 0)



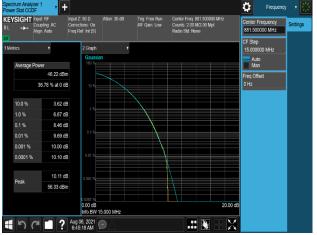
Plot 7-519. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_64QAM - Low Channel, Port 1)



Plot 7-520. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_256QAM - Low Channel,Port 0)



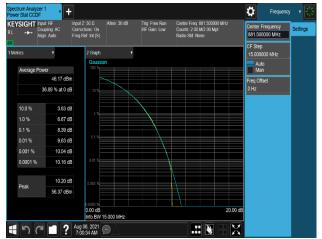
Plot 7-521. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_QPSK - Middle Channel, Port 0)



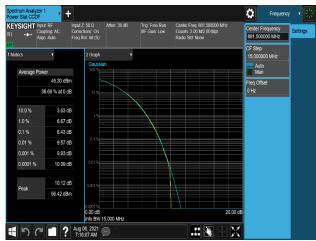
Plot 7-522. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_16QAM-Middle Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 168 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 166 01 367





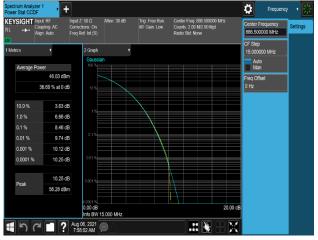
Plot 7-523. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_64QAM - Middle Channel, Port 0)



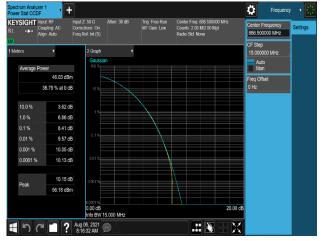
Plot 7-524. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_256QAM - Middle Channel, Port 1)



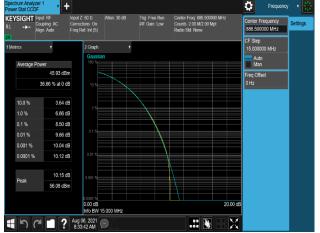
Plot 7-525. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_QPSK - High Channel, Port 1)



Plot 7-526. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_16QAM - High Channel, Port 0)



Plot 7-527. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C\_64QAM - High Channel, Port 1)



Plot 7-528. Peak To Average Power Ratio Plot (B5\_10M(DSS)+5M\_2C \_256QAM - High Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 169 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 169 01 367

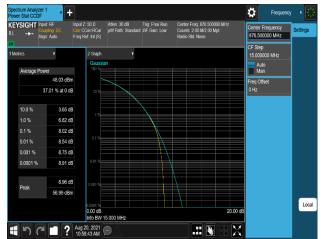


DSS Channel		Dort		Limit			
Ratio	Channel	Port	QPSK	16QAM	64QAM	256QAM	(dB)
	Low	0	8.02	8.01	8.01	8.04	< 13
	Low	1	8.00	8.00	7.97	8.02	< 13
LTE 5 :	Middle	0	8.01	7.99	7.99	8.04	< 13
NR 5	Middle	1	8.02	7.97	7.99	8.02	< 13
	Lligh	0	8.03	8.03	8.00	7.99	< 13
	High	1	8.07	8.00	8.05	8.06	< 13

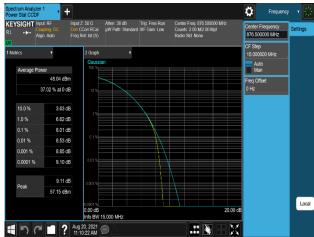
Table 7-116. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+5M\_2C\_2T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)  SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 170 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 170 of 367

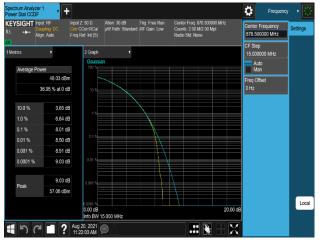




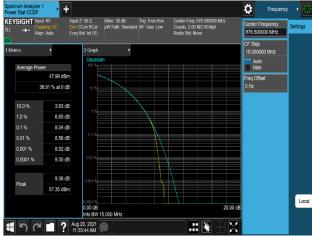
Plot 7-529. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - Low Channel, Port 0)



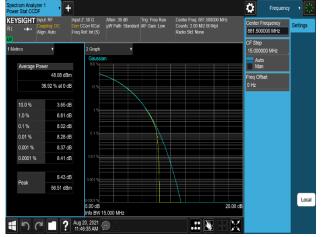
Plot 7-530. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T \_16QAM - Low Channel, Port 0)



Plot 7-531. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM - Low Channel, Port 0)

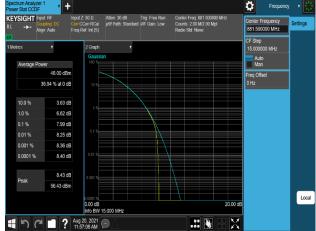


Plot 7-532. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM - Low Channel, Port 0)



Plot 7-533. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - Middle Channel, Port 1)

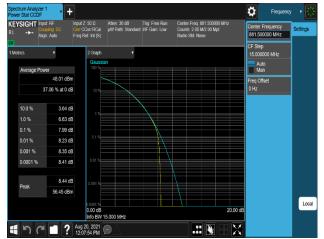
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Plot 7-534. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_16QAM- Middle Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 171 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 171 01 367

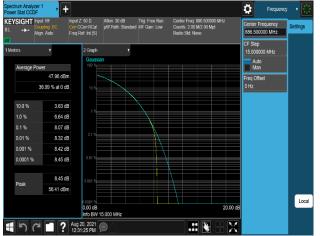




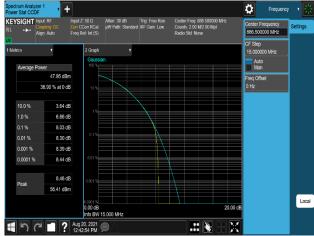
Plot 7-535. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM -Middle Channel, Port 0)



Plot 7-536. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM-Middle Channel,Port 0)



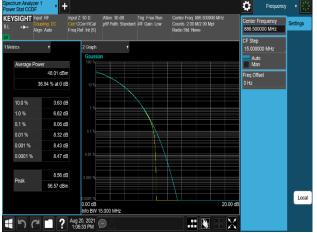
Plot 7-537. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_QPSK - High Channel, Port 1)



Plot 7-538. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_16QAM - High Channel, Port 0)



Plot 7-539. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_64QAM - High Channel, Port 1)



Plot 7-540. Peak To Average Power Ratio Plot (B5\_10M(DSS)\_1C\_2T\_256QAM -High Channel, Port 1)

FCC ID: A3LRF4440D-13A	ENGINESRING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 172 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 172 of 367



DSS	DSS Channel	Dort		Limit			
Ratio Channel	Port	QPSK	16QAM	64QAM	256QAM	(dB)	
		0	8.39	8.43	8.33	8.59	< 13
	Low	1	8.41	8.37	8.39	8.59	< 13
	Low	2	8.04	8.06	8.01	8.17	< 13
		3	8.01	8.05	8.06	8.13	< 13
		0	8.39	8.40	8.41	8.42	< 13
LTE 5 :	Middle	1	8.45	8.38	8.39	8.47	< 13
NR 5	Middle	2	8.02	8.04	8.06	8.06	< 13
		3	8.04	8.03	8.00	8.02	< 13
		0	8.41	8.41	8.36	8.41	< 13
ا ان ا	1	8.41	8.39	8.35	8.37	< 13	
	High	2	8.05	8.05	8.07	8.07	< 13
		3	8.04	8.04	8.05	8.08	< 13

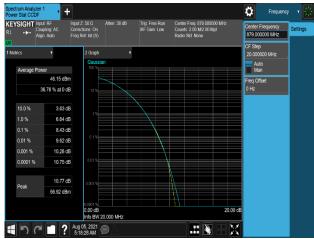
Table 7-117. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+10M\_2C\_4T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 172 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 173 of 367

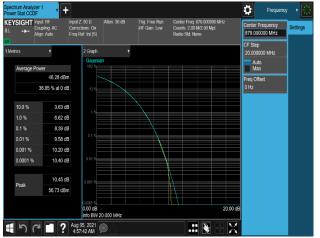




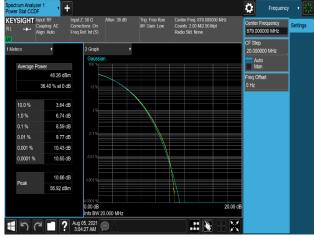
Plot 7-541. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_QPSK - Low Channel, Port 1)



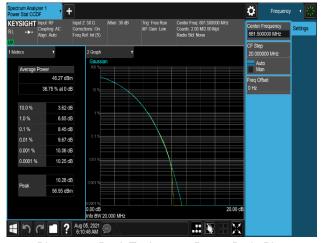
Plot 7-542. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_16QAM - Low Channel, Port 0)



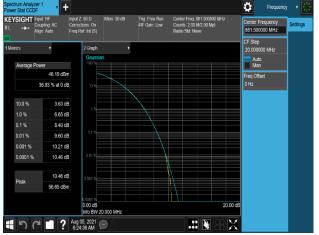
Plot 7-543. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_64QAM - Low Channel, Port 1)



Plot 7-544. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_256QAM-Low Channel, Port 0)



Plot 7-545. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_QPSK - Middle Channel, Port 1)

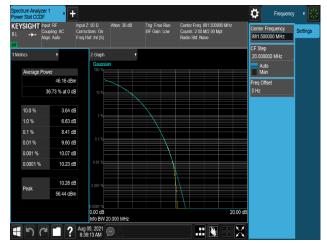


Plot 7-546. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_16QAM - Middle Channel, Port 0)

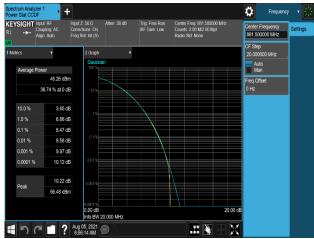
FCC ID: A3LRF4440D-13A	PCTEST ENGINESRING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 174 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 174 01 367

PK-QP-16-14 Rev.01

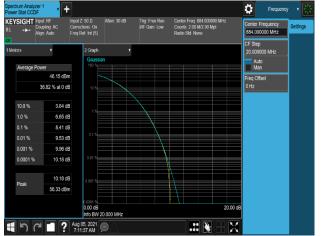




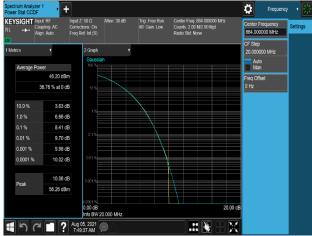
Plot 7-547. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_64QAM - Middle Channel, Port 0)



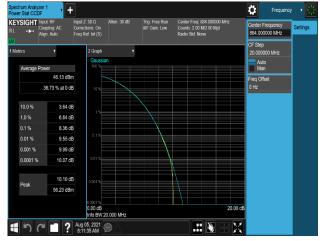
Plot 7-548. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_256QAM - Middle Channel, Port 1)



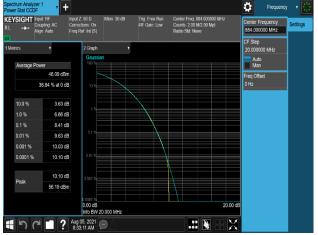
Plot 7-549. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_QPSK - High Channel, Port 0)



Plot 7-550. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_16QAM - High Channel, Port 0)



Plot 7-551. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_64QAM - High Channel, Port 0)



Plot 7-552. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_256QAM - High Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 175 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	rage 175 01 307



DSS Channel		Dort	PAPR (dB)				Limit
Ratio	Channel	Port	QPSK	16QAM	64QAM	256QAM	(dB)
	Low	0	8.08	8.08	8.05	8.08	< 13
	Low	1	8.08	8.08	8.07	8.08	< 13
LTE 5:	Middle	0	8.04	8.05	8.04	8.05	< 13
NR 5	NR 5 Middle	1	8.02	8.02	8.03	8.05	< 13
Lligh	0	8.05	8.03	8.05	8.09	< 13	
	High	1	8.05	8.04	8.06	8.06	< 13

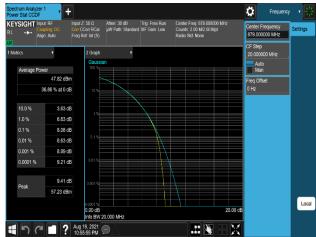
Table 7-118. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+10M\_2C\_2T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 176 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 176 01 367

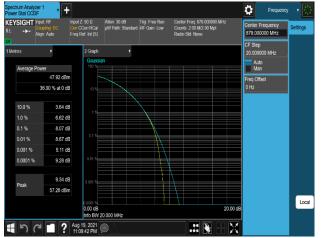




Plot 7-553. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_QPSK-Low Channel, Port 0)



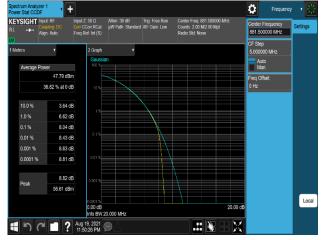
Plot 7-554. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_16QAM - Low Channel, Port 0)



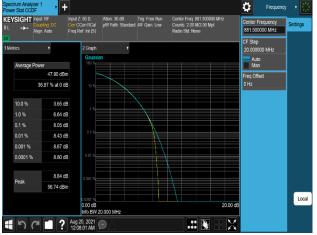
Plot 7-555. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_64QAM - Low Channel, Port 1)



Plot 7-556. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_256QAM-Low Channel, Port 0)



Plot 7-557. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_QPSK - Middle Channel, Port 0)



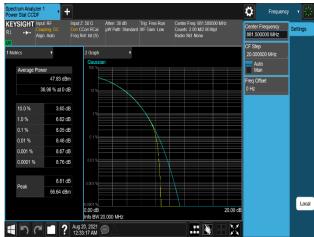
Plot 7-558. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_16QAM - Middle Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 177 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 177 of 367

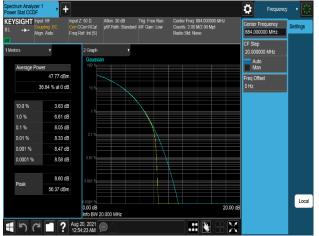




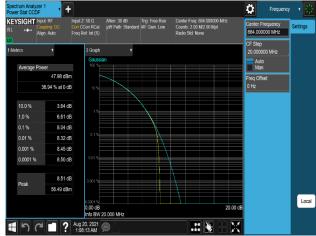
Plot 7-559. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_64QAM - Middle Channel, Port 0)



Plot 7-560. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_256QAM - Middle Channel, Port 0)



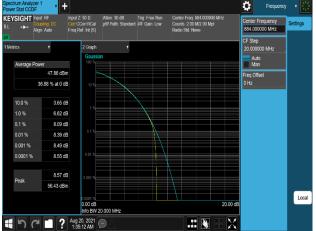
Plot 7-561. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_QPSK - High Channel, Port 0)



Plot 7-562. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_16QAM - High Channel, Port 1)



Plot 7-563. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_64QAM - High Channel, Port 1)



Plot 7-564. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M\_2C\_2T\_256QAM - High Channel, Port 0)

FCC ID: A3LRF4440D-13A	PCTEST ENGINESRING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 178 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 176 01 367

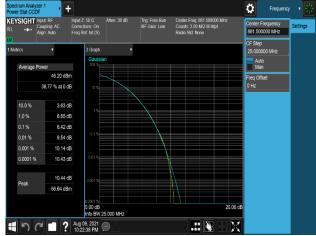


DSS	DSS Channel		PAPR (dB)				Limit
Ratio Channel	Port	QPSK	16QAM	64QAM	256QAM	(dB)	
LTE 5 : Low	0	8.44	8.37	8.40	8.44	< 13	
	1	8.37	8.42	8.39	8.48	< 13	
	2	8.03	8.06	8.10	8.07	< 13	
		3	8.05	8.03	8.07	8.09	< 13

Table 7-119. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+10M+5M\_3C\_4T)



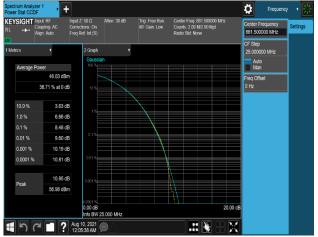
Plot 7-565. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_QPSK, Port 0)



Plot 7-566. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_16QAM, Port 1)



Plot 7-567. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_64QAM, Port 0)



Plot 7-568. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_256QAM, Port 1)

FCC ID: A3LRF4440D-13A	PCTEST*	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dags 470 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)		Page 179 of 367
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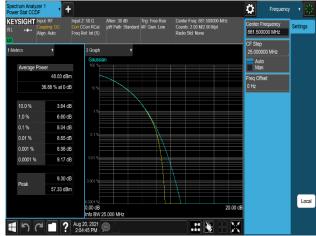


DSS Channel		Dort	PAPR (dB)				Limit
Ratio	Chamilei	Port	QPSK	16QAM	64QAM	256QAM	(dB)
LTE 5:	Low	0	8.03	8.03	8.06	8.05	< 13
NR 5	Low	1	8.08	8.04	8.05	8.09	< 13

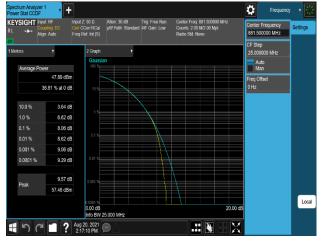
Table 7-120. Peak To Average Power Ratio Summary Data (B5\_10M(DSS)+10M+5M\_3C\_2T)



Plot 7-569. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_2T\_QPSK, Port 1)



Plot 7-570. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_2T\_16QAM, Port 1)



Plot 7-571. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_2T\_64QAM, Port 0)



Plot 7-572. Peak To Average Power Ratio Plot (B5\_10M(DSS)+10M+5M\_3C\_2T\_256QAM, Port 1)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogg 100 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)		Page 180 of 367
© 2021 PCTEST				PK-QP-16-14 Rev.01



# 7.5 Band Edge Emissions at Antenna Terminal §2.1051, §22.917, §27.53(c)

# **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.

### **Test Procedure Used**

KDB 971168 D01 v03r01 - Section 6

KDB 662911 D01 v02r01 - Section E)3) Out-of-Band and Spurious Emission Measurements

- a) Absolute Emission Limits
- iii) Measure and add 10 log(NANT) dB

ANSI C63.26-2015 - Section 5.7

# **Test Setting**

- 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: Please see test notes below.
- 4.  $VBW \ge 3 \times RBW$
- 5. Detector = RMS
- 6. Number of sweep points ≥ 2 x Span/RBW
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Limit

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

The power of any emission outside of the authorized operating frequency range cannot exeed -13 dBm. The limit is adjusted to -19 dBm [-13 dBm - 10 log (4)] per KDB 662911 D01 v02r01 - section E)3) because the EUT operate as a 4 port MIMO transmitter.

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 191 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 181 of 367



# **Test Setup**

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

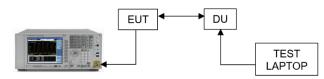


Figure 7-5. Test Instrument & Measurement Setup

# **Test Notes**

- 1. Per §22.917, compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows. In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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. In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.
- 2. Per §27.53(c), compliance with the these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.
- 3. All modes of operation were investigated. The port with highest level i.e. worst case port per each test range has been highlighted in the following emission tables.
- The integration method was performed using the spectrum analyzer's channel power, or band power functions.
  - The spectrum analyzer marker was placed at one-half of the RBW away from the band edge.
  - The integration value was set to the a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 192 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 182 of 367



		Measured		Limit			
Channel	Port	Range (MHz)	QPSK	16QAM	64QAM	256QAM	(dBm)
Low	0	868 to 869	-24.71	-26.28	-23.22	-25.48	-19.02
	1	868 to 869	-22.17	-21.76	-24.29	-22.92	-19.02
High	0	894 to 895	-22.98	-23.92	-22.00	-24.16	-19.02
	1	894 to 895	-23.23	-24.51	-23.48	-22.06	-19.02

Table 7-121. Band Edge Emission Summary Data (B5\_5M\_1C\_2T)

		Measured		Limit			
Channel	Port	Range (MHz)	QPSK	16QAM	64QAM	256QAM	(dBm)
Low	0	868 to 869	-25.50	-25.00	-26.17	-24.84	-19.02
	1	868 to 869	-26.69	-25.09	-25.33	-24.65	-19.02
High	0	894 to 895	-24.20	-24.27	-24.21	-24.92	-19.02
	1	894 to 895	-23.92	-24.67	-24.02	-23.40	-19.02

Table 7-122. Band Edge Emission Summary Data (B5\_10M\_1C\_2T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 183 of 367
8K21070501R2-R1 07/09/2021 - 08/25/202		RRU (RF4440d)	Fage 163 01 367





Plot 7-573. Band Edge Emission (868MHz to 869MHz) Plot (B5\_5M\_1C\_16QAM - Low Channel, Port 1)



Plot 7-574. Band Edge Emission (894MHz to 895MHz) Plot (B5\_5M\_1C\_64QAM - High Channel, Port 0)



Plot 7-575. Band Edge Emission (868MHz to 869MHz) Plot (B5\_10M\_1C\_256QAM - Low Channel, Port 1)



Plot 7-576. Band Edge Emission (894MHz to 895MHz) Plot (B5\_10M\_1C\_256QAM - High Channel, Port 1)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 184 of 367
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Fage 104 01 307



	Port	Measured Range (MHz)		Limit			
Channel			QPSK	16QAM	64QAM	256QAM	(dBm)
	0	868 to 869	-26.79	-27.46	-26.39	-27.94	-19.02
Low	1	868 to 869	-26.70	-27.59	-28.16	-27.92	-19.02
Low	2	868 to 869	-25.37	-26.29	-25.83	-25.54	-19.02
	3	868 to 869	-27.09	-25.81	-26.94	-26.77	-19.02
High	0	894 to 895	-26.68	-26.61	-26.37	-26.24	-19.02
	1	894 to 895	-26.59	-25.85	-25.85	-25.34	-19.02
	2	894 to 895	-25.31	-24.93	-23.71	-24.73	-19.02
	3	894 to 895	-24.96	-25.65	-25.01	-24.07	-19.02

Table 7-123. Band Edge Emission Summary Data (B5\_5M\_1C\_4T)

	Port	Measured Range (MHz)		Limit			
Channel			QPSK	16QAM	64QAM	256QAM	(dBm)
	0	868 to 869	-26.05	-27.56	-27.02	-26.16	-19.02
Low	1	868 to 869	-27.02	-27.34	-27.52	-25.47	-19.02
Low	2	868 to 869	-26.15	-26.20	-27.06	-25.97	-19.02
	3	868 to 869	-26.66	-27.06	-27.55	-27.43	-19.02
High	0	894 to 895	-24.99	-25.22	-24.19	-25.33	-19.02
	1	894 to 895	-26.25	-25.55	-25.92	-26.01	-19.02
	2	894 to 895	-26.41	-26.09	-26.03	-25.77	-19.02
	3	894 to 895	-23.84	-24.38	-24.71	-24.27	-19.02

Table 7-124. Band Edge Emission Summary Data (B5\_10M\_1C\_4T)

FCC ID: A3LRF4440D-13A	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 195 of 267
8K21070501R2-R1	07/09/2021 - 08/25/2021	RRU (RF4440d)	Page 185 of 367