

PEAK-TO-AVERAGE POWER RATIO (PAPR)



XMIT 2019.09.05

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.
The PAPR was measured using the CCDF function of the spectrum analyzer.

Per RSS-130 section 4.6, the PAPR shall not exceed 13 dB for more than 0.1% of the time.

PEAK-TO-AVERAGE POWER RATIO (PAPR)



TbTx 2019.08.30.0

XMI 2019.08.05

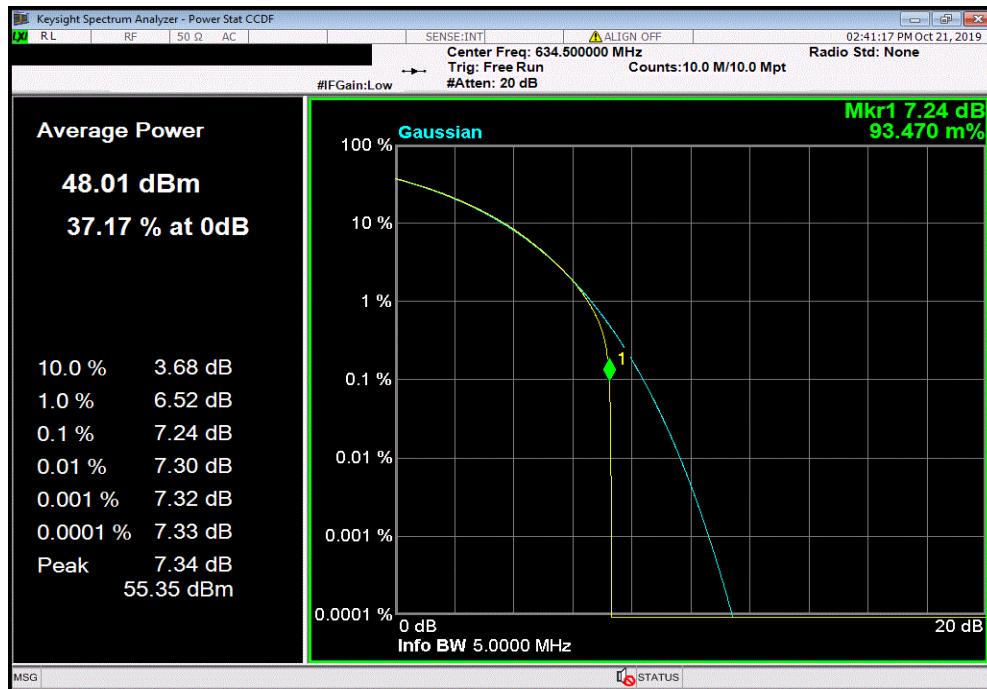
EUT:	AHBOA Remote Radio Head (RRH)	Work Order:	NOKI0003			
Serial Number:	BL1934X1001	Date:	23-Oct-19			
Customer:	Nokia	Temperature:	22 °C			
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill	Humidity:	38.7% RH			
Project:	None	Barometric Pres.:	1020 mbar			
Tested by:	Jonathan Kiefer	Power:	48VDC			
TEST SPECIFICATIONS		Test Method	ANSI C63.26:2015			
FCC 27:2019						
COMMENTS	Band 71 PAPR measurements for LTE5 channel bandwidth at mid channel for four modulation types (QPSK, 16QAM, 64QAM, 256QAM). Tested at highest antenna port (Port 1). EUT is operated at 100% duty cycle.					
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1	Signature	<i>Jonathan Kiefer</i>			
Band 71		PAPR Value (dB)	PAPR Limit (dBm)	Results		
QPSK Modulation	LTE5 Bandwidth	7.24	13	Pass		
16QAM Modulation	LTE5 Bandwidth	7.22	13	Pass		
64QAM Modulation	LTE5 Bandwidth	7.23	13	Pass		
256QAM Modulation	LTE5 Bandwidth	7.25	13	Pass		

PEAK-TO-AVERAGE POWER RATIO (PAPR)

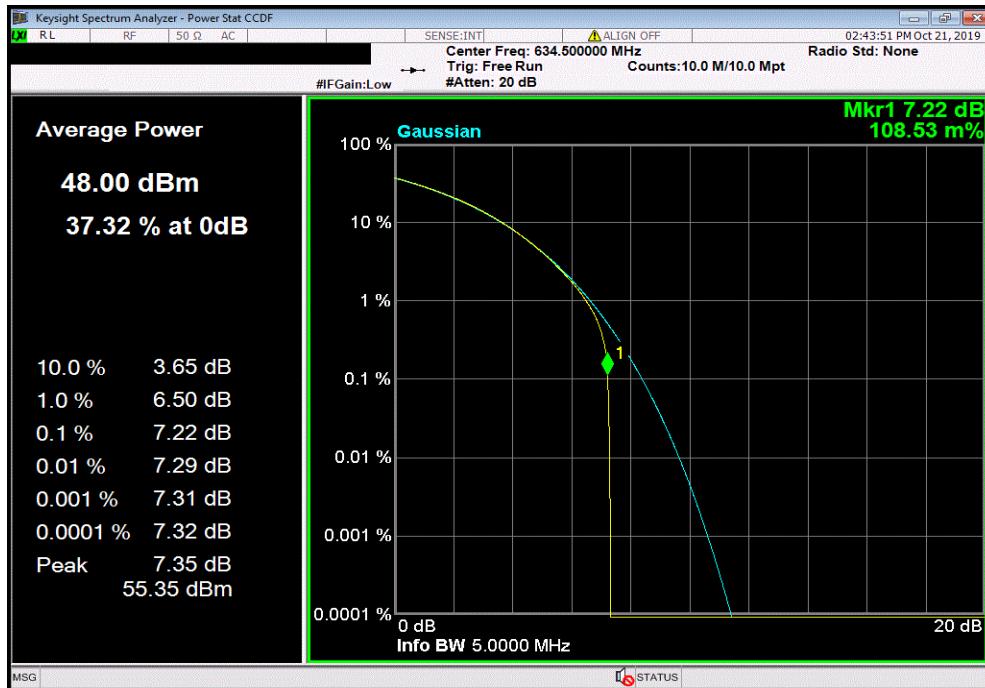


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Band 71, QPSK Modulation, LTE5 Bandwidth		
PAPR Value (dB)	PAPR Limit (dBm)	Results
7.24	13	Pass



Band 71, 16QAM Modulation, LTE5 Bandwidth		
PAPR Value (dB)	PAPR Limit (dBm)	Results
7.22	13	Pass

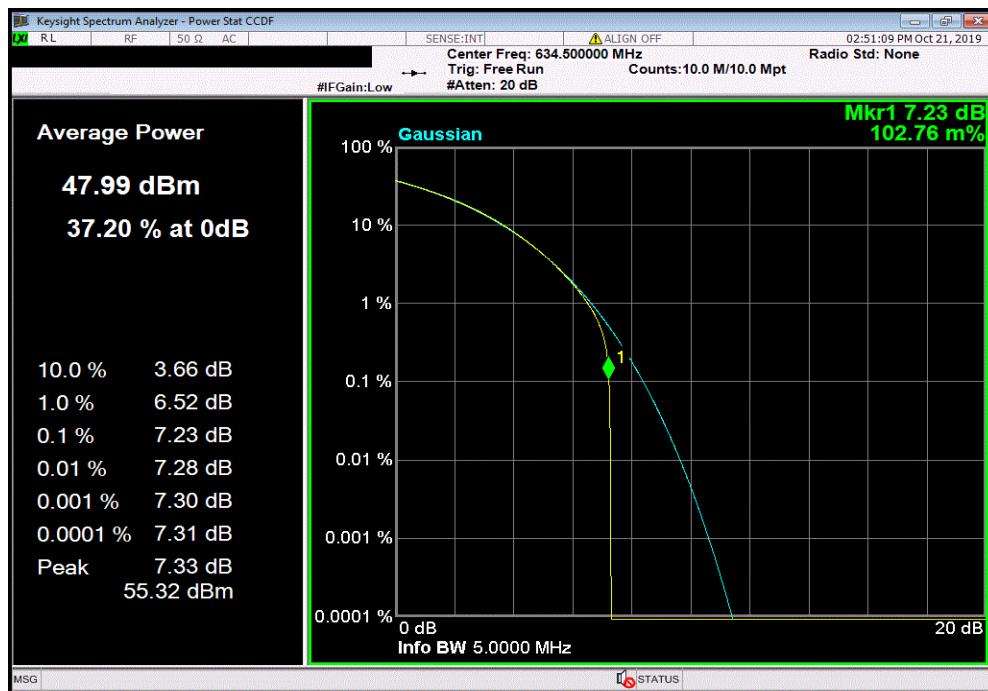


PEAK-TO-AVERAGE POWER RATIO (PAPR)

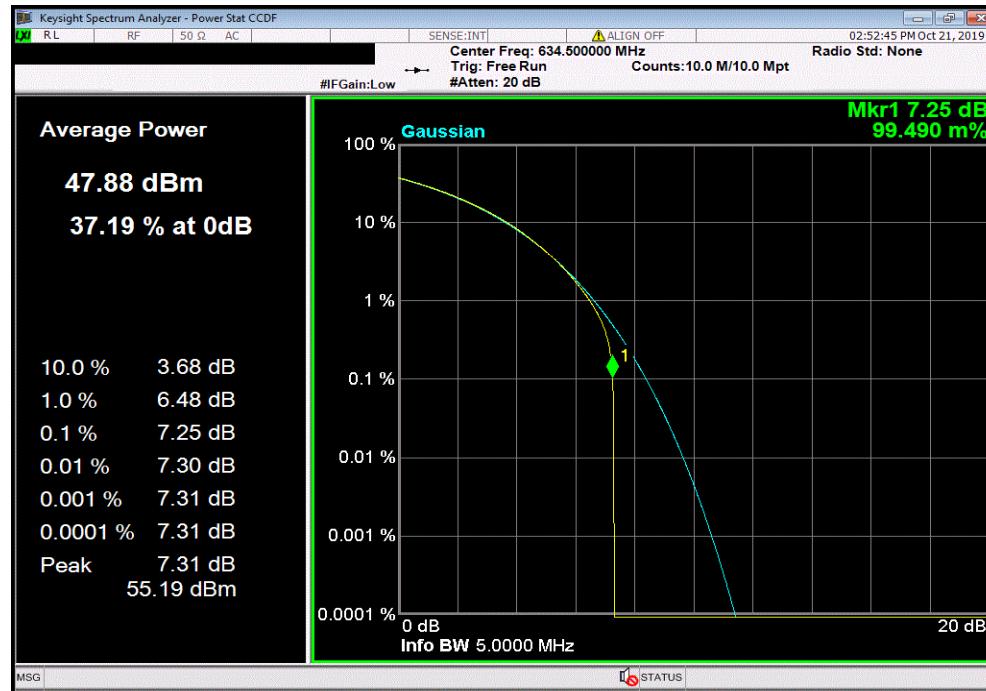


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Band 71, 64QAM Modulation, LTE5 Bandwidth				PAPR Value (dB)	PAPR Limit (dBm)	Results
				7.23	13	Pass



Band 71, 256QAM Modulation, LTE5 Bandwidth				PAPR Value (dB)	PAPR Limit (dBm)	Results
				7.25	13	Pass



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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
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Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4. The PAPR was measured using the CCDF function of the spectrum analyzer.

Per RSS-130 section 4.6, the PAPR shall not exceed 13 dB for more than 0.1% of the time.

PEAK-TO-AVERAGE POWER RATIO (PAPR)



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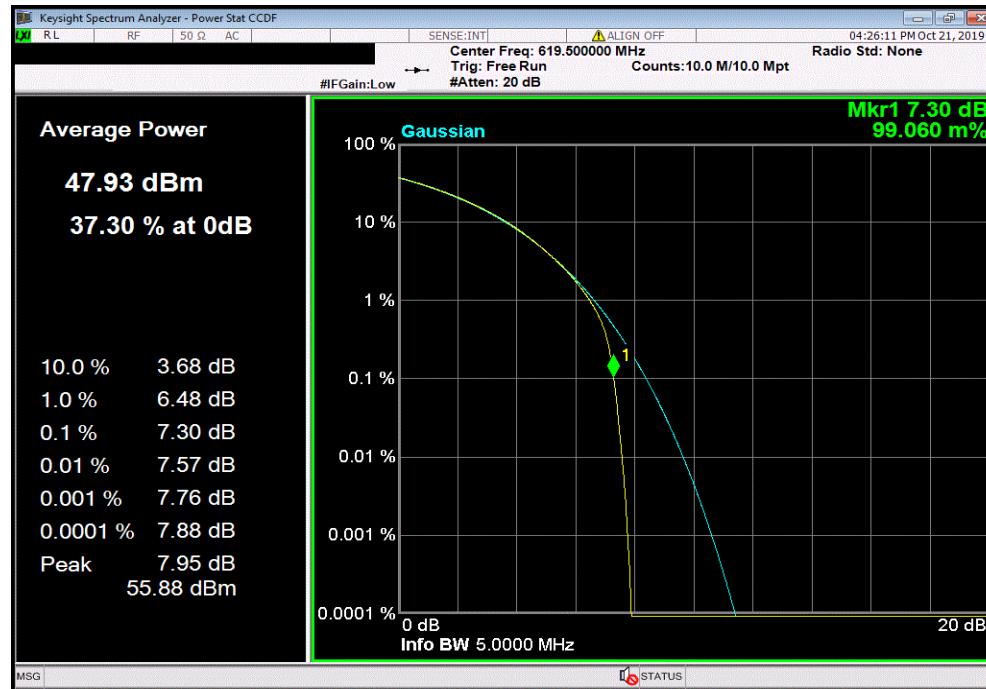
EUT:	AHBOA Remote Radio Head (RRH)	Work Order:	NOKI0003	
Serial Number:	BL1934X1001	Date:	23-Oct-19	
Customer:	Nokia	Temperature:	22.4 °C	
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill	Humidity:	37.8% RH	
Project:	None	Barometric Pres.:	1020 mbar	
Tested by:	Jonathan Kiefer	Power:	48VDC	
TEST SPECIFICATIONS		Test Method	ANSI C63.26:2015	
FCC 27:2019				
COMMENTS				
Band 71 PAPR measurements for 256QAM modulation type at Low, Mid and High channels for four (5,10,15, 20MHz) channel bandwidths. Tested at highest antenna port (Port 1). EUT is operated at 100% duty cycle. Note: 256QAM LTE5 BW Mid Channel data shown elsewhere in the report.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	1	Signature	<i>Jonathan Kiefer</i>	
Band 71		PAPR Value (dB)	Limit (dB)	Results
256QAM Modulation				
LTE5 Bandwidth				
Low Channel, 617 MHz 7.3 13 Pass				
High Channel, 652 MHz 7.31 13 Pass				
LTE10 Bandwidth				
Low Channel, 617 MHz 7.41 13 Pass				
Mid Channel, 634.5 MHz 7.24 13 Pass				
High Channel, 652 MHz 7.41 13 Pass				
LTE15 Bandwidth				
Low Channel, 617 MHz 7.48 13 Pass				
Mid Channel, 634.5 MHz 7.22 13 Pass				
High Channel, 652 MHz 7.52 13 Pass				
LTE20 Bandwidth				
Low Channel, 617 MHz 7.45 13 Pass				
Mid Channel, 634.5 MHz 7.2 13 Pass				
High Channel, 652 MHz 7.55 13 Pass				

PEAK-TO-AVERAGE POWER RATIO (PAPR)

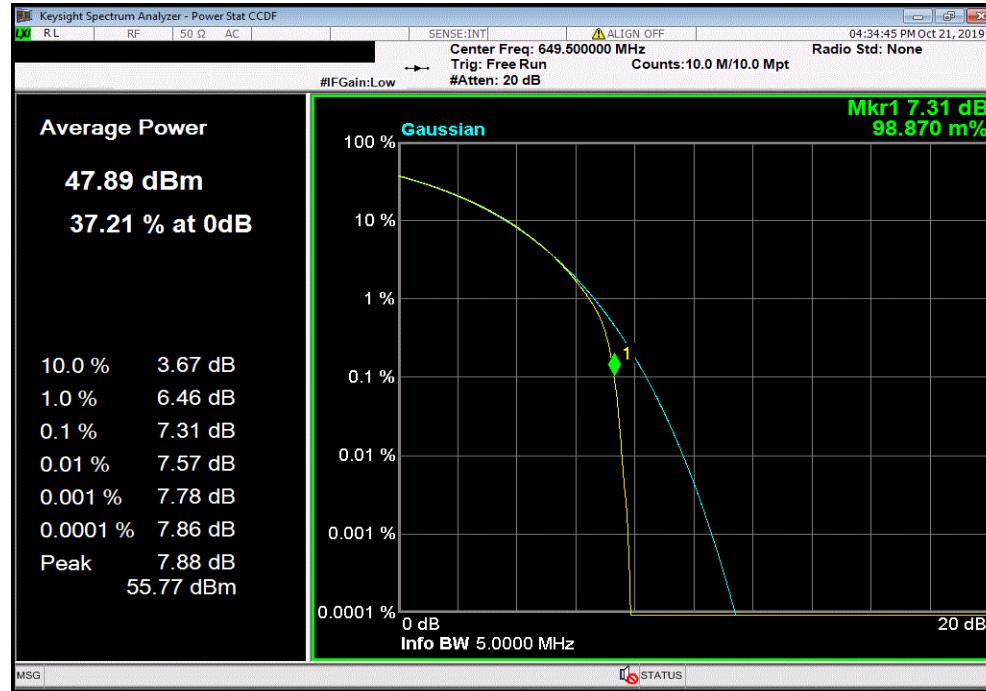


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Band 71, 256QAM Modulation, LTE5 Bandwidth, Low Channel, 617 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.3	13	Pass	



Band 71, 256QAM Modulation, LTE5 Bandwidth, High Channel, 652 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.31	13	Pass	

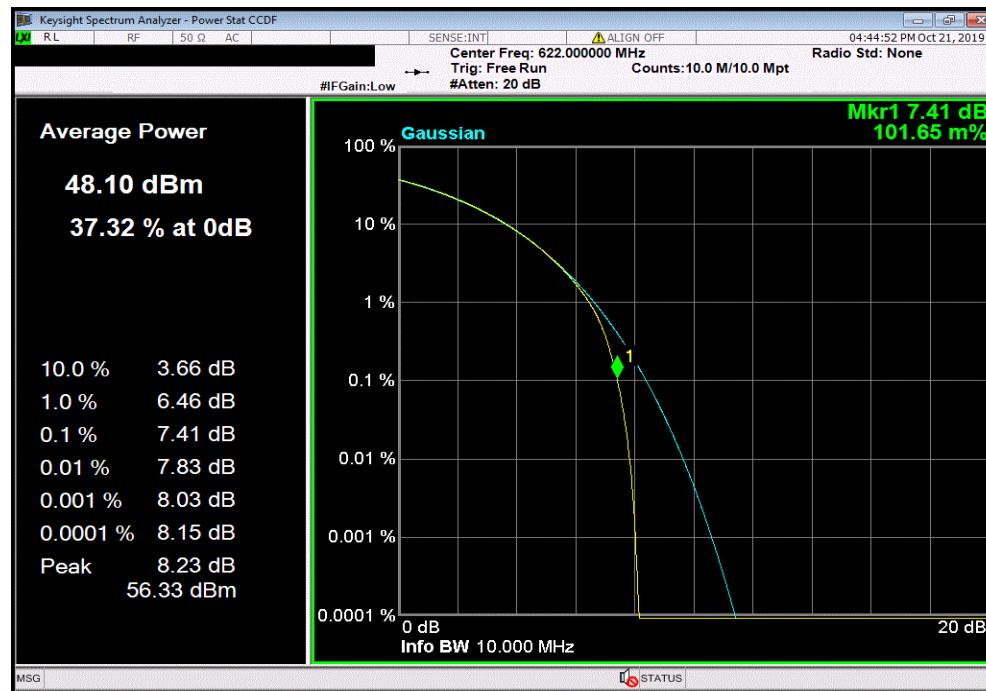


PEAK-TO-AVERAGE POWER RATIO (PAPR)

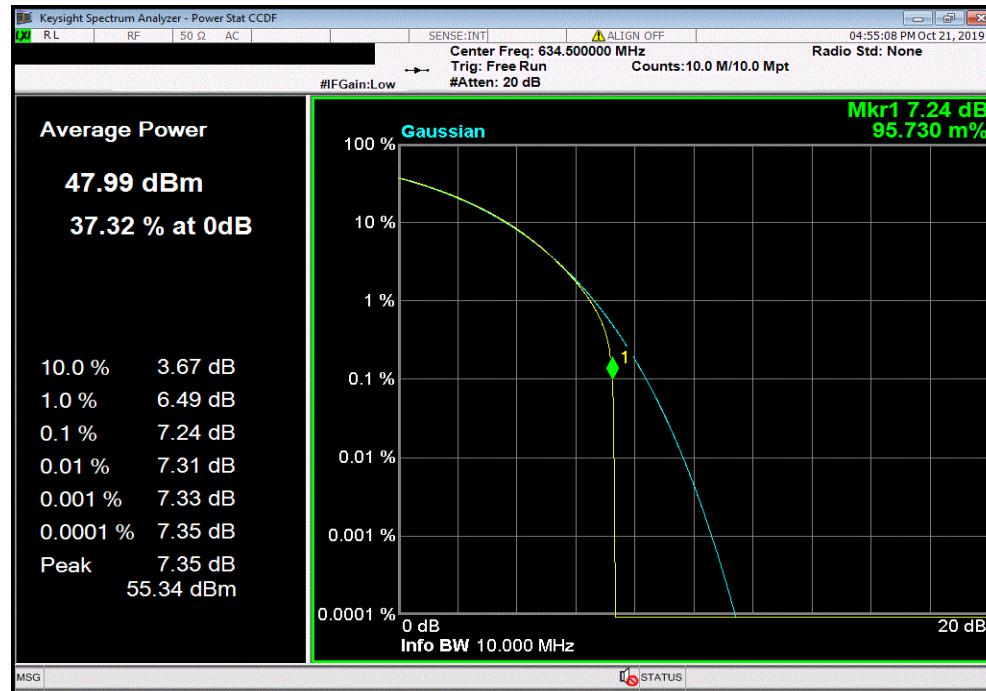


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Band 71, 256QAM Modulation, LTE10 Bandwidth, Low Channel, 617 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.41	13	Pass	



Band 71, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 634.5 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.24	13	Pass	

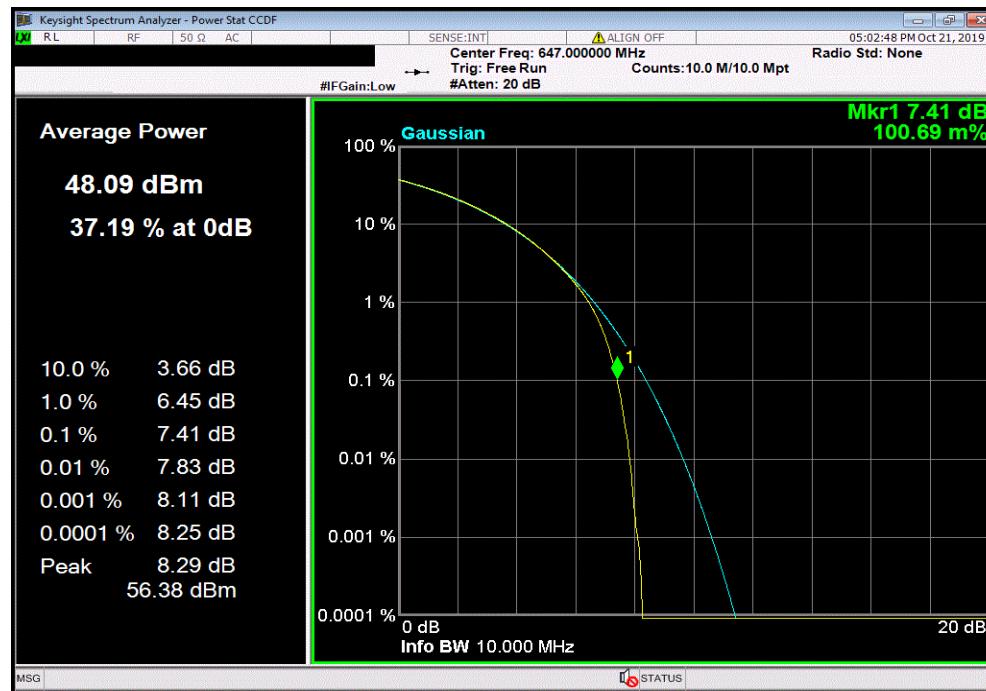


PEAK-TO-AVERAGE POWER RATIO (PAPR)

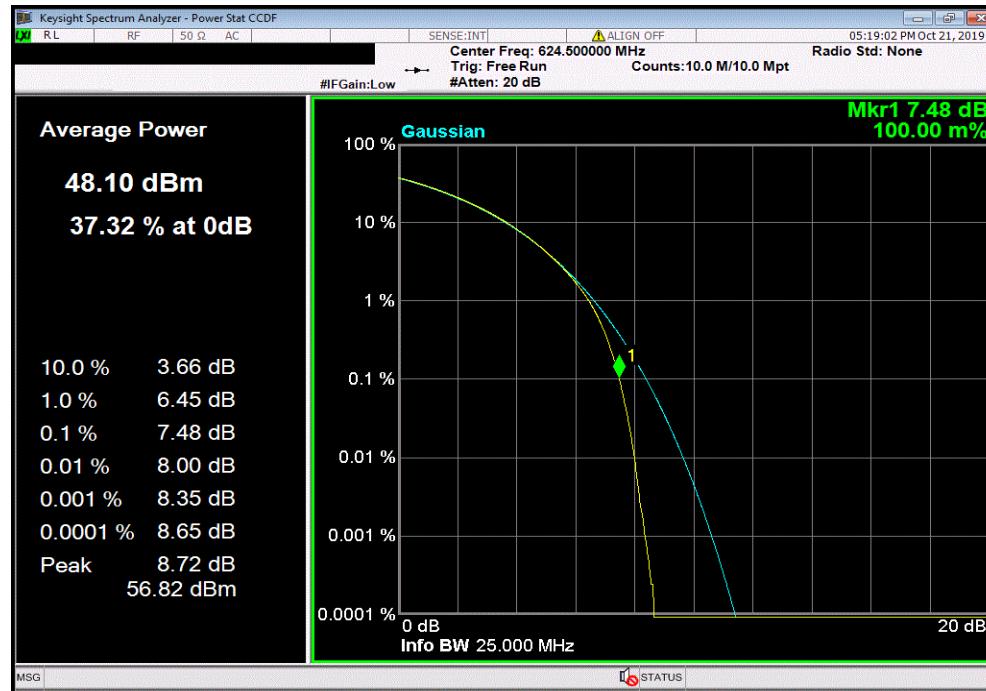


TbTx 2019.08.30.0 XM1 2019.09.05

Band 71, 256QAM Modulation, LTE10 Bandwidth, High Channel, 652 MHz			
	PAPR Value (dB)	Limit (dB)	Results
	7.41	13	Pass



Band 71, 256QAM Modulation, LTE15 Bandwidth, Low Channel, 617 MHz			
	PAPR Value (dB)	Limit (dB)	Results
	7.48	13	Pass

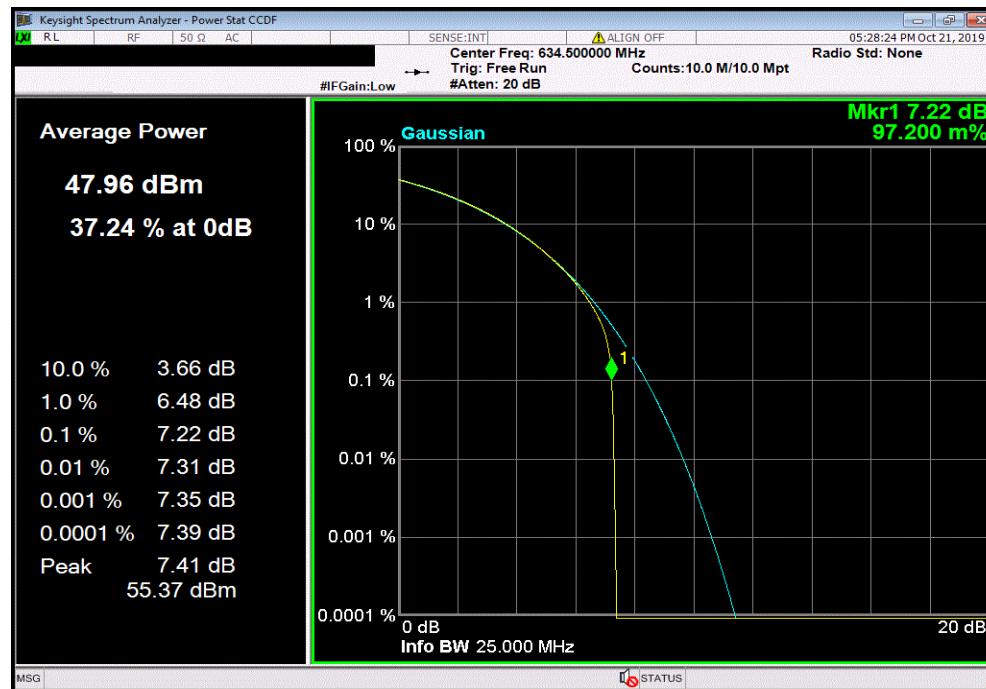


PEAK-TO-AVERAGE POWER RATIO (PAPR)

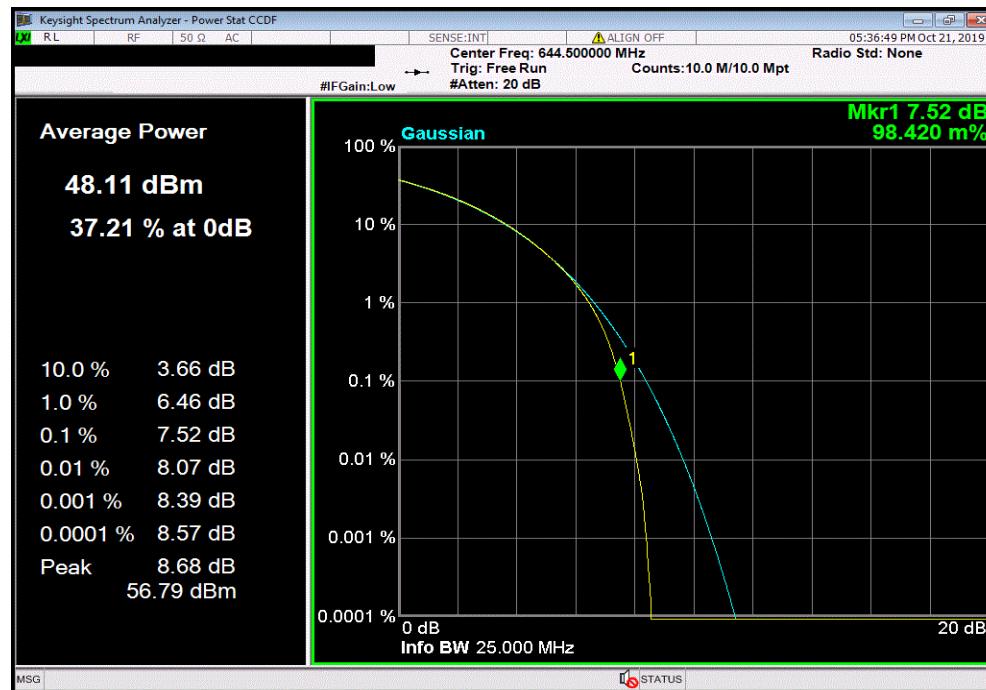


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Band 71, 256QAM Modulation, LTE15 Bandwidth, Mid Channel, 634.5 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.22	13	Pass	



Band 71, 256QAM Modulation, LTE15 Bandwidth, High Channel, 652 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.52	13	Pass	

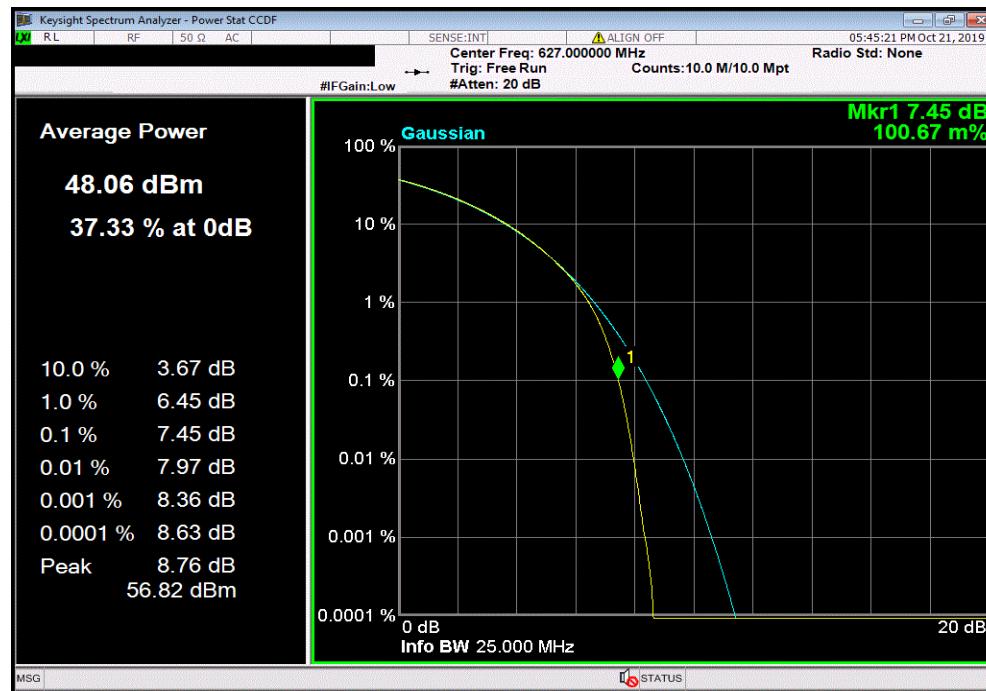


PEAK-TO-AVERAGE POWER RATIO (PAPR)

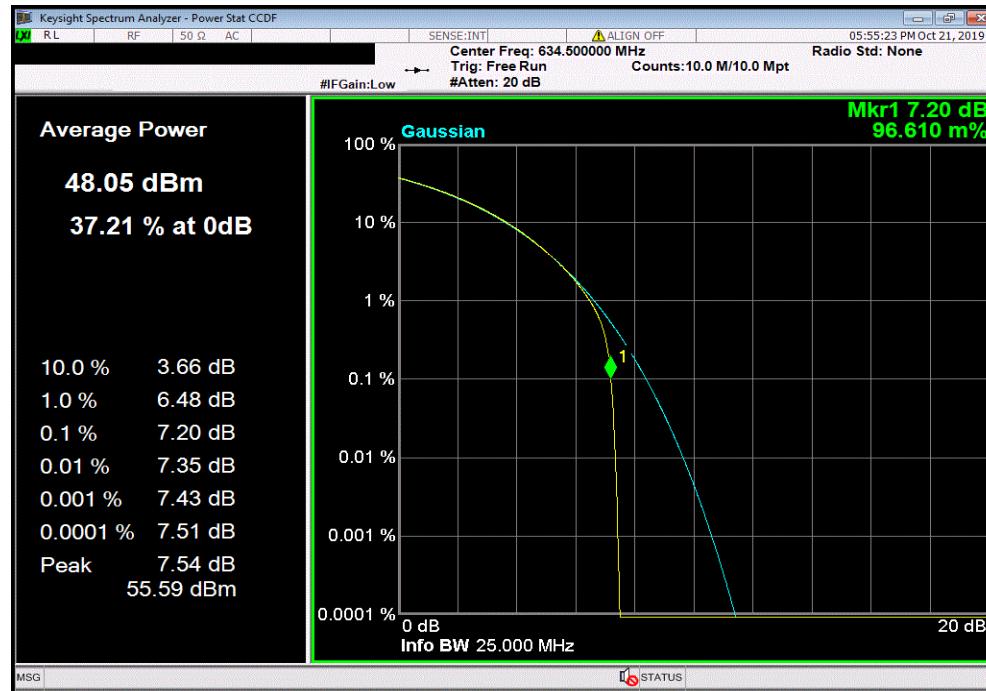


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Band 71, 256QAM Modulation, LTE20 Bandwidth, Low Channel, 617 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.45	13	Pass	



Band 71, 256QAM Modulation, LTE20 Bandwidth, Mid Channel, 634.5 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.2	13	Pass	

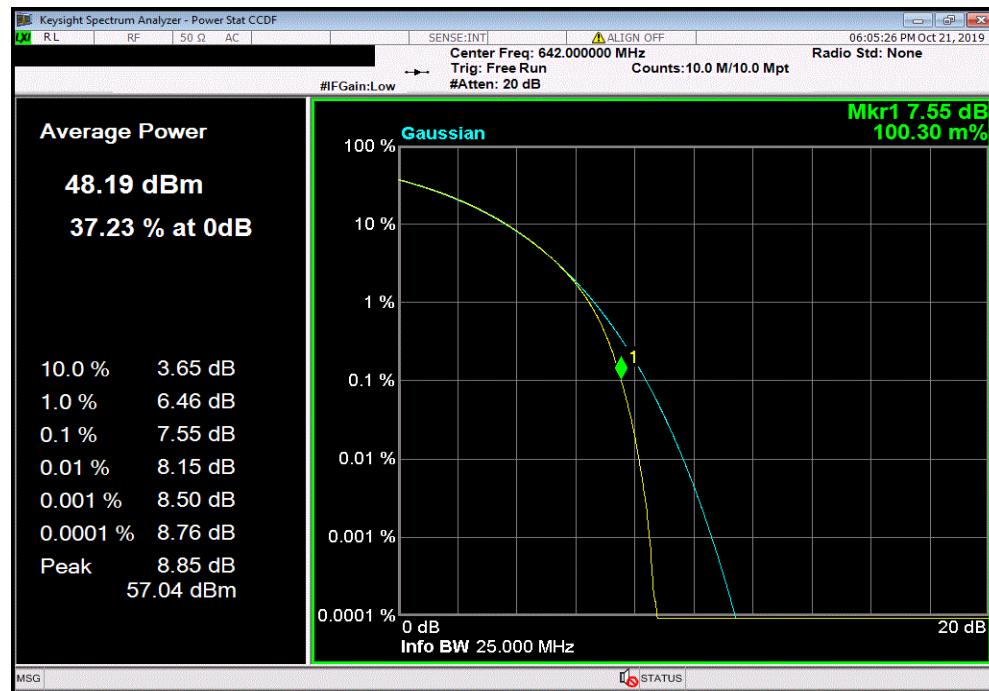


PEAK-TO-AVERAGE POWER RATIO (PAPR)



TbTx 2019.08.30.0 XM1 2019.09.05

Band 71, 256QAM Modulation, LTE20 Bandwidth, High Channel, 652 MHz			
PAPR Value (dB)	Limit (dB)	Results	
7.55	13	Pass	



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The PAPR was measured using the CCDF function of the spectrum analyzer.

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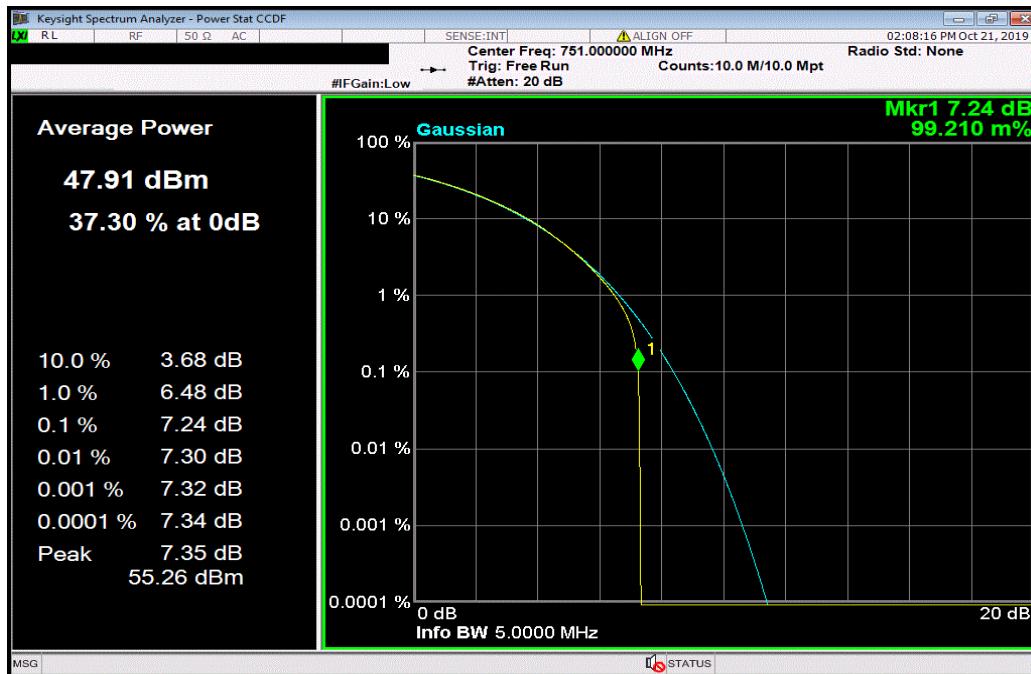
EUT:	AHBOA Remote Radio Head (RRH)		Work Order:	NOKI0003								
Serial Number:	BL1934X1001		Date:	23-Oct-19								
Customer:	Nokia		Temperature:	22.9 °C								
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill		Humidity:	36.8% RH								
Project:	None		Barometric Pres.:	1020 mbar								
Tested by:	Jonathan Kiefer	Power:	48VDC	Job Site:	TX09							
TEST SPECIFICATIONS	FCC 27:2019		Test Method	ANSI C63.26:2015								
COMMENTS	Band 13 PAPR measurements for LTE5 channel bandwidth at Mid channel using 256QAM on all four antenna ports. EUT is operated at 100% duty cycle.											
DEVIATIONS FROM TEST STANDARD												
None												
Configuration #	1	Signature	<i>Jonathan Kiefer</i>	PAPR Value (dB)	PAPR Limit (dB)							
Band 13	256QAM Modulation	LTE5 Bandwidth	Mid Channel, 751 MHz	7.24	13							
			Antenna Port 1	7.23	13							
			Antenna Port 2	7.24	13							
			Antenna Port 3	7.26	13							
			Antenna Port 4									

PEAK-TO-AVERAGE POWER RATIO (PAPR)

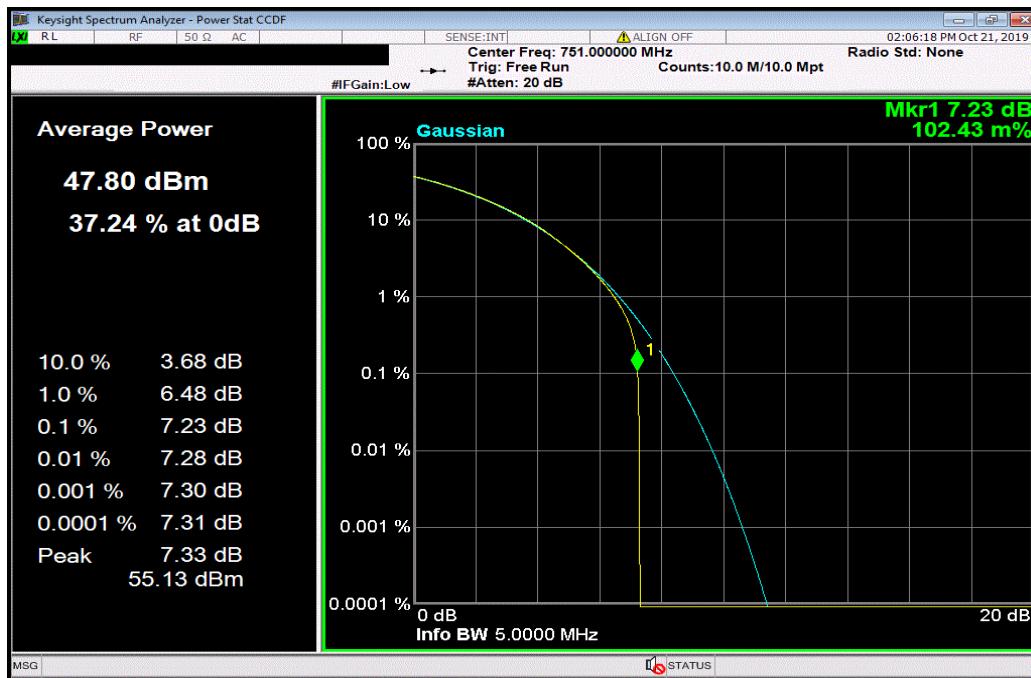


TbTx 2019.08.30.0 XMI 2019.09.05

Band 13, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz, Antenna Port 1			PAPR	PAPR	Results
	Value (dB)	Limit (dB)			
	7.24	13		Pass	



Band 13, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz, Antenna Port 2			PAPR	PAPR	Results
	Value (dB)	Limit (dB)			
	7.23	13		Pass	

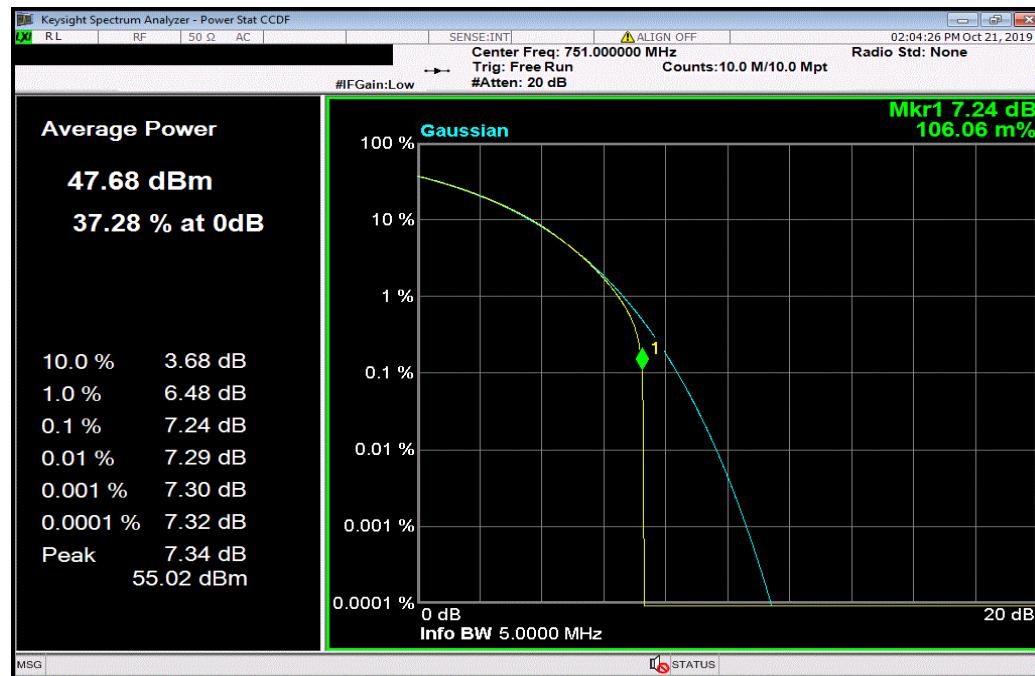


PEAK-TO-AVERAGE POWER RATIO (PAPR)

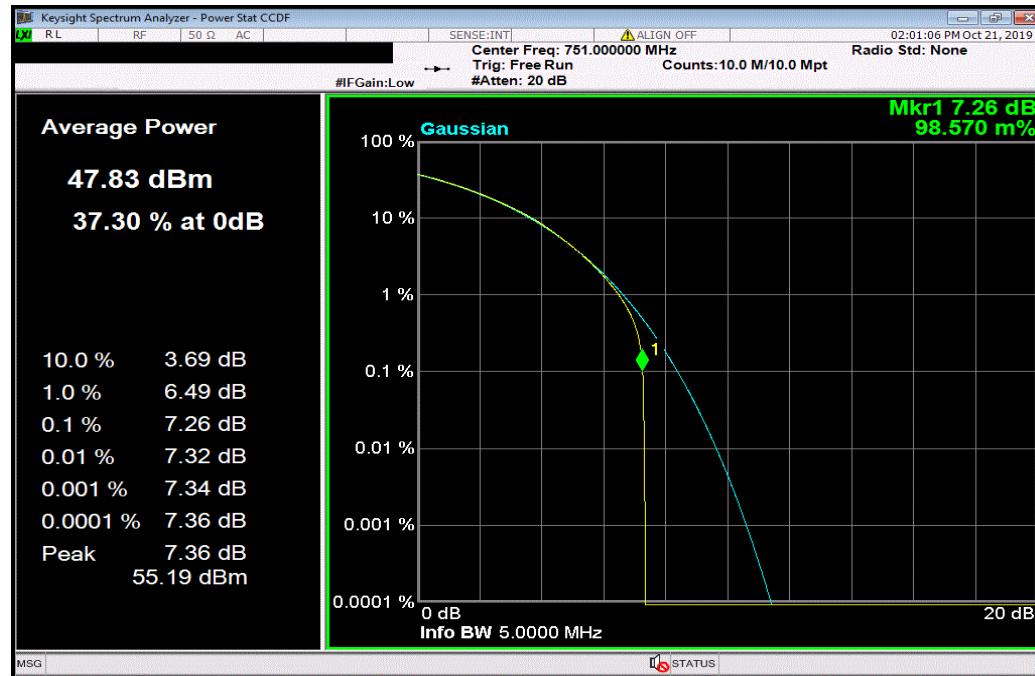


TbTx 2019.08.30.0 XMI 2019.09.05

Band 13, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz, Antenna Port 3		
PAPR Value (dB)	PAPR Limit (dB)	Results
7.24	13	Pass



Band 13, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz, Antenna Port 4		
PAPR Value (dB)	PAPR Limit (dB)	Results
7.26	13	Pass



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Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

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The PAPR was measured using the CCDF function of the spectrum analyzer.

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XMI 2019.08.05

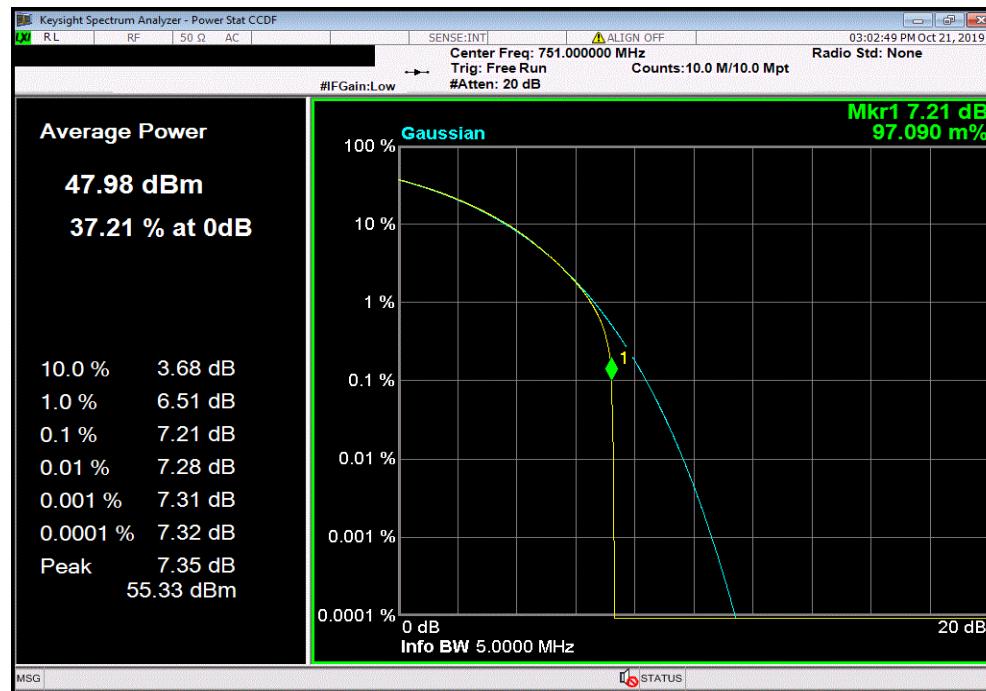
EUT:	AHBOA Remote Radio Head (RRH)	Work Order:	NOKI0003			
Serial Number:	BL1934X1001	Date:	23-Oct-19			
Customer:	Nokia	Temperature:	22.7 °C			
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill	Humidity:	37.2% RH			
Project:	None	Barometric Pres.:	1020 mbar			
Tested by:	Jonathan Kiefer	Power:	48VDC			
TEST SPECIFICATIONS		Test Method	ANSI C63.26:2015			
FCC 27:2019						
COMMENTS	Band 13 PAPR measurements for LTE5 channel bandwidth at Mid channel for four modulation types. Tested on highest power antenna port (Port 1). EUT is operated at 100% duty cycle.					
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1	Signature	<i>Jonathan Kiefer</i>			
		PAPR Value (dB)	PAPR Limit (dB)	Results		
Band 13						
QPSK Modulation	LTE5 Bandwidth	7.21	13	Pass		
16QAM Modulation	LTE5 Bandwidth	7.21	13	Pass		
64QAM Modulation	LTE5 Bandwidth	7.21	13	Pass		
256QAM Modulation	LTE5 Bandwidth	7.24	13	Pass		

PEAK-TO-AVERAGE POWER RATIO (PAPR)

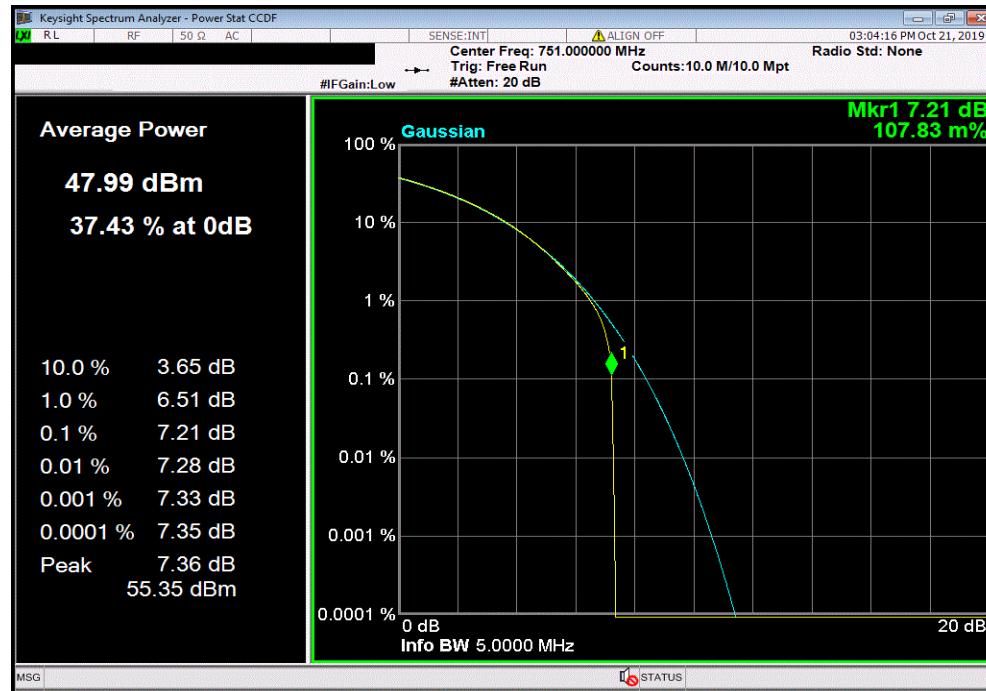


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Band 13, QPSK Modulation, LTE5 Bandwidth			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.21	13	Pass	



Band 13, 16QAM Modulation, LTE5 Bandwidth			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.21	13	Pass	

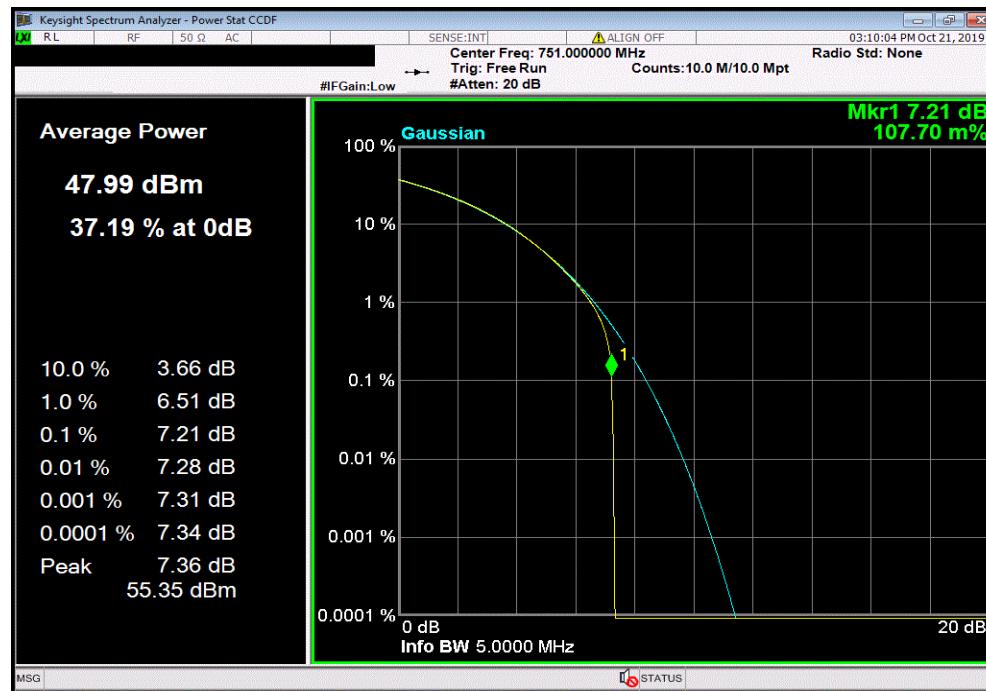


PEAK-TO-AVERAGE POWER RATIO (PAPR)

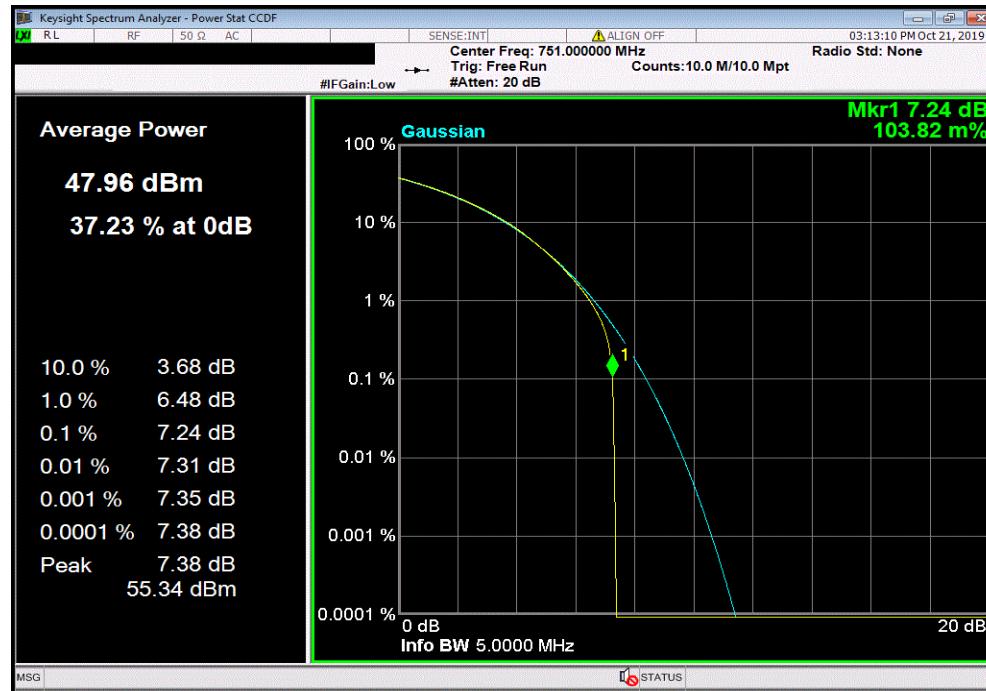


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Band 13, 64QAM Modulation, LTE5 Bandwidth			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.21	13	Pass	



Band 13, 256QAM Modulation, LTE5 Bandwidth			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.24	13	Pass	



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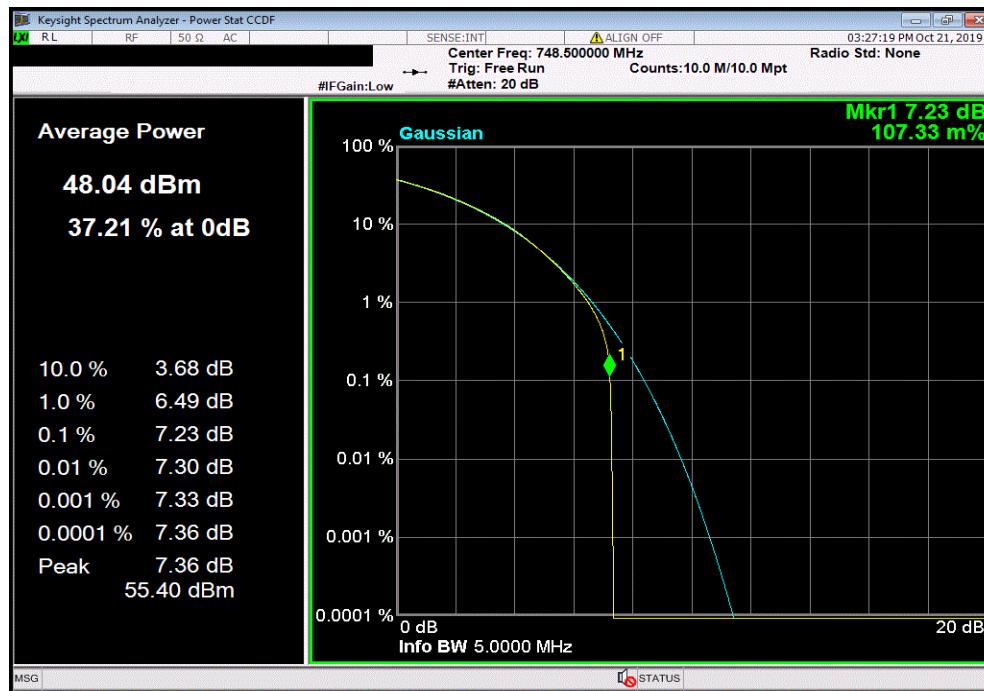
EUT:	AHBOA Remote Radio Head (RRH)		Work Order:	NOKI0003			
Serial Number:	BL1934X1001		Date:	23-Oct-19			
Customer:	Nokia		Temperature:	22.2 °C			
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill		Humidity:	38.2% RH			
Project:	None		Barometric Pres.:	1020 mbar			
Tested by:	Jonathan Kiefer	Power:	48VDC	Job Site:	TX09		
TEST SPECIFICATIONS	Test Method						
FCC 27:2019	ANSI C63.26:2015						
COMMENTS	Band 13 average power for 256QAM modulation type at Low, Mid and High channels for LTE5 and LTE10 channel bandwidths. For Band 13, LTE10 only tested on Mid channel. Tested on highest power antenna port (Port 1). EUT is operated at 100% duty cycle. Note: 256QAM LTE5 BW Mid Channel data shown elsewhere in the report.						
DEVIATIONS FROM TEST STANDARD	None						
Configuration #	1	Signature	<i>Jonathan Kiefer</i>	PAPR Value (dB)	PAPR Limit (dB)		
Band 13					Results		
256QAM Modulation							
LTE5 Bandwidth							
Low Channel, 746 MHz			7.23	13	Pass		
High Channel, 756 MHz			7.24	13	Pass		
LTE10 Bandwidth							
Mid Channel, 751 MHz			7.23	13	Pass		

PEAK-TO-AVERAGE POWER RATIO (PAPR)

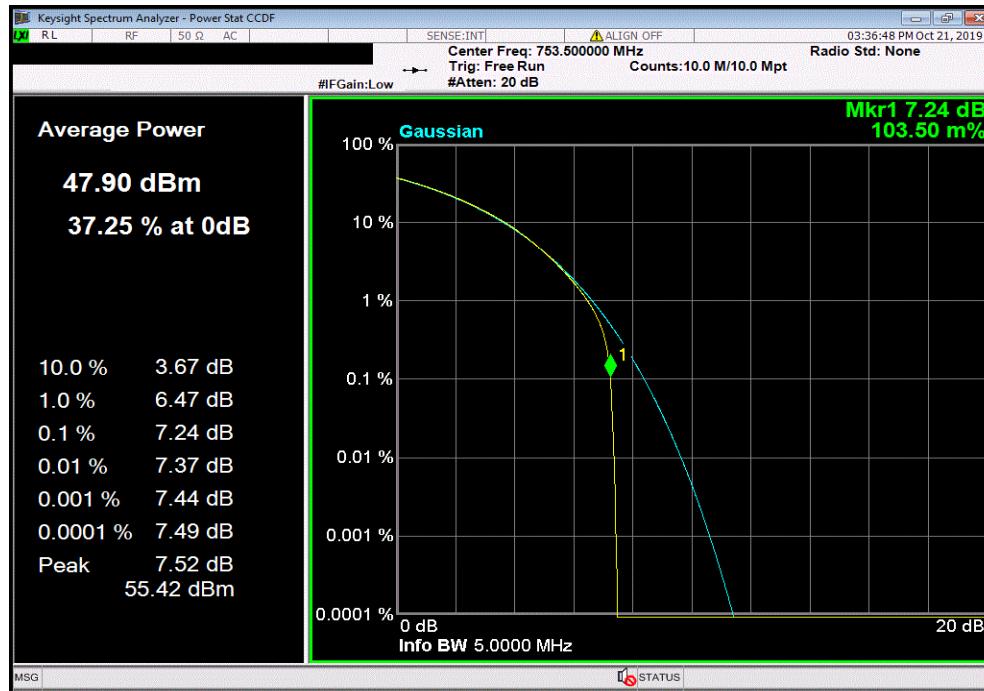


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Band 13, 256QAM Modulation, LTE5 Bandwidth, Low Channel, 746 MHz			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.23	13	Pass	



Band 13, 256QAM Modulation, LTE5 Bandwidth, High Channel, 756 MHz			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.24	13	Pass	

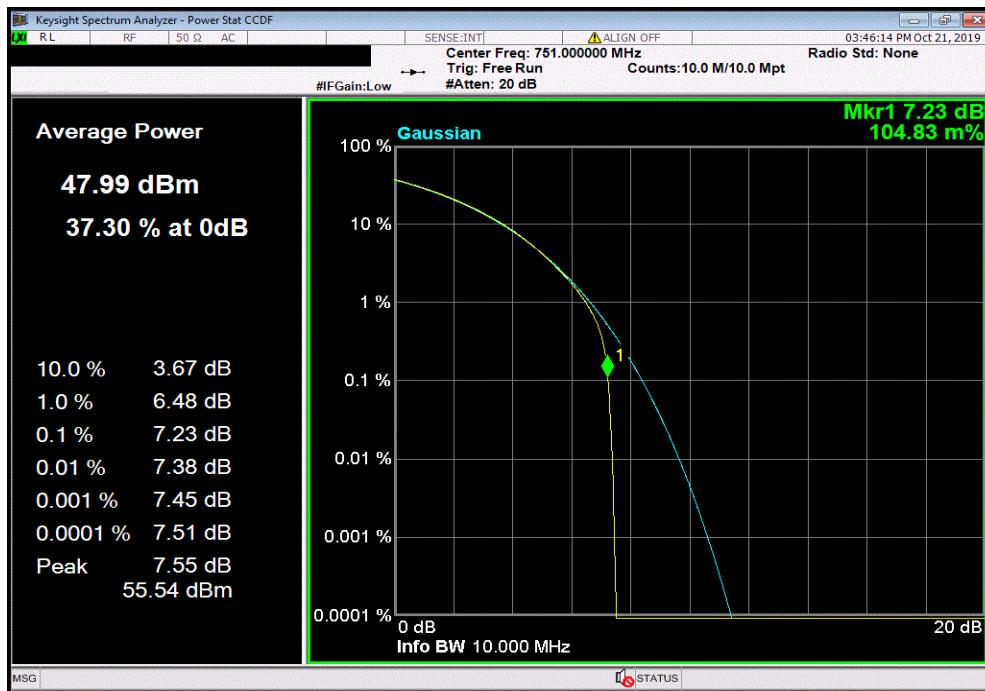


PEAK-TO-AVERAGE POWER RATIO (PAPR)



TbtTx 2019.08.30.0 XM1 2019.09.05

Band 13, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 751 MHz			
PAPR Value (dB)	PAPR Limit (dB)	Results	
7.23	13	Pass	





XMit 2019.09.05

OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The emission bandwidth was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method in section 5.4 of ANSI C63.26 was used to make the measurement.

The spectrum analyzer settings were as follows:

RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).

VBW=> RBW

A peak detector was used

Trace max hold.

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 26 dB emission bandwidth.

Band 71 Emission Designators

517MHz to 652MHz Band Emission Designators				
Channel Bandwidth	LTE-QPSK	LTE-16QAM	LTE-64QAM	LTE-256QAM
5M	4M87F9W	4M84F9W	4M86F9W	4M85F9W
10M	9M65F9W	9M66F9W	9M67F9W	9M67F9W
15M	14M4F9W	14M3F9W	14M4F9W	14M4F9W
20M	19M1F9W	19M1F9W	19M1F9W	19M1F9W

Note: Based on 26dB emission bandwidth

OCCUPIED BANDWIDTH



TbTx 2019.08.30.0

XMI 2019.08.05

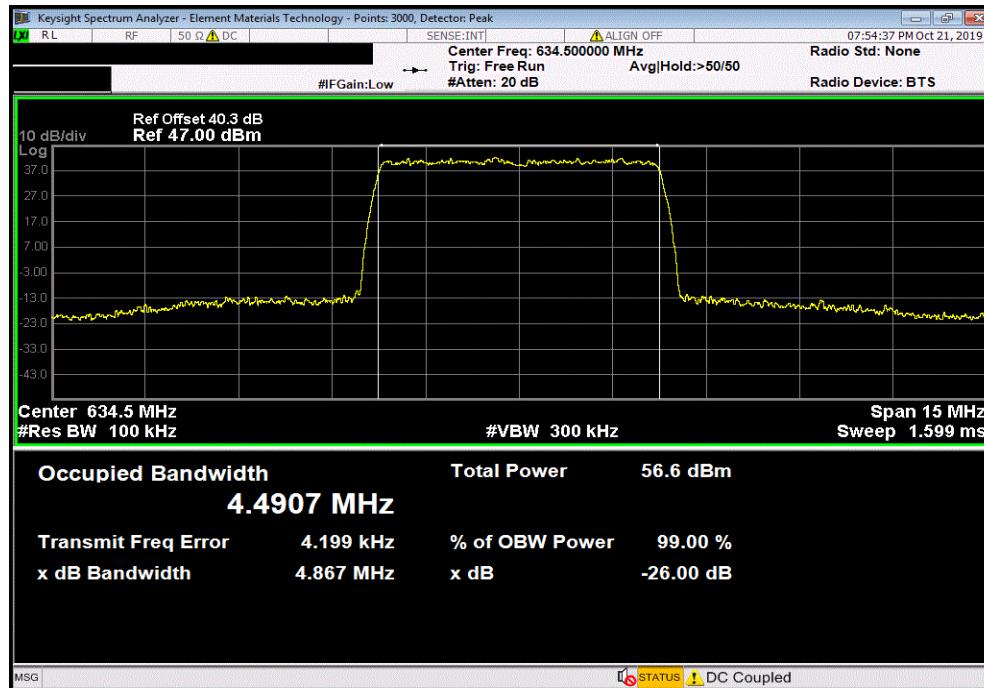
EUT:	AHBOA Remote Radio Head (RRH)	Work Order:	NOKI0003
Serial Number:	BL1934X1001	Date:	23-Oct-19
Customer:	Nokia Solutions and Networks	Temperature:	22.8 °C
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill	Humidity:	37.3% RH
Project:	None	Barometric Pres.:	1020 mbar
Tested by:	Jonathan Kiefer	Power:	48VDC
TEST SPECIFICATIONS		Test Method	ANSI C63.26:2015
FCC 27:2019			
COMMENTS	Band 71 emission bandwidth measurements for four modulation types at Mid frequency for four channel bandwidths. Tested at highest antenna port (Port 1). EUT is operated at 100% duty cycle.		
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature	
		Value (dB)	Limit
			Result
Band 71			
QPSK Modulation			
LTE5 Bandwidth	Mid Channel, 634.5 MHz	4.867 MHz	Within Band
LTE10 Bandwidth	Mid Channel, 634.5 MHz	9.65 MHz	Within Band
LTE15 Bandwidth	Mid Channel, 634.5 MHz	14.377 MHz	Within Band
LTE20 Bandwidth	Mid Channel, 634.5 MHz	19.085 MHz	Within Band
16QAM Modulation			
LTE5 Bandwidth	Mid Channel, 634.5 MHz	4.837 MHz	Within Band
LTE10 Bandwidth	Mid Channel, 634.5 MHz	9.656 MHz	Within Band
LTE15 Bandwidth	Mid Channel, 634.5 MHz	14.329 MHz	Within Band
LTE20 Bandwidth	Mid Channel, 634.5 MHz	19.104 MHz	Within Band
64QAM Modulation			
LTE5 Bandwidth	Mid Channel, 634.5 MHz	4.859 MHz	Within Band
LTE10 Bandwidth	Mid Channel, 634.5 MHz	9.667 MHz	Within Band
LTE15 Bandwidth	Mid Channel, 634.5 MHz	14.417 MHz	Within Band
LTE20 Bandwidth	Mid Channel, 634.5 MHz	19.136 MHz	Within Band
256QAM Modulation			
LTE5 Bandwidth	Mid Channel, 634.5 MHz	4.861 MHz	Within Band
LTE10 Bandwidth	Mid Channel, 634.5 MHz	9.671 MHz	Within Band
LTE15 Bandwidth	Mid Channel, 634.5 MHz	14.408 MHz	Within Band
LTE20 Bandwidth	Mid Channel, 634.5 MHz	19.138 MHz	Within Band

OCCUPIED BANDWIDTH

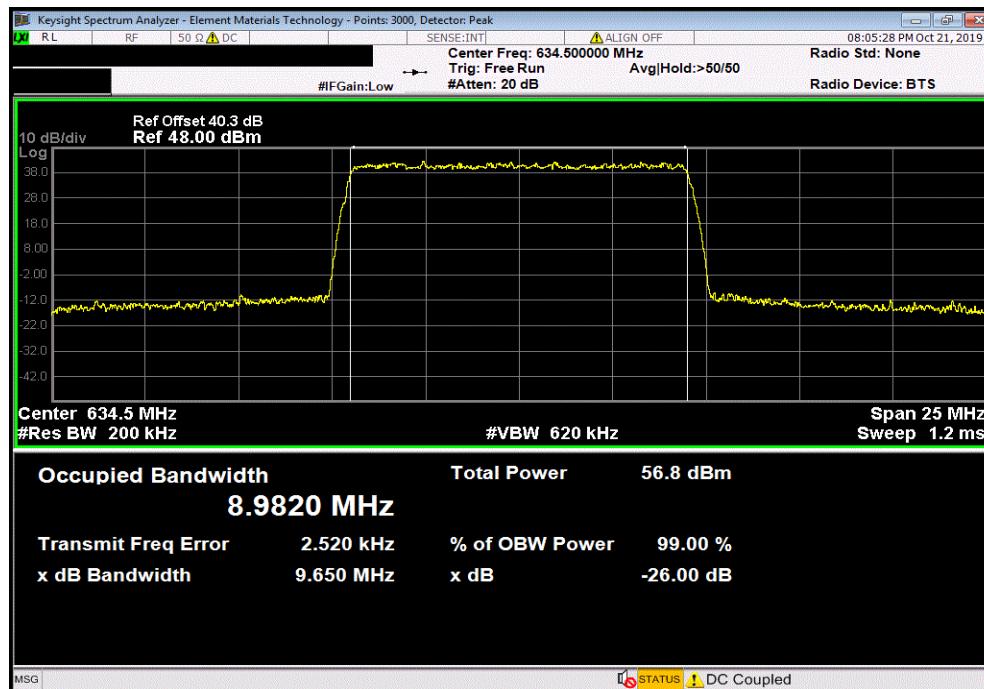


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Band 71, QPSK Modulation, LTE5 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	4.867 MHz	Within Band	Pass



Band 71, QPSK Modulation, LTE10 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	9.65 MHz	Within Band	Pass

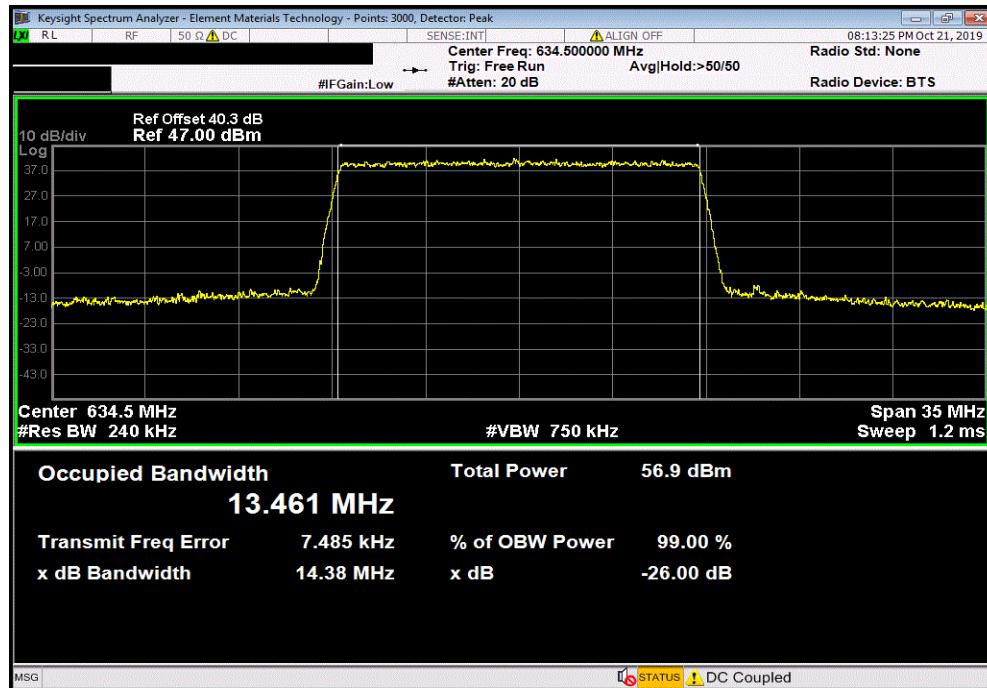


OCCUPIED BANDWIDTH

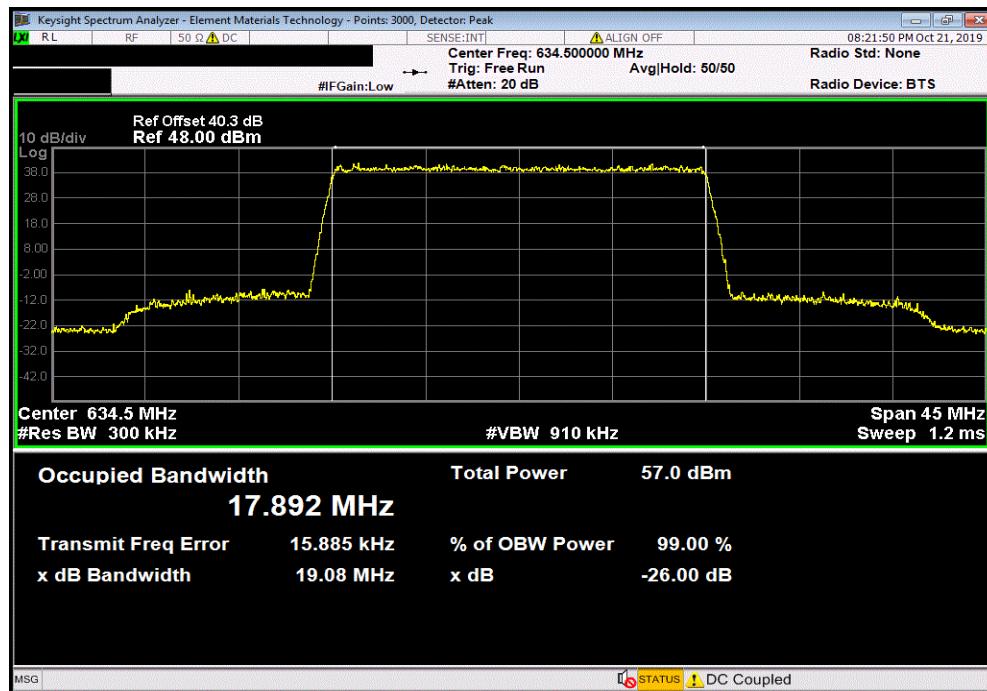


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, QPSK Modulation, LTE15 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	14.377 MHz	Within Band	Pass



Band 71, QPSK Modulation, LTE20 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	19.085 MHz	Within Band	Pass

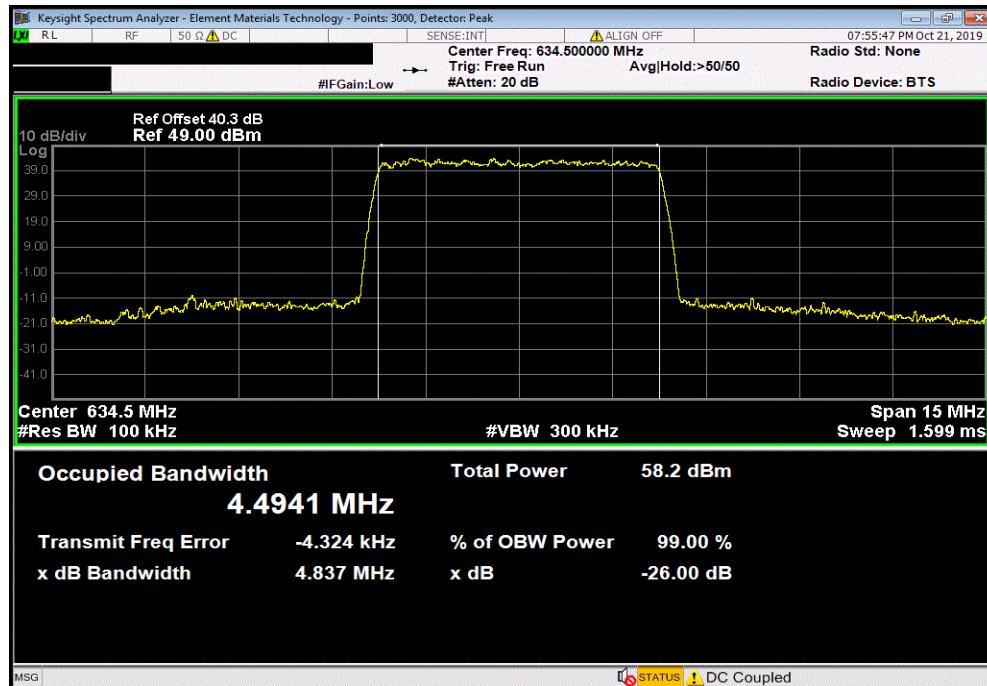


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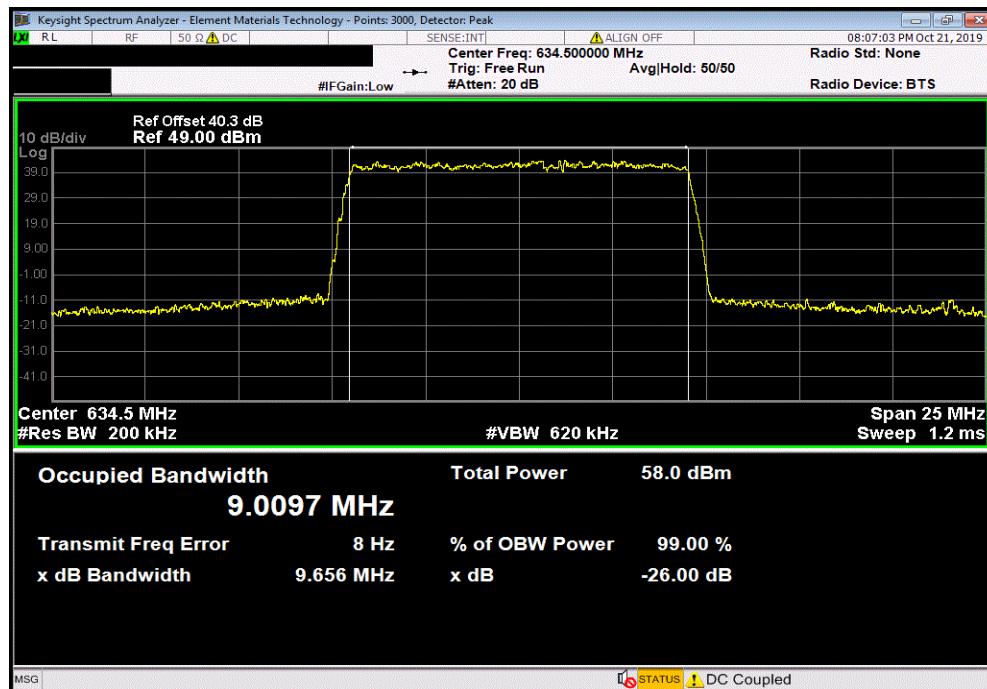


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 16QAM Modulation, LTE5 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
4.837 MHz	Within Band	Pass	



Band 71, 16QAM Modulation, LTE10 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
9.656 MHz	Within Band	Pass	

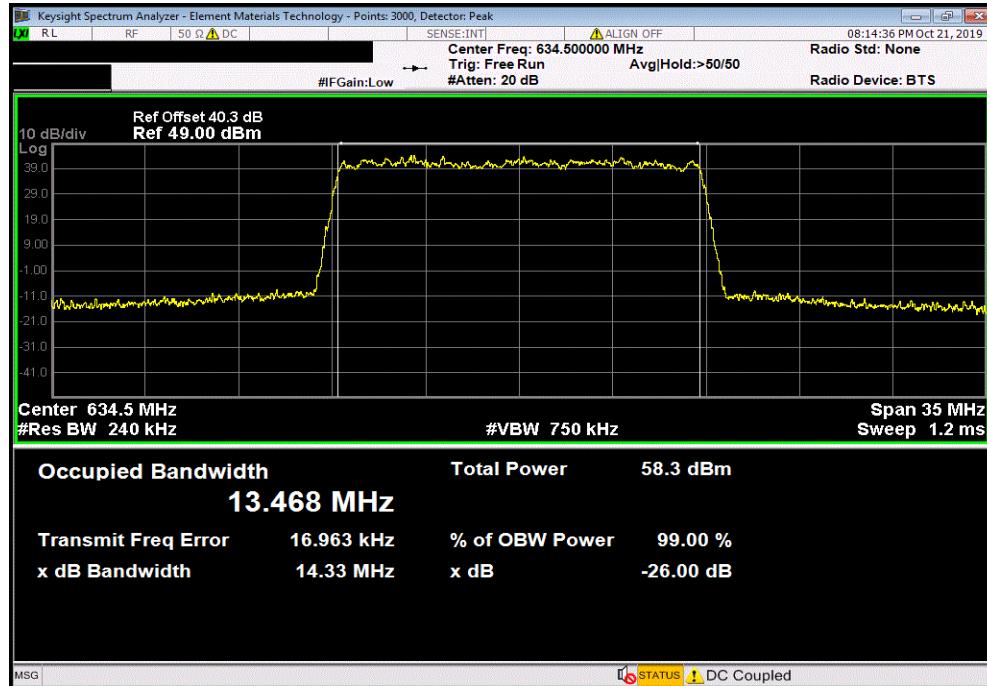


OCCUPIED BANDWIDTH

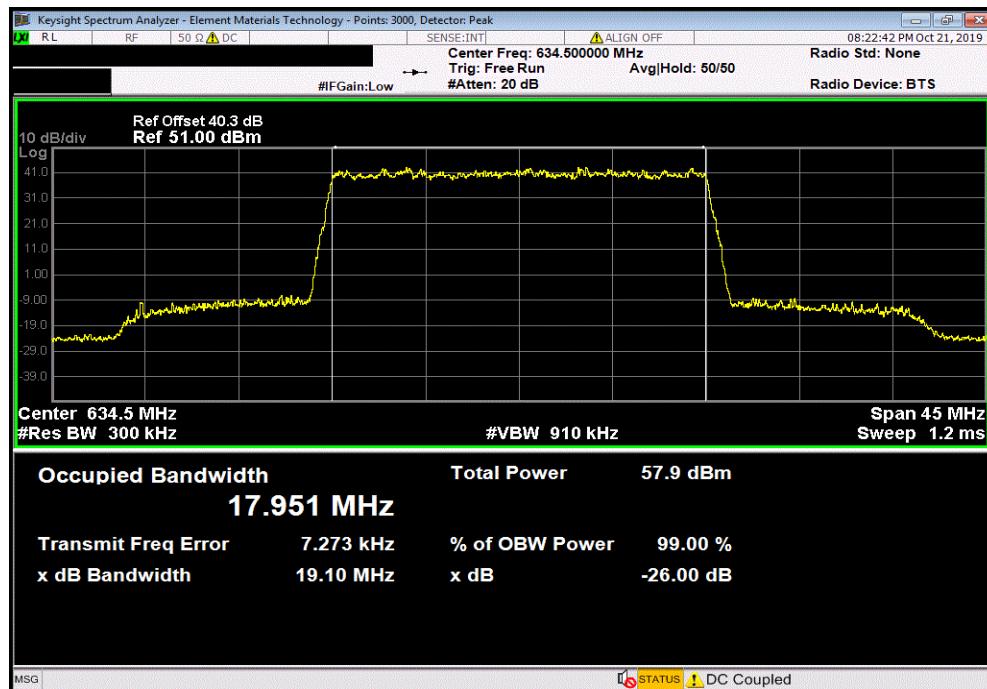


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 16QAM Modulation, LTE15 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
14.329 MHz	Within Band	Pass	



Band 71, 16QAM Modulation, LTE20 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
19.104 MHz	Within Band	Pass	

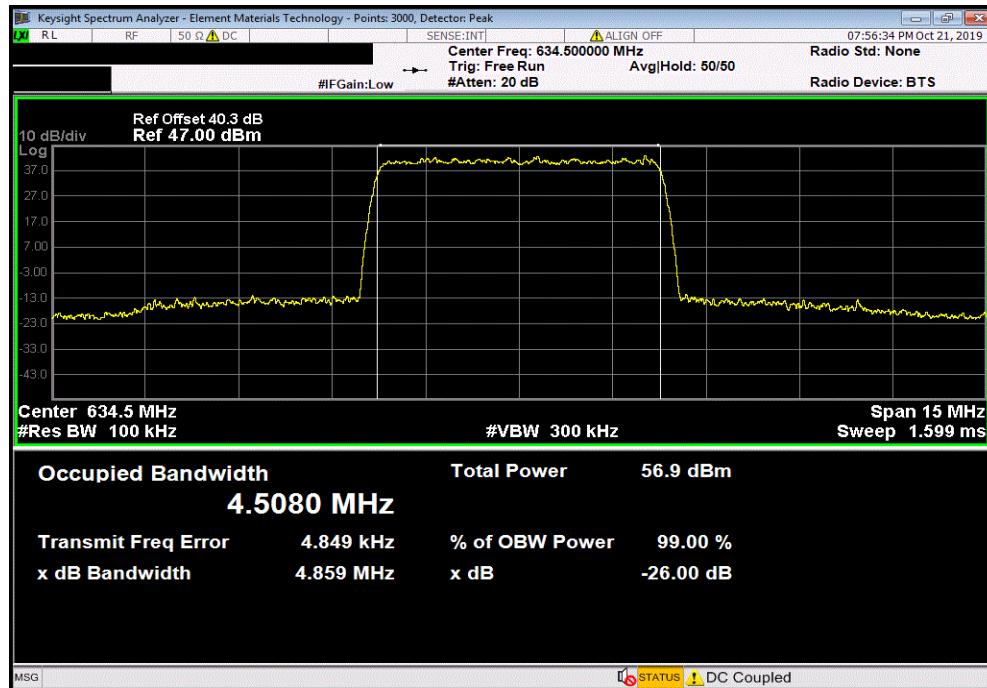


OCCUPIED BANDWIDTH

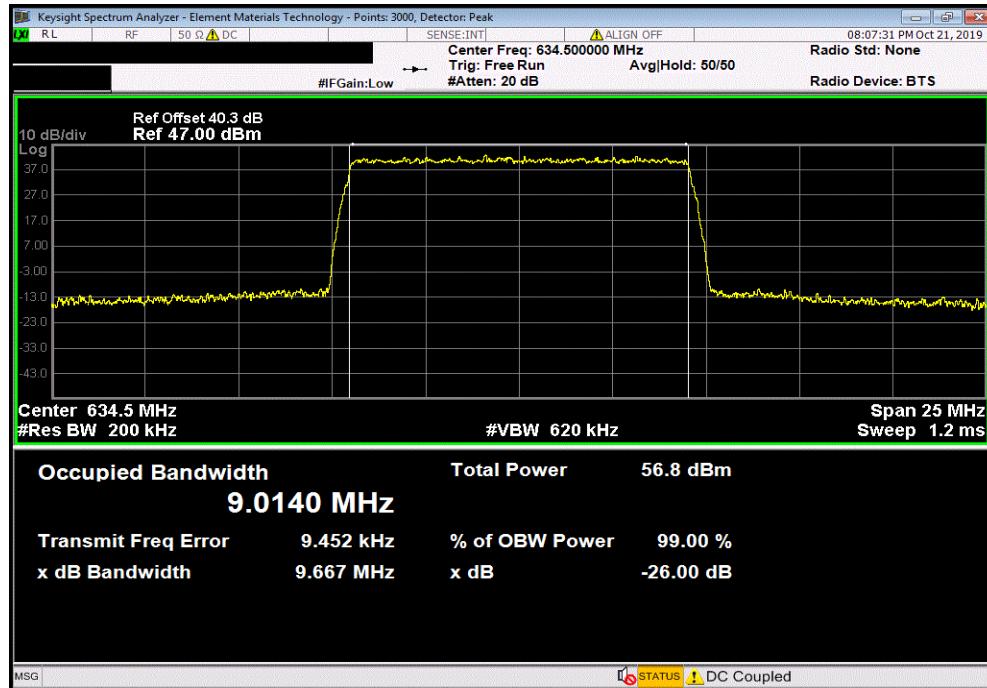


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 64QAM Modulation, LTE5 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
4.859 MHz	Within Band	Pass	



Band 71, 64QAM Modulation, LTE10 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
9.667 MHz	Within Band	Pass	

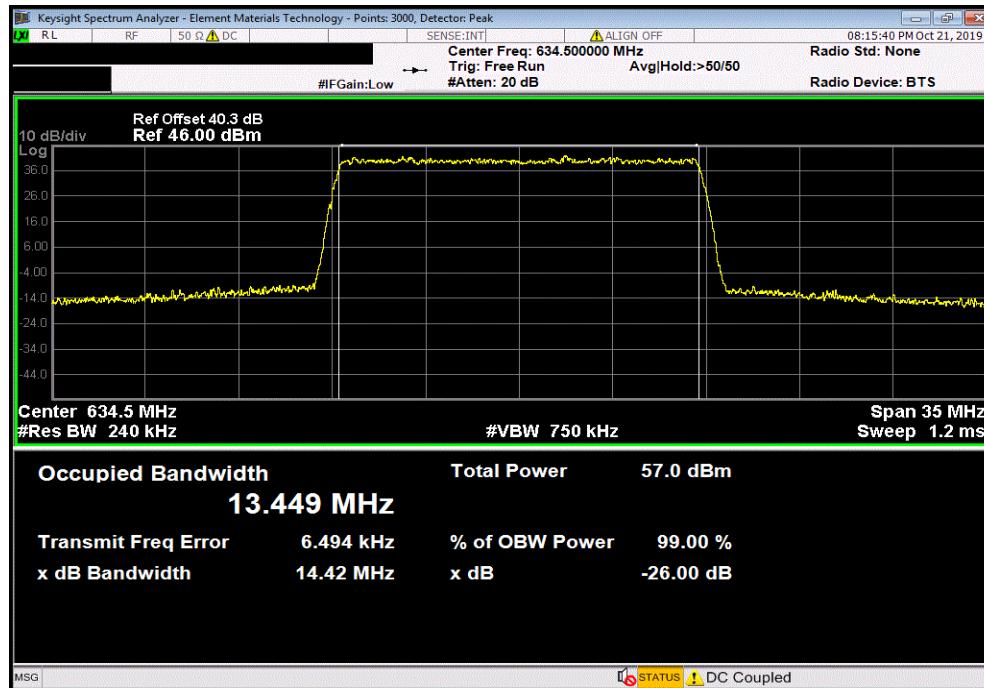


OCCUPIED BANDWIDTH

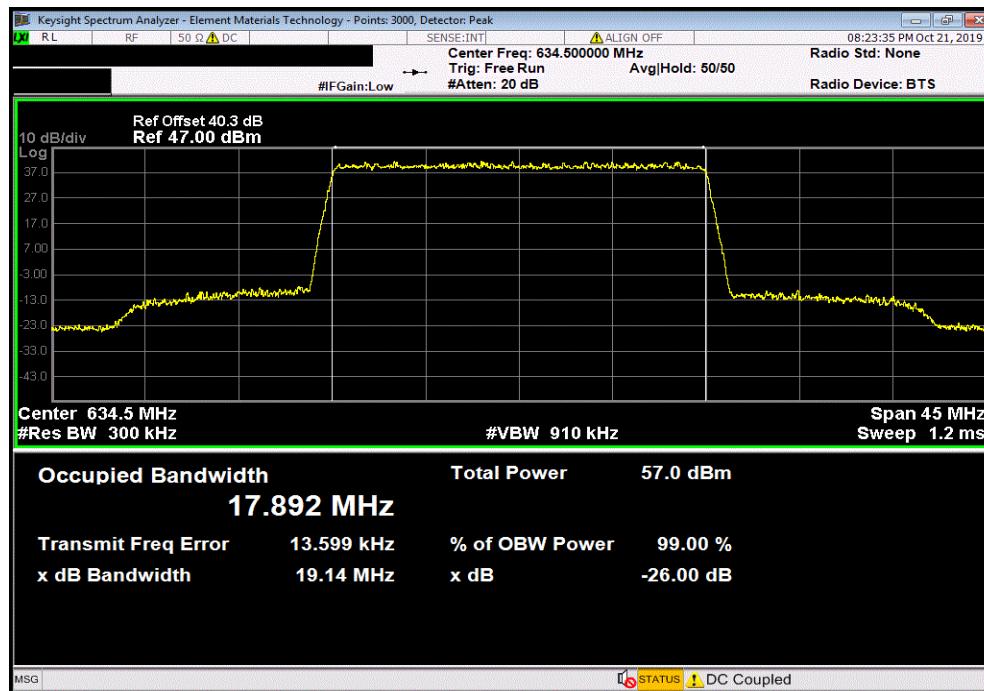


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 64QAM Modulation, LTE15 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
14.417 MHz	Within Band	Pass	



Band 71, 64QAM Modulation, LTE20 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
19.136 MHz	Within Band	Pass	

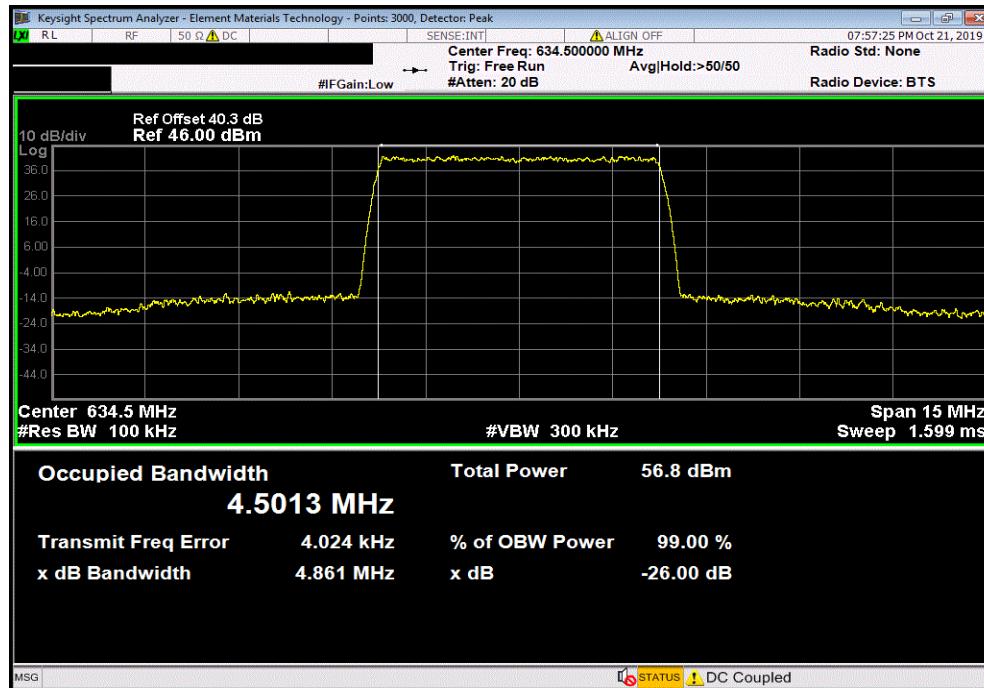


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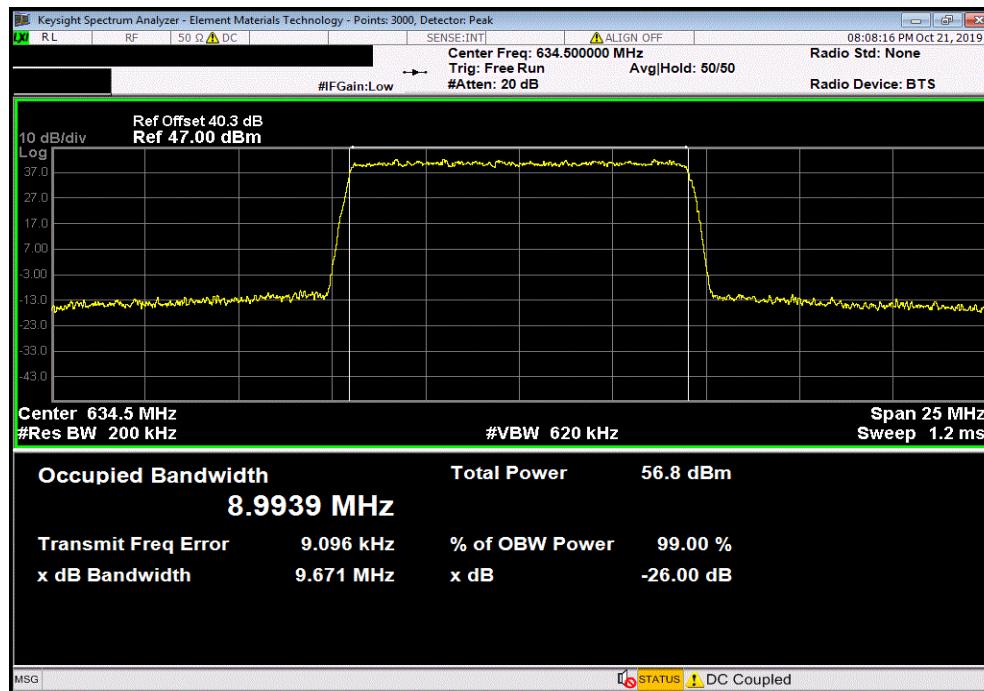


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
4.861 MHz	Within Band	Pass	



Band 71, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 634.5 MHz			
Value (dB)	Limit	Result	
9.671 MHz	Within Band	Pass	

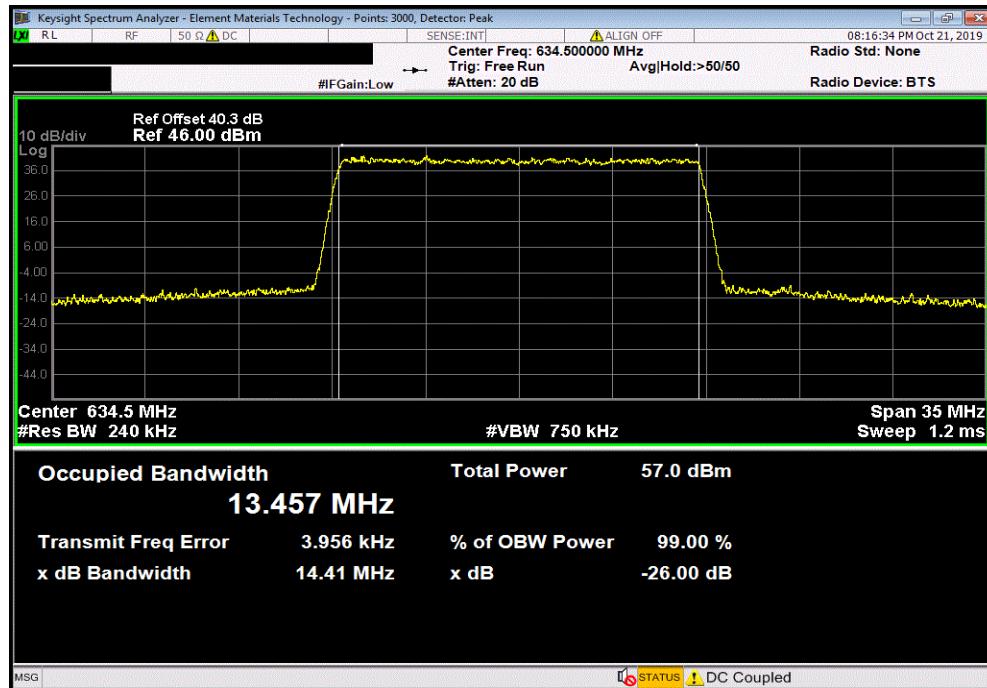


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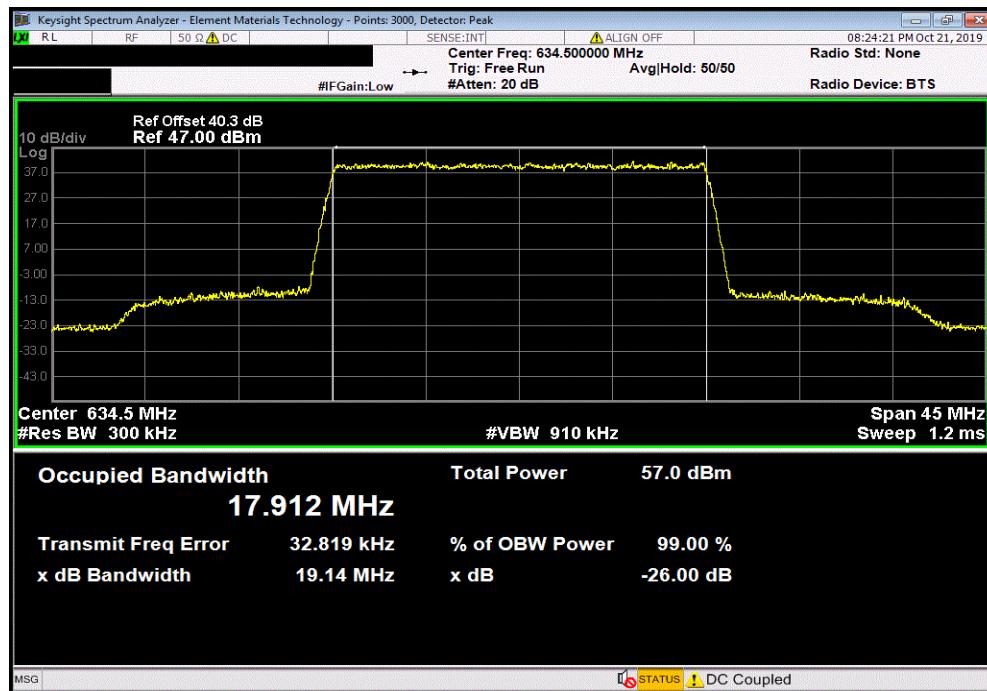


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 71, 256QAM Modulation, LTE15 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	14.408 MHz	Within Band	Pass



Band 71, 256QAM Modulation, LTE20 Bandwidth, Mid Channel, 634.5 MHz			
	Value (dB)	Limit	Result
	19.138 MHz	Within Band	Pass



OCCUPIED BANDWIDTH



XMit 2019.09.05

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The emission bandwidth was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method in section 5.4 of ANSI C63.26 was used to make the measurement.

The spectrum analyzer settings were as follows:

RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).

VBW=> RBW

A peak detector was used

Trace max hold.

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 26 dB emission bandwidth.

Band 13 Emission Designators

746MHz to 756MHz Band Emission Designators				
Channel Bandwidth	LTE-QPSK	LTE-16QAM	LTE-64QAM	LTE-256QAM
5M	4M86F9W	4M83F9W	4M87F9W	4M86F9W
10M	9M66F9W	9M67F9W	9M70F9W	9M65F9W

Note: Based on 26dB emission bandwidth

OCCUPIED BANDWIDTH



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XMI 2019.08.05

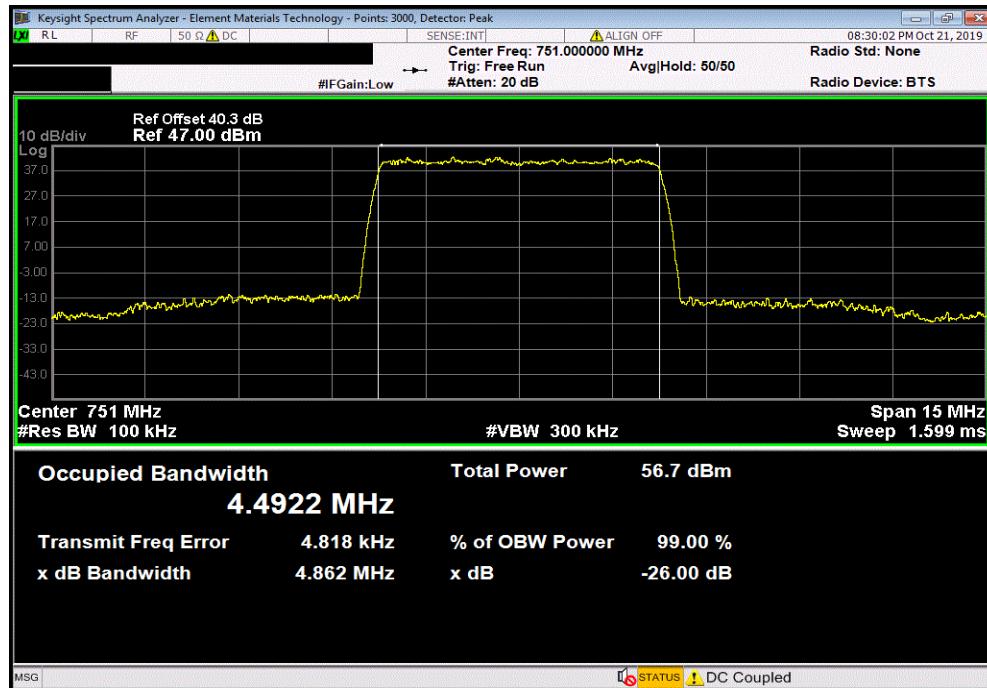
EUT:	AHBOA Remote Radio Head (RRH)	Work Order:	NOKI0003	
Serial Number:	BL1934X1001	Date:	23-Oct-19	
Customer:	Nokia Solutions and Networks	Temperature:	22.4 °C	
Attendees:	Robert Smith, John Rattanavong, Mitchell Hill	Humidity:	38.3% RH	
Project:	None	Barometric Pres.:	1020 mbar	
Tested by:	Jonathan Kiefer	Power:	48VDC	
TEST SPECIFICATIONS		Test Method	ANSI C63.26:2015	
FCC 27:2019				
COMMENTS				
Band 13 emission bandwidth measurements for four modulation types at mid channel for LTE5 and LTE10 bandwidths. Tested on highest power antenna port (Port 1). EUT is operated at 100% duty cycle.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	1	Signature		
		Value (dB)	Limit	Result
Band 13				
QPSK Modulation				
LTE5 Bandwidth	Mid Channel, 751 MHz	4.862 MHz	Within	Pass
LTE10 Bandwidth	Mid Channel, 751 MHz	9.661 MHz	Within Band	Pass
16QAM Modulation				
LTE5 Bandwidth	Mid Channel, 751 MHz	4.834 MHz	Within Band	Pass
LTE10 Bandwidth	Mid Channel, 751 MHz	9.667 MHz	Within Band	Pass
64QAM Modulation				
LTE5 Bandwidth	Mid Channel, 751 MHz	4.867 MHz	Within Band	Pass
LTE10 Bandwidth	Mid Channel, 751 MHz	9.701 MHz	Within Band	Pass
256QAM Modulation				
LTE5 Bandwidth	Mid Channel, 751 MHz	4.864 MHz	Within Band	Pass
LTE10 Bandwidth	Mid Channel, 751 MHz	9.654 MHz	Within Band	Pass

OCCUPIED BANDWIDTH

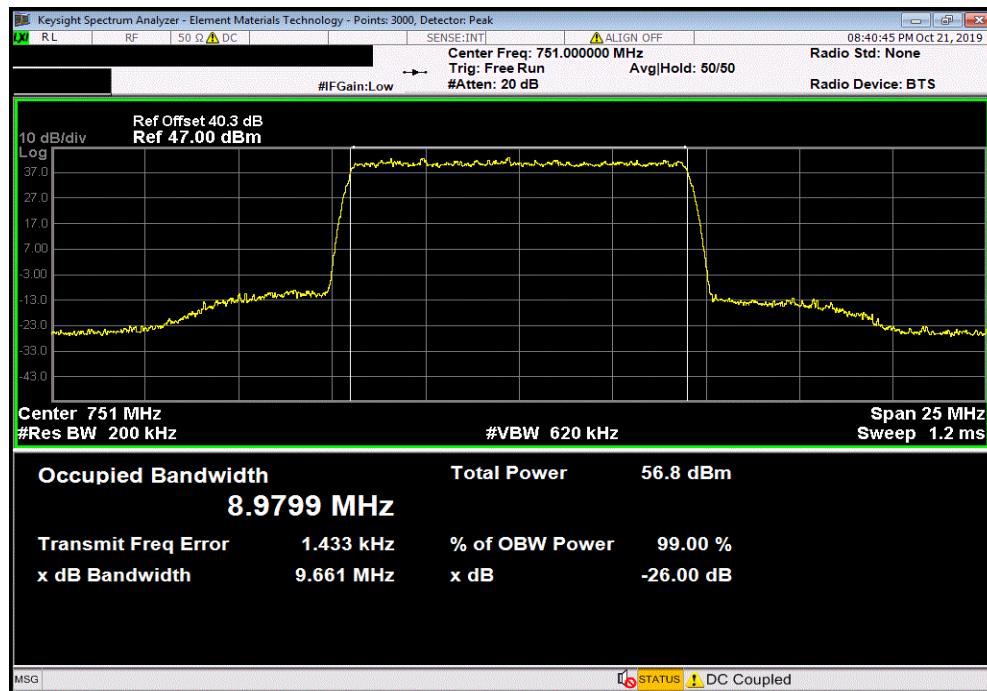


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Band 13, QPSK Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz			
Value (dB)	Limit	Result	
4.862 MHz	Within	Pass	



Band 13, QPSK Modulation, LTE10 Bandwidth, Mid Channel, 751 MHz			
Value (dB)	Limit	Result	
9.661 MHz	Within Band	Pass	

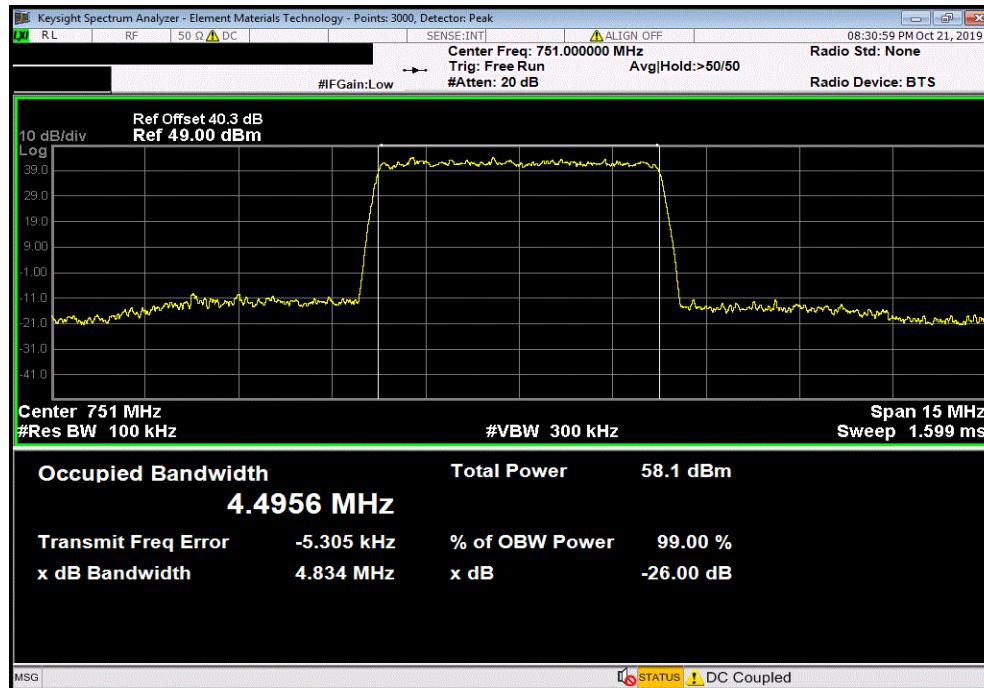


OCCUPIED BANDWIDTH

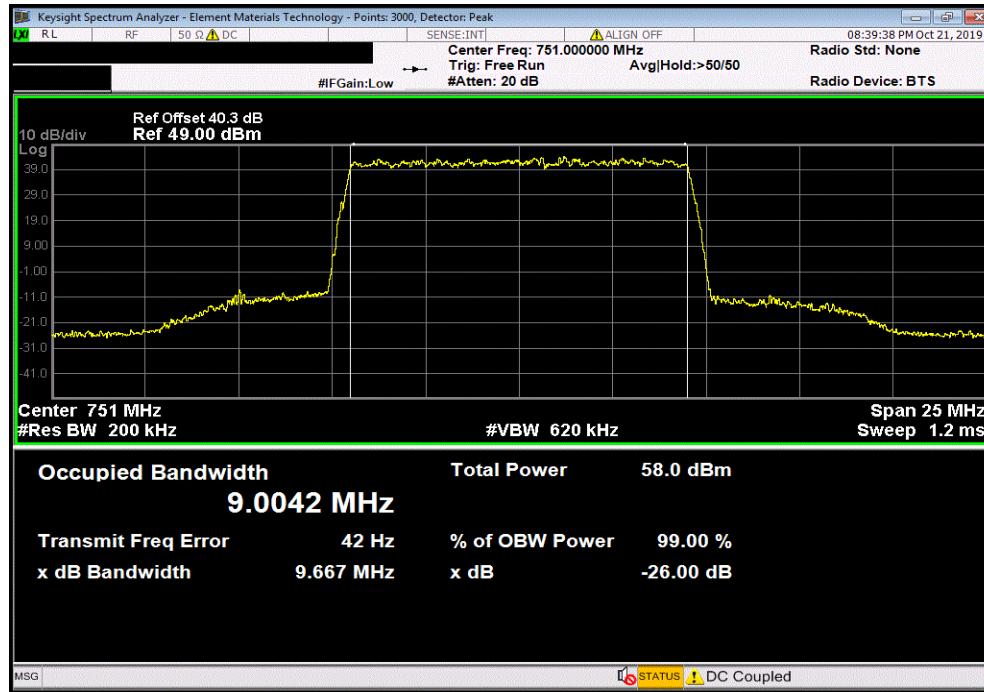


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 13, 16QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz			
	Value (dB)	Limit	Result
	4.834 MHz	Within Band	Pass



Band 13, 16QAM Modulation, LTE10 Bandwidth, Mid Channel, 751 MHz			
	Value (dB)	Limit	Result
	9.667 MHz	Within Band	Pass

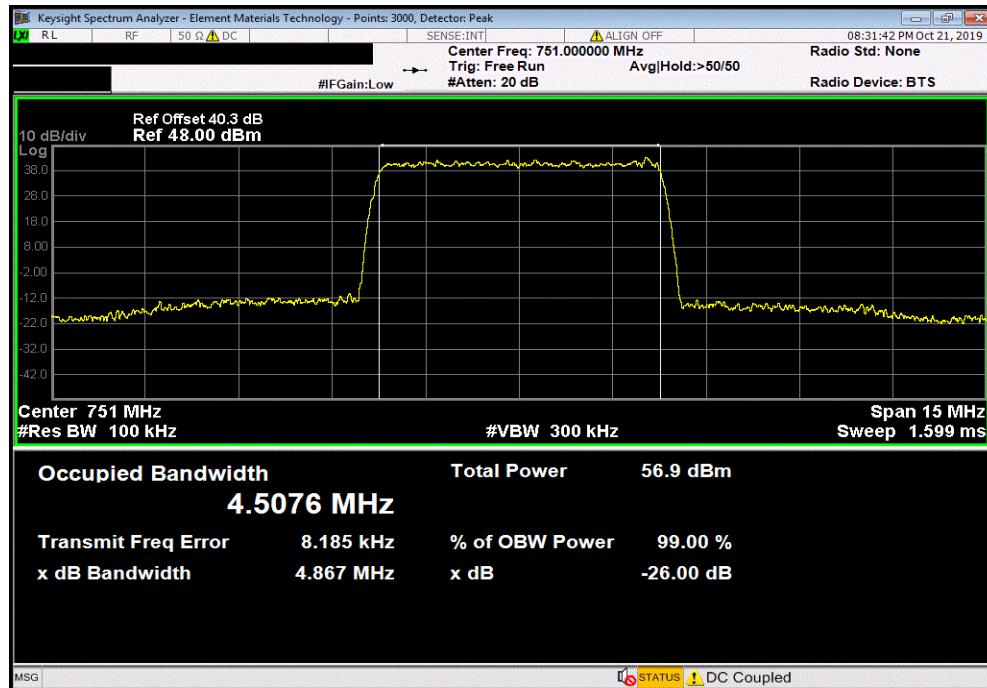


OCCUPIED BANDWIDTH

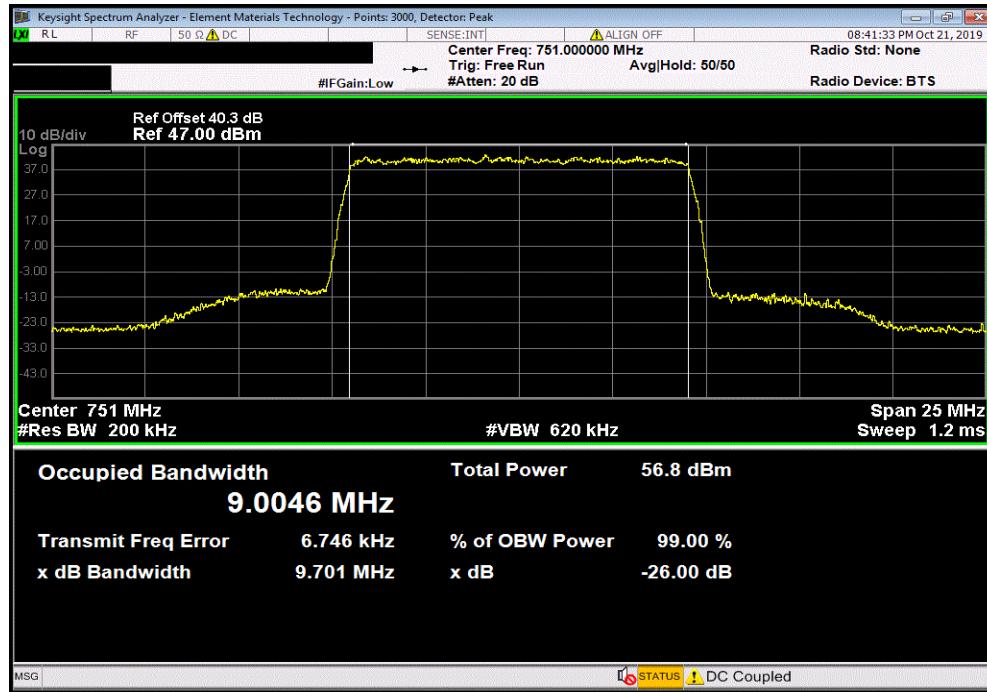


TbtTx 2019.08.30.0 XMI 2019.09.05

Band 13, 64QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz			
Value (dB)	Limit	Result	
4.867 MHz	Within Band	Pass	



Band 13, 64QAM Modulation, LTE10 Bandwidth, Mid Channel, 751 MHz			
Value (dB)	Limit	Result	
9.701 MHz	Within Band	Pass	

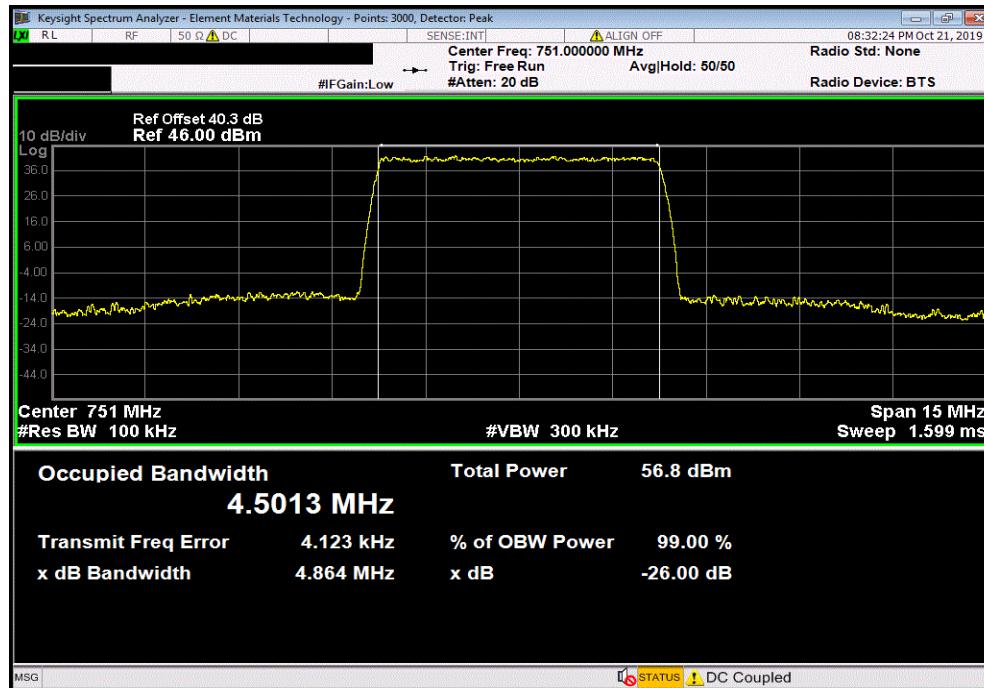


OCCUPIED BANDWIDTH



TbtTx 2019.08.30.0 XMI 2019.09.05

Band 13, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 751 MHz			
	Value (dB)	Limit	Result
	4.864 MHz	Within Band	Pass



Band 13, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 751 MHz			
	Value (dB)	Limit	Result
	9.654 MHz	Within Band	Pass

