

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 fundamental emission output power (maximum average conducted output power) 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 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Per FCC sections 27.50(c)(3) and 90.542, the Effective Radiated Power (ERP) of the transceiver cannot exceed 1000 Watts/MHz.

Report No. NOKI0004.1



EUT: AHLBBA RRH
Serial Number: K9193514835
Customer: Nokia Solutions and Networks
Attendess: John Rattanavong
Project: None
Tested by: Jonathan Kiefer
TEST SPECIFICATIONS Work Order: NOKI0004
Date: 18-Nov-19
Temperature: 22.7 °C Humidity: 29.9% RH Barometric Pres.: 1019 mbar Power: 54VDC Test Method Job Site: TX09 FCC 27:2019 ANSI C63.26:2015

COMMENTS

Band 12 Multicarrier average power measurements. Tested on highest power antenna port (Port 1). EUT is operated at 100% duty cycle. ERP depends on antenna gain, which is unknown. Only the highest dBm value is plotted per customer requirements and a Watt/MHz calculation was not made due to the unknown antenna value. Average power measurements were made for the multicarrier test cases on four modulation types (QPSK, 16QAM, 64QAM, 256QAM):

The first multicarrier test case is with three Band 12 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band edge [731.5MHz and 736.5MHz] and a third carrier with maximum spacing between the other two carrier frequencies [741.5MHz] at the Band 12 upper band edge.

EVIATIONS FRO	M TEST STANDARD						
one							
onfiguration #	2	Signature	than Kiefer				
		•	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (W ERP/MHz)	Results
nd 12							
	QPSK Modulation						
	LTE5 Bandy						
		Multicarrier Test Case 1	40.04		40.0	4000	
		Mid Channel, 736.5 MHz Multicarrier Test Case 3	48.91	0	48.9	1000	Pass
		Mid Channel, 741.5 MHz	49.03	0	49	1000	Pass
		Mid Channel, 723.0 MHz	43.57	0	43.6	1000	Pass
	16QAM Modulation	IVIId CHarmer, 723.0 WHZ	40.07	<u> </u>	43.0	1000	1 033
	LTE5 Bandy	vidth					
		Multicarrier Test Case 1					
		Mid Channel, 736.5 MHz	48.89	0	48.9	1000	Pass
		Multicarrier Test Case 3					
		Mid Channel, 741.5 MHz	49.03	0	49	1000	Pass
		Mid Channel, 723.0 MHz	43.57	0	43.6	1000	Pass
	64QAM Modulation						
	LTE5 Bandy						
		Multicarrier Test Case 1 Mid Channel, 736.5 MHz	48.92	0	48.9	1000	Pass
		Multicarrier Test Case 3	46.92	0	40.9	1000	Pass
		Mid Channel, 741.5 MHz	49.04	0	49	1000	Pass
		Mid Channel, 723.0 MHz	43.61	0	43.6	1000	Pass
	256QAM Modulation LTE5 Bandy	vidth	10.01	Ü	10.0	1000	1 400
		Multicarrier Test Case 1					
		Mid Channel, 736.5 MHz	48.92	0	48.9	1000	Pass
		Multicarrier Test Case 3					
		Mid Channel, 741.5 MHz	49.03	0	49	1000	Pass
		Mid Channel, 723.0 MHz	43.51	0	43.5	1000	Pass

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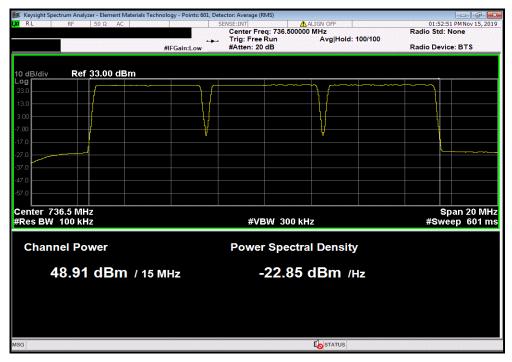


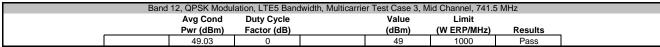
Band 12, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 736.5 MHz

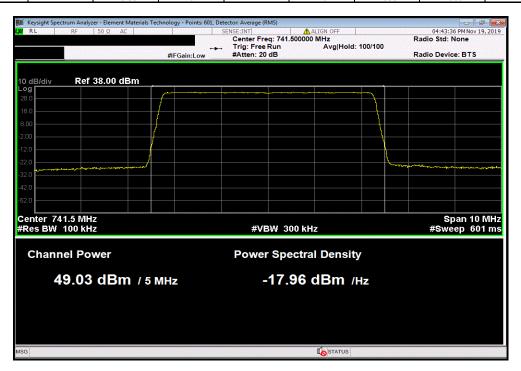
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.91 0 48.9 1000 Pass







Report No. NOKI0004.1 79/574

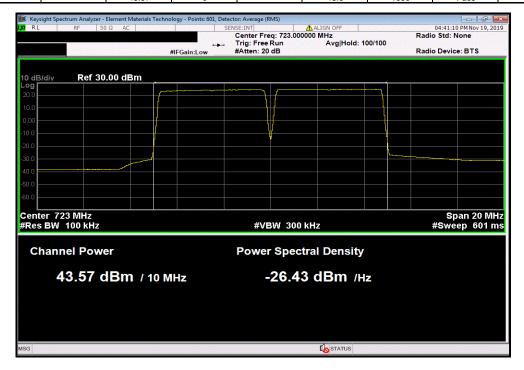


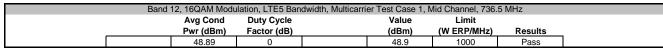
Band 29, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 723.0 MHz

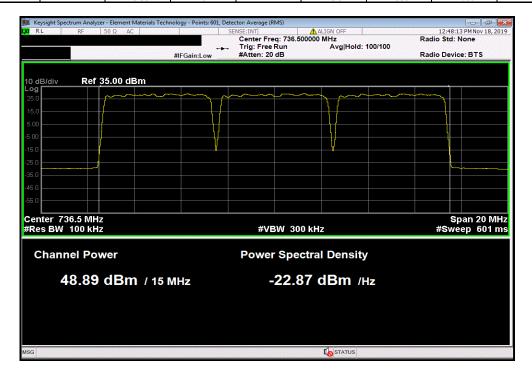
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.57 0 43.6 1000 Pass







Report No. NOKI0004.1 80/574

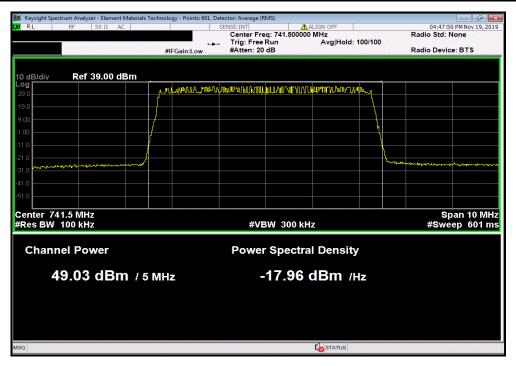


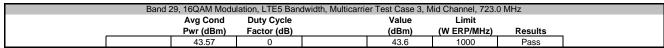
Band 12, 16QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 741.5 MHz

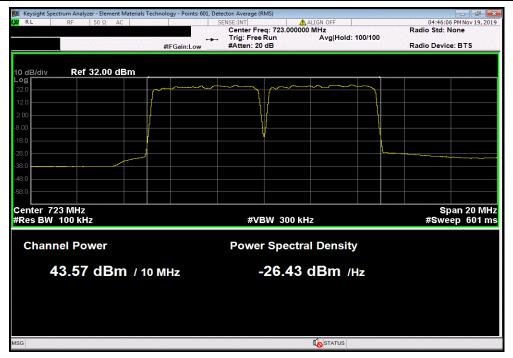
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

49.03 0 49 1000 Pass







Report No. NOKI0004.1 81/574

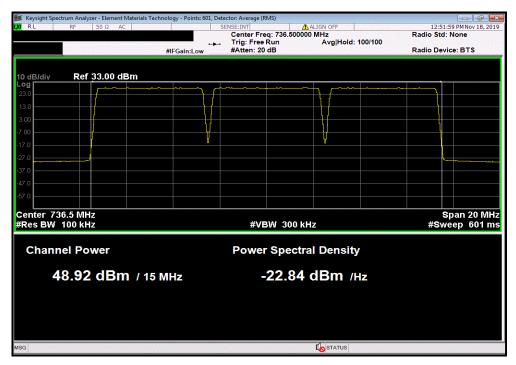


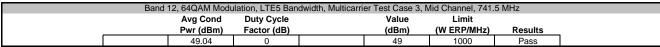
Band 12, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 736.5 MHz

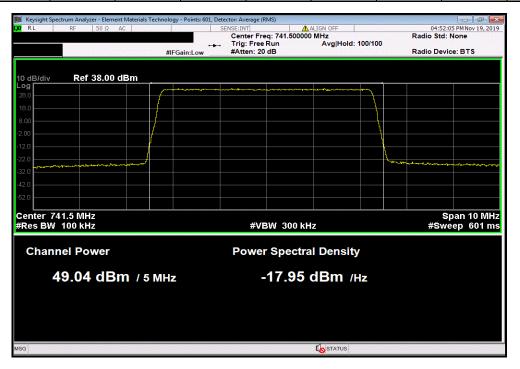
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.92 0 48.9 1000 Pass







Report No. NOKI0004.1 82/574

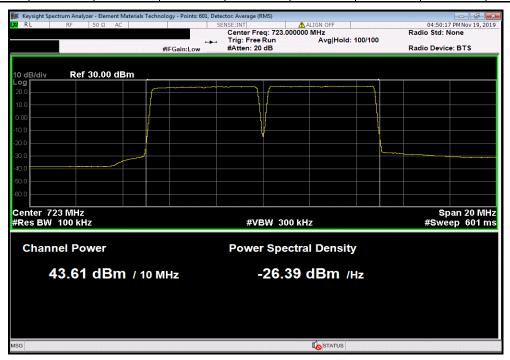


Band 29, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 723.0 MHz

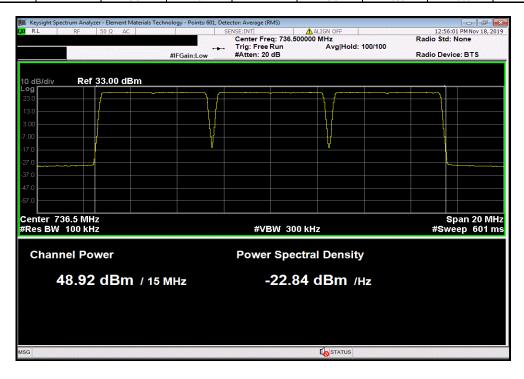
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.61 0 43.6 1000 Pass



Band 12,	, 256QAM Modu	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 1, I	Mid Channel, 736	.5 MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	48.92	0		48.9	1000	Pass



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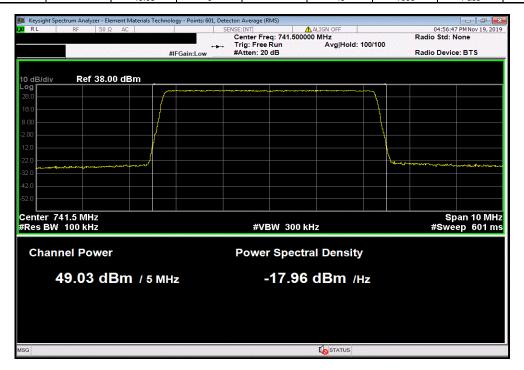


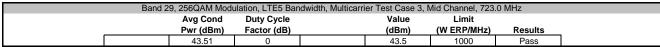
 Band 12, 256QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 741.5 MHz

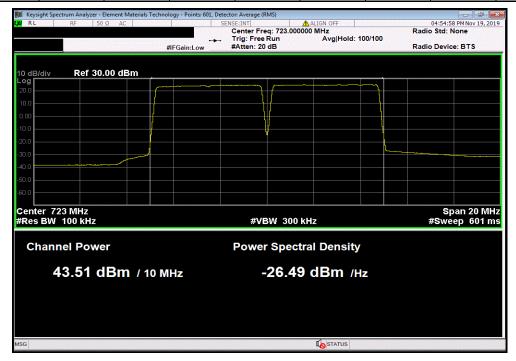
 Avg Cond
 Duty Cycle
 Value
 Limit

 Pwr (dBm)
 Factor (dB)
 (dBm)
 (W ERP/MHz)
 Results

 49.03
 0
 49
 1000
 Pass







Report No. NOKI0004.1 84/574



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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 fundamental emission output power (maximum average conducted output power) 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 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Per FCC sections 27.50(c)(3) and 90.542, the Effective Radiated Power (ERP) of the transceiver cannot exceed 1000 Watts/MHz.

Report No. NOKI0004.1



					TbtTx 2019.08.30.0	XMit 2019.09.05
EUT:	AHLBBA RRH			Work Order:	NOKI0004	
Serial Number:	K9193514835			Date:	18-Nov-19	
Customer:	Nokia Solutions and Networks			Temperature:	22.7 °C	
Attendees:	John Rattanavong			Humidity:	29.9% RH	
Project:	None			Barometric Pres.:	1019 mbar	
Tested by:	Jonathan Kiefer	Power:	54VDC	Job Site:	TX09	
TEST SPECIFICATI	ONS		Test Method			
FCC 27:2019			ANSI C63.26:2015			
FCC 90I:2019			ANSI C63.26:2015			
COMMENTS						

Band 12 Multicarrier average power measurements. Tested on highest power antenna port (Port 2). EUT is operated at 100% duty cycle. ERP depends on antenna gain, which is unknown. Only the highest dBm value is plotted per customer requirements and a Watt/MHz calculation was not made due to the unknown antenna value. Average power measurements were made for the multicarrier test cases on four modulation types (QPSK, 16QAM, 64QAM, 256QAM):

The first multicarrier test case is with three Band 12 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band edge [731.5MHz] and 736.5MHz] and a third carrier with maximum spacing between the other two carrier frequencies [741.5MHz] at the Band 12 upper band edge.

The second multicarrier test case is with three Band 12/Band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band 12 lower band 12 lower band 13 lower band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band 15 lower band 15 lower band 16 lower band 17 lower band 17 lower band 18 lower band 18 lower band 19 low

dge [731.5MHz ar	nd 736.5MHz] and a third c	arrier with maximum spacing betwee	n the other two carrier frequencies [76	55.5MHz] at the Band 14 uppe	er band edge.		
EVIATIONS FRO	M TEST STANDARD						
lone							
onfiguration #	2	Signature	Jonathan Kiefer				
			Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (W ERP/MHz)	Results
ind 12	QPSK Modulation						
	LTE5 Bandw	ridth					
		Multicarrier Test Case 1					
		Mid Channel, 736.5 MHz	48.94	0	48.9	1000	Pass
		Multicarrier Test Case 2					
		Mid Chanel, 734.0 MHz	47.08	0	47.1	1000	Pass
		Mid Channel, 765.5 MHz	43.58	0	43.6	1000	Pass
	16QAM Modulation LTE5 Bandw	Multicarrier Test Case 1					
		Mid Channel, 736.5 MHz	48.93	0	48.9	1000	Pass
		Multicarrier Test Case 2					
		Mid Chanel, 734.0 MHz	47.22	0	47.2	1000	Pass
	0.404.44.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.	Mid Channel, 765.5 MHz	43.6	0	43.6	1000	Pass
	64QAM Modulation LTE5 Bandw						
		Multicarrier Test Case 1					_
		Mid Channel, 736.5 MHz	48.93	0	48.9	1000	Pass
		Multicarrier Test Case 2 Mid Chanel, 734.0 MHz	47.09	0	47.1	1000	Pass
		Mid Channel, 734.0 MHz	43.6	0	43.6	1000	Pass
	256QAM Modulation LTE5 Bandw		43.0	0	43.0	1000	Pass
		Mid Channel, 736.5 MHz	48.91	0	48.9	1000	Pass
		Multicarrier Test Case 2	40.51		40.5	1000	1 833
		Mid Chanel, 734.0 MHz	47.2	0	47.2	1000	Pass
							Pass
		Mid Channel, 765.5 MHz	43.58	0	43.6	1000	

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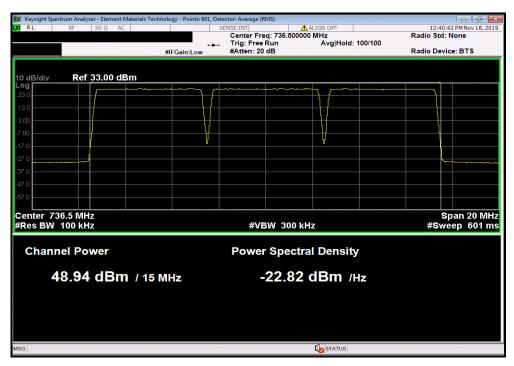


Band 12, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 736.5 MHz

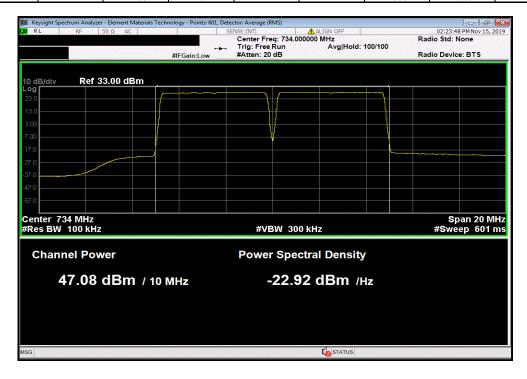
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.94 0 48.9 1000 Pass



Band	d 12, QPSK Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, N	lid Chanel, 734.0	MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	47.08	0		47.1	1000	Pass



Report No. NOKI0004.1 87/574



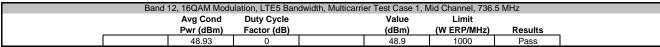
Band 14, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 765.5 MHz

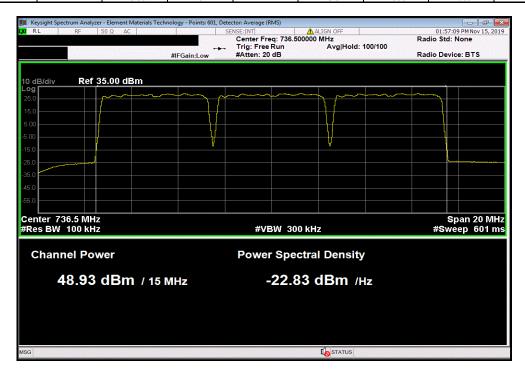
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.58 0 43.6 1000 Pass







Report No. NOKI0004.1 88/574

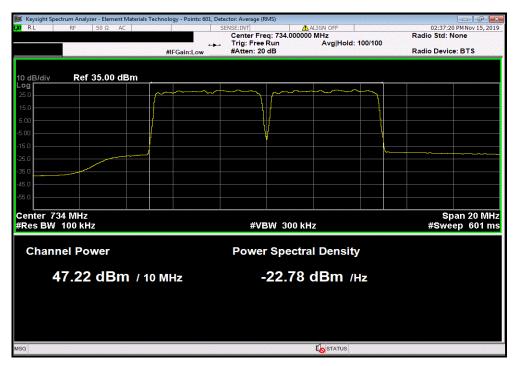


Band 12, 16QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Chanel, 734.0 MHz

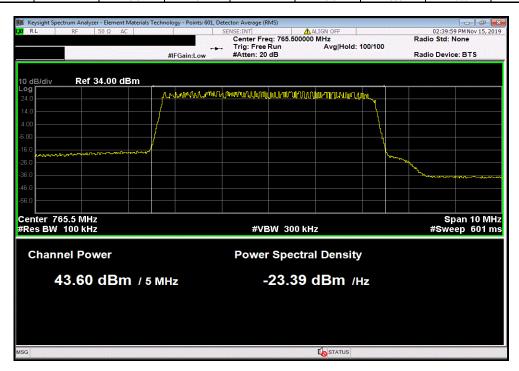
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

47.22 0 47.2 1000 Pass



	Band '	14, 16QAM Modu	lation, LTE5 Band	dwidth, Multicarrie	er Test Case 2, M	lid Channel, 765.	5 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
		43.6	0		43.6	1000	Pass



Report No. NOKI0004.1 89/574

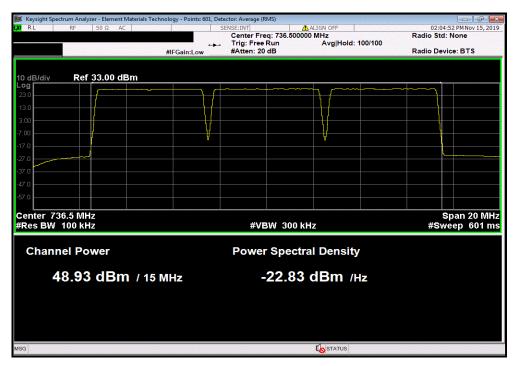


Band 12, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 736.5 MHz

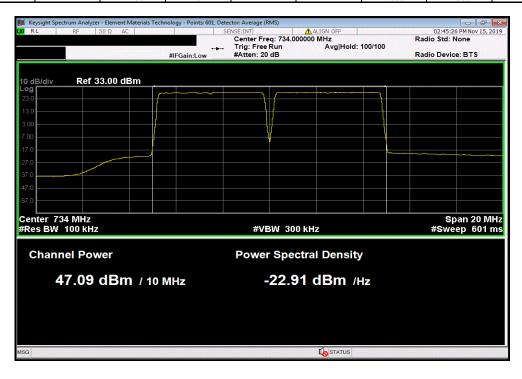
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.93 0 48.9 1000 Pass



	Band	12, 64QAM Modi	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 2,	Mid Chanel, 734.0) MHz
		Avg Cond	Duty Cycle		Value	Limit	
		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
1		47.09	0		47.1	1000	Pass



Report No. NOKI0004.1 90/574

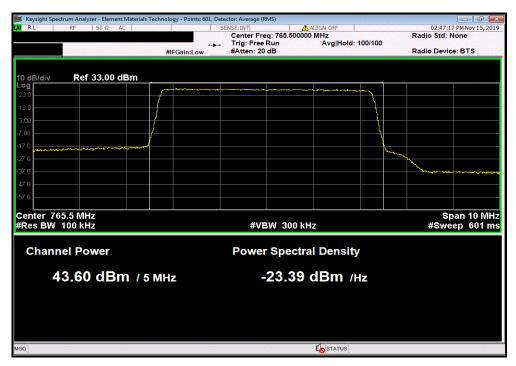


Band 14, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 765.5 MHz

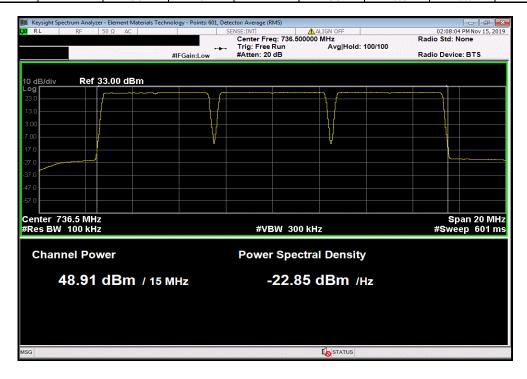
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.6 0 43.6 1000 Pass



	Band 1	2, 256QAM Modi	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 1,	Mid Channel, 736	.5 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
l		48.91	0		48.9	1000	Pass



Report No. NOKI0004.1 91/574

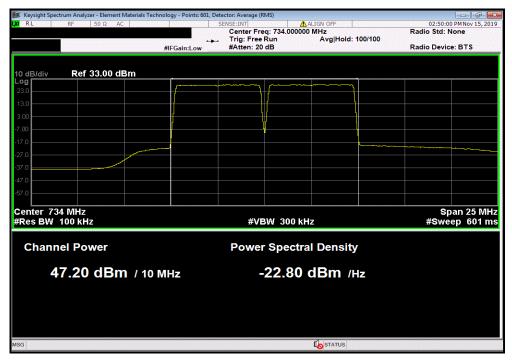


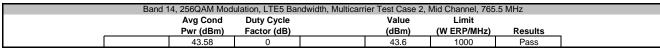
Band 12, 256QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Chanel, 734.0 MHz

Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

47.2 0 47.2 1000 Pass







Report No. NOKI0004.1 92/574



XMit 2019.09.05

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Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

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Per FCC sections 27.50(c)(3) and 90.542, the Effective Radiated Power (ERP) of the transceiver cannot exceed 1000 Watts/MHz.

Report No. NOKI0004.1



EUT: AHLBBA RRH
Serial Number: K9193514835
Customer: Nokia Solutions and Networks
Attendees: John Rattanavong
Project: None
Tested by: Jonathan Kiefer
TEST SPECIFICATIONS Work Order: NOKI0004
Date: 19-Nov-19
Temperature: 24 °C Humidity: 31.9% RH
Barometric Pres.: 1015 mbar Power: 54VDC Test Method Job Site: TX09 FCC 27:2019 FCC 901:2019 COMMENTS

Band 14 Multicarrier average power measurements. Tested on highest power antenna port (Port 1). EUT is operated at 100% duty cycle. ERP depends on antenna gain, which is unknown. Only the highest dBm value is plotted per customer requirements and a Watt/MHz calculation was not made due to the unknown antenna value. Average power measurements were made for the multicarrier test cases on four

The first multicarrier test case is with two Band 14 LTE5 carriers at the lower and upper band edge channels [760.5MHz and 765.5MHz]. Two carriers cover the entire Band 14 channel bandwidth so three carrier operation is not available.

The second multicarrier test case is with three Band 12/Band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band

VIATIONS FRO	M TEST STANDARD						
ne							
nfiguration #	2	Signature	Jonathan Kiefer				
		- Symmer	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (W ERP/MHz)	Results
114							
	QPSK Modulation						
	LTE5 Band	Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.848	0	48.8	1000	Pass
		Multicarrier Test Case 2	40.040		40.0	1000	Pass
		Mid Channel, 734.0 MHz	47.305	0	47.3	1000	Pass
		Mid Channel, 765.5 MHz	43.57	0	43.6	1000	Pass
		Multicarrier Test Case 3	40.07		70.0	1000	1 033
		Mid Channel, 765.5 MHz	48.45	0	48.45	1000	Pass
		Mid Channel, 723.0 MHz	43.81	Ō	43.81	1000	Pass
	16QAM Modulation						
	LTE5 Band	width					
		Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.84	0	48.8	1000	Pass
		Multicarrier Test Case 2					
		Mid Channel, 734.0 MHz	47.29	0	47.3	1000	Pass
		Mid Channel, 765.5 MHz	43.57	0	43.6	1000	Pass
		Multicarrier Test Case 3	40.44			4000	
		Mid Channel, 765.5 MHz	48.44 43.7	0 0	48.44 43.7	1000	Pass
	64QAM Modulation	Mid Channel, 723.0 MHz	43.7	0	43.7	1000	Pass
	LTE5 Band	lwidth					
	LTE3 Ballu	Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.85	0	48.8	1000	Pass
		Multicarrier Test Case 2	40.00		40.0	1000	1 433
		Mid Channel, 734.0 MHz	47.31	0	47.3	1000	Pass
		Mid Channel, 765.5 MHz	43.58	0	43.6	1000	Pass
		Multicarrier Test Case 3	.5.00				. 200
		Mid Channel, 765.5 MHz	48.44	0	48.44	1000	Pass
		Mid Channel, 723.0 MHz	43.69	0	43.69	1000	Pass
	256QAM Modulation						
	LTE5 Band						
		Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.82	0	48.8	1000	Pass
		Multicarrier Test Case 2	47		47.0	4000	
		Mid Channel, 734.0 MHz	47.33	0	47.3	1000	Pass
		Mid Channel, 765.5 MHz	43.59	0	43.6	1000	Pass
		Multicarrier Test Case 3	40.40	•	40.40	1000	D
		Mid Channel, 765.5 MHz	48.43	0 0	48.43	1000	Pass Pass
		Mid Channel, 723.0 MHz	43.76	U	43.76	1000	Pass

Report No. NOKI0004.1 94/574

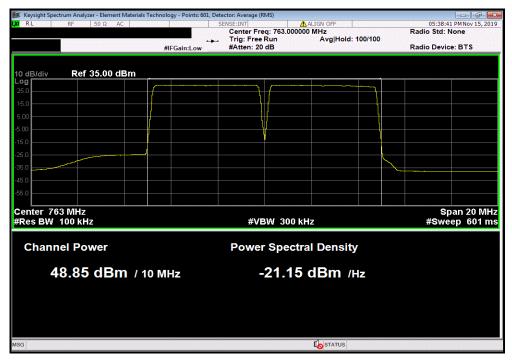


Band 14, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 763.0 MHz

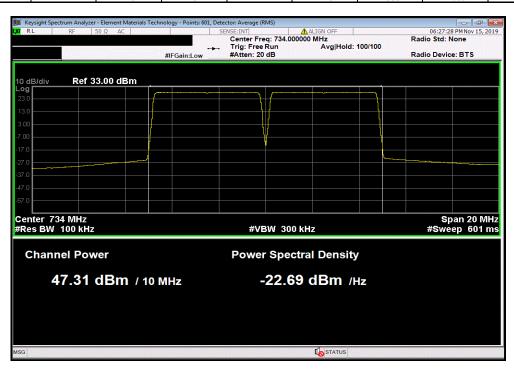
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.85 0 48.8 1000 Pass



Band	12, QPSK Modula	ation, LTE5 Band	width, Multicarrie	r Test Case 2, M	id Channel, 734.0) MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
<u> </u>	47.31	0		47.3	1000	Pass



Report No. NOKI0004.1 95/574

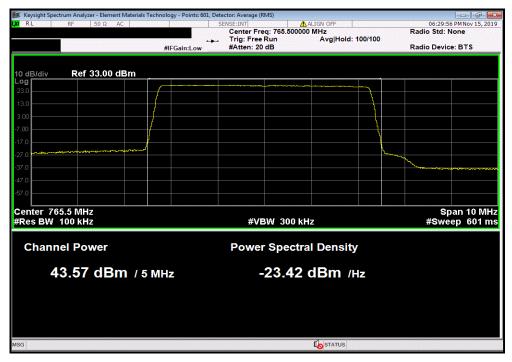


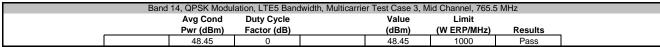
Band 14, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 765.5 MHz

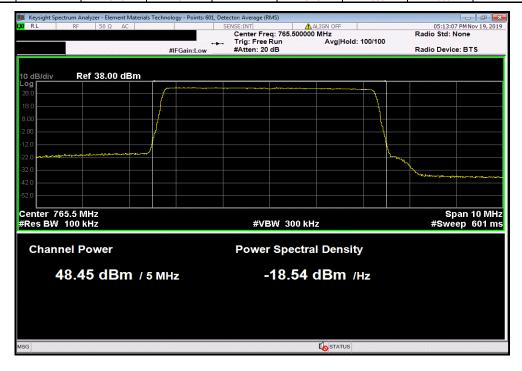
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.57 0 43.6 1000 Pass







Report No. NOKI0004.1 96/574

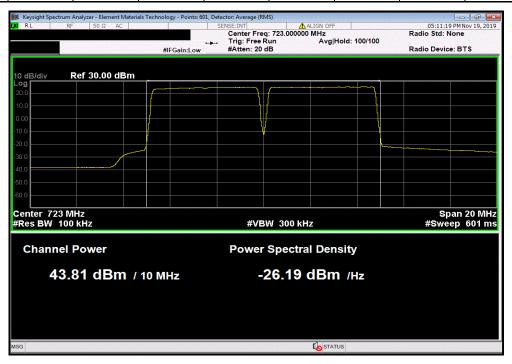


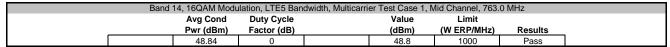
Band 29, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 723.0 MHz

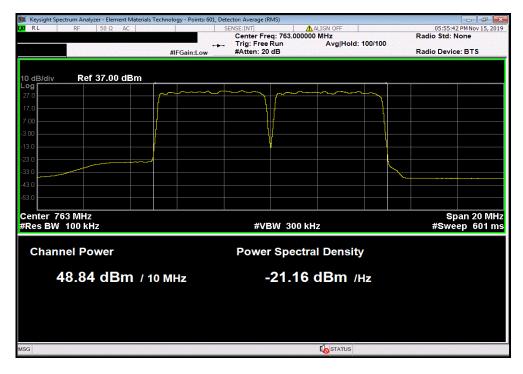
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.81 0 43.81 1000 Pass







Report No. NOKI0004.1 97/574

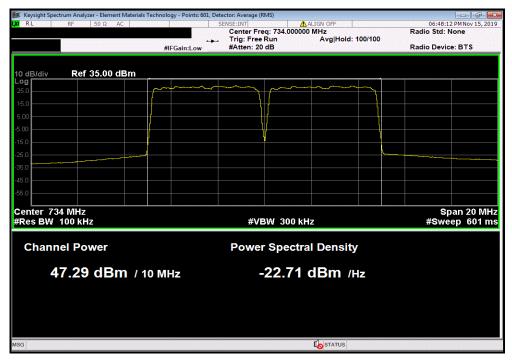


Band 12, 16QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 734.0 MHz

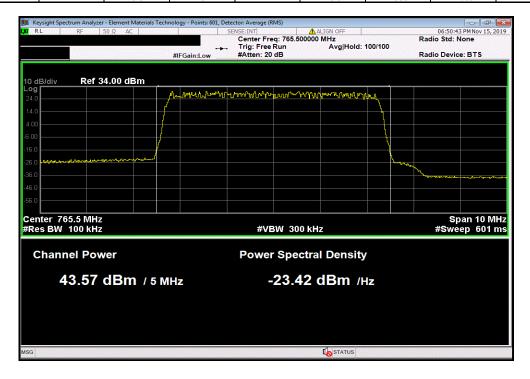
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

47.29 0 47.3 1000 Pass



	Band '	14, 16QAM Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, N	lid Channel, 765.	5 MHz
		Avg Cond	Duty Cycle		Value	Limit	
		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
1		43.57	0		43.6	1000	Pass



Report No. NOKI0004.1 98/574

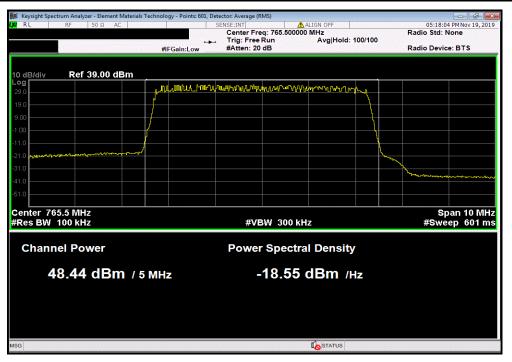


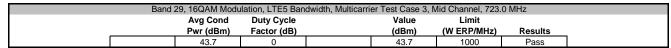
Band 14, 16QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 765.5 MHz

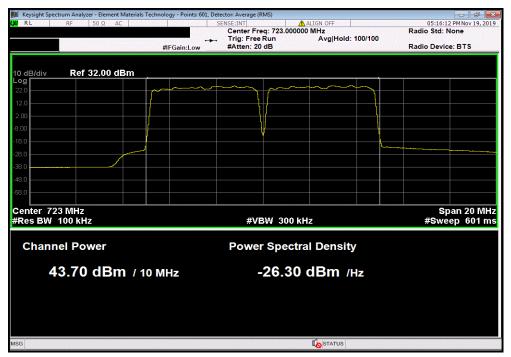
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.44 0 48.44 1000 Pass

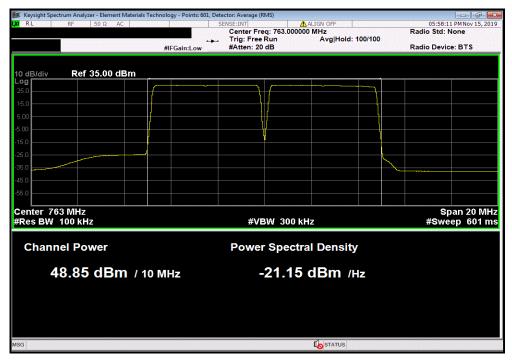




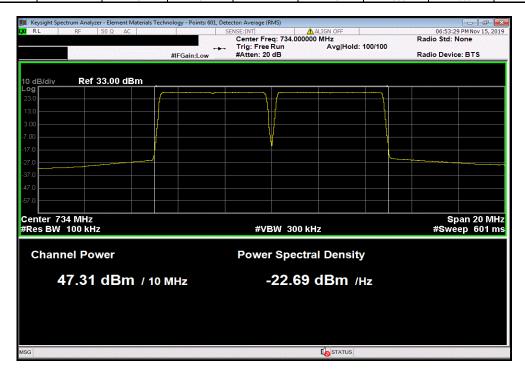


Report No. NOKI0004.1 99/574





	Band	12, 64QAM Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, N	/lid Channel, 734.	0 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
ĺ		47.31	0		47.3	1000	Pass



Report No. NOKI0004.1 100/574

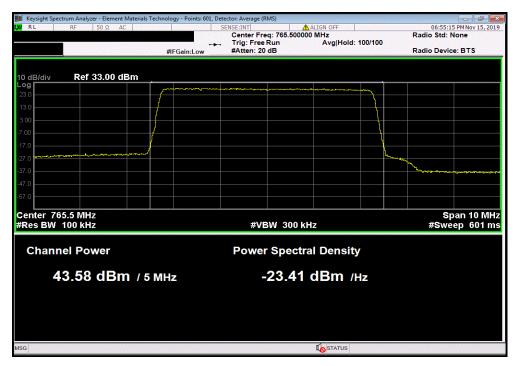


Band 14, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 765.5 MHz

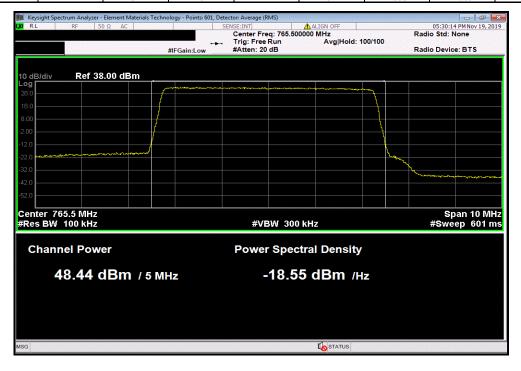
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.58 0 43.6 1000 Pass



	Band	14, 64QAM Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 3, N	/lid Channel, 765.	5 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
l		48.44	0		48.44	1000	Pass



Report No. NOKI0004.1 101/574

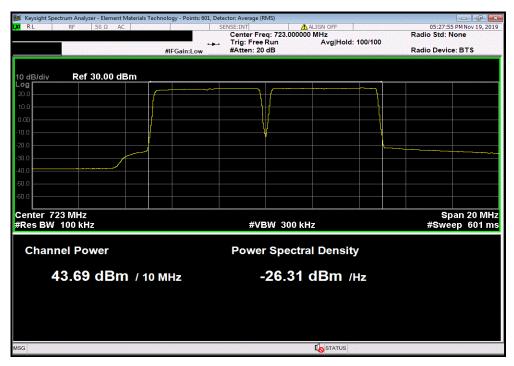


Band 29, 64QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 723.0 MHz

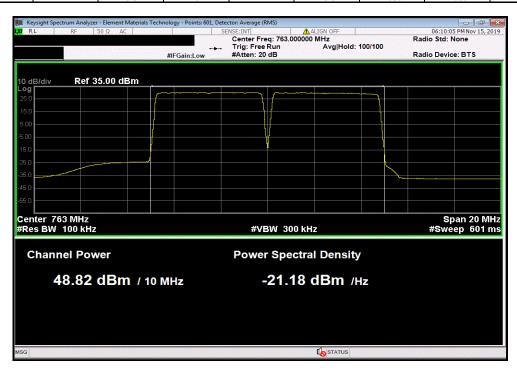
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.69 0 43.69 1000 Pass

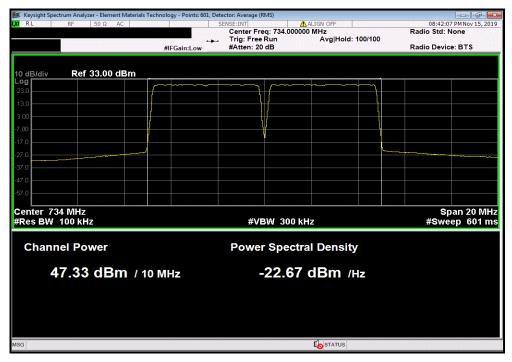


	Band 1	4, 256QAM Modi	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 1,	Mid Channel, 763	.0 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
l [48.82	0		48.8	1000	Pass

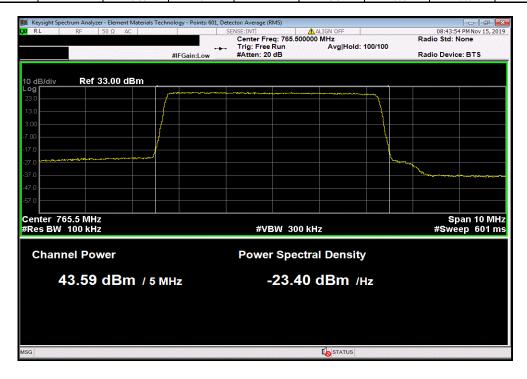


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Band 1	14, 256QAM Mod	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 2, I	Mid Channel, 765	.5 MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	43.59	0		43.6	1000	Pass



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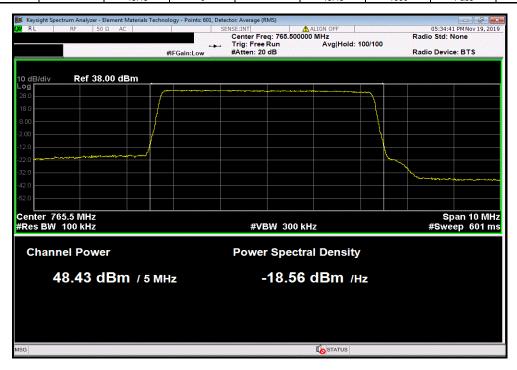


Band 14, 256QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 3, Mid Channel, 765.5 MHz

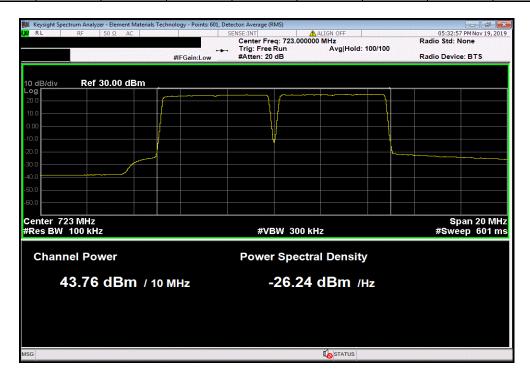
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.43 0 48.43 1000 Pass



Band 2	9, 256QAM Modu	ılation, LTE5 Ban	dwidth, Multicarri	er Test Case 3, I	Mid Channel, 723.	.0 MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	43.76	0		43.76	1000	Pass



Report No. NOKI0004.1 104/574



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 fundamental emission output power (maximum average conducted output power) 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 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Per FCC sections 27.50(c)(3) and 90.542, the Effective Radiated Power (ERP) of the transceiver cannot exceed 1000 Watts/MHz.

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Band 14 Multicarrier average power measurements. Tested on highest power antenna port (Port 2). EUT is operated at 100% duty cycle. ERP depends on antenna gain, which is unknown. Only the highest dBm value is plotted per customer requirements and a Watt/MHz calculation was not made due to the unknown antenna value. Average power measurements were made for the multicarrier test cases on four modulation types (QPSK, 16QAM, 64QAM, 256QAM):

The first multicarrier test case is with two Band 14 LTE5 carriers at the lower and upper band edge channels [760.5MHz and 765.5MHz]. Two carriers cover the entire Band 14 channel bandwidth so three carrier operation is not available.

The second multicarrier test case is with three Band 12/Band 14 LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the Band 12 lower band edge [731.5MHz] and 736.5MHz] and a third carrier with maximum spacing between the other two carrier frequencies [765.5MHz] at the Band 14 upper band edge.

EVIATIONS FRO	M TEST STANDARD						
one							
onfiguration #	2	Signature	Jonathan Kiefer				
			Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (W ERP/MHz)	Results
and 14			· · · · · ·				
	QPSK Modulation						
	LTE5 Bandwi						
		Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.94	0	48.9	1000	Pass
		Multicarrier Test Case 2					
		Mid Channel, 734.0 MHz	47.06	0	47.1	1000	Pass
		Mid Channel, 765.5 MHz	43.59	0	43.6	1000	Pass
	16QAM Modulation LTE5 Bandwi	idth Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.86	0	48.9	1000	Pass
		Multicarrier Test Case 2					
		Mid Channel, 734.0 MHz	47.07	0	47.1	1000	Pass
		Mid Channel, 765.5 MHz	43.59	0	43.6	1000	Pass
	64QAM Modulation LTE5 Bandwi	idth Multicarrier Test Case 1					
		Mid Channel, 763.0 MHz	48.88	0	48.9	1000	Pass
		Multicarrier Test Case 2	10.00		10.0	1000	. 400
		Mid Channel, 734.0 MHz	47.16	0	47.2	1000	Pass
		Mid Channel, 765.5 MHz	43.59	0	43.6	1000	Pass
	256QAM Modulation LTE5 Bandwi		.0.00	Ü	10.0	1000	i doc
		Mid Channel, 763.0 MHz	48.72	0	48.7	1000	Pass
		Multicarrier Test Case 2	40.72	<u> </u>	40.7	1000	1 000
		Mid Channel, 734.0 MHz	47.05	0	47	1000	Pass
		Mid Channel, 765.5 MHz	43.58	0	43.6	1000	Pass

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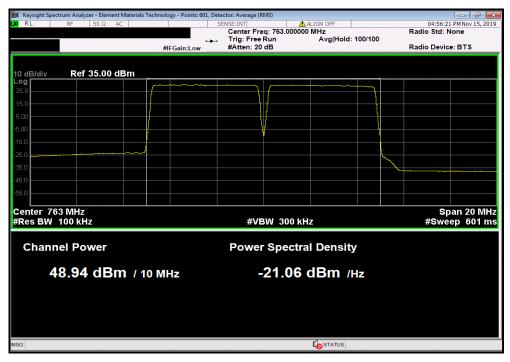


Band 14, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 1, Mid Channel, 763.0 MHz

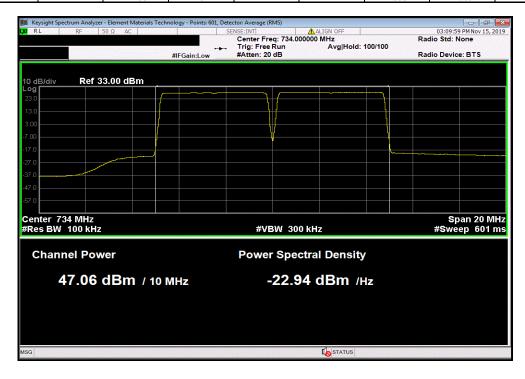
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

48.94 0 48.9 1000 Pass



Band	12, QPSK Modula	ation, LTE5 Band	width, Multicarrie	r Test Case 2, M	id Channel, 734.0	MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	47.06	0		47.1	1000	Pass



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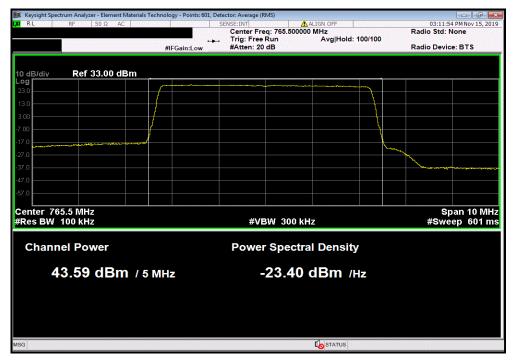


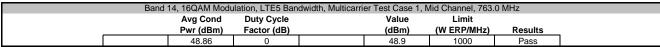
Band 14, QPSK Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 765.5 MHz

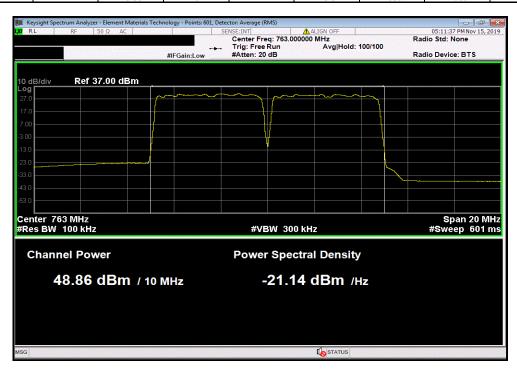
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

43.59 0 43.6 1000 Pass







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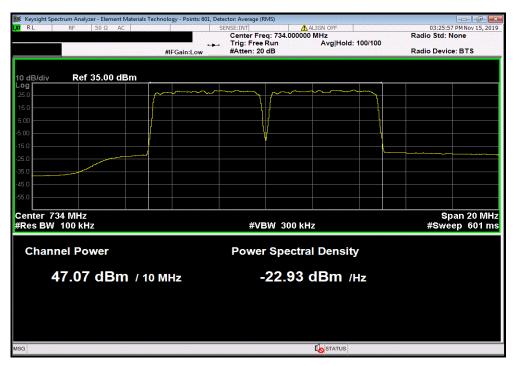


Band 12, 16QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 734.0 MHz

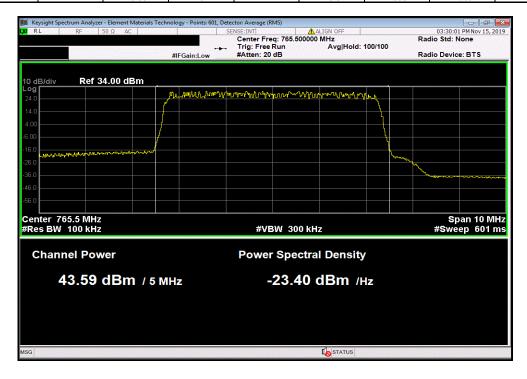
Avg Cond Duty Cycle Value Limit

Pwr (dBm) Factor (dB) (dBm) (W ERP/MHz) Results

47.07 0 47.1 1000 Pass

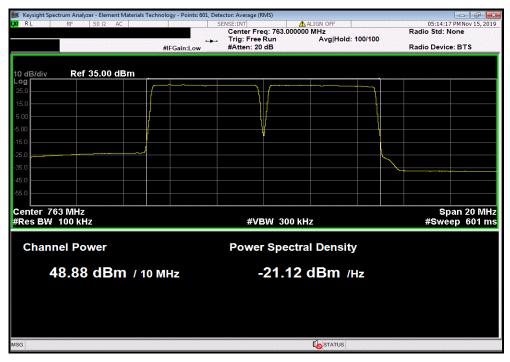


Band	14, 16QAM Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, N	/lid Channel, 765.	5 MHz
	Avg Cond	Duty Cycle		Value	Limit	
	Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
	43.59	0		43.6	1000	Pass

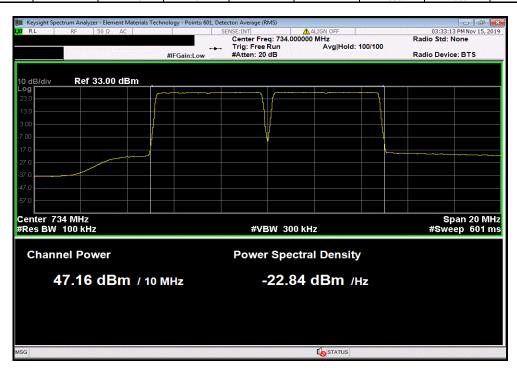


Report No. NOKI0004.1 109/574



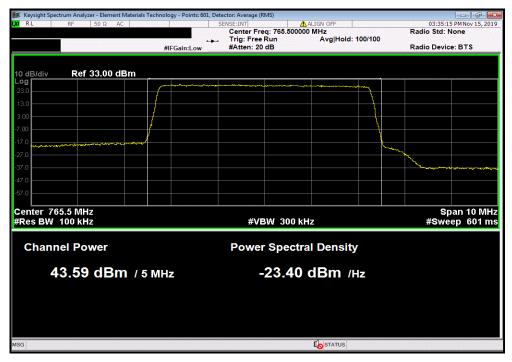


	Band	12, 64QAM Modu	lation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, N	/lid Channel, 734.	0 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
i í	<u> </u>	47.16	0		47.2	1000	Pass

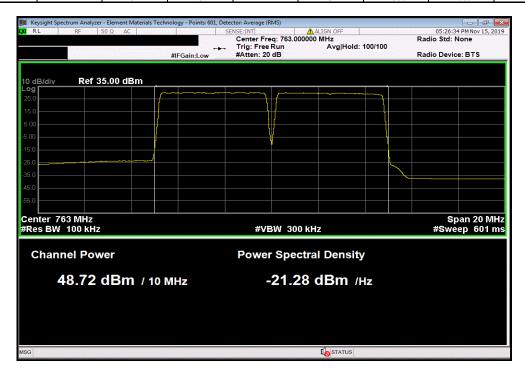


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	Band 1	14, 256QAM Modi	ulation, LTE5 Bar	ndwidth, Multicarr	ier Test Case 1, I	Mid Channel, 763	.0 MHz
		Avg Cond	Duty Cycle		Value	Limit	
_		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
l í	<u> </u>	48.72	0		48.7	1000	Pass



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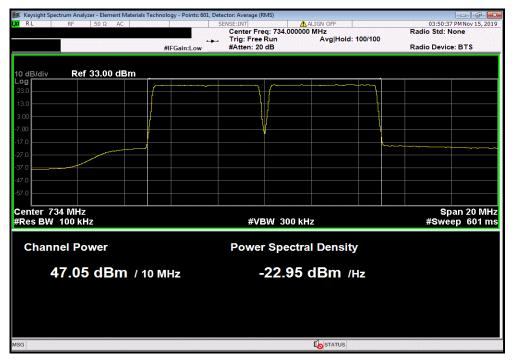


 Band 12, 256QAM Modulation, LTE5 Bandwidth, Multicarrier Test Case 2, Mid Channel, 734.0 MHz

 Avg Cond
 Duty Cycle
 Value
 Limit

 Pwr (dBm)
 Factor (dB)
 (dBm)
 (W ERP/MHz)
 Results

 47.05
 0
 47
 1000
 Pass



	Band 1	4, 256QAM Modu	ılation, LTE5 Ban	dwidth, Multicarri	er Test Case 2, M	/lid Channel, 765.	5 MHz
		Avg Cond	Duty Cycle		Value	Limit	
		Pwr (dBm)	Factor (dB)		(dBm)	(W ERP/MHz)	Results
1	<u> </u>	43.58	0		43.6	1000	Pass



Report No. NOKI0004.1 112/574



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.



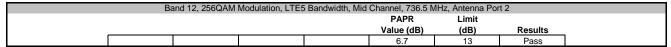
						TbtTx 2019.08.30.0	
	AHLBBA RRH				Work Order:		
Serial Number:						18-Nov-19	
Customer:	Nokia Solutions and Net	works			Temperature:		
Attendees:	John Rattanavong				Humidity:	29.7% RH	
Project:					Barometric Pres.:	1019 mbar	
Tested by:	Jonathan Kiefer		Power:	54VDC	Job Site:	TX09	
TEST SPECIFICATI	IONS			Test Method			
FCC 27:2019				ANSI C63.26:2015			
COMMENTS				•			
	asurements for LTF5 chan	nel handwidth at Mid channel	using 256QAM on all four	antenna ports. EUT is operated at 1	00% duty cycle		
Dana 121 Al Killot	asarcinents for ETES char	mer banawiath at mia chamier	using 200@Ain on an iou	unterma porto. Lo i la operatea at 1	50 % duty cycle.		
DEVIATIONS FROM	M TEST STANDARD						
DEVIATIONS FROM None	M TEST STANDARD						
	M TEST STANDARD						
	Y TEST STANDARD		Jonathan	Xieler			
None		Signature	Jonathan	Xiefer			
None		Signature	Jorathan	Xiefa	PAPR	Limit	
None		Signature	Jonathan	Xiefa	PAPR Value (dB)	Limit (dB)	Results
None		Signature	Jonathan	Xiefo			Results
None Configuration # Band 12		Signature	Jonathan	Xiefo			Results
None Configuration # Band 12	2	•	Jonathan	Xiefa			Results
None Configuration # Band 12	2 256QAM Modulation LTE5 Bandw	•	Jonathan	Xiefo			Results
None Configuration # Band 12	2 256QAM Modulation LTE5 Bandw	idth	Jonathan	Xiefo			Results
None Configuration # Band 12	2 256QAM Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz	Jonathan	Xiefo	Value (dB)	(dB)	
None Configuration # Band 12	2 256QAM Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz Antenna Port 1 Antenna Port 2	Jonathan	Xiefo	Value (dB) 7.7 6.7	(dB) 13 13	Pass Pass
None Configuration # Band 12	2 256QAM Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz Antenna Port 1	Jonathan	Riefo	Value (dB)	(dB)	Pass

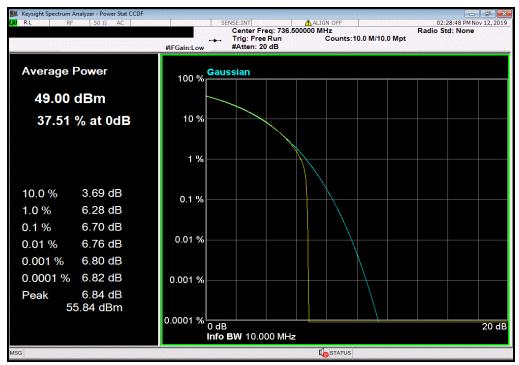
Report No. NOKI0004.1 114/574



Band 12, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz, Antenna Port 1
PAPR Limit
Value (dB) (dB) Results
7.7 13 Pass





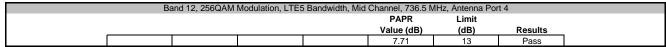


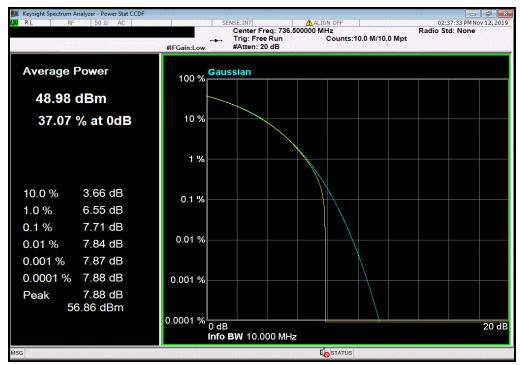
Report No. NOKI0004.1 115/574



Band 12, 256QAM Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz, Antenna Port 3
PAPR Limit
Value (dB) (dB) Results
6.71 13 Pass







Report No. NOKI0004.1 116/574



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.

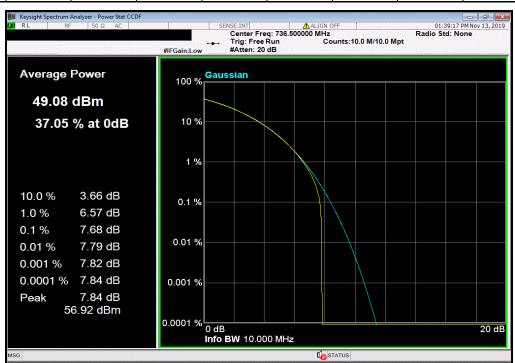


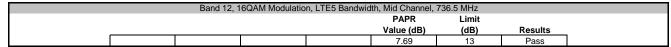
						TbtTx 2019.08.30.0	XMit 2019.09.05
	: AHLBBA RRH				Work Order:	NOKI0004	
Serial Number:	: K9193514835				Date:	18-Nov-19	
Customer:	: Nokia Solutions and Net	works			Temperature:	22.4 °C	
Attendees:	: John Rattanavong				Humidity:	29.6% RH	
Project:	: None				Barometric Pres.:	1019 mbar	
Tested by:	: Jonathan Kiefer		Power:	54VDC	Job Site:	TX09	
TEST SPECIFICAT	TONS			Test Method			
FCC 27:2019				ANSI C63.26:2015			
COMMENTS							
Band 12 PAPR me	asurements for LTE5 char	nel bandwidth at Mid channel for fou	r modulation types	. Tested on highest power antenna po	ort (Port 1), EUT is operated at 100% of	luty cycle.	
					(* *), * *	, .,	
DEVIATIONS FROM	M TEST STANDARD						
None							
None				1000			
None Configuration #	2		Jonathan	Xiele			
	2	Signature	Jonathan	Xiefer			
	2	Signature	Jonathan	Xiefer	PAPR	Limit	
	2	Signature	Jonathan	Niefe	PAPR Value (dB)	Limit (dB)	Results
	2	Signature	Jorathan	Xiefer			Results
Configuration #	2 QPSK Modulation	Signature	Jonathan	Xiefer			Results
Configuration #			Jonathan	Xiefor			Results
Configuration #	QPSK Modulation		Jonathan	Kiefer			Results
Configuration #	QPSK Modulation	idth	Jonathan	Riefor	Value (dB)	(dB)	
Configuration #	QPSK Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz	Jovathan	Xiefo	Value (dB)	(dB)	
Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation	idth Mid Channel, 736.5 MHz	Jovethan	Kiefer	Value (dB)	(dB)	
Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation	idth Mid Channel, 736.5 MHz idth	Jovathan	Riefor	Value (dB) 7.68	(dB)	Pass
Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz idth Mid Channel, 736.5 MHz	Jonathan	Xiefo	Value (dB) 7.68	(dB)	Pass
Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation LTE5 Bandw 64QAM Modulation	idth Mid Channel, 736.5 MHz idth Mid Channel, 736.5 MHz	Jonathan	Kiefer	Value (dB) 7.68	(dB)	Pass

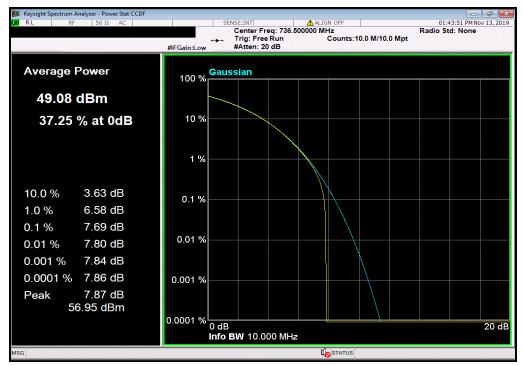
Report No. NOKI0004.1 118/574



Band 12, QPSK Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz
PAPR Limit
Value (dB) (dB) Results
7.68 13 Pass



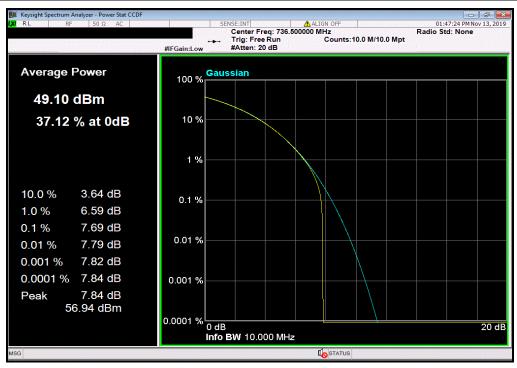




Report No. NOKI0004.1 119/574



Band 12, 64QAM Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz
PAPR Limit
Value (dB) (dB) Results
7.69 13 Pass



Report No. NOKI0004.1 120/574



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.

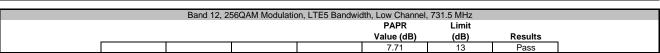
The PAPR was measured using the CCDF function of the spectrum analyzer.



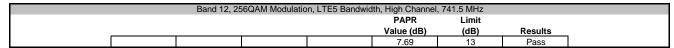
EUT: AHLBBA RRH
Serial Number: K9193514835
Customer: Nokia Solutions and Networks
Attendess: John Rattanavong
Project: None
Tested by: Jonathan Kiefer
TEST SPECIFICATIONS Work Order: NOKI0004
Date: 18-Nov-19
Temperature: 22.4 °C Humidity: 29.7% RH
Barometric Pres.: 1019 mbar Power: 54VDC Test Method Job Site: TX09 COMMENTS Band 12 PAPR measurements for 256QAM moduation type at Low, Mid, High channels for LTE5 and LTE10 channel bandwidths. 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 Jonathan Kiefer Configuration # 2 Signature PAPR Limit (dB) Value (dB) Results 256QAM Modulation LTE5 Bandwidth Low Channel, 731.5 MHz High Channel, 741.5 MHz 7.71 7.69 13 13 Pass Pass LTE10 Bandwidth Mid Channel, 736.5 MHz 7.69 13 Pass Low Channel, 734.0 MHz High Channel, 739.0 MHz 7.7 7.69 Pass Pass 13 13

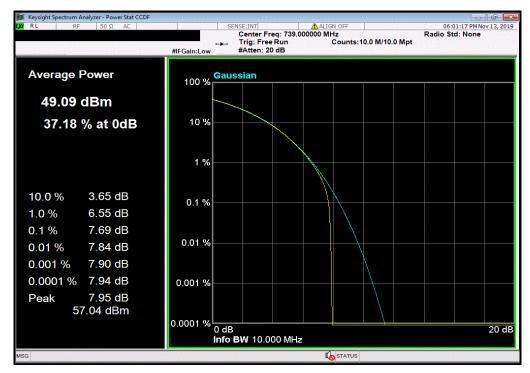
Report No. NOKI0004.1 122/574







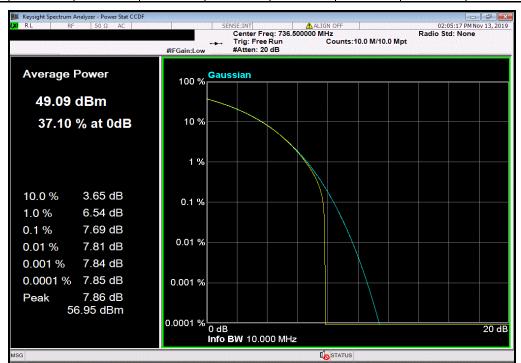


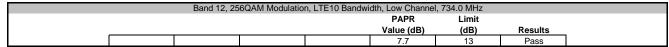


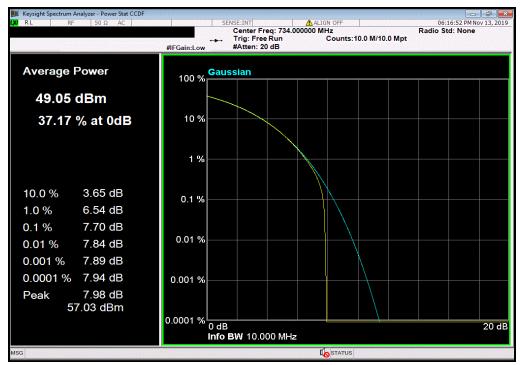
Report No. NOKI0004.1 123/574



Band 12, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 736.5 MHz
PAPR Limit
Value (dB) (dB) Results
7.69 13 Pass



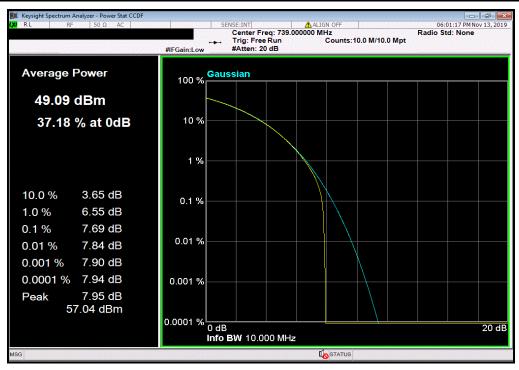




Report No. NOKI0004.1 124/574



Band 12, 256QAM Modulation, LTE10 Bandwidth, High Channel, 739.0 MHz
PAPR Limit
Value (dB) (dB) Results
7.69 13 Pass



Report No. NOKI0004.1 125/574



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.



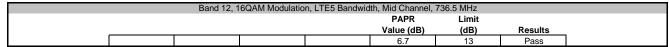
						TbtTx 2019.08.30.0	
	AHLBBA RRH				Work Order	NOKI0004	
Serial Number:	K9193514835				Date	18-Nov-19	
Customer:	Nokia Solutions and Net	works			Temperature		
Attendees:	John Rattanavong				Humidity:	29.7% RH	
Project:					Barometric Pres.		
	Jonathan Kiefer		Power:	54VDC	Job Site:	TX09	
TEST SPECIFICAT	TONS			Test Method			
FCC 27:2019				ANSI C63.26:2015			
COMMENTS							
Band 12 PAPR me	asurements for LTE5 char	nel bandwidth at Mid channel for for	ur modulation types	. Tested on highest power antenna po	ort (Port 2), EUT is operated at 100%	duty cycle.	
				3,			
DEVIATIONS FROM	M TEST STANDARD						
None							
			2/	92			
	2		Jonathan	Xielen			
None	2	Signature	Jonathan	Xiefor			
None	2	Signature	Jonathan	Niefe	PAPR	Limit	
None	2	Signature	Jonathan	Xiefo	PAPR Value (dB)	Limit (dB)	Results
None	2	Signature	Jonathan	Xiefer			Results
None Configuration #	2 QPSK Modulation	Signature	Jonathan	Niefor			Results
None Configuration #		<u> </u>	Jorathan	Xiefer			Results
None Configuration #	QPSK Modulation	<u> </u>	Jonathan	Xiefe			Results Pass
None Configuration #	QPSK Modulation	idth	Jovethan	Niefo	Value (dB)	(dB)	
None Configuration #	QPSK Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz	Jonathan	Xiefo	Value (dB)	(dB)	
None Configuration #	QPSK Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz	Jonathan	Xiefe	Value (dB)	(dB)	
None Configuration #	QPSK Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz idth	Jonathan	Riefo	Value (dB) 6.69	(dB)	Pass
None Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation LTE5 Bandw	idth Mid Channel, 736.5 MHz idth Mid Channel, 736.5 MHz	Jonathan	Xiefo	Value (dB) 6.69	(dB)	Pass
None Configuration #	QPSK Modulation LTE5 Bandw 16QAM Modulation LTE5 Bandw 64QAM Modulation	idth Mid Channel, 736.5 MHz idth Mid Channel, 736.5 MHz	Jonathan	Xiefe	Value (dB) 6.69	(dB)	Pass

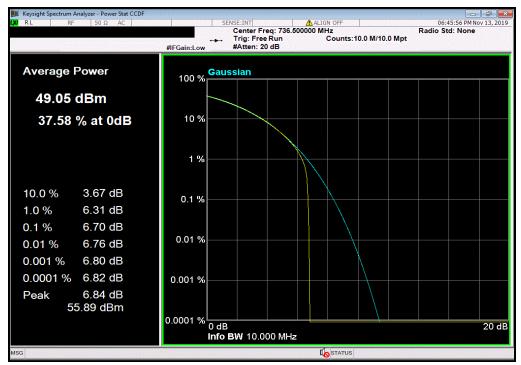
Report No. NOKI0004.1 127/574



Band 12, QPSK Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz
PAPR Limit
Value (dB) (dB) Results
6.69 13 Pass







Report No. NOKI0004.1 128/574

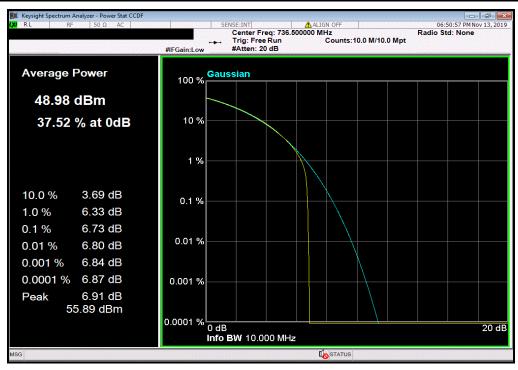


Band 12, 64QAM Modulation, LTE5 Bandwidth, Mid Channel, 736.5 MHz

PAPR Limit

Value (dB) (dB) Results

6.73 13 Pass



Report No. NOKI0004.1 129/574



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.

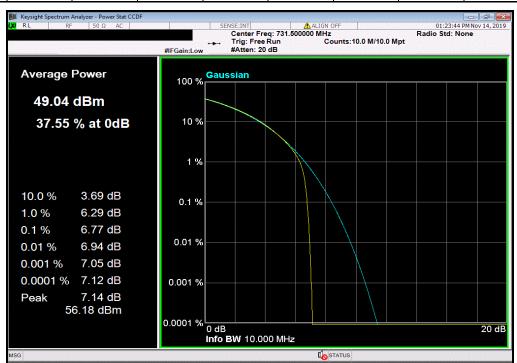


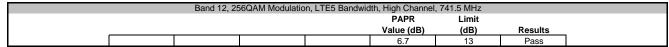
		TbtTx 2019.08.30.0	XMit 2019.09.0
EUT: AHLBBA RRH	Work Order:		
Serial Number: K9193514835		18-Nov-19	
Customer: Nokia Solutions and Networks	Temperature:	22.4 °C	
Attendees: John Rattanavong		29.7% RH	
Project: None	Barometric Pres.:	1019 mbar	
Tested by: Jonathan Kiefer Power: 54VDC	Job Site:	TX09	
TEST SPECIFICATIONS Test Method			
FCC 27:2019 ANSI C63.26:2015	_		
	_		
COMMENTS			
cycle. Note: 256QAM LTE5 BW Mid Channel data shown elsewhere in the report.			
None			
Configuration # 2 Signature			
Configuration# 2 Jonathan Kiefer	PAPR Value (dB)	Limit (dB)	Results
Sonfiguration # 2 Signature Sonathan Xiefon			Results
Sand 12 256QAM Modulation 256QAM Modulation			Results
Sand 12 256QAM Modulation LTE5 Bandwidth	Value (dB)	(dB)	
Sand 12 256QAM Modulation LTE5 Bandwidth Low Channel, 731.5 MHz	Value (dB)	(dB)	Pass
Sand 12 256QAM Modulation LTE5 Bandwidth Low Channel, 731.5 MHz High Channel, 741.5 MHz	Value (dB)	(dB)	
Sand 12 256QAM Modulation LTE5 Bandwidth Low Channel, 731.5 MHz High Channel, 741.5 MHz LTE10 Bandwidth	Value (dB) 6.77 6.7	(dB) 13 13	Pass Pass
Signature Signature	Value (dB) 6.77 6.7 6.79	(dB) 13 13	Pass Pass Pass
Signature Signature Signature Signature 256QAM Modulation LTE5 Bandwidth Low Channel, 731.5 MHz High Channel, 741.5 MHz LTE10 Bandwidth	Value (dB) 6.77 6.7	(dB) 13 13	Pass Pass

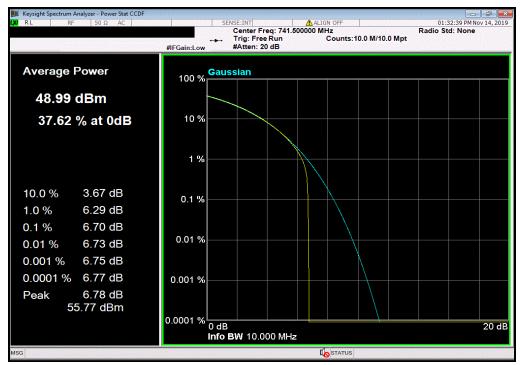
Report No. NOKI0004.1 131/574



Band 12, 256QAM Modulation, LTE5 Bandwidth, Low Channel, 731.5 MHz
PAPR Limit
Value (dB) (dB) Results
6.77 13 Pass



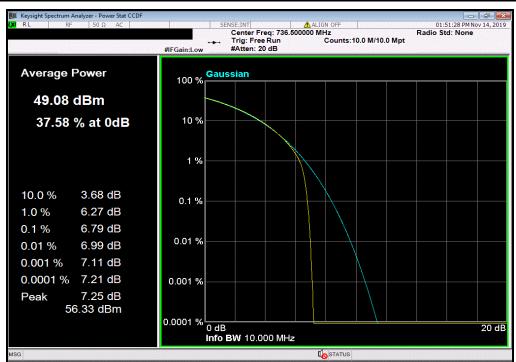


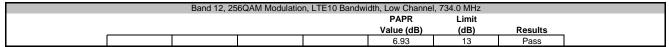


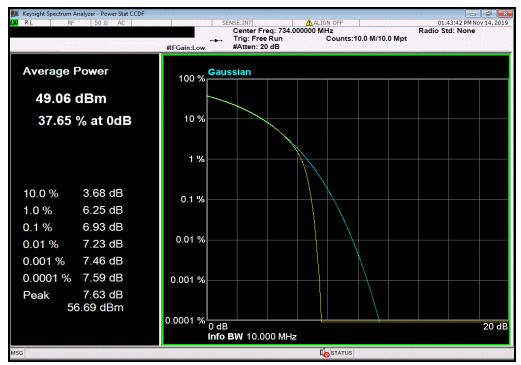
Report No. NOKI0004.1 132/574



Band 12, 256QAM Modulation, LTE10 Bandwidth, Mid Channel, 736.5 MHz
PAPR Limit
Value (dB) (dB) Results
6.79 13 Pass



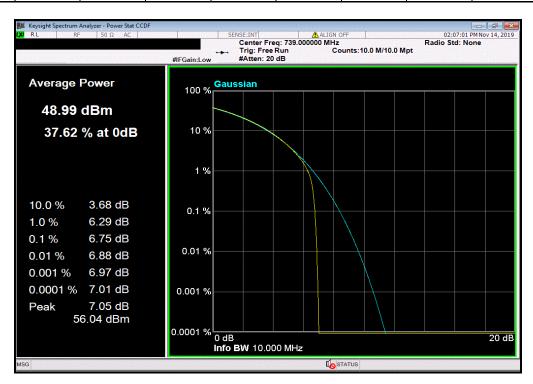




Report No. NOKI0004.1 133/574



Band 12, 256QAM Modulation, LTE10 Bandwidth, High Channel, 739.0 MHz
PAPR Limit
Value (dB) (dB) Results
6.75 13 Pass



Report No. NOKI0004.1 134/574