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Report On

FCC Testing of the

Ericsson Remote Radio Unit LTE KRC 161 592/1 and KRC 161 592/2, Radio 2217 B26D (859-869 MHz), in a Base Station configuration in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 90

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161592

PREPARED BY

APPROVED BY

DATED

Myulmining.

Maggie Whiting Key Account Manager

Rom Herly

Ryan Henley Authorised Signatory 18 September 2018

Document 75939974 Report 02 Issue 2

September 2018



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SECTION 1

REPORT INFORMATION



1.1 **REPORT DETAILS**

The information contained in this report is intended to show verification of the Ericsson Radio 2217 B26D KRC 161 592/1 and KRC 161 592/2 to the requirements of FCC CFR 47 Part 90.

Testing was carried out in support of an application for Grant of Radio 2217 B26D KRC 161 592/1 and KRC 161 592/2 in LTE mode.

Manufacturer	Ericsson AB
Address	Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden
Product Name	Radio 2217 B26D
Product Number	KRC 161 592/1
Serial Number(s)	SD825975510
Software Version	CXP 901 7316/2 R67GK
Hardware Version	R1E
Non-Test Variant	KRC 161 592/2
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2016 FCC CFR 47 Part 90: 2016
Start of Test	06 September 2017
Finish of Test	27 September 2017
Name of Engineer(s)	Mohamed Toubella Jack Tuckwell
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01
This report has been up issued	to Issue 2 and should be read in place

This report has been up issued to Issue 2 and should be read in place of Issue 1. This report has been up issued to Issue 2 to correct the Maximum rated output power Statement in Section 1.4, The Declaration of Build Status.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, Part 90 is shown below.

Section		c Clause	Test Description	Result
000000	Part 2	Part 90		Rooun
2.1	2.1046	90.635	Maximum Output Power – Conducted	Pass
-	-	90.635	Effective Radiated Power (ERP)	N/A ¹
2.2	2.1049 (h)	-	Occupied Bandwidth	Pass
2.3	2.1051	90.691	Emission Masks	Pass
2.4	2.1053	90.691	Radiated Spurious Emissions	Pass
2.5	2.1051	90.691	Conducted Spurious Emissions	Pass
2.6	2.1055	90.213	Frequency Stability	Pass
-	-	15.111	Receiver Spurious Emissions	N/A ²

 N/A^1-Not Applicable, due to no Integral Antenna. N/A^2-Not Applicable, due to this is a transceiver.



1.3 CONFIGURATION DESCRIPTION

Test Configuration	Configuration Code	Carrier(s)	Configuration Description
Config A	L-MIMO-SC	1C	LTE MIMO, Single Carrier
Config B	L-MIMO-MC	2C	LTE MIMO, Multi Carrier x2
Config C	L-MIMO-MC1	3C	LTE MIMO, Multi Carrier x3

The Radio 2217 B26D KRC 161 592/1 and KRC 161 592/2 supports Test Models E-TM1.1, E-TM3.2 and E-TM3.1 at 800MHz defined in 3GPP TS 36.141. Test Model E-TM1.1 is used to represent QPSK modulation only, and Test Model E-TM3.2 is used to represent 16QAM modulation, and Test Model E-TM3.1 is used to represent 64QAM modulation. The product also supports ETM3.1a for 256QAM.

The settings below were deemed representative for all traffic scenarios when settings with different modulations, channel bandwidths, number for carriers and RF configurations has been tested to find the worst case setting. The setting below were used for all measurements if not otherwise noted:

LTE: MIMO mode single carrier: E-TM1.1 MIMO mode multi carrier (x2): E-TM1.1 MIMO mode multi carrier (x3): E-TM1.1

The Maximum Output Power was tested on both TX/RX output connector RF A and RF B, all other TX measurements were performed on the combined TX/RX output connector RF A of the EUT as the representative ports.

The complete testing was performed with the EUT transmiting at maximum RF power Unless otherwise stated.



1.4 DECLARATION OF BUILD STATUS

Manufacturing Description	Remote Radio Unit					
Manufacturer	Ericsson AB					
Product Name	Radio 2217 B26D					
Flodder Name	KRC 161 592/1					
Product Number	KRC 161 592/1 KRC 161 592/2					
RU Name	Radio 2217 B26D					
RU Number	KRC 161 592/1					
Ro Nulliber	KRC 161 592/2					
DU Name	NA					
DU Number	NA					
Band Number	B26D					
RAT	LTE					
Number of carriers	Maximum 3 carriers per port					
Base station class	Wide Area					
Maximum rated output		or all m	odes e	xcept maximum 43.0dBm (20W) per		
power(s)	carrier per port for LTE 1.4MHz Sing	ale Cari	rier			
Duplex Mode	FDD		-			
Frequency Band	B26D (800MHz)					
Modulation type(s)	LTE: QPSK, 16QAM, 64QAM, 256Q	AM				
Channel Bandwidth(s)	LTE: 1.4MHz, 3MHz, 5MHz, 10MHz		z			
Transmit diversity	Each transmitter path is declared to					
Receive diversity	Each receiver path is declared to be					
MIMO	Each transmitter path is declared to					
	Each receiver path is declared to be					
ITU designation or class	LTE: 1M40F9W, 3M00F9W, 5M00F	9W, 10I	M0F9W	/, 15M0F9W		
of emission						
Hardware Version	R1E					
Software Version	CXP 901 7316/2 R67GK					
FCC ID	TA8AKRC161592					
ISED Model Name						
Highest Internally	1030.1 MHz					
Generated Frequency						
Environment temperature	Minimum Maximum					
range(s)	-40 °C +55 °C					
AC Power source	Voltage Range(s)					
	Minimum VAC Nominal Maximum VAC			Maximum VAC		
		VAC				
DC Power source	Yes					
	Voltage Range(s)					
	Minimum VDC	Nomi	nal	Maximum VDC		
		VDC				
	-36.0	-48 \		-58.5 V		
Options	Туре		Mode			

Signature

Date D of B S Serial No

No responsibility will be accepted by TÜV SÜD Product Service UK Limited as to the accuracy of the information declared in this document by the manufacturer.



1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) Radio 2217 B26D KRC 161 592/1 and KRC 161 592/2 is an Ericsson Remote Radio Unit working in the public mobile service 800MHz band which provides communication connections to 800MHz network. The Radio 2217 B26D KRC 161 592/1 and KRC 161 592/2 operates from a -48V DC supply.

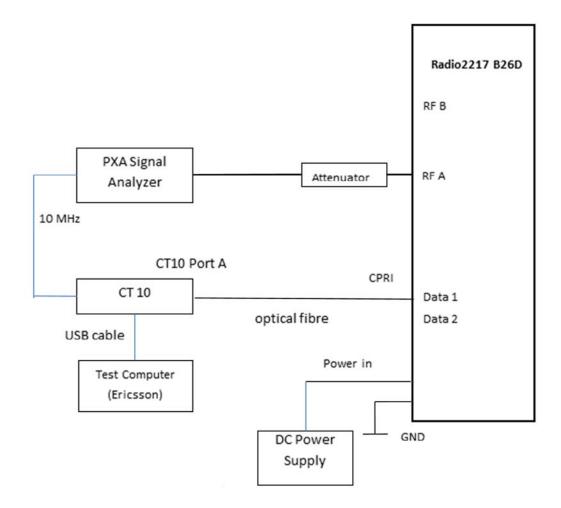
The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

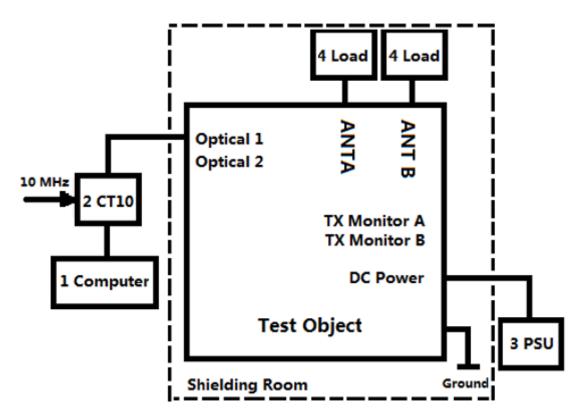


1.6 TEST SETUP



Block diagram of Radio 2217 B26D with cables and auxiliary equipment





Block diagram of Radio 2217 B26D with cables and auxiliary equipment for Radiated measurements.



1.7 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or a chamber as appropriate.

The EUT was powered from a -48V DC supply.

FCC Measurement Facility Registration Number 90987 Octagon House, Fareham Test Laboratory

1.8 DEVIATION FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.9 MODIFICATION RECORD

No modifications were made to the EUT during testing.

1.10 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD Product Service conducted the following tests at Ericsson in Fareham, UK.

Test Name	Name of Engineer(s)
Maximum Peak Output Power and Peak to Average Ratio - Conducted	Mohamed Toubella
Occupied Bandwidth	Mohamed Toubella
Band Edge	Mohamed Toubella
Radiated Spurious Emissions	Jack Tuckwell
Transmitter Spurious Emissions	Mohamed Toubella
Frequency Stability	Mohamed Toubella
Receiver Spurious Emissions	Mohamed Toubella



SECTION 2

TEST DETAILS



2.1 MAXIMUM PEAK OUTPUT POWER AND PEAK TO AVERAGE RATIO - CONDUCTED

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046 FCC CFR 47 Part 90, Clause 90.635

2.1.2 Date of Test and Modification State

21 and 22 September 2017 - Modification State 0

2.1.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.4 Environmental Conditions

Ambient Temperature22.5°CRelative Humidity55.2%

2.1.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01, clause 5.2.1 and summed in accordance with FCC KDB 662911 D01.

Measurements were performed with a Spectrum Analyser using the Band Power measurement function. The detector was set to RMS with an RBW of at least 1 % of the carrier bandwidth and a VBW of at least 3 times the RBW. The integration bandwidth was configured to be wider than the total bandwidth of the carrier or combinations of carriers, (multi-carrier). Using a sweep time of auto, measurements were performed over 200 samples, with the average measurement recorded.

Due to Average measurements being recorded, an additional Peak to Average measurement was made in all single carrier configurations. This was achieved using the CCDF function of the Spectrum Analyser with the RBW being set to a value wider than the largest signal being measured – in this case – 10 MHz.

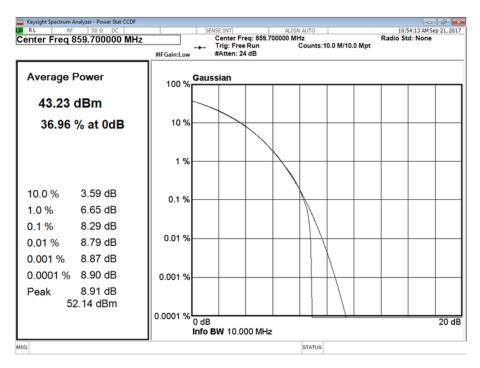
2.1.6 Test Results

Configuration A

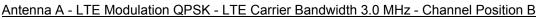
Maximum Output Power 46 dBm

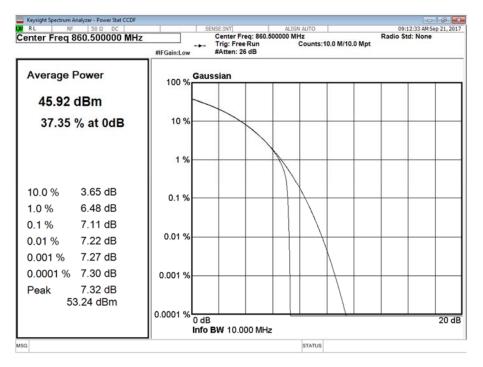
	Antenna LTE Modulation LTE Carrier Bandwidth	LTE Carrier	Peak to Average Ratio (PAR) / Output Power		
Antonno			Channel Position B		
Antenna		Bandwidth		Average Power	
		PAR (dB)	dBm	dBm/MHz	
A	QPSK	1.4 MHz	8.29	43.23	42.70
A	QPSK	3.0 MHz	7.11	45.91	42.16
A	QPSK	5.0 MHz	7.14	45.97	40.15
В	QPSK	5.0 MHz	7.16	46.24	40.31
	Total		-	49.12	43.24



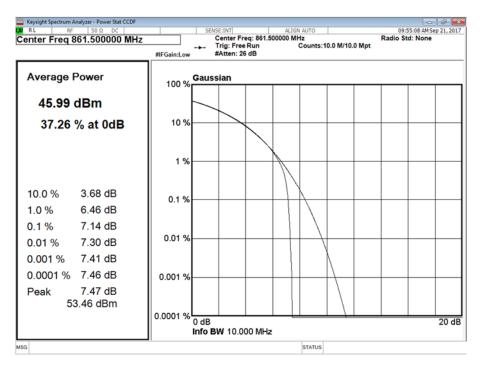


Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position B

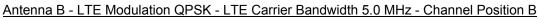


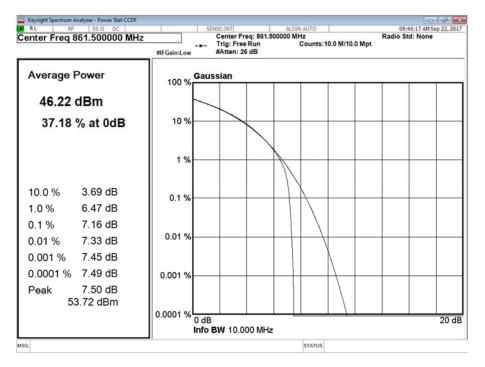






Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B





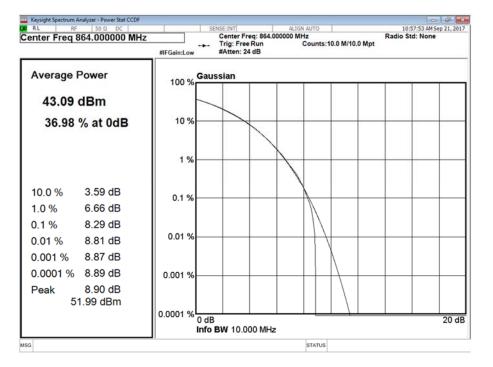


Configuration A

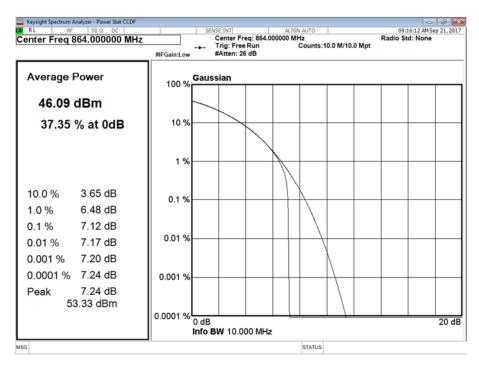
Maximum Output Power 46 dBm

	LTE Modulation	LTE Carrier	Peak to Average Ratio (PAR) / Output Power		
Antonno			Channel Position M		
Antenna		Bandwidth		Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.4 MHz	8.29	43.08	42.43
A	QPSK	3.0 MHz	7.12	46.11	42.36
A	QPSK	5.0 MHz	7.12	46.09	40.06
В	QPSK	5.0 MHz	7.13	46.28	40.27
Total			-	49.20	43.18
A	QPSK	10.0 MHz	7.22	46.17	37.56

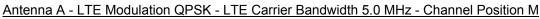
Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position M

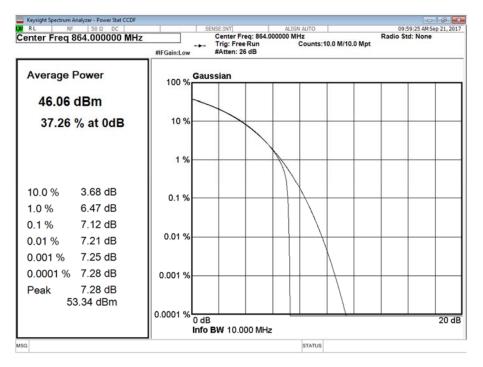




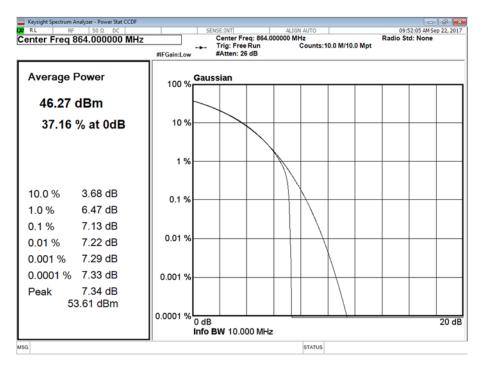


Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position M

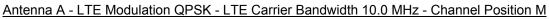








Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M





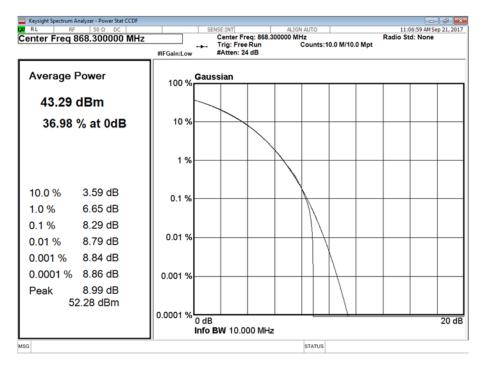


Configuration A

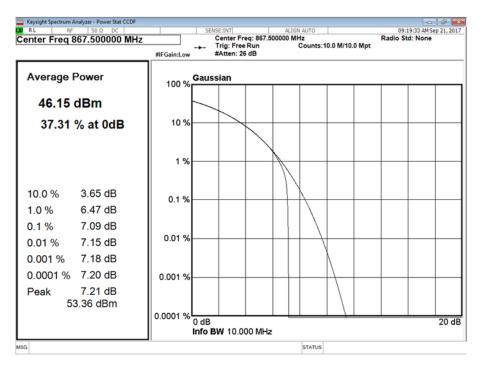
Maximum Output Power 46 dBm

		LTE Carrier	Peak to Ave	erage Ratio (PAR) /	Output Power
Antenna			Channel Position T		
Antenna		Bandwidth		Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.4 MHz	8.29	43.28	42.72
A	QPSK	3.0 MHz	7.09	46.15	42.30
A	QPSK	5.0 MHz	7.10	46.21	40.13
В	QPSK	5.0 MHz	7.11	46.35	40.34
Total			-	49.29	43.25

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position T

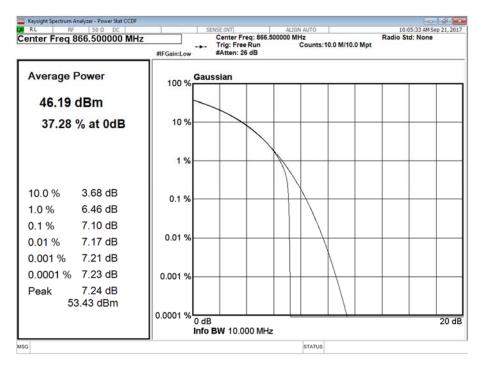




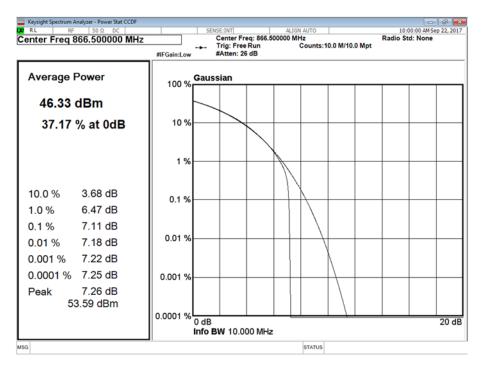


Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position T

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T







Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T

Configuration B

Maximum Output Power 46 dBm

		LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power			
			Channel Position M			
Antenna	Antenna LTE Modulation		vidth PAR (dB)	Average Power		
				dBm	dBm/MHz	
A	QPSK	1.4 MHz	-	46.08	42.38	
A	QPSK	3.0 MHz	-	46.11	39.49	
A	QPSK	5.0 MHz	-	46.13	37.38	

Configuration C

Maximum Output Power 46 dBm

		LTE Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
Antonno	LTE Modulation		Channel Position M		
Antenna	LTE Modulation			Average Power	
			PAR (dB)	dBm	dBm/MHz
A	QPSK	1.4 MHz	-	46.03	40.53
A	QPSK	3.0 MHz	-	46.08	37.54

Limit		
Peak Power	≤500 W or ≤+57 dBm	
Peak to Average Ratio	13 dB	



2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049

2.2.2 Date of Test and Modification State

21 September 2017 - Modification State 0

2.2.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.4 Environmental Conditions

Ambient Temperature22.5°CRelative Humidity55.2%

2.2.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 4.2.

The Spectrum Analyser RBW was configured to be at least 1% of the channel bandwidth of the carrier to be measured.

For 26dB Bandwidth, in accordance with KDB 971168 D01, a peak detector and a trace setting of Max Hold were used. The trace was allowed to stabilise. Using the Spectrum Analyser function, the 26 dB measurement result was obtained.

2.2.6 Test Results

Configuration A

Maximum Output Power 46 dBm

					Result	t (kHz)		
Antenna	LTE	LTE Carrier	Channel I	Position B	Channel F	Position M	Channel I	Position T
	Modulation	Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	1.4 MHz	1,096.28	1,264.45	1,097.28	1,273.46	1,095.25	1,275.95
А	QPSK	3.0 MHz	2,695.40	2,898.25	2,691.33	2,899.52	2,696.21	2,895.10
А	QPSK	5.0 MHz	4,483.41	4,805.77	4,478.41	4,799.11	4,482.87	4,798.21
В	QPSK	5.0 MHz	4,478.13	4,809.33	4,483.85	4,802.90	4,480.53	4,792.56
А	QPSK	10.0 MHz	-	-	8,948.46	9,644.45	-	-



ter Freq 859.700000 M		Center Freq: 859.700000		10:55:59 AM Sep 21, 201 Radio Std: None
	#IFGain:Low	→ Trig: Free Run #Atten: 22 dB	Avg Hold: 200/200	Radio Device: BTS
B/div Ref 48.48 dBm				
	<u> </u>			
		mon man marked	mmm	
	A		N	
			<u>_</u>	
	^		\	
	1		- la	
www.mananan	,-			man man
nter 859.7 MHz es BW 15 kHz		#VBW 43 kHz		Span 2.8 MHz Sweep 12 ms
	L_	Total Power	49.7 dBm	010000 1211
Dccupied Bandwidtl	0963 MHz	Total Power	43.7 GBM	
ransmit Freq Error	-6.786 kHz	% of OBW Power		
dB Bandwidth	1.264 MHz	x dB	-26.00 dB	
			STATUS	

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position B

Position M

Keysight Spectrum Analyzer - Occupied BW RL RF 50.0 DC		enverand in in	CH 11/70	
RL RF 50 Ω DC	Hz	Center Freq: 864.000000 I		10:59:38 AM Sep 21, 20 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 22 dB	Avg Hold: 200/200	Radio Device: BTS
B-640.04 (B-				
odB/div Ref 48.31 dBm	1	1 1 1	11	
8.3				
6.3	mon	mon manual manual	many	
8.3	A		R	
31	A Contraction of the second se			
69	1		\	
1.7	<u> </u>			
1.7				
1.7 who manner	N		5	mmmmmmmmm
1.7				
enter 864 MHz Res BW 15 kHz		#VBW 43 kHz		Span 2.8 M Sweep 12 n
		Total Power	49.4 dBm	00000 121
Occupied Bandwidth		Total Fower	49.4 UDIII	
1.0	973 MHz			
Transmit Freq Error	-7.702 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	1.273 MHz	x dB	-26.00 dB	
a			STATUS	



			SENSE:INT					6 AM Sep 21, 2017
eq 868.30000	DMHZ					200/200	Radio Std:	None
	#1				Anginoid.	200,200	Radio Devi	ce: BTS
Ref 48.50 dB	3m							
		marun	-	mmm	m			
	J _ J							
	,r					$ \rightarrow $		
	ļ -							
						$\left \right $		
	~							
mannen	har					V. W	Marsh Marca	mound
8.3 MHz							Sr	an 2.8 MHz
15 kHz			#V	BW 43 kHz				/eep 12 ms
			Total F	Power	49.7 d	Bm		
1	.0953	MHZ						
nit Freq Error	-6.2	07 kHz	% of O	BW Power	99.0	0 %		
andwidth	1.27	6 MHz	x dB		-26.00	dB		
	Ref 48.50 dl	Ref 48.50 dBm Ref 48.50 dBm	Ref 48.50 dBm #IFGain:Low Ref 48.50 dBm	Ref 50 Ω SENSE:INT eq 868.300000 MHz Center Fr. #IFGain:Low Trig: Free #IFGain:Low #Atten: 22 Ref 48.50 dBm	Ref 38.0 OC SENSE.INT A4 eq 868.300000 MHz Center Freq: 868.300000 Trig: Freq: 808.30000 #IFGain:Low Trig: Freq: 808.30000 Trig: Freq: 808.30000 Trig: Freq: 808.30000 Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.3 MHz #VBW 43 kHz #VBW 43 kHz bied Bandwidth Total Power 1.0953 MHz hit Freq Error -6.207 kHz % of OBW Power	Ref 58 0.0 0C SENSE:INT ALIGN AUTO eq 868.300000 MHz Center Freq: 868.300000 MHz Center Freq: 868.300000 MHz #IFGain:Low Triff: Freq Run Avg Hold: #Ref 48.50 dBm #Atten: 22 dB Augument Ref 48.50 dBm #Weith Augument Ref 48.50 dBm #VBW 43 kHz	Ref 36.0000 MHz Center Freq: 868.300000 MHz #IFGaint.ow Center Freq: 868.300000 MHz Avg Hold: 200/200 #Ref 48.50 dBm #Atten: 22 dB Avg Hold: 200/200 Ref 48.50 dBm #IFGaint.ow #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #Atten: 22 dB #IFGaint.ow #VBW 43 kHz #Atten: 22 dB #S.3 MHz #VBW 43 kHz #VBW 43 kHz bied Bandwidth Total Power 49.7 dBm 1.0953 MHz * of OBW Power 99.00 % andwidth 1.276 MHz x dB -26.00 dB	eq 868.300000 MHz Center Free: \$88.300000 MHz Radio Std: #FGain:Low #Ef 22 dB Avg Hold: 200/200 Ref 48.50 dBm #Atten: 22 dB Radio Devi Ref 48.50 dBm #Atten: 22 dB Ref 48.50 dBm #Std: #Atten: 22 dB Ref 48.50 dBm #Atten: 22 dB #WBW 43 kHz Sp #Std: #VBW 43 kHz Sp #Std: #VBW 43 kHz Sp bied Bandwidth Total Power 49.7 dBm 1.0953 MHz % of OBW Power 99.00 % andwidth 1.276 MHz x dB -26.00 dB

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position T

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position B

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC		SENSE:INT ALI	IGN AUTO	09:14:23 AM Sep 21, 20
enter Freq 860.500000 N		Center Freq: 860.500000 I Trig: Free Run #Atten: 24 dB	MHz Avg Hold: 200/200	Radio Std: None Radio Device: BTS
dB/div Ref 51.06 dBm				
pg				
1.1	aman	anonen and some some	mound	
1.1	1			
	1			
06				
94				
8.9 mmmmmmmmmmmm	A*		*(174	Manangerman
3.9				
				0
enter 860.5 MHz Res BW 30 kHz		#VBW 91 kHz		Span 6 Mi Sweep 6.4 n
Occupied Bandwidth	ı	Total Power	52.7 dBm	
2.6	6954 MHz			
Transmit Freq Error	-2.547 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	2.898 MHz	x dB	-26.00 dB	



	Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Chann	el Position M
--	---	---------------

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	/		SENSE:INT	AL	IGN AUTO			00:18:0	
Center Freq 864.000000 I	MHz		Center Fre	q: 864.000000		00/20	•	Radio Std: N	
	#	#FGain:Low	#Atten: 24		Avginoid. 2	00/20	•	Radio Devic	e: BTS
10 dB/div Ref 51.04 dBn	<u> </u>								
41.0									
11.0	- F	hunner	manny	menter mar		-			
1.0	-/								
1.0									
.04						+			
96							1		
9.0 margaren and and and and and and and and and an	N						Mr a	Manne	h and have
9.0									
enter 864 MHz Res BW 30 kHz			#VE	SW 91 kHz					span 6 Mi ep 6.4 n
Occupied Bandwidt	h		Total P	ower	52.8 dE	3m			
		MHz							
Transmit Freq Error	-2.	545 kHz	% of O	BW Power	99.00	%			
x dB Bandwidth	2.9	00 MHz	x dB		-26.00	dB			
G					STATUS				

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position T

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC		SENSE:INT	AL	GN AUTO		09:21:3	2 AM Sep 21, 20
enter Freq 867.500000 N	//Hz #IFGain:Low	Trig: Free		MHz Avg Hold: 200	200	Radio Std: M	
dB/div Ref 50.82 dBm			a	c			
29							
0.8	manson	mann	mann	mmmmmm			
18	Δ				N		1
18					\backslash		
20							
18							
2.2 margan part on logo of the	~~				nd	mmm	mym
0.2							
enter 867.5 MHz							pan 6 Mi
Res BW 30 kHz		#VE	BW 91 kHz				ep 6.4 n
Occupied Bandwidt	h	Total F	ower	52.9 dBn	า		
2.	6962 MHz	2					
Transmit Freq Error	-3.974 kH	z % of O	BW Power	99.00 %	6		
x dB Bandwidth	2.895 MHz	z xdB		-26.00 dE	3		



Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	1		SENSE:INT	A1	IGN AUTO			00:57:5	- 🕞
enter Freq 861.500000 M	ЛНz		Center Fre	q: 861.500000	MHz			Radio Std: N	
	#IFG	ain:Low	. Trig: Free I #Atten: 24		Avg Hold: 2	00/20	0	Radio Devic	e: BTS
dB/div Ref 52.36 dBm	n .								
2.4									
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24	1					h			
24	{								
36	{						1		
64									
.6									
6 mm une an molon m	m						mon	mour	
.6									
enter 861.5 MHz									an 10 M
Res BW 51 kHz			#VB	W 160 kHz	<u> </u>			SI	veep 5 i
Occupied Bandwidt	h		Total P	ower	53.2 dE	Bm			
	4834 N	ИHz							
Transmit Freq Error	-6	94 Hz	% of OE	SW Power	99.00	%			
x dB Bandwidth	4.806	6 MHz	x dB		-26.00	dB			
3									

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position B

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC			SENSE:INT	AL	IGN AUTO		09:49:0	5 AM Sep 22, 20
enter Freq 861.500000 N		Gain:Low	Center Fre	q: 861.500000 Run		00/200	Radio Std: Radio Devi	None
dB/div Ref 51.42 dBm	ı							
Pg								
1.4	part		man	mannen	· ·····	m		
1.4	1					1	2	
4								
42	1					11		
8								
16								
16 man man manning	w					m	markon land	manna
1.6								
			#\/F	3W 160 kHz	2			pan 10 Mi weep 5 n
			# *					
Res BW 51 kHz			Total P		53.4 dE	ßm		
Res BW 51 kHz Occupied Bandwidt	^h 4781	MHz			53.4 dE	3m		
Res BW 51 kHz Occupied Bandwidt	4781 I	MHz 90 kHz	Total P					
4.4	4781 I -1.49		Total P	ower		%		
Res BW 51 kHz Occupied Bandwidtl 4.4 Transmit Freq Error	4781 I -1.49	00 kHz	Total P % of O	ower	99.00	%		
Res BW 51 kHz Occupied Bandwidtl 4.4 Transmit Freq Error	4781 I -1.49	00 kHz	Total P % of O	ower	99.00	%		



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M
--

Keysight Spectrum Analyzer - Occupied B RL RF 50 Ω DC	W	SENSE:INT ALI	GN AUTO	10:03:43 AM Sep 21, 2
enter Freq 864.000000		Center Freq: 864.000000 M		Radio Std: None
	#IFGain:Low	#Atten: 24 dB	Avginoid: 200/200	Radio Device: BTS
dB/div Ref 52.54 dBr	m , , , , , , , , , , , , , , , , , , ,			
2.5				
2.5		amound	manning	
2.5			A	
2.5				
54				
46				
.5				
5 mar man march	Number 1		h	mussel
7.5				
enter 864 MHz Res BW 51 kHz		#VBW 160 kHz		Span 10 M Sweep 5
Occupied Bandwid	th	Total Power	53.2 dBm	
	.4784 MHz			
Transmit Freq Error	-4.150 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	4.799 MHz	x dB	-26.00 dB	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M

I Bandwidth 4.4839 Freq Error -5. width 4.8	z % of OBW Power 99.00 %	
Bandwidth 4.4839	2	
Bandwidth		
	Total Power 53.4 dBm	
V12		
Hz (Hz	#VBW 160 kHz	Span 10 N Sweep 5
monorman	- Marina Marina	monsom
- A		
	menter and	
Ref 51.24 dBm		
		adio Device: BTS
364.000000 MHz	Center Freq: 864.000000 MHz Ra	adio Std: None
	Trig: Free Run Avg Hold: 200/200	



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T
--

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	1	SENSE:INT ALI	GN AUTO	10:08:00 AM Sep 21, 20
enter Freq 866.500000 M		Center Freq: 866.500000		Radio Std: None
	#IFGain:Low	#Atten: 24 dB	Avginola. 200/200	Radio Device: BTS
odB/div Ref 52.38 dBm	<u> </u>			
2.4				
2.4	manno	aman manual	monterman	
2.4			R	
2.4				
38				
62				
.6	A			
7.6 gaber-someward	~			washinger work the former
7.6				
enter 866.5 MHz				Span 10 M
Res BW 51 kHz		#VBW 160 kHz		Sweep 5 r
Occupied Bandwidt	h	Total Power	53.4 dBm	
4.4	4829 MHz			
Transmit Freq Error	-2.097 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	4.798 MHz	x dB	-26.00 dB	
3			STATUS	

Antenna B - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position T

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC			JGN AUTO	10:02:28 AM Sep 22, 20
enter Freq 866.500000 I	MHz #IFGain:Low	Center Freq: 866.500000 Trig: Free Run #Atten: 24 dB	MHz Avg Hold: 200/200	Radio Std: None Radio Device: BTS
0 dB/div Ref 51.50 dBr	1			
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1.5	10 mm 11 mm	um mannen under	And a complete	
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1.5	-{			
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8.5				
enter 866.5 MHz				Span 10 Mi
Res BW 51 kHz		#VBW 160 kH	Z	Sweep 5 n
Occupied Bandwidt	h	Total Power	53.5 dBm	
4.4	4805 MHz			
Transmit Freq Error	-2.290 kHz	% of OBW Power	99.00 %	
x dB Bandwidth	4.793 MHz	x dB	-26.00 dB	



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 10.0 MHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	1		SENSE:INT	Δι	IGN AUTO			10:24:1	8 AM Sep 21, 2
enter Freg 864.000000 M	ИHz		Center Fre	q: 864.000000	MHz			Radio Std:	
	#1	FGain:Low	. Trig: Free #Atten: 24		Avg Hold:	200/20	00	Radio Devid	e: BTS
dB/div Ref 51.94 dBm									
g									
.9	m	mann	mannen	mound	m	m			
.9						\square			
.9	/						\downarrow		
94						\square	1		
16						\vdash	+		
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1 magnussenser and a second						\vdash			ar weaking
3.1						Ħ			
enter 864 MHz Res BW 100 kHz			#\/E	3W 300 kHz					oan 20 M
					_			Swee	9 1.9331
Occupied Bandwidt	h		Total P	ower	53.7 d	Bm			
8.9	9485	MHz							
Transmit Freq Error	12.7	74 kHz	% of O	BW Power	99.00	0 %			
x dB Bandwidth	9.64	4 MHz	x dB		-26.00	dB			
1					STATUS				

Configuration B

Maximum Output Power 46 dBm

			Result	(KHz)
Antenna	LTE Modulation	LTE Carrier Bandwidth	Channel F	Position M
		Danawiati	Occupied Bandwidth	-26 dB Bandwidth
A	QPSK	1.4 MHz	9,696.64	9,884.63
A	QPSK	3.0 MHz	9,675.94	9,924.24
А	QPSK	5.0 MHz	9,440.06	9,826.71



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position M
--

Keysight Spectrum Analyzer - Occupied BV R L RF 50 Ω DC	N		SENSE:INT	A11	IGN AUTO	1	1.22.20	0 PM Sep 20, 2
enter Freq 864.000000	MHz		Center Free	q: 864.000000 I	MHz	4. 200/200	Radio Std:	
	#IF(Gain:Low	#Atten: 20		Avgino	d: 200/200	Radio Devi	e: BTS
dB/div Ref 48.83 dBr	<u>n</u>					<u></u>		
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83	-							
17						+		
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2 amongo all and a second and								
enter 864 MHz								pan 25 M
Res BW 15 kHz			#VB	W 43 kHz			Swee	p 106.6
Occupied Bandwidt	th		Total P	ower	53.4	dBm		
9.	6966 I	MHz						
Transmit Freq Error	-6.20	7 kHz	% of OE	W Power	99	.00 %		
x dB Bandwidth	9.88	5 MHz	x dB		-26.0	0 dB		
					STATUS			

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Q DC	E	I driver met	NAME AND A	-GG-
enter Freq 864.000000 Γ	MHz #IFGain:Low	SENSE:INT Center Freq: 864.00 Trig: Free Run #Atten: 24 dB	ALIGN AUTO 00000 MHz Avg[Hold: 200/200	09:46:20 AM Sep 21, 20 Radio Std: None Radio Device: BTS
dB/div Ref 48.25 dBn				
g	·		1 1	
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8.3	pharman	energy	Annonition	
8.3				
25	1			
75				
8				
18				
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1.0				
enter 864 MHz				Span 25 Mi
Res BW 30 kHz		#VBW 91	KHZ	Sweep 26.53 n
Occupied Bandwidt	h	Total Power	53.3 dBm	
	6759 MHz			
Transmit Freq Error	-1.817 kHz	% of OBW Po	wer 99.00 %	
x dB Bandwidth	9.924 MHz	x dB	-26.00 dB	



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 5.0 MHz - Channel Position M

RL RF 50 Ω DC		SENSE:INT	ALIGN A	UTO	10.21.0	8 AM Sep 21, 20
enter Freg 864.000000 N	IHz	Center Freq: 86	4.000000 MHz		Radio Std: I	
	#IFGain:Low	Trig: Free Run #Atten: 24 dB	A	/g Hold: 200/200	Radio Devid	e: BTS
dB/div Ref 48.97 dBm						
9 0						
3.0	manulos	munham in	rannon	man		
0.0	1					
97	1			l		
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				1		
.0						
	www.			and the second	manden	man
1.0 Amarchingendingeners alon						
1.0						
enter 864 MHz						ban 25 M
Res BW 51 kHz		#VBW	150 kHz		SW	eep 9.2 r
Occupied Bandwidth	n	Total Pow	er s	53.6 dBm		
	401 MHz					
Transmit Freq Error	-640 Hz	% of OBW	Power	99.00 %		
x dB Bandwidth	9.827 MHz	x dB		-26.00 dB		

Configuration C

Maximum Output Power 46 dBm

			Result	: (kHz)
Antenna	LTE Modulation	LTE Carrier Bandwidth	Channel F	Position M
		Danawiath	Occupied Bandwidth	-26 dB Bandwidth
А	QPSK	1.4 MHz	9,672.71	9,893.39
А	QPSK	3.0 MHz	9,638.70	9,912.22



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position M
--

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC			SENSE:INT	۵۱	IGN AUTO		06:09:5	5 PM Sep 20, 20
enter Freq 864.000000 N	1Hz		Center Fre	q: 864.000000	MHz	200/200	Radio Std: I	
		Trig: Free Run Avg Hold: 200/200 #Atten: 24 dB			Radio Device: BTS			
odB/div Ref 46.99 dBm								
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3.0								
enter 864 MHz								an 25 M
Res BW 15 kHz			#VE	SW 43 kHz			Swee	p 106.6
Occupied Bandwidth	n		Total P	ower	53.4 d	Bm		
	5727 I	MHz						
Transmit Freg Error		18 kHz	% of O	BW Power	99.0	0 %		
x dB Bandwidth	vidth 9.893 MHz		x dB		-26.00	-26.00 dB		
	0.00	0 11112			20100			
3					STATUS			

Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 3.0 MHz - Channel Position M

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC		SENSE:INT	ALIGN AUTO	09:49:50 AM Sep 21, 201
enter Freq 864.000000 M		Center Freq: 864.000 Trig: Free Run #Atten: 24 dB		Radio Std: None Radio Device: BTS
OdB/div Ref 46.36 dBm			- <u>1</u> - 11	1 1
6.4				
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5.4	-			
36			V N	
54				
1.6				
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3.6				
enter 864 MHz Res BW 30 kHz		#VBW 91 k	H7	Span 25 MH Sweep 26.53 n
		Total Power	53.3 dBm	Sweep 20.33 II
Occupied Bandwidth 9.6	387 MHz	Total Power	55.5 GE III	
Transmit Freq Error -3.912 kH		% of OBW Pov	ver 99.00 %	
x dB Bandwidth 9.912 MHz		x dB	-26.00 dB	
a			STATUS	



2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 FCC CFR 47 Part 90, Clause 90.691

2.3.2 Date of Test and Modification State

22 and 27 September 2017 - Modification State 0

2.3.3 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.4 Environmental Conditions

Ambient Temperature	21.2-22.5°C
Relative Humidity	53.8- 55.2%

2.3.5 Test Method

All measurements were made in accordance with FCC KDB 971168 D01 Clause 6.

The EUT was connected to a Spectrum Analyser via 40 dB of attenuation. The path loss between the EUT and the Spectrum Analyser was measured using a Network Analyser. The measured path loss was entered as a Reference Level Offset in the Spectrum Analyser. All measurements were made using a RBW of <1 % of the 26 dB Bandwidth in conjunction with the Band Power function of the Spectrum Analyser. The Band Power span was configured to be at least 1 % of the 26 dB Bandwidth and was positioned in the 1MHz region above/below the band edge which gave the worst-case result. The result was an integration of the power giving the result as a value which was at least 1 % of the 26 dB Bandwidth. The display line was set to the worst case accounting for 2 Port MIMO operation in accordance with KDB 662911 D01. This equated to 43 + 10log(P) – 10log(2) = -16dBm.

Additional plots were shown for measurements from 1 - 5 MHz away from the Band Edge. A RBW of 51 kHz was used with the limit line corrected by $10\log(100 \text{ kHz} / 51 \text{ kHz}) = 3 \text{ db}$. Therefore, the limit line accounting for MIMO and the reduced RBW was set at -19 dBm.

2.3.6 Test Results

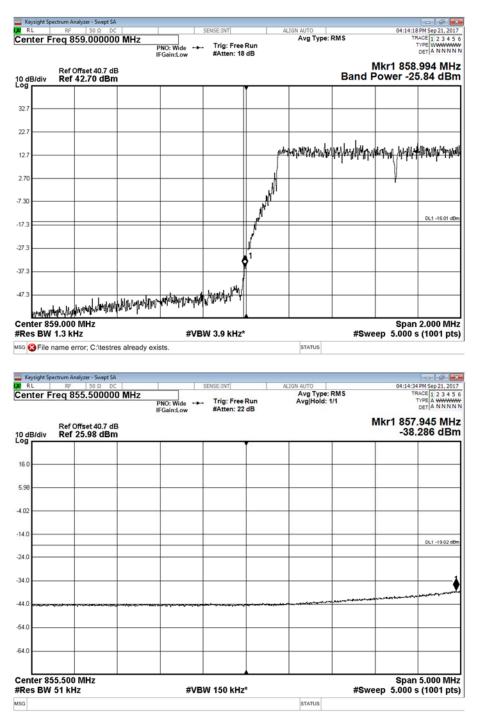
Configuration A

Maximum Output Power 46 dBm

Antenna	LTE Modulation	LTE Carrier Bandwidth	Band Edge (MHz)				
			Channel Position B	Channel Position M	Channel Position T		
А	QPSK	1.4 MHz	859.7	-	868.3		
А	QPSK	3.0 MHz	860.5	-	867.5		
А	QPSK	5.0 MHz	861.5	-	866.5		
В	QPSK	5.0 MHz	861.5	-	866.5		
А	QPSK	10.0 MHz	-	864.0	-		



Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position B





Antenna A - LTE Modulation QPSK - LTE Carrier Bandwidth 1.4 MHz - Channel Position T

