

Report On

FCC and IC Testing of the

Ericsson RD 2242 B13 (746-756 MHz) LTE Base Station in accordance with FCC CFR 47 Part 2 and 27 and Industry Canada RSS-130 and RSS-Gen

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRY901334-1 IC: 287AB-AS9013341

PREPARED BY

APPROVED BY

DATED

mm

Neil Rousell Senior Engineer (RF)

Merly

Ryan Henley Authorised Signatory

27 February 2015

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SECTION 1

REPORT INFORMATION





1.1 **REPORT DETAILS**

Manufacturer	Ericsson
Address	349 Terry Fox Drive Ottawa Ontario K2K 2V6
Product Name	RD 2242 B13
Product Number	KRY 901 334/1
IC Model Name	AS9013341
Serial Number(s)	C829198777
Software Version	CXP9013268/14_R59FJ
Hardware Version	R1B
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2014 FCC CFR 47 Part 27: 2014 Industry Canada RSS-130 Issue 1: Oct 2013
Start of Test	28 January 2015
Finish of Test	02 February 2015
Name of Engineer(s)	Neil Rousell
Related Document(s)	Industry Canada RSS-GEN Issue 4: Nov 2014





1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2 and 27 and Industry Canada RSS-130 and RSS-Gen is shown below.

	Spec Clause				
Section	Part 2	Part 27	RSS 130 / RSS-Gen	Test Description	Result
2.1	2.1046	27.50(b)	4.4	Maximum Peak Output Power – Conducted	Pass
2.2	2.1049(h)	27.53(c)(1)	RSS-Gen 6.6	Occupied Bandwidth	Pass
2.3	2.1051	27.53(c)	4.6 / 6.13	Spurious Emissions at Band Edge	Pass
2.4	2.1051	27.53(c)	4.6 / 6.13	Conducted Spurious Emissions	Pass
2.5	2.1055	27.54	4.3 / 6.11	Frequency Stability Under Temperature Variations	Pass
2.6	2.1055	27.54	4.3 / 6.11	Frequency Stability Under Voltage Variations	Pass
-	-	-	RSS-Gen 7.1	Receiver Spurious Emissions	Pass*
-	2.1053	27.53	RSS-Gen 6.13	Transmitter Radiated Emissions	Pass*

N/A – Not Applicable.

* - Reference Flextronics Design Validation Centre, Canada EMC Test Report: Reference Number K002569-TR-EMC-03-R1.

Flextronics Canada Design Services Inc.

1280 Teron Side Road Kanata, Ontario, K2K 2C1 Canada

Accreditations (Flextronics)

The Design Validation Centre (DVC) test facilities are accredited by the Standards Council of Canada (SCC) to ISO/IEC 17025 in accordance with the scope of accreditation outlined at the web site http://palcan.scc.ca/Specs/PDF/95_e.pdf. The SCC is a signatory of the APLAC [4] and ILAC [14] Mutual Recognition Arrangements. The SCC's Laboratory Accreditation Program has been evaluated and has demonstrated its competence to operate according to the requirements of ISO/IEC 17011.

4) APLAC, Asia Pacific Laboratory Accreditation Cooperation, Website (http://www.aplac.org).
14) ILAC, International Laboratory Accreditation Cooperation, Website (http://www.ilac.org/)





1.3 CONFIGURATION DESCRIPTION

The RD 2242 B13 / KRY 901 334/1 supports Single and Dual Carrier operation from either a single or dual port configuration.

The RD 2242 B13 / KRY 901 334/1 supports LTE Test Models E-TM1.1, E-TM3.1 and E-TM3.2 in Band 13 (746 MHz – 756 MHz). The following test models were used as defined in 3GPP TS 36.141. Test Model E-TM1.1 was used to represent QPSK modulation, Test Model E-TM3.1 was used to represent 64QAM modulation, and Test Model E-TM3.2 was used to represent 16QAM modulation.

The RD 2242 B13 has been tested and authorized for LTE Transmission SC, MC. The LTE Test Model used, unless otherwise stated was E-TM1.1.

For TX test cases: Maximum Conducted Output Power, Spurious Emissions at Antenna Terminals (±1MHz) and Conducted Spurious Emissions, measurements were performed on both RF Ports using a test limit accounting for MIMO operation with 2 ports. All RF ports were tested for RF Carrier Power and results recorded using the Measure and Sum approach to account for MIMO operation. The test limits shown are representative of the worst case. All testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

The EUT was powered via POE (Power Over Ethernet) from the IRU 2242 using a -48V DC Power supply.

Channel Configurations LTE B13

<u>746 MHz – 756 MHz</u>

All tests

Mode	DAT	Number	Dondwidth	Carrier Frequency Configuration (MHz)				
Description	KAI	Carriers	Banowidth	Bottom (BRFBW)	Middle (MRFBW)	Top (TRFBW)		
LTE-SC	LTE	1	5 MHz	748.5	751	753.5		
LTE-SC	LTE	1	10 MHz		751			
LTE-MC	LTE	2	5 MHz	-	748.5 + 753.5	-		

Table 1





1.4 DECLARATION OF BUILD STATUS

	MAIN EUT					
MANUFACTURING DESCRIPTION	Radio Dot					
MANUFACTURER	Ericsson					
TYPE	Remote Radio Base Station					
PART NUMBER	KRY 901 334/1					
SERIAL NUMBER	C829198777					
HARDWARE VERSION	R1B .					
SOFTWARE VERSION	R59FJ					
TRANSMITTER OPERATING RANGE	746MHz – 756MHz					
RECEIVER OPERATING RANGE	777MHz – 787MHz .					
COUNTRY OF ORIGIN	Sweden					
INTERMEDIATE FREQUENCIES	DL 140MHz - 150 MHz, UL 70MHz - 80MHz					
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	LTE 5M00 W7D 10M0 W7D					
MODULATION TYPES: (i.e. GMSK, QPSK)	LTE: QPSK, 16QAM, 64QAM					
HIGHEST INTERNALLY GENERATED	787MHz					
OUTPUT POWER (W or dBm)	2 x 0.05W (17dBm)					
FCC ID	TA8AKRY901334-1					
INDUSTRY CANADA ID	287AB-AS9013341					
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The RD 2242 B13 (KRY 901 334/1) is a Remote Radio Unit forming part of the Ericsson Radio Base Station (RBS) equipment. The RD provides radio access for mobile and fixed devices and is intended for the indoor environment. The radio operates over 2 Transmit ports in Single, Multi- Carrier, and MIMO transmission with a maximum rated RF Output of 0.05W per port over an operational temperature of 5°C to +40°C. The unit is designed to be ceiling mounted.					

Signature:

 \sim

David Bolzon Date: 09 February 2015 Declaration of Build Status Serial Number: C829198777

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





1.5 **PRODUCT INFORMATION**

1.5.1 Technical Description

The RD 2242 B13 (KRY 901 334/1) is a multi-standard radio forming part of Ericsson's RBS 6000 series Radio Base Station (RBS) equipment. The RD 2242 (Radio Dot System) product provides radio access for mobile and fixed devices and is intended for the indoor environment.

An ethernet interface provides the RD 2242 with a power, control and digital communications between the RD 2242 and RBS. The location of the RD 2242 with respect to the RBS is limited to a distance of 100 metres.

The RD 2242 B13 supports two (2) Transmit / Receive ports operating in the E-UTRA Band 13 at a Downlink (transmit) frequency from 746 MHz to 756 MHz and an Uplink (receive) frequency from 777 MHz to 787 MHz. The radio operates in FDD (Frequency Division Duplex) with a duplex spacing of 31 MHz and supports operation on LTE Radio Access Transmission Standard (RAT) at transmit bandwidths up to 10 MHz.

The radio operates over 2 transmit ports in Single, Multi-Carrier, and MIMO transmission with a maximum rated RF output power of 50mW per port over an operational temperature of $+5^{\circ}$ C to $+40^{\circ}$ C.

A full technical description can be found in the Manufacturer's documentation.





1.6 TEST SETUP

Test Setup, Conducted Measurement:



RD 2242 RU Radio Compliance Set-Up

See Section 3 for a list of the test equipment used in the test.

Test Setup, Radiated Measurement:

Reference: Flextronics Design Validation Centre, Canada Report Reference Number K002569-TR-EMC-03-R1.





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 via POE (Power Over Ethernet).

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 Ottawa, Canada.

1.11 ADDITIONAL INFORMATION

Testing performed in the presence of Mr Denis Lalonde.





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 27, Clause 27.50(b) Industry Canada RSS-130, Clause 4.4

2.1.2 Date of Test and Modification State

30 January 2015 - 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 Temperature27.5°CRelative Humidity16.6%

2.1.5 Test Method

The EUT was connected to a Spectrum Analyser via 20dB 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.

Measurements were performed with the Spectrum Analyser Band Power measurement function in accordance with FCC KDB 971168 D01 v02r02. The detector was set to RMS with a RBW of at least 1% of the theoretical signal bandwidth and a VBW of 3 times the RBW. The detection bandwidth was configured to be wider than the total bandwidth of the carrier or combinations of carriers, (multi-carrier). The sweep time was set to Auto and 200 averages were performed before the result was recorded. Prior to testing, comparative measurements were made with an Average Power sensor and Power Meter to confirm correlation with the method used.

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 80MHz (In this case 10MHz was the total RF Bandwidth in single and multi-carrier mode). A comparison was made with a wide band Power Meter capable of measuring Peak to Average ratio to confirm correlation with the method used.

Testing was performed on both ports.





2.1.6 Test Results

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per Carrier, E-TM1.1

		Peak Output Power / Peak to Average Ratio (PAR)							
Antenna	Carrier Bandwidth	Channel Position B		Channel F	Channel Position M		Channel Position T		
/ interind	(MHz)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)		
A		17.07	7.37	17.16	7.44	17.58	7.41		
В	5.0 MHZ	16.14	7.30	16.38	7.37	16.66	7.33		
Total		19.64	-	19.80	-	20.16	-		
A		-	-	17.11	7.40	-	-		
В	TU.U MHZ	-	-	16.37	7.34	-	-		
Total		-	-	19.76	-	-	-		





Channel Position B – Bandwidth 5.0 MHz – Antenna A



Channel Position M – Bandwidth 5.0 MHz – Antenna A







Channel Position T – Bandwidth 5.0 MHz – Antenna A



Channel Position B - Bandwidth 5.0 MHz - Antenna B







Channel Position M – Bandwidth 5.0 MHz – Antenna B



Channel Position T – Bandwidth 5.0 MHz – Antenna B







im Analyzer - Power Stat CCD 11:54:00 AM Jan 30, 2015 Radio Std: None NSE:EXT ALIGN AUTO Center Freq: 751.000000 MHz Trig: Free Run Counts:10.0 M/10.0 Mpt #Atten: 18 dB SE Center Freq 751.000000 MHz -#IFGain:Low 100 % Gaussian Average Power 16.97 dBm 36.89 % at 0dB 10 % 1 % 10.0 % 3.68 dB 0.1 % 1.0 % 6.64 dB 0.1 % 7.40 dB 0.01 % 7.61 dB 0.01 % 0.001 % 7.73 dB 0.0001 % 7.83 dB 0.001 % 7.84 dB Peak 24.81 dBm 0.0001 % 20 dB Info BW 80.000 MHz STATUS

Channel Position M – Bandwidth 10.0 MHz – Antenna A

Channel Position M – Bandwidth 10.0 MHz – Antenna B







Configuration 2 LTE-MC (See Table 1 for carrier frequency)

Maximum Output Power 14 dBm per Carrier (17 dBm per Port), E-TM1.1

		Peak Output Power / Peak to Average Ratio (PAR)						
Antenna	Carrier Bandwidth (MHz)	Channel Position B		Channel Position M		Channel Position T		
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	
А	5 0 MUL	-	-	17.08	-	-	-	
В	5.0 MHZ	-	-	16.48	-	-	-	
Total		-	-	19.80	-	-	-	

Limit					
Peak Power	≤1000 W or ≤+60 dBm				
Peak to Average Ratio	13 dB				





2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 27, Clause 27.53(c)(1) Industry Canada RSS-Gen, Clause 6.6

2.2.2 Date of Test and Modification State

30 January 2015 - 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 Temperature27.5°CRelative Humidity16.6%

2.2.5 Test Method

The EUT was connected to a Spectrum Analyser via 20dB 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.

Measurements were performed with the Spectrum Analyser Occupied Band Width measurement function in accordance with FCC KDB 971168 D01 v02r02.

The Spectrum Analyser RBW was configured to be at least 1% of the channel bandwidth of the carrier to be measured and its OBW measurement mode used in conjunction with an RMS detector and a long sweep time (as described in the operating manual for the test equipment) for the 26dB and 99% Occupied Bandwidth measurements on Bottom, Middle and Top Channels. Testing was performed on both ports.

The results are shown in the plots below.

2.2.6 Test Results

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna A, E-TM1.1

	Result (MHz)								
Carrier	Channel Position B		Channel I	Position M	Channel Position T				
Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth			
5.0 MHz	4,479.03	4,740.64	4,481.08	4,738.88	4,474.75	4,732.58			
10.0 MHz	-	-	8,944.03	9,380.59	-	-			





Channel Position B – Bandwidth 5.0 MHz – Antenna A

📕 Keysight Spectrum Analyzer - Occupied BV	N			
X RL RF 50Ω AC	MHz	SENSE:EXT Center Freg: 748.50000	ALIGN AUTO	09:32:26 AM Jan 30, 2015 Radio Std: None
	→	Trig: Free Run	Avg Hold: 1000/1000	Padia Davias: BTS
	#IFGain:Low	#Atten: 14 db		Radio Device: B I S
Log	<u>n</u>			
4.02			+	
-5.98				
-16.0				
-26.0				
-36.0				
-46.0				
-56.0				
-66.0				
-76.0				
Center 748.5 MHz		#V/B)A/ 160 k	H7	Span 10 MHz Sween 5 ms
#Res BW ST RHZ		#VDVV 100 K	112	Sweep 5 113
Occupied Bandwidt	th	Total Power	17.0 dBm	
4.	4790 MHz			
Transmit Freq Error	364 Hz	OBW Power	99.00 %	
x dB Bandwidth	4.741 MHz	x dB	-26.00 dB	
MSG			STATUS	

Channel Position M – Bandwidth 5.0 MHz – Antenna A

Keysight Spectrum Analyzer - Occupied	3 BW			- ð -
Center Freq 751.00000		SENSE:EXT Center Freq: 751.00000	ALIGN AUTO	09:42:04 AM Jan 30, 2015 Radio Std: None
	→	Trig: Free Run	Avg Hold: 1000/1000	Padia Davias: BTS
	#IFGain:Low	#Atten: 16 db		Radio Device: B13
	_			
10 dB/div Ref 14.04 dl	Bm			
4.04				
-5.96				
-16.0	1			
-26.0				
-36.0				
-46.0			~~~~	
-56.0				
-66.0				
-76.0				
Center 751 MHz #Res BW 51 kHz		#VBW 160 kl	Hz	Span 10 MHz Sweep 5 ms
Occupied Bandwi	dth	Total Power	17.1 dBm	
4	4.4811 MHz			
Transmit Freq Error	2.931 kHz	OBW Power	99.00 %	
x dB Bandwidth	4.739 MHz	x dB	-26.00 dB	
MSG			STATUS	





Channel Position T – Bandwidth 5.0 MHz – Antenna A

📕 Keysight Spectrum	Analyzer - Occupied	BW							
Center Fred	F 50 Ω AC			SENSE:EXT Center Fre	a: 753.50000	ALIGN AUTO		09:46:1 Radio Std:	1 AM Jan 30, 2015 None
Center rieg	100.00000			Trig: Free	Run	Avg Hold: 1	000/1000	Padio Devi	A BTS
		-	#FGain:Low	#Attent to	ab			Radio Devic	:e: D13
10 dB/div	Pof 14 27 dE								
Log		<u>, , , , , , , , , , , , , , , , , , , </u>	Τ				1		
4.27									
-5.73	+ +		T						
-15.7			-						
-25.7	+	-+	+						
-35.7									
-45.7									
-55.7									
-65.7	+ +		-						+
-75.7	-								
Center 753.5	MHz							S	oan 10 MHz
#Res BW 51	kHz			#VE	3W 160 ki	łz		S	weep 5 ms
Occupie	d Bandwic	lth		Total P	ower	17.5 dE	m		
Coode	A	4747							
	4	.4/4/							
Transmit	Freq Error	2.8	824 kHz	OBW P	ower	99.00	%		
x dB Band	dwidth	4.7	33 MHz	x dB		-26.00	B		
MSG						STATUS			

Channel Position M – Bandwidth 10.0 MHz – Antenna A

📕 Keysight Spectrum Ana	alyzer - Occupied B	3W							- 6 -
Center Fred 75	50 Ω AC	MHz		SENSE:EXT	Ag: 751.00000	MHz		11:54:1 Radio Std:	16 AM Jan 30, 2015 None
			HEColori	Trig: Free #Atten: 16	Run	Avg Hold:	1000/1000	Padio Devi	BTS
			#IFGall1:LOW	written. To	00			Rudio Devi	
10 dB/div De	f 14 20 dB	m							
Log	1 14.20 db	<u> </u>							
4.20		~							
-5.80		1							
-15.8									
-25.8									
-35.8							+		I
-45.8									
-55.8									+
-65.8									I
-75.8									I
Center 751 MH	z							S	pan 20 MHz
#Res BW 100 k	Hz			#VE	300 kH	z		Swee	p 2.533 ms
Occupied	Bandwid	th		Total P	ower	17.1 d	Bm		
	0	9110	MU-						
	0								
Transmit Fre	eq Error	5.	228 kHz	OBW P	ower	99.0	0 %		
x dB Bandw	idth	9.3	81 MHz	x dB		-26.00	dB		
MSG						STATUS			





Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna B, E-TM1.1

		Result (MHz)								
Carrier	Channel F	Position B	Channel F	Position M	Channel Position T					
Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth				
5.0 MHz	4,475.98	4,724.37	4,480.75	4,732.36	4,474.63	4,726.62				
10.0 MHz	-	-	8,935.78	9,365.85	-	-				

Channel Position B – Bandwidth 5.0 MHz – Antenna B

鱦 Keysight Spec	trum Analyzer - Occupied BW				
UXI RL	RF 50 Ω AC		SENSE:EXT	ALIGN AUTO	10:06:23 AM Jan 30, 2015
Center Fr	eq 748.500000 N	/Hz	Trig: Free Run	AvalHold: 1000/1000	Radio Std: None
		#IFGain:Low	#Atten: 14 dB		Radio Device: BTS
	2				
10 dB/div	Def 13.01 dBm				
Log		· · · · · · · · · · · · · · · · · · ·			
3.01					
-6.99					
-17.0		1			
-27.0					
37.0		/			
47.0					
-47.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				- min - min
-57.0					
-67.0					
-77.0					
Center 74	9.5 MHz				Spap 10 MHz
#Res BW	51 kHz		#VBW 1601	kHz	Sweep 5 ms
Occur	ied Bandwidt	n	Total Power	16.1 dBm	
	4.4				
Transm	nit Freq Error	481 Hz	OBW Power	99.00 %	
x dB Ba	andwidth	4.724 MHz	x dB	-26.00 dB	
NEO				CTATIC	
MSG				STATUS	





Channel Position M – Bandwidth 5.0 MHz – Antenna B

📕 Keysight Spe	ectrum Analyzer - Occupied I	BW							
Center Fi	RF 50 Ω AC	MH7		SENSE:EXT Center Fre	a: 751.00000	ILIGN AUTO		10:12:2 Radio Std:	0 AM Jan 30, 2015 None
Center I		111112		Trig: Free	Run	Avg Hold: 10	000/1000	Padio Devir	De BTS
	_		#IFGain:Low	#Atten: 14	ub			Radio Devic	2.013
	Dof 12 45 dB								
Log	Rel 13.45 ub	, mi					1		
3.45							_		
-6.55		f					7	-	
-16.6									
-26.6									
-36.6		-+					+		
-46.6			-						
-56.6									
-66.6									
-76.6									
#Res BW	51 MHZ 51 kHz			#VE	3W 160 kH	Iz		5	weep 5 ms
Occur	pied Bandwid	ith		Total P	ower	16.4 dB	m		
	4	.4807	′ MHz						
Transr	nit Freq Error	2.	727 kHz	OBW P	ower	99.00	%		
x dB B	andwidth	4.7	732 MHz	x dB		-26.00 0	IВ		
MSG						STATUS			

Channel Position T – Bandwidth 5.0 MHz – Antenna B

🎉 Keysight Spectrum Analyzer - O	ccupied BW							
Center Freq 753 50			SENSE:EXT Center Freq:	AL 753.500000	IGN AUTO		10:17: Radio Std:	31 AM Jan 30, 2015 None
	0000 11112	#IECoind out	Trig: Free Ru	n	Avg Hold:	1000/1000	Radio Devi	ce: BTS
		#IFGain:Low	WAtten: 14 ub				Radio Devi	
10 dB/div Def 13	l6 dBm							
								I
3.46								
-6.54	1					<u>₹}</u>		
-16.5						$+\mathbb{N}$		
-26.5	- /					+		
-36.5	- /					++		I
-46.5						++	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-56.5		_				+	_	
-66.5			+ +			+	_	<u> </u>
-76.5						+	_	
Cepter 753.5 MHz								nan 10 MHz
#Res BW 51 kHz			#VBW	160 kHz	z		s	weep 5 ms
Occupied Ban	dwidth		Total Pov	ver	16.6 d	IBm		
	A A7A							
	4.4/4							
Transmit Freq Er	ror 2	.214 kHz	OBW Pov	ver	99.0	0 %		
x dB Bandwidth	4.	727 MHz	x dB		-26.00	dB		
MSG					STATUS			





Channel Position M – Bandwidth 10.0 MHz – Antenna B

Keysight Spectrum Analyzer - Occupied BW	1			
RL RF 50 Ω AC Center Freq 751 000000 N	ЛН	SENSE:EXT Center Freq: 751.00000	ALIGN AUTO	10:29:57 AM Jan 30, 2015 Radio Std: None
	#IFGain:Low	. Trig: Free Run #Atten: 16 dB	Avg Hold: 1000/1000	Radio Device: BTS
10 dB/div Ref 13.56 dBm	1			
Log				
5.56				
-0.44	1			
-10.4	}			
36.4	/			
-36.4				
56.4				
-56.4				
-76.4				
10.4				
Center 751 MHz #Res BW 100 kHz		#VBW 300 k	Hz	Span 20 MHz Sweep 2.533 ms
Occupied Bandwidt	h	Total Power	16.4 dBm	
8.9	9358 MHz			
Transmit Freq Error	4.742 kHz	OBW Power	99.00 %	
x dB Bandwidth	9.366 MHz	x dB	-26.00 dB	
MSG			STATUS	





2.3 BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 FCC CFR 47 Part 27, Clause 27.53(c)(1) Industry Canada RSS-Gen, Clause 6.13 Industry Canada RSS-130, Clause 4.6

2.3.2 Date of Test and Modification State

30 January 2015 - 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 Temperature27.5°CRelative Humidity16.6%

2.3.5 Test Method

The EUT was connected to a Spectrum Analyser via 20dB 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.

The Spectrum Analyser RBW was adjusted to be at least 1% of the measured 26dB Bandwidth. Using an RMS detector, the frequency spectrum up to 1MHz away from the Band Edge was investigated. The Band Power measurement function of the Spectrum Analyser was used. The Band Power span was configured to be at least 1% of the 26dB Bandwidth and was positioned in the 1MHz region which gave the worst case result.

Testing was performed on both ports. The test limits were set to a worst case value of -16dBm.

The results are shown in the plots below.

2.3.6 Test Results

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna A, E-TM1.1

Corrier Denduridah	Madulation	Band Edge (MHz)				
Carrier Bandwidth	Modulation	Channel Position B	Channel Position T			
5.0 MHz	QPSK	748.50	753.50			
10.0 MHz	QPSK	751.00	751.00			





Channel Position B – Bandwidth 5.0 MHz – Antenna A



Channel Position T - Bandwidth 5.0 MHz - Antenna A







Channel Position B – Bandwidth 10.0 MHz – Antenna A

🎉 Ke	/sight Spe	trum An	alyzer - Swept SA										- 6 -
CXI R		RF	50 Ω AC			SENSE:E	XT		ALI	GN AUTO	DMC	11:59	:52 AM Jan 30, 2015
Cen	ter Fr	eq 7	46.000000	MHz	NO: Wido	. Tric	: Free	Run		Avg Type: Avg Hold: 1	RMIS 1/1		TYPE A WWWW
				i i	FGain:Low	#At	ten: 10	dB					DETANNNNN
				_								Mkr1 74	5.950 MHz
10 dF	Sidiv	Ref	mset 20.43 d 14.43 dBm	в							Band P	ower -4	4.379 dBm
Log													
4.43													
-5.57													
-15.6												~~~~~	16.01 dBm
-25.6													
35.6										/			
-55.0													
15.0													
-45.6							.1						
							2	مورسيا					
-55.6	-		*****		en dillerer deter								
-65.6		_											
-75.6													
~ ~~	tor 74		DALL-										n 2 000 MHz
ten #Po	BIA	0.000 10 kH			#\/B	M 30	kH7*				#Sw	oon 5.000	an 2.000 MHZ
#RC	5 044		2		#*0	W 30	KI12				#3₩	eep 3.000	, a (1001 pts)
MSG										STATUS			

Channel Position T - Bandwidth 10.0 MHz - Antenna A







Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna B, E-TM1.1

O and a D an day idth	Madulatian	Band Edge (MHz)				
Camer Bandwidth	Modulation	Channel Position B	Channel Position T			
5.0 MHz	QPSK	748.50	753.50			
10.0 MHz	QPSK	751.00	751.00			

Channel Position B – Bandwidth 5.0 MHz – Antenna B

🔰 Kej	/sight Spee	trum Ar	nalyzer - Swept SA									
LXI R	L .	RF	50 Ω AC			SENSE:EXT		AL	IGN AUTO		10:06:50	AM Jan 30, 2015
Cen	ter Fr	eq 7	46.00000) MHz	PNO: Wide	. Trig: Fr #Atten:	ree R 10 d	tun IB	Avg Type: Avg Hold: 1	RMS //1	T	DET A NNNNN
				_	IFGall.LOW						Mkr1 745	975 MHz
10 dE	3/div	Ref C Ref	offset 20.42 d 14.42 dBm	в						Band P	ower -48.	150 dBm
LUg												
4.42							\vdash					
-5.58												
									ለኩታሎታማበላት	www.	wannethoutset	mondues
-15.6							H		1			* \$16.01*dBm
-25.6							\vdash		1			
-35.6									«'			
								م م				
-45.6								7				
-55.6				1	مريد بر ماريد	where the second	\$	м —				
65.6	yra byra	H MAN	₿ ৻ ∕₩ ₽ ₽₩₩₩₩	and the second	In order of the Low of							
-05.0												
-75.6							\vdash					
Cen #Re	ter 740 s BW 4	5.000 5.1 kł	MHz Hz		#VB	W 16 kH	Z*			#Swe	Span ep 5.000 s	2.000 MHz (1001 pts)
MSG									STATUS		-	





Channel Position T – Bandwidth 5.0 MHz – Antenna B



Channel Position B - Bandwidth 10.0 MHz - Antenna B







Channel Position T – Bandwidth 10.0 MHz – Antenna B



Configuration 2 LTE MC (see Table 1 for carrier frequency)

Maximum Output Power 14 dBm per Carrier (17 dBm per Port), Antenna A, E-TM1.1

Corrier Dendwidth		Band Edge (MHz)				
Carner Bandwidth	Modulation	Channel Position B	Channel Position T			
5.0 MHz	QPSK	748.5 + 753.5	748.5 + 753.5			





Channel Position B - Antenna A

📕 Kej	/sight Spe	ctrum A	nalyzer - Swept SA									
K RI		RF	50 Ω AC			SENSE:E	XT	AL	IGN AUTO	DMC	10:52:3	9 AM Jan 30, 2015
Cen	ter Fi	req /	46.00000	UMHZ	PNO: Wide	. Tric	a: Free	Run	Avg Type: Avg Hold: 1	KWI5 1/1		TYPE A WWWW
					IFGain:Low	#At	ten: 10	dB				DET A NNNNN
											Mkr1 745	.950 MHz
10 dF	Sidiv	Ref	Jπset 20.42 d 14.42 dBm	1B 1B						Band P	ower -44	.223 dBm
Log												
4.42							<u> </u>					
-5.58												
-15.6									men	4-~~?\$4~~******	*******	-16.01 dBm
-25.6												
20.0									2			
35.6									1			
-55.0								1				
15.0												
-45.6							•1					
							2					
-55.6		1445-95	and the second					¥ -				
-65.6					+							
-75.6					+	-						<u>├</u> []
Com	tor 74	6 000	DALL-			I					Cmar	
#Poi		0.000 10 kH	IVINZ Iz		#\/P	1AC 30	kH7*			#Swa	spar 5000	2.000 WHZ
TRC:	5 099	IO KI	12		#VE	W 30	KHZ			#3999	cep 3.000	5 (1001 pts)
MSG									STATUS			

Channel Position T - Antenna A







Configuration 2 LTE MC (see Table 1 for carrier frequency)

Maximum Output Power 14 dBm per Carrier (17 dBm per Port), Antenna B, E-TM1.1

	Madulatian	Band Edg	ge (MHz)
Camer Bandwidth	Modulation	Channel Position B	Channel Position T
5.0 MHz	QPSK	748.5 + 753.5	748.5 + 753.5

Channel Position B - Antenna B

🎉 Kej	ysight Spe	ctrum Ar	nalyzer - Swept SA									
LXI RI	L	RF	50 Ω AC			SENSE:E	XT	AL	IGN AUTO		12:08:34	PM Jan 30, 2015
Cen	ter Fi	req 7	46.000000	D MHz		Trie	. Ereel	Run	Avg Type:	RMS	TF	TYPE A MANAGEMENT
					PNO: Wide ++	#At	ten: 10	dB	Avginola.			DETANNNN
					Ir Gall.Low						Alen4 745	050 1411-
		Ref	Offset 20.42 d	IB						Danal D	VIKF1 745	.950 MHZ
10 dE	3/div	Ref	14.42 dBm	1						Band Po	ower -46.	807 aBm
Log												
4.42						-						
-5.58						-						<u> </u>
-15.6									man	hannen men	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	16.01 0Bm
-13.0									1			
									{			
-25.6						-			1			
									r			
-35.6								- /				
-45.6												
							6 ¹					
-55.b		n.Ah	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- way		-	~~**				
-65.6					+							<u> </u>
-75.6												
Cen	ter 74	6.000	MHz								Span	2.000 MHz
#Re:	s BW	10 kH	Iz		#VE	W 30	kHz*			#Swe	ep 5.000 s	s (1001 pts)
MSG									STATUS		-	/
									012103			





Channel Position T - Antenna B







2.4 TRANSMITTER SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 FCC CFR 47 Part 27, Clause 27.53(c) Industry Canada RSS-Gen, Clause 6.13 Industry Canada RSS-130, Clause 4.6

2.4.2 Date of Test and Modification State

30 January 2015 - Modification State 0

2.4.3 Test Equipment Used

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

2.4.4 Environmental Conditions

Ambient Temperature27.5°CRelative Humidity16.6%

2.4.5 Test Method

The EUT was connected to a Spectrum Analyser via 20dB of attenuation for measurements below 1.34GHz and 20dB of attenuation and a high pass filter for measurements from 1.34GHz to 8GHz.

A Network Analyser was used to calibrate the path loss between the EUT and the Spectrum Analyser and the worst case path loss in the measured ranges was entered as a reference level offset.

Measurements were performed in accordance with FCC KDB 971168 D01 v02r02. Over the measured ranges, the analyser RBW was set to 1MHz, VBW 3MHz with an RMS detector used in conjunction with a trace Max Hold to give the required average result.

Testing was performed on both ports in configurations of the EUT as reported below. The test limits were set to a worst case value of -16dBm.

The results are shown in the plots below.

2.4.6 Test Results

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna A, E-TM1.1





Channel Position B – Bandwidth 5.0 MHz – Antenna A

📕 Kej	/sight Spectru	m Analyzer - Swept S	A								
LXI RI		RF 50 Ω 🚹 D	с		SENSE:EXT		AL	IGN AUTO	-	09:33:38	AM Jan 30, 2015
Cen	ter Fre	q 670.00450	NFE	PNO: Fast ++	. Trig: Free #Atten: 10	Run dB		#Avg Type:	RMS		DET A NNNN
10 dE	F B/div F	tef Offset 20.69 tef 16.05 dBi	dB n							Mkr1 7 11	47.3 MHz I.03 dBm
209						· ·	•1 [−]				
6.05											
-3.95											
-14.0											-16.01 dBm
-24.0											
-34.0											
-44.0							<u> </u>				
-54.0											
-64.0											
74.0											
-74.0	Manager	an a	a hild a state of the state of	internet (je zakoval	ultynligthidigu yn fei da	et Shide	والمغية	alanan wasan ini kuwa kuwa kuwa kuwa kuwa kuwa kuwa kuwa	an in the second second	n in the states of the states of the	lippeden at since principles
Star #Res	t 9 kHz s BW 1.0) MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🧘	DC Coupled		

Channel Position B - Bandwidth 5.0 MHz - Antenna A







Channel Position M – Bandwidth 5.0 MHz – Antenna A

🚺 Kej	sight Spectrur	n Analyzer - Swept SA									- 6 -
LXI RI	L	RF 50 Ω 🚹 DC			SENSE:EXT		AL	IGN AUTO		09:42:45	AM Jan 30, 2015
Cen	ter Frec	670.00450	D MHZ NFE I	PNO: Fast ++ FGain:Low	Trig: Free #Atten: 10	Run dB		#Avg Type:	RMS	TR	DET A NNNN
10 dE	R B/div R	ef Offset 20.69 d ef 16.30 dBm	IB I							Mkr1 7 11	52.3 MHz I.33 dBm
209							∳ 1				
6.30											
-3.70											
-13.7											-16.01 dBm
-23.7											
-33.7											
-43.7											
-53.7											
-63.7											
70.7											
-/3.7	₩andrainifi(¶#		n for the state of	and a constant of the play is	n si ka il ka il ka ili ka Ka ili ka ili	the super	Hereitad		-	lejinijer-rozentogle	handrighter
Star #Re	t9 kHz sBW 1.0	MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🧘	DC Coupled		

Channel Position M – Bandwidth 5.0 MHz – Antenna A







Channel Position T – Bandwidth 5.0 MHz – Antenna A

🗾 Ke	ysight Spectrum	Analyzer - Swept SA									
LXI R	L Ri	F 50 Ω 🚹 DC			SENSE:EXT		AL	IGN AUTO	-	09:47:27	AM Jan 30, 2015
Cen	ter Freq	670.00450	NFE I	PNO: Fast ++	. Trig: Free #Atten: 12	Run dB		#Avg Type:	RMS	1	DET A NNNNN
10 di	Ref B/div Re	f Offset 20.69 o f 16.54 dBm	IB I							Mkr1 7 11	54.3 MHz I.55 dBm
						· ·	●1 [
6.54							1				
-3.46											
-13.5											-16.01 dBm
-23.5											
-33.5											
-43.5											
-53.5											
-63.5											
-73.5	· ·			and the second secon	alitation as beaut	Level ball of	-		4	to be device to a	
	2 8 6 8 7 B 9	արտերու արտանություն	իստ ու ենել։	, 1976 - 197 9 - 1979 - 19 79 - 197 	a a la contra de la Contra de la contra d		in nit	internet and the second of the second se	i form for the state of the sta	erian filmaniya in	ar an
Star #Re	t9 kHz sBW 1.0∣	MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz 6 (2680 pts)
MSG								STATUS 🧘	DC Coupled		

Channel Position T - Bandwidth 5.0 MHz - Antenna A







Channel Position M – Bandwidth 10.0 MHz – Antenna A

🔰 Ke	ysight Spectrum	Analyzer - Swept SA									- 6 -
LXI R	L RF	50 Ω 🚹 DC			SENSE:EXT		AL	IGN AUTO	DMC	11:55:53	AM Jan 30, 2015
Inpu	it Mech A	atten 12 de	NFE F	PNO: Fast ++	. Trig: Free #Atten: 12	Run dB		#Avg Type:	RWS		DET A NNNNN
10 di	Ref B/div Re t	Offset 20.69 d f 13.39 dBm	В							Mkr1 7 ٤	53.8 MHz 3.34 dBm
209							● 1 []				
3.39							1				
-6.61											
-16.6											-16.01 dBm
-26.6											
-36.6							<u> </u>				
-46.6											
-56.6											
-66.6											
-76.6	had a start of the	a and the second se	hale start for the second	ilyi ye ifi iye a a a a a a a a a a a a a a a a a a a	International of the second			مەربىيەنىيەر بەربىيەر بەربىيە			the sales of the s
Star #Re	t9 kHz sBW/1.0 ľ	VIHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🔔	DC Coupled		

Channel Position M – Bandwidth 10.0 MHz – Antenna A







Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna B, E-TM1.1

Channel Position B - Bandwidth 5.0 MHz - Antenna B

🗾 Ke	Keysight Spectrum Analyzer - Swept SA											- 6 -
LXI R	L	RF	50 Ω 🛕 DC			SENSE:EXT		AL	IGN AUTO		10:07:36	AM Jan 30, 2015
Cen	iter Fr	eq 6	70.004500	D MHz NFE F	PNO: Fast ++	Trig: Free #Atten: 10	Run dB		#Avg Type:	RMS	TR	ACE 1 2 3 4 5 6 YPE WWWWWW DET A NNNNN
10 di	B/div	Ref (Ref	Offset 20.69 d 15.07 dBm	B				_			Mkr1 74 10	47.3 MHz).08 dBm
5.07								1				
-4.93												
-14.9												16.01 dBm
-24.9												
-34.9												
-44.9												
-54.9								+				
-64.9												
-74.9	Hertester	1	an the second	and the second		unnika kapada ang ma	international de la construcción de	إنجيا	distance in the second	وشولة وبزوارهم بزريالياه	مى بۇر ىيە ب ۇرۇرىيە مۇرۇرە مەرەپ	Muthyd-new myddillad oudlog
Star #Re:	t9 kHz sBW/1	z I.0 Ⅳ	IHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG									STATUS 🤔	DC Coupled		

Channel Position B - Bandwidth 5.0 MHz - Antenna B

🇾 Kej	ysight Spec	trum Analyze	er - Swept SA								
IXI RI	L En	RF	50 Ω AC			SENSE:EXT	A	ALIGN AUTO	DMS	10:08:58	8 AM Jan 30, 2015
Cen	ter Fr	eq 4.67	000000	JU GHZ	PNO: Fast	. Trig: Free #Atten: 6 d	Run IB	#Avg Type.	Ring		DET A NNNNN
10 dE	3/div	Ref Offs Ref 20.	et 29.51 d 00 dBm	в		-		-		Mkr1 3.6 -53	56 2 GHz 3.05 dBm
10.0											
0.00											
-10.0											
-20.0											-16.01 dBm
-30.0											
40.0											
-40.0											
-50.0				~							
-60.0						\sim					
-70.0											
010										04	
#Re	t 1.340 s BW 1	I.0 MHz			#VE	W 3.0 MHz	•		#Swee	stop p 13.32 s	8.000 GHz (13320 pts)
MSG								STATUS			





Channel Position M – Bandwidth 5.0 MHz – Antenna B

🚺 Kej	sight Spectrum	Analyzer - Swept SA									
IXI RI	R	F 50 Ω 🚹 DC			SENSE:EXT		AL	IGN AUTO		10:13:20	AM Jan 30, 2015
Cen	ter Freq	670.00450	D MHZ NFE F	PNO: Fast ++	Trig: Free #Atten: 10	Run dB		#Avg Type:	RMS	TH T	ACE 1 2 3 4 5 6 YPE WWWWWW DET A N N N N N
10 dE	Re Bidiv R e	f Offset 20.69 d f 15.49 dBm	IB I							Mkr1 7 10	52.3 MHz).53 dBm
209							∳ 1				
5.49											
-4.51							-				
-14.5											-16.01 dDm
-24.5											
34.5											
-54.5											
-44.5											
-54.5											
-64.5							+				
-74.5			and Matter start								
	Lift and Life and Lif	Lollingerkeinen a.	an lan in sing a sin Sing a sing a	****		hidlan	i in the	*****	Turkitense Arreitense fo	, girsenation to right	۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰۰۶، ۲۰
Star #Re	t9 kHz 5 BW 1.0	MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🤔	DC Coupled		

Channel Position M – Bandwidth 5.0 MHz – Antenna B







Channel Position T – Bandwidth 5.0 MHz – Antenna B

🎉 Key	/sight Spectru	m Analyzer - Swept SA									
KI RI	L	RF 50 Ω 🛕 DC			SENSE:EXT		AL	IGN AUTO	DMS	10:19:36	AM Jan 30, 2015
Cen	ter Fred	9670.004500	NFE F	PNO: Fast ++	Trig: Free #Atten: 10	Run dB		#Avg Type.	RMS	1	DET A NNNN
10 dE	R B/div R	ef Offset 20.69 d ef 15.60 dBm	IB I				_			Mkr1 7 10	54.3 MHz).60 dBm
209							●1 ∥				
5.60							l				
-4.40							-				
-14.4		_									-16.01 dBm
-24.4											
-34.4							ļ				
-44.4											
-54.4											
-64.4											
74.4											
-/4.4	, Walker		a the state of the	Manager Handburg	hiking the states	un an	in the second	\$15 14 54.444.05449.444	u,jelezhazierez	lah-diptinglingson	hisenstaan history
Star #Res	t9 kHz sBW 1.0) MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🔔	DC Coupled		

Channel Position T – Bandwidth 5.0 MHz – Antenna B







Channel Position M – Bandwidth 10.0 MHz – Antenna B

📕 Kej	/sight Spec	trum Ar	nalyzer - Swept SA										
LXI RI	L	RF	50 Ω 🚹 DC			SENSE:EXT			AL	IGN AUTO		10:30:44	AM Jan 30, 2015
Cen	ter Fr	eq 6	70.004500	DIMHZ NFE F	PNO: Fast ++-	Trig: Free #Atten: 10	Run dB			#Avg Type:	RMS	TR	DET A NNNN
10 dE	3/div	Ref (Ref	0ffset 20.69 d 12.65 dBm	В					_			Mkr1 7 7	53.3 MHz 7.67 dBm
									1				
2.00													
-7.35								T					-16.01 dBm
-17.4								1					
-27.4								╫	_				
-37.4								\mathbb{H}	_				
-47.4								H	_				
-57.4								Ĥ					
-67.4													
-77.4		n an	<u>heine der seiner der s</u>	uny de ter waard		adia kilikila ya alikila ya a	y this late		64(AM	t den fremen i en he	a a a a a a a a a a a a a a a a a a a	Majajir Aburda arifish	rlägsfordagiony of Phys
Star #Re:	t9 kHz sBW/1	z 1.0 M	Hz		#VB	W 3.0 MHz	*				#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG										STATUS 🔔	DC Coupled		

Channel Position M – Bandwidth 10.0 MHz – Antenna B







Configuration 2 LTE MC (see Table 1 for carrier frequency)

Maximum Output Power 14 dBm per Carrier (17 dBm per Port), Antenna A, E-TM1.1

Channel Position M - Antenna A

🎉 Kej	ysight Spectrum A	Analyzer - Swept SA									
C R	L RF	50 Q 🔥 DC			SENSE:EXT		AL	IGN AUTO	DMS	10:49:56	AM Jan 30, 2015
Cen	iter Fred t	570.004500	NFE F	PNO: Fast ++ Gain:Low	Trig: Free #Atten: 16	Run dB		writh type:	Rin 3	1	DET A NNNN
10 dE	Ref B/div Ref	Offset 20.69 d 13.38 dBm	В							Mkr1 7 ٤	54.8 MHz 3.32 dBm
209							●1 ⁻ ∭				
3.38											
-6.62											
-16.6											-16.01 dBm
-26.6							Ļ				
-36.6											
-46.6											
-66.6	****	Him K arpart Ann	tak internet	Hindiridanidahadanan	, Alister, Maining and the second s		وسانواه		warnettratterit	historiaity. And a space	anger and the second
-76.6											
Star #Do	t9 kHz			#\/P	M 2 0 MIL-				# E wa	Stop 1	.3400 GHz
#Res MSG	5 DW 1.0 N	1112		#VD	W 3.0 MINZ	-		STATUS 🔔	#Swe DC Coupled	eh 2.000 s	(2000 pts)

Channel Position M - Antenna A

🗱 Keysight Spectrum Analyzer - Swept SA 📃 🔂											
Con	L Iter Fi	RF	50 Ω AC			SENSE:EXT	A	HIGN AUTO #Avg Type:	RMS	10:50:58 TF	AM Jan 30, 2015
Cen		eq 4.0	100000	JU GHZ	PNO: Fast ++ IFGain:Low	Trig: Free #Atten: 6 c	Run 1B			1	DET A N N N N N
10 di	B/div	Ref Off Ref 2	set 29.49 d 0.00 dBm	В						Mkr1 3.6 -53	58 2 GHz 3.33 dBm
10.0											
0.00											
-10.0											
-20.0											-16.01 dBm
20.0											
-50.0											
-40.0											
-50.0	<u> </u>										
-60.0				~~~~~	\sim	\sim					
-70.0											
Star #Re	t 1.34 s BW	0 GHz 1.0 MH	z		#VB	W 3.0 MHz	*		#Swee	Stop p 13.32 s	8.000 GHz (13320 pts)
MSG								STATUS			





Configuration 2 LTE MC (see Table 1 for carrier frequency)

Maximum Output Power 14 dBm per Carrier (17 dBm per Port), Antenna B, E-TM1.1

Channel Position M - Antenna B

🗾 Key	/sight Spectrum	Analyzer - Swept SA									
LXI RI	L RF	50 Ω 🚹 DC			SENSE:EXT		AL	IGN AUTO		12:05:13	PM Jan 30, 2015
Cen	ter Freq	670.00450	D MHz	PNO: Fast	. Trig: Free #Atten: 16	Run dB		#Avg Type:	RMS	TF	ACE 1 2 3 4 5 6 TYPE WWWWW DET A NNNN
10 dE	Ref 3/div R e	Offset 20.69 d f 12.76 dBm	ів 1	Gam.cow						Mkr1 7	53.8 MHz 7.75 dBm
2.76							●1 /				
-7.24											
-17.2											-16.01 dBm
-27.2							-				
-37.2							-				
-47.2											
-57.2							+				
-67.2	^{an} te tel la stringe	ine and the state	₽₩₽ [₽] ₽₩₩₩₩₩₩₩₩₩₩₩₩₩₩	مار ورار المارين المارينين. المرارية المارين المارينين المرارين المرارين المرارين المرارين المرارين المرارين ا	المراجعة والمراجع	Himples	بنديله	and the state of the	seden selek a seden da a da balan	Mulderine we the of the	Loine, de bo
-77.2					a fi - a - a canada a - fi - fi			L. Charles an Birth	an de la casa de la cas	ll a ll sa ll sa dian de la secola de la secol	and the second secon
Stari #Res	t9 kHz sBW 1.0 l	MHz		#VB	W 3.0 MHz	*			#Swe	Stop 1 ep 5.000 s	.3400 GHz (2680 pts)
MSG								STATUS 🔔	DC Coupled		

Channel Position M - Antenna B

🇾 Ke	📕 Keysight Spectrum Analyzer - Swept SA 👘 🚱										
Con	L Fr	RF	50 Ω AC			SENSE:EXT	A	LIGN AUTO	RMS	12:06:42 TE	PM Jan 30, 2015
Cell		eq 4.0	00000		PNO: Fast ++	Trig: Free #Atten: 6 c	Run IB			1	DET A N N N N
10 di	B/div	Ref Of Ref 2	fset 29.51 d 0.00 dBm	IB I						Mkr1 3.6 -53	60 2 GHz 3.08 dBm
10.0											
0.00	<u> </u>										
-10.0	<u> </u>										
-20.0											-16.01 dBm
-30.0											
-40.0											
£0.0					▲1						
-50.0						~~					
-60.0											
-70.0	<u> </u>										
Star #Re	t 1.34 s BW	0 GHz 1.0 MH	z		#VB	W 3.0 MHz	*		#Swee	Stop p 13.32 s	8.000 GHz (13320 pts)
MSG								STATUS			





	-16dBm						
	For IC:						
	4.6.2 In addition to the limit outlined in Section 4.6.1 above, equipment operating in the frequency band 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:						
	(a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-77 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:						
	(i) 76 + 10 log10 p (watts), dB, for base and fixed equipment.						
Limit	(b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.						
	Summary:						
	9 kHz to 8 GHz :	-16 dBm					
	763 to 775 MHz : -46 dBm - 10 log (N) =	-49 dBm					
	793 to 806 MHz : -46 dBm - 10 log (N) =	-49 dBm					
	1559 to 1610 MHz : -50 dBm - 10 log (N) =	-53 dBm					





2.5 FREQUENCY STABILITY

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055 FCC CFR 47 Part 27, Clause 27.54 Industry Canada RSS-Gen, Clause 6.11 Industry Canada RSS-130 Clause 4.3

2.5.2 Date of Test and Modification State

30 January 2015 - Modification State 0

2.5.3 Test Equipment Used

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

2.5.4 Environmental Conditions

Ambient Temperature27.5°CRelative Humidity16.6%

2.5.5 Test Method

The EUT was placed in a Climatic Chamber and connected to a Vector Signal Analyser via an attenuator. The temperature was varied over the range -30°C to +50°C in 10°C steps. At each temperature interval, the EUT was left to stabilise. After this period of time, the mean Frequency Error was measured and recorded on the Middle channel.

At 20°C, the voltage was varied between 85% and 115% of the nominal declared voltage. At each extreme voltage, the mean Frequency Error was measured and recorded on the Middle channel.

2.5.6 Test Results

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Tomporatura	Frequency Stability (Hz)					
remperature	Channel Position M					
-30°C	NPD					
-20°C	NPD					
-10°C	2.00					
0°C	-1.54					
+5°C	1.70					
+10°C	1.83					
+20°C	1.98					
+30°C	2.01					
+40°C	-2.77					
+50°C	1.45					

Maximum Output Power 17 dBm per carrier, Antenna A, E-TM1.1





Remarks

Limit

IRU 2242 was placed outside climatic chamber at ambient temperature. NPD = No Power Detected.

Configuration 1 LTE SC (see Table 1 for carrier frequency)

Maximum Output Power 17 dBm per carrier, Antenna A, E-TM1.1

Valtara	Frequency Stability (Hz)
voltage	Channel Position M
-40.8 V	1.50
-48.0 V	1.98
-55.2 V	-1.88

±1.5 ppm or 1126.5 kHz = 1.5ppm x 751 MHz





SECTION 3

TEST EQUIPMENT USED





3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Туре No.	TE No.	Calibration Period (months)	Calibration Due
Maximum Peak Output	Power and Peak to Average	ge Ratio - Conducted			
Hygrometer	RS	1260	4300	12	01-May-2015
DMM	Fluke	179	4007	12	31-Jul-2015
Spectrum Analyser	Agilent	PXA N9030A	US49230391	12	22-Sep-2015
Network Analyser	Agilent	8722ES	US39175387	12	15-Oct-2015
Power Meter	Agilent	1912A	MY45101348	24	22-Jul-2016
Power Sensor	Agilent	1921A	MY52410016	12	22-Jul-2015
PSU	Xantrex	XKW60-50	1001425551	-	O/P Mon
Attenuator (20dB)	Hewlett Packard	8491A	-	-	O/P Mon
Occupied Bandwidth	-	-	-	-	-
Hygrometer	RS	1260	4300	12	01-May-2015
DMM	Fluke	179	4007	12	31-Jul-2015
Spectrum Analyser	Agilent	PXA N9030A	US49230391	12	22-Sep-2015
Network Analyser	Agilent	8722ES	US39175387	12	15-Oct-2015
Power Meter	Agilent	1912A	MY45101348	24	22-Jul-2016
Power Sensor	Agilent	1921A	MY52410016	12	22-Jul-2015
PSU	Xantrex	XKW60-50	1001425551	-	O/P Mon
Attenuator (20dB)	Hewlett Packard	8491A	-	-	O/P Mon
Band Edge					
Hygrometer	RS	1260	4300	12	01-May-2015
DMM	Fluke	179	4007	12	31-Jul-2015
Spectrum Analyser	Agilent	PXA N9030A	US49230391	12	22-Sep-2015
Network Analyser	Agilent	8722ES	US39175387	12	15-Oct-2015
Power Meter	Agilent	1912A	MY45101348	24	22-Jul-2016
Power Sensor	Agilent	1921A	MY52410016	12	22-Jul-2015
PSU	Xantrex	XKW60-50	1001425551	-	O/P Mon
Attenuator (20dB)	Hewlett Packard	8491A	-	-	O/P Mon
Transmitter Spurious E	missions				
Hygrometer	RS	1260	4300	12	01-May-2015
DMM	Fluke	179	4007	12	31-Jul-2015
Spectrum Analyser	Agilent	PXA N9030A	US49230391	12	22-Sep-2015
Network Analyser	Agilent	8722ES	US39175387	12	15-Oct-2015
Power Meter	Agilent	1912A	MY45101348	24	22-Jul-2016
Power Sensor	Agilent	1921A	MY52410016	12	22-Jul-2015
PSU	Xantrex	XKW60-50	1001425551	-	O/P Mon
Attenuator (20dB)	Hewlett Packard	8491A	-	-	O/P Mon
HPF	Mini-Circuits	1340-4000	-	-	O/P Mon





Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due		
Frequency Stability							
Hygrometer	RS	1260	4300	12	01-May-2015		
DMM	Fluke	179	4007	12	31-Jul-2015		
Thermometer	Fluke	51	3174	12	01-Dec-2015		
Spectrum Analyser	Agilent	PXA N9030A	US49230391	12	22-Sep-2015		
Network Analyser	Agilent	8722ES	US39175387	12	15-Oct-2015		
PSU	Xantrex	XKW60-50	1001425551	-	O/P Mon		
Attenuator (20dB)	Hewlett Packard	8491A	-	-	O/P Mon		
Climatic chamber	Burnsco	RTC-37P-3-3	07-07	-	O/P Mon		

O/P Mon - Output Monitored with Calibrated Equipment





3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Operating band unwanted emissions		± 0.9 dB
Adjacent Channel Leakage power Ratio	ACLR	± 0.6 dB
(ACLR)	Absolute power	± 0.9 dB
	For "Spurious emissions"	
	9 kHz < f ≤ 4 GHz	± 1.6 dB
	4 GHz < f ≤ 12,75 GHz	± 1.9 dB
	For co-existence requirements (> -60 dBm)	± 0.9 dB
	For co-existence requirements (≤ -60 dBm)	± 1.1 dB
	For protection of the BS receiver	± 1.1 dB
Base Station maximum output power		± 0.1 dB
	For Operating band unwanted emissions	± 0.9 dB
	For ACLR	± 0.6 dB
	For "Spurious emissions":	
Transmitter intermedulation	f ≤ 2,2 GHz	± 0.9 dB
	2,2 GHz < f ≤ 4 GHz	± 1.6 dB
	f > 4 GHz	± 1.9 dB
	For co-existence requirements	± 1.1 dB
	Interference signal	± 0.9 dB
Deseries and in the interior	30 MHz ≤ f ≤ 4 GHz	± 1.6 dB
Receiver spurious emissions	4 GHz < f ≤ 12,75 GHz	± 1.9 dB
	In-band blocking, using modulated interferer	± 0.3 dB
Placking characteristics	Out of band blocking, using CW interferer:	
Blocking characteristics	1 MHz < finterferer ≤ 3 GHz	± 0.4 dB
	3 GHz < finterferer ≤ 12,75 GHz	± 0.5 dB
Receiver intermodulation characteristics		± 0.9 dB
Adjacent Channel Selectivity (ACS) and narrow-band blocking		± 0.9 dB





SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT





4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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ANNEX A

MODULE LIST





Configuration							
Product	Product No	R-State	Serial No				
RD 2242 B13	KRY 901 334/1	R1B	C829198777				
IRU 2242	KRC 161 444/1	R1C	C828840931				
RBS 6601	BFL 901 009/1	R3B	BR81278870				
Software Version:	CXP9013268/14	Revision:	R59FJ				