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# Report On

FCC and IC Testing of the  
Ericsson Remote Radio Unit LTE and NB-IoT GB and NB-IoT SA KRC 161  
408/1, RRUS E2 B29 (700 MHz), with compatible Main Unit in a Base Station  
configuration in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 27,  
Industry Canada RSS-GEN and Industry Canada RSS-130

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161408-1

IC ID: 287AB-AS1614081

PREPARED BY

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APPROVED BY

Steve Scarfe  
Authorised Signatory

DATED

04 May 2018

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May 2018



## CONTENTS

Section	Page No
<b>1</b>	<b>REPORT INFORMATION ..... 2</b>
1.1	Report Details ..... 3
1.2	Brief Summary of Results ..... 4
1.3	Configuration Description ..... 5
1.4	Declaration of Build Status ..... 6
1.5	Product Information ..... 7
1.6	Test Setup ..... 8
1.7	Test Conditions ..... 9
1.8	Deviation From The Standard ..... 9
1.9	Modification Record ..... 9
<b>2</b>	<b>TEST DETAILS ..... 10</b>
2.1	Maximum Peak Output Power and Peak to Average Ratio - Conducted ..... 11
2.2	Occupied Bandwidth ..... 17
2.3	Band Edge ..... 21
2.4	Transmitter Spurious Emissions ..... 25
2.5	Radiated Emissions ..... 31
<b>3</b>	<b>TEST EQUIPMENT USED ..... 38</b>
3.1	Test Equipment Used ..... 39
3.2	Measurement Uncertainty ..... 41
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 42</b>
4.1	Accreditation, Disclaimers and Copyright ..... 43
<b>ANNEX A</b>	<b>Module Lists ..... A.2</b>



Product Service

## **SECTION 1**

### **REPORT INFORMATION**



Product Service

## 1.1 REPORT DETAILS

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name	RRUS E2 B29
Product Number	KRC 161 408/1
IC Model Name	AS1614081
Serial Number(s)	CF84609406
Software Version	CXP9013268%259_NBSA001
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2017 FCC CFR 47 Part 27: 2017 Industry Canada RSS-GEN: Issue 4: 2014 Industry Canada RSS-130: Issue 3: 2015
Start of Test	30 March 2018
Finish of Test	16 April 2018
Name of Engineer(s)	Ashok Kumar Joe Santos
Related Document(s)	KDB 971168 D01 v02r02 KDB 662911 D01 v02r01



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## 1.2 BRIEF SUMMARY OF RESULTS

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

Section	Specification Clause				Test Description	Result
	FCC CFR 47 Part 2	FCC CFR 47 Part 27	RSS-GEN	RSS-130		
2.1	2.1046	27.50	-	6.4	Maximum Peak Output Power and Peak to Average Ratio - Conducted	Pass
2.2	2.1049	27.53	6.6	-	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (h)	-	6.5	Band Edge	Pass
2.4	2.1051	27.53 (h)	-	6.5	Transmitter Spurious Emissions	Pass
2.5	2.1053	27.53 (c)	-	6.5	Radiated Emissions	Pass



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### 1.3 CONFIGURATION DESCRIPTION

Configuration	RAT	No. Of carriers	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
A	LTE+NB IoT GB	1	10 MHz	722	-	723
B	NB IoT SA	1	0.18 MHz	717.2	722.5	727.8



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#### 1.4 DECLARATION OF BUILD STATUS

<b>MAIN EUT</b>	
<b>MANUFACTURING DESCRIPTION</b>	Remote Radio Unit
<b>MANUFACTURER</b>	Ericsson AB
<b>PRODUCT NAME</b>	RRUS E2 B29
<b>PART NUMBER</b>	KRC 161 408/1
<b>IC Model Name</b>	AS1614081
<b>SERIAL NUMBER</b>	CF84609406
<b>HARDWARE VERSION</b>	R1A
<b>SOFTWARE VERSION</b>	CXP9013268%259_NBSA001
<b>TRANSMITTER OPERATING RANGE</b>	717 to 728 MHz
<b>MODULATIONS</b>	QPSK, 16QAM, 64QAM, 256QAM
<b>INTERMEDIATE FREQUENCIES</b>	-
<b>ITU DESIGNATION OF EMISSION</b>	10 MHz BW channel <sup>1</sup> : 9M45F9W NB-IoT SA 200 kHz BW channel: 210KW7D
<b>OUTPUT POWER (RMS) (W or dBm)</b>	40W <sup>1</sup> per port NB-IoT SA 1x20W
<b>FCC ID</b>	TA8AKRC161408-1
<b>IC ID</b>	287AB-AS1614081
<b>TECHNICAL DESCRIPTION (a brief description of the intended use and operation)</b>	Base station radio

<sup>1</sup> Including 2 NB-IoT GB carriers.

Signature   
Linda Grell

Date 2018-05-04

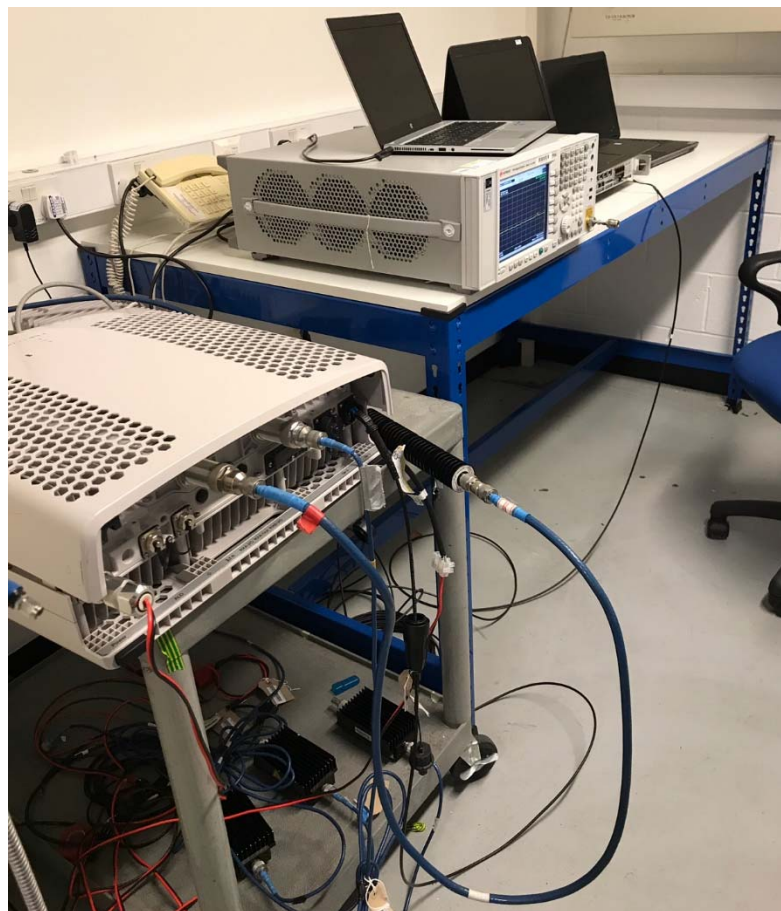
No responsibility will be accepted by TÜV SÜD Product Service UK Limited as to the accuracy of the information declared in this document by the manufacturer.

## 1.5 PRODUCT INFORMATION

### 1.5.1 Technical Description

The Equipment Under Test (EUT) KRC 161 408/1 is an Ericsson AB Radio Unit working in the public mobile service 700 MHz band which provides communication connections to 700 MHz network. The KRC 161 408/1 operates from a -48V DC supply.

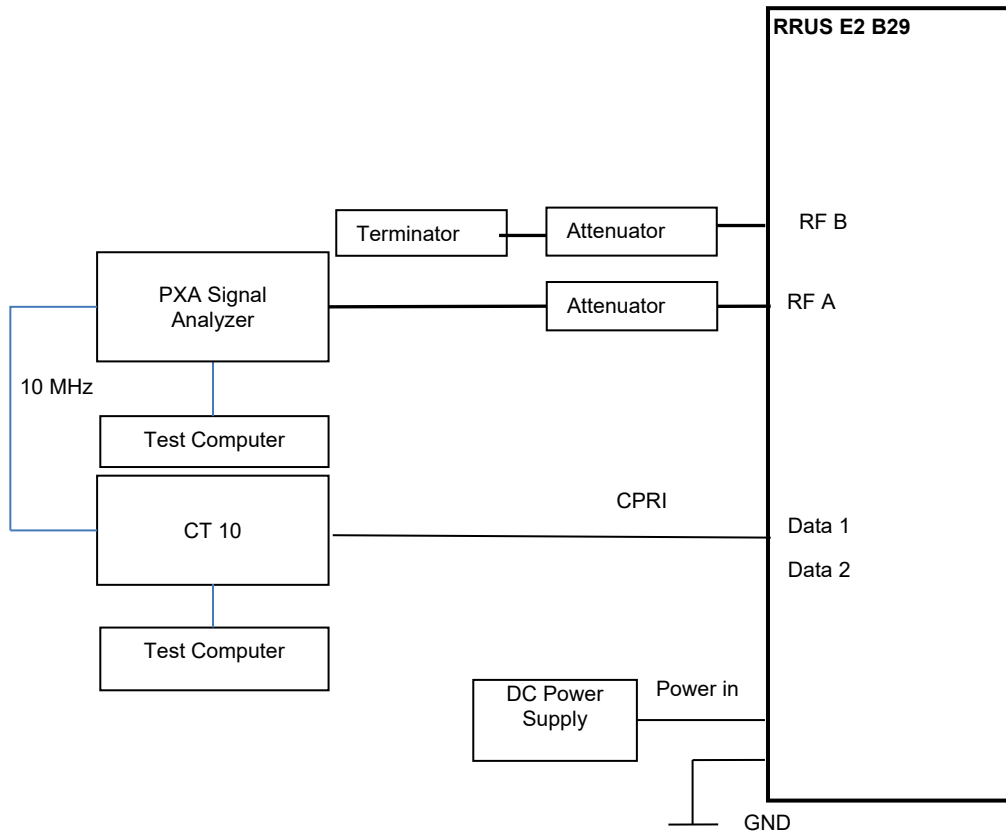
The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test



### 1.6 TEST SETUP





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## **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

Industry Canda Facility Registrartion Number  
2932B, Site#2932B-1

## **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.



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## **SECTION 2**

### **TEST DETAILS**



Product Service

**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  
 Industry Canada RSS-130, Clause 6.4

**2.1.2 Date of Test and Modification State**

16 April 2018 - 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 Temperature 23°C  
 Relative Humidity 35%

**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.

**2.1.6 Test Results**

Configuration A

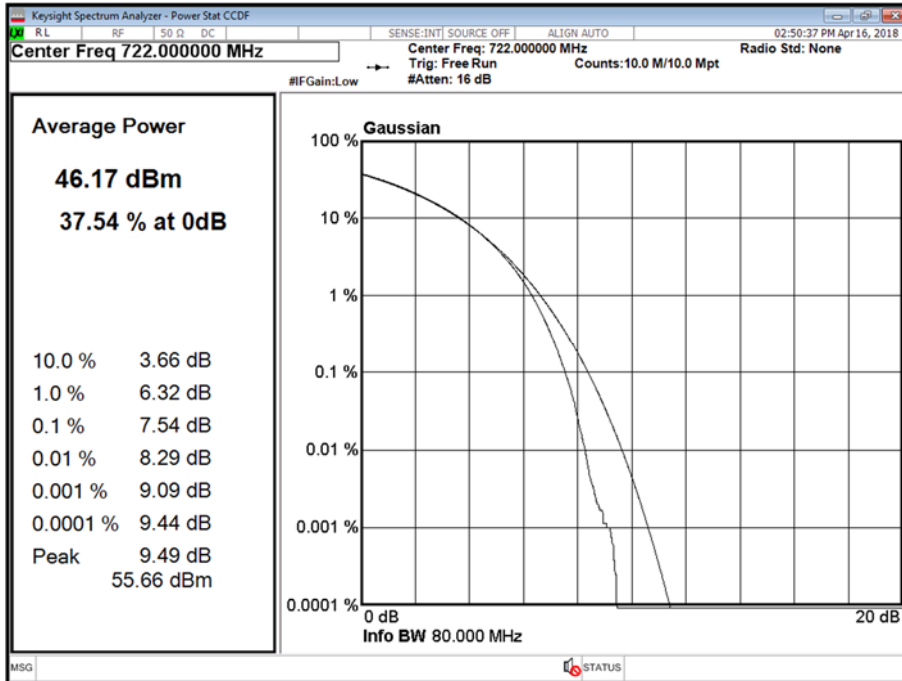
Maximum Output Power 46 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
dBm	dBm/MHz				
A	L:64QAM / N:QPSK	L:10.0 MHz / N:180 kHz	7.54	46.17	-



Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B



Configuration A

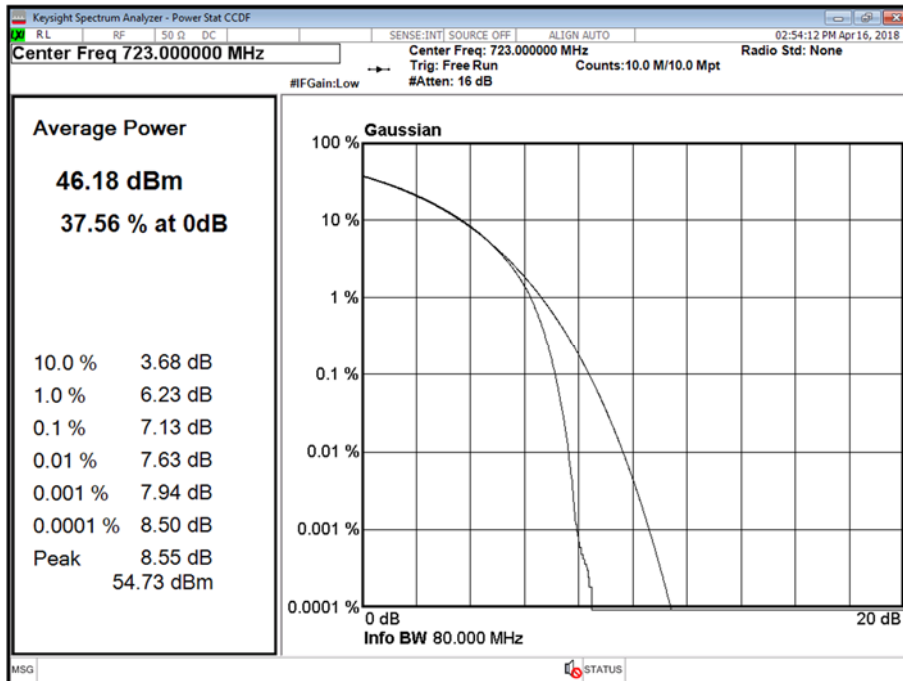
Maximum Output Power 46 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
dBm	dBm/MHz				
A	L:64QAM / N:QPSK	L:10.0 MHz / N:180 kHz	7.13	46.18	-



Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T



Configuration B

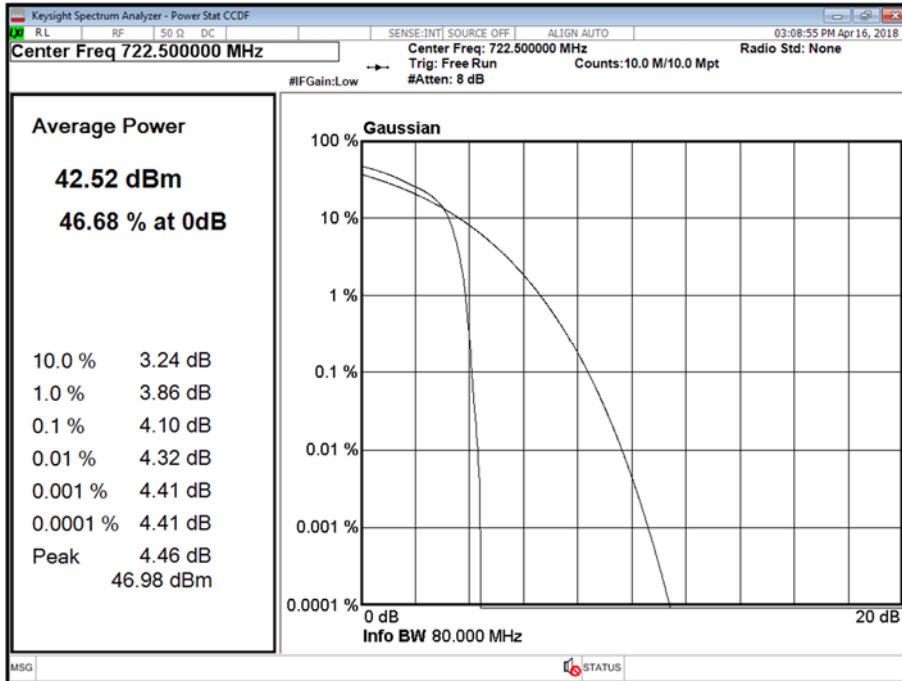
Maximum Output Power 43 dBm

Antenna	NB-IoT SA Modulation	NB-IoT SA Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position B		
			PAR (dB)	Average Power	
dBm	dBm/MHz				
A	N:QPSK	N:180 kHz	4.10	42.52	-



Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B



Configuration B

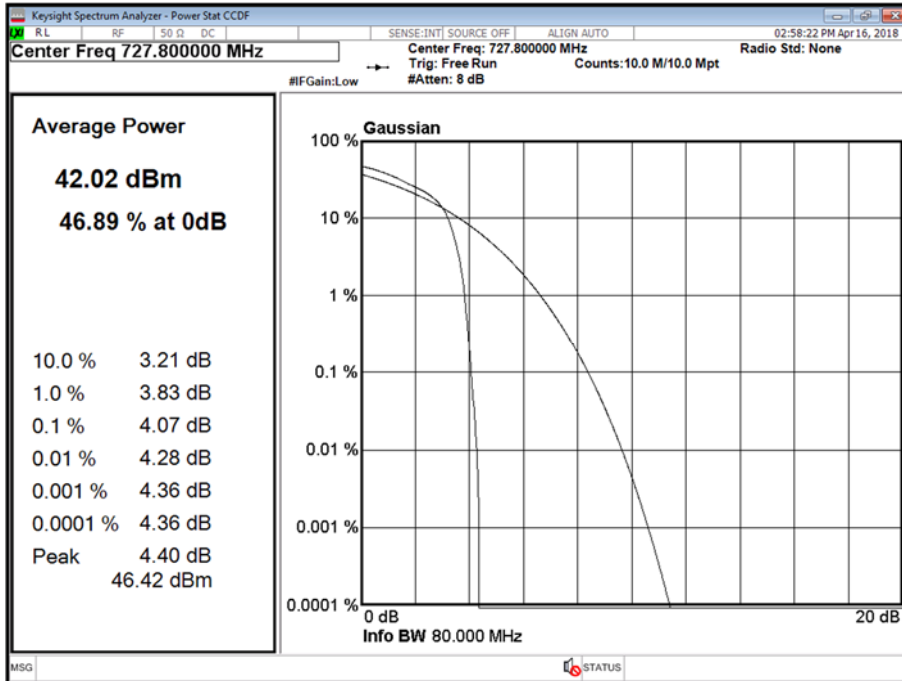
Maximum Output Power 43 dBm

Antenna	NB-IoT SA Modulation	NB-IoT SA Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position M		
			PAR (dB)	Average Power	
dBm	dBm/MHz				
A	N:QPSK	N:180 kHz	4.07	42.02	-



Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M



Configuration B

Maximum Output Power 43 dBm

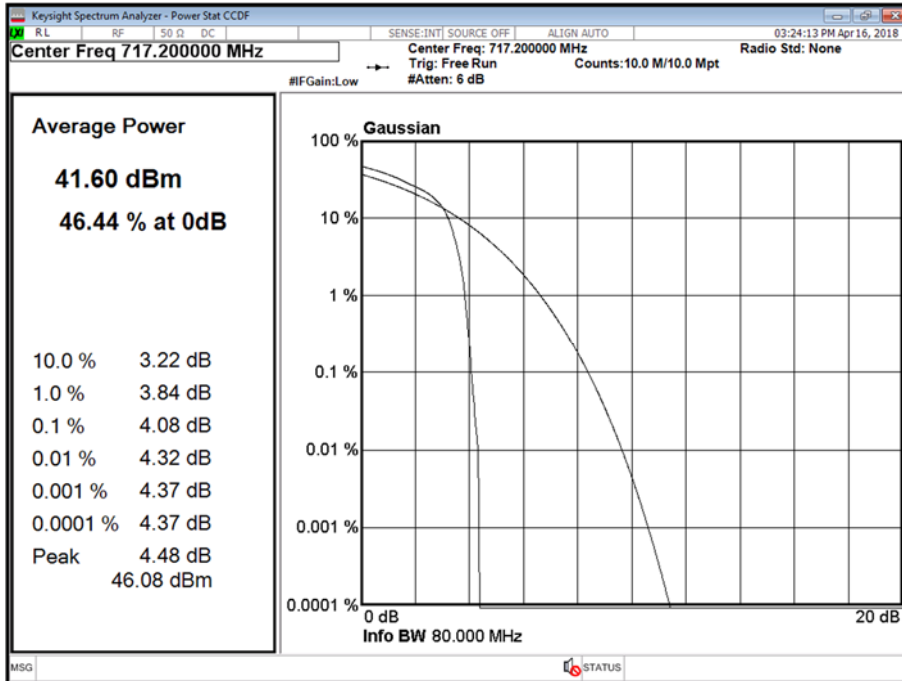
Antenna	NB-IoT SA Modulation	NB-IoT SA Carrier Bandwidth	Peak to Average Ratio (PAR) / Output Power		
			Channel Position T		
			PAR (dB)	Average Power	
dBm	dBm/MHz				
A	N:QPSK	N:180 kHz	4.08	41.60	-





Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T



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  
FCC CFR 47 Part 27, Clause 27.53  
Industry Canada RSS-GEN, Clause 6.6

### 2.2.2 Date of Test and Modification State

16 April 2018 - 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 Temperature 23°C  
Relative Humidity 35%

### 2.2.5 Test Method

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

### 2.2.6 Test Results

Configuration A

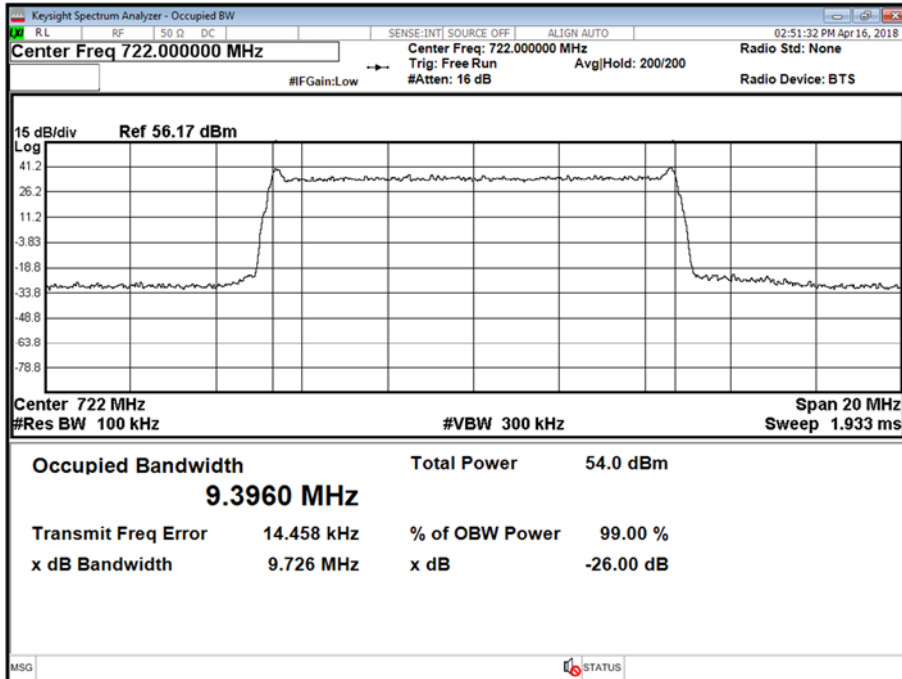
Maximum Output Power 46 dBm

Antenna	LTE / NB- IoT GB Modulation	LTE / NB- IoT GB Carrier Bandwidth	Result (KHz)					
			Channel Position B		Channel Position M		Channel Position T	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	L:64QAM / N:QPSK	L:10.0 MHz / N:180 kHz	9,396.00	9,726.00	-	-	9,398.00	9,782.00

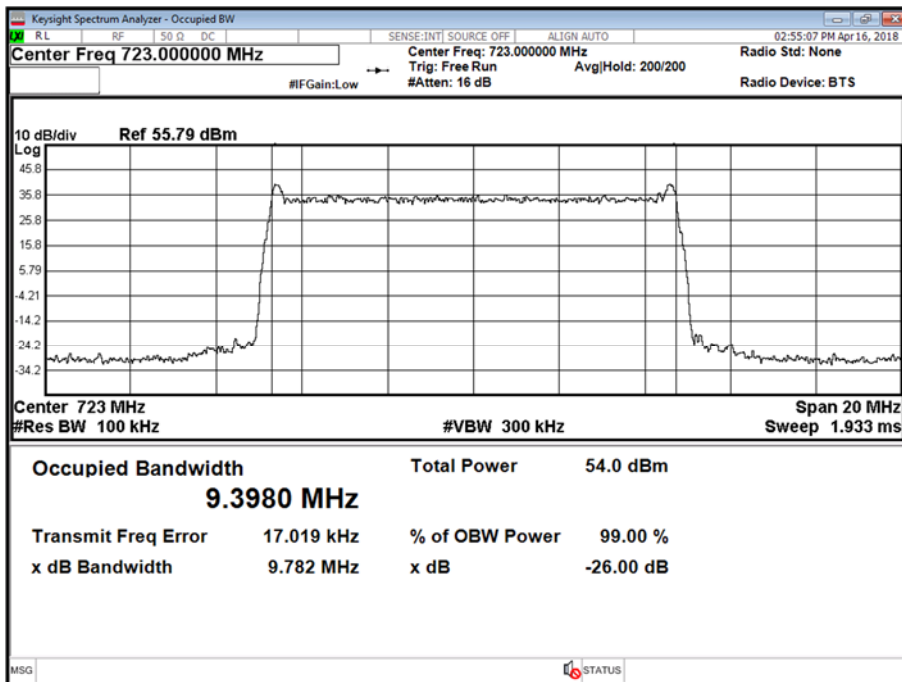


Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B



Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T





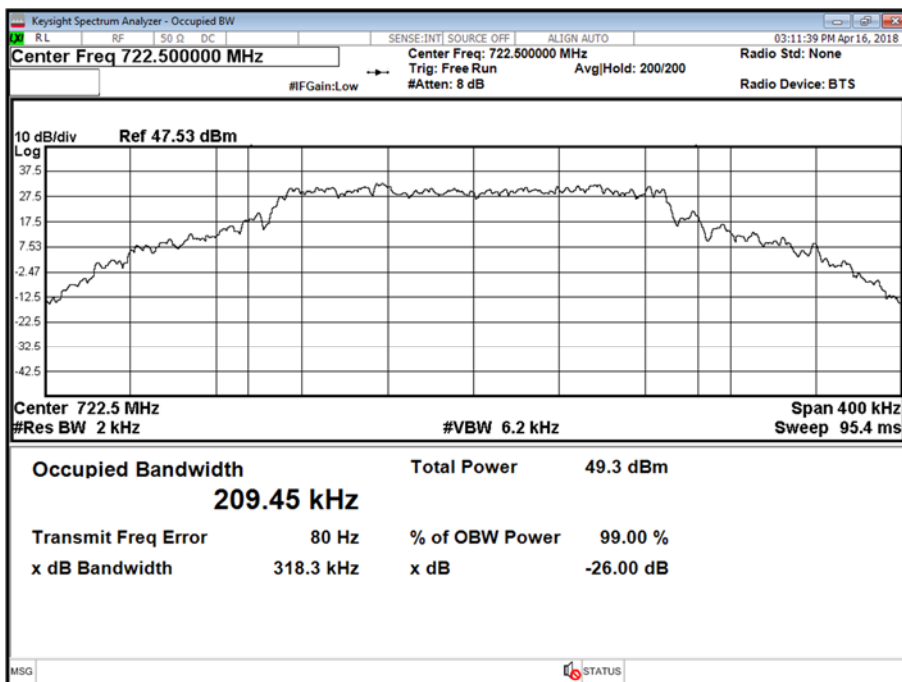
Product Service

Configuration B

Maximum Output Power 43 dBm

Antenna	NB-IoT SA Modulation	NB-IoT SA Carrier Bandwidth	Result (KHz)					
			Channel Position B		Channel Position M		Channel Position T	
			Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth	Occupied Bandwidth	-26 dB Bandwidth
A	N:QPSK	N:180 kHz	209.45	318.30	209.48	318.40	209.12	318.30

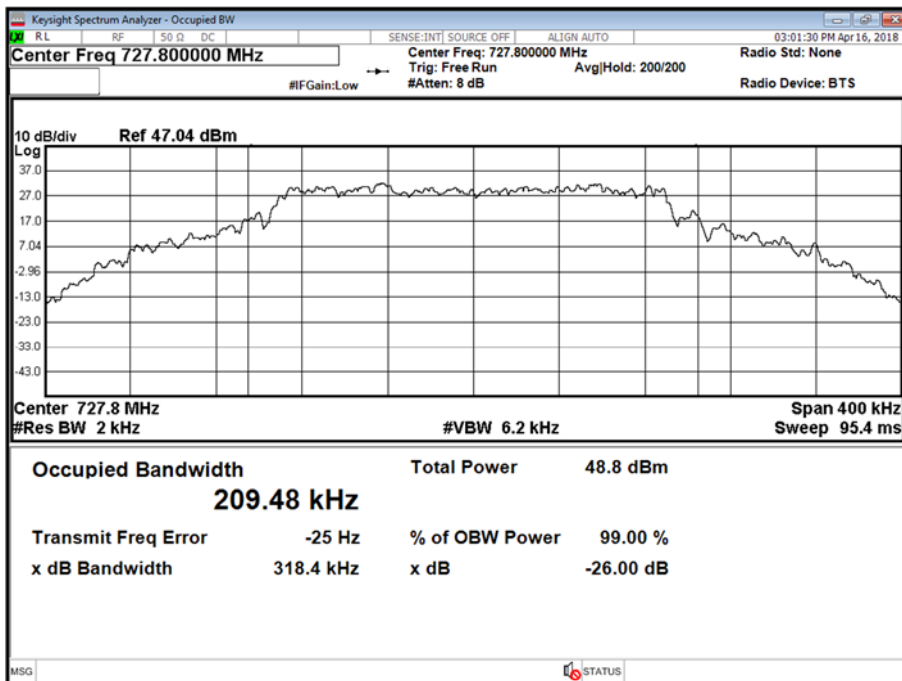
Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B



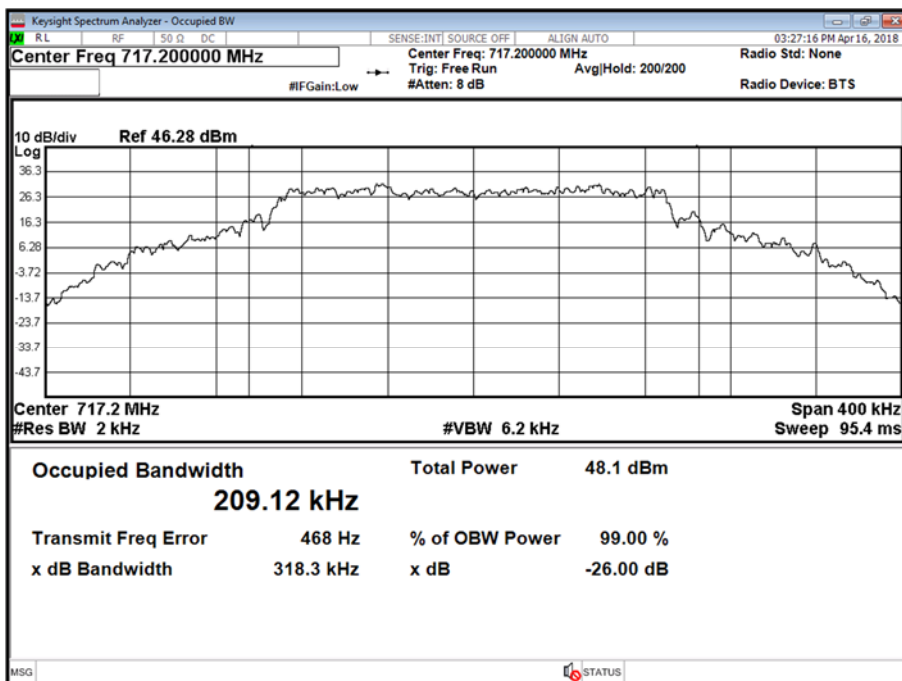


Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M



Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T





**2.3 BAND EDGE**

**2.3.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1051  
FCC CFR 47 Part 27, Clause 27.53 (h)  
Industry Canada RSS-130, Clause 6.5

**2.3.2 Date of Test and Modification State**

16 April 2018 - 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 23°C  
Relative Humidity 35%

**2.3.5 Test Method**

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

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by  $10 * \text{Log}(N)$ , where N is equal to the number of MIMO antenna ports.

For four ports, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(4) = -19 \text{ dBm}$ .

For dual ports, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(2) = -16 \text{ dBm}$ .

**2.3.6 Test Results**

Configuration A

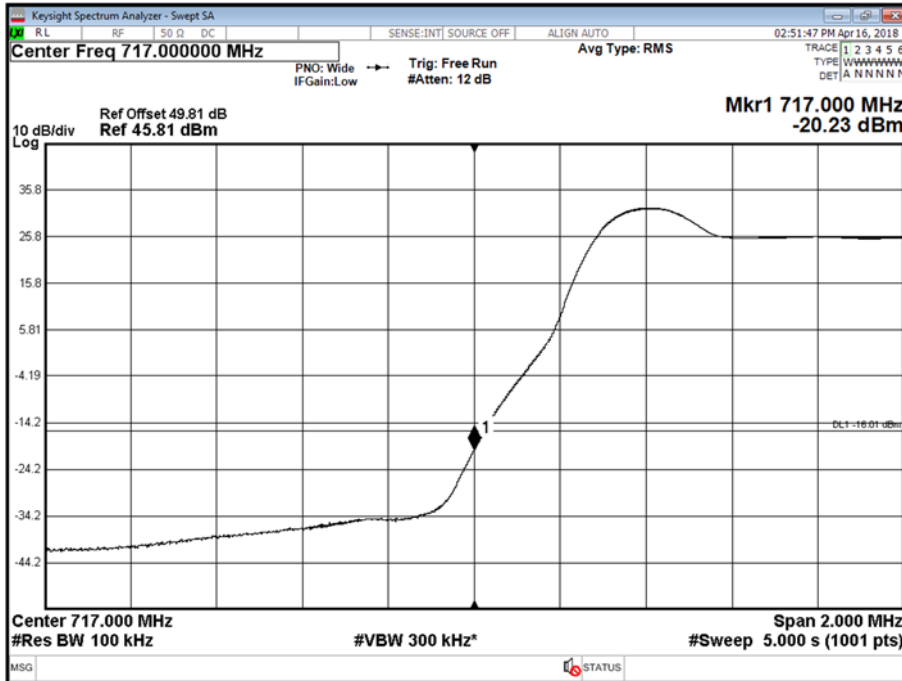
Maximum Output Power 46 dBm

Antenna	LTE / NB-IoT GB Modulation	LTE / NB-IoT GB Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	L:64QAM / N:QPSK	L:10.0 MHz / N:180 kHz	717.0	728.0

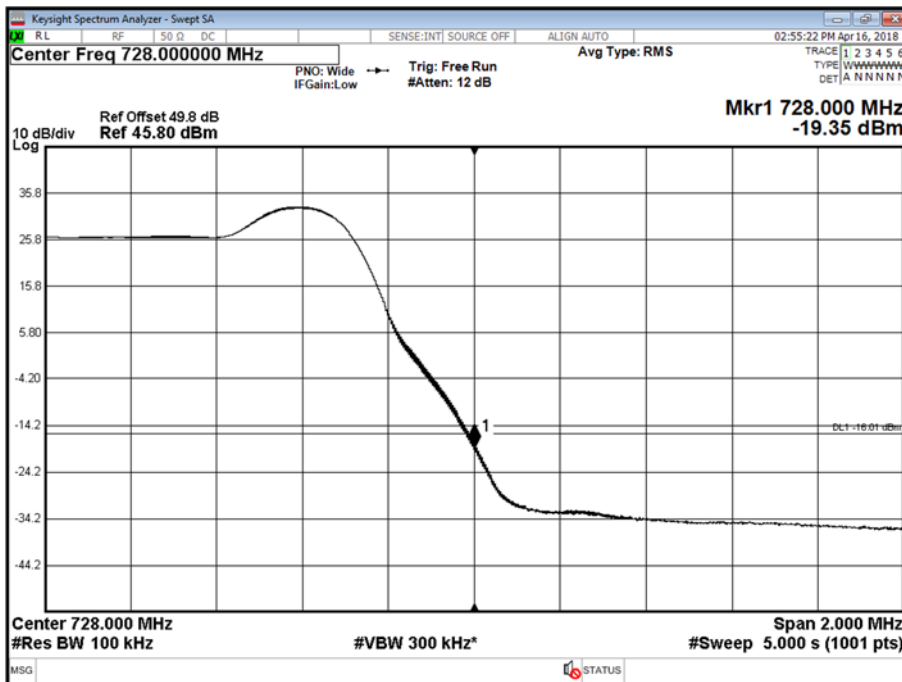


Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B



Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T





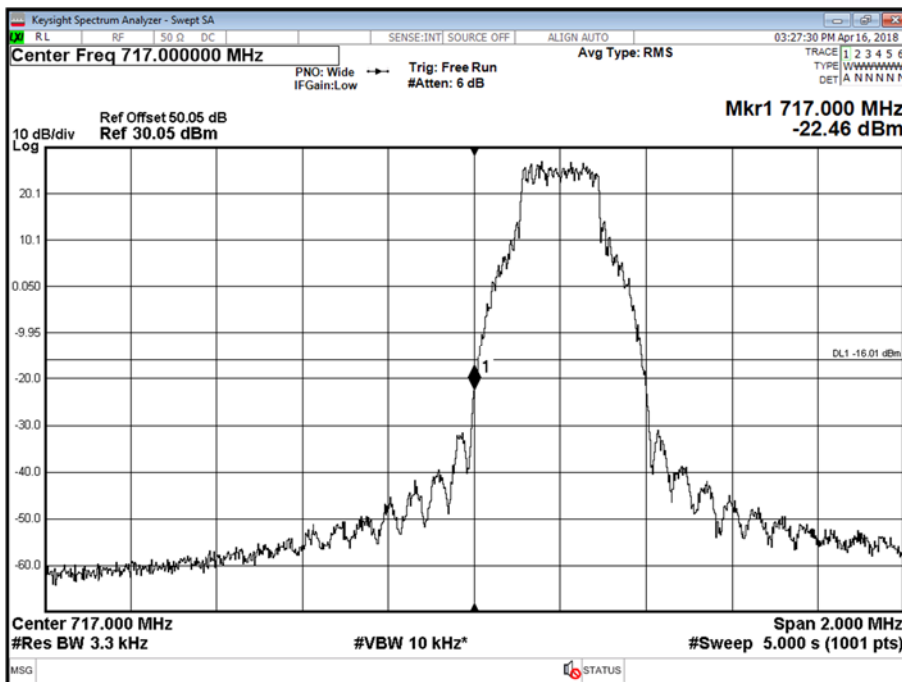
Product Service

Configuration B

Maximum Output Power 43 dBm

Antenna	NB-IoT SA Modulation	NB-IoT SA Carrier Bandwidth	Band Edge (MHz)	
			Channel Position B	Channel Position T
A	N:QPSK	N:180 kHz	717.0	728.0

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B

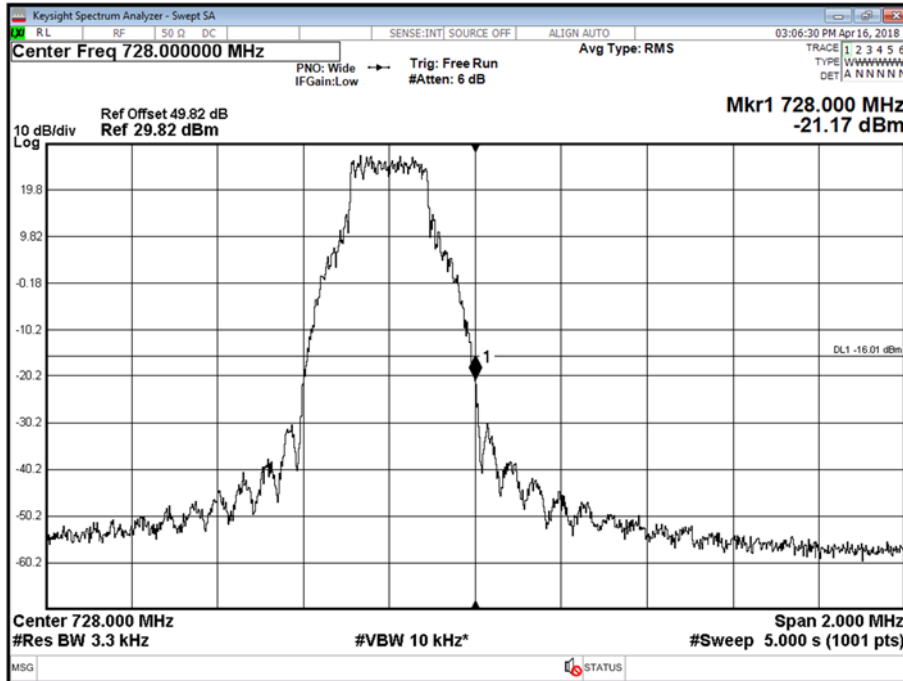






Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T



Limit MIMO	-16 dBm
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Product Service

## **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 (h)  
Industry Canada RSS-130, Clause 6.5

### **2.4.2 Date of Test and Modification State**

16 April 2018 - 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 Temperature	23°C
Relative Humidity	35%

### **2.4.5 Test Method**

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

Each antenna port has been declared as being equivalent, therefore measurements were made on one antenna port only. To account for this, the limit was tightened by  $10 * \text{Log}(N)$ , where N is equal to the number of MIMO antenna ports.

For four ports, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(4) = -19 \text{ dBm}$ .

For dual ports, the limit was calculated as being  $-13 \text{ dBm} - 10 * \text{Log}(2) = -16 \text{ dBm}$ .

### **2.4.6 Test Results**

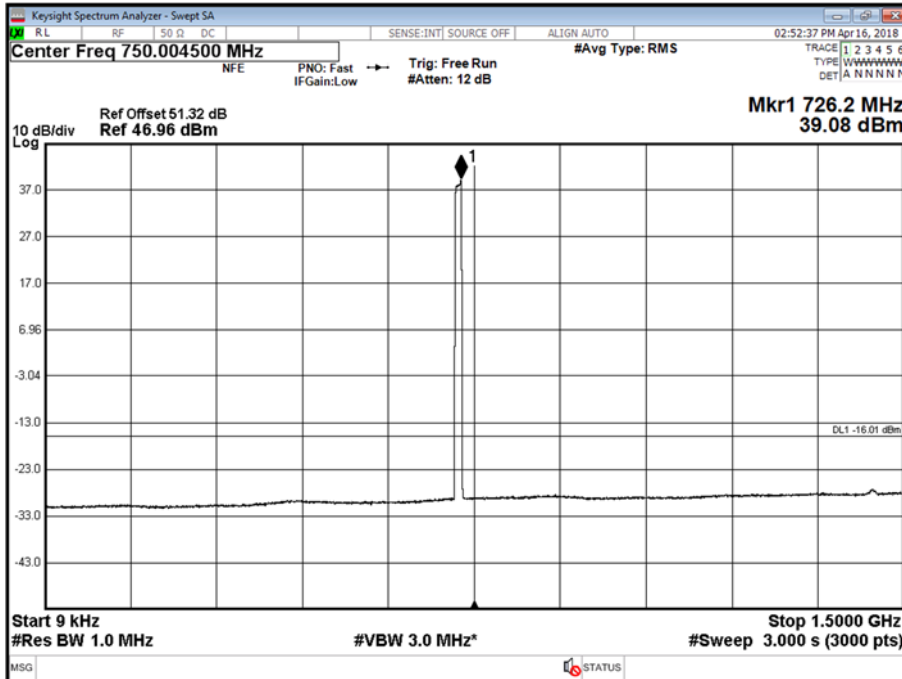
Configuration A

Maximum Output Power 46 dBm

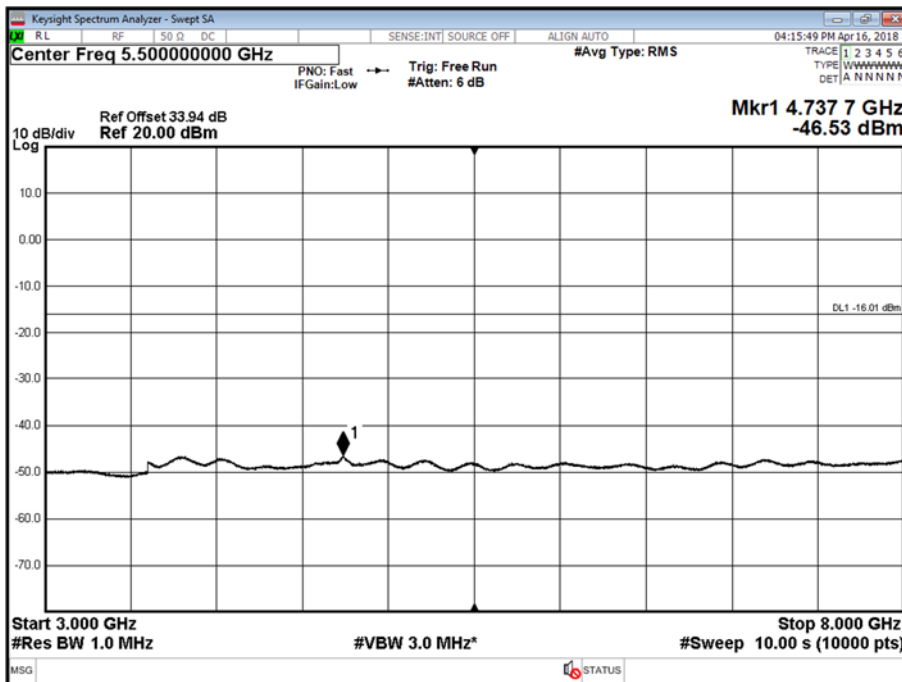


Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier  
Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B - Band 1 - Range 0.009 to 1500 MHz



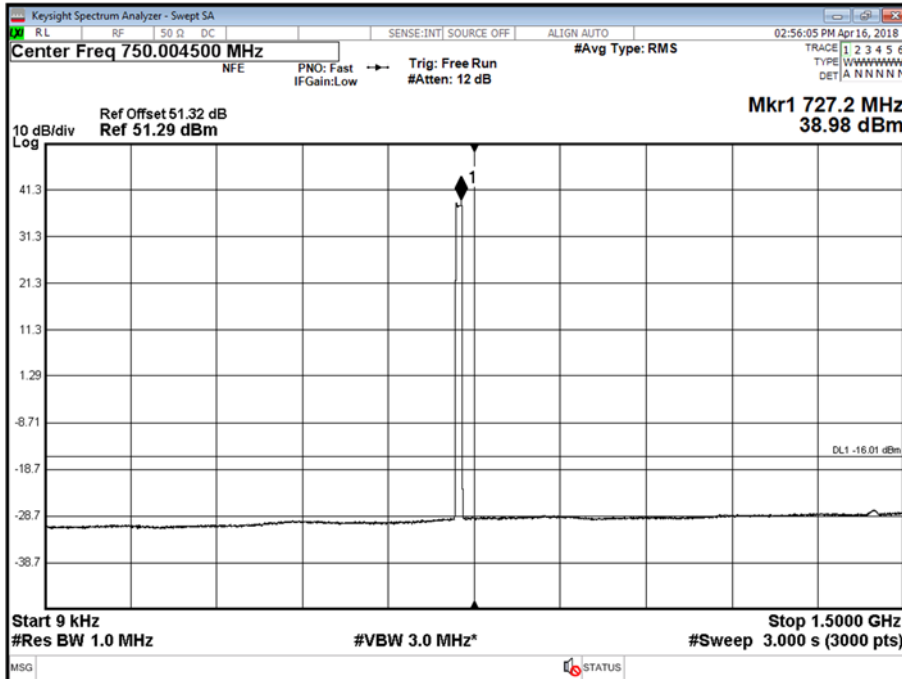
Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier  
Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B - Band 2 - Range 1500 to 8000 MHz



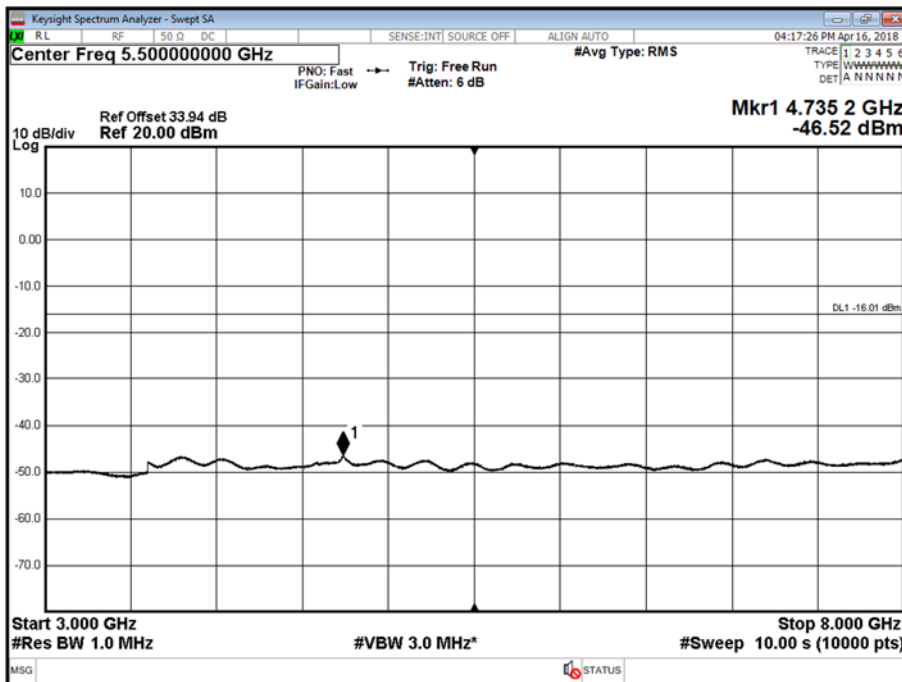


Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier  
Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T - Band 1 - Range 0.009 to 1000 MHz



Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier  
Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T - Band 2 - Range 1000 to 8000 MHz



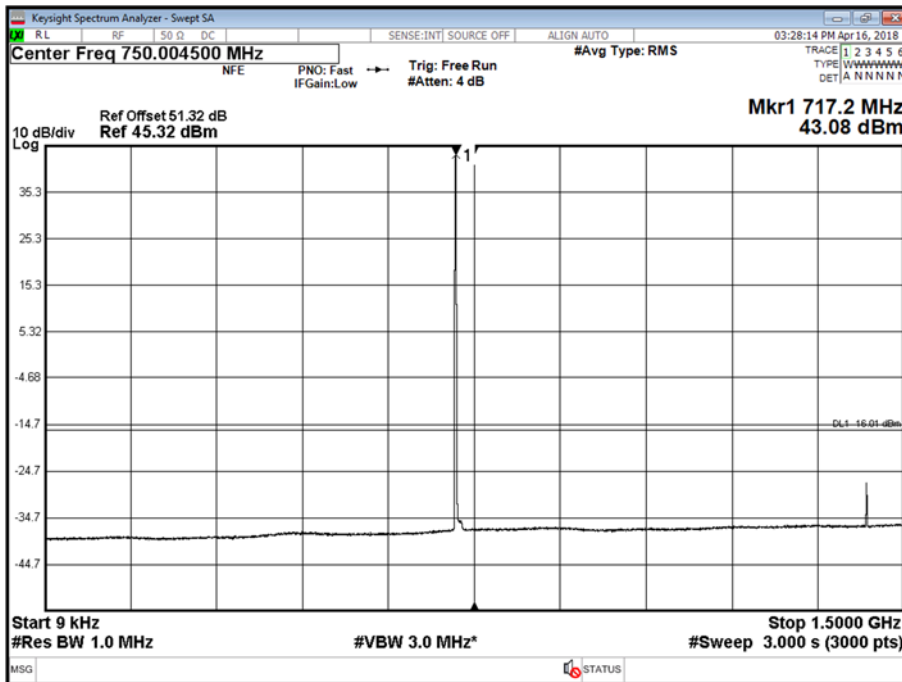


Product Service

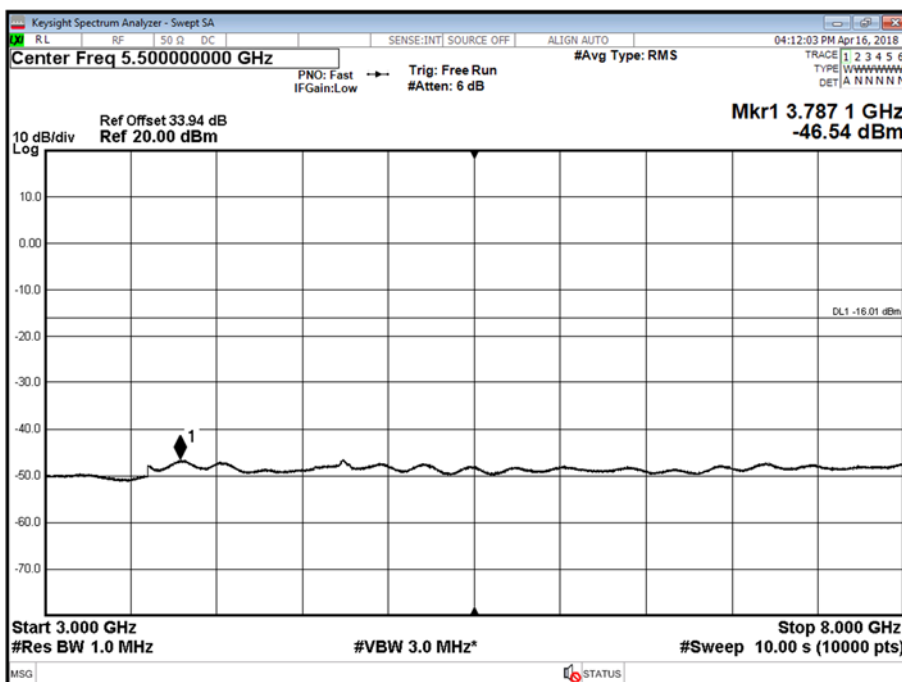
### Configuration B

Maximum Output Power 43 dBm

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B - Band 1 - Range 0.009 to 1500 MHz



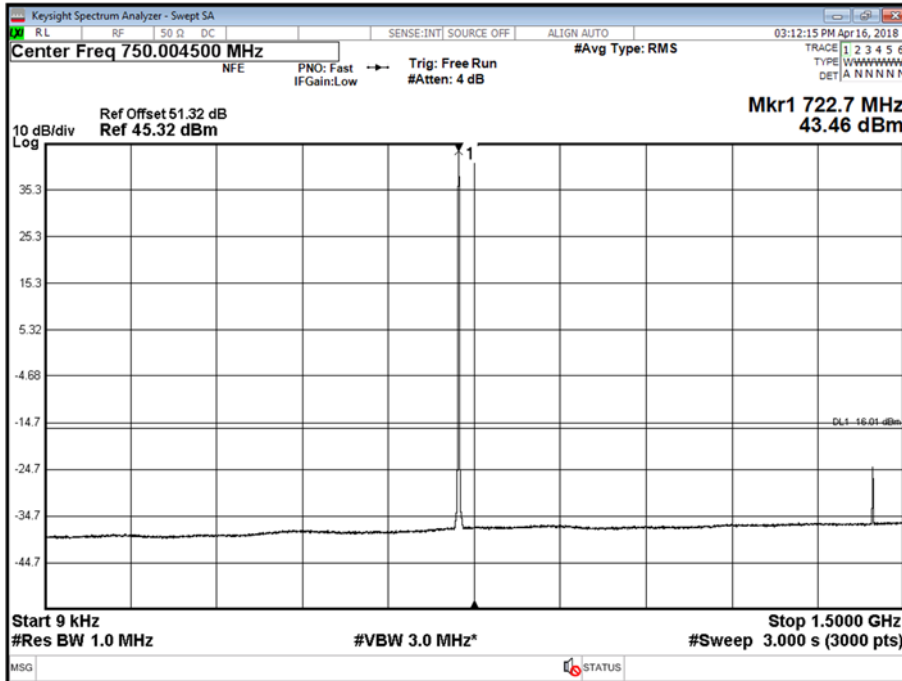
Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B - Band 2 - Range 1500 to 8000 MHz



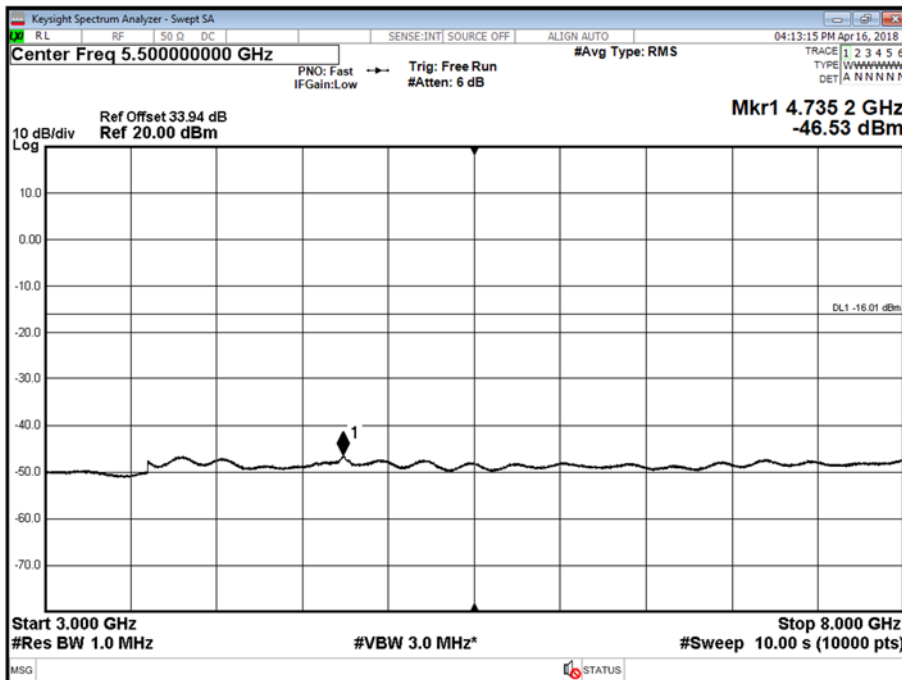


Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M - Band 1 - Range 0.009 to 1500 MHz



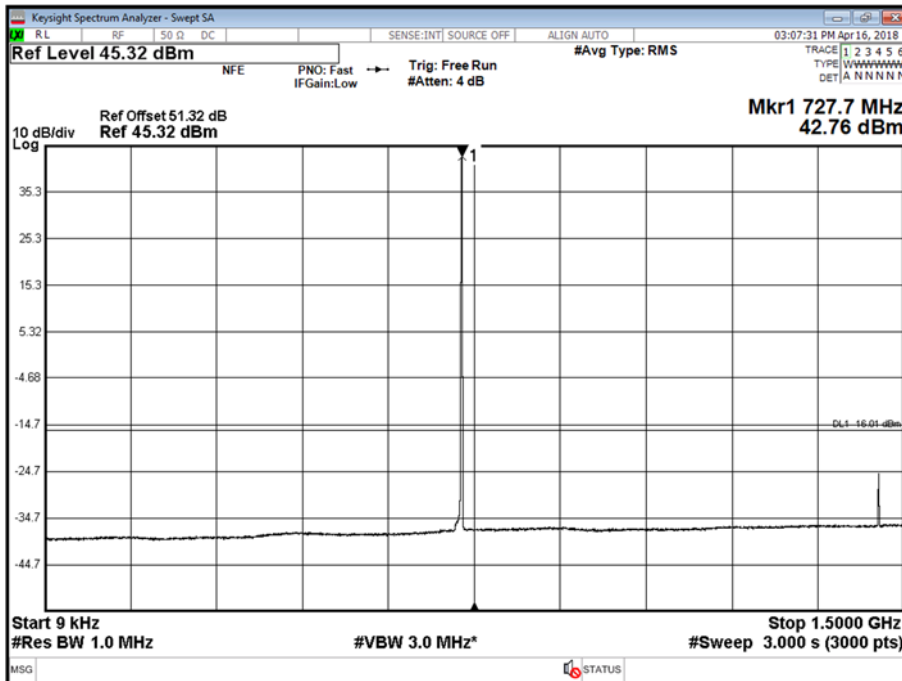
Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M - Band 2 - Range 1500 to 8000 MHz



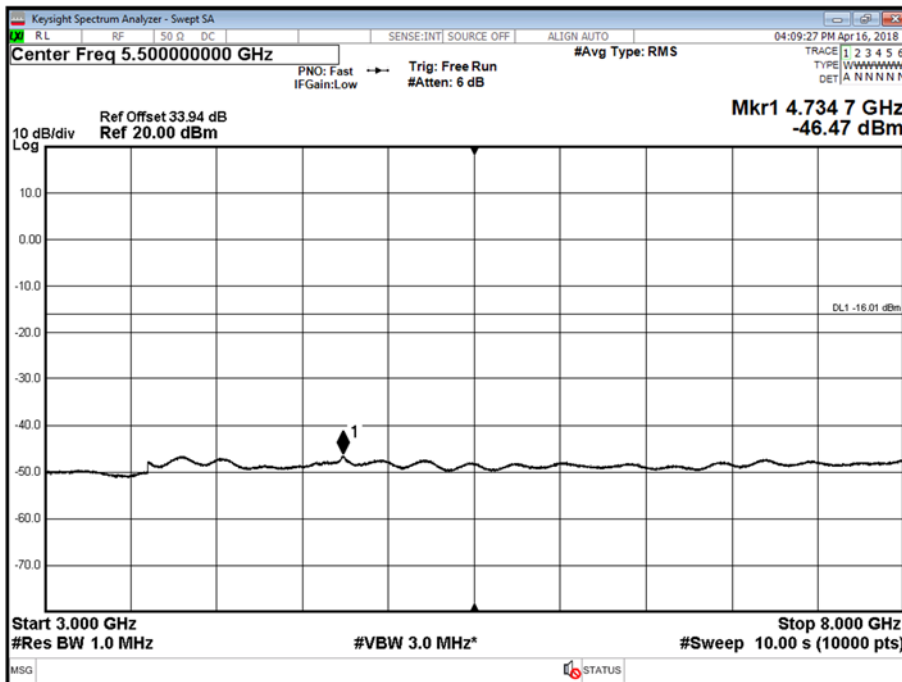


Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T - Band 1 - Range 0.009 to 1500 MHz



Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T - Band 2 - Range 1500 to 8000 MHz



Limit MIMO	-16dBm
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Product Service

## **2.5 RADIATED EMISSIONS**

### **2.5.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1053  
FCC CFR 47 Part 27, Clause 27.53 (c)  
Industry Canada RSS-130, Clause 6.5

### **2.5.2 Date of Test and Modification State**

30 March 2018 - 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 Temperature    25°C  
Relative Humidity        35%

### **2.5.5 Test Method**

The test was applied in accordance with test method requirements of ANSI/TIA-603-C-2004.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations.

The Applicant declared that the highest internally generated frequency would be up to 8000MHz and so the upper limit for measurement was calculated at 10 times this, which is 8GHz.

Emissions identified within the range 30MHz – 8GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 1GHz, the measurement was performed with a resolution bandwidth of 100kHz.

In the frequency Range 1GHz – 8GHz, the measurement was performed with a resolution bandwidth of 1MHz.

The measurements were performed at a 3m distance unless otherwise stated.

The limits for Spurious Emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier -  $(43 + 10\text{Log}(P))$  dB

Where:

Field Strength is measured in dB $\mu$ V/m

P is measured Transmitter Power in Watts





Product Service

### **Determination of Spurious Emission Limit**

As the EUT does not have an integral antenna, the field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipole as per 2.1053 (a).

$$E_{(v/m)} = (30 \times G_i \times P_o)^{0.5} / d$$

Where  $G_i$  is the antenna gain of an ideal half-wave dipole,  
 $P_o$  is the power out of the transceiver in W,  
 $d$  is the measurement distance in meter.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

$$E_{(v/m)} = (30 \times 1.64 \times 40)^{0.5} / 3 = 25.61V/m = 148.17dB\mu V/m$$

As per 24.238 the spurious emission must be attenuated by  $43 + 10\log(P_o)$  dB this gives:

$$43 + 10\log(40) = 59.02dB$$

Therefore the limit at 3m measurement distance is:

$$148.17 - 59.02 = 89.15 \text{ dB}\mu V/m$$

This limit has been used to determine Pass or Fail for the harmonics measured and detailed in the following results.

### **2.5.6 Test Results**

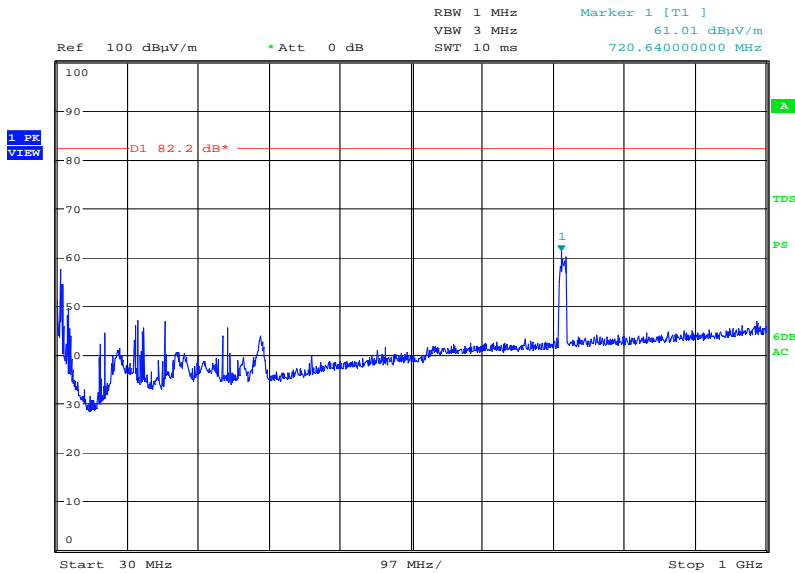
Configuration A

Maximum Output Power 46 dBm



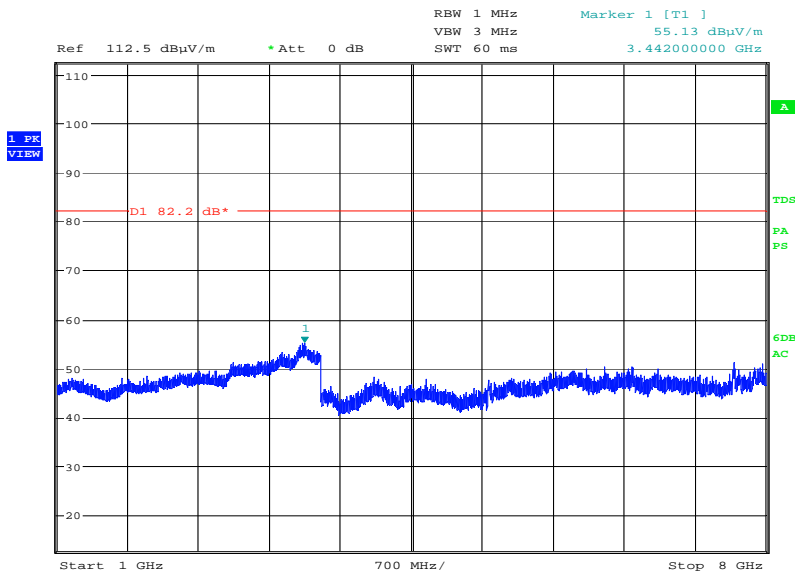
Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B - Band 1 - Range 30 to 1000 MHz



Date: 30.MAR.2018 11:03:11

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position B - Band 2 - Range 1000 to 8000 MHz

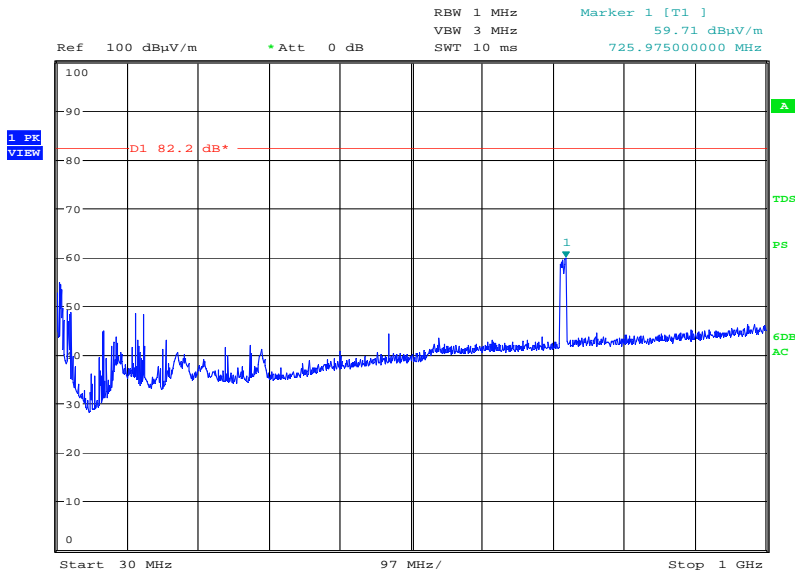


Date: 30.MAR.2018 12:03:38



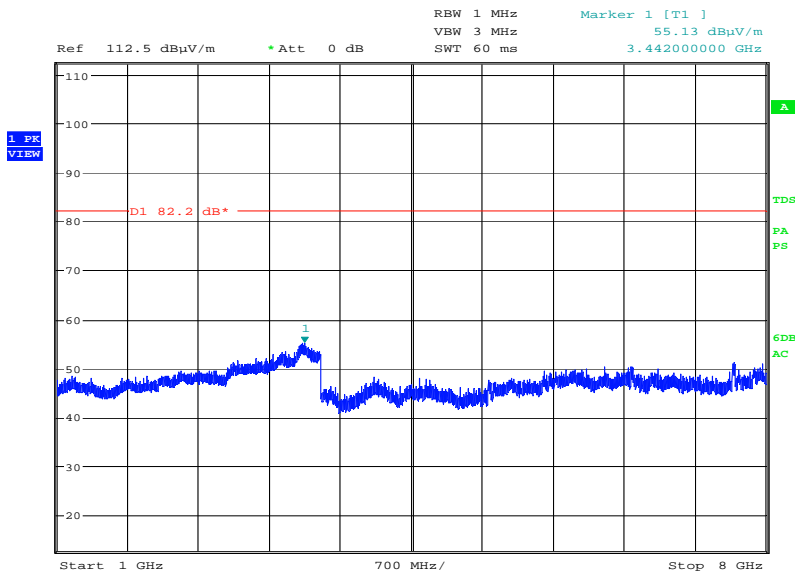
Product Service

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T - Band 1 - Range 30 to 1000 MHz



Date: 30.MAR.2018 10:59:10

Antenna A - LTE / NB-IoT GB Modulation L:64QAM / N:QPSK - LTE / NB-IoT GB Carrier Bandwidth L:10.0 MHz / N:180 kHz - Channel Position T - Band 2 - Range 1000 to 8000 MHz



Date: 30.MAR.2018 12:07:29

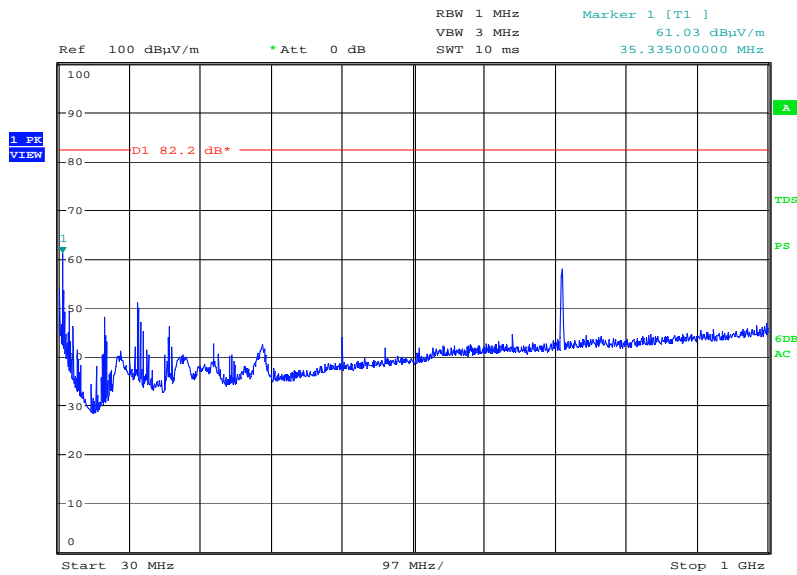


Product Service

### Configuration B

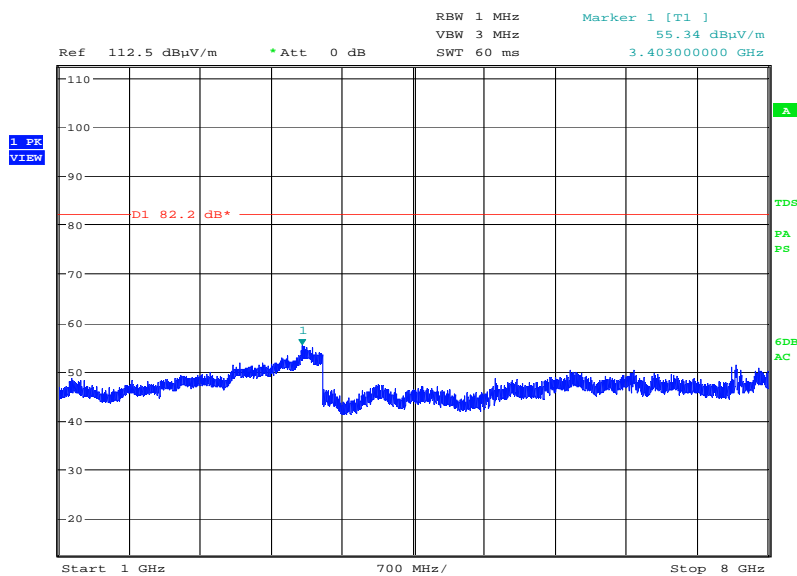
Maximum Output Power 43 dBm

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B - Band 1 - Range 30 to 1000 MHz



Date: 30.MAR.2018 11:08:03

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position B - Band 2 - Range 1000 to 8000 MHz

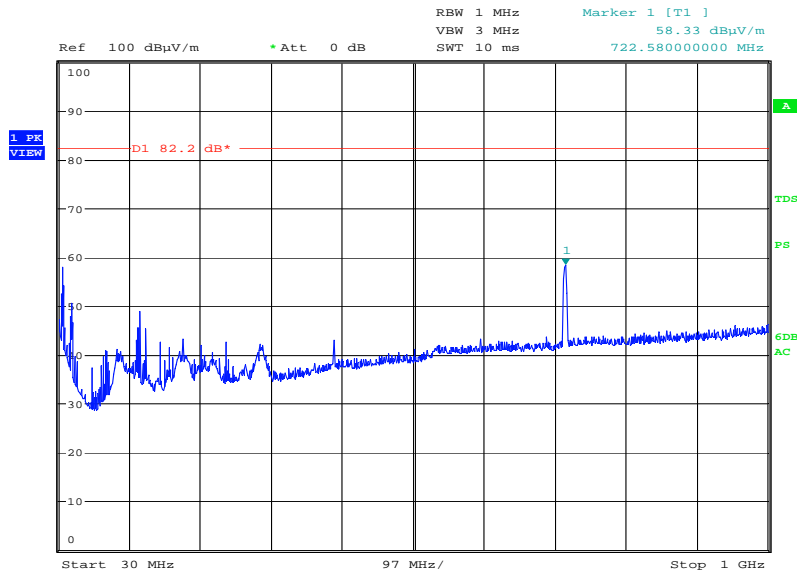


Date: 30.MAR.2018 11:57:56



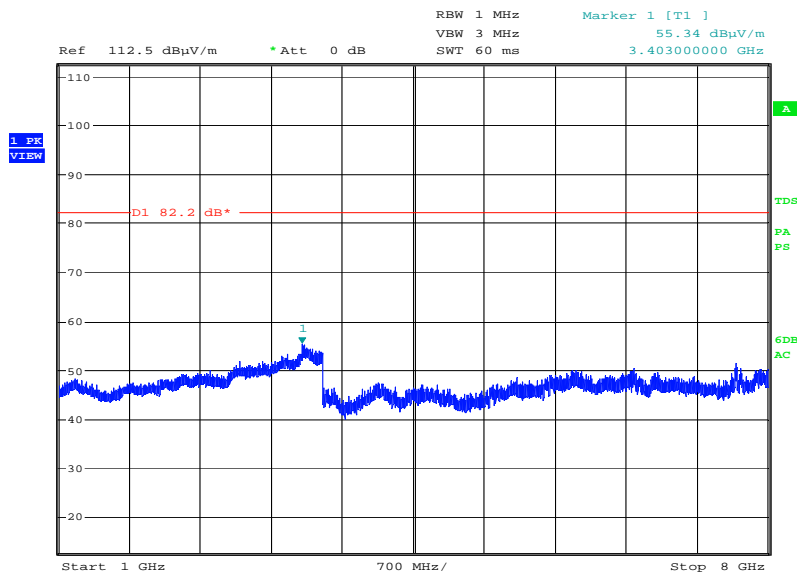
Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M - Band 1 - Range 30 to 1000 MHz



Date: 30.MAR.2018 11:11:13

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position M - Band 2 - Range 1000 to 8000 MHz

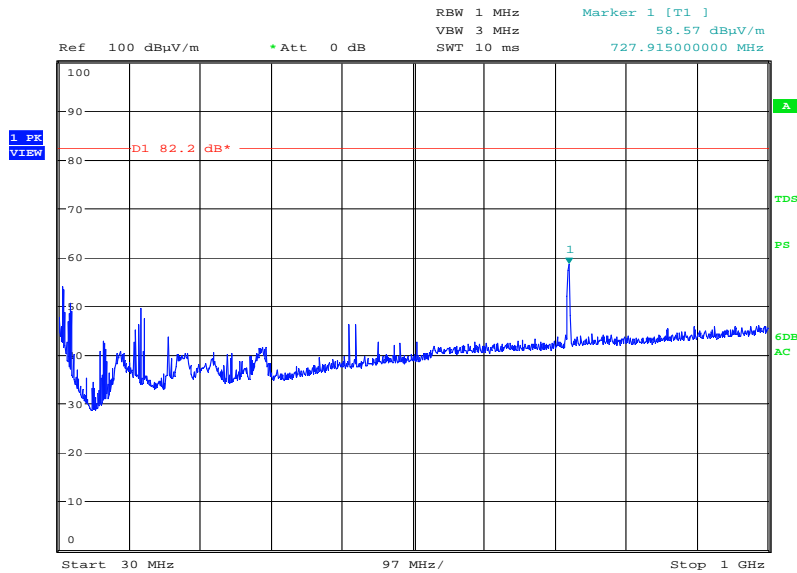


Date: 30.MAR.2018 11:53:46



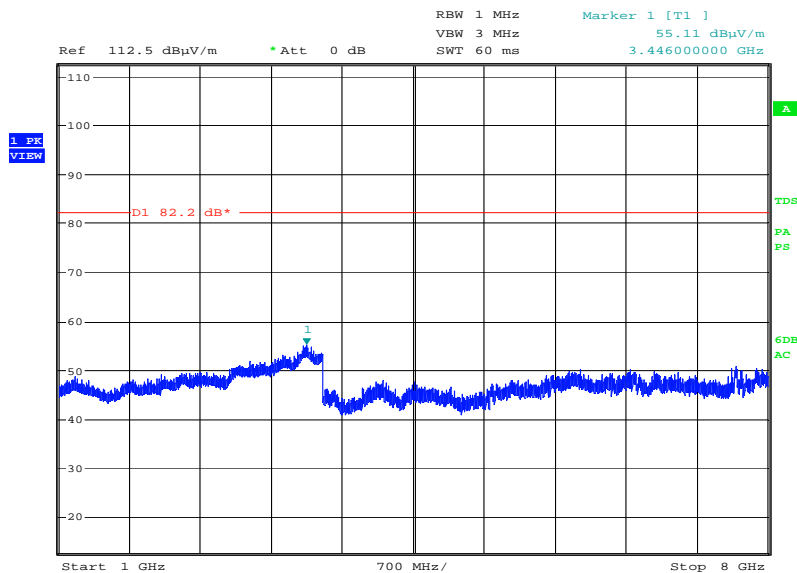
Product Service

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T - Band 1 - Range 30 to 1000 MHz



Date: 30.MAR.2018 11:17:04

Antenna A - NB-IoT SA Modulation N:QPSK - NB-IoT SA Carrier Bandwidth N:180 kHz - Channel Position T - Band 2 - Range 1000 to 8000 MHz



Date: 30.MAR.2018 11:49:10

Limit	-13dBm / 89.15 dBμV/m
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The EUT does not exceed -13dBm / 89.15 dBμV/m at the measured frequencies.



Product Service

## **SECTION 3**

### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Maximum Peak Output Power and Peak to Average Ratio - Conducted</b>					
Spectrum Analyser	Keysight	PXA	MY49430624	12	30-Jun-2018
Spectrum Analyser	Keysight	PXA	MY54410231	12	30-Nov-2018
Network Analyser	Rohde&Schwarz	ZVA40	TE3548	12	02-Oct-2018
Calibration unit	Rohde&Schwarz	ZV-Z54	TE4368	12	19-Sep-2018
High Pass filter	K&L	11SH10-3000/X18000-0/0	4412	-	O/P Mon
Attenuator	Weinschel	47-10-34	BU0642	-	O/P Mon
Attenuator	Weinschel	48-10-43	CH9195	-	O/P Mon
Attenuator	Weinschel	48-30-43	CH9182	-	O/P Mon
RF Load	weinschel	WA49-40-33	A1565	-	O/P Mon
Power Meter	Agilent	N1911A	MY45101617	-	O/P Mon
Power Supply	Delta	BML 901 250/1	BW96903167	-	O/P Mon
Wideband Power Sensor	Agilent	N1921A	MY45242699	-	O/P Mon
Hygromer	RS	TE3220	0427452	12	30-Aug-2018
Digital Volt Meter	White gold	79 III	TE00190	12	24-Nov-2018
<b>Band Edge</b>					
Spectrum Analyser	Keysight	PXA	MY49430624	12	30-Jun-2018
Spectrum Analyser	Keysight	PXA	MY54410231	12	30-Nov-2018
Network Analyser	Rohde&Schwarz	ZVA40	TE3548	12	02-Oct-2018
Calibration unit	Rohde&Schwarz	ZV-Z54	TE4368	12	19-Sep-2018
High Pass filter	K&L	11SH10-3000/X18000-0/0	4412	-	O/P Mon
Attenuator	Weinschel	47-10-34	BU0642	-	O/P Mon
Attenuator	Weinschel	48-10-43	CH9195	-	O/P Mon
Attenuator	Weinschel	48-30-43	CH9182	-	O/P Mon
RF Load	weinschel	WA49-40-33	A1565	-	O/P Mon
Power Meter	Agilent	N1911A	MY45101617	-	O/P Mon
Power Supply	Delta	BML 901 250/1	BW96903167	-	O/P Mon
Wideband Power Sensor	Agilent	N1921A	MY45242699	-	O/P Mon
Hygromer	RS	TE3220	0427452	12	30-Aug-2018
Digital Volt Meter	White gold	79 III	TE00190	12	24-Nov-2018
<b>Transmitter Spurious Emissions</b>					
Spectrum Analyser	Keysight	PXA	MY49430624	12	30-Jun-2018
Spectrum Analyser	Keysight	PXA	MY54410231	12	30-Nov-2018
Network Analyser	Rohde&Schwarz	ZVA40	TE3548	12	02-Oct-2018
Calibration unit	Rohde&Schwarz	ZV-Z54	TE4368	12	19-Sep-2018
High Pass filter	K&L	11SH10-3000/X18000-0/0	4412	-	O/P Mon
Attenuator	Weinschel	47-10-34	BU0642	-	O/P Mon
Attenuator	Weinschel	48-10-43	CH9195	-	O/P Mon
Attenuator	Weinschel	48-30-43	CH9182	-	O/P Mon
RF Load	weinschel	WA49-40-33	A1565	-	O/P Mon





Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Power Meter	Agilent	N1911A	MY45101617	-	O/P Mon
Power Supply	Delta	BML 901 250/1	BW96903167	-	O/P Mon
Waveguide	F.M.I	18-25 GHz	N/A	-	O/P Mon
Wideband Power Sensor	Agilent	N1921A	MY45242699	-	O/P Mon
Hygromer	RS	TE3220	0427452	12	30-Aug-2018
Digital Volt Meter	White gold	79 III	TE00190	12	24-Nov-2018
<b>Radiated Emissions</b>					
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	12-Jan-2019
Screened Room (5)	Rainford	Rainford	1545	36	09-Jun-2018
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	18-Oct-2018
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	01-Mar-2019
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	12-Feb-2019

O/P Mon – Output Monitored with Calibrated Equipment  
 TU – Traceability Unscheduled



Product Service

### 3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30 MHz to 20 GHz Amplitude	± 0.1 dB
Conducted Emissions	30 MHz to 20 GHz Amplitude	± 2.3 dB
Frequency Stability	30 MHz to 2 GHz	± 5.0 Hz
Occupied Bandwidth	Up to 20 MHz Bandwidth	± 1.1 Hz
Band Edge	30 MHz to 20 GHz Amplitude	± 2.3 dB
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Worst case error for both Time and Frequency measurement 12 parts in 10 <sup>6</sup>		



Product Service

## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 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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Product Service

## **ANNEX A**

### **MODULE LIST**



Product Service

Configuration A			
Product	Product No	R-State	Serial No
CT10	LPC102487/1	R1C	TO1F410050
RRUS E2 B29	KRC 161 408/1	R1A	CF84609406
Software Version:	CXP9013268%259_NBSA001		