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Report On

FCC and IC Testing of the
Ericsson AB (700MHz) RRUS 11 B12 KRC 161 241/2 Remote Radio
Unit In accordance with FCC CFR 47 Part 27 and Industry Canada
RSS-130: Issue 1

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161241-2

IC ID: 287AB-AS1612412

PREPARED BY

Guiying Zhao
Project Engineer

APPROVED BY

Nic Forsyth
Authorised Signatory

DATED

19 June 2014

Document 75927093 Report 01 Issue 1

June 2014

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SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Testing was carried out in support of an application for Grant of RRUS 11 B12 KRC 161 241/2 in LTE mode.

Manufacturer	Ericsson AB
Address	Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden
Product Name	RRUS 11 B12
Product Number	KRC 161 241/2
IC Model Number	AS1612412
Serial Number(s)	CB4T923482
LTE Software Version	CXP102051/22 Rev R11FT
PIS Software Version	CXP9017316/1 Rev R57KA
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 27: 2013 Industry Canada RSS-130 Issue 1: 2013
Start of Test	05 June 2014
Finish of Test	15 June 2014
Name of Engineer(s)	Guiying Zhao
Related Document(s)	ANSI C63.4: 2009 TIA-603-C-2004 FCC CFR 47 Part 2: 2013 Industry Canada RSS-GEN Issue 3: 2010 Industry Canada SRSP-518 Issue 1: 2013

1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause			Test Description	Result
	Part 2	Part 27	RSS 130		
2.1	2.1046	27.50 (c), (i)	4.4	Maximum Peak Output Power and Peak to Average Ratio – Conducted	Pass
	-	27.50 (c)	4.4	Effective Radiated Power	N/A
2.2	2.1049	27.53 (g)	RSS-Gen 4.6.1	Occupied Bandwidth	Pass
2.3	2.1051	27.53 (g)	4.6	Spurious Emissions at Band Edge	Pass
2.4	2.1053	27.53 (g)	4.6	Radiated Spurious Emissions	Pass
2.5	2.1051	27.53 (g)	4.6	Conducted Spurious Emissions	Pass
2.6	2.1055	27.54	4.3	Frequency Stability	Pass

N/A – Not Applicable

1.3 CONFIGURATION DESCRIPTION

Configuration Code	Carrier(s)	Configuration Description
L-MIMO-SC	1C	LTE MIMO, Single Carrier
L-MIMO-MC	2C	LTE MIMO, Multi Carrier x2

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Remote Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	RRUS 11 B12
PRODUCT NUMBER	KRC 161 241/2
IC MODLE NUMBER	AS1612412
TRANSMITTER OPERATING RANGE	TX: 729 MHz - 745 MHz RX: 699 MHz - 715 MHz
MODULATIONS	QPSK, 16QAM, 64QAM
INTERMEDIATE FREQUENCIES	-
ITU DESIGNATION OF EMISSION	5M00F9W, 10M0F9W
NUMBER OF CARRIERS	Maximum 2 carriers
SUPPORTED CHANNEL BANDWIDTH CONFIGURATION	Single Carrier: 5MHz and 10MHz Multi-Carriers(1x2): 5MHz
OUTPUT POWER (RMS) (W or dBm)	Single Carrier: 1x 46dBm per port (1 x 40W per port) Multi Carrier(x 2): 2 x 43dBm per port (2 x 20W per port)
OUTPUT POWER TOLERANCE	± 2.0dB
INSTANTANEOUS BANDWIDTH	16MHz
ANTENNA	No dedicated antenna, handled during licensing
NUMBER OF ANTENNA PORTS	2 TX/RX ports
SUPPORTED CONFIGURATION	Single carrier or Multi Carrier. Both RF chains are identical.
FCC ID	TA8AKRC161241-2
IC ID	287AB-AS1612412
Power source	-48V DC
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Remote Radio Part of LTE Base Station.

Signature

Date

D of B S Serial No



10 June 2014

75927093/01

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) RRUS 11 B12 KRC 161 241/2 is an Ericsson Remote Radio Unit working in the public mobile service 700MHz band which provides communication connections to 700MHz network in LTE mode. The RRUS 11 B12 KRC 161 241/2 operates from a -48V DC supply.

The EUT includes two TX/RX ports and it can be configured to transmit in MIMO mode, and MIMO mode was used for measurements as the worst configuration.

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 port.

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

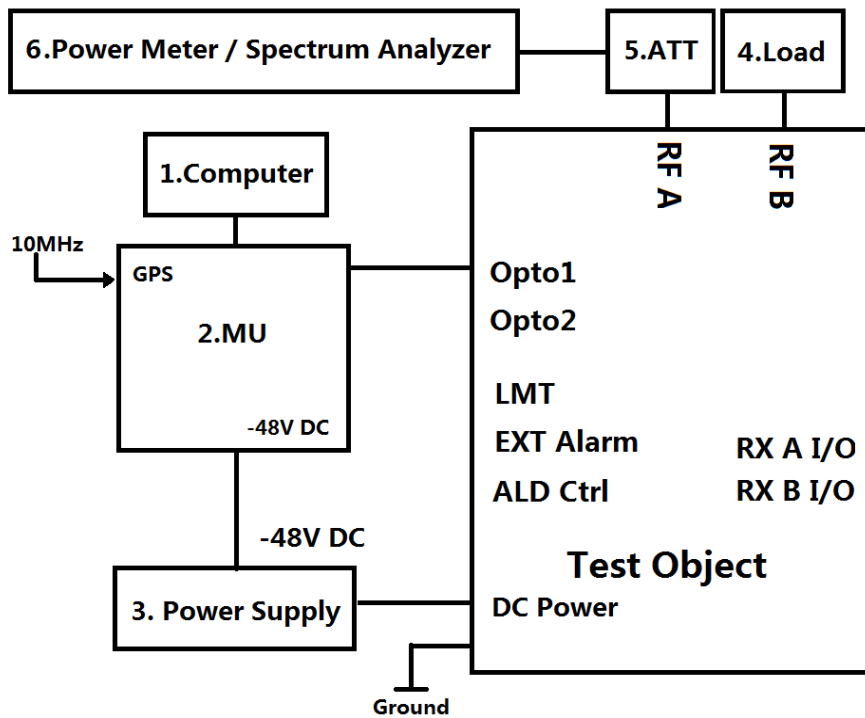


Equipment Under Test

1.6 TEST SETUP

Test Setup, Conducted Measurement:

Configuration setup:

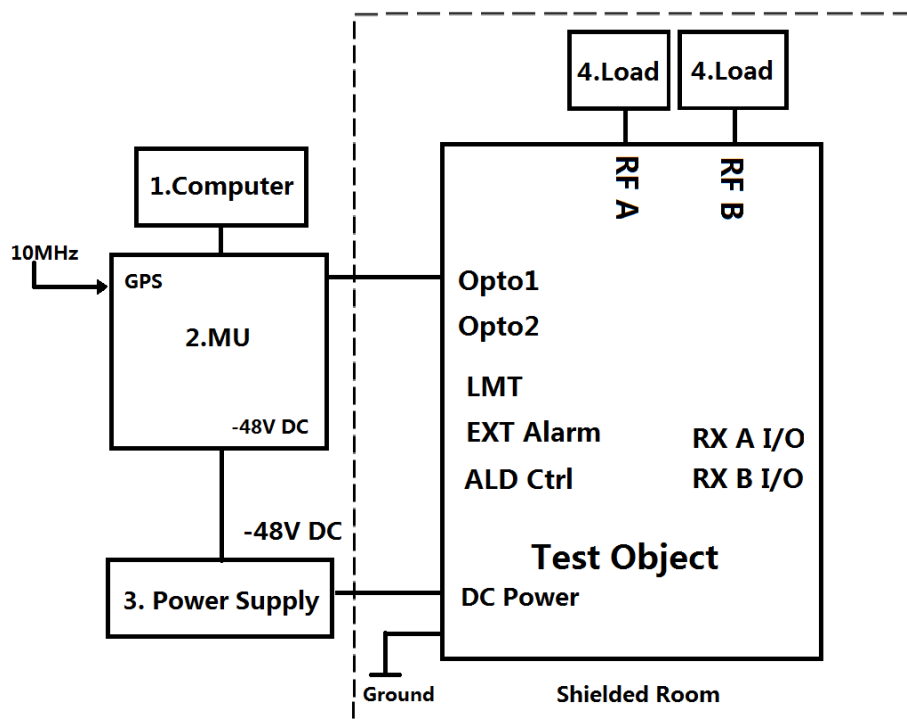


Product Name	Product Number	Version	Serial Number
RRUS 11 B12	KRC 161 241/2	R1A	CB4T923482

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	RBS 6601	1/BFL 901 009/4		
	DUL 20 01	KDU 137 533/4	R1F	CD36915077
	SUP 6601	1/BFL 901 009/4	R2A	BR88468818
3	Power Supply	DH1716-5D	--	2008040050
4	Load	TF100	--	09121648
5	40dB Attenuator	66-40-33	--	CD4019
6	Spectrum Analyzer	FSQ26	--	100253
	Power Meter	NRP	--	101283
	Power Sensor	NRP-Z51	--	102127

Test Setup, Radiated Measurement:

Base Station setup:



Product Name	Product Number	Version	Serial Number
RRUS 11 B12	KRC 161 241/2	R1A	CB4T923482

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	RBS 6601	1/BFL 901 009/4		
	DUL 20 01	KDU 137 533/4	R1F	CD36915077
	SUP 6601	1/BFL 901 009/4	R2A	BR88468818
3	Power Supply	DH1716-5D	--	2008040050
4	Load	TF100	--	09121648
	Load	TF100	--	09121605

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.

1.8 DEVIATION FROM THE STANDARD

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

1.9 MODIFICATION RECORD

Modification State 0 - 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 Beijing, China:

- Maximum Average Output Power and Peak to Average Ratio – Conducted
- Modulation Characteristics
- Occupied Bandwidth
- Band Edge
- Conducted Spurious Emissions
- Frequency Stability

Only Radiated Spurious Emissions testing has been performed under the following site registrations:

FCC Accreditation 413514:

TA Beijing Limited, Building B-4, No.1 JingHai 3rd Road, BDA East Park, Beijing,100176,China

Industry Canada Accreditation 10852A-1:

TA Beijing Limited, Building B-4, No.1 JingHai 3rd Road, BDA East Park, Beijing,100176,China



Product Service

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 (c), (i)
Industry Canada RSS-130, Clause 4.4

2.1.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.1.3 Date of Test and Modification State

05, 06 and 09 June 2014 - Modification State 0

2.1.4 Test Equipment Used

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

2.1.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.1.6 Test Method

The test was applied in accordance with the test method requirements of FCC Part 27 and Industry Canada RSS-130.

Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal. The carrier power was measured with E-TM1.1 test models as the representative models. Since the EUT transmits on two antennas simultaneously in the same frequency range, i.e, TX MIMO mode, using the Measure-and-Sum approach, the output power at both antennas were measured, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

The peak to average ratio measurement was performed at the conducted ports of the EUT. The spectrum analyzer's Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

The RMS Power and Peak to Average Ratio were measured and recorded with the results being compared with the limits.

2.1.7 Test Results

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier

QPSK

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 731.5MHz				Channel Position M 737.0MHz				Channel Position T 742.5MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.75	37.58	38.91	6.76	45.75	37.58	38.91	6.67	45.74	37.50	38.90	6.70
B	45.70	37.15	38.86	6.70	45.73	37.41	38.89	6.60	45.78	37.84	38.94	6.67
Total	48.73	74.73	-	-	48.75	74.99	-	-	48.77	75.34	-	-

Note1 :

1 MHz Power for 5MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(4.83)=Output Power - 6.84

10MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 734.0MHz				Channel Position M 737.0MHz				Channel Position T 740.0MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.75	37.58	36.01	6.83	45.72	37.33	35.98	6.67	45.73	37.41	35.99	6.70
B	45.74	37.50	36.00	6.76	45.73	37.41	35.99	6.63	45.74	37.50	36.00	6.76
Total	48.76	75.08	-	-	48.74	74.74	-	-	48.75	74.91	-	-

Note :

1 MHz Power for 10MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(9.42) =Output Power - 9.74

16QAM

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 731.5MHz				Channel Position M 737.0MHz				Channel Position T 742.5MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.76	37.67	38.94	6.63	45.72	37.33	38.90	6.60	45.76	37.67	38.94	6.60
B	45.69	37.07	38.87	6.67	45.76	37.67	38.94	6.57	45.72	37.33	38.90	6.68
Total	48.74	74.74	-	-	48.75	75.00	-	-	48.75	74.99	-	-

Note 1:

1 MHz Power for 5MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(4.81)=Output Power - 6.82

10MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 734.0MHz				Channel Position M 737.0MHz				Channel Position T 740.0MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.72	37.33	35.98	6.83	45.69	37.07	35.95	6.67	45.69	37.07	35.95	6.70
B	45.70	37.15	35.96	6.73	45.67	36.90	35.93	6.67	45.70	37.15	35.96	6.76
Total	48.72	74.48	-	-	48.69	73.97	-	-	48.71	74.22	-	-

Note 1:

1 MHz Power for 10MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(9.42)=Output Power - 9.74

64QAM

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 731.5MHz				Channel Position M 737.0MHz				Channel Position T 742.5MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.78	37.84	38.94	6.63	45.74	37.50	38.90	6.67	45.77	37.76	38.93	6.63
B	45.80	38.02	38.96	6.57	45.79	37.93	38.95	6.60	45.77	37.76	38.93	6.67
Total	48.80	75.86	-	-	48.78	75.43	-	-	48.78	75.52	-	-

Note 1:

1 MHz Power for 5MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(4.83)=Output Power - 6.84

10MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)											
	Channel Position B 734.0MHz				Channel Position M 737.0MHz				Channel Position T 740.0MHz			
	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)	Power (dBm)	Power (W)	Power (dBm/MHz ¹)	PAR (dB)
A	45.76	37.67	36.02	6.83	45.74	37.50	36.00	6.67	45.76	37.67	36.02	6.67
B	45.72	37.33	35.98	6.73	45.70	37.15	35.96	6.63	45.74	37.50	36.00	6.79
Total	48.75	74.99	-	-	48.73	74.65	-	-	48.76	75.17	-	-

Note 1:

1 MHz Power for 10MHz BW=Output Power - 10lg(OBW/1)=Output Power - 10lg(9.42)=Output Power - 9.74

Configuration L-MIMO-MC (2C)

Maximum Output Power 43.0dBm per carrier

Declarative Maximum Output power per antenna port: 45.5dBm

QPSK

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)								
	Channel Position B _{RFBW} -			Channel Position M _{RFBW} 731.5MHz + 742.5MHz			Channel Position T _{RFBW} -		
	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)
A	-	-	-	45.13	32.58	7.08	-	-	-
B	-	-	-	45.11	32.43	7.08	-	-	-
Total	-	-	-	48.13	65.01	-	-	-	-

16QAM

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)								
	Channel Position B _{RFBW} -			Channel Position M _{RFBW} 731.5MHz + 742.5MHz			Channel Position T _{RFBW} -		
	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)
A	-	-	-	45.16	32.81	7.05	-	-	-
B	-	-	-	45.09	32.28	7.05	-	-	-
Total	-	-	-	48.14	65.09	-	-	-	-

64QAM

5MHz Bandwidth

Antenna	Average Output Power / Peak to Average Ratio (PAR)								
	Channel Position B _{RFBW} -			Channel Position M _{RFBW} 731.5MHz + 742.5MHz			Channel Position T _{RFBW} -		
	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)	Power (dBm)	Power (W)	PAR (dB)
A	-	-	-	45.15	32.73	7.05	-	-	-
B	-	-	-	45.11	32.43	7.05	-	-	-
Total	-	-	-	48.14	65.16	-	-	-	-

Note :

This unit is tested without antenna. ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible IC Bureau(s). Licensees are required to take into account maximum allowed antenna gain used in combination with above power settings to prevent the radiated output power to exceed the limits.

Limit	
Output Power	FCC: (ERP) 1000 W/MHz or 60 dBm/MHz IC: (e.i.r.p) 1640 W/MHz or 62.15 dBm/MHz
Peak to Average Ratio	13 dB

Remarks

The maximum output power of the EUT is sufficient to keep it within the range of the rated transmitter power that the manufacture declared and the requirements of FCC and IC standards. The peak to average ratio is under the limit of 13dB.

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 (g)
Industry Canada RSS-GEN, Clause 4.6.1

2.2.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.2.3 Date of Test and Modification State

05, 06 and 09 June 2014 - Modification State 0

2.2.4 Test Equipment Used

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

2.2.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.2.6 Test Method

The test was applied in accordance with the test method requirements of FCC Part 27 and Industry Canada RSS-130.

The EUT was set to transmit at maximum power and testing was carried out on Bottom, Middle and Top Channels. Using the Occupied Bandwidth measurement function in the Spectrum Analyser, measurements were made in accordance with FCC KDB 971168 D01 Power Meas License Digital Systems v02r01 Clause 4.2. In addition, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Power Meas License Digital Systems v02r01 Clause 4.1. The RBW was configured to 1% of the theoretical channel bandwidth, meeting the requirement of being between 1 to 5% of the Occupied Bandwidth described in the KDB aforementioned.

The results are shown in the plots below.

2.2.7 Test Results

Configuration L-MIMO-SC

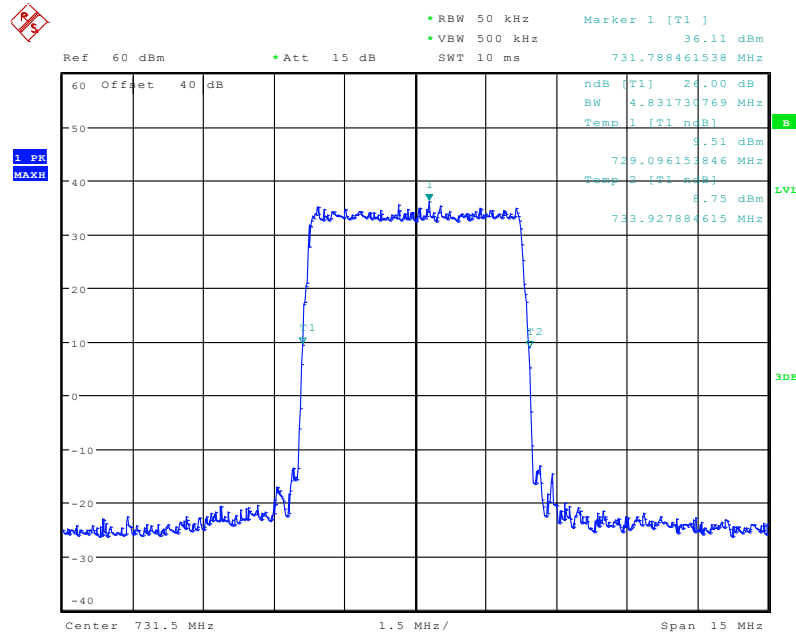
Maximum Output Power 46.0dBm per carrier

-26dBc Occupied Bandwidth for FCC requirement

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 731.5MHz	Channel Position M 737.0MHz	Channel Position T 742.5MHz
QPSK / 5.0 MHz	4.83	4.83	4.83
16QAM / 5.0 MHz	-	4.81	-
64QAM / 5.0 MHz	-	4.83	-

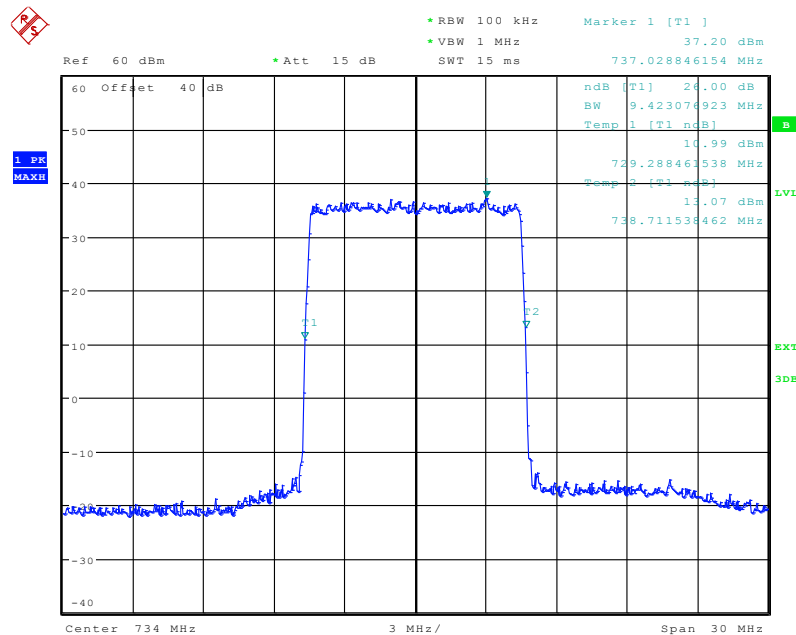
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 734.0MHz	Channel Position M 737.0MHz	Channel Position T 740.0MHz
QPSK / 10.0 MHz	9.42	9.42	9.42
16QAM / 10.0 MHz	-	9.42	-
64QAM / 10.0 MHz	-	9.42	-

Channel Position B - QPSK / Bandwidth 5.0 MHz



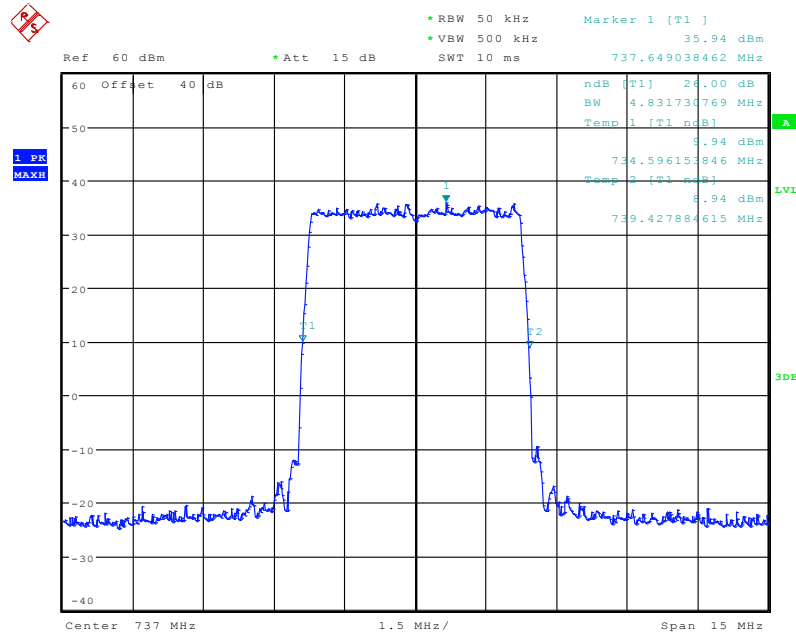
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Channel Position B - QPSK / Bandwidth 10.0 MHz



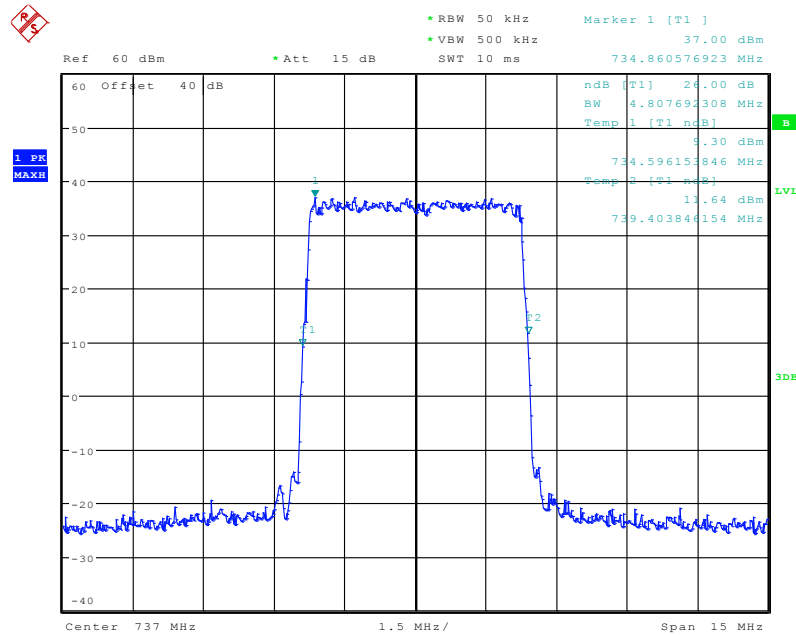
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Channel Position M - QPSK / Bandwidth 5.0 MHz



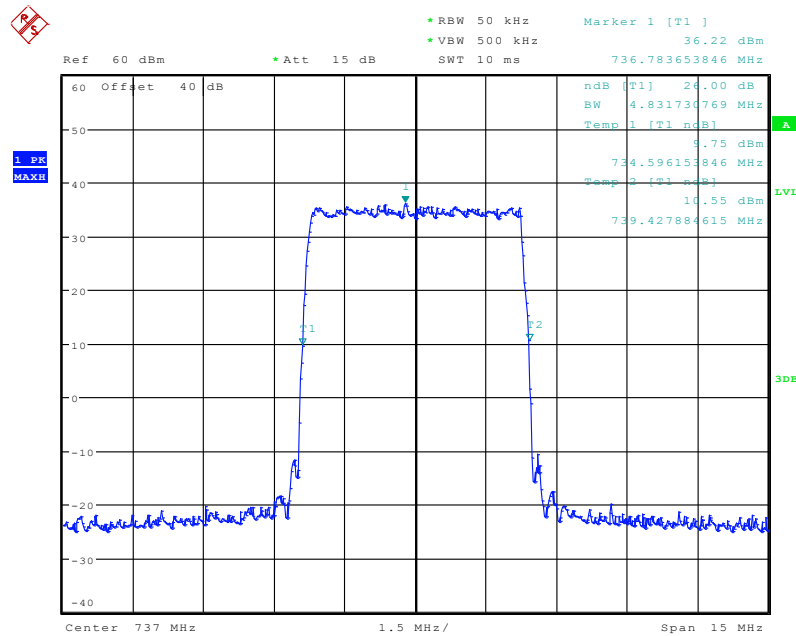
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Channel Position M - 16QAM / Bandwidth 5.0 MHz



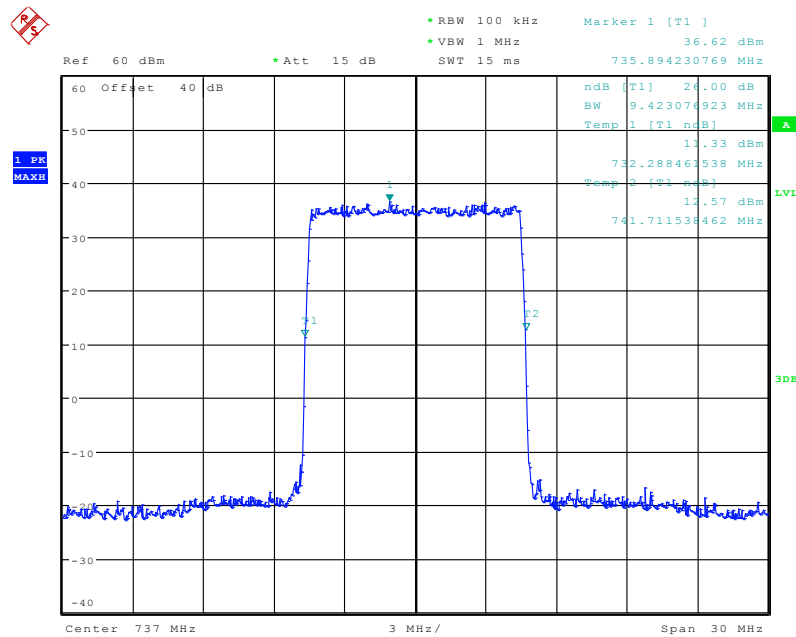
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Channel Position M - 64QAM / Bandwidth 5.0 MHz



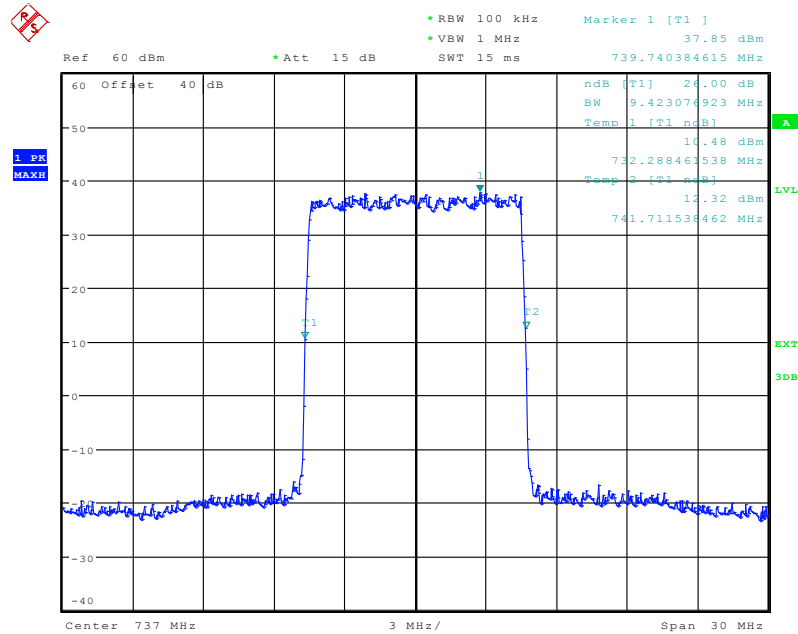
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Channel Position M - QPSK / Bandwidth 10.0 MHz



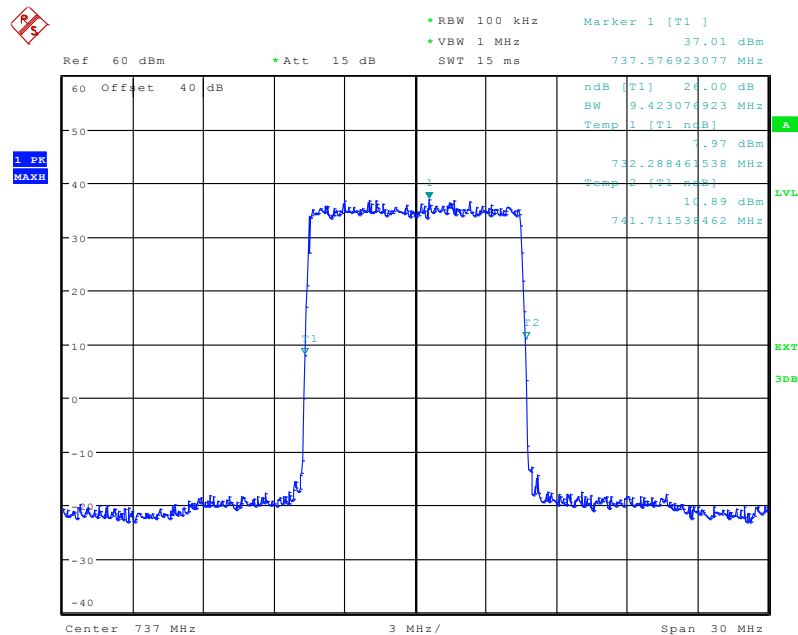
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Channel Position M - 16QAM / Bandwidth 10.0 MHz



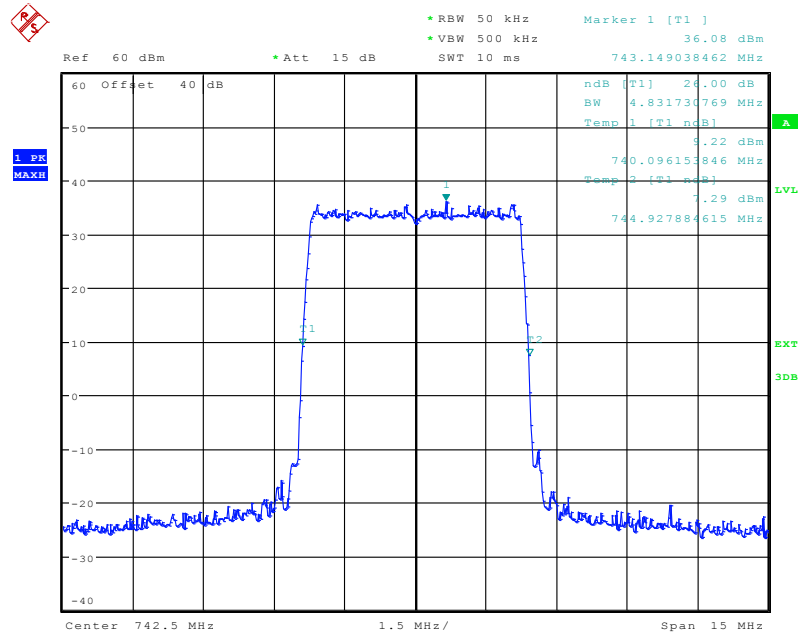
Date: 6.JUN.2014 11:25:23

Channel Position M - 64QAM / Bandwidth 10.0 MHz



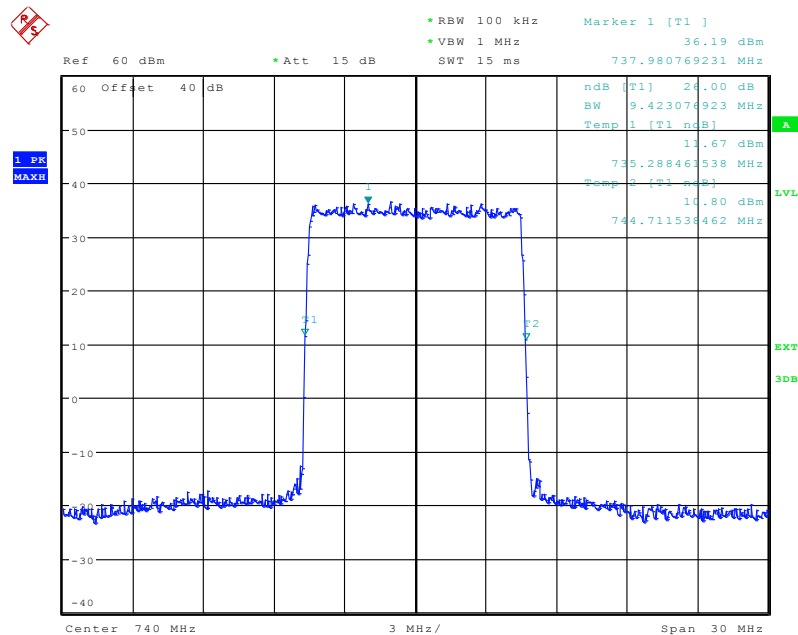
Date: 6.JUN.2014 11:17:28

Channel Position T - QPSK / Bandwidth 5.0 MHz



Date: 6.JUN.2014 15:23:05

Channel Position T - QPSK / Bandwidth 10.0 MHz



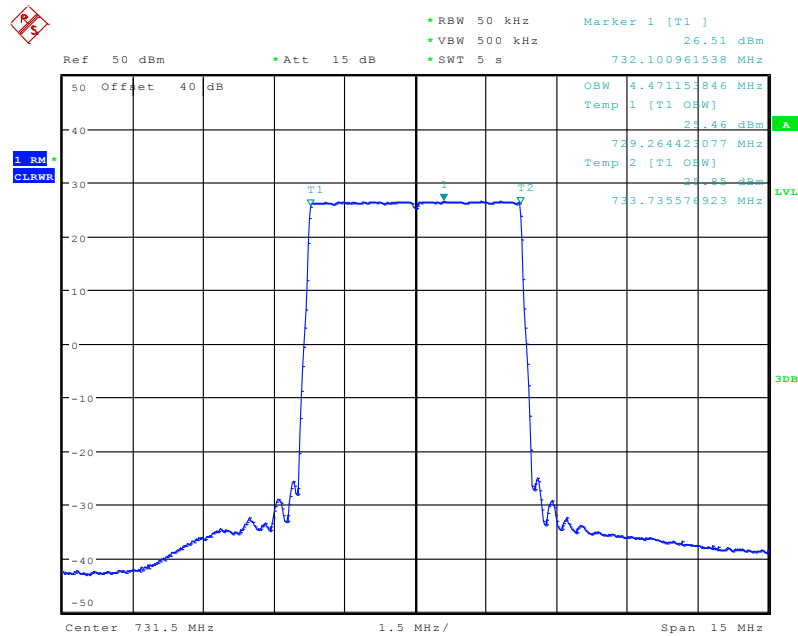
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99% Occupied Bandwidth for IC requirement

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 731.5MHz	Channel Position M 737.0MHz	Channel Position T 742.5MHz
QPSK / 5.0 MHz	4.47	4.47	4.47
16QAM / 5.0 MHz	-	4.47	-
64QAM / 5.0 MHz	-	4.47	-

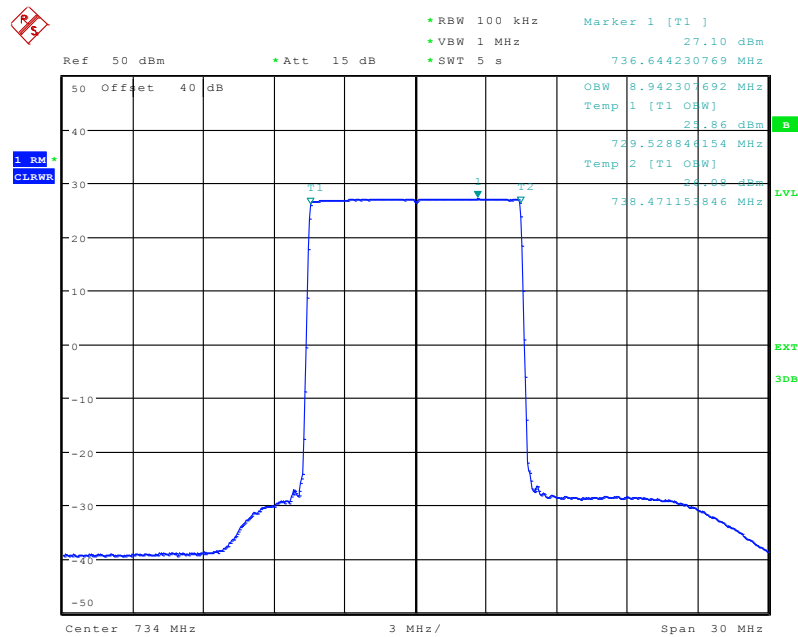
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 734.0MHz	Channel Position M 737.0MHz	Channel Position T 740.0MHz
QPSK / 10.0 MHz	8.94	8.94	8.94
16QAM / 10.0 MHz	-	8.94	-
64QAM / 10.0 MHz	-	8.94	-

Channel Position B - QPSK / Bandwidth 5.0 MHz



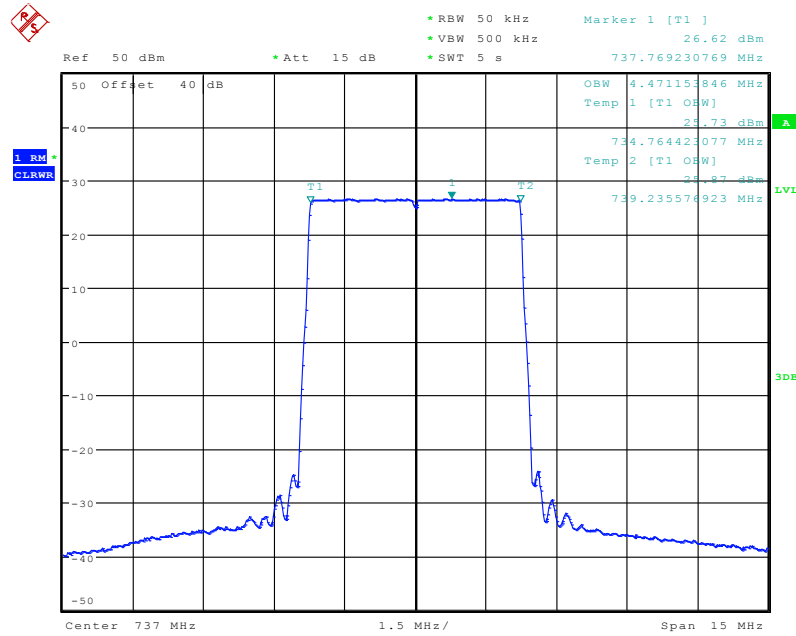
Date: 9.JUN.2014 11:26:43

Channel Position B - QPSK / Bandwidth 10.0 MHz



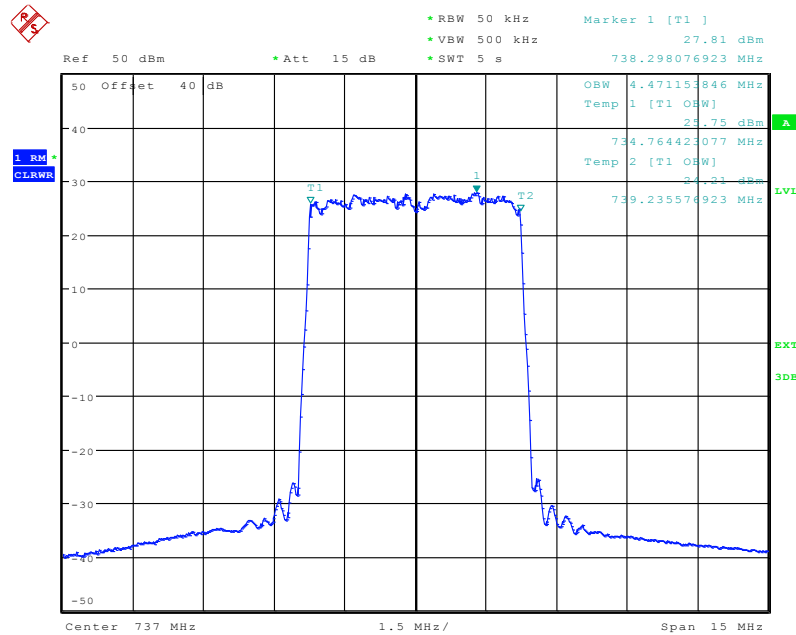
Date: 6.JUN.2014 16:49:40

Channel Position M - QPSK / Bandwidth 5.0 MHz



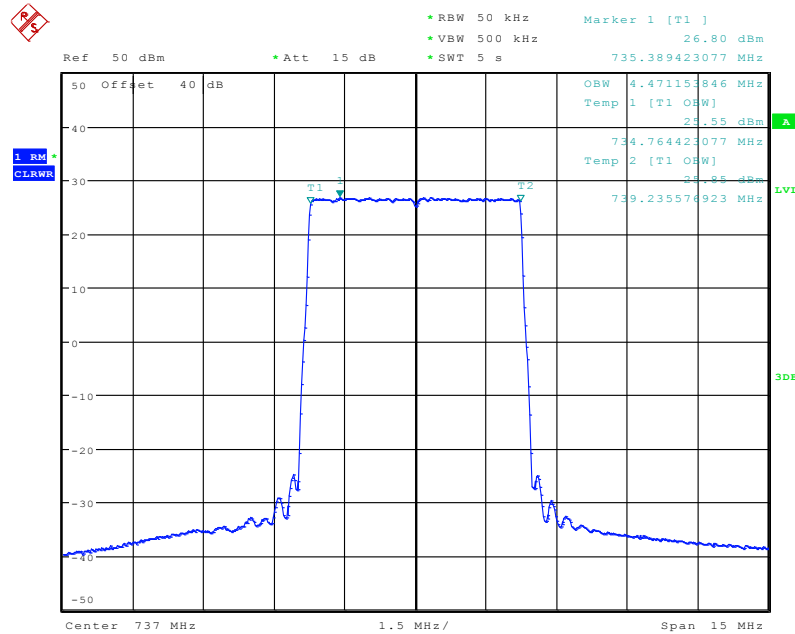
Date: 6.JUN.2014 10:02:01

Channel Position M - 16QAM / Bandwidth 5.0 MHz



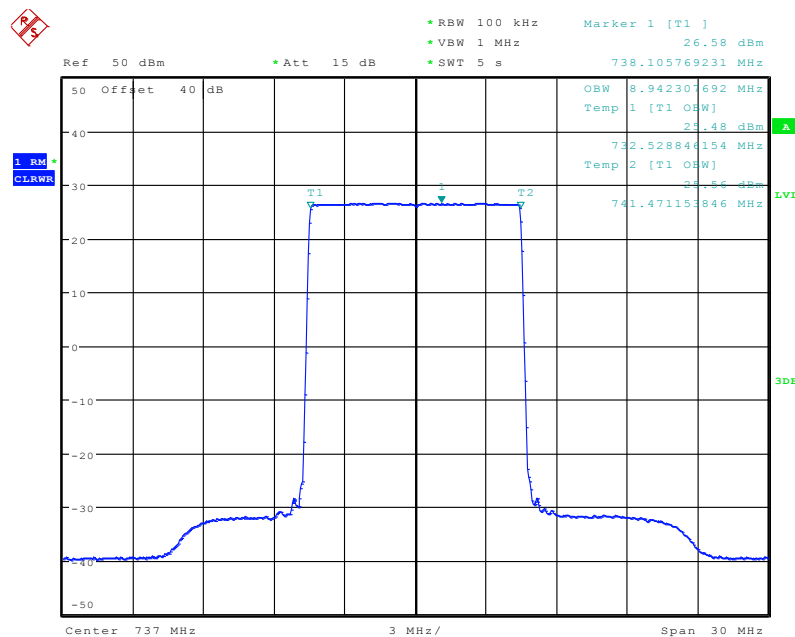
Date: 6.JUN.2014 10:55:23

Channel Position M - 64QAM / Bandwidth 5.0 MHz



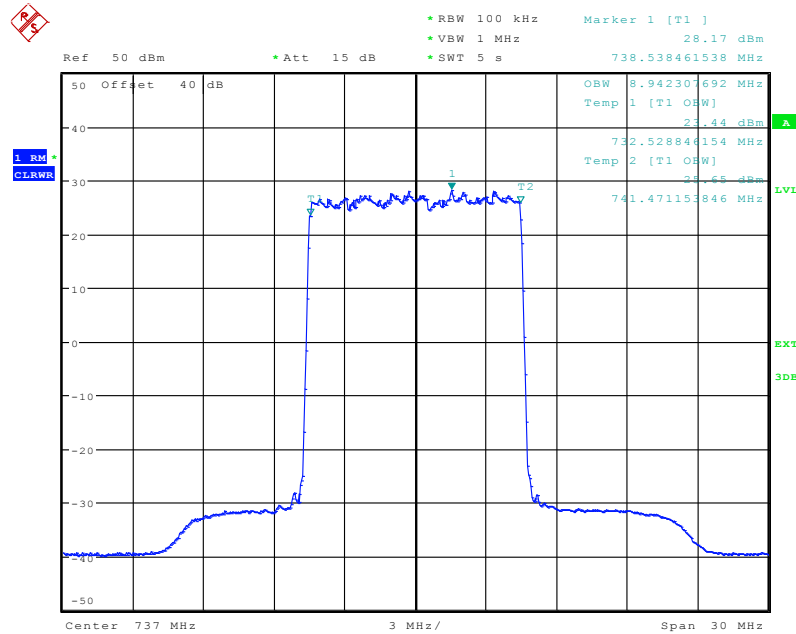
Date: 6.JUN.2014 10:34:00

Channel Position M - QPSK / Bandwidth 10.0 MHz



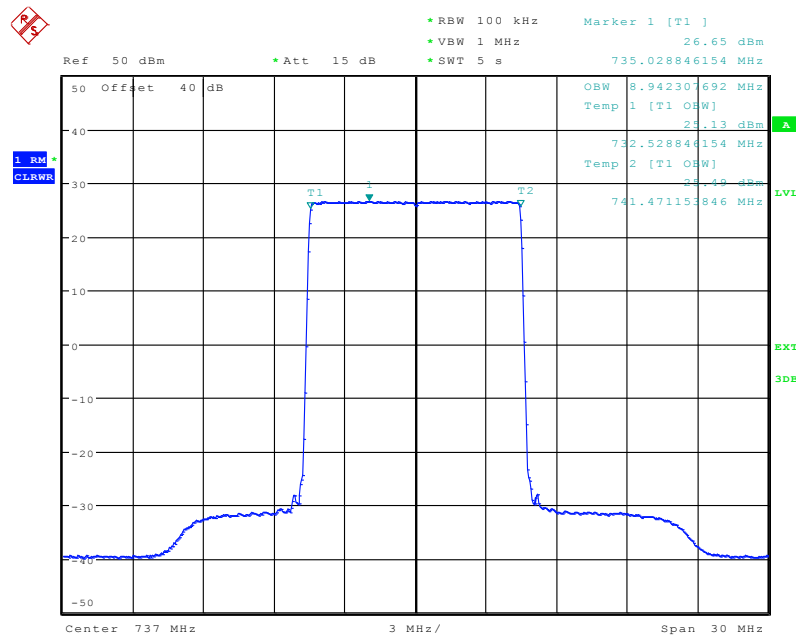
Date: 5.JUN.2014 17:06:12

Channel Position M - 16QAM / Bandwidth 10.0 MHz



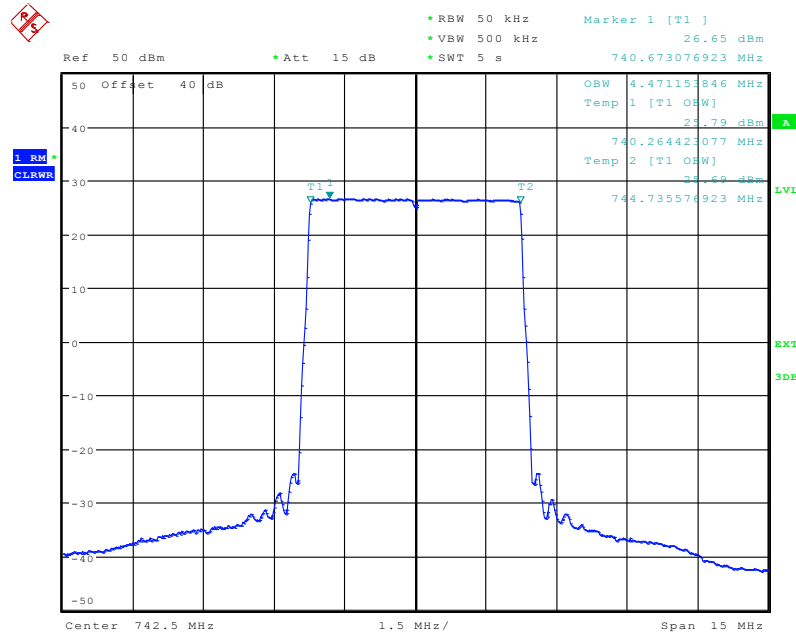
Date: 6.JUN.2014 11:24:45

Channel Position M - 64QAM / Bandwidth 10.0 MHz



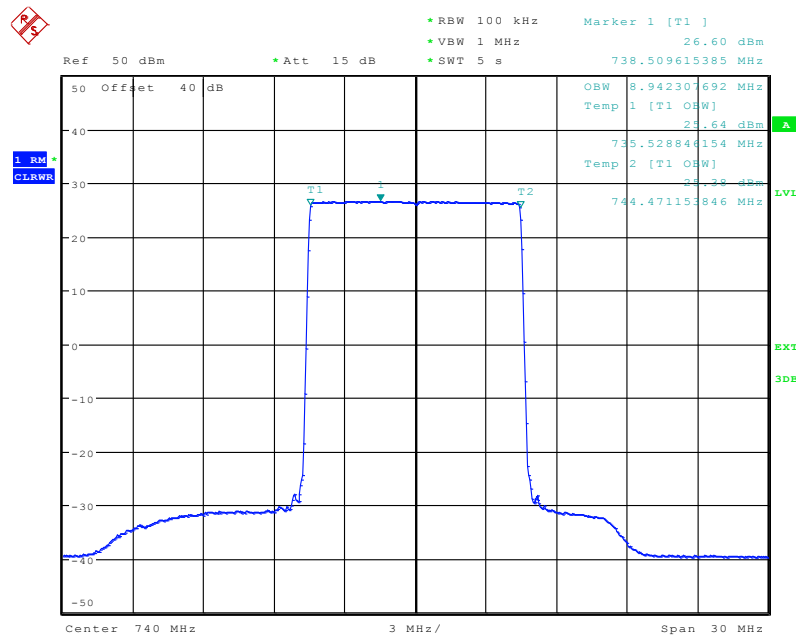
Date: 6.JUN.2014 11:18:13

Channel Position T - QPSK / Bandwidth 5.0 MHz



Date: 6.JUN.2014 15:22:16

Channel Position T - QPSK / Bandwidth 10.0 MHz



Date: 6.JUN.2014 16:37:15

2.3 SPURIOUS EMISSION AT BAND EDGE

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.3.3 Date of Test and Modification State

05, 06 and 09 2014 - Modification State 0

2.3.4 Test Equipment Used

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

2.3.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.3.6 Test Method

The test was applied in accordance with the test method requirements of FCC Part 27 and Industry Canada RSS-130.

In accordance with FCC CFR 47 Part 27, Clause 27.53 (g), the power of any emissions outside of the block edges shall be attenuated below the transmitter power (P) with the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. For the measurements of 100kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30kHz should be used. For measurements of emissions > 100kHz away from the band edges, a resolution bandwidth of 100 kHz or greater should be used. As a resolution bandwidth of 30kHz was applied to the measurement of emission > 100kHz away from the band edges, the limit was adjusted from -13dBm to -18.2dBm to compensate for the reduce measurement bandwidth.

For MIMO mode configurations, the limit was adjusted with a correction of -3dB $[10\log(2)]$ by using the Measure and Add $10\log(N)$ dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 accounting for simultaneous transmission from antennas port RF A and RF B. The limit of -16dBm was applied to the measurement of emissions in the 100kHz immediately outside and adjacent to the frequency block, and -21.2dBm was used for emission > 100kHz away from the band edges.

The path loss measured and entered as a reference level offset. The EUT was set to transmit at its maximum rated output power in the configurations described in the tables below. The Measurements were made at the bottom and top of the band with all channel bandwidth.

The worst results are shown in the plots below.

2.3.7 Test Results

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier

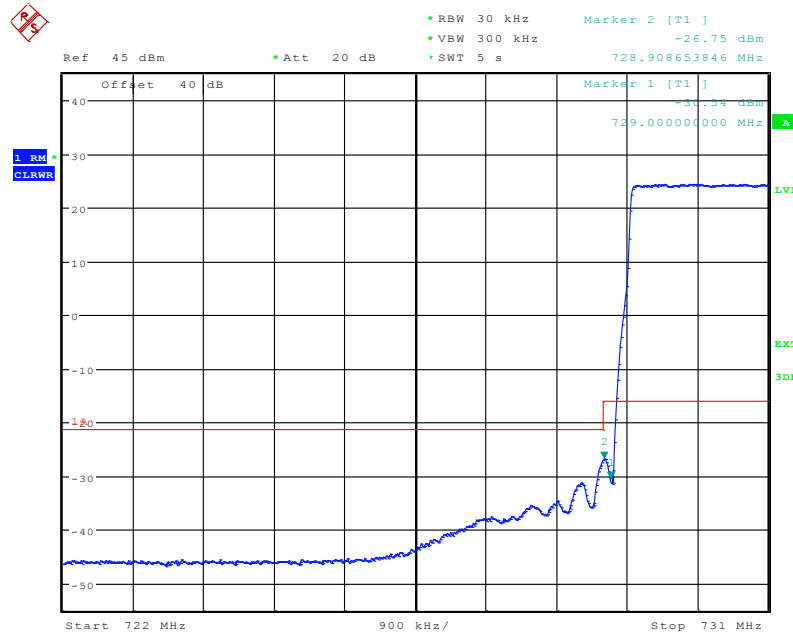
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B 729.0 MHz	5.0 MHz	731.5MHz
	10.0 MHz	734.0MHz
Channel Position T 745.0 MHz	5.0 MHz	742.5MHz
	10.0 MHz	740.0MHz

Band Edge Frequency	Channel Bandwidth	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 729.0 MHz	5.0 MHz	731.5MHz
Channel Position T 745.0 MHz	5.0 MHz	742.5MHz

Band Edge Frequency	Channel Bandwidth	Edge Test with modulation 64QAM Channel Frequencies
Channel Position B 729.0 MHz	5.0 MHz	731.5MHz
Channel Position T 745.0 MHz	5.0 MHz	742.5MHz

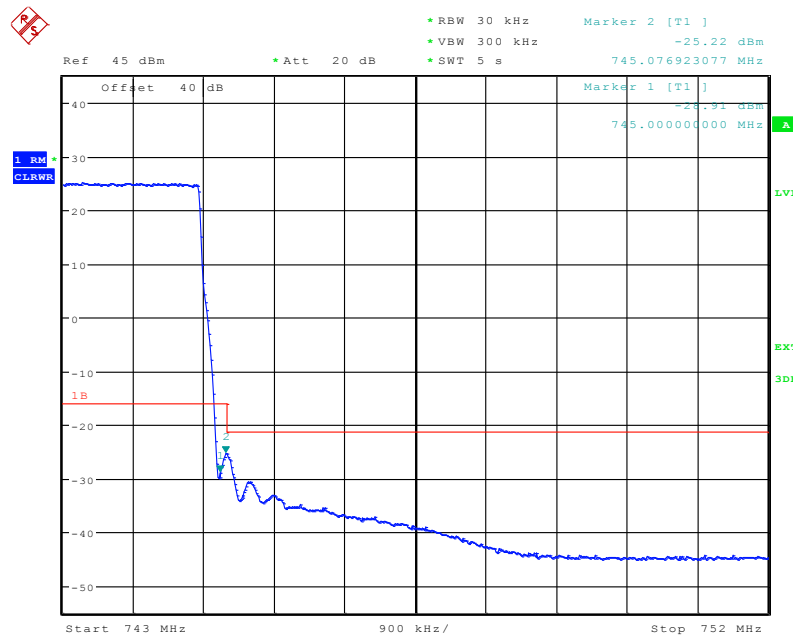
Note: The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance. Channels outside of the ranges shown in the above tables shall not be available to the end user.

Channel Position B - QPSK / Bandwidth 5.0 MHz



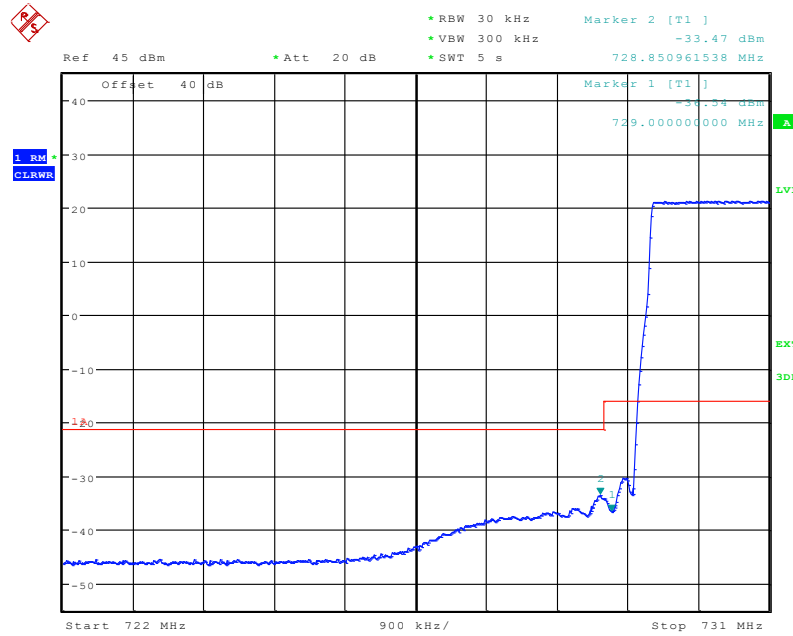
Date: 6.JUN.2014 14:11:00

Channel Position T - QPSK / Bandwidth 5.0 MHz



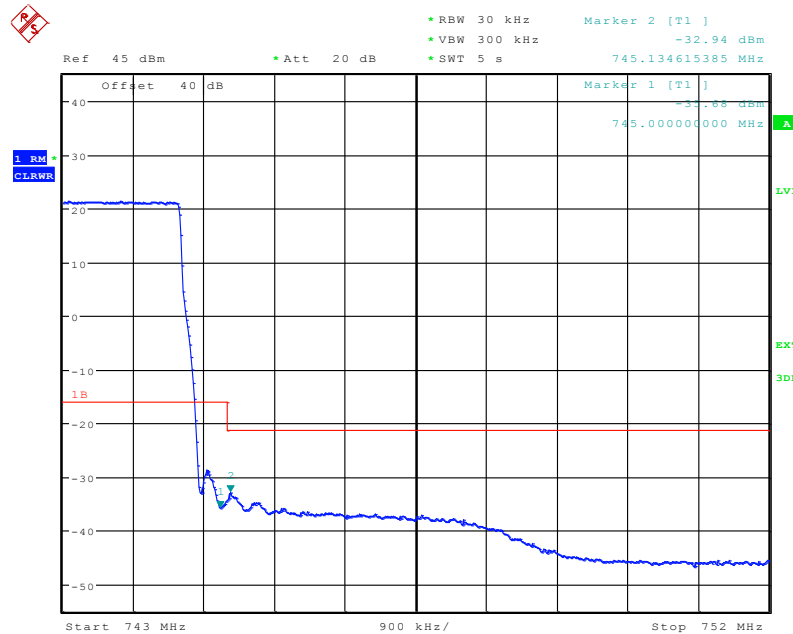
Date: 6.JUN.2014 16:44:45

Channel Position B - QPSK / Bandwidth 10.0 MHz



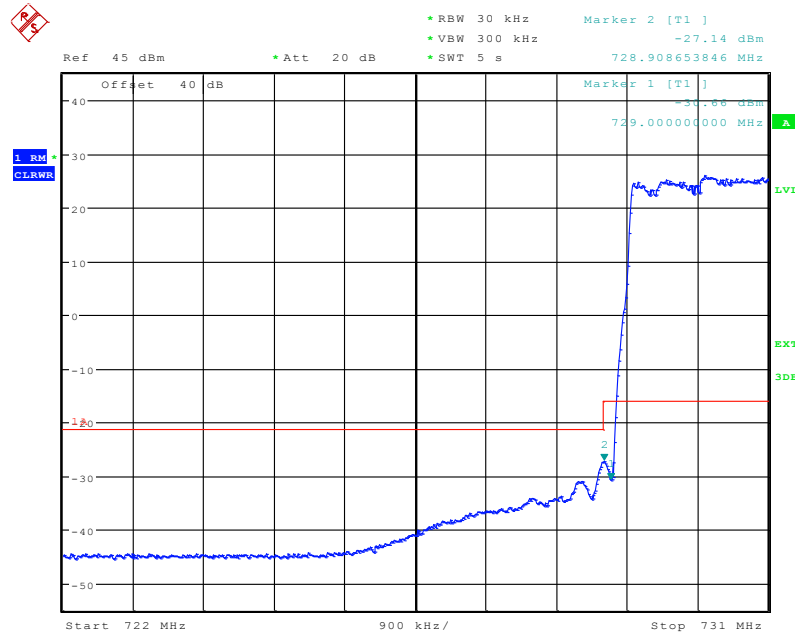
Date: 6.JUN.2014 16:02:49

Channel Position T - QPSK / Bandwidth 10.0 MHz



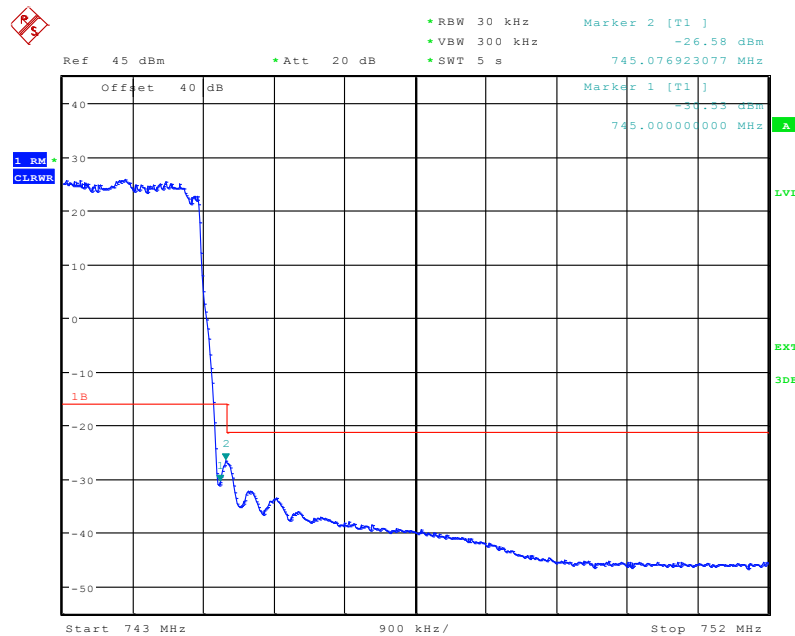
Date: 6.JUN.2014 16:36:03

Channel Position B - 16QAM / Bandwidth 5.0 MHz



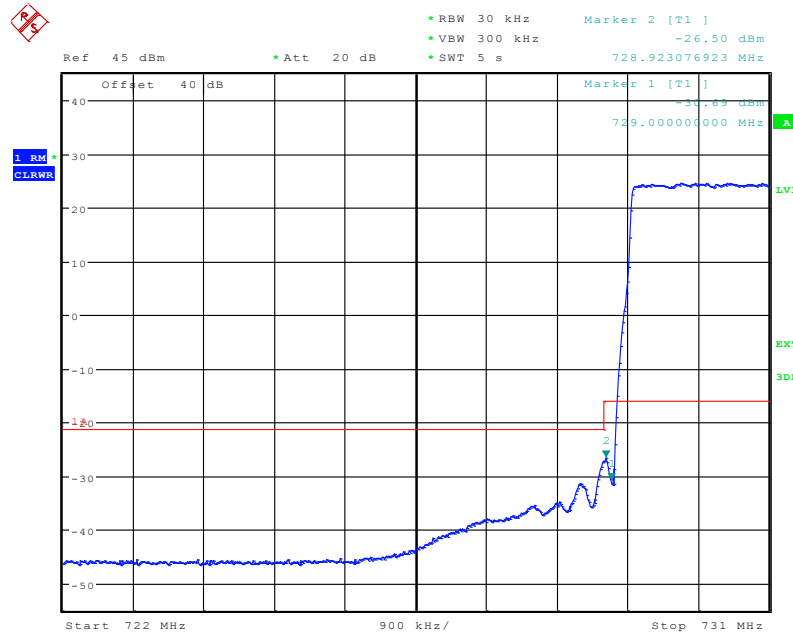
Date: 6.JUN.2014 16:41:02

Channel Position T - 16QAM / Bandwidth 5.0 MHz



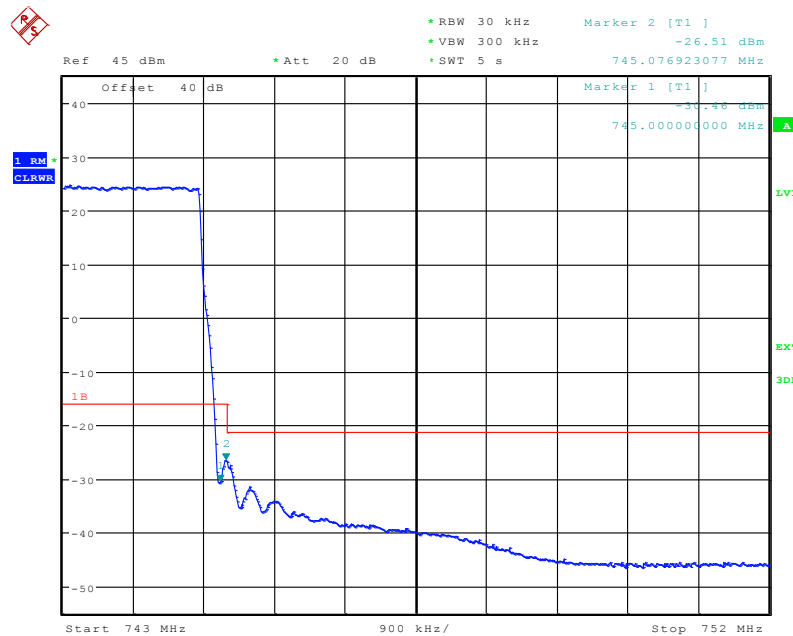
Date: 6.JUN.2014 15:45:06

Channel Position B - 64QAM / Bandwidth 5.0 MHz



Date: 6.JUN.2014 14:19:55

Channel Position T - 64QAM / Bandwidth 5.0 MHz



Date: 6.JUN.2014 15:34:07

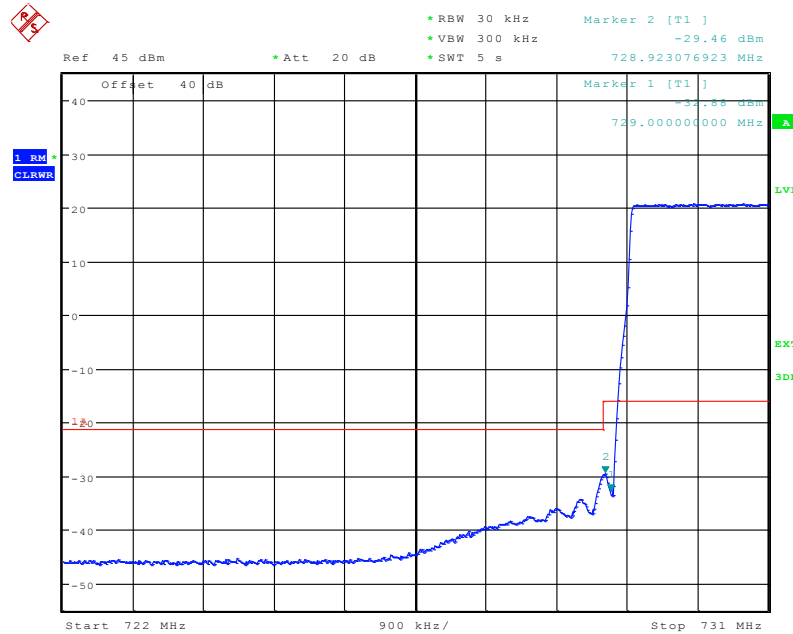
Configuration L-MIMO-MC (2C)

Maximum Output Power 43.0dBm per carrier

Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B_{RFBW} 729.0 MHz	5.0 MHz	731.5MHz + 742.5MHz
Channel Position T_{RFBW} 745.0 MHz	5.0 MHz	731.5MHz + 742.5MHz

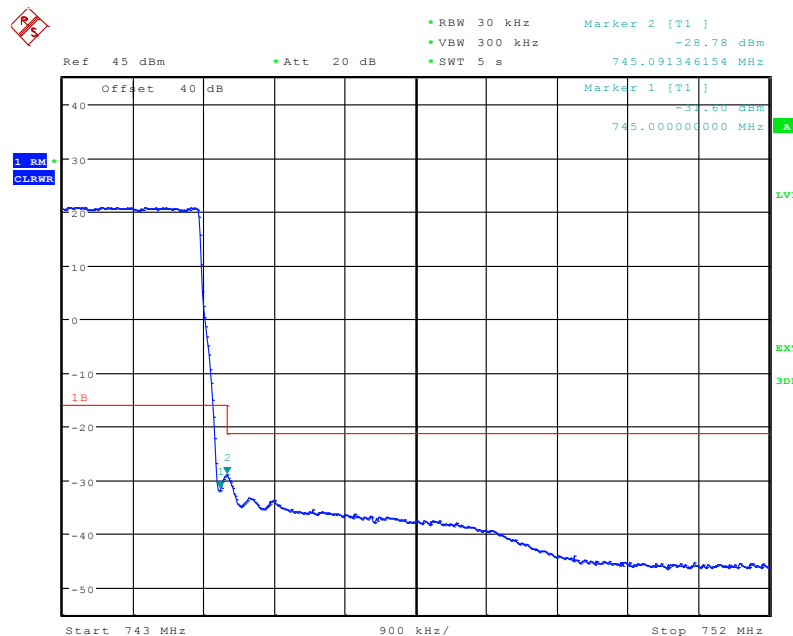
Note: The channels shown in the table above are the minimum and maximum channels that can be used in the authorised frequency ranges to maintain compliance. Channels outside of the ranges shown in the above tables shall not be made available to the end user.

Channel Position B_{RFBW} - QPSK / Bandwidth 5.0 MHz



Date: 6.JUN.2014 17:06:22

Channel Position T_{RFBW} - QPSK / Bandwidth 5.0 MHz



Date: 6.JUN.2014 17:07:00

Limit

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10\log P$ dB.

2.4 RADIATED SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 27, Clause 27.53 (g)
Industry Canada RSS-130, Clause 4.6

2.4.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.4.3 Date of Test and Modification State

16 June 2014 - Modification State 0

2.4.4 Test Equipment Used

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

2.4.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.4.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 27 and RSS-130 and 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.

Emissions identified within the range 30MHz to 10GHz were then formally measured using a Peak detector as the worst case. The measurement of the outside a licensee's frequency band(s) of operation was performed with a resolution bandwidth of 100 kHz.

The EUT was measured with the antenna height varied between 1 and 4 m with the turntable rotated between 0 and 360 degrees. The emission of any outside a licensee's frequencies within 10dB of the limit were measured with the substitution method used according to the standard.

The limits for outside a licensee's frequency band(s) of operation the power of the Spurious Emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - $(43 + 10\log(P))$ dB

Where:

Field Strength is measured in dBμV/m

P is measured Transmitter Power in Watts

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

Determination of Spurious Emission Limit

The field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipoles 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 ideal half-wave dipoles,

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:

$$E_{(v/m)} = (30 \times 1.64 \times 32.28)^{0.5} / 3 = 13.28 \text{ V/m} = 142.47 \text{ dB}\mu\text{V/m}$$

As per 27.53 (g) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(32.28) = 58.09 \text{ dB}$$

Therefore the limit at 3m measurement distance is:

$$142.47 - 58.09 = 84.4 \text{ dB}\mu\text{V/m}$$

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

The results are shown in the plots below.

2.4.7 Test Results

Note: Only the worst case results plots have been included as all of the emissions are greater than 20dB below the limit. A set of plots have been included to show the measurement system noise floor.

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position B	731.5MHz
Channel Position M	737.0MHz
Channel Position T	742.5MHz

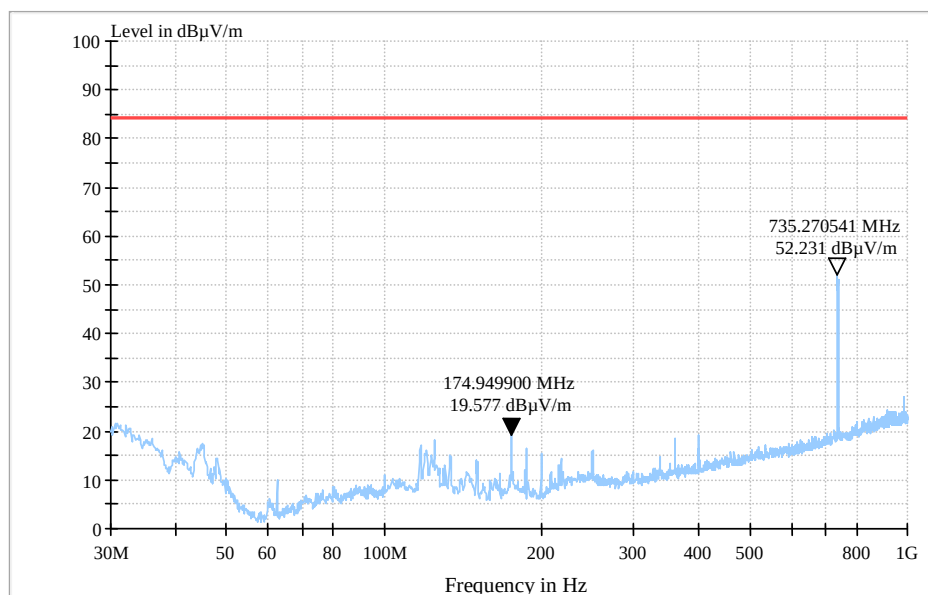
Channel Position B - 16QAM

No emissions were detected within 20dB of the limit.

Channel Position M - QPSK

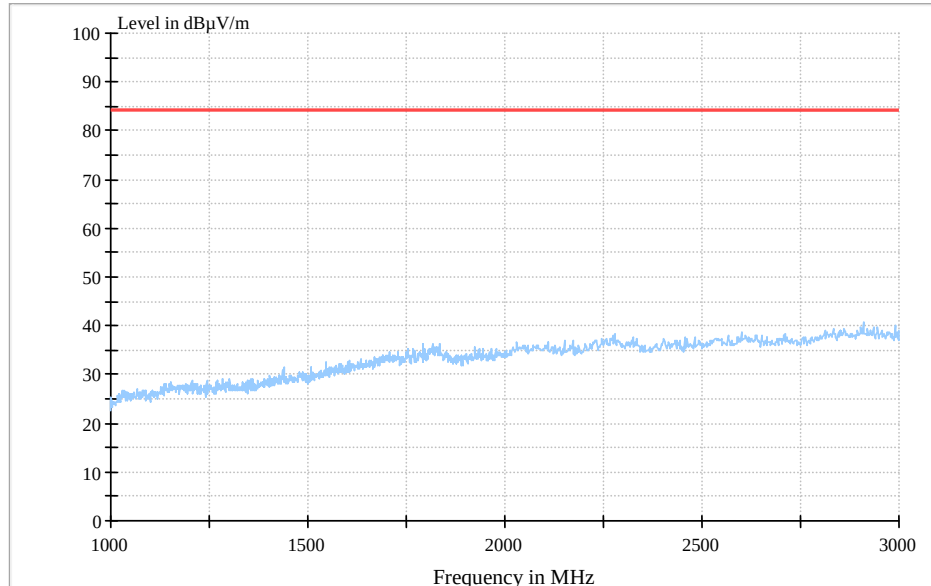
No emissions were detected within 20dB of the limit.

Channel Position M - 16QAM - 30MHz – 1GHz

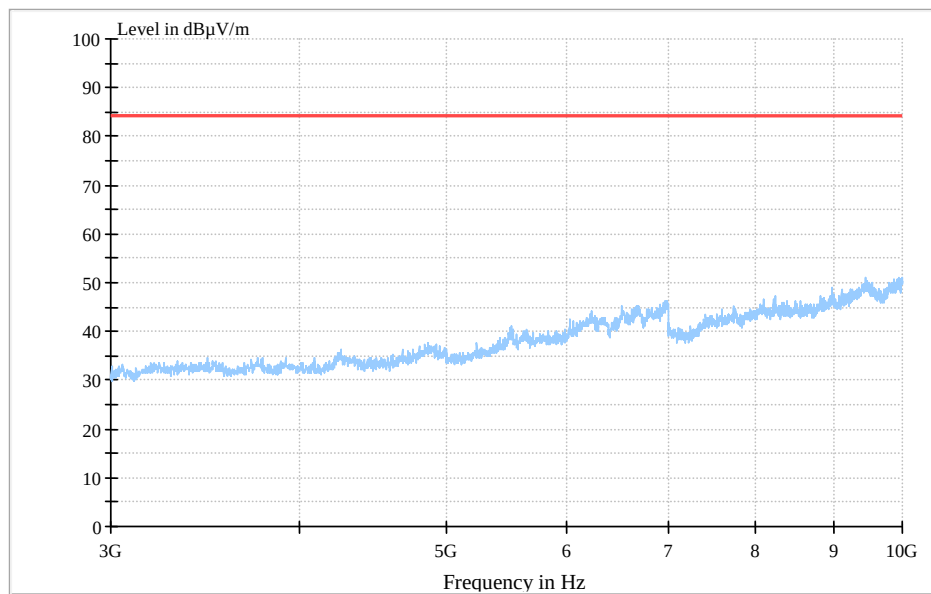


Note: The emission beyond the limit is the operating frequency.

Channel Position M - 16QAM - 1GHz – 3GHz



Channel Position M - 16QAM - 3GHz – 10GHz



Channel Position M - 64QAM

No emissions were detected within 20dB of the limit.

Channel Position T - 16QAM

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier, LTE Bandwidth 10.0MHz

Channel Position	Channel Frequencies
Channel Position M	737.0MHz

Channel Position M - QPSK

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-MC (2C)

Maximum Output Power 43.0dBm per carrier, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	731.5MHz + 742.5MHz

Channel Position M_{RFBW} - QPSK

No emissions were detected within 20dB of the limit.

Limit	-13dBm / 84.4dB μ V/m.
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Remarks

The EUT does not exceed -13dBm / 84.4dB μ V/m at the measured frequencies.

2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.5.3 Date of Test and Modification State

05, 06 and 09 June 2014 - Modification State 0

2.5.4 Test Equipment Used

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

2.5.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.5.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 27 and RSS-130.

In accordance with FCC CFR 47 Part 27, Clause 27.53 (g), any emissions outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB, and the measurement should be performed with a resolution bandwidth of 100kHz.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 10GHz. The EUT was set to transmit on maximum power. The EUT was measured on E-TM1.1 test model as the representative model. The resolution bandwidth was set to 100kHz for 9kHz to 10GHz thus meeting the requirements of FCC part 27.53(g) and Industry Canada RSS-130 Clause 4.6. The spectrum analyzer detector was set to peak and trace was kept on Max Hold as worst case.

For MIMO mode configurations, the limit was adjusted with a correction of -3dB $[10\log 2]$ by using the Measure and Add $10\log(N)$ dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 accounting for simultaneous transmission from antenna ports RF A and RF B, so the limit of -16dBm was applied.

The measurements were performed on the output connector RF A. Limited complementary measurement were done at output connector RF B to verify identical performance for both transmitter chains in MIMO mode.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

The worst results are shown in the plots below.

2.5.7 Test Results

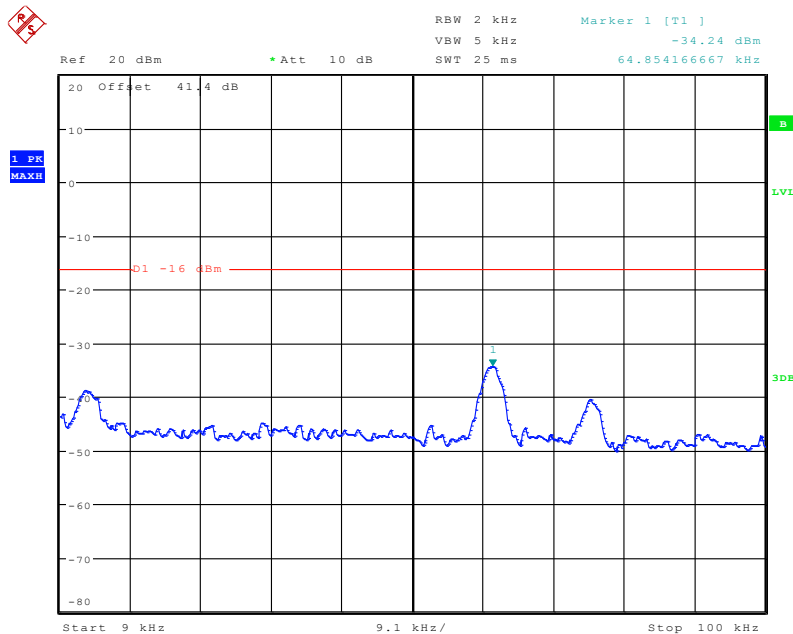
Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position B	5.0MHz	731.5MHz
Channel Position M	5.0MHz	737.0MHz
	10.0MHz	
Channel Position T	5.0MHz	742.5MHz

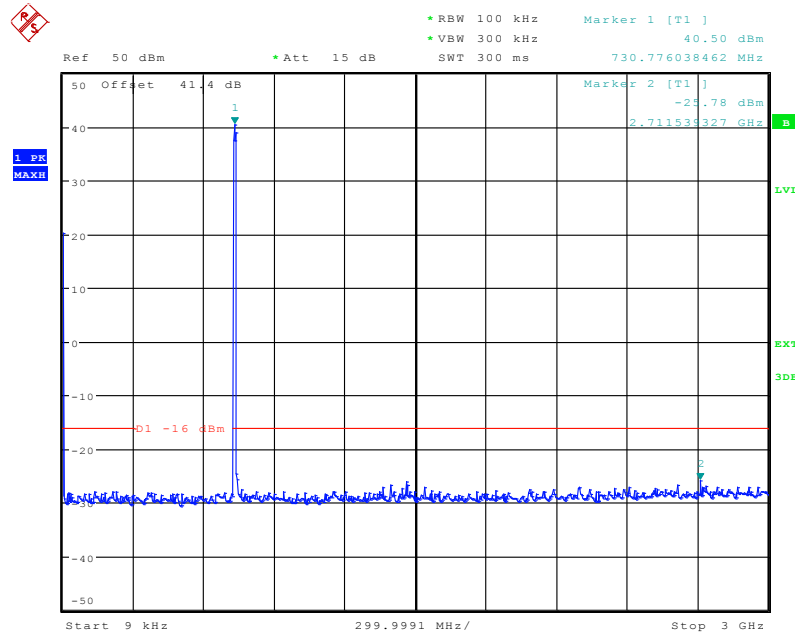
Remark:

The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller span showed that it was related to the LO feedthrough.



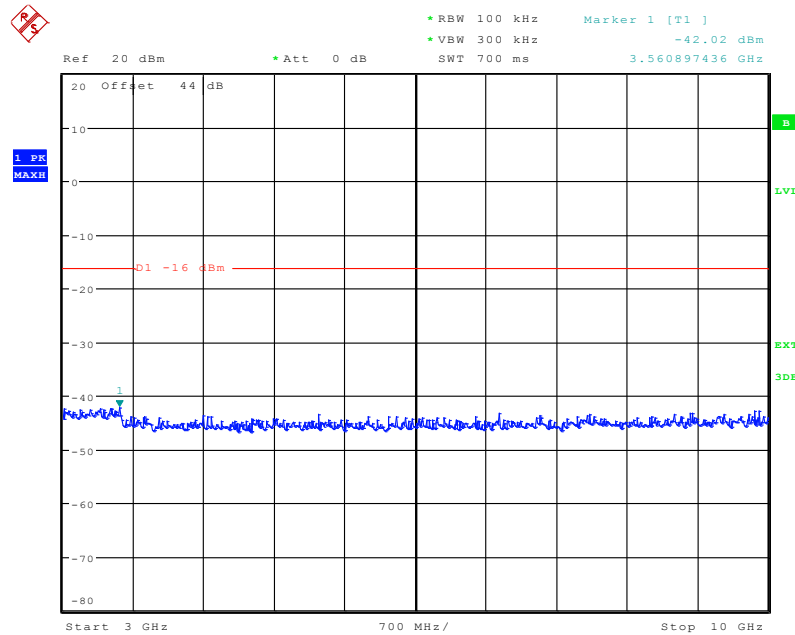
Date: 5.JUN.2014 17:10:39

Channel Position B - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



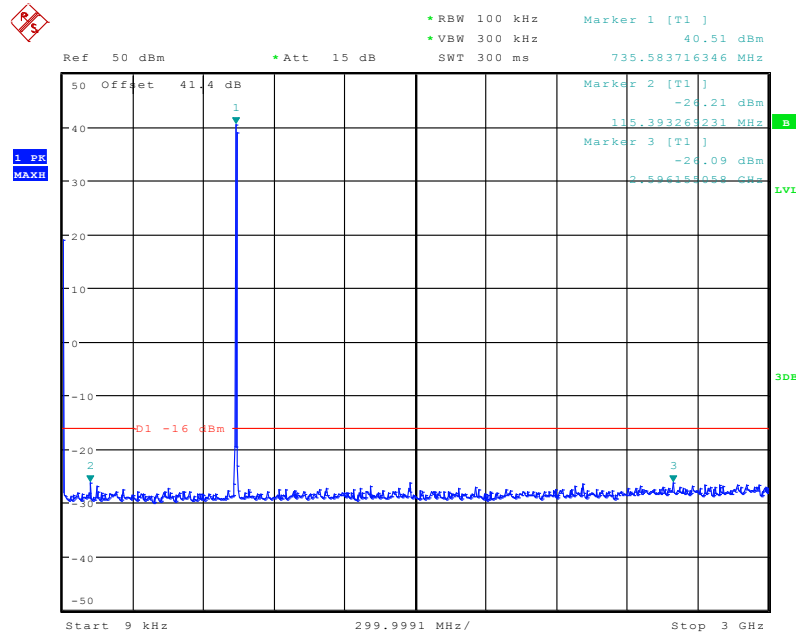
Date: 6.JUN.2014 14:18:27

Channel Position B - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



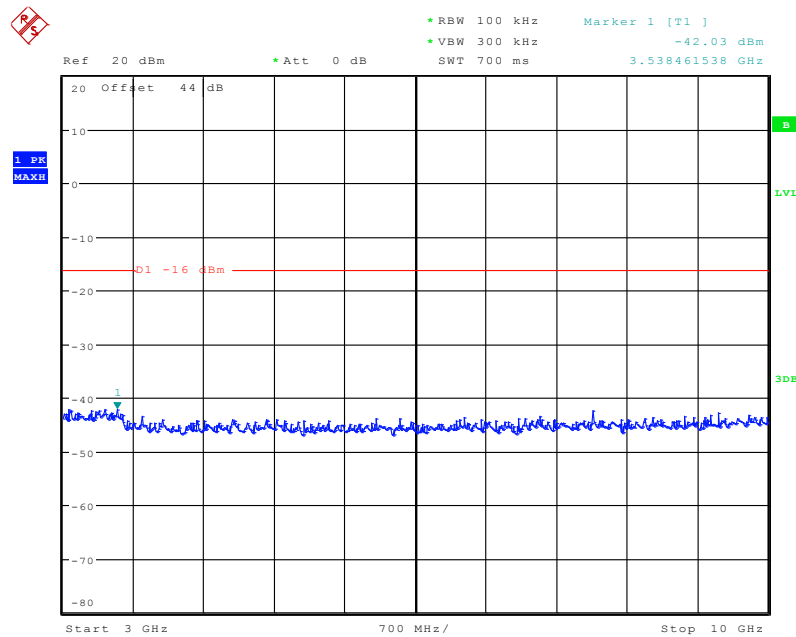
Date: 6.JUN.2014 14:14:42

Channel Position M - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



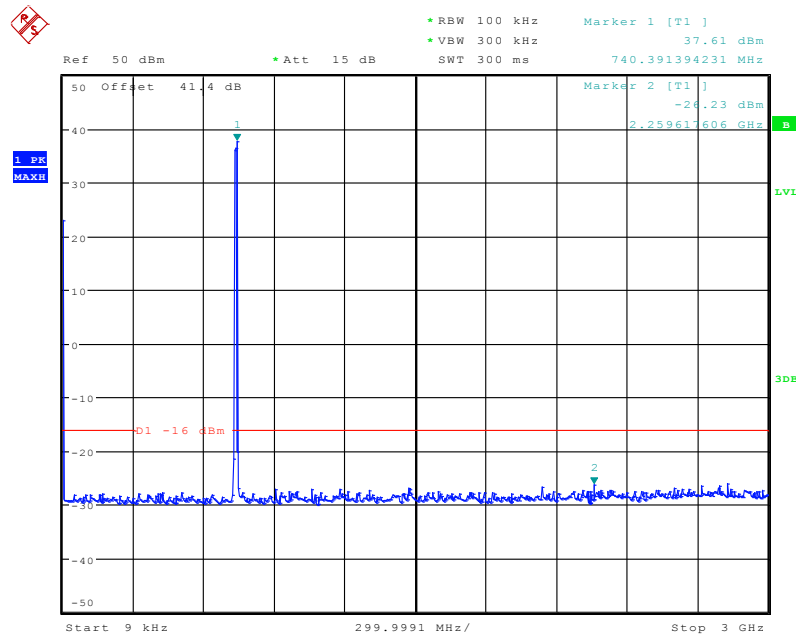
Date: 6.JUN.2014 10:05:41

Channel Position M - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



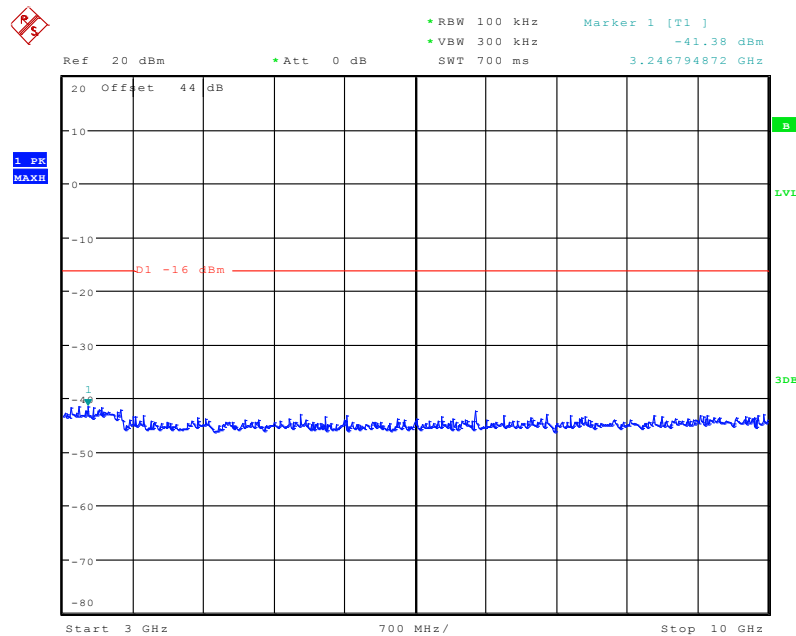
Date: 6.JUN.2014 10:07:43

Channel Position M - QPSK / Bandwidth 10.0MHz - 9kHz - 3GHz



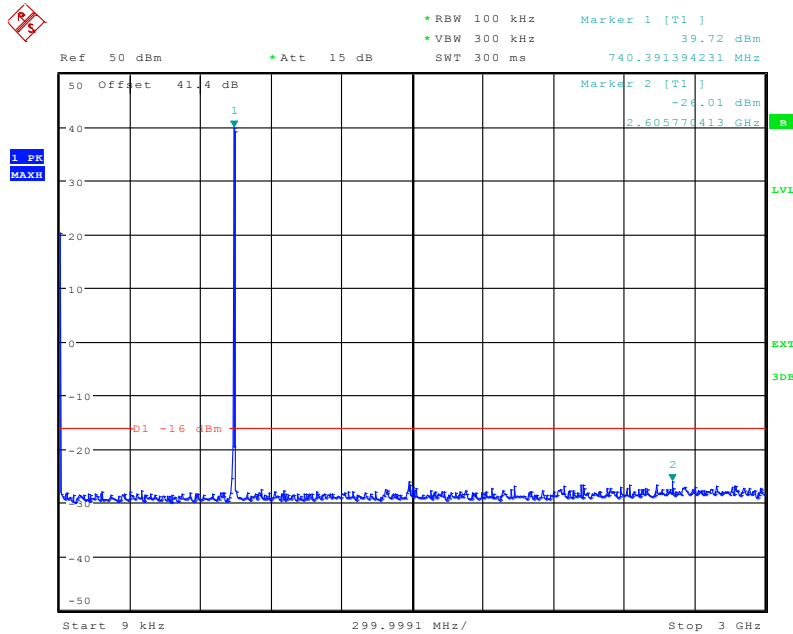
Date: 5.JUN.2014 17:09:13

Channel Position M - QPSK / Bandwidth 10.0MHz - 3GHz - 10GHz



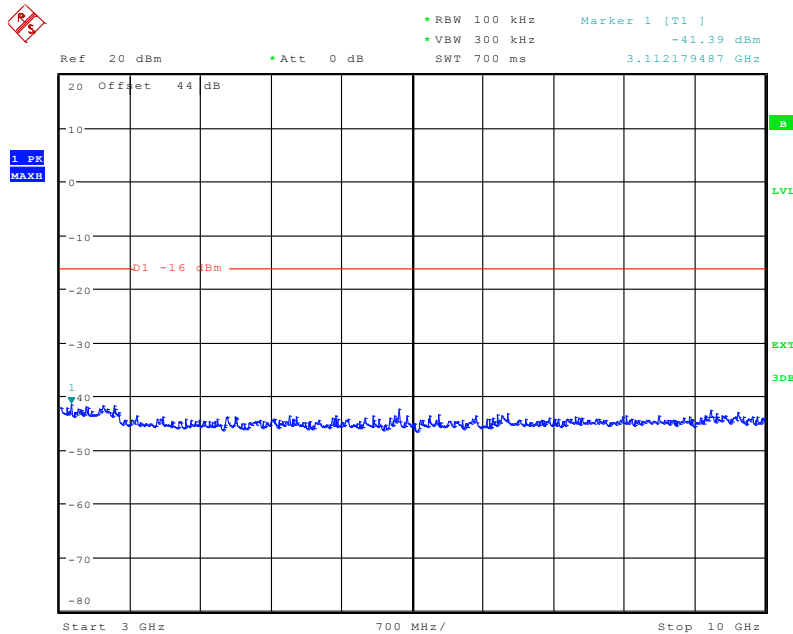
Date: 5.JUN.2014 17:07:26

Channel Position T - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



Date: 6.JUN.2014 15:17:35

Channel Position T - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



Date: 6.JUN.2014 15:16:13

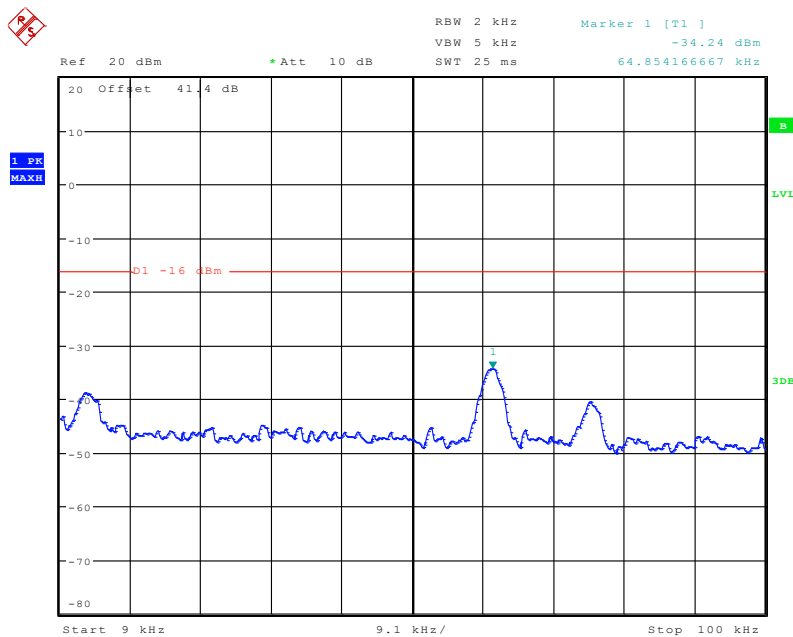
Configuration L-MIMO-MC (2C)

Maximum Output Power 43.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position M_{RFBW}	5.0MHz	731.5MHz + 742.5MHz

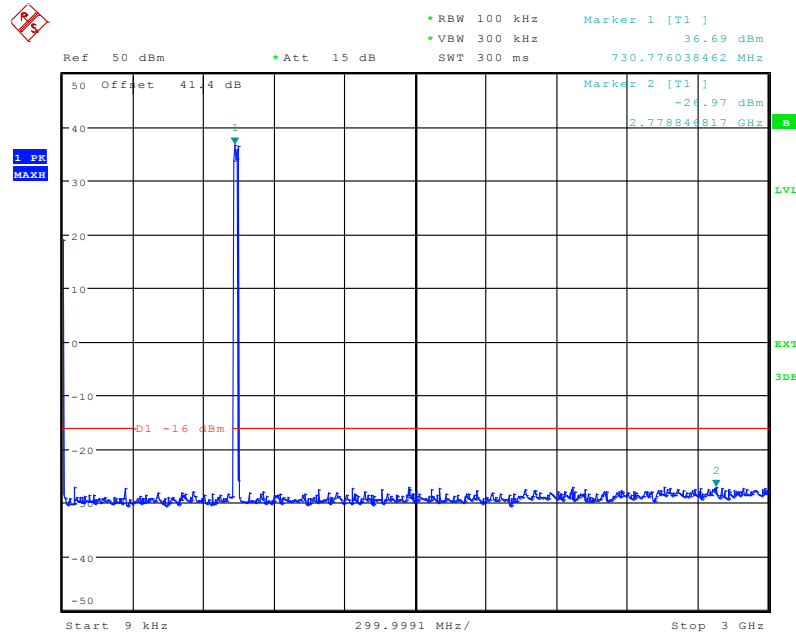
Remark:

The emissions at 9kHz on the plots was not generated by the test object. A complementary measurement with a smaller span showed that it was related to the LO feedthrough.



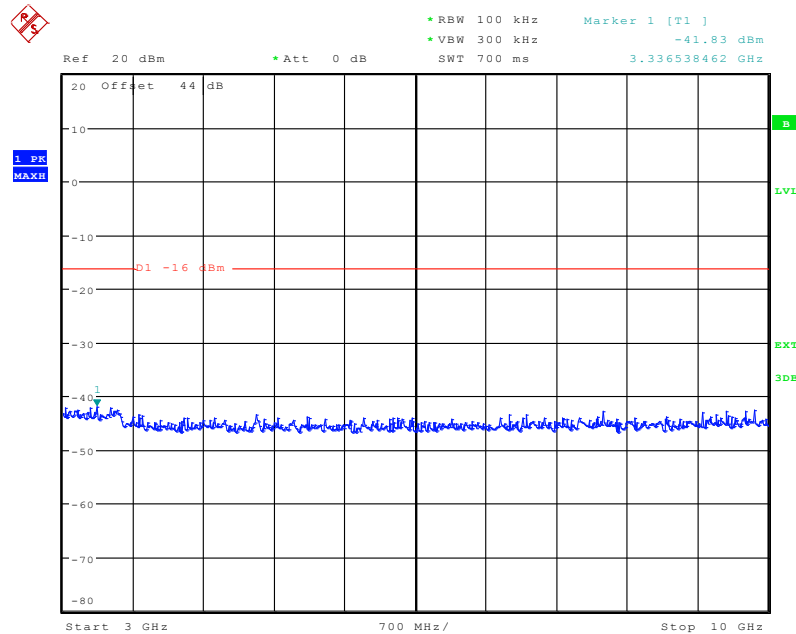
Date: 5.JUN.2014 17:10:39

Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 9kHz - 3GHz



Date: 6.JUN.2014 17:07:35

Channel Position M_{RFBW} - QPSK / Bandwidth 5.0MHz - 3GHz - 10GHz



Date: 6.JUN.2014 17:08:35

Limit	-13dBm
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Remarks

The EUT does not exceed -13dBm at the frequency range of 9kHz to 10GHz.

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

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

2.6.2 Equipment Under Test

RRUS 11 B12, KRC 161 241/2, S/N: CB4T923482

2.6.3 Date of Test and Modification State

10 and 11 June 2014 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Environmental Conditions

Ambient Temperature	22.0 - 28.5°C
Relative Humidity	41.5 - 64.8%

2.6.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 27 and RSS-130.

Frequency Error – Temperature Variation

The EUT was tested over the temperature range -30°C to +50°C in 10°C steps with -48 VDC Power Supply. At each temperature step, the Base Station was configured to transmit an [RAT]* at maximum power on the middle channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

Frequency Error – Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal values of -48 VDC. At +20°C, the Base Station was configured to transmit an [RAT]* at maximum power on the bottom, middle and top channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

Frequency range

Using a resolution bandwidth of 1% of the occupied bandwidth, a reference point at the unwanted emission level which complies with the attenuation of $43 + 10 \log_{10} p$ (watts) on the emission mask of the lowest and highest channel shall be selected, and the frequency at these points shall be recorded as F_L and F_H respectively, and the F_L minus the frequency offset and F_H plus the frequency offset shall be within the frequency range in which the equipment is designed to operate.

[RAT]* LTE (5.0 MHz OBW) – Single Carrier with QPSK modulation.

2.6.7 Test Results

Frequency Error – Temperature Variation

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (731.5MHz)	Channel Position M (737.0MHz)	Channel Position T (742.5MHz)
-48.0	-30°C	+10.25	+11.67	+11.60
	-20°C	+11.60	+12.10	+11.37
	-10°C	+12.81	+11.42	+12.37
	0°C	+10.97	+10.78	+12.62
	+10°C	+10.46	+10.25	+11.89
	+20°C	+12.35	+11.97	+12.57
	+30°C	+10.41	+10.82	+12.34
	+40°C	+12.06	+10.89	+12.84
	+50°C	+13.39	+10.99	+12.13

Frequency Error – Voltage Variation

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)		
		Channel Position B (731.5MHz)	Channel Position M (737.0MHz)	Channel Position T (742.5MHz)
-40.8	+20°C	+12.45	-13.41	+12.12
-48.0		+12.35	+11.97	+12.57
-55.2		+10.05	+11.06	+11.25

Frequency range

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency range for Channel Position B (731.5MHz)		
		F _L (MHz)	Frequency offset (Hz)	F _L - Frequency offset
-48.0	-30°C	729.061452632	+10.25	729.061442382
	+20°C		+12.35	729.061440282
	+50°C		+13.39	729.061439242
-40.8	+20°C		+12.45	729.061440182
-55.2	+20°C		+10.05	729.061442582

Supply Voltage DC (V)	Temperature	Frequency range for Channel Position T (742.5MHz)		
		F _H (Hz)	Frequency offset (Hz)	F _H + Frequency offset(MHz)
-48.0	-30°C	744.948376593	+11.60	744.948388193
	+20°C		+12.57	744.948389163
	+50°C		+12.13	744.948388723
-40.8	+20°C		+12.12	744.948388713
-55.2	+20°C		+11.25	744.948387843

Limit	Frequency Stability : $\pm (0.05 \text{ ppm} + 12 \text{ Hz})$ or $\pm 48.85 \text{ Hz}^1$
	IC: Frequency offset: F _L minus the frequency offset and F _H plus the frequency offset shall be within the frequency range in which the equipment is designed to operate.

Note 1: Limit according to 3GPP TS 36.141 V10.10.0.

Remarks

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature and voltage interval across the measured range.



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
Maximum Average Output Power and Peak to Average Ratio - Conducted					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Power Meter	Rohde & Schwarz	NRP	101283	12	04-Aug-2014
Power Sensor	Rohde & Schwarz	NRP-Z51	102127	12	14-Apr-2015
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Modulation Characteristics					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Occupied Bandwidth					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Band Edge					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Conducted Spurious Emission					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON

Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121605	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESIB26	100301	12	27-Mar-2015
BiLog Antenna	Rohde & Schwarz	HL562	100488	12	15-Feb-2015
Double Ridge Guide Horn Antenna	ETS-Lindgren	EMCO 3117	00056645	12	15-Feb-2015
Double Ridge Guide Horn Antenna	ETS-Lindgren	EMCO 3117	00056662	12	15-Feb-2015
Semi Anechoic Chamber	ETS-Lindgren	9.6m×6.72m×5.98m	-	12	18-Mar-2015
30MHz~3GHz Pre-amplifier	Rohde & Schwarz	SCU03	10005	-	O/P MON
3GHz~18GHz Pre-amplifier	Rohde & Schwarz	AFS42-00101800-25-S-42	1078388		O/P MON
Filters Array	Rohde & Schwarz	TS-Filt	-	-	O/P MON
Switches Array	Rohde & Schwarz	TS-RSP	100241	-	O/P MON
Multi-Device Controller	ETS-Lindgren	2090	00049393	-	O/P MON
Viedo monitoring system	ETS-Lindgren	Y21953A	2501103	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014
Frequency Stability					
Network Analyzer	Agilent	8720D	US36140166	12	26-Sep-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121648	-	O/P MON
Climate Chamber	Shang Hai Zenda	ZTH100U	10080065	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2008040050	-	O/P MON
Digital Multi-meter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151665	12	12-Dec-2014

N/A – Not Applicable

OP 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
Conducted Maximum Peak Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
Frequency stability	30MHz to 2GHz	$<\pm 1 \times 10^{-7}$
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 10^6		

* In accordance with CISPR 16-4



Product Service

SECTION 4

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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