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Report On

FCC Testing of the
Ericsson AB (800MHz) RRUS 11 B26B KRC 161 457/1 Remote Radio
Unit In accordance with FCC CFR 47 Part 90

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161457-1

PREPARED BY

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DATED

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SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

The information contained in this report is intended to show verification of the Ericsson RRUS 11 B26B KRC 161 457/1 to the requirements of FCC CFR 47 Part 90.

Testing was carried out in support of an application for Grant of RRUS 11 B26B KRC 161 457/1 in LTE mode.

Manufacturer	Ericsson AB
Address	Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden
Product Name	RRUS 11 B26B
Product Number	KRC 161 457/1
Serial Number(s)	CB4V574403
LTE Software Version	CXP102051/21 Rev R26AK
Hardware Version	R1A
Number of Sample Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 90: 2013
Start of Test	28 October 2014
Finish of Test	05 November 2014
Name of Engineer(s)	Guiying Zhao
Related Document(s)	ANSI C63.4: 2009 ANSI/TIA-603-C-2004 FCC CFR 47 Part 2: 2013

1.2 BRIEF SUMMARY OF RESULTS

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

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

N/A¹ – Not Applicable, due to no Integral Antenna.

N/A² – Not Applicable, due to this is a transceiver.

Note 1: See FCC 12-25

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

The RRUS 11 B26B / KRC 161 457/1 supports Test Models E-TM1.1, E-TM3.2 and E-TM3.1 at 800MHz defined in 3GPP TS 36.141. Test Model E-TM1.1 is used to represent QPSK modulation only, and Test Model E-TM3.2 is used to represent 16QAM modulation, and Test Model E-TM3.1 is used to represent 64QAM modulation.

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

LTE:

MIMO mode single carrier: E-TM1.1

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

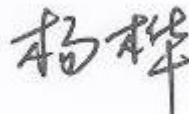
The Maximum Output Power was tested on both TX/RX output connector RF A and RF B, all other TX measurements were performed on the combined TX/RX output connector RF A of the EUT as the representative ports.

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

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Remote Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	RRUS 11 B26B
PRODUCT NUMBER	KRC 161 457/1
TRANSMITTER OPERATING RANGE	TX: 859 MHz - 869 MHz RX: 814 MHz - 824 MHz
MODULATIONS	QPSK, 16QAM, 64QAM
ITU DESIGNATION OF EMISSION	1M40F9W, 3M00F9W, 5M00F9W, 10M0F9W
SUPPORTED CHANNEL BANDWIDTH CONFIGURATION	Single Carrier: 1.4MHz,3MHz,5MHz,10MHz Multi Carrier (x2): 1.4MHz,3MHz,5MHz
OUTPUT POWER (RMS) (W or dBm)	Single Carrier: 1x46.0dBm per port (1x40W per port) Multi Carrier (x2): 2x42.4dBm per port (2x17.5W per port)
OUTPUT POWER TOLERANCE	± 2.0dB
ANTENNA GAIN	No Integral Antenna
SUPPORTED CONFIGURATION	Single Carrier, Multi Carrier, 2x2 MIMO
NUMBER OF CARRIERS	Maximum 2 carriers
INSTANTANEOUS BANDWIDTH	10MHz
NUMBER OF ANTENNA PORTS	2 TX/RX ports
FCC ID	TA8AKRC161457-1
Power source	-48V DC
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is a LTE Remote Radio Unit.

Signature



Date

29 October 2014

D of B S Serial No

75928436/01

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 Equipment Under Test (EUT) RRUS 11 B26B KRC 161 457/1 is an Ericsson Remote Radio Unit working in the public mobile service 800MHz band which provides communication connections to 800MHz network in LTE mode. The RRUS 11 B26B KRC 161 457/1 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.

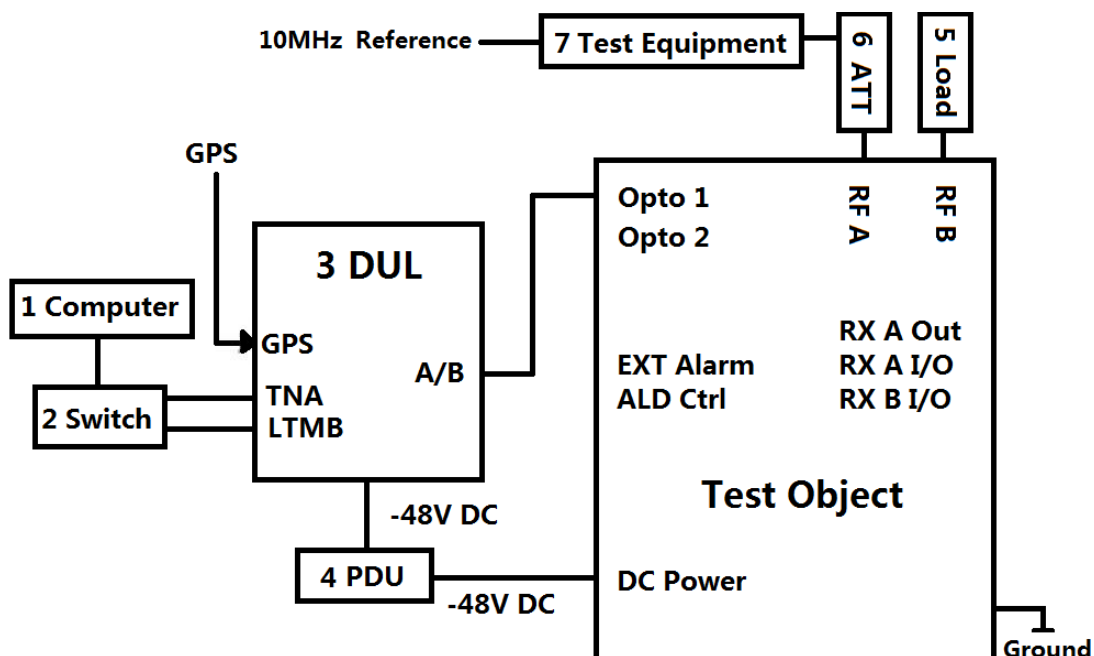
The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

1.6 TEST SETUP

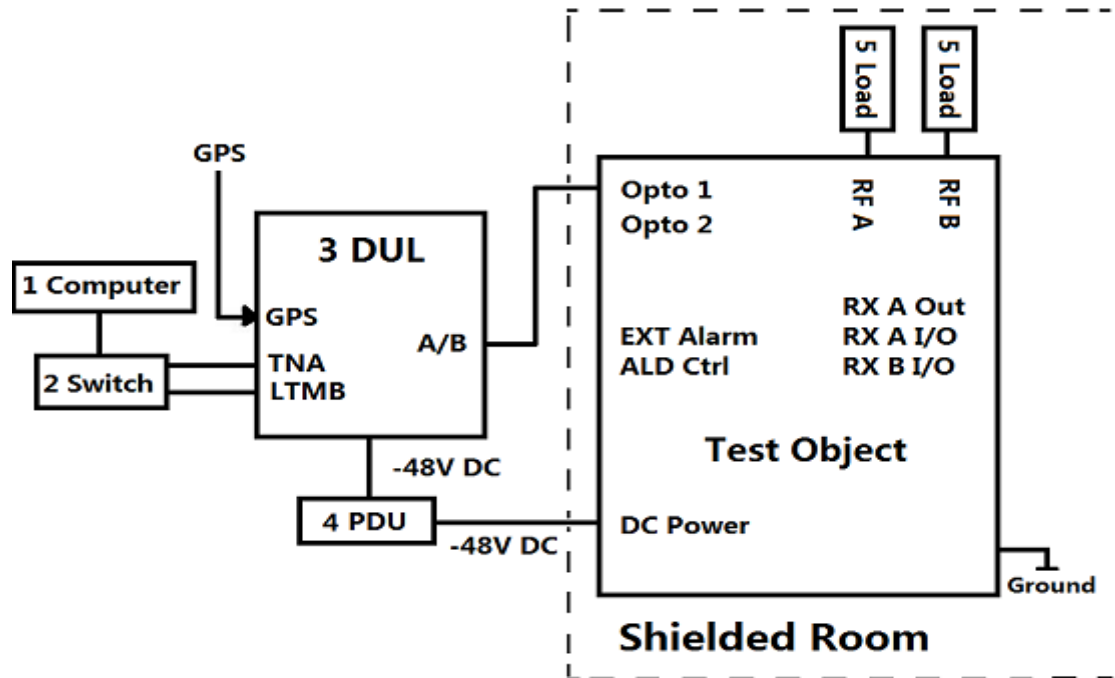
Test Setup, Conducted Measurement:



Product Name	Product Number	Version	Serial Number
RRUS 11 B26B	KRC 161 457/1	R1A	CB4V574403

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	Switch	TL-SF1008+		11936826484
3	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
4	Power Supply	DH1716-5D	--	2007060032
5	Load	TF150	--	11081905
6	40dB Attenuator	48-40-43-LIM	--	BR5020
7	Spectrum Analyzer	FSQ26	--	101140
	Power Meter	NRP	--	101593
	Power Sensor	NRP-Z51	--	102311
	Power Sensor	NRP-Z51	--	102309

Test Setup, Radiated Measurement:



Product Name	Product Number	Version	Serial Number
RRUS 11 B26B	KRC 161 457/1	R1A	CB4V574403

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	Switch	TL-SF1008+		11936826484
3	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
4	Power Supply	DH1716-5D	--	2007060032
5	Load	TF150	--	11081905
	Load	TF150	--	06081413

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 Output Power – Conducted
- Occupied Bandwidth
- Emission Masks
- 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



Product Service

SECTION 2

TEST DETAILS

2.1 MAXIMUM OUTPUT POWER - CONDUCTED

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1, S/N: CB4V574403

2.1.3 Date of Test and Modification State

28 and 29 October 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	24.5 – 26.5°C
Relative Humidity	22.5 – 24.5%

2.1.6 Test Method

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 90.

Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal. The path loss between the EUT and the power sensor was measured and recorded for the test band. The path loss was entered as an offset into the power meter and spectrum analyzer.

The EUT was configured to transmit on maximum power on the configurations defined in the tables below. Since the EUT transmits on two antennas simultaneously in the same frequency range for MIMO devices, i.e., TX MIMO mode, using the Measure-and-Sum approach, the output power at both antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

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 port

QPSK

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 859.7MHz		Channel Position M 864.0MHz		Channel Position T 868.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 1.4 MHz	45.58	7.40	45.96	6.82	45.88	6.78
B		45.52	7.29	46.00	6.73	45.97	6.80
Total		48.56	-	48.99	-	48.94	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 860.5MHz		Channel Position M 864.0MHz		Channel Position T 867.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 3.0 MHz	45.81	7.71	45.96	6.86	45.96	6.72
B		45.81	7.81	46.01	6.85	46.00	6.74
Total		48.82	-	49.00	-	49.00	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 861.5MHz		Channel Position M 864.0MHz		Channel Position T 866.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 5.0 MHz	45.68	8.28	45.97	6.96	45.89	6.83
B		45.76	8.29	46.01	7.00	45.86	6.83
Total		48.73	-	49.00	-	48.89	-

10MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B -		Channel Position M 864.0MHz		Channel Position T -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 10.0 MHz	-	-	45.83	8.47	-	-
B		-	-	45.88	8.43	-	-
Total		-	-	48.87	-	-	-

16QAM

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 859.7MHz		Channel Position M 864.0MHz		Channel Position T 868.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 1.4 MHz	-	-	46.10	6.82	-	-
B		-	-	46.15	6.70	-	-
Total		-	-	49.14	-	-	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 860.5MHz		Channel Position M 864.0MHz		Channel Position T 867.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 3.0 MHz	-	-	45.94	6.90	-	-
B		-	-	45.98	6.81	-	-
Total		-	-	48.97	-	-	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 861.5MHz		Channel Position M 864.0MHz		Channel Position T 866.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	-	-	45.89	7.01	-	-
B		-	-	45.93	7.03	-	-
Total		-	-	48.92	-	-	-

10MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B -		Channel Position M 864.0MHz		Channel Position T -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 10.0 MHz	-	-	45.82	8.55	-	-
B		-	-	45.86	8.31	-	-
Total		-	-	48.85	-	-	-

64QAM

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 859.7MHz		Channel Position M 864.0MHz		Channel Position T 868.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 1.4 MHz	-	-	45.98	6.70	-	-
B		-	-	46.04	6.72	-	-
Total		-	-	49.02	-	-	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 860.5MHz		Channel Position M 864.0MHz		Channel Position T 867.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 3.0 MHz	-	-	45.99	6.81	-	-
B		-	-	46.06	6.69	-	-
Total		-	-	49.04	-	-	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 861.5MHz		Channel Position M 864.0MHz		Channel Position T 866.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 5.0 MHz	-	-	46.00	6.99	-	-
B		-	-	46.06	7.07	-	-
Total		-	-	49.04	-	-	-

10MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B -		Channel Position M 864.0MHz		Channel Position T -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 10.0 MHz	-	-	45.83	8.32	-	-
B		-	-	45.88	8.86	-	-
Total		-	-	48.87	-	-	-

Configuration L-MIMO-MC (2C)

Maximum Output Power 45.4dBm per port

QPSK

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 1.4 MHz	-	-	44.92	8.25	-	-
B		-	-	44.95	8.38	-	-
Total		-	-	47.95	-	-	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 3.0 MHz	-	-	45.19	8.80	-	-
B		-	-	45.21	8.70	-	-
Total		-	-	48.21	-	-	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 5.0 MHz	-	-	45.33	8.61	-	-
B		-	-	45.33	8.99	-	-
Total		-	-	48.34	-	-	-

16QAM

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 1.4 MHz	-	-	45.09	8.35	-	-
B		-	-	45.13	8.67	-	-
Total		-	-	48.12	-	-	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW}		Channel Position M _{RFBW}		Channel Position T _{RFBW}	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 3.0 MHz	-	-	45.27	8.74	-	-
B		-	-	45.30	8.58	-	-
Total		-	-	48.30	-	-	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} -		Channel Position M _{RFBW} 861.5MHz + 866.5MHz		Channel Position T _{RFBW} -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	-	-	45.28	8.73	-	-
B		-	-	45.32	8.73	-	-
Total		-	-	48.31	-	-	-

64QAM

1.4MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} -		Channel Position M _{RFBW} 859.7MHz + 868.3MHz		Channel Position T _{RFBW} -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 1.4 MHz	-	-	44.98	8.56	-	-
B		-	-	45.01	8.38	-	-
Total		-	-	48.01	-	-	-

3MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} -		Channel Position M _{RFBW} 860.5MHz + 867.5MHz		Channel Position T _{RFBW} -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 3.0 MHz	-	-	45.22	8.68	-	-
B		-	-	45.26	8.55	-	-
Total		-	-	48.25	-	-	-

5MHz Bandwidth

Antenna	Modulation / Carrier Bandwidth (MHz)	RMS Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} -		Channel Position M _{RFBW} 861.5MHz + 866.5MHz		Channel Position T _{RFBW} -	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	-	-	45.30	8.42	-	-
B		-	-	45.34	8.78	-	-
Total		-	-	48.33	-	-	-

Note :

This unit is tested without antenna. ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible FCC 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	≤1000 W or ≤+60 dBm

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049(h)

2.2.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1, S/N: CB4V574403

2.2.3 Date of Test and Modification State

31 October 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 25.5°C

Relative Humidity 23.5%

2.2.6 Test Method

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and FCC 12-25.

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, the Occupied Bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency.

For FCC requirement, outside of which all emissions are attenuated by at least X dB below the transmitter power, where the value of X is typically specified as 26. The -26dBc Bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The results are shown in the plots below.

2.2.7 Test Results

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port

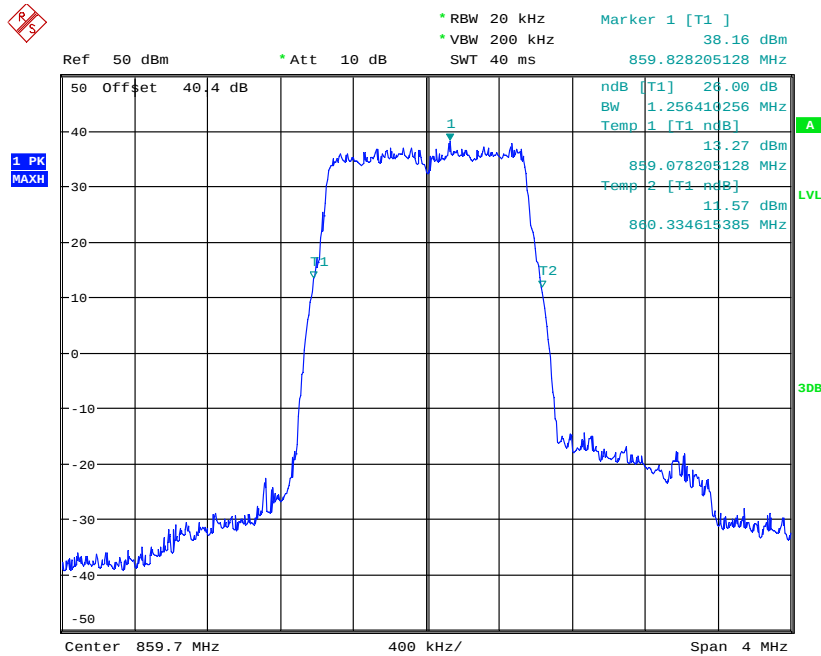
Modulation / Bandwidth	-26dBc Occupied Bandwidth (MHz)		
	Channel Position B 859.7MHz	Channel Position M 864.0MHz	Channel Position T 868.3MHz
QPSK / 1.4 MHz	1.26	1.28	1.28
16QAM / 1.4 MHz	-	1.25	-
64QAM / 1.4 MHz	-	1.26	-

Modulation / Bandwidth	-26dBc Occupied Bandwidth (MHz)		
	Channel Position B 860.5MHz	Channel Position M 864.0MHz	Channel Position T 867.5MHz
QPSK / 3.0 MHz	2.88	2.91	2.91
16QAM / 3.0 MHz	-	2.93	-
64QAM / 3.0 MHz	-	2.91	-

Modulation / Bandwidth	-26dBc Occupied Bandwidth (MHz)		
	Channel Position B 861.5MHz	Channel Position M 864.0MHz	Channel Position T 866.5MHz
QPSK / 5.0 MHz	4.81	4.81	4.83
16QAM / 5.0 MHz	-	4.78	-
64QAM / 5.0 MHz	-	4.83	-

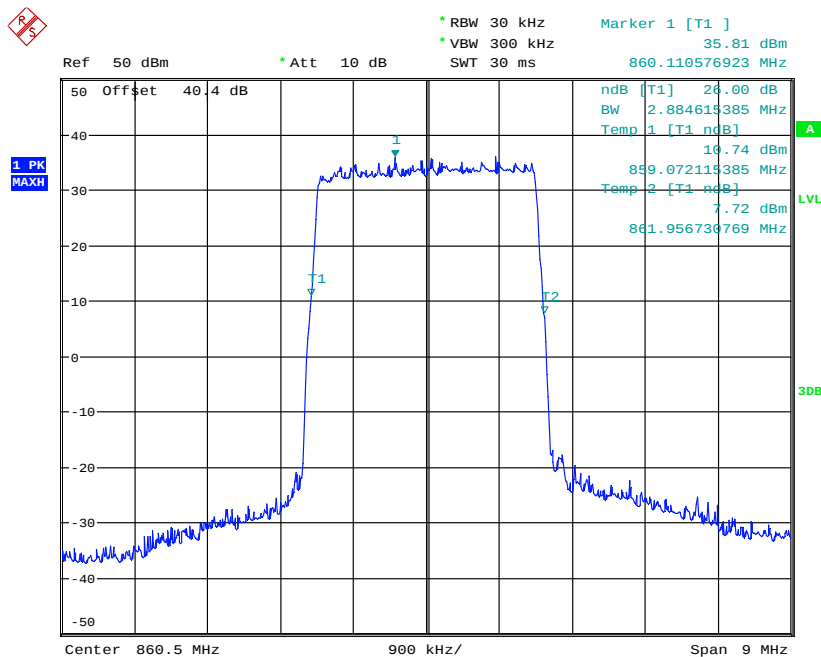
Modulation / Bandwidth	-26dBc Occupied Bandwidth (MHz)		
	Channel Position B -	Channel Position M 864.0MHz	Channel Position T -
QPSK / 10.0 MHz	-	9.38	-
16QAM / 10.0 MHz	-	9.38	-
64QAM / 10.0 MHz	-	9.38	-

Channel Position B - QPSK / Bandwidth 1.4 MHz



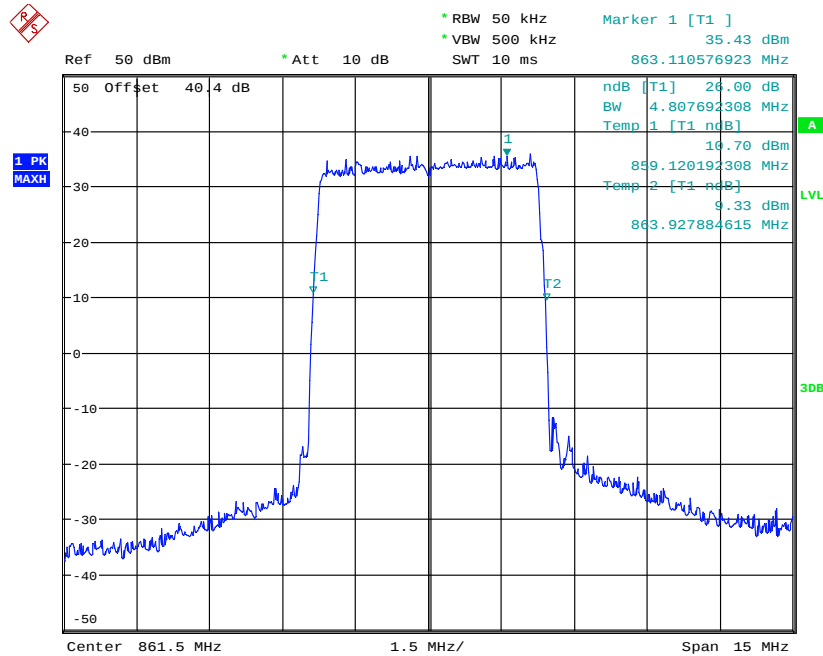
Date: 31.OCT.2014 04:00:24

Channel Position B - QPSK / Bandwidth 3.0 MHz



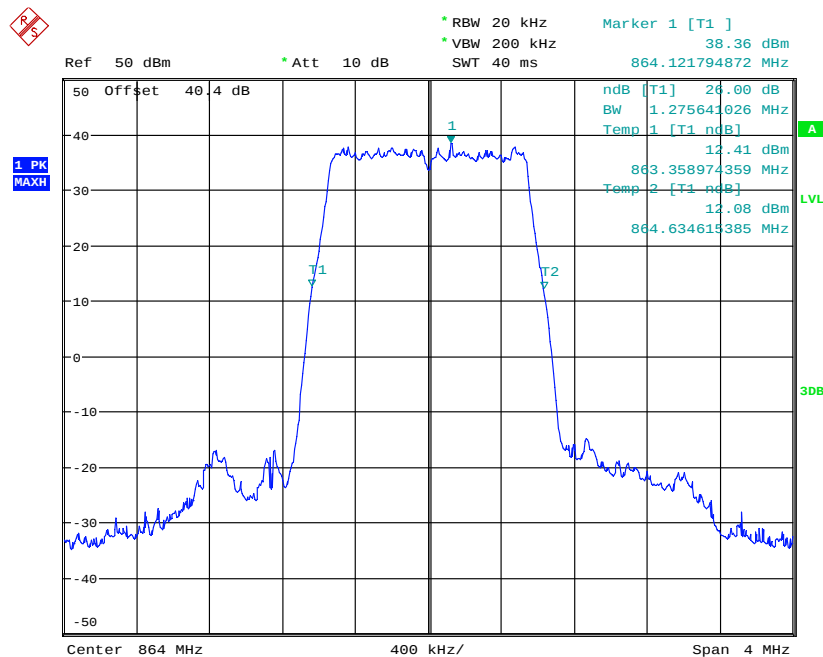
Date: 31.OCT.2014 04:30:24

Channel Position B - QPSK / Bandwidth 5.0 MHz



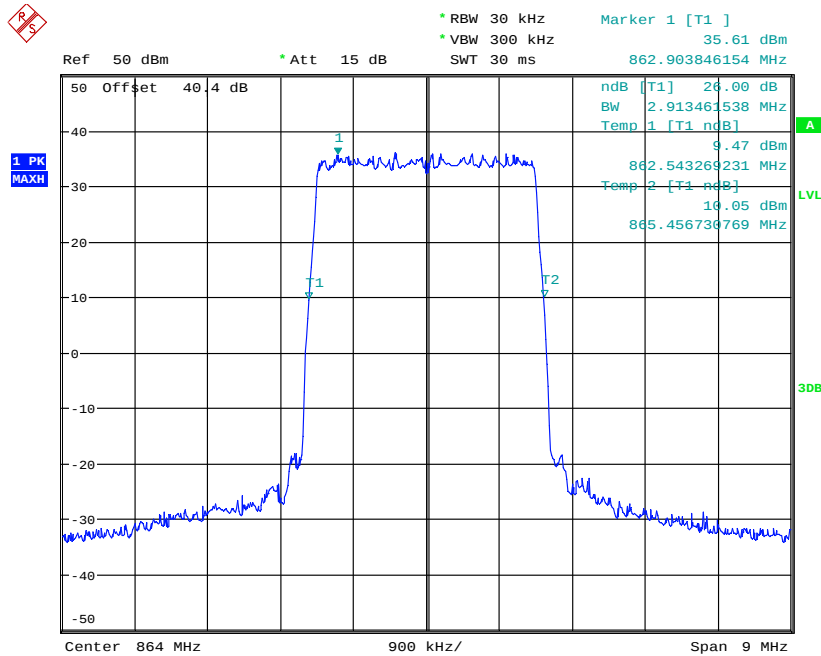
Date: 31.OCT.2014 04:36:06

Channel Position M - QPSK / Bandwidth 1.4 MHz



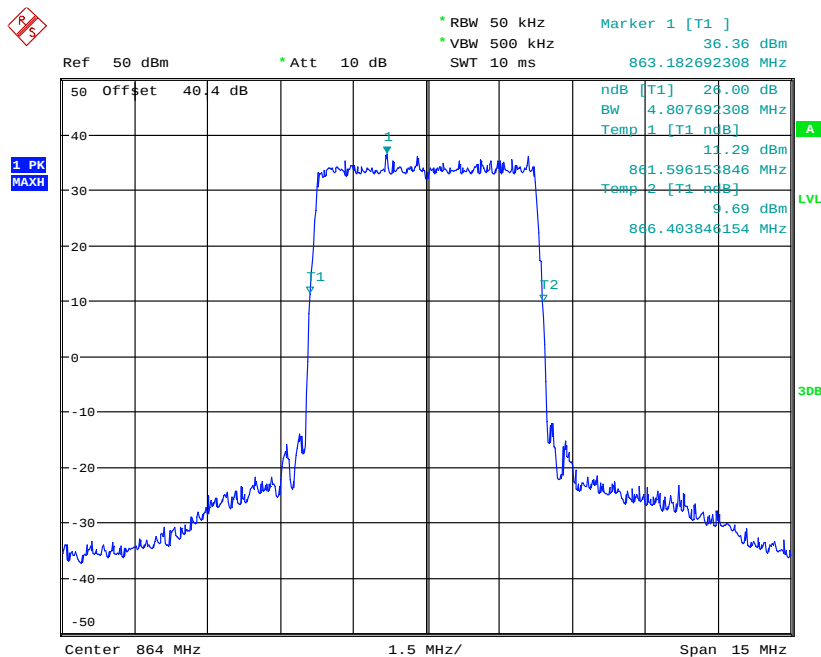
Date: 31.OCT.2014 03:57:19

Channel Position M - QPSK / Bandwidth 3.0 MHz



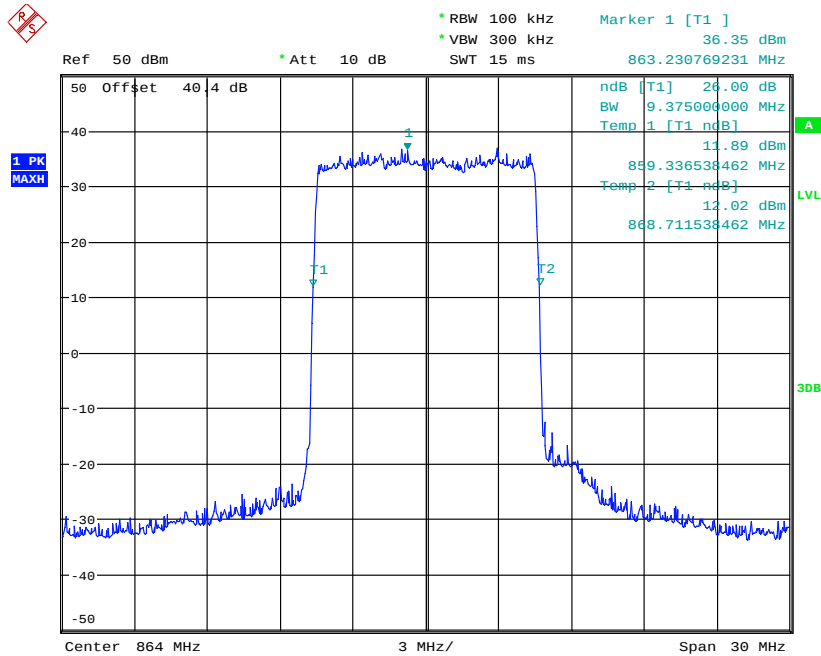
Date: 31.OCT.2014 04:08:59

Channel Position M - QPSK / Bandwidth 5.0 MHz



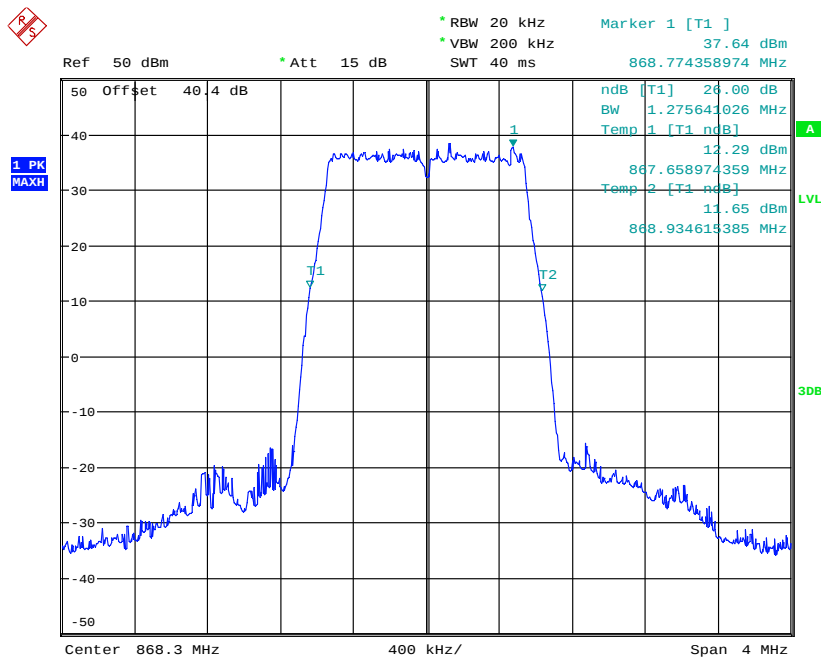
Date: 31.OCT.2014 04:32:50

Channel Position M - QPSK / Bandwidth 10.0 MHz



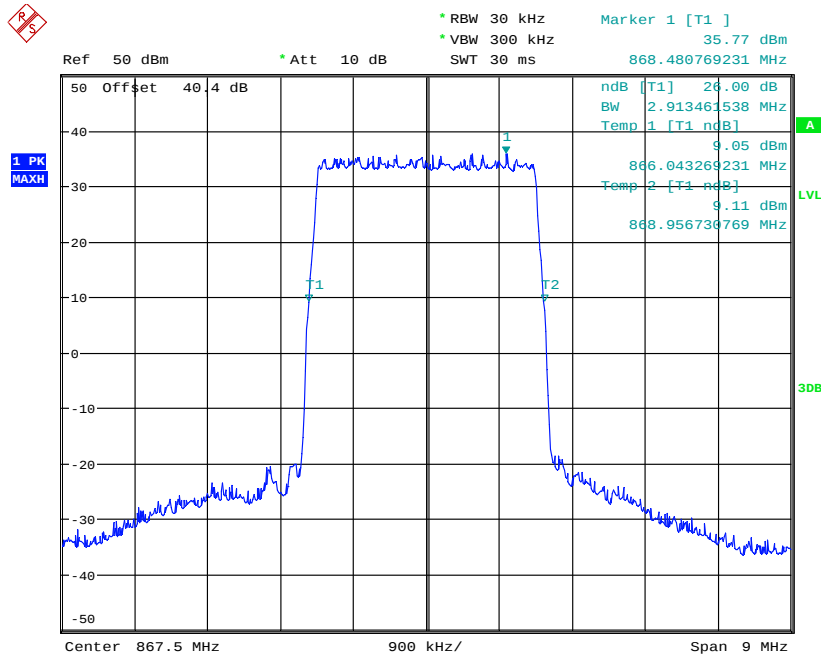
Date: 31.OCT.2014 04:38:16

Channel Position T - QPSK / Bandwidth 1.4 MHz



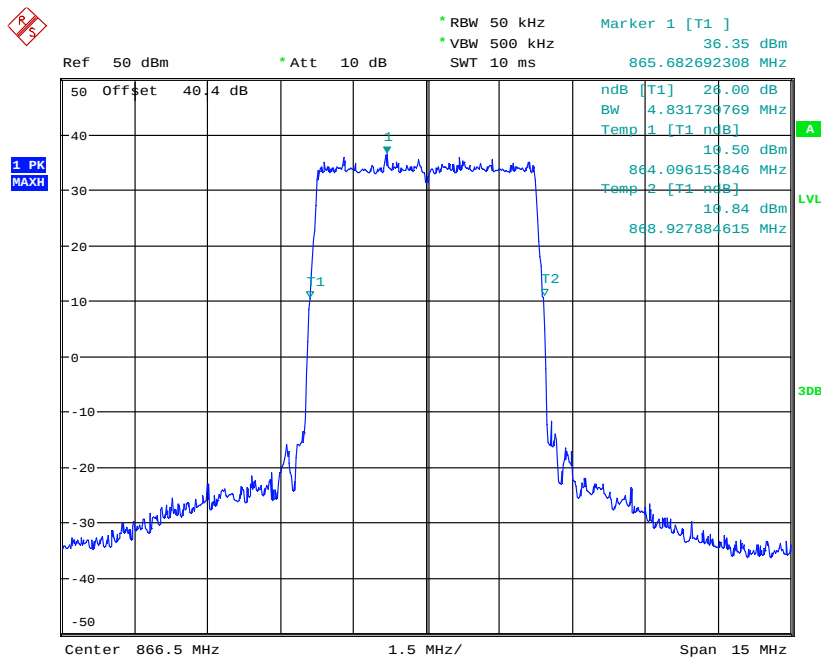
Date: 31.OCT.2014 04:06:31

Channel Position T - QPSK / Bandwidth 3.0 MHz



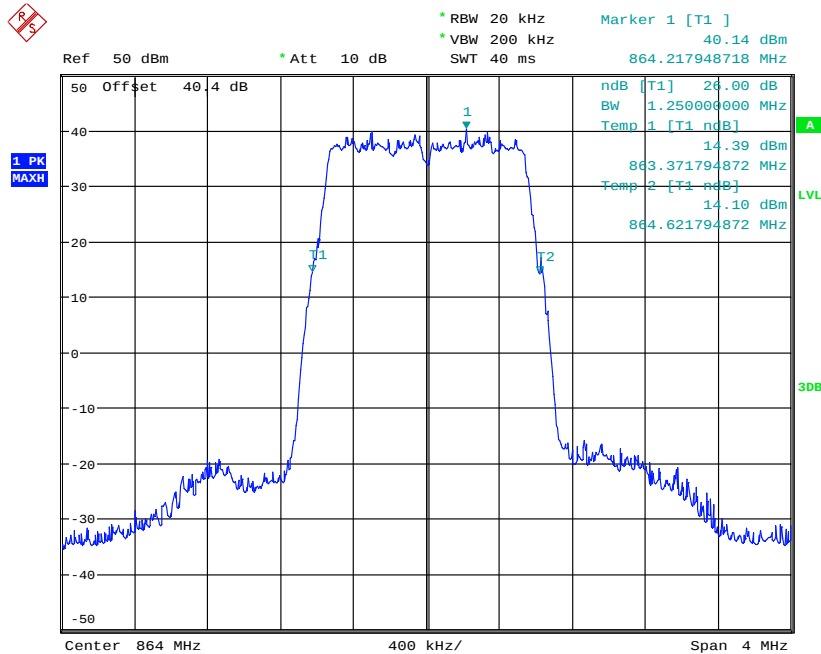
Date: 31.OCT.2014 04:31:29

Channel Position T - QPSK / Bandwidth 5.0 MHz



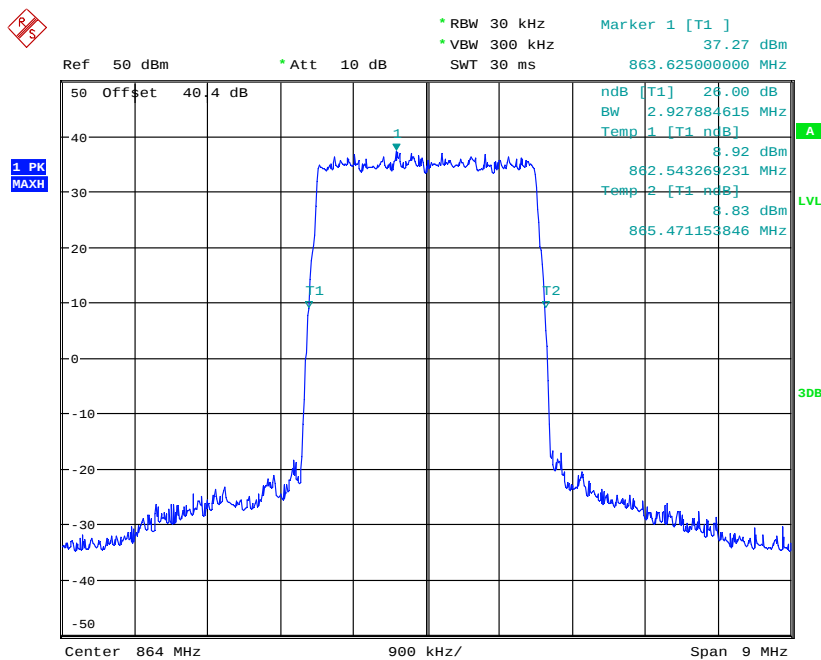
Date: 31.OCT.2014 04:37:04

Channel Position M - 16QAM/ Bandwidth 1.4 MHz



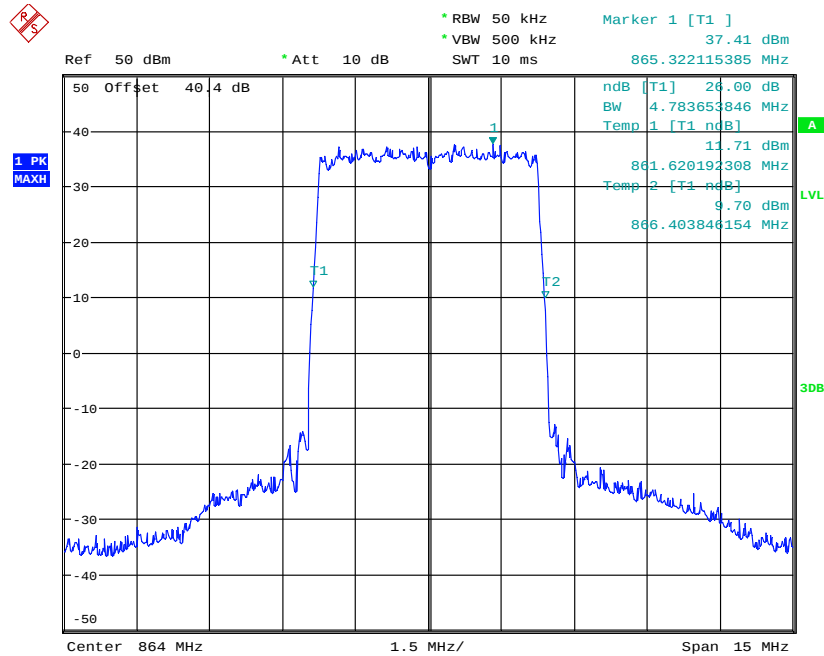
Date: 31.OCT.2014 03:58:06

Channel Position M - 16QAM / Bandwidth 3.0 MHz



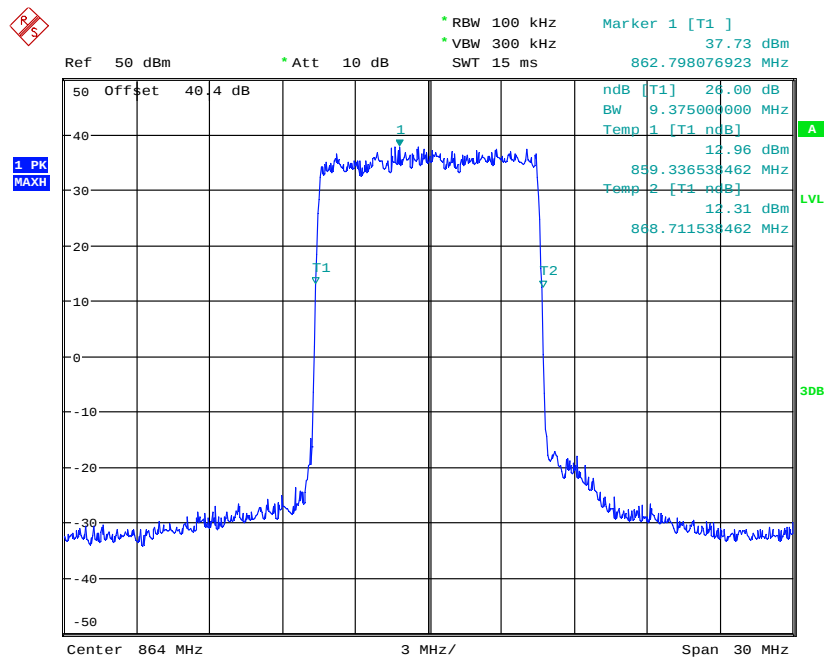
Date: 31.OCT.2014 04:15:46

Channel Position M - 16QAM / Bandwidth 5.0 MHz



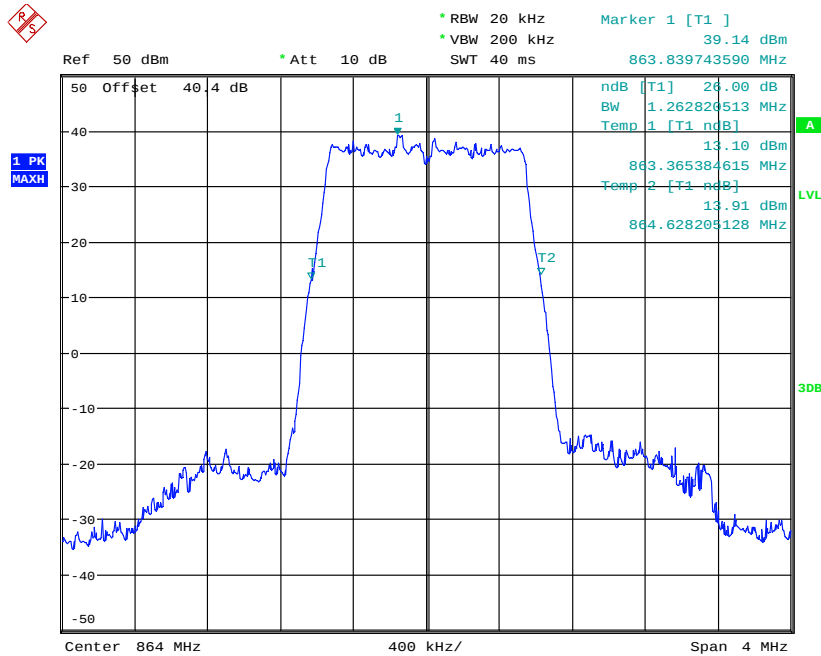
Date: 31.OCT.2014 04:33:39

Channel Position M - 16QAM / Bandwidth 10.0 MHz



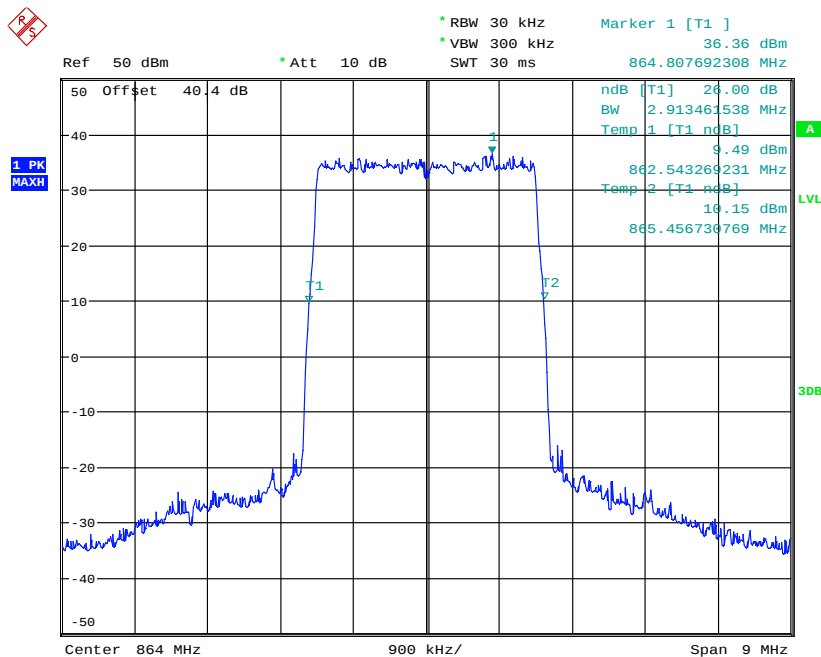
Date: 31.OCT.2014 04:39:17

Channel Position M - 64QAM/ Bandwidth 1.4 MHz



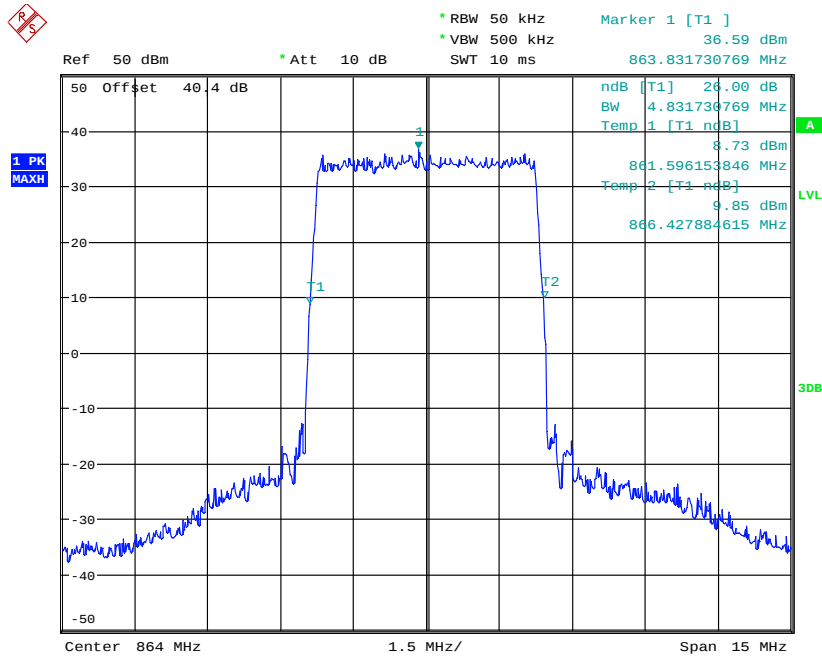
Date: 31.OCT.2014 03:58:56

Channel Position M - 64QAM / Bandwidth 3.0 MHz



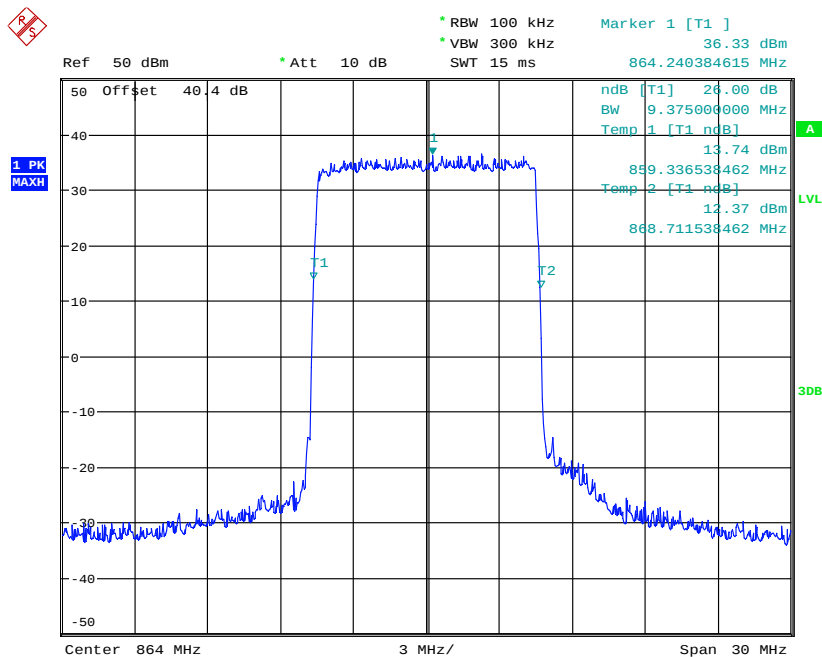
Date: 31.OCT.2014 04:29:21

Channel Position M - 64QAM / Bandwidth 5.0 MHz



Date: 31.OCT.2014 04:34:25

Channel Position M - 64QAM / Bandwidth 10.0 MHz



Date: 31.OCT.2014 04:40:38

2.3 EMISSION MASKS

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1, S/N: CB4V574403

2.3.3 Date of Test and Modification State

29 and 31 October 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	24.5 – 26.5°C
Relative Humidity	22.5 – 24.5%

2.3.6 Test Method

The test was applied in accordance with the test method requirements of FCC Part 90.

Reference is made to FCC 12-25 where an allowance is made for equipment where the bandwidth is greater than that defined in 90.209(b)(5). As all the EUT bandwidths exceed the bandwidth defined in 90.209(b)(5), the emission masks defined in 90.210 and 90.691 are not applicable. Therefore, to demonstrate compliance considering the proposed rule change in FCC 12-25 to clause 90.209(b)(7), a band edge measurement has been performed. The EUT has been set to the lowest and highest channels within the 859 – 869 MHz band and the conducted spurious emission limit of $43+10\log(P)$. For the measurements of 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth were used. The plots shown in the test report show a tighter limit of -26dBm for measurements of emission > 1MHz away from the band edges with a resolution bandwidth of 100kHz.

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 KDB662911 D01 accounting for simultaneous transmission from antennas port RF A and RF B.

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. Measurements were made at the top and bottom of the band.

The worst results are shown in the plots below.

2.3.7 Test Results

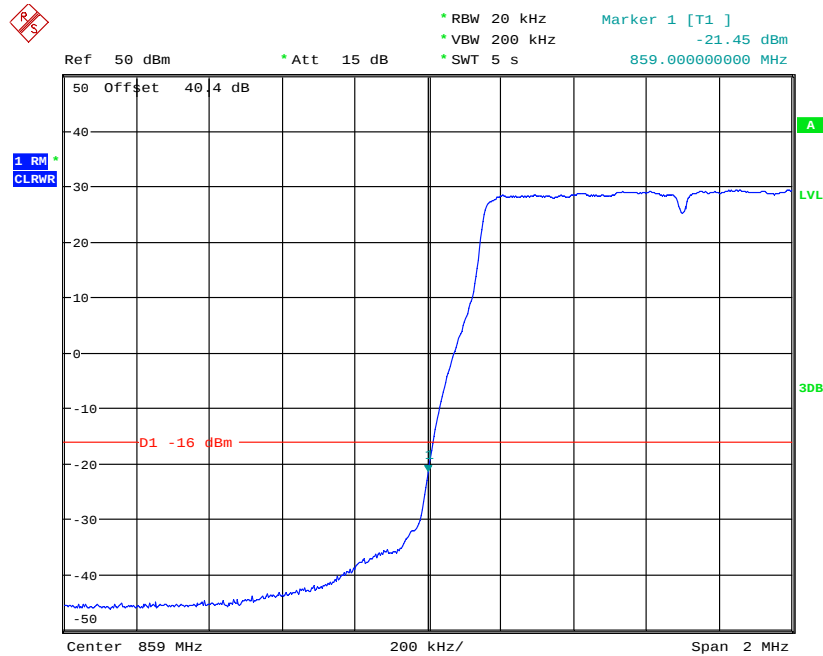
Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port

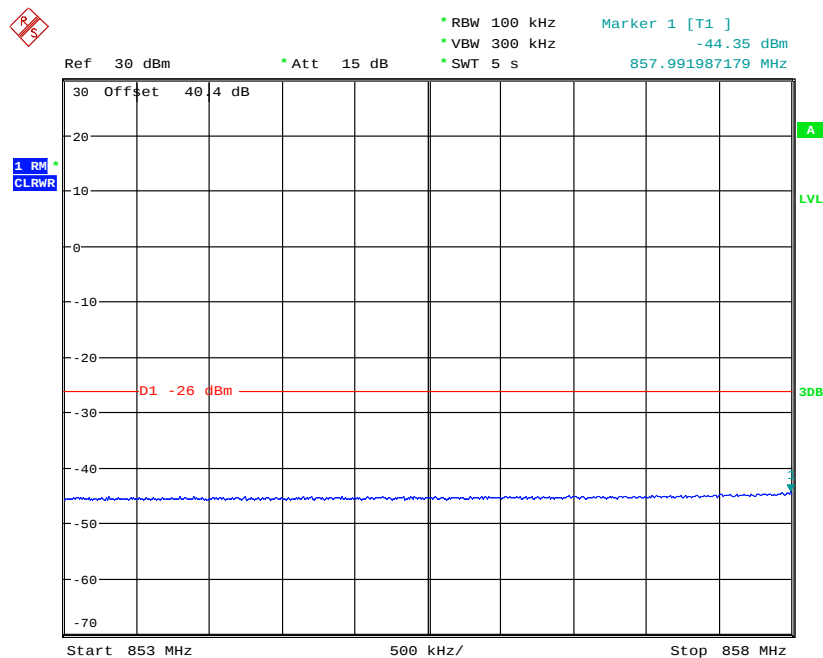
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B	1.4 MHz	859.7MHz
	3.0 MHz	860.5MHz
	5.0 MHz	861.5MHz
	10.0 MHz	864.0MHz
Channel Position T	1.4 MHz	868.3MHz
	3.0 MHz	867.5MHz
	5.0 MHz	866.5MHz
	10.0 MHz	864.0MHz

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 1.4 MHz

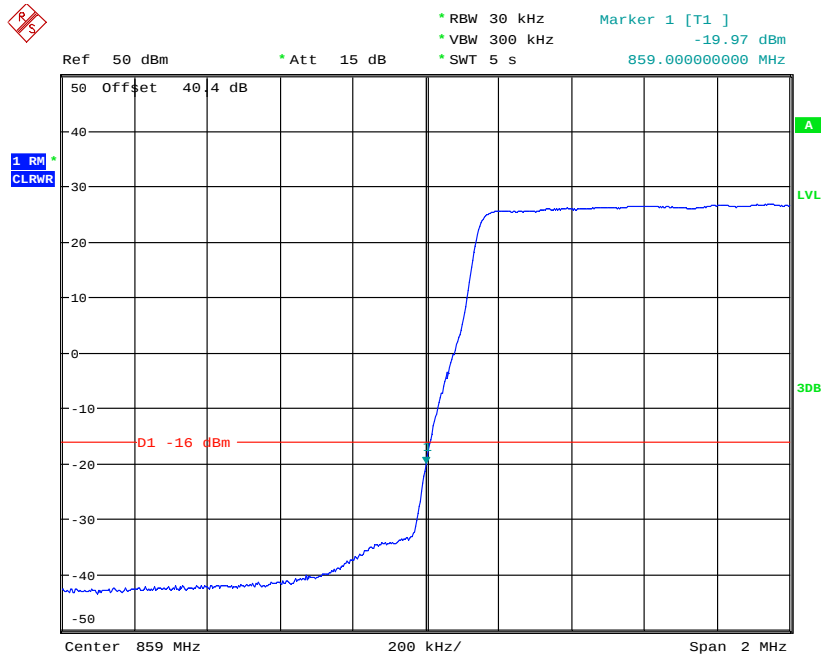


Date: 29.OCT.2014 03:58:35

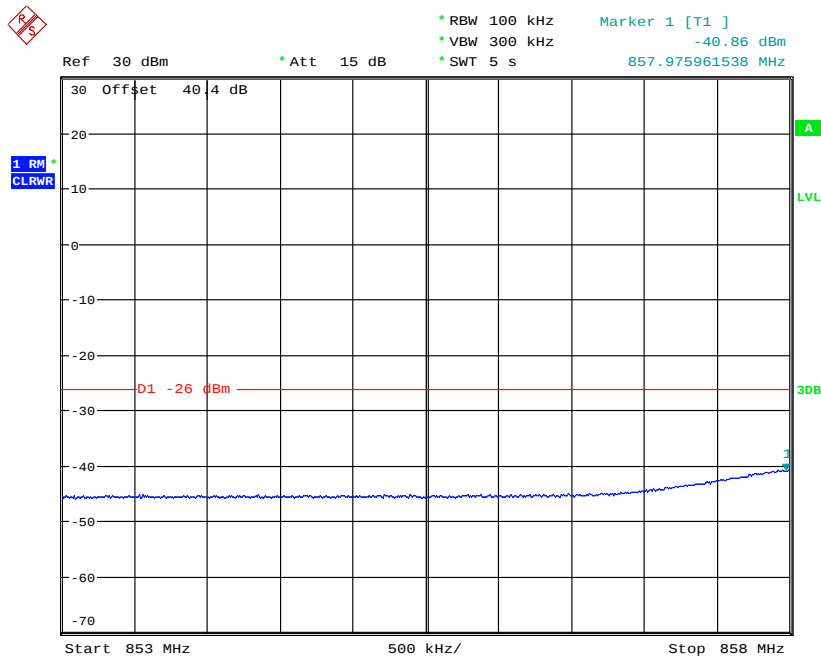


Date: 29.OCT.2014 04:15:31

Channel Position B - QPSK / Bandwidth 3.0 MHz

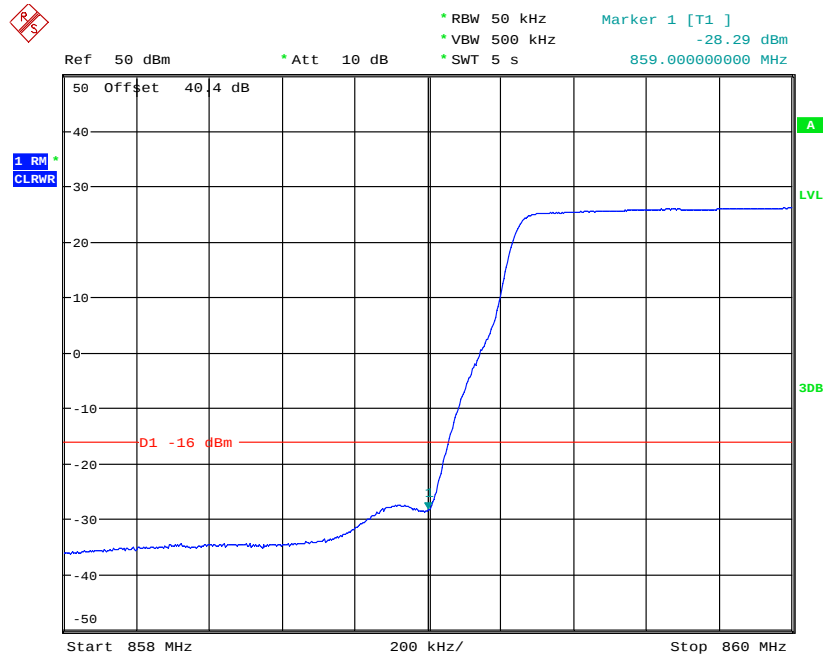


Date: 29.OCT.2014 05:04:38

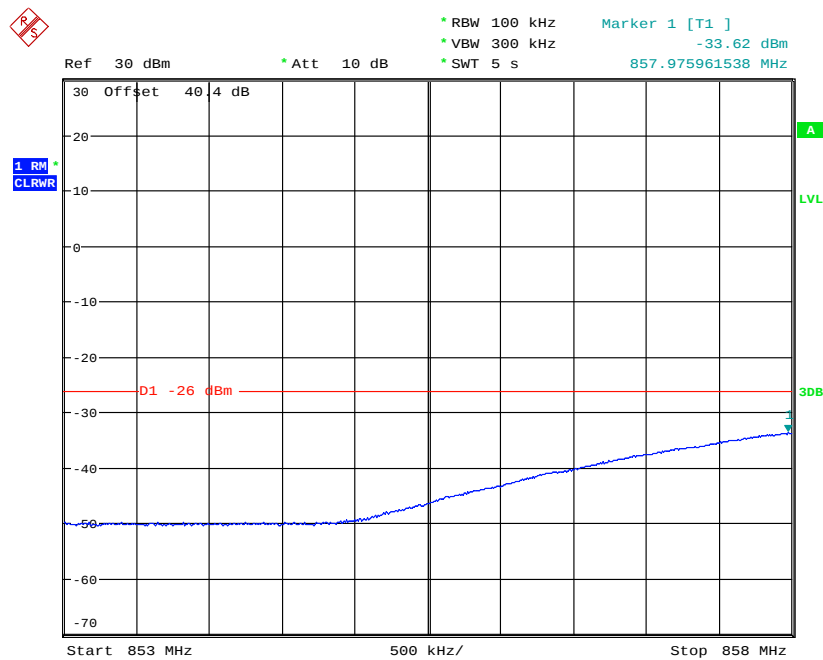


Date: 29.OCT.2014 05:06:23

Channel Position B - QPSK / Bandwidth 5.0 MHz

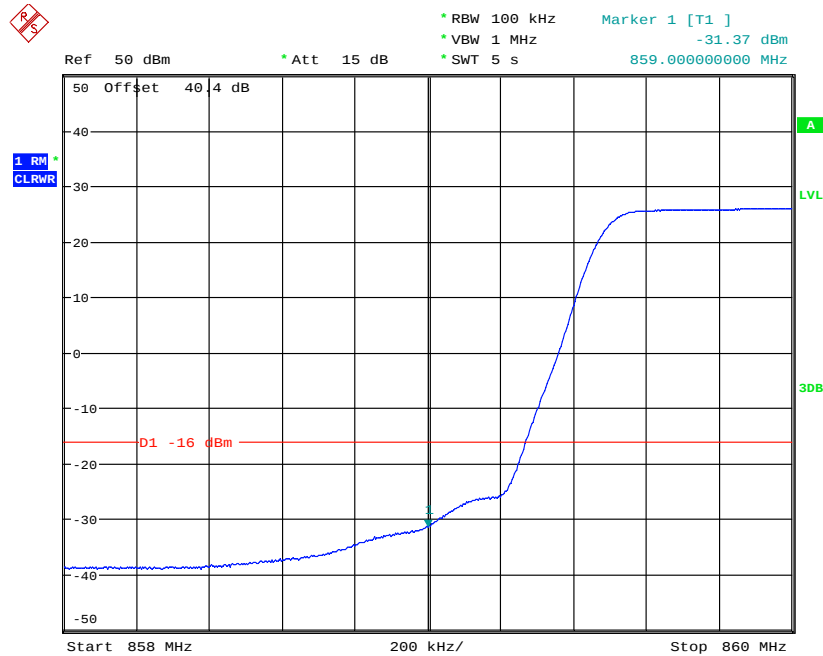


Date: 29.OCT.2014 05:39:52

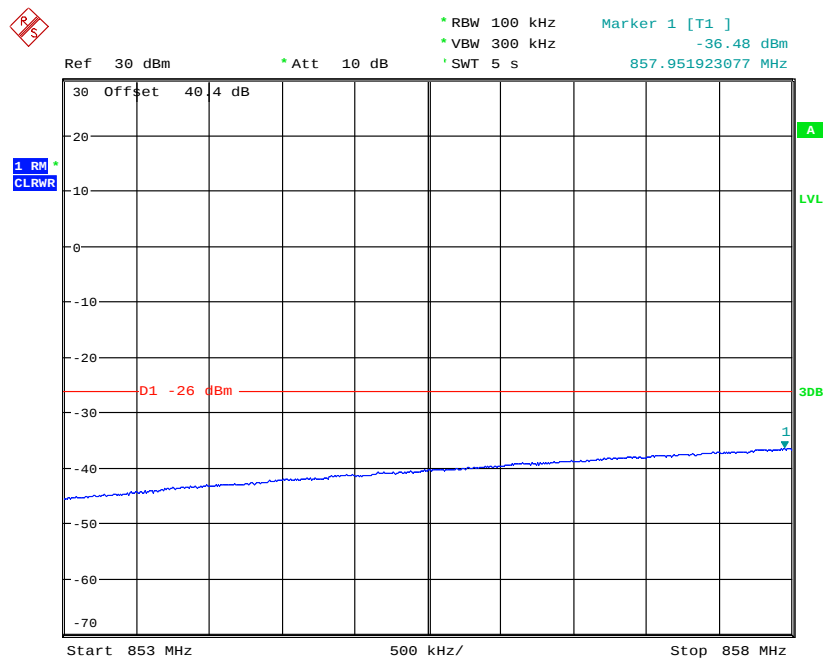


Date: 29.OCT.2014 05:40:53

Channel Position B - QPSK / Bandwidth 10.0 MHz

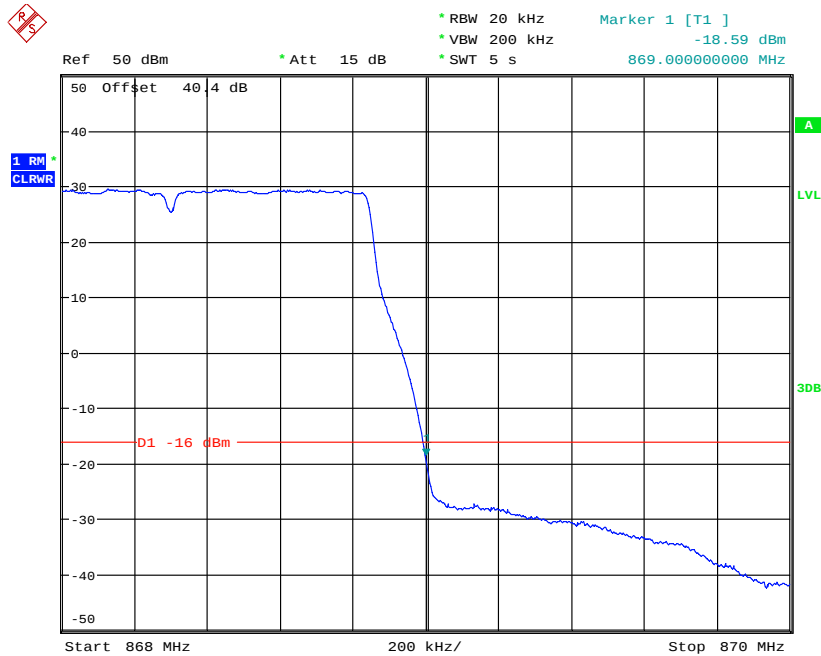


Date: 29.OCT.2014 06:33:42

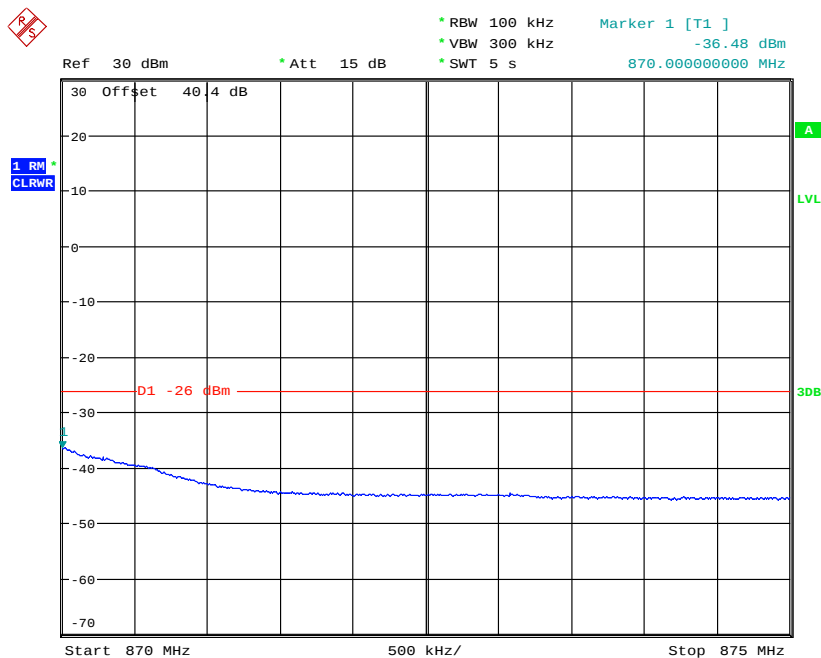


Date: 29.OCT.2014 06:35:51

Channel Position T - QPSK / Bandwidth 1.4 MHz

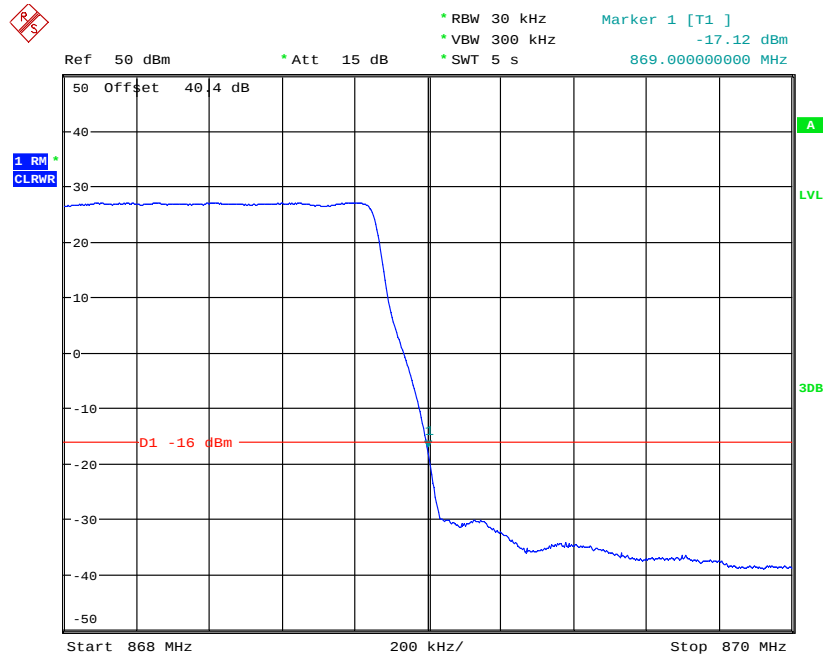


Date: 29.OCT.2014 04:18:25

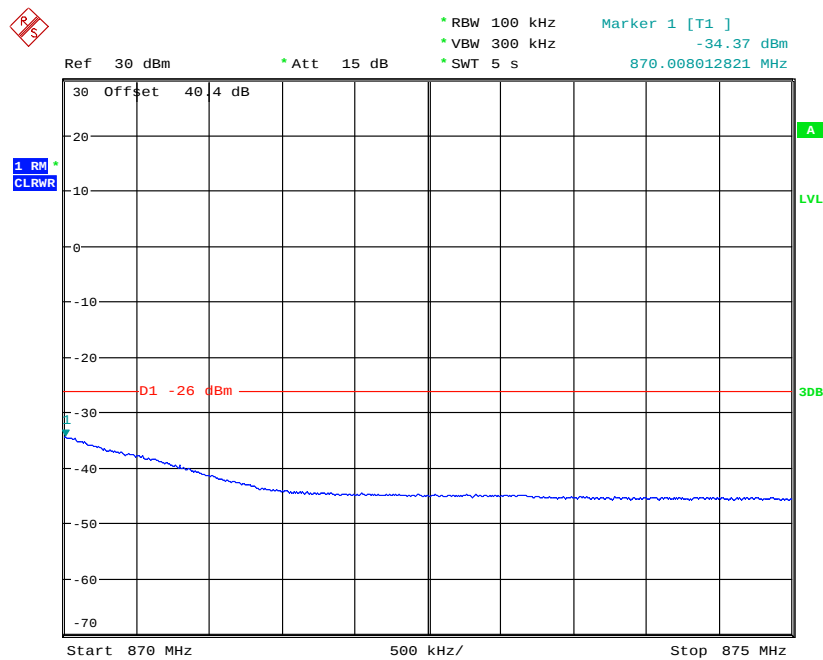


Date: 29.OCT.2014 04:20:33

Channel Position T- QPSK / Bandwidth 3.0 MHz

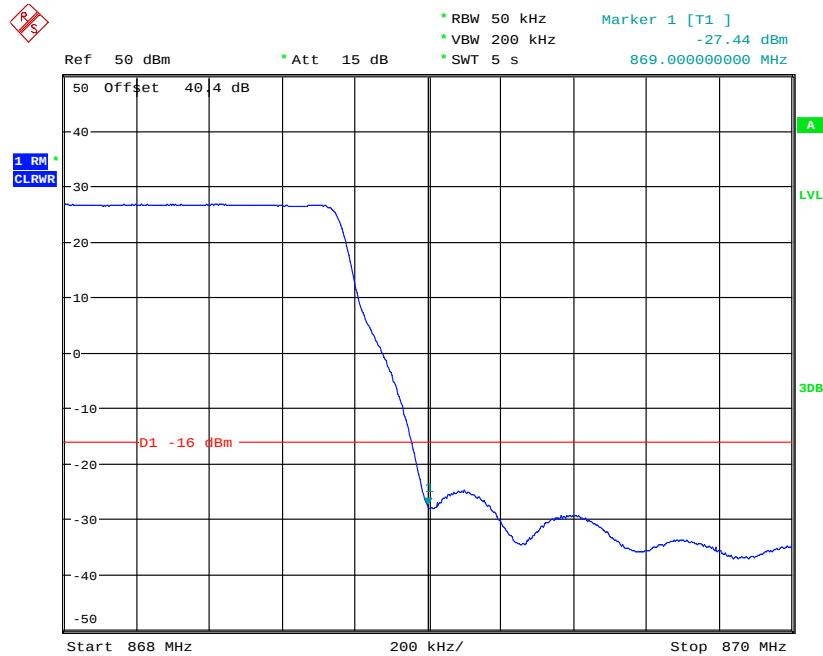


Date: 29.OCT.2014 05:12:47

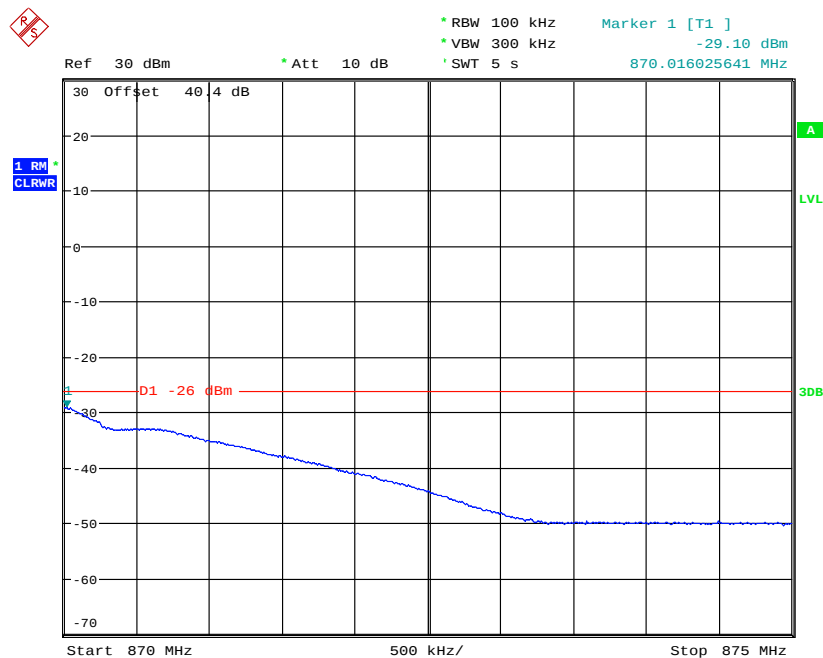


Date: 29.OCT.2014 05:13:53

Channel Position T- QPSK / Bandwidth 5.0 MHz

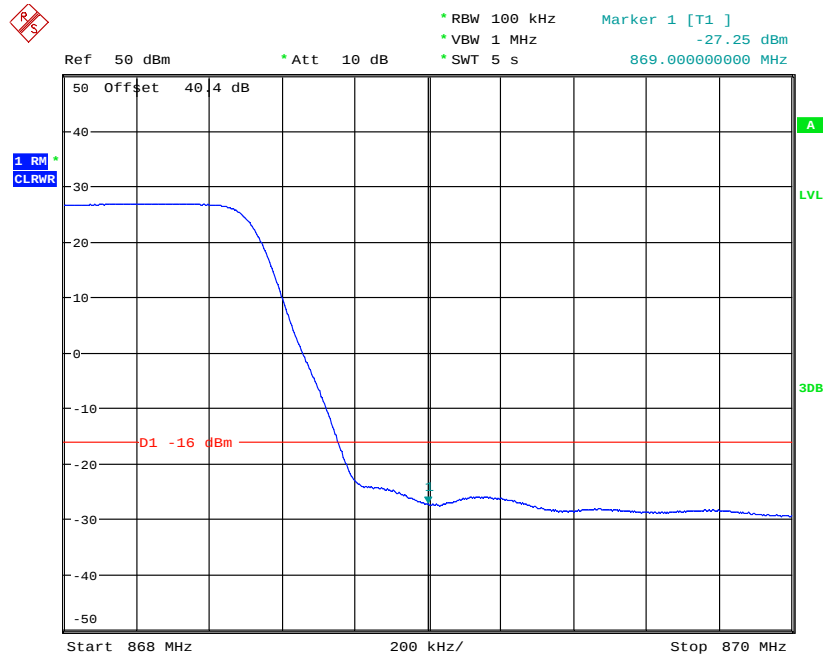


Date: 29.OCT.2014 06:17:39

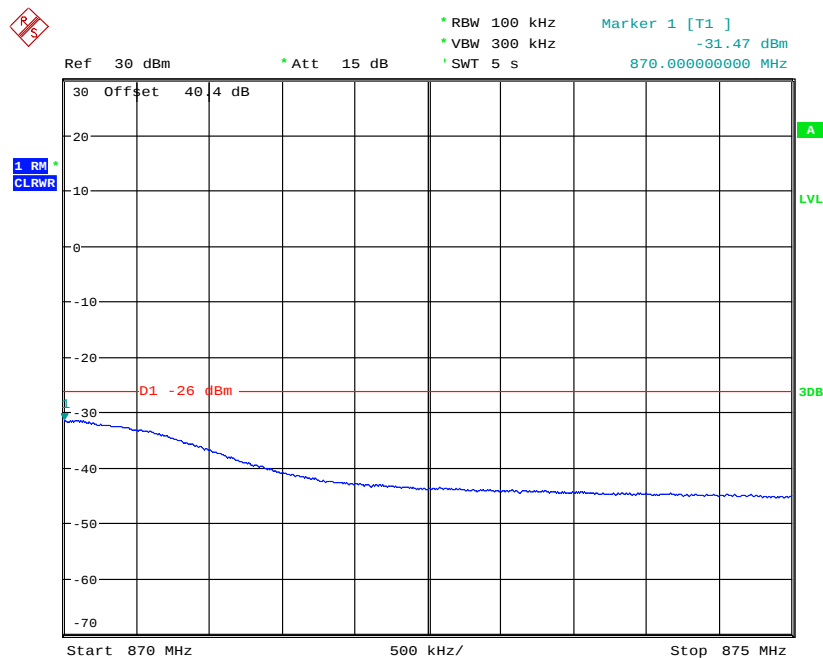


Date: 29.OCT.2014 06:19:14

Channel Position T - QPSK / Bandwidth 10.0 MHz



Date: 29.OCT.2014 06:37:00



Date: 29.OCT.2014 06:37:47

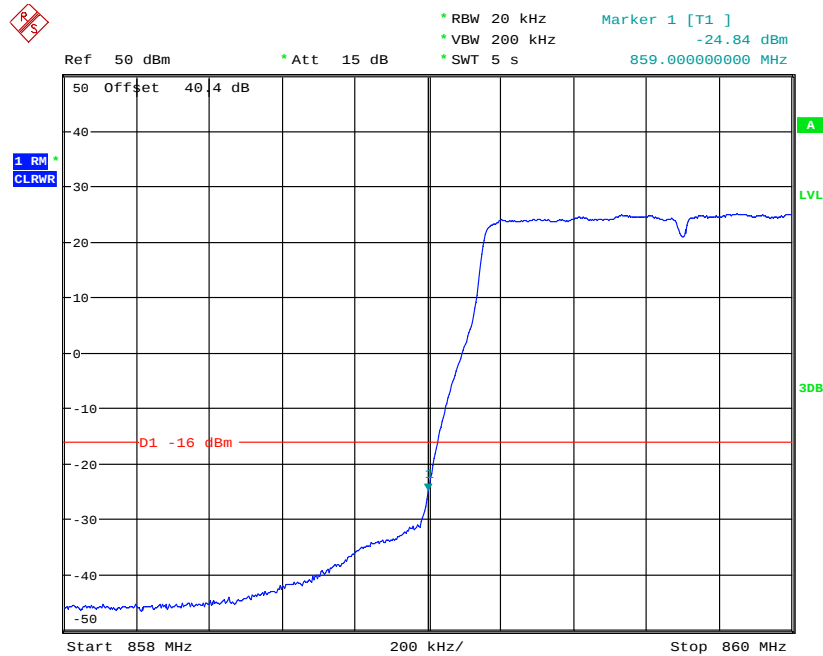
Configuration L-MIMO-MC (2C)

Maximum Output Power 45.4dBm per port

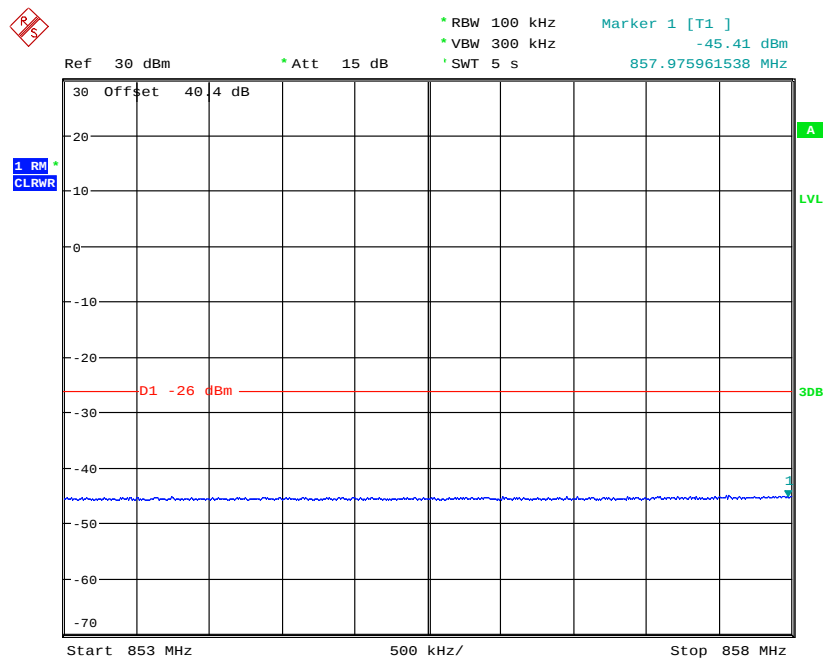
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B_{RFBW}	1.4 MHz	859.7MHz + 868.3MHz
	3.0 MHz	860.5MHz + 867.5MHz
	5.0 MHz	861.5MHz + 866.5MHz
Channel Position T_{RFBW}	1.4 MHz	859.7MHz + 868.3MHz
	3.0 MHz	860.5MHz + 867.5MHz
	5.0 MHz	861.5MHz + 866.5MHz

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 1.4 MHz

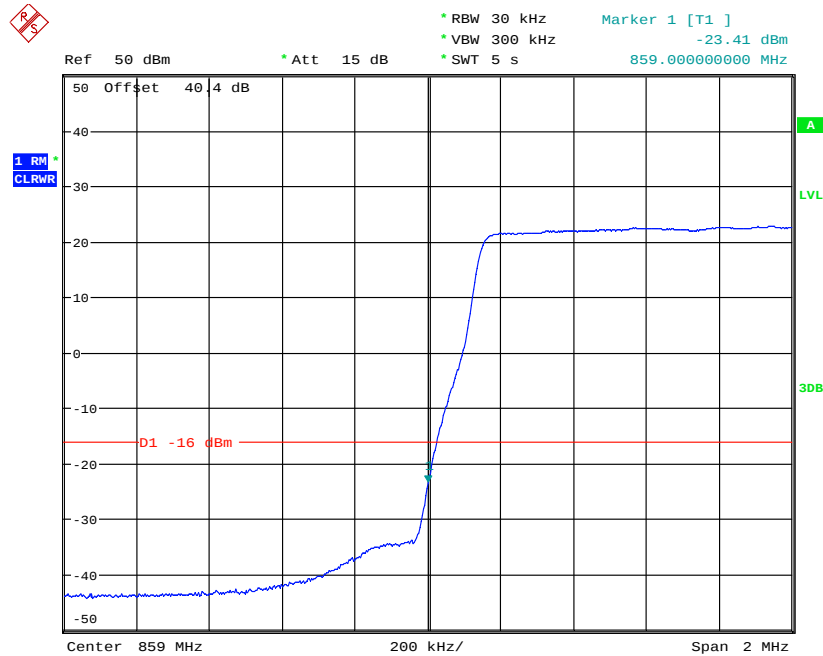


Date: 29.OCT.2014 07:57:50

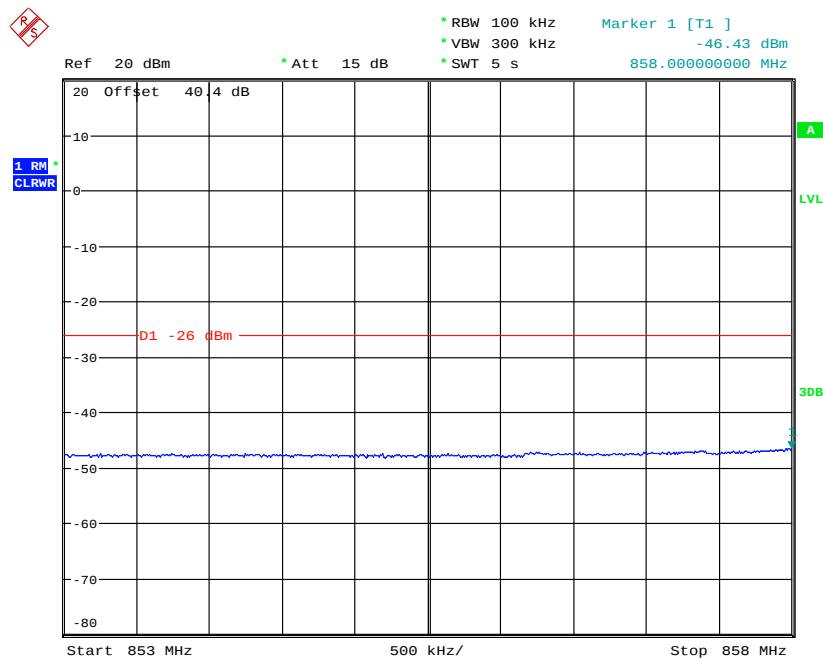


Date: 29.OCT.2014 07:59:41

Channel Position B_{RFBW} - QPSK / Bandwidth 3.0 MHz

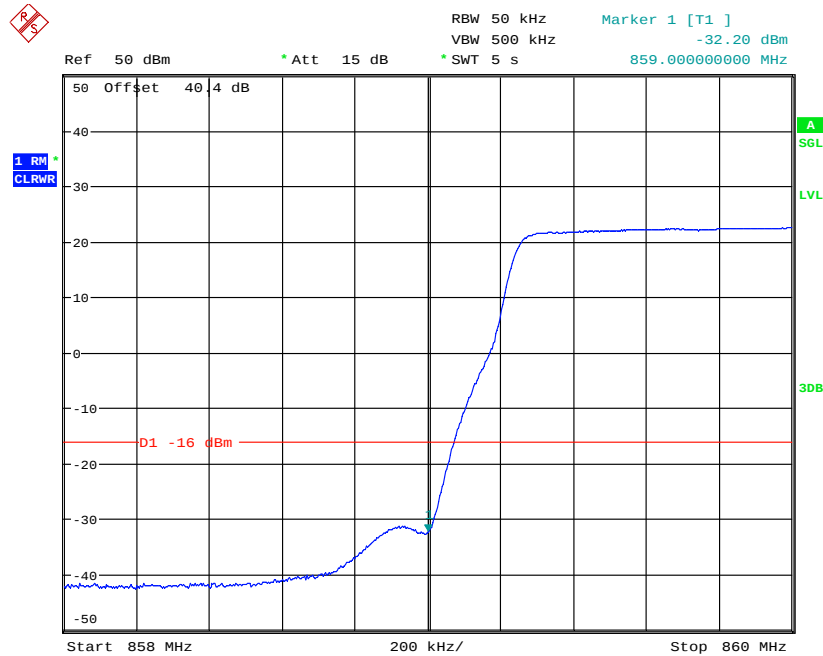


Date: 29.OCT.2014 08:24:26

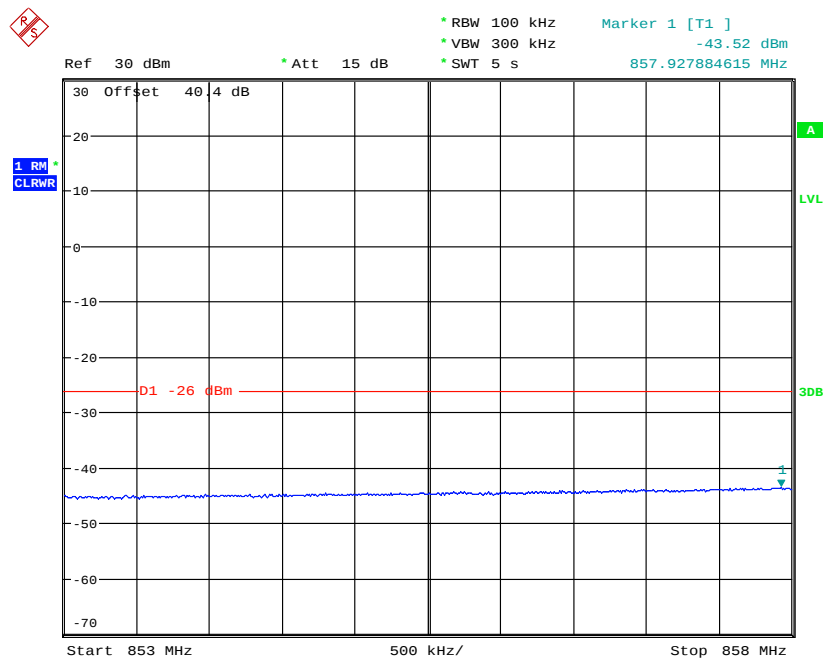


Date: 31.OCT.2014 04:52:01

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

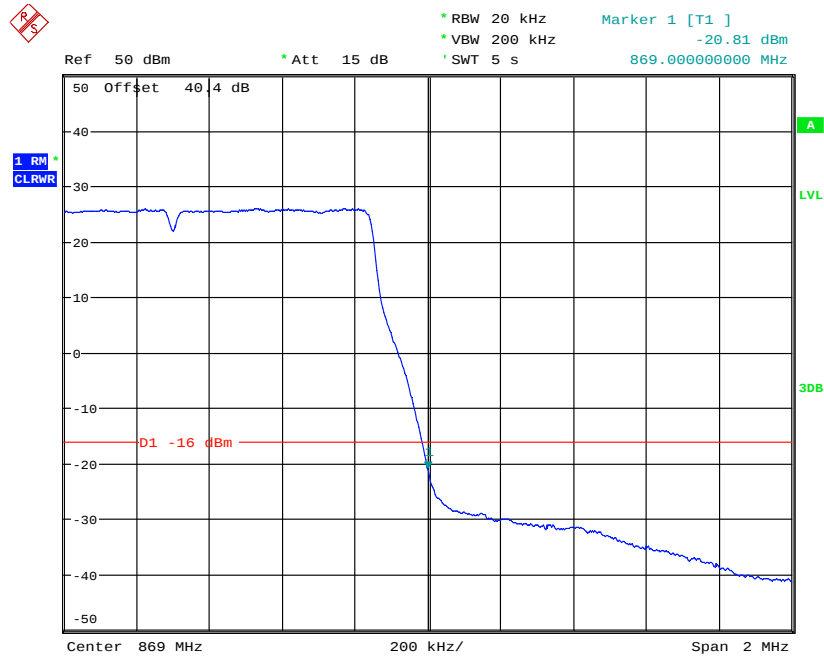


Date: 29.OCT.2014 08:36:51

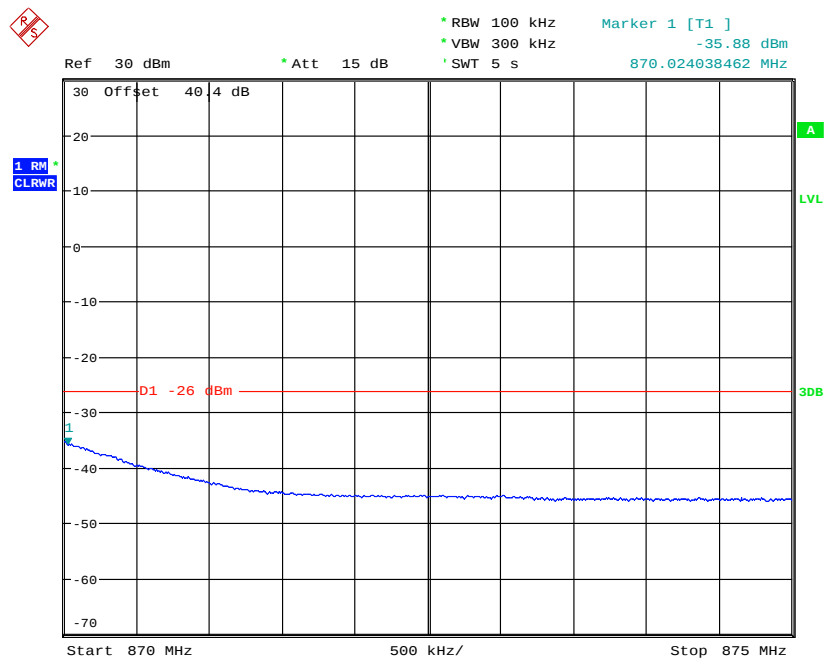


Date: 29.OCT.2014 08:39:41

Channel Position T_{RFBW} – QPSK / Bandwidth 1.4 MHz

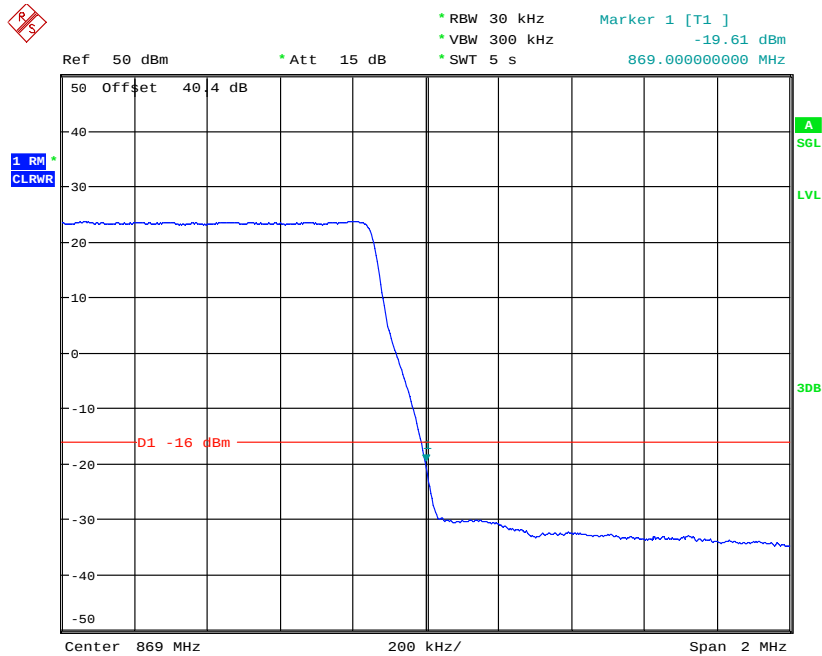


Date: 29.OCT.2014 08:18:48

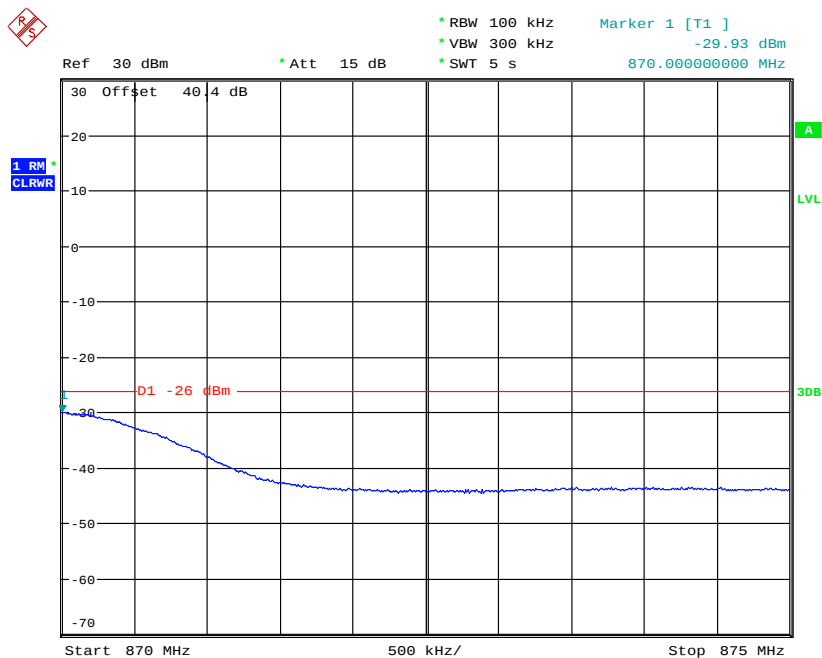


Date: 31.OCT.2014 04:45:09

Channel Position T_{RFBW} – QPSK / Bandwidth 3.0 MHz

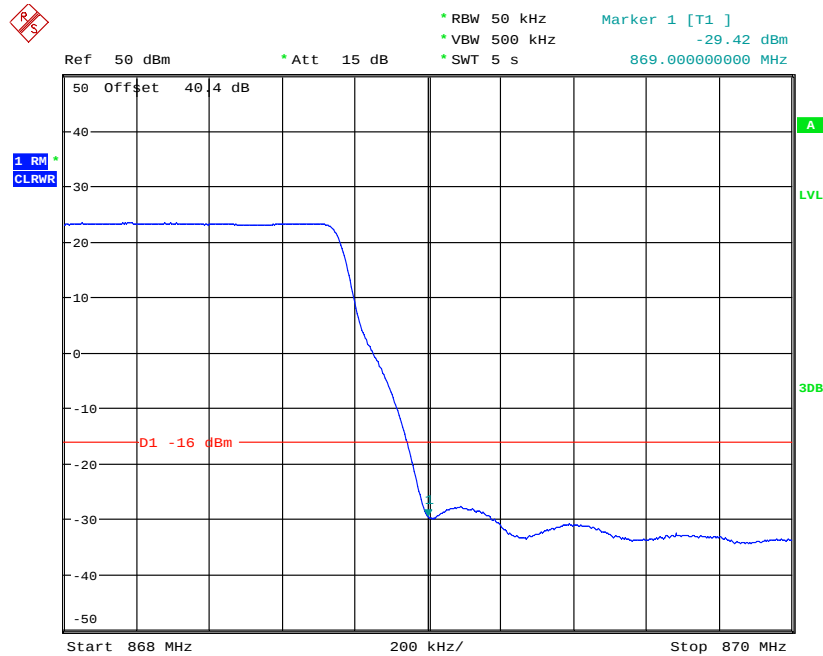


Date: 29.OCT.2014 08:32:39

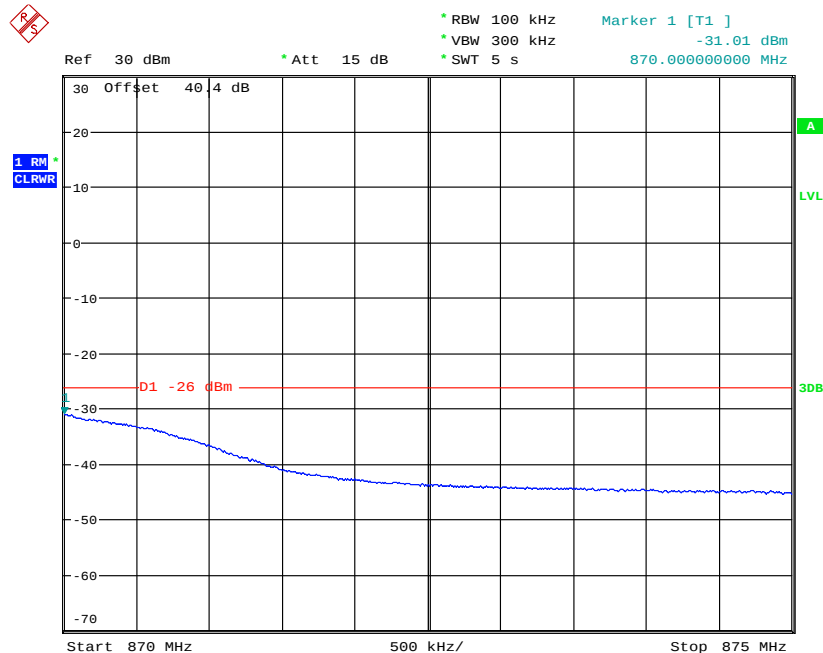


Date: 29.OCT.2014 08:31:42

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



Date: 29.OCT.2014 08:41:35



Date: 29.OCT.2014 08:42:16

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 90, Clause 90.691

2.4.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1 , S/N: CB4V574403

2.4.3 Date of Test and Modification State

04 and 05 November 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	24.0 – 26.0C
Relative Humidity	23.0 – 24.0%

2.4.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 90 and 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.

Emissions identified within the range 30MHz to 9GHz were then formally measured using a peak detector as the worst case.

In the frequency range 30MHz – 9GHz, the measurement was performed with a resolution bandwidth of 1MHz.

The limits for the power of the Spurious Emissions outside a licensee's frequency band(s) of operation 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 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 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:

$$E_{(v/m)} = (30 \times 1.64 \times 62.37)^{0.5} / 3 = 18.46 \text{ V/m} = 145.32 \text{ dB}\mu\text{V/m}$$

As per 90.691 the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(62.37) = 60.94 \text{ dB}$$

Therefore the limit at 3m measurement distance is:

$$145.32 - 60.94 = 84.4 \text{ dB}\mu\text{V/m}$$

These limits have 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.

Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port, LTE Bandwidth 1.4MHz

Channel Position	Channel Frequencies
Channel Position M	864.0MHz

Channel Position M - QPSK

No emissions were detected within 20dB of the limit.

Maximum Output Power 46.0dBm per port, LTE Bandwidth 3.0MHz

Channel Position	Channel Frequencies
Channel Position M	864.0MHz

Channel Position M - QPSK

No emissions were detected within 20dB of the limit.

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

Channel Position	Channel Frequencies
Channel Position B	861.5MHz
Channel Position M	864.0MHz
Channel Position T	866.5MHz

Channel Position B - QPSK

No emissions were detected within 20dB of the limit.

Channel Position M - QPSK

No emissions were detected within 20dB of the limit.

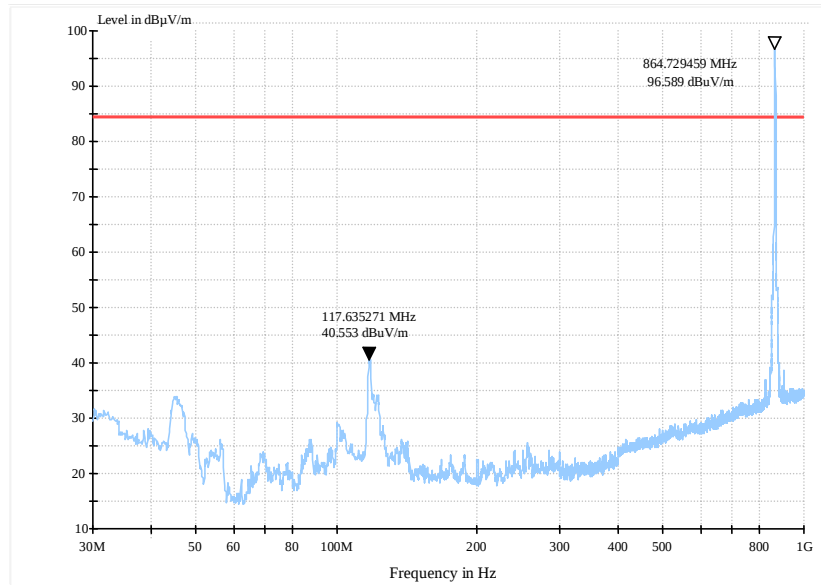
Channel Position M - 16QAM

No emissions were detected within 20dB of the limit.

Channel Position M - 64QAM

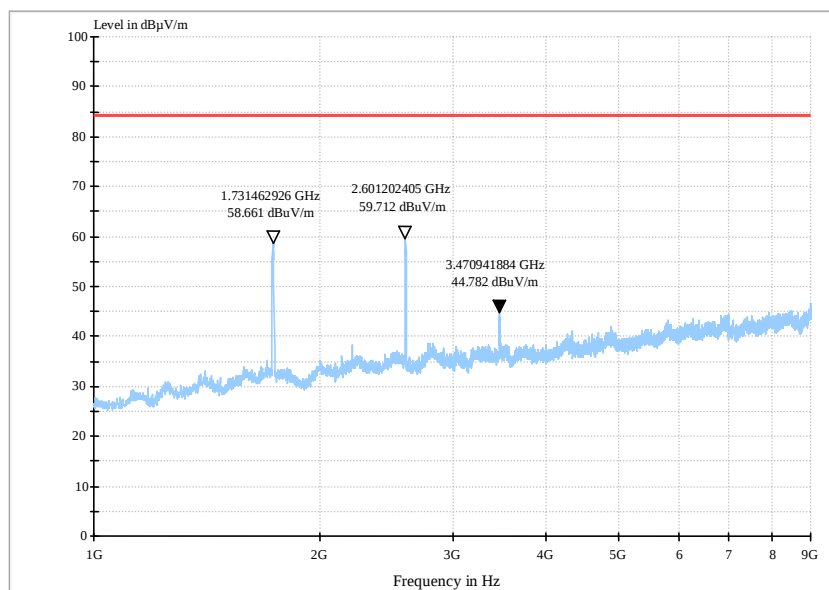
No emissions were detected within 20dB of the limit.

Channel Position T - QPSK - 30MHz – 1GHz



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

Channel Position T - QPSK – 1GHz – 9GHz



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

Channel Position	Channel Frequencies
Channel Position M	864.0MHz

Channel Position M - QPSK

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-MC (2C)

Maximum Output Power 45.4dBm per port, LTE Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position M_{RFBW}	861.5MHz + 866.5MHz

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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2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

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

2.5.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1, S/N: CB4V574403

2.5.3 Date of Test and Modification State

29 and 31 October 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	24.5 – 26.5°C
Relative Humidity	22.5 – 24.5%

2.5.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 90.

In accordance with FCC CFR 47 Part 90, Clause 90.691, 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 were performed with a resolution bandwidth of 1MHz.

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 9GHz. The EUT was set to transmit on maximum power and the path loss between the spectrum analyser and the EUT was measured with the worst case level being entered as a Reference Level Offset.

Test model E-TM1.1 was measured as the representative model. The resolution bandwidth of 1MHz was employed for frequency band 9kHz to 9GHz. 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 accounting for simultaneous transmission from antenna ports RF A and RF B.

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 worst results are shown in the plots below.

2.5.7 Test Results

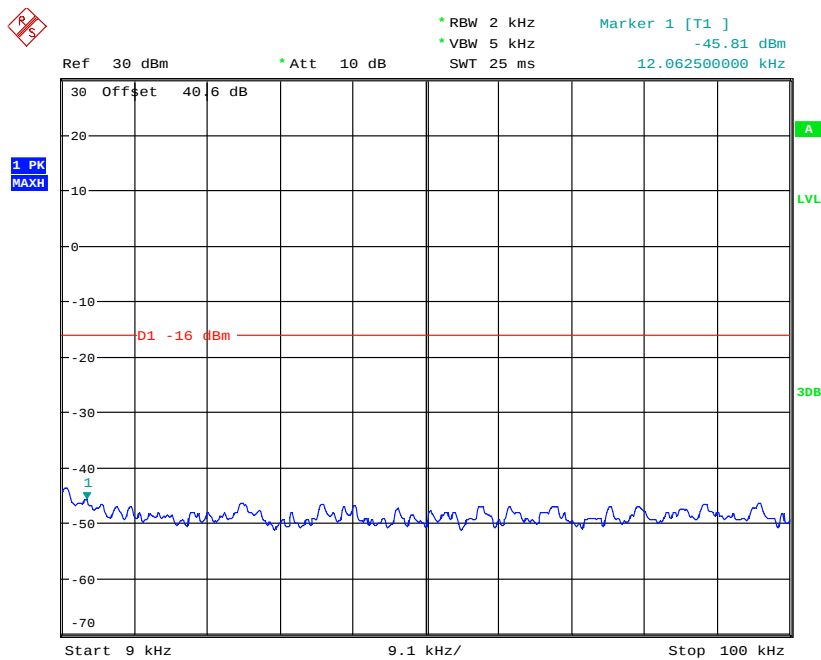
Configuration L-MIMO-SC

Maximum Output Power 46.0dBm per port

Channel Position	Bandwidth	Channel Frequency
Channel Position B	1.4MHz	859.7MHz
Channel Position M	1.4MHz	864.0MHz
	10.0MHz	
Channel Position T	1.4MHz	868.3MHz

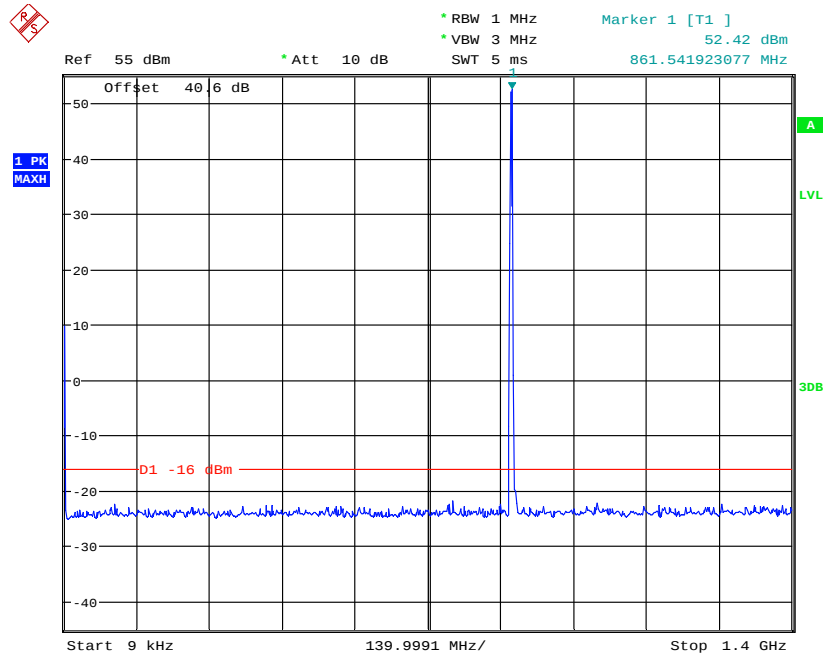
Remark:

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.



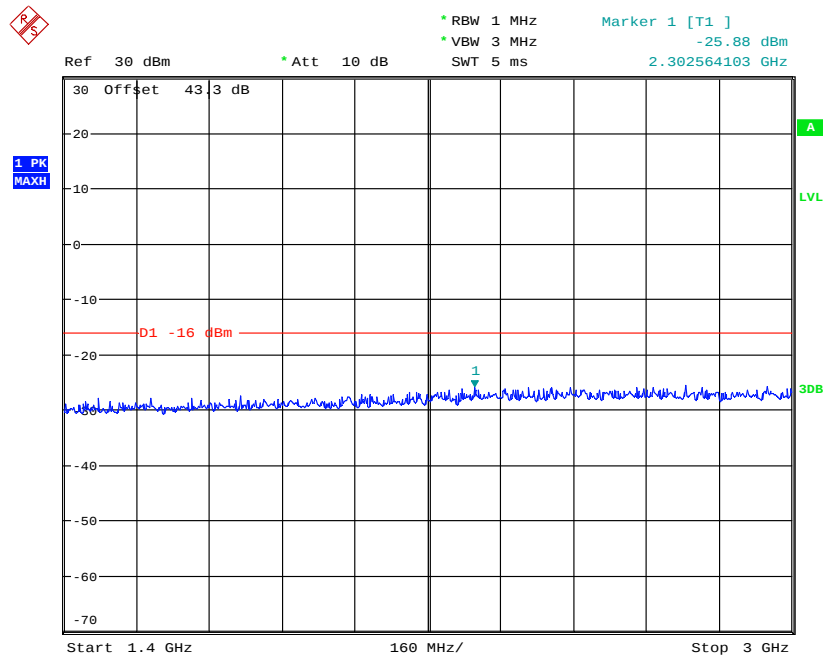
Date: 31.OCT.2014 04:57:36

Channel Position B - QPSK / Bandwidth 1.4MHz - 9kHz – 1.4GHz



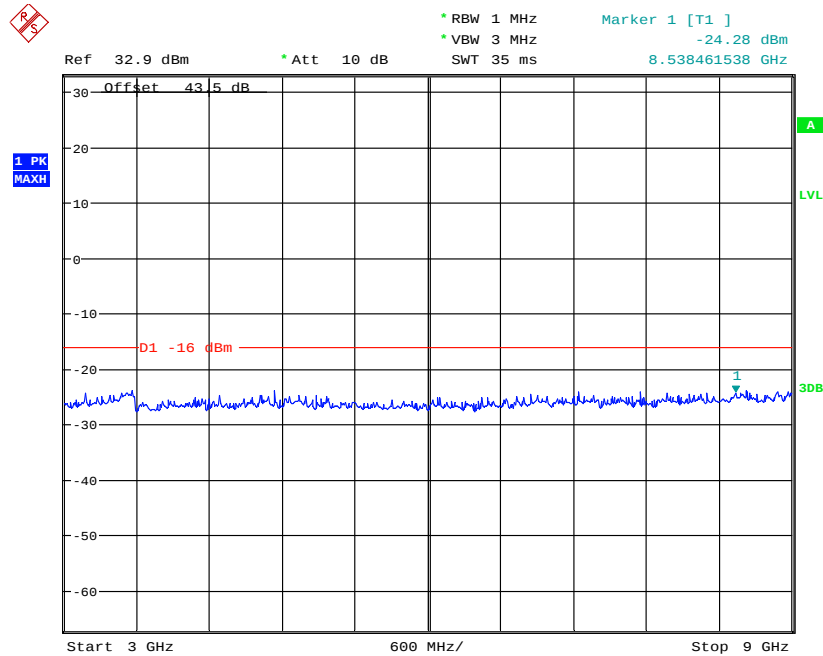
Date: 29.OCT.2014 04:50:05

Channel Position B - QPSK / Bandwidth 1.4MHz – 1.4GHz - 3GHz



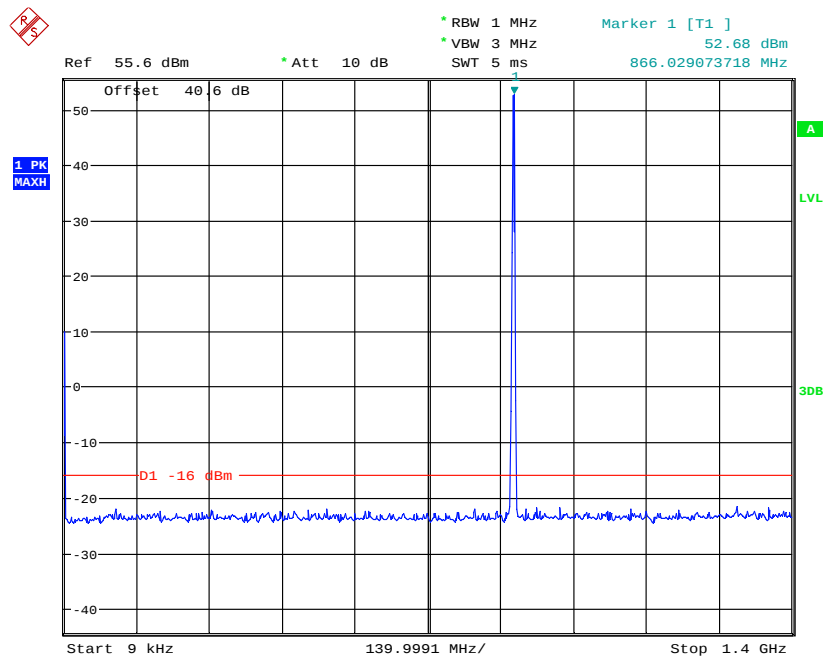
Date: 29.OCT.2014 09:43:16

Channel Position B - QPSK / Bandwidth 1.4MHz - 3GHz - 9GHz



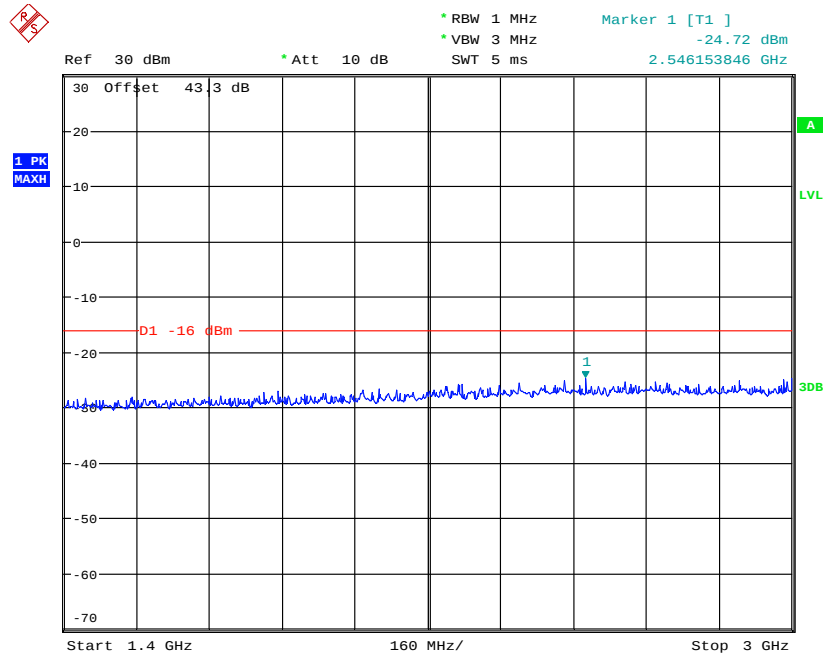
Date: 29.OCT.2014 04:51:24

Channel Position M - QPSK / Bandwidth 1.4MHz - 9kHz – 1.4GHz



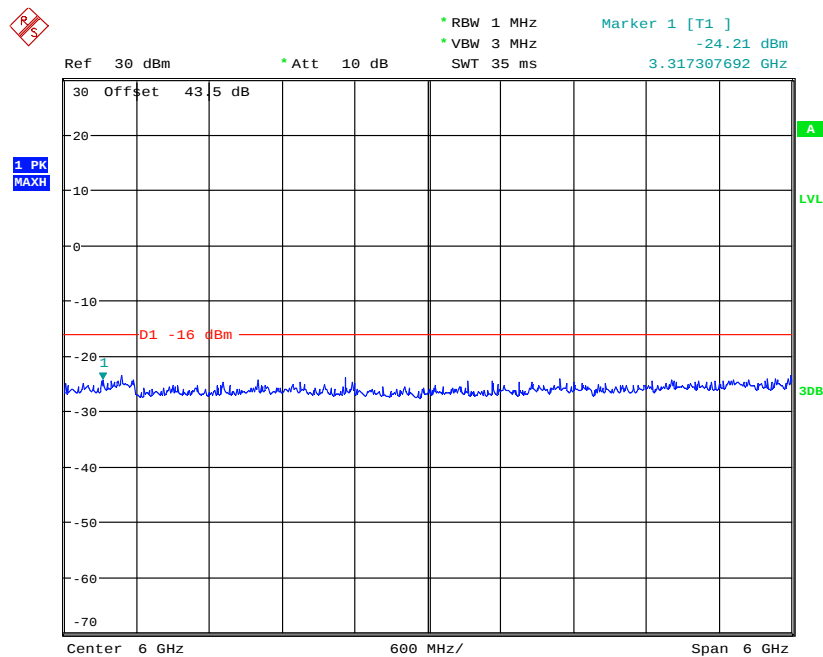
Date: 29.OCT.2014 04:42:04

Channel Position M- QPSK / Bandwidth 1.4MHz – 1.4GHz - 3GHz



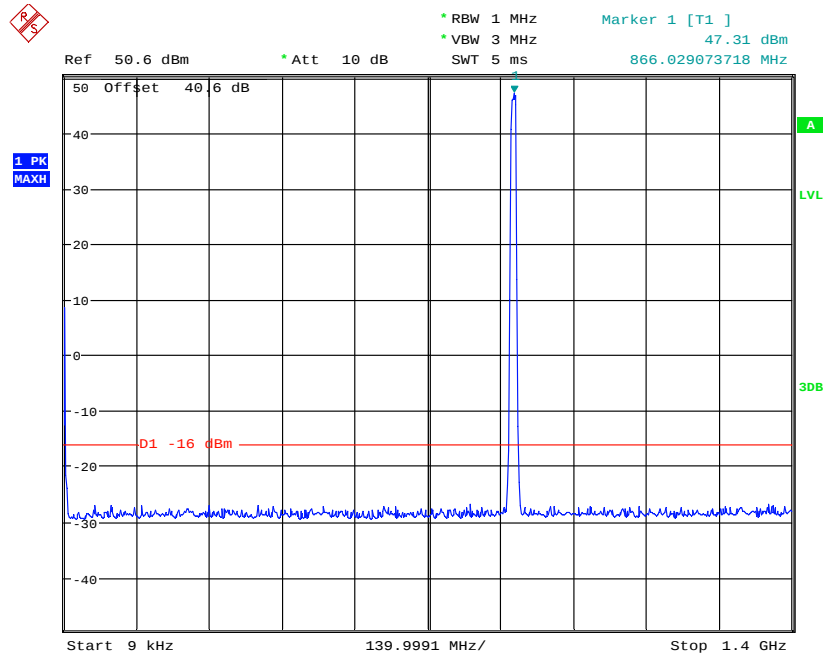
Date: 29.OCT.2014 09:51:08

Channel Position M - QPSK / Bandwidth 1.4MHz - 3GHz - 9GHz



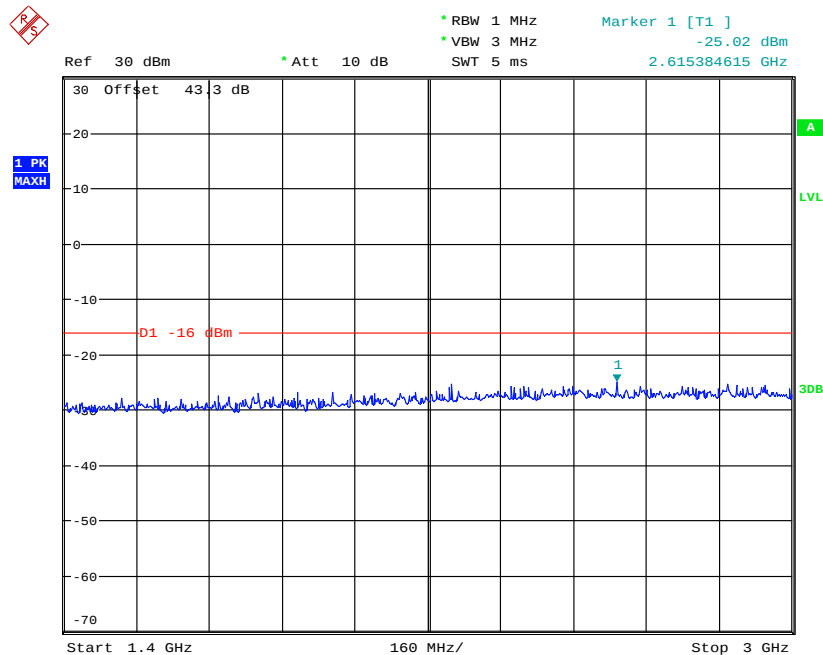
Date: 29.OCT.2014 04:43:36

Channel Position M - QPSK / Bandwidth 10.0MHz - 9kHz – 1.4GHz



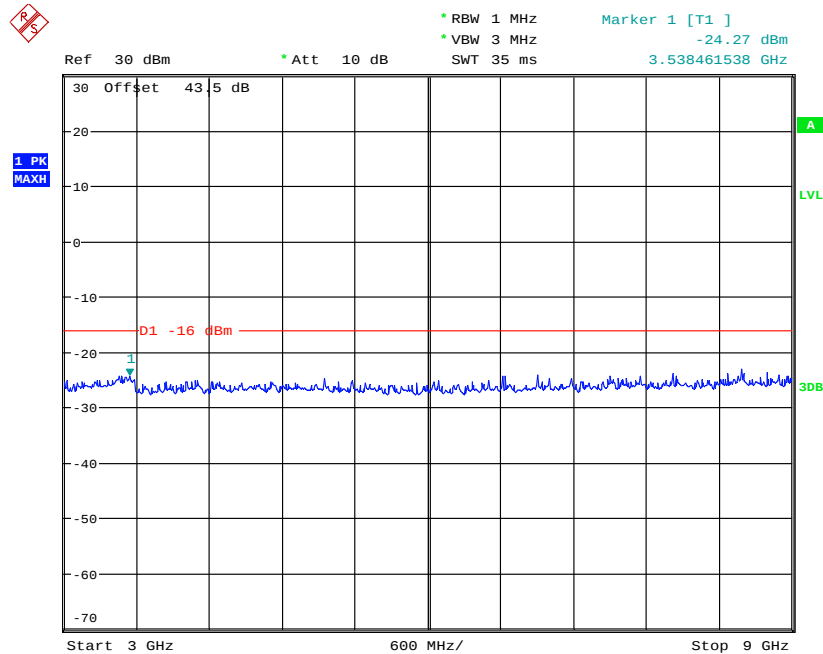
Date: 29.OCT.2014 06:39:25

Channel Position M - QPSK / Bandwidth 10.0MHz – 1.4GHz - 3GHz



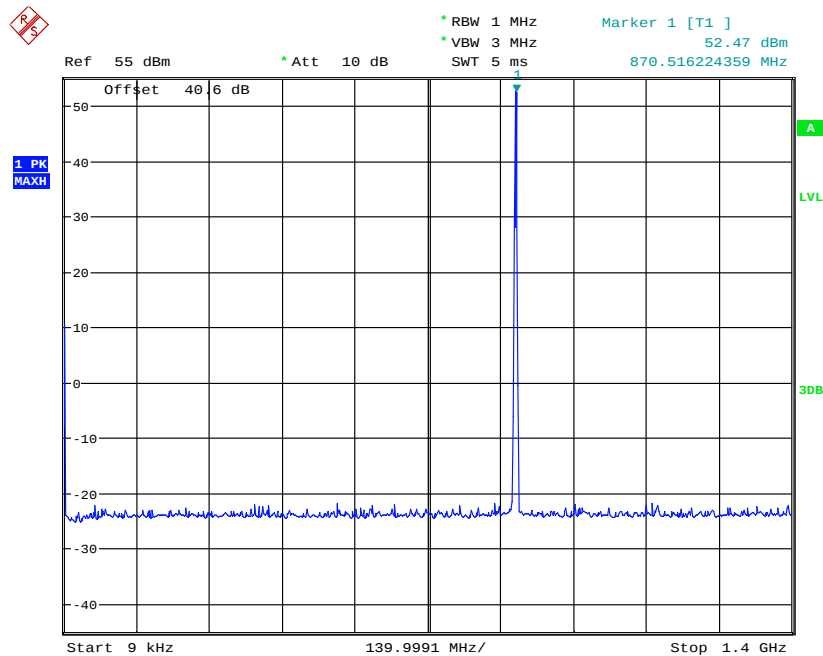
Date: 29.OCT.2014 09:56:33

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



Date: 29.OCT.2014 06:42:09

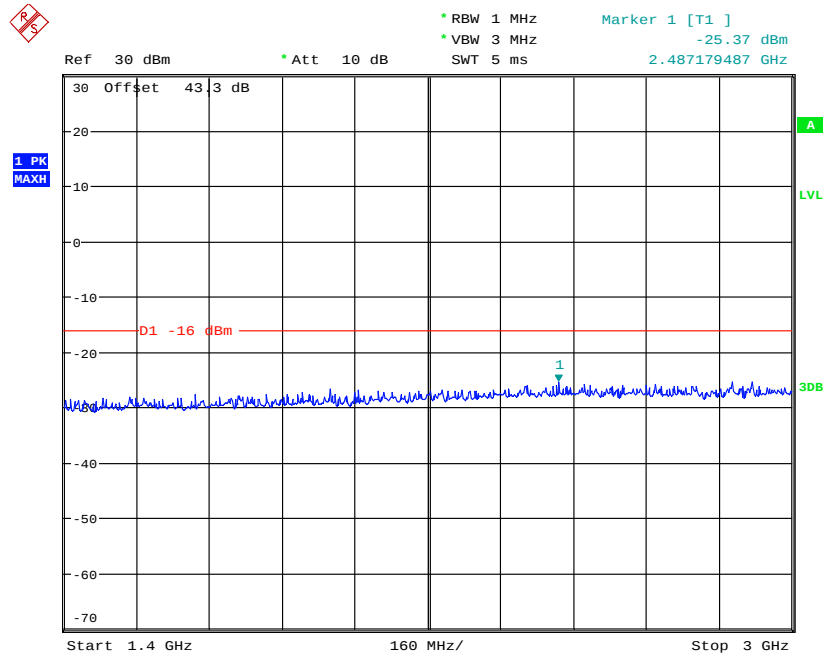
Channel Position T- QPSK / Bandwidth 1.4MHz - 9kHz – 1.4GHz



Date: 29.OCT.2014 04:56:02

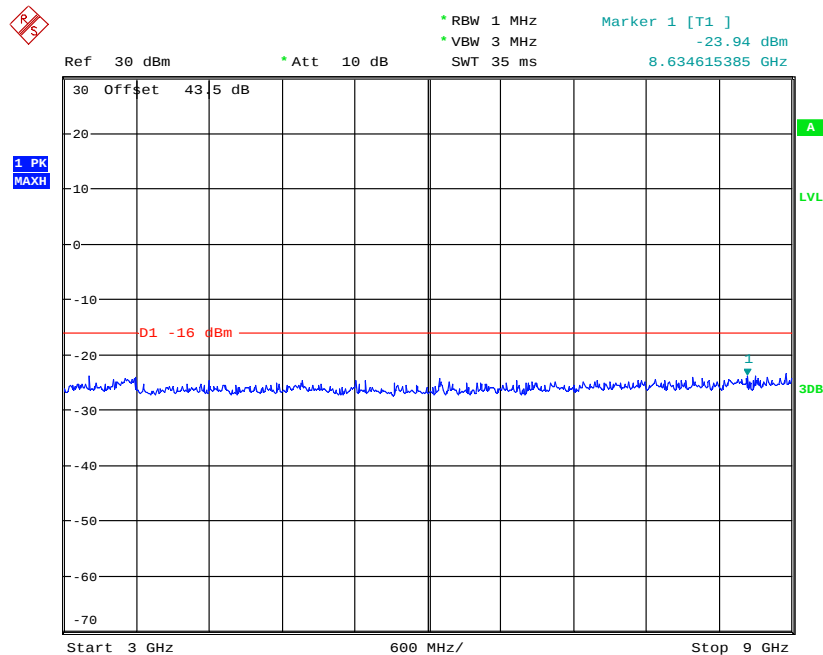
Note: The result of any unwanted emissions outside the operating frequency band should be compared to a limit of -16dBm.

Channel Position T- QPSK / Bandwidth 1.4MHz – 1.4GHz - 3GHz



Date: 29.OCT.2014 09:54:20

Channel Position T - QPSK / Bandwidth 1.4MHz - 3GHz - 9GHz



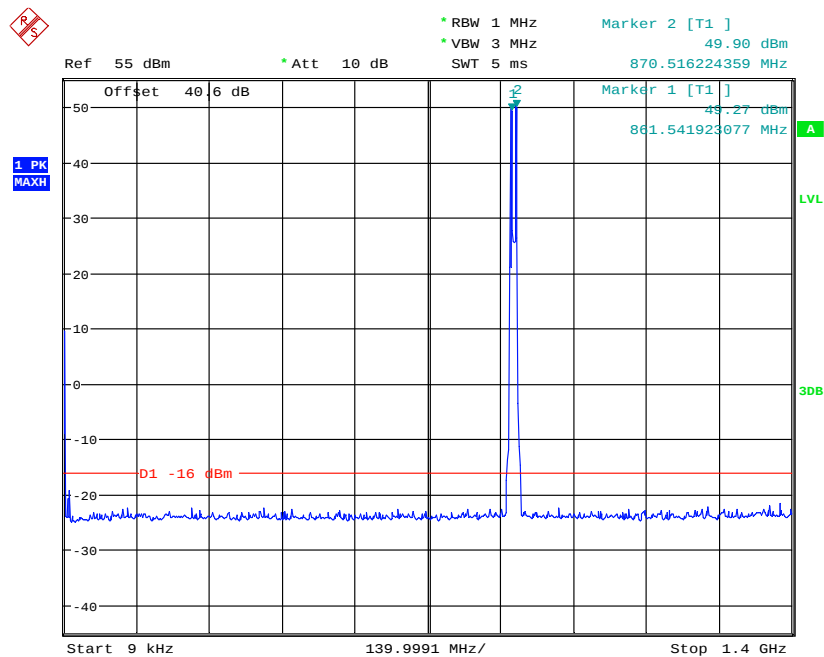
Date: 29.OCT.2014 04:57:16

Configuration L-MIMO-MC (2C)

Maximum Output Power 45.4dBm per port

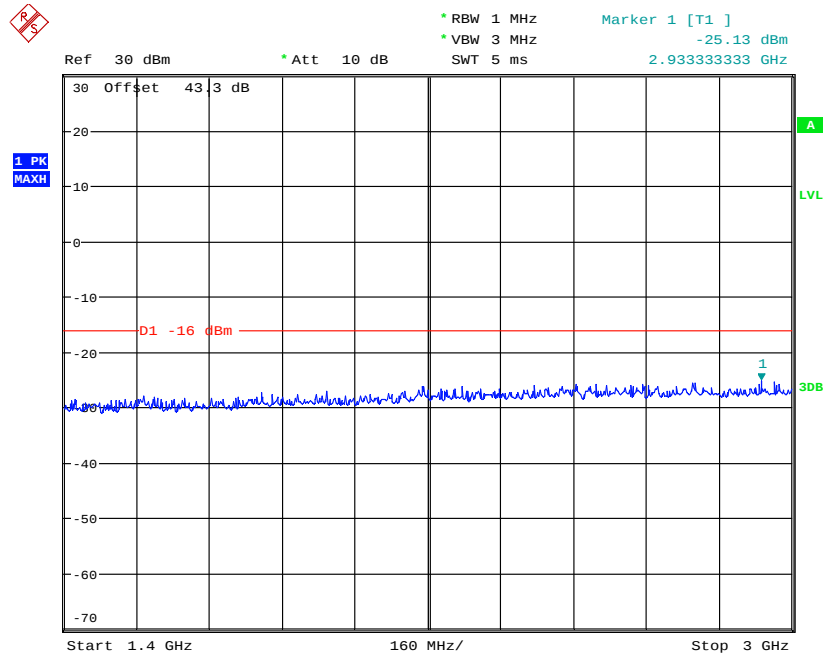
Channel Position	Bandwidth	Channel Frequency
Channel Position M_{RFBW}	1.4MHz	859.7MHz + 868.3MHz

Channel Position M_{RFBW} - QPSK / Bandwidth 1.4MHz - 9kHz – 1.4GHz



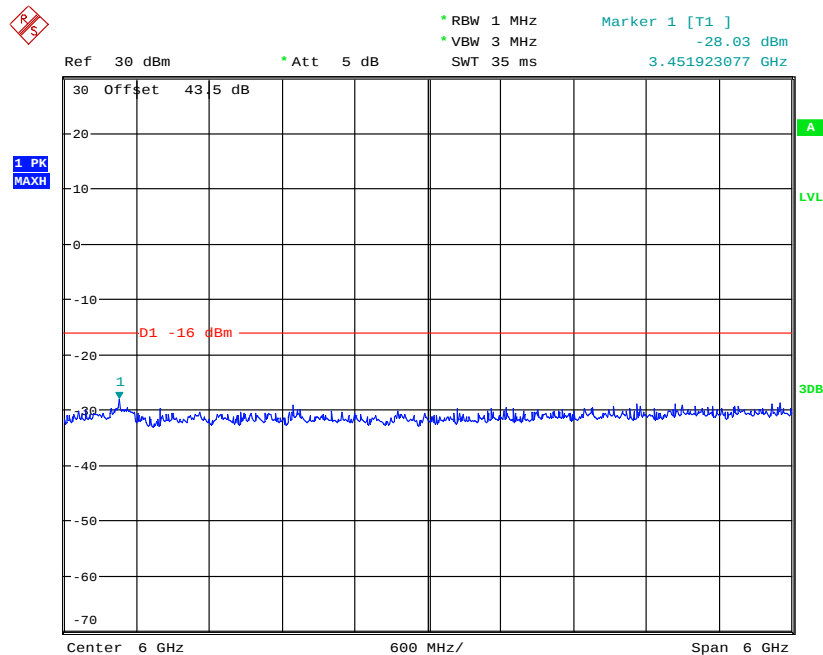
Date: 29.OCT.2014 08:03:46

Channel Position M_{RFBW} - QPSK / Bandwidth 1.4MHz – 1.4GHz - 3GHz



Date: 29.OCT.2014 10:02:09

Channel Position M_{RFBW} - QPSK / Bandwidth 1.4MHz – 3GHz - 9GHz



Date: 29.OCT.2014 08:09:03



Product Service

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.

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 90, Clause 90.213

2.6.2 Equipment Under Test

RRUS 11 B26B, KRC 161 457/1, S/N: CB4V574403

2.6.3 Date of Test and Modification State

30 and 31 October 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	24.5 – 26.5°C
Relative Humidity	22.5 – 24.5%

2.6.6 Test Method

The test was applied in accordance with test method requirements of FCC Part 90

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 middle of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]*: LTE (3.0 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 port, Channel Bandwidth 3MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (864.0MHz)
-48.0	-30°C	-12.16
	-20°C	-12.52
	-10°C	-12.61
	0°C	-13.03
	+10°C	-12.79
	+20°C	-12.34
	+30°C	-11.95
	+40°C	-12.72
	+50°C	-12.83

Frequency Error – Voltage Variation

Configuration L-MIMO-SC

Maximum Output Power 45.4dBm per port, Channel Bandwidth 3MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (864.0MHz)
-40.8	+20°C	-11.98
-48.0		-12.34
-55.2		-11.34

Limit	FCC: ± 1.5 ppm or 1.296kHz
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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 Output Power - Conducted					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Power Meter	Rohde & Schwarz	NRP	101593	12	15-Apr-2015
Power Sensor	Rohde & Schwarz	NRP-Z51	102311	12	15-Apr-2015
Power Sensor	Rohde & Schwarz	NRP-Z51	102309	12	10-Aug-2015
Spectrum Analyser	Rohde & Schwarz	FSQ26	101140	12	23-Apr-2015
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060032	-	O/P MON
Occupied Bandwidth					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	101140	12	23-Apr-2015
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060032	-	O/P MON
Emission Masks					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	101140	12	23-Apr-2015
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060032	-	O/P MON
Conducted Spurious Emission					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	101140	12	23-Apr-2015
Pass Filter	K&L	ULK 904 098/2	17	-	O/P MON
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060032	-	O/P MON

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Load	Shanghai Huaxiang	TF150	06081413	-	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	2007060032	-	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	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	101140	12	23-Apr-2015
40dB Attenuator	Aeroflex / Weinschel	66-40-33	CD4019	-	O/P MON
Load	Shanghai Huaxiang	TF150	11081905	-	O/P MON
Climatic Test Chamber	Weisifuqi	C, 600, -70	54686007660010	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060032	-	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 Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
Frequency stability	30MHz to 3GHz	$<\pm 1 \times 10^{-7}$
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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