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Report On

FCC and IC Testing of the
Ericsson AB (1900 MHz) RBS 6501 B2 KRD 901 102/x* Radio Base
Station In accordance with FCC CFR 47 Part 24 and Industry Canada
RSS-133: Issue 6

See Note* in page 3

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRD901102

IC: 287AB-AS901102

PREPARED BY

Guangdi Dong
Project Engineer

APPROVED BY

Simon Bennett
Authorised Signatory

DATED

08 May 2014

Document 75926231 Report 01 Issue 2

May 2014

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Product Service

SECTION 1

REPORT INFORMATION

1.1 REPORT DETAILS

Manufacturer	Ericsson AB
Address	Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden
Product Name	RBS 6501 B2
Product Number	KRD 901 102/x*
IC Model Number	AS901102x*
Serial Number(s)	CB4S979228 CB4T007169
Software Version	CXP 902 3291 Rev R2B34 for WCDMA CXP 102 051/19 Rev R37AL for LTE
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 24: 2013 Industry Canada RSS-133 Issue 6: 2013
Start of Test	21 March 2014
Finish of Test	23 April 2014
Name of Engineer(s)	Guangdi Dong
Related Document(s)	ANSI C63.4-2009 ANSI/TIA/EIA-603-C-2004 FCC CFR 47 Part 2: 2013 Industry Canada RSS-GEN Issue 3: 2010

Note*: X can be 1 to 4.

RBS 6501 B2 is available in the following four variants with the listed product numbers and IC Model Numbers. The differences among them are as follows:

Product Number	IC Model Number	Description
KRD 901 102/1	AS9011021	100 - 250 VAC power feed with integrated antenna
KRD 901 102/2	AS9011022	-48 VDC power feed with integrated antenna
KRD 901 102/3	AS9011023	100 - 250 VAC power feed without integrated antenna
KRD 901 102/4	AS9011024	-48 VDC power feed without integrated antenna

This report has been up issued to Issue 2 and should be read in place of Issue 1. The report has been up issued to clarify the Limits listed in Section 2.7.7.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2, Part 24 and RSS-133 is shown below.

Section	Spec Clause			Test Description	Result
	Part 2	Part 24	RSS 133		
2.1	2.1046	24.232(a) 24.232(d)	6.4	Maximum Peak Output Power and Peak to Average Ratio – Conducted	Pass
2.2	-	24.232(a)	6.4	Maximum Peak Output Power – Radiated	Pass
2.3	2.1049(h)	24.238(b)	RSS-Gen 4.6.1	Occupied Bandwidth	Pass
2.4	2.1051	24.238(b)	6.5.1	Spurious Emissions at Band Edge	Pass
2.5	2.1053	24.238(a)	6.5.1	Radiated Spurious Emissions	Pass
2.6	2.1051	24.238(a)	6.5.1	Conducted Spurious Emissions	Pass
2.7	2.1055	24.235	6.3	Frequency Stability	Pass
-	-	-	6.6	Receiver Spurious Emissions	N/A

N/A – Not Applicable

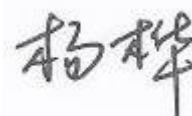
1.3 CONFIGURATION DESCRIPTION

Configuration Code	Carrier(s)	Configuration Description
W-SC	1C	WCDMA Single Antenna, Single Carrier
W-MC 1	2C	WCDMA Single Antenna, Multi Carrier x2
W-MC 2	4C	WCDMA Single Antenna, Multi Carrier x4
W-MIMO-SC	1C	WCDMA MIMO, Single Carrier
W-MIMO-MC 1	2C	WCDMA MIMO, Multi Carrier x2
W-MIMO-MC 2	4C	WCDMA MIMO, Multi Carrier x4
L-MIMO-SC	1C	LTE MIMO, Single Carrier
L-MIMO-MC 1	2C	LTE MIMO, Multi Carrier x2

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Base Station
MANUFACTURER	Ericsson AB
PRODUCT NAME	RBS 6501 B2
PRODUCT NUMBER	KRD 901 102/1 KRD 901 102/2 KRD 901 102/3 KRD 901 102/4
IC MODLE NUMBER	AS9011021 AS9011022 AS9011023 AS9011024
TRANSMITTER OPERATING RANGE	TX: 1930MHz - 1990MHz RX: 1850MHz - 1910MHz
MODULATIONS	WCDMA: QPSK, 16QAM, 64QAM LTE: QPSK, 16QAM, 64QAM
INTERMEDIATE FREQUENCIES	-
ITU DESIGNATION OF EMISSION	WCDMA: 5M00F9W LTE: 1M40F9W, 3M00F9W, 5M00F9W, 10M0F9W, 15M0F9W, 20M0F9W
SUPPORTED CHANNEL BANDWIDTH CONFIGURATION	WCDMA: 4.2 to 5MHz (configurable in steps of 100/200kHz) LTE: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz and 20MHz
OUTPUT POWER (RMS) (W or dBm)	Single Antenna: 37dBm (5W) MIMO: 2 x 37dBm (2 x 5W)
ANTENNA GAIN	Internal antenna KRE 101 2141/1: >5dBi Semi-integrated Omni antenna KRE 101 2233/1: 2dBi
NUMBER OF CARRIERS	Maximum 2 carriers for LTE Maximum 4 carriers for WCDMA
INSTANTANEOUS BANDWIDTH	25MHz
FCC ID	TA8AKRD901102
IC ID	287AB-AS901102
AC POWER SOURCE	100-250 V AC
DC POWER SOURCE	-48V DC
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is a WCDMA and LTE Radio Base Station

Signature



Date

23 April 2014

D of B S Serial No

75926231/01

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) RBS 6501 B2 KRD 901 102/x is an Ericsson Radio Base Station working in the public mobile service 1800MHz/1900MHz band which provides communication connections to 1800MHz/1900MHz network in WCDMA/LTE Modes. The RBS 6501 B2 Radio Base Station supports 100 - 250 VAC and -48 VDC power supply.

The RBS 6501 B2 KRD 901 102/x Radio Base Station is likely to use an integrated wide Sector antenna or Semi-integrated Omni antenna.

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

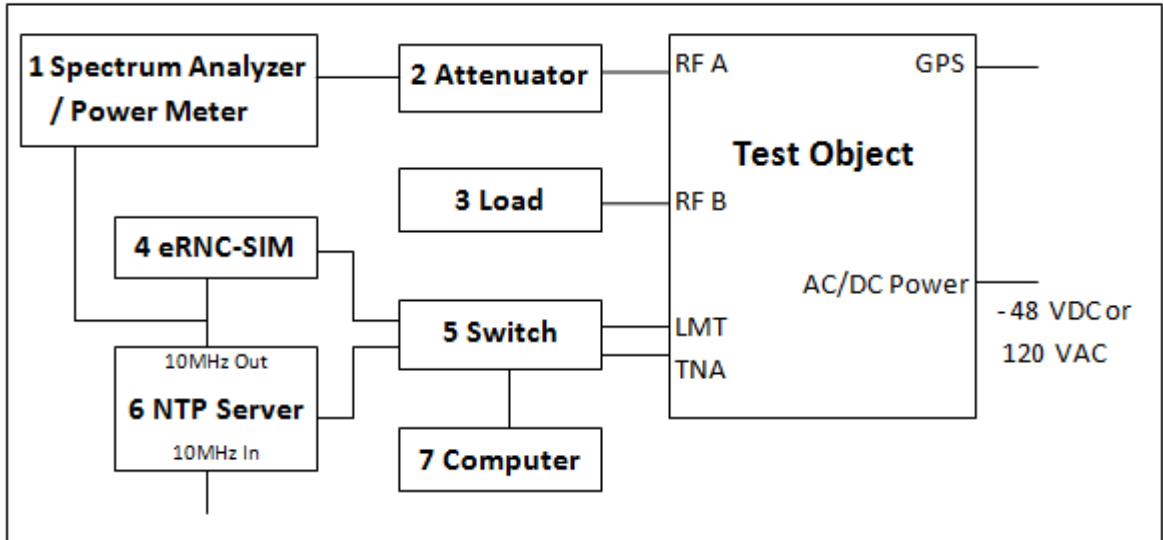


Equipment Under Test

1.6 TEST SETUP

Test Setup, Conducted Measurement:

WCDMA Configuration setup:

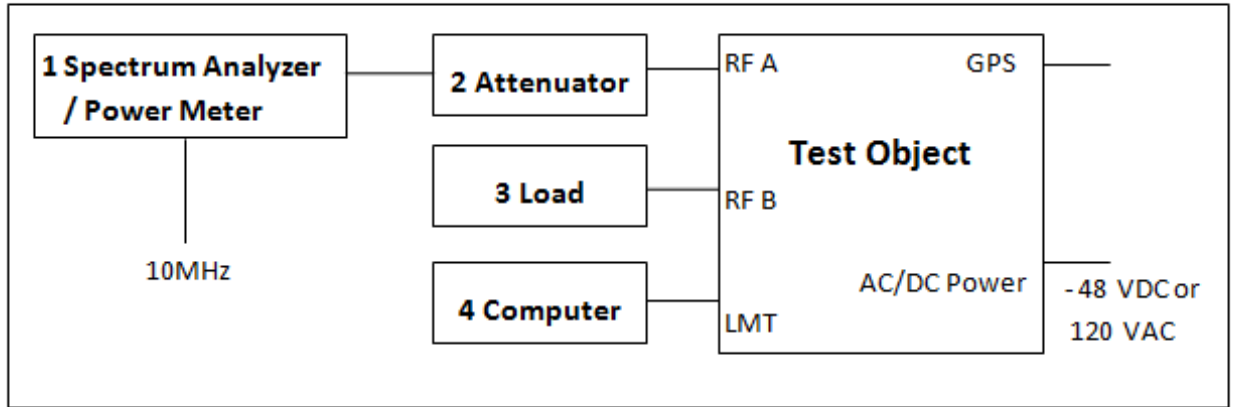


Product Name	Product Number	Version	Serial Number
RBS 6501 B2	KRD 901 102/2	R1A	CB4S979228
RBS 6501 B2	KRD 901 102/3	R1A	CB4T007169

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Spectrum Analyzer	FSQ26	--	100253
	Power Meter	NRP	--	101593
	Power Sensor	NRP-Z51	--	102309
2	Attenuator	48-40-43-LIM	--	BR5020
3	Load	TFE100	--	09121647
4	eRNC-SIM	LPA 108 214	--	ETD/L171
5	Switch	1000 Base-X	--	ETE/L593
6	NTP Server	SyncServer S250	--	ETE/L581
7	Computer	Advantech-610H	--	ETD/L913

Test Setup, Conducted Measurement:

LTE Configuration setup:

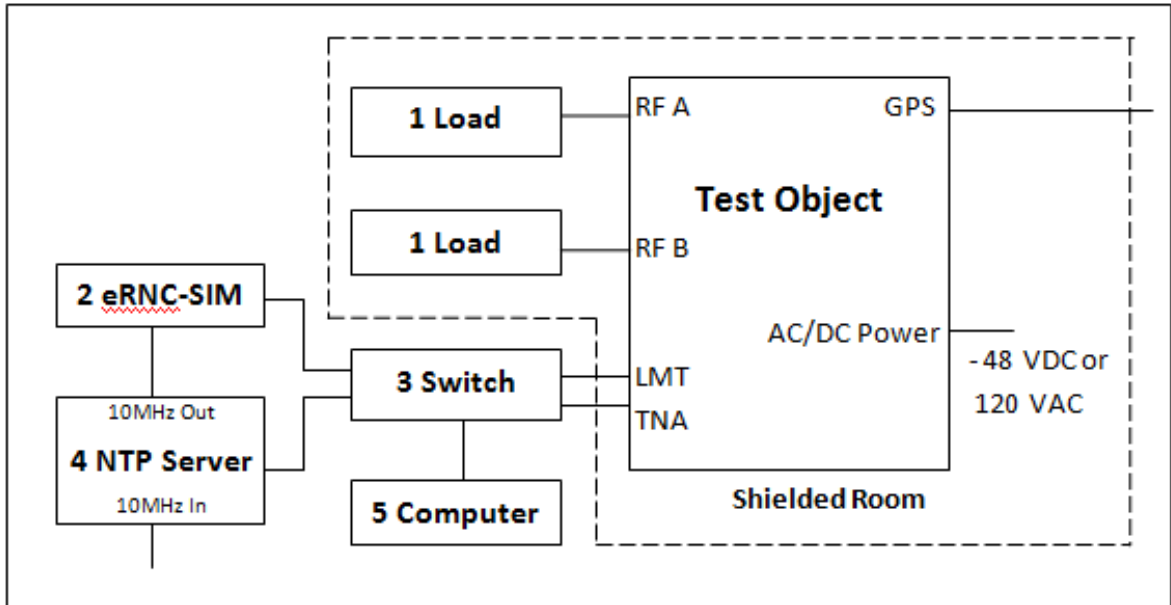


Product Name	Product Number	Version	Serial Number
RBS 6501 B2	KRD 901 102/2	R1A	CB4S979228
RBS 6501 B2	KRD 901 102/3	R1A	CB4T007169

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Spectrum Analyzer	FSQ26	--	100253
	Power Meter	NRP	--	101593
	Power Sensor	NRP-Z51	--	102309
2	Attenuator	48-40-43-LIM	--	BR5020
3	Load	TFE100	--	09121647
4	Computer	Advantech-610H	--	ETD/L913

Test Setup, Radiated Measurement:

WCDMA Configuration setup:

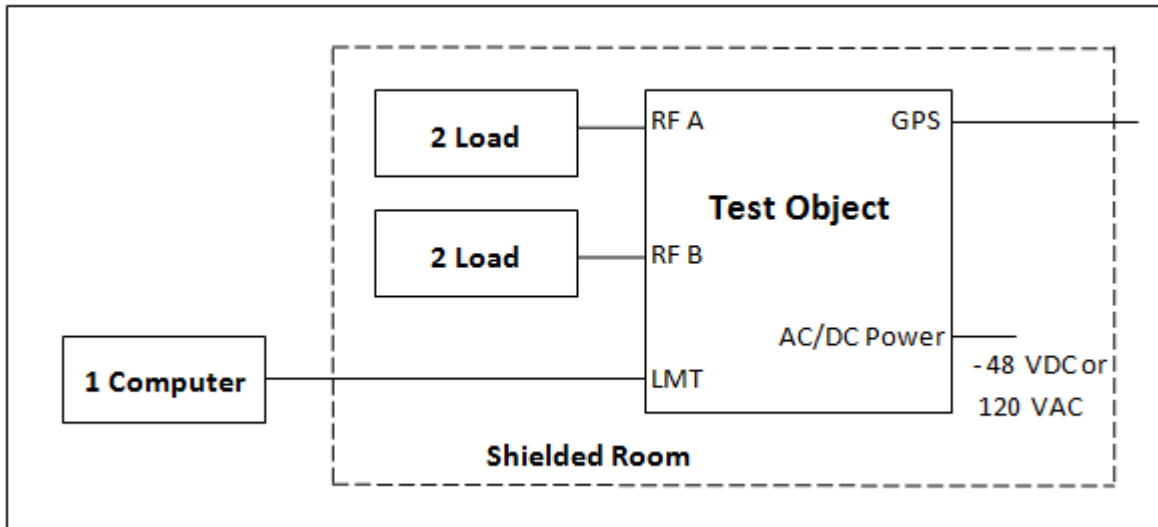


Product Name	Product Number	Version	Serial Number
RBS 6501 B2	KRD 901 102/2	R1A	CB4S979228
RBS 6501 B2	KRD 901 102/3	R1A	CB4T007169

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Load	TFE100	--	09121647
	Load	TFZ10-3R	--	20100908079
2	eRNC-SIM	LPA 108 214	--	ETD/L171
3	Switch	1000 Base-X	--	ETE/L593
4	NTP Server	SyncServer S250	--	ETE/L581
5	Computer	Advantech-610H	--	ETD/L913

Test Setup, Radiated Measurement:

Configuration setup:



Product Name	Product Number	Version	Serial Number
RBS 6501 B2	KRD 901 102/2	R1A	CB4S979228
RBS 6501 B2	KRD 901 102/3	R1A	CB4T007169

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	Advantech-610H	--	ETD/L913
2	Load	TFE100	--	09121647
	Load	TFZ10-3R	--	20100908079

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.

All test cases were tested with the EUT supplied with -48V DC by an external power supply. Frequency stability measurements were tested using both -48V DC and 120V AC.

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

Radiated Spurious Emissions and Maximum Peak Output Power-Radiated testing have been performed under the following site registrations:

FCC Accreditation 910917:

The State Radio Monitoring Centre, No.80 Beilishi Road, Xicheng District, Beijing, China.

Industry Canada Accreditation 7308A-1:

The State Radio Monitoring Centre, No.80 Beilishi Road, Xicheng District, Beijing, 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 24, Clause 24.232 (a)(d)
Industry Canada RSS-133, Clause 6.4

2.1.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.1.3 Date of Test and Modification State

21 to 25 March 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	22.6 - 23.8°C
Relative Humidity	24.0 - 25.5%

2.1.6 Test Method

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. Using a power meter and attenuator(s), the output power of the EUT was measured at the antenna terminal. A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF), measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in given bandwidth. A resolution bandwidth of 50MHz was used. The Average Power and Peak to Average Ratio was measured and recorded with the results being compared with the limits. In the case of MIMO devices, the power was measured from each antenna port and the results summed in accordance with FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

2.1.7 Test Results

Configuration W-SC (1C)

Maximum Output Power 37.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz		Channel Position M 1960.0MHz		Channel Position T 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 5.0 MHz	36.95	6.93	37.06	6.81	36.88	6.85
B		-	-	-	-	-	-
Total		36.95	-	37.06	-	36.88	-

Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz		Channel Position M 1960.0MHz		Channel Position T 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	37.01	6.77	37.18	6.66	36.95	6.66
B		36.64	6.87	36.75	6.84	36.70	6.89
Total		39.84	-	39.98	-	39.84	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz		Channel Position M 1960.0MHz		Channel Position T 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 5.0 MHz	36.84	6.96	36.99	6.80	36.79	6.84
B		36.46	7.12	36.56	6.98	36.51	7.01
Total		39.66	-	39.79	-	39.66	-

Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1952.6 MHz		Channel Position M 1950.0MHz + 1970.0 MHz		Channel Position T 1967.4MHz + 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	37.03	-	37.00	-	37.01	-
B		36.62	-	36.92	-	36.89	-
Total		39.84	-	39.97	-	-	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1952.6 MHz		Channel Position M 1950.0MHz + 1970.0 MHz		Channel Position T 1967.4MHz + 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 5.0 MHz	36.72	-	36.81	-	36.91	-
B		36.55	-	36.71	-	36.80	-
Total		39.65	-	39.77	-	39.87	-

Configuration W-MIMO-MC 2 (4C)

Maximum Output Power 31.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1937.4 MHz + 1947.6 MHz + 1952.6 MHz		Channel Position M 1950.0MHz + 1955.0 MHz + 1965.0 MHz + 1970.0 MHz		Channel Position T 1967.4MHz + 1972.4 MHz + 1982.6 MHz + 1987.6 MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 5.0 MHz	36.98	-	36.98	-	36.98	-
B		36.88	-	36.93	-	36.89	-
Total		39.97	-	39.97	-	39.95	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1937.4 MHz + 1947.6 MHz + 1952.6 MHz		Channel Position M 1950.0MHz + 1955.0 MHz + 1965.0 MHz + 1970.0 MHz		Channel Position T 1967.4MHz + 1972.4 MHz + 1982.6 MHz + 1987.6 MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 5.0 MHz	36.50	-	36.24	-	36.23	-
B		36.39	-	36.16	-	36.12	-
Total		39.46	-	39.21	-	39.19	-

Configuration L-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1930.7MHz		Channel Position M 1960.0MHz		Channel Position T 1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 1.4 MHz	36.41	6.97	36.95	7.10	36.70	7.00
B		36.38	7.18	36.90	7.17	36.68	7.08
Total		39.41	-	39.94	-	39.70	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1931.5MHz		Channel Position M 1960.0MHz		Channel Position T 1988.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 3.0 MHz	36.65	6.92	37.06	6.80	36.79	6.85
B		36.52	6.88	36.98	6.79	36.80	6.83
Total		39.60	-	40.03	-	39.81	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.5MHz		Channel Position M 1960.0MHz		Channel Position T 1987.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 5.0 MHz	36.83	7.07	37.07	6.86	36.84	6.85
B		36.62	7.11	36.99	6.82	36.82	6.86
Total		39.74	-	40.04	-	39.84	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1935.0MHz		Channel Position M 1960.0MHz		Channel Position T 1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 10.0 MHz	36.99	7.25	37.07	6.84	36.93	6.95
B		36.87	7.28	36.97	6.87	36.87	6.95
Total		39.94	-	40.03	-	39.91	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1937.5MHz		Channel Position M 1960.0MHz		Channel Position T 1982.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 15.0 MHz	37.01	7.59	37.03	6.96	36.90	7.05
B		36.89	7.53	36.93	6.90	36.87	6.99
Total		39.96	-	39.99	-	39.90	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1940.0MHz		Channel Position M 1960.0MHz		Channel Position T 1980.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 20.0 MHz	37.02	7.83	37.05	6.95	36.90	7.08
B		36.89	7.89	36.89	6.91	36.86	7.02
Total		39.97	-	39.98	-	39.89	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1930.7MHz		Channel Position M 1960.0MHz		Channel Position T 1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 1.4 MHz	36.42	7.07	36.98	7.04	36.71	6.99
B		36.37	7.06	36.91	6.95	36.72	6.90
Total		39.41	-	39.96	-	39.73	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1940.0MHz		Channel Position M 1960.0MHz		Channel Position T 1980.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 20.0 MHz	36.99	7.90	37.03	6.93	36.89	7.20
B		36.87	7.80	36.88	6.96	36.83	7.09
Total		39.94	-	39.97	-	39.87	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1930.7MHz		Channel Position M 1960.0MHz		Channel Position T 1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 1.4 MHz	36.37	7.07	36.94	7.06	36.68	6.99
B		36.36	7.18	36.90	7.00	36.71	6.95
Total		39.38	-	39.93	-	39.71	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1940.0MHz		Channel Position M 1960.0MHz		Channel Position T 1980.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 20.0 MHz	37.01	7.86	37.05	6.93	36.90	7.10
B		36.90	7.91	36.90	6.96	36.86	7.03
Total		39.97	-	39.99	-	39.89	-

Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1930.7MHz +1954.3MHz		Channel Position M _{RFBW} 1948.2MHz+1971.8MHz		Channel Position T _{RFBW} 1965.7MHz+1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 1.4 MHz	36.58	-	36.89	-	36.79	-
B		36.48	-	36.76	-	36.64	-
Total		39.54	-	39.84	-	39.73	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1931.5MHz +1953.5MHz		Channel Position M _{RFBW} 1949.0MHz+1971.0MHz		Channel Position T _{RFBW} 1966.5MHz+1988.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 3.0 MHz	36.72	-	36.96	-	36.87	-
B		36.59	-	36.83	-	36.73	-
Total		39.67	-	39.79	-	39.81	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1932.5MHz +1952.5MHz		Channel Position M _{RFBW} 1950.0MHz+1970.0MHz		Channel Position T _{RFBW} 1967.5MHz+1987.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 5.0 MHz	36.82	-	37.01	-	36.90	-
B		36.64	-	36.83	-	36.75	-
Total		39.74	-	39.93	-	39.84	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1935.0MHz +1950.0MHz		Channel Position M _{RFBW} 1952.5MHz+1967.5MHz		Channel Position T _{RFBW} 1970.0MHz+1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	QPSK / 10.0 MHz	36.94	-	37.05	-	36.92	-
B		36.80	-	36.85	-	36.82	-
Total		39.88	-	39.96	-	39.88	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1930.7MHz +1954.3MHz		Channel Position M _{RFBW} 1948.2MHz+1971.8MHz		Channel Position T _{RFBW} 1965.7MHz+1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 1.4 MHz	36.59	-	36.89	-	36.79	-
B		36.49	-	36.78	-	36.66	-
Total		39.55	-	39.85	-	39.74	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1935.0MHz +1950.0MHz		Channel Position M _{RFBW} 1952.5MHz+1967.5MHz		Channel Position T _{RFBW} 1970.0MHz+1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	16QAM / 10.0 MHz	36.91	-	37.01	-	36.88	-
B		36.76	-	36.82	-	36.77	-
Total		39.85	-	39.93	-	39.84	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1930.7MHz +1954.3MHz		Channel Position M _{RFBW} 1948.2MHz+1971.8MHz		Channel Position T _{RFBW} 1965.7MHz+1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 1.4 MHz	36.55	-	36.86	-	36.76	-
B		36.47	-	36.74	-	36.62	-
Total		39.52	-	39.81	-	39.70	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Average Output Power / Peak to Average Ratio (PAR)					
		Channel Position B _{RFBW} 1935.0MHz +1950.0MHz		Channel Position M _{RFBW} 1955.0MHz+1970.0MHz		Channel Position T _{RFBW} 1975.0MHz+1990.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	64QAM / 10.0 MHz	36.94	-	37.04	-	36.92	-
B		36.79	-	36.85	-	36.80	-
Total		39.88	-	39.96	-	39.87	-

Limit	
Peak Power	FCC/IC: ≤ 1640 W (e.i.r.p)/ MHz or 65.15 dBW/MHz IC: ≤100W or ≤ 50 dBm
Peak to Average Ratio	13 dB

2.2 MAXIMUM PEAK OUTPUT POWER - RADIATED

2.2.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.232 (a)
Industry Canada RSS-133, Clause 6.4

2.2.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.2.3 Date of Test and Modification State

11 and 15 April 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 - 22.8°C
Relative Humidity	30.5 - 31.5%

2.2.6 Test Method

The measurements were performed according to ANSI/TIA/EIA-603-C-2004.

The EUT was set to transmit at maximum power and testing was carried out on Bottom, Middle and Top Channels. The test of radiated emission was performed in a semi anechoic chamber. The measurements were performed with both horizontal and vertical polarizations of the antennas. The antenna distance was 3.0 m.

The fundamental was scanned with Peak detector with the antenna height was varied between 1-4 m and the turntable was rotated between 0-360 degrees for maximum response. The carrier power was measured with RMS detector activated with a RBW of 1MHz. The output power was verified with the substitution method. The antenna distance during the measurements was 3.0 m.

2.2.7 Test Results

Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Internal antenna KRE 101 2141/1, upright mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1932.4MHz	31.16/42.58	1.31/18.11

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1960.0MHz	33.53/42.16	2.25/16.44

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1987.6MHz	34.82/41.17	3.03/13.09

Internal antenna KRE 101 2141/1, side mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1932.4MHz	41.08/33.20	12.82/2.09

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1960.0MHz	41.13/34.95	12.97/3.13

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1987.6MHz	41.82/36.21	15.21/4.18

Semi-integrated Omni antenna KRE 101 2233/1, upright mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1932.4MHz	36.66/28.16	4.63/0.65

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1960.0MHz	37.21/26.13	5.26/0.41

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1987.6MHz	36.65/26.81	4.62/0.48

Semi-integrated Omni antenna KRE 101 2233/1, side mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1932.4MHz	38.09/26.18	6.44/0.41

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1960.0MHz	37.22/25.54	5.27/0.36

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 5.0 MHz	1987.6MHz	37.85/26.28	6.09/0.42

Configuration L-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Internal antenna KRE 101 2141/1, upright mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1930.7MHz	40.07/41.62	10.16/14.52

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1960.0MHz	40.80/41.74	12.02/14.93

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1989.3MHz	41.48/42.40	14.06/17.38
QPSK / 3.0 MHz	1988.5MHz	39.47/40.80	8.85/12.02
QPSK / 5.0 MHz	1987.5MHz	37.52/38.36	5.65/6.85
QPSK / 10.0 MHz	1985.0MHz	34.48/35.72	2.81/3.73
QPSK / 15.0 MHz	1982.5MHz	32.72/33.18	1.87/2.08
QPSK / 20.0 MHz	1980.0MHz	31.49/32.34	1.41/1.71

Internal antenna KRE 101 2141/1, side mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1930.7MHz	40.39/41.70	10.94/14.79

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1960.0MHz	40.94/42.37	12.42/17.26

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1989.3MHz	41.88/42.47	15.42/17.66

Semi-integrated Omni antenna KRE 101 2233/1, upright mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1930.7MHz	39.66/28.65	9.25/0.73
QPSK / 3.0 MHz	1931.5MHz	37.96/27.06	6.25/0.51
QPSK / 5.0 MHz	1932.5MHz	35.97/24.91	3.95/0.31
QPSK / 10.0 MHz	1935.0MHz	31.71/22.40	1.48/0.17
QPSK / 15.0 MHz	1937.5MHz	29.80/20.75	0.95/0.12
QPSK / 20.0 MHz	1940.0MHz	28.25/19.97	0.67/0.10

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1960.0MHz	39.40/30.20	8.71/1.05

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1989.3MHz	38.50/28.01	7.08/0.63

Semi-integrated Omni antenna KRE 101 2233/1, side mounted

Modulation / Bandwidth Configuration (MHz)	Channel Position B	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1930.7MHz	38.88/29.41	

Modulation / Bandwidth Configuration (MHz)	Channel Position M	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1960.0MHz	38.53/29.37	7.73/0.86

Modulation / Bandwidth Configuration (MHz)	Channel Position T	Vertical/Horizontal RMS power	
		dBm/MHz	W/MHz
QPSK / 1.4 MHz	1989.3MHz	38.39/29.30	6.90/0.85

Limit	
e.i.r.p.	FCC / IC: ≤ 1640 W / MHz

2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
FCC CFR 47 Part 24, Clause 24.238(b)
Industry Canada RSS-GEN, Clause 4.6.1

2.3.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.3.3 Date of Test and Modification State

26 to 28 March 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	23.2 – 24.5°C
Relative Humidity	26.5 – 28.5%

2.3.6 Test Method

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 IC requirement, the 99% Occupied Bandwidth was measured. For FCC requirement, the -26dBc Occupied Bandwidth was measured from each antenna port in accordance with FCC KDB 971168 D01 v02r01.

The results are shown in the plots below.

2.3.7 Test Results

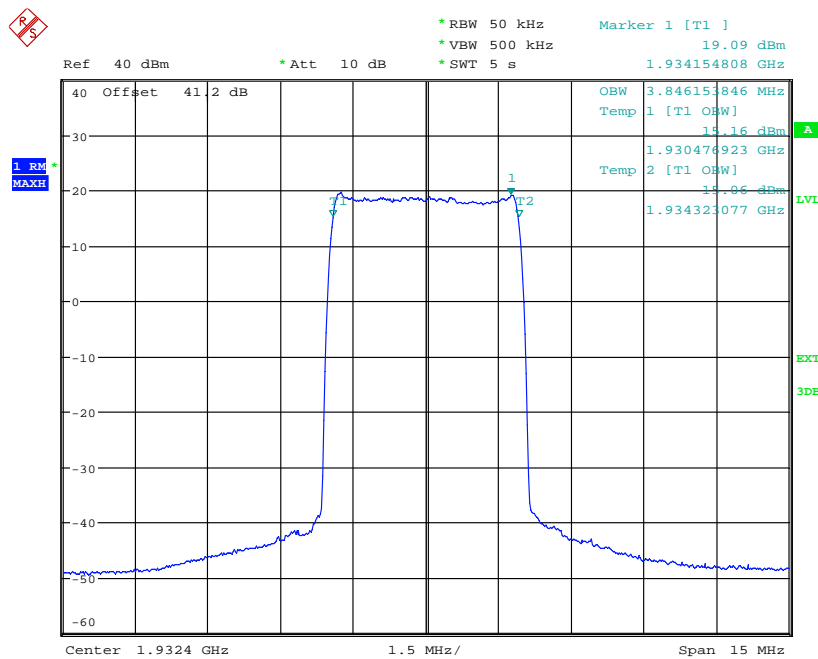
Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

99% Occupied Bandwidth for IC requirement

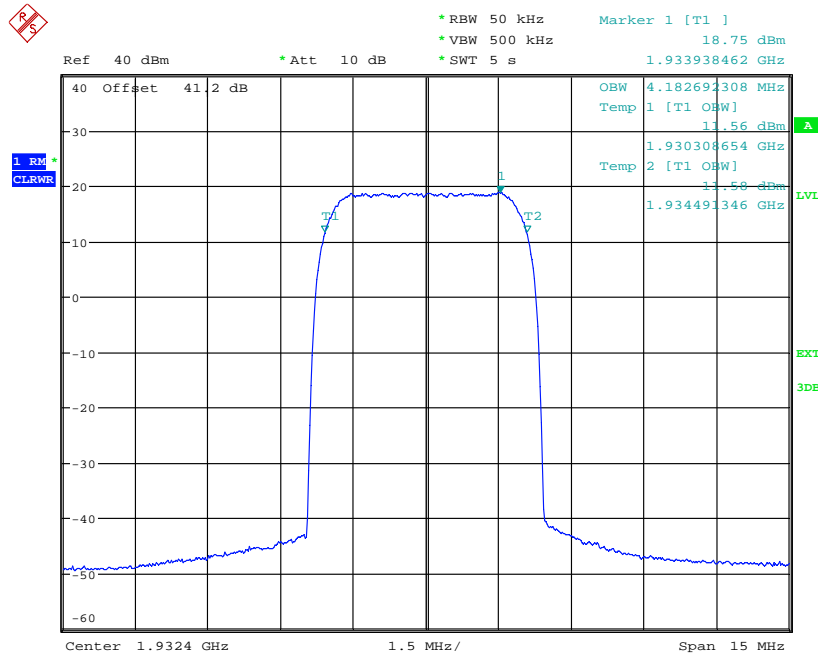
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.4MHz	Channel Position M 1960.0MHz	Channel Position T 1987.6MHz
QPSK / 4.2 MHz	3.85	3.85	3.85
16QAM / 4.2 MHz	-	3.85	-
64QAM / 4.2 MHz	-	3.85	-
QPSK / 5.0 MHz	4.18	4.18	4.18
64QAM / 5.0 MHz	-	4.18	-
16QAM / 5.0 MHz	-	4.18	-

Channel Position B - QPSK / Bandwidth 4.2 MHz



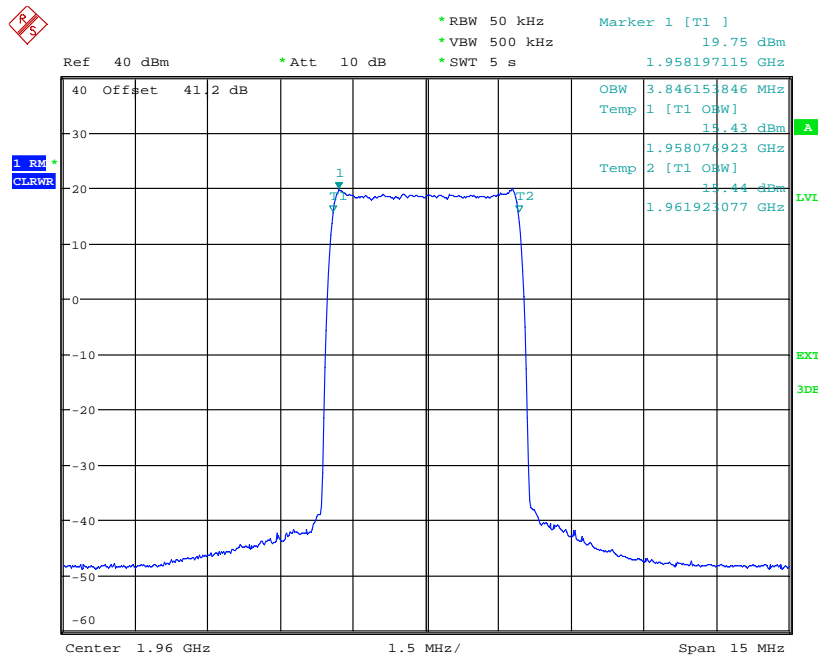
Date: 28.MAR.2014 13:41:26

Channel Position B - QPSK / Bandwidth 5.0 MHz



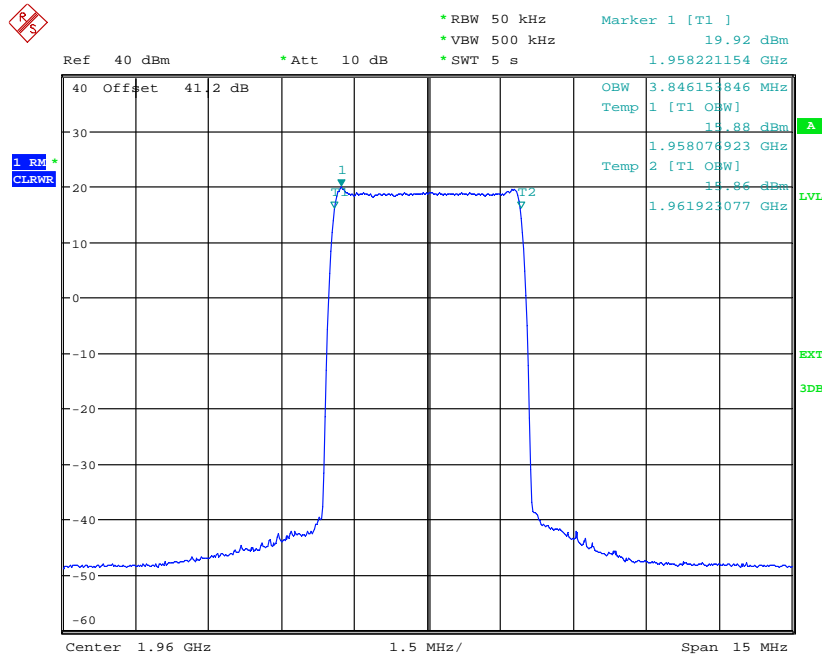
Date: 28.MAR.2014 10:02:21

Channel Position M - QPSK / Bandwidth 4.2 MHz



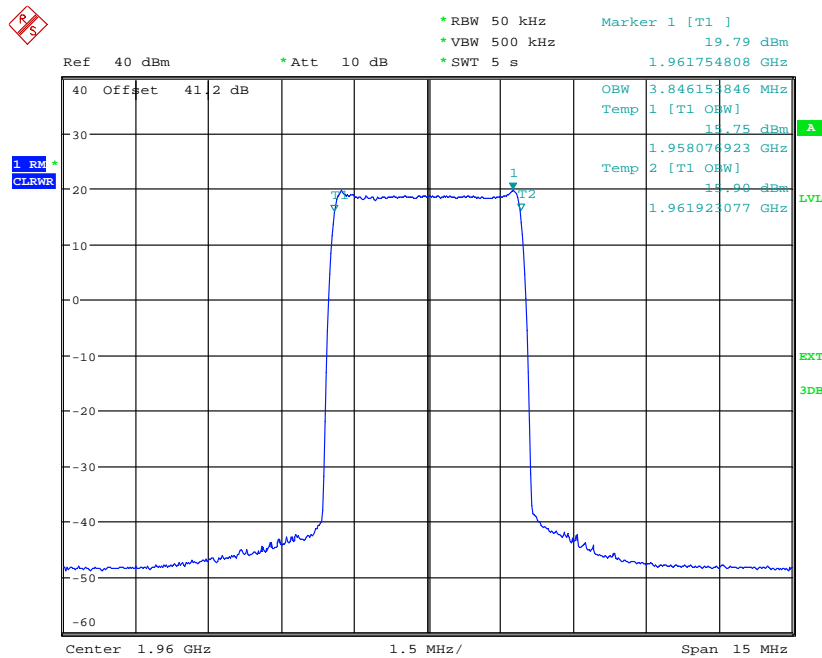
Date: 28.MAR.2014 13:29:47

Channel Position M - 16QAM / Bandwidth 4.2 MHz



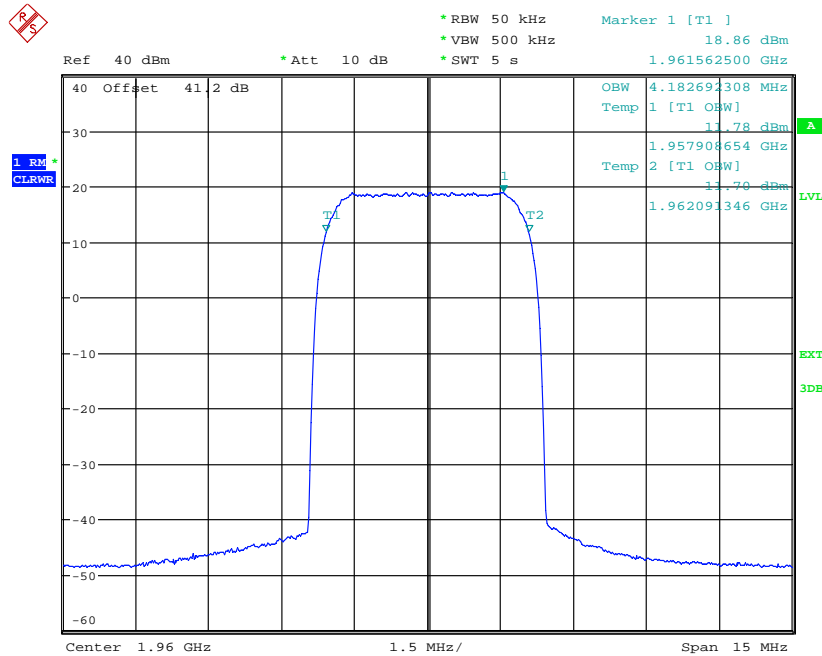
Date: 28.MAR.2014 13:22:22

Channel Position M - 64QAM / Bandwidth 4.2 MHz



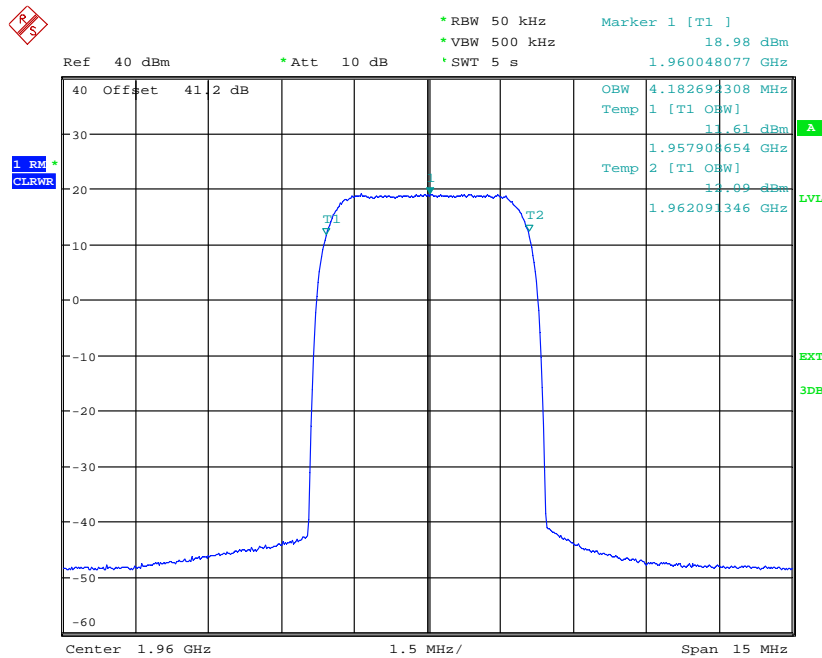
Date: 28.MAR.2014 13:17:55

Channel Position M - QPSK / Bandwidth 5.0 MHz



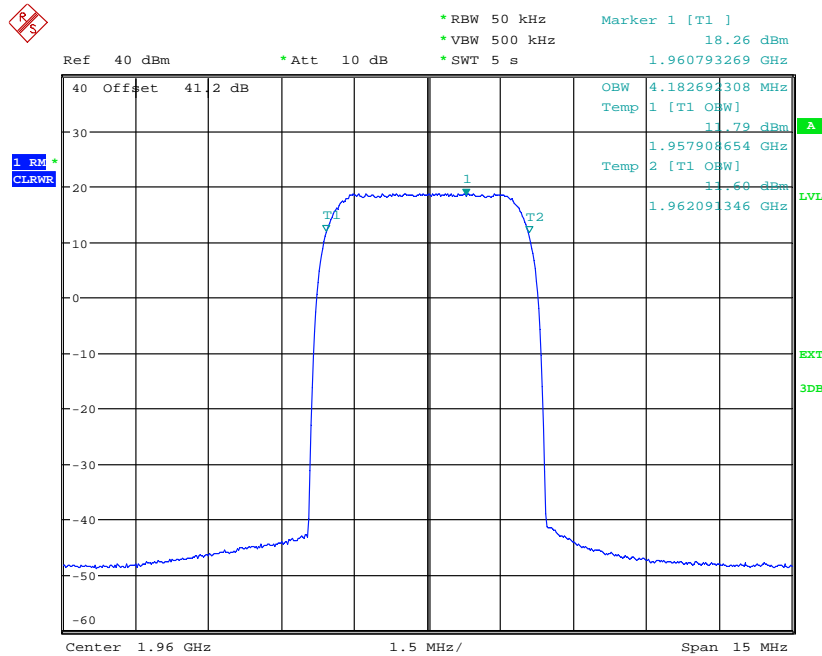
Date: 28.MAR.2014 10:21:12

Channel Position M - 16QAM / Bandwidth 5.0 MHz



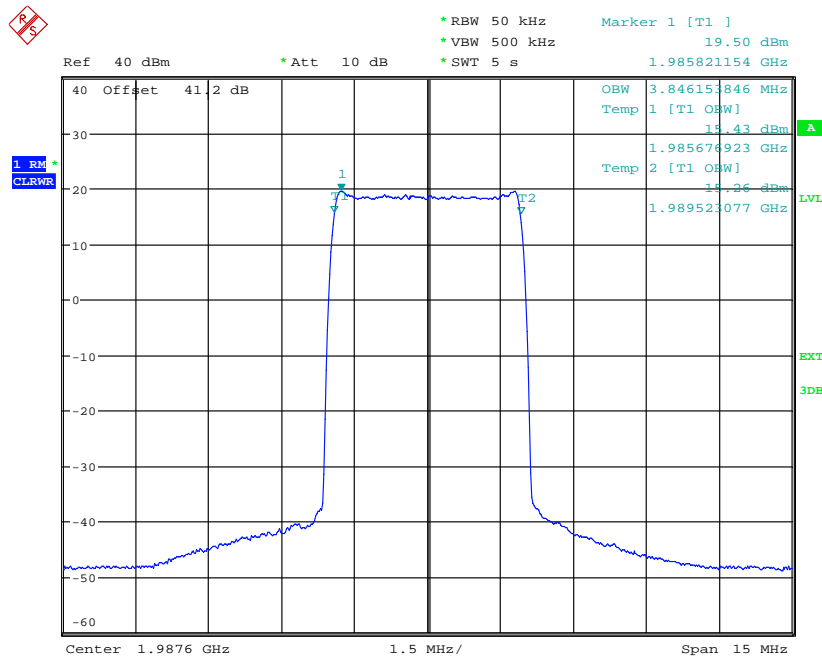
Date: 28.MAR.2014 14:18:47

Channel Position M - 64QAM / Bandwidth 5.0 MHz



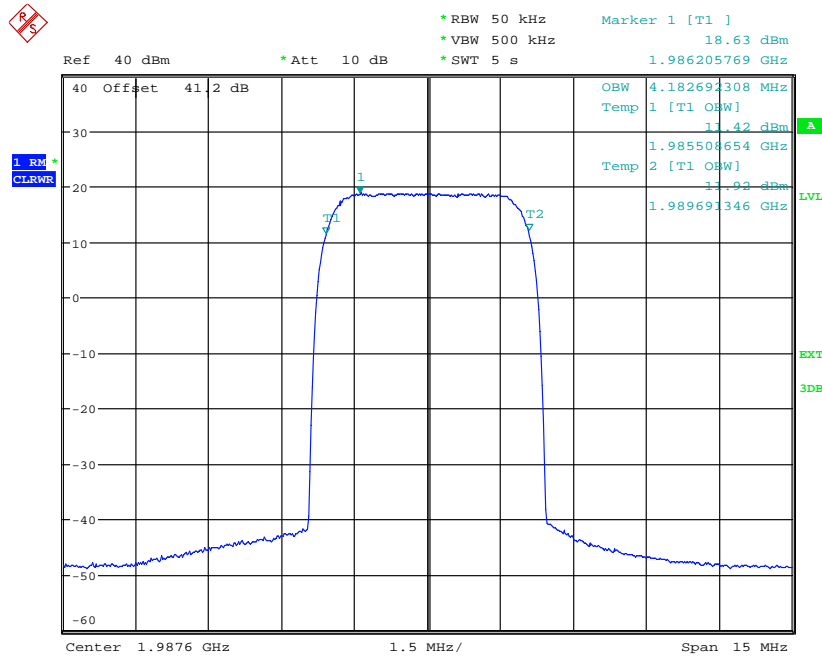
Date: 28.MAR.2014 14:46:54

Channel Position T - QPSK / Bandwidth 4.2 MHz



Date: 28.MAR.2014 11:06:15

Channel Position T - QPSK / Bandwidth 5.0 MHz

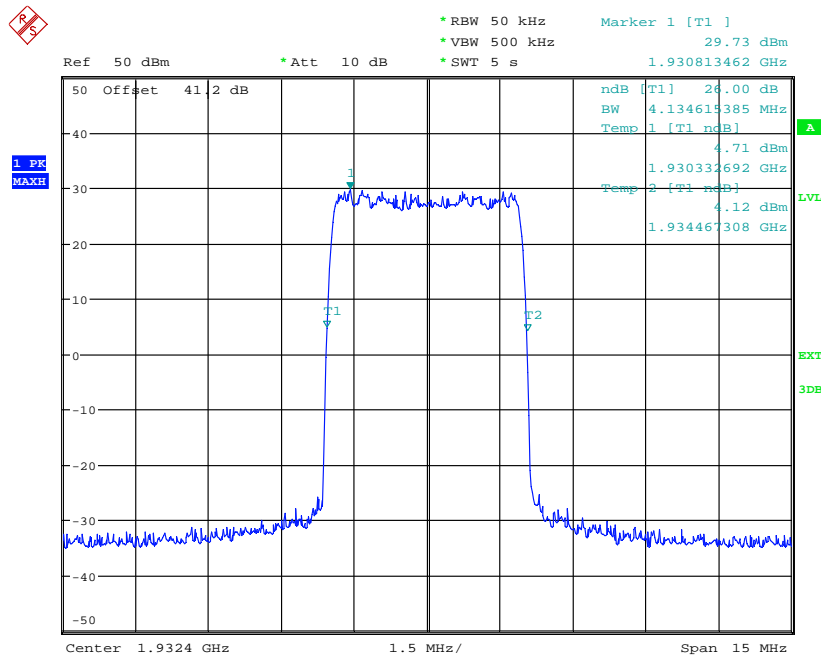


Date: 28.MAR.2014 14:26:59

-26dBc Occupied Bandwidth for FCC requirement

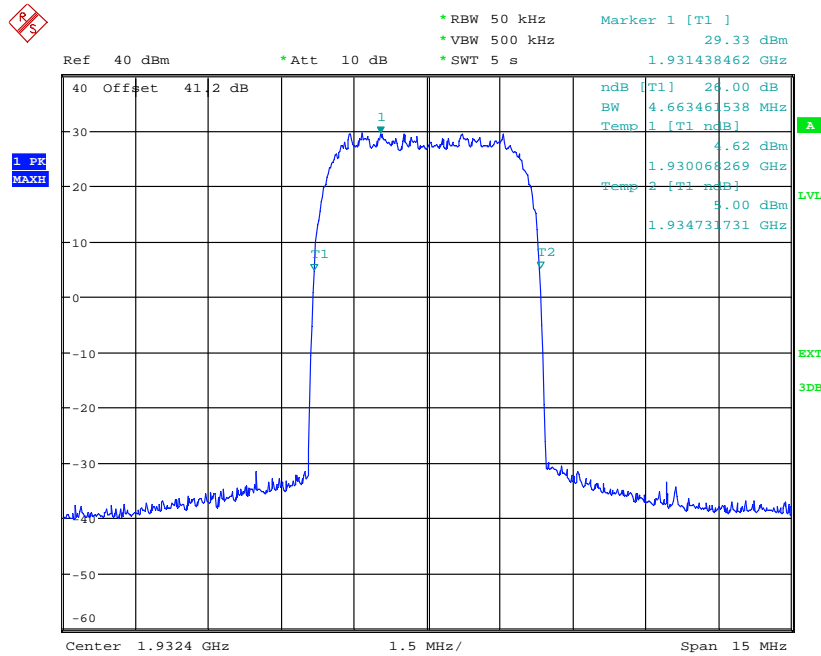
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.4MHz	Channel Position M 1960.0MHz	Channel Position T 1987.6MHz
QPSK / 4.2 MHz	4.13	4.13	4.13
16QAM / 4.2 MHz	-	4.13	-
64QAM / 4.2 MHz	-	4.13	-
16QAM / 5.0 MHz	4.66	4.66	4.66
64QAM / 5.0 MHz	-	4.66	-
QPSK / 5.0 MHz	-	4.66	-

Channel Position B - QPSK / Bandwidth 4.2 MHz



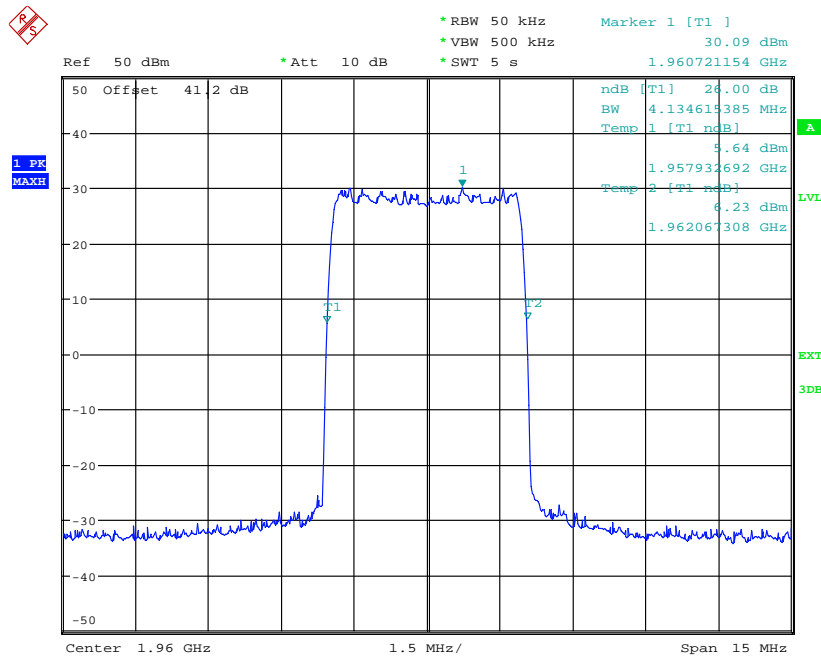
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Channel Position B - QPSK / Bandwidth 5.0 MHz



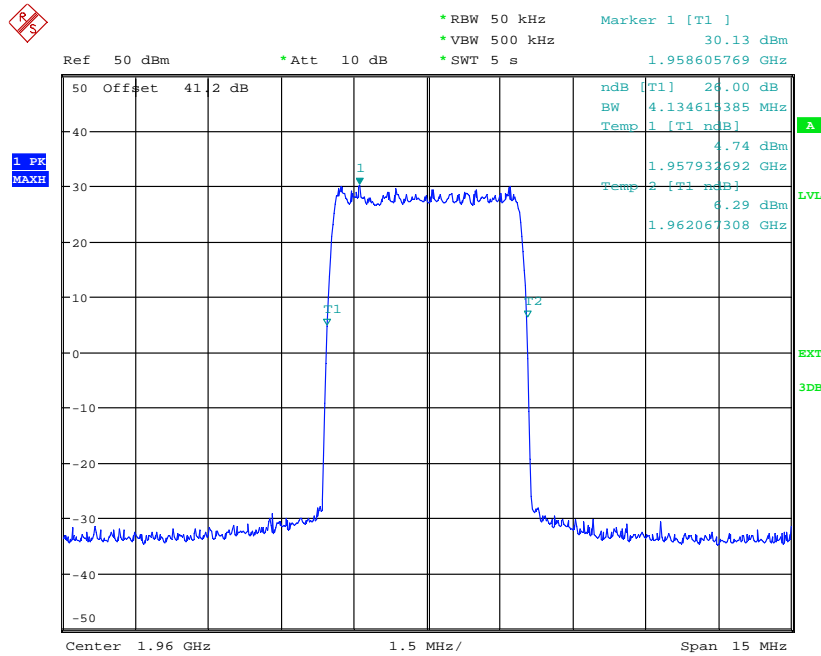
Date: 28.MAR.2014 10:03:43

Channel Position M - QPSK / Bandwidth 4.2 MHz



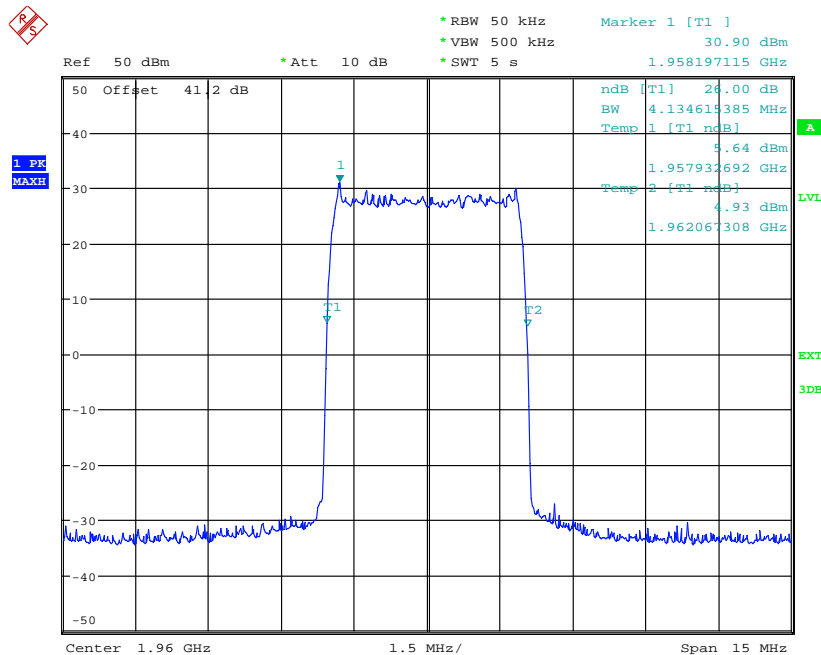
Date: 28.MAR.2014 13:29:11

Channel Position M - 16QAM / Bandwidth 4.2 MHz



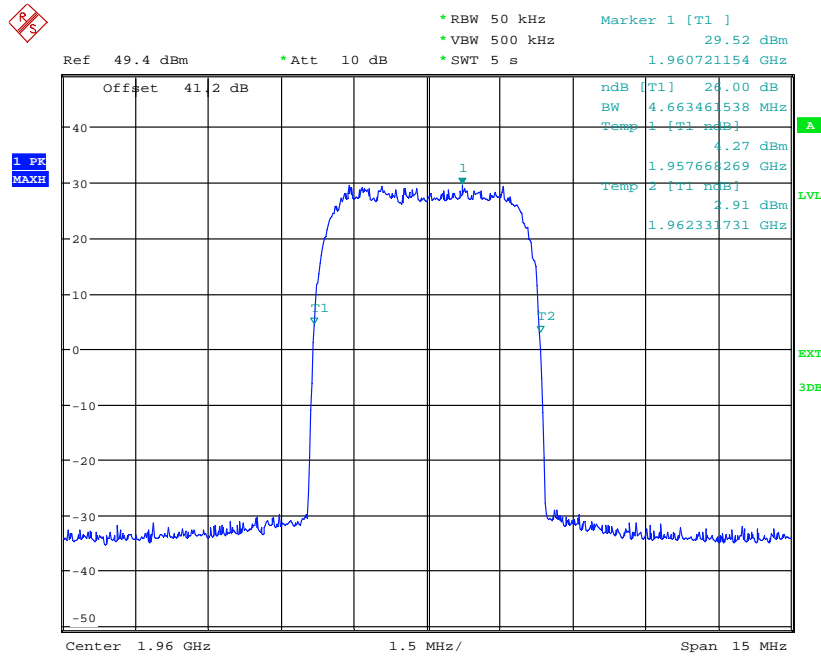
Date: 28.MAR.2014 13:23:00

Channel Position M - 64QAM / Bandwidth 4.2 MHz



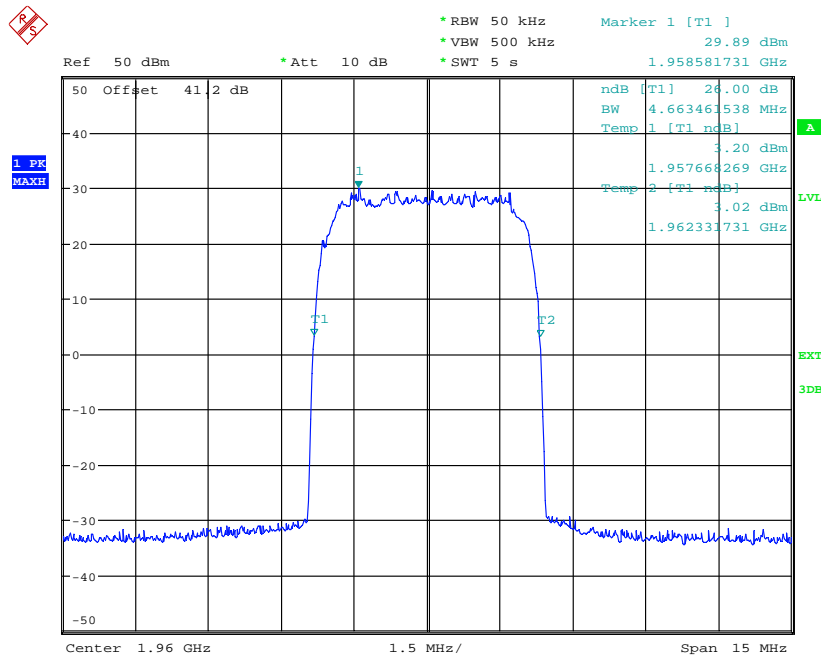
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Channel Position M - QPSK / Bandwidth 5.0 MHz



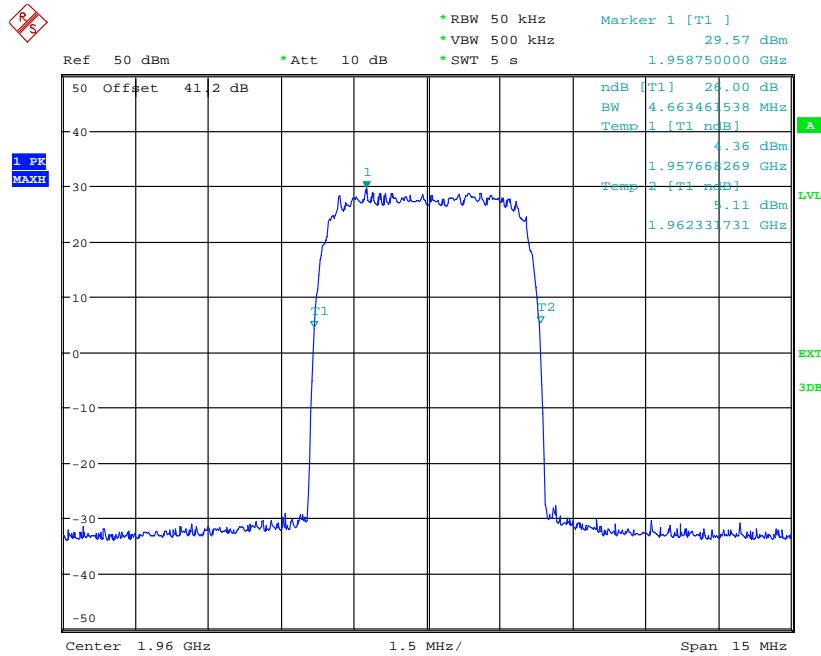
Date: 28.MAR.2014 10:20:32

Channel Position M - 16QAM / Bandwidth 5.0 MHz



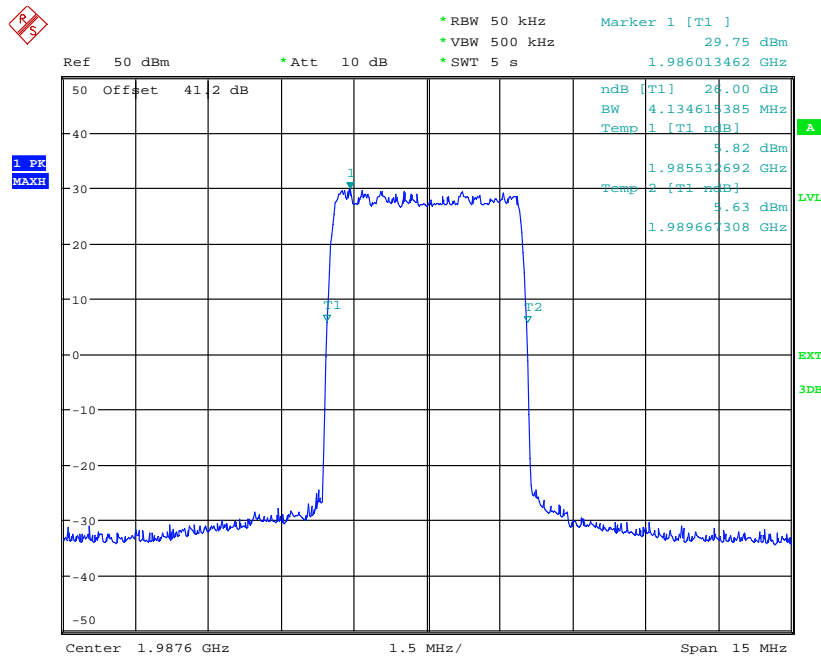
Date: 28.MAR.2014 14:19:53

Channel Position M - 64QAM / Bandwidth 5.0 MHz



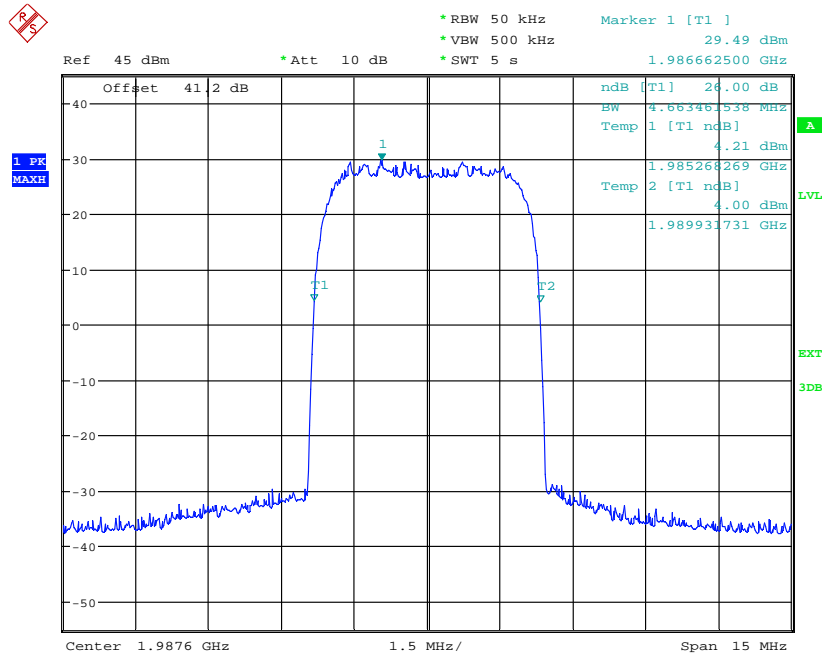
Date: 28.MAR.2014 14:46:14

Channel Position T - QPSK / Bandwidth 4.2 MHz



Date: 28.MAR.2014 11:07:14

Channel Position T - QPSK / Bandwidth 5.0 MHz



Date: 28.MAR.2014 10:29:45

Configuration L-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

99% Occupied Bandwidth for IC requirement

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1930.7MHz	Channel Position M 1960.0MHz	Channel Position T 1989.3MHz
QPSK / 1.4 MHz	1.09	1.09	1.09
16QAM / 1.4 MHz	-	1.09	-
64QAM / 1.4 MHz	-	1.09	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1931.5MHz	Channel Position M 1960.0MHz	Channel Position T 1988.5MHz
QPSK / 3.0 MHz	2.70	2.68	2.68
16QAM / 3.0 MHz	-	2.70	-
64QAM / 3.0 MHz	-	2.68	-

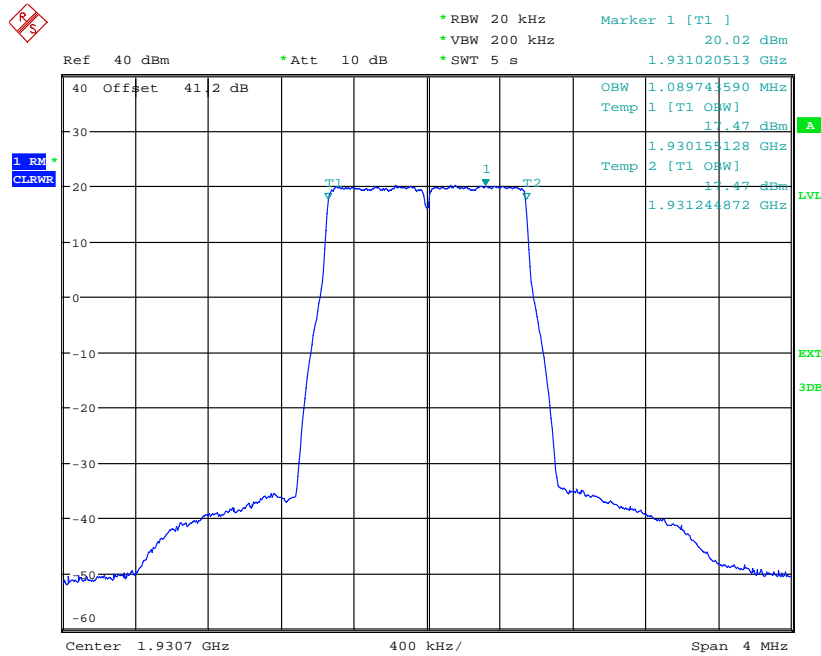
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.5MHz	Channel Position M 1960.0MHz	Channel Position T 1987.5MHz
QPSK / 5.0 MHz	4.47	4.47	4.47
16QAM / 5.0 MHz	-	4.47	-
64QAM / 5.0 MHz	-	4.47	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1935.0MHz	Channel Position M 1960.0MHz	Channel Position T 1985.0MHz
QPSK / 10.0 MHz	8.94	8.94	8.94
16QAM / 10.0 MHz	-	8.94	-
64QAM / 10.0 MHz	-	8.94	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1937.5MHz	Channel Position M 1960.0MHz	Channel Position T 1982.5MHz
QPSK / 15.0 MHz	13.41	13.41	13.41
16QAM / 15.0 MHz	-	13.41	-
64QAM / 15.0 MHz	-	13.41	-

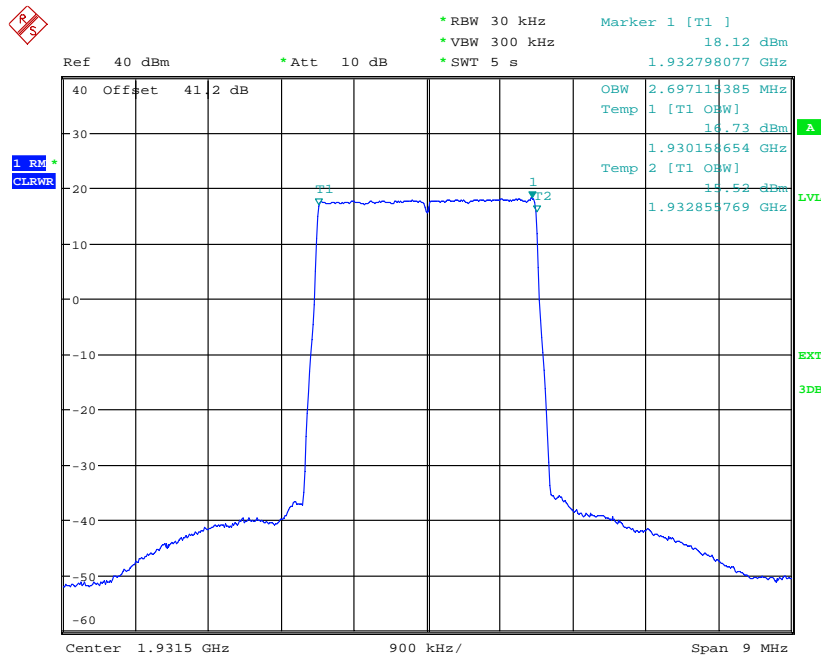
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1940.0MHz	Channel Position M 1960.0MHz	Channel Position T 1980.0MHz
QPSK / 20.0 MHz	17.88	17.88	17.88
16QAM / 20.0 MHz	-	17.88	-
64QAM / 20.0 MHz	-	17.88	-

Channel Position B - QPSK / Bandwidth 1.4 MHz



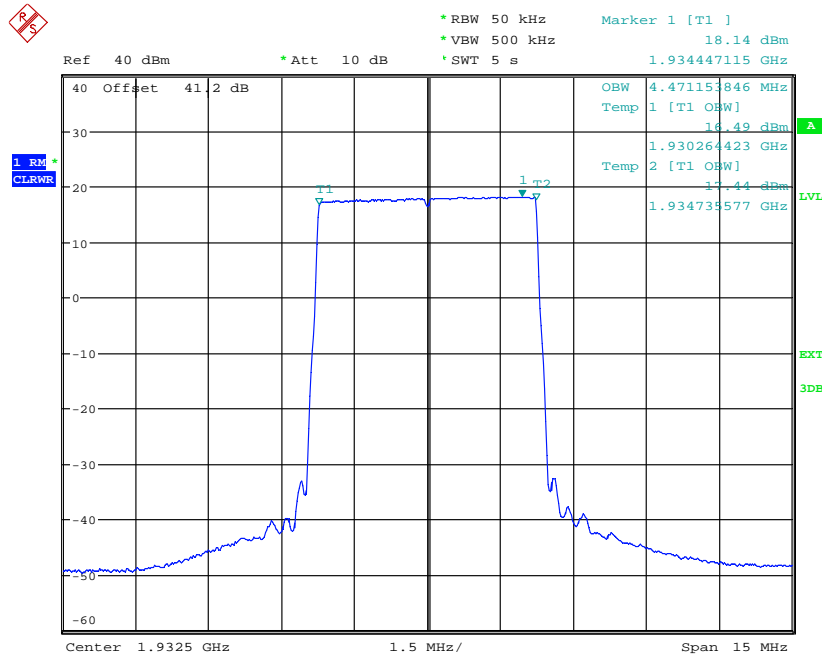
Date: 26.MAR.2014 13:52:40

Channel Position B - QPSK / Bandwidth 3.0 MHz



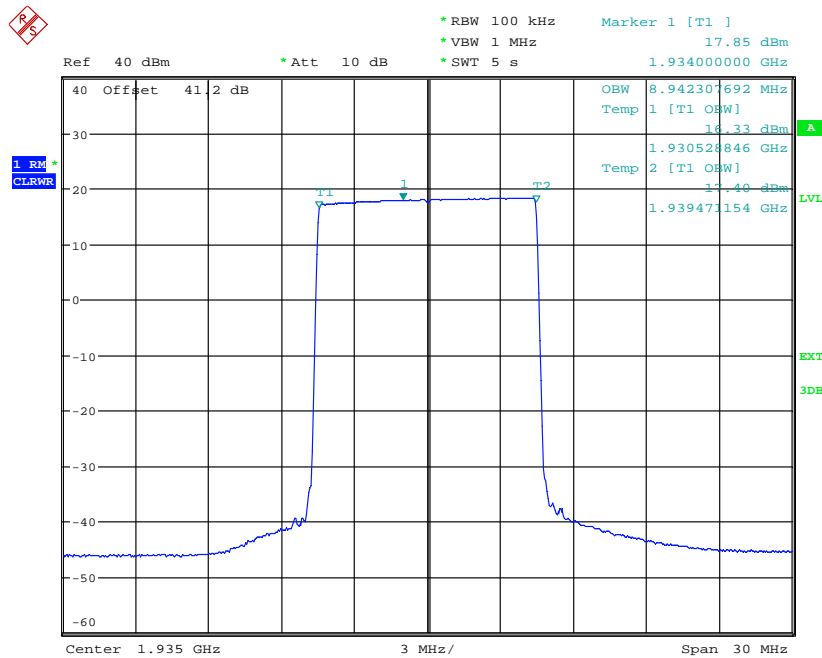
Date: 26.MAR.2014 16:20:18

Channel Position B - QPSK / Bandwidth 5.0 MHz



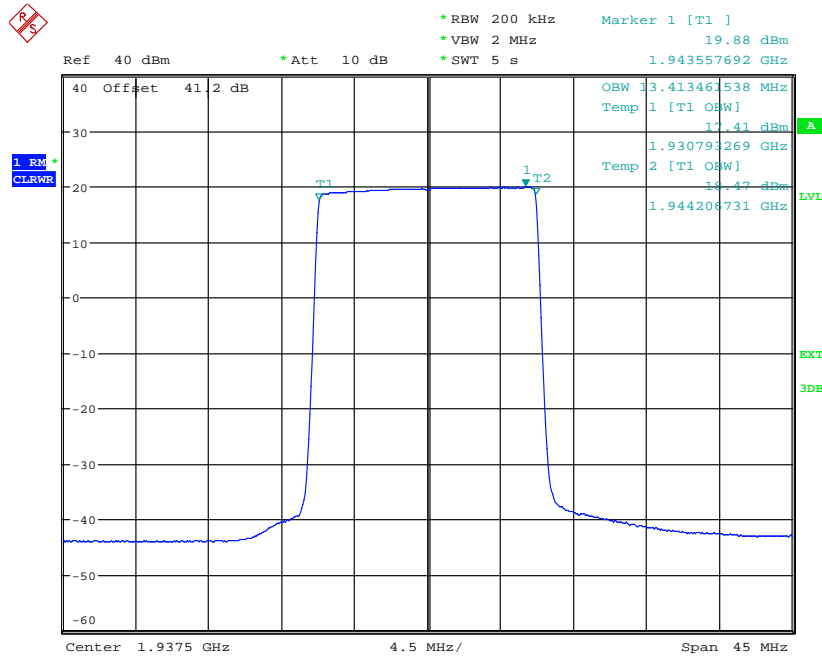
Date: 27.MAR.2014 09:29:11

Channel Position B - QPSK / Bandwidth 10.0 MHz



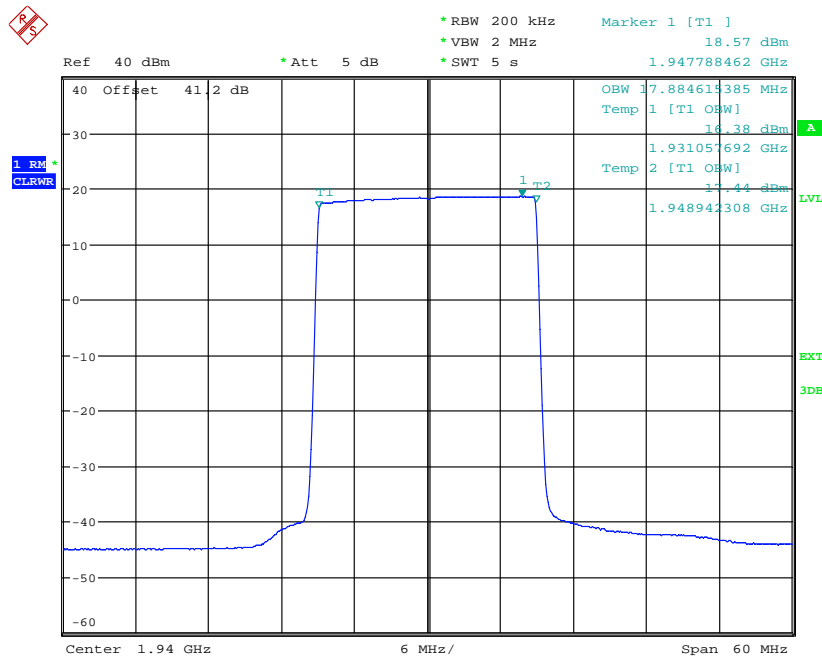
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Channel Position B - QPSK / Bandwidth 15.0 MHz



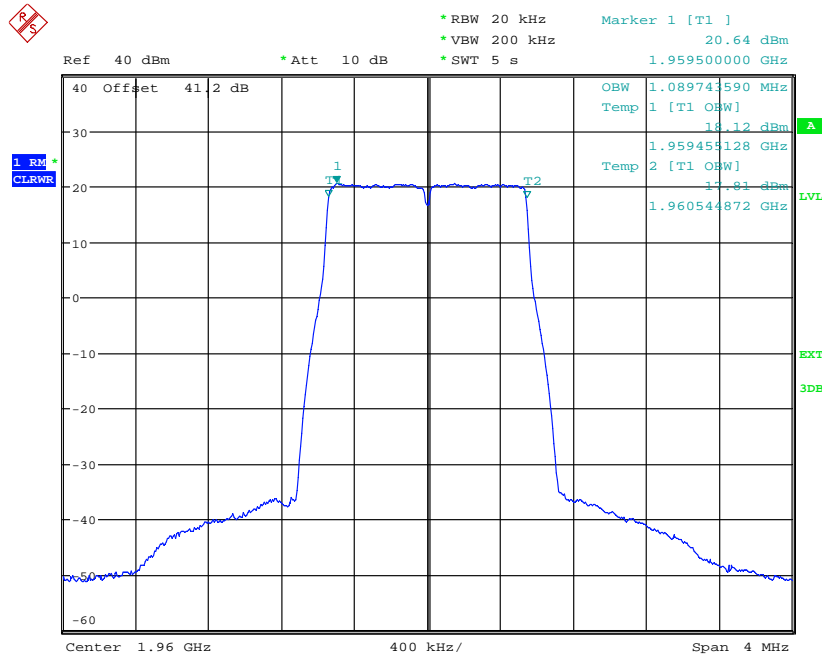
Date: 27.MAR.2014 10:23:38

Channel Position B - QPSK / Bandwidth 20.0 MHz



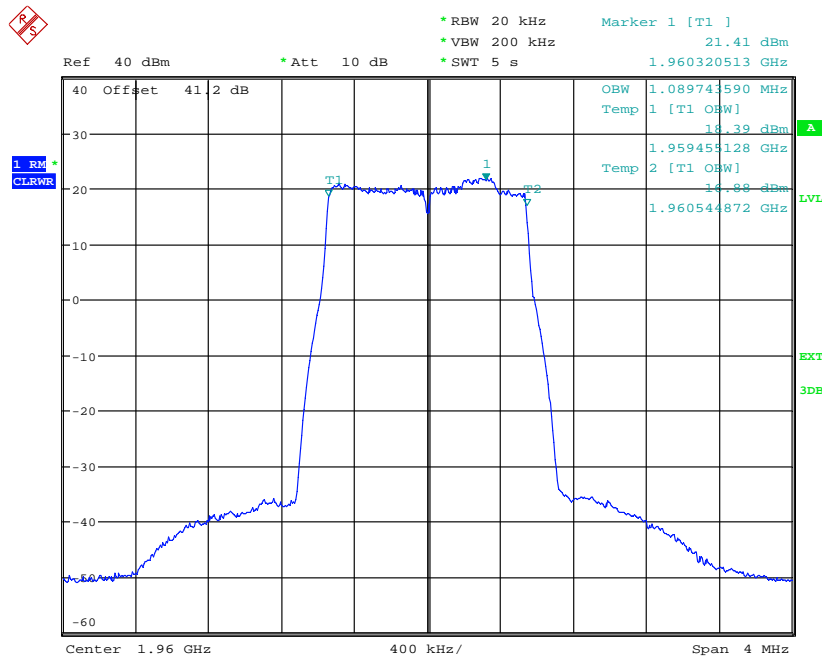
Date: 26.MAR.2014 15:56:50

Channel Position M - QPSK / Bandwidth 1.4 MHz



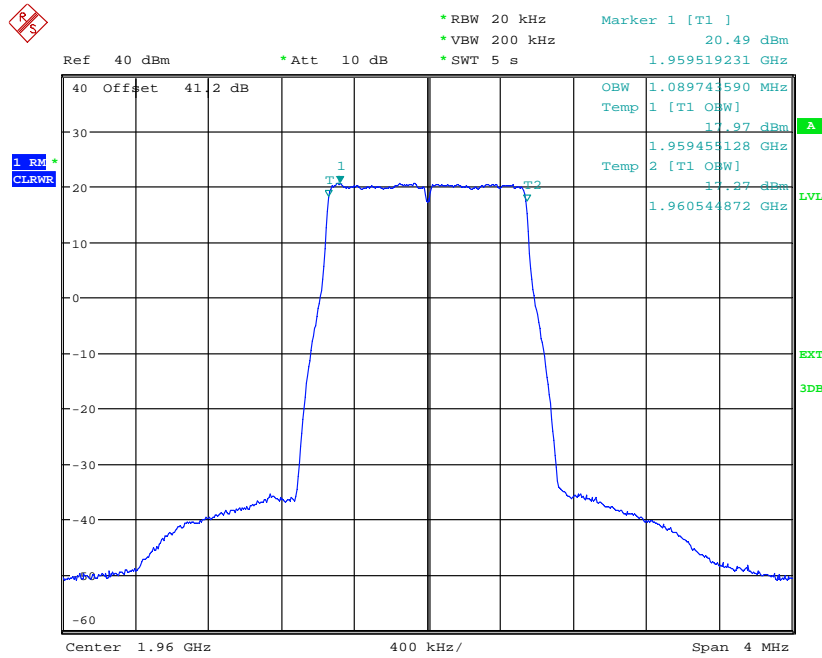
Date: 26.MAR.2014 13:42:43

Channel Position M - 16QAM / Bandwidth 1.4 MHz



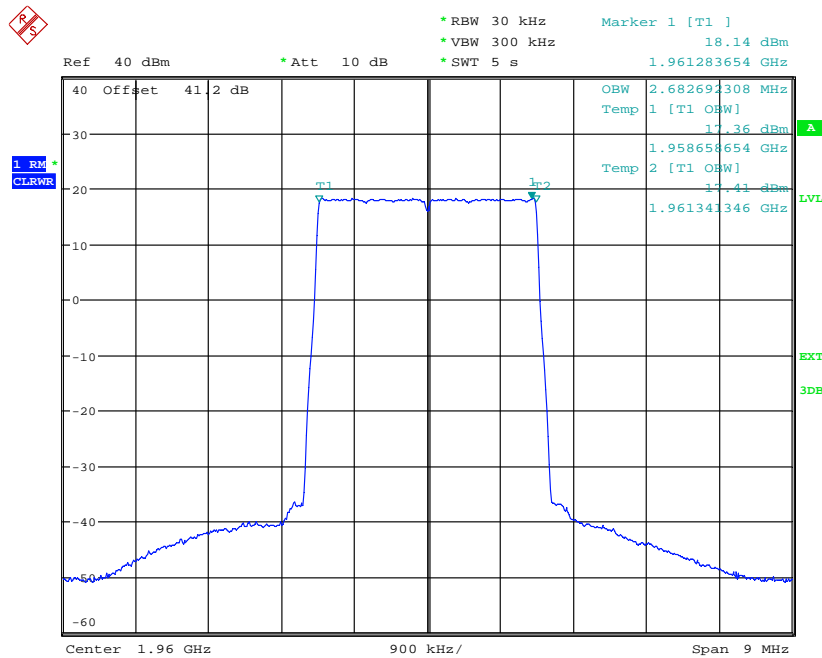
Date: 26.MAR.2014 17:13:24

Channel Position M - 64QAM / Bandwidth 1.4 MHz



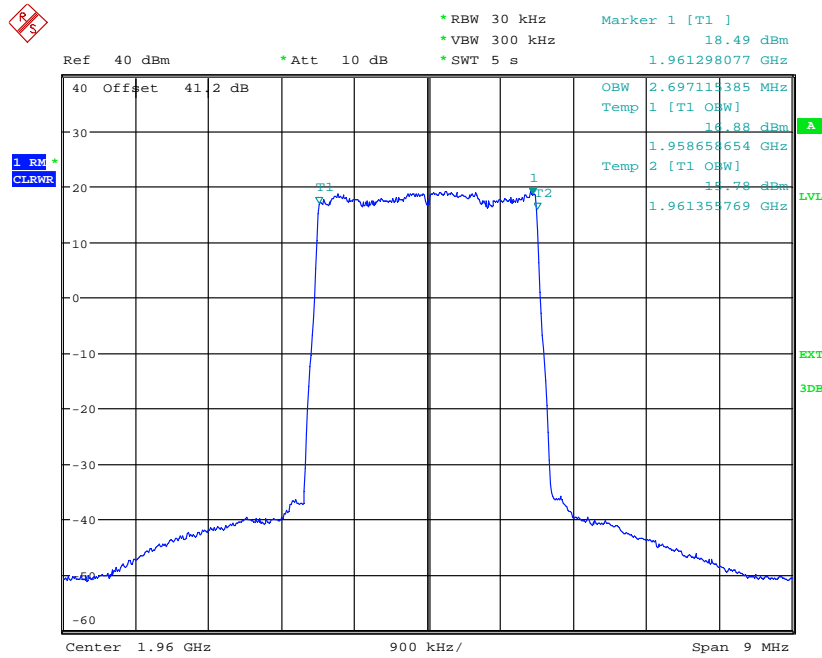
Date: 26.MAR.2014 17:17:53

Channel Position M - QPSK / Bandwidth 3.0 MHz



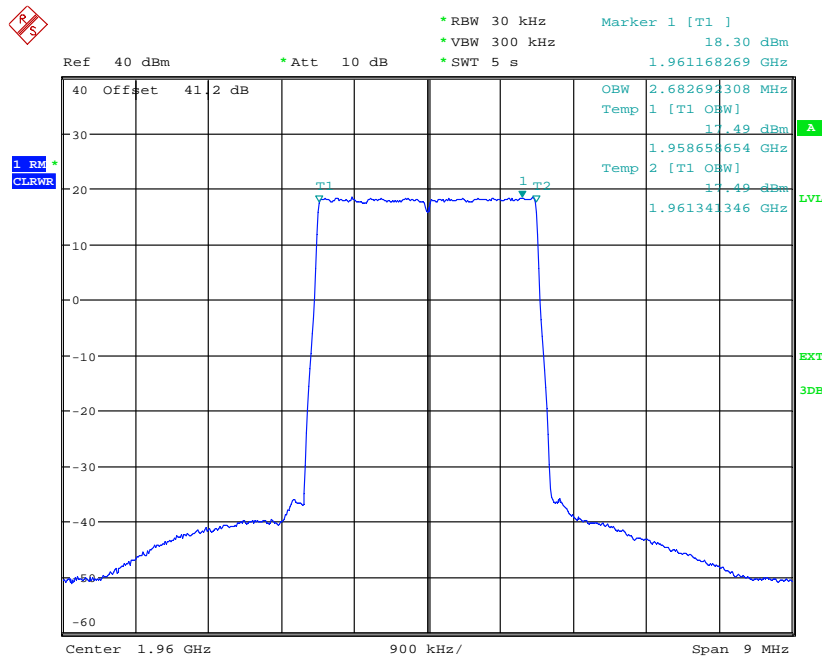
Date: 26.MAR.2014 14:22:18

Channel Position M - 16QAM / Bandwidth 3.0 MHz



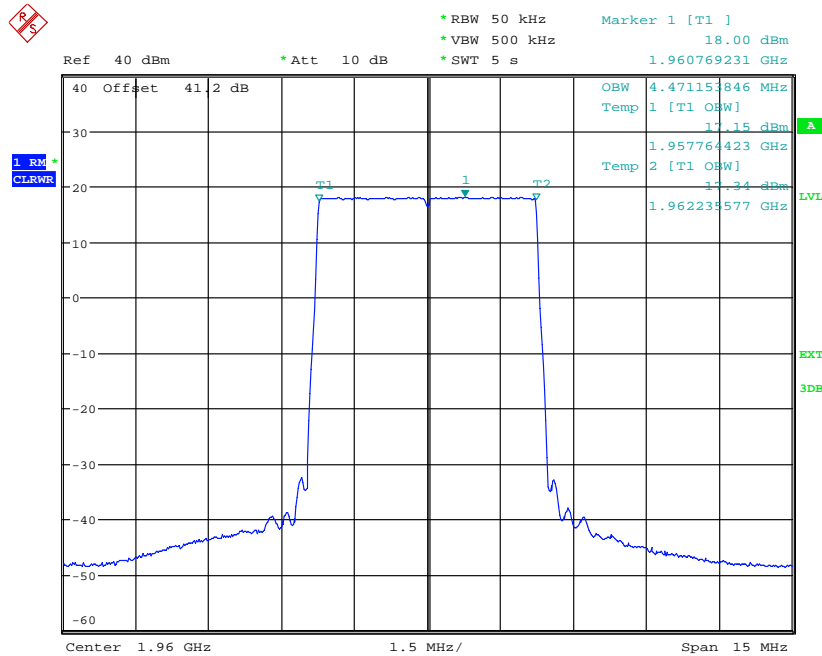
Date: 26.MAR.2014 14:29:10

Channel Position M - 64QAM / Bandwidth 3.0 MHz



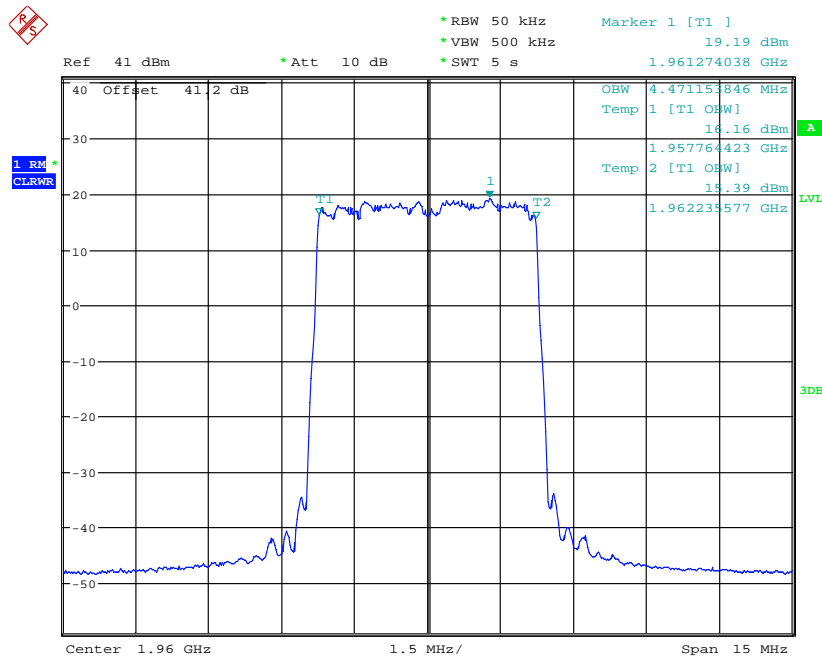
Date: 26.MAR.2014 14:31:44

Channel Position M - QPSK / Bandwidth 5.0 MHz



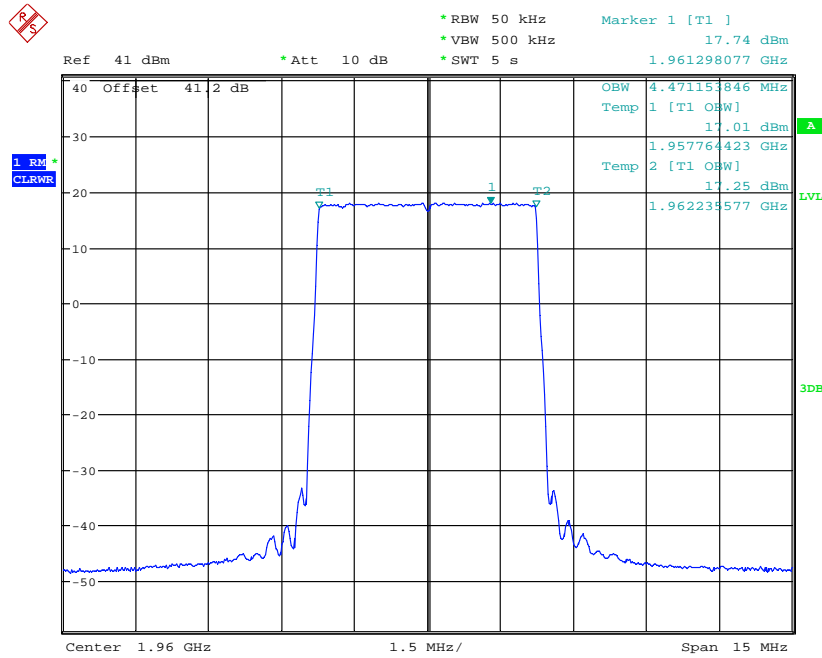
Date: 26.MAR.2014 11:07:02

Channel Position M - 16QAM / Bandwidth 5.0 MHz



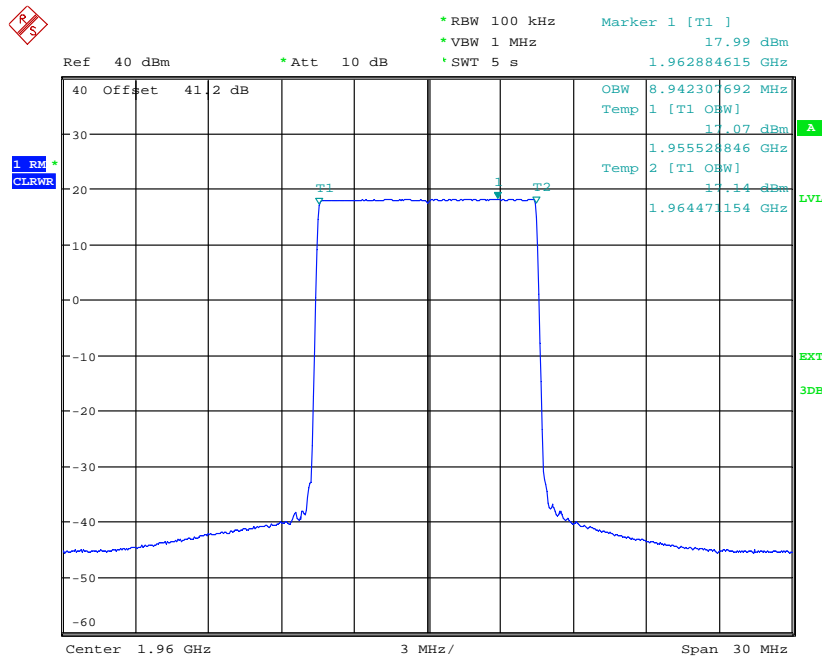
Date: 22.APR.2014 11:36:25

Channel Position M - 64QAM / Bandwidth 5.0 MHz



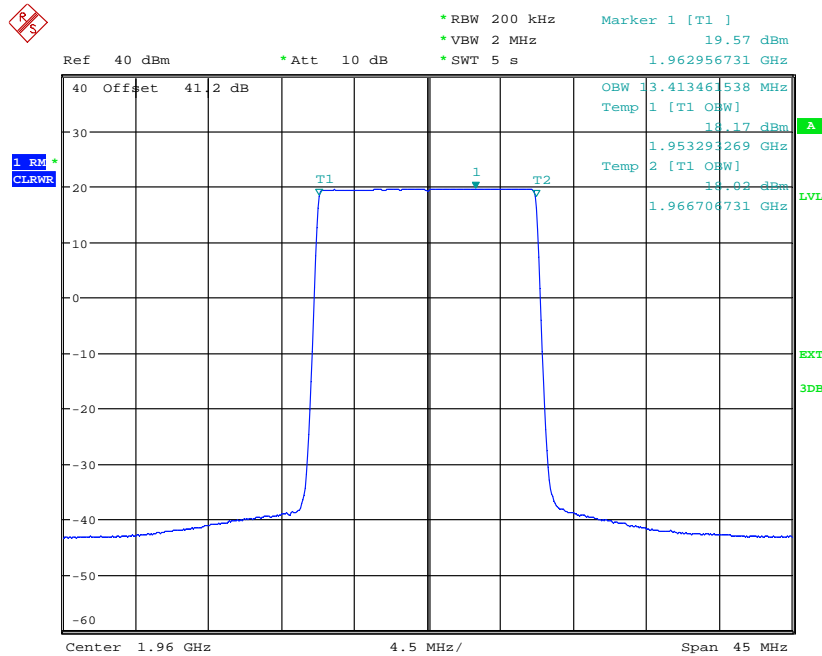
Date: 22.APR.2014 11:33:26

Channel Position M - QPSK / Bandwidth 10.0 MHz



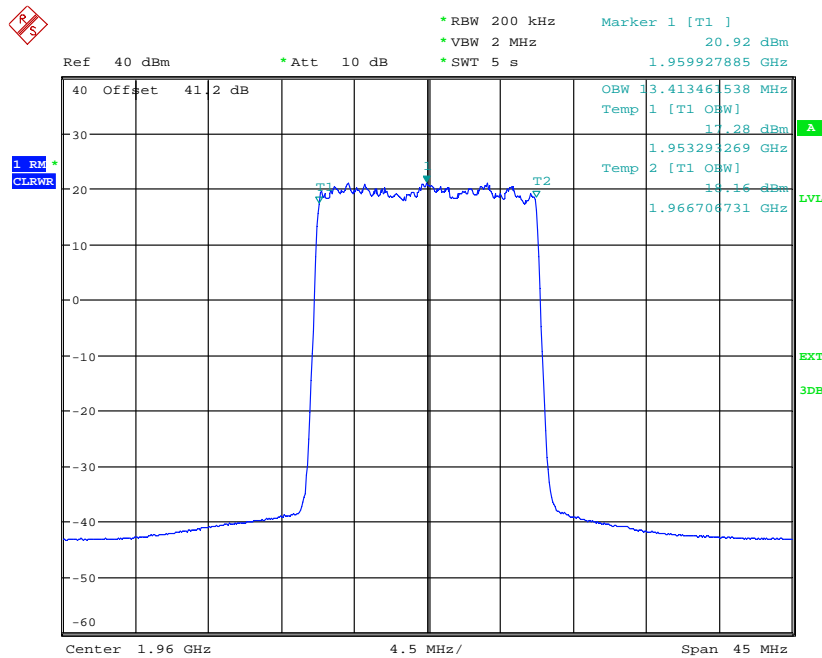
Date: 26.MAR.2014 14:50:57

Channel Position M - QPSK / Bandwidth 15.0 MHz



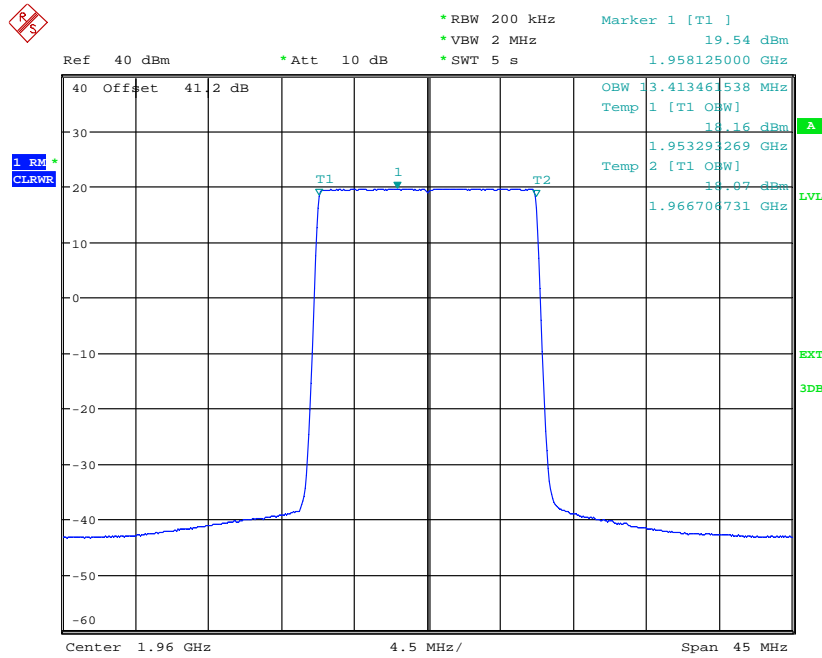
Date: 26.MAR.2014 15:14:12

Channel Position M - 16QAM / Bandwidth 15.0 MHz



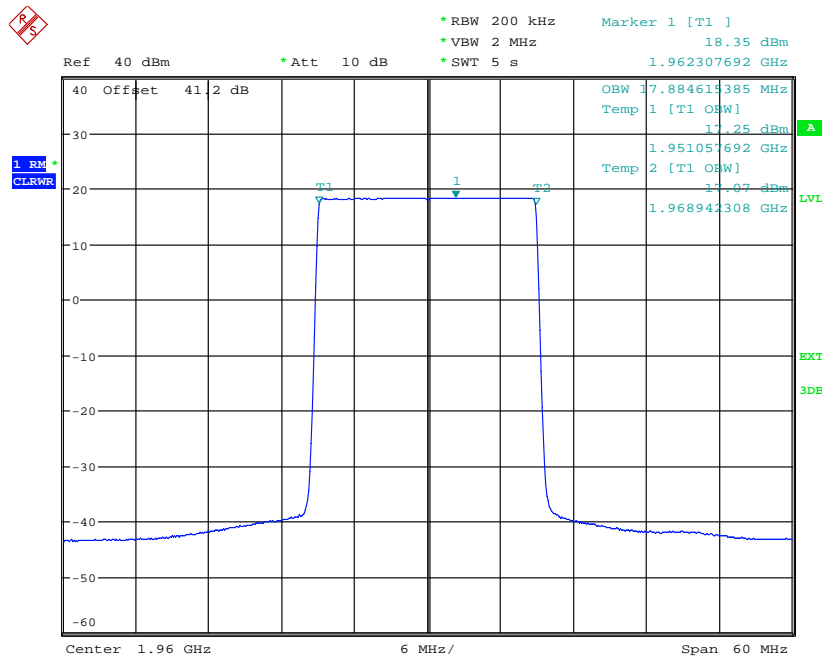
Date: 26.MAR.2014 15:11:53

Channel Position M - 64QAM / Bandwidth 15.0 MHz



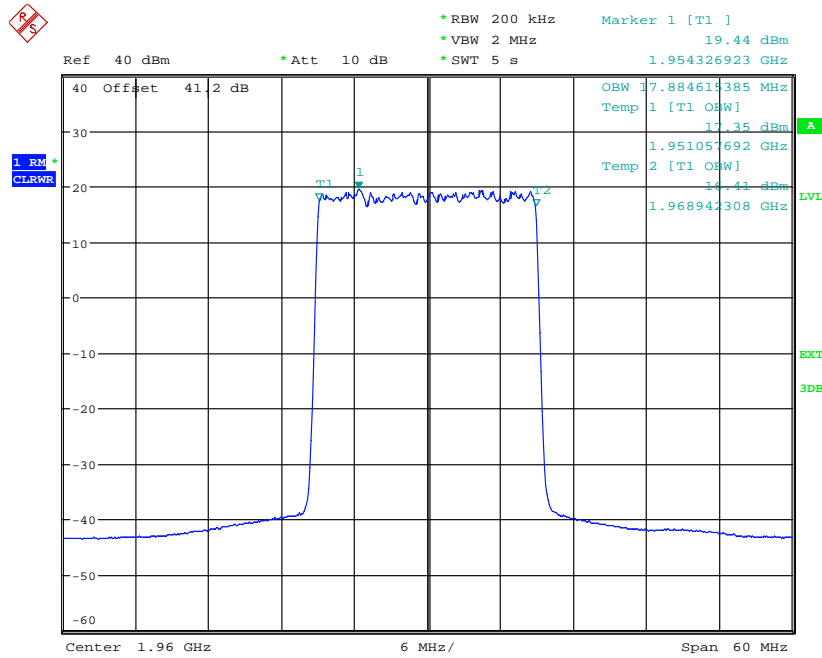
Date: 26.MAR.2014 15:11:04

Channel Position M - QPSK / Bandwidth 20.0 MHz



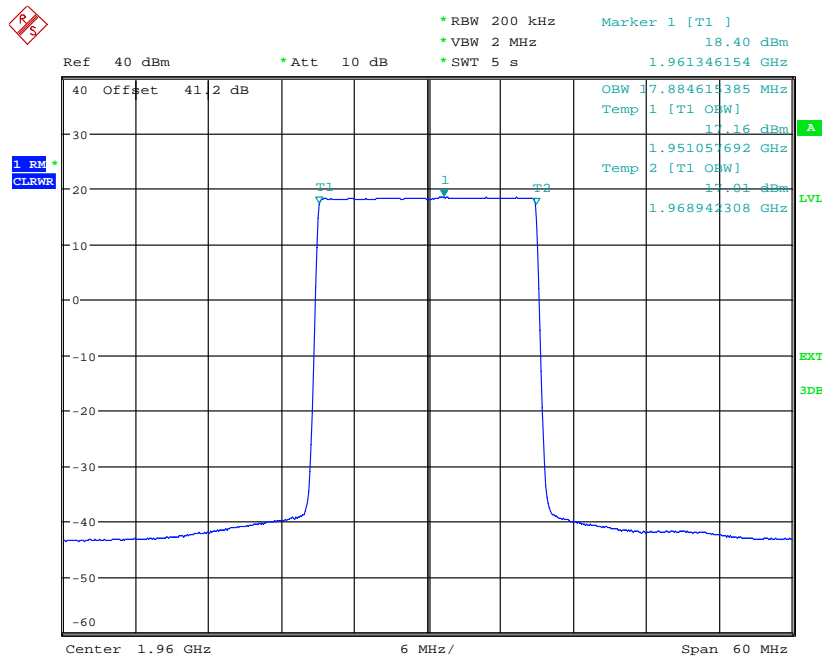
Date: 26.MAR.2014 15:25:42

Channel Position M – 16QAM / Bandwidth 20.0 MHz



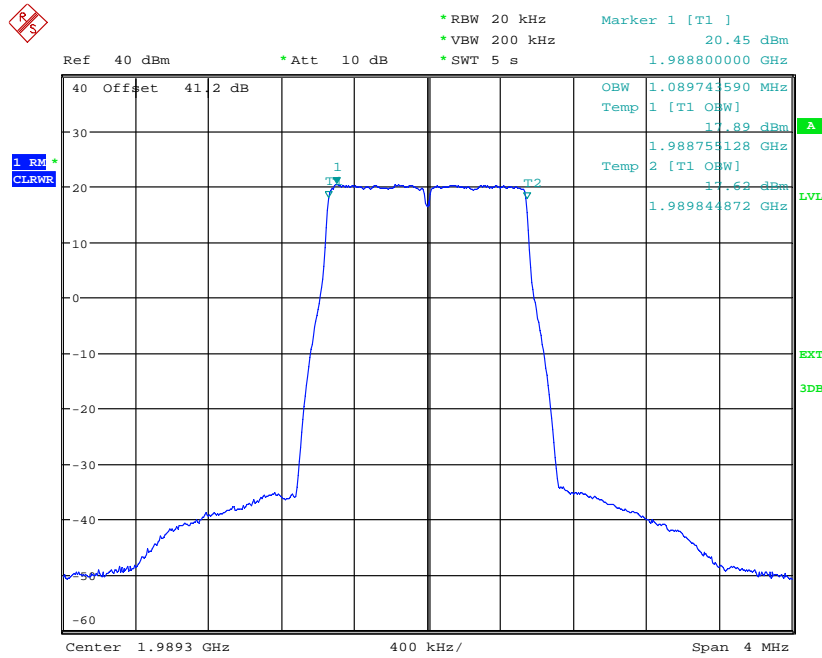
Date: 26.MAR.2014 15:26:31

Channel Position M – 64QAM / Bandwidth 20.0 MHz



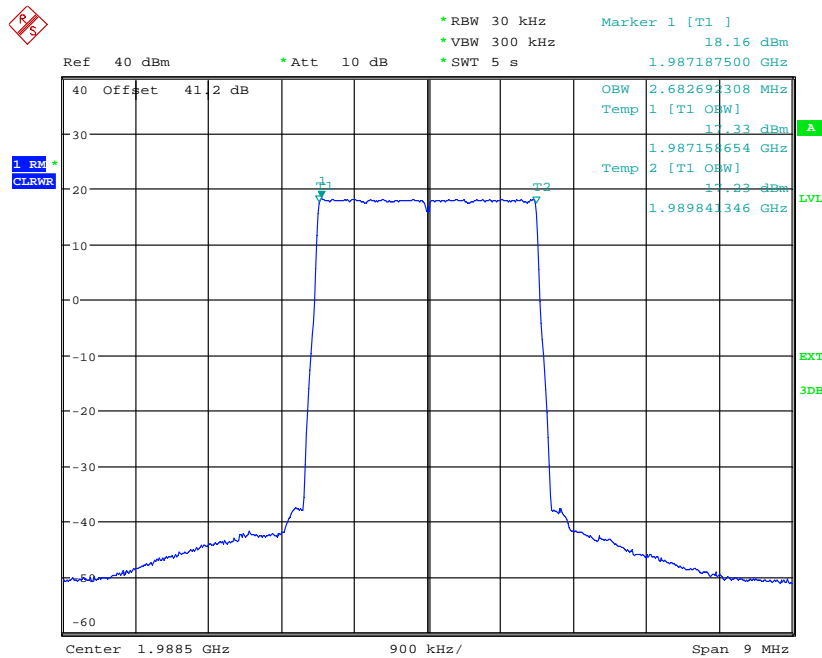
Date: 26.MAR.2014 15:34:29

Channel Position T - QPSK / Bandwidth 1.4 MHz



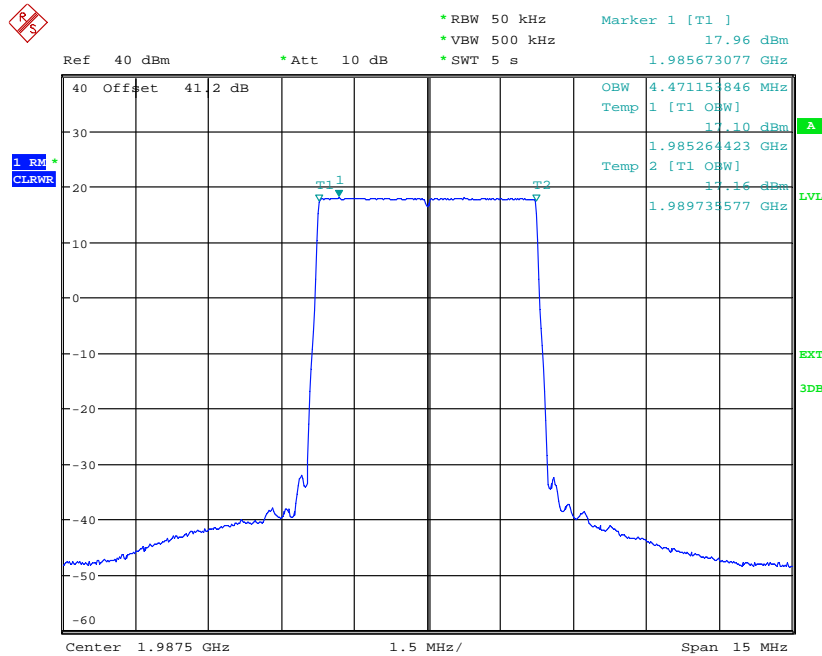
Date: 26.MAR.2014 13:59:01

Channel Position T - QPSK / Bandwidth 3.0 MHz



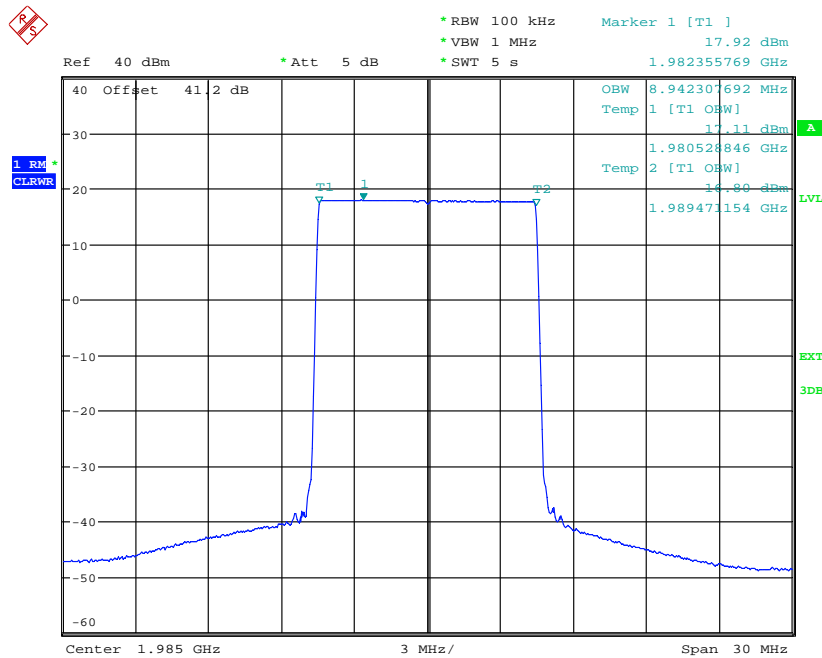
Date: 27.MAR.2014 09:19:46

Channel Position T - QPSK / Bandwidth 5.0 MHz



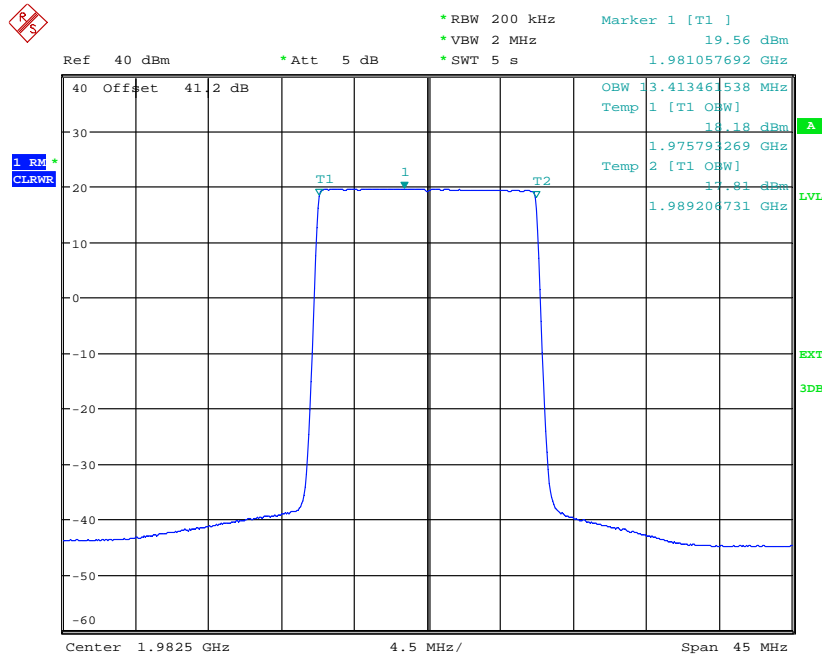
Date: 27.MAR.2014 09:55:38

Channel Position T - QPSK / Bandwidth 10.0 MHz



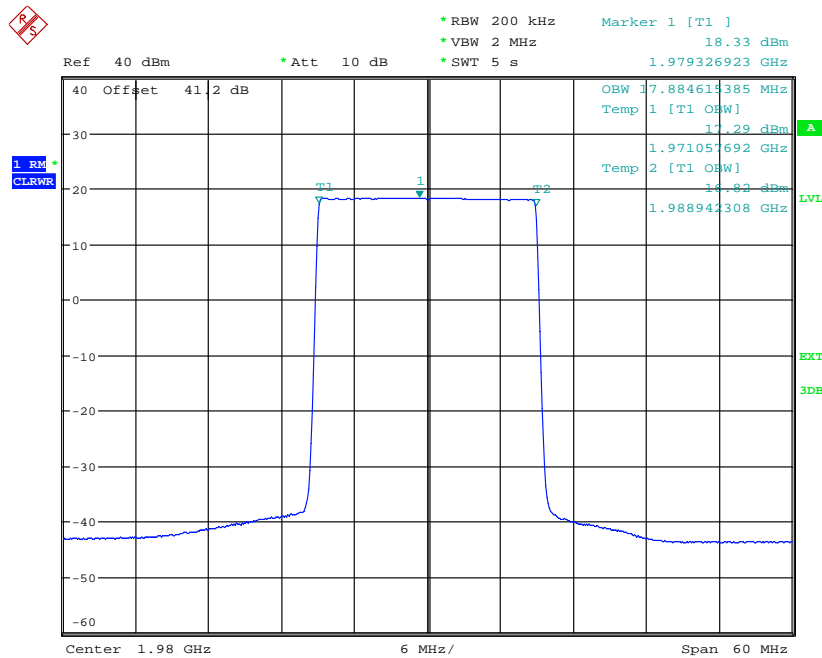
Date: 27.MAR.2014 10:15:16

Channel Position T - QPSK / Bandwidth 15.0 MHz



Date: 27.MAR.2014 10:27:42

Channel Position T - QPSK / Bandwidth 20.0 MHz



Date: 26.MAR.2014 15:42:36

-26dBc Occupied Bandwidth for FCC requirement

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1930.7MHz	Channel Position M 1960.0MHz	Channel Position T 1989.3MHz
QPSK / 1.4 MHz	1.27	1.27	1.27
16QAM / 1.4 MHz	-	1.27	-
64QAM / 1.4 MHz	-	1.27	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1931.5MHz	Channel Position M 1960.0MHz	Channel Position T 1988.5MHz
QPSK / 3.0 MHz	2.91	2.91	2.91
16QAM / 3.0 MHz	-	2.93	-
64QAM / 3.0 MHz	-	2.91	-

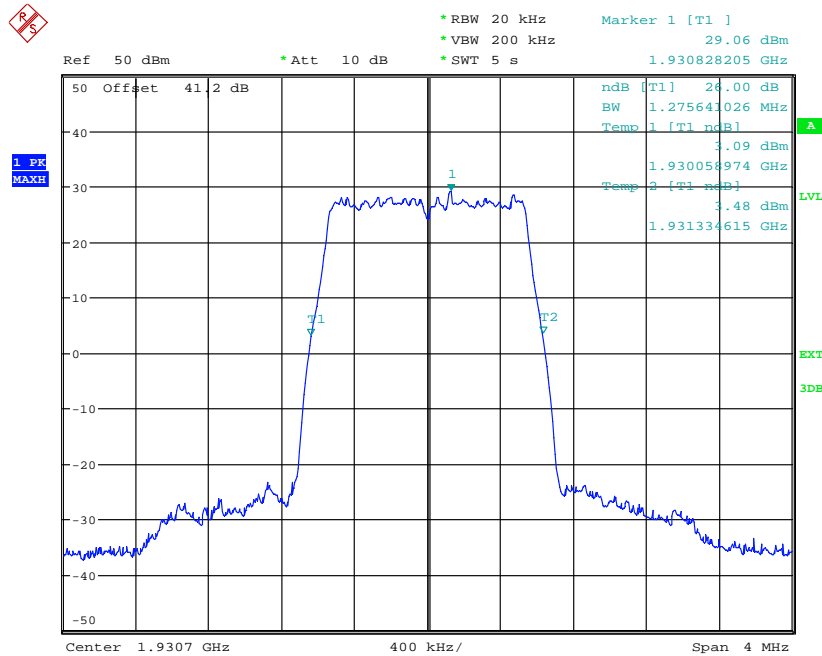
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.5MHz	Channel Position M 1960.0MHz	Channel Position T 1987.5MHz
QPSK / 5.0 MHz	4.83	4.83	4.83
16QAM / 5.0 MHz	-	4.81	-
64QAM / 5.0 MHz	-	4.86	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1935.0MHz	Channel Position M 1960.0MHz	Channel Position T 1985.0MHz
QPSK / 10.0 MHz	9.42	9.42	9.42
16QAM / 10.0 MHz	-	9.42	-
64QAM / 10.0 MHz	-	9.42	-

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1937.5MHz	Channel Position M 1960.0MHz	Channel Position T 1982.5MHz
QPSK / 15.0 MHz	14.28	14.21	14.28
16QAM / 15.0 MHz	-	14.21	-
64QAM / 15.0 MHz	-	14.28	-

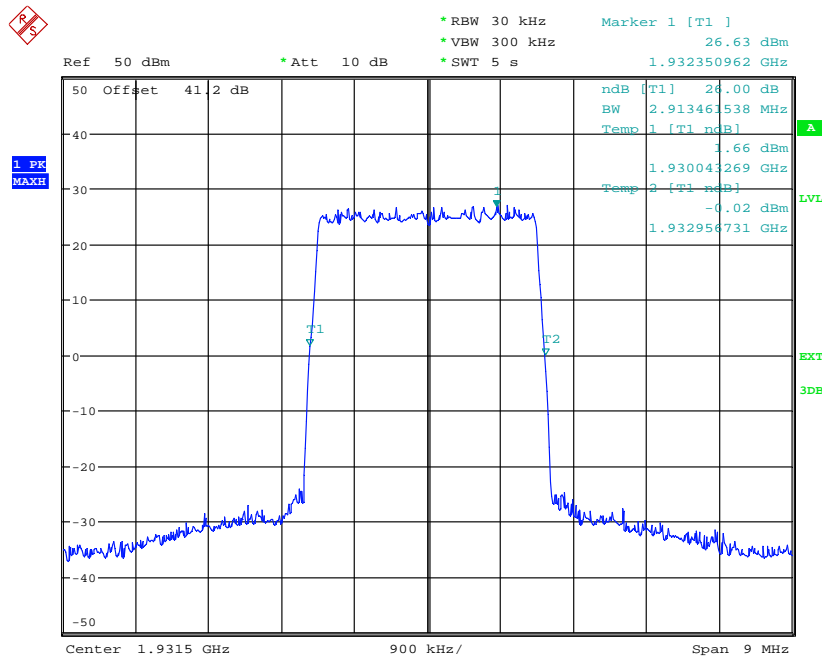
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1940.0MHz	Channel Position M 1960.0MHz	Channel Position T 1980.0MHz
QPSK / 20.0 MHz	18.65	18.75	18.75
16QAM / 20.0 MHz	-	18.65	-
64QAM / 20.0 MHz	-	18.75	-

Channel Position B - QPSK / Bandwidth 1.4 MHz



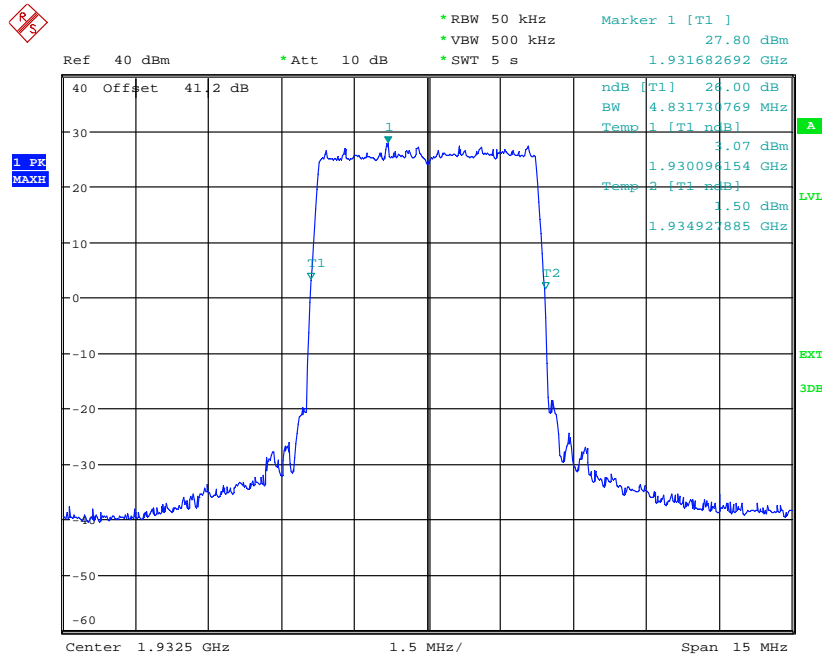
Date: 26.MAR.2014 13:51:30

Channel Position B - QPSK / Bandwidth 3.0 MHz



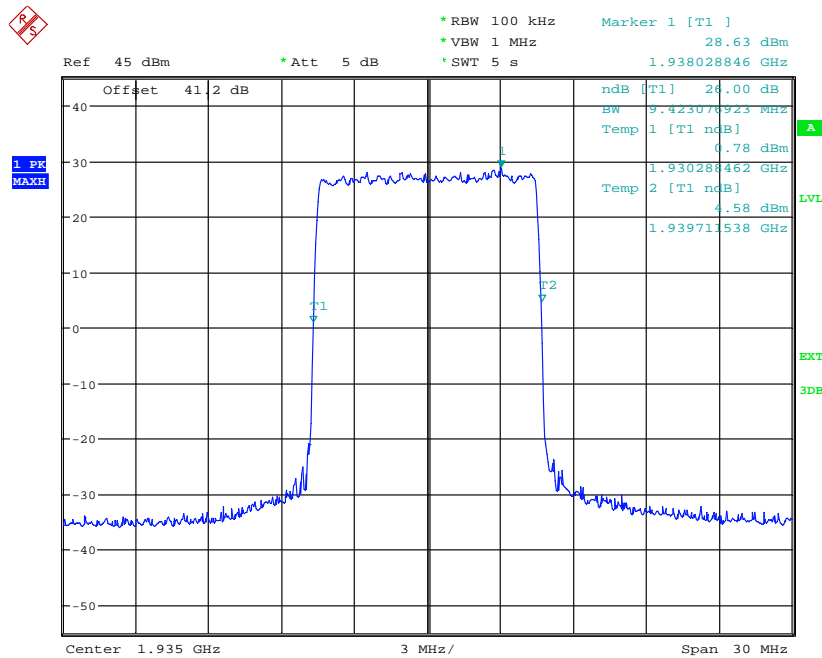
Date: 26.MAR.2014 16:19:32

Channel Position B - QPSK / Bandwidth 5.0 MHz



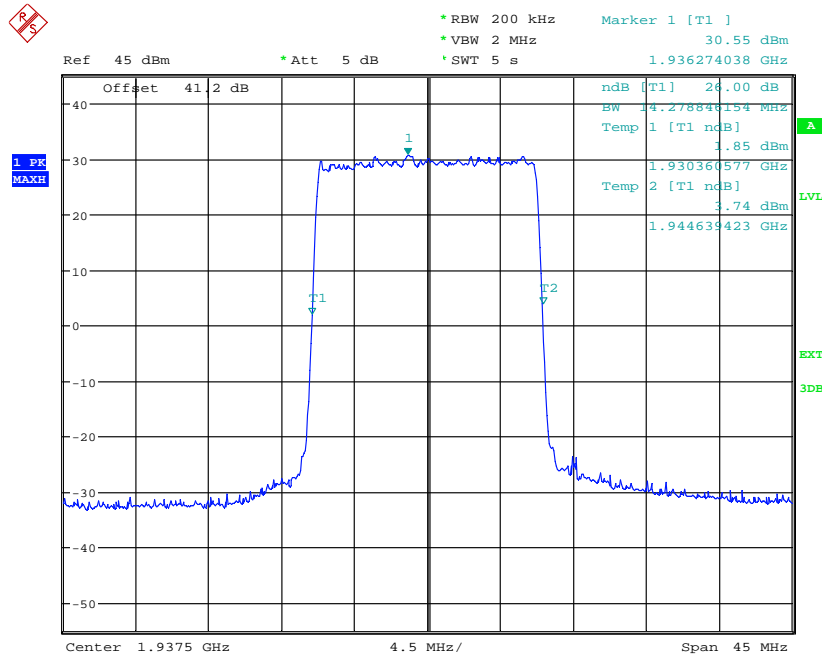
Date: 27.MAR.2014 09:29:59

Channel Position B - QPSK / Bandwidth 10.0 MHz



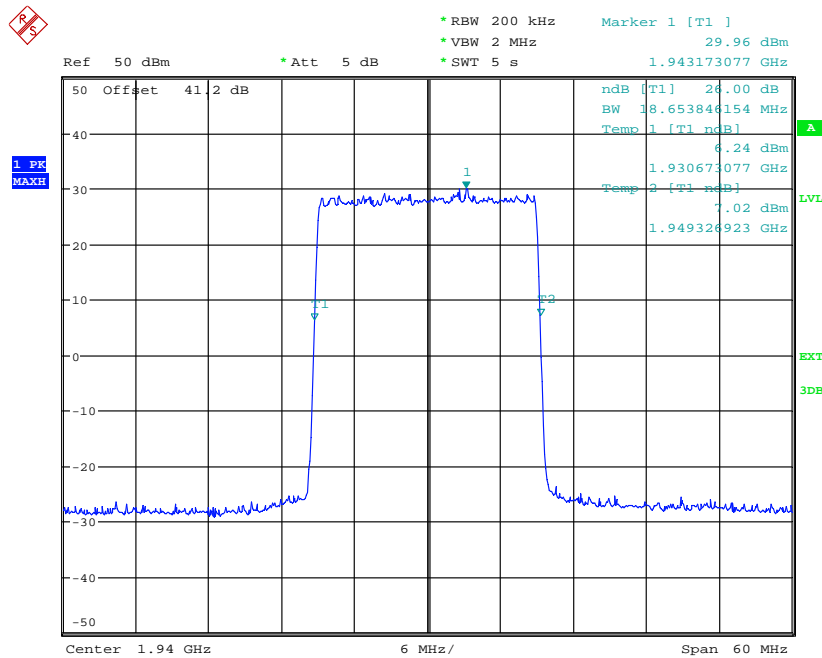
Date: 27.MAR.2014 10:03:03

Channel Position B - QPSK / Bandwidth 15.0 MHz



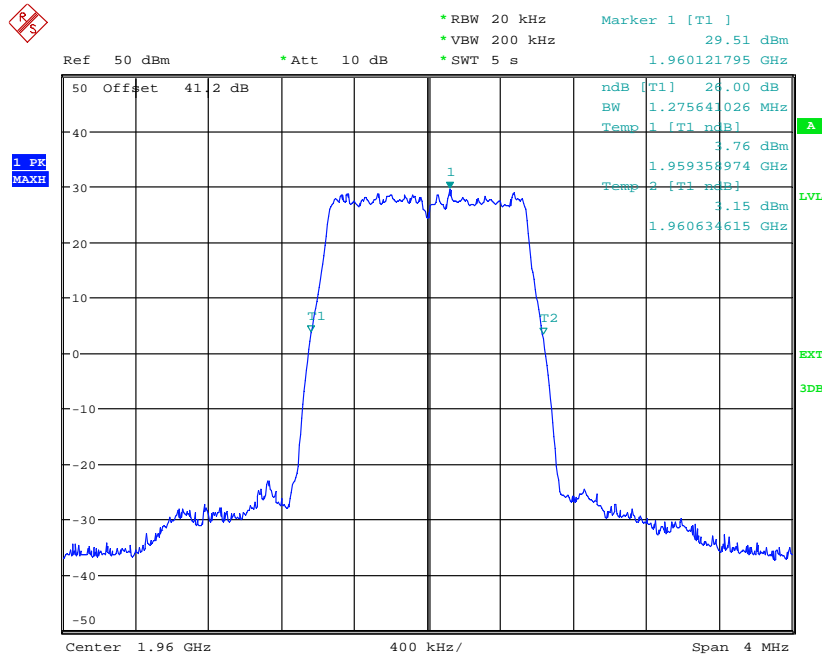
Date: 27.MAR.2014 10:24:40

Channel Position B - QPSK / Bandwidth 20.0 MHz



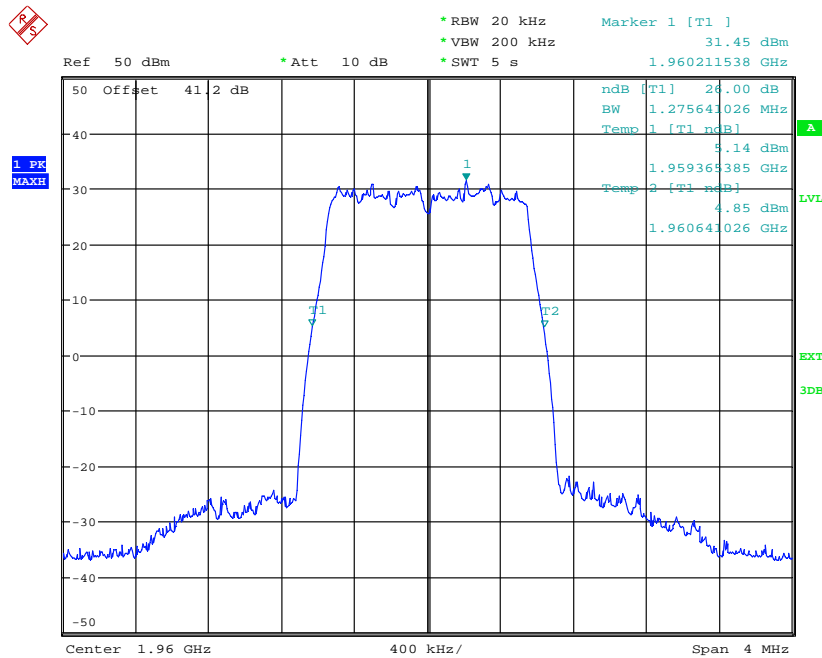
Date: 26.MAR.2014 15:57:33

Channel Position M - QPSK / Bandwidth 1.4 MHz



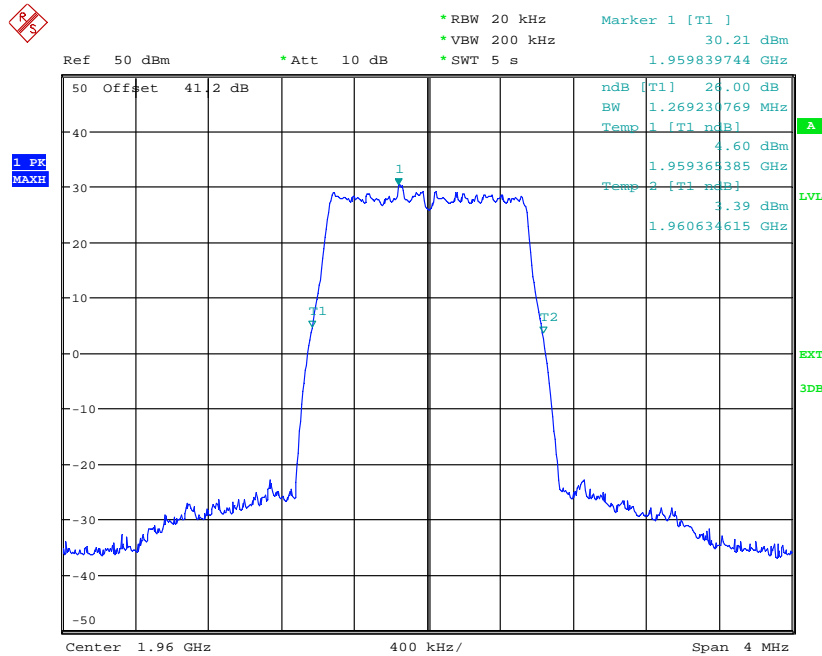
Date: 26.MAR.2014 13:44:06

Channel Position M - 16QAM / Bandwidth 1.4 MHz



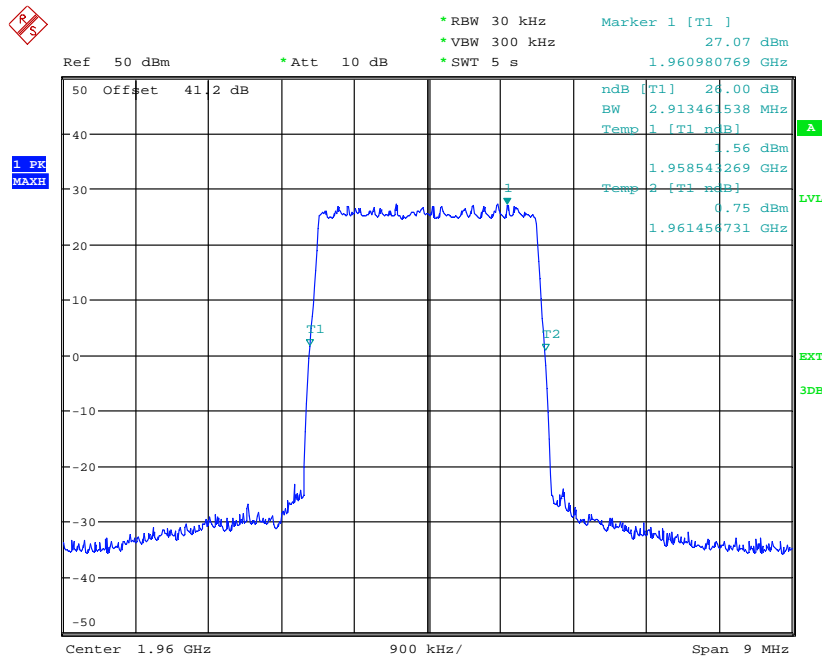
Date: 26.MAR.2014 17:14:36

Channel Position M - 64QAM / Bandwidth 1.4 MHz



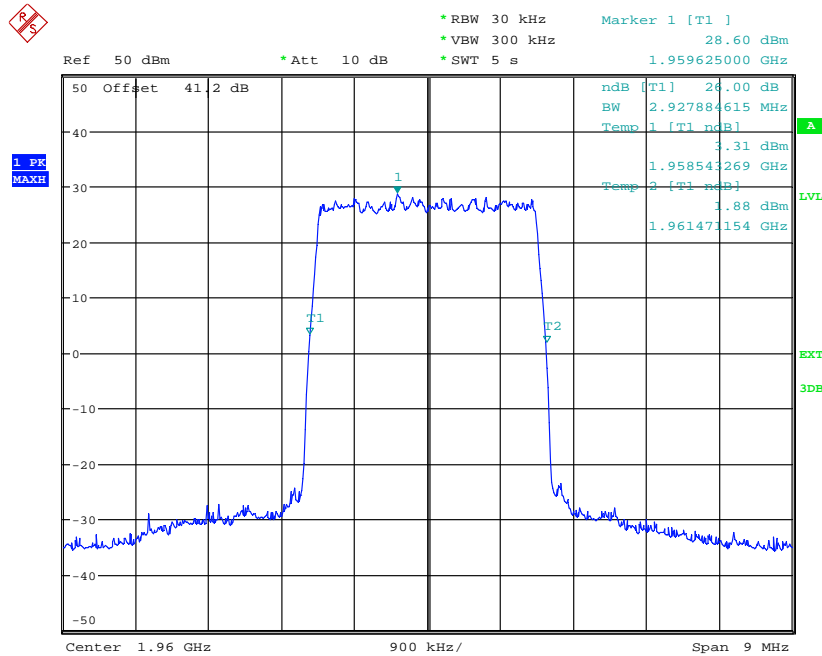
Date: 26.MAR.2014 17:17:19

Channel Position M - QPSK / Bandwidth 3.0 MHz



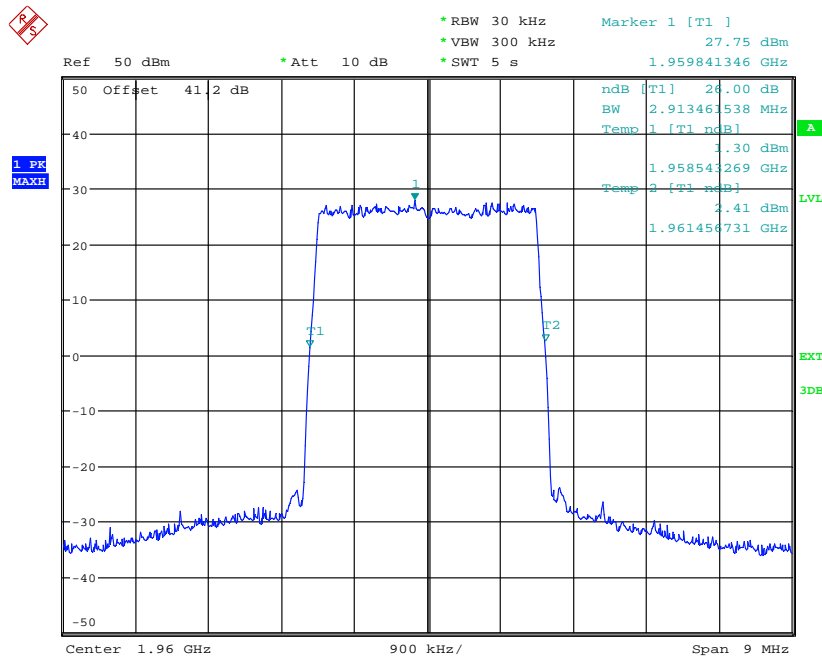
Date: 26.MAR.2014 14:23:04

Channel Position M - 16QAM / Bandwidth 3.0 MHz



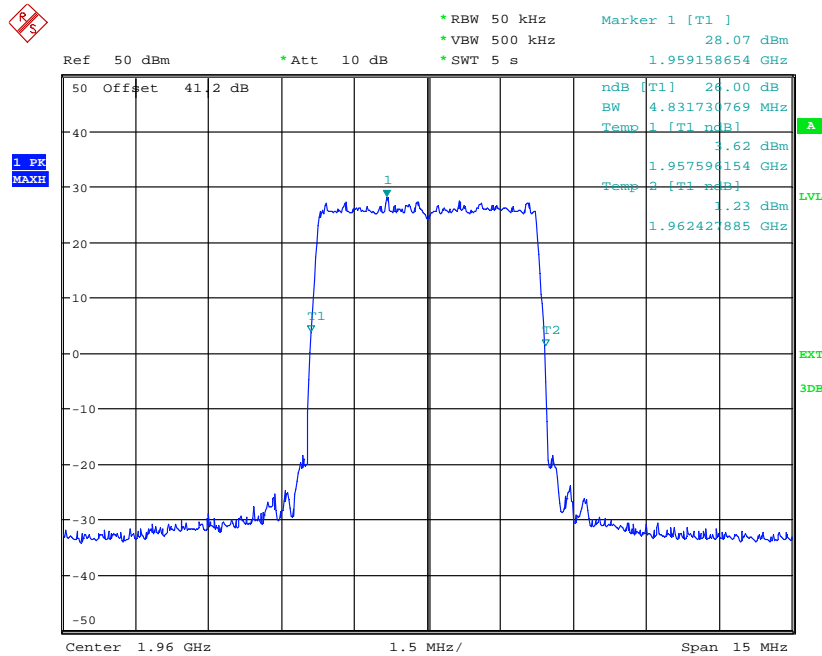
Date: 26.MAR.2014 14:30:05

Channel Position M - 64QAM / Bandwidth 3.0 MHz



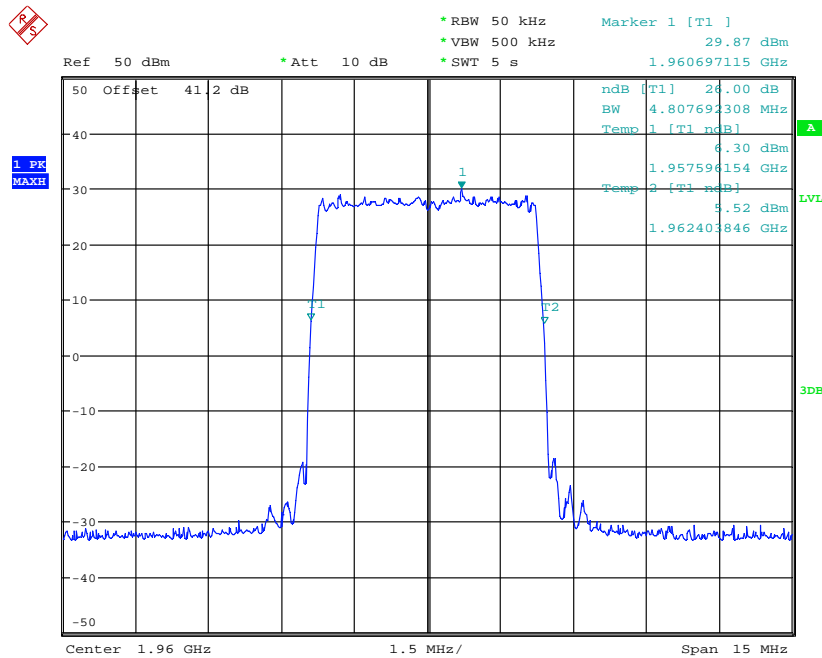
Date: 26.MAR.2014 14:31:10

Channel Position M - QPSK / Bandwidth 5.0 MHz



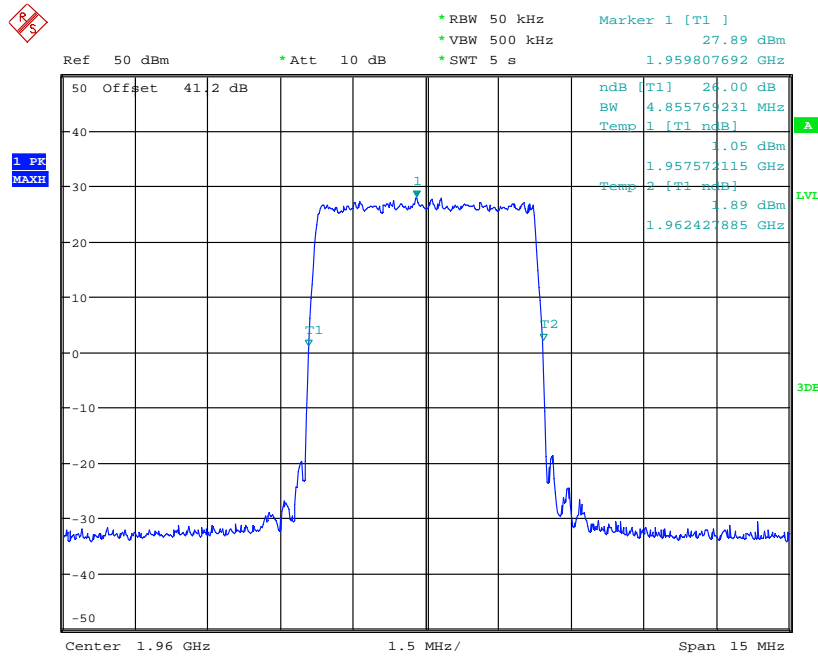
Date: 26.MAR.2014 11:08:04

Channel Position M - 16QAM / Bandwidth 5.0 MHz



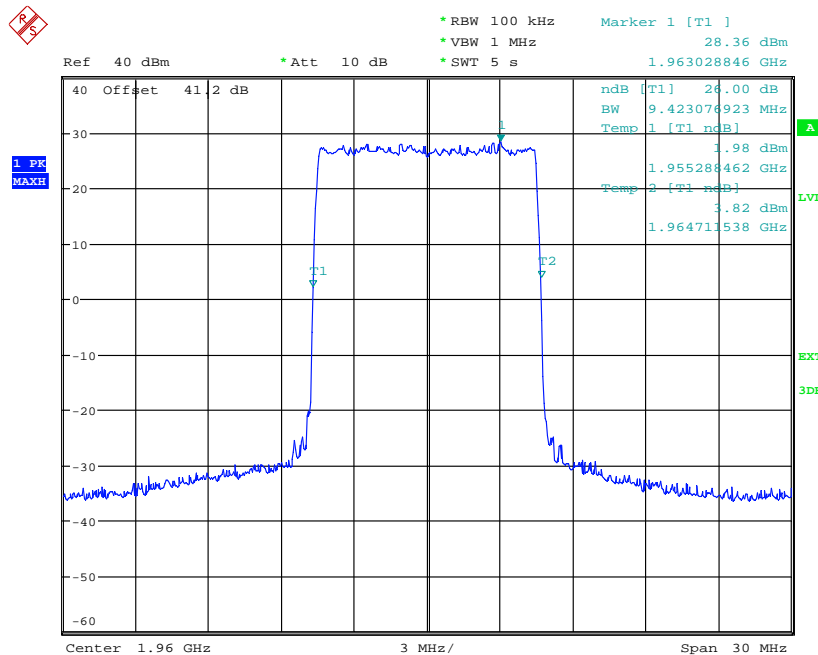
Date: 22.APR.2014 11:35:44

Channel Position M - 64QAM / Bandwidth 5.0 MHz



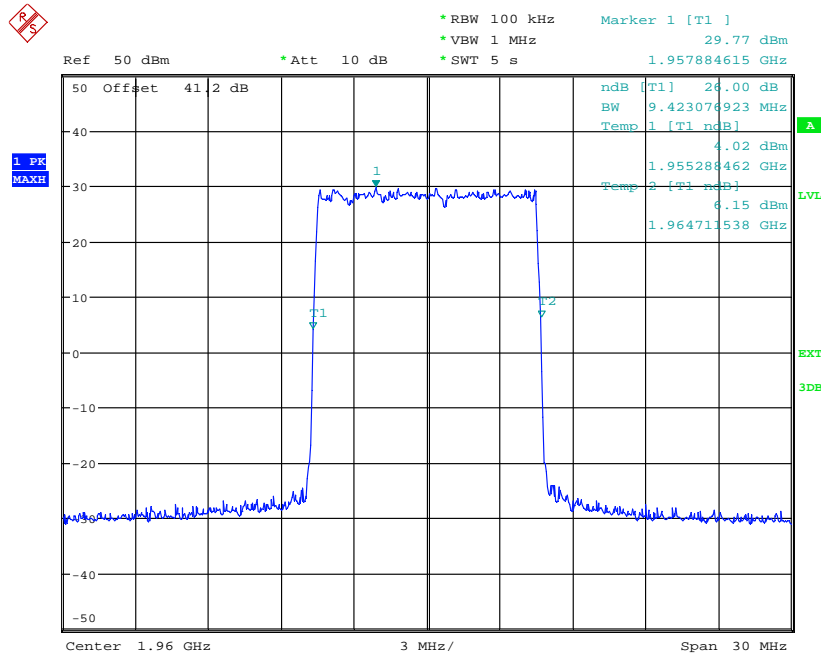
Date: 22.APR.2014 11:34:32

Channel Position M - QPSK / Bandwidth 10.0 MHz



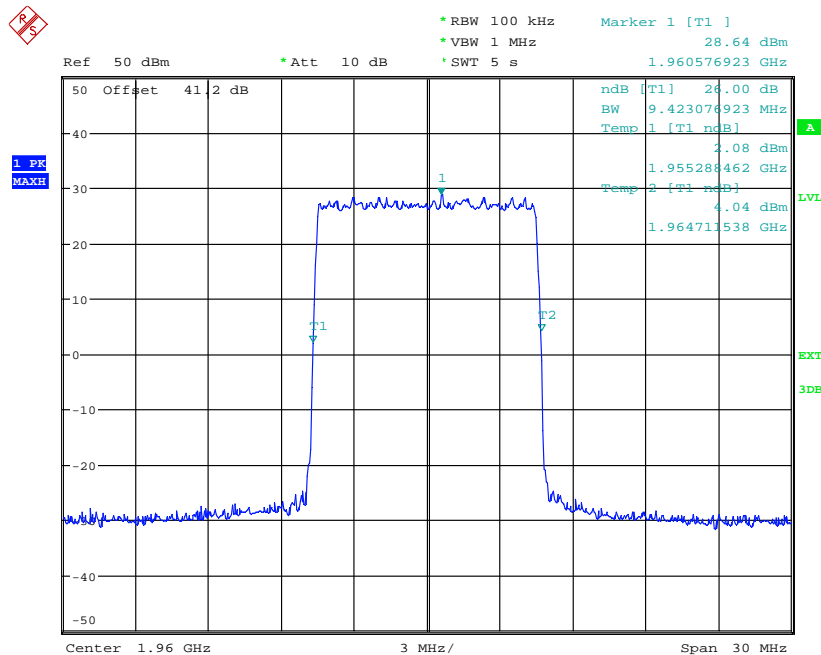
Date: 26.MAR.2014 14:51:49

Channel Position M - 16QAM / Bandwidth 10.0 MHz



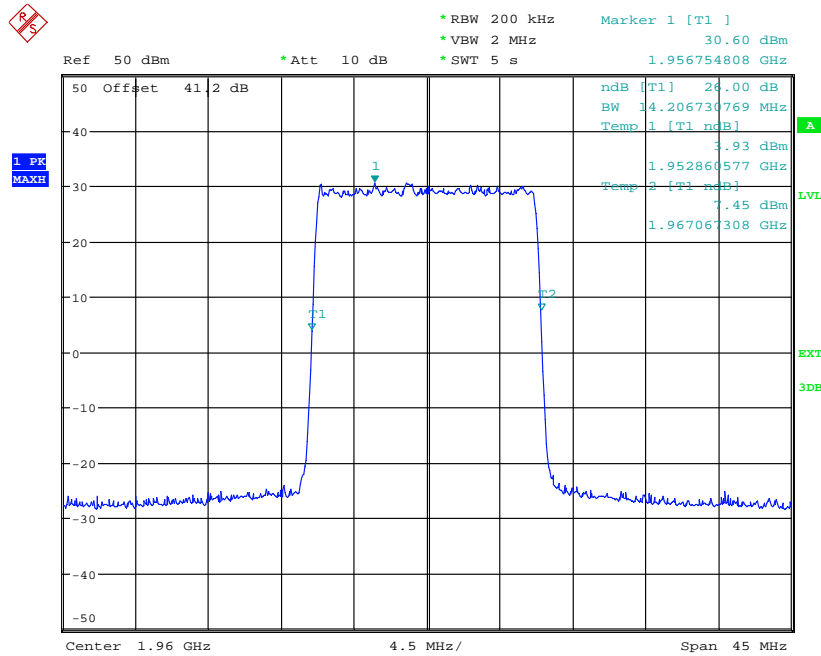
Date: 26.MAR.2014 14:54:06

Channel Position M - 64QAM / Bandwidth 10.0 MHz



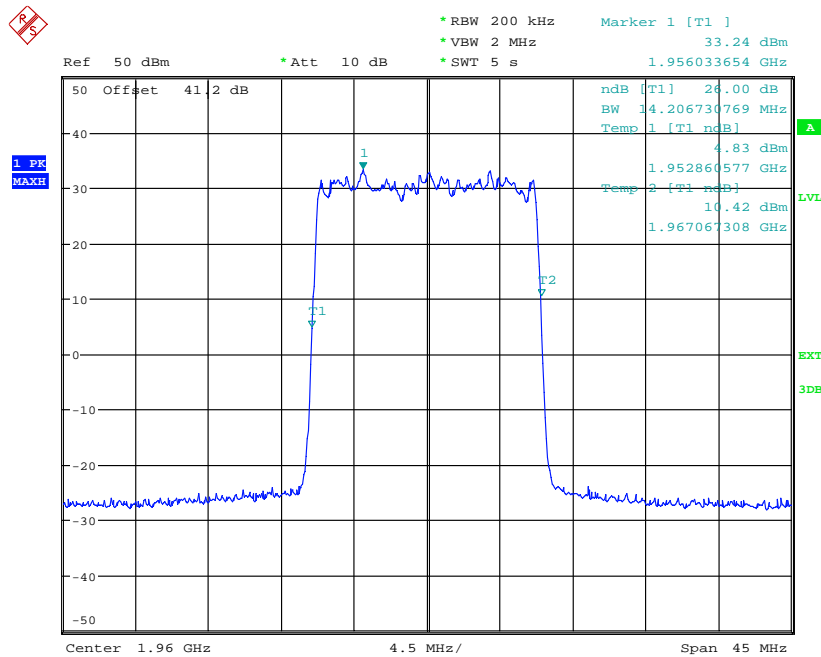
Date: 26.MAR.2014 15:06:42

Channel Position M - QPSK / Bandwidth 15.0 MHz



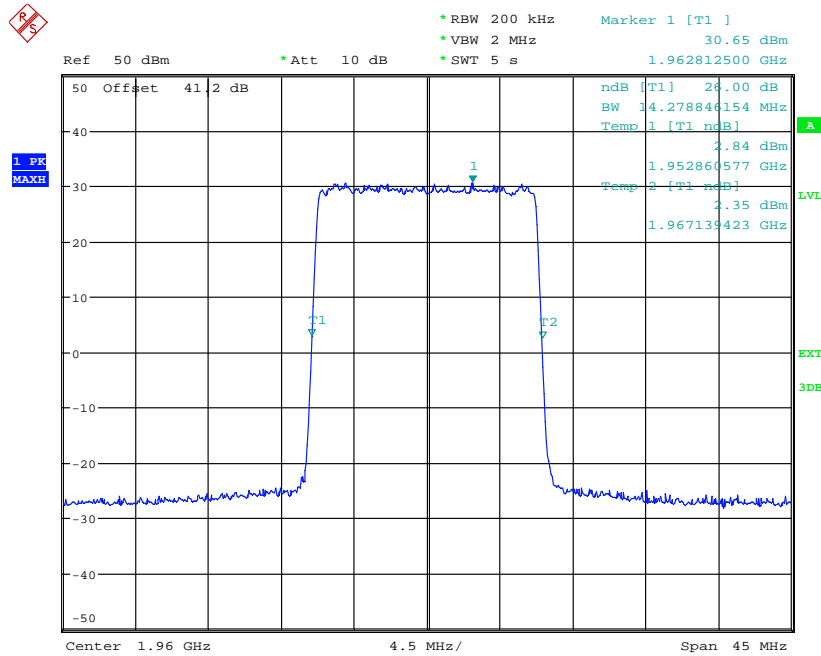
Date: 26.MAR.2014 15:13:50

Channel Position M - 16QAM / Bandwidth 15.0 MHz



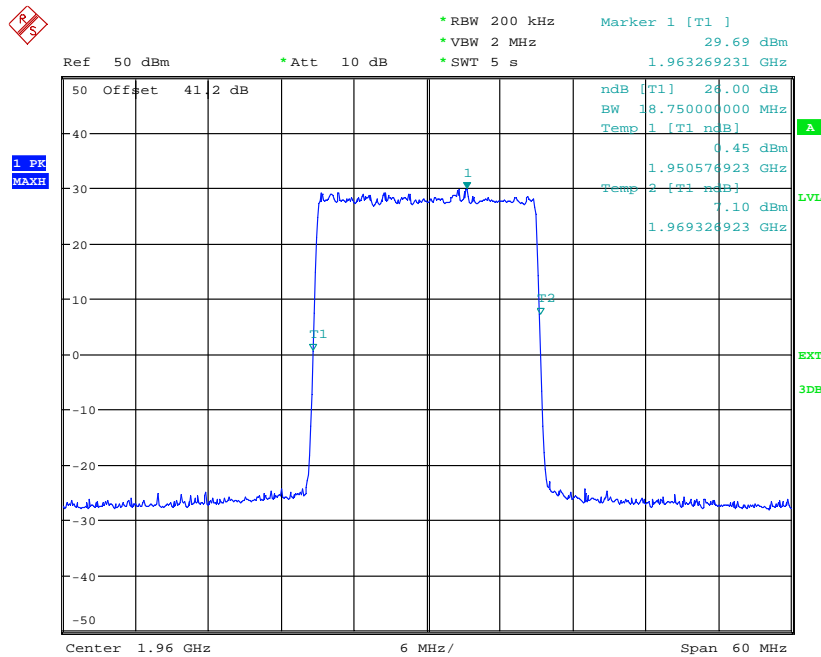
Date: 26.MAR.2014 15:12:37

Channel Position M - 64QAM / Bandwidth 15.0 MHz



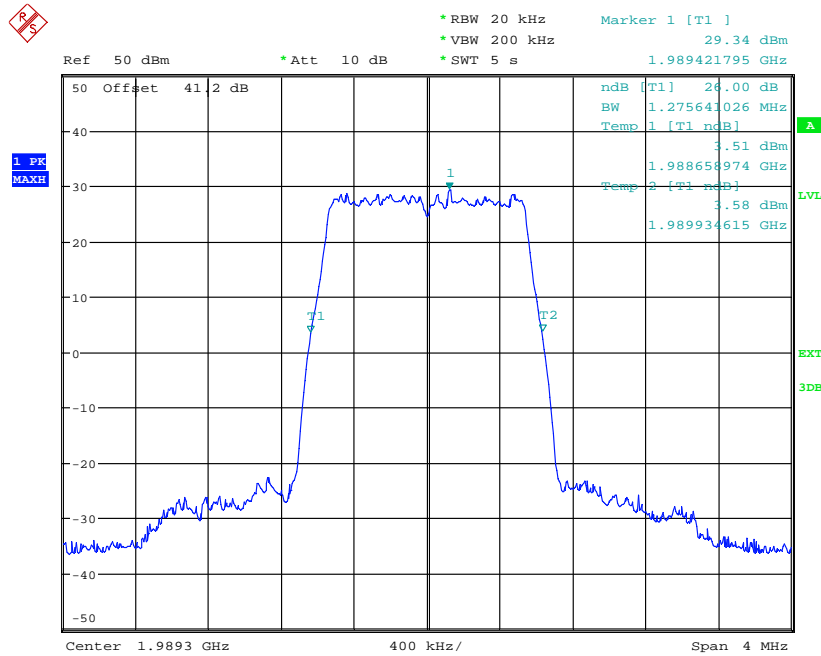
Date: 26.MAR.2014 15:10:32

Channel Position M - QPSK / Bandwidth 20.0 MHz



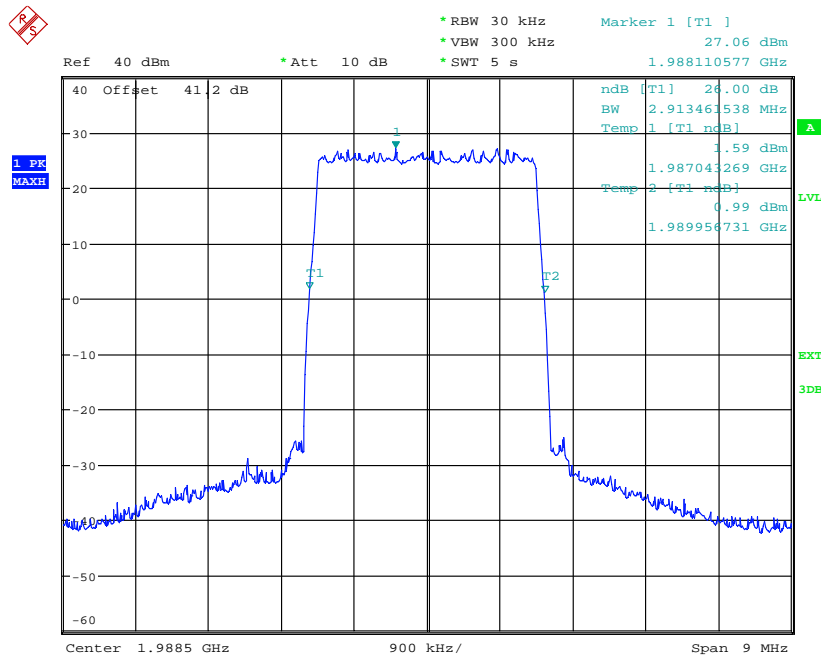
Date: 26.MAR.2014 15:25:11

Channel Position T - QPSK / Bandwidth 1.4 MHz



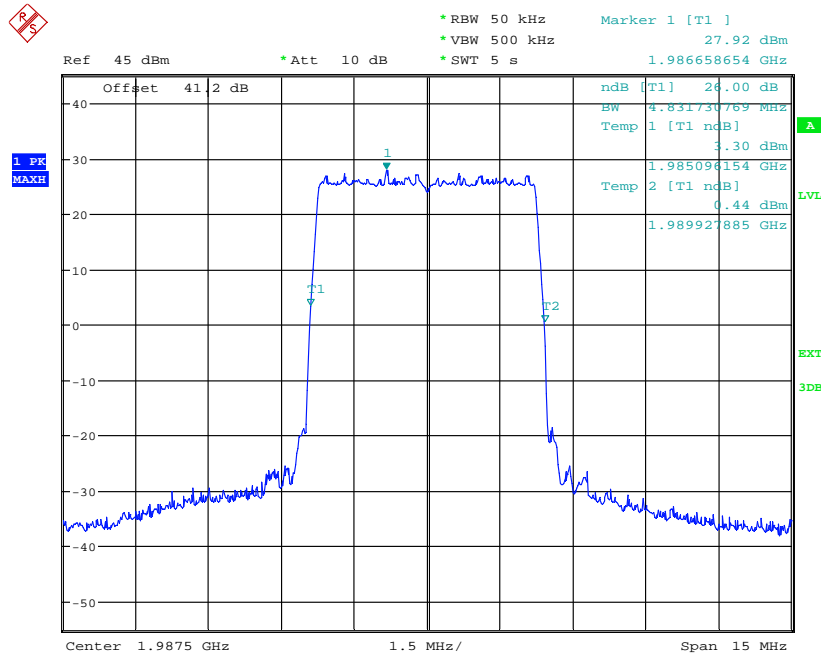
Date: 26.MAR.2014 14:00:28

Channel Position T - QPSK / Bandwidth 3.0 MHz



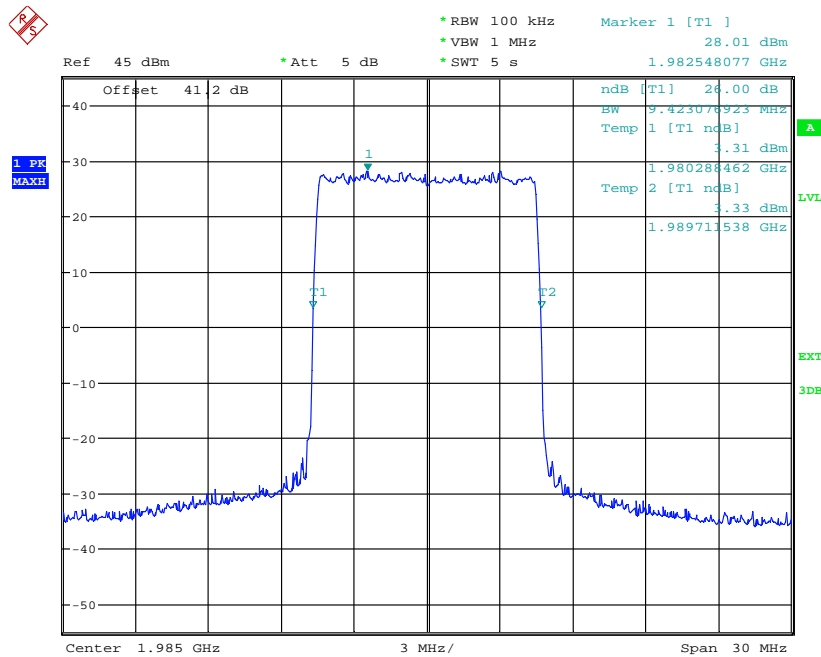
Date: 27.MAR.2014 09:20:38

Channel Position T - QPSK / Bandwidth 5.0 MHz



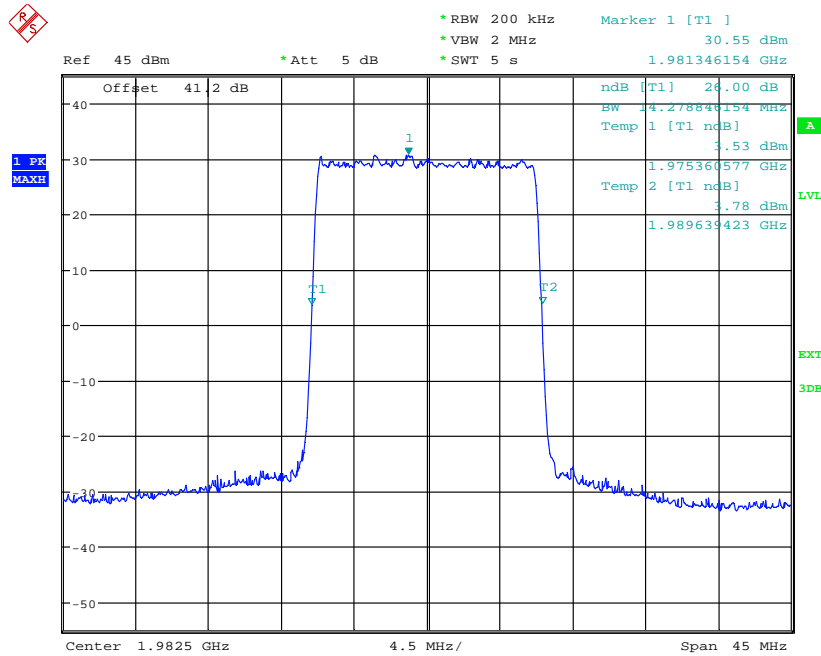
Date: 27.MAR.2014 09:55:02

Channel Position T - QPSK / Bandwidth 10.0 MHz



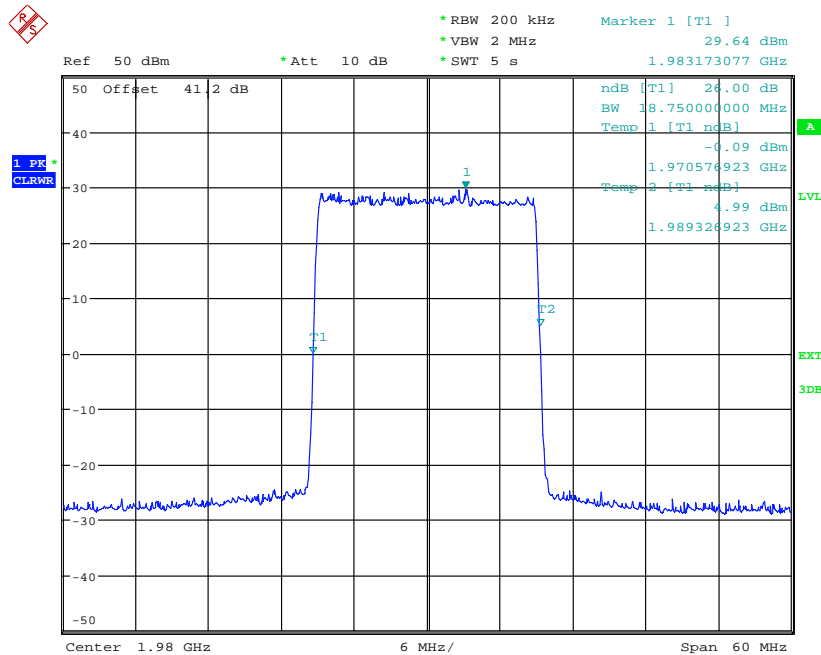
Date: 27.MAR.2014 10:14:44

Channel Position T - QPSK / Bandwidth 15.0 MHz



Date: 27.MAR.2014 10:27:09

Channel Position T - QPSK / Bandwidth 20.0 MHz



Date: 26.MAR.2014 15:44:08

2.4 SPURIOUS EMISSION AT BAND EDGE

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238(b)
Industry Canada RSS-133, Clause 6.5

2.4.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.4.3 Date of Test and Modification State

26 to 31 March 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	24.1 - 25.5°C
Relative Humidity	26.5 - 28.6%

2.4.6 Test Method

In accordance with FCC CFR 47 Part 24, Clause 24.238(b) and Industry Canada RSS-133, Clause 6.5, any emissions outside of the block edges shall be attenuated by at least $43 + 10 \log(P)$. In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth may be used.

For measurements of emissions > 1MHz away from the band edges, a RBW of 1MHz or greater should be used. A resolution bandwidth of 50kHz was used between 1MHz to 6MHz from the band edge to improve measurement accuracy. To compensate for the reduced measurement bandwidth, the limit was adjusted respectively.

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 results are shown in the plots below.

2.4.7 Test Results

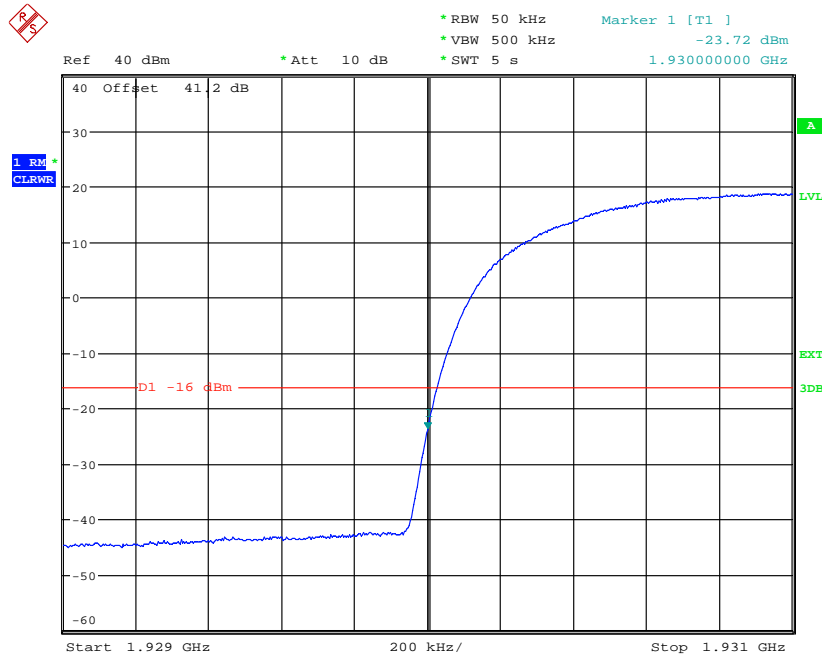
Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

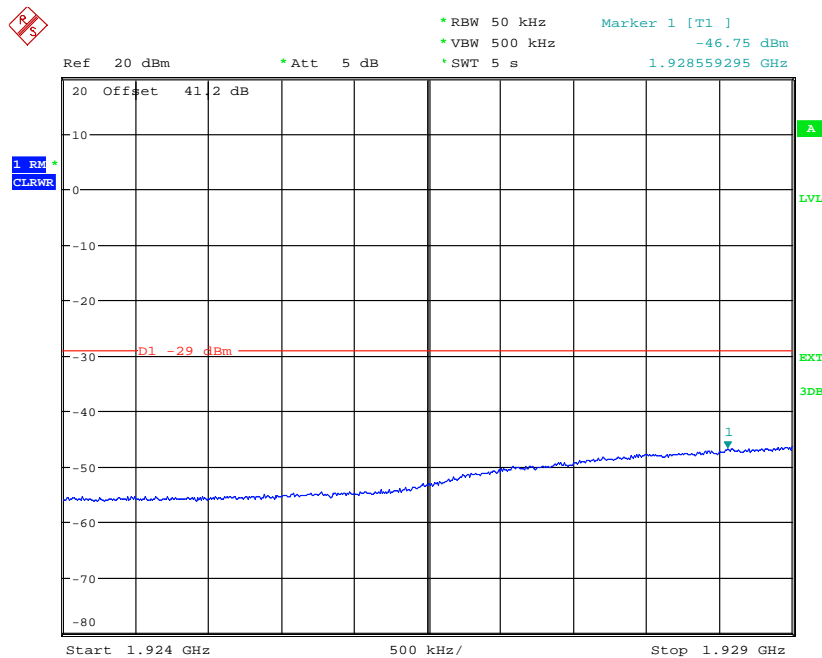
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	5.0 MHz	1932.4MHz
Channel Position T 1990.0 MHz	5.0 MHz	1987.6MHz

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 – 16QAM / Bandwidth 5.0 MHz

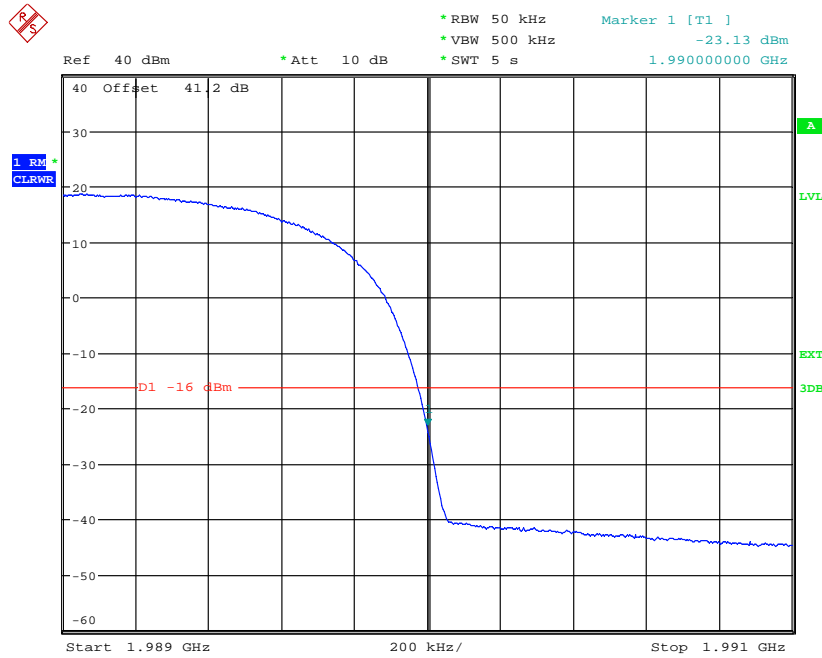


Date: 28.MAR.2014 14:08:25

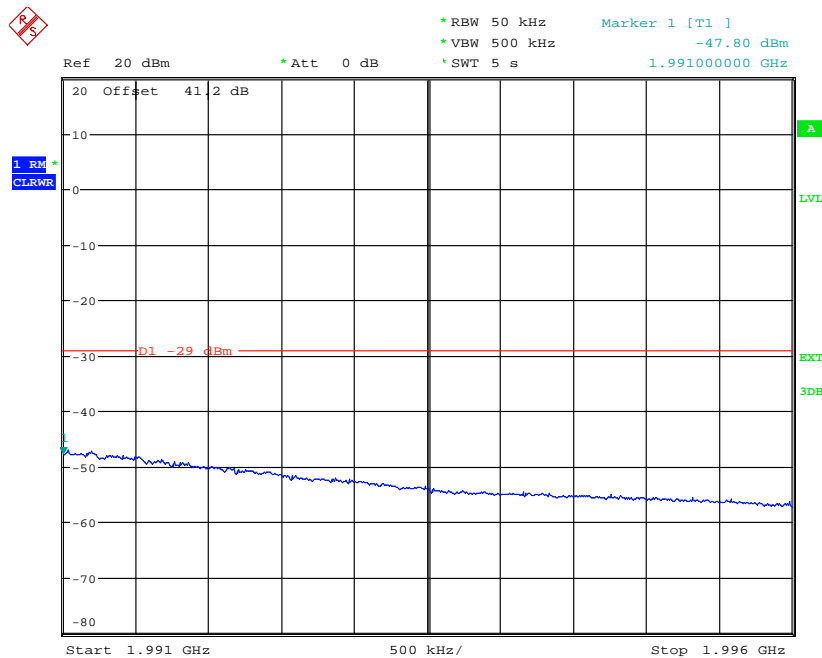


Date: 28.MAR.2014 14:09:42

Channel Position T – 16QAM / Bandwidth 5.0 MHz



Date: 28.MAR.2014 14:27:47



Date: 28.MAR.2014 14:28:30

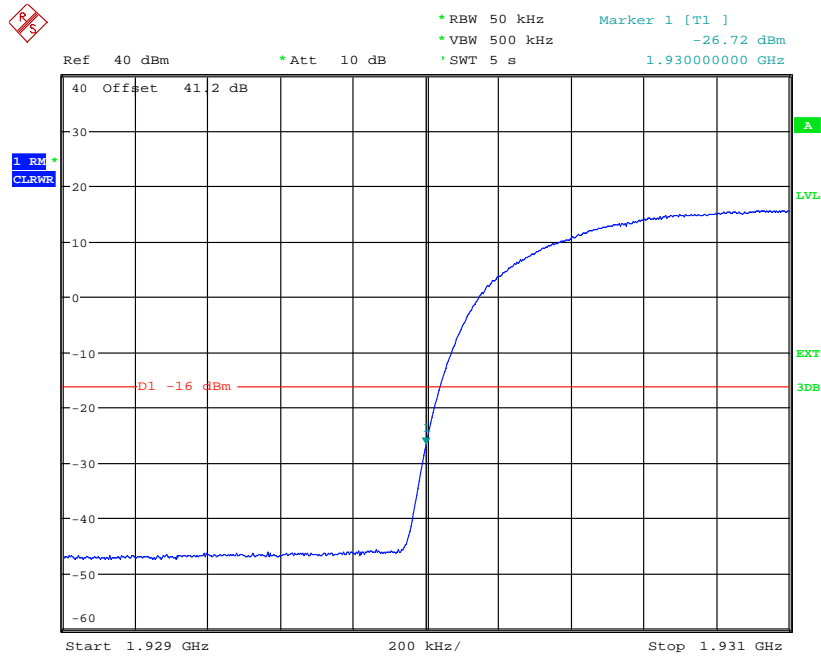
Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

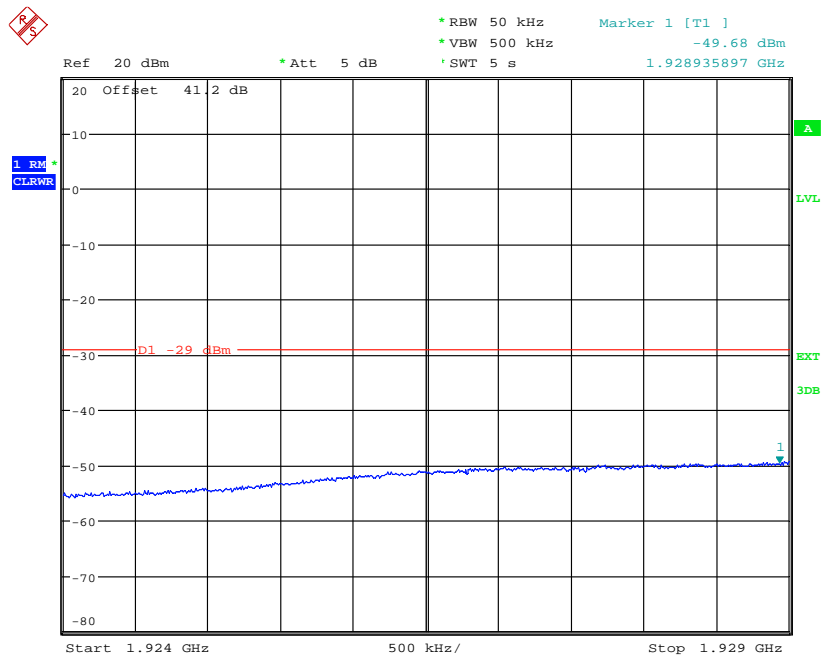
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	5.0 MHz	1932.4MHz + 1937.4MHz
Channel Position T_{RFBW} 1990.0 MHz	5.0 MHz	1982.6MHz + 1987.6MHz

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} - 16QAM / Bandwidth 5.0 MHz

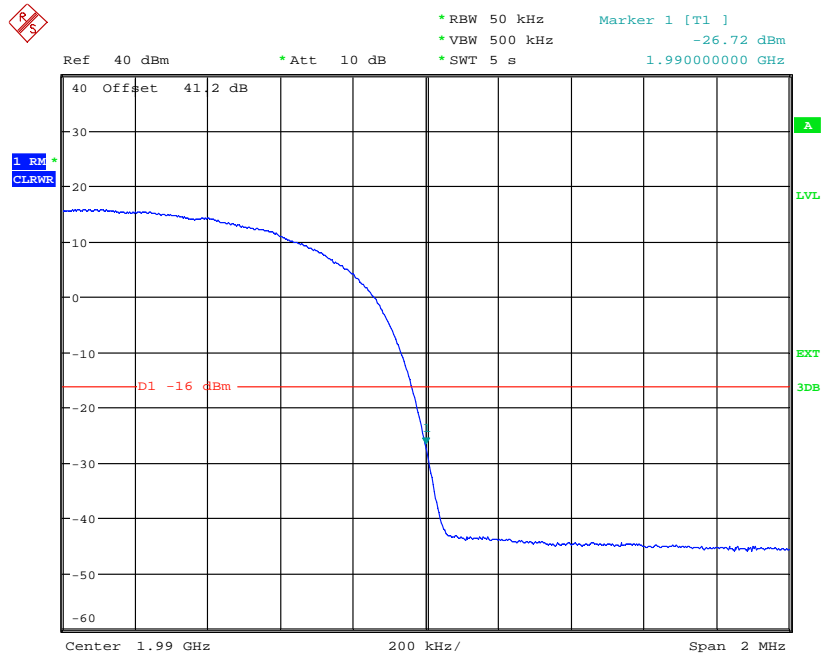


Date: 31.MAR.2014 11:17:31

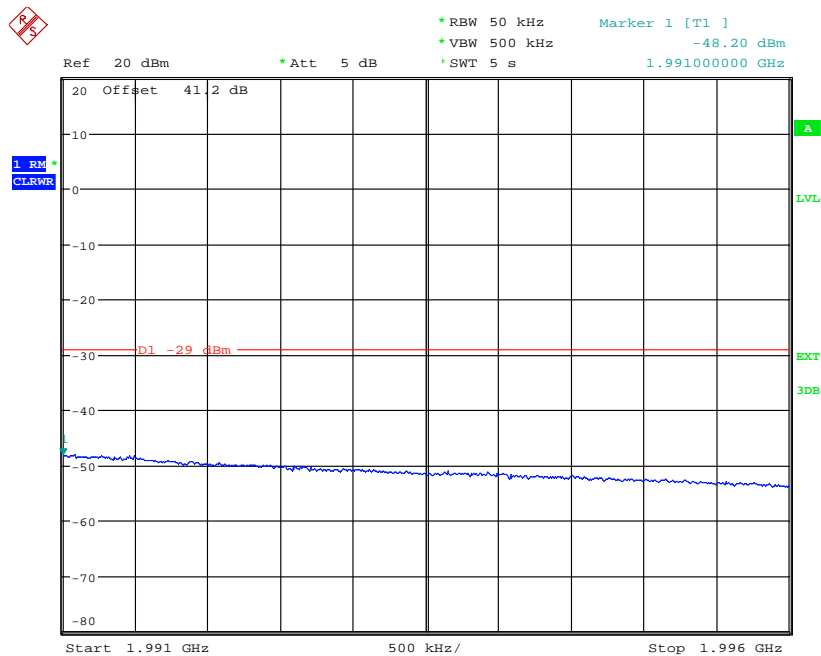


Date: 31.MAR.2014 11:16:46

Channel Position T_{RFBW} - 16QAM / Bandwidth 5.0 MHz



Date: 31.MAR.2014 11:26:06



Date: 31.MAR.2014 11:26:56

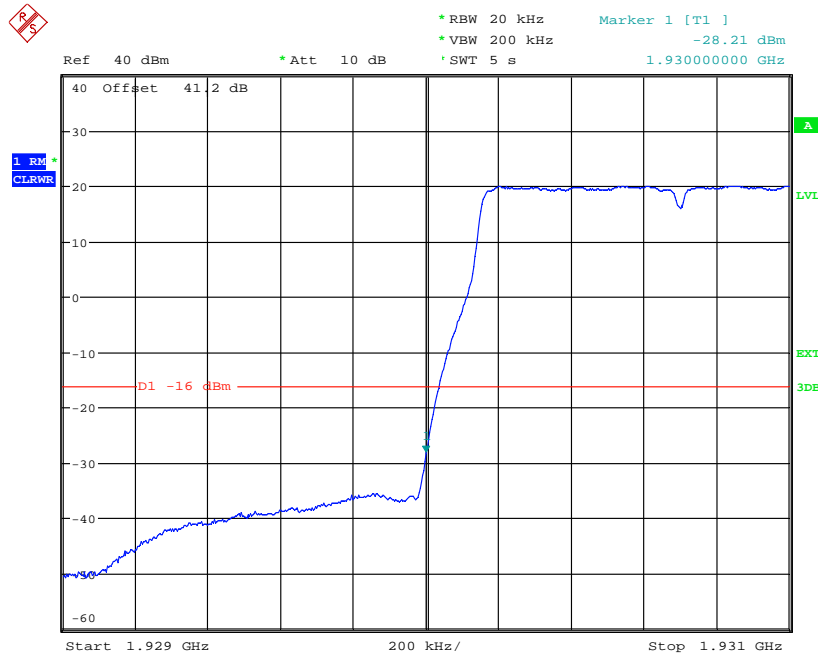
Configuration L-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

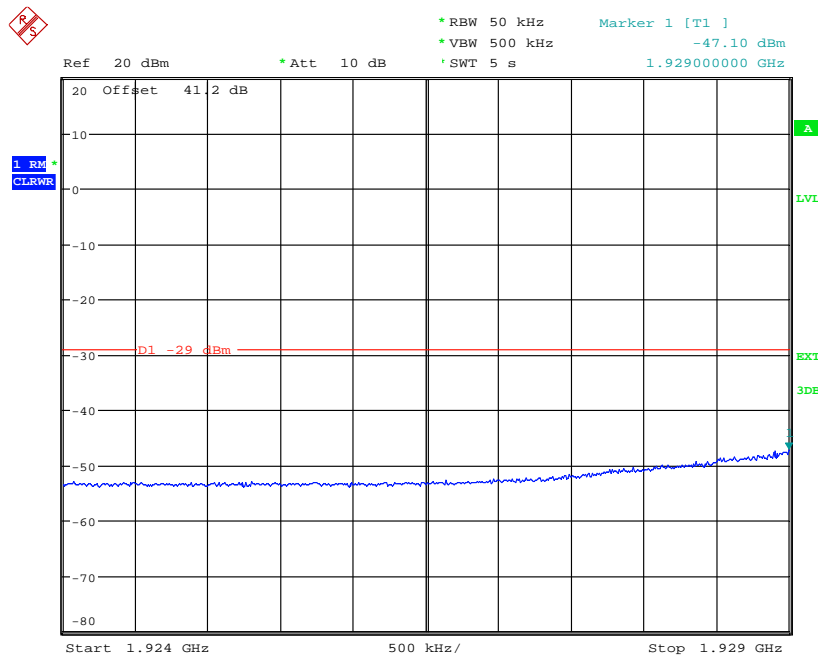
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B 1930.0 MHz	1.4 MHz	1930.7MHz
	3.0 MHz	1931.5MHz
	5.0 MHz	1932.5MHz
	10.0 MHz	1935.0MHz
	15.0 MHz	1937.5MHz
	20.0 MHz	1940.0MHz
Channel Position T 1990.0 MHz	1.4 MHz	1989.3MHz
	3.0 MHz	1988.5MHz
	5.0 MHz	1987.5MHz
	10.0 MHz	1985.0MHz
	15.0 MHz	1982.5MHz
	20.0 MHz	1980.0MHz

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 made available to the end user.

Channel Position B - QPSK / Bandwidth 1.4 MHz

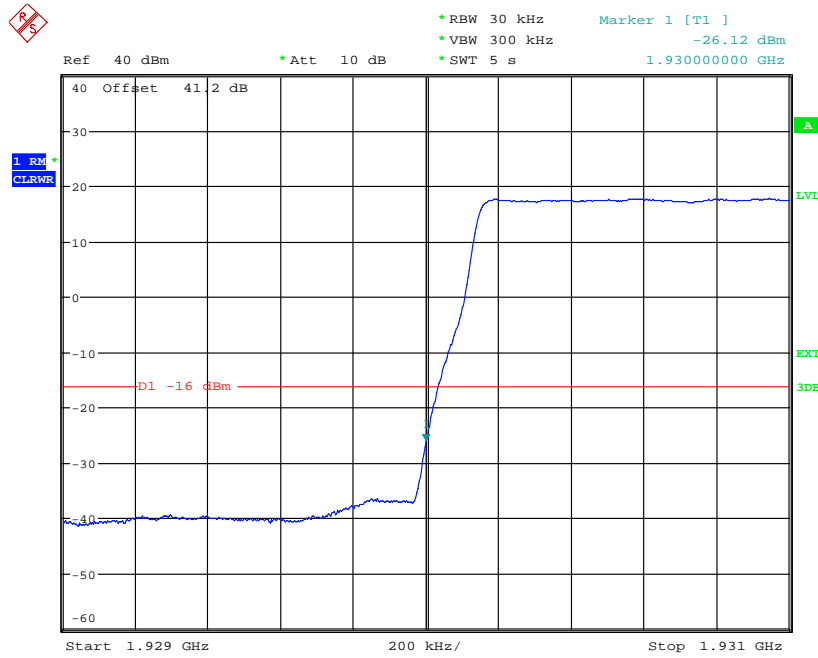


Date: 26.MAR.2014 13:53:53

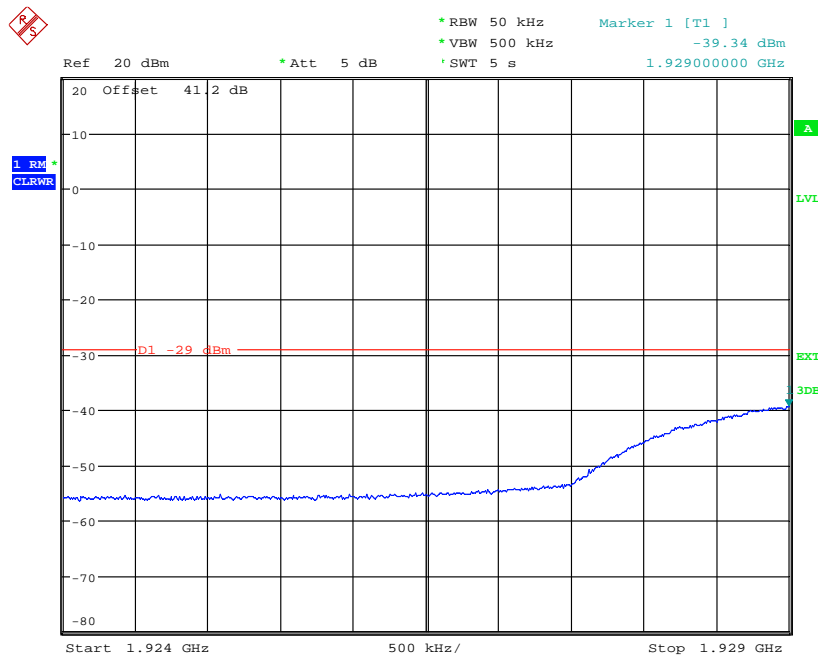


Date: 26.MAR.2014 13:55:37

Channel Position B - QPSK / Bandwidth 3.0 MHz

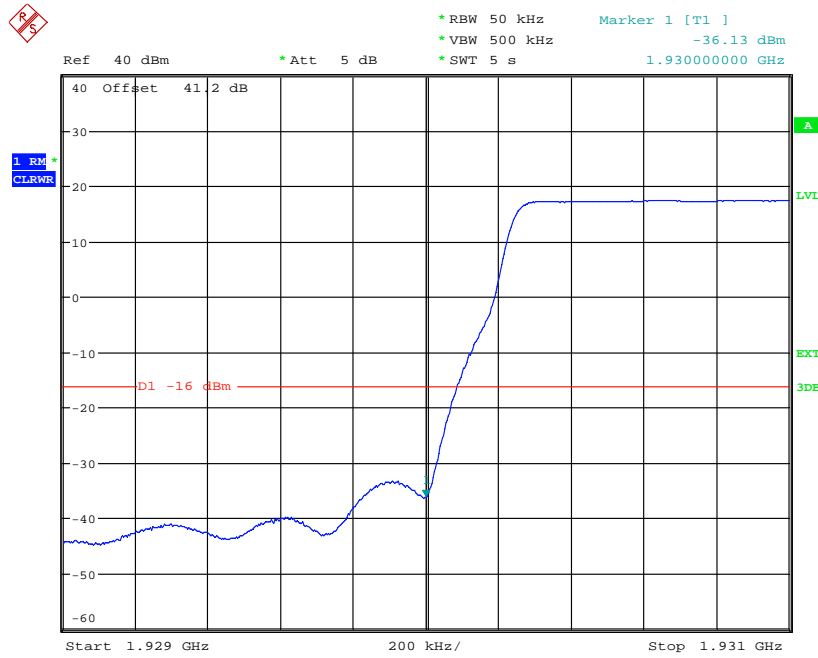


Date: 26.MAR.2014 16:21:12

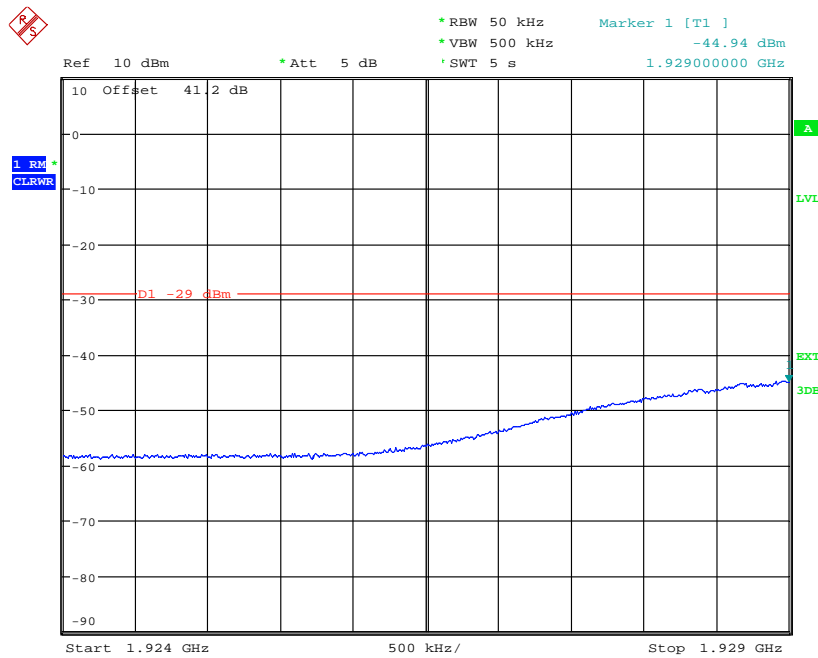


Date: 26.MAR.2014 16:22:22

Channel Position B - QPSK / Bandwidth 5.0 MHz

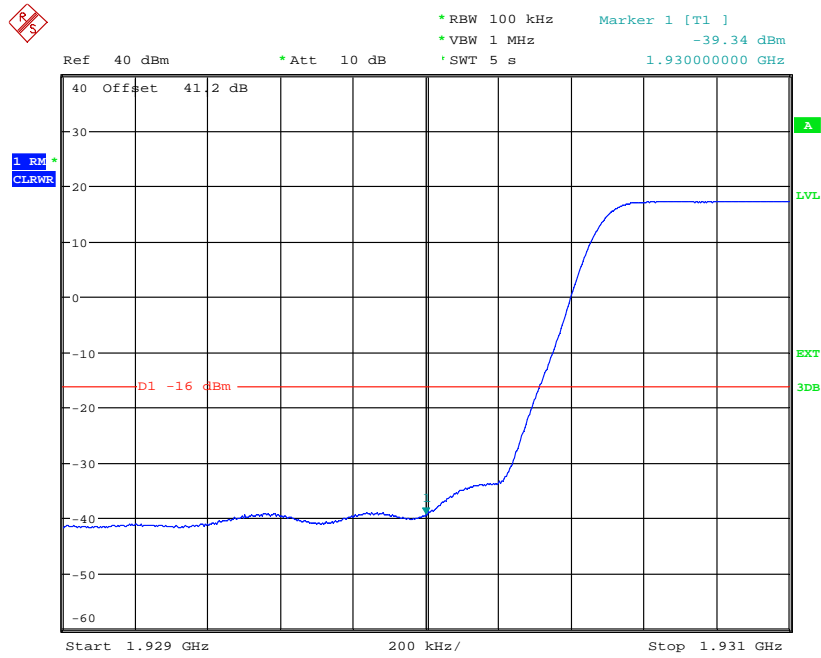


Date: 27.MAR.2014 09:27:51

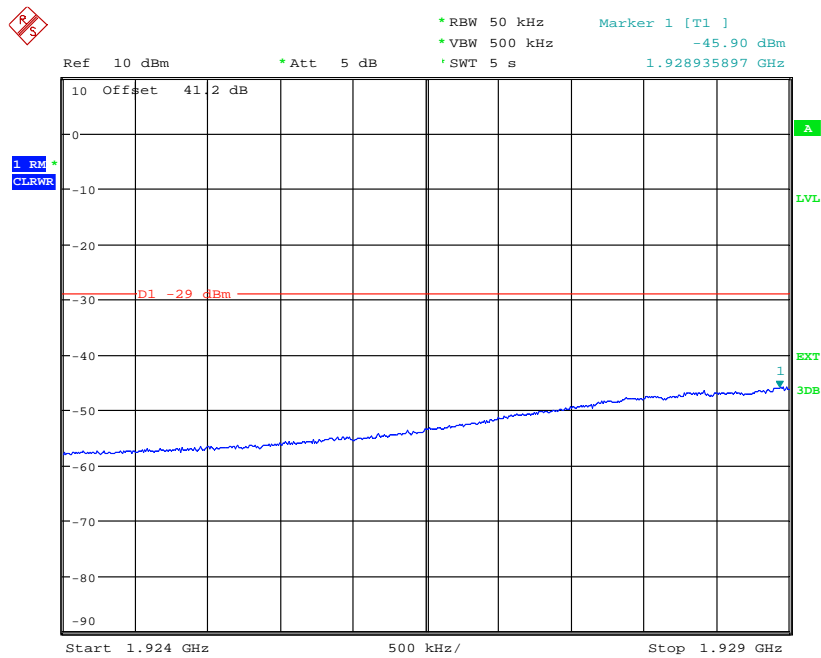


Date: 27.MAR.2014 09:27:04

Channel Position B - QPSK / Bandwidth 10.0 MHz

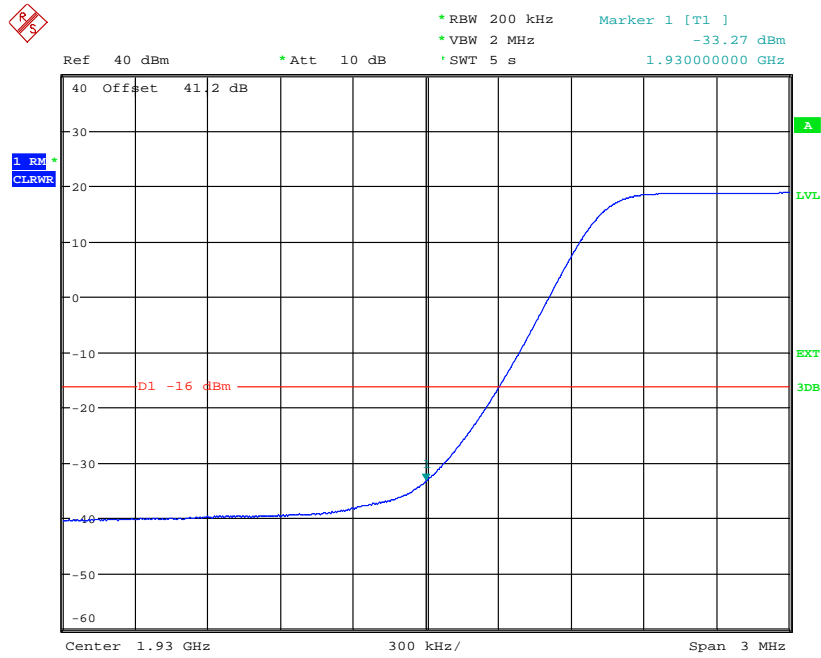


Date: 27.MAR.2014 10:00:51

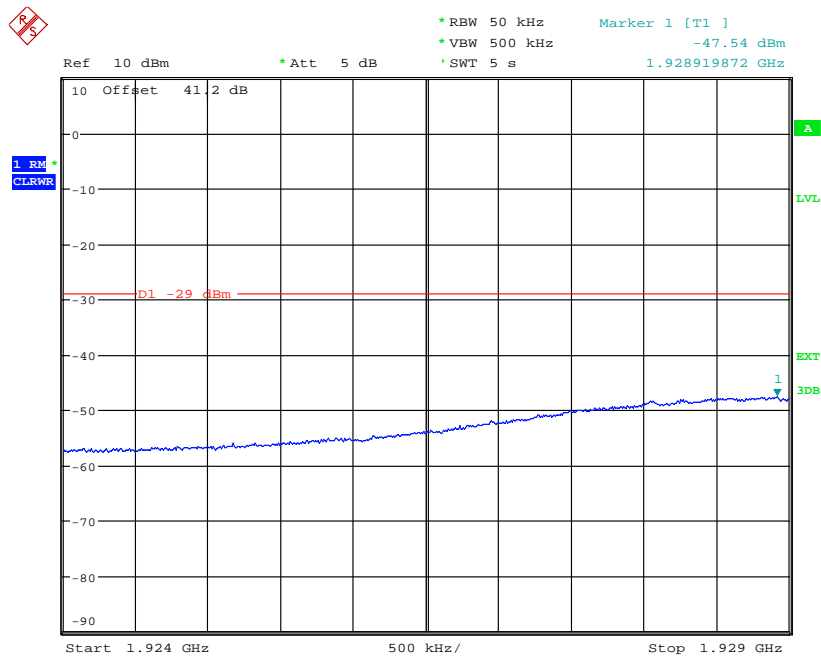


Date: 27.MAR.2014 09:59:43

Channel Position B - QPSK / Bandwidth 15.0 MHz

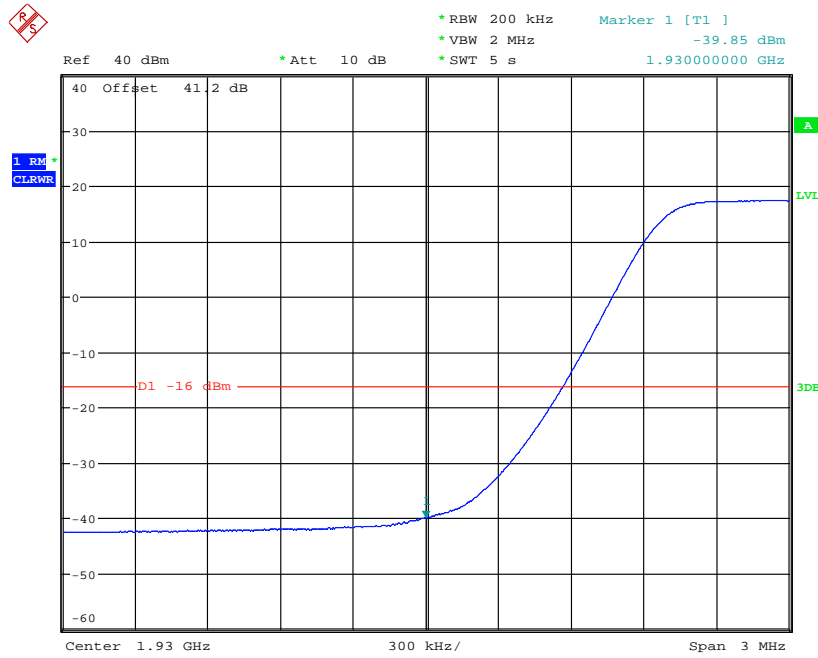


Date: 27.MAR.2014 10:22:41

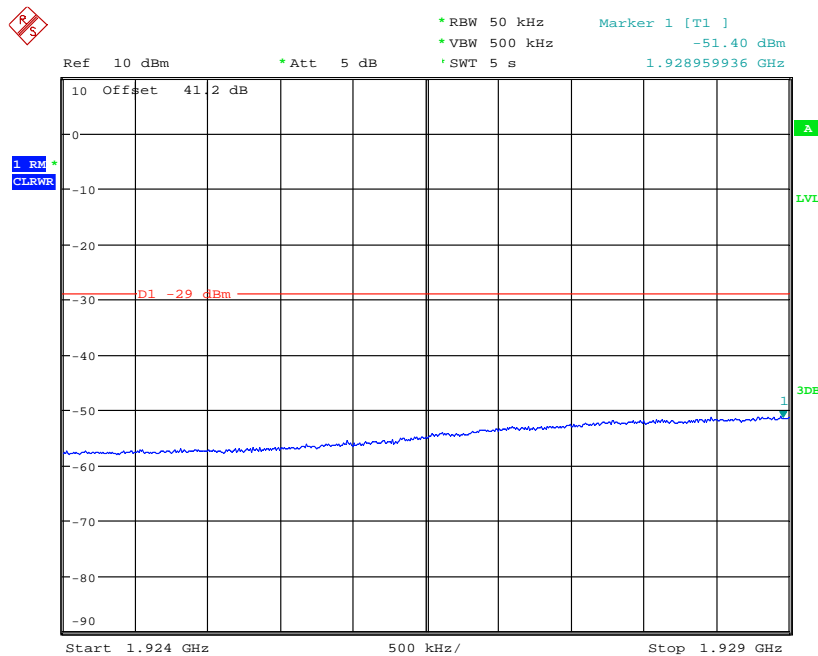


Date: 27.MAR.2014 10:20:45

Channel Position B - QPSK / Bandwidth 20.0 MHz

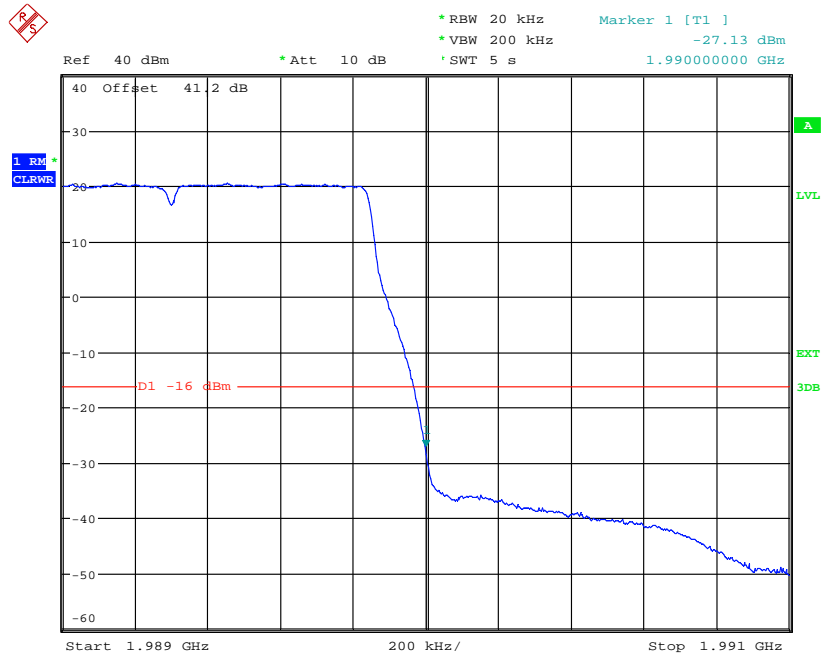


Date: 22.APR.2014 11:41:10

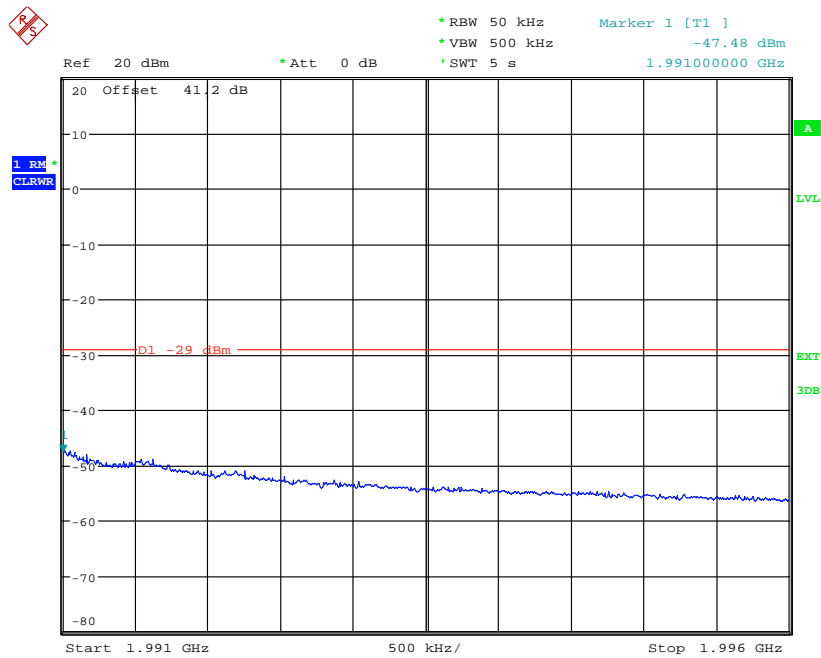


Date: 22.APR.2014 11:42:07

Channel Position T - QPSK / Bandwidth 1.4 MHz

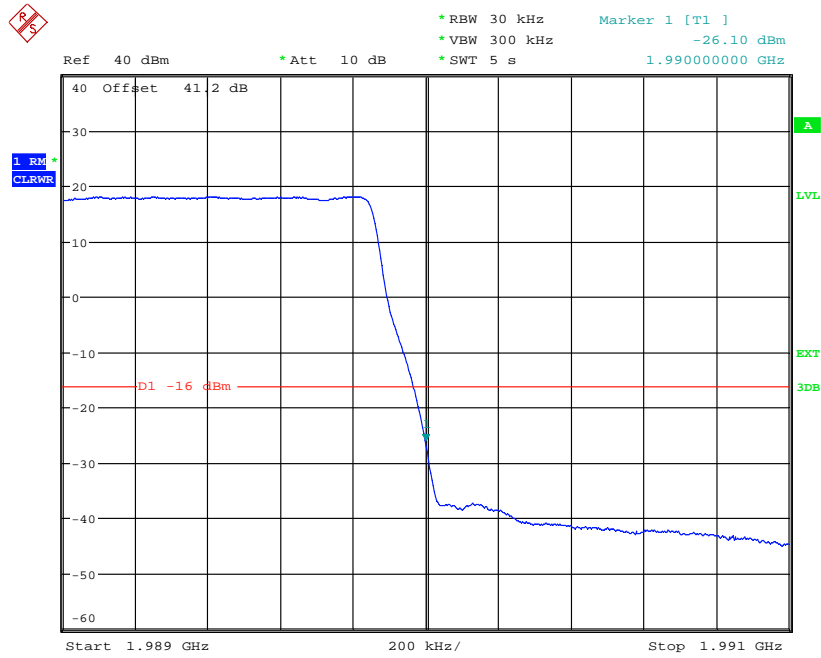


Date: 27.MAR.2014 14:42:04

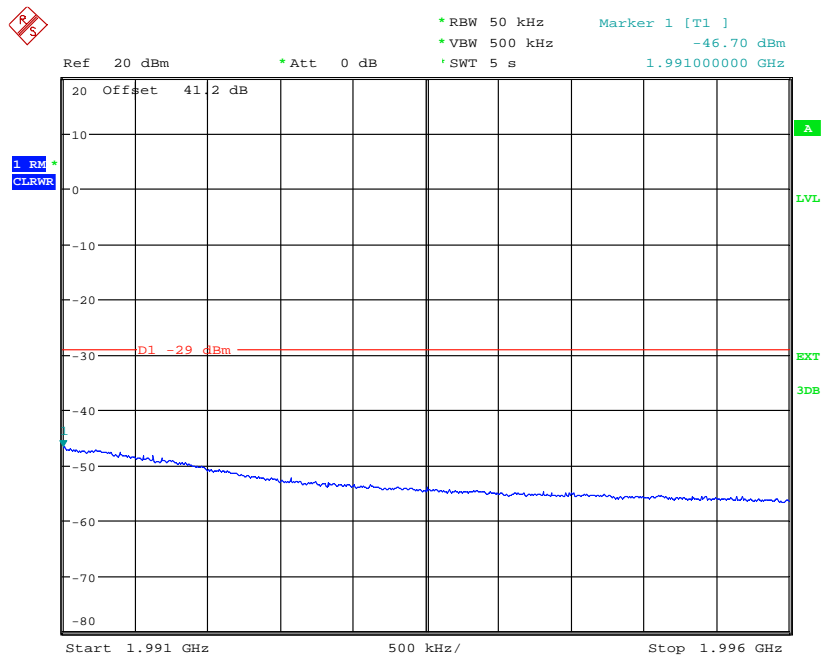


Date: 27.MAR.2014 14:43:05

Channel Position T - QPSK / Bandwidth 3.0 MHz

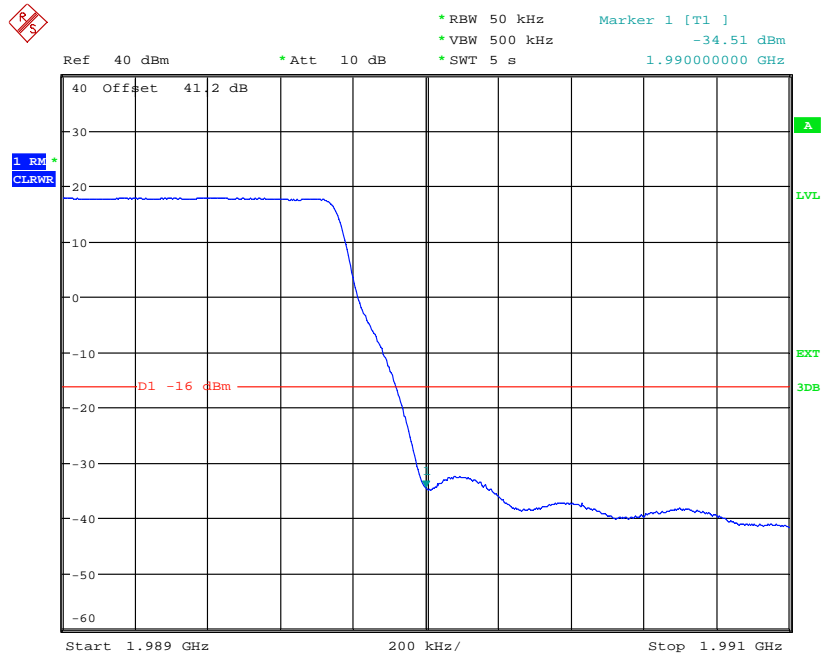


Date: 27.MAR.2014 09:22:58

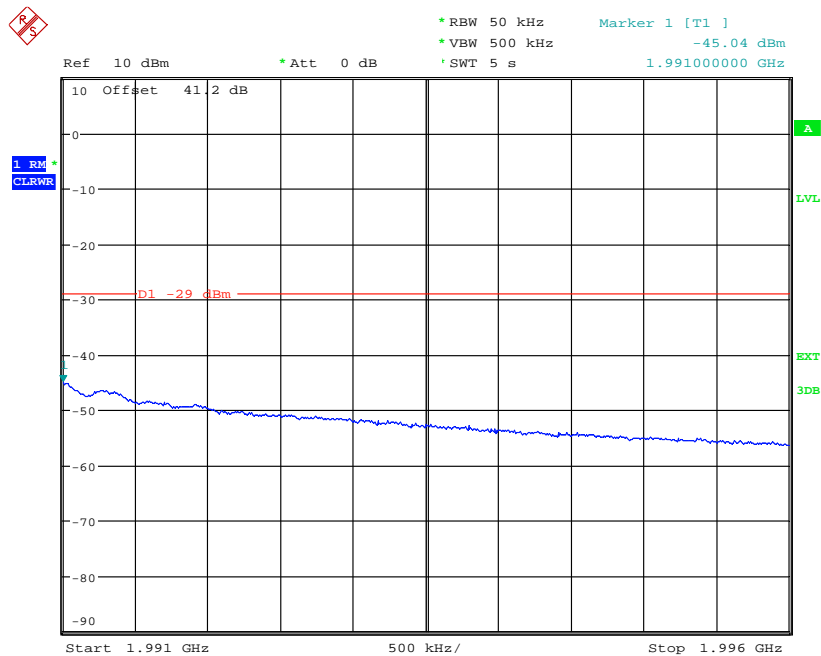


Date: 27.MAR.2014 09:23:57

Channel Position T - QPSK / Bandwidth 5.0 MHz

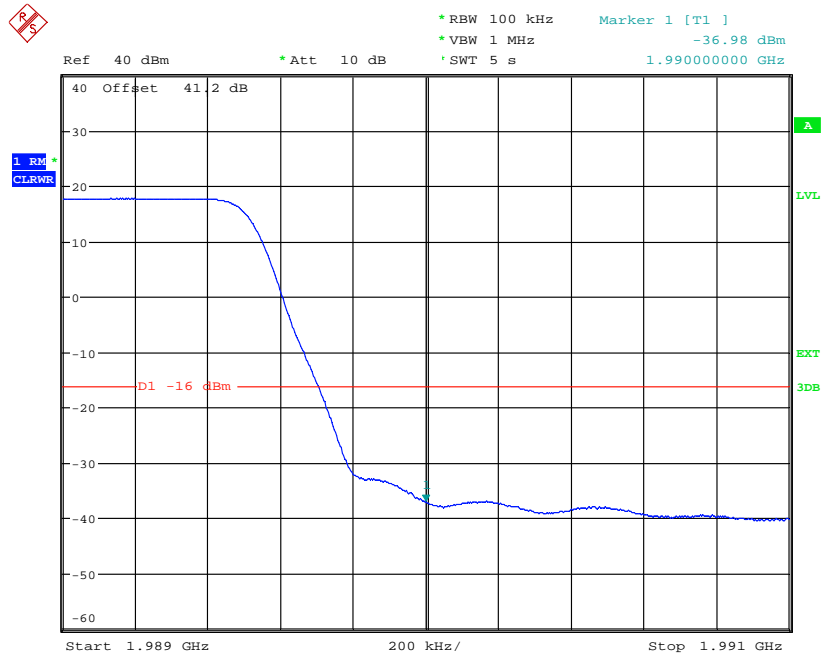


Date: 27.MAR.2014 09:56:21

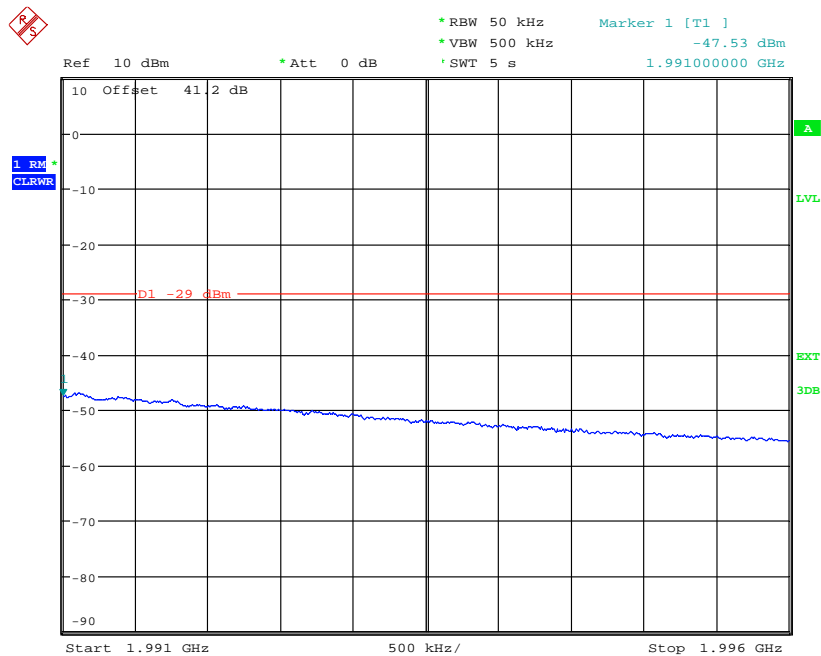


Date: 27.MAR.2014 09:57:08

Channel Position T - QPSK / Bandwidth 10.0 MHz

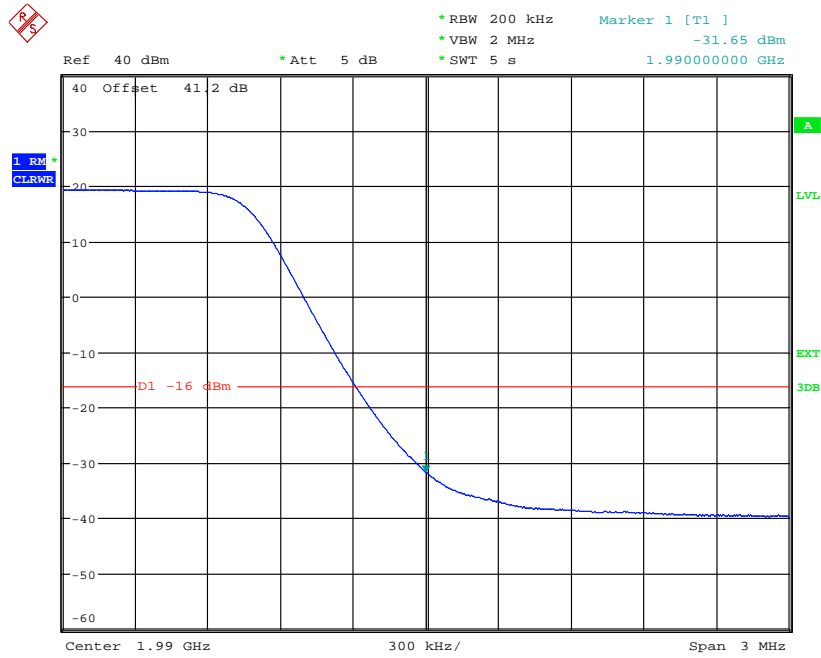


Date: 27.MAR.2014 10:16:15

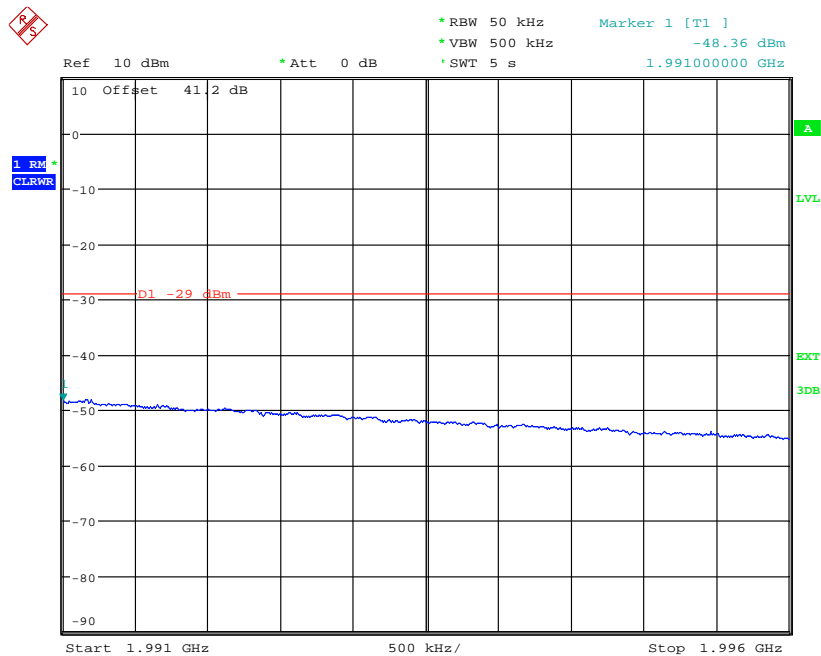


Date: 27.MAR.2014 10:17:13

Channel Position T - QPSK / Bandwidth 15.0 MHz

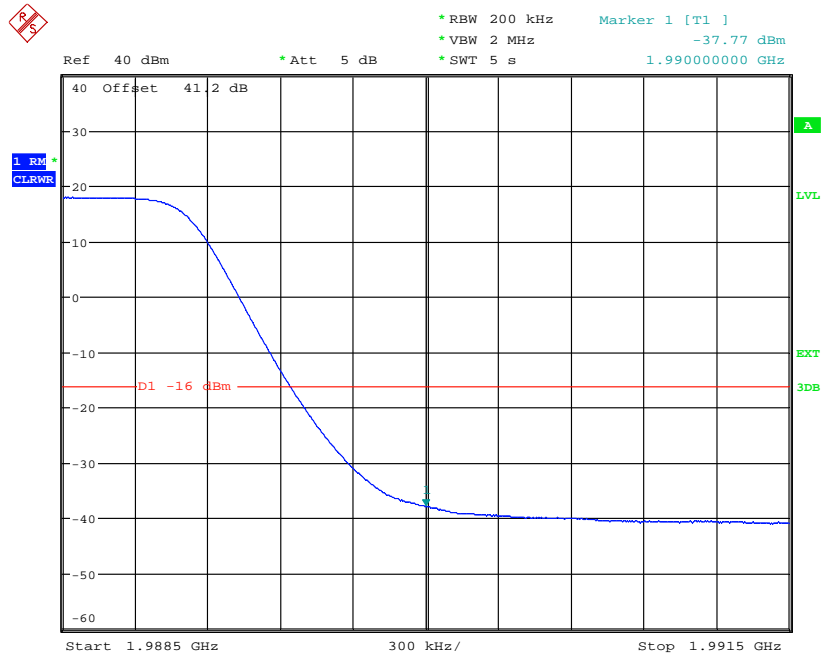


Date: 27.MAR.2014 10:28:38

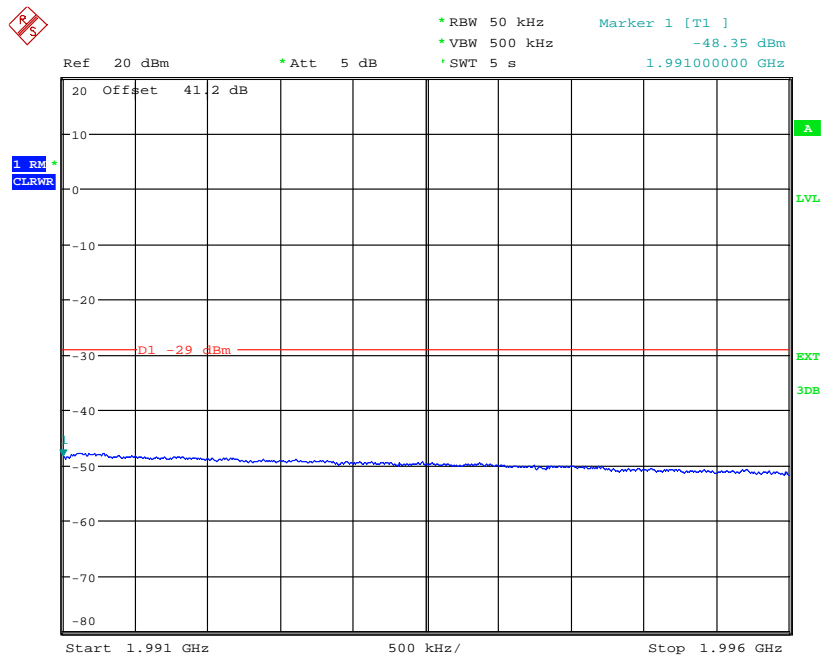


Date: 27.MAR.2014 10:30:22

Channel Position T - QPSK / Bandwidth 20.0 MHz



Date: 26.MAR.2014 15:50:25



Date: 26.MAR.2014 15:48:53

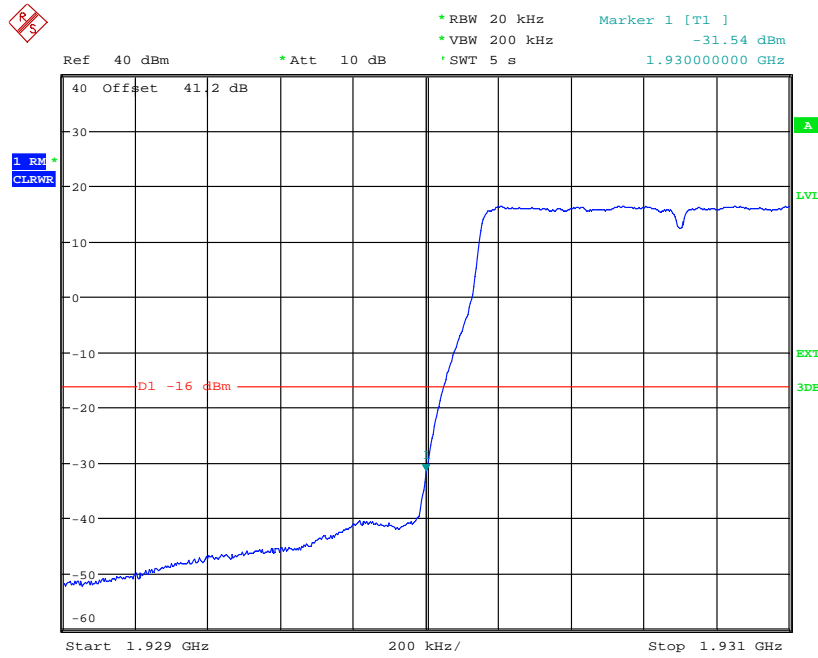
Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

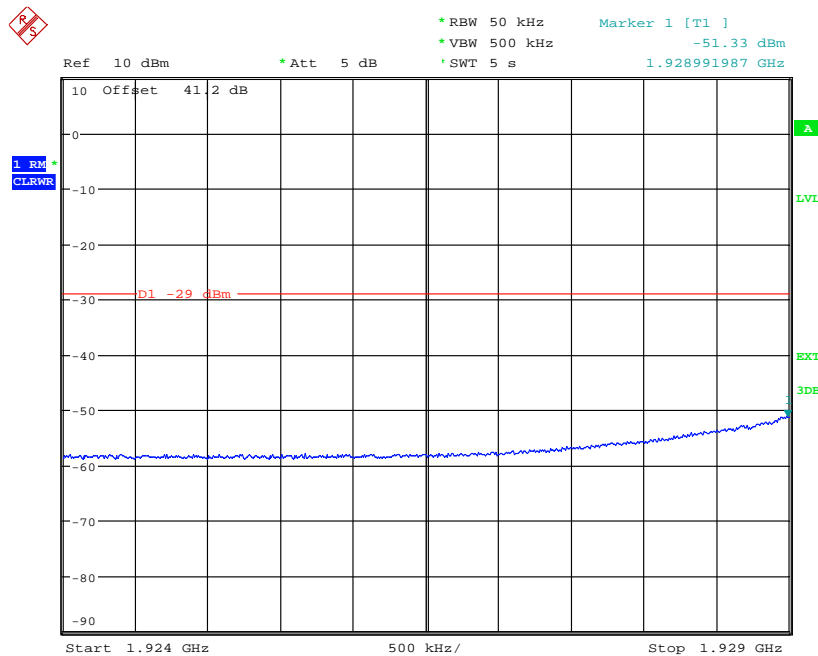
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	1.4 MHz	1930.7MHz + 1932.1MHz
	3.0 MHz	1931.5MHz + 1934.5MHz
	5.0 MHz	1932.5MHz + 1937.5MHz
	10.0 MHz	1935.0MHz + 1945.0MHz
	15.0 MHz	-
	20.0 MHz	-
Channel Position T_{RFBW} 1990.0 MHz	1.4 MHz	1987.9MHz + 1989.3MHz
	3.0 MHz	1985.5MHz + 1988.5MHz
	5.0 MHz	1982.5MHz + 1987.5MHz
	10.0 MHz	1975.0MHz + 1985.0MHz
	15.0 MHz	-
	20.0 MHz	-

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

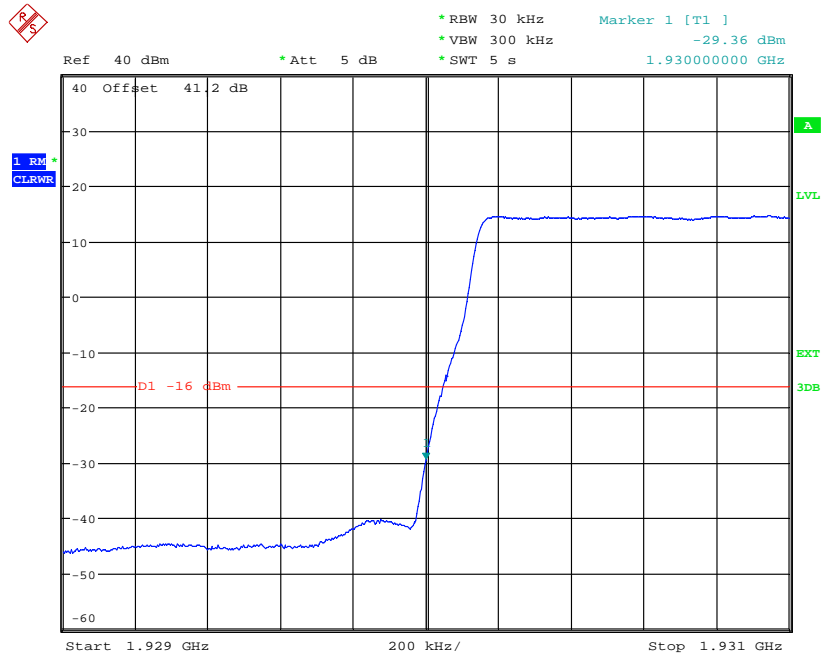


Date: 27.MAR.2014 16:17:12

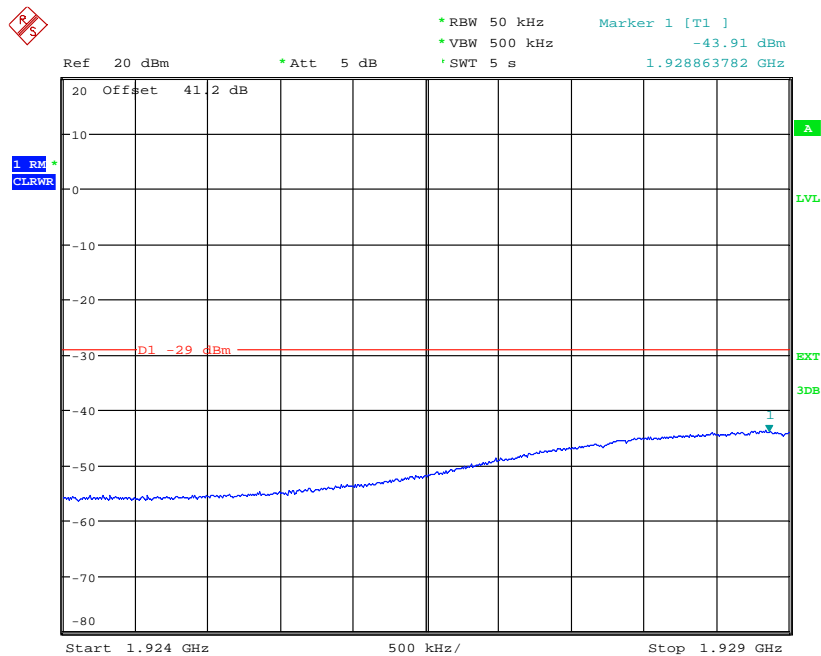


Date: 27.MAR.2014 16:16:20

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

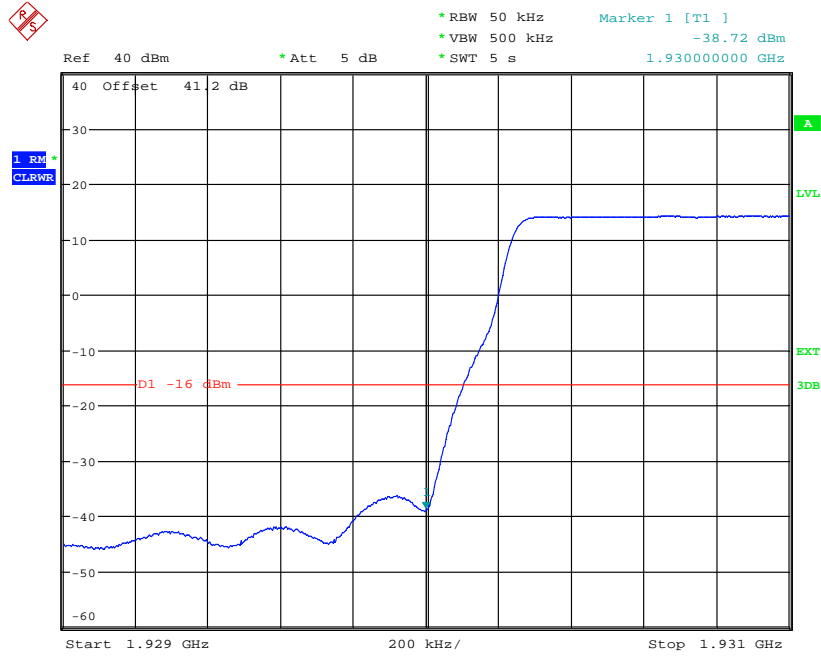


Date: 27.MAR.2014 16:22:43

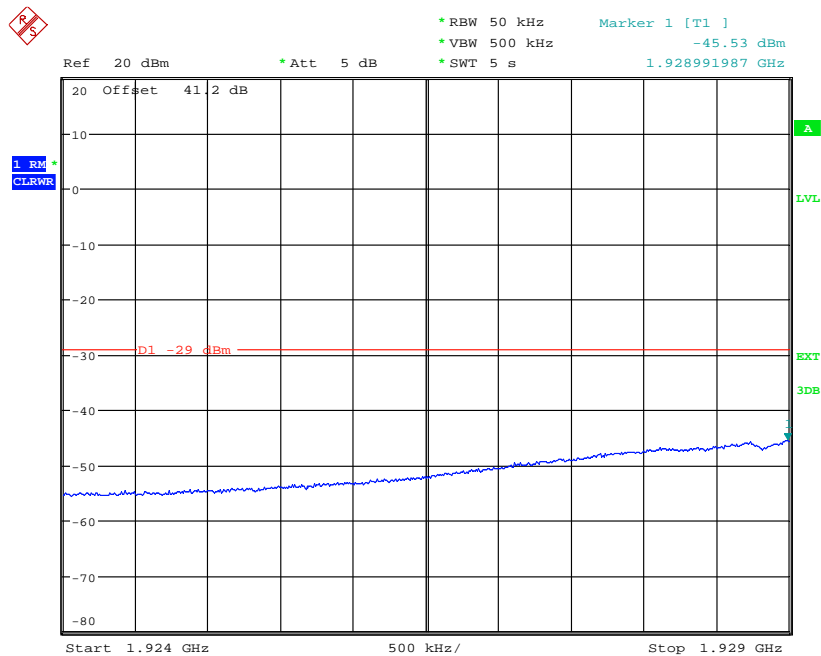


Date: 27.MAR.2014 16:25:51

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

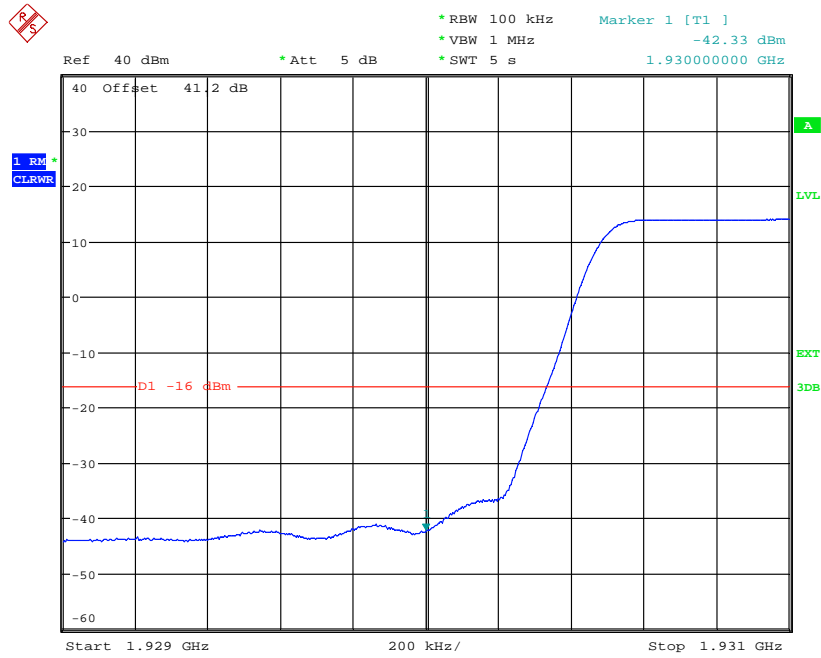


Date: 27.MAR.2014 16:33:15

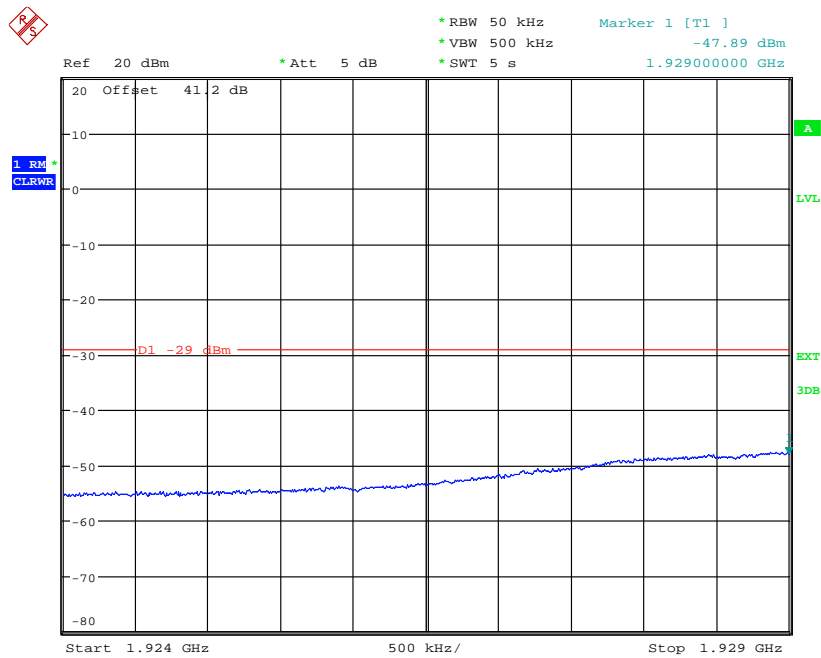


Date: 27.MAR.2014 16:32:25

Channel Position B_{RFBW} - QPSK / Bandwidth 10.0 MHz

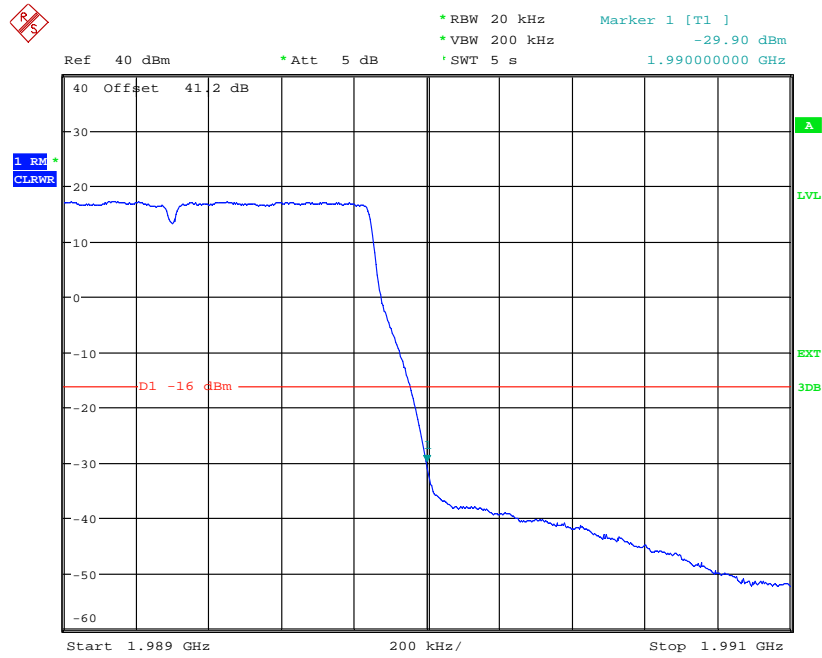


Date: 27.MAR.2014 16:35:16

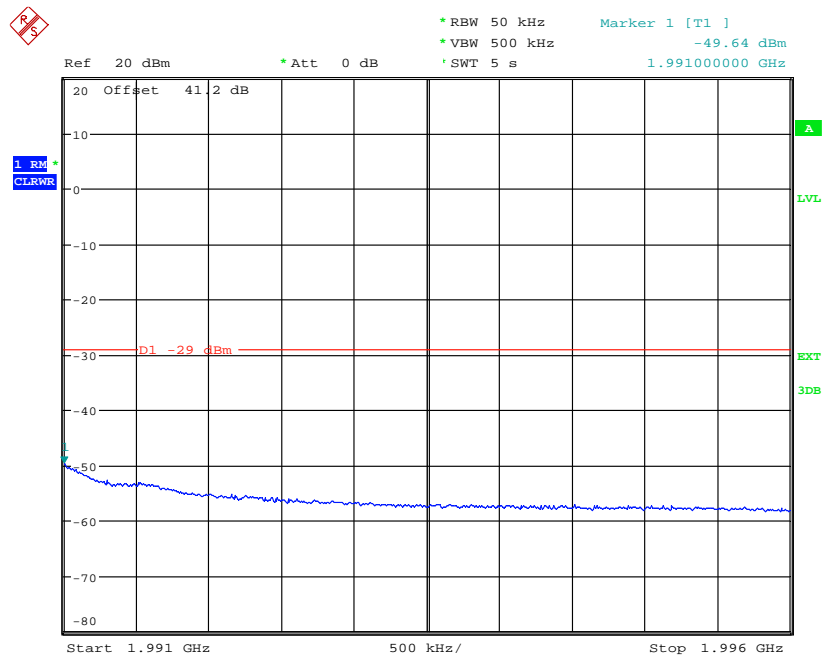


Date: 27.MAR.2014 16:35:54

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

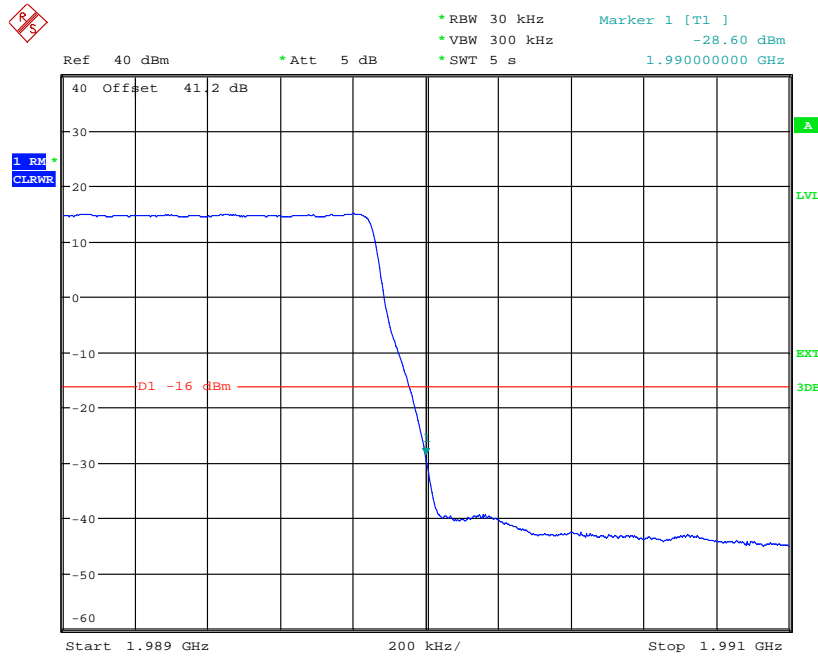


Date: 27.MAR.2014 16:21:27

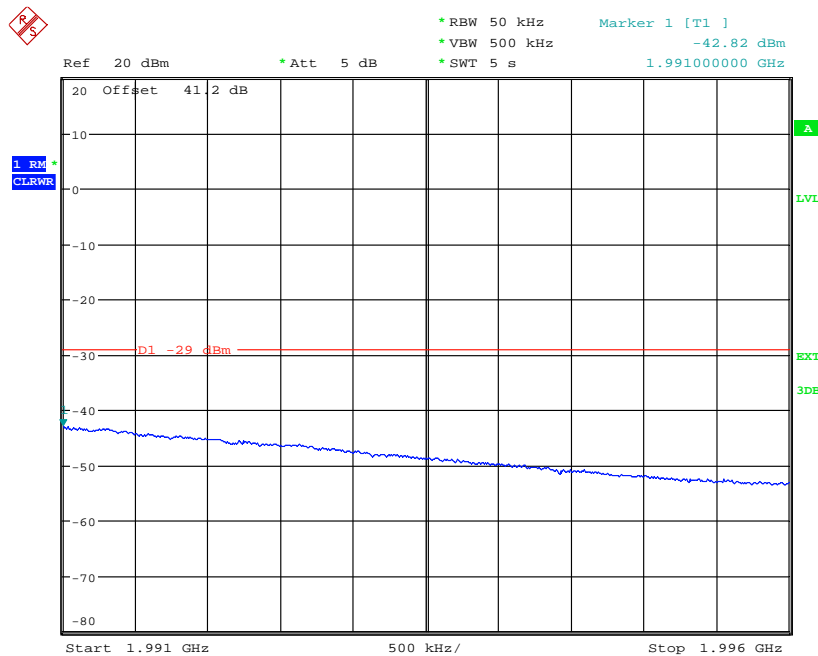


Date: 27.MAR.2014 16:20:50

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

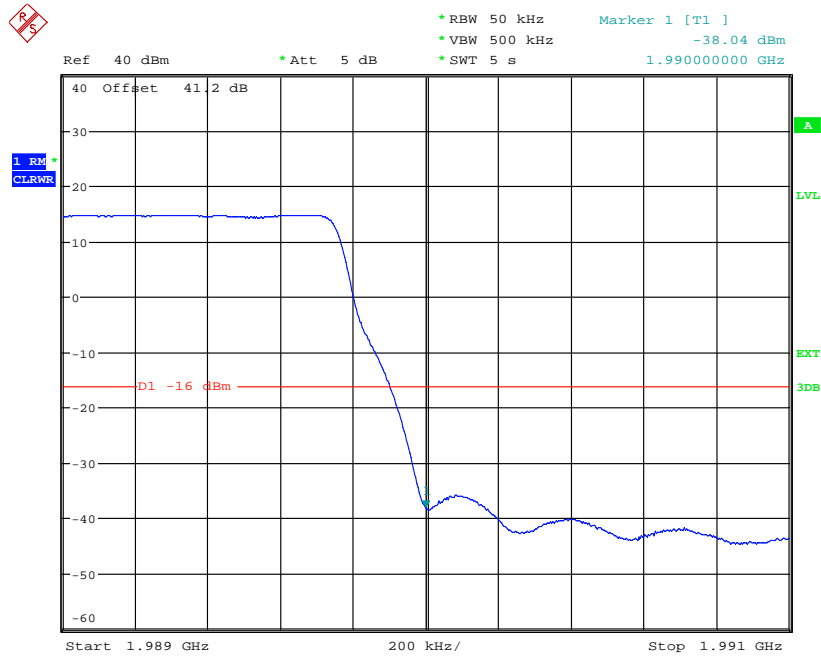


Date: 27.MAR.2014 16:28:25

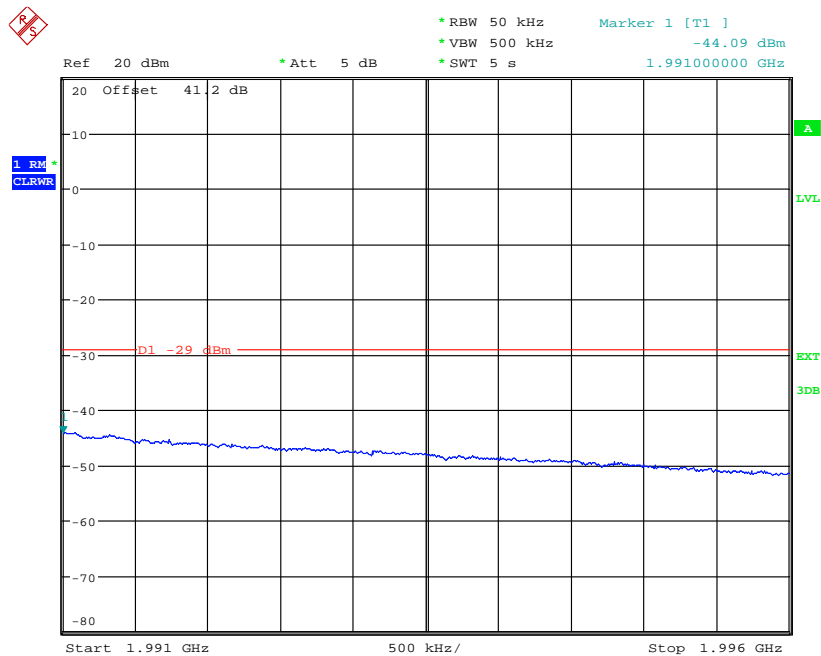


Date: 27.MAR.2014 16:27:18

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

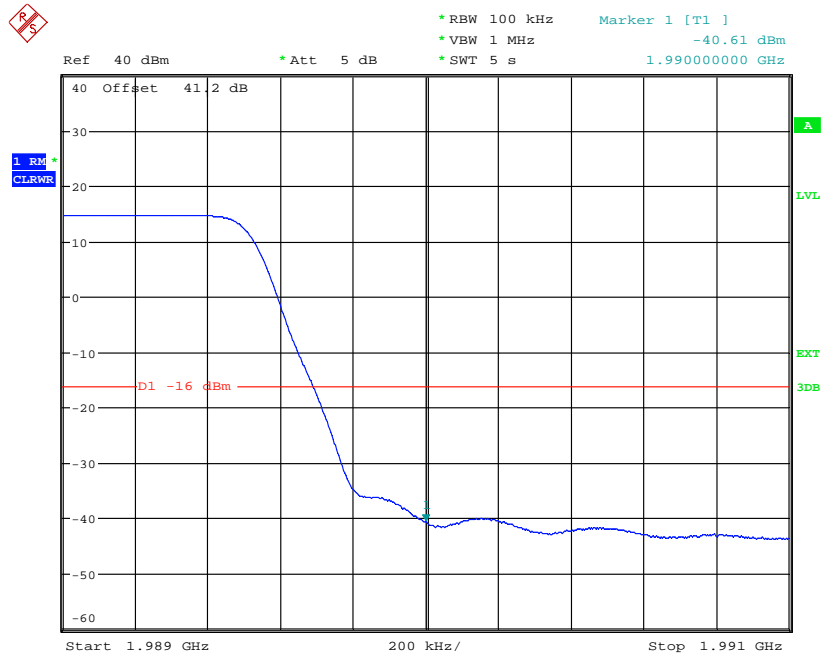


Date: 27.MAR.2014 16:29:52

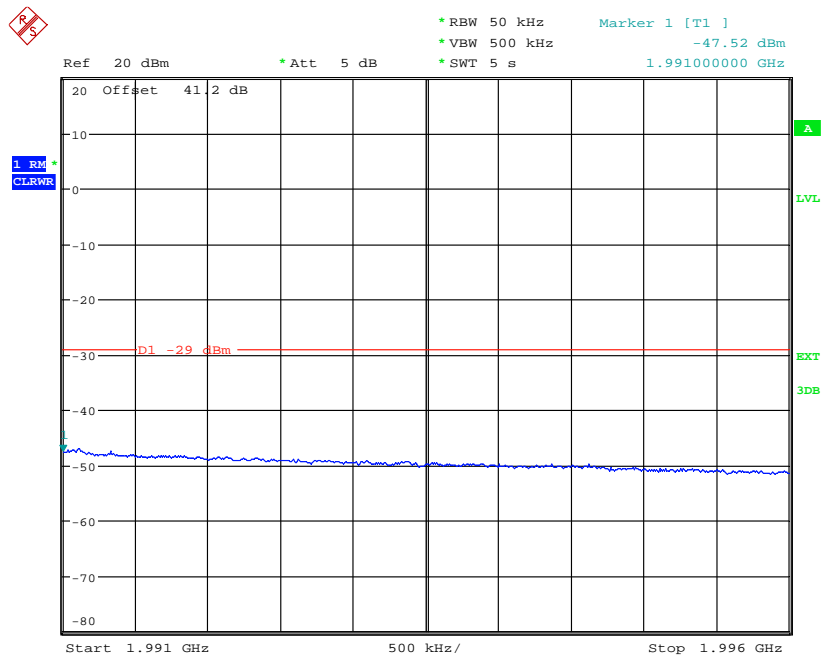


Date: 27.MAR.2014 16:30:39

Channel Position T_{RFBW} - QPSK / Bandwidth 10.0 MHz



Date: 27.MAR.2014 16:37:53



Date: 27.MAR.2014 16:37:06

Limit	-13 dBm
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2.5 RADIATED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 24, Clause 24.238(a)
Industry Canada RSS-133, Clause 6.5

2.5.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.5.3 Date of Test and Modification State

08 and 09 April 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	23.2 – 23.5°C
Relative Humidity	31.0 – 32.5%

2.5.6 Test Method

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 Polarizations.

Emissions identified within the range 30MHz – 20GHz were then formally measured using a Peak detector as the worst case.

In the frequency Range 30MHz – 20GHz, the measurement was performed with a resolution bandwidth of 1MHz.

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

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

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

Where:

Field Strength is measured in dB μ V/m

P is measured Transmitter Power in Watts

Determination of Spurious Emission Limit

As the EUT have an integral antenna, the field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned 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:

$$E_{(v/m)} = (30 \times 1.64 \times 8.30)^{0.5} / 3 = 6.74V/m = 136.57dB\mu V/m$$

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

$$43 + 10\log(8.30) = 52.19dB$$

Therefore the limit at 3m measurement distance is:

$$136.57 - 52.19 = 84.4 \text{ dB}\mu V/m$$

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

The results are shown in the plots below.

2.5.7 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 W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier, WCDMA Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position B	1932.4MHz
Channel Position M	1960.0MHz
Channel Position T	1987.6MHz

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 T - QPSK

No emissions were detected within 20dB of the limit.

Channel Position T – 16QAM

No emissions were detected within 20dB of the limit.

Channel Position T – 64QAM

No emissions were detected within 20dB of the limit.

Configuration W-MIMO-MC1 (2C)

Maximum Output Power 37.0dBm per carrier, WCDMA Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position B _{RFBW}	1932.4MHz + 1952.6MHz

Channel Position B_{RFBW} - QPSK

No emissions were detected within 20dB of the limit.

Configuration W-MIMO-MC2 (4C)

Maximum Output Power 37.0dBm per carrier, WCDMA Bandwidth 5.0MHz

Channel Position	Channel Frequencies
Channel Position B _{RFBW}	1932.4MHz + 1937.4MHz+ 1947.6MHz+ 1952.6MHz

Channel Position B_{RFBW} - QPSK

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-SC (1C)

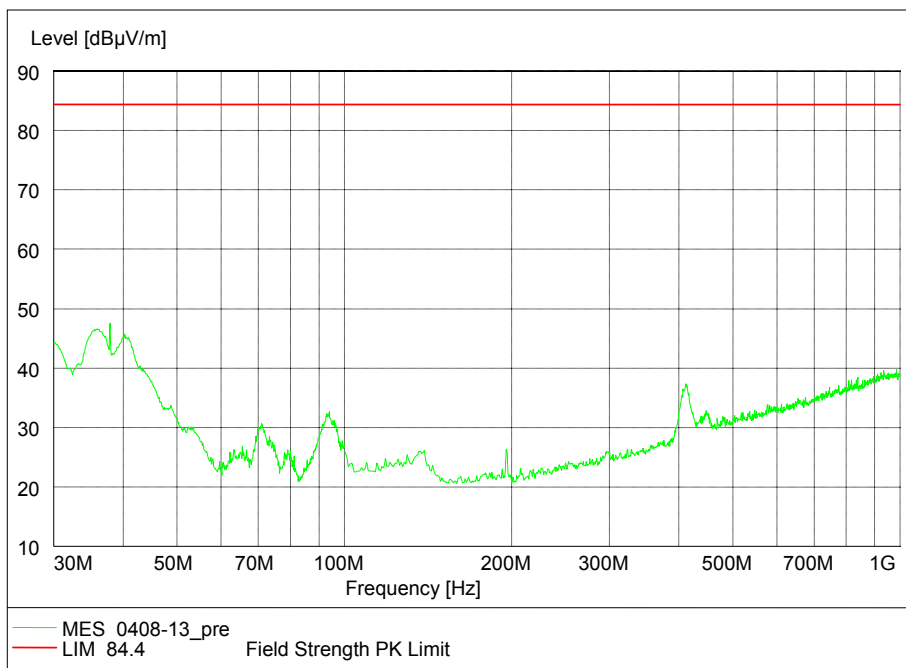
Maximum Output Power 37.0dBm per carrier, LTE Bandwidth 1.4MHz

Channel Position	Channel Frequencies
Channel Position B	1930.7MHz
Channel Position M	1960.0MHz
Channel Position T	1989.3MHz

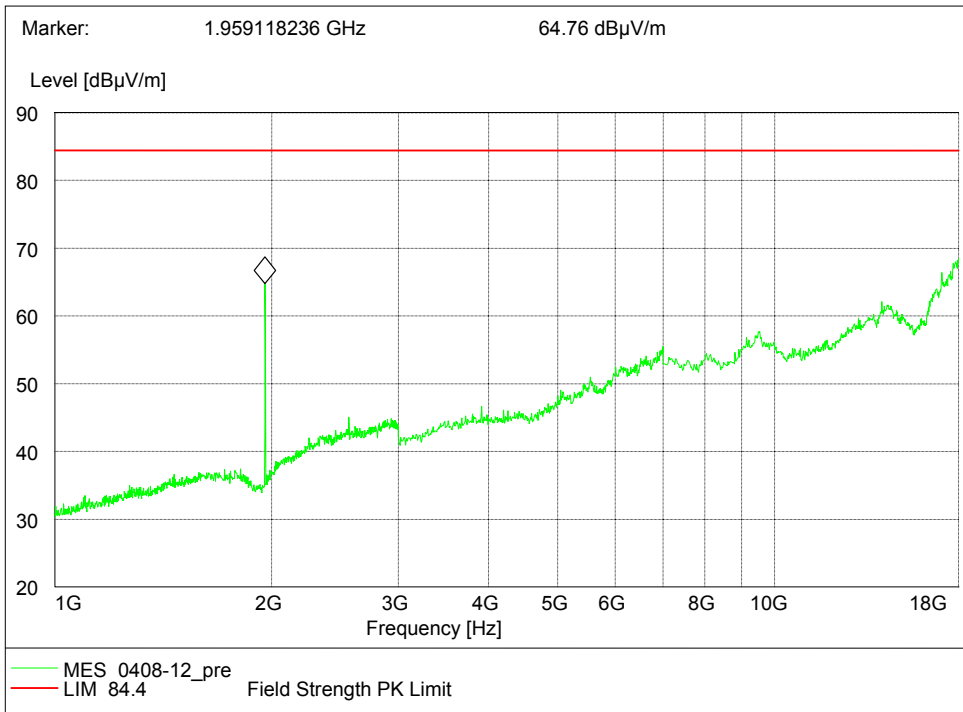
Channel Position B - QPSK

No emissions were detected within 20dB of the limit.

Channel Position M – QPSK / Bandwidth 1.4MHz - 30MHz – 1GHz

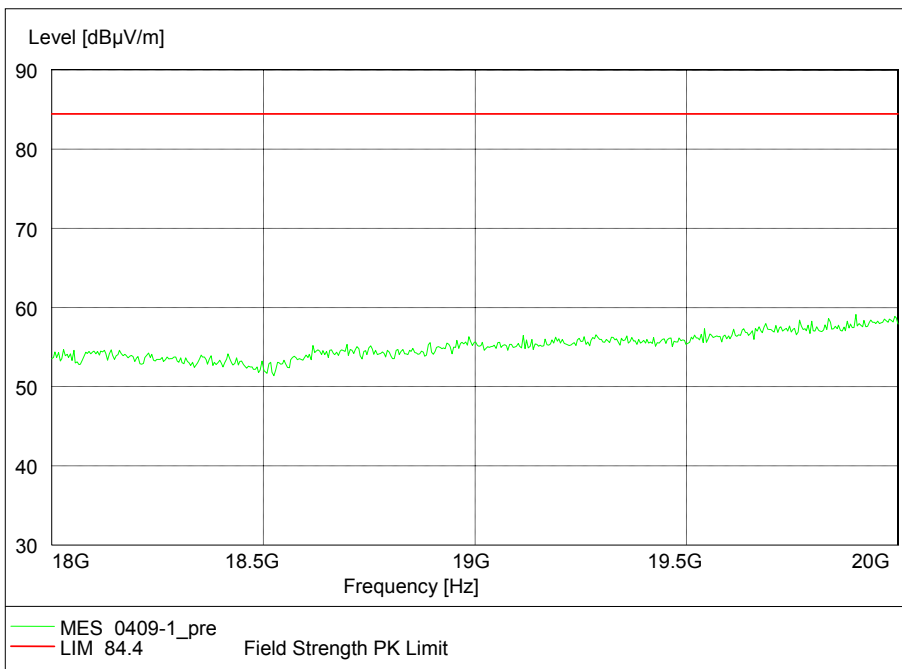


Channel Position M – QPSK / Bandwidth 1.4MHz - 1GHz – 18GHz



Note: The frequency marked is the carrier.

Channel Position M – QPSK / Bandwidth 1.4MHz - 18GHz – 20GHz



Channel Position T - 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.

Maximum Output Power 37.0dBm per carrier, LTE Bandwidth 3.0MHz, 5.0MHz, 10.0MHz, 15.0MHz, 20.0MHz

Channel Position	Channel Frequencies
Channel Position M	1960.0MHz

Channel Position M – QPSK

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier, LTE Bandwidth 1.4MHz

Channel Position	Channel Frequencies
Channel Position M _{RFBW}	1948.2MHz + 1971.8MHz

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.

2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238(a)
Industry Canada RSS-133, Clause 6.5

2.6.2 Equipment Under Test

RBS 6501 B2, KR D 901 102/2, S/N: CB4S979228
RBS 6501 B2, KR D 901 102/3, S/N: CB4T007169

2.6.3 Date of Test and Modification State

26 to 31 March 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	23.2 - 25.5 °C
Relative Humidity	26.5 - 28.6 %

2.6.6 Test Method

In accordance with FCC CFR 47 Part 2, Clause 2.1051, the spurious emissions from the antenna terminal were measured. In accordance with FCC CFR 47 Part 24, Clause 24.238(a) and Industry Canada RSS-133, Clause 6.5, any emissions outside of the block edges shall be attenuated by at least $43 + 10 \log (P)$.

The EUT was set to transmit at its maximum rated output power. The path loss between the Spectrum Analyser and the EUT was measured with the worst case level being entered as a Reference Level Offset. In accordance with 24.238(a), the RBW was set to 1MHz and a Peak detector with the trace set to Max Hold was used. The frequency spectrum was then investigated between 9kHz and 20GHz. Testing was carried out on the Bottom, Middle and Top channels.

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 antenna ports RF A and RF B.

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

The results are shown in the plots below.

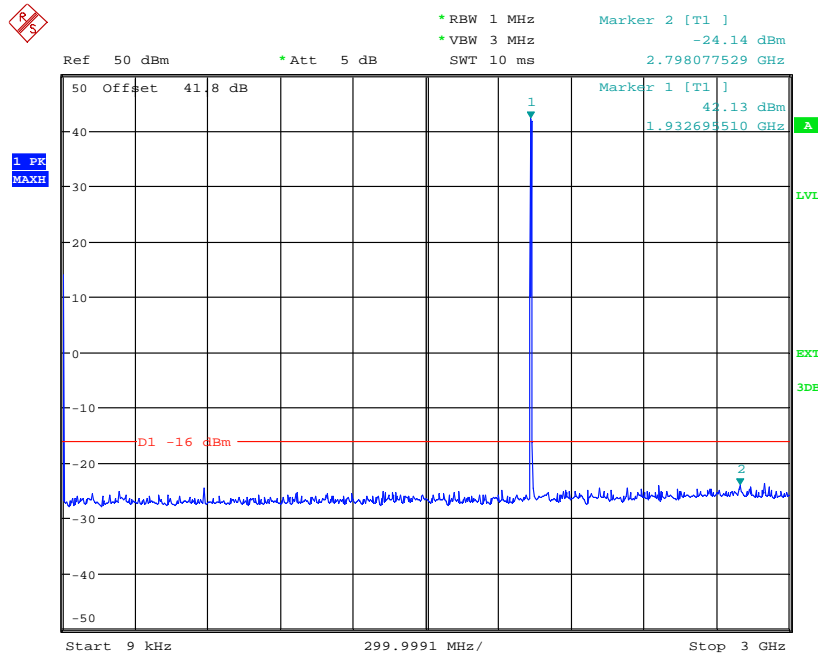
2.6.7 Test Results

Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position B	5.0MHz	1932.4MHz
Channel Position M	5.0MHz	1960.0MHz
Channel Position T	5.0MHz	1987.6MHz

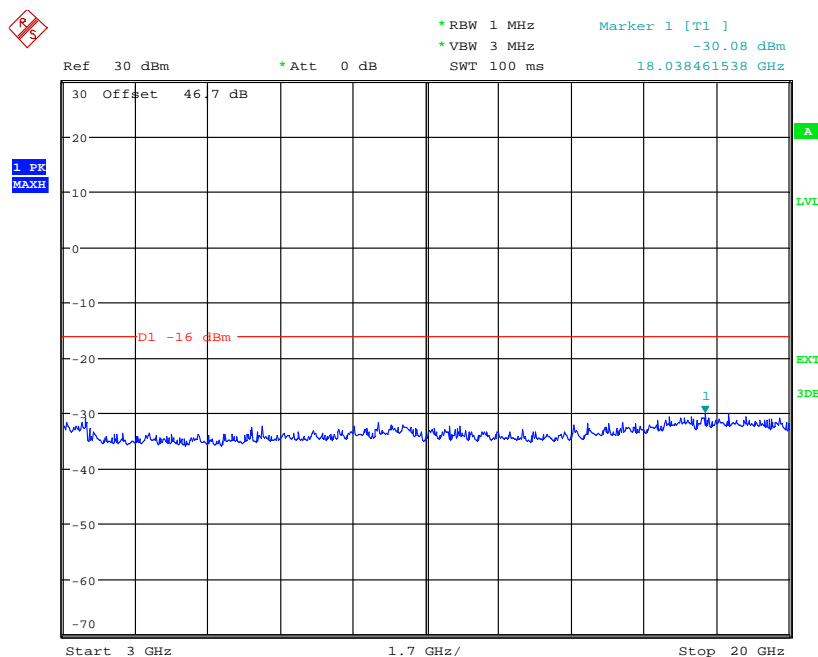
Channel Position B - 16QAM - 9kHz – 3GHz



Date: 28.MAR.2014 14:11:38

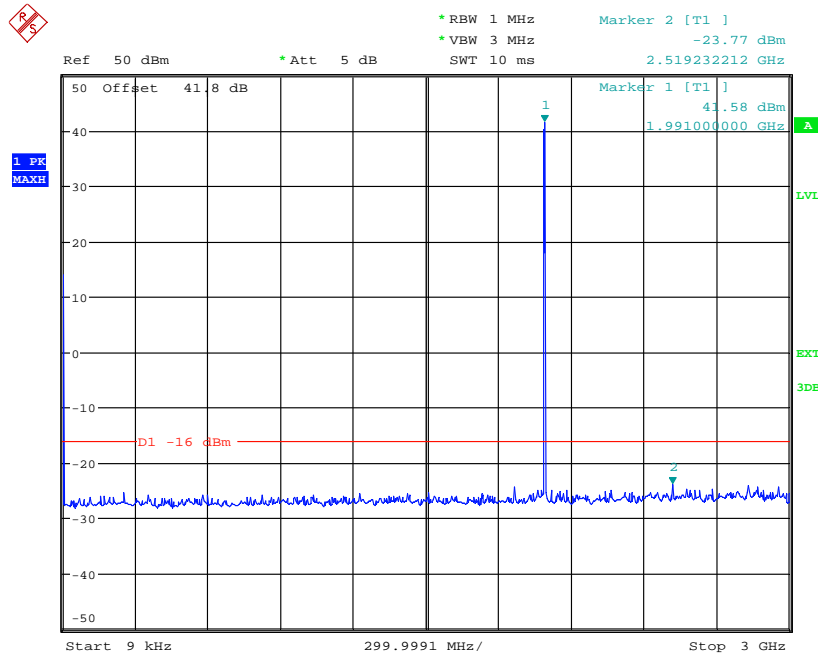
Note: The emission beyond the limit is within the operating frequency.

Channel Position B - 16QAM - 3GHz – 20GHz



Date: 28.MAR.2014 14:12:22

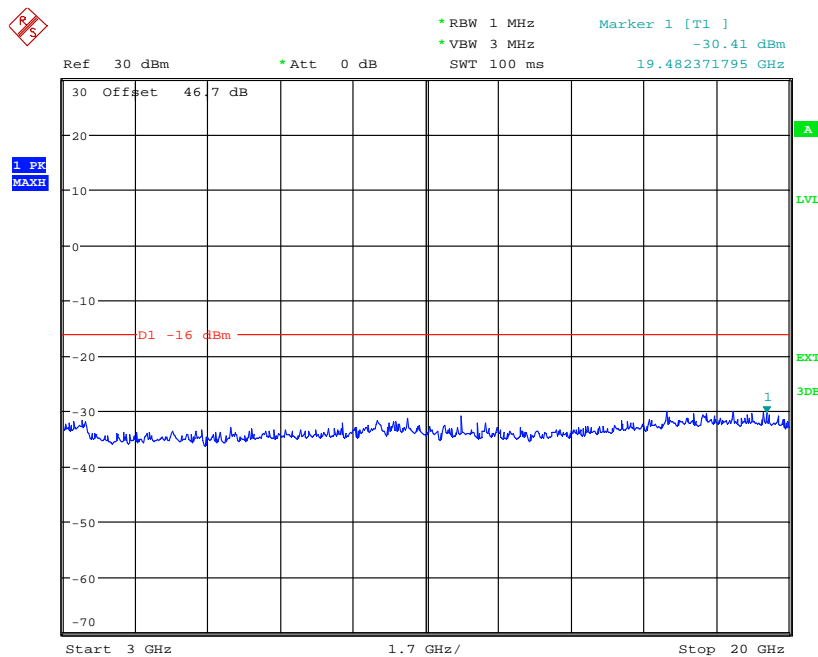
Channel Position T - 16QAM - 9kHz – 3GHz



Date: 28.MAR.2014 14:29:52

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

Channel Position T - 16QAM - 3GHz – 20GHz



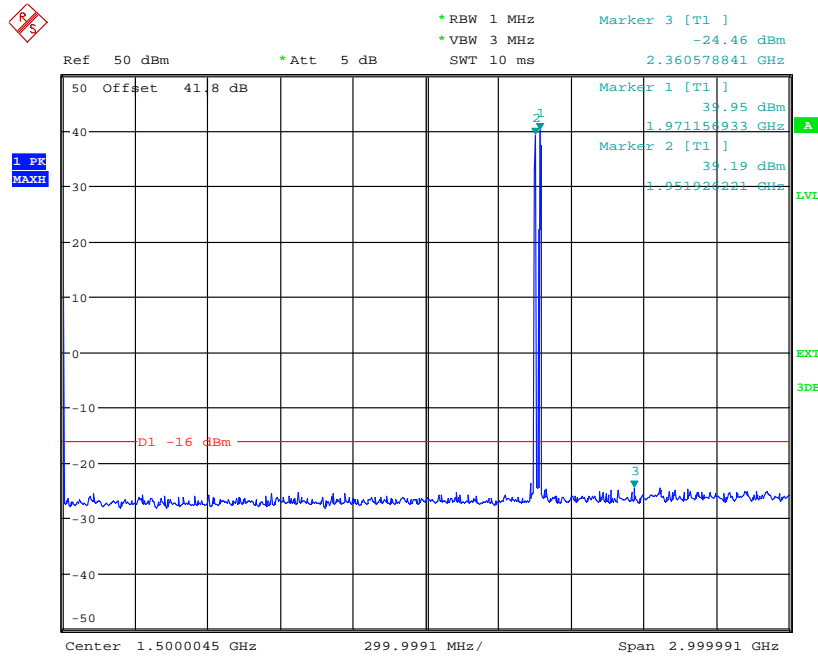
Date: 28.MAR.2014 14:30:34

Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	5.0MHz	1932.4MHz + 1952.6MHz
Channel Position M_{RFBW}	5.0MHz	1950.0MHz + 1970.0MHz
Channel Position T_{RFBW}	5.0MHz	1967.4MHz + 1987.6MHz

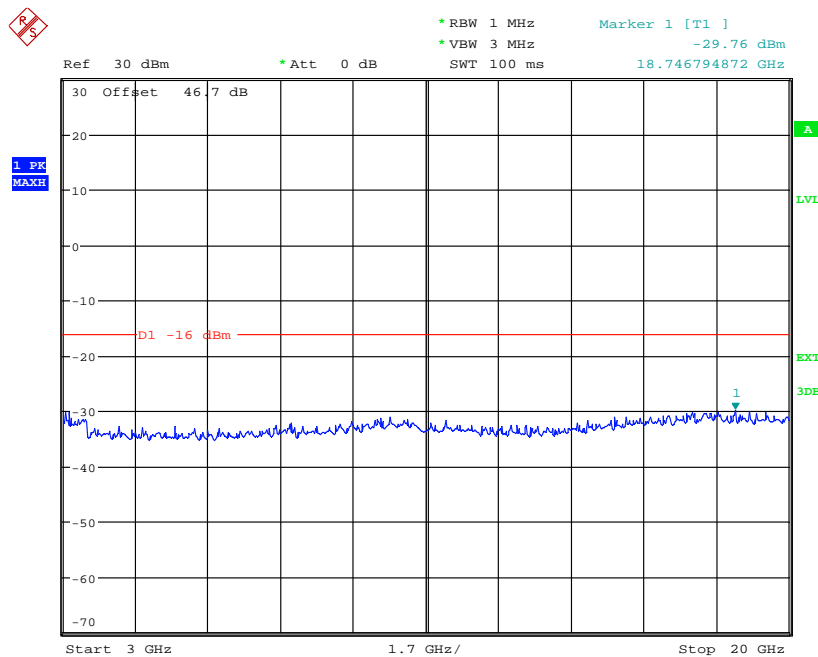
Channel Position M_{RFBW} - 16QAM - 9kHz - 3GHz



Date: 31.MAR.2014 11:49:14

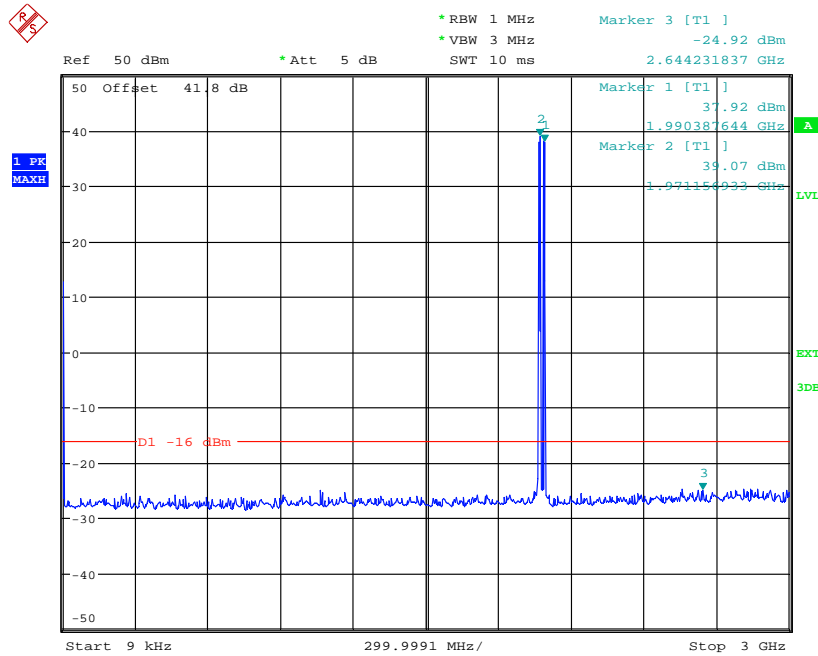
Note: The emission beyond the limit is within the operating frequency.

Channel Position M_{RFBW} - 16QAM - 3GHz - 20GHz



Date: 31.MAR.2014 11:50:32

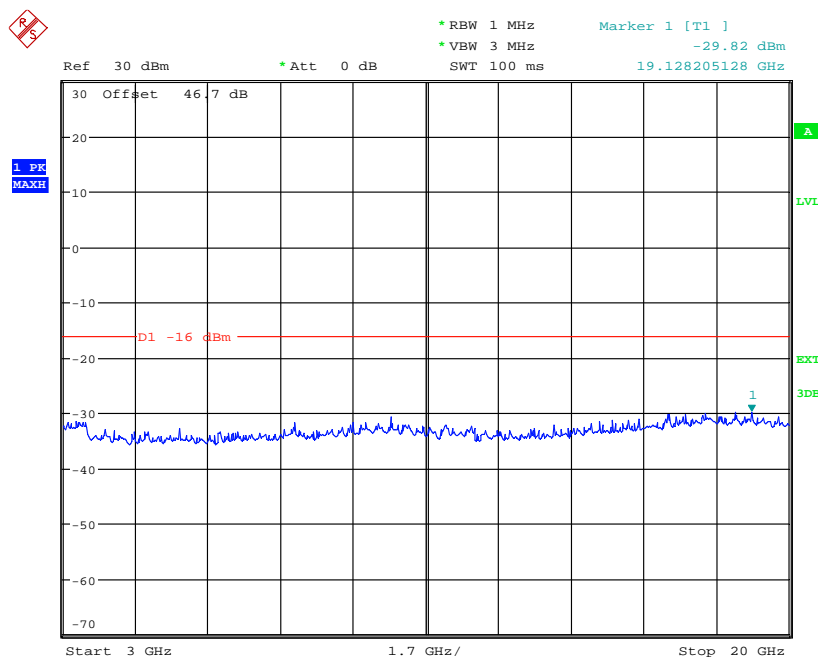
Channel Position T_{RFBW} - 16QAM - 9kHz – 3GHz



Date: 31.MAR.2014 11:58:52

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

Channel Position T_{RFBW} - 16QAM - 3GHz – 20GHz



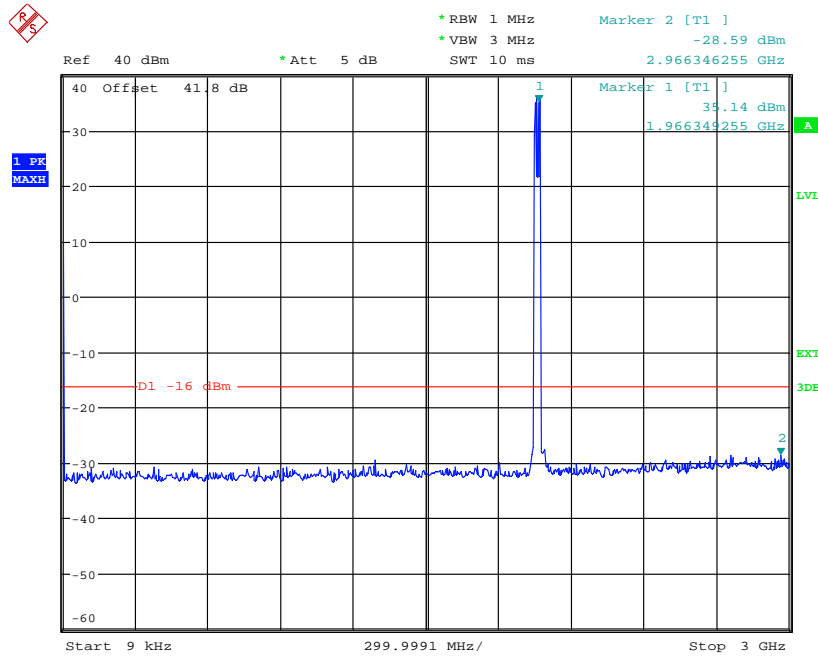
Date: 31.MAR.2014 11:57:29

Configuration W-MIMO-MC 2 (4C)

Maximum Output Power 31.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	5.0MHz	1932.4MHz + 1937.4MHz + 1947.6MHz + 1952.6MHz
Channel Position M_{RFBW}	5.0MHz	1950.0MHz + 1955.0MHz + 1965.0MHz + 1970.0MHz
Channel Position T_{RFBW}	5.0MHz	1967.4MHz + 1972.4MHz + 1982.6MHz + 1987.6MHz

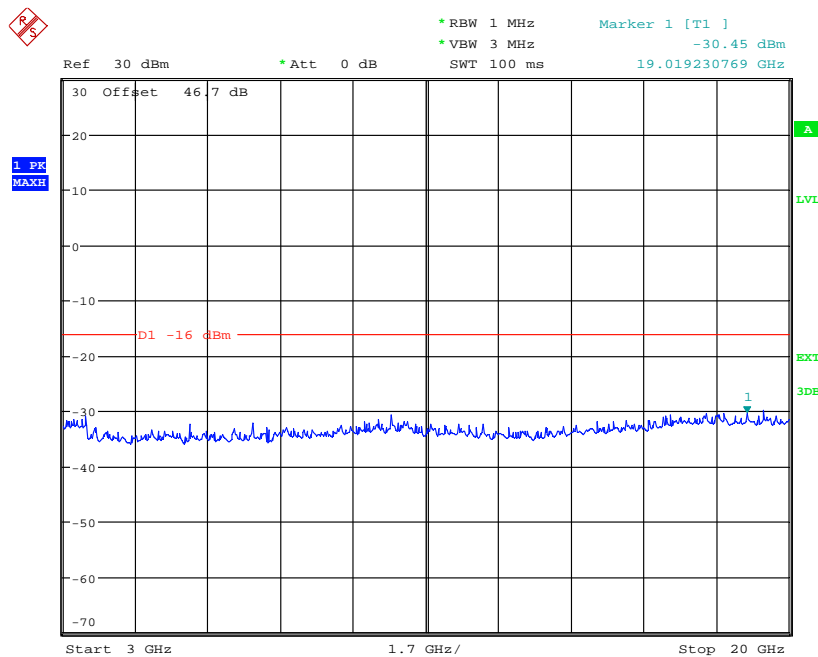
Channel Position M_{RFBW} - 16QAM - 9kHz – 3GHz



Date: 31.MAR.2014 13:28:57

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

Channel Position M_{RFBW} - 16QAM - 3GHz – 20GHz



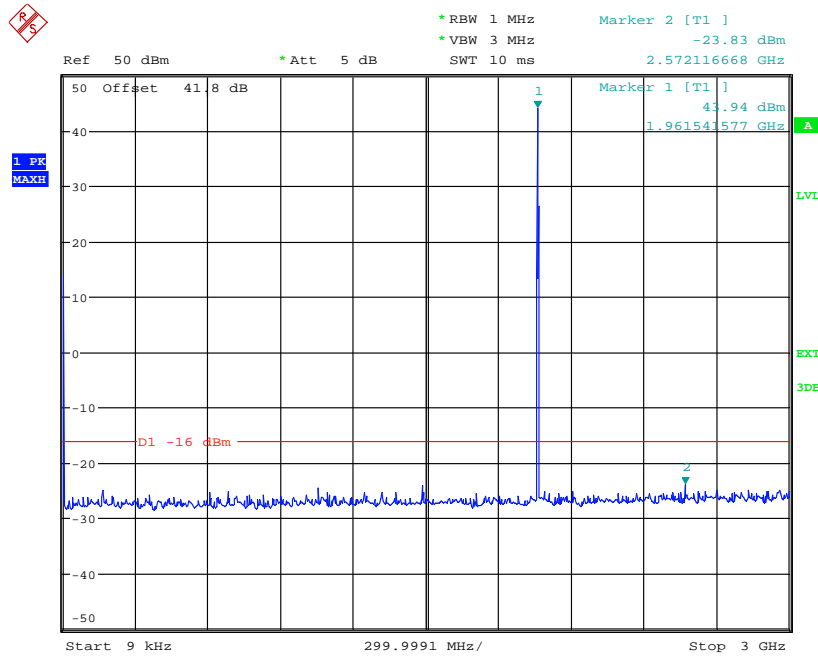
Date: 31.MAR.2014 13:28:08

Configuration L-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier

Channel Position	Bandwidth	Channel Frequency
Channel Position B	1.4MHz	1930.7MHz
	20.0MHz	1940.0MHz
Channel Position M	1.4MHz	1960.0MHz
	20.0MHz	1960.0MHz
Channel Position T	1.4MHz	1989.3MHz
	20.0MHz	1980.0MHz

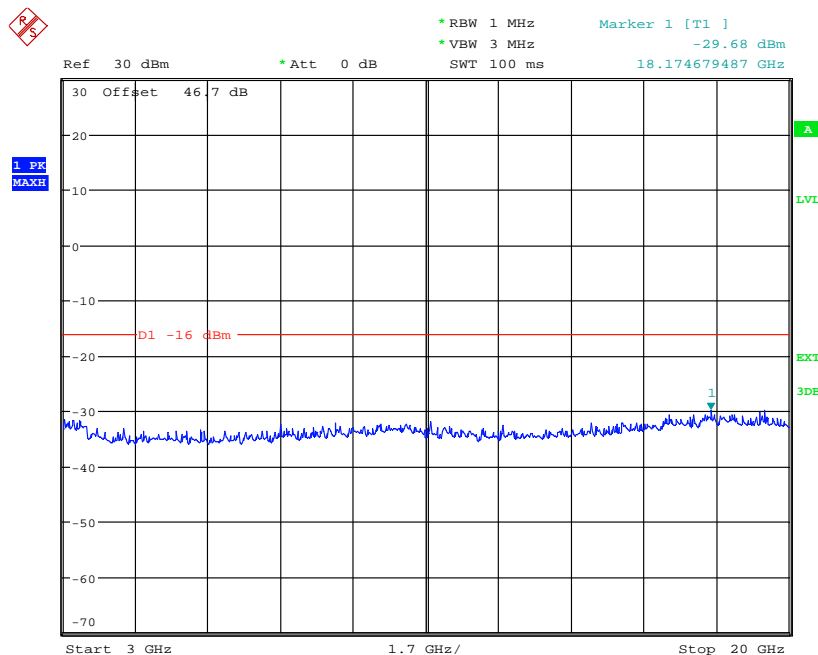
Channel Position M - QPSK / Bandwidth 1.4MHz - 9kHz – 3GHz



Date: 27.MAR.2014 10:54:03

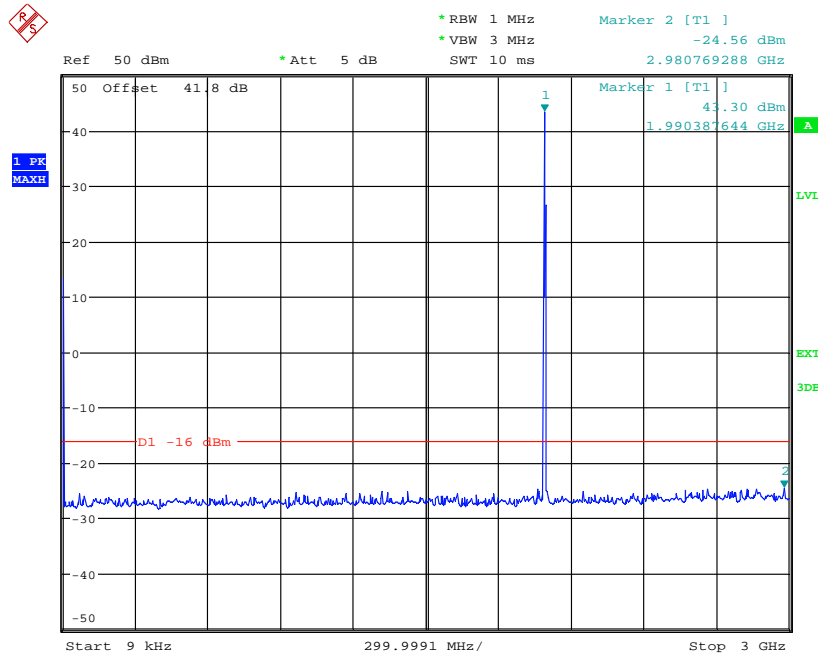
Note: The emission beyond the limit is within the operating frequency.

Channel Position M - QPSK / Bandwidth 1.4MHz - 3GHz – 20GHz



Date: 27.MAR.2014 10:50:58

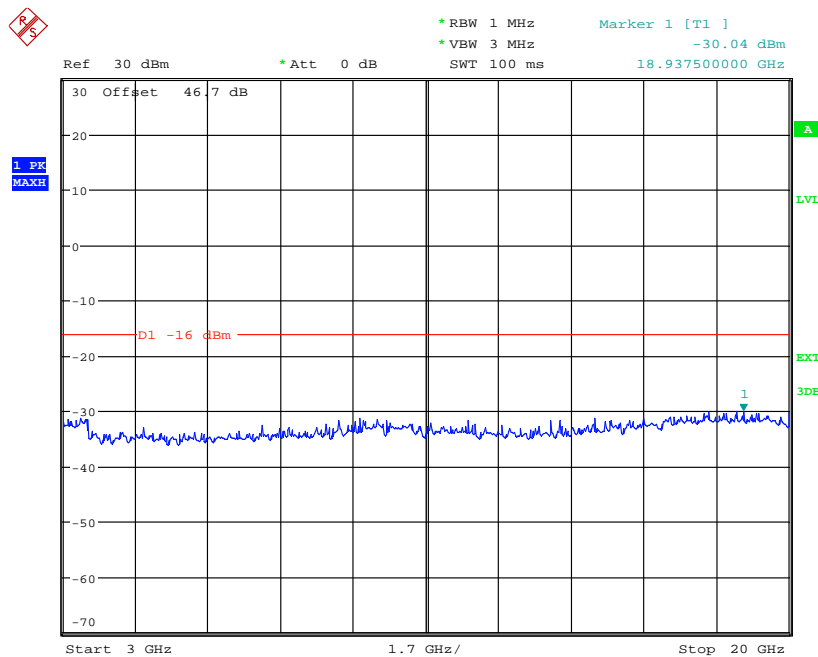
Channel Position T - QPSK / Bandwidth 1.4MHz - 9kHz – 3GHz



Date: 26.MAR.2014 14:08:31

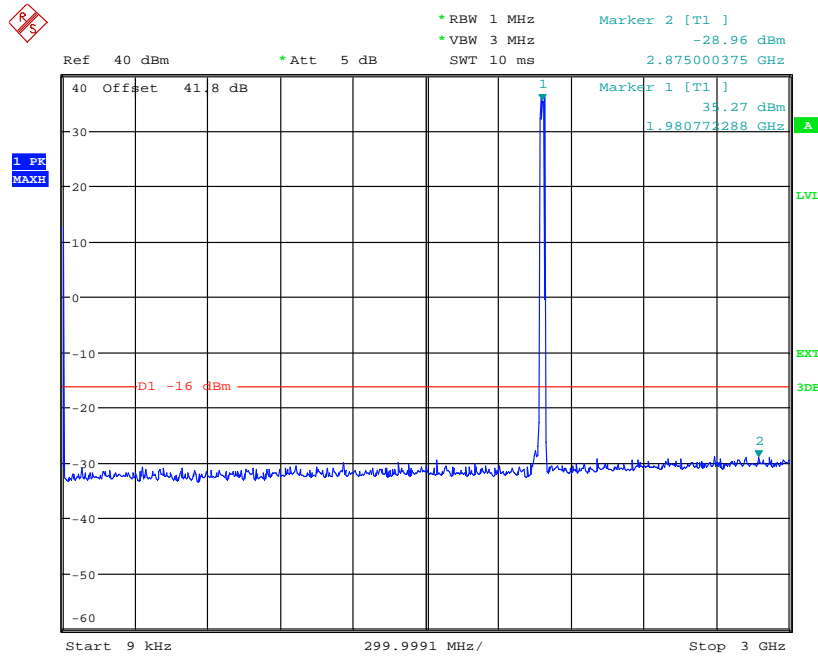
Note: The emission beyond the limit is within the operating frequency.

Channel Position T - QPSK / Bandwidth 1.4MHz - 3GHz – 20GHz



Date: 26.MAR.2014 14:09:59

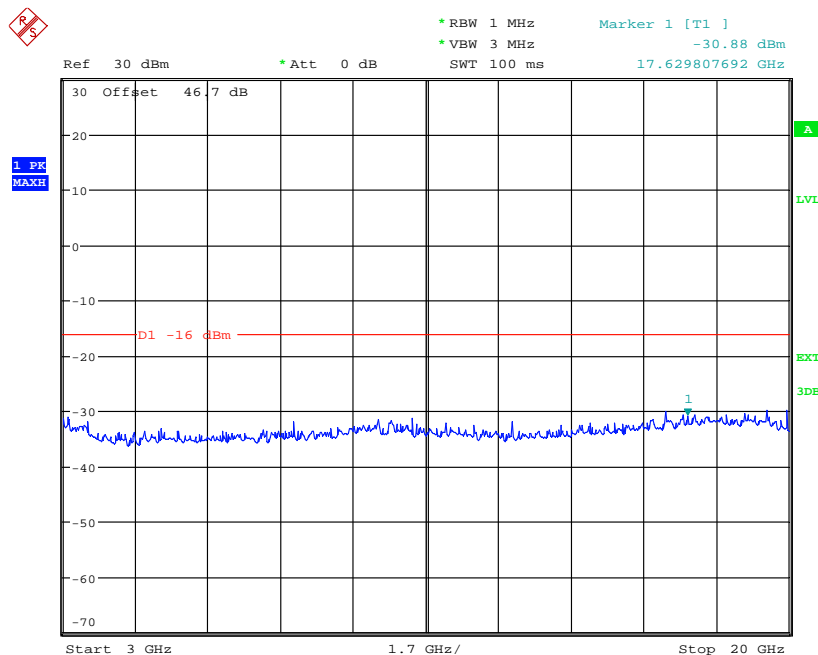
Channel Position T - QPSK / Bandwidth 20.0MHz - 9kHz – 3GHz



Date: 26.MAR.2014 15:51:34

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

Channel Position T - QPSK / Bandwidth 20.0MHz - 3GHz – 20GHz



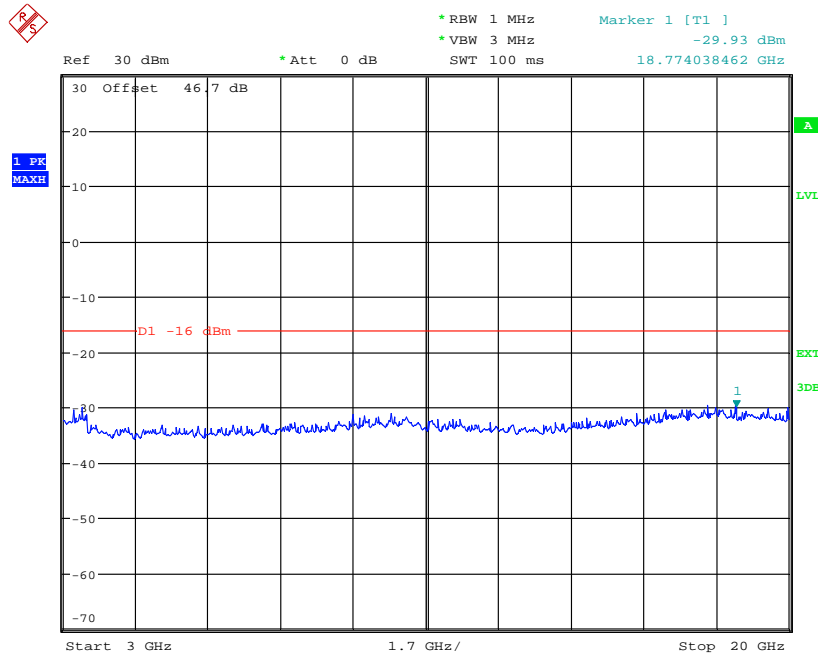
Date: 26.MAR.2014 15:52:22

Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 34.0dBm per carrier

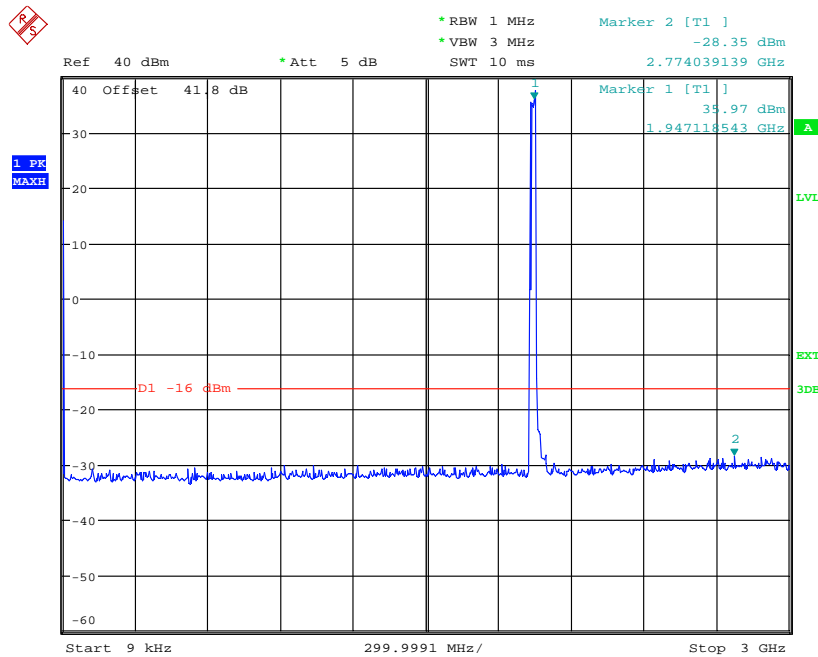
Channel Position	Bandwidth	Channel Frequency
Channel Position B_{RFBW}	1.4MHz	1930.7MHz + 1954.3MHz
	10.0MHz	1935.0MHz + 1950.0MHz
Channel Position M_{RFBW}	1.4MHz	1948.2MHz + 1971.8MHz
	10.0MHz	1952.5MHz + 1967.5MHz
Channel Position T_{RFBW}	1.4MHz	1965.7MHz + 1989.3MHz
	10.0MHz	1970.0MHz + 1985.0MHz

Channel Position B_{RFBW} - QPSK / Bandwidth 1.4MHz - 3GHz – 20GHz



Date: 27.MAR.2014 15:27:26

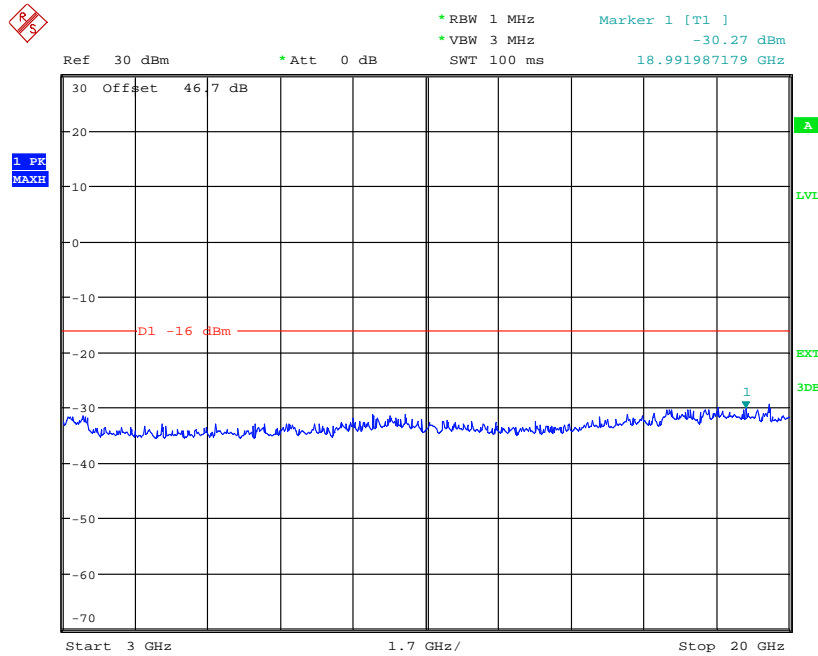
Channel Position B_{RFBW} - QPSK / Bandwidth 10.0MHz - 9kHz – 3GHz



Date: 27.MAR.2014 15:51:01

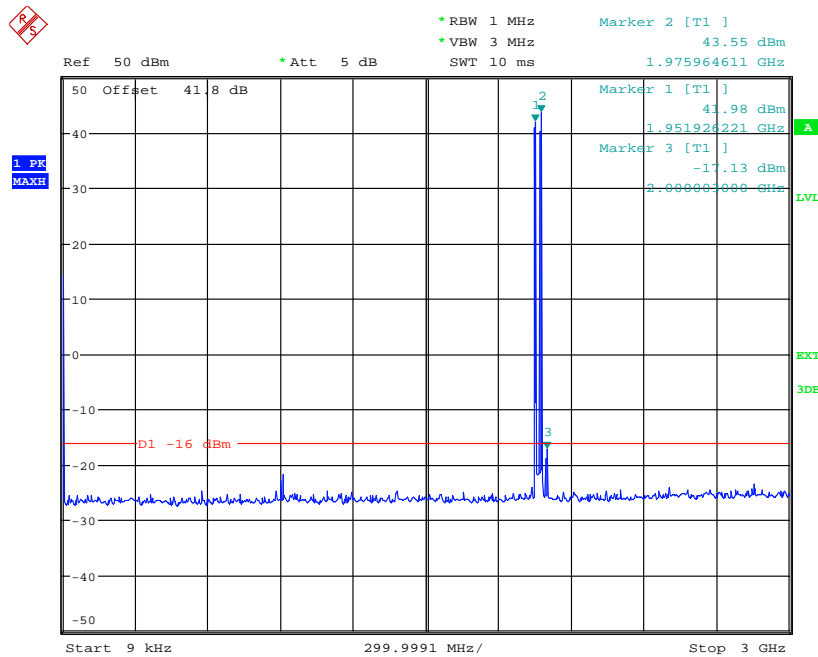
Note: The emission beyond the limit is within the operating frequency.

Channel Position B_{RFBW} - QPSK / Bandwidth 10.0MHz - 3GHz – 20GHz

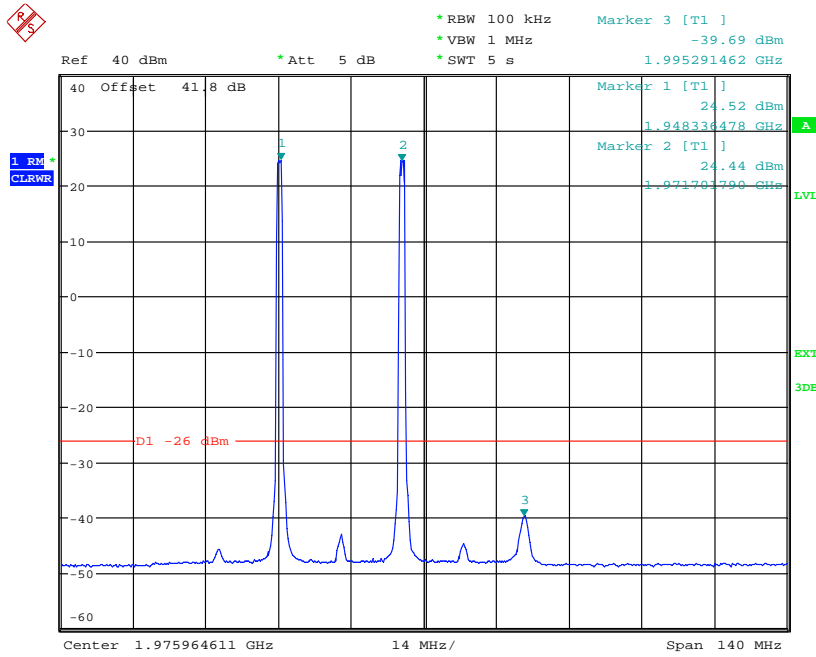


Date: 27.MAR.2014 15:49:23

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



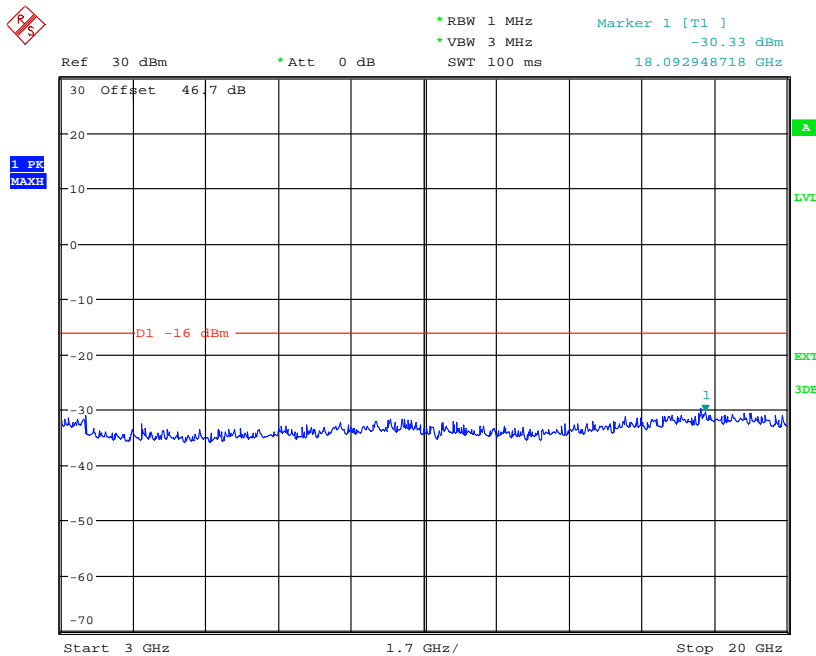
Date: 27.MAR.2014 15:30:30



Date: 27.MAR.2014 15:32:04

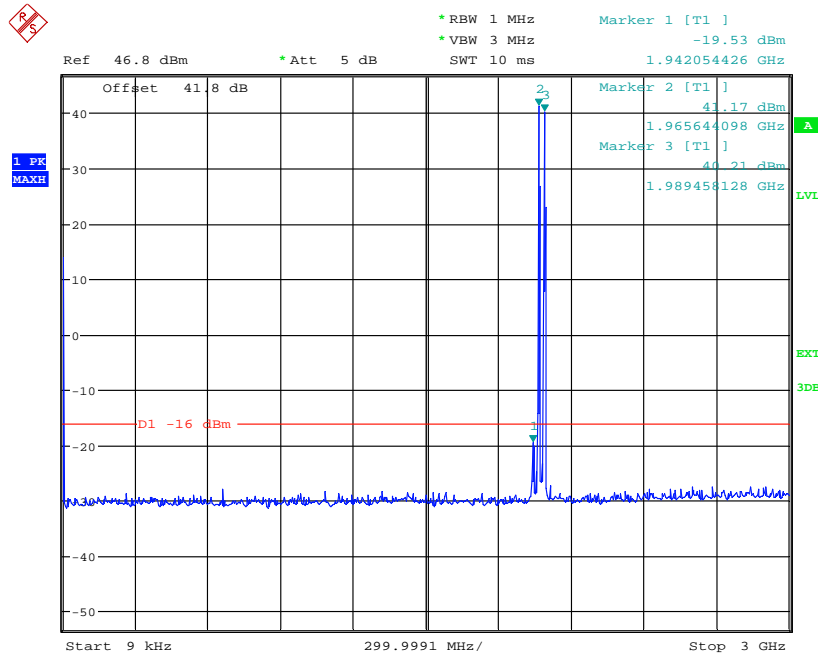
Note: The emission beyond the limit is within the operating frequency.

Channel Position M_{RFBW} - QPSK / Bandwidth 1.4MHz - 3GHz – 20GHz



Date: 27.MAR.2014 15:28:56

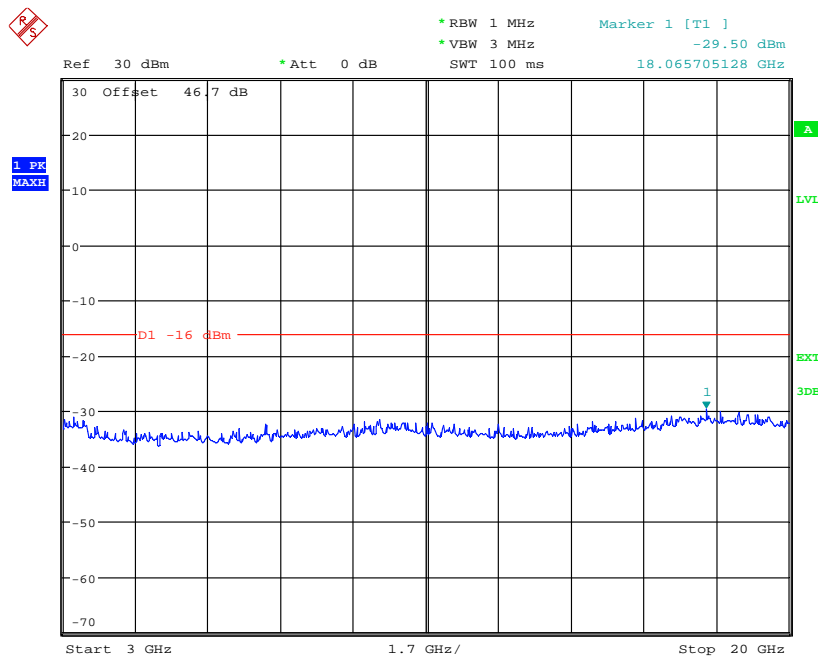
Channel Position T_{RFBW} - QPSK / Bandwidth 1.4MHz - 9kHz – 3GHz



Date: 27.MAR.2014 15:35:44

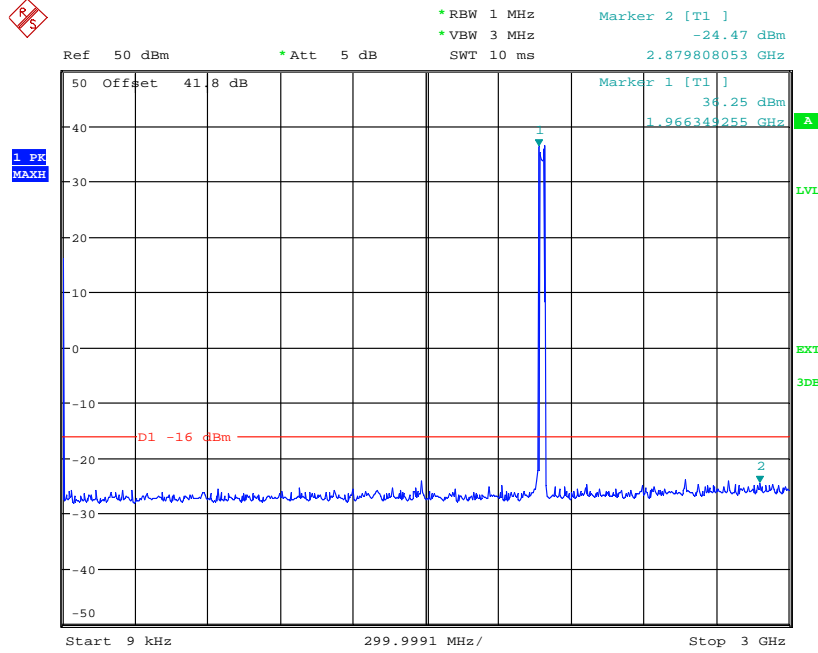
Note: The emission beyond the limit is within the operating frequency.

Channel Position T_{RFBW} - QPSK / Bandwidth 1.4MHz - 3GHz – 20GHz



Date: 27.MAR.2014 15:36:29

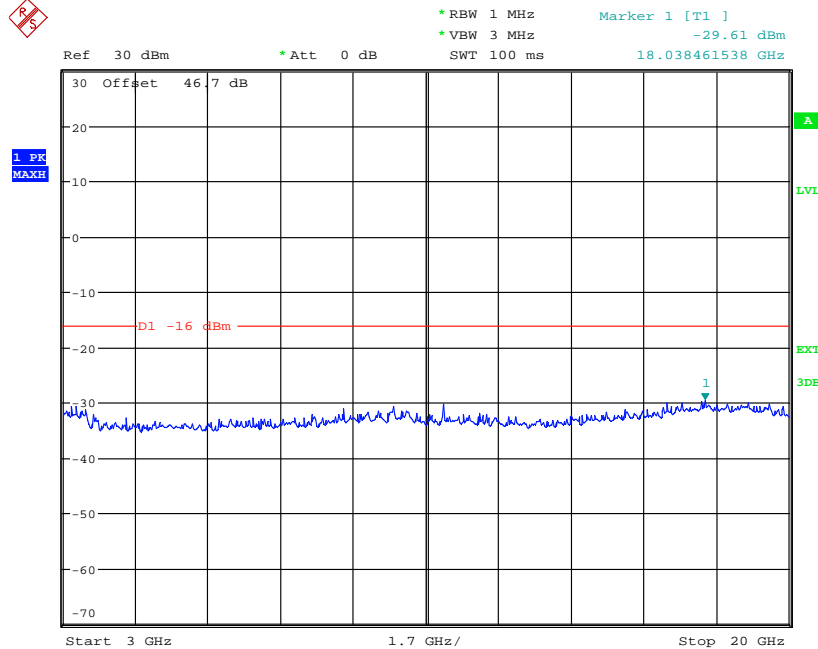
Channel Position T_{RFBW} - QPSK / Bandwidth 10.0MHz - 9kHz – 3GHz



Date: 27.MAR.2014 15:55:55

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

Channel Position T_{RFBW} - QPSK / Bandwidth 10.0MHz - 3GHz – 20GHz



Date: 27.MAR.2014 15:55:16

Limit	-13 dBm/MHz
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2.7 FREQUENCY STABILITY

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 24, Clause 24.235
Industry Canada RSS-133, Clause 6.3

2.7.2 Equipment Under Test

RBS 6501 B2, KRD 901 102/2, S/N: CB4S979228
RBS 6501 B2, KRD 901 102/3, S/N: CB4T007169

2.7.3 Date of Test and Modification State

25 and 26 March 2014 - Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Environmental Conditions

Ambient Temperature	22.5 - 24.0°C
Relative Humidity	26.5 - 27.5%

2.7.6 Test Method

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 both -48 VDC and 120 VAC power supplies. At +20°C and each voltage extreme, the Base Station was configured to transmit an [RAT]* at maximum power on the middle channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

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

2.7.7 Test Results

Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-48.0	-30°C	-3.17
	-20°C	+4.55
	-10°C	+4.16
	0°C	-3.67
	+10°C	-3.17
	+20°C	+4.25
	+30°C	-3.75
	+40°C	-3.95
	+50°C	-3.36

Configuration LTE-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-48.0	-30°C	-7.58
	-20°C	+7.47
	-10°C	-7.08
	0°C	+6.35
	+10°C	-6.52
	+20°C	+7.83
	+30°C	-8.75
	+40°C	-6.48
	+50°C	+6.59

Configuration W-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-40.8 V	+20°C	-3.68
-48.0 V		+4.25
-55.2 V		-4.46

Supply Voltage AC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-102.0 V	+20°C	-2.45
-120.0 V		-3.93
-138.0 V		-3.83

Configuration LTE-MIMO-SC (1C)

Maximum Output Power 37.0dBm per carrier, Channel Bandwidth 5MHz

Supply Voltage DC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-40.8 V	+20°C	+7.56
-48.0 V		+7.83
-55.2 V		-6.57

Supply Voltage AC (V)	Temperature	Frequency Stability (Hz)
		Channel Position M (1960.0MHz)
-102.0 V	+20°C	+10.17
-120.0 V		+12.44
-138.0 V		+12.53

FCC Part 24, Clause 24.235 Limit	The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorised frequency block.
Industry Canada RSS-133 Clause 6.3 Limit	± 1.0ppm or ±1.96kHz
3GPP TS 36.141 V10.10.0 Limit	± (0.05ppm or +12Hz) or ±110Hz

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	17-Nov-2014
Power Meter	Rohde & Schwarz	NRP	101593	12	04-Aug-2014
Power Sensor	Rohde & Schwarz	NRP-Z51	102309	12	04-Aug-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
DC Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Maximum Average Output Power - Radiated					
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2014
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2014
Double-Ridged Wave-guide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2014
Antenna master	Frankonia	MA 260	-	-	19-Aug-2014
Semi Anechoic Chamber	Frankonia	23.18m×16.88m×9.60m	-	12	19-Aug-2014
Single Generator	Rohde & Schwarz	SMR40	100152	12	19-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
DC Power Supply	Dahua	DH1716-5D	2007060047	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151655	12	12-Dec-2014
Occupied Bandwidth					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
DC Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Band Edge					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
DC Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Conducted Spurious Emission					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Pass Filter	K & L	ULK 904 240/n	35	-	O/P MON
Pass Filter	Ericsson	ULK 904 193	-	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
DC Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TF150-3	06081410	-	O/P MON
Load	Shanghai Huaxiang	TF100	09121614	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2014
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2014
Double-Ridged Wave-guide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2014
Pyramidal Horn Antenna	EMCO	3160-09	760840	12	19-Aug-2014
Pyramidal Horn Antenna	EMCO	3160-10	808234	12	19-Aug-2014
Antenna master	Frankonia	MA 260	-	-	19-Aug-2014
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
Semi Anechoic Chamber	Frankonia	23.18m×16.88m×9.60m	-	12	19-Aug-2014
DC Power Supply	Dahua	DH1716-5D	2007060047	-	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151655	12	12-Dec-2014
Frequency Stability					
Network Analyzer	Agilent	8720D	US36140166	12	17-Nov-2014
Spectrum Analyser	Rohde & Schwarz	FSQ26	100253	12	04-Aug-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Climate Chamber	Shang Hai Zenda	ZTH100U	10080065	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
DC Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
AC Power Supply	Chroma	6530	ETD/L710	12	O/P MON
Digital Multimeter	FLUKE	179	91820401	12	24-Dec-2014
Thermo-hygrometer	AZ Instruments	8705	9151655	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*
EIRP	30MHz to 20GHz Amplitude	2.6dB
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 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

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

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