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Report On

FCC and IC Testing of the
Ericsson AB (1900 MHz) RUS 02 B2 KRC 161 298/1 Radio Unit
In accordance with FCC CFR 47 Part 24 and Industry Canada RSS-
133: Issue 6

COMMERCIAL-IN-CONFIDENCE

FCC ID: TA8AKRC161298-1

IC ID: 287AB-AS1612981

PREPARED BY

APPROVED BY

DATED

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09 July 2013

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SECTION 1

REPORT INFORMATION



1.1 REPORT DETAILS

Manufacturer	Ericsson AB
Address	Isafjordsgatan 10 SE-16480 Stockholm Sweden
Product Name	RUS 02 B2
Product Number	KRC 161 298/1
IC Model Name	AS1612981
Serial Number(s)	CB4Q847017, CB4Q847016
Software Version	CXP 901 7316/2 Rev R49EL
Hardware Version	R1B
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2012 FCC CFR 47 Part 24: 2012 RSS-133: Issue 6
Start of Test	08 June 2013
Finish of Test	03 July 2013
Name of Engineer(s)	Yuanjie He
Related Document(s)	ANSI C63.4: 2009 FCC CFR 47 Part 2: 2012 Industry Canada RSS-GEN Issue 3: 2010

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	2.1049(h)	24.238(b)	RSS-Gen 4.6.1	Occupied Bandwidth	Pass
2.3	2.1051	24.238(b)	6.5.1	Spurious Emissions at Band Edge	Pass
2.4	2.1053	24.238(a)	6.5.1	Radiated Spurious Emissions	Pass
2.5	2.1051	24.238(a)	6.5.1	Conducted Spurious Emissions	Pass
2.6	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
G-SC	1C	GSM Single Antenna, Single Carrier
G-MC 1	2C	GSM Single Antenna, Multi Carrier x2
G-MC 2	3C	GSM Single Antenna, Multi Carrier x3
G-MC 3	8C	GSM Single Antenna, Multi Carrier x8
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
G+W-MC 1	1G+1W	GSM+WCDMA Single Antenna, 1GSM+1WCDMA
G+W-MC 2	6G+2W	GSM+WCDMA Single Antenna, 6GSM+2WCDMA
G+W-MIMO-MC 1	1G+1W	GSM+WCDMA MIMO, 1GSM+1WCDMA
G+W-MIMO-MC 2	6G+2W	GSM+WCDMA MIMO, 6GSM+2WCDMA
G+W-MIMO-MC 3	2G+1W	GSM+WCDMA MIMO, 2GSM+1WCDMA
G+L-MC 1	1G+1L	GSM+LTE Single Antenna, 1GSM+1LTE
G+L-MC 2	6G+2L	GSM+LTE Single Antenna, 6GSM+2LTE
G+L-MIMO-MC 1	1G+1L	GSM+LTE MIMO, 1GSM+1LTE
G+L-MIMO-MC 2	6G+2L	GSM+LTE MIMO, 6GSM+2LTE
G+L-MIMO-MC 3	2G+1L	GSM+LTE MIMO, 2GSM+1LTE
W+L-MC 1	1W+1L	WCDMA+LTE Single Antenna, 1WCDMA+1LTE
W+L-MC 2	2W+2L	WCDMA+LTE Single Antenna, 2WCDMA+2LTE
W+L-MIMO-MC 1	1W+1L	WCDMA+LTE MIMO, 1WCDMA+1LTE
W+L-MIMO-MC 2	2W+2L	WCDMA+LTE MIMO, 2WCDMA+2LTE

1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Radio Unit
MANUFACTURER	Ericsson AB
PRODUCT NAME	RUS 02 B2
PART NUMBER	KRC 161 298/1
IC Model Name	AS1612981
TRANSMITTER OPERATING RANGE	TX: 1930MHz - 1990MHz RX: 1850MHz - 1910MHz
MODULATIONS	GSM: GMSK, 8-PSK, 16QAM, 32QAM, AQPSK WCDMA: QPSK, 16QAM, 64QAM LTE: QPSK, 16QAM, 64QAM
INTERMEDIATE FREQUENCIES	-
ITU DESIGNATION OF EMISSION	GSM: 245KGXW, 245KG7W WCDMA: 5M00F9W LTE: 1M40F9W, 3M00F9W, 5M00F9W, 10M0F9W, 15M0F9W, 20M0F9W
SUPPORTED CHANNEL BANDWIDTH CONFIGURATION	GSM: 200kHz 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)	Maximum 49.0dBm (80W) per port
INSTANTANEOUS BANDWIDTH	40MHz
FCC ID	TA8AKRC161298-1
IC ID	287AB-AS1612981
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The equipment is the Radio Part of GSM / WCDMA / LTE / GSM & WCDMA / GSM & LTE / WCDMA & LTE MSR Base Station

Signature



Date

03 July 2013

D of B S Serial No

75922897/01

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

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) RUS 02 B2, KRC 161 298/1 is an Ericsson AB Radio Unit working in the public mobile service 1900 band which provides communication connections to 1900 network in GSM / WCDMA / LTE Modes and GSM & WCDMA / GSM & LTE / WCDMA & LTE MSR modes. The RUS 02 B2, KRC 161 298/1 operates from a -48V DC supply.

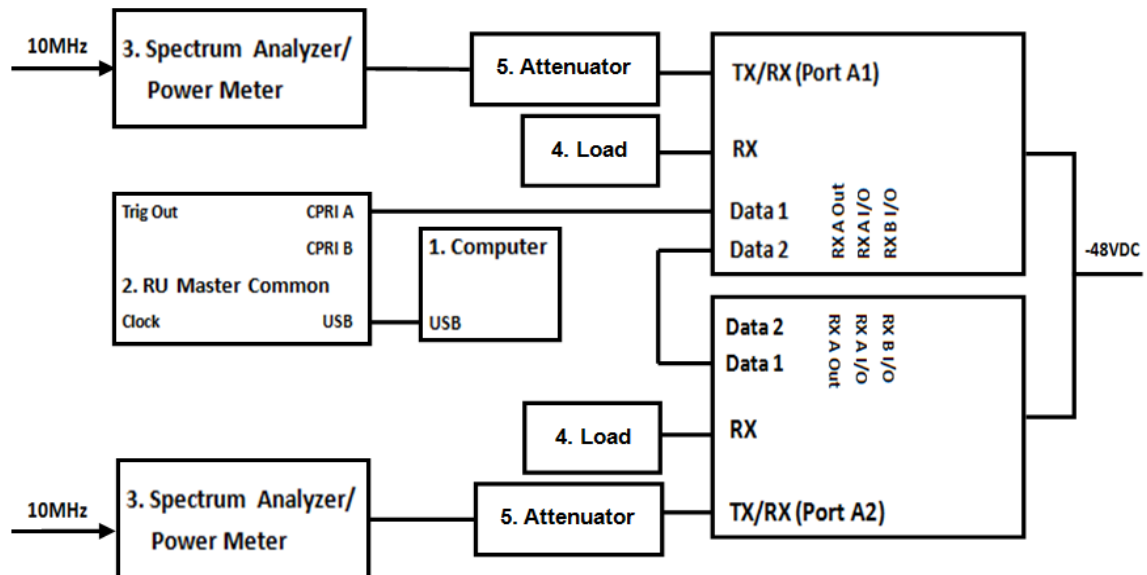
The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

1.6 TEST SETUP

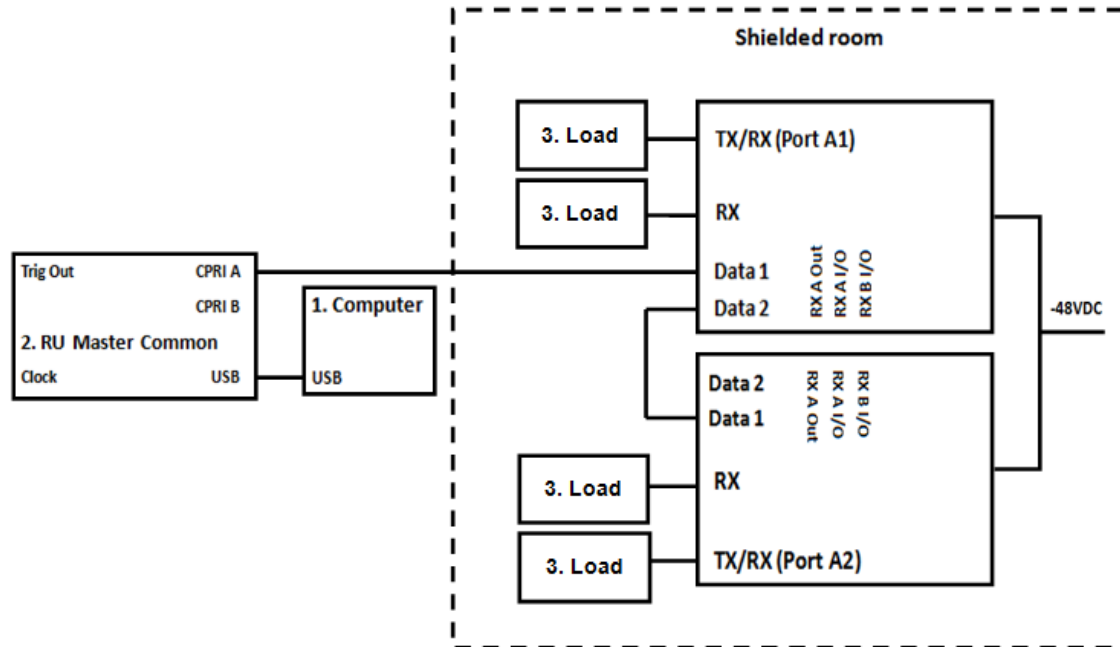
Test Setup, Conducted Measurement:



Product Name	Product Number	Version	Serial Number
RUS 02 B2	KRC 161 298/1	R1B	CB4Q847017, CB4Q847016

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	RU Master Common	LPC 102 400/5	R2A	T01E963734
3	Spectrum Analyzer	FSQ26	--	200235
	Spectrum Analyzer	FSQ26	--	100244
	Power Meter	NRP	--	102625
	Power Meter	NRP	--	101310
	Power Sensor	NRP-Z51	--	101407
	Power Sensor	NRP-Z51	--	102433
4	Load	TFE100	--	09121647
	Load	TFZ10-3R	--	20100908079
5	Attenuator	48-40-43-LIM	--	BR5020
		TSG100C-3-3R	--	090211049
		DTS50-40dB-3G	--	090211049
		DTS50-20dB	--	--
		DTS50-20dB-3G	--	090722020

Test Setup, Radiated Measurement:



Product Name	Product Number	Version	Serial Number
RUS 02 B2	KRC 161 298/1	R1B	CB4Q847017, CB4Q847016

No.	Auxiliary Equipment	Part Number / Model Type	Version	Serial Number
1	Computer	HP EliteBook 8540w	--	CND1234642
2	RU Master Common	LPC 102 400/5	R2A	T01E963734
3	Load	TFE100	--	09121647
	Load	TFE100	--	09032343
	Load	TFE100	--	09121614
	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.

The EUT was powered from a -48V DC supply.

1.8 DEVIATION FROM THE STANDARD

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

1.9 MODIFICATION RECORD

Modification State 0 - No modifications were made to the EUT during testing.

1.10 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV SÜD Product Service conducted the following tests at Ericsson in Beijing, China:

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

Only Radiated Spurious Emissions testing has 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.



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

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017, CB4Q847016

2.1.3 Date of Test and Modification State

08 to 14 June 2013 - Modification State 0

2.1.4 Test Equipment Used

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

2.1.5 Environmental Conditions

Ambient Temperature 22.0 – 23.0°C
Relative Humidity 60.0 – 65.5%

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. 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.

2.1.7 Test Results

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position B 1930.4MHz		Channel Position M 1960.0MHz		Channel Position T 1989.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK	47.46	0.45	47.47	0.45	47.60	0.46
8-PSK	47.39	3.75	47.52	3.77	47.55	3.74
AQPSK	47.41	2.86	47.53	2.84	47.56	2.79
16QAM	47.40	5.13	47.50	5.15	47.52	5.23
32QAM	47.46	5.54	47.55	5.60	47.55	5.55

Configuration G-MC 1 (2C)

Maximum Output Power 46.0dBm per carrier

Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position B 1930.4MHz + 1969.8MHz		Channel Position M 1940.2MHz + 1979.8MHz		Channel Position T 1950.2MHz + 1989.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK	48.57	-	48.63	-	48.58	-
8-PSK	48.53	-	48.60	-	48.54	-
AQPSK	48.56	-	48.62	-	48.55	-
16QAM	47.43	-	47.52	-	47.46	-
32QAM	47.03	-	47.04	-	47.03	-

Configuration G-MC 3 (8C)

Maximum Output Power 38.0dBm per carrier

Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position B 1930.4MHz + 1930.8MHz + 1931.2MHz + 1931.6MHz + 1968.6MHz + 1969.0MHz + 1969.4MHz + 1969.8MHz		Channel Position M 1940.2 MHz + 1940.6MHz + 1941.0MHz + 1941.4MHz + 1978.6MHz + 1979.0MHz + 1979.4MHz + 1979.8MHz		Channel Position T 1950.2MHz + 1950.6MHz + 1960.0MHz + 1960.4MHz 1988.4MHz + 1988.8MHz + 1989.2MHz + 1989.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK	46.61	-	46.65	-	46.64	-
8-PSK	43.28	-	43.31	-	43.29	-
AQPSK	44.70	-	44.74	-	44.72	-
16QAM	41.85	-	41.93	-	41.91	-
32QAM	41.49	-	41.53	-	41.51	-

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

Modulation	Peak 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)
QPSK	48.74	7.08	48.92	6.94	48.79	7.00

Configuration W-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position B 1932.4MHz + 1967.6MHz		Channel Position M 1942.4MHz + 1977.6MHz		Channel Position T 1952.4MHz + 1987.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
QPSK	48.63	-	48.63	-	48.60	-

Configuration W-MC 2 (4C)

Maximum Output Power 42.4dBm per carrier

Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position B 1932.4MHz + 1937.4MHz + 1962.6MHz + 1967.6MHz		Channel Position M 1942.4MHz + 1947.4MHz + 1972.6MHz + 1977.6MHz		Channel Position T 1952.4MHz + 1957.4MHz + 1982.6MHz + 1987.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
QPSK	48.31	-	48.27	-	48.27	-

Configuration W-MIMO-SC

Maximum Output Power 47.0dBm per carrier

Antenna	Modulation	Peak 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)
A1	16QAM	46.90	7.69	46.89	7.58	46.96	7.65
A2	16QAM	47.08	7.60	47.07	7.51	47.09	7.53
Total		50.00	-	49.99	-	50.03	-

Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

Antenna	Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1967.6MHz		Channel Position M 1942.4MHz + 1977.6MHz		Channel Position T 1952.4MHz + 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	16QAM	48.61	-	48.62	-	48.64	-
A2	16QAM	48.73	-	48.82	-	48.80	-
Total		51.68	-	51.73	-	51.73	-

Configuration W-MIMO-MC 2 (4C)

Maximum Output Power 42.4dBm per carrier

Antenna	Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.4MHz + 1937.4MHz + 1962.6MHz + 1967.6MHz		Channel Position M 1942.4MHz + 1947.4MHz + 1972.6MHz + 1977.6MHz		Channel Position T 1952.4MHz + 1957.4MHz + 1982.6MHz + 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	16QAM	48.28	-	48.24	-	48.27	-
A2	16QAM	48.39	-	48.44	-	48.46	-
Total		51.35	-	51.35	-	51.38	-

Configuration L-MIMO-SC

Maximum Output Power 49.0dBm per carrier

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 1.4 MHz	48.54	6.97	48.88	7.06	48.66	7.01
A2		48.74	6.89	49.05	6.90	48.76	6.92
Total		51.65	-	51.98	-	51.72	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 3.0 MHz	48.66	6.92	48.89	6.88	48.73	6.90
A2		48.80	6.66	49.07	6.66	48.85	6.71
Total		51.74	-	51.99	-	51.80	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 5.0 MHz	48.71	6.94	48.89	6.86	48.76	6.93
A2		48.90	6.91	49.08	6.81	48.92	6.86
Total		51.82	-	52.00	-	51.85	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 10.0 MHz	48.84	7.25	48.89	6.84	48.85	7.04
A2		49.02	7.11	49.10	6.77	49.03	6.89
Total		51.94	-	52.00	-	51.95	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 15.0 MHz	48.93	7.52	48.90	6.94	48.94	7.26
A2		49.10	7.40	49.13	6.83	49.09	7.12
Total		52.03	-	52.03	-	52.03	-

Antenna	Modulation / Carrier Bandwidth (MHz)	Peak 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)
A1	QPSK / 20.0 MHz	48.99	7.77	48.89	6.89	48.93	7.39
A2		49.12	7.55	49.13	6.77	49.10	7.10
Total		52.07	-	52.02	-	52.03	-

Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

Antenna	Carrier Bandwidth (MHz)	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1930.7MHz + 1969.3MHz		Channel Position M 1940.7MHz + 1979.3MHz		Channel Position T 1950.7MHz + 1989.3MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	QPSK / 1.4 MHz	48.53	-	48.62	-	48.60	-
A2		48.64	-	48.75	-	48.70	-
Total		51.60	-	51.70	-	51.66	-

Antenna	Carrier Bandwidth (MHz)	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1931.5MHz + 1968.5MHz		Channel Position M 1941.5MHz + 1978.5MHz		Channel Position T 1951.5MHz + 1988.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	QPSK / 3.0 MHz	48.63	-	48.91	-	48.61	-
A2		48.68	-	49.07	-	48.75	-
Total		51.67	-	52.00	-	51.69	-

Antenna	Carrier Bandwidth (MHz)	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1932.5MHz + 1967.5MHz		Channel Position M 1942.5MHz + 1977.5MHz		Channel Position T 1952.5MHz + 1987.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	QPSK / 5.0 MHz	48.33	-	48.33	-	48.33	-
A2		48.45	-	48.54	-	48.51	-
Total		51.40	-	51.45	-	51.43	-

Antenna	Carrier Bandwidth (MHz)	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position B 1935.0MHz + 1965.0MHz		Channel Position M 1945.0MHz + 1975.0MHz		Channel Position T 1955.0MHz + 1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	QPSK / 10.0 MHz	48.18	-	48.15	-	48.18	-
A2		48.30	-	48.35	-	48.36	-
Total		51.25	-	51.26	-	51.28	-

Configuration G+W-MC 1 (1G + 1W)

Maximum Output Power 44.8dBm per carrier

Modulation (GSM / WCDMA)	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW (G) 1930.4MHz + (W)1967.6MHz		Channel Position MRFBW (G) 1940.2MHz + (W) 1977.6MHz		Channel Position TRFBW (G) 1950.2MHz + (W) 1987.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK / QPSK	47.44	-	47.51	-	47.52	-

Configuration G+W-MC 2 (6G + 2W)

Maximum Output Power 38.0dBm per carrier

Modulation (GSM / WCDMA)	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW (G) 1930.4MHz + 1931.0MHz + 1931.6MHz + (W) 1947.4MHz + 1952.4MHz + (G) 1968.6MHz + 1969.2MHz + 1969.8MHz		Channel Position MRFBW (G) 1940.2MHz + 1940.8MHz + 1941.4MHz + (W) 1957.4MHz + 1962.4MHz + (G) 1978.6MHz + 1979.2MHz + 1979.8MHz		Channel Position TRFBW (G) 1950.2MHz + 1950.8MHz + 1951.4MHz + (W) 1967.6MHz + 1972.6MHz + (G) 1988.4MHz + 1989.0MHz + 1989.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK / QPSK	46.67	-	46.68	-	46.65	-

Configuration G+W-MIMO-MC 1 (1G + 1W)

Maximum Output Power 44.8dBm per carrier

Antenna	GSM Modulation / WCDMA Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1930.4MHz + (W)1967.6MHz		Channel Position MRFBW (G) 1940.2MHz + (W) 1977.6MHz		Channel Position TRFBW (G) 1950.2MHz + (W) 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	GMSK / 16QAM	47.45	-	47.56	-	47.56	-
Antenna	GSM Modulation / WCDMA Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1931.0MHz + (W)1967.6MHz		Channel Position MRFBW (G) 1940.8MHz + (W) 1977.6MHz		Channel Position TRFBW (G) 1950.8MHz + (W) 1987.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A2	GMSK / 16QAM	47.62	-	47.70	-	47.69	-
Total		50.55	-	50.64	-	50.64	-

Configuration G+W-MIMO-MC 2 (6G +2W)

Maximum Output Power 38.0dBm per carrier

Antenna	GSM Modulation / WCDMA Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1930.4MHz + 1931.0MHz + 1931.6MHz + (W) 1947.4MHz + 1952.4MHz + (G) 1968.6MHz + 1969.2MHz + 1969.8MHz		Channel Position MRFBW (G) 1940.2MHz + 1940.8MHz + 1941.4MHz + (W) 1957.4MHz + 1962.4MHz + (G) 1978.6MHz + 1979.2MHz + 1979.8MHz		Channel Position TRFBW (G) 1950.2MHz + 1950.8MHz + 1951.4MHz + (W) 1967.6MHz + 1972.6MHz + (G) 1988.4MHz + 1989.0MHz + 1989.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	GMSK / 16QAM	46.69	-	46.68	-	46.63	-
Antenna	GSM Modulation / WCDMA Modulation	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1932.2MHz + 1932.8MHz + 1933.4MHz + (W) 1947.4MHz + 1952.4MHz + (G) 1966.6MHz + 1967.2MHz + 1968.0MHz		Channel Position MRFBW (G) 1942.0MHz + 1942.6MHz + 1943.2MHz + (W) 1957.4MHz + 1962.4MHz + (G) 1976.8MHz + 1977.4MHz + 1978.0MHz		Channel Position TRFBW (G) 1952.0MHz + 1952.6MHz + 1953.2MHz + (W) 1967.6MHz + 1972.6MHz + (G) 1986.6MHz + 1987.2MHz + 1987.8MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A2	GMSK / 16QAM	46.84	-	46.90	-	46.87	-
Total		49.78	-	49.80	-	49.76	-

Configuration G+L-MC 1 (1G + 1L)

Maximum Output Power 45.6dBm per carrier

GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW (G) 1930.4MHz + (L) 1965.0MHz		Channel Position MRFBW (G) 1940.2MHz + (L) 1975.0MHz		Channel Position TRFBW (G) 1950.2MHz + (L) 1985.0MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK / QPSK 10.0 MHz	48.23	-	48.33	-	48.36	-

Configuration G+L-MC 2 (6G + 2L)

Maximum Output Power 40.0dBm per carrier

GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW (G) 1930.4MHz + 1931.0MHz + 1931.6MHz + (L) 1948.5MHz + 1951.5MHz + (G) 1968.6MHz + 1969.2MHz + 1969.8MHz		Channel Position MRFBW (G) 1940.2MHz + 1940.8MHz + 1941.4MHz + (L) 1958.5MHz + 1961.5MHz + (G) 1978.6MHz + 1979.2MHz + 1979.8MHz		Channel Position TRFBW (G) 1950.2MHz + 1950.8MHz + 1951.4MHz + (L) 1968.5MHz + 1971.5MHz + (G) 1988.4MHz + 1989.0MHz + 1989.6MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
GMSK / QPSK 3.0 MHz	48.72	-	48.71	-	48.70	-

Configuration G+L-MIMO-MC 1 (1G + 1L)

Maximum Output Power 45.6dBm per carrier

Antenna	GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1930.4MHz + (L) 1965.0MHz		Channel Position MRFBW (G) 1940.2MHz + (L) 1975.0MHz		Channel Position TRFBW (G) 1950.2MHz + (L) 1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	GMSK / QPSK 10.0 MHz	48.28	-	48.34	-	48.38	-
Antenna	GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (G) 1931.0MHz + (L) 1965.0MHz		Channel Position MRFBW (G) 1940.8MHz + (L) 1975.0MHz		Channel Position TRFBW (G) 1950.8MHz + (L) 1985.0MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A2	GMSK / QPSK 10.0 MHz	48.40	-	48.50	-	48.54	-
Total		51.35	-	51.43	-	51.47	-

Configuration G+L-MIMO-MC 2 (6G + 2L)

Maximum Output Power 40.0dBm per carrier

Antenna	GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW		Channel Position MRFBW		Channel Position TRFBW	
		(G) 1930.4MHz + 1931.0MHz + 1931.6MHz + (L) 1948.5MHz + 1951.5MHz + (G) 1968.6MHz + 1969.2MHz + 1969.8MHz		(G) 1940.2MHz + 1940.8MHz + 1941.4MHz + (L) 1958.5MHz + 1961.5MHz + (G) 1978.6MHz + 1979.2MHz + 1979.8MHz		(G) 1950.2MHz + 1950.8MHz + 1951.4MHz + (L) 1968.5MHz + 1971.5MHz + (G) 1988.4MHz + 1989.0MHz + 1989.6MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A	GMSK / QPSK 3.0 MHz	48.73	-	48.73	-	48.70	-
Antenna	GSM Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW		Channel Position MRFBW		Channel Position TRFBW	
		(G) 1932.2MHz + 1932.8MHz + 1933.4MHz + (L) 1948.5MHz + 1951.5MHz + (G) 1966.6MHz + 1967.2MHz + 1968.0MHz		(G) 1942.0MHz + 1942.6MHz + 1943.2MHz + (L) 1958.5MHz + 1961.5MHz + (G) 1976.8MHz + 1977.4MHz + 1978.0MHz		(G) 1952.0MHz + 1952.6MHz + 1953.2MHz + (L) 1968.5MHz + 1971.5MHz + (G) 1986.6MHz + 1987.2MHz + 1987.8MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
B	GMSK / QPSK 3.0 MHz	48.88	-	48.89	-	48.92	-
Total		51.82	-	51.82	-	51.82	-

Configuration W+L-MC 1 (1W + 1L)

Maximum Output Power 45.7dBm per carrier

WCDMA Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW		Channel Position MRFBW		Channel Position TRFBW	
	(W) 1932.4MHz + (L) 1968.5MHz		(W) 1942.4MHz + (L) 1978.5MHz		(W) 1952.4MHz + (L) 1988.5MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
QPSK / QPSK 3.0 MHz	48.53	-	48.54	-	48.52	-

Configuration W+L-MC 2 (2W + 2L)

Maximum Output Power 42.2dm per carrier

WCDMA Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
	Channel Position BRFBW		Channel Position MRFBW		Channel Position TRFBW	
	(W) 1932.4MHz + 1937.4MHz + (L) 1962.5MHz + 1967.5MHz		(W) 1942.4MHz + 1947.4MHz + (L) 1972.5MHz + 1977.5MHz		(W) 1952.4MHz + 1957.4MHz + (L) 1982.5MHz + 1987.5MHz	
	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
QPSK / QPSK 5.0 MHz	48.09	-	48.07	-	48.09	-

Configuration W+L-MIMO-MC 1 (1W + 1L)

Maximum Output Power 45.7dBm per carrier

Antenna	WCDMA Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (W) 1932.4MHz + (L)1968.5MHz		Channel Position MRFBW (W) 1942.4MHz + (L)1978.5MHz		Channel Position TRFBW (W) 1952.4MHz + (L)1988.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	16QAM / QPSK 3.0 MHz	48.57	-	48.52	-	48.50	-
A2	16QAM / QPSK 3.0 MHz	48.64	-	48.70	-	48.67	-
Total		51.62	-	51.62	-	51.60	-

Configuration W+L-MIMO-MC 2 (2W + 2L)

Maximum Output Power 42.2dBm per carrier

Antenna	WCDMA Modulation / LTE Modulation Bandwidth	Peak Output Power / Peak to Average Ratio (PAR)					
		Channel Position BRFBW (W) 1932.4MHz + 1937.4MHz + (L) 1962.5MHz + 1967.5MHz		Channel Position MRFBW (W) 1942.4MHz +1947.4MHz + (L)1972.5MHz + 1977.5MHz		Channel Position TRFBW (W) 1952.4MHz + 1957.4MHz + (L)1982.5MHz + 1987.5MHz	
		Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)	Power (dBm)	PAR (dB)
A1	16QAM / QPSK 5.0 MHz	48.12	-	48.07	-	48.12	-
A2	16QAM / QPSK 5.0 MHz	48.23	-	48.29	-	48.28	-
Total		51.19	-	51.19	-	51.21	-

Limit	
Maximum Power	FCC: ≤1640 W or ≤+62.15dBm IC: ≤100 W or ≤+50dBm per transmitter
Peak to Average Ratio	13 dB

2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
FCC CFR 47 Part 4, Clause 24.238 (b)
Industry Canada RSS-GEN, Clause 4.6.1

2.2.2 Equipment Under Test

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017

2.2.3 Date of Test and Modification State

13 to 18 June 2013 - 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 21.8 – 23.0°C
Relative Humidity 60.0 – 64.0%

2.2.6 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 99% Occupied Bandwidth was measured.

The results are shown in the plots below.

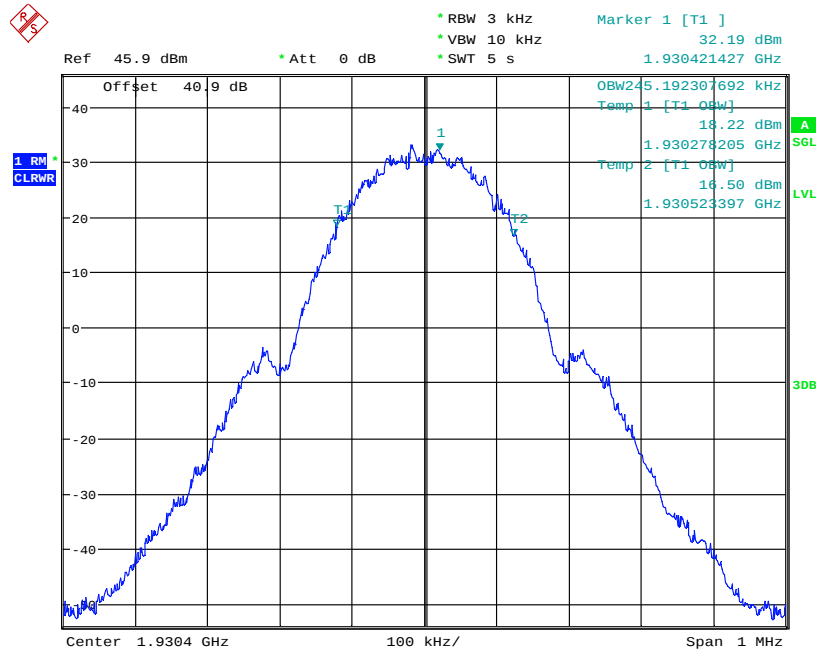
2.2.7 Test Results

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

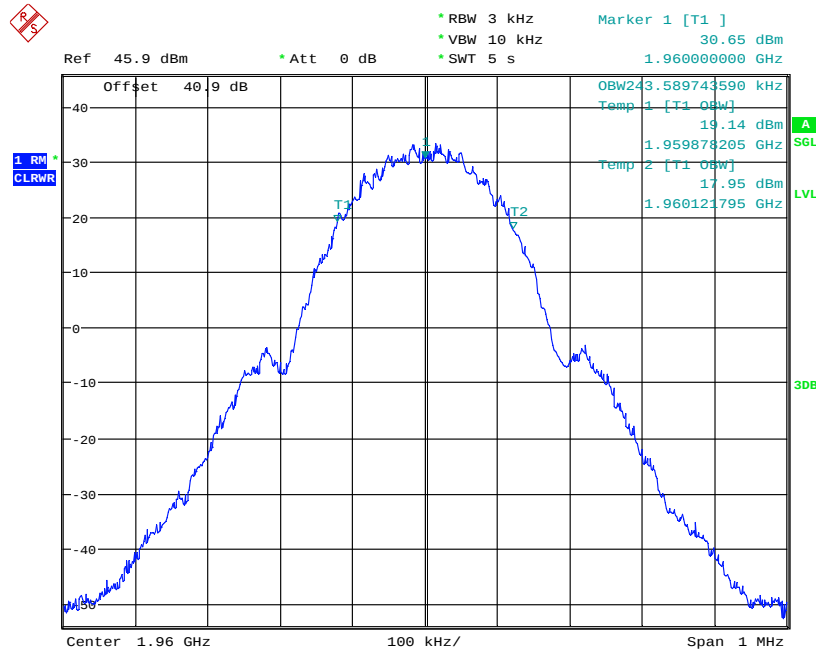
Modulation	Occupied Bandwidth (kHz)		
	Channel Position B 1930.4MHz	Channel Position M 1960.0MHz	Channel Position T 1989.6MHz
GMSK	245.19	243.59	245.19
8-PSK	245.19	243.59	243.59
AQPSK	243.59	243.59	243.59
16QAM	243.59	243.59	245.19
32QAM	243.59	243.59	243.59

Channel Position B - GMSK



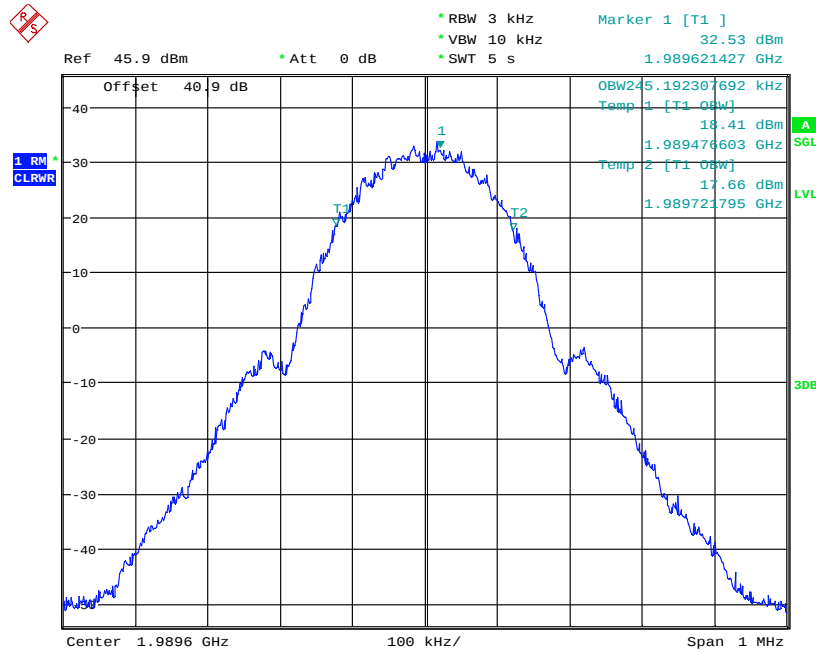
Date: 13.JUN.2013 14:24:19

Channel Position M - GMSK



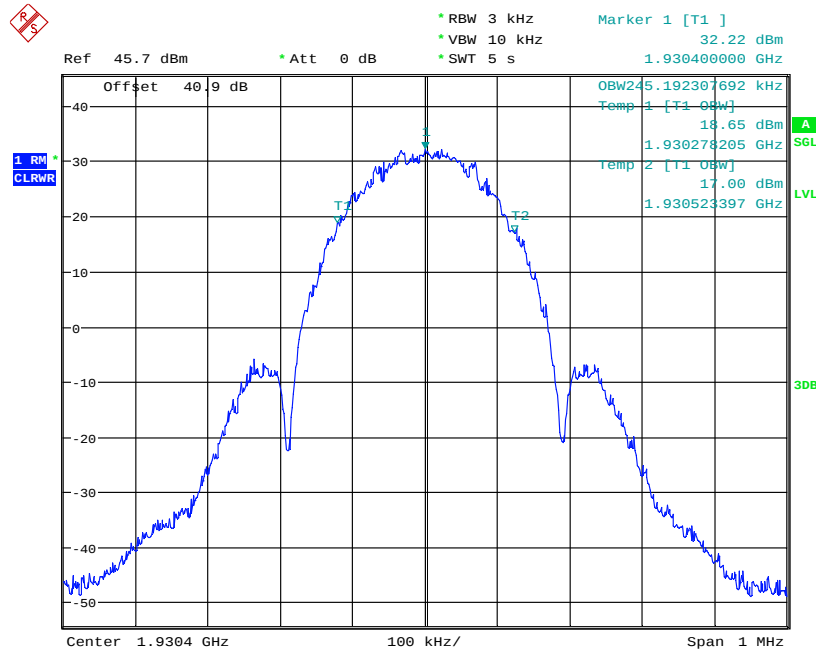
Date: 13.JUN.2013 14:40:17

Channel Position T - GMSK



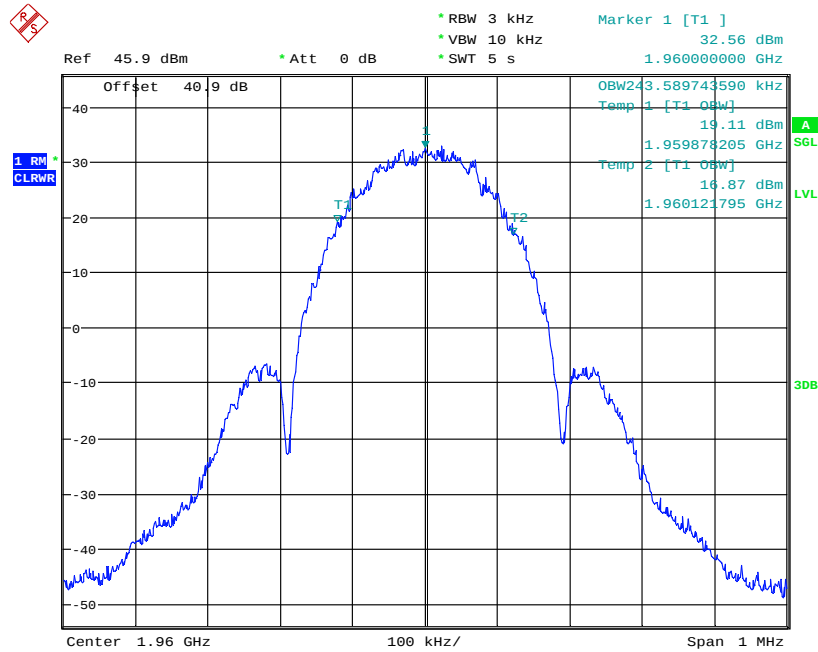
Date: 13.JUN.2013 14:42:51

Channel Position B – 8-PSK



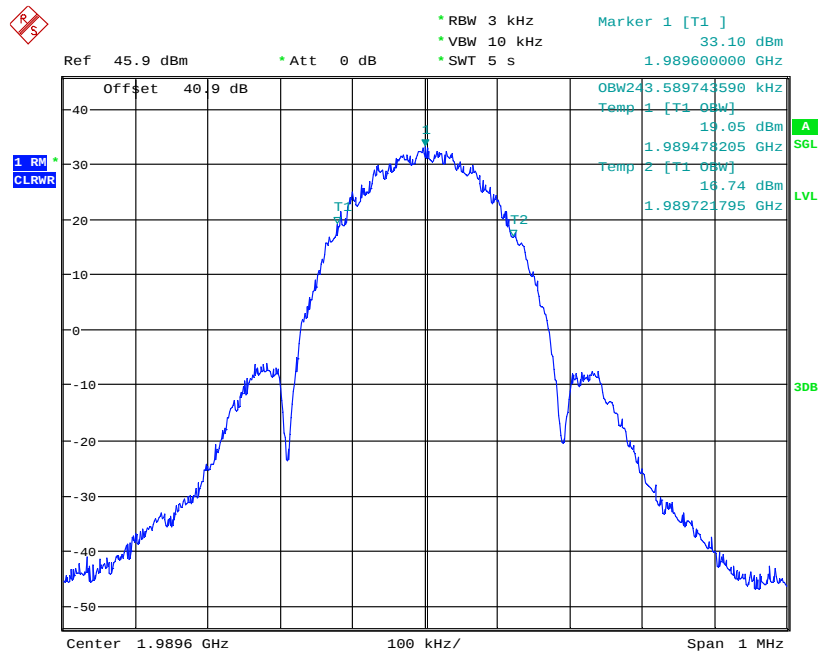
Date: 13.JUN.2013 15:00:37

Channel Position M – 8-PSK



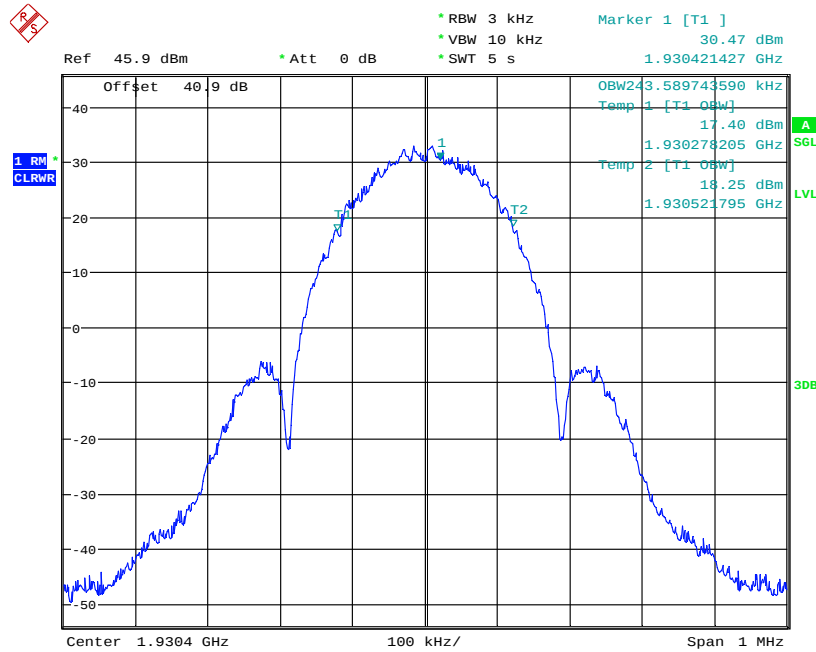
Date: 13.JUN.2013 14:56:00

Channel Position T – 8-PSK



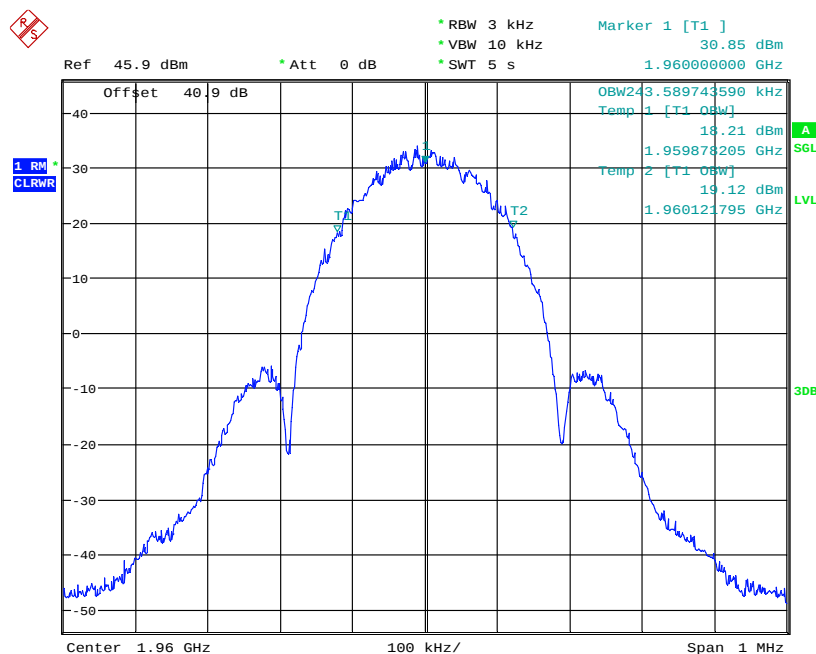
Date: 13.JUN.2013 14:50:54

Channel Position B - AQPSK



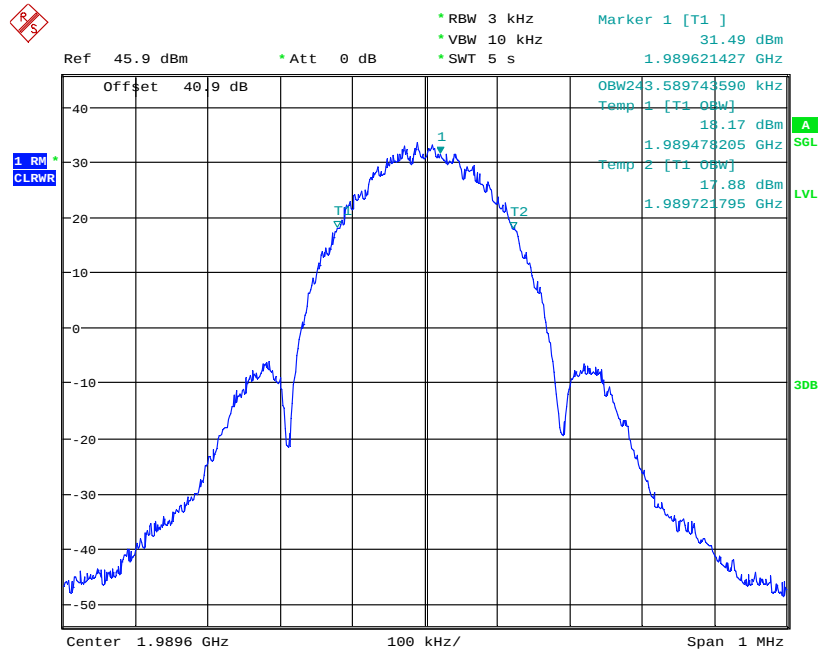
Date: 13.JUN.2013 15:04:04

Channel Position M - AQPSK



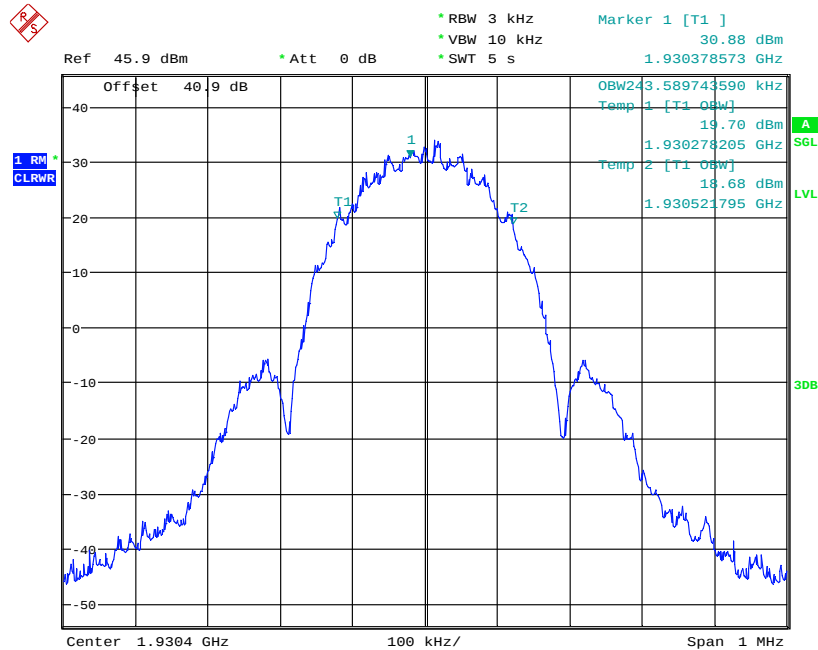
Date: 13.JUN.2013 15:13:17

Channel Position T - AQPSK



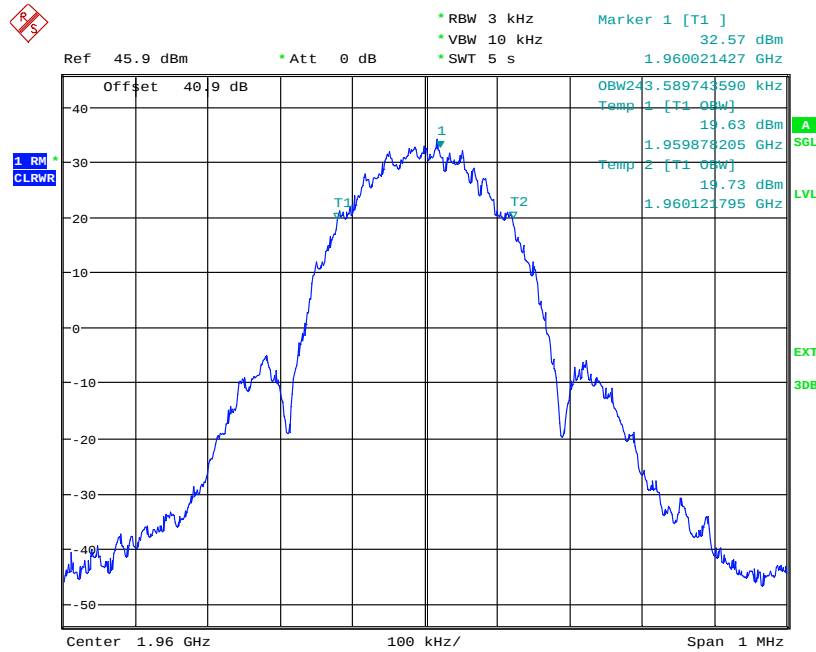
Date: 13.JUN.2013 15:17:16

Channel Position B - 16QAM



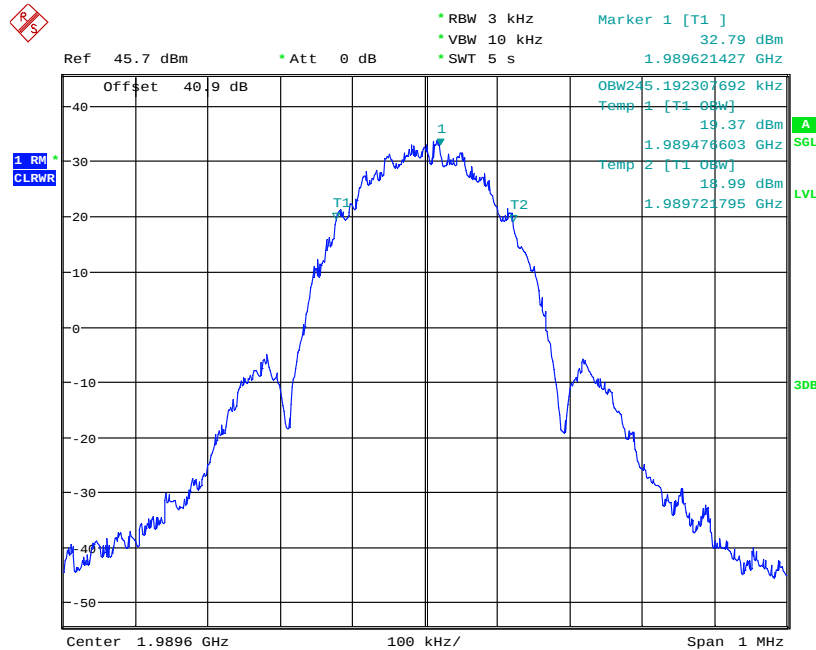
Date: 13.JUN.2013 15:50:04

Channel Position M – 16QAM



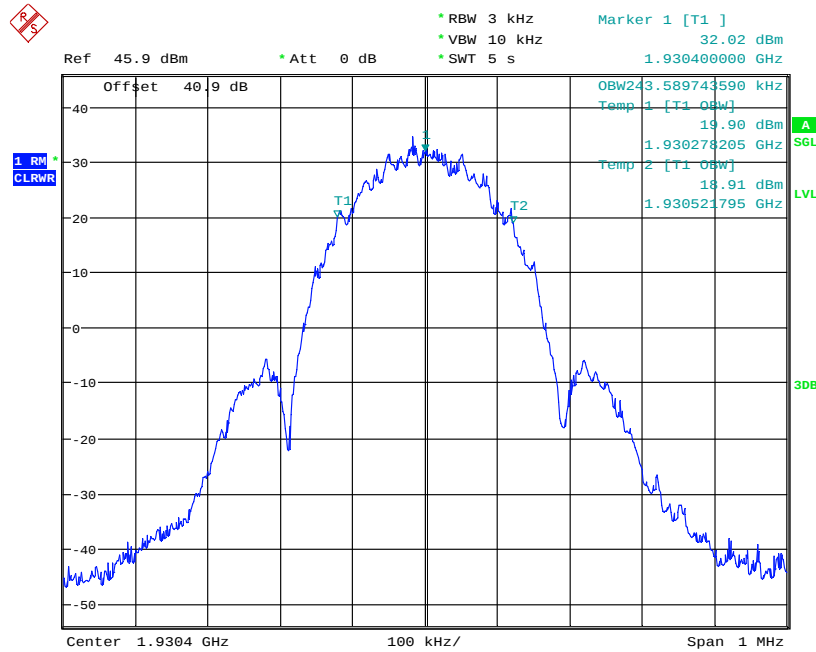
Date: 13.JUN.2013 16:06:55

Channel Position T – 16QAM



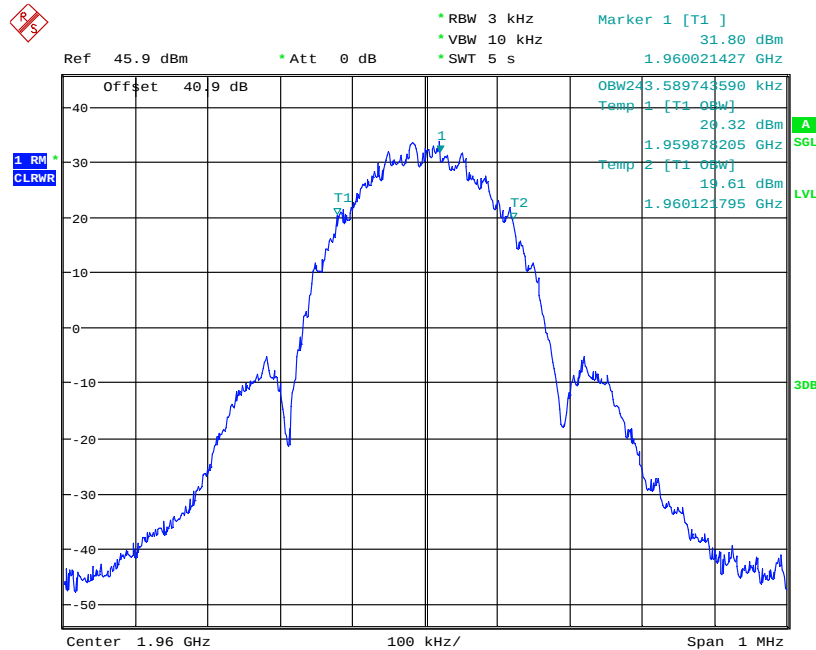
Date: 13.JUN.2013 15:35:59

Channel Position B – 32QAM



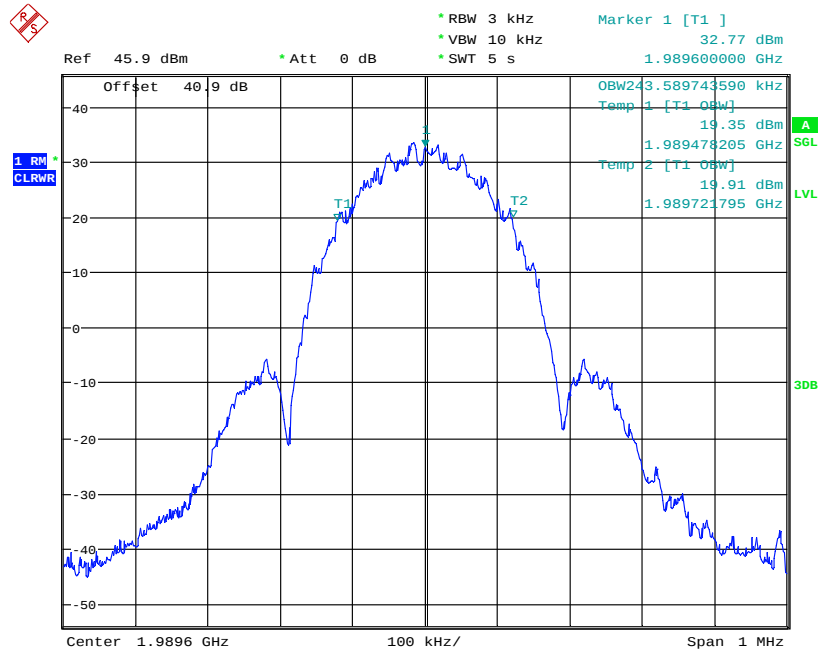
Date: 13.JUN.2013 16:16:58

Channel Position M – 32QAM



Date: 13.JUN.2013 16:13:00

Channel Position T - 32QAM



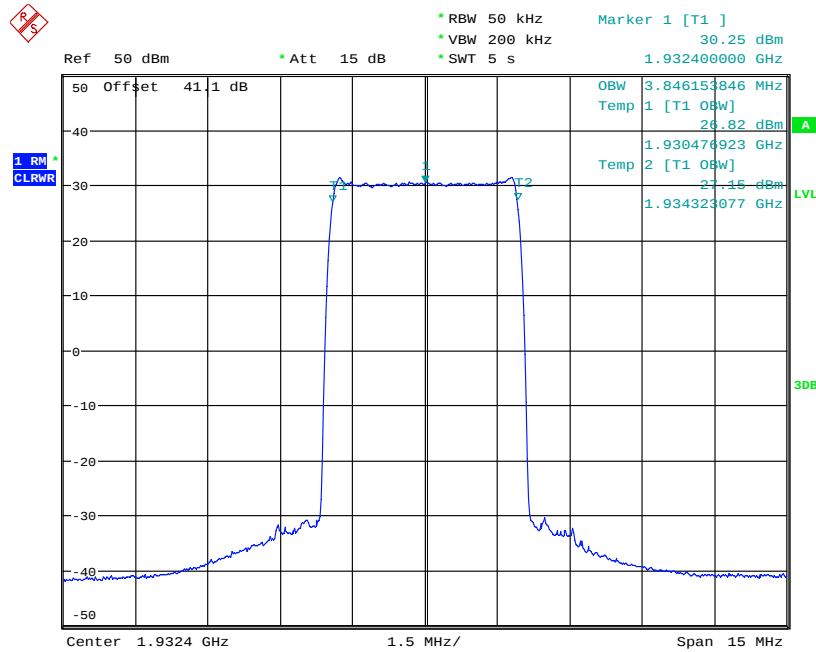
Date: 13.JUN.2013 16:23:21

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

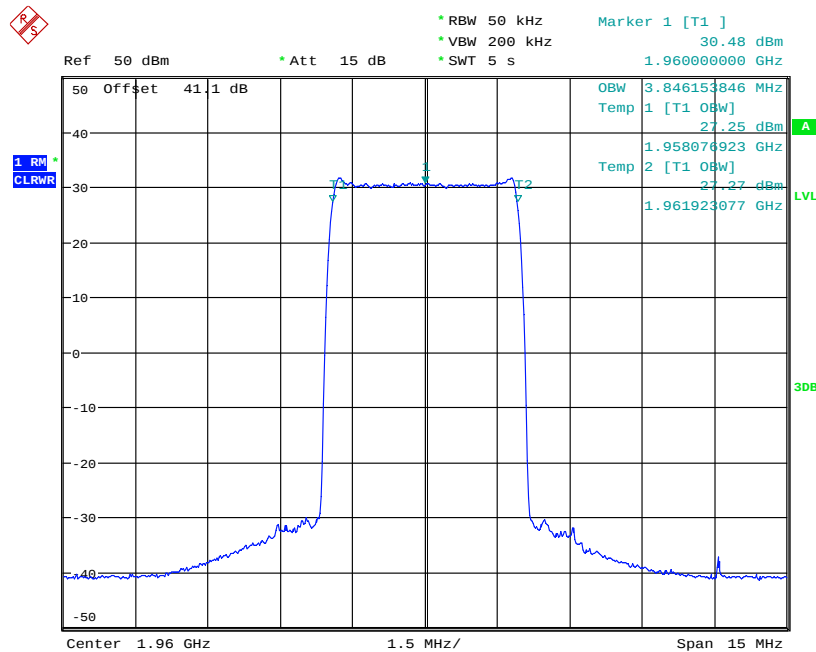
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.4MHz	Channel Position M 1960.0MHz	Channel Position T 1987.6MHz
QPSK / 4.2 MHz	3.85	3.85	3.85
QPSK / 5.0 MHz	4.18	4.18	4.18

Channel Position B - QPSK / Bandwidth 4.2 MHz



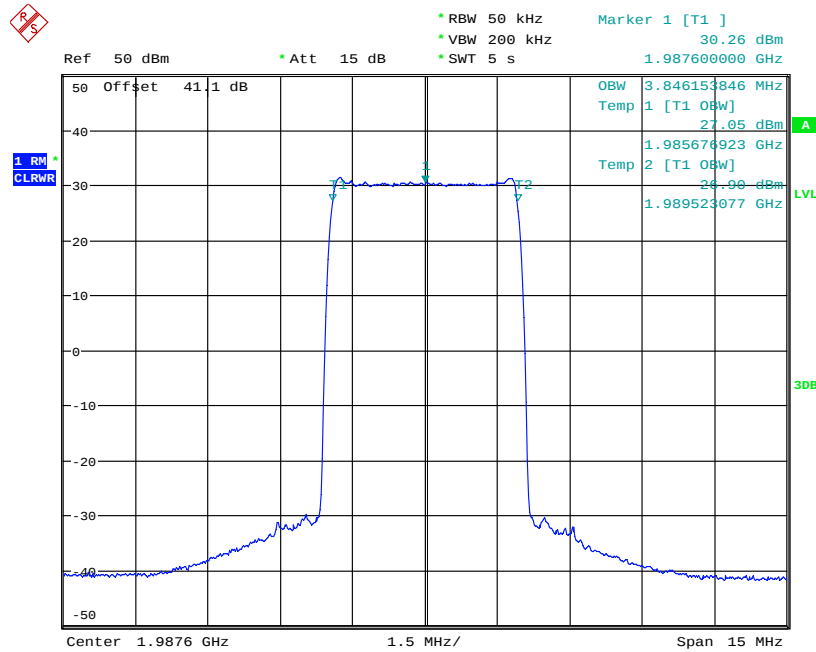
Date: 14.JUN.2013 11:28:11

Channel Position M - QPSK / Bandwidth 4.2 MHz



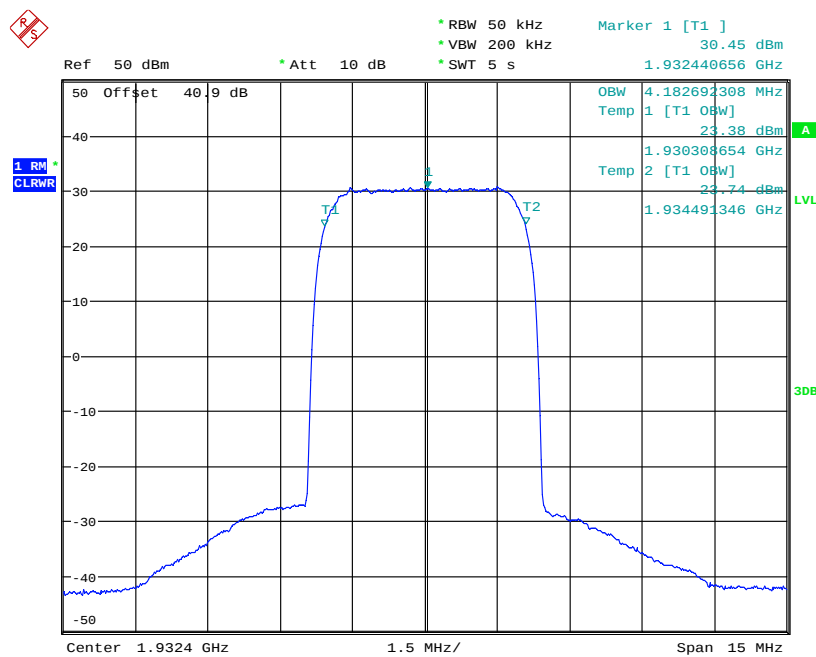
Date: 14.JUN.2013 11:30:50

Channel Position T - QPSK / Bandwidth 4.2 MHz



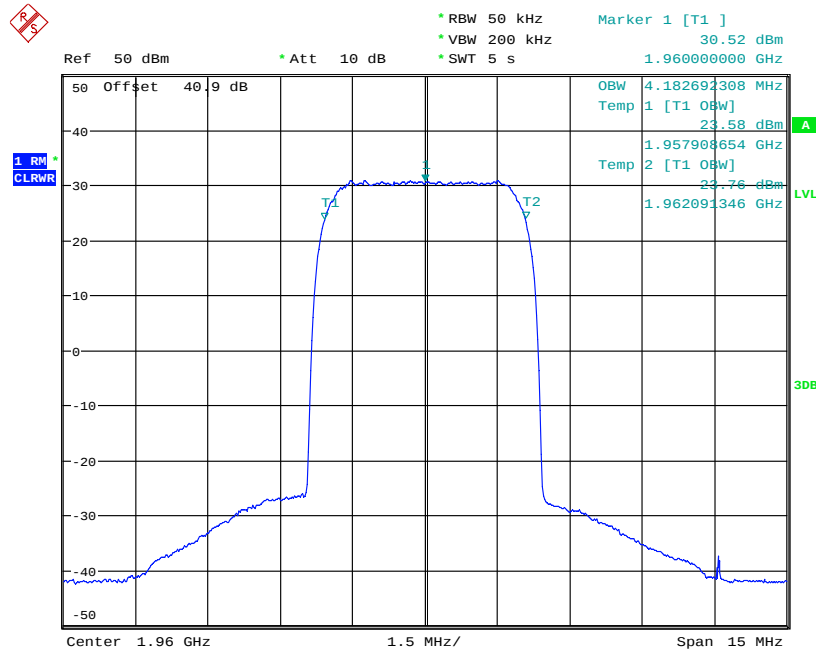
Date: 14.JUN.2013 11:37:09

Channel Position B - QPSK / Bandwidth 5.0 MHz



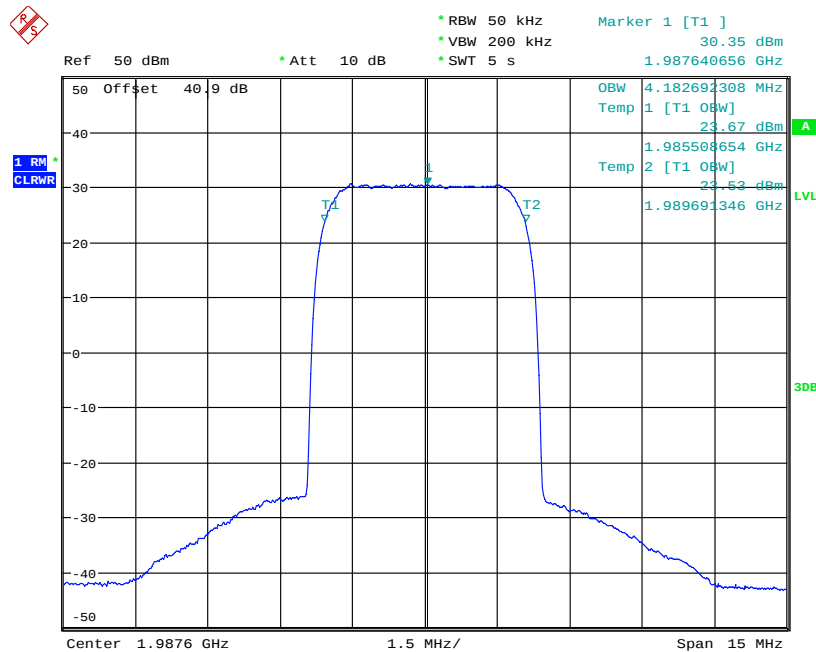
Date: 13.JUN.2013 17:43:33

Channel Position M - QPSK / Bandwidth 5.0 MHz



Date: 13.JUN.2013 17:55:34

Channel Position T - QPSK / Bandwidth 5.0 MHz



Date: 13.JUN.2013 17:50:06

Configuration LTE-SC

Maximum Output Power 49.0dBm per carrier

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	1.10	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	2.69	2.69	2.69

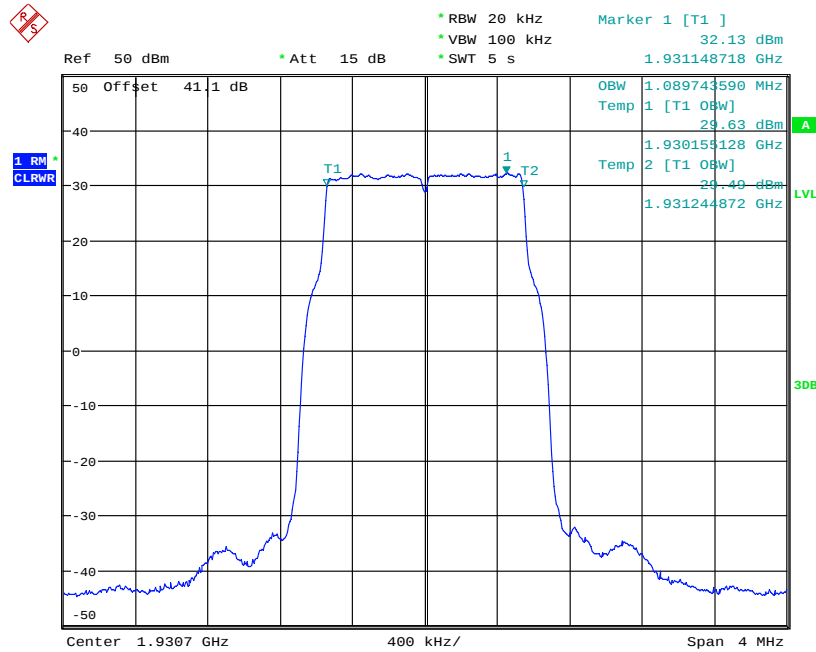
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1932.5MHz	Channel Position M 1960.0MHz	Channel Position T 1987.5MHz
QPSK / 5.0 MHz	4.47	4.47	4.47

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

Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1937.5MHz	Channel Position M 1960.0MHz	Channel Position T 1982.5MHz
QPSK / 15.0 MHz	13.46	13.46	13.46

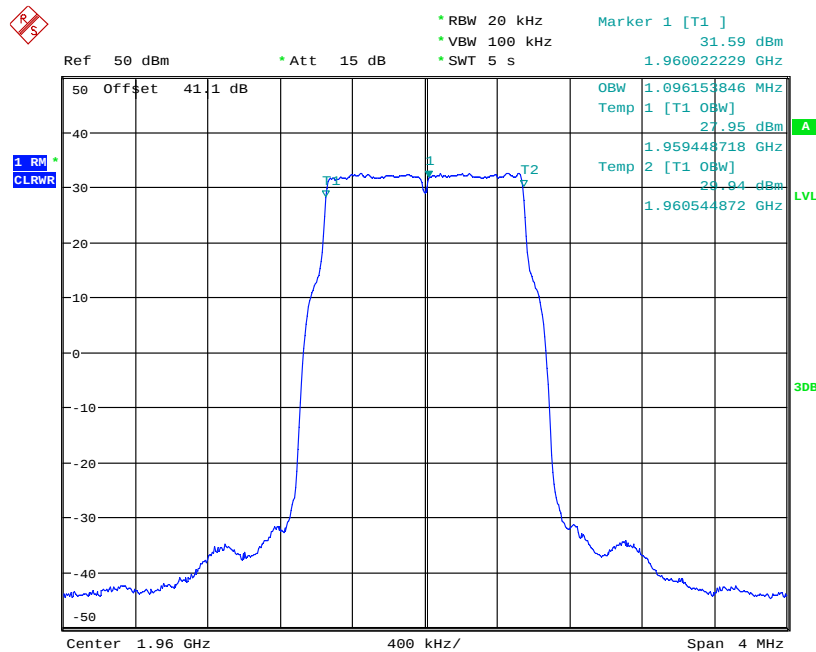
Modulation / Bandwidth	Occupied Bandwidth (MHz)		
	Channel Position B 1940.0MHz	Channel Position M 1960.0MHz	Channel Position T 1980.0MHz
QPSK / 20.0 MHz	17.88	17.88	17.88

Channel Position B - QPSK / Bandwidth 1.4 MHz



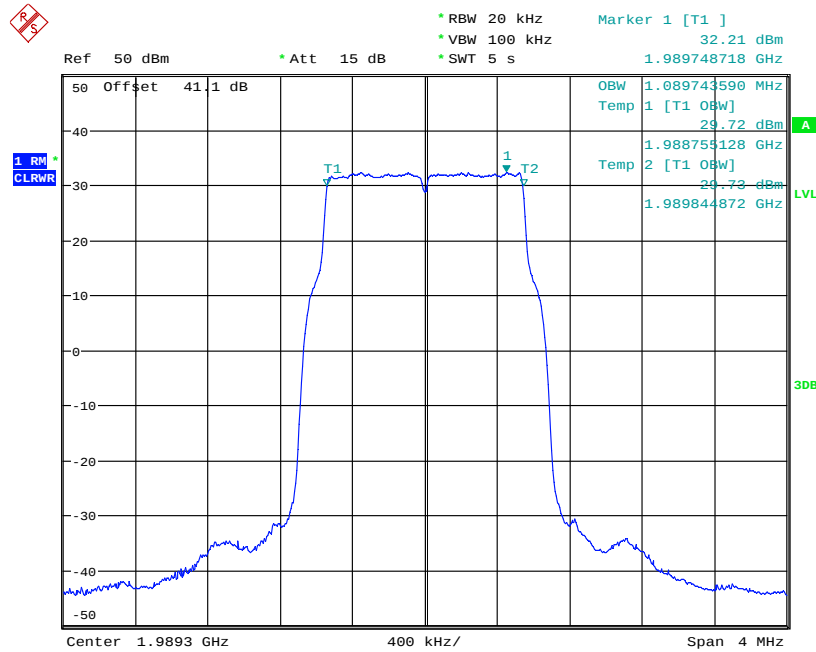
Date: 14.JUN.2013 17:26:13

Channel Position M - QPSK / Bandwidth 1.4 MHz



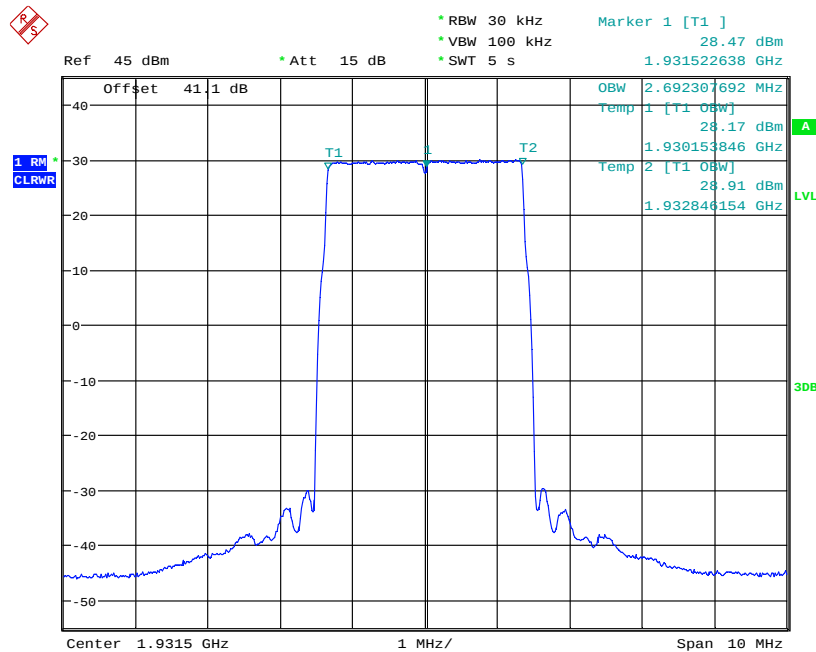
Date: 14.JUN.2013 17:41:55

Channel Position T - QPSK / Bandwidth 1.4 MHz



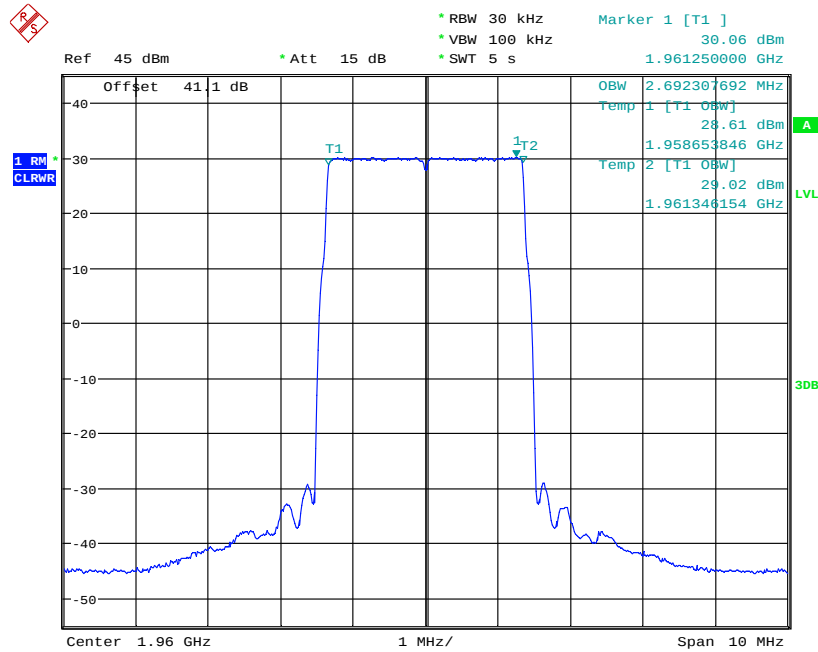
Date: 17.JUN.2013 10:17:08

Channel Position B - QPSK / Bandwidth 3.0 MHz



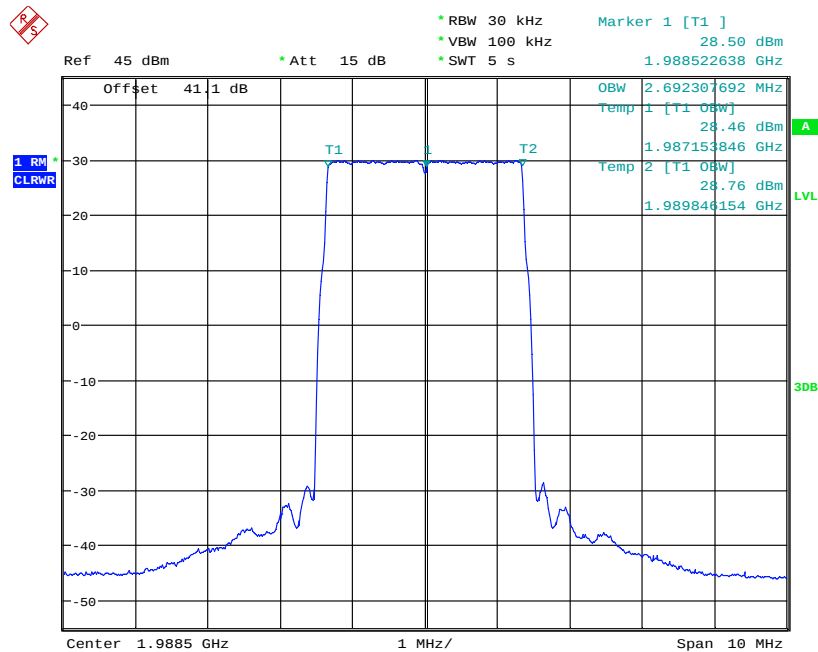
Date: 17.JUN.2013 10:36:13

Channel Position M - QPSK / Bandwidth 3.0 MHz



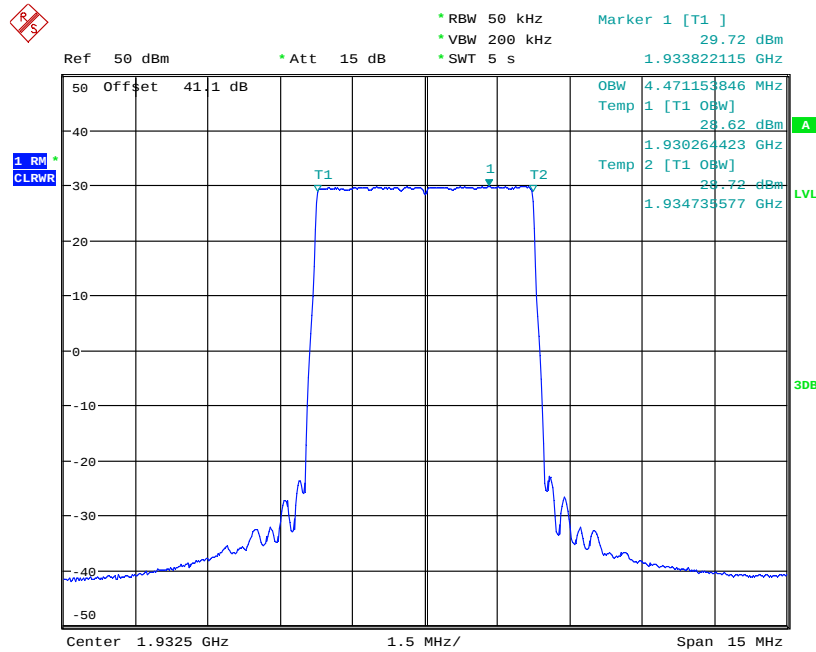
Date: 17.JUN.2013 10:59:11

Channel Position T - QPSK / Bandwidth 3.0 MHz



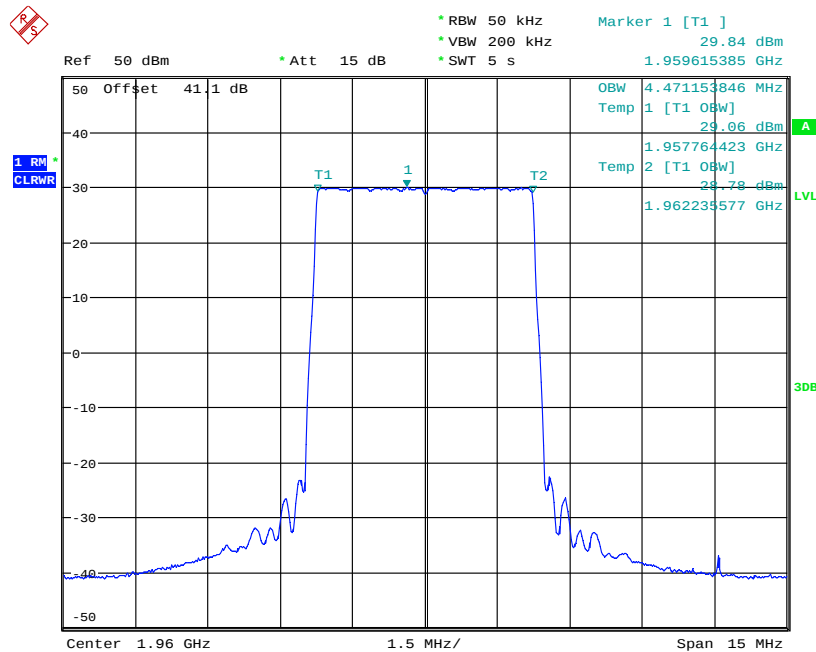
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Channel Position B - QPSK / Bandwidth 5.0 MHz



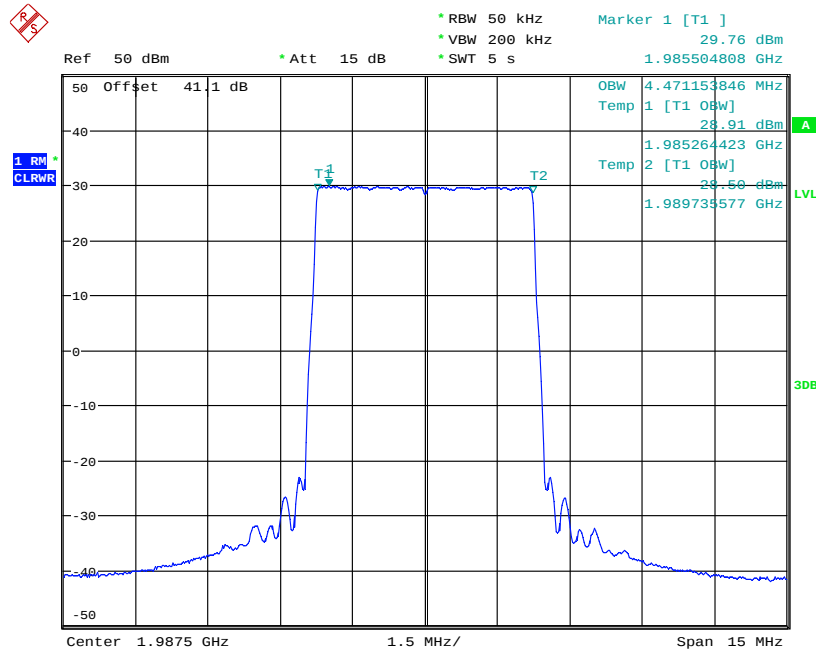
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Channel Position M - QPSK / Bandwidth 5.0 MHz



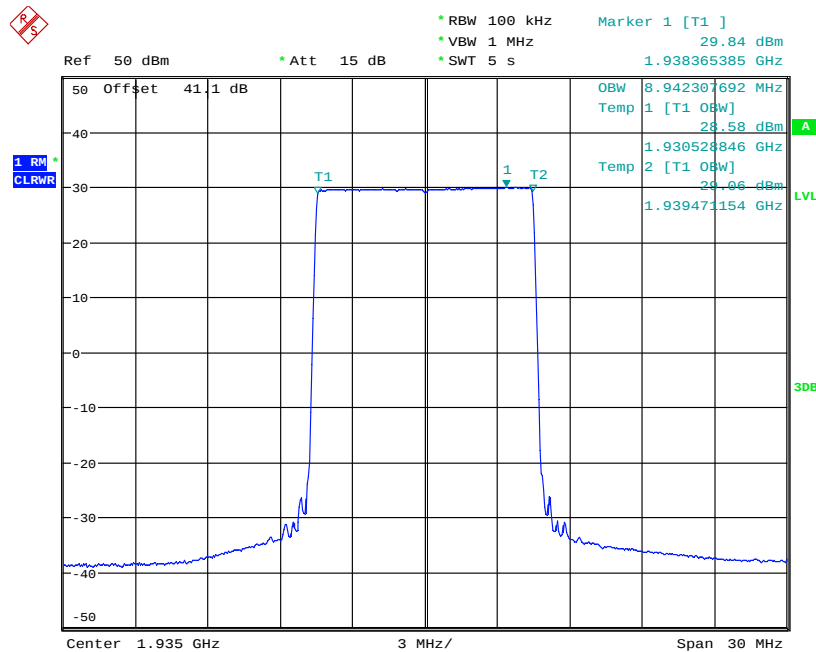
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Channel Position T - QPSK / Bandwidth 5.0 MHz



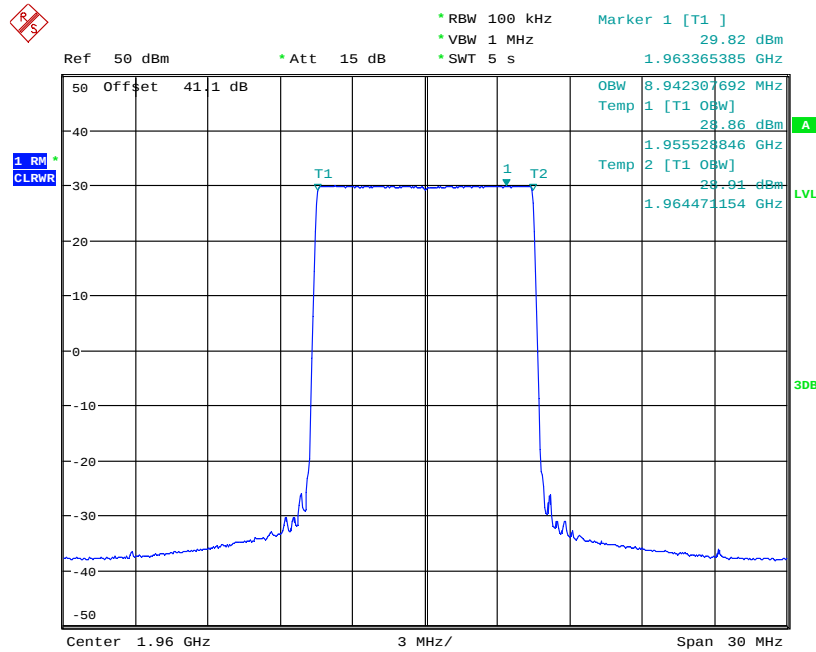
Date: 17.JUN.2013 11:27:24

Channel Position B - QPSK / Bandwidth 10.0 MHz



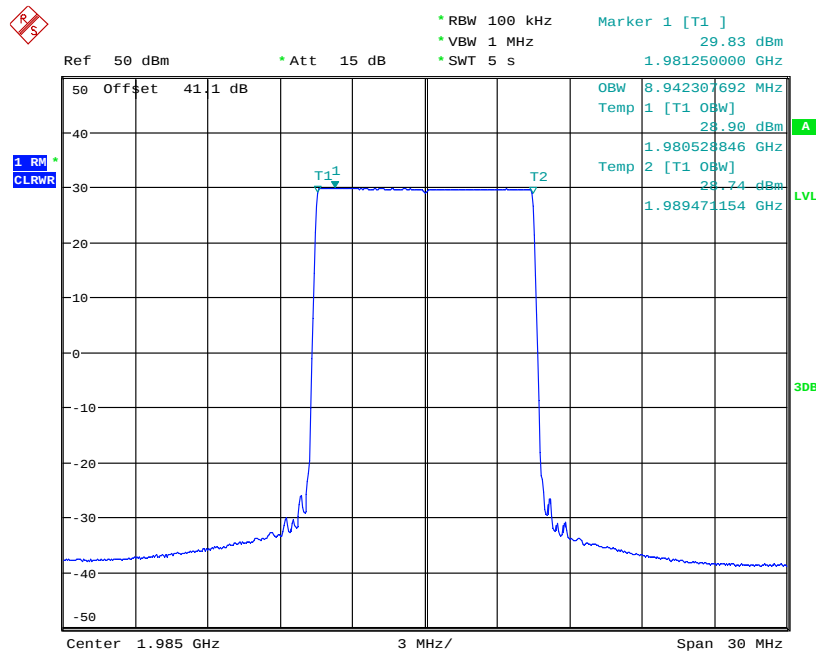
Date: 17.JUN.2013 11:40:28

Channel Position M - QPSK / Bandwidth 10.0 MHz



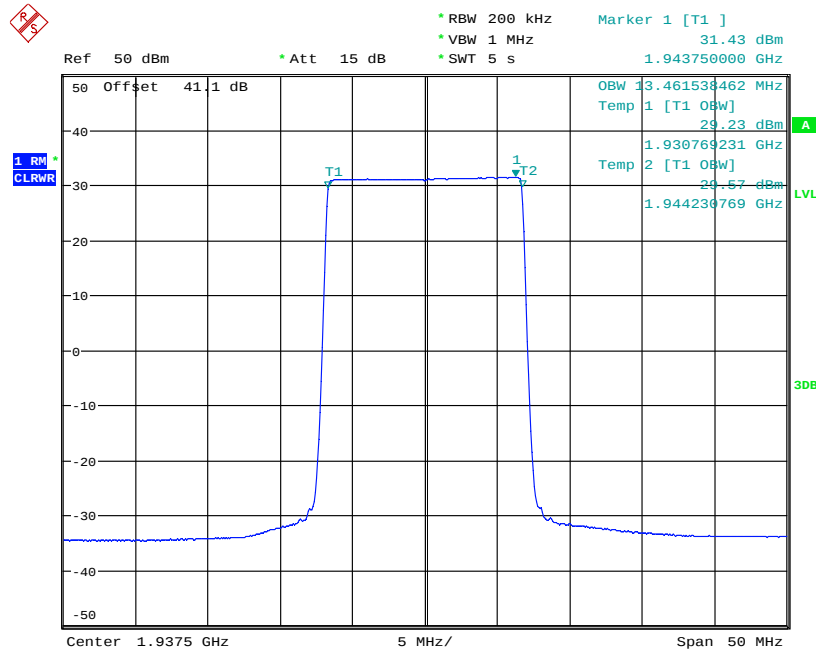
Date: 17.JUN.2013 11:56:26

Channel Position T - QPSK / Bandwidth 10.0 MHz



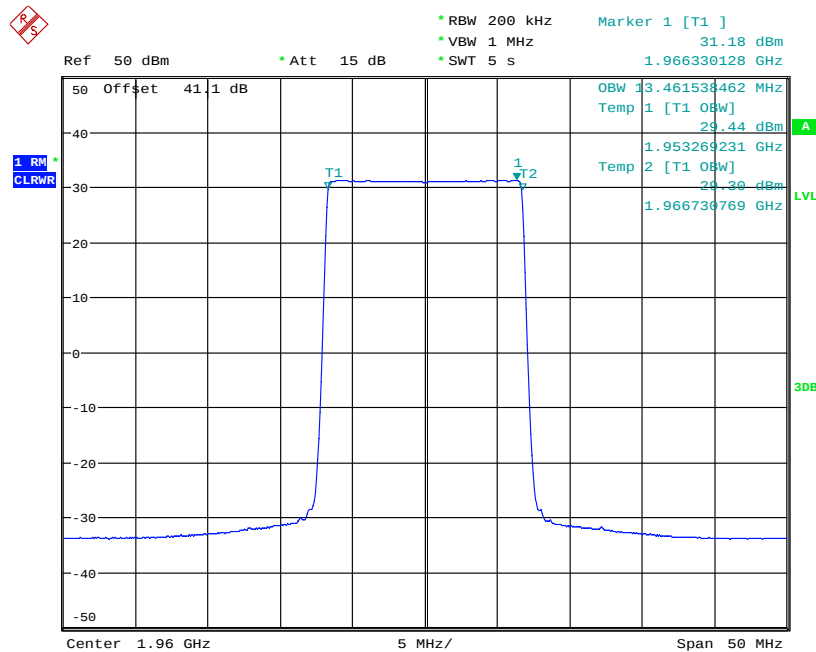
Date: 17.JUN.2013 11:50:33

Channel Position B - QPSK / Bandwidth 15.0 MHz



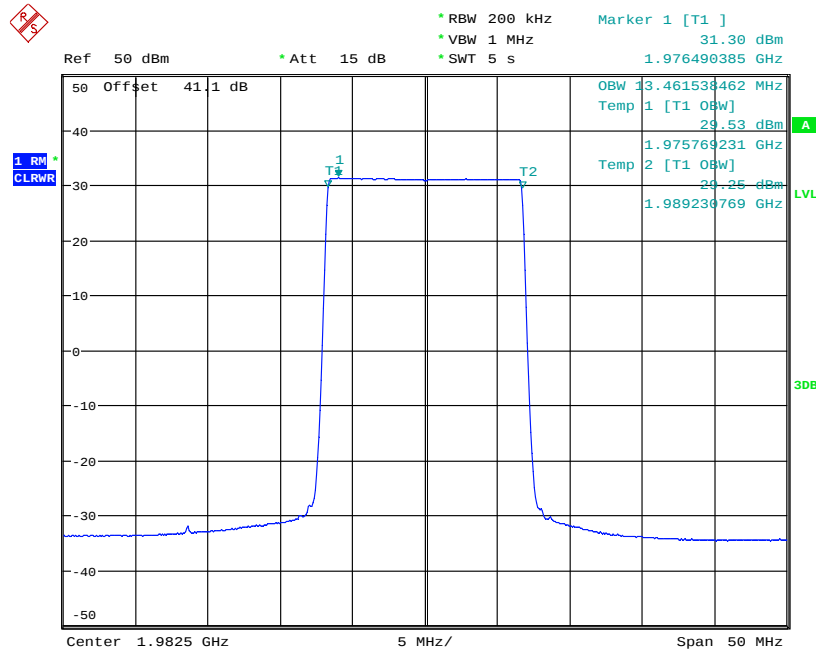
Date: 17.JUN.2013 13:43:42

Channel Position M - QPSK / Bandwidth 15.0 MHz



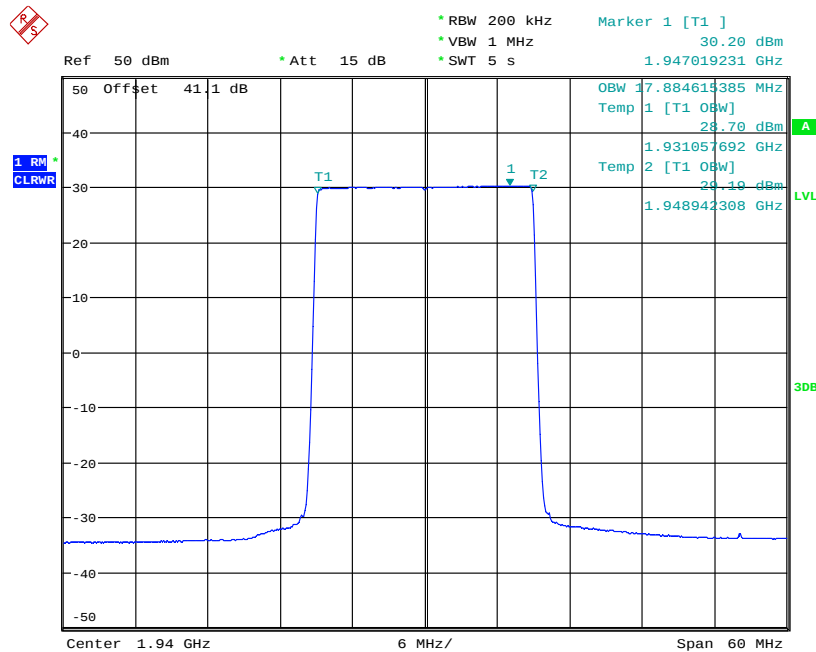
Date: 17.JUN.2013 12:00:46

Channel Position T - QPSK / Bandwidth 15.0 MHz



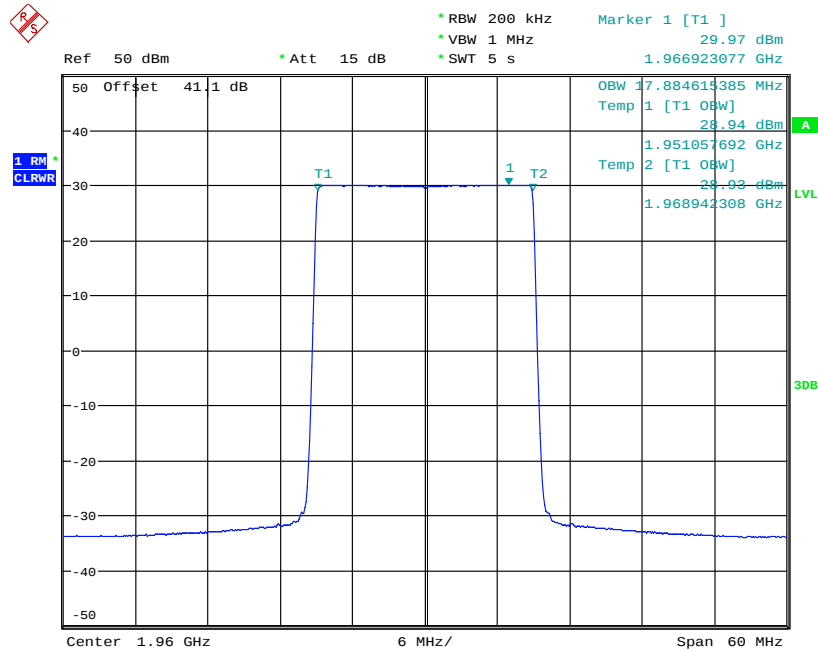
Date: 17.JUN.2013 13:56:43

Channel Position B - QPSK / Bandwidth 20.0 MHz



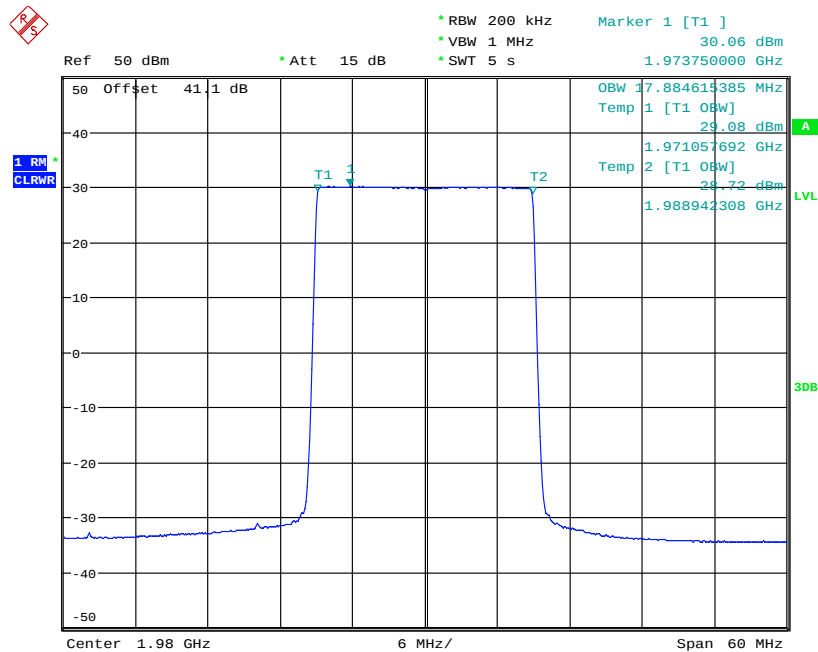
Date: 17.JUN.2013 14:10:55

Channel Position M - QPSK / Bandwidth 20.0 MHz



Date: 17.JUN.2013 14:38:53

Channel Position T - QPSK / Bandwidth 20.0 MHz



Date: 17.JUN.2013 14:24:47

2.3 SPURIOUS EMISSION AT BAND EDGE

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238 (b)
Industry Canada RSS-133, Clause 6.5.1

2.3.2 Equipment Under Test

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017, CB4Q847016

2.3.3 Date of Test and Modification State

13 to 20 June 2013 - 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	21.8 - 23.0°C
Relative Humidity	59.5 – 65.5%

2.3.6 Test Method

In accordance with FCC CFR 47 Part 24, Clause 24.238 and Industry Canada RSS-133, Clause 6.5.1, 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 should 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 compensate for the reduced measurement bandwidth, then added $13\text{dB}[10\log(1/0.05)]$ to the offset.

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 A1 and RF A2.

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.

2.3.7 Test Results

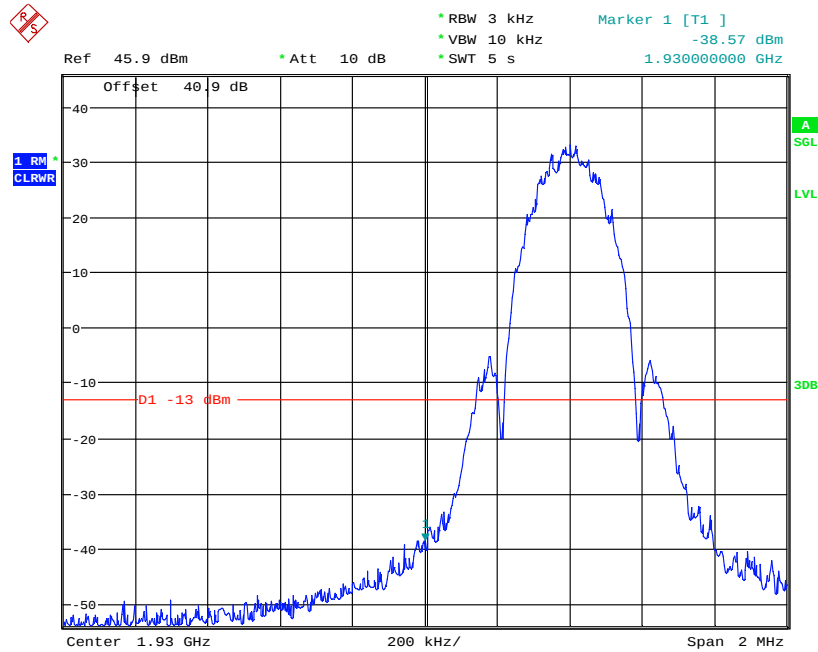
Configuration G-SC

Maximum Output Power 47.8dBm per carrier

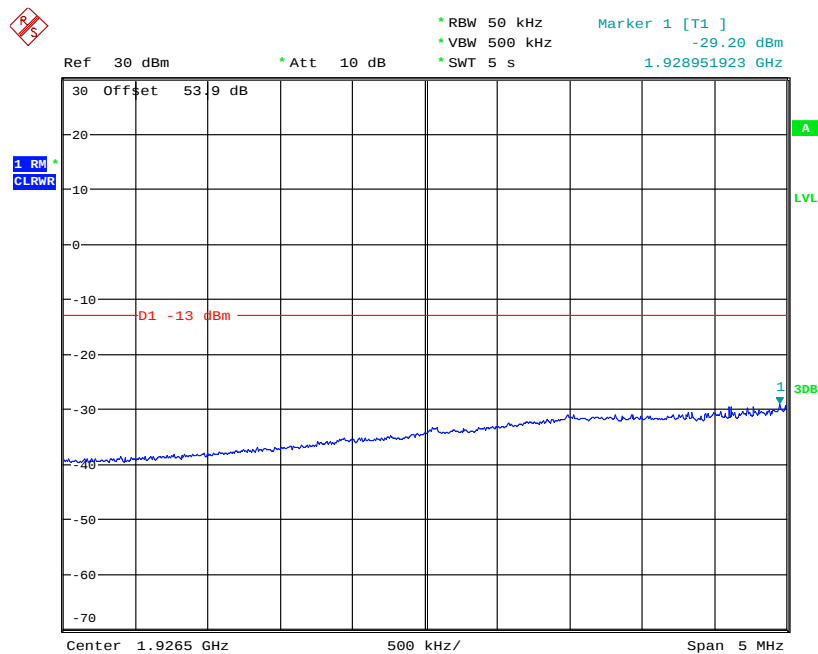
Band Edge Frequency	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	1930.4MHz*
Channel Position T 1990.0 MHz	1989.6MHz*

Note*: For GSM, 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.

Channel Position B – 16QAM

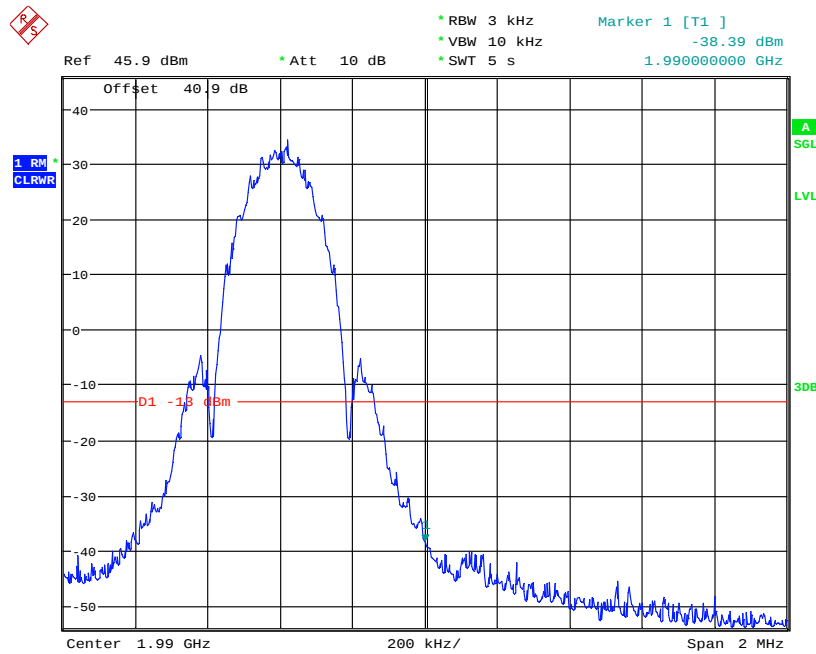


Date: 13.JUN.2013 15:50:44

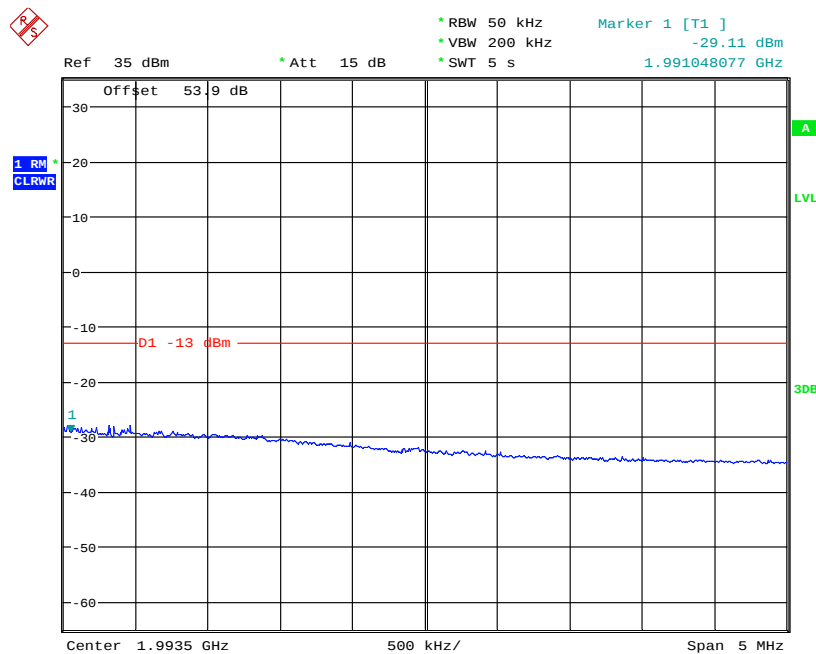


Date: 13.JUN.2013 15:51:42

Channel Position T – 16QAM



Date: 13.JUN.2013 15:36:39



Date: 13.JUN.2013 15:39:42

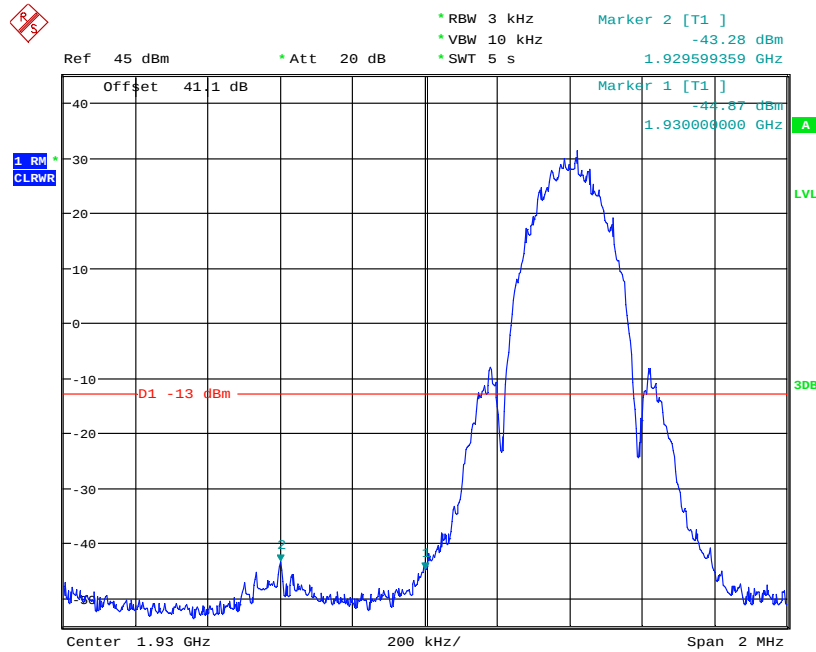
Configuration G-MC 1 (2C)

Maximum Output Power 46.0dBm per carrier

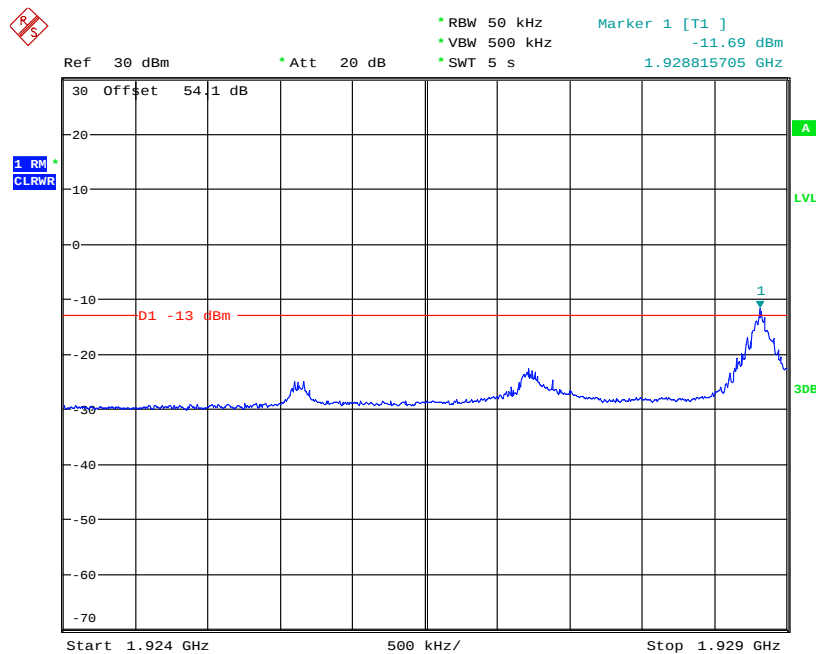
Band Edge Frequency	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	1930.4MHz* + 1932.0MHz
Channel Position T 1990.0 MHz	1989.6MHz* + 1988.0MHz

Note*: For GSM, 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.

Channel Position B – 16QAM

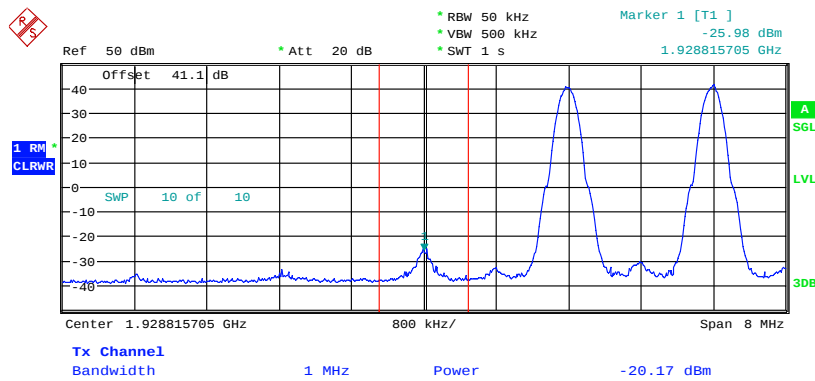


Date: 20.JUN.2013 13:55:41



Date: 20.JUN.2013 13:56:48

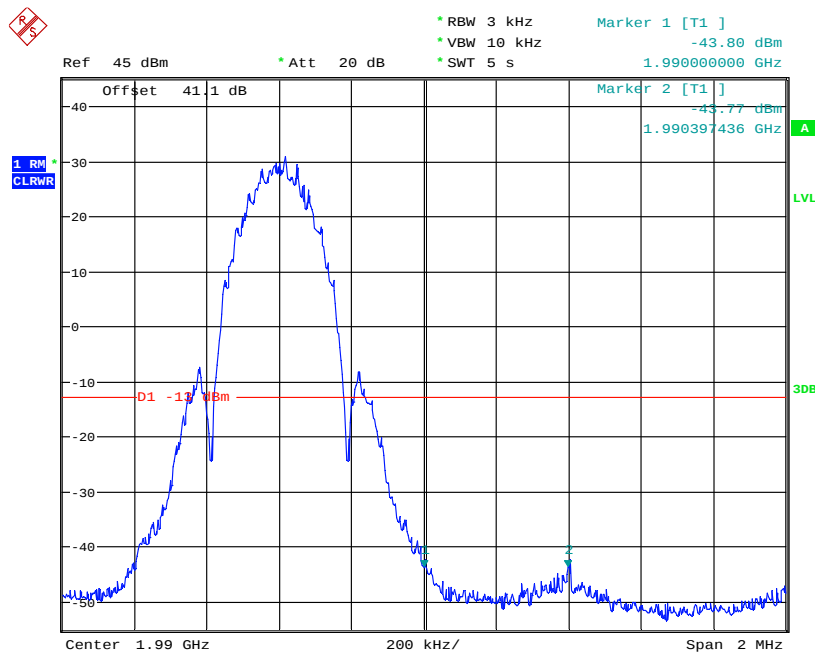
Note: Pre-sweep between 1MHz to 5MHz away from the band edge.



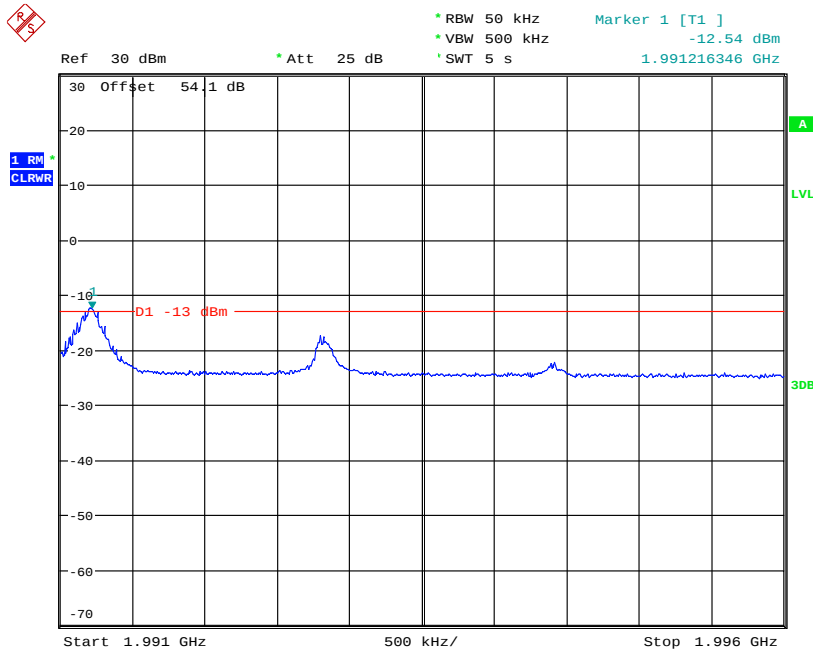
Date: 20.JUN.2013 14:06:00

Note: Verification for the 1MHz channel power between 1MHz to 5MHz away from the band edge. The limitation is -13dBm/1M.

Channel Position T – 16QAM

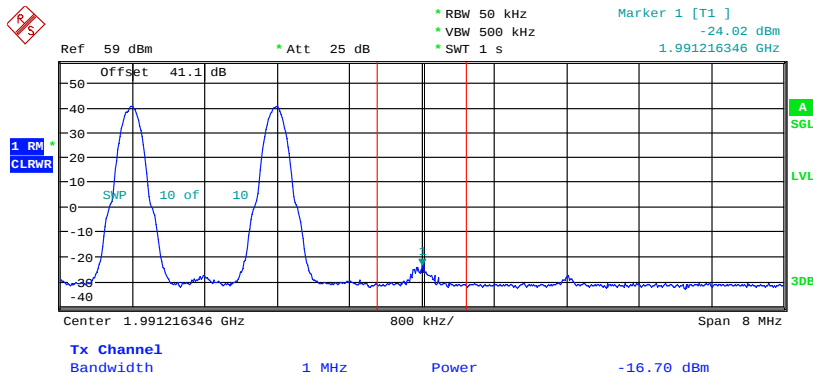


Date: 20.JUN.2013 14:20:58



Date: 20.JUN.2013 14:22:34

Note: Pre-sweep between 1MHz to 5MHz away from the band edge.



Date: 20.JUN.2013 14:24:49

Note: Verification for the 1MHz channel power between 1MHz to 5MHz away from the band edge. The limitation is -13dBm/1M.

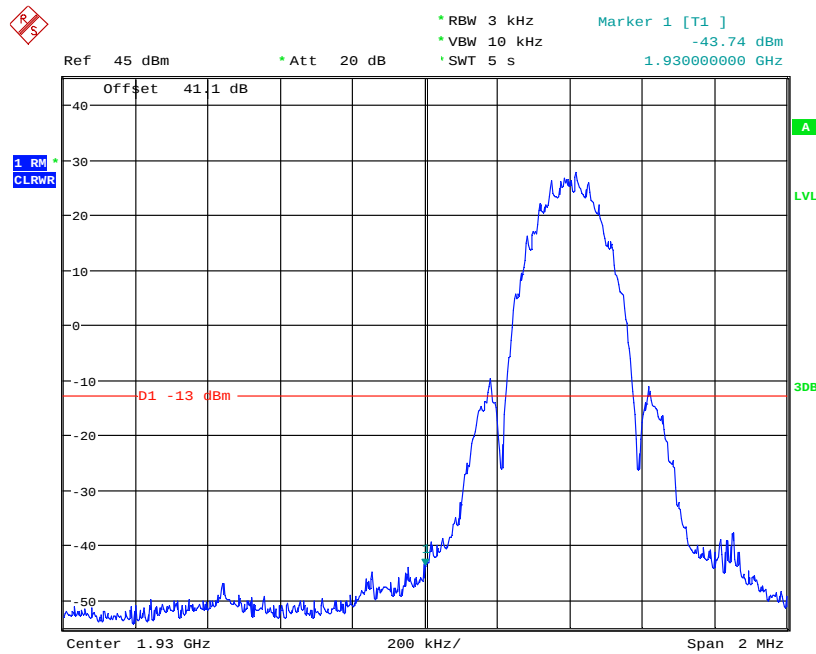
Configuration G-MC 2 (3C)

Maximum Output Power 42.3dBm per carrier

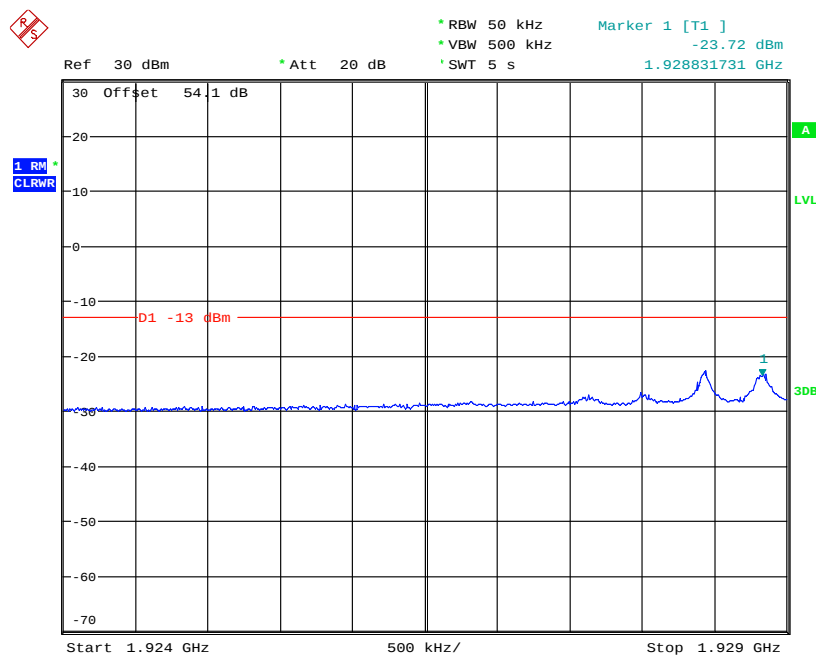
Band Edge Frequency	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	1930.4MHz* + 1932.0MHz + 1932.4MHz
Channel Position T 1990.0 MHz	1989.6MHz* + 1988.0MHz + 1987.6MHz

Note*: For GSM, 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.

Channel Position B – 16QAM

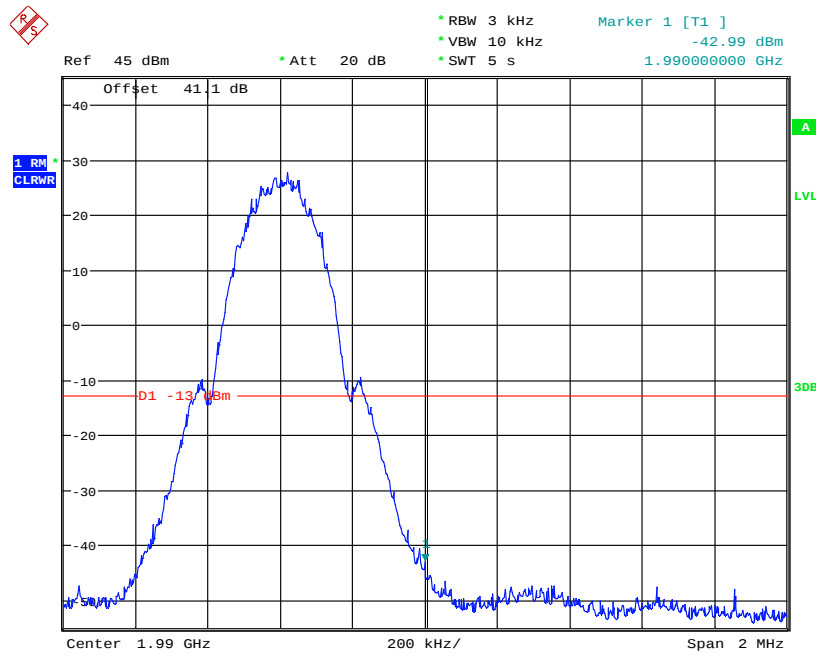


Date: 20.JUN.2013 14:30:29

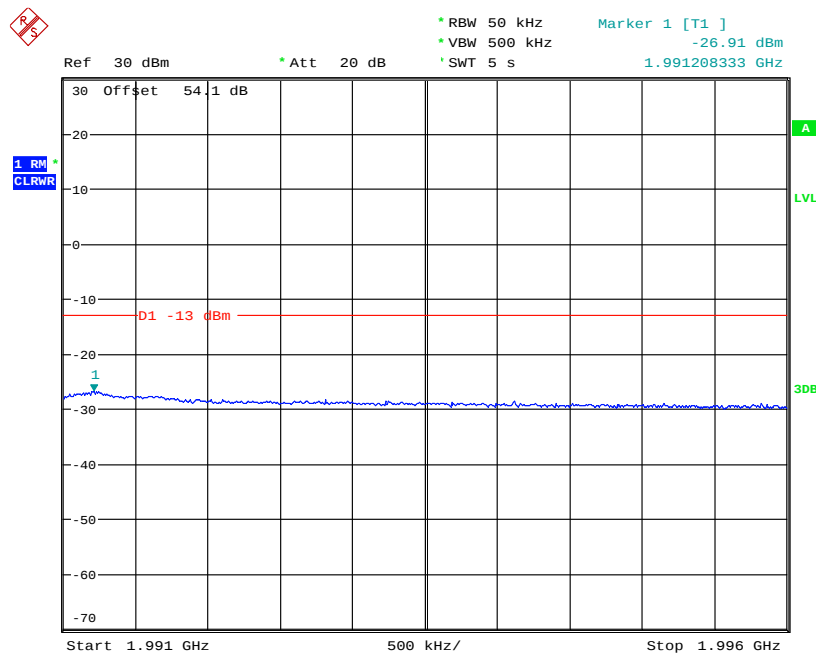


Date: 20.JUN.2013 14:31:29

Channel Position T – 16QAM



Date: 20.JUN.2013 14:55:44



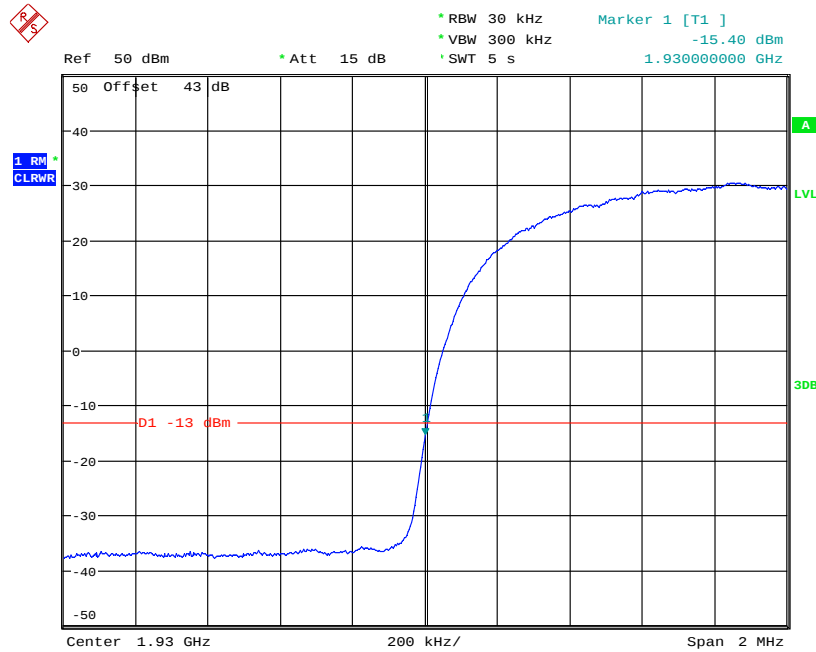
Date: 20.JUN.2013 14:56:59

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

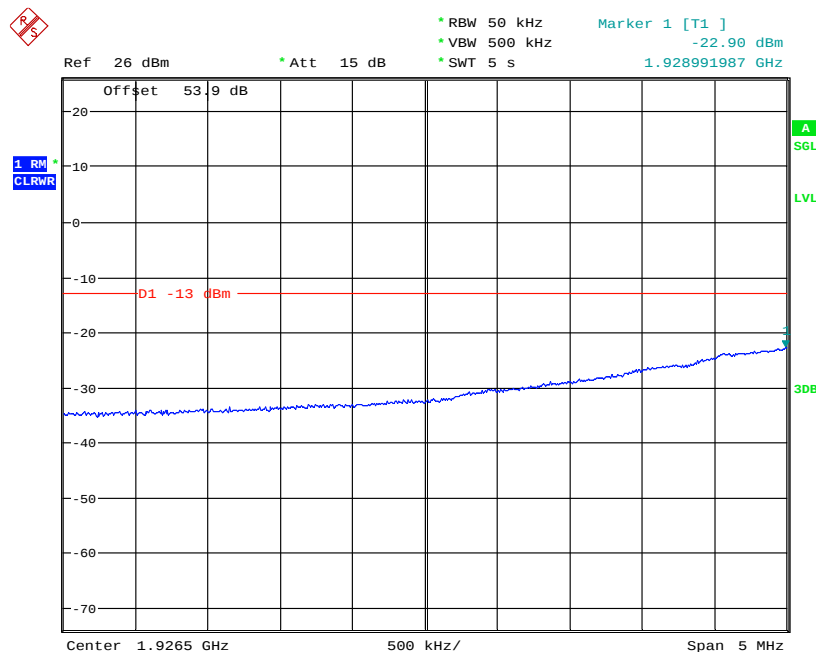
Band Edge Frequency	Edge Test with modulation QPSK Channel Frequencies
Channel Position B 1930.0 MHz	1932.4MHz
Channel Position T 1990.0 MHz	1987.6MHz

Channel Position B - QPSK



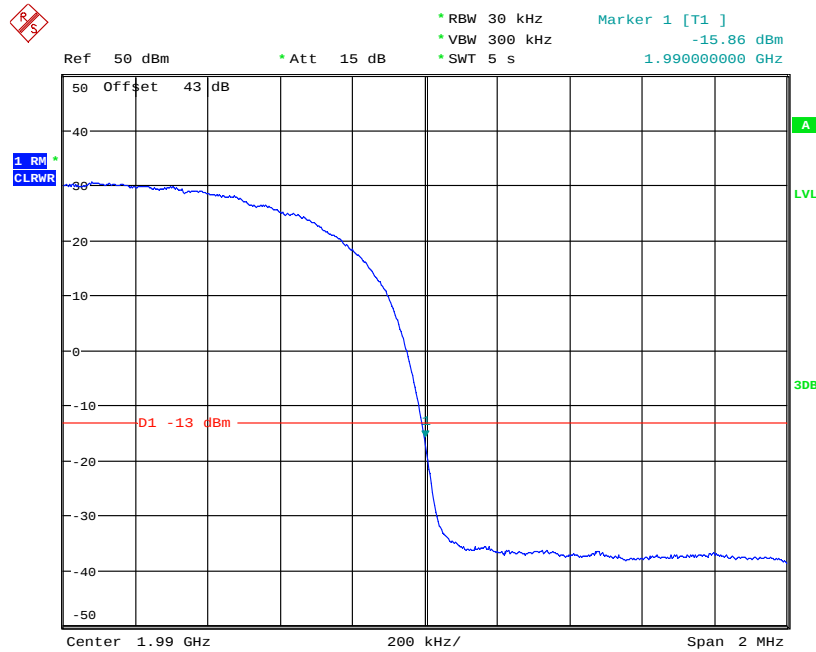
Date: 14.JUN.2013 10:56:53

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



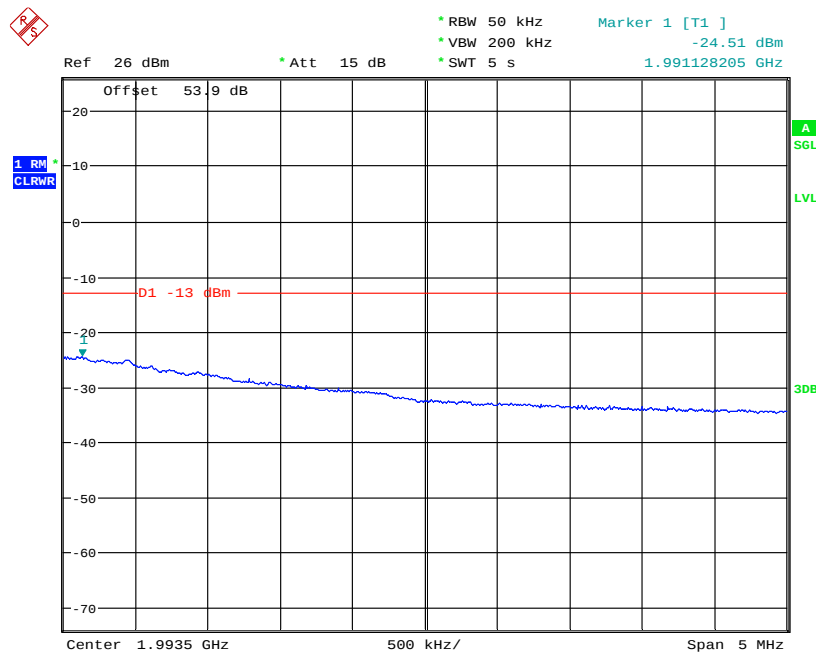
Date: 13.JUN.2013 17:41:43

Channel Position T - QPSK



Date: 14.JUN.2013 10:55:11

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



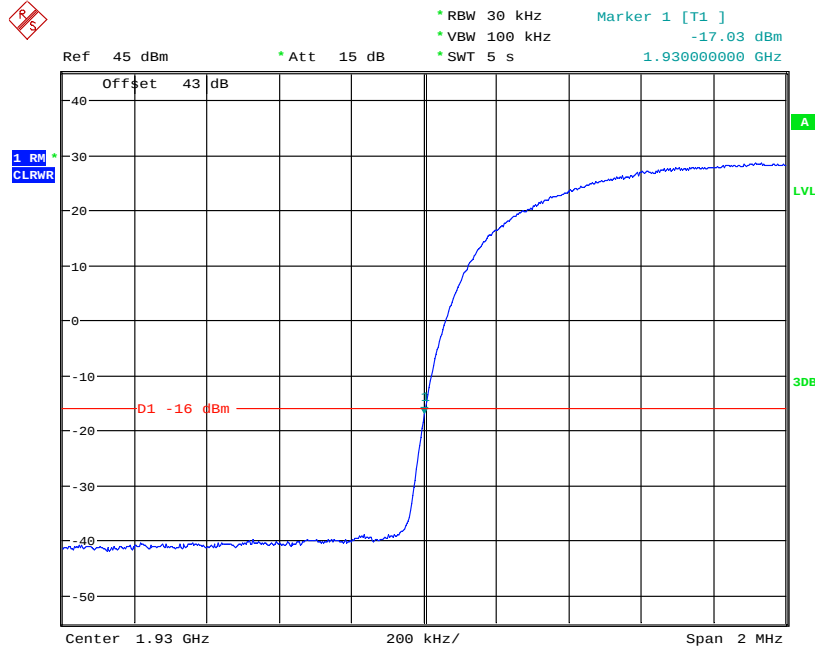
Date: 13.JUN.2013 17:51:50

Configuration W-MIMO-SC

Maximum Output Power 47.0dBm per carrier

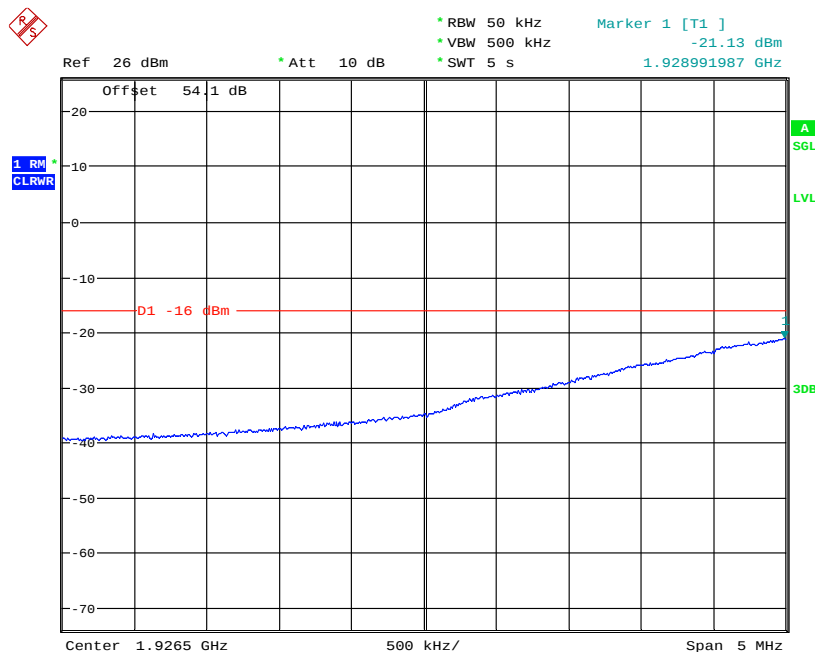
Band Edge Frequency	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	Port A1: 1932.4MHz
Channel Position T 1990.0 MHz	Port A1: 1987.6MHz

Channel Position B - 16QAM



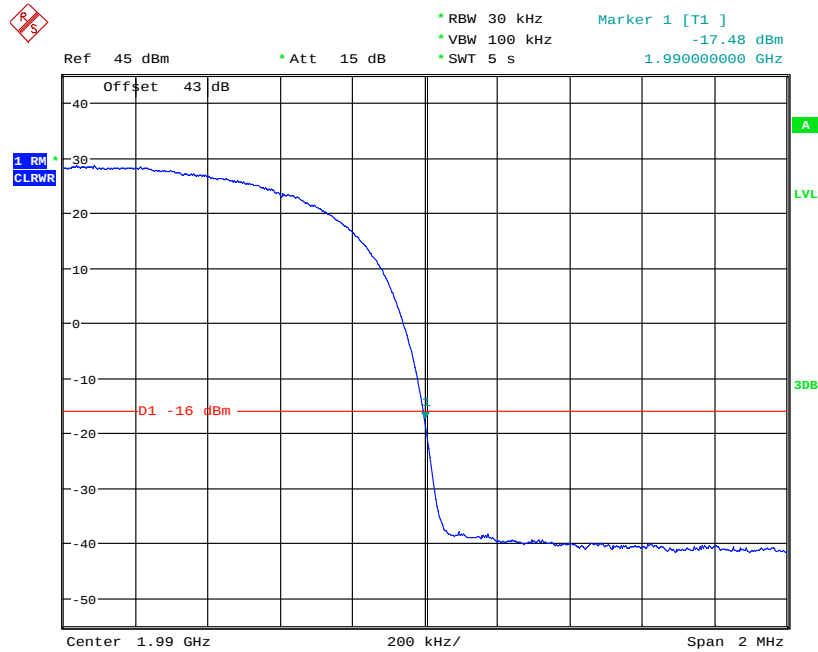
Date: 14.JUN.2013 14:56:56

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



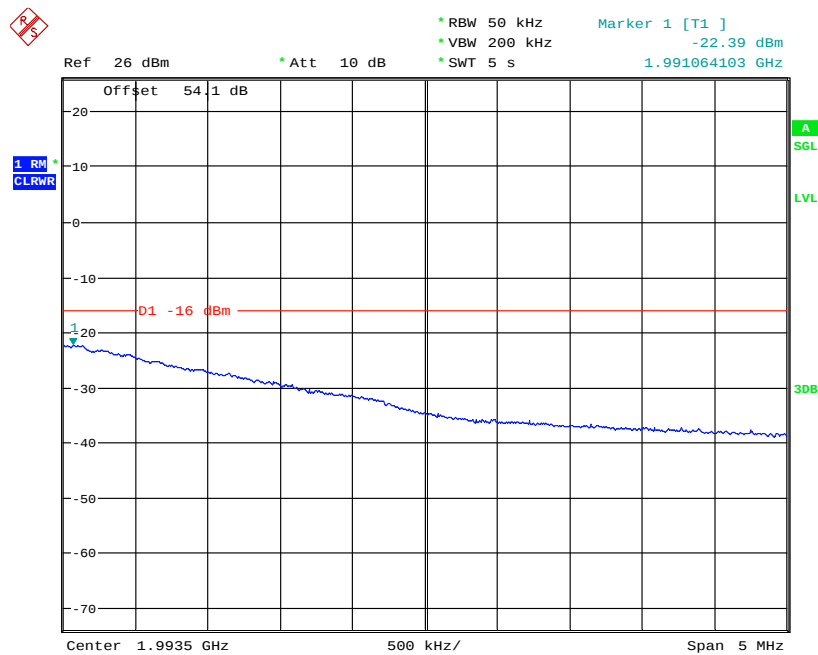
Date: 14.JUN.2013 14:57:35

Channel Position T - 16QAM



Date: 14.JUN.2013 15:03:58

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



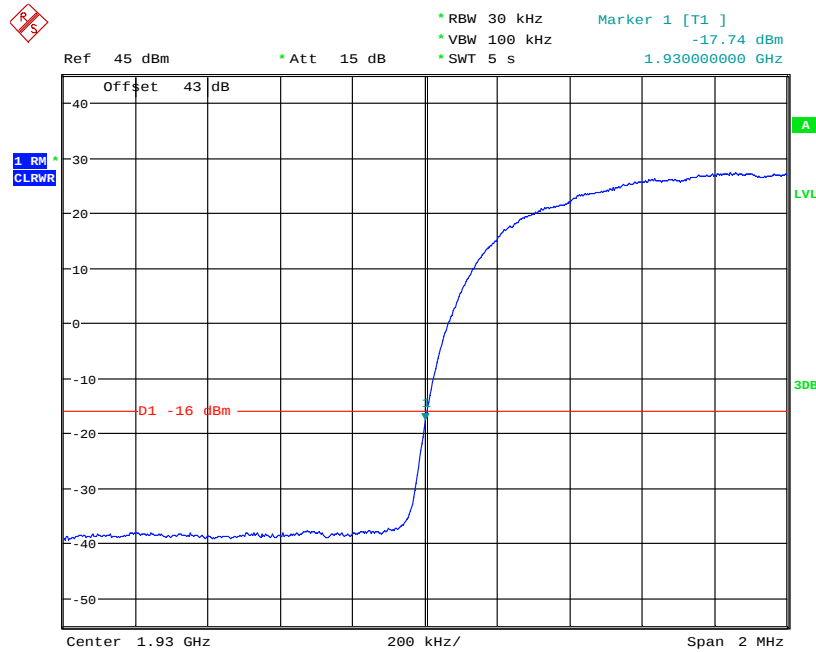
Date: 14.JUN.2013 15:04:36

Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

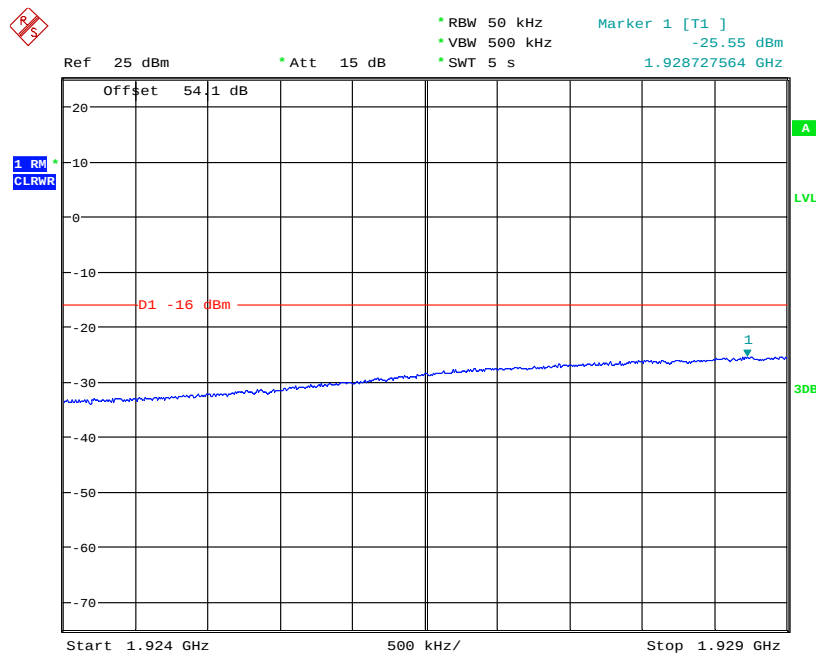
Band Edge Frequency	Edge Test with modulation 16QAM Channel Frequencies
Channel Position B 1930.0 MHz	Port A1: 1932.4MHz + 1937.4MHz
Channel Position T 1990.0 MHz	Port A1: 1987.6MHz + 1982.6MHz

Channel Position B - 16QAM



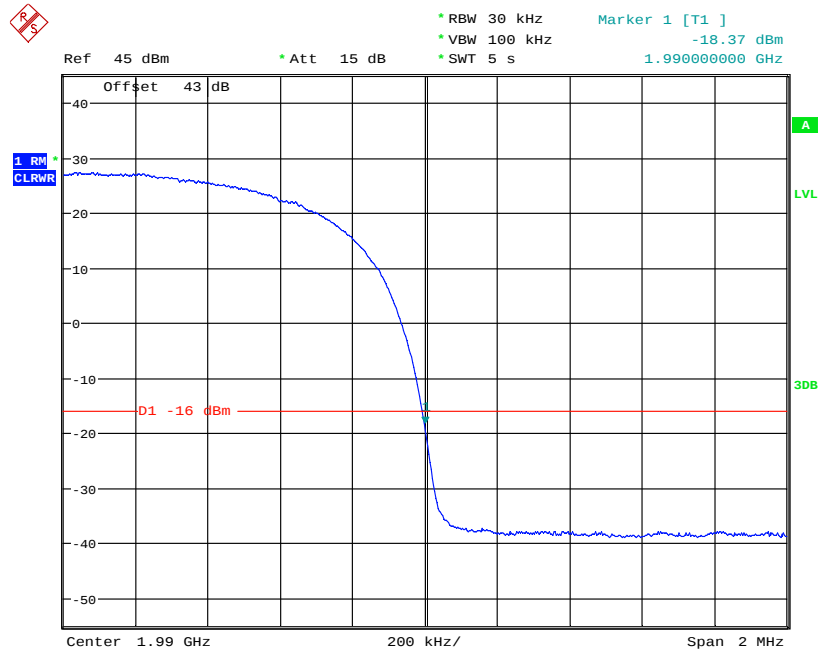
Date: 14.JUN.2013 17:05:09

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



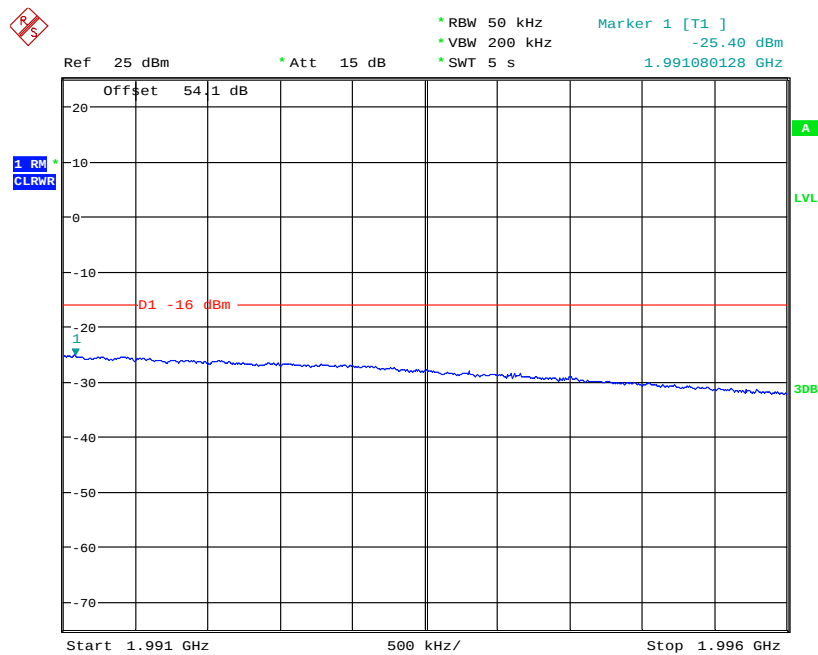
Date: 14.JUN.2013 17:08:12

Channel Position T - 16QAM



Date: 14.JUN.2013 17:11:54

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



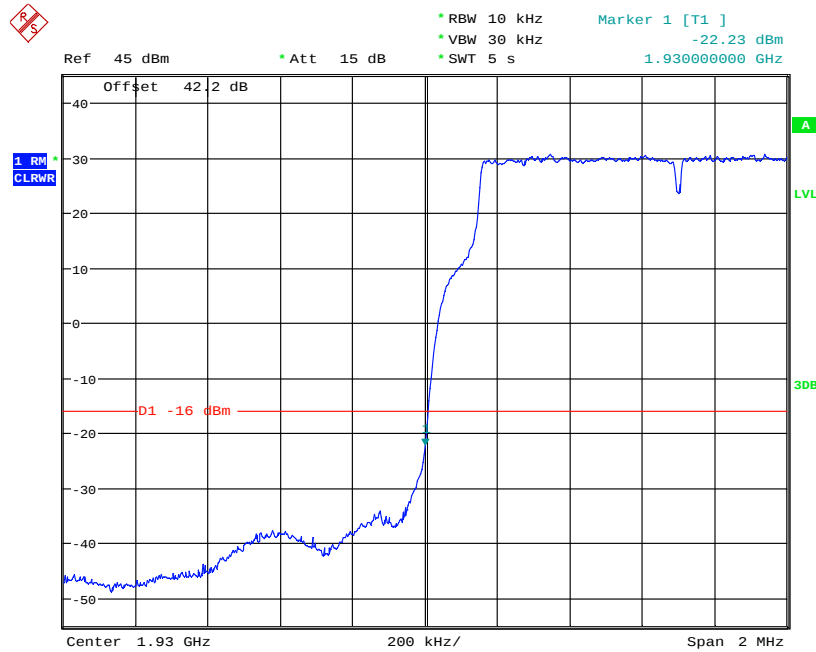
Date: 14.JUN.2013 17:13:32

Configuration L-MIMO-SC

Maximum Output Power 49.0dBm per carrier

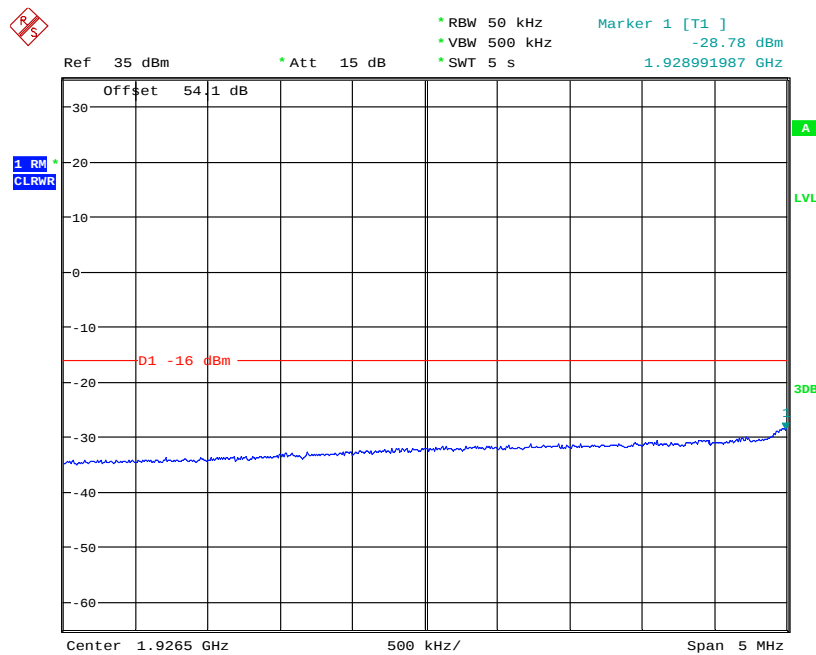
Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B 1930.0 MHz	1.4 MHz	Port A1: 1930.7MHz
	3.0 MHz	Port A1: 1931.5MHz
	5.0 MHz	Port A1: 1932.5MHz
	10.0 MHz	Port A1: 1935.0MHz
	15.0 MHz	Port A1: 1937.5MHz
	20.0 MHz	Port A1: 1940.0MHz
Channel Position T 1990.0 MHz	1.4 MHz	Port A1: 1989.3MHz
	3.0 MHz	Port A1: 1988.5MHz
	5.0 MHz	Port A1: 1987.5MHz
	10.0 MHz	Port A1: 1985.0MHz
	15.0 MHz	Port A1: 1982.5MHz
	20.0 MHz	Port A1: 1980.0MHz

Channel Position B - QPSK / Bandwidth 1.4 MHz



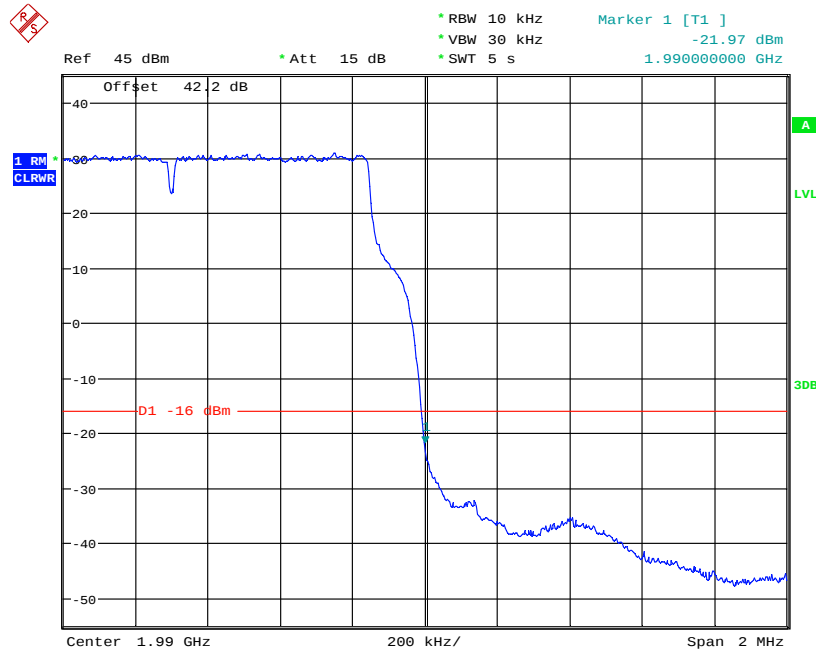
Date: 14.JUN.2013 17:34:35

Note: A resolution bandwidth of 10kHz was used. 10kHz is <1% of the Emission Bandwidth of LTE (1.3MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.2dB.



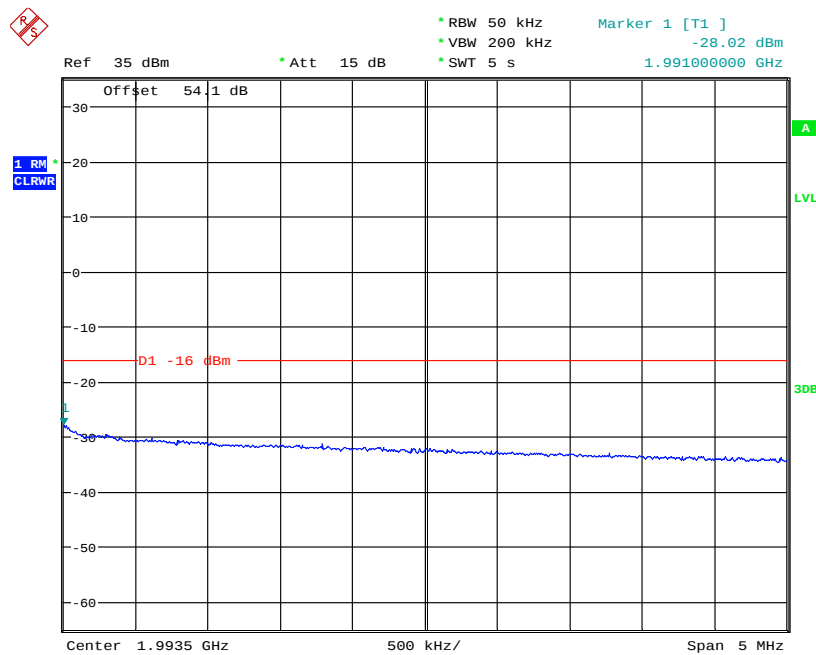
Date: 14.JUN.2013 17:36:27

Channel Position T - QPSK / Bandwidth 1.4 MHz



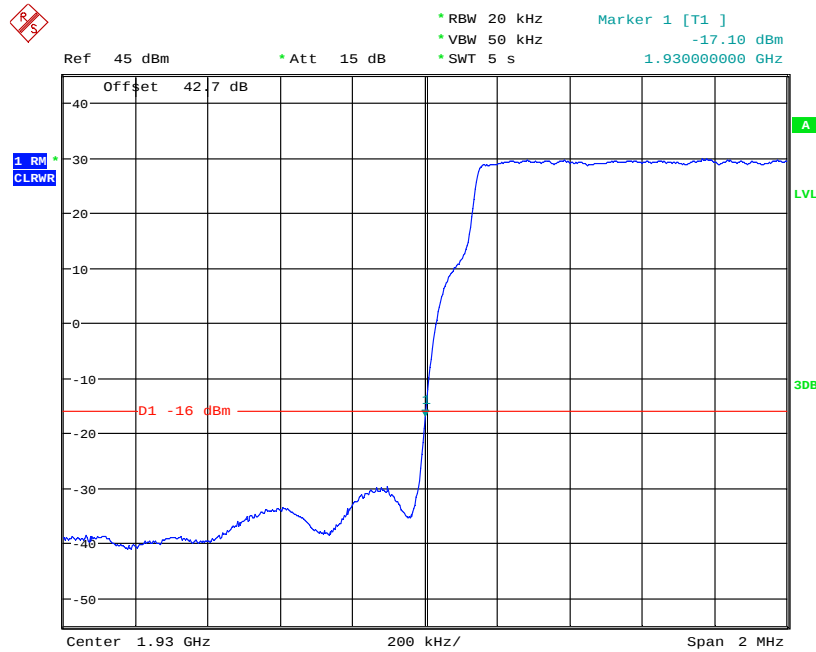
Date: 17. JUN. 2013 10:19:48

Note: A resolution bandwidth of 10kHz was used. 10kHz is <1% of the Emission Bandwidth of LTE (1.3MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.2dB.



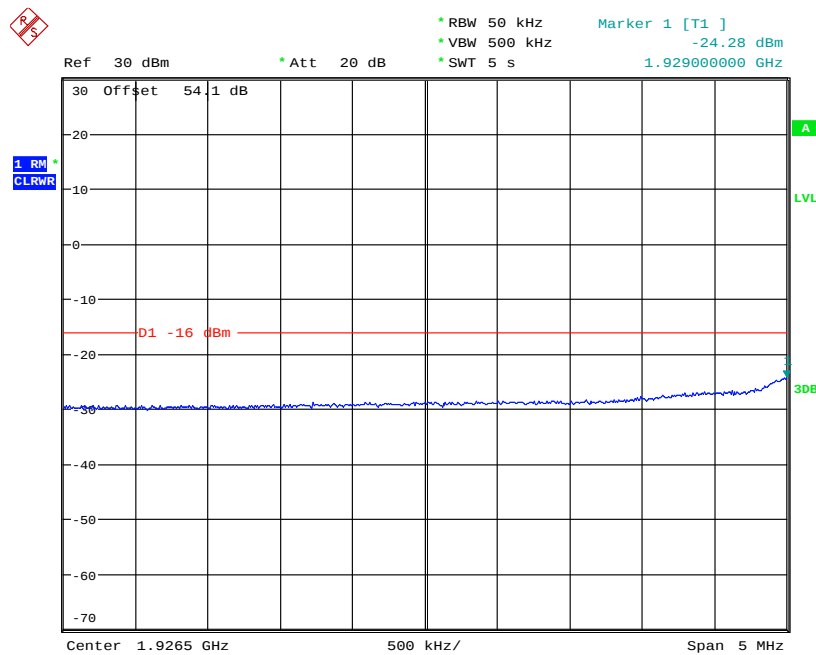
Date: 17. JUN. 2013 10:21:07

Channel Position B - QPSK / Bandwidth 3.0 MHz



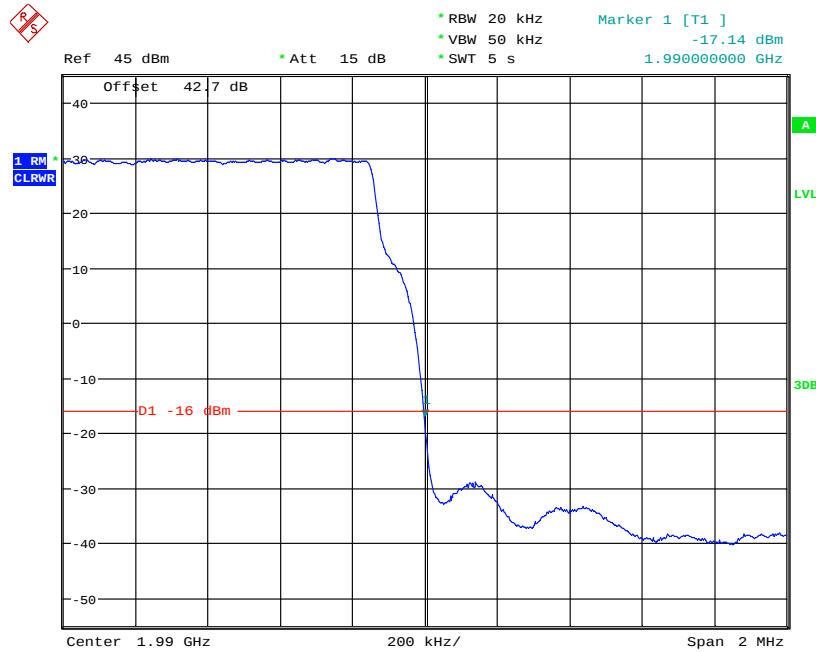
Date: 17.JUN.2013 10:39:18

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.



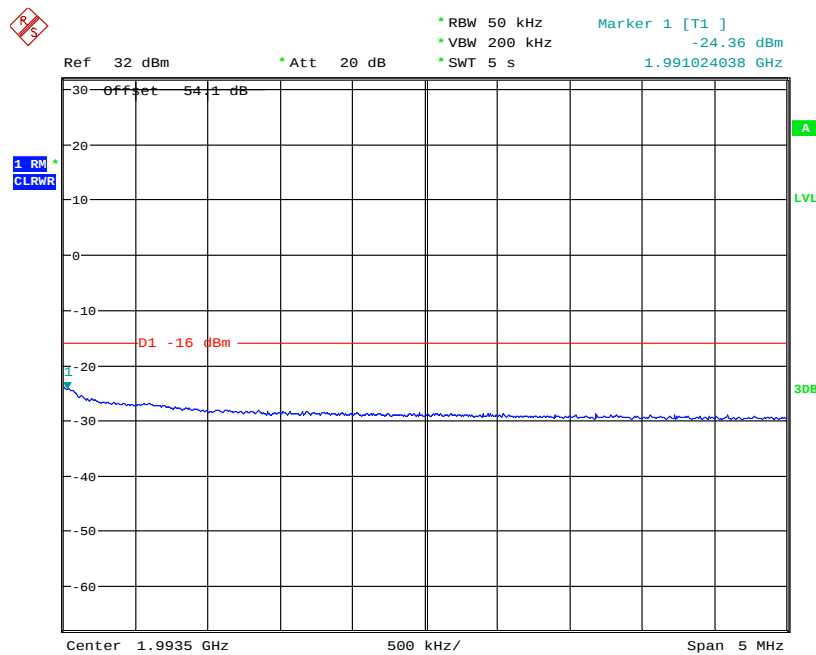
Date: 17.JUN.2013 10:41:00

Channel Position T - QPSK / Bandwidth 3.0 MHz



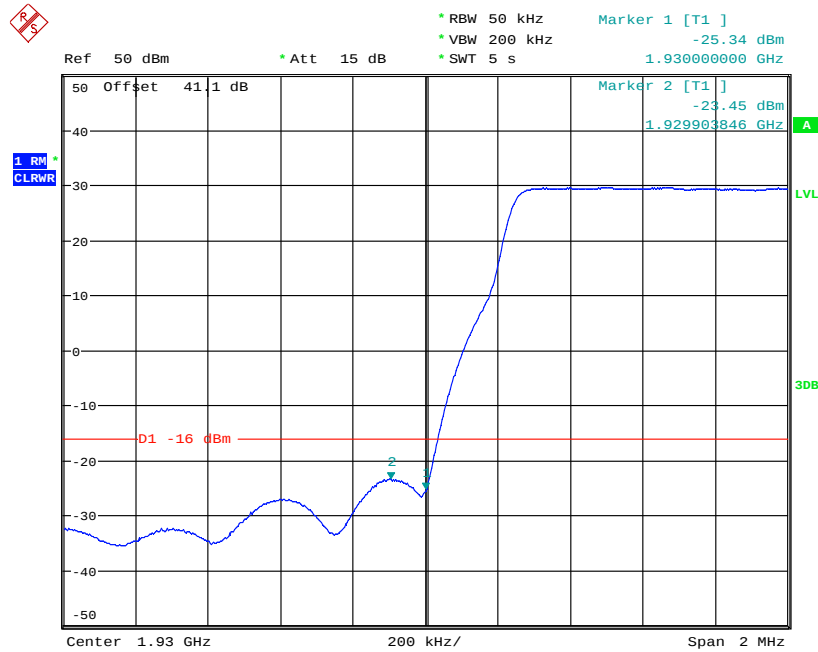
Date: 17. JUN. 2013 10:52:06

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.

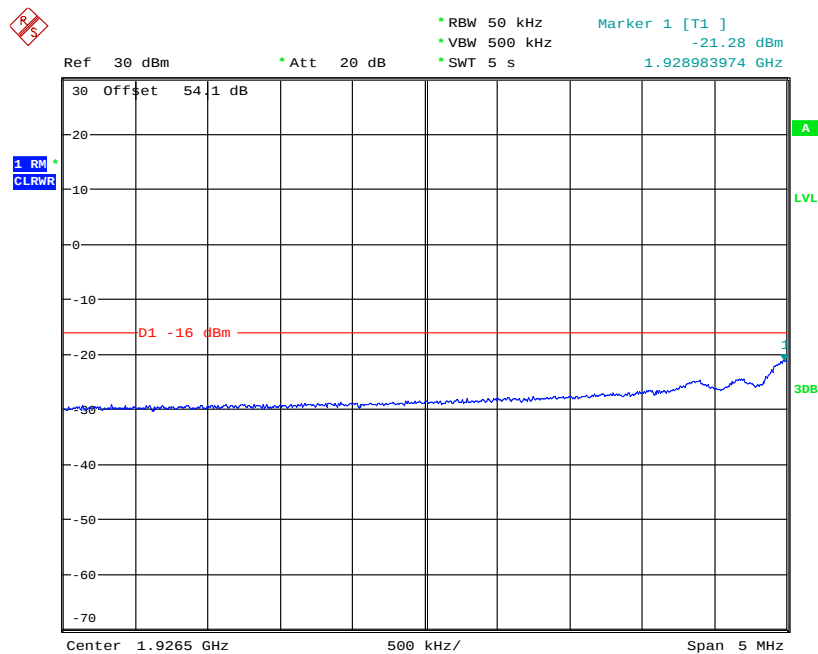


Date: 17. JUN. 2013 10:54:25

Channel Position B - QPSK / Bandwidth 5.0 MHz

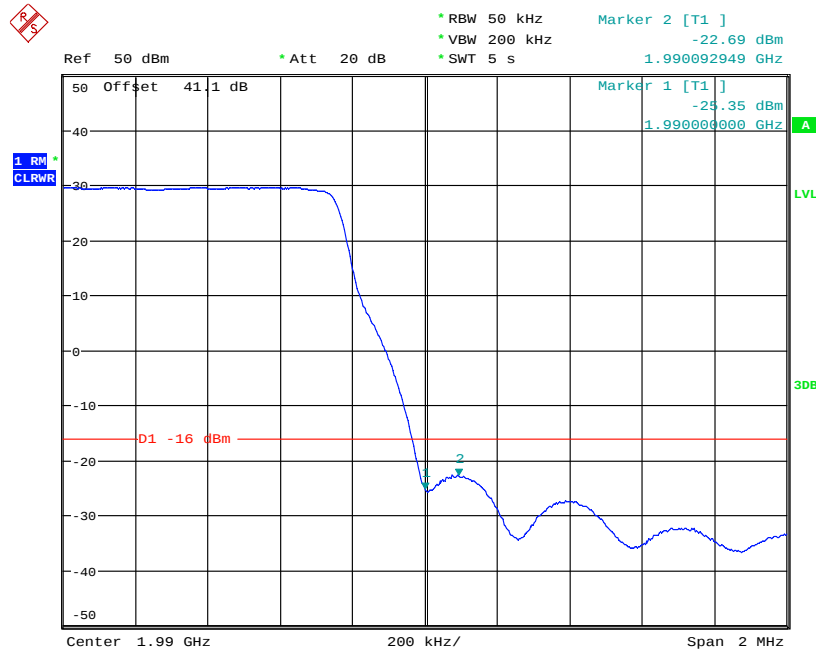


Date: 17.JUN.2013 11:17:59

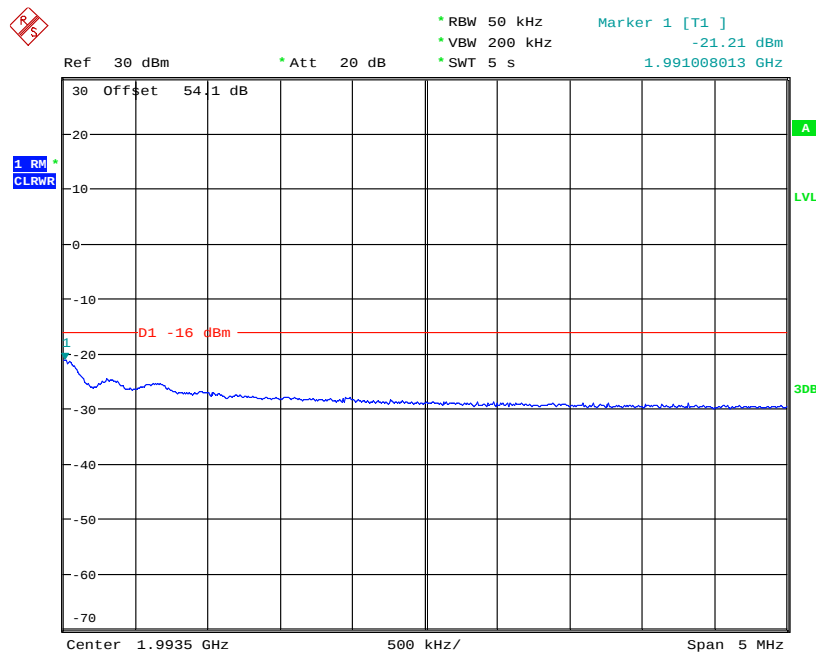


Date: 17.JUN.2013 11:19:55

Channel Position T - QPSK / Bandwidth 5.0 MHz

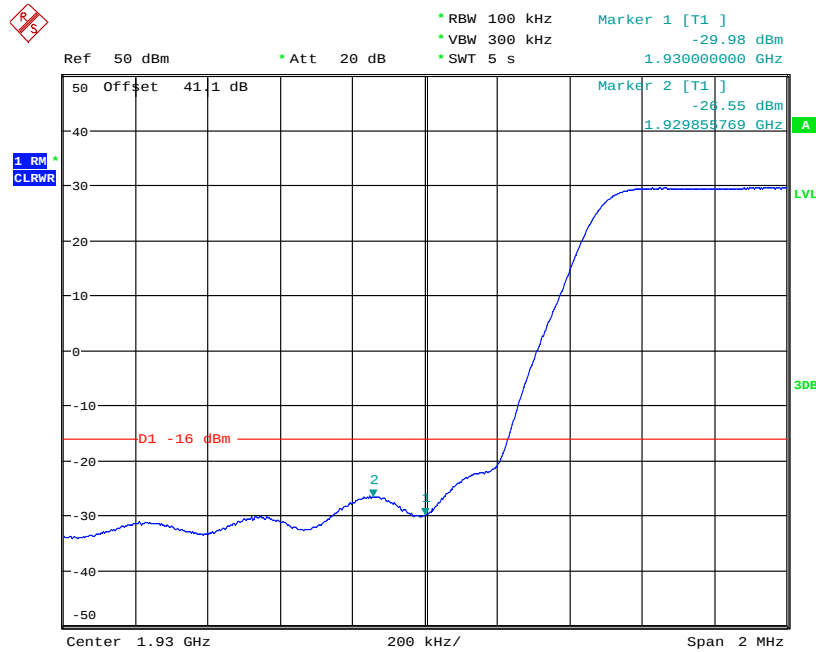


Date: 17.JUN.2013 11:29:14

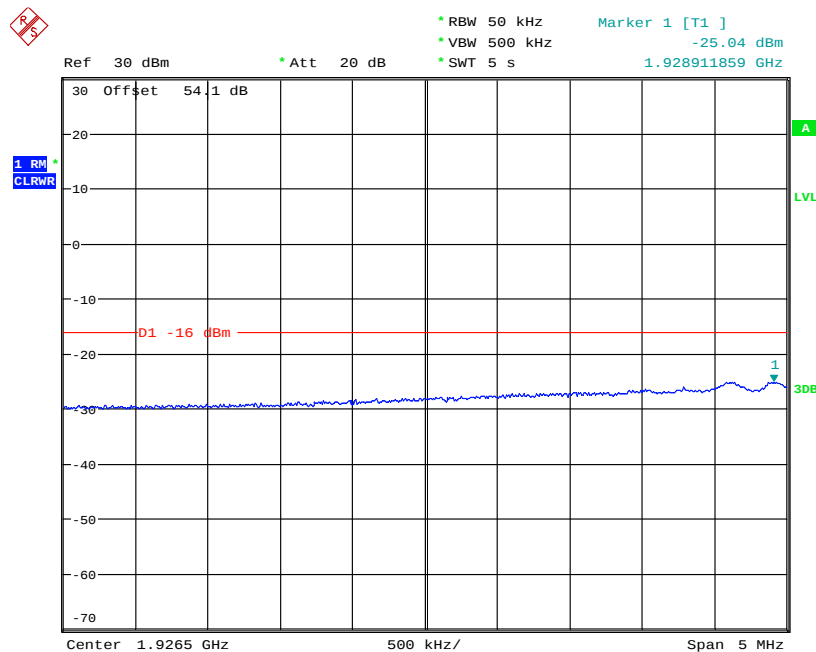


Date: 17.JUN.2013 11:26:03

Channel Position B - QPSK / Bandwidth 10.0 MHz

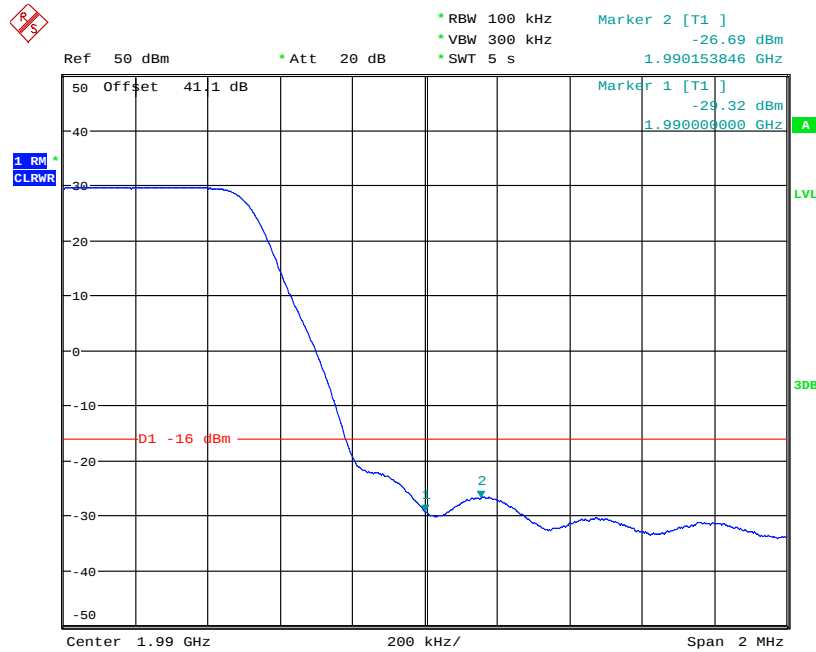


Date: 17.JUN.2013 11:42:08

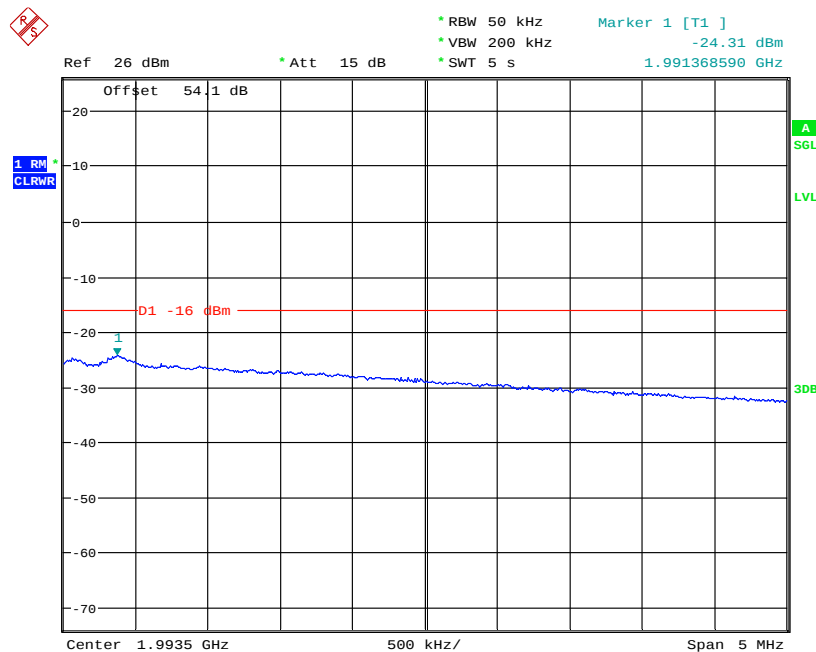


Date: 17.JUN.2013 11:43:13

Channel Position T - QPSK / Bandwidth 10.0 MHz

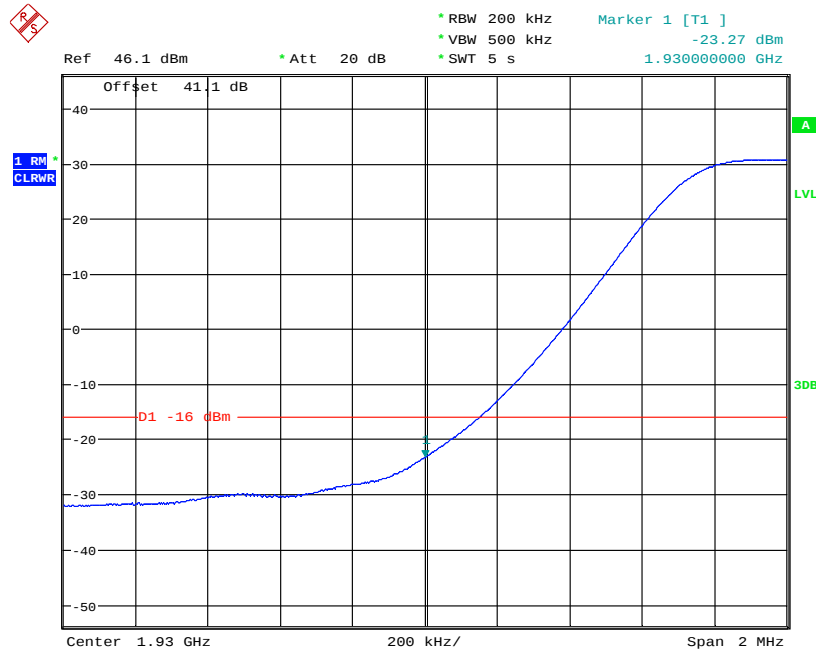


Date: 17.JUN.2013 11:52:01

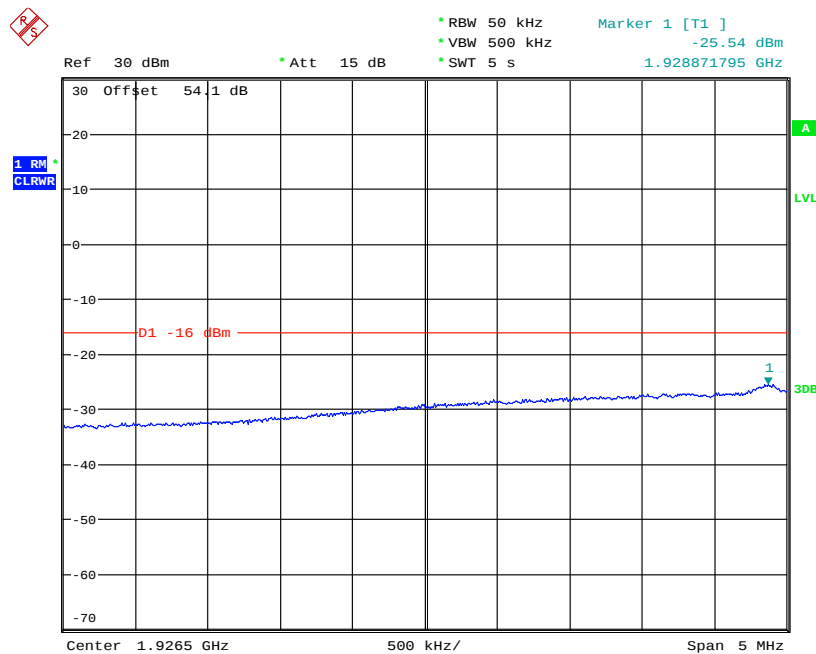


Date: 17.JUN.2013 11:49:23

Channel Position B - QPSK / Bandwidth 15.0 MHz

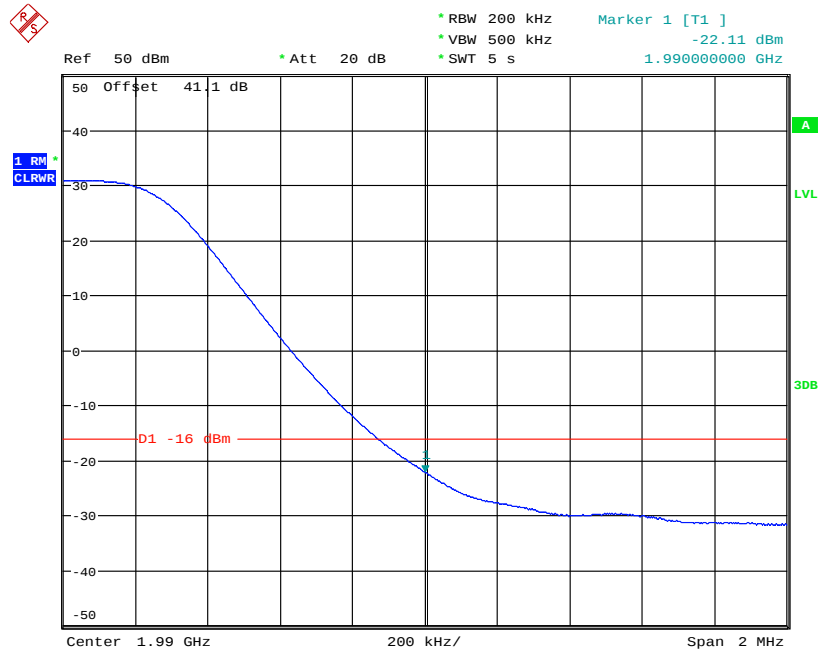


Date: 17.JUN.2013 13:48:08

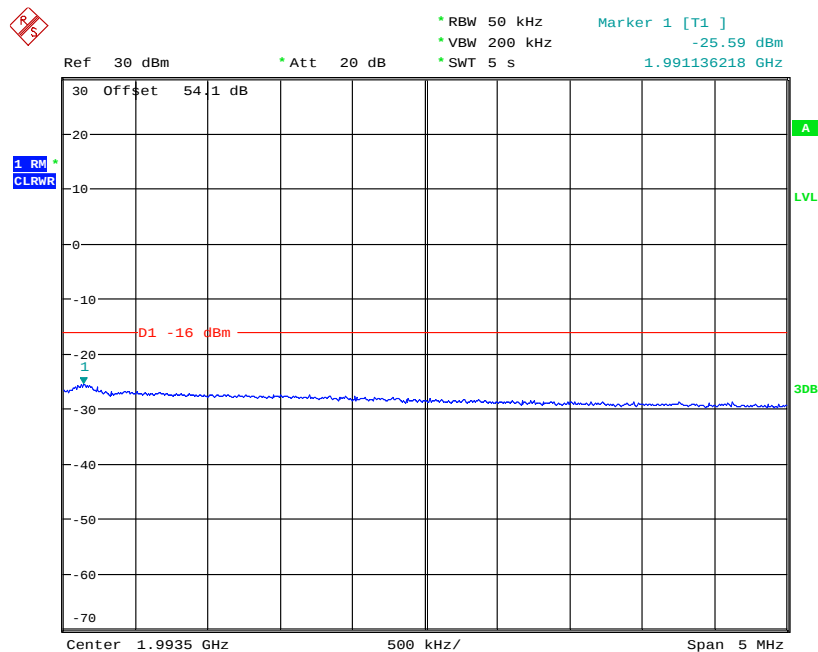


Date: 17.JUN.2013 13:49:12

Channel Position T - QPSK / Bandwidth 15.0 MHz

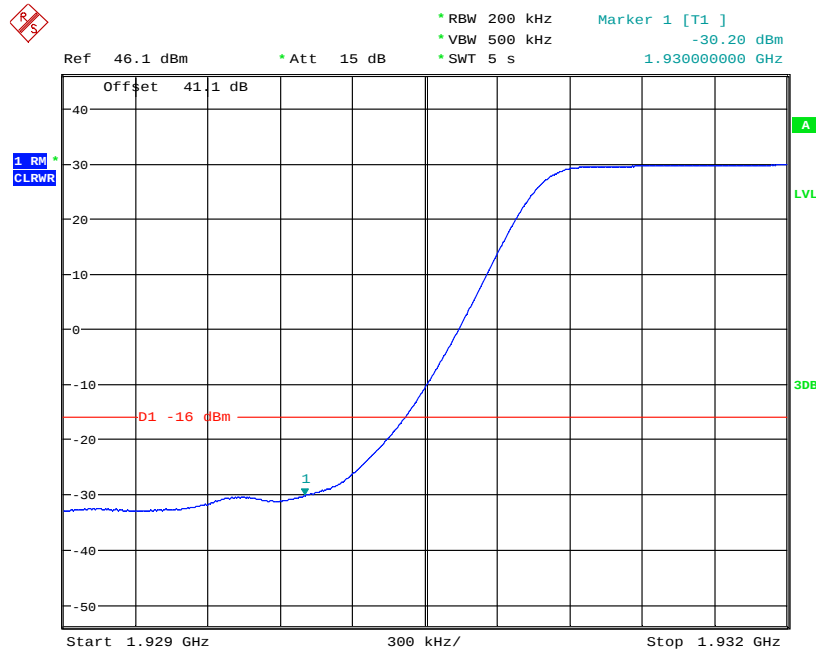


Date: 17.JUN.2013 14:00:20

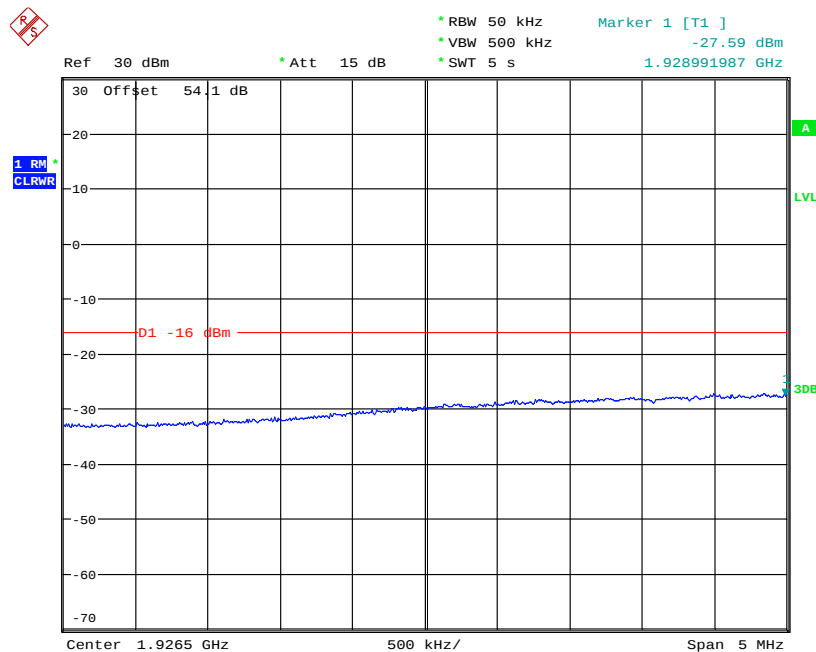


Date: 17.JUN.2013 14:01:30

Channel Position B - QPSK / Bandwidth 20.0 MHz

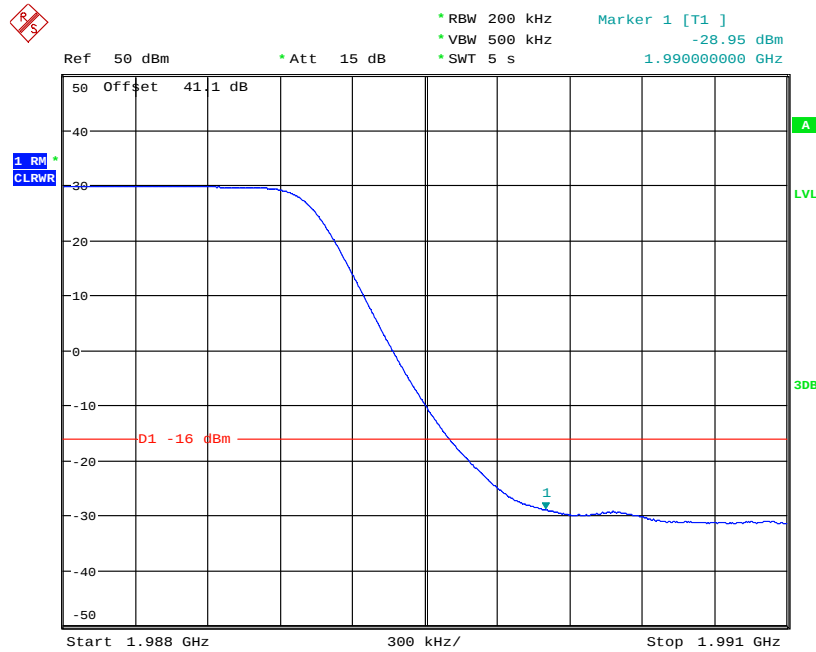


Date: 17.JUN.2013 14:12:46

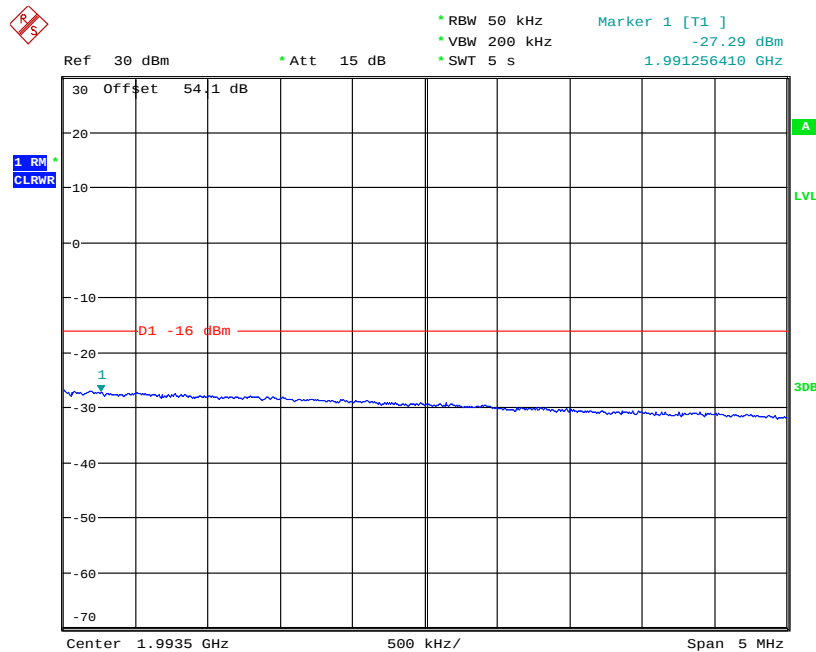


Date: 17.JUN.2013 14:14:14

Channel Position T - QPSK / Bandwidth 20.0 MHz



Date: 17.JUN.2013 14:26:25



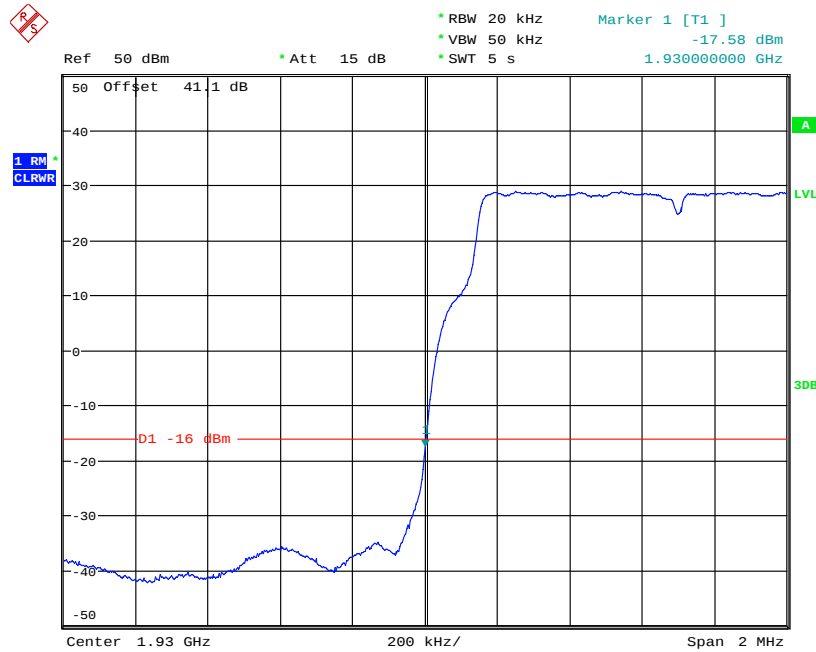
Date: 17.JUN.2013 14:27:48

Configuration L-MIMO-MC 1 (2C)

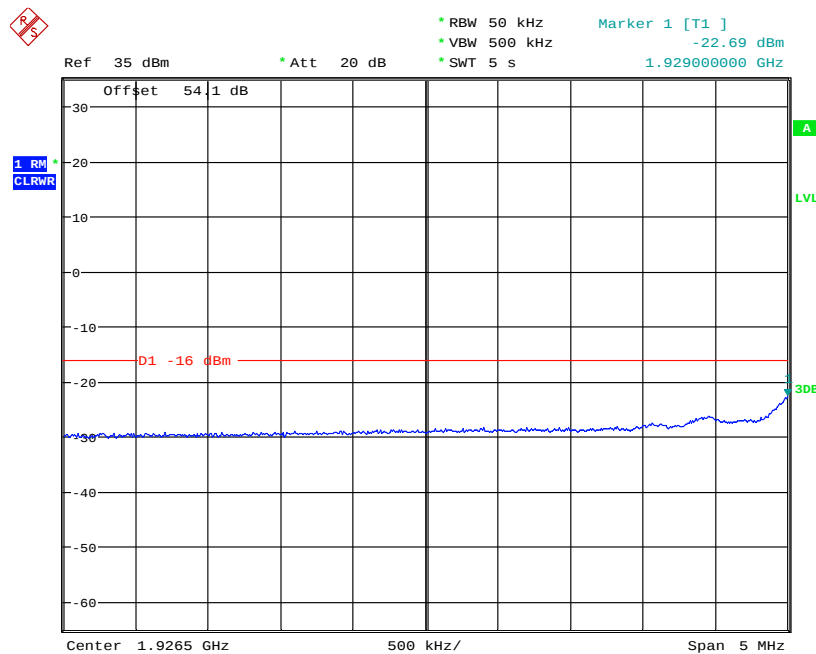
Maximum Output Power 45.8dBm per carrier

Band Edge Frequency	Channel Bandwidth	Edge Test with modulation QPSK Channel Frequencies
Channel Position B 1930.0 MHz	1.4 MHz	Port A1: 1930.7MHz + 1932.1MHz
	3.0 MHz	Port A1: 1931.5MHz + 1934.5MHz
	5.0 MHz	Port A1: 1932.5MHz + 1937.5MHz
	10.0 MHz	Port A1: 1935.0MHz + 1945.0MHz
	15.0 MHz	-
	20.0 MHz	-
Channel Position T 1990.0 MHz	1.4 MHz	Port A1: 1989.3MHz + 1987.9MHz
	3.0 MHz	Port A1: 1988.5MHz + 1985.5MHz
	5.0 MHz	Port A1: 1987.5MHz + 1982.5MHz
	10.0 MHz	Port A1: 1985.0MHz + 1975.0MHz
	15.0 MHz	-
	20.0 MHz	-

Channel Position B - QPSK / Bandwidth 1.4 MHz

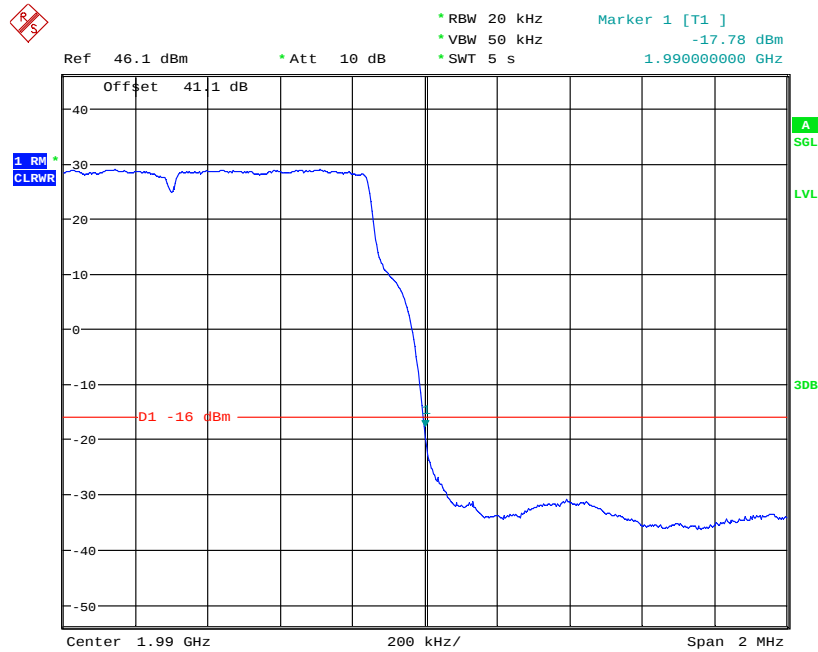


Date: 17.JUN.2013 14:49:39

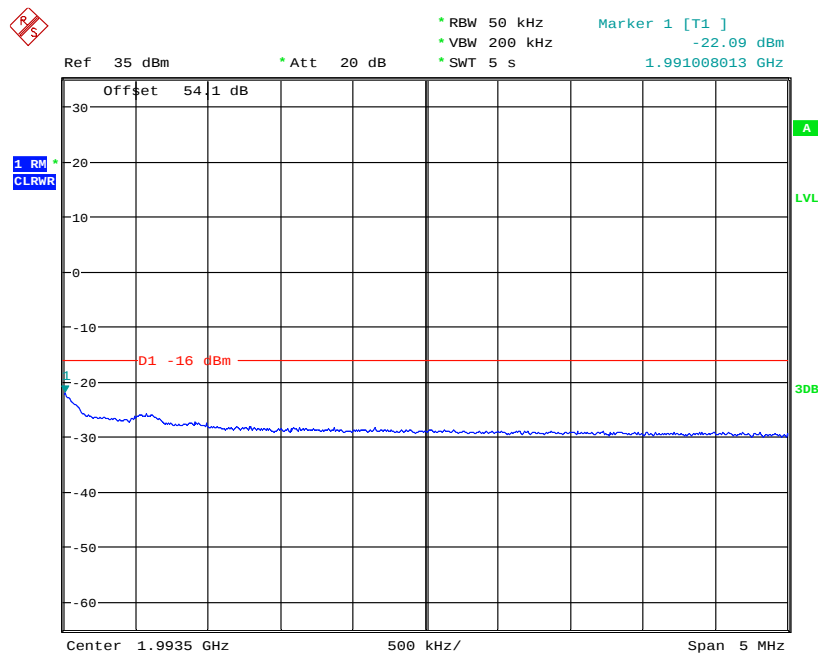


Date: 17.JUN.2013 14:47:26

Channel Position T – Modulation QPSK / Bandwidth 1.4 MHz

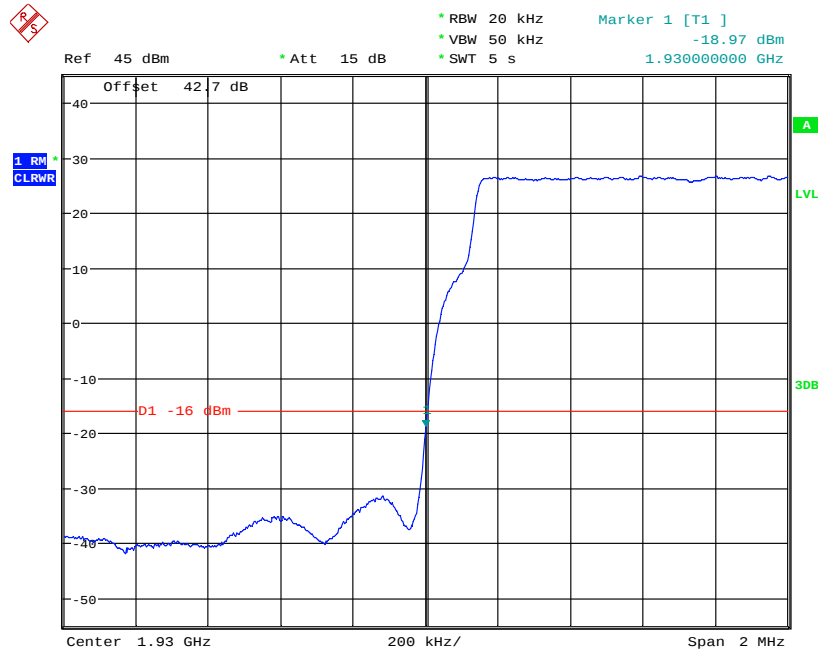


Date: 17.JUN.2013 14:52:26



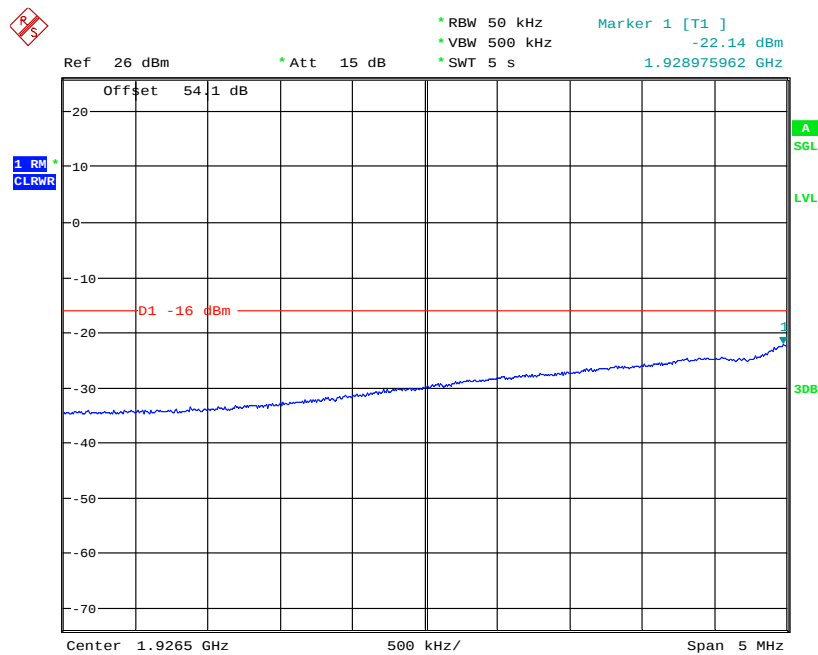
Date: 17.JUN.2013 14:53:43

Channel Position B - QPSK / Bandwidth 3.0 MHz



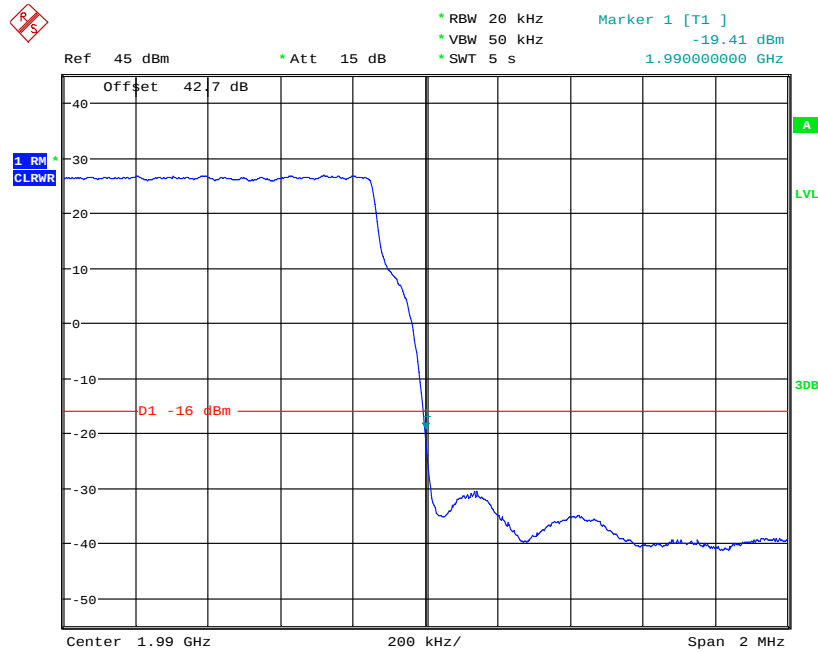
Date: 17. JUN. 2013 15:07:43

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.



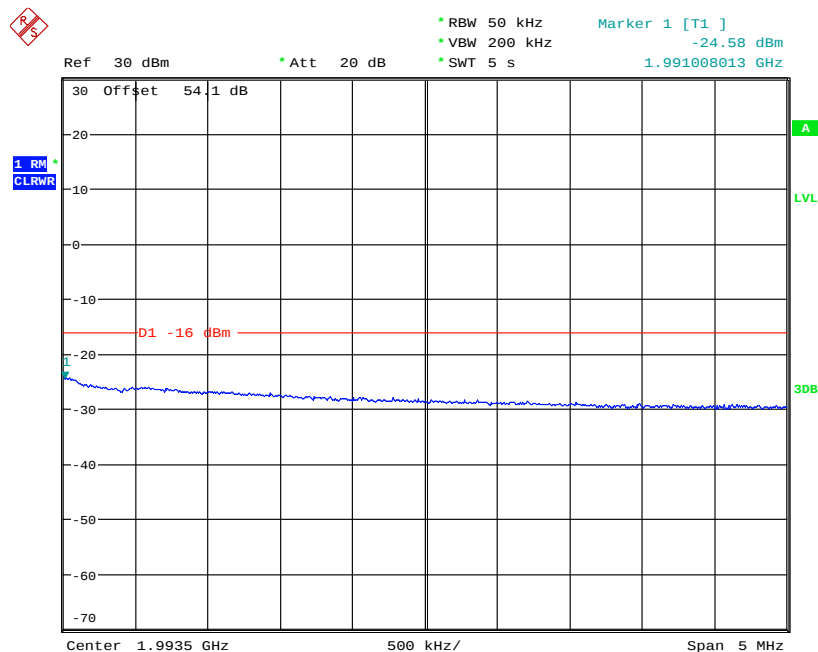
Date: 17. JUN. 2013 15:08:20

Channel Position T - QPSK / Bandwidth 3.0 MHz



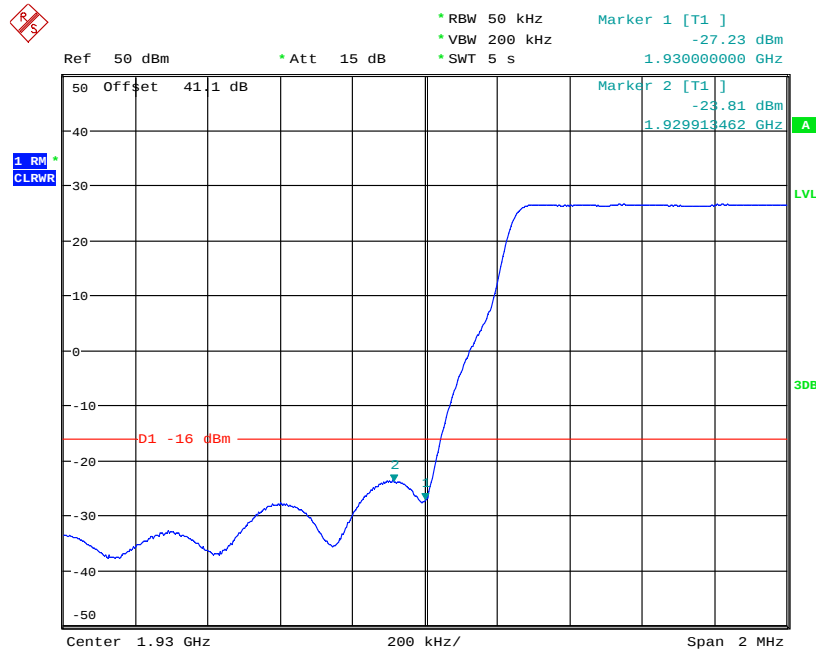
Date: 17. JUN. 2013 15:14:13

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.

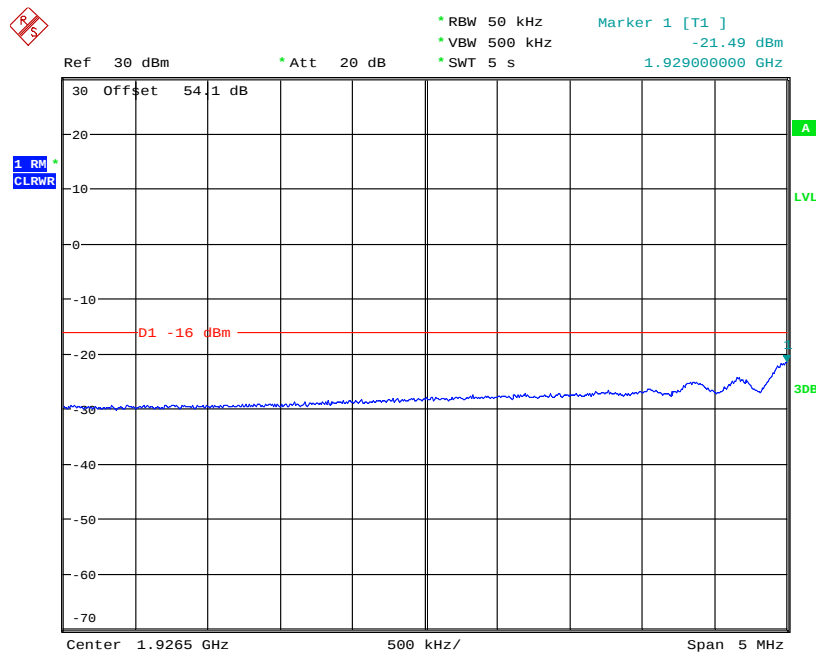


Date: 17. JUN. 2013 15:15:44

Channel Position B - QPSK / Bandwidth 5.0 MHz

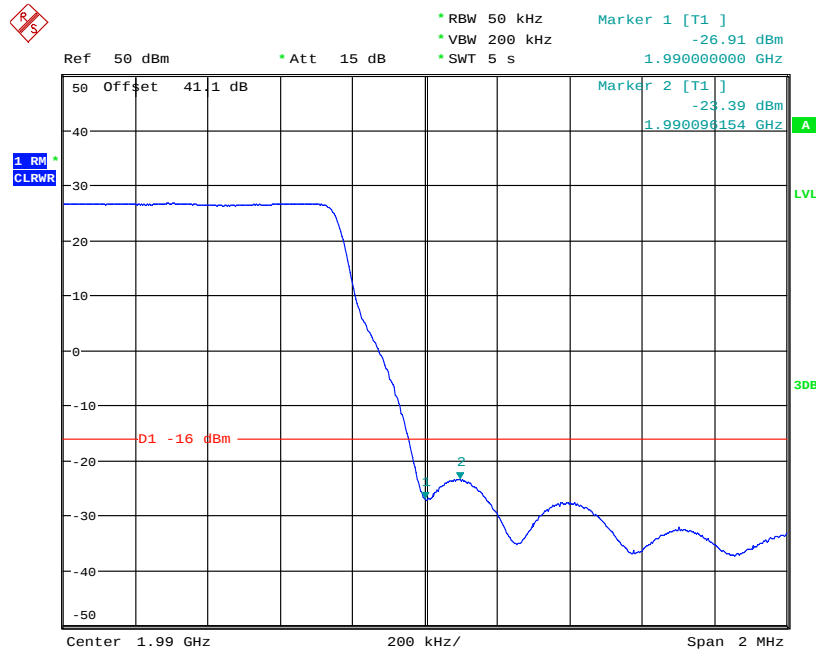


Date: 17.JUN.2013 15:23:15

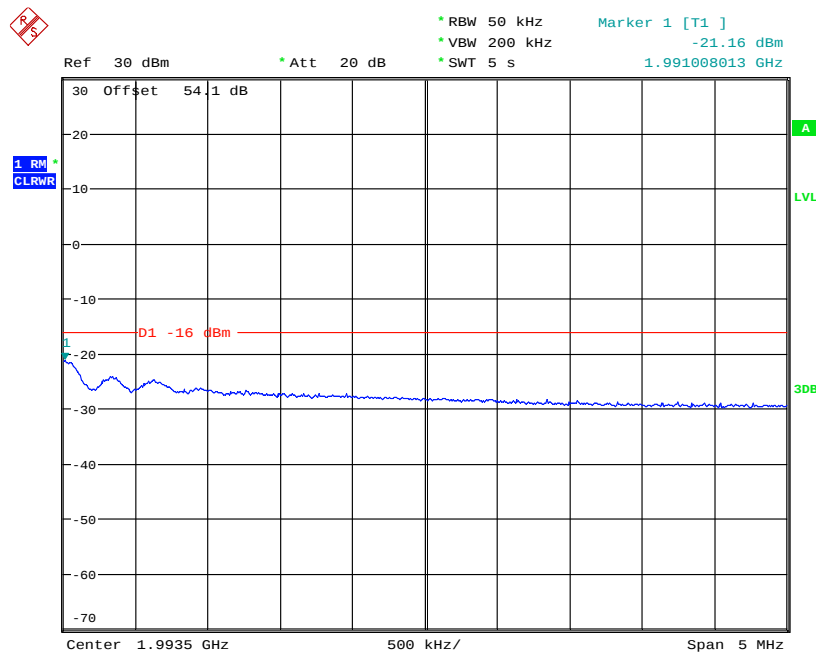


Date: 17.JUN.2013 15:24:34

Channel Position T - QPSK / Bandwidth 5.0 MHz

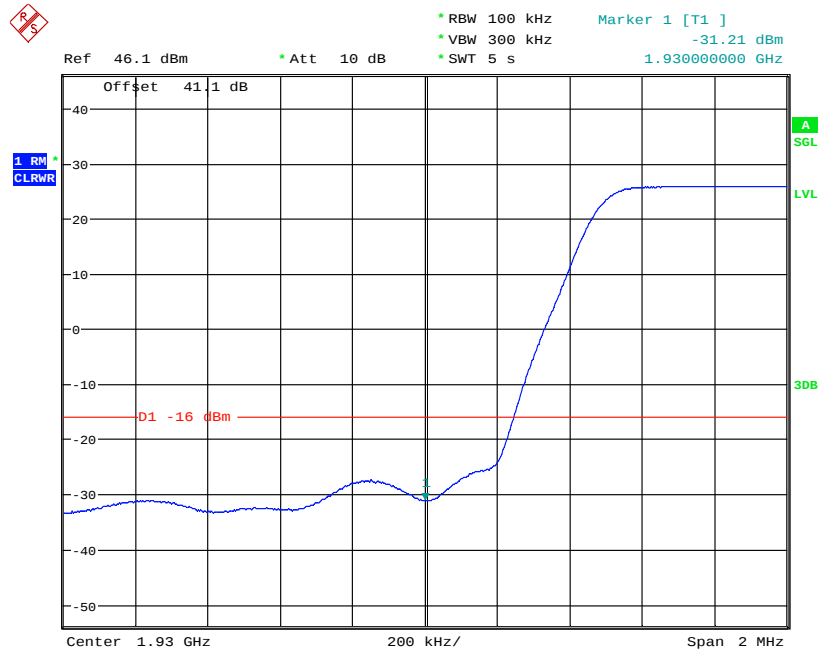


Date: 17.JUN.2013 15:33:49

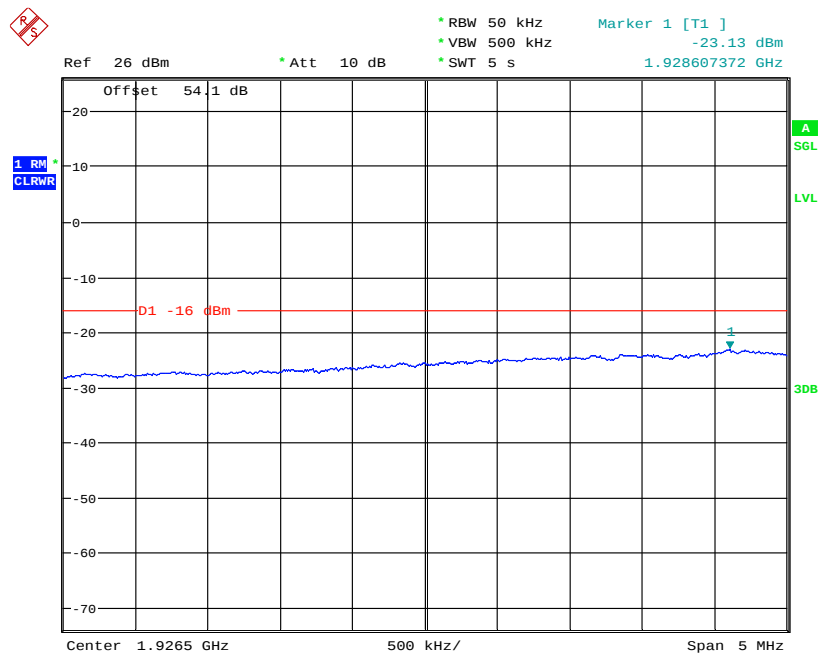


Date: 17.JUN.2013 15:35:35

Channel Position B - QPSK / Bandwidth 10.0 MHz

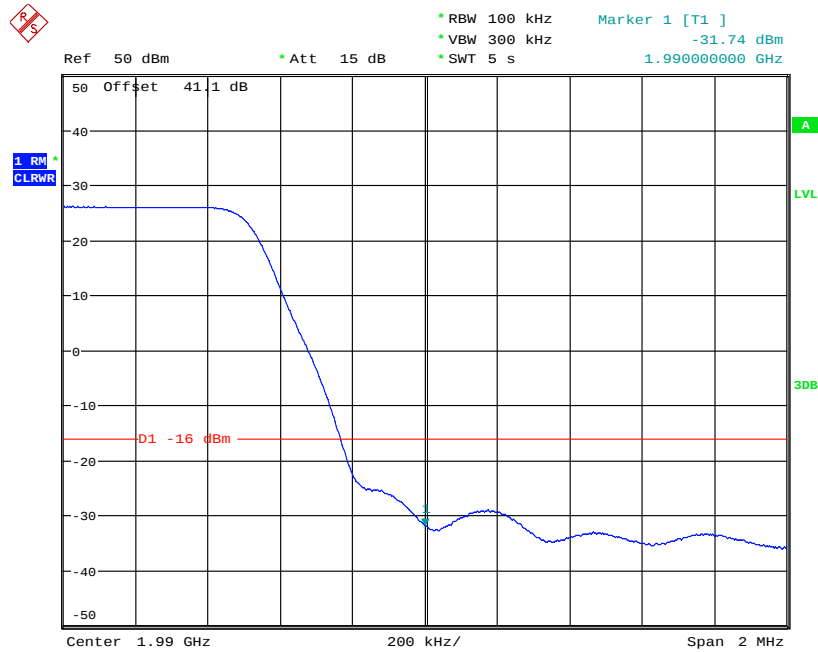


Date: 17.JUN.2013 15:42:02

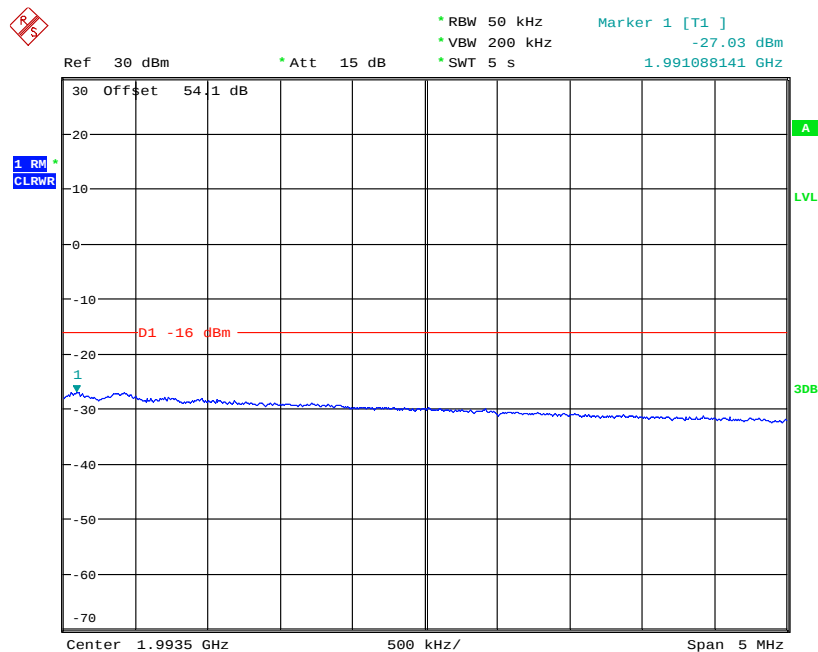


Date: 17.JUN.2013 15:42:41

Channel Position T - QPSK / Bandwidth 10.0 MHz



Date: 17.JUN.2013 15:49:34



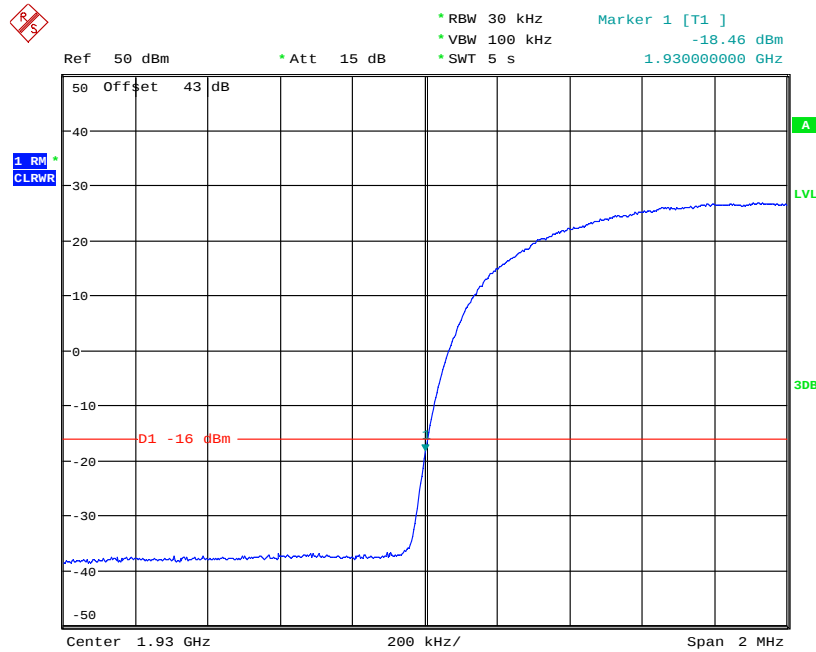
Date: 17.JUN.2013 15:50:45

Configuration G+W-MIMO-MC 1 (1W + 1G)

Maximum Output Power 44.8dBm per carrier

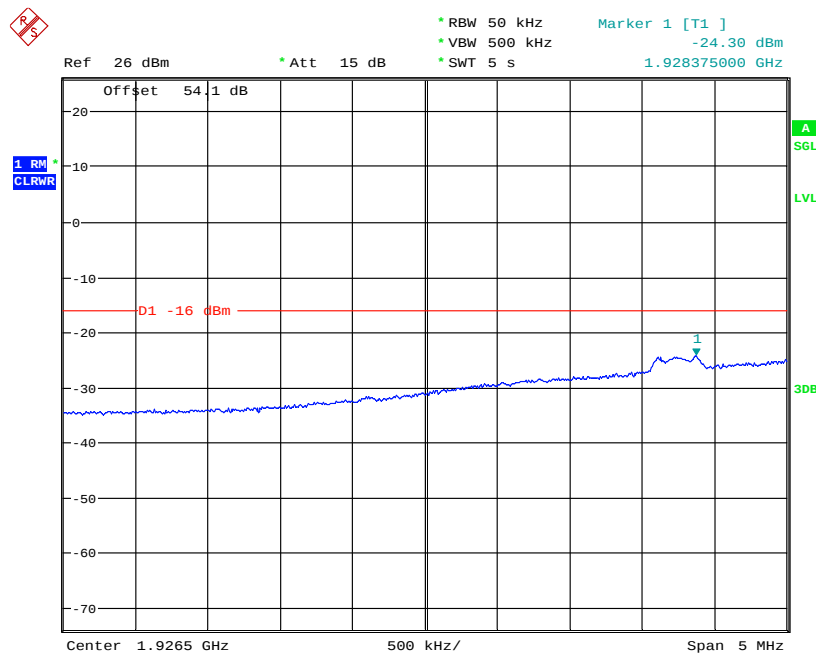
Band Edge Frequency	Edge Test with modulation (W) 16QAM + (G) GMSK Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	Port A1: (W) 1932.4MHz + (G) 1935.2MHz Port A2: (W) 1932.4MHz + (G) 1935.8MHz
Channel Position T_{RFBW} 1990.0 MHz	Port A1: (W) 1987.6MHz + (G) 1984.8MHz Port A2: (W) 1987.6MHz + (G) 1984.2MHz

Channel Position B_{RFBW} - WCDMA 16QAM / GSM GMSK



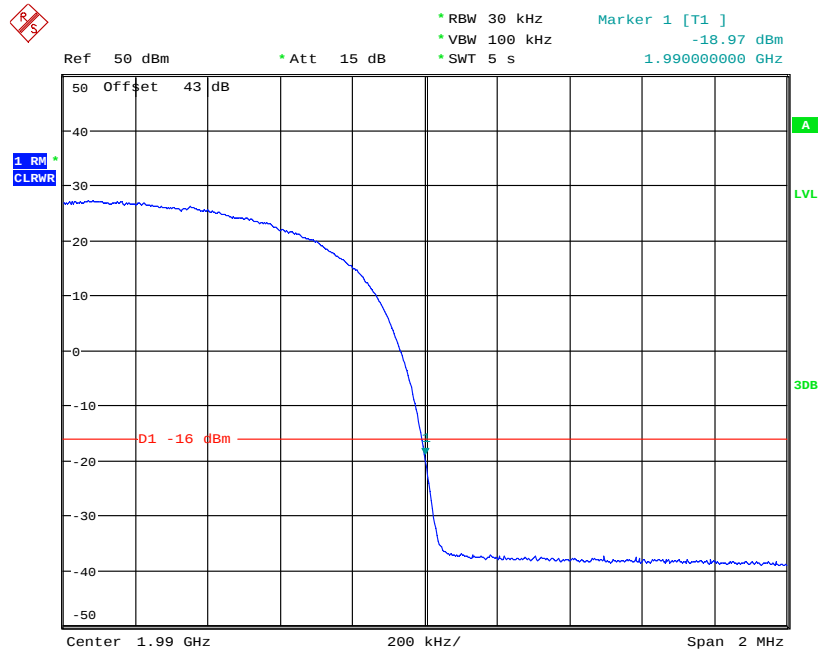
Date: 18.JUN.2013 11:58:01

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



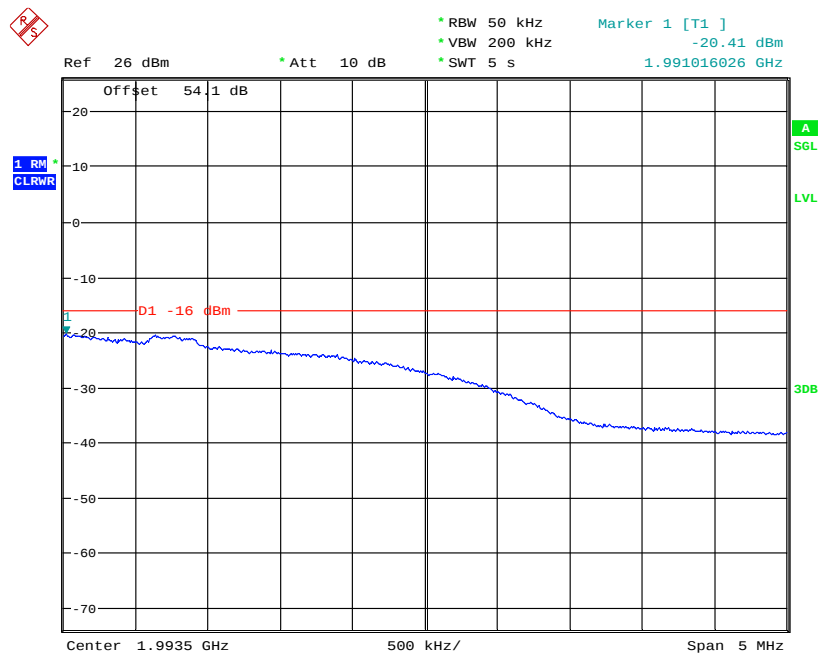
Date: 18.JUN.2013 11:58:38

Channel Position T_{RFBW} - WCDMA 16QAM / GSM GMSK



Date: 18.JUN.2013 12:06:28

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



Date: 18.JUN.2013 12:07:07

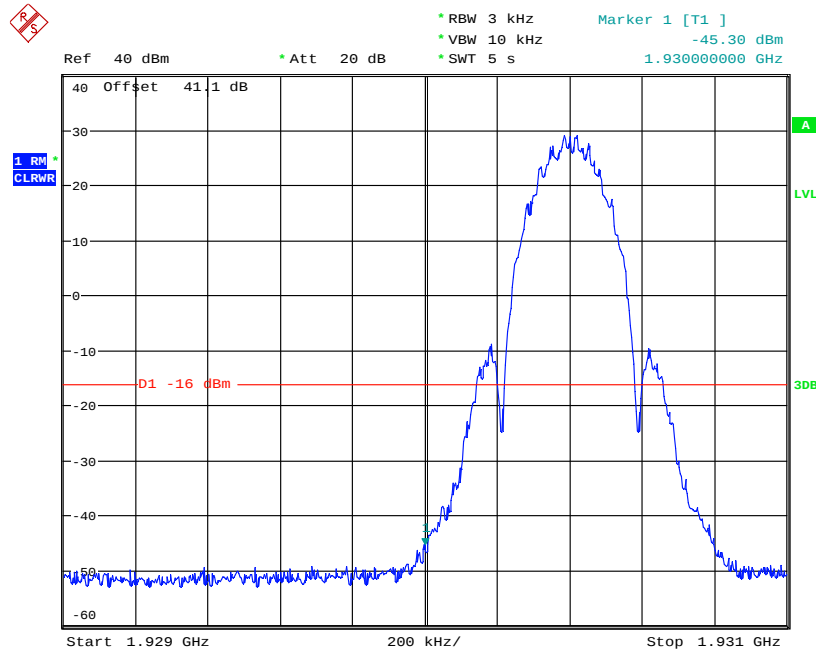
Configuration G+W-MIMO-MC 3 (2G + 1W)

Maximum Output Power 43.8dBm per carrier

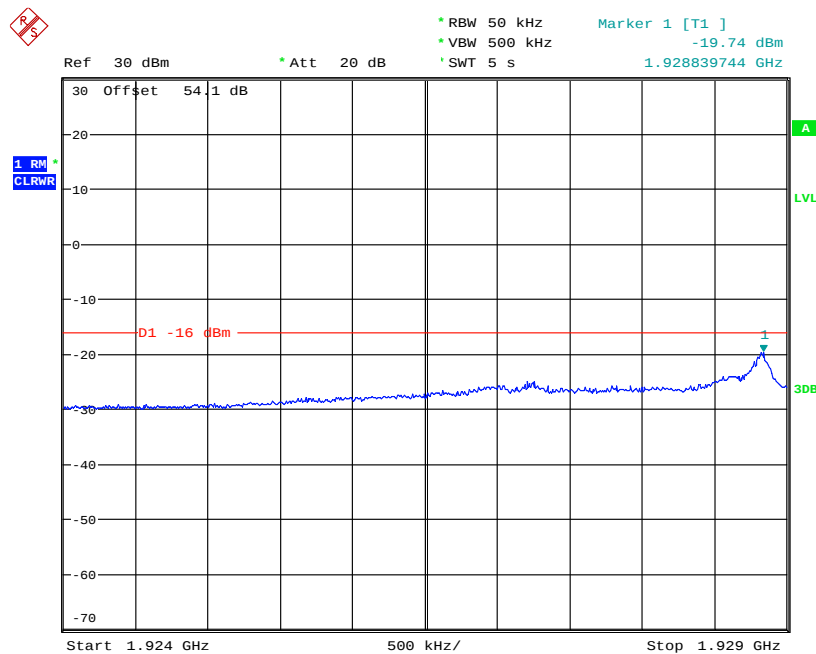
Band Edge Frequency	Edge Test with modulation (G) 16QAM + (W) 16QAM Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	Port A1: (G) 1930.4MHz* + (G) 1932.0MHz + (W) 1935.4MHz Port A2: (G) 1931.0MHz + (G) 1932.6MHz + (W) 1935.4MHz
Channel Position T_{RFBW} 1990.0 MHz	Port A1: (G) 1989.6MHz* + (G) 1988.0MHz + (W) 1984.6MHz Port A2: (G) 1989.0MHz + (G) 1987.4MHz + (W) 1984.6MHz

Note*: For GSM, 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.

Channel Position B_{RFBW} - GSM 16QAM / WCDMA 16QAM

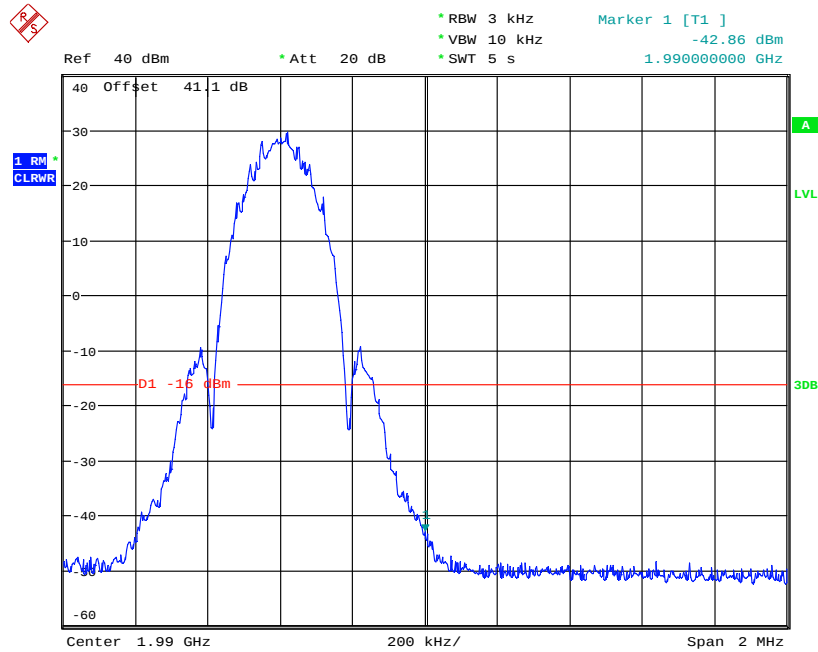


Date: 20.JUN.2013 15:17:19

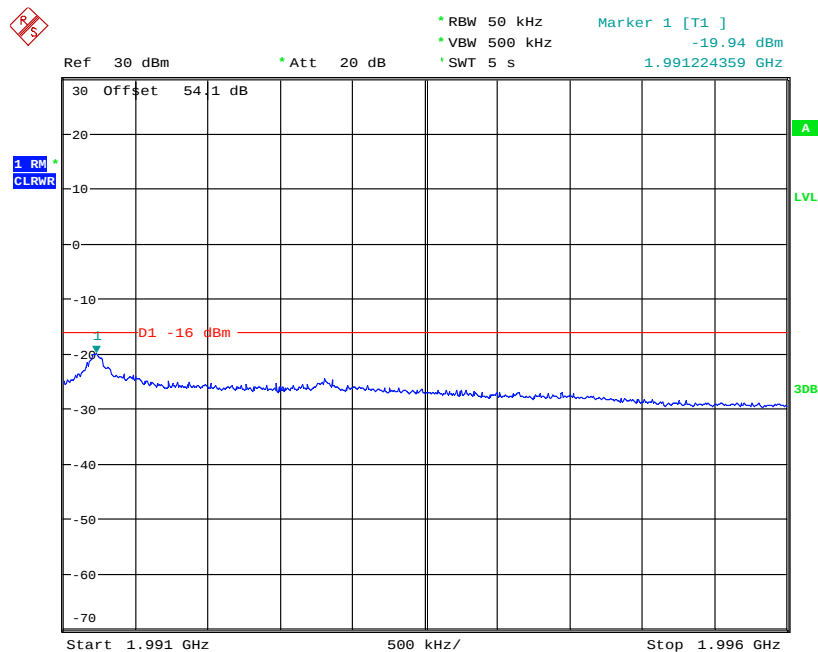


Date: 20.JUN.2013 15:15:19

Channel Position T_{RFBW} - GSM 16QAM / WCDMA 16QAM



Date: 20.JUN.2013 15:27:07



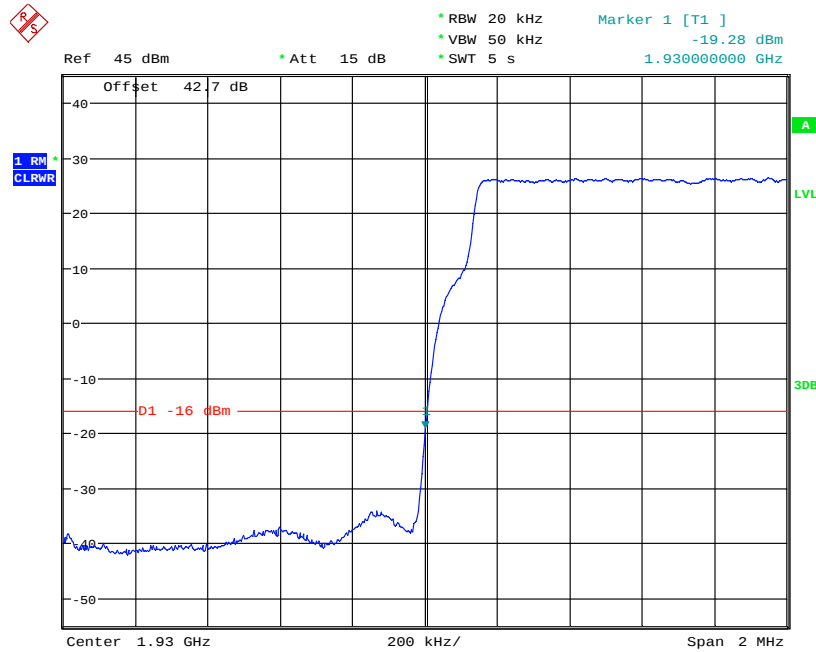
Date: 20.JUN.2013 15:28:57

Configuration G+L-MIMO-MC 1 (1L + 1G)

Maximum Output Power 44.4dBm per carrier

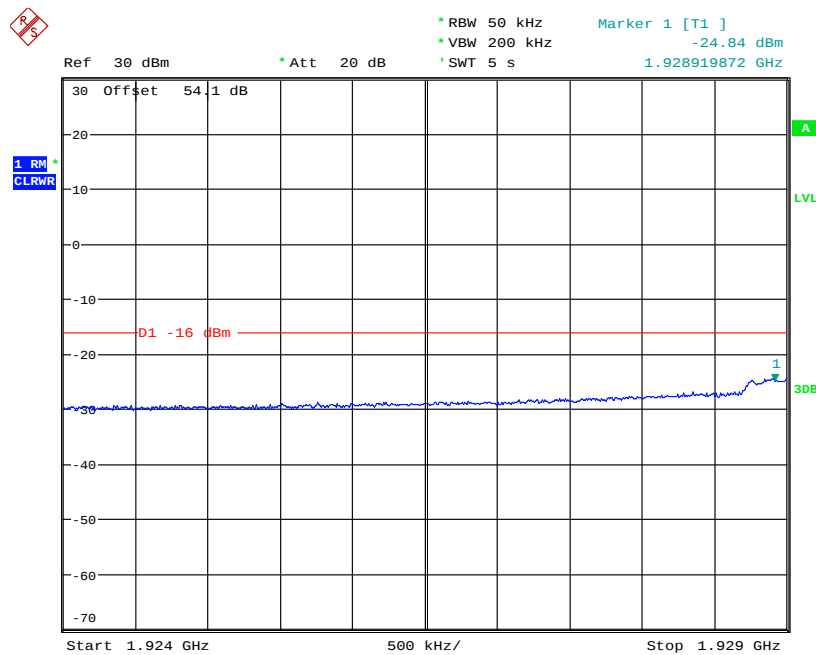
Band Edge Frequency	Edge Test with modulation (L) QPSK / 3.0MHz Bandwidth + (G) GMSK Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	Port A1: (L) 1931.5MHz + (G) 1933.2MHz Port A2: (L) 1931.5MHz + (G) 1933.8MHz
Channel Position T_{RFBW} 1990.0 MHz	Port A1: (L) 1988.5MHz + (G) 1986.8MHz Port A2: (L) 1988.5MHz + (G) 1986.2MHz

Channel Position B_{RFBW} - LTE QPSK: Bandwidth 3.0MHz / GSM GMSK



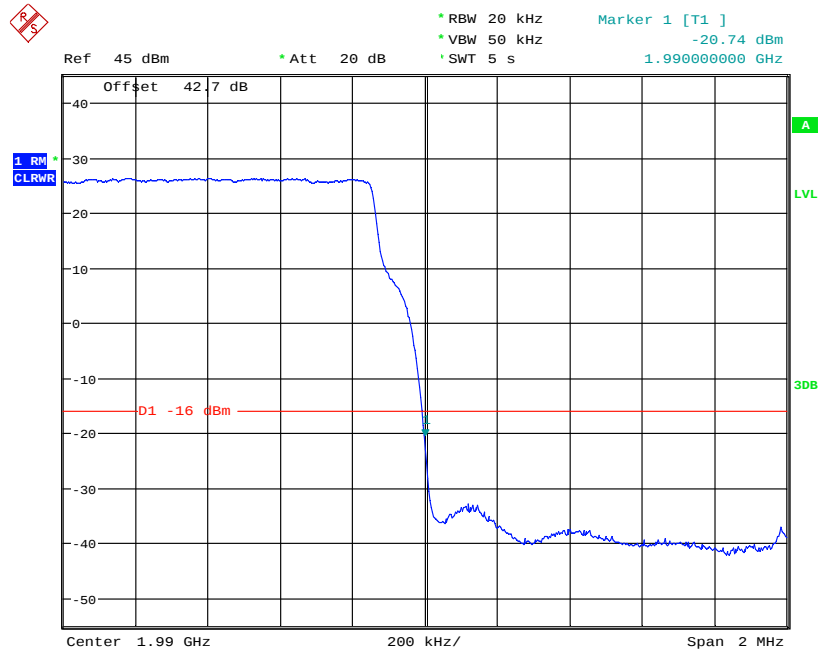
Date: 18.JUN.2013 17:56:54

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.



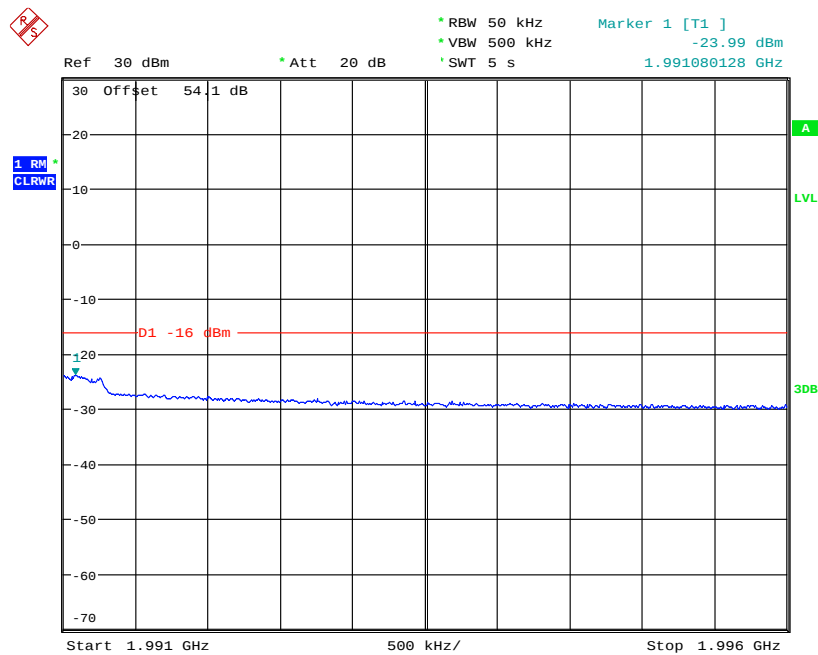
Date: 18.JUN.2013 17:59:18

Channel Position T_{RFBW} - LTE QPSK: Bandwidth 3.0MHz / GSM GMSK



Date: 19.JUN.2013 10:32:04

Note: A resolution bandwidth of 20kHz was used. 20kHz is <1% of the Emission Bandwidth of LTE (2.9MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 42.7dB.



Date: 19.JUN.2013 10:30:10

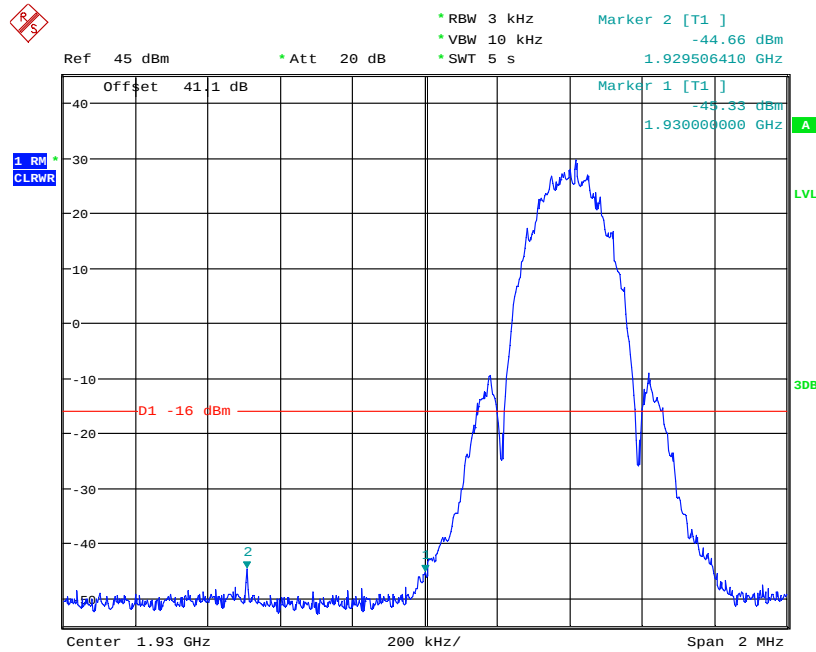
Configuration G+L-MIMO-MC 3 (2G + 1L)

Maximum Output Power 43.3dBm per carrier

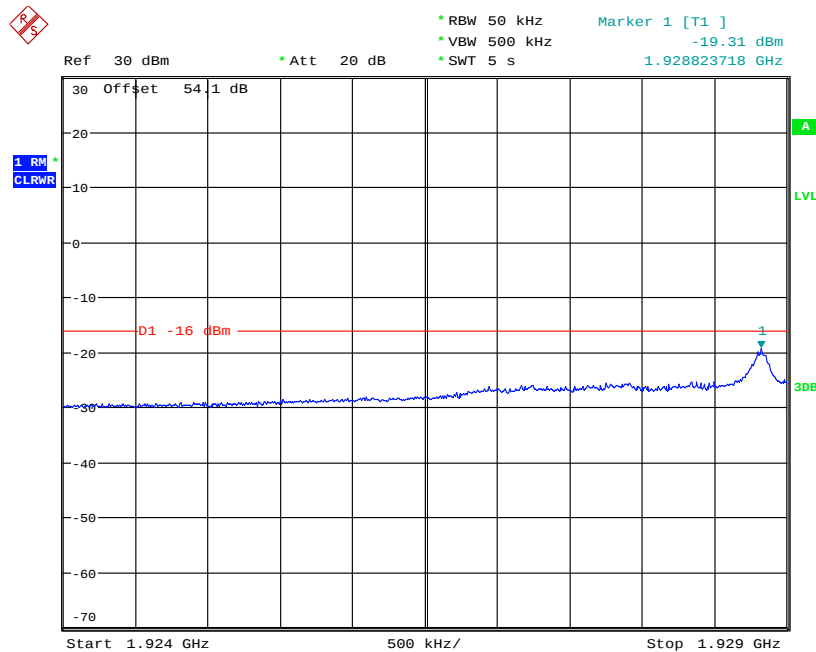
Band Edge Frequency	Edge Test with modulation (G) 16QAM + (L) QPSK / 3.0MHz Bandwidth Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	Port A1: (G) 1930.4MHz* + (G) 1932.0MHz + (L) 1934.3MHz Port A2: (G) 1931.0MHz + (G) 1932.6MHz + (L) 1934.3MHz
Channel Position T_{RFBW} 1990.0 MHz	Port A1: (G) 1989.6MHz* + (G) 1988.0MHz + (L) 1985.7MHz Port A2: (G) 1989.0MHz + (G) 1987.4MHz + (L) 1985.7MHz

Note*: For GSM, 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.

Channel Position B_{RFBW} - GSM 16QAM / LTE QPSK: Bandwidth 3.0MHz

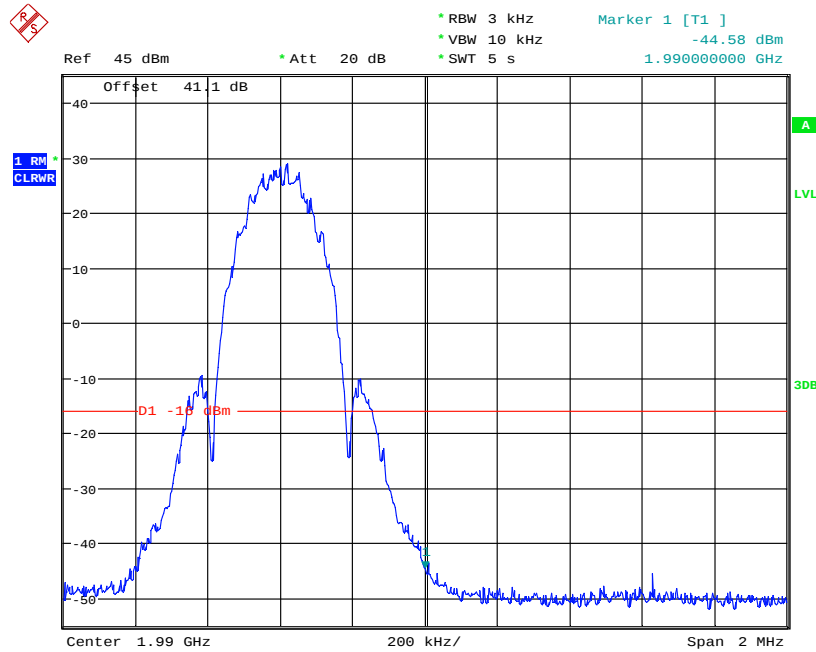


Date: 20.JUN.2013 16:06:32

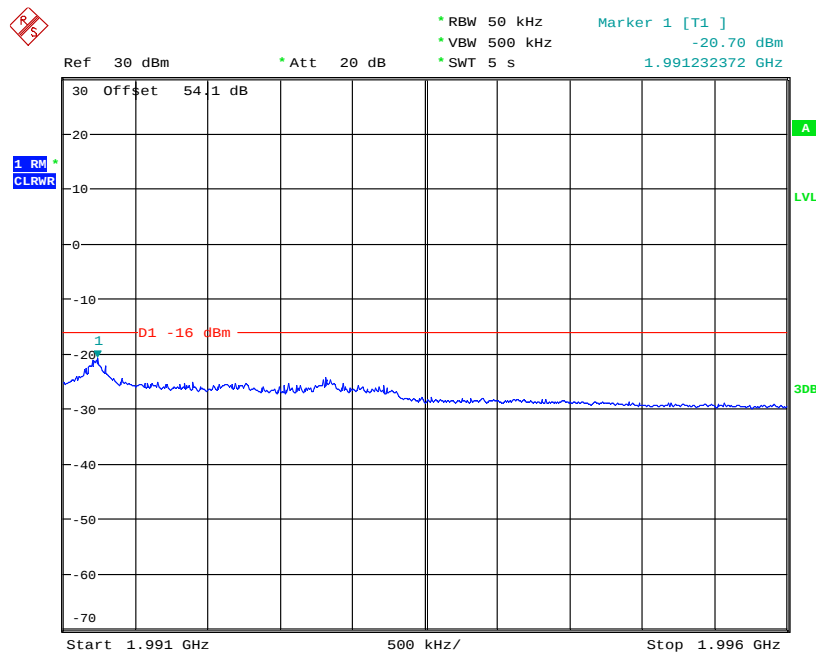


Date: 20.JUN.2013 16:07:44

Channel Position T_{RFBW} - GSM 16QAM / LTE QPSK: Bandwidth 3.0MHz



Date: 20.JUN.2013 16:15:25



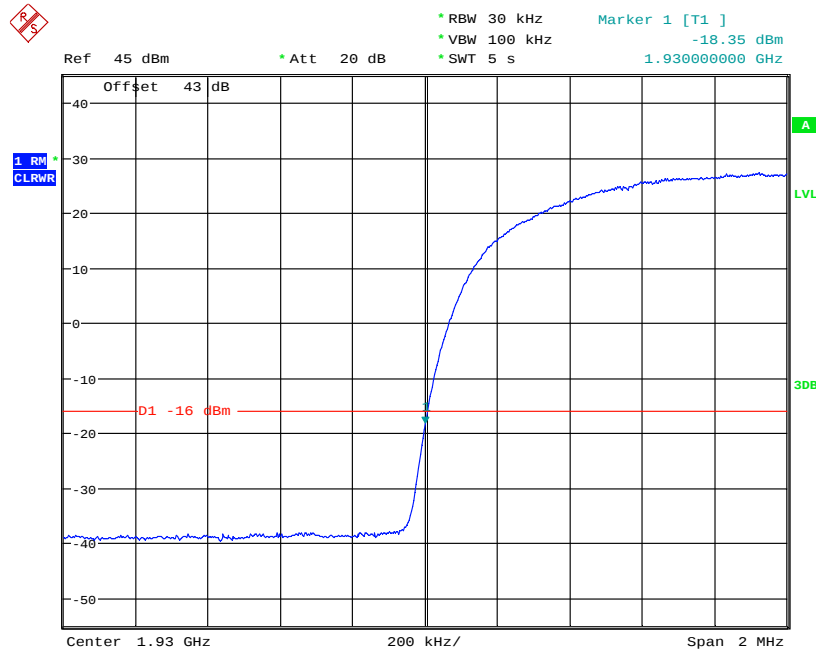
Date: 20.JUN.2013 16:13:29

Configuration W+L-MIMO-MC 1 (1W + 1L)

Maximum Output Power 45.7dBm per carrier

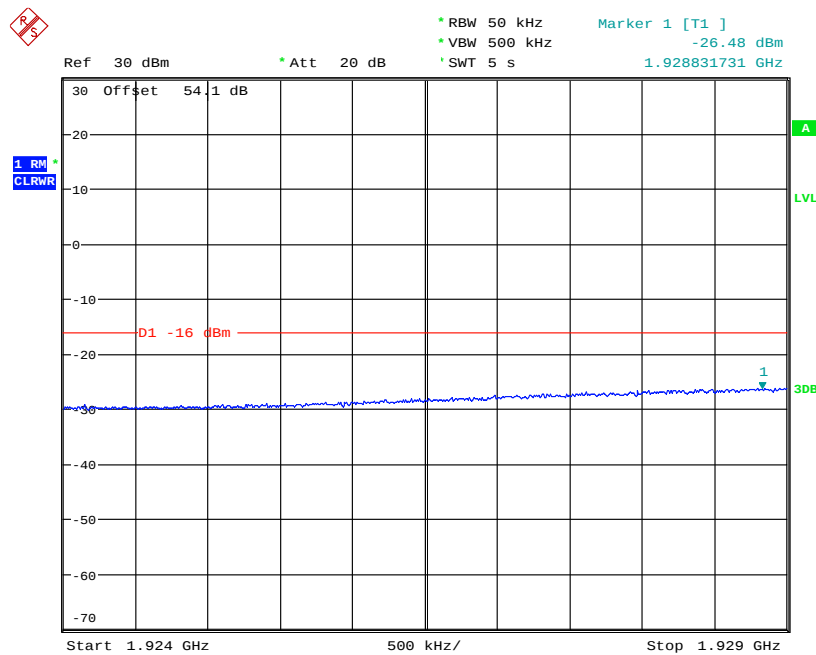
Band Edge Frequency	Edge Test with modulation (W) 16QAM + (L) QPSK / 3.0MHz Bandwidth Channel Frequencies
Channel Position B_{RFBW} 1930.0 MHz	Port A1: (W) 1932.4MHz + (L) 1936.5MHz Port A2: (W) 1932.4MHz + (L) 1936.5MHz
Channel Position T_{RFBW} 1990.0 MHz	Port A1: (W) 1987.6MHz + (L) 1983.5MHz Port A2: (W) 1987.6MHz + (L) 1983.5MHz

Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz



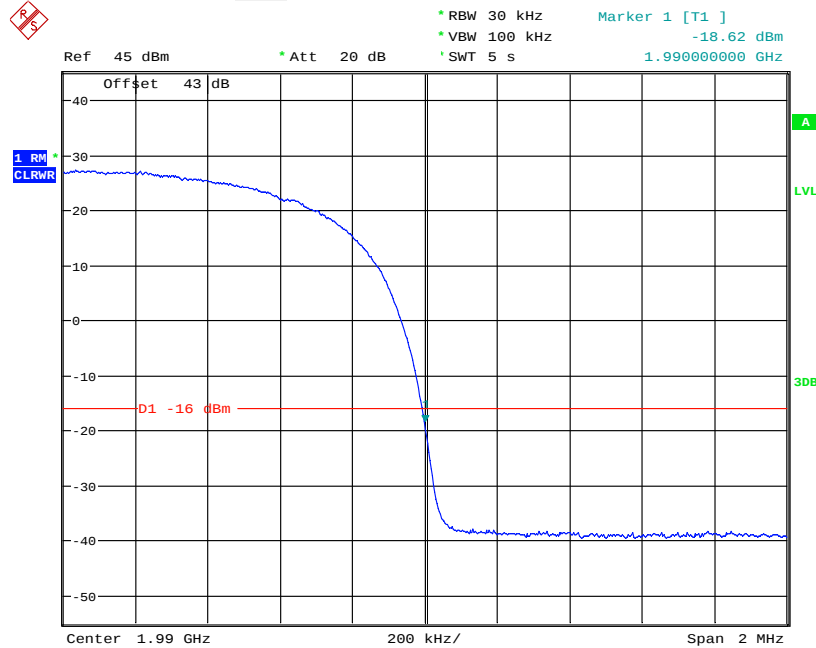
Date: 19.JUN.2013 10:59:48

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



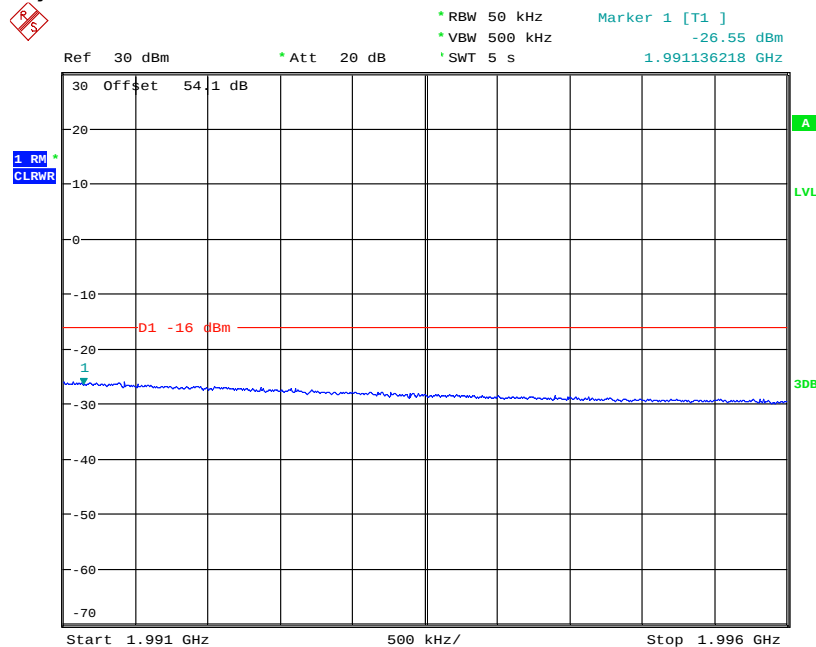
Date: 19.JUN.2013 10:56:47

Channel Position T_{RFBW} - LTE QPSK: Bandwidth 3.0MHz / WCDMA 16QAM



Date: 19.JUN.2013 12:10:56

Note: A resolution bandwidth of 30kHz was used. 30kHz is <1% of the Emission Bandwidth of WCDMA (4.7MHz), to compensate for the reduced measurement bandwidth, the offset was adjusted from 41.1dB to 43dB.



Date: 19.JUN.2013 12:12:04

Limit	-13 dBm
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2.4 RADIATED SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 24, Clause 24.238 (a)
Industry Canada RSS-133, Clause 6.5.1

2.4.2 Equipment Under Test

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017

2.4.3 Date of Test and Modification State

28 June , 02 and 03 July 2013 - 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	24.5 – 27.2°C
Relative Humidity	52.5 – 54.4%

2.4.6 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 Polarisations.

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 - $(43 + 10\log(P))$ 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 does not have an integral antenna, the field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned 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:

$$E_{(v/m)} = (30 \times 1.64 \times 14.09)^{0.5} / 3 = 8.78V/m = 138.87dB\mu V/m$$

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

$$43 + 10\log(14.09) = 54.49dB$$

Therefore the limit at 3m measurement distance is:

$$138.87 - 54.49 = 84.4 \text{ dB}\mu V/m$$

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.

2.4.7 Test Results

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

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

Channel Position M	1960.0MHz
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Channel Position M - GMSK - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

Channel Position M	1960.0MHz
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Channel Position M - QPSK - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration W-MIMO-SC

Maximum Output Power 47.0dBm per carrier

Channel Position M	Port A1: 1960.0MHz
	Port A2: 1960.0MHz

Channel Position M - 16QAM - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration L-MIMO-SC

Maximum Output Power 49.0dBm per carrier

Channel Position	Channel Frequencies
Channel Position B	Port A1: 1930.7MHz
	Port A2: 1930.7MHz
Channel Position M	Port A1: 1960.0MHz
	Port A2: 1960.0MHz
Channel Position T	Port A1: 1989.3MHz
	Port A2: 1989.3MHz

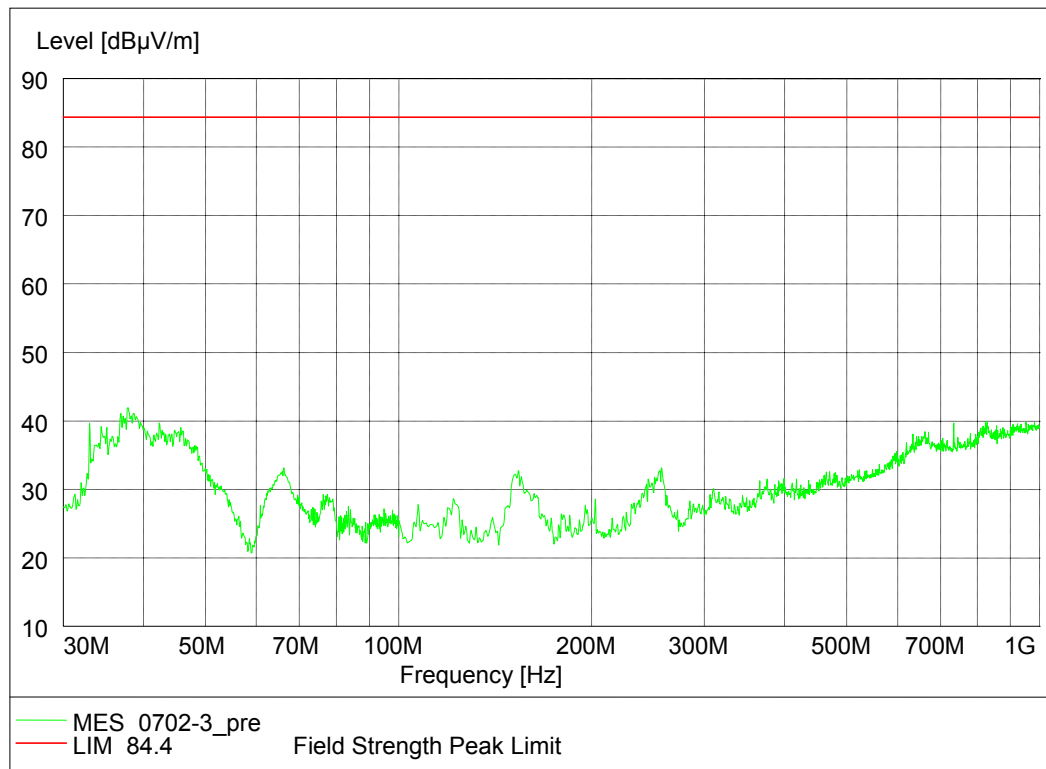
Channel Position B - LTE QPSK: Bandwidth 1.4MHz - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

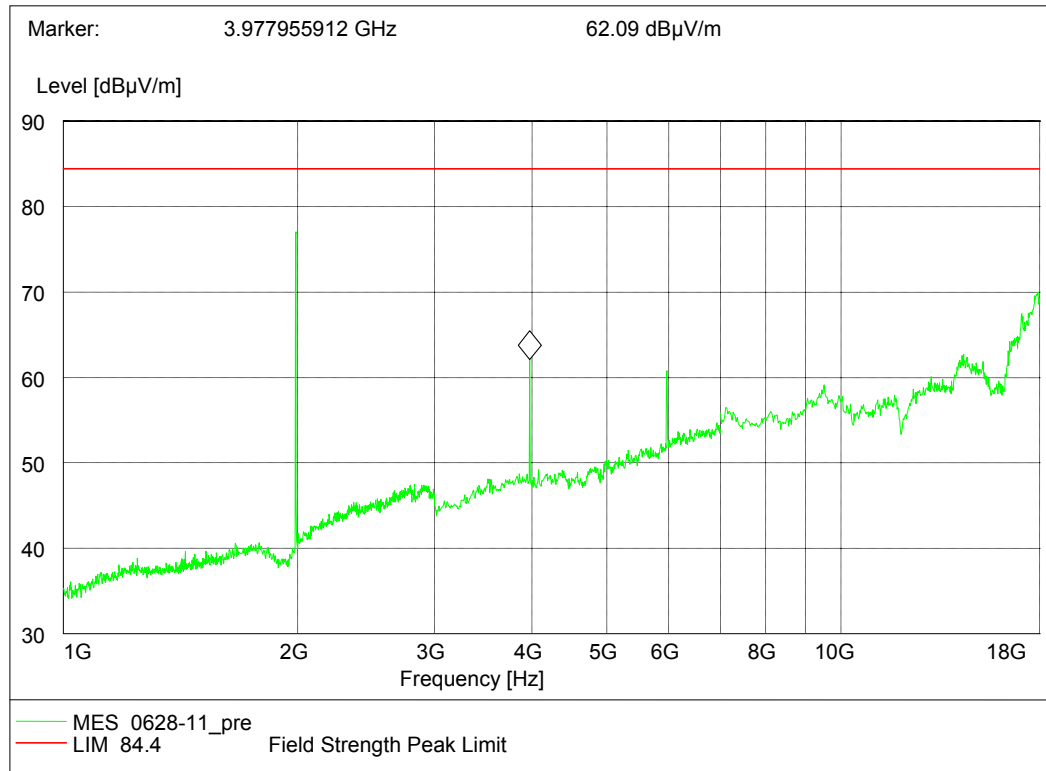
Channel Position M - LTE QPSK: Bandwidth 1.4MHz - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

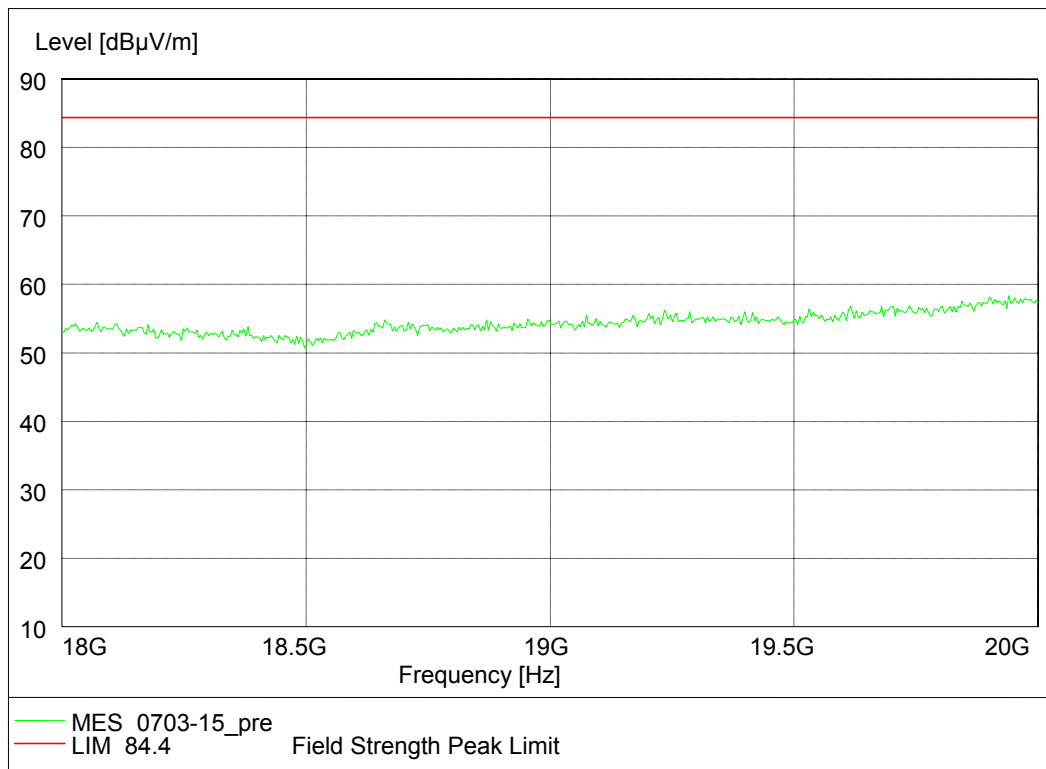
Channel Position T - LTE QPSK: Bandwidth 1.4MHz - 30MHz – 1GHz



Channel Position T - LTE QPSK: Bandwidth 1.4MHz - 1GHz - 18GHz



Channel Position T - LTE QPSK: Bandwidth 1.4MHz - 18GHz -20GHz



Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

Channel Position M	Port A1: 1940.7MHz + 1979.3MHz
	Port A2: 1940.7MHz + 1979.3MHz

Channel Position M - LTE QPSK: Bandwidth 1.4MHz - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration G+W-MIMO-MC 1 (1G+1W)

Maximum Output Power 44.8dBm per carrier

Channel Position M _{RFBW}	Port A1: (G) 1940.2MHz + (W) 1977.6MHz
	Port A2: (G) 1940.8MHz + (W) 1977.6MHz

Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration G+L-MIMO-MC 1 (1G+1L)

Maximum Output Power 45.6dBm per carrier

Channel Position M _{RFBW}	Port A1: (G) 1940.2MHz + (L) 1978.5MHz
	Port A2: (G) 1940.8MHz + (L) 1978.5MHz

Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Configuration W+L-MIMO-MC 1 (1W+1L)

Maximum Output Power 45.7dBm per carrier

Channel Position M _{RFBW}	Port A1: (W) 1942.4MHz + (L) 1978.5MHz
	Port A2: (W) 1942.4MHz + (L) 1978.5MHz

Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 30MHz – 20GHz

No emissions were detected within 20dB of the limit.

Limit	-13dBm / 84.4dB μ V/m
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Remarks

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

2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238 (a)
Industry Canada RSS-133, Clause 6.5.1

2.5.2 Equipment Under Test

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017

2.5.3 Date of Test and Modification State

13 to 20 June 2013 - 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	21.8 – 23.0°C
Relative Humidity	59.5 – 64.0%

2.5.6 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 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 (b), 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 [10Log2] by using the Measure and Add 10Log(N) dB technique according to FCC KDB662911 D01 accounting for simultaneous transmission from antenna ports RF A1 and RF A2.

The measurements were performed on the output connector RF A1. Limited complementary measurement were done at output conector RF A2 to verify identical performance for both transmitter chains in MIMO mode

The results are shown in the plots below.

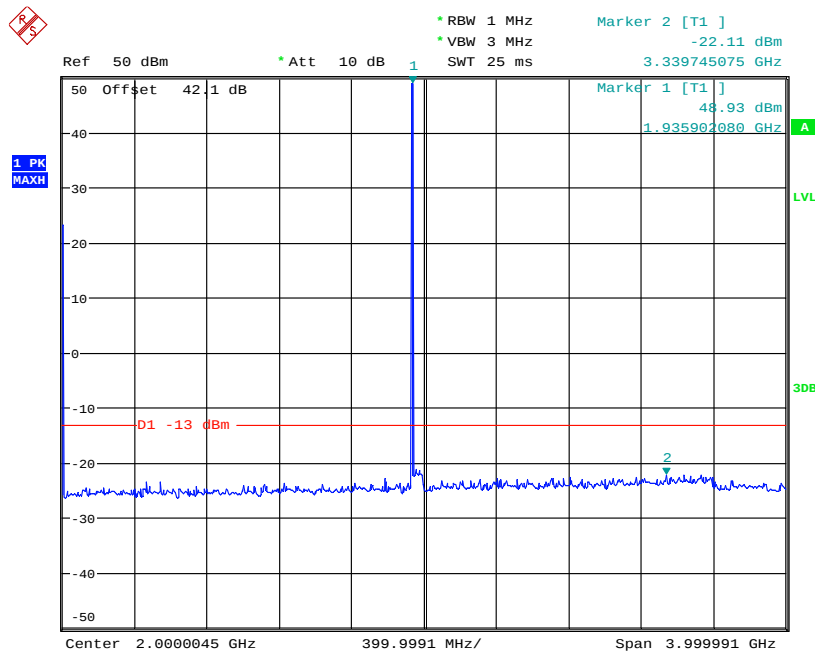
2.5.7 Test Results

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

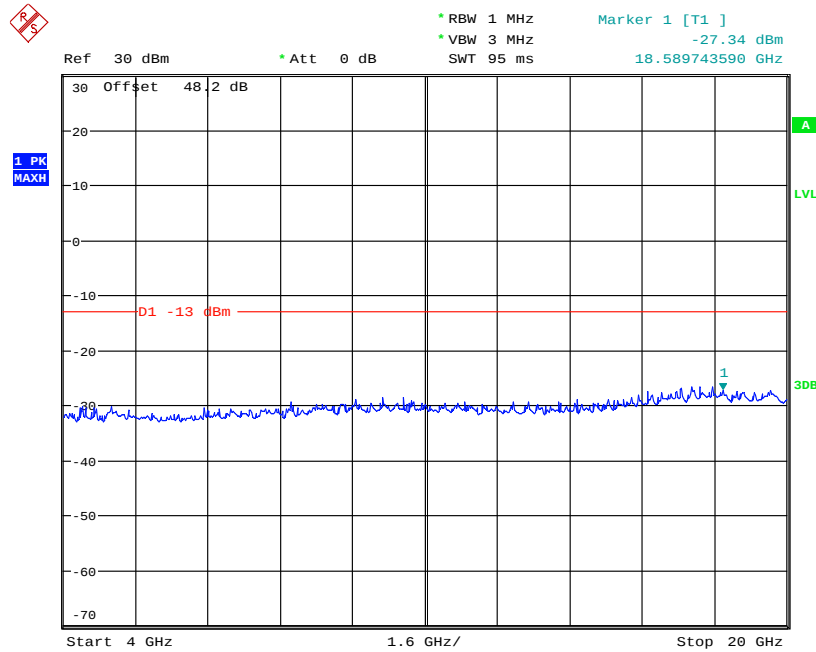
Channel Position	Channel Frequencies
Channel Position B	Port A1: 1930.4MHz
Channel Position M	Port A1: 1960.0MHz
Channel Position T	Port A1: 1989.6MHz

Channel Position B - GMSK - 9kHz – 4GHz



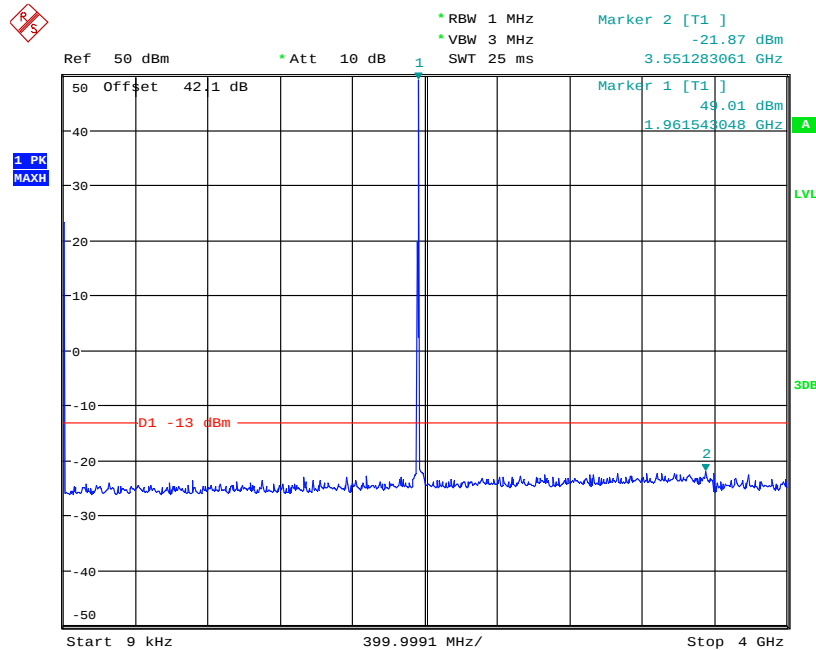
Date: 14.JUN.2013 11:58:12

Channel Position B - GMSK – 4GHz – 20GHz



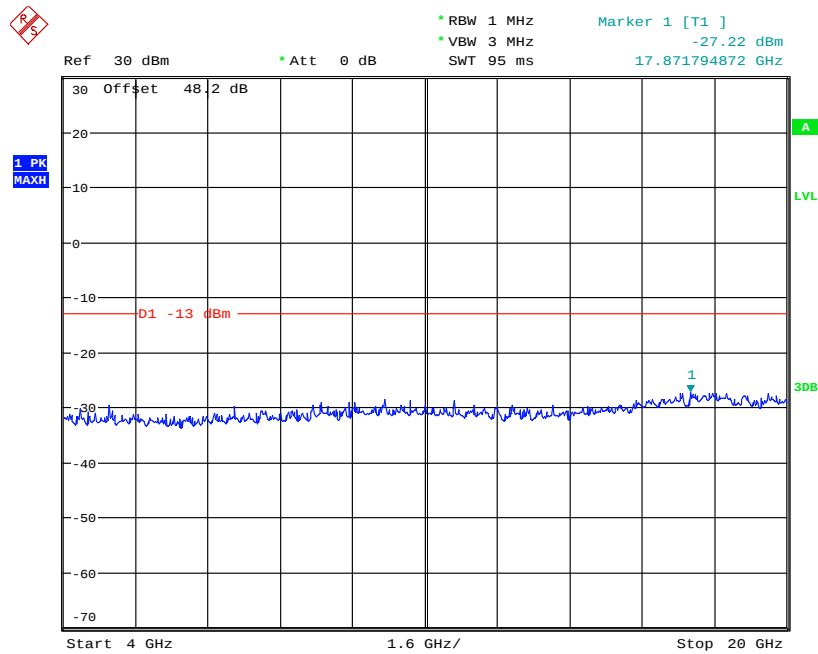
Date: 14.JUN.2013 11:59:15

Channel Position M - GMSK - 9kHz – 4GHz



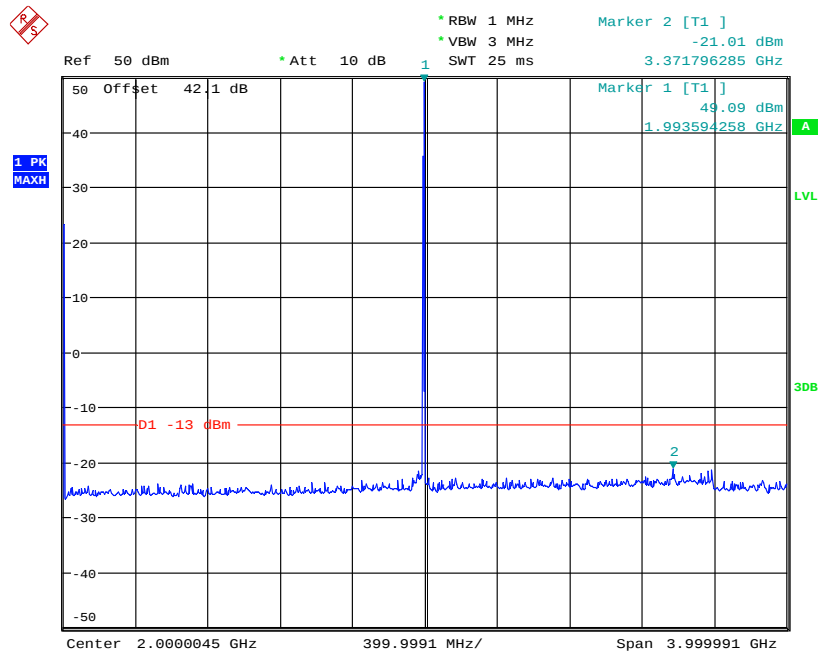
Date: 14.JUN.2013 12:02:38

Channel Position M - GMSK - 4GHz – 20GHz



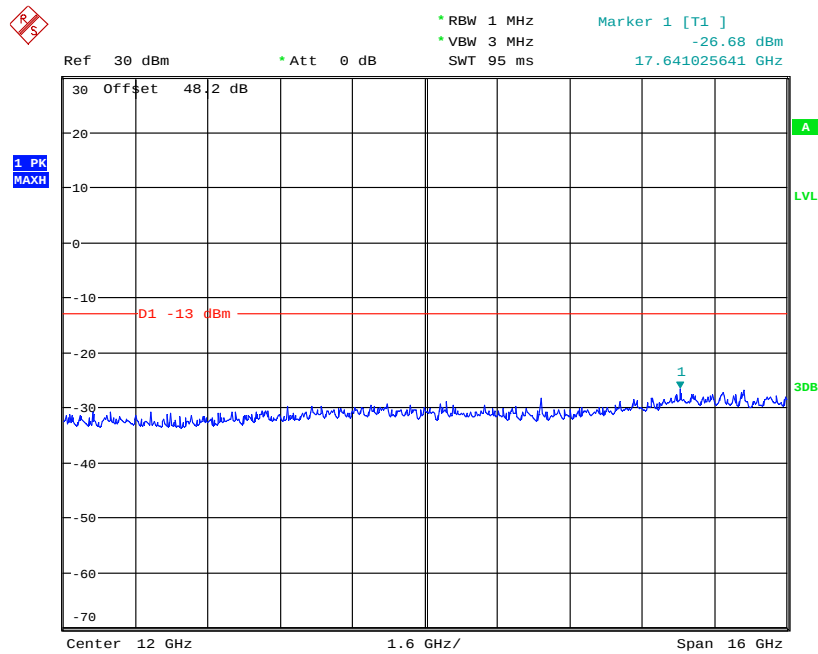
Date: 14.JUN.2013 12:03:51

Channel Position T - GMSK - 9kHz – 4GHz



Date: 14.JUN.2013 12:06:14

Channel Position T - GMSK - 4GHz – 20GHz



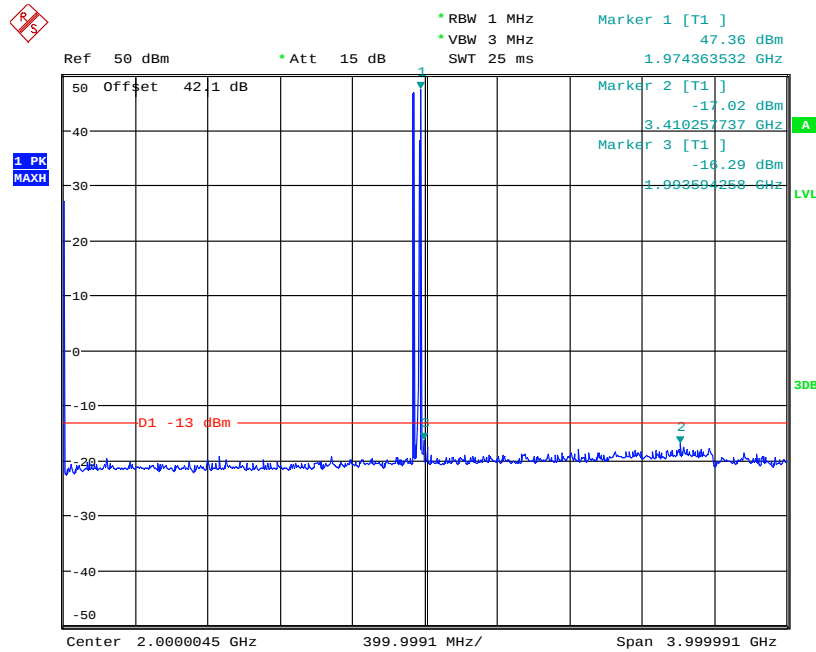
Date: 14.JUN.2013 12:07:01

Configuration G-MC 1 (2C)

Maximum Output Power 46.0dBm per carrier

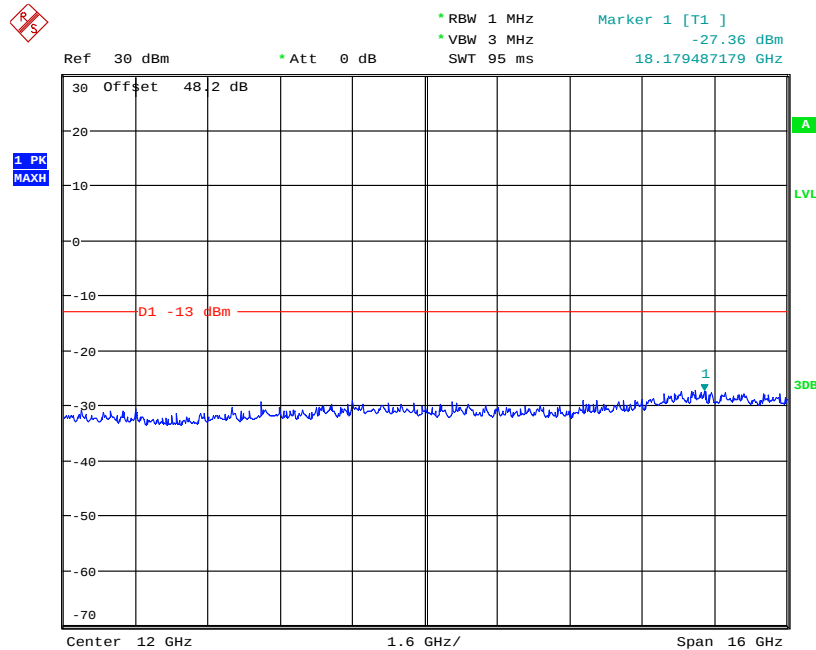
Channel Position	Channel Frequencies
Channel Position B	Port A1: 1930.4MHz + 1969.8MHz
Channel Position M	Port A1: 1940.2MHz + 1979.8MHz
Channel Position T	Port A1: 1950.2MHz + 1989.6MHz

Channel Position B - GMSK - 9kHz – 4GHz



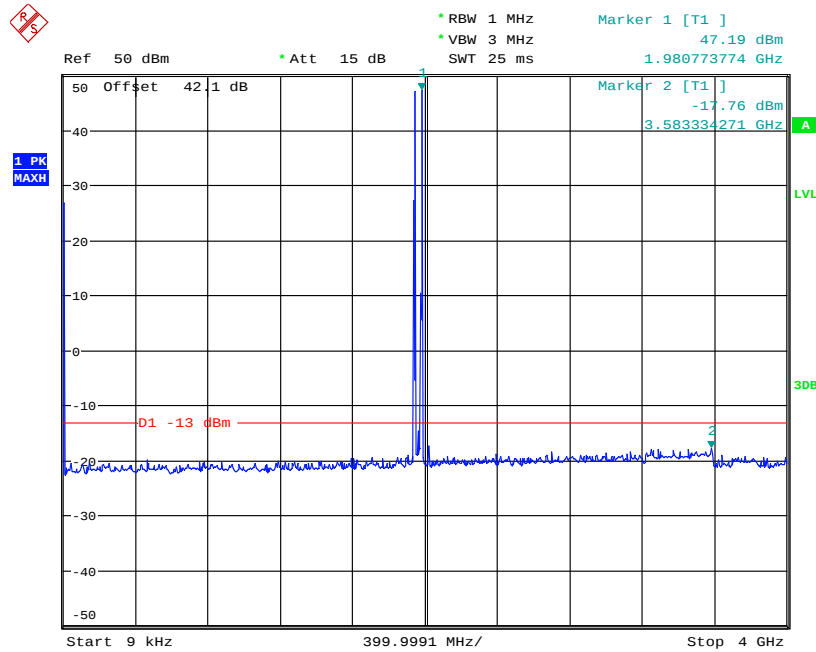
Date: 14.JUN.2013 14:18:08

Channel Position B - GMSK - 4GHz – 20GHz



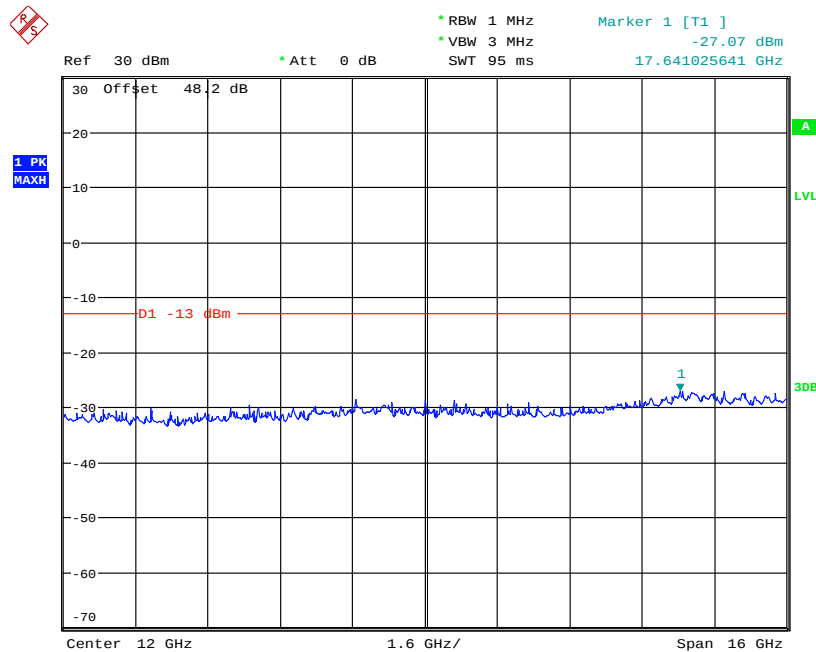
Date: 14.JUN.2013 14:18:48

Channel Position M - GMSK - 9kHz – 4GHz



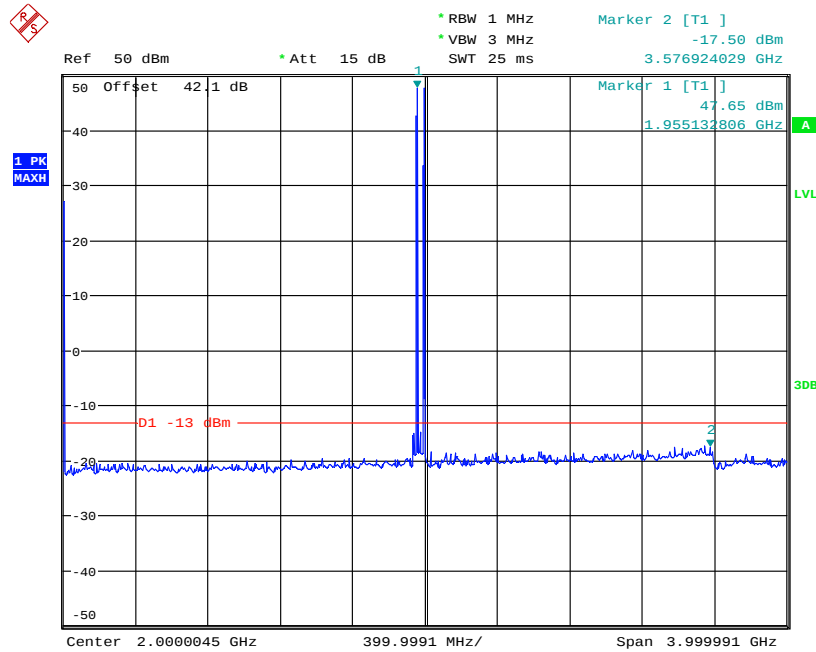
Date: 14.JUN.2013 14:01:15

Channel Position M - GMSK - 4GHz – 20GHz



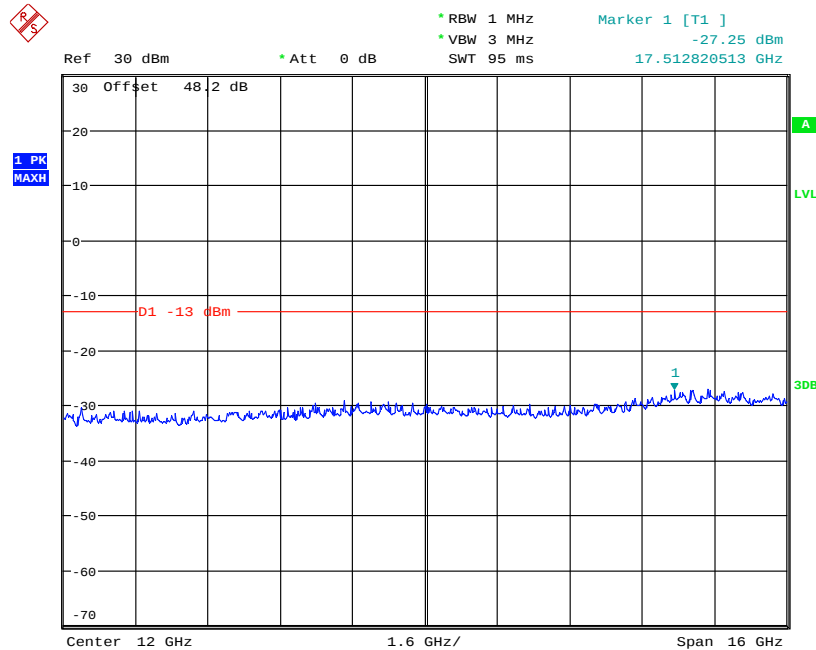
Date: 14.JUN.2013 14:02:06

Channel Position T - GMSK - 9kHz – 4GHz



Date: 14.JUN.2013 14:22:42

Channel Position T - GMSK - 4GHz – 20GHz



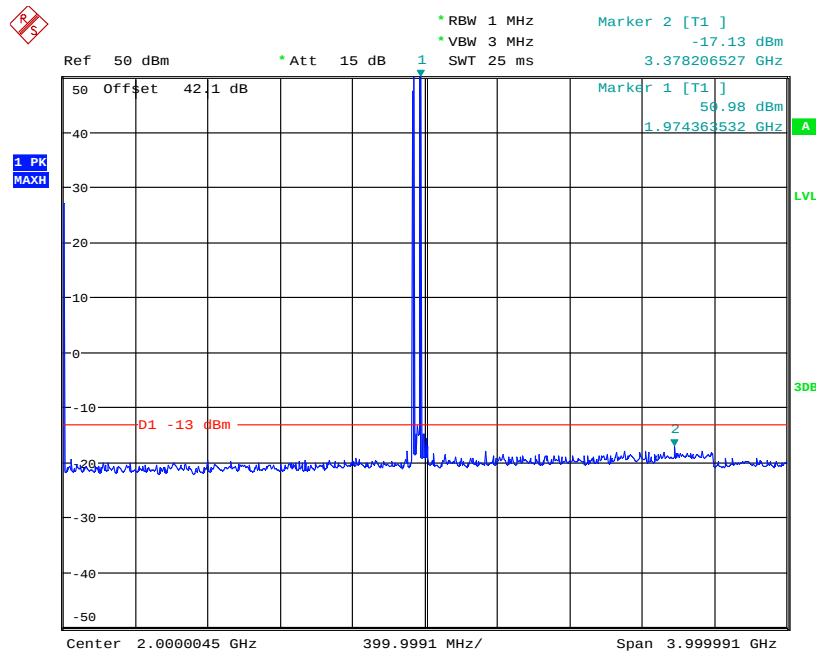
Date: 14.JUN.2013 14:23:17

Configuration G-MC 3 (8C)

Maximum Output Power 38.0dBm per carrier

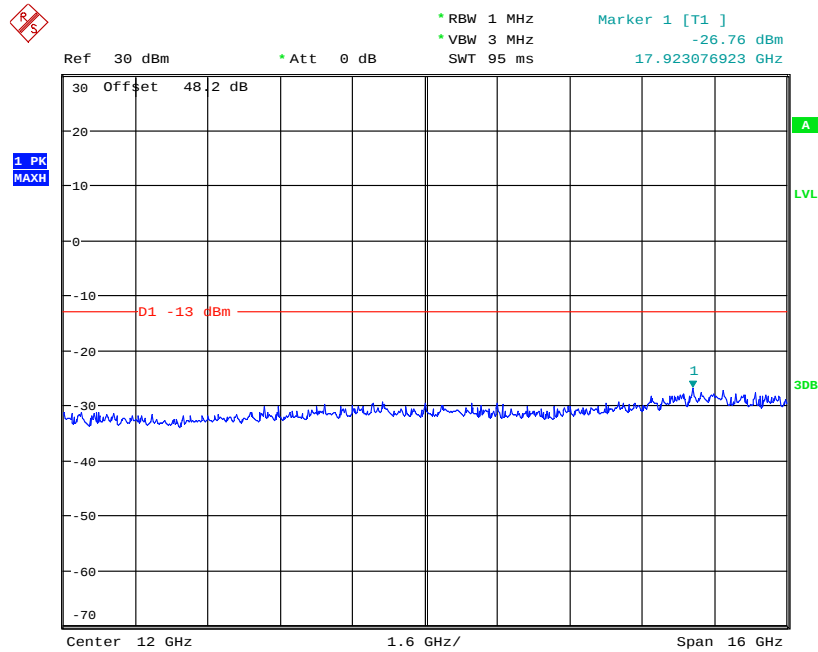
Channel Position	Channel Frequencies
Channel Position B	Port A1: 1930.4MHz + 1930.8MHz + 1931.2MHz + 1931.6MHz 1968.6MHz + 1969.0MHz + 1969.4MHz + 1969.8MHz
Channel Position M	Port A1: 1940.2MHz + 1940.6MHz + 1941.0MHz + 1941.4MHz 1978.6MHz + 1979.0MHz + 1979.4MHz + 1979.8MHz
Channel Position T	Port A1: 1950.2MHz + 1950.6MHz + 1951.0MHz + 1951.4MHz 1988.4MHz + 1988.8MHz + 1989.2MHz + 1989.6MHz

Channel Position B - GMSK - 9kHz – 4GHz



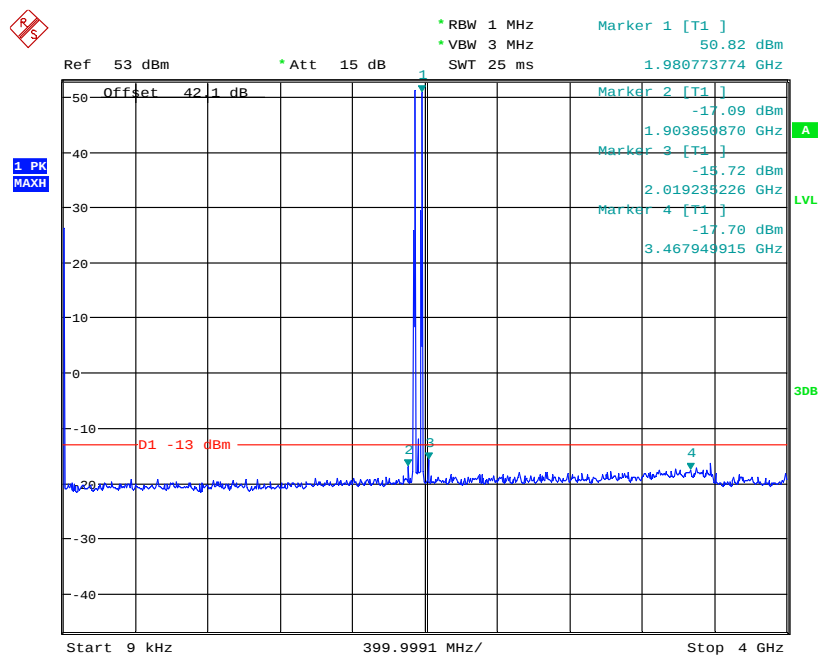
Date: 14.JUN.2013 14:28:43

Channel Position B - GMSK - 4GHz – 20GHz



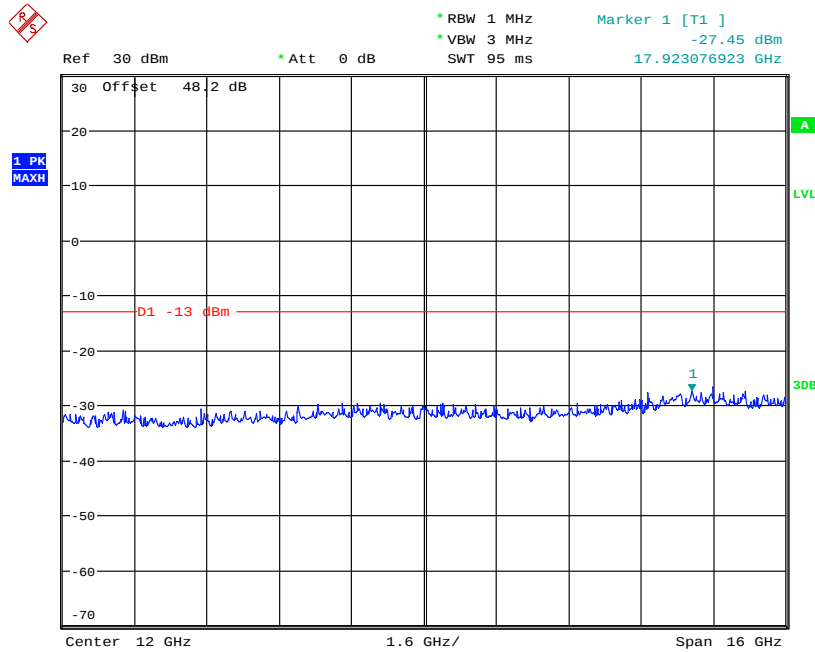
Date: 14.JUN.2013 14:29:18

Channel Position M - GMSK - 9kHz – 4GHz



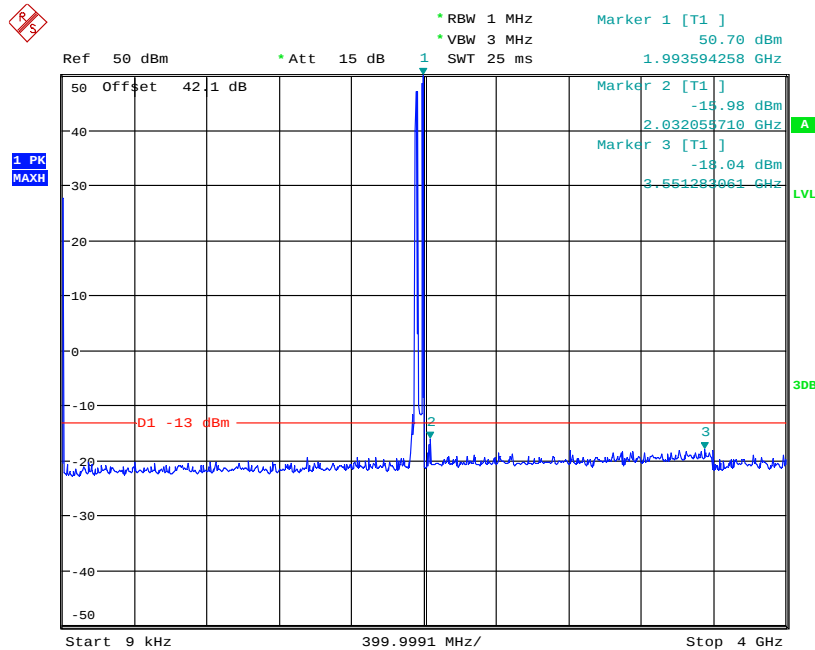
Date: 14.JUN.2013 14:33:05

Channel Position M - GMSK - 4GHz – 20GHz



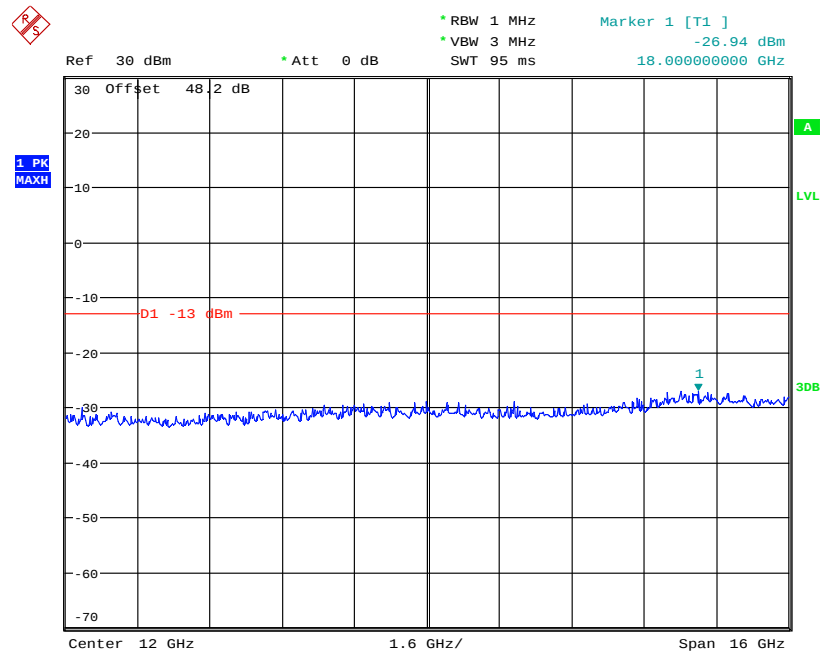
Date: 14.JUN.2013 14:33:46

Channel Position T - GMSK - 9kHz – 4GHz



Date: 14.JUN.2013 14:37:34

Channel Position T - GMSK - 4GHz – 20GHz



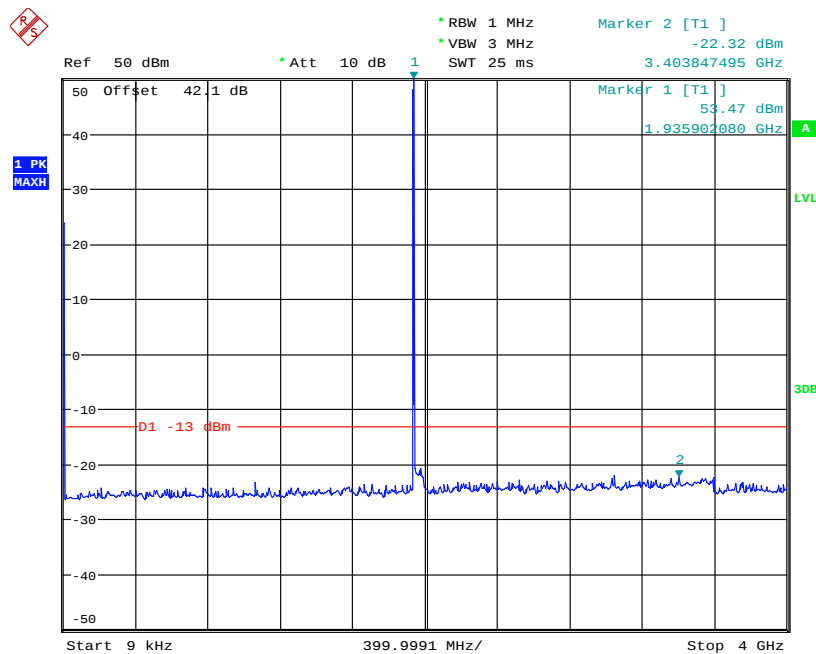
Date: 14.JUN.2013 14:38:10

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

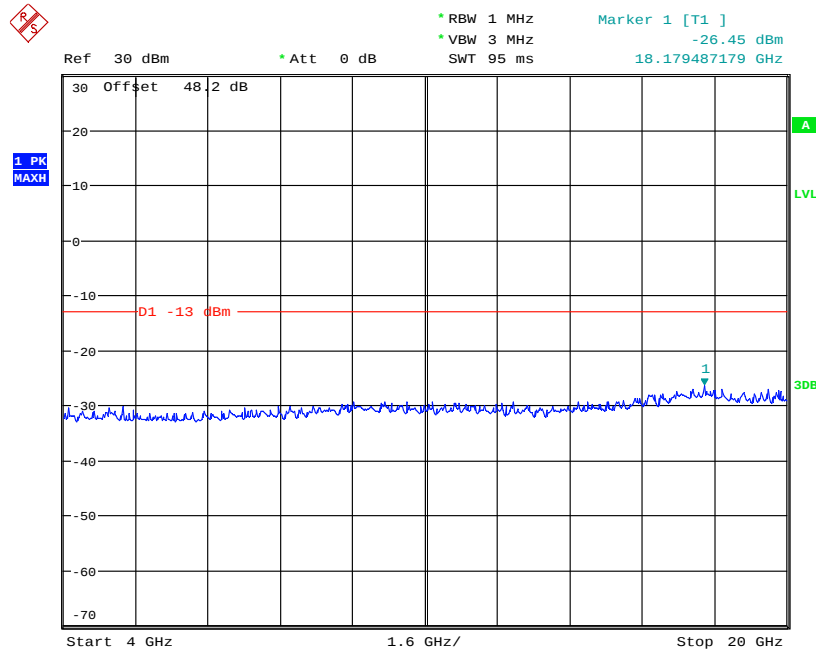
Channel Position	Channel Frequency
Channel Position B	Port A1: 1932.4MHz
Channel Position M	Port A1: 1960.0MHz
Channel Position T	Port A1: 1987.6MHz

Channel Position B - QPSK - 9kHz – 4GHz



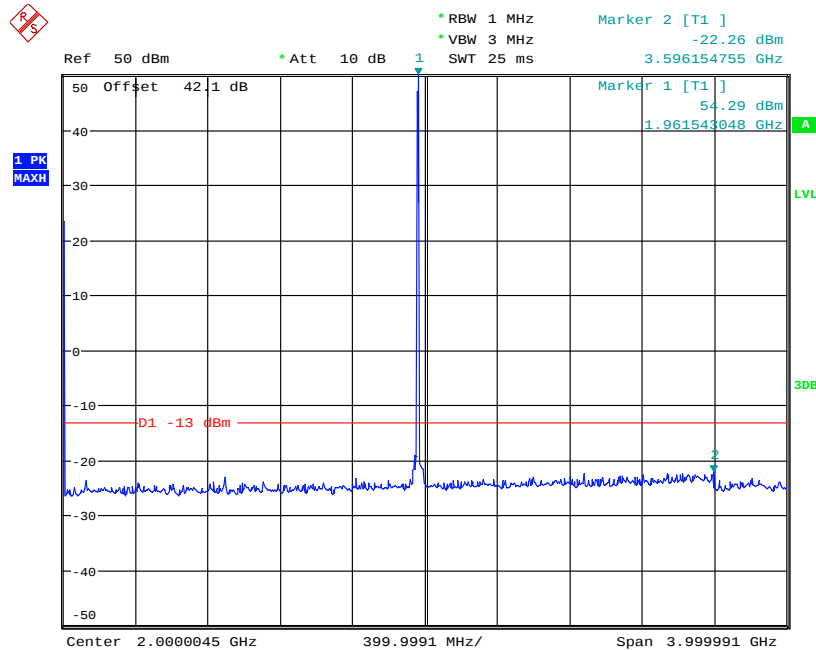
Date: 14.JUN.2013 11:42:13

Channel Position B - QPSK - 4GHz – 20GHz



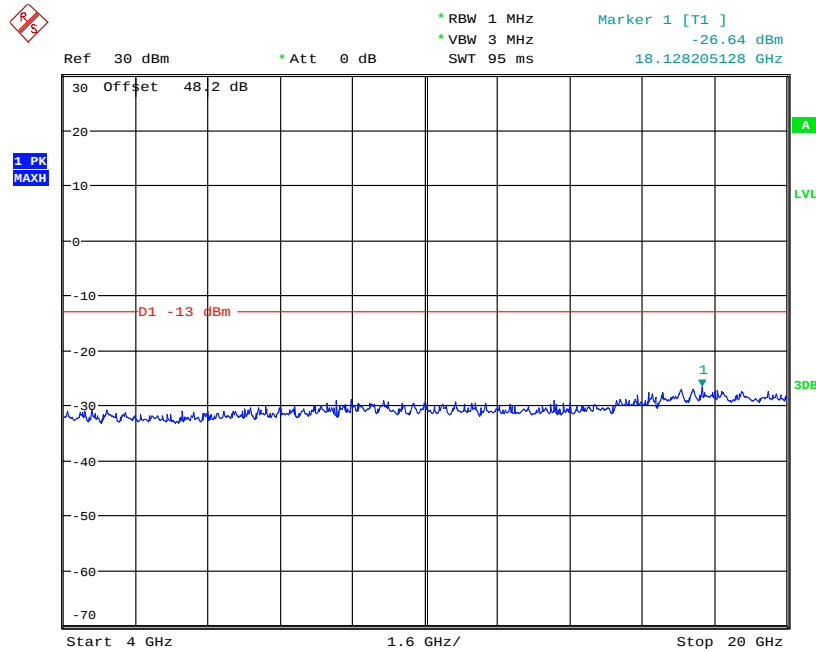
Date: 14.JUN.2013 11:43:20

Channel Position M - QPSK - 9kHz – 4GHz



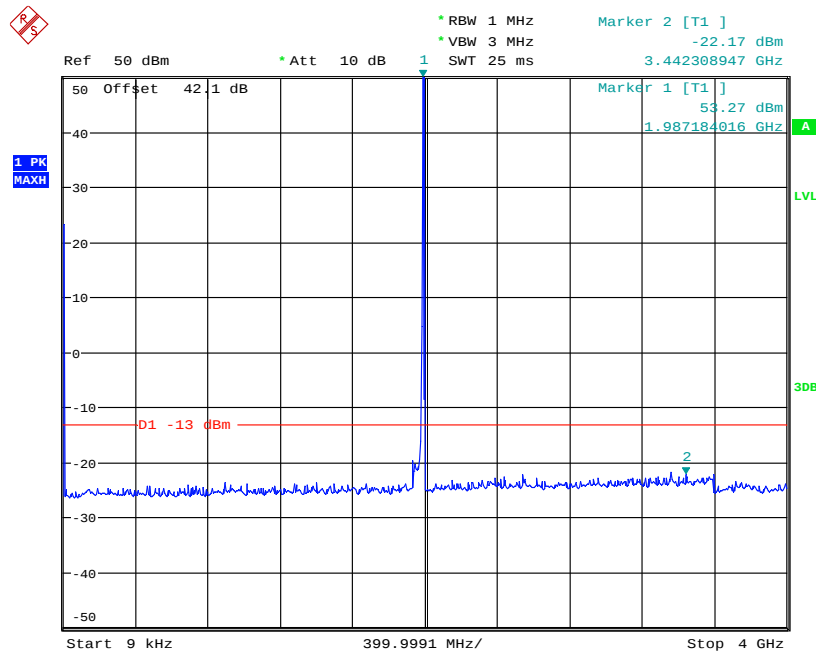
Date: 14.JUN.2013 11:46:04

Channel Position M - QPSK - 4GHz – 20GHz



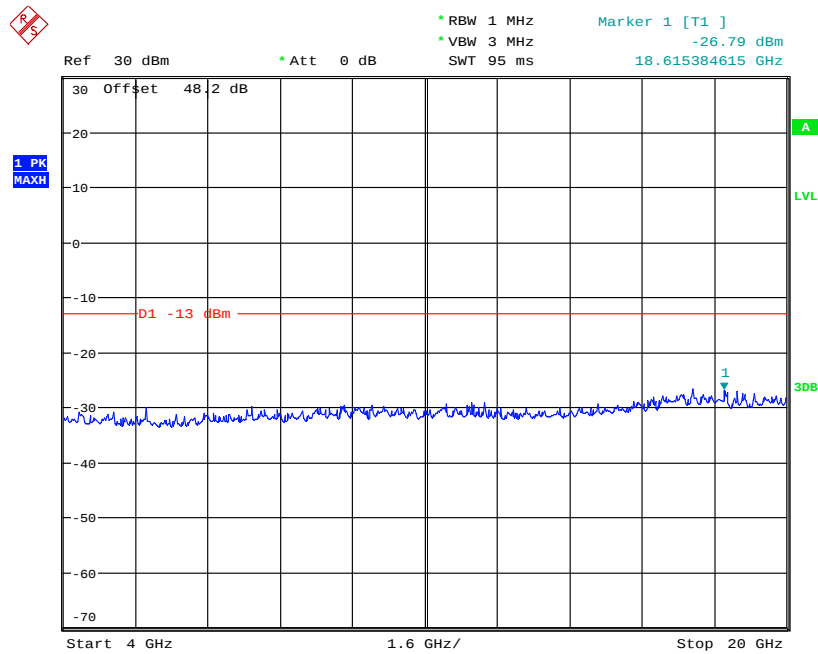
Date: 14.JUN.2013 11:47:10

Channel Position T - QPSK - 9kHz – 4GHz



Date: 14.JUN.2013 11:49:23

Channel Position T - QPSK - 4GHz – 20GHz



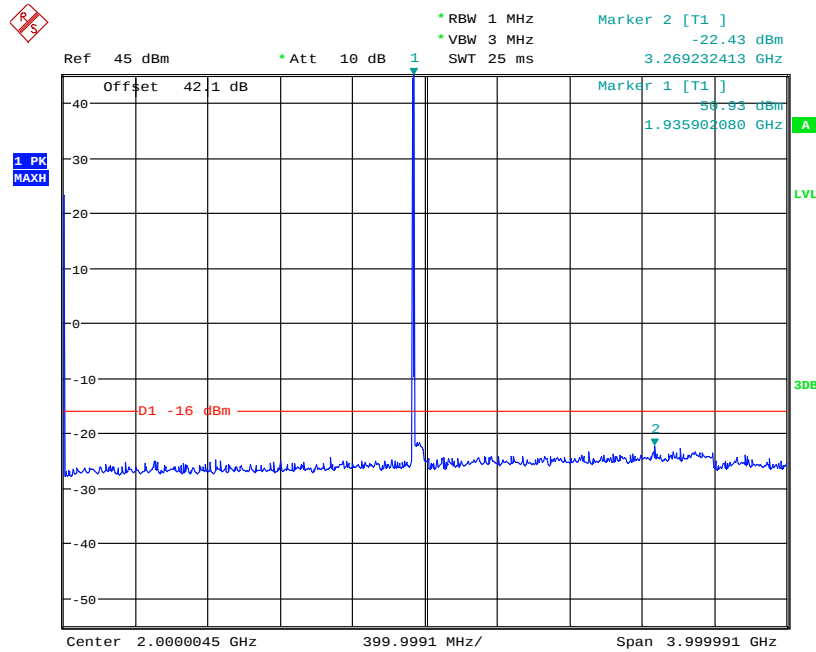
Date: 14.JUN.2013 11:50:19

Configuration W-MIMO-SC

Maximum Output Power 47.0dBm per carrier

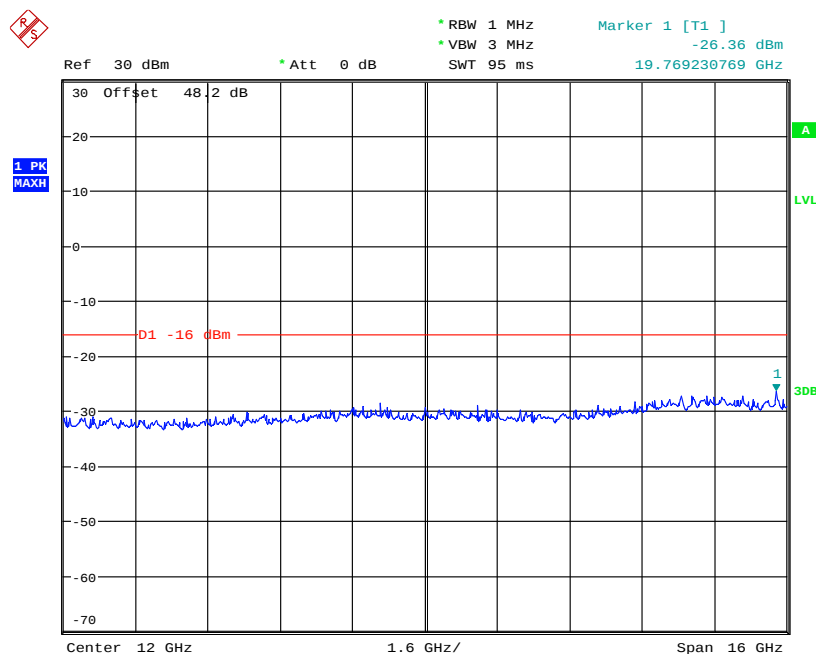
Channel Position	Channel Frequency
Channel Position B	1932.4MHz
Channel Position M	1960.0MHz
Channel Position T	1987.6MHz

Channel Position B - 16QAM - 9kHz – 4GHz



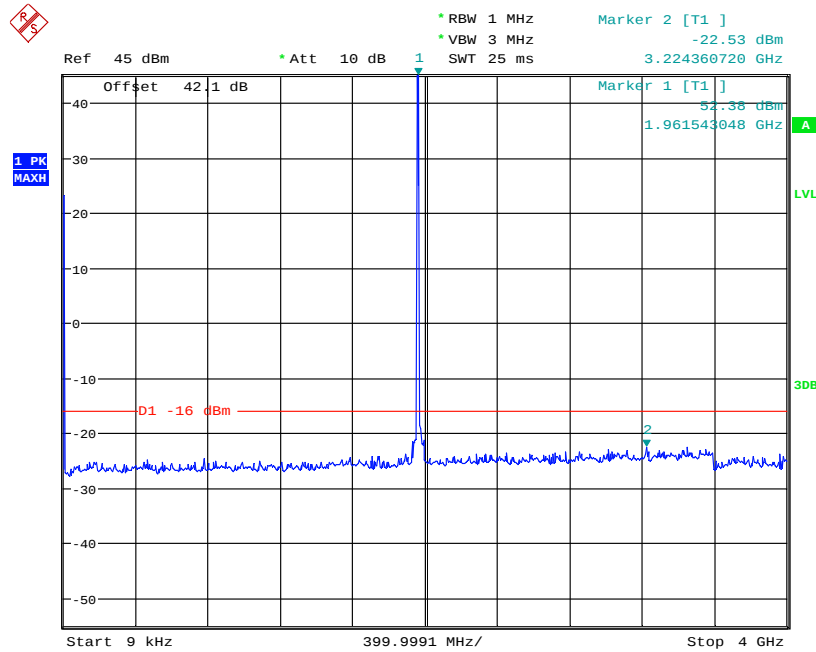
Date: 14.JUN.2013 14:58:40

Channel Position B - 16QAM - 4GHz – 20GHz



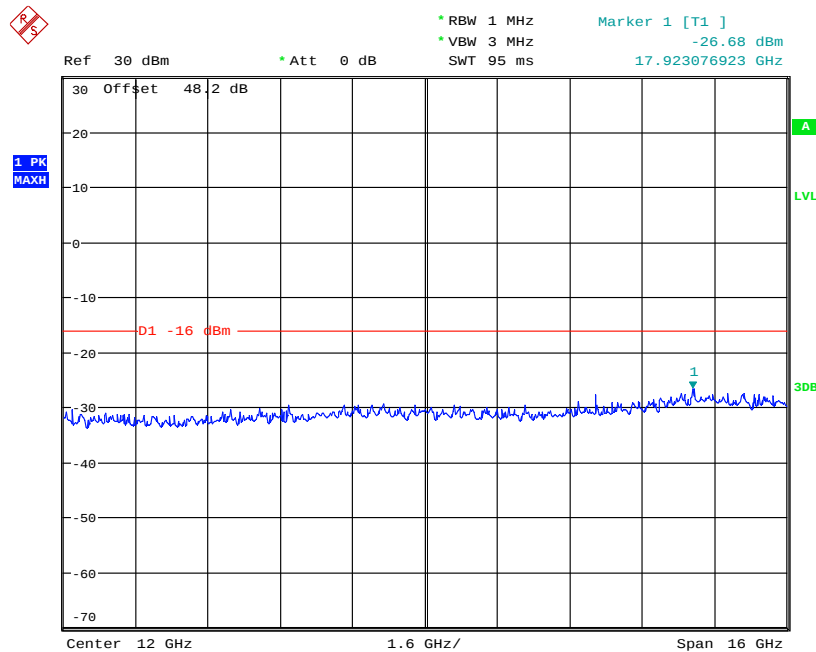
Date: 14.JUN.2013 14:59:25

Channel Position M - 16QAM - 9kHz – 4GHz



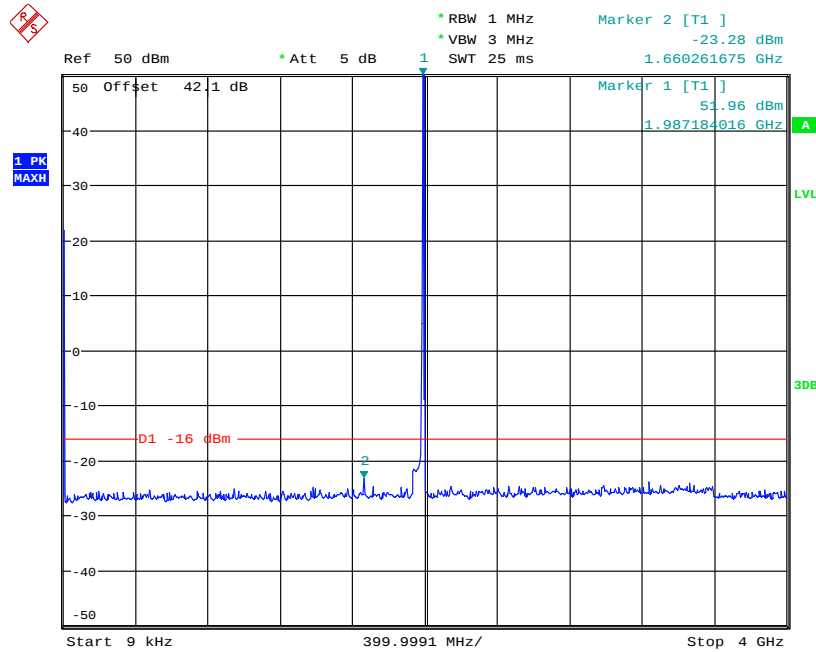
Date: 14.JUN.2013 15:10:48

Channel Position M - 16QAM - 4GHz – 20GHz



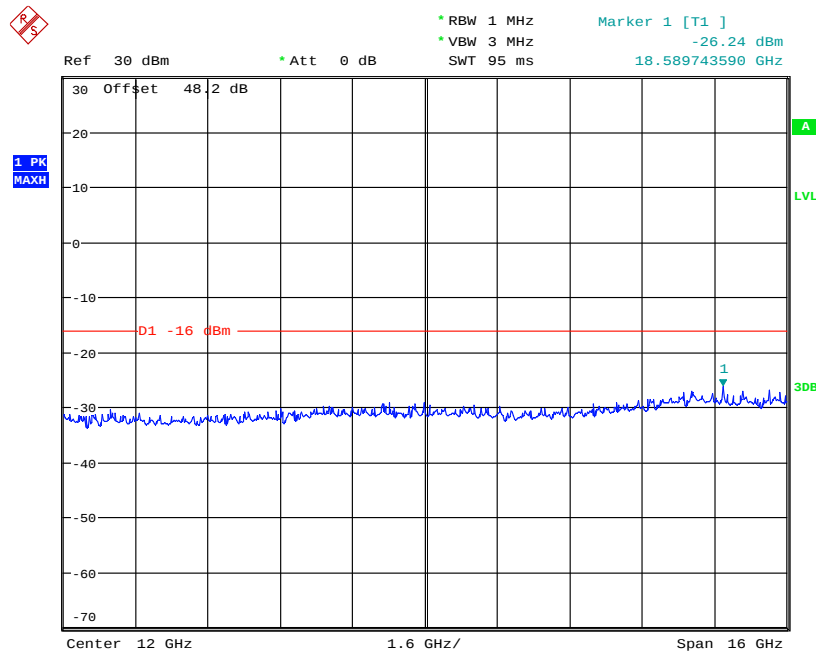
Date: 14.JUN.2013 15:11:35

Channel Position T - 16QAM - 9kHz – 4GHz



Date: 14.JUN.2013 15:06:09

Channel Position T - 16QAM - 4GHz – 20GHz



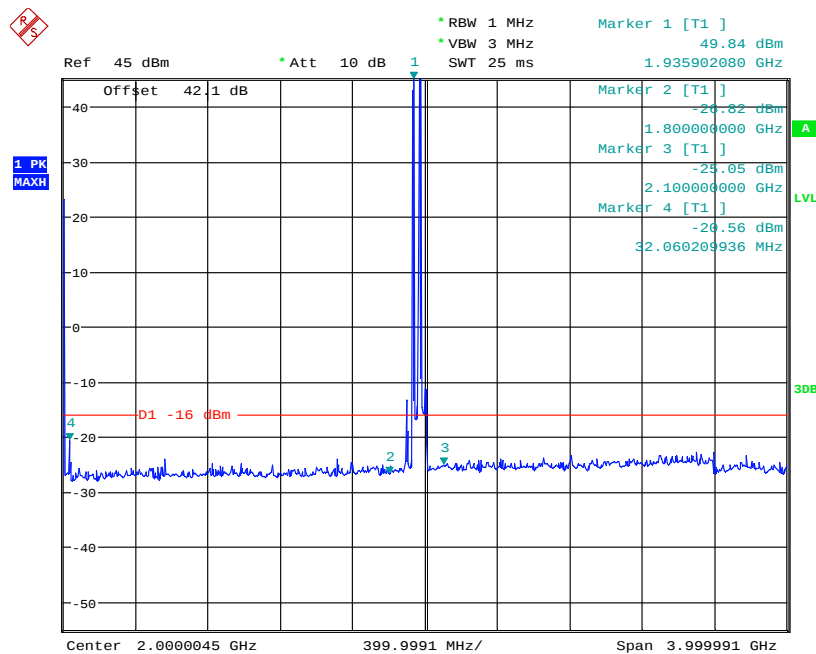
Date: 14.JUN.2013 15:07:17

Configuration W-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

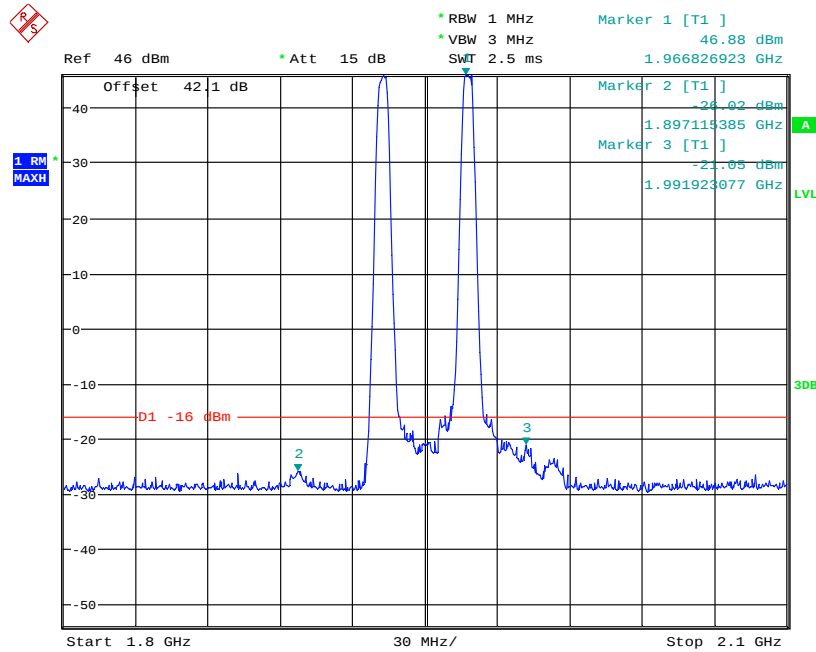
Channel Position	Channel Frequencies
Channel Position B	Port A1: 1932.4MHz + 1967.6MHz
Channel Position M	Port A1: 1942.4MHz + 1977.6MHz
Channel Position T	Port A1: 1952.4MHz + 1987.6MHz

Channel Position B - 16QAM - 9kHz – 4GHz



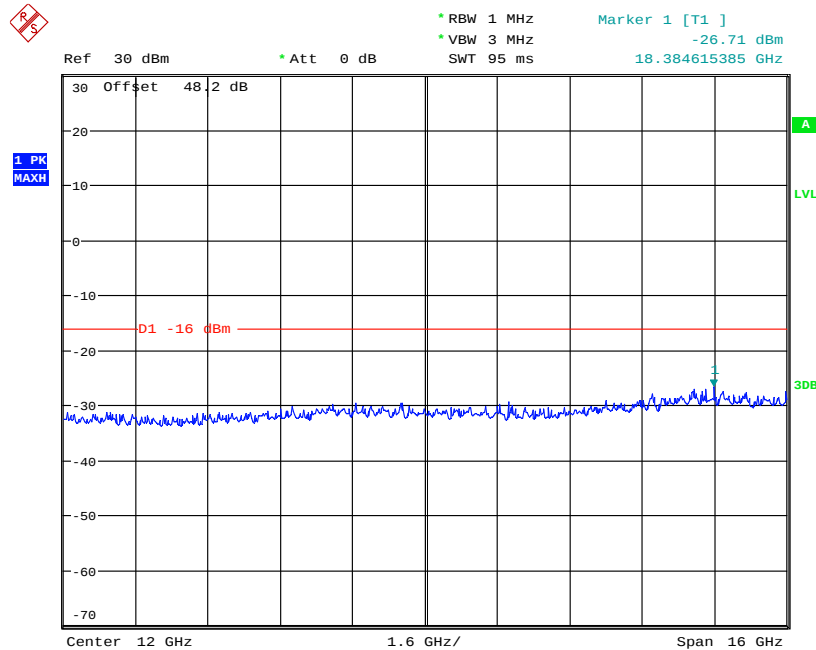
Date: 14.JUN.2013 15:33:06

Channel Position B - 16QAM - 1.8GHz – 2.1GHz



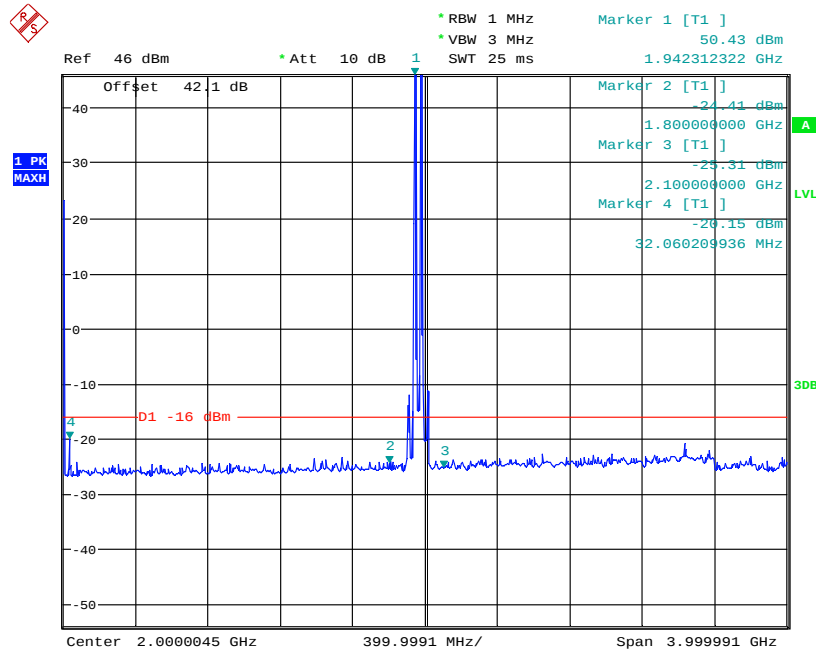
Date: 14.JUN.2013 15:37:17

Channel Position B - 16QAM - 4GHz – 20GHz



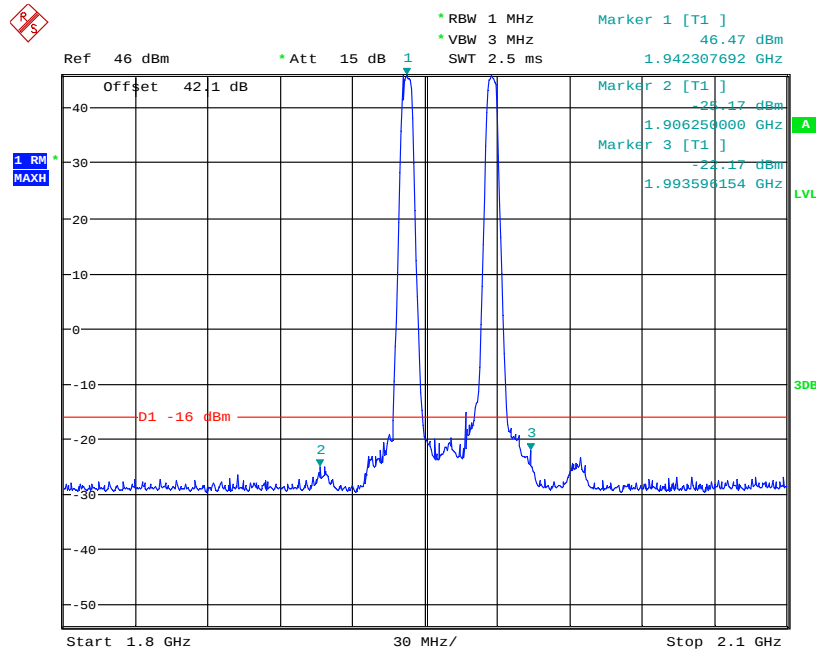
Date: 14.JUN.2013 15:33:47

Channel Position M - 16QAM - 9kHz – 4GHz



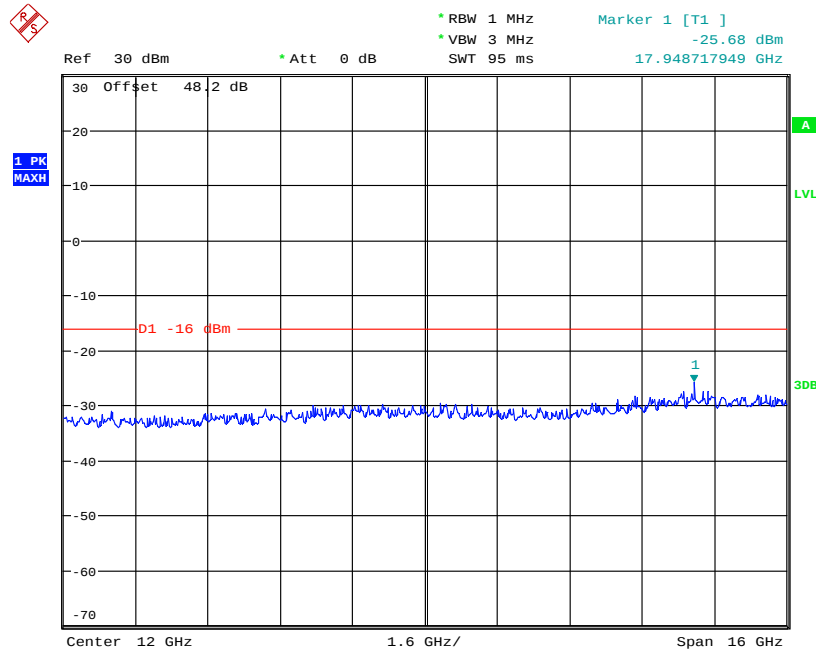
Date: 14.JUN.2013 15:44:28

Channel Position M - 16QAM - 1.8GHz – 2.1GHz



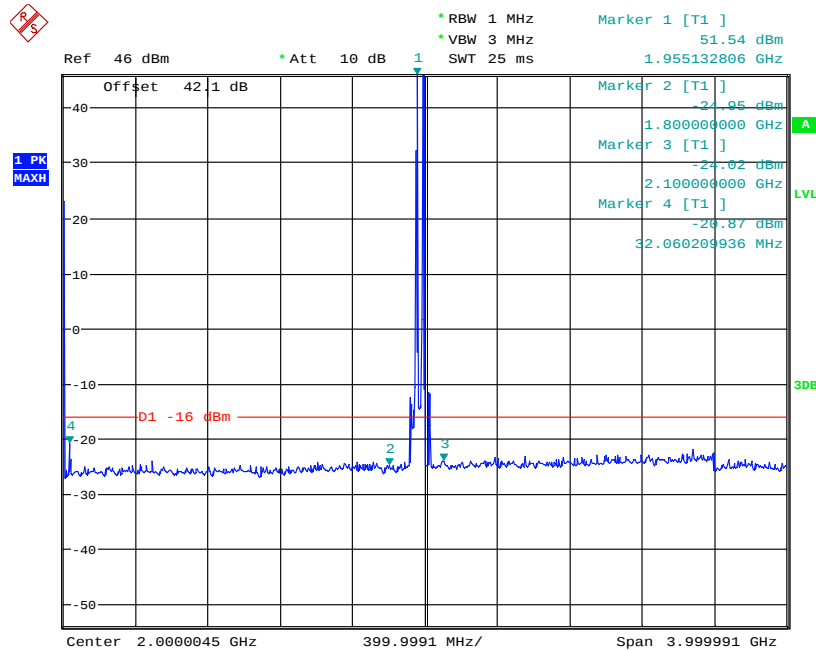
Date: 14.JUN.2013 15:48:43

Channel Position M - 16QAM - 4GHz – 20GHz



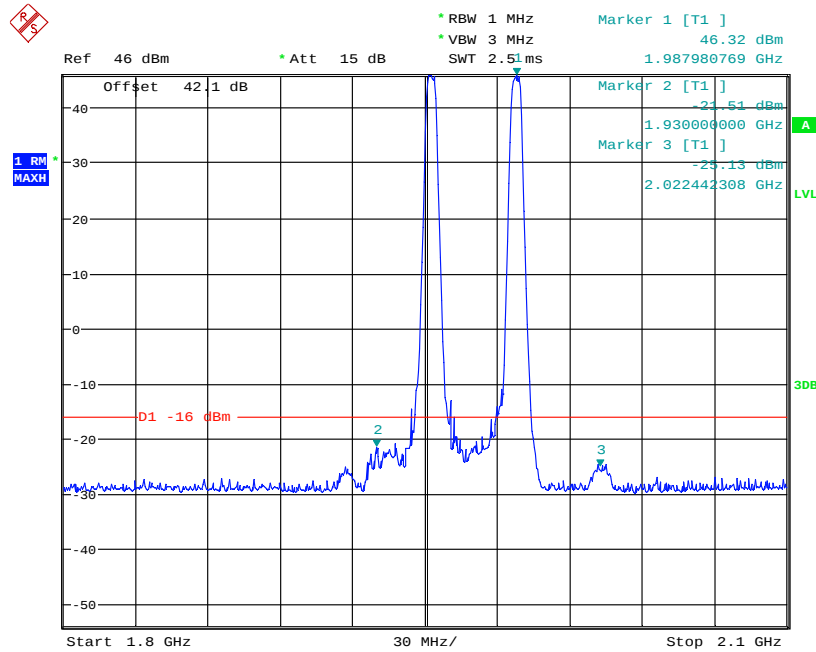
Date: 14.JUN.2013 15:45:03

Channel Position T - 16QAM - 9kHz – 4GHz



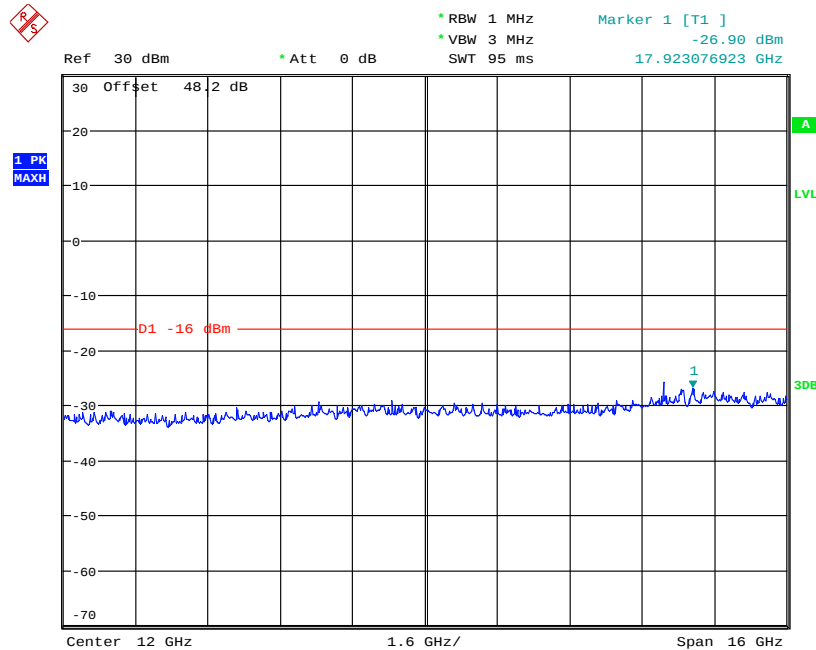
Date: 14.JUN.2013 15:55:38

Channel Position T - 16QAM - 1.8GHz – 2.1GHz



Date: 14.JUN.2013 15:53:40

Channel Position T - 16QAM - 4GHz – 20GHz



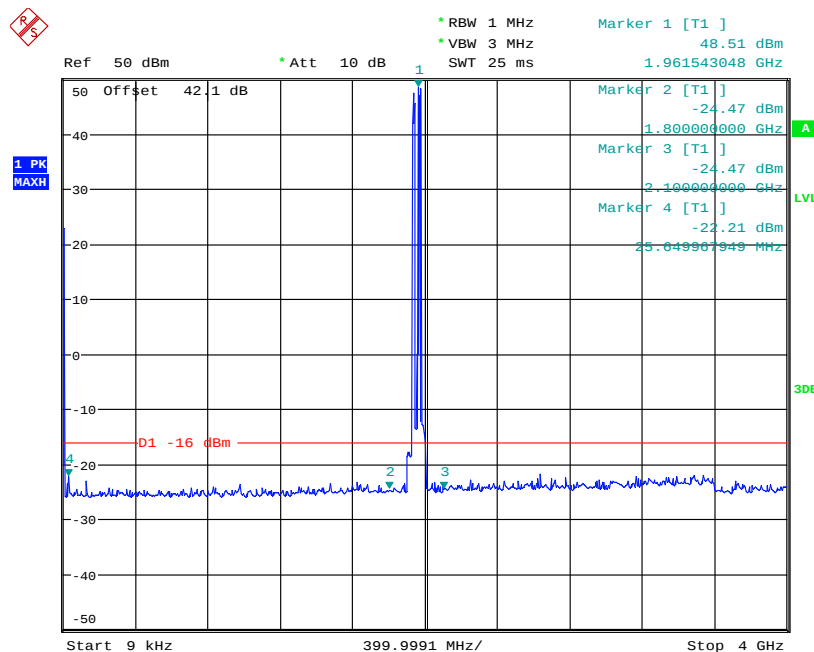
Date: 14.JUN.2013 15:56:19

Configuration W-MIMO-MC 2 (4C)

Maximum Output Power 42.4dBm per carrier

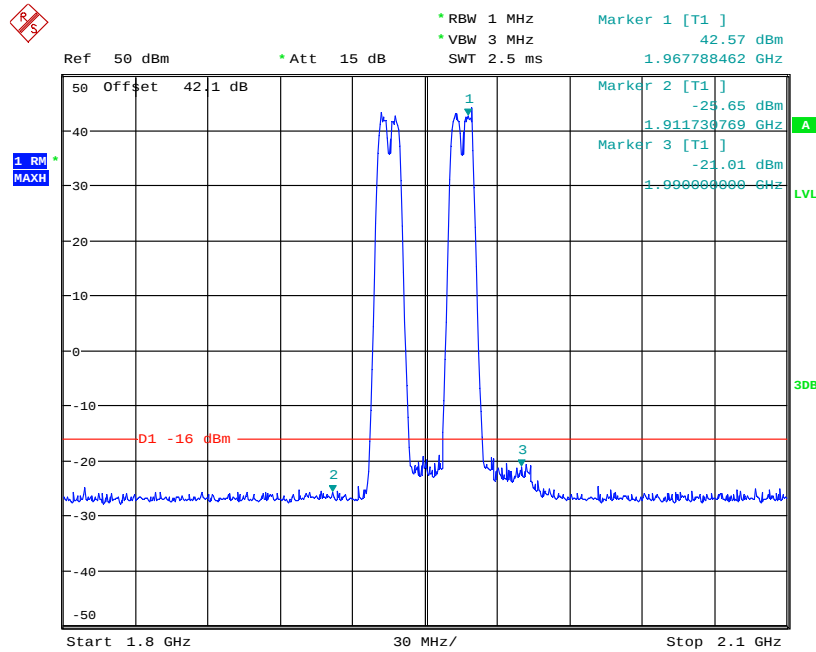
Channel Position	Channel Frequencies
Channel Position B	Port A1: 1932.4MHz + 1937.4MHz + 1962.6MHz + 1967.6MHz
Channel Position M	Port A1: 1942.4MHz + 1947.4MHz + 1972.6MHz + 1977.6MHz
Channel Position T	Port A1: 1952.4MHz + 1957.4MHz + 1982.6MHz + 1987.6MHz

Channel Position B - 16QAM - 9kHz – 4GHz



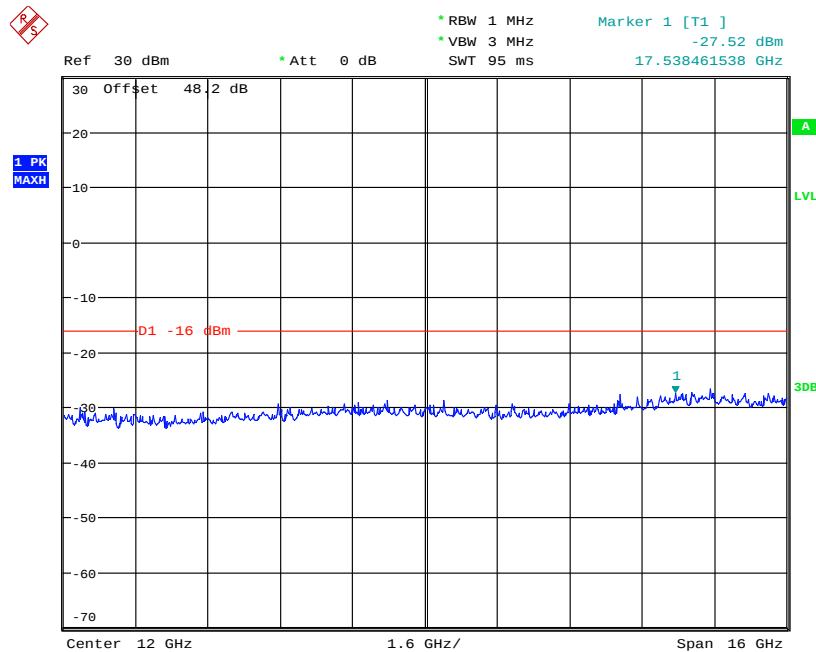
Date: 14.JUN.2013 16:31:10

Channel Position B - 16QAM - 1.8GHz – 2.1GHz



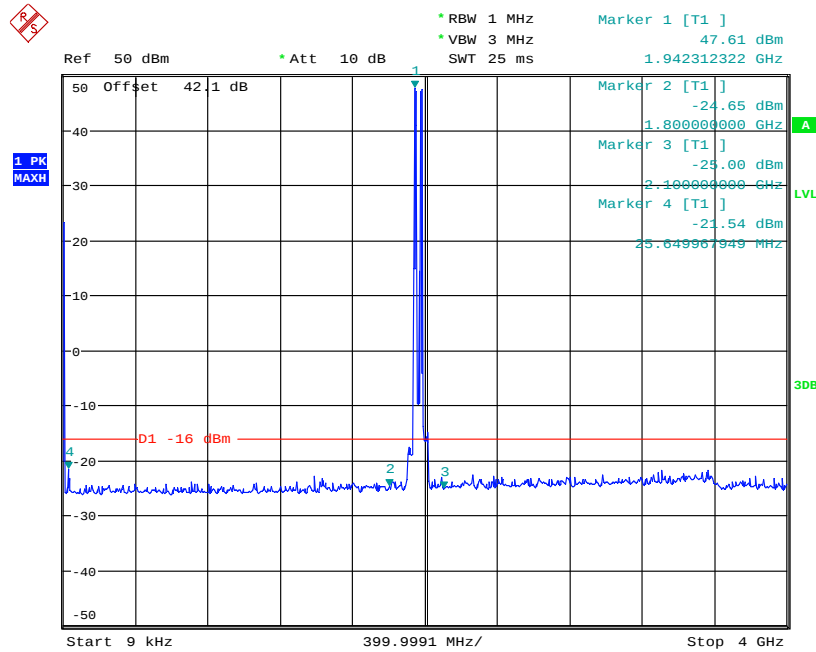
Date: 20.JUN.2013 16:45:51

Channel Position B - 16QAM - 4GHz – 20GHz



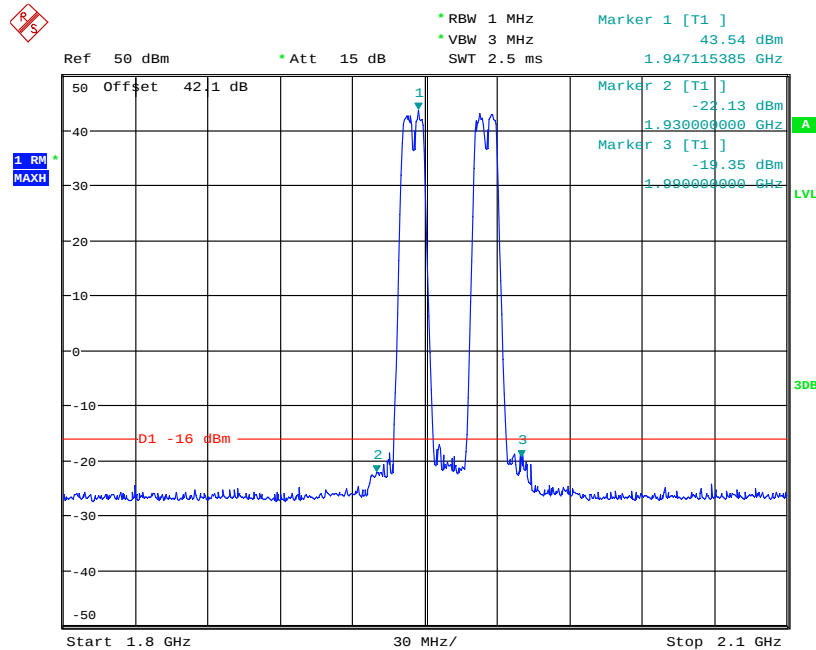
Date: 14.JUN.2013 16:31:48

Channel Position M - 16QAM - 9kHz – 4GHz



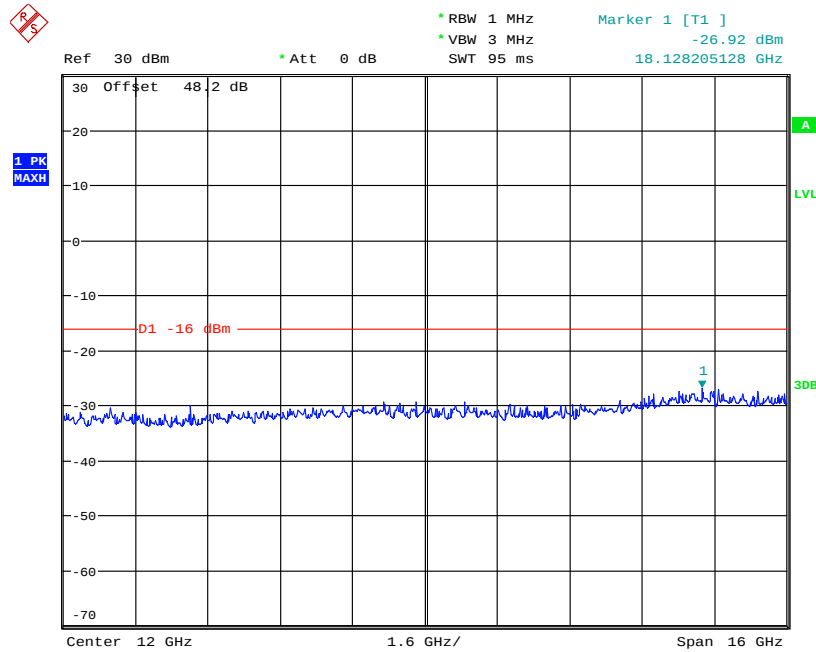
Date: 14.JUN.2013 16:42:20

Channel Position M - 16QAM - 1.8GHz – 2.1GHz



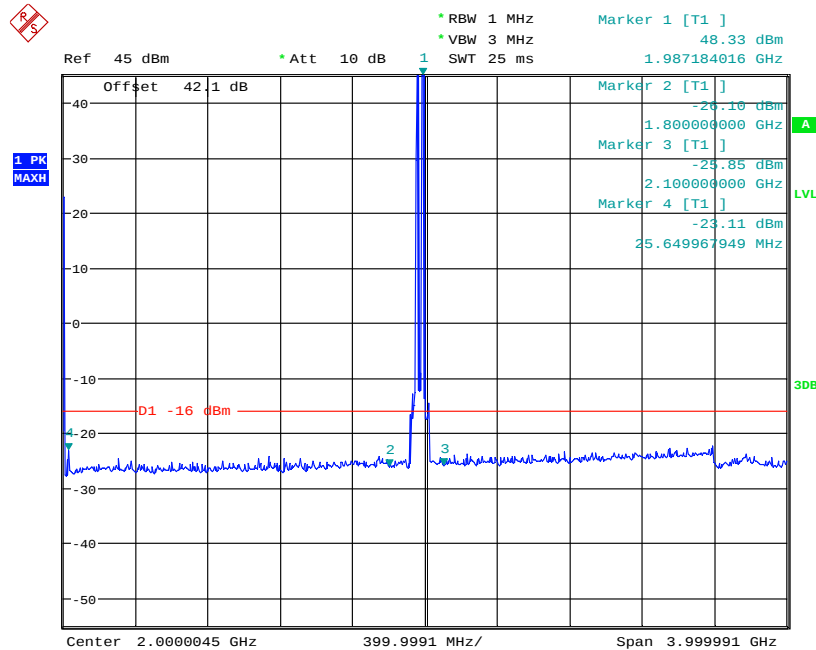
Date: 20.JUN.2013 16:48:57

Channel Position M - 16QAM - 4GHz – 20GHz



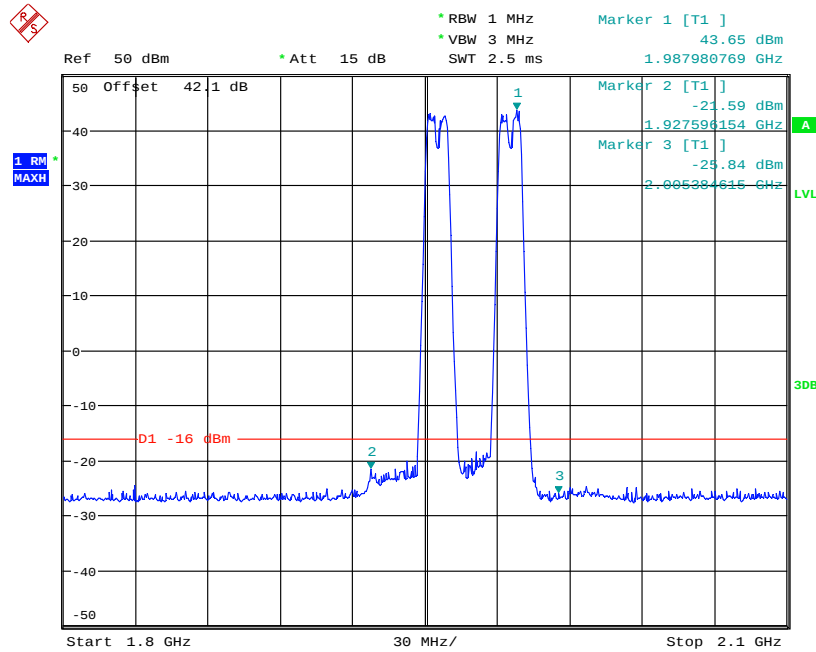
Date: 14.JUN.2013 16:43:05

Channel Position T - 16QAM - 9kHz – 4GHz



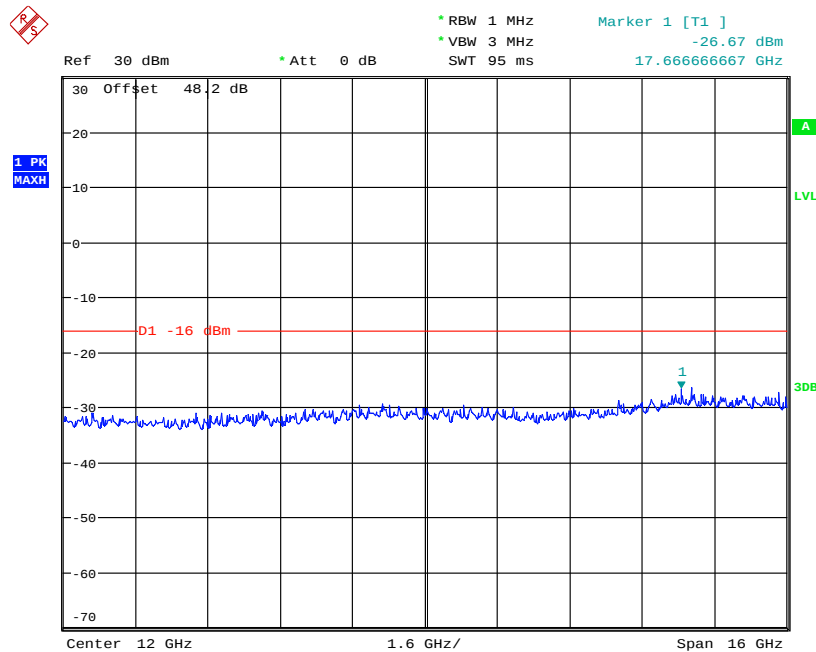
Date: 14.JUN.2013 16:48:21

Channel Position T - 16QAM - 1.8GHz – 2.1GHz



Date: 20.JUN.2013 16:50:58

Channel Position T - 16QAM - 4GHz – 20GHz



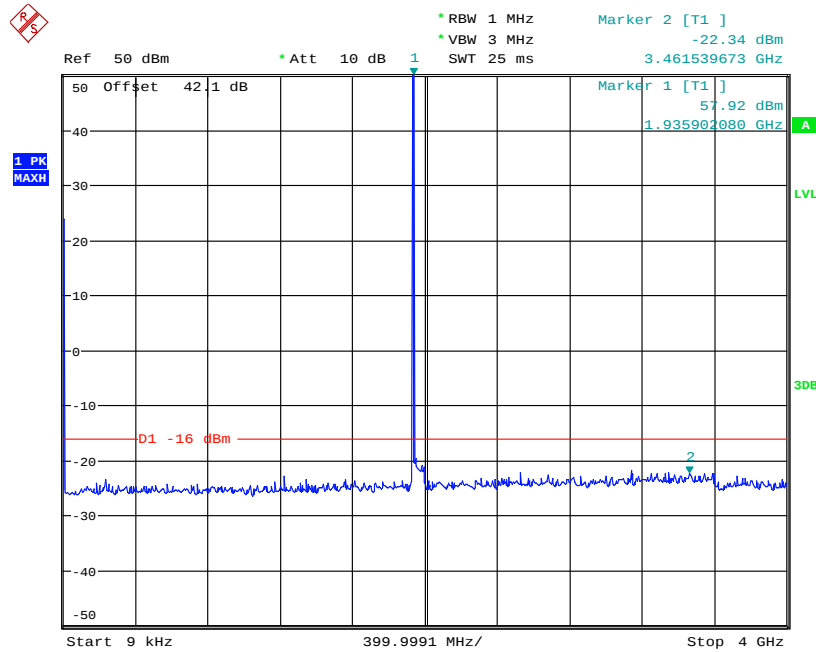
Date: 14.JUN.2013 16:49:02

Configuration L-MIMO-SC

Maximum Output Power 49.0dBm per carrier

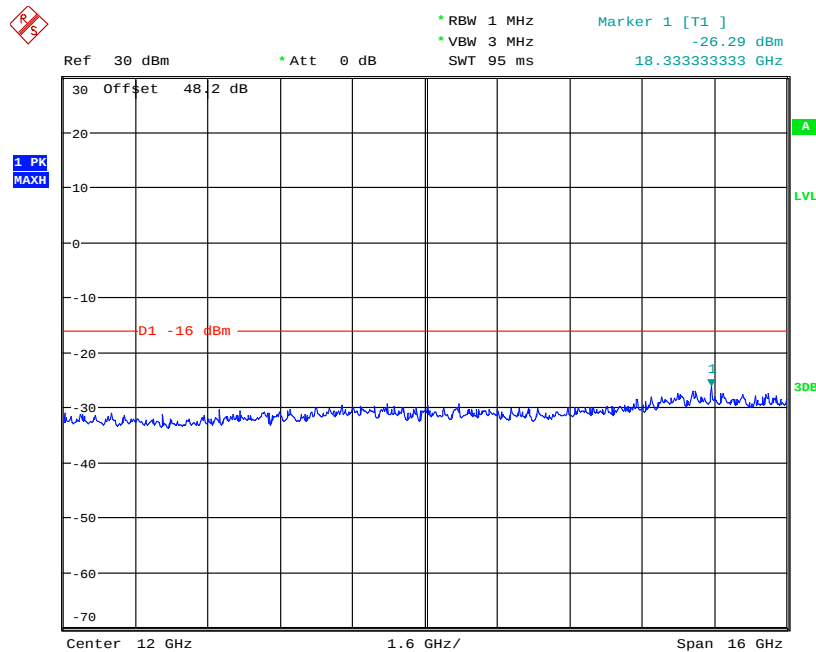
Channel Position	Bandwidth	Channel Frequency
Channel Position B	1.4MHz	Port A1: 1930.7MHz
	20.0MHz	Port A1: 1940.0MHz
Channel Position M	1.4MHz	Port A1: 1960.0MHz
	20.0MHz	
Channel Position T	1.4MHz	Port A1: 1989.3MHz
	20.0MHz	Port A1: 1980.0MHz

Channel Position B - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



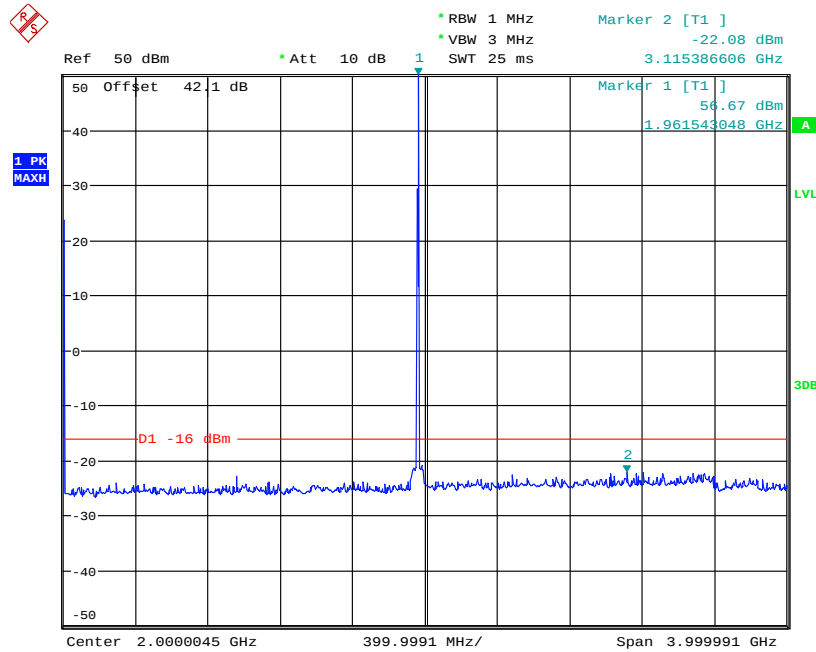
Date: 14.JUN.2013 17:37:55

Channel Position B - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



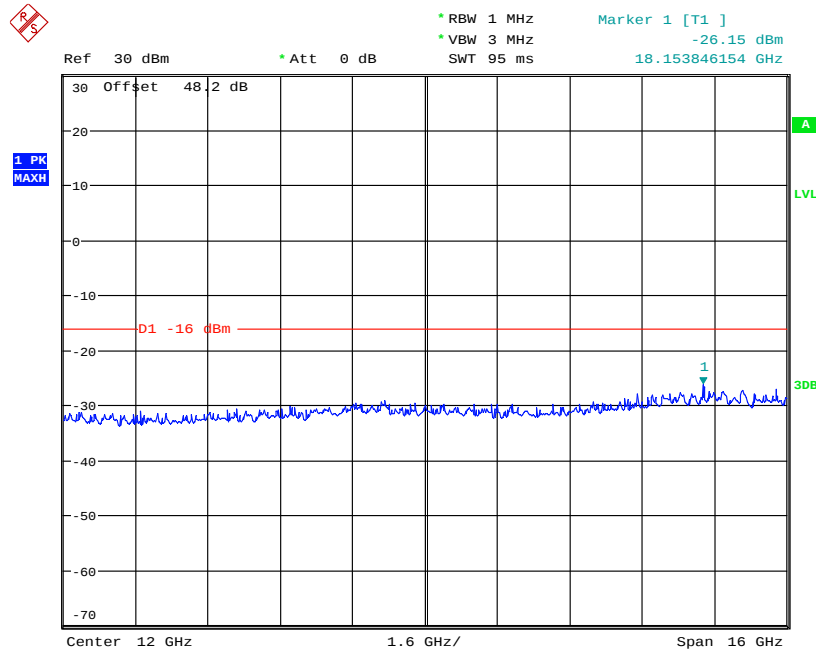
Date: 14.JUN.2013 17:38:42

Channel Position M - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



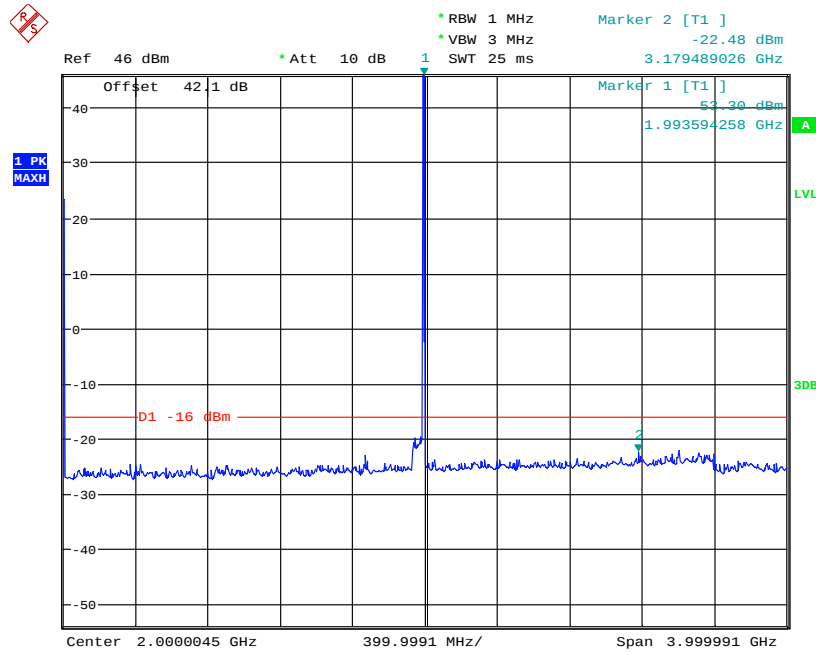
Date: 14.JUN.2013 17:43:07

Channel Position M - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



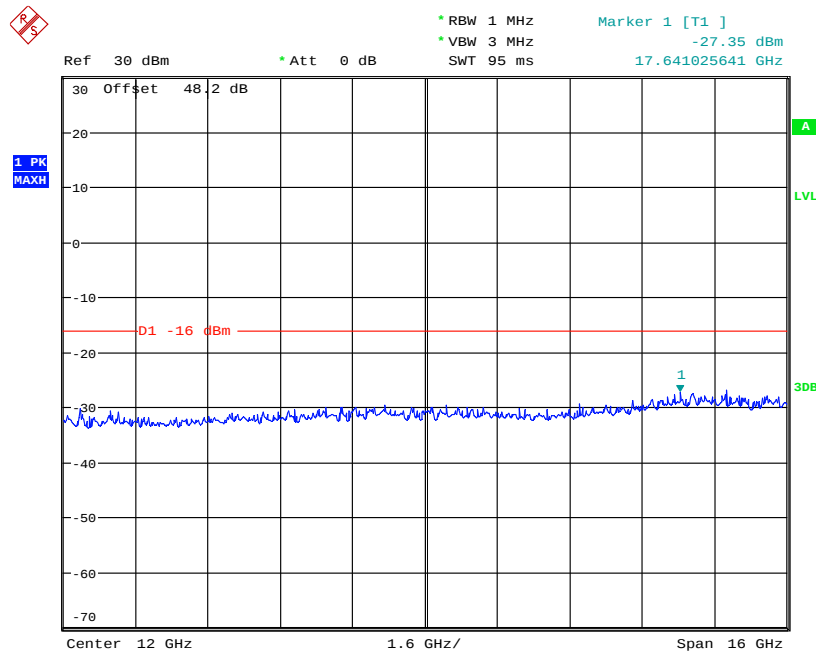
Date: 14.JUN.2013 17:43:40

Channel Position T - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



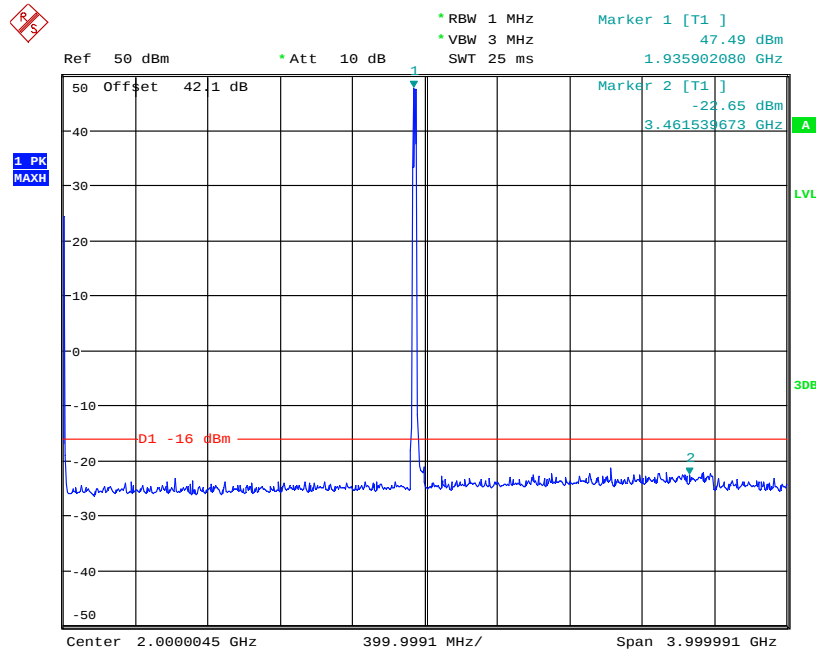
Date: 17.JUN.2013 10:22:19

Channel Position T - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



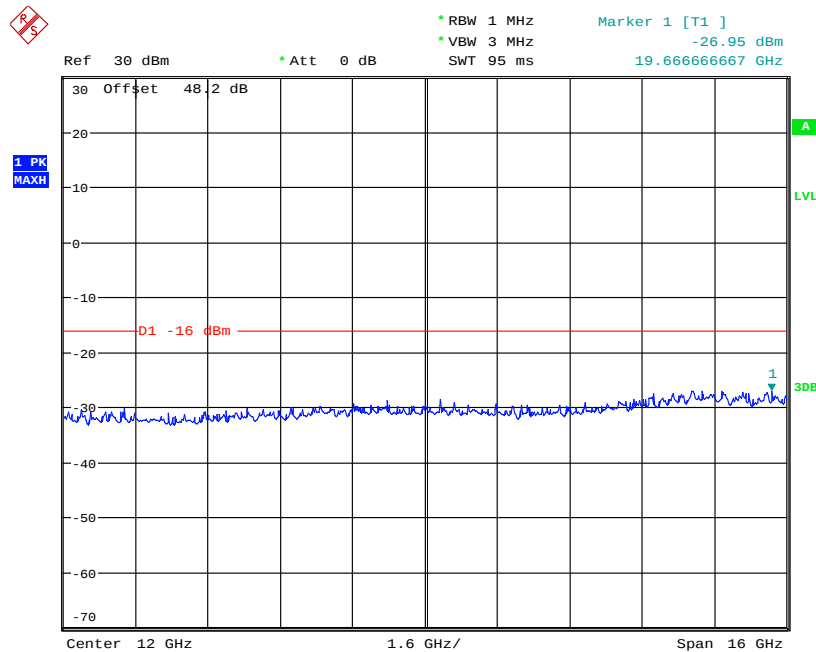
Date: 17.JUN.2013 10:23:09

Channel Position B - QPSK / Bandwidth 20.0MHz - 9kHz – 4GHz



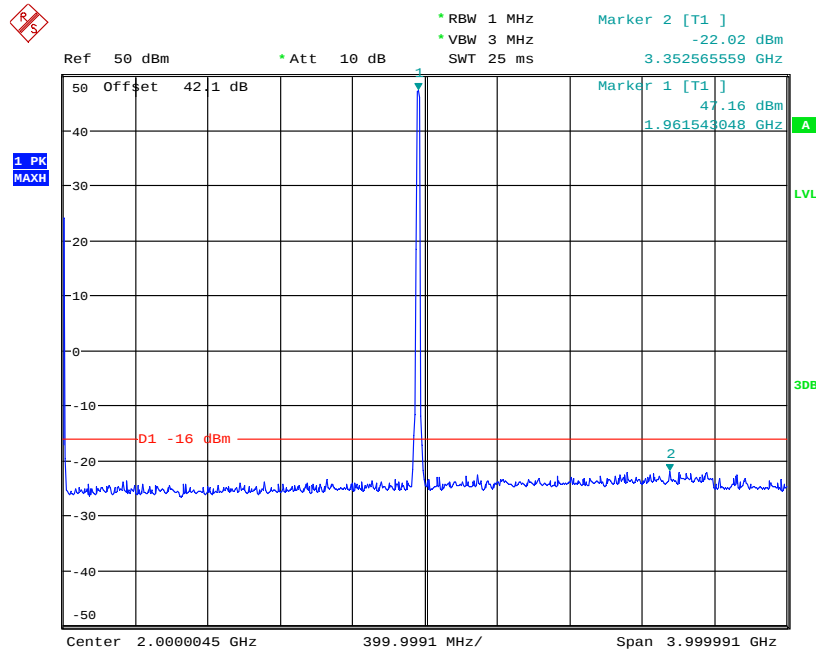
Date: 17.JUN.2013 14:08:54

Channel Position B - QPSK / Bandwidth 20.0MHz - 4GHz – 20GHz



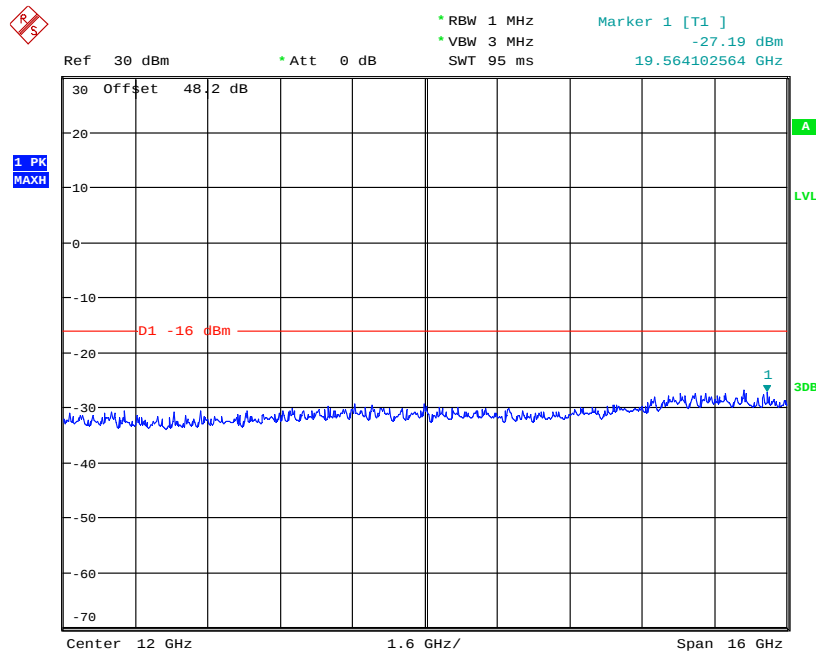
Date: 17.JUN.2013 14:09:45

Channel Position M - QPSK / Bandwidth 20.0MHz - 9kHz – 4GHz



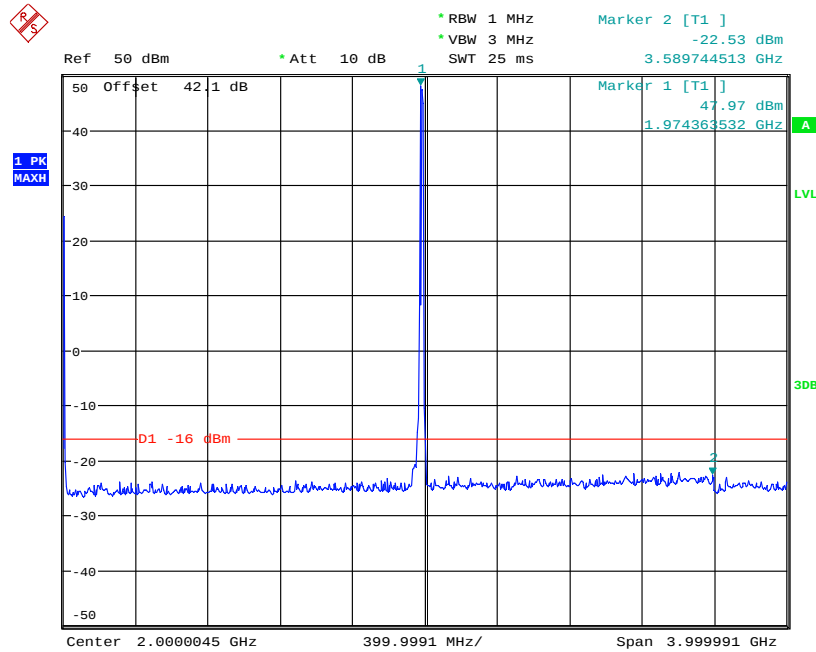
Date: 17. JUN. 2013 14:36:59

Channel Position M - QPSK / Bandwidth 20.0MHz - 4GHz – 20GHz



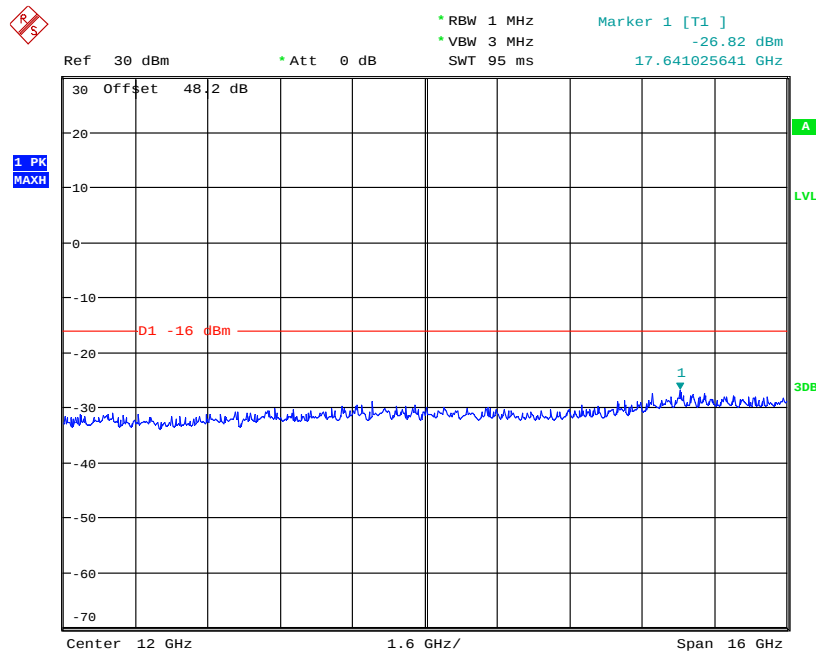
Date: 17. JUN. 2013 14:37:36

Channel Position T - QPSK / Bandwidth 20.0MHz - 9kHz – 4GHz



Date: 17.JUN.2013 14:23:06

Channel Position T - QPSK / Bandwidth 20.0MHz - 4GHz – 20GHz



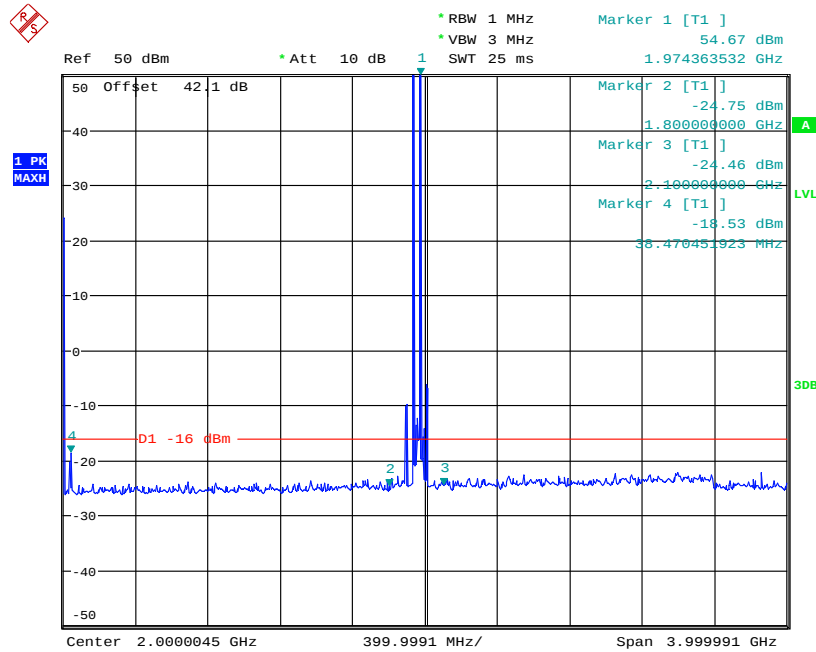
Date: 17.JUN.2013 14:23:41

Configuration L-MIMO-MC 1 (2C)

Maximum Output Power 45.8dBm per carrier

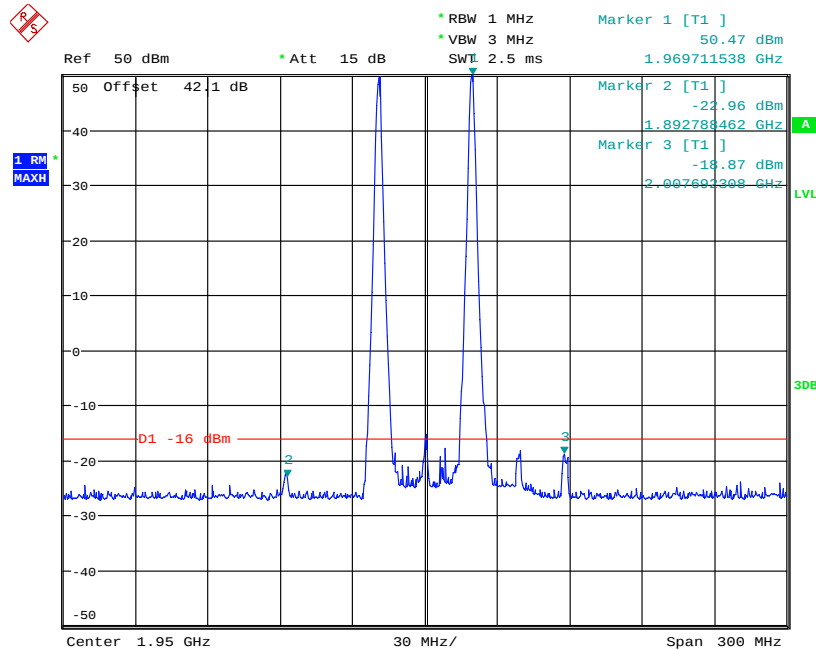
Channel Position	Bandwidth	Channel Frequency
Channel Position B	1.4MHz	Port A1: 1930.7MHz + 1969.3MHz
	10.0MHz	Port A1: 1935.0MHz + 1965.0MHz
Channel Position M	1.4MHz	Port A1: 1940.7MHz + 1979.3MHz
	10.0MHz	Port A1: 1945.0MHz + 1975.0MHz
Channel Position T	1.4MHz	Port A1: 1950.7MHz + 1989.3MHz
	10.0MHz	Port A1: 1955.0MHz + 1985.0MHz

Channel Position B - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



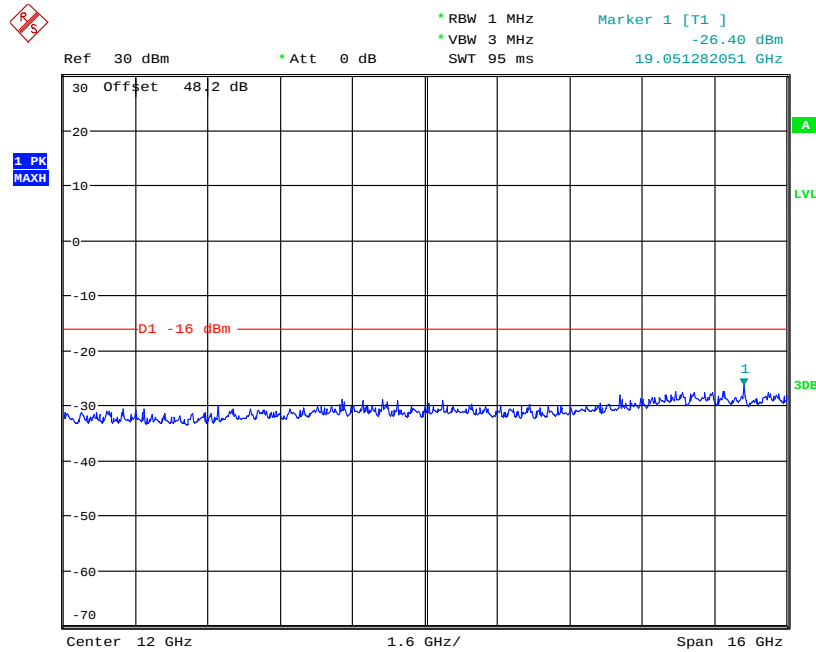
Date: 17. JUN. 2013 15:59:42

Channel Position B - QPSK / Bandwidth 1.4MHz - 1.8Hz – 2.1GHz



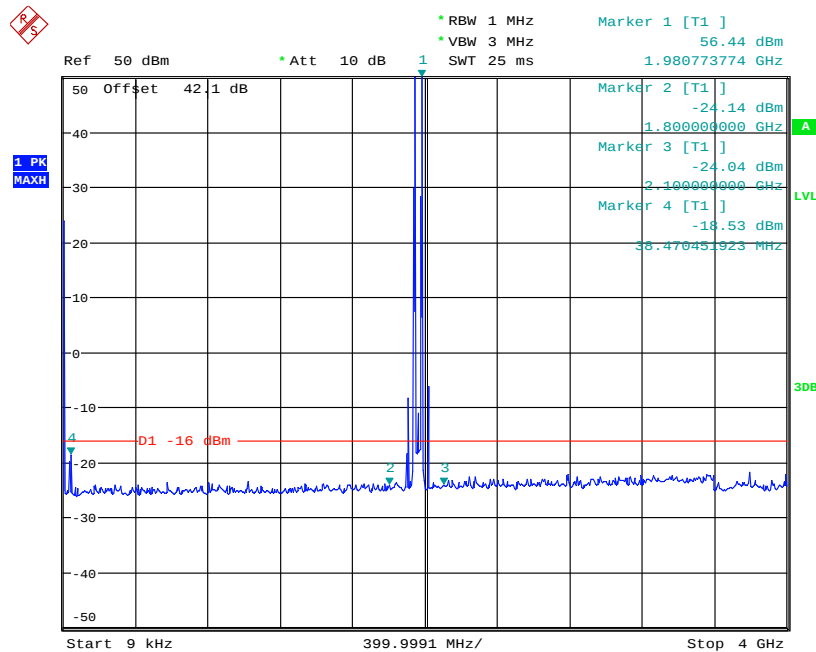
Date: 17. JUN. 2013 16:03:53

Channel Position B - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



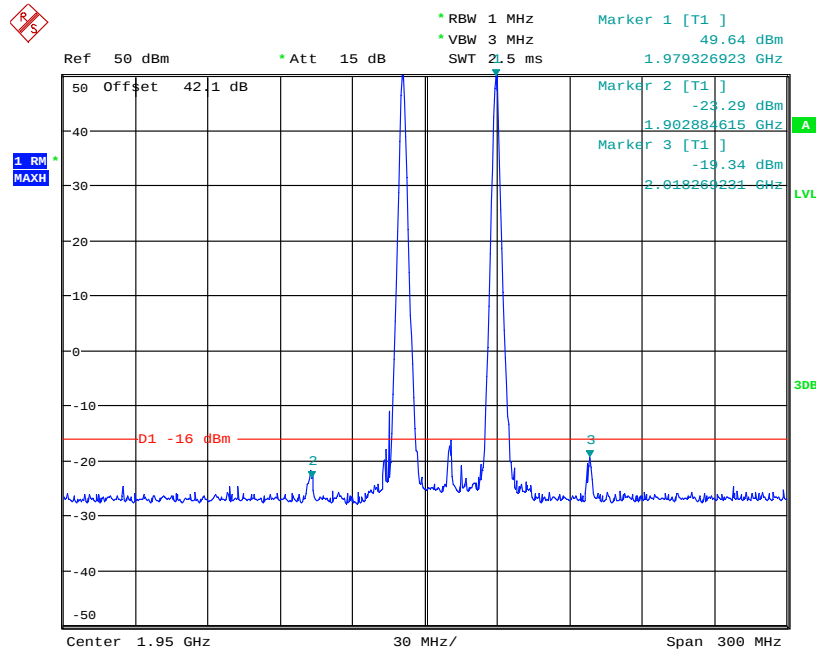
Date: 17.JUN.2013 16:00:49

Channel Position M - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



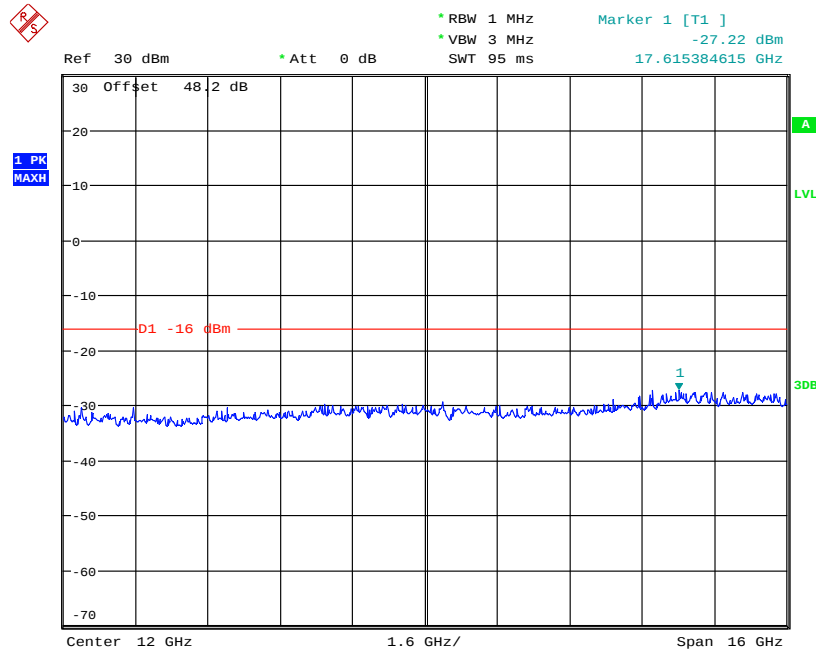
Date: 17.JUN.2013 16:08:11

Channel Position M - QPSK / Bandwidth 1.4MHz - 1.8Hz – 2.1GHz



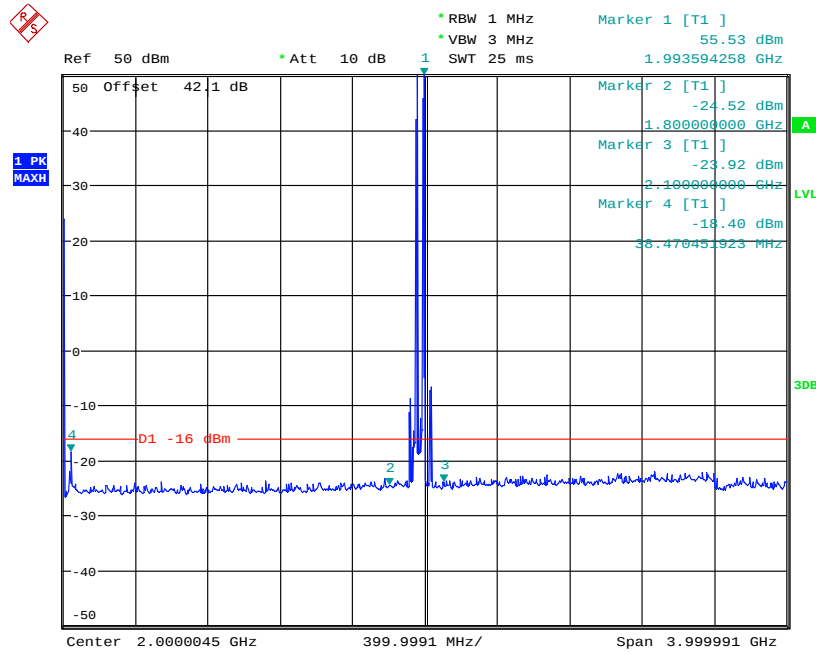
Date: 17. JUN. 2013 16:06:33

Channel Position M - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



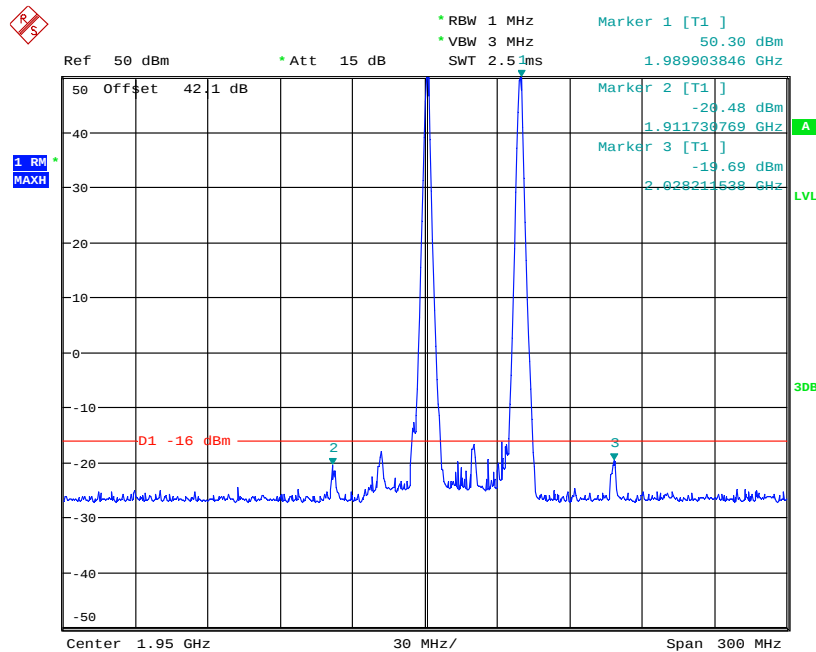
Date: 17. JUN. 2013 16:08:47

Channel Position T - QPSK / Bandwidth 1.4MHz - 9kHz – 4GHz



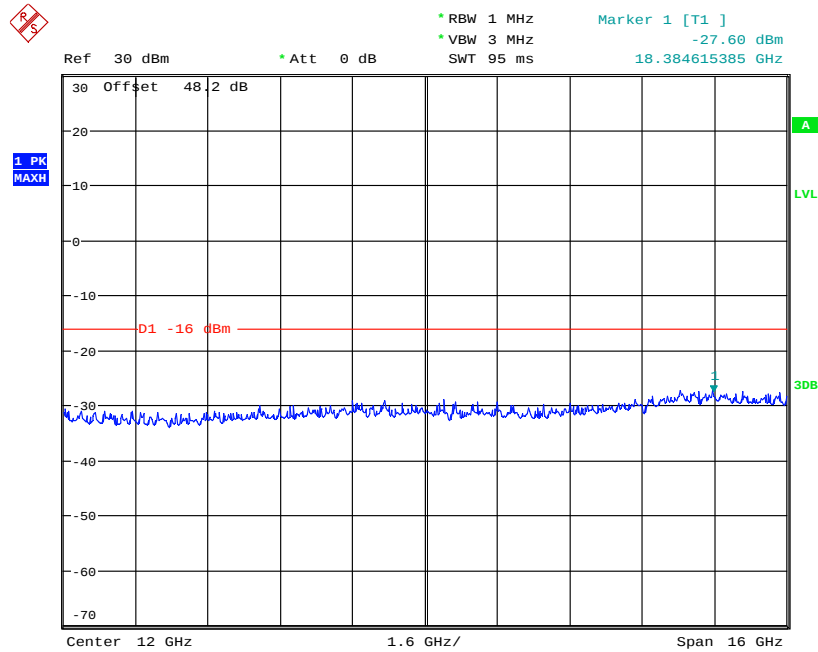
Date: 17. JUN. 2013 16:11:25

Channel Position T - QPSK / Bandwidth 1.4MHz - 1.8Hz – 2.1GHz



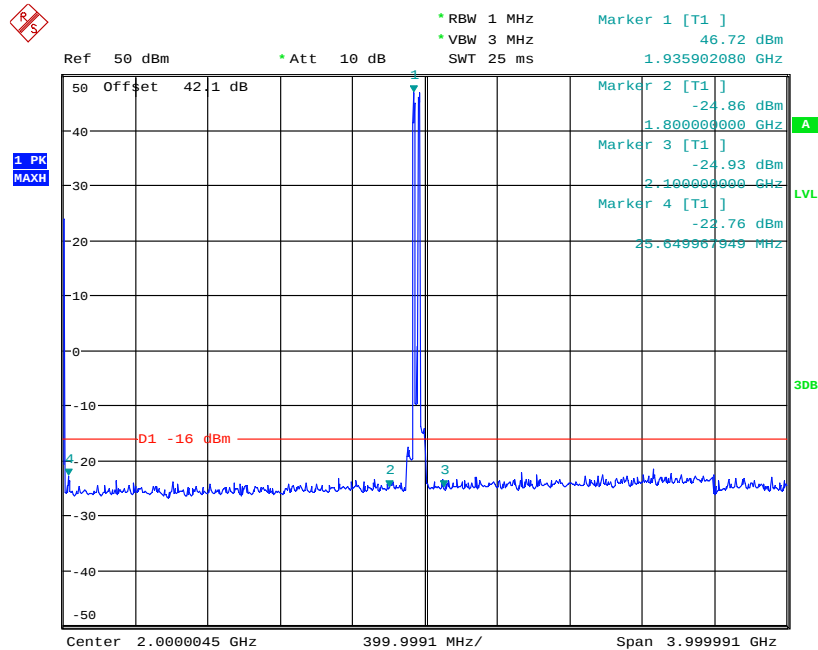
Date: 17. JUN. 2013 16:15:02

Channel Position T - QPSK / Bandwidth 1.4MHz - 4GHz – 20GHz



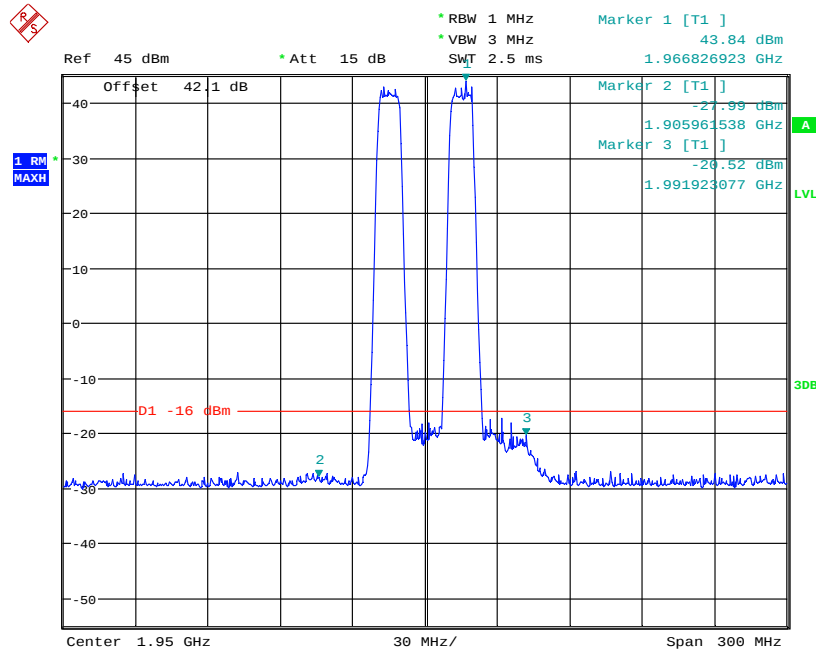
Date: 17. JUN. 2013 16:12:06

Channel Position B - QPSK / Bandwidth 10.0MHz - 9kHz – 4GHz



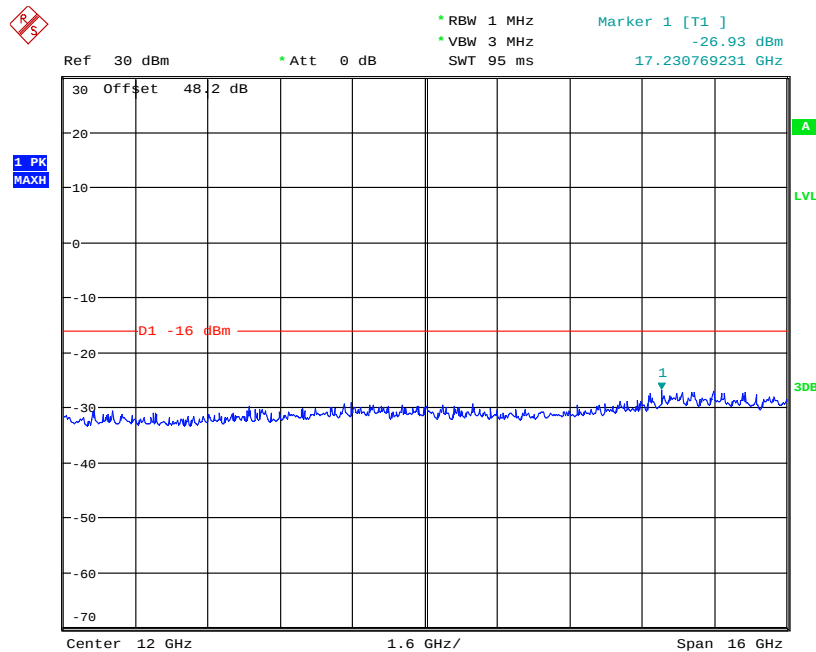
Date: 17. JUN. 2013 16:24:34

Channel Position B - QPSK / Bandwidth 10.0MHz - 1.8Hz – 2.1GHz



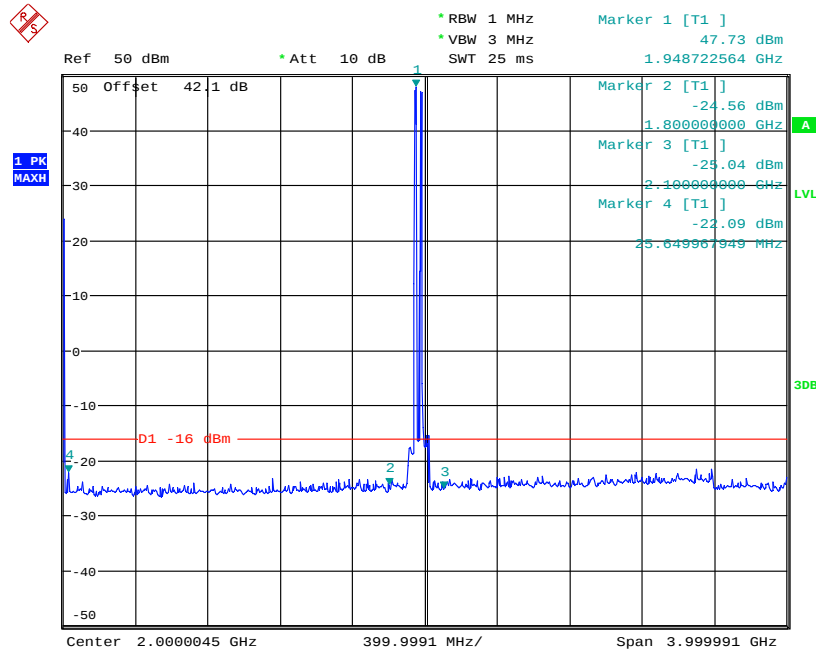
Date: 17.JUN.2013 16:27:00

Channel Position B - QPSK / Bandwidth 10.0MHz - 4GHz – 20GHz



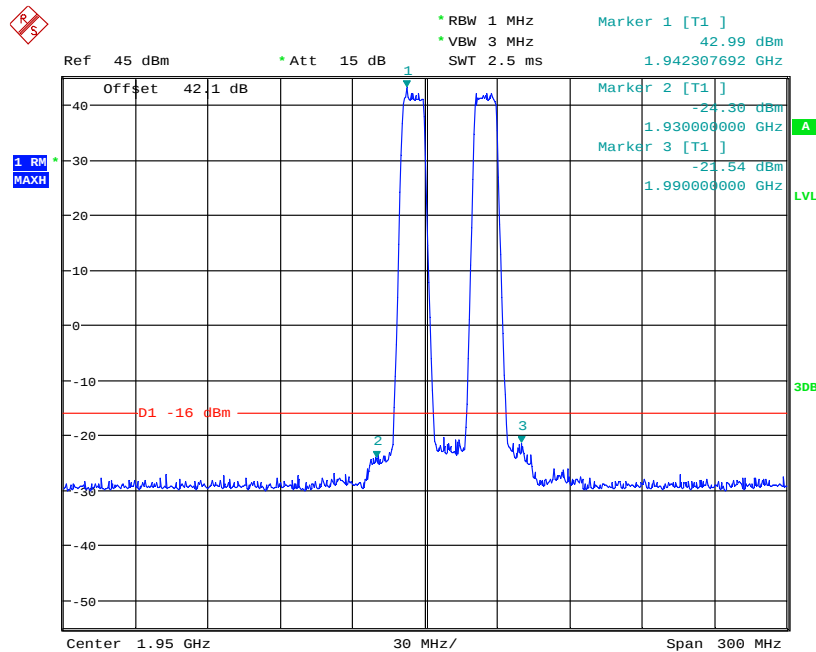
Date: 17.JUN.2013 16:25:14

Channel Position M - QPSK / Bandwidth 10.0MHz - 9kHz – 4GHz



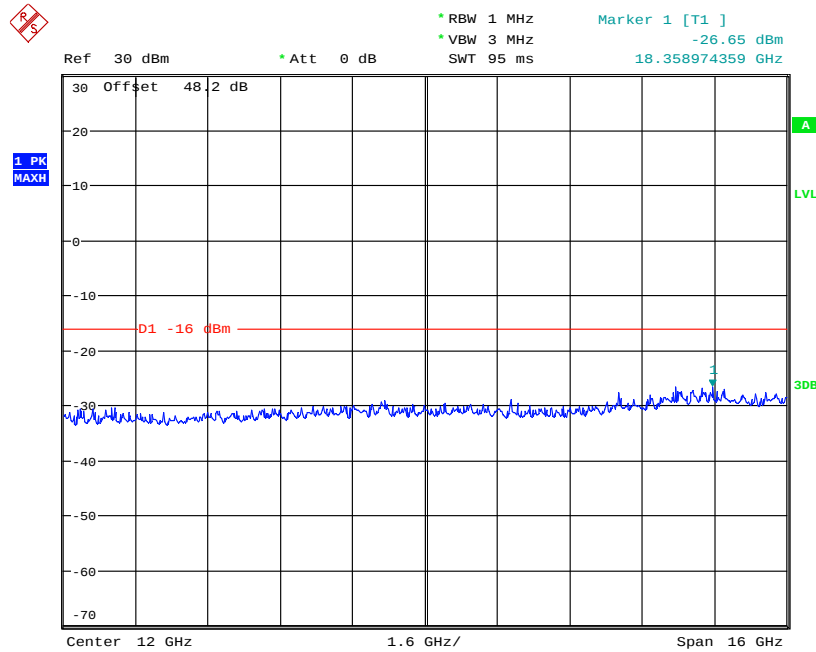
Date: 17. JUN. 2013 16:31:01

Channel Position M - QPSK / Bandwidth 10.0MHz - 1.8Hz – 2.1GHz



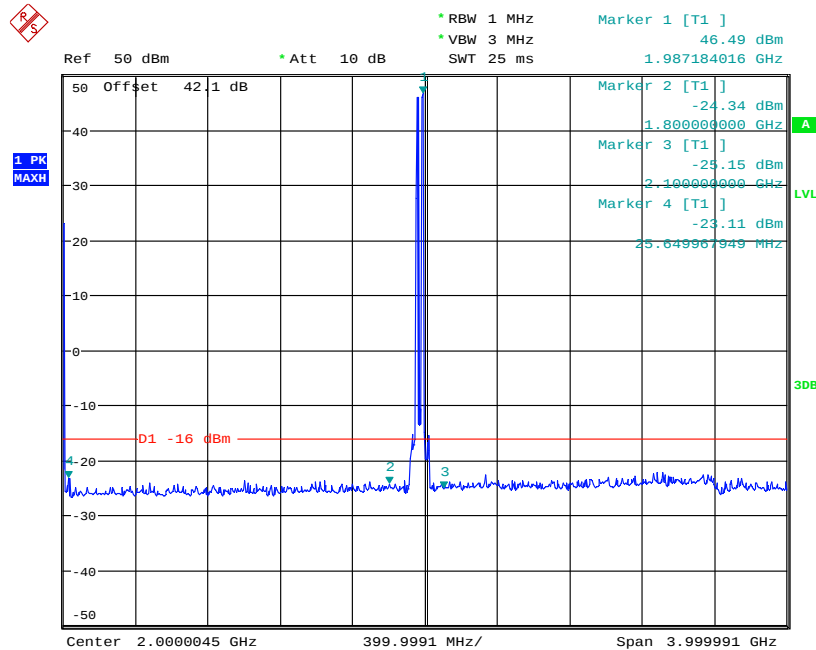
Date: 17. JUN. 2013 16:28:56

Channel Position M - QPSK / Bandwidth 10.0MHz - 4GHz – 20GHz



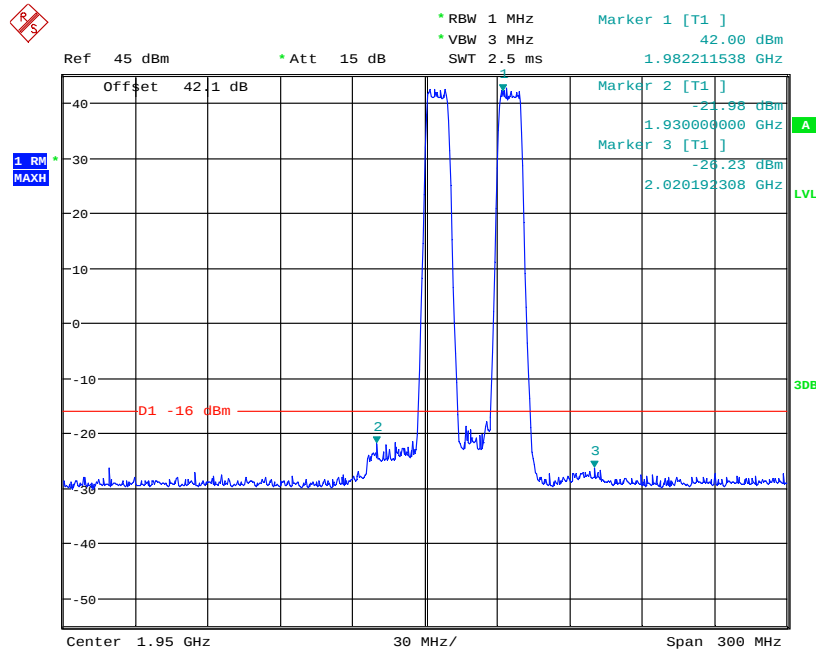
Date: 17. JUN. 2013 16:32:12

Channel Position T - QPSK / Bandwidth 10.0MHz - 9kHz – 4GHz



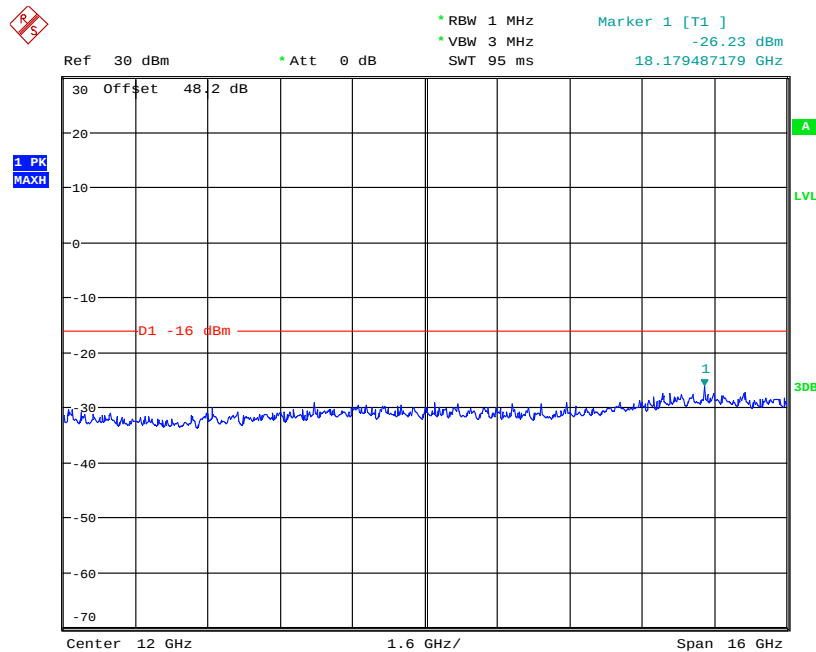
Date: 17. JUN. 2013 16:42:42

Channel Position T - QPSK / Bandwidth 10.0MHz - 1.8Hz – 2.1GHz



Date: 17. JUN. 2013 16:51:57

Channel Position T - QPSK / Bandwidth 10.0MHz - 4GHz – 20GHz



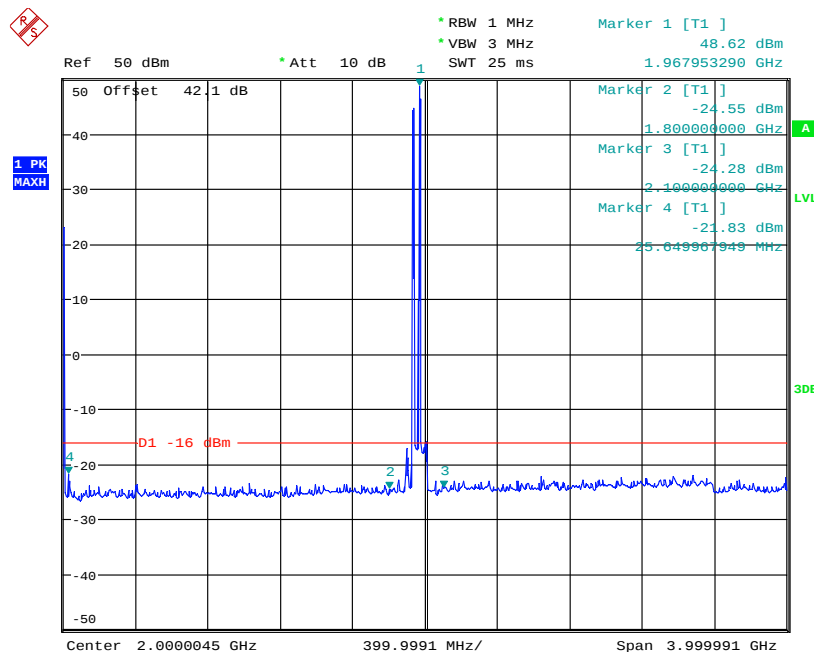
Date: 17. JUN. 2013 16:43:14

Configuration G+W-MIMO-MC 3 (2G + 1W)

Maximum Output Power 43.8dBm per carrier

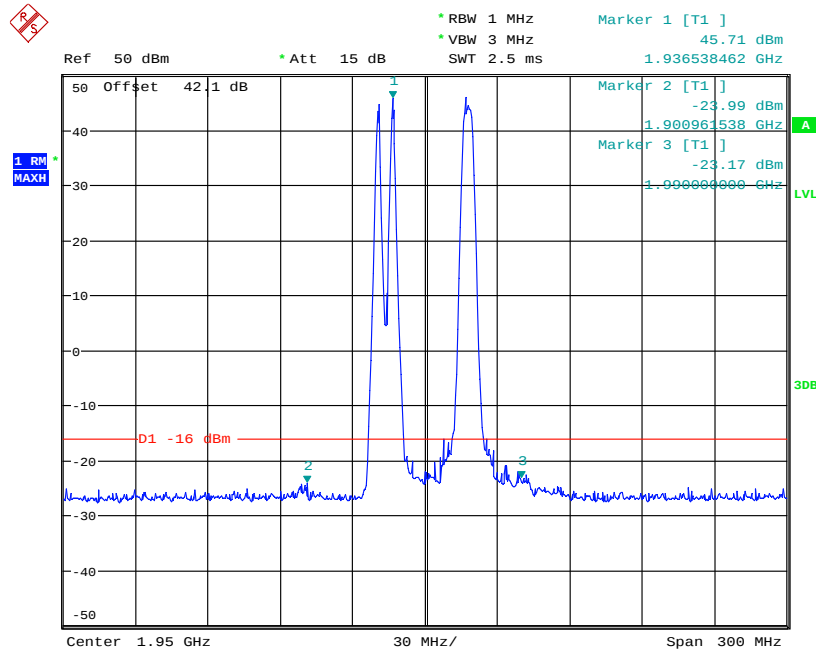
Channel Position	Channel Frequencies
Channel Position B_{RFBW}	Port A1: (G) 1930.4MHz + (G)1936.4MHz + (W)1967.6MHz Port A2: (G) 1931.0MHz + (G)1937.0MHz + (W)1967.6MHz
Channel Position M_{RFBW}	Port A1: (G) 1940.2MHz + (G)1946.2MHz + (W) 1977.6MHz Port A2: (G) 1940.8MHz + (G)1946.8MHz + (W) 1977.6MHz
Channel Position T_{RFBW}	Port A1: (G) 1950.2MHz + (G)1956.2MHz + (W) 1987.6MHz Port A2: (G) 1950.8MHz + (G)1956.8MHz + (W) 1987.6MHz

Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM - 9kHz – 4GHz



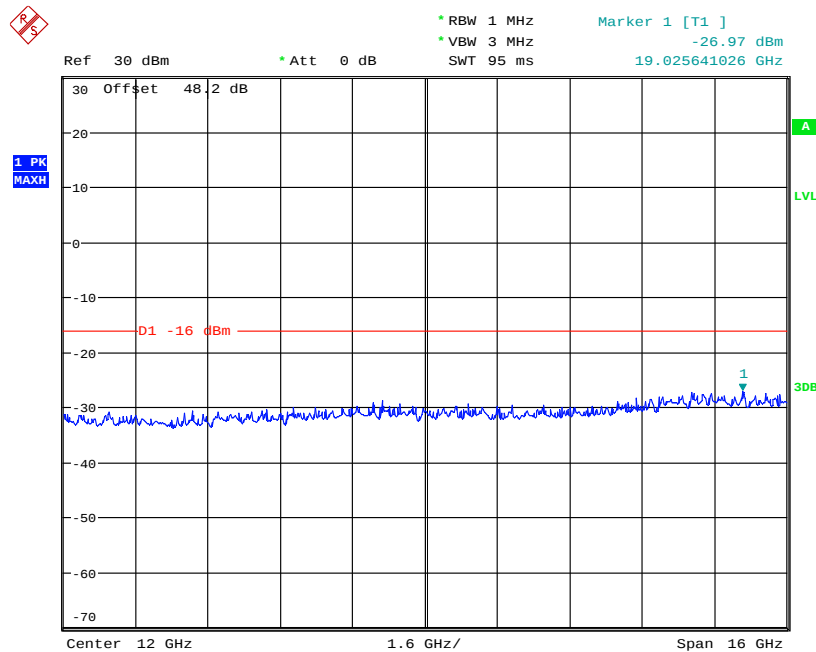
Date: 18.JUN.2013 14:07:24

Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM - 1.8GHz – 2.1GHz



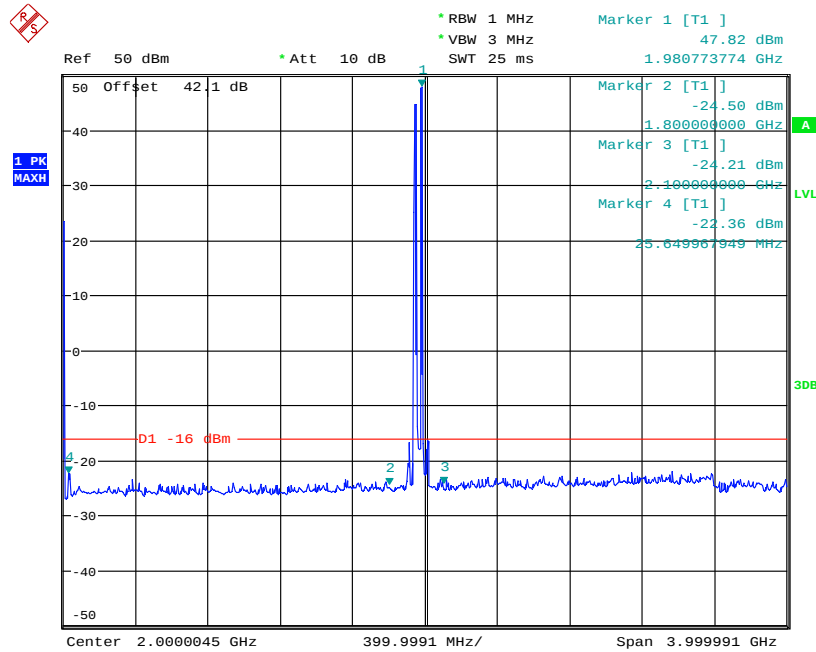
Date: 18.JUN.2013 14:33:01

Channel Position B_{RFBW} - GSM GMSK / WCDMA 16QAM - 4GHz – 20GHz



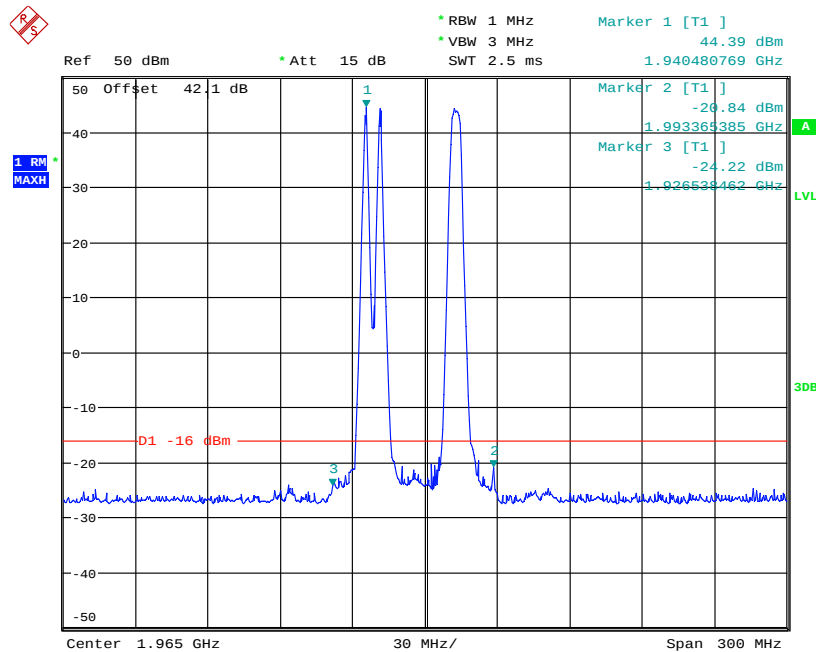
Date: 18.JUN.2013 14:08:00

Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM - 9kHz – 4GHz



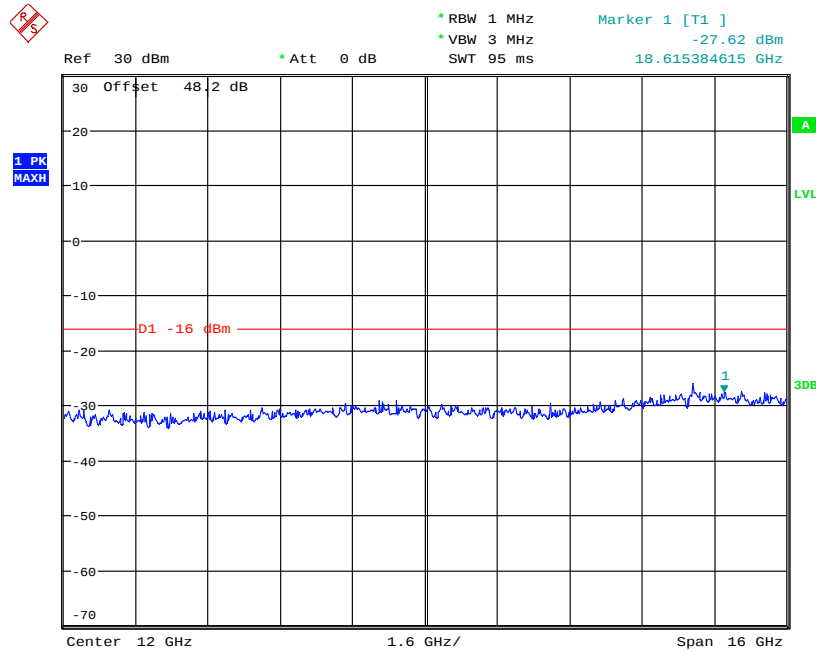
Date: 18.JUN.2013 13:59:36

Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM - 1.8GHz – 2.1GHz



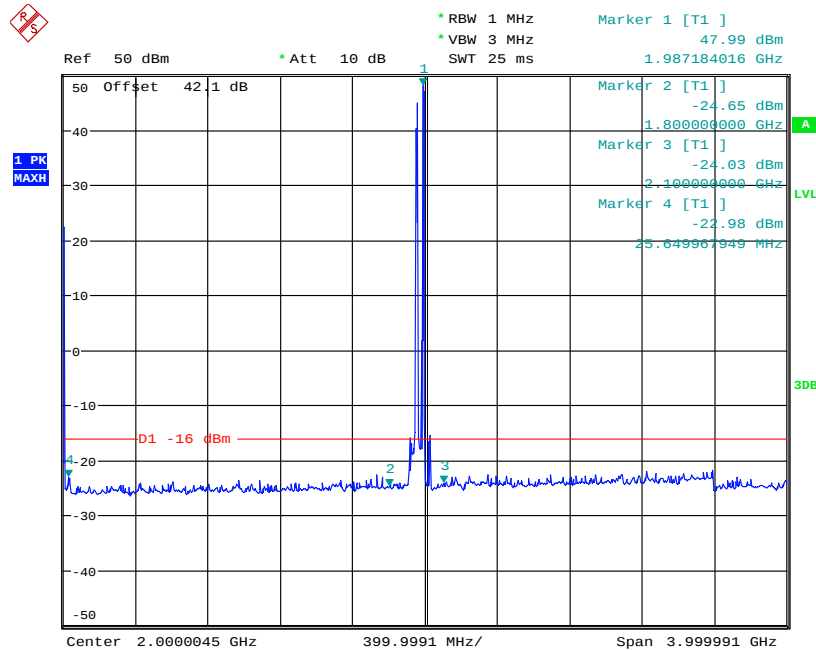
Date: 18.JUN.2013 13:56:00

Channel Position M_{RFBW} - GSM GMSK / WCDMA 16QAM - 4GHz – 20GHz



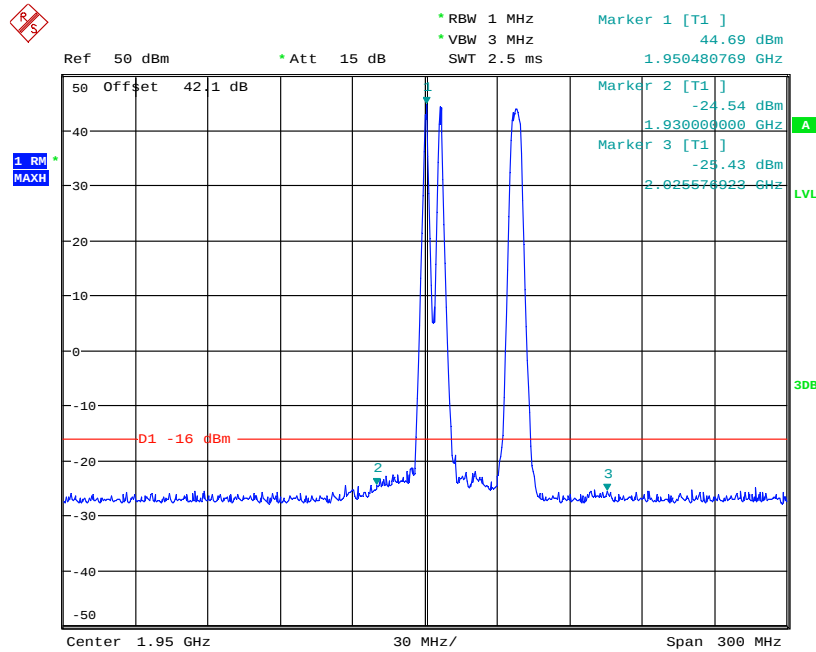
Date: 18.JUN.2013 14:00:13

Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM - 9kHz – 4GHz



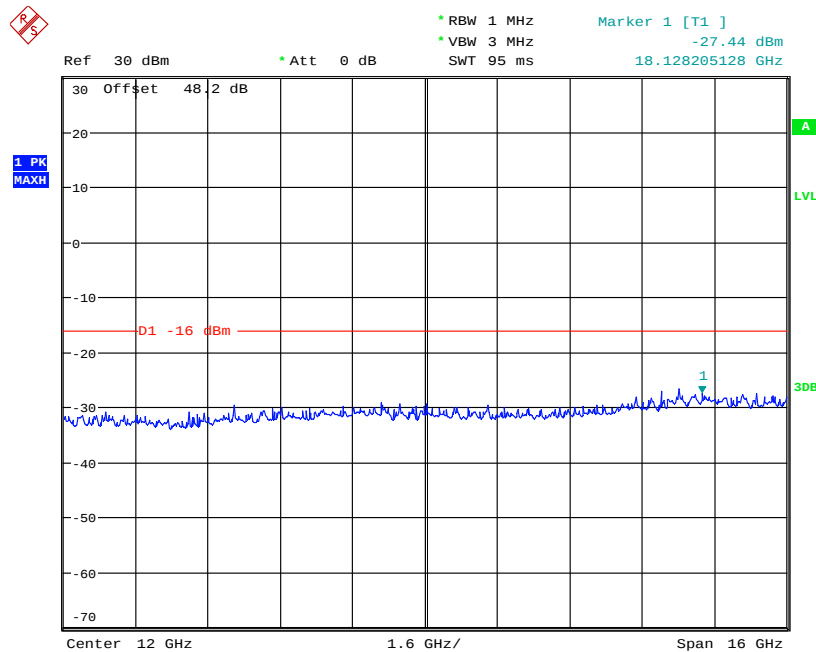
Date: 18.JUN.2013 14:38:21

Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM - 1.8GHz – 2.1GHz



Date: 18.JUN.2013 14:35:47

Channel Position T_{RFBW} - GSM GMSK / WCDMA 16QAM - 4GHz – 20GHz



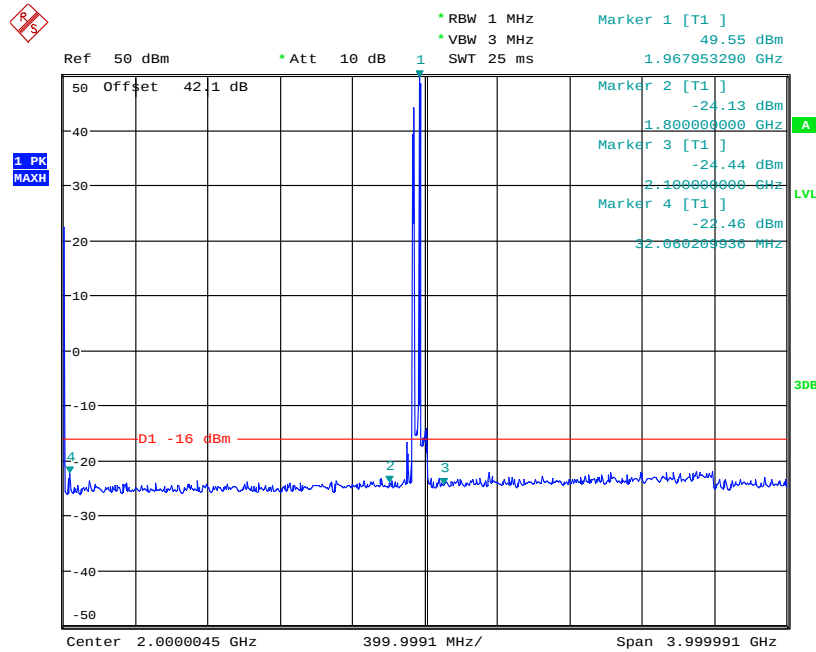
Date: 18.JUN.2013 14:38:56

Configuration G+L-MIMO-MC 3 (2G + 1L)

Maximum Output Power 43.3dBm per carrier

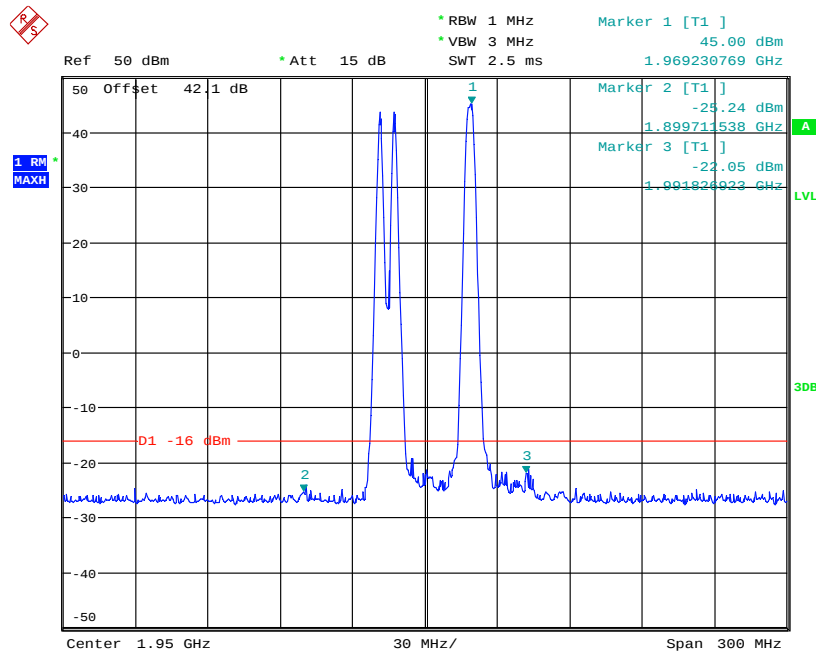
Channel Position	Channel Frequencies
Channel Position B_{RFBW}	Port A1: (G) 1930.4MHz + (G)1936.4MHz + (L)1968.5MHz Port A2: (G) 1931.0MHz + (G)1937.0MHz + (L)1968.5MHz
Channel Position M_{RFBW}	Port A1: (G) 1940.2MHz + (G)1946.2MHz + (L)1978.5MHz Port A2: (G) 1940.8MHz + (G)1946.8MHz + (L)1978.5MHz
Channel Position T_{RFBW}	Port A1: (G) 1950.2MHz + (G)1956.2MHz + (L)1988.5MHz Port A2: (G) 1950.8MHz + (G)1956.8MHz + (L)1988.5MHz

Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



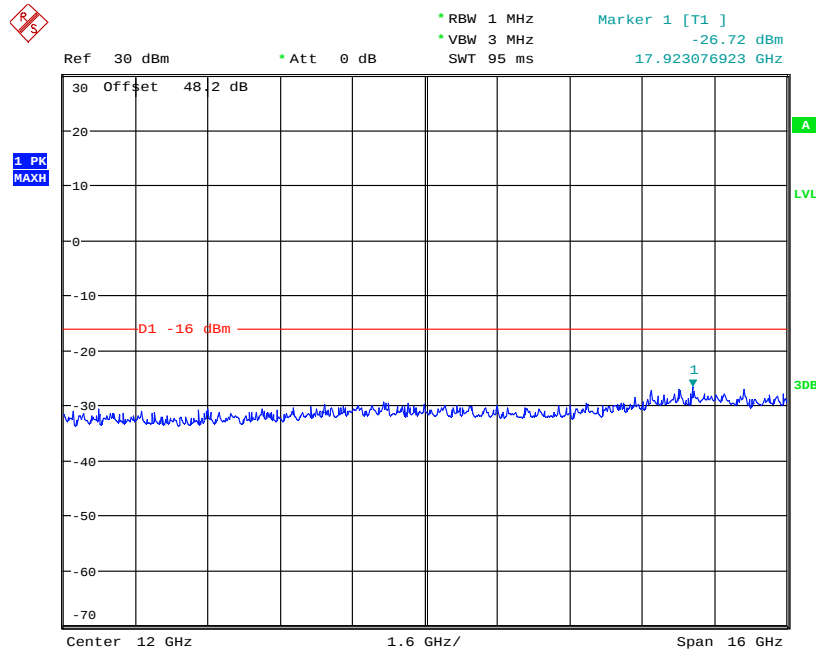
Date: 18.JUN.2013 17:31:13

Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



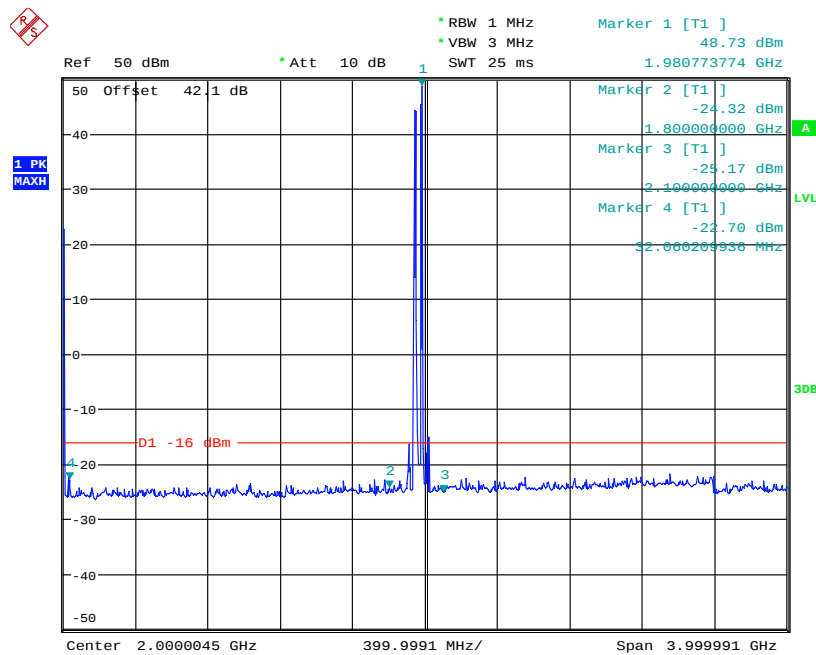
Date: 18.JUN.2013 17:33:31

Channel Position B_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



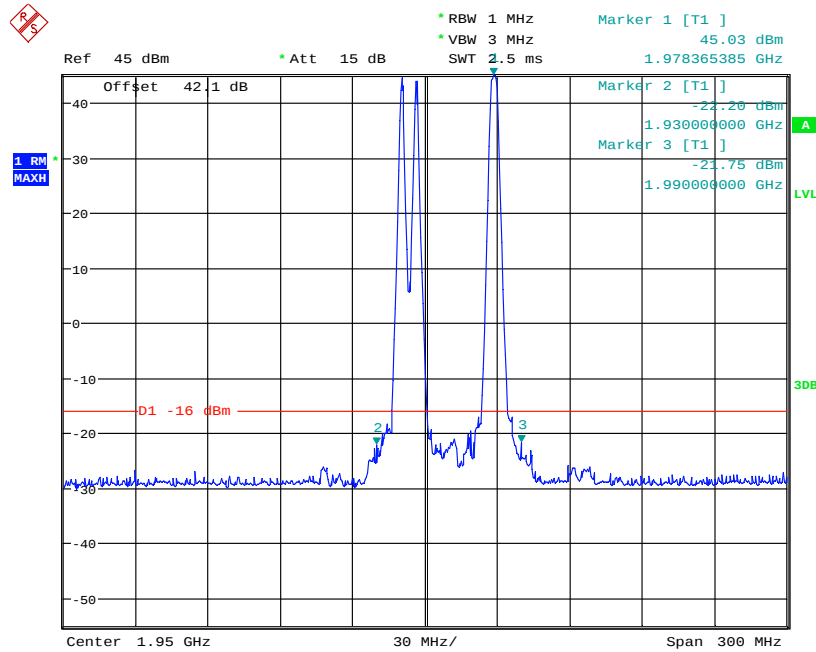
Date: 18.JUN.2013 17:31:46

Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



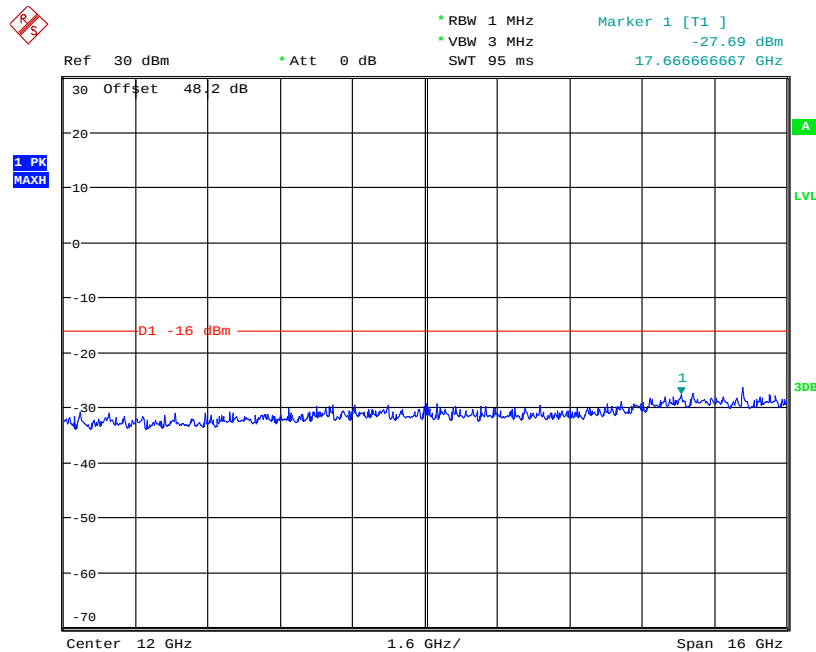
Date: 18.JUN.2013 17:45:12

Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



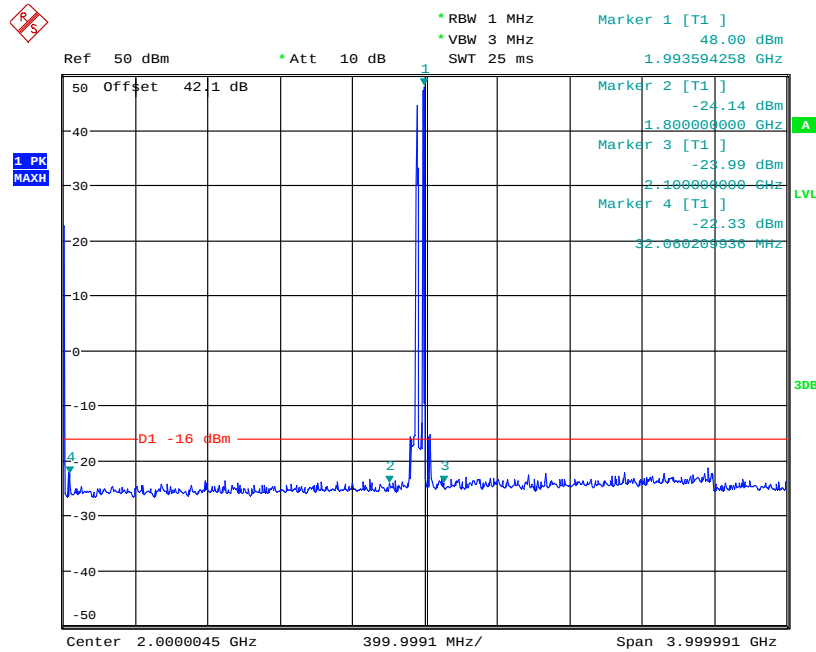
Date: 18.JUN.2013 16:58:07

Channel Position M_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



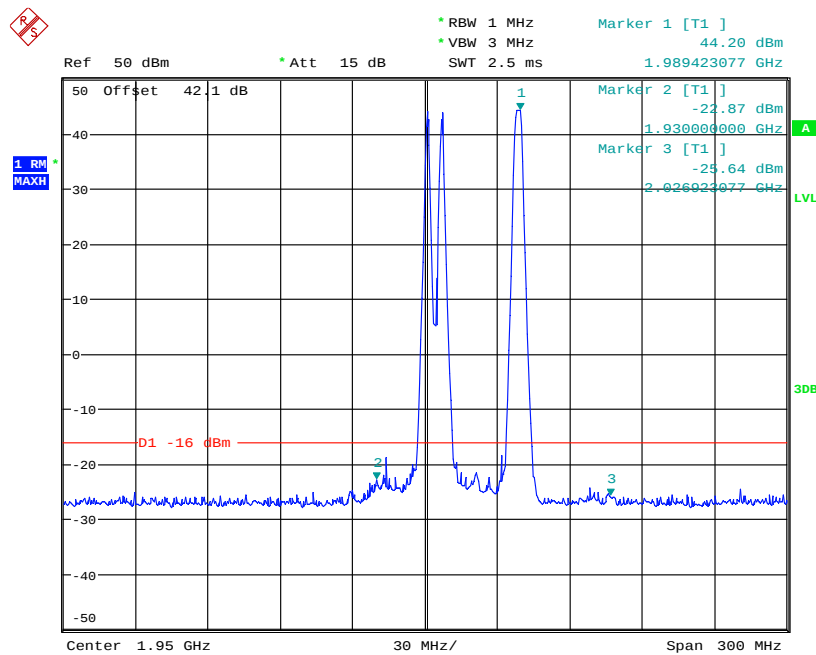
Date: 18.JUN.2013 17:45:57

Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



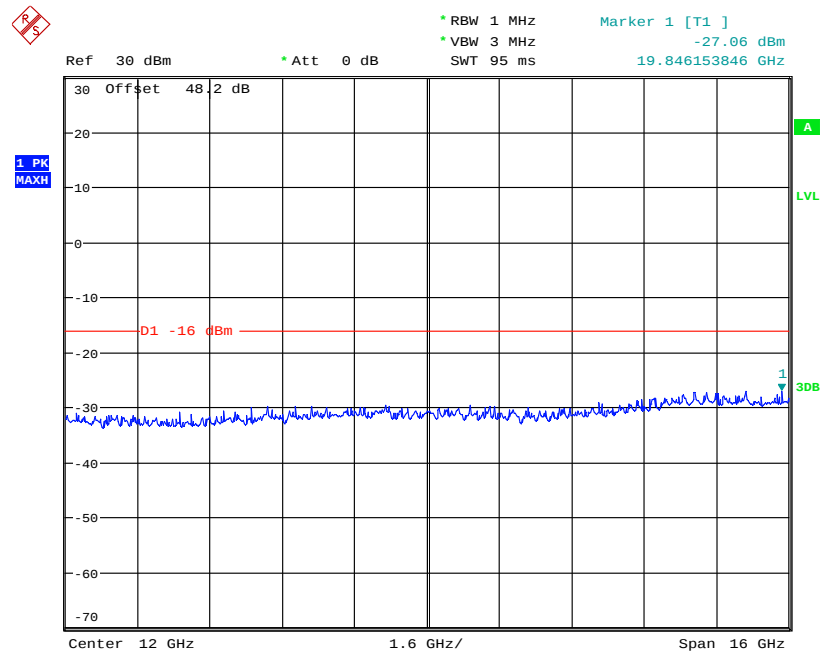
Date: 18.JUN.2013 17:39:12

Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



Date: 18.JUN.2013 17:36:30

Channel Position T_{RFBW} - GSM GMSK / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



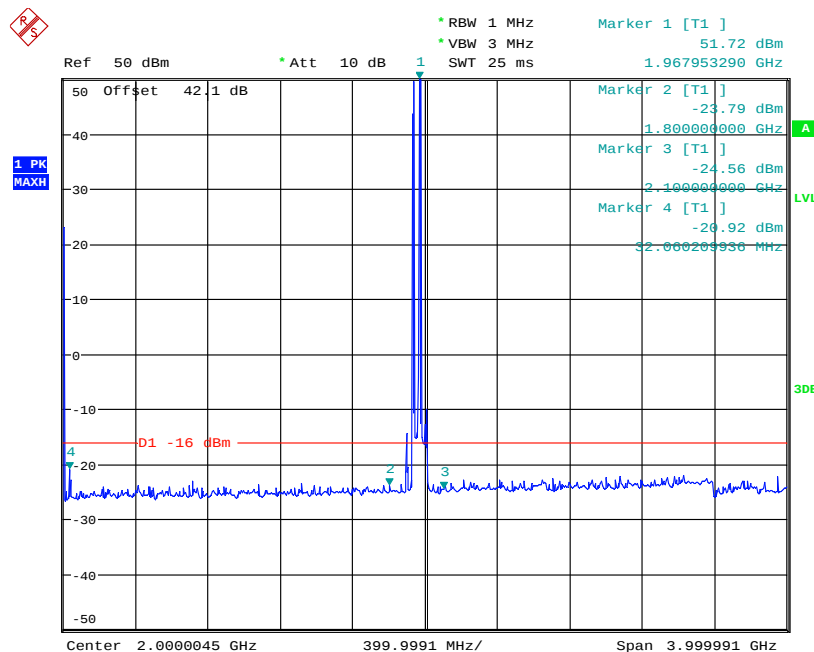
Date: 18.JUN.2013 17:39:46

Configuration W+L-MIMO-MC 1 (1W + 1L)

Maximum Output Power 45.7dBm per carrier

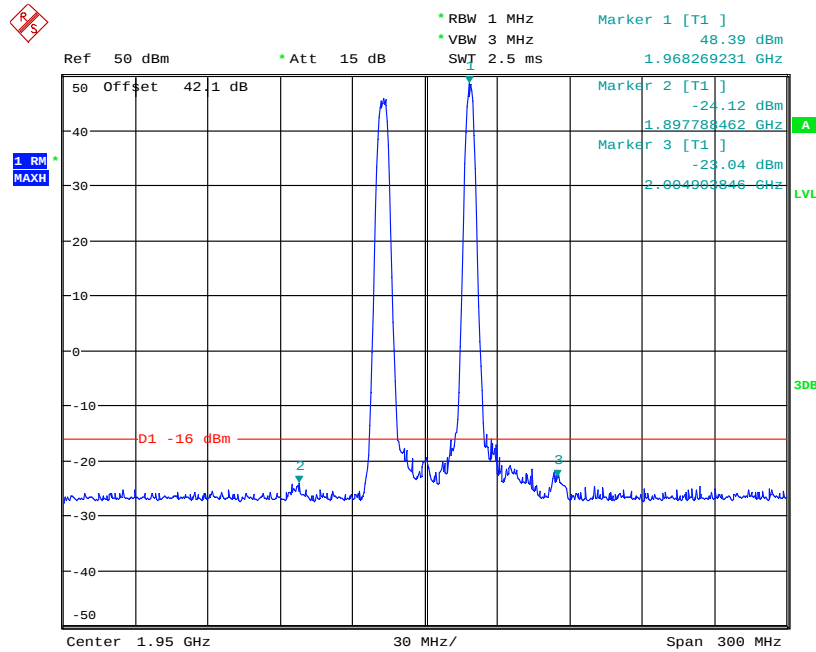
Channel Position	Channel Frequencies
Channel Position B_{RFBW}	Port A1: (W) 1932.4MHz + (L)1968.5MHz
Channel Position M_{RFBW}	Port A1: (W) 1942.4MHz + (L)1978.5MHz
Channel Position T_{RFBW}	Port A1: (W) 1952.4MHz + (L)1988.5MHz

Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



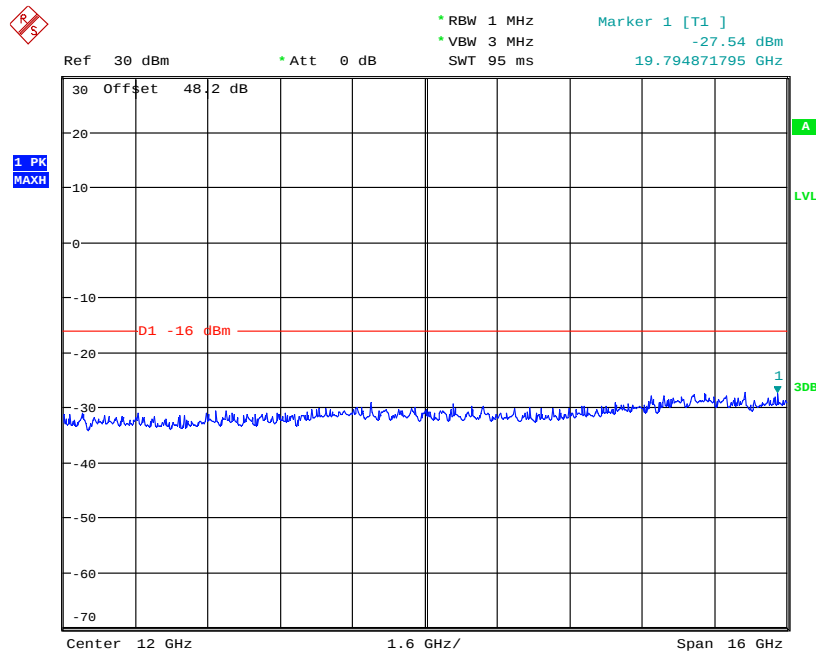
Date: 19.JUN.2013 15:17:21

Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



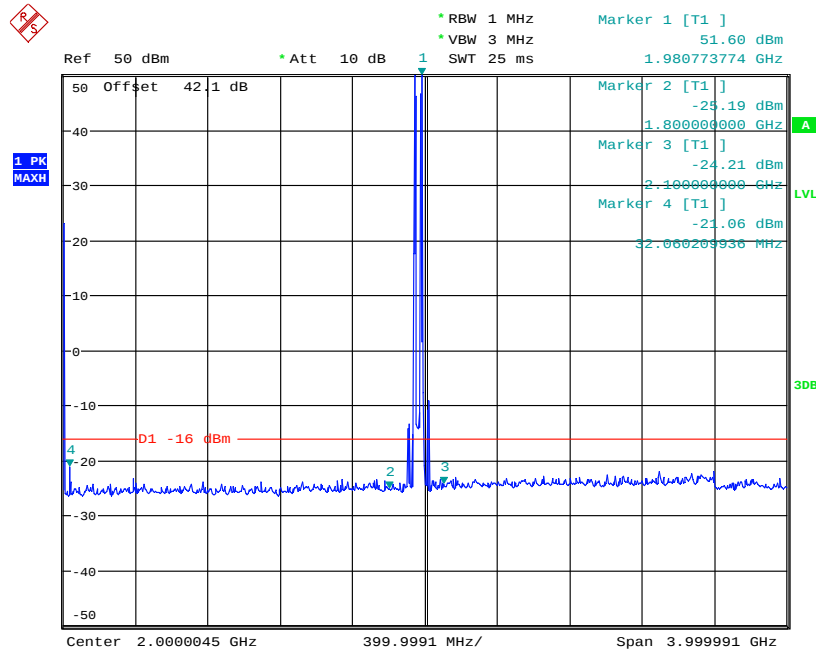
Date: 19.JUN.2013 15:20:26

Channel Position B_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



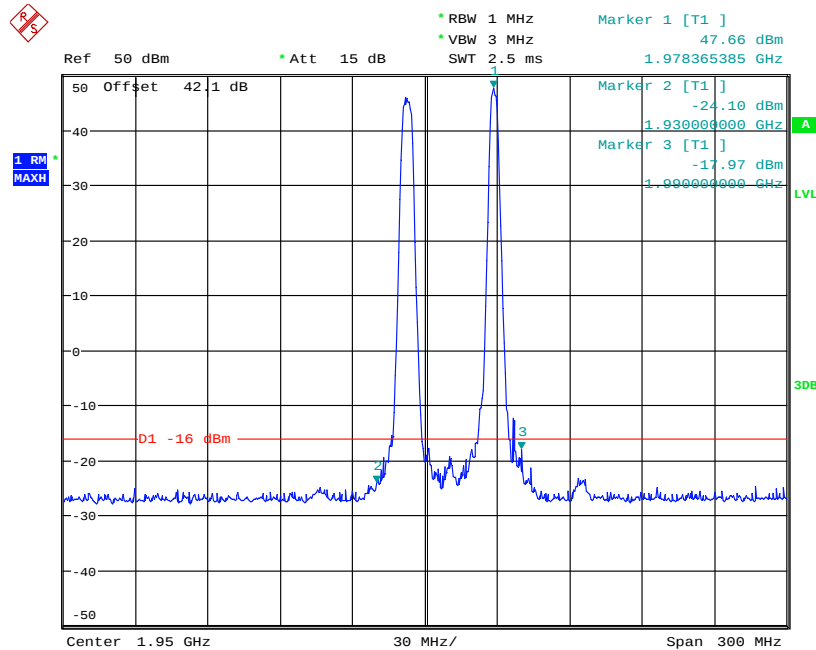
Date: 19.JUN.2013 15:17:51

Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



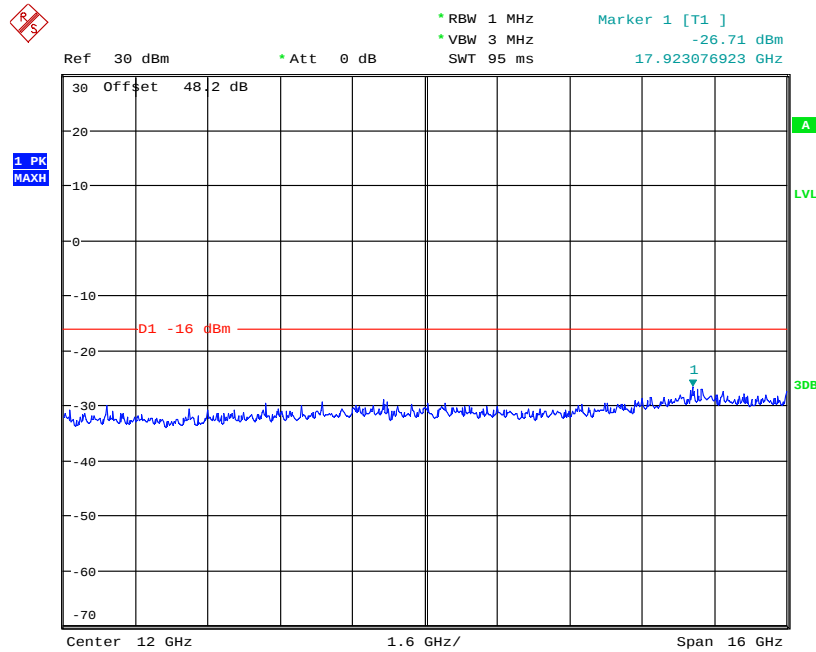
Date: 19.JUN.2013 13:58:53

Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



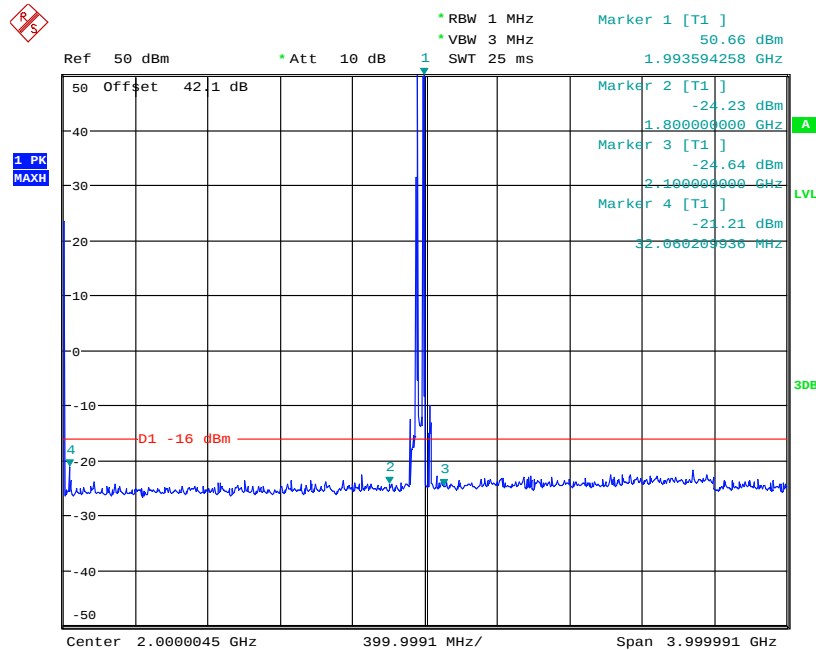
Date: 19.JUN.2013 14:43:01

Channel Position M_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



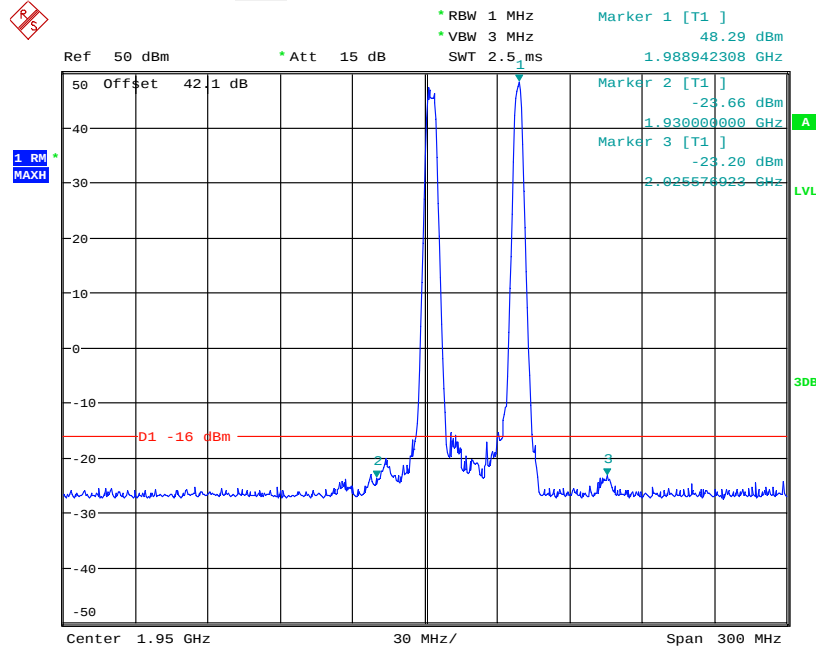
Date: 19.JUN.2013 13:59:39

Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 9kHz – 4GHz



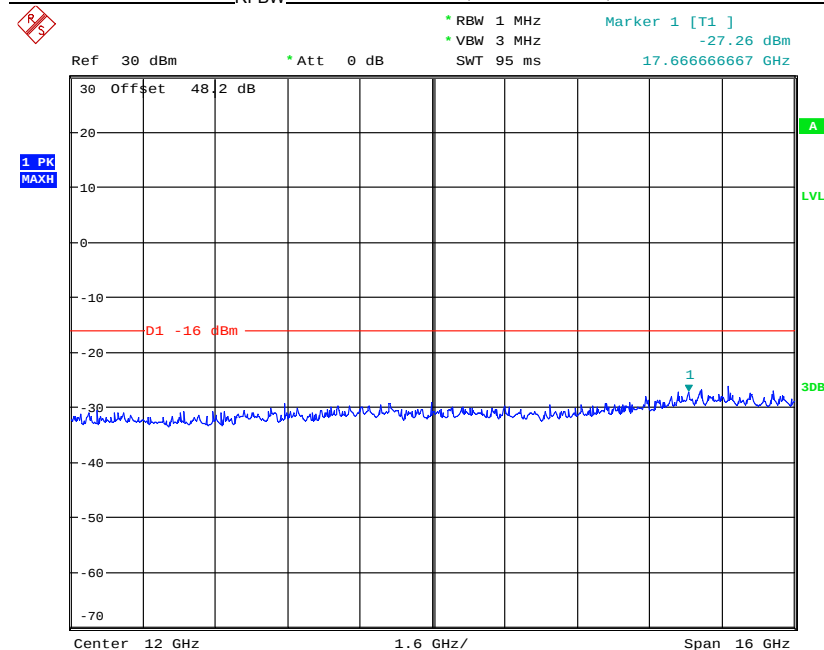
Date: 19.JUN.2013 15:25:07

Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 1.8GHz – 2.1GHz



Date: 19.JUN.2013 15:23:03

Channel Position T_{RFBW} - WCDMA 16QAM / LTE QPSK: Bandwidth 3.0MHz - 4GHz – 20GHz



Date: 19.JUN.2013 15:25:49

Limit	-13dBm
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2.6 FREQUENCY STABILITY

2.6.1 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

2.6.2 Equipment Under Test

RUS 02 B2, KRC 161 298/1, S/N: CB4Q847017

2.6.3 Date of Test and Modification State

21 and 24 June 2013 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Environmental Conditions

Ambient Temperature	22.0 - 22.5°C
Relative Humidity	57.5 - 60.0%

2.6.6 Test Method

Frequency Error – Temperature Variation

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

Frequency Error – Voltage Variation

The EUT was tested at the supplied voltage varied from 85 to 115 percent of the nominal value. At each voltage extreme, the BTS 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]* GSM – GSM Single Carrier with all timeslots active with GMSK modulation
WCDMA – Test Model 1 Single Carrier with QPSK modulation
LTE (5.0 MHz OBW) – Test Model E-TM1.1 Single Carrier with QPSK modulation

2.6.7 Test Results

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

Temperature	Frequency Stability (Hz)
	Channel Position M
-30°C	12.46
-20°C	11.36
-10°C	7.53
0°C	7.42
+10°C	9.43
+20°C	12.36
+30°C	10.95
+40°C	-11.46
+50°C	-11.81

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

Temperature	Frequency Stability (Hz)
	Channel Position M
-30°C	4.25
-20°C	-4.33
-10°C	4.93
0°C	-9.01
+10°C	-5.11
+20°C	6.37
+30°C	-6.11
+40°C	-5.34
+50°C	4.43

Configuration LTE-SC

Maximum Output Power 49.0dBm per carrier

Temperature	Frequency Stability (Hz)
	Channel Position M
-30°C	5.42
-20°C	-6.02
-10°C	-6.33
0°C	-8.80
+10°C	6.75
+20°C	-5.71
+30°C	-8.36
+40°C	9.01
+50°C	-7.67

Configuration G-SC

Maximum Output Power 47.8dBm per carrier

Voltage	Frequency Stability (Hz)
	Channel Position M (1960.0MHz)
-40.8 V	-13.01
-48.0 V	12.36
-55.2 V	-13.77

Configuration W-SC

Maximum Output Power 49.0dBm per carrier

Voltage	Frequency Stability (Hz)
	Channel Position M (1960.0MHz)
-40.8 V	5.18
-48.0 V	6.37
-55.2 V	5.62

Configuration LTE-SC

Maximum Output Power 49.0dBm per carrier

Voltage	Frequency Stability (Hz)
	Channel Position M (1960.0MHz)
-40.8 V	-7.86
-48.0 V	-5.71
-55.2 V	-8.15

Limit	$\pm 1.0\text{ppm}$ or $\pm 1.96\text{ kHz}$
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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 Peak Output Power and Peak to Average Ratio - Conducted					
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
Power Meter	Rohde & Schwarz	NRP	102625	12	12-Aug-2013
Power Meter	Rohde & Schwarz	NRP	101310	12	12-Aug-2013
Power Sensor	Rohde & Schwarz	NRP-Z51	101407	12	12-Aug-2013
Power Sensor	Rohde & Schwarz	NRP-Z51	102433	12	12-Aug-2013
Spectrum Analyser	Rohde & Schwarz	FSQ26	200235	12	06-Sep-2013
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
3dB Attenuator	Shanghai Huaxiang	TSG100C-3-3R	090211049	-	O/P MON
40dB Attenuator	Shanghai Huaxiang	DTS50-40dB-3G	090211049	-	O/P MON
20dB Attenuator	Shanghai Huaxiang	DTS50-20dB-3G	--	-	O/P MON
20dB Attenuator	Shanghai Huaxiang	DTS50-20dB-3G	090722020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Load	Shanghai Huaxiang	TFZ10-3R	20100908079	-	O/P MON
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Occupied Bandwidth					
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
Spectrum Analyser	Rohde & Schwarz	FSQ26	200235	12	06-Sep-2013
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Band Edge					
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
Spectrum Analyser	Rohde & Schwarz	FSQ26	200235	12	06-Sep-2013
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Load	Shanghai Huaxiang	TFZ10-3R	20100908079	-	O/P MON
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Conducted Spurious Emission					
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
Spectrum Analyser	Rohde & Schwarz	FSQ26	200235	12	06-Sep-2013
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Load	Shanghai Huaxiang	TFZ10-3R	20100908079	-	O/P MON
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON

Radiated Spurious Emissions					
Load	Shanghai Huaxiang	TFE100	09032343	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121614	-	O/P MON
Load	Shanghai Huaxiang	TFZ10-3R	20100908079	-	O/P MON
EMI Receiver	Rohde & Schwarz	ESI 40	100015	12	19-Aug-2013
Ultra log test antenna	Rohde & Schwarz	HL562	100167	12	19-Aug-2013
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100029	12	19-Aug-2013
Pyramidal Horn Antenna	EMCO	3160-09	-	-	-
Antenna master	Frankonia	MA 260	-	12	19-Aug-2013
Relay Switch Unit	Rohde & Schwarz	331.1601.31	338965002	-	TU
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON
Frequency Stability					
Network Analyzer	Agilent	8720D	US36140166	12	06-Sep-2013
Spectrum Analyser	Rohde & Schwarz	FSQ26	100244	12	07-Apr-2014
40dB Attenuator	Aeroflex / Weinschel	48-40-43-LIM	BR5020	-	O/P MON
Load	Shanghai Huaxiang	TFE100	09121647	-	O/P MON
Load	Shanghai Huaxiang	TFZ10-3R	20100908079	-	O/P MON
Power Supply	Dahua	DH1716A-10	1000303181	-	O/P MON

N/A – Not Applicable

OP MON – Output Monitored with Calibrated Equipment

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Conducted Maximum Peak Output Power	30MHz to 10GHz Amplitude	0.5dB*
Conducted Emissions	30MHz to 40GHz Amplitude	3.0dB*
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



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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