



Test report no. : 145878 - 7

Item tested : EXPLORER 325

Type of equipment : Satellite terminal

Client : Thrane & Thrane

FCC Part 25, Satellite Communications
Subpart C, Technical Standards

15 October 2010

Authorized by :

Frode Sveinsen
Technical Verifier

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1 GENERAL INFORMATION

1.1 Testhouse Info

Name : Nemko AS
Address : Nemko Kjeller
 Instituttveien 6, Box 96
 N-2007 Kjeller, NORWAY
Telephone : +47 64 84 57 00
Fax : +47 64 84 57 05
E-mail: comlab@nemko.com
Number of Pages: 103

1.2 Client Information

Name : Thrane & Thrane AS
Address : Lundtoftegaardsvej 93D, DK-2800 Kgs. Lyngby, Denmark
Telephone : +45 39 55 88 00
Fax : +45 39 55 88 88

Contact:

Name: Morten Becker Saul
Phone: +45 39 55 82 09
E-mail: MBS@thrane.com

1.3 Manufacturer (if other than client)

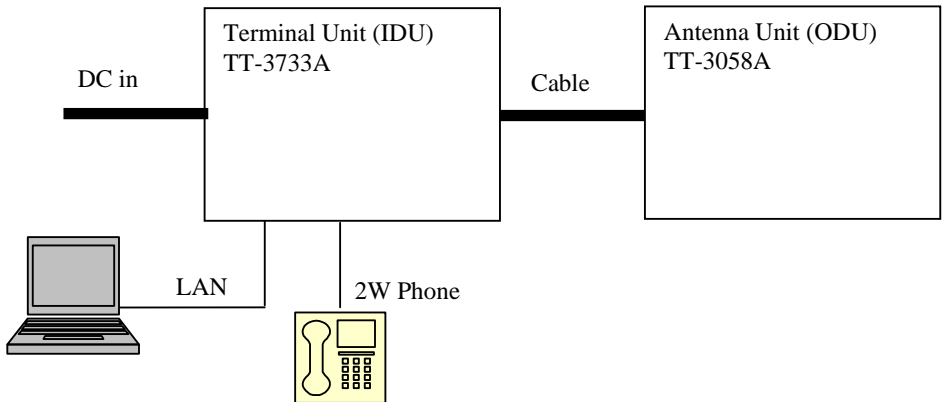
Name : /
Address : /
Telephone : /
Fax : /
E-mail : /

2 Test Information

2.1 Technical Specification of the EUT

Name :	Thrane & Thrane
Model/version :	EXPLORER 325
	Consist of: TT-3733A (Terminal) & TT-3058A (Antenna)
Serial number :	0410160001
Hardware identity and/or version:	TT-3733A (Terminal) / TT-3058A (Antenna)
Software identity and/or version :	/
Frequency Range :	1525 – 1559.0 MHz (downlink) & 1626.5 – 1660.5 MHz (uplink)
Type of Power Supply :	10.5 – 32 V DC Power Supply
Rated output power	Mean EIRP: 15,1 dBW
Modulation	$\pi/4$QPSK – 4 Bandwidths: T0,5 (21KHz), T1 (42KHz), T2 (84 KHz), T4,5 (189KHz) 16QAM – 3 Bandwidths: T1(42KHz), T2(84KHz), T4,5(189KHz)
Antenna type	2" Helix
Antenna gain	Max 11,88 dBi at 20° elevation
Interfaces	LAN with POW
	Phone : 2W analogue phone
	SIM card
	Antenna connector
Desktop Charger :	NA

2.2 Description of Tested Device(s)



2.3 Test Environment

2.3.1 Normal test condition

Temperature:	20 - 23 °C
Relative humidity:	40 - 60 %
Atmospheric pressure:	98 - 102 kPa
Normal test voltage:	10.5, 18.0, and 32.0 V DC

The values are the limit registered during the test period.

All testing has been carried out with a mains DC voltage of 18 volts.

2.4 Test Period

Item received date:	2010-06-01
Test period:	from 2010-06-01 to 2010-06-30

2.5 Standards and Regulations

2.6 Test Engineer(s)

Jan G Eriksen

2.7 Additional information

This test report is applicable for certification in USA.

2.7.1 Test Methods

Described in the relevant standards.

2.7.2 Test Equipment

List of used test equipment, see clause 6.



**THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.
Deviations from, additions to, or exclusions from the test specifications are
described in "Summary of Test Data".**

TESTED BY :



Jan G Eriksen, Test Engineer

DATE: 13 september 2010

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3 TEST REPORT SUMMARY

3.1 Abbreviations

- P** Passed, the equipment fulfils the requirement
- F** Failed, the equipment does not fulfil the requirement
- I** Inconclusive, the test does not give a conclusive verdict
- NA** Not applicable, the requirement is not applicable
- NT** Not tested, the test is not performed even though the requirement is relevant

3.2 List of measurements

Clause	Measurement	Ref. page	Result (Pass/Fail)
4.1	TX Output Power (measured with Power meter)	10	Pass
4.2	TX Output Power (measured with Spectrum analyzer)	11	Pass
6.1	Occupied Bandwidth	13	Pass
6.2	Spectrum Mask	14	Pass
6.3	Conducted spurious and unwanted emissions	15	Pass
6.4	Spurious missions from mobile earth stations for protection of aeronautical radionavigation-satellite service	16	Pass
7	Radiated spurious and unwanted emissions	18	Pass
	Spurious in TX Off mode		Pass
8	Frequency Stability (Normal and Extreme temperatures)	19	Pass

3.3 Conclusion

The tested equipment complies with the requirements of relevant standards.

3.4 OTHER COMMENTS

EUT (Equipment Under Test):

Inmarsat BGAN Satellite Terminal with external antenna

List of ports:

Signal port: External antenna
Power ports: 10,5 - 32 V DC

Antenna Gain:

The antenna gain changes with elevation. The gain is highest at 20 deg elevation, and lowest at 5 deg elevation (antenna pointing towards horizon). For measurement of output e.i.r.p. the highest gain has been used in the calculations.

Elevation Angle (deg)	1525 MHz	1542 MHz	1559 MHz	1626,5 MHz	1643,5 MHz	1660,5 MHz
5	9,41	9,79	10,04	10,25	10,21	10,08
10	10,07	10,52	10,69	10,86	10,69	10,57
20	11,10	11,47	11,57	11,87	11,88	11,84
30	10,21	10,59	10,73	11,59	11,64	11,50
40	9,98	10,40	10,57	11,42	11,35	11,21
50	9,39	9,79	10,06	10,64	10,51	10,33
60	9,46	9,77	10,04	10,36	10,45	10,16
70	9,56	10,29	10,61	10,94	10,84	10,69
80	10,46	11,25	11,47	11,55	11,27	11,18
90	10,72	11,04	11,38	11,60	11,31	11,10

Table 1: LV11-X Antenna gain for various elevation/cross-elevation settings, obtained when measuring the radiation patterns according to ITU M.1091.

For measurement of carrier to spurious ratio the lower gain has been used in the calculation – applies for carrier to spurious ratio in the “Out-of-Band Region”.

List of Bearers used by the terminal's transmitter

Bearer	Name	Symbol Rate (kHz)	Authorized Bandwidth (kHz)	Bandwidth (kHz)	Relative Symbol Rate wrt 33.6 kHz	Modulation	Emission Designator
R20T0.5Q	QPSK0.5	16.8	21	21	0,5	$\pi/4$ -QPSK	G1W
R20T1Q	QPSK1	33.6	42	42	1.0	$\pi/4$ -QPSK	G1W
R20T1X	QAM1	33.6	42	42	1.0	16QAM	D1W
R20T2Q	QPSK2	67.2	84	84	2.0	$\pi/4$ -QPSK	G1W
R20T2X	QAM2	67.2	84	84	2.0	16QAM	D1W
R20T4.5Q	QPSK4.5	151.2	189	189	4.5	$\pi/4$ -QPSK	G1W
R20T4.5X	QAM4.5	151.2	189	189	4.5	16QAM	D1W

4 TX Output Power \$25.204 & \$2.1046

4.1 TX output power measured with power meter

These measurements were performed at the antenna cable of the antenna unit. A power attenuator of 30 dB and Huber & Suhner microwave cables were used. The output power was measured with a power meter.

The measurements were done with all available modulation schemes on all three channels in the lower part of the TX frequency band, the middle part of the TX frequency band, and the upper part of the TX frequency band, and at the mains DC voltage of 18 volts.

Measurement of Output power (dBm/W) measured with an rms Power Meter							
Modulation	TX frequency (MHz)						Requirement
	1626,6		1643,5		1660,4		
	RF Power dBm	RF Power (W)	RF Power dBm	RF Power (W)	RF Power dBm	RF Power (W)	
QPSK 0,5	33,33	2,1	33,72	2,3	33,84	2,4	Power class 1 Max. 15,1dBW ± 2dB
QPSK 1	33,41	2,2	33,84	2,4	33,96	2,5	
QAM 1	33,70	2,3	34,12	2,6	34,28	2,7	
QPSK 2	33,53	2,3	33,94	2,5	34,05	2,5	
QAM 2	33,61	2,3	34,03	2,5	34,17	2,6	
QPSK 4,5	33,43	2,2	33,92	2,5	34,04	2,5	
QAM 4,5	33,58	2,3	33,96	2,5	34,06	2,5	

Result: PASS

Test Equipment used: 4

4.2 TX EIRP output power measured with spectrum analyzer

These measurements were performed at the antenna cable of the antenna unit. A power attenuator of 30 dB and Huber & Suhner microwave cables were used. The output power was measured with a spectrum analyzer.

The measurements were done with all available modulation schemes on all three channels in the lower part of the TX frequency band, the middle part of the TX frequency band, and the upper part of the TX frequency band, and at the mains DC voltage of 18 volts.

The antenna gain changes with elevation. The gain is highest at 20 deg elevation, The figures in the table below are at highest gain.

- 1626,5 MHz – **11.87 dBi**
- 1643,5 MHz – **11.88 dBi**
- 1660,4 MHz – **11,84 dBi**

The table shows output power (dBW) using a rms-detector

Measurement of EIRP Output power (dBW) measured with a Spectrum Analyzer, RBW=0,3 MHz; VBW=1 MHz						
TX Output Power EIRP (dBW)						Requirement
Modulation	TX frequency (MHz)					
	1626,6		1643,5		1660,4	
	Cond. Rms (dBm)	Gain = 11,87dBi EIRP (dBW)	Cond. Rms (dBm)	Gain = 11,88dBi EIRP (dBW)	Cond. Rms (dBm)	Gain = 11,84dBi EIRP (dBW)
QPSK 0,5	33,3	15,2	33,7	15,6	33,9	15,7
QPSK 1	33,4	15,3	33,8	15,7	33,9	15,8
QAM 1	33,7	15,6	34,1	16,0	34,2	16,0
QPSK 2	33,5	15,4	33,9	15,8	34,1	15,9
QAM 2	33,6	15,5	34,0	15,9	34,2	16,0
QPSK 4,5	33,4	15,3	33,9	15,8	34,1	15,9
QAM 4,5	33,5	15,4	33,9	15,8	34,1	15,9

Power class 1
Max. 15,1
dBW ± 2dB

Result: PASS

Test Equipment used: 2

5 Spurious or unwanted emission requirements

\$25.202(f), \$25.216, \$2.1051

5.1 Requirements

§25.202 Frequencies, frequency tolerance and emission limitations

(f) Emission limitations. The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50% up to and including 100% of the authorized bandwidth: 25 decibels;
- (2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100% up to and including 250% of the authorized bandwidth: 35 decibels;
- (3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250% of the authorized bandwidth: an amount equal to 43 decibels plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
- (4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f)(1), (2) and (3) of this section.

§25.216 Limits on emissions from mobile earth stations for protection of aeronautical radionavigation-satellite service.

(c) The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed -70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed -80 dBW, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band.

(f) Mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies in the 1610-1660.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -10 dBW/MHz at 1610 MHz.

(h) Mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1626.5-1660.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from -80 dBW at 1605 MHz to -56 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

§2.1051 Measurements required: Spurious emissions at antenna terminals. - The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

These measurements were performed at the antenna cable of the antenna unit. The spurious was measured with a spectrum analyzer.

The measurements were done on three channels in the lower part of the TX frequency band, the middle part of the TX frequency band, and the upper part of the TX frequency band.

The R20T1Q modulation scheme has been used, with bit rate of 67,2 kbit/s.

6 Spurious and unwanted emissions measurements

6.1 Occupied Bandwidth

The Occupied Bandwidth has been measured using all modulation schemes provided by the EuT, on three channels in the lower part of the TX frequency band, the middle part of the TX frequency band, and the upper part of the TX frequency band.

Occupied Bandwidth measurement					
		Carrier frequency (MHz)			
		1626,6	1643,5	1660,4	
EUT modulation	Authorized bandwidth KHz	OBW - 99% of power value (kHz)			
QPSK 0,5	21	18,7	18,3	18,6	Pass
QPSK 1	42	36,9	36,8	37,2	Pass
QAM 1	42	37,5	36,5	36,9	Pass
QPSK 2	84	73,6	74,6	74,2	Pass
QAM 2	84	74,4	73,2	74,4	Pass
QPSK 4,5	189	163,5	167,5	167,0	Pass
QAM 4,5	189	164,5	166,0	168,0	Pass

Result: PASS

(see plots on page 21)

Test Equipment used: 2

6.2 Spectrum mask measurements

The spectrum masks has been measured using all modulation schemes provided by the EuT, on three channels in the lower part of the TX frequency band, the middle part of the TX frequency band, and the upper part of the TX frequency band.

The requirements are given in clause 4.1. The “authorized bandwidths” in §25.202(f) which has been used as basis to calculate the limit lines, are the following for the possible EuT modulation schemes;

EuT modulation scheme	R20T0.5Q	R20T1Q	R20T1X	R20T2Q	R20T2X	R20T4.5Q	R20T4.5X
“Authorized bandwidth” (kHz)	21	42	42	84	84	189	189
Symbol Rate (kS/s)	16.8	33.6	33.6	67.2	67.2	151.2	151.2
50% Bandwidth (KHz)	10,5	21	21	42	42	94,5	94,5
50% – 100% Bandwidth (KHz)	10,5 - 21	21 - 42	21 - 42	42 - 84	42 - 84	94 - 189	94 - 189
100% - 250% Bandwidth (KHz)	21 – 52,5	42 – 105	42 – 105	84 – 210	84 – 210	189 – 472,5	189 – 472,5
>250 % of authorized bandwidth (KHz)	> 52,5	>105	>105	>210	>210	>472,5	>472,5

The measurement was done at the amplifier output of the transmitter (including attenuators), a rms detector was used. The reference level was the level measured with a RBW of 300 kHz.

For the modulation schemes R20T0.5Q, R20T1Q, R20T1X, a RBW of 300 Hz was used. The threshold limits as given in §25.202(f) was reduced accordingly by a factor $10 \cdot \log(4 \text{ kHz} / 300 \text{ Hz}) = 11.25 \text{ dB}$.

For the remaining modulation schemes a RBW of 3 KHz was used. The threshold limits as given in §25.202(f) was reduced accordingly by a factor $10 \cdot \log(4 \text{ kHz} / 3000 \text{ Hz}) = 1.25 \text{ dB}$.

Result: PASS (see plots on page **Feil! Bokmerke er ikke definert.**)

Test Equipment used: 1

6.3 Conducted Spurious Emissions (20 MHz - 18 GHz)

This measurement has been performed conducted at the connector to the antenna.

Reference fundamental level = 34,2 dBm / 2,63W

Carrier to Spurious ratio (dB)			
Spurious frequency (MHz)	Modulation scheme		Requirement
	-	R20T1Q	
carrier at 1626,6 MHz			
1630,000	-	74,2	
1644,750	-	71,9	
1648,140	-	71,9	
6506,4	-	69,9	
All others	-	>80	
carrier at 1643,5 MHz			43 + 10*log(TX Watt)]
1624,225	-	>80	in any 4 kHz bandwidth
1637,835	-	76,2	
1651,445	-	77	
6574,0	-	83,0	↔
All others	-	>85	Carrier to Spurious ratio of >47,2 dB @ +34,2 dBm
carrier at 1660,4 MHz			
1642,250	-	>80	
1645,653	-	76,9	
1654,953	-	76,1	
1663,800	-	76,3	
6641,6	-	86,8	
All others	-	>90	

Result: PASS

Test Equipment used: 1

Plots can be found on pages: 53 - 77

6.4 Spurious missions from mobile earth stations for protection of aeronautical radionavigation-satellite service

Measurements according to §25.216(c, f, h)

This measurement has been performed conducted and radiated in the frequency range 1559 – 1610 MHz.

Spurious level (dBW/1MHz)			
Spurious frequency (MHz)	Modulation scheme		Requirement
	-	R20T1Q	
Carrier at 1626,6 MHz			shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from -70 dBW/MHz at 1605 MHz to -46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. In the band 1559-1605 MHz shall not exceed -70 dBW/MHz, averaged over any 2 millisecond active transmission interval
1608,47	-	-66,5	
Carrier at 1643,5 MHz			
1609,39	-	-86,2	
Carrier at 1660,4 MHz			
1609,69	-	-84,4	

Spurious level (dBW/300 Hz)			
Spurious frequency (MHz)	Modulation scheme		Requirement
	-	R20T1Q	
Carrier at 1626,6 MHz			In the 1587.42-1605 MHz band the e.i.r.p. of discrete emissions of less than 700 Hz bandwidth generated by such stations shall not exceed -74 dBW, averaged over any 2 millisecond active transmission interval
1605	-	-115,3	
Carrier at 1643,5 MHz			
1605	-	<-120	
Carrier at 1660,4 MHz			
1605	-	<-120	

Result: PASS

Test Equipment used: 1

Plots from conductive measurements are found on page 41 to 52

Plots from radiated measurements are found on page 53 to 54

Measurements according to §25.216(i)

This measurement has been performed conducted and radiated

Spurious frequency (MHz)	Spurious level (dBW/MHz)	Requirement
Conducted measurement		shall not exceed -80 dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval
1559-1610	<-94	
Radiated vertical polarization		
1605	-91,4	
Radiated horizontal polarization		
1562,8	-91,6	

Result: PASS

Test Equipment used: 1

Plots are found on page 91 to 93

7 Radiated Spurious emissions TX ON

\$25.202(f) & \$2.1053

This test has been performed in a semi-anechoic chamber. The distance between EUT and antenna was 3 meters.

The EUT was in TX ON mode. Spurious was measured from 30 MHz to 18 GHz.

Spurious freq (MHz)	Spurious level (dBm)	RBW used at measurement (kHz)	Polarisation (VP / HP)	Requirement
Carrier at 1626,6 MHz				EIRP – [43 + 10*log(EIRP _{TX Watt})] in any 4 kHz bandwidth ⇔ -14,25 dBm @ EIRP +46,18 dBm
4879,7	-52,7	300	VP	
6506,4	-32,2	1000	HP	
9759,6	-37,4	1000	HP	
Carrier at 1643,5 MHz				
4930,5	-49,0	300	VP	
6574,0	-38,6	1000	HP	
9861,0	-39,5	1000	HP	
Carrier at 1660,4 MHz				
4981,2	-63,8	300	VP	
6641,6	-45,4	300	HP	
Others 20 – 1000 MHz	<-60 dBm	100	VP&HP	
Others 1000 – 18000 MHz	<-37 dBm	1000	VP&HP	

NOTE: Measured spurious level (dBm) is value with measurement bandwidth (RBW) as given in column 3
Measured value is with trace in "Max-Hold" and EuT being turned 360 deg.

Result: PASS

Test Equipment used: 2, 5, 6, 7, 8

Plots are found on page: **78 - 90**

8 Frequency stability

Nominal Channel Frequency: 1.643 500 000 GHz
 Reference Frequency (measured at 20°C and nominal voltage): 1.643 499 880 GHz (18VDC)
 Frequency stability was measured when locked to satellite emulator

DC supply voltage was reduced from nominal value to DC operating end point for each temperature.

Ambient Temp.(°C) Frequency 1643,499880 MHz@ 20°C/18VDC	Deviation (Hz)	Deviation (Hz)	Deviation (Hz)	FCC Requirements
	10,5 V	18V	32V	
-30	-120	-109	-118	± 10ppm
-20	-119	-116	-118	
-10	-118	-118	-121	
0	-115	-118	-111	
10	-119	-110	-120	
20	-110	-120	-112	
30	-120	-107	-120	
40	-120	-114	-117	
50	-106	-114	-120	
55	-102	-110	-123	

Max deviation = -123Hz / -0,07ppm

Test result: Pass

9 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

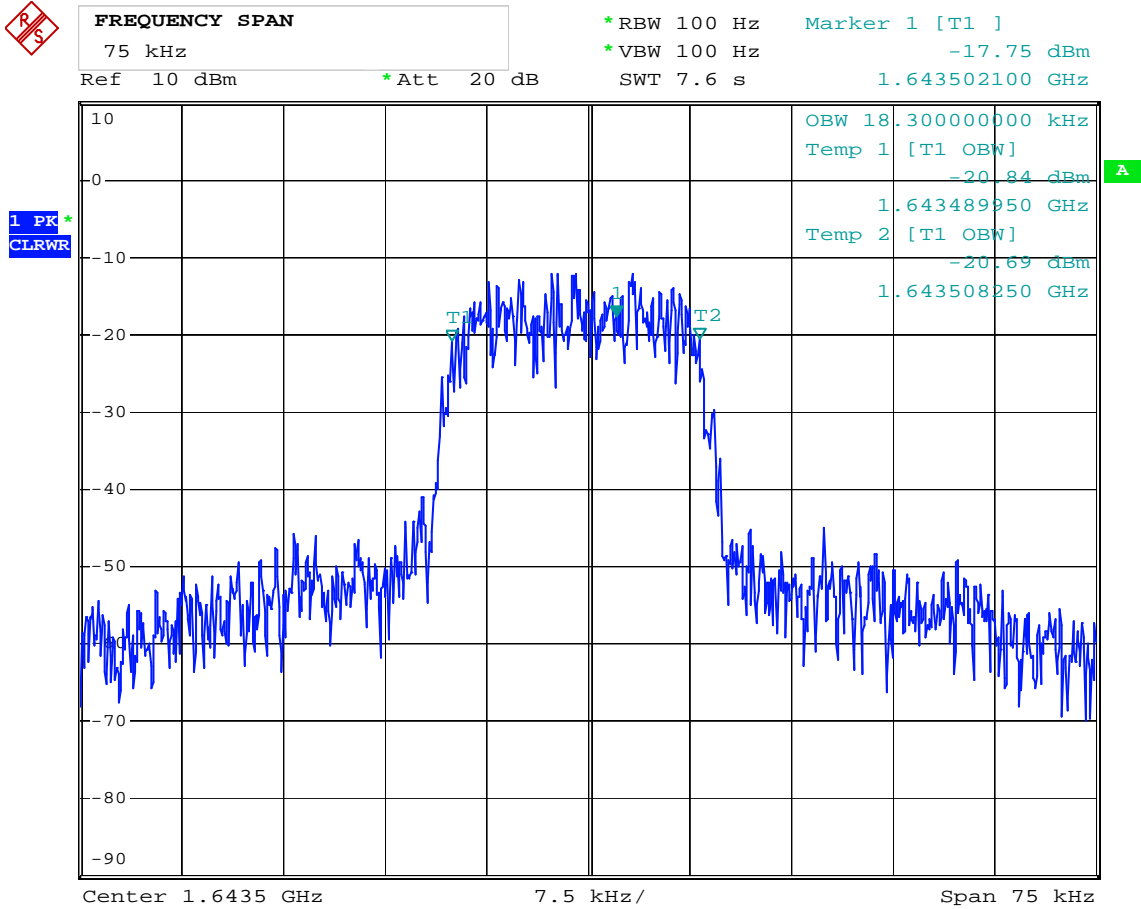
To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory.

No	Instrument/ Ancillary	Model	Manufacturer	Ser. No.	Calibration date	Calibration due
1	Spectrum Analyser	FSEK	R&S	848604/010	23.12.2009	23.12.2011
2	Spectrum Analyser	FSU	R&S	100030	28.05.2009	25.05.2011
3	Spectrum Analyzer	FSL	R&S	100126	20.10.2009	20.10.2010
4	Power Meter	436A	HP	1725A02104	21.10.2009	21.10.2010
5	Log Periodical antenna	HL562	R&S	100263	21.10.2009	21.10.2012
6	Horn Antenna	3115	EMCO	9710-5306	24.04.2009	24.04.2012
7	Horn Antenna	643	NARDA	NA	26.01.2009	26.01.2012
8	Preamplifier	JS4	MITEQ	NA	28.01.2009	28.01.2011
9	Radiated Test site	FCC test firm registration no. : 994405				

10 Measurement Plots

10.1 Occupied Bandwidth

Only plots for carrier at 1643.5 MHz are given as the plots are very much similar for all three carriers. Plots are provided for all modulation schemes.



Date: 8.JUN.2010 14:44:00

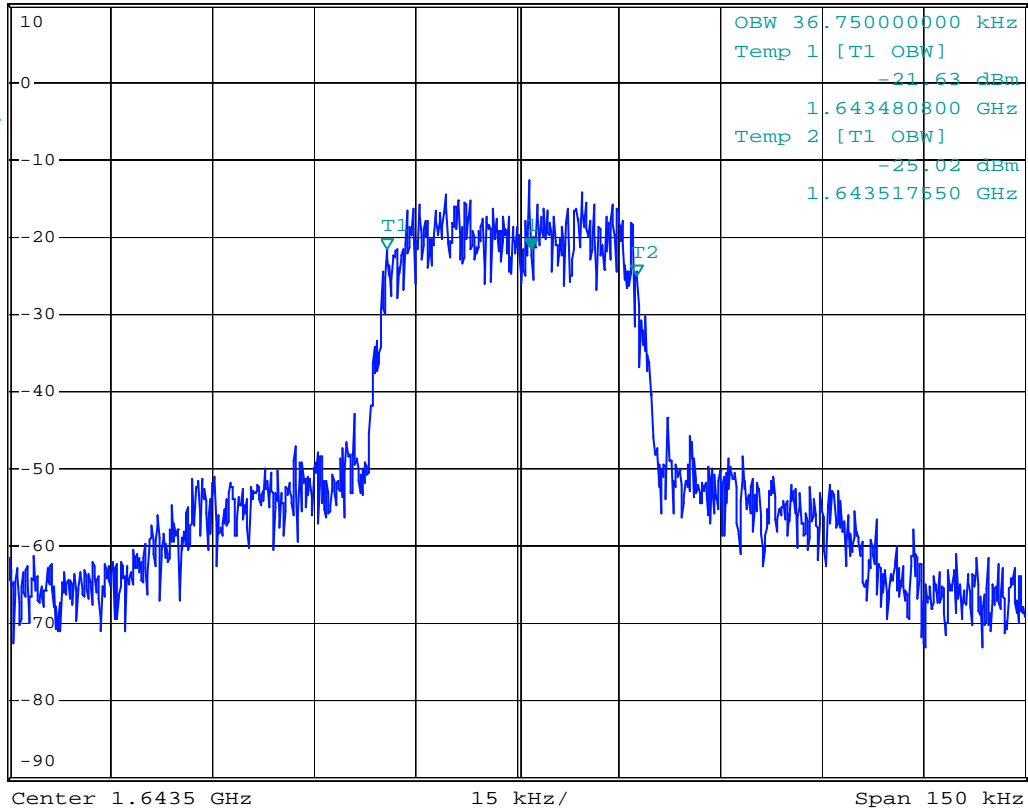
R20T0.5Q



FREQUENCY SPAN
150 kHz
Ref 10 dBm *Att 20 dB

*RBW 100 Hz Marker 1 [T1]
*VBW 100 Hz -21.64 dBm
SWT 15 s 1.643502100 GHz

1 PR *
CLRWR



Date: 8.JUN.2010 14:40:15

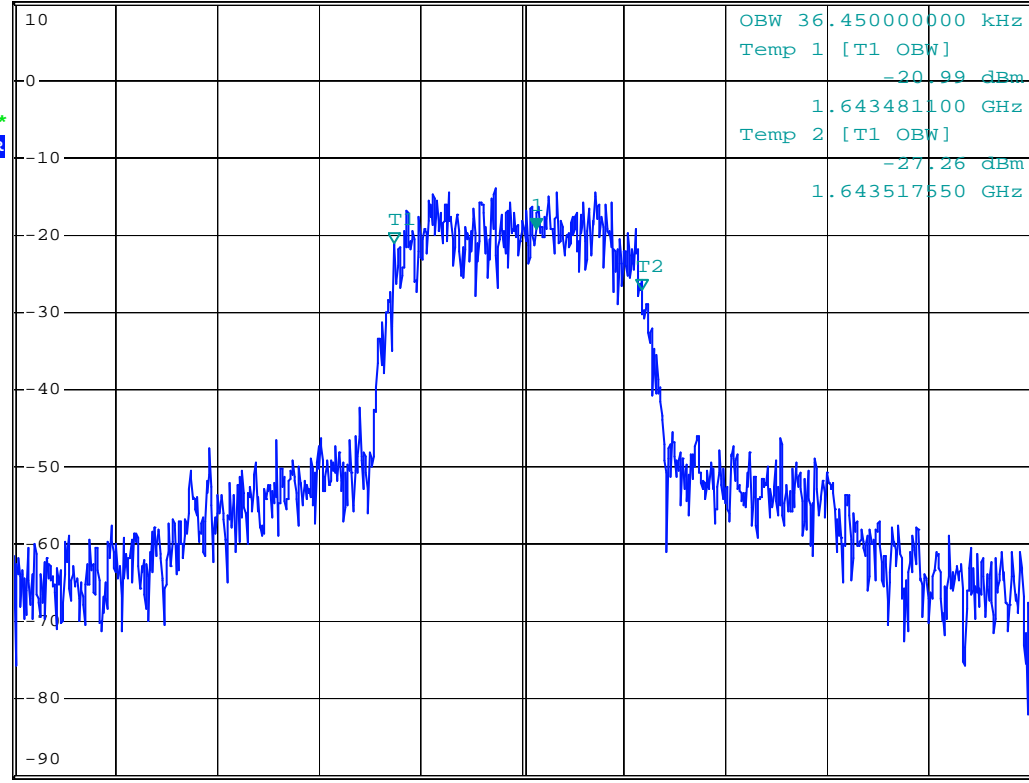
R20T1Q



FREQUENCY SPAN
 150 kHz
 Ref 10 dBm *Att 20 dB

*RBW 100 Hz Marker 1 [T1]
 *VBW 100 Hz -19.20 dBm
 SWT 15 s 1.643502100 GHz

1 PR *
 CLRWR



Center 1.6435 GHz 15 kHz/ Span 150 kHz

Date: 8.JUN.2010 14:41:08

R20T1X

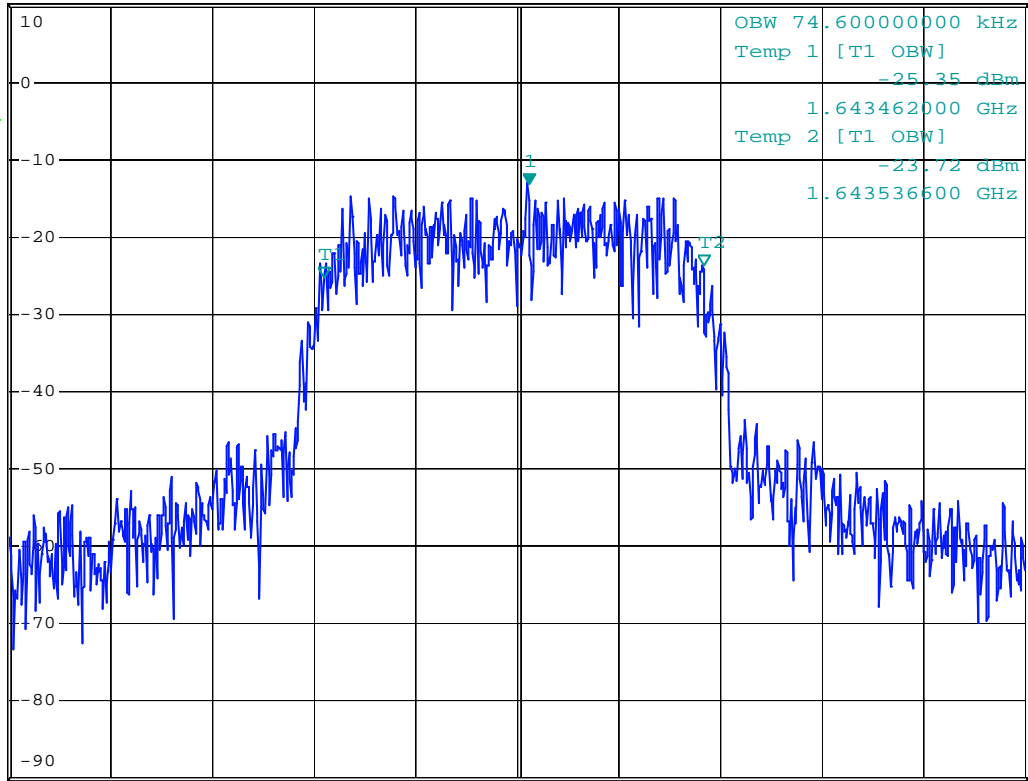


FREQUENCY SPAN
 200 kHz

Ref 10 dBm *Att 20 dB

*RBW 300 Hz Marker 1 [T1]
 *VBW 300 Hz -13.26 dBm
 SWT 2.25 s 1.643502100 GHz

1 PR *
 CLRWR



Center 1.6435 GHz 20 kHz/ Span 200 kHz

Date: 8.JUN.2010 14:28:40

R20T2Q

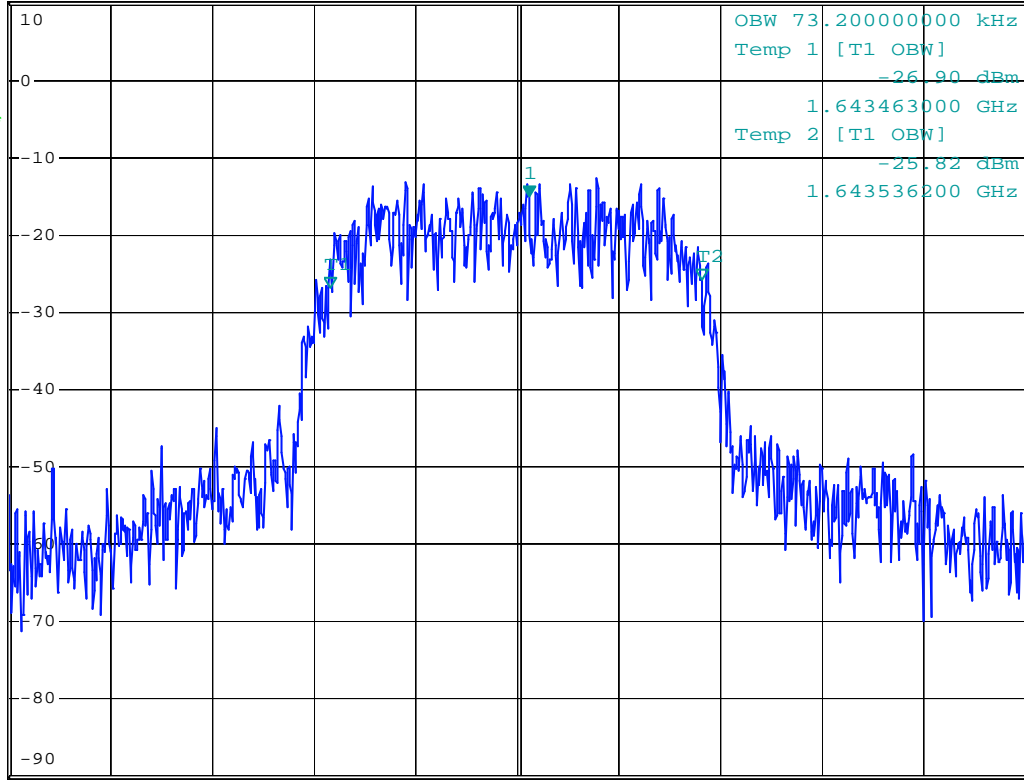


FREQUENCY SPAN
 200 kHz

Ref 10 dBm *Att 20 dB

*RBW 300 Hz Marker 1 [T1]
 *VBW 300 Hz -15.03 dBm
 SWT 2.25 s 1.643502100 GHz

1 PR *
 CLRWR



Center 1.6435 GHz 20 kHz/ Span 200 kHz

Date: 8.JUN.2010 14:29:19

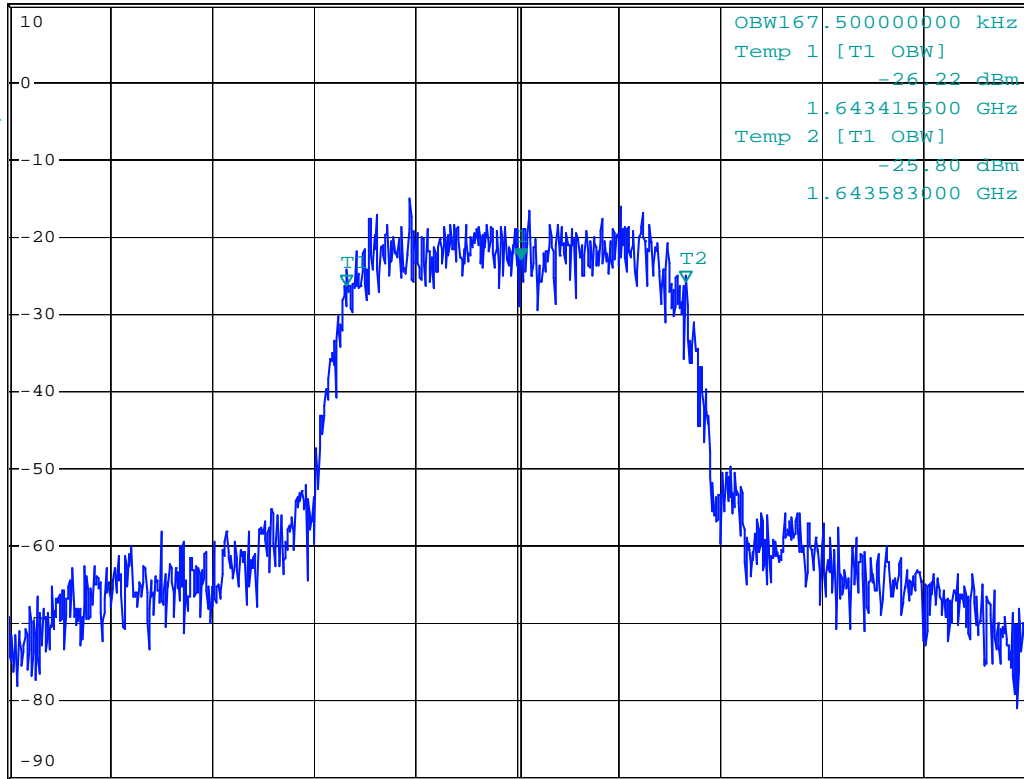
R20T2X



FREQUENCY SPAN
 500 kHz
 Ref 10 dBm *Att 20 dB

*RBW 300 Hz Marker 1 [T1]
 *VBW 300 Hz -22.83 dBm
 SWT 5.6 s 1.643502100 GHz

1 PR *
 CLRWR



OBW167.500000000 kHz
 Temp 1 [T1 OBW] -26.22 dBm
 1.643415500 GHz
 Temp 2 [T1 OBW] -25.80 dBm
 1.643583000 GHz

Center 1.6435 GHz 50 kHz/ Span 500 kHz

Date: 8.JUN.2010 14:24:11

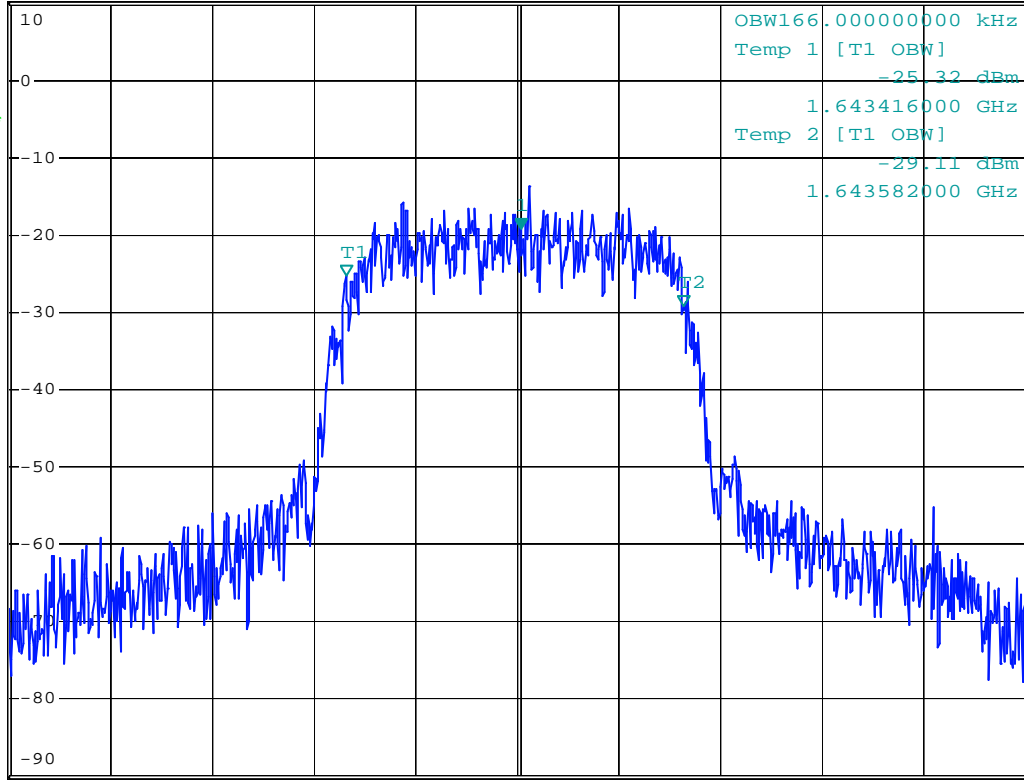
R20T4.5Q



FREQUENCY SPAN
500 kHz
Ref 10 dBm *Att 20 dB

*RBW 300 Hz Marker 1 [T1]
*VBW 300 Hz -19.30 dBm
SWT 5.6 s 1.643502100 GHz

1 PK*
CLRWR



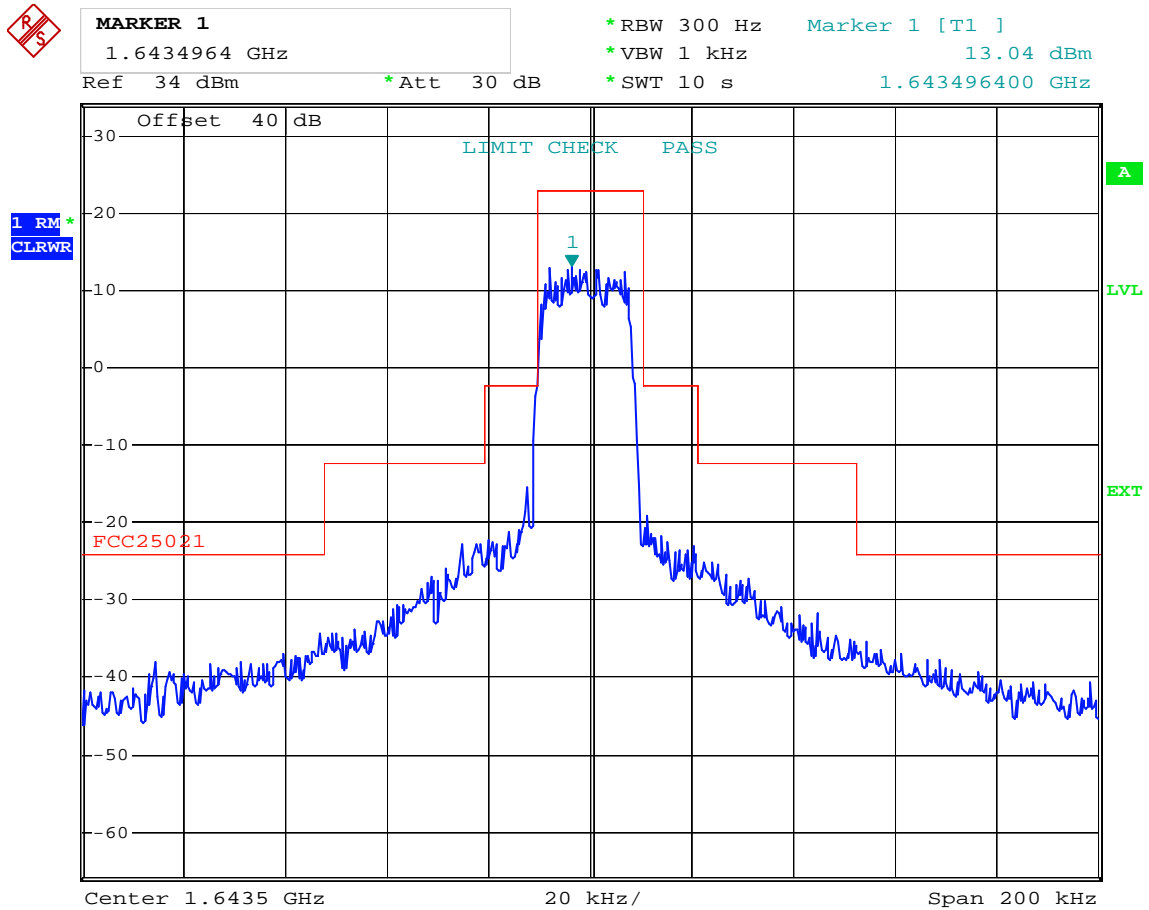
Center 1.6435 GHz 50 kHz/ Span 500 kHz

Date: 8.JUN.2010 14:24:51

R20T4.5X

10.2 Spectrum Masks

Only plots for carrier at 1643.5 MHz are given as the plots are very much similar for all three carriers. Plots are provided for all modulation schemes.



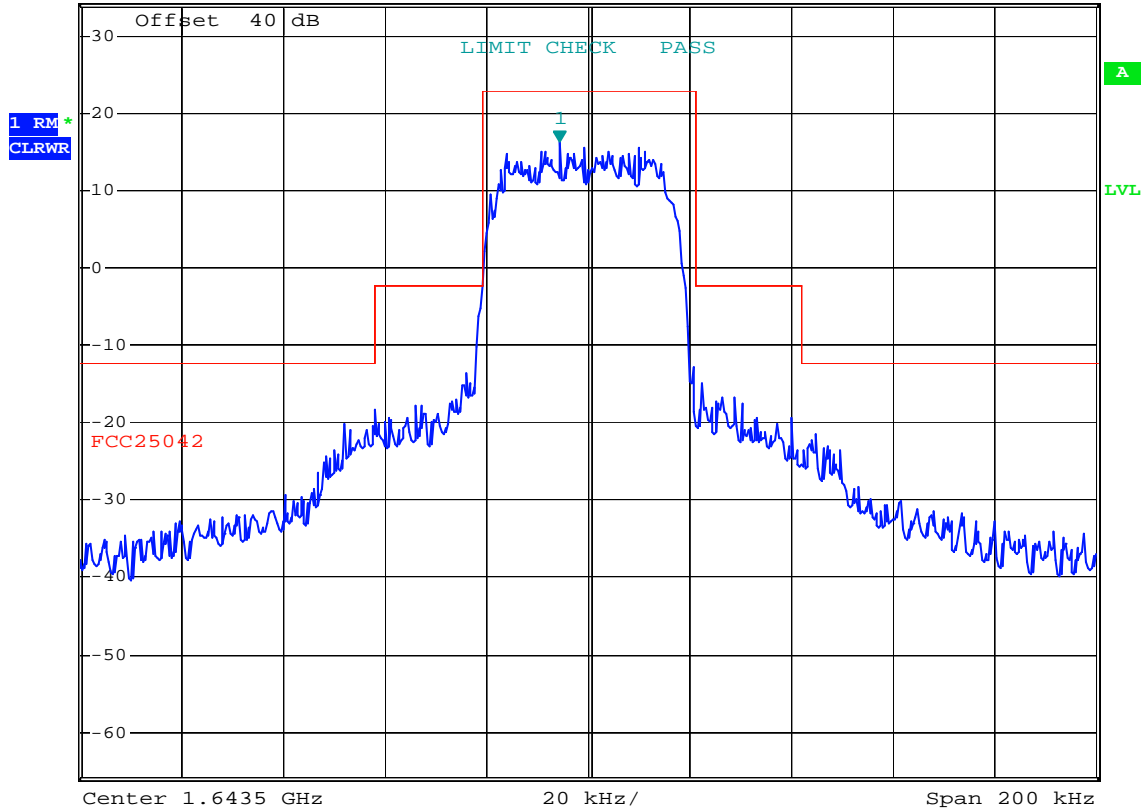
Date: 29.SEP.2010 14:49:44

1643.5 MHz – modulation scheme R20T0.5Q – SR 16.8 kS/s



MARKER 1
1.6434944 GHz
Ref 34 dBm *Att 30 dB

*RBW 300 Hz Marker 1 [T1]
*VBW 1 kHz 16.35 dBm
*SWT 10 s 1.643494400 GHz



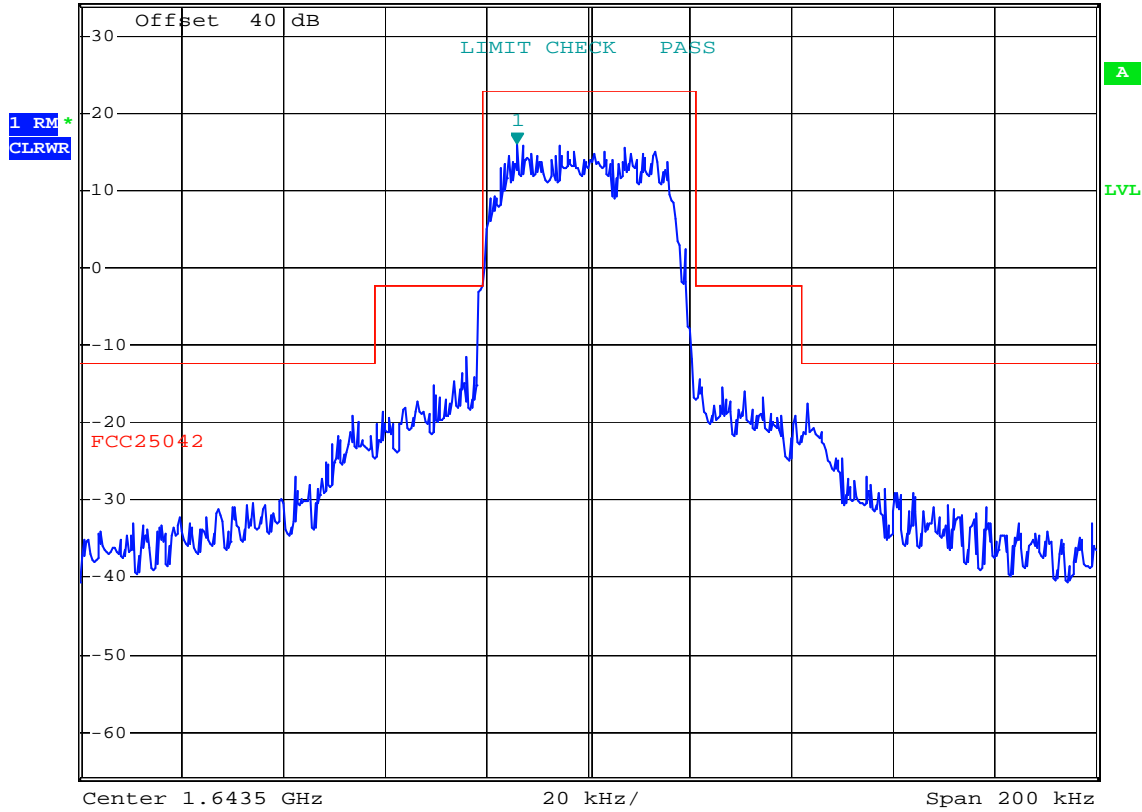
Date: 29.SEP.2010 13:43:00

1643.5 MHz – modulation scheme R20T1Q – SR 33.6 kS/s



MARKER 1
1.643486 GHz
Ref 34 dBm *Att 30 dB

*RBW 300 Hz Marker 1 [T1]
*VBW 1 kHz 16.08 dBm
*SWT 10 s 1.643486000 GHz



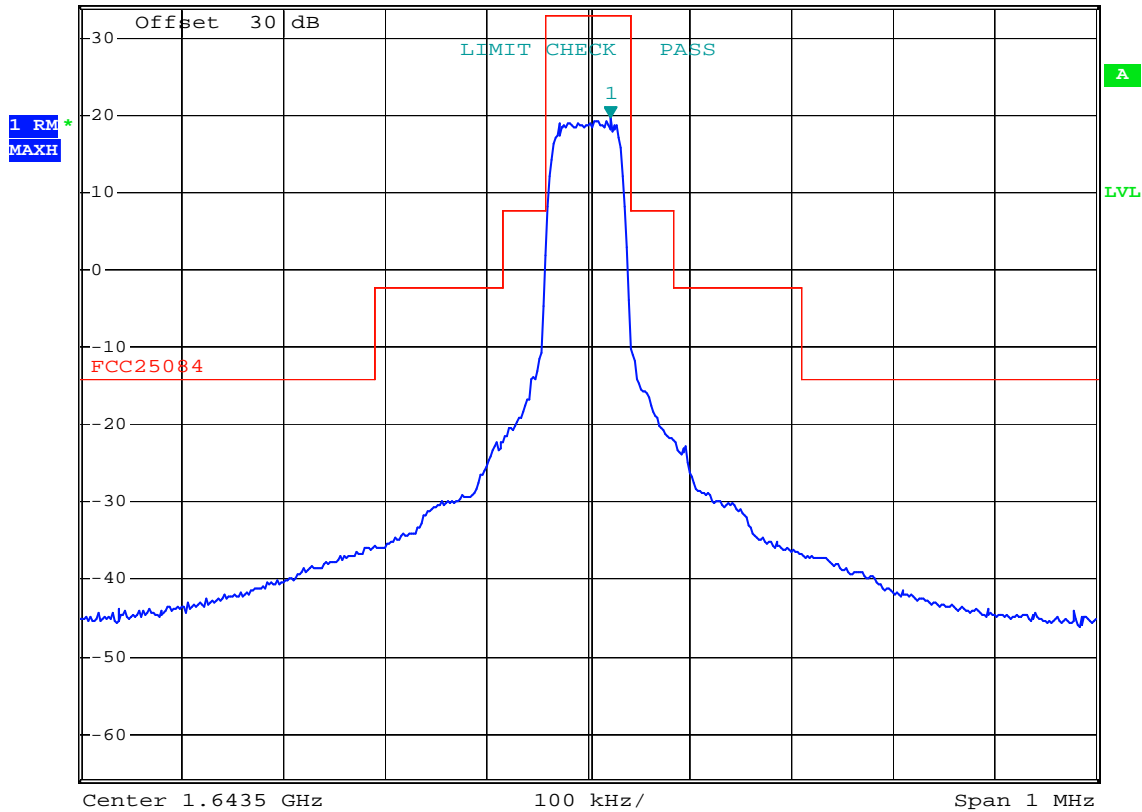
Date: 29.SEP.2010 13:46:40

1643.5 MHz – modulation scheme R20T1X – SR 33.6 kS/s



MARKER 1
1.643522 GHz
Ref 34 dBm *Att 40 dB

*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz 19.82 dBm
*SWT 10 s 1.643522000 GHz



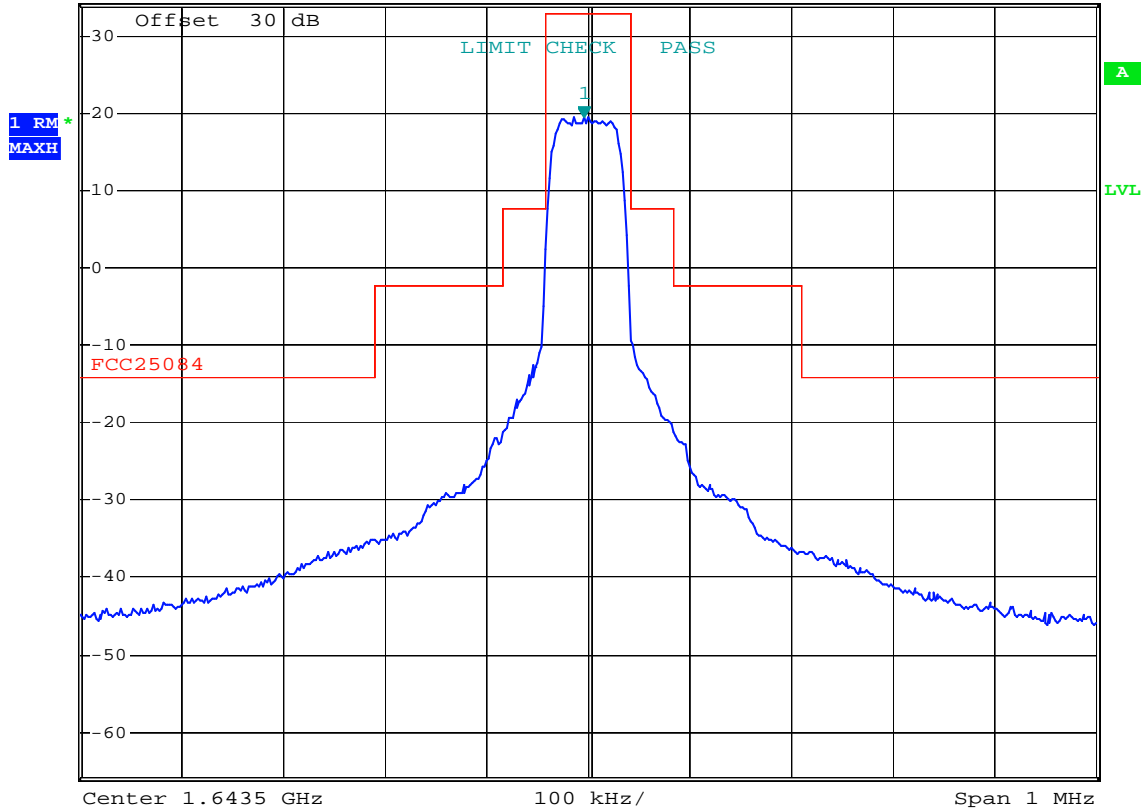
Date: 29.SEP.2010 13:25:28

1643.5 MHz – modulation scheme R20T2Q – SR 67.2 kS/s



MARKER 1
1.643496 GHz
Ref 34 dBm *Att 40 dB

*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz 19.44 dBm
*SWT 10 s 1.643496000 GHz



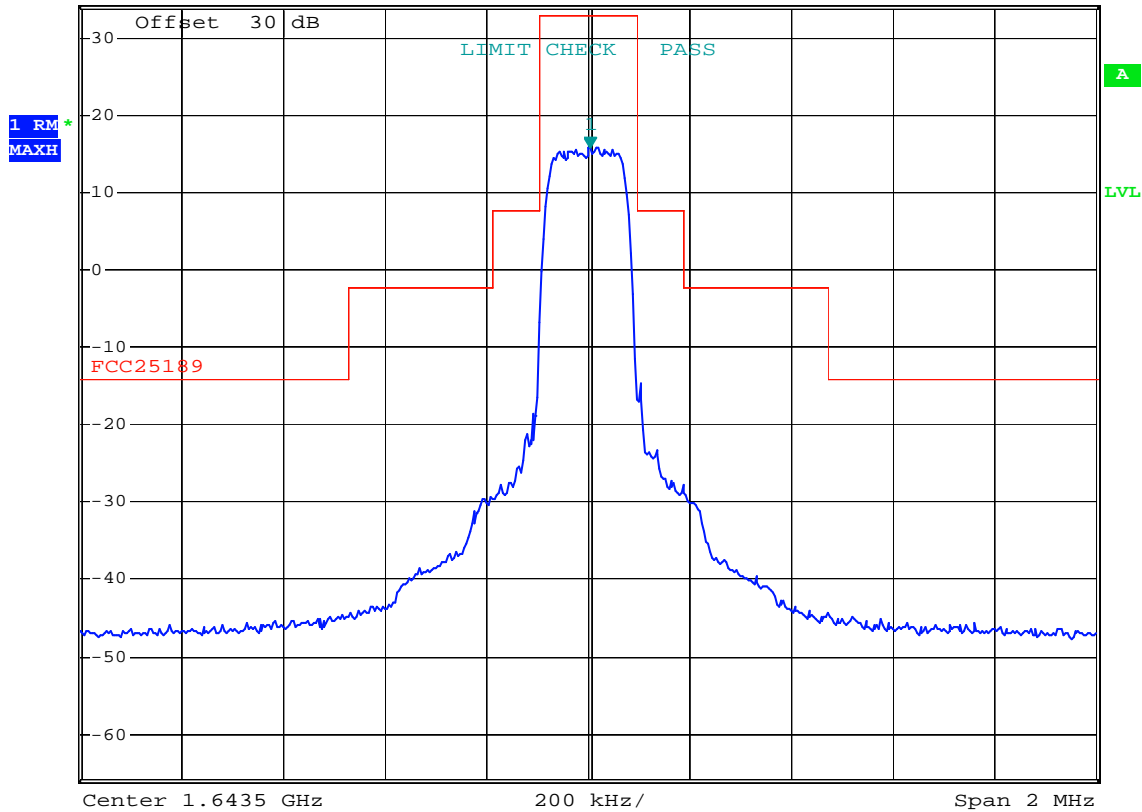
Date: 29.SEP.2010 13:24:24

1643.5 MHz – modulation scheme R20T2X – SR 67.2 kS/s



MARKER 1
 1.643504 GHz
 Ref 34 dBm *Att 40 dB

*RBW 3 kHz Marker 1 [T1]
 *VBW 10 kHz 15.89 dBm
 *SWT 10 s 1.643504000 GHz



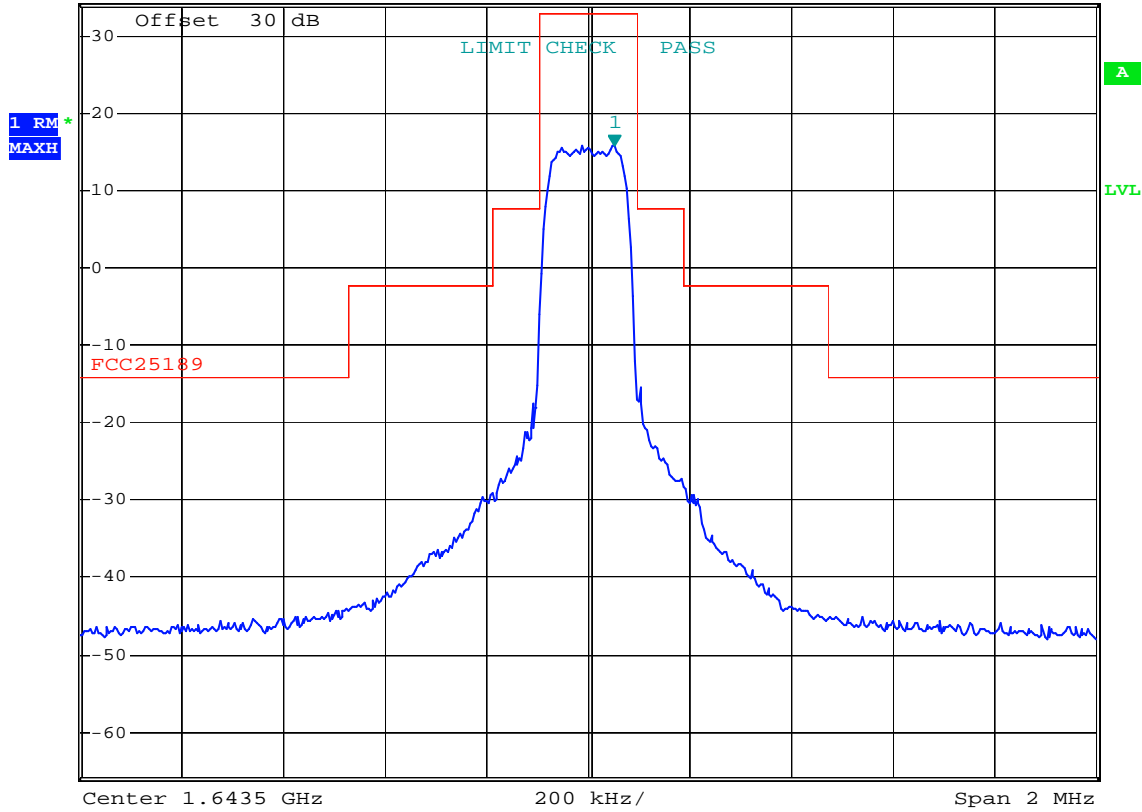
Date: 29.SEP.2010 13:26:28

1643.5 MHz – modulation scheme R20T4.5Q – SR 151.2 kS/s



MARKER 1
 1.643552 GHz
 Ref 34 dBm *Att 40 dB

*RBW 3 kHz Marker 1 [T1]
 *VBW 10 kHz 15.85 dBm
 *SWT 10 s 1.643552000 GHz

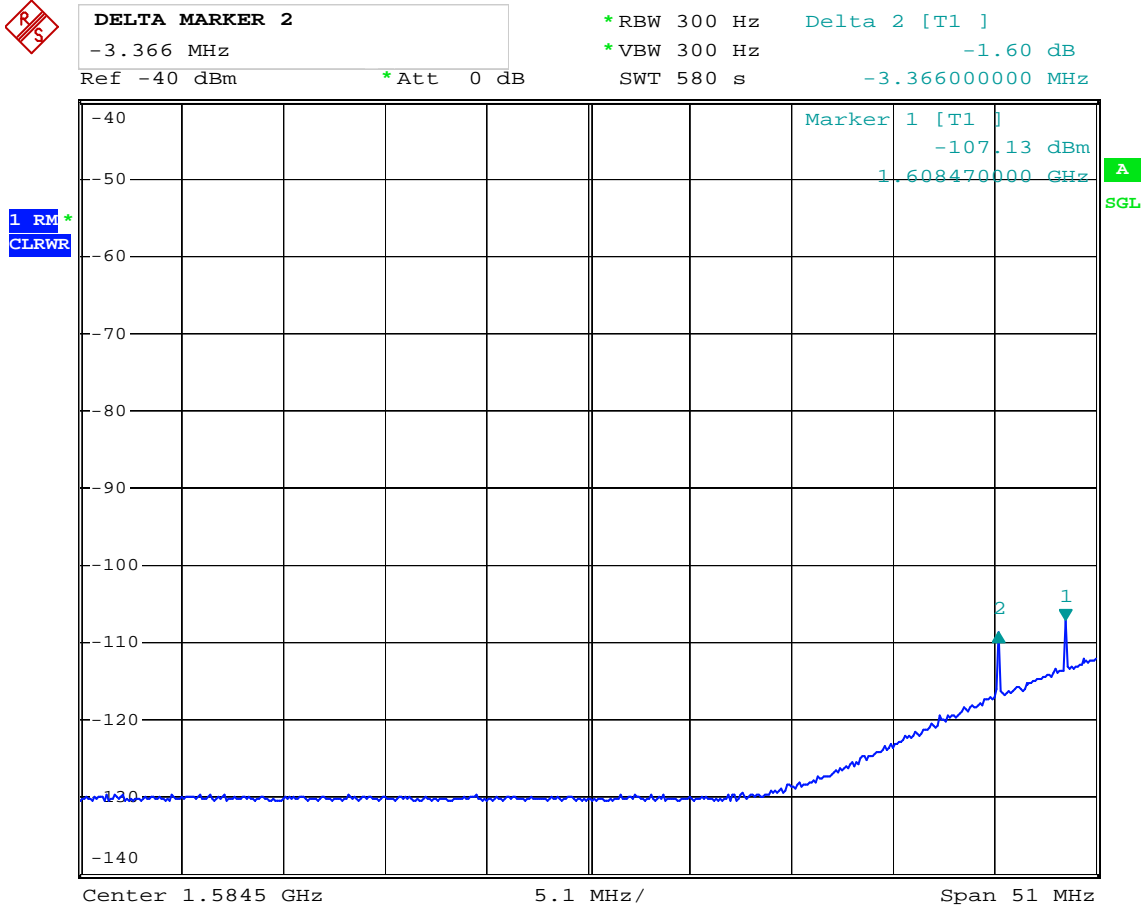


Date: 29.SEP.2010 13:27:17

1643.5 MHz – modulation scheme R20T4.5X – SR 151.2 kS/s

10.3 Spurious emissions TX ON

10.3.1 Conducted 1559 – 1610 MHz



Date: 4.JUN.2010 12:49:07

Carrier 1626,6 MHz, modulation scheme R20T1Q

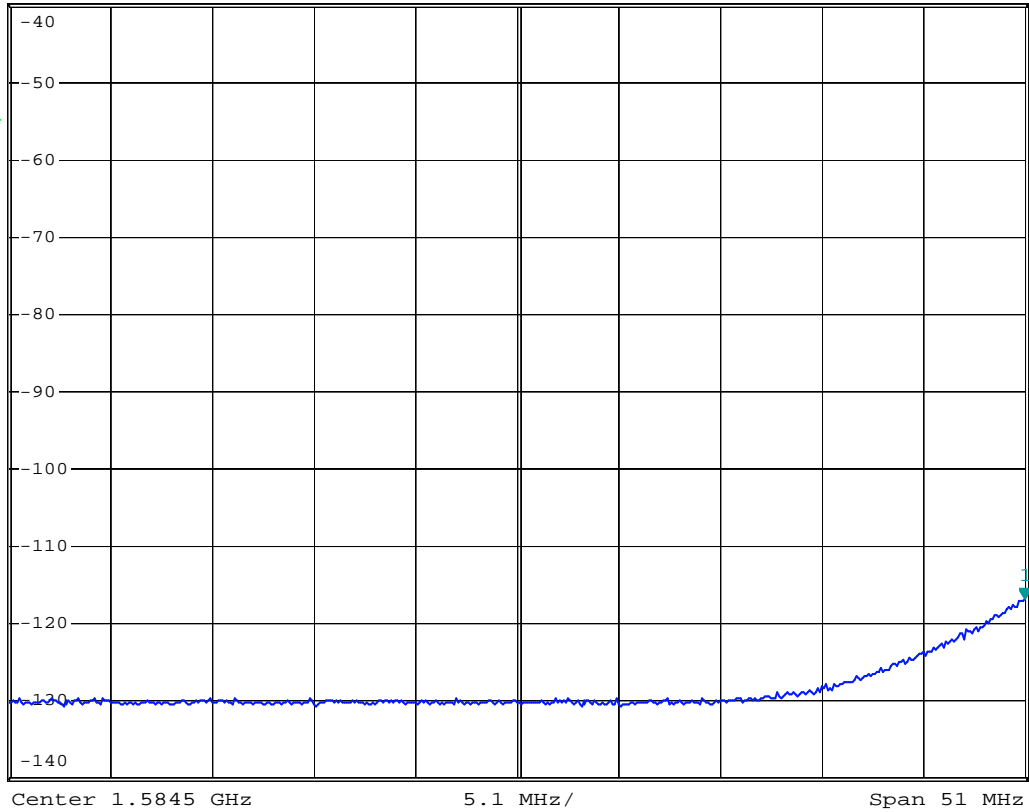


MARKER 1
1.61 GHz
Ref -40 dBm *Att 0 dB

*RBW 300 Hz Marker 1 [T1]
*VBW 300 Hz -116.65 dBm
SWT 580 s 1.61000000 GHz

1. RM *
CLRWR

A
SGL



Date: 4.JUN.2010 13:03:01

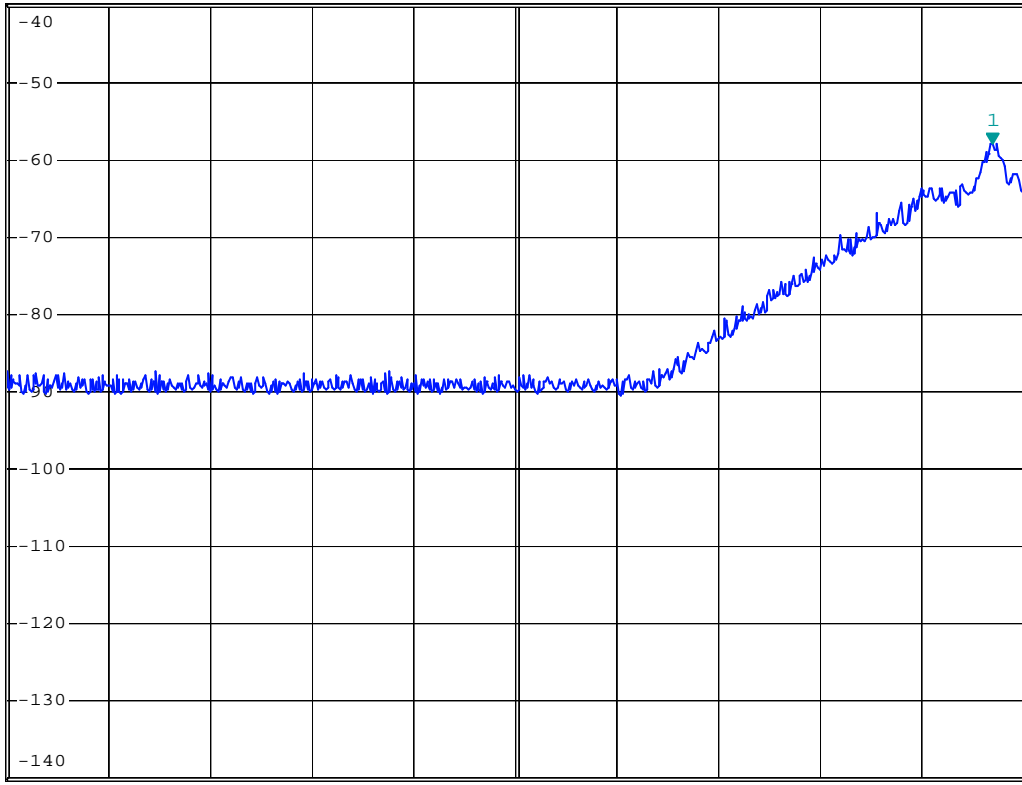
Carrier 1643.5 MHz, modulation scheme R20T1Q



STOP FREQUENCY
1.61 GHz
Ref -40 dBm *Att 0 dB

*RBW 1 MHz Marker 1 [T1]
*VBW 1 MHz -57.86 dBm
SWT 2.5 ms 1.608470000 GHz

1. RM
MAXH



Start 1.559 GHz 5.1 MHz/ Stop 1.61 GHz

Date: 4.JUN.2010 13:18:42

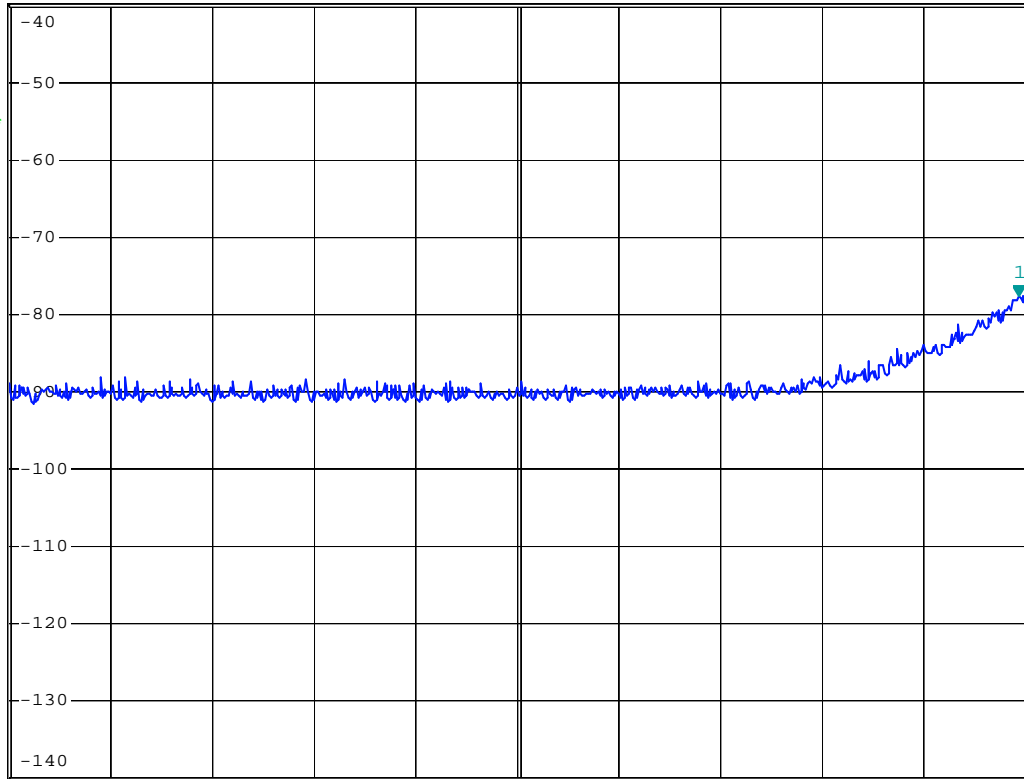
Carrier 1626.6 MHz, modulation scheme R20T1Q



MARKER 1
1.609694 GHz
Ref -40 dBm *Att 0 dB

*RBW 1 MHz Marker 1 [T1]
*VBW 1 MHz -77.62 dBm
SWT 2.5 ms 1.609694000 GHz

1. RM
MAXH



Start 1.559 GHz 5.1 MHz/ Stop 1.61 GHz

Date: 4.JUN.2010 13:23:24

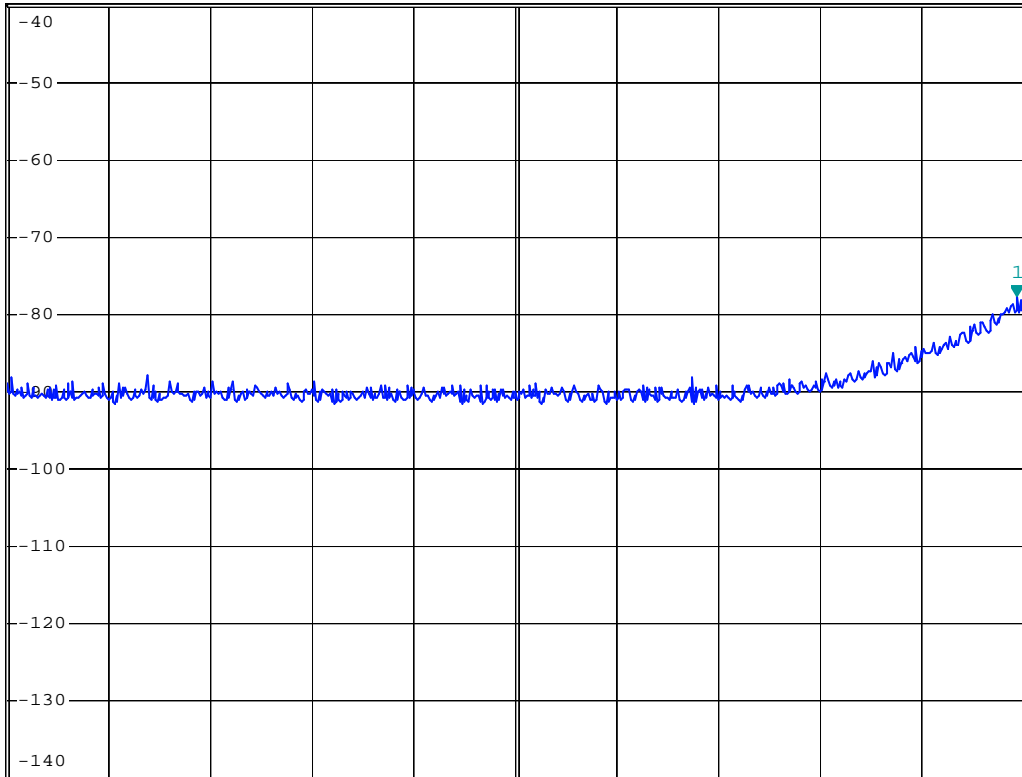
Carrier 1643.5 MHz, modulation scheme R20T1Q



MARKER 1
1.609694 GHz
Ref -40 dBm *Att 0 dB

*RBW 1 MHz Marker 1 [T1]
*VBW 1 MHz -77.75 dBm
SWT 2.5 ms 1.609694000 GHz

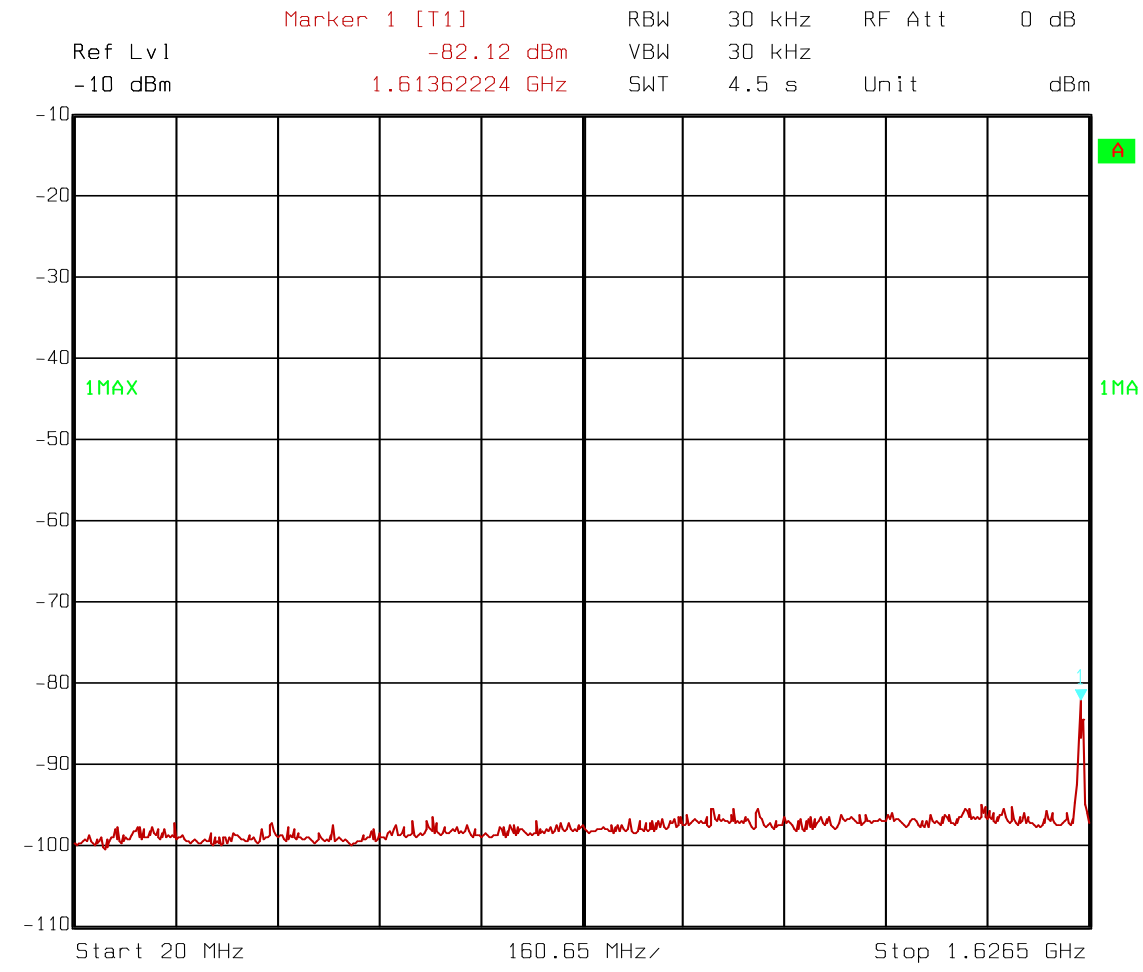
1. RM
MAXH



Start 1.559 GHz 5.1 MHz/ Stop 1.61 GHz

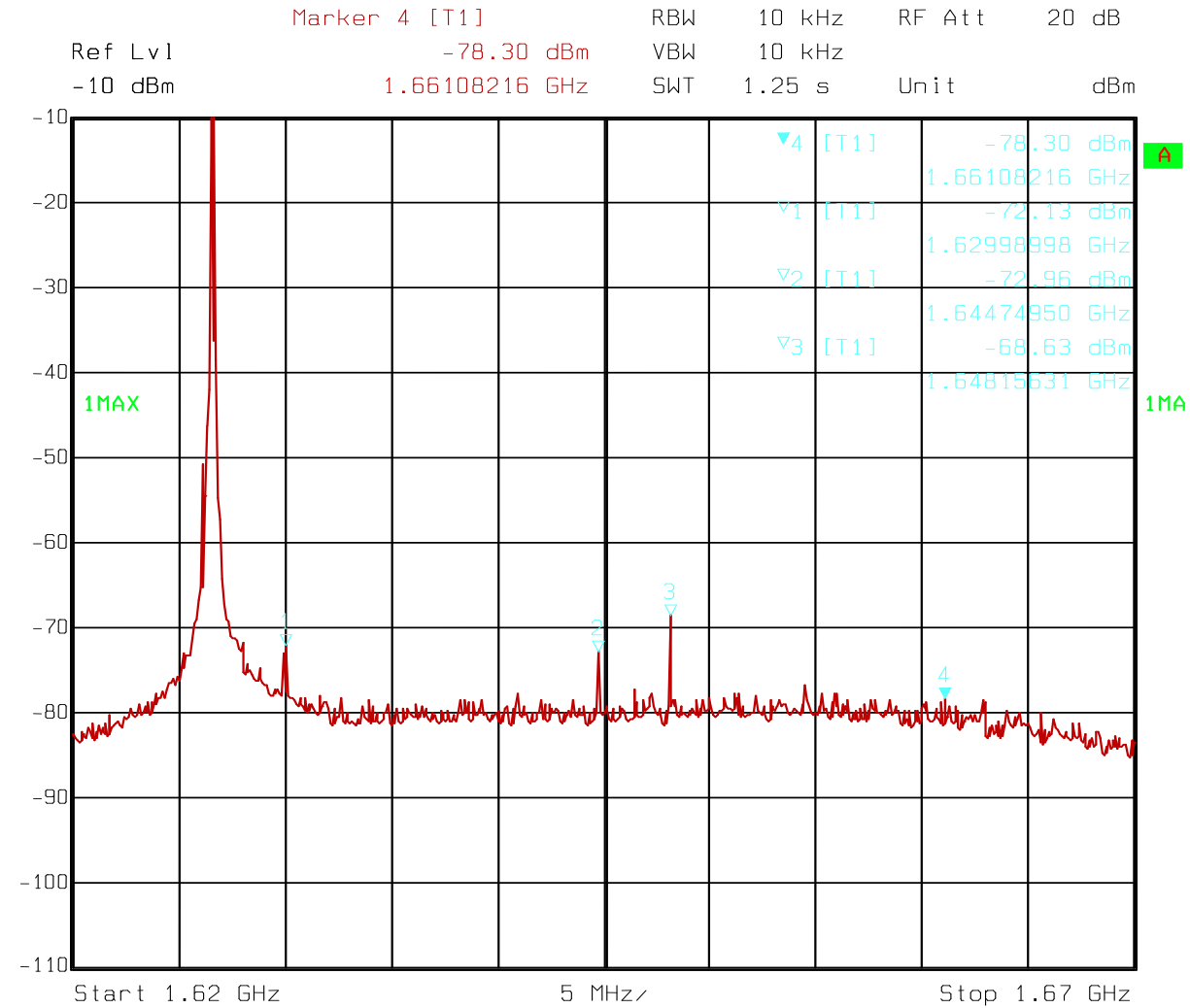
Date: 4.JUN.2010 13:24:46

Carrier 1660.4 MHz, modulation scheme R20T1Q



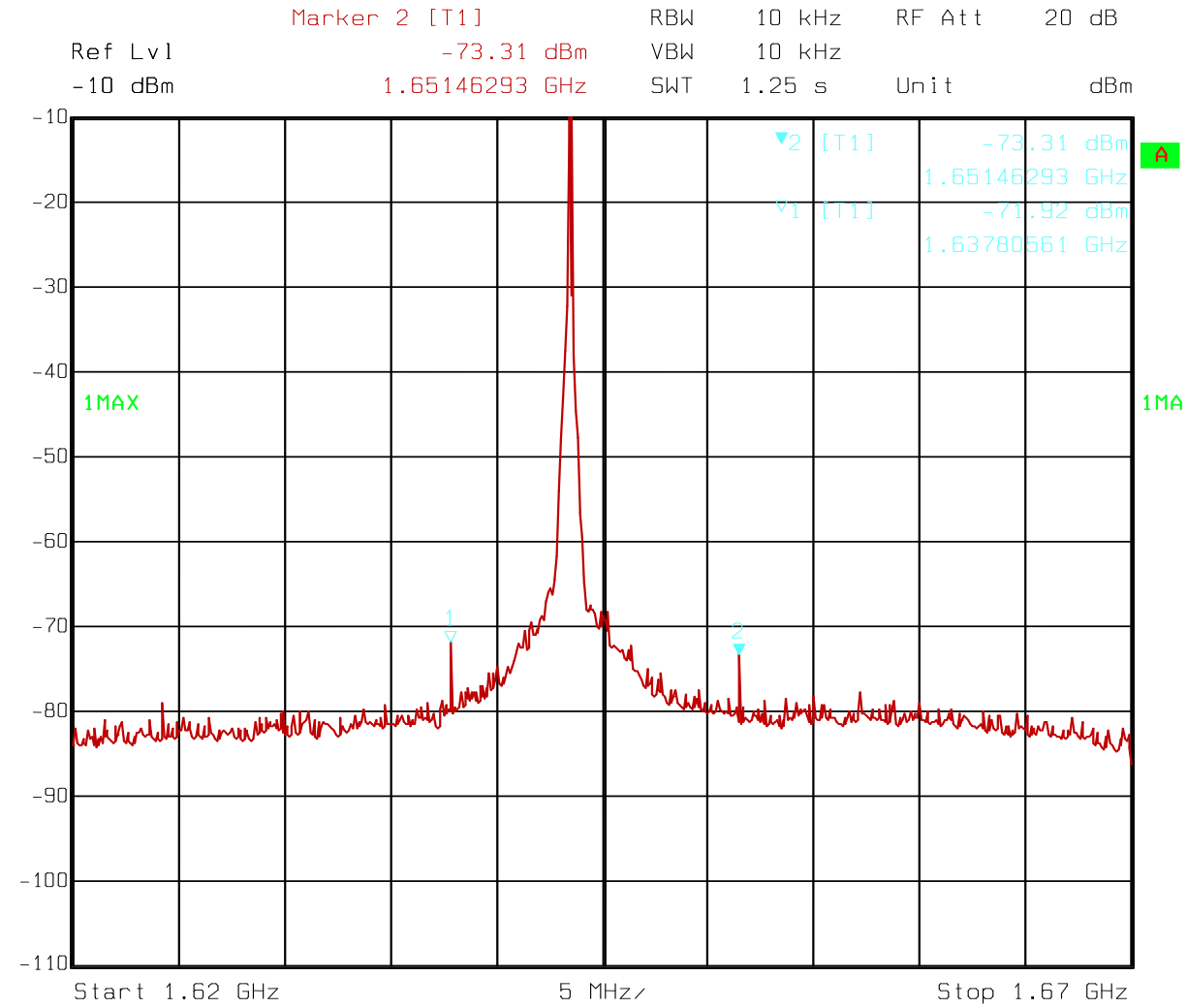
Date: 04.JUN.2010 08:42:04

Carrier 1643 MHz, modulation scheme R20T1Q



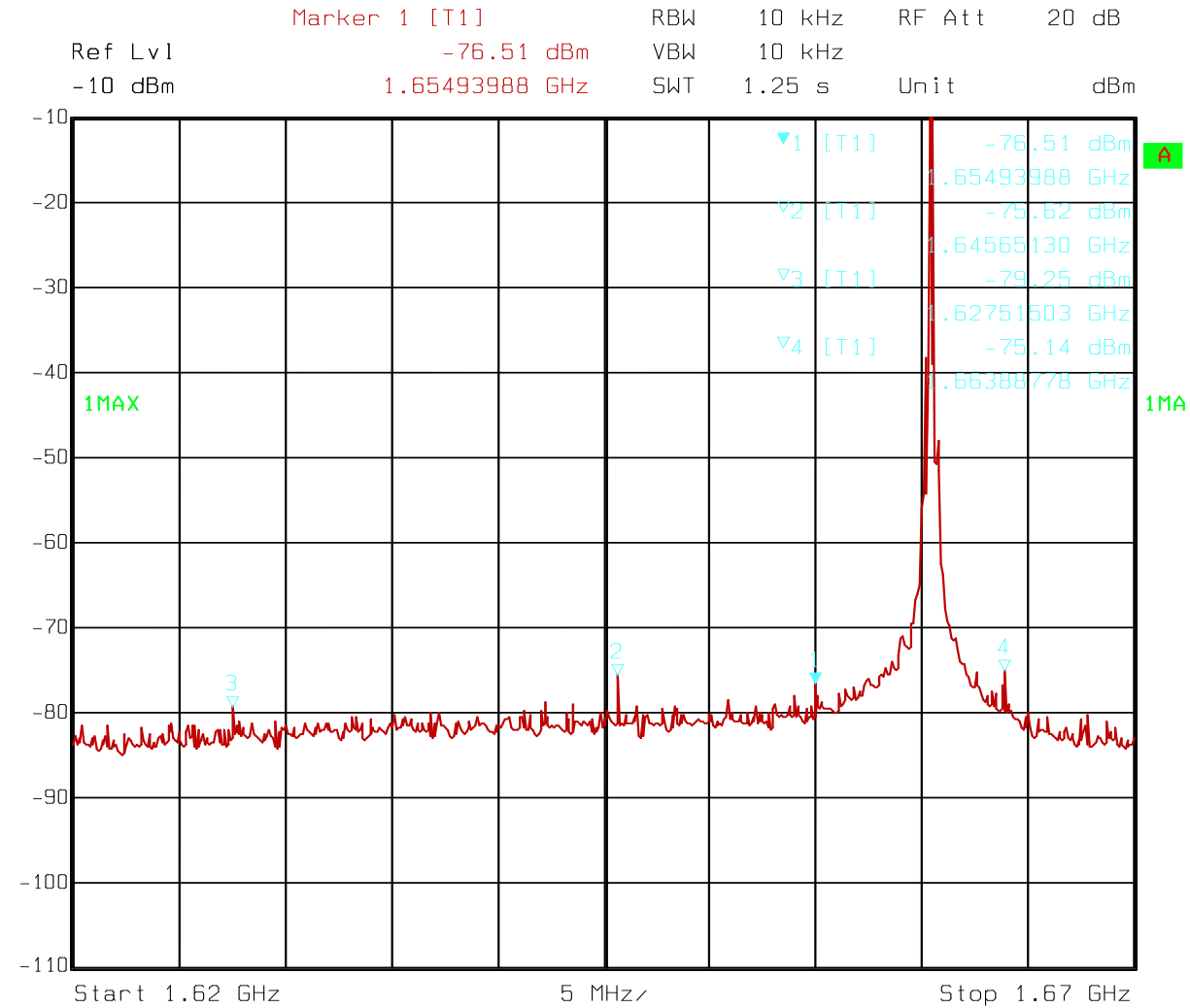
Date: 09.JUN.2010 09:33:07

Carrier 1626,6 MHz, modulation scheme R20T1Q



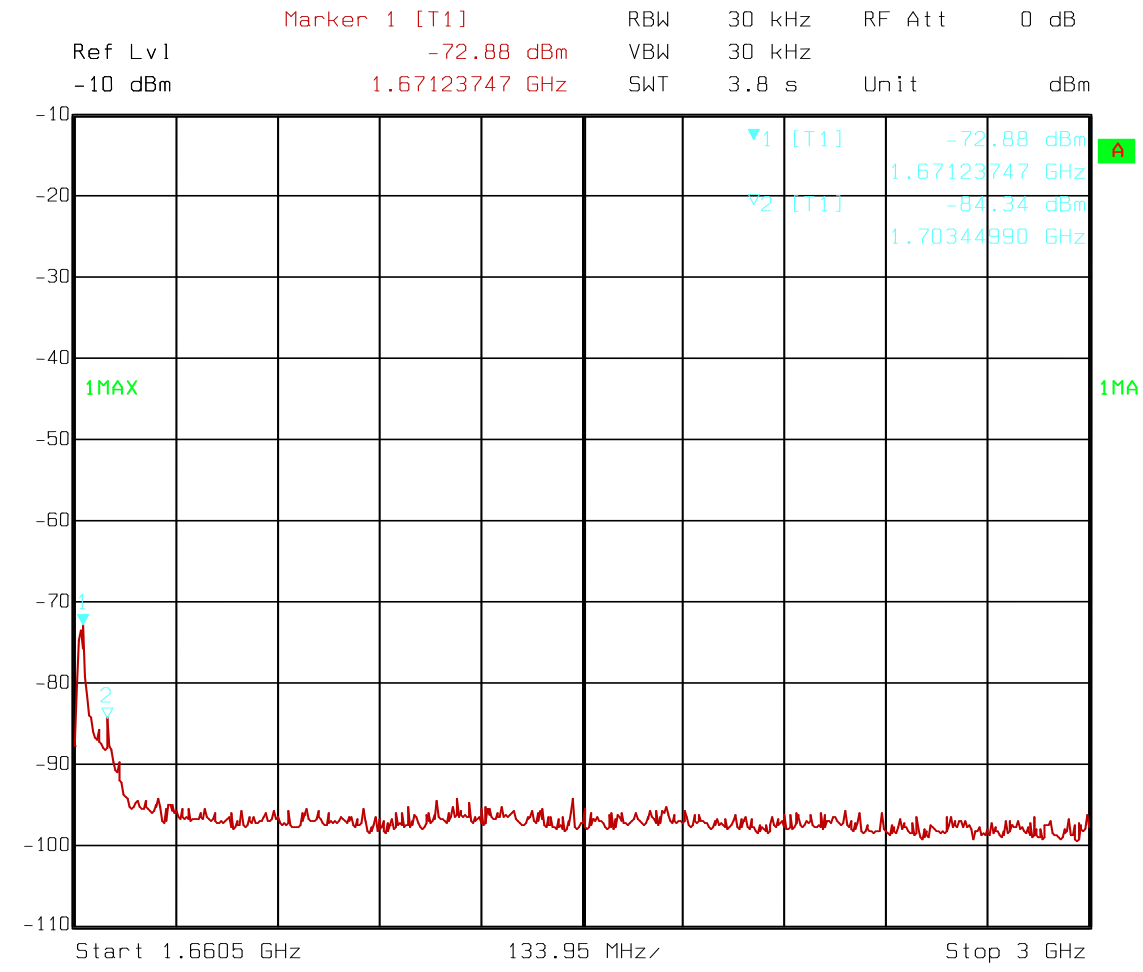
Date: 09.JUN.2010 09:28:36

Carrier 1643,5 MHz, modulation scheme R20T1Q



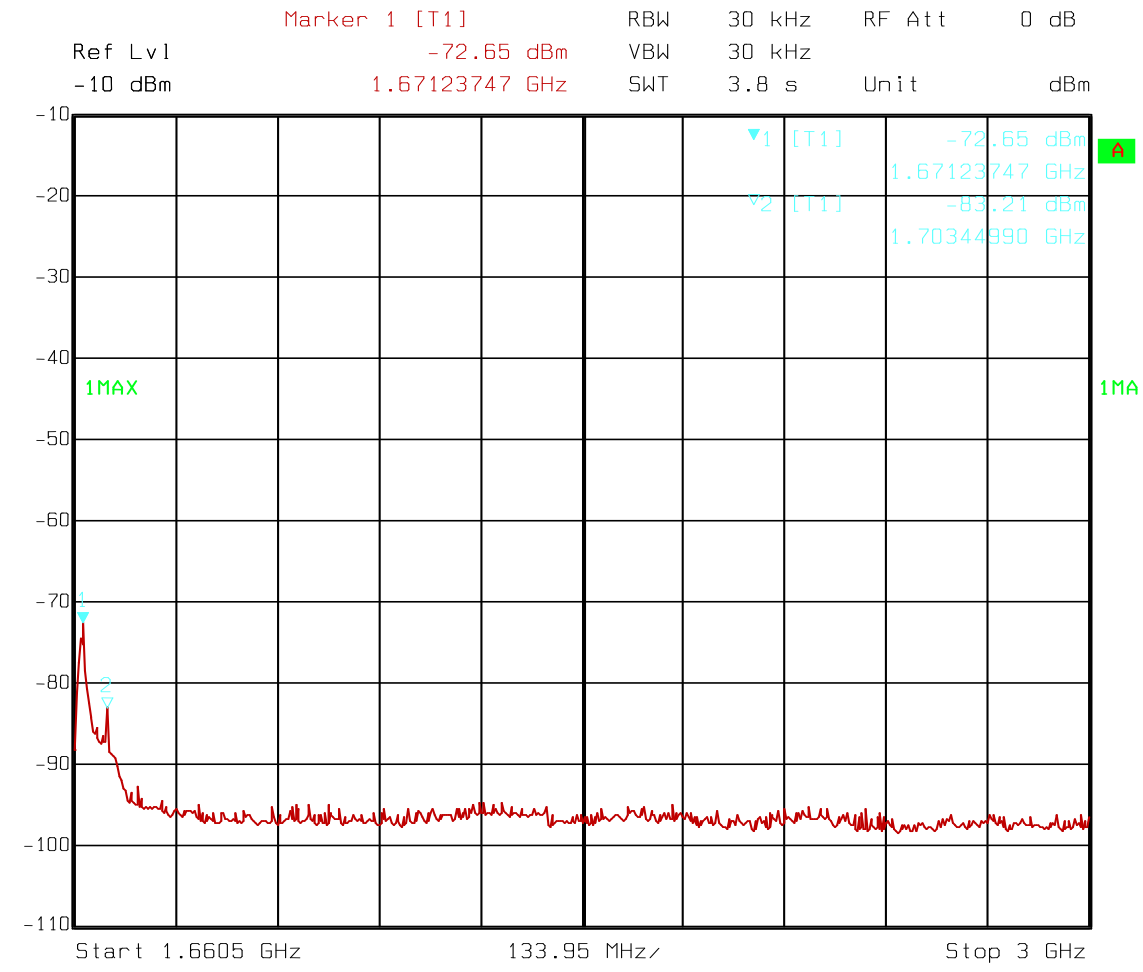
Date: 09.JUN.2010 09:37:29

Carrier 1660,4 MHz, modulation scheme R20T1Q



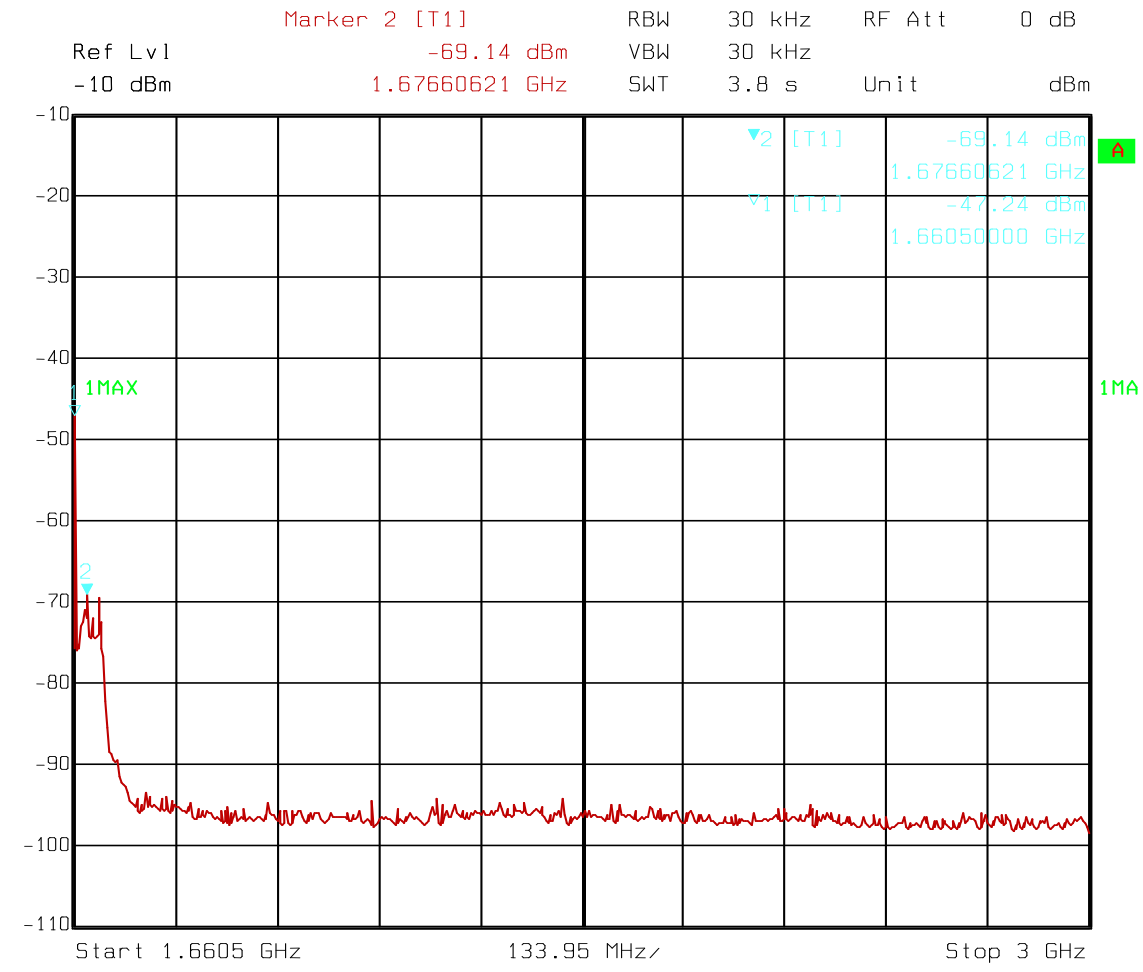
Date: 04.JUN.2010 09:33:47

Carrier 1626,6 MHz, modulation scheme R20T1Q



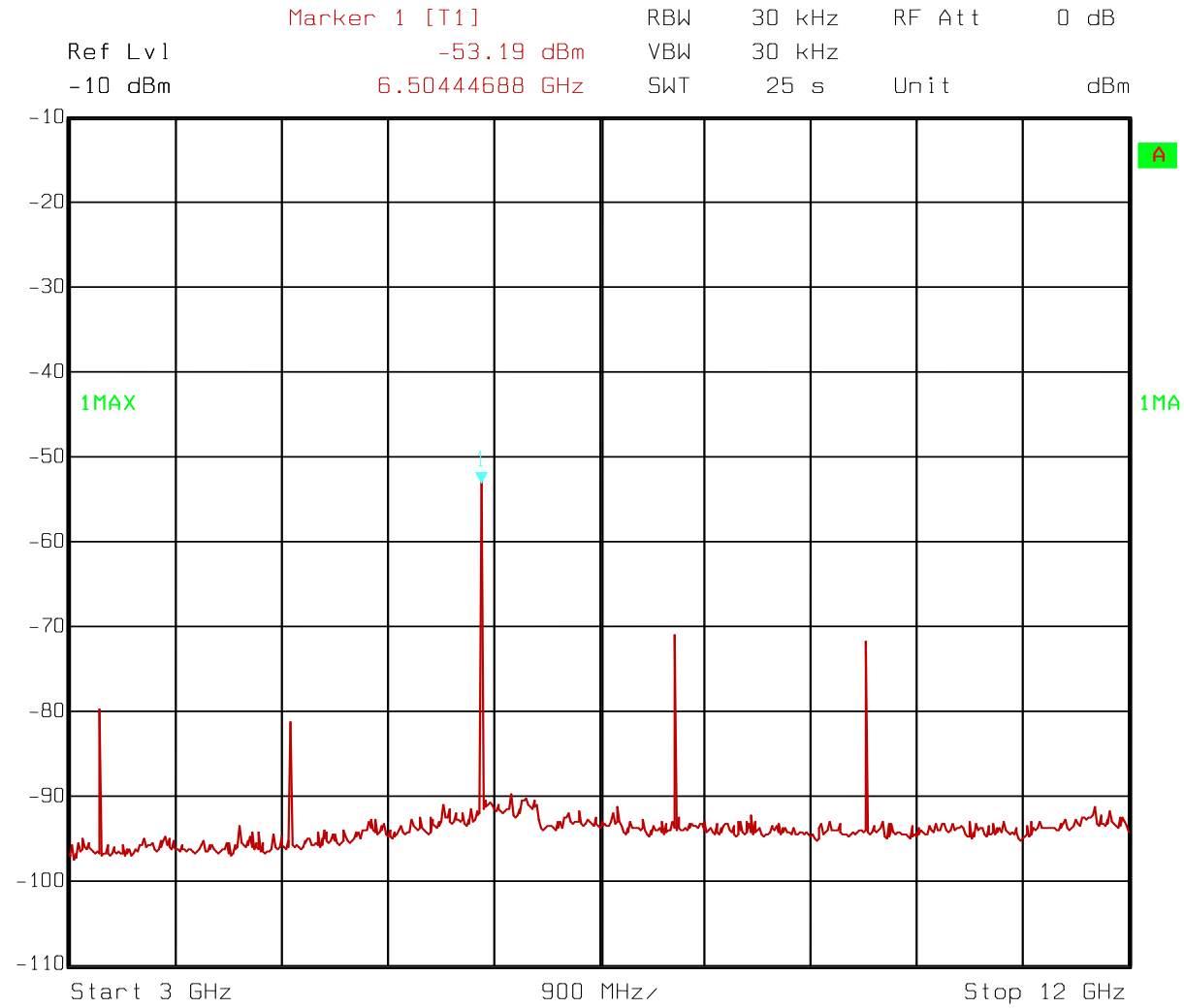
Date: 04.JUN.2010 09:31:05

Carrier 1643,5 MHz, modulation scheme R20T1Q



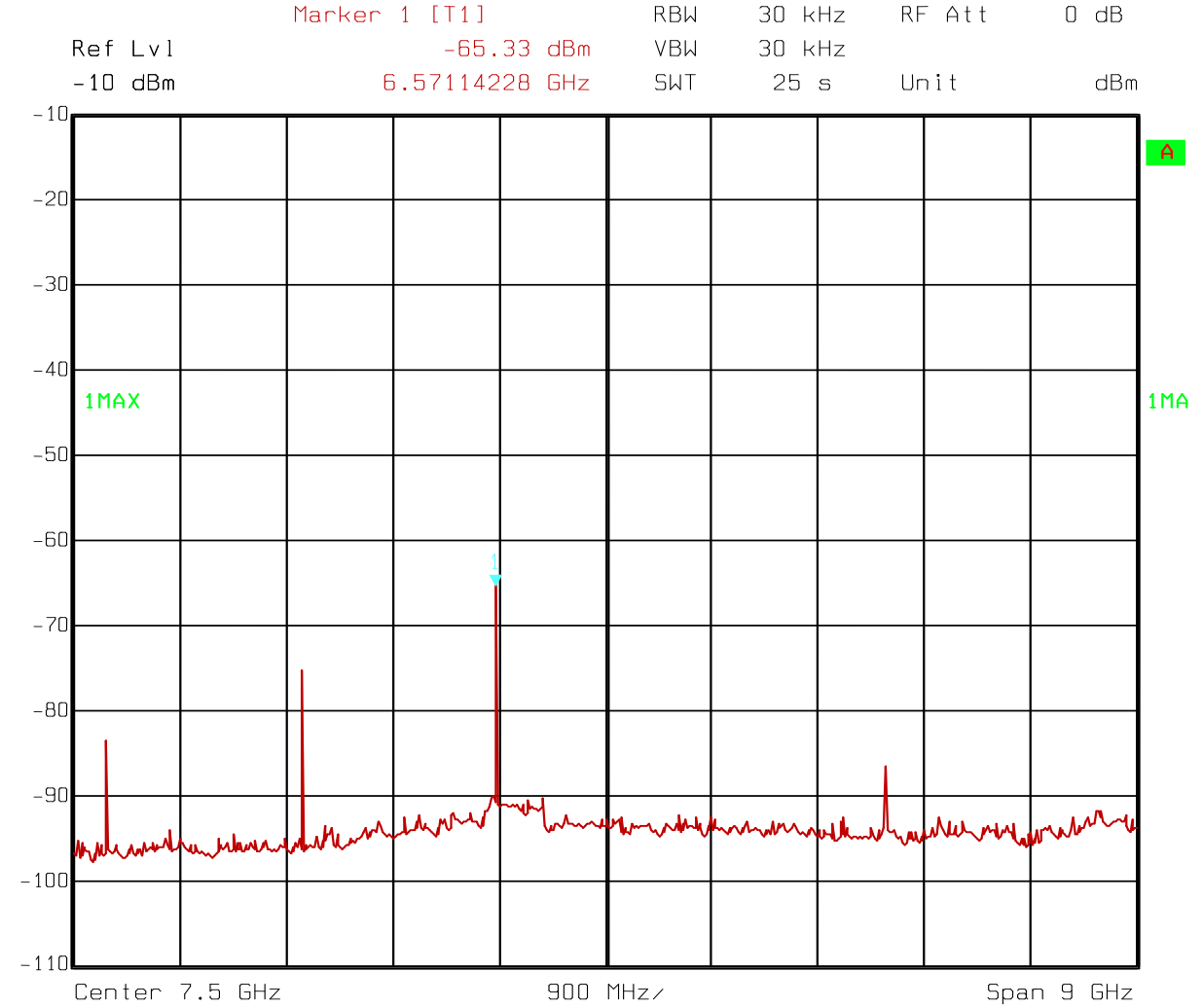
Date: 04.JUN.2010 09:34:44

Carrier 1660,4 MHz, modulation scheme R20T1Q



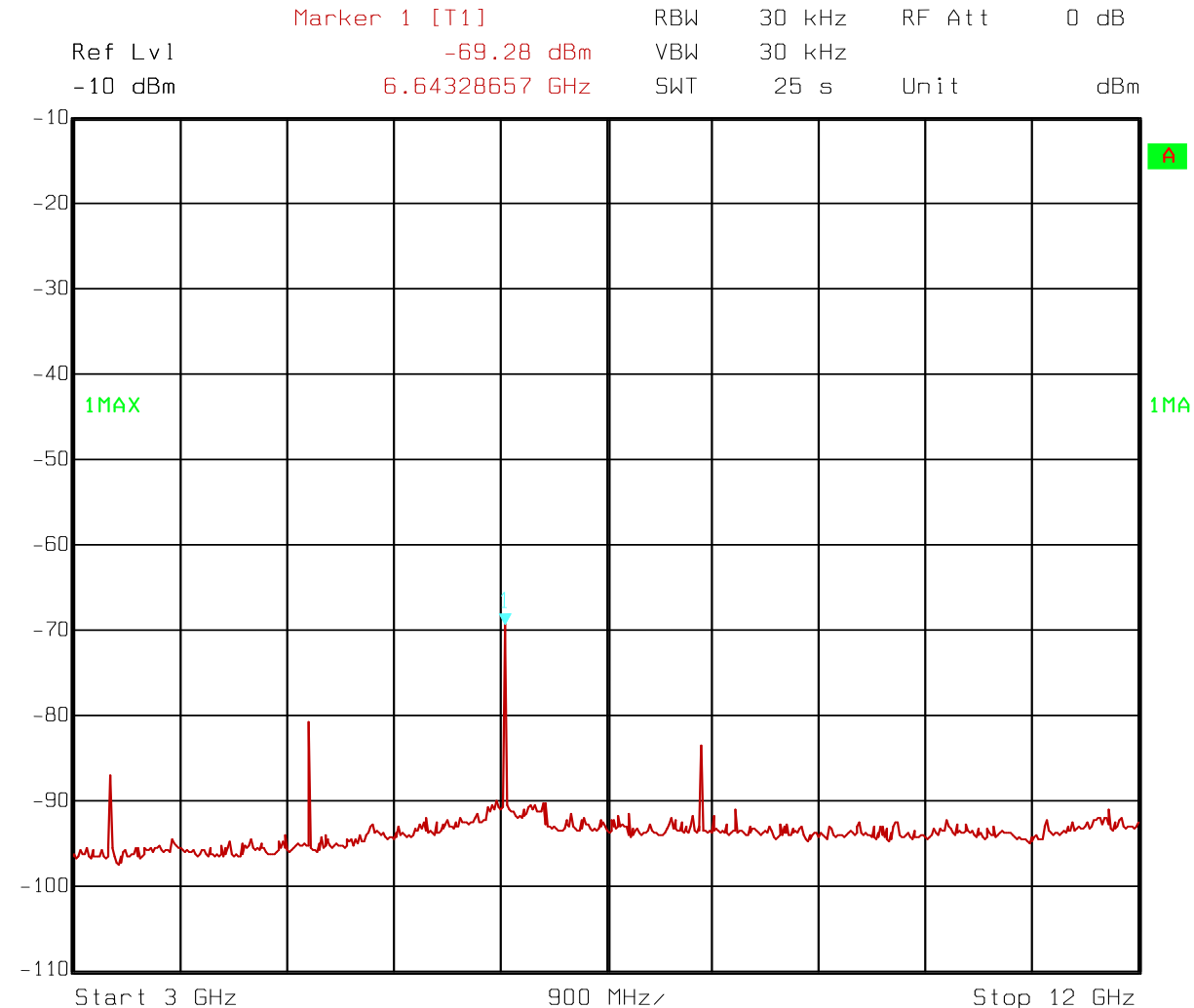
Date: 10.JUN.2010 08:25:28

Carrier 1626,6 MHz, modulation scheme 20T1Q



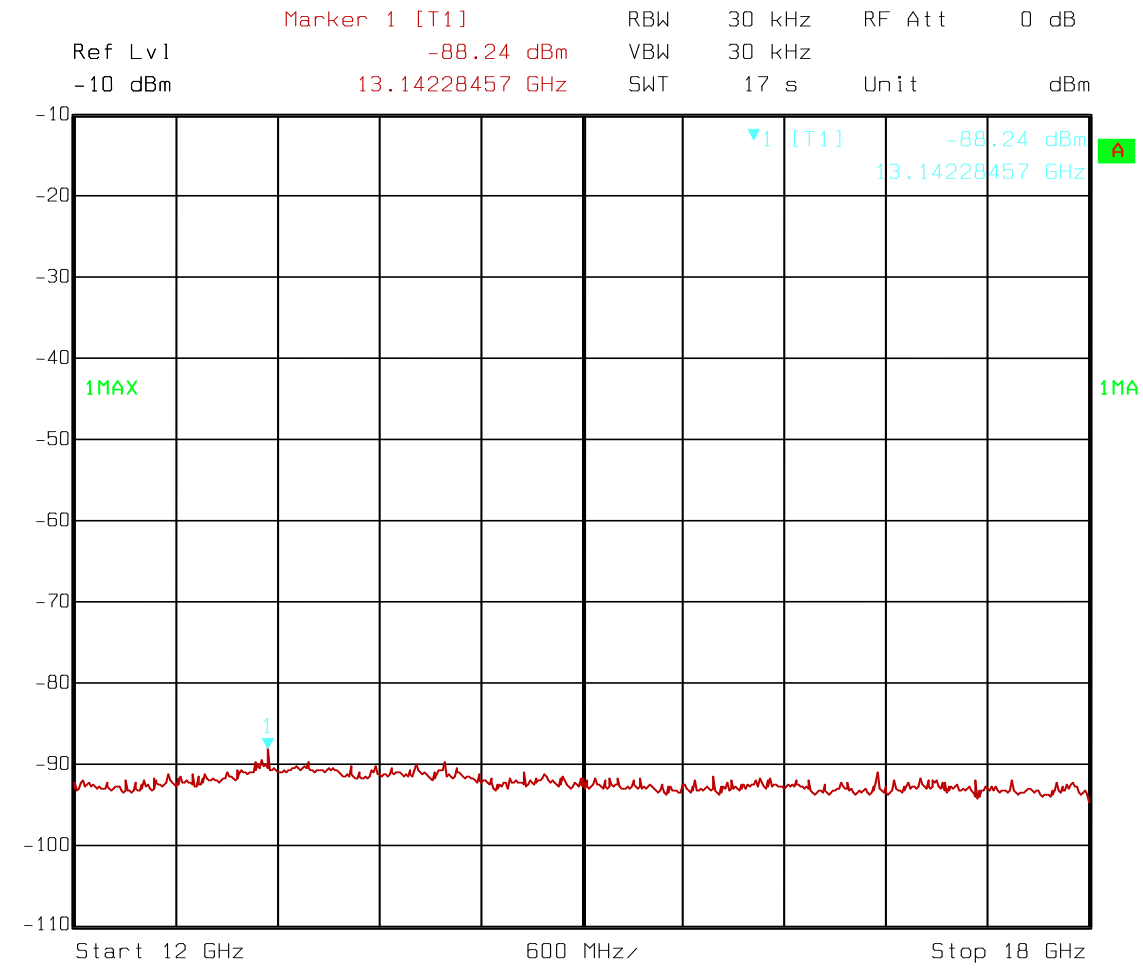
Date: 10.JUN.2010 09:00:44

Carrier 1643,5 MHz, modulation scheme 20T1Q



Date: 10.JUN.2010 08:57:43

Carrier 1660,4 MHz, modulation scheme 20T1Q



Date: 04.JUN.2010 13:38:41

Carriers 1626.6, 1643.5, and 1660.4 MHz, modulation scheme R20T1Q

10.3.3 Radiated 20 – 18000 MHz



Date: 8.JUL.2010 15:14:07

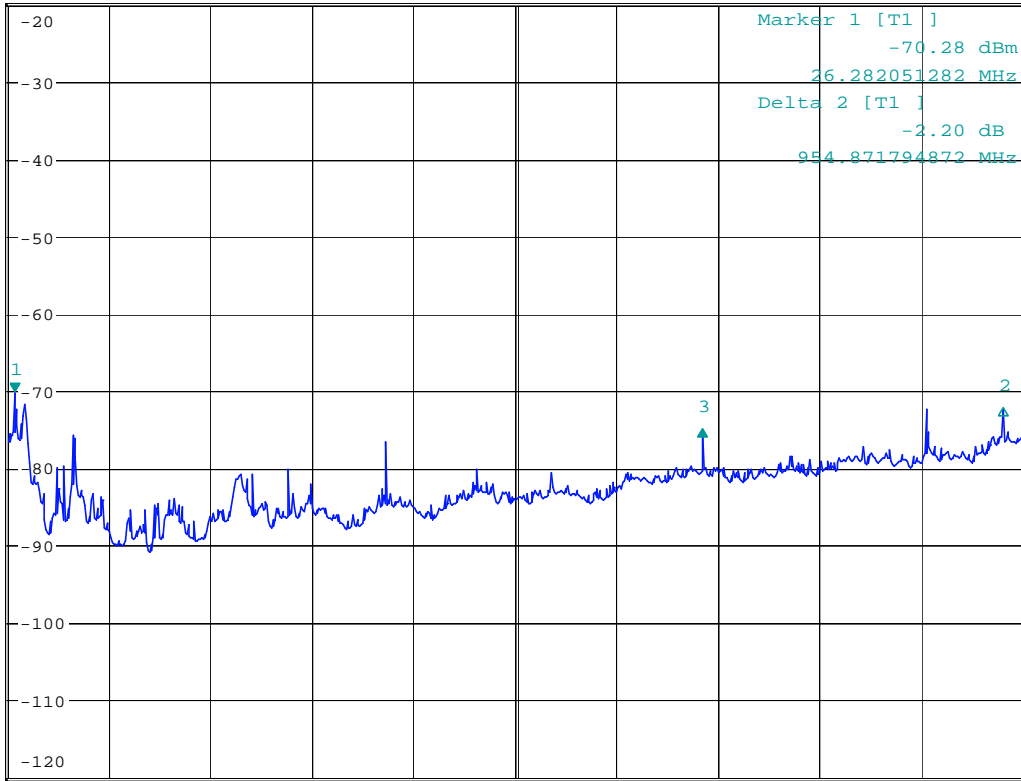
Carrier 1626.6 MHz modulation scheme R20T1X, Vertical Polarisation



* RBW 100 kHz Delta 3 [T1]
 * VBW 300 kHz -4.81 dB
 SWT 100 ms 664.326923077 MHz

Ref -20 dBm * Att 0 dB

1 PK
 MAXH



Start 20 MHz 98 MHz/ Stop 1 GHz

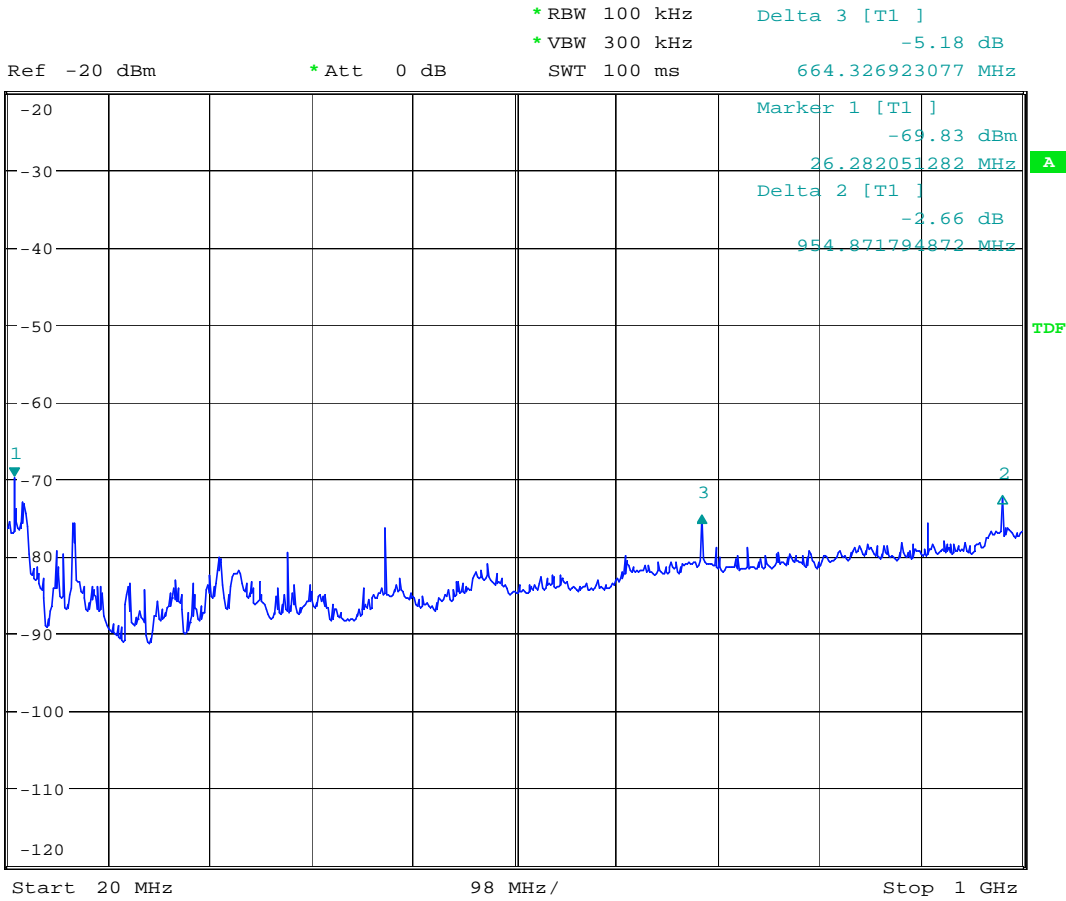
Date: 8.JUL.2010 15:25:31

Carrier 1626.6 MHz modulation scheme R20T1X, Horizontal Polarisation



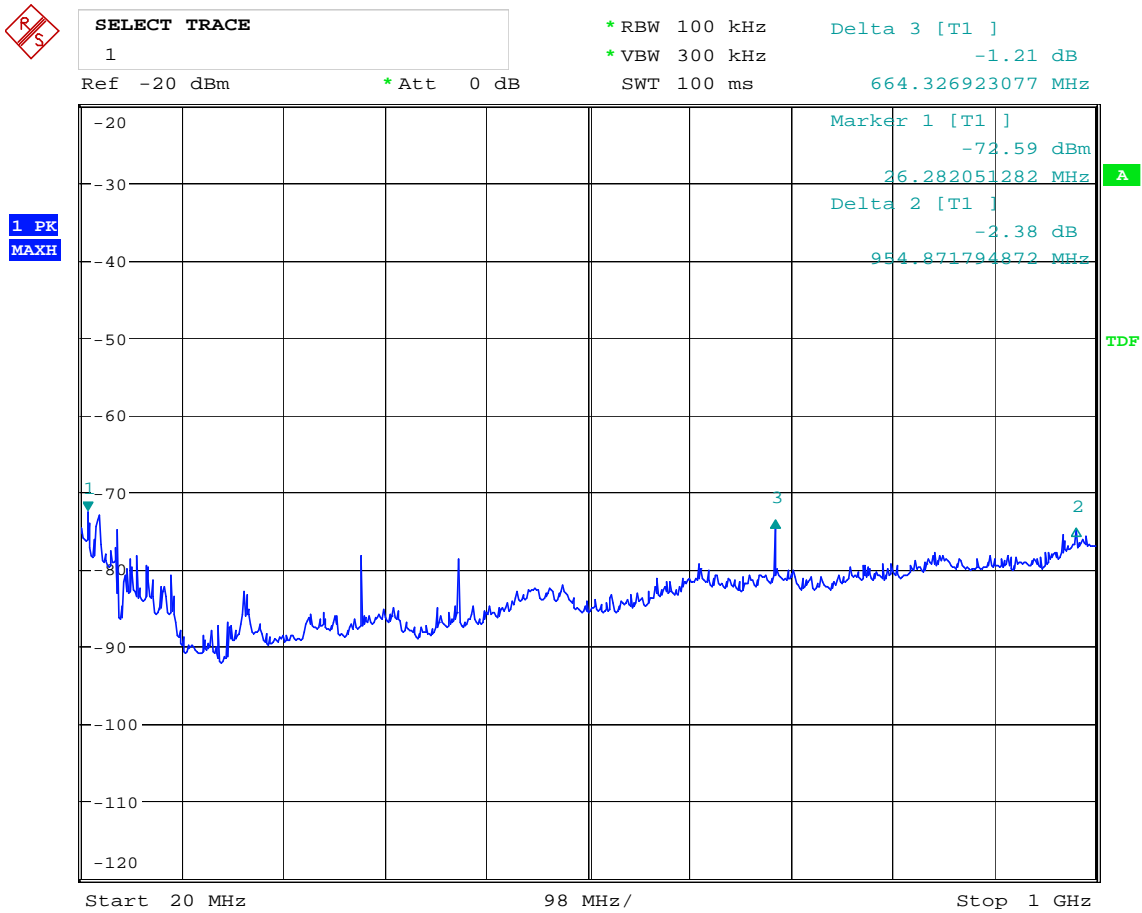
Date: 8.JUL.2010 15:34:43

Carrier 1643.5 MHz modulation scheme R20T1X, Vertical Polarisation



Date: 8.JUL.2010 15:27:57

Carrier 1643.5 MHz modulation scheme R20T1X, Horizontal Polarisation



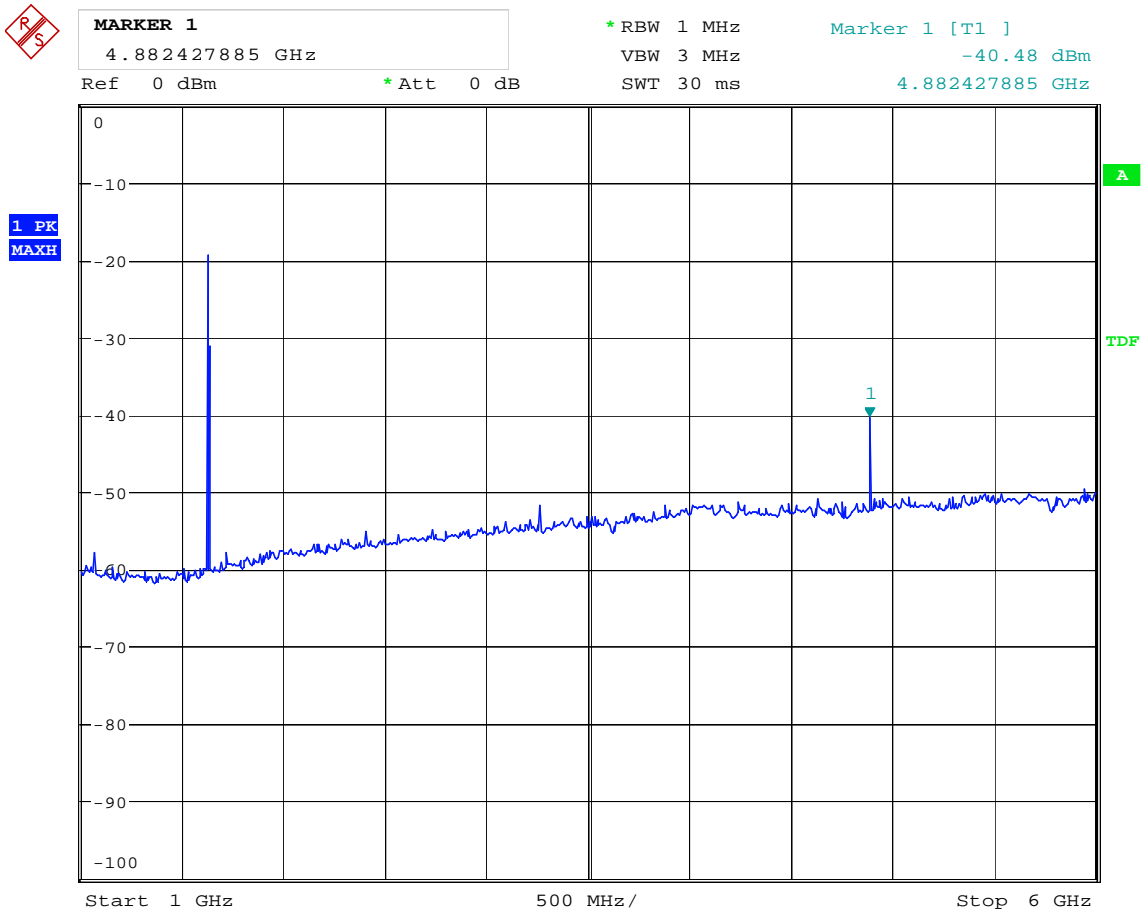
Date: 8.JUL.2010 15:32:31

Carrier 1660.4 MHz modulation scheme R20T1X, Vertical Polarisation



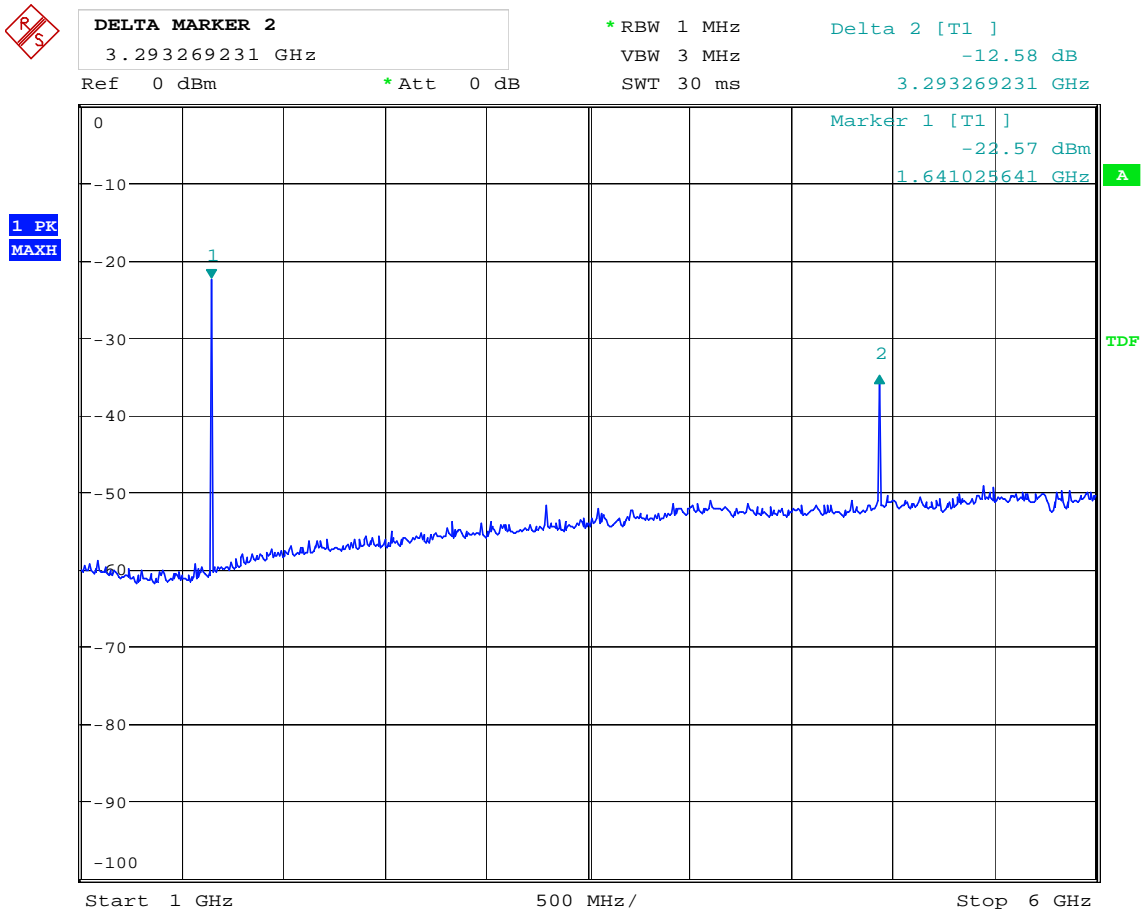
Date: 8.JUL.2010 15:29:55

Carrier 1660.4 MHz modulation scheme R20T1X, Horizontal Polarisation



Date: 2.JUL.2010 14:41:50

Carrier 1626.6 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



Date: 2.JUL.2010 14:27:04

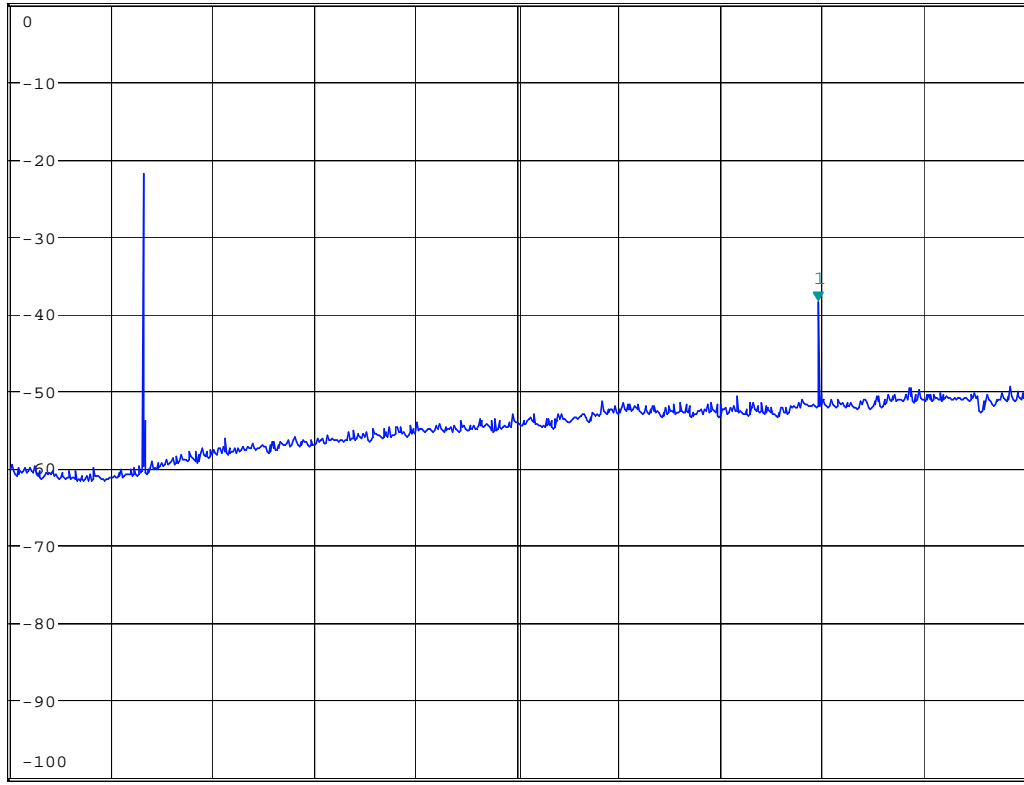
Carrier 1643.5 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



MARKER 1
4.983910577 GHz
Ref 0 dBm * Att 0 dB

* RBW 1 MHz Marker 1 [T1]
VBW 3 MHz -38.58 dBm
SWT 30 ms 4.983910577 GHz

1 PK
MAXH



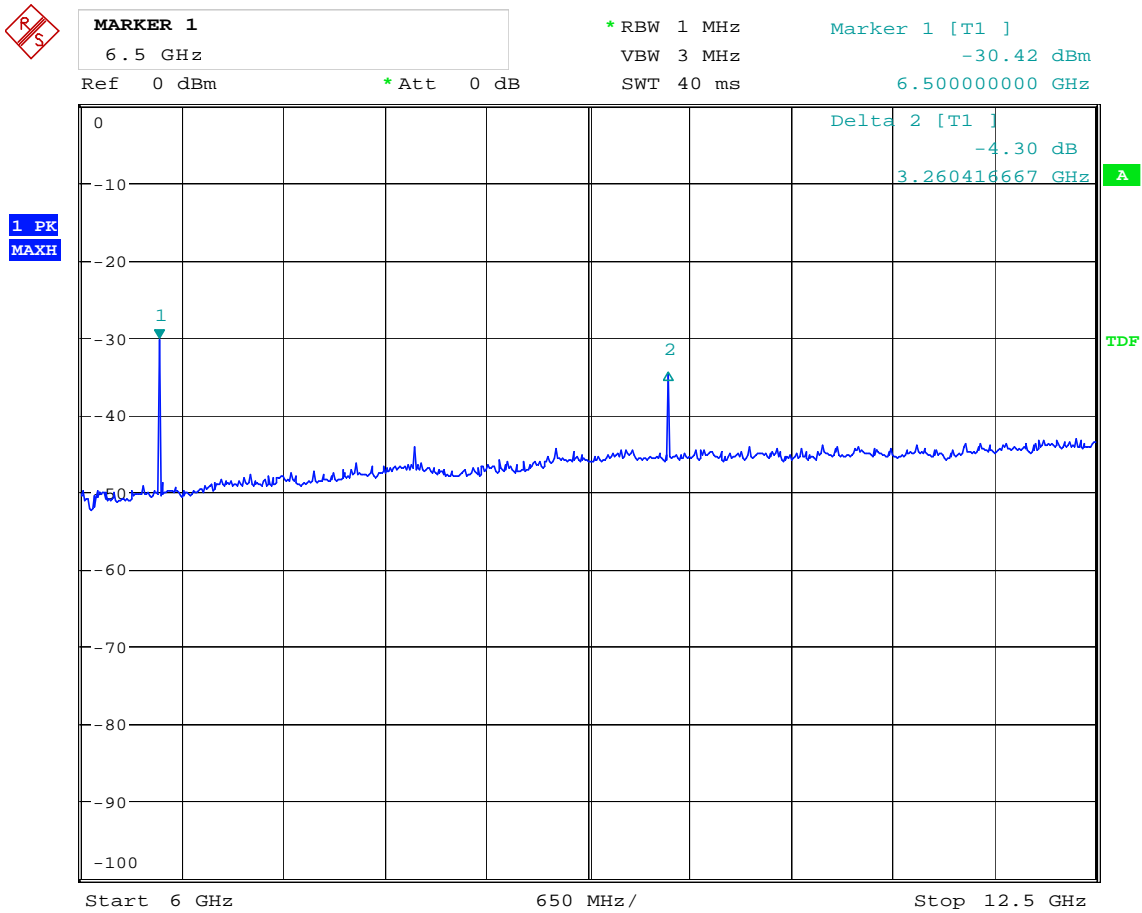
A

TDF

Start 1 GHz 500 MHz/ Stop 6 GHz

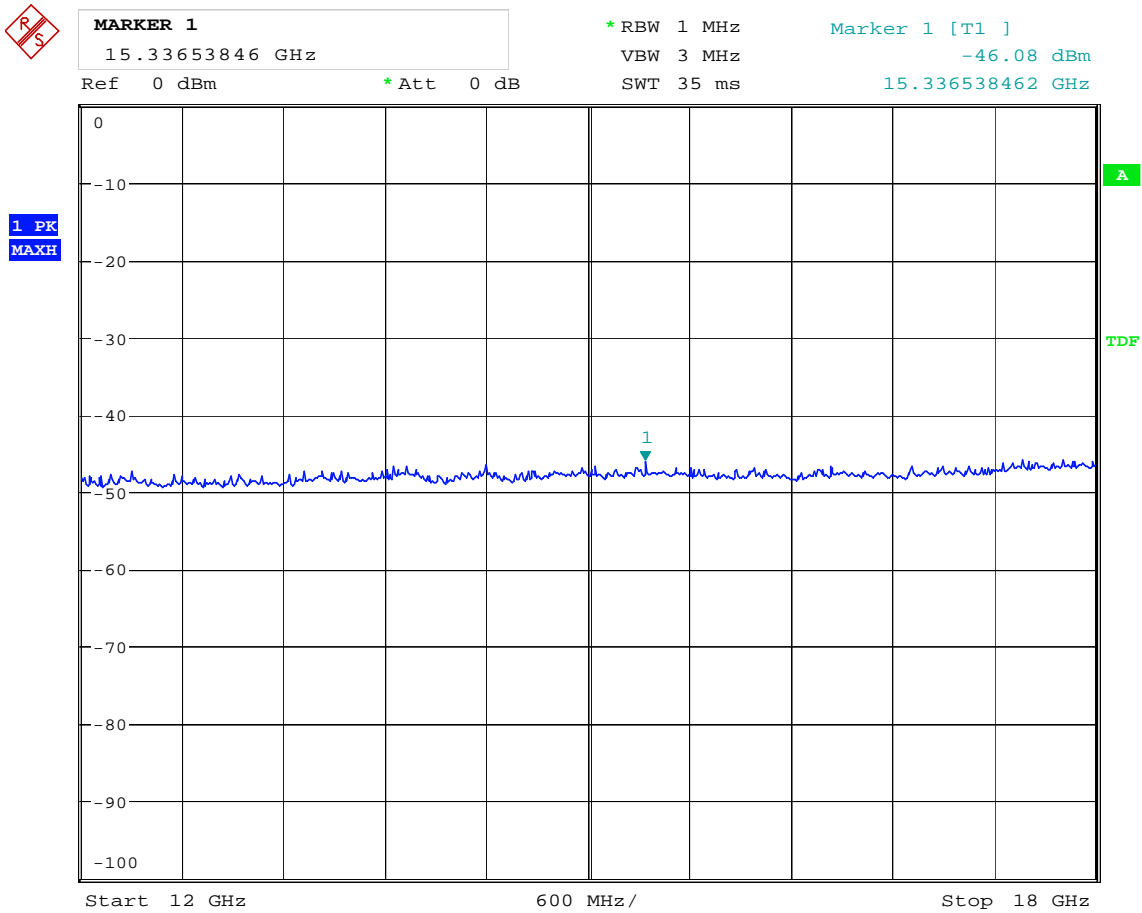
Date: 2.JUL.2010 14:51:48

Carrier 1660.4 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



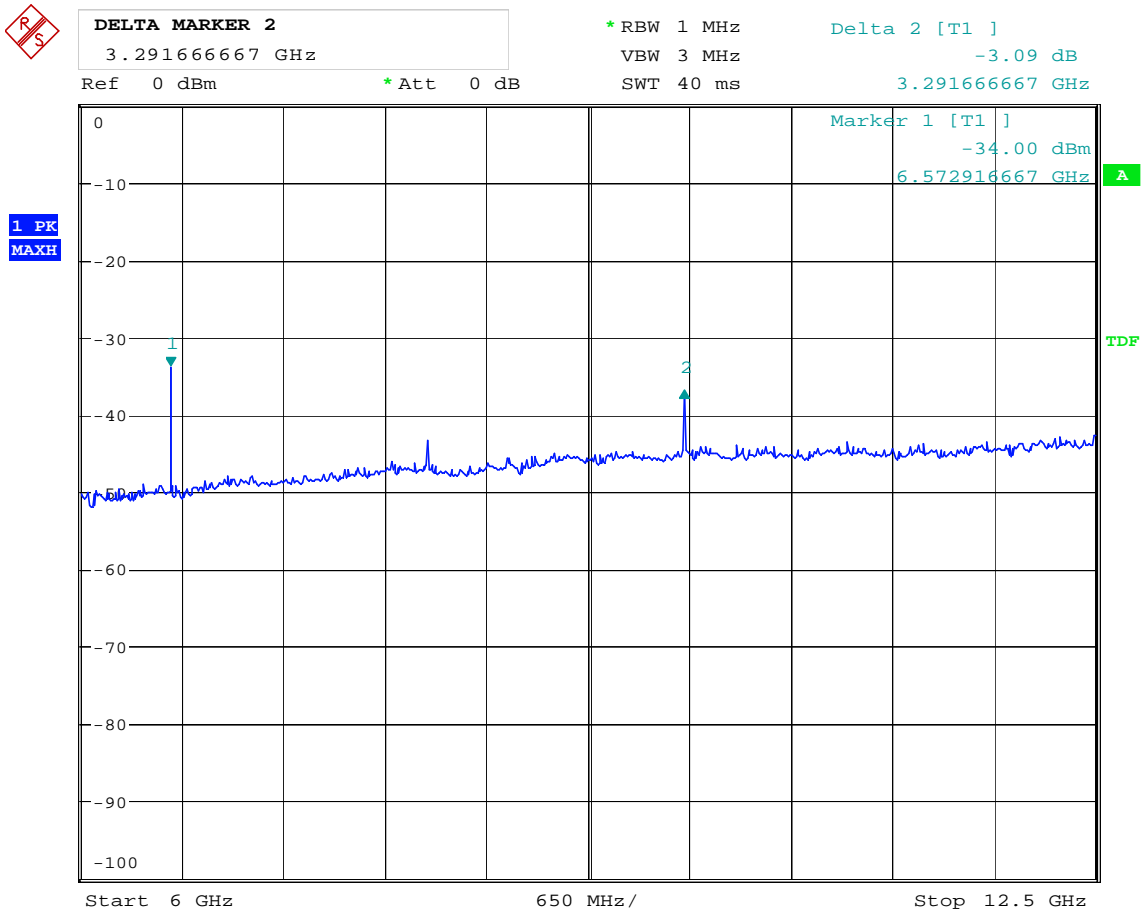
Date: 2.JUL.2010 16:06:16

Carrier 1626.6 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



Date: 2.JUL.2010 16:51:41

Carrier 1626.6, 1643.5, and 1660.4 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



Date: 2.JUL.2010 15:55:50

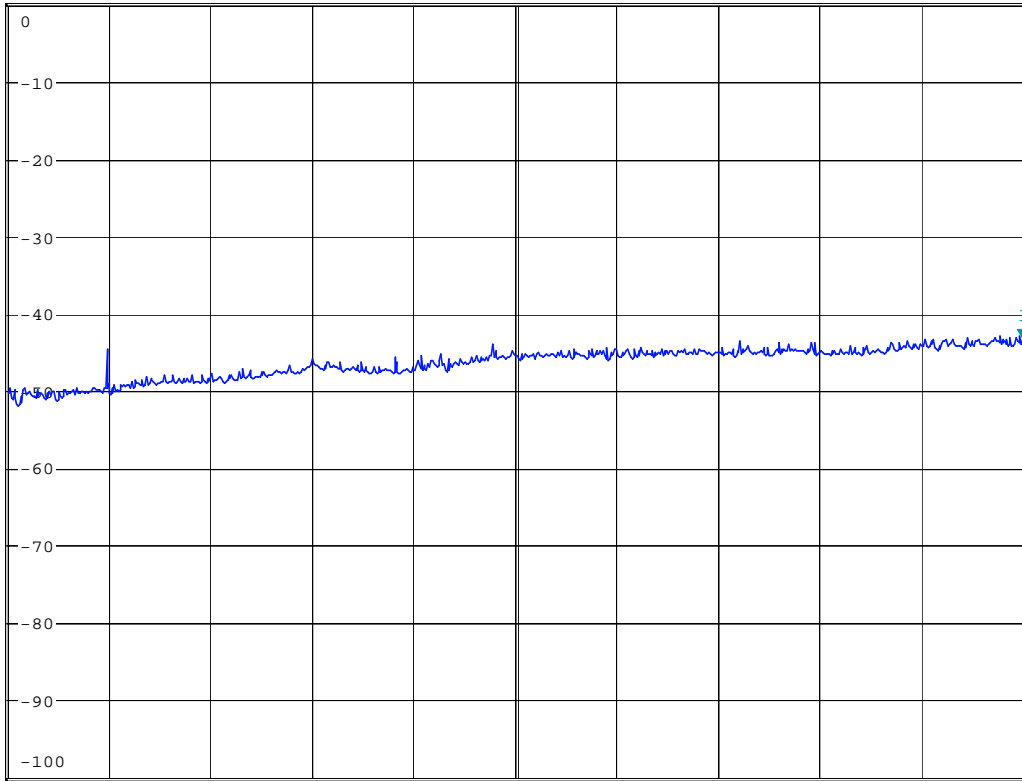
Carrier 1643.5 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation



START FREQUENCY
6 GHz
Ref 0 dBm * Att 0 dB

* RBW 1 MHz Marker 1 [T1]
VBW 3 MHz -43.35 dBm
SWT 40 ms 12.50000000 GHz

1 PK
MAXH



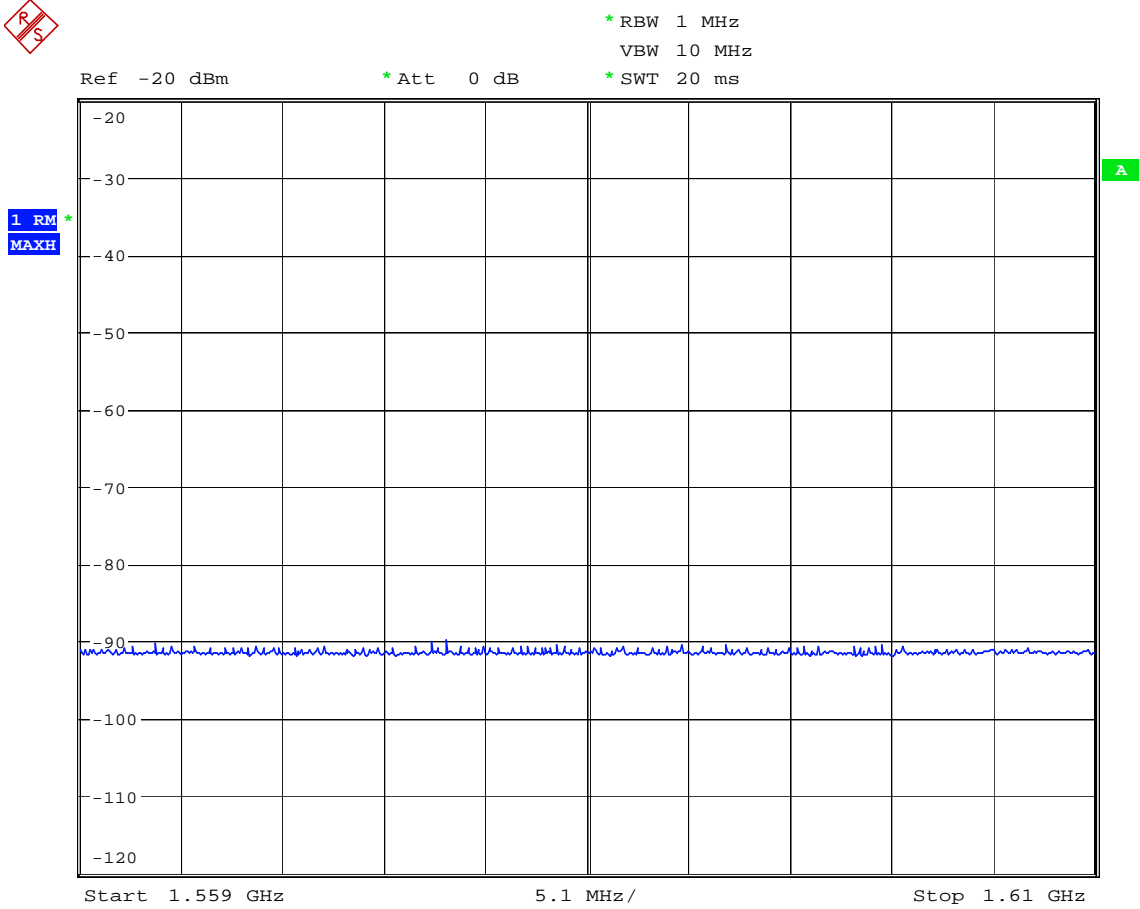
Start 6 GHz 650 MHz/ Stop 12.5 GHz

Date: 2.JUL.2010 15:06:41

Carrier 1660.4 MHz modulation scheme R20T1X, Vertical & Horizontal Polarisation

10.4 Spurious emissions – TX OFF

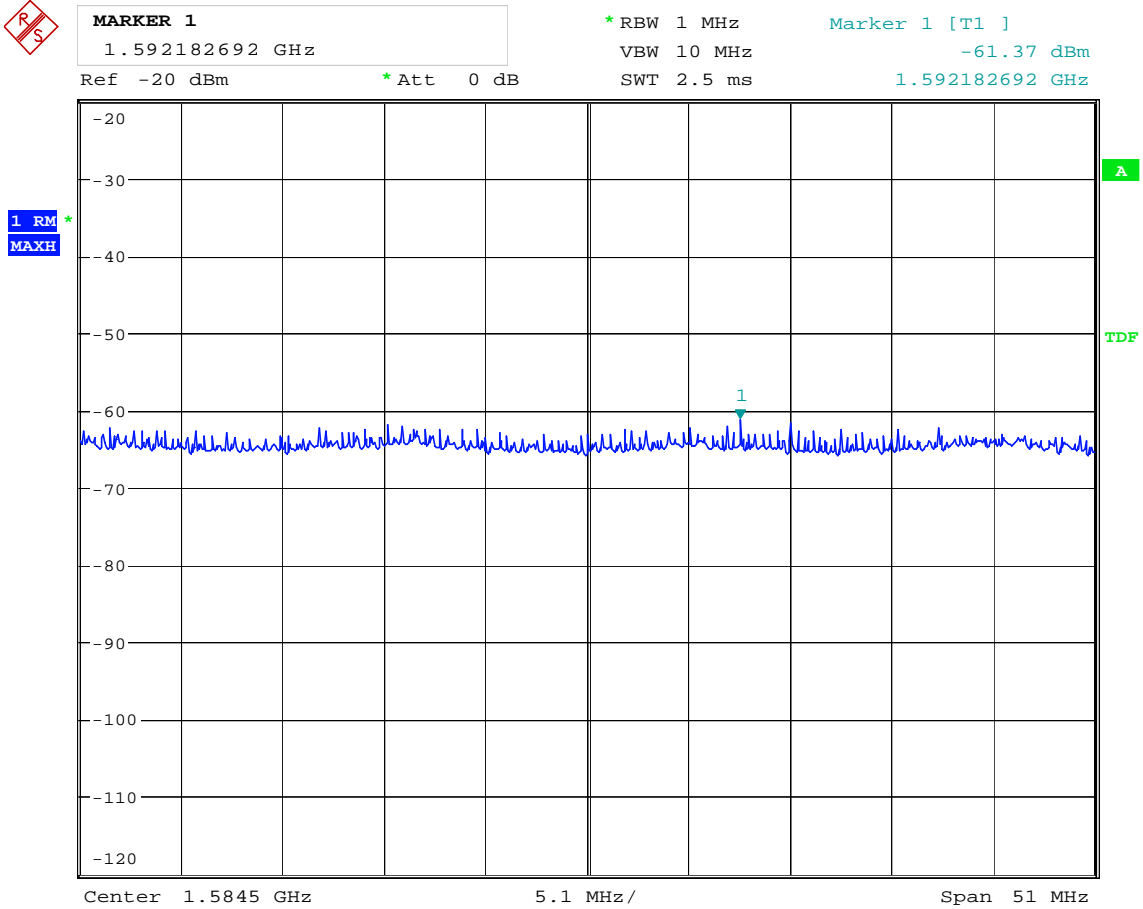
10.4.1 Conducted 1559 – 1610 MHz



Date: 15.JUL.2010 13:31:59

TX OFF - conducted in 1 MHz bandwidth

10.4.2 Radiated 1559 – 1610 MHz TX OFF



Date: 15.JUL.2010 13:55:19

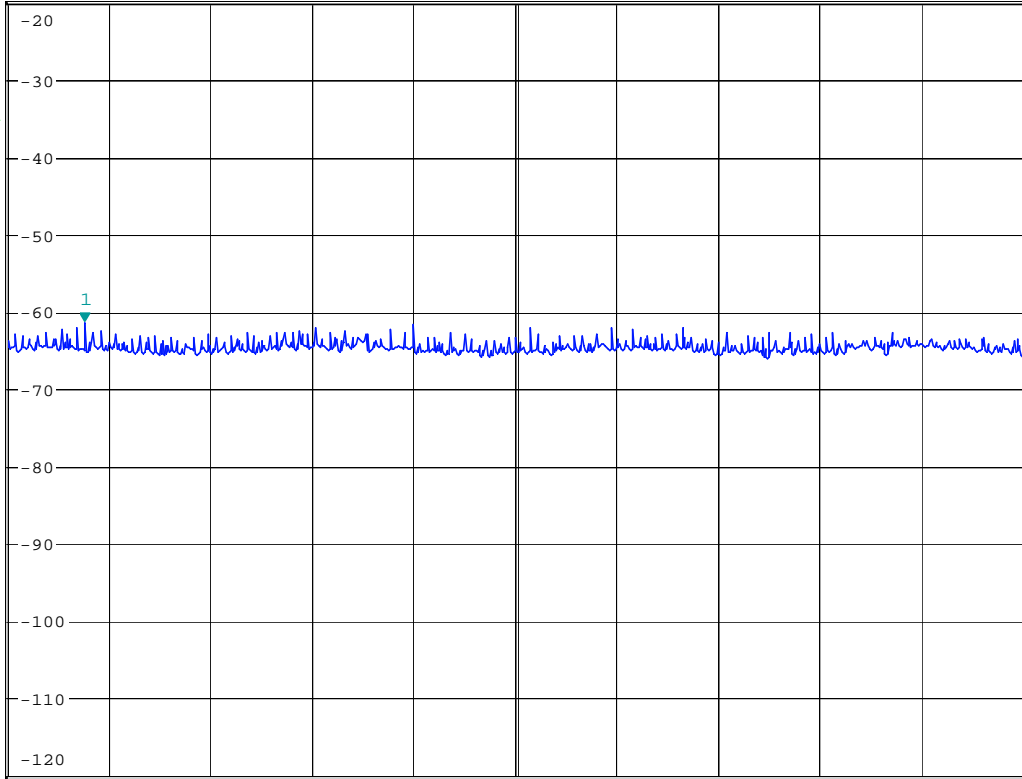
TX OFF - 1 MHz bandwidth, vertical polarization



MARKER 1
 1.562841346 GHz
 Ref -20 dBm * Att 0 dB

* RBW 1 MHz Marker 1 [T1]
 VBW 10 MHz -61.60 dBm
 SWT 2.5 ms 1.562841346 GHz

1 RM *
 MAXH



A

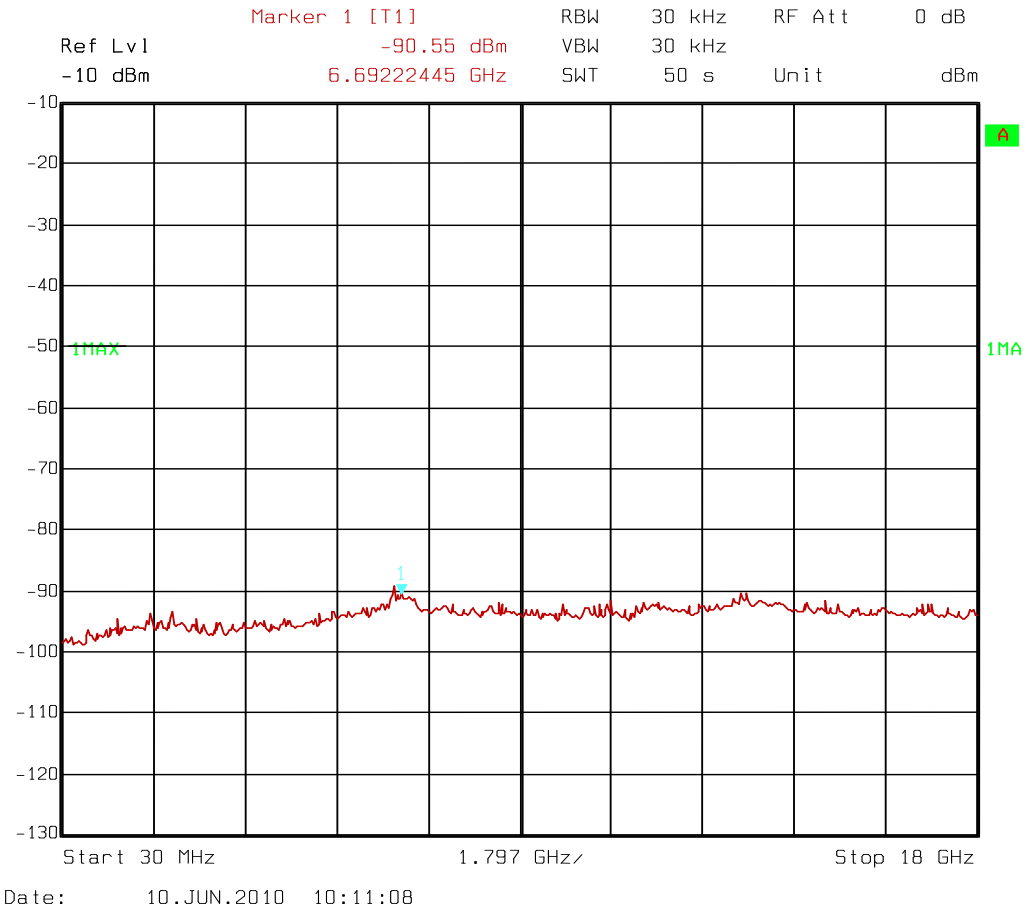
TDF

Center 1.5845 GHz 5.1 MHz/ Span 51 MHz

Date: 15.JUL.2010 13:57:25

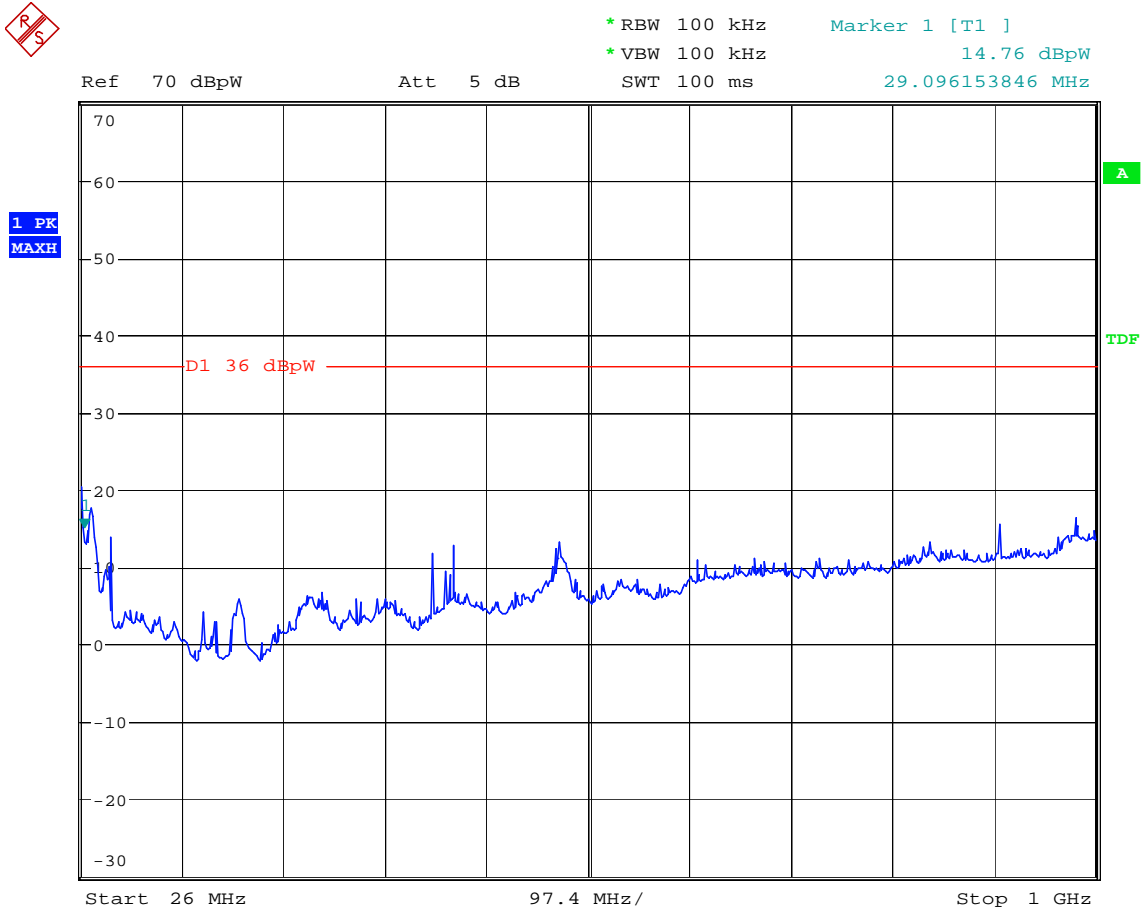
TX OFF - 1 MHz bandwidth, horizontal polarization

10.4.3 Conducted 30 – 18000 MHz



TX OFF

10.4.4 Radiated 20 – 6000 MHz TX OFF



Date: 3.JUN.2010 10:41:33

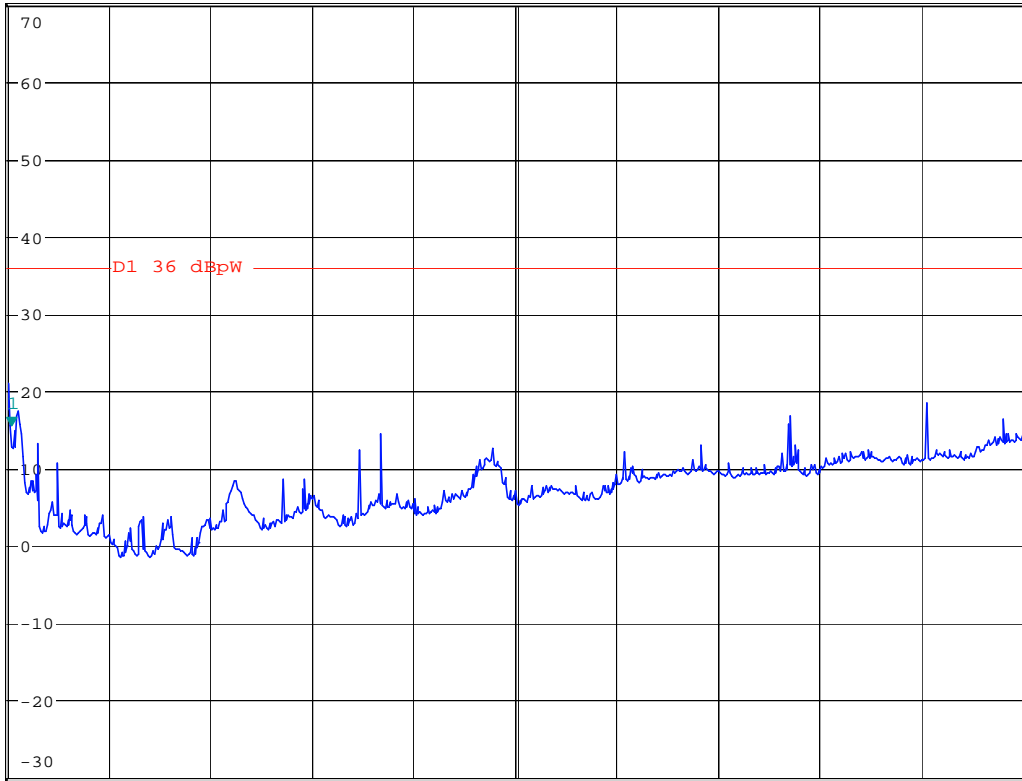
TX OFF vertical polarization



SELECT TRACE
1
Ref 70 dBpW Att 5 dB

* RBW 100 kHz Marker 1 [T1]
* VBW 100 kHz 15.17 dBpW
SWT 100 ms 29.096153846 MHz

1 PK
MAXH



Start 26 MHz 97.4 MHz/ Stop 1 GHz

Date: 3.JUN.2010 10:38:22

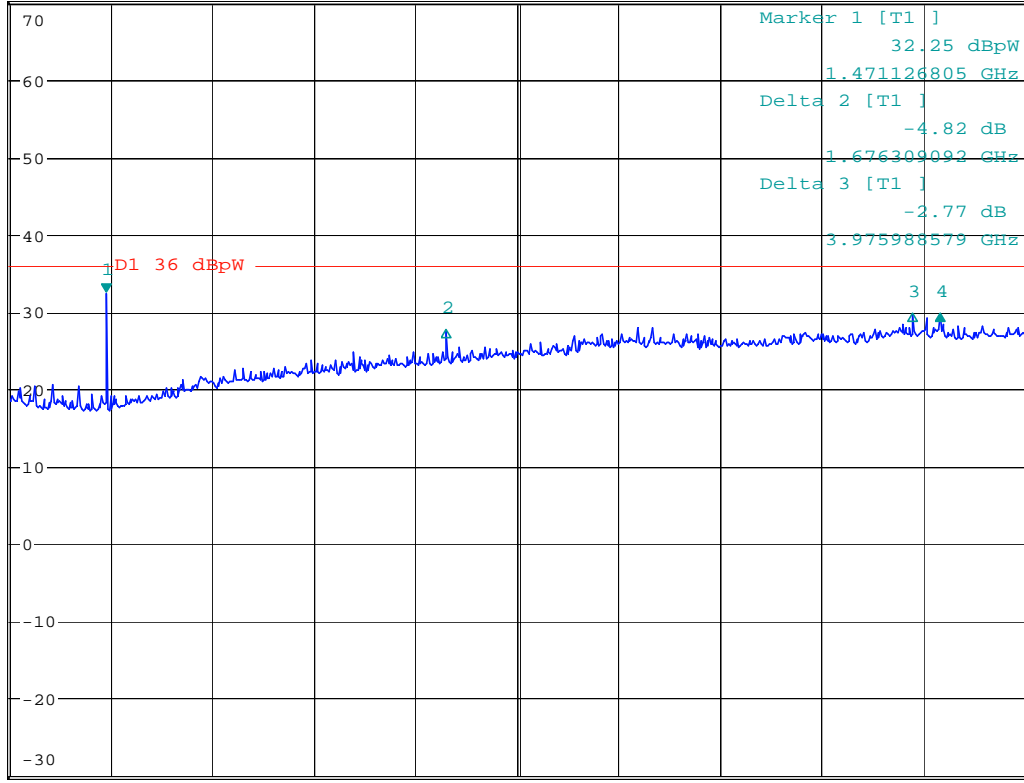
TX OFF horizontal polarization



DELTA MARKER 4
4.112206528 GHz
Ref 70 dBpW * Att 0 dB

* RBW 100 kHz Delta 4 [T1]
* VBW 100 kHz -2.59 dB
SWT 500 ms 4.112206528 GHz

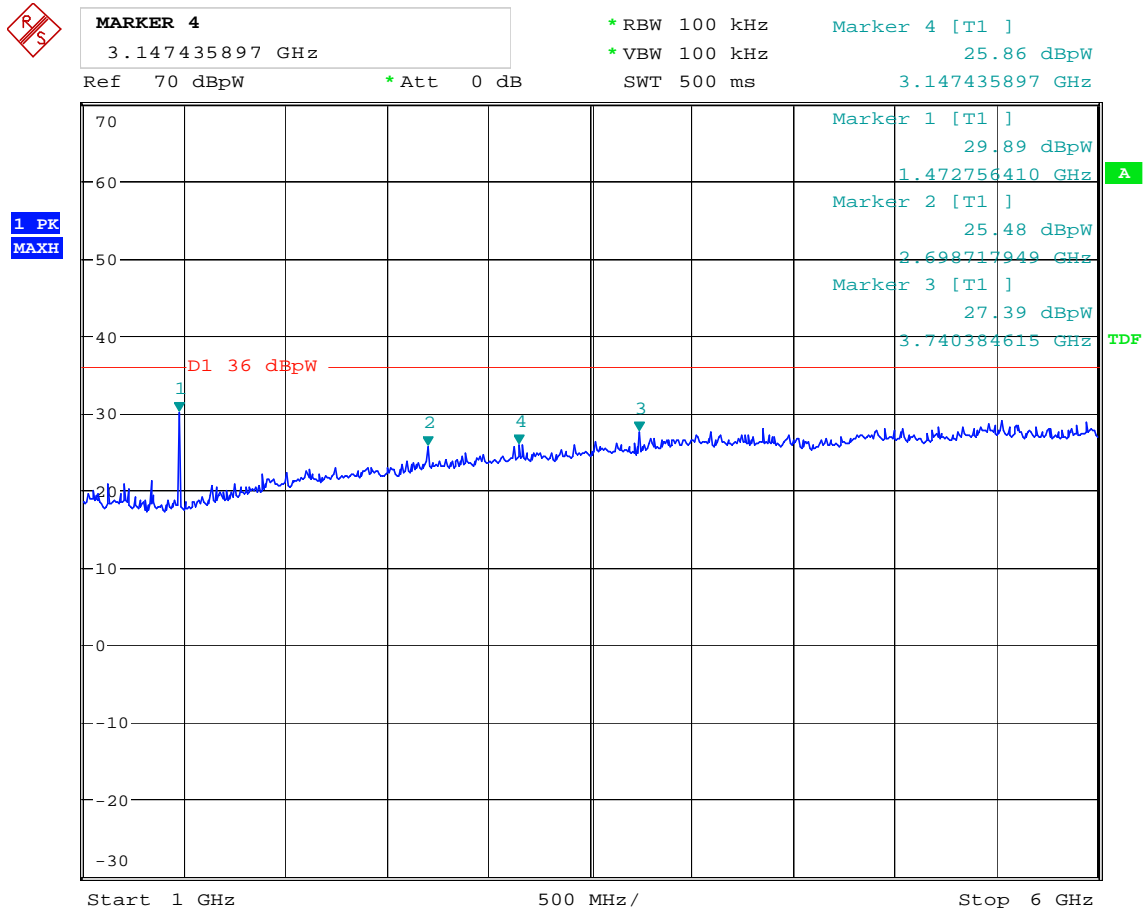
1 PK
MAXH



Start 1 GHz 500 MHz/ Stop 6 GHz

Date: 3.JUN.2010 12:59:13

TX OFF vertical polarization



Date: 3.JUN.2010 13:29:27

TX OFF horizontal polarization