TECHNICAL REPORT

卓時檢測 TIMEWAY TESTING LABORATORY

TESTING CNAS L2292

ISO/IEC17025Accredited Lab.

Report No: FCC 1104104-02
File reference No: 2011/05/28

Applicant: Rainkine Thompson Ltd

Product: RTL LINX1+ vehicle telematics unit

Model No: RTL LINX1+

Trademark: RTL

Test Standards: FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4& FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung
Manager

Dated: May 28, 2011

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Tel (755) 83448688 Fax (755) 83442996

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-01.

Test Report Conclusion

Content

1.0 **General Details**

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Telephone: (755) 83448688

Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-01

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: Rainkine Thompson Ltd

Address: 44a Lower Market Street, Broadbottom, Cheshire, SK14 6AA, UK

Telephone: +44 (0) 1457767309

Fax: +44 1457 762247

1.3 Description of EUT

Product:	RTL LINX1+ vehicle telematics unit
Manufacturer:	Cwlinux Ltd.
Brand Name:	**RTL**
Model Number:	RTL LINX1+
Additional Model Name	N/A
Emission Designator:	Celluar band :1M44F9W
	PCS band : 1M43F9W
Power Supply	12VDC
Type of Modulation	CDMA
Frequency range	824.7-848.31MHz 1851.25-1908.75MHz
Antenna type	the antenna gain is 2.0 dBi

1.4 Submitted Sample: 2 Sample

1.5 Test Duration

2011-04-18 to 2011-05-28

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tang

Print Name: Terry Tang

2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2010-12-06	2011-12-05
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2010-12-06	2011-12-05
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2010-12-06	2011-12-05
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2010-12-06	2011-12-05
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2010-12-06	2011-12-05
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2010-12-06	2011-12-05
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2010-12-06	2011-12-05
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2010-12-06	2011-12-05
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2010-12-06	2011-12-05
System Controller	CT	SC100	-	2010-12-06	2011-12-05
Printer	EPSON	PHOTO EX3	CFNH234850	2010-12-06	2011-12-05
FM-AM Signal Generator	JUNGJIN	SG-150M	389911177	2010-12-06	2011-12-05
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2010-12-06	2011-12-05
Computer	IBM	8434	1S8434KCE99BLX LO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2010-12-06	2011-12-05
Power meter	Anritsu	ML2487A	6K00003613	2010-12-06	2011-12-05
Power sensor	Anritsu	MA2491A	32263	2010-12-06	2011-12-05

Spectrum Analyzer	HAMEG	HM5012	-	2010-12-06	2011-12-05
Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2010-12-06	2011-12-05
CDN	EM TEST	CDN M2/M3	-	2010-12-06	2011-12-05
Attenuation	EM TEST	ATT6/75	-	2010-12-06	2011-12-05
Resistance	EM TEST	R100	-	2010-12-06	2011-12-05
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2010-12-06	2011-12-05
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2010-12-06	2011-12-05
Power Amplifier	AR	150W1000	300999	2010-12-06	2011-12-05
Field probe	Holaday	HI-6005	105152	2010-12-06	2011-12-05
Bilog Antenna	Chase	CBL6111C	2576	2010-12-06	2011-12-05
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2010-12-06	2011-12-05
3m OATS	--	--	N/A	2010-12-06	2011-12-05
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2010-12-06	2011-12-05
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2010-12-06	2011-12-05
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	1100.0008.02	2010-12-06	2011-12-05
Angilent	Spectrum Analyzer	E4440A	----	2010-12-06	2011-12-05
Angilent	Analyzer,commuications	E5155C	----	2010-12-06	2011-12-05

3.0 Technical Details

3.1 Summary of test results

FCC RULE	DESCRIPTION OF TEST	Result
§1.1037, §2.1091	RF Exposure	Compliant
§2.1046; § 22.913 (a) § 24.232 (c)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049 § 22.905 § 22.917 § 24.238	99% & -26 dB Occupied Bandwidth	Compliant
§ 2.1051, § 22.917 (a) § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053 § 22.917 (a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a) § 24.238 (a)	Out of band emission, Band Edge	Compliant
§ 2.1055 § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant

3.2 Test Standards

FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

5.0 RF EXPOSURE

5.1 Applicable Standards:

§1.1310 and §2.1093

According to 1.1307(b)(1), systems operating under the provisions of this section shall be operated in Manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to 1.1310 and 2.1091 RF exposure is calculated . Limits for Maximum Pemissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	--.	--.	f/1500	30
1500–100,000	--	--	1.0	30

5.2 Test Data:

S=PG/4∏R2

Where: S= Power density

P= Power input to antenna

G=Power gain of the antenna in the direction of interest relative to an isotropic radiator

R=Distance to the center of raidation of the antenna

FOR CELLULAR BAND

Maximum peak output power at antenna input terminal : 24.06 (dBm) =0.255**(W)**

Prediction distance 20 (cm) **Prediction frequency** : 824.7 (MHz) **numeric Antenna Gain**: 1.585 dBi

Power density at predication frequency at 20cm :0.0804(mW/cm2)

MPE Limit for uncontrolled exposure at prediction frequency : 0.5498**(mW/cm2)**

FOR PCS BAND

Maximum peak output power at antenna input terminal : 23.91 (dBm) = 0.246 **(W)**

Prediction distance 20 (cm) **Prediction frequency** : 1908.75 (MHz) **numeric Antenna Gain**: 1.585 dBi

Power density at predication frequency at 20cm :0.0776(mW/cm2)

MPE Limit for uncontrolled exposure at prediction frequency : 1**(mW/cm2)**

6.0 MODULATION CHARACTERISTIC

6.1 Applicable Standards:

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7.0 RF OUTPUT POWER

7.1 Applicable Standards

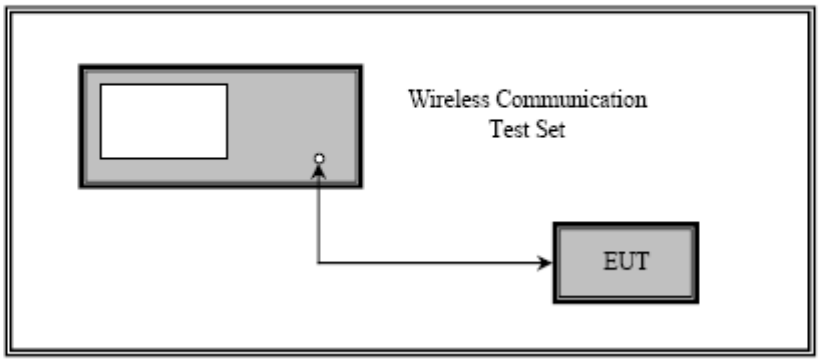
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), in no case may the peak output power of a base station transmitter exceed 2 watt EIRP.

7.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.



Radiated method:

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the fundamental frequency emissions were measured by the substitution.

Please refer to TIA 603-C section 2.2.17

7.3 Test Data:

Environmental conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

Conducted Power

CDMA2000 Cellular					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
CDMA 200 1x RTT	FCH_RC1	1013(Low)	824.70	23.42	0.22
		384 (Mid)	836.52	23.58	0.23
		777(High)	848.31	23.47	0.22
	FCH_RC3	1013(Low)	824.70	23.46	0.22
		384 (Mid)	836.52	23.65	0.23
		777(High)	848.31	23.54	0.23
	FCH+SCH_RC3	1013(Low)	824.70	23.44	0.22
		384 (Mid)	836.52	23.56	0.23
		777(High)	848.31	23.56	0.23
CDMA 2000 1xEV-DO (Rev.0)	EVDO-UL:9.6Kbps	1013(Low)	824.70	**24.06**	0.25
		384 (Mid)	836.52	24.03	0.25
		777(High)	848.31	24.02	0.25
	EVDO-UL:38.4Kbps	1013(Low)	824.70	23.98	0.25
		384 (Mid)	836.52	23.87	0.25
		777(High)	848.31	23.96	0.23
	EVDO-UL:153.6Kbps	1013(Low)	824.70	23.52	0.22
		384 (Mid)	836.52	23.72	0.23
		777(High)	848.31	23.60	0.23
CDMA 2000 1xEV-DO (Rev.A)	RETAP_128Kbps	1013(Low)	824.70	23.96	0.25
		384 (Mid)	836.52	24.03	0.25
		777(High)	848.31	23.97	0.25
	RETAP_2048Kbps	1013(Low)	824.70	23.84	0.24
		384 (Mid)	836.52	23.77	0.24
		777(High)	848.31	23.82	0.24
	RETAP_12288Kbps	1013(Low)	824.70	23.92	0.25
		384 (Mid)	836.52	24.05	0.25
		777(High)	848.31	23.97	0.25

CDMA2000 PCS					
Test Mode	Test Status	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)
CDMA 2000 1x RTT	FCH_RC1	25(Low)	1851.25	23.12	0.21
		600 (Mid)	1880.00	23.22	0.21
		1177(High)	1908.75	23.07	0.20
	FCH_RC3	25(Low)	1851.25	23.10	0.20
		600 (Mid)	1880.00	23.26	0.21
		1177(High)	1908.75	23.02	0.20
	FCH+SCH_RC3	25(Low)	1851.25	23.07	0.20
		600 (Mid)	1880.00	23.31	0.21
		1177(High)	1908.75	23.05	0.20
CDMA 2000 1xEV-DO (Rev.0)	EVDO-UL:9.6Kbps	25(Low)	1851.25	23.88	0.23
		600 (Mid)	1880.00	23.81	0.24
		1177(High)	1908.75	**23.91**	0.25
	EVDO-UL:38.4Kbps	25(Low)	1851.25	23.60	0.23
		600 (Mid)	1880.00	23.71	0.24
		1177(High)	1908.75	23.72	0.24
	EVDO-UL:153.6Kbps	25(Low)	1851.25	23.39	0.22
		600 (Mid)	1880.00	23.57	0.23
		1177(High)	1908.75	23.44	0.22
CDMA 2000 1xEV-DO (Rev.A)	RETAP_128Kbps	25(Low)	1851.25	23.85	0.24
		600 (Mid)	1880.00	23.85	0.24
		1177(High)	1908.75	23.74	0.24
	RETAP_2048Kbps	25(Low)	1851.25	23.45	0.22
		600 (Mid)	1880.00	23.56	0.23
		1177(High)	1908.75	23.60	0.23
	RETAP_12288Kbps	25(Low)	1851.25	23.79	0.24
		600 (Mid)	1880.00	23.80	0.24
		1177(High)	1908.75	23.76	0.24

Radiated Power (ERP and EIRP)

Brand:	CDMA2000 Cellular	Channel:	1013/384/777
Test Mode	1Xev-DO Rev.0 9.6kbps		

f (GHz)	SA reading (dBuV/m)	Ant. Pol (H/V)	SG reading dBm	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
CH1013, 824.7MHz								
824.7	97.8	H	22.3	0.5	0.0	21.8	38.5	-16.7
824.7	96.5	V	20.7	0.5	0.0	20.2	38.5	-18.3
CH384, 836.52MHz								
836.52	96.3	H	21.8	0.5	0.0	21.3	38.5	-17.2
836.52	94.6	V	20.2	0.5	0.0	19.7	38.5	-18.8
CH777, 848.31MHz								
848.31	98.7	H	22.4	0.5	0.0	21.9	38.5	-16.6
848.31	96.5	V	21.2	0.5	0.0	20.7	38.5	-17.8

Brand:	CDMA2000 PCS	Channel:	25/600/1175
Test Mode	1xEV-DO Rev.0 9.6kbps		

f (GHz)	SA reading (dBuV/m)	Ant. Pol (H/V)	SG reading dBm	CL (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
CH25, 1851.25MHz								
1851.25	89.7	H	14.4	0.6	8.3	22.1	33.0	-10.9
1851.25	88.2	V	12.8	0.6	8.3	20.5	33.0	-12.5
CH3600, 1880MHz								
1880	87.5	V	12.6	0.6	8.3	20.3	33.0	-12.7
1880	90.0	H	14.1	0.6	8.3	21.8	33.0	-11.2
CH1175, 1908.75MHz								
1908.75	86.8	V	11.3	0.7	8.4	19.0	33.0	-14.0
1908.75	89.5	H	13.2	0.7	8.4	20.9	33.0	-12.1

8.0 Occupied Bandwidth

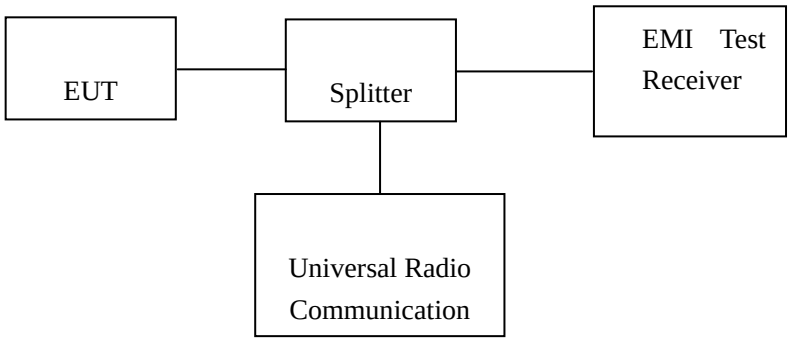
8.1 Applicable Standards:

CFR 47 §2.1049, §22.917, §22.905 and §24.238.

8.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



8.3 Test Data:

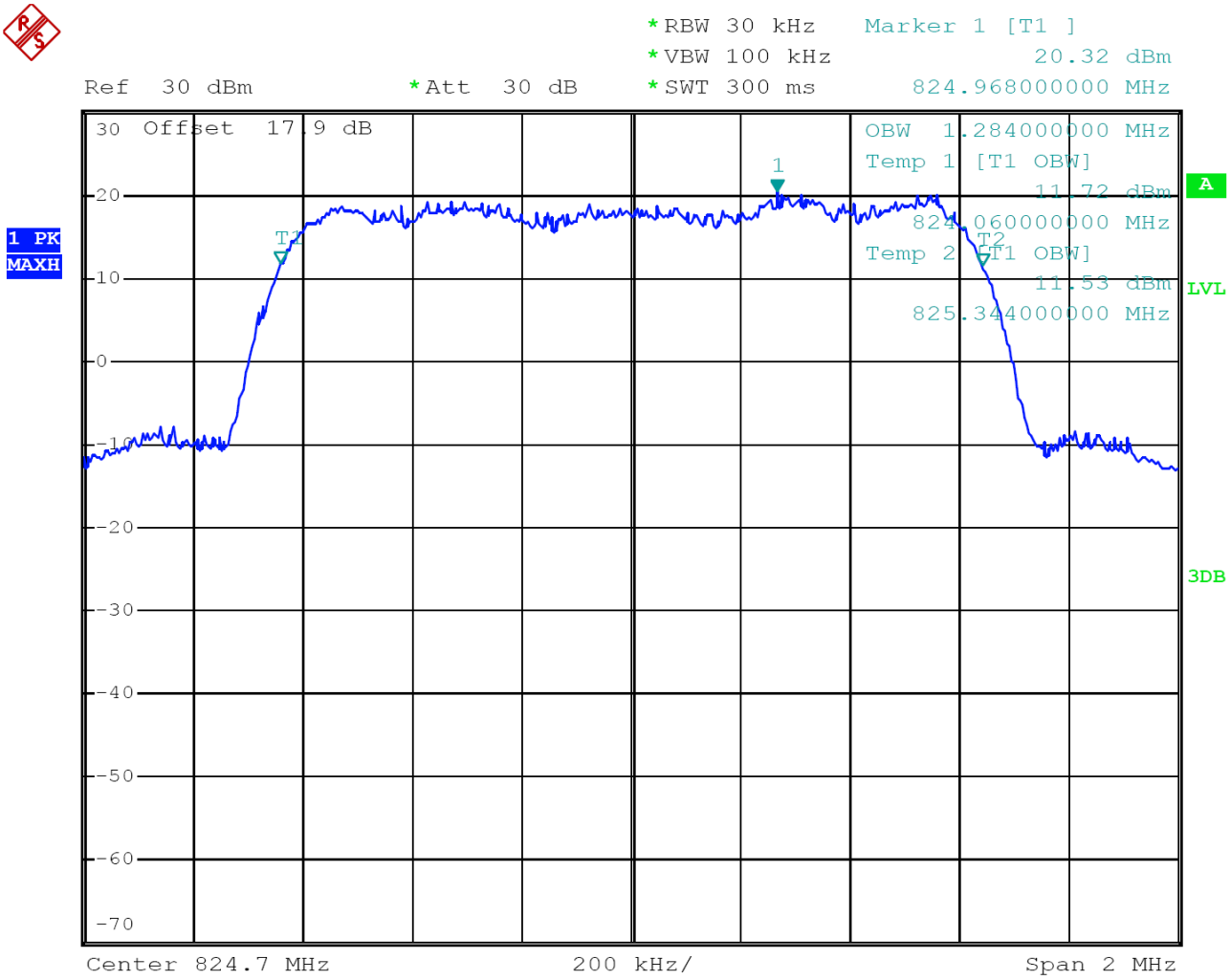
Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The Worse Case Recorded

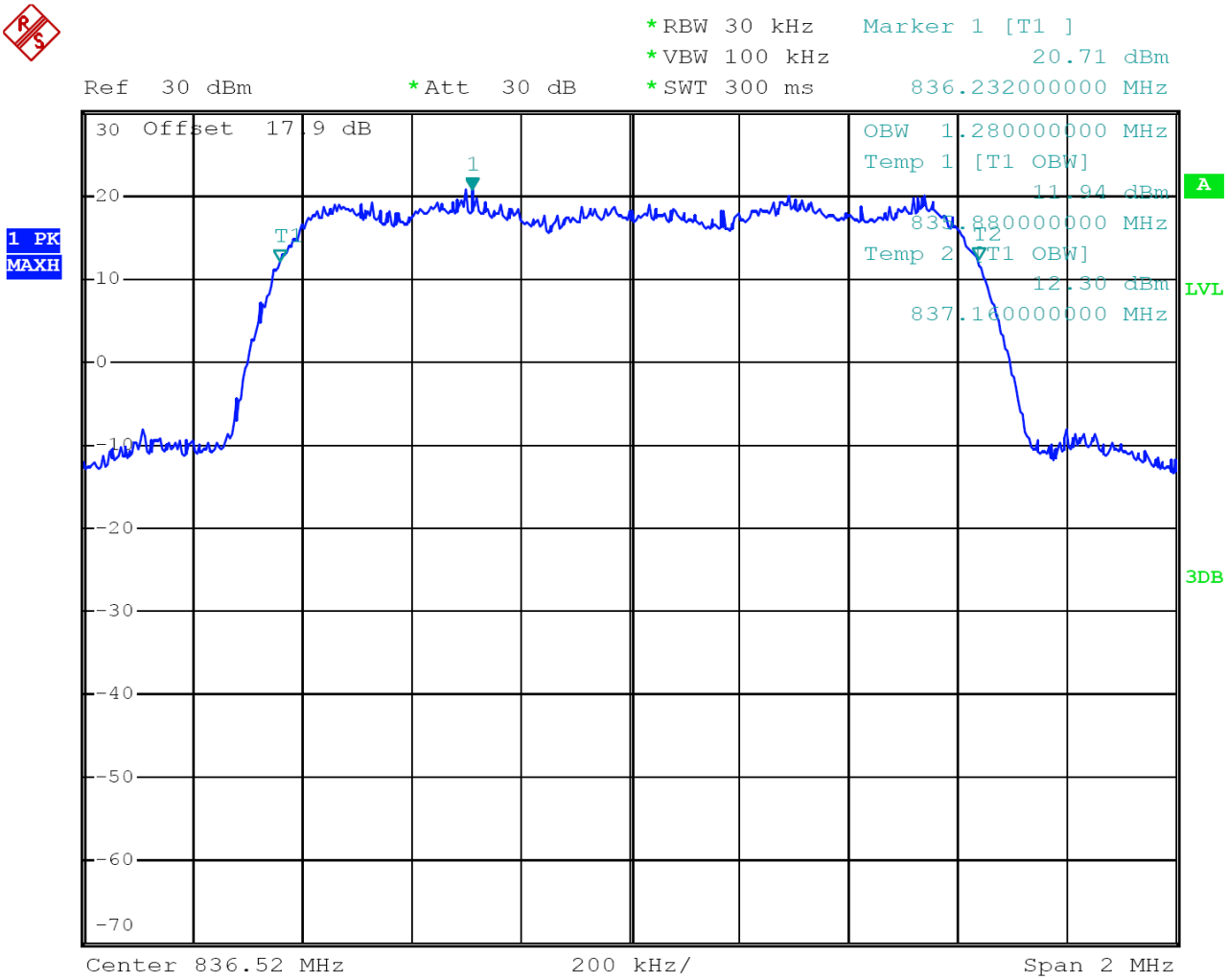
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 1013



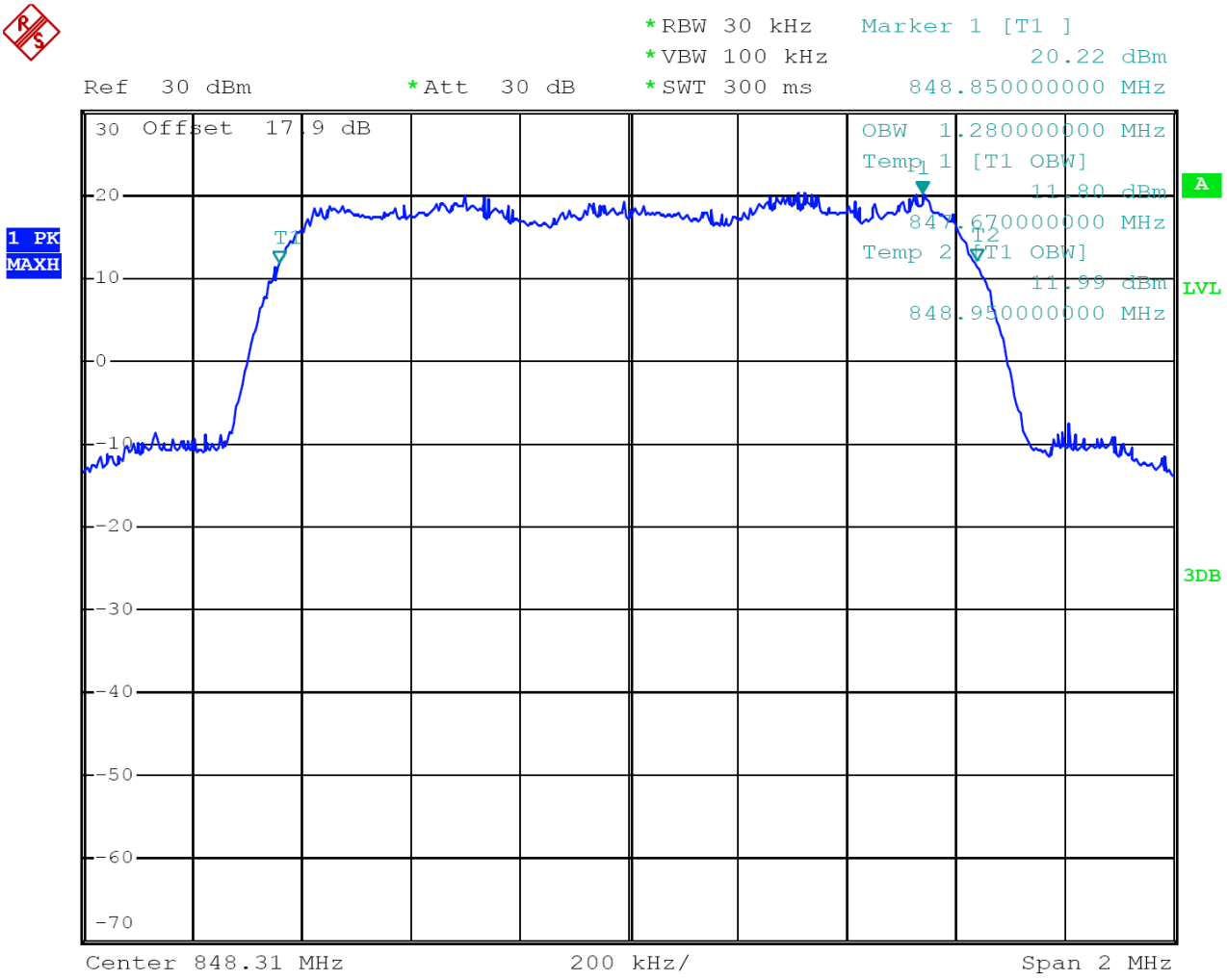
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 384



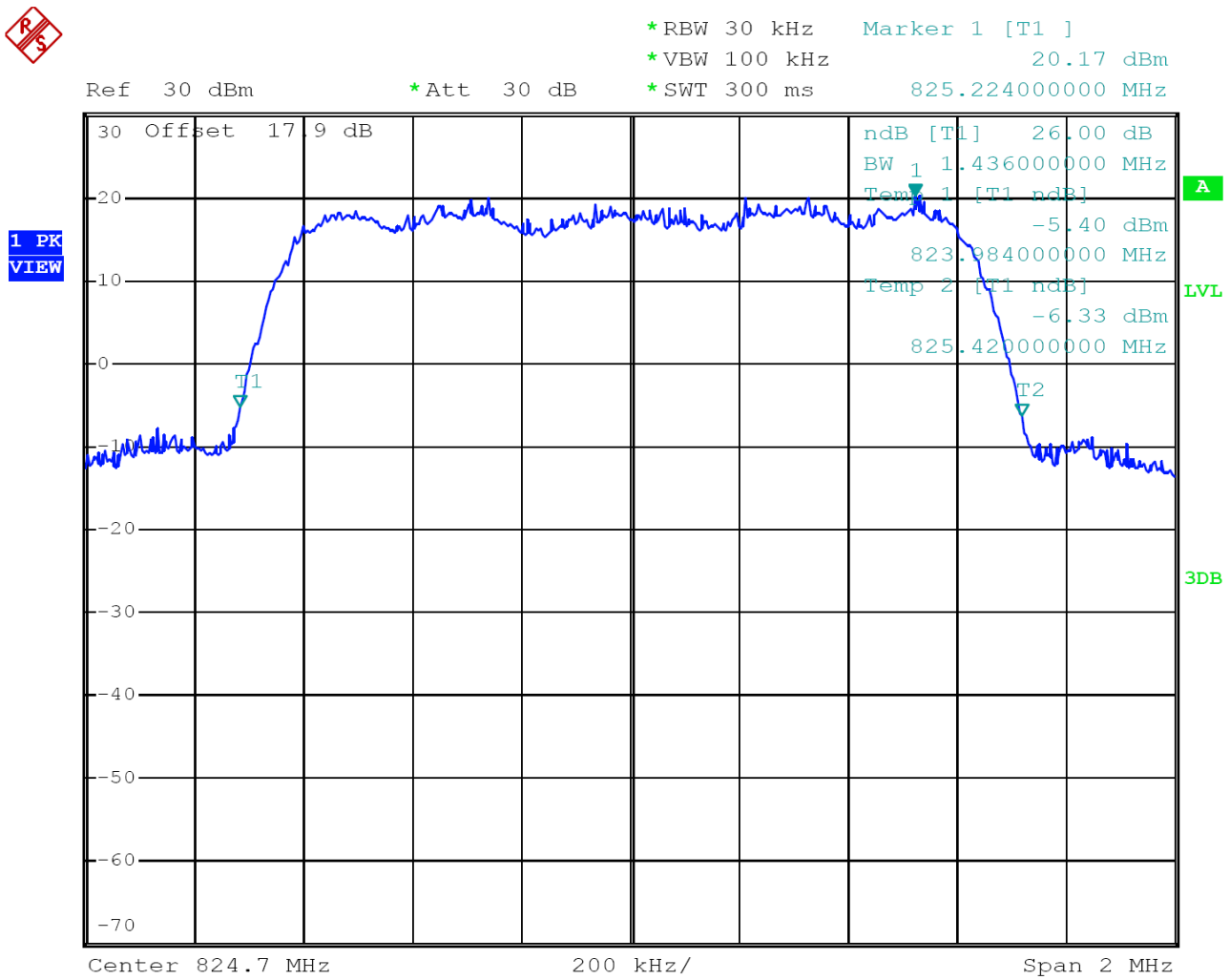
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 777



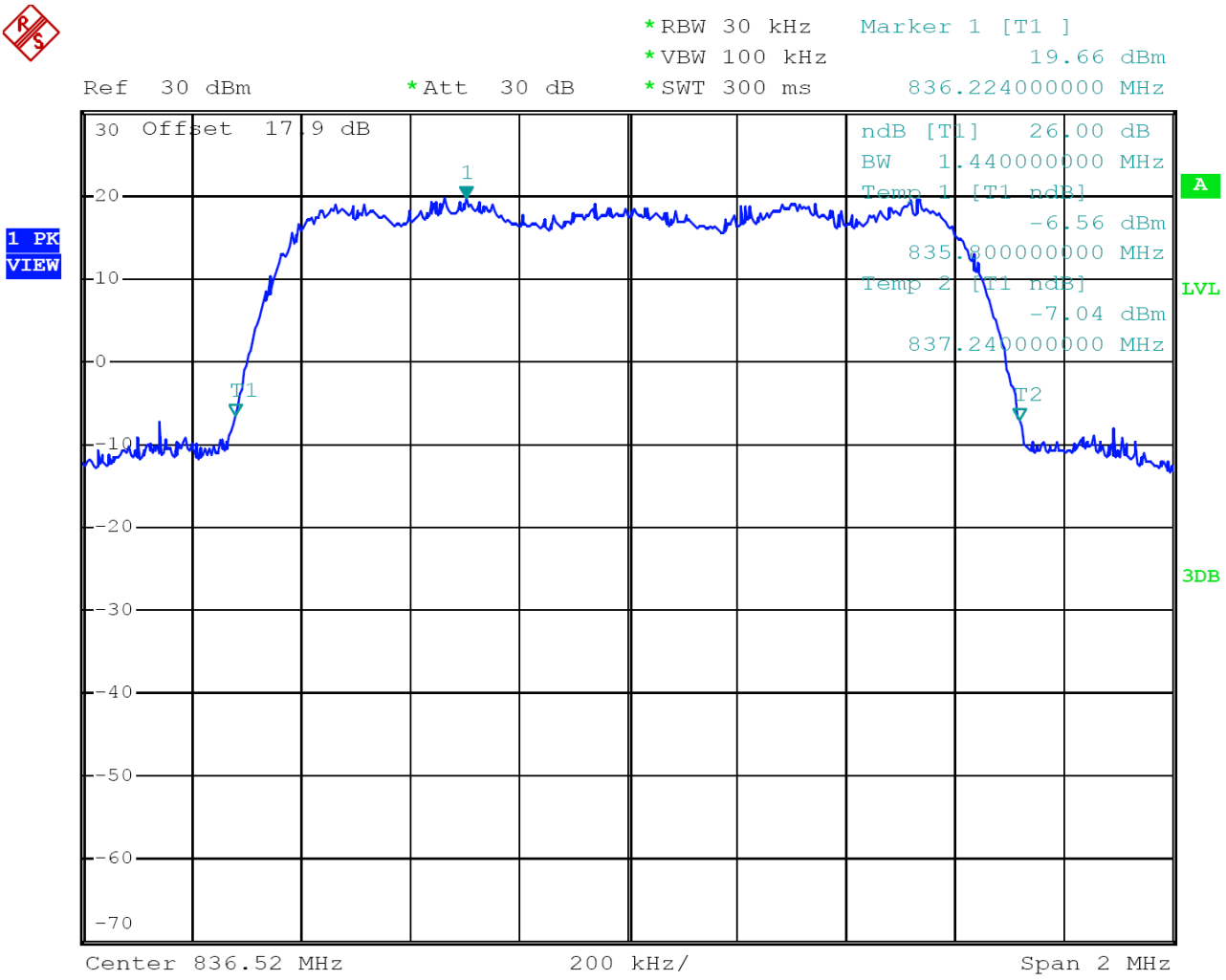
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 1013



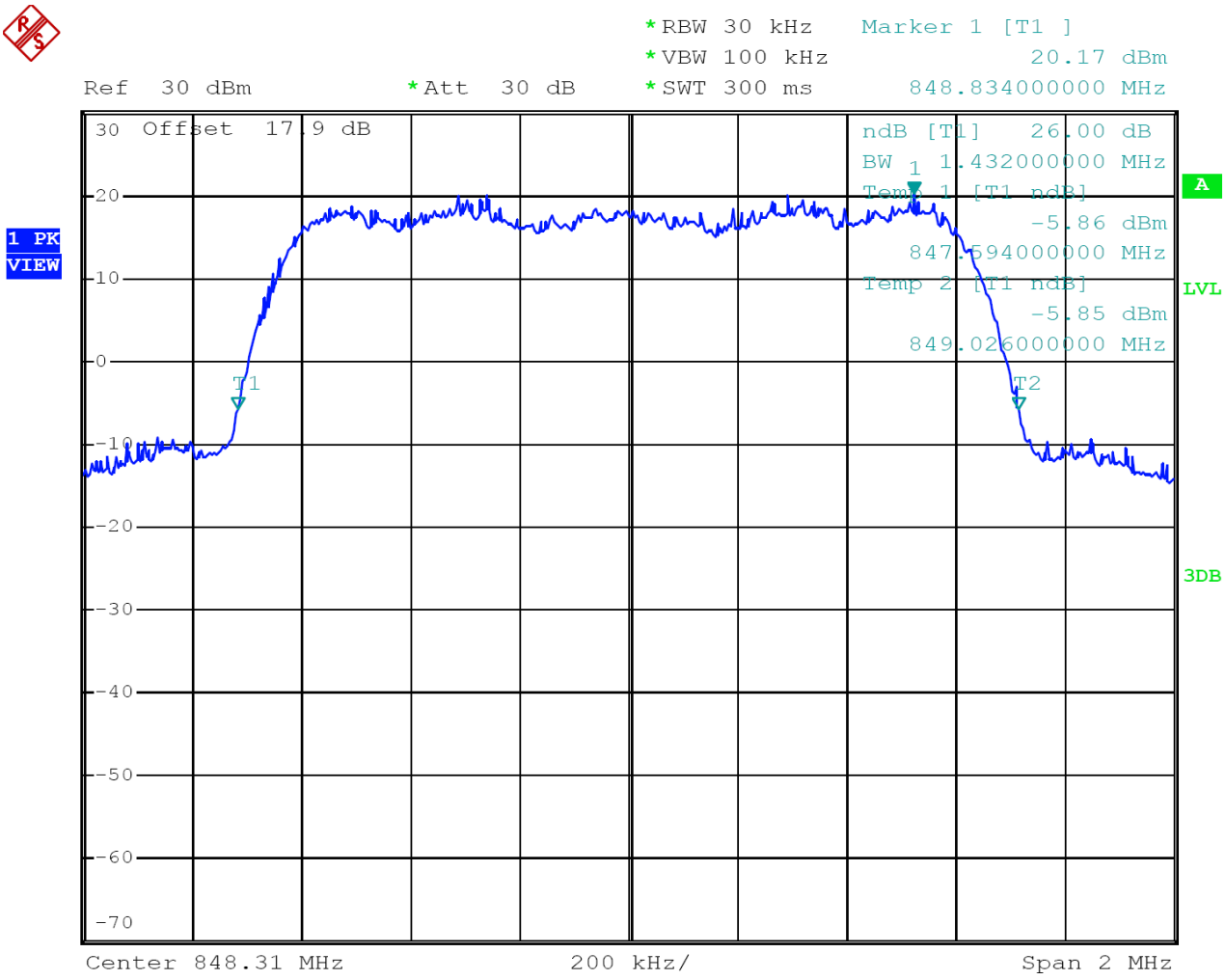
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 384



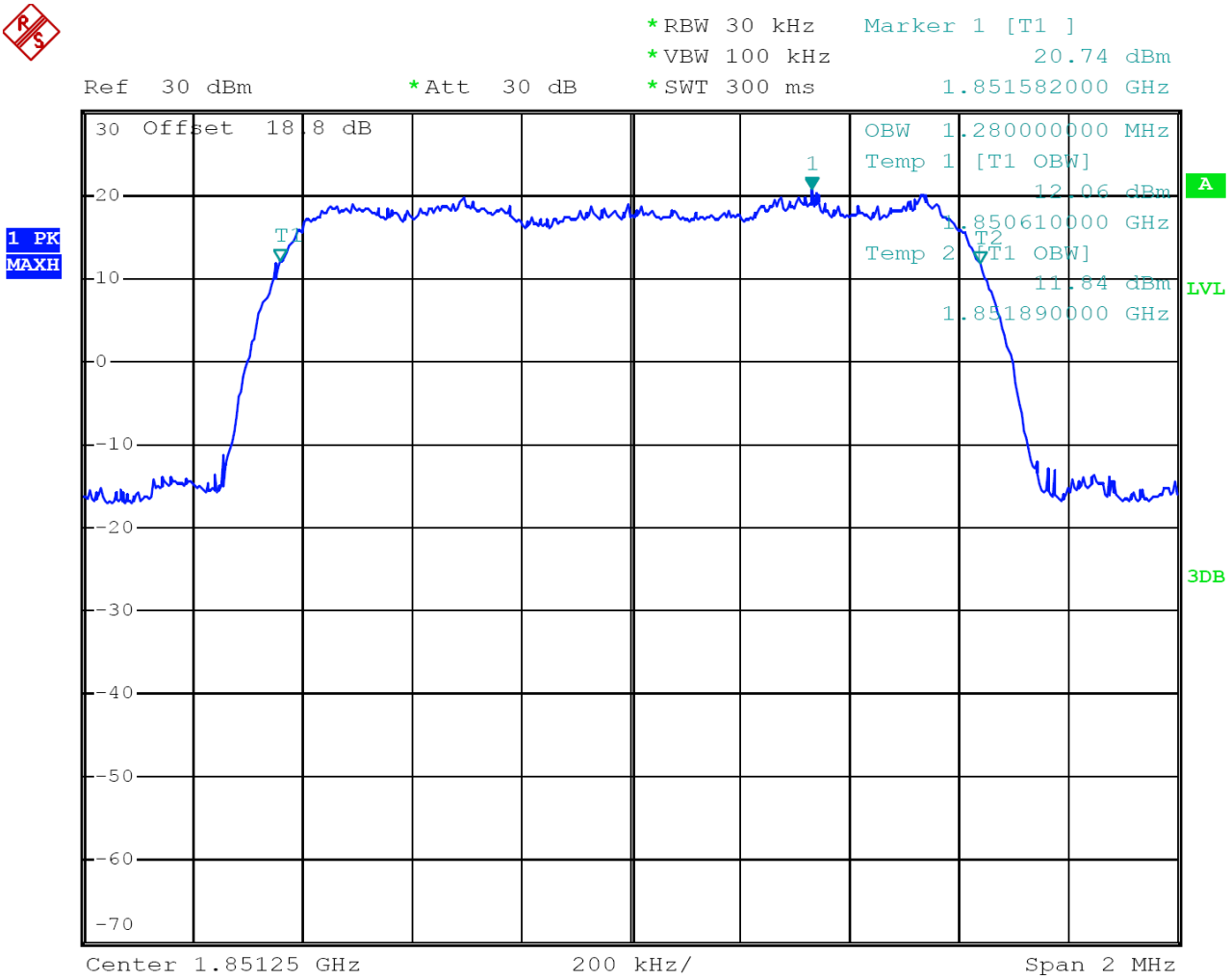
Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 777



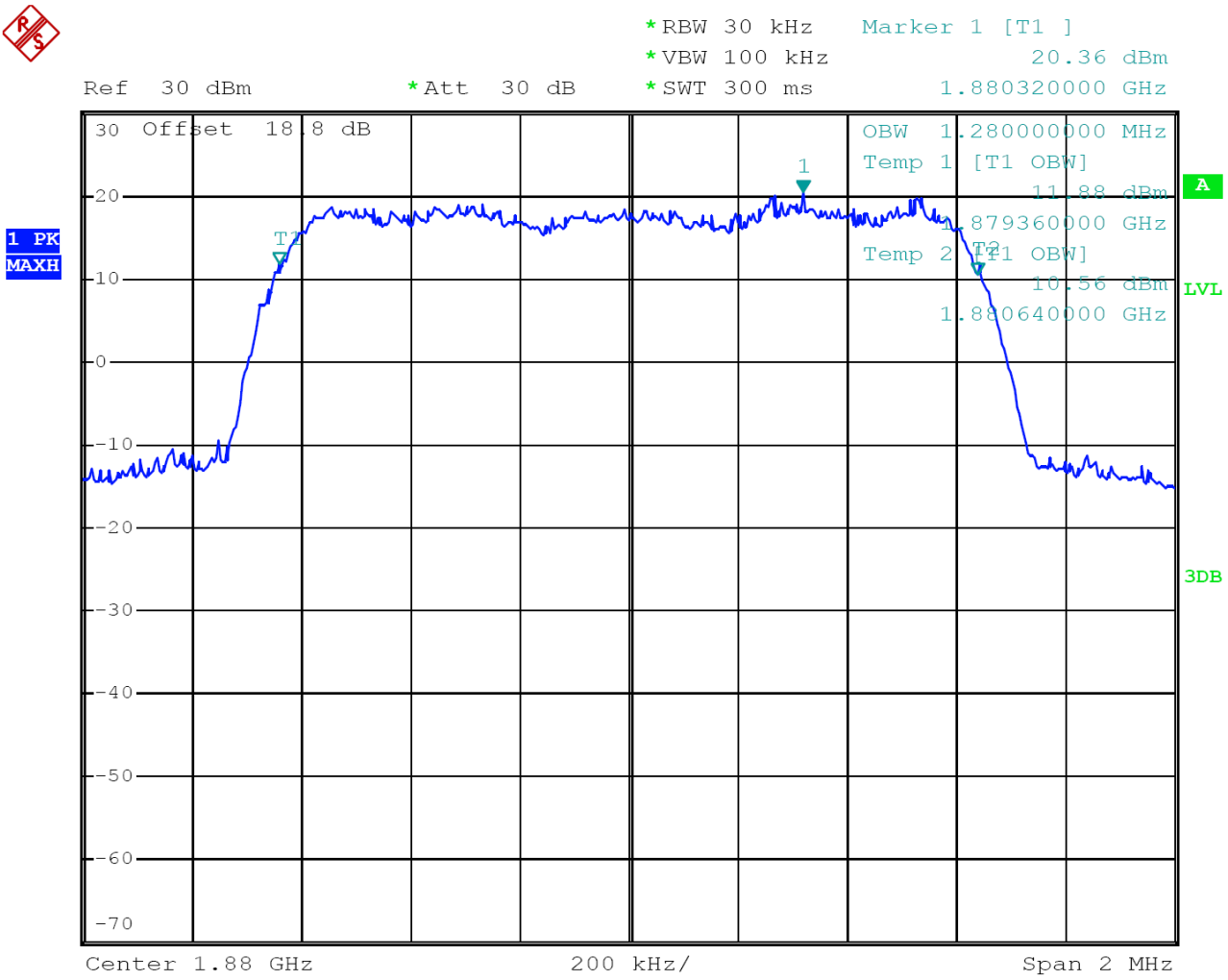
Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 25



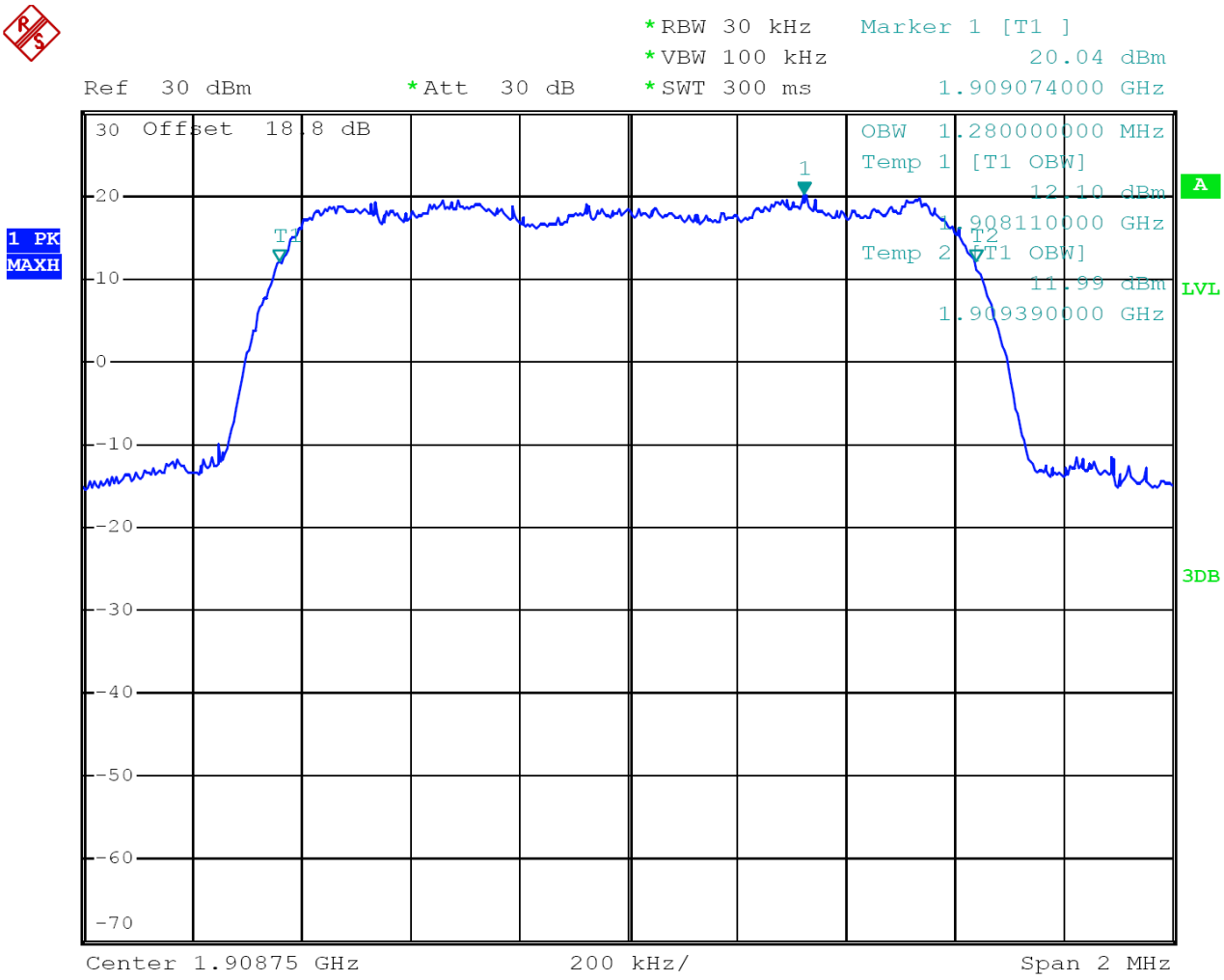
Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 600



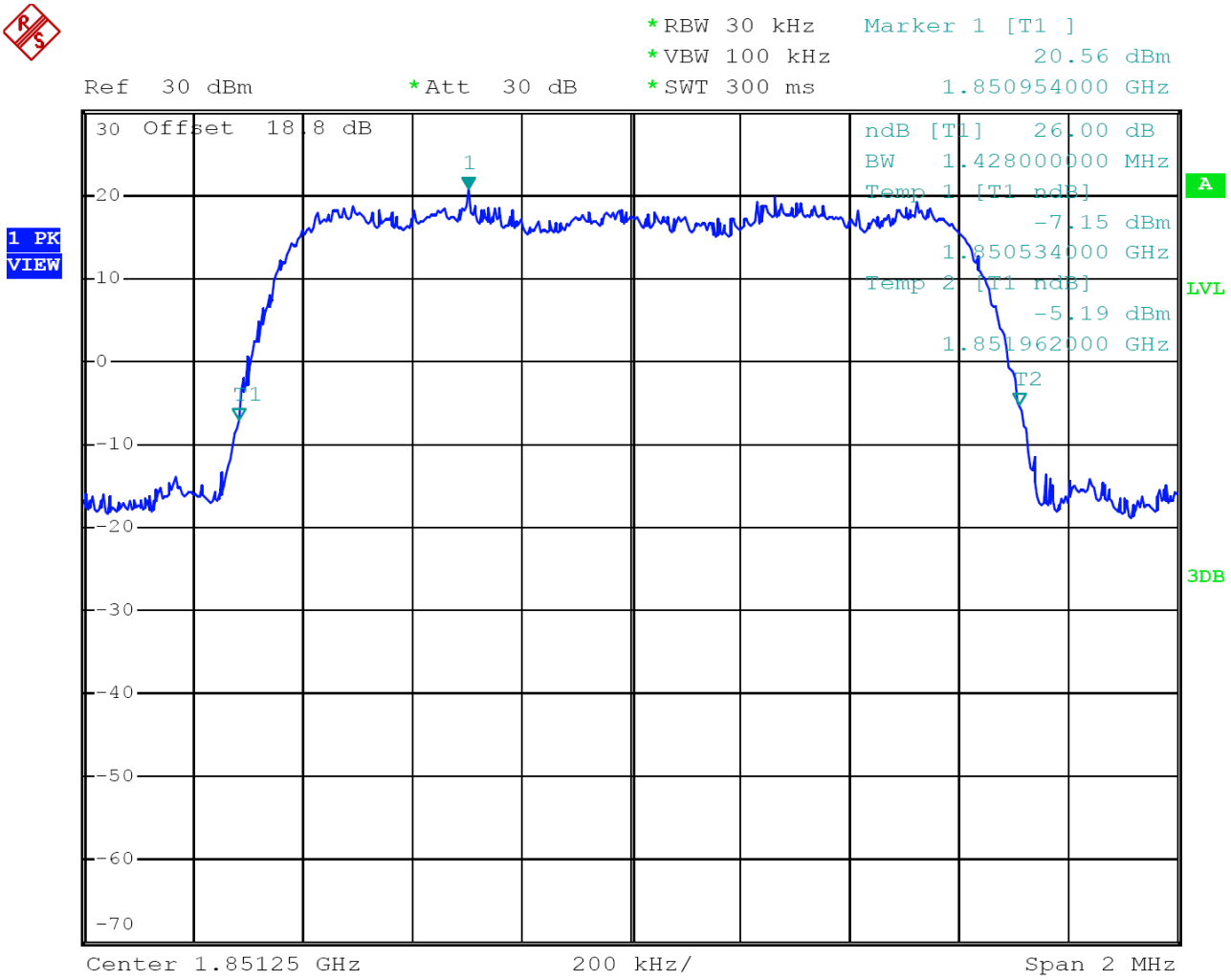
Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

99% Occupied Bandwidth Plot on Channel 1175



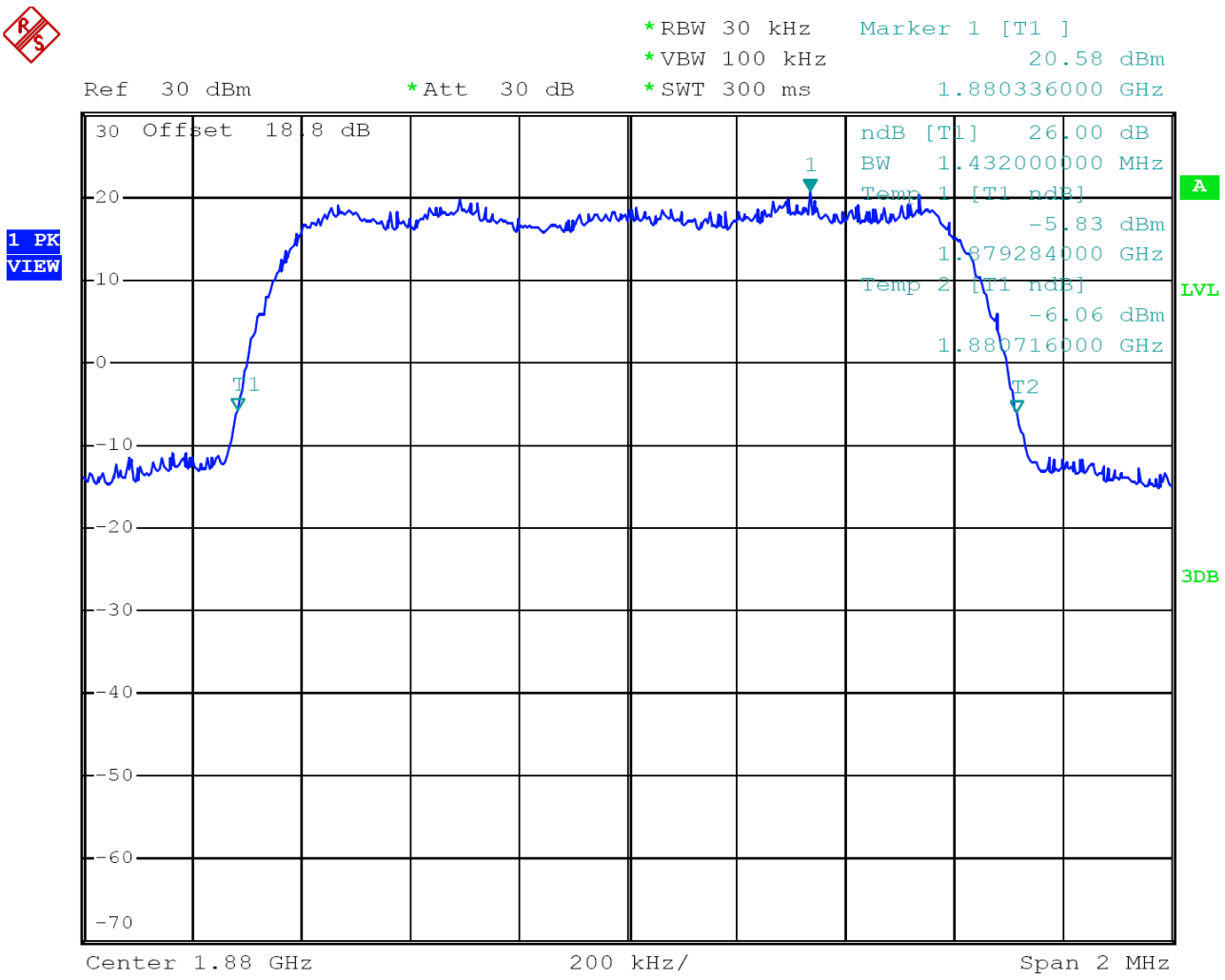
Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 25



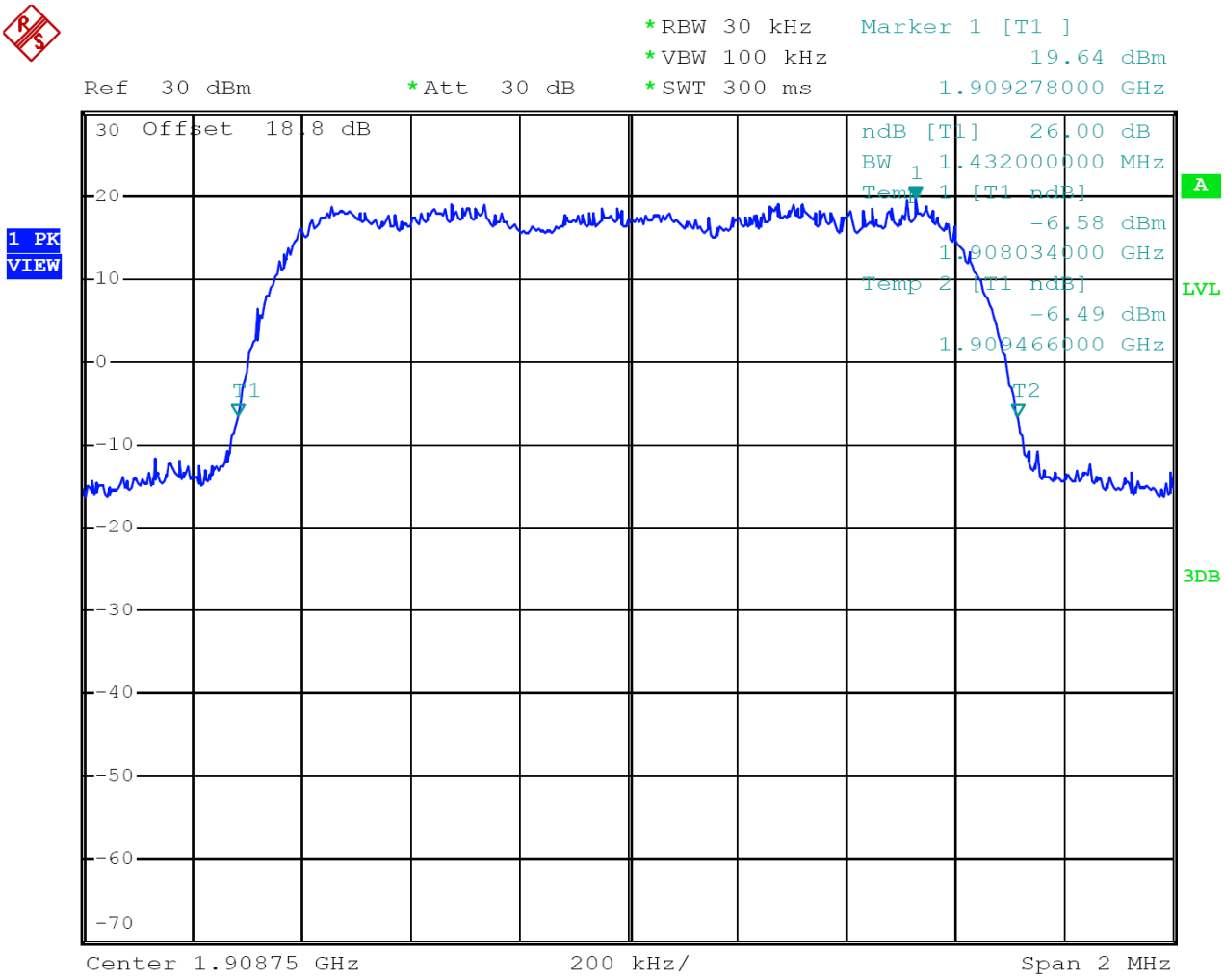
Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 600



Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

26dB Bandwidth Plot on Channel 1175



9.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

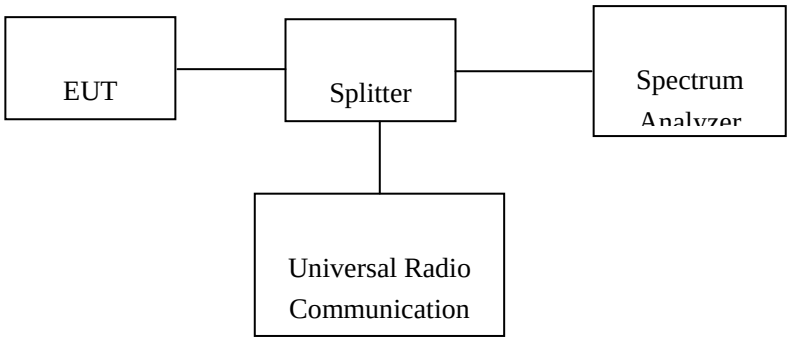
9.1 Applicable Standards

CFR 47 §2.1051, §22.917(a) and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

9.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for 22H, And for 24E, employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.



9.3 Test Data:

Environmental conditions:

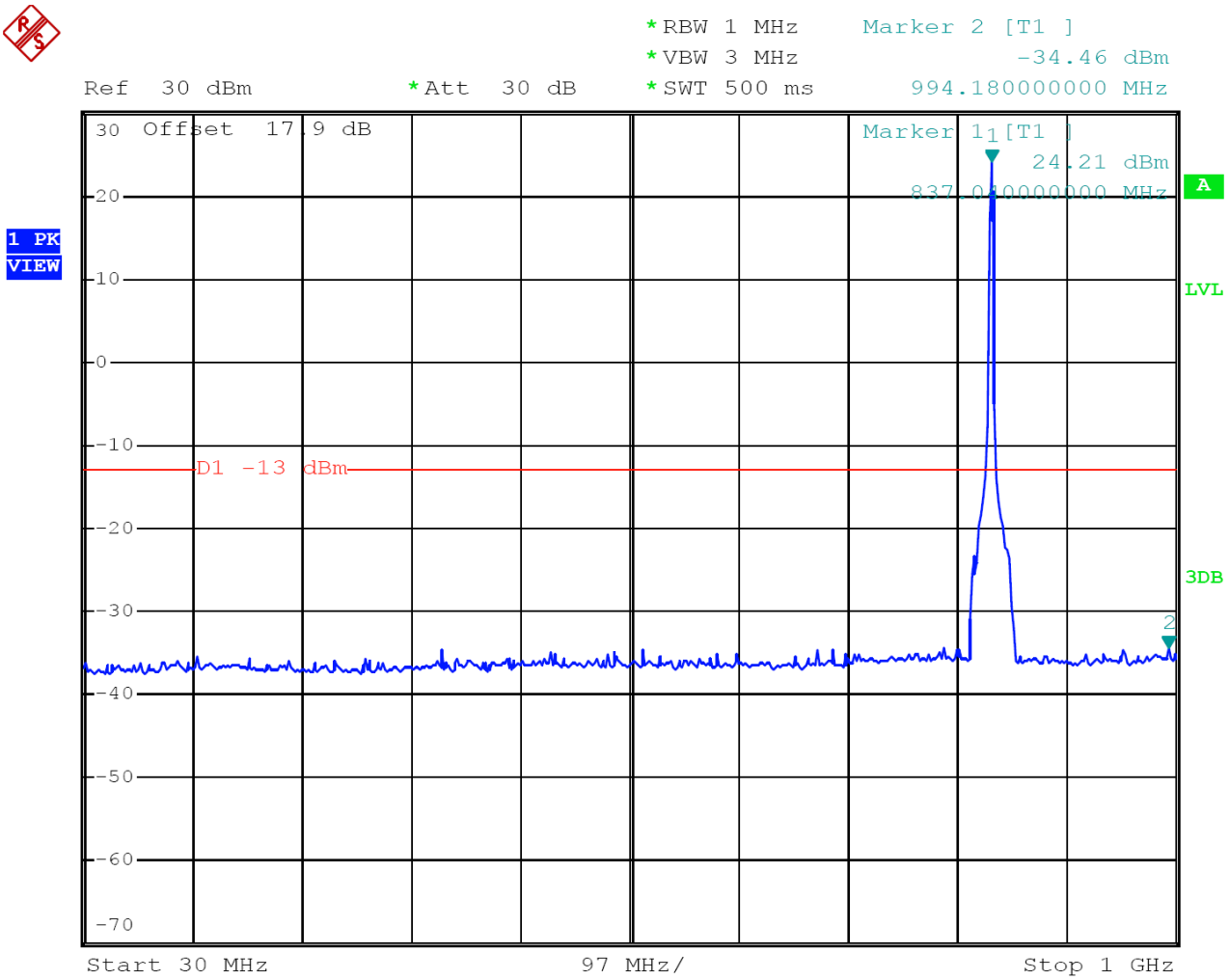
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The Worse Case Recorded

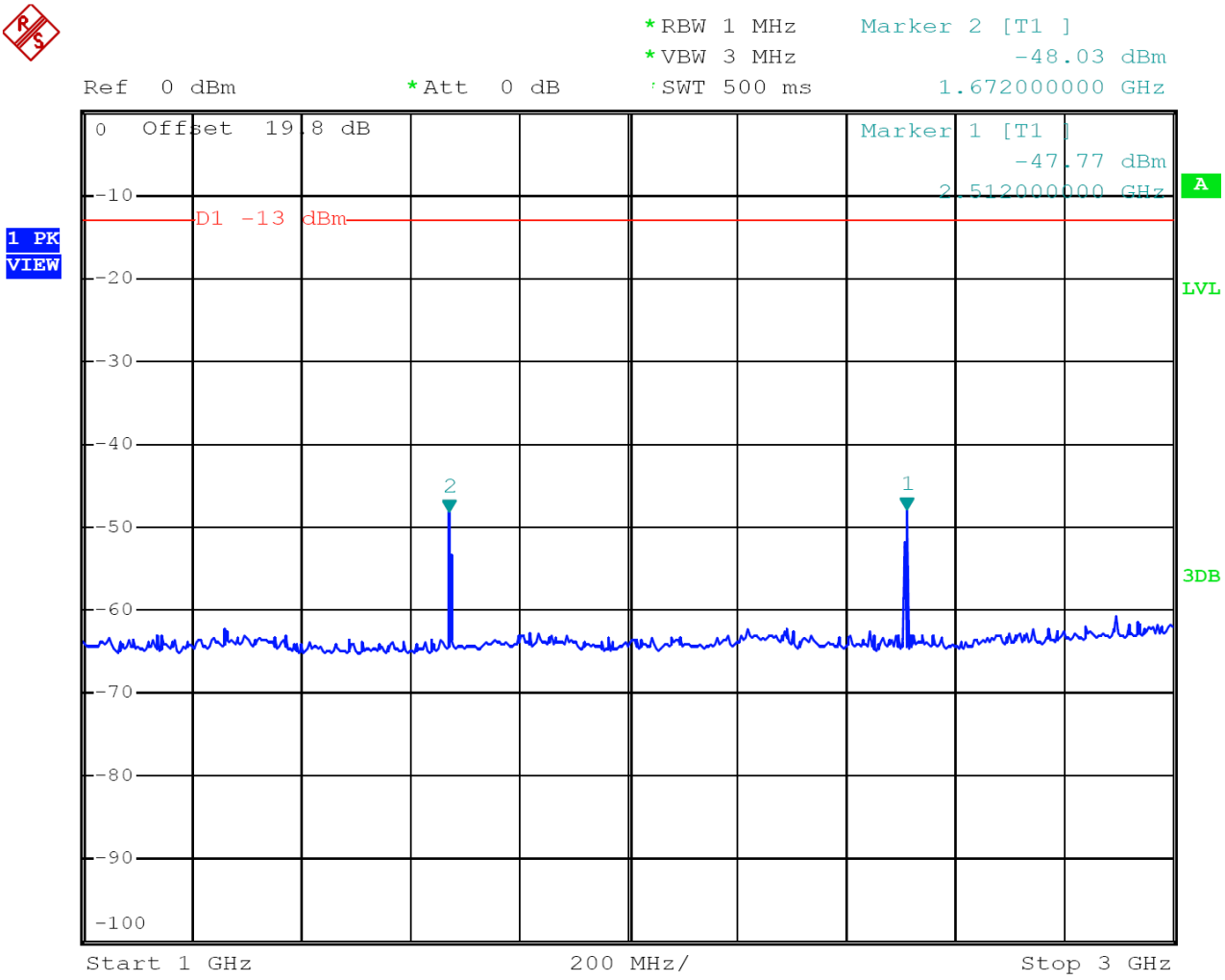
Please refer to the hereinafter plots.

Brand:	CDMA2000 Cellular	Channel:	384
Test Mode	1Xev-DO Rev.0 9.6kbps		

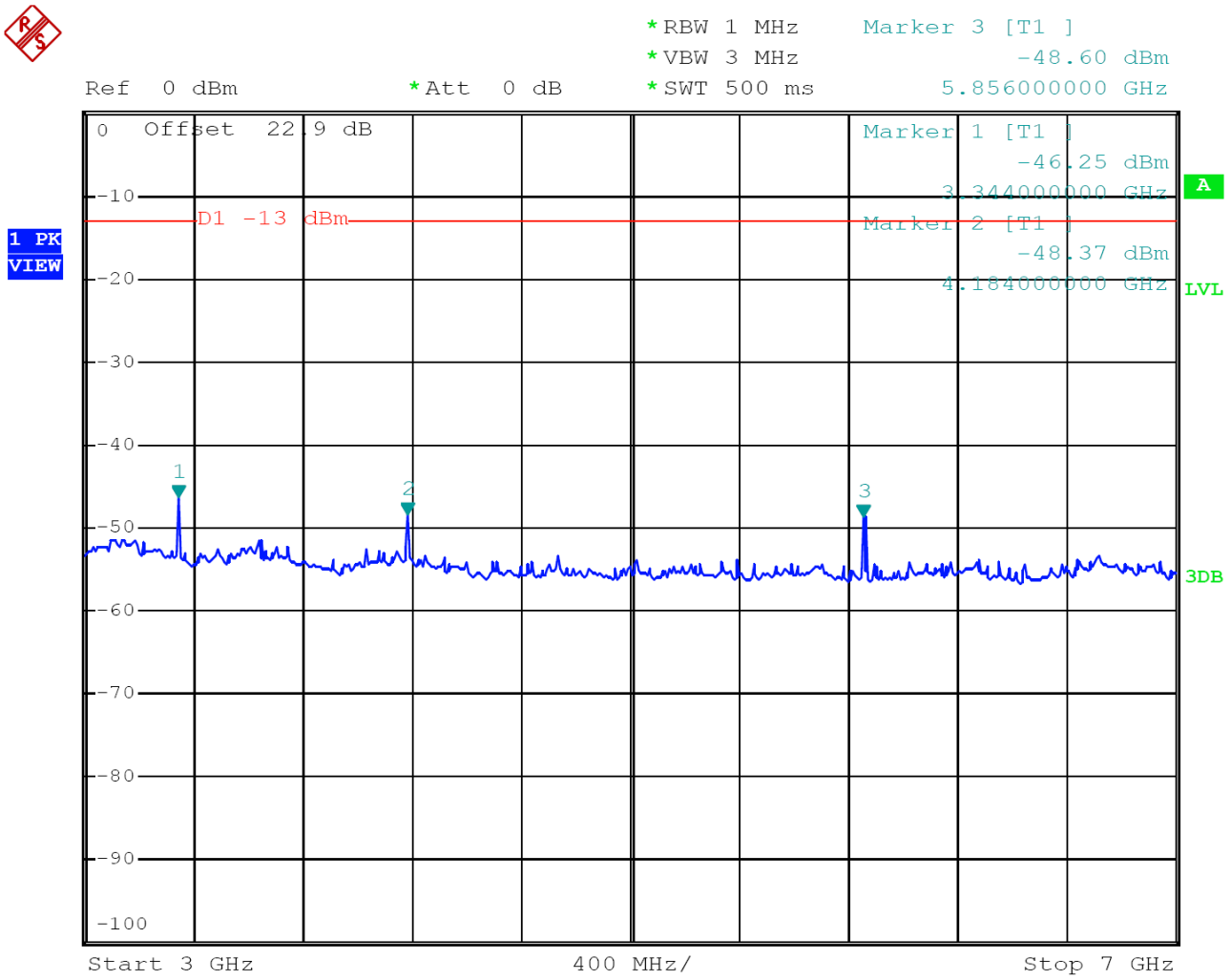
Conducted Emissions Test Plot between 30MHz-1GHz



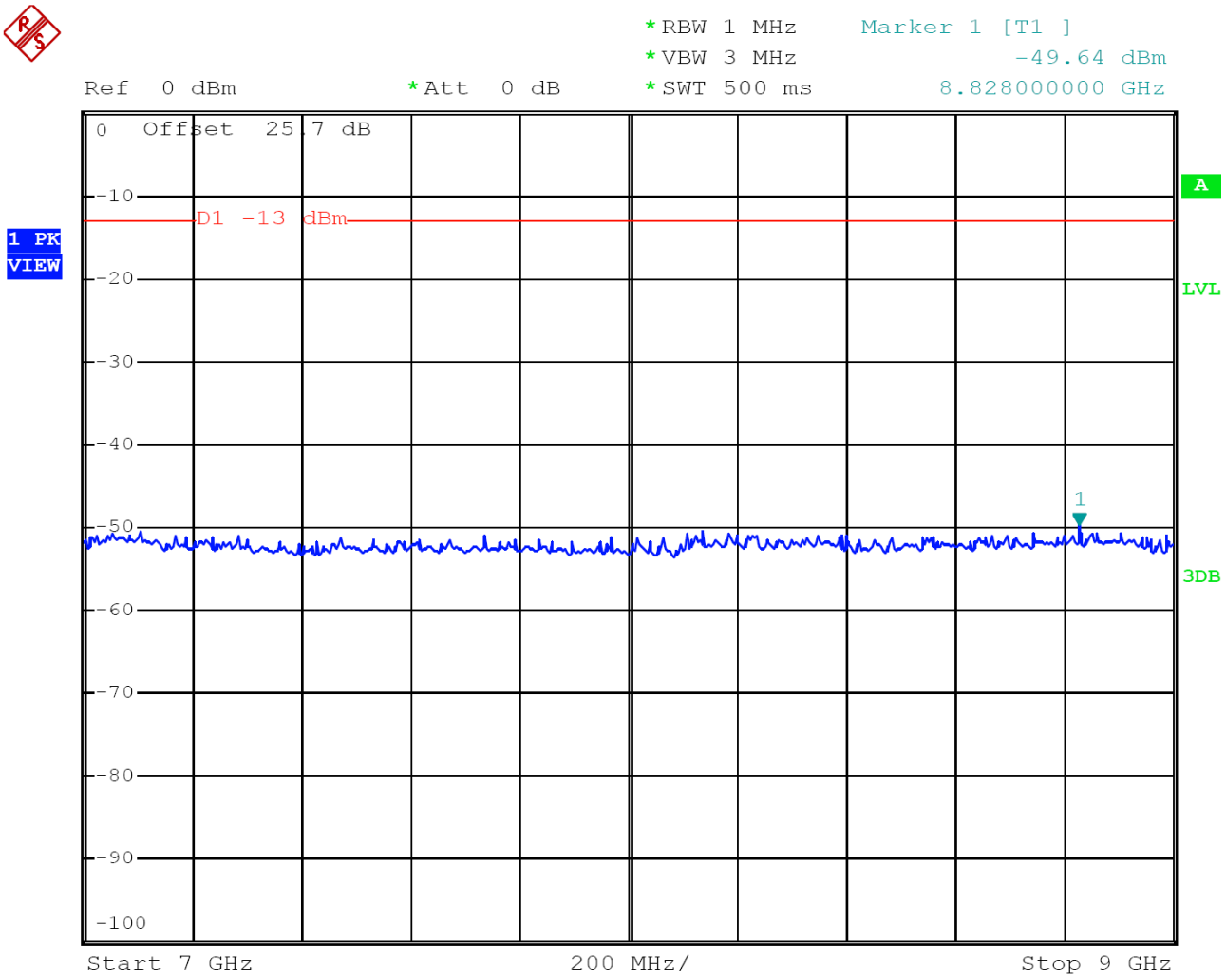
Conducted Emissions Test Plot between 1GHz-3GHz



Conducted Emissions Test Plot between 3GHz7GHz

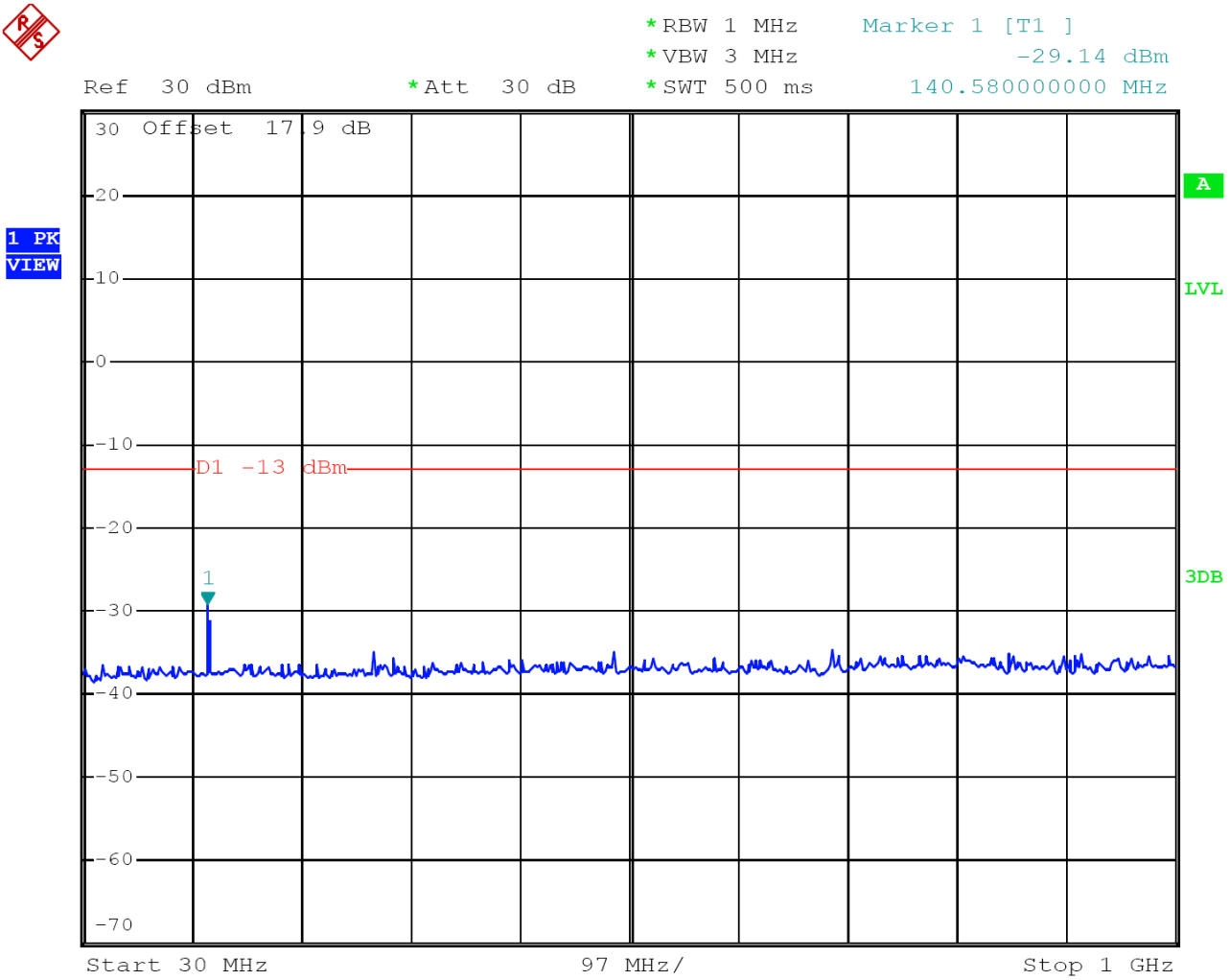


Conducted Emissions Test Plot between 7GHz-9GHz

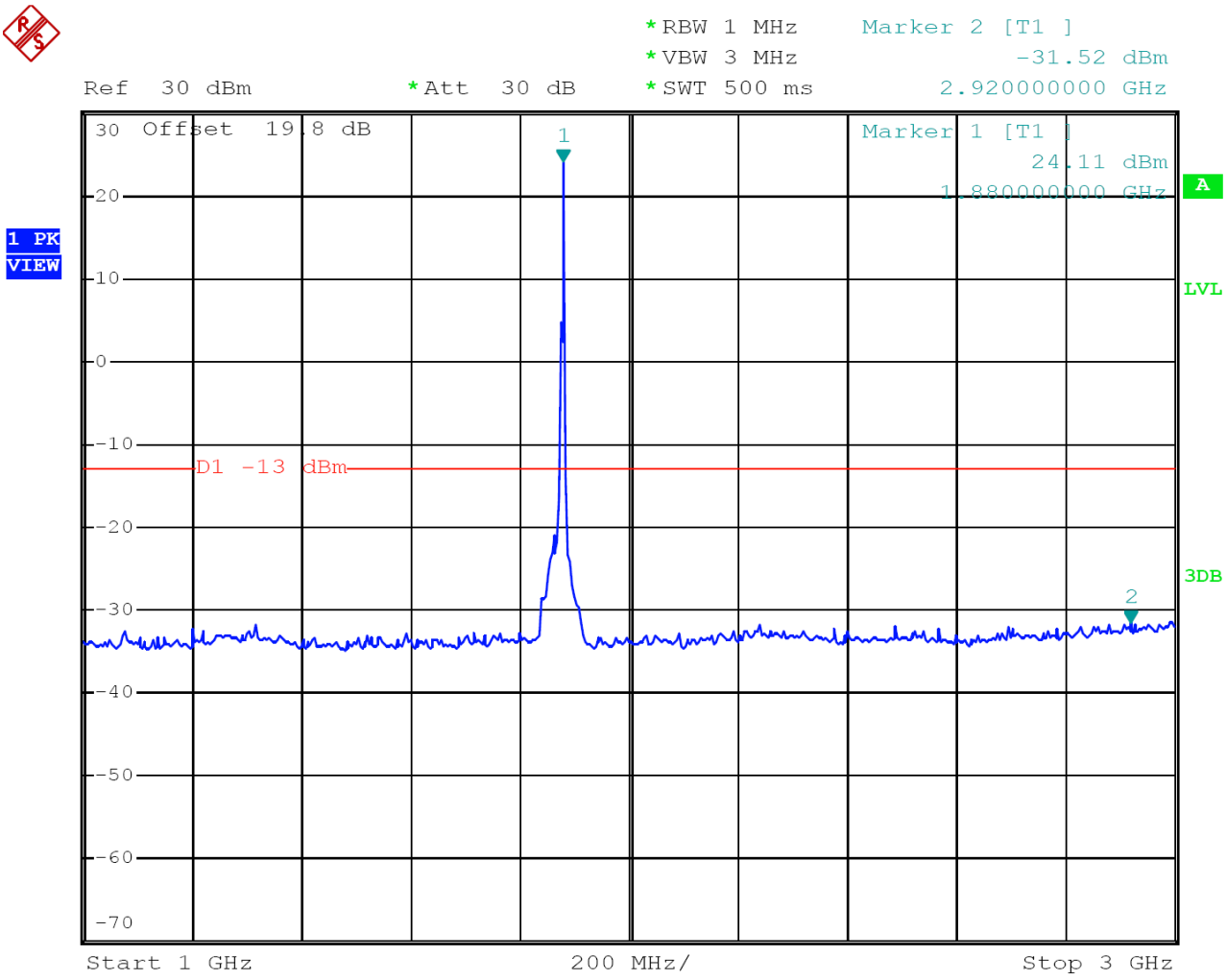


Brand:	CDMA2000 PCS	Channel:	600
Test Mode	1Xev-DO Rev.0 9.6kbps		

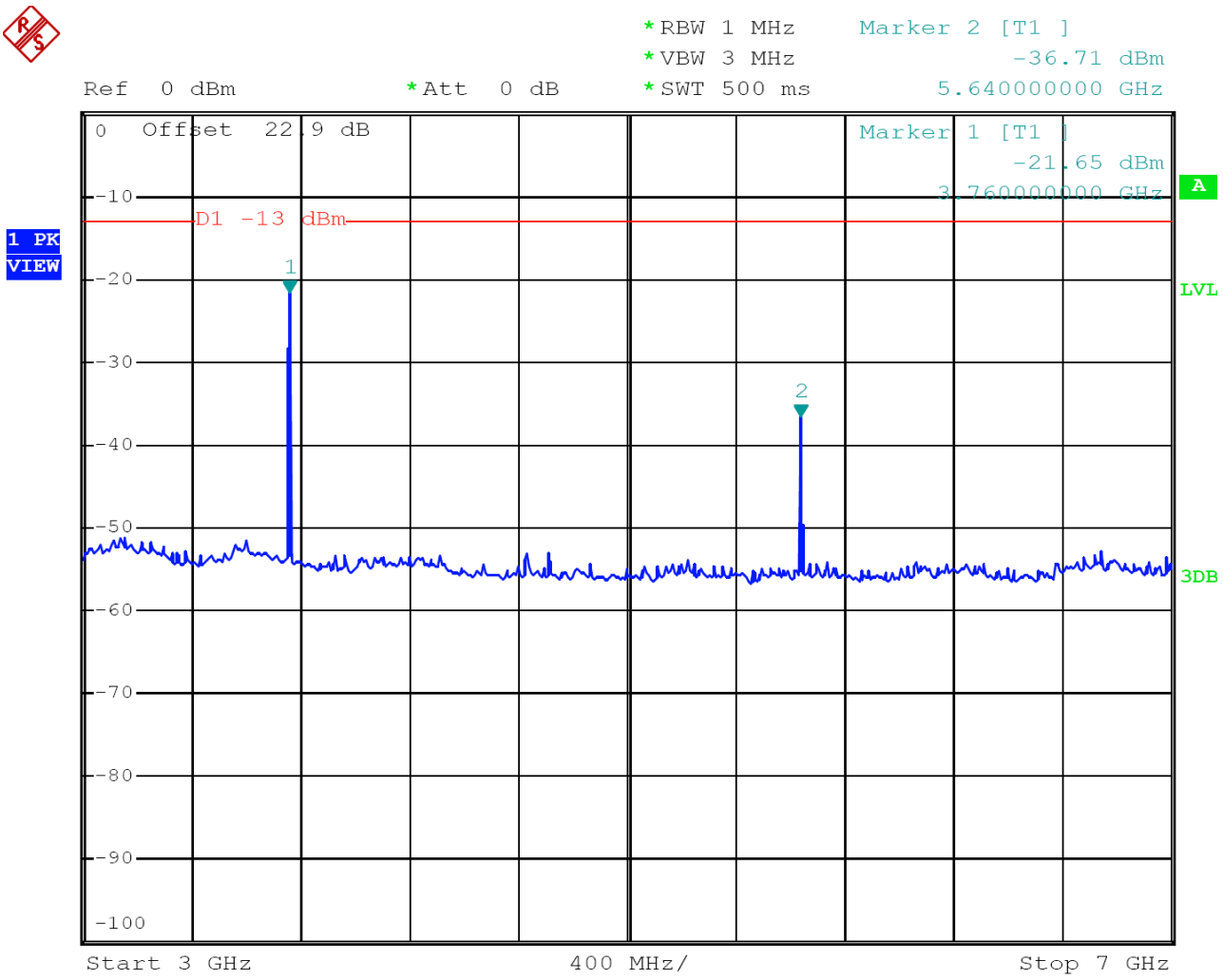
Conducted Emissions Test Plot between 30MHz-1GHz



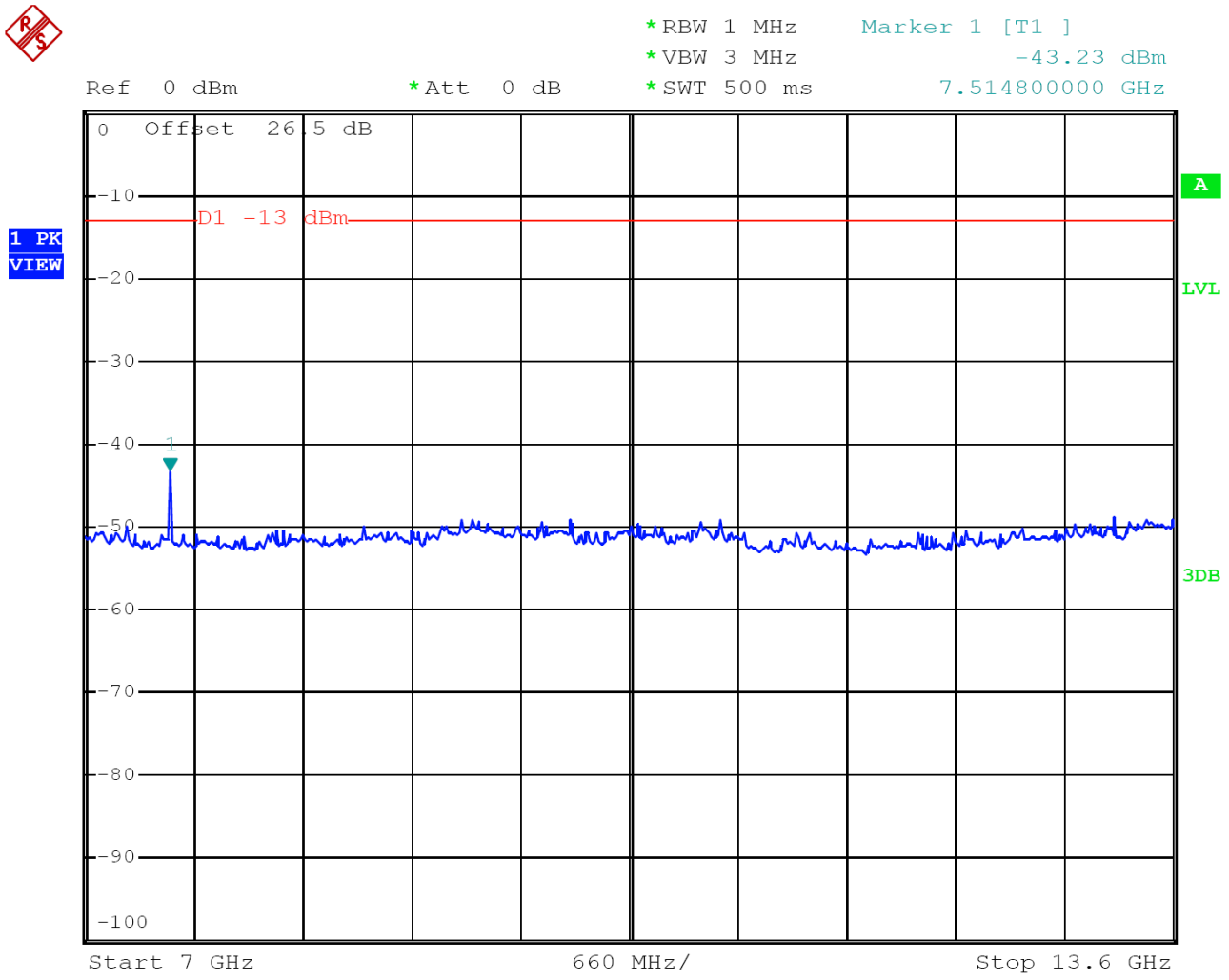
Conducted Emissions Test Plot between 1GHz-3GHz



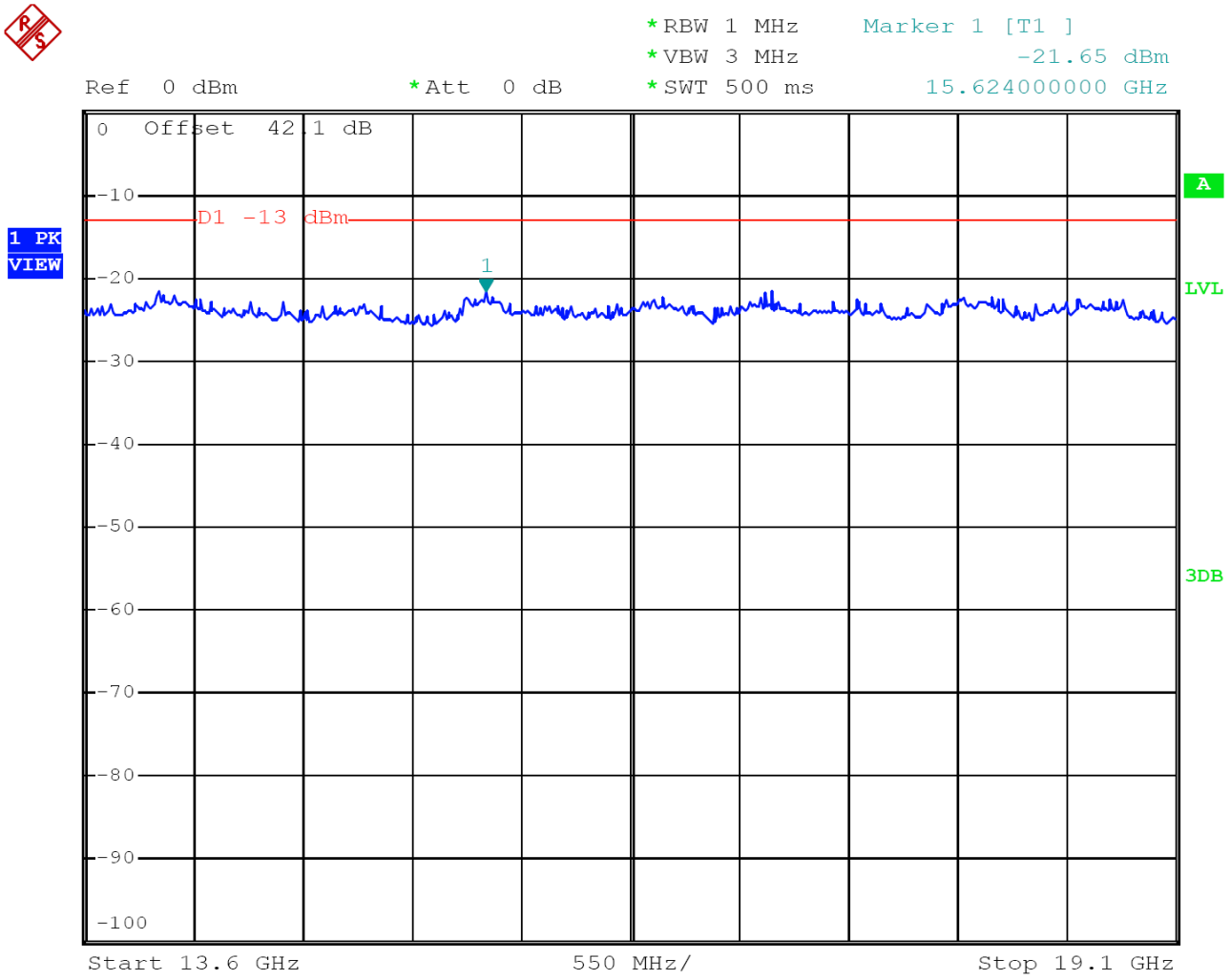
Conducted Emissions Test Plot between 3GHz-7GHz



Conducted Emissions Test Plot between 7GHz-13.6GHz



Conducted Emissions Test Plot between 13.6GHz-19.1GHz



10.0 SPURIOUS RADIATED EMISSIONS

10.1 Applicable Standards:

CFR 47 § 2.1053, 22.917 and § 24.238.

10.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

10.3 Test Data:

Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The Worse Case Recorded

Brand:	CDMA2000 Cellular	Channel:	1013/384/777
Test Mode	1Xev-DO Rev.0 9.6kbps		

f (GHz)	SA reading (dBuV/m)	Ant. Pol (H/V)	SG reading dBm	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
CH1013, 824.7MHz									
1.649	60.8	H	-45.9	3.1	7.1	4.9	-44.0	-13.0	-31.0
2.473	49.5	H	-55.3	3.9	9.3	7.1	-52.1	-13.0	-39.1
3.297	43.6	H	-57.2	4.6	9.4	7.3	-54.5	-13.0	-41.5
1.649	58.8	V	-48.6	3.1	7.1	4.9	-46.7	-13.0	-33.7
2.437	50.0	V	-55.0	3.9	9.3	7.1	-51.8	-13.0	-38.8
3.297	43.4	V	-57.5	4.6	9.4	7.3	-54.8	-13.0	-41.8
CH384, 836.52MHz									
1.673	60.8	H	-45.8	3.1	7.2	5.0	-43.9	-13.0	-30.9
2.510	56.0	H	-48.6	3.9	9.3	7.1	-45.4	-13.0	-32.4
3.356	42.7	H	-57.9	4.6	9.5	7.3	-55.2	-13.0	-42.2
1.673	60.5	V	-46.8	3.1	7.2	5.0	-44.9	-13.0	-31.9
2.510	59.2	V	-45.6	3.9	9.3	7.1	-42.4	-13.0	-29.4
3.356	43.2	V	-57.5	4.6	9.5	7.3	-54.8	-13.0	-41.8
CH777, 848.31MHz									
1.697	61.6	H	-44.9	3.1	7.2	5.1	-43.0	-13.0	-30.0
2.545	48.6	H	-55.8	4.0	9.3	7.1	-52.6	-13.0	-39.6
3.393	42.2	H	-58.2	4.7	9.5	7.3	-55.6	-13.0	-42.6
1.697	63.0	V	-44.2	3.1	7.2	5.1	-42.3	-13.0	-29.3
2.545	49.5	V	-55.1	4.0	9.3	7.1	-51.9	-13.0	-38.9
3.393	43.2	V	-57.3	4.7	9.5	7.3	-54.7	-13.0	-41.7

Brand:	CDMA2000 PCS	Channel:	25/600/1175
Test Mode	1Xev-DO Rev.0 9.6kbps		

f (GHz)	SA reading (dBuV/m)	Ant. Pol (H/V)	SG reading dBm	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
CH25, 1851.25MHz									
3.703	62.0	H	-37.2	4.9	9.7	7.5	-32.5	-13.0	-19.5
5.554	43.5	H	-49.5	6.3	11.0	8.9	-44.8	-13.0	-31.8
7.405	41.5	H	-48.2	7.3	12.0	9.8	-43.5	-13.0	-30.5
3.703	65.5	V	-33.8	4.9	9.7	7.5	-29.1	-13.0	-16.1
5.554	45.0	V	-49.0	6.3	11.0	8.9	-44.3	-13.0	-31.3
7.405	42.6	V	-47.9	7.3	12.0	9.8	-43.2	-13.0	-30.2
CH600,1880MHz									
3.760	67.5	H	-31.5	5.0	9.7	7.5	-26.8	-13.0	-13.8
5.640	42.6	H	-50.6	6.3	11.2	9.0	-45.7	-13.0	-32.7
7.520	43.6	H	-45.8	7.4	12.0	9.8	-41.2	-13.0	-28.2
3.760	70.4	V	-28.7	5.0	9.7	7.5	-24.0	-13.0	-11.0
5.640	45.2	V	-49.0	6.3	11.2	9.0	-44.1	-13.0	-31.1
7.520	42.3	V	-47.9	7.4	12.0	9.8	-43.3	-13.0	-30.3
CH1175, 1908.75MHz									
3.818	62.0	H	-36.8	5.0	9.7	7.6	-32.1	-13.0	-19.1
5.726	43.6	H	-49.7	6.4	11.3	9.2	-44.8	-13.0	-31.8
7.635	42.3	H	-46.8	7.4	12.0	9.8	-42.2	-13.0	-29.2
3.818	67.1	V	-31.8	5.0	9.7	7.6	-27.1	-13.0	-14.1
5.726	43.5	V	-50.8	6.4	11.3	9.2	-45.9	-13.0	-32.9
7.635	42.0	V	-47.9	7.4	12.0	9.8	-43.3	-13.0	-30.3

Note: The resolution bandwidth of the spectrum analyzer was set at 1MHz for 24E,

11.0 BAND EDGES

11.1 Applicable Standards:

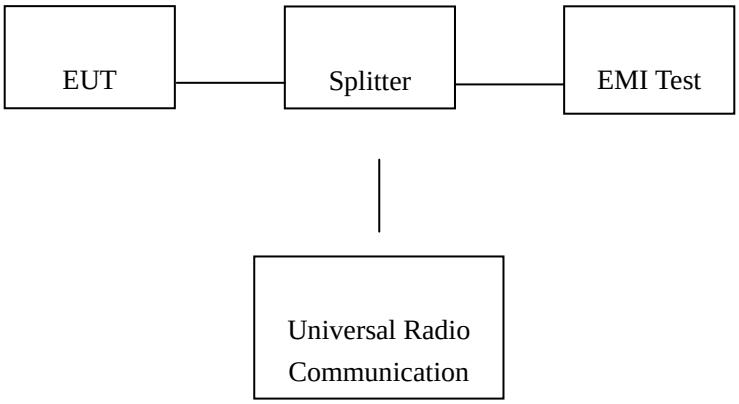
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.



11.3 Test Data

Environmental conditions:

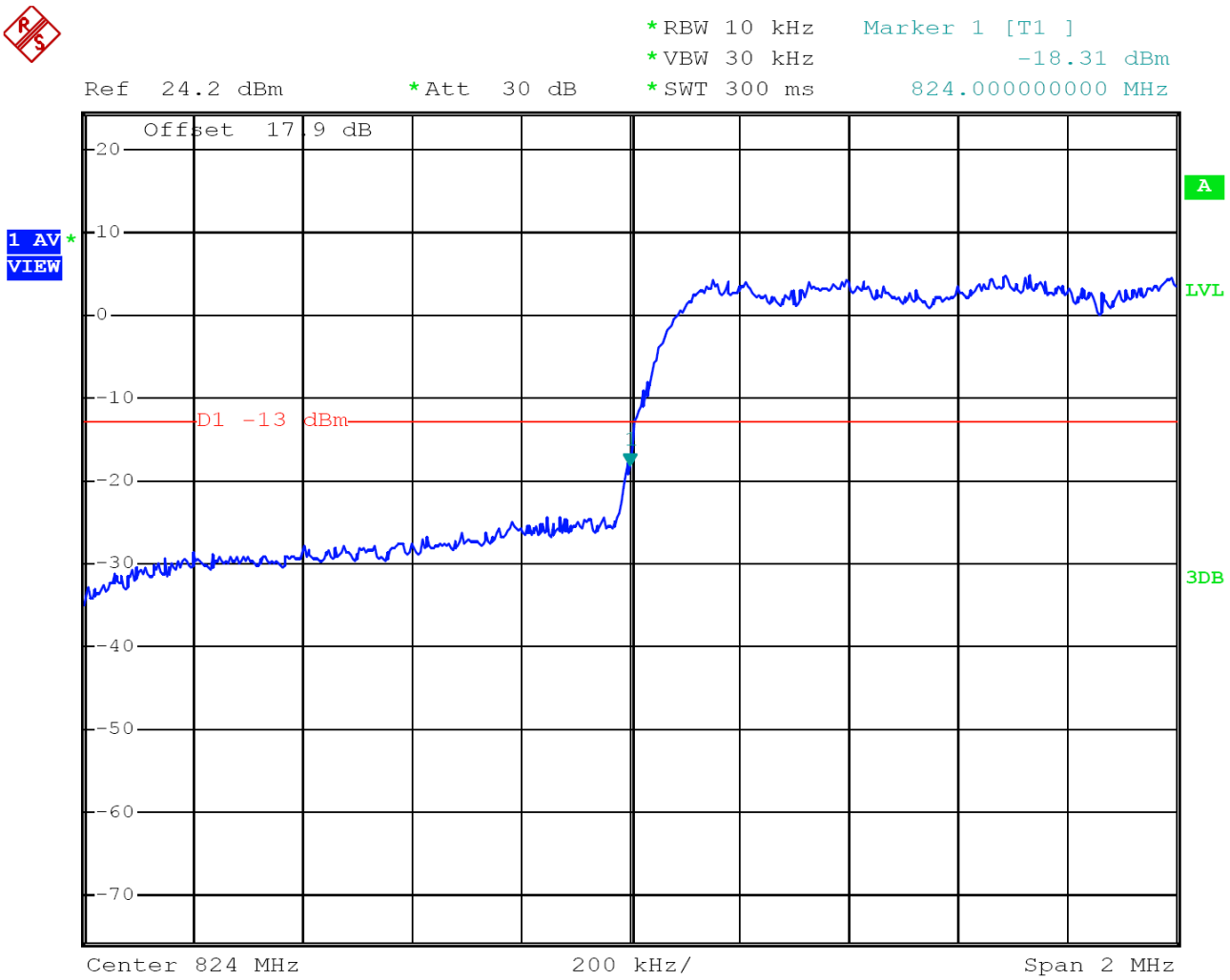
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The Worse Case Recorded

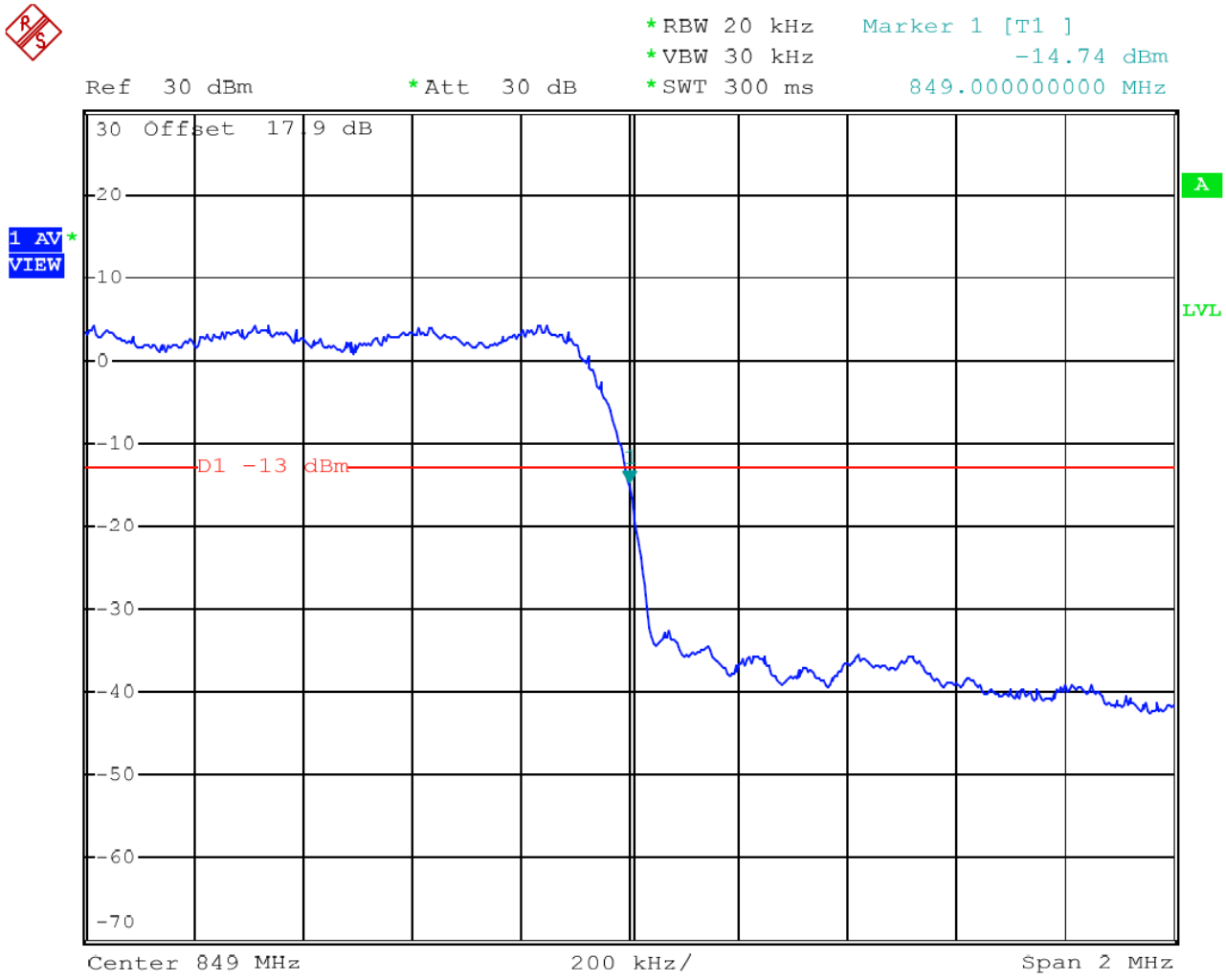
Please refer to the following tables and plots.

Brand:	CDMA2000 Cellular	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

Channel 1013:

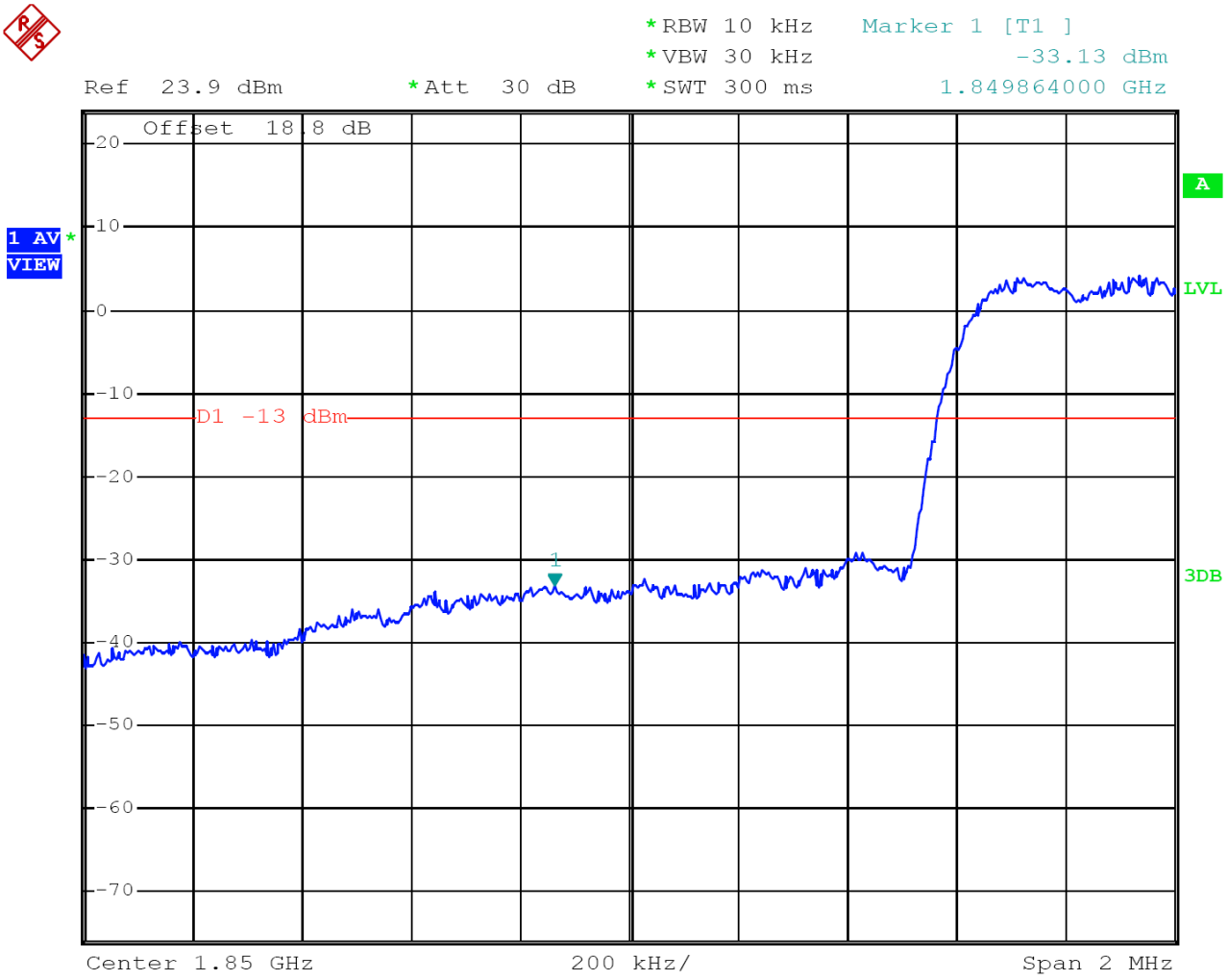


Channel 777

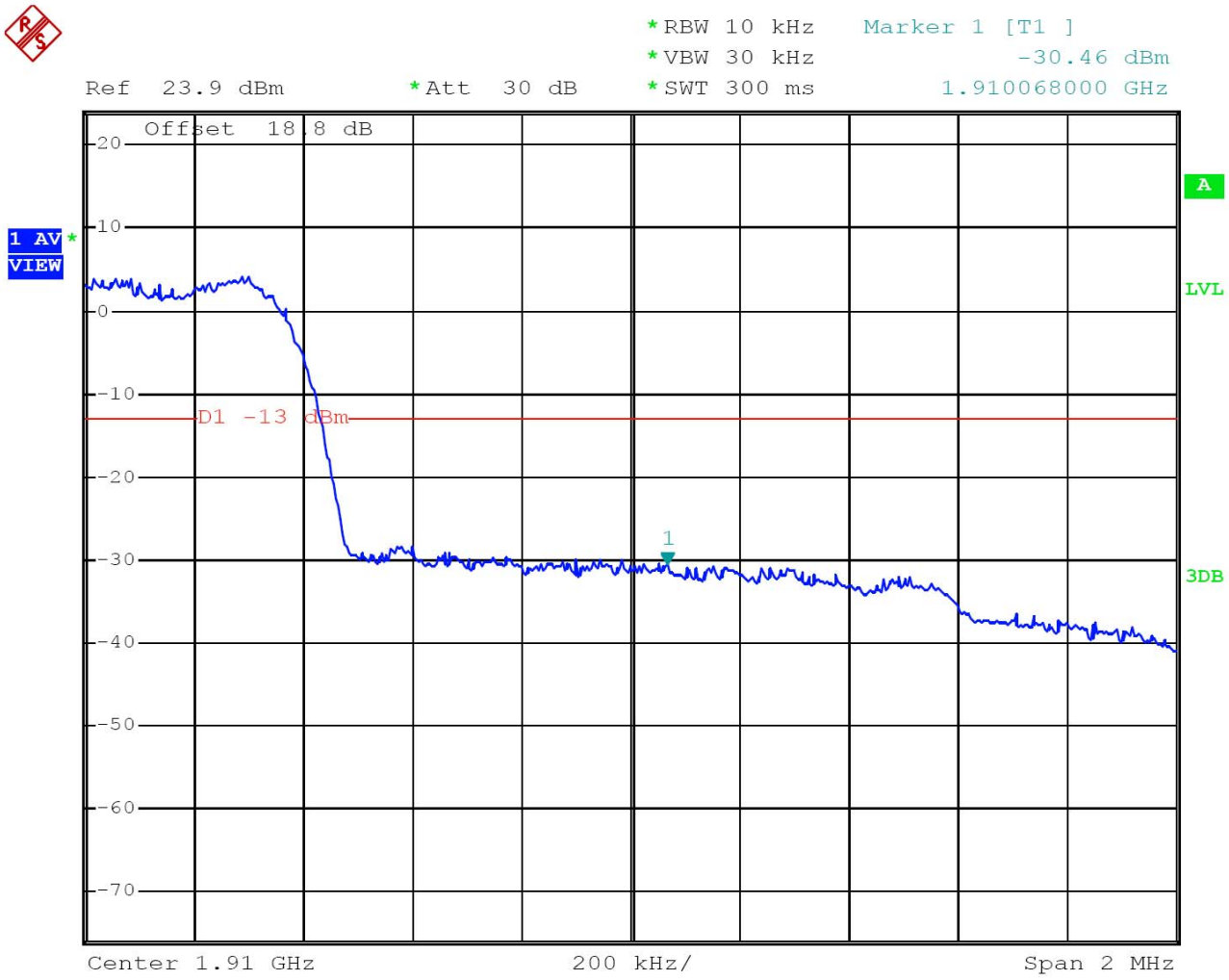


Brand:	CDMA2000 PCS	Power Stage:	High
Test Mode	1xEV-DO Rev.0 9.6kbps		

Channel 25



Channel 1177



12.0 FREQUENCY STABILITY

12.1 Applicable Standards:

CFR47 § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

12.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

12.3 Test Data

Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

Cellular Band, Part 22H:

Middle channel, fo =836.52MHz				
Temperature (℃)	**Power Supplied (V)**	**Frequency Error (Hz)**	**Error (ppm)**	**Limit (ppm)**
-30	10.2	-32	-0.038	2.5
	12.0	-28	-0.033	2.5
	13.8	-21	-0.025	2.5
-20	10.2	-26	-0.031	2.5
	12.0	-27	-0.032	2.5
	13.8	-29	-0.035	2.5
-10	10.2	-33	-0.039	2.5
	12.0	-39	-0.047	2.5
	13.8	-26	-0.031	2.5
0	10.2	-27	-0.032	2.5
	12.0	-29	-0.035	2.5
	13.8	-25	-0.030	2.5
10	10.2	-31	-0.037	2.5
	12.0	-29	-0.035	2.5
	13.8	-25	-0.030	2.5
20	10.2	-36	-0.043	2.5
	12.0	-29	-0.035	2.5
	13.8	-29	-0.035	2.5
30	10.2	-18	-0.022	2.5
	12.0	-42	-0.050	2.5
	13.8	-23	-0.027	2.5
40	10.2	-39	-0.047	2.5
	12.0	-22	-0.026	2.5
	13.8	-45	-0.054	2.5
50	10.2	-54	-0.065	2.5
	12.0	-36	-0.043	2.5
	13.8	-42	-0.050	2.5

PCS Band, Part 24E:

Middle channel, fo =1880MHz				
Temperature (℃)	**Power Supplied (V)**	**Frequency Error (Hz)**	**Error (ppm)**	**Limit (ppm)**
-30	10.2	-54	-0.029	2.5
	12.0	-56	-0.030	2.5
	13.8	-67	-0.036	2.5
-20	10.2	-45	-0.024	2.5
	12.0	-36	-0.019	2.5
	13.8	-50	-0.027	2.5
-10	10.2	-36	-0.019	2.5
	12.0	-51	-0.027	2.5
	13.8	-29	-0.015	2.5
0	10.2	-49	-0.026	2.5
	12.0	-40	-0.021	2.5
	13.8	-28	-0.015	2.5
10	10.2	-56	-0.030	2.5
	12.0	-32	-0.017	2.5
	13.8	-26	-0.014	2.5
20	10.2	-49	-0.026	2.5
	12.0	-26	-0.014	2.5
	13.8	-55	-0.029	2.5
30	10.2	-23	-0.012	2.5
	12.0	-36	-0.019	2.5
	13.8	-50	-0.027	2.5
40	10.2	-22	-0.012	2.5
	12.0	-32	-0.017	2.5
	13.8	-65	-0.035	2.5
50	10.2	-38	-0.020	2.5
	12.0	-26	-0.014	2.5
	13.8	-58	-0.031	2.5

******END OF REPORT******