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Dates of Tests: April 01 ~ 11 2010  
 Test Report S/N: LR500191004B  
 Test Site : LTA CO., LTD.

FCC ID

**T7MPW1900CA**

APPLICANT

**Kisan Telecom Co., Ltd.**

## Test Report

### FCC Part 24(E) Certification

**Classification** : PCS Licensed Transmitter  
**Manufacturing Description** : 1900MHz Optical DAS Repeater  
**Manufacturer** : Kisan Telecom Co., Ltd.  
**Model name** : PW1900-C  
**Test Device Serial No.:** : Identification  
**FCC Rule Part(s)** : §24(E), §2  
**Downlink** : 1930~1990MHz (PCS CDMA)  
**Uplink** : N/A (Optical)  
**Max. RF Output Power** : 10W  
**Type Modulation** : OQPSK (PCS CDMA)  
**Emission Designators:** : F9W  
**Data of issue** : April 12, 2010

This test report is issued under the authority of:

The test was supervised by:

Kyung-Taek LEE, Technical Manager

Hyun-Chae You, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

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## 1. General information's

### **1-1 Test Performed**

Company name : LTA Co., Ltd.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
 Telephone : +82-31-323-6008  
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### **1-2 Accredited agencies**

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2010-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2010-05-03	IC filing

## 2. Information's about test item

### 2-1 Client

Company name : Kisan Telecom Co., Ltd.  
 Address : 2F, Segi Bldg., 66-2 Bangyi-Dong Songpa-Gu, Seoul, 138-828, Korea  
 Telephone : +82-2-3433-8341  
 Facsimile : +82-2-3433-8316

### 2-2 Equipment Under Test (EUT)

Classification : PCS Licensed Transmitter  
 Trade name : Optical DAS Repeater  
 Model name : PW1900-C  
 Serial number : Identification  
 Date of receipt : April 01, 2010  
 EUT condition : Pre-production, not damaged  
 Downlink : 1930~1990MHz (PCS CDMA)  
 Uplink : N/A (Optical)  
 Frequency Tolerance :  $\pm 0.0002$  ppm  
 Emission Designators : F9W  
 Power Input : 120Vac

### 2-3 Tested frequency

Frequency (CH)	TX (MHz)
Low (25)	1931.25
Mid (550)	1960.00
High (1175)	1988.75

### 3. Test Report

#### 3.1 Summary of tests

Parameter	Status
<b>Transmitter Requirements</b>	
RF Power Output	C
Occupied Bandwidth	C
Spurious Radiation at Antenna Terminal	C
Field Strength of Spurious Radiation	C
Frequency Stability	C

Note 1: C=Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

## **3.2 DESCRIPTION OF TESTS**

### **3.2.1 RF Power Output**

Power output shall be measured at the RF outut terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated

### **3.2.2 Occupied Bandwidth**

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

### **3.2.3 Spurious Emission at Antenna Terminal**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment upto 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block. For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

22.917(f): Mobile emission in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed -80dBm at the transmit antenna connector.

### **3.2.4 Field Strength of Spurious Radiation**

Radiation and harmonic emission are measured outdoors at our 3 meters test range. The equipment under test isplaced on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntablerotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipolewas substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of thesignal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. Forreadings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain ofthe horn and an isotropic or dipole antenna are taken into consideration.

### 3.2.5 Frequency Stability/Temperature Variation

The frequency stability of the transmitter is measured by:

- a) **Temperature** :The temperature is varied from -30°C to + 60°C using an environmental chamber.
- b) **Primary Supply Voltage** :The primary supply voltage is varied from 85% to 115% of the voltage Normally at the input to the device or at the power supply terminals if cables are not normally supplied.

※ The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequencyblock. The frequency stability of the transmitter shall be maintained within  $\pm 1\text{ppm}$  of the center frequency.

#### Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C(usually 14-16 hours),the equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

### **3.3 Results OF TESTS**

#### **3.3.1 RF Power Output**

**Supply Voltage: AC 120V**

**Modulation : PCS CDMA**

	<b>Freq. Tuned (MHz)</b>	<b>Power Input (dBm)</b>	<b>Power output (dBm)</b>	<b>Power Output (W)</b>
Low	1931.25	-19.29	39.18	8.28
Middlw	1960.00	-19.73	40.76	11.90
High	1988.75	-19.46	40.30	10.72

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### **3.3 DESCRIPTION OF TESTS**

#### **3.3.2 Occupied Bandwidth**

**Supply Voltage: AC 120V**

**Modulation : PCS CDMA**

	<b>Freq. Tuned (MHz)</b>	<b>26dB Bandwidth (MHz)</b>
Low	1931.25	1.27
Middlw	1960.00	1.27
High	1988.75	1.27

### 3.3.3 Spurious Emission at Antenna Terminal

#### PCS CDMA (Spurious Emission : Band Edge)

	<b>Freq. Tuned</b> (MHz)	<b>Result</b> (dBm)	<b>Limit</b> (dBm)	<b>Magin</b>
Low	1931.25	-15.47	-13.00	2.47
High	1988.75	-20.02	-13.00	7.02

#### PCS CDMA (Spurious Emission : Out of Band)

	<b>Freq. Tuned</b> (MHz)	<b>Result</b> (dBm)	<b>Limit</b> (dBm)	<b>Magin</b>
Low	1931.25	-22.30	-13.00	9.30
Middlw	1960.00	-22.48	-13.00	9.48
High	1988.75	-22.91	-13.00	9.91

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### 3.3.4 Field Strength of Spurious Radiation

#### PCS CDMA (CH25)

Frequency [MHz]	Reading [dBuV/m]	Pol.	Correction Factor		EIRP [dBm]		Limit [dBm]	Margin [dB]
			Antenna	Cable	S/G Reading	Result		
No other emissions were detected at a level greater than 20dB below limit								

#### PCS CDMA (CH600)

Frequency [MHz]	Reading [dBuV/m]	Pol.	Correction Factor		EIRP [dBm]		Limit [dBm]	Margin [dB]
			Antenna	Cable	S/G Reading	Result		
No other emissions were detected at a level greater than 20dB below limit								

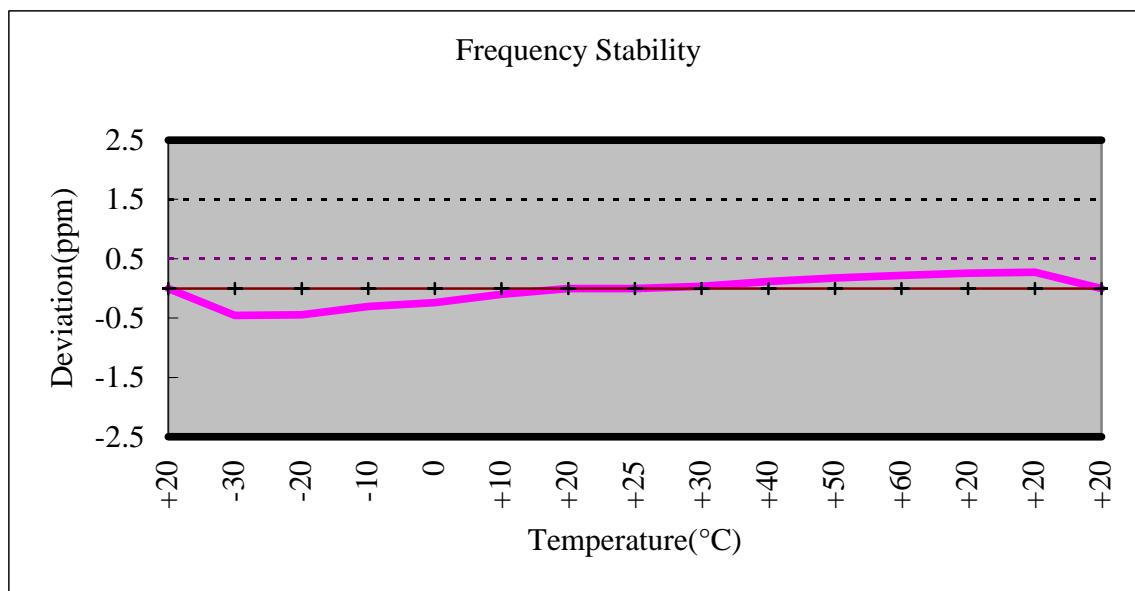
#### PCS CDMA (CH1175)

Frequency [MHz]	Reading [dBuV/m]	Pol.	Correction Factor		EIRP [dBm]		Limit [dBm]	Margin [dB]
			Antenna	Cable	S/G Reading	Result		
No other emissions were detected at a level greater than 20dB below limit								

### 3.3.5 Frequency Stability

OPERATING FREQUENCY : 1,960,000,893 Hz  
 CHANNEL : 600(Mid)  
 REFERENCE VOLTAGE : 120 VAC  
 DEVIATION LIMIT :  $\pm 0.00010$  % or 1 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	120	+20(Ref)	1,960,000,893	0.000000
100%		-30	1,960,000,003	-0.000045
100%		-20	1,960,000,023	-0.000044
100%		-10	1,960,000,298	-0.000030
100%		0	1,960,000,421	-0.000024
100%		+10	1,960,000,698	-0.000010
100%		+20	1,960,000,893	0.000000
100%		+25	1,960,000,893	0.000000
100%		+30	1,960,000,962	0.000004
100%		+40	1,960,001,123	0.000012
100%		+50	1,960,001,236	0.000017
100%		+60	1,960,001,321	0.000022
85%	102	+20	1,960,001,396	0.000026
115%	138	+20	1,960,001,423	0.000027
BATT.ENDPOINT	-	-	-	-



### **3.4 CONCLUSION**

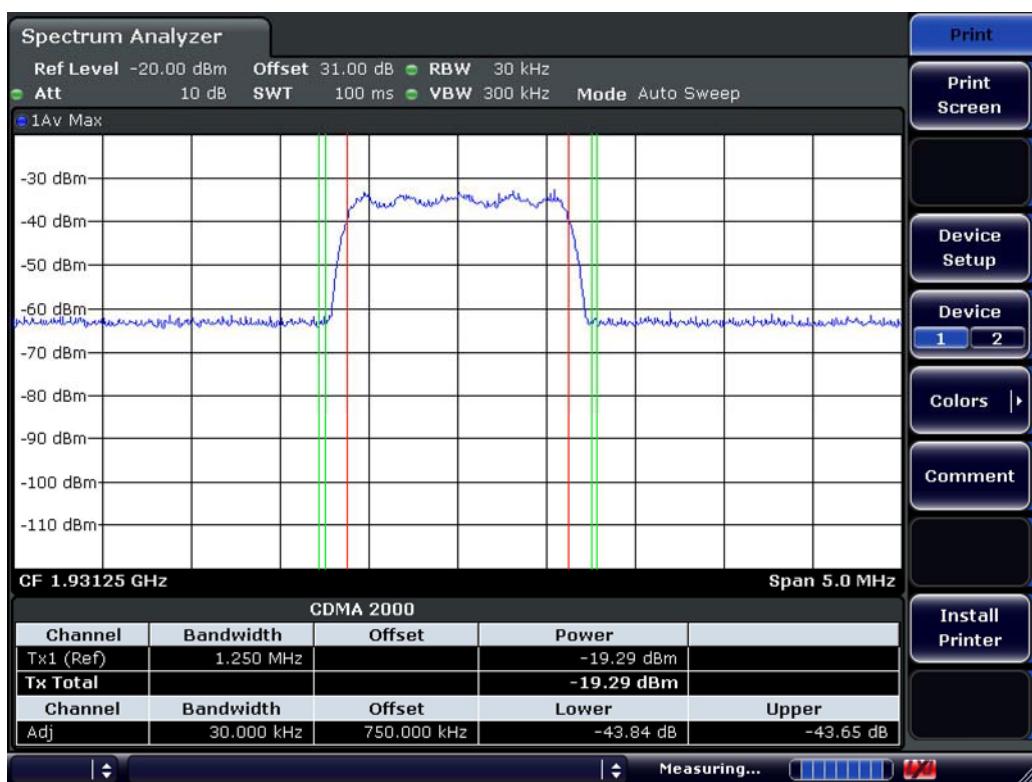
The data collected shows that the **Kisan Telecom Co., Ltd. Optical DAS PCS CDMA Repeater FCC ID: T7MPW1900C** complies with all the requirements of Parts 2, 24 of the FCC Rules.

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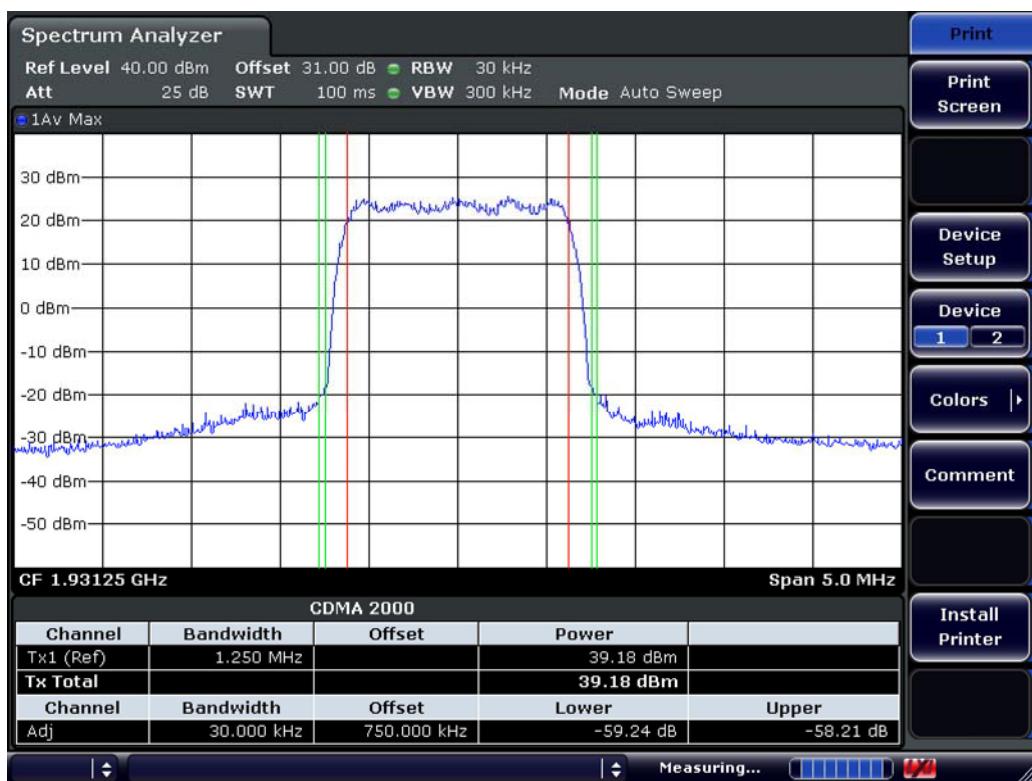
### **3.5 TEST PLOTS**

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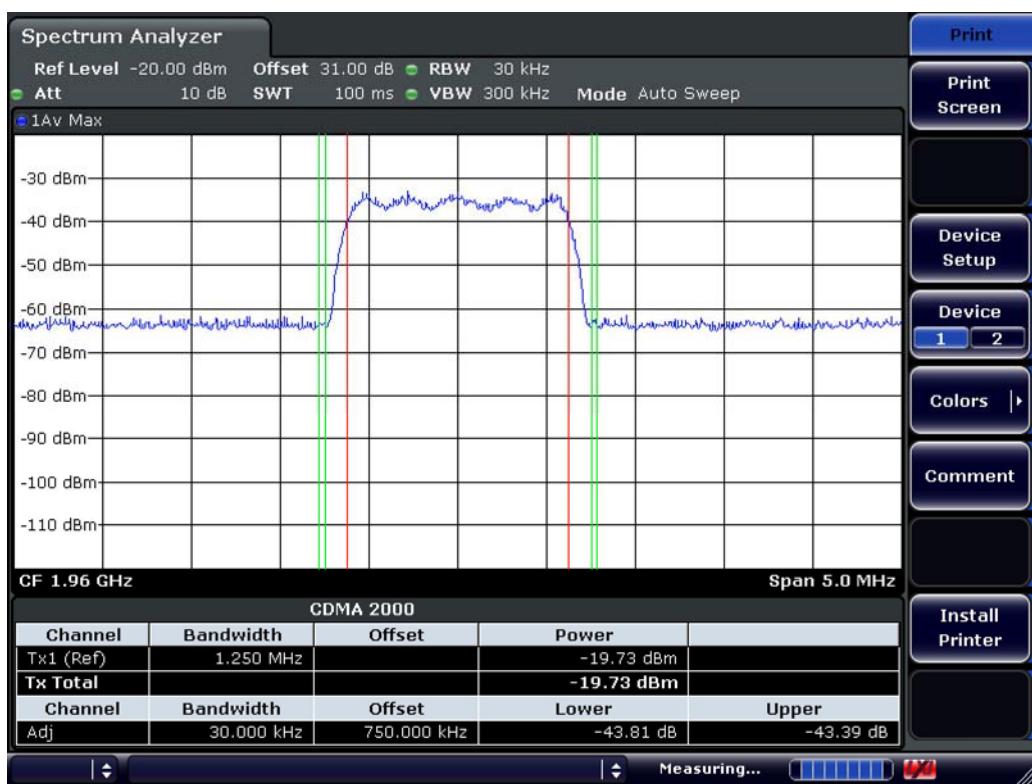
## Input signal output Power (ch25)



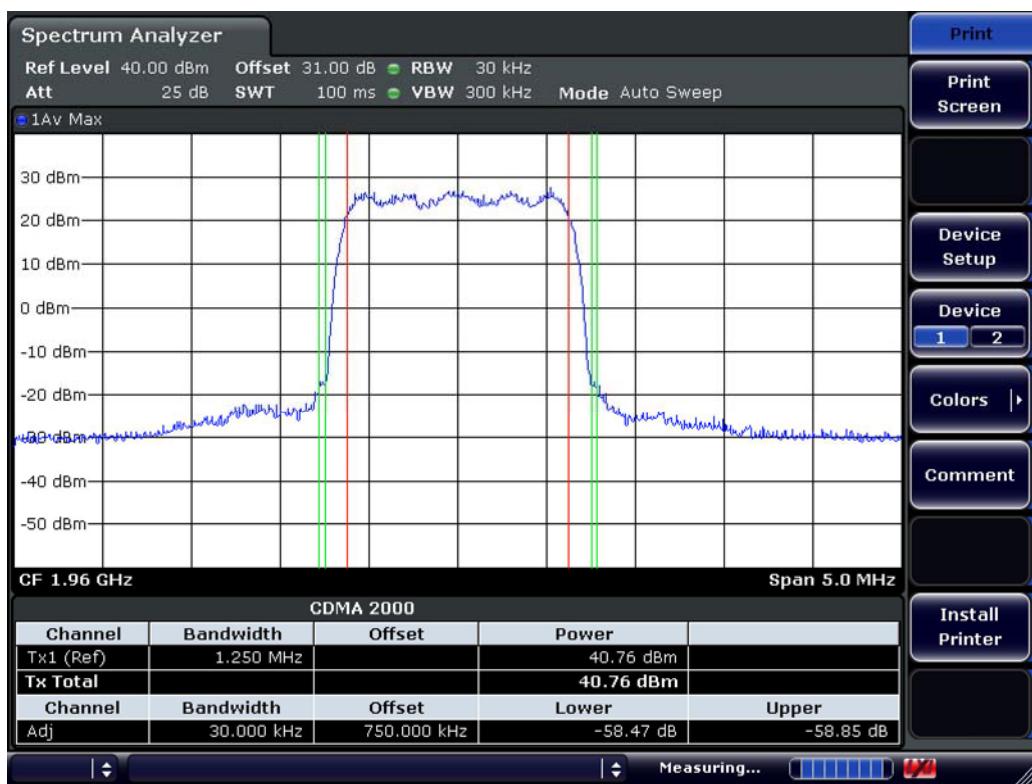
## Downlink Output power (ch25)



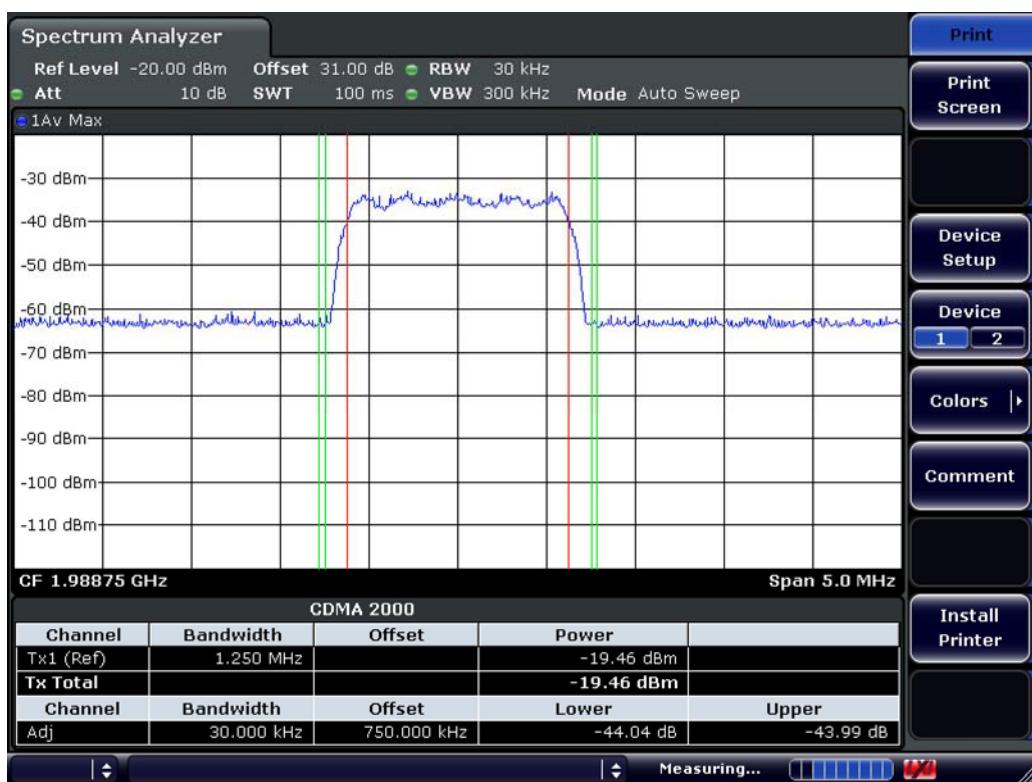
## Input signal output Power (ch600)



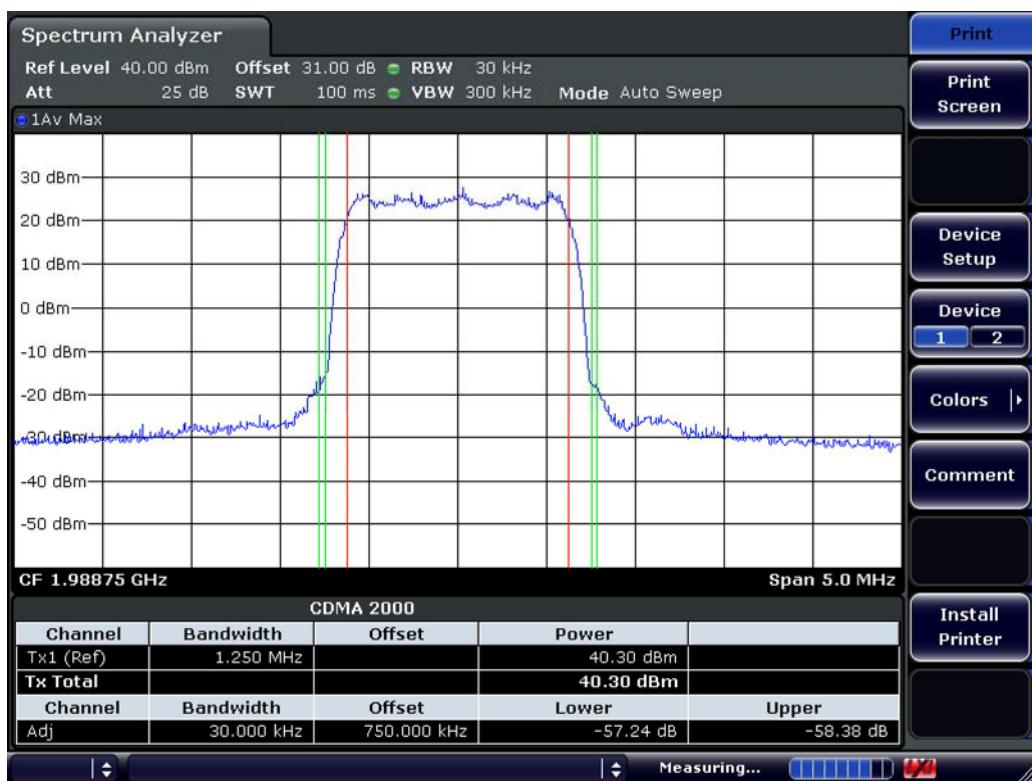
## Downlink Output power (ch600)



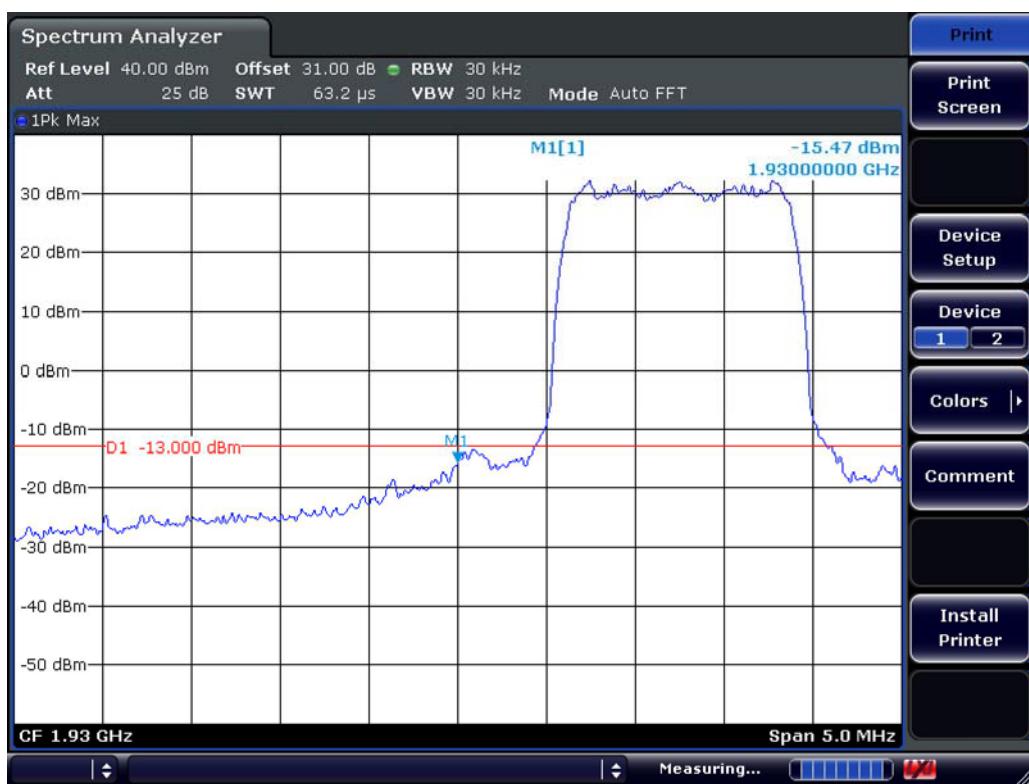
## Input signal output Power (ch1175)



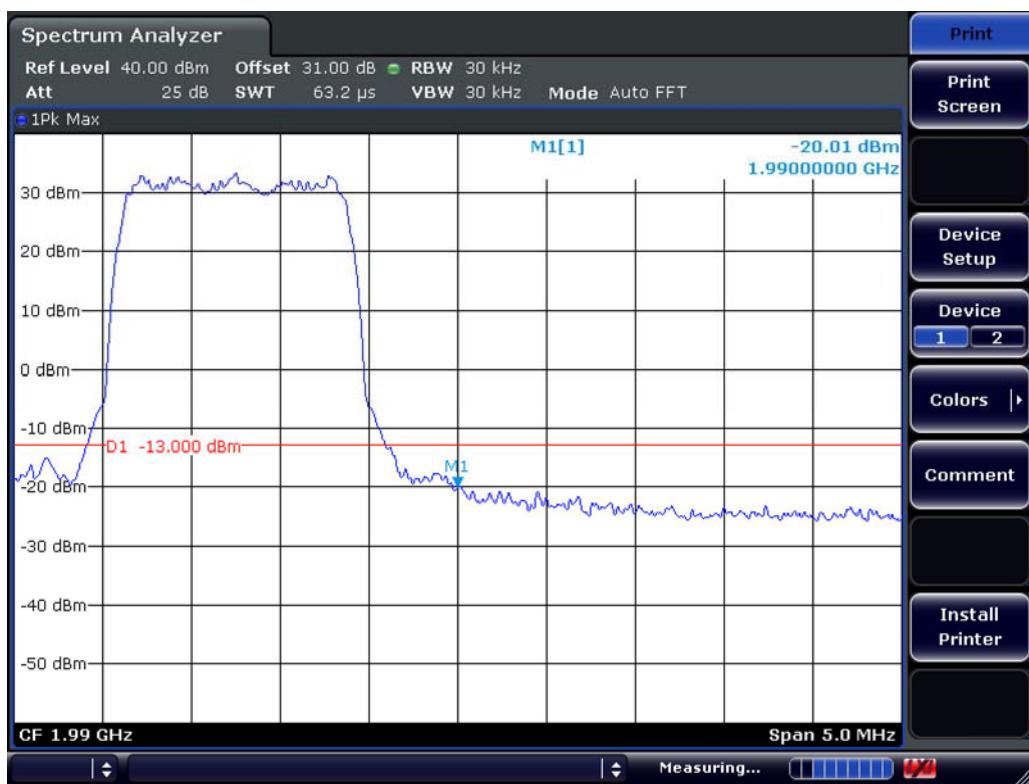
## Downlink Output power (ch1175)



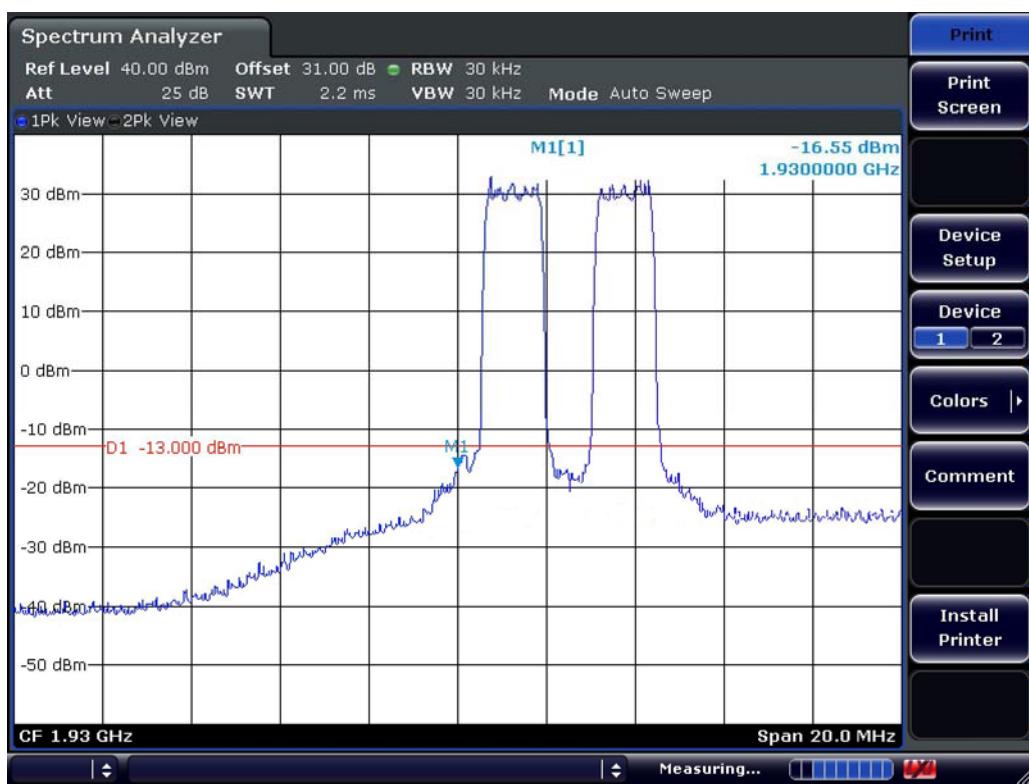
## Band Edge (ch25)



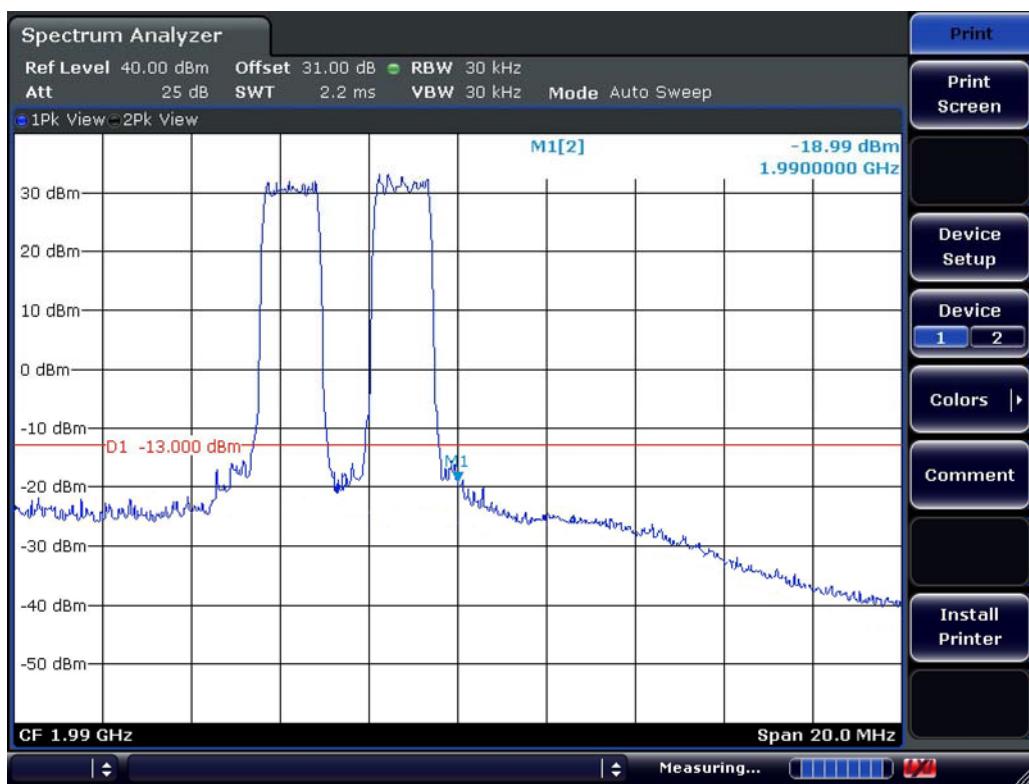
## Band Edge (ch1175)



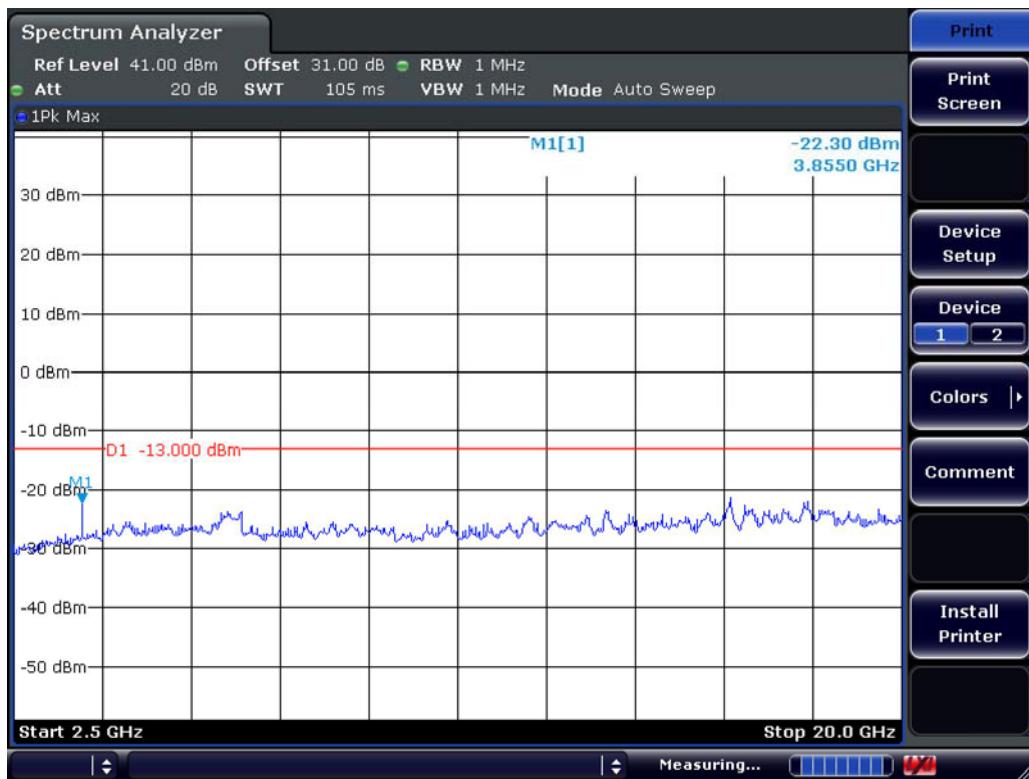
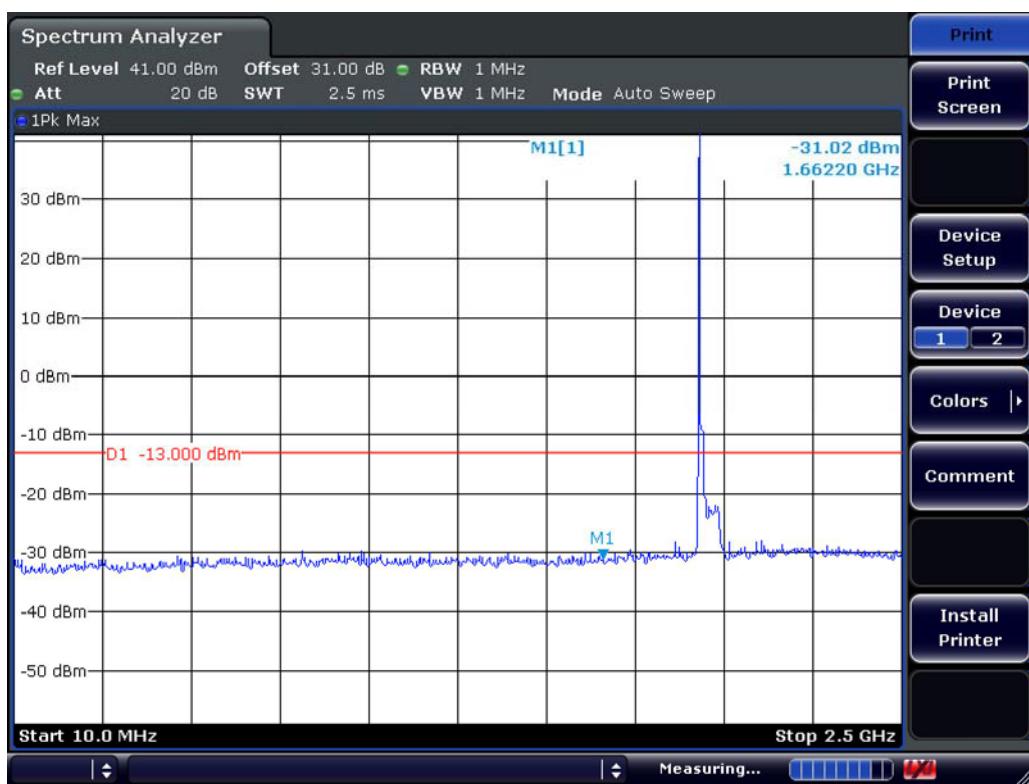
## Band Edge Intermodulation (ch25)



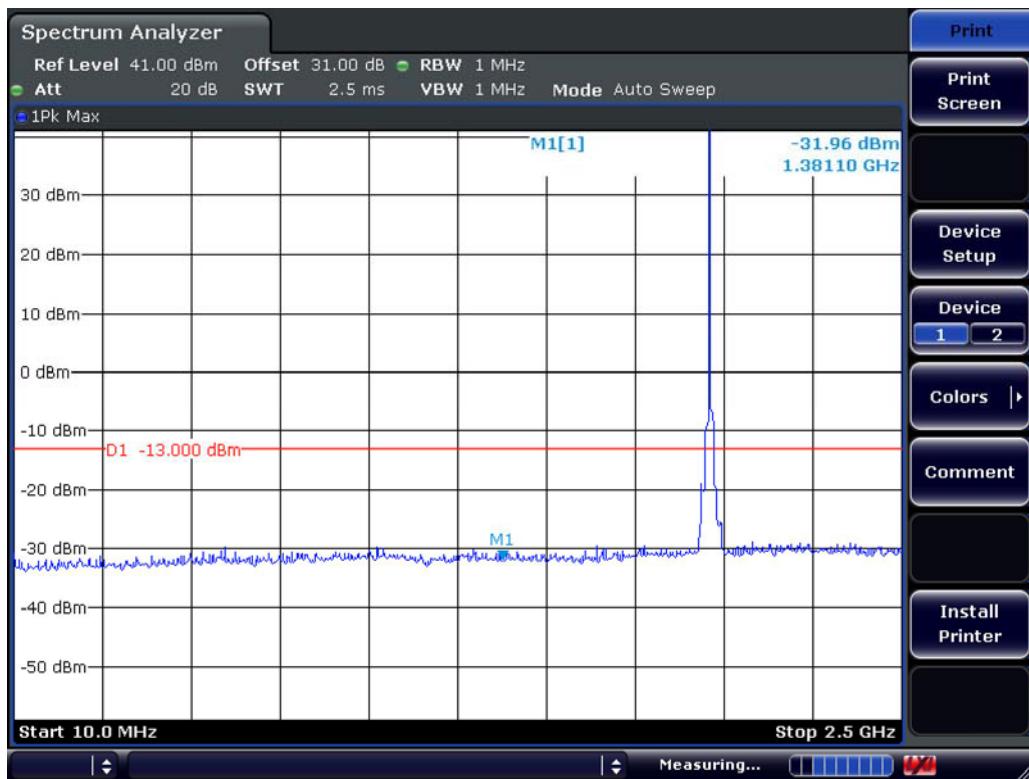
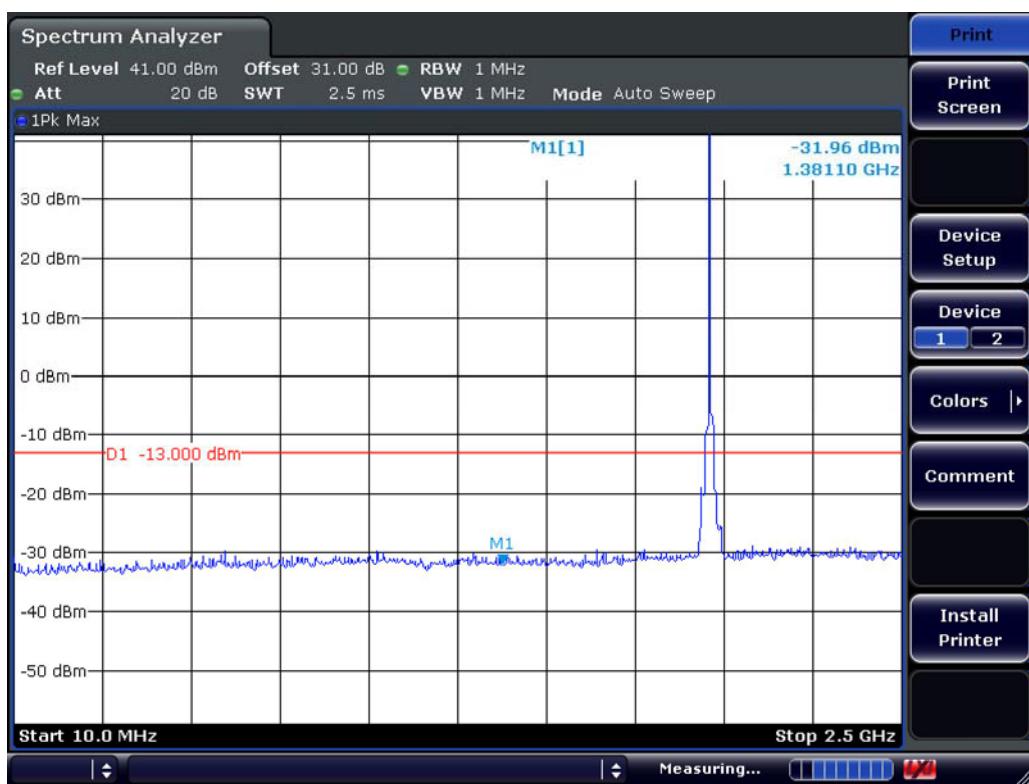
## Band Edge Intermodulation (ch1175)



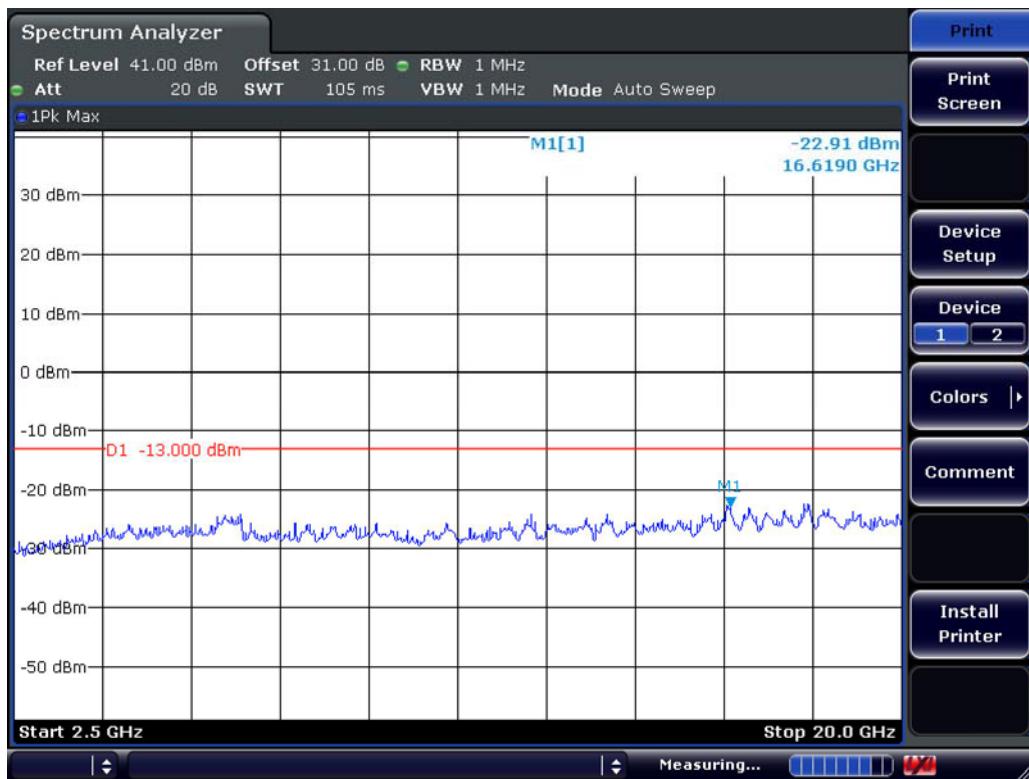
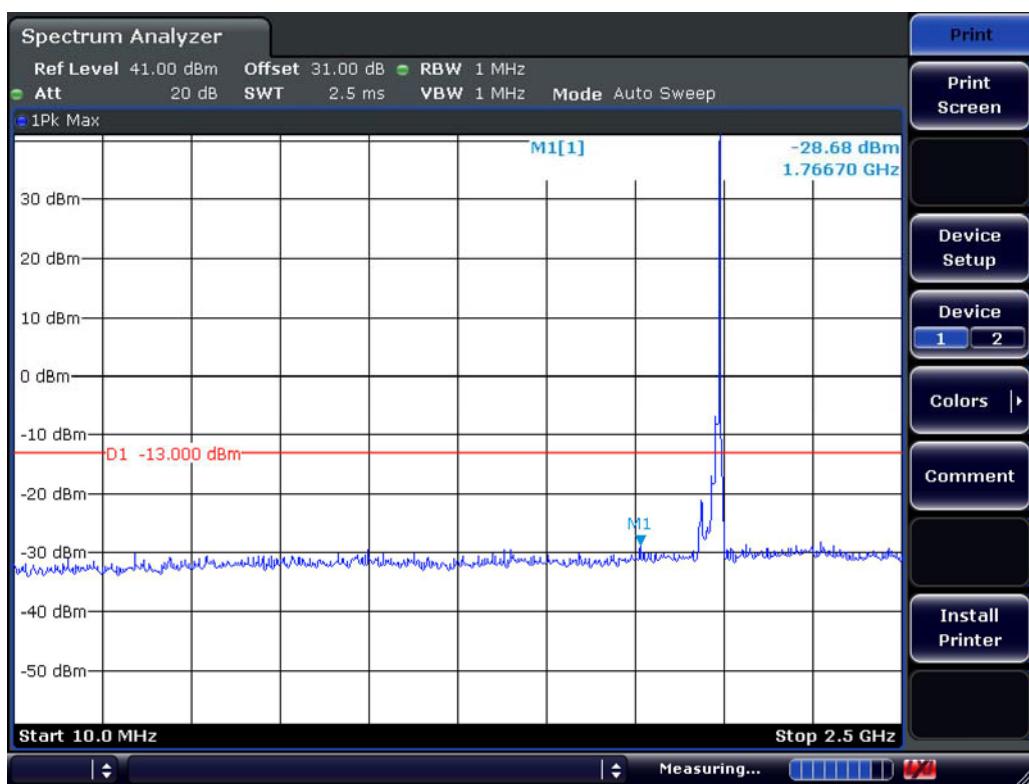
## Out of Band (ch25)



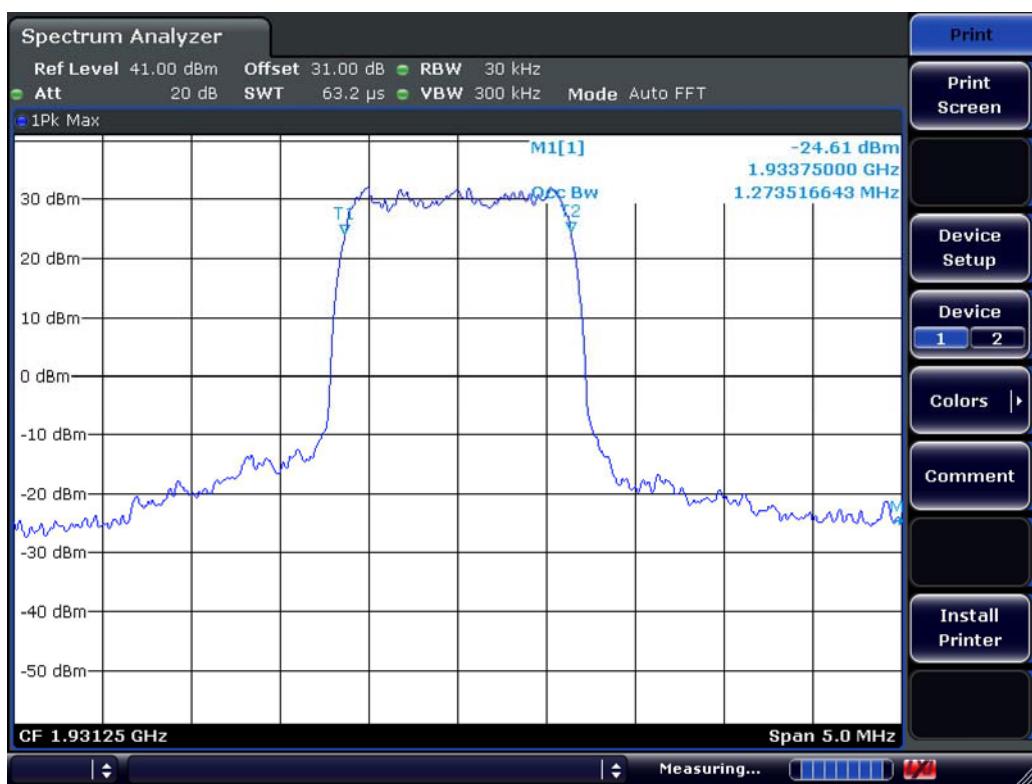
## Out of Band (ch600)



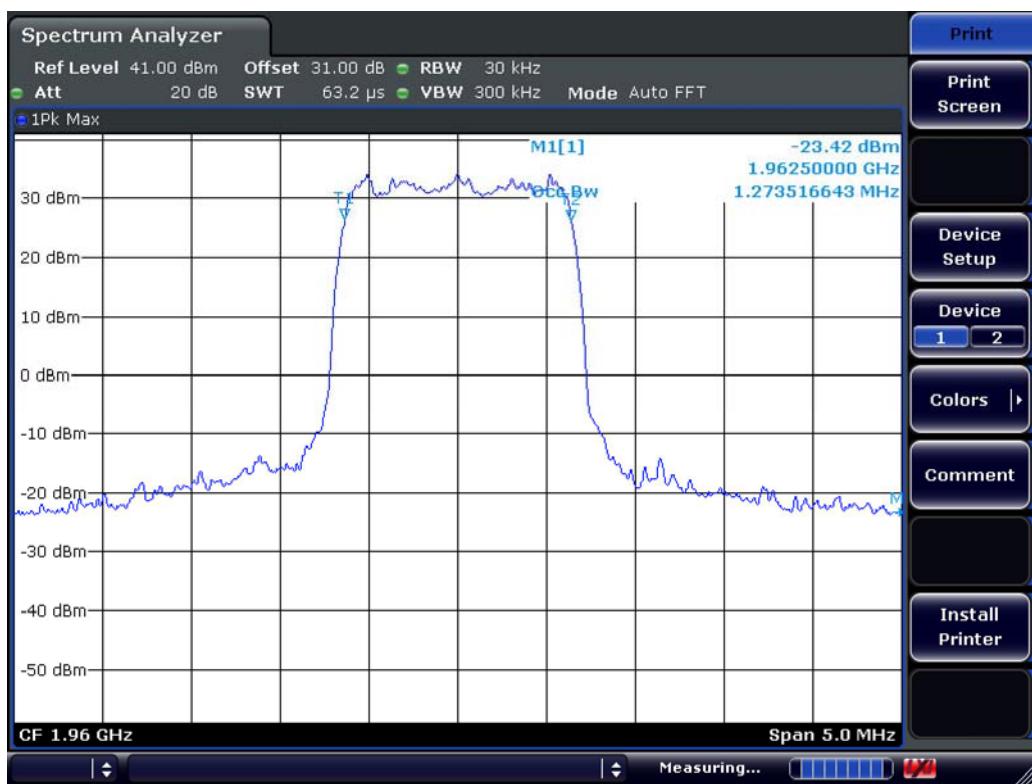
## Out of Band (ch1175)



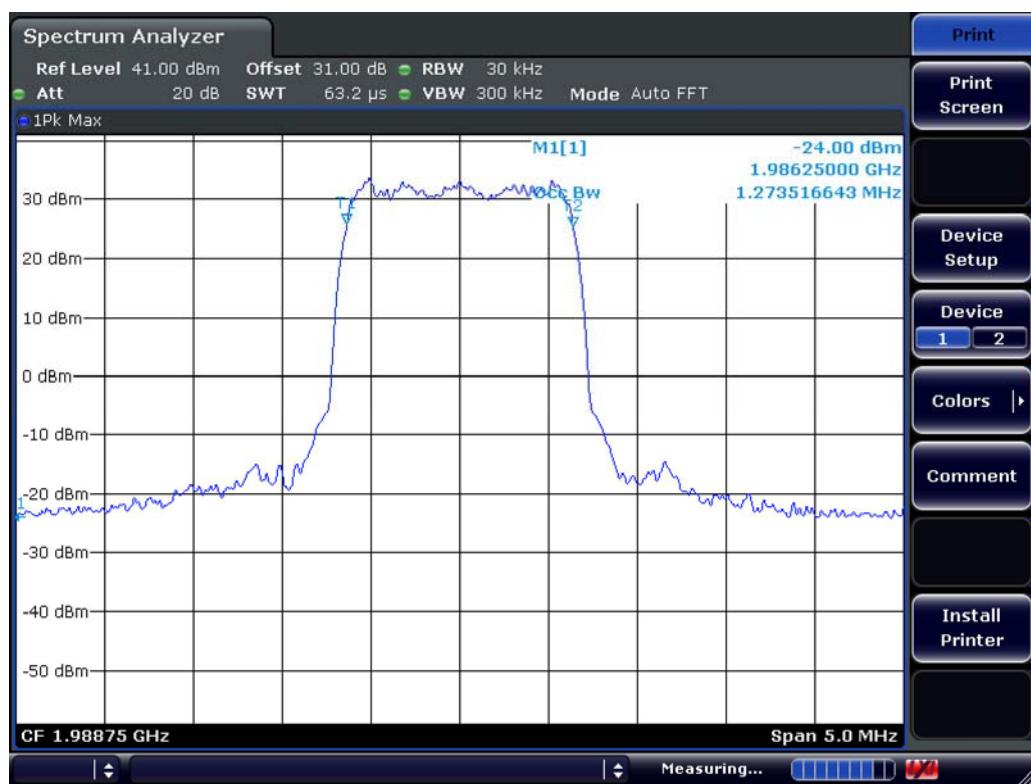
## OCCUPIED BW (CH25)



## OCCUPIED BW (CH600)



## OCCUPIED BW (CH1175)



## APPENDIX 1

### TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	8563E	3425A02505	HP	Mar-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-10
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-10
7	Attenuator (10dB)	8491A	63196	HP	Oct-10
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-10
9	EMI Test Receiver	ESVD	843748/001	R&S	Mar-11
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-10
13	RF Amplifier	8449B	3008A02126	HP	Mar-11
14	Test Receiver	ESHS10	828404/009	R&S	Mar-11
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-10
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-10
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-10
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-10
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-10
28	DC Power Supply	6622A	3448A03079	HP	Oct-10
29	Frequency Counter	5342A	2826A12411	HP	Mar-11
30	Power Meter	EPM-441A	GB32481702	HP	Mar-11
31	Power Sensor	8481A	2702A64048	HP	Mar-11
32	Audio Analyzer	8903B	3729A18901	HP	Oct-10
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-10
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-10
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Mar-11
37	LISN	ENV216	100408	R&S	Oct-10