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Dates of Tests: February 01 ~ 11 2010
Test Report S/N: LR500191002D
Test Site : LTA CO., LTD.

FCC ID

T7MPW1900C

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	: 20W
Type Modulation	: PCS CDMA
Emission Designators:	: F9W
Data of issue	: February 11, 2010

This test report is issued under the authority of:

The test was supervised by:

Dong -Min JUNG, Technical Manager

Kyung-Taek LEE, 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
 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 : February 01, 2010
EUT condition : Pre-production, not damaged
Downlink : 1930~1990MHz (PCS CDMA)
Uplink : N/A (Optical)
Frequency Tolerance : ± 0.0002 ppm
Emission Designators : F9W
Power Input : 120Vac

2-3 Tested frequency

Frequency (CH)	TX (MHz)
Low (25)	1931.25
Mid (550)	1957.50
High (1175)	1988.75

3. Test Report

3.1 Summary of tests

Parameter	Status
Transmitter Requirements	
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 output 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 up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm limit, in the 1MHz 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 is placed on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the 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 $+60^{\circ}\text{C}$ 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 frequency block. 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 10 intervals starting at -30°C up to $+60^{\circ}\text{C}$ 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

	Freq. Tuned (MHz)	Power Input (dBm)	Power output (dBm)	Power Output (W)
Low	1931.25	-14.12	43.01	20
Middlw	1957.50	-14.15	42.55	17.99
High	1988.75	-14.03	42.37	17.26

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3.3 DESCRIPTION OF TESTS

3.3.2 Occupied Bandwidth

Supply Voltage: AC 120V

Modulation : PCS CDMA

	Freq. Tuned (MHz)	26dB Bandwidth (MHz)
Low	1931.25	1.26
Middlw	1957.50	1.26
High	1988.75	1.26

3.3.3 Spurious Emission at Antenna Terminal

PCS CDMA (Spurious Emission : Band Edge)

	Freq. Tuned (MHz)	Result (dBm)	Limit (dBm)	Margin
Low	1931.25	-15.52	-13.00	2.52
High	1988.75	-25.06	-13.00	12.06

PCS CDMA (Spurious Emission : Out of Band)

	Freq. Tuned (MHz)	Result (dBm)	Limit (dBm)	Margin (W)
Low	1931.25	-19.12	-13.00	6.12
Middlw	1957.50	-22.10	-13.00	9.10
High	1988.75	-22.49	-13.00	9.49

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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 (CH550)

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								

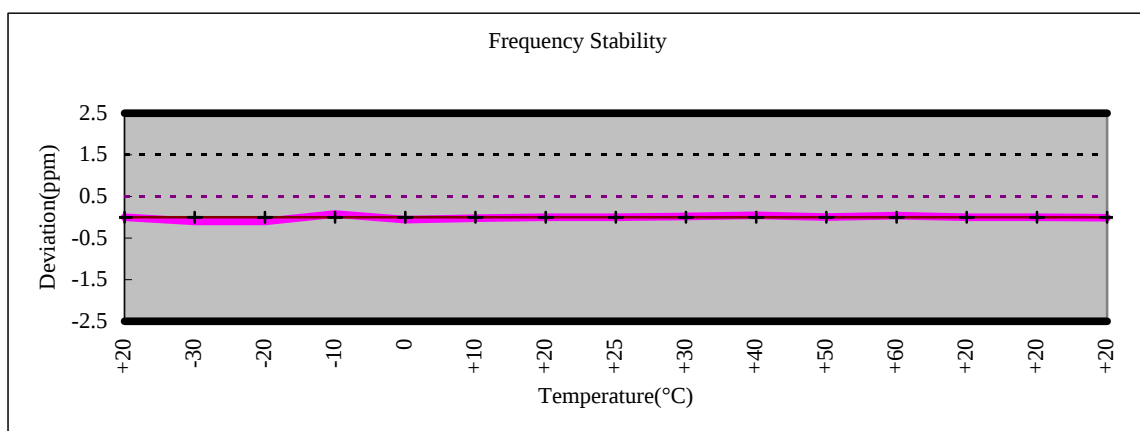
PCS CDMA (CH1175)

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 : 1,957,499,830 Hz
 CHANNEL : 550(Mid)
 REFERENCE VOLTAGE : 120 VAC
 DEVIATION LIMIT : ± 0.00010 % or 1 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	120	+20(Ref)	1,957,499,830	0.000000
100%		-30	1,957,499,637	-0.000010
100%		-20	1,957,499,638	-0.000010
100%		-10	1,957,499,676	0.000008
100%		0	1,957,499,714	-0.000006
100%		+10	1,957,499,783	-0.000003
100%		+20	1,957,499,830	0.000000
100%		+25	1,957,499,830	0.000000
100%		+30	1,957,499,864	0.000002
100%		+40	1,957,499,918	0.000005
100%		+50	1,957,499,841	0.000001
100%		+60	1,957,499,905	0.000004
85%	102	+20	1,957,499,830	0.000000
115%	138	+20	1,957,499,830	0.000000
BATT.ENDPOINT	-	-	-	-



3.4 CONCLUSION

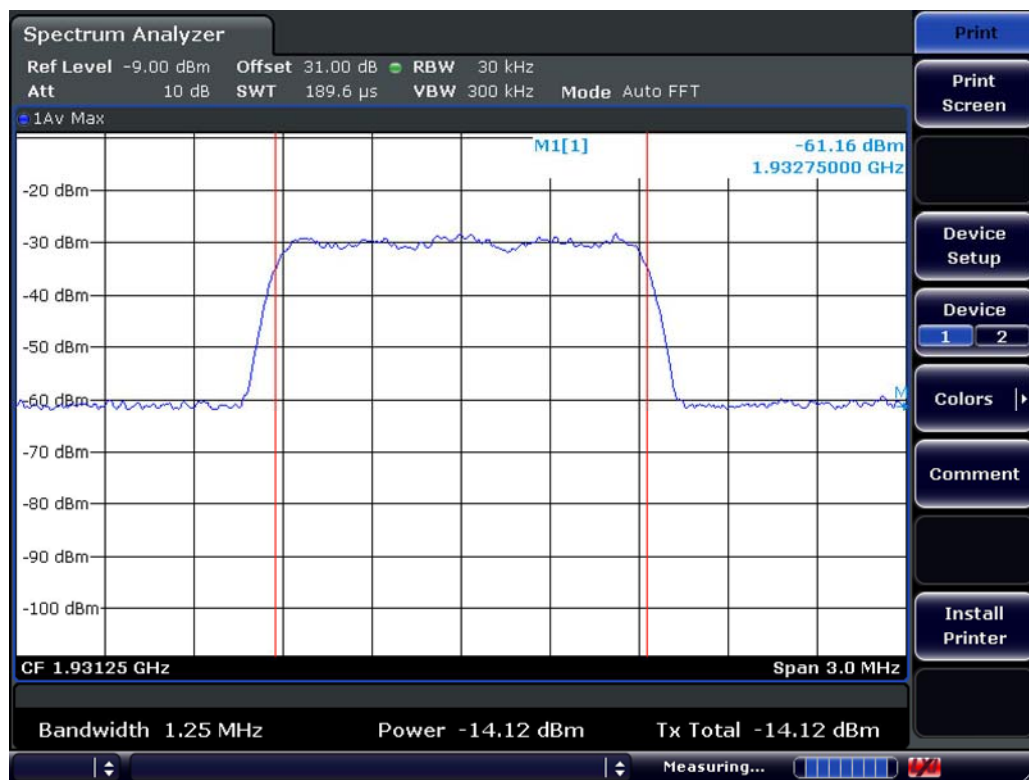
The data collected shows that the **Kisan Telecom Co., Ltd. Optical DAS PCS CDMA Repeater FCC ID: T7MPW1900C** complies with all the requirements of Parts 2, 24 of the FCC Rules.

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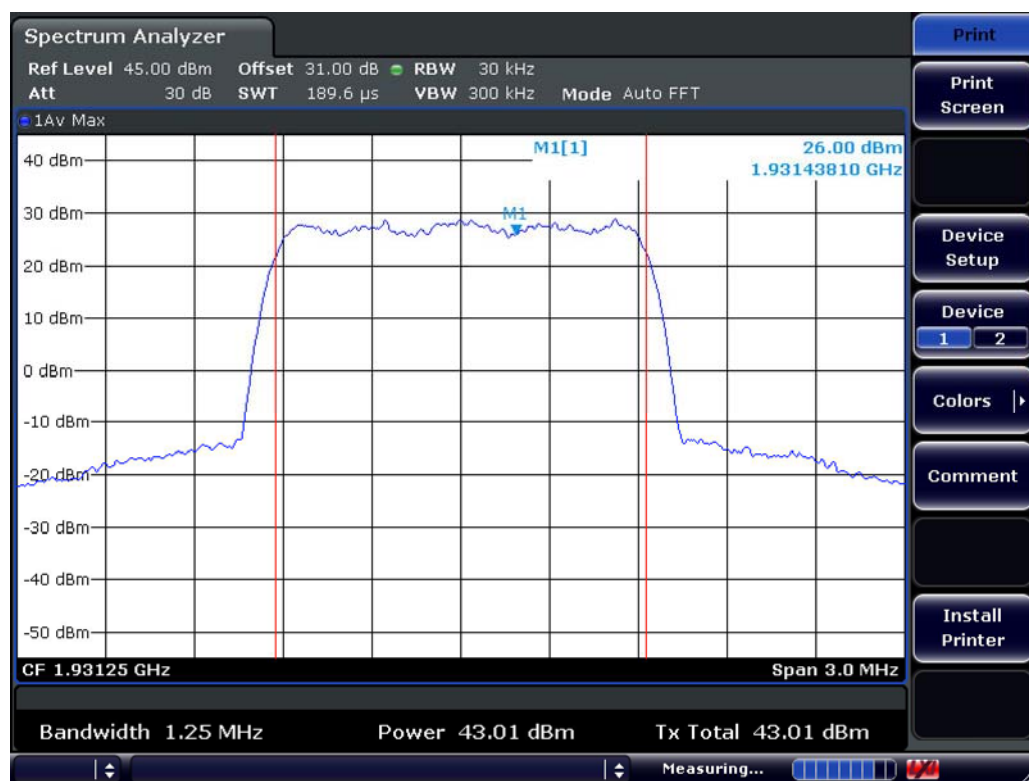
3.5 TEST PLOTS

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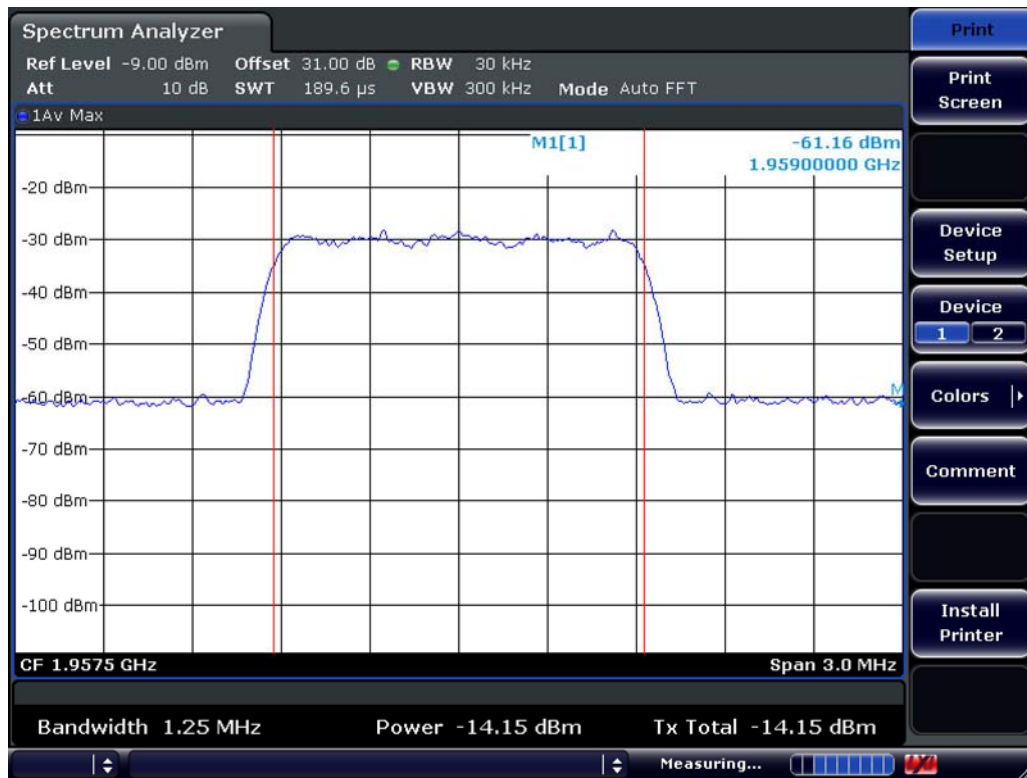
Input signal output Power (ch25)



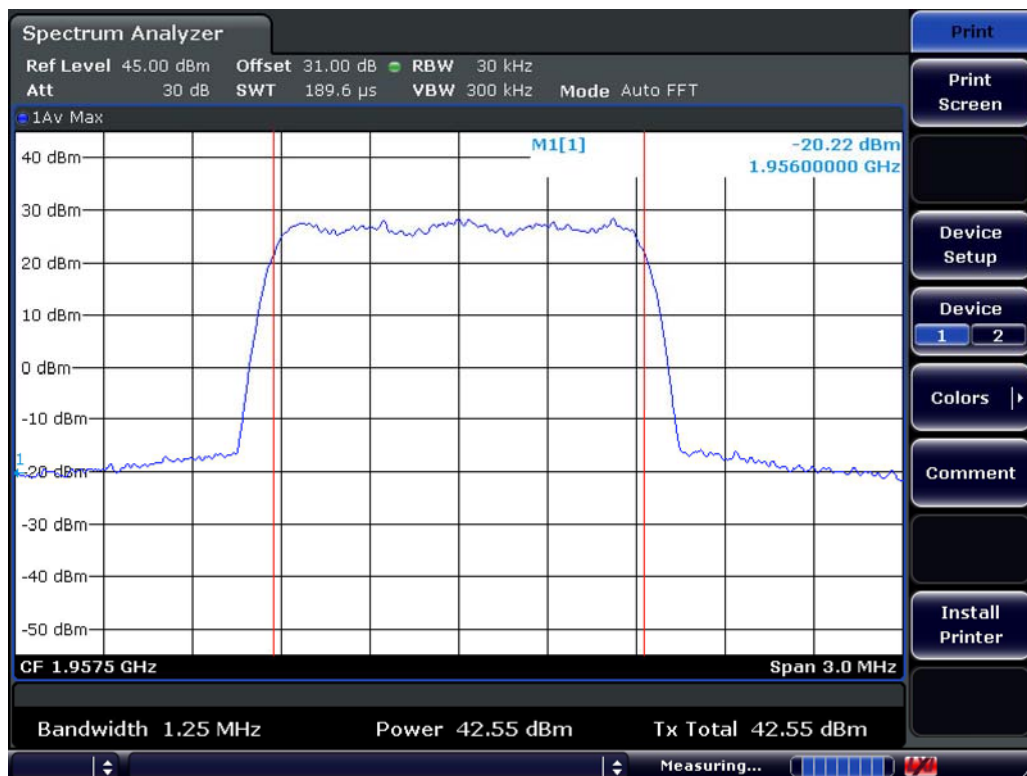
Downlink Output power (ch25)



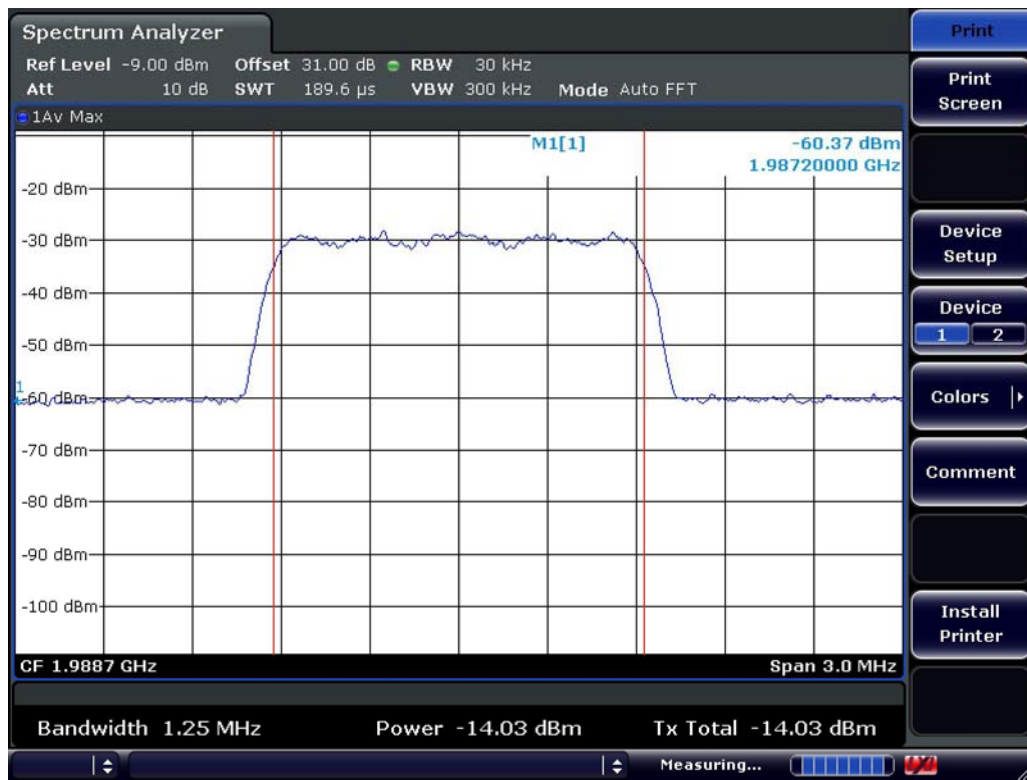
Input signal output Power (ch550)



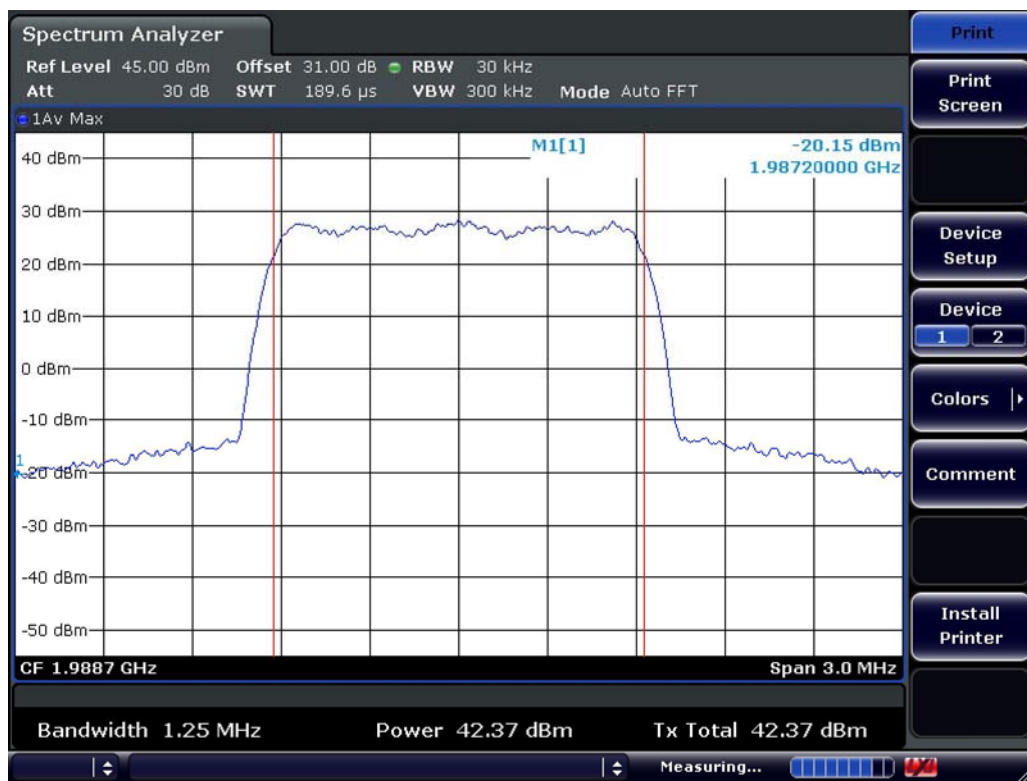
Downlink Output power (ch550)



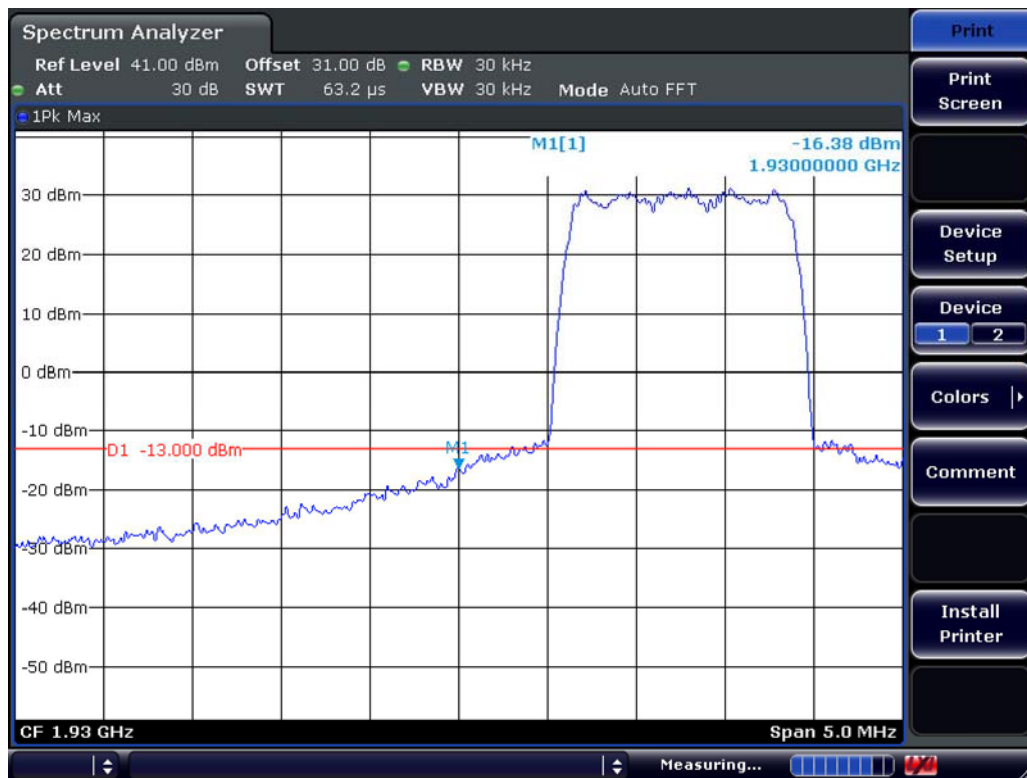
Input signal output Power (ch1175)



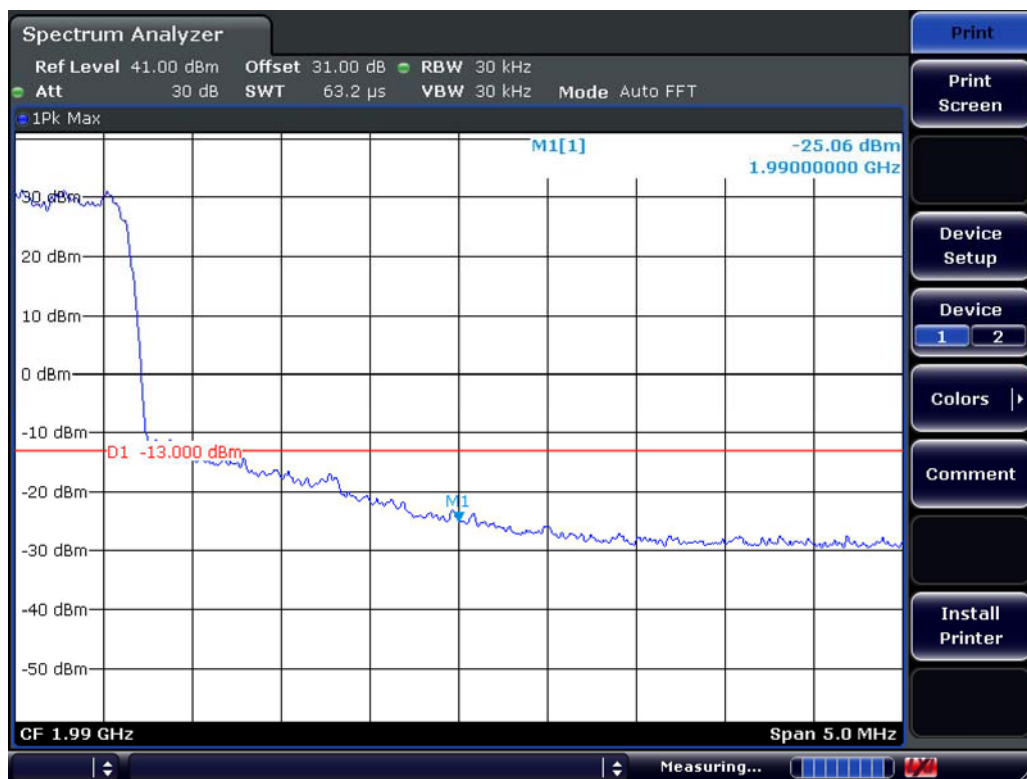
Downlink Output power (ch1175)



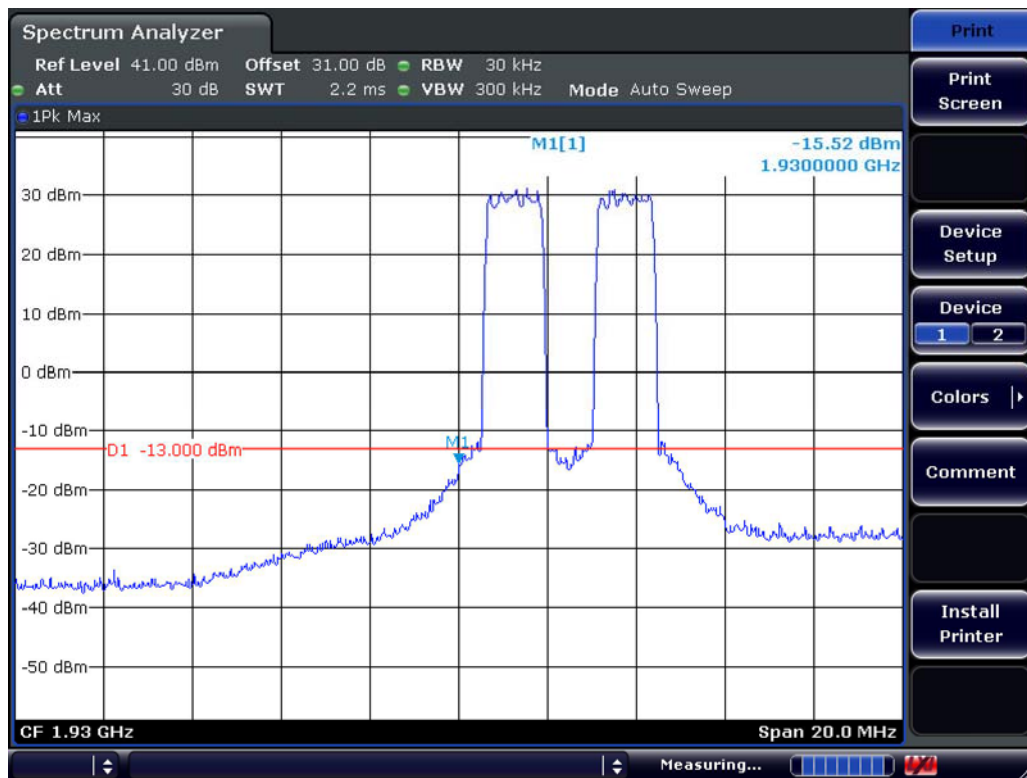
Band Edge (ch25)



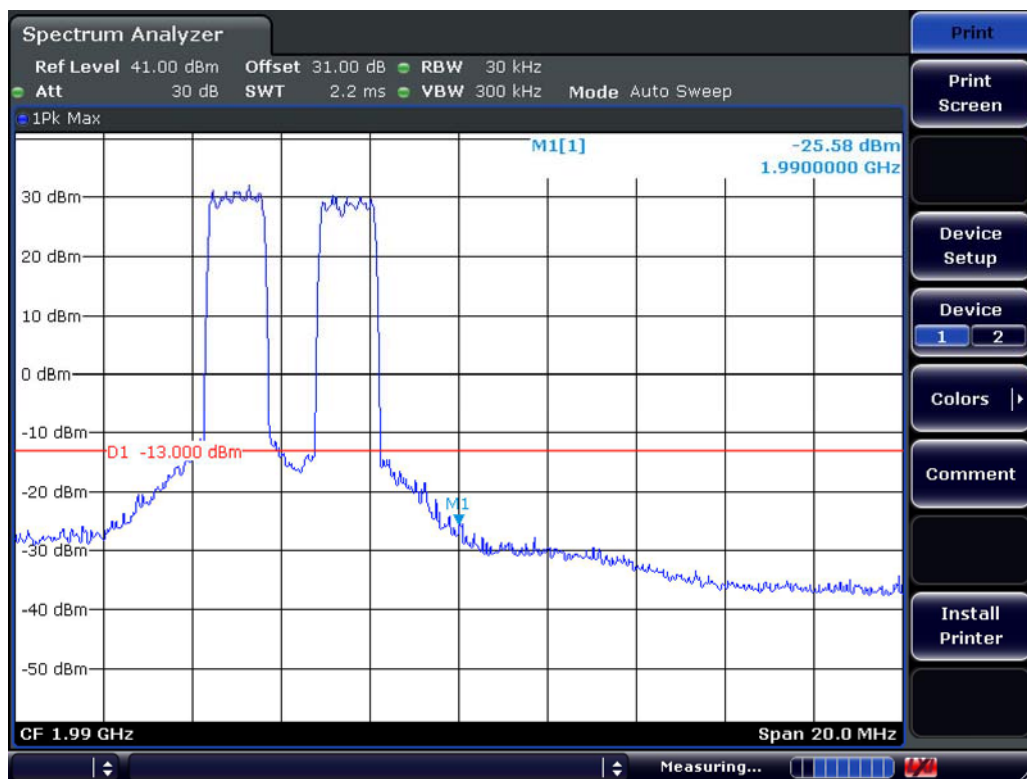
Band Edge (ch1175)



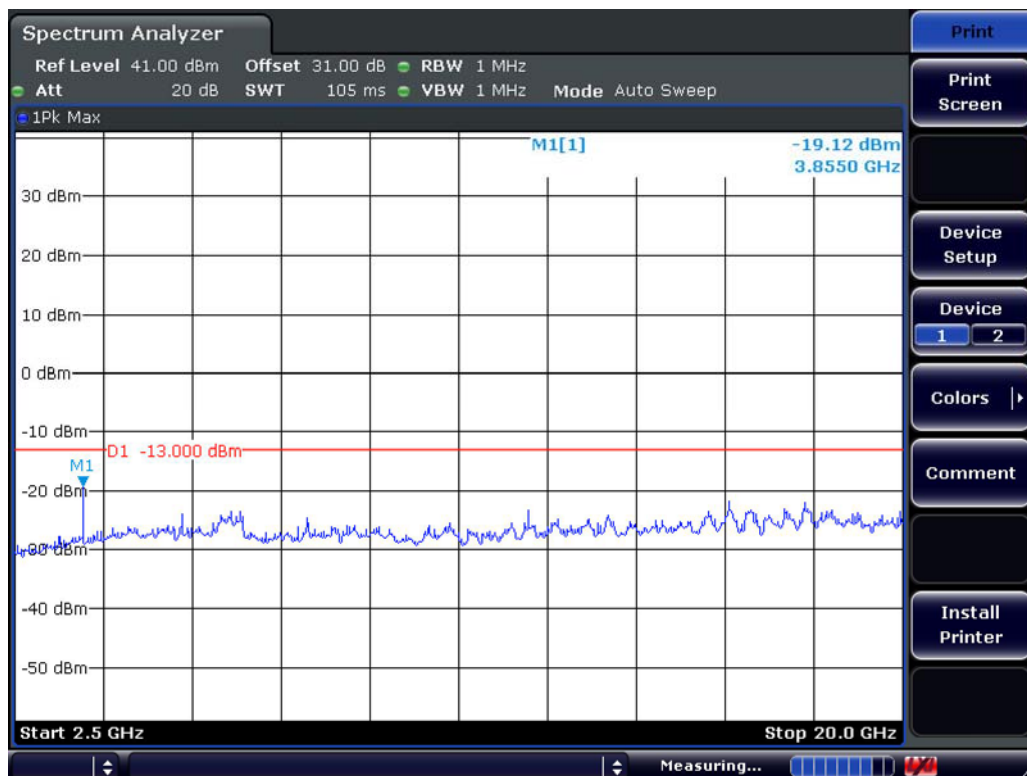
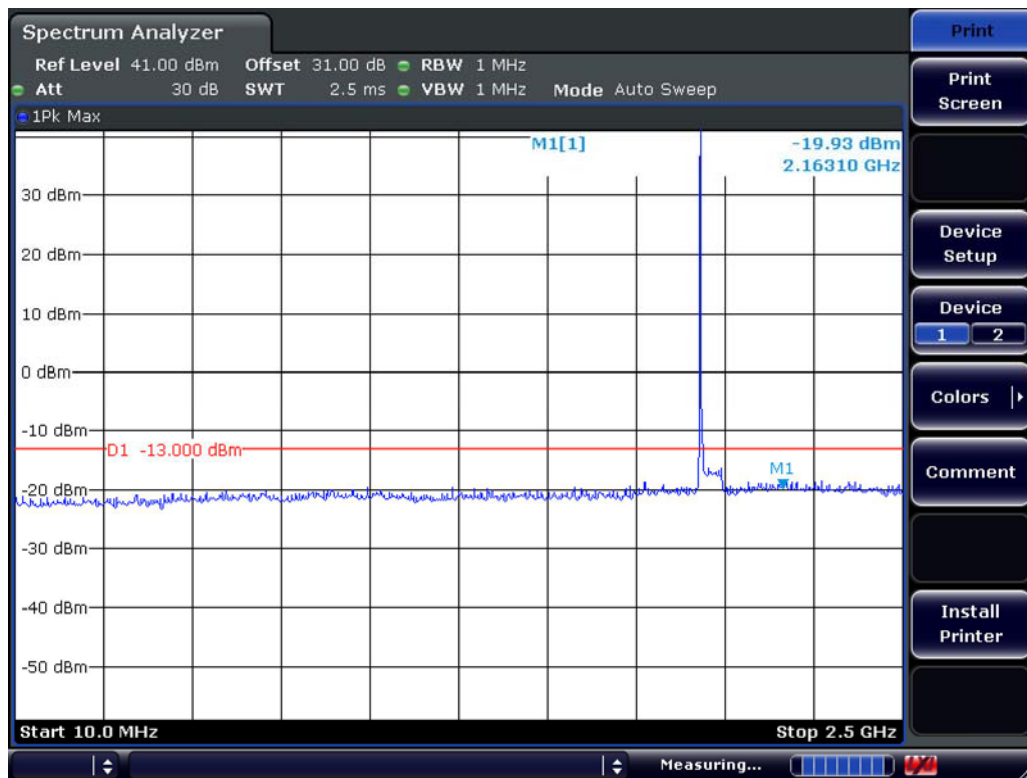
Band Edge Intermodulation (ch25)



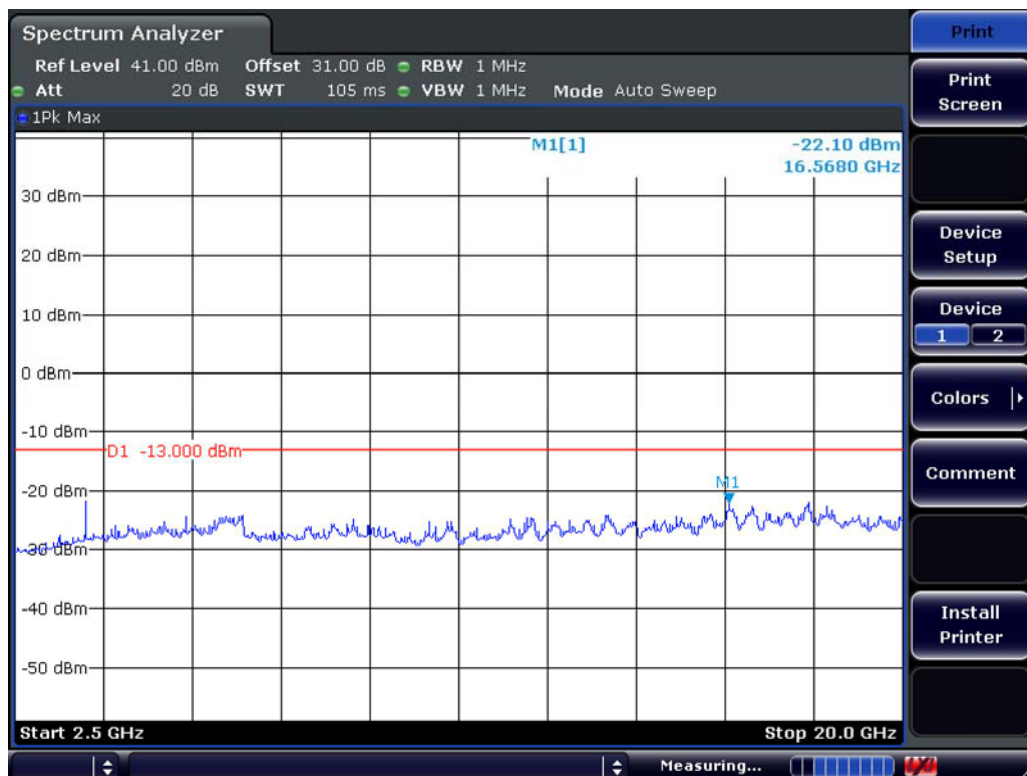
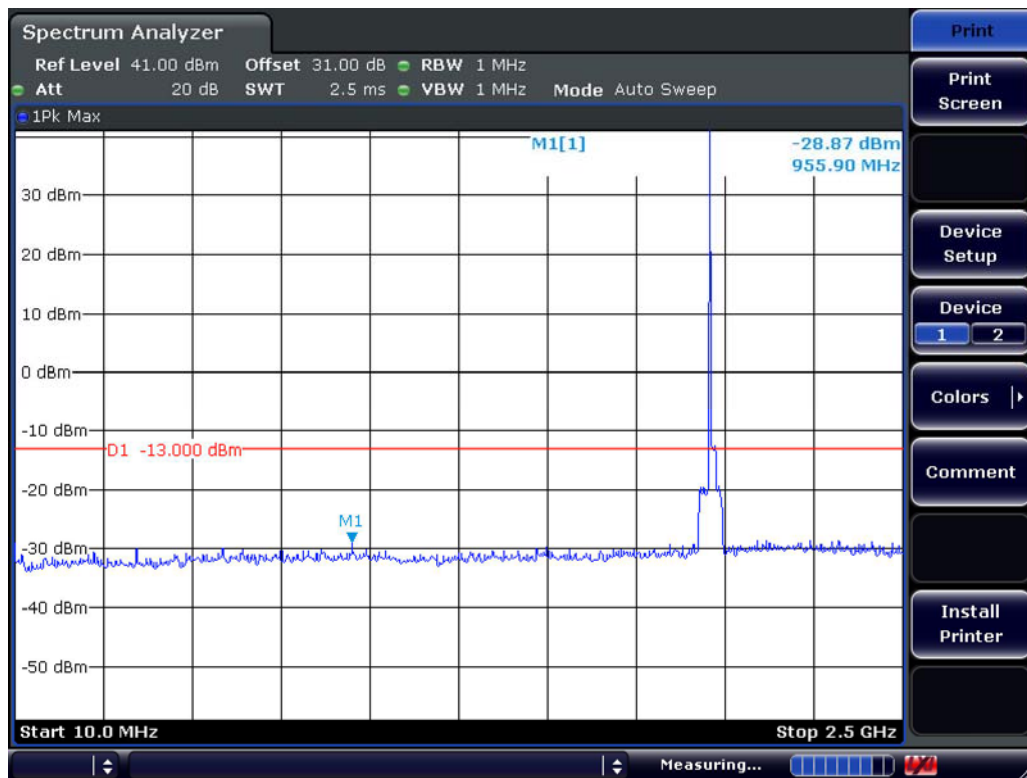
Band Edge Intermodulation (ch1175)



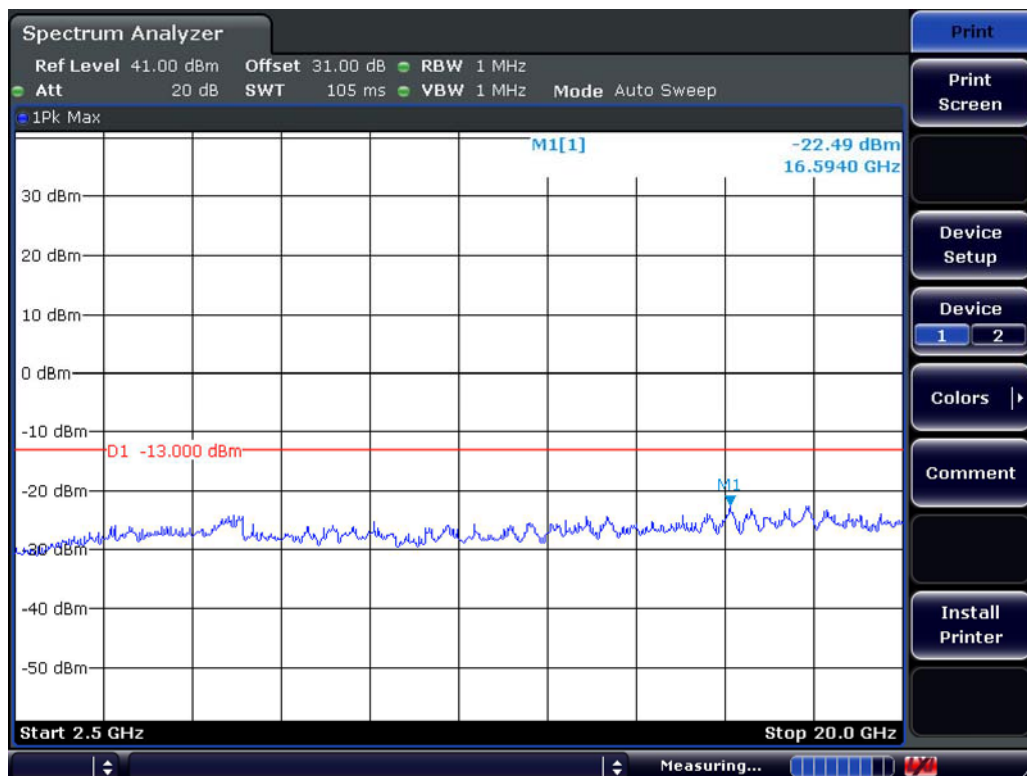
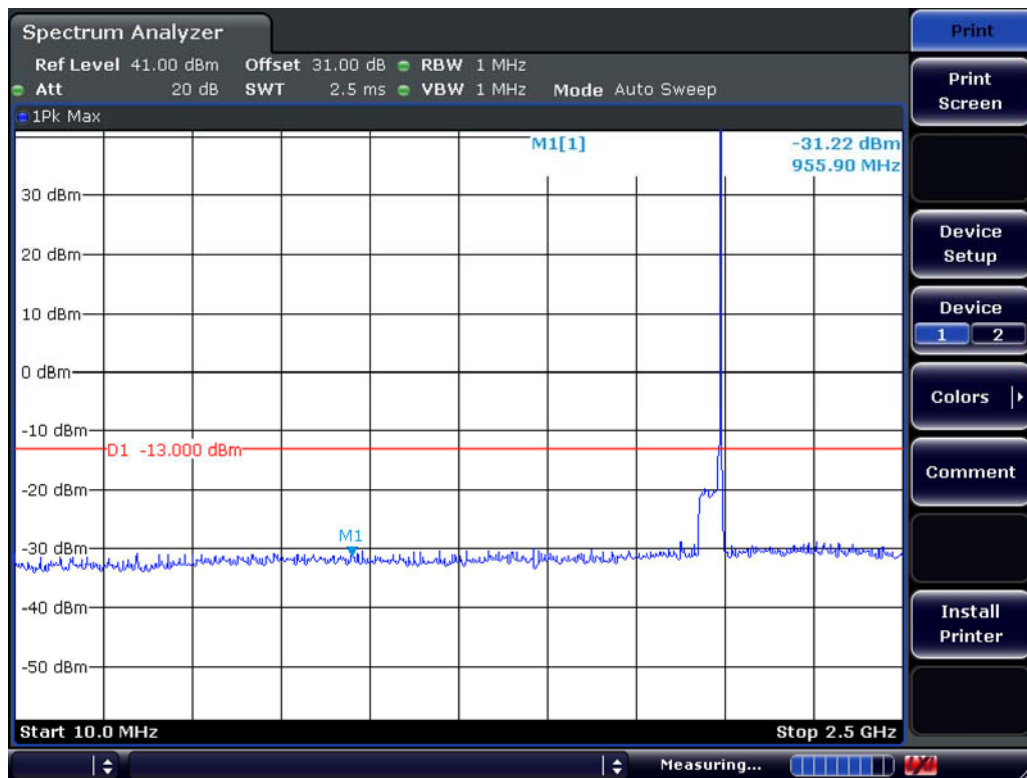
Out of Band (ch25)



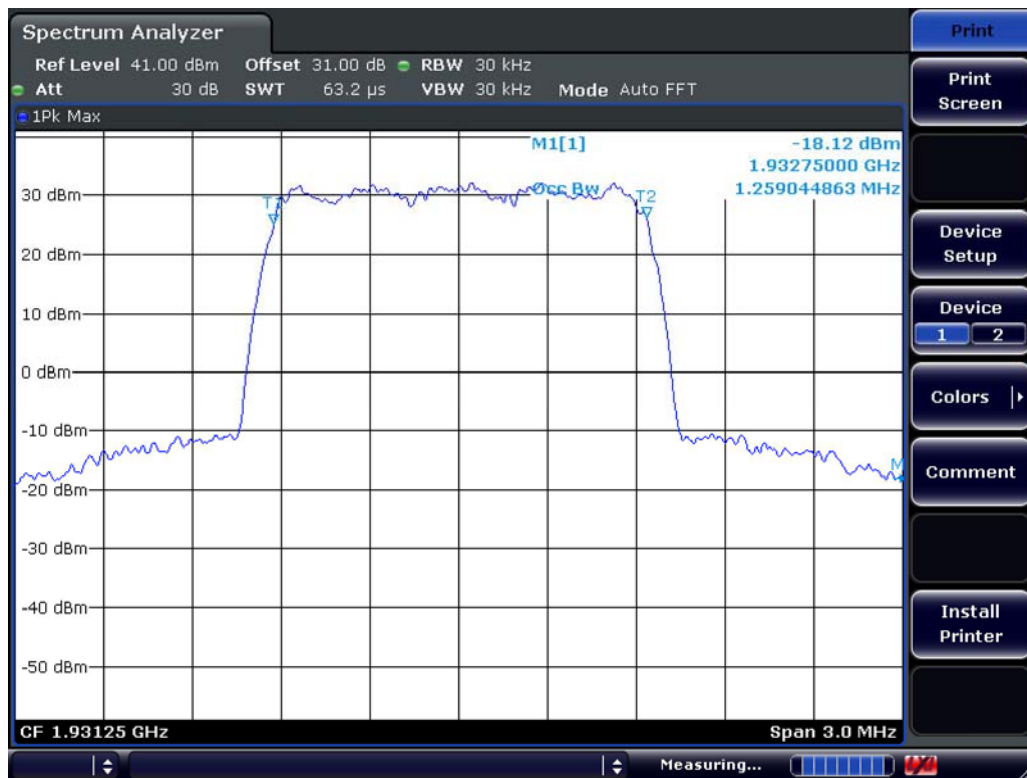
Out of Band (ch550)



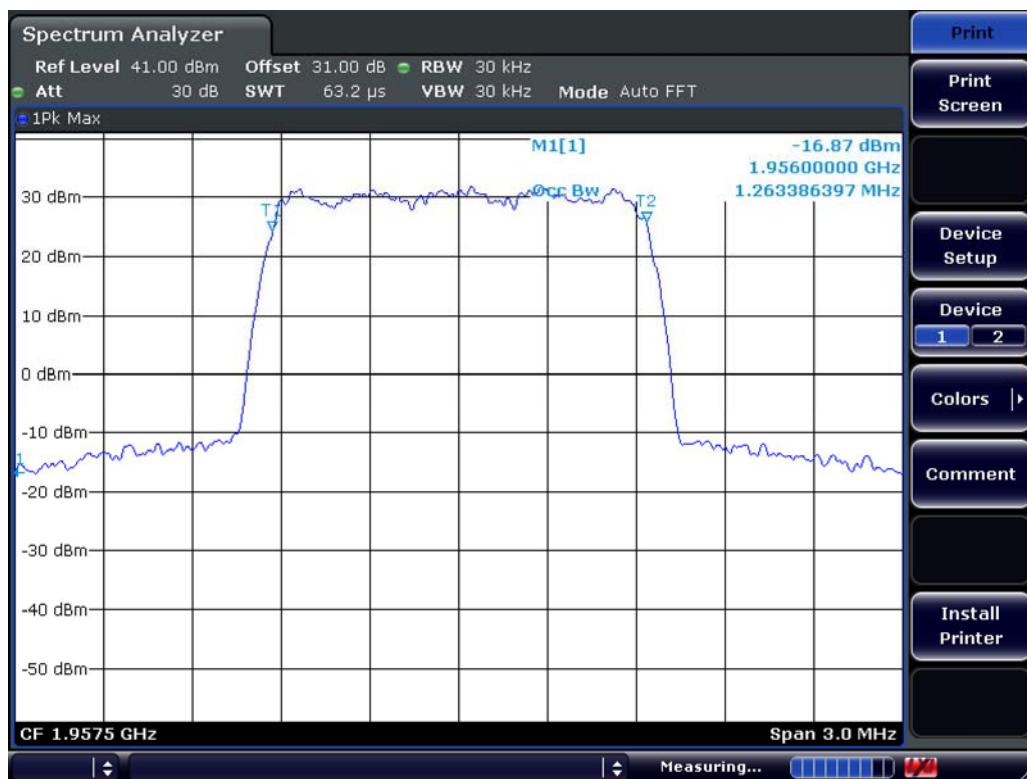
Out of Band (ch1175)



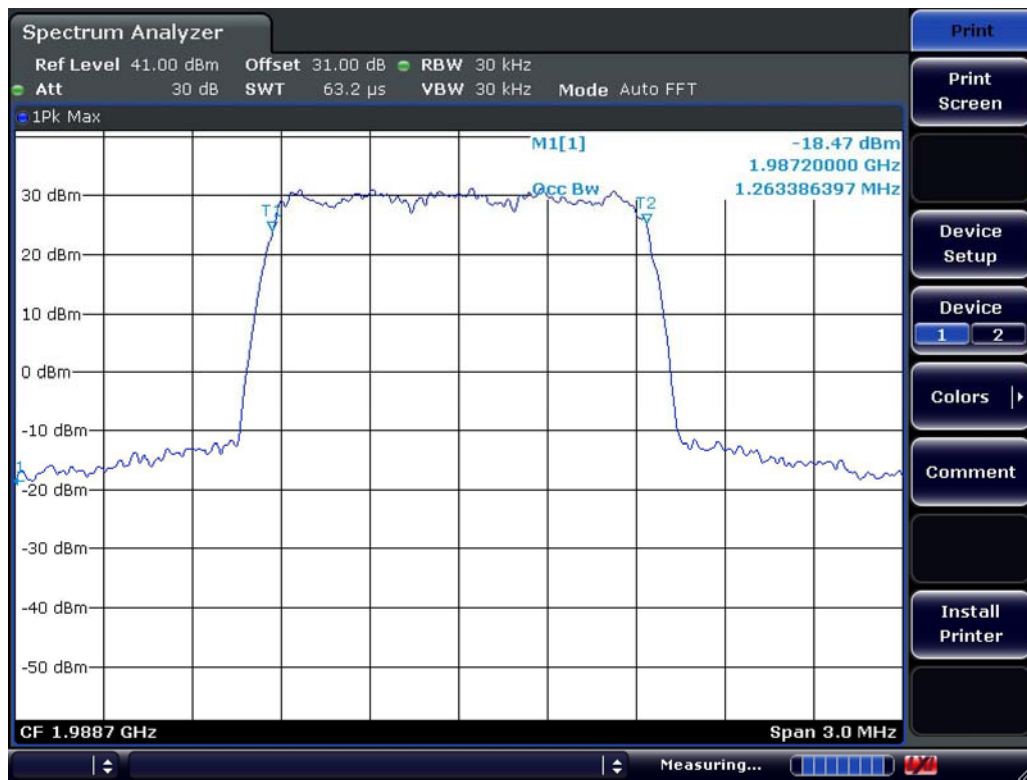
OCCUPIED BW (CH25)



OCCUPIED BW (CH550)



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	Apr-10
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-10
4	Signal Generator	8648C	3623A02597	HP	Apr-10
5	Signal Generator	83711B	US34490456	HP	Apr-10
6	ESG-D Series Signal Generator	E4438C	US40054094	Agilent	Nov-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	Apr-10
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	Apr-10
14	Test Receiver	ESHS10	828404/009	R&S	Apr-10
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	Apr-10
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	Apr-10
30	Power Meter	EPM-441A	GB32481702	HP	Apr-10
31	Power Sensor	8481A	2702A64048	HP	Apr-10
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	Apr-10
37	LISN	ENV216	100408	R&S	Oct-10