SGS-CSTC Standards Technical Services Co., Ltd.

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TEST REPORT

Application No.:	GZEM1311005668RF
Applicant:	Comba Telecom Ltd.
FCC ID:	PX8MBDA-200
Product Name:	mBDA Band Selective Wireless Repeater
Model No.:	mBDA-200
Trade Mark:	Comba
Standards:	FCC Part 22,FCC Part 24,FCC Part 2
Date of Receipt:	2013-12-11
Date of Test:	2013-12-11 to 2013-12-16
Date of Issue:	2013-12-20
Test Result :	**Pass***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further details.

Richard Li
Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2013-12-20		Original

Authorized for issue by:				
Tested By		Daniel He **(Daniel Hew) /Project Engineer**		2013-12-11 to 2013-12-16 **Date**
Prepared By		Daniel He **(Daniel Hew) /Clerk**		2013-12-20 **Date**
Checked By		Jeffrey Chen **(Jeffrey Chen) /Reviewer**		2013-12-20 **Date**

3 Test Summary

Test Item	Test Requirement	Test Method	Result
Output Power	FCC part 22.913 FCC part 24.232	FCC part 2.1046 KDB935210 D02	PASS
Conducted Spurious Emissions	FCC part 22.917 FCC part 24.238	FCC part 2.1051 KDB935210 D02	PASS
Band Edge& Intermodulation	FCC part 22.917 FCC part 24.238	FCC part 2.1051 KDB935210 D02	PASS
Radiated Spurious Emissions	FCC part 22.917 FCC part 24.238	FCC part 2.1053 KDB935210 D02	PASS
Occupied Bandwidth	FCC part 2.1049	FCC part 2.1049 KDB935210 D02	PASS
Out of Band Rejection	KDB935210 D02	KDB935210 D02	PASS
Frequency Stablility	FCC part 22.355 FCC part 24.235	FCC part 2.1055	PASS
Remark: Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver.			

4 Contents

5 General Information

5.1 Client Information

Applicant Name:	Comba Telecom Ltd.
Applicant Address:	611 East Wing, No. 8 Science Park West Avenue, Hong Kong Science Park, Tai Po, Hong Kong
Manufacturer:	Comba Telecom Systems(Guangzhou) Ltd.
Address of Manufacturer:	No.10 Shenzhou Road, Guangzhou Science City, Guangzhou 510663, Guangdong, P.R. China

5.2 General Description of E.U.T.

Product Name:	mBDA Band Selective Wireless Repeater
Model No.:	mBDA-200
Power Supply:	AC 100-240V/47-63Hz
Test power:	AC 120V 60Hz
Operating Temperature:	-20 °C to +40°C
Operating Humidity:	≤ 95%

5.3 Details of E.U.T.

Type of Modulation	CDMA & WCDMA & GSM
	GXW(GSM)
Emission Designator:	F9W(CDMA),
	F9W (WCDMA)
Frequency Band:	Downlink: 869MHz to 894MHz
	Uplink: 824MHz to 849MHz
	include the Modulation:
	GSM, CDMA, WCDMA
	Downlink 1930MHz to 1995MHz
	Uplink: 1850MHz to 1915MHz
	include the Modulation:
	GSM, CDMA, WCDMA
Nominal Power Output:	27dBm,30dBm,33dBm for downlink
	23dBm for Uplink
Nominal System Gain:	80dB for downlink
	80dB for Uplink

5.4 Product Description

mBDA is a wireless enhanced solution where high-quality voice or high-speed data service is not available between a mobile and a base station. mBDA is ideal for the first phase of the network rollout and for any subsequent phase where cost, coverage, and quality need to be optimized.

5.5 Standards Applicable for Testing

The standard used was FCC part 2 & FCC part 22 & FCC part 24

5.6 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059
No tests were sub-contracted.

5.7 Other Information Requested by the Customer

None.

5.8 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **ACMA**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

  Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

  SGS-CSTC Standards Technical Services Co., Ltd., 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 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

  The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

  The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584，G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

  SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)	Calibration Interval
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-08-30	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-05-06	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2014-03-04	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2016-08-31	3Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2016-08-31	3Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-06-02	2Y
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2016-08-31	3Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2014-07-01	2Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-04	1Y
EMC2065	Amplifier	HP	8447F	N/A	2014-08-31	1Y
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2014-07-29	1Y
EMC0075	310N Amplifier	Sonama	310N	272683	2014-03-04	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-04-07	2Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2014-06-01	3Y
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-06-05	1Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-04-27	2Y

	Other equipment					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal. Due Date (dd-mm-yy)**
NA	Power Meter	Agilent	E4419B	MY45100856	2013.6.12	2014.6.11
NA	Signal Generator	Agilent	E4437B	US39260800	2013.6.17	2014.6.16
NA	Signal Generator	Agilent	E4438C	US39260800	2013.6.14	2014.6.14
NA	Spectrum Analyzer	Agilent	N9020A	MY48011385	2013.6.14	2014.6.14
NA	Spectrum Analyzer	Rohde&Schwarz	FSQ 8	SN0805772	2013.6.14	2014.6.14
NA	Attenuator	SHX manufacturer	30dB/50W	09031816	----	----
NA	Attenuator	SHX manufacturer	40dB/50W	09031312	----	----
NA	Attenuator	SHX manufacturer	50dB/50W	09053023	----	----
NA	Signal Generator	Rohde&Schwarz	SMU 200A	08103303	2013.6.12	2014.6.11

General used equipment						
No.	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Due date (YYYY-MM-DD)**	**Calibration Interval**
EMC0006	DMM	Fluke	73	70681569	2014-09-13	1Y
EMC0007	DMM	Fluke	73	70671122	2014-09-13	1Y

7 Test Results

7.1 E.U.T. test conditions

Input Voltage:	AC 120V
Operating Environment:	
Temperature:	22°C ~26°C
Humidity:	46%~56% RH
Atmospheric Pressure:	990~1005mbar
Test Requirement:	The RF output power of the EUT was measured at the antenna port, by adjusting the input power of signal generter to drive the EUT to get to maximum output power point and keep the EUT at maximum gain setteing for all tests. The device should be tested on downlink. For detail test Modulation and Frequency, please refer to 7.2.

Remark:
GENERAL DEFINITIONS FOR CERTIFICATION PURPOSES:
The following three general definitions follow from those stated in the Part 22, 24, and 90 rule sections as listed above. Two of the definitions replace previous EAB internal definitions given for booster, repeater and extender. The general term “extender” is the same as booster, but booster should be used rather than extender. The general term “translator” is the same as repeater, but repeater should be used rather than translator.
External radio frequency power amplifier (ERFPA) - any device which, (1) when used in conjunction with a radio transmitter signal source, is capable of amplification of that signal, and (2) is not an integral part of a radio transmitter as manufactured. The EAS equipment class AMP is used only for an ERFPA device inserted between a transmitter (TNB/PCB) and an antenna (has only one antenna port)
Booster is a device that automatically reradiates signals from base transmitters without channel translation, for the purpose of improving the reliability of existing service by increasing the signal strength in dead spots. An “in-building radiation system” is a signal booster. These devices are not intended to extend the size of coverage from the originating base station. A booster can be either single or multiple channels**.**
Repeater is a device that retransmits the signals of other stations. Repeaters are different from boosters in that they can include frequency translation and can extend coverage beyond the design of the original base station. A repeater is typically single channel but can also be multiple channels.
ERFPA (AMP) and boosters/repeaters (TNB/PCB) can generally be authorized for all rule parts except 15 and 18.
Tests should be done with each typical signal. e.g., for F3E emissions use 2500 Hz with 2.5 or 5 kHz deviation. Use of CW signal for some tests is acceptable in lieu of actual emission, in some cases when CW signal gives worst case.
mBDA is a wireless enhanced solution where high-quality voice or high-speed data service is not available between a mobile and a base station. mBDA is ideal for the first phase of the network rollout and for any subsequent phase where cost, coverage, and quality need to be optimized. So **the Equipment belongs to the repeater and TNB class.**

7.2 Test **Procedure** & Measurement Data

Test Modulation and Frequency

1.Downlink: 869MHz to 894MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
GSM	869.6.	881.5	893.4
CDMA	871	881.5	892
WCDMA	872	881.5	891

2.Uplink: 824MHz to 849MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
GSM	824.6	836.5	848.4
CDMA	826	836.5	847
WCDMA	827	836.5	846

3.Downlink: 1930MHz to 1995MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
GSM	1930.6	1962.5	1994.4
CDMA	1932	1962.5	1993
WCDMA	1933	1962.5	1992

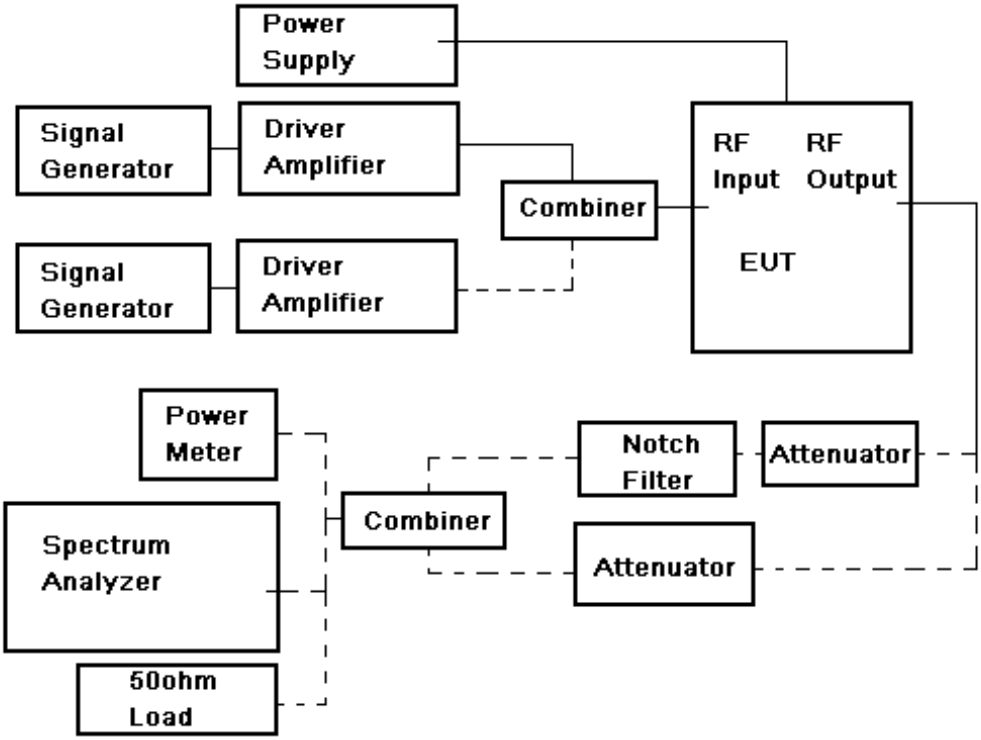
4.Uplink: 1850MHz to 1915MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
GSM	1850.6	1882.5	1914.4
CDMA	1852	1882.5	1913
WCDMA	1853	1882.5	1912

Remark:

1) We test the downlink and uplink in the lowest band; the middle band; the hightest band and test the respective frequency as above table;

General Test Setup:



7.2.1 RF Output Power

Test Date: 2013-12-11 to 2013-12-16

Test Requirement: FCC part 22.913(a) & FCC part 24.232(a)&(b)

22.913(a):Maximum ERP. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

24.232(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See §24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section. The service area boundary limit and microwave protection criteria specified in §§24.236 and 24.237 apply.

Test Method: FCC part 2.1046

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

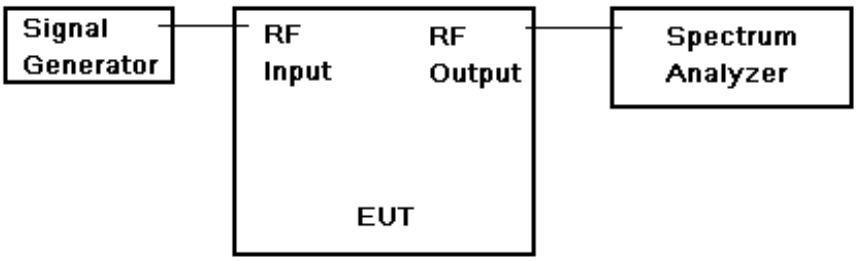


Fig.1 RF Output Power test configuration

Test Procedure:	RF output power test procedure: 1. a) Connect the equipment as illustrated, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility. b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line. c) do not apply any tone to modulate the EUT. d1) Adjust the spectrum analyzer for the following settings: 1) Resolution Bandwidth >> the carrier bandwidth, 2) Video Bandwidth refer to standard requirement. d2) Use spectrum analyzer channel power measurement function; e) Record the frequencies and levels of carrier power; f) Calculate the signal link way loss and final power value. Or 2. a) Connect the equipment as illustrated; b) Read the value from the power meter; c) Calculate the signal link way loss and final power value.
Remark:	Output power – Power on Form 731 should be clearly understood as either composite of multichannels or per carrier. If power is composite include in comments field: "Power output listed is composite for multi-channel operation." Check that the input drive level is at maximum input rating and maximum gain settings for all tests. Check both uplink and downlink input levels. See manual or brochures/technical description for maximum rating. May need to check FCC identifier of transmitter used for tests. Confirm device can not operate in saturation. Are there means to control maximum power and to assure linear operation (use in system configuration may be necessary)? How is saturation or over-modulation prevented for pulsed signal inputs?

7.2.1.1 Measurement Record:

1.Downlink: 869MHz ~ 894MHz

1.1Test in the maxoutput 27dBm

Per channel Power Input=-52dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	26.34dBm(0.431W)	26.12dBm(0.409W)	26.32dBm(0.429W)
CDMA	26.21dBm(0.418W)	26.09dBm(0.406W)	26.31dBm(0.428W)
WCDMA	26.25dBm(0.422W)	26.17dBm(0.414W)	26.26dBm(0.423W)

1.2 Test in the maxoutput 30dBm

Per channel Power Input=-50dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	29.43dBm(0.877W)	29.16dBm(0.824W)	29.37dBm(0.865W)
CDMA	29.25dBm(0.841W)	29.15dBm(0.822W)	29.29dBm(0.849W)
WCDMA	29.32dBm(0.855W)	29.24dBm(0.839W)	29.42dBm(0.875W)

1.3 Test in the maxoutput 33dBm

Per channel Power Input=-46dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	32.81dBm(1.910W)	32.16dBm(1.644W)	32.78dBm(1.897W)
CDMA	33.08dBm(2.032W)	33.11dBm(2.046W)	32.73dBm(1.875W)
WCDMA	33.09dBm(2.037W)	33.17dBm(2.075W)	32.96dBm(1.977W)

2. Uplink: 824MHz ~ 849MHz

Per channel Power Input=-56dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	22.63dBm(0.183W)	23.35 dBm(0.216W)	22.27 dBm(0.167W)
CDMA	22.24dBm(0.167W)	22.52dBm(0.179W)	22.18dBm(0.165W)
WCDMA	23.04dBm(0.201W)	23.46dBm(0.222W)	22.38dBm(0.173W)

3.Downlink: 1930MHz ~ 1995MHz

3.1Test in the maxoutput 27dBm

Per channel Power Input=-52dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	26.32dBm(0.429W)	26.21dBm(0.418W)	26.27dBm(0.424W)
CDMA	26.12dBm(0.409W)	26.09dBm(0.406W)	26.33dBm(0.430W)
WCDMA	26.31dBm(0.428W)	26.34dBm(0.431W)	26.49dBm(0.446W)

3.2 Test in the maxoutput 30dBm

Per channel Power Input=-50dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	29.42dBm(0.875W)	29.21dBm(0.834W)	29.28dBm(0.847W)
CDMA	29.31dBm(0.853W)	29.09dBm(0.811W)	29.17dBm(0.826W)
WCDMA	29.19dBm(0.830W)	29.14dBm(0.820W)	29.49dBm(0.889W)

3.3 Test in the maxoutput 33dBm

Per channel Power Input=-46dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	32.74dBm(1.879W)	32.23dBm(1.671W)	32.68dBm(1.854W)
CDMA	33.15dBm(2.066W)	33.16dBm(2.070W)	32.59dBm(1.816W)
WCDMA	33.21dBm(2.094W)	33.35dBm(2.163W)	32.39dBm(1.734W)

2. Uplink:1850MHz ~ 1915MHz

Per channel Power Input=-56dBm for downlink			
Modulation	**Lowest frequency**	**Middle frequency**	**Highest frequency**
GSM	22.54dBm(0.179W)	23.31 dBm(0.214W)	22.14 dBm(0.164W)
CDMA	22.36dBm(0.172W)	22.78dBm(0.190W)	22.39dBm(0.173W)
WCDMA	22.54dBm(0.179W)	23.52dBm(0.225W)	22.48dBm(0.177W)

7.2.2 Conducted Spurious Emissions

Test Date: 2013-12-11 to 2013-12-16

Test Requirement: FCC part 22.917(a) & FCC part 24.238(a)

22.917(a) Out of band emissions. The power of any emission 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.

24.238(a) Out of band emissions. The power of any emission 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.

Test Method: FCC part 2.1051

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

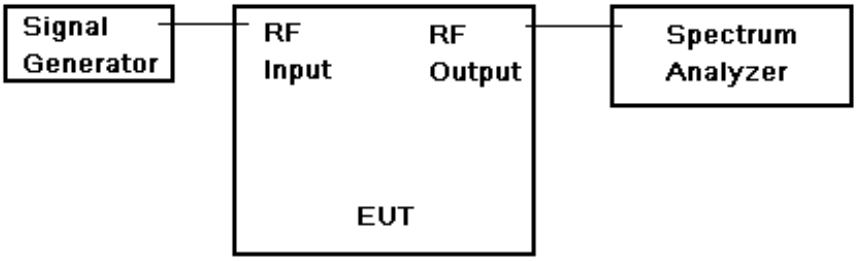
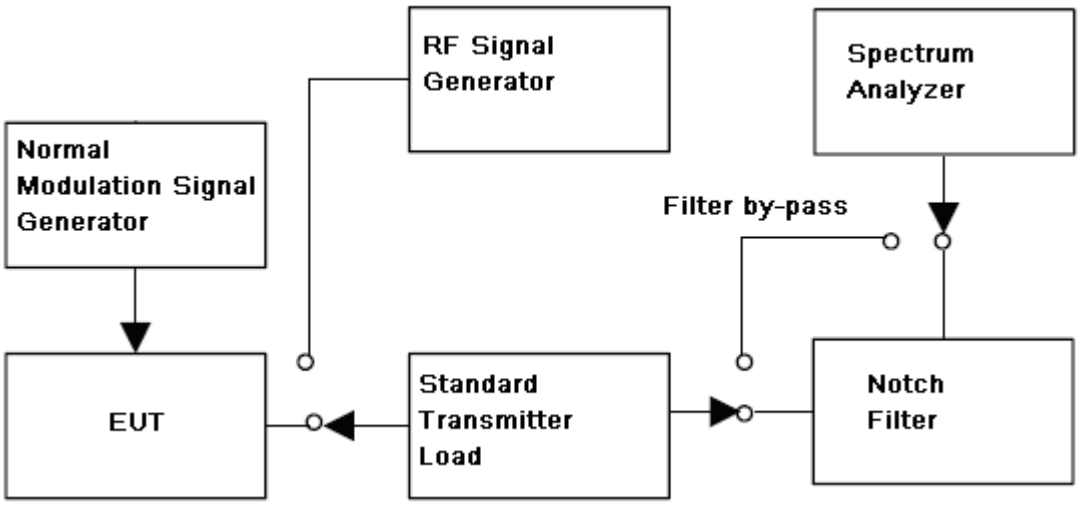


Fig.2. Conducted Spurious Emissions test configuration



Test Procedure:

Conducted Emissions test procedure:

a) Connect the equipment as illustrated, with the notch filter by-passed, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth,(base the standard, apply the different set),her is 100KHz for frequency band less than 1GHz, 1MHz for frequency over 1GHz;

2) Video Bandwidth refer to standard requirement.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) the lowest radio frequency generated in the equipment, it can be 9KHz base the test method, here select 30MHz as lowest frequency start point;

2) the highest radion frequency shall higher than 10 times of carrier frequency;

f) Record the frequencies and levels of spurious emissions from step e)

Remark:

The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

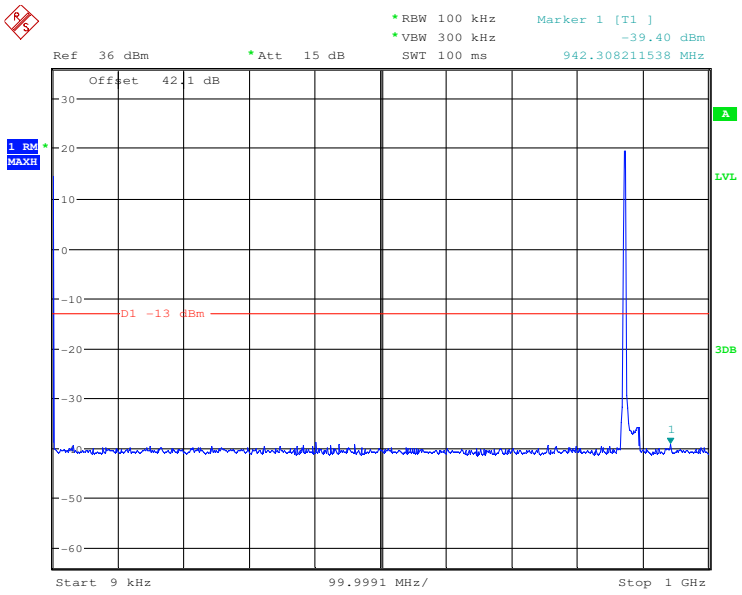
7.2.2.1 Measurement Record:

1. Downlink: 869MHz ~ 894MHz(GSM,CDMA,WCDMA)
Remark:
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).
The data of the GSM mode and CDMA mode is almost the same with WCDMA mode, so we only show the photo in the WCDMA mode,others record the data.

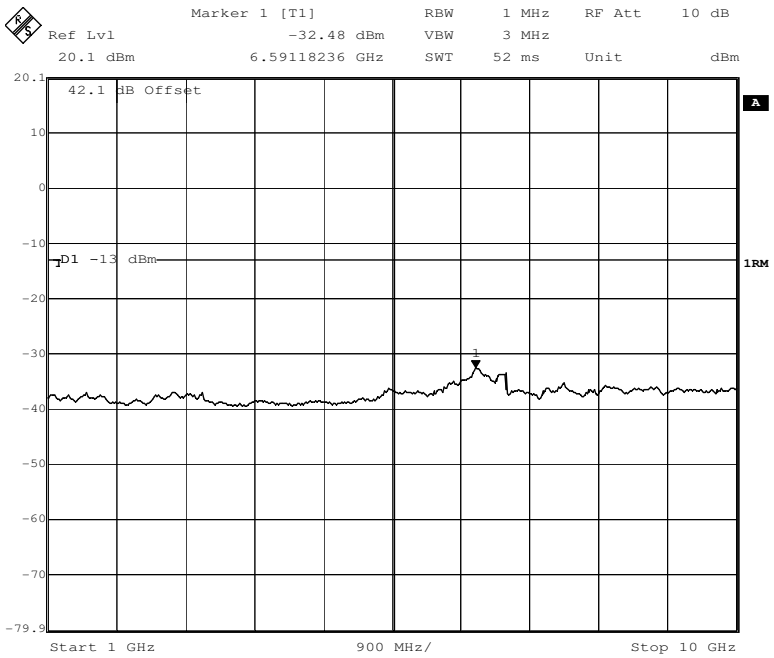
1.1 For WCDMA mode:

1)lowest frequency

9KHz to 1GHz

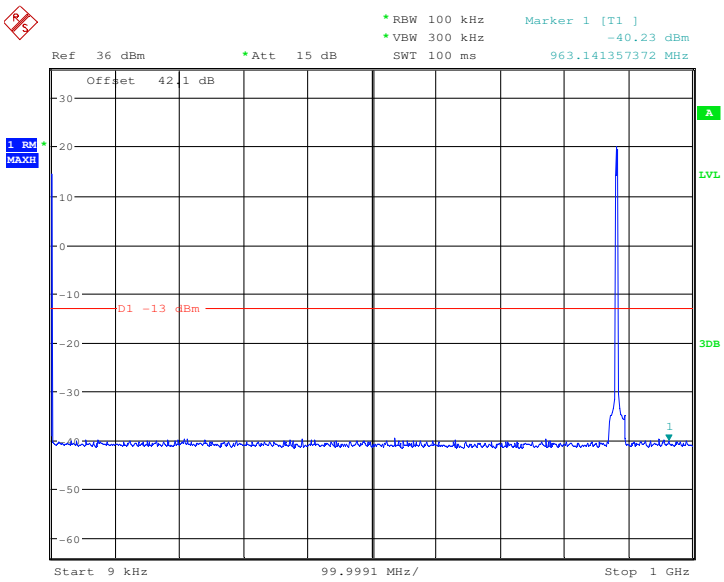


1GHz to 10GHz

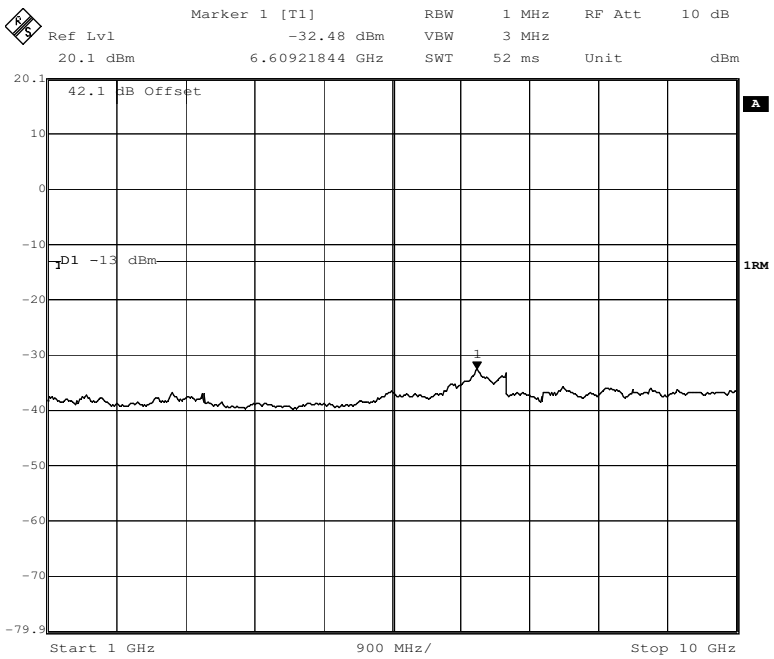


2)Middle frequency

9KHz to 1GHz

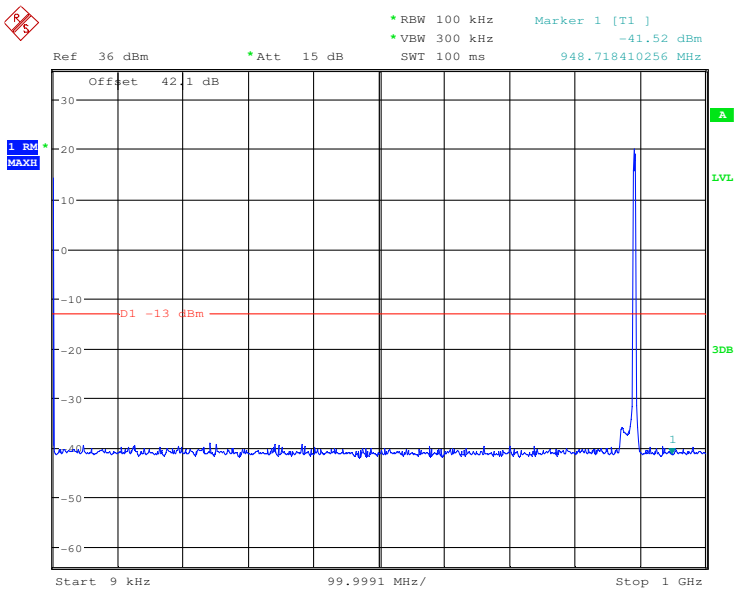


1GHz to 10GHz

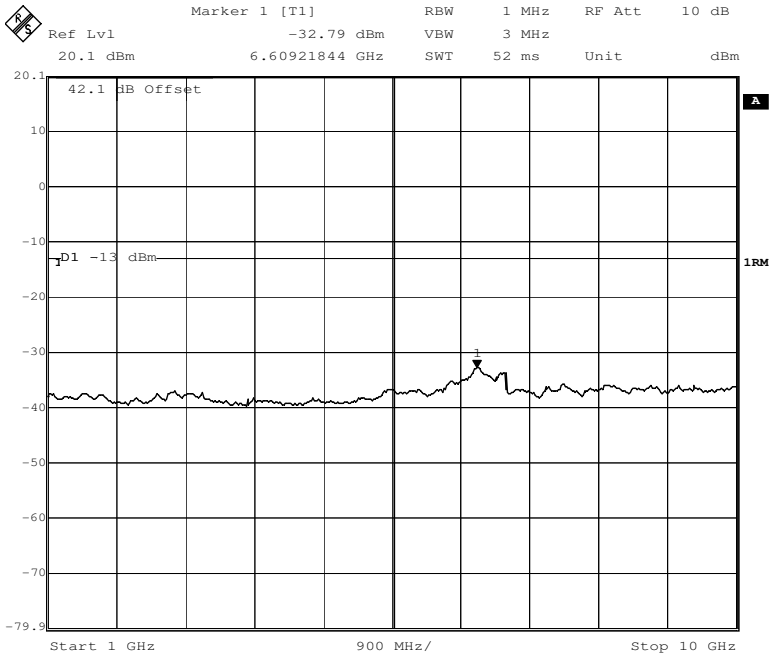


3)highest frequency

9KHz to 1GHz



1GHz to 10GHz



1.2 For GSM mode:

1)lowest frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-39.45	-13.0	-26.45
1GHz to 10GHz	RBW=1MHz	-32.52	-13.0	-19.52

2)Middle frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.35	-13.0	-27.35
1GHz to 10GHz	RBW=1MHz	-32.59	-13.0	-19.59

3)highest frequency

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.64	-13.0	-28.64
1GHz to 10GHz	RBW=1MHz	-32.83	-13.0	-19.83

1.3 For CDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-39.52	-13.0	-26.52
1GHz to 10GHz	RBW=1MHz	-32.51	-13.0	-19.51

2)Middle frequency:

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-40.36	-13.0	-27.36
1GHz to 10GHz	RBW=1MHz	-32.63	-13.0	-19.63

3)highest frequency

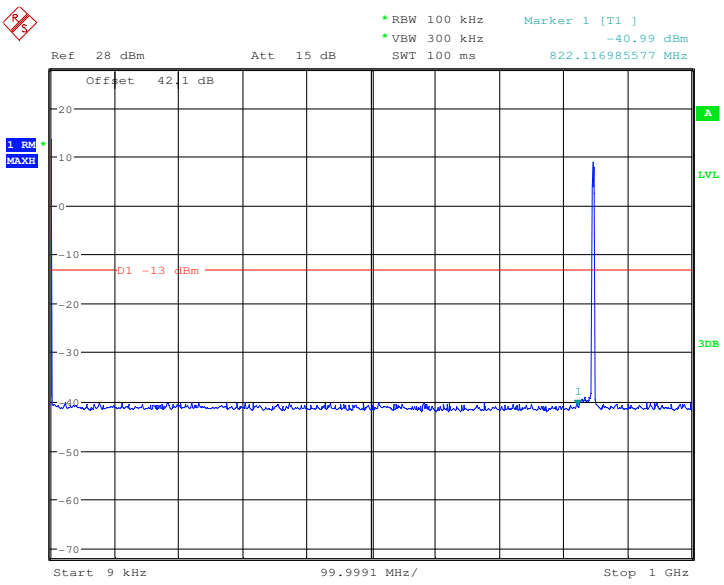
Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-41.59	-13.0	-28.59
1GHz to 10GHz	RBW=1MHz	-32.86	-13.0	-19.86

2. Uplink: 824MHz ~ 849MHz(GSM,CDMA,WCDMA)
Remark:
The data of the GSM mode and CDMA mode is almost the same with WCDMA mode, so we only show the photo in the WCDMA mode,others record the data.

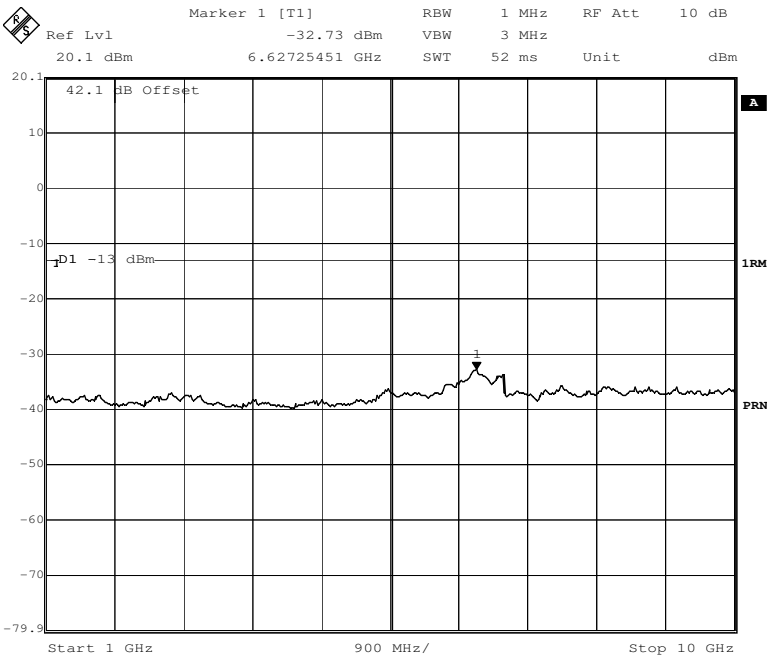
2.1 For WCDMA mode:

1)lowest frequency

9KHz to 1GHz

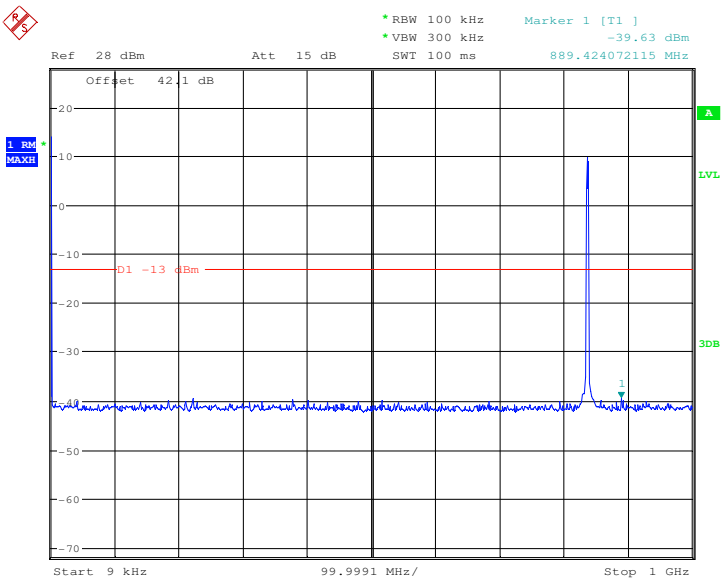


1GHz to 10GHz

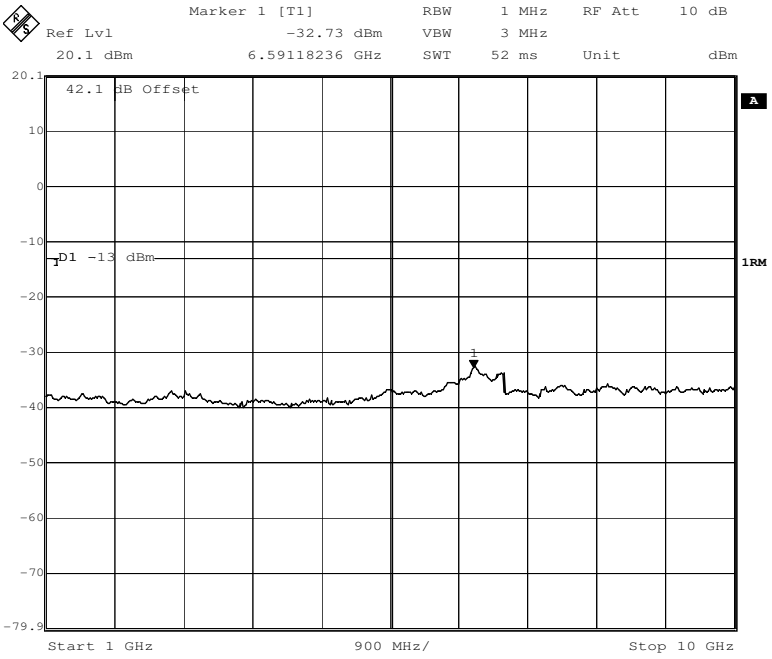


2)Middle frequency

9KHz to 1GHz

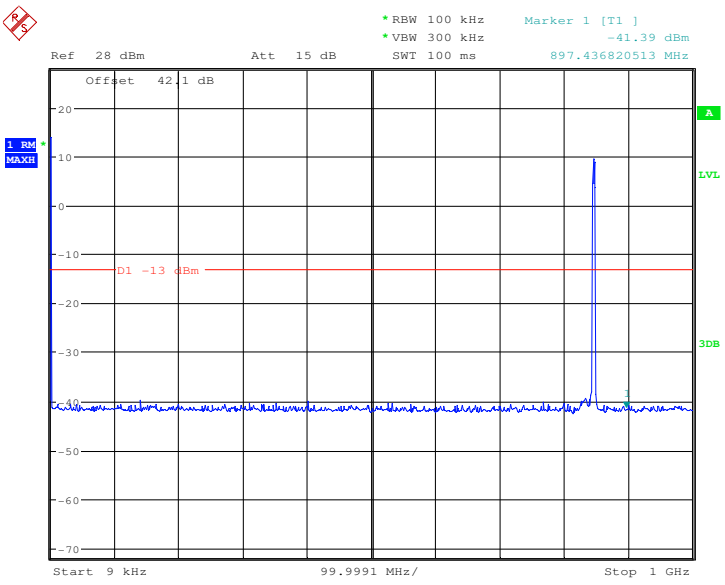


1GHz to 10GHz

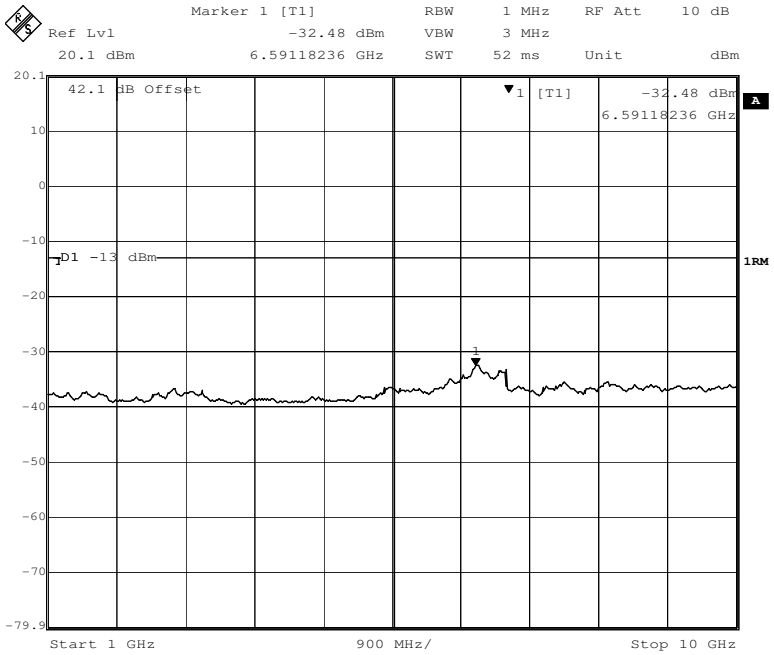


3)highest frequency

9KHz to 1GHz



1GHz to 10GHz



2.2 For GSM mode:

1)lowest frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.12	-13.0	-28.12
1GHz to 10GHz	RBW=1MHz	-32.74	-13.0	-19.74

2)Middle frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-39.89	-13.0	-26.89
1GHz to 10GHz	RBW=1MHz	-32.86	-13.0	-19.86

3)highest frequency

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.56	-13.0	-28.56
1GHz to 10GHz	RBW=1MHz	-32.59	-13.0	-19.59

2.3 For CDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-41.23	-13.0	-28.23
1GHz to 10GHz	RBW=1MHz	-32.89	-13.0	-19.89

2)Middle frequency:

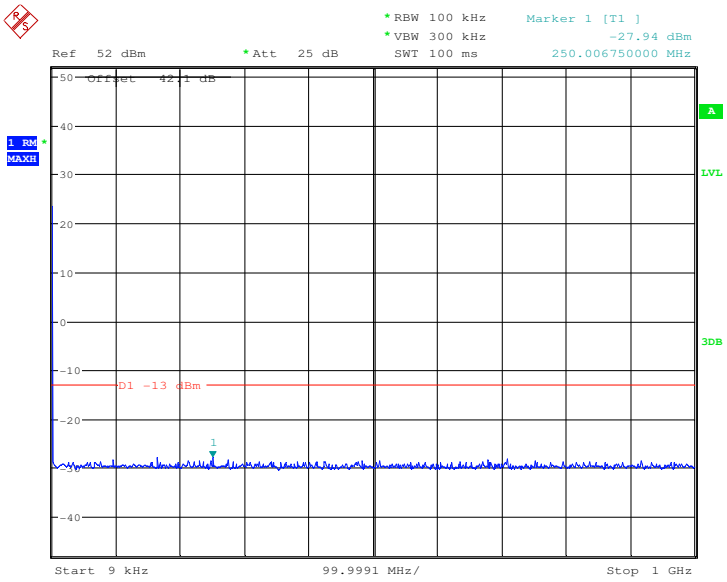
Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-39.74	-13.0	-26.74
1GHz to 10GHz	RBW=1MHz	-32.84	-13.0	-19.84

3)highest frequency

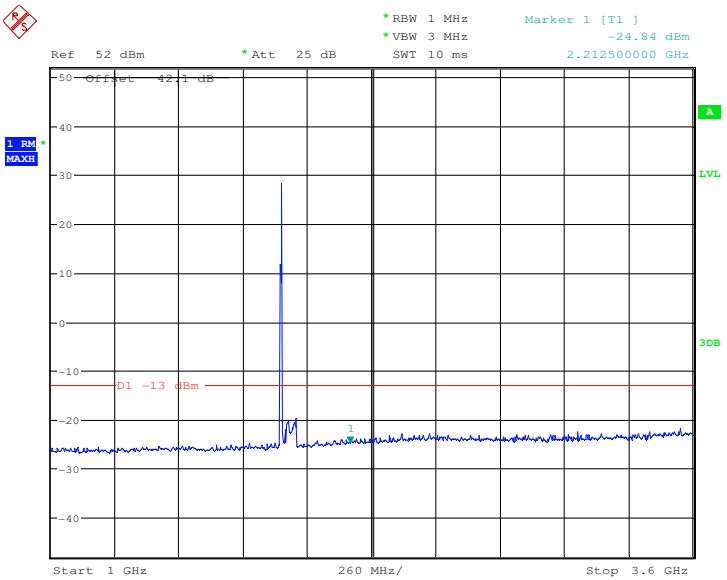
Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-41.85	-13.0	-28.85
1GHz to 10GHz	RBW=1MHz	-32.91	-13.0	-19.91

3. Downlink: 1930MHz ~ 1995MHz(GSM,CDMA,WCDMA)
Remark:
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).
The data of the GSM mode and CDMA mode is almost the same with WCDMA mode, so we only show the photo in the WCDMA mode,others record the data.

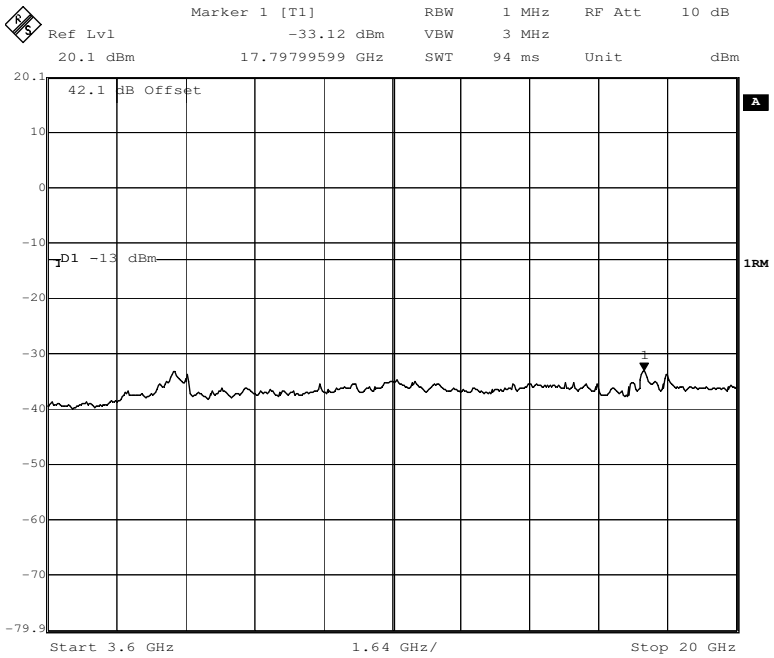
3.1 For WCDMA mode:
1) lowest frequency
9KHz to 1GHz



1GHz to 3.6GHz

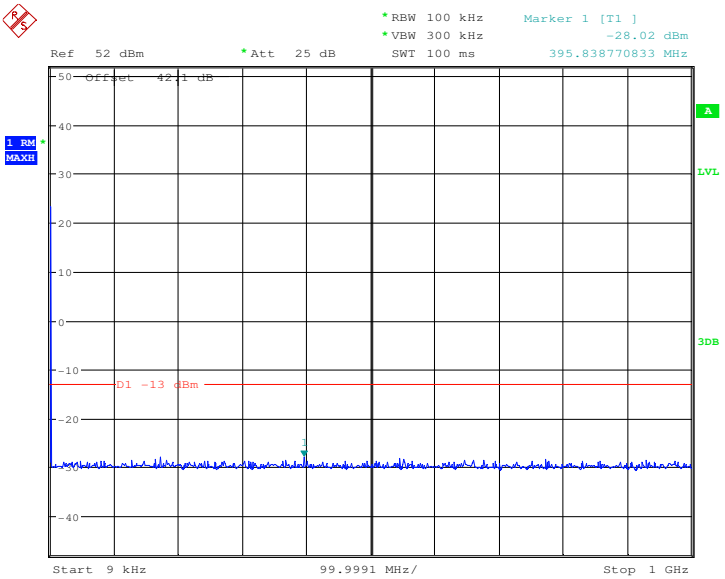


3.6GHz to 20GHz

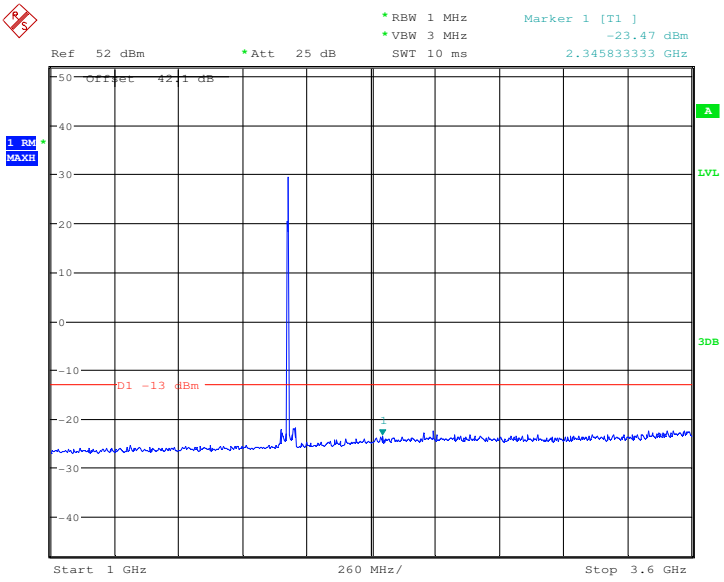


2)Middle frequency

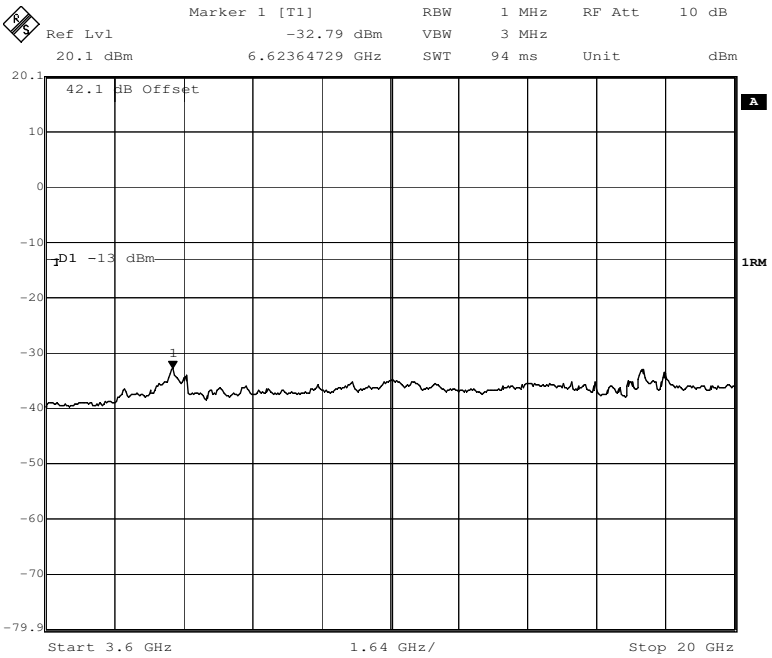
9KHz to 1GHz



1GHz to 3.6GHz

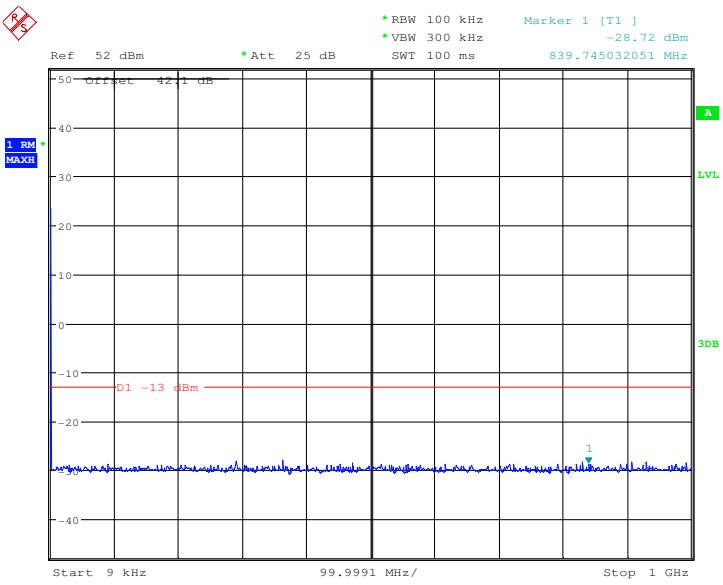


3.6GHz to 20GHz

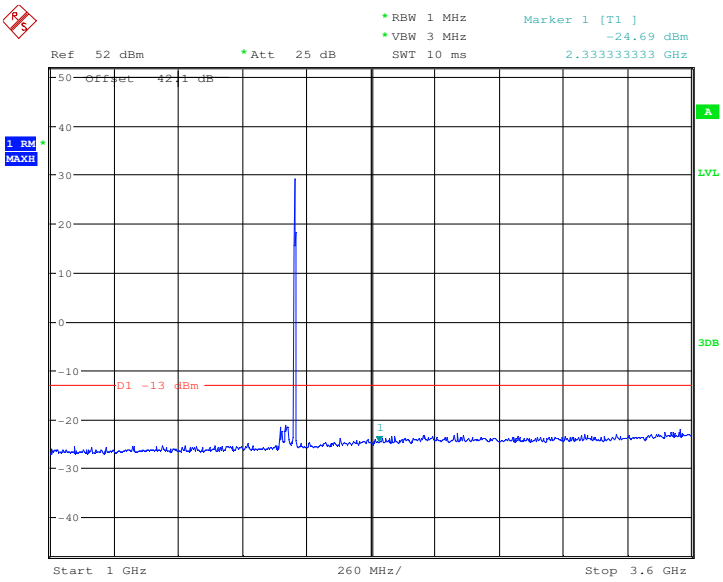


3)highest frequency

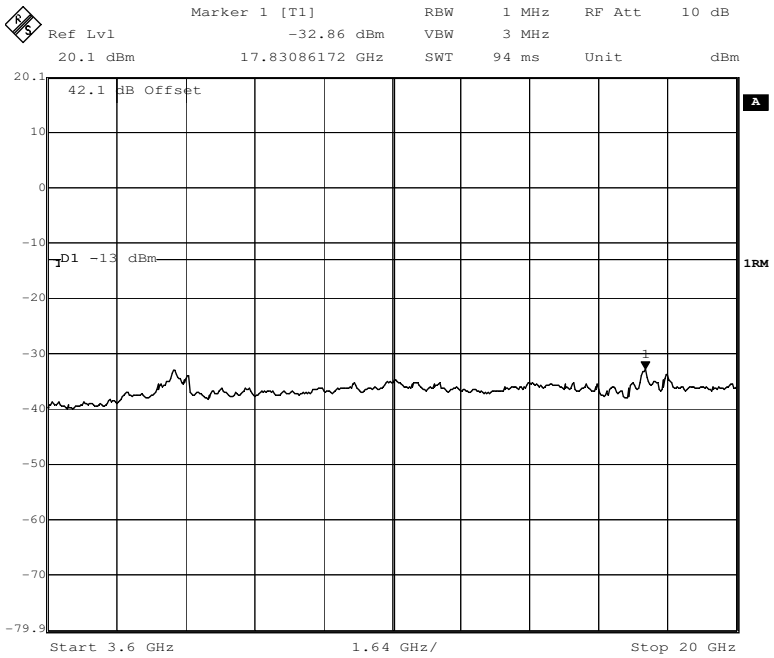
9KHz to 1GHz



1GHz to 3.6GHz



3.6GHz to 20GHz



3.2 For GSM mode:

1)lowest frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-28.02	-13.0	-15.02
1GHz to 3.6GHz	RBW=1MHz	-25.13	-13.0	-12.13
3.6GHz to 20GHz	RBW=1MHz	-33.24	-13.0	-20.24

2)Middle frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-28.53	-13.0	-15.53
1GHz to 3.6GHz	RBW=1MHz	-24.19	-13.0	-11.19
3.6GHz to 20GHz	RBW=1MHz	-32.98	-13.0	-19.98

3)highest frequency

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-29.65	-13.0	-16.65
1GHz to 3.6GHz	RBW=1MHz	-25.67	-13.0	-12.67
3.6GHz to 20GHz	RBW=1MHz	-33.01	-13.0	-20.01

3.3 For CDMA mode:

1)lowest frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-28.35	-13.0	-15.35
1GHz to 3.6GHz	RBW=1MHz	-25.67	-13.0	-12.67
3.6GHz to 20GHz	RBW=1MHz	-33.42	-13.0	-20.42

2)Middle frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-28.74	-13.0	-15.74
1GHz to 3.6GHz	RBW=1MHz	-25.12	-13.0	-12.12
3.6GHz to 20GHz	RBW=1MHz	-32.96	-13.0	-19.96

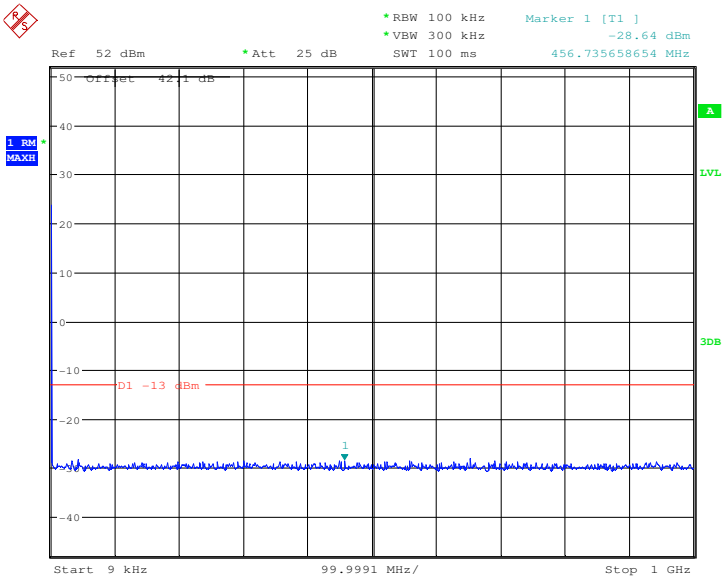
3)highest frequency

Measurement Record:

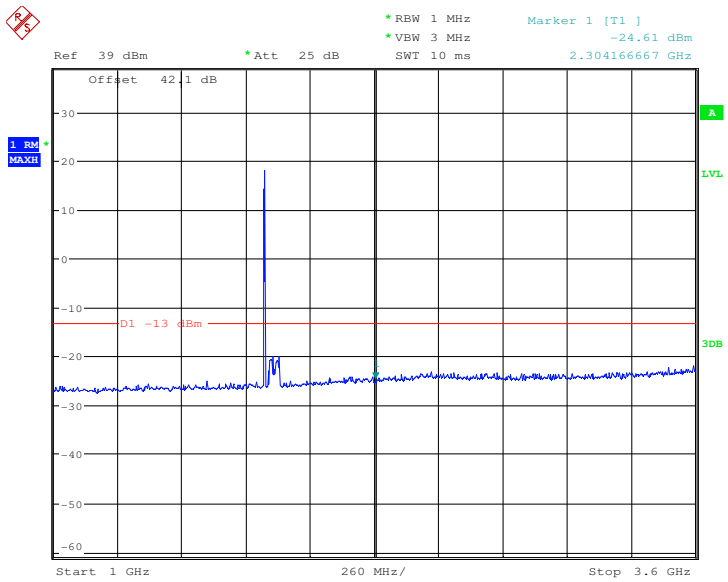
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-29.64	-13.0	-16.64
1GHz to 3.6GHz	RBW=1MHz	-25.63	-13.0	-12.63
3.6GHz to 20GHz	RBW=1MHz	-32.97	-13.0	-19.97

4. Uplink: 1850MHz ~ 1915MHz(GSM,CDMA,WCDMA)
Remark:
The data of the GSM mode and CDMA mode is almost the same with WCDMA mode, so we only show the photo in the WCDMA mode,others record the data.

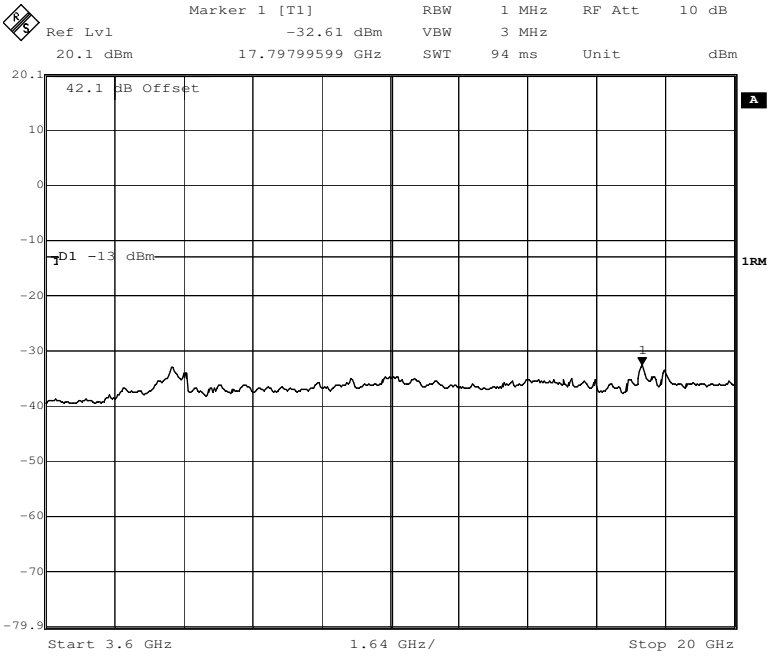
4.1 For WCDMA mode:
1) lowest frequency
9KHz to 1GHz



1GHz to 3.6GHz

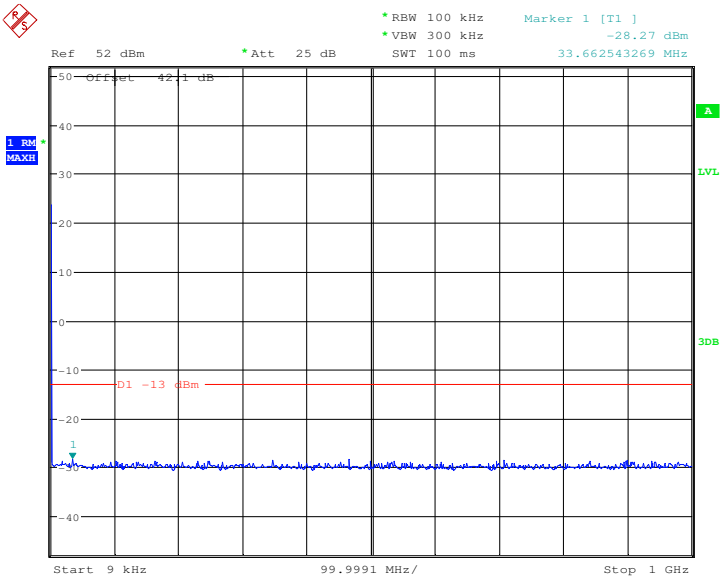


3.6GHz to 20GHz

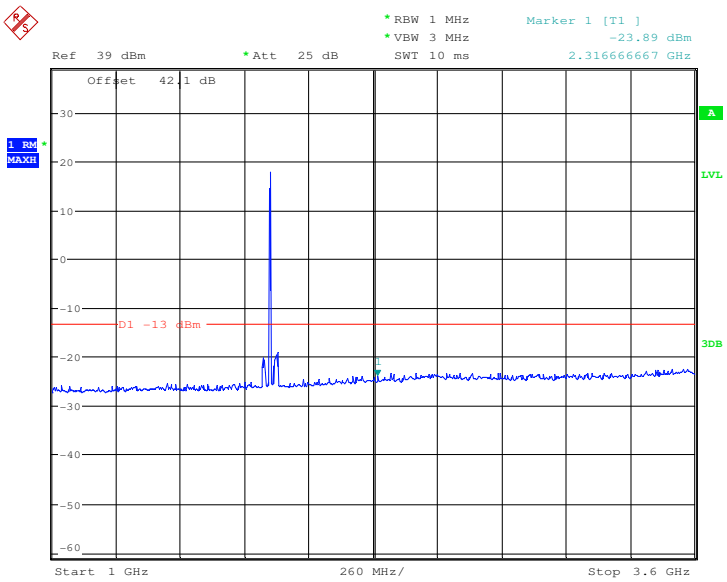


2)Middle frequency

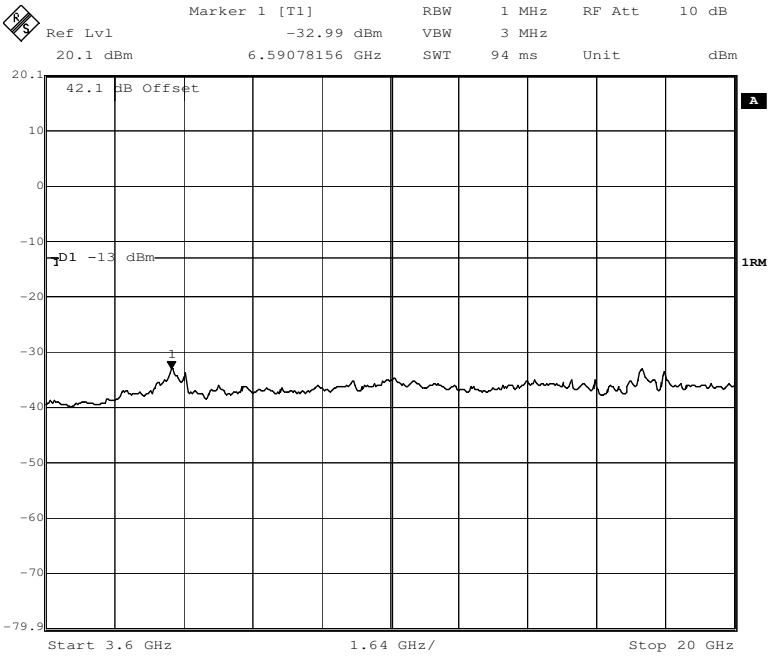
9KHz to 1GHz



1GHz to 3.6GHz

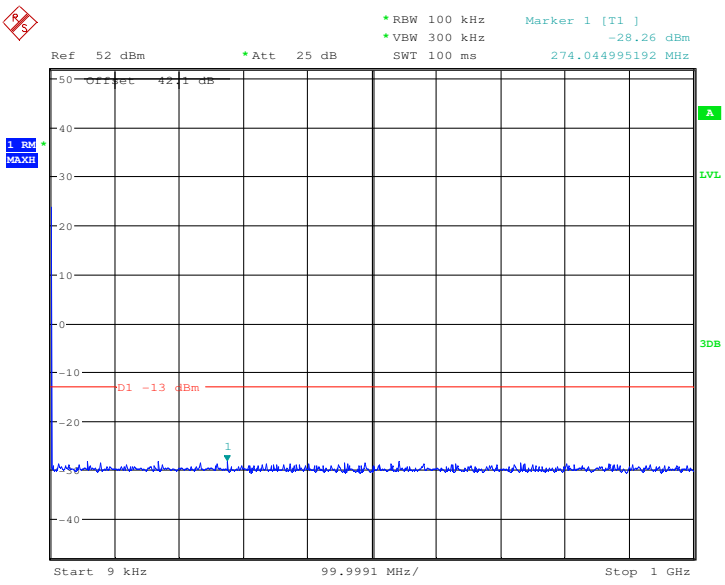


3.6GHz to 20GHz

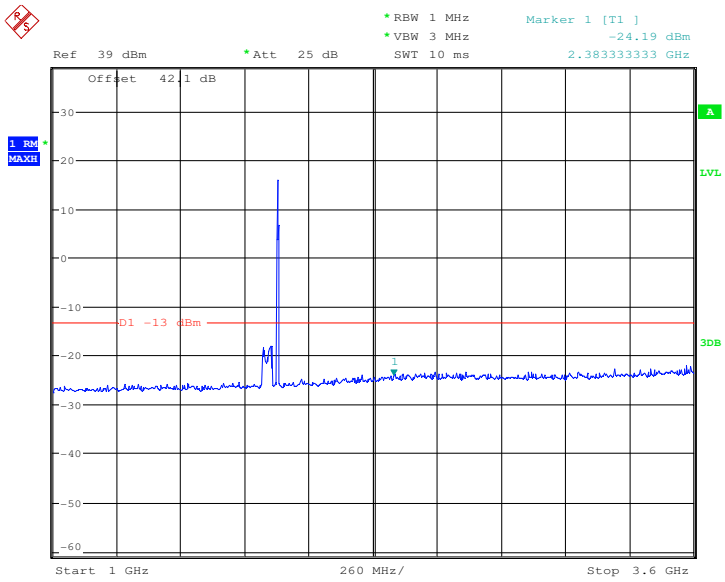


3)highest frequency

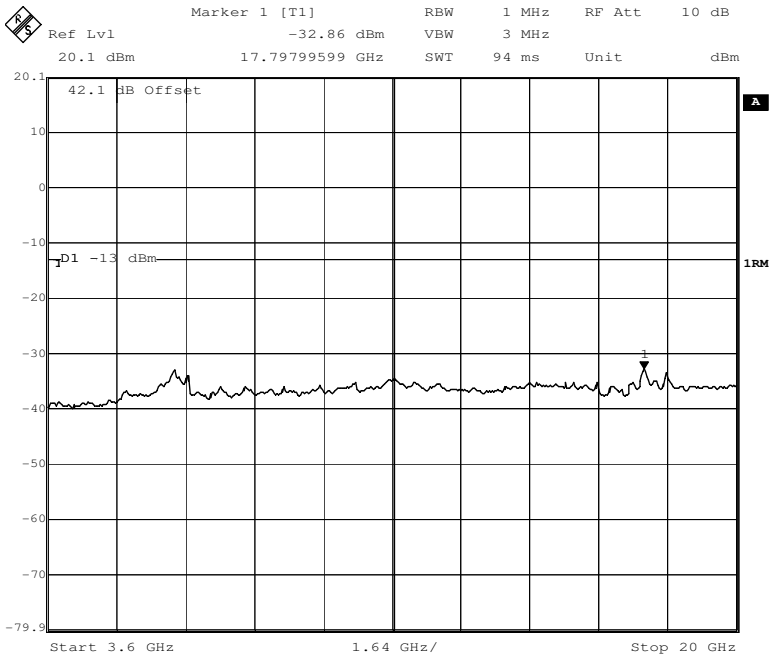
9KHz to 1GHz



1GHz to 3.6GHz



3.6GHz to 20GHz



4.2 For GSM mode:

1)lowest frequency:

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-29.41	-13.0	-16.41
1GHz to 3.6GHz	RBW=1MHz	-24.75	-13.0	-11.75
3.6GHz to 20GHz	RBW=1MHz	-32.64	-13.0	-19.64

2)Middle frequency:

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-29.42	-13.0	-16.42
1GHz to 3.6GHz	RBW=1MHz	-24.53	-13.0	-11.53
3.6GHz to 20GHz	RBW=1MHz	-33.04	-13.0	-20.04

3)highest frequency

Measurement Record:				
Frequency range	**Measurement bandwidth**	**Spurious Emission Level(dBm)**	**Limit(dBm)**	**Over Limit(dB)**
9KHz to 1GHz	RBW=100KHz	-29.17	-13.0	-16.17
1GHz to 3.6GHz	RBW=1MHz	-24.25	-13.0	-11.25
3.6GHz to 20GHz	RBW=1MHz	-33.18	-13.0	-20.18

4.3 For CDMA mode:

1)lowest frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-29.49	-13.0	-16.49
1GHz to 3.6GHz	RBW=1MHz	-24.81	-13.0	-11.81
3.6GHz to 20GHz	RBW=1MHz	-32.75	-13.0	-19.75

2)Middle frequency:

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-29.56	-13.0	-16.56
1GHz to 3.6GHz	RBW=1MHz	-24.93	-13.0	-11.93
3.6GHz to 20GHz	RBW=1MHz	-33.15	-13.0	-20.15

3)highest frequency

Measurement Record:

Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-29.12	-13.0	-16.12
1GHz to 3.6GHz	RBW=1MHz	-24.29	-13.0	-11.29
3.6GHz to 20GHz	RBW=1MHz	-33.24	-13.0	-20.24

7.2.3 Band Edge& Intermodulation

Test Date: 2013-12-11 to 2013-12-16

Test Requirement: FCC part 22.917(b) & FCC part 24.238(b)

22.917(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

24.238(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

27.53(h) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Method: FCC part 2.1051 & KDB935210 D02

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

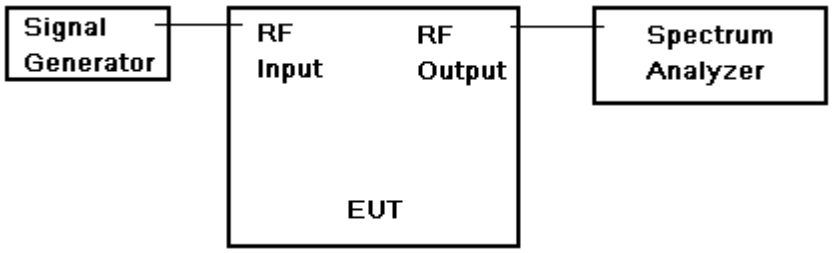
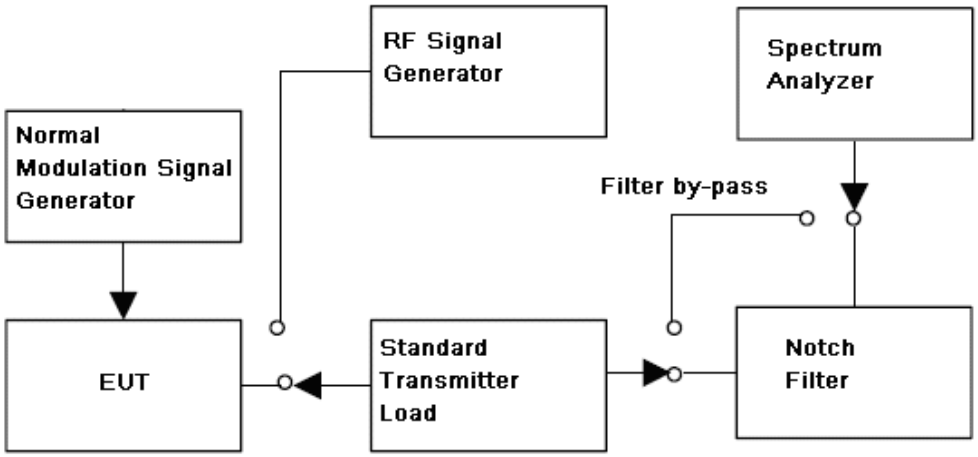


Fig.3. Band edge and Intermodulation test configuration



Test Procedure: Conducted Emissions test procedure:

a) Connect the equipment as illustrated, with the notch filter by-passed, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth,(base the standard, apply the different set),here is 100KHz for frequency band less than 1GHz, 1MHz for frequency over 1GHz;

2) Video Bandwidth refer to standard requirement.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) the lowest radio frequency generated in the equipment, it can be 9KHz base the test method, here select 30MHz as lowest frequency start point;

2) the highest radion frequency shall higher than 10 times of carrier frequency;

f) Record the frequencies and levels of spurious emissions from step e)

Remark:

The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

Intermodulation Test Procedure:	1. Connect the equipment as illustrated; 2. Test the background noise level with all the test facilities; 3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads; 4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroied; 5. Keep the EUT continuously transmitting in max power; 6. Keep two signals are same in modulation type and level; 7. Measure the 3 order intermodulated product by the EUT(the sum of the two unwanted signal should be rated power); 8. Correct for all losses in the RF path; 9. Read the conducted spurious emissioins of the EUT antenna port. Remark: CW signal rather than typical signal is acceptable (for FM). · At maximum drive level, for each modulation: one test with three tones, or two tests (high-, low-band edge) with two tones · Limit usually is -13dBm conducted. · Not needed for Single Channel systems.

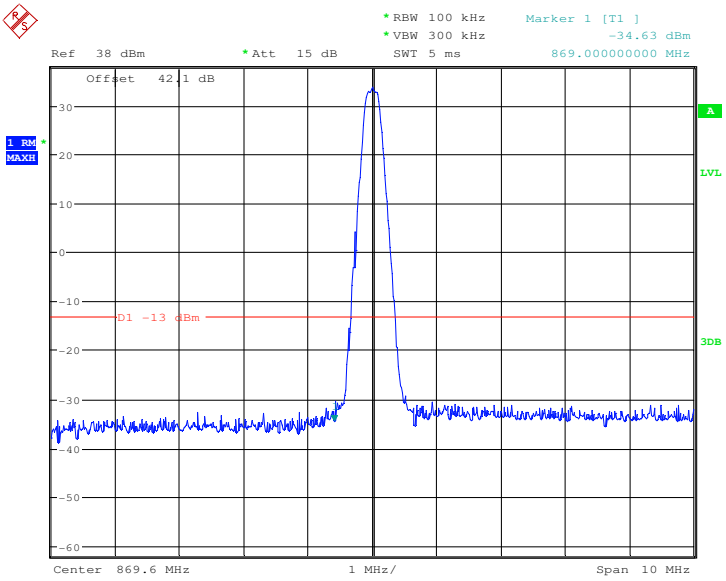
7.2.3.1 Measurement Record:

1.Downlink: 869MHz to 894MHz(GSM,CDMA,WCDMA)

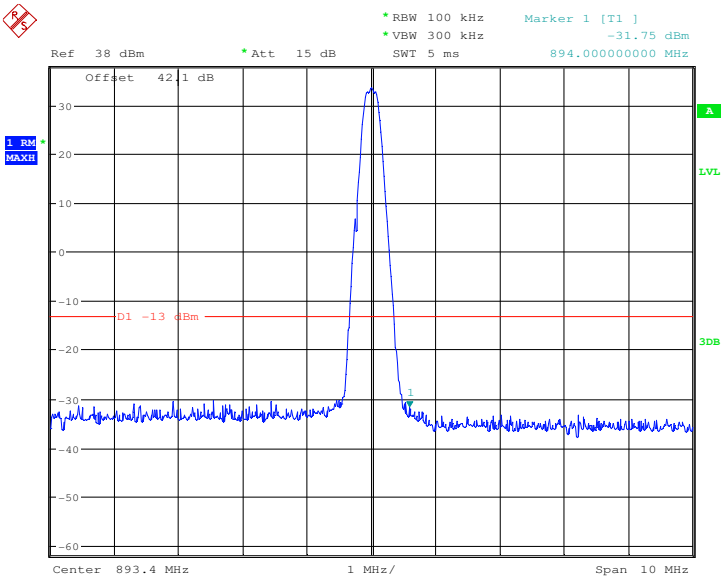
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).

1.1 GSM Mode:

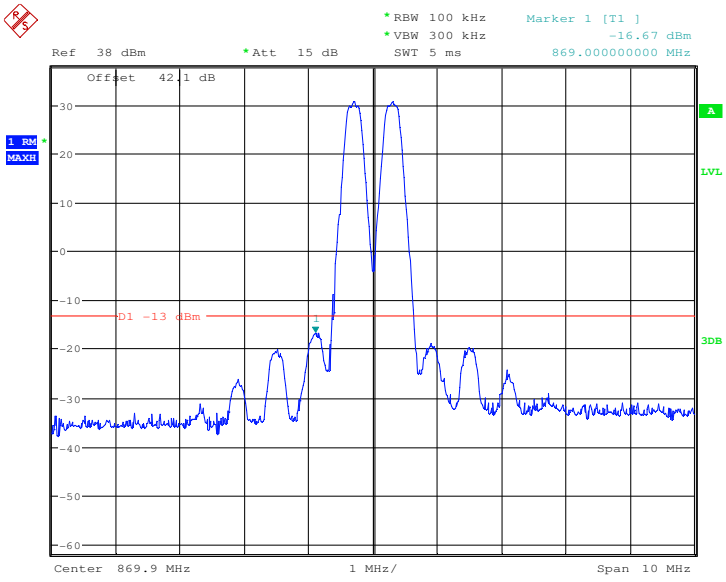
1.1.1 one signal input —Lower Edge



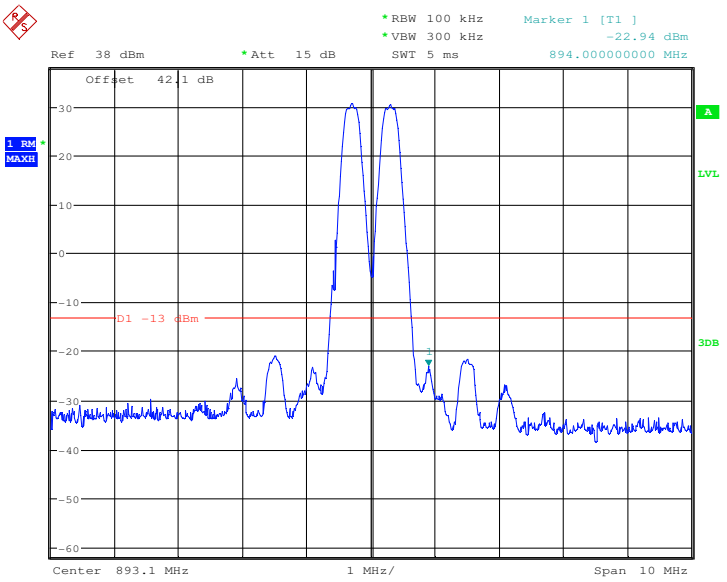
1.1.2 one signal input — Upper Edge



1.1.3 two signal input —Lower Edge

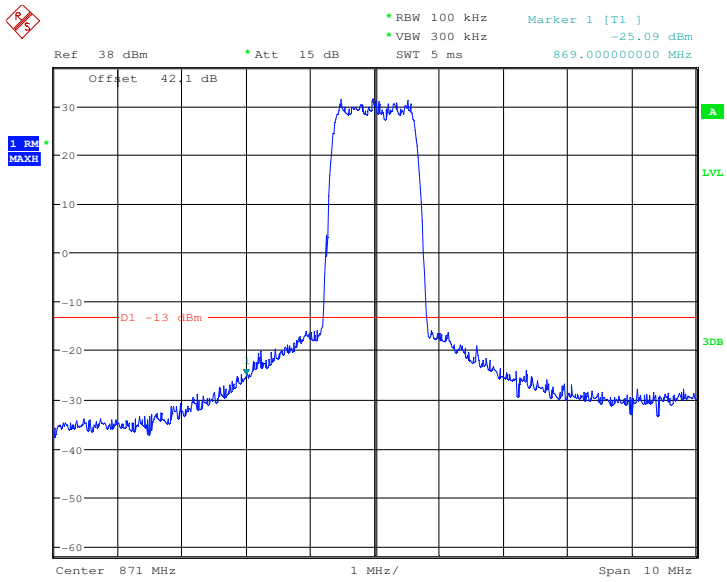


1.1.4 two signal input —Upper Edge

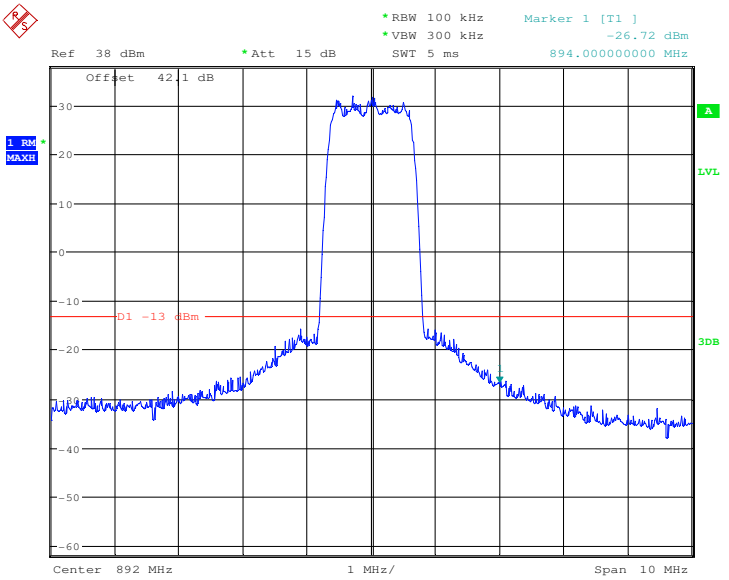


1.2 CDMA Mode:

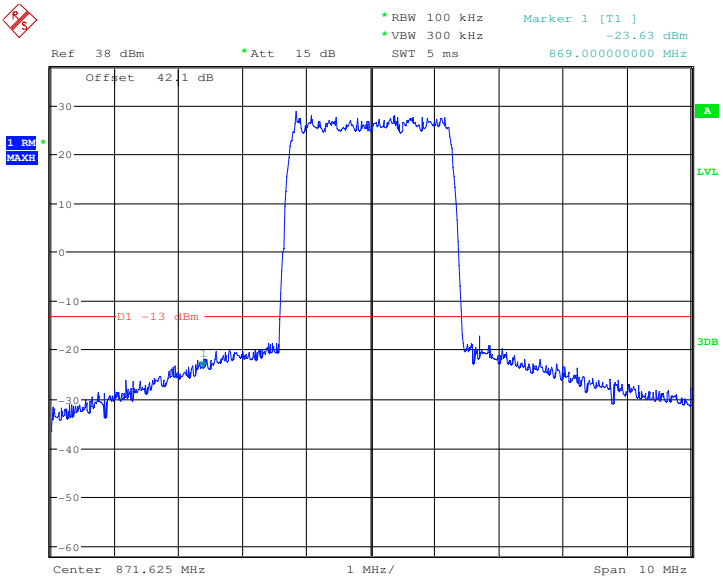
1.2.1 one signal input —Lower Edge



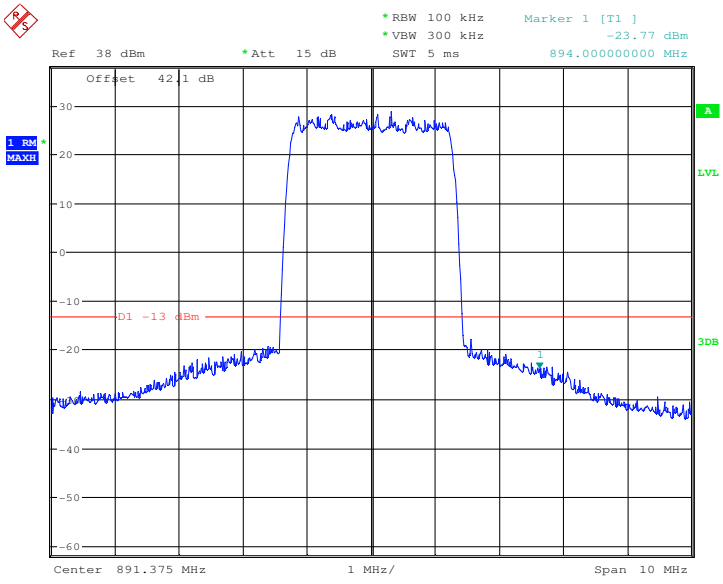
1.2.2 one signal input — Upper Edge



1.2.3 two signal input —Lower Edge

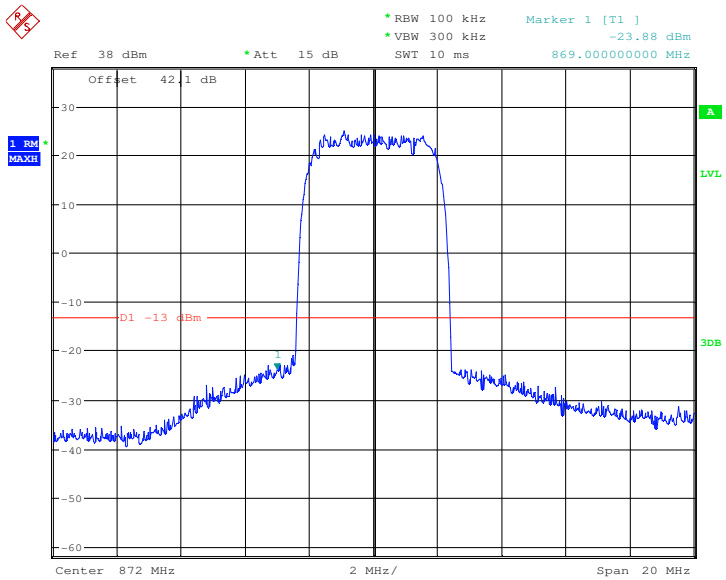


1.2.4 two signal input —Upper Edge

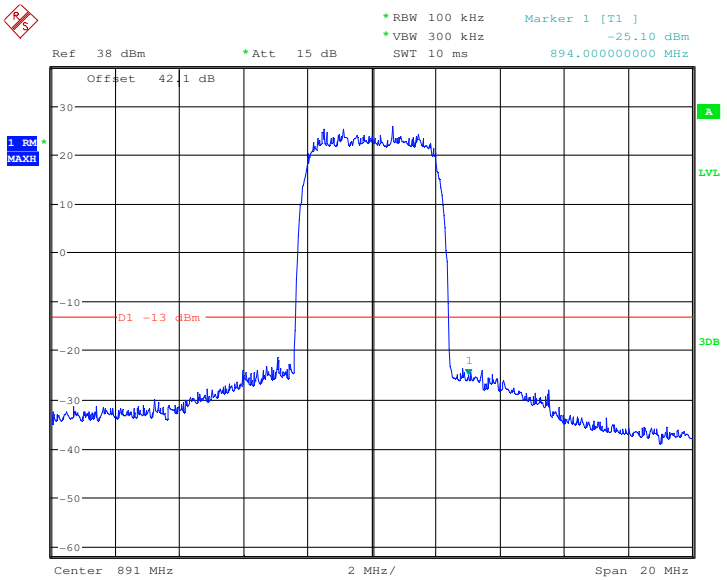


1.3 WDMA Mode:

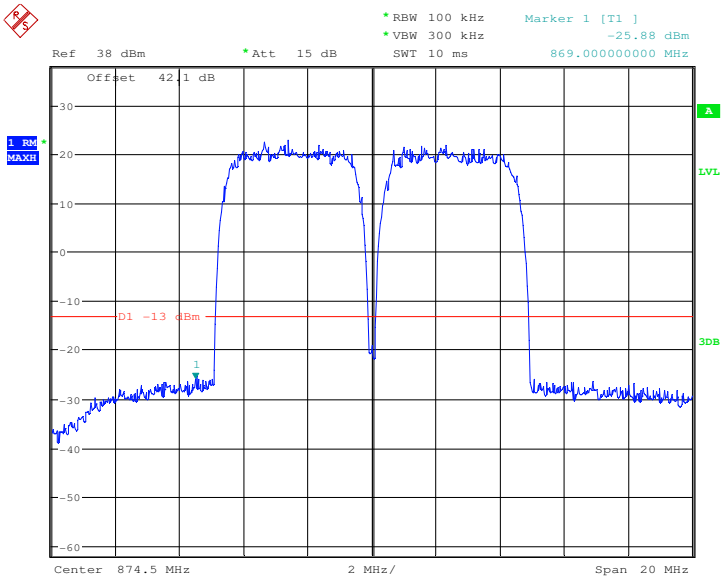
1.3.1 one signal input —Lower Edge



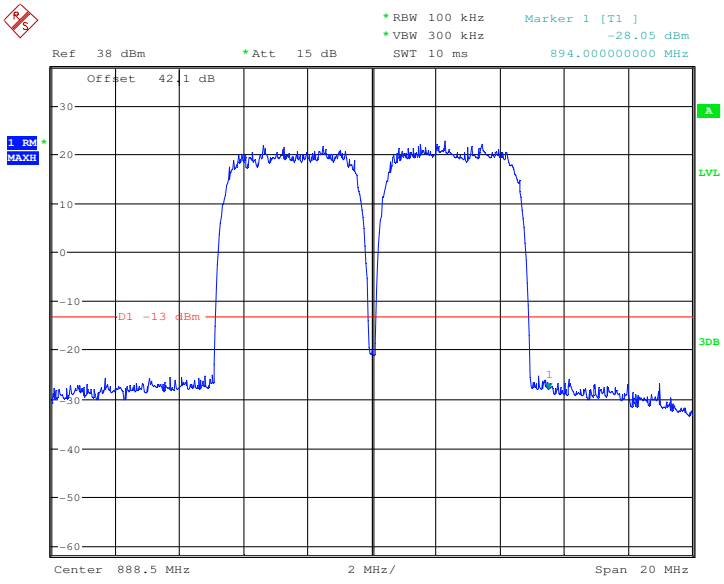
1.3.2 one signal input — Upper Edge



1.3.3 two signal input —Lower Edge



1.3.4 two signal input —Upper Edge



1.4 intermodulation spurious emissioins

1.4.1 For GSM mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=869.6MHz,f2=870.2MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=892.8MHz,f2=893.4MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=869MHz,F2=894MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=868.4MHz,F2=894.6MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=867.8MHz,F2=895.2MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:869MHz	-16.67	-13dBm	-3.67
	Higher:894MHz	-22.94		-9.94
5rd	Lower:868.4MHz	-23.64	-13dBm	-10.64
	Higher:894.6MHz	-25.39		-12.39
7rd	Lower:867.8MHz	-24.41	-13dBm	-11.41
	Higher:895.2MHz	-26.79		-13.79

1.4.2 For CDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=871MHz,f2=873MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=890MHz,f2=892MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,
in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;
in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=869MHz,F2=894MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,
in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;
in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=867MHz,F2=896MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,
in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;
in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=865MHz,F2=898MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:869MHz	-23.63	-13dBm	-10.63
	Higher:894MHz	-23.77		-10.77
5rd	Lower:867MHz	-29.49	-13dBm	-16.49
	Higher:896MHz	-30.38		-17.38
7rd	Lower:865MHz	-33.17	-13dBm	-20.17
	Higher:898MHz	-33.98		-20.98

1.4.3 For WCDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=872MHz,f2=875MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=888MHz,f2=891MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=869MHz,F2=894MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=866MHz,F2=897MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=863MHz,F2=900MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:869MHz	-25.88	-13dBm	-12.88
	Higher:894MHz	-28.05		-15.05
5rd	Lower:866MHz	-34.88	-13dBm	-21.88
	Higher:897MHz	-30.62		-17.62
7rd	Lower:863MHz	-37.63	-13dBm	-24.63
	Higher:900MHz	-32.14		-19.14

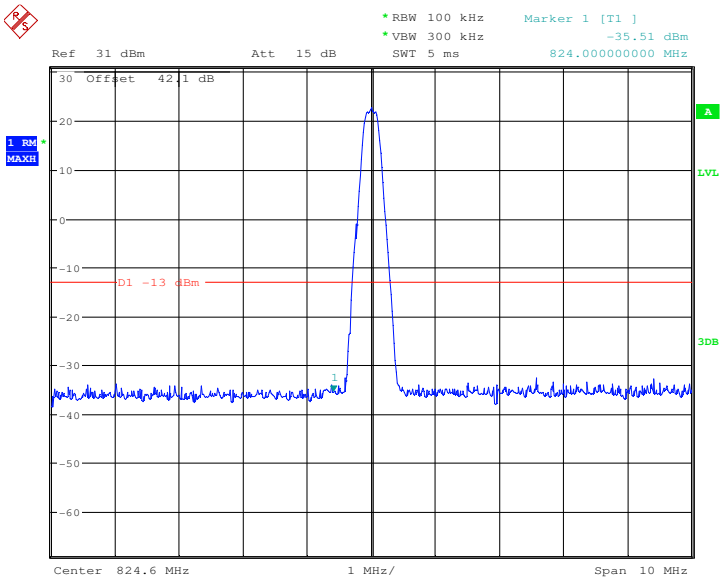
Remark:

No other intermodulation spurious emissioins of above 7rd have been found,so only record the test data about the 3rd, 5rdand 7rd

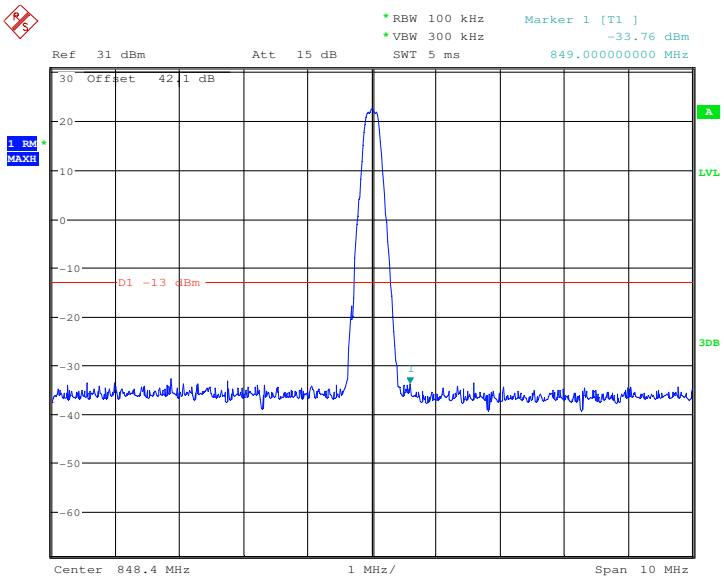
2.Uplink: 824MHz to 849MHz(GSM,CDMA,WCDMA)

2.1 GSM Mode:

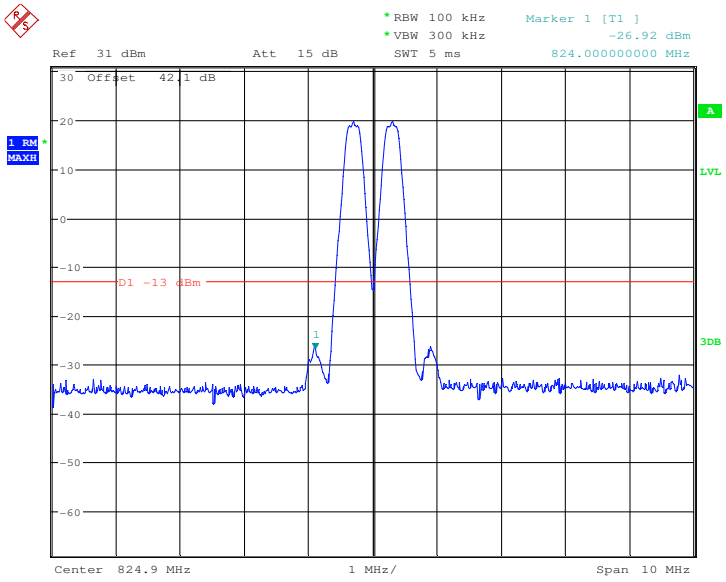
2.1.1 one signal input —Lower Edge



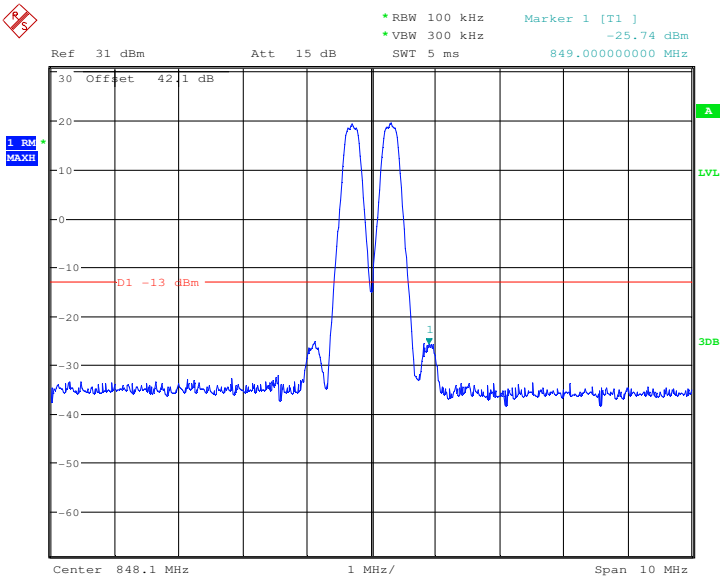
2.1.2 one signal input — Upper Edge



2.1.3 two signal input —Lower Edge

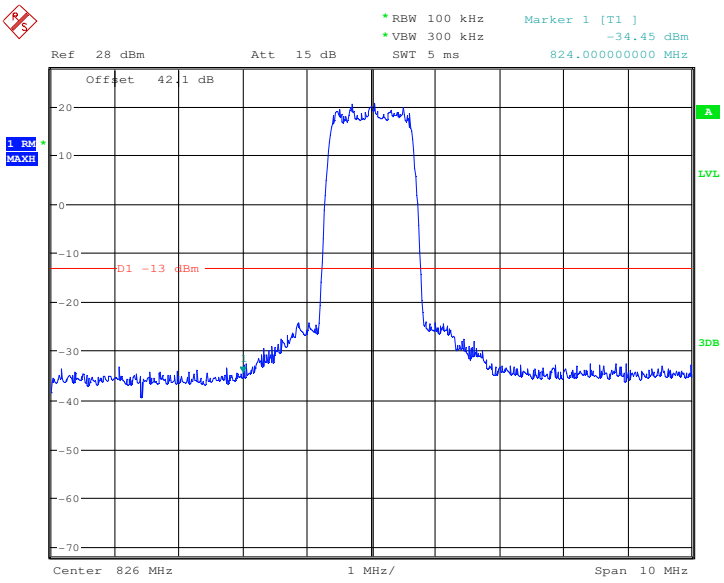


2.1.4 two signal input —Upper Edge

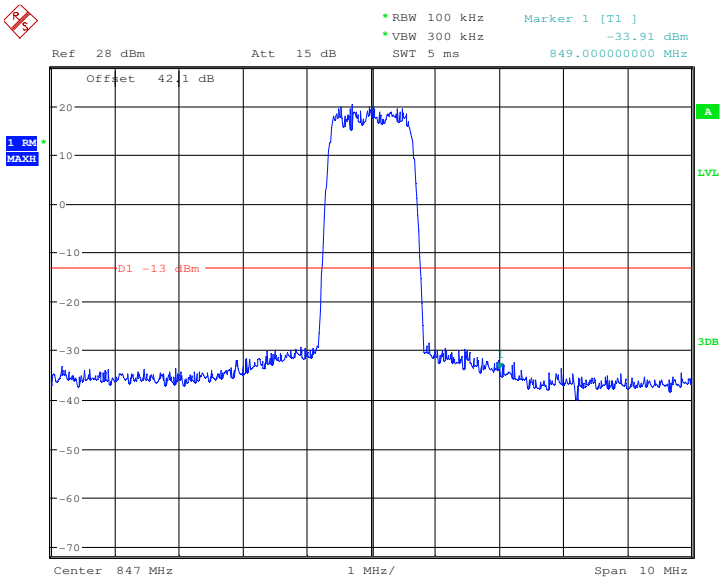


2.2 CDMA Mode:

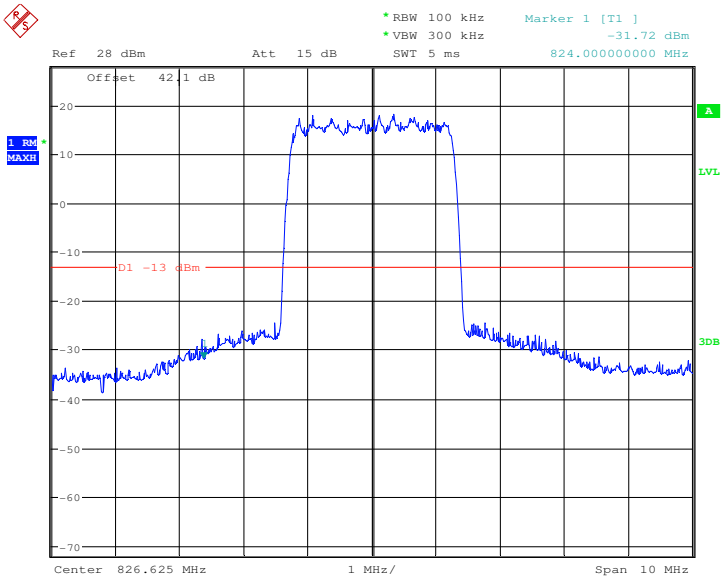
2.2.1 one signal input —Lower Edge



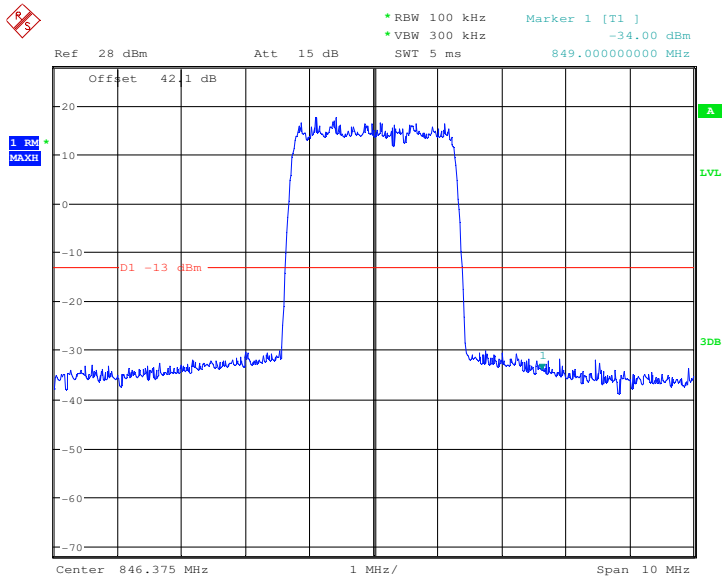
2.2.2 one signal input — Upper Edge



2.2.3 two signal input —Lower Edge

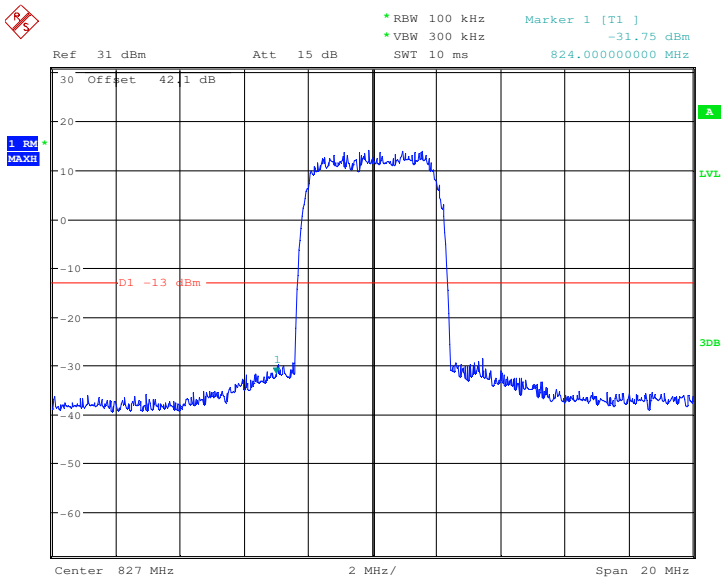


2.2.4 two signal input —Upper Edge

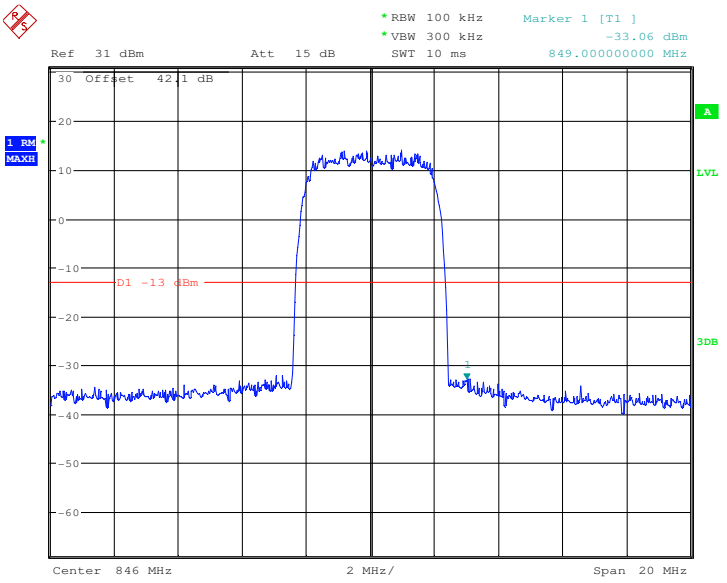


2.3 WDMA Mode:

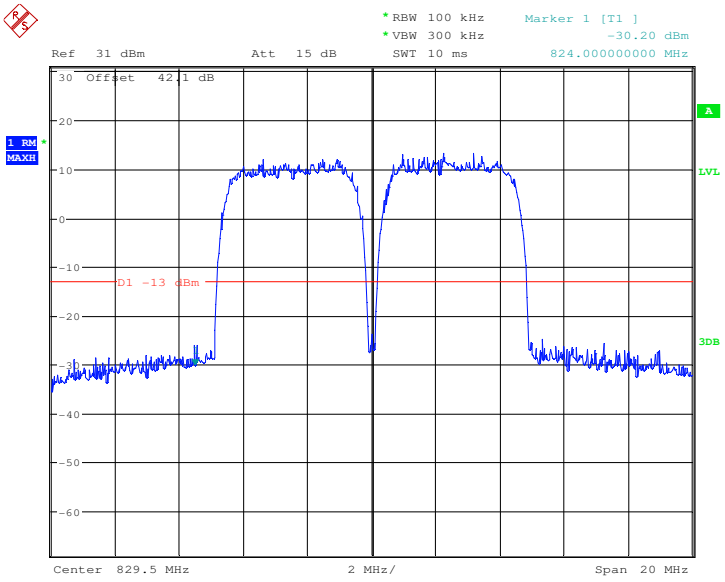
2.3.1 one signal input —Lower Edge



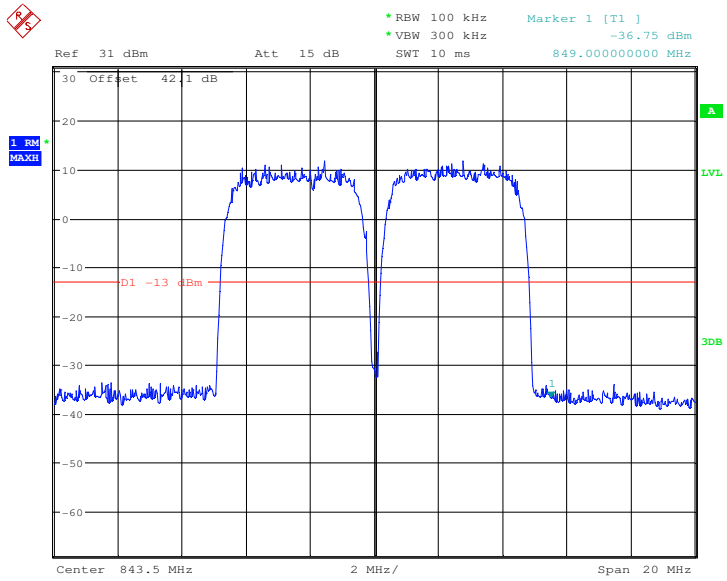
2.3.2 one signal input — Upper Edge



2.3.3 two signal input —Lower Edge



2.3.4 two signal input —Upper Edge



2.4 intermodulation spurious emissioins

2.4.1 For GSM mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=824.6MHz,f2=825.2MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=847.8MHz,f2=848.4MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+△f)=f1-△f=lower edge frequency;

in higher edge test, F2=2f2-(f2-△f)=f2+△f=higher edge frequency.

F1=824MHz,F2=849MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+△f)=f1-2△f=lower edge frequency;

in higher edge test, F2=3f2-2(f2-△f)=f2+2△f=higher edge frequency.

F1=823.4MHz,F2=849.6MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+△f)=f1-3△f=lower edge frequency;

in higher edge test, F2=4f2-3(f2-△f)=f2+3△f=higher edge frequency.

F1=822.8MHz,F2=850.2MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:824MHz	-26.92	-13dBm	-13.92
	Higher:849MHz	-25.74		-12.74
5rd	Lower:823.4MHz	-35.46	-13dBm	-22.46
	Higher:849.6MHz	-36.12		-23.12
7rd	Lower:822.8MHz	-36.23	-13dBm	-23.23
	Higher:850.2MHz	-36.47		-23.47

2.4.2 For CDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=826MHz,f2=828MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=845MHz,f2=847MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=824MHz,F2=849MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=822MHz,F2=851MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=820MHz,F2=853MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:824MHz	-31.72	-13dBm	-18.72
	Higher:849MHz	-34.00		-21.00
5rd	Lower:822MHz	-34.18	-13dBm	-21.18
	Higher:851MHz	-35.41		-22.41
7rd	Lower:820MHz	-36.98	-13dBm	-23.98
	Higher:853MHz	-37.16		-24.16

2.4.3 For WCDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=827MHz,f2=830MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=843MHz,f2=846MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=824MHz,F2=849MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=821MHz,F2=852MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=818MHz,F2=855MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:824MHz	-30.20	-13dBm	-17.20
	Higher:849MHz	-36.75		-23.75
5rd	Lower:821MHz	-31.84	-13dBm	-18.84
	Higher:852MHz	-37.89		-24.89
7rd	Lower:818MHz	-32.75	-13dBm	-19.75
	Higher:855MHz	-38.09		-25.09

Remark:

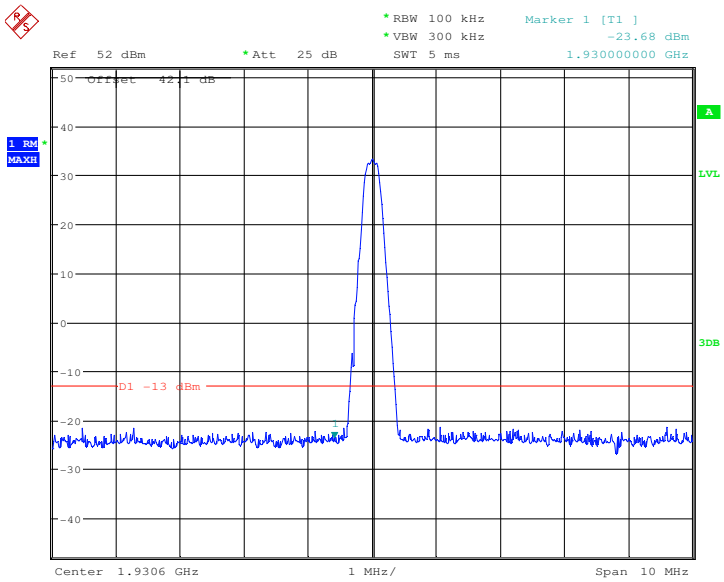
No other intermodulation spurious emissioins of above 7rd have been found,so only record the test data about the 3rd, 5rdand 7rd

3.Downlink: 1930MHz to 1995MHz(GSM,CDMA,WCDMA)

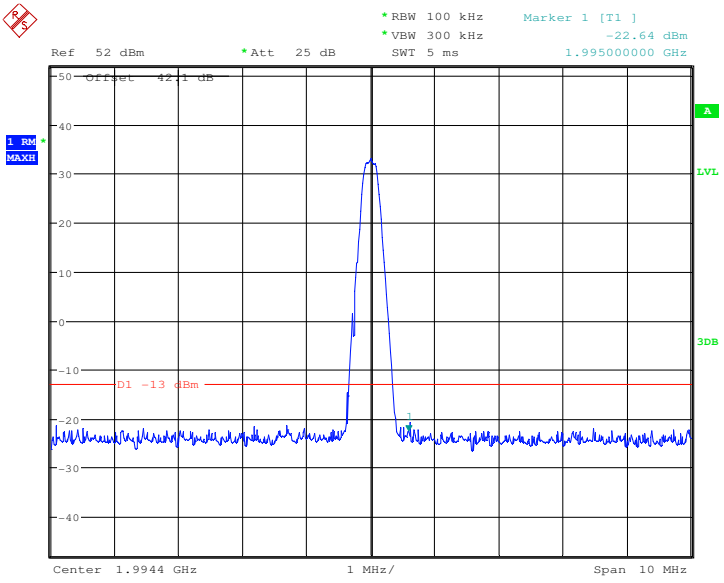
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).

3.1 GSM Mode:

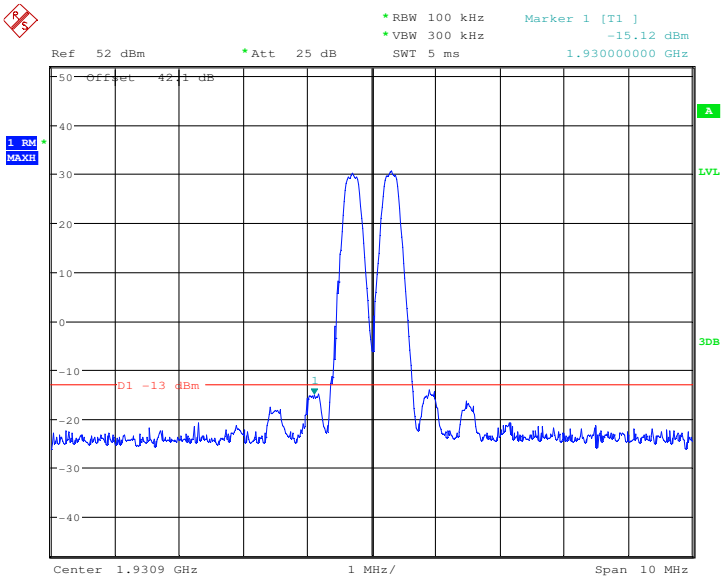
3.1.1 one signal input —Lower Edge



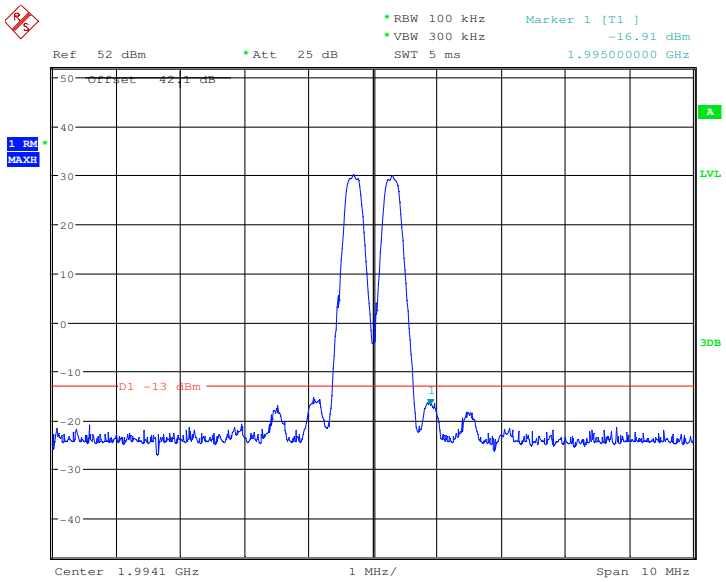
3.1.2 one signal input — Upper Edge



3.1.3 two signal input —Lower Edge

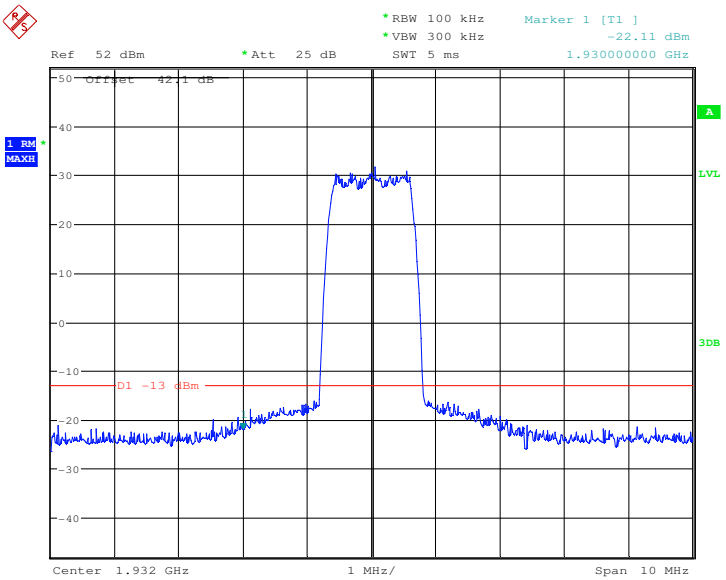


3.1.4 two signal input —Upper Edge

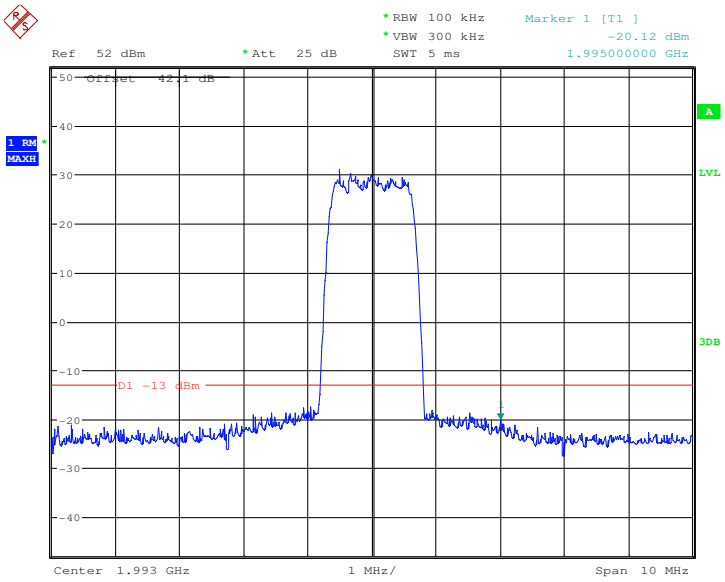


3.2 CDMA Mode:

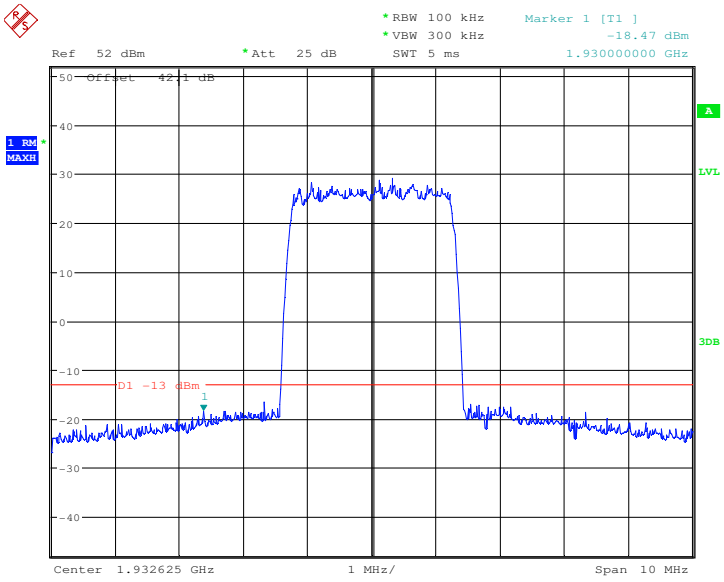
3.2.1 one signal input —Lower Edge



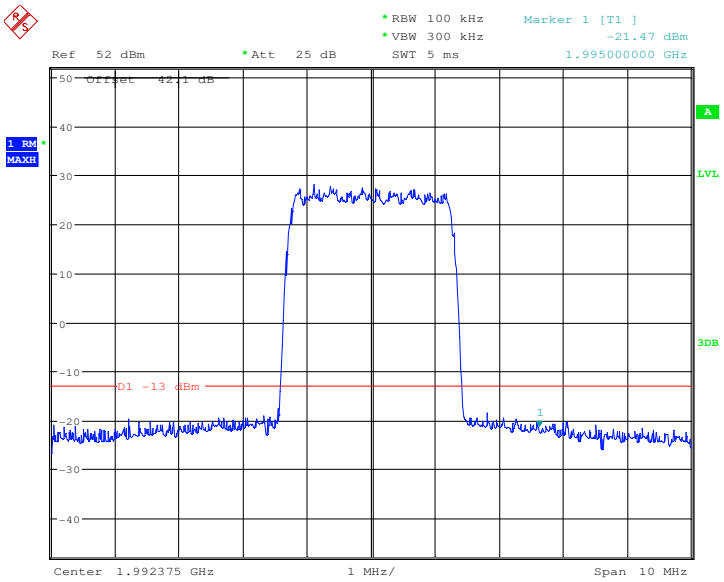
3.2.2 one signal input — Upper Edge



3.2.3 two signal input —Lower Edge

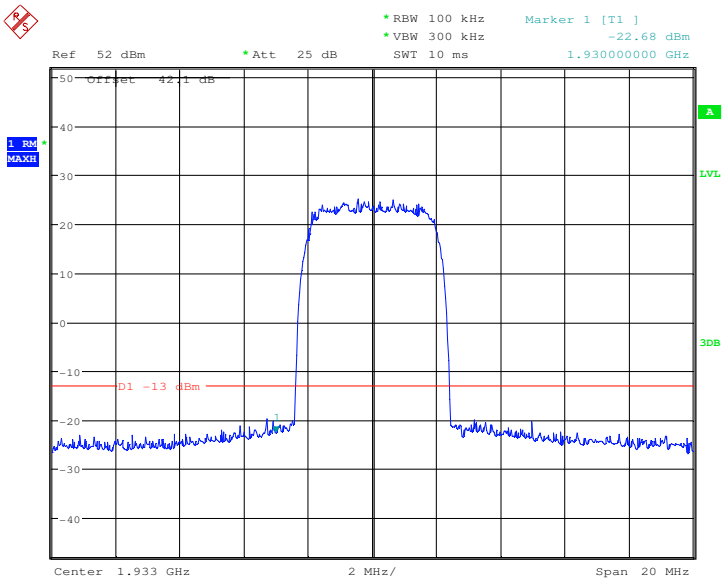


3.2.4 two signal input —Upper Edge

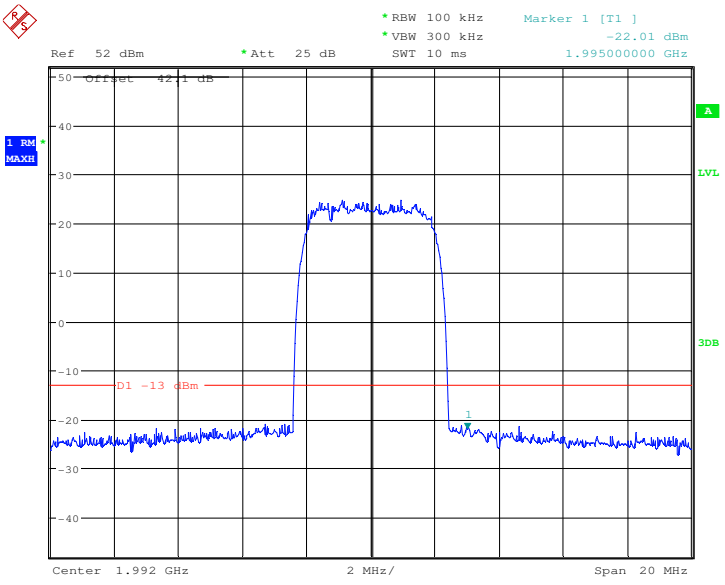


3.3 WDMA Mode:

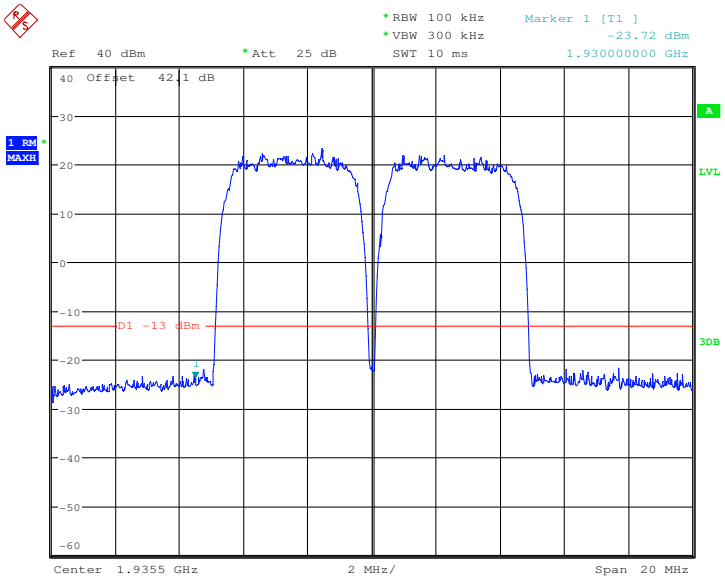
3.3.1 one signal input —Lower Edge



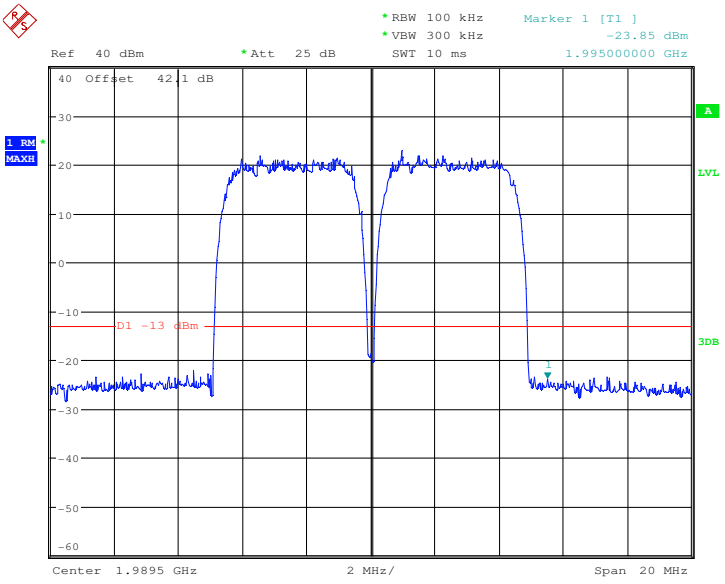
3.3.2 one signal input — Upper Edge



3.3.3 two signal input —Lower Edge



3.3.4 two signal input —Upper Edge



3.4 intermodulation spurious emissioins

3.4.1 For GSM mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1930.6MHz,f2=1931.2MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1994MHz,f2=1994.6MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1930MHz,F2=1995MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1929.4MHz,F2=1995.6MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1928.8MHz,F2=1996.2MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1930MHz	-15.12	-13dBm	-2.12
	Higher:1995MHz	-16.91		-3.91
5rd	Lower:1929.4MHz	-17.40	-13dBm	-4.40
	Higher:1995.6MHz	-20.89		-7.89
7rd	Lower:1928.8MHz	-23.78	-13dBm	-10.78
	Higher:1996.2MHz	-22.31		-9.31

3.4.2 For CDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1930MHz,f2=1932MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1991MHz,f2=1993MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1930MHz,F2=1995MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1928MHz,F2=1997MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1926MHz,F2=1999MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1930MHz	-18.47	-13dBm	-5.47
	Higher:1995MHz	-21.47		-8.47
5rd	Lower:1928MHz	-22.48	-13dBm	-9.48
	Higher:1997MHz	-24.36		-11.36
7rd	Lower:1926MHz	-26.75	-13dBm	-13.75
	Higher:1999MHz	-27.12		-14.12

3.4.3 For WCDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1933MHz,f2=1936MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1989MHz,f2=1992MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1930MHz,F2=1995MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1927MHz,F2=1998MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1924MHz,F2=2001MHz

Input power:-46dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1930MHz	-23.72	-13dBm	-10.72
	Higher:1995MHz	-23.85		-10.85
5rd	Lower:1927MHz	-26.79	-13dBm	-13.79
	Higher:1998MHz	-27.13		-14.13
7rd	Lower:1924MHz	-28.81	-13dBm	-15.81
	Higher:2001MHz	-29.19		-16.19

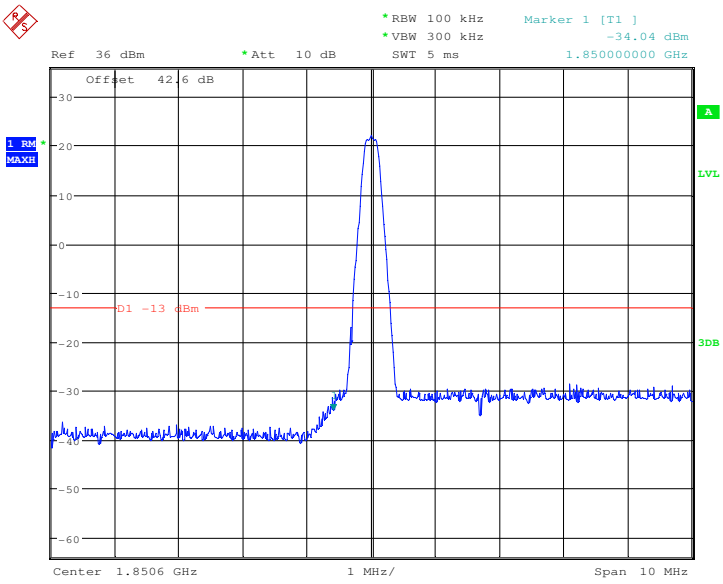
Remark:

No other intermodulation spurious emissioins of above 7rd have been found,so only record the test data about the 3rd, 5rdand 7rd

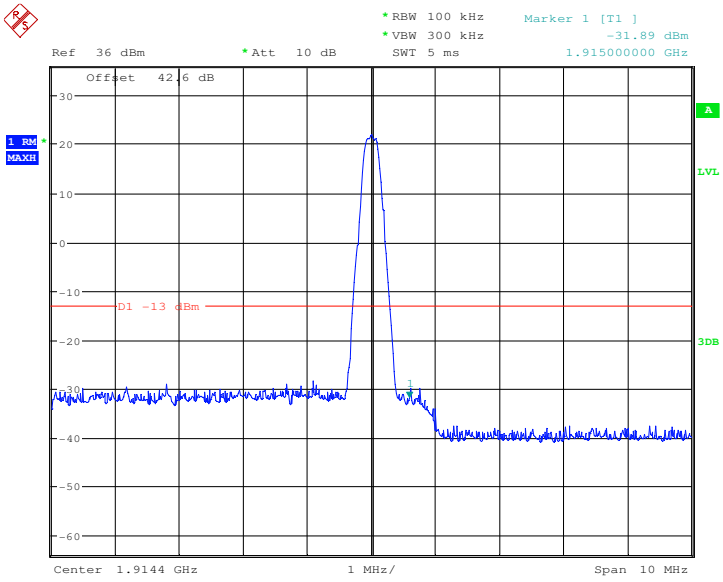
4.Uplink: 1850MHz to 1915MHz(GSM,CDMA,WCDMA)

4.1 GSM Mode:

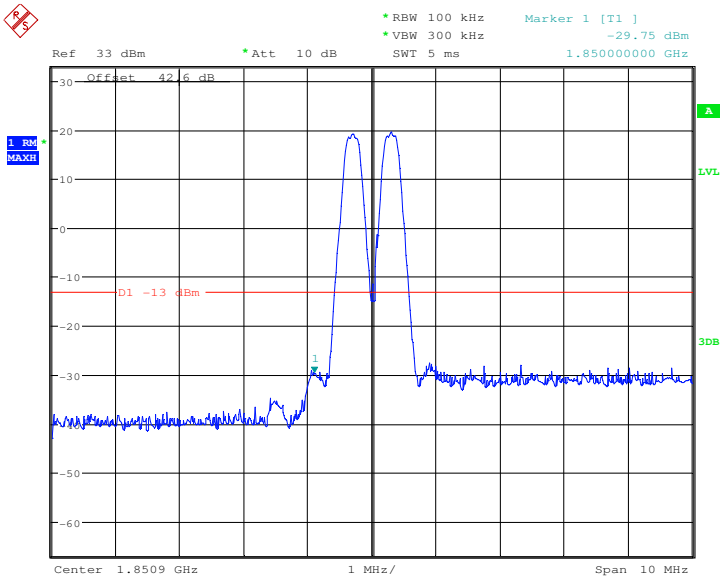
4.1.1 one signal input —Lower Edge



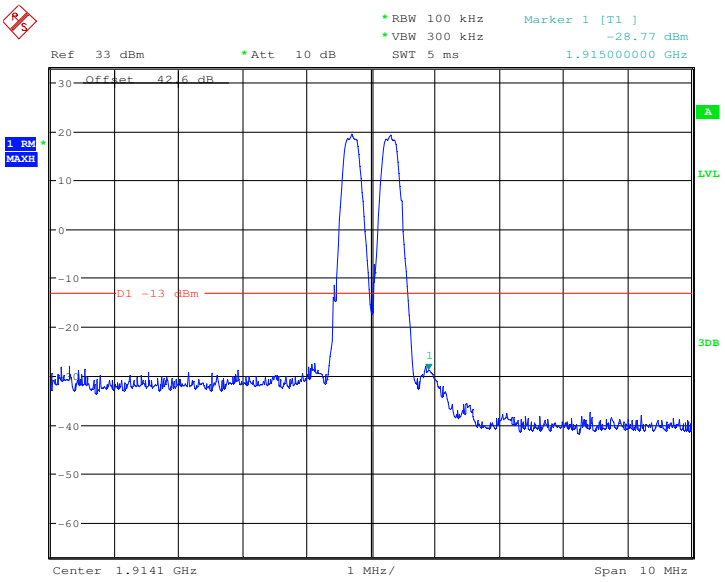
4.1.2 one signal input — Upper Edge



4.1.3 two signal input —Lower Edge

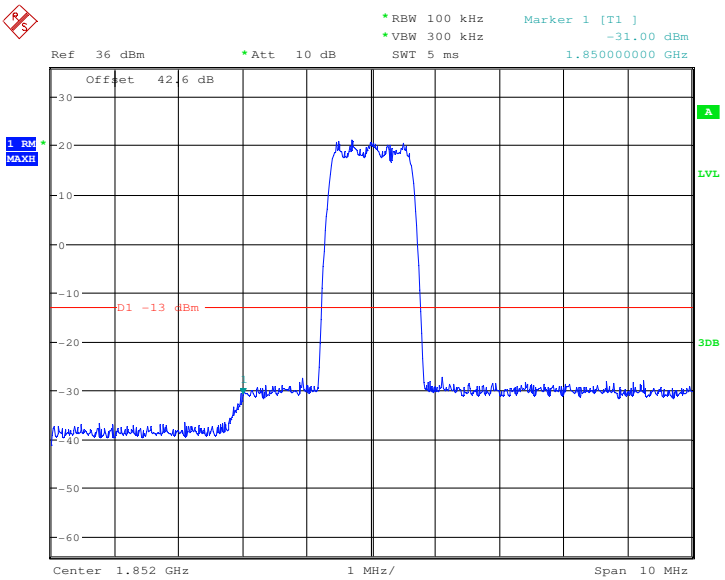


4.1.4 two signal input —Upper Edge

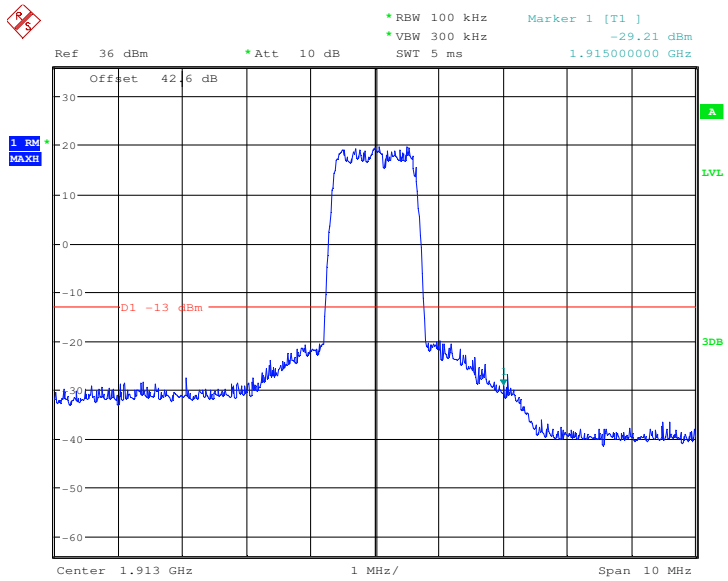


4.2 CDMA Mode:

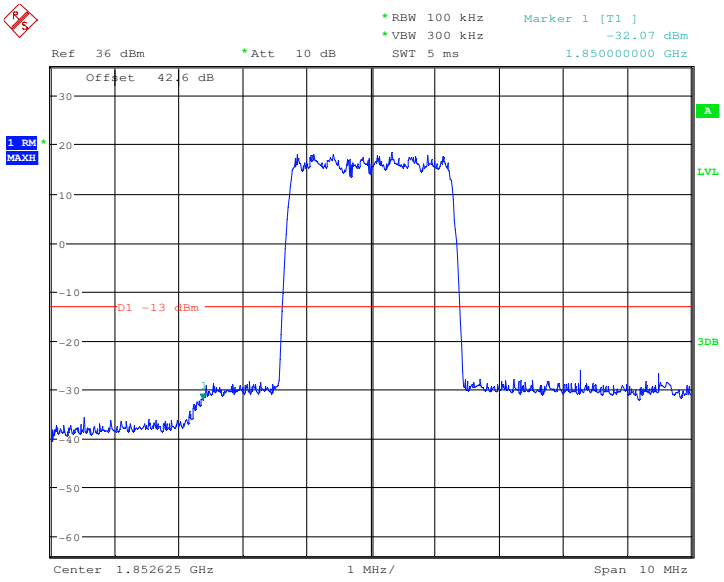
4.2.1 one signal input —Lower Edge



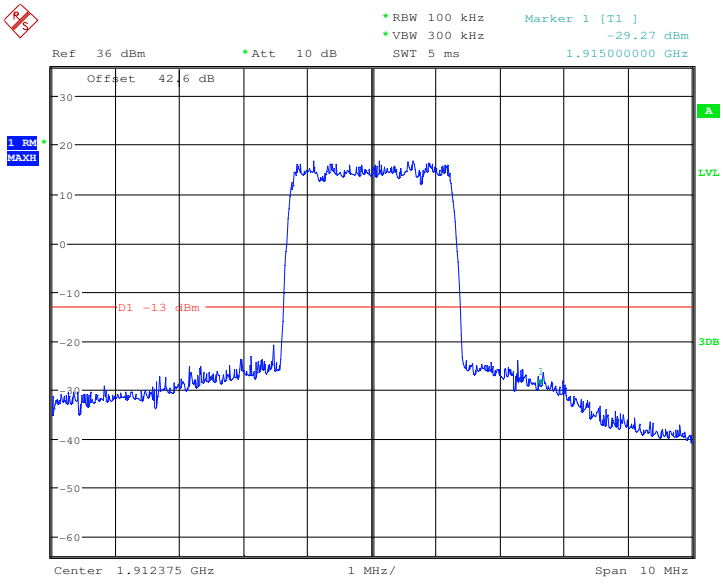
4.2.2 one signal input — Upper Edge



4.2.3 two signal input —Lower Edge

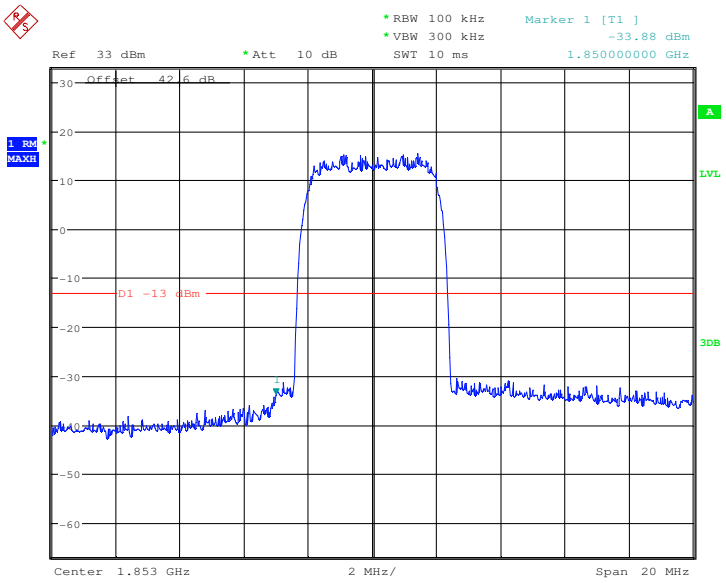


4.2.4 two signal input —Upper Edge

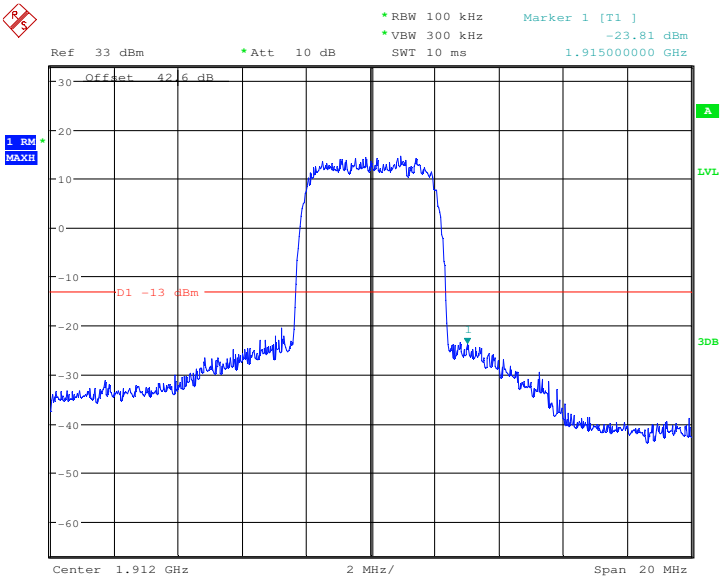


4.3 WDMA Mode:

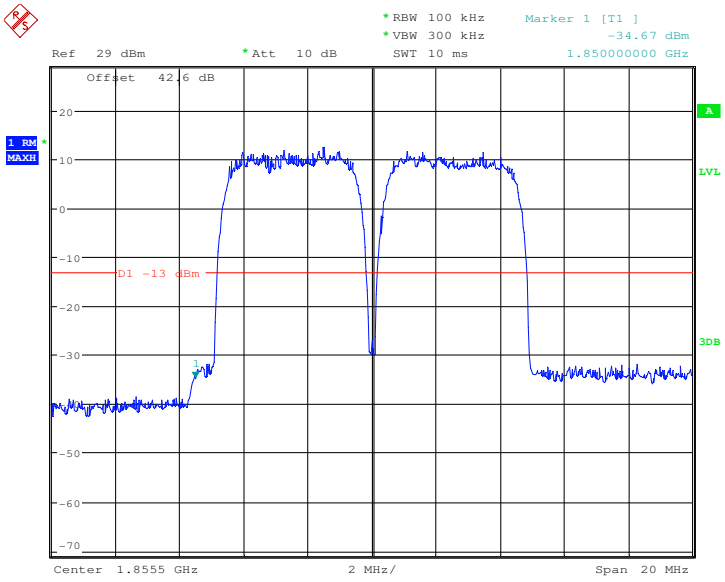
4.3.1 one signal input —Lower Edge



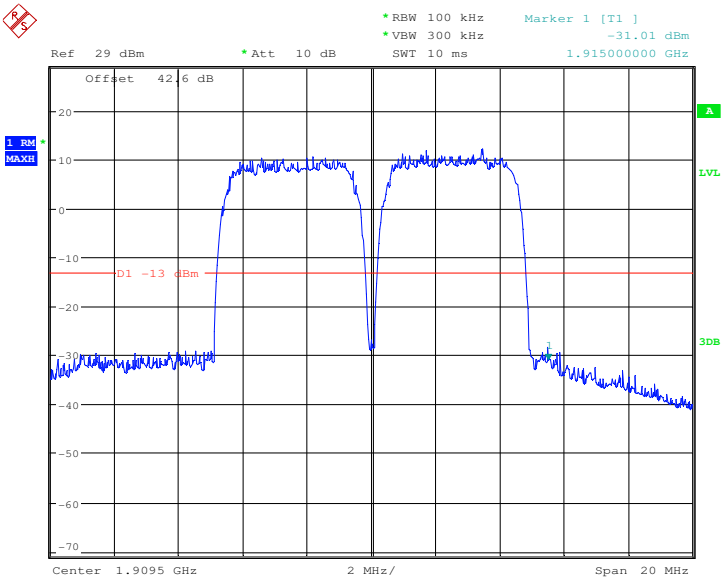
4.3.2 one signal input — Upper Edge



4.3.3 two signal input —Lower Edge



4.3.4 two signal input —Upper Edge



4.4 intermodulation spurious emissioins

4.4.1 For GSM mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1850.6MHz,f2=1851.2MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1913.8MHz,f2=1914.4MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1850MHz,F2=1915MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1849.4MHz,F2=1915.6MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1848.8MHz,F2=1916.2MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1850MHz	-29.75	-13dBm	-16.75
	Higher:1915MHz	-28.77		-15.77
5rd	Lower:1849.4MHz	-36.79	-13dBm	-23.79
	Higher:1915.6MHz	-37.34		-24.34
7rd	Lower:1848.8MHz	-39.89	-13dBm	-26.89
	Higher:1916.2MHz	-40.18		-27.18

3.4.2 For CDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1932MHz,f2=1934MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1911MHz,f2=1913MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1850MHz,F2=1915MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1848MHz,F2=1917MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1846MHz,F2=1919MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1850MHz	-32.09	-13dBm	-19.09
	Higher:1915MHz	-29.27		-16.27
5rd	Lower:1848MHz	-38.19	-13dBm	-25.19
	Higher:1917MHz	-38.47		-25.47
7rd	Lower:1846MHz	-39.98	-13dBm	-26.98
	Higher:1919MHz	-40.09		-27.09

3.4.3 For WCDMA mode:

Input frequency:

1)in lower edge test:f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency

f1=1853MHz,f2=1856MHz

2)in higher edge test:f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency

f1=1912MHz,f2=1909MHz

3)base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,

in lower edge test, F1=2f1-(f1+Δf)=f1-Δf=lower edge frequency;

in higher edge test, F2=2f2-(f2-Δf)=f2+Δf=higher edge frequency.

F1=1850MHz,F2=1915MHz

4)base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,

in lower edge test, F1=3f1-2(f1+Δf)=f1-2Δf=lower edge frequency;

in higher edge test, F2=3f2-2(f2-Δf)=f2+2Δf=higher edge frequency.

F1=1847MHz,F2=1918MHz

5)base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,

in lower edge test, F1=4f1-3(f1+Δf)=f1-3Δf=lower edge frequency;

in higher edge test, F2=4f2-3(f2-Δf)=f2+3Δf=higher edge frequency.

F1=1844MHz,F2=1921MHz

Input power:-56dBm

measure frequency		product Value (dBm)	Limit (dBm)	**Over Limit(dB)**
3rd	Lower:1850MHz	-34.67	-13dBm	-21.67
	Higher:1915MHz	-31.01		-18.01
5rd	Lower:1847MHz	-39.68	-13dBm	-26.68
	Higher:1918MHz	-38.74		-25.74
7rd	Lower:1844MHz	-41.02	-13dBm	-28.02
	Higher:1921MHz	-42.34		-29.34

Remark:
No other intermodulation spurious emissioins of above 7rd have been found,so only record the test data about the 3rd, 5rdand 7rd

Remark:

For the test in two signal input or intermodulation, test input signal f1 and f2 will consider as follows conditions:

1) EUT frequency band span and the amount of channels;
2) f1 is the frequency lower, f2 is the frequency higher, △f is the channel spacing;
3) in lower edge test, f1 is the lower edge frequency +1 channel frequency, and f2 is +2 channel frequency;
4) in higher edge test, f1 is the higher edge frequency -2 channel frequency, and f2 is -1 channel frequency;
5) according to the amplifier characteristic, the 3rd product will appear when two signals input;
6) base the 3rd product frequency F1= 2f1-f2 and F2=2f2-f1, when the f1 and f2 frequency select above,
   a) in lower edge test, F1=2f1-(f1+△f)=f1-△f=lower edge frequency;
   b) in higher edge test, F2=2f2-(f2-△f)=f2+△f=higher edge frequency.
7) base the 5rd product frequency F1= 3f1-2f2 and F2=3f2-2f1, when the f1 and f2 frequency select above,
   a) in lower edge test, F1=3f1-2(f1+△f)=f1-2△f=lower edge frequency;
   b) in higher edge test, F2=3f2-2(f2-△f)=f2+2△f=higher edge frequency.
8) base the 7rd product frequency F1= 4f1-3f2 and F2=4f2-3f1, when the f1 and f2 frequency select above,
   a) in lower edge test, F1=4f1-3(f1+△f)=f1-3△f=lower edge frequency;
   b) in higher edge test, F2=4f2-3(f2-△f)=f2+3△f=higher edge frequency.

`

7.2.4 Radiated Spurious Emissions

Test Date: 2013-12-11 to 2013-12-16

Test Requirement: FCC part 22.917(a) & FCC part 24.238(a)

22.917(a) Out of band emissions. The power of any emission 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.

24.238(a) Out of band emissions. The power of any emission 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.

27.53(h)For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

Test Method: FCC part 2.1053

ANSI/TIA-603-C-2004

EUT Operation:

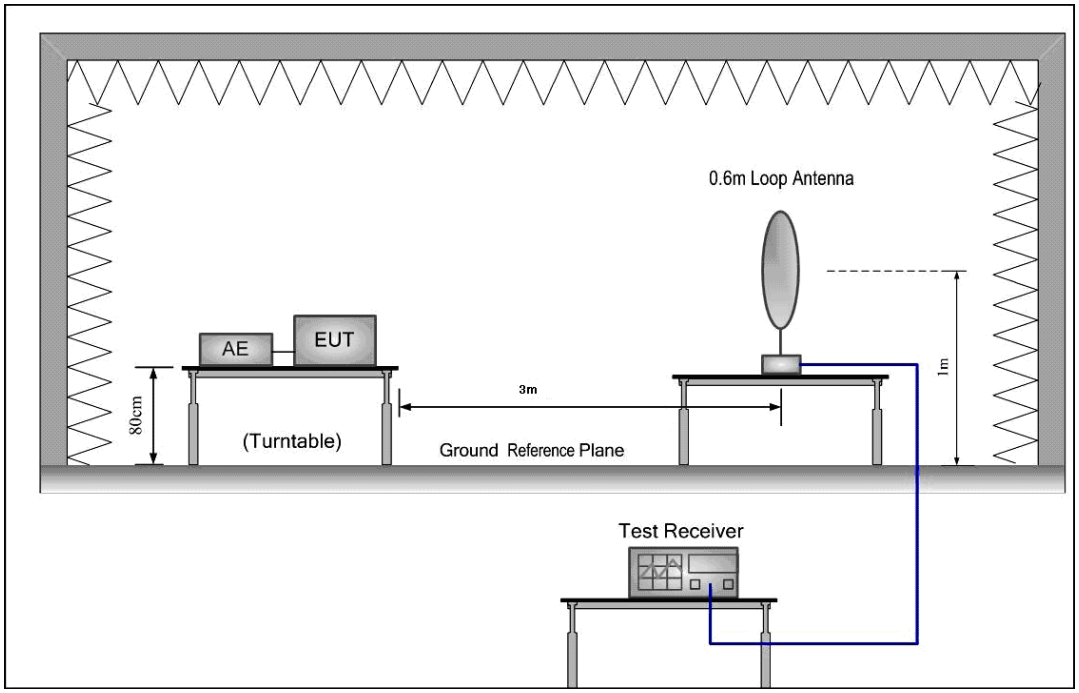
Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

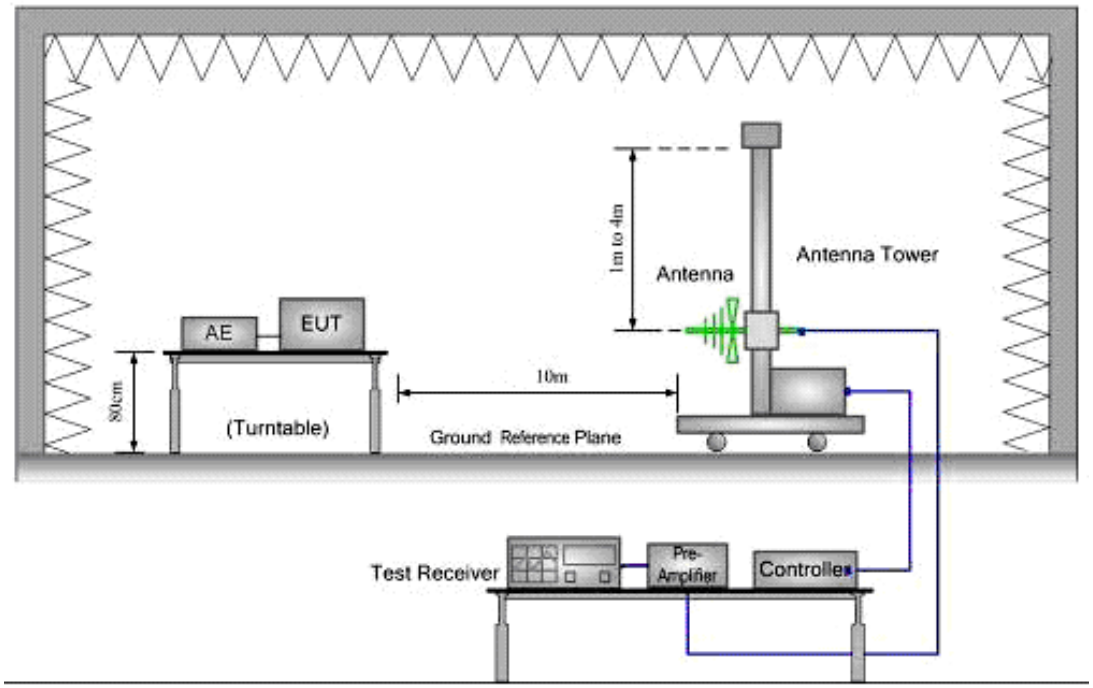
Application: Enclosure

Test Configuration:

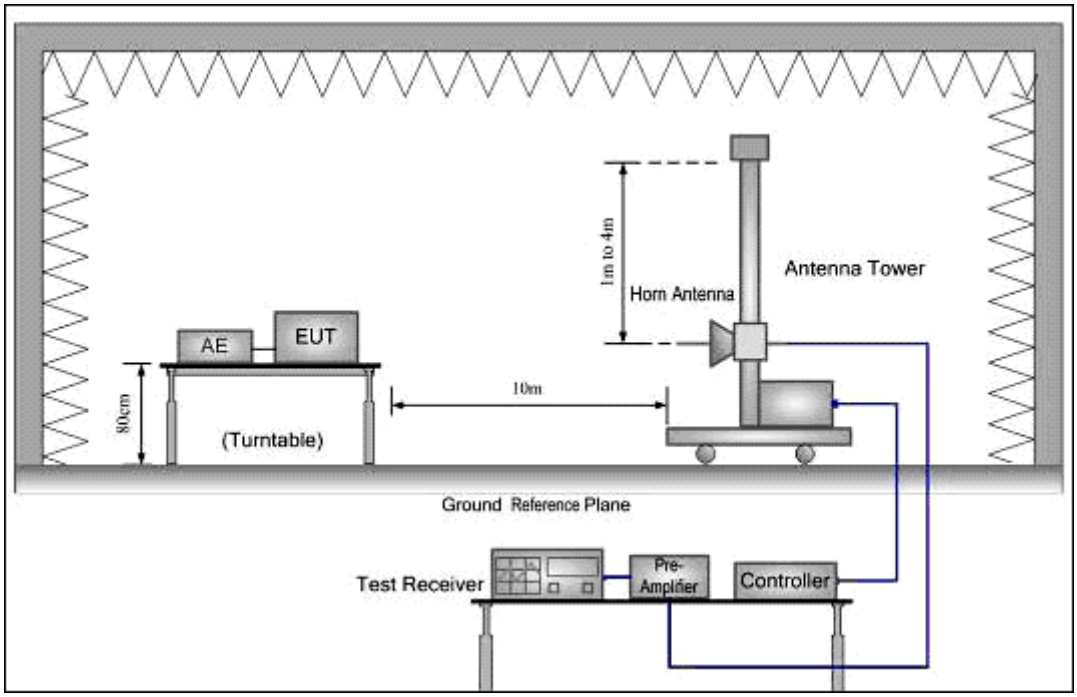
9 kHz to 30 MHz emissions:



30MHz to 1GHz emissions:



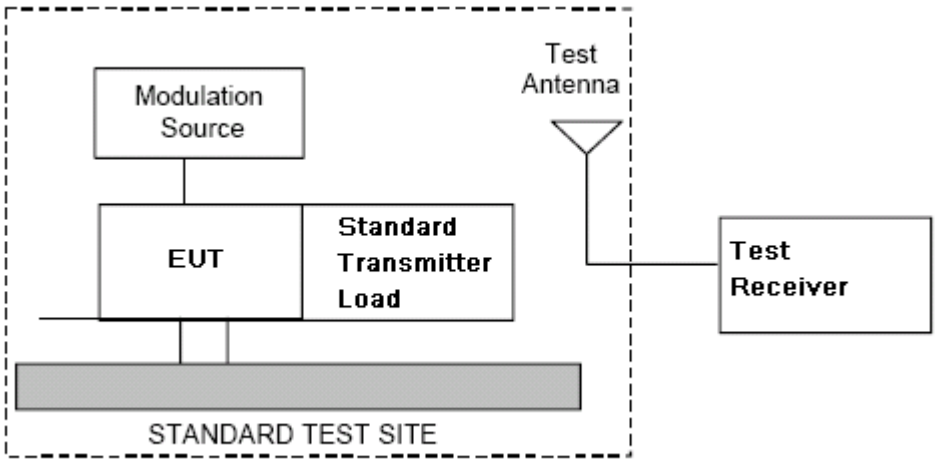
1GHz to 40GHz emissions:



Test Procedure:

1. Test the background noise level with all the test facilities;
2. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
3. Select the suitable RF notch filter to avoid the test receiver or spectrum analyzer produce unwanted spurious emissions;
4. Keep the EUT continuously transmitting in max power;
5. Read the radiated emissioins of the EUT enclosure.

Radiated Emissions Test Procedure:



a) Connect the equipment as illustrated.

b) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

3) Sweep Speed slow enough to maintain measurement calibration.

4) Detector Mode = Positive Peak.

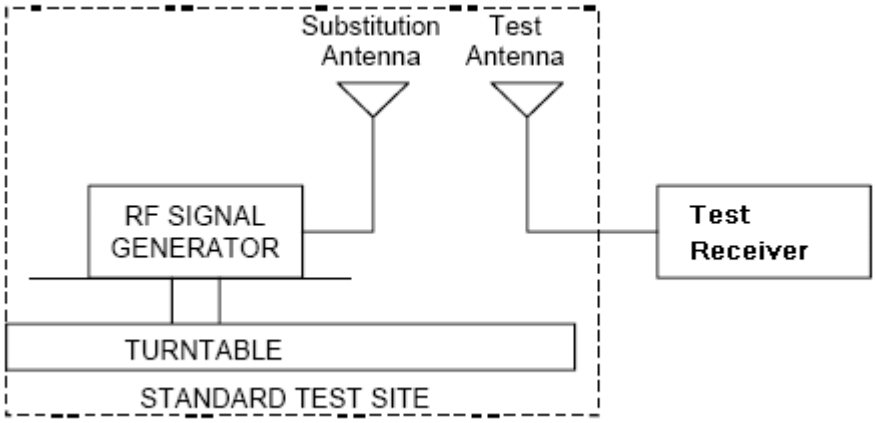
c) Place the transmitter to be tested on the turntable in the standard test site, The transmitter is transmitting into a nonradiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

d) Measurements shall be made from30MHz to 10 tims of fundamental carrier, except for the region close to the carrier equal to ± the carrier bandwidth.

e) Key the transmitter without modulation or normal modulation base the standard.

f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.



h) Reconnect the equipment as illustrated.

i) Keep the spectrum analyzer adjusted as in step b).

j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where

the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to

obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

l) Repeat step k) with both antennas vertically polarized for each spurious frequency.

m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole

antenna by the following formula:

Pd(dBm) = *Pg*(dBm) – *cable loss* (dB) + *antenna gain* (dB)

where:

Pd is the dipole equivalent power and

Pg is the generator output power into the substitution antenna.

NOTE: It is permissible to use other antennas provided they can be referenced to a dipole.

NOTE: Effective radiated power (e.r.p) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.

e.r.p (dBm) = e.i.r.p. (dBm) – 2.15

7.2.4.1 Measurement Record:

No emissions were detected within 20dB below the limit for the Downlink direction.

No emissions were detected within 20dB below the limit for the Uplink direction.

Remark:

The cabinet radiation was measured with the equipment transmitting a CW signal into a non-radiating 50 Ohm load at maximum output power on a signal frequency .

Measured were performed in the lowest, middle and hightest frequency for : the Downlink & Uplink.

The spectrum was searched from 9KHz to 26GHz (10th Harmonic) for downlink & Uplink;

7.2.5 Occupied Bandwidth

Test Date:	2013-12-11 to 2013-12-16
Test Requirement:	KDB935210 D02
Test Method:	FCC part 2.1049, KDB935210 D02
	The spectral shape of the output should look similar to input for all modulations.
EUT Operation:	
Status:	Drive the EUT to maximum output power. .
Conditions:	Normal conditions
Application:	Cellular Band RF output ports

Test Configuration:

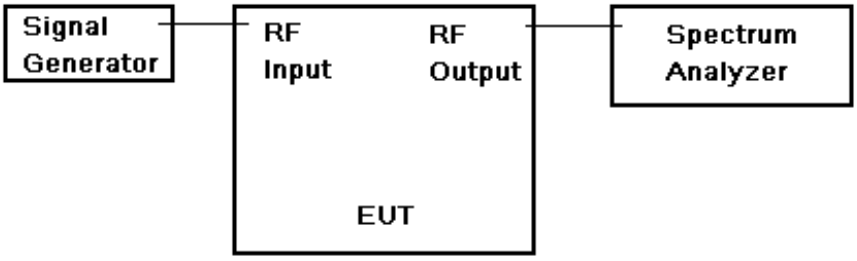


Fig.2. Conducted Spurious Emissions test configuration

Test Procedure:

a) Set the spectrum analyzer RBW 300 Hz or >1%&<2% emission bandwidth of carrier.

b) Capture the trace of input signal;

c) Connect the equipment as illustrated;

d) Capture the trace of output signal;

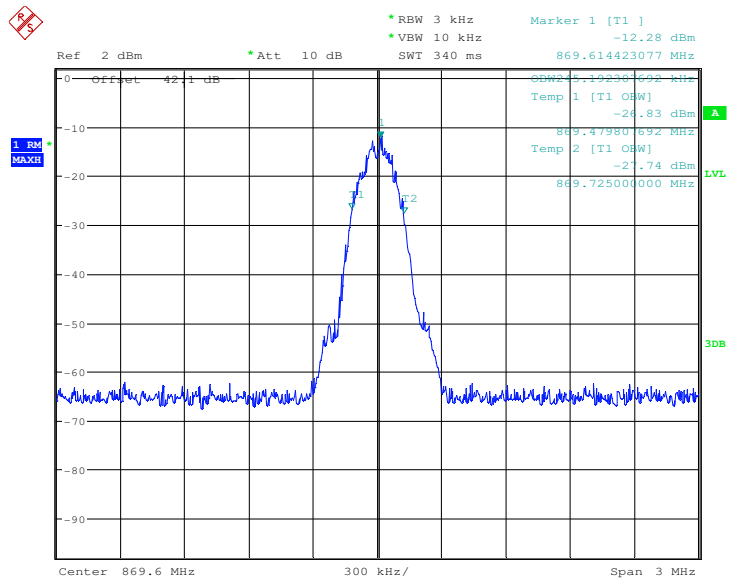
7.2.5.1 Measurement Record:

1.Downlink: 869MHz to 894MHz(GSM,CDMA,WCDMA)

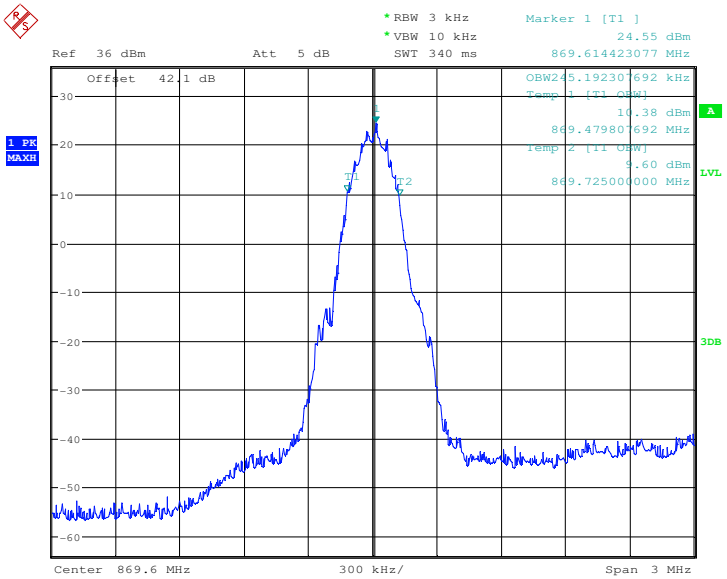
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).

1.1 GSM Mode:

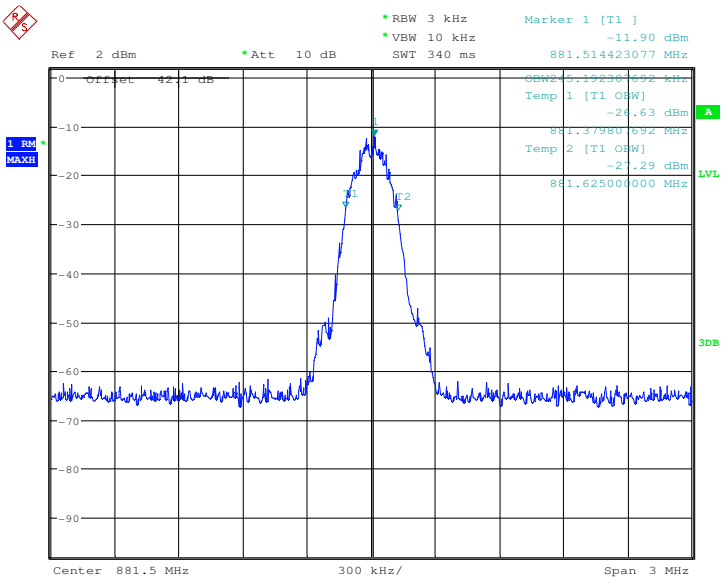
1.1.1 lowest frequency– Input



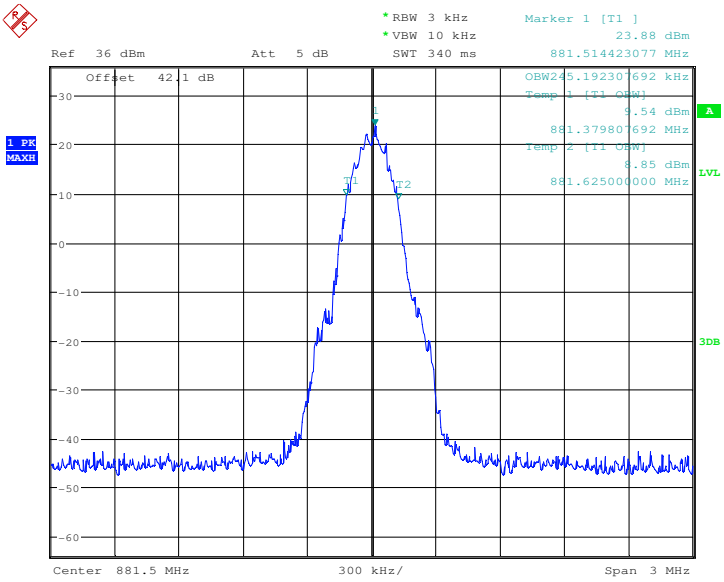
1.1.2 lowest frequency-- Output



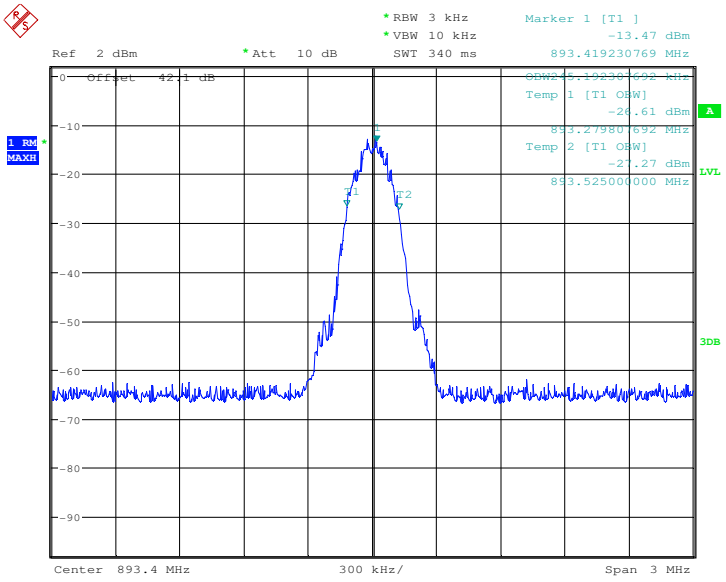
1.1.3 middle frequency-- Input



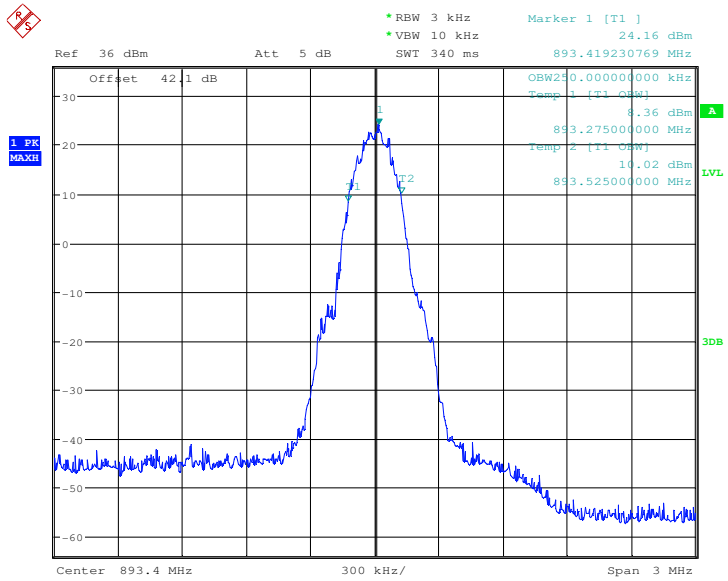
1.1.4 middle frequency-- Output



1.1.5 highest frequency—Input

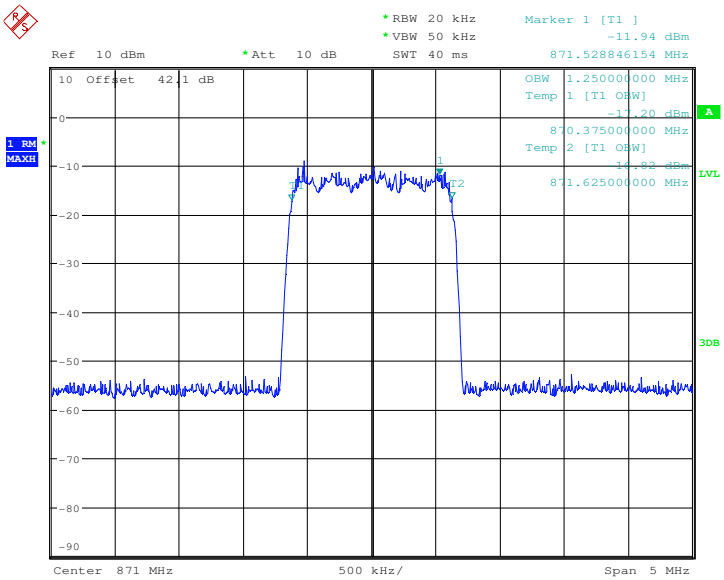


1.1.6 highest frequency--Output

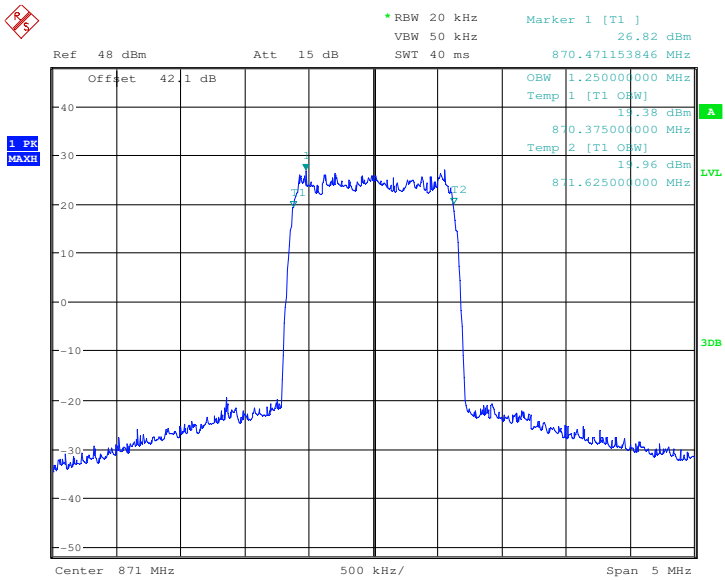


1.2 CDMA Mode:

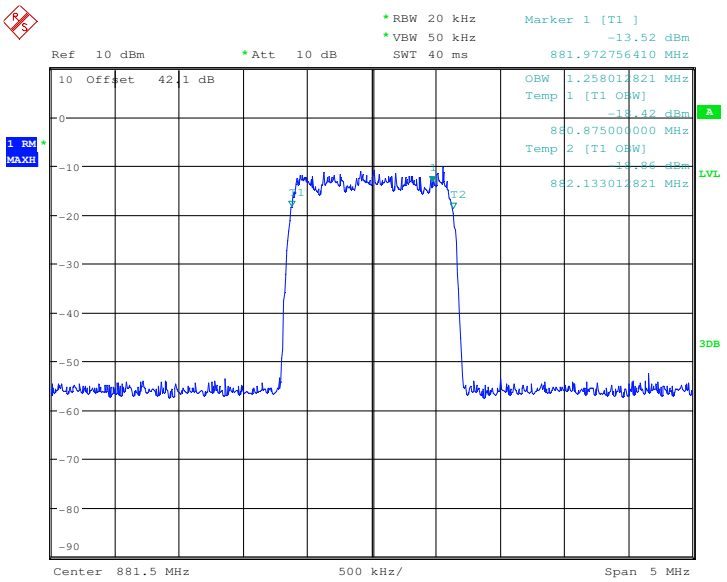
1.2.1 lowest frequency– Input



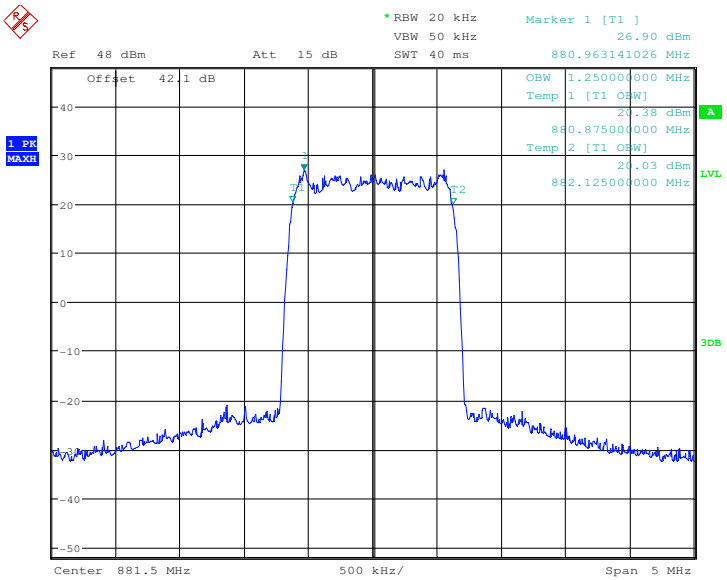
1.2.2 lowest frequency-- Output



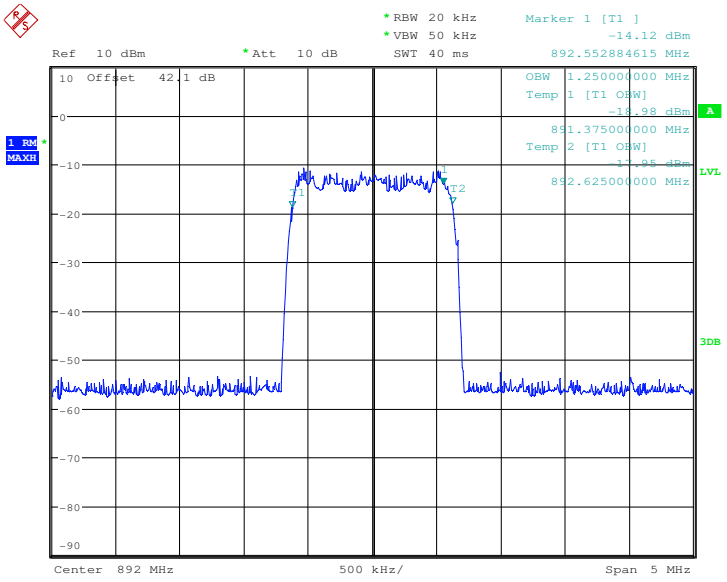
1.2.3 middle frequency-- Input



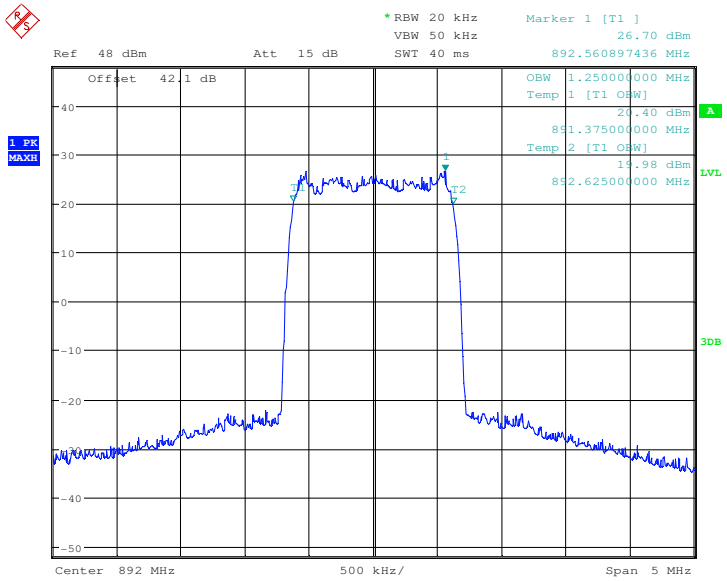
1.2.4 middle frequency-- Output



1.2.5 highest frequency—Input

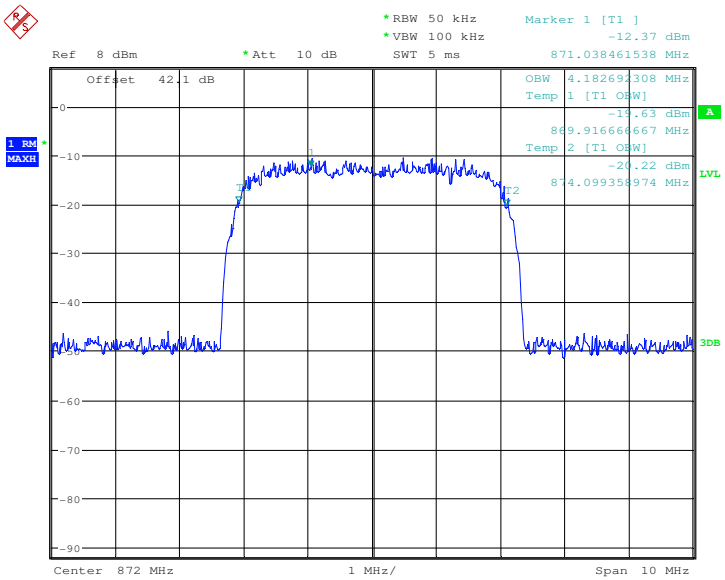


1.2.6 highest frequency--Output

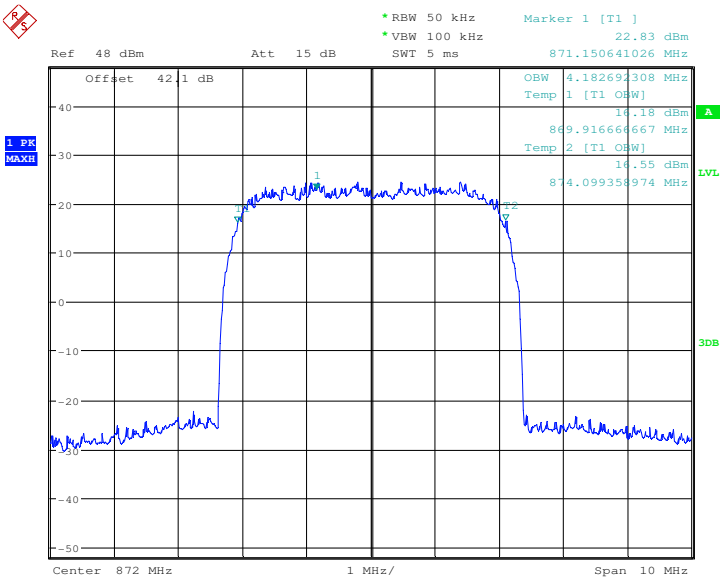


1.3 WCDMA Mode:

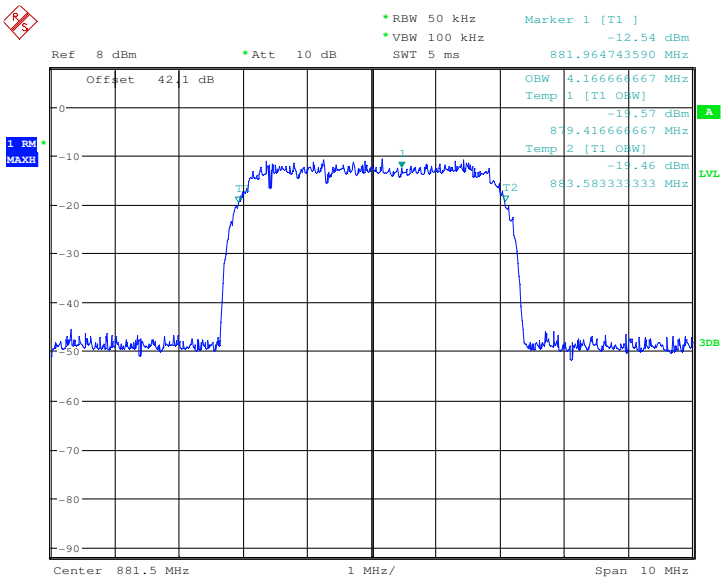
1.3.1 lowest frequency– Input



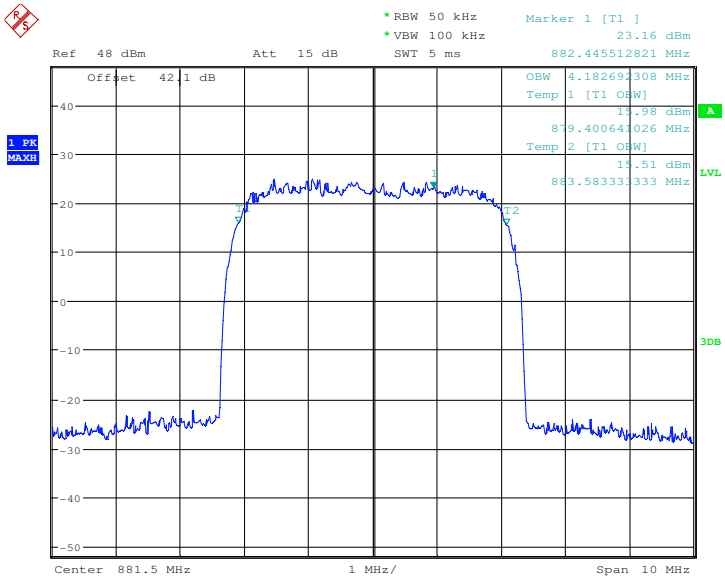
1.3.2 lowest frequency-- Output



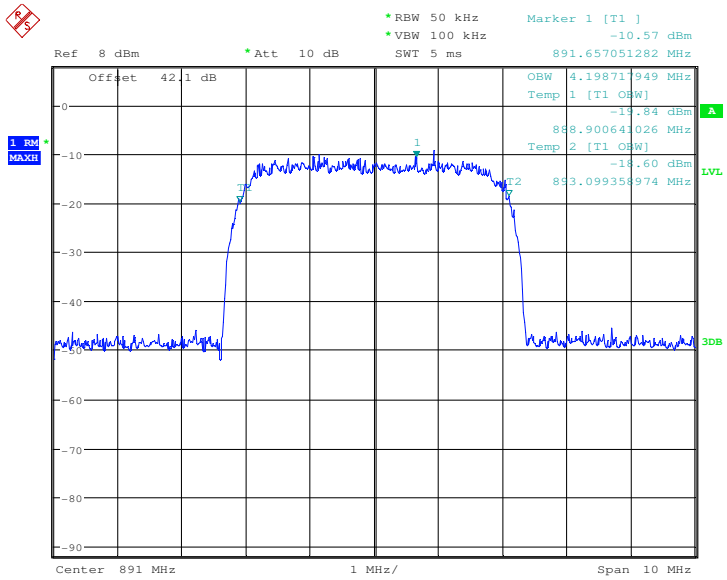
1.3.3 middle frequency-- Input



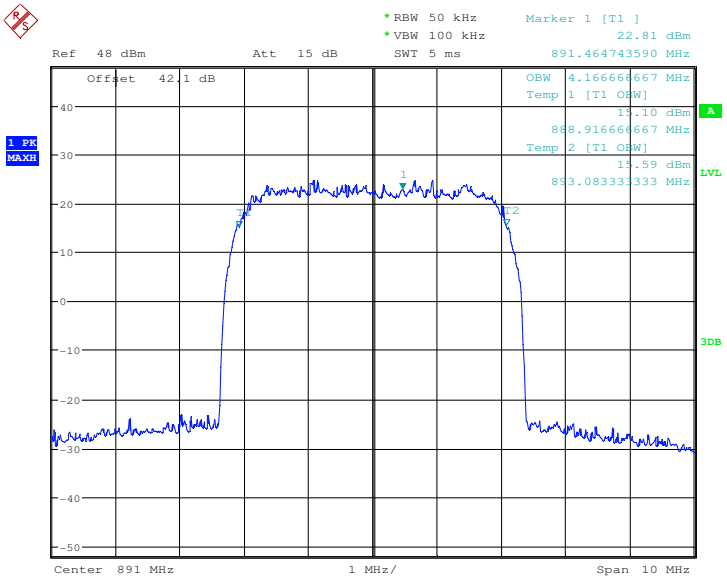
1.3.4 middle frequency-- Output



1.3.5 highest frequency—Input



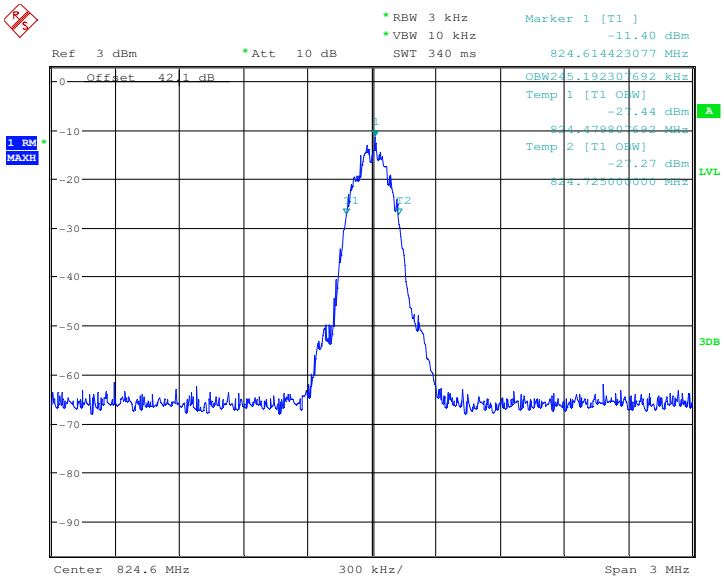
1.3.6 highest frequency--Output



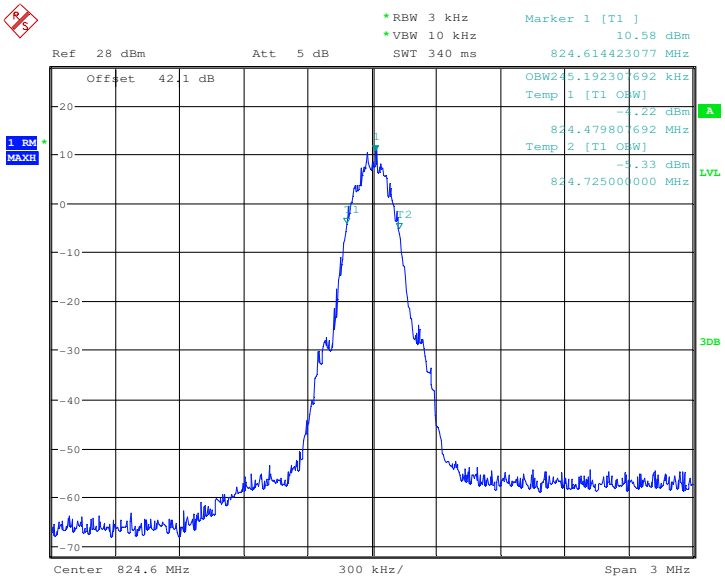
2.Uplink: 824MHz to 849MHz(GSM,CDMA,WCDMA)

2.1 GSM Mode:

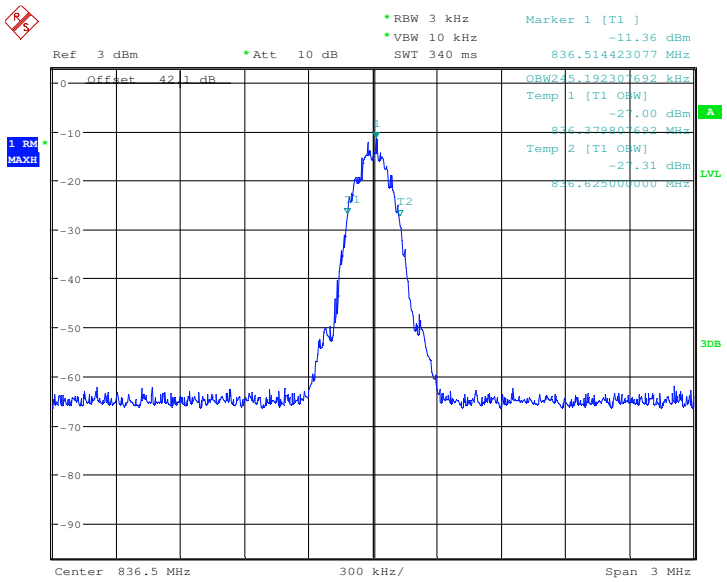
2.1.1 lowest frequency– Input



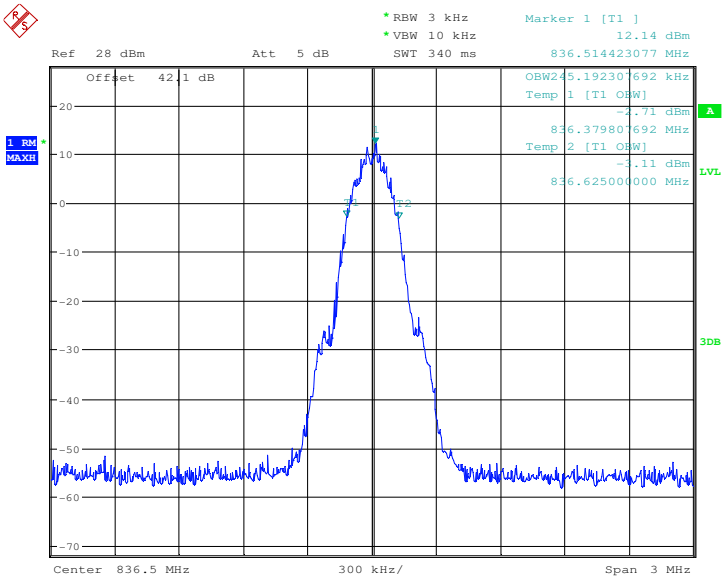
2.1.2 lowest frequency-- Output



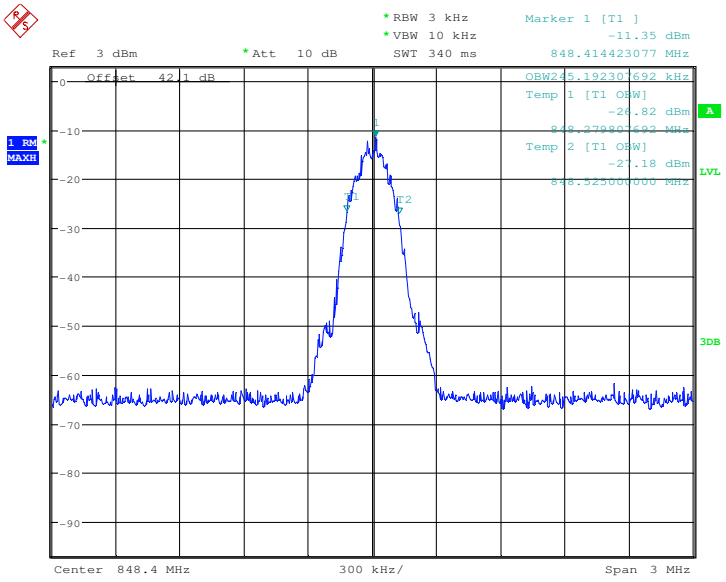
2.1.3 middle frequency-- Input



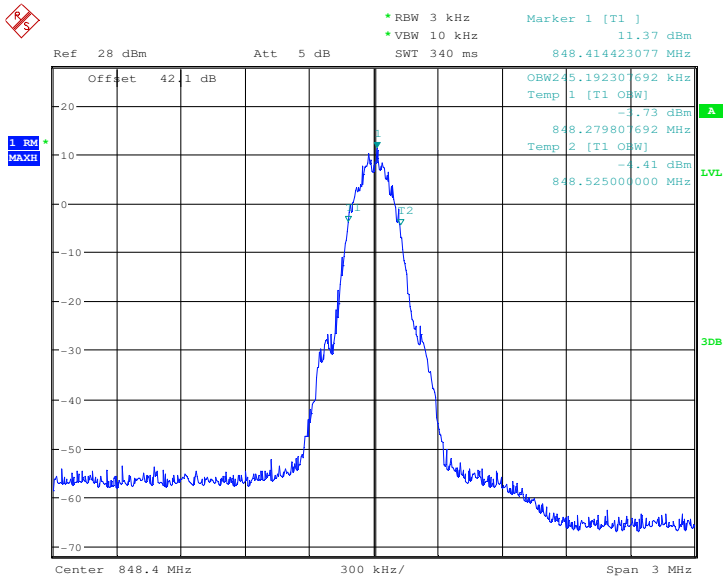
2.1.4 middle frequency-- Output



2.1.5 highest frequency—Input

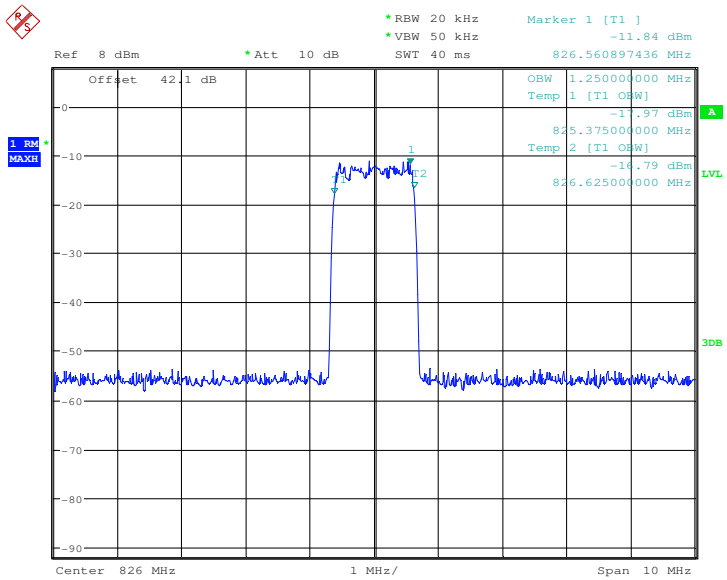


2.1.6 highest frequency--Output

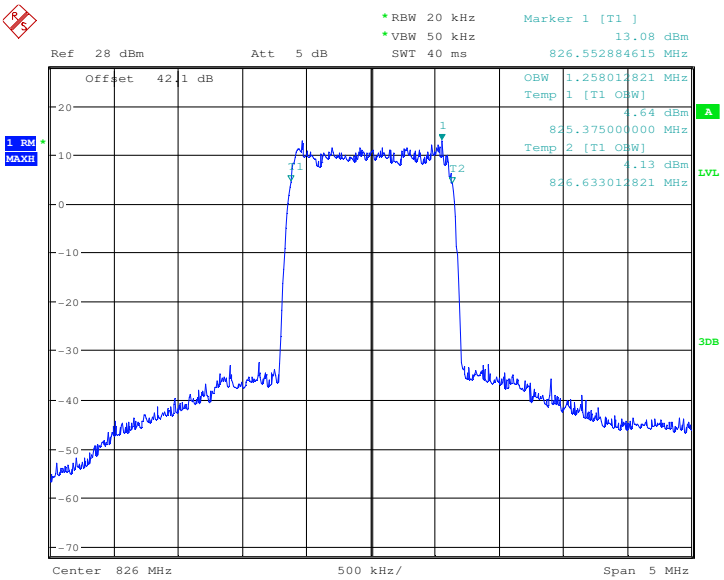


2.2 CDMA Mode:

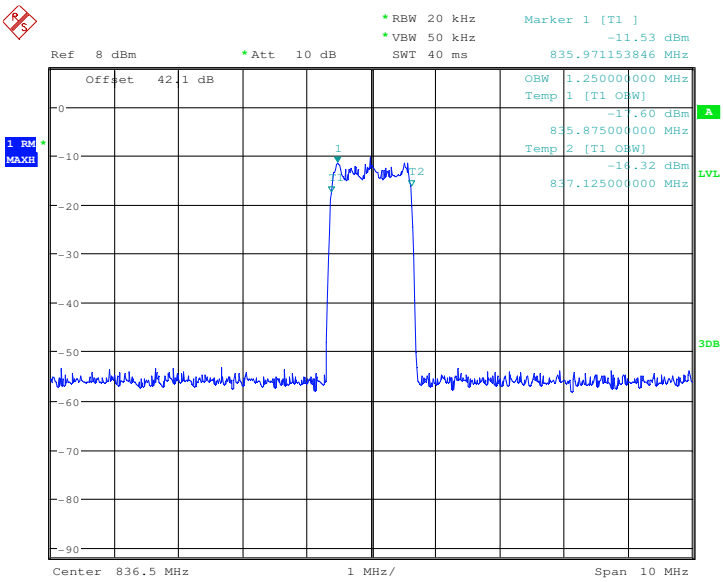
2.2.1 lowest frequency– Input



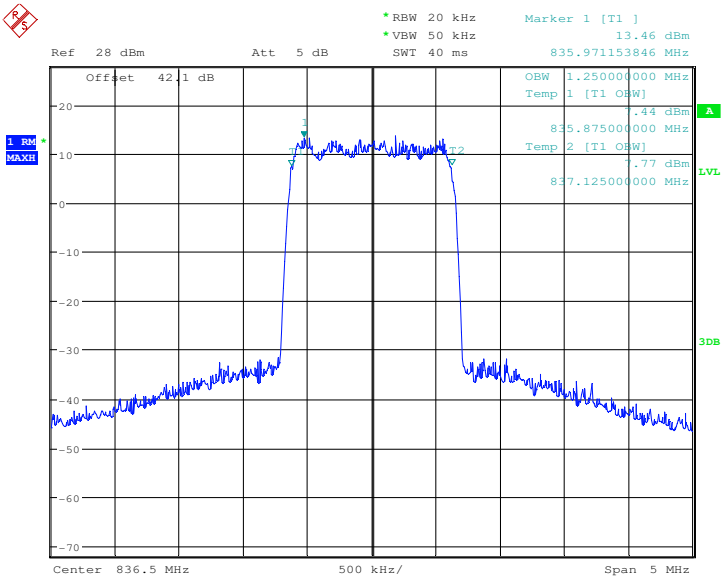
2.2.2 lowest frequency-- Output



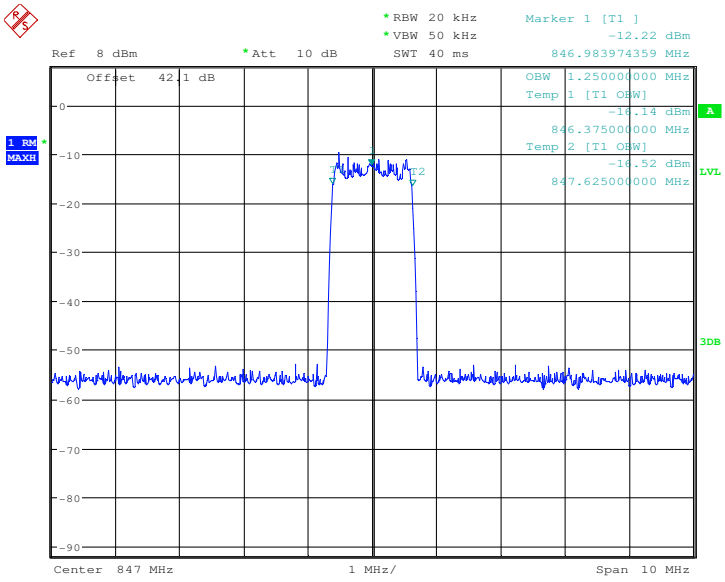
2.2.3 middle frequency-- Input



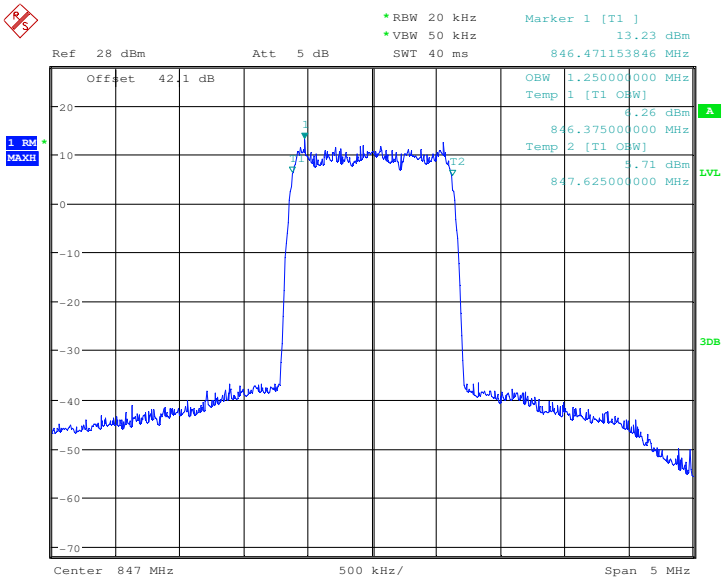
2.2.4 middle frequency-- Output



2.2.5 highest frequency—Input

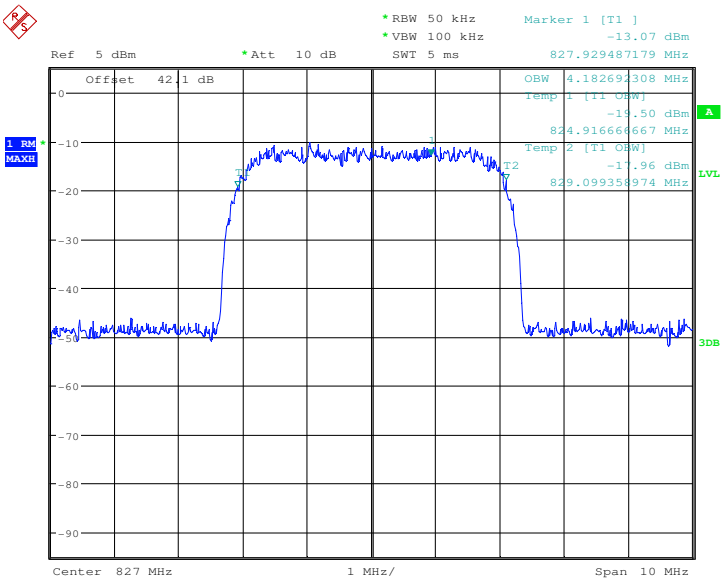


2.2.6 highest frequency--Output

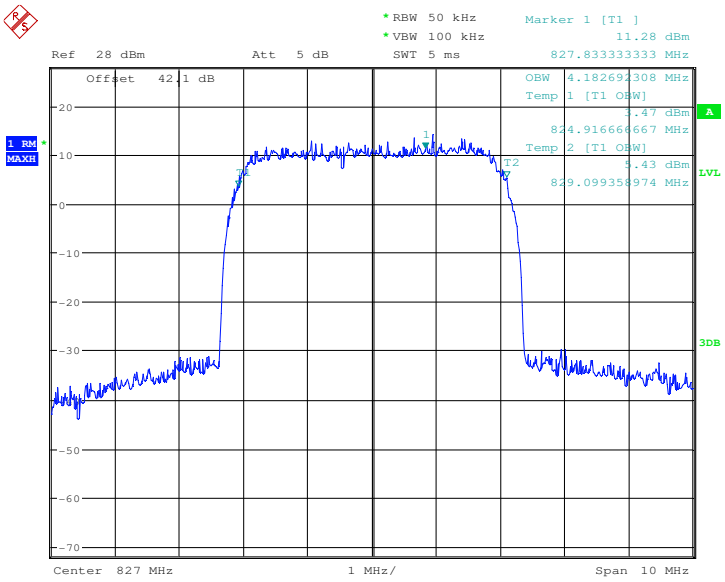


2.3 WCDMA Mode:

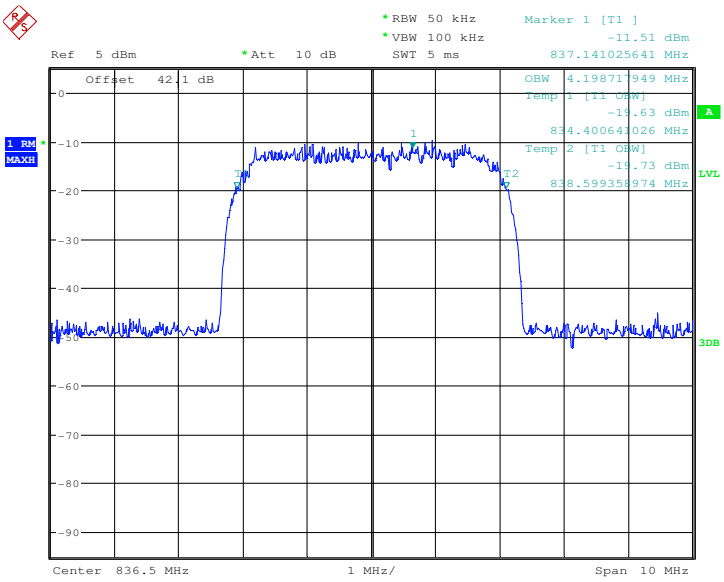
2.3.1 lowest frequency– Input



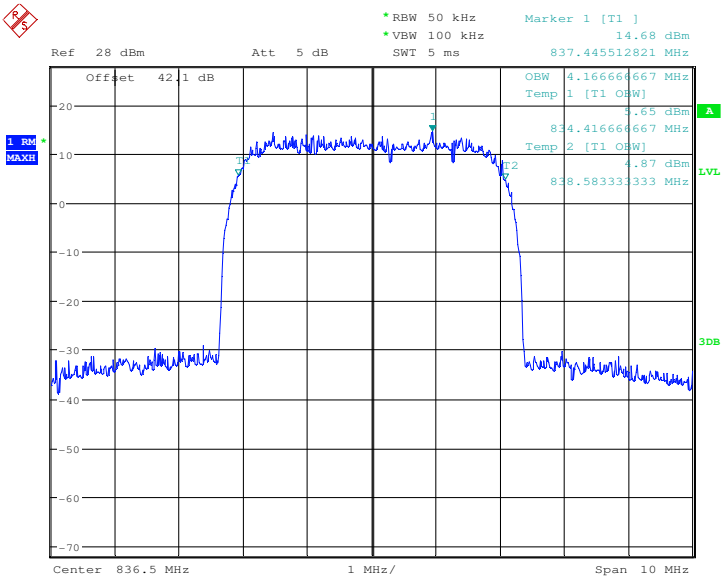
2.3.2 lowest frequency-- Output



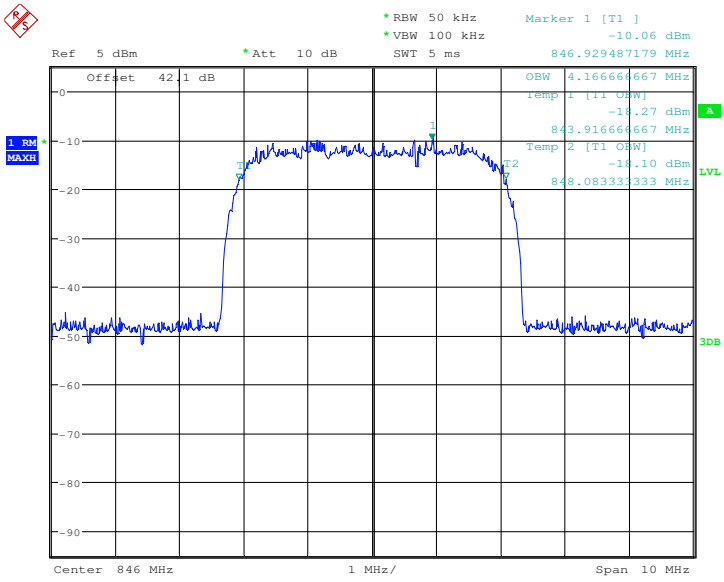
2.3.3 middle frequency-- Input



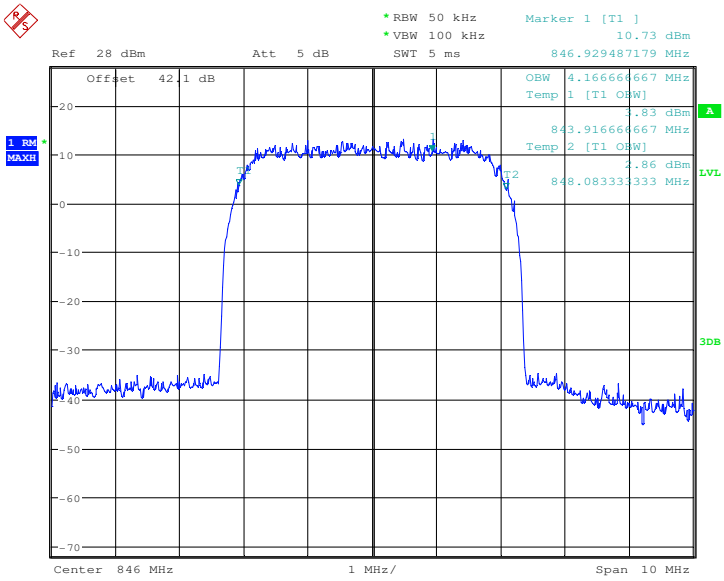
2.3.4 middle frequency-- Output



2.3.5 highest frequency—Input



2.3.6 highest frequency--Output

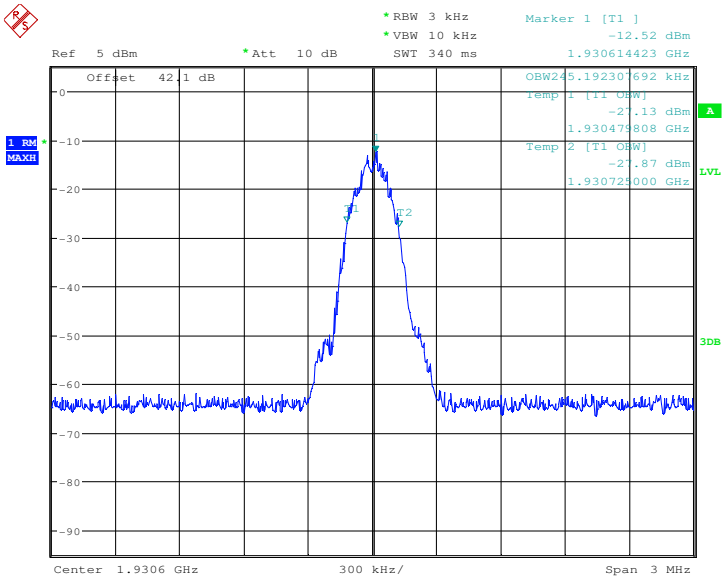


3.Downlink: 1930MHz to 1995MHz(GSM,CDMA,WCDMA)

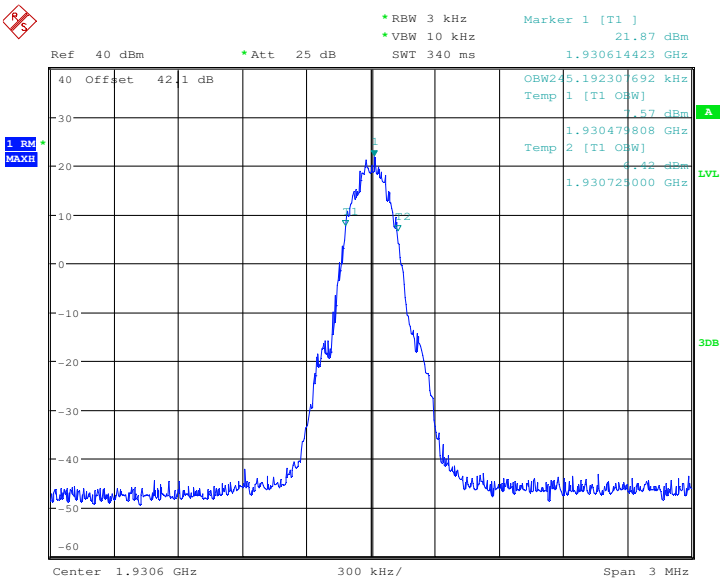
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).

3.1 GSM Mode:

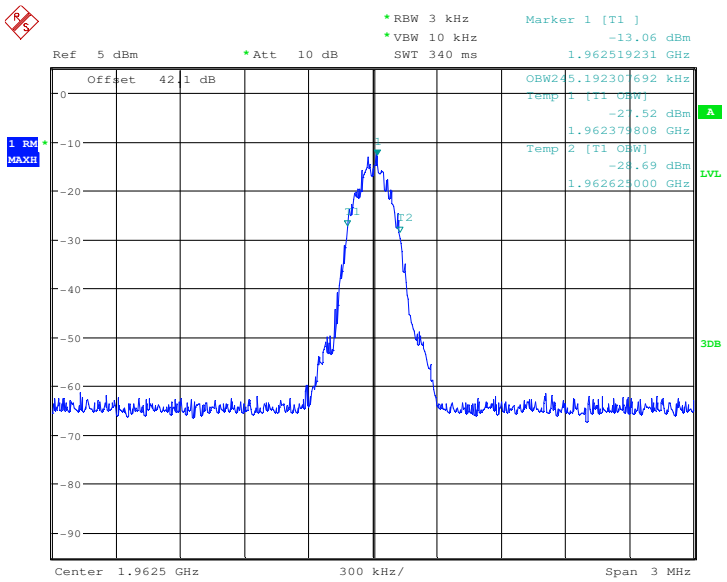
3.1.1 lowest frequency– Input



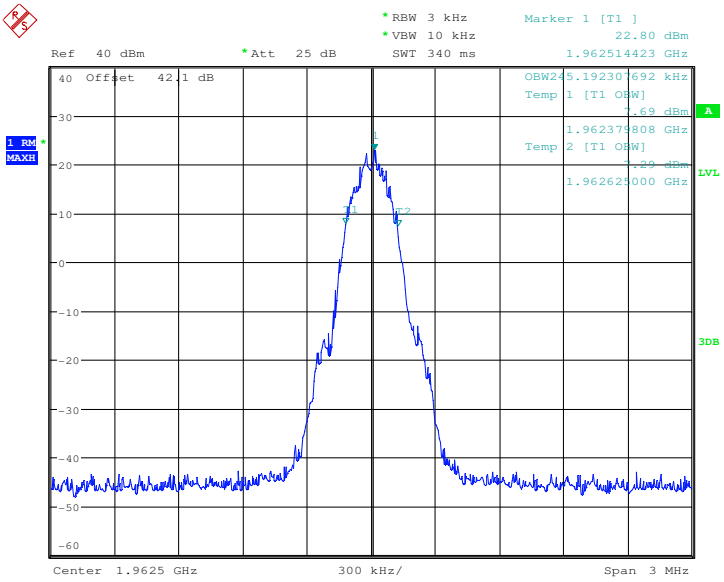
3.1.2 lowest frequency-- Output



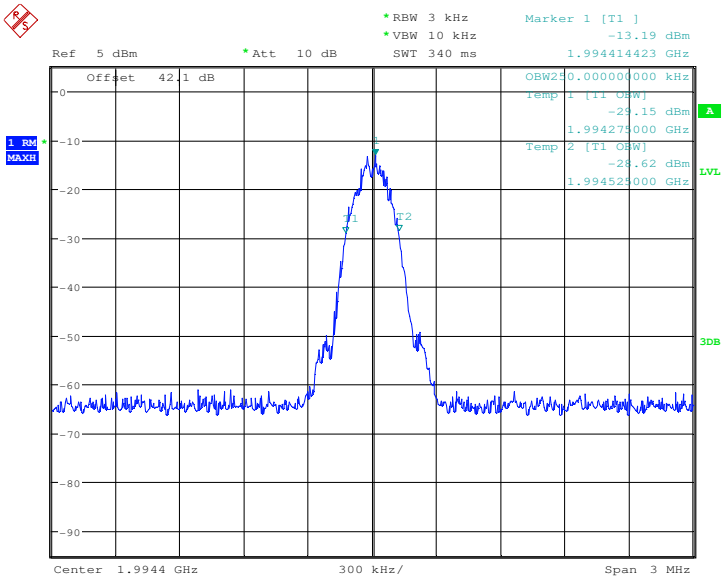
3.1.3 middle frequency-- Input



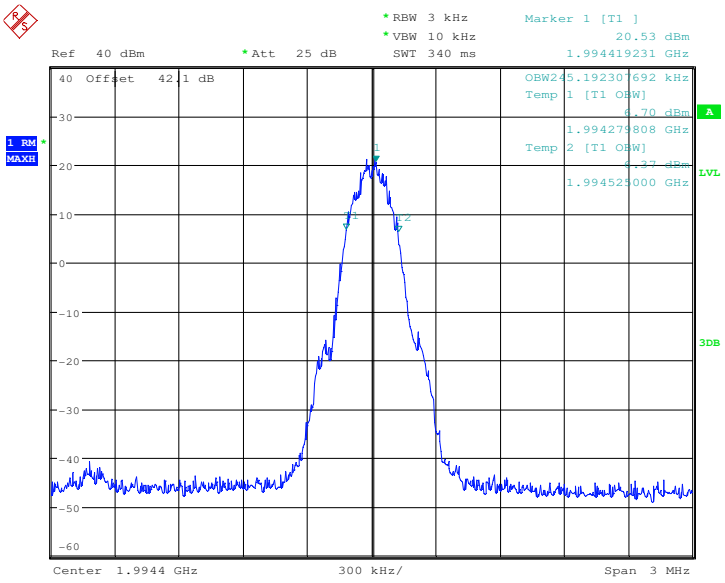
3.1.4 middle frequency-- Output



3.1.5 highest frequency—Input

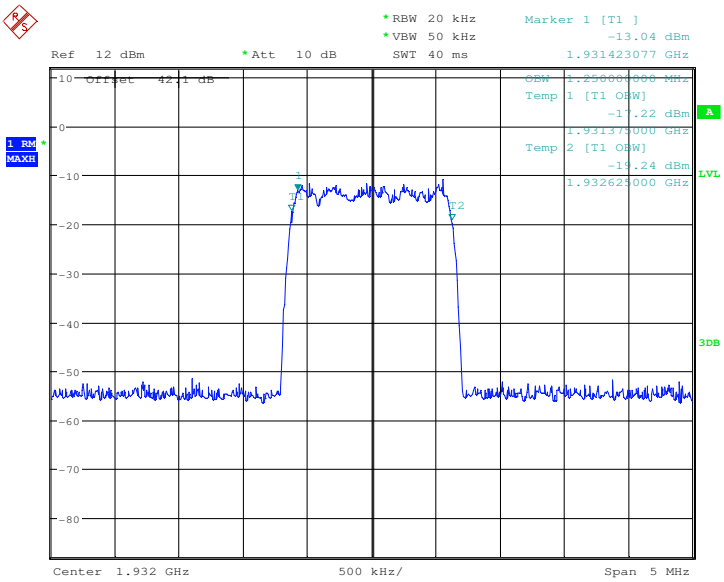


3.1.6 highest frequency--Output

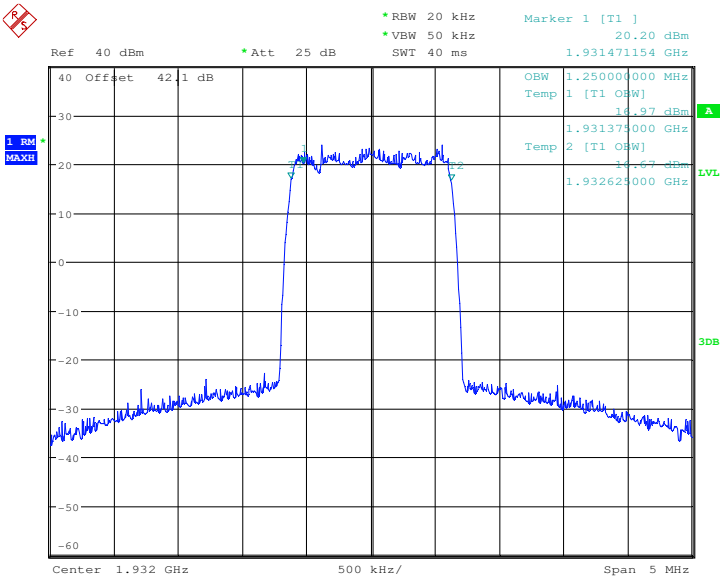


3.2 CDMA Mode:

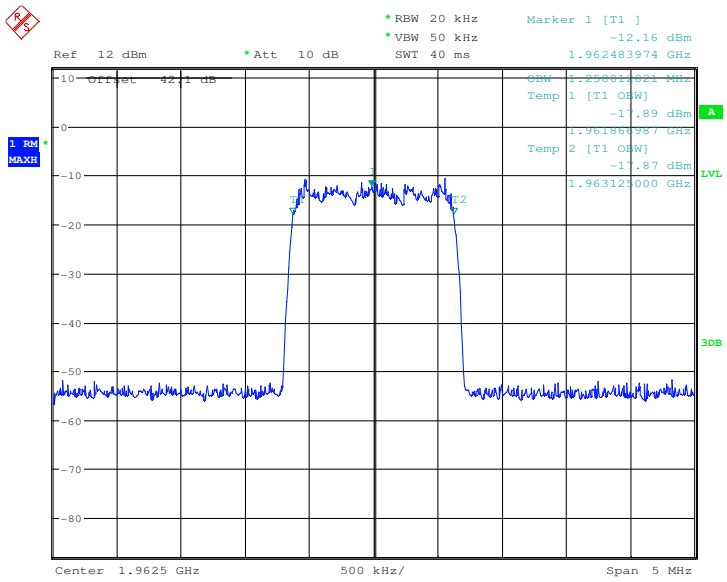
3.2.1 lowest frequency– Input



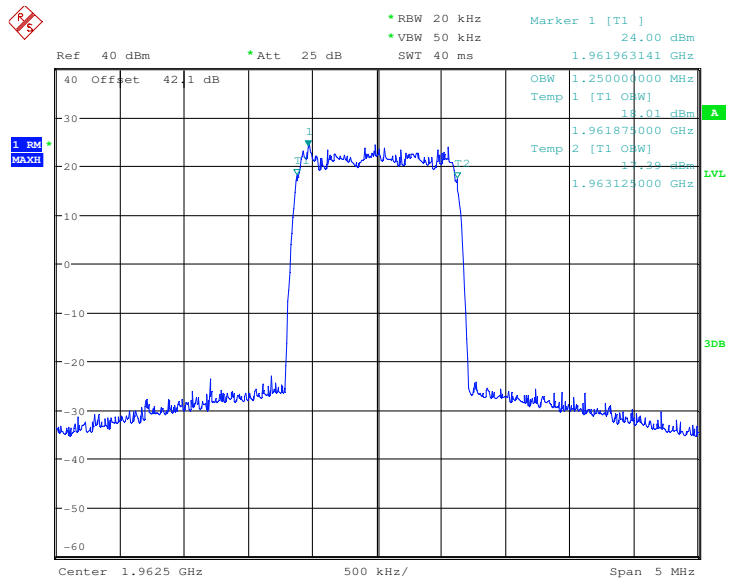
3.2.2 lowest frequency-- Output



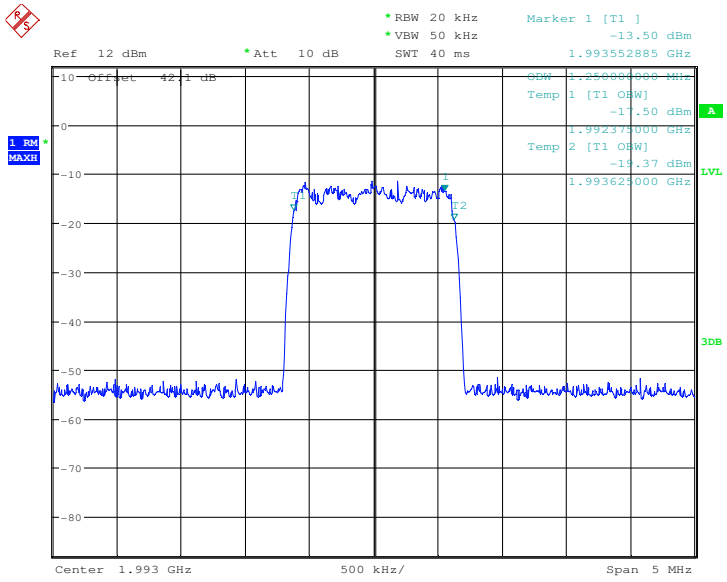
3.2.3 middle frequency-- Input



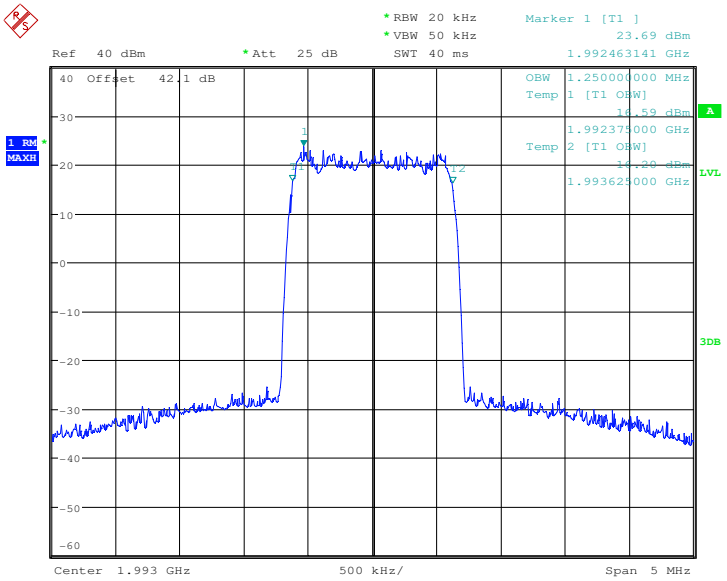
3.2.4 middle frequency-- Output



3.2.5 highest frequency—Input

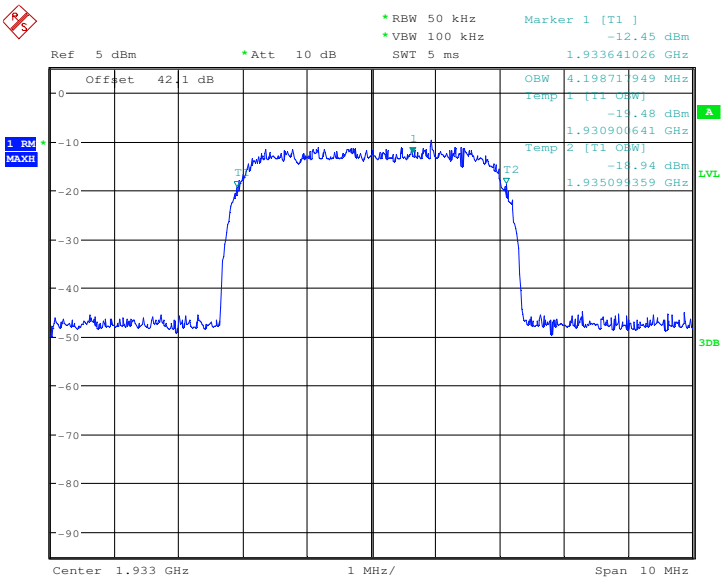


3.2.6 highest frequency--Output

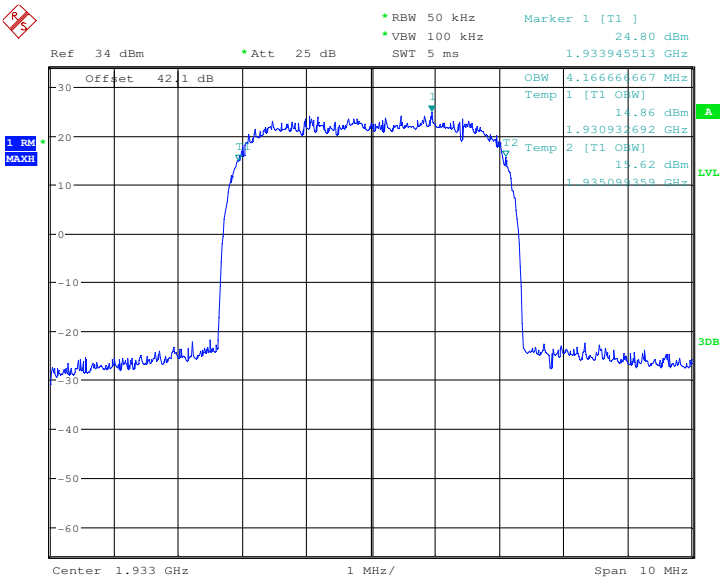


3.3 WCDMA Mode:

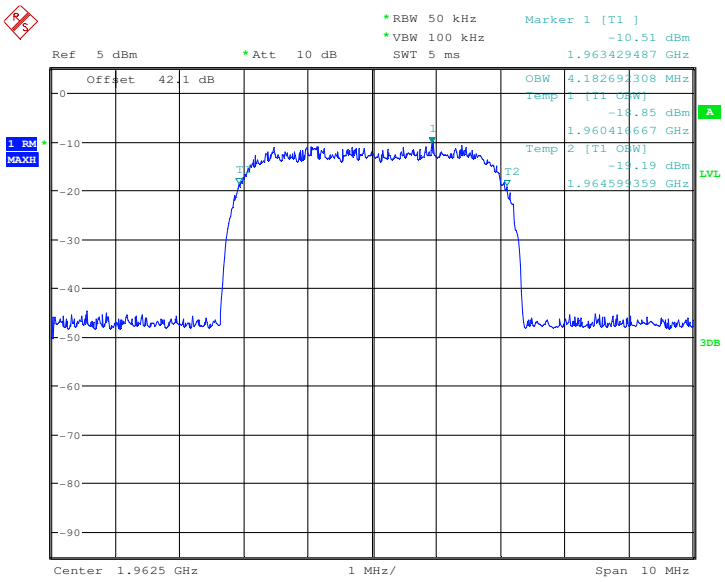
3.3.1 lowest frequency– Input



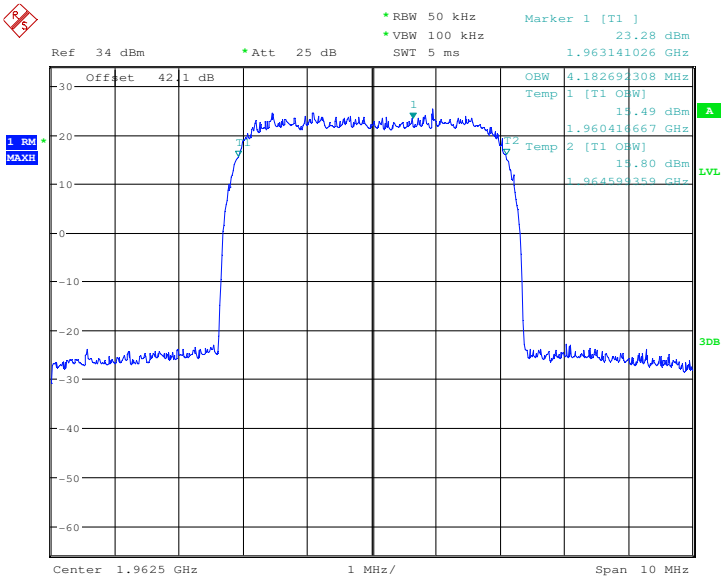
3.3.2 lowest frequency-- Output



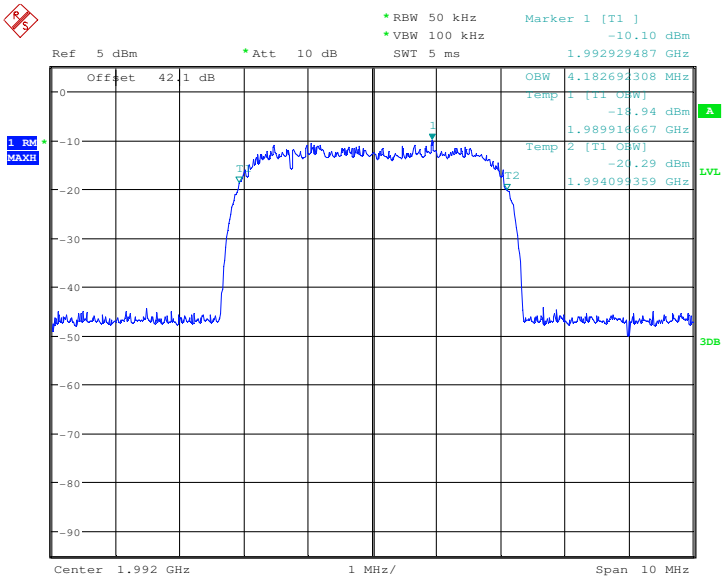
3.3.3 middle frequency-- Input



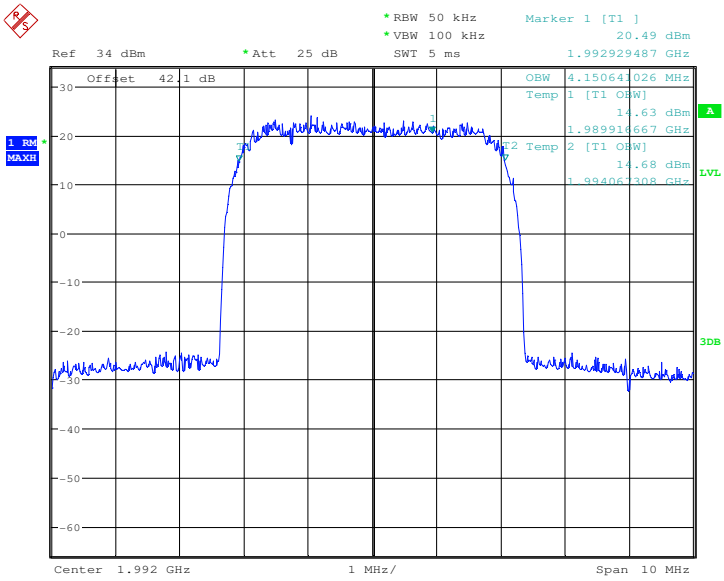
3.3.4 middle frequency-- Output



3.3.5 highest frequency—Input



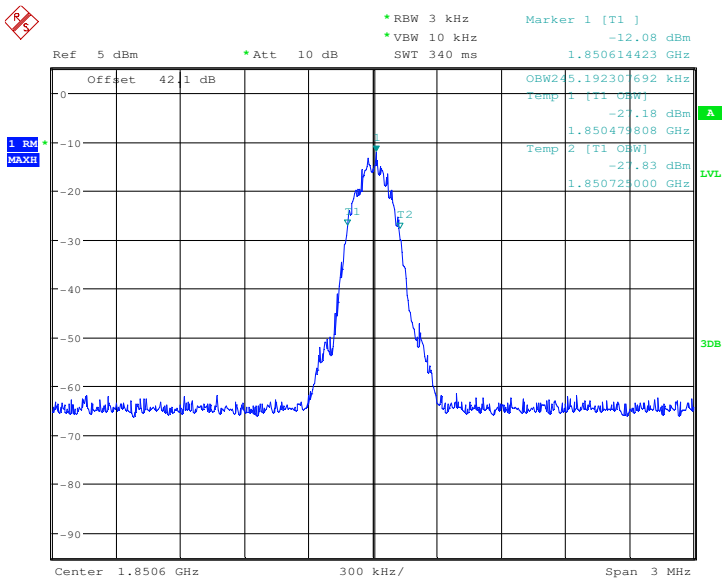
3.3.6 highest frequency--Output



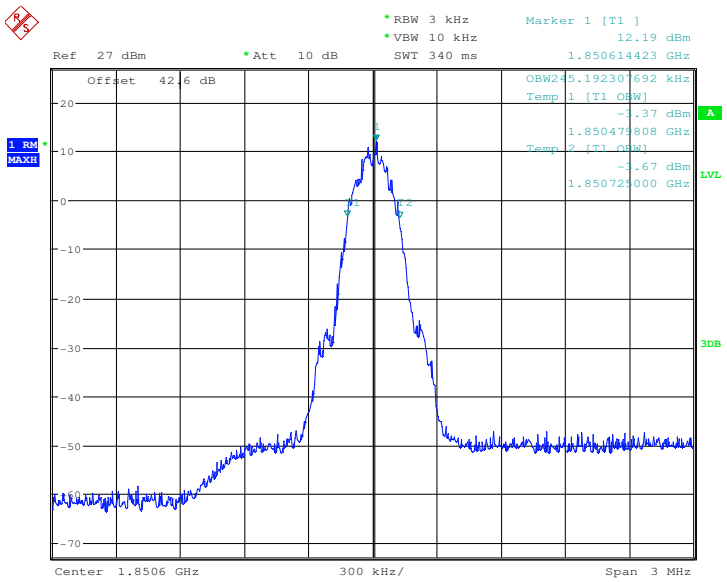
4.Uplink: 1850MHz to 1915MHz(GSM,CDMA,WCDMA)

4.1 GSM Mode:

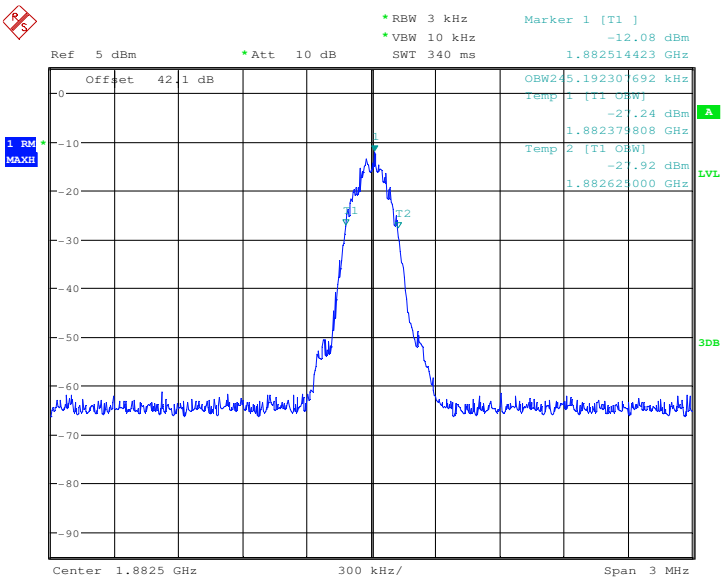
4.1.1 lowest frequency– Input



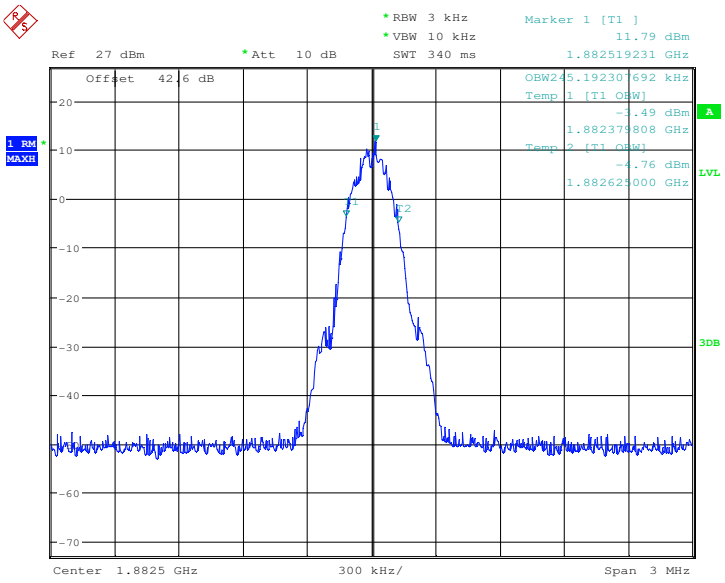
4.1.2 lowest frequency-- Output



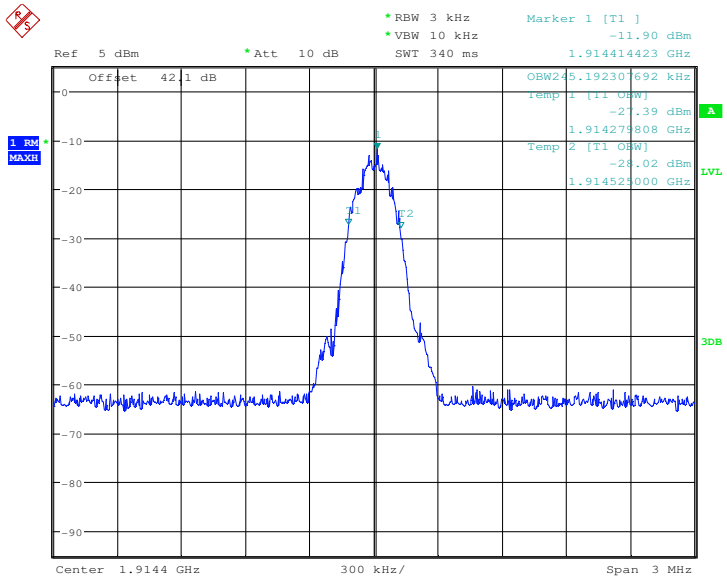
4.1.3 middle frequency-- Input



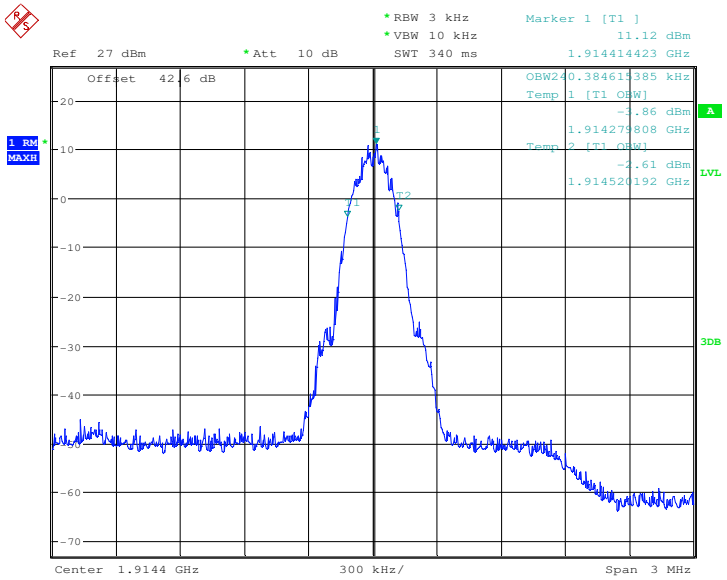
4.1.4 middle frequency-- Output



4.1.5 highest frequency—Input

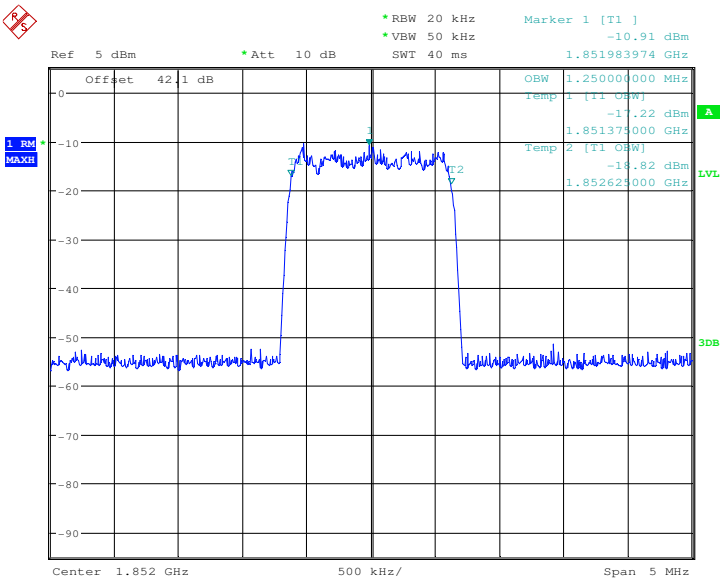


4.1.6 highest frequency--Output

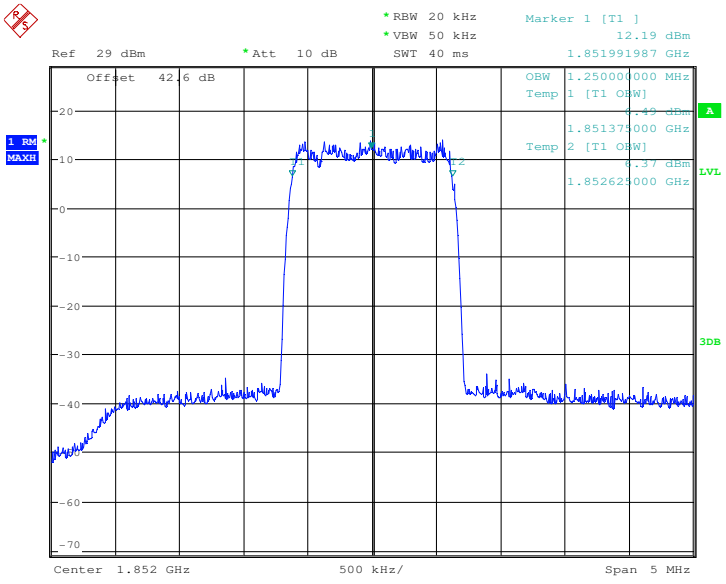


4.2 CDMA Mode:

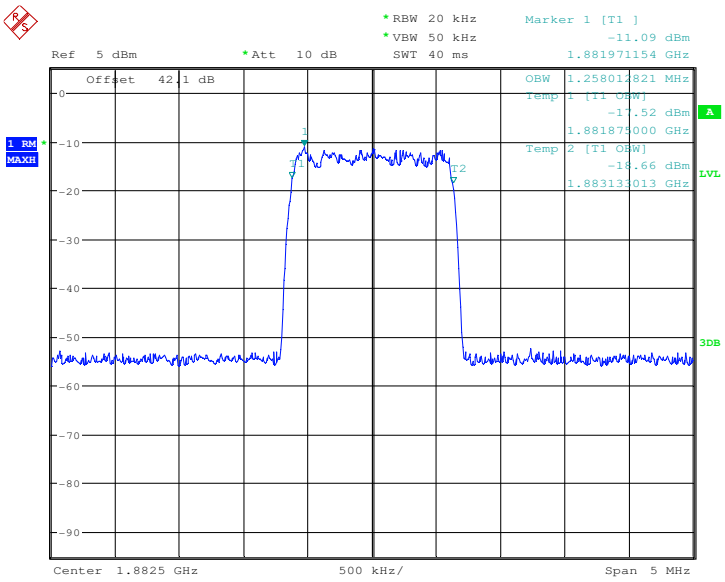
4.2.1 lowest frequency– Input



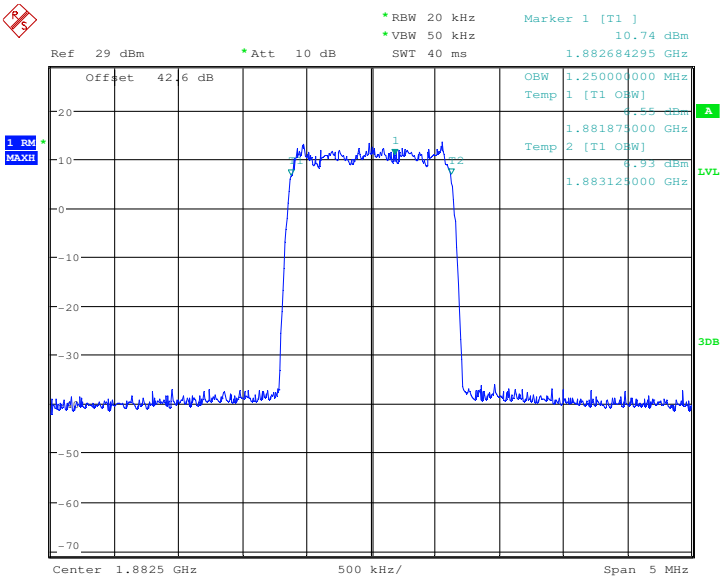
4.2.2 lowest frequency-- Output



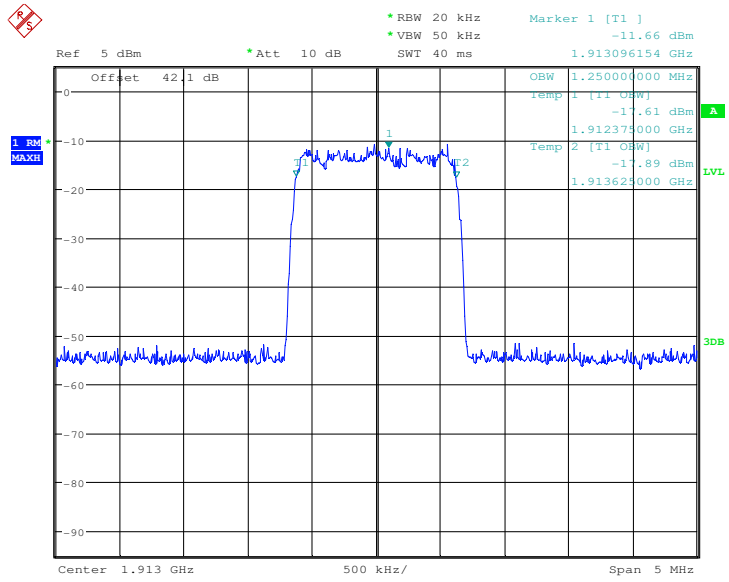
4.2.3 middle frequency-- Input



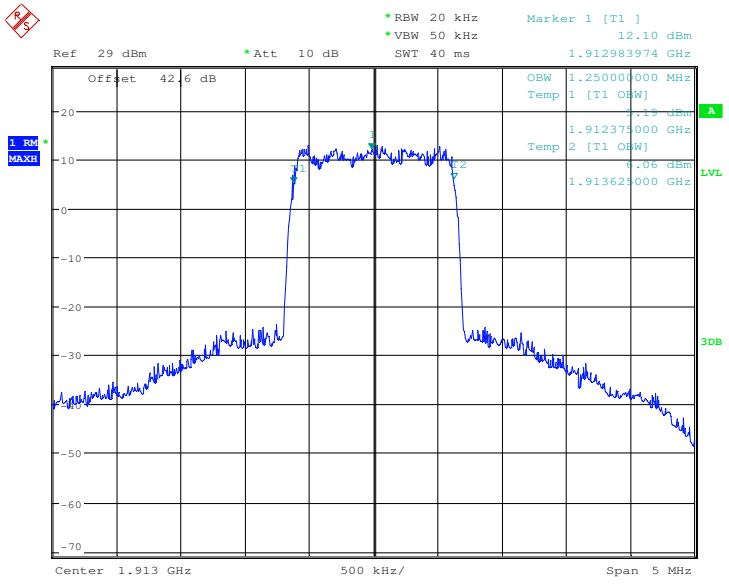
4.2.4 middle frequency-- Output



4.2.5 highest frequency—Input

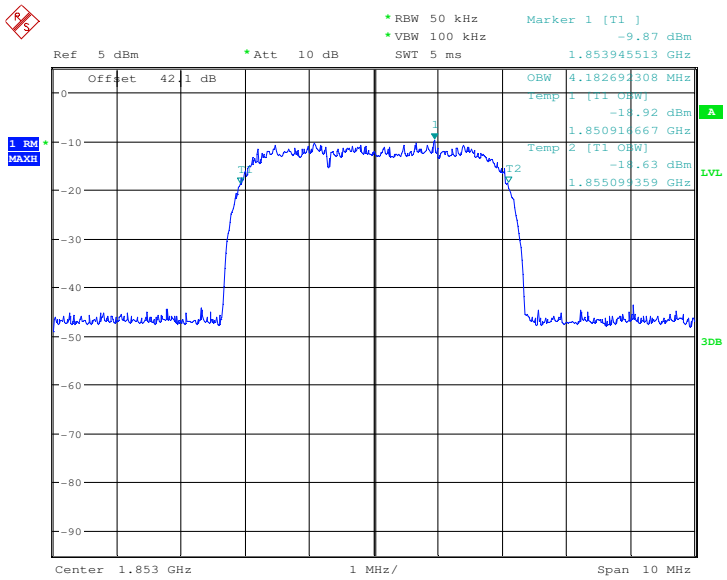


4.2.6 highest frequency--Output

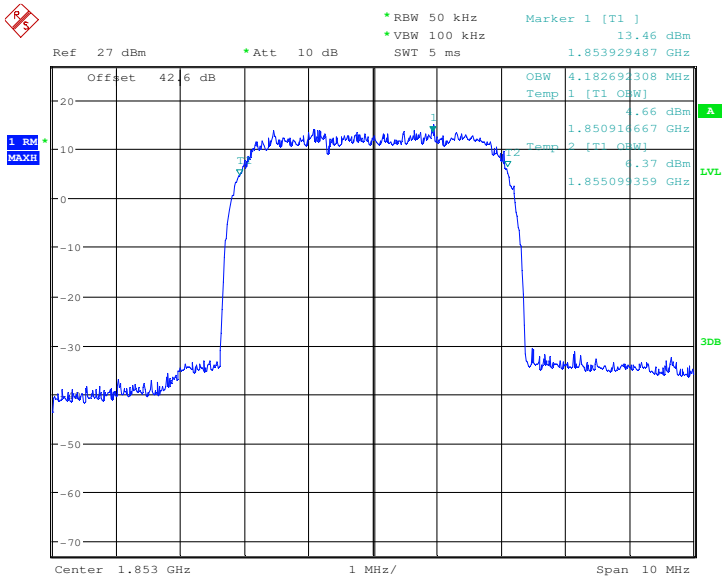


4.3 WCDMA Mode:

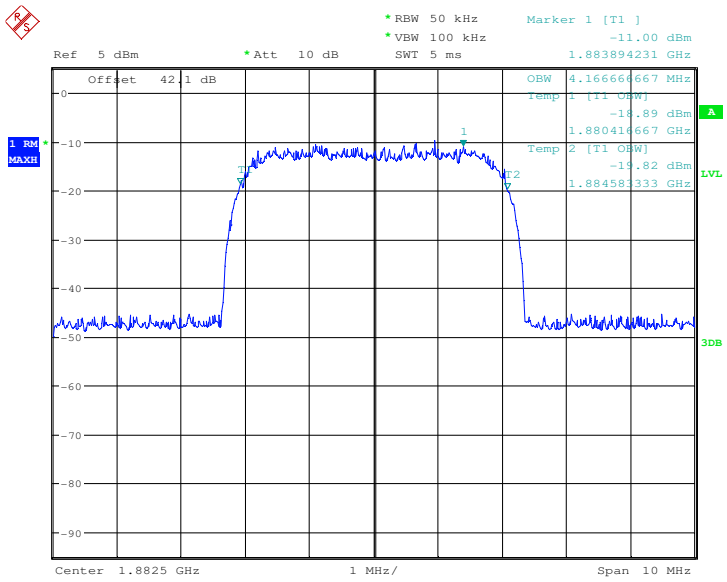
4.3.1 lowest frequency– Input



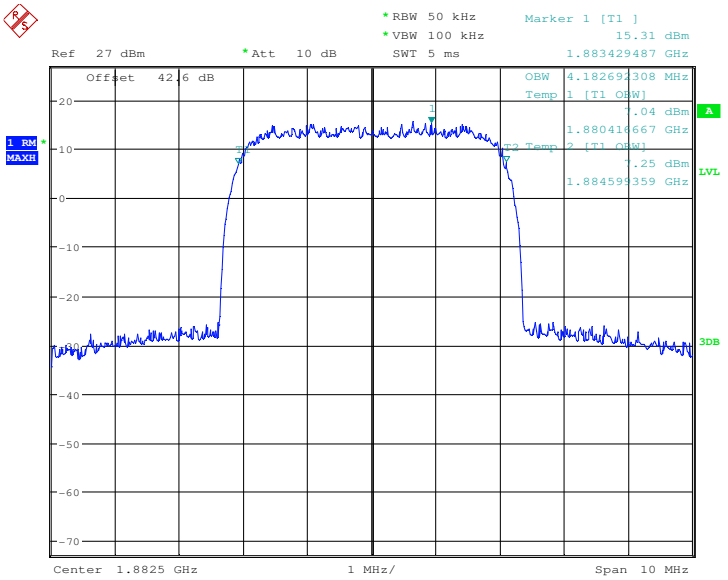
4.3.2 lowest frequency-- Output



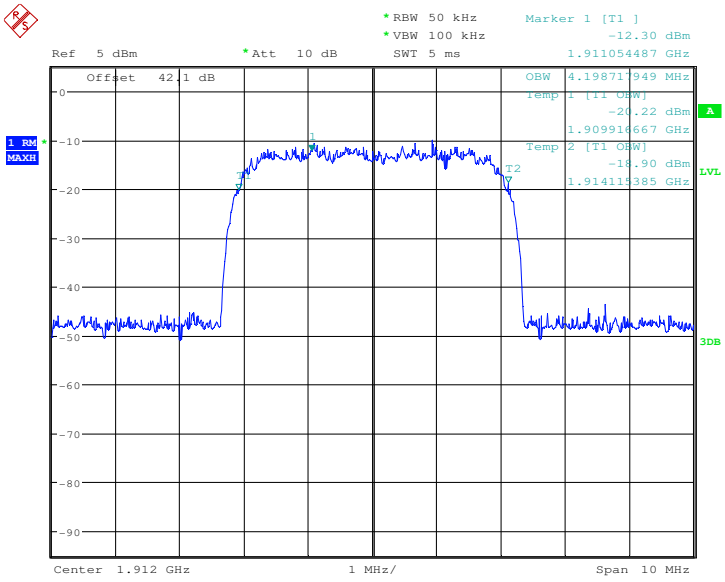
4.3.3 middle frequency-- Input



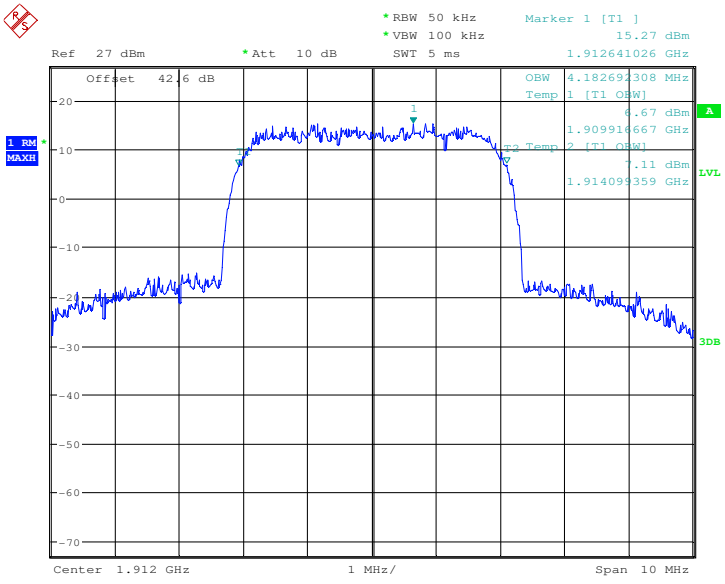
4.3.4 middle frequency-- Output



4.3.5 highest frequency—Input



4.3.6 highest frequency--Output



7.2.6 Out of Band Rejection

Test Date:	2013-12-11 to 2013-12-16
Test Requirement:	KDB935210 D02
	Test for rejection of out of band signals. Filter freq. response plots are acceptable.
Test Method:	KDB935210 D02
EUT Operation:	
Status:	Drive the EUT to maximum output power. .
Conditions:	Normal conditions
Application:	Cellular Band RF output ports

Test Configuration:

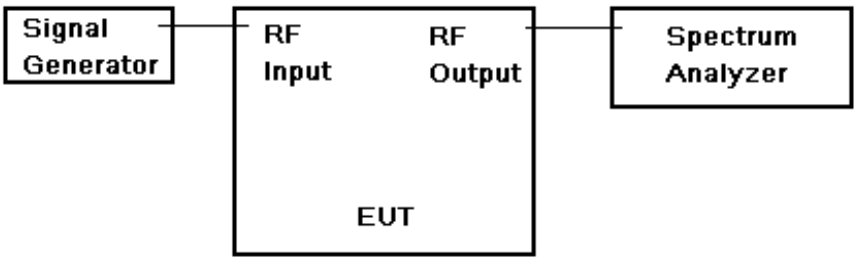


Fig.4. Out of Band rejection test configuration

Test Procedure:

1. Connect the equipment as illustrated;
2. Test the background noise level with all the test facilities;
3. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
4. Select the attenuator to avoid the test receiver or spectrum analyzer being destroied;
5. Keep the EUT continuously transmitting in max power;
6. Signal generator sweep from the frequency more lower than the product frequency to the frequency more higher than it, find the product band filter characteristic;

· CW signal rather than typical signal is acceptable (for FM).

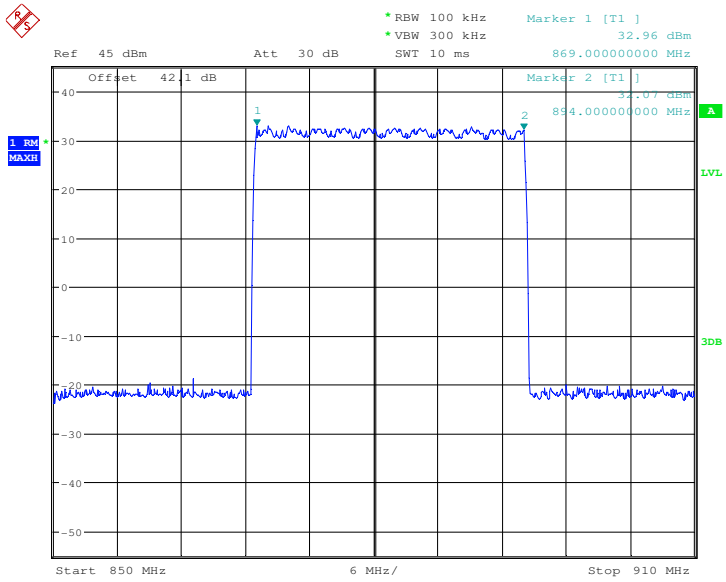
· Multiple band filter will need test each other.

7.2.6.1 Measurement Record:

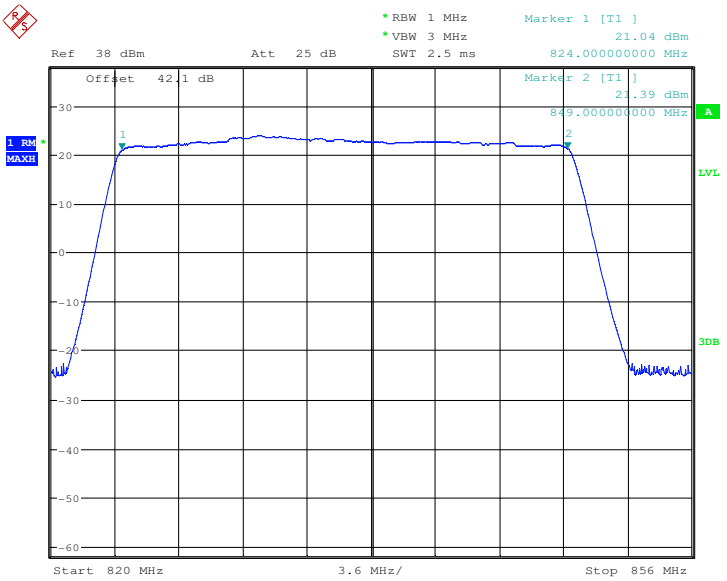
1. Test for Downlink: 869MHz to 894MHz

Remark:

Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).



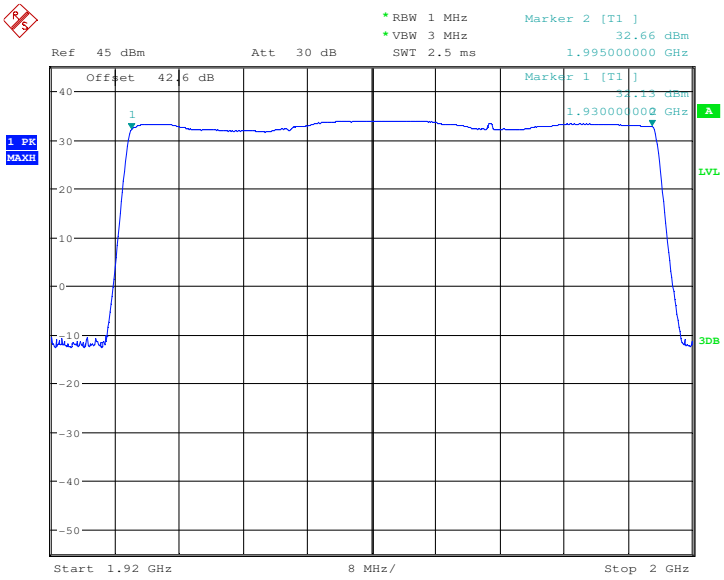
2. Test for Uplink: 824MHz to 849MHz



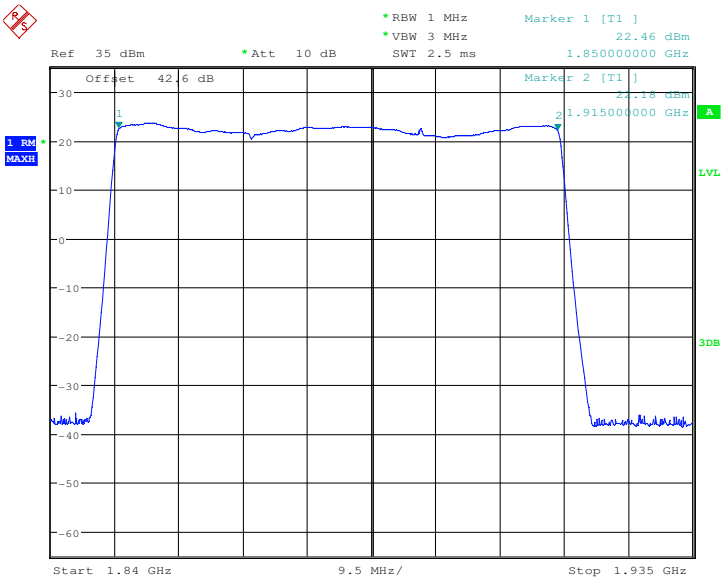
3. Test for Downlink: 1930MHz to 1995MHz

Remark:

Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worse case as the EUT with Maximum Rated Output power(33dBm).



4. Test for Uplink:1850MHz to 1915MHz



7.2.7 Frequency Stability

Test Date: 2013-12-11 to 2013-12-16

Test Requirement: FCC part 22.355 & FCC part 24.235

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Method: FCC part 2.1055

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Temperature conditions, voltage conditions

Application: Cellular Band RF output ports

Test Procedure:

1. Temperature conditions:
   a) The RF output port of the EUT was connected to Frequency Meter;
   b) Set the working Frequency in the middle channel;
   c) record the 20℃ and norminal voltage frequency value as reference point;
   d) vary the temperature from -40℃ to 50℃ with step 10℃
   e) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
   f) read the frequency at the relative temperature.

2. Voltage conditions:
   a) record the 20℃ and norminal voltage frequency value as reference point;
   b) vary the voltage from -15% norminal voltage to +15% voltage;
   c) read the frequency at the relative voltage.

7.2.7.1 Measurement Record:

1) Frequency Stability vs temperature:

1.1) Test for Downlink: 869~894MHz (middle channel 881.5MHz)

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
40	881.5000029	0.0001134
30	881.5000030	0.0002269
20	881.5000028	Reference
10	881.5000027	-0.0001134
0	881.5000031	0.0003403
-10	881.5000029	0.0001134
-20	881.5000030	0.0002269

1.2) Test for Uplink: 824~849MHz (middle channel 836.5MHz)

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
40	836.5000034	0.0003586
30	836.5000032	0.0001195
20	836.5000031	Reference
10	836.5000032	0.0001195
0	836.5000031	0
-10	836.5000032	0.0001195
-20	836.5000033	0.0002391

1.3) Test for Downlink: 1930~1995MHz (middle channel 1962.5MHz)

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
40	1962.5000029	0.0000510
30	1962.5000027	-0.0000510
20	1962.5000028	Reference
10	1962.5000030	0.0001019
0	1962.5000029	0.0000510
-10	1962.5000029	0.0000510
-20	1962.5000031	0.0001529

1.4) Test for Uplink: 1850~1915MHz (middle channel 1882.5MHz)

Temperature(℃)	Frequency(MHz)	Tolerance(ppm)
40	1882.5000028	0.0000531
30	1882.5000027	0
20	1882.5000027	Reference
10	1882.5000029	0.0001062
0	1882.5000030	0.0001593
-10	1882.5000029	0.0001062
-20	1882.5000031	0.0002125

2) Frequency Stability vs voltage:

1.1) Test for Downlink: 869~894MHz (middle channel 881.5MHz)

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	881.5000029	0.0001134
120	881.5000028	Reference
138 (120*1.15)	881.5000031	0.00034033

1.2) Test for Uplink: 824~849MHz (middle channel 836.5MHz)

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	836.5000032	0.0001195
120	836.5000031	Reference
138 (120*1.15)	836.5000033	0.0002391

1.3) Test for Downlink: 1930~1995MHz (middle channel 1962.5MHz)

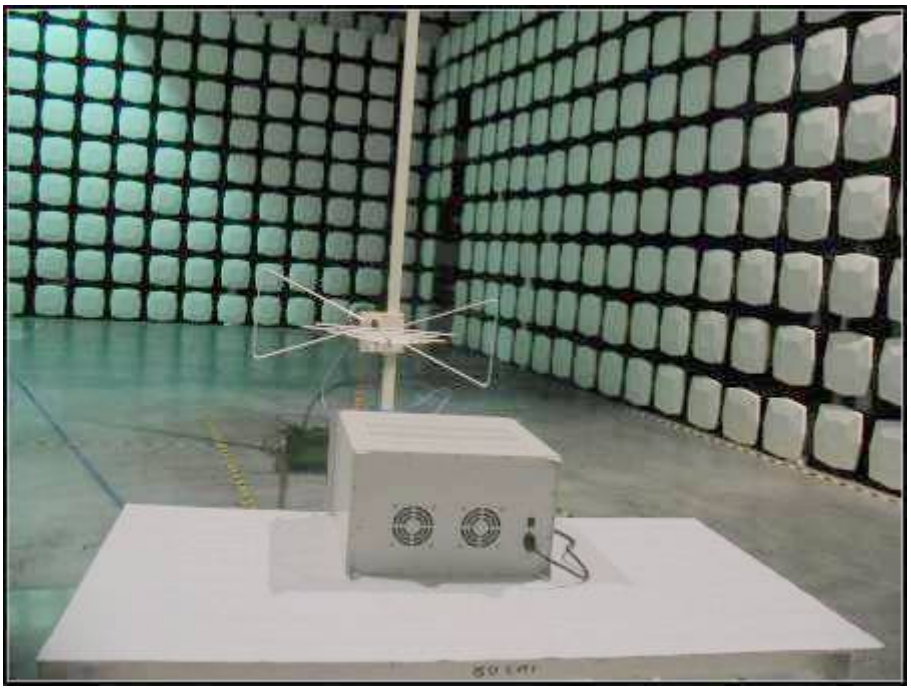
Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	1962.5000027	-0.0000510
120	1962.5000028	Reference
138 (120*1.15)	1962.5000029	0.0000510

1.4) Test for Uplink: 1850~1915MHz (middle channel 1882.5MHz)

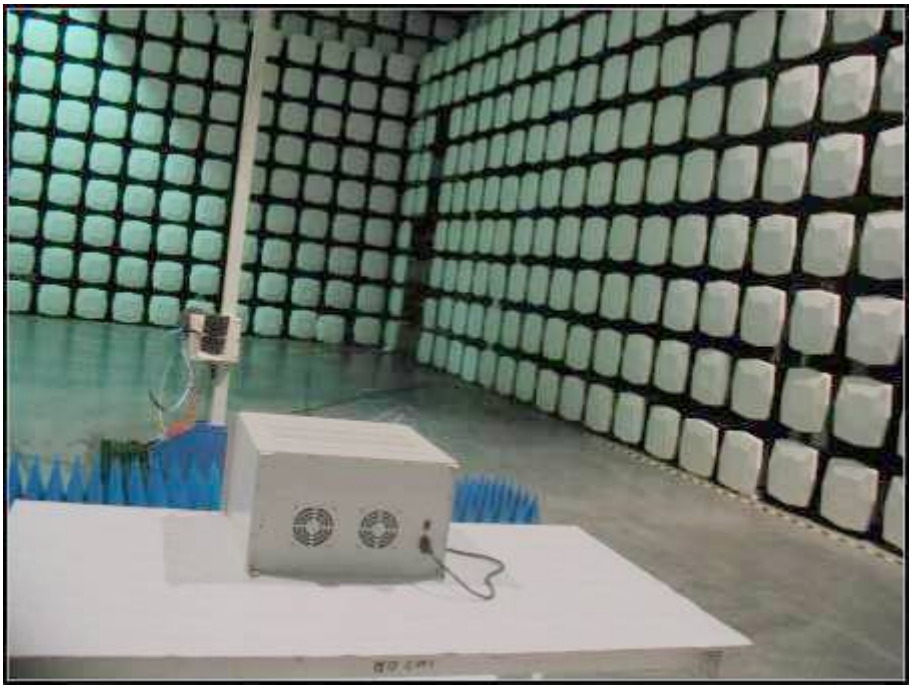
Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	1882.5000029	0.0001062
120	1882.5000027	Reference
138 (120*1.15)	1882.5000028	0.00005312

8 Photographs - Test Setup

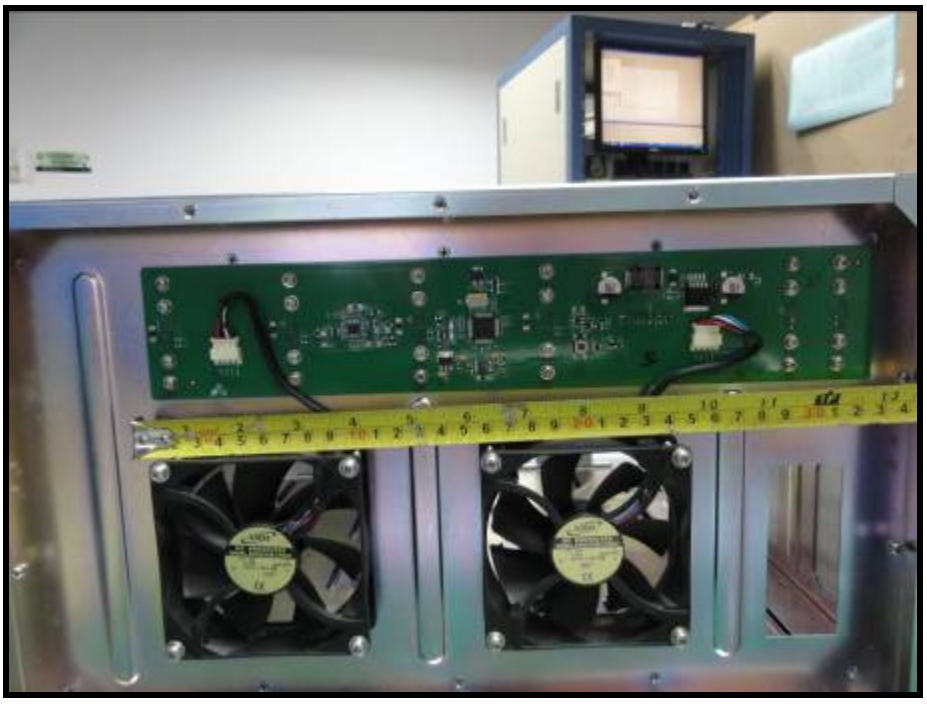
30MHz ~ 1GHz Radiated Emission

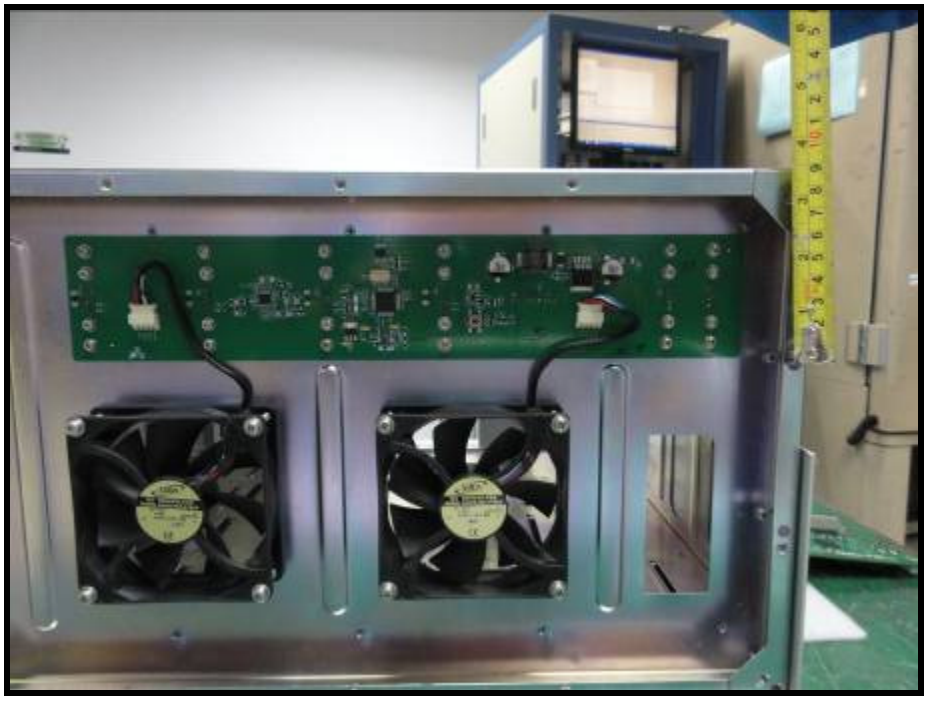


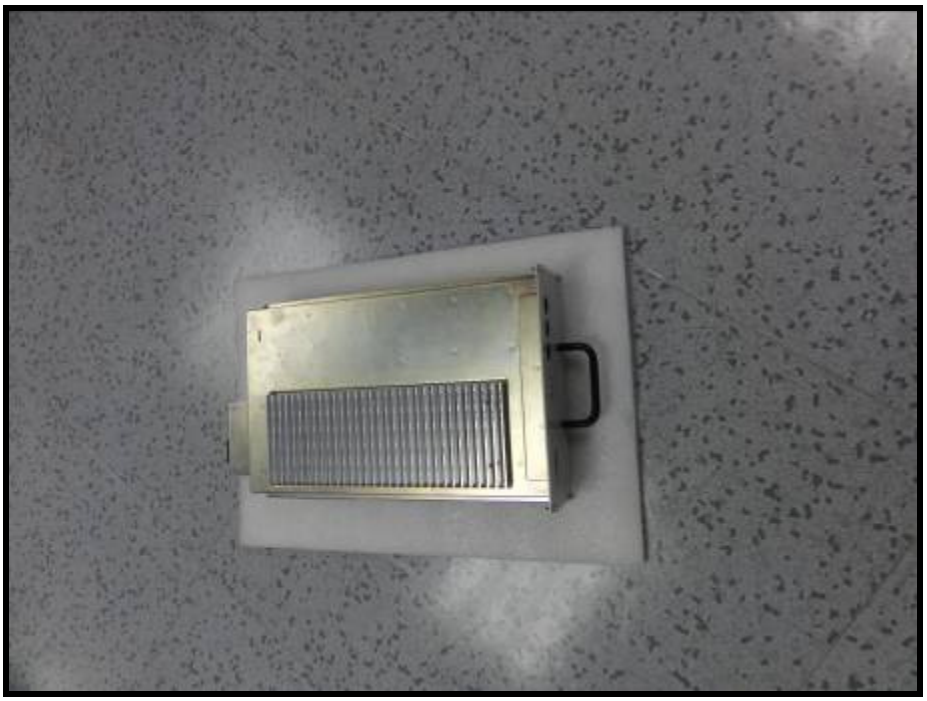
Above 1GHz Radiated Emission

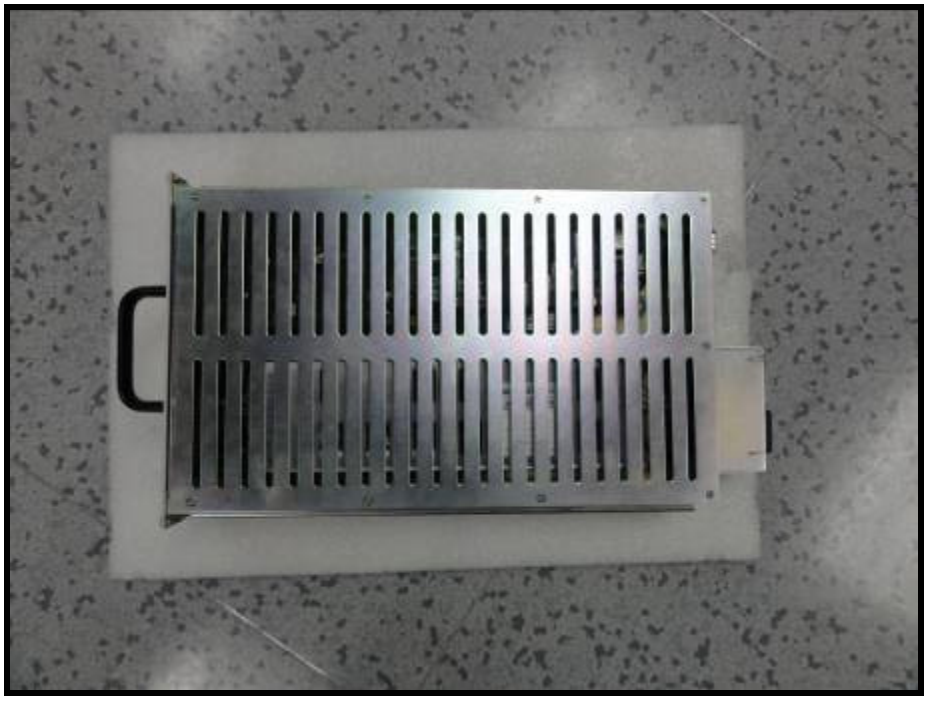


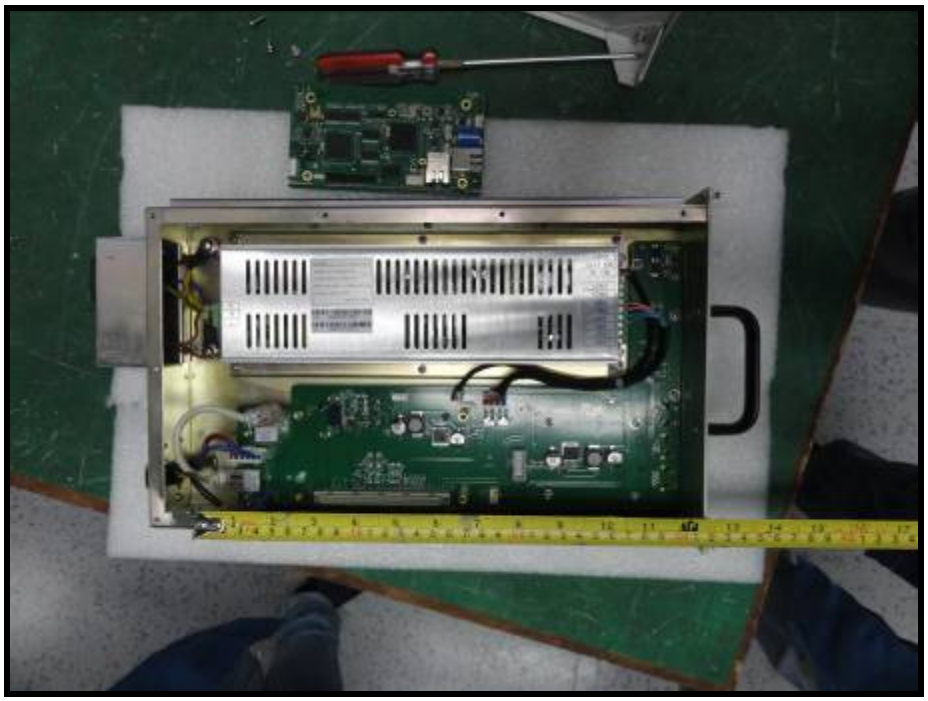
9 Photographs - EUT Constructional Details

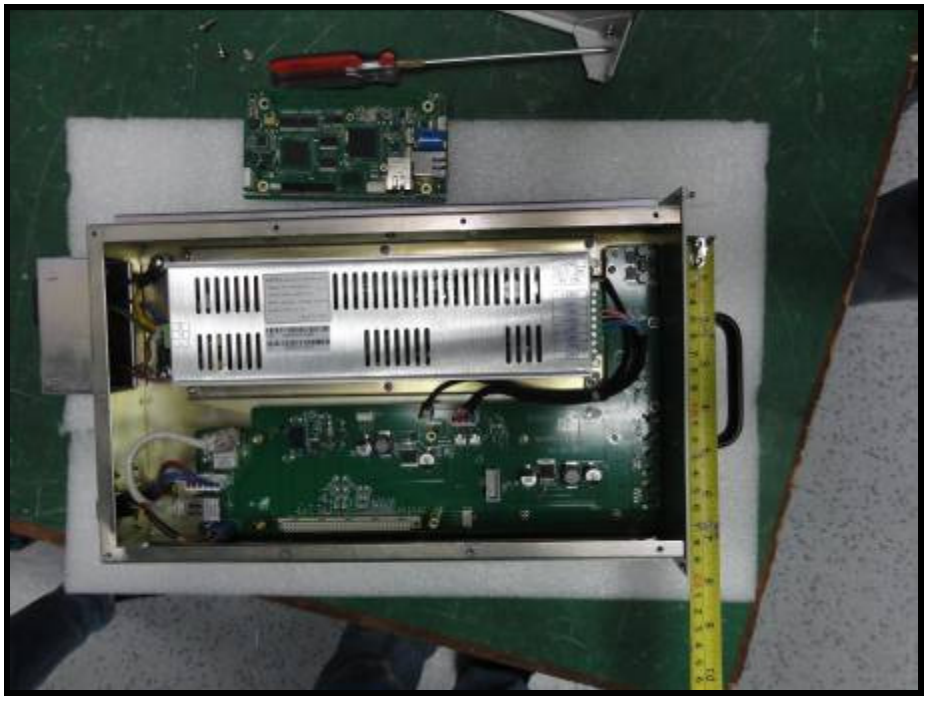


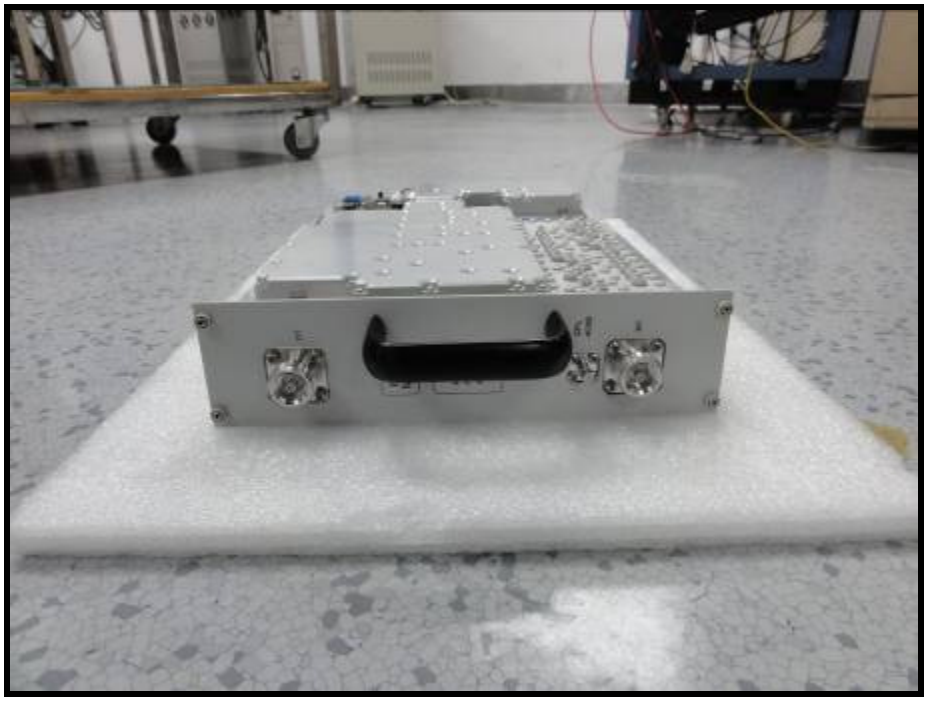


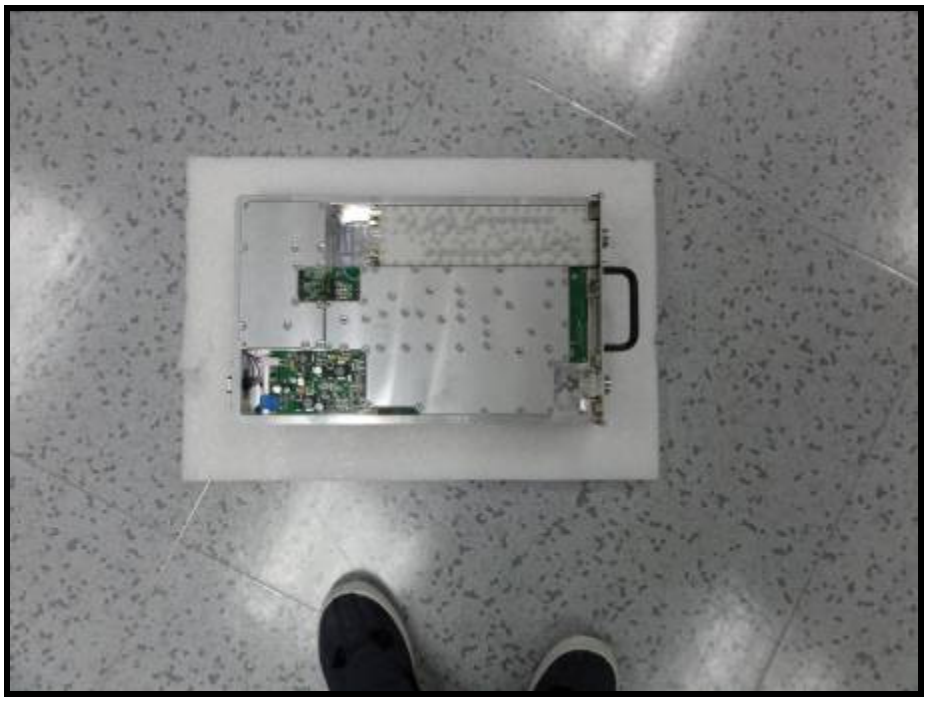


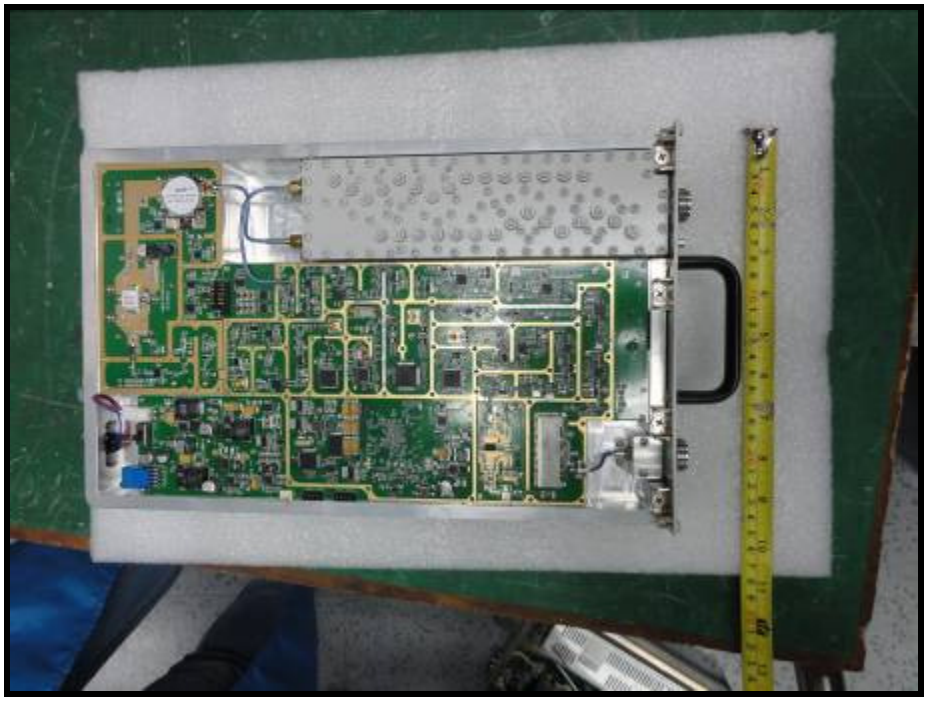


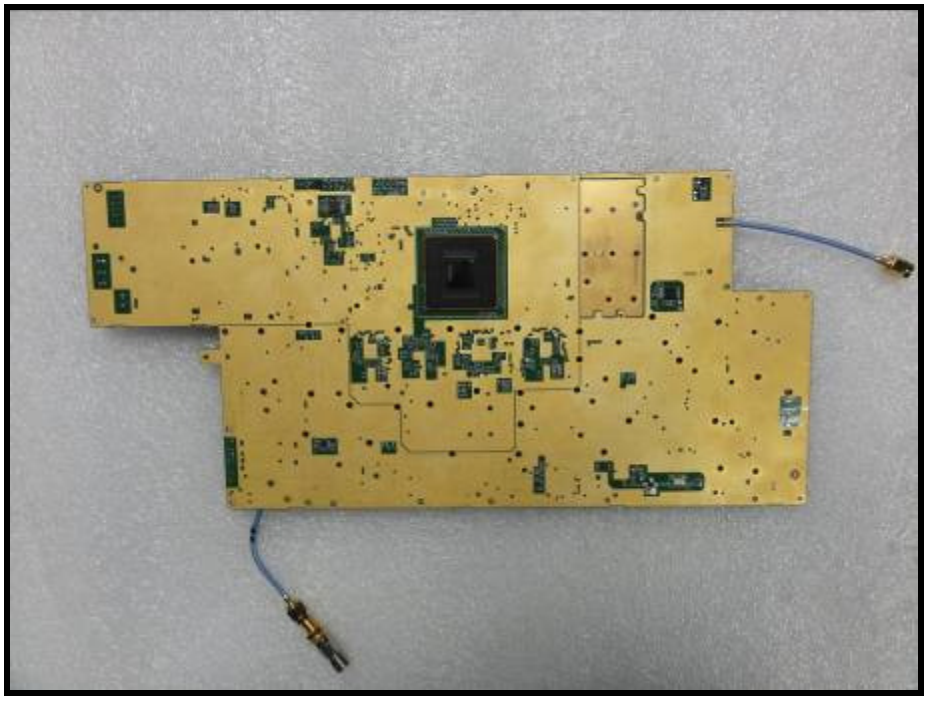


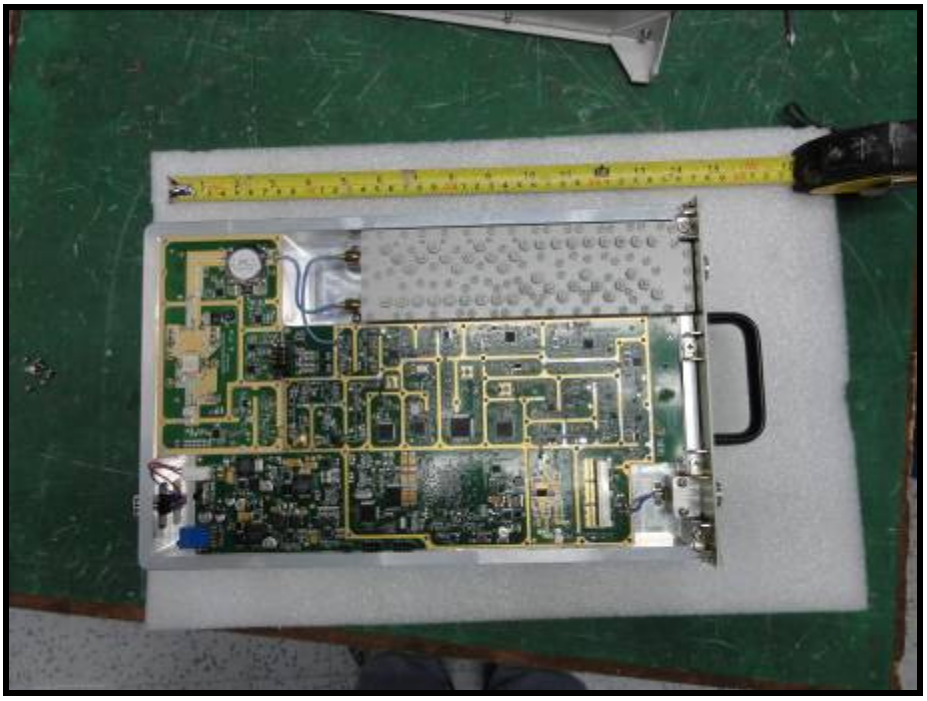


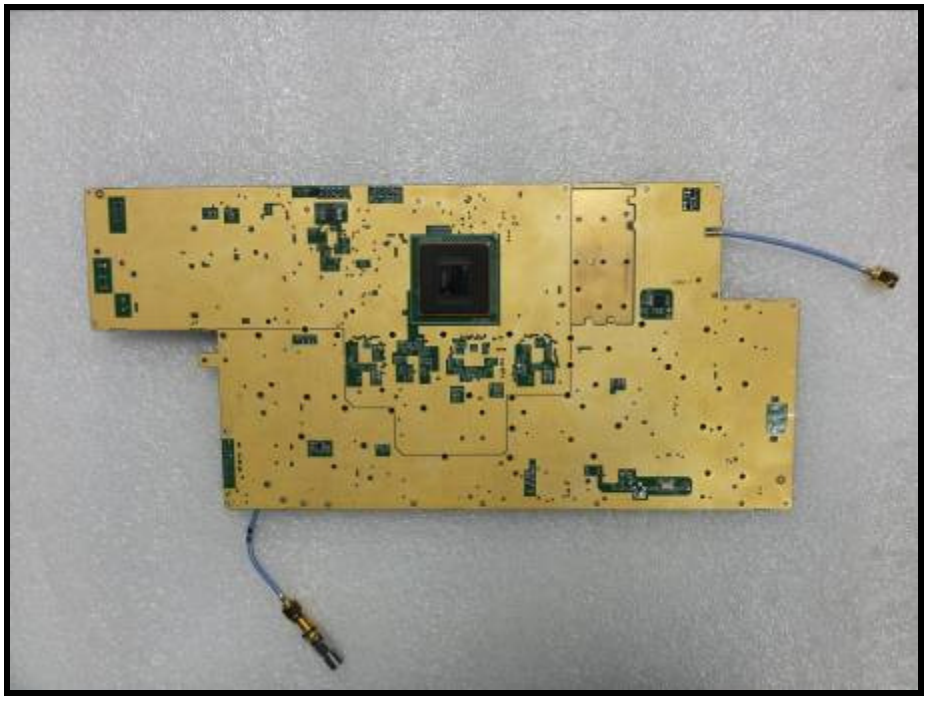


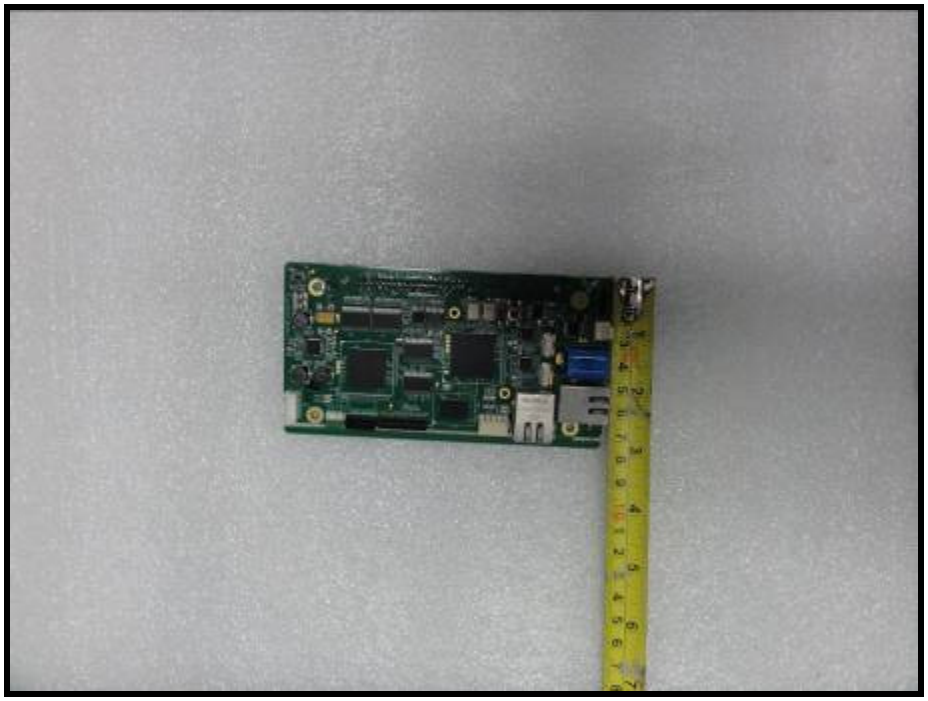


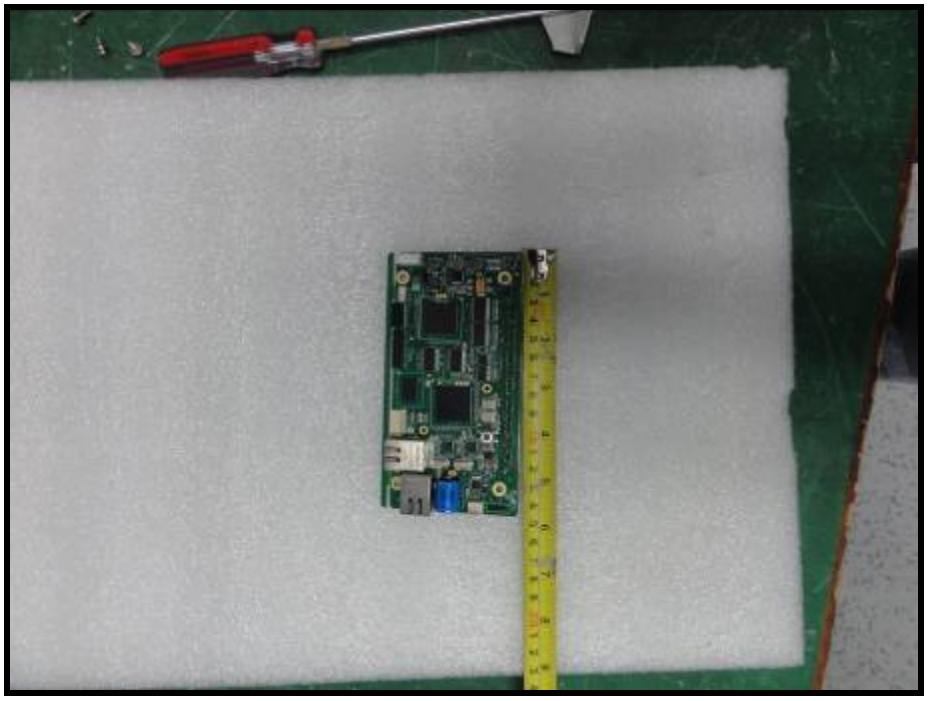


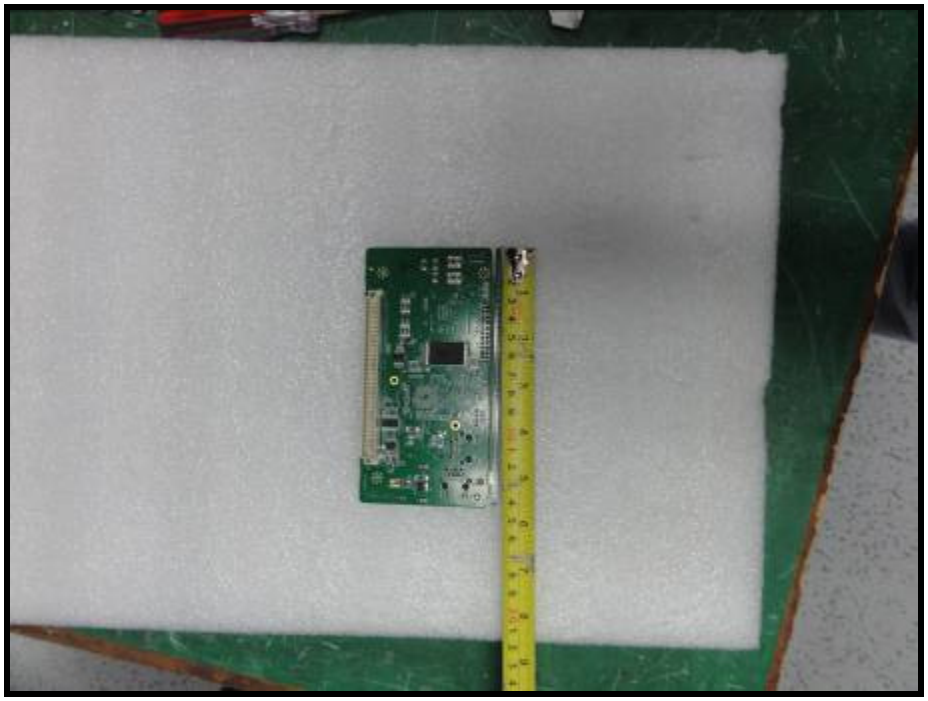


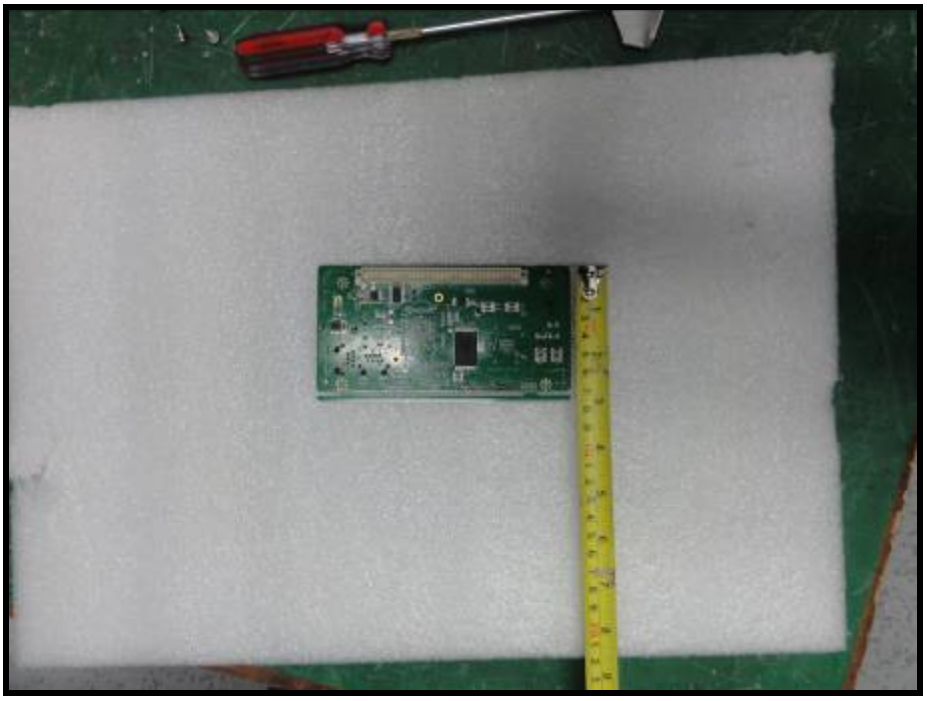












--The End of Report--