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Report No.: GZEM140700341203
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FCC ID: PX8MBDA-200S

TEST REPORT

Application No.:	GZEM1407003412RF
Applicant:	Comba Telecom Ltd.
FCC ID:	PX8MBDA-200S
Product Name:	mBDA Band Selective Wireless Repeater
Model No.:	mBDA-200S
Trade Mark:	Comba
Standards:	FCC Part 22, FCC Part 24, FCC Part 27, FCC Part 2
Date of Receipt:	2014-07-08
Date of Test:	2014-07-09 to 2014-08-31
Date of Issue:	2014-10-30
Test Result :	Pass*

* In the configuration tested, the EUT complied with the standards specified above. This report GZEM140700341203 supersedes the previous report GZEM140700341201, issued on 2014-09-01 which is hereby deemed null and void.

Richard Li
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.




The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2014-09-01		Original (null)
01		2014-10-30		Adding test information for RF Output power.

Authorized for issue by:			
Tested By			2014-07-09 to 2014-08-31 Date
Prepared By			2014-10-30 Date
Checked By			2014-10-30 Date



3 Test Summary

Test Item	Test Requirement	Test Method	Result
Output Power	FCC part 22.913 FCC part 24.232 FCC part 27.50	FCC part 2.1046 2-11-04/EAB/RF	PASS
Conducted Spurious Emissions	FCC part 22.917 FCC part 24.238 FCC part 27.53	FCC part 2.1051 2-11-04/EAB/RF	PASS
Band Edge& Intermodulation	FCC part 22.917 FCC part 24.238 FCC part 27.53	FCC part 2.1051 2-11-04/EAB/RF	PASS
Radiated Spurious Emissions	FCC part 22.917 FCC part 24.238 FCC part 27.53	FCC part 2.1053 2-11-04/EAB/RF	PASS
Occupied Bandwidth	FCC part 2.1049	FCC part 2.1049 2-11-04/EAB/RF	PASS
Out of Band Rejection	2-11-04/EAB/RF	2-11-04/EAB/RF	PASS
Frequency Stability	FCC part 22.355 FCC part 24.235 FCC part 27.54	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.			



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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 (China) 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-200S
Power Supply: AC 100-240V 47-63Hz
Test power: AC 120V 60Hz
Operating Temperature: -20 °C to +40°C
Operating Humidity: 10% to 85%

5.3 Details of E.U.T.

Type of Modulation GSM&CDMA&WCDMA & LTE
GXW(GSM)
Emission Designator: F9W(CDMA),
F9W (WCDMA)
G7D(LTE)
Frequency Band: Downlink 728MHz to 746MHz;Uplink 698MHz to 716MHz
include the Modulation:LTE;
Downlink 746MHz to 757MHz;Uplink 776MHz to 787MHz
include the Modulation:LTE;
Downlink 869MHz to 894MHz;uplink 824MHz to 849MHz
include the Modulation: GSM,CDMA, WCDMA, LTE;
Downlink 1930MHz to 1995MHz;uplink 1850MHz to 1915MHz
include the Modulation: GSM,CDMA, WCDMA, LTE;
Downlink 2110MHz to 2155MHz;Uplink 1710MHz to 1755MHz
include the Modulation: WCDMA, LTE;
Downlink 2620MHz to 2690MHz;Uplink 2500MHz to 2570MHz
include the Modulation:LTE
Nominal Power Output: 27,30,33dBm for downlink of all frequency bands
23dBm for uplink @824-849&1850-1915MHz
17dBm for uplink @698-716&776-787&1710-1755&2500-2570MHz
Nominal System Gain: 80dB for downlink & 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.

mBDA offers a modular, robust design that is easy to install, manage an upgrade. It supports three individually adjustable sub-bands for flexibility and high RF performance, supports multi-carrier and multi-band operation.

Remote configuration and surveillance is possible through Comba's remote and monitoring system via PC or wireless modem to the OMT/OMC.

5.5 Standards Applicable for Testing

The standard used was FCC part 2 & FCC part 22 & FCC part 24 & FCC part 27

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.



6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2013-12-5	2014-12-5
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-04-19	2015-04-19
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2014-03-03	2015-03-03
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	2015-05-09
EMC2025	Trilog Broadband Antenna 30-1 000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3372	2014-07-14	2017-07-14
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-08-31	2016-08-31
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-05-04	2017-05-04
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2013-08-31	2016-08-31
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2012-07-01	2015-07-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-03	2015-03-03
EMC2065	Amplifier	HP	8447F	N/A	2014-08-25	2015-08-25
EMC0075	310N Amplifier	Sonama	310N	272683	2014-03-03	2015-03-03
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-03-03	2016-03-03
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9170	9170-375	2014-05-26	2017-05-26
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-04-19	2015-04-19
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-05-03	2016-05-03



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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	2014.6.12	2015.6.11
NA	Signal Generator	Agilent	E4437B	US39260800	2014.6.12	2015.6.11
NA	Signal Generator	Agilent	E4438C	US39260800	2014.6.12	2015.6.11
NA	Spectrum Analyzer	Agilent	N9020A	MY48011385	2014.6.12	2015.6.11
NA	Spectrum Analyzer	Rohde&Schwarz	FSQ 8	SN0805772	2014.6.12	2015.6.11
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	2014.6.12	2015.6.11

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal. Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2013-09-13	2014-09-13
EMC0007	DMM	Fluke	73	70671122	2013-09-13	2014-09-13



7 Test Results

7.1 E.U.T. test conditions

Input Voltage:	AC 120V 60Hz
Operating Environment:	
Temperature:	22°C ~26°C
Humidity:	46%~56% RH
Atmospheric Pressure:	990~1005M modulationbar
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 setting 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

1.700L MHz

Downlink: 728MHz to 746MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	731.5	737	743.5
LTE(15M modulation)	735.5	737	738.5

Uplink: 698MHz to 716MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	700.5	707	713.5
LTE(15M modulation)	705.5	707	708.5

2.700U MHz

Downlink: 746MHz to 757MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	748.5	751.5	754.5
LTE(10M modulation)	751	751.5	752

Uplink: 776MHz to 787MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	778.5	781.5	784.5
LTE(10M modulation)	781	781.5	782

3.850MHz

Downlink: 869MHz to 894MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	872	881.5	891
LTE(5M modulation)	871.5	881.5	891.5
LTE(15M modulation)	879	881.5	884

Uplink: 824MHz to 849MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	827	836.5	846
LTE(5M modulation)	826.5	836.5	846.5
LTE(15M modulation)	834	836.5	839



4. 1900MHz

Downlink: 1930MHz to 1995MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	1933	1962.5	1992
LTE(5M modulation)	1932.5	1962.5	1992.5
LTE(15M modulation)	1940	1962.5	1985

Uplink: 1850MHz to 1915MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	1853	1882.5	1912
LTE(5M modulation)	1852.5	1882.5	1912.5
LTE(15M modulation)	1860	1882.5	1905

5. AWS

Downlink: 2110 MHz to 2155MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	2113	2130	2152
LTE(5M modulation)	2112.5	2130	2152.5
LTE(15M modulation)	2120	2130	2145

Uplink: 1710 MHz to 1755MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	1713	1730	1752
LTE(5M modulation)	1712.5	1730	1752.5
LTE(15M modulation)	1720	1730	2150

6. 2600MHz

Downlink: 2620MHz to 2690MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	2622.5	2640	2687.5
LTE(15M modulation)	2630	2640	2680

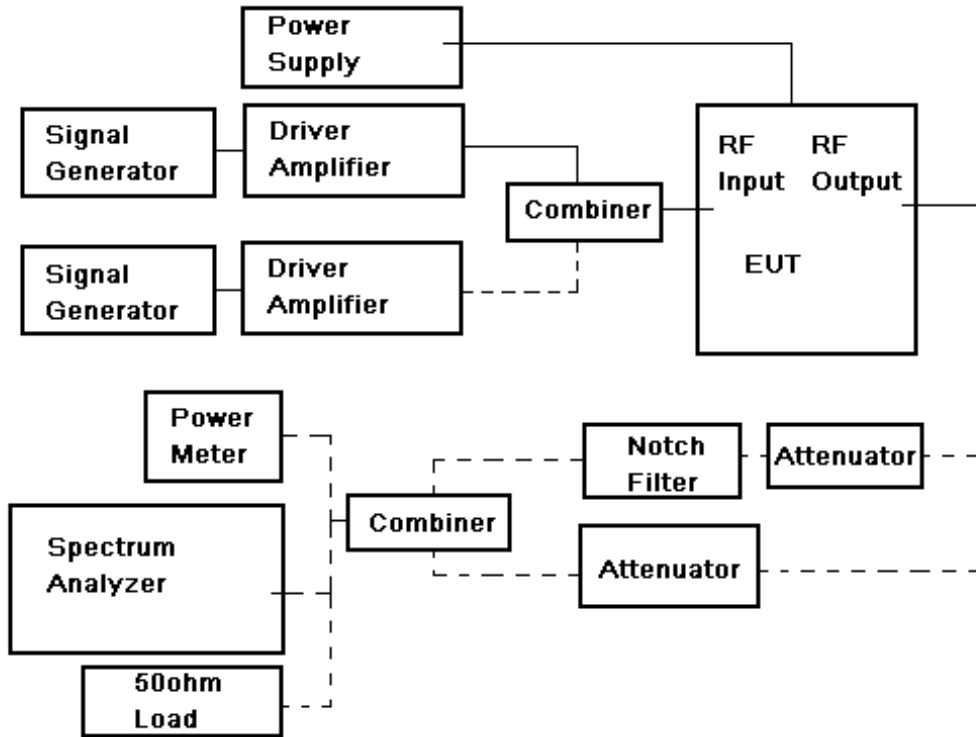
Uplink: 2500 MHz to 2570MHz

Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	2502.5	2535	2567.5
LTE(15M modulation)	2510	2535	2560

Remark:

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

General Test Setup:





7.2.1 RF Output Power

Test Date: 2014-08-10

Test Requirement: FCC part 22.913(a) & FCC part 24.232(a)&(b) and FCC part 27.50(b)(2), (c)(1)(3),d(3)(4)

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.

(b) The following power and antenna height limits apply to transmitters operating in the 746-763 MHz, 775-793 MHz and 805-806 MHz bands:

(2) Fixed and base stations transmitting a signal in the 746-757 MHz, 758-763 MHz, 776-787 MHz, and 788-793 MHz bands with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.

(c) The following power and antenna height requirements apply to stations transmitting in the 698-746 MHz band:

(1) Fixed and base stations transmitting a signal with an emission bandwidth of 1 MHz or less must not exceed an effective radiated power (ERP) of 1000 watts and an antenna height of 305 m height above average terrain (HAAT), except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section;

(3) Fixed and base stations transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section;

Para. No.27.50(d)(1). The power of each fixed or base station transmitting in the 2110-2155 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available



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population statistics from the Bureau of the Census, is limited to a peak equivalent isotropically radiated power (EIRP) of 3280 watts. The power of each fixed or base station transmitting in the 2110-2155 MHz band from any other location is limited to a peak EIRP of 1640 watts. A licensee operating a base or fixed station utilizing a power of more than 1640 watts EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band.

Operations above 1640 watts EIRP must also be coordinated in advance with the following licensees within 120 kilometers (75 miles) of the base or fixed station: all Broadband Radio Service (BRS) licensees authorized under Part 27 in the 2155-2160 MHz band and all AWS licensees in the 2110-2155 MHz band.

(3) A licensee operating a base or fixed station in the 2110-2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-2110 MHz band. A licensee operating a base or fixed station in the 2110-2180 MHz band utilizing power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: All Broadband Radio Service (BRS) licensees authorized under this part in the 2155-2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110-2180 MHz band.

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

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:

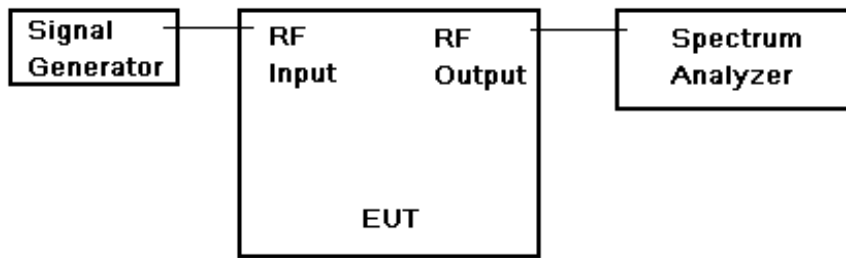


Fig.1 RF Output Power test configuration



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

Uncertainty: ± 2dB

1.700L MHz

1.1 Downlink: 728MHz ~ 746MHz

7.2.1.2 1.1.1 Test in the maxoutput 27dBm

limit: 27dBm± 2dB

Per channel Power Input=-53dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	27.6dBm (0.575W)	27.7dBm (0.589W)	27.5dBm (0.562W)
LTE(15M modulation)	26.2dBm (0.417W)	26.3 dBm (0.427W)	26.5dBm (0.447W)

1.1.2 Test in the maxoutput 30dBm

limit: 30dBm± 2dB

Per channel Power Input=-50dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	30.6dBm (1.148W)	30.7dBm (1.175W)	30.5dBm (1.122W)
LTE(15M modulation)	29.3dBm (0.851W)	29.4 dBm (0.871W)	29.5dBm (0.891W)

1.1.3 Test in the maxoutput 33dBm

limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	33.7dBm (2.344W)	32.8dBm (1.905W)	33.6dBm (2.291W)
LTE(15M modulation)	32.2dBm (1.660W)	32.3 dBm (1.698W)	32.3 dBm (1.698W)

1.2 Uplink: 698MHz ~ 716MHz

limit: 17dBm± 2dB

Per channel Power Input=-63dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	16.9dBm (0.049W)	17.1dBm (0.512W)	17.0dBm (0.501W)
LTE(15M modulation)	16.9dBm (0.049W)	17.3dBm (0.054W)	17.2dBm (0.053W)



2.700U MHz

2.1 Downlink: 746MHz ~ 757MHz

2.1.1 Test in the maxoutput 27dBm limit: 27dBm± 2dB

Per channel Power Input=-53 dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	27.6dBm (0.575W)	27.4dBm (0.550W)	27.2dBm (0.525W)
LTE(15M modulation)	27.5dBm (0.562W)	27.5dBm (0.562W)	27.4dBm (0.550W)

2.1.2 Test in the maxoutput 30dBm limit: 30dBm± 2dB

Per channel Power Input=-50dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	30.6dBm (1.148W)	30.4dBm (1.096W)	30.3dBm (1.071W)
LTE(15M modulation)	30.5dBm (1.122W)	30.4dBm (1.096W)	30.6dBm (1.148W)

2.1.3 Test in the maxoutput 33dBm limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	33.7dBm (2.344W)	33.5dBm (2.239W)	33.3dBm (2.140W)
LTE(10M modulation)	33.4dBm (2.188W)	33.6dBm (2.291W)	33.5dBm (2.239W)

2.2 Uplink: 776MHz ~ 787MHz limit: 17dBm± 2dB

Per channel Power Input=-63dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	17.1dBm (0.051W)	17.8dBm (0.061W)	18.1dBm (0.065W)
LTE(10M modulation)	16.8dBm (0.047W)	16.7dBm (0.047W)	16.9dBm (0.049W)



3.850MHz

Remark:

The data of the GSM mode and CDMA mode have been tested in 850MHz frequency bands ,reference the report of GZEM1311005668RF(FCC ID: PX8MBDA-200).

3.1 Downlink: 869MHz ~ 894MHz

3.1.1 Test in the maxoutput 27dBm limit: 27dBm± 2dB

Per channel Power Input=-53dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	26.8dBm (0.479W)	26.6dBm (0.457W)	26.1dBm (0.407W)
LTE(5M modulation)	26.9dBm (0.490W)	27.3 dBm (0.537W)	27.8dBm (0.603W)
LTE(20M modulation)	27.1dBm (0.513W)	26.8dBm (0.479W)	26.9dBm (0.490W)

3.1.2 Test in the maxoutput 30dBm limit: 30dBm± 2dB

Per channel Power Input=-50dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	29.7dBm (0.933W)	29.7dBm (0.955W)	30.0dBm (1.000W)
LTE(5M modulation)	29.9dBm (0.977W)	30.3 dBm (1.072W)	29.8dBm (0.955W)
LTE(20M modulation)	30.0dBm (1.023W)	29.9dBm (0.977W)	29.8dBm (0.955W)

3.1.3 Test in the maxoutput 33dBm limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	32.7dBm (1.861W)	32.7dBm (1.905W)	33.0dBm (1.995W)
LTE(5M modulation)	32.9dBm (1.995)	33.3dBm (2.138W)	32.8dBm (1.906W)
LTE(20M modulation)	33.0dBm (1.995W)	32.9dBm (1.950W)	32.8dBm (1.905W)



3.2 Uplink: 824MHz ~ 849MHz

limit: 23dBm± 2dB

Per channel Power Input=-57dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	23.3dBm (0.214W)	23.3dBm (0.214W)	23.1dBm (0.204W)
LTE(5M modulation)	22.4 dBm (0.173W)	23.1dBm (0.204W)	22.3dBm (0.169W)
LTE(20M modulation)	22.9dBm (0.195W)	23.0dBm (0.200W)	23.2dBm (0.209W)

4.LTE 1900MHz

Remark:

The data of the GSM mode and CDMA mode in 1900MHz frequency bands have been tested ,reference the report of GZEM1311005668RF(FCC ID: PX8MBDA-200).

4.1 Downlink: 1930MHz ~ 1995MHz

4.1.1 Test in the maxoutput 27dBm

limit: 27dBm± 2dB

Per channel Power Input=-53dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	26.8dBm (0.480W)	26.9dBm (0.490W)	27.1dBm (0.513W)
LTE(5M modulation)	26.5dBm (0.447W)	25.9 dBm (0.389W)	26.3dBm (0.427W)
LTE(20M modulation)	26.4dBm (0.437W)	26.5dBm (0.447W)	26.1dBm (0.407W)

4.1.2 Test in the maxoutput 30dBm

limit: 30dBm± 2dB

Per channel Power Input=-50dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	29.8dBm (0.955W)	29.7dBm (0.933W)	30.1dBm (1.023W)
LTE(5M modulation)	29.3 dBm (0.851W)	29.6 dBm (0.912W)	29.3 dBm (0.851W)
LTE(20M modulation)	29.5dBm (0.891W)	29.2dBm (0.831W)	29.1dBm (0.813W)



4.1.3 Test in the maxoutput 33dBm limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	32.7dBm (1.862W)	32.7dBm (1.862W)	33.0dBm (1.995W)
LTE(5M modulation)	31.4dBm (1.380W)	31.8dBm (1.514W)	31.2dBm (1.349W)
LTE(20M modulation)	32.4dBm (1.738W)	32.4dBm (1.738W)	32.0dBm (1.585W)

4.2 Uplink: 1850MHz ~ 1915MHz limit: 23dBm± 2dB

Per channel Power Input=-47dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	22.5dBm (0.178W)	22.3dBm (0.170W)	22.1dBm (0.162W)
LTE(5M modulation)	22.4dBm (0.174W)	22.4dBm (0.174W)	22.0dBm (0.159W)
LTE(20M modulation)	22.2dBm (0.170W)	21.5dBm (0.141W)	23.2dBm (0.209W)

5. AWS

5.1 Downlink: 2110 MHz to 2155MHz

5.1.1 Test in the maxoutput 27dBm limit: 27dBm± 2dB

Per channel Power Input=-53dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	26.6dBm (0.457W)	26.5dBm (0.450W)	26.1dBm (0.470W)
LTE(5M modulation)	27.3dBm (0.537W)	26.2dBm (0.417W)	26.2dBm (0.417W)
LTE(20M modulation)	26.7dBm (0.468W)	26.8dBm (0.480W)	26.6dBm (0.458W)



5.1.2 Test in the maxoutput 30dBm limit: 30dBm± 2dB

Per channel Power Input=-50dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	29.5dBm (0.891W)	29.4dBm (0.871W)	29.0dBm (0.794W)
LTE(5M modulation)	30.4dBm (1.096W)	29.1dBm (0.813W)	29.0dBm (0.794W)
LTE(20M modulation)	29.6dBm (0.891W)	29.6dBm (0.912W)	29.5dBm (0.891W)

5.1.3 Test in the maxoutput 33dBm limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	32.5dBm (1.778W)	32.4dBm (1.738W)	32.0dBm (1.585W)
LTE(5M modulation)	33.4dBm (2.188W)	32.1dBm (1.622W)	32.0dBm (1.585W)
LTE(20M modulation)	32.6dBm (1.820W)	32.6dBm (1.820W)	32.5dBm (1.778W)

5.2 Uplink: 1710 MHz to 1755MHz limit: 17dBm± 2dB

Per channel Power Input=-63dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
WCDMA	17.2dBm (0.052W)	17.4dBm (0.550W)	16.7 dBm (0.470W)
LTE(5M modulation)	17.6dBm (0.058W)	18.0dBm (0.063W)	17.0dBm (0.050W)
LTE(20M modulation)	17.9dBm (0.062W)	17.2dBm (0.053W)	16.7dBm (0.048W)



6. LTE 2600MHz

6.1 Downlink: 2620 MHz to 2690MHz

6.1.1 Test in the maxoutput 27dBm limit: 27dBm± 2dB

Per channel Power Input=-53dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	26.2dBm (0.417W)	26.5dBm (0.447W)	26.1dBm (0.407W)
LTE(20M modulation)	27.2dBm (0.524W)	27.3dBm (0.537W)	27.0dBm (0.501W)

6.1.2 Test in the maxoutput 30dBm limit: 30dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	29.2dBm (0.832W)	29.7dBm (0.933W)	29.2dBm (0.835W)
LTE(20M modulation)	30.2dBm (1.047W)	30.3dBm (1.071W)	29.9dBm (0.977W)

6.1.3 Test in the maxoutput 33dBm limit: 33dBm± 2dB

Per channel Power Input=-47dBm for downlink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	32.1dBm (1.621W)	32.6dBm (1.820W)	31.3dBm (1.349W)
LTE(20M modulation)	33.3dBm (2.138W)	33.4dBm (2.188W)	33.1dBm (2.042W)

6.2 Uplink: 2500 MHz to 2570MHz limit: 17dBm± 2dB

Per channel Power Input=-63dBm for uplink			
Modulation	Lowest frequency	Middle frequency	Highest frequency
LTE(5M modulation)	18.1dBm (0.065W)	17.1dBm (0.051W)	15.5dBm (0.040W)
LTE(20M modulation)	17.8dBm (0.060W)	17.3dBm (0.054W)	16.6dBm (0.046W)

7.2.2 Conducted Spurious Emissions

Test Date: 2014-08-11 to 2014-08-23

Test Requirement: FCC part 22.917(a) & FCC part 24.238(a) & FCC part 27.53(h)

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 $43 + 10 \log_{10}(P)$ 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:

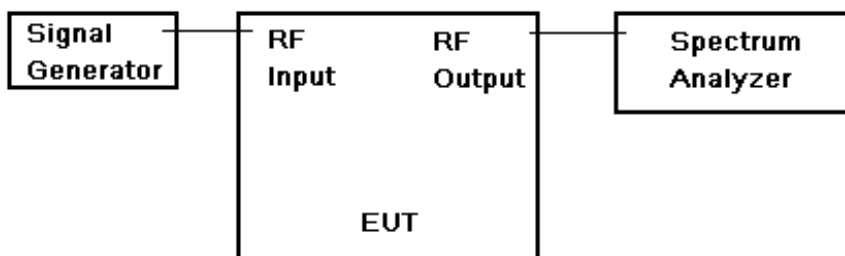
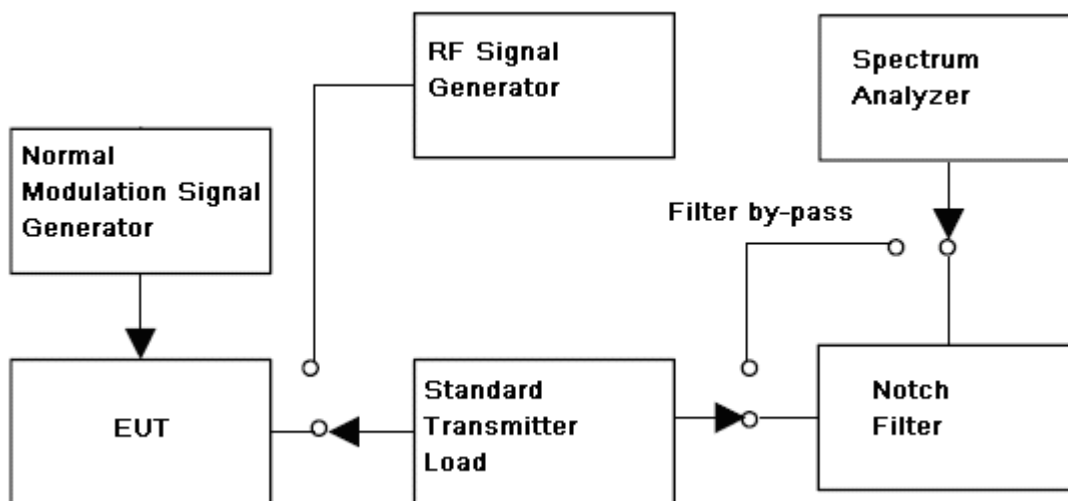


Fig.2. Conducted Spurious Emissions test configuration





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:

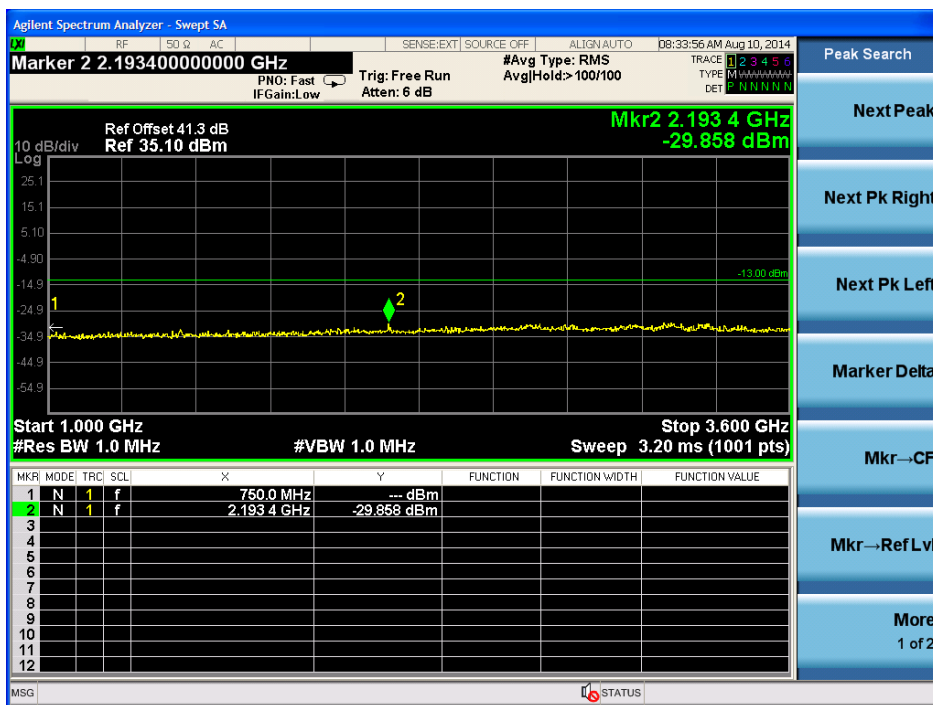
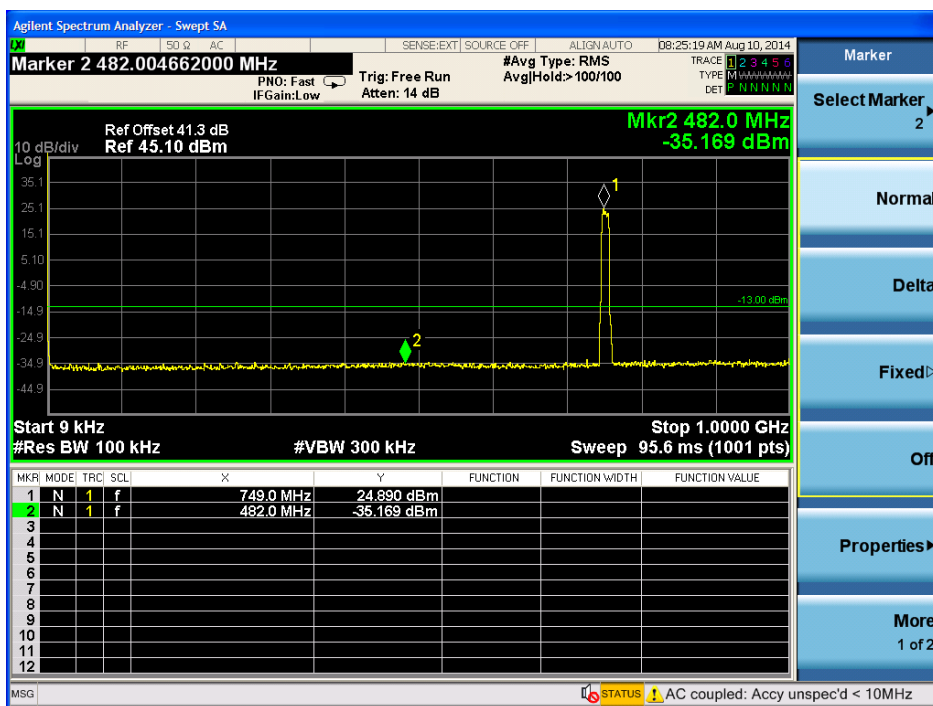
1.Downlink: 728MHz ~ 746MHz(LTE)

Remark:

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

1.1 lowest frequency:

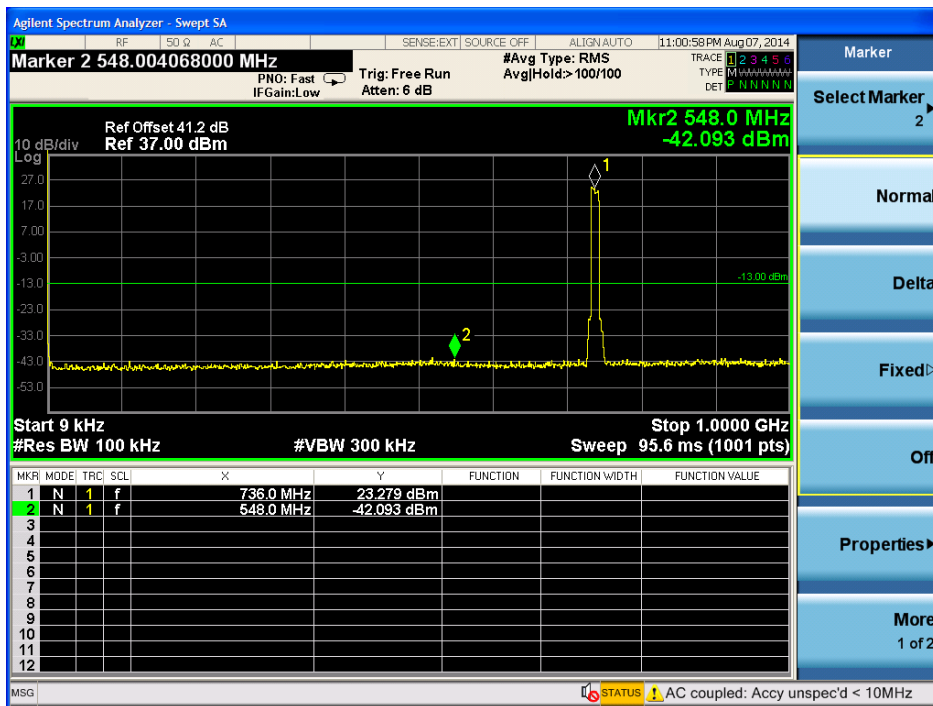
9KHz to 1GHz



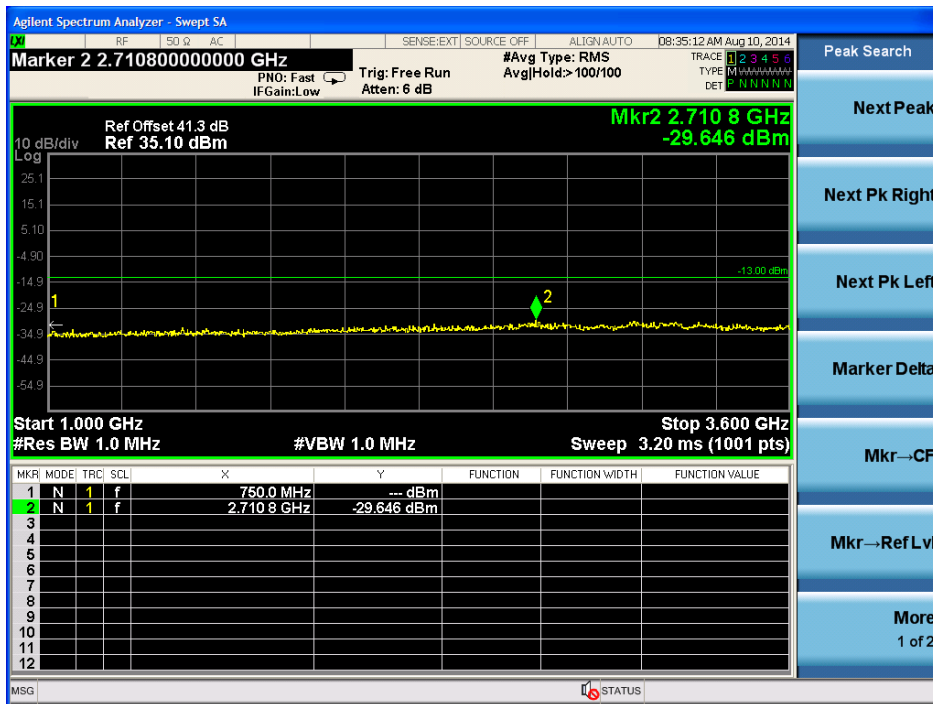


1.2 Middle frequency

9KHz to 1GHz



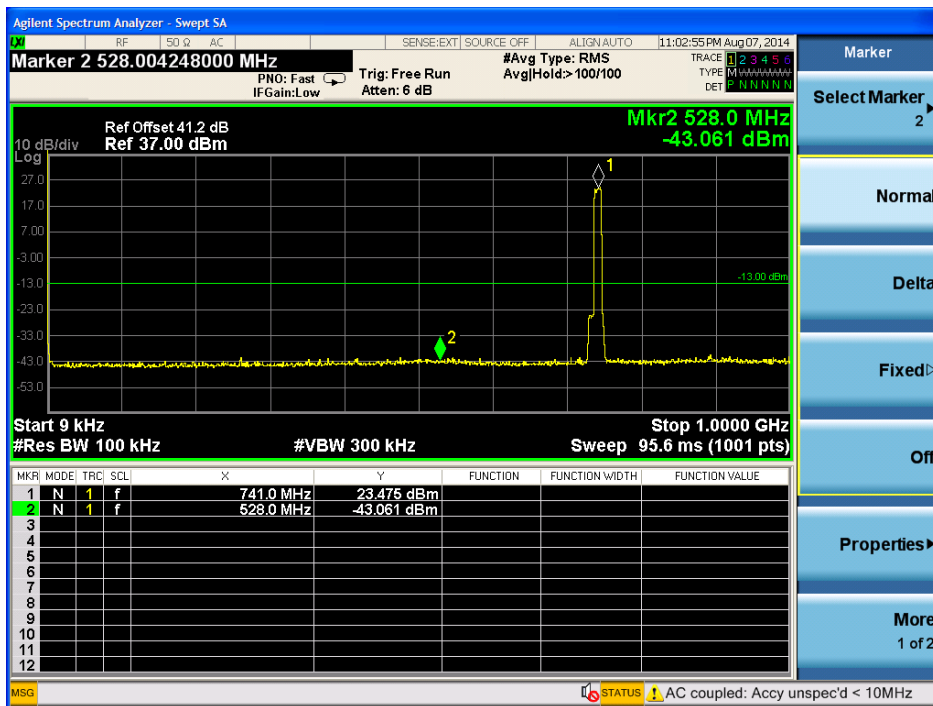
1GHz to 10GHz



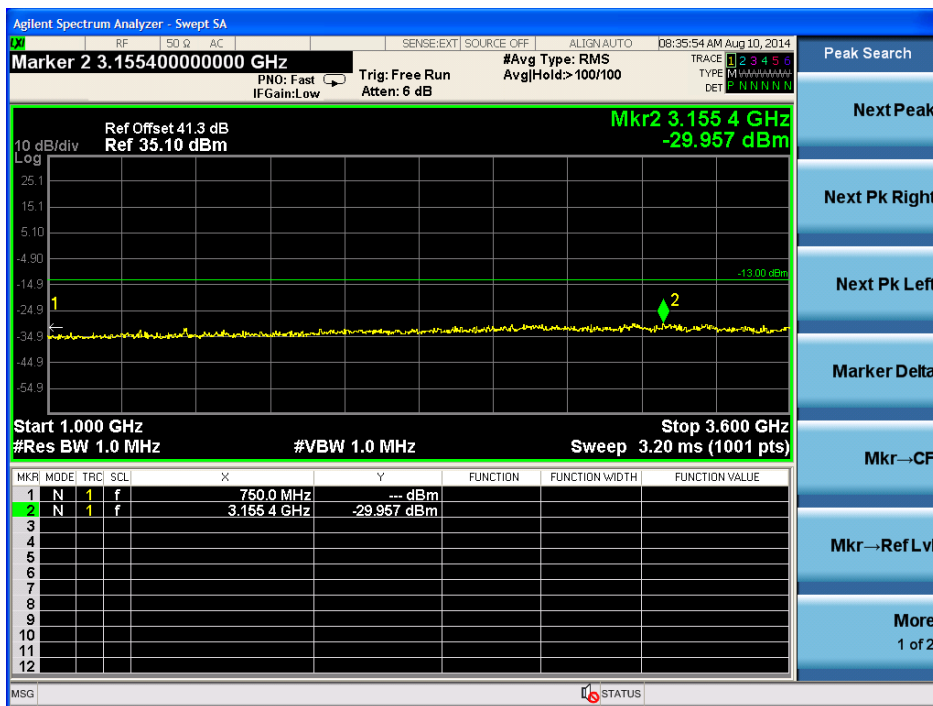


1.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-35.1	-13.0	-22.1
1GHz to 10GHz	RBW=1MHz	-29.8	-13.0	-16.8

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.0	-13.0	-29.0
1GHz to 10GHz	RBW=1MHz	-29.6	-13.0	-16.6

3)highest frequency

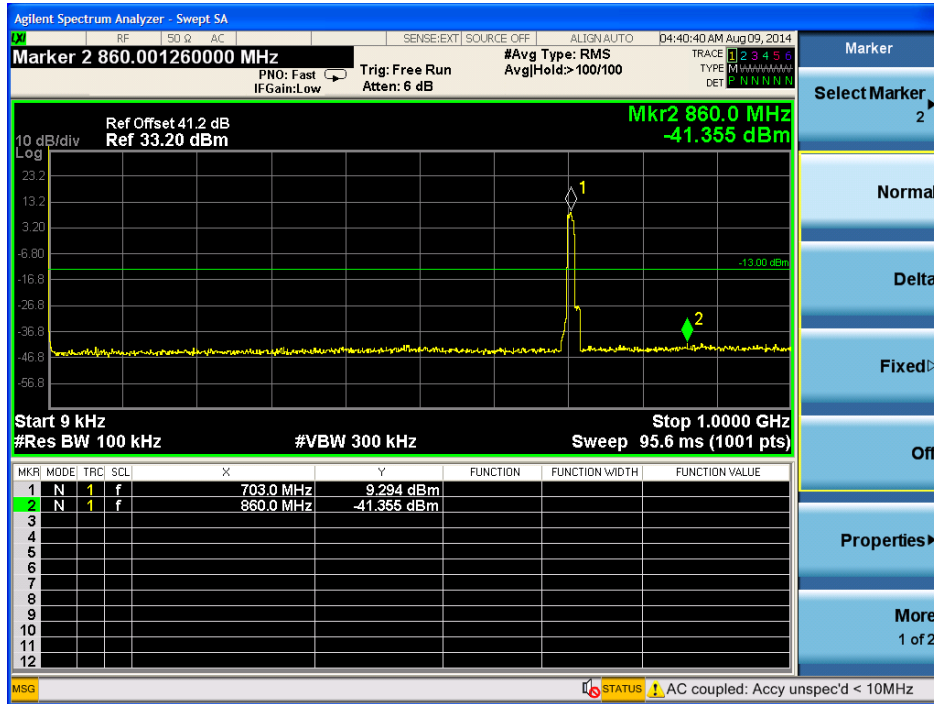
Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.0	-13.0	-30.1
1GHz to 10GHz	RBW=1MHz	-30.0	-13.0	-17.1



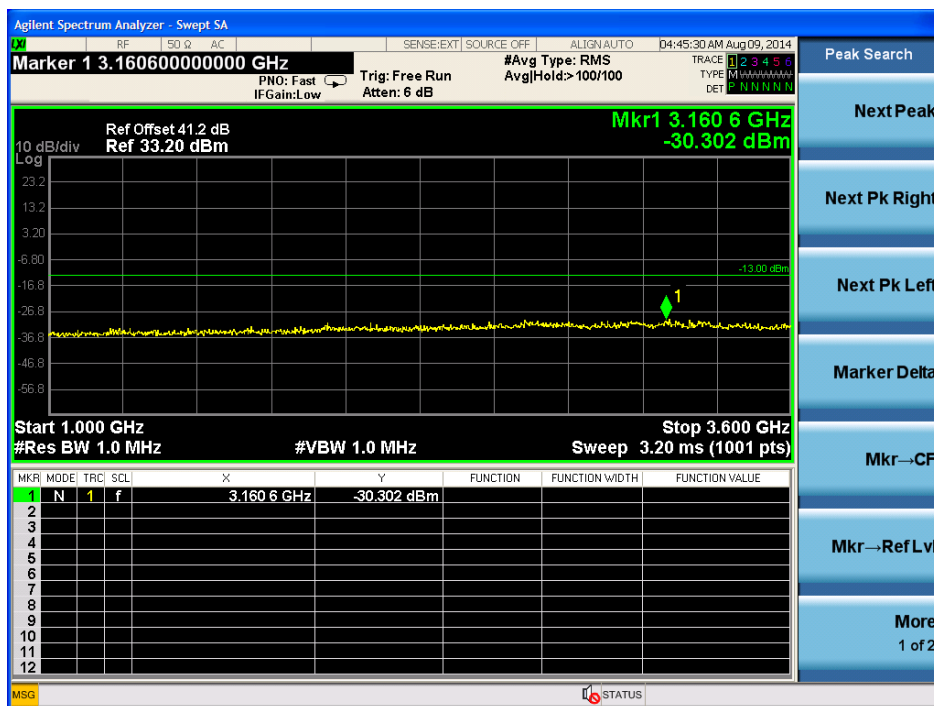
2.Uplink: 698MHz ~ 716MHz(LTE)

2.1 lowest frequency:

9KHz to 1GHz



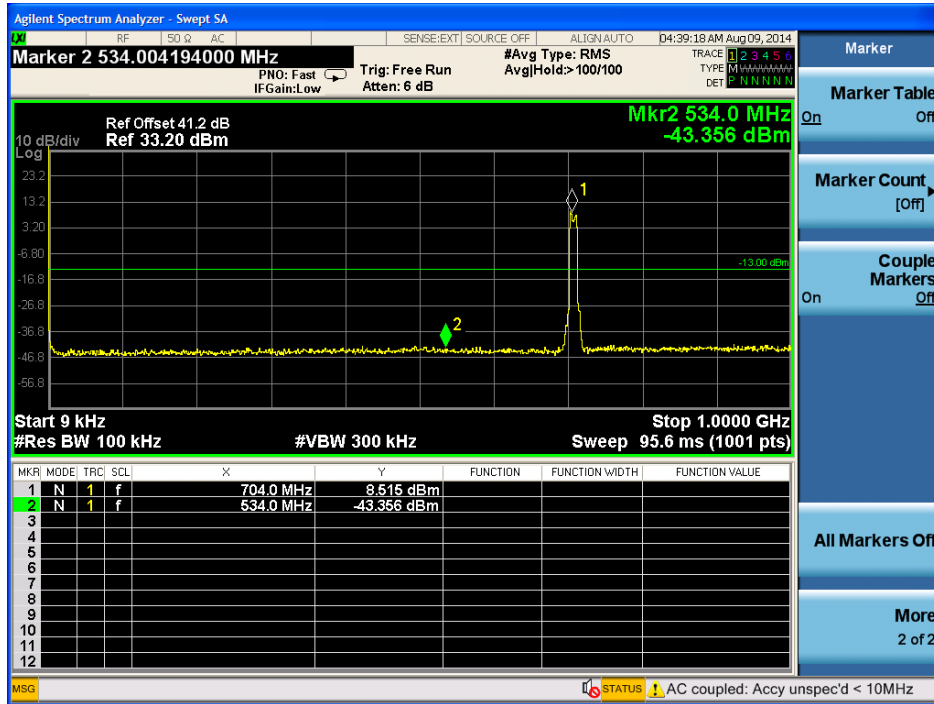
1GHz to 10GHz



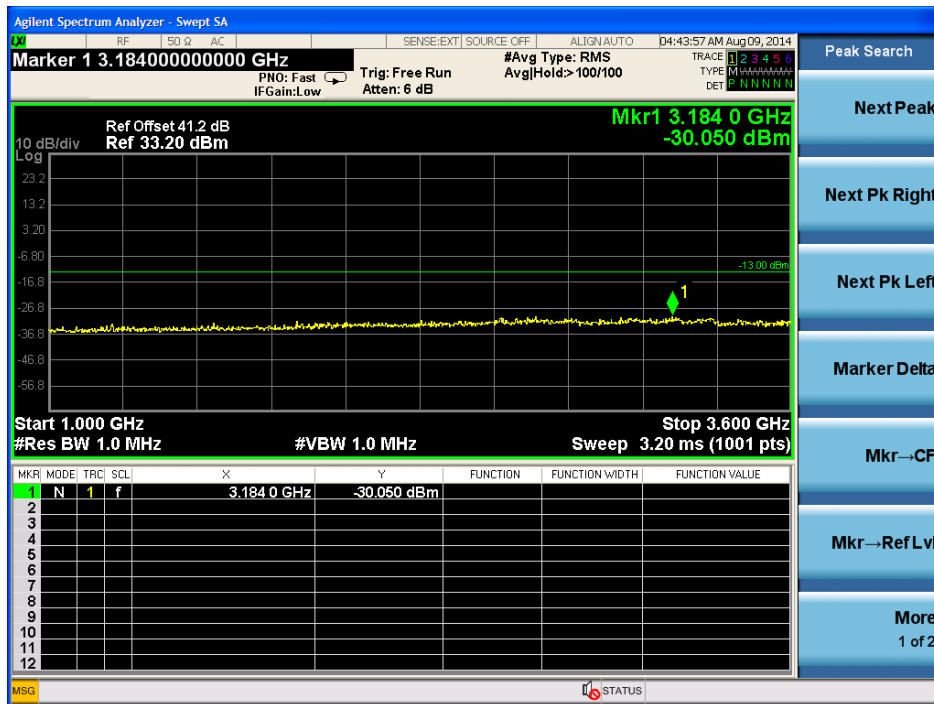


2.2 Middle frequency

9KHz to 1GHz

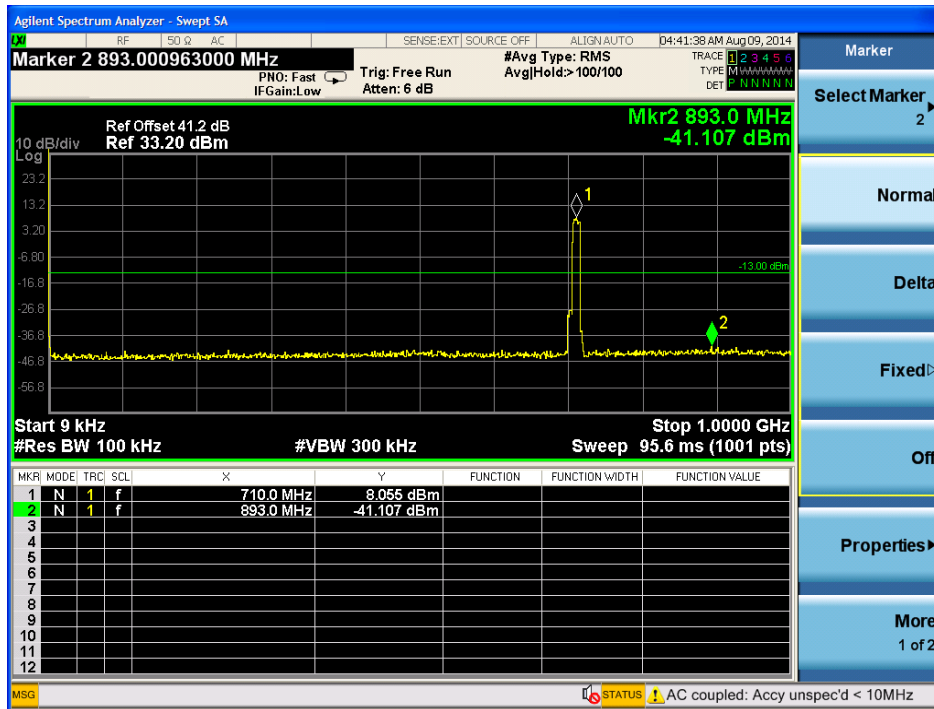


1GHz to 10GHz

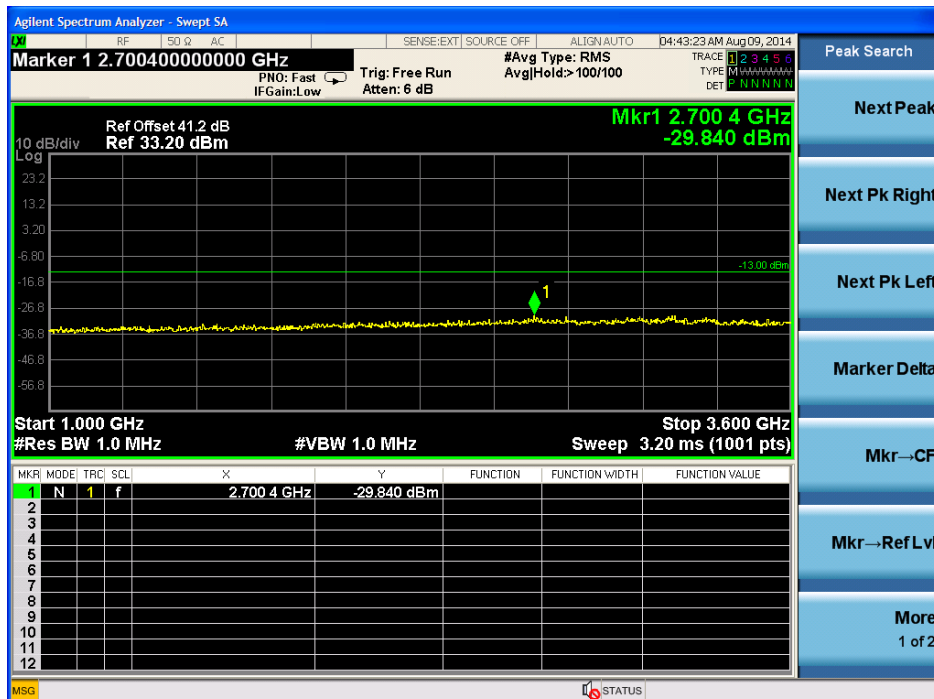




2.3 highest frequency
9KHz to 1GHz



1GHz to 10GHz





Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.3	-13.0	-28.3
1GHz to 10GHz	RBW=1MHz	-30.0	-13.0	-17.0

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.3	-13.0	-30.3
1GHz to 10GHz	RBW=1MHz	-30.1	-13.0	-17.1

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.2	-13.0	-28.2
1GHz to 10GHz	RBW=1MHz	-29.8	-13.0	-16.8



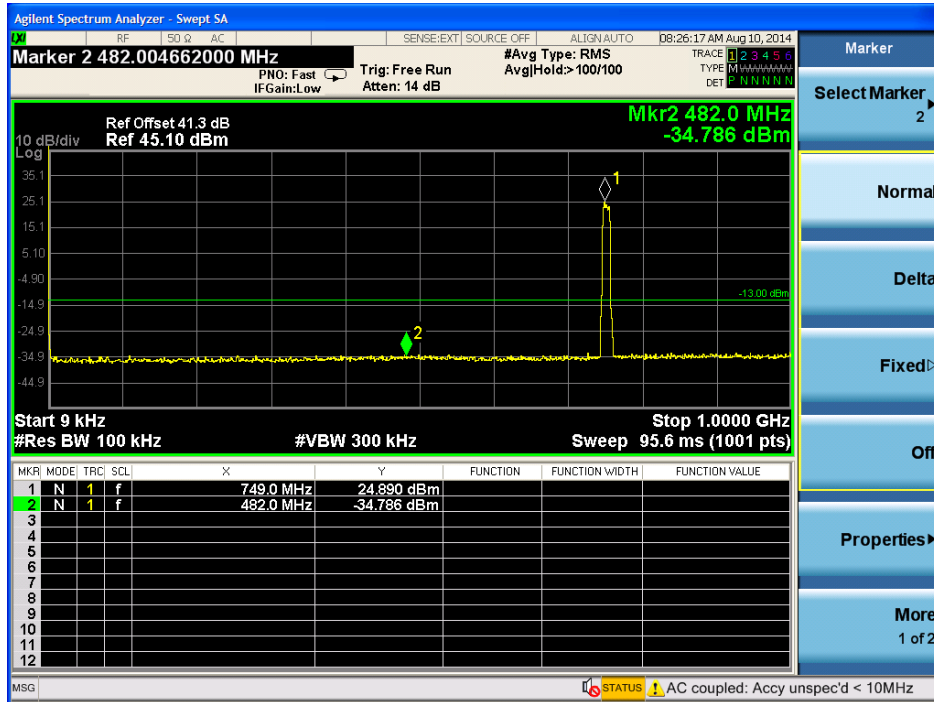
3.Downlink: 746MHz ~ 757MHz(LTE)

Remark:

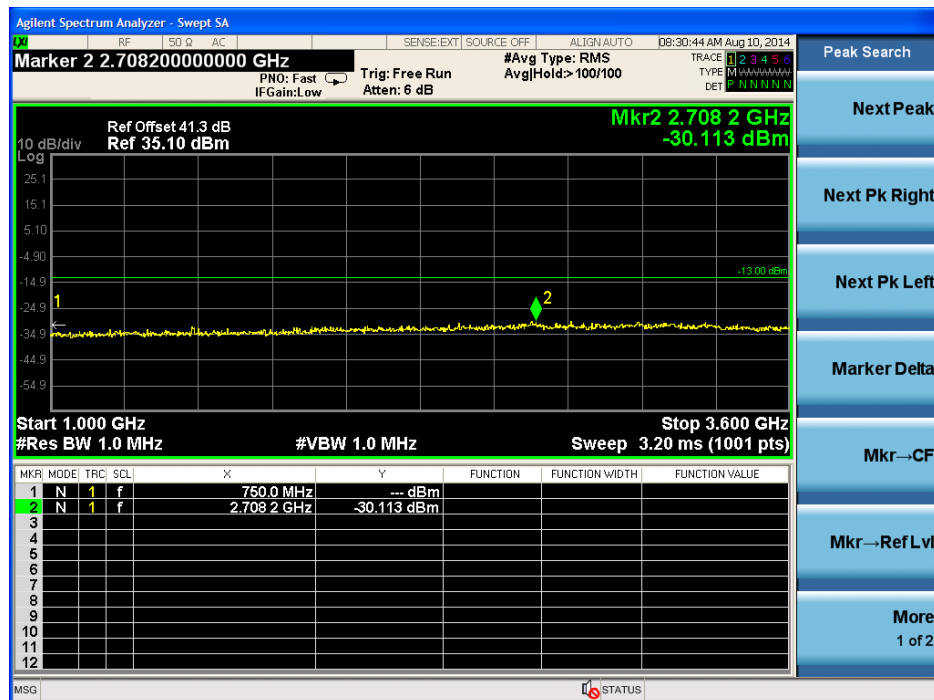
Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worst case as the EUT with Maximum Rated Output power(33dBm).

3.1 lowest frequency

9KHz to 1GHz

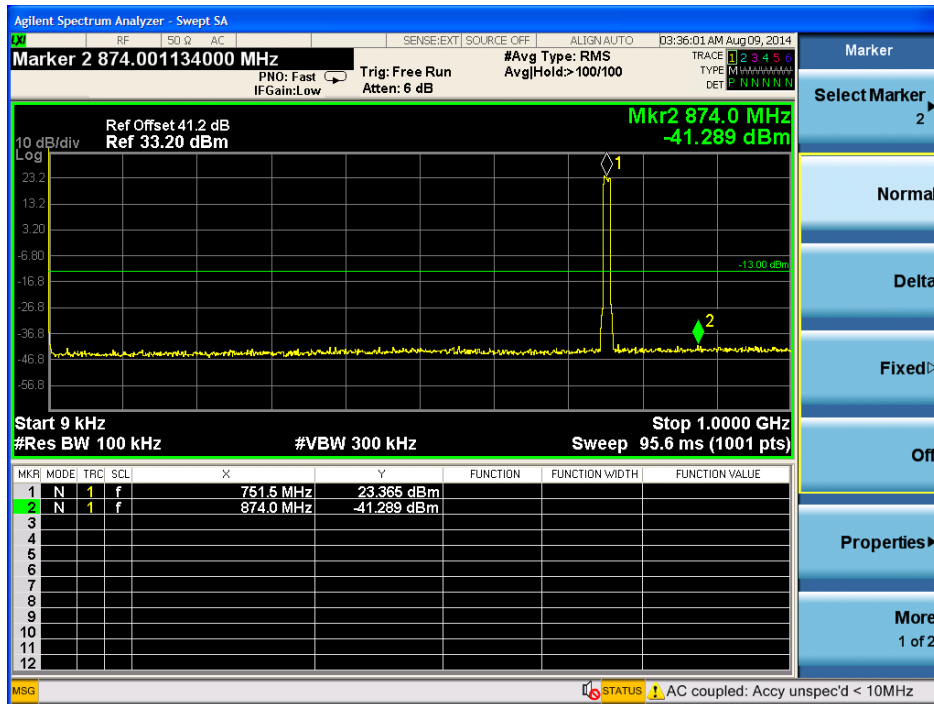


1GHz to 10GHz

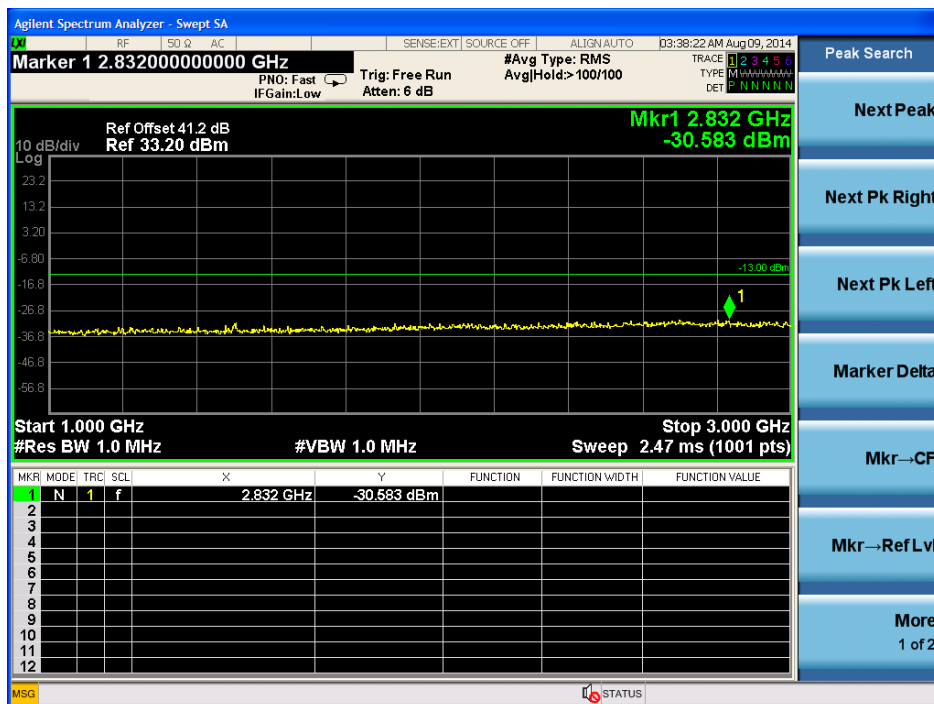




3.2 Middle frequency
9KHz to 1GHz



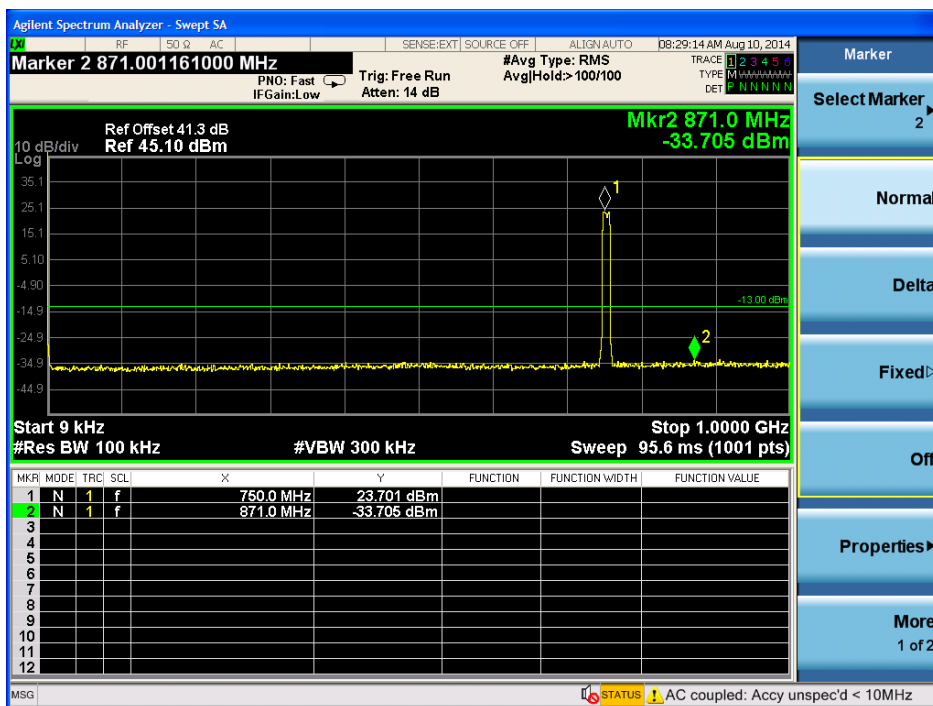
1GHz to 10GHz



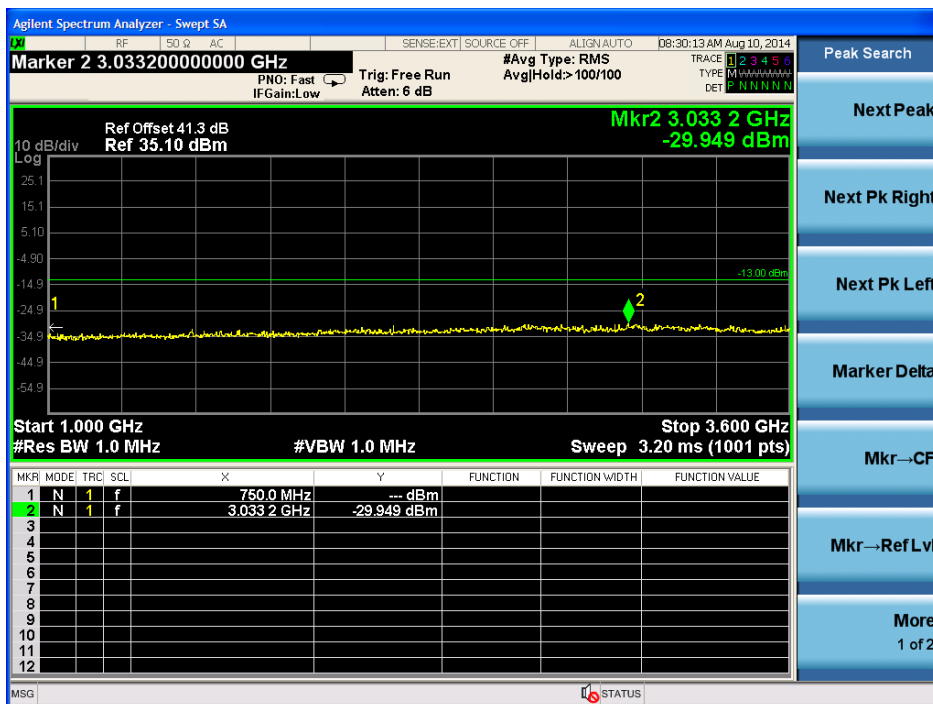


3.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-34.7	-13.0	-21.7
1GHz to 10GHz	RBW=1MHz	-30.1	-13.0	-17.1

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.2	-13.0	-28.2
1GHz to 10GHz	RBW=1MHz	-30.5	-13.0	-17.5

3)highest frequency

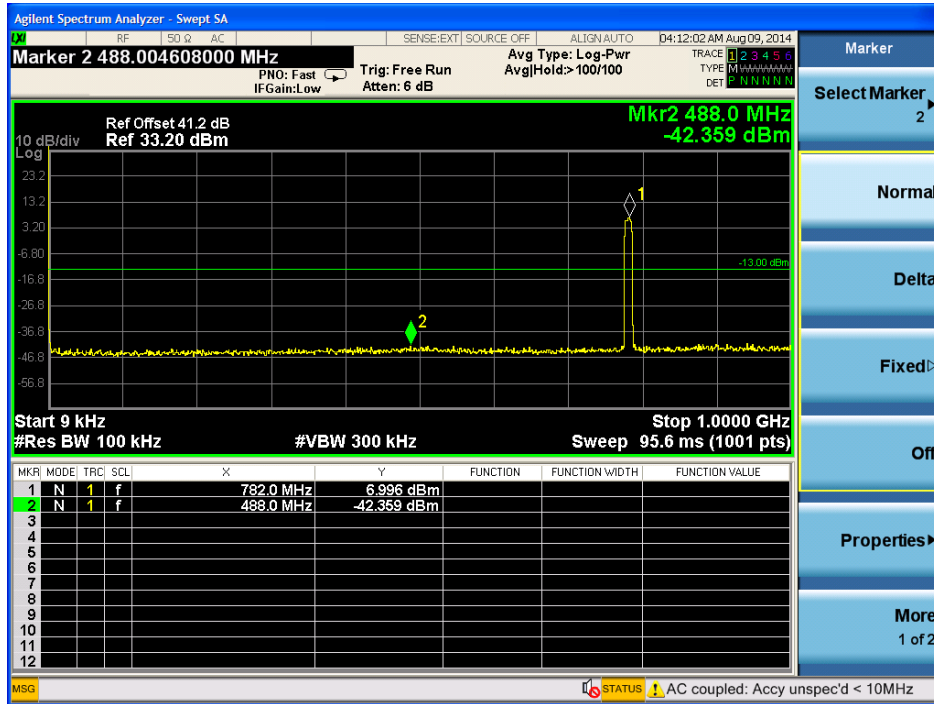
Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-33.7	-13.0	-20.7
1GHz to 10GHz	RBW=1MHz	-29.9	-13.0	-16.9



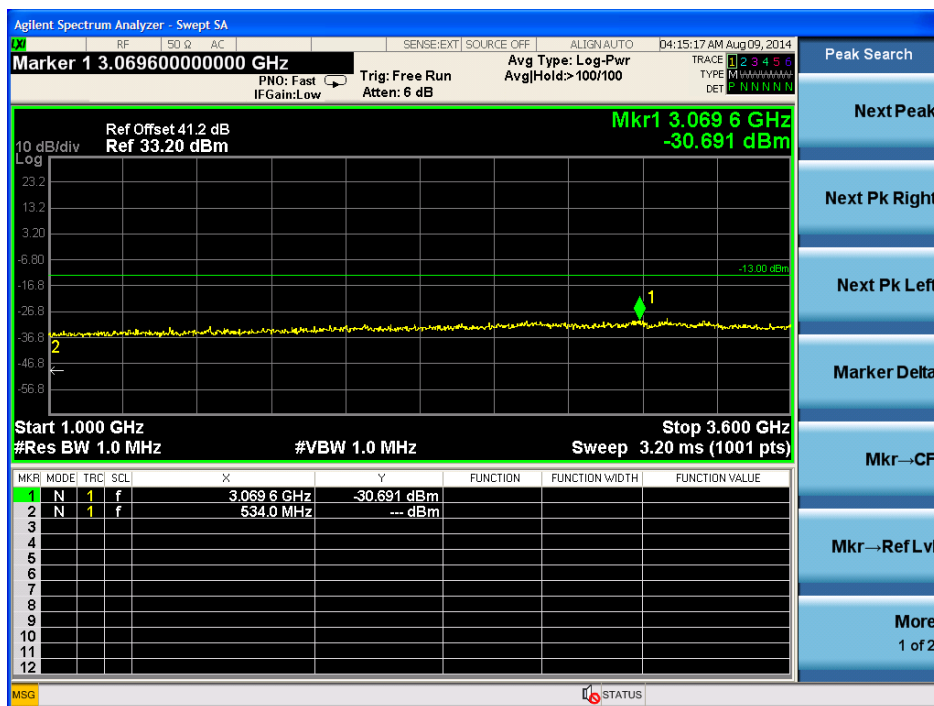
4.Uplink: 776MHz ~ 787MHz(LTE)

4.1 lowest frequency

9KHz to 1GHz



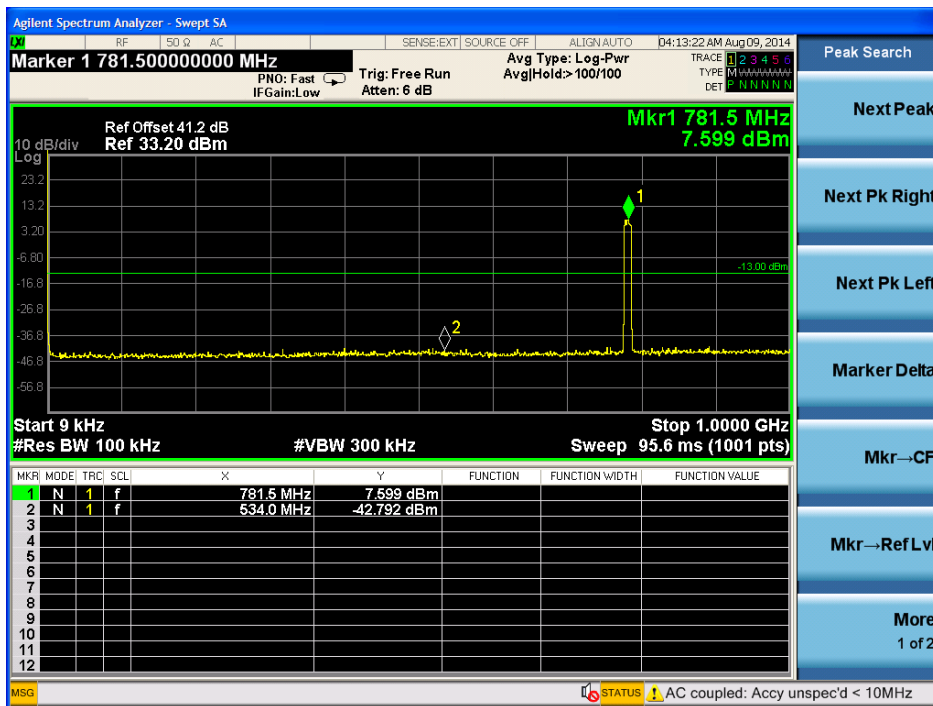
1GHz to 10GHz



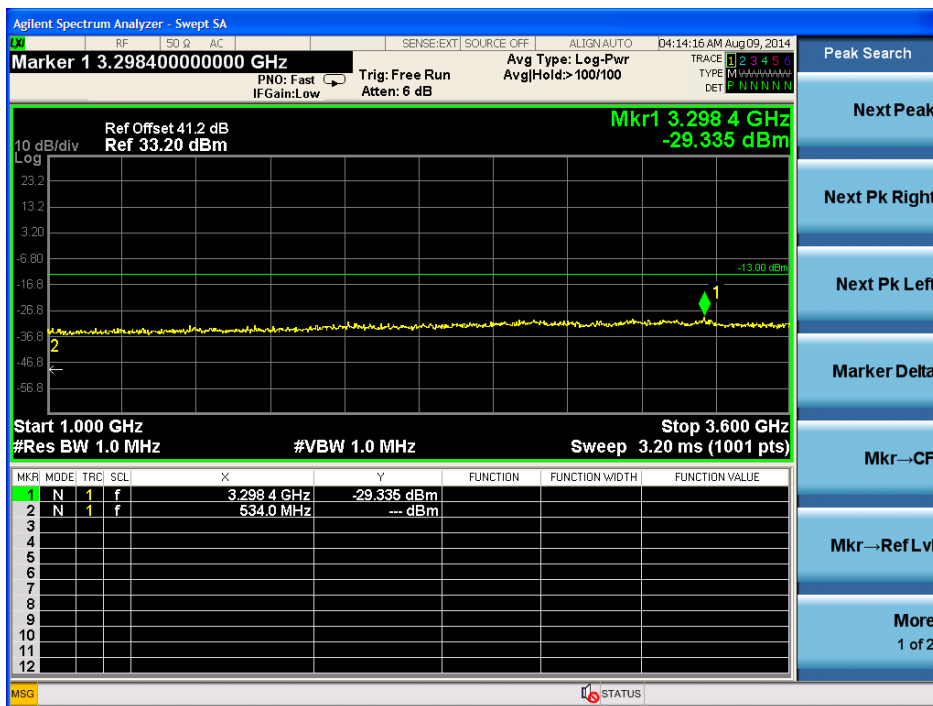


4.2 Middle frequency

9KHz to 1GHz



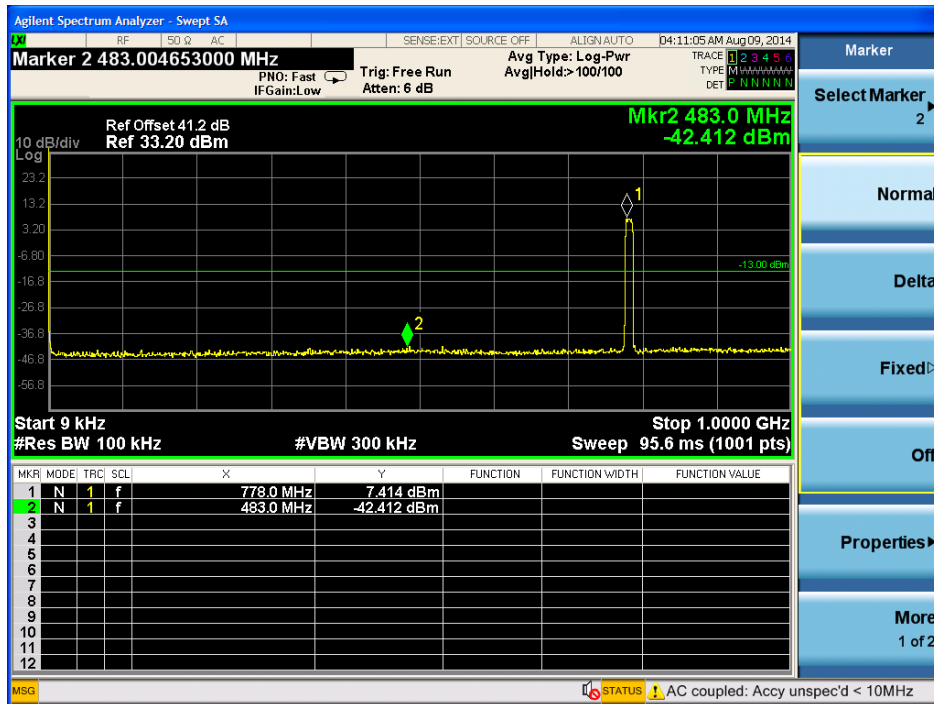
1GHz to 10GHz



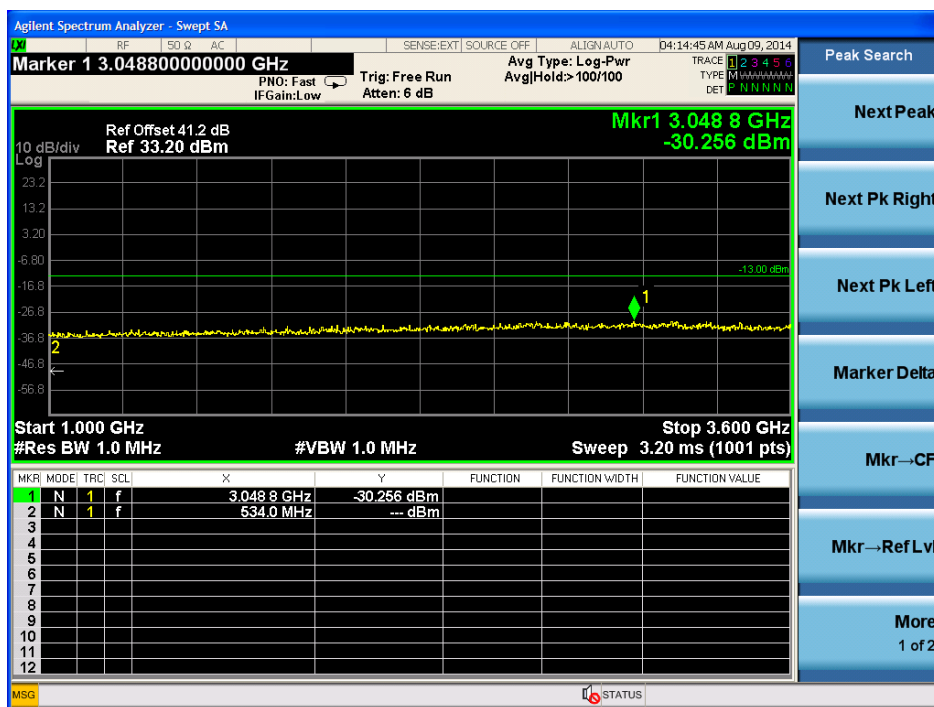


4.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.7	-13.0	-29.7
1GHz to 10GHz	RBW=1MHz	-30.7	-13.0	-17.7

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.8	-13.0	-29.8
1GHz to 10GHz	RBW=1MHz	-29.3	-13.0	-16.3

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.4	-13.0	-29.4
1GHz to 10GHz	RBW=1MHz	-30.2	-13.0	-17.2



5. Downlink: 869MHz ~ 894MHz(WCDMA,LTE)

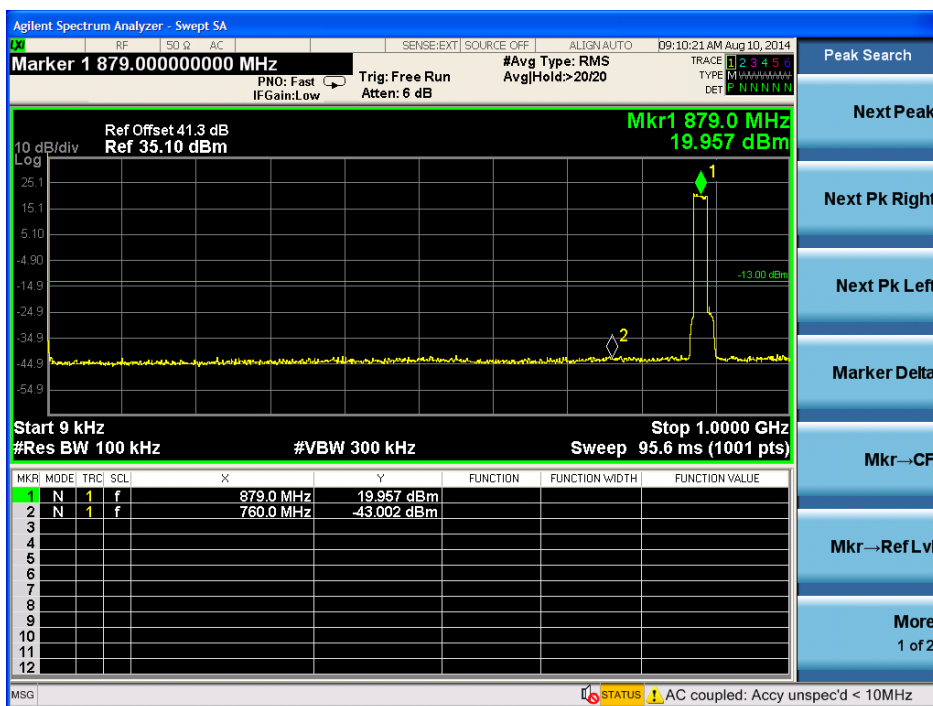
Remark:

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

The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

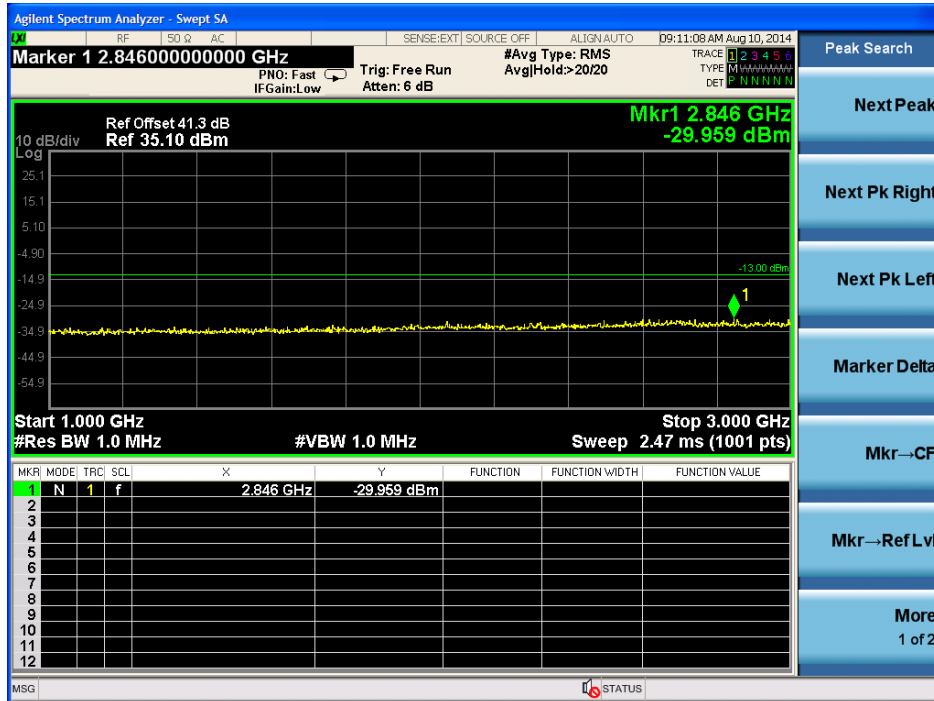
5.1 lowest frequency

9KHz to 1GHz



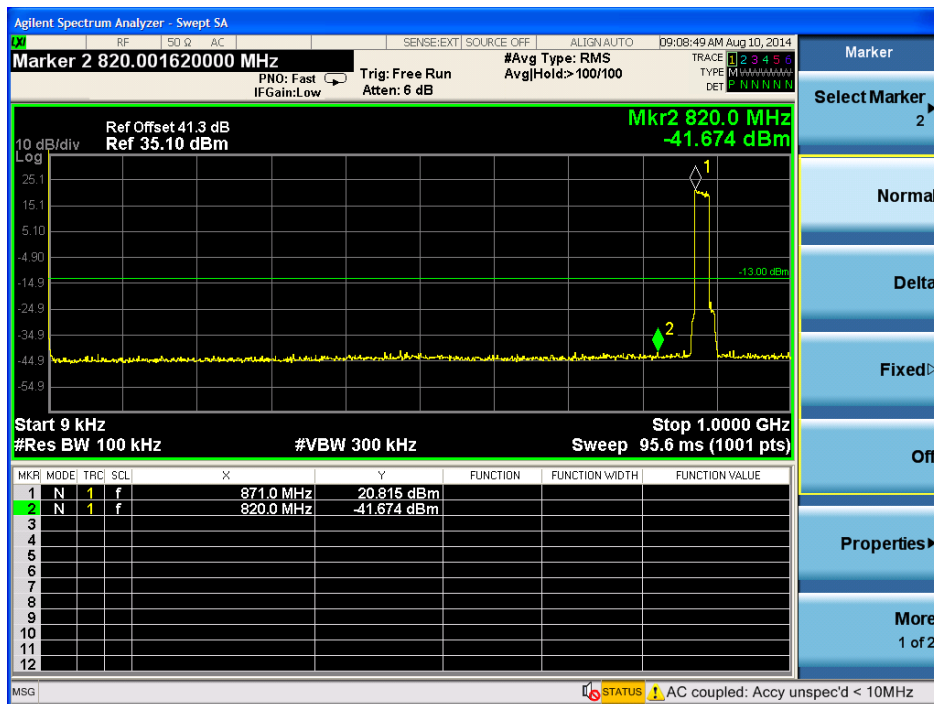


1GHz to 10GHz



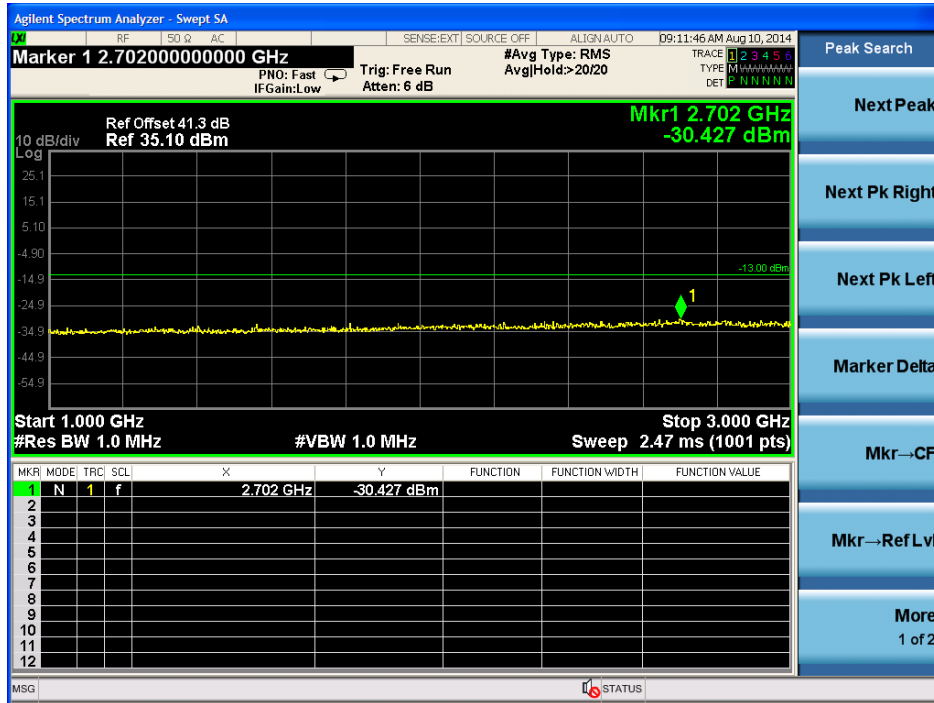
5.2 Middle frequency

9KHz to 1GHz





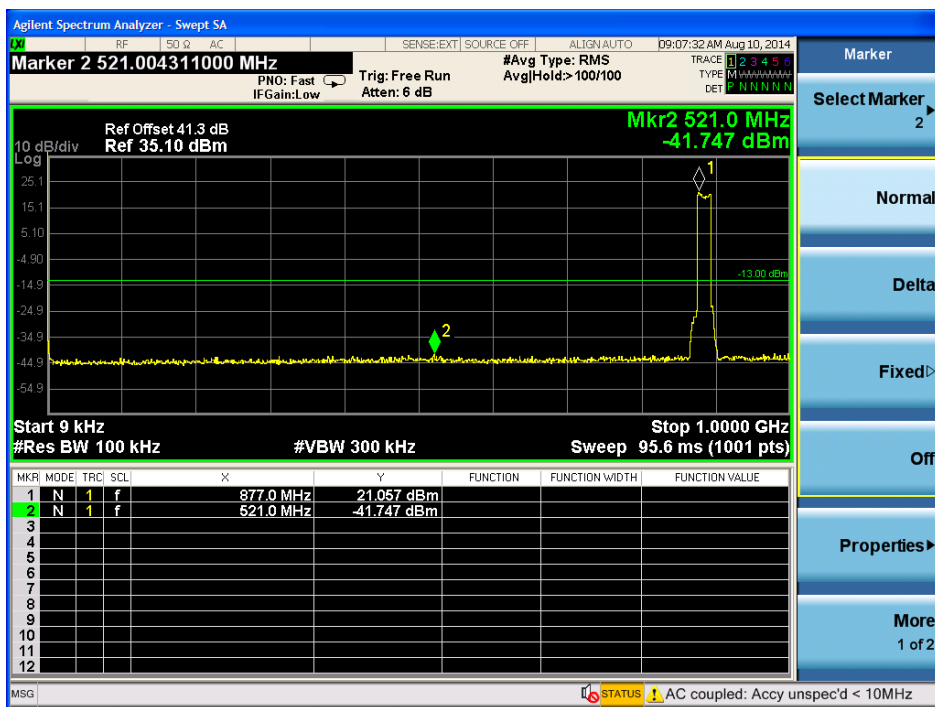
1GHz to 10GHz



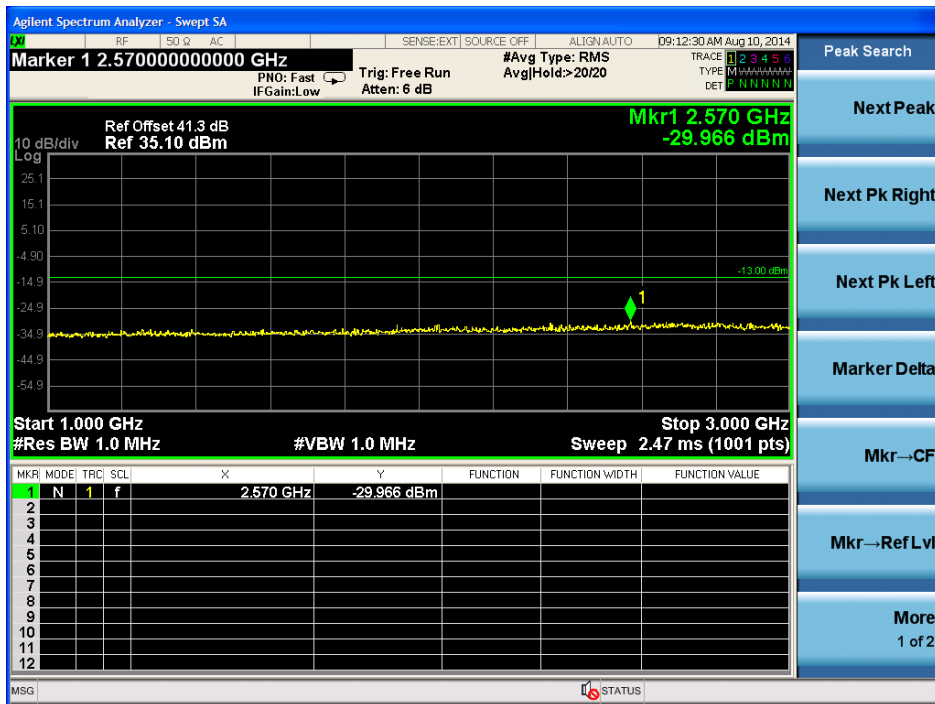


5.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.5	-13.0	-30.5
1GHz to 10GHz	RBW=1MHz	-29.7	-13.0	-16.7

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.2	-13.0	-28.2
1GHz to 10GHz	RBW=1MHz	-30.2	-13.0	-17.2

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.6	-13.0	-28.6
1GHz to 10GHz	RBW=1MHz	-30.5	-13.0	-17.5

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.0	-13.0	-30.1
1GHz to 10GHz	RBW=1MHz	-29.9	-13.0	-16.9

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.7	-13.0	-28.7
1GHz to 10GHz	RBW=1MHz	-30.4	-13.0	-17.4

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.7	-13.0	-28.7
1GHz to 10GHz	RBW=1MHz	-30.0	-13.0	-17.0



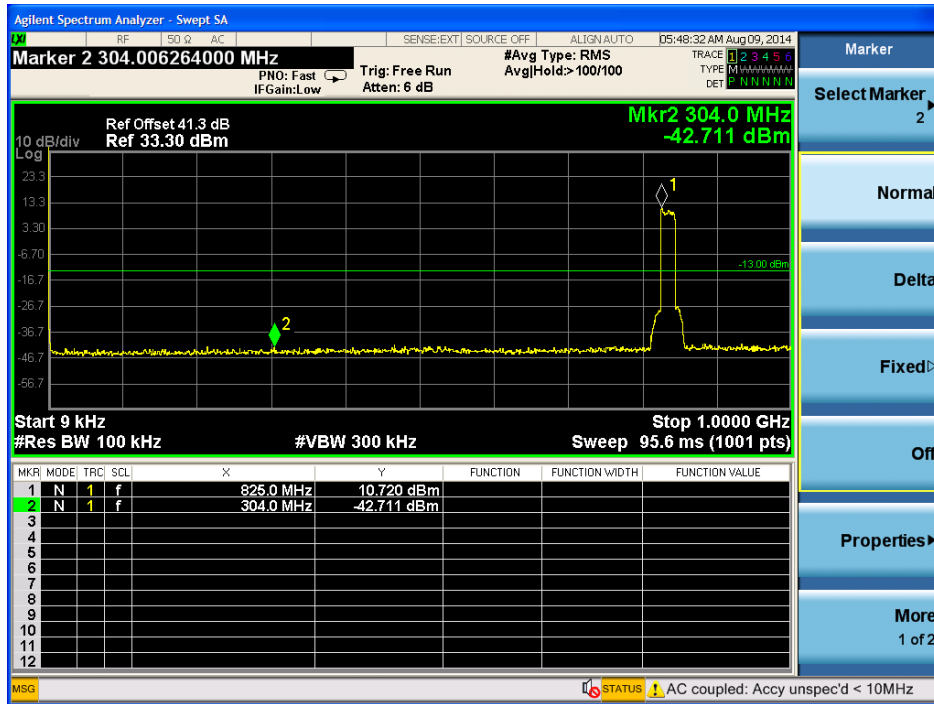
6.Uplink: 824MHz ~ 849MHz(WCDMA,LTE)

Remark:

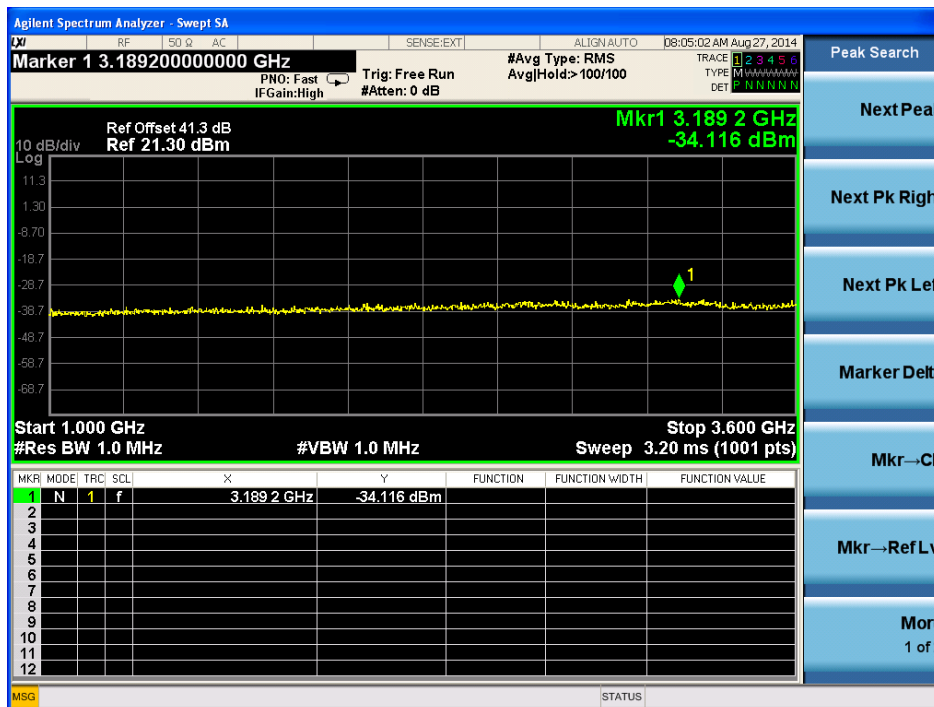
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

6.1 lowest frequency

9KHz to 1GHz



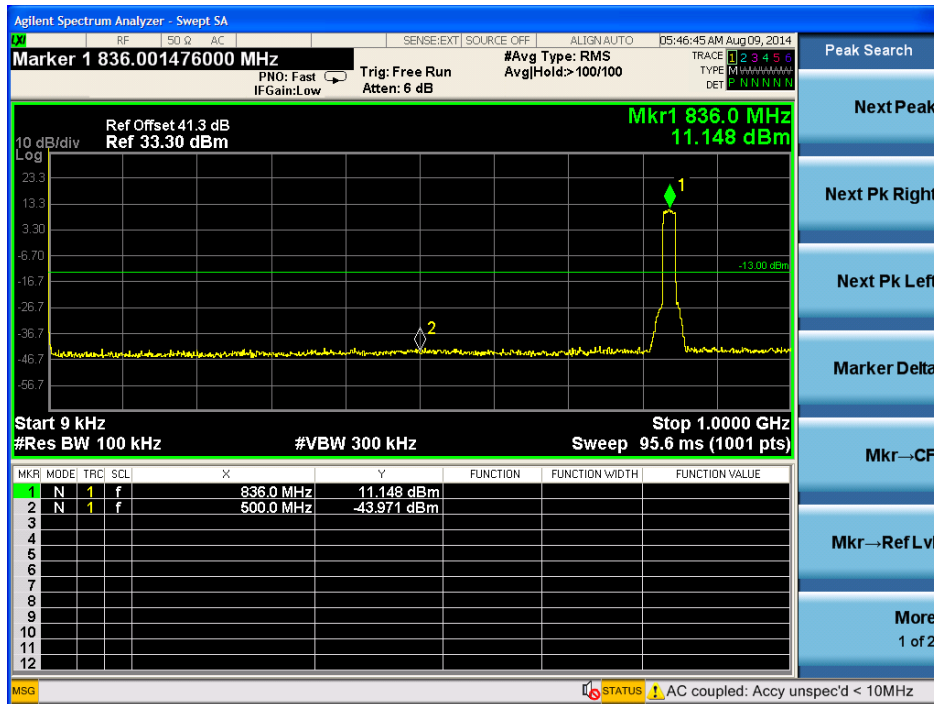
1GHz to 10GHz



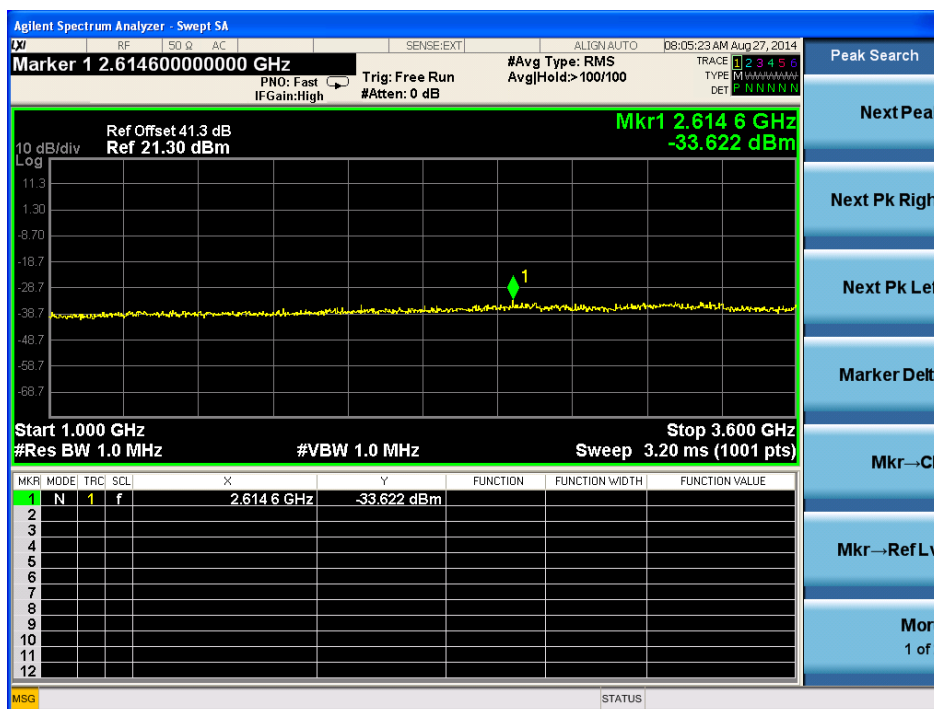


6.2 Middle frequency

9KHz to 1GHz



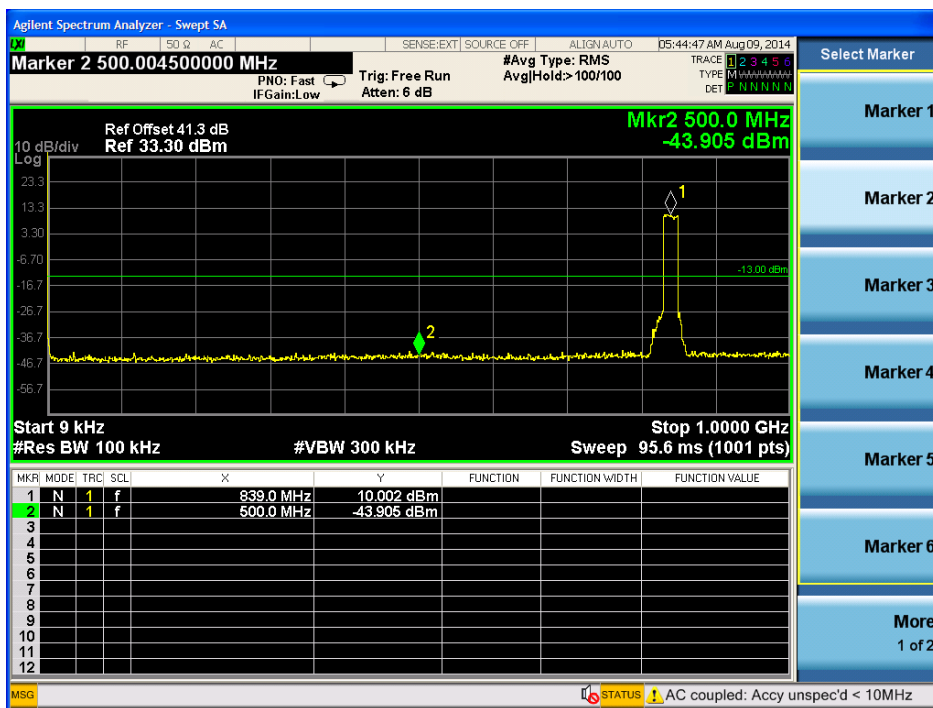
1GHz to 10GHz



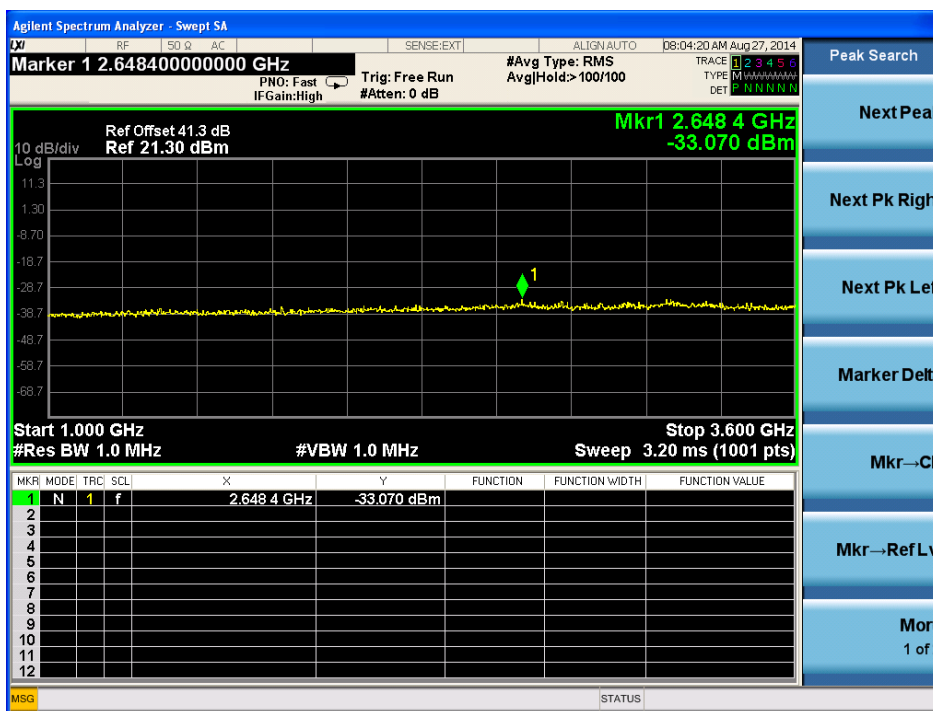


6.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.1	-13.0	-30.1
1GHz to 10GHz	RBW=1MHz	-29.2	-13.0	-16.2

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.9	-13.0	-28.9
1GHz to 10GHz	RBW=1MHz	-30.5	-13.0	-17.5

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.2	-13.0	-28.2
1GHz to 10GHz	RBW=1MHz	-30.2	-13.0	-17.2

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.7	-13.0	-29.7
1GHz to 10GHz	RBW=1MHz	-29.4	-13.0	-16.4

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.9	-13.0	-30.9
1GHz to 10GHz	RBW=1MHz	-29.7	-13.0	-16.7

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-43.8	-13.0	-30.8
1GHz to 10GHz	RBW=1MHz	-29.5	-13.0	-16.5



7. Downlink: 1930MHz ~ 1995MHz(WCDMA,LTE)

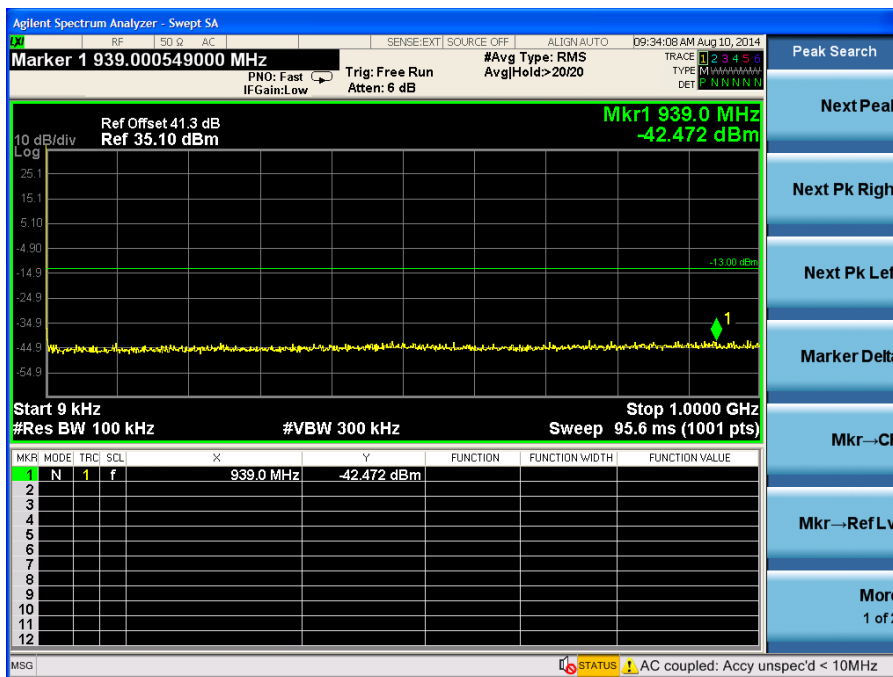
Remark:

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

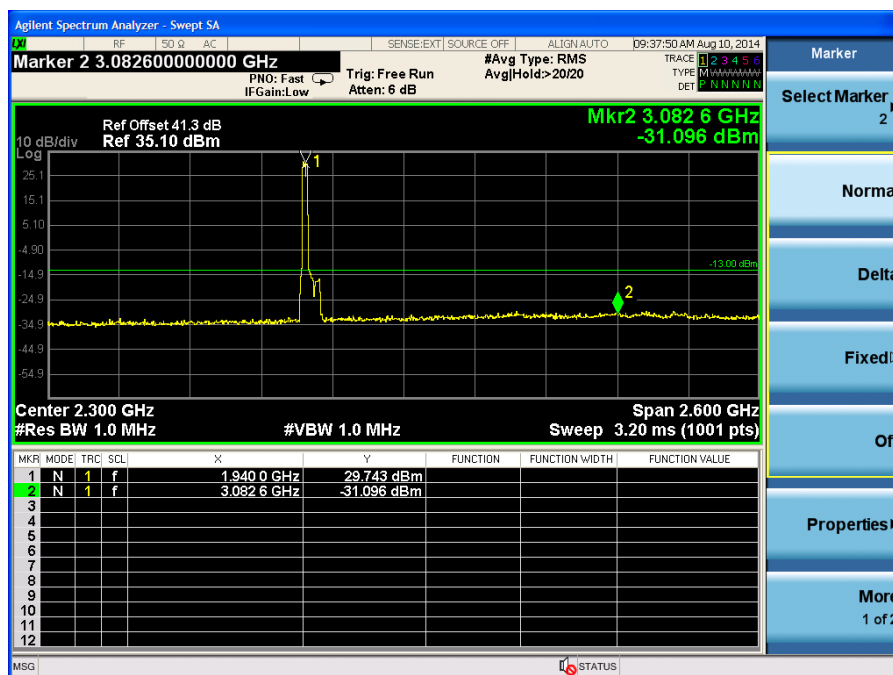
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

7.1 lowest frequency

9KHz to 1GHz

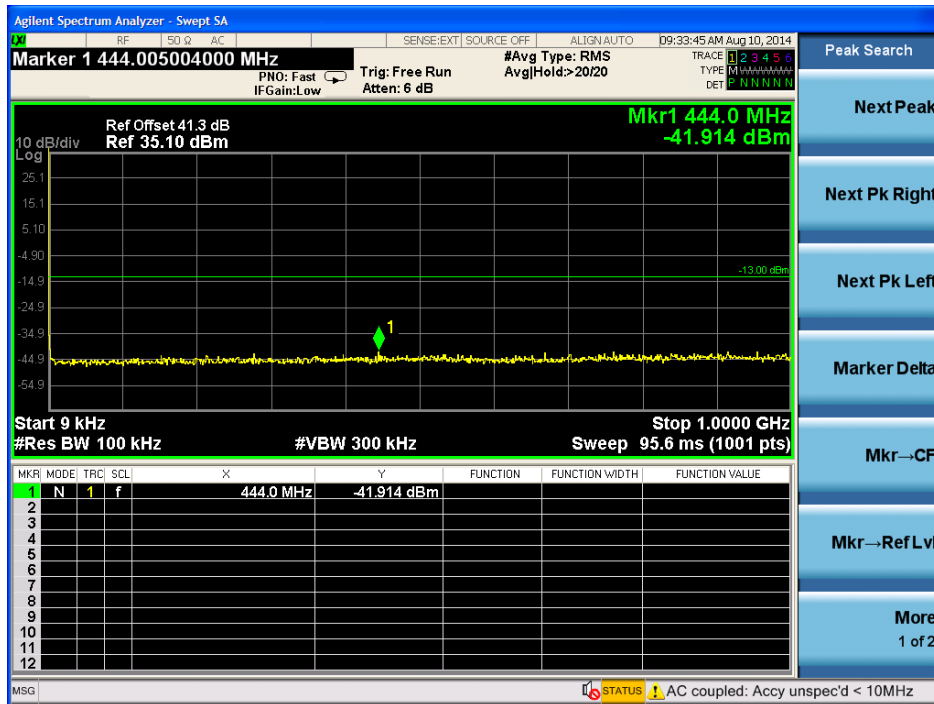


1GHz to 10GHz

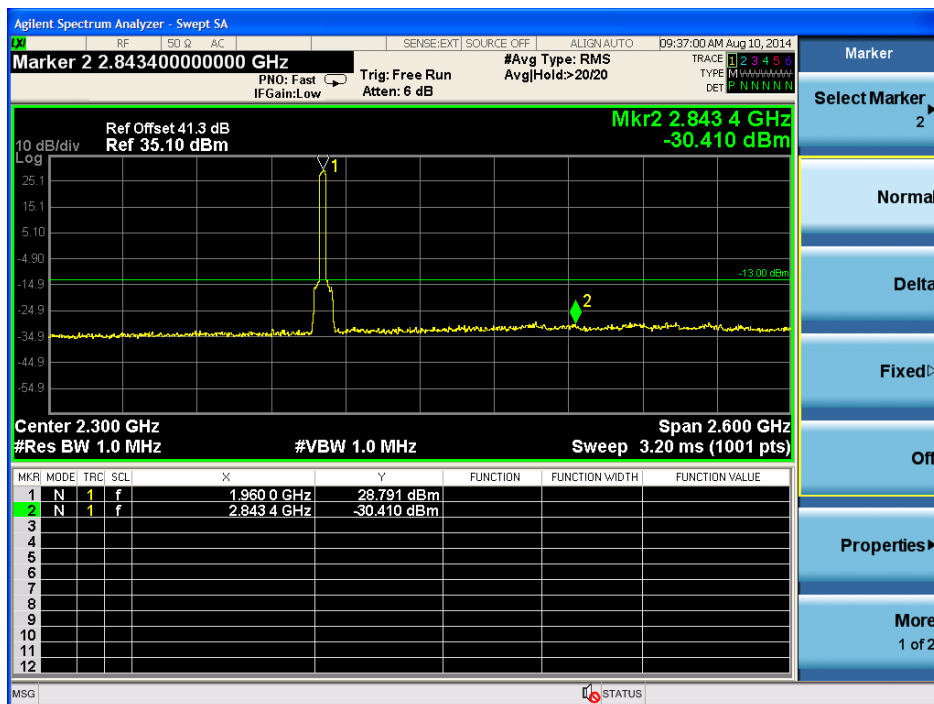




7.2 Middle frequency
9KHz to 1GHz



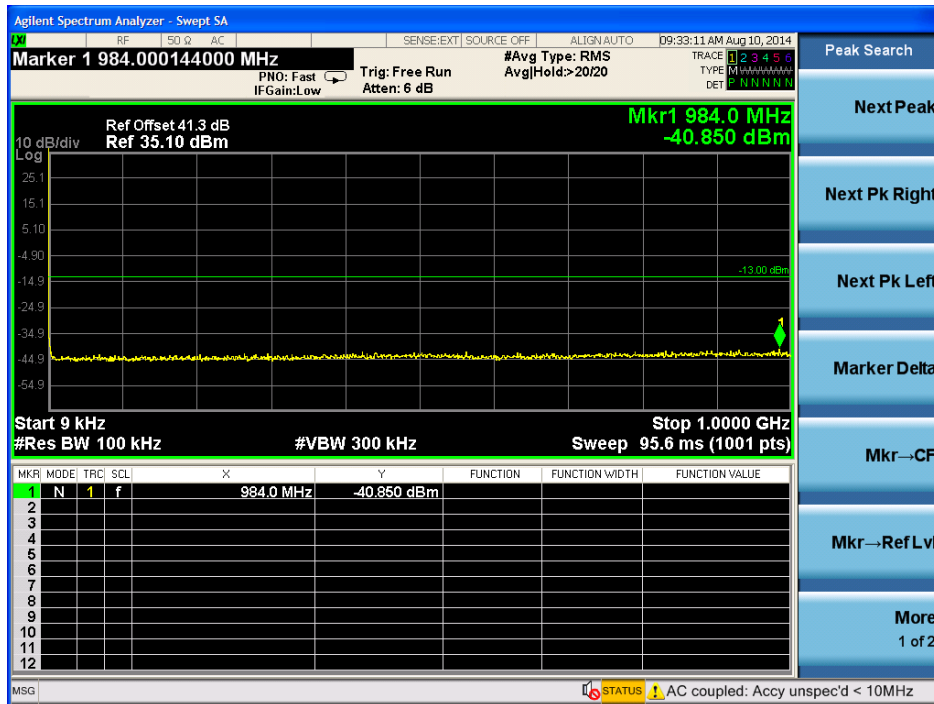
1GHz to 10GHz



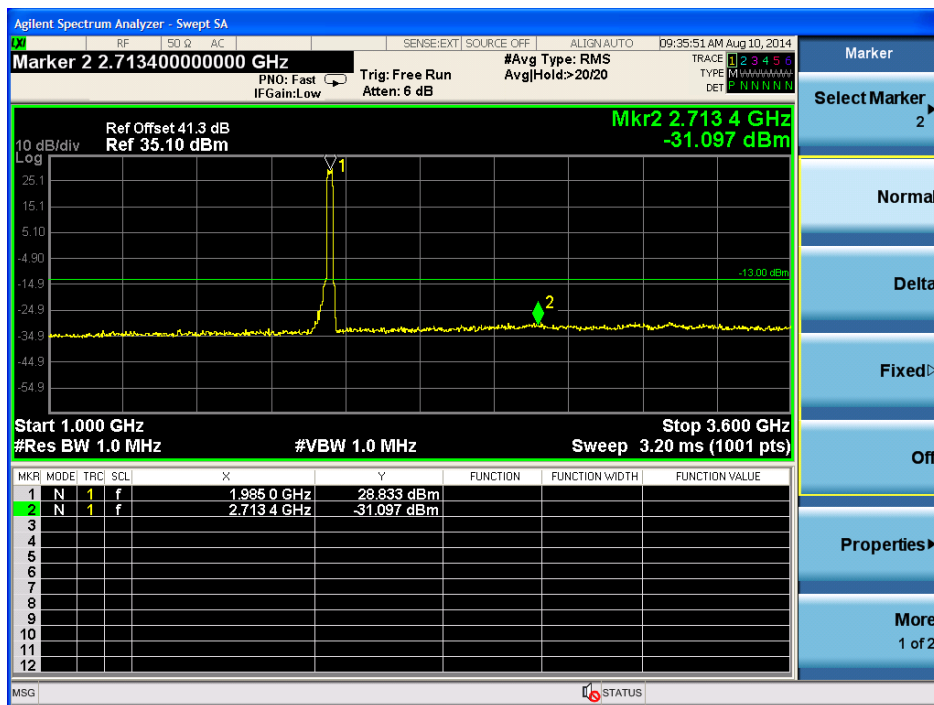


7.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.5	-13.0	-29.5
1GHz to 10GHz	RBW=1MHz	-29.1	-13.0	-16.1

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.2	-13.0	-29.2
1GHz to 10GHz	RBW=1MHz	-30.1	-13.0	-17.1

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.7	-13.0	-28.7
1GHz to 10GHz	RBW=1MHz	-30.1	-13.0	-17.1

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.5	-13.0	-29.5
1GHz to 10GHz	RBW=1MHz	-31.0	-13.0	-18.0

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.9	-13.0	-28.9
1GHz to 10GHz	RBW=1MHz	-30.4	-13.0	-17.4

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.9	-13.0	-27.9
1GHz to 10GHz	RBW=1MHz	-31.1	-13.0	-18.1



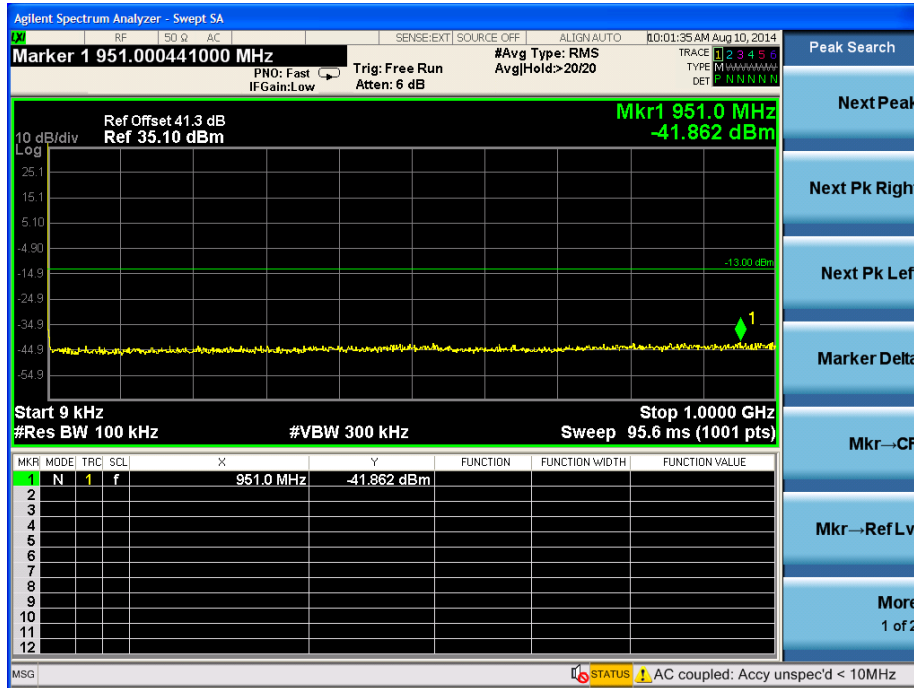
8.Uplink: 1850MHz ~ 1915MHz(WCDMA,LTE)

Remark:

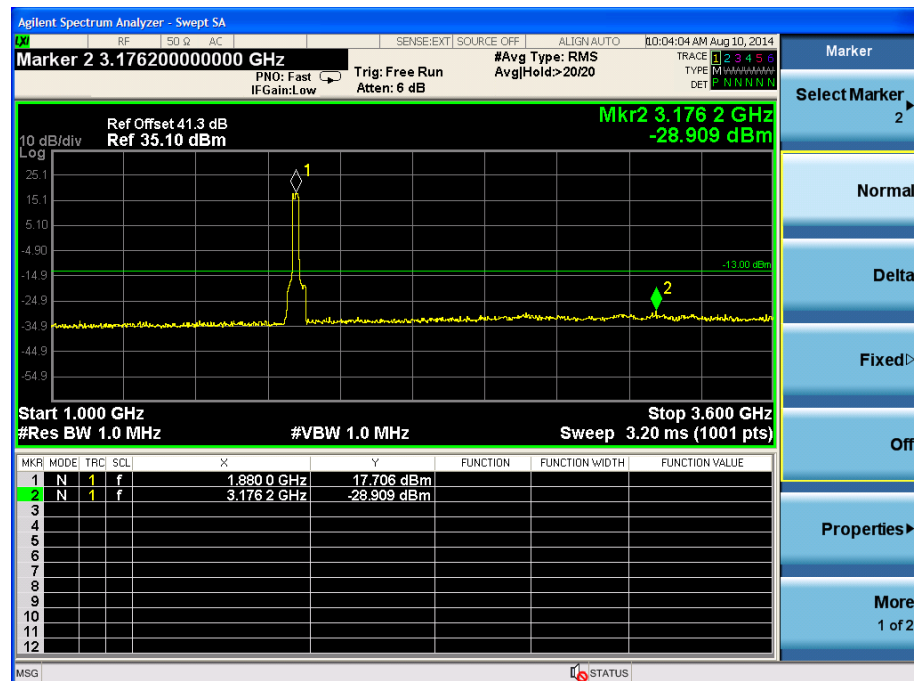
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

8.1 lowest frequency

9KHz to 1GHz

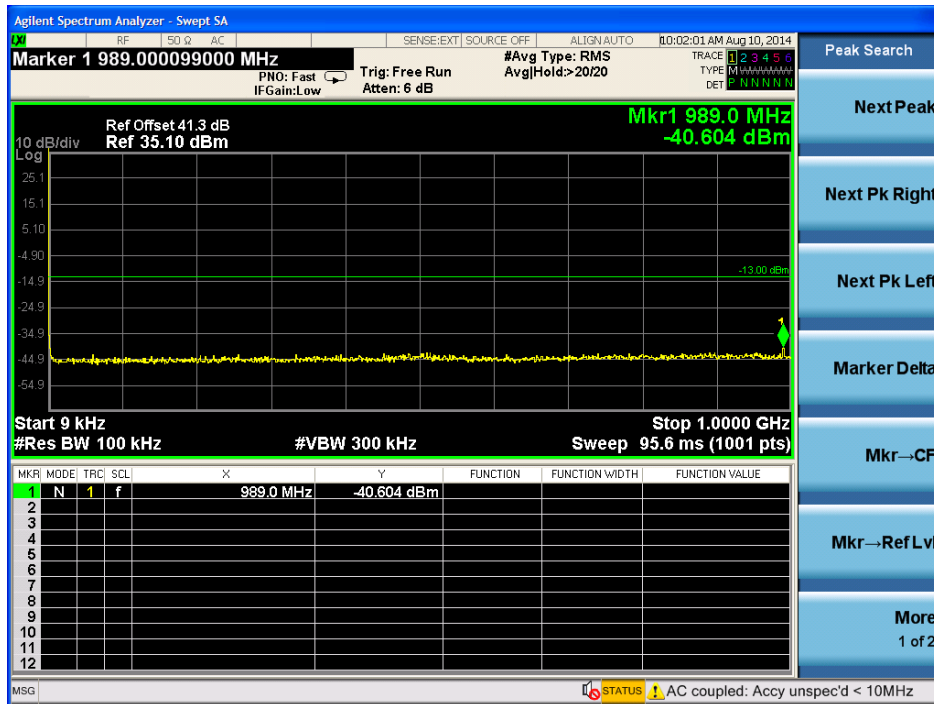


1GHz to 10GHz

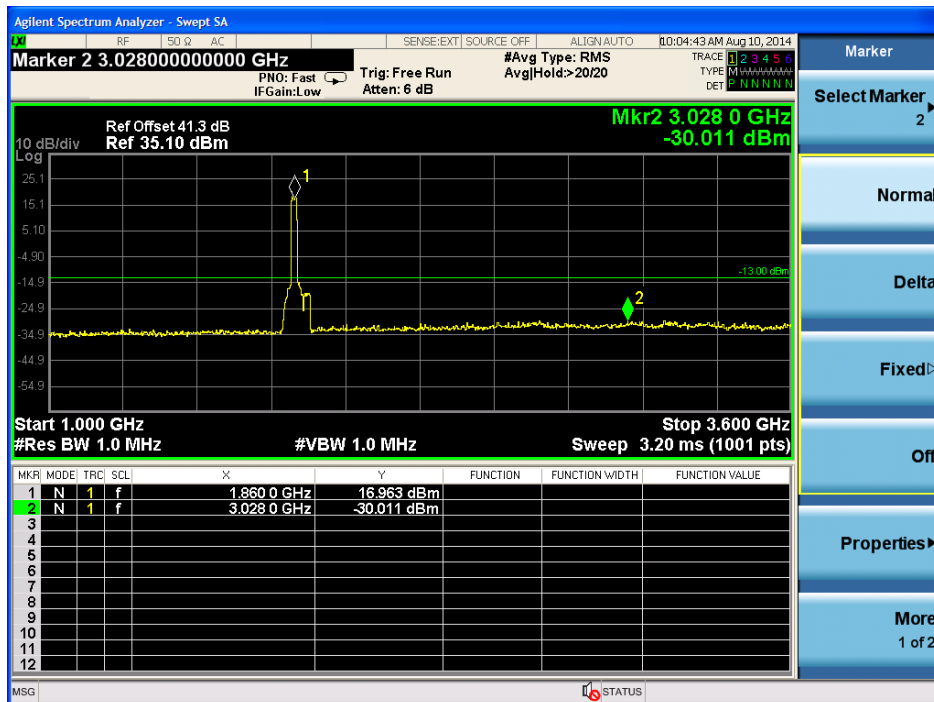




8.2 Middle frequency
9KHz to 1GHz



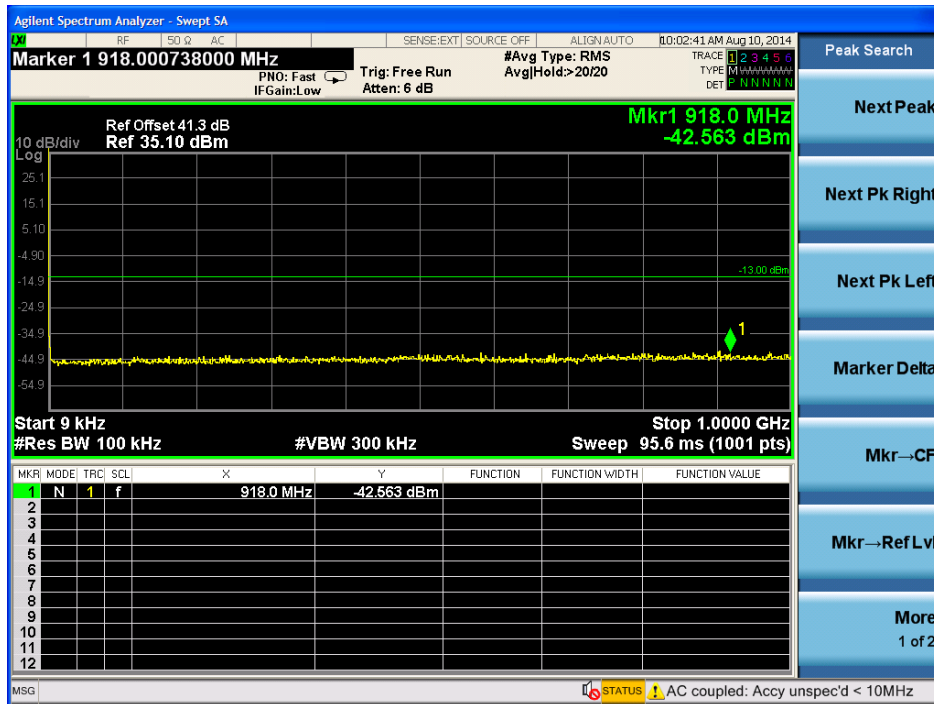
1GHz to 10GHz



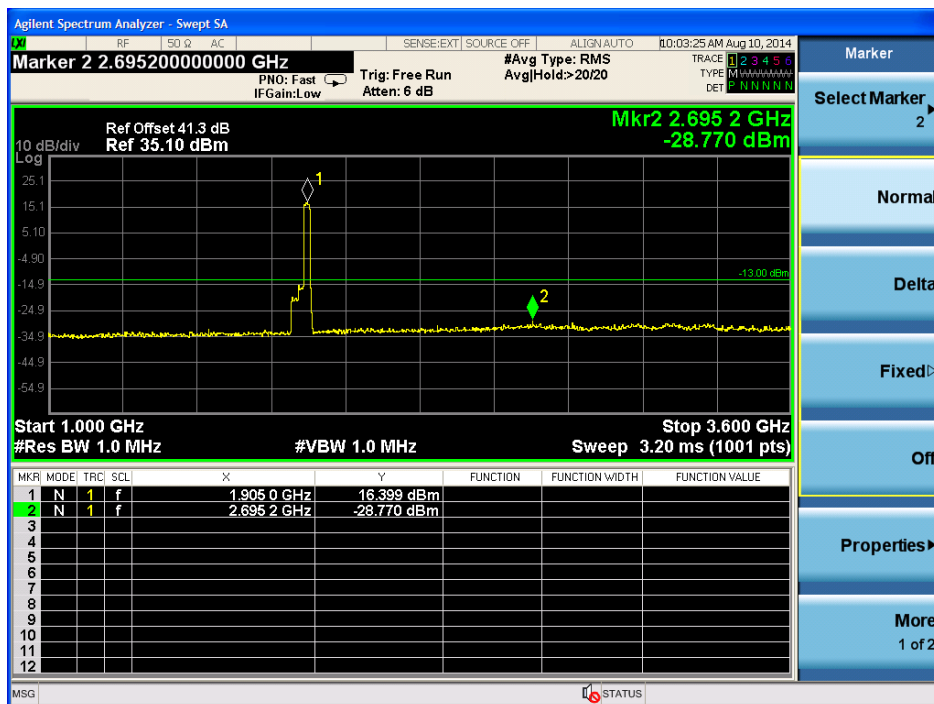


8.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.3	-13.0	-29.3
1GHz to 10GHz	RBW=1MHz	-29.7	-13.0	-16.7

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.1	-13.0	-29.1
1GHz to 10GHz	RBW=1MHz	-30.5	-13.0	-17.5

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.6	-13.0	-28.6
1GHz to 10GHz	RBW=1MHz	-30.4	-13.0	-17.4

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.9	-13.0	-28.9
1GHz to 10GHz	RBW=1MHz	-28.9	-13.0	-15.9

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.6	-13.0	-27.6
1GHz to 10GHz	RBW=1MHz	-30.4	-13.0	-17.4

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.5	-13.0	-29.5
1GHz to 10GHz	RBW=1MHz	-28.8	-13.0	-15.8

9. Downlink: 2110MHz ~ 2155MHz

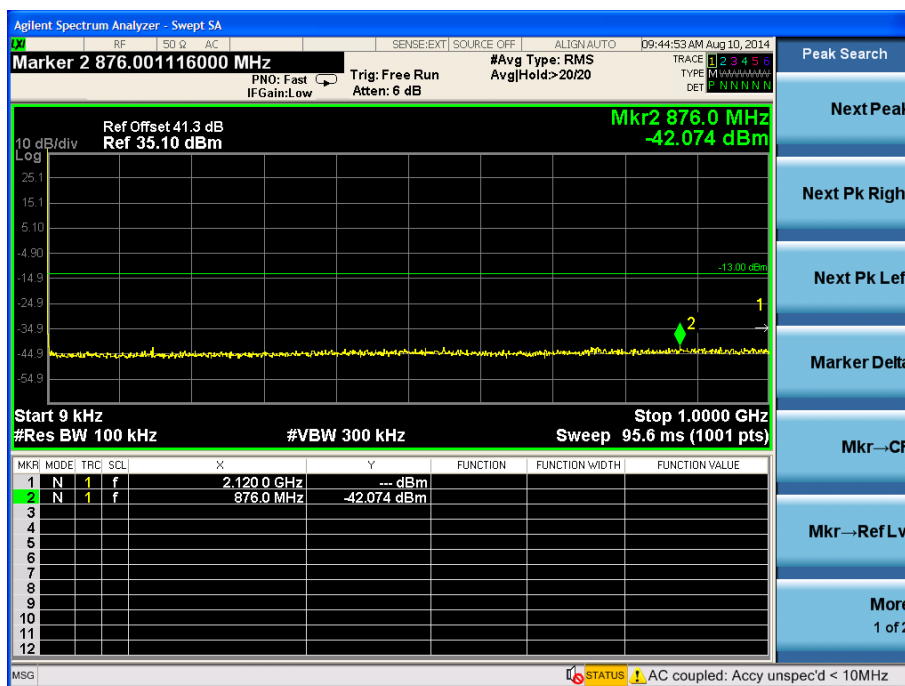
Remark:

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

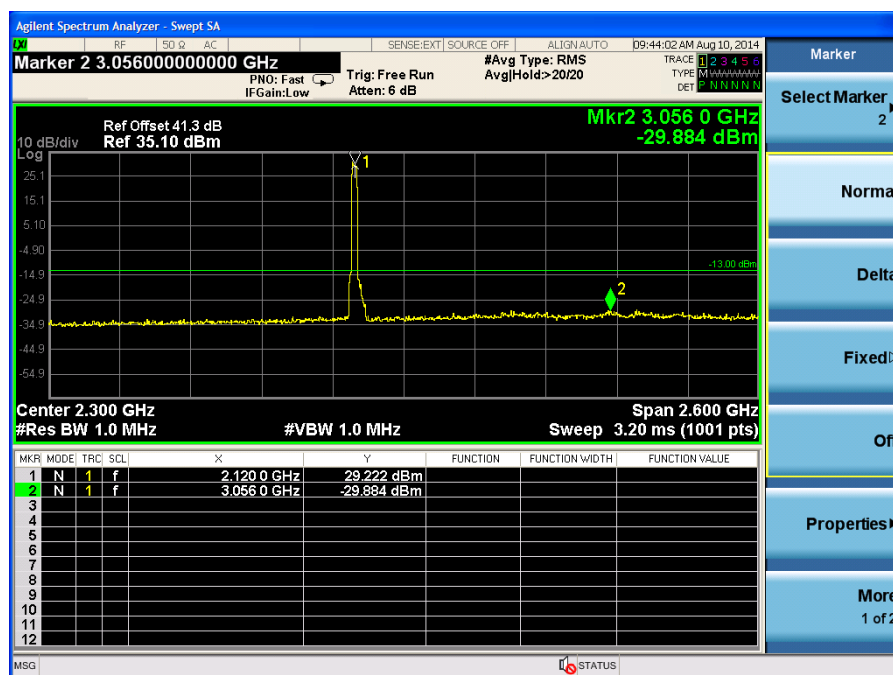
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

9.1 lowest frequency

9KHz to 1GHz



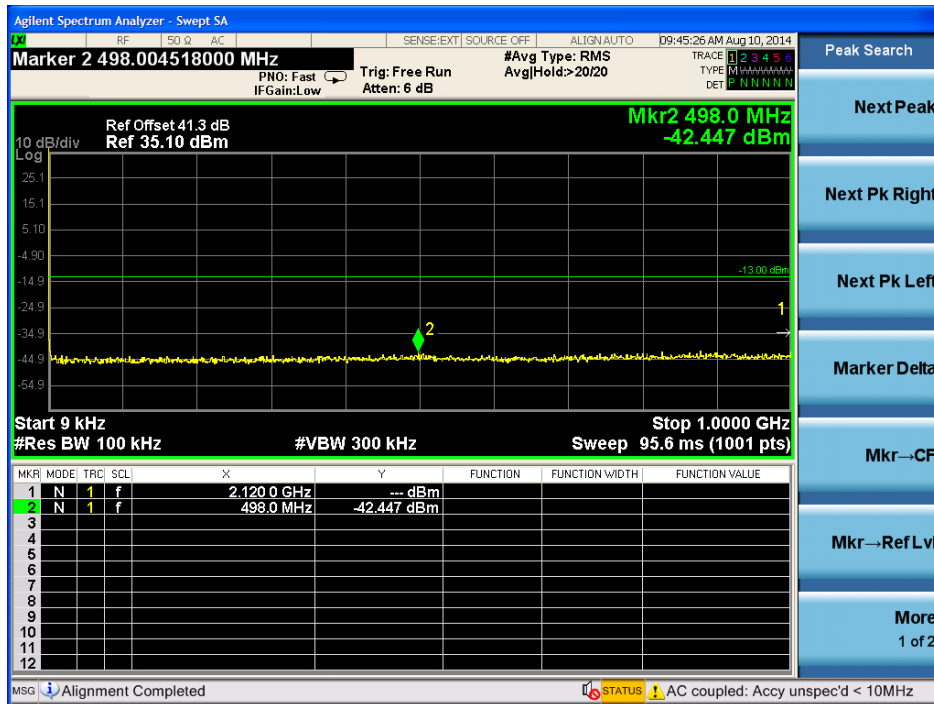
1GHz to 10GHz



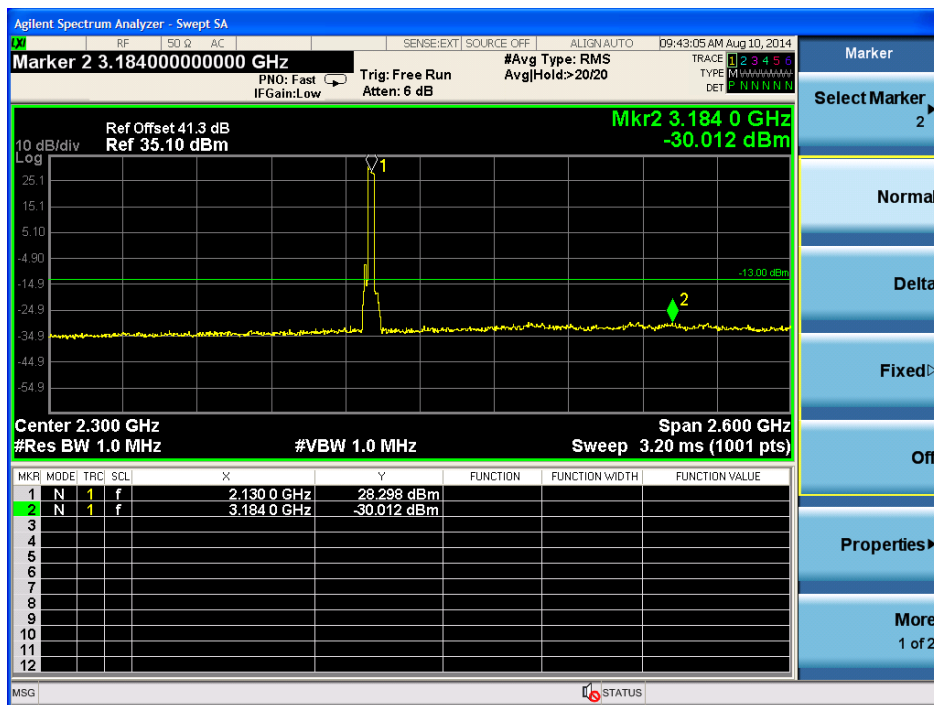


9.2 Middle frequency

9KHz to 1GHz



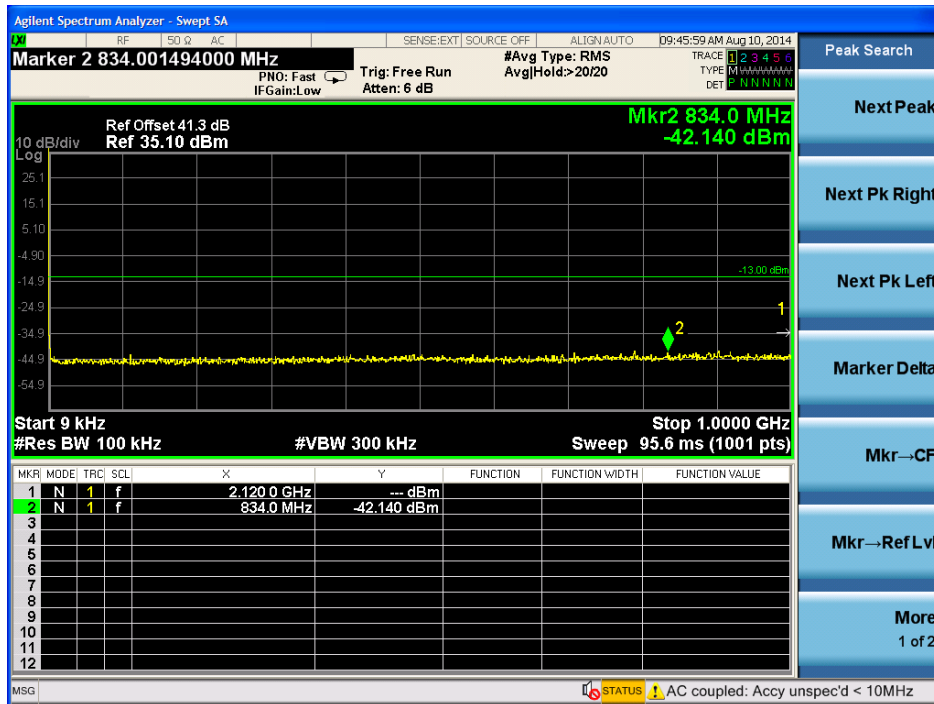
1GHz to 10GHz



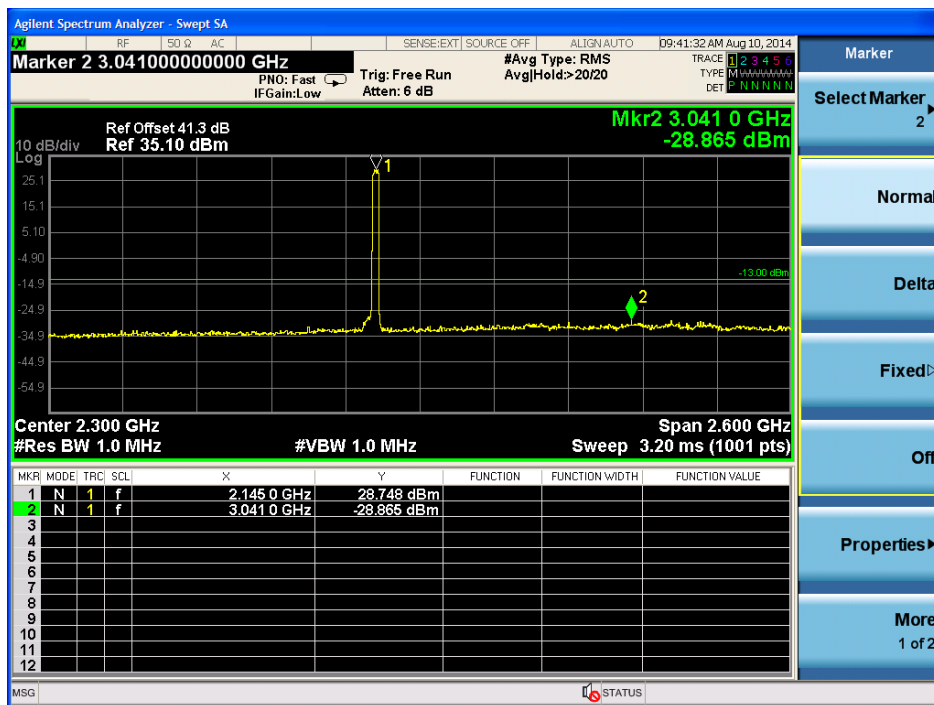


9.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.7	-13.0	-29.7
1GHz to 10GHz	RBW=1MHz	-29.1	-13.0	-16.1

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.5	-13.0	-29.5
1GHz to 10GHz	RBW=1MHz	-30.2	-13.0	-17.2

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.3	-13.0	-28.3
1GHz to 10GHz	RBW=1MHz	-29.8	-13.0	-16.8

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.0	-13.0	-29.1
1GHz to 10GHz	RBW=1MHz	-29.9	-13.0	-16.9

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.4	-13.0	-29.4
1GHz to 10GHz	RBW=1MHz	-30.0	-13.0	-17.0

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.1	-13.0	-29.1
1GHz to 10GHz	RBW=1MHz	-28.9	-13.0	-15.9



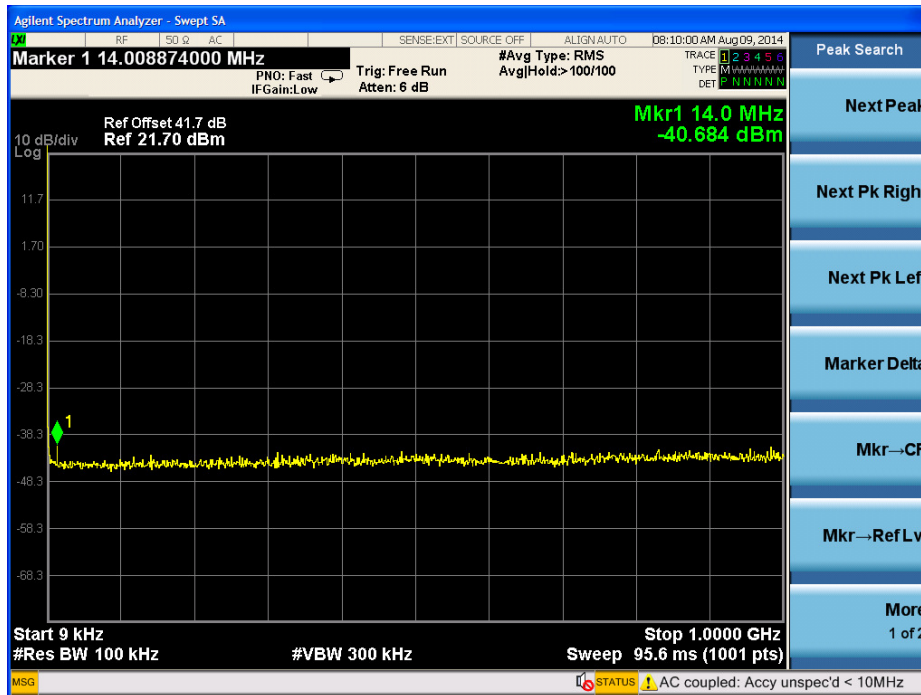
10.Uplink: 1710MHz ~ 1755MHz

Remark:

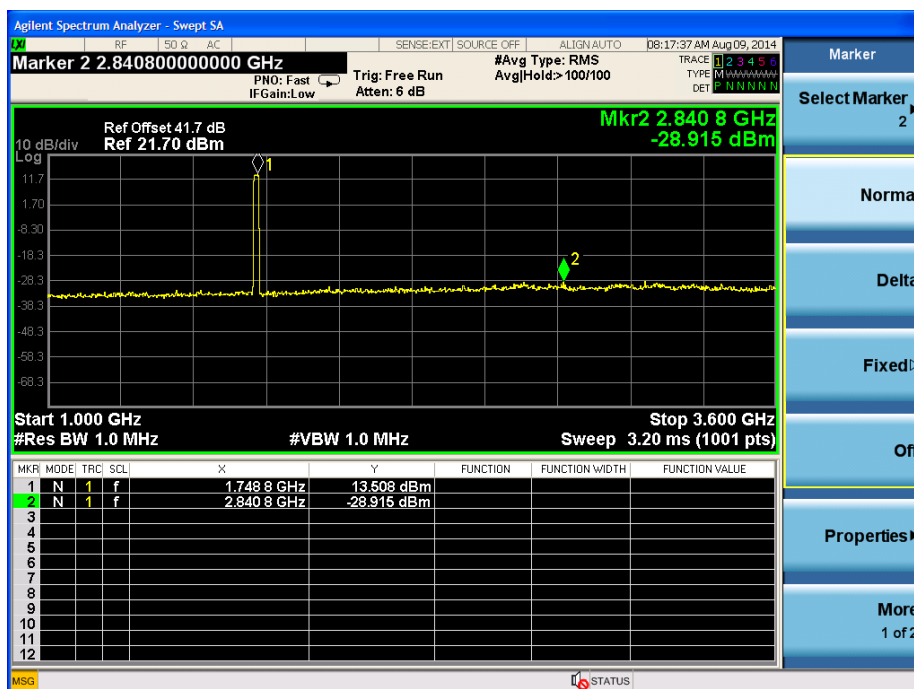
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode, others record the data.

10.1 lowest frequency

9KHz to 1GHz



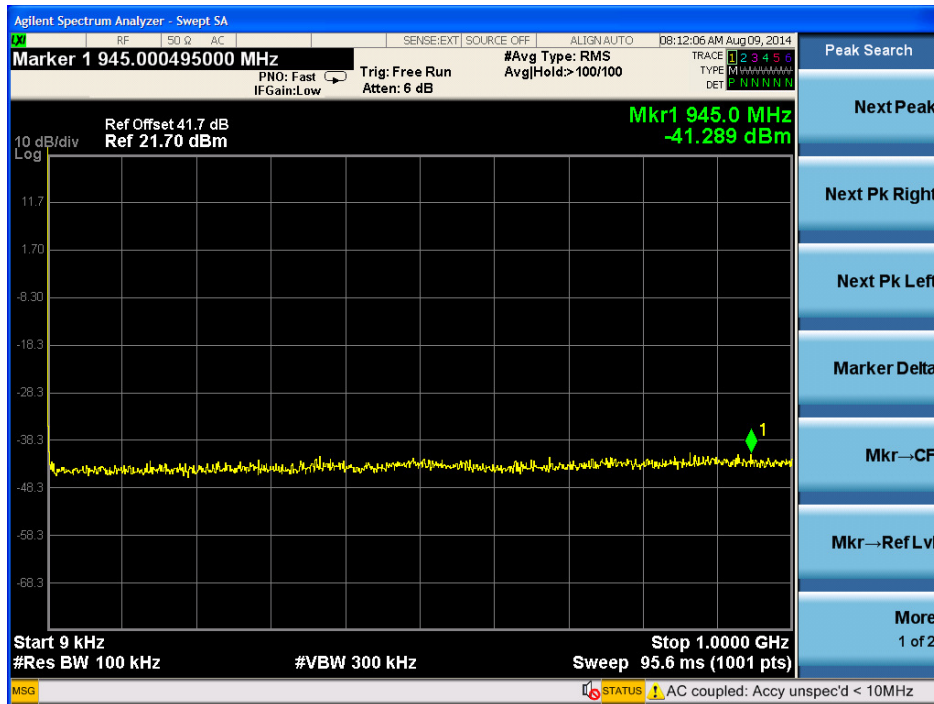
1GHz to 10GHz



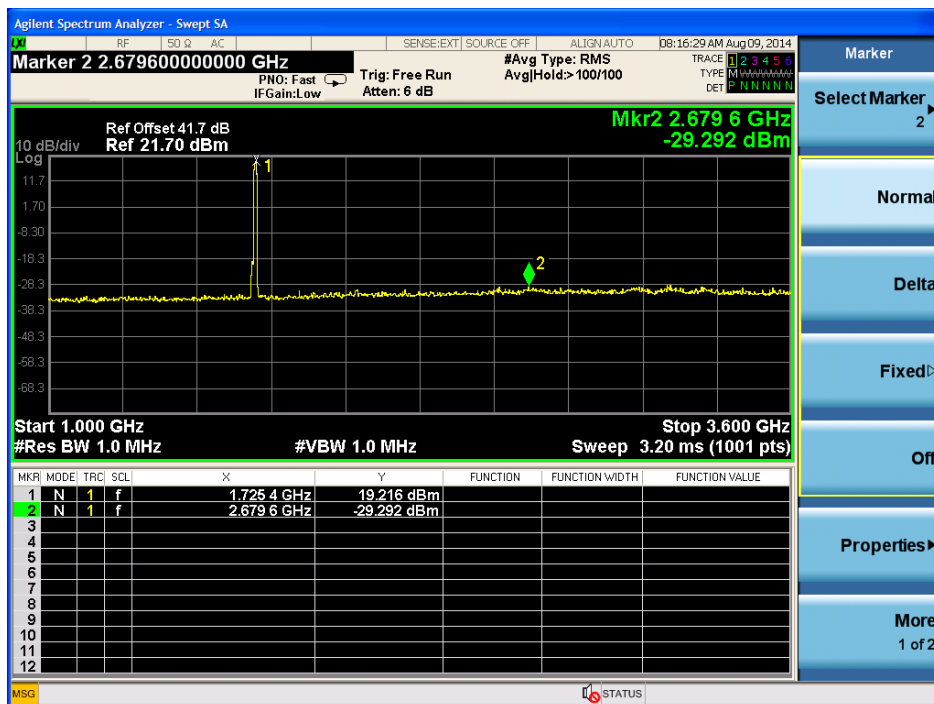


10.2 Middle frequency

9KHz to 1GHz



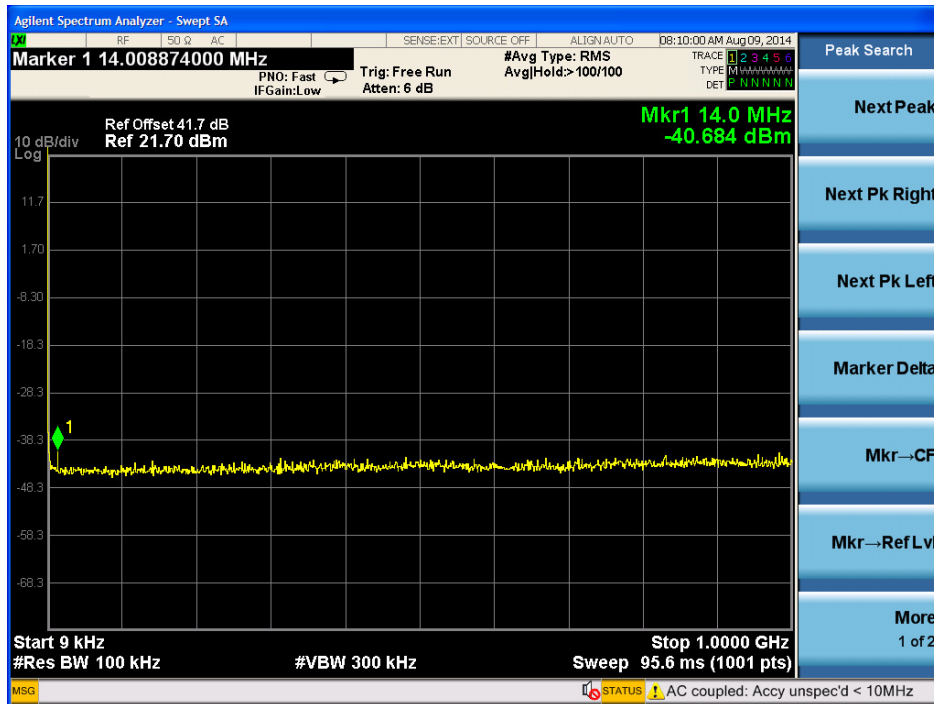
1GHz to 10GHz



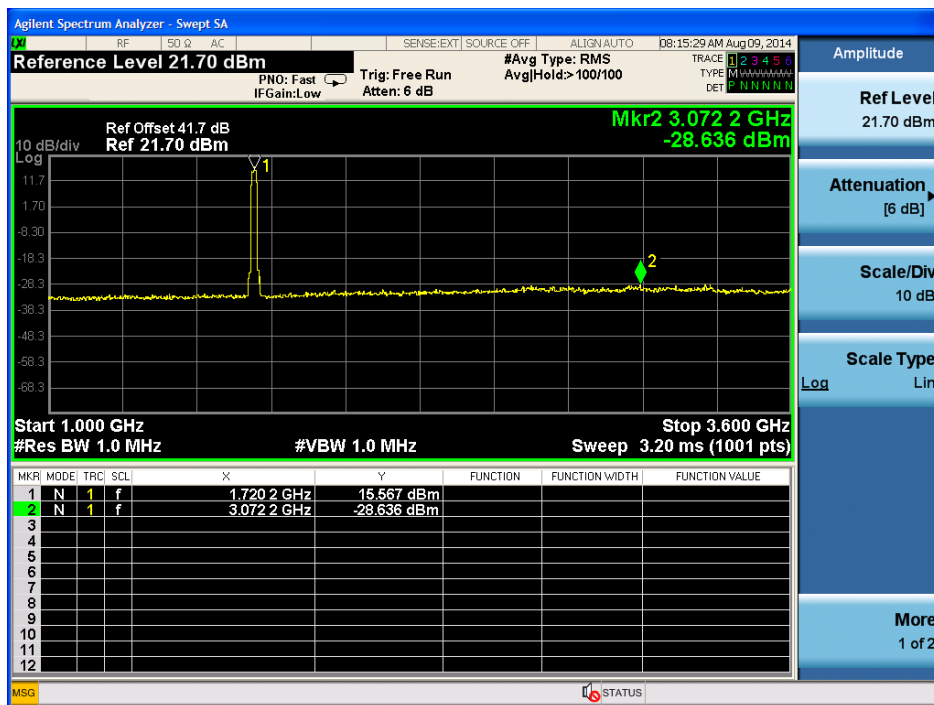


10.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 For WCDMA mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.1	-13.0	-29.1
1GHz to 10GHz	RBW=1MHz	-29.5	-13.0	-16.5

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-42.3	-13.0	-29.3
1GHz to 10GHz	RBW=1MHz	-30.4	-13.0	17.4

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.5	-13.0	-28.5
1GHz to 10GHz	RBW=1MHz	-29.5	-13.0	-16.5

2.2 For LTE mode:

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.7	-13.0	-27.7
1GHz to 10GHz	RBW=1MHz	-28.9	-13.0	-15.9

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-41.3	-13.0	-28.3
1GHz to 10GHz	RBW=1MHz	-29.2	-13.0	-16.2

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.7	-13.0	-27.7
1GHz to 10GHz	RBW=1MHz	-28.6	-13.0	-15.6



11. Downlink: 2620MHz ~ 2690MHz(LTE)

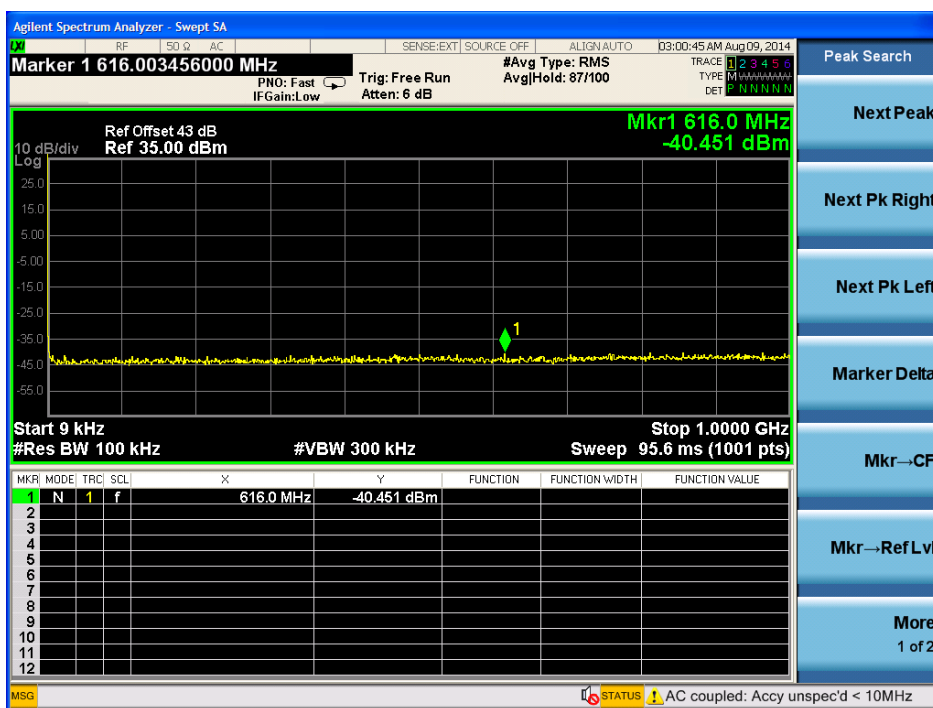
Remark:

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

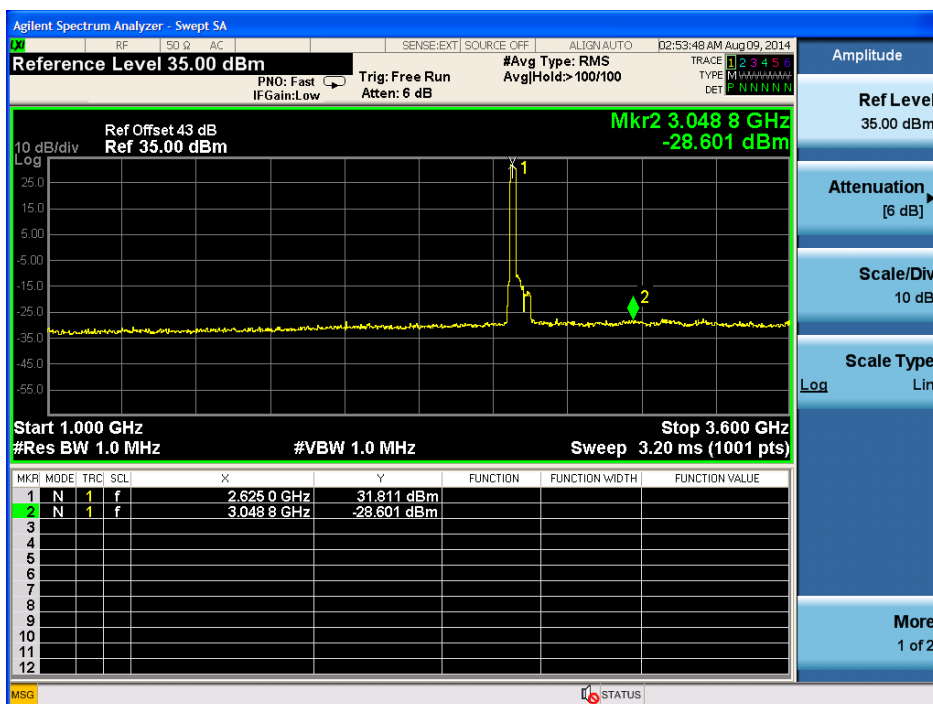
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

11.1 lowest frequency

9KHz to 1GHz



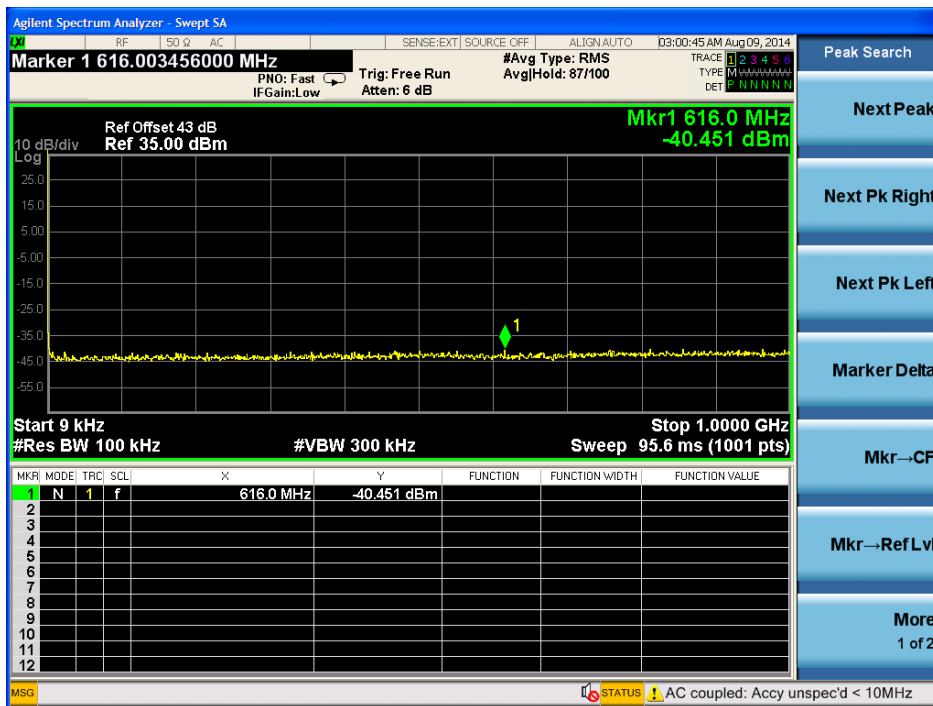
1GHz to 10GHz



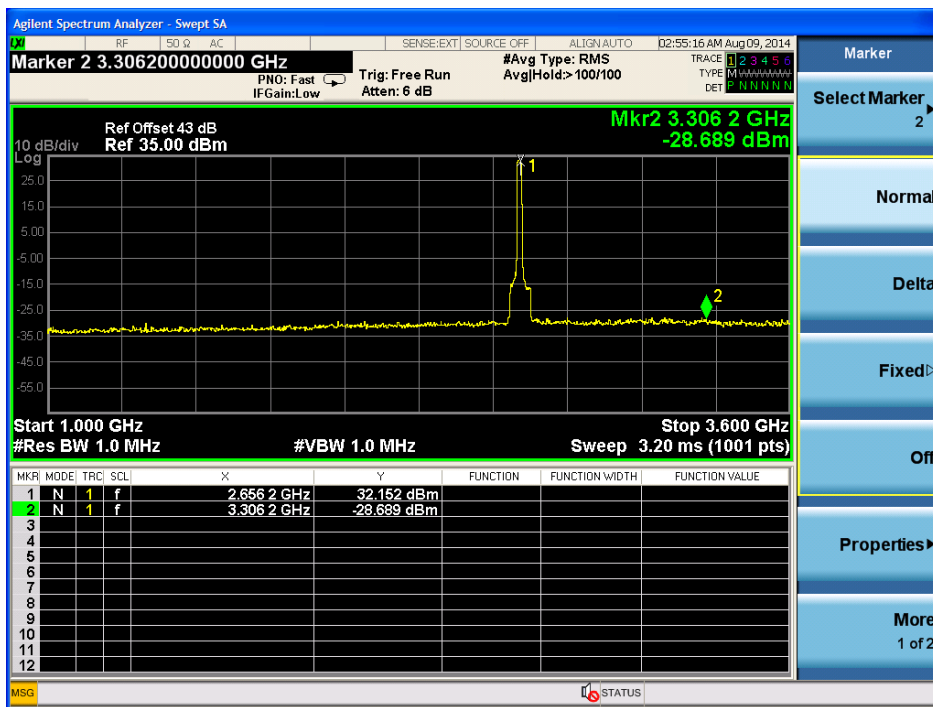


11.2 Middle frequency

9KHz to 1GHz



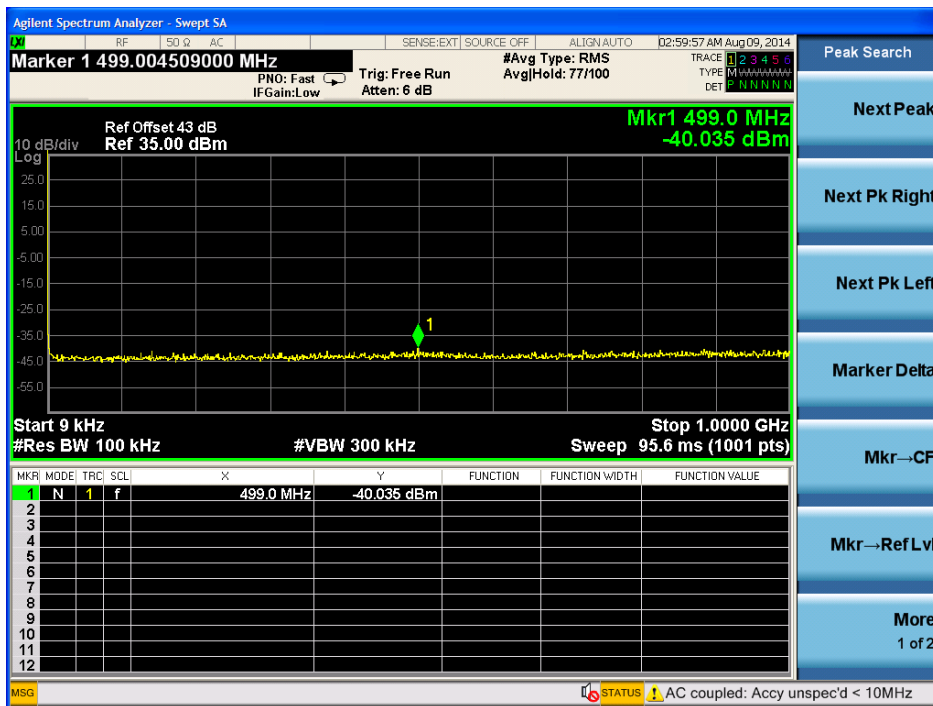
1GHz to 10GHz



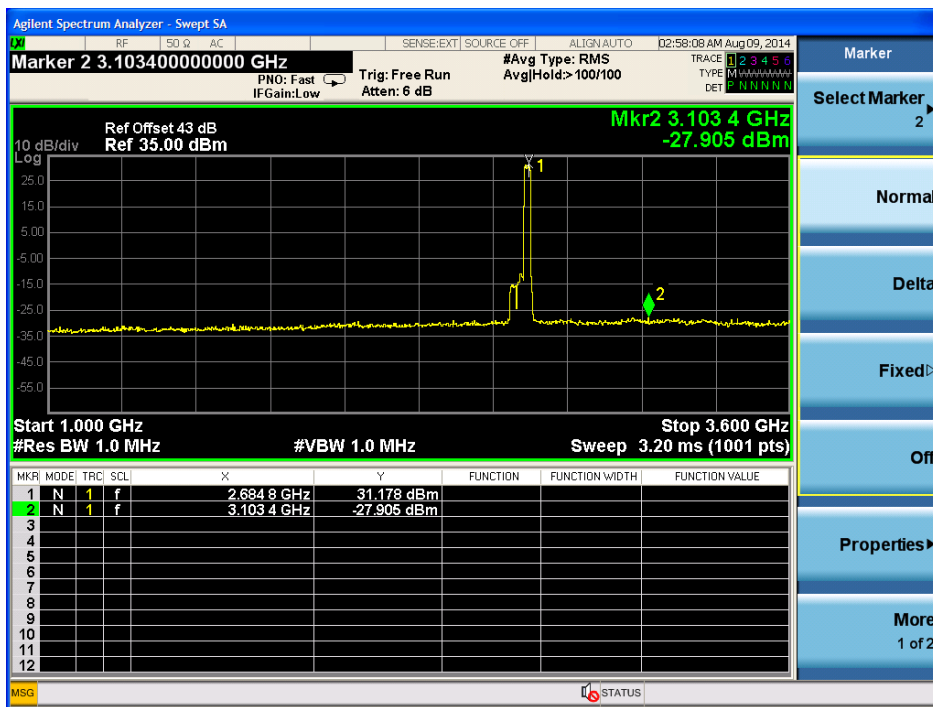


11.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.1 Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.5	-13.0	-27.5
1GHz to 10GHz	RBW=1MHz	-28.6	-13.0	-15.6

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.4	-13.0	-27.4
1GHz to 10GHz	RBW=1MHz	-28.7	-13.0	-15.7

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.0	-13.0	-27.0
1GHz to 10GHz	RBW=1MHz	-27.9	-13.0	-14.9



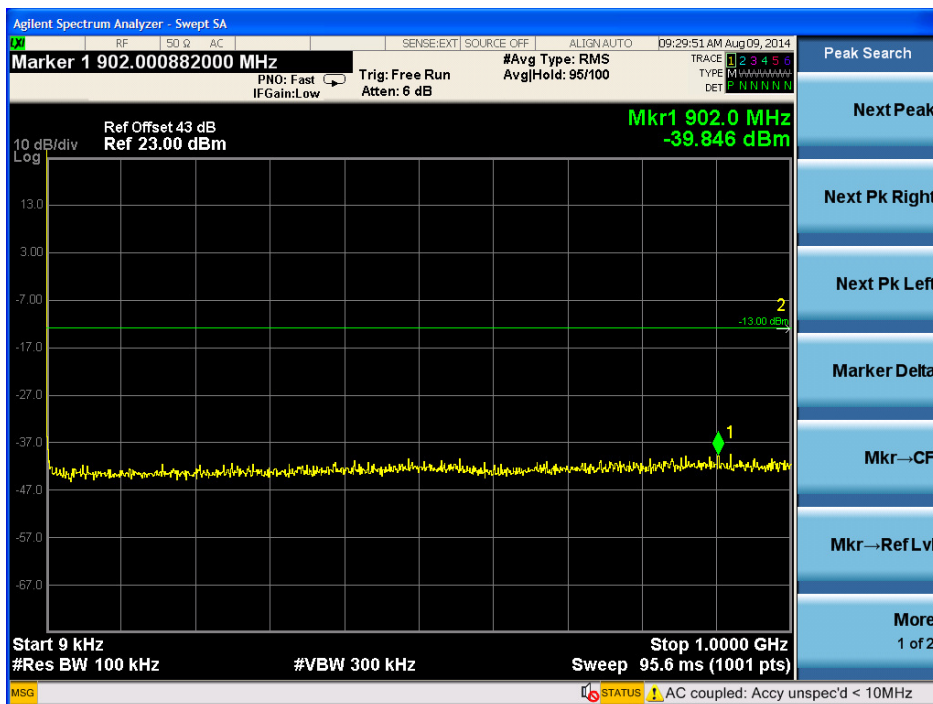
12.Uplink: 2500MHz ~ 2570MHz(LTE)

Remark

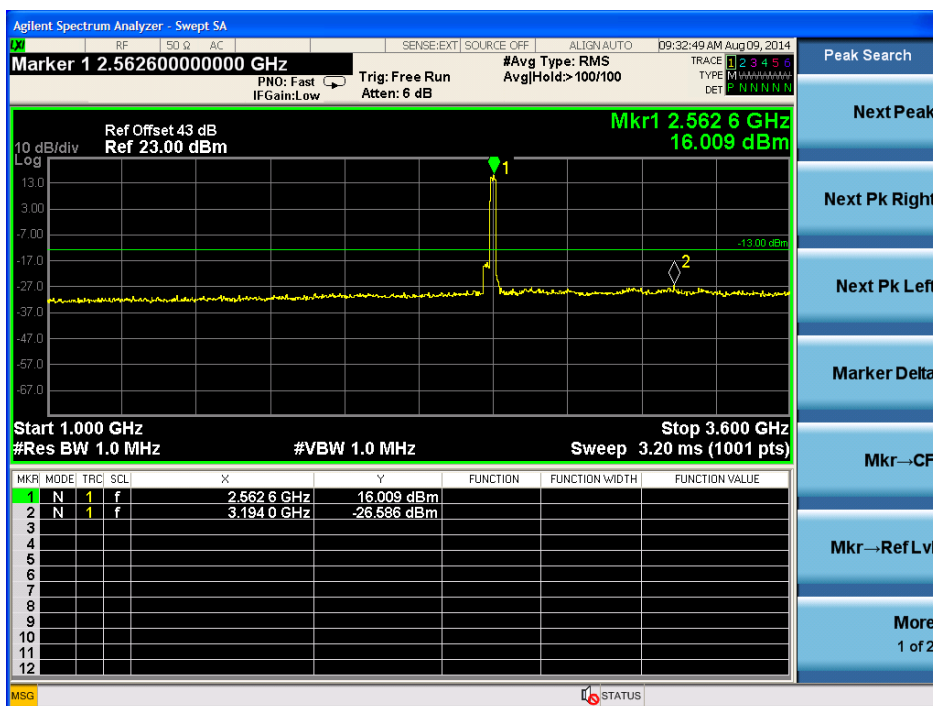
The data of the WCDMA mode is almost the same with LTE mode, so we only show the photo in the LTE mode,others record the data.

12.1 lowest frequency

9KHz to 1GHz



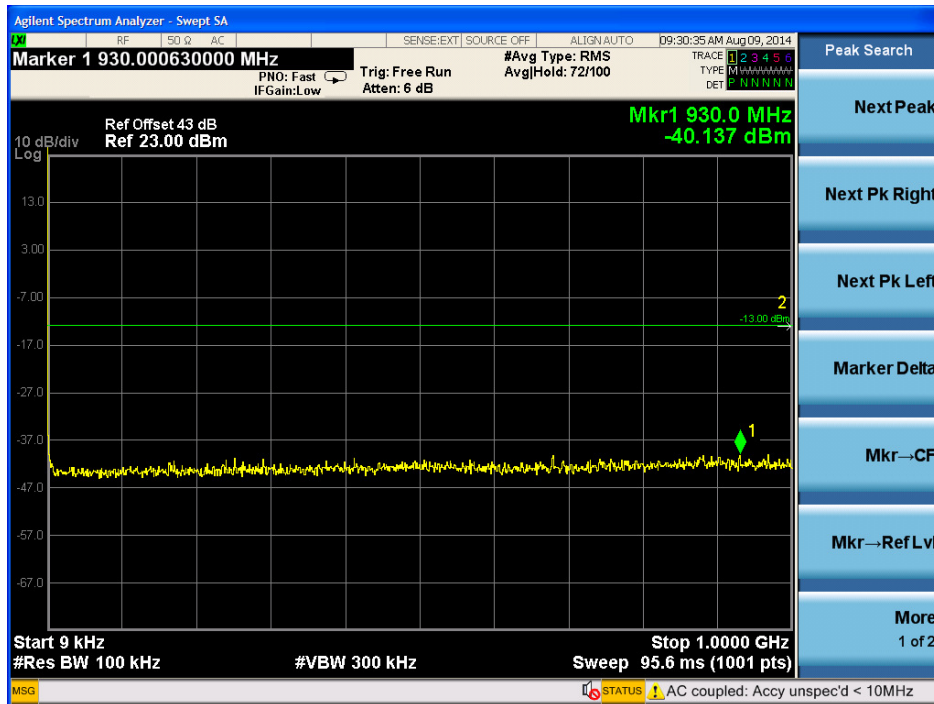
1GHz to 10GHz



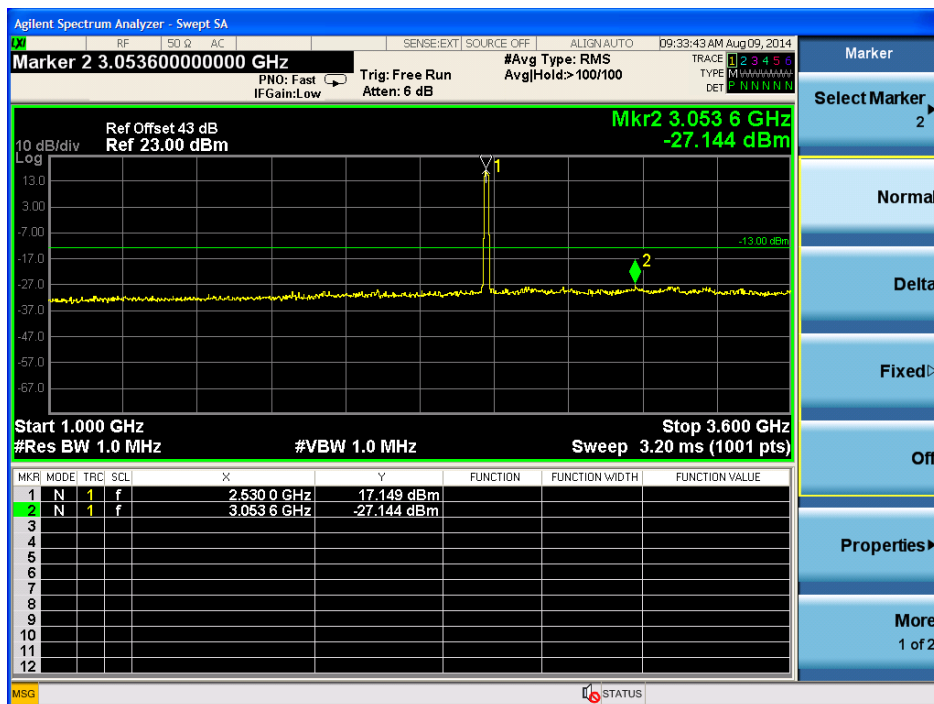


12.2 Middle frequency

9KHz to 1GHz



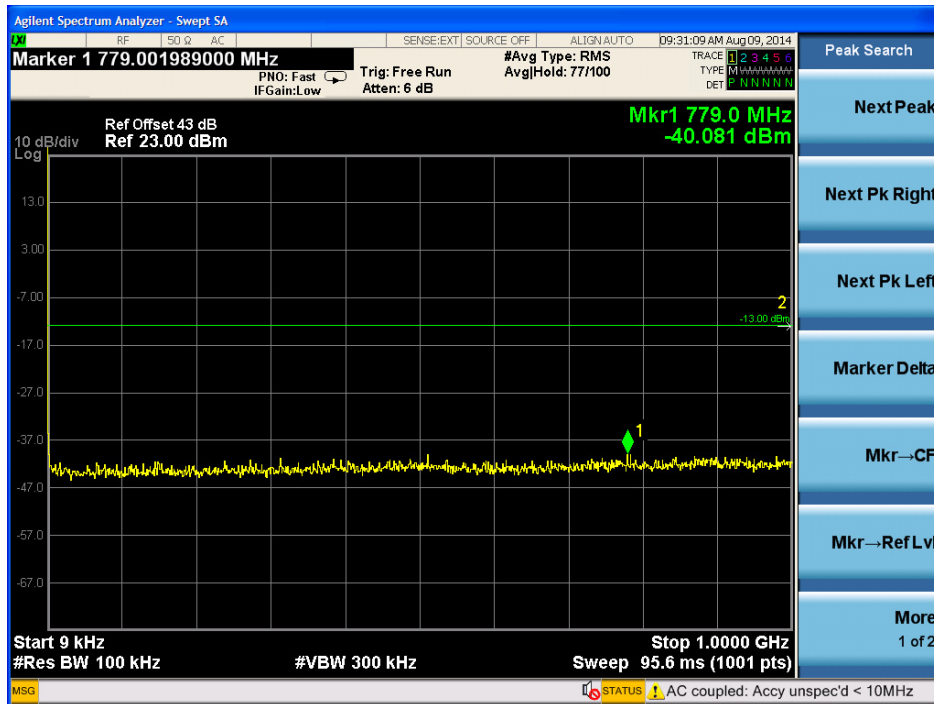
1GHz to 10GHz



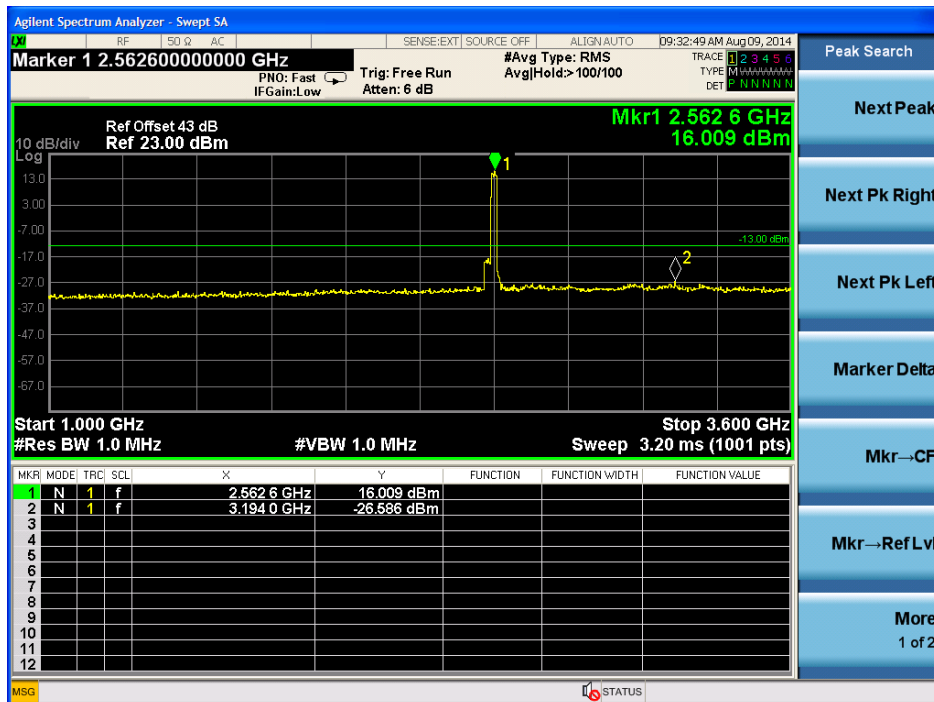


12.3 highest frequency

9KHz to 1GHz



1GHz to 10GHz





2.2 Test result

1)lowest frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-39.8	-13.0	-26.8
1GHz to 10GHz	RBW=1MHz	-26.7	-13.0	-13.7

2)Middle frequency:

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.1	-13.0	-27.1
1GHz to 10GHz	RBW=1MHz	-27.1	-13.0	-14.1

3)highest frequency

Measurement Record:				
Frequency range	Measurement bandwidth	Spurious Emission Level(dBm)	Limit(dBm)	Over Limit(dB)
9KHz to 1GHz	RBW=100KHz	-40.0	-13.0	-27.0
1GHz to 10GHz	RBW=1MHz	-26.6	-13.0	-13.6



7.2.3 Band Edge & Intermodulation

Test Date: 2014-08-19

Test Requirement: FCC part 22.917(b) & FCC part 24.238(b) & FCC part 27.53(h)

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&2-11-04/EAB/RF

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

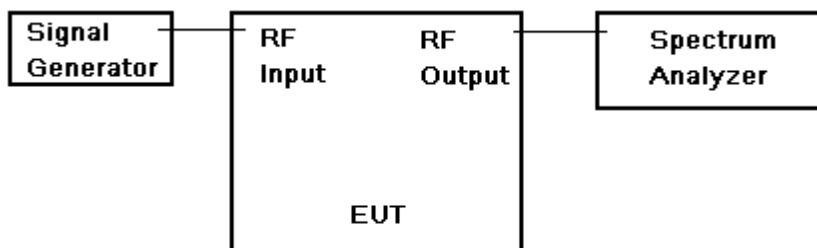
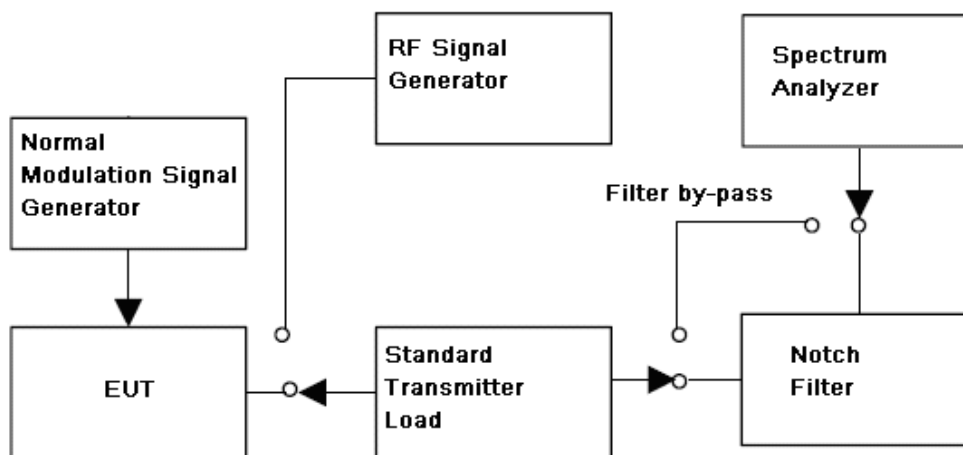


Fig.3. Band edge and Intermodulation test configuration



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 destroyed;
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 emissions 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.

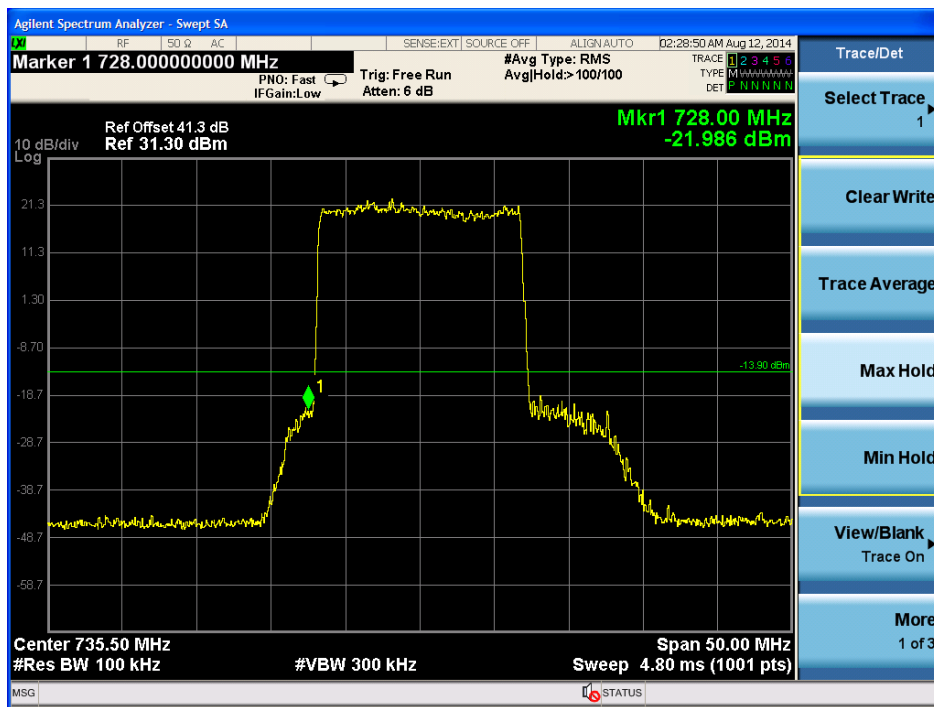
7.2.3.1 Measurement Record:

1) Downlink: 728MHz to 746MHz(LTE)

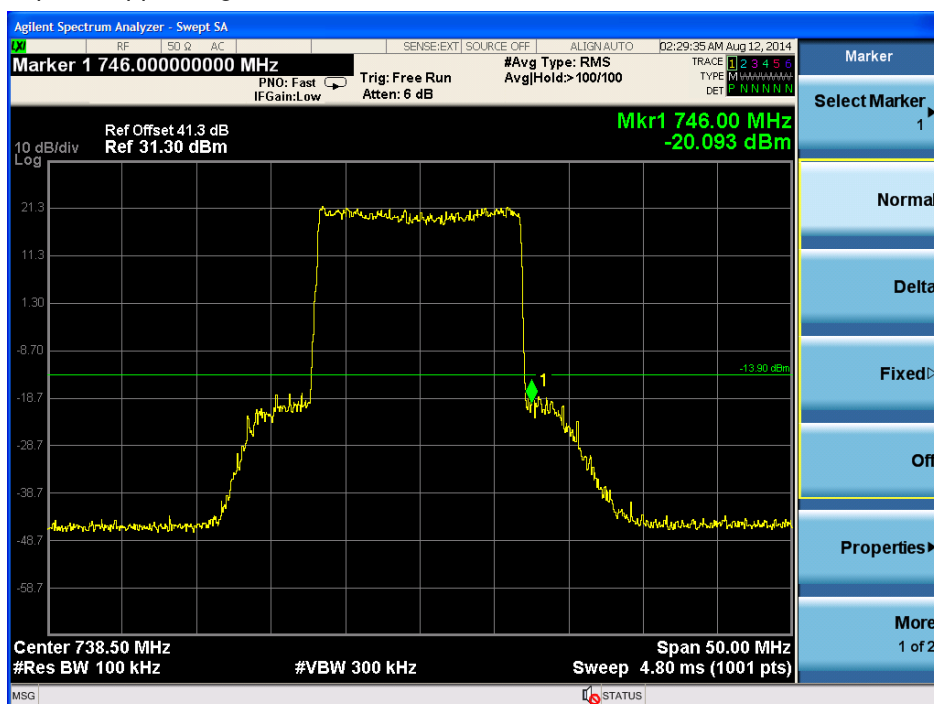
1. Pretest the EUT with Maximum Rated Output Power(27dBm,30dBm,33dBm),finally find the worst case as the EUT with Maximum Rated Output power(33dBm)

LTE Mode:

1.1 one signal input —Lower Edge(1 Carrier 15M modulation)

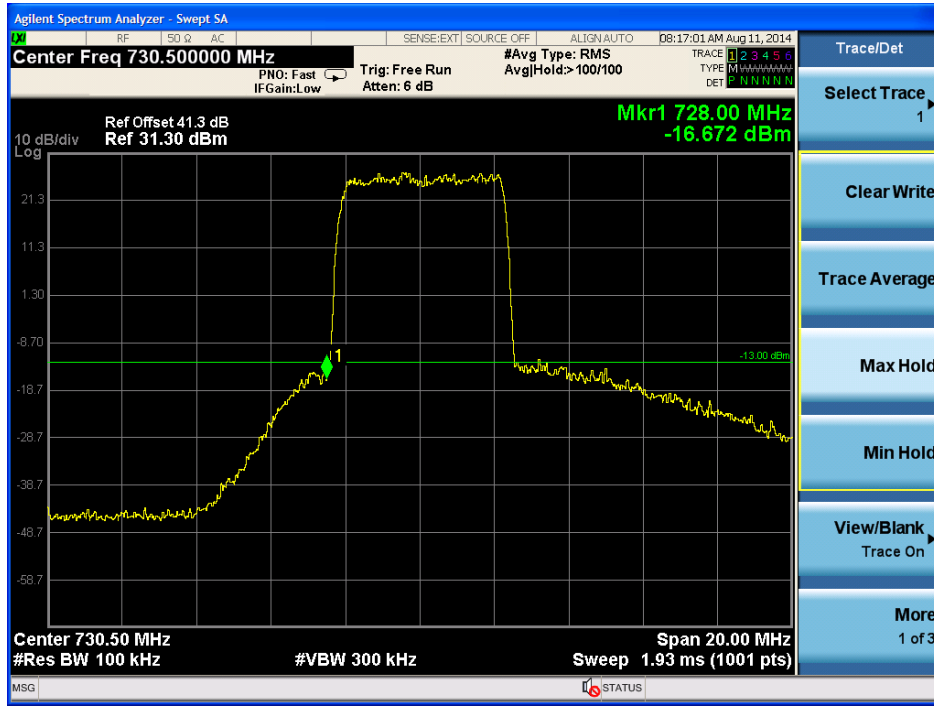


1.2 one signal input —Upper Edge





1.3 one signal input —Lower Edge (1 Carrier 5M modulation)



1.4 one signal input —Upper Edge

