# FCC REPORT

**Applicant:** BTI Wireless

**Address of Applicant:** 6185 Phyllis Dr. Unit D Cypress California 90630 United States

**Equipment Under Test (EUT)**

Product Name: mBSC-CM RUM

Model No.: mBSC0850i-005-RUCM11, mBSC0850i-002-RUCM11

Trade Mark: BTI WIRELESS™

**FCC ID:** WBKMBSC850IRUM

**Applicable standards:** FCC CFR Title 47 Part 2:2016
FCC CFR Title 47 Part 90 Subpart S:2016

**Date of sample receipt:** April 10, 2016

**Date of Test:** April 10-25, 2016

**Date of report issued:** April 25, 2016

**Test Result :** PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

**Robinson Lo**
**Laboratory Manager**

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
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## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *April 25, 2016* | *Original* |
| | | |
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| ***Prepared By:*** | Edward.Pan | ***Date:*** | *April 25, 2016* |
| | ***Project Engineer*** | | |
| ***Check By:*** | hank. yan | ***Date:*** | *April 25, 2016* |
| | ***Reviewer*** | | |

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# 4 Test Summary

| Test Item | Test Description | Result |
|---|---|---|
| Maximum Permissible Exposure(MPE) | § 1.1307(b)(1), § 2.1091 | PASS* (Please refer to MPE Report) |
| Effective radiated power (ERP). | § 2.1046; § 90.635 | PASS |
| Modulation Characteristics | § 2.1047 | N/A* |
| Passband Gain and Occupied Bandwidth | § 2.1049 | PASS |
| Spurious Emissions at Antenna Terminal | § 2.1051; § 90.691 | PASS |
| Intermodulation | § 2.1051; § 90.691 | PASS |
| Field Strength of Spurious Radiation | § 2.1053; § 90.691 | PASS |
| Out of Band Emission, Band Edge | § 90.219(d); § 90.691 | PASS |
| Frequency Stability vs. Temperature<br>Frequency Stability vs. Voltage | § 2.1055; § 90.213 | PASS |
| Measuring the EUT AGC threshold | --- | PASS |
| Out-of-Band Rejection | --- | PASS |
| AC Power Line Conducted Emission Test | § 15.207 | PASS |

Remark:

N/A*: Not application

# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | BTI Wireless |
| Address of Applicant: | 6185 Phyllis Dr. Unit D Cypress California 90630 United States |
| Manufacturer: | BTI Wireless(ShenZhen)Co.,Ltd. |
| Address of Manufacturer: | No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China |
| Factory: | BTI Wireless(ShenZhen)Co.,Ltd. |
| Address of Factory: | No. 8 Building, The 3rd Zone, Tangtou Industrial Park Shiyan, Baoan District, Shenzhen, China |

## 5.2 General Description of EUT

| | | |
|---|---|---|
| Product Name: | mBSC-CM RUM | |
| Model No.: | mBSC0850i-005-RUCM11, mBSC0850i-002-RUCM11 | |
| Power supply: | RPM: Input: AC 120V/60Hz<br>RUM: DC 28V, 3A Max<br>RTM: Input DC 28V / 2.2A<br>Normal test voltage: AC 120V/60Hz | |
| Operating Temperature: | -20℃ to + 55℃ | |
| Operating Humidity: | up to 95% | |
| **Technical Parameter:** | | |
| Frequency Range | Downlink | 862MHz~869MHz |
| | Uplink | 817MHz~824MHz |
| Operating Bandwidth | 7MHz | |
| Channel Spacing(s) / Bandwidth(s) | CDMA: 1.25MHz;<br>LTE: 1.4M,3M,5M; | |
| Maximun RF Output Power | Downlink: 37.31dBm(For 5W); 33.67dBm(For 2W);<br>Uplink: 5.42dBm(For 5W); 5.33dBm(For 2W); | |
| Max Gain | Downlink: 54.35dB; Uplink: 62.31dB | |
| Type of modulation and Designator | CDMA(F9W), LTE(W7D); | |
| Antenna Type | External antenna (N female) | |
| Antenna Gain | Maximum permissible antenna gain is 17dBi | |

## 5.3 Related Submittal(s) / Grant (s)

| | |
|---|---|
| Title 47 Part 2 | General Requirements and Information for the Certification of Radio Apparatus |
| Title 47 Part 90 | PRIVATE LAND MOBILE RADIO SERVICES |

## 5.4 Test Methodology

| | |
|---|---|
| Title 47 Part 2 | General Requirements and Information for the Certification of Radio Apparatus |
| Title 47 Part 90 | PRIVATE LAND MOBILE RADIO SERVICES |
| ANSI C63.4: 2014 | Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| KDB | AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET<br>PART 90 700/800 BANDS INDUSTRIAL BOOSTERS REQUIREMENTS SUMMARY |
| KDB 935210 | D01 Signal Booster Definitions v02;<br>D02 Signal Booster Certification v03<br>D03 Signal Booster Measurements v03<br>D04 Signal Booster Provider Specific v01r01<br>D05 Indus Booster Basic Meas v01 |

## 5.5 Description of Support Units

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| BTI | RTM | mBSC1430-RTM-5SW | N/A |

## 5.6 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC)**

The 3m Semi-anechoic chamber of China Certification & Inspection Services Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

## 5.7 Test Location

| All tests were performed at: |
|---|
| Global United Technology Services Co., Ltd.<br>Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102<br>Tel: 0755-27798480<br>Fax: 0755-27798960 |

## 5.8 Test Instruments list

| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (dd-mm-yy) | Cal.Due date (dd-mm-yy) |
|---|---|---|---|---|---|---|
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | Mar. 27 2015 | Mar. 26 2020 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | Jun. 29, 2015 | Jun. 28, 2016 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | Feb. 20 2016 | Feb. 19 2017 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June 25 2015 | June 24 2016 |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Coaxial Cable | GTS | N/A | GTS213 | Mar. 26 2016 | Mar. 25 2017 |
| 8 | Coaxial Cable | GTS | N/A | GTS211 | Mar. 26 2016 | Mar. 25 2017 |
| 9 | Coaxial cable | GTS | N/A | GTS210 | Mar. 26 2016 | Mar. 25 2017 |
| 10 | Coaxial Cable | GTS | N/A | GTS212 | Mar. 26 2016 | Mar. 25 2017 |
| 11 | Amplifier(100KHz-5GHz) | HP | 8347A | GTS204 | Jun. 29, 2015 | Jun. 28, 2016 |
| 12 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | Jun. 29, 2015 | Jun. 28, 2016 |
| 13 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 25 2015 | June 24 2016 |
| 14 | Shielding Room | ZhongYu Electron | 7.0(L)x3.0(W)x3.0(H) | GTS264 | Sep. 05 2015 | Sep. 04 2017 |
| 15 | EMI Test Receiver | Rohde & Schwarz | ESCS30 | GTS223 | Jun. 29, 2015 | Jun. 28, 2016 |
| 16 | 10dB Pulse Limita | Rohde & Schwarz | N/A | GTS224 | Jun. 29, 2015 | Jun. 28, 2016 |
| 17 | LISN | SCHWARZBECK MESS-ELEKTRONIK | NSLK 8127 | GTS226 | Jun. 29, 2015 | Jun. 28, 2016 |
| 18 | Temp. Humidity/ Barometer | Oregon Scientific | BA-888 | GTS248 | May 08 2015 | May 07 2017 |
| 19 | Spectrum Analyzer | Agilent | E4440A | GTS 536 | Oct.19 2015 | Oct.18 2016 |
| 20 | Spectrum Analyzer | Agilent | E4445A | MY41000047 | Sept. 09 2015 | Sept. 08 2017 |
| 21 | Splitter | Agilent | 11636B | GTS237 | May 08 2015 | May 07 2017 |
| 22 | Signal Generator | Rohde & Schwarz | SML03 | GTS236 | May 08 2015 | May 07 2017 |
| 23 | Signal Generator | AEROFLEX | IFR3414 | 341300/019 | Sept. 09 2015 | Sept. 08 2016 |
| 24 | Power Reflection Meter | Rohde & Schwarz | NRT | 100540 | Sept. 09 2015 | Sept. 08 2016 |
| 25 | Power Sensor | Giga-tronics | 80601A | 1831785 | Sept. 09 2015 | Sept. 08 2016 |
| 26 | Power Attenuator | BTI | 30dB/250W | 040706090 | Sept. 09 2015 | Sept. 08 2016 |
| 27 | Power Attenuator | BTI | 20dB | 040706089 | Sept. 09 2015 | Sept. 08 2016 |
| 28 | Power Attenuator | BTI | 10dB | 040706088 | Sept. 09 2015 | Sept. 08 2016 |
| 29 | Signal Generator | Agilent | E4438C | MY45093111 | Oct.19 2015 | Oct.18 2016 |
| 30 | Signal Generator | Agilent | 4432B | GB40051373 | May 09 2014 | May 08 2016 |
| 31 | Noise Figure Analyzer | Agilent | N8973A | GB42151304 | May 09 2014 | May 08 2016 |

# 6 TEST CONFIGURATION AND CONDITIONS

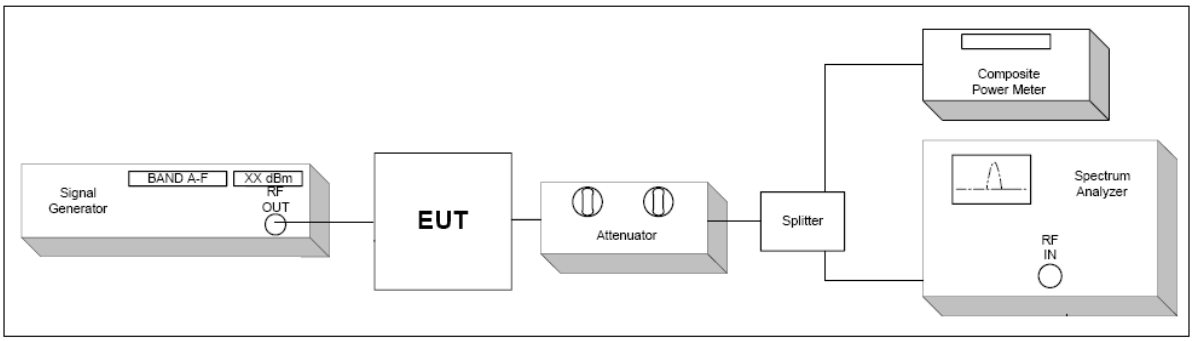
## 6.1 EUT Configuration

This mBSC0850i-005-RUCM11； mBSC0850i-002-RUCM11 are the Remote Unit on BTI CM system. This remote unit supports 850MHz band with the air standard CDMA and LTE. The unit consists of Duplexer, PA and CPU board. This product is designed to operate in an outdoor or indoor environment. The conducted output power of the RUM at Antenna interface port is average 37.31dBm (for 5W) and 33.67dBm (for 2W) Downlink path with Convection Cooling.

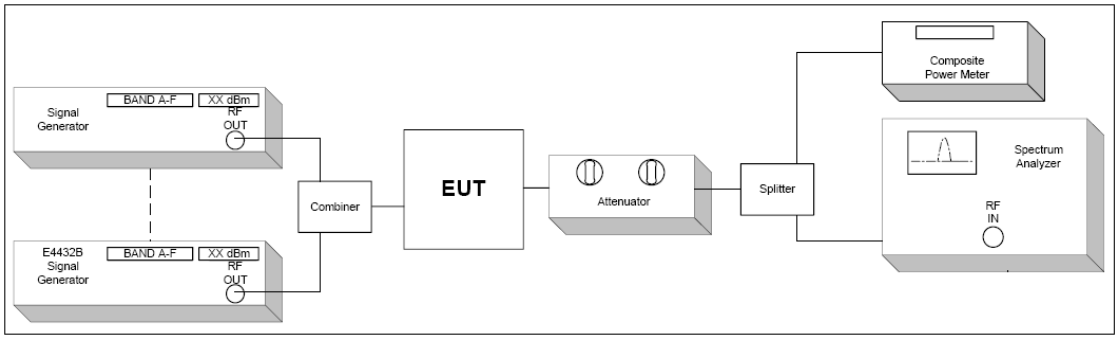
For details, refer to technical document and the user manual.

## 6.2 Configuration of Tested System

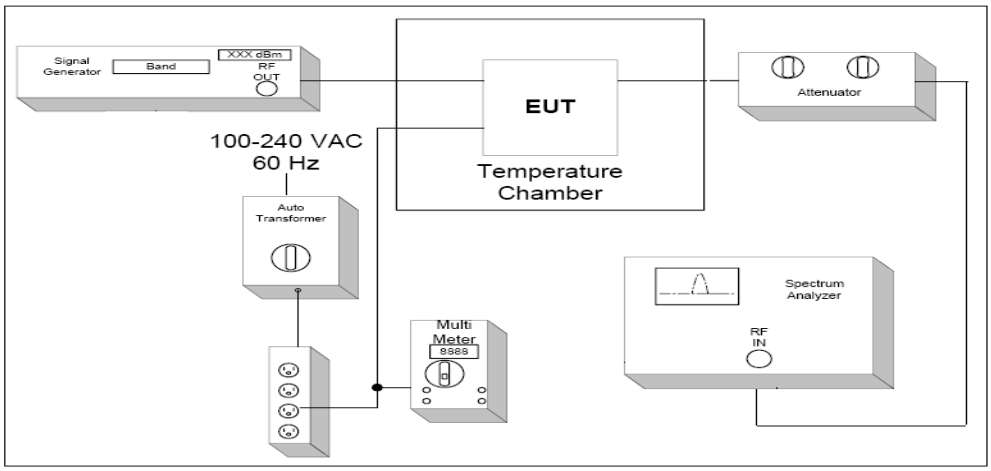
(A) RF Output Power, Occupied Bandwidth, Spurious Emissions at Antenna Terminal, Band Edge, Emission Mask , Noise Test Set-UP



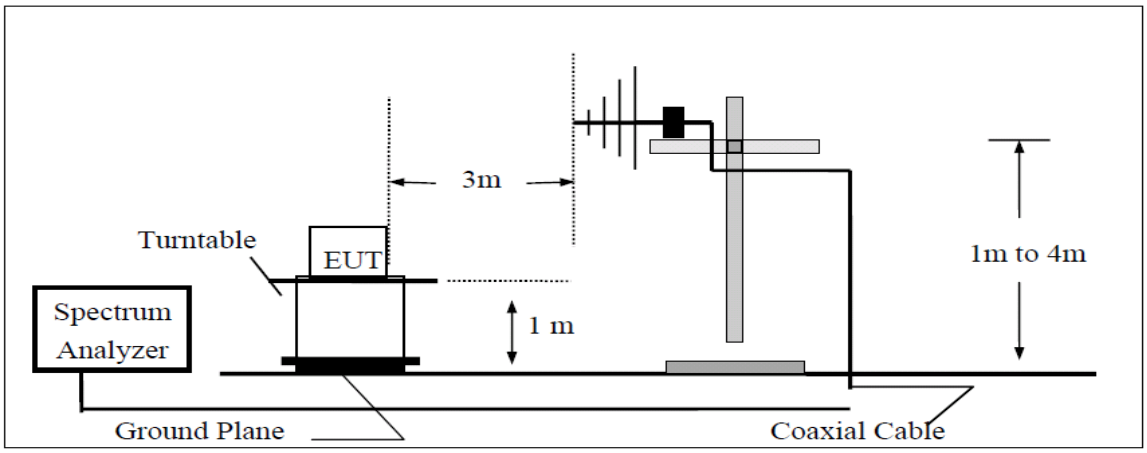

(B) Intermodulation Test Set-UP



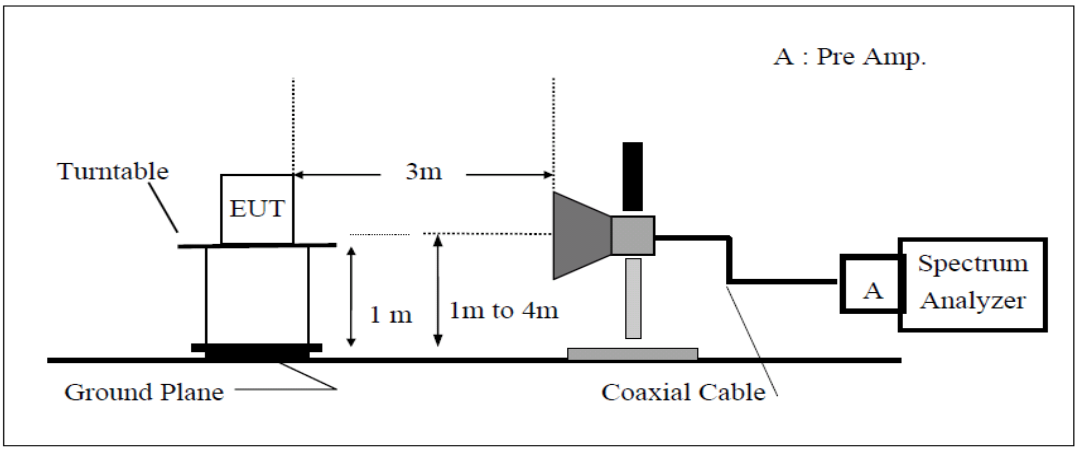

(C)Frequency stability Test Set-UP



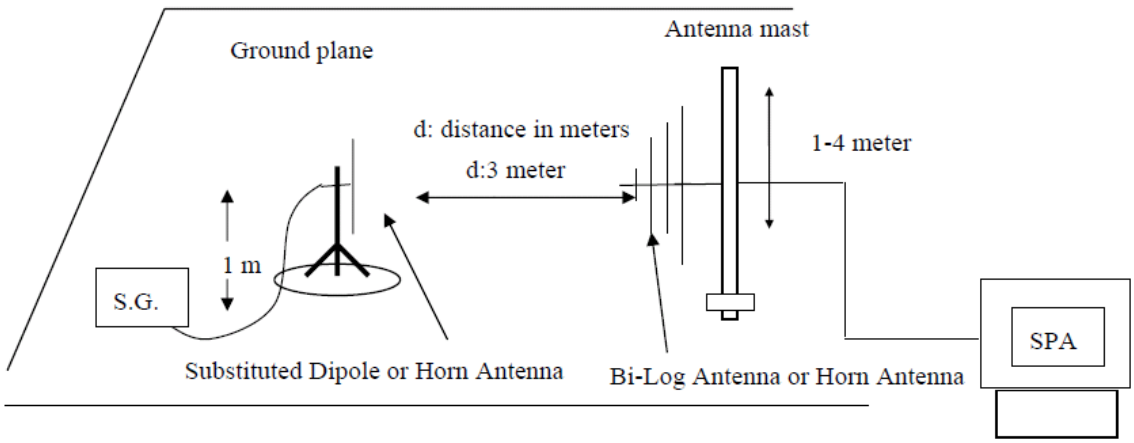
(D) Radiated Emission Test Set-Up, Frequency below 1000MHz




(E) Radiated Emission Test Set-UP Frequency over 1 GHz




(F) Substituted Method Test Set-UP



## 6.3 Test Environments

| Condition | Minimum value | Maximum value |
|---|---|---|
| Barometric pressure | 86 kPa | 106 kPa |
| Temperature | 15°C | 30°C |
| Relative Humidity | 20 % | 75 % |
| Power supply range | ±5% of rated voltages | |
| Normal Test Condition | (1).Temperature: +15 °C to +30 °C;<br>(2). voltage is 120V AC. | |
| Extreme Test Conditions: | (1). Temperatures: -20°C to +55°C.<br>(2). Voltages: 102V AC to 138V AC. | |

## 6.4 Test frequency selection

Downlink:

| Operating Mode(TX) | Channels No. Multi- Carriers | Channels frequency (MHz) | | |
|---|---|---|---|---|
| | | Low Ch. | Mid Ch. | High Ch. |
| CDMA | Single Carrier | 863.25 | 865.50 | 867.75 |
| LTE 1.4MHz Bandwidth | Single Carrier | 862.70 | 865.50 | 868.30 |
| LTE 3MHz Bandwidth | Single Carrier | 863.50 | 865.50 | 867.50 |
| LTE 5MHz Bandwidth | Single Carrier | --- | 865.50 | --- |

Uplink:

| Operating Mode(TX) | Channels No. Multi- Carriers | Channels frequency (MHz) | | |
|---|---|---|---|---|
| | | Low Ch. | Mid Ch. | High Ch. |
| CDMA | Single Carrier | 818.25 | 820.50 | 822.75 |
| LTE 1.4MHz Bandwidth | Single Carrier | 817.70 | 820.50 | 823.30 |
| LTE 3MHz Bandwidth | Single Carrier | 818.50 | 820.50 | 822.50 |
| LTE 5MHz Bandwidth | Single Carrier | --- | 820.50 | --- |

## 6.5 DESCRIPTION OF TEST MODES

| Test mode | Detail description of the test mode |
|---|---|
| Downlink | Downlink (Low channel; middle channel; high channel) |
| Uplink | Uplink (Low channel; middle channel; high channel) |
| Modulation type | CDMA and LTE |

Remark:

1: The EUT was powered by 120VAC.

2: The EUT was configured for maximum gain and maximum ouput power. The input power was the maximum declared by the manufacturer.This is to ensure that the equipment is operating in the linear output range.

3: Signal generator was used to provide the input signals to the EUT. Tests were performed with CDMA and LTE signal input and multi-carrier signal mode input.

4: Pre-test all test modes as above, only the worst case and typical mode is list in report it.

5: All testing is end-to-end (input to host through to output from remote, and vice-versa)

# 7 RF POWER OUTPUT(ERP) MEASUREMENT

## 7.1 Standard Applicable

According to FCC § 2.1046 and § 90.635

Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).

## 7.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 7.3 Measurement Procedure

1. The output from the EUT t signal shall be increased, antenna connector was connected to the power meter.
2. The level of RF input until the maximum output power per channel, declared by client, is reached.
3. The RF output power was measured at low, middle and high channel with CDMA and LTE signal.

## 7.4 Test Result

**5W**
Downlink:

| Test mode | Carrier Conf. | Channel | Average Power （dBm） | Average Power （W） | RF Output Power(W/MHz) | Result |
|---|---|---|---|---|---|---|
| WCDMA | Single Carrier | Low | 37.16 | 5.20 | 1.04 | Compliant |
| | | Middle | 37.31 | 5.38 | 1.08 | Compliant |
| | | High | 37.06 | 5.08 | 1.02 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 37.10 | 5.13 | 3.66 | Compliant |
| | | Middle | 37.28 | 5.35 | 3.82 | Compliant |
| | | High | 37.15 | 5.19 | 3.71 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 37.12 | 5.15 | 1.72 | Compliant |
| | | Middle | 37.25 | 5.31 | 1.77 | Compliant |
| | | High | 37.07 | 5.09 | 1.70 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | --- | --- | --- | --- |
| | | Middle | 37.23 | 5.28 | 1.06 | Compliant |
| | | High | --- | --- | --- | --- |

Uplink:

| Test mode | Carrier Conf. | Channel | Average Power （dBm） | Average Power （W） | RF Output Power(W/MHz) | Result |
|---|---|---|---|---|---|---|
| WCDMA | Single Carrier | Low | 5.31 | 0.0034 | 0.0007 | Compliant |
| | | Middle | 5.42 | 0.0035 | 0.0007 | Compliant |
| | | High | 5.28 | 0.0034 | 0.0007 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 5.25 | 0.0033 | 0.0024 | Compliant |
| | | Middle | 5.38 | 0.0035 | 0.0025 | Compliant |
| | | High | 5.23 | 0.0033 | 0.0024 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 5.21 | 0.0033 | 0.0011 | Compliant |
| | | Middle | 5.34 | 0.0034 | 0.0011 | Compliant |
| | | High | 5.20 | 0.0033 | 0.0011 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | --- | --- | --- | --- |
| | | Middle | 5.35 | 0.0034 | 0.0007 | Compliant |
| | | High | --- | --- | --- | --- |

**2W**

Downlink:

| Test mode | Carrier Conf. | Channel | Average Power （dBm） | Average Power （W） | RF Output Power(W/MHz) | Result |
|---|---|---|---|---|---|---|
| WCDMA | Single Carrier | Low | 33.54 | 2.26 | 0.45 | Compliant |
| | | Middle | 33.67 | 2.33 | 0.47 | Compliant |
| | | High | 33.46 | 2.22 | 0.44 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 33.51 | 2.24 | 1.60 | Compliant |
| | | Middle | 33.62 | 2.30 | 1.64 | Compliant |
| | | High | 33.47 | 2.22 | 1.59 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 33.50 | 2.24 | 0.75 | Compliant |
| | | Middle | 33.61 | 2.30 | 0.77 | Compliant |
| | | High | 33.42 | 2.20 | 0.73 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | --- | --- | --- | --- |
| | | Middle | 33.57 | 2.28 | 0.46 | Compliant |
| | | High | --- | --- | --- | --- |

Uplink:

| Test mode | Carrier Conf. | Channel | Average Power （dBm） | Average Power （W） | RF Output Power(W/MHz) | Result |
|---|---|---|---|---|---|---|
| WCDMA | Single Carrier | Low | 5.21 | 0.0033 | 0.0007 | Compliant |
| | | Middle | 5.33 | 0.0034 | 0.0007 | Compliant |
| | | High | 5.16 | 0.0033 | 0.0007 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 5.17 | 0.0033 | 0.0023 | Compliant |
| | | Middle | 5.28 | 0.0034 | 0.0024 | Compliant |
| | | High | 5.13 | 0.0033 | 0.0023 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 5.19 | 0.0033 | 0.0011 | Compliant |
| | | Middle | 5.29 | 0.0034 | 0.0011 | Compliant |
| | | High | 5.24 | 0.0033 | 0.0011 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | --- | --- | --- | --- |
| | | Middle | 5.30 | 0.0034 | 0.0007 | Compliant |
| | | High | --- | --- | --- | --- |

## 7.5 Peak to Average Ratio

Downlink:

| Test mode | Carrier Conf. | Peak to Average Ratio (dB) | | | Limit (dB) | Result |
|---|---|---|---|---|---|---|
| | | Low Ch. | Middle Ch. | High Ch. | | |
| CDMA | Single Carrier | 6.12 | 6.35 | 6..47 | 13 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | 7.64 | 7.57 | 7.96 | 13 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | 7.58 | 7.85 | 7.42 | 13 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | 7.65 | 7.55 | 7.53 | 13 | Compliant |

Uplink:

| Test mode | Carrier Conf. | Peak to Average Ratio (dB) | | | Limit (dB) | Result |
|---|---|---|---|---|---|---|
| | | Low Ch. | Middle Ch. | High Ch. | | |
| CDMA | Single Carrier | 6.25 | 6.38 | 6.54 | 13 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | 7.59 | 7.38 | 7.45 | 13 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | 7.38 | 7.39 | 7.52 | 13 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | 7.42 | 7.41 | 7.60 | 13 | Compliant |

# 8 MEASURING THE EUT AGC THRESHOLD

## 8.1 Standard Applicable

Please refer the section §3.2 8 MEASURING THE EUT AGC THRESHOLD of D05 Indus Booster Basic Meas v01

## 8.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 8.3 Test Procedure

Please refer the section §3.2 8 MEASURING THE EUT AGC THRESHOLD of D05 Indus Booster Basic Meas v01

## 8.4 Test Result

**Downlink:**

| Test mode | Carrier Conf. | AGC threshold level （dB） | | | Result |
|---|---|---|---|---|---|
| | | Low Ch. | Middle Ch. | High Ch. | |
| CDMA | Single Carrier | 39.15 | 39.26 | 39.20 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | 39.12 | 39.21 | 39.13 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | 39.11 | 39.27 | 39.15 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | 39.01 | 39.24 | 39.02 | Compliant |

**Uplink:**

| Test mode | Carrier Conf. | AGC threshold level （dB） | | | Result |
|---|---|---|---|---|---|
| | | Low Ch. | Middle Ch. | High Ch. | |
| CDMA | Single Carrier | 7.45 | 7.59 | 7.38 | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | 7.31 | 7.55 | 7.42 | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | 7.42 | 7.51 | 7.39 | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | 7.28 | 7.49 | 7.35 | Compliant |

# 9 PASSBAND GAIN AND OCCUPIED BANDWIDTH

## 9.1 Standard Applicable

According to FCC §2.1049

## 9.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 9.3 Test Procedure

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. The spectrum analyzer was setup to measure the Occupied Bandwidth (defined as the 99% Power Bandwidth).
4. The Occupied Bandwidth was measured at the input and output ports of the EUT at low, middle and high channel of each type of modulation and each type of carrier signal.

Spectrum analyzer settings:

Detector: RMS.

iDEN: RBW= 300Hz, VBW≥RBW, Sweep: Auto

C4FM/Analog FM: RBW= 100Hz, VBW≥RBW, Sweep: Auto

## 9.4 Test Result

## Pass band Gain

Downlink:

| Test mode | Carrier Conf. | Channel | Pass band Gain (dB) | Nominal Gain (dB) | Result |
|---|---|---|---|---|---|
| CDMA | Single Carrier | Low | 54.24 | 54±0.5 | Compliant |
| | | Middle | 54.35 | | Compliant |
| | | High | 54.26 | | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 54.20 | | Compliant |
| | | Middle | 54.33 | | Compliant |
| | | High | 54.21 | | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 54.08 | | Compliant |
| | | Middle | 54.24 | | Compliant |
| | | High | 54.13 | | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | 54.11 | | Compliant |
| | | Middle | 54.25 | | Compliant |
| | | High | 54.09 | | Compliant |

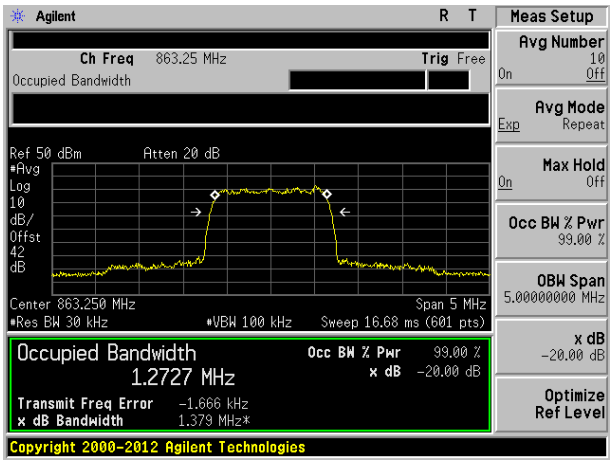
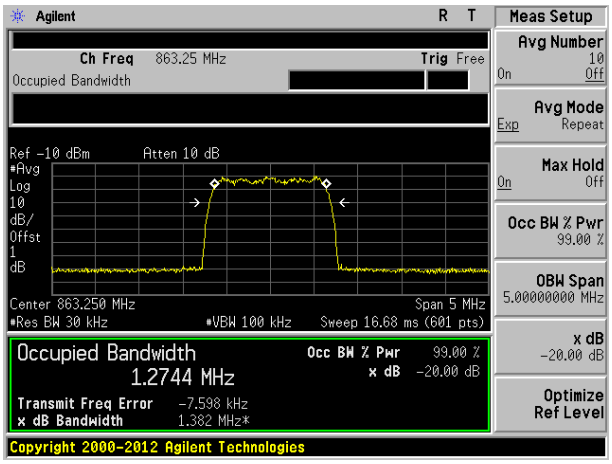
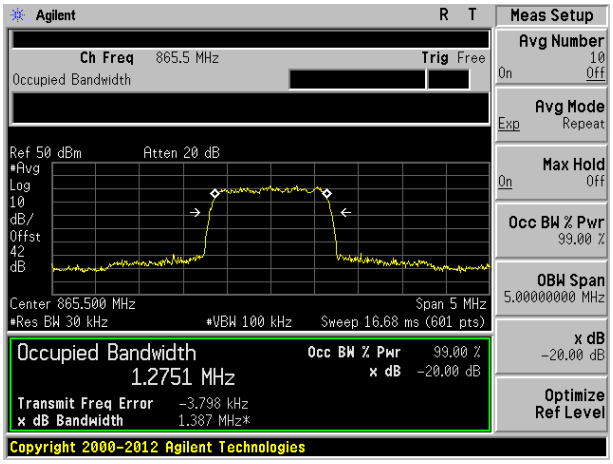
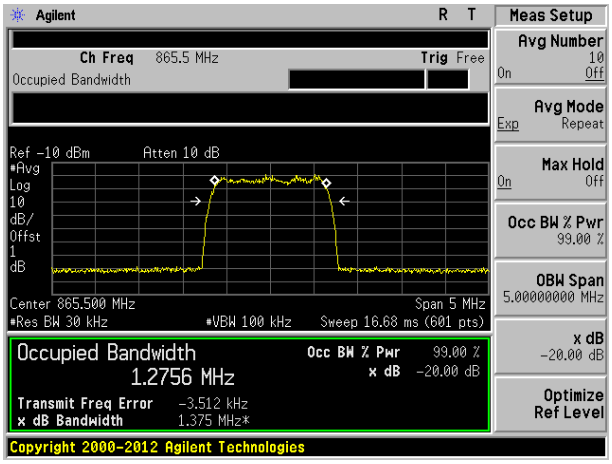
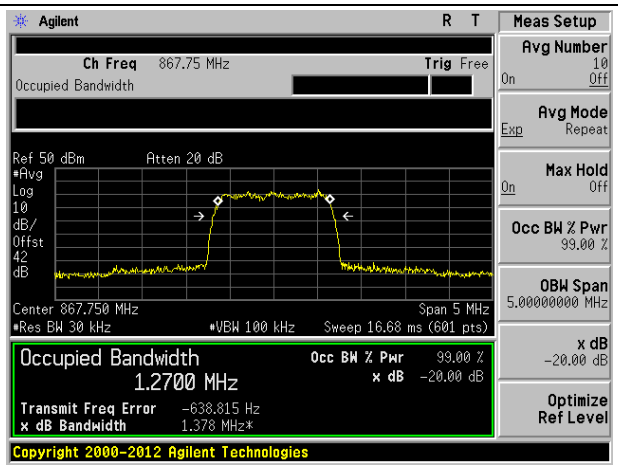
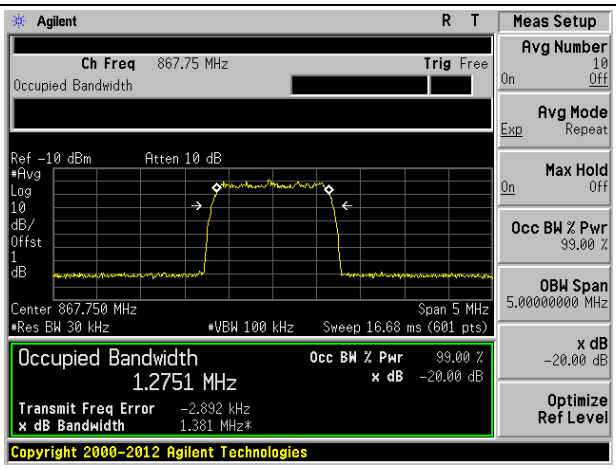
Uplink:

| Test mode | Carrier Conf. | Channel | Pass band Gain (dB) | Nominal Gain (dB) | Result |
|---|---|---|---|---|---|
| CDMA | Single Carrier | Low | 62.24 | 62±0.5 | Compliant |
| | | Middle | 62.31 | | Compliant |
| | | High | 62.17 | | Compliant |
| LTE 1.4MHz Bandwidth | Single Carrier | Low | 62.10 | | Compliant |
| | | Middle | 62.27 | | Compliant |
| | | High | 62.11 | | Compliant |
| LTE 3MHz Bandwidth | Single Carrier | Low | 62.15 | | Compliant |
| | | Middle | 62.26 | | Compliant |
| | | High | 62.03 | | Compliant |
| LTE 5MHz Bandwidth | Single Carrier | Low | 62.12 | | Compliant |
| | | Middle | 62.23 | | Compliant |
| | | High | 62.06 | | Compliant |

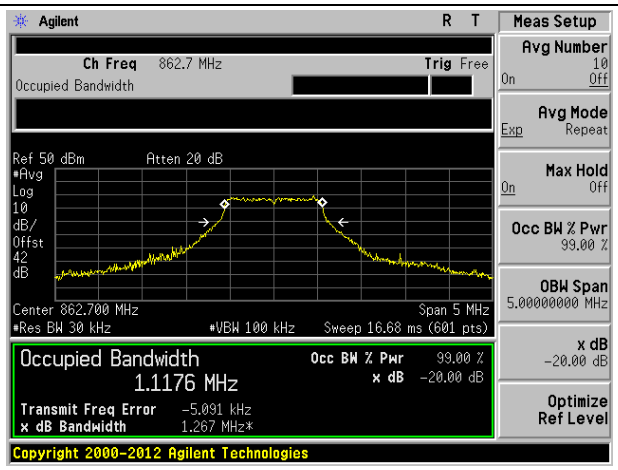
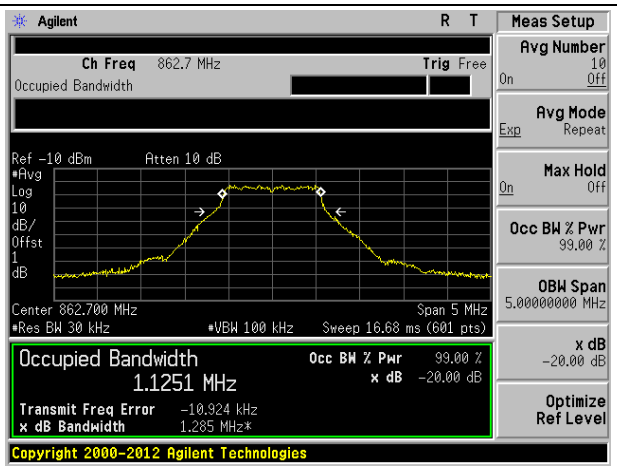
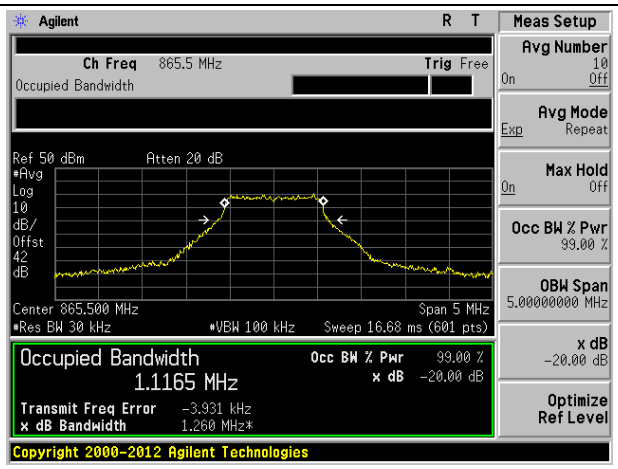
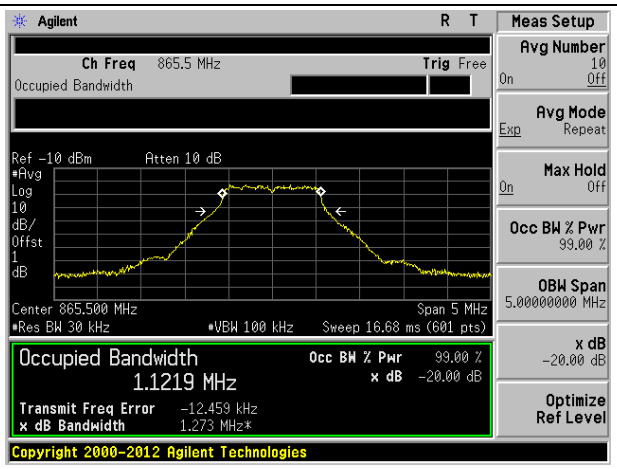
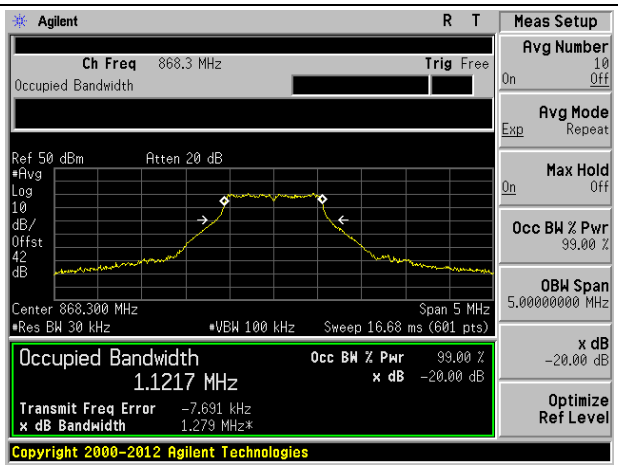
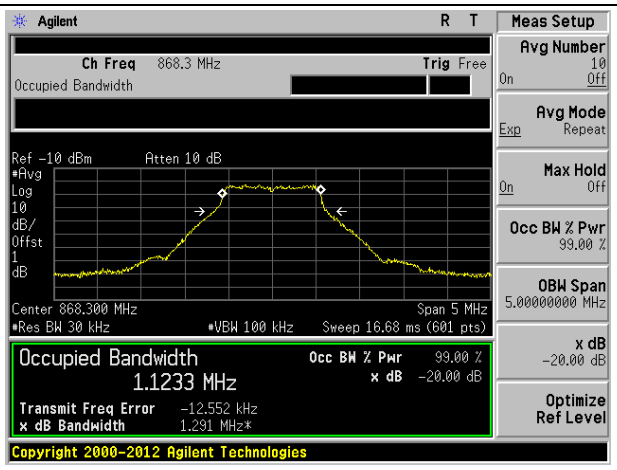
## Input/output Bandwidth Comparison

Downlink:

**Input/output Bandwidth Comparison for CDMA**

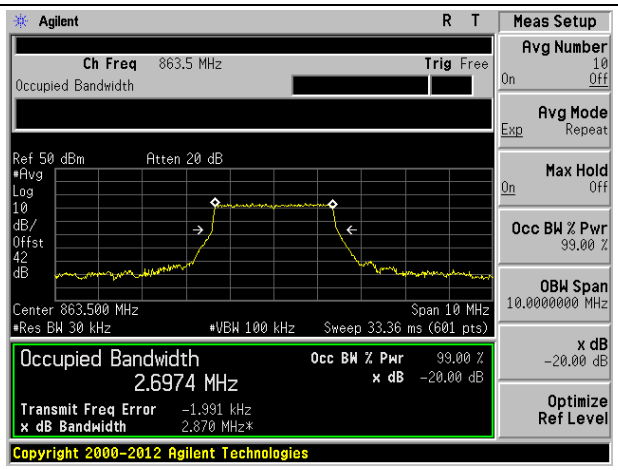
| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|  |  |
| Output(Middle channel) | Input(Middle channel) |
|  |  |
| Output(Highest channel) | Input(Highest channel) |
|  |  |

**Input/output Bandwidth Comparison for LTE 1.4MHz Bandwidth**

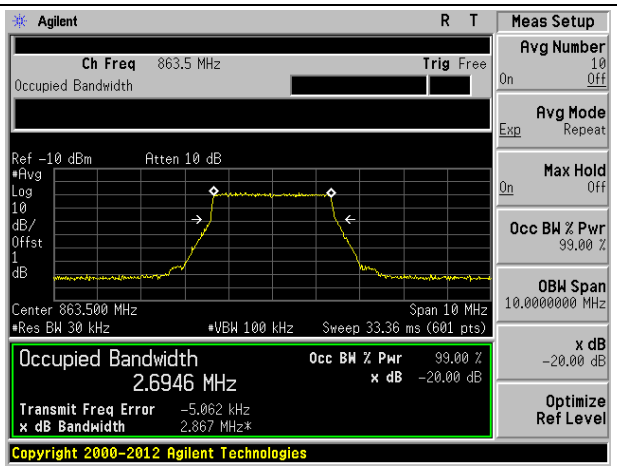
| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|  |  |
| **Output(Middle channel)** | **Input(Middle channel)** |
|  |  |
| **Output(Highest channel)** | **Input(Highest channel)** |
|  |  |

**Input/output Bandwidth Comparison for LTE 3MHz Bandwidth**

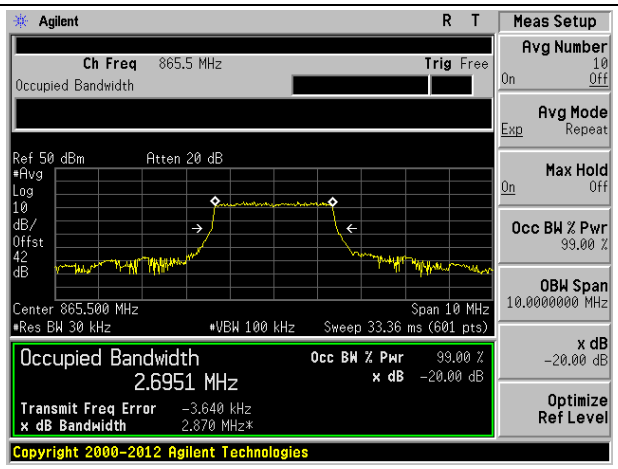
Output(Lowest channel)



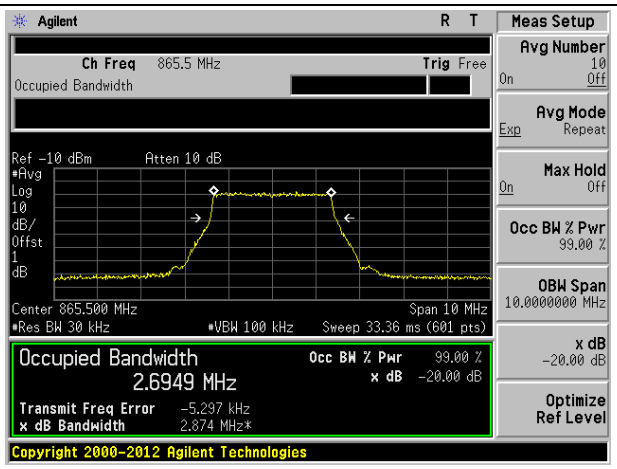

Input(Lowest channel)



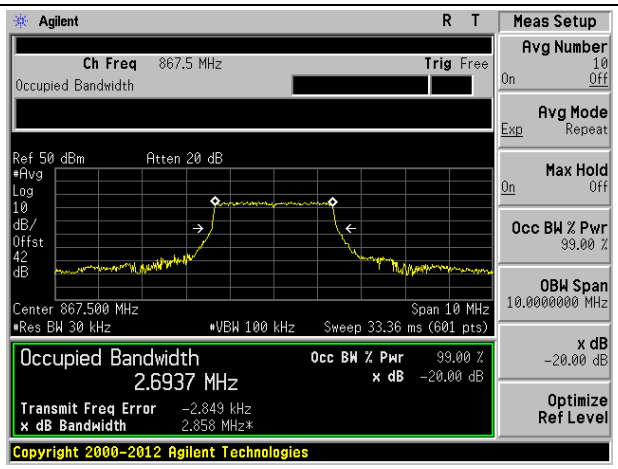

Output(Middle channel)



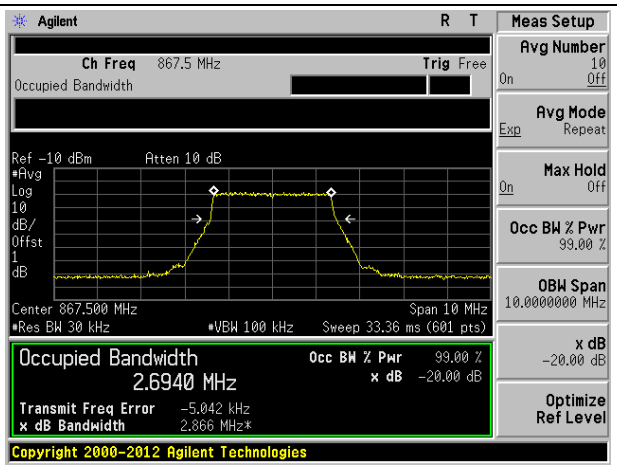

Input(Middle channel)



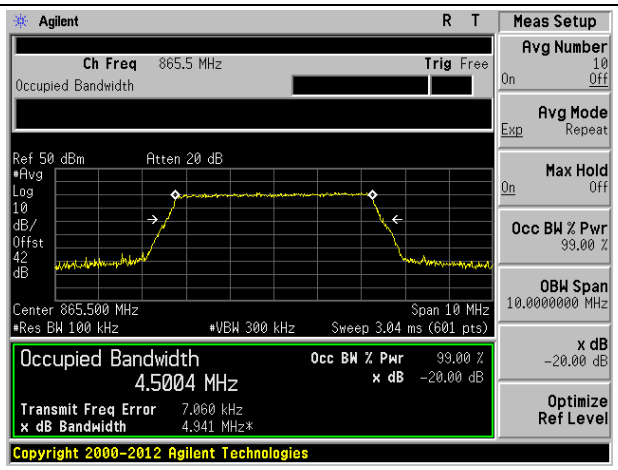
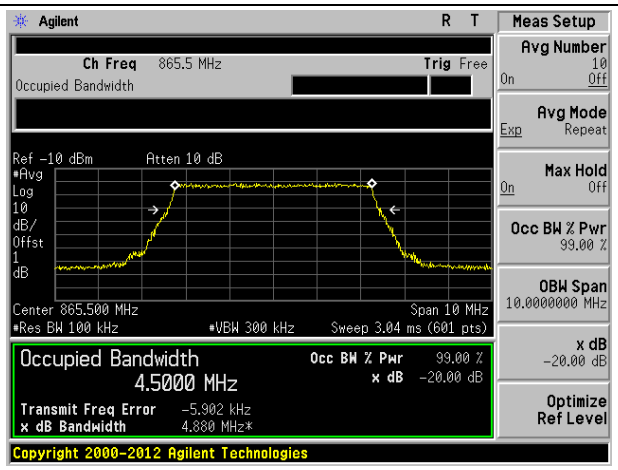

Output(Highest channel)




Input(Highest channel)

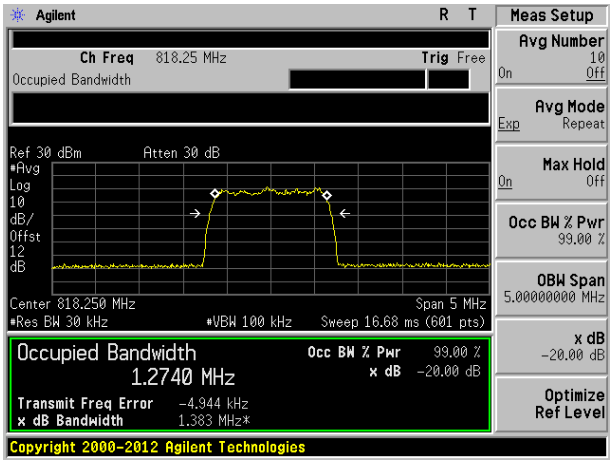
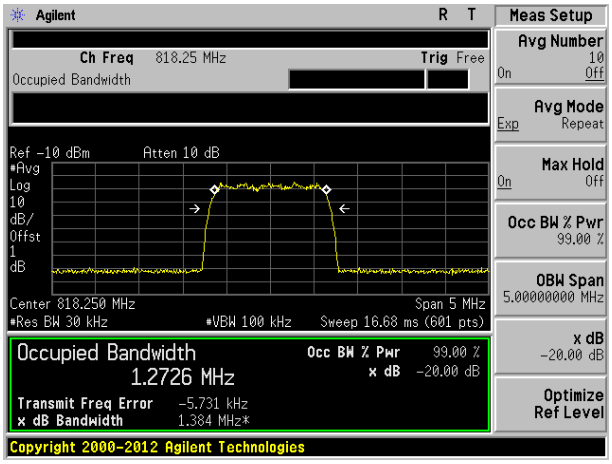
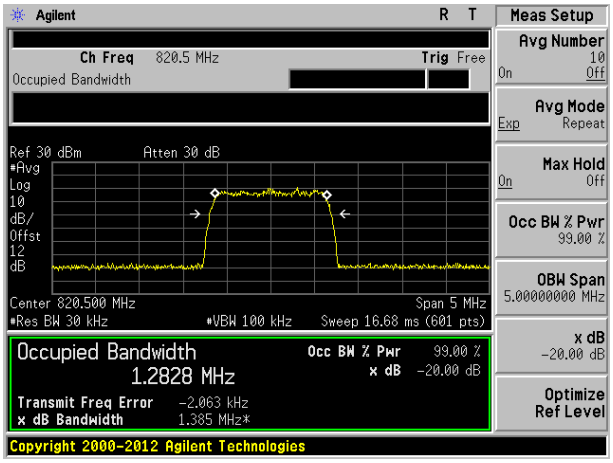
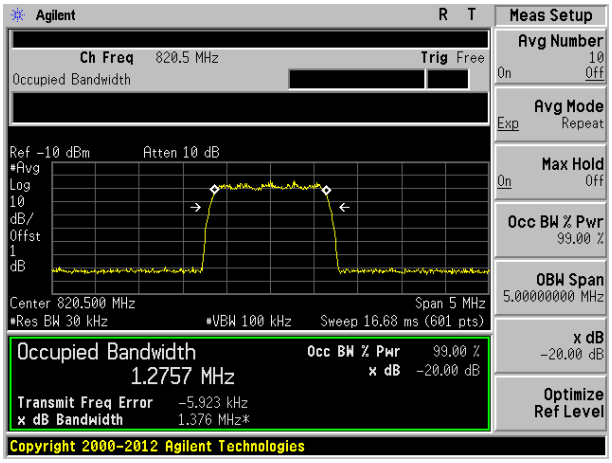
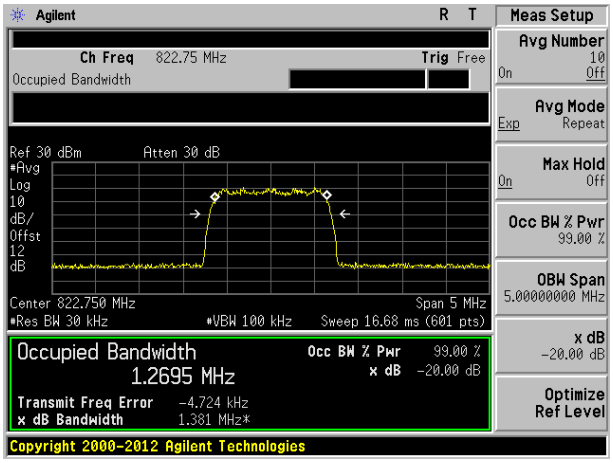
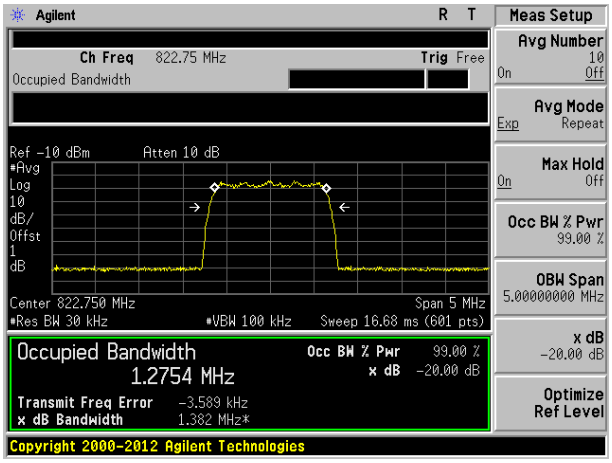


**Input/output Bandwidth Comparison for LTE 5MHz Bandwidth**

| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|  |  |

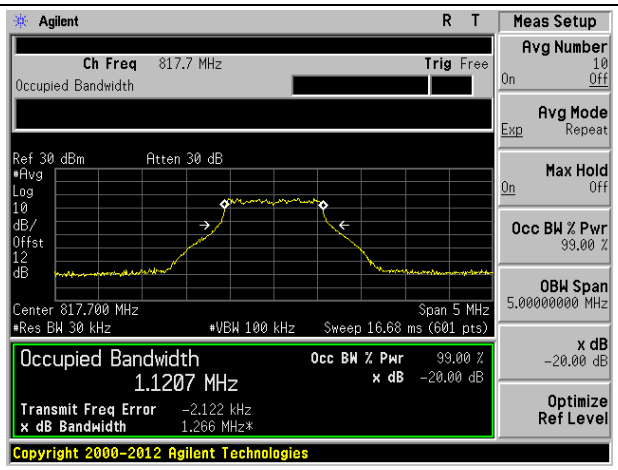
Uplink:

**Input/output Bandwidth Comparison for CDMA**

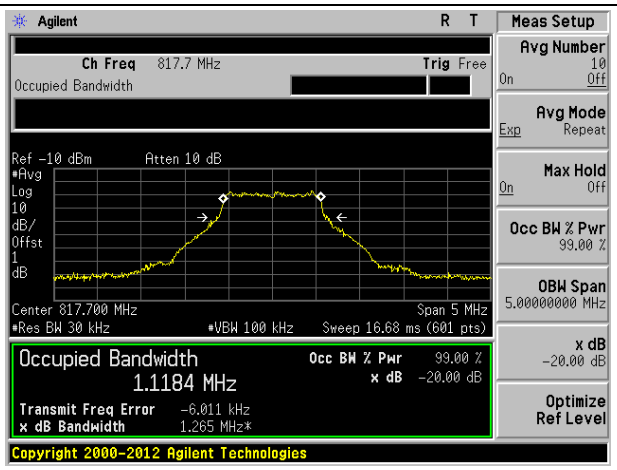
| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|   |   |
| Output(Middle channel) | Input(Middle channel) |
|   |   |
| Output(Highest channel) | Input(Highest channel) |
|   |   |

**Input/output Bandwidth Comparison for LTE 1.4MHz Bandwidth**

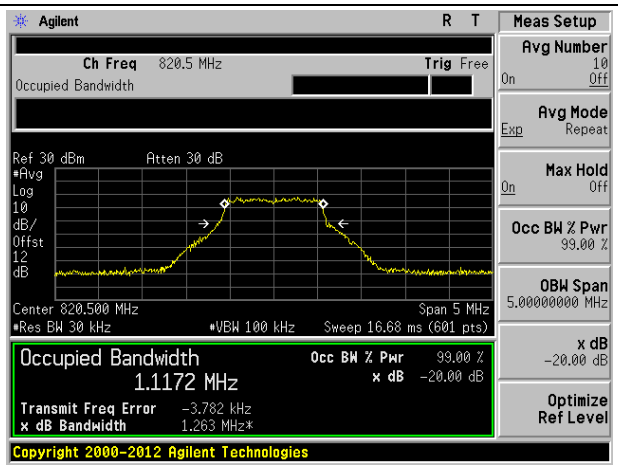
Output(Lowest channel)



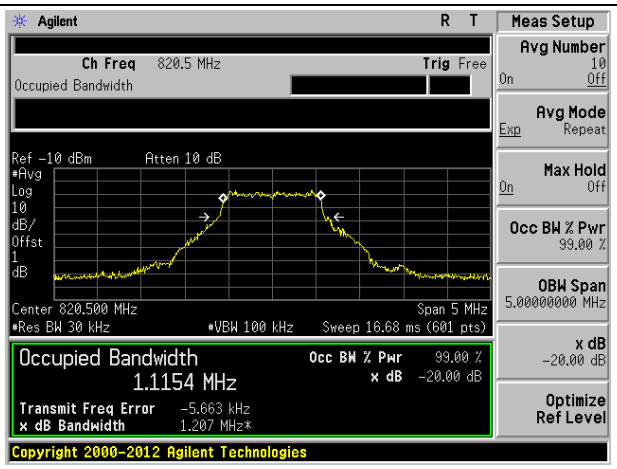

Input(Lowest channel)



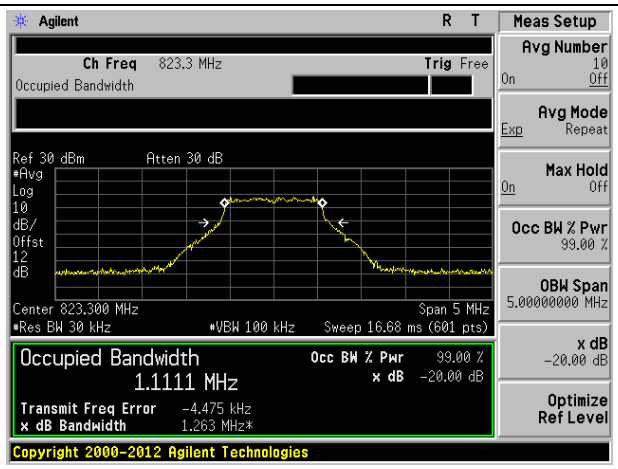

Output(Middle channel)



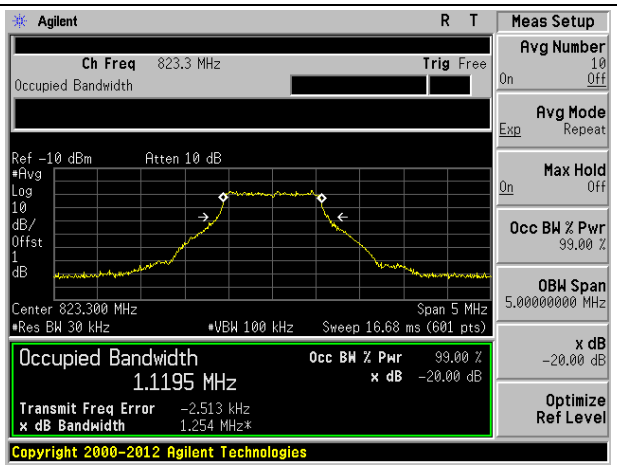

Input(Middle channel)



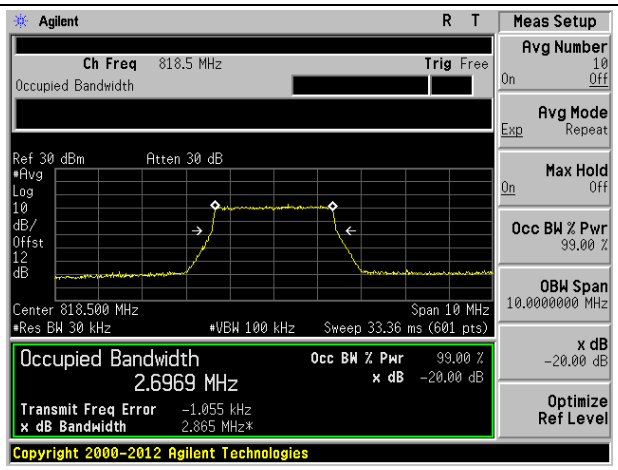
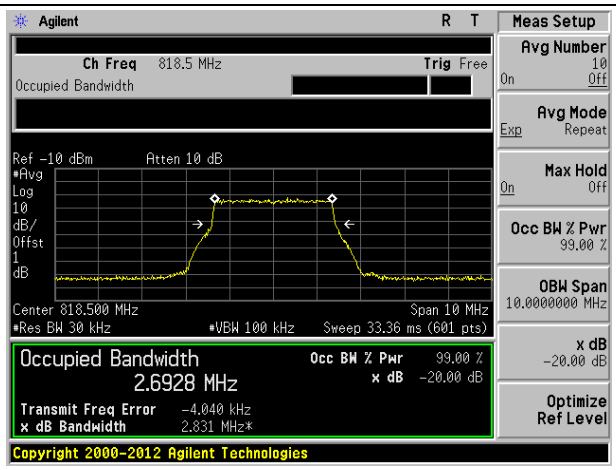
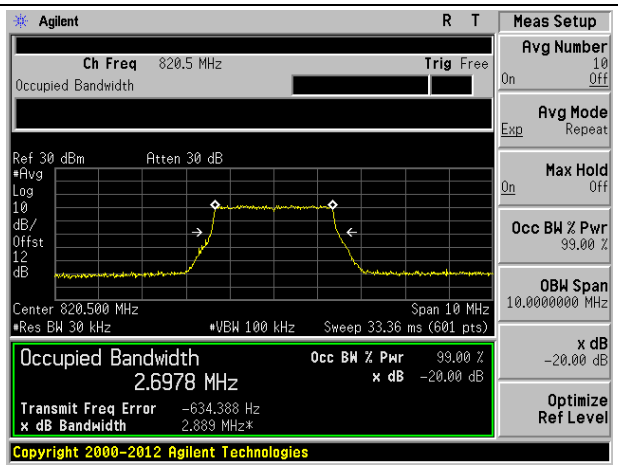
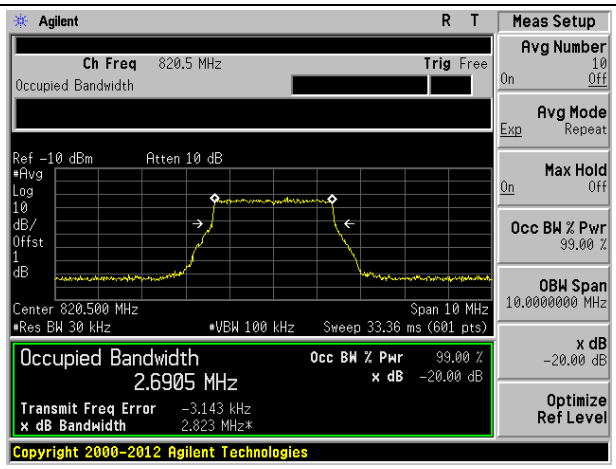
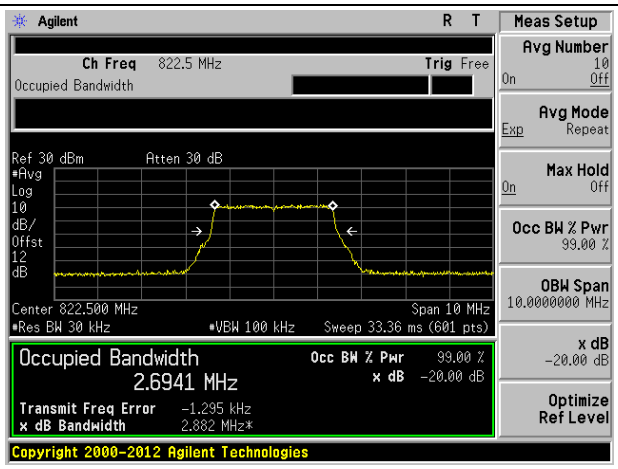
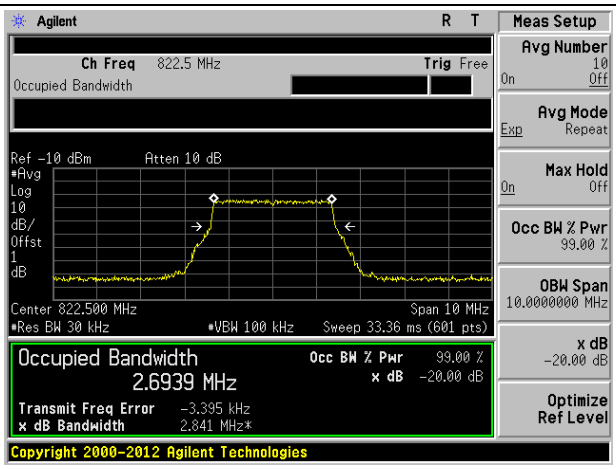

Output(Highest channel)



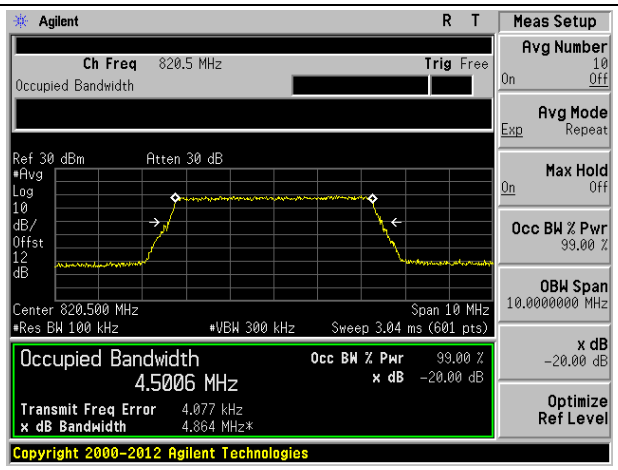
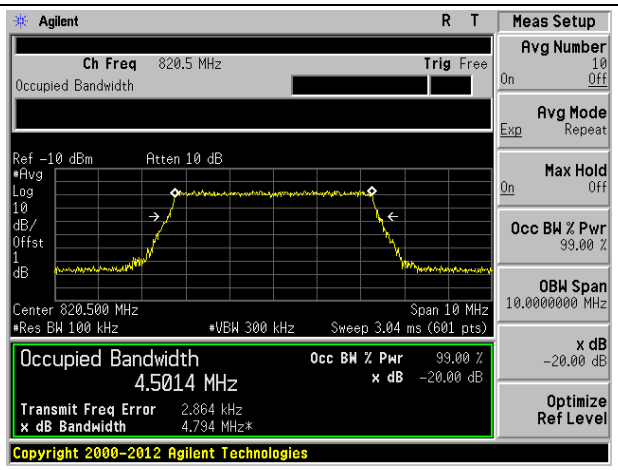

Input(Highest channel)



**Input/output Bandwidth Comparison for LTE 3MHz Bandwidth**

| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|  |  |
| Output(Middle channel) | Input(Middle channel) |
|  |  |
| Output(Highest channel) | Input(Highest channel) |
|  |  |

**Input/output Bandwidth Comparison for LTE 5MHz Bandwidth**

| Output(Lowest channel) | Input(Lowest channel) |
|---|---|
|  |  |

# 10 OUT OF BAND EMISSION AT ANTENNA TERMINALS

## 10.1 Standard Applicable

According to FCC § 2.1051 and § 90.691.

## 10.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 10.3 Measurement Procedure

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10th harmonic of the highest carrier frequency. Test signals used is CDMA and LTE. The different signals were input one at a time to the EUT. Tests was performed with CDMA and LTE signal input.

Band edge compliance is also demonstrated using a CDMA and LTE signal at the upper and lower limits of the band.

1. The EUT RF output port was connected to spectrum analyzer.
2. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
3. The spurious emissions at antenna were measured at the RF output port of the EUT at middle channel of each type of modulation.

Spectrum analyzer settings:

Detector: RMS.

Band Edge:

RBW=1%of the occupied channel bandwidth without going below 1%, VBW≥ RBW

Spurious emissions:

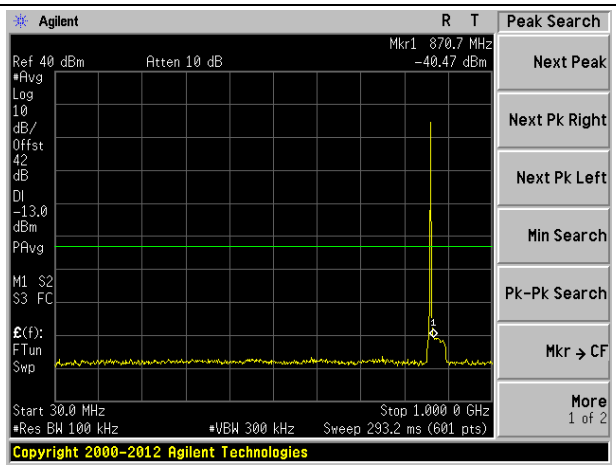
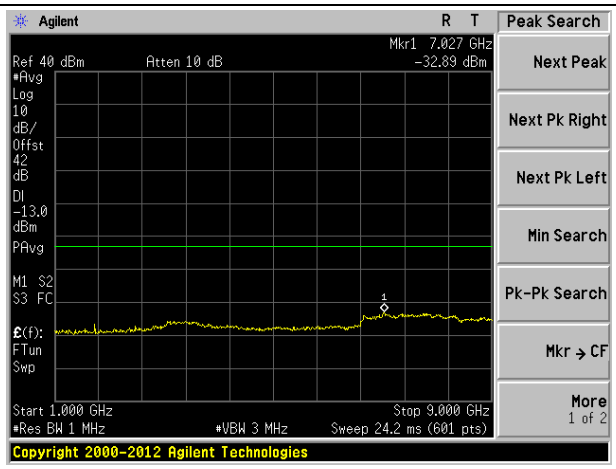
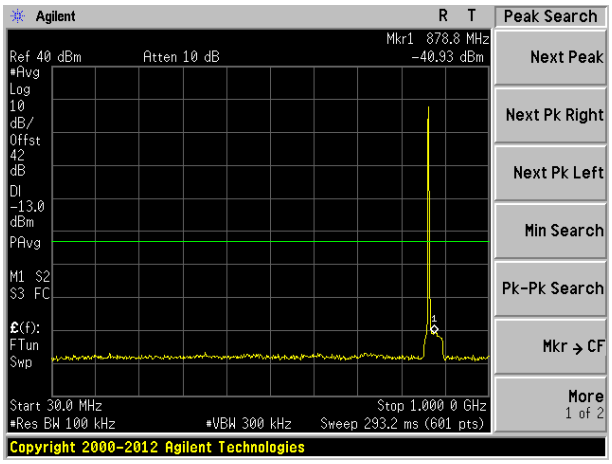
Below 1G: RBW=100kHz; VBW=300KHz; Above 1G: RBW=1 MHz ; VBW≥ RBW

## 10.4 Measurement Result

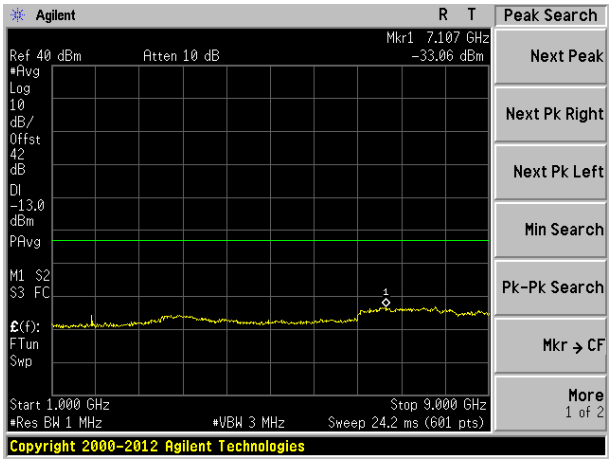
### 10.4.1 Spurious emission

Downlink:

**Spurious emission of CDMA**

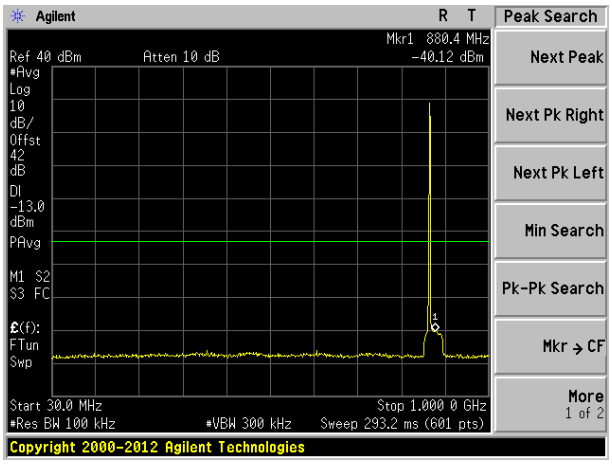
| Lowest channel |
|---|
| 30MHz-1000MHz |
|   |
| 1000MHz-9000MHz |
|   |
| Middle channel |
| 30MHz-1000MHz |
|   |

1000MHz-9000MHz

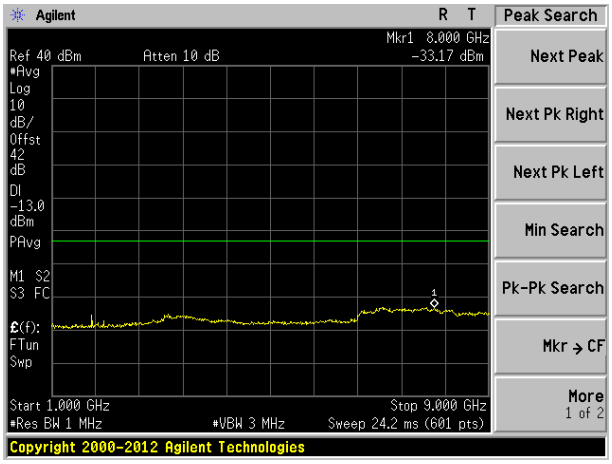



Highest channel

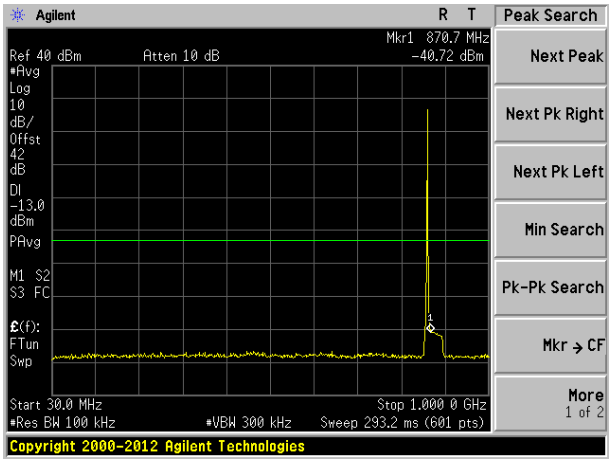
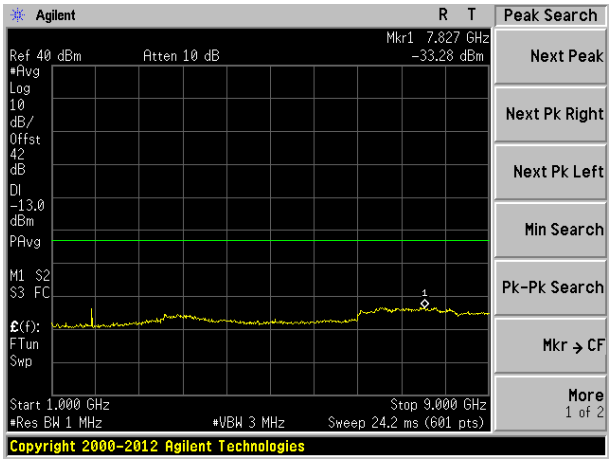
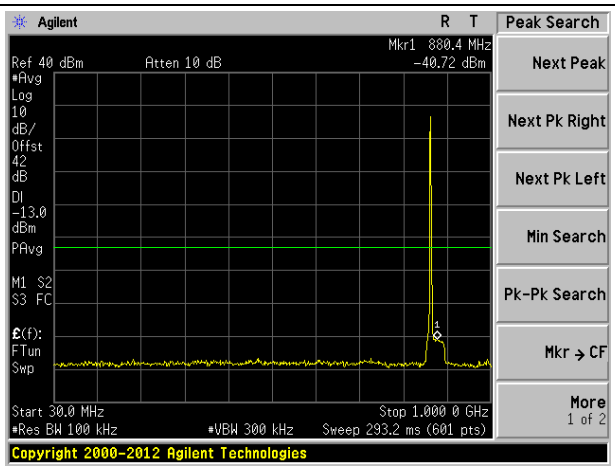
30MHz-1000MHz



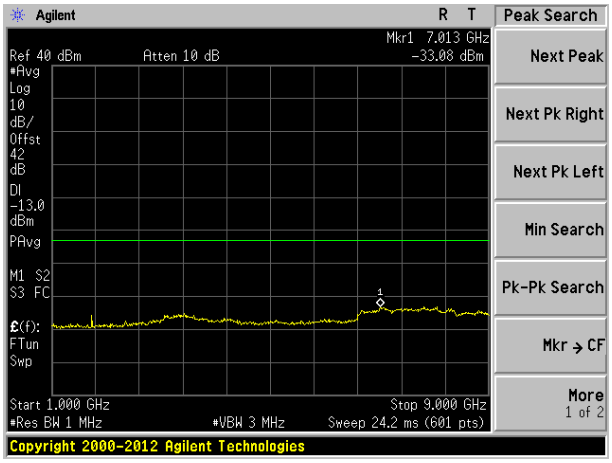

1000MHz-9000MHz



**Spurious emission of LTE for 1.4MHz Bandwidth**

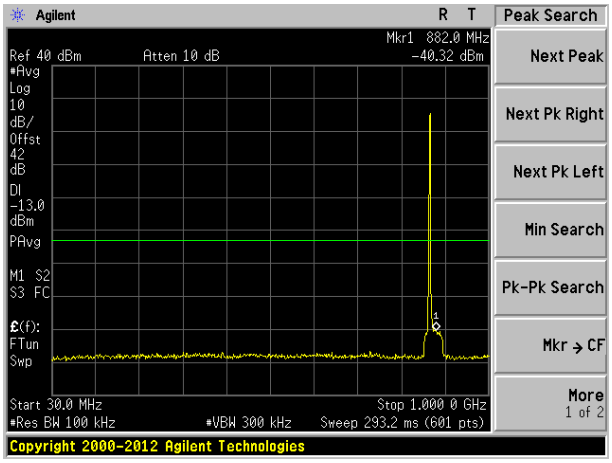
| Lowest channel |
|---|
| 30MHz-1000MHz |
|  |
| 1000MHz-9000MHz |
|  |
| Middle channel |
| 30MHz-1000MHz |
|  |

1000MHz-9000MHz

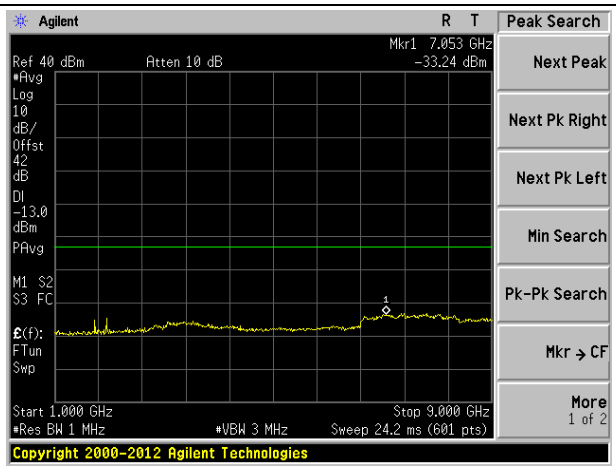



Highest channel

30MHz-1000MHz



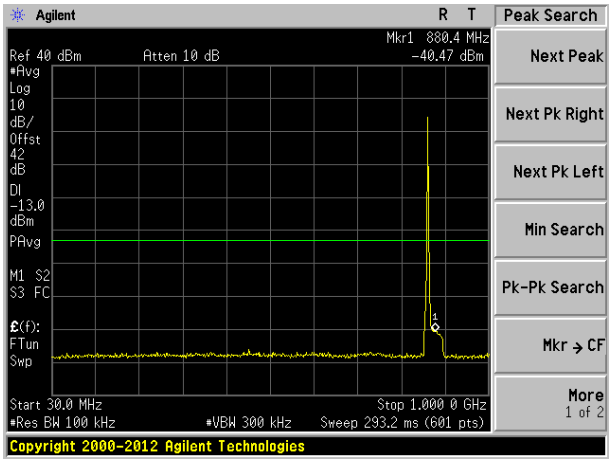

1000MHz-9000MHz



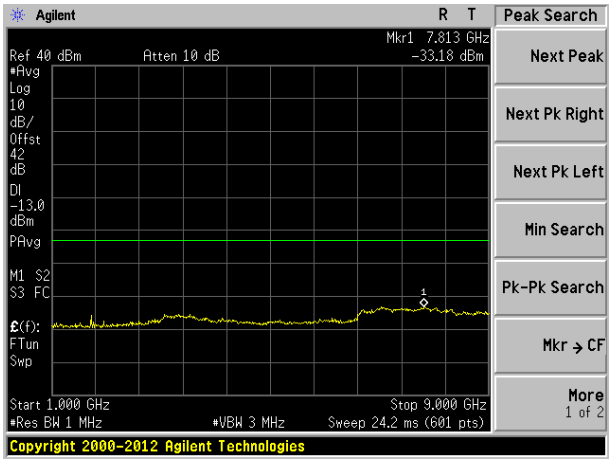
**Spurious emission of LTE 3MHz Bandwidth**

Lowest channel

30MHz-1000MHz

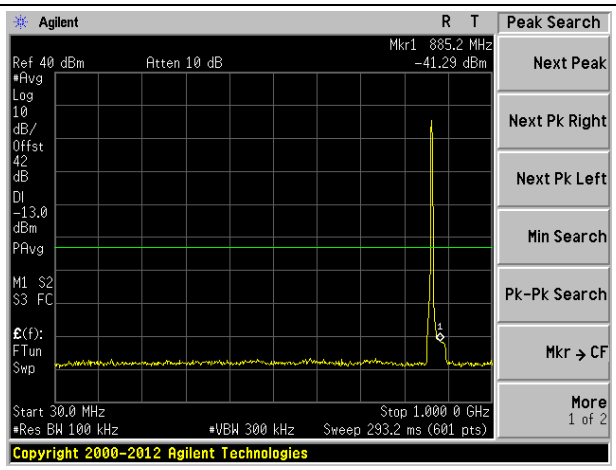



1000MHz-9000MHz

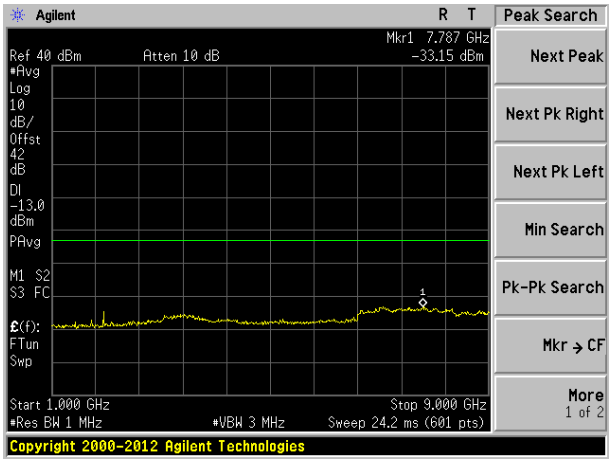



Middle channel

30MHz-1000MHz

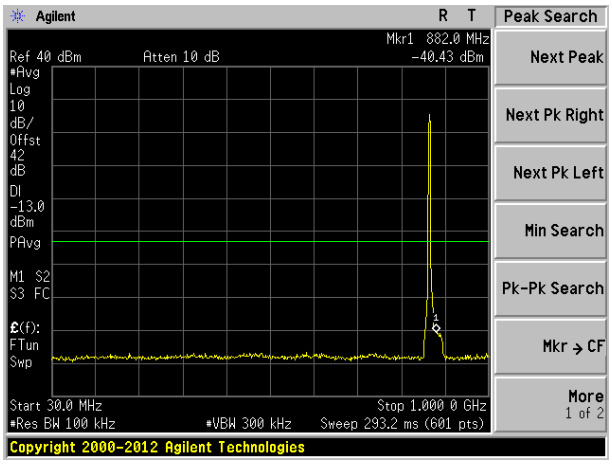


1000MHz-9000MHz

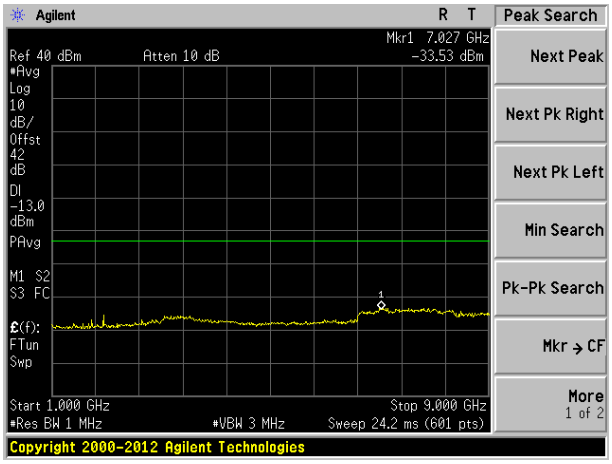



Highest channel

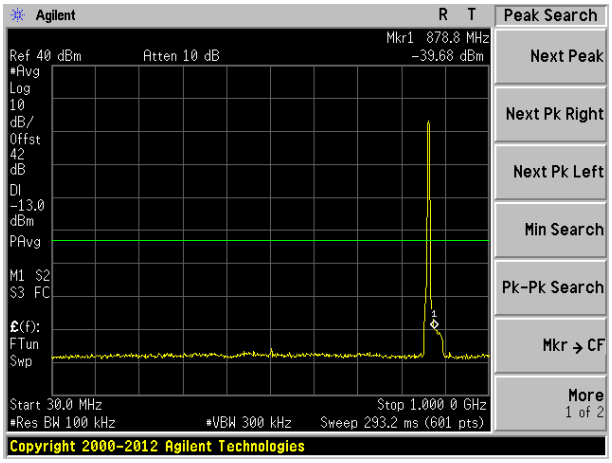
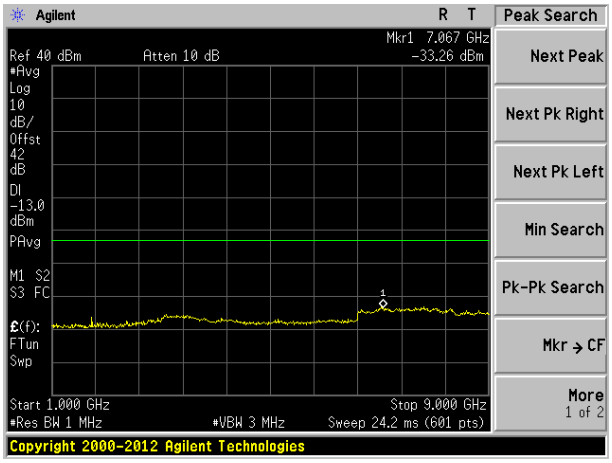
30MHz-1000MHz




1000MHz-9000MHz

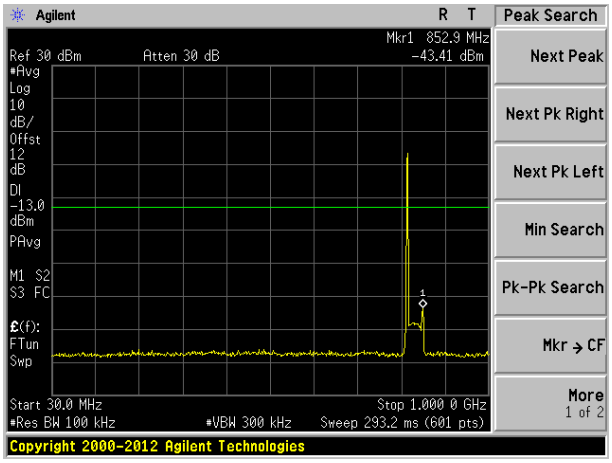
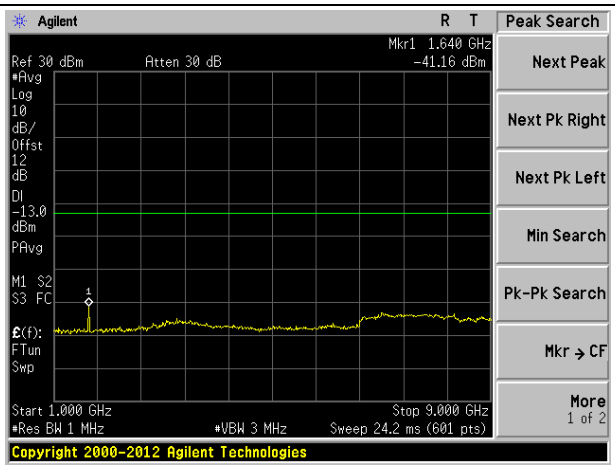
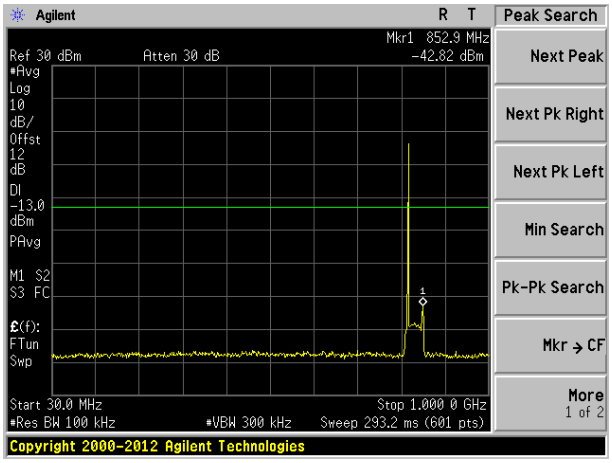


**Spurious emission of LTE 5MHz Bandwidth**

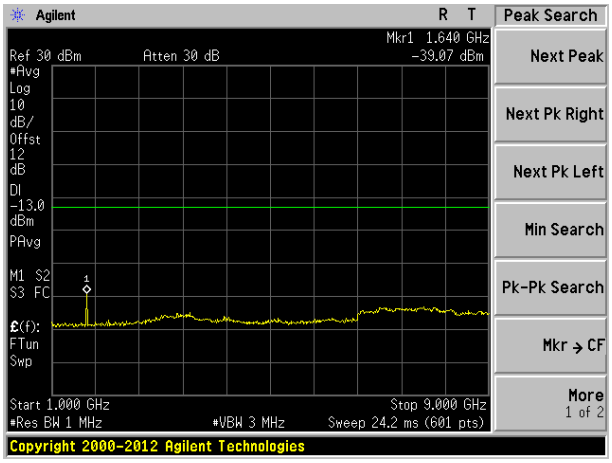
| Middle channel |
|---|
| 30MHz-1000MHz |
|  |
| 1000MHz-9000MHz |
|  |

Uplink:

**Spurious emission of CDMA**

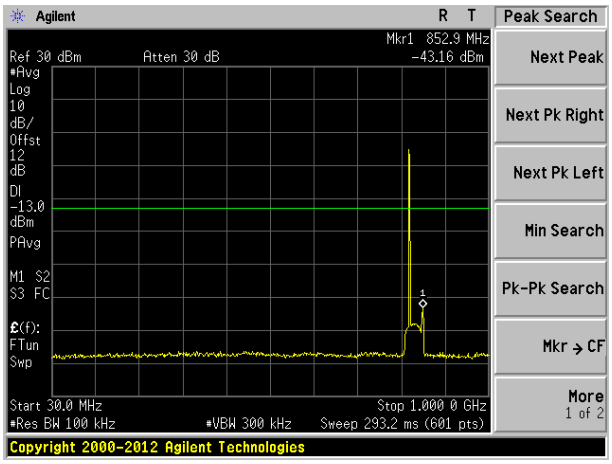
| Lowest channel |
|---|
| 30MHz-1000MHz |
|  |
| 1000MHz-9000MHz |
|  |
| Middle channel |
| 30MHz-1000MHz |
|  |

1000MHz-9000MHz

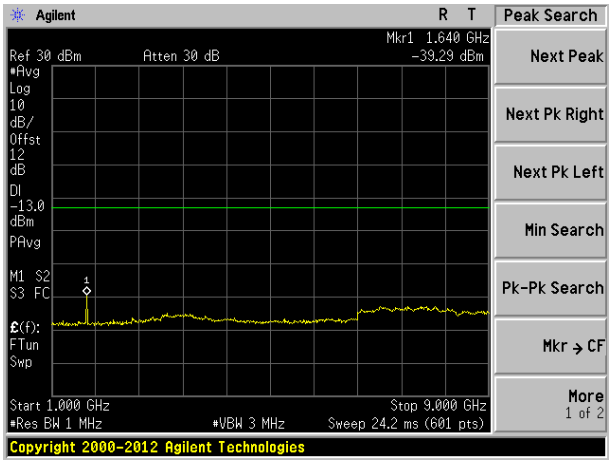



Highest channel

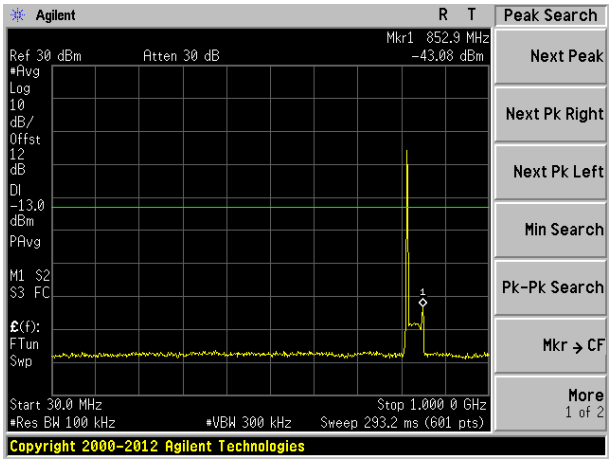
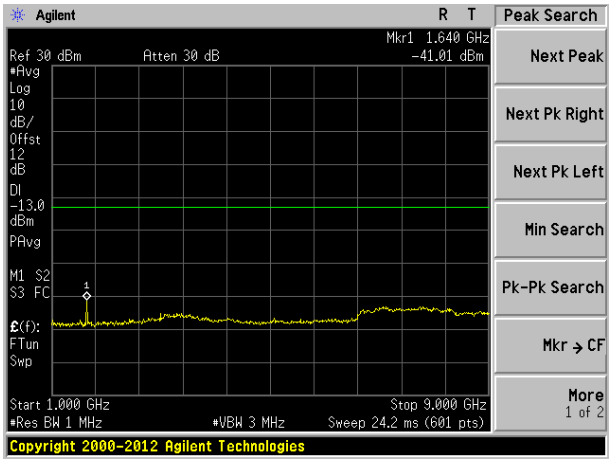
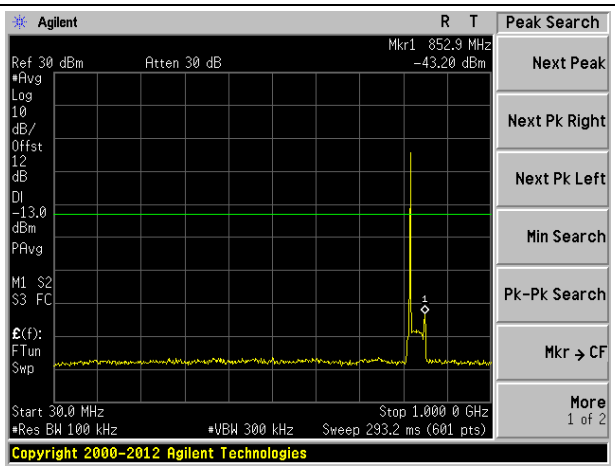
30MHz-1000MHz



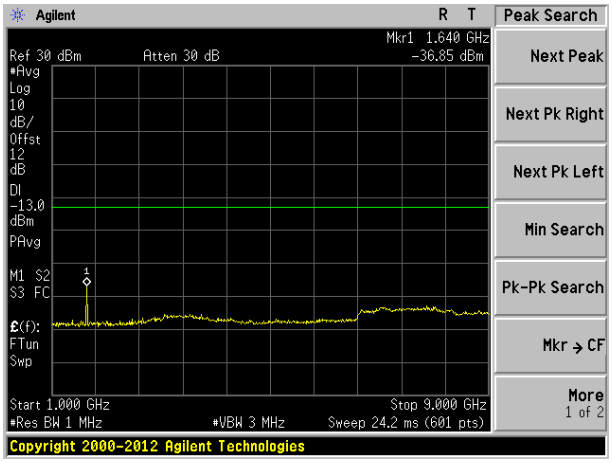

1000MHz-9000MHz



**Spurious emission of LTE for 1.4MHz Bandwidth**

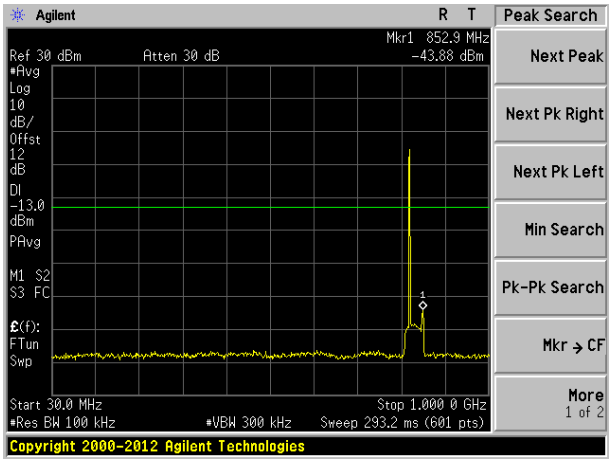
| Lowest channel |
|---|
| 30MHz-1000MHz |
|  |
| 1000MHz-9000MHz |
|  |
| Middle channel |
| 30MHz-1000MHz |
|  |

1000MHz-9000MHz

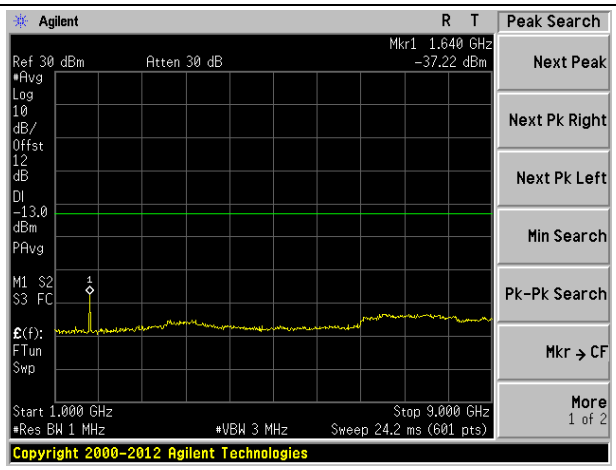



Highest channel

30MHz-1000MHz



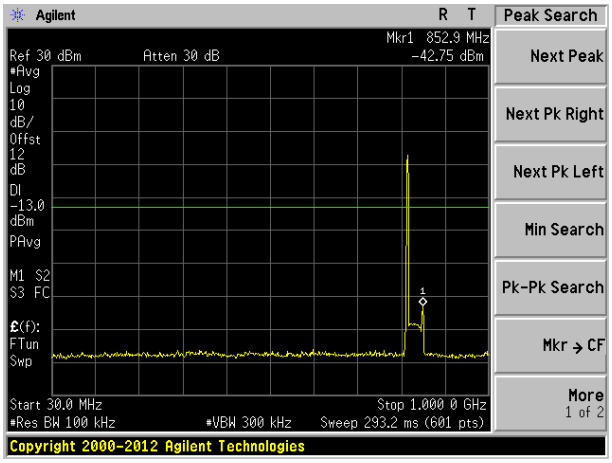

1000MHz-9000MHz



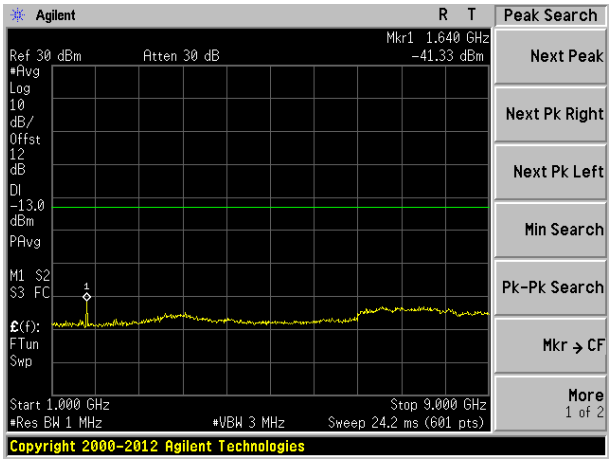
**Spurious emission of LTE 3MHz Bandwidth**

Lowest channel

30MHz-1000MHz

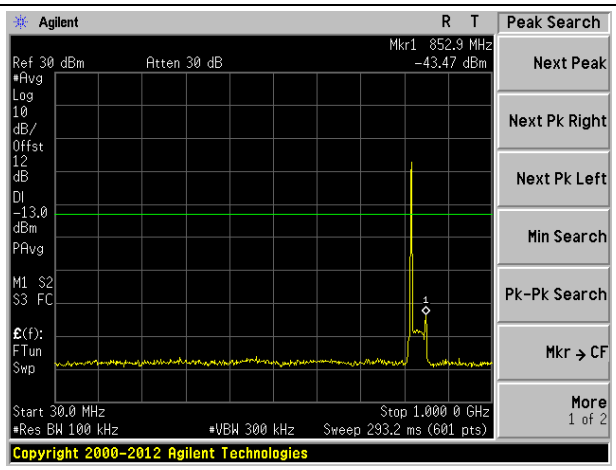



1000MHz-9000MHz

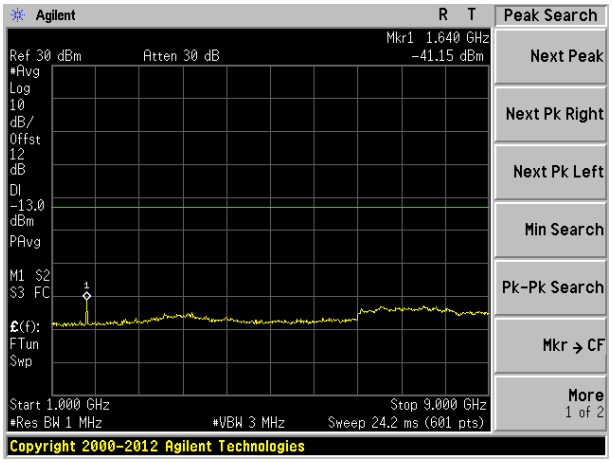



Middle channel

30MHz-1000MHz

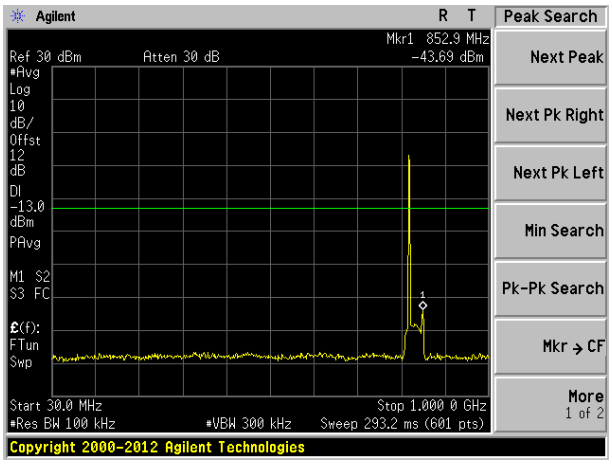


1000MHz-9000MHz

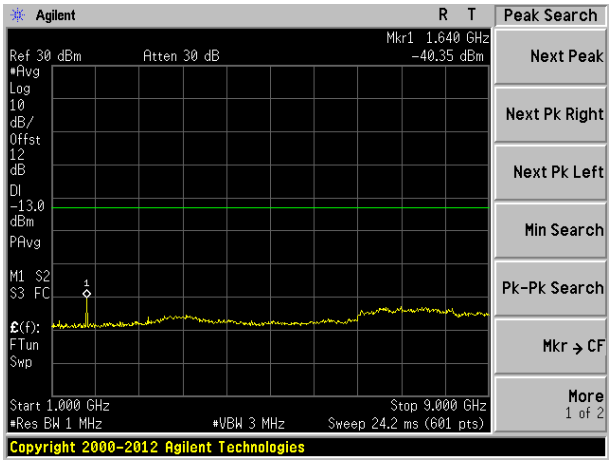



Highest channel

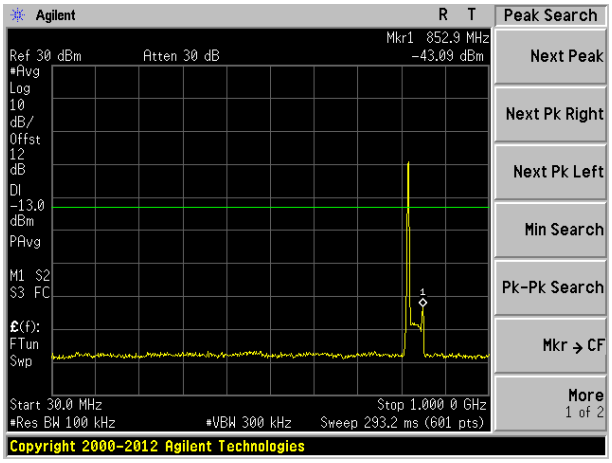
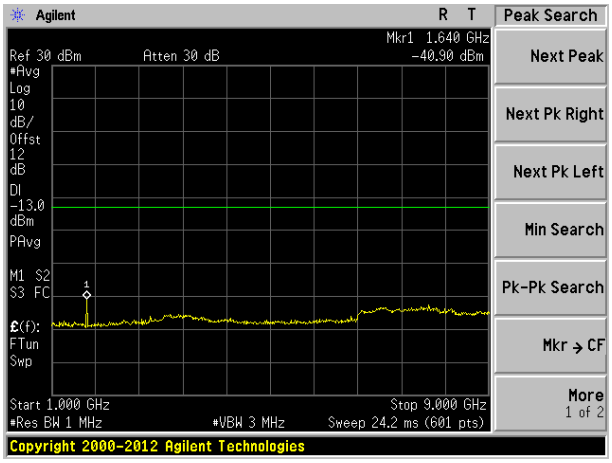
30MHz-1000MHz




1000MHz-9000MHz



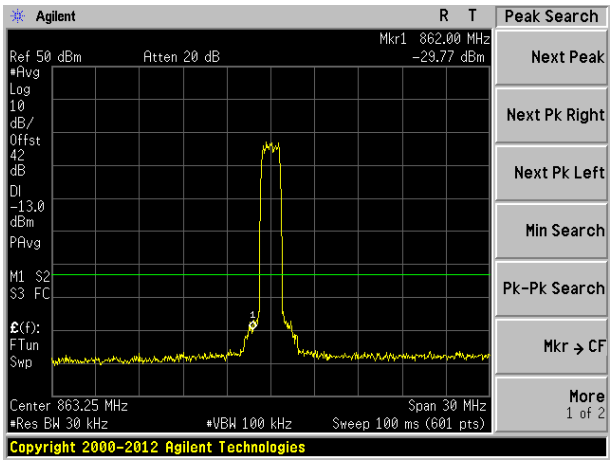
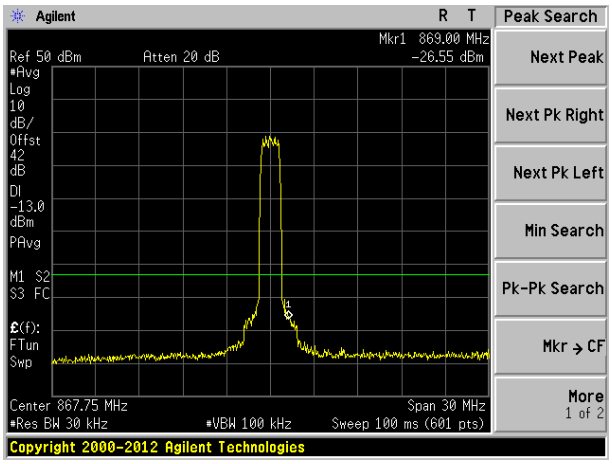
**Spurious emission of LTE 5MHz Bandwidth**

| Middle channel |
|---|
| 30MHz-1000MHz |
|  |
| 1000MHz-9000MHz |
|  |

### 10.4.2 Band edge emission

Downlink:

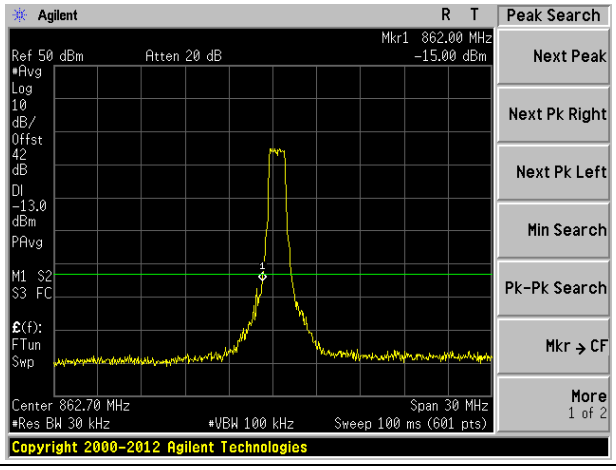
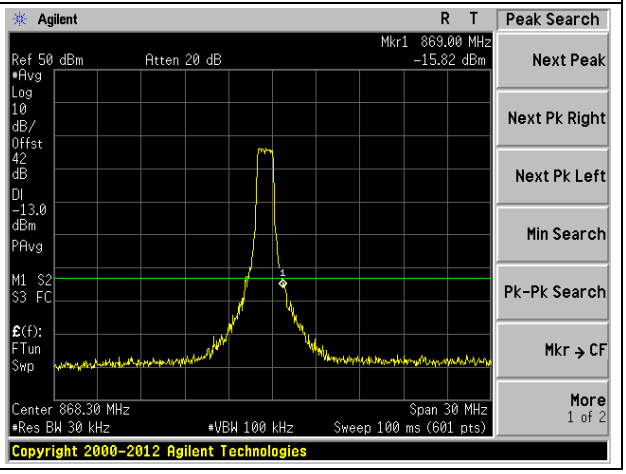
**Band edge of CDMA**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

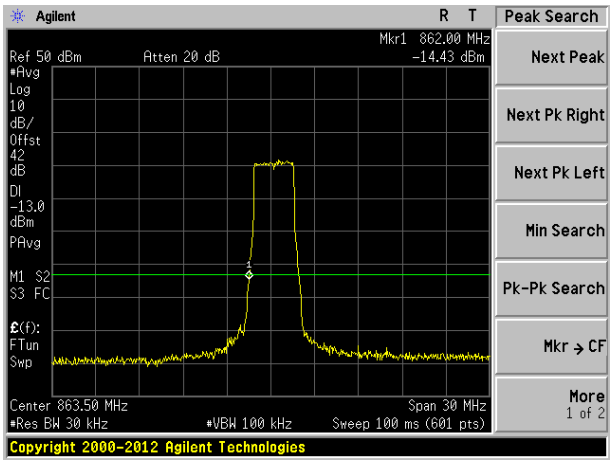
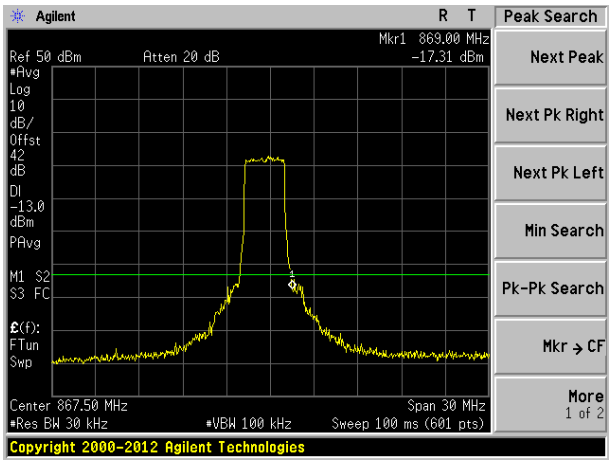




**Band edge of LTE 1.4MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

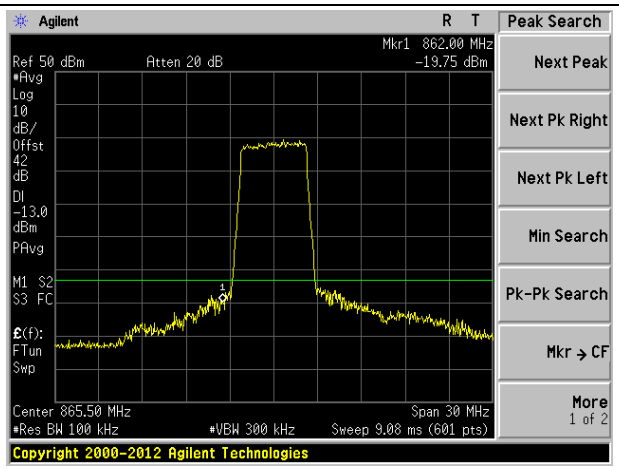
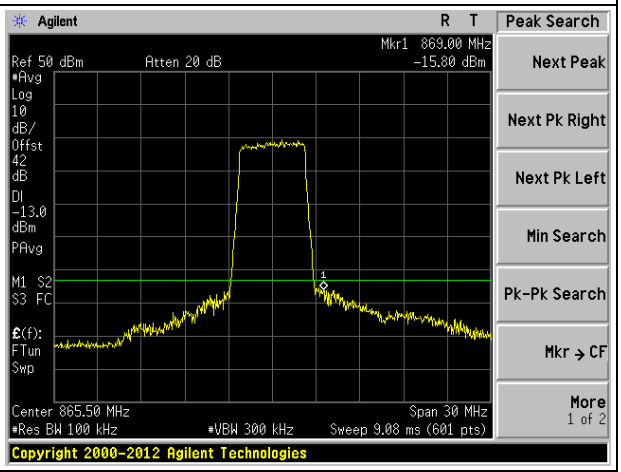
**Band edge of 3MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |



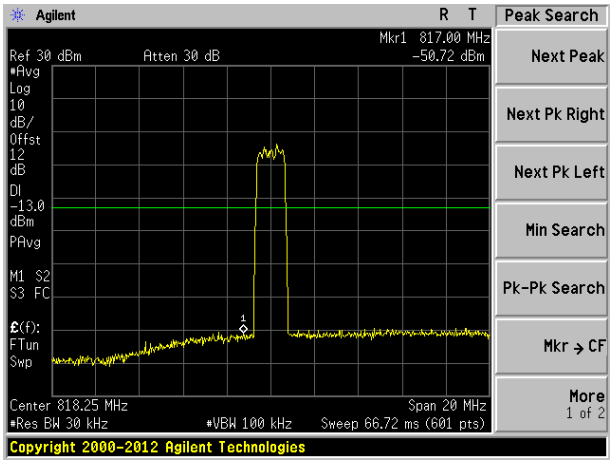
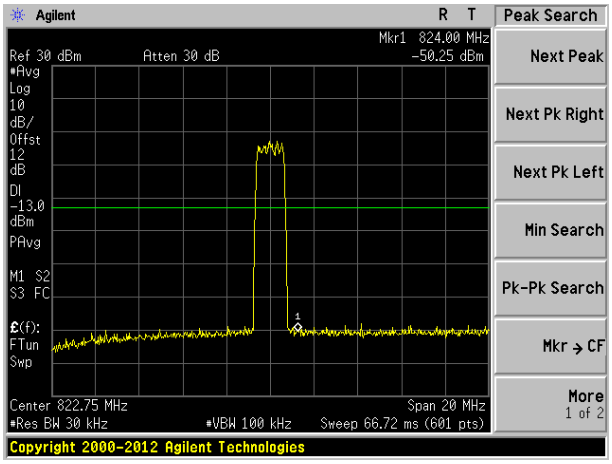


**Band edge of 5MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

Uplink:
Downlink:

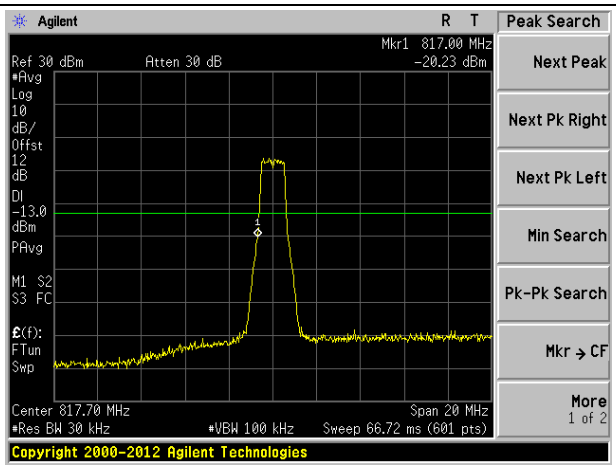
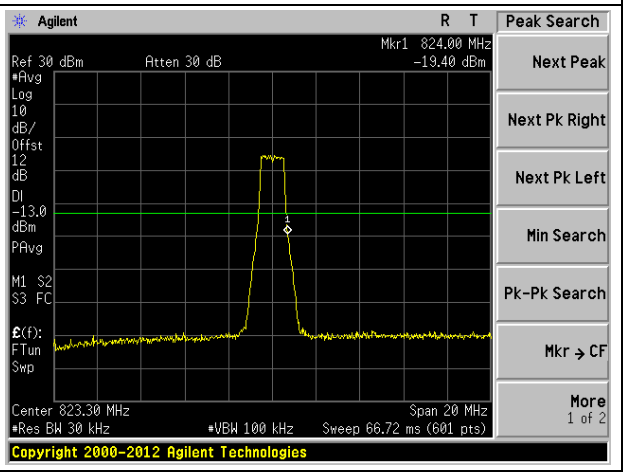
**Band edge of CDMA**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

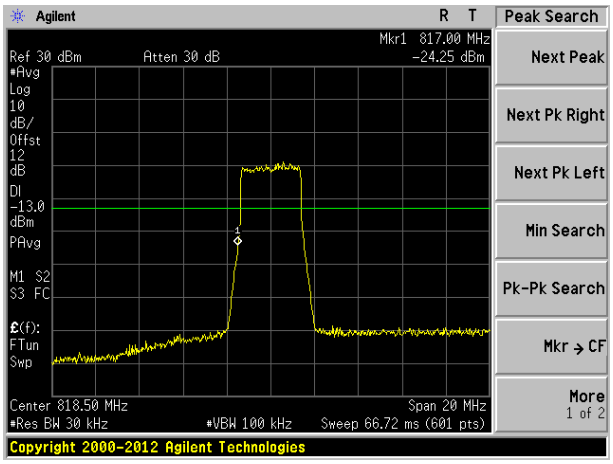
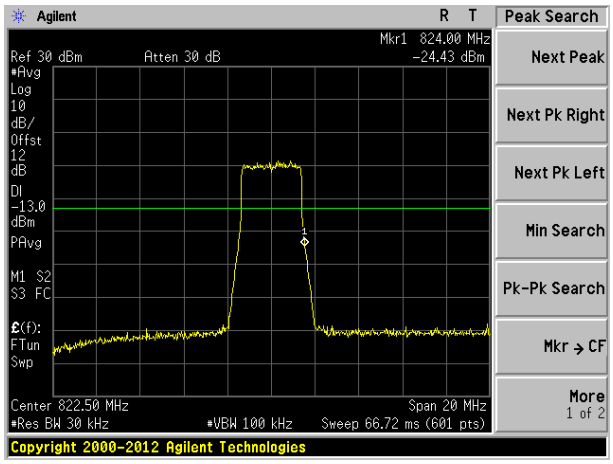




**Band edge of LTE 1.4MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

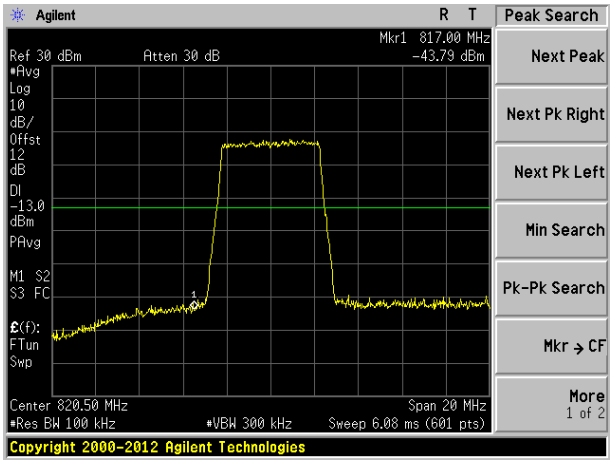
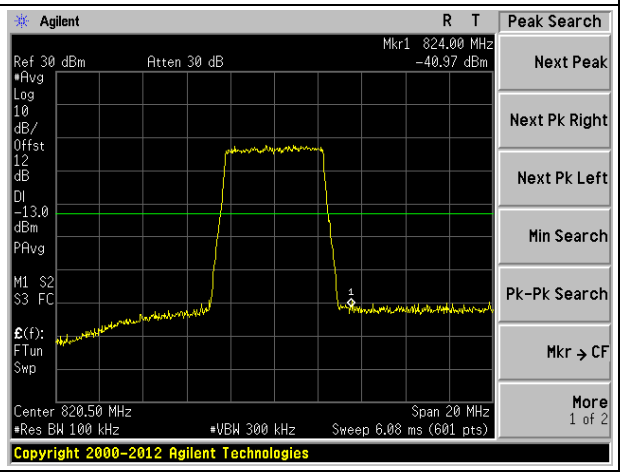
**Band edge of 3MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |





**Band edge of 5MHz Bandwidth**

| Left edge of band | Right edge of band |
|---|---|
|  |  |

# 11 INTERMODULATION

## 11.1 Standard Applicable

According to FCC §2.1051 and §90.691.

## 11.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 11.3 Measurement Procedure

1. The EUT RF output port was connected to spectrum analyzer. The EUT shall be set to maximum gain
   and maximum rated output power per channel.
2. Two continuous sinusoidal RF signals shall be fed to the input antenna port of the repeater using a combining device. The two channels near each other should be separated by at least one operating channel width.
3. The spurious emissions at antenna were measured at the RF output port of the EUT.
4. The modulation types tested is CDMA and LTE.

Spectrum analyzer settings:

Detector: RMS.

Intermodulation:

RBW=1%of the occupied channel bandwidth without going below 1%; VBW≥ RBW

Spurious emissions:

Below 1G: RBW=100kHz; Above 1G: RBW=1 MHz ; VBW≥ RBW

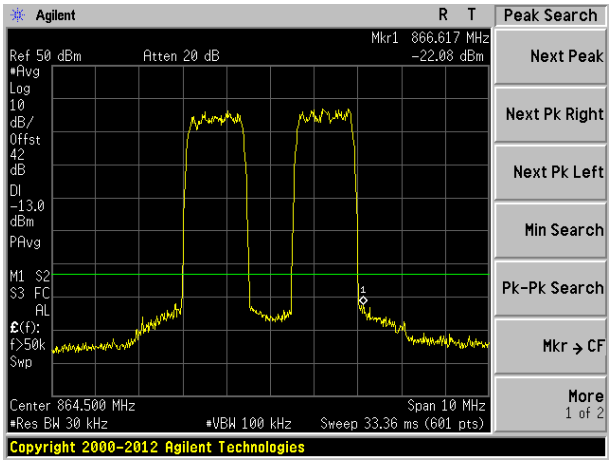
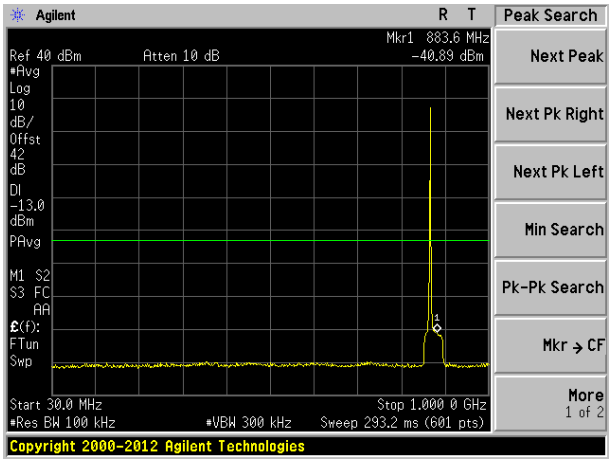
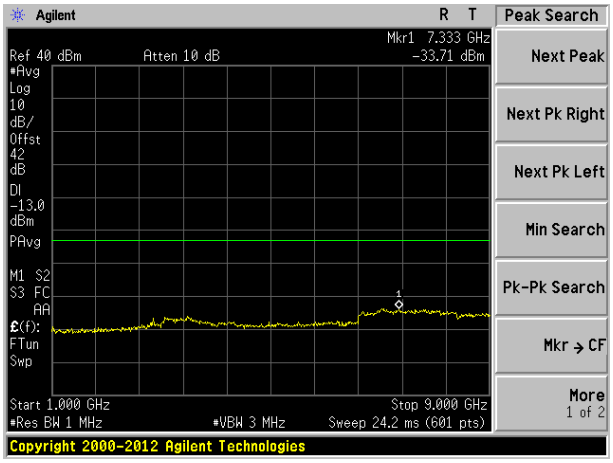
## 11.4 Test Result

**Passed.**

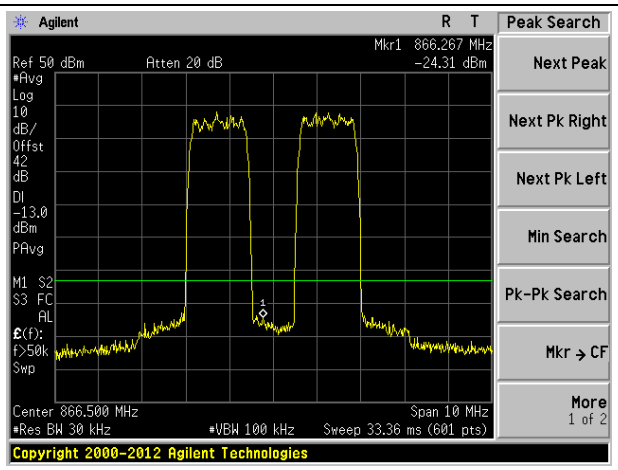
*Remark: Both case of the normal input power level and increase 3dB above the AGC threshold were tested, we found this case increase 3dB above the AGC threshold which was the worst, and record in the report.*

Downlink:

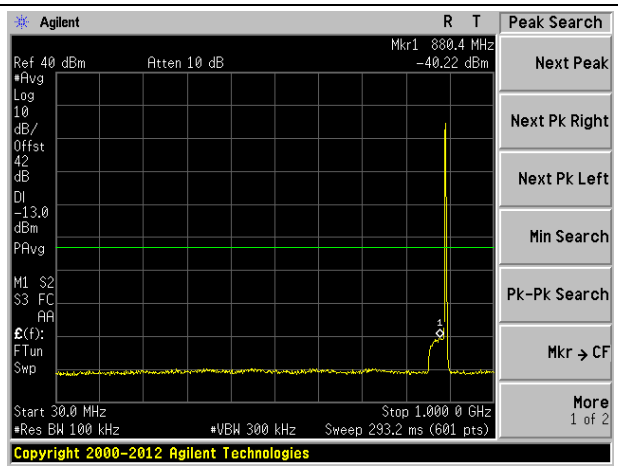
**Intermodulation of CDMA**

| Intermodulation - Low part of band |
|---|
|  |
| 30MHz-1000MHz spurious emissions |
|  |
| 1000MHz-9000MHz spurious emissions |
|  |

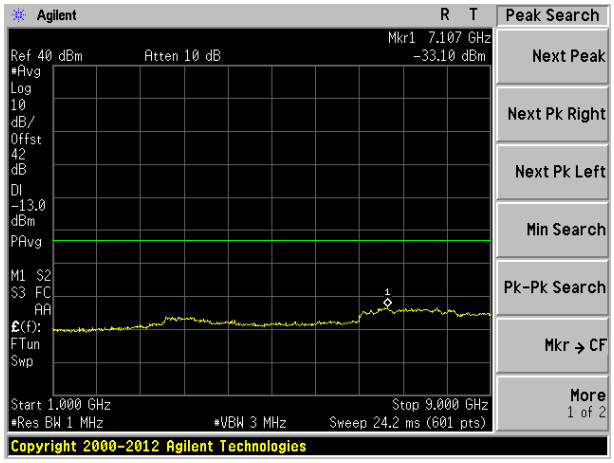
Intermodulation - High part of band




30MHz-1000MHz spurious emissions

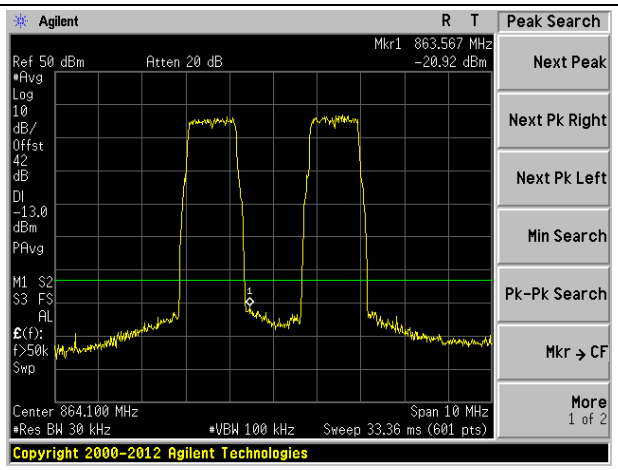



1000MHz-9000MHz spurious emissions

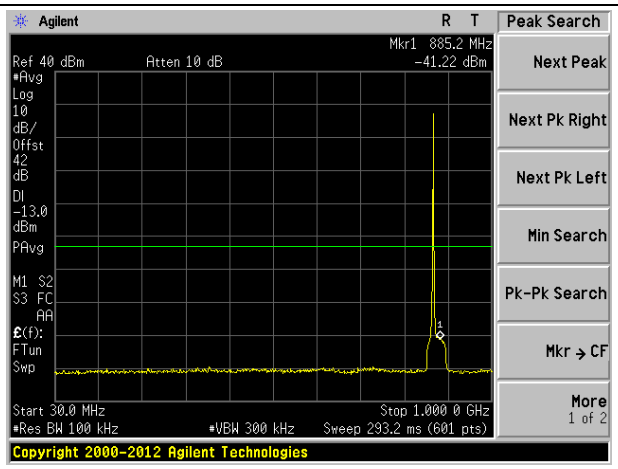


**Intermodulation of LTE 1.4MHz Bandwidth**

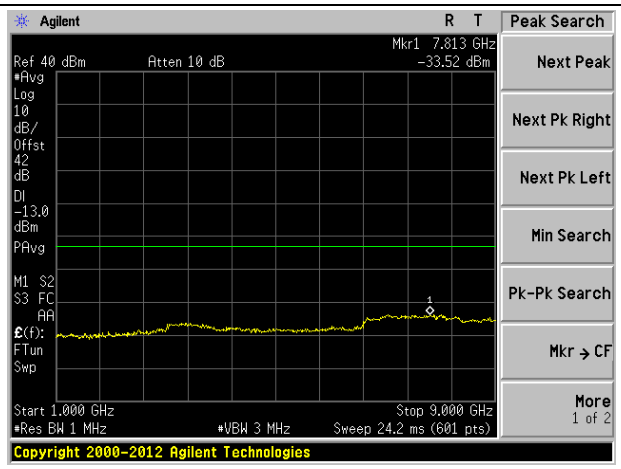
Intermodulation - Low part of band



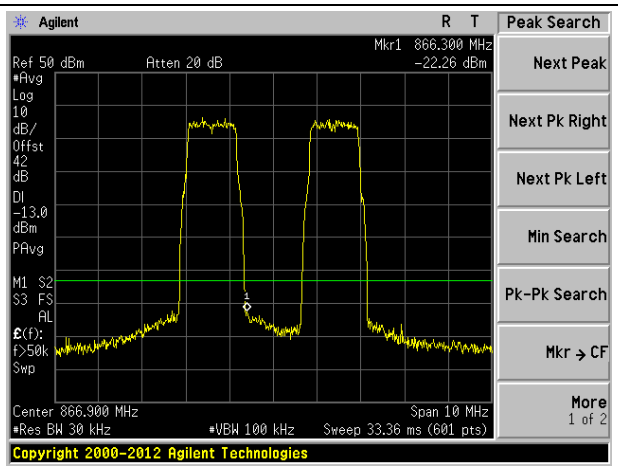

30MHz-1000MHz spurious emissions



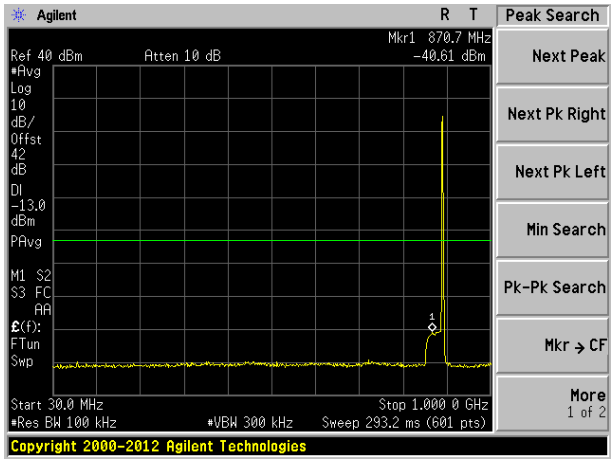

1000MHz-9000MHz spurious emissions



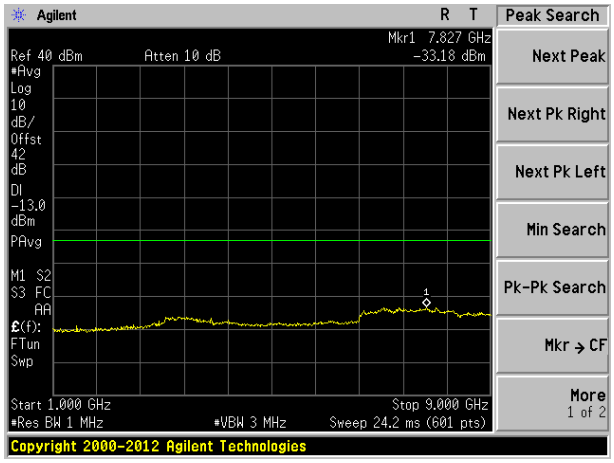
Intermodulation - High part of band




30MHz-1000MHz spurious emissions

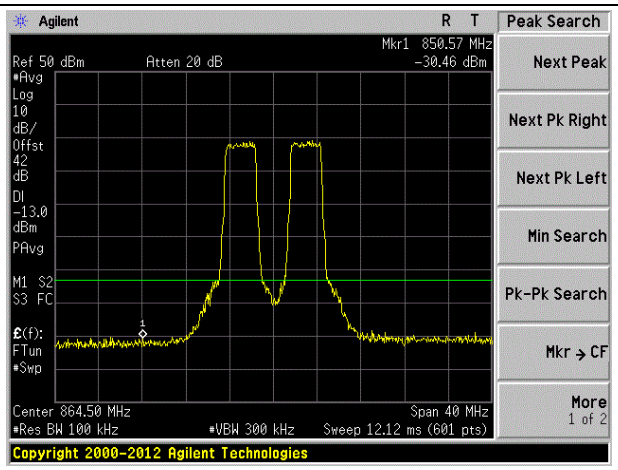



1000MHz-9000MHz spurious emissions

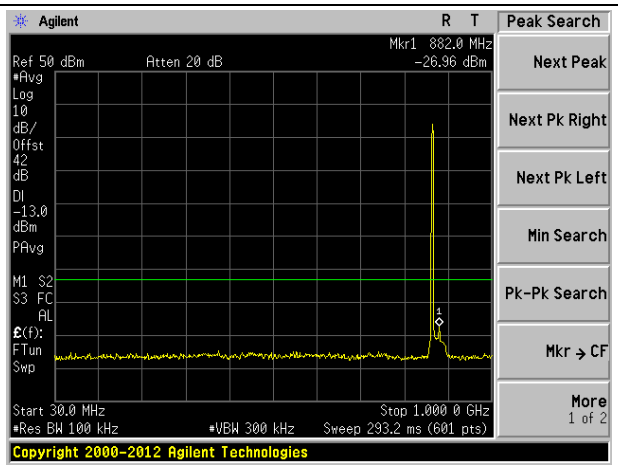


**Intermodulation of LTE 3MHz Bandwidth**

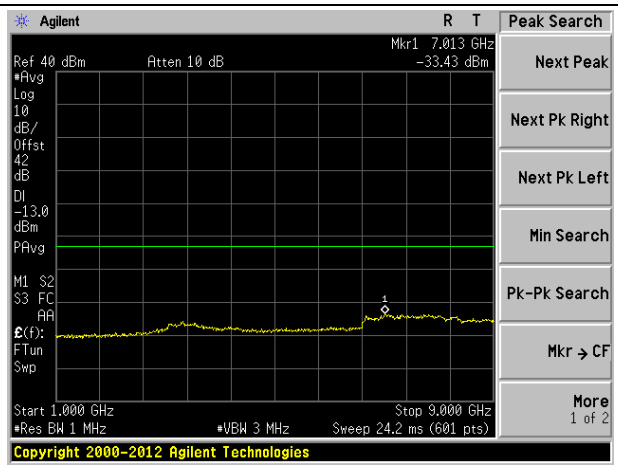
Intermodulation - Low part of band



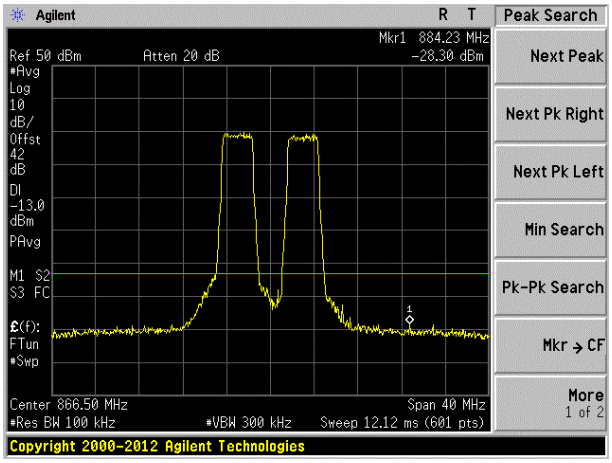

30MHz-1000MHz spurious emissions



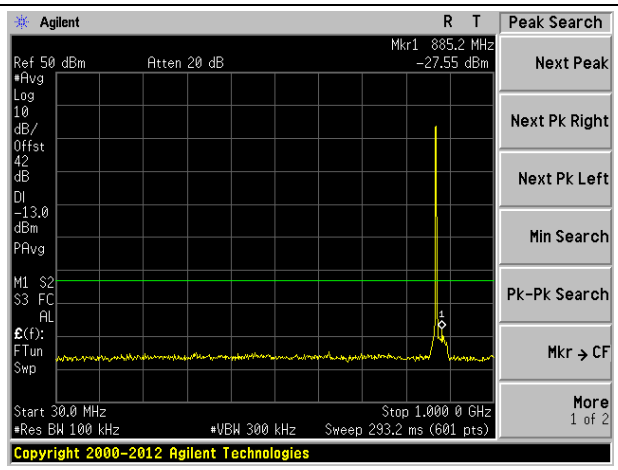

1000MHz-9000MHz spurious emissions



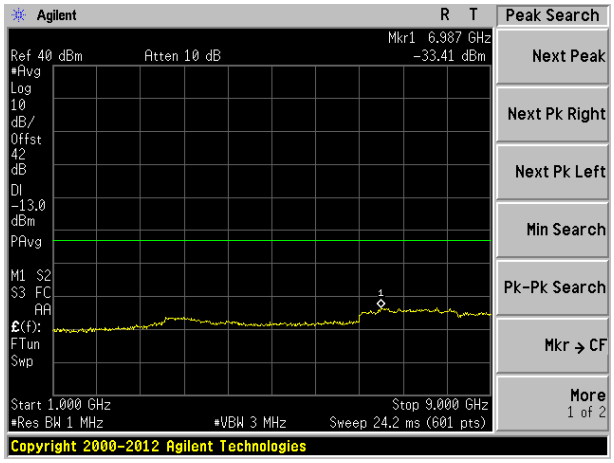
Intermodulation - High part of band




30MHz-1000MHz spurious emissions



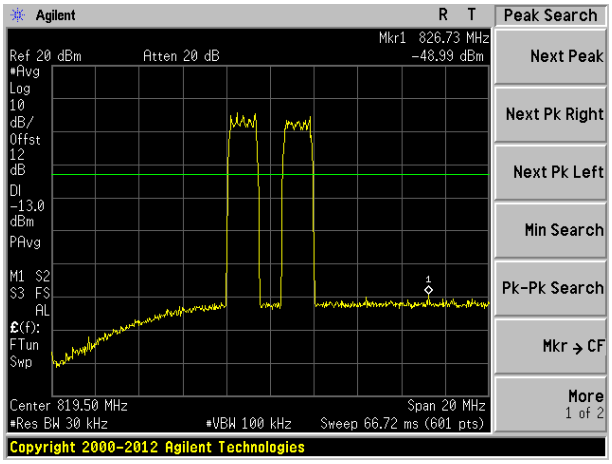

1000MHz-9000MHz spurious emissions



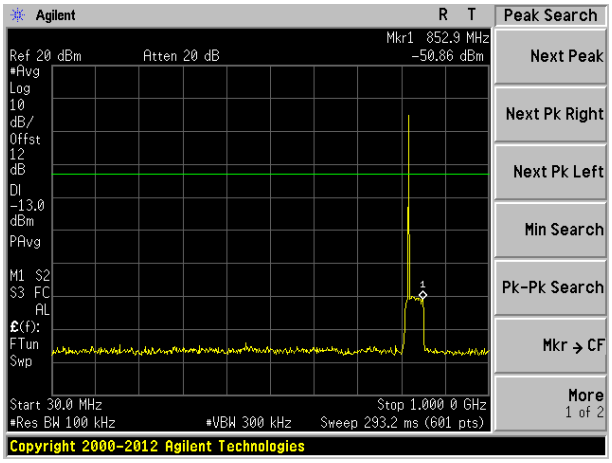
Uplink:

**Intermodulation of CDMA**

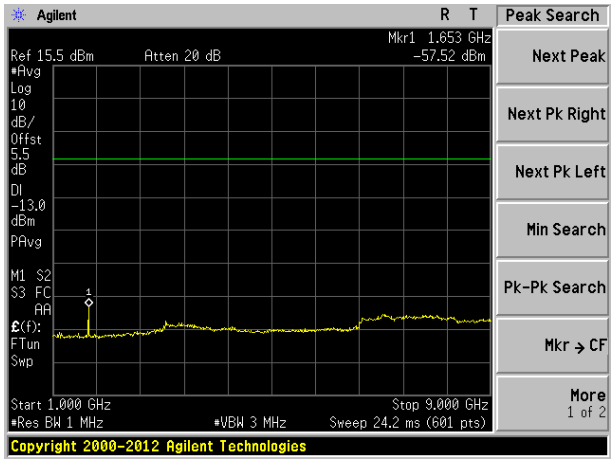
Intermodulation - Low part of band



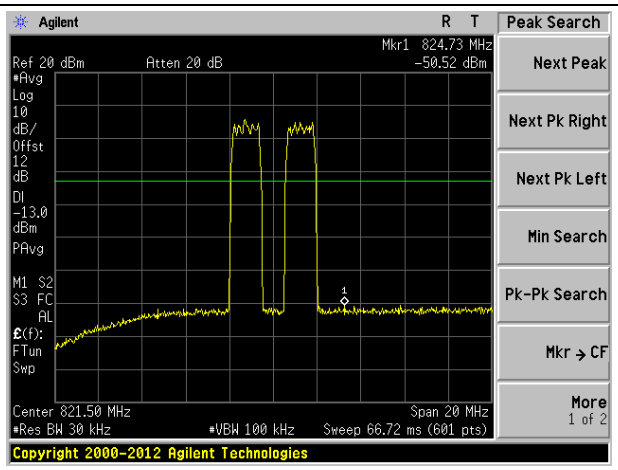

30MHz-1000MHz spurious emissions



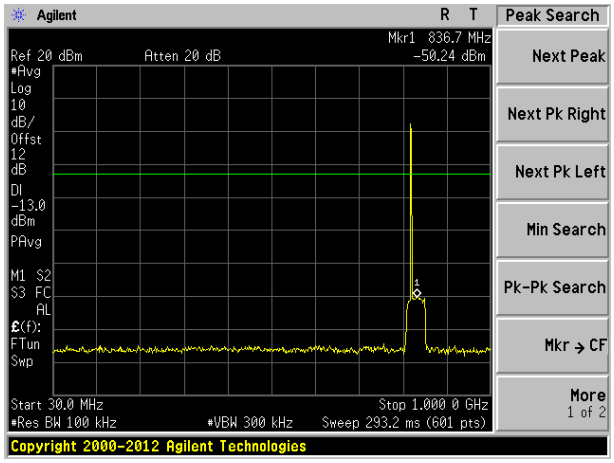

1000MHz-9000MHz spurious emissions



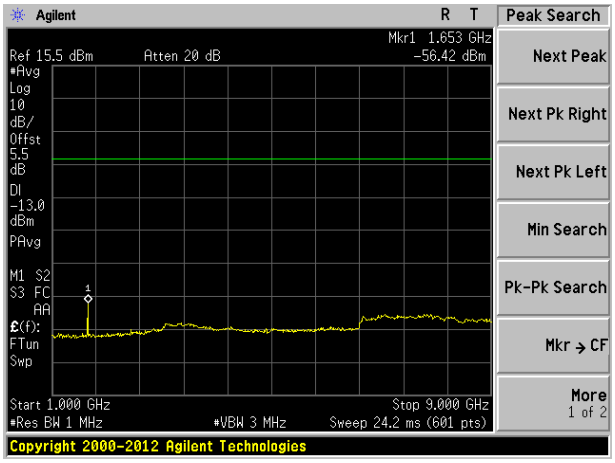
Intermodulation - High part of band




30MHz-1000MHz spurious emissions

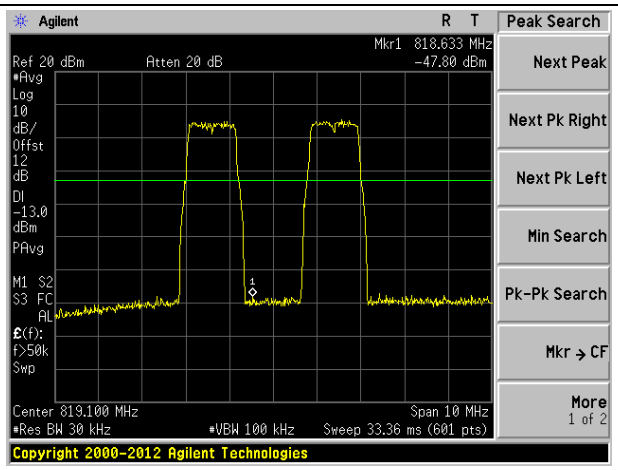



1000MHz-9000MHz spurious emissions

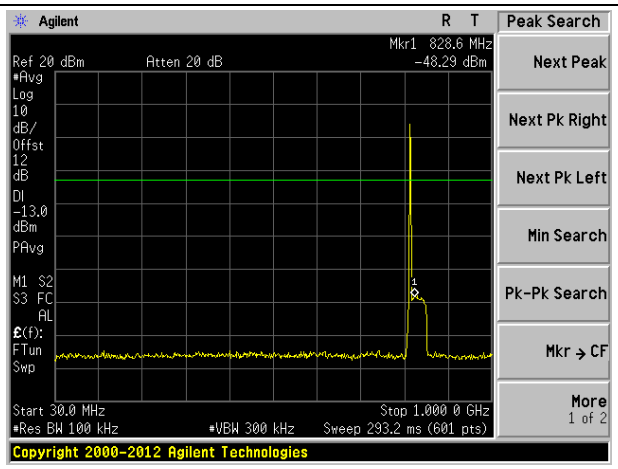


**Intermodulation of LTE 1.4MHz Bandwidth**

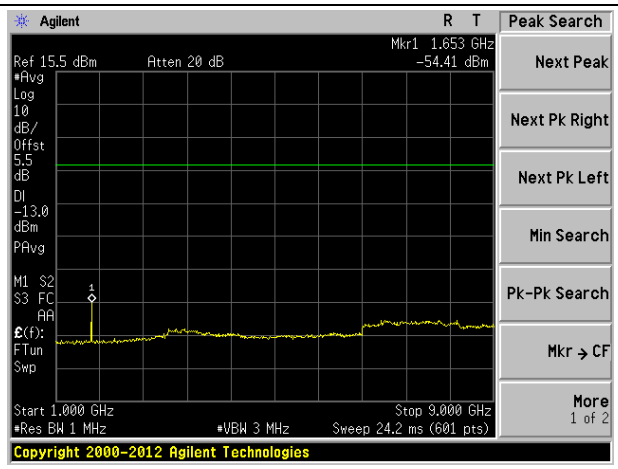
Intermodulation - Low part of band



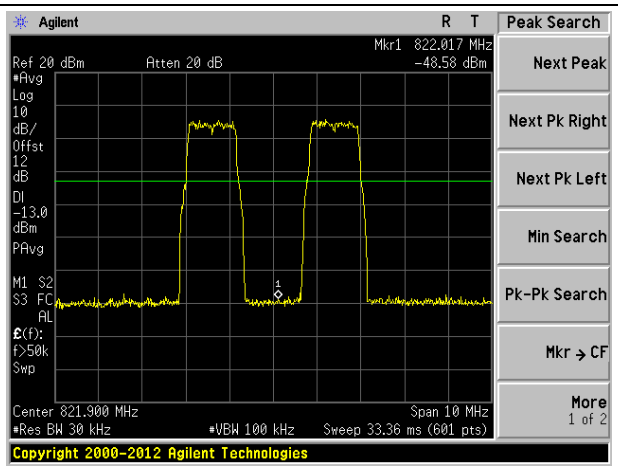

30MHz-1000MHz spurious emissions



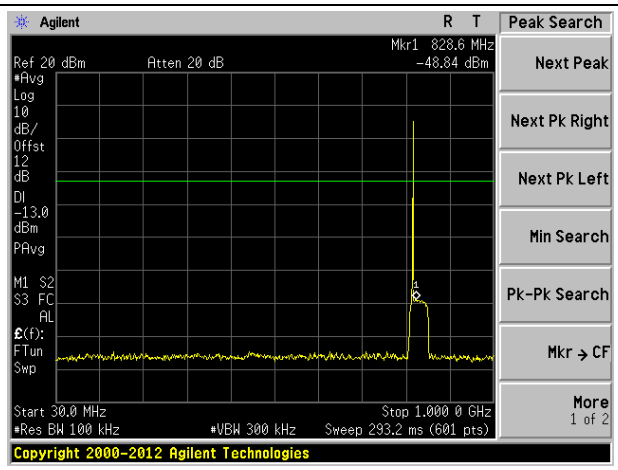

1000MHz-9000MHz spurious emissions



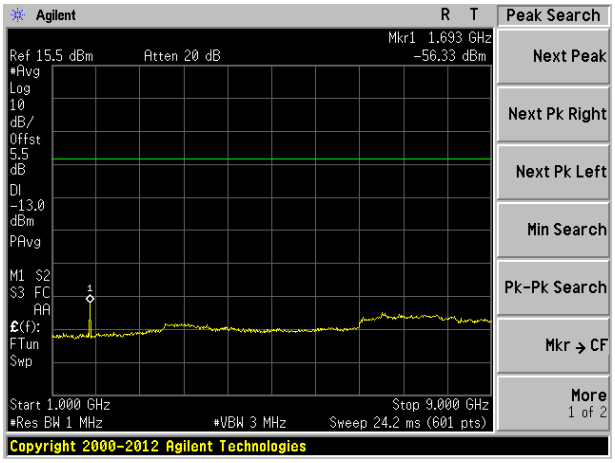
Intermodulation - High part of band




30MHz-1000MHz spurious emissions

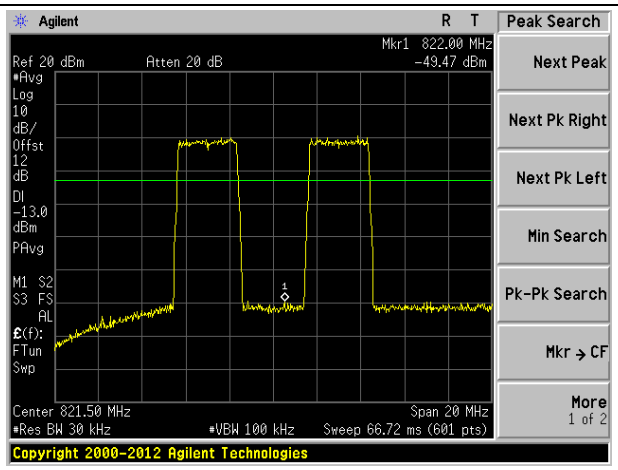



1000MHz-9000MHz spurious emissions

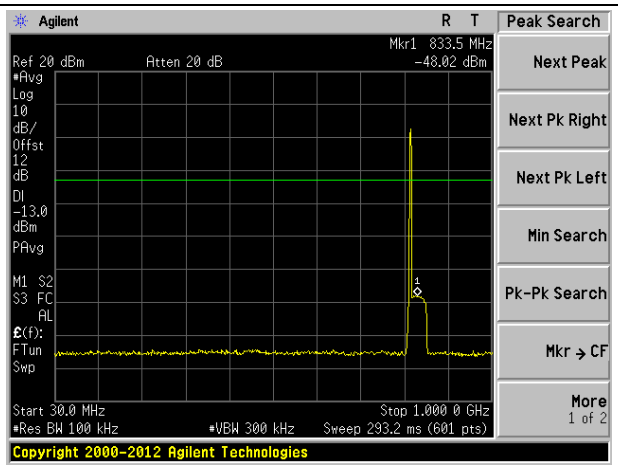


**Intermodulation of LTE 3MHz Bandwidth**

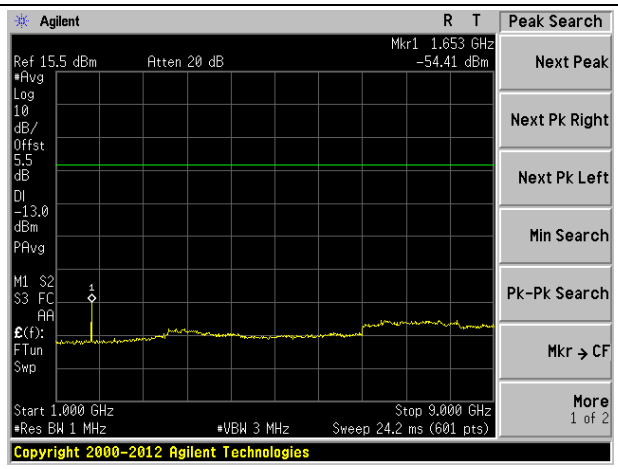
Intermodulation - Low part of band



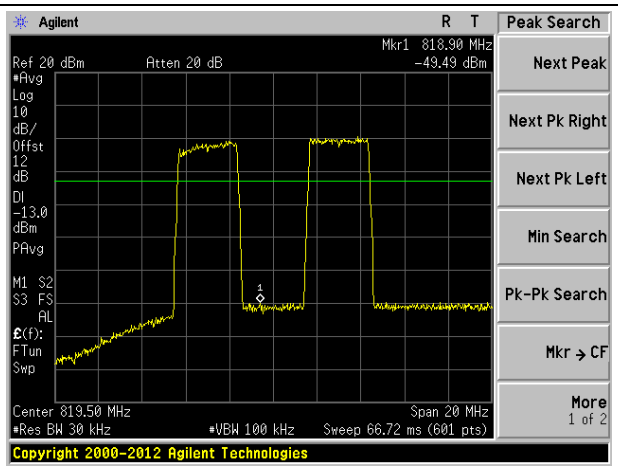

30MHz-1000MHz spurious emissions



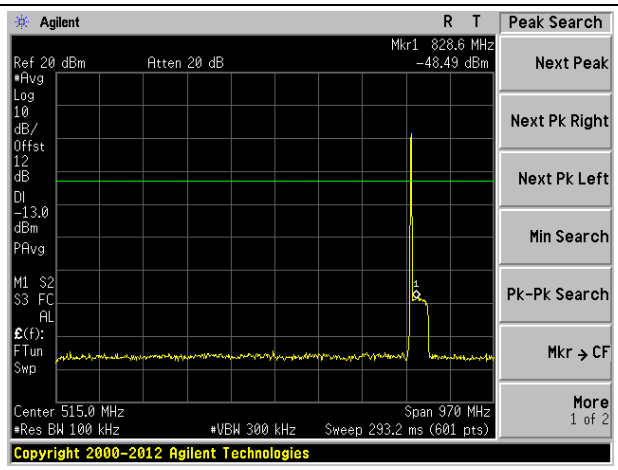

1000MHz-9000MHz spurious emissions



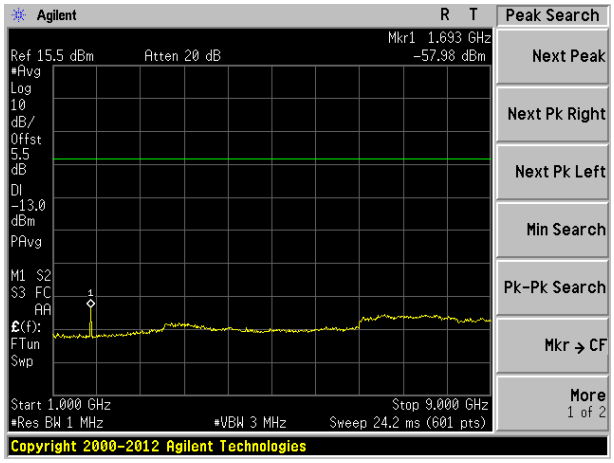
Intermodulation - High part of band




30MHz-1000MHz spurious emissions




1000MHz-9000MHz spurious emissions



# 12 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

## 12.1 Standard Applicable

According to FCC §2.1053 and §90.691

## 12.2 EUT Setup (Block Diagram of Configuration)

Please refer the section §6.2 Configuration of Tested System.

## 12.3 Measurement Procedure

1. The EUT RF output port was connected to 50 ohm RF load.
2. The EUT input port was connected to signal generator and was setup to transmit maximum power.
3. The measurement antenna was placed at a distance of 3 meters from the EUT.
4. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from EUT.
5. The frequency range up to 10-th harmonic of each of the three fundamental frequencies (low, middle and high channels) was investigated. The worst case of emissions was reported.
6. For spurious emissions attenuation, the substitution method was used.
7. The EUT was substituted by a reference antenna (half-wave dipole – below 1 GHz, or Horn antenna – above 1 GHz), connected to a signal generator.
8. The signal generator output level was adjusted to obtain the same reading as from EUT. The EIRP at the spurious emissions frequency was calculated as follows:

   EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)
9. The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic dipole
10. From KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET): Radiated spurs (enclosure) – Use of CW signal (low, mid. and high freq.) is acceptable rather than all modulations.
11. The maximum RFI field strength was determined during the measurement by rotating the turntable (±180 degrees) and varying the height of the receive antenna (h = 1 ... 4 m) as like defined in ANSI C63.4. A measurement receiver has been used with a RBW 120 kHz up to 1 GHz and 1 MHz above 1 GHz. Steps with during pre measurement was half the RBW.
12. Both, the Fully Anechoic Chamber (FAC) and the Semi Anechoic Chamber (SAC) fulfil the requirements of ANSI C63.4 and CISPR 16-1-4 with regards to NSA and SVSWR.

## 12.4 Measurement data

Downlink mode

| Test mode: | Below 1G | | Test channel: | Lowest channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 36.95 | Vertical | -44.58 | -13.00 | Pass |
| 72.53 | V | -43.92 | | |
| 232.47 | V | -45.47 | | |
| 522.71 | V | -48.55 | | |
| 628.31 | V | --- | | |
| 776.88 | V | --- | | |
| 41.96 | Horizontal | -47.14 | -13.00 | Pass |
| 75.83 | H | -45.10 | | |
| 126.85 | H | -42.96 | | |
| 455.83 | H | -48.57 | | |
| 742.31 | H | --- | | |
| 828.59 | H | --- | | |
| **Test mode:** | **Above 1G** | | **Test channel:** | **Lowest channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 2153.00 | Vertical | -53.85 | -13.00 | Pass |
| 3954.00 | V | -55.66 | | |
| 4672.00 | V | -54.74 | | |
| 7231.00 | V | --- | | |
| 8235.00 | V | --- | | |
| 1754.00 | Horizontal | -55.36 | -13.00 | Pass |
| 2395.00 | H | -54.61 | | |
| 3958.00 | H | -52.96 | | |
| 6574.00 | H | --- | | |
| 7395.00 | H | --- | | |

| Test mode: | Below 1G | | Test channel: | Middle channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 32.69 | Vertical | -42.82 | -13.00 | Pass |
| 72.58 | V | -45.66 | | |
| 186.47 | V | -43.51 | | |
| 356.41 | V | -42.63 | | |
| 531.34 | V | --- | | |
| 653.45 | V | --- | | |
| 43.56 | Horizontal | -45.69 | -13.00 | Pass |
| 124.71 | H | -44.28 | | |
| 243.85 | H | -43.67 | | |
| 355.75 | H | -45.73 | | |
| 495.81 | H | --- | | |
| 836.59 | H | --- | | |
| **Test mode:** | **Above 1G** | | **Test channel:** | **Middle channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1645.00 | Vertical | -53.85 | -13.00 | Pass |
| 2649.00 | V | -56.55 | | |
| 4384.00 | V | -54.69 | | |
| 5935.00 | V | --- | | |
| 7341.00 | V | --- | | |
| 1358.00 | Horizontal | -58.47 | -13.00 | Pass |
| 2485.00 | H | -55.37 | | |
| 4352.00 | H | -54.85 | | |
| 5539.00 | H | --- | | |
| 6728.00 | H | --- | | |

| Test mode: | Below 1G | | Test channel: | Highest channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 35.75 | Vertical | -44.65 | -13.00 | Pass |
| 69.52 | V | -46.76 | | |
| 212.74 | V | -45.82 | | |
| 395.47 | V | -44.93 | | |
| 573.52 | V | --- | | |
| 655.24 | V | --- | | |
| 42.53 | Horizontal | -43.26 | -13.00 | Pass |
| 146.22 | H | -45.86 | | |
| 385.96 | H | -46.93 | | |
| 425.58 | H | -42.75 | | |
| 638.14 | H | --- | | |
| 715.38 | H | --- | | |
| **Test mode:** | **Above 1G** | | **Test channel:** | **Highest channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1549.00 | Vertical | -52.35 | -13.00 | Pass |
| 2533.00 | V | -54.96 | | |
| 3869.00 | V | -53.97 | | |
| 5283.00 | V | --- | | |
| 7253.00 | V | --- | | |
| 2534.00 | Horizontal | -53.55 | -13.00 | Pass |
| 3854.00 | H | -55.69 | | |
| 4698.00 | H | -52.85 | | |
| 5863.00 | H | --- | | |
| 7259.00 | H | --- | | |

Remark:
1. Remark”---“ means that the emission level is too low to be measured

Uplink mode

| Test mode: | Below 1G | | Test channel: | Lowest channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 33.56 | Vertical | -43.68 | -13.00 | Pass |
| 75.72 | V | -45.53 | | |
| 138.53 | V | -42.88 | | |
| 242.35 | V | -46.07 | | |
| 356.76 | V | --- | | |
| 486.75 | V | --- | | |
| 36.53 | Horizontal | -45.27 | -13.00 | Pass |
| 114.52 | H | -44.39 | | |
| 235.70 | H | -42.07 | | |
| 384.74 | H | -45.59 | | |
| 432.96 | H | --- | | |
| 527.04 | | --- | | |
| **Test mode:** | **Above 1G)** | | **Test channel:** | **Lowest channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1438.00 | Vertical | -55.38 | -13.00 | Pass |
| 2751.00 | V | -52.75 | | |
| 3869.00 | V | -56.09 | | |
| 5782.00 | V | --- | | |
| 7396.00 | V | --- | | |
| 2753.00 | Horizontal | -53.96 | -13.00 | Pass |
| 3869.00 | H | -55.27 | | |
| 4576.00 | H | -55.20 | | |
| 5927.00 | H | --- | | |
| 7356.00 | H | --- | | |

| Test mode: | Below 1G | | Test channel: | Middle channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 32.96 | Vertical | -45.12 | -13.00 | Pass |
| 69.69 | V | -44.38 | | |
| 121.35 | V | -44.96 | | |
| 245.28 | V | -42.38 | | |
| 385.27 | V | --- | | |
| 469.58 | V | --- | | |
| 45.25 | Horizontal | -42.75 | -13.00 | Pass |
| 127.65 | H | -45.39 | | |
| 285.70 | H | -43.71 | | |
| 352.89 | H | -44.33 | | |
| 486.41 | H | --- | | |
| 752.36 | H | --- | | |
| **Test mode:** | **Aabove 1G** | | **Test channel:** | **Middle channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1586.00 | Vertical | -56.93 | -13.00 | Pass |
| 2734.00 | V | -57.83 | | |
| 4375.00 | V | -55.22 | | |
| 5396.00 | V | --- | | |
| 7283.00 | V | --- | | |
| 1539.00 | Horizontal | -54.74 | -13.00 | Pass |
| 3852.00 | H | -55.86 | | |
| 4358.00 | H | -56.33 | | |
| 5374.00 | H | --- | | |
| 6827.00 | H | --- | | |

| Test mode: | Below 1G | | Test channel: | Highest channel |
|---|---|---|---|---|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 35.69 | Vertical | -45.36 | -13.00 | Pass |
| 68.83 | V | -44.27 | | |
| 127.54 | V | -45.66 | | |
| 245.53 | V | -46.72 | | |
| 356.45 | V | --- | | |
| 538.55 | V | --- | | |
| 33.69 | Horizontal | -42.37 | -13.00 | Pass |
| 123.56 | H | -46.39 | | |
| 243.86 | H | -44.22 | | |
| 352.74 | H | -43.75 | | |
| 465.44 | H | --- | | |
| 652.57 | H | --- | | |
| **Test mode:** | **Above 1G** | | **Test channel:** | **Highest channel** |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1955.00 | Vertical | -53.58 | -13.00 | Pass |
| 3568.00 | V | -56.38 | | |
| 4822.00 | V | -57.43 | | |
| 5762.00 | V | --- | | |
| 7531.00 | V | --- | | |
| 2438.00 | Horizontal | -55.71 | -13.00 | Pass |
| 3396.00 | H | -53.69 | | |
| 4826.00 | H | -54.57 | | |
| 5769.00 | H | --- | | |
| 7235.00 | H | --- | | |

Remark:
1. Remark”---“ means that the emission level is too low to be measured

# 13 FREQUENCY STABILITY

## 13.1 Standard Applicable

According to FCC §2.1055 and §90.213

## 13.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 13.3 Test Procedure

1. The EUT was placed inside the temperature chamber.
2. The RF output port was connected to a spectrum analyzer.
3. The level of RF input signal shall be increased, until the maximum output power per channel, declared by client, is reached.
4. After the temperature stabilized for approximately 20 min, the transmitting frequency was measured by the spectrum analyzer and recorded.
5. At room temperature, the frequency was measured when EUT was powered with the nominal voltage and with 85% and 115% of the nominal voltage.

## 13.4 Test Result

**Passed.**

Downlink:

| CDMA mode | | | | | |
|---|---|---|---|---|---|
| Reference Frequency: Middle channel=865.50MHz | | | | | |
| **Voltage with nominal Voltage** | **Power Supplied (VAC)** | **Temperature (℃)** | **Frequency Error (Hz)** | **Frequency Error (ppm)** | **Result** |
| 100% | 120V | -40 | 18 | 0.0208 | Passed |
| 100% | | -30 | 17 | 0.0196 | Passed |
| 100% | | -20 | 14 | 0.0162 | Passed |
| 100% | | -10 | 11 | 0.0127 | Passed |
| 100% | | 0 | 8 | 0.0092 | Passed |
| 100% | | 10 | 9 | 0.0104 | Passed |
| 100% | | 20 | 11 | 0.0127 | Passed |
| 100% | | 30 | 13 | 0.0150 | Passed |
| 100% | | 40 | 14 | 0.0162 | Passed |
| 100% | | 50 | 17 | 0.0196 | Passed |
| 100% | | 55 | 18 | 0.0208 | Passed |
| 85% | 102V | 20 | 17 | 0.0196 | Passed |
| 115% | 138V | 20 | 14 | 0.0162 | Passed |

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

Uplink:

| CDMA mode | | | | | |
|---|---|---|---|---|---|
| Reference Frequency: Middle channel=820.50MHz | | | | | |
| Voltage with nominal Voltage | Power Supplied (VAC) | Temperature (℃) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| 100% | 120V | -40 | 19 | 0.0232 | Passed |
| 100% | | -30 | 16 | 0.0195 | Passed |
| 100% | | -20 | 14 | 0.0171 | Passed |
| 100% | | -10 | 13 | 0.0158 | Passed |
| 100% | | 0 | 9 | 0.0110 | Passed |
| 100% | | 10 | 6 | 0.0073 | Passed |
| 100% | | 20 | 10 | 0.0122 | Passed |
| 100% | | 30 | 13 | 0.0158 | Passed |
| 100% | | 40 | 13 | 0.0158 | Passed |
| 100% | | 50 | 17 | 0.0207 | Passed |
| 100% | | 55 | 19 | 0.0232 | Passed |
| 85% | 102V | 20 | 16 | 0.0195 | Passed |
| 115% | 138V | 20 | 14 | 0.0171 | Passed |

Remark: EUT is specified for outdoor use with temperature range of -40° to +55° C, and was tested with its range.

# 14 OUT-OF-BAND REJECTION

## 14.1 Standard Applicable

According to KDB (AMPLIFIER, BOOSTER, AND REPEATER REMINDER SHEET):

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Please refer the section §3.3 OUT-OF-BAND REJECTION of D05 Indus Booster Basic Meas v01

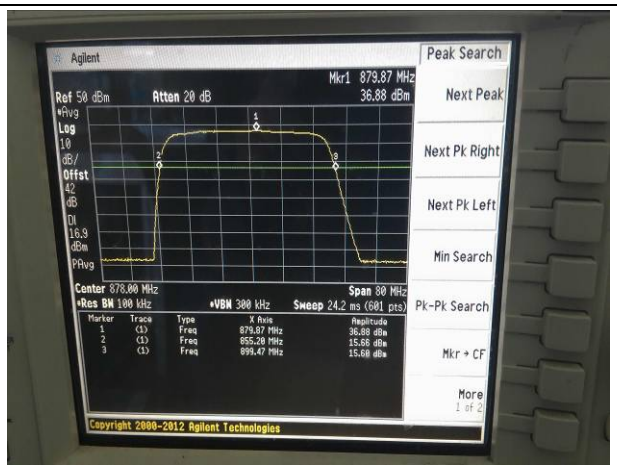
## 14.2 Test setup

Please refer the section §6.2 Configuration of Tested System.

## 14.3 Test Procedure

Please refer the section §3.3 OUT-OF-BAND REJECTION of D05 Indus Booster Basic Meas v01

## 14.4 Test Result

| Out-of-Band Rejection | |
|---|---|
|  | |
| Downlink | Uplink |

# 15 POWER LINE CONDUCTED EMISSION TEST

## 15.1 Standard Applicable

According to FCC §15.207. The emission value for frequency within 150KHz to 30MHz shall not Exceed criteria of below chart.

| Frequency range (MHz) | Limits dB(uV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 79 | 66 |
| 0.50 to 30 | 73 | 60 |
| Note<br>1.The lower limit shall apply at the transition frequencies<br>2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. | | |

## 15.2 Test setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2001.
2. The EUT was plug-in DC power adaptort and was placed on the center of the back edge on the test table. The peripherals like earphone was placed on the side of the EUT. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The Power adaptor was connected with 110VAC/60Hz power source.

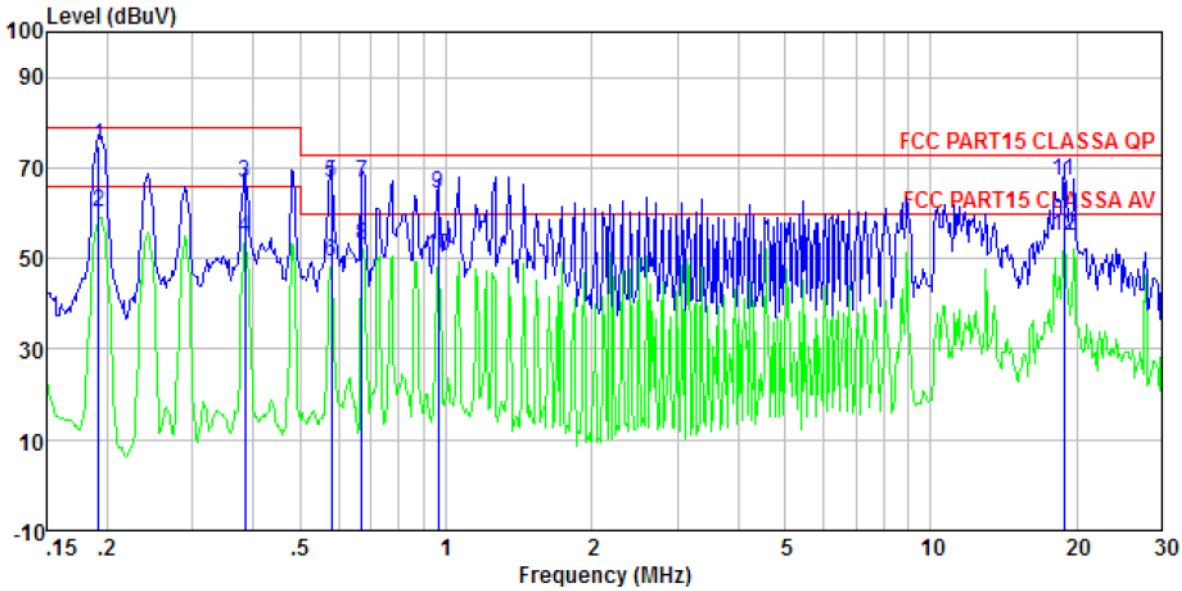
## 15.3 Test Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

## 15.4 Measurement Result

**Downlink:**

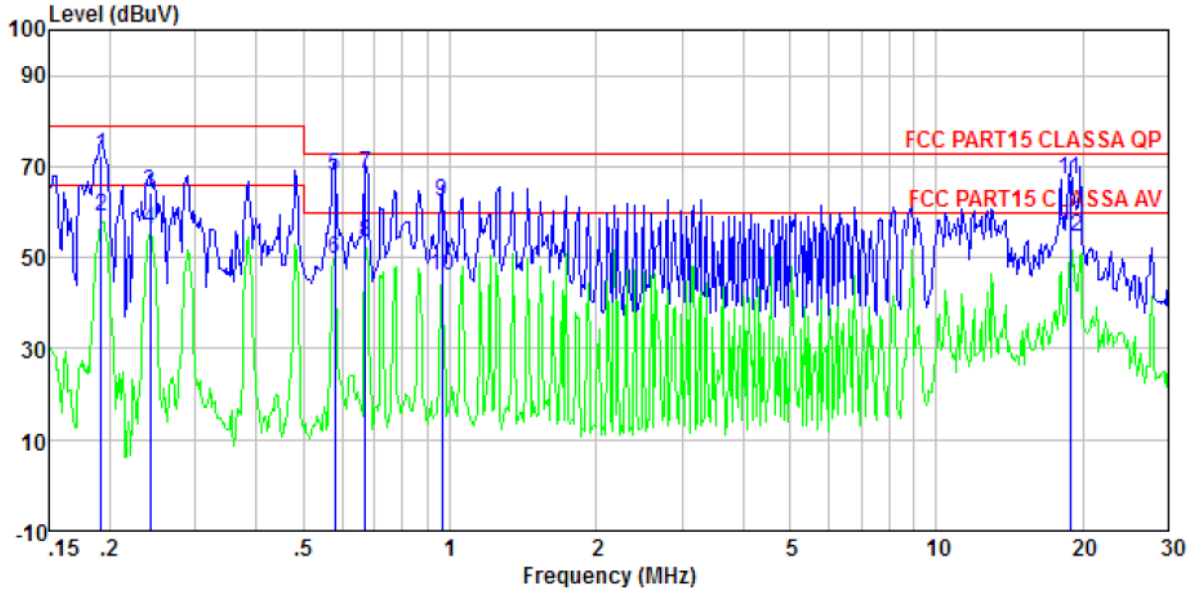
**Line:**




Site : Shielded room
Condition : FCC PART15 CLASSA QP LISN-2013 LINE
Job No. : 0438
Test mode : Downlink mode
Test Engineer: Sky

| | Freq | Read Level | Level | Cable Loss | LISN Factor | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.192 | 74.55 | 74.82 | 0.13 | 0.14 | 79.00 | -4.18 | QP |
| 2 | 0.192 | 60.02 | 60.29 | 0.13 | 0.14 | 66.00 | -5.71 | Average |
| 3 | 0.385 | 66.37 | 66.58 | 0.10 | 0.11 | 79.00 | -12.42 | QP |
| 4 | 0.385 | 54.49 | 54.70 | 0.10 | 0.11 | 66.00 | -11.30 | Average |
| 5 | 0.579 | 66.35 | 66.60 | 0.12 | 0.13 | 73.00 | -6.40 | QP |
| 6 | 0.579 | 48.87 | 49.12 | 0.12 | 0.13 | 60.00 | -10.88 | Average |
| 7 | 0.672 | 66.32 | 66.59 | 0.13 | 0.14 | 73.00 | -6.41 | QP |
| 8 | 0.672 | 52.80 | 53.07 | 0.13 | 0.14 | 60.00 | -6.93 | Average |
| 9 | 0.963 | 64.15 | 64.42 | 0.13 | 0.14 | 73.00 | -8.58 | QP |
| 10 | 0.963 | 50.30 | 50.57 | 0.13 | 0.14 | 60.00 | -9.43 | Average |
| 11 | 18.820 | 66.54 | 67.31 | 0.22 | 0.55 | 73.00 | -5.69 | QP |
| 12 | 18.820 | 54.19 | 54.96 | 0.22 | 0.55 | 60.00 | -5.04 | Average |

**Neutral:**

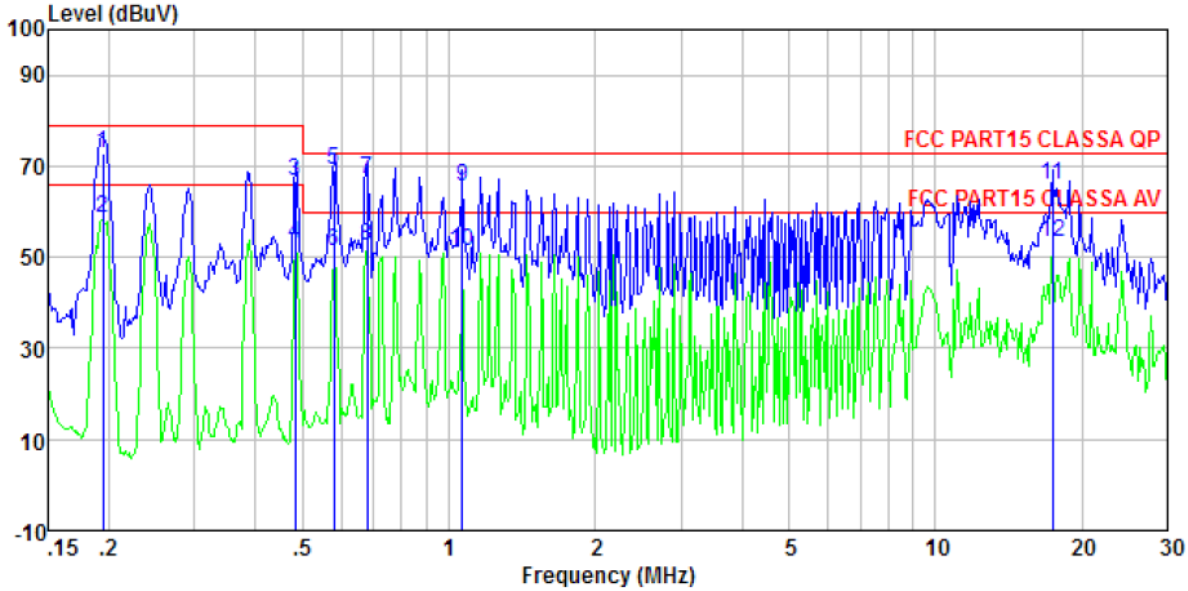



Site : Shielded room
Condition : FCC PART15 CLASSA QP LISN-2013 NEUTRAL
Job No. : 0438
Test mode : Downlink mode
Test Engineer: Sky

| | Freq | Read Level | Level | Cable Loss | LISN Factor | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.192 | 72.33 | 72.53 | 0.13 | 0.07 | 79.00 | -6.47 | QP |
| 2 | 0.192 | 58.64 | 58.84 | 0.13 | 0.07 | 66.00 | -7.16 | Average |
| 3 | 0.242 | 64.22 | 64.40 | 0.12 | 0.06 | 79.00 | -14.60 | QP |
| 4 | 0.242 | 55.98 | 56.16 | 0.12 | 0.06 | 66.00 | -9.84 | Average |
| 5 | 0.579 | 67.54 | 67.73 | 0.12 | 0.07 | 73.00 | -5.27 | QP |
| 6 | 0.579 | 49.55 | 49.74 | 0.12 | 0.07 | 60.00 | -10.26 | Average |
| 7 | 0.672 | 68.14 | 68.34 | 0.13 | 0.07 | 73.00 | -4.66 | QP |
| 8 | 0.672 | 53.17 | 53.37 | 0.13 | 0.07 | 60.00 | -6.63 | Average |
| 9 | 0.963 | 62.16 | 62.36 | 0.13 | 0.07 | 73.00 | -10.64 | QP |
| 10 | 0.963 | 45.74 | 45.94 | 0.13 | 0.07 | 60.00 | -14.06 | Average |
| 11 | 18.820 | 66.35 | 67.03 | 0.22 | 0.46 | 73.00 | -5.97 | QP |
| 12 | 18.820 | 53.96 | 54.64 | 0.22 | 0.46 | 60.00 | -5.36 | Average |

**Uplink:**

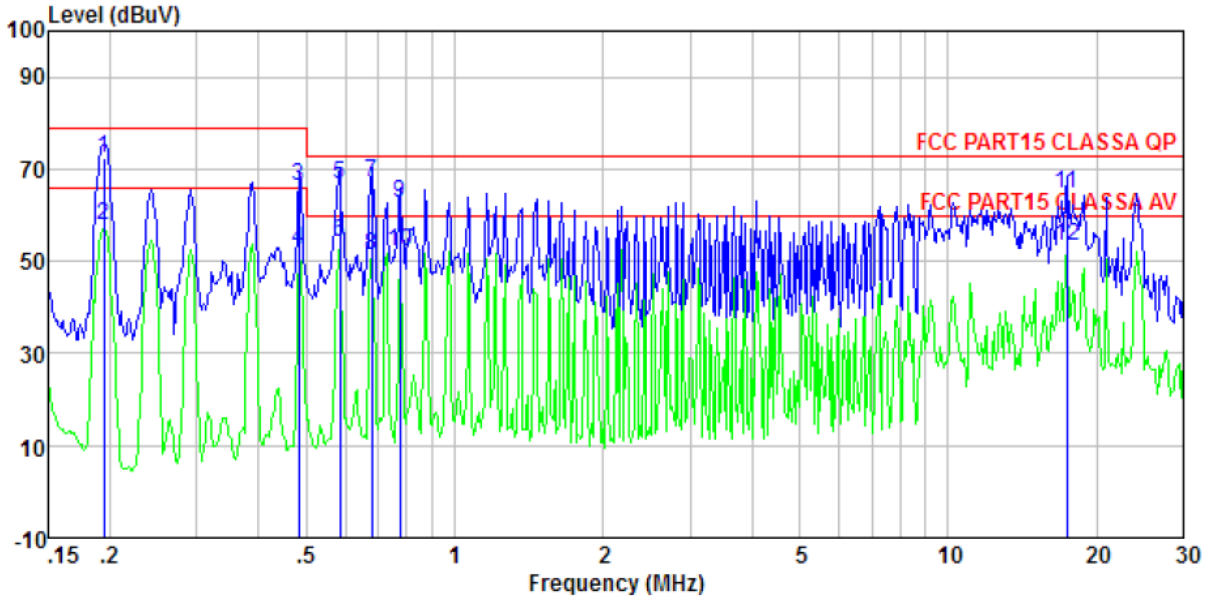
**Line:**




Site : Shielded room
Condition : FCC PART15 CLASSA QP LISN-2013 LINE
Job No. : 0438
Test mode : Uplink mode
Test Engineer: Sky

| | Freq | Read Level | Level | Cable Loss | LISN Factor | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.194 | 72.36 | 72.63 | 0.13 | 0.14 | 79.00 | -6.37 | QP |
| 2 | 0.194 | 58.34 | 58.61 | 0.13 | 0.14 | 66.00 | -7.39 | Average |
| 3 | 0.484 | 66.57 | 66.80 | 0.11 | 0.12 | 79.00 | -12.20 | QP |
| 4 | 0.484 | 52.62 | 52.85 | 0.11 | 0.12 | 66.00 | -13.15 | Average |
| 5 | 0.579 | 68.99 | 69.24 | 0.12 | 0.13 | 73.00 | -3.76 | QP |
| 6 | 0.579 | 51.04 | 51.29 | 0.12 | 0.13 | 60.00 | -8.71 | Average |
| 7 | 0.679 | 66.75 | 67.02 | 0.13 | 0.14 | 73.00 | -5.98 | QP |
| 8 | 0.679 | 52.42 | 52.69 | 0.13 | 0.14 | 60.00 | -7.31 | Average |
| 9 | 1.065 | 65.36 | 65.63 | 0.13 | 0.14 | 73.00 | -7.37 | QP |
| 10 | 1.065 | 50.91 | 51.18 | 0.13 | 0.14 | 60.00 | -8.82 | Average |
| 11 | 17.383 | 65.21 | 65.91 | 0.22 | 0.48 | 73.00 | -7.09 | QP |
| 12 | 17.383 | 52.67 | 53.37 | 0.22 | 0.48 | 60.00 | -6.63 | Average |

**Neutral:**

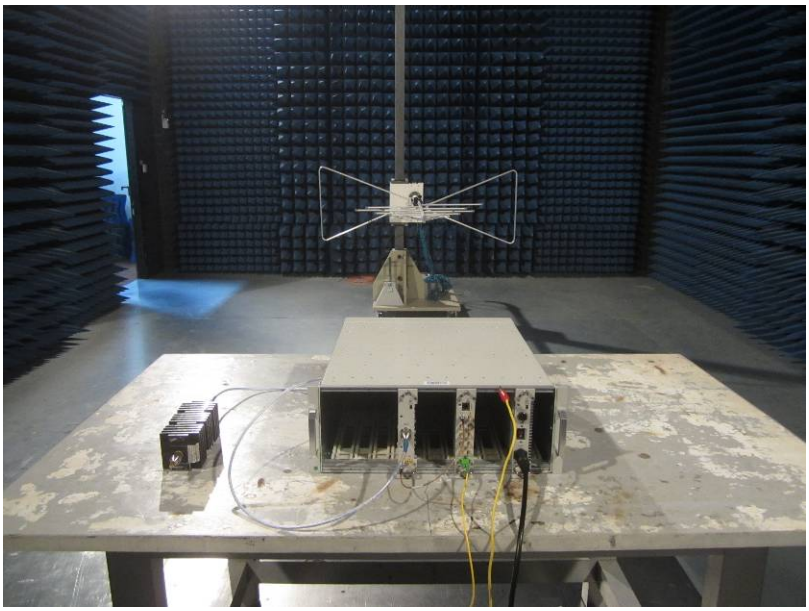


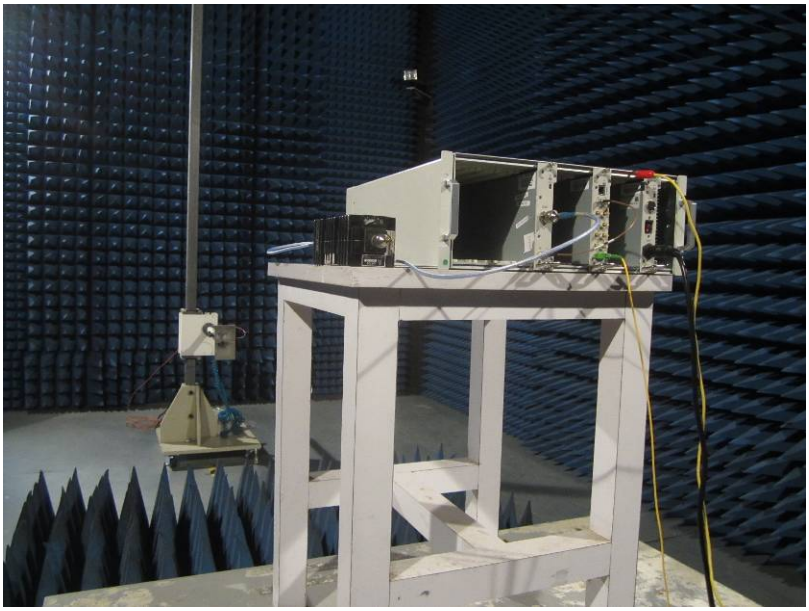

Site : Shielded room
Condition : FCC PART15 CLASSA QP LISN-2013 NEUTRAL
Job No. : 0438
Test mode : Uplink mode
Test Engineer: Sky

| | Freq | Read Level | Level | Cable Loss | LISN Factor | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.194 | 72.36 | 72.56 | 0.13 | 0.07 | 79.00 | -6.44 | QP |
| 2 | 0.194 | 57.57 | 57.77 | 0.13 | 0.07 | 66.00 | -8.23 | Average |
| 3 | 0.484 | 65.99 | 66.16 | 0.11 | 0.06 | 79.00 | -12.84 | QP |
| 4 | 0.484 | 52.48 | 52.65 | 0.11 | 0.06 | 66.00 | -13.35 | Average |
| 5 | 0.585 | 66.60 | 66.79 | 0.12 | 0.07 | 73.00 | -6.21 | QP |
| 6 | 0.585 | 53.91 | 54.10 | 0.12 | 0.07 | 60.00 | -5.90 | Average |
| 7 | 0.679 | 66.78 | 66.98 | 0.13 | 0.07 | 73.00 | -6.02 | QP |
| 8 | 0.679 | 51.17 | 51.37 | 0.13 | 0.07 | 60.00 | -8.63 | Average |
| 9 | 0.775 | 62.36 | 62.56 | 0.13 | 0.07 | 73.00 | -10.44 | QP |
| 10 | 0.775 | 51.75 | 51.95 | 0.13 | 0.07 | 60.00 | -8.05 | Average |
| 11 | 17.383 | 64.21 | 64.83 | 0.22 | 0.40 | 73.00 | -8.17 | QP |
| 12 | 17.383 | 52.65 | 53.27 | 0.22 | 0.40 | 60.00 | -6.73 | Average |

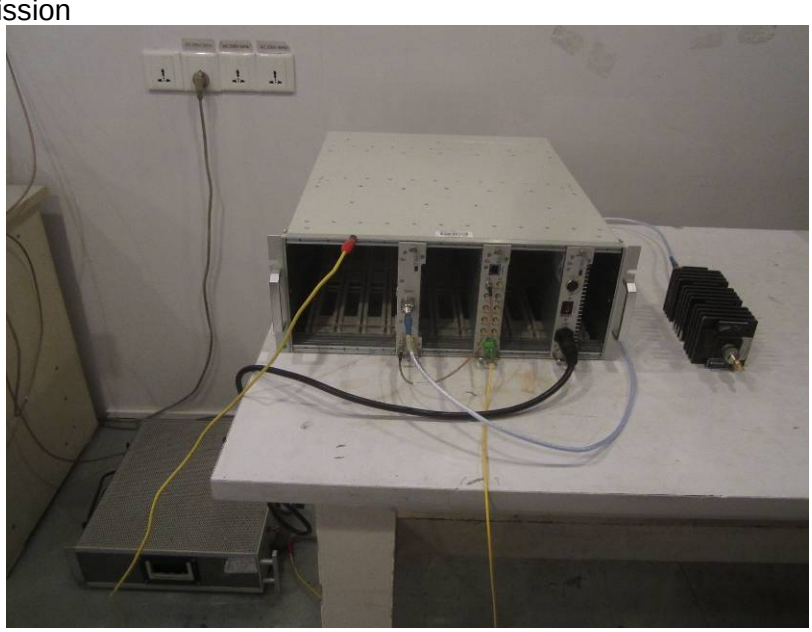
# 16 Test Setup Photo

Radiated Emission





Conducted Emission



## 17 EUT Constructional Details

Reference to the test report No. GTS16000438E01

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