

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                  |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|
| <b>Prüfbericht-Nr.:</b><br><i>Test Report No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>16081948 001</b>                                                                                                                                                              | <b>Auftrags-Nr.:</b><br><i>Order No.:</i>                                                                                                                                              | <b>174061986</b>                                                                   | Seite 1 von 89<br><i>Page 1 of 89</i>            |                                         |
| <b>Kunden-Referenz-Nr.:</b><br><i>Client Reference No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                         | 660876                                                                                                                                                                           | <b>Auftragsdatum:</b><br><i>Order date:</i>                                                                                                                                            | 11 Jan, 2017                                                                       |                                                  |                                         |
| <b>Auftraggeber:</b><br><i>Client:</i>                                                                                                                                                                                                                                                                                                                                                                                                                              | Bonaverde GmbH<br>c/o MCB GmbH Rosenthaler Str. 2 10119 Berlin<br>Germany                                                                                                        |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüfgegenstand:</b><br><i>Test item:</i>                                                                                                                                                                                                                                                                                                                                                                                                                         | Roast, Grind, Brew<br>Coffee Maker                                                                                                                                               |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| Bezeichnung / Typ-Nr.:<br>Identification / Type No.:                                                                                                                                                                                                                                                                                                                                                                                                                | Berlin                                                                                                                                                                           |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Auftrags-Inhalt:</b><br><i>Order content:</i>                                                                                                                                                                                                                                                                                                                                                                                                                    | TUV Rheinland – FCC service                                                                                                                                                      |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüfgrundlage:</b><br><i>Test specification:</i>                                                                                                                                                                                                                                                                                                                                                                                                                 | FCC 47 CFR Part 22 (October 1, 2016) Subpart H section 913, 917, 355<br>FCC 47 CFR Part 24 (October 1, 2016) Subpart E section 232, 238, 235<br>RSS 132 Issue 3, RSS-133 issue 6 |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Wareneingangsdatum:</b><br><i>Date of receipt:</i>                                                                                                                                                                                                                                                                                                                                                                                                               | 02 Mar, 2017                                                                                                                                                                     |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüfmuster-Nr.:</b><br><i>Test sample No.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                   | 174061986-001                                                                                                                                                                    |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüfzeitraum:</b><br><i>Testing period:</i>                                                                                                                                                                                                                                                                                                                                                                                                                      | Refer to test report.                                                                                                                                                            |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Ort der Prüfung:</b><br><i>Place of testing:</i>                                                                                                                                                                                                                                                                                                                                                                                                                 | TÜV Rheinland<br>(Guangdong) Ltd.                                                                                                                                                |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüflaboratorium:</b><br><i>Testing laboratory:</i>                                                                                                                                                                                                                                                                                                                                                                                                              | TÜV Rheinland<br>(Guangdong) Ltd.                                                                                                                                                |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Prüfergebnis*:</b><br><i>Test result*:</i>                                                                                                                                                                                                                                                                                                                                                                                                                       | Pass                                                                                                                                                                             |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>geprüft von / tested by:</b><br><br><br>16 May, 2017 Amy Wang / Project Manager                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                  | <b>kontrolliert von / reviewed by:</b><br><br><br>16 May, 2017 Max Y. C. Yao / Department Manager |                                                                                    |                                                  |                                         |
| <b>Datum</b><br><i>Date</i>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Name / Stellung</b><br><i>Name / Position</i>                                                                                                                                 | <b>Unterschrift</b><br><i>Signature</i>                                                                                                                                                | <b>Datum</b><br><i>Date</i>                                                        | <b>Name / Stellung</b><br><i>Name / Position</i> | <b>Unterschrift</b><br><i>Signature</i> |
| <b>Sonstiges / Other:</b><br>FCC ID: 2ALZRBONAVERDEBER                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                  |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br><i>Condition of the test item at delivery:</i>                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                  |                                                                                                                                                                                        | Prüfmuster vollständig und unbeschädigt<br><i>Test item complete and undamaged</i> |                                                  |                                         |
| <p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft<br/>P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor<br/>P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>                      |                                                                                                                                                                                  |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p> |                                                                                                                                                                                  |                                                                                                                                                                                        |                                                                                    |                                                  |                                         |

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## TEST SUMMARY

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## 1. General Remarks

### 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

#### **Appendix 1: Test Result of Radiated Emissions**

##### Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

**Table 1: Applied Standard and Test Levels**

| <b>Radio</b>                                                          |
|-----------------------------------------------------------------------|
| FCC 47 CFR Part 22 Subpart H & Part 24 Subpart E                      |
| IC RSS-132 Issue 3: January 2013 and IC RSS-133 Issue 6: January 2013 |

## 2. Test Sites

### 2.1 Test Facilities

**Shenzhen Huatongwei International Inspection Co., Ltd**

Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Hongfa Hi-tech Industrial Park,  
Shenzhen, China

FCC-Registration No.: 317478

IC-Registration No.: 5377A&5377B.

## 2.2 List of Test and Measurement Instruments

**Table 2: List of Test and Measurement Equipment**

| <b>Output Power(Conducted) &amp;Occupied Bandwidth&amp;Emission Bandwidth&amp;Band Edge Compliance&amp;Conducted Spurious Emission</b> |                               |               |           |              |            |                     |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------|-----------|--------------|------------|---------------------|
| No.                                                                                                                                    | Equipment                     | Manufacturer  | Model No. | SerialNo.    | Last Cal.  | Calibrated Interval |
| 1                                                                                                                                      | UNIVERSAL RADIO COMMUNICATION | Rohde&Schwarz | CMU200    | 112012       | 11/13/2016 | 1 Year              |
| 2                                                                                                                                      | WIDEB.RADIO COMM.TESRER       | Rohde&Schwarz | CMW500    | 1201.0002K50 | 11/13/2016 | 1 Year              |
| 3                                                                                                                                      | Spectrum Analyzer             | Rohde&Schwarz | FSU26     | 201141       | 11/13/2016 | 1 Year              |
| 4                                                                                                                                      | Splitter                      | Mini-Circuit  | ZAPD-4    | 400059       | 11/13/2016 | 1 Year              |

| <b>Output Power (Radiated) &amp;Radiated Spurious Emission</b> |                               |                              |           |              |            |                     |
|----------------------------------------------------------------|-------------------------------|------------------------------|-----------|--------------|------------|---------------------|
| No.                                                            | Equipment                     | Manufacturer                 | Model No. | SerialNo.    | Last Cal.  | Calibrated Interval |
| 1                                                              | UNIVERSAL RADIO COMMUNICATION | Rohde&Schwarz                | CMU200    | 112012       | 11/13/2016 | 1 Year              |
| 2                                                              | Spectrum Analyzer             | Rohde&Schwarz                | FSU26     | 201141       | 11/13/2016 | 1 Year              |
| 3                                                              | HORNANTENNA                   | ShwarzBeck                   | 9120D     | 1012         | 11/13/2016 | 1 Year              |
| 4                                                              | HORNANTENNA                   | ShwarzBeck                   | 9120D     | 1011         | 11/13/2016 | 1 Year              |
| 5                                                              | Ultra-Broadband Antenna       | ShwarzBeck                   | VULB9163  | 538          | 11/13/2016 | 1 Year              |
| 6                                                              | Ultra-Broadband Antenna       | ShwarzBeck                   | VULB9163  | 539          | 11/13/2016 | 1 Year              |
| 7                                                              | TURNTABLE                     | MATURO                       | TT2.0     | ----         | N/A        | 1 Year              |
| 8                                                              | ANTENNA MAST                  | MATURO                       | TAM-4.0-P | ----         | N/A        | 1 Year              |
| 9                                                              | EMI Test Software             | Audix                        | E3        | N/A          | N/A        | 1 Year              |
| 10                                                             | EMI Test Receiver             | Rohde&Schwarz                | ESIB 26   | 100009       | 11/13/2016 | 1 Year              |
| 11                                                             | RF Test Panel                 | Rohde&Schwarz                | TS / RSP  | 335015/ 0017 | 11/13/2016 | 1 Year              |
| 12                                                             | High pass filter              | Compliance Direction systems | BSU-6     | 34202        | 11/13/2016 | 1 Year              |
| 13                                                             | Splitter                      | Mini-Circuit                 | ZAPD-4    | 400059       | 11/13/2016 | 1 Year              |
| 14                                                             | Horn Antenna                  | SCHWARZBECK                  | BBHA9170  | 25841        | 11/13/2016 | 1 Year              |
| 15                                                             | Horn Antenna                  | SCHWARZBECK                  | BBHA9170  | 25842        | 11/13/2016 | 1 Year              |
| 16                                                             | Preamplifier                  | ShwarzBeck                   | BBV 9718  | BBV 9718     | 11/13/2016 | 1 Year              |
| 17                                                             | Broadband Preamplifier        | ShwarzBeck                   | BBV743    | 9743-0079    | 11/13/2016 | 1 Year              |
| 18                                                             | Signal Generator              | Rohde&Schwarz                | SMF100A   | 101932       | 11/13/2016 | 1 Year              |
| 19                                                             | Amplifier                     | Compliance Direction systems | PAP1-4060 | 120          | 11/13/2016 | 1 Year              |
| 20                                                             | TURNTABLE                     | ETS                          | 2088      | 2149         | 11/13/2016 | 1 Year              |
| 21                                                             | ANTENNA MAST                  | ETS                          | 2075      | 2346         | 11/13/2016 | 1 Year              |
| 22                                                             | HORNANTENNA                   | Rohde&Schwarz                | HF906     | 100068       | 11/13/2016 | 1 Year              |

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**Output Power (Radiated) & Radiated Spurious Emission**

| No. | Equipment                  | Manufacturer  | Model No. | SerialNo.        | Last Cal.  | Calibrated Interval |
|-----|----------------------------|---------------|-----------|------------------|------------|---------------------|
| 23  | HORNANTENNA                | Rohde&Schwarz | HF906     | 100039           | 11/13/2016 | 1 Year              |
| 24  | WIDEB.RADIO<br>COMM.TESRER | R&S           | CMW500    | 1201.0002K5<br>0 | 11/13/2016 | 1 Year              |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are  $\pm 3\text{dB}$ .

**Table 3: Emission Measurement Uncertainty**

| Parameter                                            | Uncertainty                      |
|------------------------------------------------------|----------------------------------|
| Radio Frequency                                      | $\pm 1 \times 10^{-7}$           |
| RF power, conducted                                  | $\pm 2.68 \text{ dB}$            |
| Adjacent channel power                               | $\pm 3 \text{ dB}$               |
| Radiated emission of transmitter, valid up to 26 GHz | $\pm 5.16 \text{ dB}$            |
| Radiated emission of receiver, valid up to 26 GHz    | $\pm 5.16 \text{ dB}$            |
| Temperature                                          | $\pm 2 \text{ }^{\circ}\text{C}$ |
| Humidity                                             | $\pm 10 \text{ } \%$             |

### 3. General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a coffee maker. It contains a 2G/3G module enabling the user to control it through a Wireless interface. They could not operation with RFID function.  
For details refer to the User Guide, Data Sheet and Circuit Diagram.

#### 3.2 Ratings and System Details

**Table 4: Basic Information of EUT**

| Item              | EUT information   |
|-------------------|-------------------|
| Kind of Equipment | Coffee Maker      |
| Type Designation  | Berlin            |
| Brand Name        | Bonaverde         |
| FCC ID            | 2ALZRBONAVERDEBER |

**Table 5: Technical Specification of EUT**

| Technical Specification | Value                                                                                                                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Frequencies   | GPRS / EDGE: 850: 824.2 ~ 848.8 MHz<br>GPRS / EDGE: 1900: 1850.2 ~ 1909.8 MHz<br>WCDMA / HSDPA / HSUPA Band II: 1852.4 ~ 1907.6 MHz<br>WCDMA / HSDPA / HSUPA Band V: 826.4 ~ 846.6MHz |
| Operation Voltage       | AC 120V, 60Hz                                                                                                                                                                         |
| Modulation              | GMSK, 8PSK                                                                                                                                                                            |
| Antenna gain            | GPRS / EDGE 850: -1.1 dBi<br>GPRS / EDGE 1900:-1.1 dBi<br>WCDMA band II:-1.1 dBi<br>WCDMA band V: -1.1 dBi                                                                            |

### **3.3 Independent Operation Modes**

Basic operation modes are:

- A. Transmitting
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- B. Receiving
- C. Standby
- D. Off

### **3.4 Noise Generating and Noise Suppressing Parts**

Refer to the Circuit Diagram.

### **3.5 Submitted Documents**

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

## **4. Test Set-up and Operation Modes**

### **4.1 Principle of Configuration Selection**

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

### **4.2 Test Operation and Test Software**

Setup for testing: Test samples are provided with a digital interface which makes it possible to control them through a test software installed on a notebook computer.

### **4.3 Special Accessories and Auxiliary Equipment**

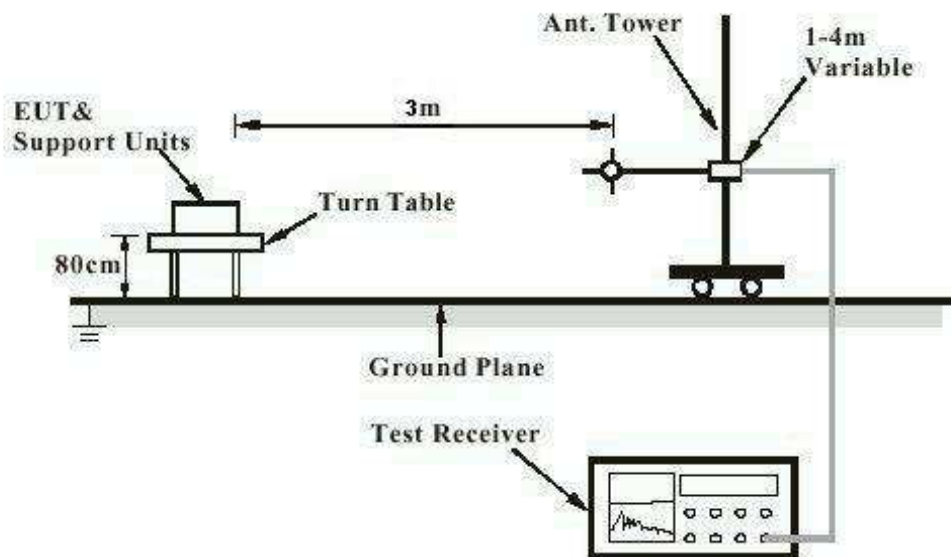
N/A.

## 4.4 Countermeasures to achieve EMC Compliance

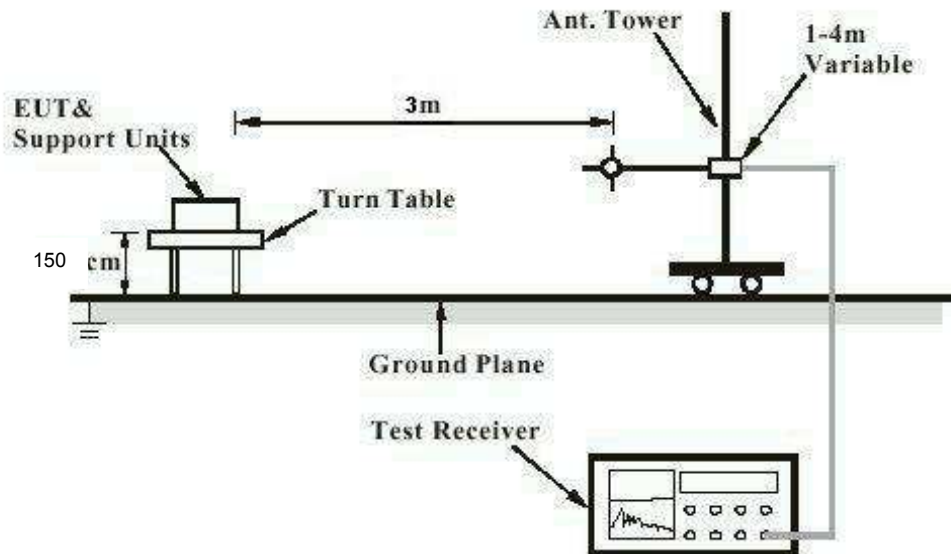
The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

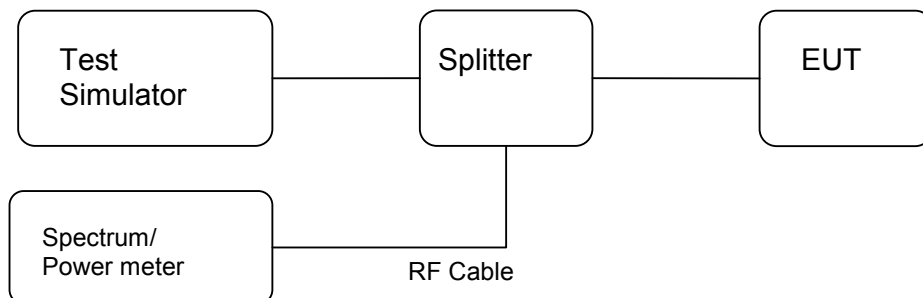
Diagram of Measurement Configuration for Radiation Test (Below 1GHz)



### Diagram of Measurement Configuration for Radiation Test (Above 1GHz)



### Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



## 5. Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Peak Power

**RESULT:****Passed**

|                   |   |                           |
|-------------------|---|---------------------------|
| Test standard     | : | FCC §2.1046               |
| Basic standard    | : | FCC Part 22 & 24          |
| Limit             | : | According to FCC §2.1046. |
| Kind of test site | : | Shielded room             |

**Test setup**

|                      |   |                   |
|----------------------|---|-------------------|
| Test Channel         | : | Low/ Middle/ High |
| Operation Mode       | : | A                 |
| Ambient temperature  | : | 20-24 °C          |
| Relative humidity    | : | 50-65 %           |
| Atmospheric pressure | : | 100-103 kPa       |

**Table 6: Test result (GPRS/EDGE)**

| Band         | Channel | Frequency (MHz) | Measured Output Power dBm | Verdict |
|--------------|---------|-----------------|---------------------------|---------|
| GPRS 850MHz  | 128     | 824.2           | 32.65                     | PASS    |
|              | 190     | 836.6           | 32.71                     | PASS    |
|              | 251     | 848.8           | 32.64                     | PASS    |
| GPRS 1900MHz | 512     | 1850.2          | 29.21                     | PASS    |
|              | 661     | 1880.0          | 29.31                     | PASS    |
|              | 810     | 1909.8          | 29.35                     | PASS    |
| EDGE 850MHz  | 128     | 824.2           | 26.95                     | PASS    |
|              | 190     | 836.6           | 27.01                     | PASS    |
|              | 251     | 848.8           | 26.92                     | PASS    |
| EDGE 1900MHz | 512     | 1850.2          | 25.28                     | PASS    |
|              | 661     | 1880.0          | 25.37                     | PASS    |
|              | 810     | 1909.8          | 25.39                     | PASS    |

Remark: The value of factor includes both the loss of cable and external attenuator

**Table 7: Test result (WCDMA/HSDPA/HSUPA)**

| Item    | band            | WCDMA 850<br>Band V |       |       | WCDMA 1900<br>Band II |       |       |
|---------|-----------------|---------------------|-------|-------|-----------------------|-------|-------|
|         | Frequency       | 4132                | 4183  | 4233  | 9262                  | 9400  | 9538  |
|         | Subtest         | dBm                 |       |       | dBm                   |       |       |
| WCDMA   | RMC<br>12.2Kbps | 22.33               | 22.39 | 22.26 | 23.80                 | 23.59 | 23.46 |
| HSDPA   | 1               | 21.77               | 21.82 | 21.76 | 23.22                 | 23.18 | 23.13 |
|         | 2               | 21.54               | 21.47 | 21.52 | 23.09                 | 22.95 | 22.91 |
|         | 3               | 21.64               | 21.66 | 21.73 | 22.92                 | 22.80 | 22.81 |
|         | 4               | 20.85               | 20.83 | 20.94 | 22.14                 | 22.06 | 22.02 |
| HSUPA   | 1               | 21.87               | 21.85 | 21.86 | 23.30                 | 23.19 | 23.11 |
|         | 2               | 21.48               | 21.52 | 21.45 | 22.87                 | 22.76 | 22.78 |
|         | 3               | 21.71               | 21.64 | 21.67 | 22.95                 | 22.87 | 22.91 |
|         | 4               | 21.55               | 21.54 | 21.57 | 22.74                 | 22.68 | 22.61 |
|         | 5               | 20.88               | 20.90 | 20.84 | 22.02                 | 21.94 | 21.93 |
| Verdict |                 | PASS                | PASS  | PASS  | PASS                  | PASS  | PASS  |

Remark: The value of factor includes both the loss of cable and external attenuator

**5.1.2 ERP & EIRP Measurement****RESULT:****Passed**

Test standard : FCC 22.913(a), FCC 24.232(b)  
Basic standard : FCC Part 22 & 24  
Limit: : According to FCC §2.1046  
FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.  
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

Kind of test site : Shielded room

**Test setup**

Test Channel : Low/ Middle/ High  
Operation Mode : A  
Ambient temperature : 20-24°C  
Relative humidity : 50-65%  
Atmospheric pressure : 100-103 kPa

**Table 8: Test result of ERP/EIRP (GSM850)**
**a) GPRS 850**

| Band           | Channel | Frequenc<br>y (MHz) | PCL | Antenna<br>Pol<br>(H/V) | Measured ERP<br>dBm | Limit<br>dBm | Verdict |
|----------------|---------|---------------------|-----|-------------------------|---------------------|--------------|---------|
| GPRS<br>850MHz | 128     | 824.20              | 5   | V                       | 30.25               | 38.5         | PASS    |
|                |         |                     |     | H                       | 29.18               |              |         |
|                | 190     | 836.60              | 5   | V                       | <b>30.70</b>        |              | PASS    |
|                |         |                     |     | H                       | 29.39               |              |         |
|                | 251     | 848.80              | 5   | V                       | 30.46               |              | PASS    |
|                |         |                     |     | H                       | 29.22               |              |         |

**b) EGPRS 850**

| Band            | Channel | Frequenc<br>y (MHz) | PCL | Antenna<br>Pol<br>(H/V) | Measured ERP<br>dBm | Limit<br>dBm | Verdict |
|-----------------|---------|---------------------|-----|-------------------------|---------------------|--------------|---------|
| EGPRS<br>850MHz | 128     | 824.20              | 5   | V                       | 24.29               | 38.5         | PASS    |
|                 |         |                     |     | H                       | 23.01               |              |         |
|                 | 190     | 836.60              | 5   | V                       | <b>24.48</b>        |              | PASS    |
|                 |         |                     |     | H                       | 23.57               |              |         |
|                 | 251     | 848.80              | 5   | V                       | 24.32               |              | PASS    |
|                 |         |                     |     | H                       | 23.16               |              |         |

**Table 9: Test result of ERP/EIRP (PCS1900)**
**a) GPRS 1900**

| Band            | Channel | Frequenc<br>y (MHz) | PCL | Antenna<br>Pol<br>(H/V) | Measured EIRP<br>dBm | Limit<br>dBm | Verdict |
|-----------------|---------|---------------------|-----|-------------------------|----------------------|--------------|---------|
| GPRS<br>1900MHz | 512     | 1850.2              | 0   | V                       | 27.15                | 33           | PASS    |
|                 |         |                     |     | H                       | 26.08                |              |         |
|                 | 661     | 1880.0              | 0   | V                       | 27.18                |              | PASS    |
|                 |         |                     |     | H                       | 26.01                |              |         |
|                 | 810     | 1909.8              | 0   | V                       | <b>27.26</b>         |              | PASS    |
|                 |         |                     |     | H                       | 26.11                |              |         |

**b) EGPRS 1900**

| Band             | Channel | Frequenc<br>y (MHz) | PCL | Antenna<br>Pol<br>(H/V) | Measured EIRP<br>dBm | Limit<br>dBm | Verdict |
|------------------|---------|---------------------|-----|-------------------------|----------------------|--------------|---------|
| EGPRS<br>1900MHz | 512     | 1850.2              | 0   | V                       | 23.40                | 33           | PASS    |
|                  |         |                     |     | H                       | 22.11                |              |         |
|                  | 661     | 1880.0              | 0   | V                       | 23.31                |              | PASS    |
|                  |         |                     |     | H                       | 22.08                |              |         |
|                  | 810     | 1909.8              | 0   | V                       | <b>23.52</b>         |              | PASS    |
|                  |         |                     |     | H                       | 22.34                |              |         |

**Table 10: Test result of ERP/EIRP (WCDMA/HSDPA/HSUPA)**
**a) WCDMA Band II**

| Band          | Channel | Frequency (MHz) | Antenna Pol (H/V) | Measured EIRP dBm | Limit dBm | Verdict |
|---------------|---------|-----------------|-------------------|-------------------|-----------|---------|
| WCDMA 1900MHz | 9262    | 1852.4          | V                 | 21.35             | 33        | PASS    |
|               |         |                 | H                 | 20.10             |           |         |
|               | 9400    | 1880            | V                 | 21.27             |           | PASS    |
|               |         |                 | H                 | 20.22             |           |         |
|               | 9538    | 1907.6          | V                 | <b>21.41</b>      |           | PASS    |
|               |         |                 | H                 | 20.29             |           |         |

**b) WCDMA Band V**

| Band         | Channel | Frequency (MHz) | Antenna Pol (H/V) | Measured ERP dBm | Limit dBm | Verdict |
|--------------|---------|-----------------|-------------------|------------------|-----------|---------|
| WCDMA 850MHz | 4132    | 826.4           | V                 | 20.44            | 38.5      | PASS    |
|              |         |                 | H                 | 19.28            |           |         |
|              | 4175    | 835             | V                 | 20.32            |           | PASS    |
|              |         |                 | H                 | 19.30            |           |         |
|              | 4233    | 846.6           | V                 | <b>20.48</b>     |           | PASS    |
|              |         |                 | H                 | 19.27            |           |         |

**c) HSDPA Band II**

| Band          | Channel | Frequency (MHz) | Antenna Pol (H/V) | Measured EIRP dBm | Limit dBm | Verdict |
|---------------|---------|-----------------|-------------------|-------------------|-----------|---------|
| HSDPA 1900MHz | 9262    | 1852.4          | V                 | 20.90             | 33        | PASS    |
|               |         |                 | H                 | 19.59             |           |         |
|               | 9400    | 1880            | V                 | 20.97             |           | PASS    |
|               |         |                 | H                 | 19.62             |           |         |
|               | 9538    | 1907.6          | V                 | <b>21.02</b>      |           | PASS    |
|               |         |                 | H                 | 19.66             |           |         |

**d) HSDPA Band V**

| Band            | Channel | Frequenc<br>y (MHz) | Antenna Pol<br>(H/V) | Measured ERP<br>dBm | Limit<br>dBm | Verdict |
|-----------------|---------|---------------------|----------------------|---------------------|--------------|---------|
| HSDPA<br>850MHz | 4132    | 826.4               | V                    | <b>20.03</b>        | 38.5         | PASS    |
|                 |         |                     | H                    | 18.96               |              |         |
|                 | 4175    | 835                 | V                    | 19.94               |              | PASS    |
|                 |         |                     | H                    | 18.88               |              |         |
|                 | 4233    | 846.6               | V                    | 19.98               |              | PASS    |
|                 |         |                     | H                    | 18.95               |              |         |

**e) HSUPA Band II**

| Band             | Channel | Frequenc<br>y (MHz) | Antenna Pol<br>(H/V) | Measured EIRP<br>dBm | Limit<br>dBm | Verdict |
|------------------|---------|---------------------|----------------------|----------------------|--------------|---------|
| HSUPA<br>1900MHz | 9262    | 1852.4              | V                    | 20.82                | 33           | PASS    |
|                  |         |                     | H                    | 19.65                |              |         |
|                  | 9400    | 1880                | V                    | 20.89                |              | PASS    |
|                  |         |                     | H                    | 19.62                |              |         |
|                  | 9538    | 1907.6              | V                    | <b>20.96</b>         |              | PASS    |
|                  |         |                     | H                    | 19.69                |              |         |

**f) HSUPA Band V**

| Band            | Channel | Frequenc<br>y (MHz) | Antenna Pol<br>(H/V) | Measured ERP<br>dBm | Limit<br>dBm | Verdict |
|-----------------|---------|---------------------|----------------------|---------------------|--------------|---------|
| HSUPA<br>850MHz | 4132    | 826.4               | V                    | <b>19.98</b>        | 38.5         | PASS    |
|                 |         |                     | H                    | 18.85               |              |         |
|                 | 4175    | 835                 | V                    | 19.92               |              | PASS    |
|                 |         |                     | H                    | 18.80               |              |         |
|                 | 4233    | 846.6               | V                    | 19.86               |              | PASS    |
|                 |         |                     | H                    | 18.81               |              |         |

### 5.1.3 Occupied Bandwidth Measurement

**RESULT:**
**Passed**

Test standard : According to §FCC 2.1049  
 Basic standard : FCC Part 22 & 24  
 Kind of test site : Shielded room

**Test setup**

Test Channel : Low/ Middle/ High  
 Operation Mode : A  
 Ambient temperature : 20-24°C  
 Relative humidity : 50-65%  
 Atmospheric pressure : 100-103 kPa

**Table 11: Test result of Occupied Bandwidth (GSM 850)**

| Test Mode | CH  | Frequency (MHz) | 99% Bandwidth (kHz) |
|-----------|-----|-----------------|---------------------|
| GPRS 850  | 128 | 824.20          | 244.92              |
|           | 190 | 836.60          | 241.60              |
|           | 251 | 848.80          | 243.96              |
| EDGE 850  | 128 | 824.20          | 246.22              |
|           | 190 | 836.60          | 241.34              |
|           | 251 | 848.80          | 247.19              |

**Table 12: Test result of Occupied Bandwidth (PCS 1900)**

| Test Mode | CH  | Frequency (MHz) | 99% Bandwidth (kHz) |
|-----------|-----|-----------------|---------------------|
| GPRS 1900 | 512 | 1850.20         | 242.17              |
|           | 661 | 1880.00         | 238.04              |
|           | 810 | 1909.80         | 242.37              |
| EDGE 1900 | 512 | 1850.20         | 240.66              |
|           | 661 | 1880.00         | 238.87              |
|           | 810 | 1909.80         | 248.11              |

**Table 13: Test result of Occupied Bandwidth (WCDMA/HSDPA/HSUPA)**

| Test Mode               | CH   | Frequency (MHz) | 99% Bandwidth (MHz) |
|-------------------------|------|-----------------|---------------------|
| WCDMA (Band II)         | 9262 | 1852.40         | 4.1111              |
|                         | 9400 | 1880.00         | 4.0868              |
|                         | 9538 | 1907.60         | 4.0818              |
| WCDMA (Band V)          | 4132 | 826.40          | 4.0552              |
|                         | 4182 | 836.40          | 4.0508              |
|                         | 4233 | 846.60          | 4.0520              |
| WCDMA / HSDPA (BAND II) | 9262 | 1852.40         | 4.1580              |
|                         | 9400 | 1880.00         | 4.1854              |
|                         | 9538 | 1907.60         | 4.2435              |
| WCDMA / HSDPA (BAND V)  | 4132 | 826.40          | 4.0977              |
|                         | 4182 | 836.40          | 4.0906              |
|                         | 4233 | 846.60          | 4.0982              |
| WCDMA / HSUPA (BAND II) | 9262 | 1852.40         | 4.1560              |
|                         | 9400 | 1880.00         | 4.1880              |
|                         | 9538 | 1907.60         | 4.2461              |
| WCDMA / HSUPA (BAND V)  | 4132 | 826.40          | 4.1005              |
|                         | 4182 | 836.40          | 4.0987              |
|                         | 4233 | 846.60          | 4.1076              |

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## Test Plot of Occupied Bandwidth

### GPRS 850 (CH Low)

Center Freq 824.200000 MHz

Center Freq: 824.200000 MHz

Trig: Free Run

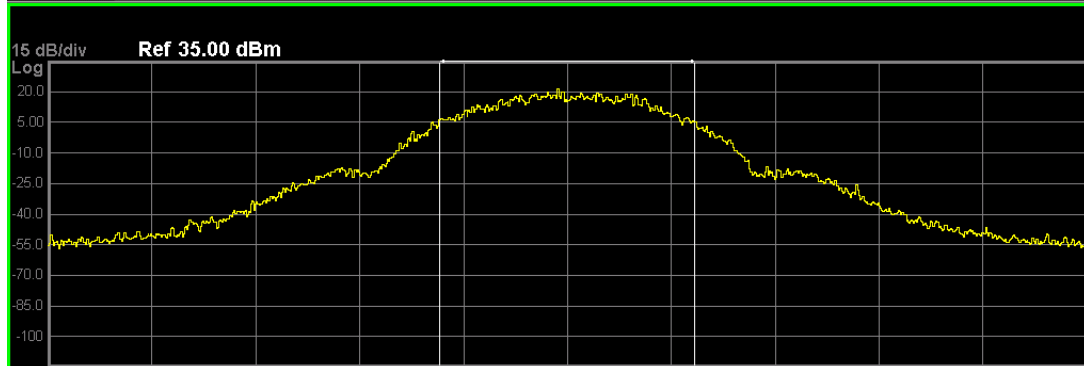
Avg|Hold:>10/10

Radio Std: None

#FGain:Low

#Atten: 24 dB

Radio Device: BTS



Center 824.2 MHz

#Res BW 3 kHz

#VBW 10 kHz

Span 1 MHz

Sweep 102.6 ms

Occupied Bandwidth

**244.92 kHz**

Total Power

34.2 dBm

Transmit Freq Error

-456 Hz

% of OBW Power

99.00 %

x dB Bandwidth

311.1 kHz

x dB

-26.00 dB

### GPRS 850 (CH Mid)

Center Freq 836.600000 MHz

Center Freq: 836.600000 MHz

Trig: Free Run

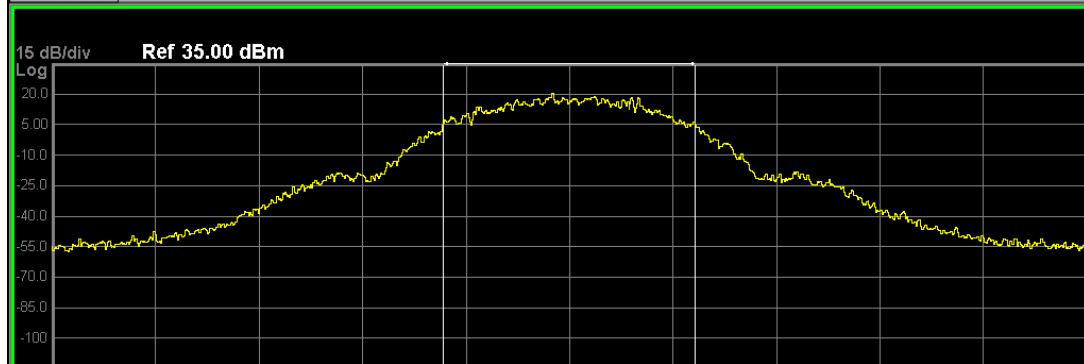
Avg|Hold:>10/10

Radio Std: None

#FGain:Low

#Atten: 24 dB

Radio Device: BTS



Center 836.6 MHz

#Res BW 3 kHz

#VBW 10 kHz

Span 1 MHz

Sweep 102.6 ms

Occupied Bandwidth

**241.60 kHz**

Total Power

33.4 dBm

Transmit Freq Error

157 Hz

% of OBW Power

99.00 %

x dB Bandwidth

308.0 kHz

x dB

-26.00 dB

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### GPRS 850 (CH High)

Center Freq 848.800000 MHz

Center Freq: 848.800000 MHz

Radio Std: None

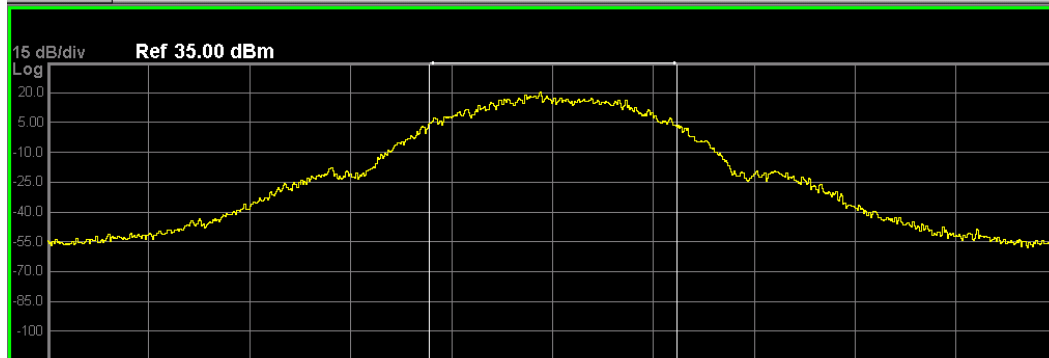
Trig: Free Run

Avg|Hold:>10/10

Radio Device: BTS

#IFGain:Low

#Atten: 24 dB



Center 848.8 MHz

#Res BW 3 kHz

#VBW 10 kHz

Span 1 MHz

Sweep 102.6 ms

Occupied Bandwidth

243.96 kHz

Total Power

33.0 dBm

Transmit Freq Error

873 Hz

% of OBW Power

99.00 %

x dB Bandwidth

309.2 kHz

x dB

-26.00 dB

### EDGE 850 (CH Low)

Center Freq 824.200000 MHz

Center Freq: 824.200000 MHz

Radio Std: None

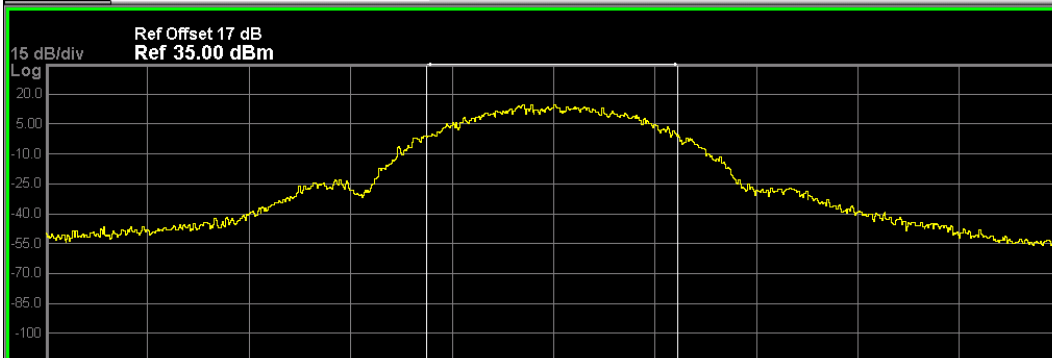
Trig: Free Run

Avg|Hold:>10/10

Radio Device: BTS

#IFGain:Low

#Atten: 30 dB



Center 824.2 MHz

#Res BW 3 kHz

#VBW 10 kHz

Span 1 MHz

Sweep 105.5 ms

Occupied Bandwidth

246.22 kHz

Total Power

29.0 dBm

Transmit Freq Error

-683 Hz

% of OBW Power

99.00 %

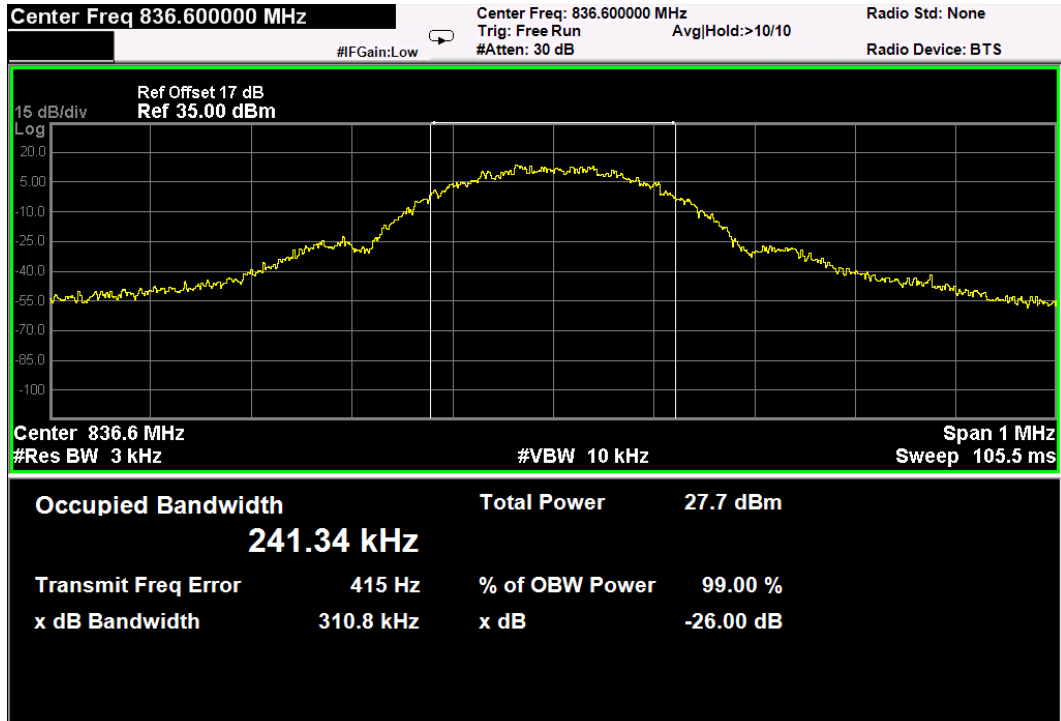
x dB Bandwidth

310.2 kHz

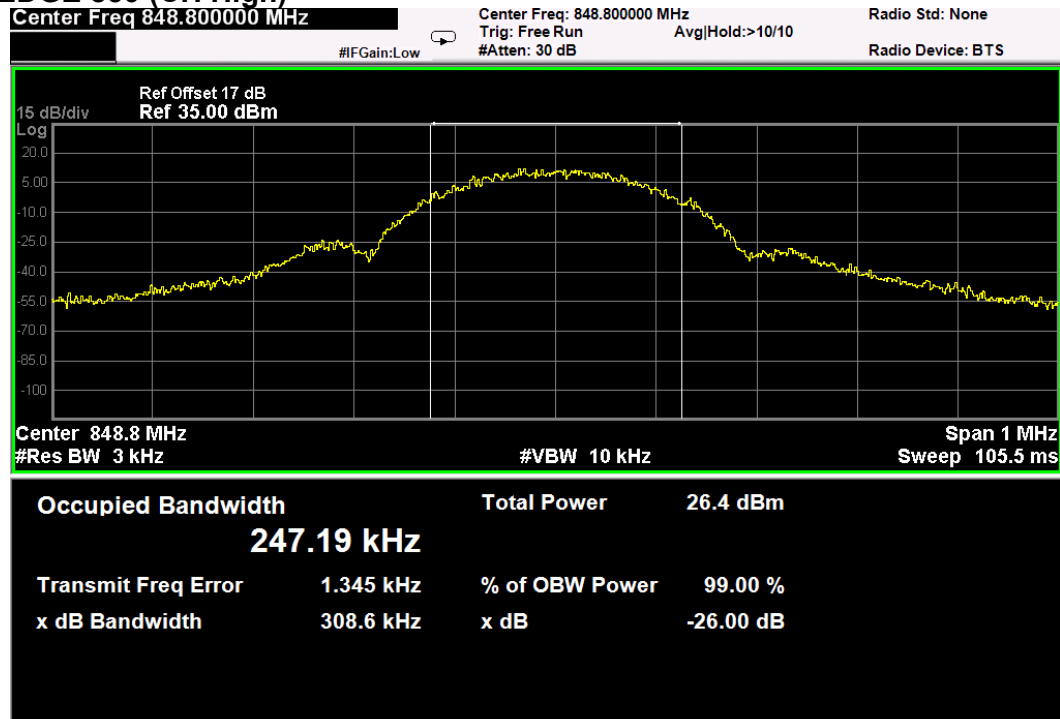
x dB

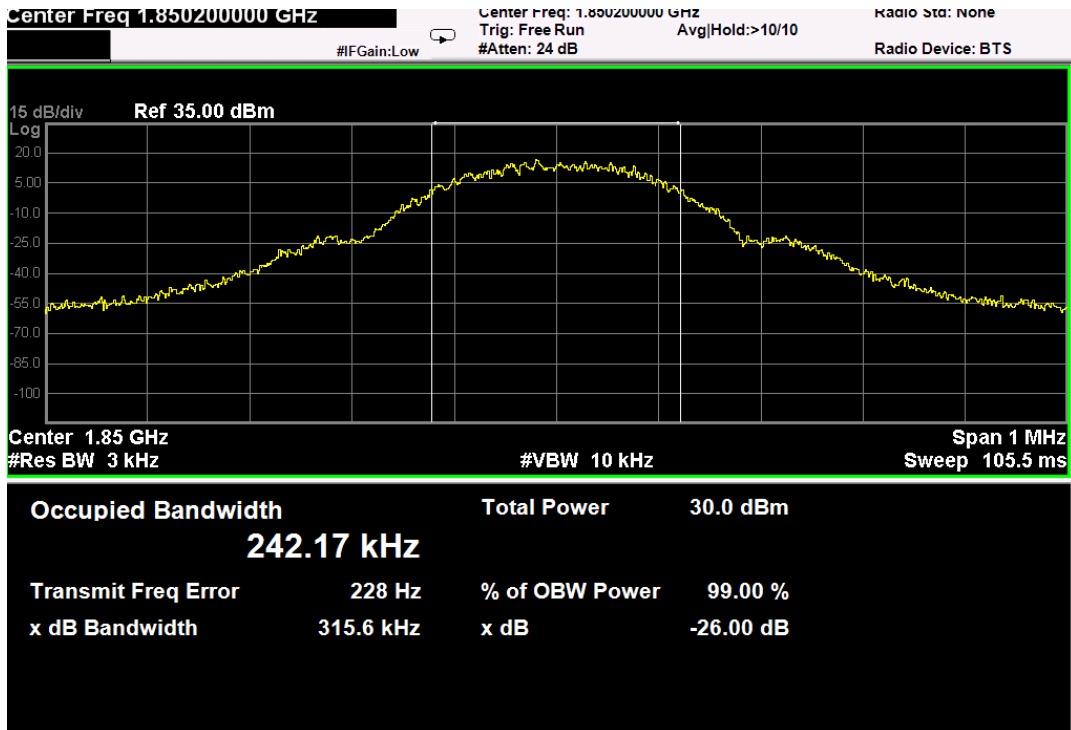
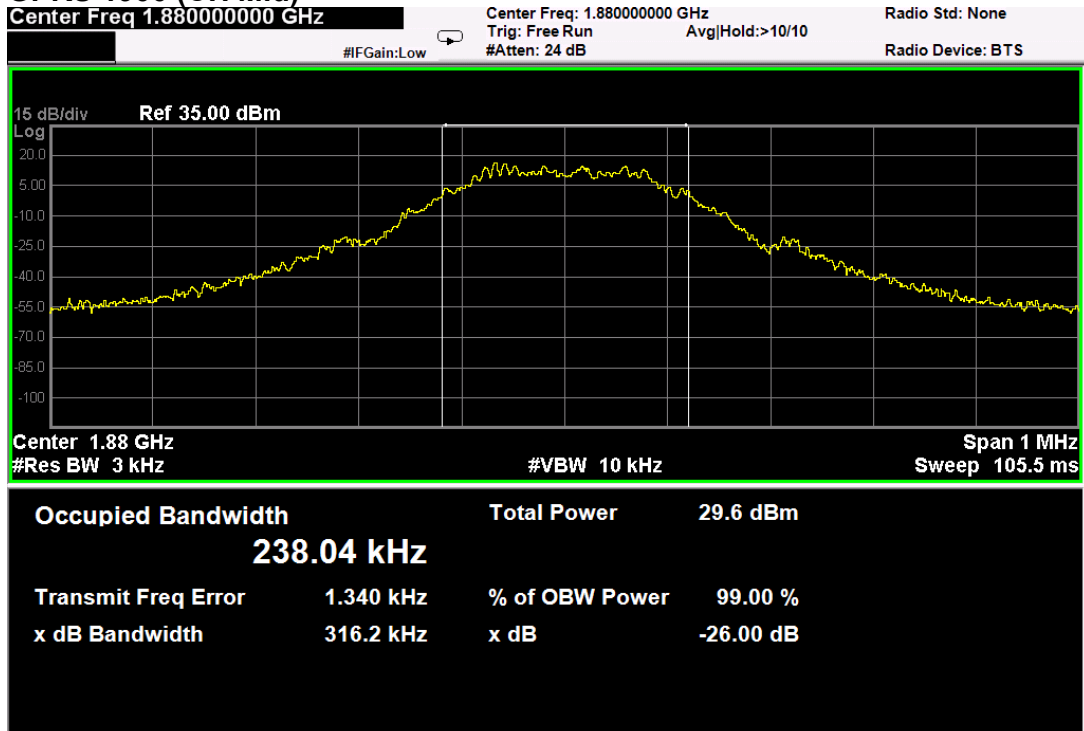
-26.00 dB

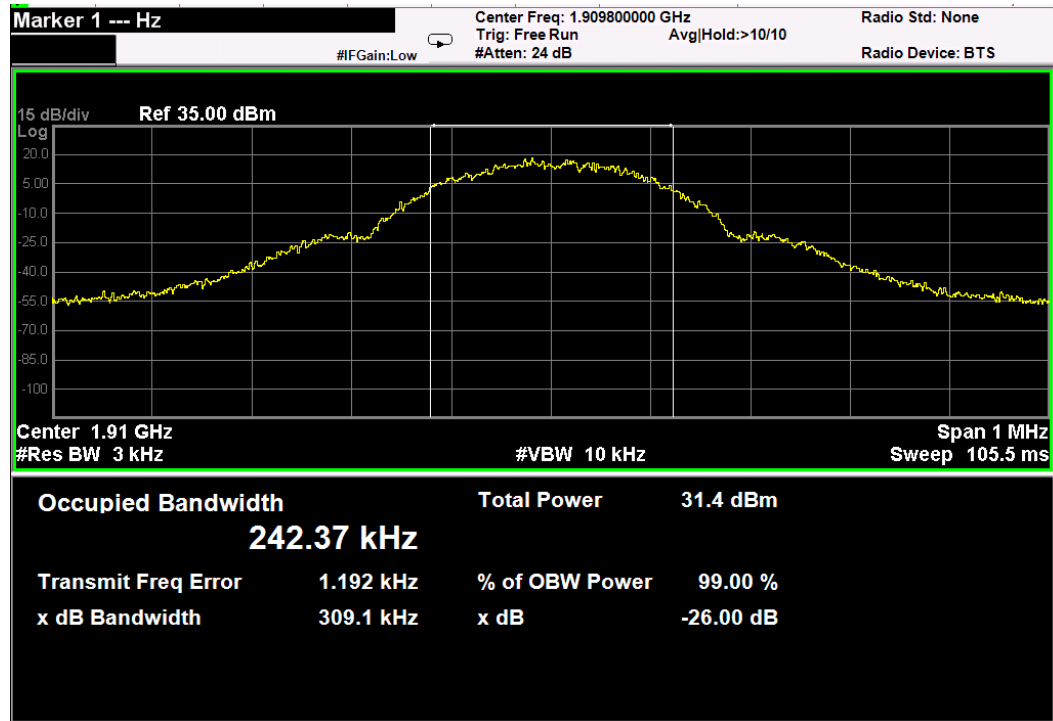
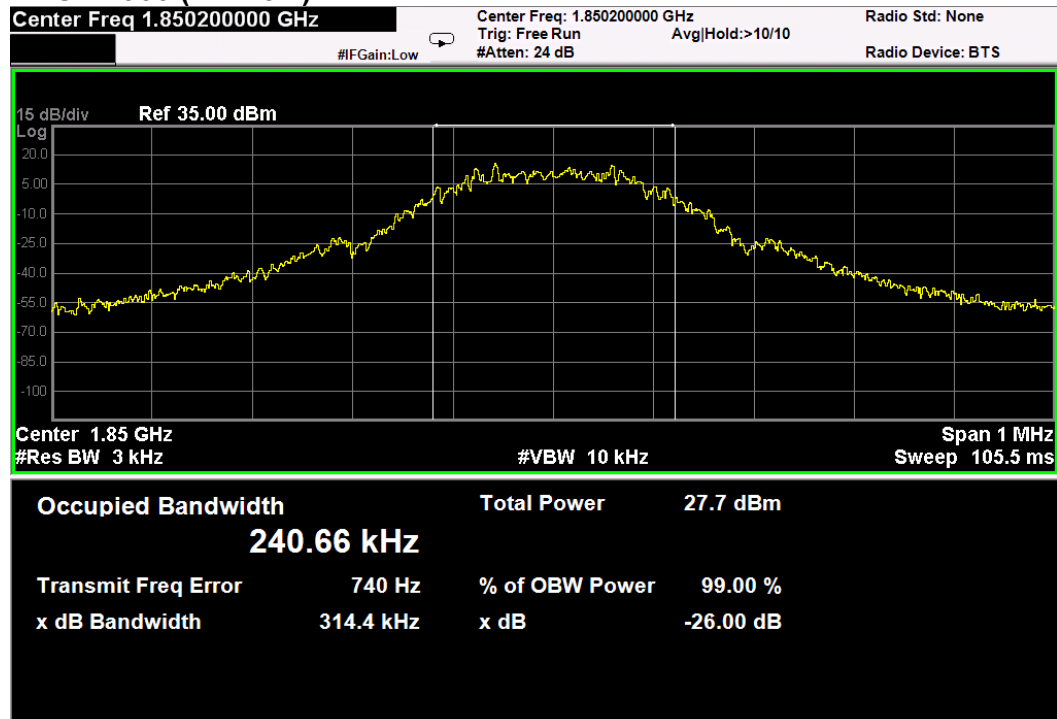
### EDGE 850 (CH Mid)



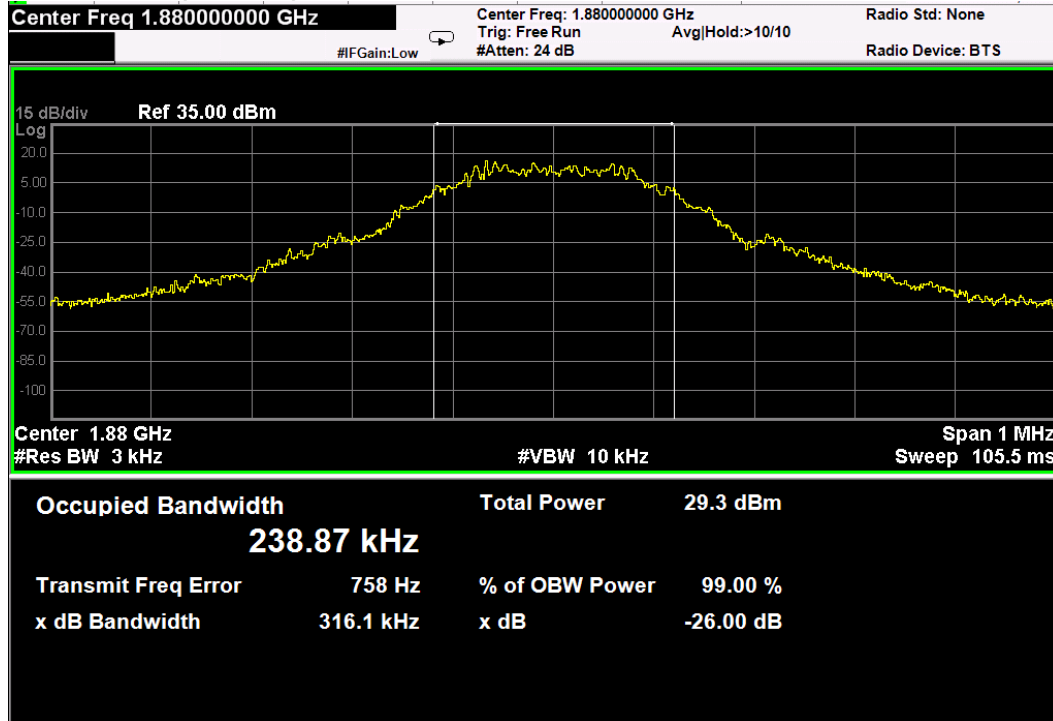
### EDGE 850 (CH High)



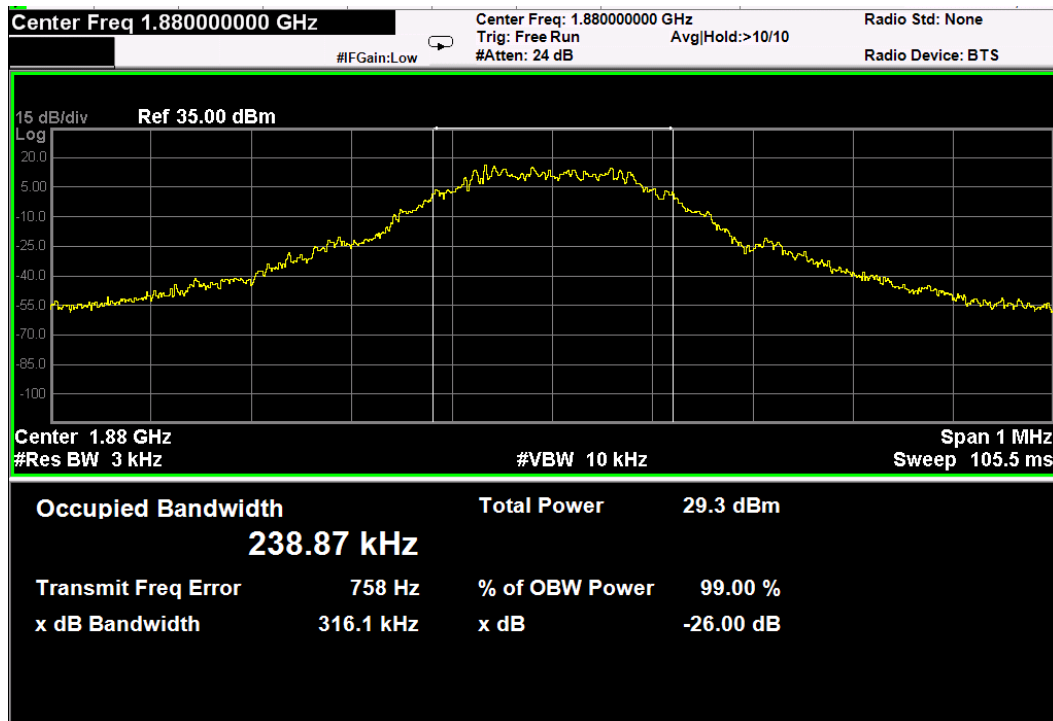
**GPRS 1900 (CH Low)**

**GPRS 1900 (CH Mid)**


**GPRS 1900 (CH High)**

**EDGE 1900 (CH Low)**


### EDGE 1900 (CH Mid)



### EDGE 1900 (CH High)



### WCDMA Band II (CH Low)

Center Freq 1.852400000 GHz

Center Freq: 1.852400000 GHz

Radio Std: None

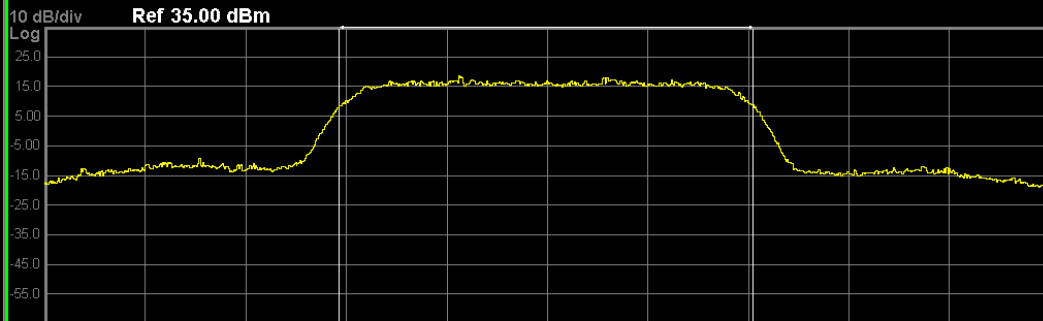
Trig: Free Run

Avg|Hold:>10/10

Radio Device: BTS

#IFGain:Low

#Atten: 24 dB



Center 1.852 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 5 ms

Occupied Bandwidth

**4.1111 MHz**

Total Power

31.5 dBm

Transmit Freq Error

-8.048 kHz

% of OBW Power

99.00 %

x dB Bandwidth

4.692 MHz

x dB

-26.00 dB

### WCDMA Band II (CH Mid)

Center Freq 1.880000000 GHz

Center Freq: 1.880000000 GHz

Radio Std: None

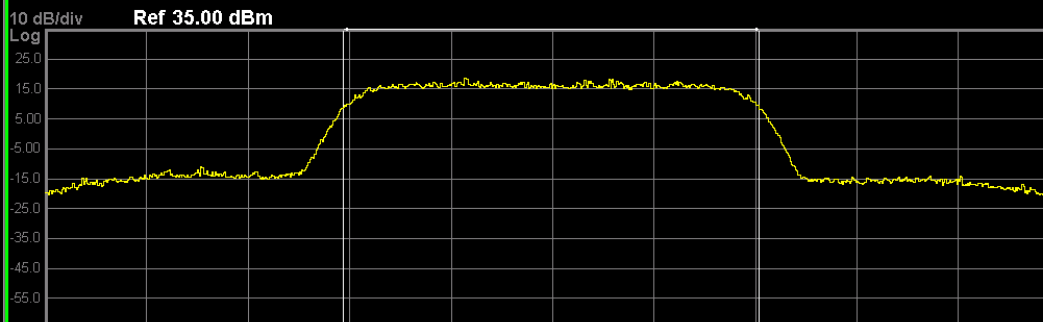
Trig: Free Run

Avg|Hold:>10/10

Radio Device: BTS

#IFGain:Low

#Atten: 24 dB



Center 1.88 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 5 ms

Occupied Bandwidth

**4.0868 MHz**

Total Power

31.7 dBm

Transmit Freq Error

-8.935 kHz

% of OBW Power

99.00 %

x dB Bandwidth

4.672 MHz

x dB

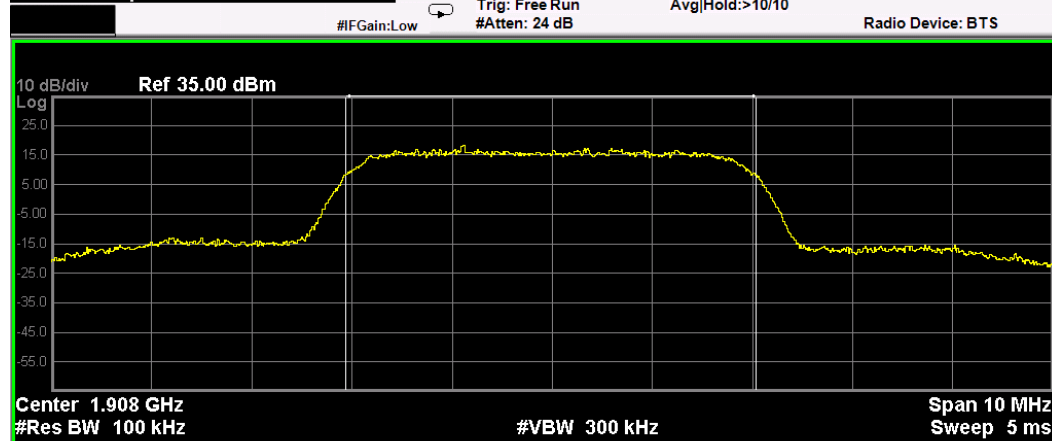
-26.00 dB

### WCDMA Band II (CH High)

Center Freq 1.907600000 GHz

Center Freq: 1.907600000 GHz  
Trig: Free Run  
#Atten: 24 dB  
Avg|Hold:>10/10

Radio Std: None  
Radio Device: BTS



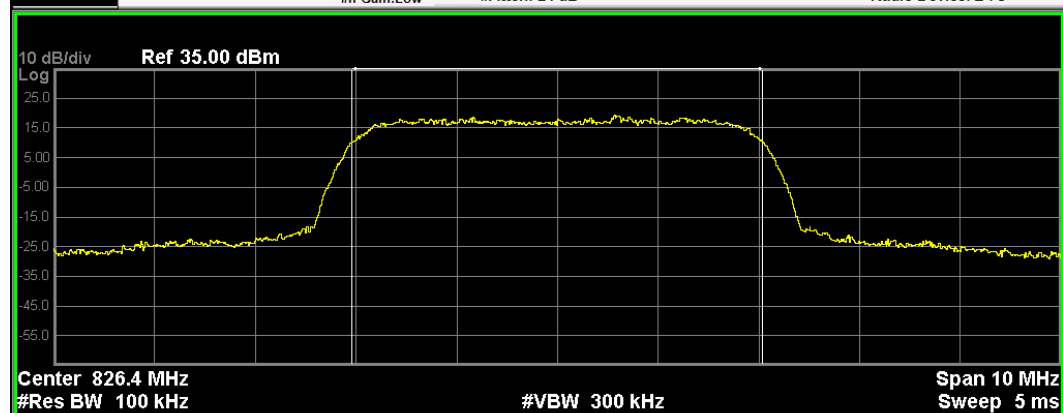
|                     |             |                        |
|---------------------|-------------|------------------------|
| Occupied Bandwidth  | Total Power | 31.1 dBm               |
| <b>4.0818 MHz</b>   |             |                        |
| Transmit Freq Error | -11.136 kHz | % of OBW Power 99.00 % |
| x dB Bandwidth      | 4.658 MHz   | x dB -26.00 dB         |

### WCDMA Band V (CH Low)

Center Freq 826.400000 MHz

Center Freq: 826.400000 MHz  
Trig: Free Run  
#Atten: 24 dB  
Avg|Hold:>10/10

Radio Std: None  
Radio Device: BTS



|                     |             |                        |
|---------------------|-------------|------------------------|
| Occupied Bandwidth  | Total Power | 32.6 dBm               |
| <b>4.0552 MHz</b>   |             |                        |
| Transmit Freq Error | 4.188 kHz   | % of OBW Power 99.00 % |
| x dB Bandwidth      | 4.606 MHz   | x dB -26.00 dB         |

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### WCDMA Band V (CH Mid)

Center Freq 836.400000 MHz

Center Freq: 836.400000 MHz

Trig: Free Run

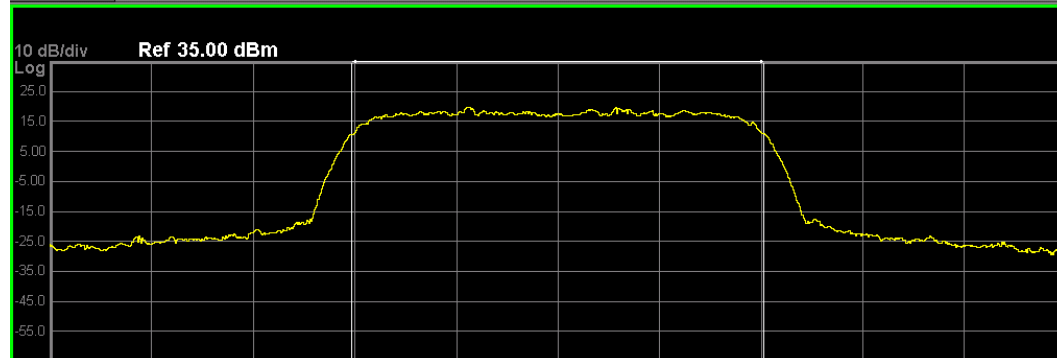
Avg|Hold:>10/10

Radio Std: None

#IFGain:Low

#Atten: 24 dB

Radio Device: BTS



Center 836.4 MHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 5 ms

Occupied Bandwidth

**4.0508 MHz**

Total Power

33.2 dBm

Transmit Freq Error

2.154 kHz

% of OBW Power

99.00 %

x dB Bandwidth

4.605 MHz

x dB

-26.00 dB

### WCDMA Band V (CH High)

Center Freq 846.600000 MHz

Center Freq: 846.600000 MHz

Trig: Free Run

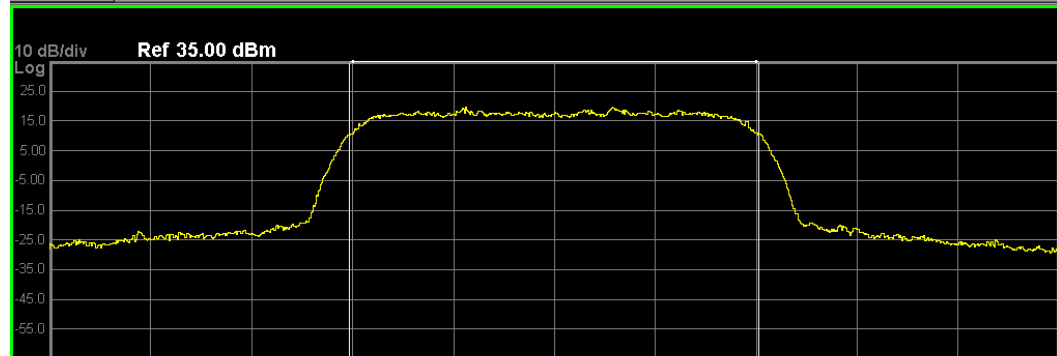
Avg|Hold:>10/10

Radio Std: None

#IFGain:Low

#Atten: 24 dB

Radio Device: BTS



Center 846.6 MHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 5 ms

Occupied Bandwidth

**4.0520 MHz**

Total Power

33.0 dBm

Transmit Freq Error

755 Hz

% of OBW Power

99.00 %

x dB Bandwidth

4.609 MHz

x dB

-26.00 dB

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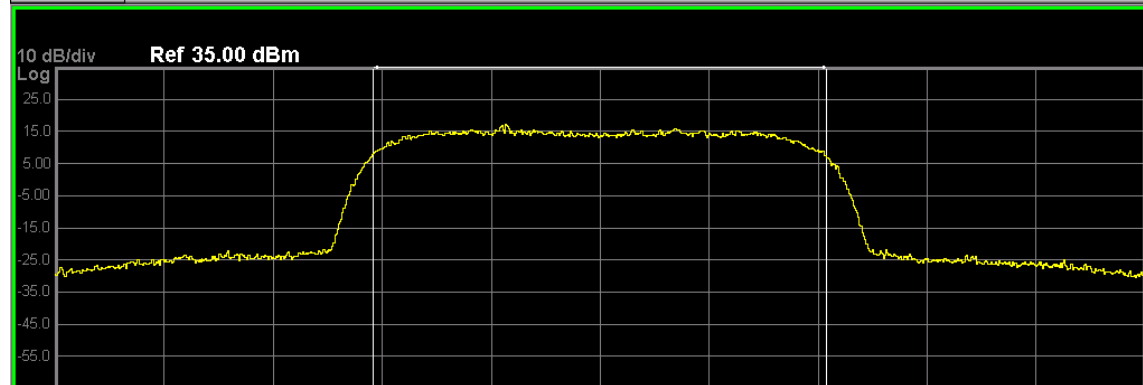
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### WCDMA / HSDPA Band II (CH Low)

Center Freq 1.852400000 GHz #IFGain:Low Center Freq: 1.852400000 GHz Trig: Free Run Avg|Hold:>10/10 Radio Std: None  
#Atten: 38 dB Radio Device: BTS



Center 1.852 GHz Span 10 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms

Occupied Bandwidth Total Power 29.9 dBm

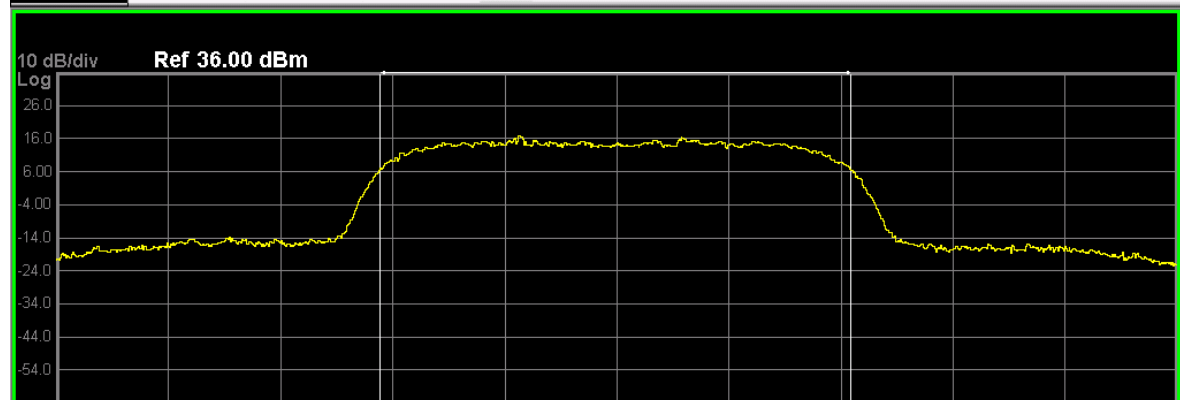
4.1580 MHz

Transmit Freq Error -4.825 kHz % of OBW Power 99.00 %

x dB Bandwidth 4.689 MHz x dB -26.00 dB

### WCDMA / HSDPA Band II (CH Mid)

Center Freq 1.880000000 GHz #IFGain:Low Center Freq: 1.880000000 GHz Trig: Free Run Avg|Hold:>10/10 Radio Std: None  
#Atten: 38 dB Radio Device: BTS



Center 1.88 GHz Span 10 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 5 ms

Occupied Bandwidth Total Power 29.9 dBm

4.1854 MHz

Transmit Freq Error -6.998 kHz % of OBW Power 99.00 %

x dB Bandwidth 4.756 MHz x dB -26.00 dB

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**WCDMA / HSDPA Band II (CH High)**
**Mech Atten 24 dB**

Center Freq: 1.907600000 GHz

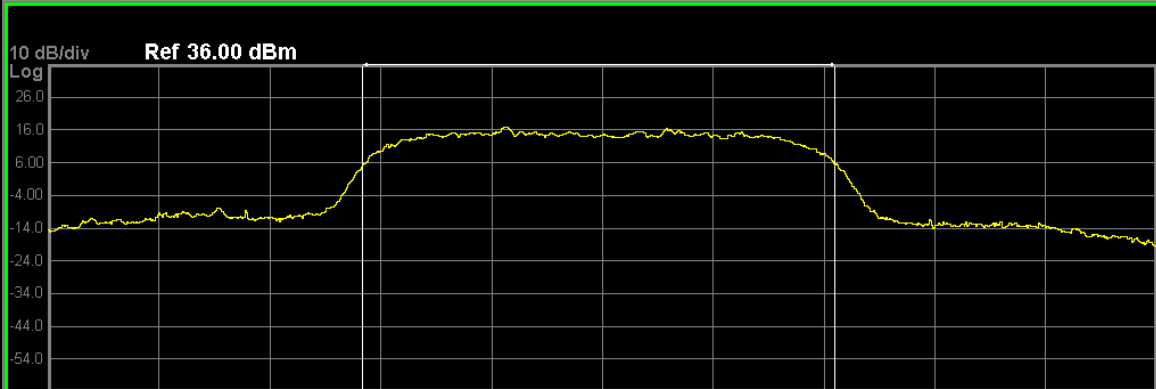
Radio Std: None

Trig: Free Run

Avg|Hold:&gt;10/10

Radio Device: BTS

#IFGain:Low



Center 1.908 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz

Sweep 5 ms

**Occupied Bandwidth**
**Total Power**
**30.1 dBm**
**4.2435 MHz**
**Transmit Freq Error**
**-27.340 kHz**
**% of OBW Power**
**99.00 %**
**x dB Bandwidth**
**6.239 MHz**
**x dB**
**-26.00 dB**
**WCDMA / HSDPA Band V (CH Low)**
**VBW 300.00 kHz**

Center Freq: 826.400000 MHz

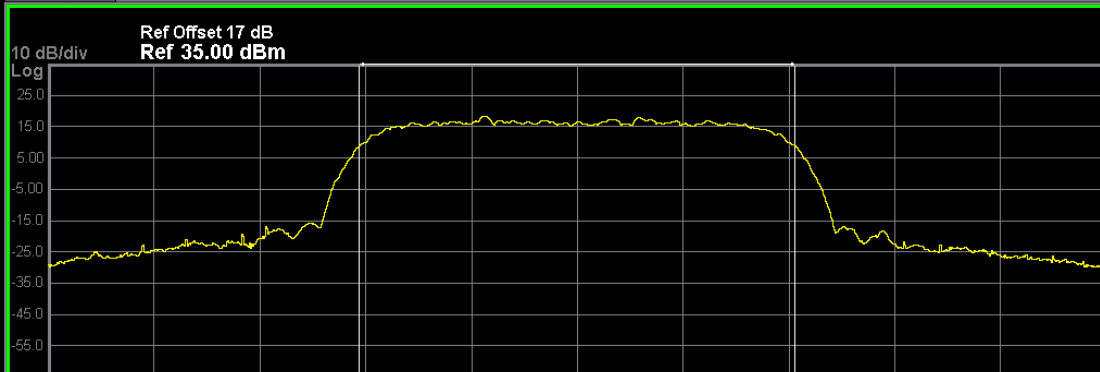
Radio Std: None

Trig: Free Run

Avg|Hold:&gt;10/10

Radio Device: BTS

#IFGain:Low



Center 826.4 MHz

#Res BW 100 kHz

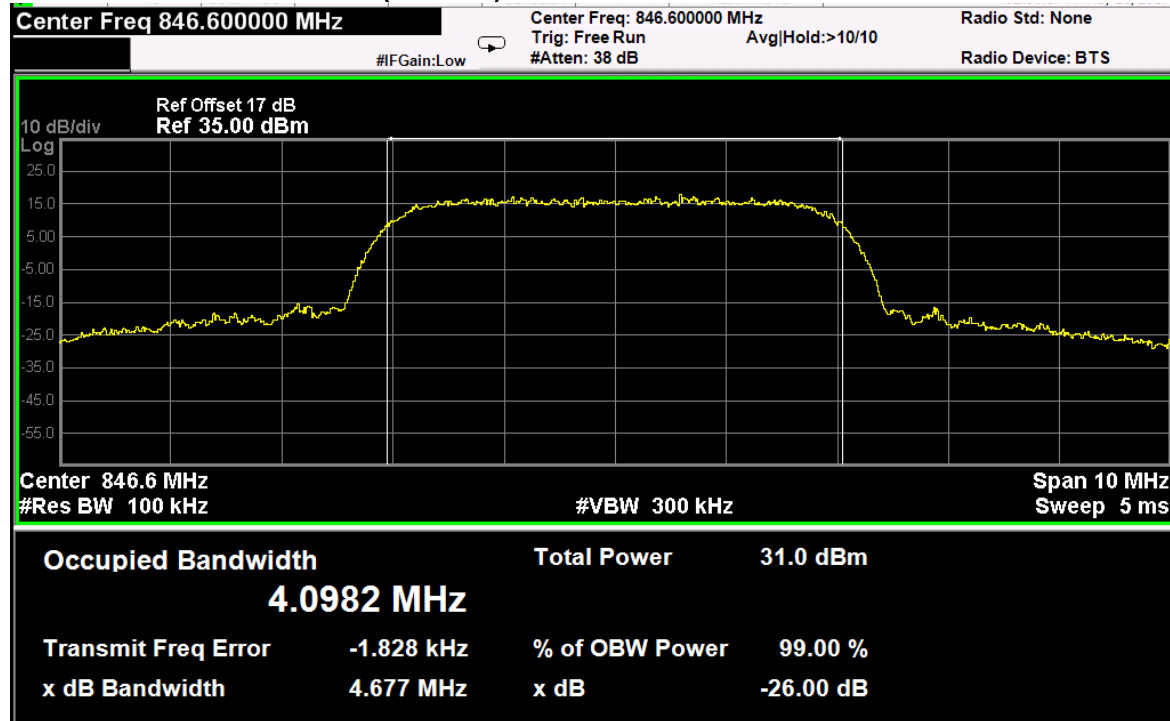
#VBW 300 kHz

Span 10 MHz

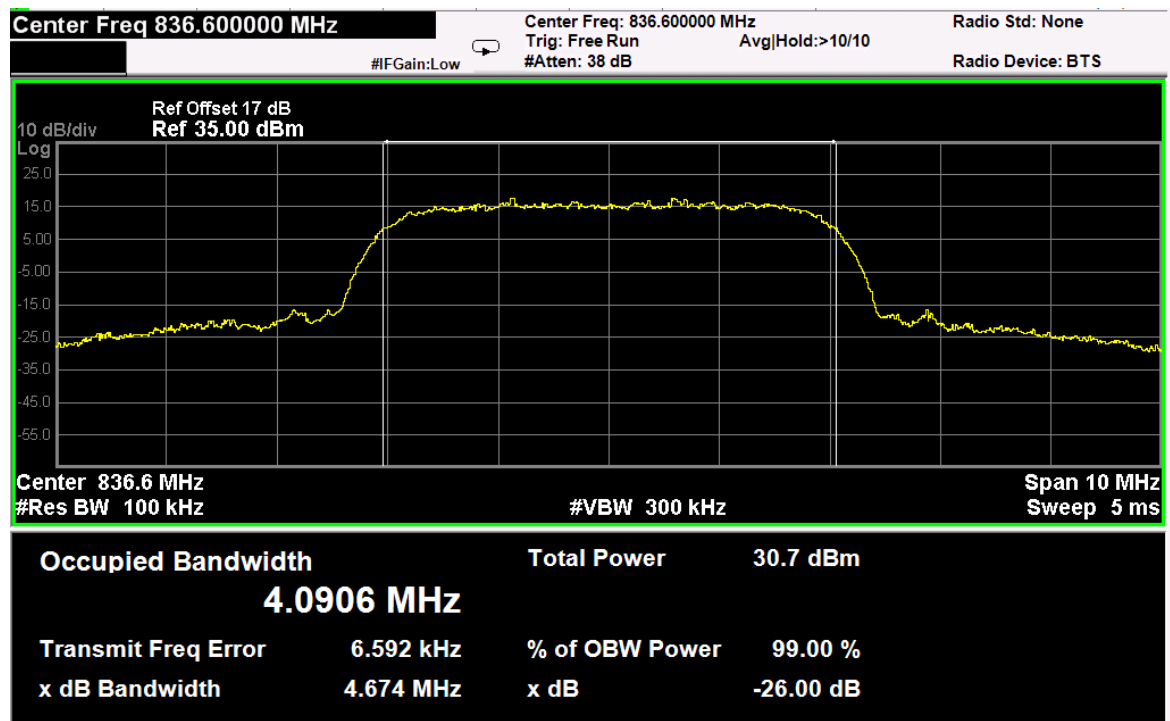
Sweep 5 ms

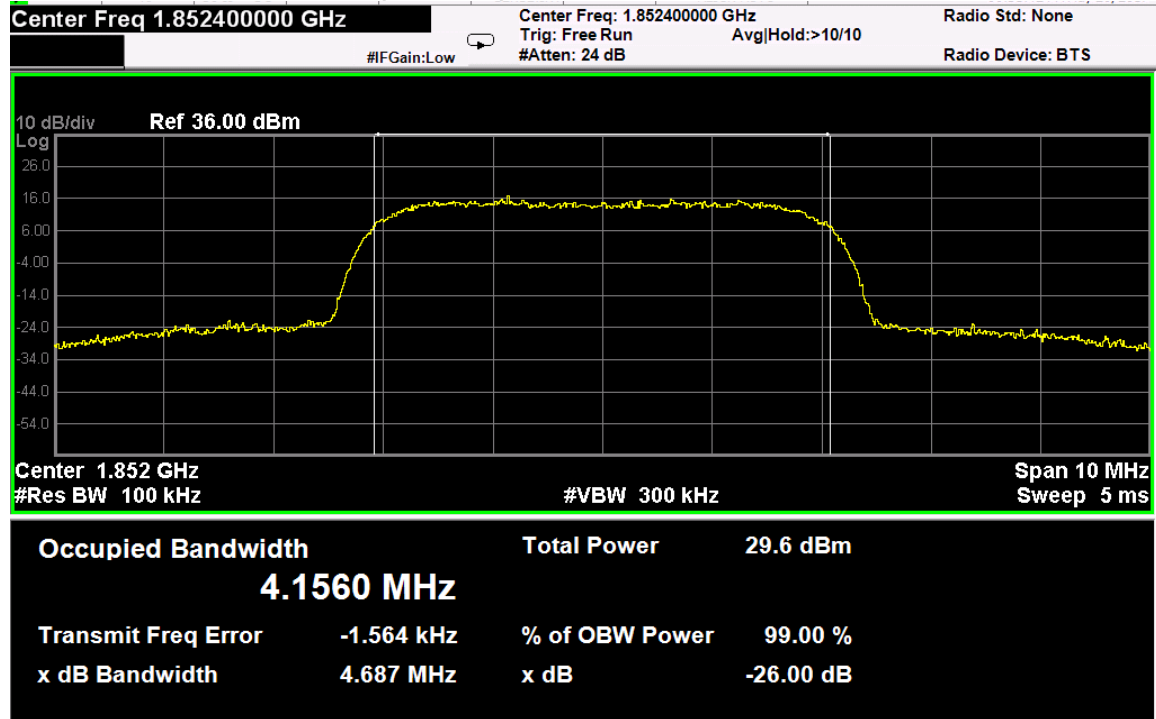
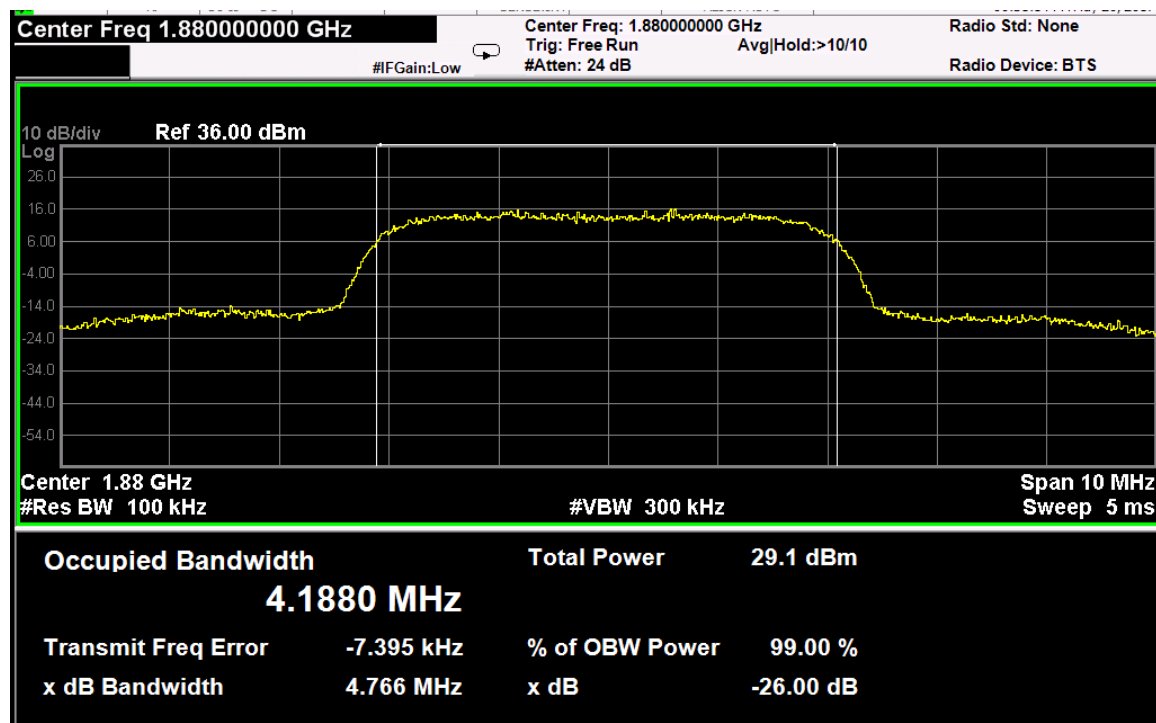
**Occupied Bandwidth**
**Total Power**
**31.7 dBm**
**4.0977 MHz**
**Transmit Freq Error**
**2.197 kHz**
**% of OBW Power**
**99.00 %**
**x dB Bandwidth**
**4.678 MHz**
**x dB**
**-26.00 dB**

### WCDMA / HSDPA Band V (CH Mid)



### WCDMA / HSDPA Band V (CH High)



**WCDMA / HSUPA Band II (CH Low)**

**WCDMA / HSUPA Band II (CH Mid)**


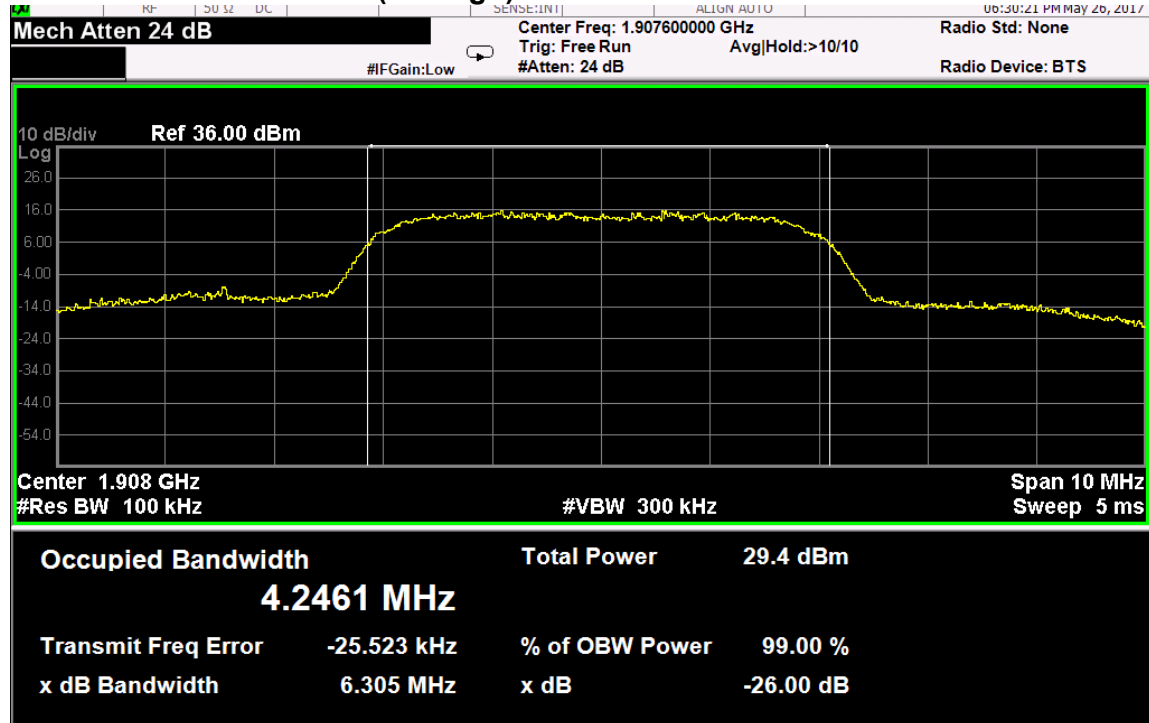
Prüfbericht - Nr.: 16081948 001

Test Report No.:

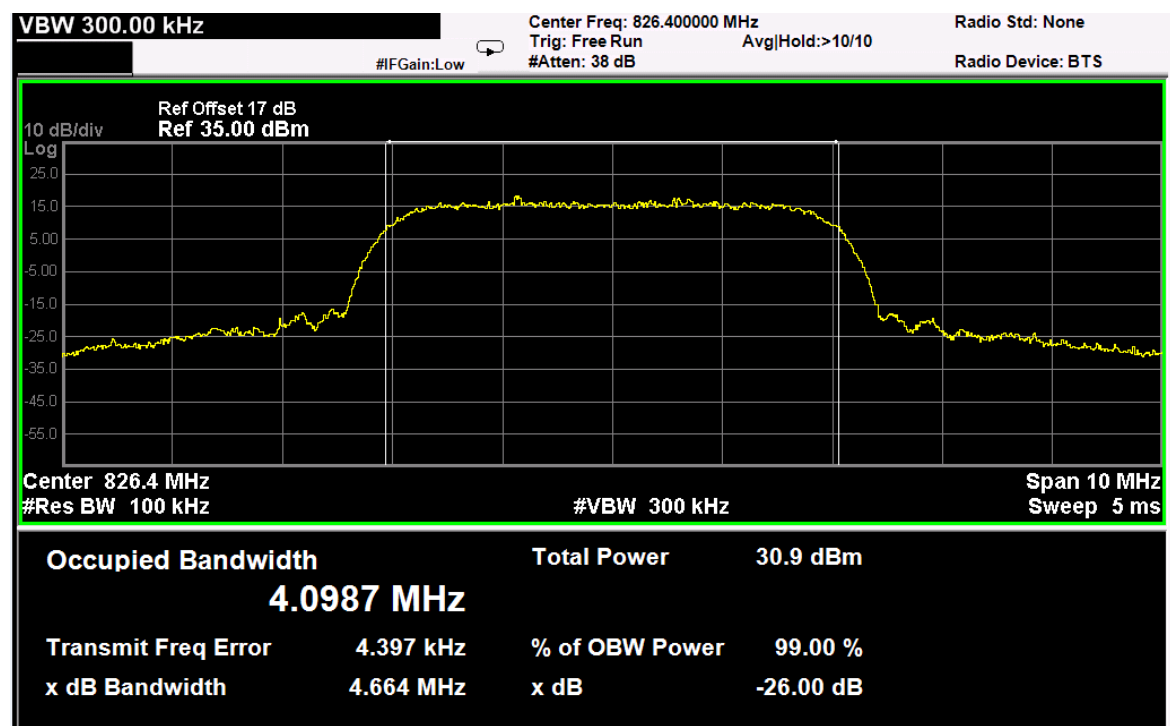
Seite 36 von 89

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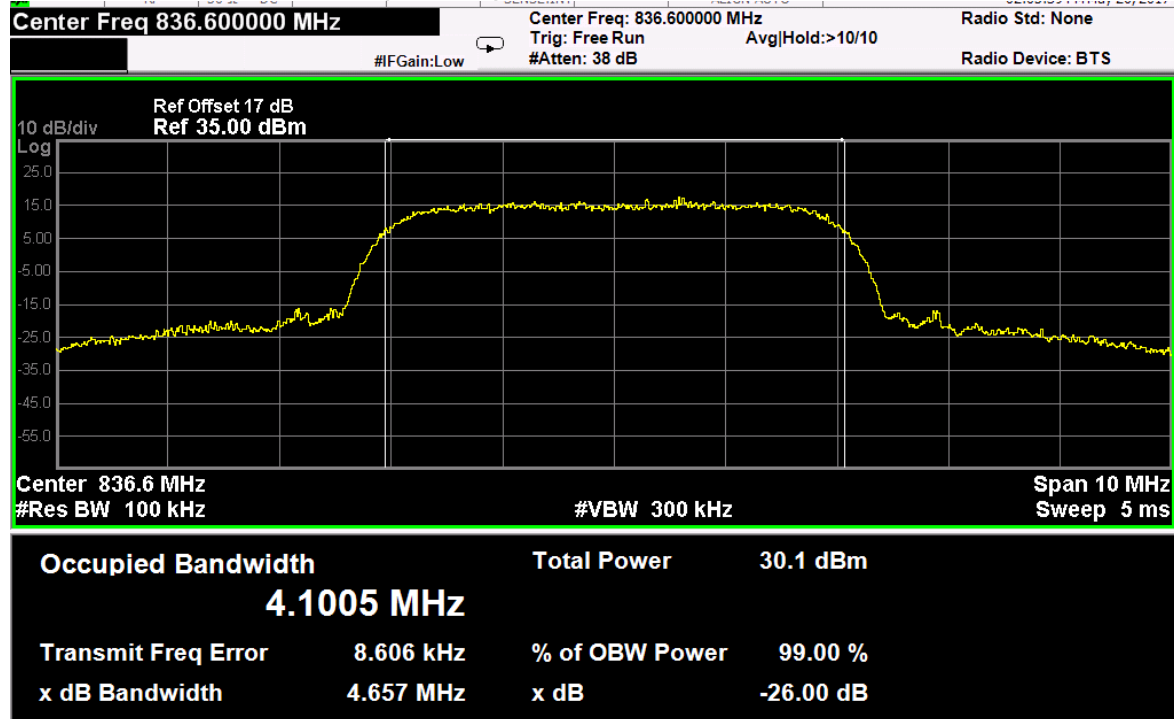
### WCDMA / HSUPA Band II (CH High)



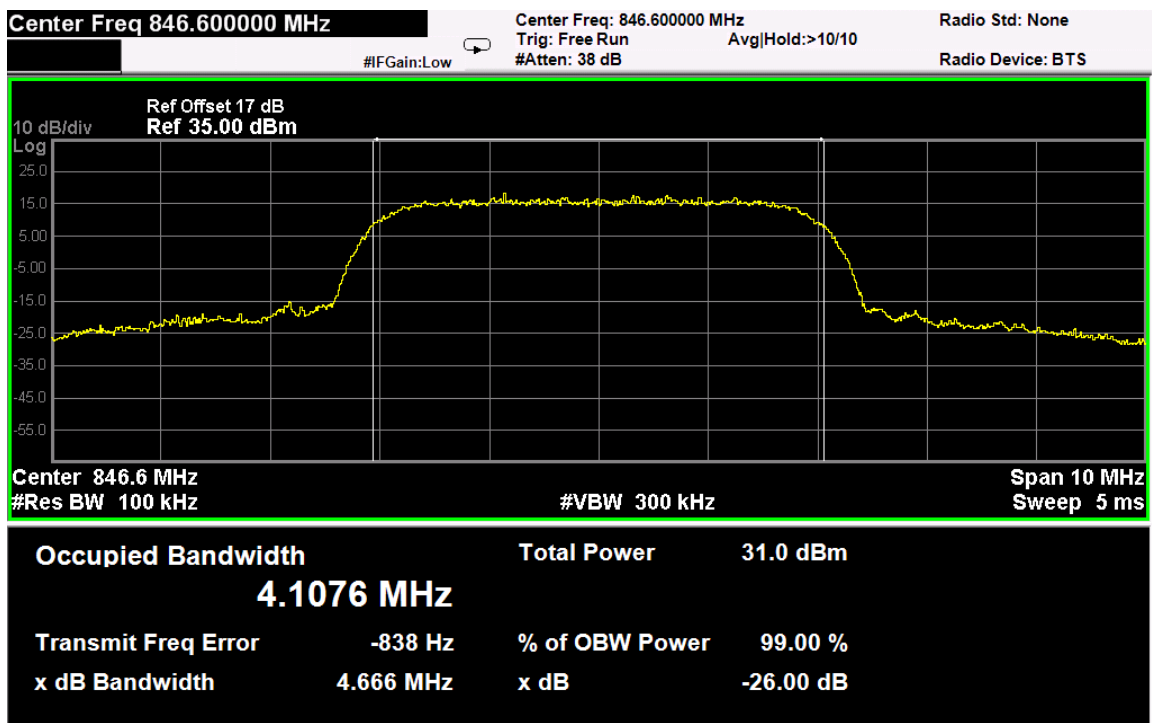
### WCDMA / HSUPA Band V (CH Low).



### WCDMA / HSUPA Band V (CH Mid)



### WCDMA / HSUPA Band V (CH High)



### 5.1.4 Out of band emission at antenna terminals

**RESULT:****Passed**

Test standard : FCC §2.1051, FCC §22.917, FCC §24.238(a)

Basic standard : FCC Part 22 & 24

Limit : Out of Band Emissions:

The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

Mobile Emissions in Base Frequency Range:

The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed -80 dBm at the transmit antenna connector.

Band Edge Requirements:

In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

Kind of test site : Shielded room

**Test setup**

Test Channel : Low/ Middle/ High

Operation mode : A

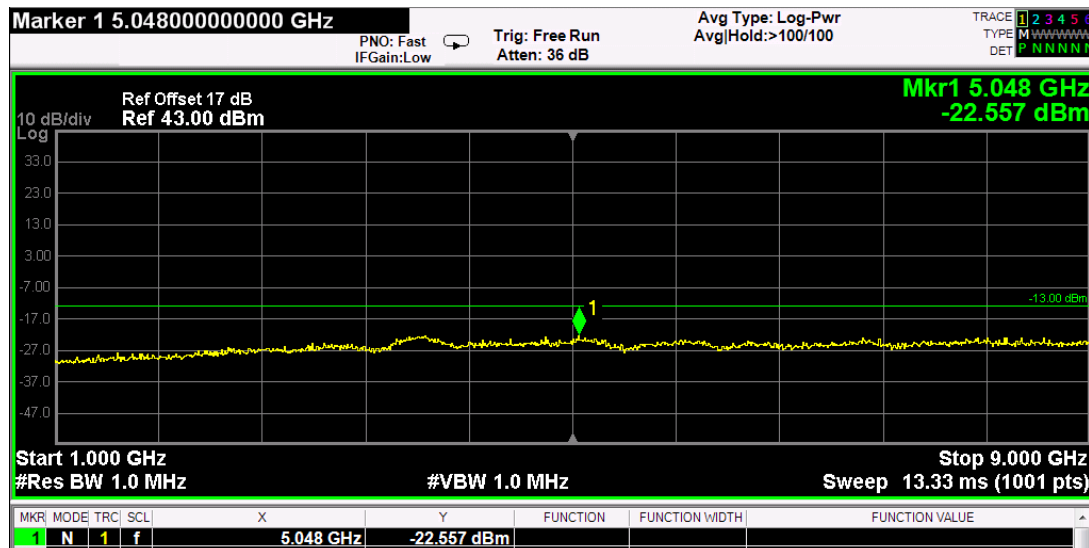
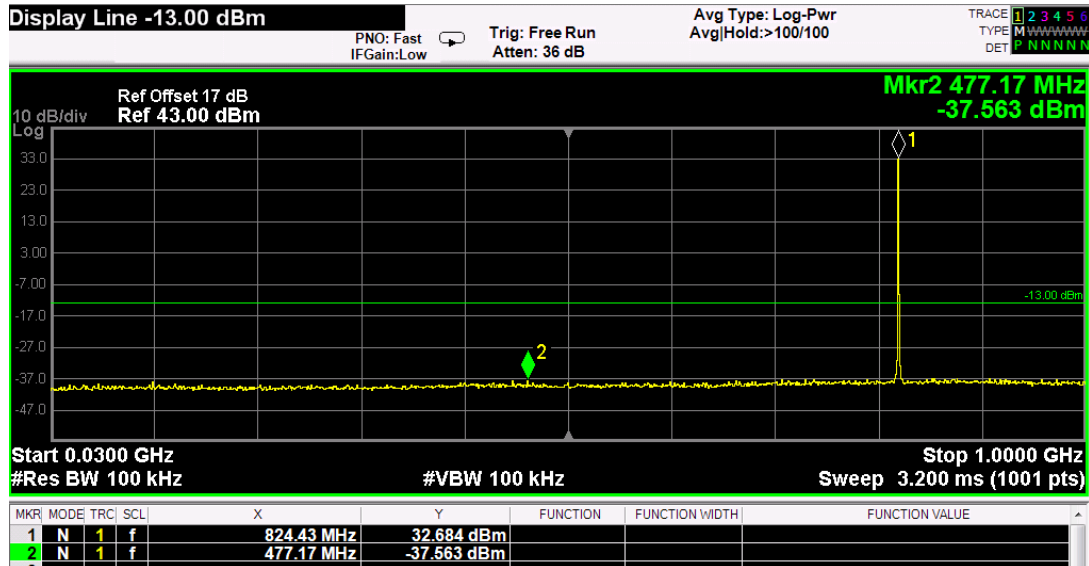
Ambient temperature : 20-24°C

Relative humidity : 50-65%

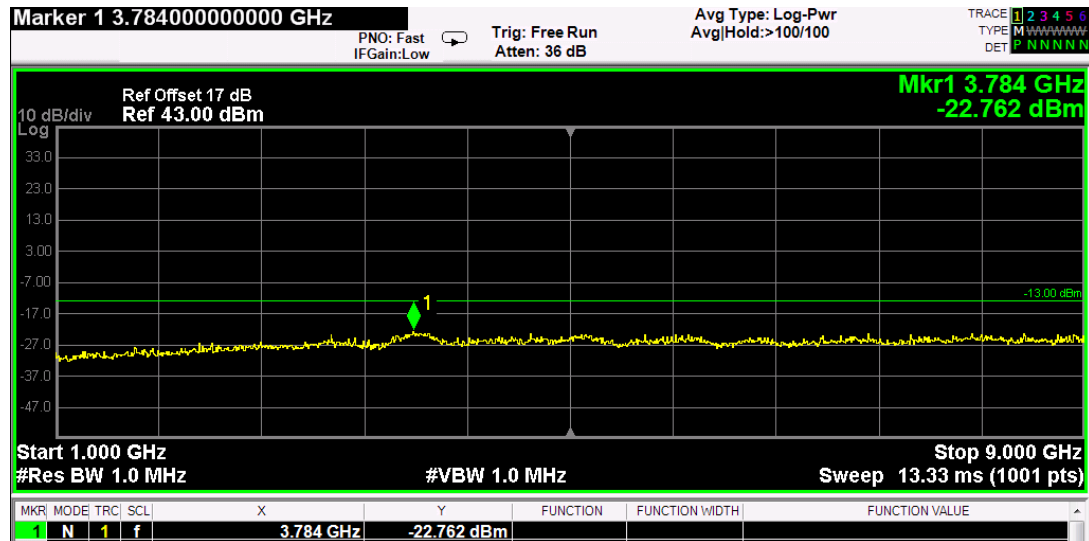
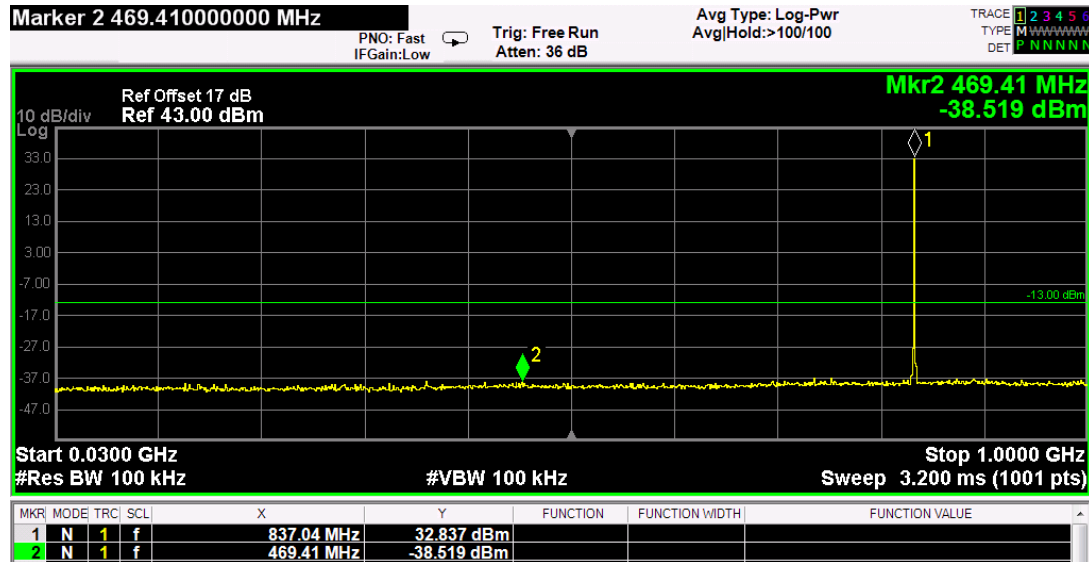
Atmospheric pressure : 100-103 kPa

## Test Plot of Out of Band emissions GPRS 850

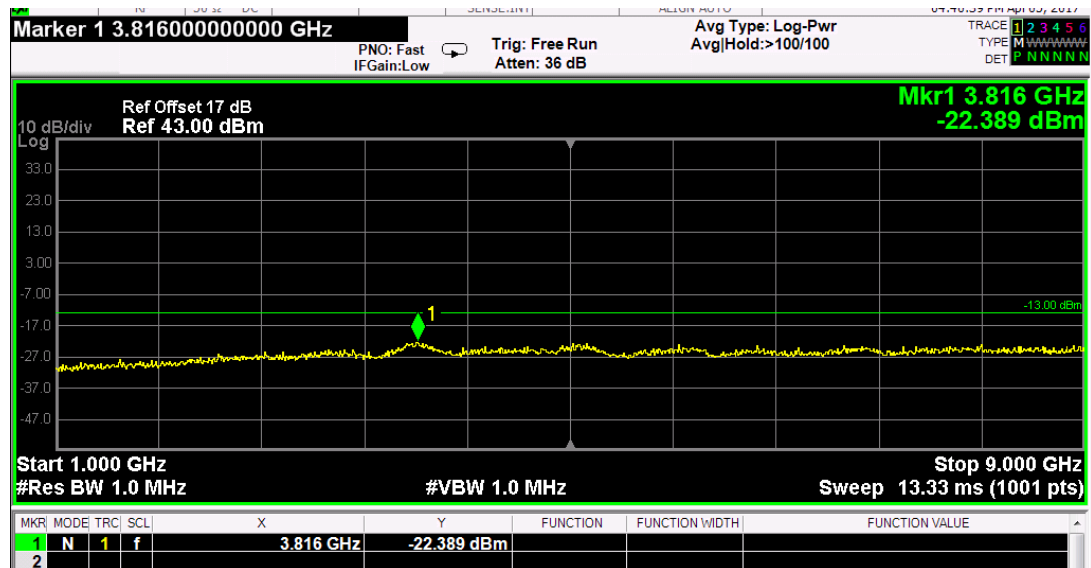
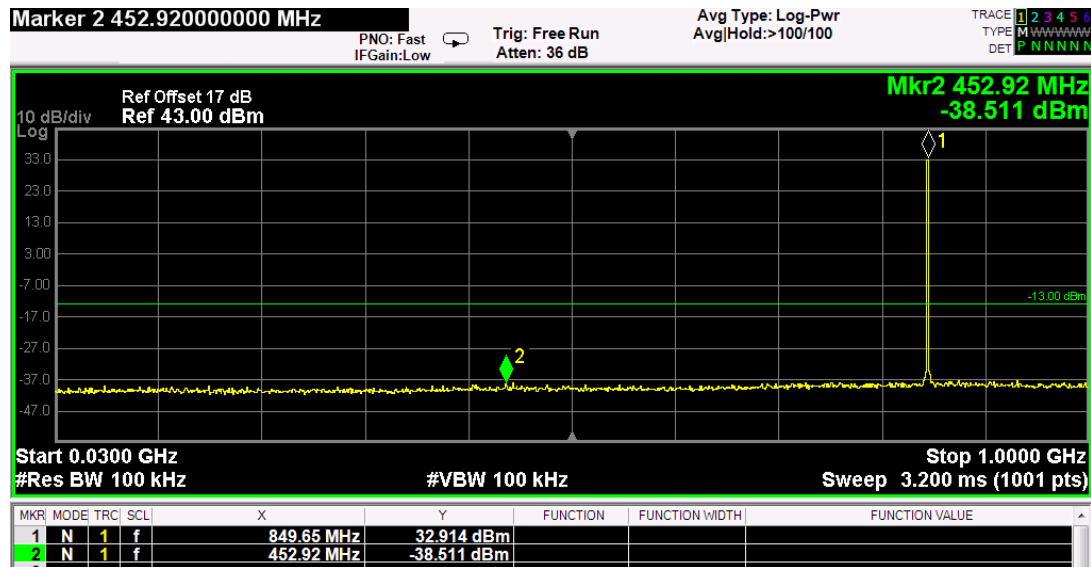
Out of Band emission at antenna terminals – GPRS CH Low



Out of Band emission at antenna terminals – GPRS CH Mid

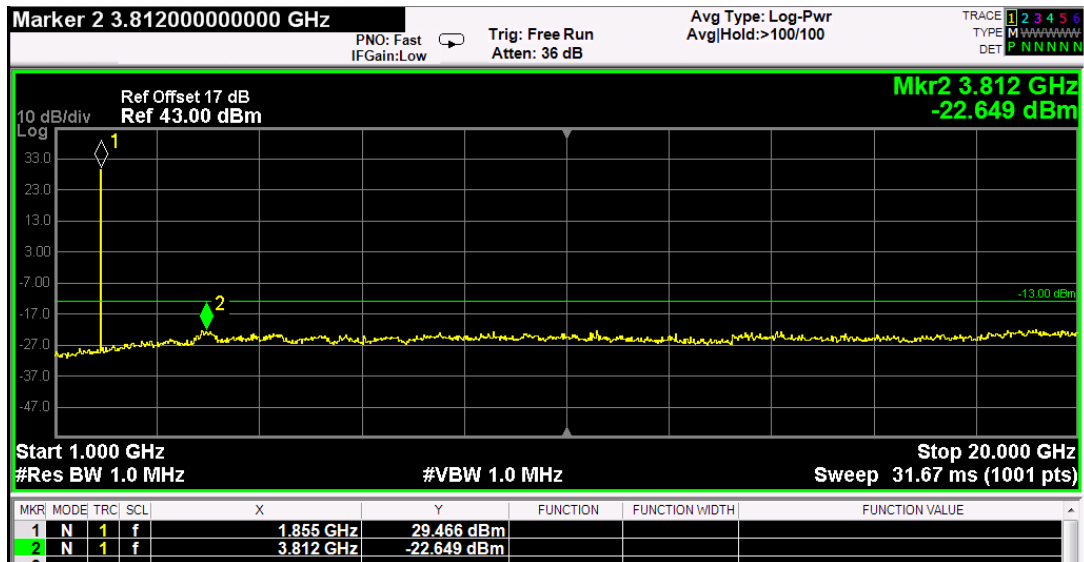
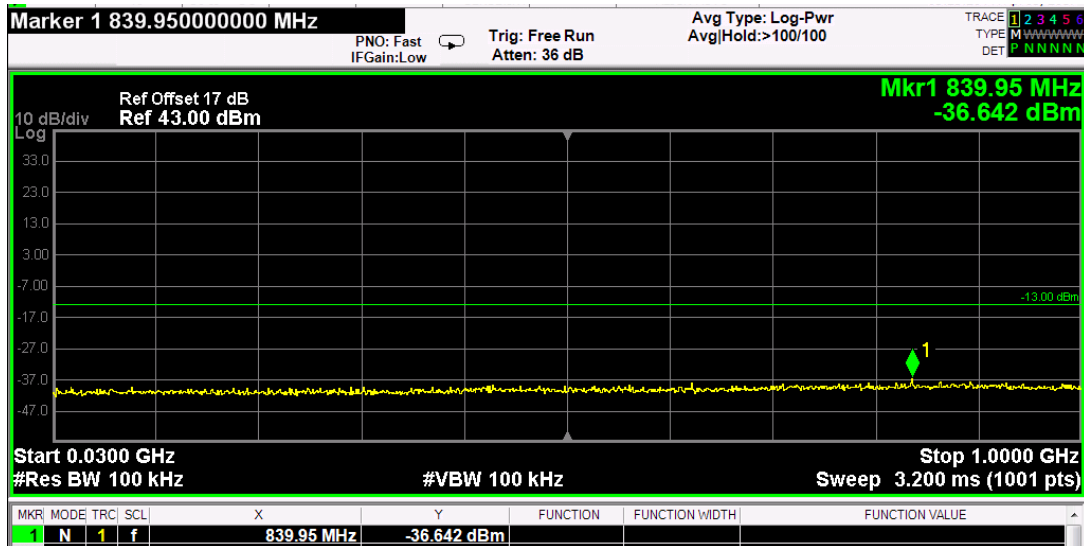


## Out of Band emission at antenna terminals – GPRS CH High

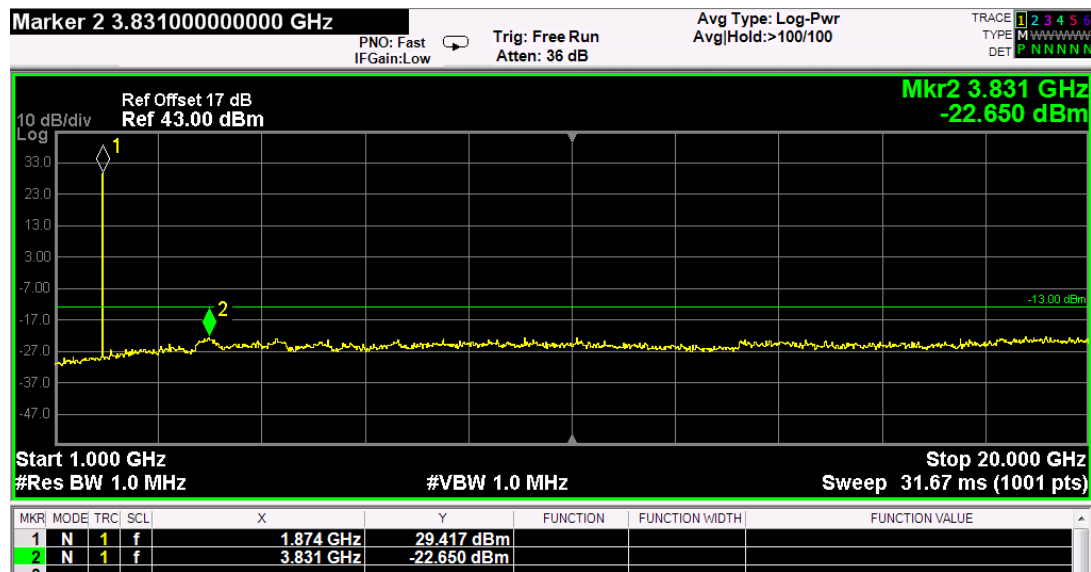
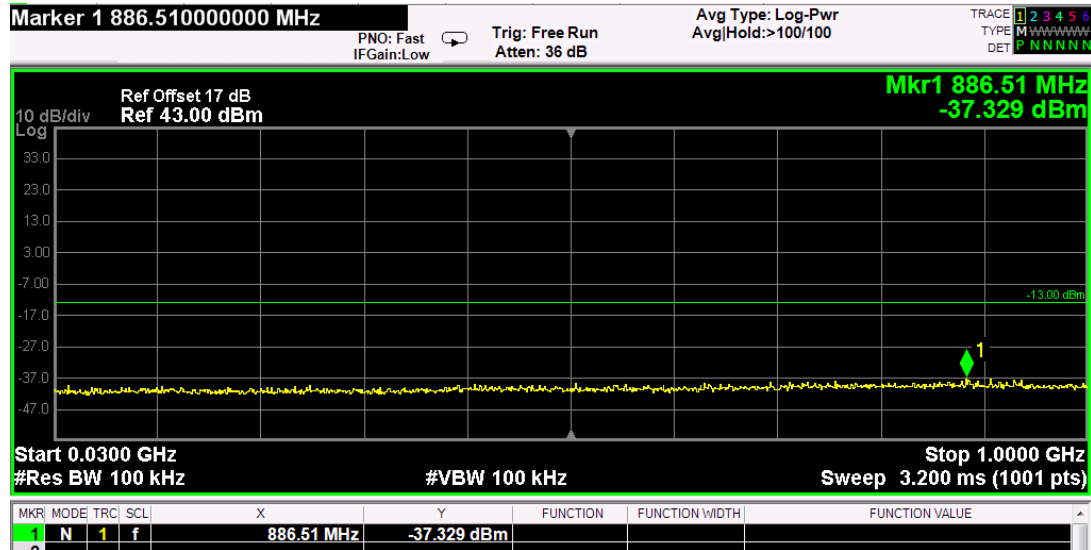


## GPRS 1900

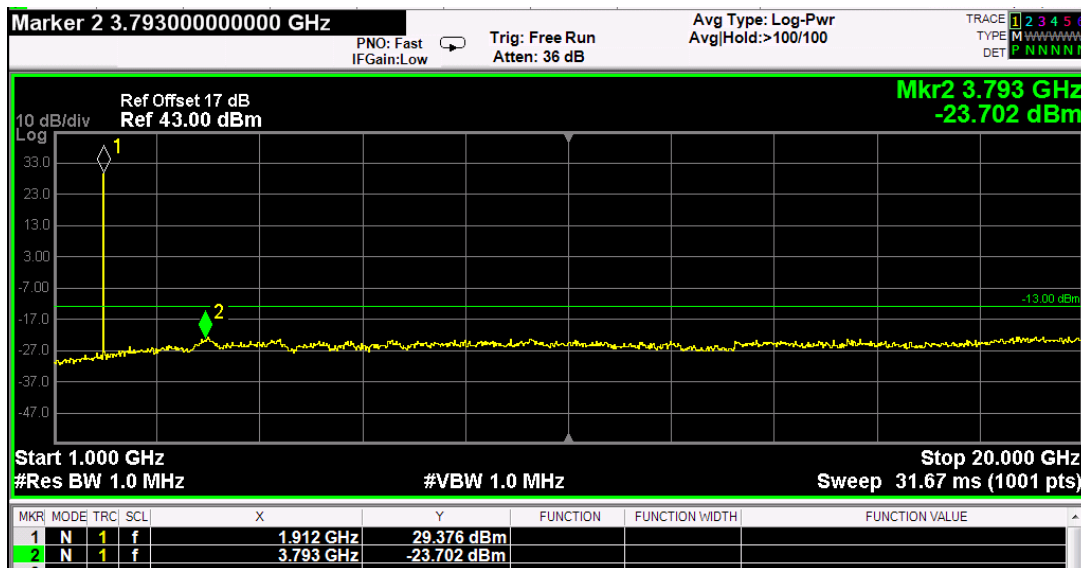
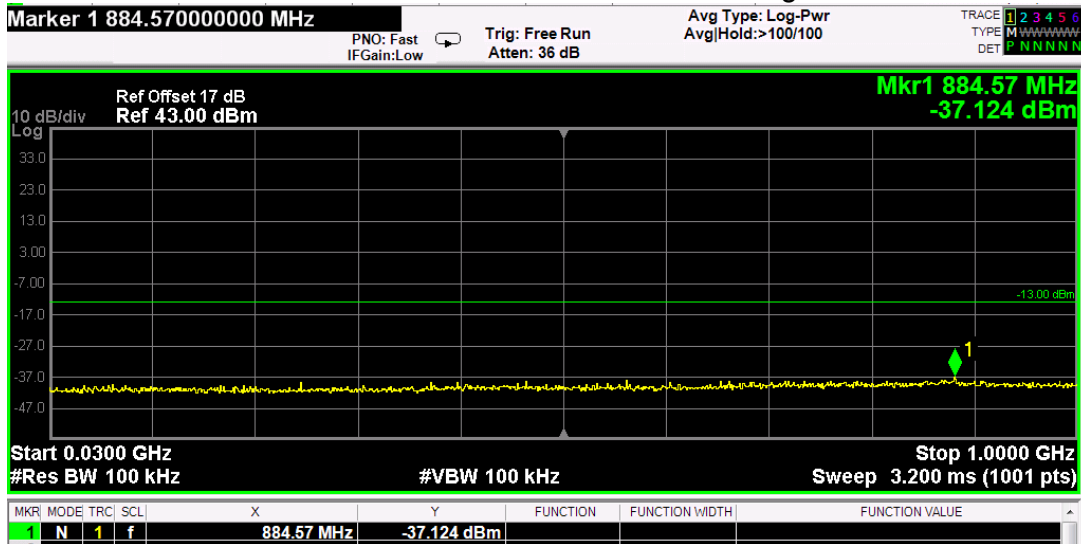
### Out of Band emission at antenna terminals – GSM CH Low



# Out of Band emission at antenna terminals – GSM CH Mid

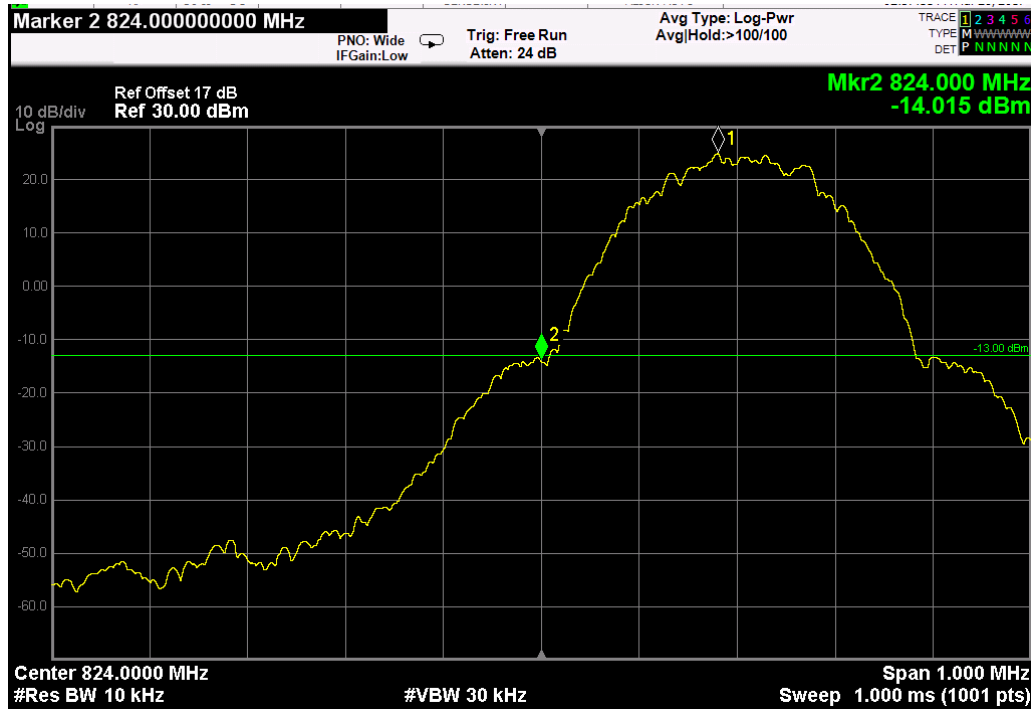


# Out of Band emission at antenna terminals – GSM CH High

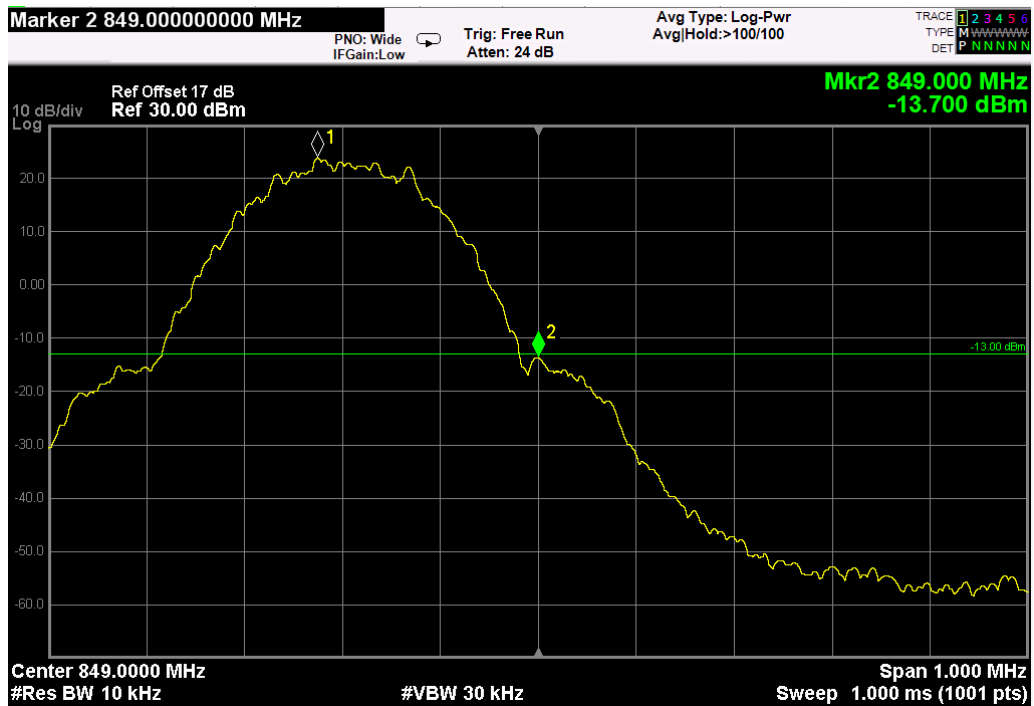


## GPRS 850

### Band Edge emissions – GPRS CH Low

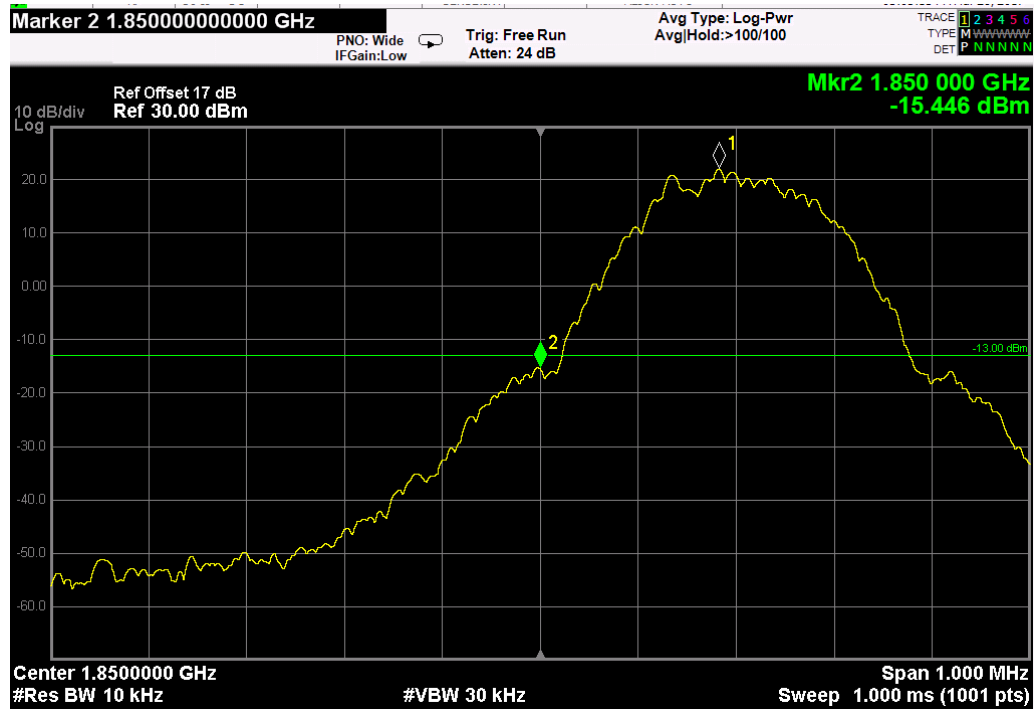


### Band Edge emissions –GPRS CH High



## GPRS 1900

### Band Edge emissions – GPRS CH Low

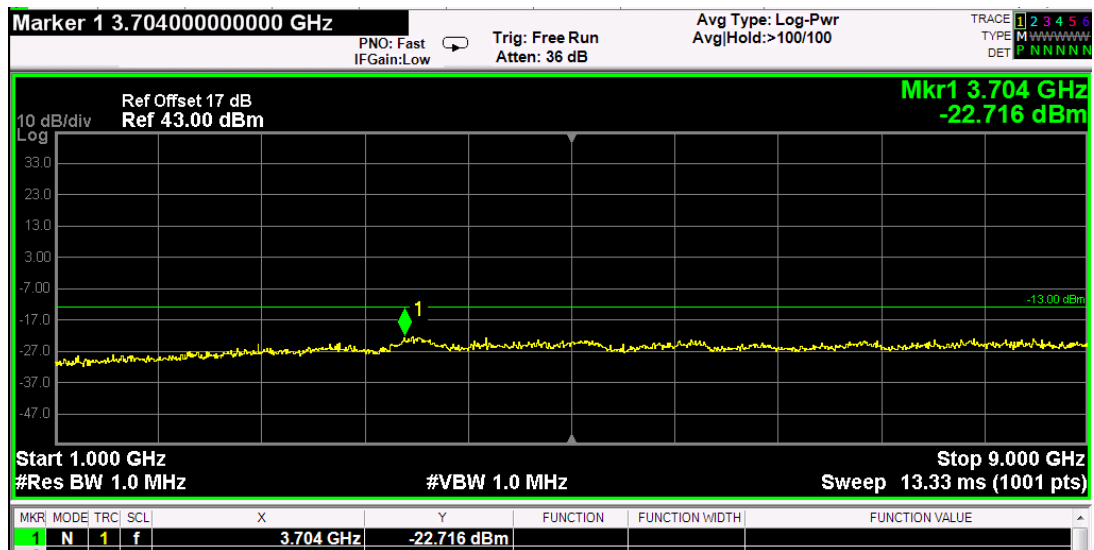
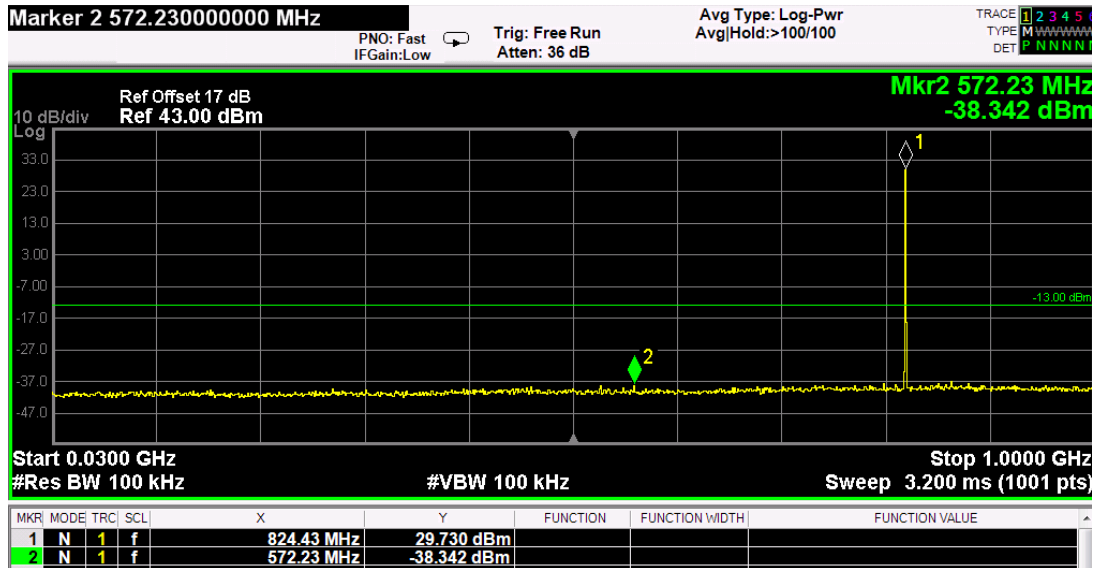


### Band Edge emissions – GPRS CH High

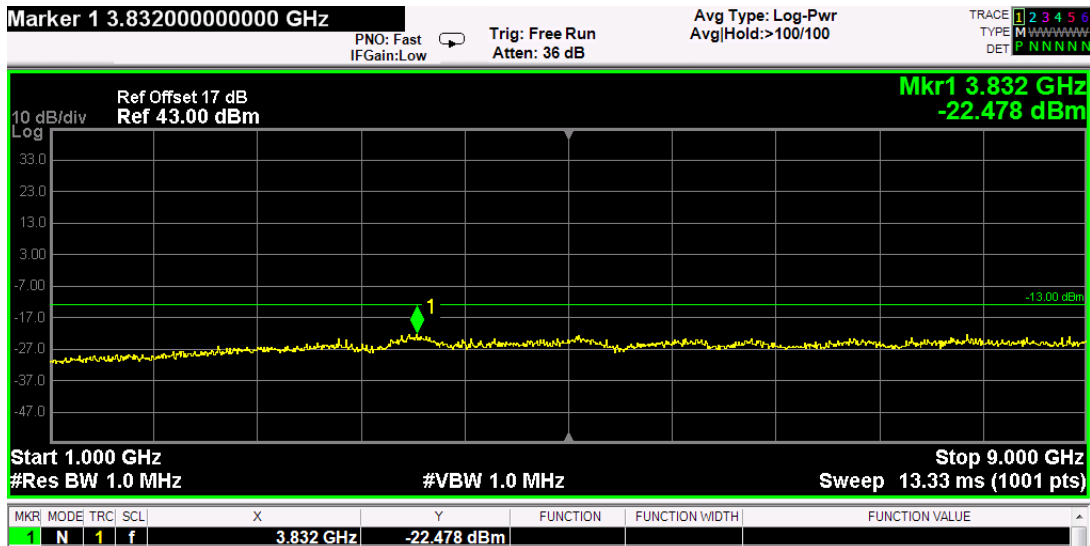
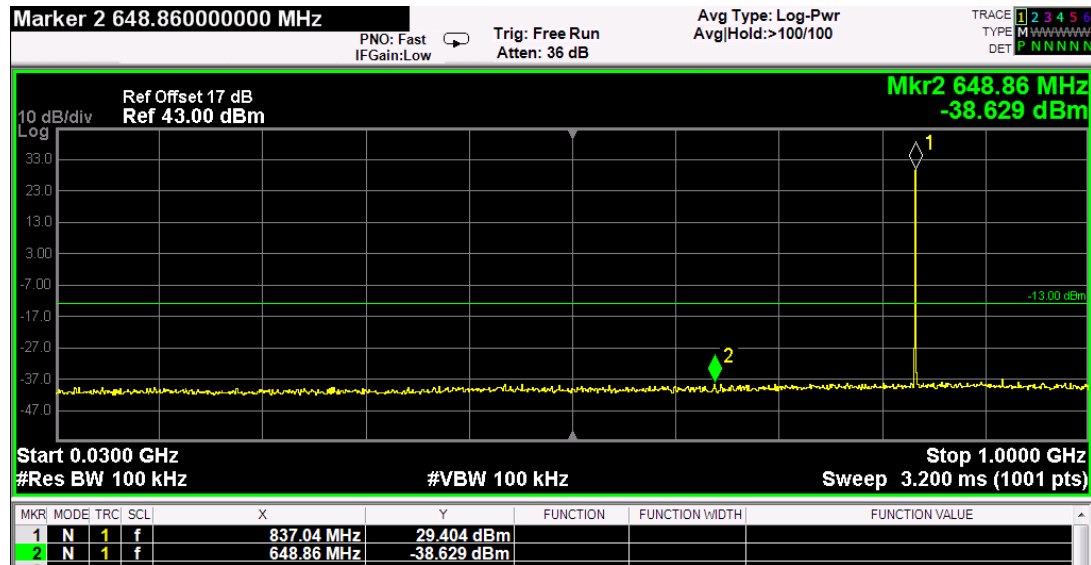


## EDGE 850

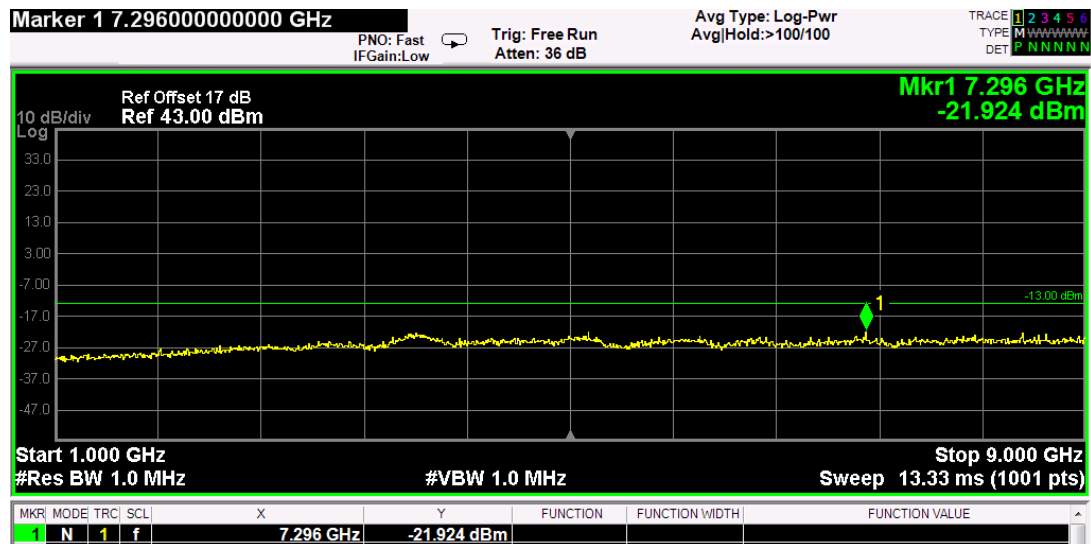
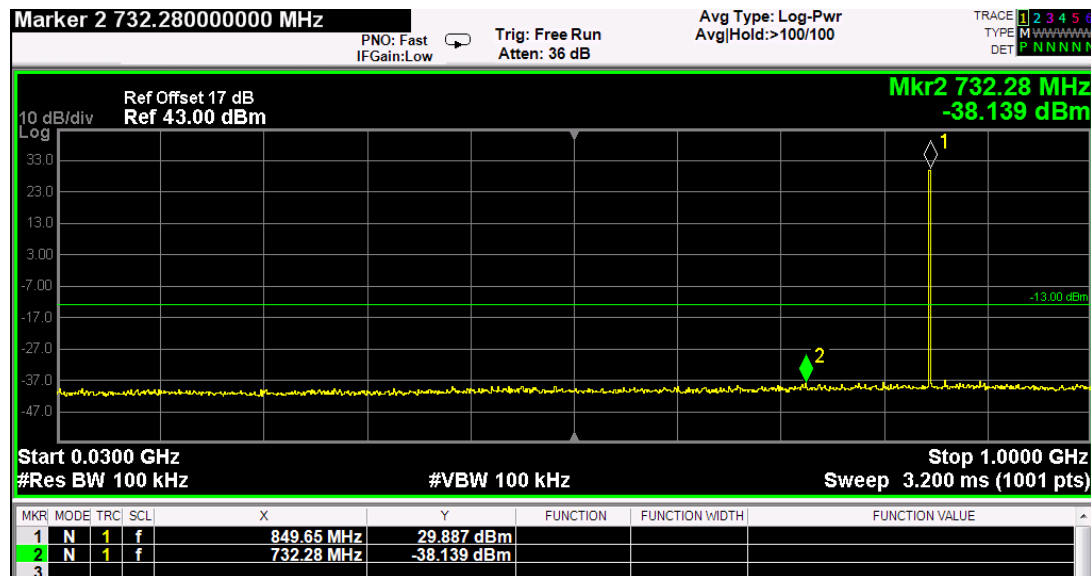
Out of Band emission at antenna terminals –EDGE CH Low



### Out of Band emission at antenna terminals –EDGE CH Mid

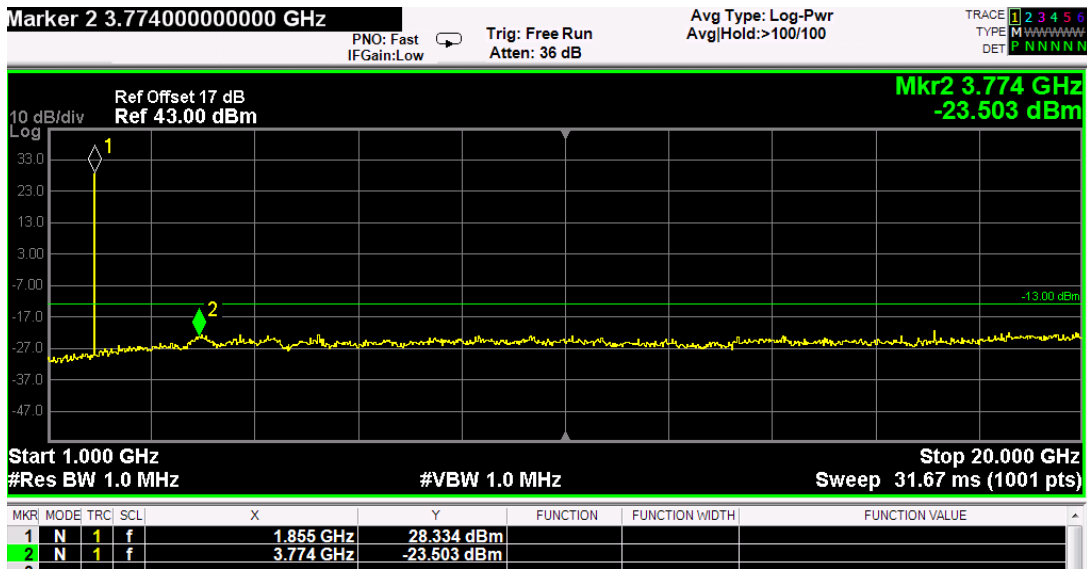
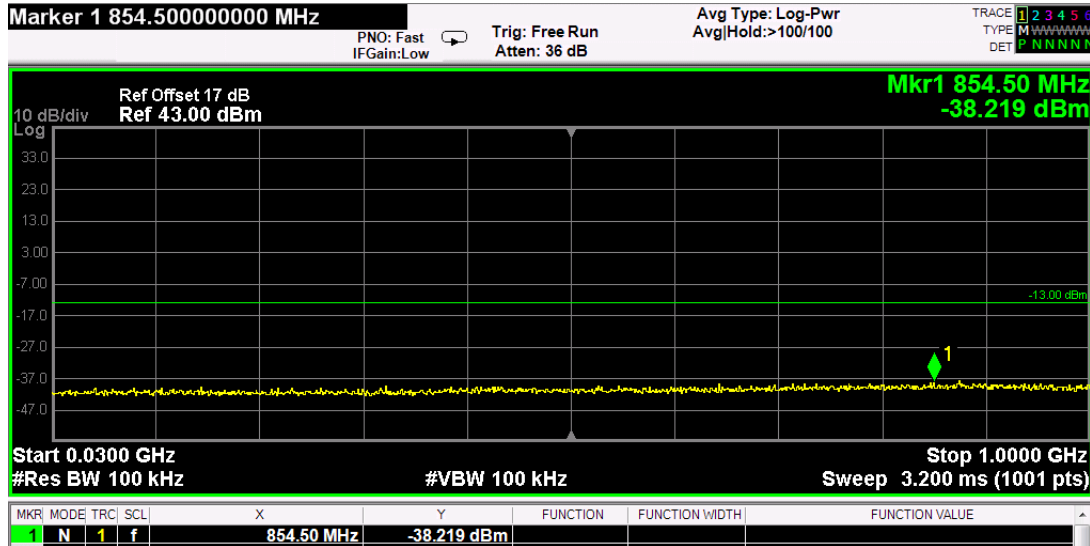


Out of Band emission at antenna terminals –EDGE CH High

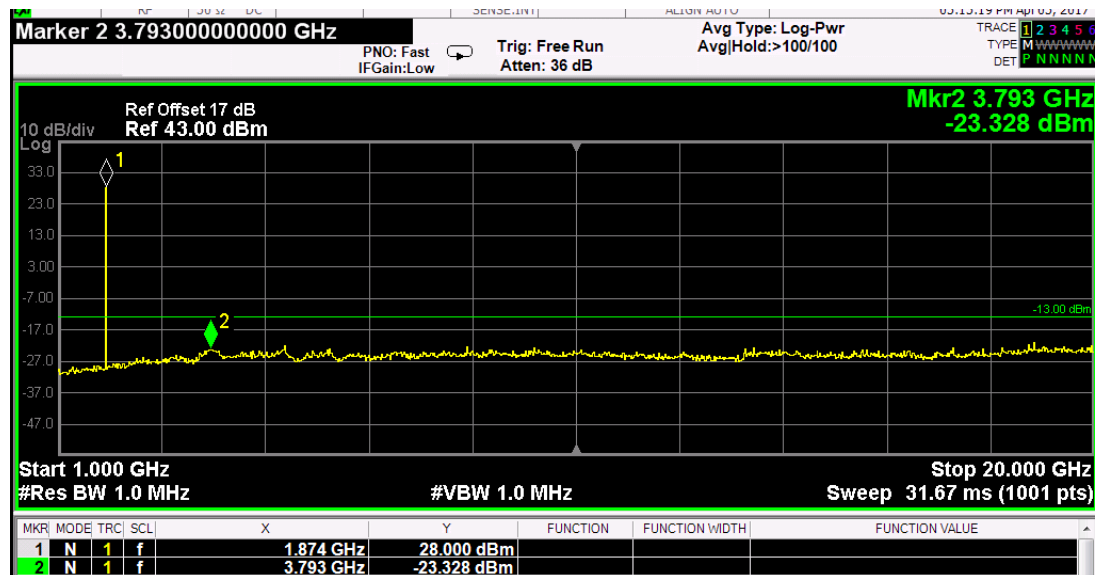
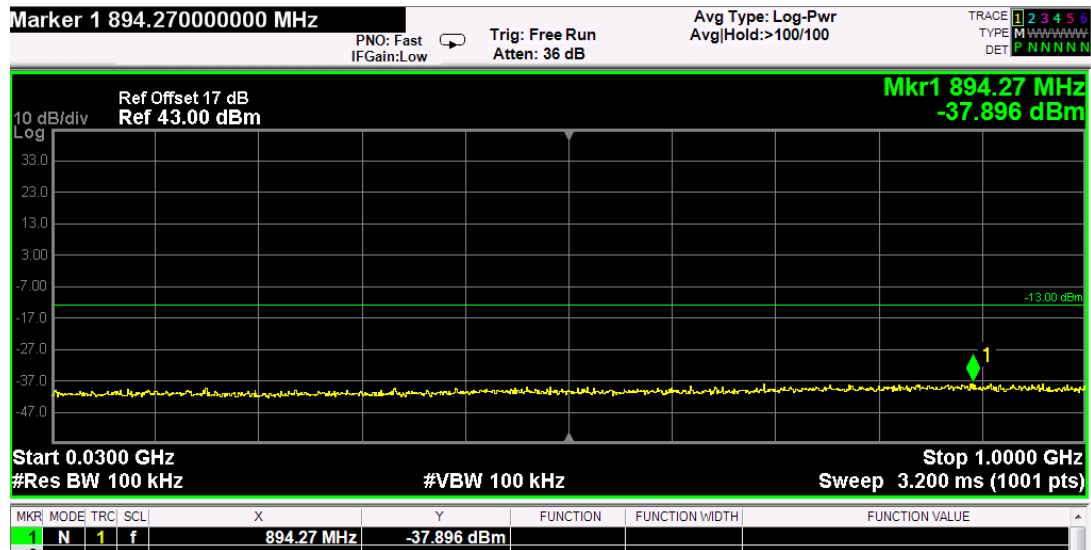


## EDGE 1900

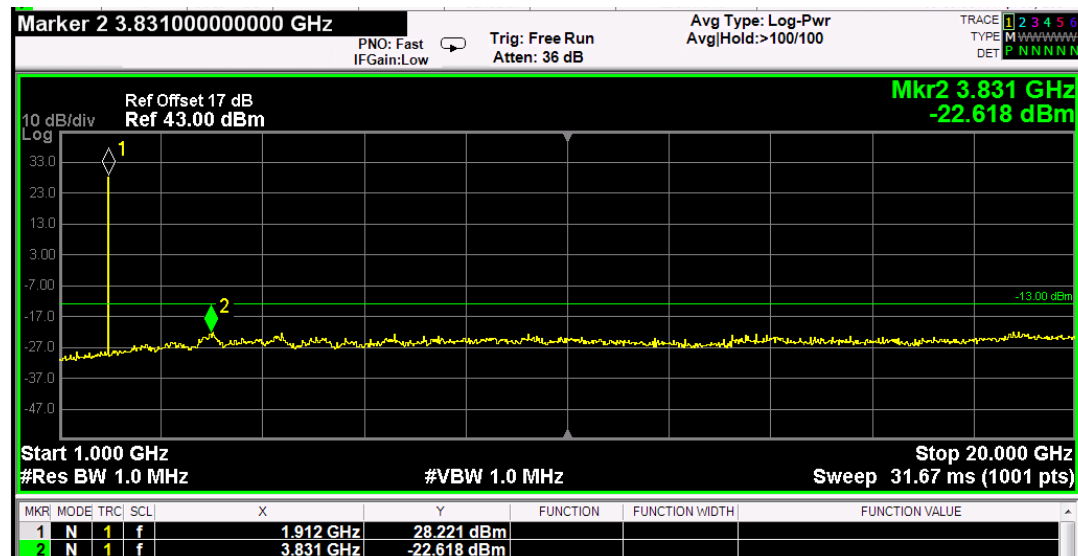
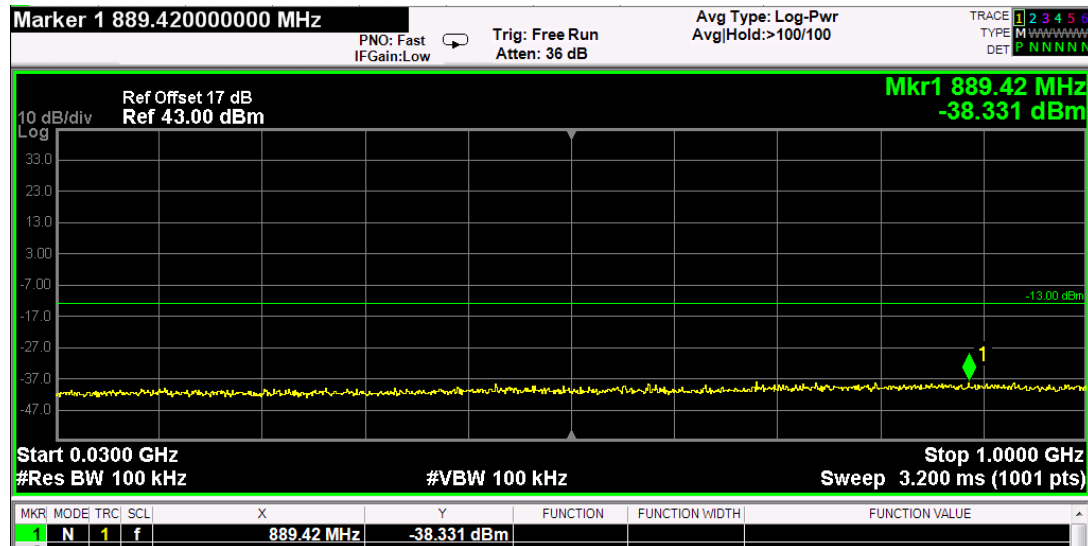
Out of Band emission at antenna terminals –EDGE CH Low



Out of Band emission at antenna terminals –EDGE CH Mid

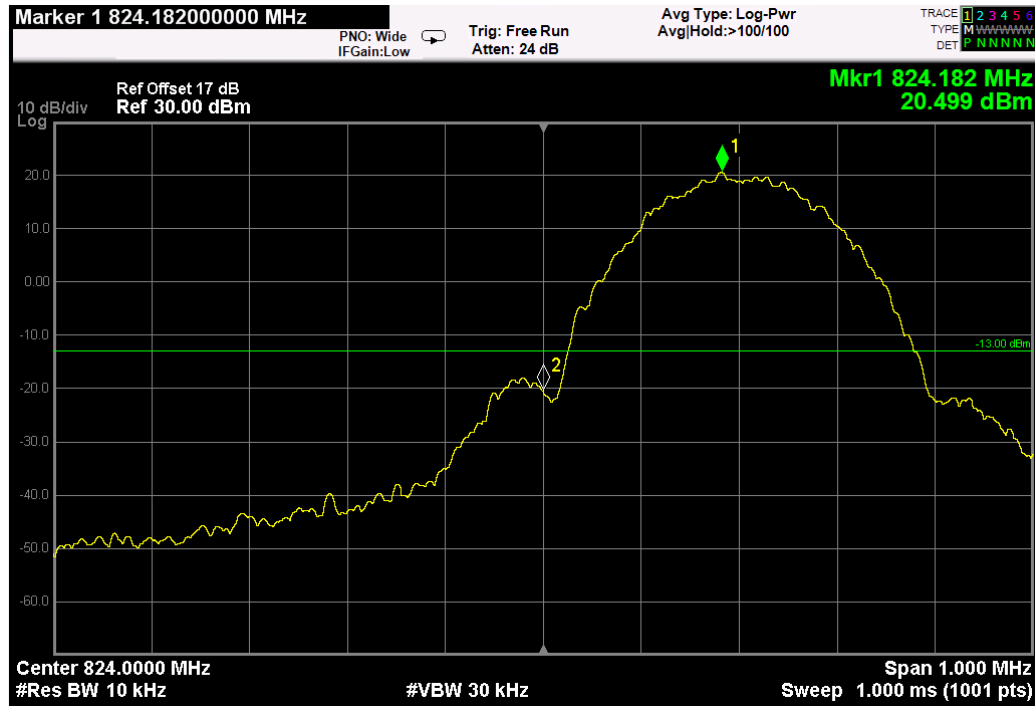


Out of Band emission at antenna terminals –EDGE CH High

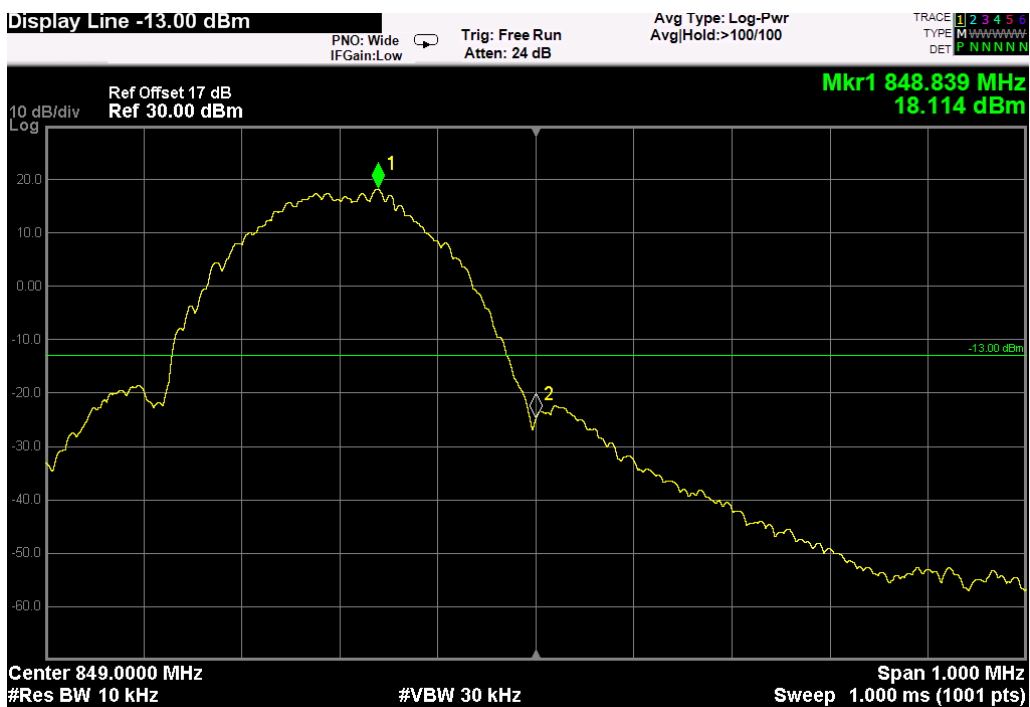


## EDGE 850

### Band Edge emissions – EDGE CH Low

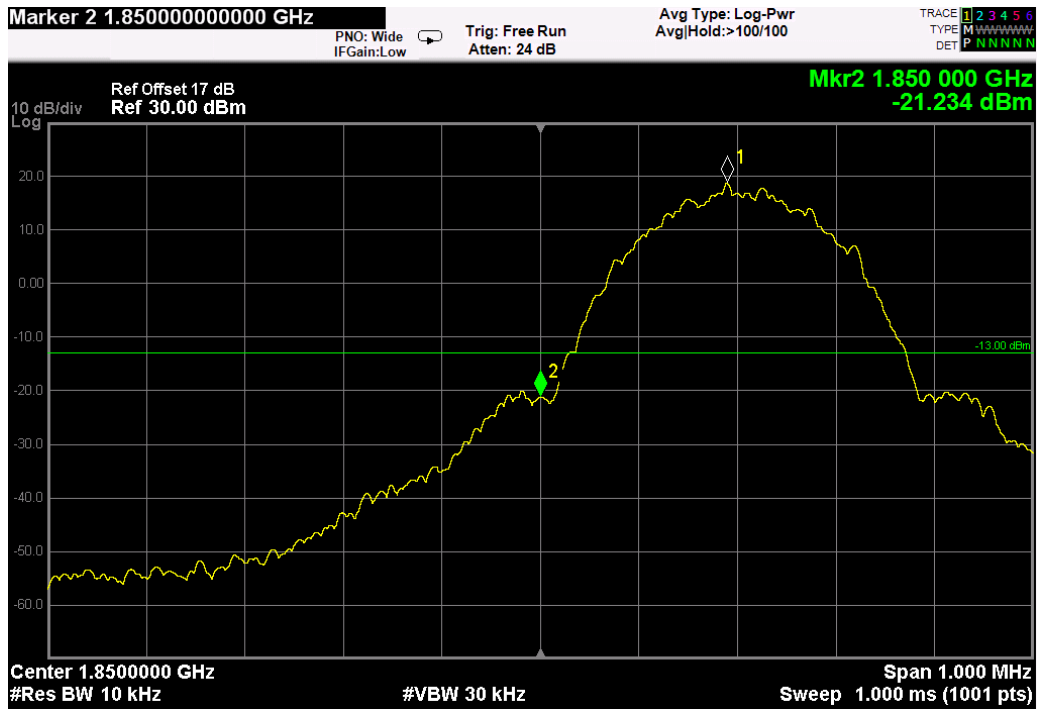


### Band Edge emissions – EDGE CH High

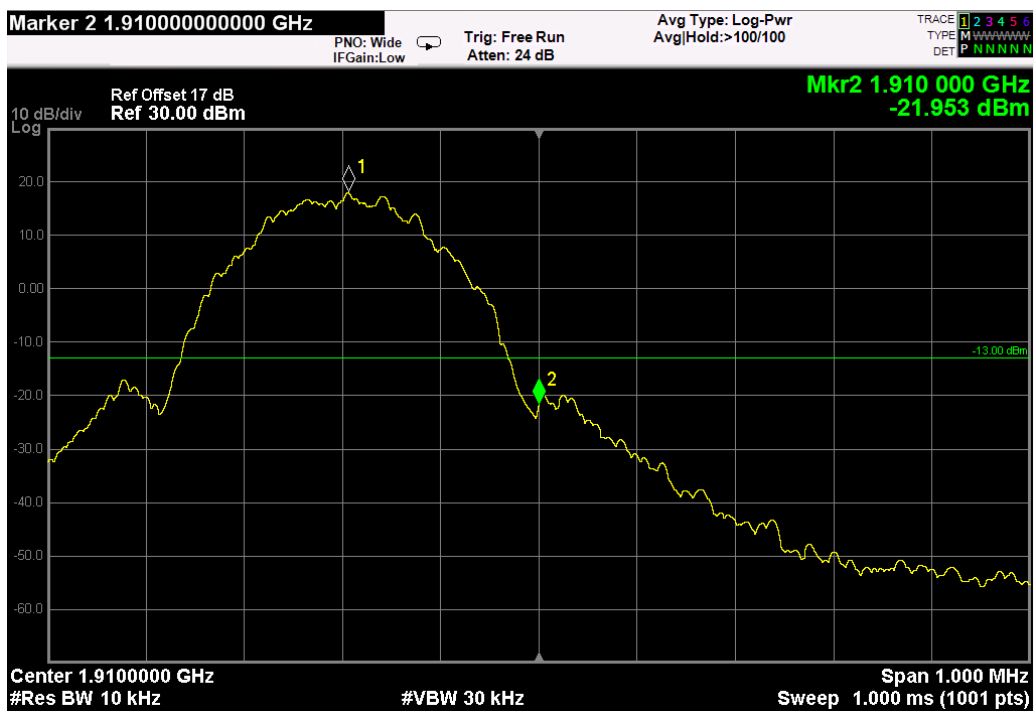


## EDGE 1900

### Band Edge emissions – EDGE CH Low

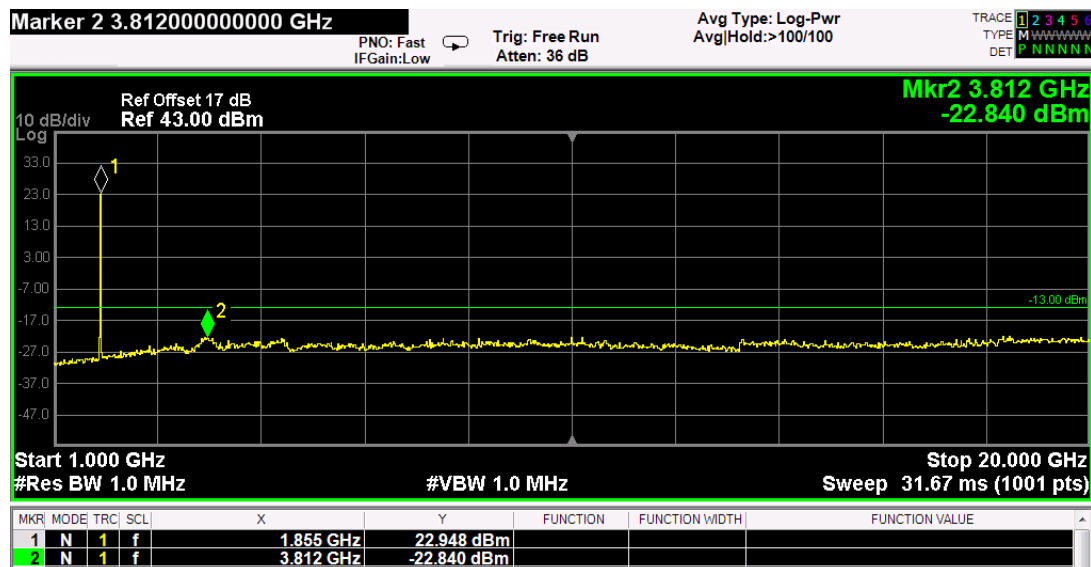
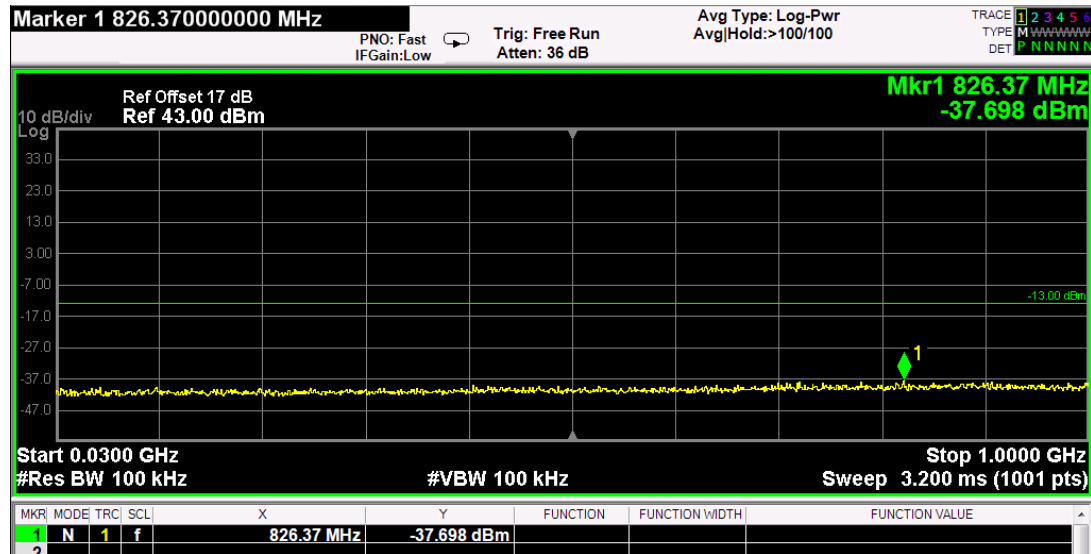


### Band Edge emissions – EDGE CH High



## WCDMA Band II

Out of Band emission at antenna terminals – WCDMA CH Low



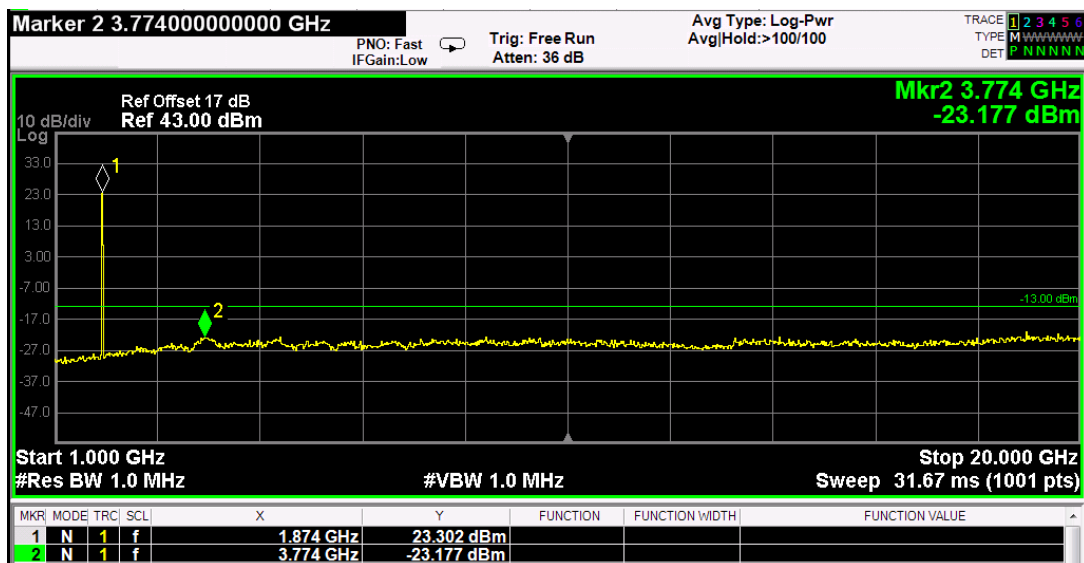
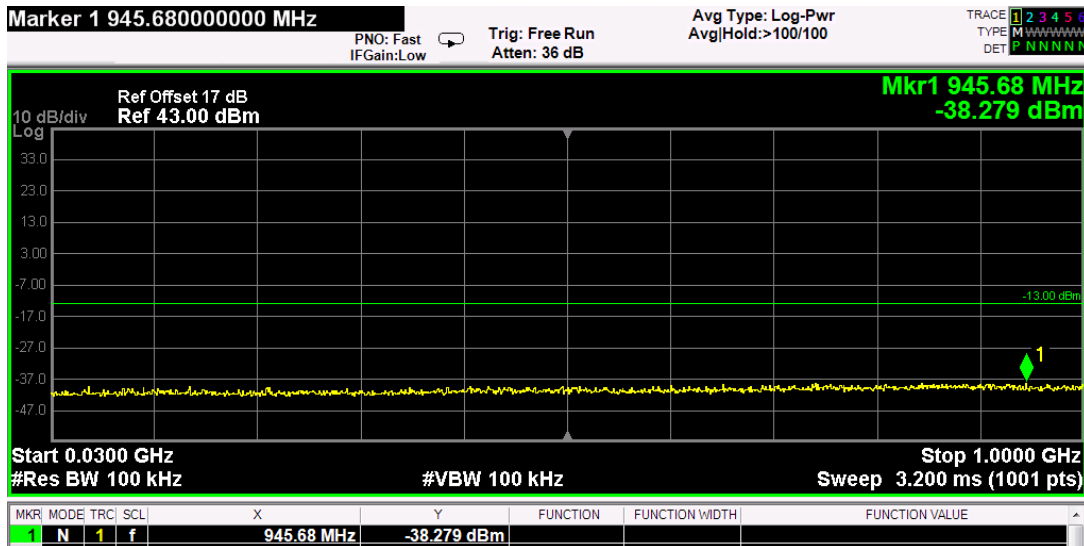
Prüfbericht - Nr.: 16081948 001

Test Report No.:

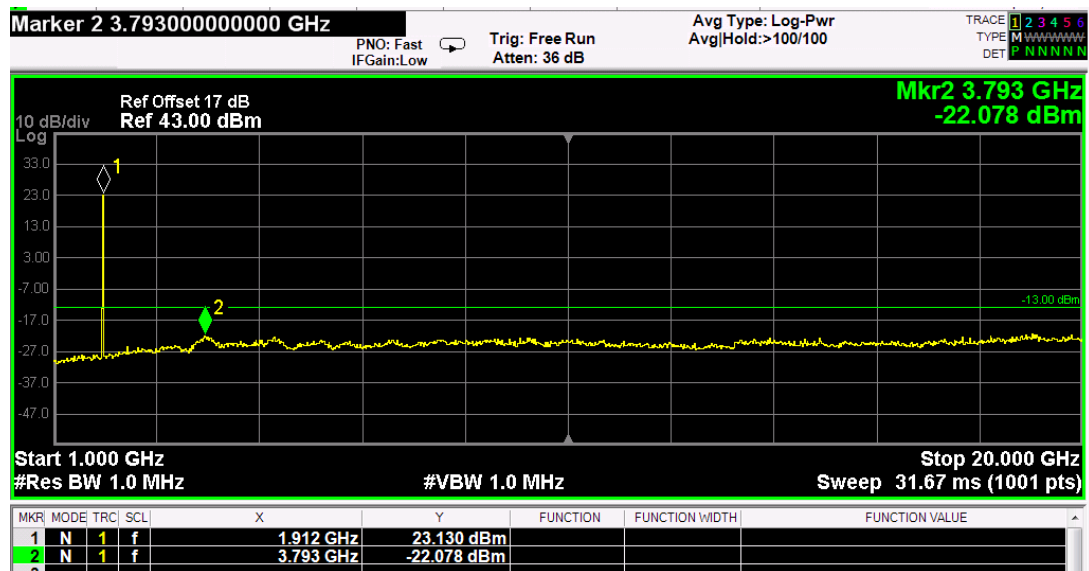
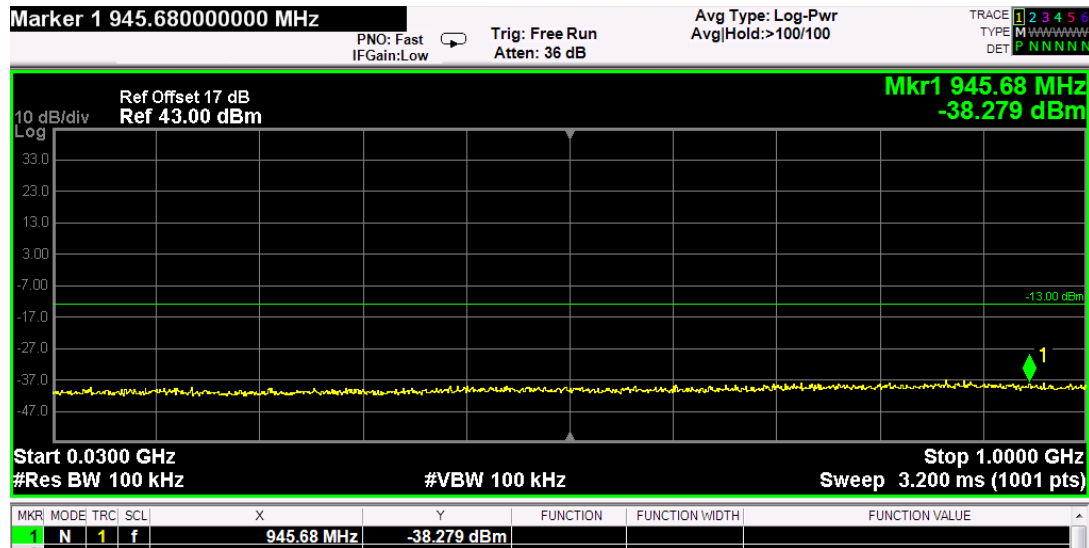
Seite 56 von 89

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### Out of Band emission at antenna terminals – WCDMA CH Mid

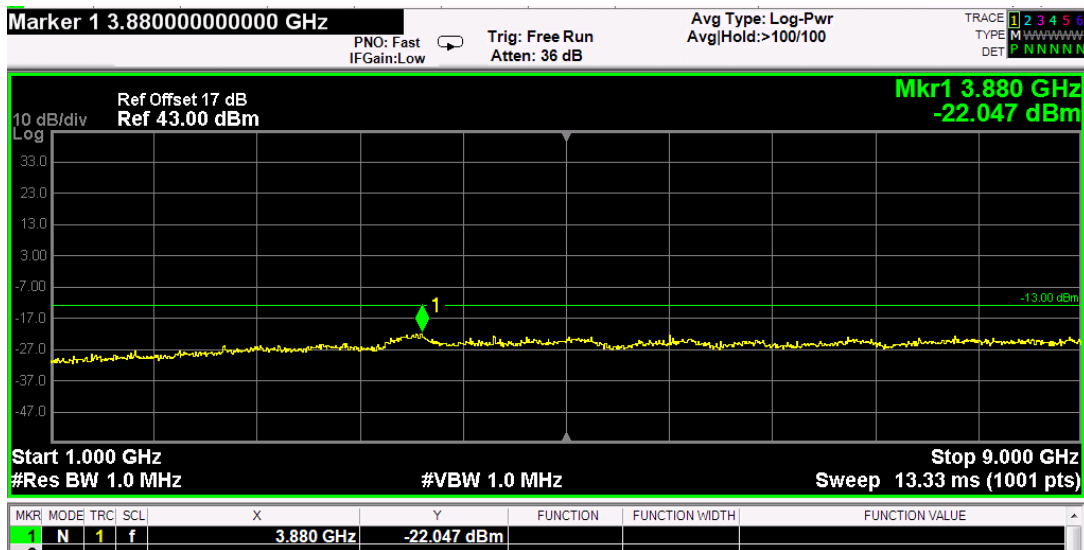
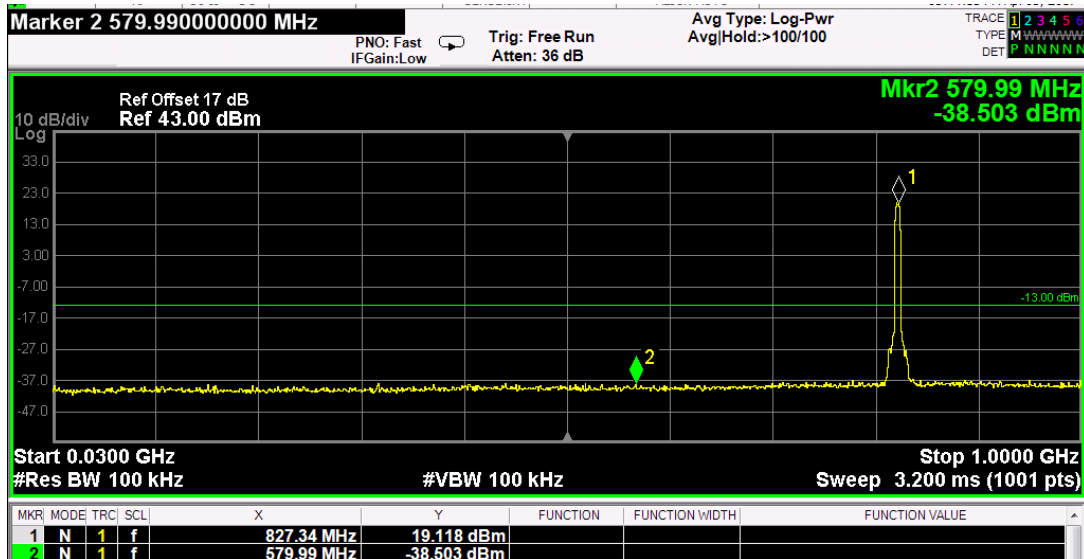


# Out of Band emission at antenna terminals – WCDMA CH High

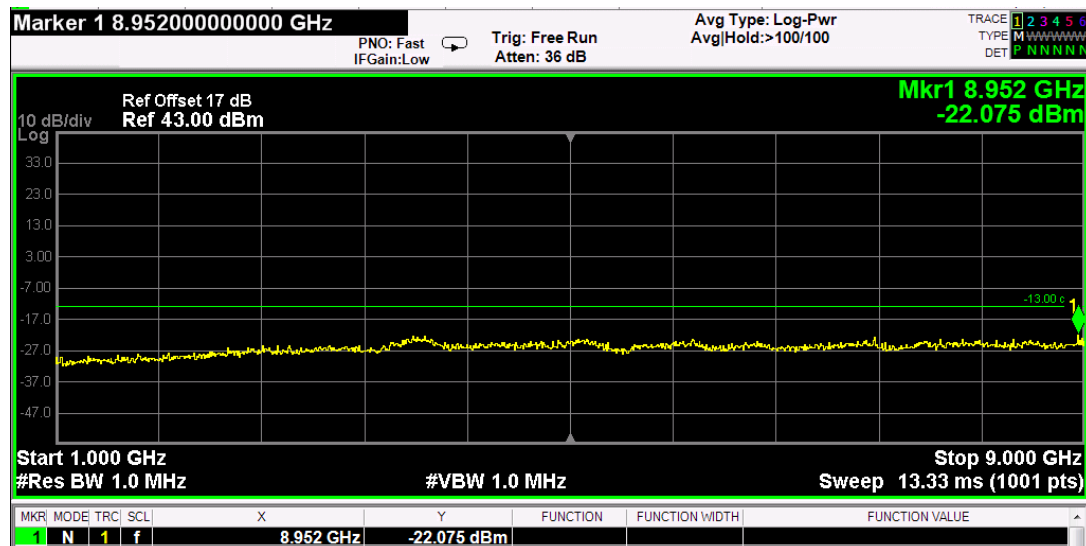
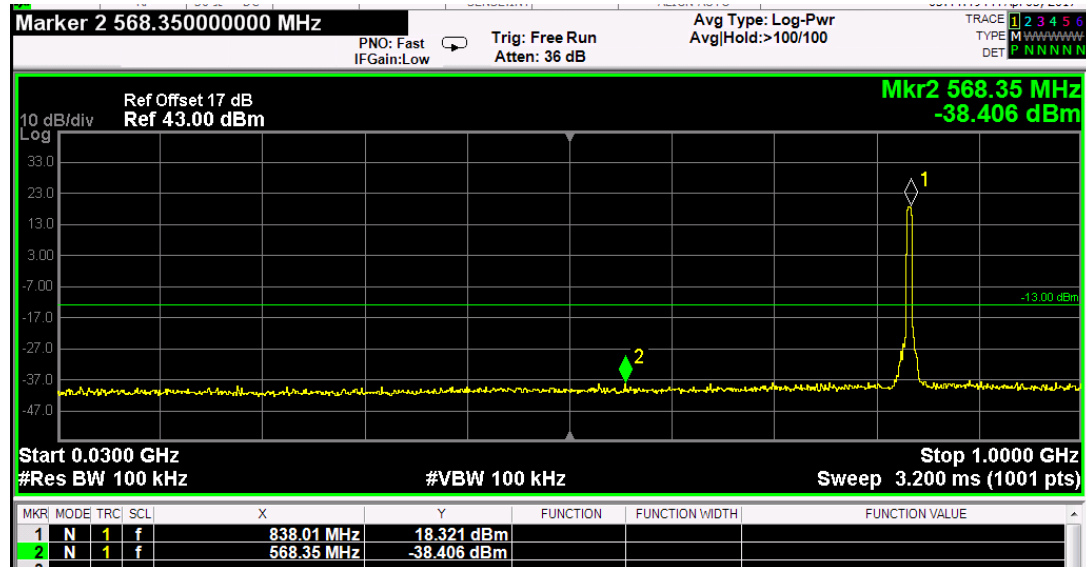


## WCDMA Band V

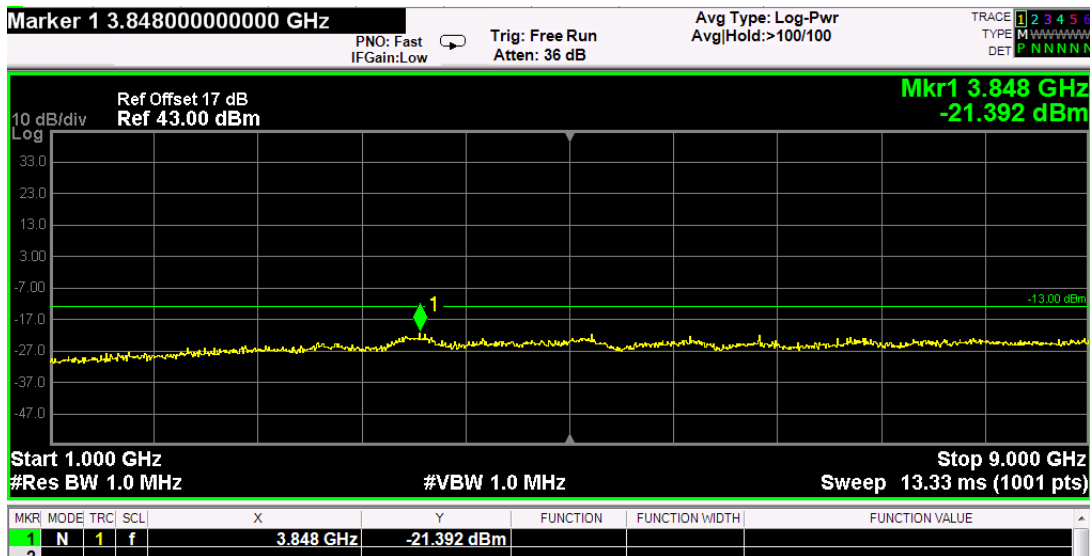
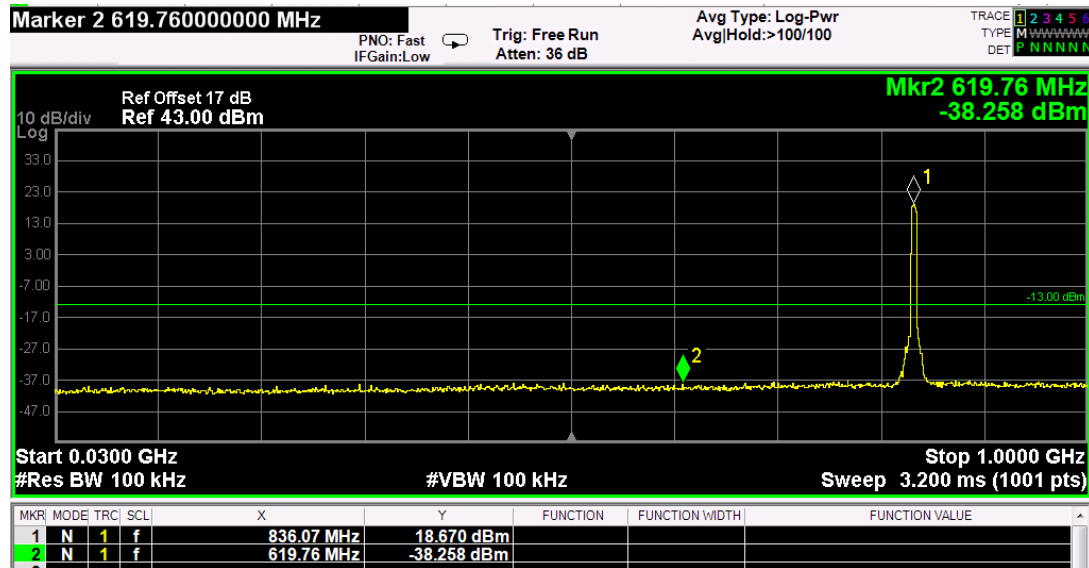
### Out of Band emission at antenna terminals – WCDMA CH Low



### Out of Band emission at antenna terminals – WCDMA CH Mid



### Out of Band emission at antenna terminals – WCDMA CH High

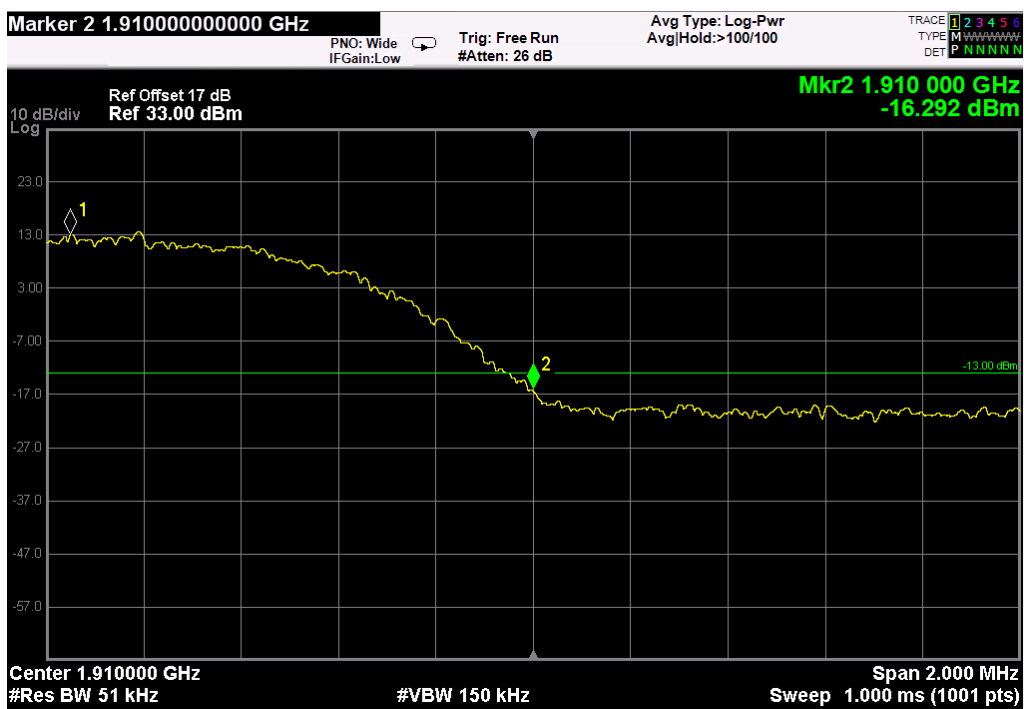


## WCDMA Band II

### Band Edge emissions – WCDMA CH Low

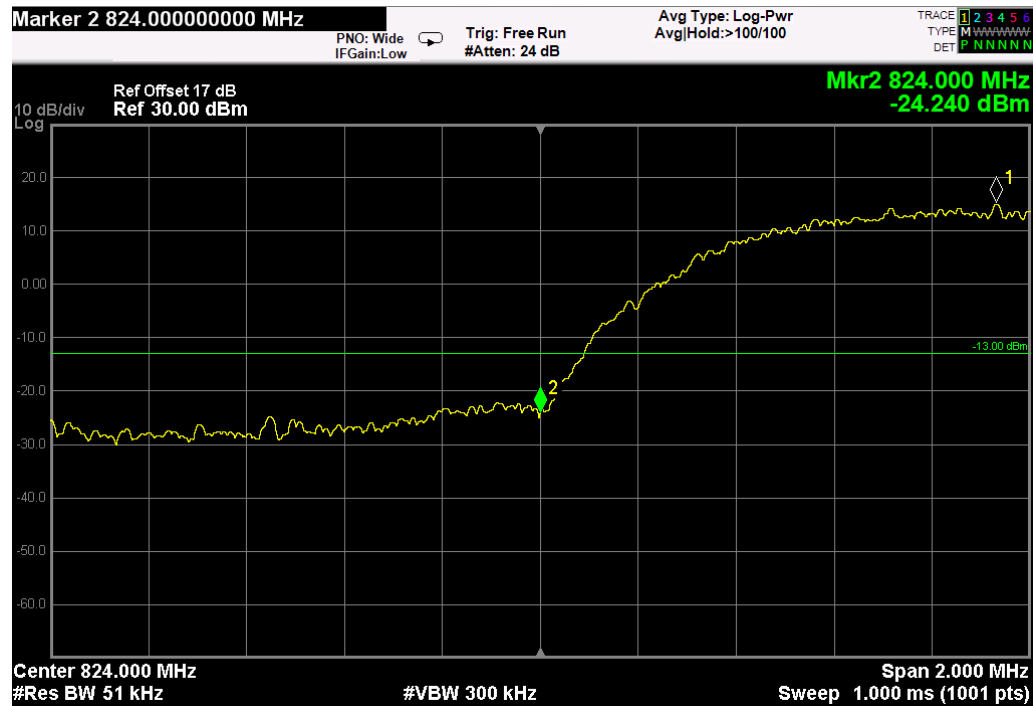


### Band Edge emissions –WCDMA CH High

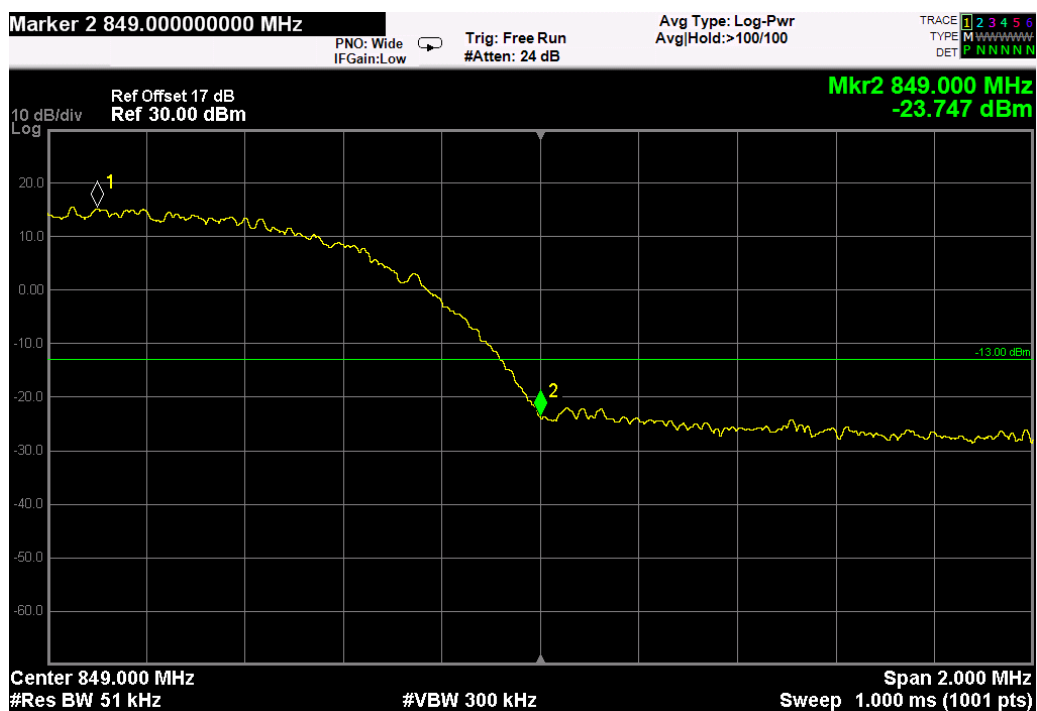


## WCDMA Band V

### Band Edge emissions –WCDMA CH Low

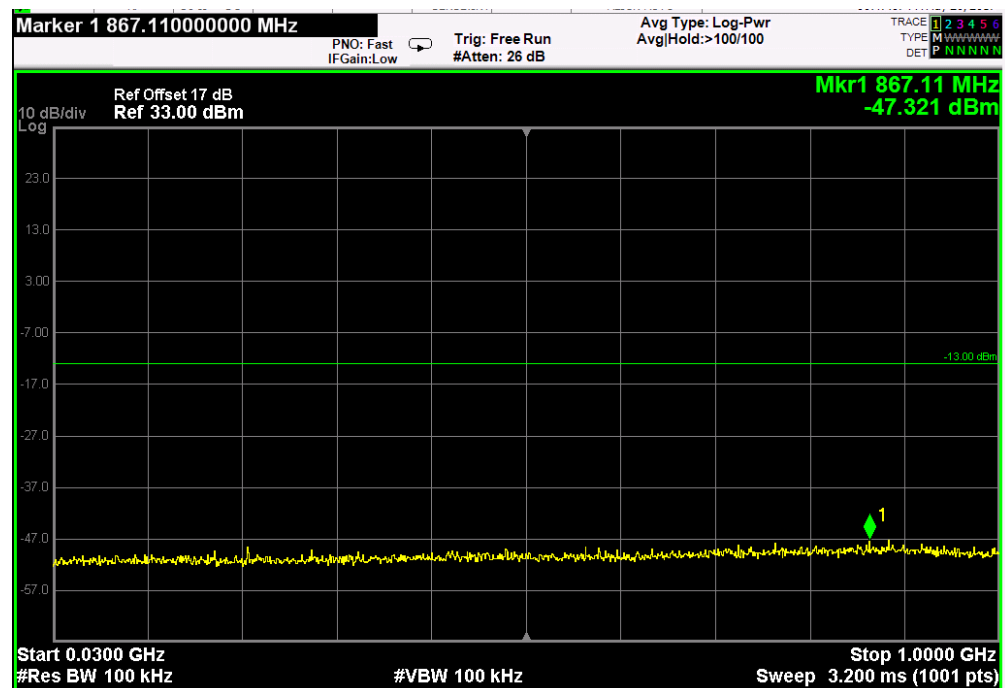
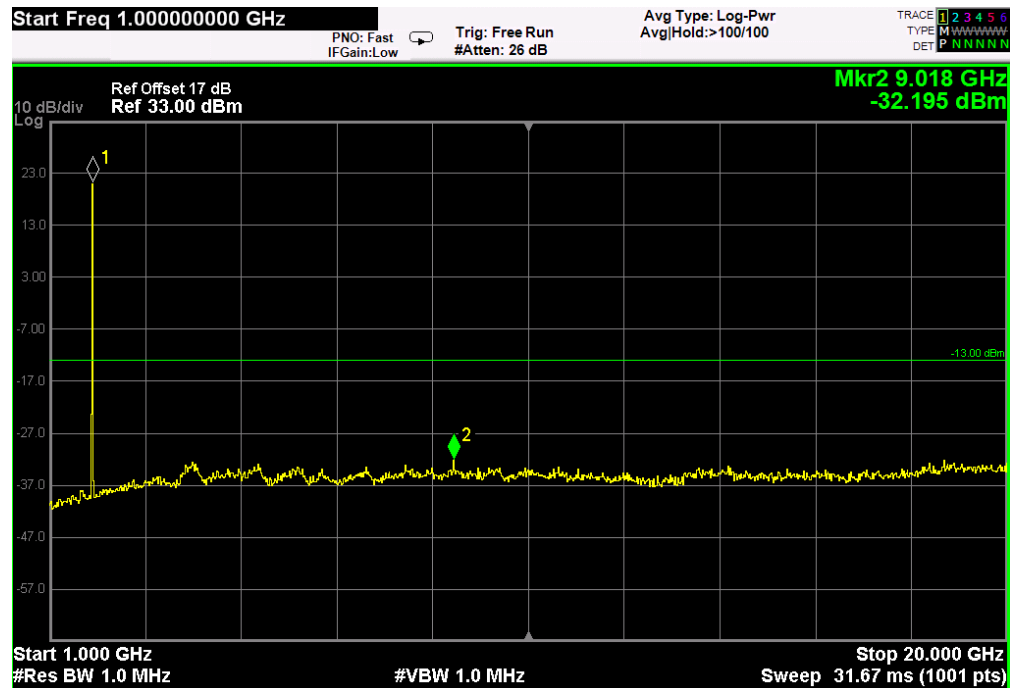


### Band Edge emissions –WCDMA CH High

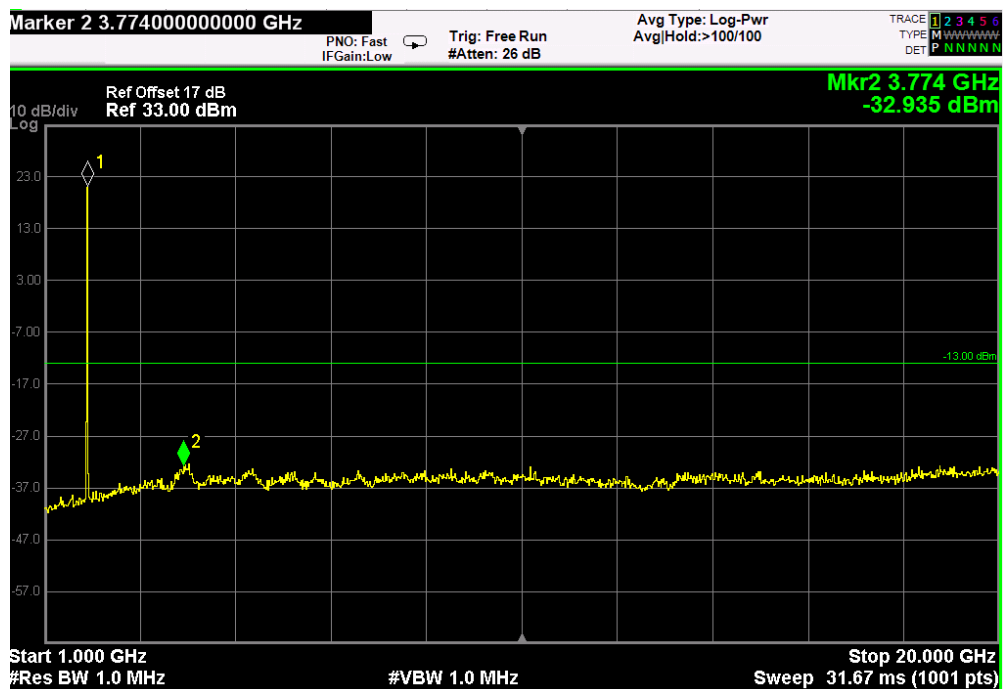
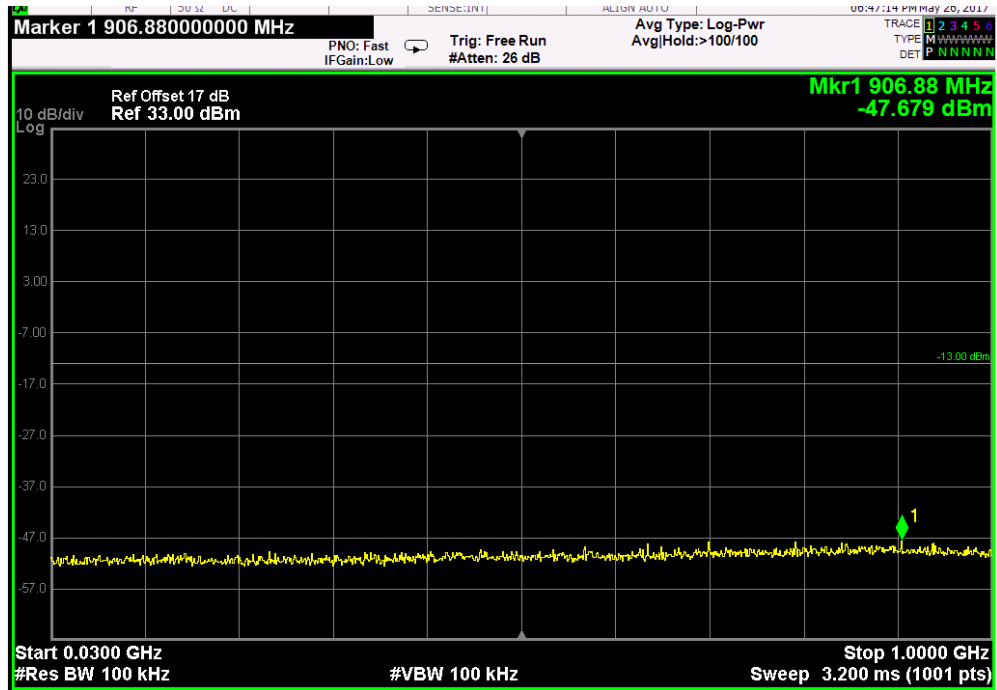


## WCDMA / HSDPA Band II

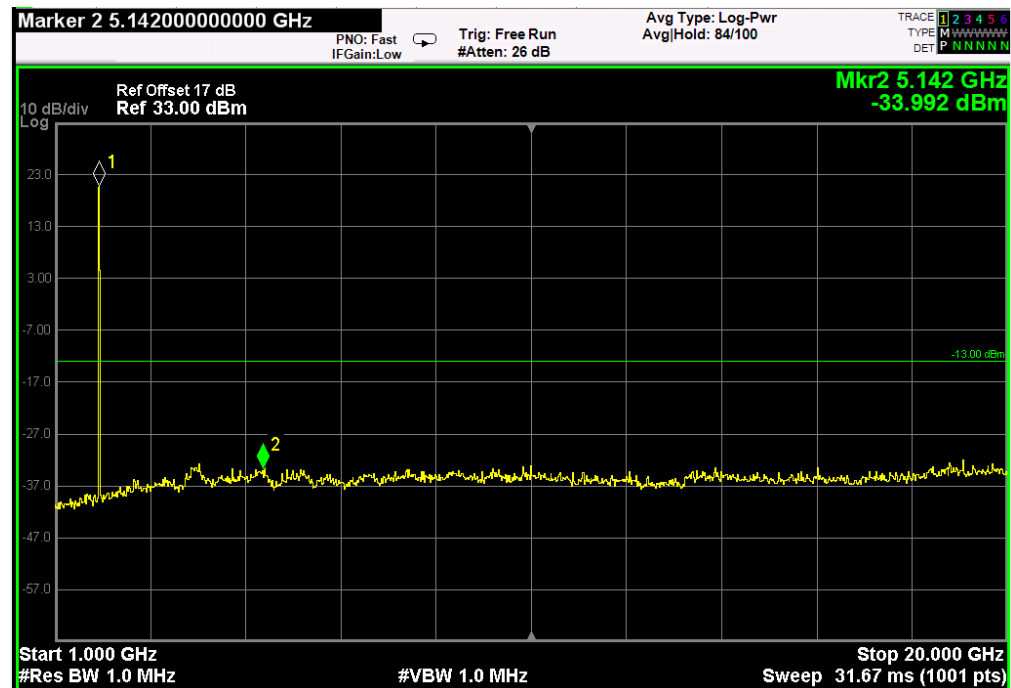
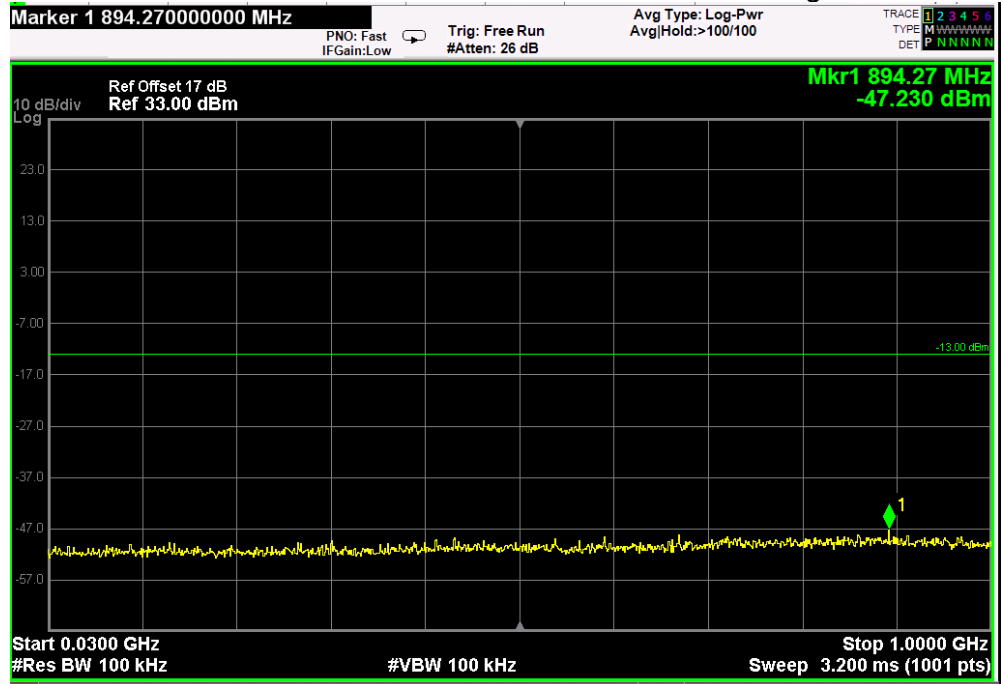
Out of Band emission at antenna terminals – HSDPA CH Low



### Out of Band emission at antenna terminals – HSDPA CH Mid

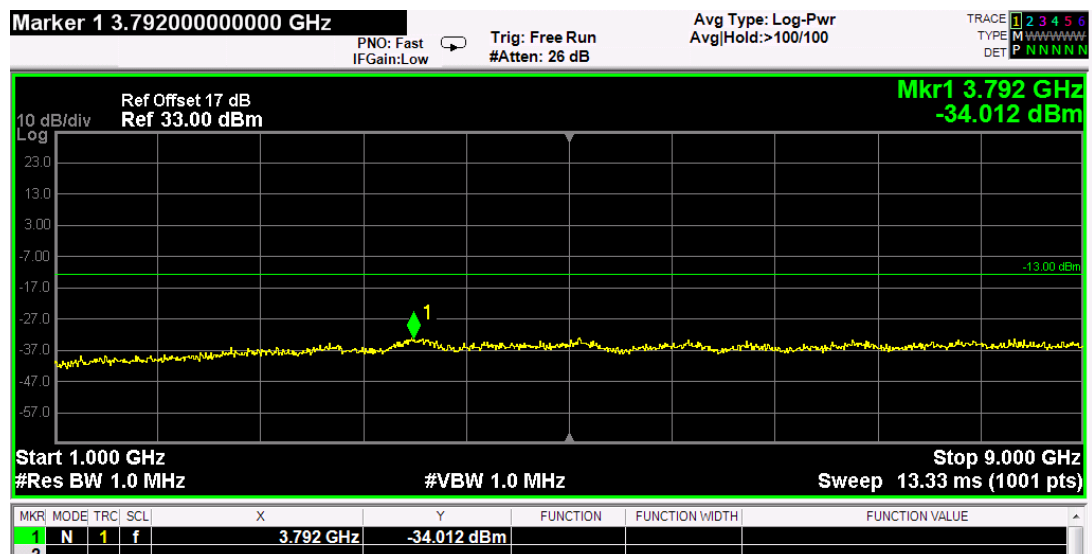
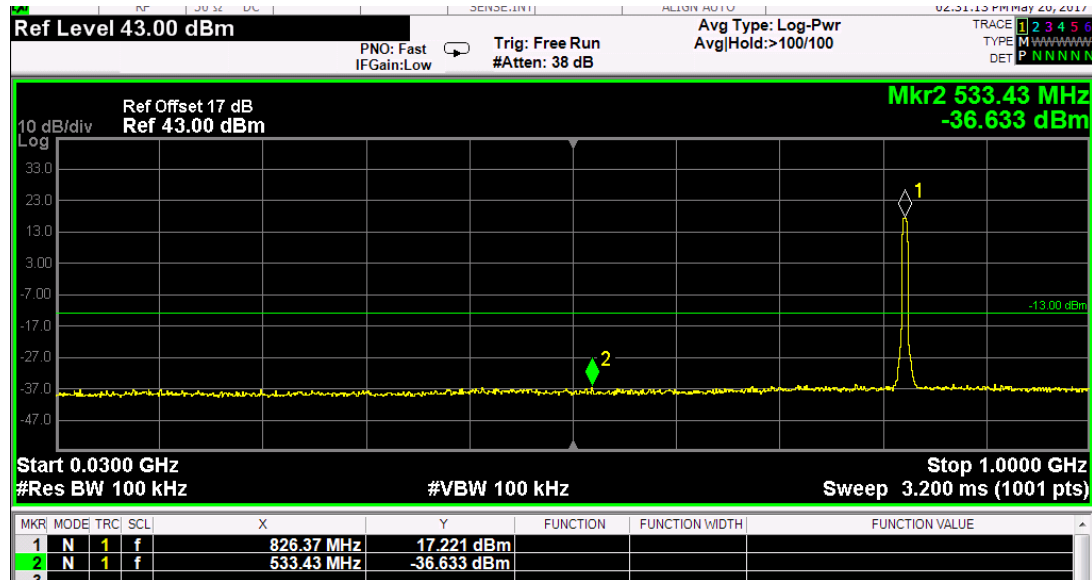


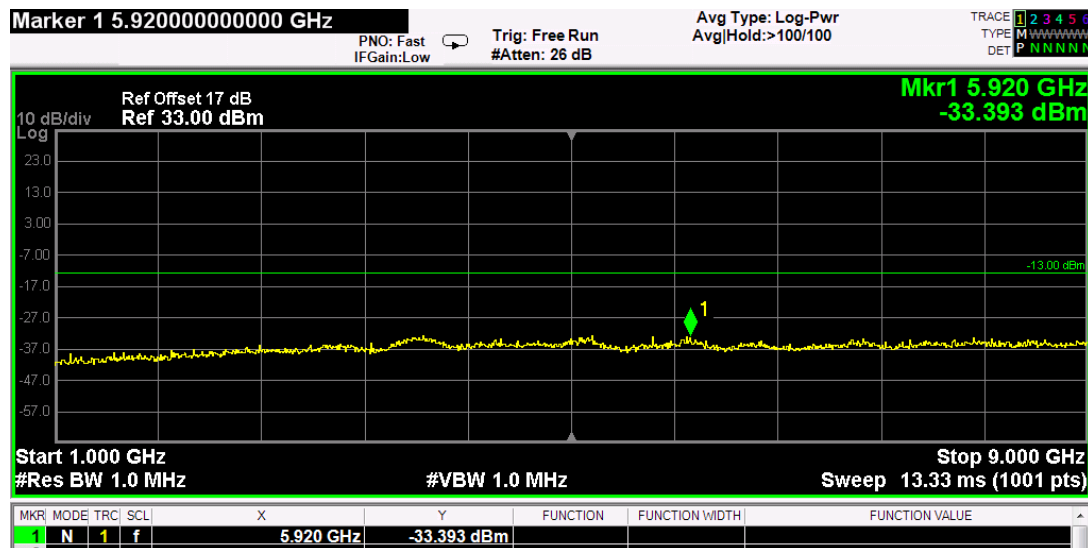
### Out of Band emission at antenna terminals – HSDPA CH High

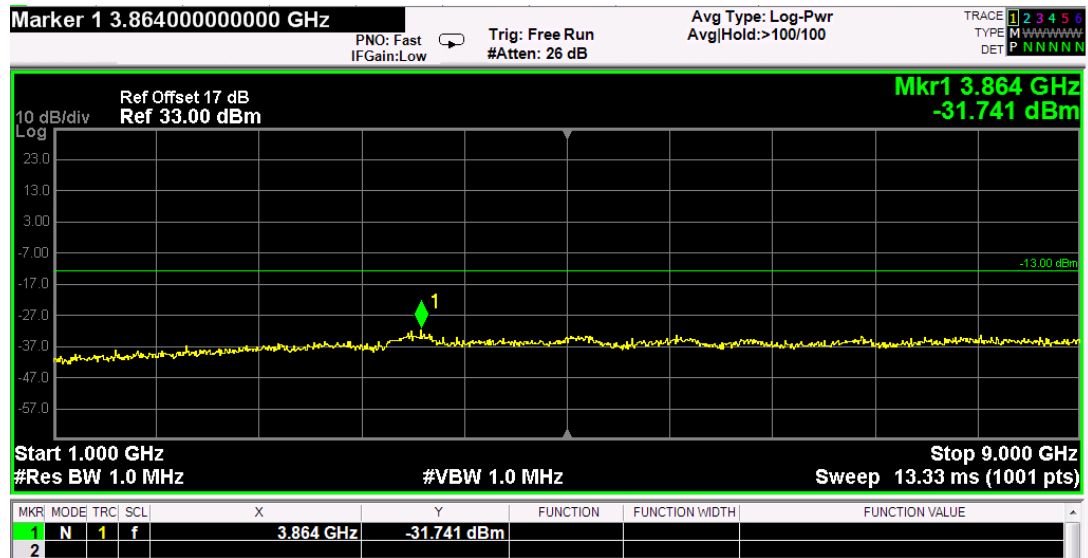


## WCDMA / HSDPA Band V

Out of Band emission at antenna terminals – HSDPA CH Low

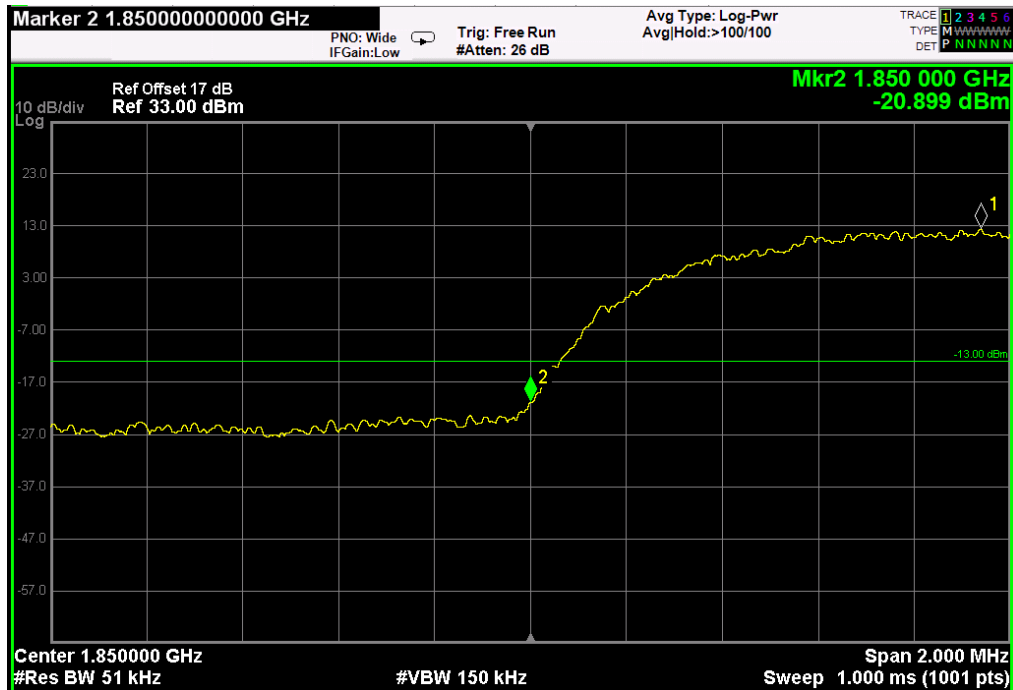






## WCDMA / HSDPA Band II

### Band Edge emissions – HSDPA CH Low



### Band Edge emissions – HSDPA CH High



## WCDMA / HSDPA Band V

### Band Edge emissions – HSDPA CH Low

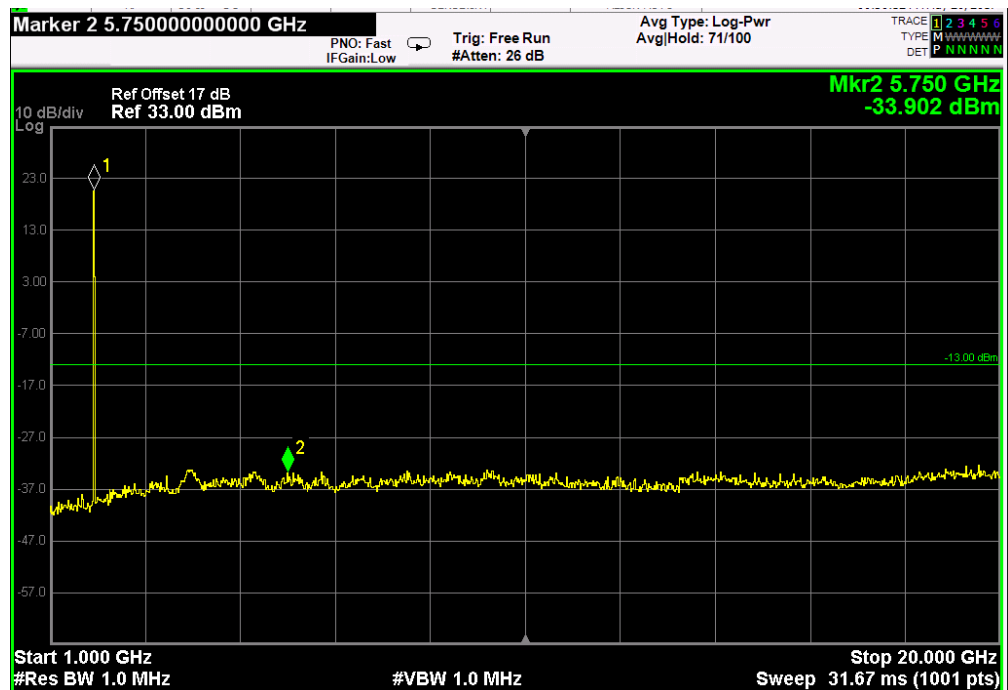
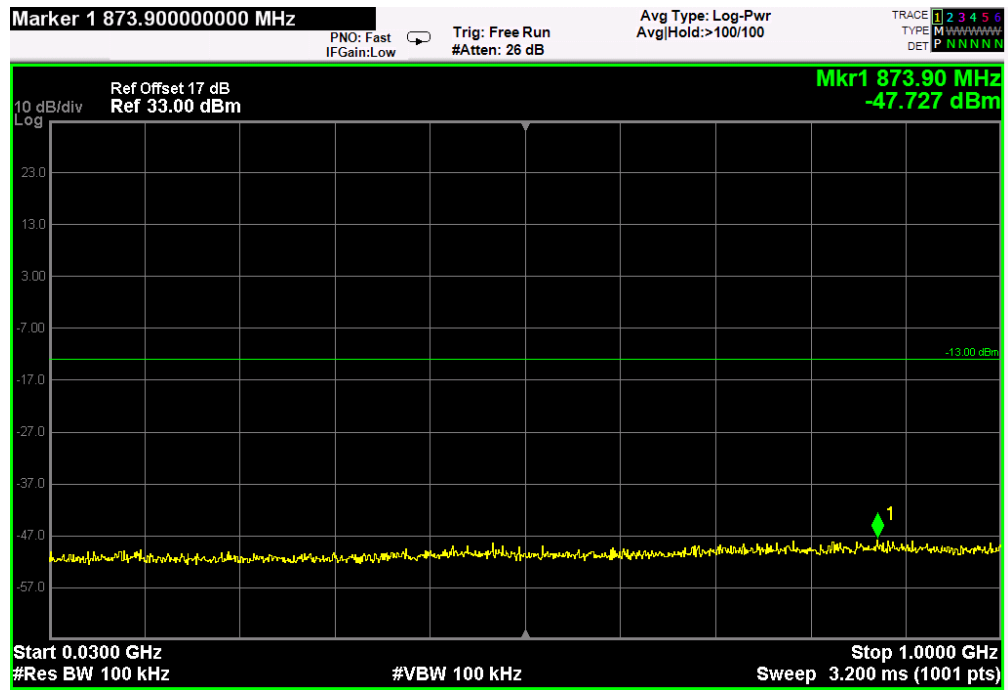


### Band Edge emissions – HSDPA CH High

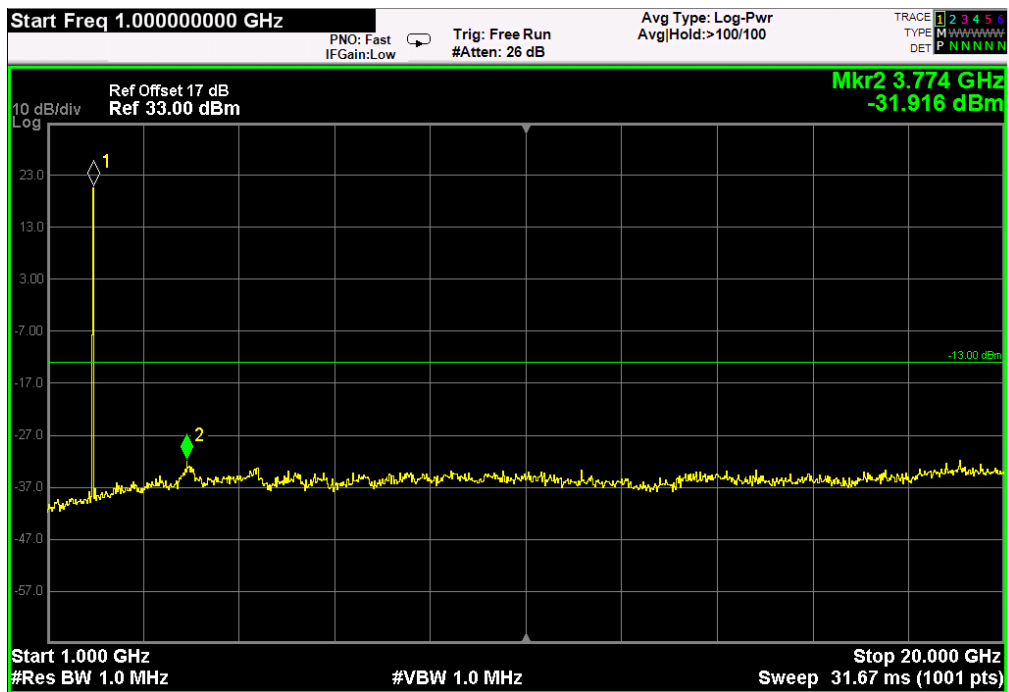
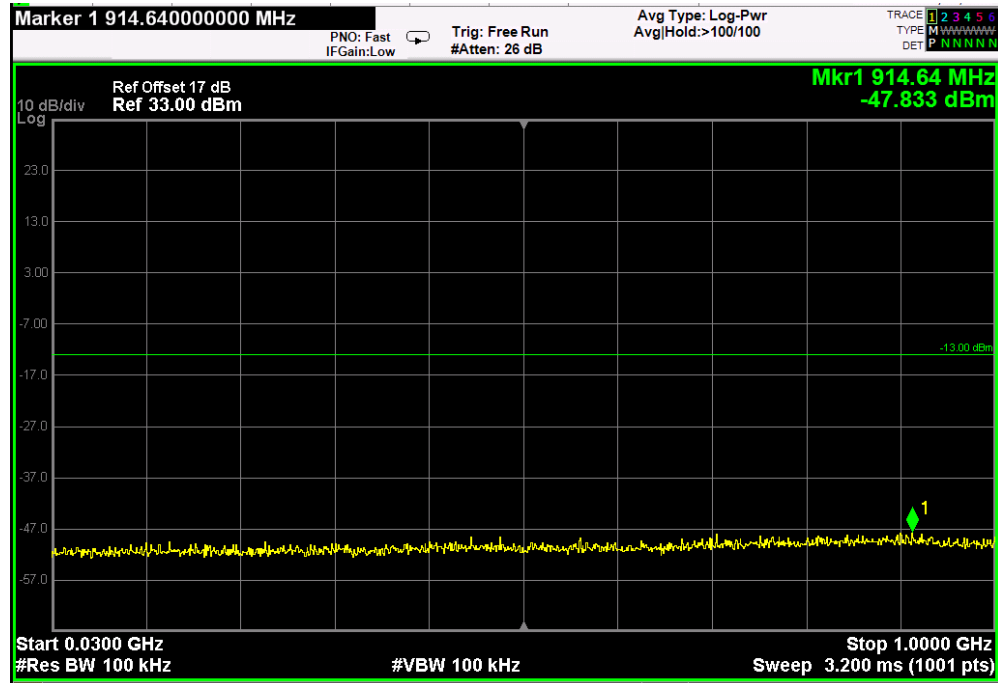


## WCDMA / HSUPA Band II

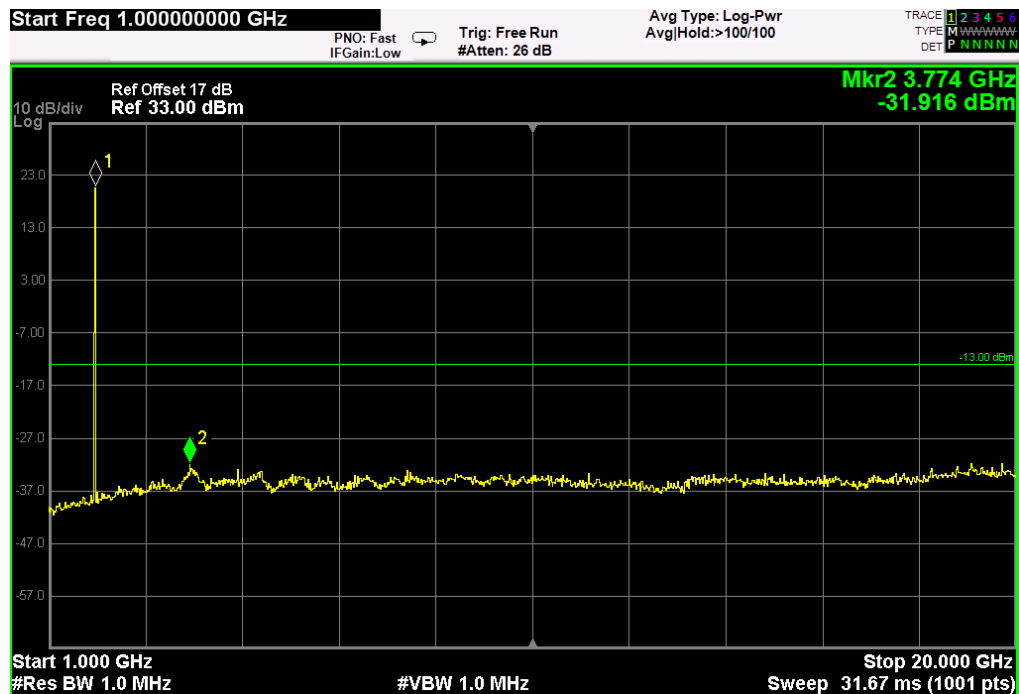
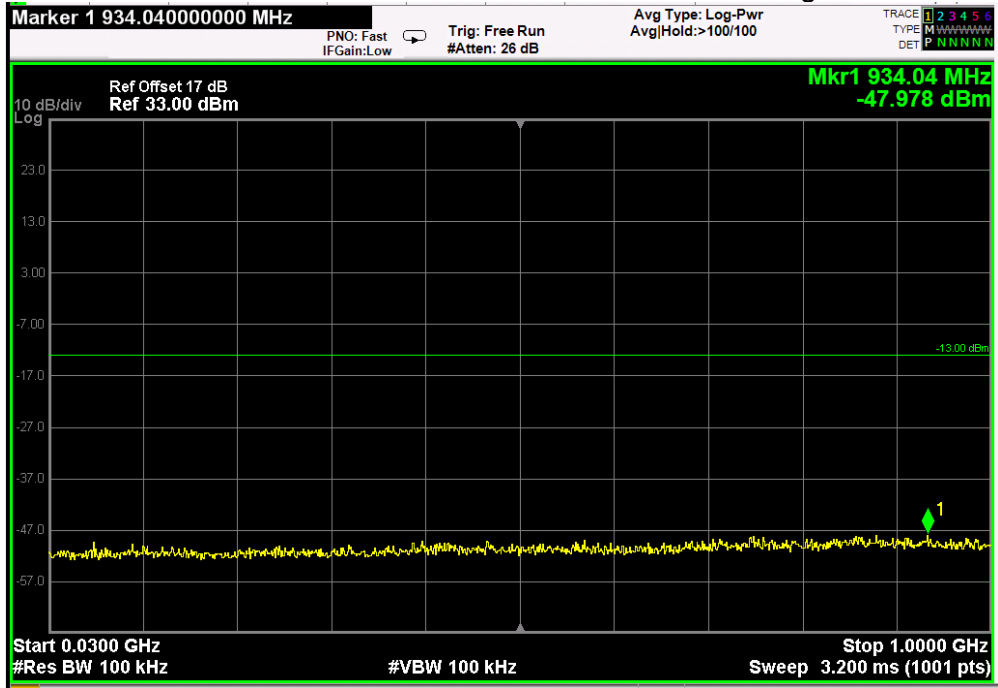
Out of Band emission at antenna terminals – HSUPA CH Low



Out of Band emission at antenna terminals – HSUPA CH Mid

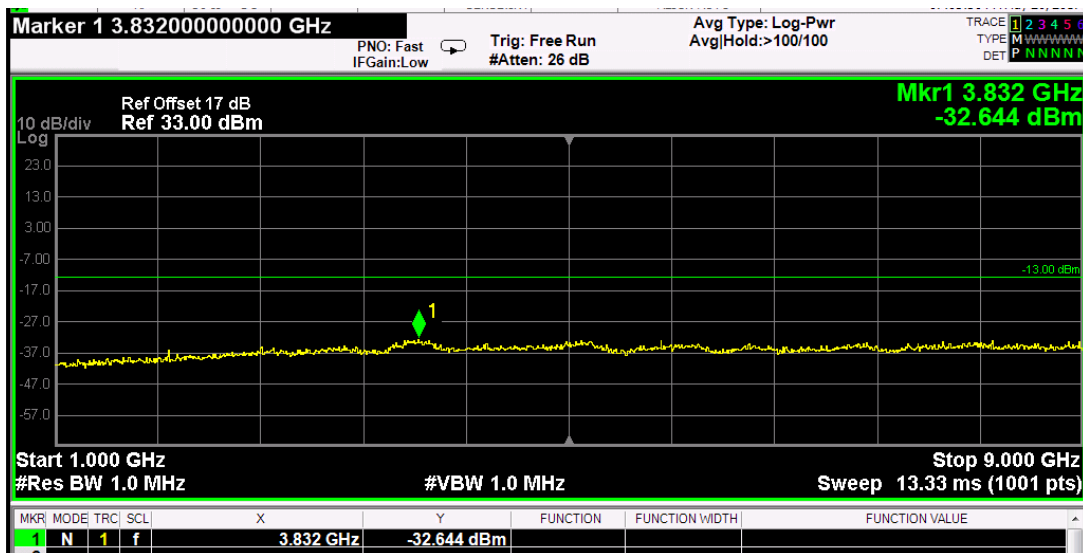
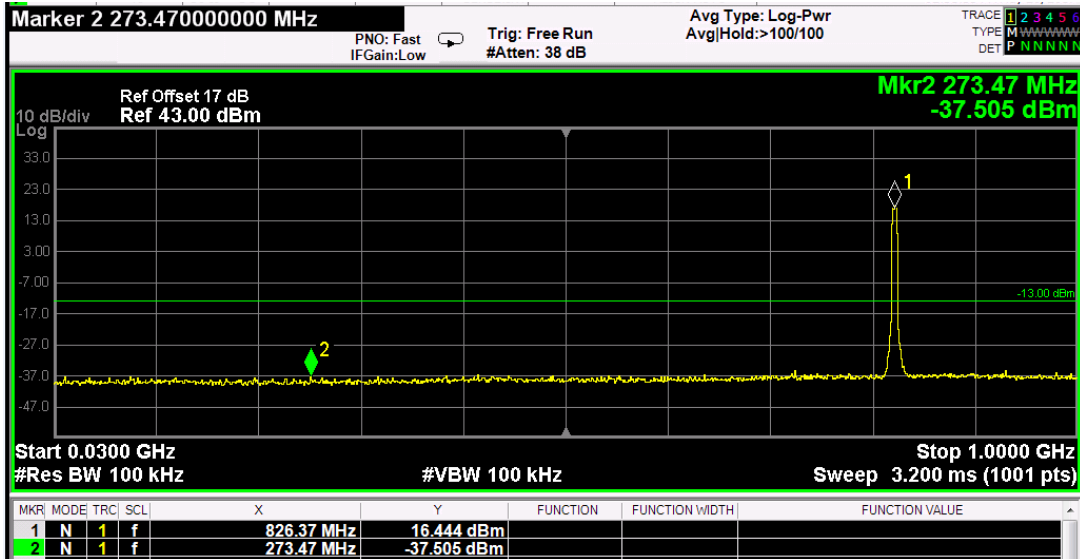


# Out of Band emission at antenna terminals – HSUPA CH High

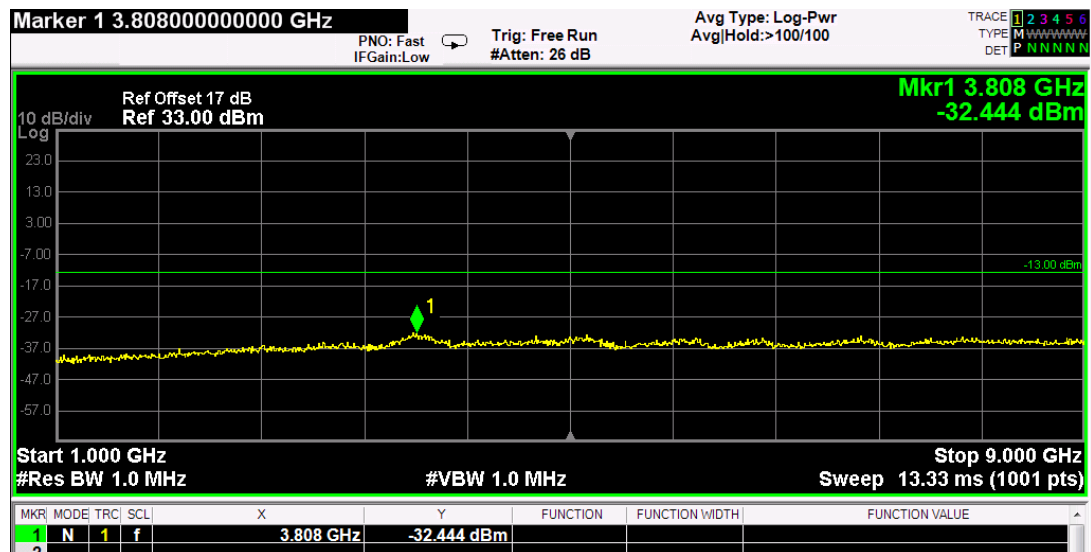
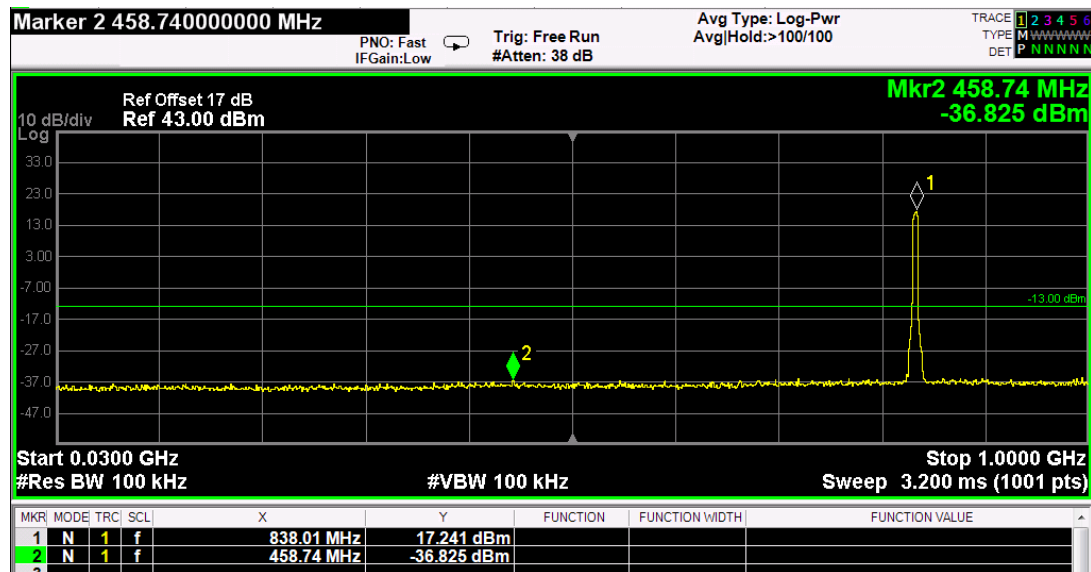


## **HSUPA / WCDMA Band V**

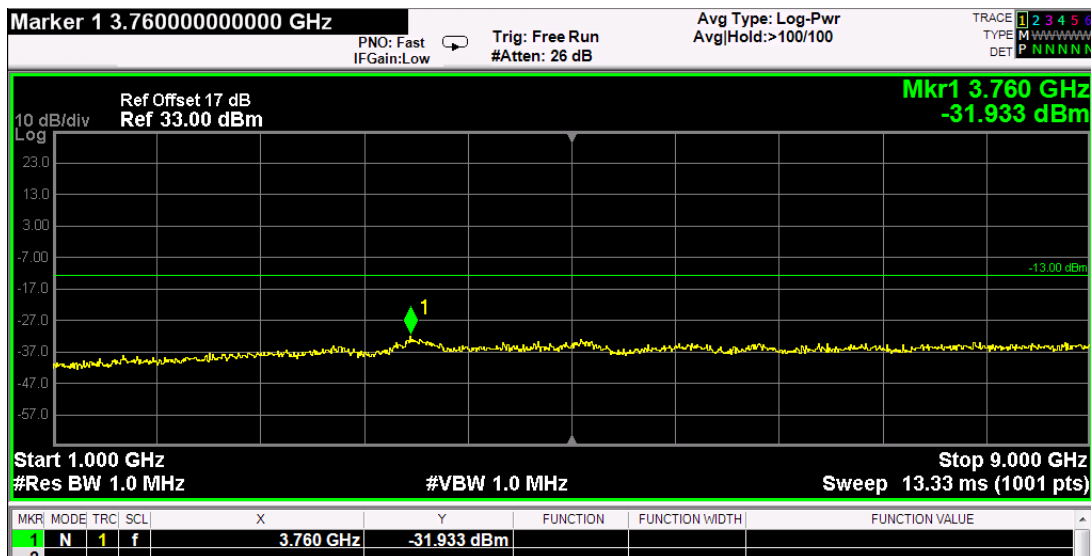
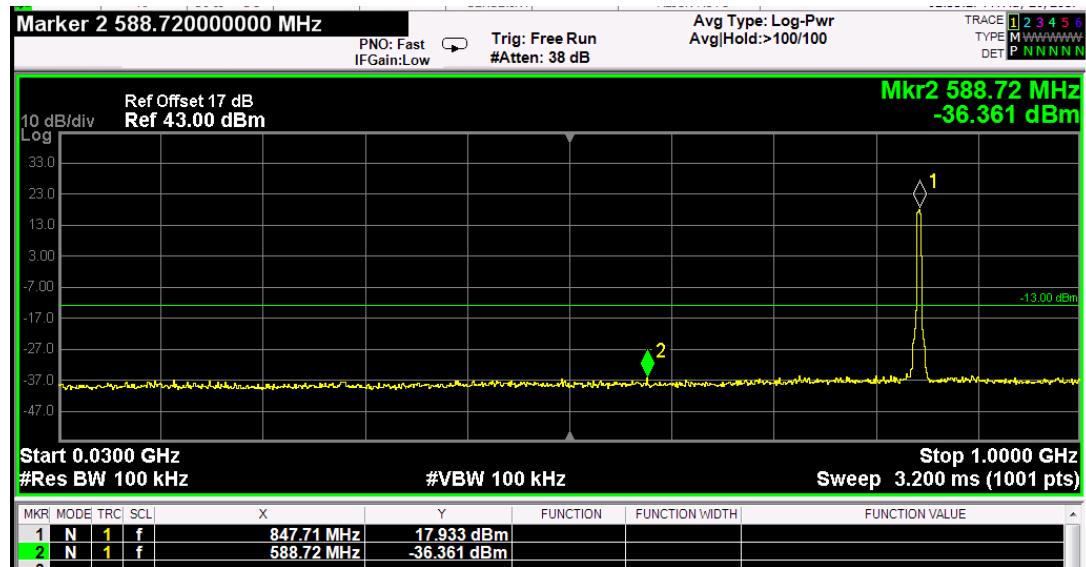
Out of Band emission at antenna terminals – HSUPA CH Low



Out of Band emission at antenna terminals – HSUPA CH Mid



# Out of Band emission at antenna terminals – HSUPA CH High

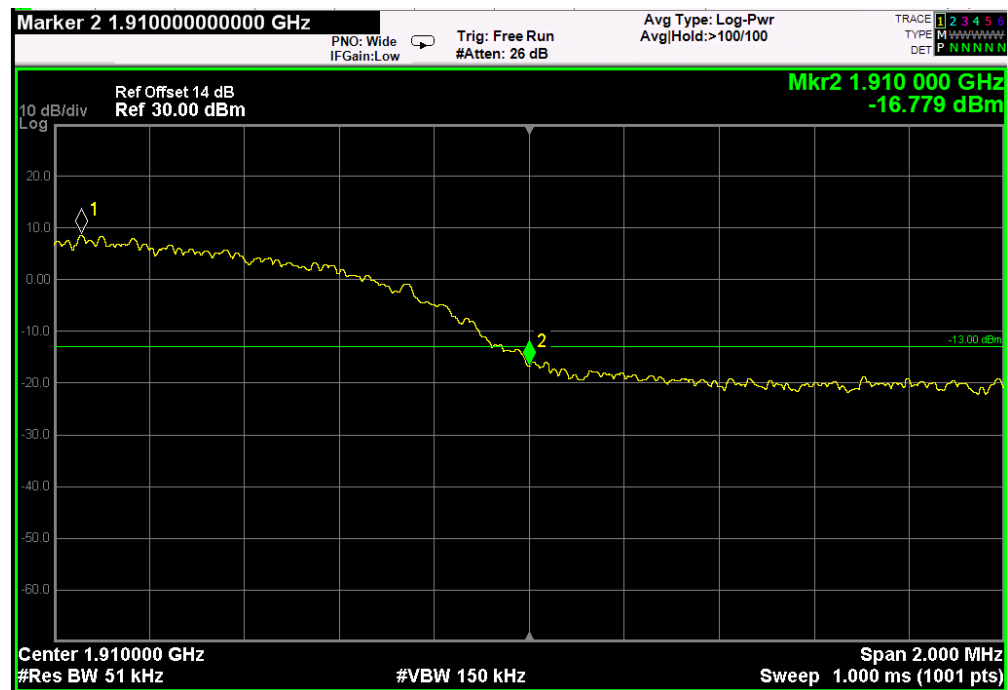


## WCDMA / HSUPA Band II

### Band Edge emissions – HSUPA CH Low



### Band Edge emissions – HSUPA CH High



## WCDMA / HSUPA Band V

### Band Edge emissions – HSUPA CH Low



### Band Edge emissions – HSUPA CH High



### 5.1.5 Field Strength of Spurious Radiation Measurement

**RESULT:****Passed**

Test standard : According to FCC §2.1053  
Basic standard : FCC Part 22 & 24  
Kind of test site : 3m Semi-Anechoic Chamber

**Test setup**

Test Channel : Low/ Middle/ High  
Operation mode : A\*

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix 1.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

\*note: According to the comparison of the result under all of modulations, the EUT with mode GPRS WCDMA have maximum output power and emits the maximum disturbance.

## 5.2 Frequency Stability

### 5.2.1 Output RF spectrum V.S. Temperature Measurement

**RESULT:****Passed**

Test standard : FCC §2.1055, FCC §22.355, .FCC §24.235  
Kind of test site : Shielded Room  
Limit : 2.5 ppm

**Test setup**

Test Channel : Middle  
Operation mode : A

**Table 14: Test result of Frequency Stability v.s. Temperature**
**GPRS 850MHz Band**

| Band:       |                  | GPRS 850        |                 | Channel:        |                 | 190      |
|-------------|------------------|-----------------|-----------------|-----------------|-----------------|----------|
| Limit(ppm): |                  | 2.5             |                 | Frequency:      |                 | 836.6MHz |
| Power (VAC) | Temperature (°C) | GPRS            |                 | EDGE            |                 | Result   |
|             |                  | Freq. Dev. (Hz) | Deviation (ppm) | Freq. Dev. (Hz) | Deviation (ppm) |          |
| 120         | -30              | 18              | 0.02            | 17              | 0.02            | PASS     |
|             | -20              | 9               | 0.01            | 10              | 0.01            |          |
|             | -10              | 25              | 0.03            | 24              | 0.03            |          |
|             | 0                | 19              | 0.02            | 11              | 0.01            |          |
|             | +10              | 11              | 0.01            | 25              | 0.03            |          |
|             | +20              | 20              | 0.02            | 17              | 0.02            |          |
|             | +30              | 16              | 0.02            | 9               | 0.01            |          |
|             | +40              | 28              | 0.03            | 26              | 0.03            |          |
|             | +50              | 10              | 0.01            | 11              | 0.01            |          |

**GPRS 1900MHz Band**

| Band:       |                  | GPRS 1900       |                 | Channel:        |                 | 661       |
|-------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------|
| Limit(ppm): |                  | 2.5             |                 | Frequency:      |                 | 1880.0MHz |
| Power (VAC) | Temperature (°C) | GPRS            |                 | EDGE            |                 | Result    |
|             |                  | Freq. Dev. (Hz) | Deviation (ppm) | Freq. Dev. (Hz) | Deviation (ppm) |           |
| 120         | -30              | 44              | 0.02            | 62              | 0.03            | PASS      |
|             | -20              | 40              | 0.02            | 25              | 0.01            |           |
|             | -10              | 22              | 0.01            | 44              | 0.02            |           |
|             | 0                | 59              | 0.03            | 25              | 0.01            |           |
|             | +10              | 41              | 0.02            | 44              | 0.02            |           |
|             | +20              | 20              | 0.01            | 27              | 0.01            |           |
|             | +30              | 51              | 0.03            | 43              | 0.02            |           |
|             | +40              | 43              | 0.02            | 37              | 0.02            |           |
|             | +50              | 27              | 0.01            | 55              | 0.03            |           |

**WCDMA 850MHz Band**

|             |                 |                |                |          |
|-------------|-----------------|----------------|----------------|----------|
| Band:       | WCDMA Band V    | Channel:       |                | 4183     |
| Limit(ppm): | 2.5             | Frequency:     |                | 836.6MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result   |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |          |
| 120         | -30             | 15             | 0.02           | PASS     |
|             | -20             | 10             | 0.01           |          |
|             | -10             | 25             | 0.03           |          |
|             | 0               | 18             | 0.02           |          |
|             | +10             | 12             | 0.01           |          |
|             | +20             | 19             | 0.02           |          |
|             | +30             | 15             | 0.02           |          |
|             | +40             | 22             | 0.03           |          |
|             | +50             | 17             | 0.02           |          |

**WCDMA 1900MHz Band**

|             |                 |                |                |           |
|-------------|-----------------|----------------|----------------|-----------|
| Band:       | WCDMA Band II   | Channel:       |                | 9400      |
| Limit(ppm): | 2.5             | Frequency:     |                | 1880.0MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result    |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |           |
| 120         | -30             | 41             | 0.02           | PASS      |
|             | -20             | 37             | 0.02           |           |
|             | -10             | 48             | 0.03           |           |
|             | 0               | 55             | 0.03           |           |
|             | +10             | 46             | 0.02           |           |
|             | +20             | 40             | 0.02           |           |
|             | +30             | 35             | 0.02           |           |
|             | +40             | 61             | 0.03           |           |
|             | +50             | 45             | 0.02           |           |

**HSDPA 850MHz Band**

|             |                 |                |                |          |
|-------------|-----------------|----------------|----------------|----------|
| Band:       | WCDMA Band V    | Channel:       |                | 4183     |
| Limit(ppm): | 2.5             | Frequency:     |                | 836.6MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result   |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |          |
| 120         | -30             | 23             | 0.03           | PASS     |
|             | -20             | 12             | 0.01           |          |
|             | -10             | 15             | 0.02           |          |
|             | 0               | 16             | 0.02           |          |
|             | +10             | 20             | 0.02           |          |
|             | +20             | 14             | 0.02           |          |
|             | +30             | 10             | 0.01           |          |
|             | +40             | 26             | 0.03           |          |
|             | +50             | 15             | 0.02           |          |

**HSDPA 1900MHz Band**

|             |                 |                |                |           |
|-------------|-----------------|----------------|----------------|-----------|
| Band:       | WCDMA Band V    | Channel:       |                | 9400      |
| Limit(ppm): | 2.5             | Frequency:     |                | 1880.0MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result    |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |           |
| 120         | -30             | 35             | 0.02           | PASS      |
|             | -20             | 45             | 0.03           |           |
|             | -10             | 58             | 0.03           |           |
|             | 0               | 40             | 0.02           |           |
|             | +10             | 41             | 0.02           |           |
|             | +20             | 34             | 0.02           |           |
|             | +30             | 38             | 0.02           |           |
|             | +40             | 55             | 0.03           |           |
|             | +50             | 60             | 0.03           |           |

**HSUPA 850MHz Band**

|             |                 |                |                |          |
|-------------|-----------------|----------------|----------------|----------|
| Band:       | WCDMA Band V    | Channel:       |                | 4183     |
| Limit(ppm): | 2.5             | Frequency:     |                | 836.6MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result   |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |          |
| 120         | -30             | 9              | 0.01           | PASS     |
|             | -20             | 18             | 0.02           |          |
|             | -10             | 15             | 0.02           |          |
|             | 0               | 25             | 0.03           |          |
|             | +10             | 10             | 0.01           |          |
|             | +20             | 28             | 0.03           |          |
|             | +30             | 12             | 0.01           |          |
|             | +40             | 24             | 0.03           |          |
|             | +50             | 11             | 0.01           |          |

**HSUPA 1900MHz Band**

|             |                 |                |                |           |
|-------------|-----------------|----------------|----------------|-----------|
| Band:       | WCDMA Band V    | Channel:       |                | 9400      |
| Limit(ppm): | 2.5             | Frequency:     |                | 1880.0MHz |
| Power(VAC)  | Temperature(°C) | RMC 12.2Kbps   |                | Result    |
|             |                 | Freq. Dev.(Hz) | Deviation(ppm) |           |
| 120         | -30             | 50             | 0.03           | PASS      |
|             | -20             | 32             | 0.02           |           |
|             | -10             | 40             | 0.02           |           |
|             | 0               | 35             | 0.02           |           |
|             | +10             | 40             | 0.02           |           |
|             | +20             | 52             | 0.03           |           |
|             | +30             | 63             | 0.03           |           |
|             | +40             | 42             | 0.02           |           |
|             | +50             | 48             | 0.03           |           |

## 5.2.2 Frequency Stability V.S. Voltage Measurement

**RESULT:****N/A**

|                   |   |                                        |
|-------------------|---|----------------------------------------|
| Test standard     | : | FCC §2.1055, FCC §22.355, .FCC §24.235 |
| Kind of test site | : | Shielded Room                          |
| Limit             | : | 2.5 ppm                                |

**Test setup**

|                |   |        |
|----------------|---|--------|
| Test Channel   | : | Middle |
| Operation mode | : | A      |

The EUT was not battery equipment. Therefore this test item has been skipped.

## 6. Safety Human exposure

### 6.1 Radio Frequency Exposure Compliance

#### 6.1.1 Electromagnetic Fields

**RESULT:****Passed**

Test standard : FCC §2.1091 and 2.1093  
FCC KDB Publication 447498 D01 v06  
RSS-102 Issue 5

Limit for power density for general population/uncontrolled exposure is 0.558 mW/cm<sup>2</sup> for 300 -1500 MHz frequency range:

The power density  $P$  (mW/cm<sup>2</sup>) =  $P_T / 4\pi r^2$ , where

$P_T$  is the maximum equivalent isotropically radiated power (EIRP).

The peak output power of 32.71 dBm with -1.1 dBi antenna gain corresponds to the equivalent isotropically radiated power (EIRP) of

32.71 dBm + (-1.1) dBi = 31.61 dBm, which is equal to 1448.77 mW.

The minimum safe distance "r", where RF exposure does not exceed FCC permissible limit, is  
 $r = \sqrt{P_T / (P \times 4\pi)} = \sqrt{2596.36/12.56} = 14.38 \text{ cm} \ll 2 \text{ m}$ .

Limit for power density for general population/uncontrolled exposure is 1 mW/cm<sup>2</sup> for 1500 -100000 MHz frequency range:

The power density  $P$  (mW/cm<sup>2</sup>) =  $P_T / 4\pi r^2$ , where

$P_T$  is the maximum equivalent isotropically radiated power (EIRP).

The peak output power of 29.31 dBm with -1.1 dBi antenna gain corresponds to the equivalent isotropically radiated power (EIRP) of

29.31 dBm + (-1.1) dBi = 28.21 dBm, which is equal to 662.21 mW.

The minimum safe distance "r", where RF exposure does not exceed FCC permissible limit, is  
 $r = \sqrt{P_T / (P \times 4\pi)} = \sqrt{2596.36/12.56} = 7.26 \text{ cm} \ll 2 \text{ m}$ .

The minimum distance for the EUT is greater than 14.38cm.

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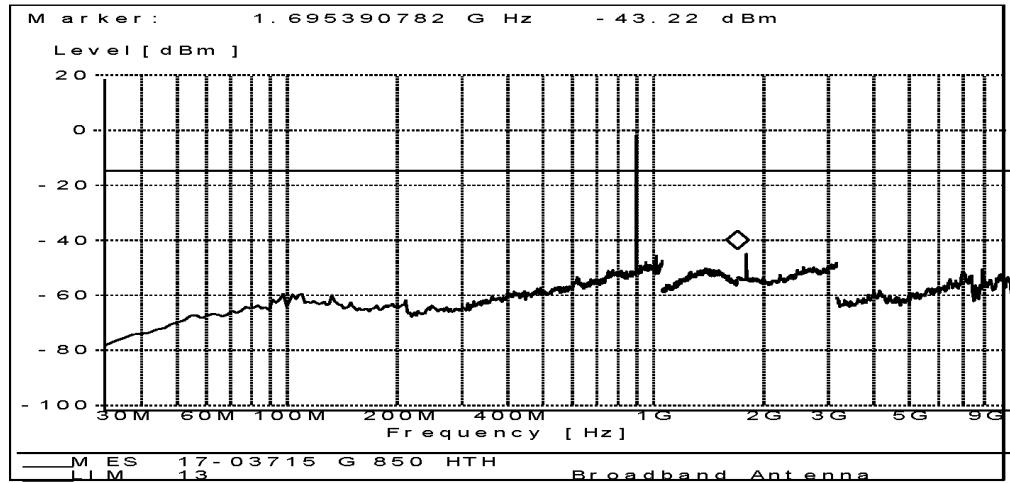
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MEASUREMENT RESULT: "result2"

2017/05/09 04:18nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 125.250500       | -58.20       | -13.00       |
| 731.743400       | -48.97       | -13.00       |
| 961.122200       | -43.90       | -13.00       |
| 1315.030100      | -48.40       | -13.00       |
| 1695.390800      | -43.22       | -13.00       |
| 2994.388800      | -46.32       | -13.00       |

2017/05/09 04:19nm

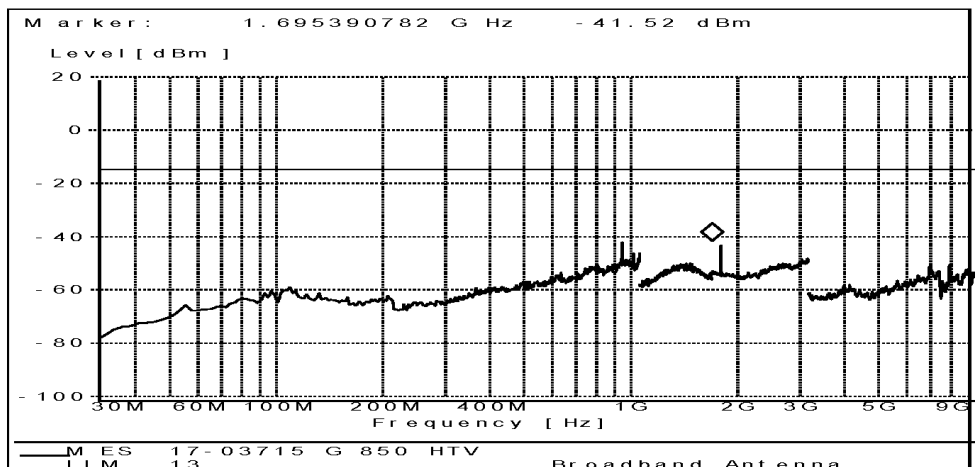
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MEASUREMENT RESULT: "result2"

2017/05/08 01:52nm

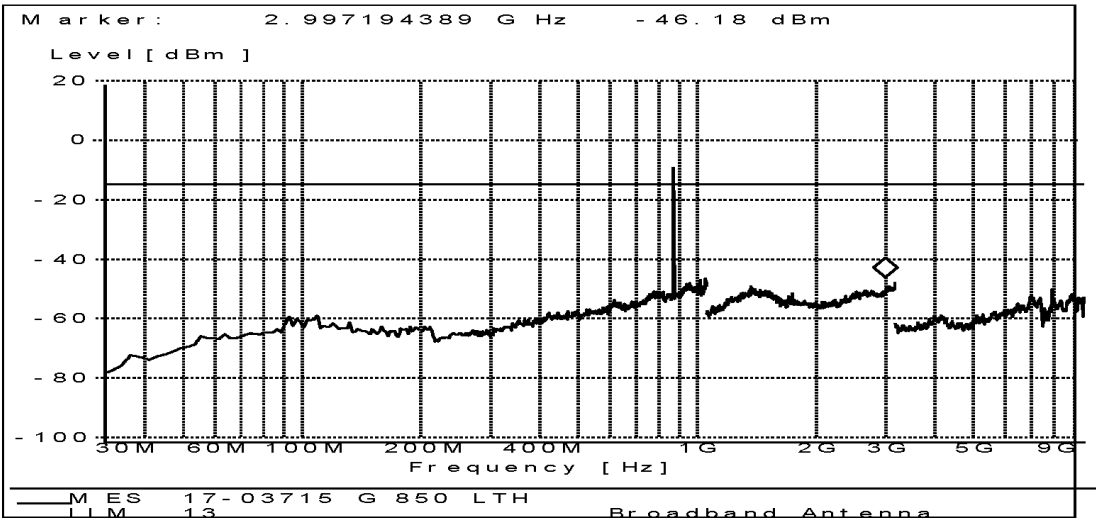
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.156300       | -57.37       | -13.00       |
| 761.623200       | -49.07       | -13.00       |
| 960.921800       | -44.53       | -13.00       |
| 1389.579100      | -48.34       | -13.00       |
| 1695.390800      | -41.52       | -13.00       |
| 2960.721400      | -46.62       | -13.00       |

2017/05/09 04:13nm

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MEASUREMENT RESULT: "result2"

|                    |        |        |  |
|--------------------|--------|--------|--|
| 2017/05/08 01:52nm |        |        |  |
| Frequency          | Level  | Limit  |  |
| MHz                | dBm    | dBm    |  |
| 103.156300         | -57.34 | -13.00 |  |
| 583.817600         | -52.03 | -13.00 |  |
| 960.921800         | -45.31 | -13.00 |  |
| 1294.589200        | -47.49 | -13.00 |  |
| 2997.194400        | -46.18 | -13.00 |  |
| 7495.491000        | -48.36 | -13.00 |  |

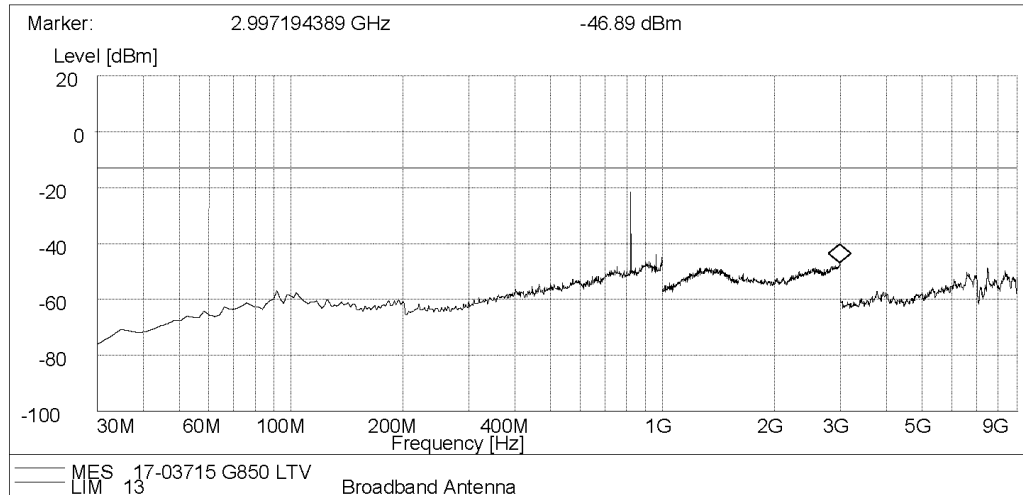
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MEASUREMENT RESULT: "result2"

2017/05/08 01:52nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 91.432900        | -56.93       | -13.00       |
| 753.807600       | -48.32       | -13.00       |
| 1307.815600      | -48.75       | -13.00       |
| 2584.769500      | -48.84       | -13.00       |
| 2997.194400      | -46.89       | -13.00       |
| 7495.490900      | -48.86       | -13.00       |

2017/05/09 03:58nm

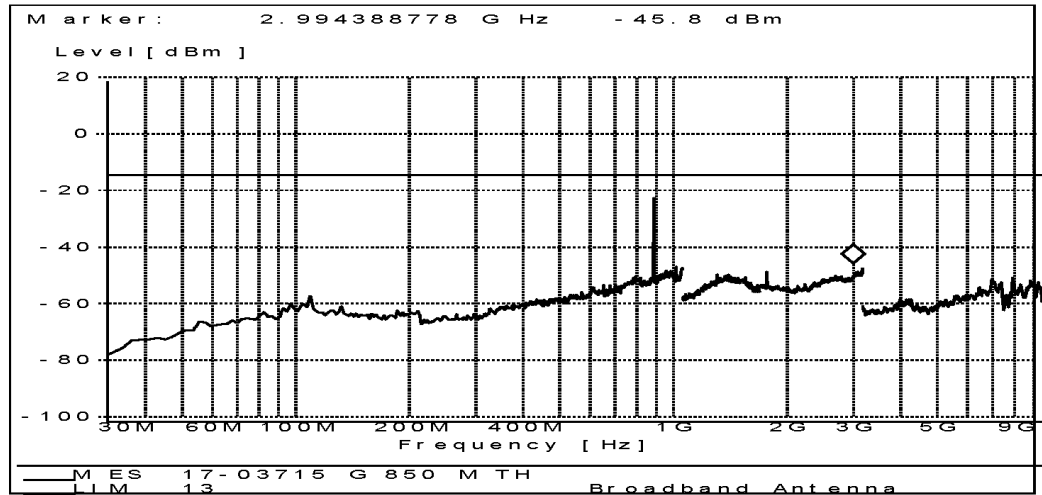
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MEASUREMENT RESULT: "result2"

2017/05/08 01:52nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.156300       | -55.69       | -13.00       |
| 617.034100       | -51.76       | -13.00       |
| 751.853700       | -49.34       | -13.00       |
| 960.921800       | -45.20       | -13.00       |
| 1670.140300      | -47.73       | -13.00       |
| 2994.388800      | -45.80       | -13.00       |

2017/05/09 04:05nm

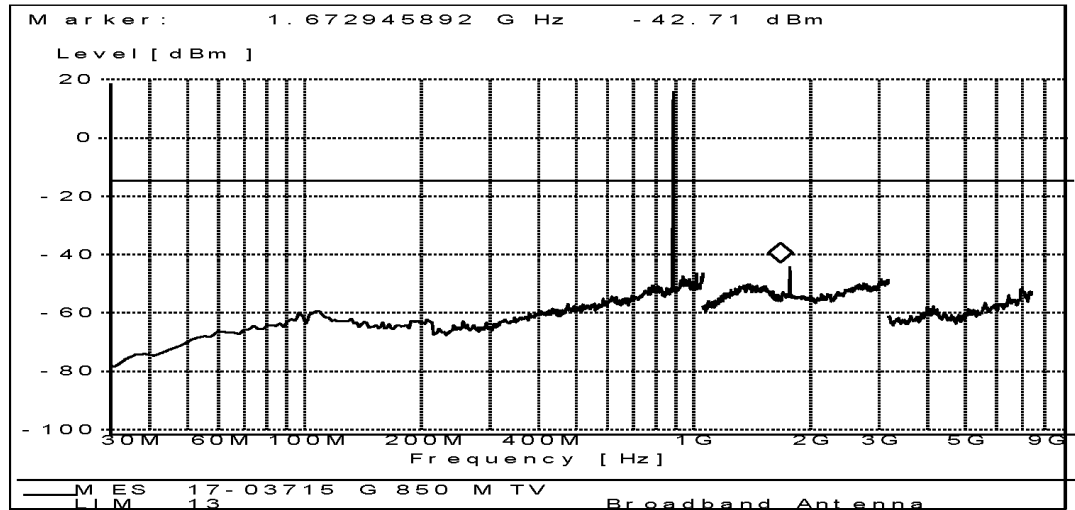
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MEASUREMENT RESULT: "result2"

2017/05/08 01:52nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.156300       | -57.73       | -13.00       |
| 749.899800       | -49.16       | -13.00       |
| 960.921800       | -44.80       | -13.00       |
| 1319.839700      | -48.52       | -13.00       |
| 1672.945900      | -42.71       | -13.00       |
| 2997.943900      | -46.71       | -13.00       |

2017/05/09 04:08nm

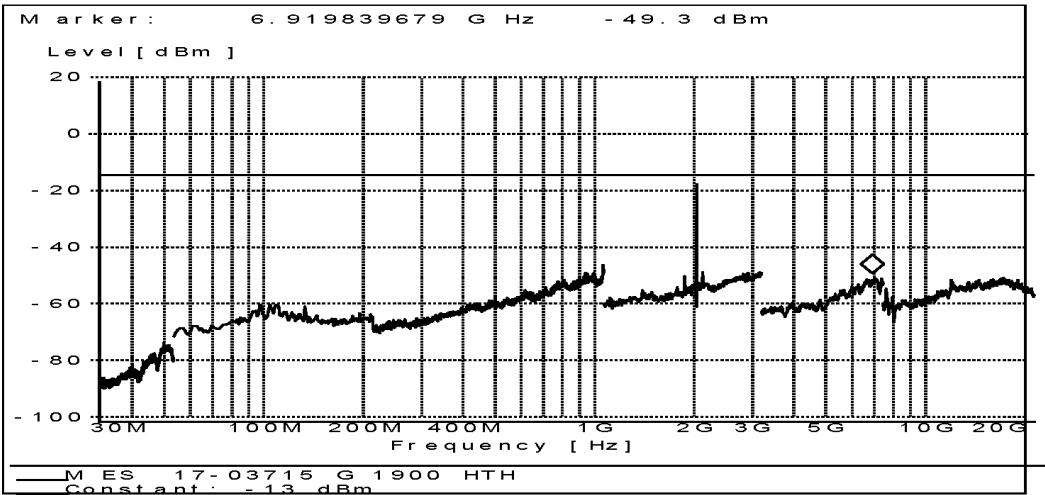
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MEASUREMENT RESULT: "result2"

2017/05/09 04:18nm

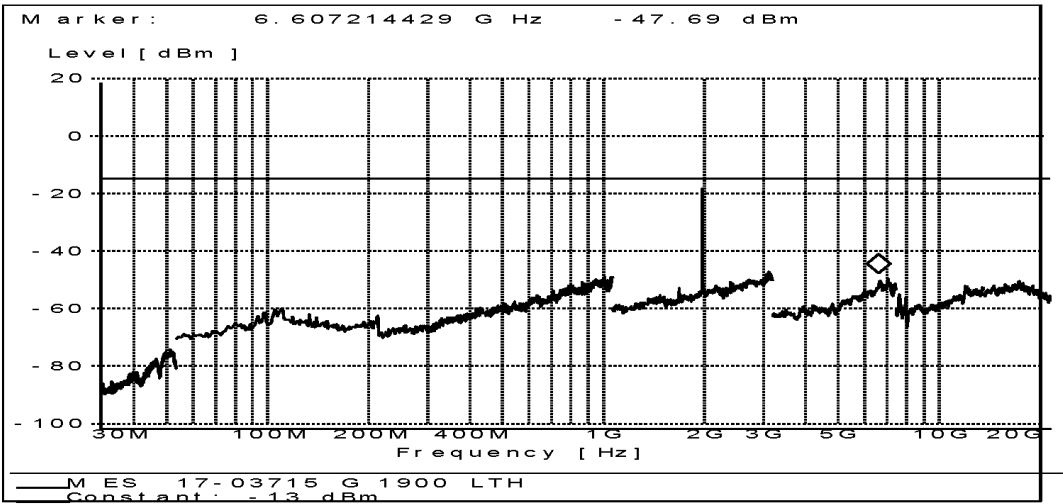
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 97.795600        | -58.56       | -13.00       |
| 997.996000       | -44.53       | -13.00       |
| 1757.515000      | -48.54       | -13.00       |
| 2735.470900      | -47.35       | -13.00       |
| 6919.839700      | -49.30       | -13.00       |
| 16178.857700     | -49.02       | -13.00       |

2017/05/09 04:48nm

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MEASUREMENT RESULT: "result2"

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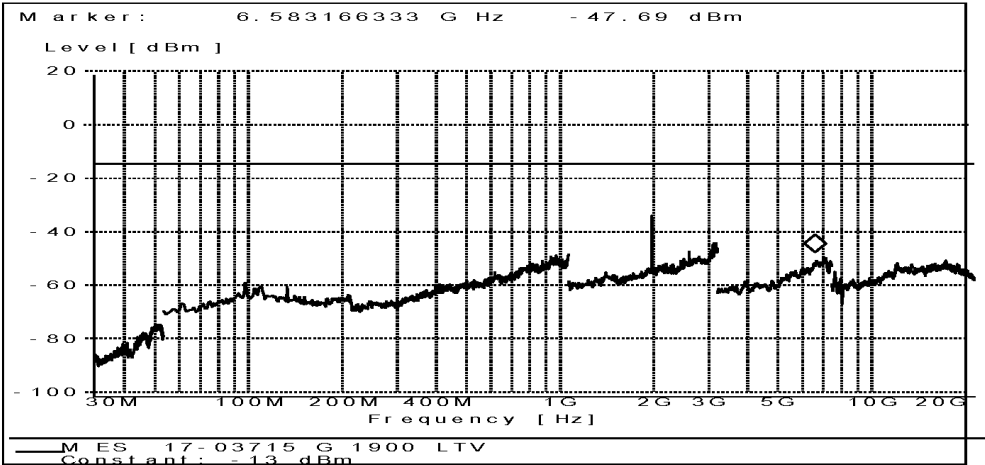
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.206400       | -58.39       | -13.00       |
| 947.895800       | -47.13       | -13.00       |
| 1581.162300      | -51.21       | -13.00       |
| 2923.847700      | -45.41       | -13.00       |
| 6607.214400      | -47.69       | -13.00       |
| 16266.032100     | -48.70       | -13.00       |

2017/05/09 04:31nm

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MEASUREMENT RESULT: "result2"

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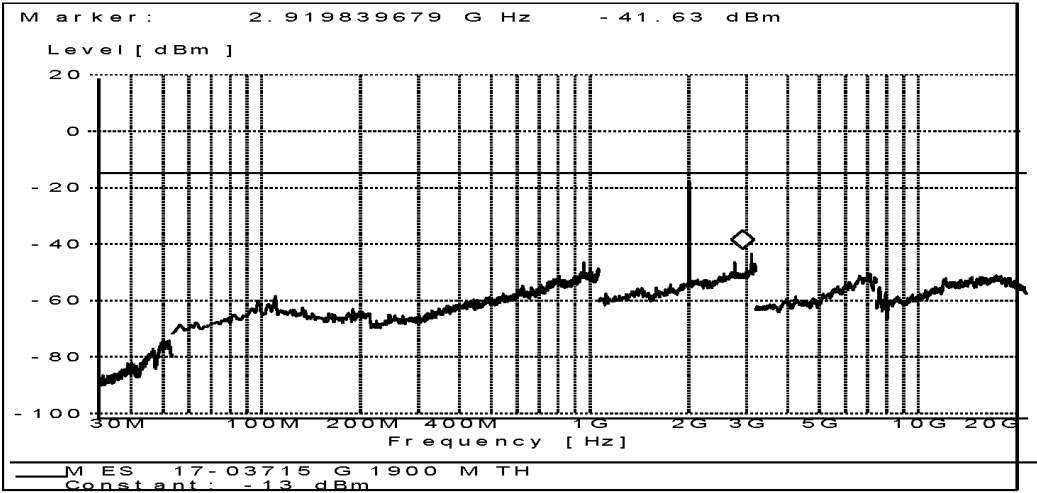
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 91.483000        | -57.30       | -13.00       |
| 909.819700       | -47.05       | -13.00       |
| 1316.663300      | -53.39       | -13.00       |
| 2927.855700      | -42.49       | -13.00       |
| 6583.166300      | -47.69       | -13.00       |
| 16266.032100     | -49.00       | -13.00       |

2017/05/09 04:35nm

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MEASUREMENT RESULT: "result2"

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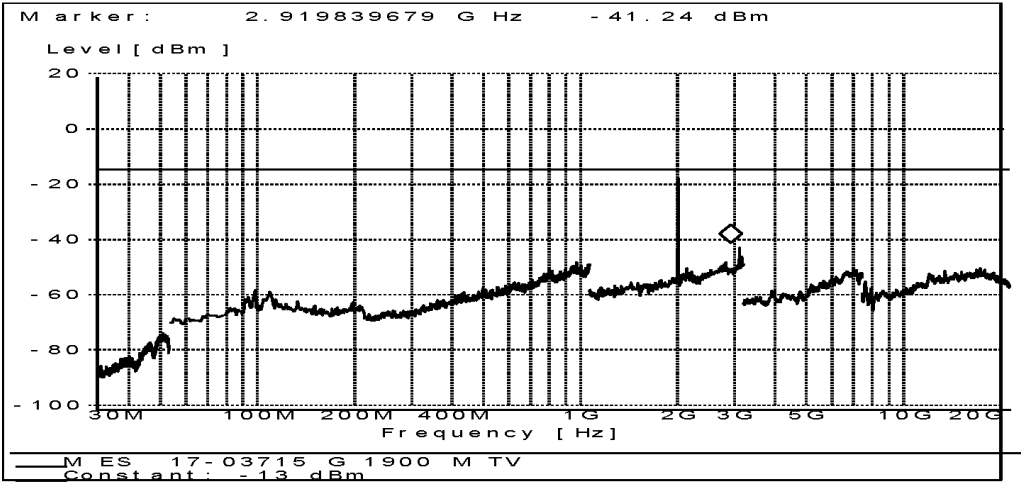
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.206400       | -56.66       | -13.00       |
| 898.797600       | -44.63       | -13.00       |
| 2595.190400      | -44.68       | -13.00       |
| 2919.839700      | -41.63       | -13.00       |
| 6599.198400      | -48.48       | -13.00       |
| 16222.444900     | -49.34       | -13.00       |

2017/05/09 04:43nm

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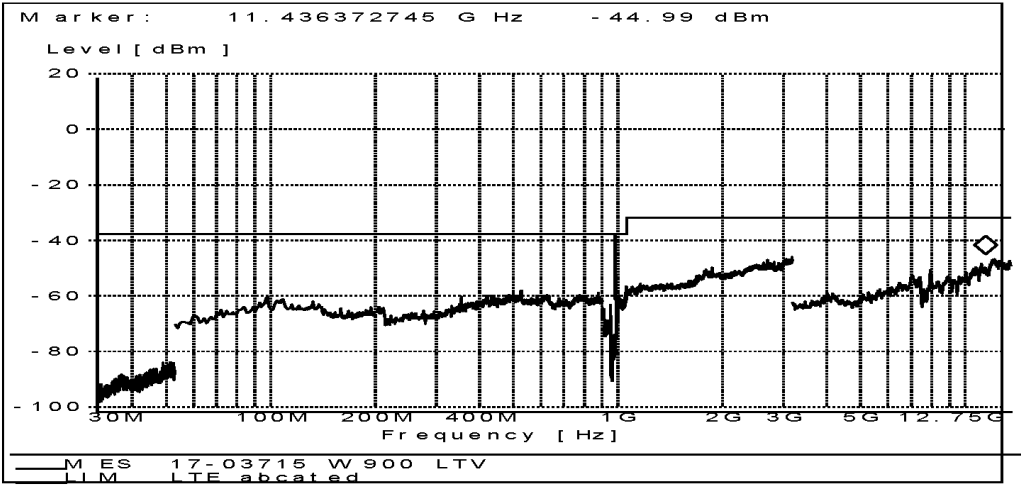
MEASUREMENT RESULT: "result2"

|                    |        |        |  |
|--------------------|--------|--------|--|
| 2017/05/09 04:18nm |        |        |  |
| Frequency          | Level  | Limit  |  |
| MHz                | dBm    | dBm    |  |
| 92.384800          | -56.65 | -13.00 |  |
| 911.823600         | -46.44 | -13.00 |  |
| 1344.689400        | -53.80 | -13.00 |  |
| 2919.899700        | -41.24 | -13.00 |  |
| 6583.166300        | -48.58 | -13.00 |  |
| 16222.444900       | -48.73 | -13.00 |  |

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MEASUREMENT RESULT: "result2"

2017/05/09 05:30nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 109.018000       | -58.89       | -13.00       |
| 742.084200       | -48.44       | -13.00       |
| 1306.613200      | -48.13       | -13.00       |
| 1653.306600      | -46.14       | -13.00       |
| 2907.414800      | -46.84       | -13.00       |
| 7495.491000      | -49.27       | -13.00       |

2017/05/09 06:01nm

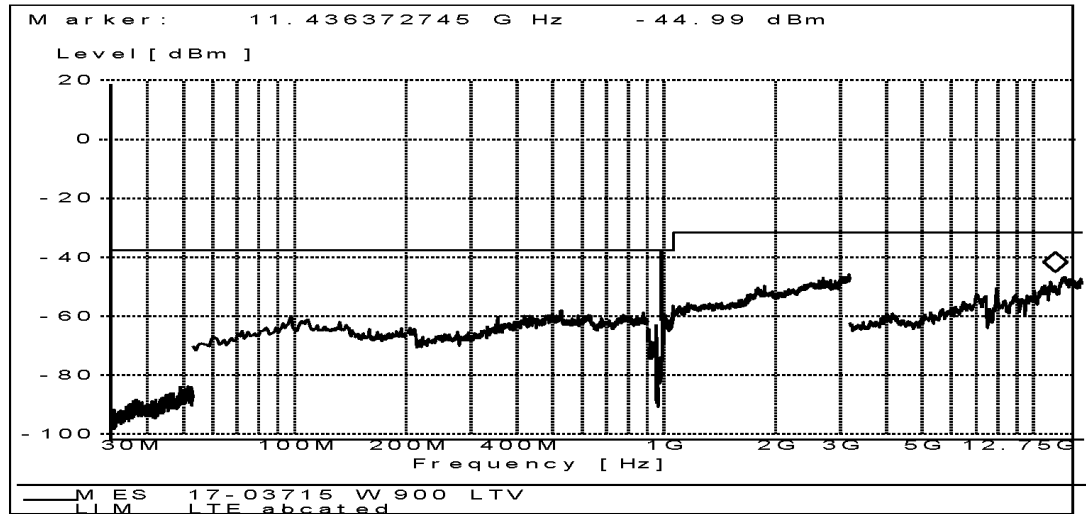
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MEASUREMENT RESULT: "result2"

2017/05/09 05:30nm

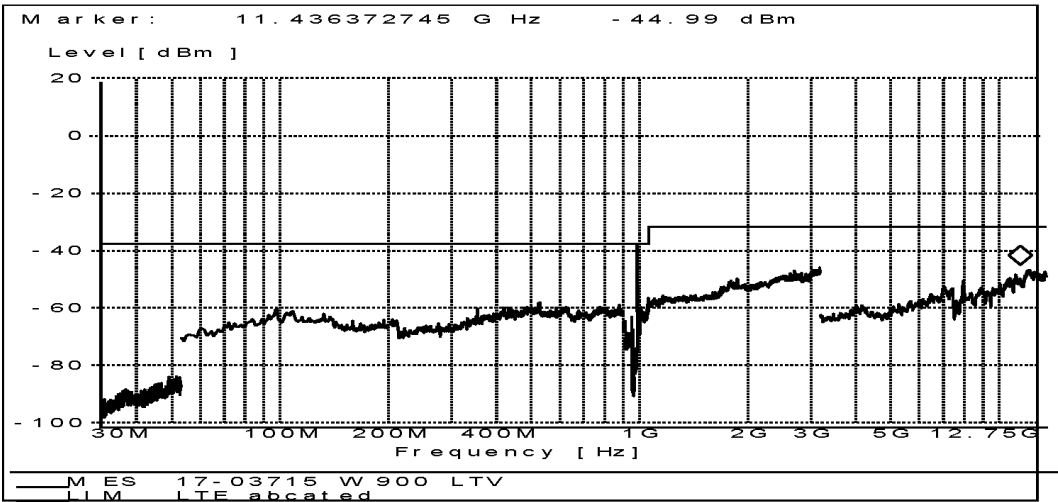
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 93.386800        | -59.07       | -13.00       |
| 710.821600       | -49.26       | -13.00       |
| 1365.531100      | -48.70       | -13.00       |
| 1751.503000      | -44.15       | -13.00       |
| 2994.388800      | -46.54       | -13.00       |
| 7495.491000      | -48.89       | -13.00       |

2017/05/09 06:06nm

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MEASUREMENT RESULT: "result2"

2017/05/09 05:30nm

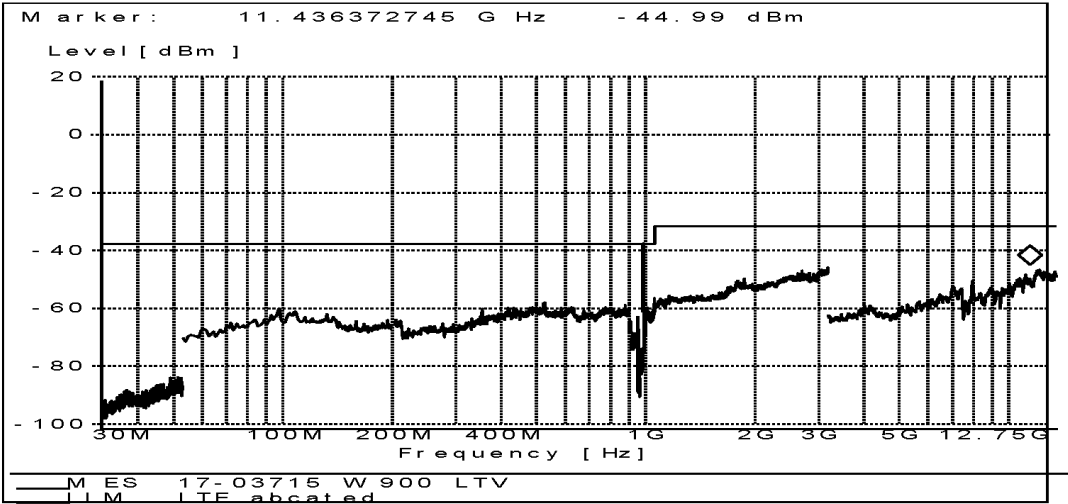
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.156300       | -55.24       | -13.00       |
| 736.222400       | -49.08       | -13.00       |
| 1371.543100      | -48.04       | -13.00       |
| 1653.306600      | -46.14       | -13.00       |
| 2997.194400      | -46.93       | -13.00       |
| 7495.491000      | -48.77       | -13.00       |

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MEASUREMENT RESULT: "result2"

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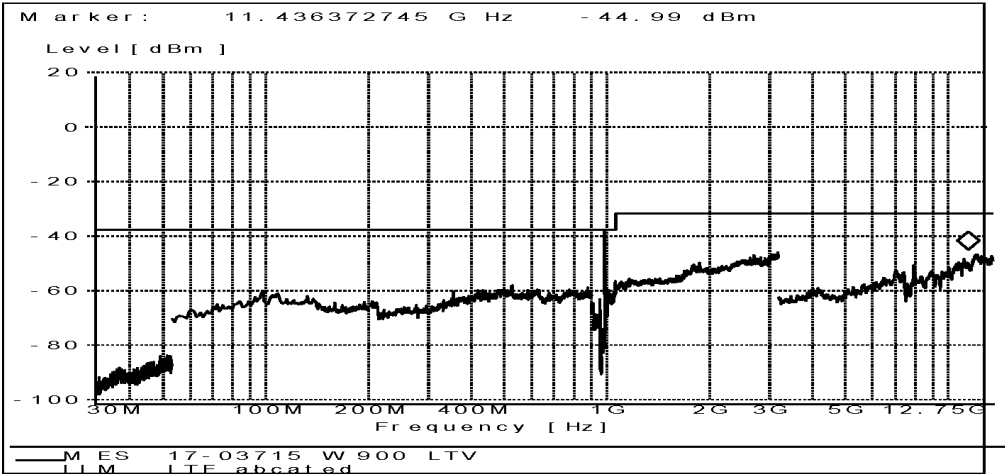
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 101.202400       | -57.66       | -13.00       |
| 761.323200       | -49.19       | -13.00       |
| 1322.224400      | -48.23       | -13.00       |
| 1743.086200      | -49.44       | -13.00       |
| 2997.194400      | -49.09       | -13.00       |
| 7495.491000      | -48.48       | -13.00       |

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MEASUREMENT RESULT: "result2"

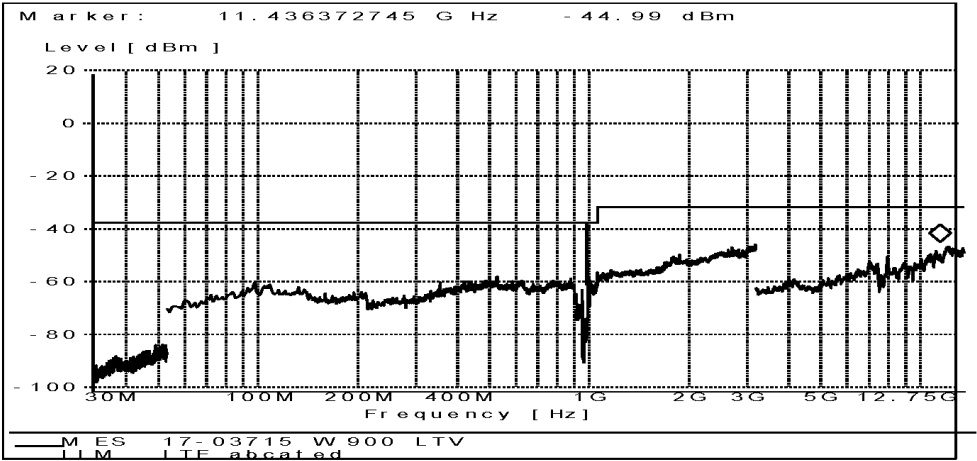
2017/05/09 05:30nm

| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 128.557100       | -59.58       | -13.00       |
| 753.807600       | -48.12       | -13.00       |
| 1416.032100      | -48.45       | -13.00       |
| 1670.140300      | -40.40       | -13.00       |
| 2994.388800      | -46.69       | -13.00       |
| 7483.968000      | -49.66       | -13.00       |

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MEASUREMENT RESULT: "result2"

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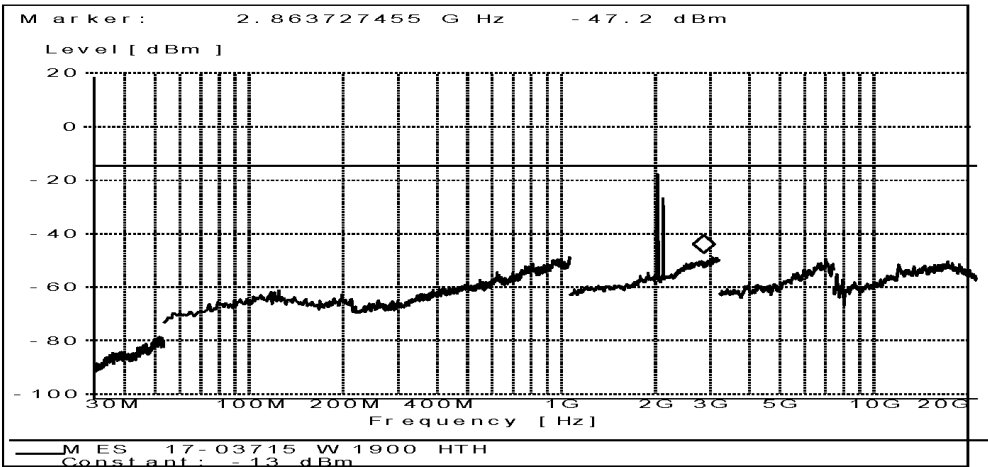
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 85.571100        | -59.62       | -13.00       |
| 755.761500       | -49.32       | -13.00       |
| 1317.434900      | -48.14       | -13.00       |
| 1667.334700      | -50.50       | -13.00       |
| 2991.583200      | -45.91       | -13.00       |
| 7495.491000      | -49.20       | -13.00       |

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MEASUREMENT RESULT: "result2"

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| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 116.733400       | -59.33       | -13.00       |
| 936.873700       | -47.56       | -13.00       |
| 2863.727500      | -47.20       | -13.00       |
| 4010.002000      | -57.44       | -13.00       |
| 6583.166300      | -47.79       | -13.00       |
| 16193.386800     | -48.65       | -13.00       |

2017/05/09 06:49nm

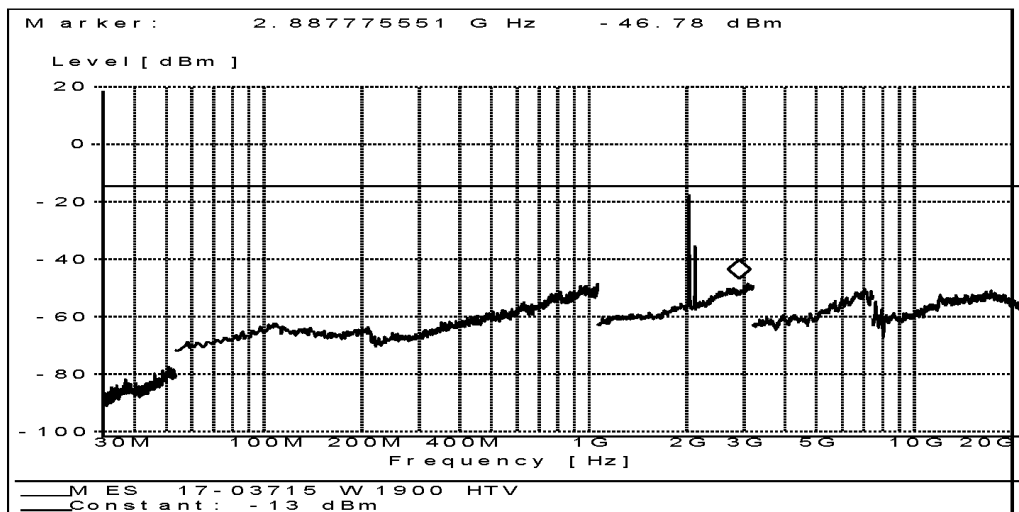
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MEASUREMENT RESULT: "result2"

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| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 98.742500        | -58.24       | -13.00       |
| 977.924700       | -44.35       | -13.00       |
| 1724.245000      | -48.52       | -13.00       |
| 2724.542700      | -47.42       | -13.00       |
| 6922.357800      | -49.22       | -13.00       |
| 16278.754600     | -49.14       | -13.00       |

2017/05/09 06:54nm

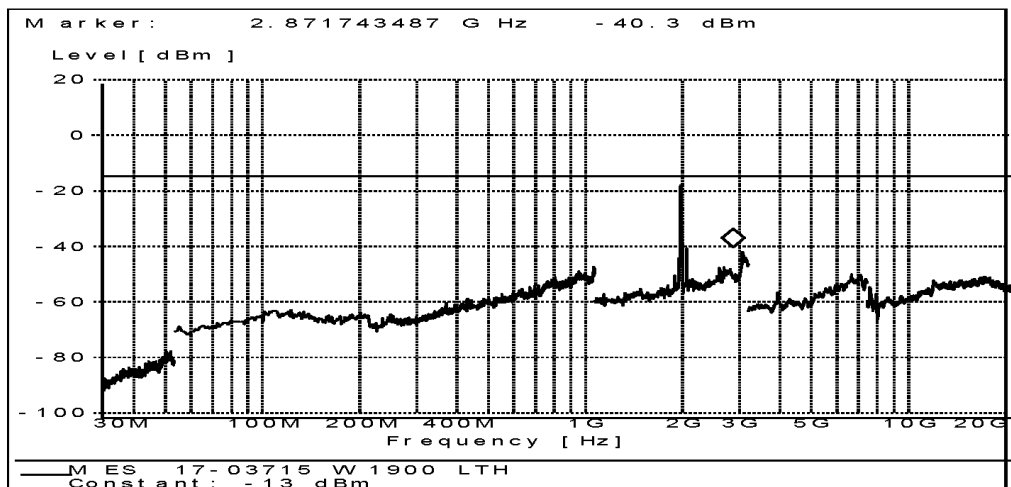
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MEASUREMENT RESULT: "result2"

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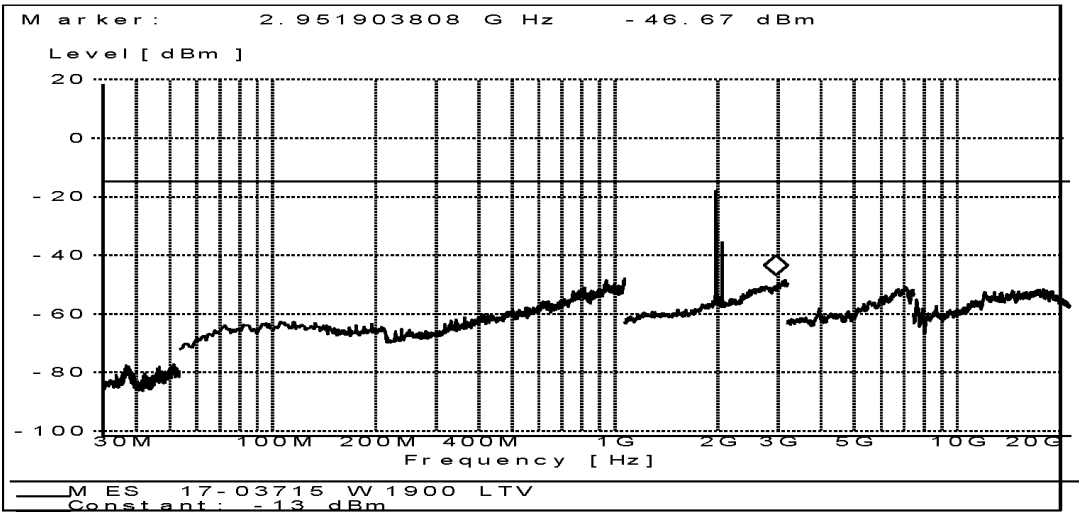
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 114.929900       | -61.22       | -13.00       |
| 996.994000       | -45.55       | -13.00       |
| 2871.743500      | -40.30       | -13.00       |
| 3697.394800      | -54.92       | -13.00       |
| 6270.541100      | -48.32       | -13.00       |
| 16207.915800     | -49.20       | -13.00       |

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MEASUREMENT RESULT: "result2"

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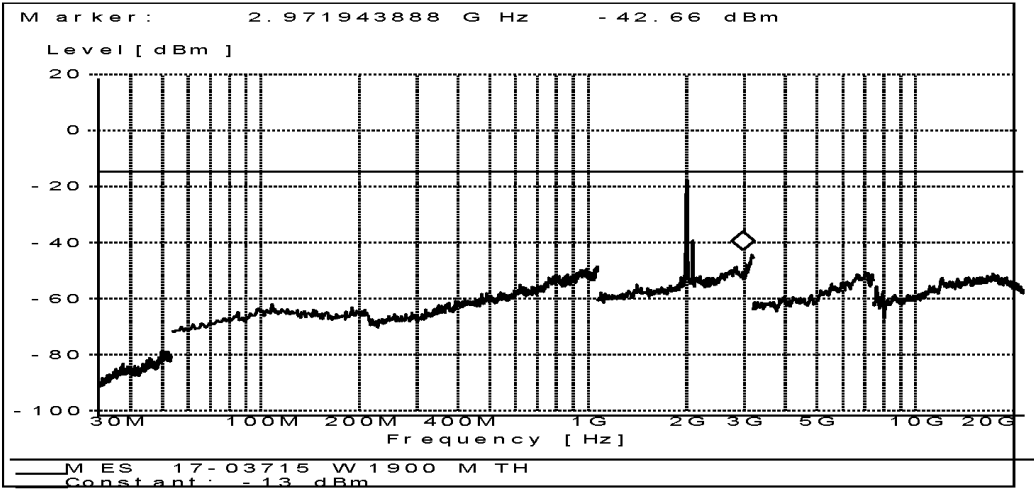
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 107.715400       | -60.93       | -13.00       |
| 888.777600       | -46.82       | -13.00       |
| 2951.903800      | -46.67       | -13.00       |
| 3705.410800      | -56.32       | -13.00       |
| 6623.246500      | -48.98       | -13.00       |
| 16745.491000     | -49.78       | -13.00       |

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MEASUREMENT RESULT: "result2"

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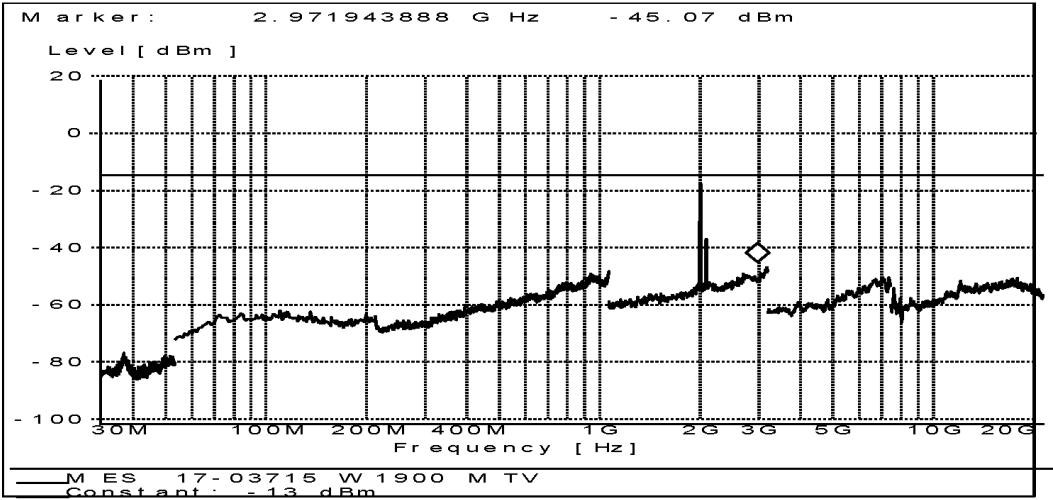
| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 101.402800       | -60.15       | -13.00       |
| 925.851700       | -47.72       | -13.00       |
| 2971.943900      | -42.66       | -13.00       |
| 3721.442900      | -58.09       | -13.00       |
| 6599.198400      | -48.99       | -13.00       |
| 16164.328700     | -49.29       | -13.00       |

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MEASUREMENT RESULT: "result2"

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| Frequency<br>MHz | Level<br>dBm | Limit<br>dBm |
|------------------|--------------|--------------|
| 103.206400       | -60.31       | -13.00       |
| 882.765500       | -47.35       | -13.00       |
| 2971.943900      | -45.07       | -13.00       |
| 3721.442900      | -57.23       | -13.00       |
| 6615.230400      | -48.55       | -13.00       |
| 16730.961900     | -48.87       | -13.00       |

2017/05/09 06:38nm