



## PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

### EMC TEST REPORT - Addendum

**Test Report Number** –24965-1 BT

**Report Date** – 2012-04-09

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signature:

Name: Lei Yang

Title: EMC Project Engineer

Test: 2012-03-07 to 2012-03-27

As the responsible test lab manager, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature:

Name: Yilin Zhao

Title: Test Lab Manager

Date: 2012-04-17

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FCC Registration Number: 402854  
IC Registration Number: 109AW-1

ADR Testing Service location ADR BJ  
ISO/IEC-17025:2005 accredited by UKAS



UKAS Certificate Number: 2404

**Table of Contents**

Test Report Details .....	3
Applicable Standards .....	3
Summary of Testing.....	4
General and Special Conditions.....	4
Equipment and Cable Configurations .....	5
Measuring Equipment and Calibration Information .....	5
Description of Bluetooth Transmitter .....	5
Measurement Procedures and Data.....	6
Spectrum Bandwidth.....	6
Measurement Procedure.....	6
Measurement Results .....	6
PEAK OUTPUT POWER .....	13
Measurement Procedure.....	13
Measurement Results .....	13
Power Spectral Density .....	17
Measurement Procedure.....	17
Measurement Results .....	17
SPURIOUS RF CONDUCTED EMISSIONS .....	18
Measurement Procedure.....	18
Measurement Results .....	18
AC LINE CONDUCTED EMISSIONS .....	31
Measurement Procedure.....	31
Measurement Results .....	31

**Test Report Details**

Tests Performed By: Motorola (Beijing) Mobility Technologies Co., Ltd.  
Asia Global Compliance Labs  
No.1 Wang Jing East Road  
Chao Yang District  
Beijing, 100102, P. R. China  
Phone: +86 10 8499 5891  
FCC Registration Number: 402854  
IC Registration Number: 109AW-1

Tests Requested By: Motorola Mobility Inc.  
No. 1 Wang Jing East Road  
Chao Yang District  
Beijing, 100102, P. R. China

Product Type: Cell phone with embedded Bluetooth

Signaling Capability: GSM850/1900, EDGE850/1900, CDMA 850/1900,  
EVDO, Bluetooth, 802.11b/802.11g/802.11n

IMEI: 351633050007759

FCC ID: IHDT56NH2

Project number: 24965-1

Testing Complete Date: 2012-03-27

**Applicable Standards**

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

  X   Part 15 Subpart C – Intentional Radiators

Applicable Standards: ANSI 63.4 2003, RSS-210 Issue 8

**Summary of Testing**

Test	Test Name	Pass/Fail
1	Spectrum Bandwidth	Pass
2	Peak Power	Pass
3	Power Spectral Density	Pass
4	Spurious RF Conducted Emissions	Pass
5	AC Line Conducted Emissions	Pass

Test	Test Name	Results
1	Spectrum Bandwidth	See plots
2	Peak Power	See plots
3	Power Spectral Density	See tables
4	Spurious RF Conducted Emissions	See plots
5	AC Line Conducted Emissions	See Plots

**General and Special Conditions**

This product utilizes an internal battery that is not removable. When applicable, EMC testing was performed with the internal battery fully charged.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

## **Equipment and Cable Configurations**

The EUT was tested in a stand-alone configuration that is representative of typical use.

## **Measuring Equipment and Calibration Information**

Manufacturer	Equipment Type	Model No.	Serial Number	Date of calibration
Rohde Schwarz	Receiver	ESU40	100036	11/08/11
Rohde Schwarz	Receiver	ESCI	100650	03/13/12
Agilent	Attenuator	8491A	MY39263202	NCR
Rohde Schwarz	LISN	ENV216	100375	12/19/2010

All test equipment was within their calibration date during the time of testing. When equipment went out of calibration during testing it was replaced using a similar piece of calibrated equipment. All these equipments are listed in the equipment list. The LISI is on a two-year calibration cycle. All other equipment is on a one-year calibration cycle.

## **Description of Bluetooth Transmitter**

The Equipment Under Test (EUT) offers Bluetooth LE + EDR as a feature. This report covers Bluetooth LE operation only. The Bluetooth LE + EDR spread-spectrum, is designed to operate between 2402 and 2480 MHz. The Bluetooth antenna is mounted inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a Bluetooth LE transmitter, it is designed operate with other Bluetooth LE devices as defined by the industrial standard. In this application, the device is battery operated.

### **De Facto EIRP Limit – Pursuant 47 CFR 15.247(b)(4); RSS-210 Section A8.4.**

Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB<sub>i</sub>. If transmitting antennas of directional gain greater than 6 dB<sub>i</sub> are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB<sub>i</sub>.

The antenna employed by this transmitter is intended to be omni-directional, and thus will not exhibit directional gain in excess of 6 dB<sub>i</sub>. The conducted power is less than the limits set forth (see elsewhere in this report for details).

## **Measurement Procedures and Data**

### **Spectrum Bandwidth**

CFR 47 Part 15.247

### **Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20dB passive attenuator. The fully charged internal battery was used for the supply voltage.

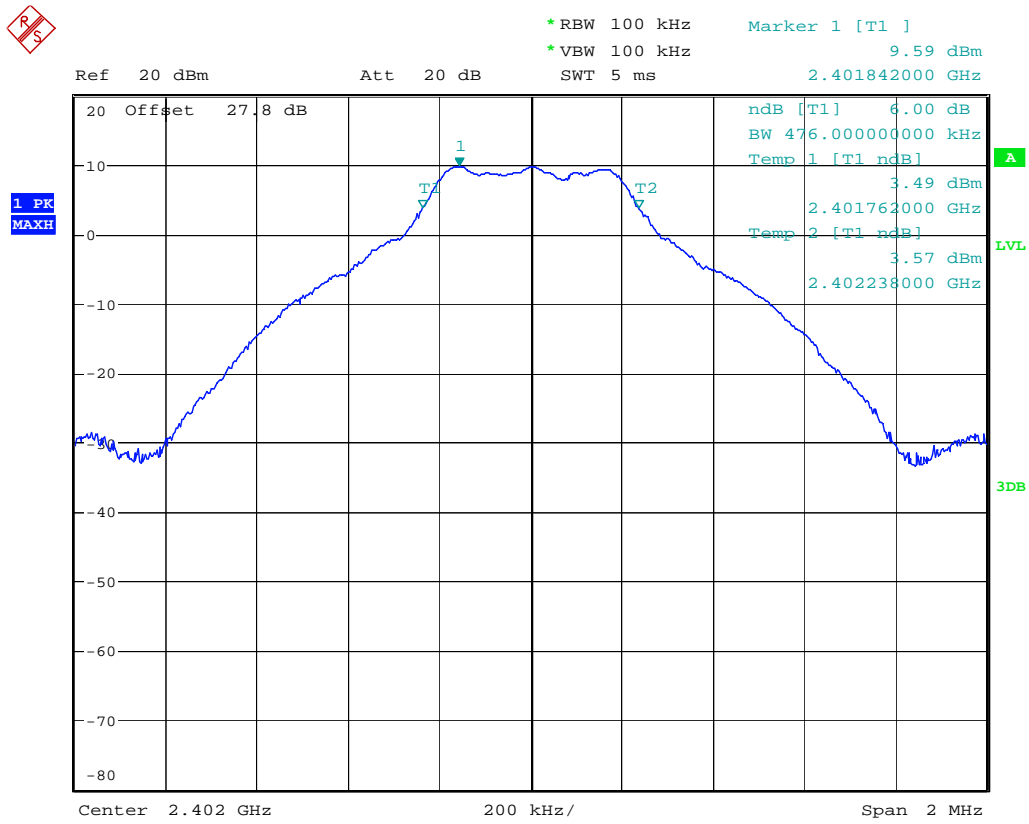
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1.  $RBW \geq 100 \text{ kHz}$
2.  $VBW \geq RBW$
3. Sweep = auto
4. Detector function = peak
5. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 6 dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 6 dB bandwidth of the emission. The same procedure was repeated for 20 dB bandwidth.

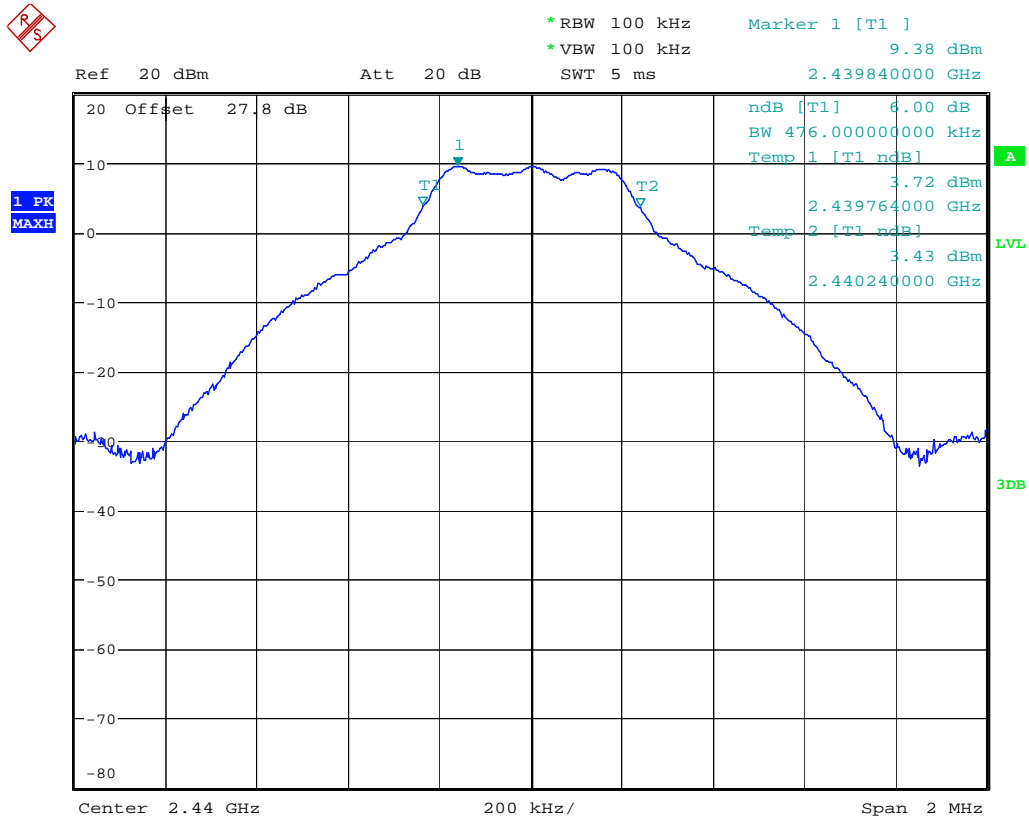
### **Measurement Results**

See attached



Date: 27.MAR.2012 11:13:20

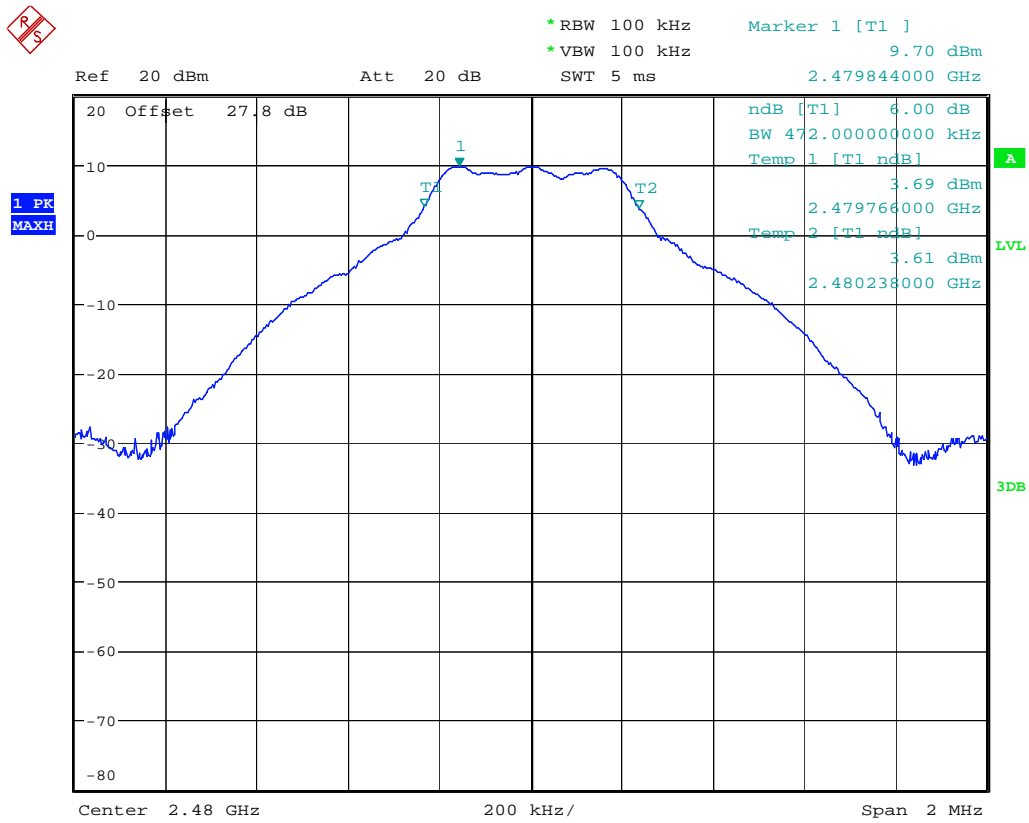
### 6 dB Bandwidth Low Channel



Date: 27.MAR.2012 11:14:55

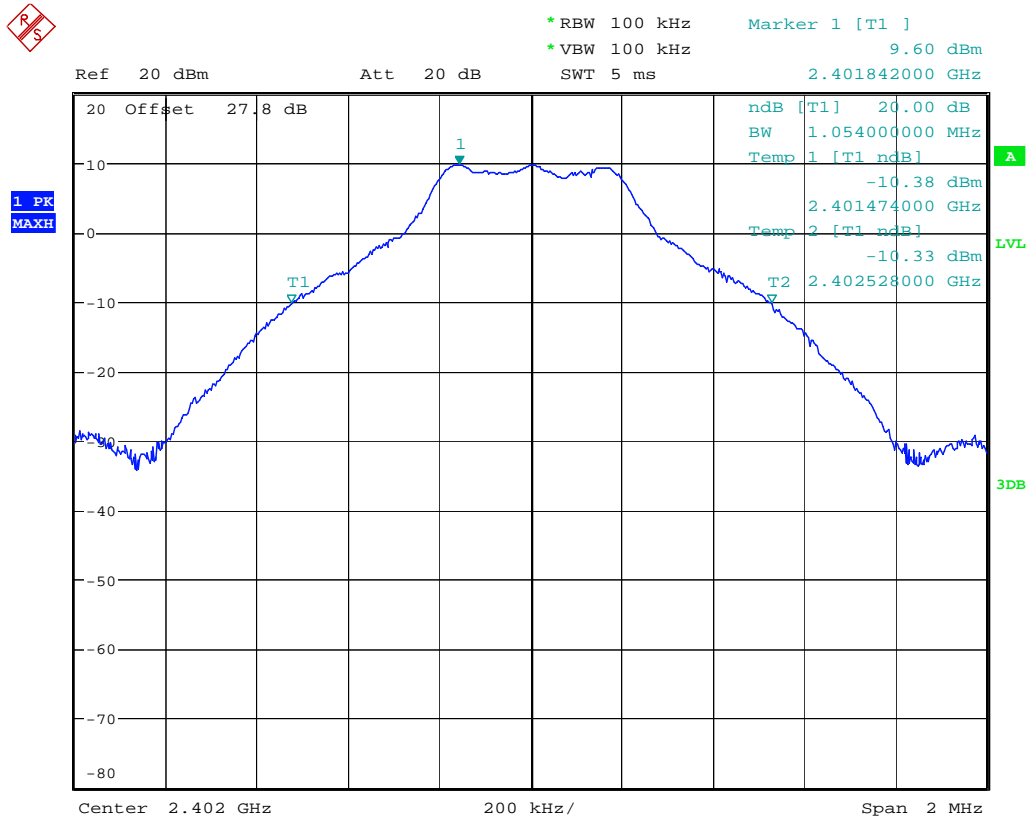
### 6 dB Bandwidth Mid Channel





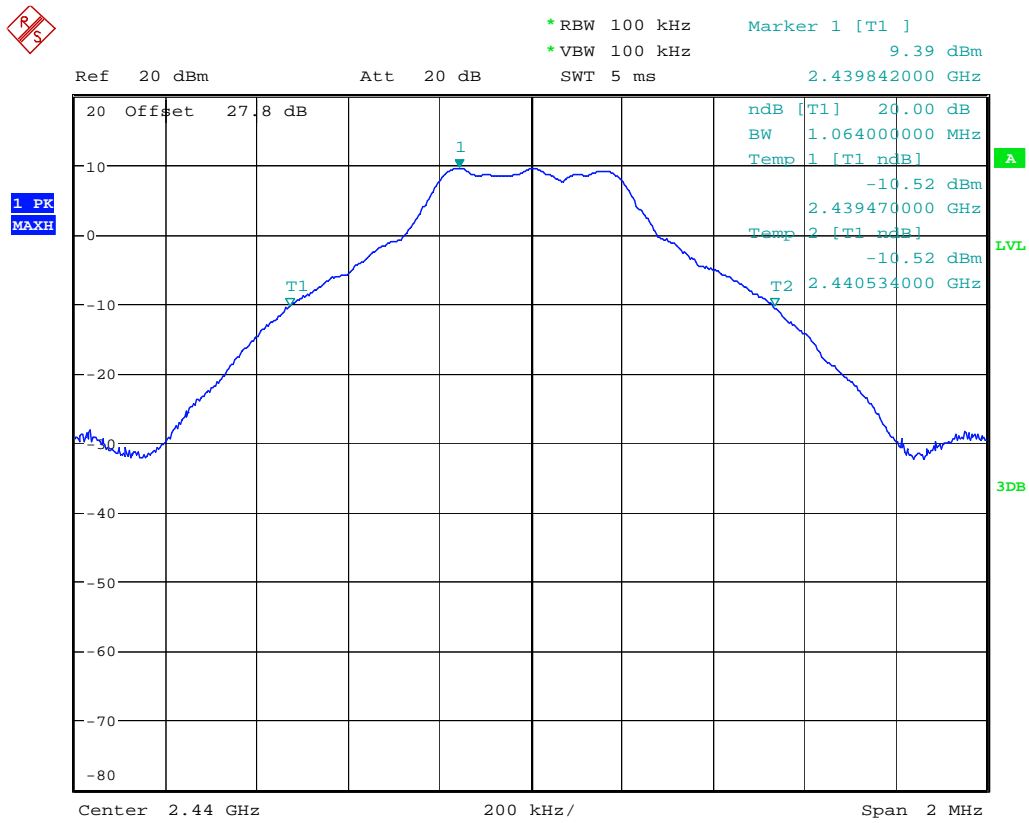
Date: 27.MAR.2012 11:16:35

### 6 dB Bandwidth High Channel



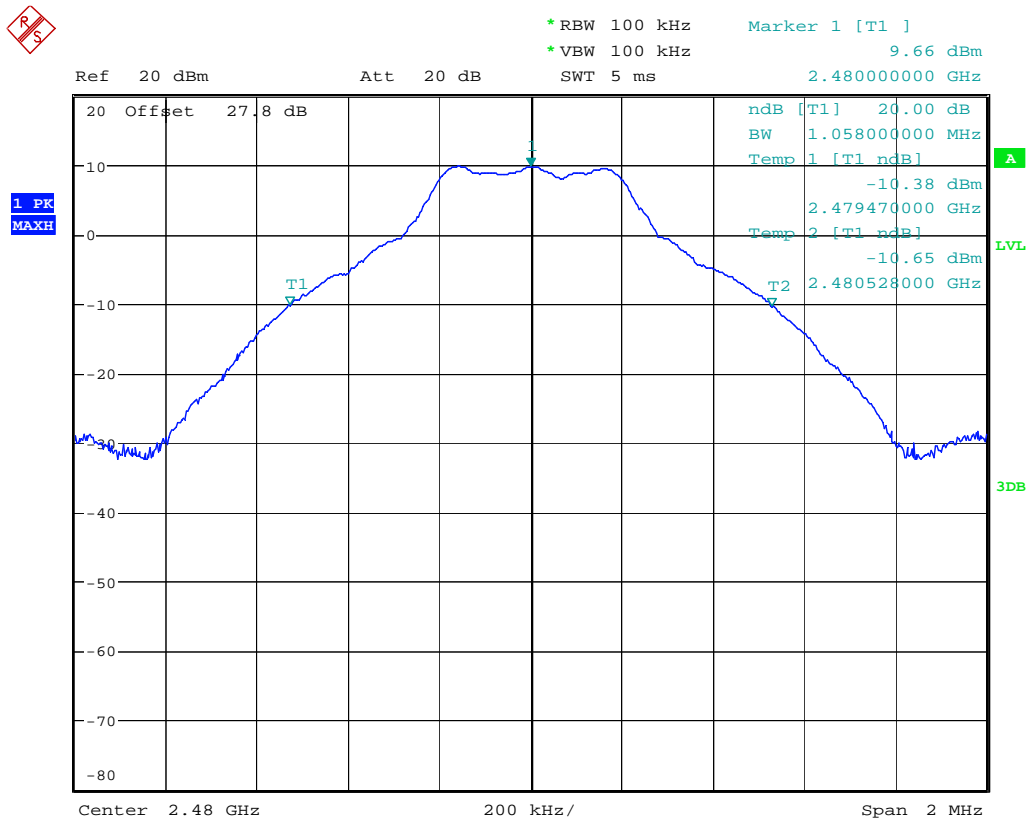
Date: 27.MAR.2012 11:17:51

### 20 dB Bandwidth Low Channel



Date: 27.MAR.2012 11:20:55

### 20 dB Bandwidth Mid Channel



Date: 27.MAR.2012 11:22:42

### 20 dB Bandwidth High Channel

## **PEAK OUTPUT POWER**

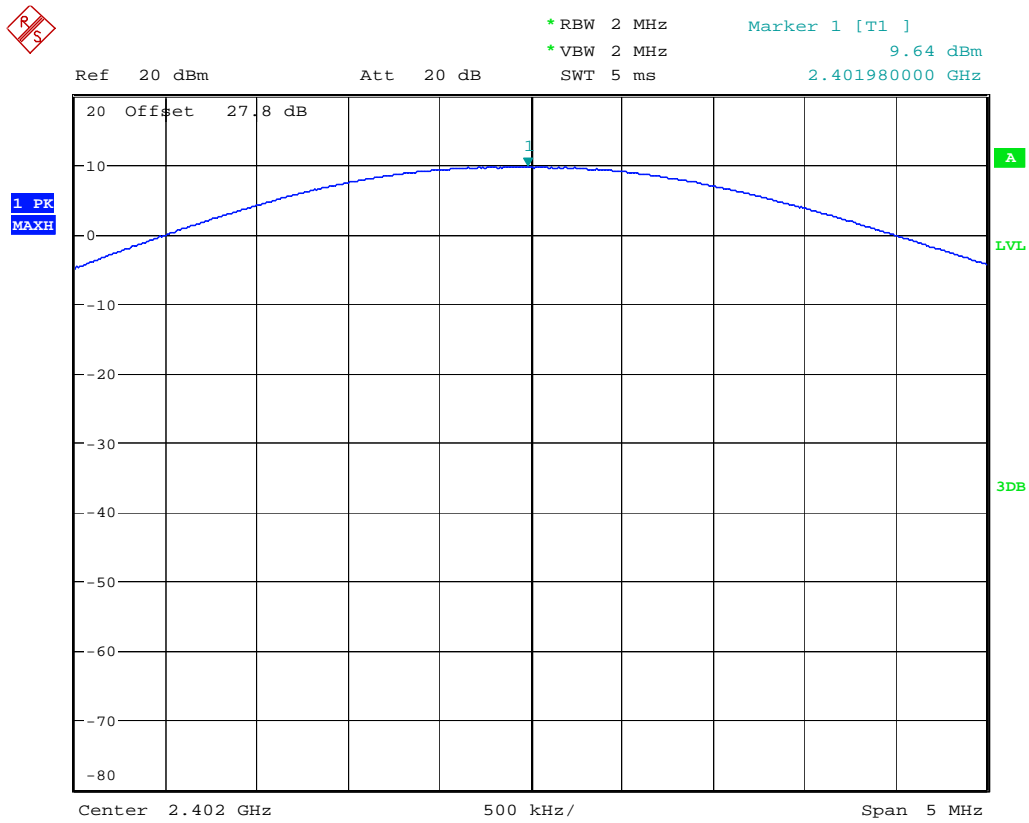
CFR 47 Part 15.247

### **Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the Spectrum analyzer through a specialized RF connector and a 20dB passive attenuator. The fully charged internal battery was used for the supply voltage. The power is then measured using a peak detector,

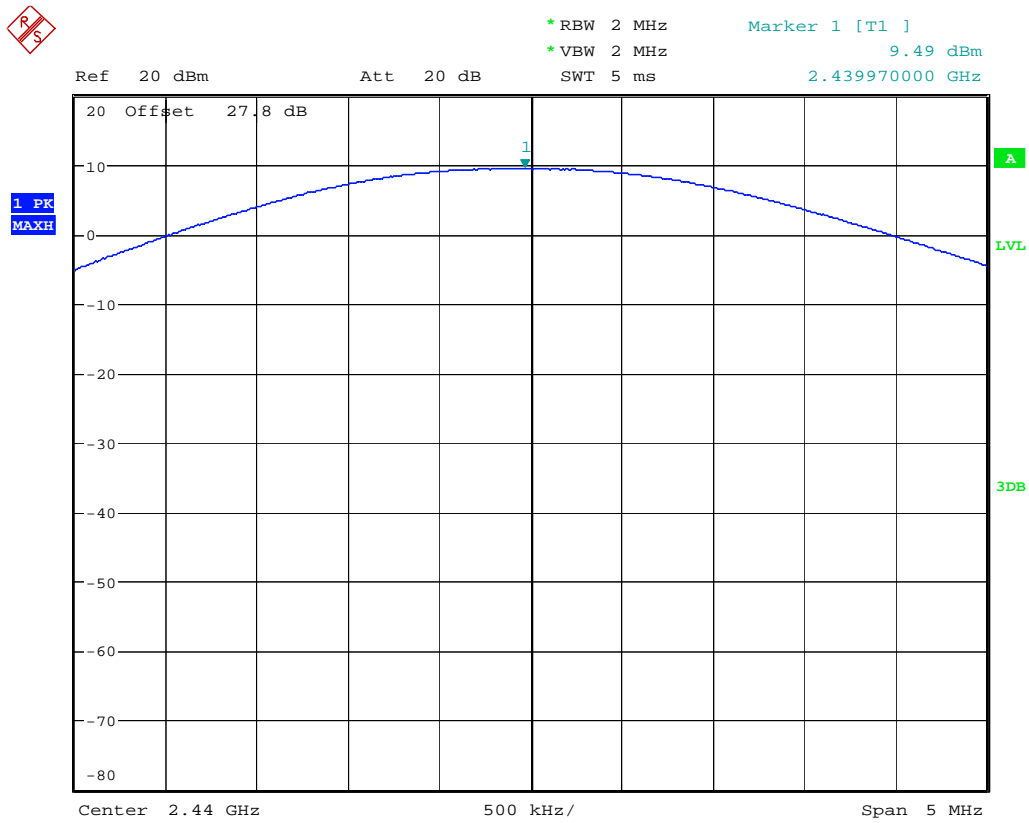
### **Measurement Results**

See Attached



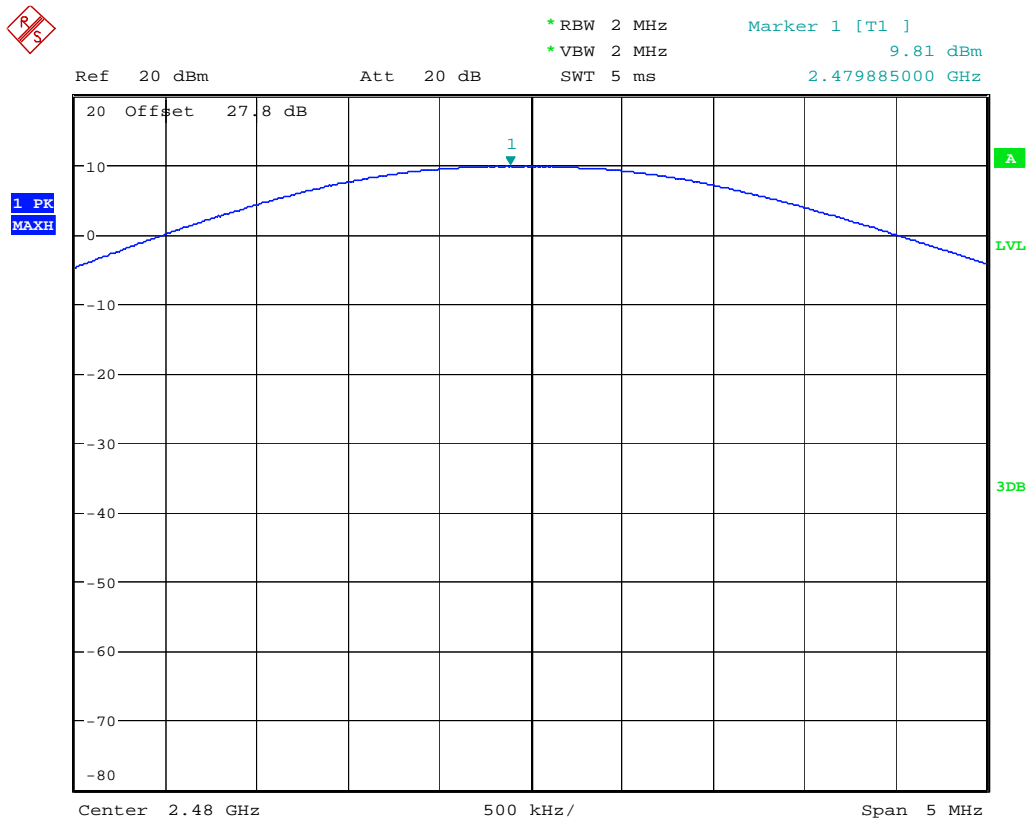
Date: 27.MAR.2012 11:25:30

### Max. Power Low Channel



Date: 27.MAR.2012 11:26:28

### Max. Power Mid Channel



Date: 27.MAR.2012 11:26:53

### Max. Power High Channel



**Power Spectral Density**

CFR 47 Part 15.247

**Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20dB passive attenuator. The fully charged internal battery was used for the supply voltage.

The BT LE function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = 300 kHz
2. VBW = 30 kHz
3. RBW = 3 kHz
4. Sweep = 50 ms
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate.

**Measurement Results**

2402 MHz	2440 MHz	2480 MHz
-3.20	-3.54	-3.03

## **SPURIOUS RF CONDUCTED EMISSIONS**

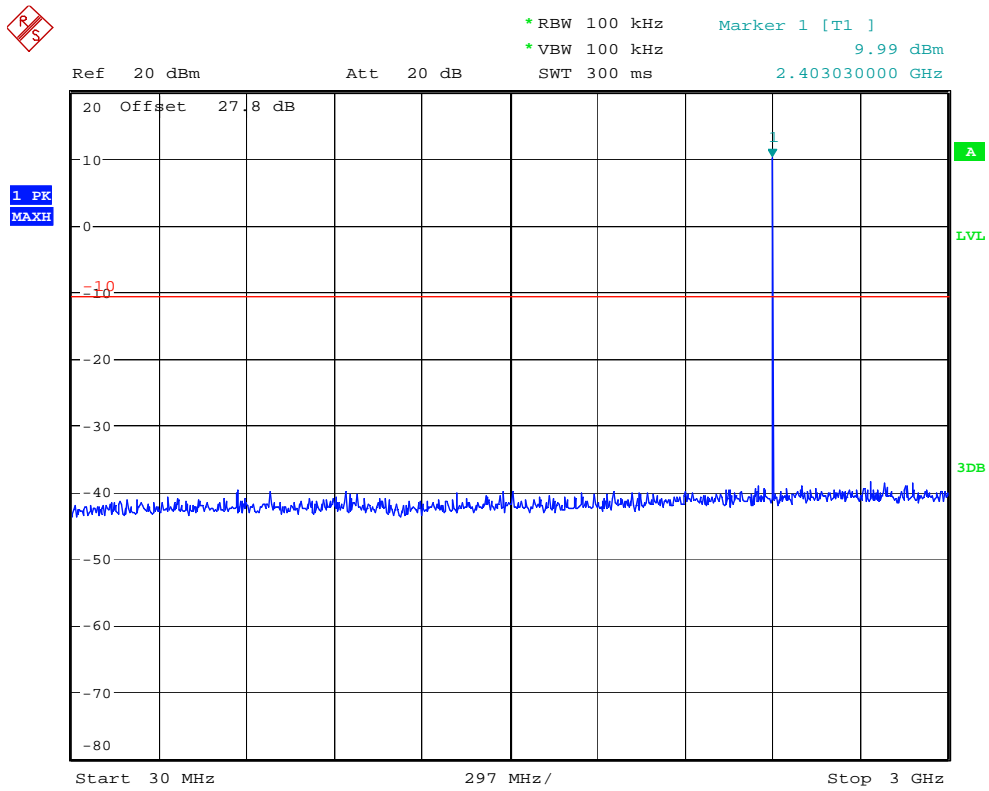
CFR 47 Part 15.247

### **Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 20dB passive attenuator. The fully charged internal battery was used for the supply voltage.

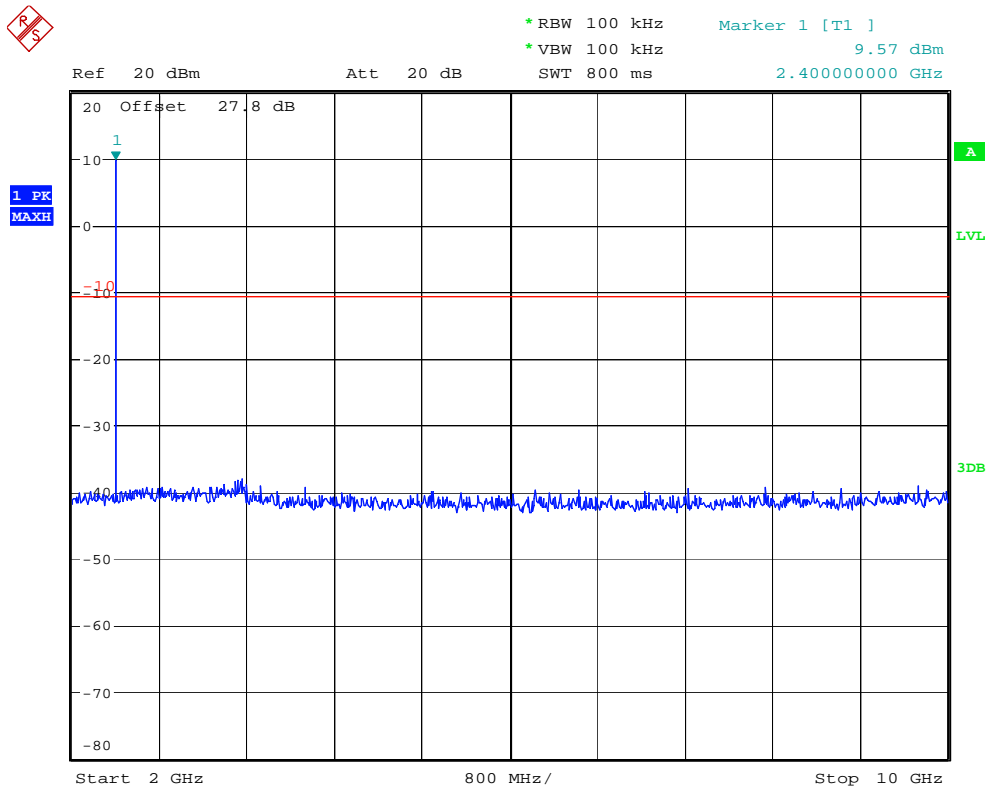
### **Measurement Results**

See attached:



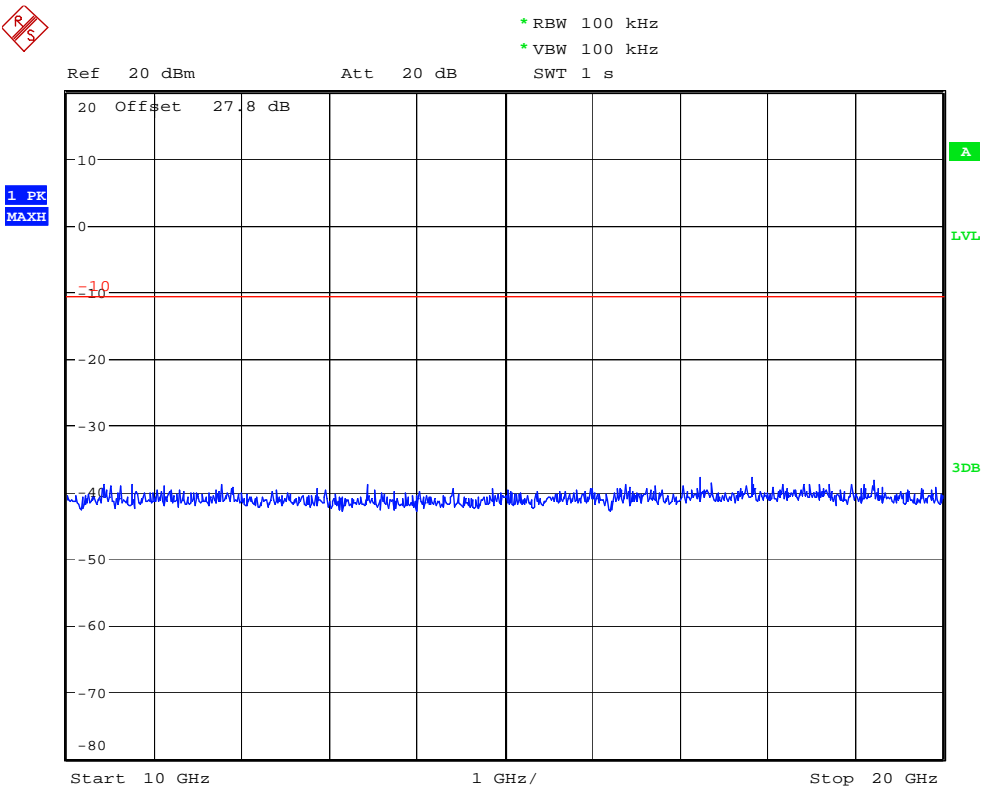
Date: 27.MAR.2012 11:31:10

## Conducted Spurious Emissions 30-3000 MHz (Low Channel)



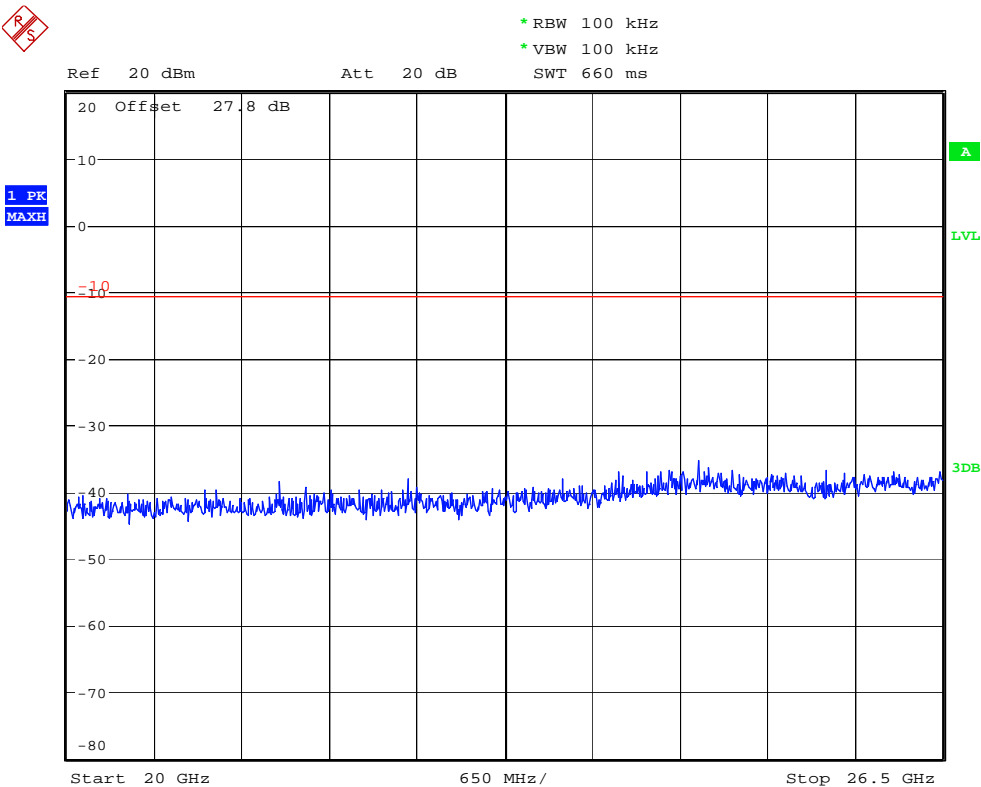
Date: 27.MAR.2012 11:32:19

## Conducted Spurious Emissions 2-10 GHz (Low Channel)



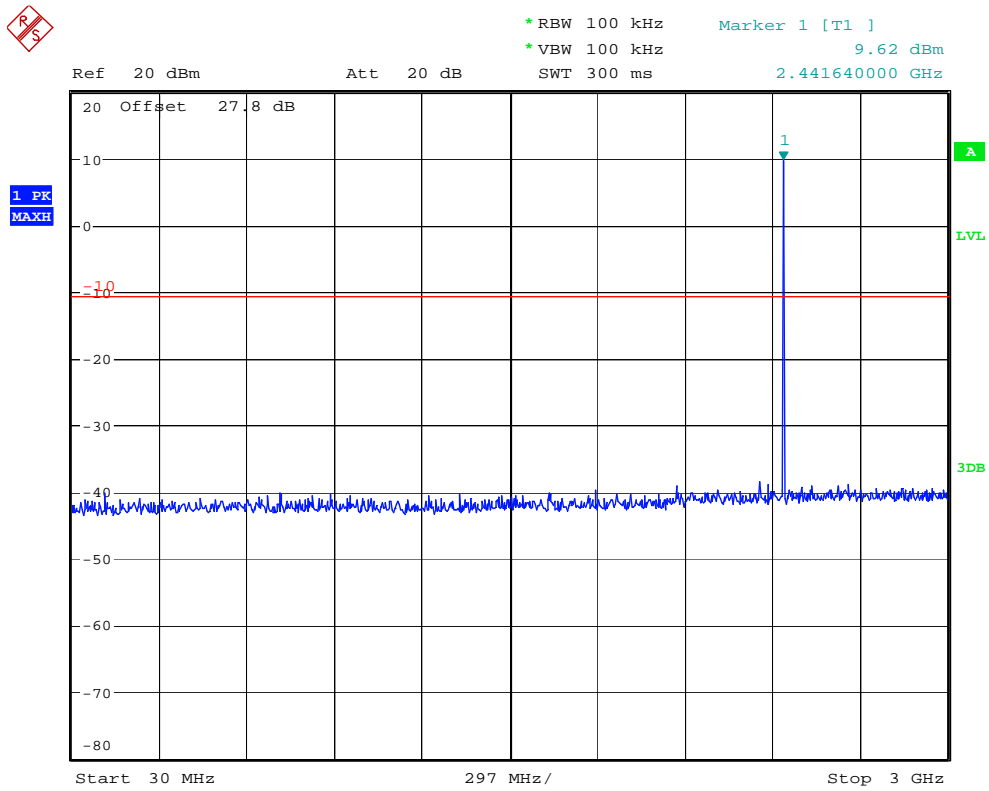
Date: 27.MAR.2012 11:32:54

Conducted Spurious Emissions 10-20 GHz (Low Channel)



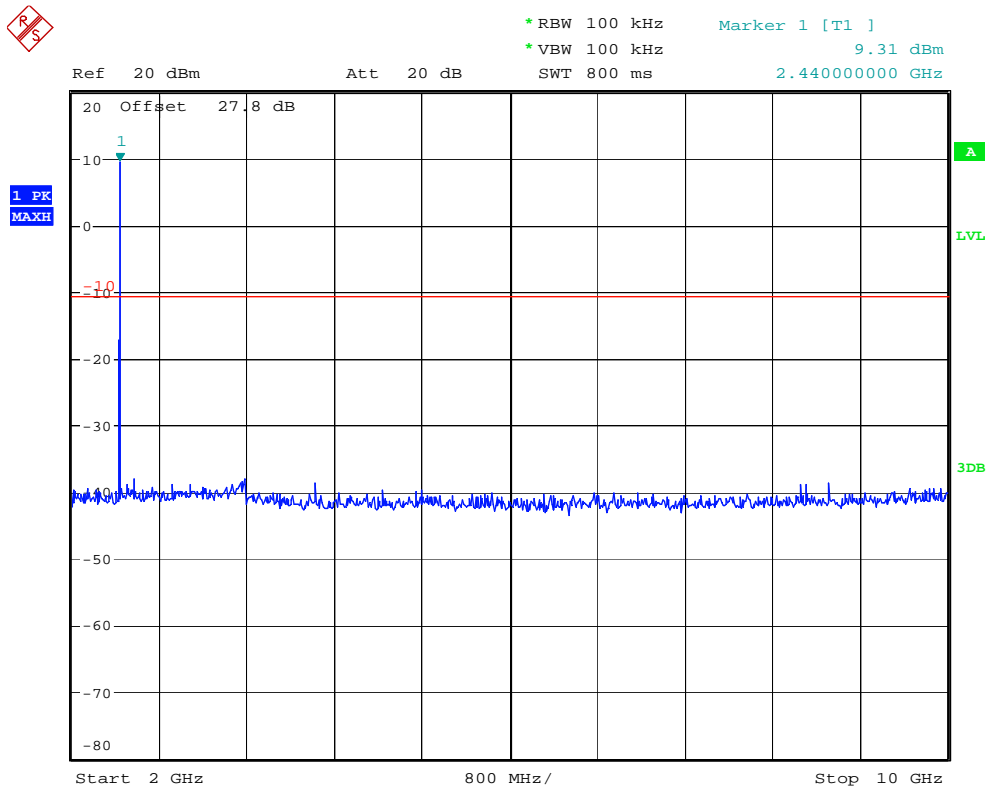
Date: 27.MAR.2012 11:33:06

Conducted Spurious Emissions 20-26.5 GHz (Low Channel)



Date: 27.MAR.2012 11:34:17

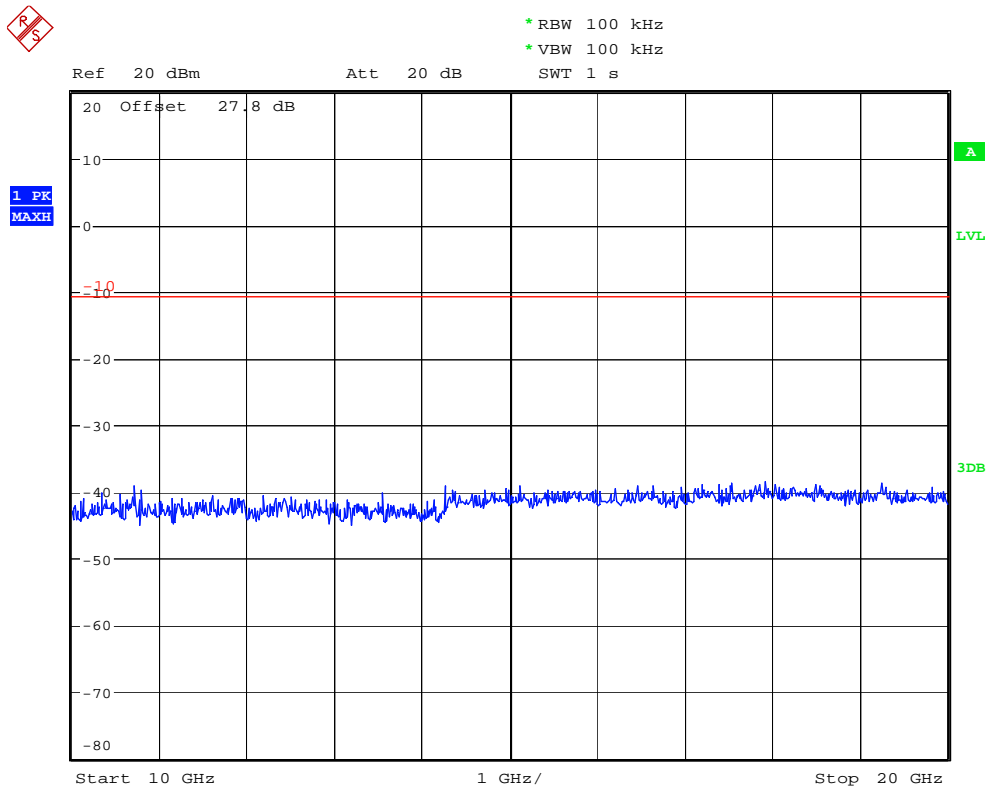
## Conducted Spurious Emissions 30-3000 MHz (Mid Channel)



Date: 27.MAR.2012 11:35:05

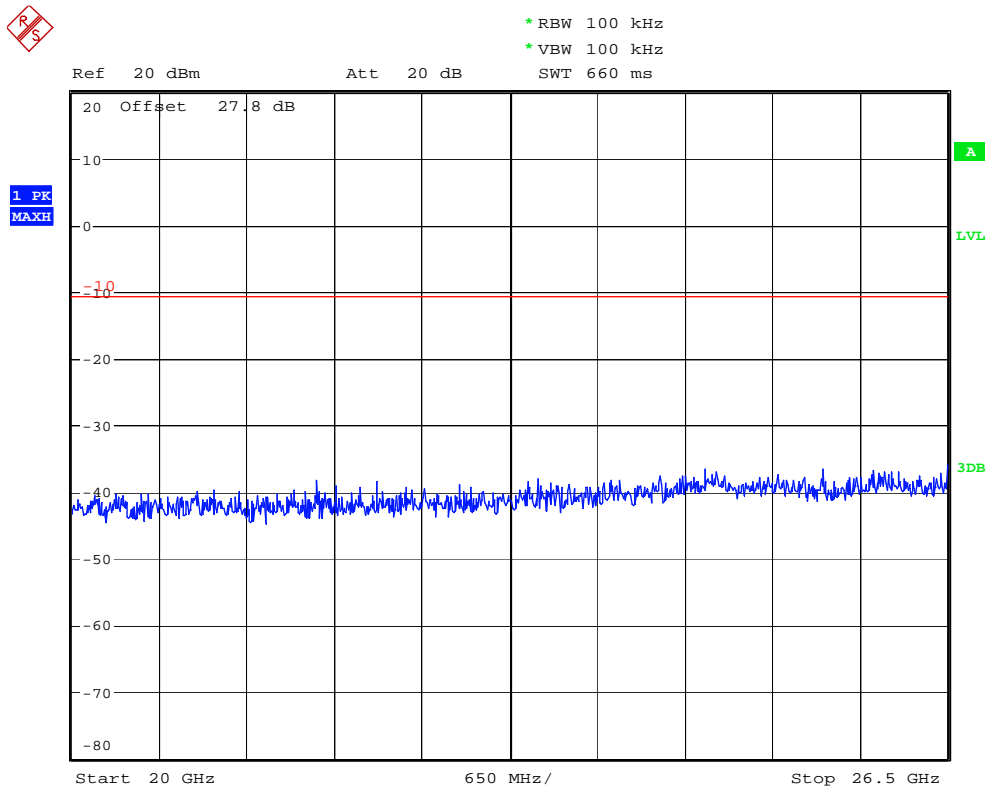
## Conducted Spurious Emissions 2-10 GHz (Mid Channel)





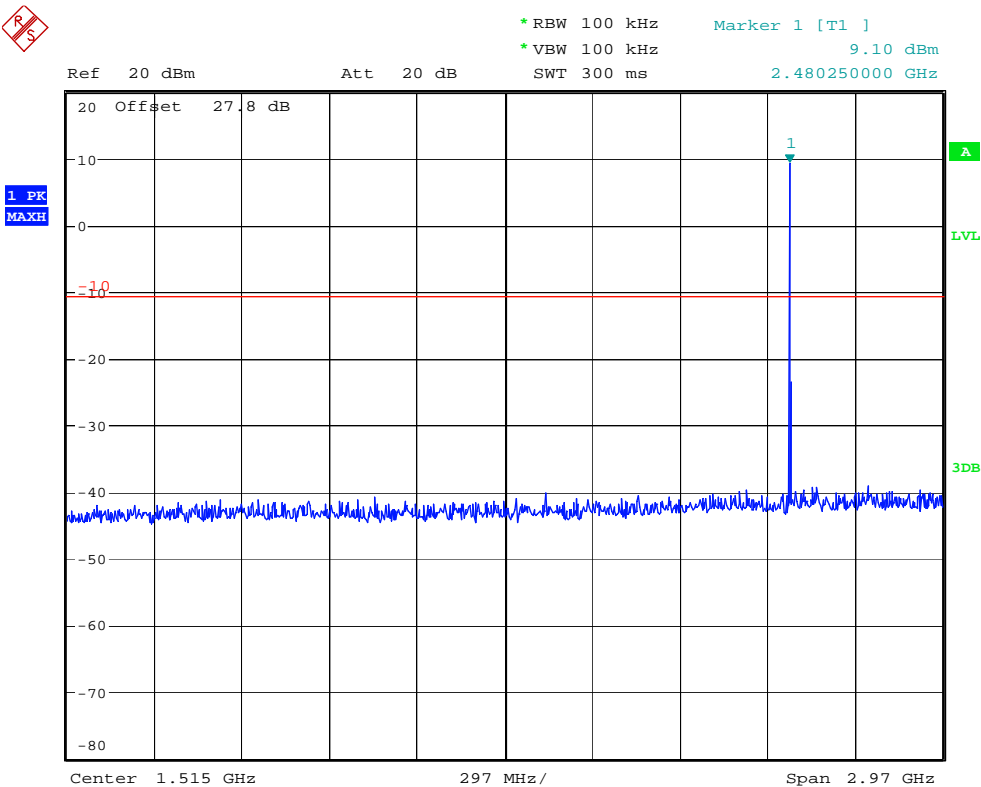
Date: 27.MAR.2012 11:35:26

## Conducted Spurious Emissions 10-20 GHz (Mid Channel)



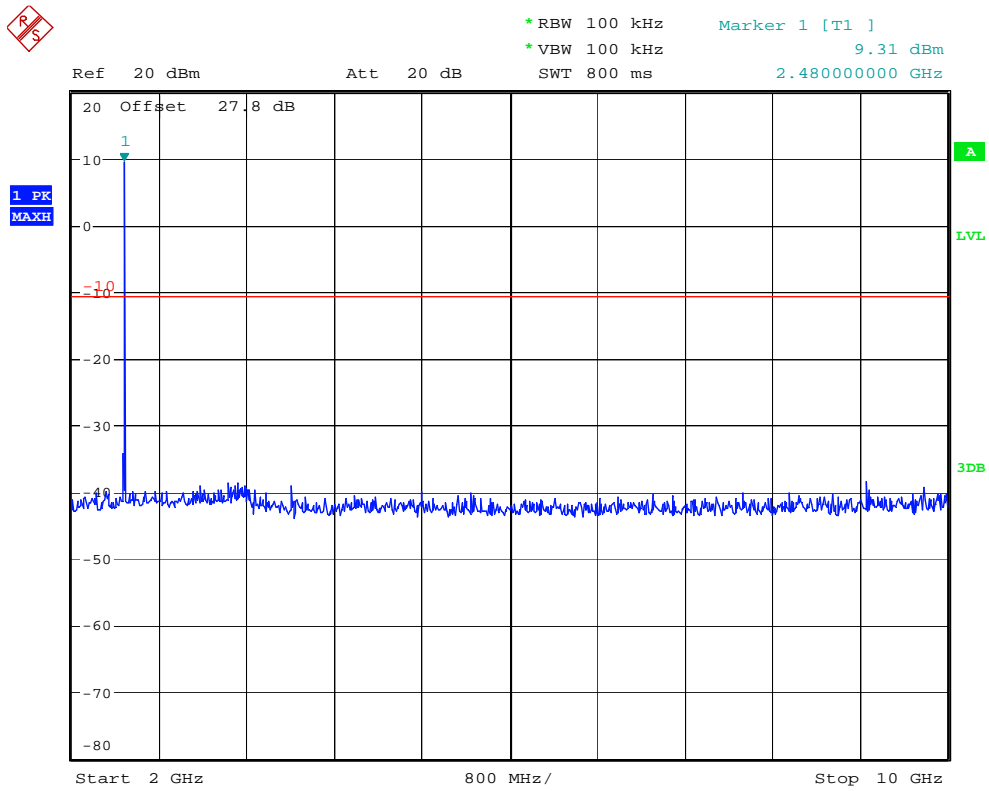
Date: 27.MAR.2012 11:35:38

## Conducted Spurious Emissions 20-26.5 GHz (Mid Channel)



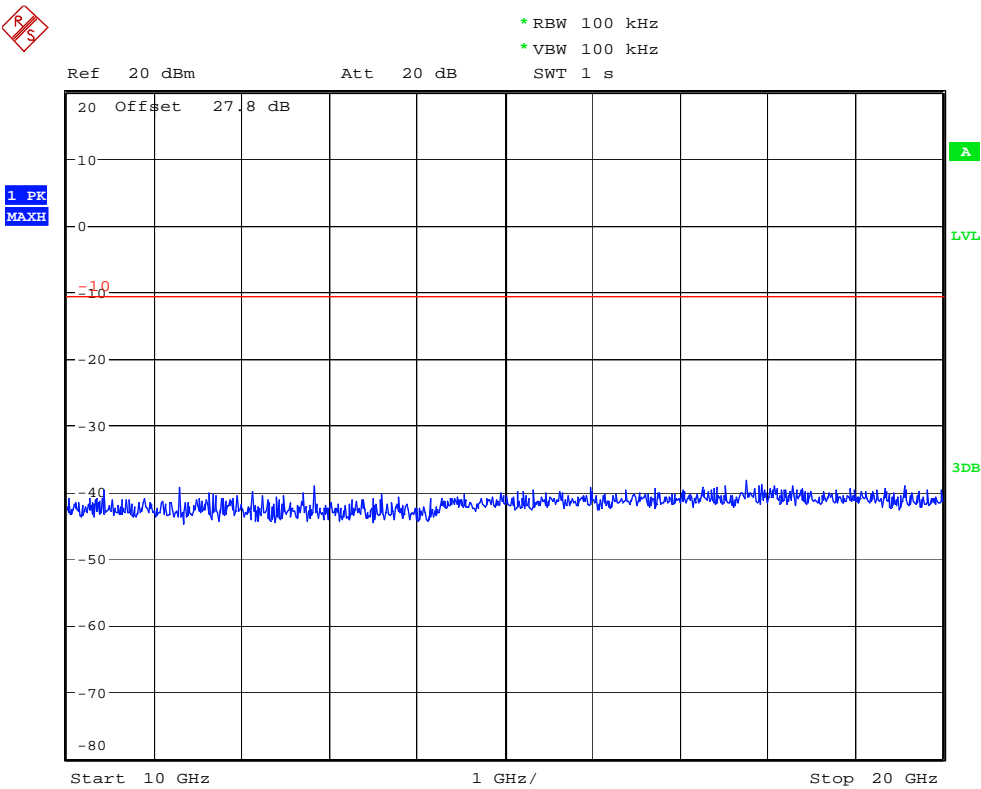
Date: 27.MAR.2012 11:36:09

Conducted Spurious Emissions 30-3000 MHz (High Channel)



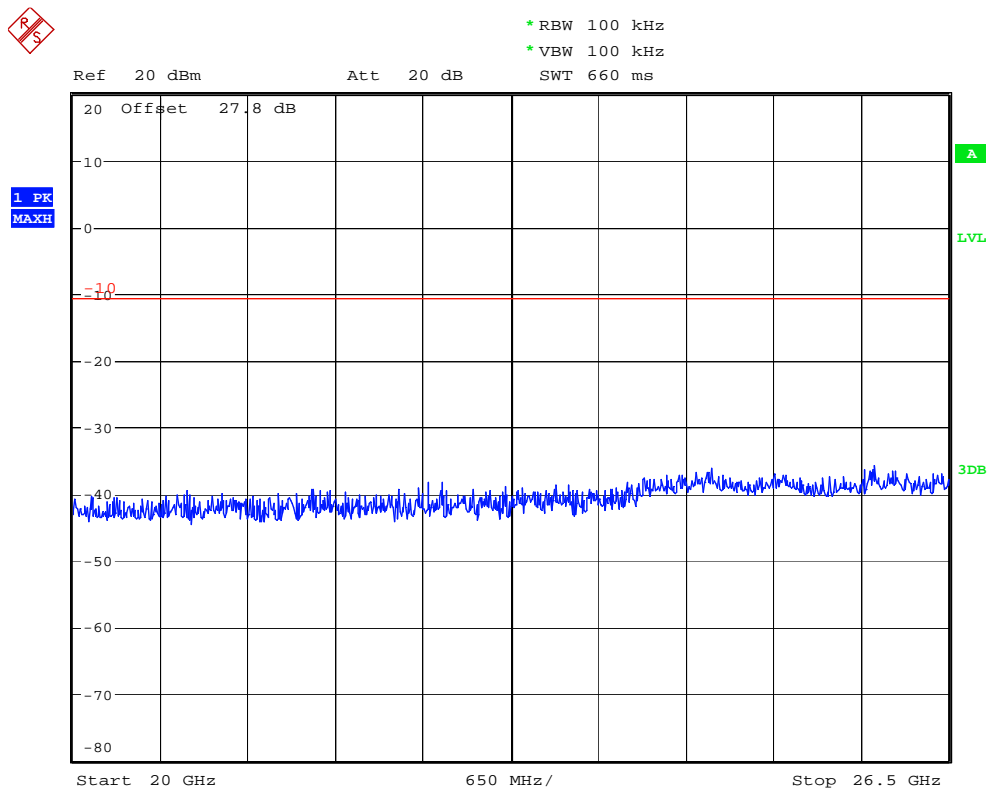
Date: 27.MAR.2012 11:37:13

## Conducted Spurious Emissions 2-10 GHz (High Channel)



Date: 27.MAR.2012 11:37:30

Conducted Spurious Emissions 10-20 GHz (High Channel)



Date: 27.MAR.2012 11:37:43

### Conducted Spurious Emissions 20-26.5 GHz (High Channel)

## **AC LINE CONDUCTED EMISSIONS**

CFR 47 Part 15.207

### **Measurement Procedure**

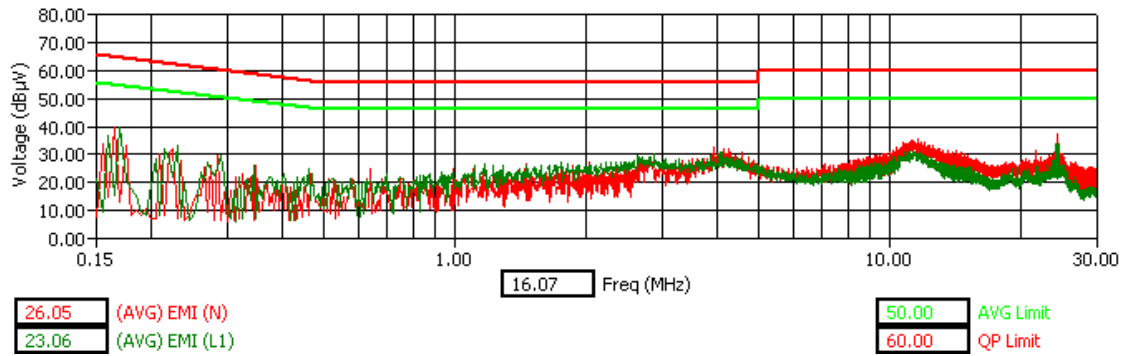
Measured levels of ac power line conducted emission shall be the radio-noise voltage from the line probe or across the 50  $\Omega$  LISN port, where permitted, terminated into a 50  $\Omega$  noise meter, or where permitted or required, the radio-noise current on the power line sensed by a current probe.

All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50  $\Omega$  measuring port is terminated by a 50  $\Omega$  radio-noise meter or a 50  $\Omega$  resistive load. All other ports are terminated in 50  $\Omega$ .

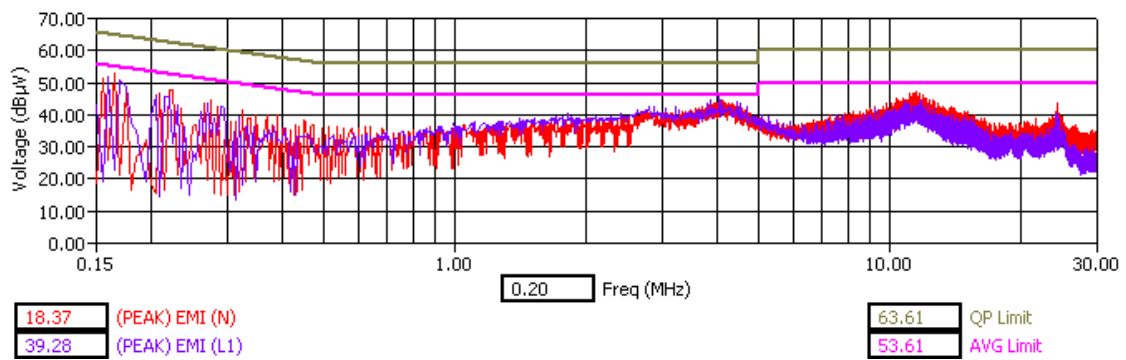
Detectors – Peak and Average Detector.

### **Measurement Results**

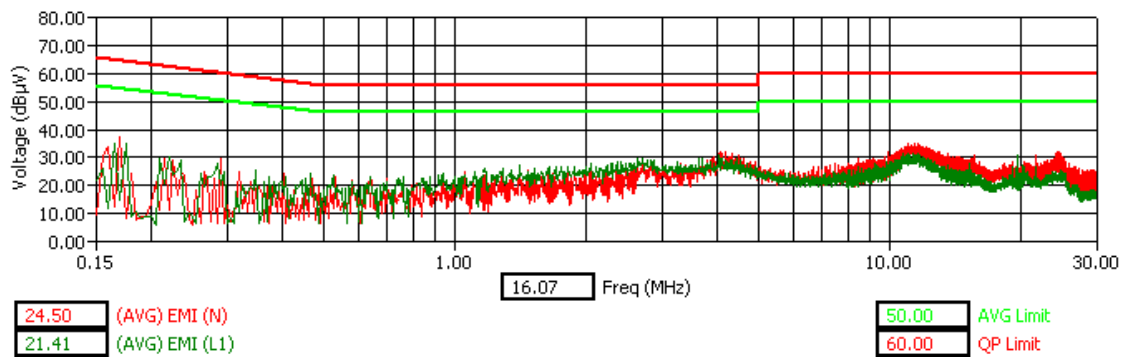
See attached:



**Low Channel - Tx Mode – AVG Detector**

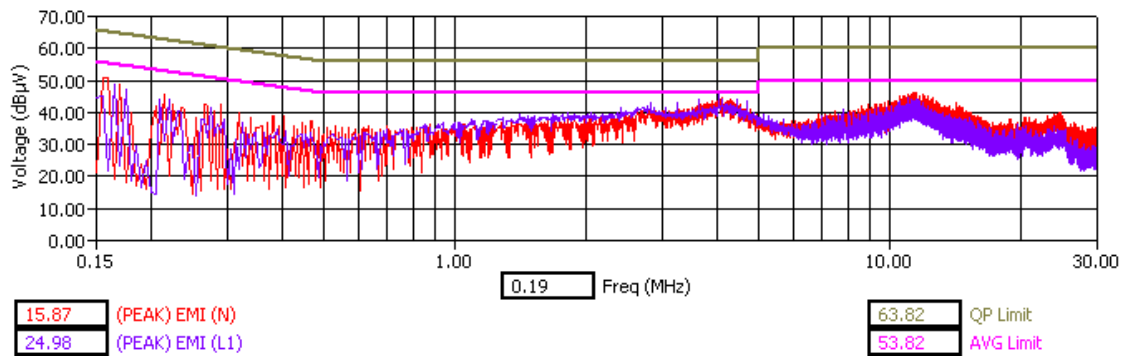


**Low Channel - Tx Mode – Peak Detector**

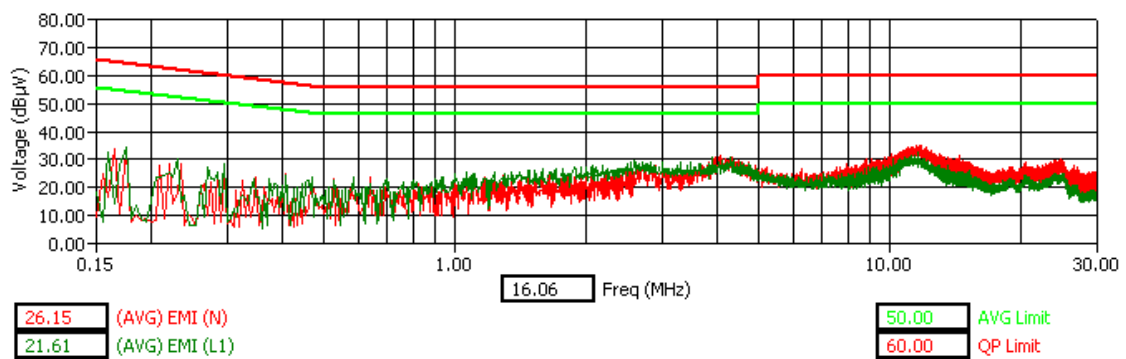


**Mid Channel - Tx Mode - AVG Detector**

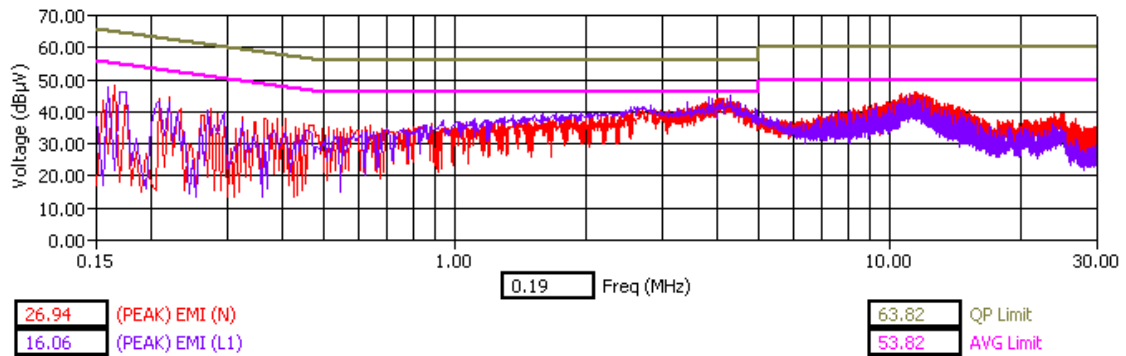




**Mid Channel - Tx Mode - Peak Detector**



**High Channel - Tx Mode - AVG Detector**



**High Channel - Tx Mode - Peak Detector**

**End of Test Report**