



**F2 Labs**  
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## CERTIFICATION TEST REPORT

**Manufacturing Address:** Beijing Jia An Electronics Technology Co., Ltd.  
No. 19 Gu Cheng West Street  
Shi Jing Shan District  
Beijing 100043, China

**Applicant:** BEA Incorporated  
RIDC Park West  
100 Enterprise Drive  
Pittsburgh, Pennsylvania 15275 USA

**Product Name:** RF 900 MHz Transmitter for Industrial Automatic Door Industry

**Product Description:** Transmitter operating in the ISM band (902-928) MHz, compatible with BEA 10RD900 Receiver, implementing frequency hopping, intended but not limited for use as wireless door activation/sequencing devices in the industrial automatic door industry.

**Model(s):** **10TD9001HH4\***

*\*Denotes actual model tested as worst case scenario of product family that includes 10TD9001HH1, 10TD9001HH2, 10TD9001HH3 and 10TD9001HH4.*

**FCC ID:** **2ABWS-10TD9001HH4**

**Testing Commenced:** Nov. 16, 2015

**Testing Ended:** Nov. 18, 2015

**Summary of Test Results:** In Compliance

The EUT complies with the FCC requirements when manufactured identically as the unit tested in this report, including any required modifications. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

**Standards:**

- ❖ **FEDERAL REGISTER CFR 47, PART 15 – RADIO FREQUENCY DEVICES**
  - Part 15 Subpart C, Section 15.231 - Periodic operation in the band 40.66–40.70 MHz and above 70 MHz
  - Part 15 Subpart C, Section 15.209 - Radiated emissions limits; general requirements
- ❖ **ANSI C63.10:2013 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz**

**Evaluation Conducted by:**

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Joe Knepper, EMC Proj. Eng.

**Report Reviewed by:**

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Ken Littell, Director of EMC & Wireless Operations

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## 1 ADMINISTRATIVE INFORMATION

### 1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

### 1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of DTS operating under Section 15.231. A list of the measurement equipment can be found in Section 6.

### 1.3 Uncertainty Budget:

- Radiated Emissions

Combined Uncertainty (+ or -) 2.54 dB

Expanded Uncertainty (+ or -) 5.07 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 1.4 Document History

Document Number	Description	Issue Date	Approved By
F2LQ7842-01E	First Issue	Dec. 8, 2015	K. Littell



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

## 2 SUMMARY OF TEST RESULTS

Standard(s)	Results
CFR 47 Part 15.231(a)(1)	Complies
CFR 47 Part 15.231(b) / Part 15.209	Complies
CFR 47 Part 15.231(b)(3)(c)	Complies
CFR 47 Part 15.31	Complies by using new batteries.

Modifications Made to the Equipment
No modifications were made to the EUT



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

### 3 ENGINEERING STATEMENT

This report has been prepared on behalf of BEA Incorporated to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.231 of the FCC Rules, using ANSI C63.10:2013 standards, with the modifications noted in Section 2 of this Test report. The test results found in this test report relate only to the items tested.



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

## 4 EUT INFORMATION AND DATA

### 4.1 Equipment Under Test:

Product: RF 900 MHz Transmitter for Industrial Automatic Door Industry  
Model: 10TD9001HH4\*  
Serial No.: ENG001944  
FCC ID: 2ABWS-10TD9001HH4

*\*Denotes actual model tested as worst case scenario of product family that includes 10TD9001HH1, 10TD9001HH2, 10TD9001HH3 and 10TD9001HH4.*

4.2 Trade Name: BEA Incorporated

### 4.3 Power Supply:

Battery Powered, non-rechargeable.

### 4.4 Applicable Rules:

CFR 47, Part 15.231, subpart C

### 4.5 Equipment Category:

Intermittent Transceiver

### 4.6 Antenna:

-4.5dBi Internal Antenna

### 4.7 Accessories:

N/A

### 4.8 Test Item Condition:

The equipment to be tested was received in good condition.

### 4.9 Testing Algorithm:

The EUT was set up in a normal operating manner, transmitting at low (908 MHz), mid (913 MHz) and high (918 MHz) channels. Powered via battery.



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

## 5 LIST OF MEASUREMENT INSTRUMENTATION

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166	AlbatrossProjects	B83117-DF435-T261	US140023	Jan. 1, 2016
Temp/Hum. Recorder	CL137	Extech	RH520	CH16992	May 7, 2016
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Nov. 12, 2015
Horn Antenna	CL098	Emco	3115	9809-5580	Dec. 3, 2015
Amplifier w/Monopole & 18" Loop	CL163	A.H. Systems, Inc.	EHA-52B	100	Apr. 20, 2016
Software:	Tile Version 1.0			Software Verified: Nov. 16, 2015	
Software:	EMC 32, Version 5.20.2			Software Verified: Nov. 16, 2015	
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	Mar. 12, 2016
Pre-Amplifier	CL153	Agilent	83006-69007	MY39500900	Feb. 10, 2016



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

## 6 FCC PART 15.231(a)(1)

### 6.1 Requirements:

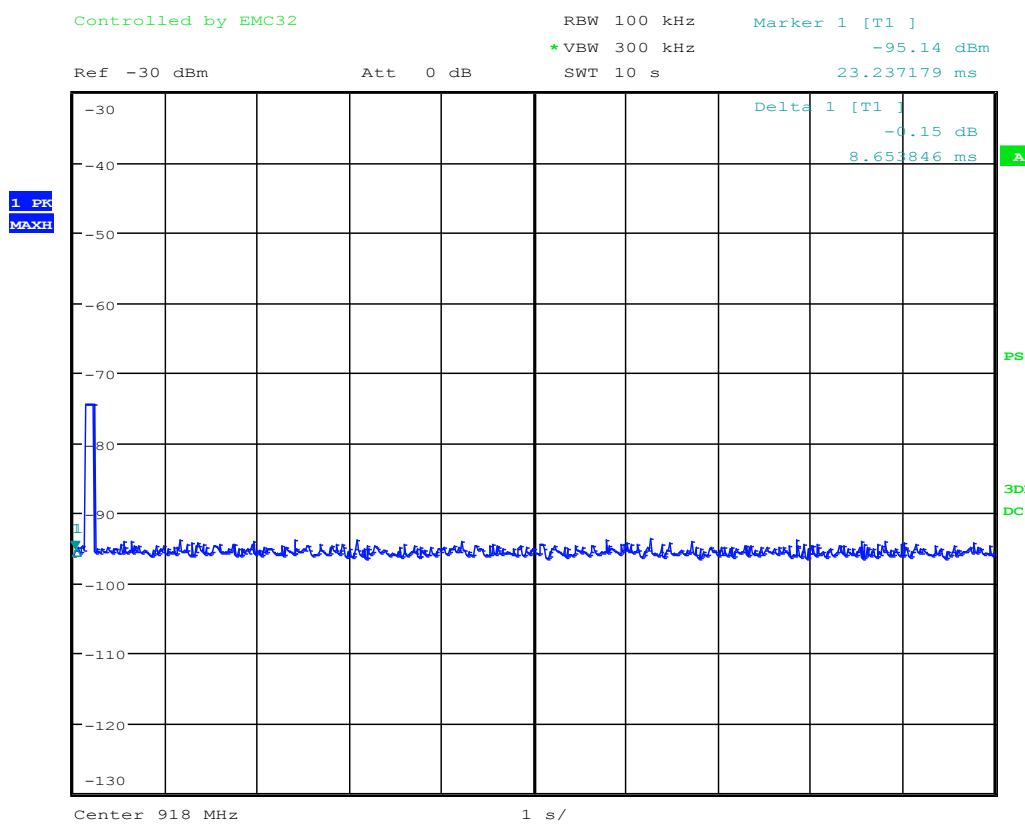
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter with not more than 5 seconds of being released.

## 6.2 Test Data

<b>Test Date:</b>	Nov. 18, 2015	<b>Test Engineer(s):</b>	J. Knepper
<b>Standards:</b>	CFR 47 Part 15.231(a)(1);	<b>Air Temperature:</b>	21.3°C

### High Channel

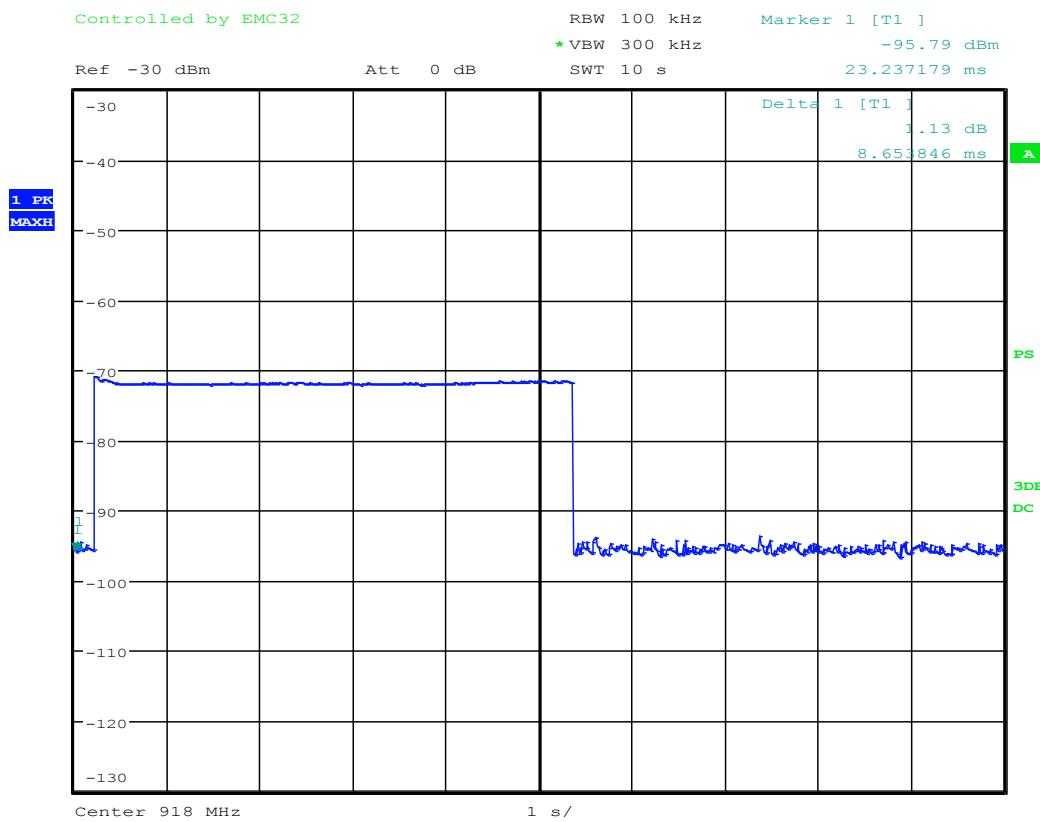
**The following plot is of a single press and release of the manual push button, showing that the transmission ceased prior to 5 seconds of release.**



Date: 18.NOV.2015 13:13:20

### High Channel, cont'd

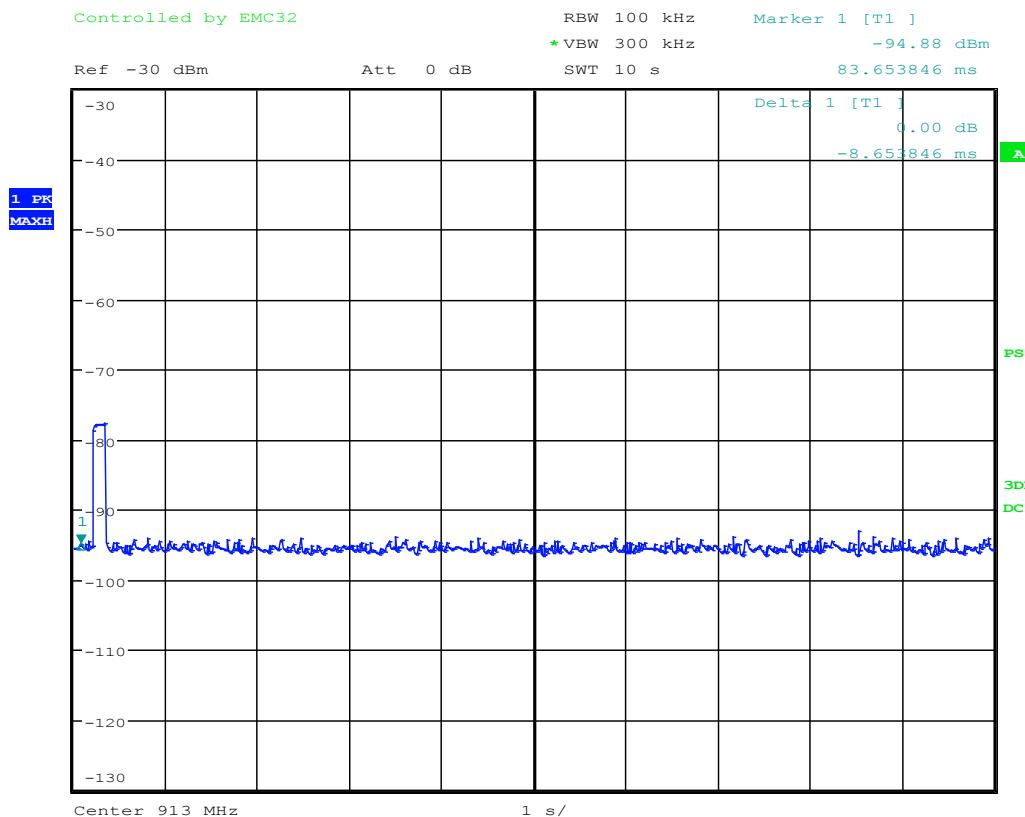
The following plot is of a press and hold for five seconds then release of the manual push button. This is to show that the transmission ceased in less than 5 seconds of release.



Date: 18.NOV.2015 13:12:45

**Mid Channel**

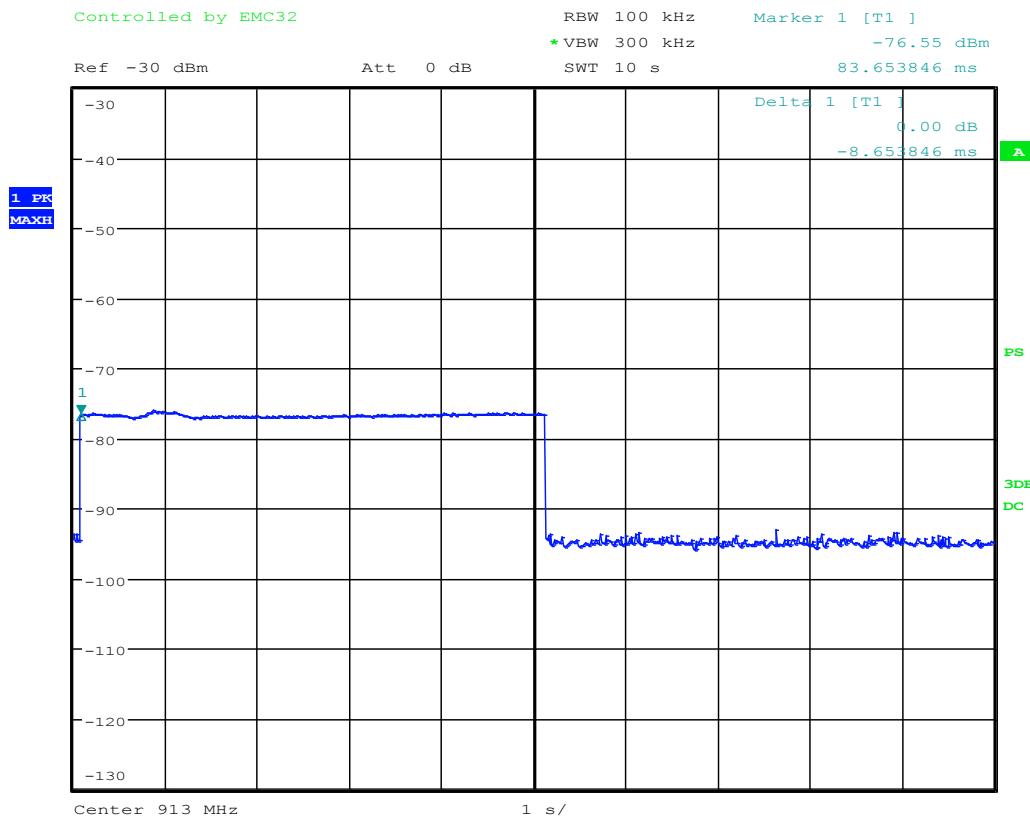
**The following plot is of a single press and release of the manual push button, showing that the transmission ceased prior to 5 seconds of release.**



Date: 18.NOV.2015 12:50:03

## Mid Channel, cont'd

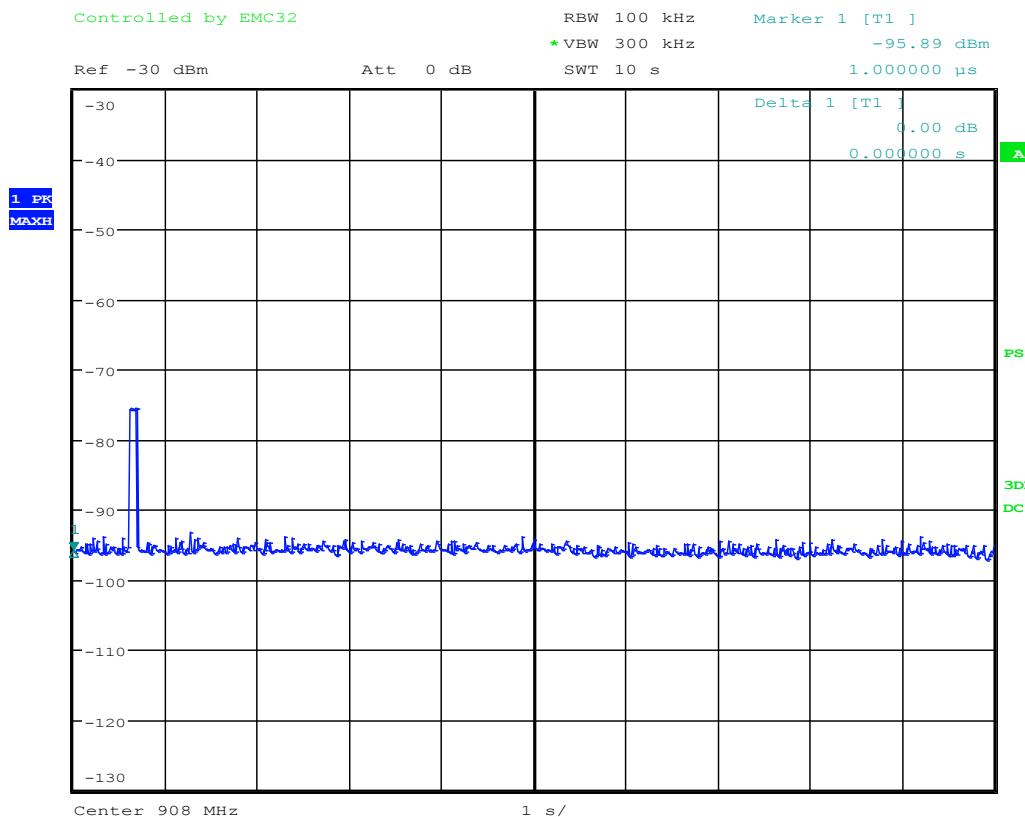
The following plot is of a press and hold for five seconds then release of the manual push button. This is to show that the transmission ceased in less than 5 seconds of release.



Date: 18.NOV.2015 12:51:38

### Low Channel

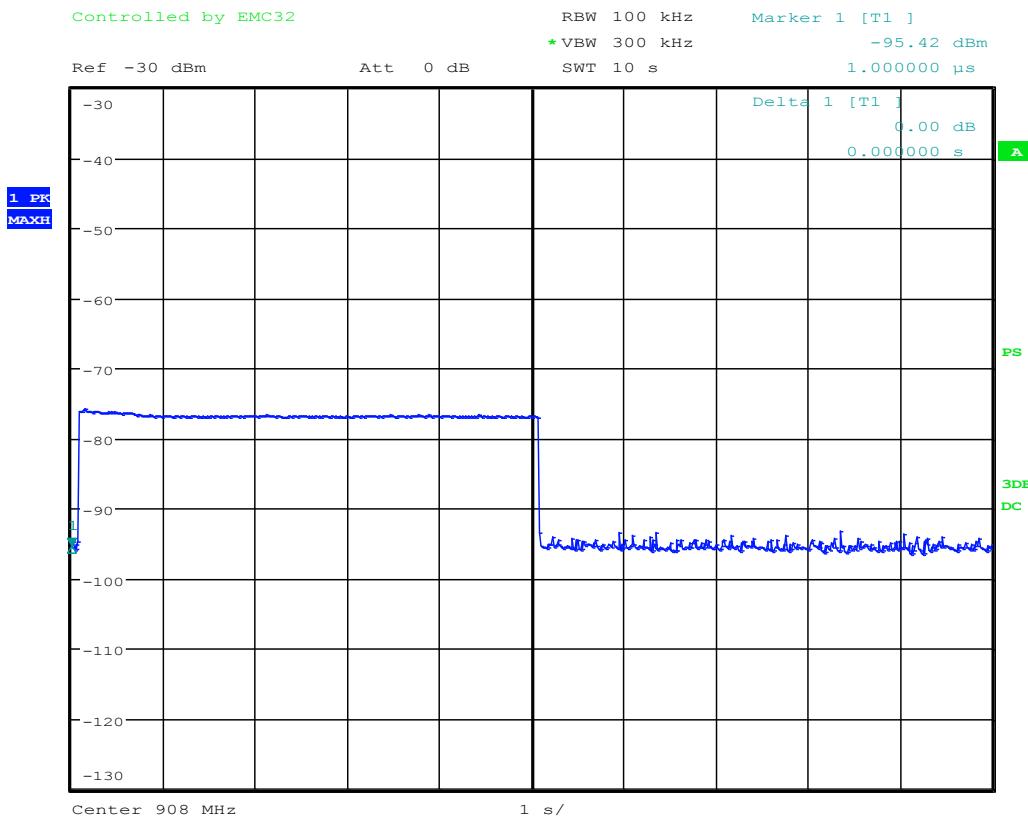
**The following plot is of a single press and release of the manual push button. This is to show that the transmission ceased in less than 5 seconds of release.**



Date: 18.NOV.2015 12:38:21

**Low Channel, cont'd**

**The following plot is of a press and hold for five seconds then release of the manual push button, showing that the transmission ceased prior to 5 seconds of release.**



Date: 18.NOV.2015 12:37:50



## 7 FCC PART 15.231(b)

### 7.1 Requirements:

Field strength of emissions, fundamental and spurious using quasi peak detector.

Limit for fundamental frequency above 470 MHz is: 12,500  $\mu$ V/m.

Limits for spurious emissions were those specified in 15.209 and 15.231.

While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength.

The equipment was fully exercised and was positioned for maximum emissions in all 3 orthogonal positions. The EUT antenna was positioned flat against the plastic tabletop and it was verified, by placing a foam support between the table and the antenna, that the table had no effect on the emissions at these frequency ranges.



Order Number: F2LQ7842

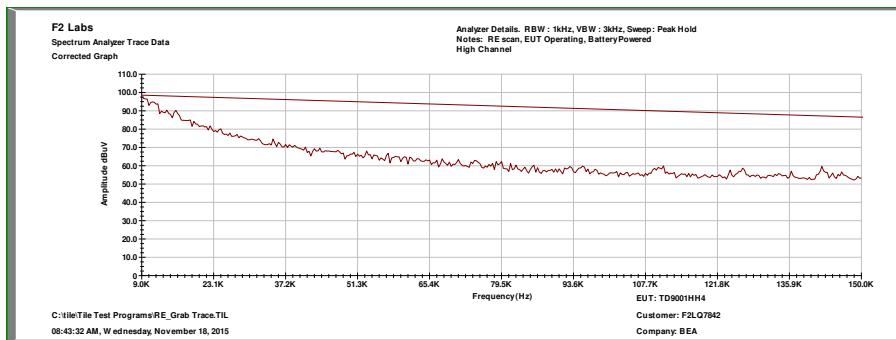
Client: BEA Incorporated

Model: 10TD9001HH4

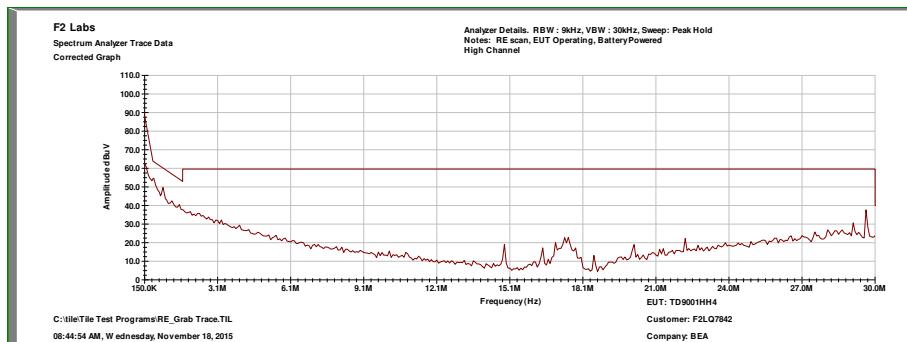
## 7.2 Test Data

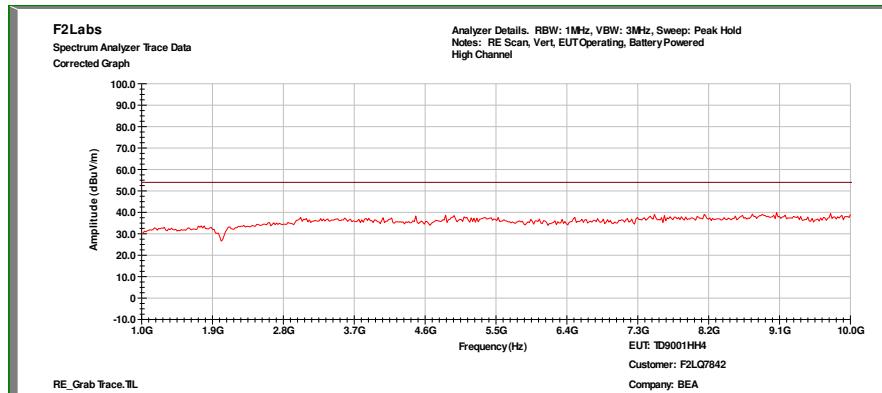
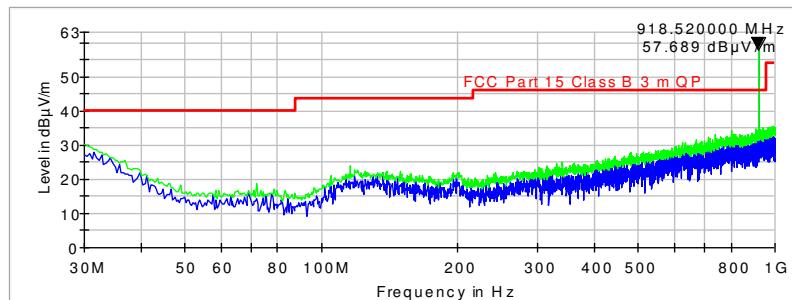
<b>Test Date:</b>	Nov. 18, 2015	<b>Test Engineer(s):</b>	J. Knepper
<b>Standards:</b>	CFR 47 Part 15.231(b); 15.209; C63.10:2013, Section 13.3	<b>Air Temperature:</b>	21.5°C
		<b>Relative Humidity:</b>	42%

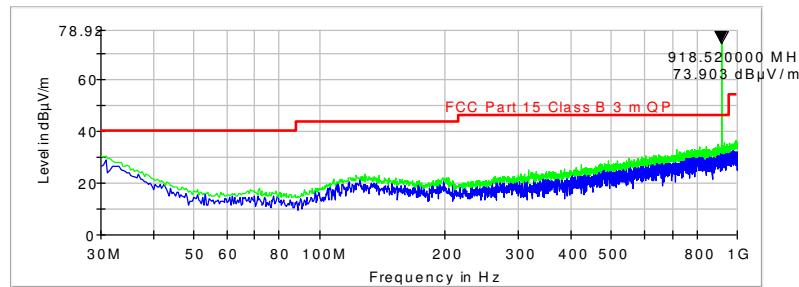
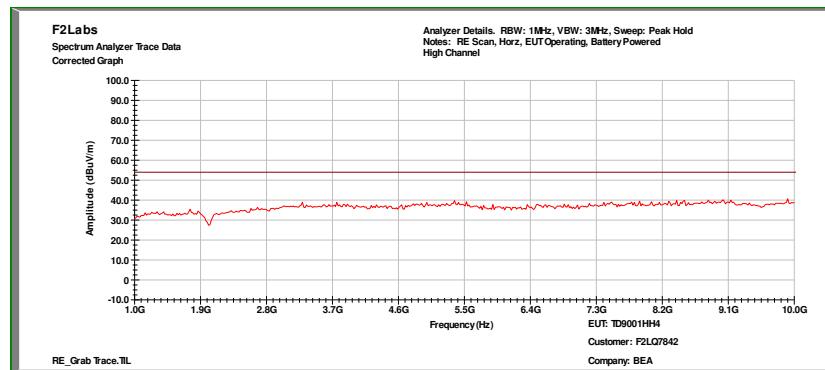
### High Channel: 9 kHz to 150 kHz



### High Channel: 150 kHz to 30 MHz



**High Channel: 30 MHz to 1 GHz, Vertical****High Channel: 1 GHz to 10 GHz, Vertical**

**High Channel: 30 MHz to 1 GHz, Horizontal****High Channel: 1 GHz to 10 GHz, Horizontal**



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

### High Channel

Frequency (MHz)	Polarity	Corr. (dB)	QuasiPeak (dB $\mu$ V/m)	QuasiPeak (dB $\mu$ V/m) Limit	QuasiPeak Margin	Bandwidth (kHz)
614.000000	V	19.5	20.1	46	-25.9	120.000
614.000000	H	19.5	20.1	46	-25.9	120.000
918.000000	V	23.1	57.4	81.9	-24.5	120.000
918.000000	H	23.1	74.1	81.9	-7.8	120.000
960.000000	H	23.4	25.1	46	-20.9	120.000
960.000000	V	23.4	24.5	46	-21.5	120.000

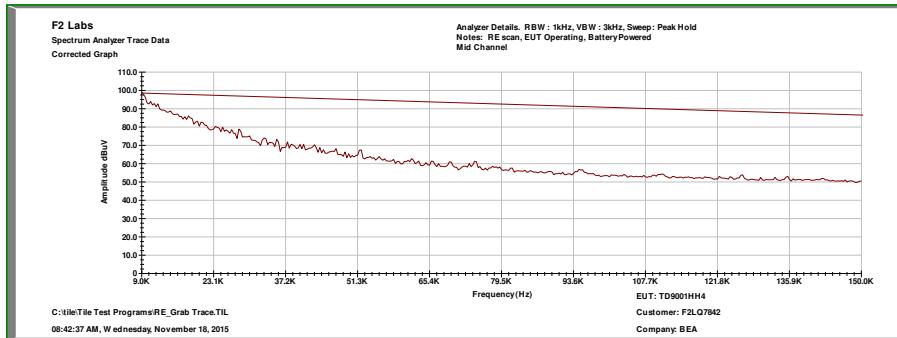


Order Number: F2LQ7842

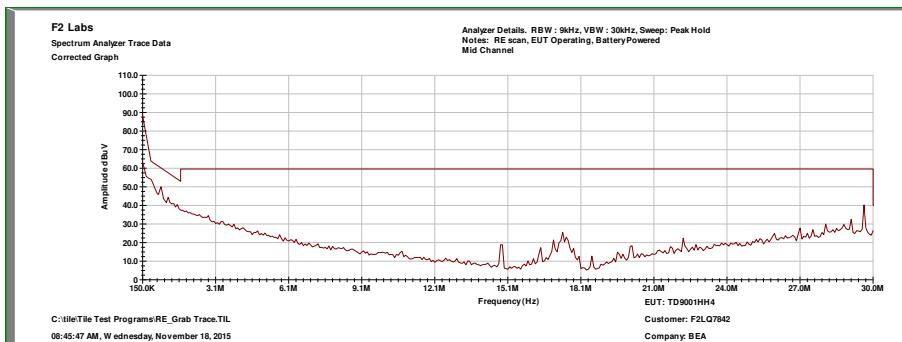
Client: BEA Incorporated

Model: 10TD9001HH4

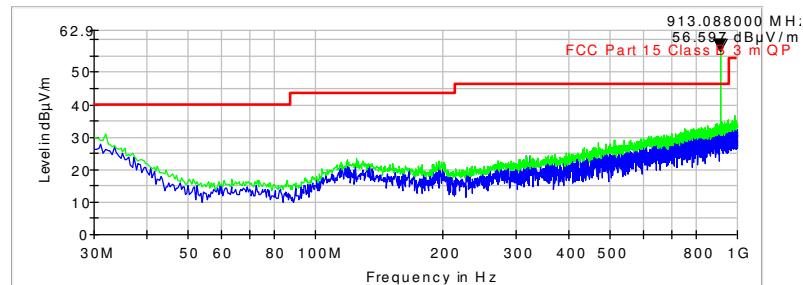
### Mid Channel: 9 kHz to 150 kHz



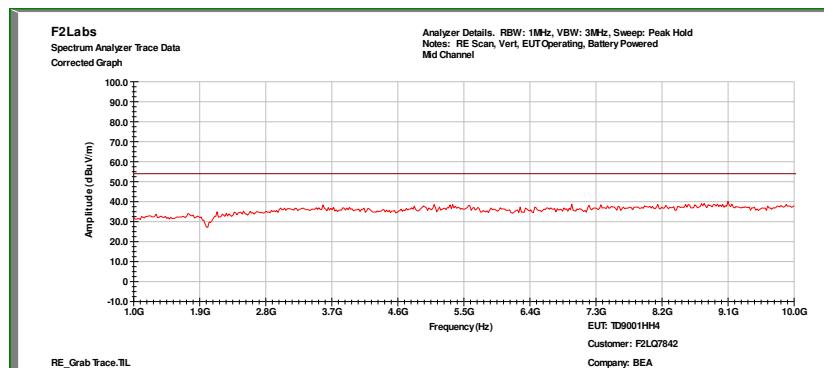
### Mid Channel: 150 kHz to 30 MHz

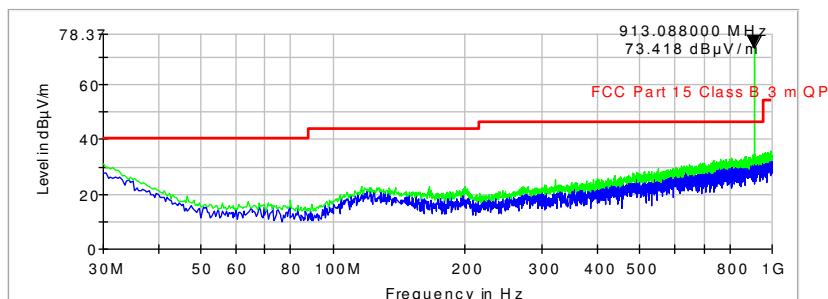
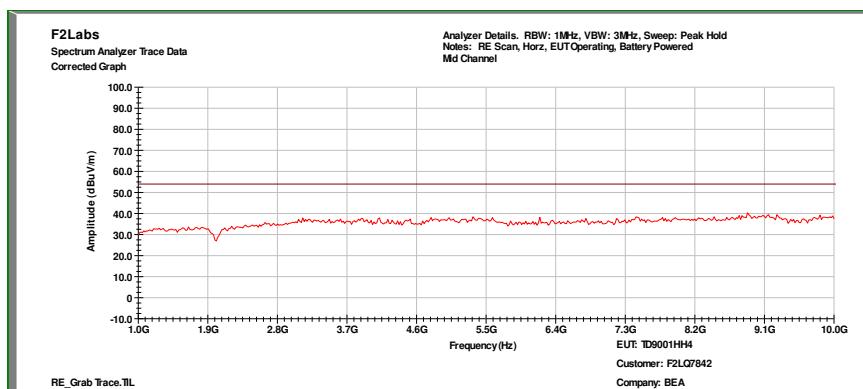


### Mid Channel: 30 MHz to 1 GHz, Vertical



### Mid Channel: 1 GHz to 10 MHz, Vertical



**Mid Channel: 30 MHz to 1 GHz, Horizontal**

**Mid Channel: 1 GHz to 10 GHz, Horizontal**




Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

### Mid Channel

Frequency (MHz)	Polarity	Corr. (dB)	QuasiPeak (dB $\mu$ V/m)	QuasiPeak (dB $\mu$ V/m) Limit	QuasiPeak Margin	Bandwidth (kHz)
614.000000	H	19.5	20.2	46	-25.8	120.000
614.000000	V	19.5	20.1	46	-25.9	120.000
913.000000	H	23.0	74.1	81.9	-7.8	120.000
913.000000	V	23.0	57	81.9	-24.9	120.000
960.000000	H	23.4	24.6	46	-21.4	120.000
960.000000	V	23.4	24.8	46	-21.2	120.000

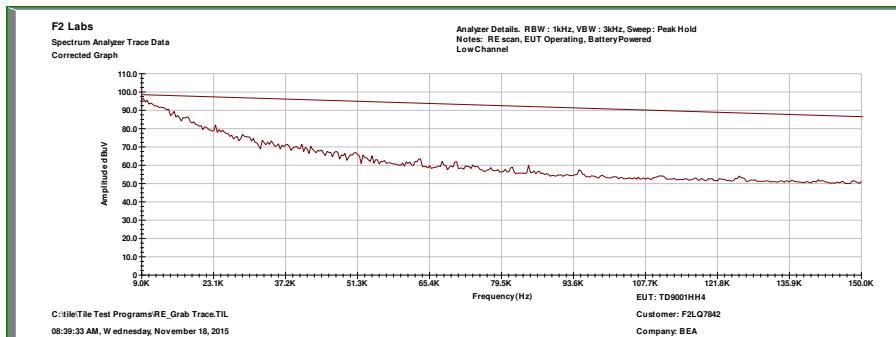


Order Number: F2LQ7842

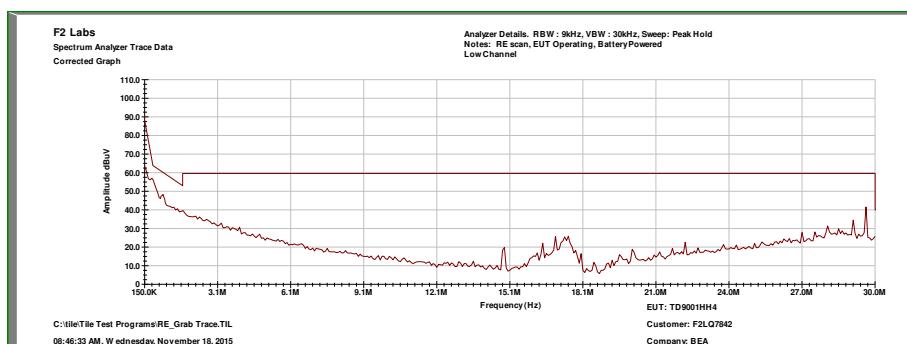
Client: BEA Incorporated

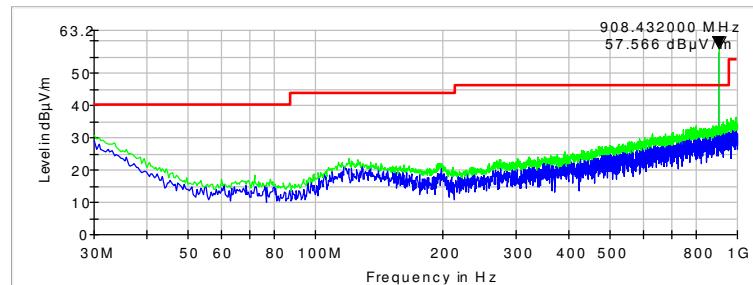
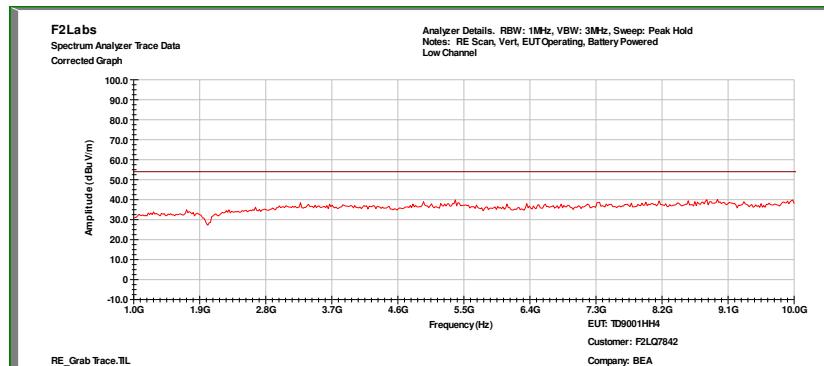
Model: 10TD9001HH4

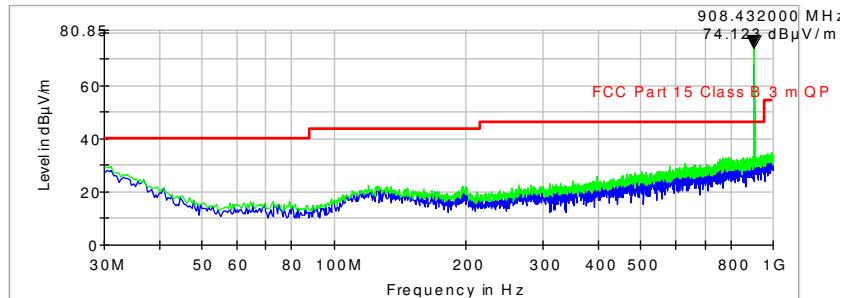
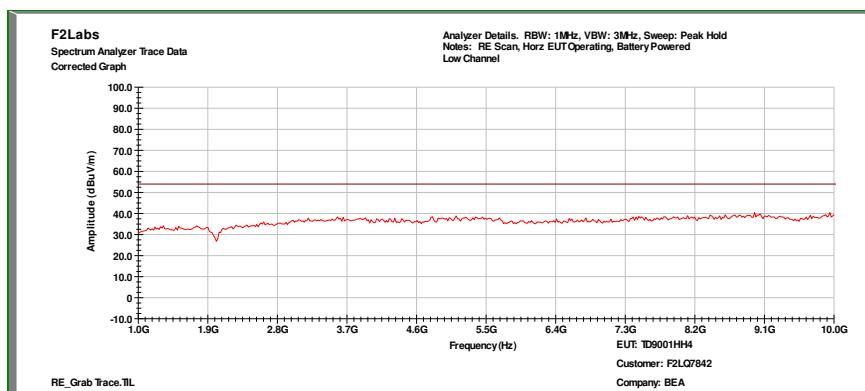
### Low Channel: 9 kHz to 150 kHz



### Low Channel: 150 kHz to 30 MHz



**Low Channel: 30 MHz to 1 GHz, Vertical****Low Channel: 1 GHz to 10 GHz, Vertical**

**Low Channel: 30 MHz to 1 GHz, Horizontal**

**Low Channel: 1 GHz to 10 GHz, Horizontal**




Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

### Mid Channel

Frequency (MHz)	Polarity	Corr. (dB)	QuasiPeak (dB $\mu$ V/m)	QuasiPeak (dB $\mu$ V/m) Limit	QuasiPeak Margin	Bandwidth (kHz)
614.000000	V	19.5	20.1	46	-25.9	120.000
614.000000	H	19.5	20.1	46	-25.9	120.000
908.000000	V	22.9	58.1	81.9	-23.8	120.000
908.000000	H	22.9	73.5	81.9	-8.4	120.000
960.000000	H	23.4	24.6	46	-21.4	120.000
960.000000	V	23.4	24.6	46	-21.4	120.000



Order Number: F2LQ7842

Client: BEA Incorporated

Model: 10TD9001HH4

## 8 FCC Part 15.231(b)(3)(c)

### 8.1 Requirements:

The bandwidth of the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier. 908 MHz bandwidth must be no wider than 4.54 MHz; 913 MHz no wider than 4.566 MHz, and 918 MHz no wider than 4.59 MHz.

## 8.2 Test Data – OCCUPIED BANDWIDTH

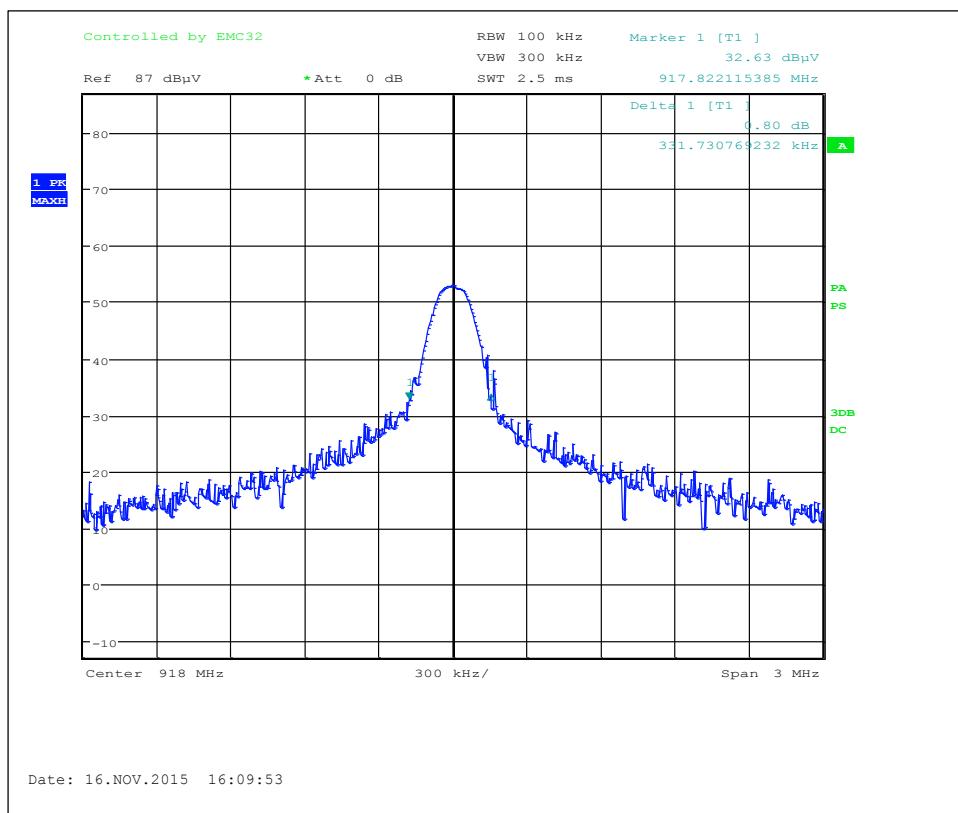
<b>Test Date:</b>	Nov. 16, 2015	<b>Test Engineer:</b>	J. Knepper
<b>Standards:</b>	CFR 47 Part 15.231(b)(3)(c)	<b>Air Temperature:</b>	21.2°C
		<b>Relative Humidity:</b>	41%

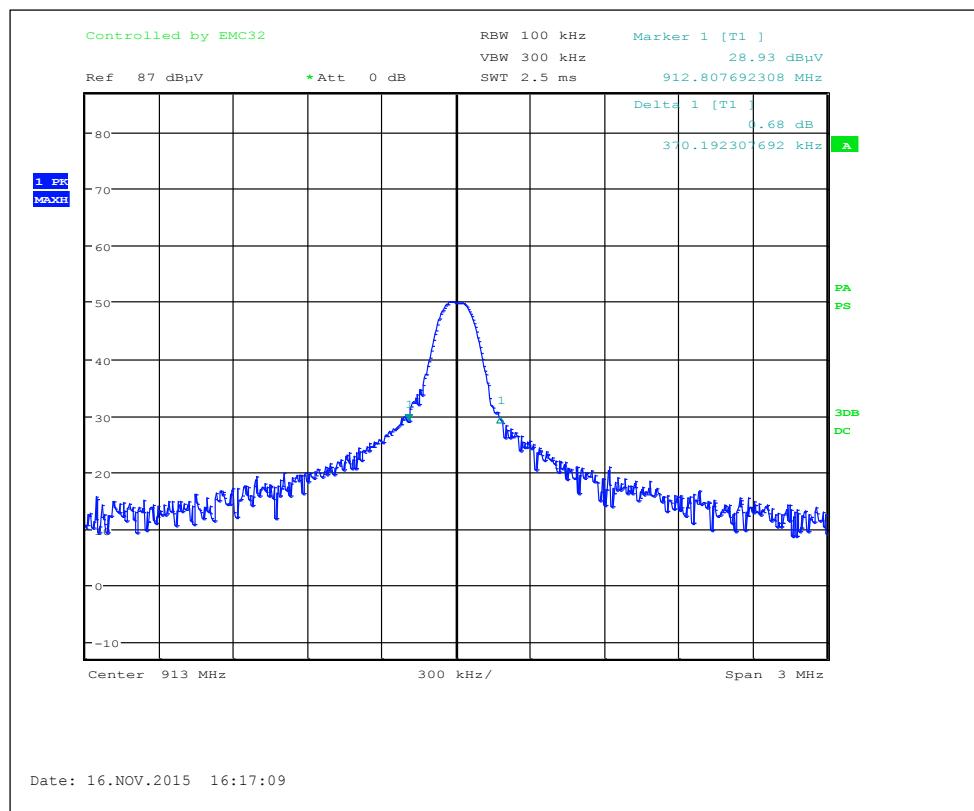
**Occupied Bandwidth, High Channel: 331.73 kHz**

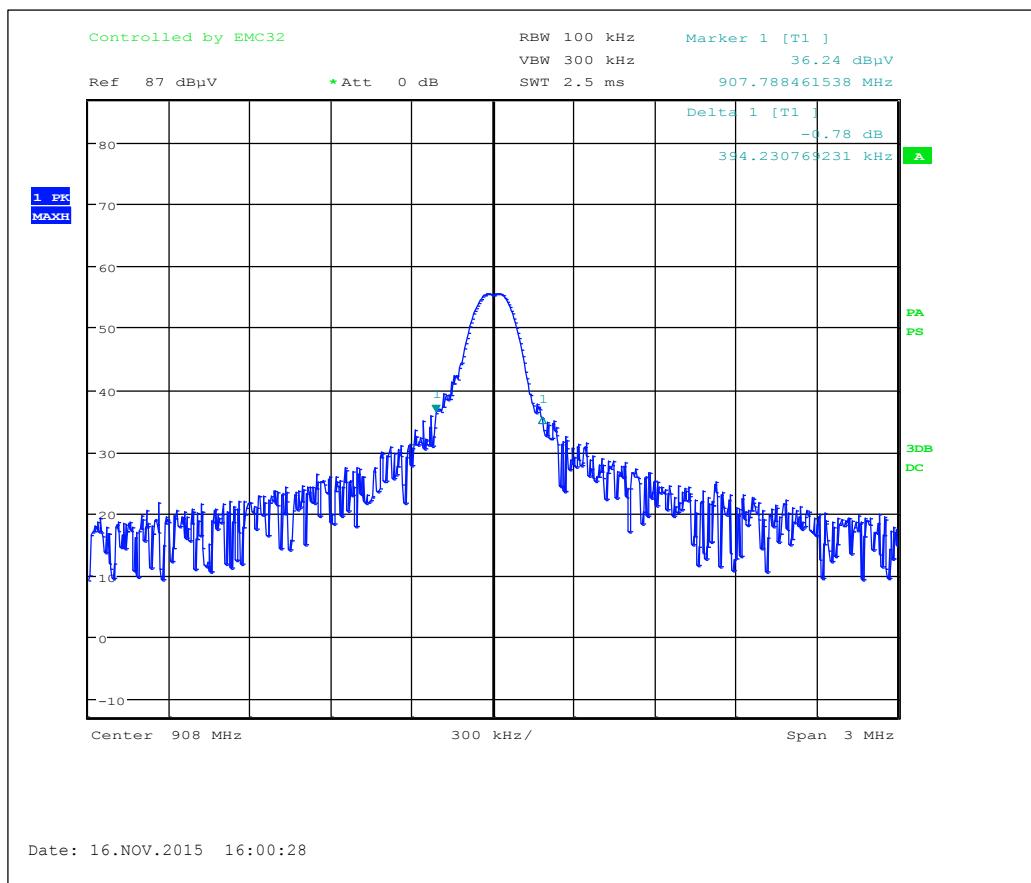
**Occupied Bandwidth, Mid Channel: 370.19 kHz**

**Occupied Bandwidth, Low Channel: 394.23 kHz**

### High Channel



**Mid Channel**

**Low Channel**

**9 PHOTOGRAHPS****RF Output Power**

**Radiated Spurious Emissions, <1 GHz****Radiated Spurious Emissions, >1 GHz**