# Wireless Smoke Detector

**Model No.:**

1. FWD-200ACCLIMATE
2. FWH-200FIX135
3. FWD-200P

**Date: 22-Dec-2013**

**Report Prepared By:**

Sasikala Subramani

EMC Test Report

| | |
|---|---|
| **Report Number** | EMC-0004-1 |
| **EUT Nomenclature** | Wireless Smoke Detector |
| **Sample Identification** | Model No. / Sl. No. : 1) FWD-200ACCLIMATE / 05936<br>2) FWH-200FIX135 / 05945<br>3) FWD-200P / 05917<br>Software Version : 5.82<br>Hardware Version : Rev D |
| **Number of Samples** | 03 |
| **Date of receipt of Sample** | 21-10-2013 |
| **Condition of Sample on receipt** | Good |
| **Client name** | Honeywell International Inc. |
| **Client Address** | System Sensor,<br>3825, Ohio Ave,<br>St. Charles, IL, USA – 60174. |
| **Testing Laboratory** | Honeywell Technology Solutions Lab Pvt. Ltd. |
| **Address** | RMZ ECOWORLD INFRASTRUCTURE PVT. LTD.,<br>(Formerly Adarsh Prime Projects Pvt. Ltd., SEZ).<br>Survey # 19/2, Devarabisanahalli Village,<br>Varthur Hobli, Bangalore East Taluk, Bangalore – 560103 |
| **Test Dates** | 21-Oct-2013 to 08-Dec-2013 |
| **Applicable Standard** | FCC Part 15 Subpart C |
| **Test Results** | PASS |

| | |
|---|---|
| Prepared By: Technical Lead<br>Name : Sasikala Subramani<br>Signature:<br>Date : 23-Dec-2013 | Reviewed By: Project Lead<br>Name : Loganathan Joghee<br>Signature:<br>Date : 23-Dec-2013 |
| Authorized By: Quality Manager<br>Name : Prasanna Kumar BT<br>Signature:<br>Date : 23-Dec-2013 | Authorized By: Lab Manager<br>Name : Ananth Krishna<br>Signature:<br>Date : 23-Dec-2013 |

*This Report relates to the above mentioned test sample only. Without the approval of Lab manager, this report shall not be reproduced except in full.*

| TEST SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| # | Name | Specification | Test Method | Pass | Fail | NA |
| | | FHSS | | | | |
| 1 | 20dB Bandwidth | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 2 | Maximum Peak Output Power | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 3 | Carrier Frequency Separation | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 4 | Number of Hopping Frequencies | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 5 | Band Edge compliance | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 6 | Time of Occupancy (Dwell Time) | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 7 | Spurious RF Conducted Emissions | FCC Part 15.247 | DA 00-705 | ☒ | ☐ | ☐ |
| 8 | Spurious Radiated Emissions | FCC Part 15.247 and 15.209 | DA 00-705 | ☒ | ☐ | ☐ |
| | | | | | | |
| | | DTS | | | | |
| 1 | DTS 6dB Bandwidth | FCC Part 15.247 | KDB 558074 | ☒ | ☐ | ☐ |
| 2 | Maximum Peak Output Power | FCC Part 15.247 | KDB 558074 | ☒ | ☐ | ☐ |
| 3 | Maximum Power Spectral Density | FCC Part 15.247 | KDB 558074 | ☒ | ☐ | ☐ |
| 4 | Band Edge Conducted Emissions | FCC Part 15.247 | KDB 558074 | ☒ | ☐ | ☐ |
| 5 | Radiated Spurious Emissions | FCC Part 15.209 and 15.209 | KDB 558074 | ☒ | ☐ | ☐ |

## MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR 16-4

The Expanded measurement uncertainty (K=2) is provided below

| # | Name | Value |
|---|---|---|
| 1 | 20dB & 6dB Occupied Bandwidth | 1.4dB |
| 2 | Maximum Peak Output Power Level | 1.4dB |
| 3 | Power Spectral Density | 1.4dB |
| 4 | Band Edge Conducted Emission | 1.4dB |
| 5 | Spurious RF Conducted Emission | 1.4dB |
| 6 | Radiated Spurious Emission < 1GHz | 4.9dB |
| 7 | Radiated Spurious Emission > 1GHz | 6.3dB |

# 1 PRODUCT DETAILS

## PRODUCT OPERATION AND INTENDED USE

The Wireless Smoke Detector is powered by four CR123A batteries. It has a sensor head to detect smoke and LEDs to indicate activation and trouble status.

## RATINGS AND SYSTEM DETAILS

| | | |
|---|---|---|
| **Operating Frequency** | 902MHz to 928MHz | |
| **Number of Channels** | DTS | :6 |
| | FHSS | :52 |
| **Channel Bandwidth (20dB)** | DTS | :1MHz |
| | FHSS | :320KHz |
| **Transmitted Power** | DTS | :12dBm & 2dBm |
| | FHSS | :17dBm |
| **Modulation Type** | FSK | |
| **Data Rate** | DTS | :300Kbps |
| | FHSS | :150Kbps |
| **Antenna Type** | Inverted F Patch Antenna | |
| **No. of Antenna** | 3 | |
| **Antenna Gain** | 2.5 dBi | |
| **Supply Voltage and Current** | 3.3V, 24mA | |
| **Dimensions (Diameter x Height)** | 4 inch x 2.1 inch | |
| **Environmental Conditions** | Operating Temperature | :0°C to 50°C |
| | Storage Temperature | :-10°C to 60°C |
| | Humidity | :10% to 93% RH |

## TEST CONFIGURATION

| Config # | Description |
|---|---|
| Conducted Test | EUT is Powered by external 3.3V power supply. EUT Debug port (UART) is connected to Laptop through USB to UART converter cable. EUT is configured to the respective operating mode through HyperTerminal. Antenna 1 is selected for the test as this is the only transmitting antenna in the field. |
| Radiated Test | EUT is Powered from Battery. EUT Debug port (UART) is connected to Laptop through USB to UART converter cable. EUT is configured to the respective operating mode through HyperTerminal. Antenna 1 is selected for the test as this is the only transmitting antenna in the field. |

## OPERATING MODES

| Mode # | Description |
|---|---|
| DTS | Following DTS channels have been used for Conducted (Continuous Transmission) and Radiated (Pulsed Transmission) Tests<br>Channel 1 : 902.875MHz<br>Channel 2 : 908.425MHz<br>Channel 3 : 914.325MHz<br>Channel 4 : 915.325MHz<br>Channel 5 : 921.575MHz<br>Channel 6 : 927.125MHz |
| FHSS | Following FHSS channels have been used for Conducted (Continuous Transmission) and Radiated (Continuous Transmission) Tests<br>Channel 1 : 903.55MHz<br>Channel 27 : 916.35MHz<br>Channel 52 : 926.45MHz |

## INPUT AND OUTPUT CABLES

| Port # | Name | Port Type | Cable Length | Cable type Shielded/ Unshielded | Comments |
|---|---|---|---|---|---|
| | Not applicable | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

*Note : AC = AC Power Port
TP = Telecommunication Ports (E.g. Ethernet)
N/E = Non Electrical
DC = DC Power Port
DI / DO = Digital Input / Output
AI / AO = Analog Input / Output

## SUPPORT EQUIPMENTS AND ACCESSORIES USED

| # | Item Description | Make | Model | Part No. / Sl. No | Cal Due Date |
|---|---|---|---|---|---|
| 1 | Laptop | DELL | E6400 | 3351399400 | NA |
| 2 | USB to UART Cable | FTDI | NA | TTL-232R-3V3 | NA |
| 3 | Dual Channel Power Supply | GW Instek | GPS-2202 | ZH846116 | 18-Feb-2014 |

## CONNECTION DIAGRAM AND SETUP DIAGRAM

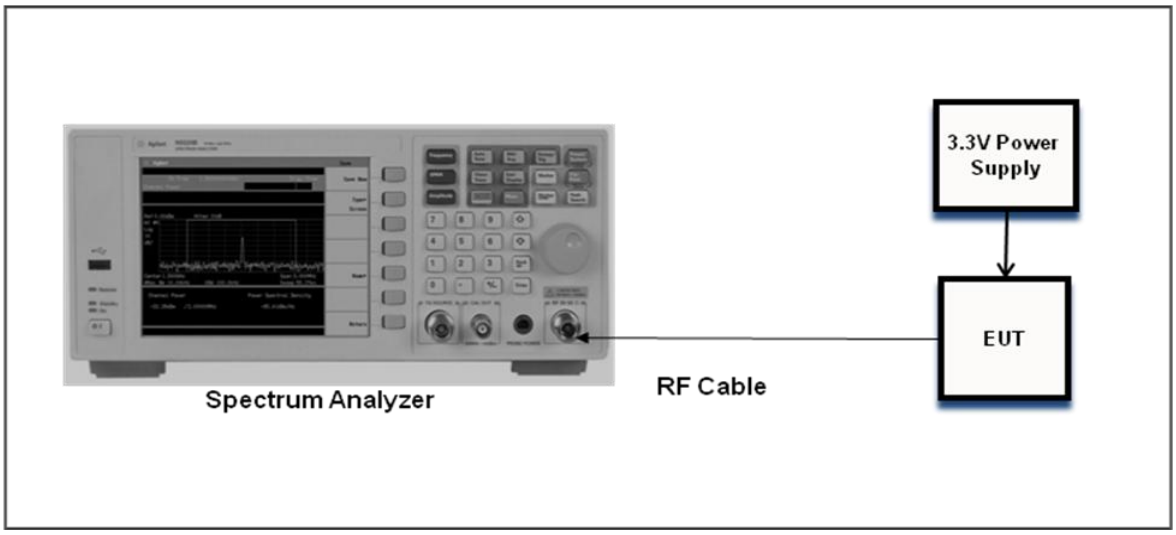



Figure 1 : Conducted RF Test Setup

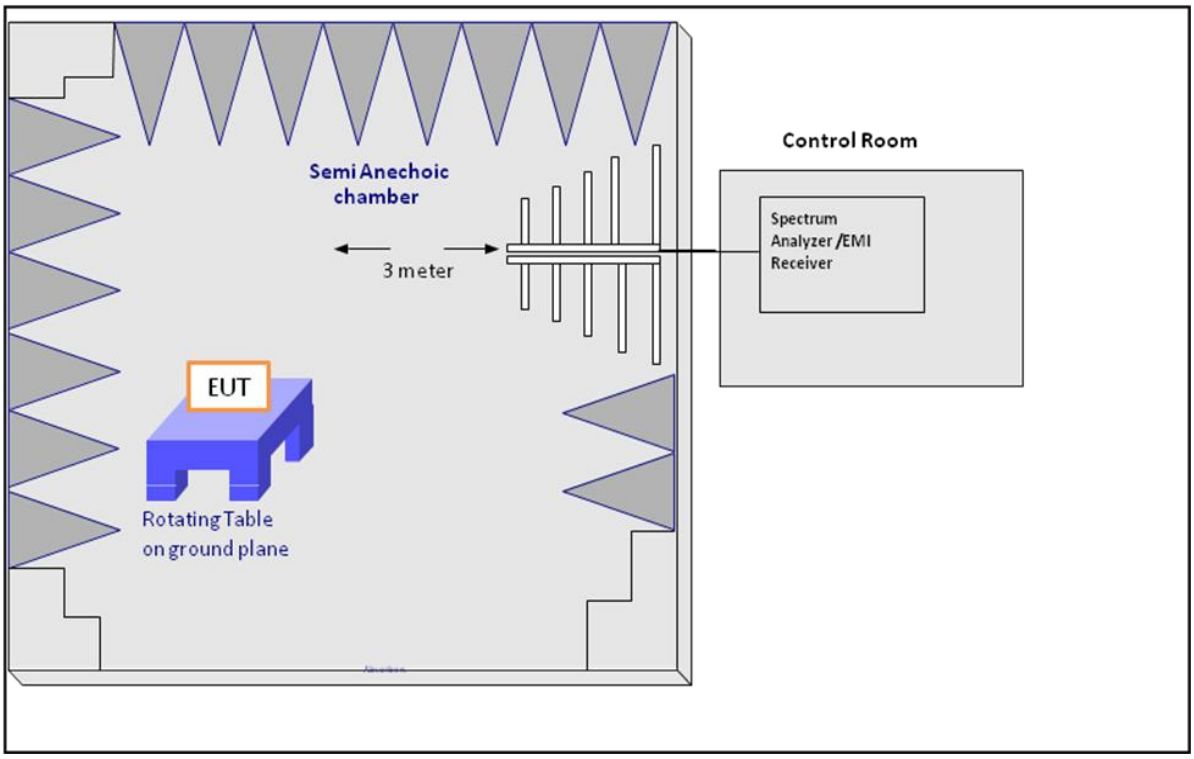



Figure 2 : Radiated Emission Test Setup

# Wireless Acclimate Smoke Detector

# 2 FHSS CHANNELS

## 2.1 20dB Bandwidth

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 21-Oct-2013 | **Temperature (˚C)** | 23.2 |
| **Test End Date** | 22-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

**TEST DETAILS**

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

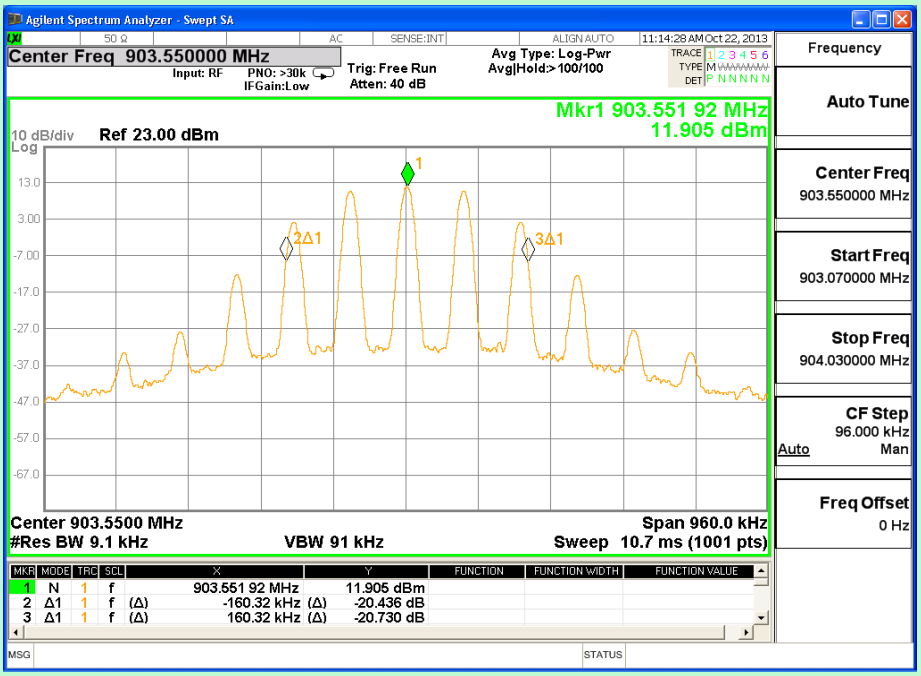
**TEST PARAMETERS**

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

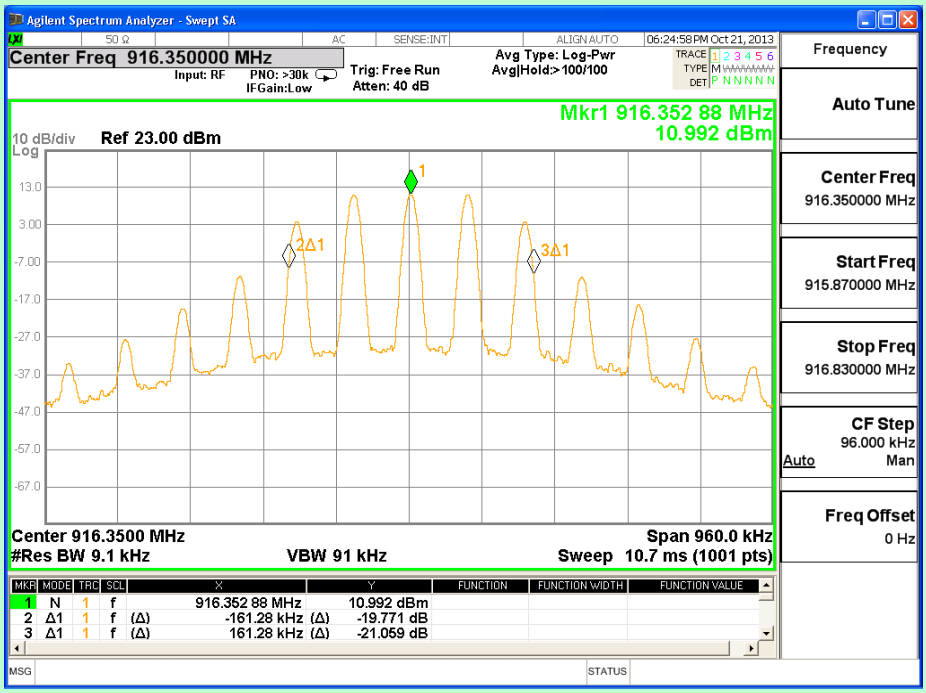
**TEST EQUIPMENT**

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

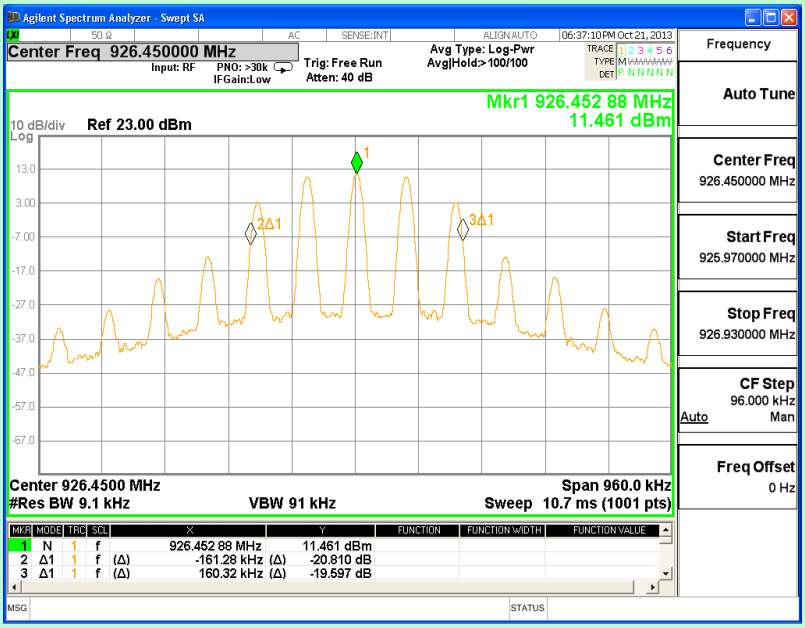
## TEST GRAPHS




**Channel 1 (903.55 MHz)**




**Channel 27 (916.35 MHz)**




**Channel 52 (926.45 MHz)**

## TEST RESULT

| Channel # | Frequency MHz | Measured Bandwidth KHz | Limit KHz | Result |
|---|---|---|---|---|
| 1 | 903.55 | 320.64 | ≥250 & ≤500 | PASS |
| 27 | 916.35 | 322.56 | ≥250 & ≤500 | PASS |
| 52 | 926.45 | 321.60 | ≥250 & ≤500 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure -1

**Conducted RF Test Setup**

## 2.2 MAXIMUM PEAK OUTPUT POWER

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 21-Oct-2013 | **Temperature (°C)** | 23.2 |
| **Test End Date** | 21-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NIL | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted , ☐ Radiated |

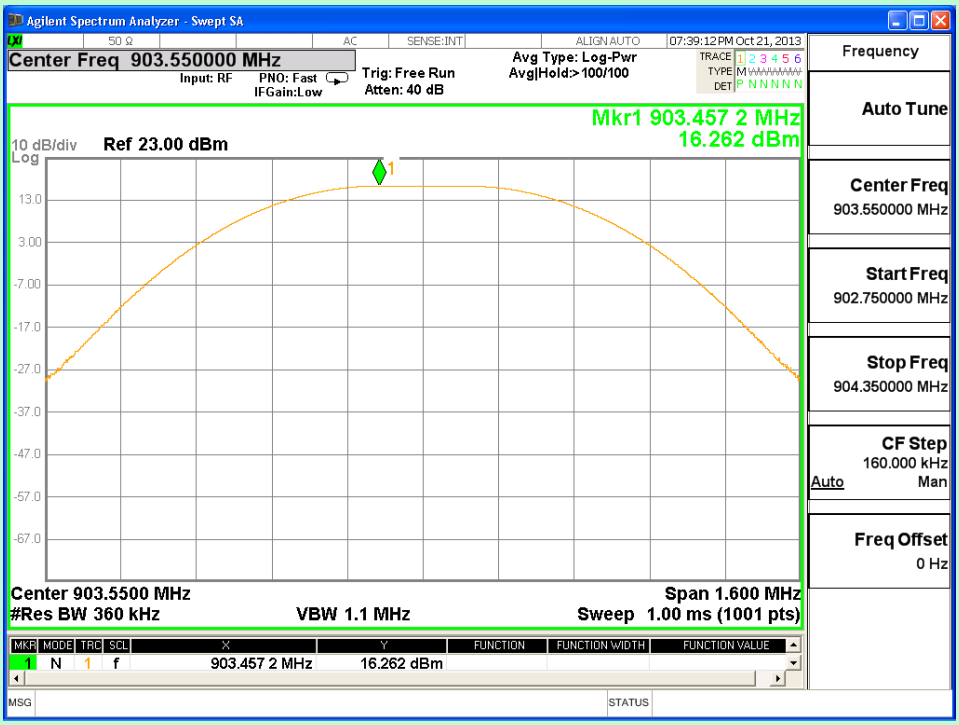
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

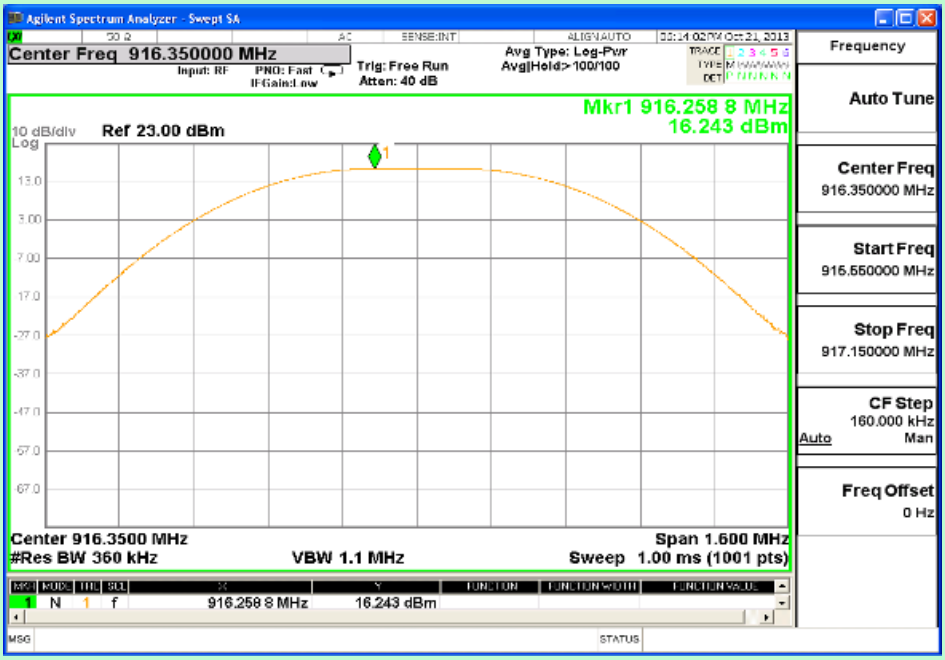
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

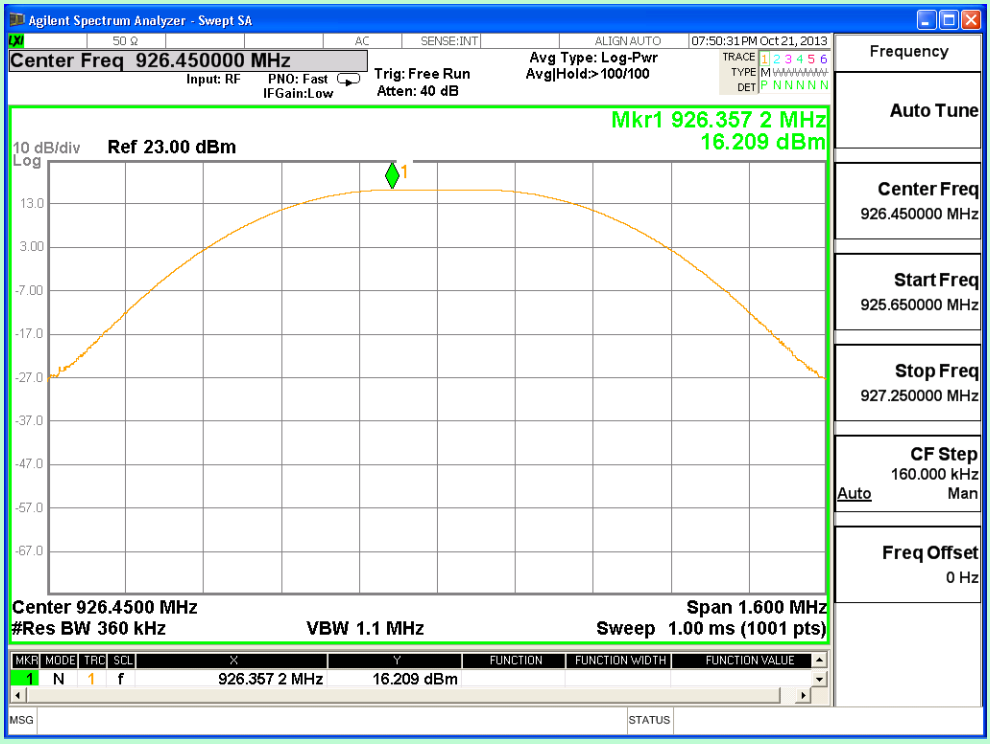
## TEST GRAPHS




**Channel 1 (903.55 MHz)**




**Channel 27 (916.35 MHz)**




**Channel 52 (926.45 MHz)**

## TEST RESULT

| Channel | Frequency | Measured Power Level | Cable Loss | Transmitter Power Level | Limit | Result |
|---|---|---|---|---|---|---|
| # | MHz | dBm | dB | dBm | dBm | |
| 1 | 903.55 | 16.262 | 0.5 | 16.762 | ≤ 23.979 | PASS |
| 27 | 916.35 | 16.243 | 0.5 | 16.743 | ≤ 23.979 | PASS |
| 52 | 926.45 | 16.209 | 0.5 | 16.709 | ≤ 23.979 | PASS |

Note: Transmitter Output Power = Measured Level (dBm) + Cable Loss (dB)

## TEST SETUP PHOTOGRAPHS

Refer Annexure -1

**Conducted RF Test Setup**

## 2.3 CARRIER FREQUENCY SEPERATION

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 22-Oct-2013 | **Temperature (˚C)** | 23.2 |
| **Test End Date** | 23-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3 Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

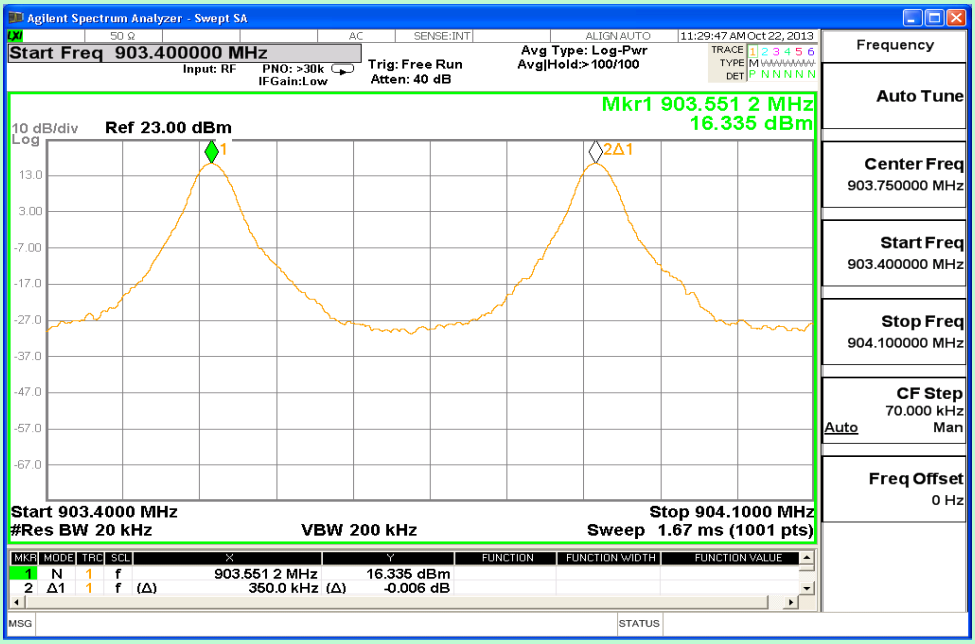
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

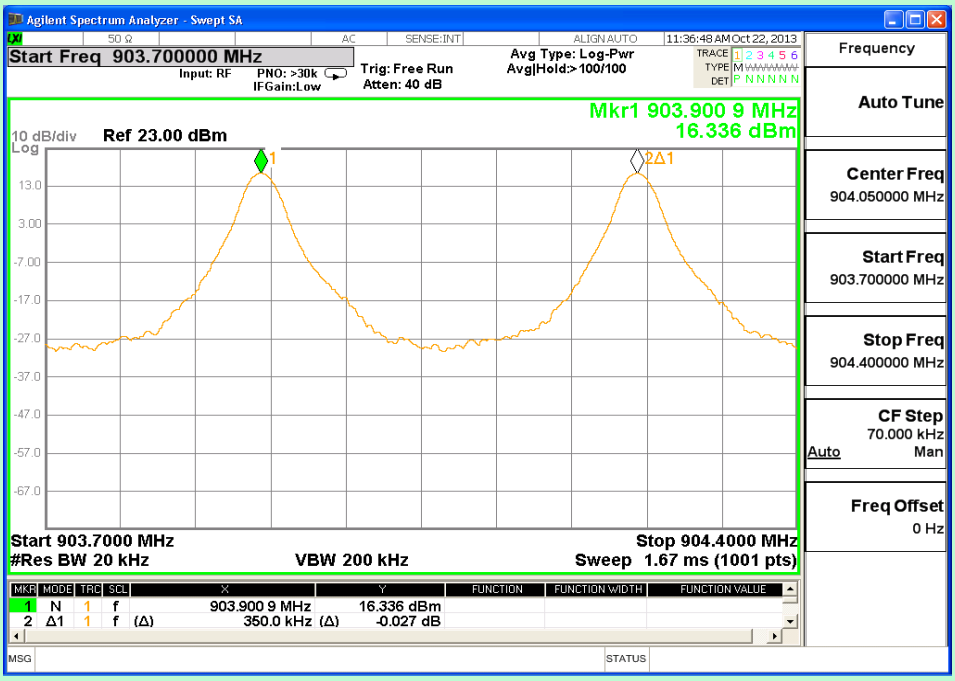
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

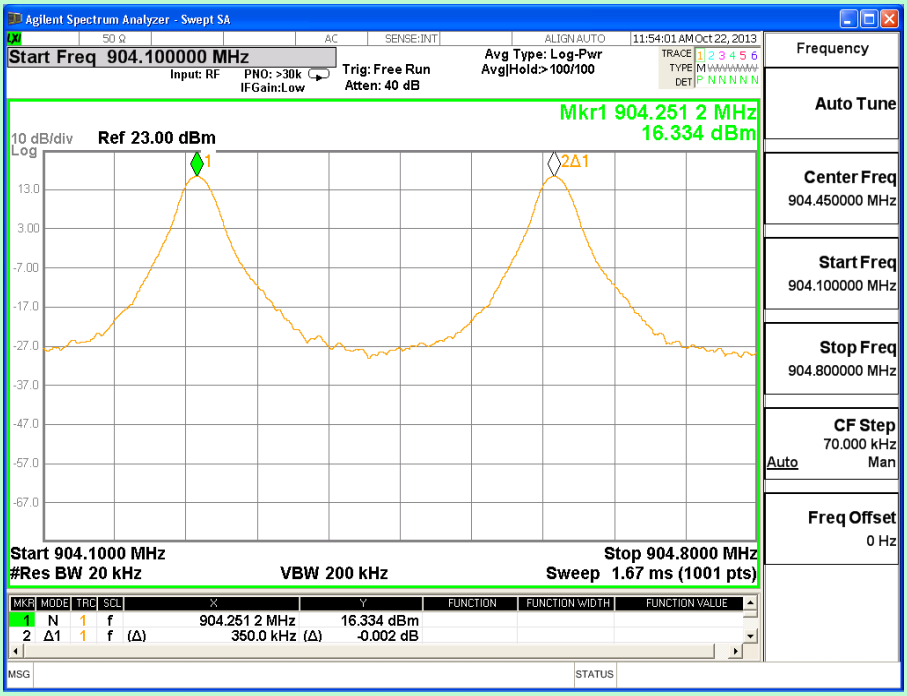
## TEST GRAPHS



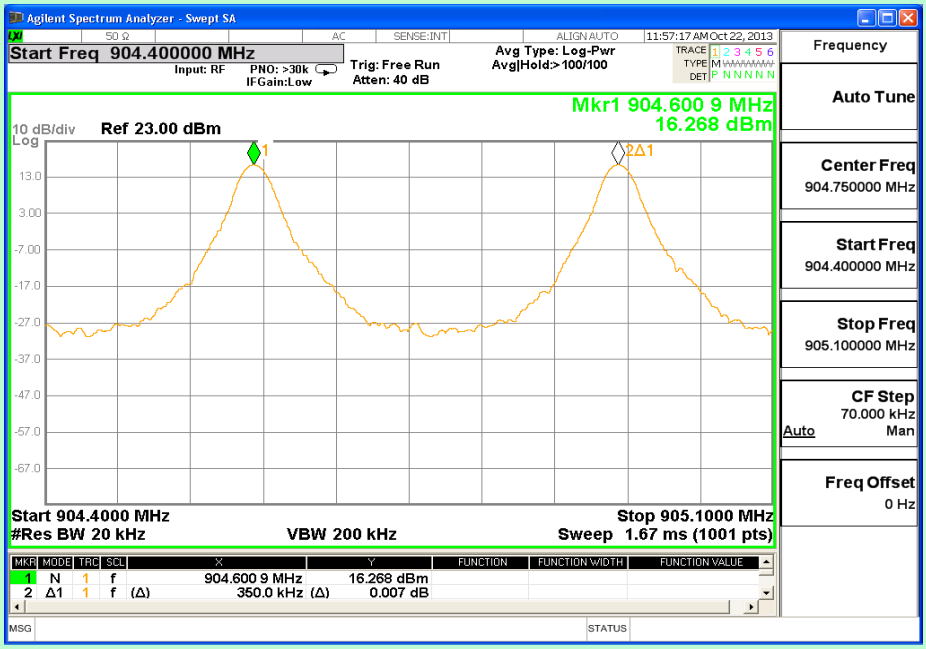

**Channel 1 and 2**



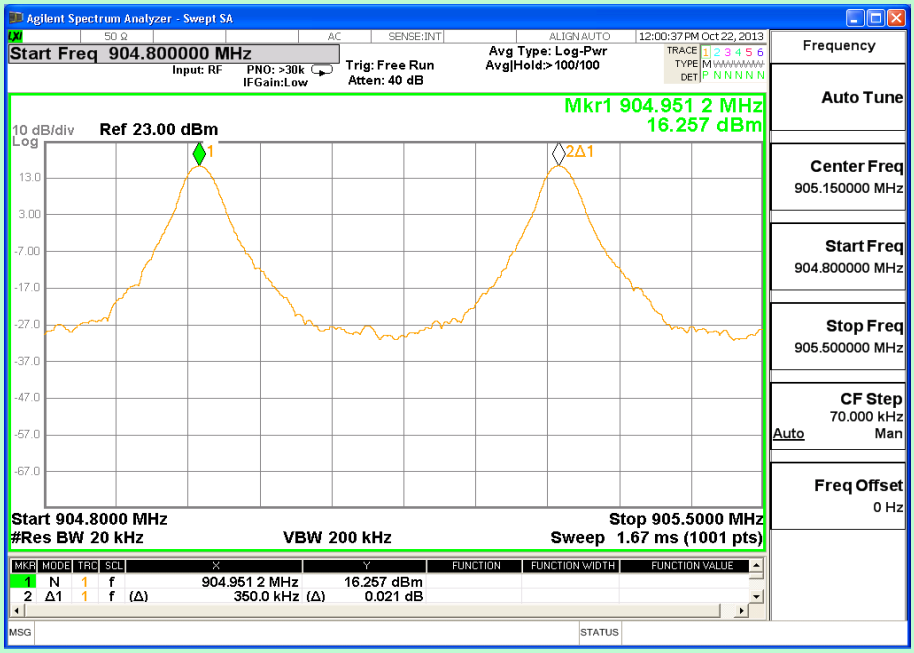

**Channel 2 and 3**



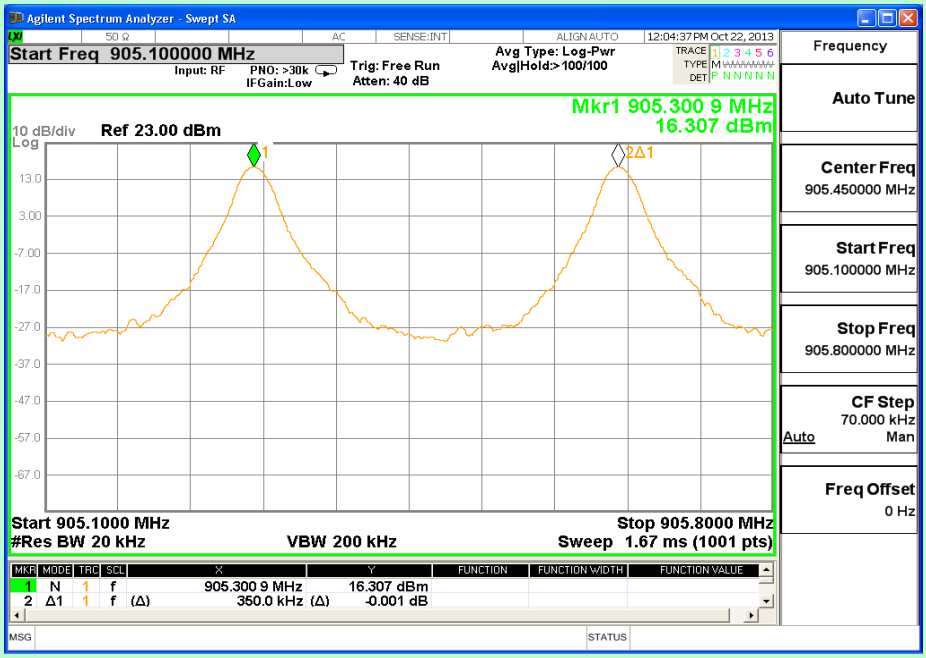

**Channel 3 and 4**



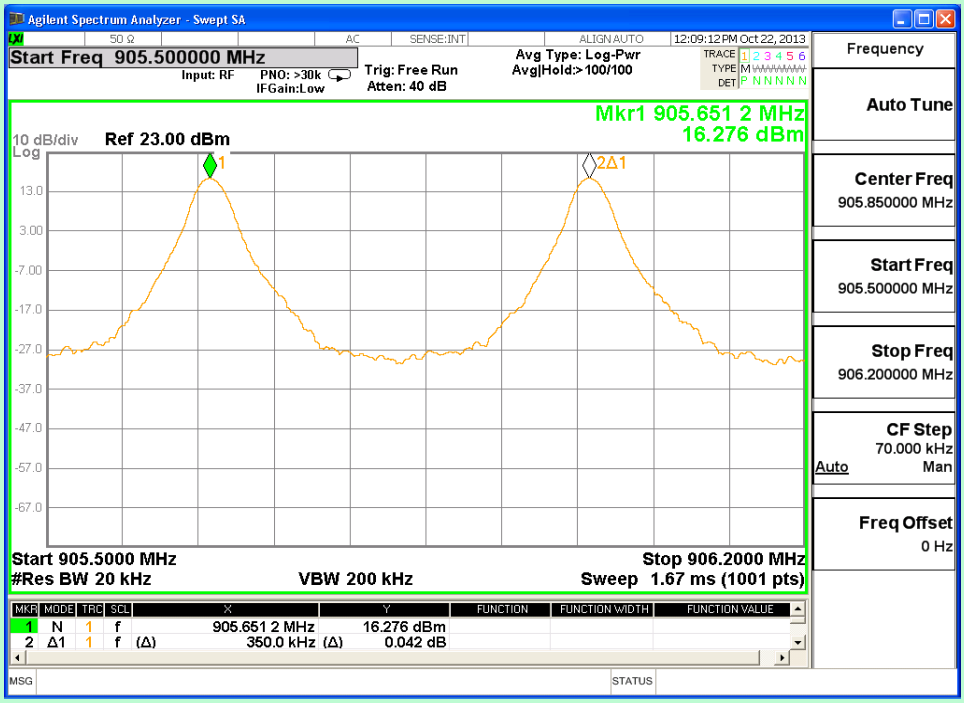

**Channel 4 and 5**



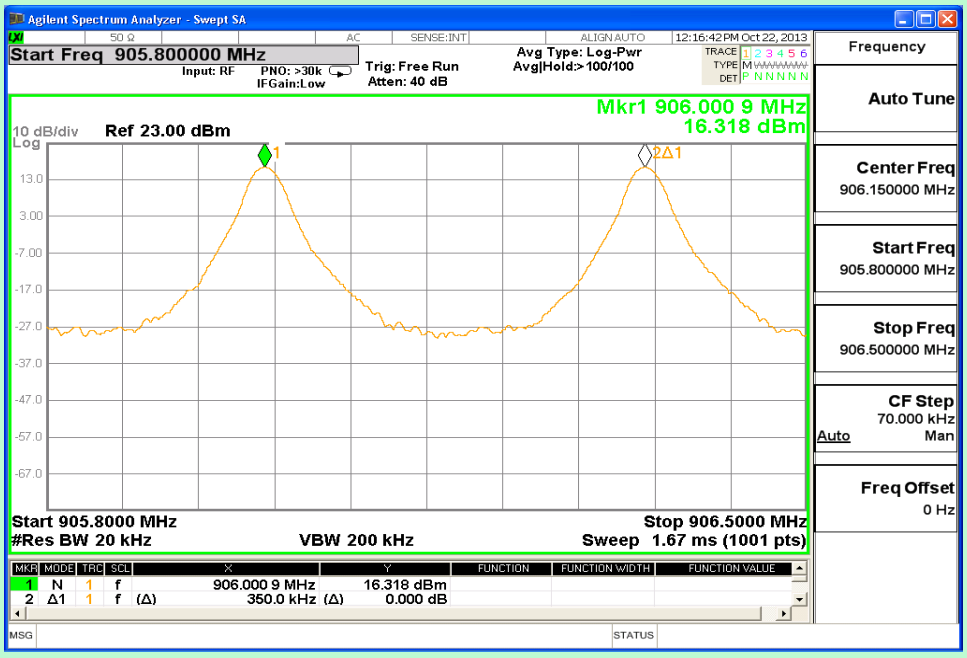

**Channel 5 and 6**



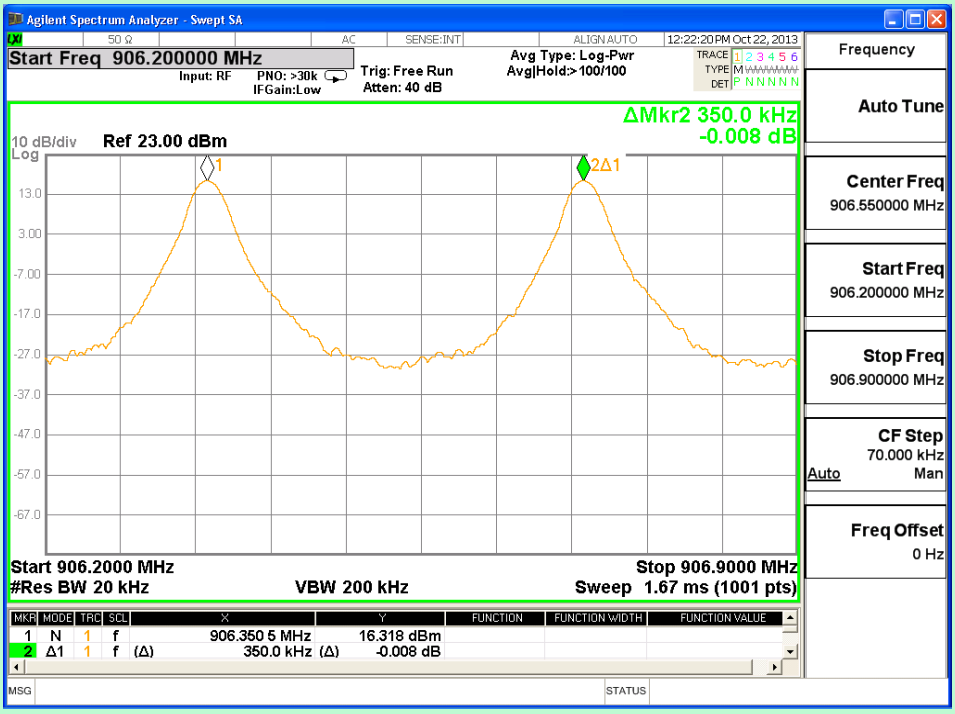

**Channel 6 and 7**



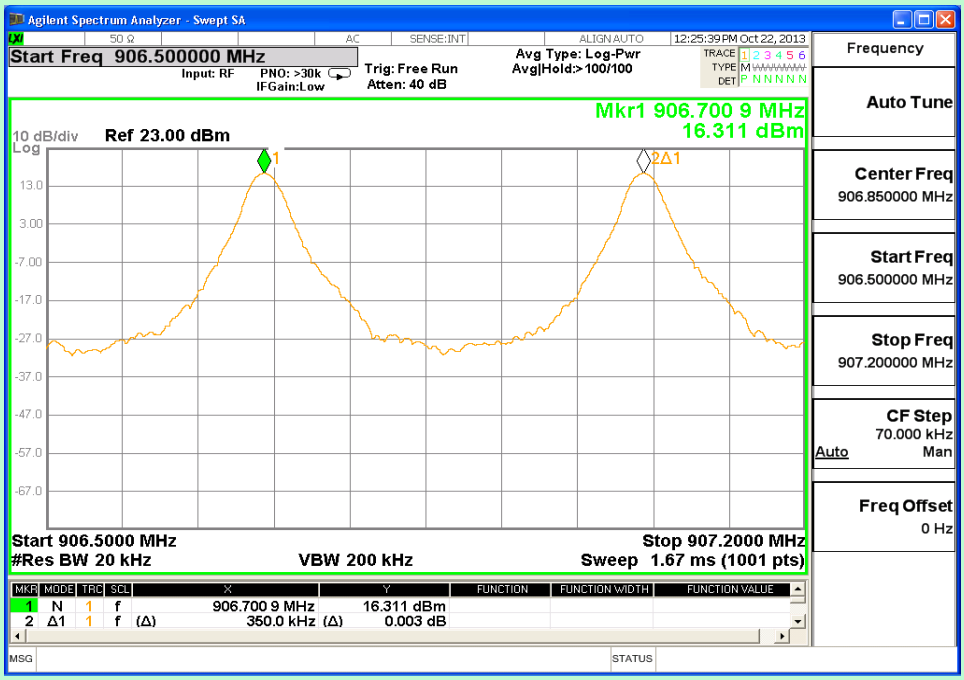

**Channel 7 and 8**



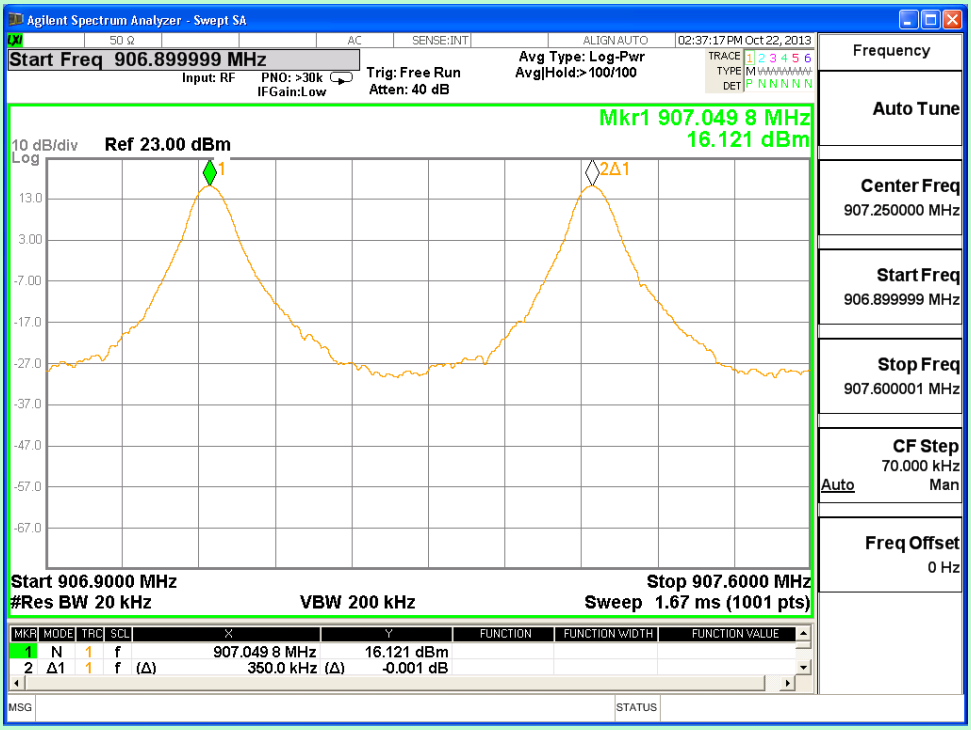

**Channel 8 and 9**



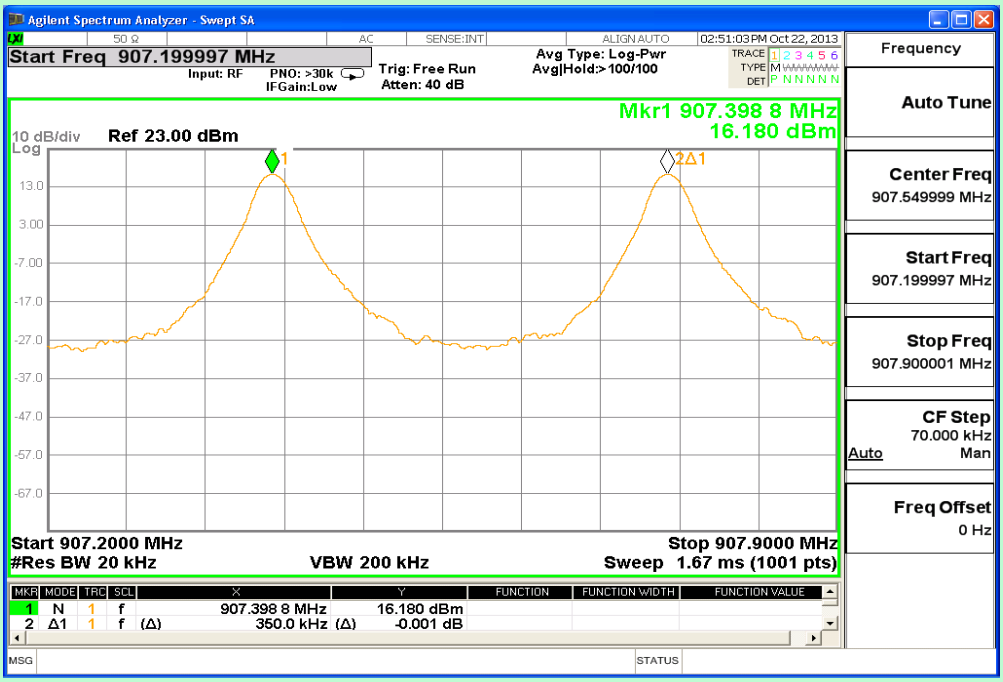

**Channel 9 and 10**



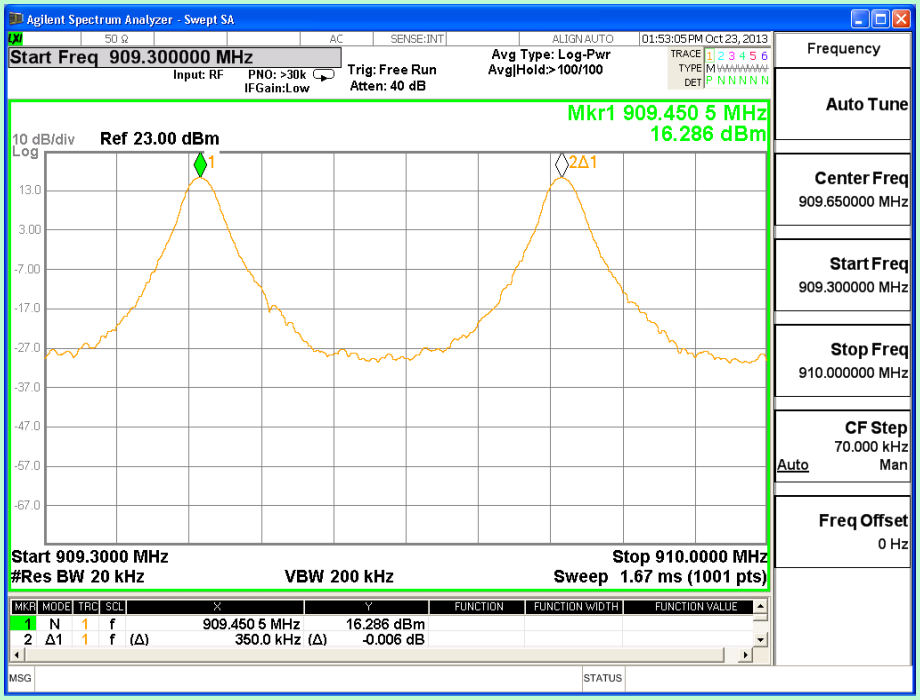

**Channel 10 and 11**



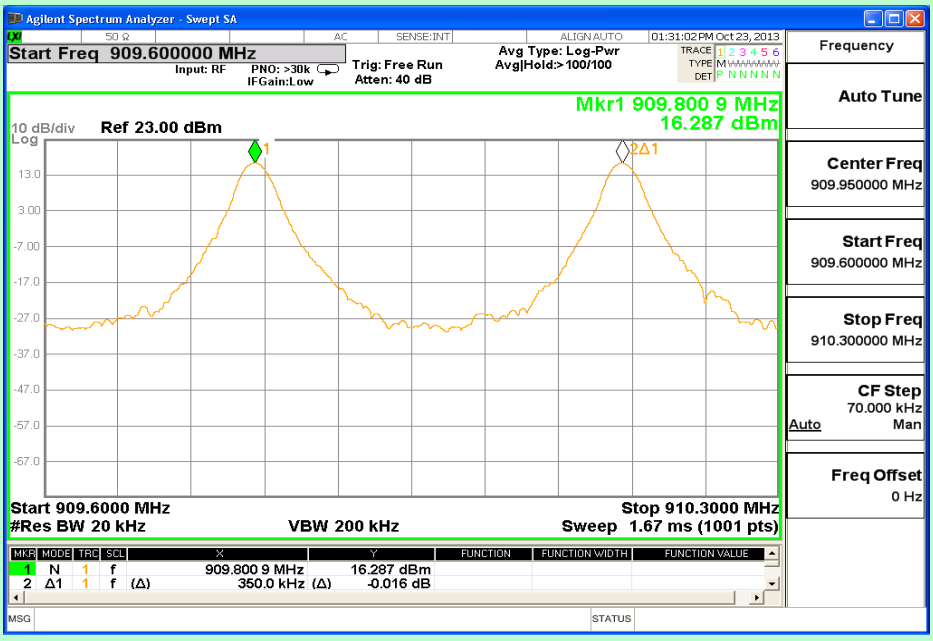

**Channel 11 and 12**



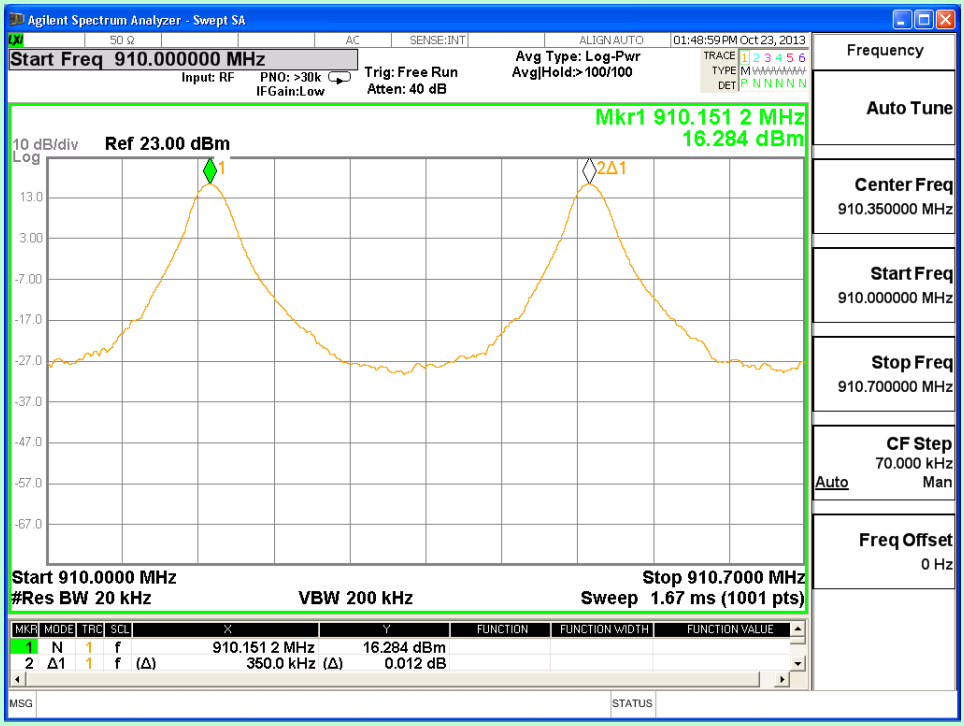

**Channel 12 and 13**



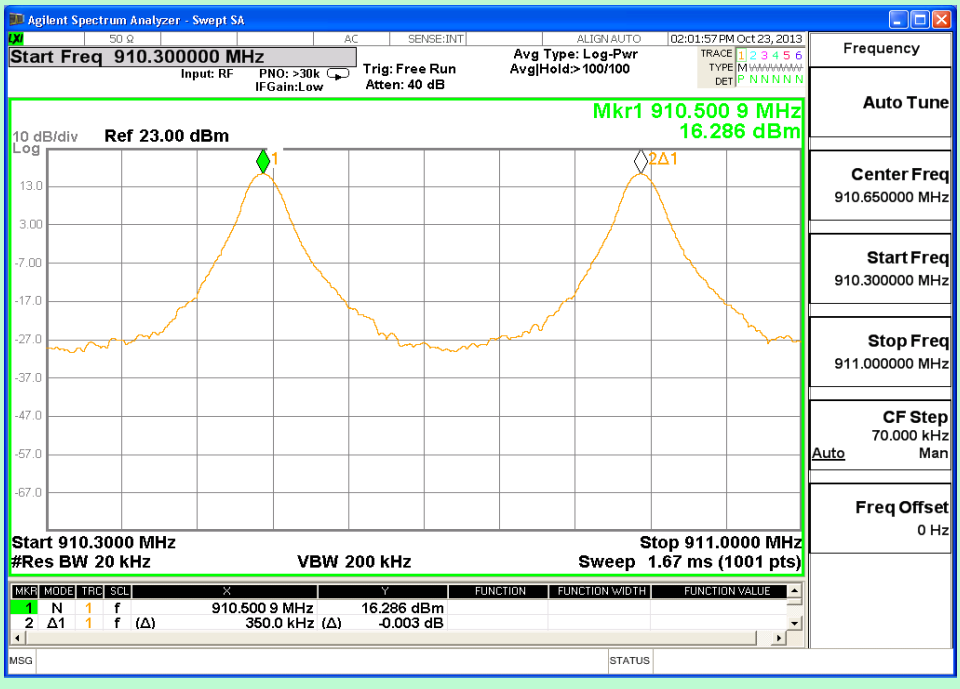

**Channel 14 and 15**



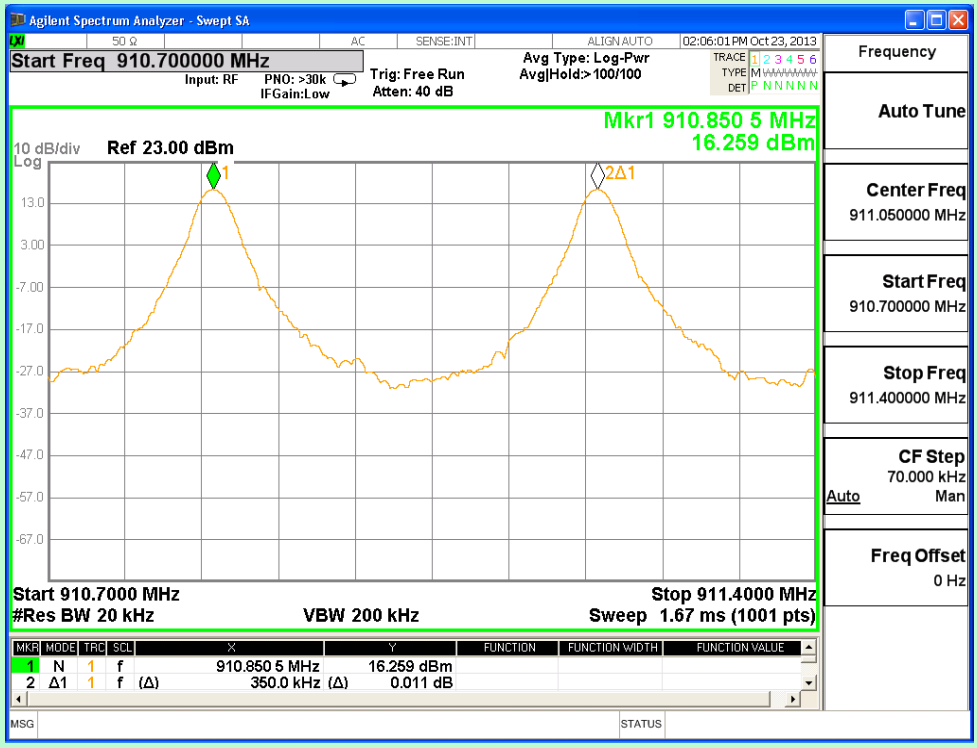

**Channel 15 and 16**



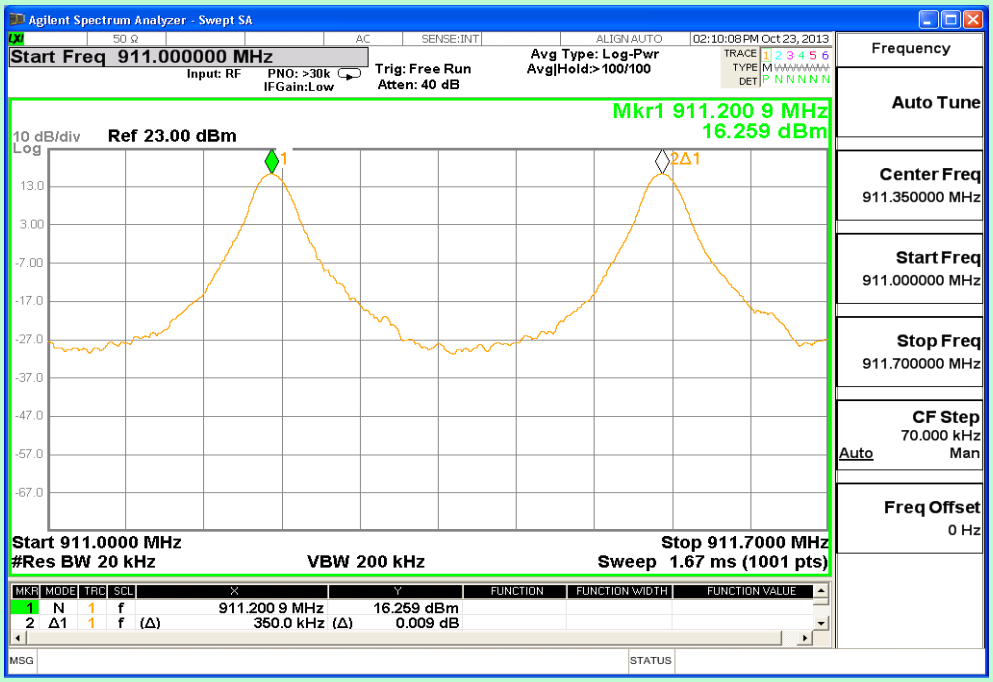

**Channel 16 and 17**



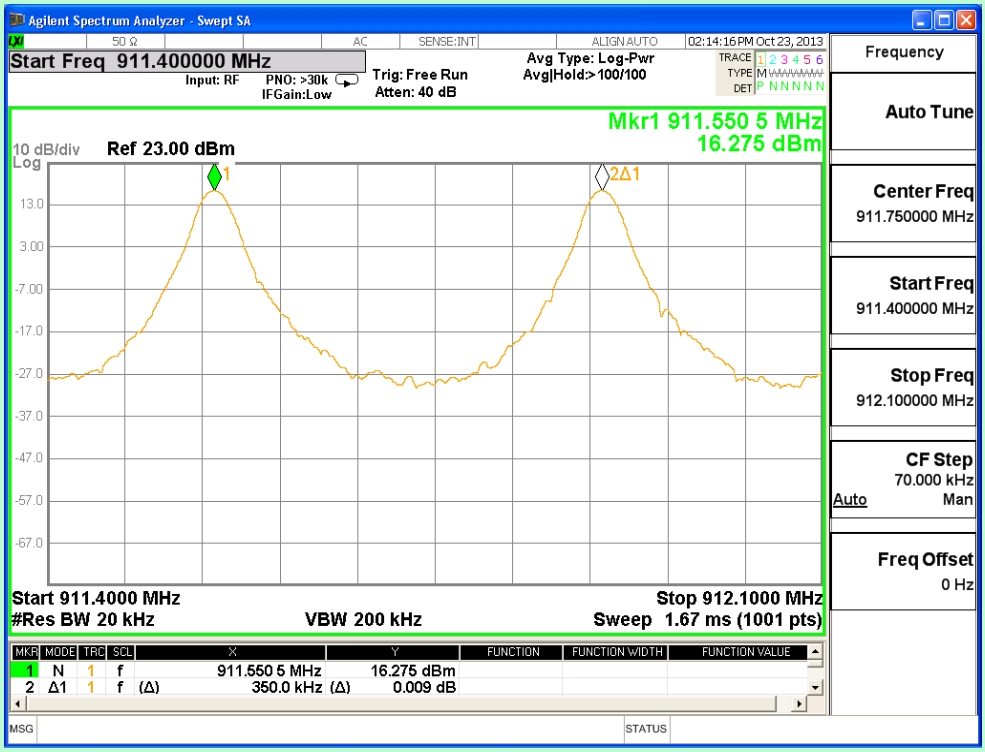

**Channel 17 and 18**



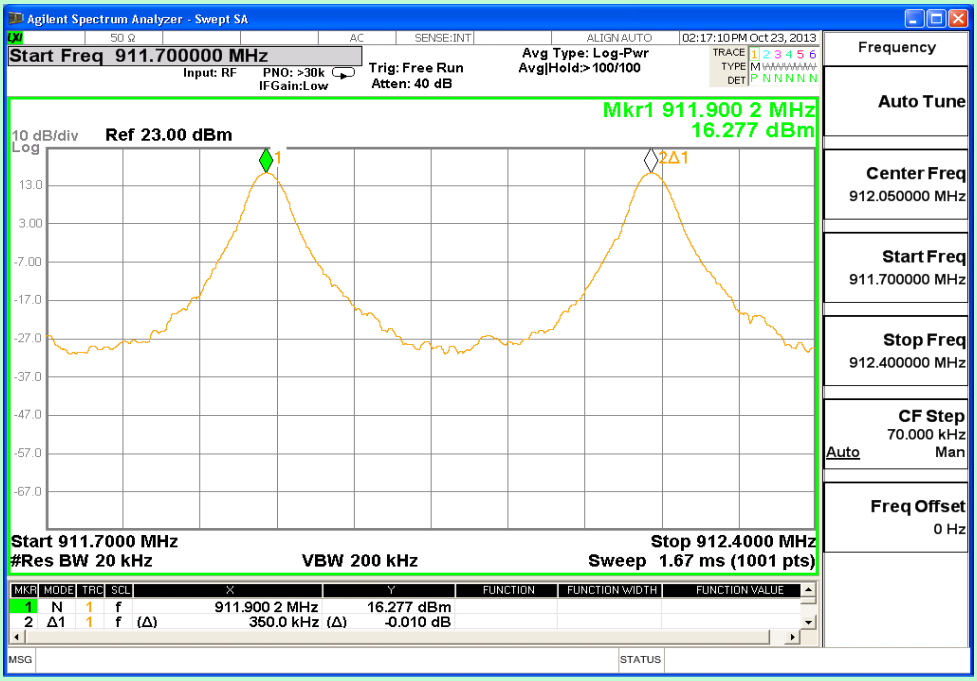

**Channel 18 and 19**



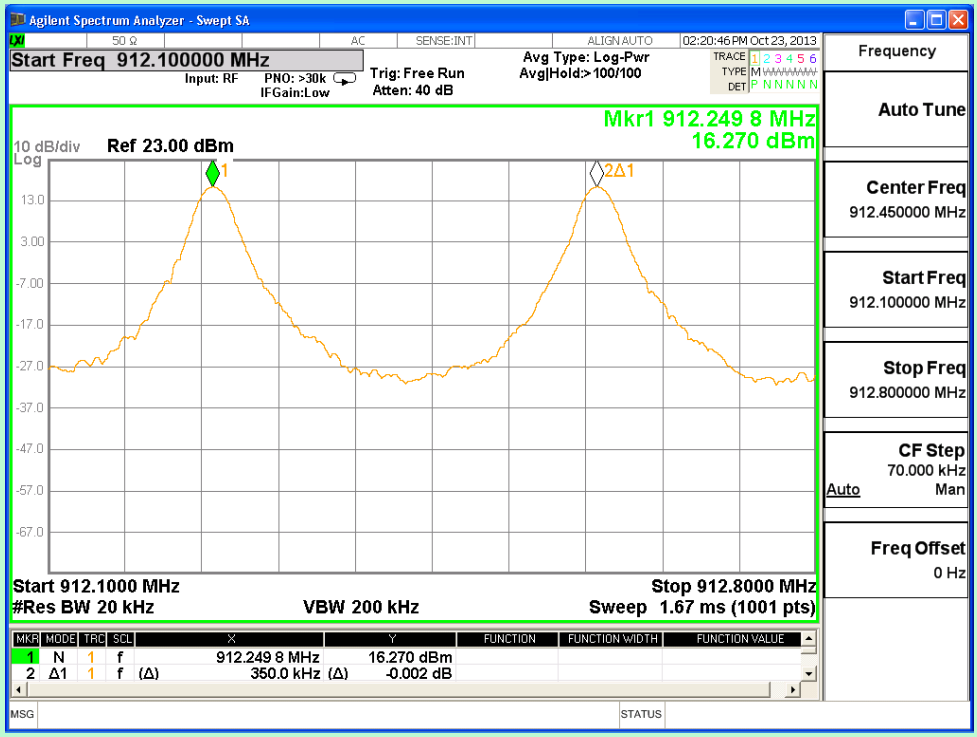

**Channel 19 and 20**



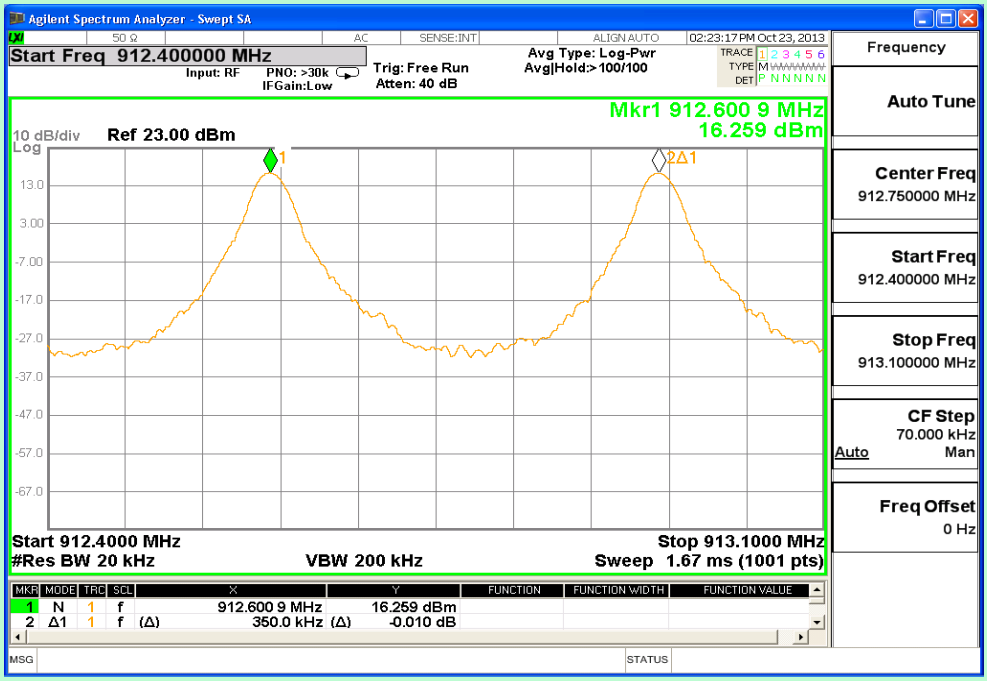

**Channel 20 and 21**



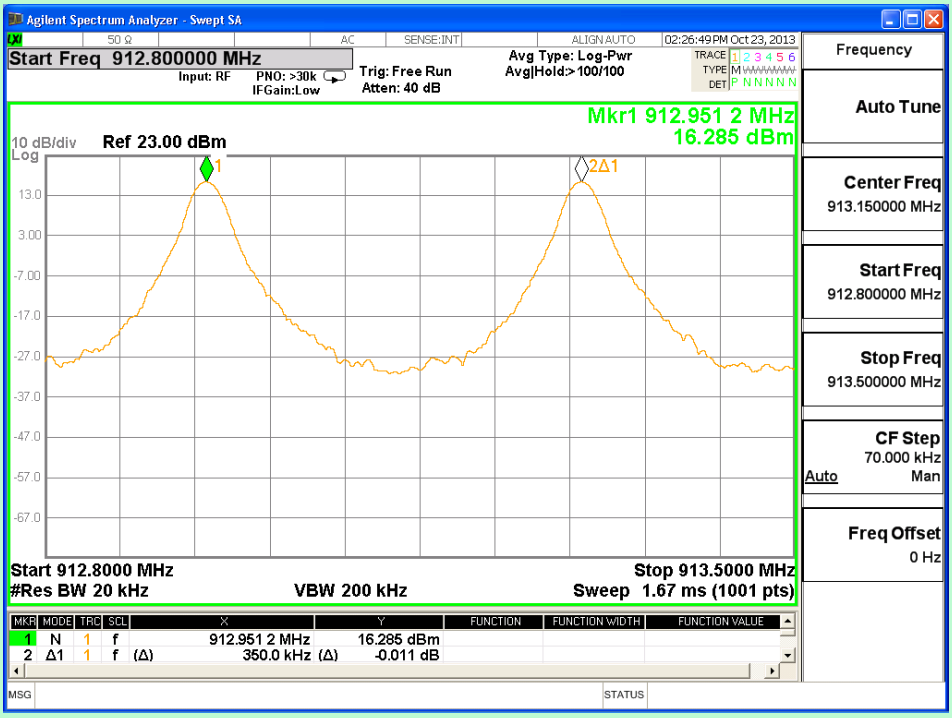

**Channel 21 and 22**



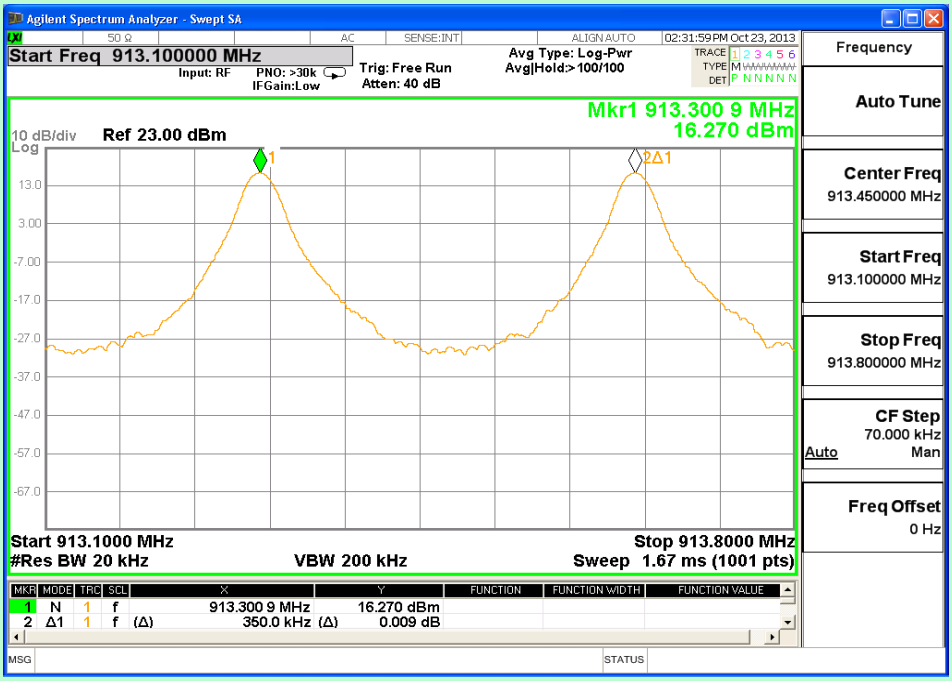

**Channel 22 and 23**



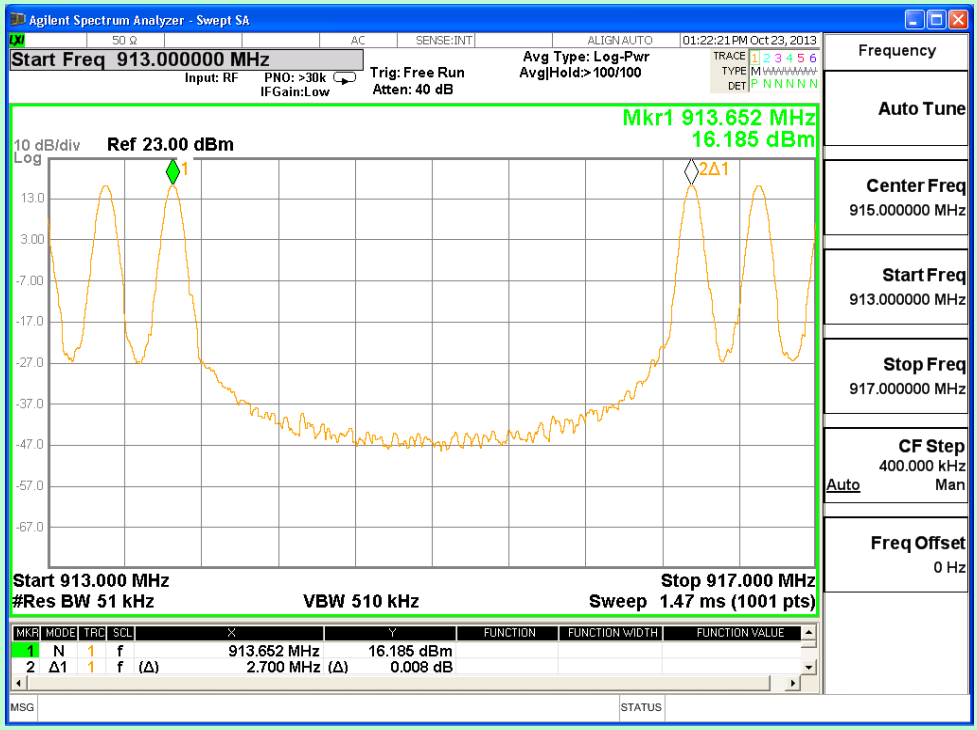

**Channel 23 and 24**



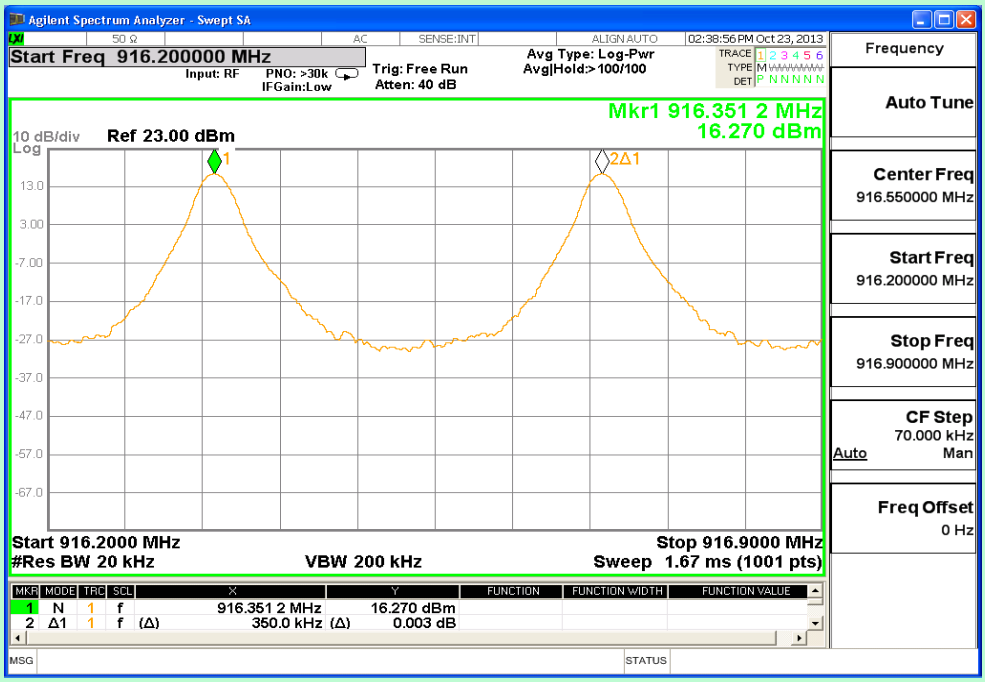

**Channel 24 and 25**



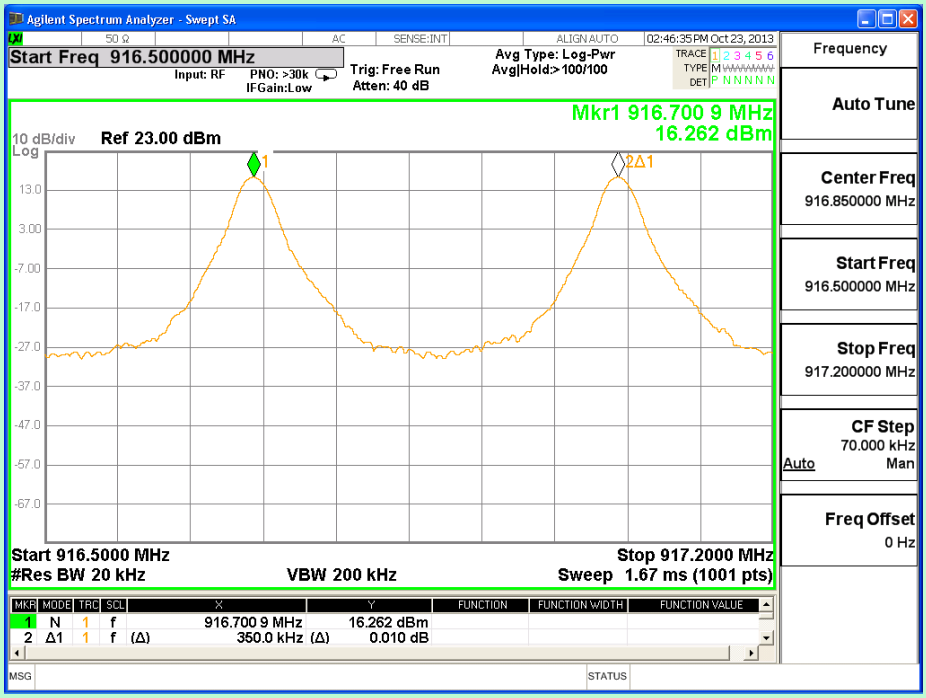

**Channel 25 and 26**



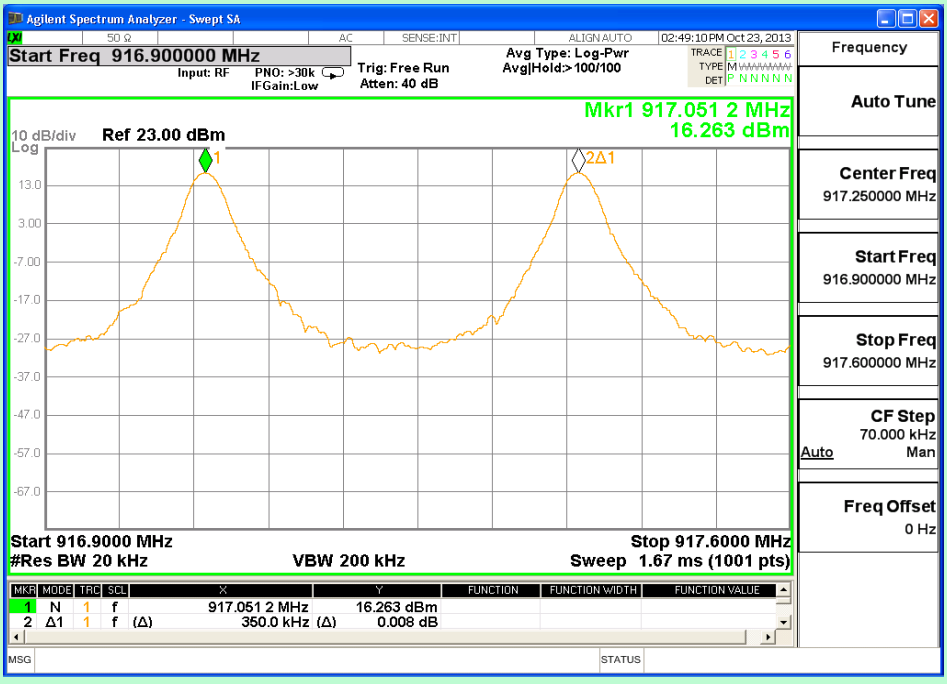

**Channel 26 and 27**



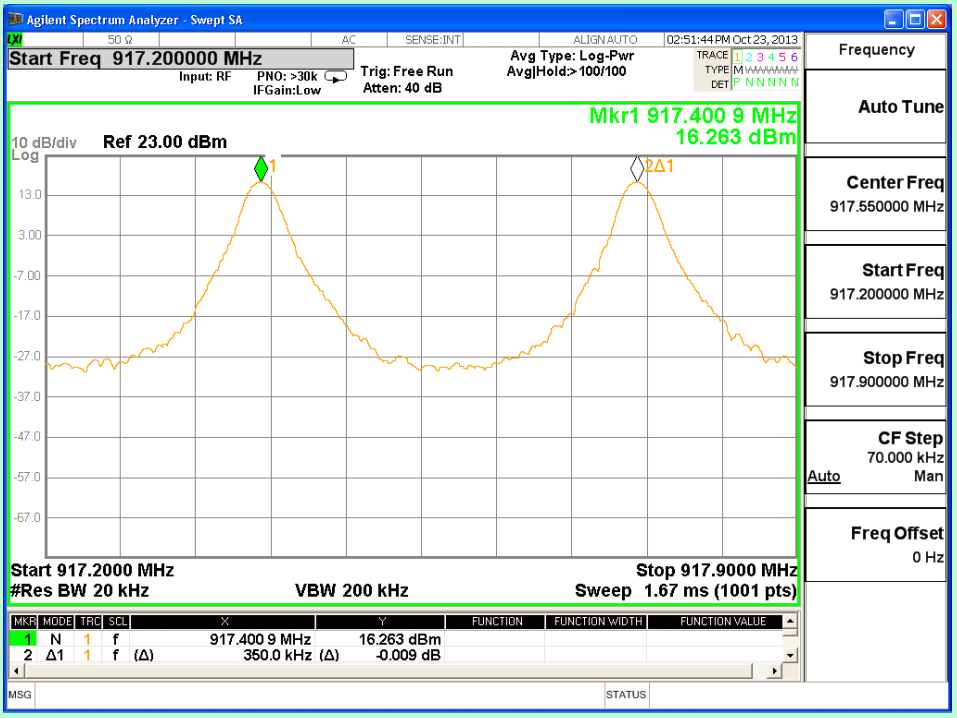

**Channel 27 and 28**



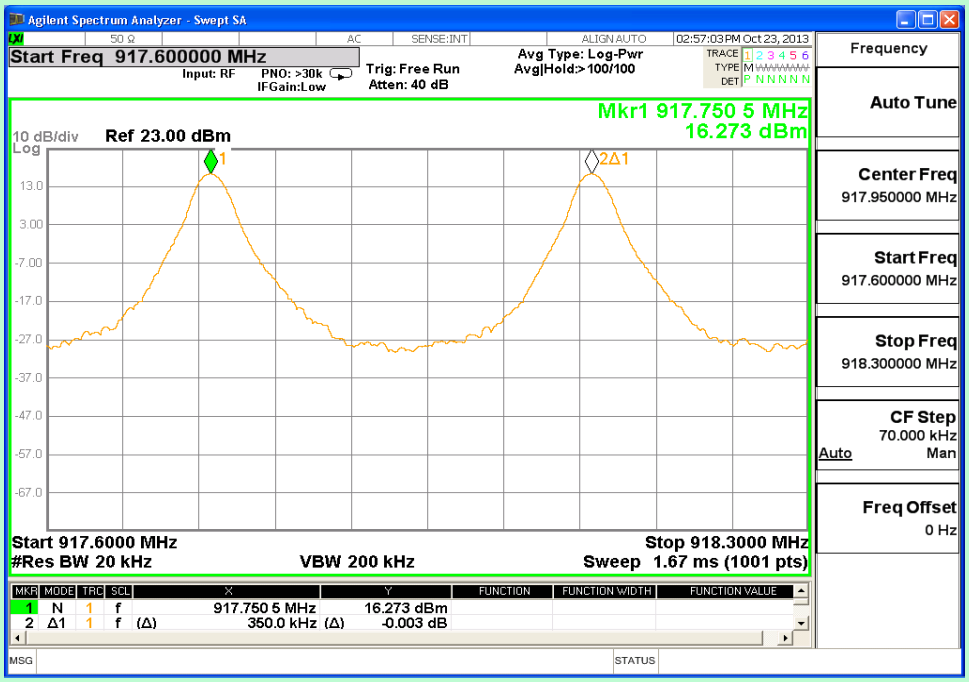

**Channel 28 and 29**



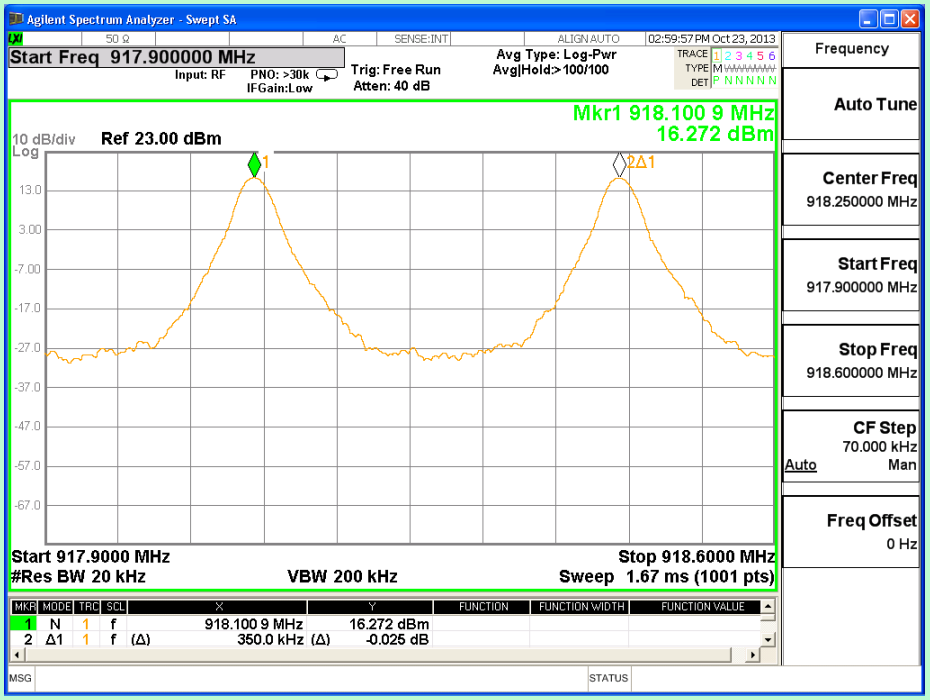

**Channel 29 and 30**



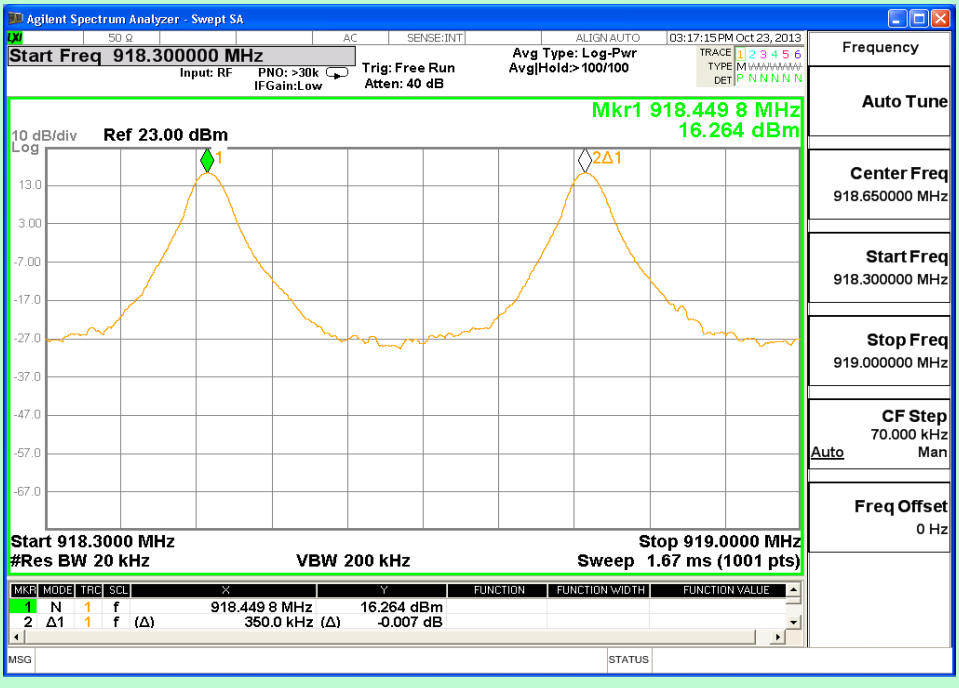

**Channel 30 and 31**



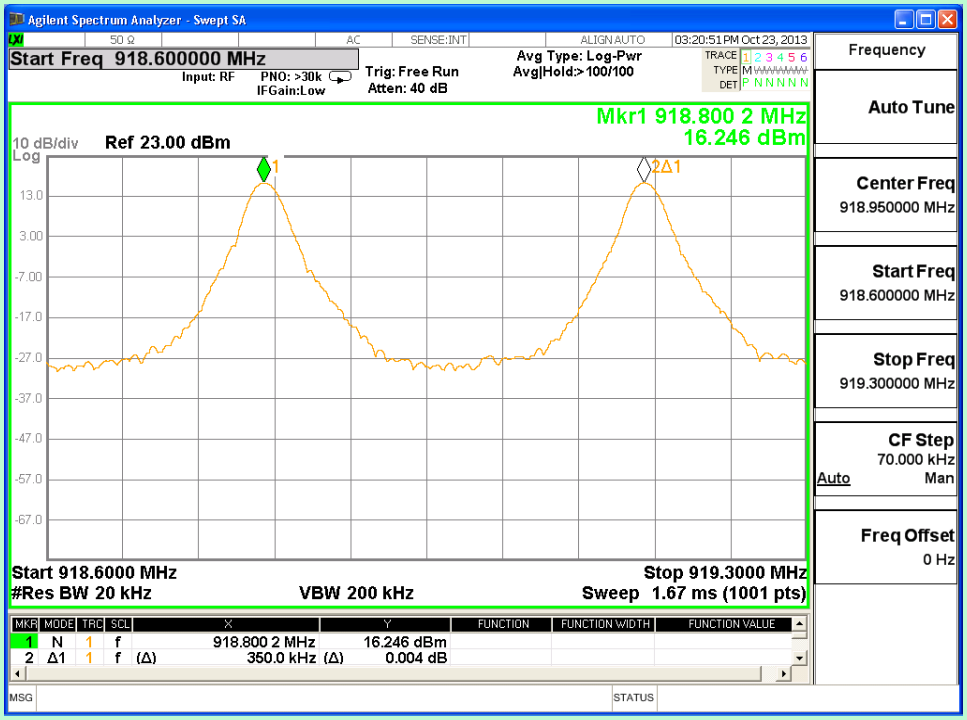

**Channel 31 and 32**



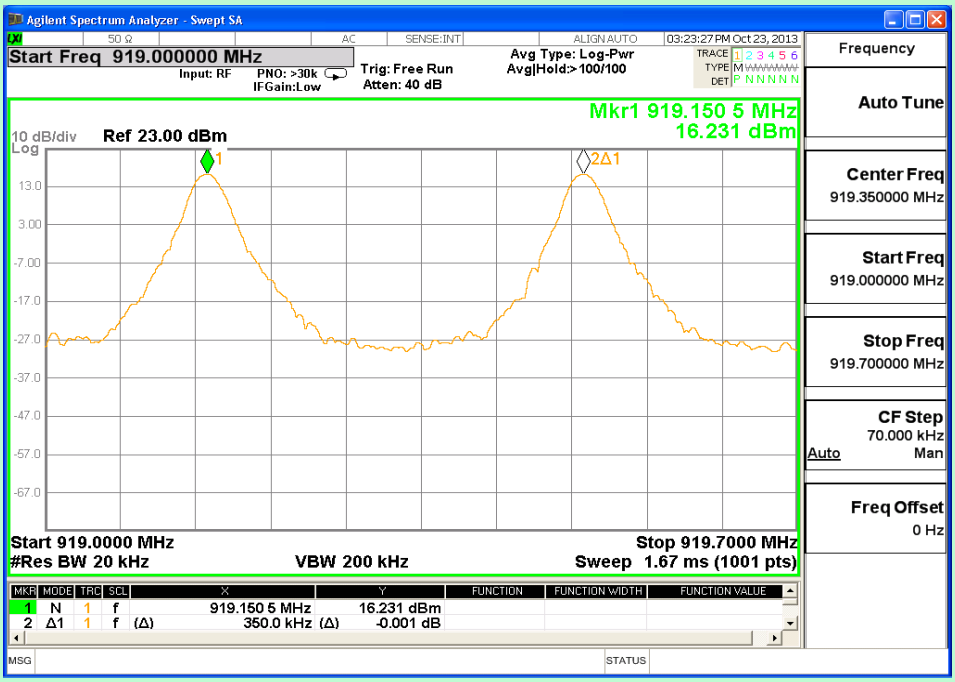

**Channel 32 and 33**



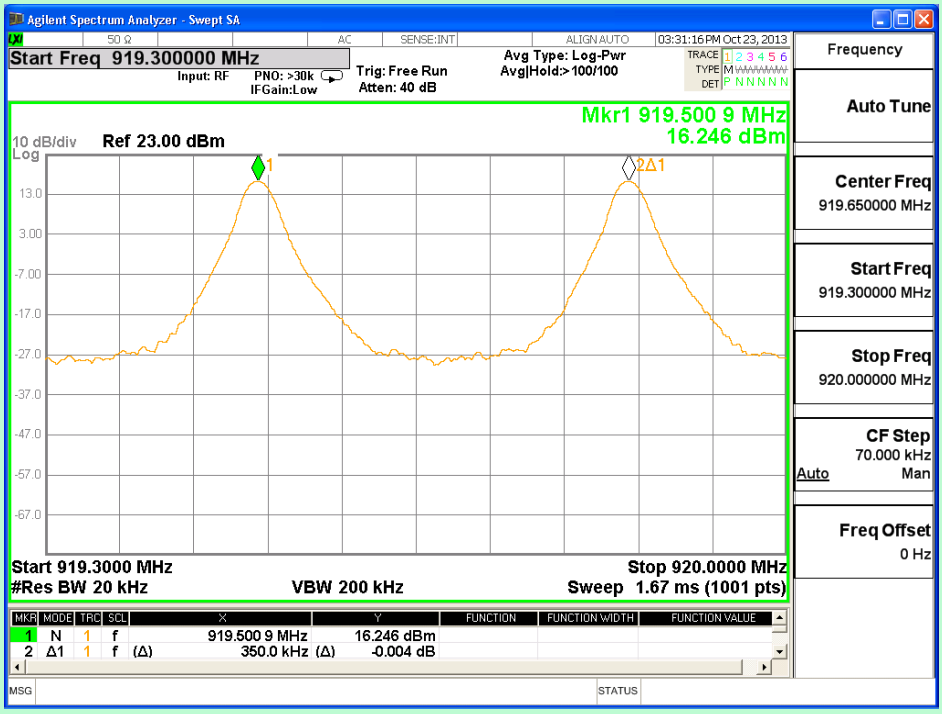

**Channel 33 and 34**



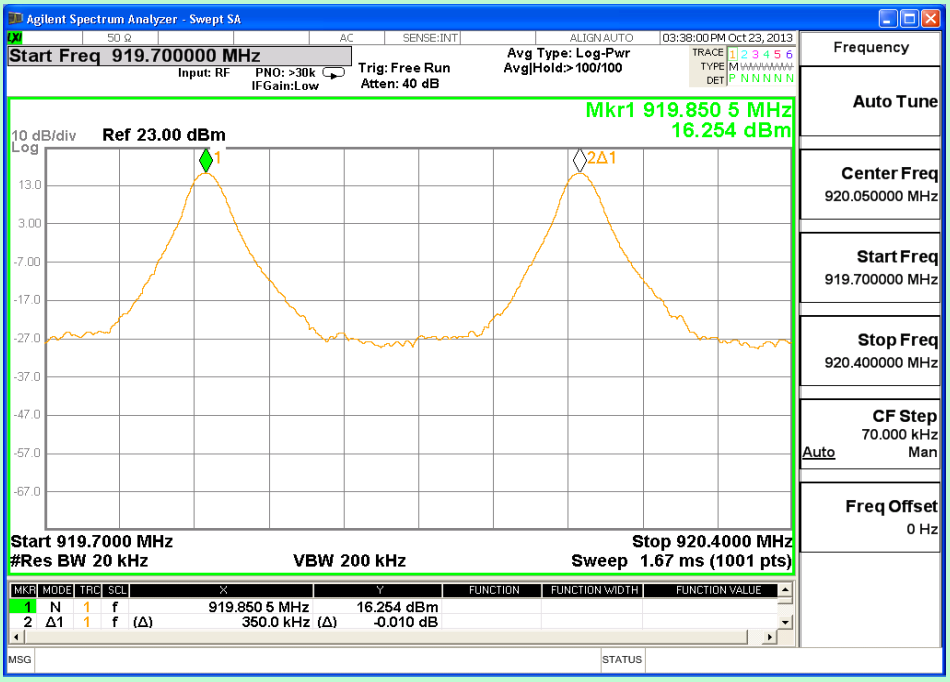

**Channel 34 and 35**



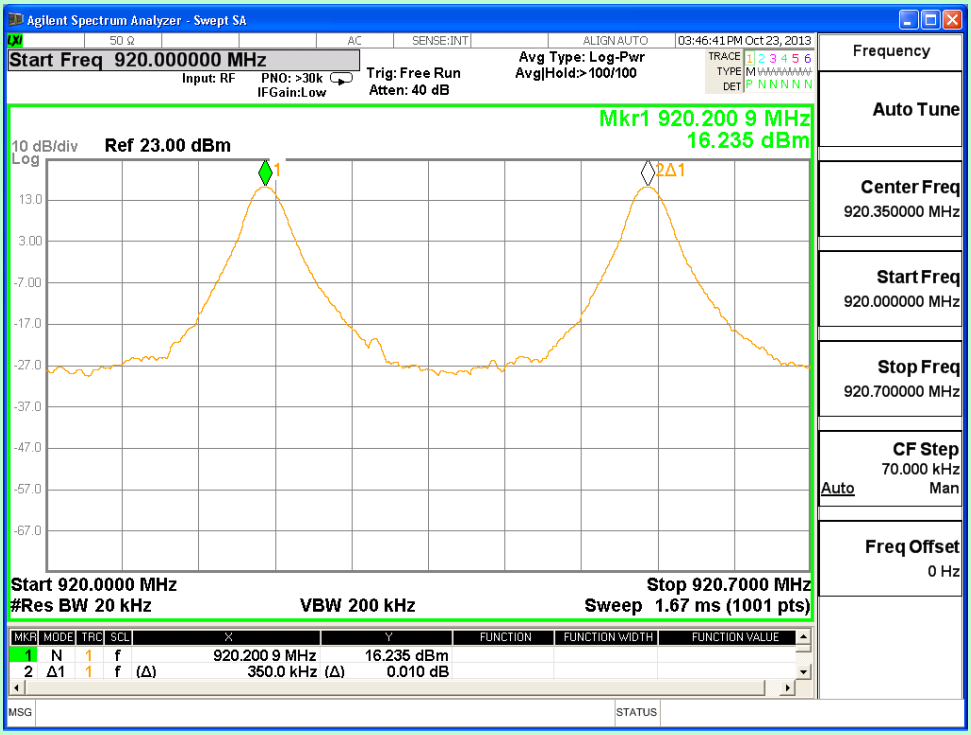

**Channel 35 and 36**



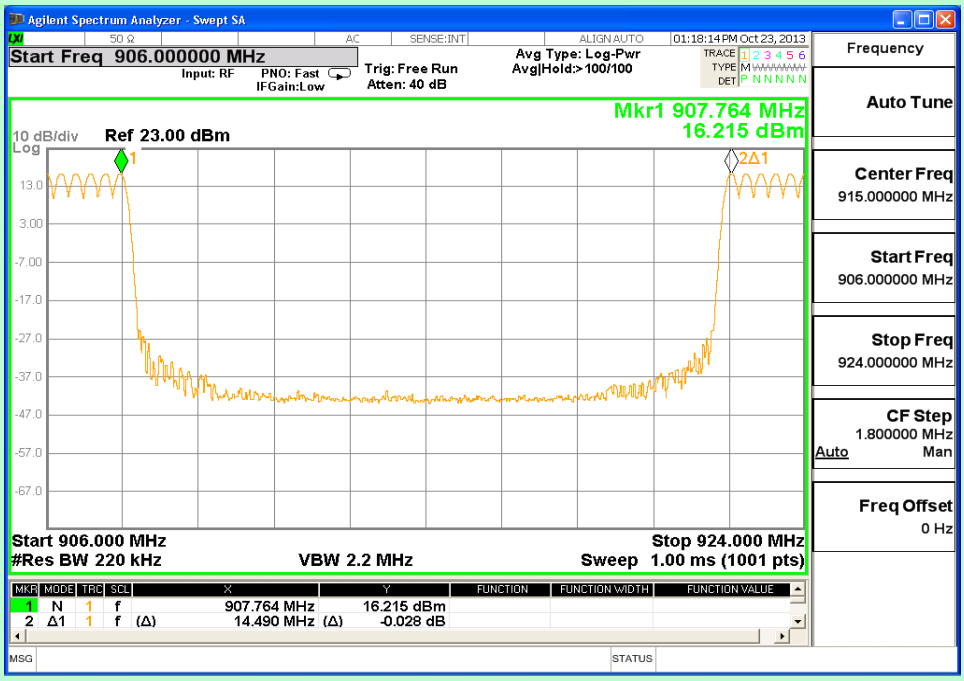

**Channel 36 and 37**



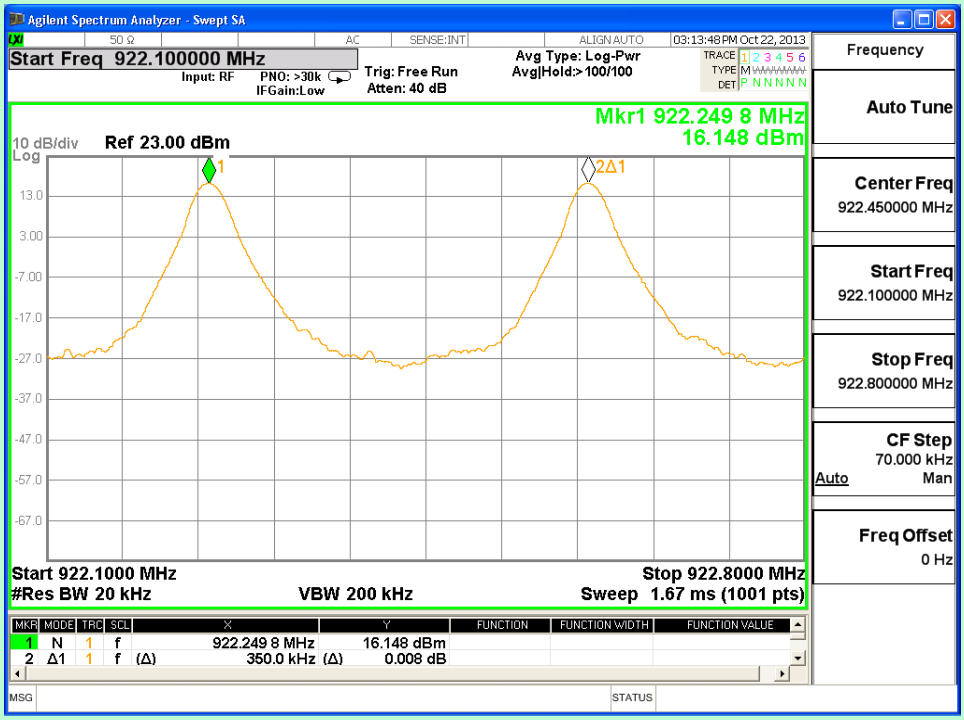

**Channel 37 and 38**



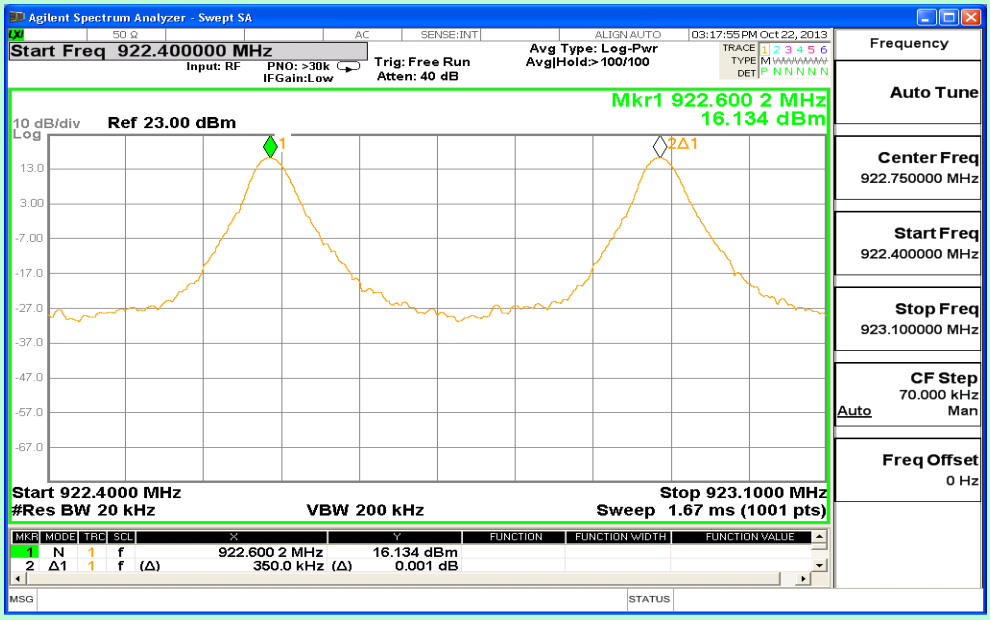

**Channel 38 and 39**



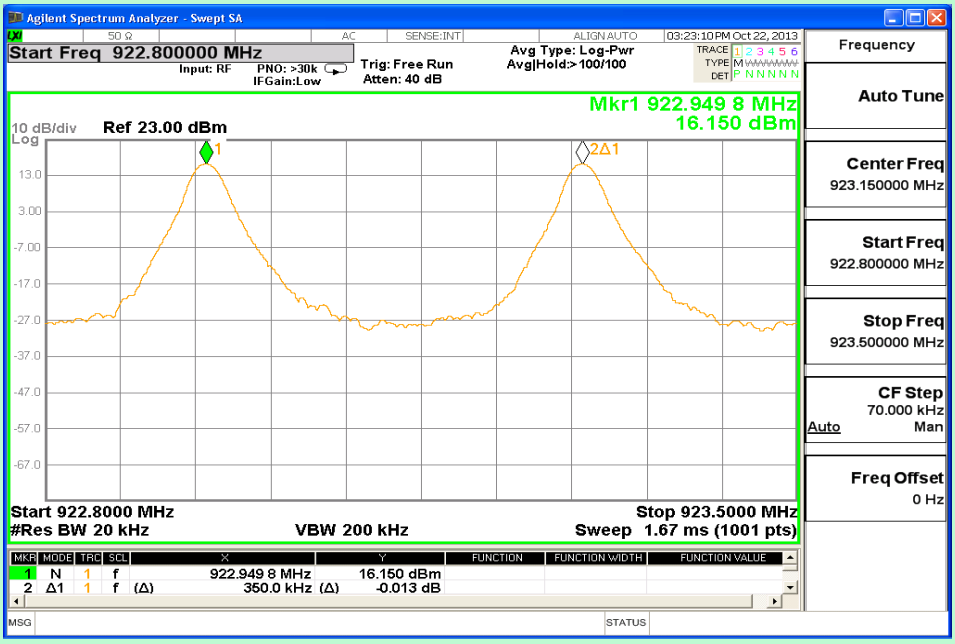

**Channel 13 and 40**



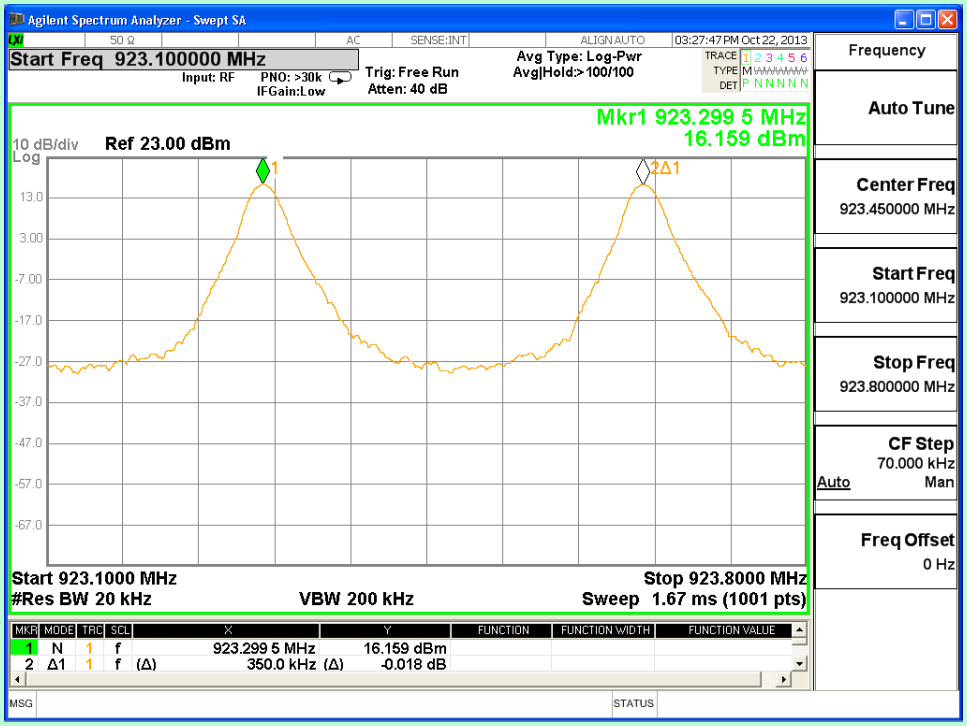

**Channel 40 and 41**



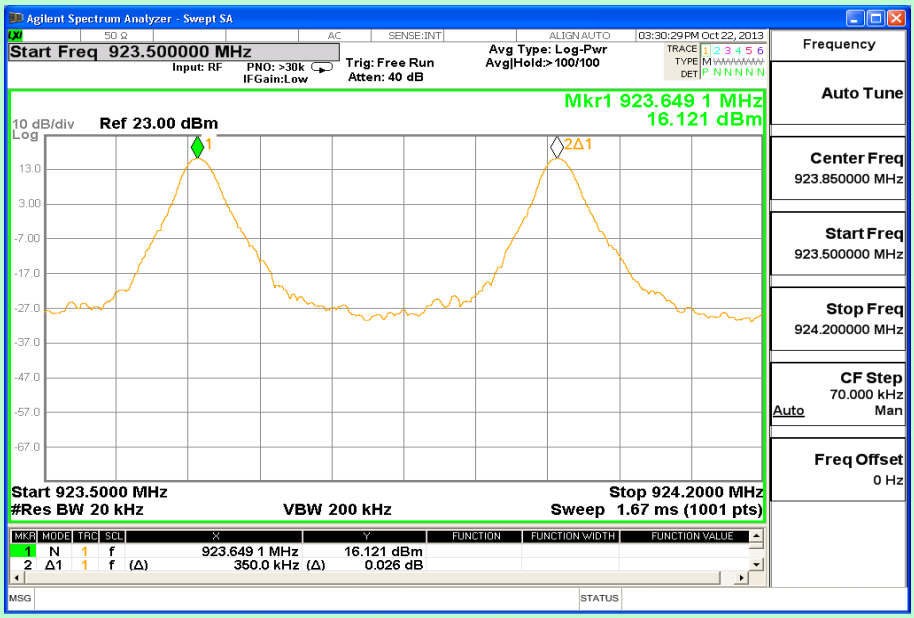

**Channel 41 and 42**



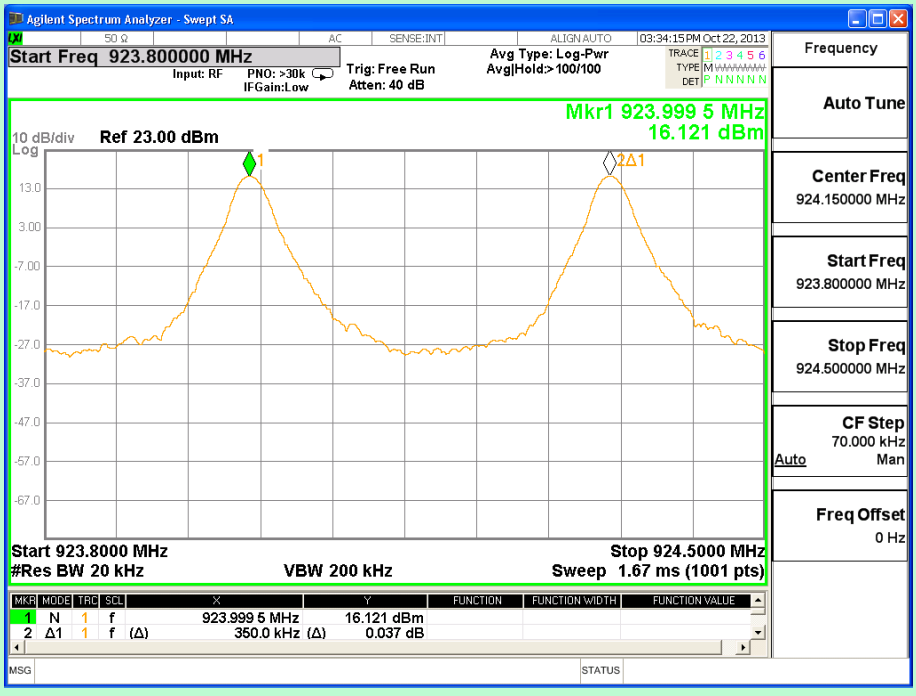

**Channel 42 and 43**



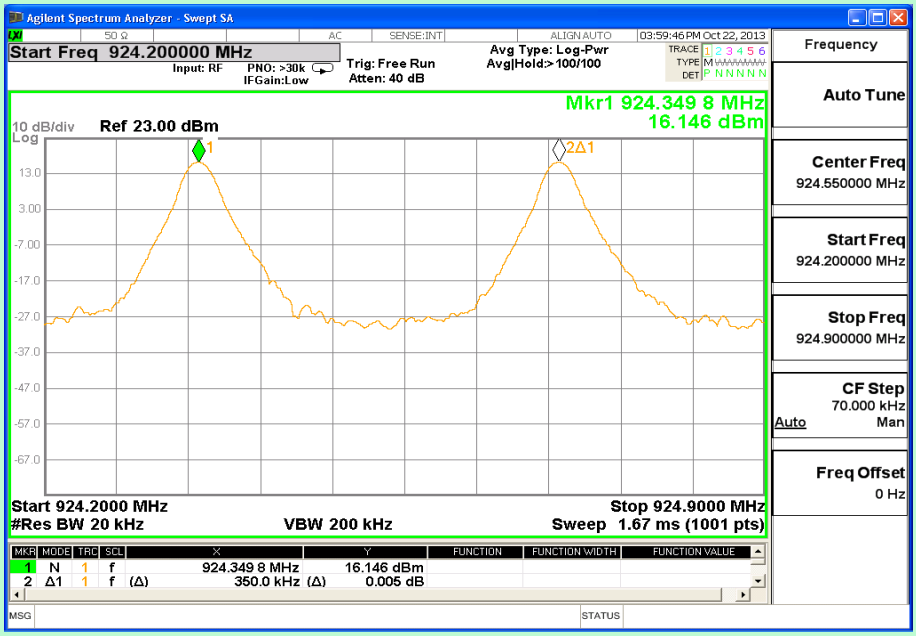

**Channel 43 and 44**



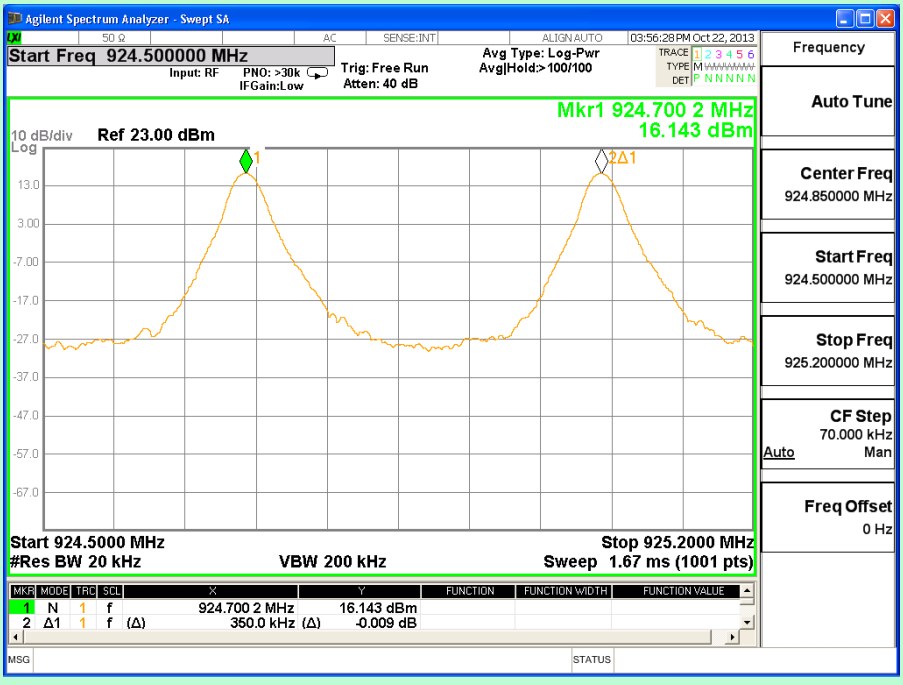

**Channel 44 and 45**



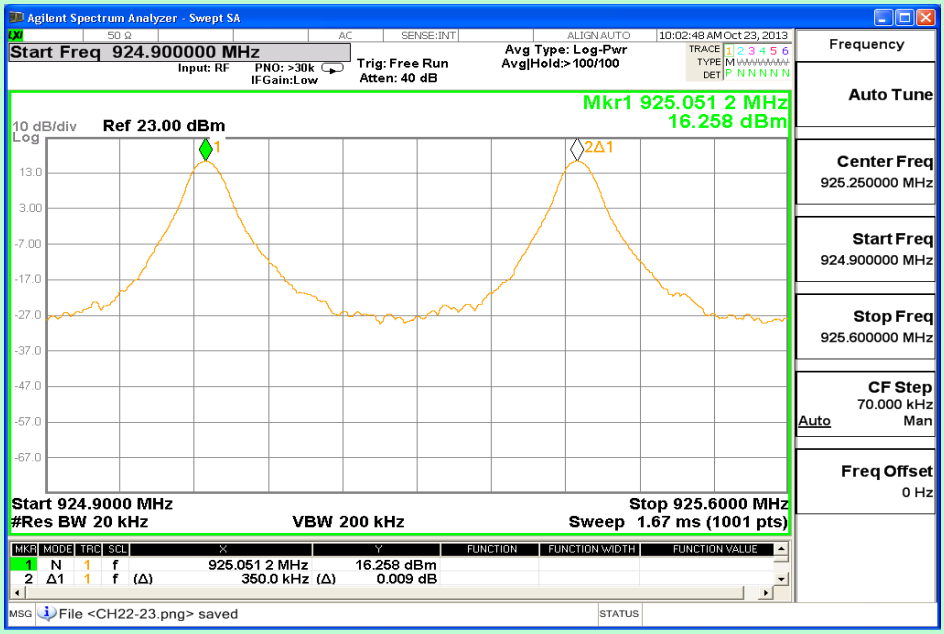

**Channel 45 and 46**



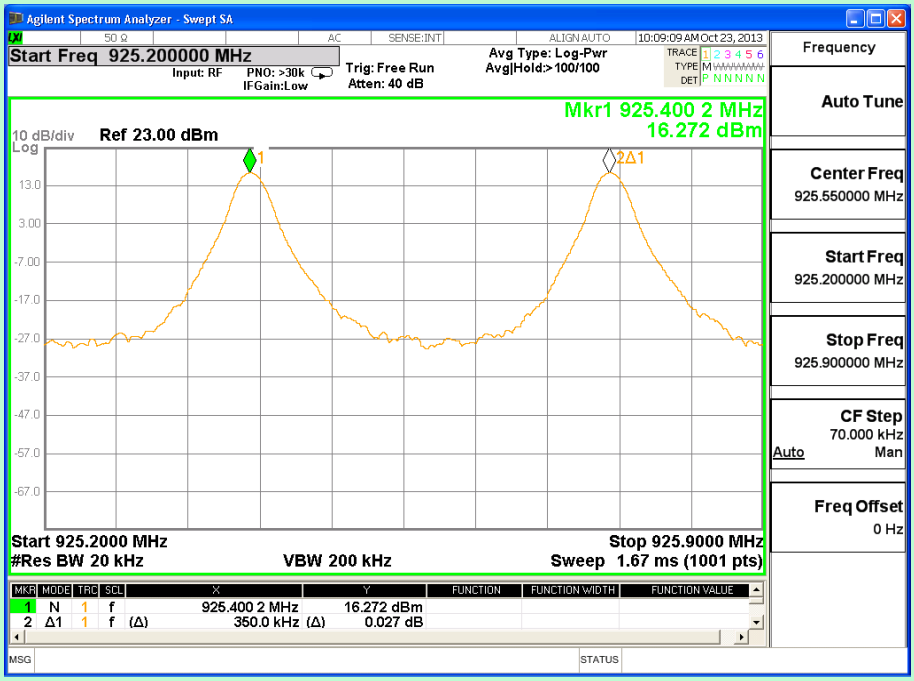

**Channel 46 and 47**



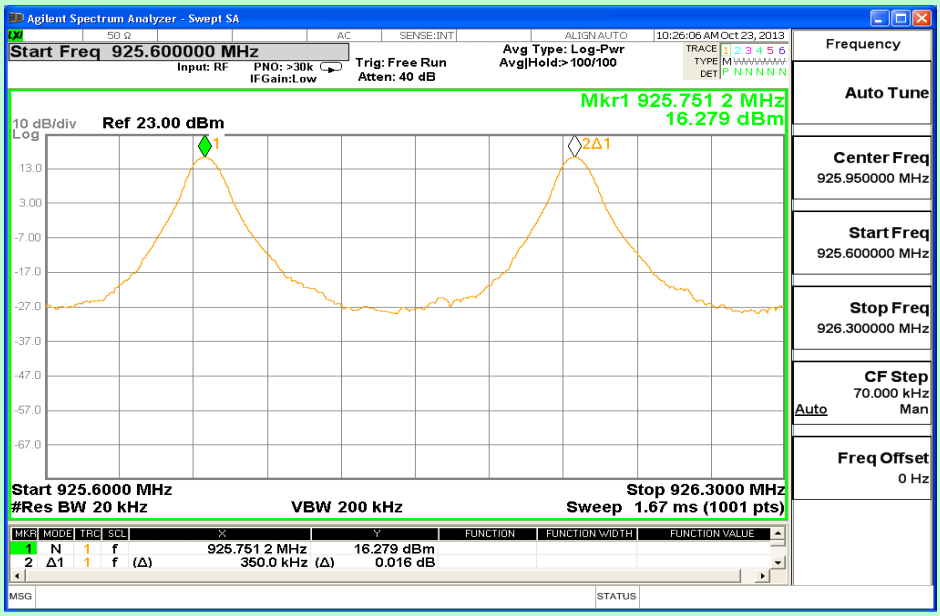

**Channel 47 and 48**



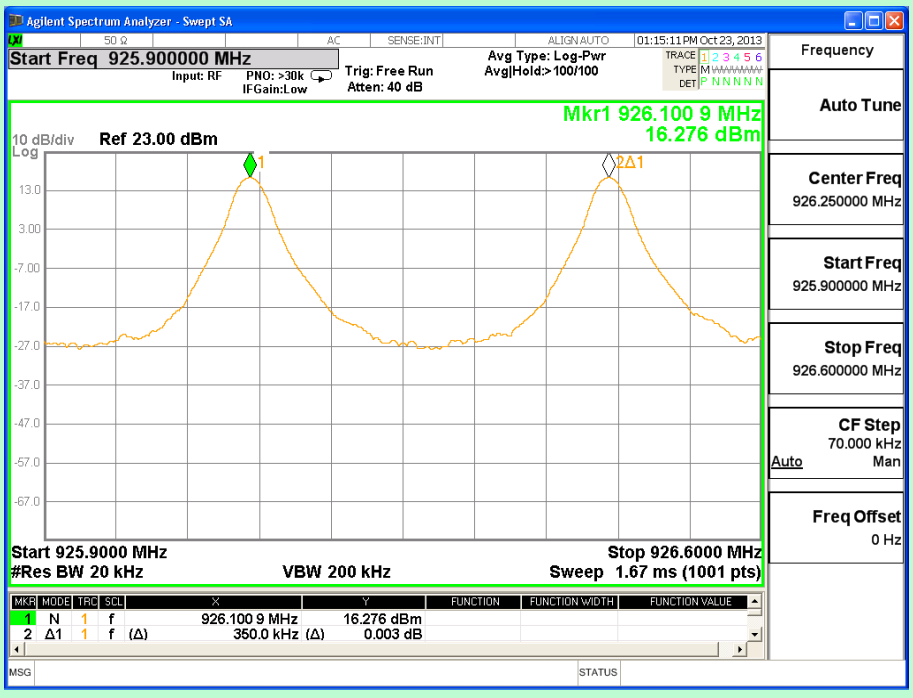

**Channel 48 and 49**




**Channel 49 and 50**




**Channel 50 and 51**




**Channel 51 and 52**

| TEST RESULTS | | | |
|---|---|---|---|
| Channel No | Measured Value | Limit | Test Results |
| # | KHz | | |
| 1 and 2 | 350 | >20dB BW | PASS |
| 2 and 3 | 350 | >20dB BW | PASS |
| 3 and 4 | 350 | >20dB BW | PASS |
| 4 and 5 | 350 | >20dB BW | PASS |
| 5 and 6 | 350 | >20dB BW | PASS |
| 6 and 7 | 350 | >20dB BW | PASS |
| 7 and 8 | 350 | >20dB BW | PASS |
| 8 and 9 | 350 | >20dB BW | PASS |
| 9 and 10 | 350 | >20dB BW | PASS |
| 10 and 11 | 350 | >20dB BW | PASS |
| 11 and 12 | 350 | >20dB BW | PASS |
| 12 and 13 | 350 | >20dB BW | PASS |
| 14 and 15 | 350 | >20dB BW | PASS |
| 15 and 16 | 350 | >20dB BW | PASS |
| 16 and 17 | 350 | >20dB BW | PASS |
| 17 and 18 | 350 | >20dB BW | PASS |
| 18 and 19 | 350 | >20dB BW | PASS |
| 19 and 20 | 350 | >20dB BW | PASS |
| 20 and 21 | 350 | >20dB BW | PASS |
| 21 and 22 | 350 | >20dB BW | PASS |
| 22 and 23 | 350 | >20dB BW | PASS |
| 23 and 24 | 350 | >20dB BW | PASS |
| 24 and 25 | 350 | >20dB BW | PASS |
| 25 and 26 | 350 | >20dB BW | PASS |
| 26 and 27 | 2700 | >20dB BW | PASS |
| 27 and 28 | 350 | >20dB BW | PASS |
| 28 and 29 | 350 | >20dB BW | PASS |
| 29 and 30 | 350 | >20dB BW | PASS |
| 30 and 31 | 350 | >20dB BW | PASS |
| 31 and 32 | 350 | >20dB BW | PASS |
| 32 and 33 | 350 | >20dB BW | PASS |
| 33 and 34 | 350 | >20dB BW | PASS |
| 34 and 35 | 350 | >20dB BW | PASS |
| 35 and 36 | 350 | >20dB BW | PASS |
| 36 and 37 | 350 | >20dB BW | PASS |
| 37 and 38 | 350 | >20dB BW | PASS |
| 38 and 39 | 350 | >20dB BW | PASS |
| 13 and 40 | 14508 | >20dB BW | PASS |
| 40 and 41 | 350 | >20dB BW | PASS |
| 41 and 42 | 350 | >20dB BW | PASS |
| 42 and 43 | 350 | >20dB BW | PASS |
| 43 and 44 | 350 | >20dB BW | PASS |
| 44 and 45 | 350 | >20dB BW | PASS |
| 45 and 46 | 350 | >20dB BW | PASS |
| 46 and 47 | 350 | >20dB BW | PASS |
| 47 and 48 | 350 | >20dB BW | PASS |
| 49 and 50 | 350 | >20dB BW | PASS |
| 50 and 51 | 350 | >20dB BW | PASS |
| 51 and 52 | 350 | >20dB BW | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure -1

**Conducted RF Test Setup**

## 2.4 NUMBER OF HOPPING FREQUENCIES

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 23-Oct-2013 | **Temperature (˚C)** | 23.2 |
| **Test End Date** | 23-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3 Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

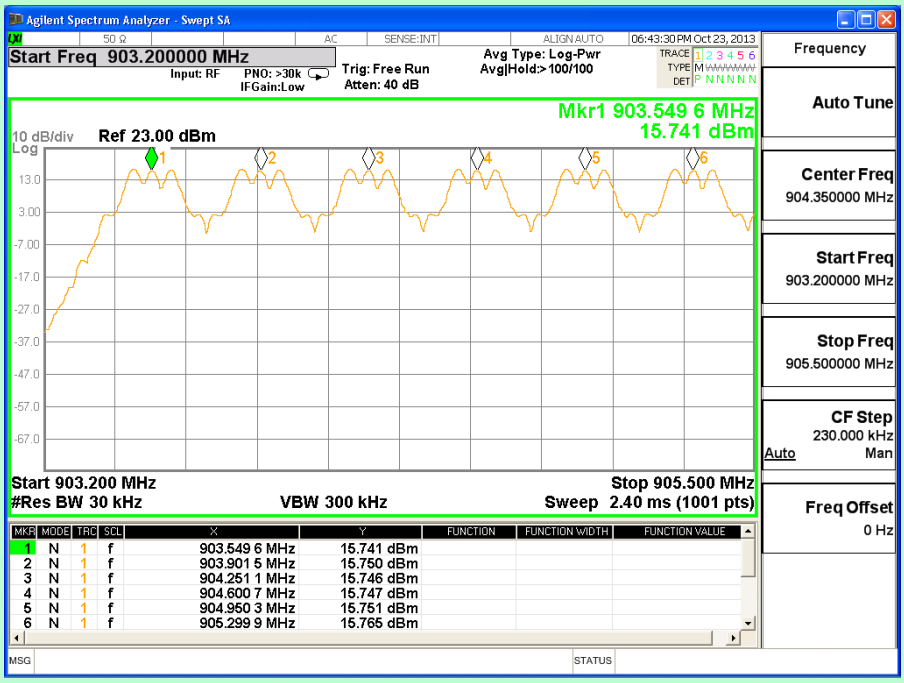
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

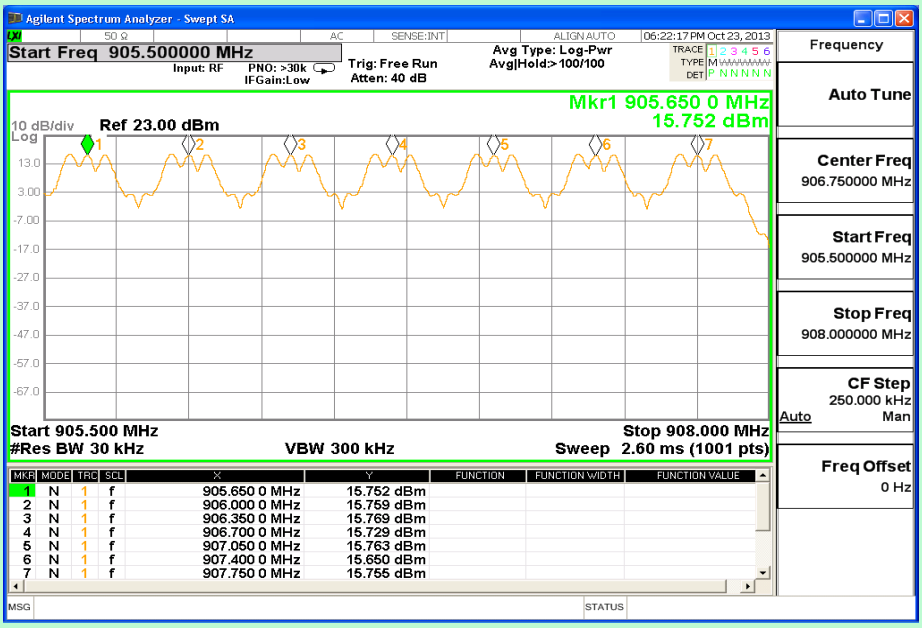
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

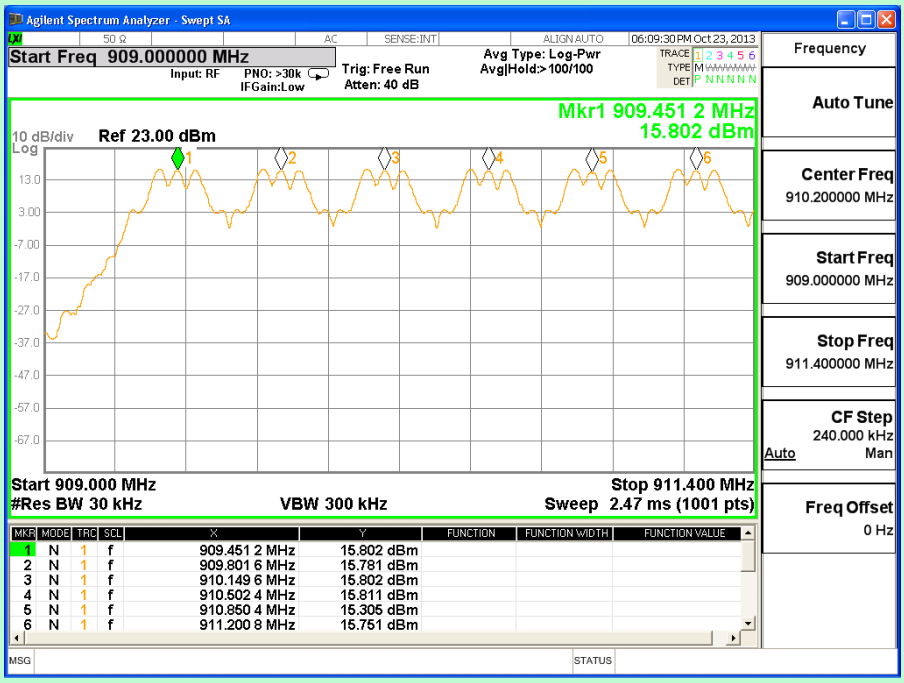
## TEST GRAPHS



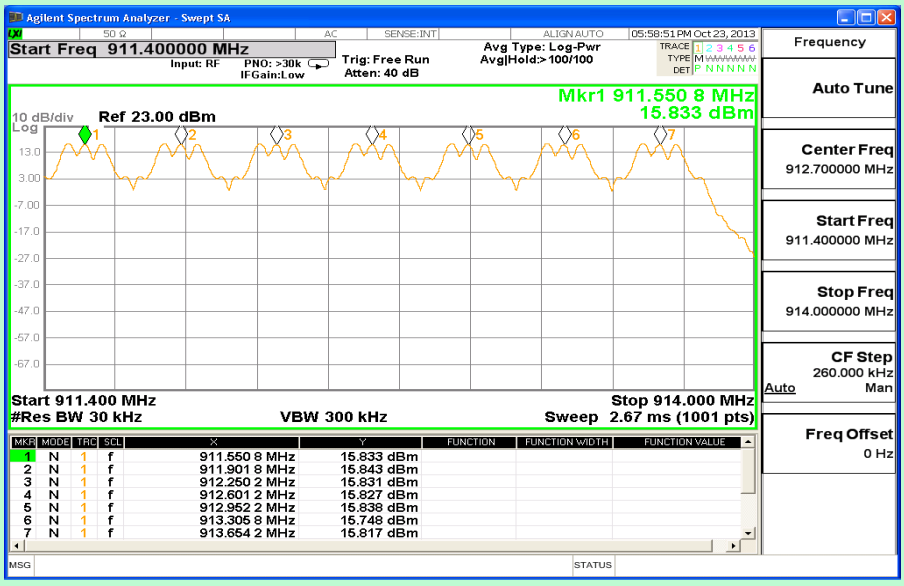

**Channel 1 - 6 [ Walkie-Talkie Mode ]**



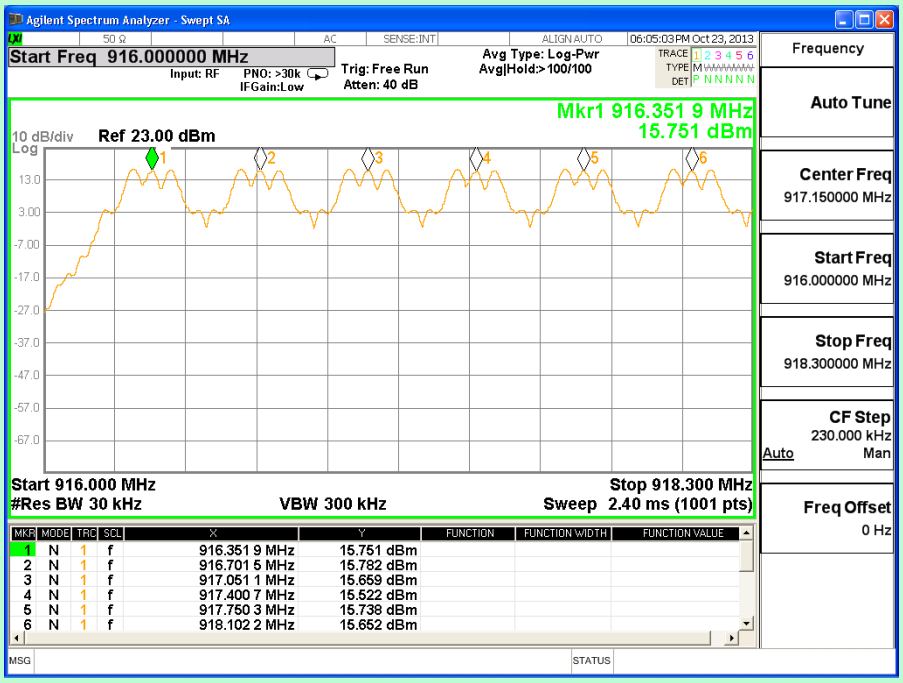

**Channel 7 - 13 [ Walkie-Talkie Mode ]**



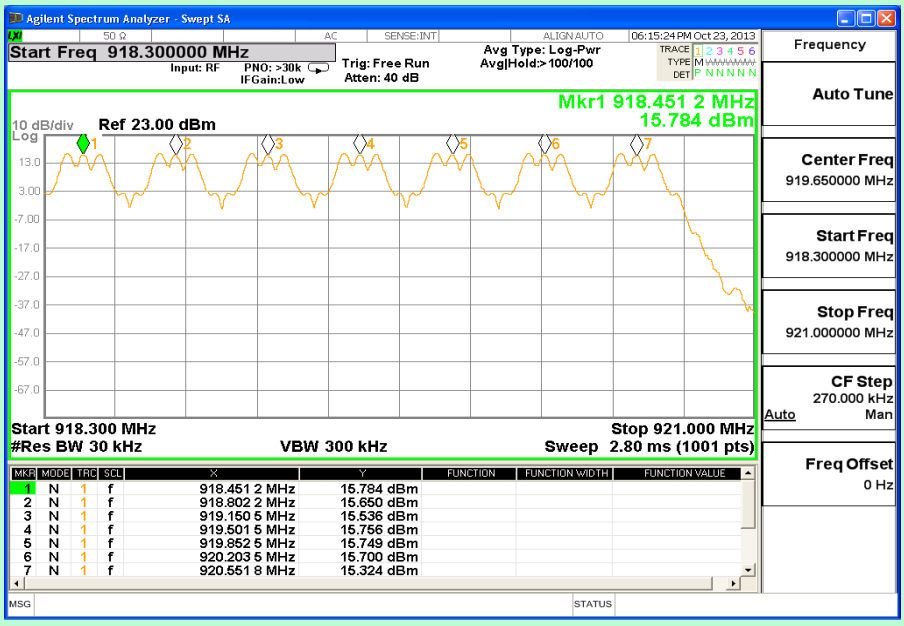

**Channel 14 to 19 [Normal Mode]**



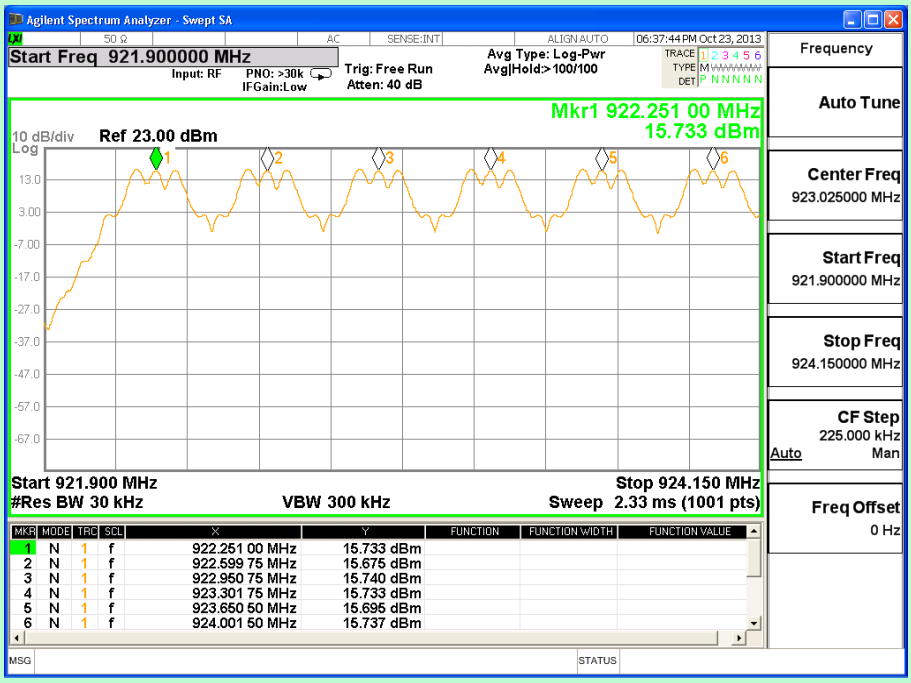

**Channel 20 to 26 [Normal Mode]**



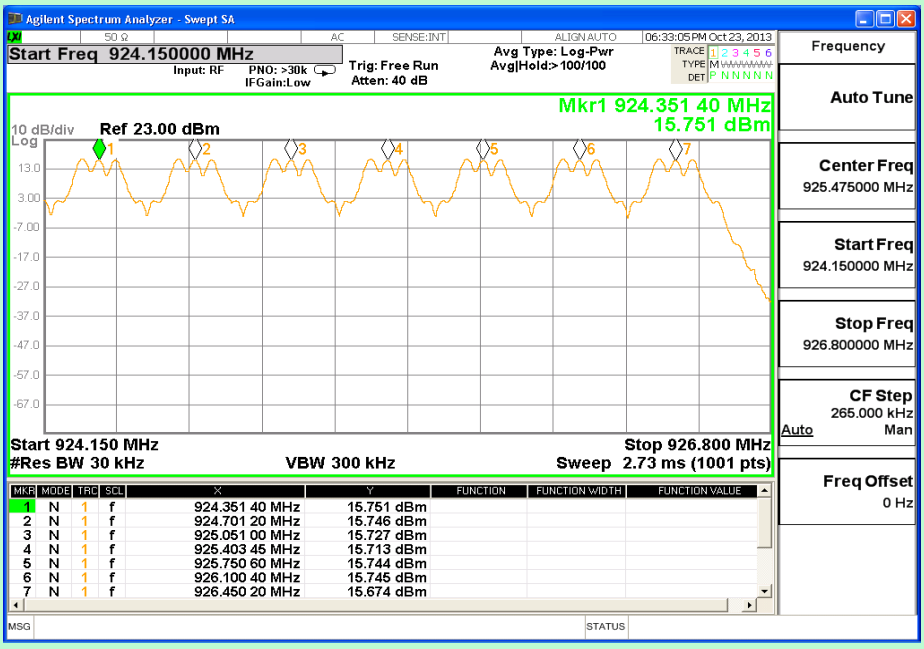

**Channel 27 to 32 [Normal Mode]**




**Channel 33 to 39 [Normal Mode]**




**Channel 40 to 45 [ Walkie-Talkie Mode ]**




**Channel 46 to 52 [ Walike-Talkie Mode ]**

| TEST RESULTS | | | |
|---|---|---|---|
| Mode of Operation | No. of Channels Measured | Limit (No. of Channels) | Test Results |
| # | # | # | |
| Normal Mode | 26 | ≥ 25 | PASS |
| Walkie-Talkie Mode | 26 | ≥ 25 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure-1

**Conducted RF Test Setup**

## 2.5 BAND-EDGE COMPLIANCE

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 21-Oct-2013 | **Temperature (˚C)** | 23.2 |
| **Test End Date** | 22-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3 Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

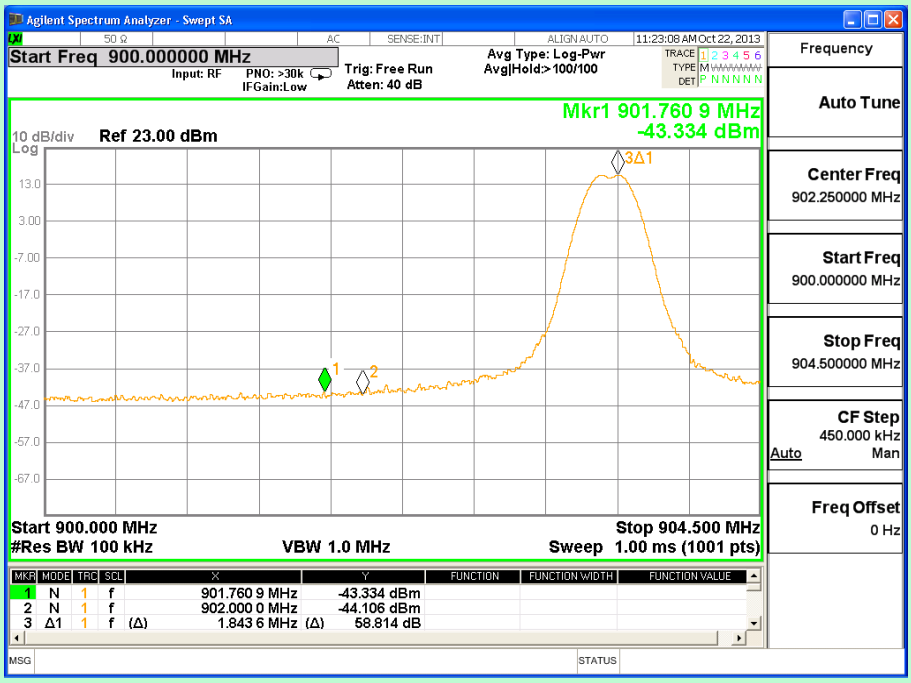
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

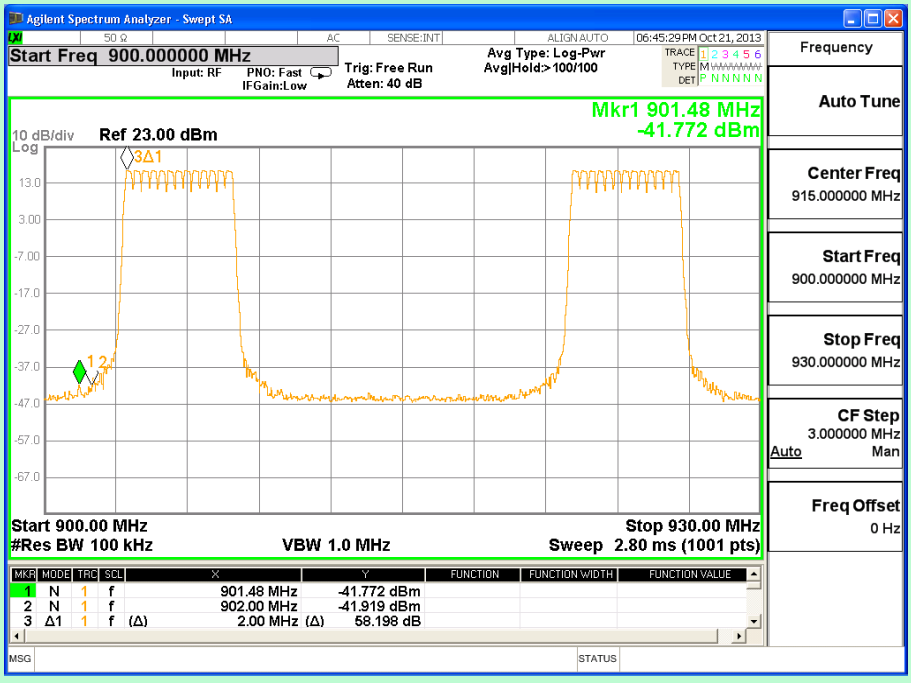
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

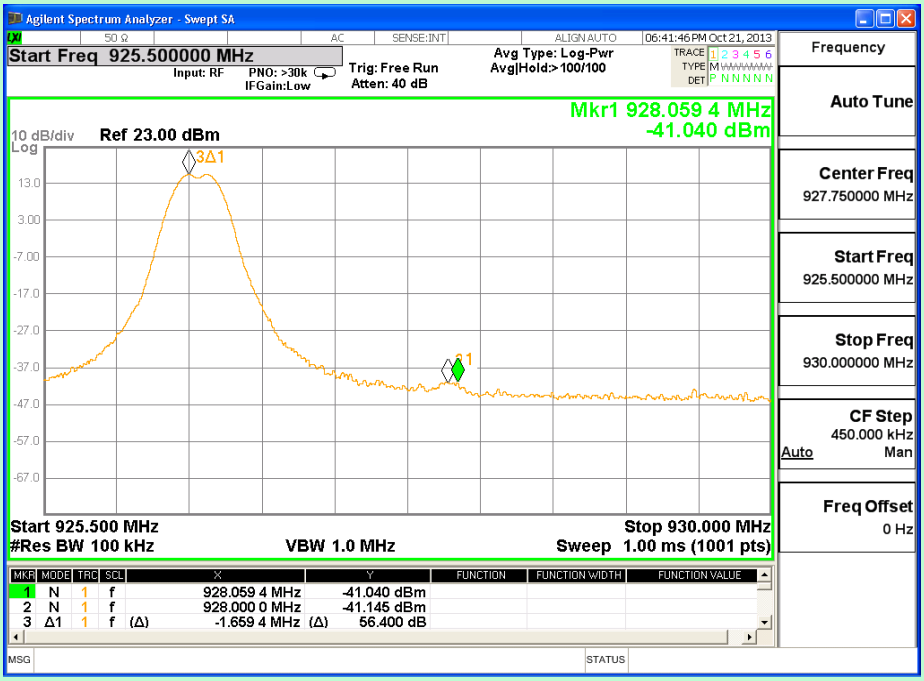
## TEST GRAPHS



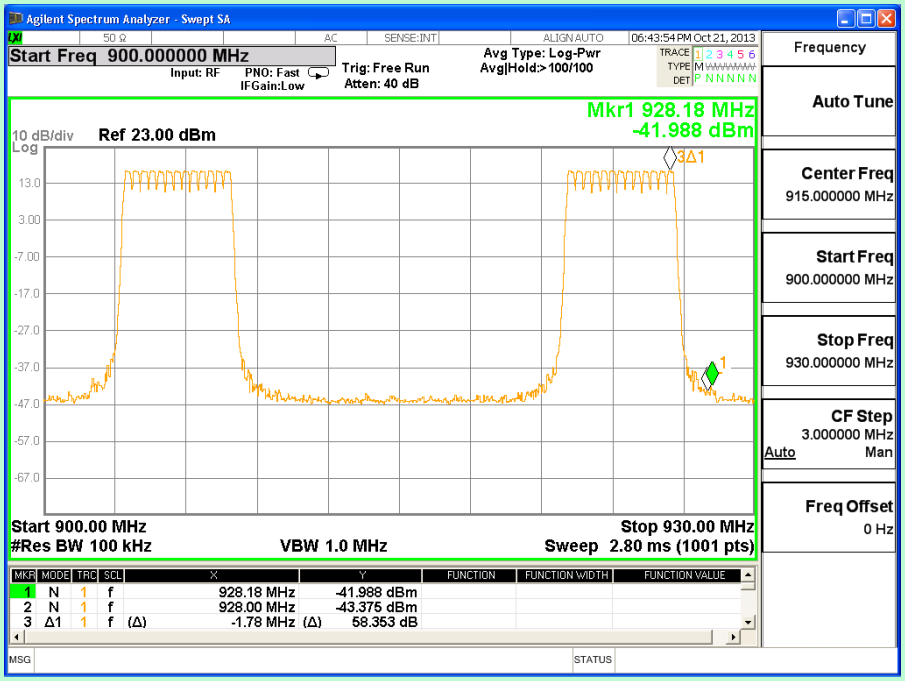

**Band-edge at 902 MHz - Channel 1 (903.55MHz)**




**Band-edge at 902MHz – Hopping Enabled**




**Band-edge at 928 MHz - Channel 52 (926.45MHz)**




**Band-edge at 928MHz – Hopping Enabled**

## TEST RESULT

| Channel | Frequency | Measured difference | | Limit | Test Results |
|---|---|---|---|---|---|
| # | MHz | SINGLE CHANNEL | FHSS ENABLED | dBc | |
| 1 | 903.355 | 58.814 | 58.198 | >20 | PASS |
| 52 | 926.45 | 56.4 | 58.353 | >20 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure-1

**Conducted RF Test Setup**

## 2.6 TIME OF OCCUPANCY (DWELL TIME)

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 08-Nov-2013 | **Temperature (˚C)** | 24.2 |
| **Test End Date** | 08-Nov- 2013 | **Humidity RH (%)** | 56.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3 Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

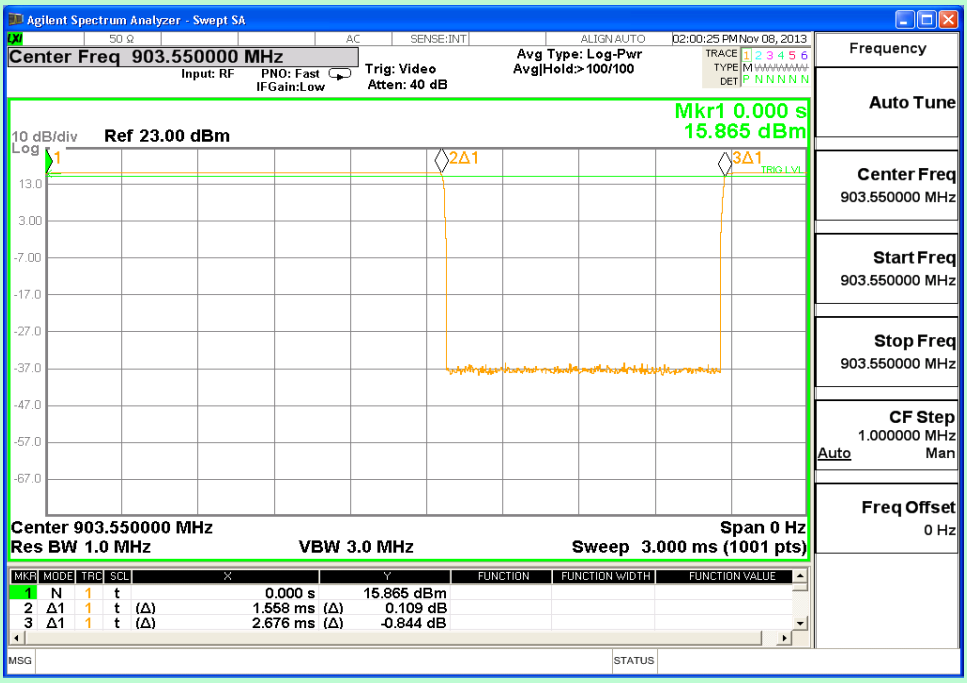
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

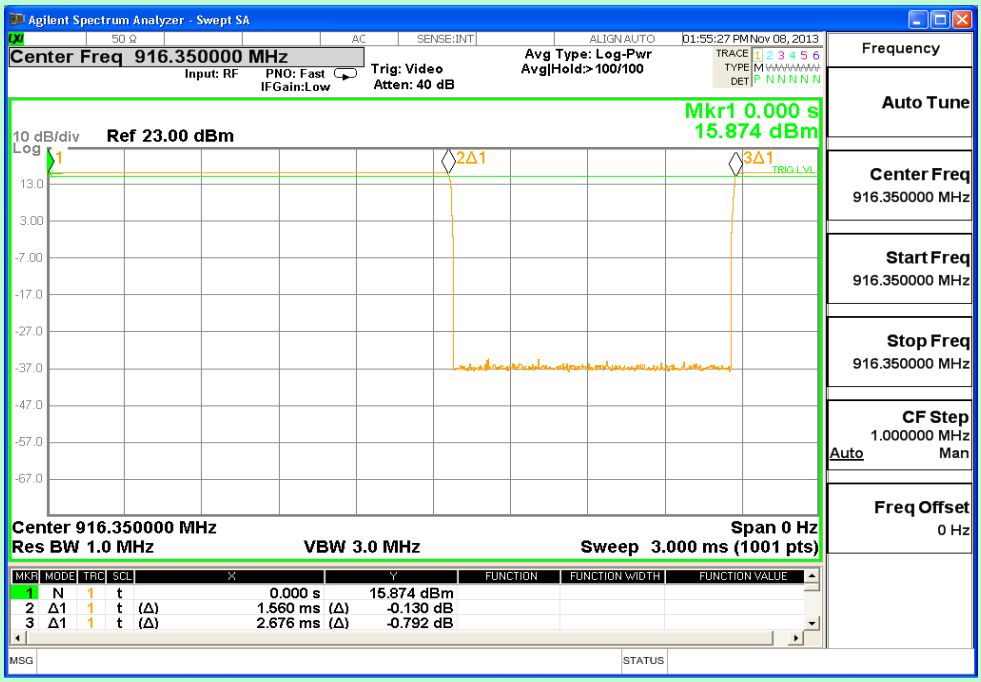
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

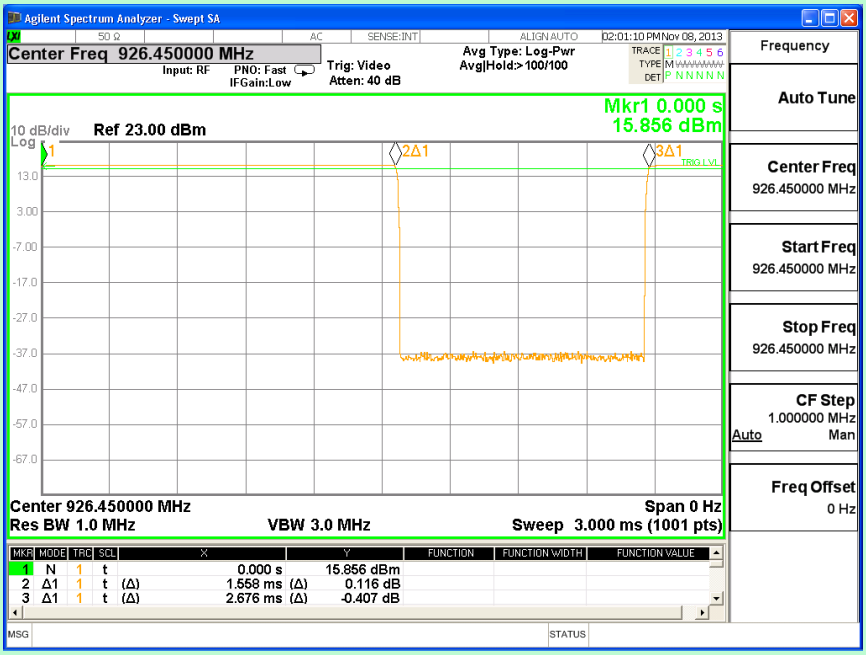
## TEST GRAPHS




**Channel 1 (903.55 MHz)**




**Channel 27 (916.35 MHz)**




**Channel 52 (926.45 MHz)**

## TEST RESULT

| Channel | Channel Frequency | Measured Dwell Time | No. of bursts | Total Dwell Time in 10sec | Limit in 10s period | Results |
|---|---|---|---|---|---|---|
| # | MHz | ms | # | ms | ms | |
| 1 | 903.55 | 1.558 | 8 | 12.48 | ≤ 400 | PASS |
| 27 | 916.35 | 1.560 | 8 | 12.48 | ≤ 400 | PASS |
| 52 | 926.45 | 1.558 | 8 | 12.48 | ≤ 400 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure - 1

**Conducted RF Test Setup**

## 2.7 SPURIOUS RF CONDUCTED EMISSIONS

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 21-Oct-2013 | **Temperature (˚C)** | 23.2 |
| **Test End Date** | 21-Oct-2013 | **Humidity RH (%)** | 55.1 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3 Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | DA 00-705 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

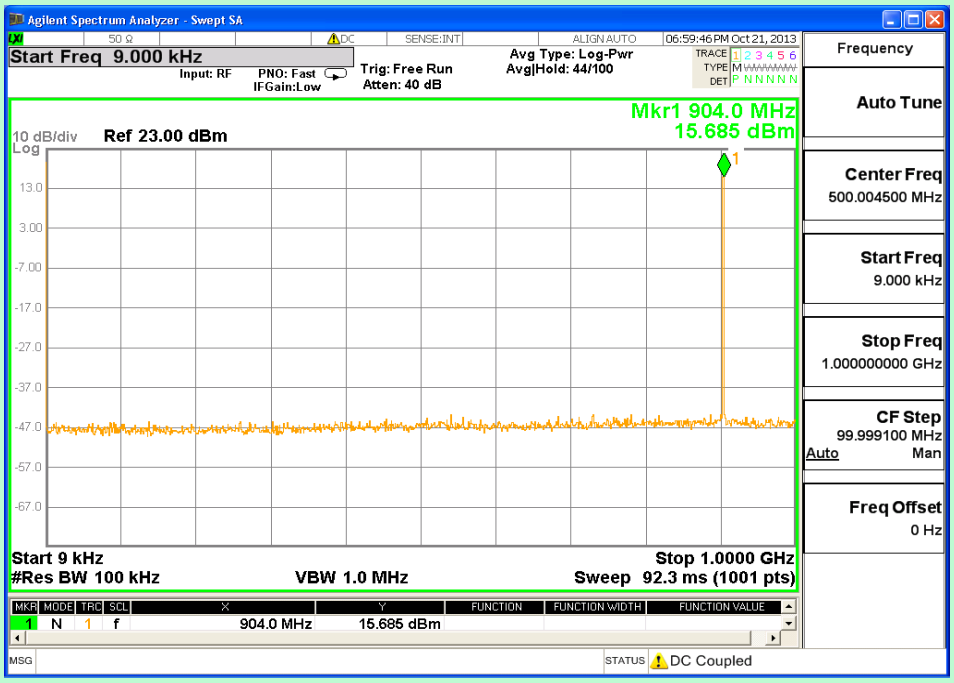
### TEST PARAMETERS

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

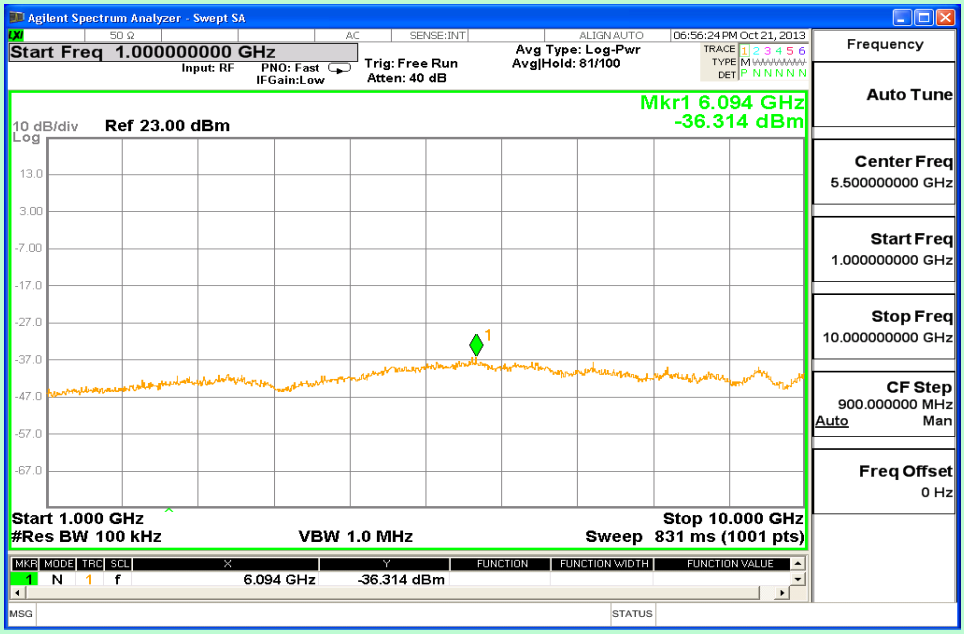
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

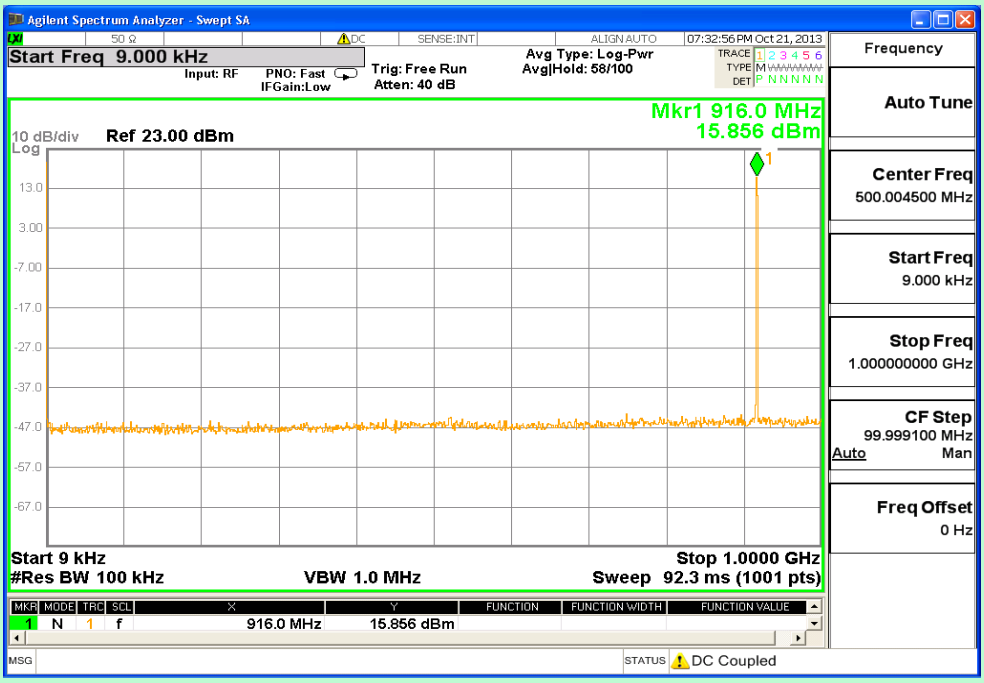
## TEST GRAPHS



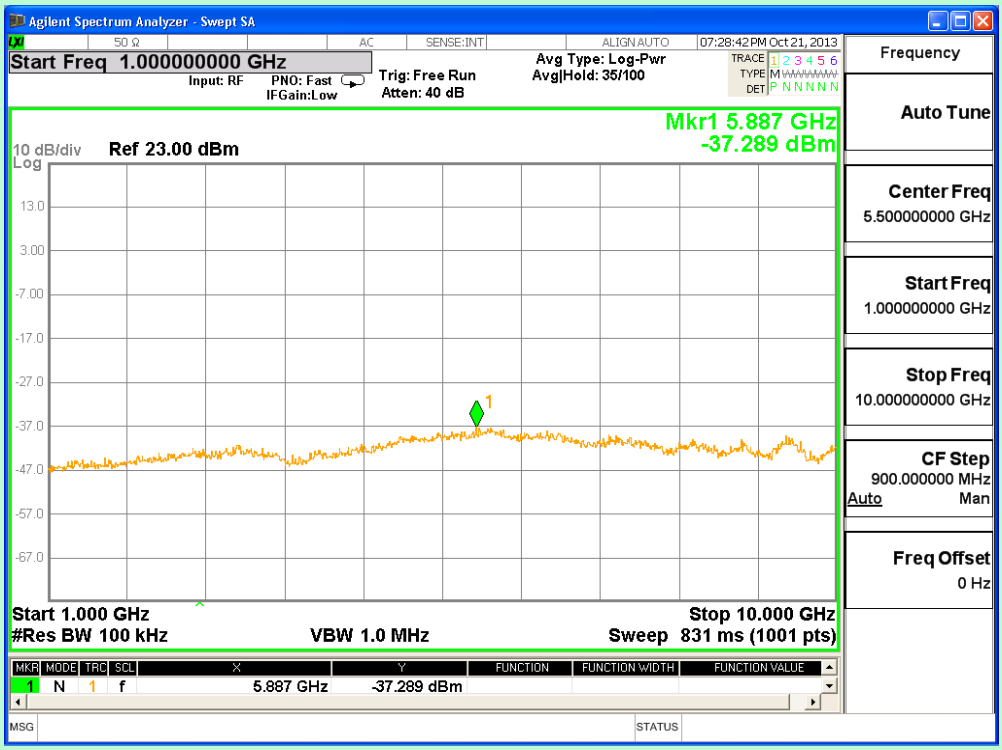

**Channel 1 (903.55 MHz) – 9 KHz to 1 GHz**



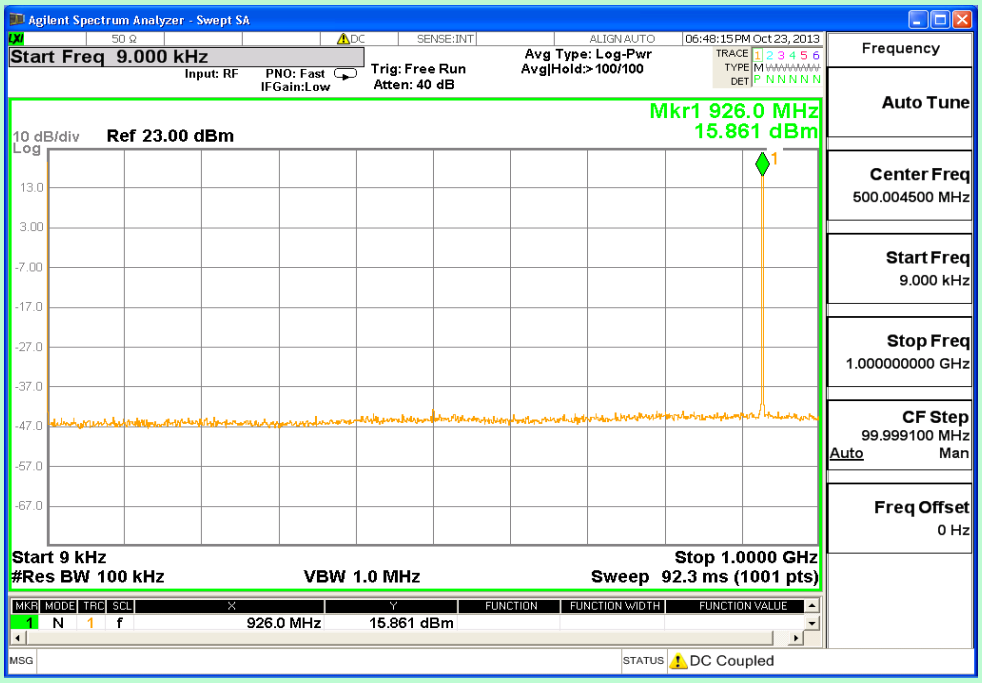

**Channel 1 (903.55 MHz) – 1 GHz to 10 GHz**



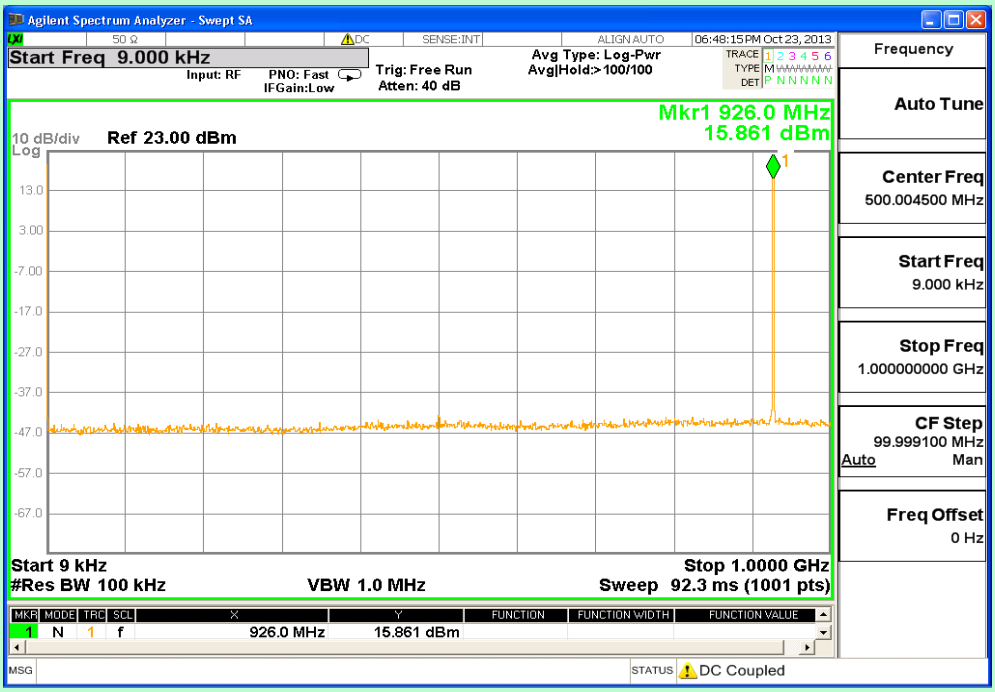

**Channel 27 (916.35 MHz) – 9 KHz to 1 GHz**




**Channel 27 (916.35 MHz) – 1 GHz to 10 GHz**




**Channel 52 (926.45 MHz) – 9 KHz to 1 GHz**




**Channel 52 (926.45 MHz) – 1 GHz to 10 GHz**

## TEST RESULT

| Channel | Channel Frequency | Measured Spurious | | Limit | Results |
|---|---|---|---|---|---|
| # | MHz | GHz | Level (dBm) | dBc | |
| 1 | 903.55 | 6.094 | -36.314 | >20 | PASS |
| 27 | 916.35 | 5.887 | -37.289 | >20 | PASS |
| 52 | 926.45 | 5.950 | -37.343 | >20 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure-1

**Conducted RF Test Setup**

## 2.8 SPURIOUS RADIATED EMISSIONS

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Report No.** | EMC-0004-1 |
| **Model No.** | FWD-200ACCLIMATE | **Serial No.** | 01 |
| **Test Start Date** | 22-Oct-2013 | **Temperature (°C)** | 23.5 |
| **Test End Date** | 31-Oct-2013 | **Humidity RH (%)** | 57.1 |
| **Tested By** | Gulshan Kumar | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3Vdc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Comment** | | | |

**TEST FREQUENCY RANGE**

| | | | |
|---|---|---|---|
| **Start Frequency** | 9 KHz | **Stop Frequency** | 10 GHz |

**MAXIMUM OPERATING FREQUENCY**

902MHz to 928MHz

**TEST PARAMETERS**

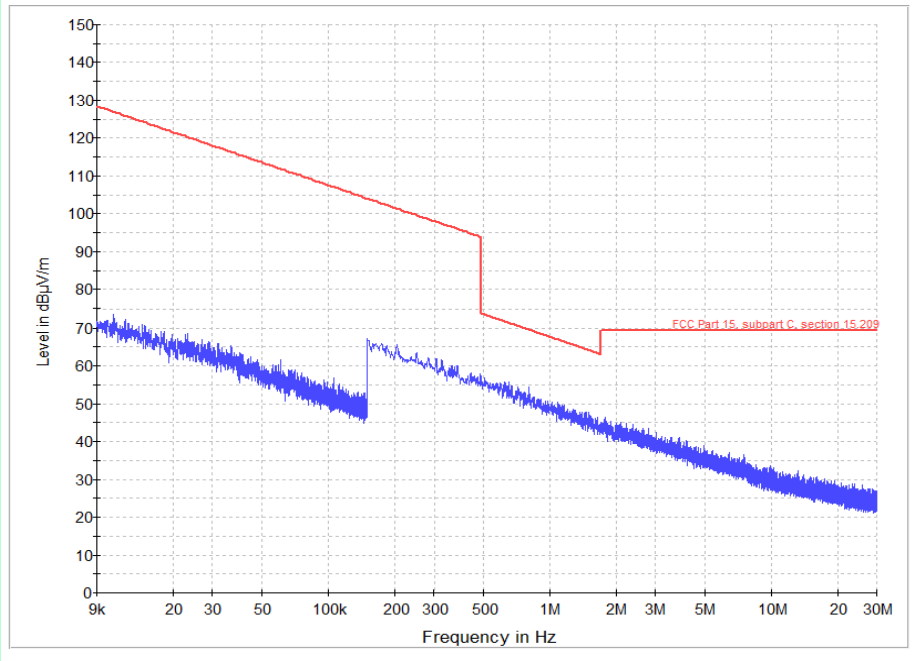
| | | | |
|---|---|---|---|
| **Antenna Height** | 1m to 4m | **Turntable Rotation** | 0° to 360° |
| **Applicable standard** | FCC Part 15.247 & 15.209 | **Test Method** | DA 00-705 |
| **Equipment Class** | NA | **Measurement Distance** | 3m |

**TEST EQUIPMENT**

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | EMI Test Receiver | R&S | ESU26 | 100229 | 04-Feb-2014 |
| Y | 3m Semi Anechoic Chamber | ETS Lindgren | DKE 6X7 DBL.DR | 1625 | 31-Dec-2013 |
| Y | Double Ridge Guide Horn Antenna | ETS Lindgren | 3117 | 00064055 | 07-Nov-2013 |
| Y | Bilog Antenna | ETS Lindgren | HLP3003C | 130525 | 30-Nov-2013 |
| Y | Loop Antenna | ETS Lindgren | 6507 | 000103694 | 12-Mar-2014 |
| Y | RF cable (9KHz to 1GHz) | COLEMAN | RG214 | RE-1A | 09-May-2014 |
| Y | RF cable (9KHz to 1GHz) | COLEMAN | RG214 | RE-1B | 09-May-2014 |
| Y | RF cable (1GHz to 18GHz) | AH Systems | SAC-18G-06 | RE-2A | 09-May-2014 |
| Y | RF cable (1GHz to 18GHz) | AH Systems | SAC-18G-06 | RE-2B | 09-May-2014 |
| Y | Signal Conditioning unit | R&S | SCU-18 | 10178 | 13-June-2014 |
| Y | High Pass Filter | Wainwright | WHKX1.5/15G-12ST | 1 | 09-May-2014 |
| Y | EMC32 Software | R&S | 8.30.0 | 820-OT101248 | NA |

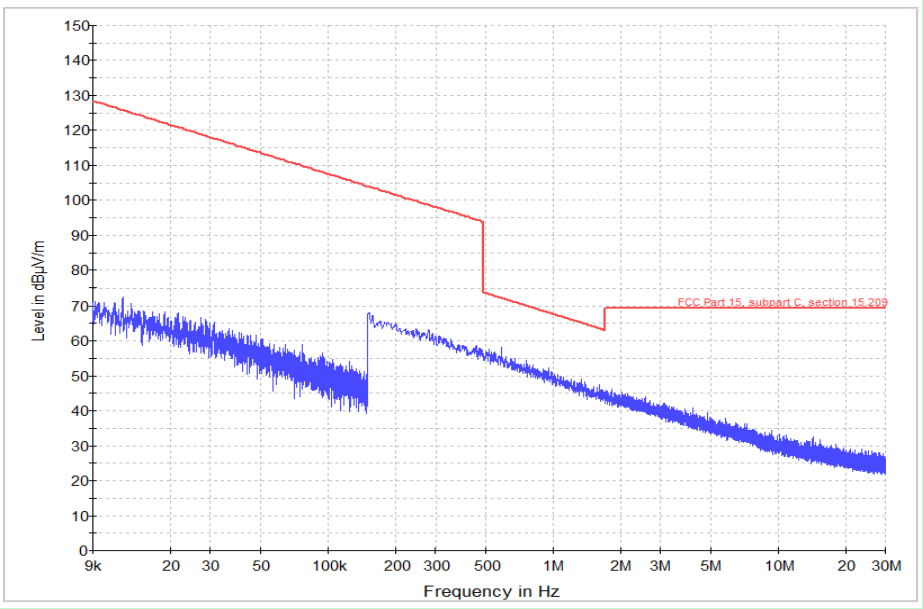
Note: Switch ON/OFF the Internal Preamplifier based on carrier level and or noise floor without overloading the receiver

## TEST GRAPHS – 9KHz to 30MHz



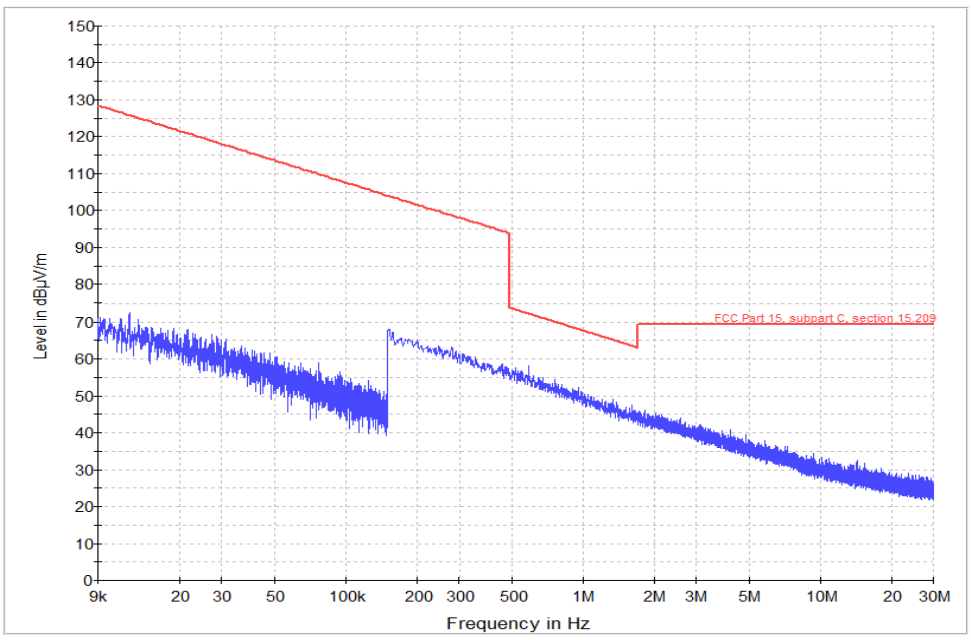

**Channel 1 (903.55 MHz)**

Note : Peak Graph - Parallel



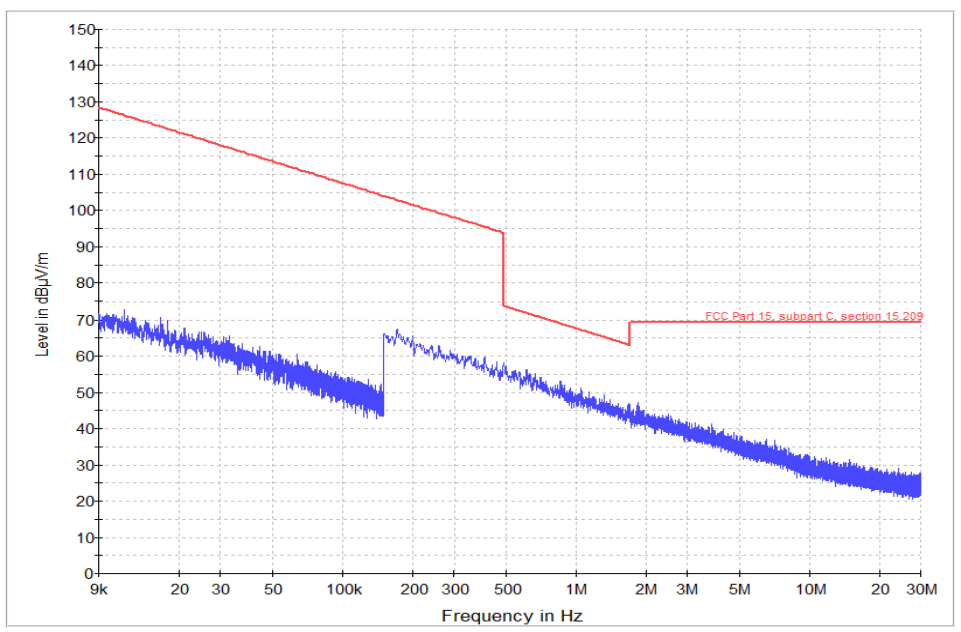

**Channel 1 (903.55 MHz)**

Note : Peak Graph - Perpendicular



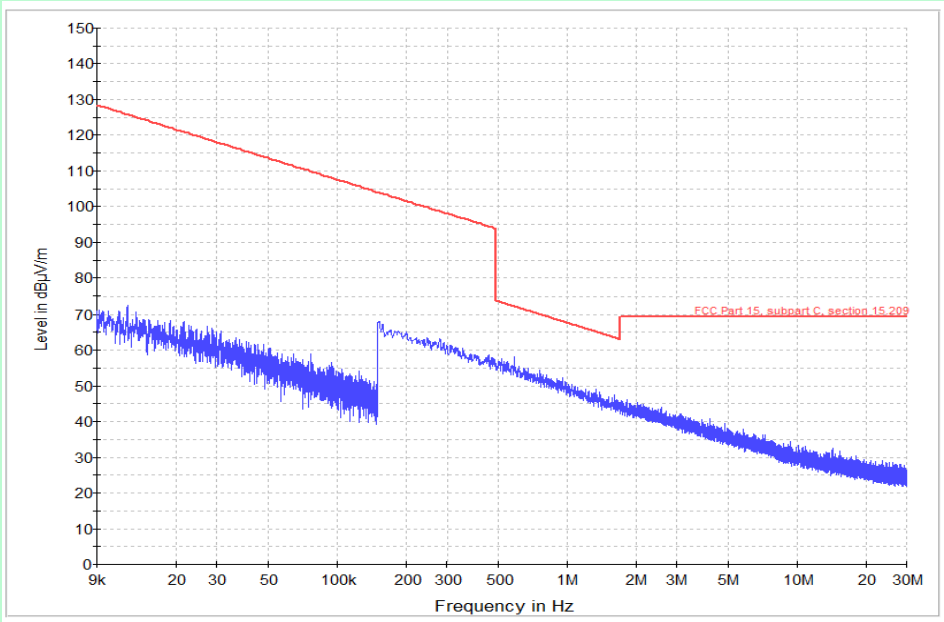

**Channel 27 (916.35 MHz)**

Note : Peak Graph - Parallel



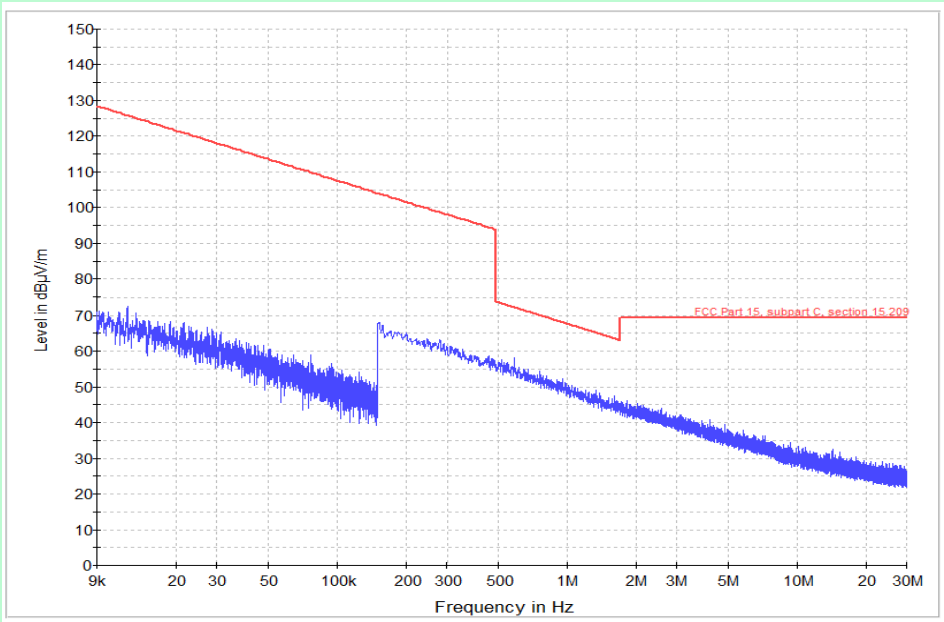

**Channel 27 (916.35 MHz)**

Note : Peak Graph - Perpendicular




**Channel 52 (926.45 MHz)**

Note : Peak Graph - Parallel




**Channel 52 (926.45 MHz)**

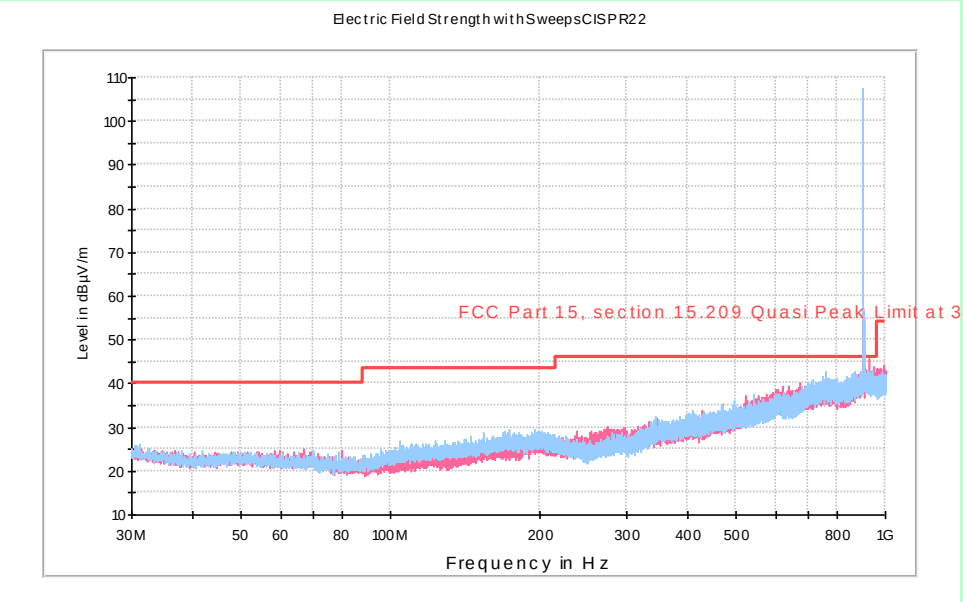
Note : Peak Graph - Perpendicular

## TEST RESULT – 9 KHz to 30 MHz

| Channel | Channel Frequency | Measured Spurious | Quasi Peak | Height | Ant Pol | Azimuth | Margin | Limit @ 3m Distance | Results |
|---|---|---|---|---|---|---|---|---|---|
| # | MHz | MHz | dBµV/m | cm | Parallel / Perpendicular | deg | dB | dBµV/m | |
| NO EMISSIONS FOUND | | | | | | | | | PASS |

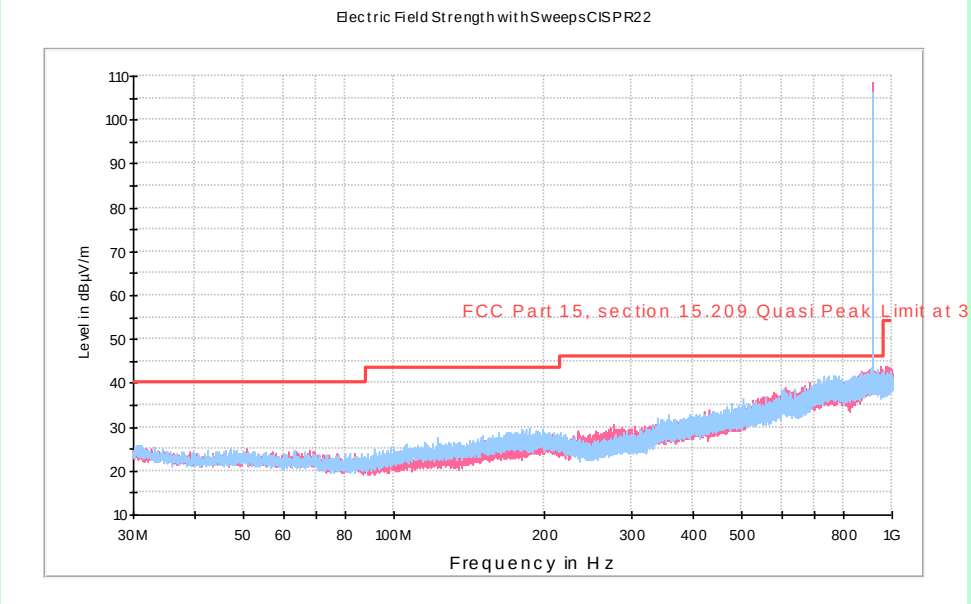
**Note :** Measured Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)

## TEST GRAPHS – 30 MHz to 1 GHz



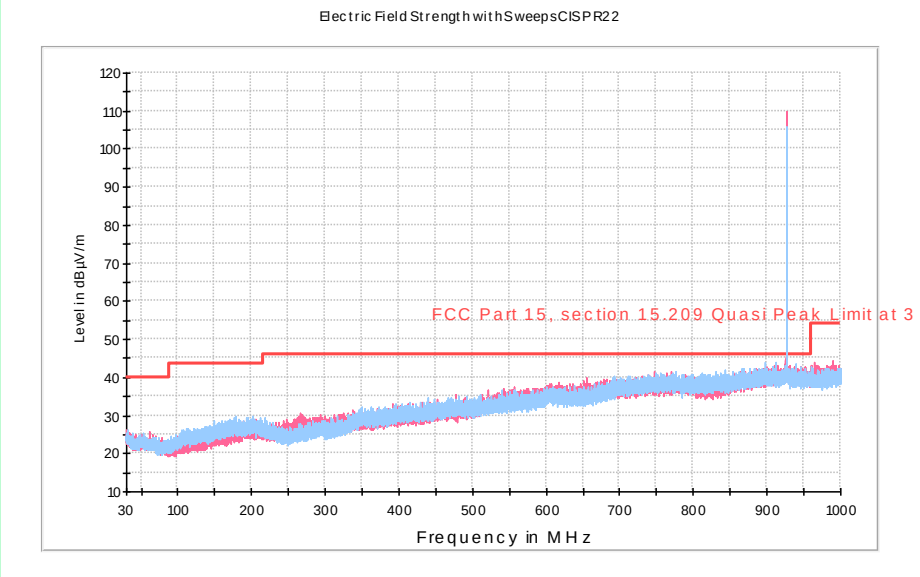

**Channel 1 (903.55 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)




**Channel 27 (916.35 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)



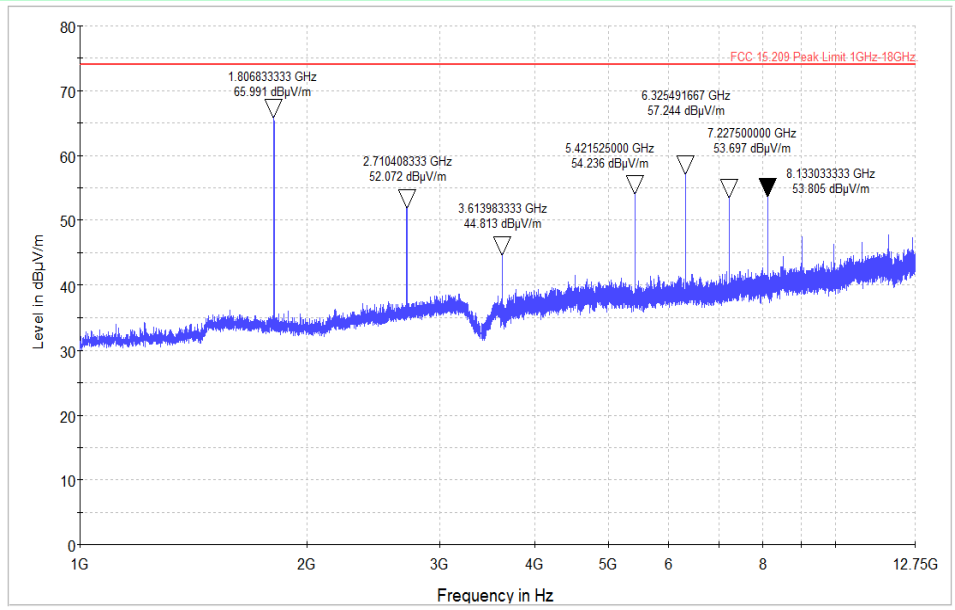

**Channel 52 (926.45 MHz)**

Note : Peak Graph Vertical (Red), Peak Graph Horizontal (Blue)

| TEST RESULT – 30 MHz to 1 GHz | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Channel | Measured Spurious | Quasi Peak | Height | Ant Pol | Azimuth | Margin | Limit @ 3m Distance | Results |
| # | MHz | dBµV/m | cm | H / V | deg | dB | dBµV/m | |
| 1 | 30.37 | 19.7 | 100.0 | H | 240.0 | 20.3 | 40.0 | PASS |
| 1 | 58.09 | 17.8 | 100.0 | H | 60.0 | 22.2 | 40.0 | PASS |
| 1 | 66.56 | 17.9 | 200.0 | H | 240.0 | 22.1 | 40.0 | PASS |
| 1 | 87.76 | 17.6 | 100.0 | H | 300.0 | 22.4 | 40.0 | PASS |
| 1 | 170.99 | 23.1 | 300.0 | H | 120.0 | 20.4 | 43.5 | PASS |
| 1 | 194.91 | 23.2 | 100.0 | H | 30.0 | 20.3 | 43.5 | PASS |
| 1 | 343.43 | 25.6 | 200.0 | H | 150.0 | 20.4 | 46.0 | PASS |
| 1 | 470.49 | 28.5 | 100.0 | H | 0.0 | 17.5 | 46.0 | PASS |
| 1 | 523.44 | 29.9 | 300.0 | V | 300.0 | 16.1 | 46.0 | PASS |
| 1 | 697.58 | 33.8 | 100.0 | V | 300.0 | 12.2 | 46.0 | PASS |
| 1 | 756.80 | 35.6 | 100.0 | H | 210.0 | 10.4 | 46.0 | PASS |
| 1 | 903.61 | 104.1 | 100.0 | V | 120.0 | -46.1 | 46.0 | Intended Frequency |
| 1 | 929.97 | 37.1 | 100.0 | H | 210.0 | 8.9 | 46.0 | PASS |
| 27 | 31.88 | 19.3 | 100.0 | V | 150.0 | 20.7 | 40.0 | PASS |
| 27 | 47.65 | 18.5 | 200.0 | H | 300.0 | 21.5 | 40.0 | PASS |
| 27 | 68.19 | 17.9 | 100.0 | H | 150.0 | 22.1 | 40.0 | PASS |
| 27 | 85.74 | 17.5 | 100.0 | H | 270.0 | 22.5 | 40.0 | PASS |
| 27 | 169.14 | 23.0 | 300.0 | H | 180.0 | 20.5 | 43.5 | PASS |
| 27 | 186.01 | 23.0 | 100.0 | H | 330.0 | 20.5 | 43.5 | PASS |
| 27 | 339.44 | 25.2 | 100.0 | V | 0.0 | 20.8 | 46.0 | PASS |
| 27 | 478.67 | 28.6 | 300.0 | H | 60.0 | 17.4 | 46.0 | PASS |
| 27 | 681.38 | 33.6 | 100.0 | V | 120.0 | 12.4 | 46.0 | PASS |
| 27 | 916.41 | 104.5 | 100.0 | V | 300.0 | -46.5 | 46.0 | Intended Frequency |
| 52 | 30.41 | 19.7 | 100.0 | H | 0.0 | 20.3 | 40.0 | PASS |
| 52 | 51.98 | 18.4 | 200.0 | H | 30.0 | 21.6 | 40.0 | PASS |
| 52 | 61.36 | 18.0 | 100.0 | V | 150.0 | 22.0 | 40.0 | PASS |
| 52 | 86.84 | 17.6 | 300.0 | H | 300.0 | 22.4 | 40.0 | PASS |
| 52 | 169.21 | 23.0 | 100.0 | H | 60.0 | 20.5 | 43.5 | PASS |
| 52 | 201.74 | 23.5 | 400.0 | H | 240.0 | 20.0 | 43.5 | PASS |
| 52 | 348.20 | 26.0 | 100.0 | H | 0.0 | 20.0 | 46.0 | PASS |
| 52 | 477.60 | 28.7 | 300.0 | H | 90.0 | 17.3 | 46.0 | PASS |
| 52 | 693.59 | 34.1 | 100.0 | H | 150.0 | 11.9 | 46.0 | PASS |
| 52 | 898.46 | 37.0 | 100.0 | H | 270.0 | 9.0 | 46.0 | PASS |
| 52 | 926.51 | 105.5 | 100.0 | V | 60.0 | -47.5 | 46.0 | Intended Frequency |
| 52 | 990.84 | 37.8 | 100.0 | V | 120.0 | 16.2 | 54.0 | PASS |

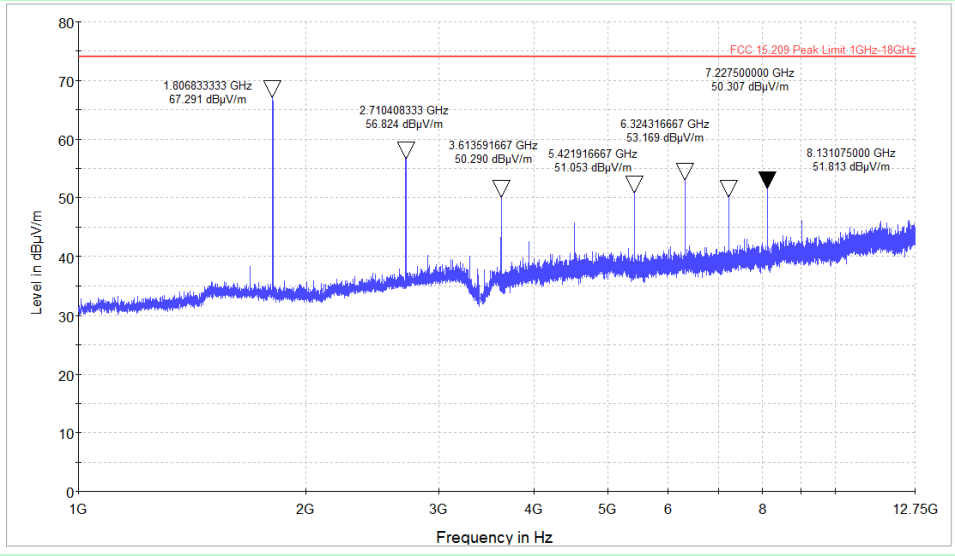
NOTE: Measured Field Strength –dBuV/m (9 KHz to 1GHz) = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB)

## TEST GRAPHS – 1 GHz to 10 GHz



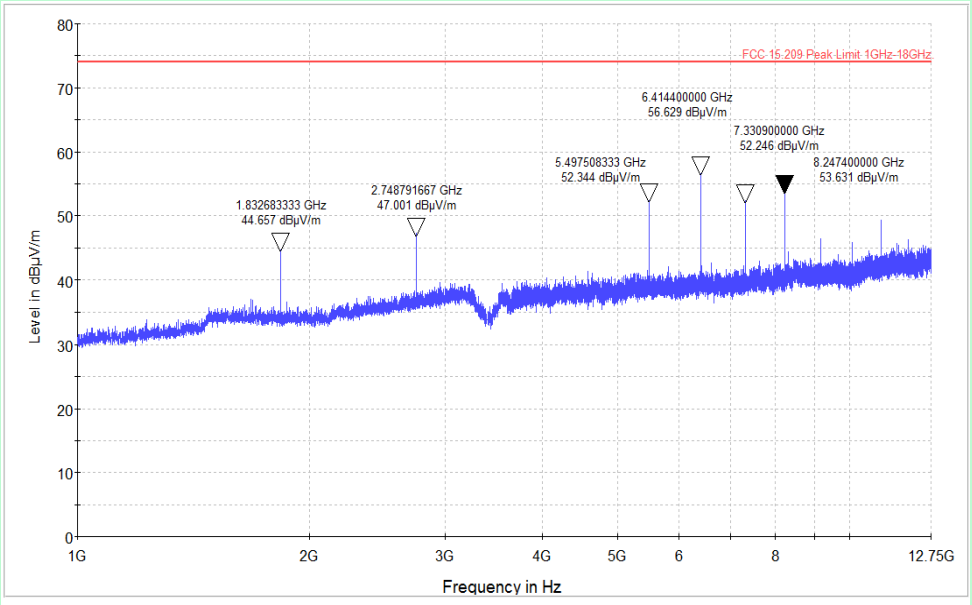

**Channel 1 (903.55 MHz)**

Note : Peak Graph - Horizontal



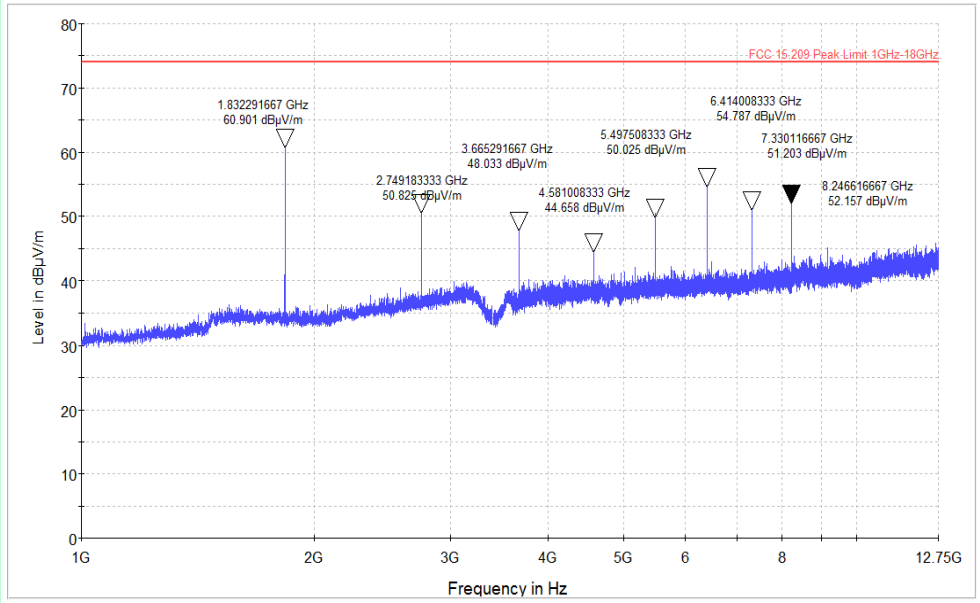

**Channel 1 (903.55 MHz)**

Note : Peak Graph - Vertical



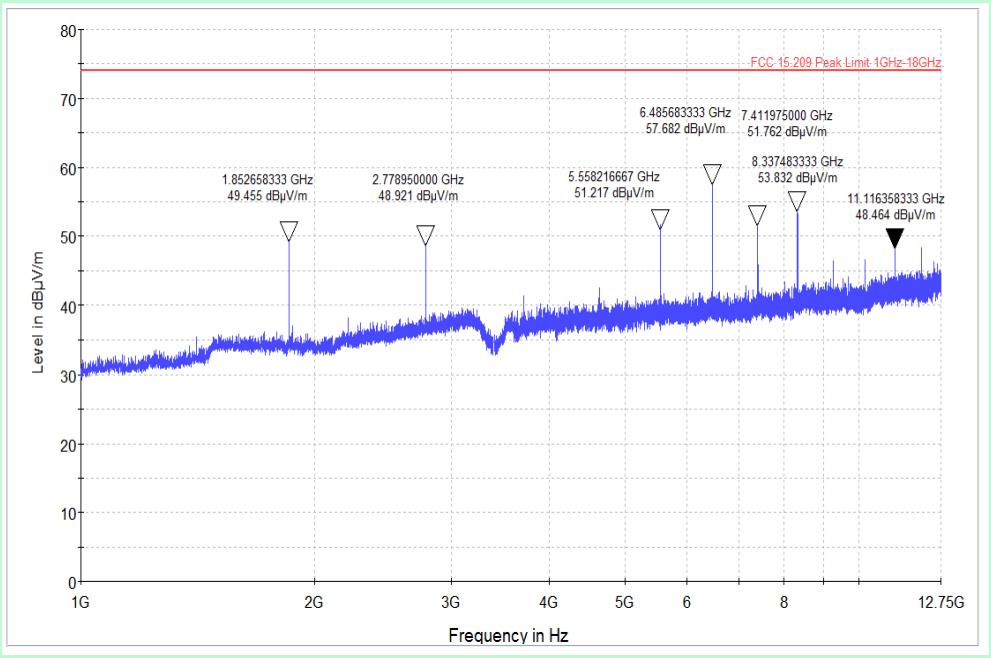

**Channel 27 (916.35 M Hz)**

Note : Peak Graph - Horizontal



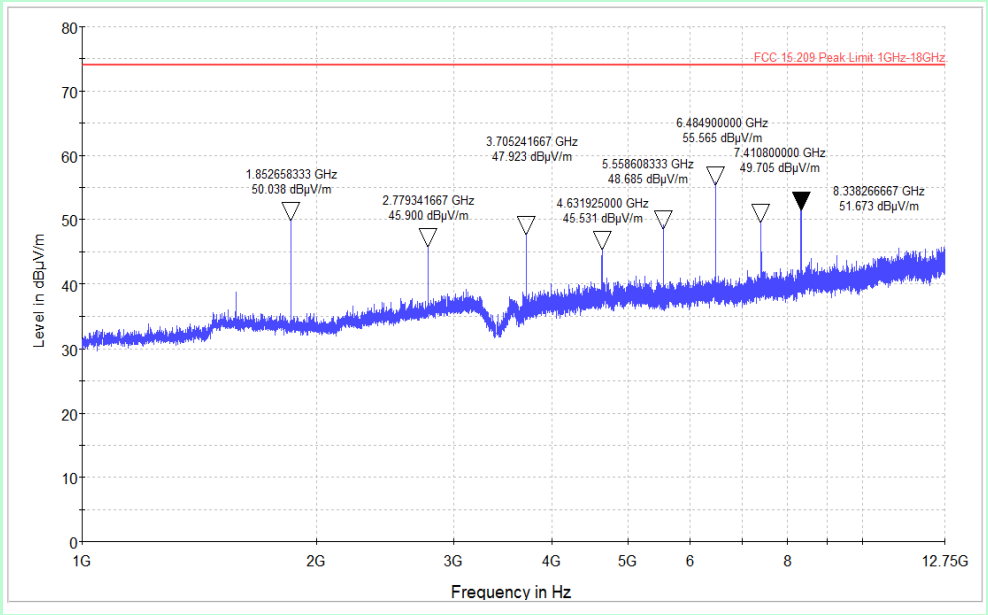

**Channel 27 (916.35 M Hz)**

Note : Peak Graph - Vertical




**Channel 52 (926.45 MHz)**

Note : Peak Graph - Horizontal




**Channel 52 (926.45 MHz)**

Note : Peak Graph - Vertical

| TEST RESULT – 1 GHz to 10 GHz | | | | | | | RESTRICTED BAND – PEAK & AVERAGE | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Channel | Spurious Frequency | Spurious Peak Level | Height | Ant Pol | Peak Limit | Peak Margin | Calculated Average Reading [ Peak – Duty cycle ] | Average Limit | Margin | Results |
| # | GHz | dBµV/m | cm | H / V | dBµV/m | dB | dBµV/m | dBµV/m | dB | |
| 1 | 2.7 | 52.1 | 100 | H | 74 | 21.9 | 34 | 54 | 20 | PASS |
| 1 | 3.6 | 44.8 | 100 | H | 74 | 29.1 | 26.7 | 54 | 27.3 | PASS |
| 1 | 5.4 | 54.2 | 200 | H | 74 | 19.7 | 36.2 | 54 | 17.8 | PASS |
| 1 | 6.3 | 57.2 | 100 | H | 74 | 16.7 | 39.2 | 54 | 14.8 | PASS |
| 1 | 7.2 | 53.7 | 100 | H | 74 | 20.3 | 35.6 | 54 | 18.4 | PASS |
| 1 | 8.1 | 53.8 | 100 | H | 74 | 20.2 | 35.7 | 54 | 18.3 | PASS |
| 1 | 2.7 | 56.8 | 100 | V | 74 | 17.2 | 38.7 | 54 | 15.3 | PASS |
| 1 | 3.6 | 50.3 | 200 | V | 74 | 23.7 | 32.2 | 54 | 21.8 | PASS |
| 1 | 5.4 | 51.1 | 100 | V | 74 | 22.9 | 33 | 54 | 21 | PASS |
| 1 | 6.3 | 53.2 | 100 | V | 74 | 20.8 | 35.1 | 54 | 18.9 | PASS |
| 1 | 7.2 | 50.3 | 100 | V | 74 | 23.7 | 32.2 | 54 | 21.8 | PASS |
| 1 | 8.1 | 51.8 | 400 | V | 74 | 22.2 | 33.7 | 54 | 20.3 | PASS |
| 27 | 2.7 | 47.0 | 100 | H | 74 | 27 | 28.9 | 54 | 25.1 | PASS |
| 27 | 5.5 | 52.3 | 100 | H | 74 | 21.7 | 34.3 | 54 | 19.7 | PASS |
| 27 | 6.4 | 56.6 | 200 | H | 74 | 17.4 | 38.5 | 54 | 15.5 | PASS |
| 27 | 7.3 | 52.2 | 100 | H | 74 | 21.8 | 34.2 | 54 | 19.8 | PASS |
| 27 | 8.2 | 53.6 | 100 | H | 74 | 20.4 | 35.6 | 54 | 18.4 | PASS |
| 27 | 2.7 | 50.8 | 100 | V | 74 | 23.2 | 32.7 | 54 | 21.3 | PASS |
| 27 | 3.7 | 48.0 | 100 | V | 74 | 26 | 30 | 54 | 24 | PASS |
| 27 | 4.6 | 44.7 | 200 | V | 74 | 29.3 | 26.6 | 54 | 27.4 | PASS |
| 27 | 5.5 | 50.0 | 100 | V | 74 | 24 | 31.9 | 54 | 22.1 | PASS |
| 27 | 6.4 | 54.8 | 100 | V | 74 | 19.2 | 36.7 | 54 | 17.3 | PASS |
| 27 | 7.3 | 51.2 | 100 | V | 74 | 22.8 | 33.1 | 54 | 20.9 | PASS |
| 27 | 8.2 | 52.2 | 400 | V | 74 | 21.8 | 34.1 | 54 | 19.9 | PASS |
| 52 | 2.8 | 48.9 | 100 | H | 74 | 25.1 | 30.8 | 54 | 23.1 | PASS |
| 52 | 5.6 | 51.2 | 100 | H | 74 | 22.8 | 33.1 | 54 | 20.8 | PASS |
| 52 | 6.5 | 57.7 | 200 | H | 74 | 16.3 | 39.6 | 54 | 14.3 | PASS |
| 52 | 7.4 | 51.8 | 100 | H | 74 | 22.2 | 33.6 | 54 | 20.3 | PASS |
| 52 | 8.3 | 53.8 | 100 | H | 74 | 20.2 | 35.7 | 54 | 18.2 | PASS |
| 52 | 11.1 | 48.5 | 100 | H | 74 | 25.5 | 30.3 | 54 | 23.6 | PASS |
| 52 | 2.8 | 45.9 | 100 | V | 74 | 28.1 | 27.8 | 54 | 26.2 | PASS |
| 52 | 3.7 | 47.9 | 200 | V | 74 | 26.1 | 29.8 | 54 | 24.1 | PASS |
| 52 | 4.6 | 45.5 | 100 | V | 74 | 28.5 | 27.4 | 54 | 26.5 | PASS |
| 52 | 5.6 | 48.7 | 100 | V | 74 | 25.3 | 30.6 | 54 | 23.3 | PASS |
| 52 | 6.5 | 55.6 | 100 | V | 74 | 18.4 | 37.4 | 54 | 16.5 | PASS |
| 52 | 7.4 | 49.7 | 400 | V | 74 | 24.3 | 31.6 | 54 | 22.3 | PASS |
| 52 | 8.3 | 51.7 | 400 | V | 74 | 22.3 | 33.5 | 54 | 20.4 | PASS |

Note :
Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss – Ext. Pre amplifier Gain (dB)

Duty Cycle Correction Factor is calculated using the guidelines provided in DA 00-705 (Spurious Radiated Emissions)

Duty Cycle correction Factor =20 log (1.560*8/100) = -18.08dB
Duty Cycle Factor =20*log (Dwell time /100msec) , Number of Transmission for 100msec: 8, Dwell time per Transmission: 1.560msec

| TEST RESULT – 1 GHz to 10 GHz | | | | | | | | | NON-RESTRICTED BAND - PEAK |
|---|---|---|---|---|---|---|---|---|---|
| Channel | Measured Fundamental | Spurious Emission | Measured Harmonic | Height | Ant Pol | Azimuth | Limit [ Fundamental – 20 dBc] | Margin | Results |
| # | dBµV/m | GHz | dBµV/m | cm | H / V | deg | dBuV/m | dB | |
| 1 | 104.1 | 1.8068 | 65.991 | 100 | H | 88.0 | 84.10 | 18.11 | PASS |
| 1 | 104.1 | 1.8068 | 67.291 | 200 | V | 66.0 | 84.10 | 16.81 | PASS |
| 27 | 104.5 | 1.8326 | 44.657 | 100 | H | 88.0 | 84.50 | 39.84 | PASS |
| 27 | 104.5 | 1.8322 | 60.901 | 200 | V | 44.0 | 84.50 | 23.60 | PASS |
| 52 | 105.5 | 1.8526 | 49.455 | 100 | H | 66.0 | 85.50 | 36.05 | PASS |
| 52 | 105.5 | 1.8526 | 50.038 | 100 | V | 88.0 | 85.50 | 35.46 | PASS |

Note :
Field Strength –dBuV/m = Receiver Readings (dBuV) + Antenna Factor (dB/m) + Cable loss (dB) + Filter Insertion loss - Pre amplifier Gain (dB)

## TEST SETUP PHOTOGRAPHS

Refer Annexure -1

**Radiated Emission Test Setup**

# 3 DTS CHANNELS

## 3.1 DTS 6dB Bandwidth

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Request No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 25-Oct-2013 | **Temperature (˚C)** | 22.6 |
| **Test End Date** | 25-Oct-2013 | **Humidity RH (%)** | 56.2 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NA | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | KDB 558074 | | |
| **Comment** | | | |

**TEST DETAILS**

| | |
|---|---|
| **Method** | ☒ Conducted ☐ Radiated |

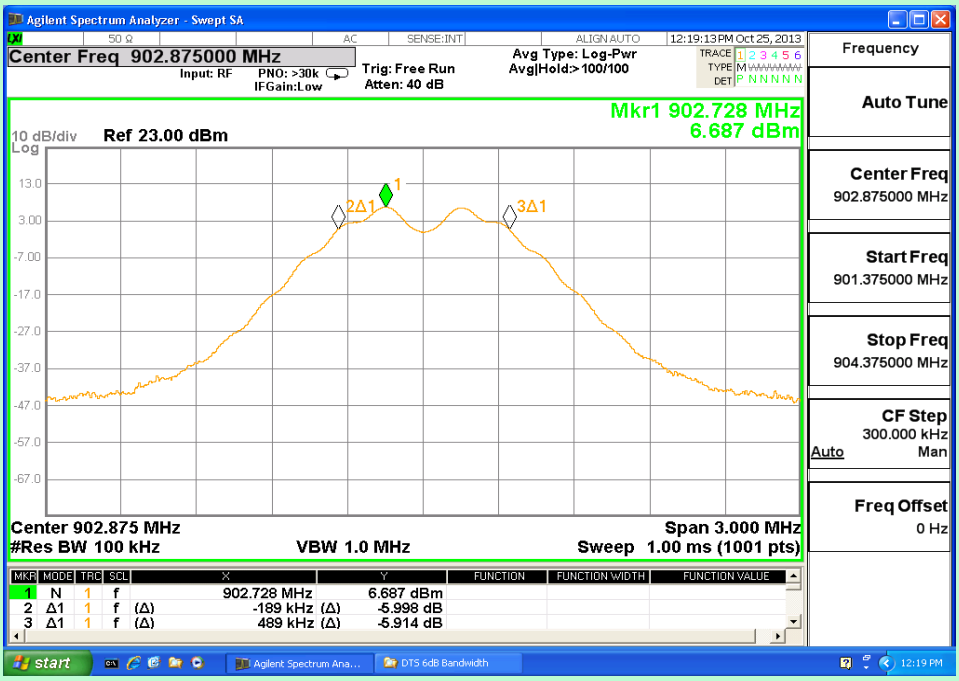
**TEST PARAMETERS**

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

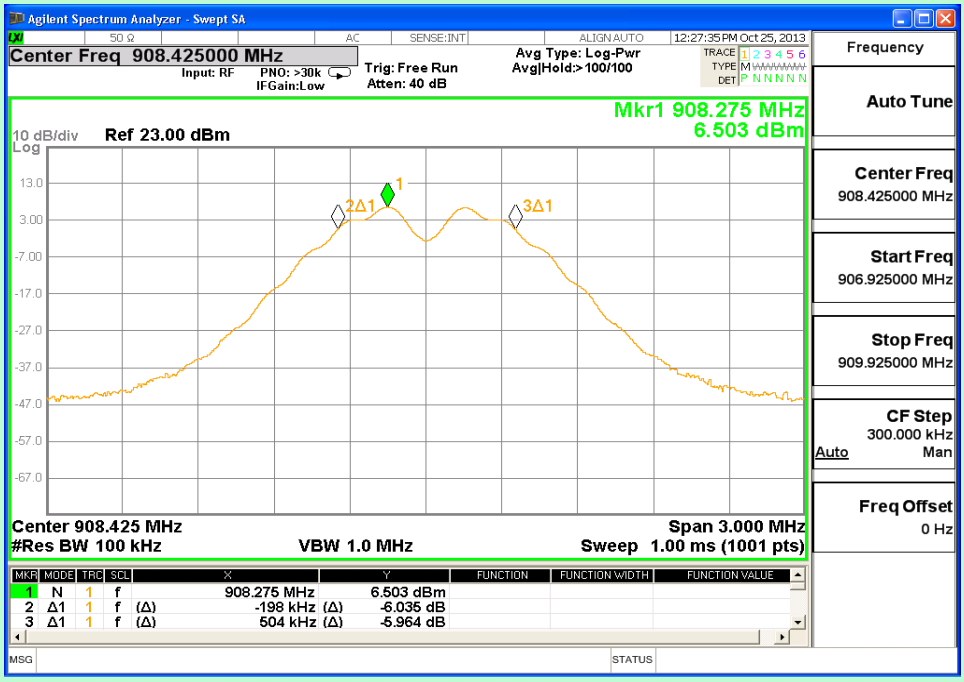
**TEST EQUIPMENT**

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

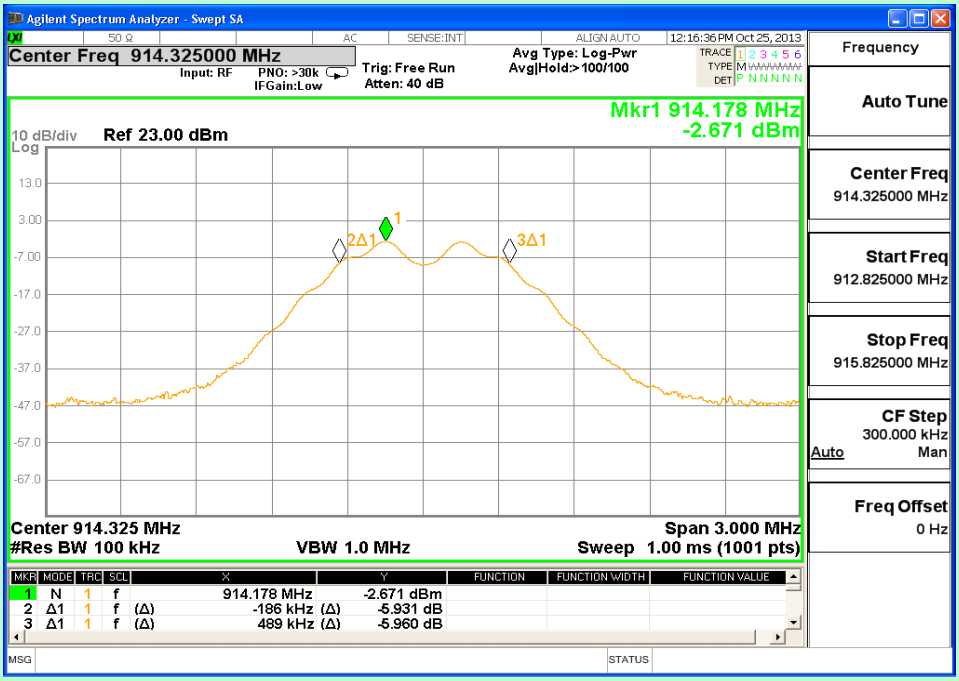
## TEST GRAPHS



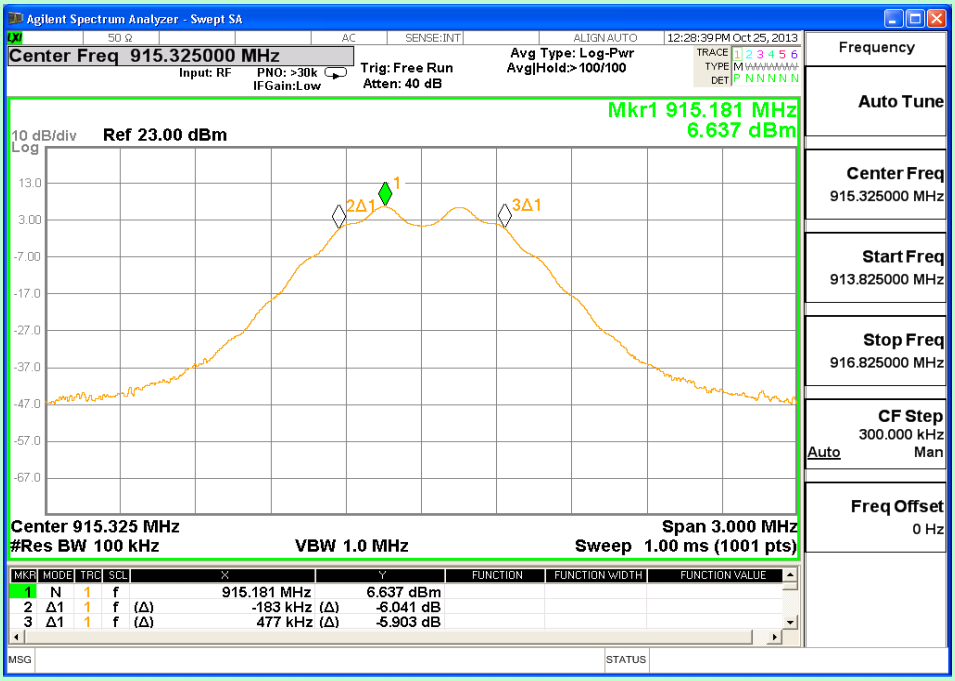

**Channel 1 (902.875 MHz)**



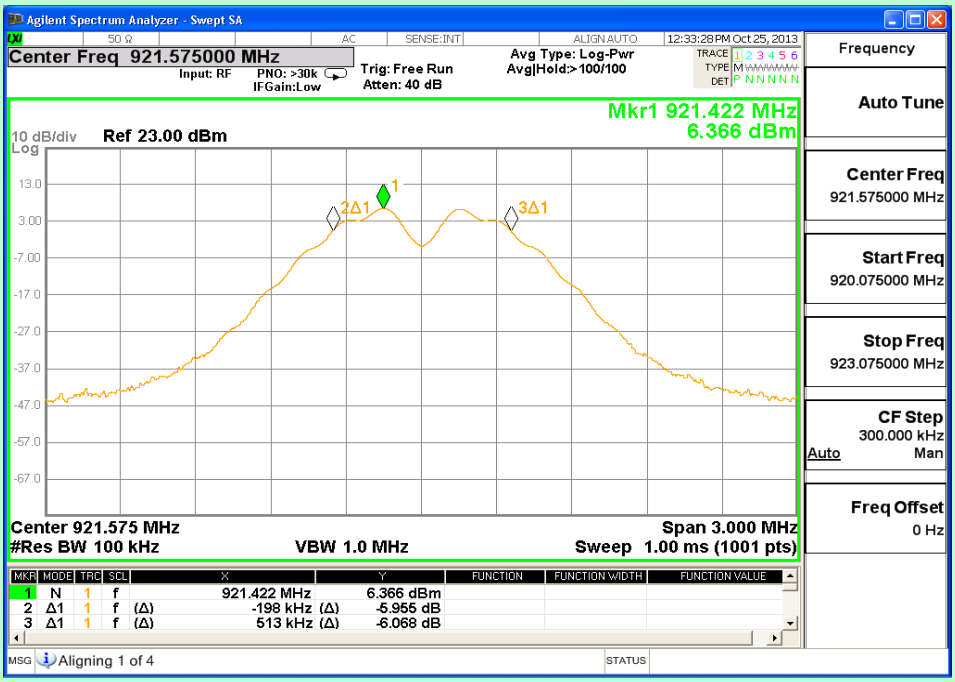

**Channel 2 (908.425 MHz)**



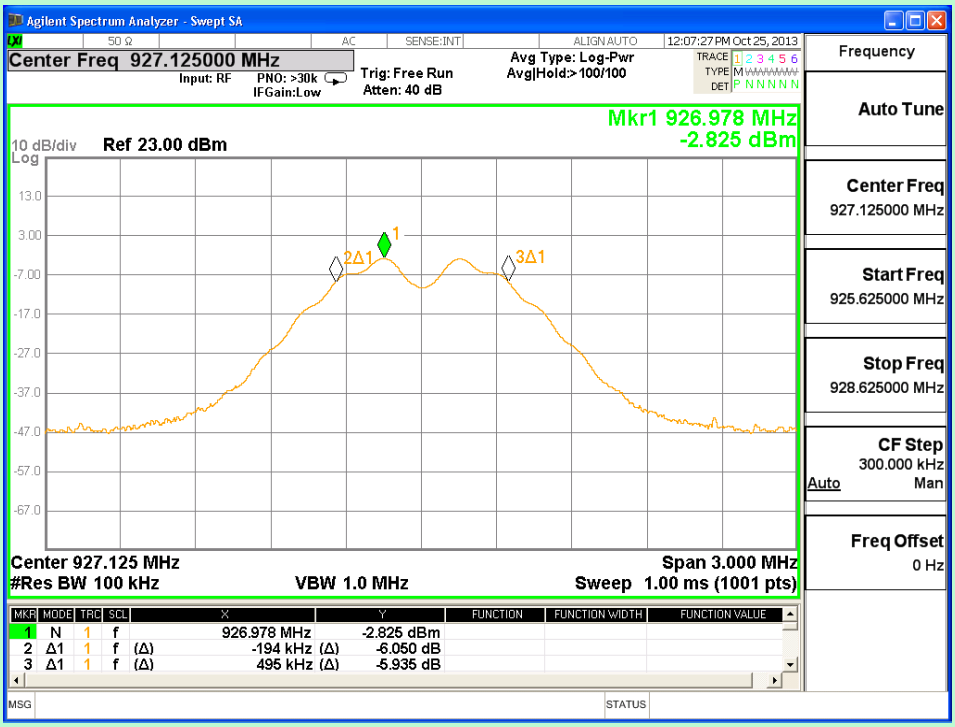

**Channel 3 (914.325 MHz)**




**Channel 4 (915.325 MHz)**




**Channel 5 (921.575 MHz)**




**Channel 6 (927.125 MHz)**

## TEST RESULT

| Channel # | Frequency MHz | Measured Value KHz | Limit KHz | Result |
|---|---|---|---|---|
| 1 | 902.875 | 678 | >500 | PASS |
| 2 | 908.425 | 702 | >500 | PASS |
| 3 | 914.325 | 675 | >500 | PASS |
| 4 | 915.325 | 660 | >500 | PASS |
| 5 | 921.575 | 711 | >500 | PASS |
| 6 | 927.125 | 689 | >500 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure – 1

**Conducted RF Test Setup**

## 3.2 MAXIMUM PEAK OUTPUT POWER

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Request No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 25-Oct-2013 | **Temperature (°C)** | 23.2 |
| **Test End Date** | 25-Oct-2013 | **Humidity RH (%)** | 55.2 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NIL | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | KDB 558074 | | |
| **Comment** | | | |

**TEST DETAILS**

| | |
|---|---|
| **Method** | ☒ Conducted , ☐ Radiated |

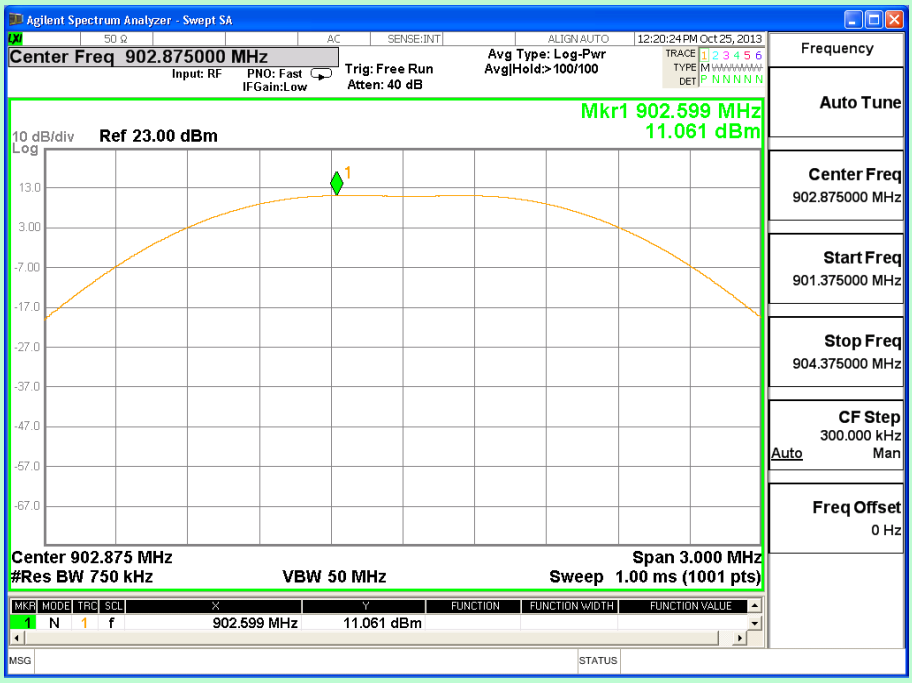
**TEST PARAMETERS – RADIATED**

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

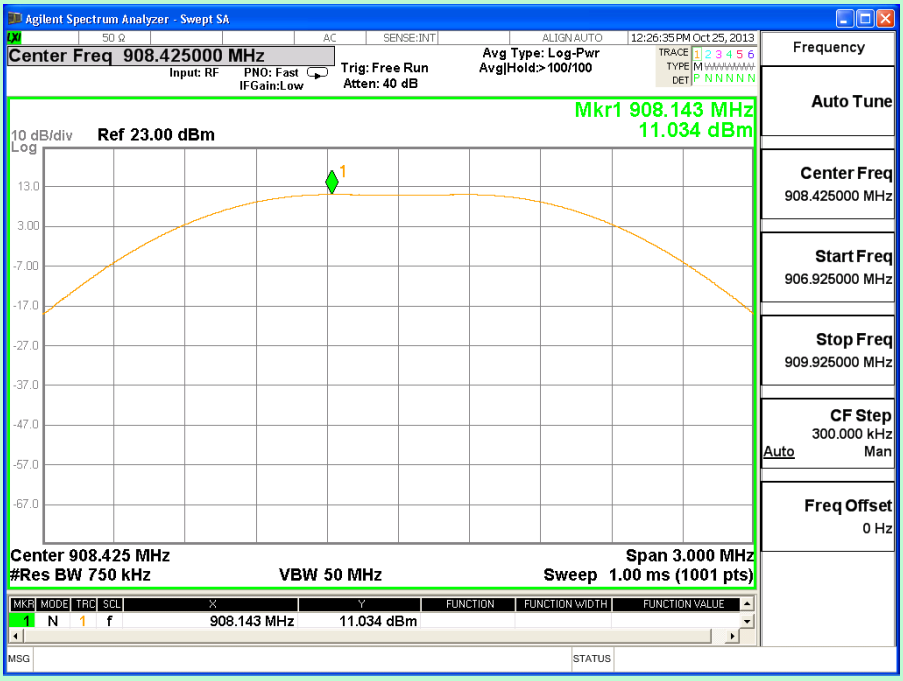
**TEST EQUIPMENT**

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

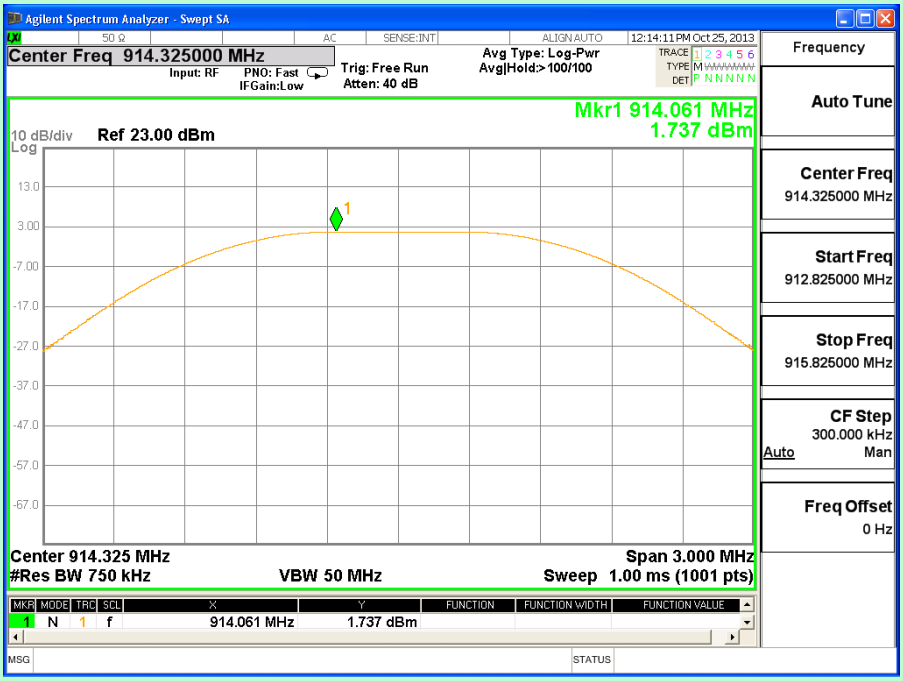
## TEST GRAPHS



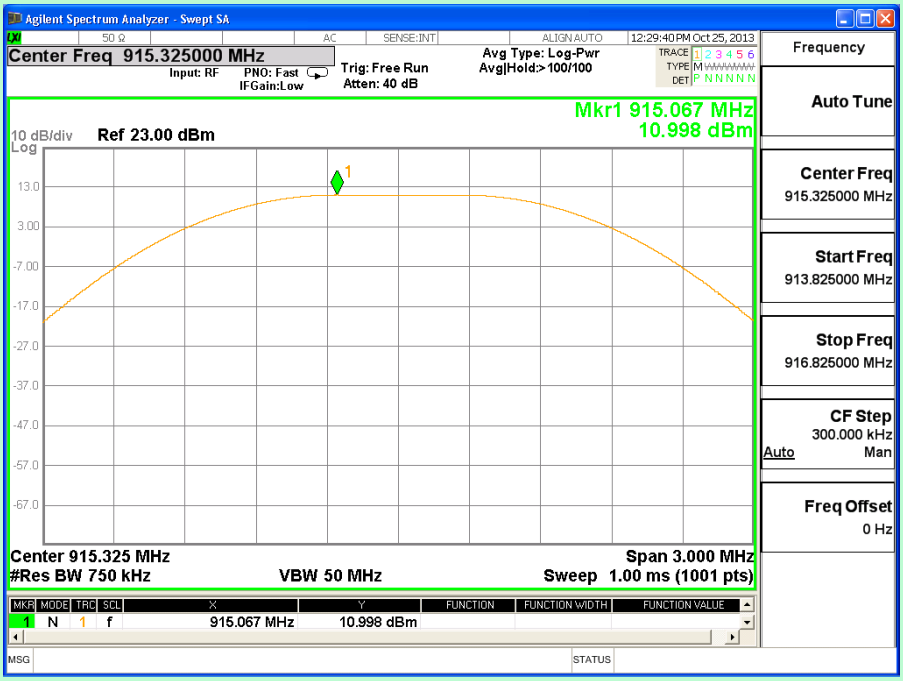

**Channel 1 (902.875 MHz)**



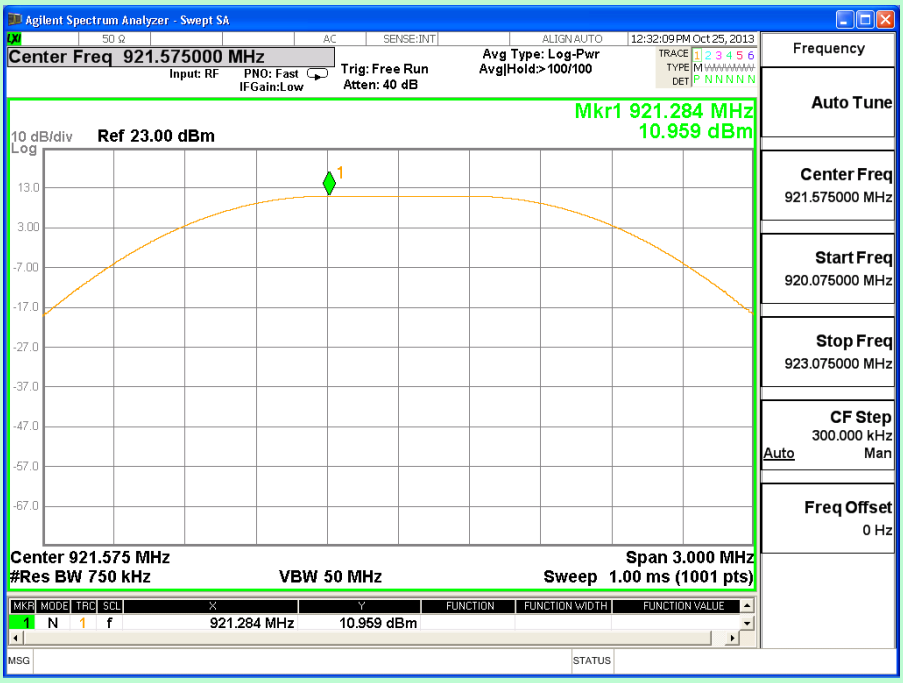

**Channel 2 (908.425 MHz)**



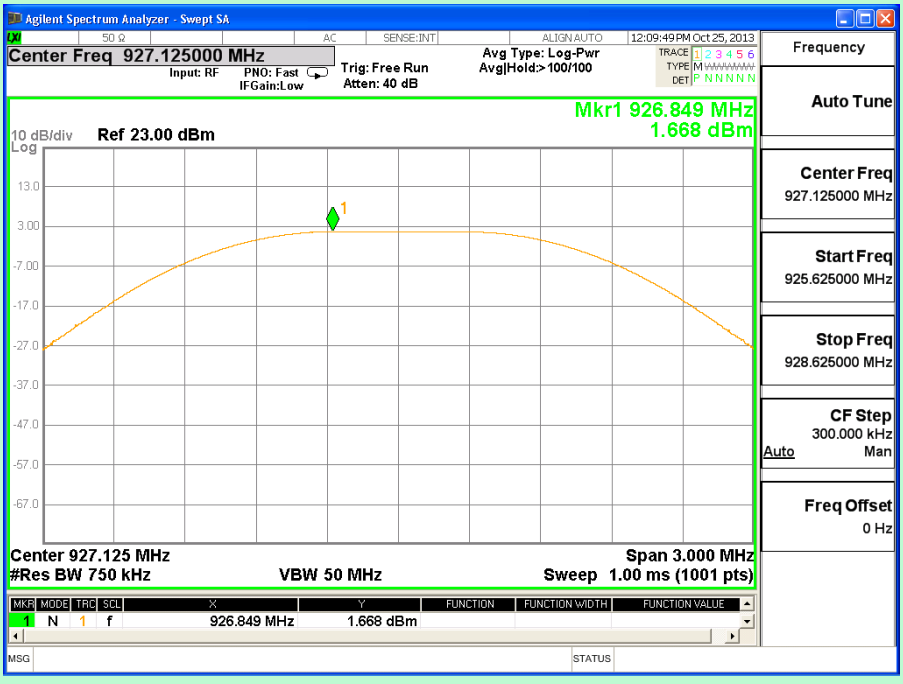

**Channel 3 (914.325 MHz)**




**Channel 4 (915.325 MHz)**




**Channel 5 (921.575 MHz)**




**Channel 6 (927.125 MHz)**

## TEST RESULT

| Channel No. | Frequency | Measured Level | Cable Loss | Transmitter Output Power Level | Limit | Result |
|---|---|---|---|---|---|---|
| # | MHz | dBm | dB | dBm | dBm | |
| 1 | 902.875 | 11.061 | 0.5 | 11.561 | ≤30 | PASS |
| 2 | 908.425 | 11.034 | 0.5 | 11.534 | ≤30 | PASS |
| 3 | 914.325 | 1.737 | 0.5 | 2.237 | ≤30 | PASS |
| 4 | 915.325 | 10.998 | 0.5 | 11.498 | ≤30 | PASS |
| 5 | 921.575 | 10.959 | 0.5 | 11.459 | ≤30 | PASS |
| 6 | 927.125 | 1.668 | 0.5 | 2.168 | ≤30 | PASS |

Note: Transmitter Output Power =Measured Level (dBm) +Cable Loss (dB)

## TEST SETUP PHOTOGRAPHS

Refer Annexure – 1

**Conducted RF Test Setup**

## 3.3 MAXIMUM POWER SPECTRAL DENSITY

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Request No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 25-Oct-2013 | **Temperature (°C)** | 22.9 |
| **Test End Date** | 25-Oct-2013 | **Humidity RH (%)** | 54.2 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NIL | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | KDB 558074 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted , ☐ Radiated |

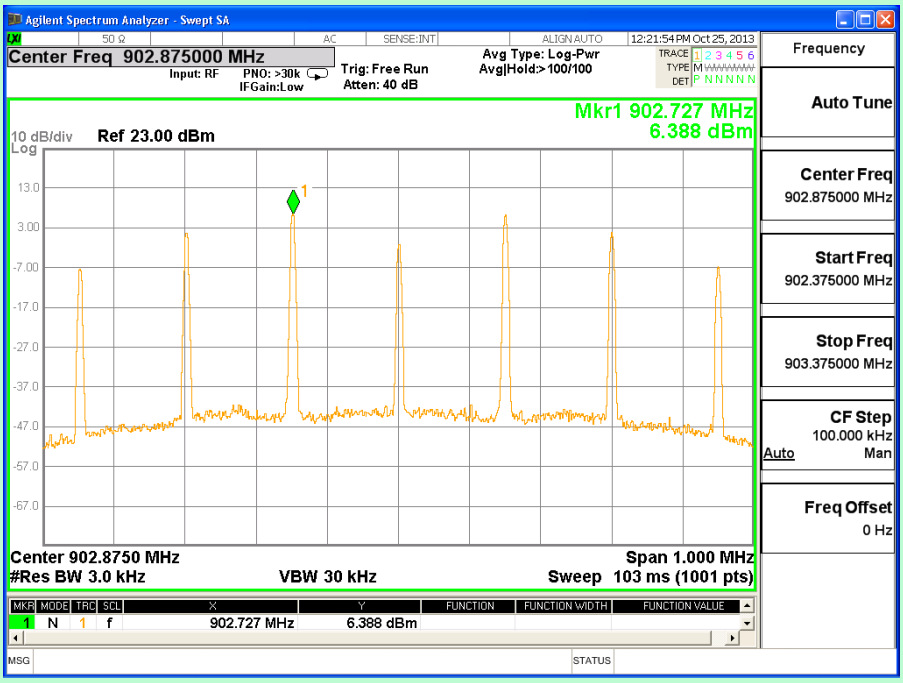
### TEST PARAMETERS – RADIATED

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

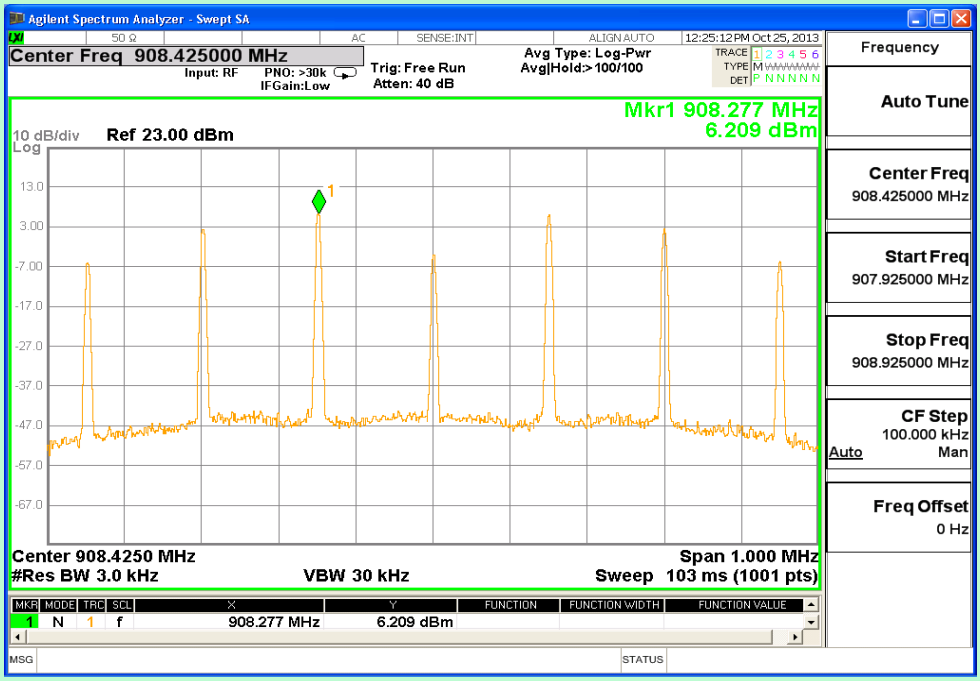
### TEST EQUIPMENT

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

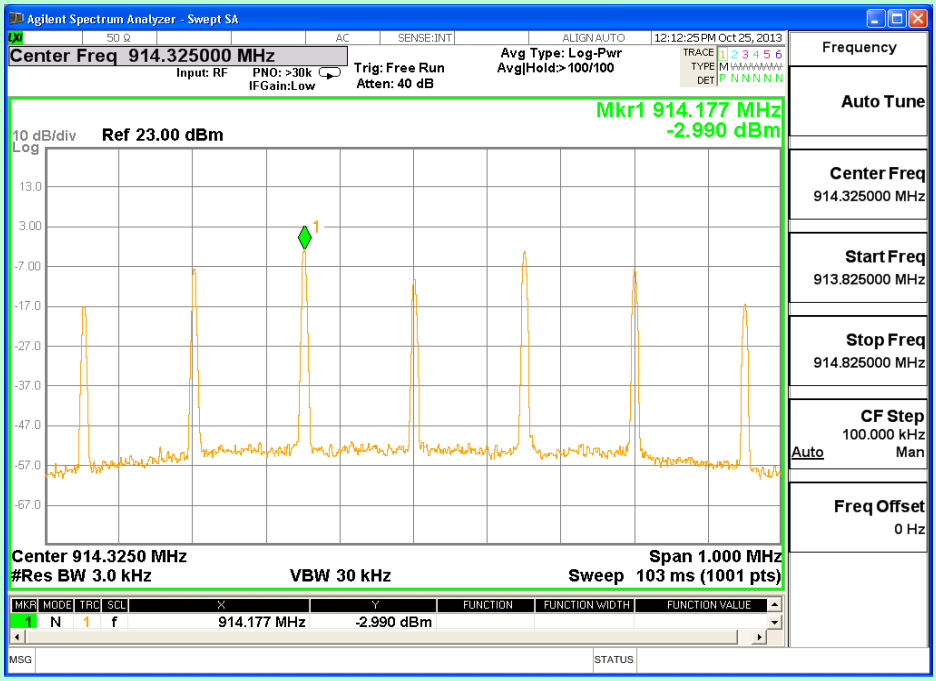
## TEST GRAPHS



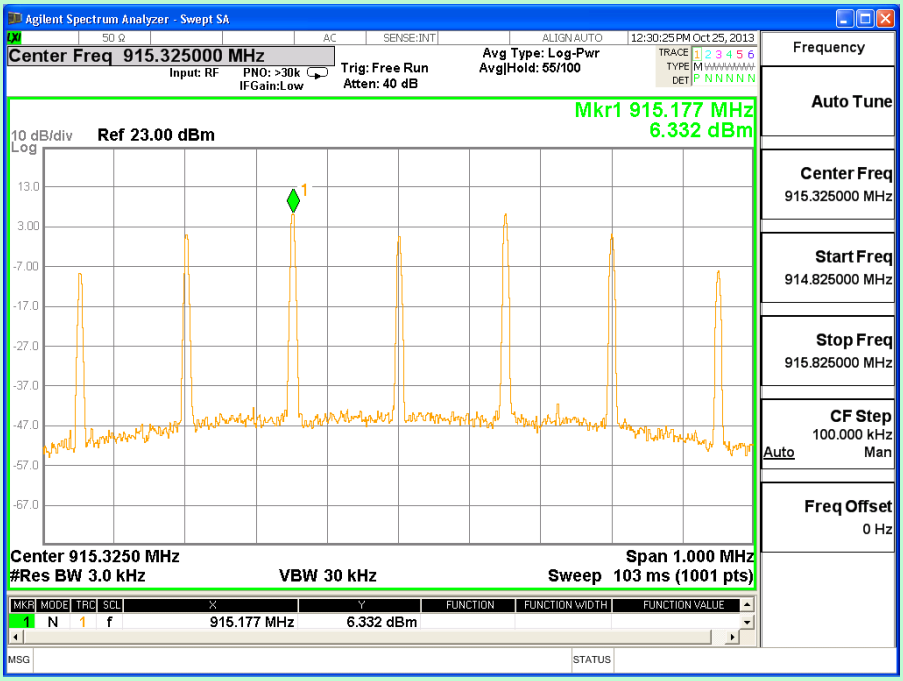

**Channel 1 (902.875 MHz)**



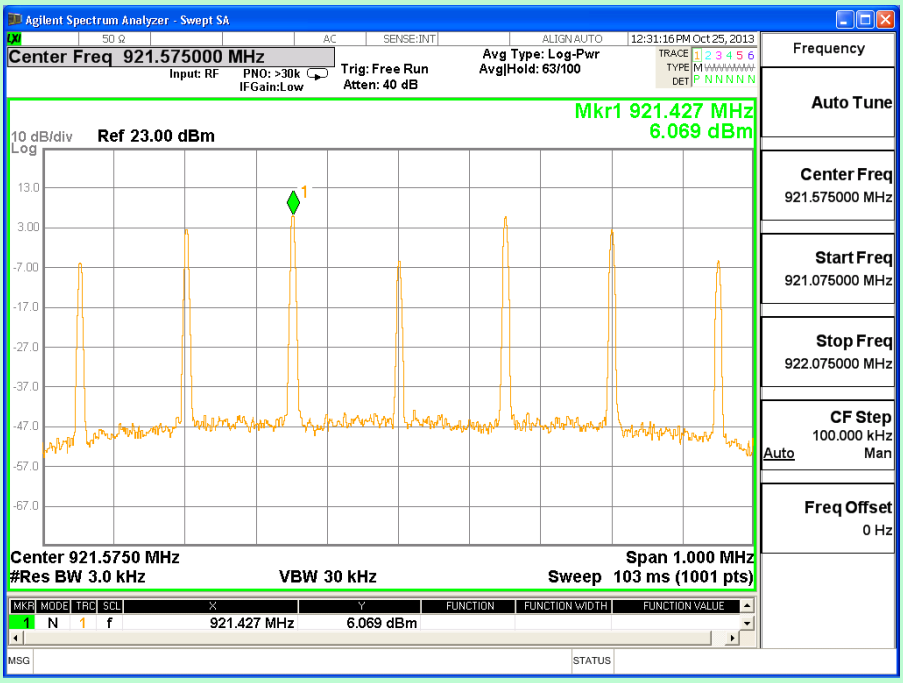

**Channel 2 (908.425 MHz)**



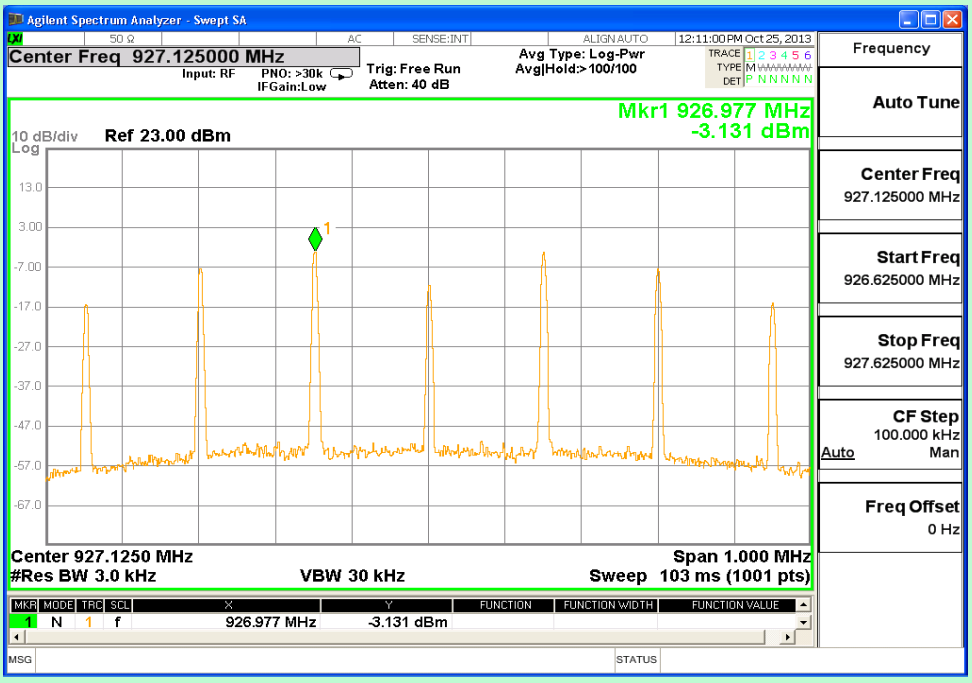

**Channel 3 (914.325 MHz)**




**Channel 4 (915.325 MHz)**




**Channel 5 (921.575 MHz)**




**Channel 6 (927.125 MHz)**

## TEST RESULT

| Channel | Freq | Measured Level | Limit | Result |
|---|---|---|---|---|
| # | MHz | dBm/3KHz | dBm/3KHz | |
| 1 | 902.875 | 6.388 | <8 | PASS |
| 2 | 908.425 | 6.209 | <8 | PASS |
| 3 | 914.325 | -2.990 | <8 | PASS |
| 4 | 915.325 | 6.332 | <8 | PASS |
| 5 | 921.575 | 6.069 | <8 | PASS |
| 6 | 927.125 | -3.131 | <8 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure - 1

**Conducted RF Test Setup**

## 3.4 BAND EDGE MEASUREMENTS

| | | | |
|---|---|---|---|
| **EUT Nomenclature** | Wireless Smoke Detector | **Test Request No.** | EMC-0004-1 |
| **Model No.** | FWD-200A CCLIMATE | **Serial No.** | 05936 |
| **Test Start Date** | 25-Oct-2013 | **Temperature (°C)** | 22.9 |
| **Test End Date** | 25-Oct-2013 | **Humidity RH (%)** | 54.2 |
| **Tested By** | Loganathan Joghee | **Pressure (mbar)** | NR |
| **Input Voltage / Freq** | 3.3V dc | | |
| **Operating Mode** | Refer Page 5 Operating Modes Table | | |
| **Test configuration** | Refer Page 5 Test Configuration Table | | |
| **Deviation from Std** | NIL | | |
| **Applicable standard** | FCC Part 15.247 | | |
| **Test Method** | KDB 558074 | | |
| **Comment** | | | |

### TEST DETAILS

| | |
|---|---|
| **Method** | ☒ Conducted , ☐ Radiated |

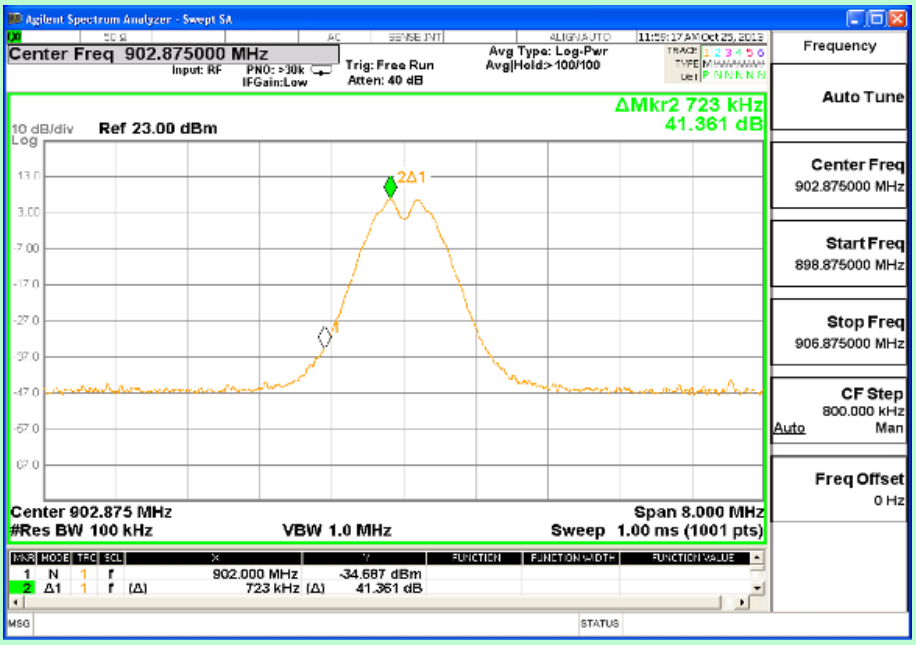
### TEST PARAMETERS – RADIATED

| | | | |
|---|---|---|---|
| **Antenna Height** | NA | **Turntable Rotation** | NA |
| **Equipment Class** | NA | **Measurement Distance** | NA |

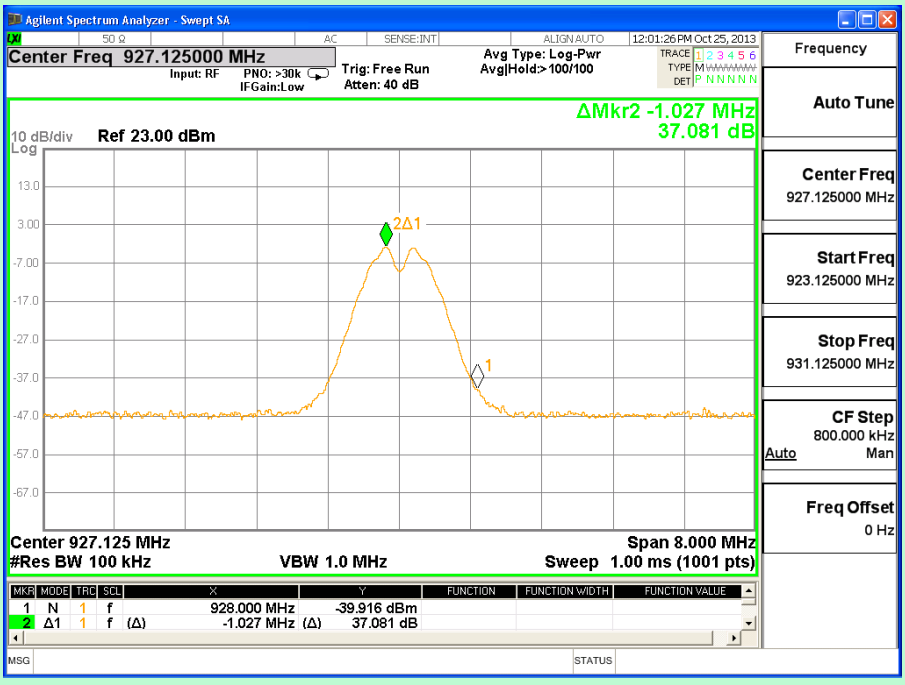
### Test Equipment

| Y/N | Equipment | Make | Model | Sl. No. | Cal Due Date |
|---|---|---|---|---|---|
| Y | Spectrum Analyzer | Agilent | N9010A | MY48031005 | 28-Nov-2014 |
| Y | RF Cable | Huber- Suhner | SF104/2X11PC3542/500 | NA | NA |

## TEST GRAPHS




**Channel 1 (902.875 MHz)**




**Channel 6 (927.125 MHz)**

| TEST RESULT | | | | |
|---|---|---|---|---|
| Channel # | Frequency MHz | Measured Level dB | Limit dBc | Results |
| 1 | 902.875 | 41.361 | >20 | PASS |
| 6 | 927.125 | 37.081 | >20 | PASS |

## TEST SETUP PHOTOGRAPHS

Refer Annexure-1

**Maximum Power Spectral Density Power Test Setup**