



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC PART 15.247 900MHz ISM

**Applicant Name:**  
Diversey, Inc.  
2415 Cascade Pointe Blvd.  
P.O. Box 28223  
Charlotte, NC 28208  
United States


**Date of Testing:**  
6/8 - 7/5/2017  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Test Report Serial No.:**  
1M1706070189-02.2ANCJ

<b>FCC ID:</b>	<b>2ANCJ-R37615-00</b>
<b>APPLICANT:</b>	<b>Diversey, Inc.</b>



**Application Type:** Certification  
**Model:** R37615-00-B  
**EUT Type:** Soap Dispenser  
**Frequency Range:** 902.3 – 914.9MHz (DSS), 903 – 914.2 (DTS)  
**Max. DTS RF Output Power:** 13.31 dBm (21.429mW)  
**Max. DSS RF Output Power:** 13.30 dBm (21.375mW)  
**FCC Classification(s):** Digital Transmission System (DTS), Spread Spectrum Transmitter (DSS)  
**FCC Rule Part(s):** Part 15 Subpart C (15.247)  
**Test Procedure(s):** ANSI C63.10-2013

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



  
 Randy Ortanez  
 President

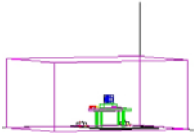


<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 1 of 60	

# TABLE OF CONTENTS

FCC PART 15.247 MEASUREMENT REPORT .....		3
1.0 INTRODUCTION.....		4
1.1 Scope .....		4
1.2 PCTEST Test Location.....		4
2.0 PRODUCT INFORMATION .....		5
2.1 Equipment Description .....		5
2.2 Device Capabilities.....		5
2.3 Test Configuration .....		5
2.4 EMI Suppression Device(s)/Modifications .....		5
3.0 DESCRIPTION OF TESTS .....		6
3.1 Evaluation Procedure .....		6
3.2 Radiated Emissions.....		6
3.3 Environmental Conditions .....		6
4.0 ANTENNA REQUIREMENTS .....		7
5.0 MEASUREMENT UNCERTAINTY .....		8
6.0 TEST EQUIPMENT CALIBRATION DATA.....		9
7.0 TEST RESULTS .....		10
7.1 Summary.....		10
7.2 Bandwidth Measurement.....		11
7.3 Output Power Measurement .....		16
7.4 Power Spectral Density .....		21
7.5 Carrier Frequency Separation .....		24
7.6 Time of Occupancy .....		26
7.7 Number of Hopping Channels .....		28
7.8 Conducted Emissions at the Band Edge .....		30
7.9 Conducted Spurious Emissions.....		34
7.10 Radiated Spurious Emission Measurements.....		41
7.11 Radiated Spurious Emission Measurements – Below 1GHz.....		56
8.0 CONCLUSION .....		60

<b>FCC ID:</b> 2ANCJ-R37615-00	 <b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 2 of 60



# MEASUREMENT REPORT

## FCC Part 15.247



### § 2.1033 General Information

**APPLICANT:** Diversey, Inc.

**APPLICANT ADDRESS:** 2415 Cascade Pointe Blvd.  
P.O. Box 28223, Charlotte, NC 28208

**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.

**TEST SITE ADDRESS:** 7185 Oakland Mills Road, Columbia, MD 21046 USA

**FCC RULE PART(S):** Part 15.247

**BASE MODEL:** R37615-00-B

**FCC ID:** 2ANCJ-R37615-00

**FCC CLASSIFICATION:** Digital Transmission System (DTS)

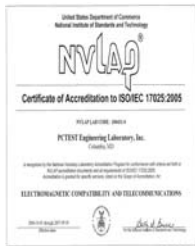
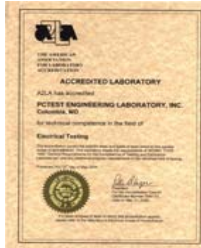
**Test Device Serial No.:** #030, #073, #114       Production     Pre-Production     Engineering

**DATE(S) OF TEST:** 6/8 - 7/5/2017



**TEST REPORT S/N:** 1M1706070189-02.2ANCJ

### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

<b>FCC ID:</b> 2ANCJ-R37615-00	 <b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 3 of 60

# 1.0 INTRODUCTION

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

## 1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity area, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on January 22, 2015.

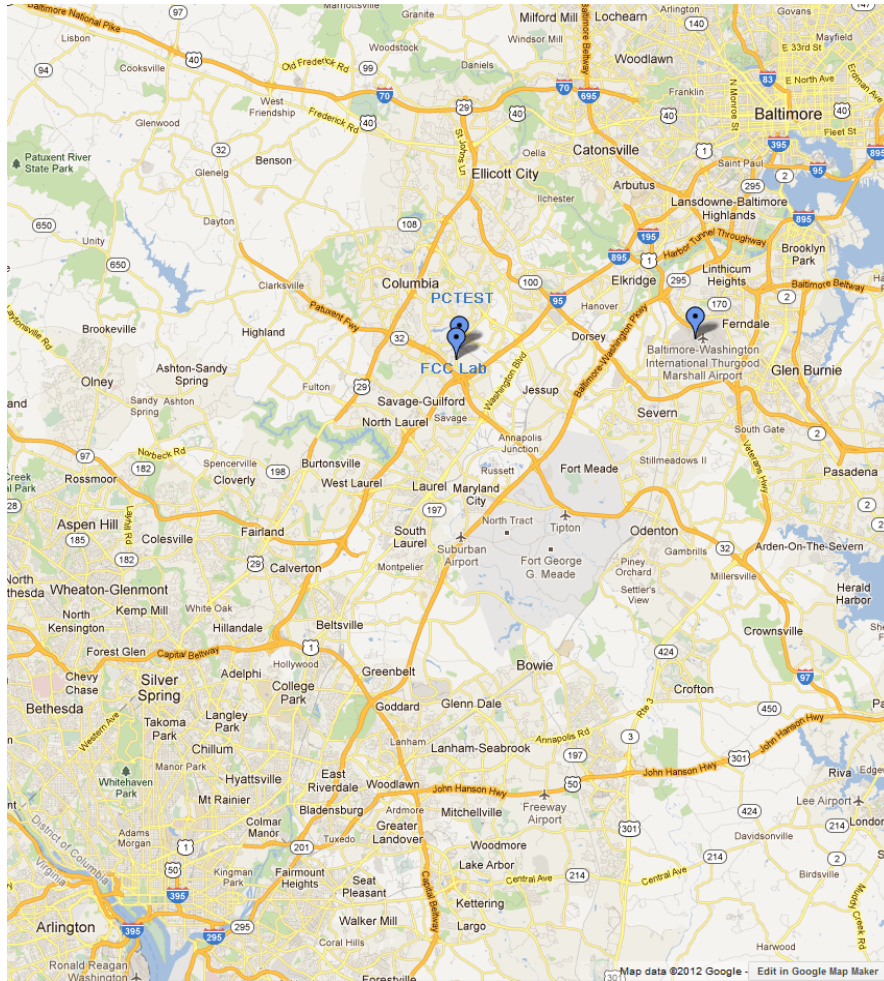


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 4 of 60

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Diversey Soap Dispenser FCC ID: 2ANCJ-R37615-00**. This device is a hybrid device, as defined in 15.247(f), with operations as both a DTS and a DSS device. When operating in DTS mode, the EUT uses an emission BW of 500kHz. When operating in DSS mode, the EUT uses an emission BW of 125kHz and four different modulation spreading factors. The test data contained in this report pertains only to the emissions due to the EUT's 900MHz ISM (DTS/DSS) transmitter.

### 2.2 Device Capabilities

This device contains the following capabilities:

900MHz (DTS/FHSS)

Ch.	Frequency (MHz)
Low	903
:	:
Mid	909.4
:	:
High	914.2

**Table 2-1. Frequency / Channel Operations (DTS Mode)**

Ch.	Frequency (MHz)
Low	902.3
:	:
Mid	908.7
:	:
High	914.9



**Table 2-2. Frequency / Channel Operations (Frequency Hopping Mode)**

### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing. See Sections 7.7 and 7.8 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5, and 7.9 for antenna port conducted emissions test setups.

### 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 5 of 60	

## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the EUT.

**Deviation from measurement procedure.....None**

### 3.2 Radiated Emissions



The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. A raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm. For measurements above 1GHz, a high density expanded polystyrene block is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

### 3.3 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

FCC ID: 2ANCJ-R37615-00	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)	 Diversey	Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 6 of 60	

## 4.0 ANTENNA REQUIREMENTS



**Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna(s) of the EUT are **permanently attached**.
- There are no provisions for connection to an external antenna.

**Conclusion:**



The EUT complies with the requirement of §15.203.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 7 of 60	

## 5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty ( $\pm$ dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07

FCC ID: 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 8 of 60	





## 6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
-	WL25-1	Conducted Cable Set (25GHz)	10/3/2016	Annual	10/3/2017	WL25-1
Agilent	N9030A	PXA Signal Analyzer (26.5GHz)	7/20/2016	Annual	7/20/2017	MY49432391
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/6/2016	Annual	7/6/2017	441119
Com-Power	PAM-118A	Pre-Amplifier	8/9/2016	Annual	8/9/2017	551079
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

**Table 6-1. Annual Test Equipment Calibration Schedule**

FCC ID: 2ANCJ-R37615-00		 <b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 9 of 60	

## 7.0 TEST RESULTS

### 7.1 Summary



Company Name: Diversey, Inc.  
 FCC ID: 2ANCJ-R37615-00  
 FCC Classifications: Digital Transmission System (DTS), Spread Spectrum Transmitter (DSS)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2), 15.247(a)(1)(i)	6dB Bandwidth (DTS) 20dB Bandwidth (DSS)	> 500kHz (DTS) < 500kHz (DSS)	CONDUCTED	PASS	Section 7.2
15.247(b)(2), 15.247(b)(3)	Transmitter Output Power	< 1 Watt (DTS/DSS)		PASS	Section 7.3
15.247(e)	Transmitter Power Spectral Density	< 8dBm / 3kHz Band (DTS Only)		PASS	Section 7.4
15.247(a)(1)(i)	Channel Separation	N/A		N/A	Section 7.5
15.247(f)	Time of Occupancy	< 0.4 sec in 25.6 sec period (64 hopping channels)		PASS	Section 7.6
15.247(a)(1)(i)	Number of Channels	> 50 Channels if the 20dB BW is less than 250kHz		PASS	Section 7.7
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 20dBc (DTS/DSS)		PASS	Sections 7.8, 7.9
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (DTS/DSS)	RADIATED	PASS	Sections 7.10, 7.11

**Table 7-1. Summary of Test Results**

**Notes:**

- All modes of operation were investigated. The test results shown in the following sections represent the worst case emissions.
- The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 10 of 60	

## 7.2 Bandwidth Measurement

§15.247(a.2), §15.247(a.1.i)

### Test Overview and Limit

The bandwidth at a specified dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the transmitter antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies. All modes of operation were investigated and the worst case configuration results are reported in this section.

***The minimum permissible 6dB bandwidth is 500 kHz for a digitally modulated system. The maximum permissible 20dB bandwidth is 500 kHz for a frequency hopping system.***

### Test Procedure Used

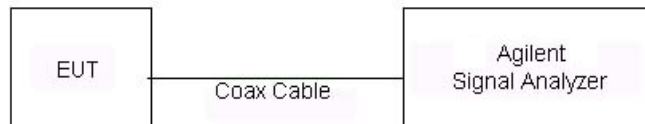
ANSI C63.10-2013

### Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the bandwidth measurements. The "X" dB bandwidth parameter was set to X = 6 in DTS mode and X = 20 in DSS mode. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100kHz (DTS), RBW = 3kHz (DSS)
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-1. Test Instrument & Measurement Setup**

### Test Notes

None

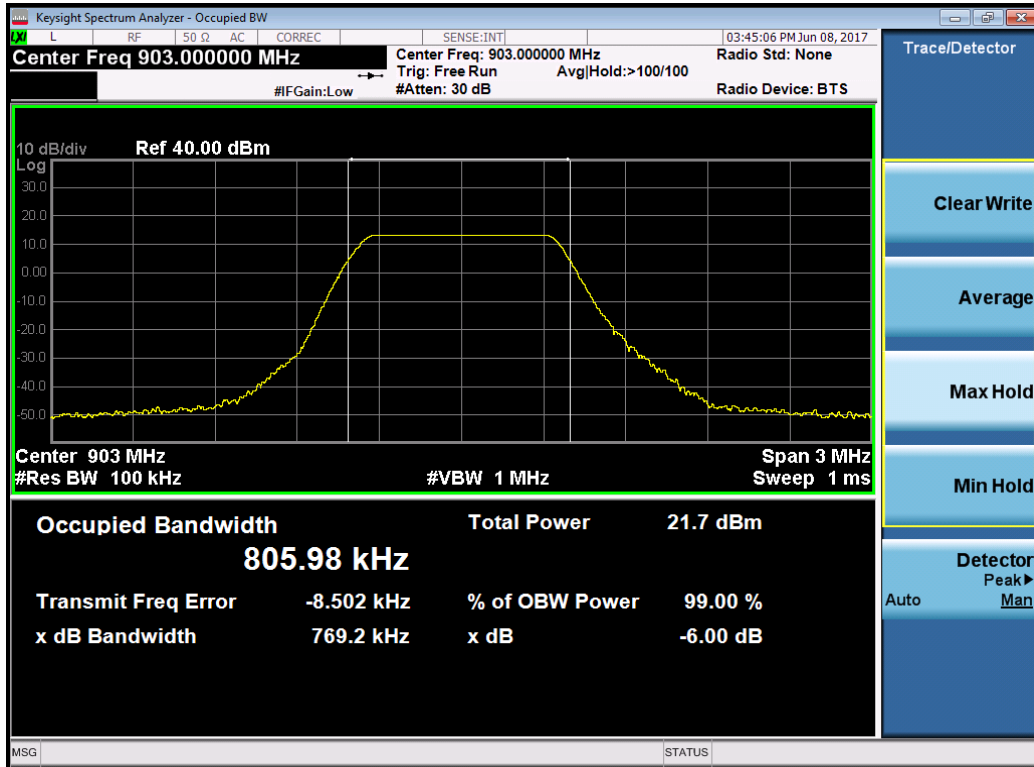
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Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 11 of 60	

Frequency [MHz]	Measured 6dB Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
903	0.806	0.500	Pass
909.4	0.803	0.500	Pass
914.2	0.791	0.500	Pass

Table 7-2. Conducted 6dB BW Measurements (DTS Mode)

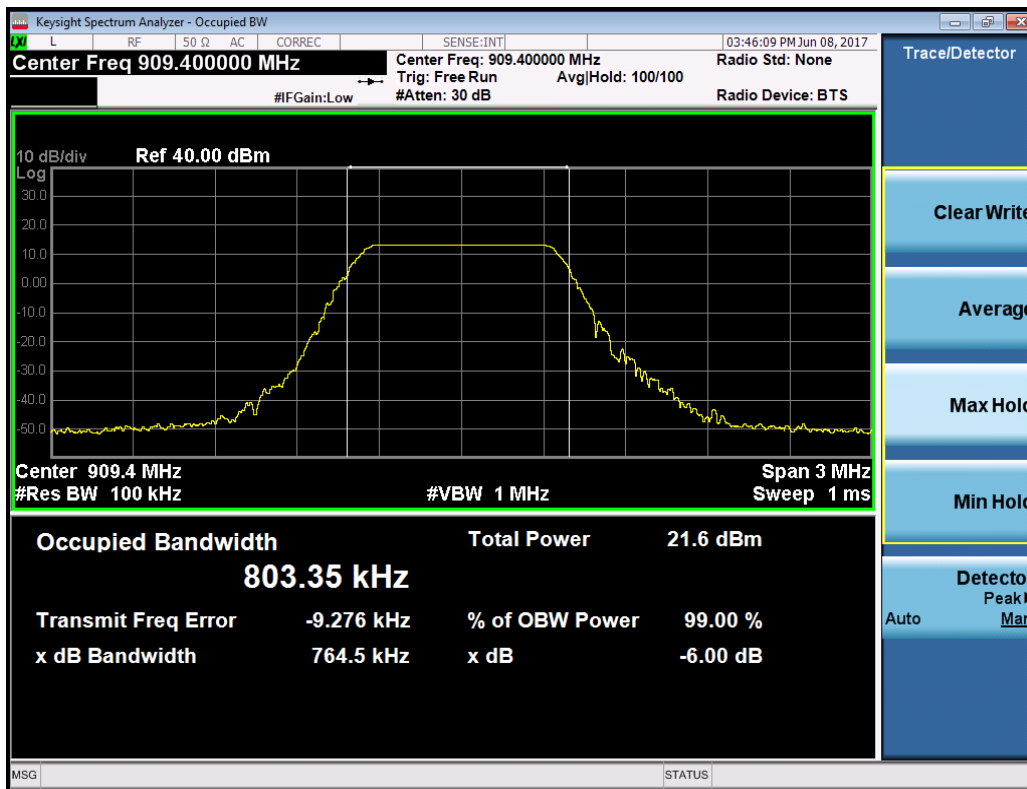
Frequency [MHz]	Measured 20dB Bandwidth [MHz]	Maximum Bandwidth [MHz]	Pass / Fail
902.3	0.128	0.500	Pass
908.7	0.128	0.500	Pass
914.9	0.128	0.500	Pass

Table 7-3. Conducted 20dB BW Measurements (DSS Mode)

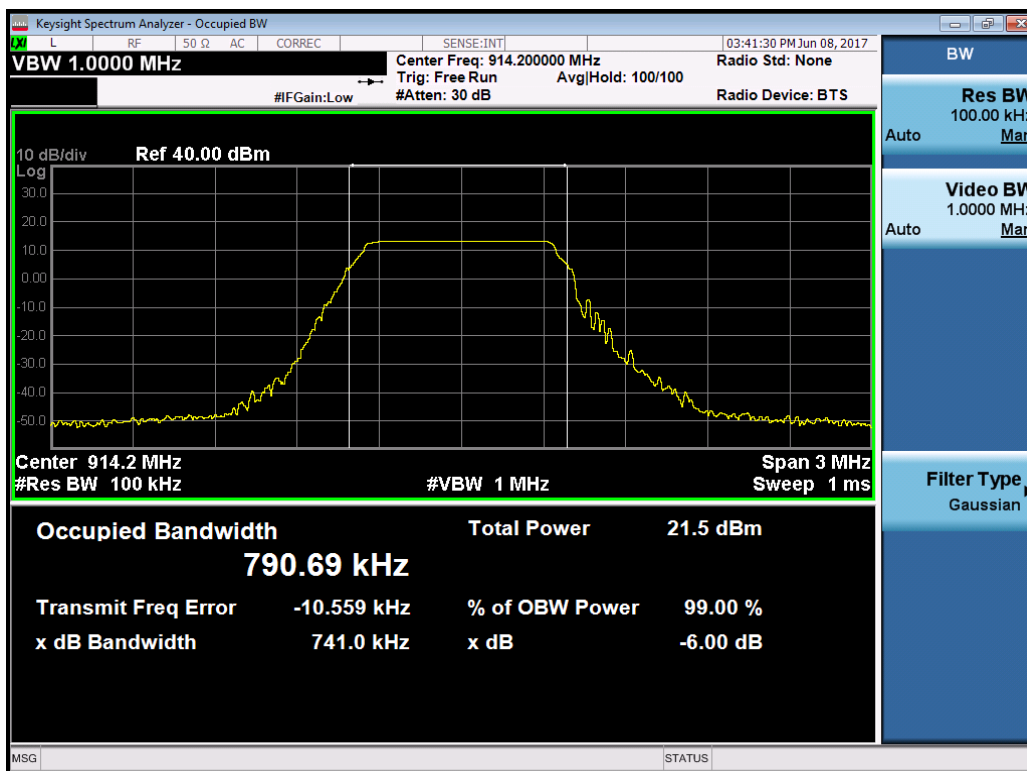


Plot 7-1. 6dB Bandwidth Plot (Low Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 12 of 60

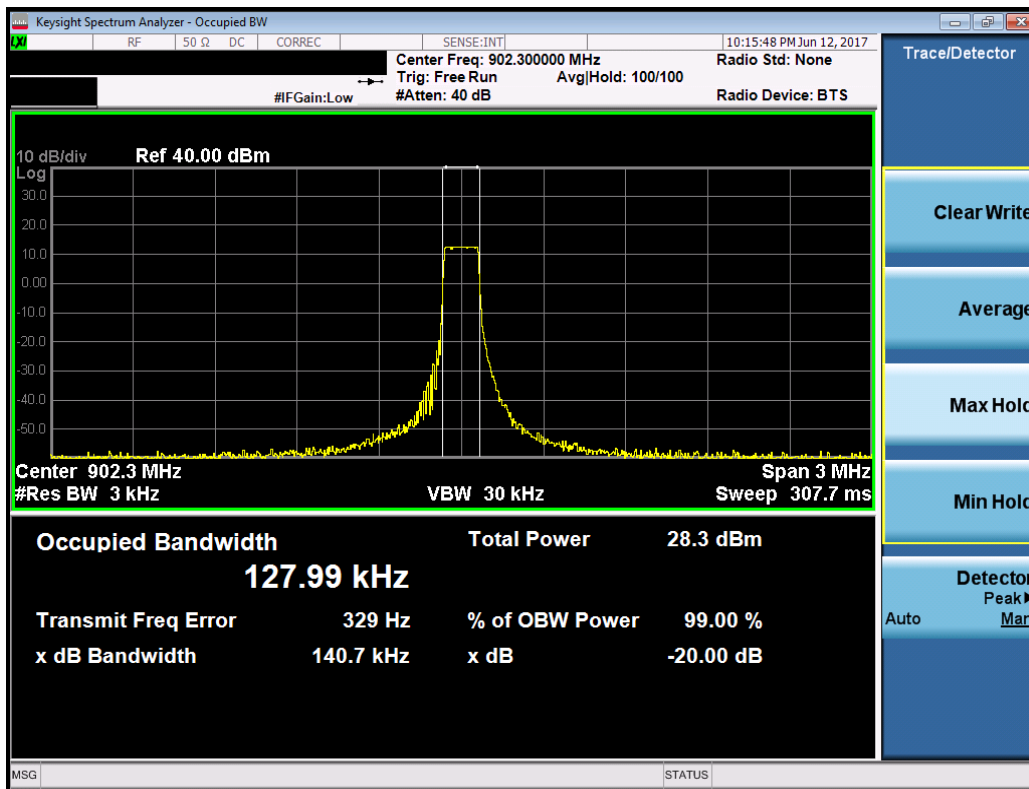


Plot 7-2. 6dB Bandwidth Plot (Mid Channel)

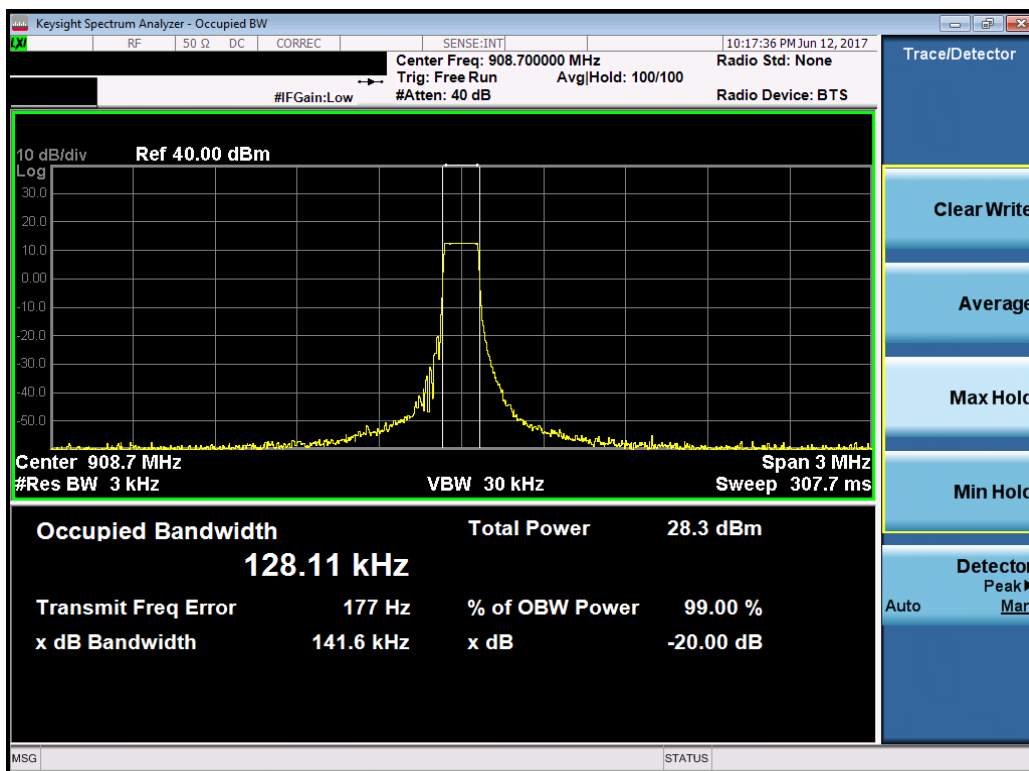


Plot 7-3. 6dB Bandwidth Plot (High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 13 of 60

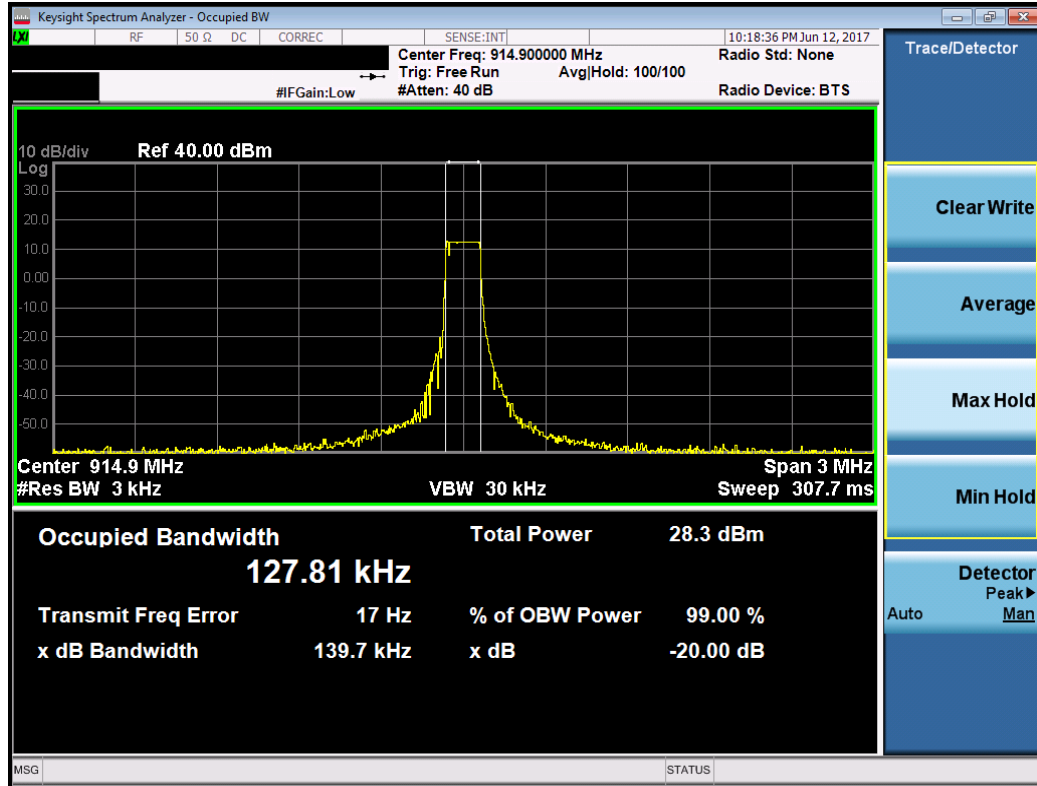


Plot 7-4. 20dB Bandwidth Plot (Low Channel)



Plot 7-5. 20dB Bandwidth Plot (Mid Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 14 of 60



Plot 7-6. 20dB Bandwidth Plot (High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 15 of 60

### 7.3 Output Power Measurement

§15.247(b.3), §15.247(b.2)

#### Test Overview and Limits

The transmitter antenna terminal of the EUT is connected to the input of a spectrum analyzer. Measurements are made while the EUT is operating at maximum power and at the appropriate frequencies.

***The maximum permissible conducted output power is 1 Watt for both digitally modulated and frequency hopping systems using at least 50 hopping channels.***

#### Test Procedure Used

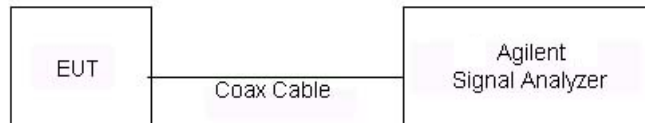
ANSI C63.10-2013

#### Test Settings

1. RBW = 1MHz
2. VBW = 3MHz
3. Span  $\geq 3 \times$  RBW
4. Sweep = auto couple
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-2. Test Instrument & Measurement Setup**

#### Test Notes

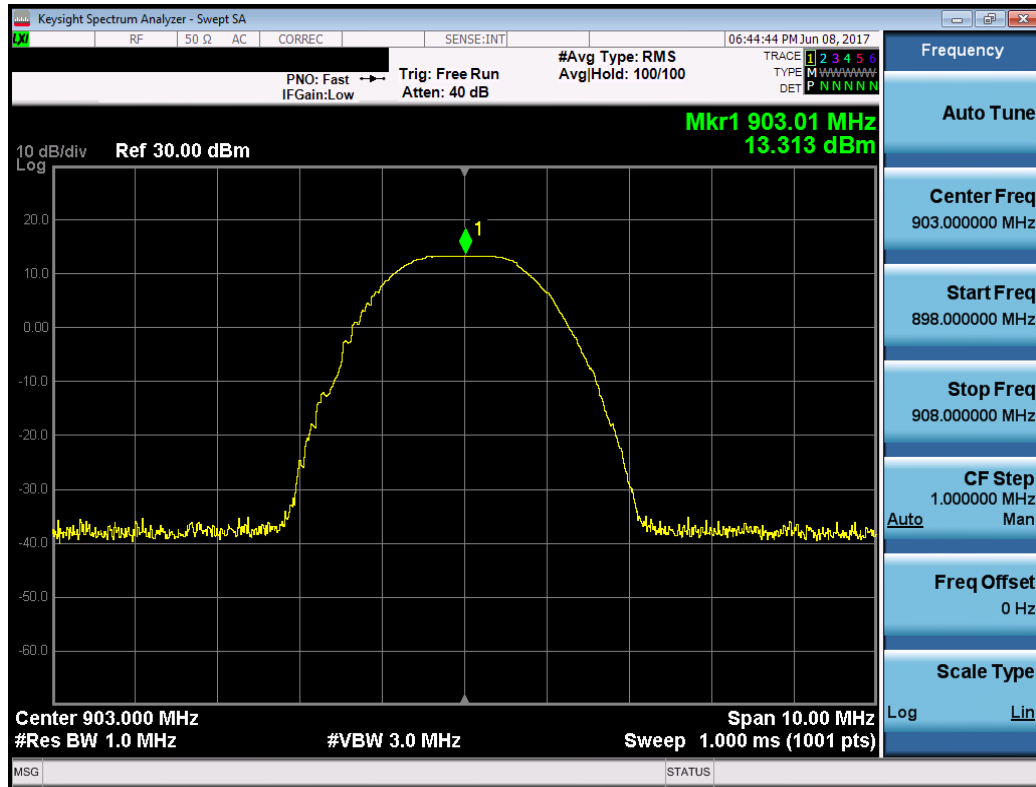
Conducted output power measurements were investigated for all available modulation Spreading Factors. The highest power was found with Spreading Factor = 7.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 16 of 60	



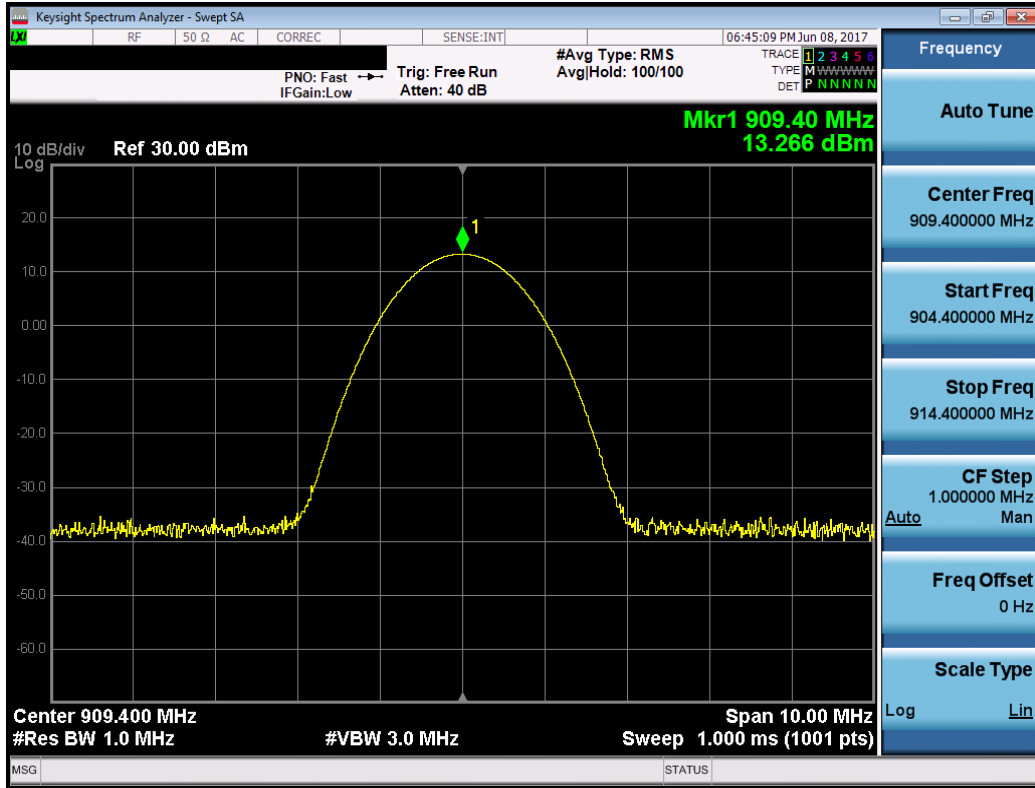
Frequency [MHz]	Channel BW [kHz]	Measured Output Power [dBm]	Maximum Permissible Output Power [dBm]	Margin [dB]
903	500	13.31	30.00	-16.69
909.4	500	13.27	30.00	-16.73
914.2	500	13.24	30.00	-16.76
902.3	125	13.26	30.00	-16.74
908.7	125	13.28	30.00	-16.72
914.9	125	13.30	30.00	-16.70

**Table 7-4. Conducted Output Power Measurements**

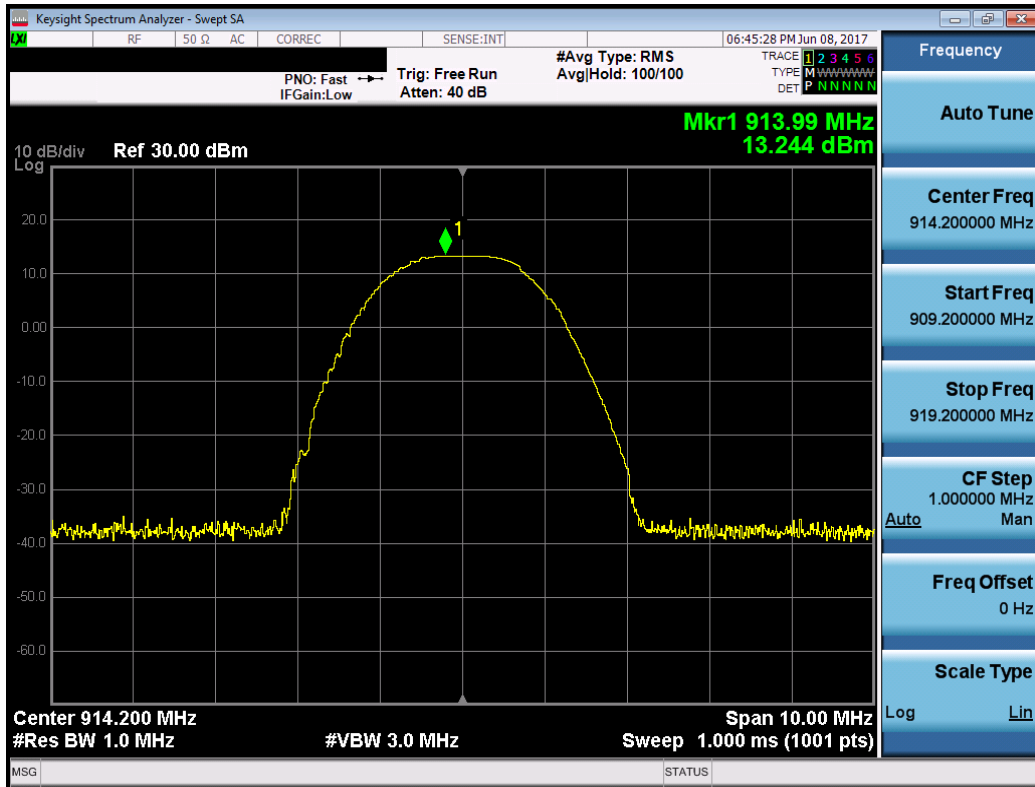


**Plot 7-7. Peak Power Plot (500kHz, Low Channel)**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 17 of 60

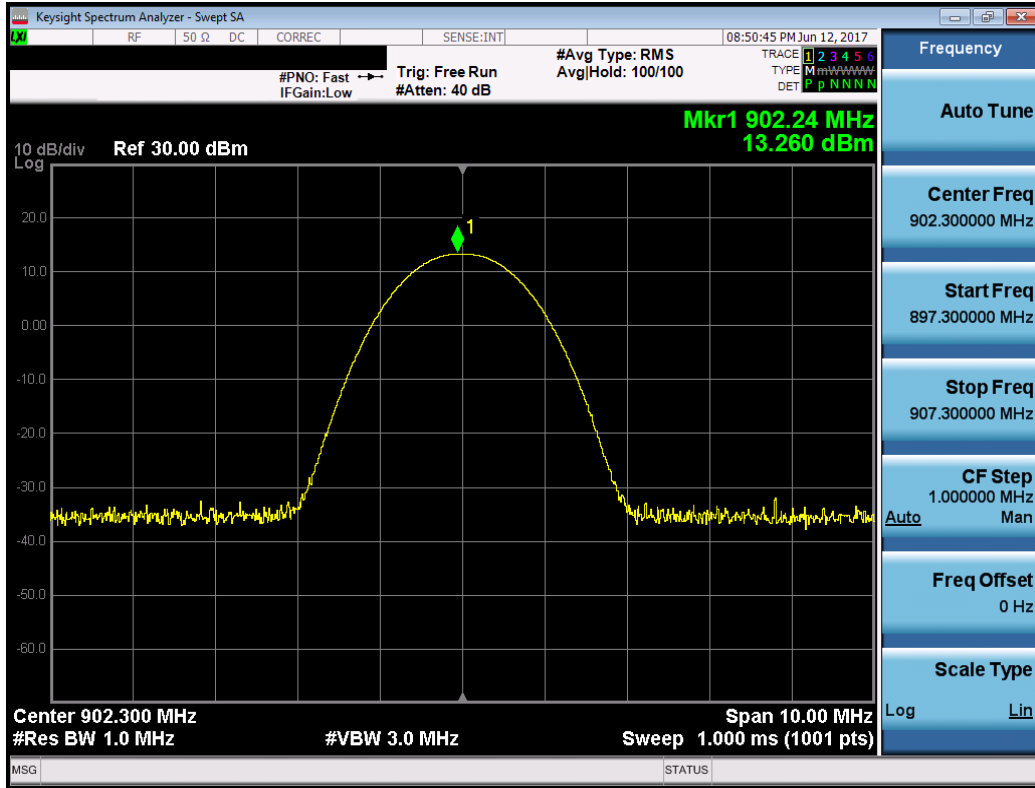


Plot 7-8. Peak Power Plot (500kHz, Mid Channel)

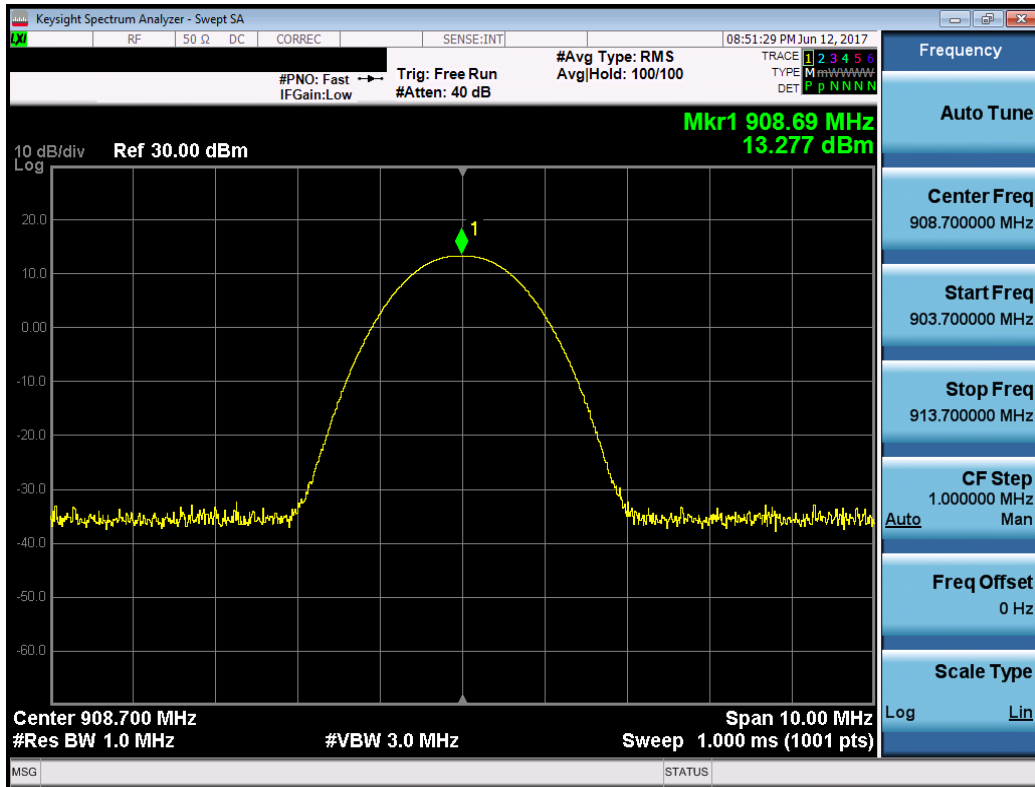


Plot 7-9. Peak Power Plot (500kHz, High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 18 of 60

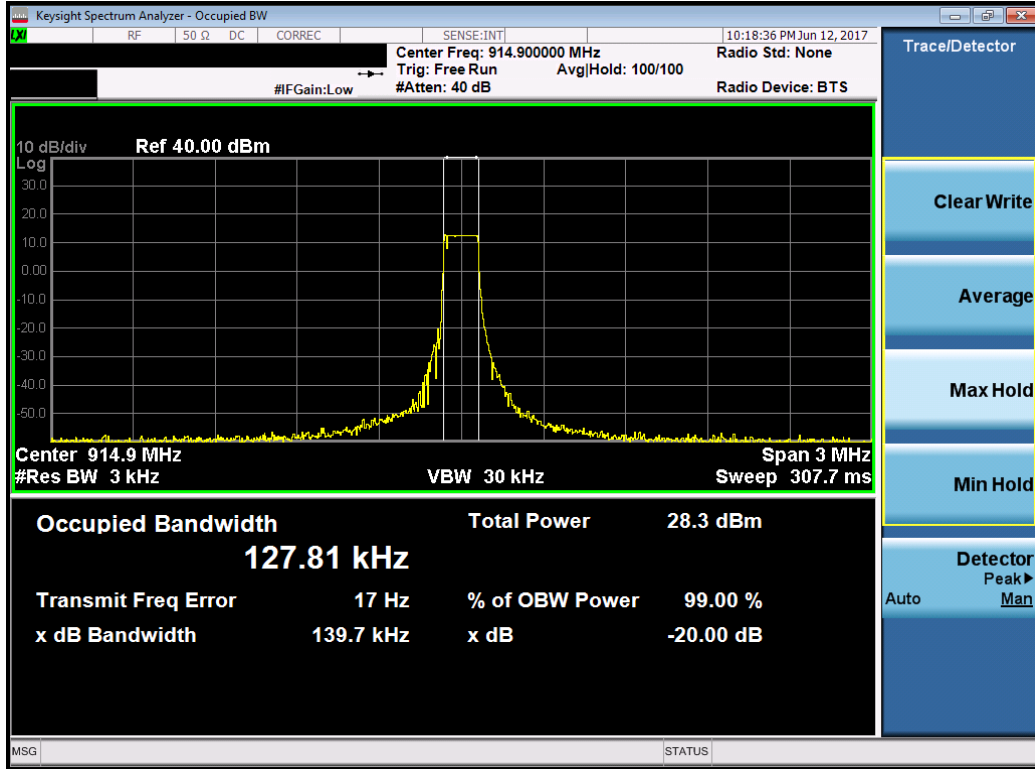


Plot 7-10. Peak Power Plot (125kHz, Low Channel)



Plot 7-11. Peak Power Plot (125kHz, Mid Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 19 of 60



Plot 7-12. Peak Power Plot (125kHz, High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 20 of 60

## 7.4 Power Spectral Density

### §15.247(e)

#### Test Overview and Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies.

*The maximum permissible power spectral density is 8 dBm in any 3 kHz band.*

#### Test Procedure Used

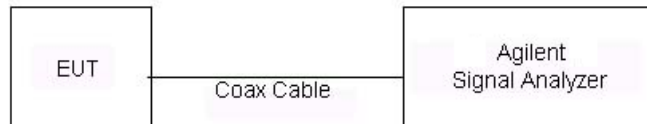
ANSI C63.10-2013

#### Test Settings

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 10kHz
4. VBW = 1MHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-3. Test Instrument & Measurement Setup**

#### Test Notes

None

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 21 of 60	

Frequency [MHz]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]
903	3.36	8.00	-4.64
909.4	3.39	8.00	-4.61
914.2	3.44	8.00	-4.56

**Table 7-5. Conducted Power Density Measurements**



**Plot 7-13. Power Spectral Density Plot (Low Channel)**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 22 of 60	



Plot 7-14. Power Spectral Density Plot (Mid Channel)



Plot 7-15. Power Spectral Density Plot (High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 23 of 60

## 7.5 Carrier Frequency Separation

### §15.247 (a.1.i)

#### Test Overview and Limit

Measurement is made with EUT operating in hopping mode with 125kHz channel bandwidth.

#### Test Procedure Used

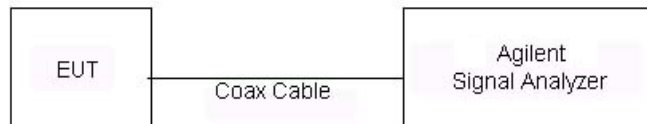
ANSI C63.10-2013

#### Test Settings

1. Span = Wide enough to capture peaks of two adjacent channels
2. RBW = 30% of channel spacing. Adjust as necessary to best identify center of each individual channel
3. VBW  $\geq$  RBW
4. Sweep = Auto
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize.
8. Marker-delta function used to determine separation between peaks of the adjacent channels

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



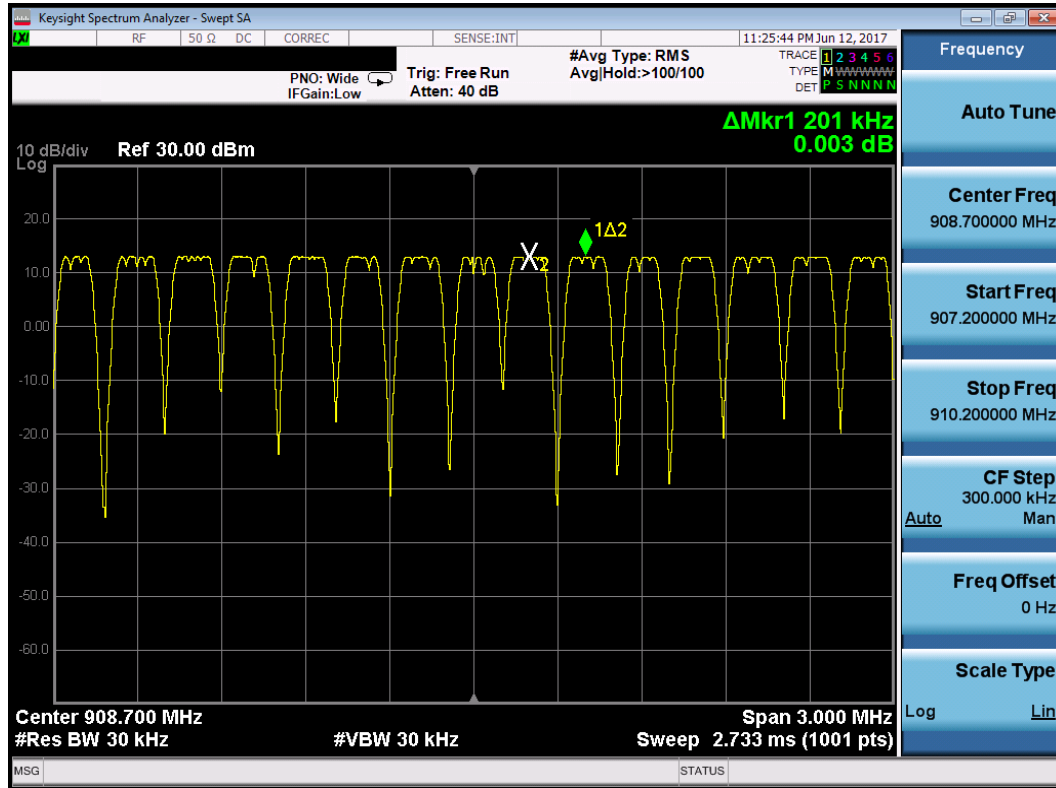
**Figure 7-4. Test Instrument & Measurement Setup**

#### Test Notes

None.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 24 of 60	





Plot 7-16. Channel Spacing Plot (Bluetooth)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 25 of 60

## 7.6 Time of Occupancy

### §15.247 (f)

#### Test Overview and Limit

Measurement is made while EUT is operating in hopping mode with the spectrum analyzer set to zero span. **The maximum permissible time of occupancy is 400 ms within a period of 400ms multiplied by the number of hopping channels employed.**

#### Test Procedure Used

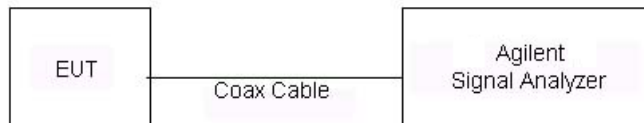
ANSI C63.10-2013 – Section 7.8.4

#### Test Settings

1. Span = zero span, centered on a hopping channel
2. RBW  $\leq$  channel spacing and  $\gg 1/T$ , where T is expected dwell time per channel
3. Sweep = as necessary to capture entire dwell time. Second plot may be required to demonstrate two successive hops on a channel
4. Trigger is set with appropriate trigger delay to place pulse near the center of the plot
5. Detector = peak
6. Trace mode = max hold
7. Marker-delta function used to determine transmit time per hop

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.





**Figure 7-5. Test Instrument & Measurement Setup**

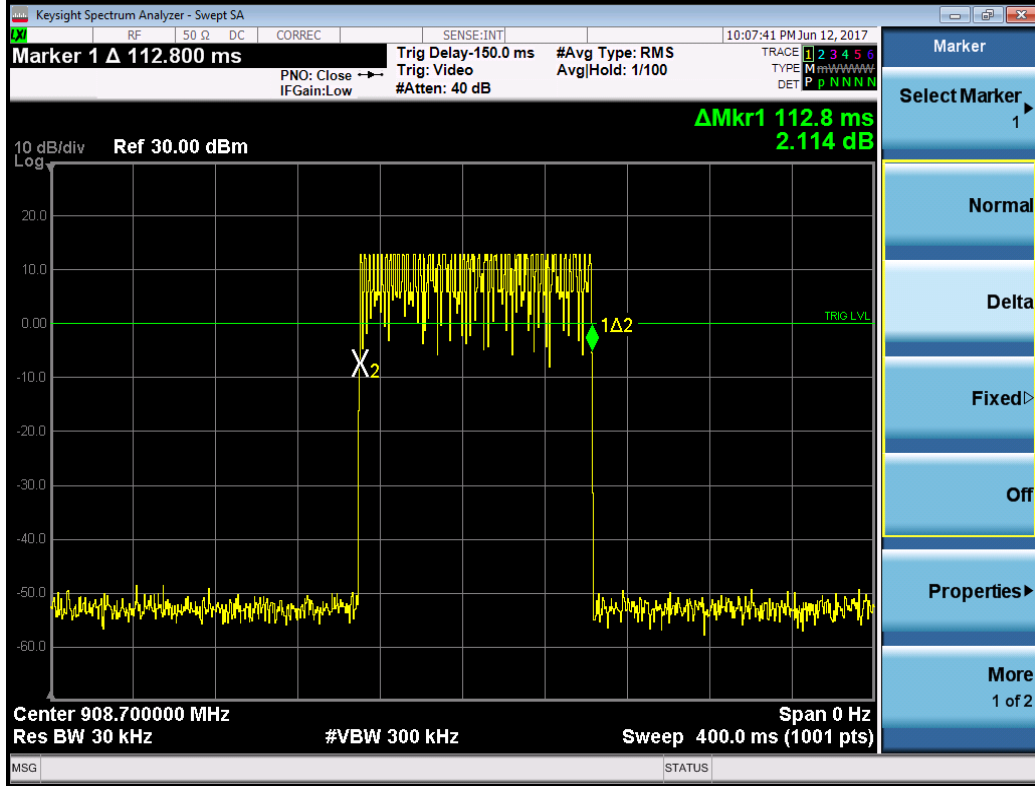
#### Test Notes

The time of occupancy is calculated based on the worst case operation over a period of 400ms times the 64 channels that are employed by the EUT. Since the EUT is a hybrid device, the Time of Occupancy is evaluated to the requirements in 15.247(f).

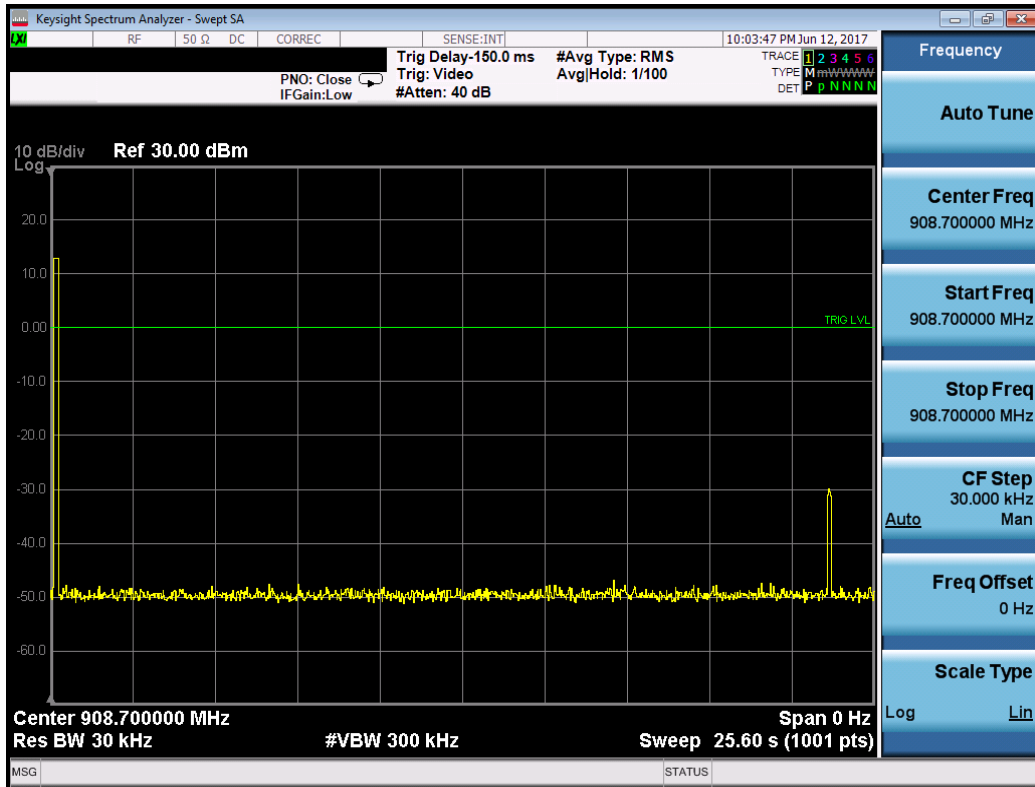
#### Time of Occupancy Calculation

- o 400ms x 64 hopping channels = 25.6sec (Time of Occupancy Limit)
- o Pulse Width = 112.8ms (See Plot 7-17)
- o Number of pulses that appear in a 25.6sec window = 1 (See Plot 7-18)
- o Time of Occupancy = Pulse width times number of pulses in 25.6sec = 112.8ms

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 26 of 60	



Plot 7-17. Pulse Width Plot



Plot 7-18. Time of Occupancy Plot

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 27 of 60

## 7.7 Number of Hopping Channels

### §15.247 (a.1.i)

#### Test Overview and Limit

Measurement is made while EUT is operating in hopping mode using a 125kHz channel bandwidth. ***This frequency hopping system must employ a minimum of 50 hopping channels.***

#### Test Procedure Used

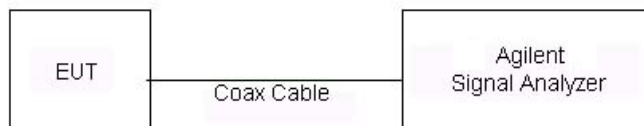
ANSI C63.10-2013 – Section 7.8.3

#### Test Settings

1. Span = frequency of band of operation (divided into two plots)
2. RBW < 30% of channel spacing or 20dB bandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. Trace was allowed to stabilize

#### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.

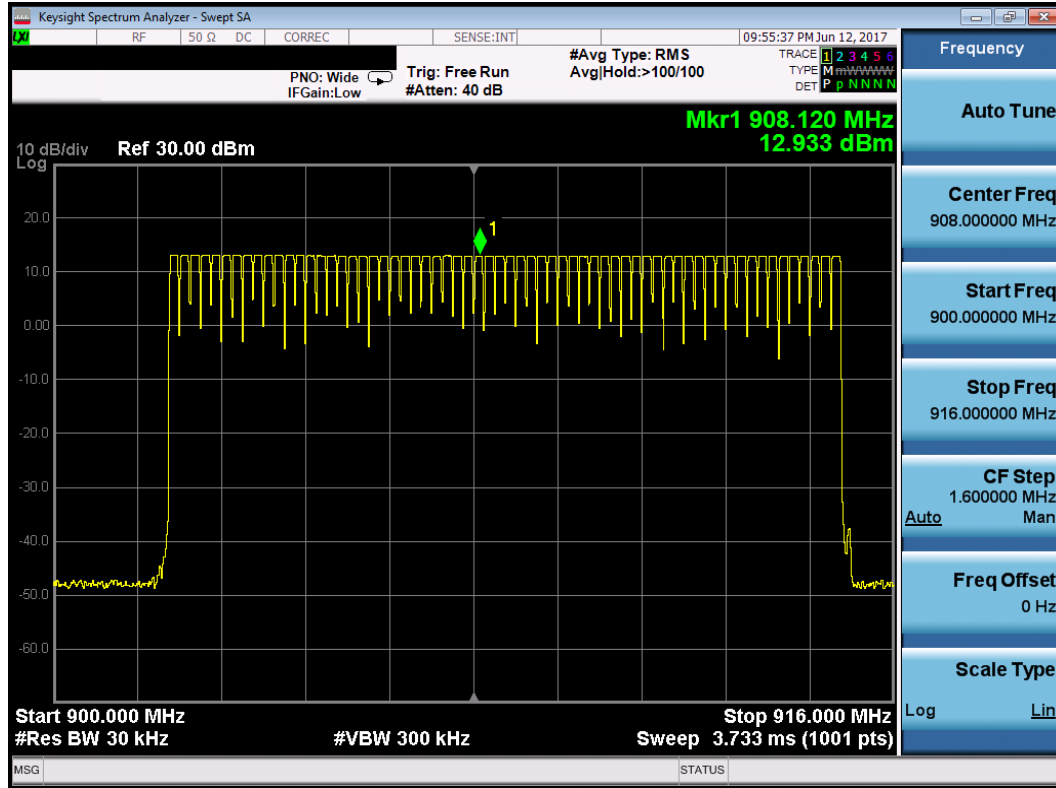


**Figure 7-6. Test Instrument & Measurement Setup**

#### Test Notes

None.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 28 of 60	



Plot 7-19. Channel Hopping Plot

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 29 of 60

## 7.8 Conducted Emissions at the Band Edge §15.247(d)

### Test Overview and Limit

For the following out of band conducted spurious emissions plots at the band edge, the EUT was set to transmit at maximum power with the worst case spreading factor using both channel bandwidths. These settings produced the worst-case emissions.

***The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the channel performed in a 100kHz bandwidth.***

### Test Procedure Used

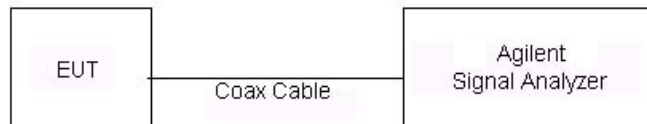
ANSI C63.10-2013

### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 100kHz
4. VBW = 300kHz
5. Detector = Peak
6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.

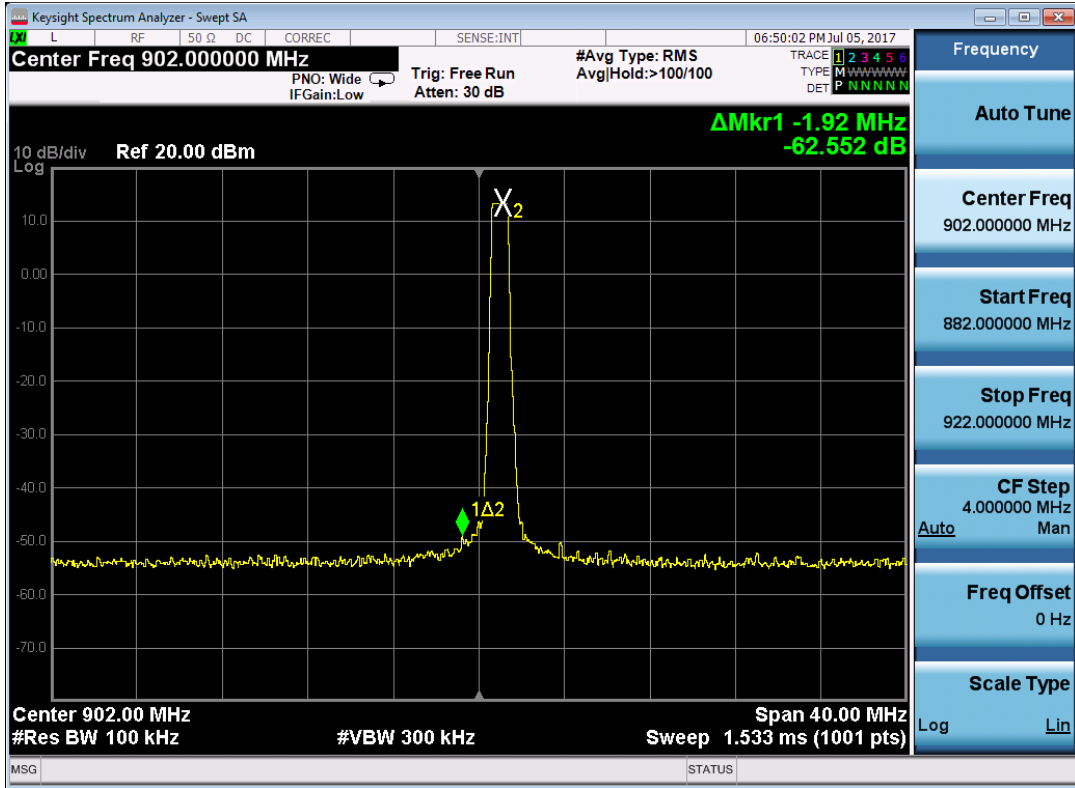


**Figure 7-7. Test Instrument & Measurement Setup**

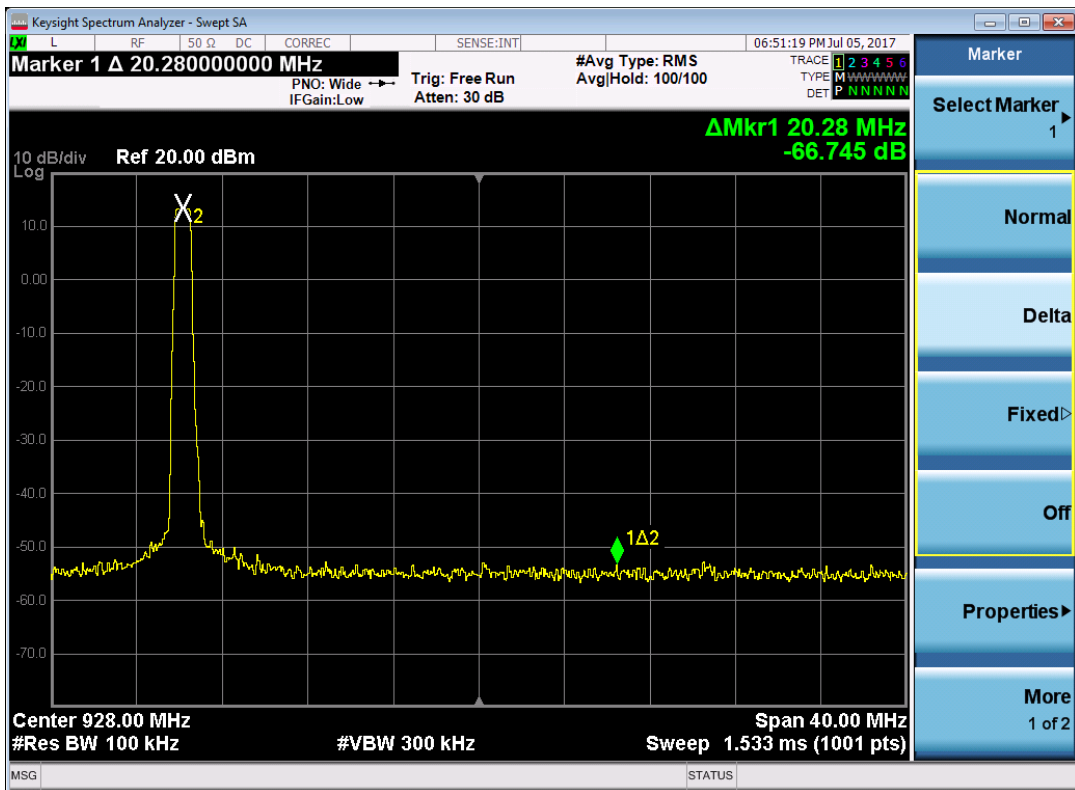
### Test Notes

For the 125kHz channel bandwidths, a conducted band edge measurement was performed with channel hopping disabled and then again with channel hopping enabled.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 30 of 60	

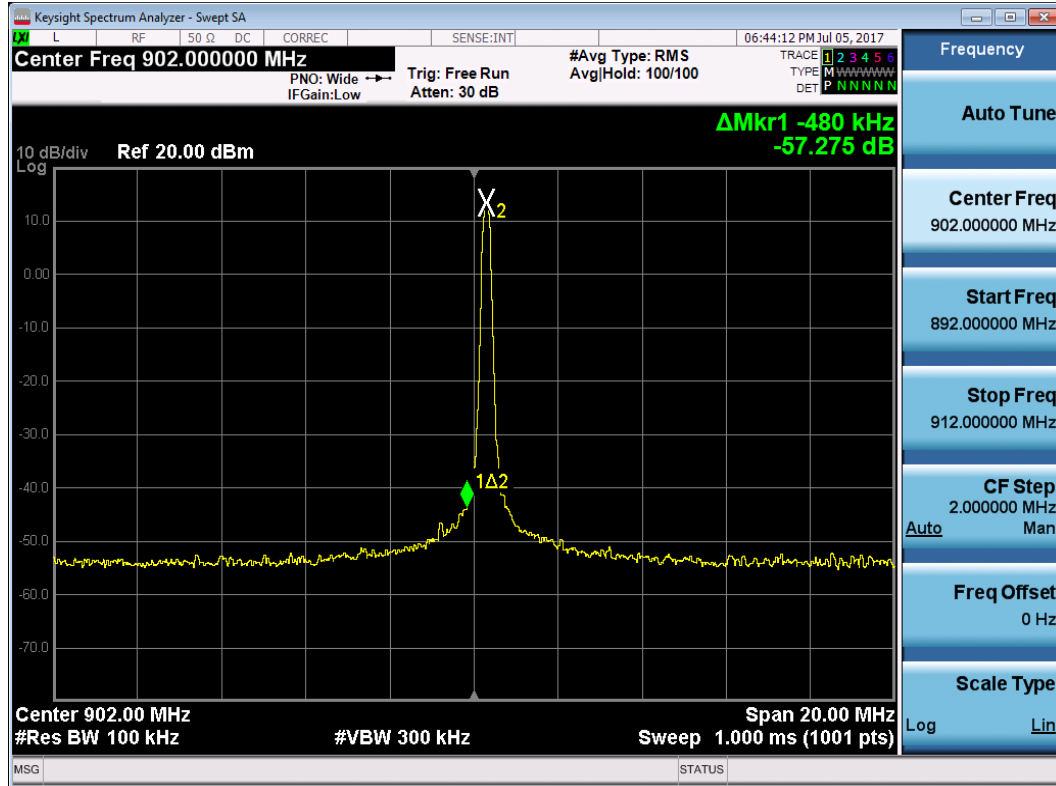


Plot 7-20. Band Edge Plot (500kHz, Low Channel)

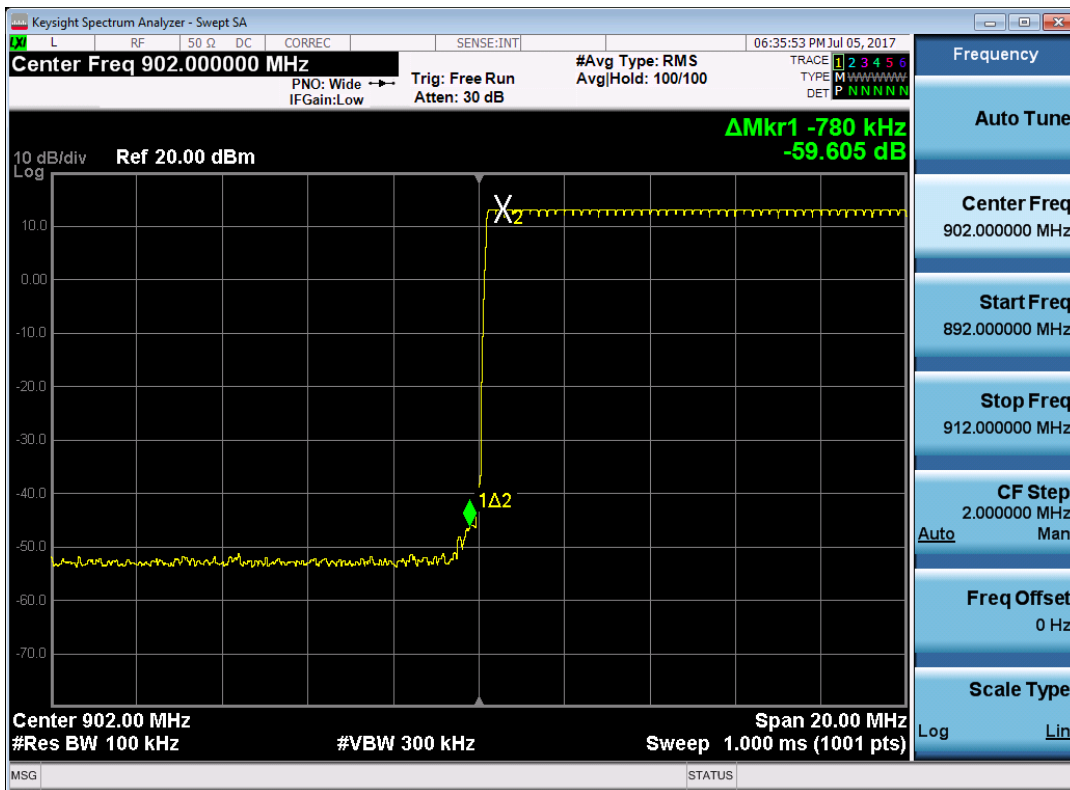


Plot 7-21. Band Edge Plot (500kHz, High channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 31 of 60



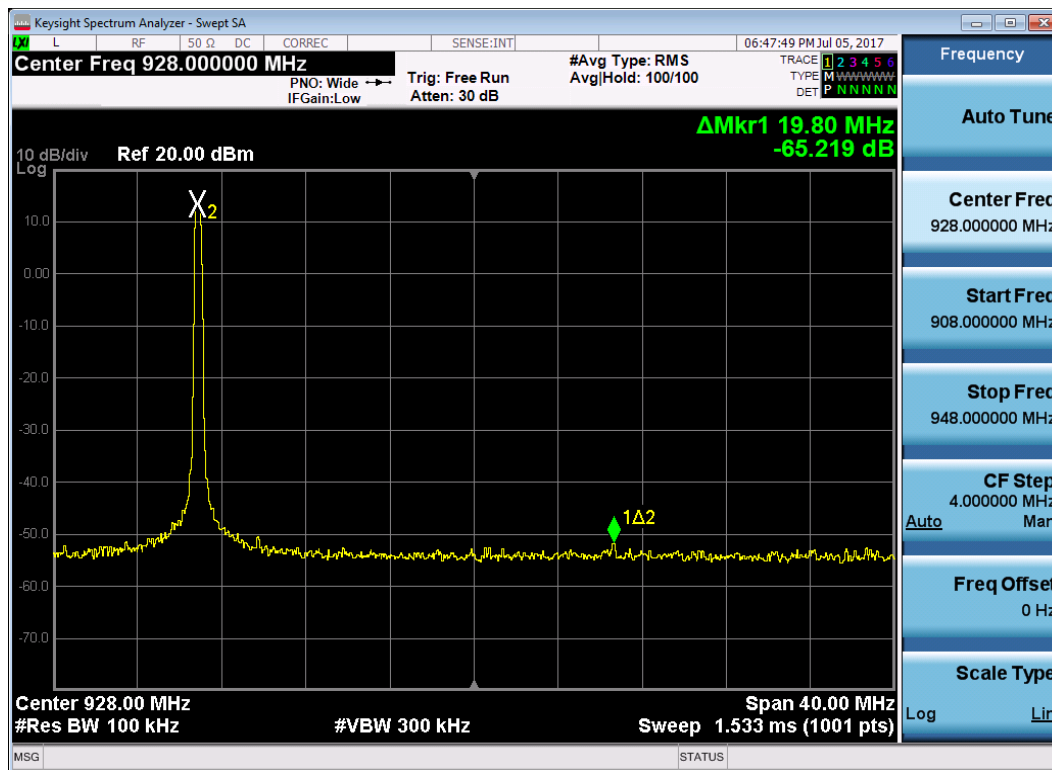
Plot 7-22. Band Edge Plot (125kHz, Hopping Disabled, Low Channel)



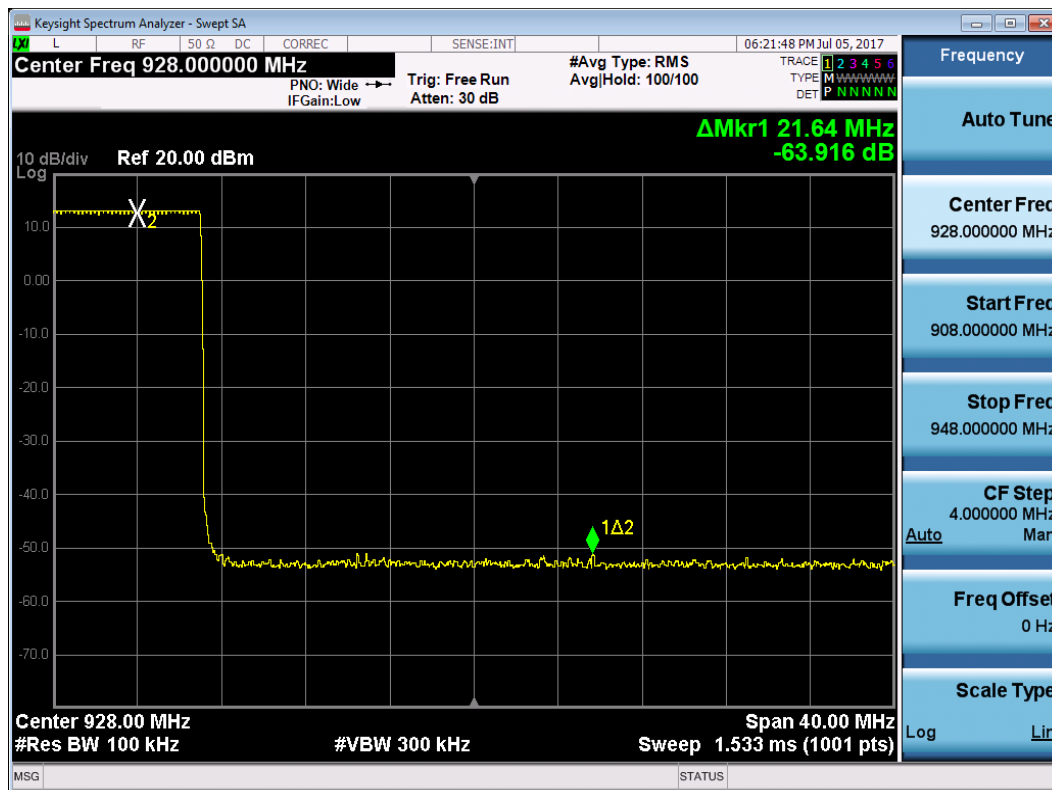
Plot 7-23. Band Edge Plot (125kHz, Hopping Enabled, Low channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 32 of 60





Plot 7-24. Band Edge Plot (125kHz, Hopping Disabled, High Channel)



Plot 7-25. Band Edge Plot (125kHz, Hopping Enabled, High channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 33 of 60

## 7.9 Conducted Spurious Emissions §15.247(d)

### Test Overview and Limit

For the following out of band conducted spurious emissions plots at the band edge, the EUT was set to transmit at maximum power with the worst case spreading factor using both channel bandwidths. These settings produced the worst-case emissions.

***The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth.***

### Test Procedure Used

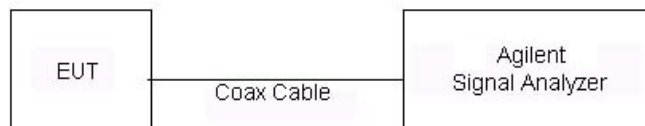
ANSI C63.10-2013

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into two plots per channel)
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.

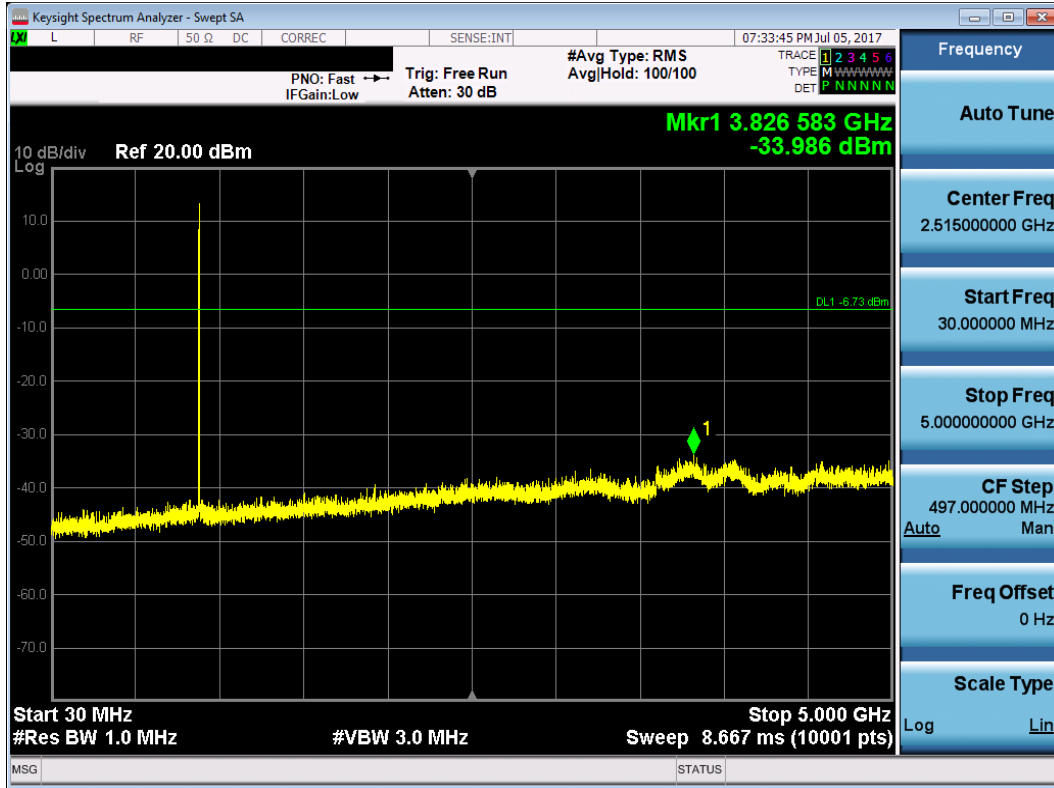


**Figure 7-8. Test Instrument & Measurement Setup**

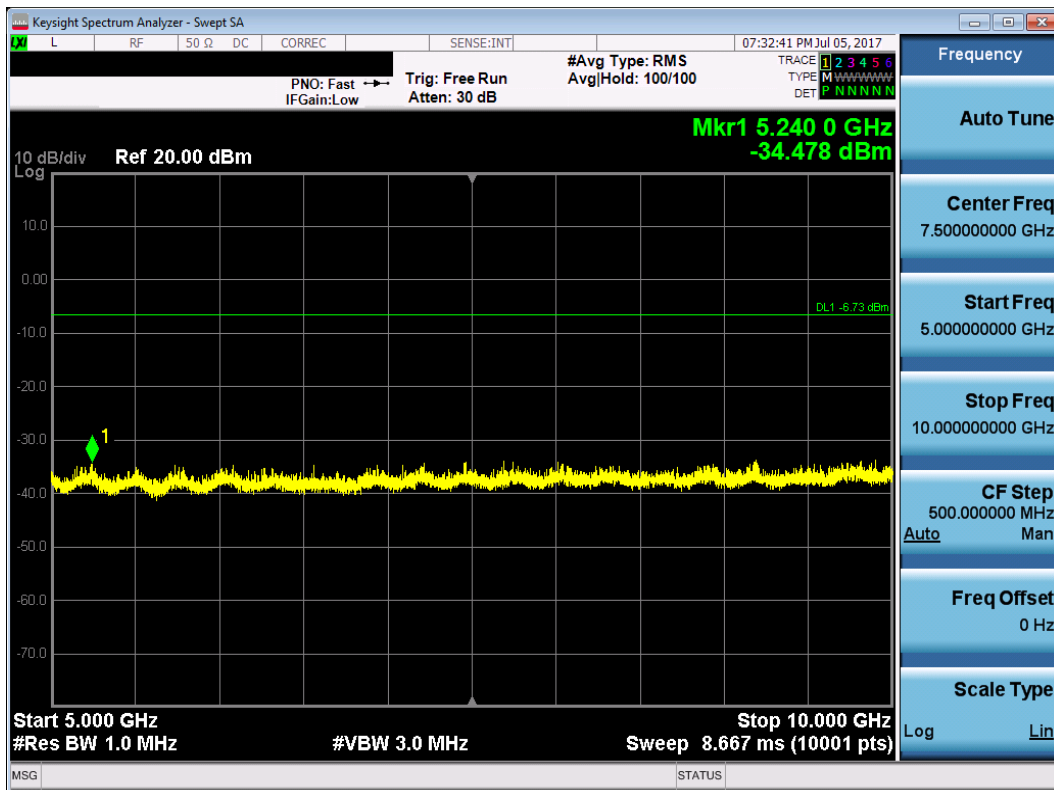
### Test Notes

1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 34 of 60	

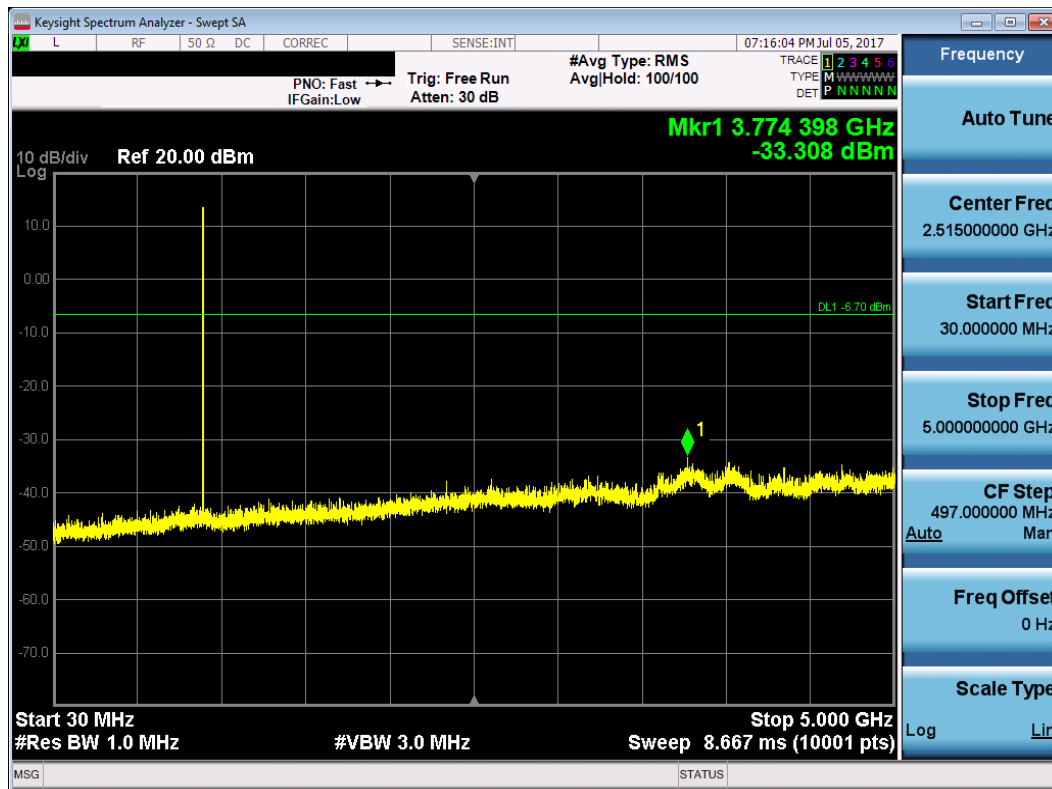


Plot 7-26. Conducted Spurious Plot (500kHz, Low Channel)

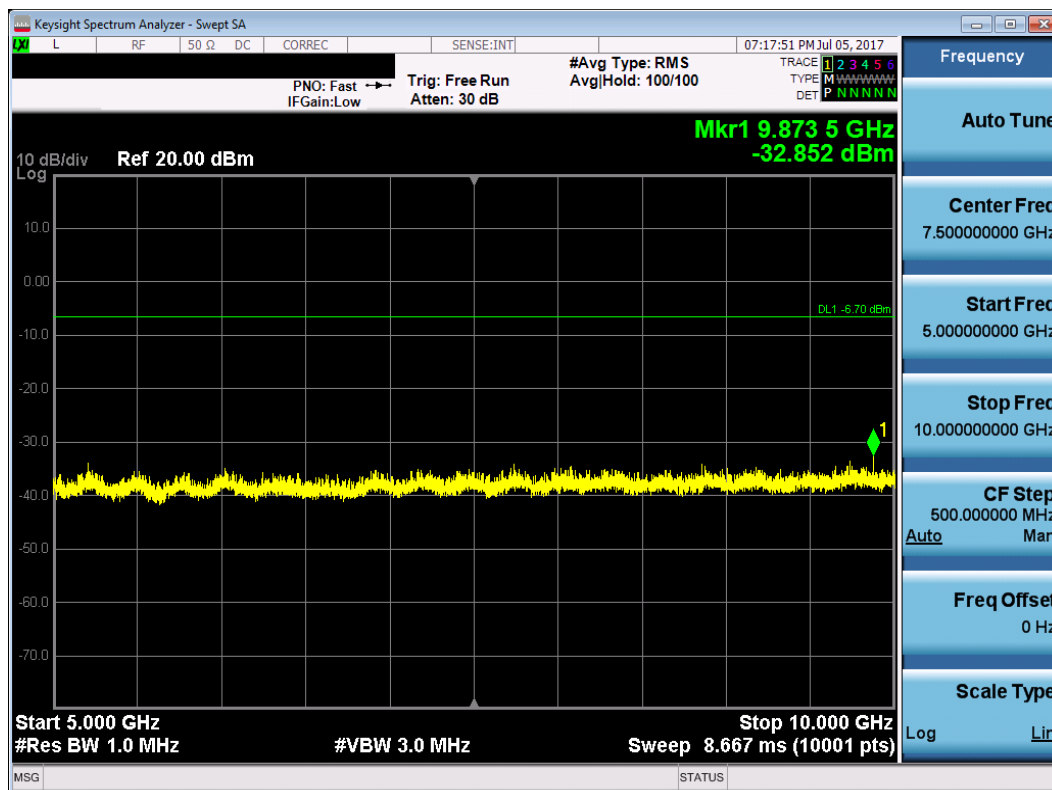


Plot 7-27. Conducted Spurious Plot (500kHz, Low Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 35 of 60

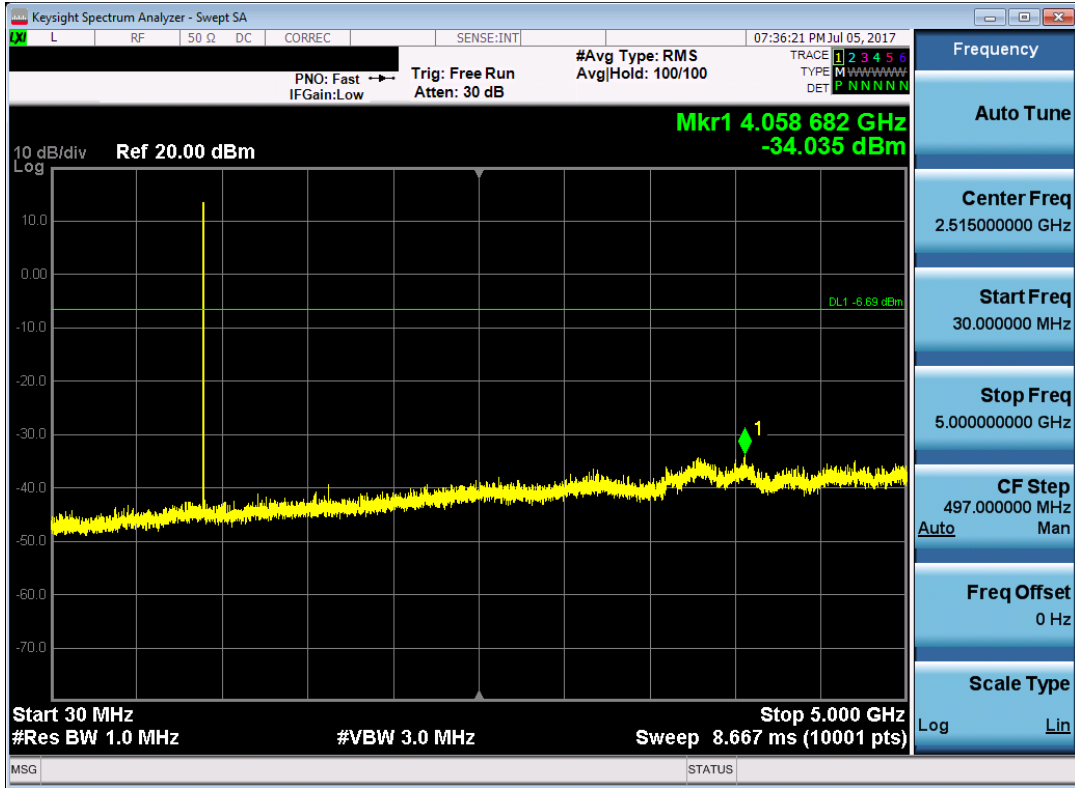


Plot 7-28. Conducted Spurious Plot (500kHz, Mid Channel)

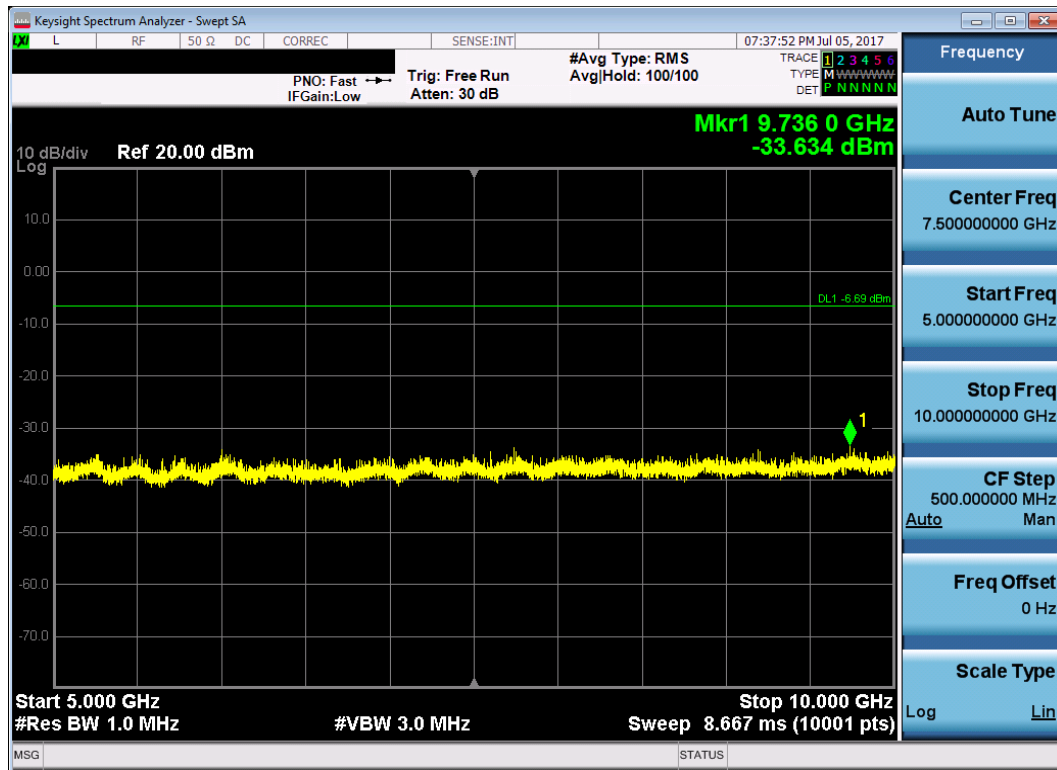


Plot 7-29. Conducted Spurious Plot (500kHz, Mid Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 36 of 60

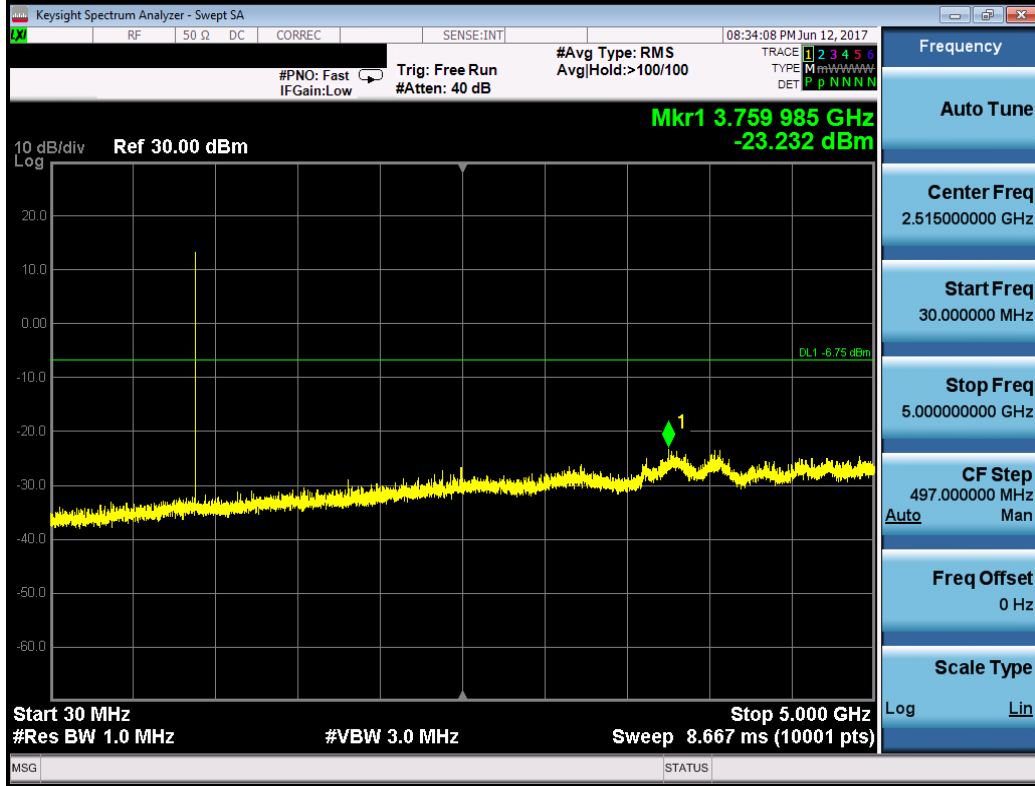


Plot 7-30. Conducted Spurious Plot (500kHz, High Channel)

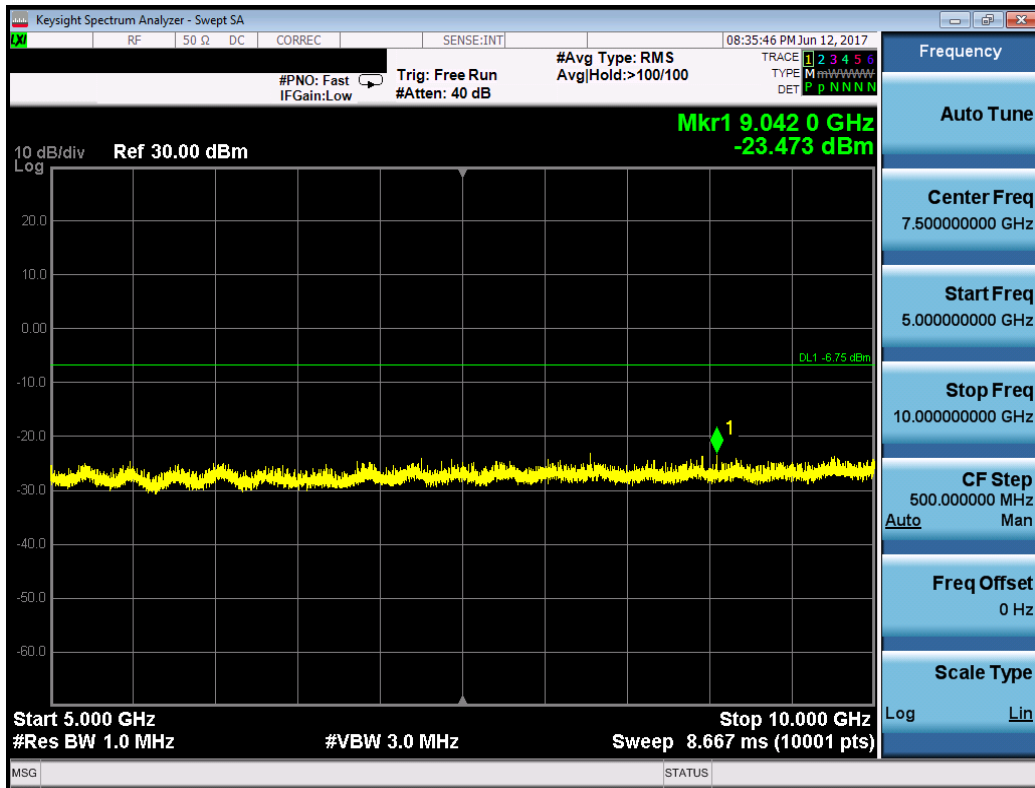


Plot 7-31. Conducted Spurious Plot (500kHz, High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 37 of 60

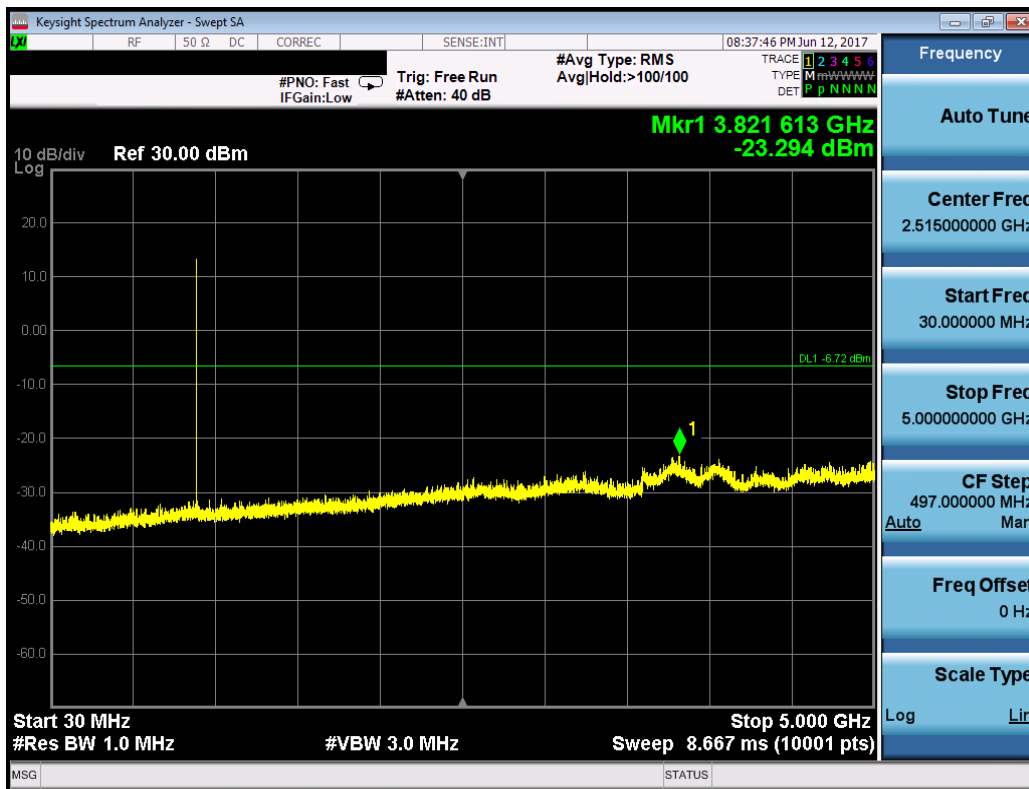


Plot 7-32. Conducted Spurious Plot (125kHz, Low Channel)

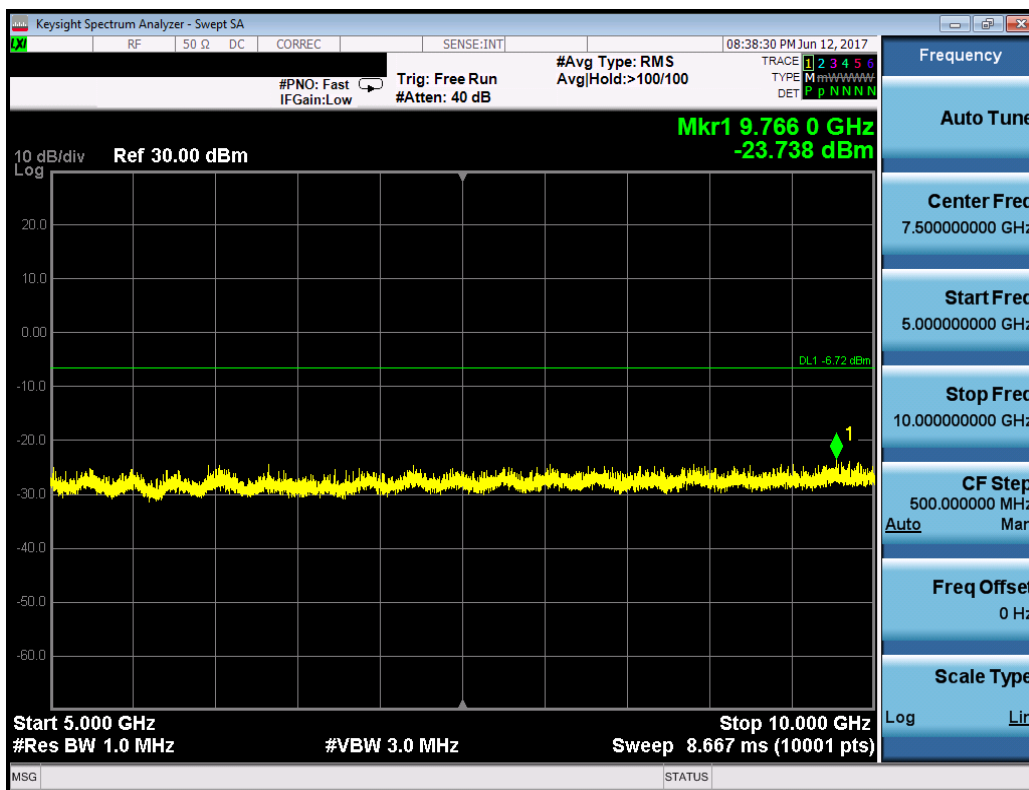


Plot 7-33. Conducted Spurious Plot (125kHz, Low Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 38 of 60	

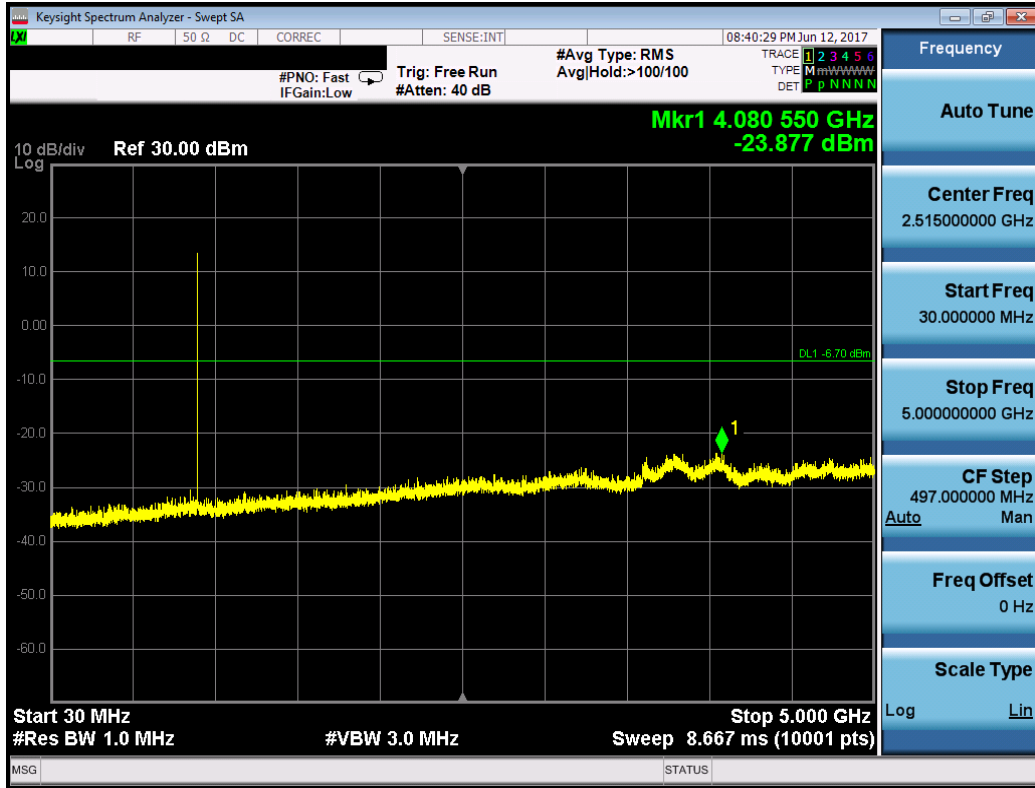


Plot 7-34. Conducted Spurious Plot (125kHz, Mid Channel)

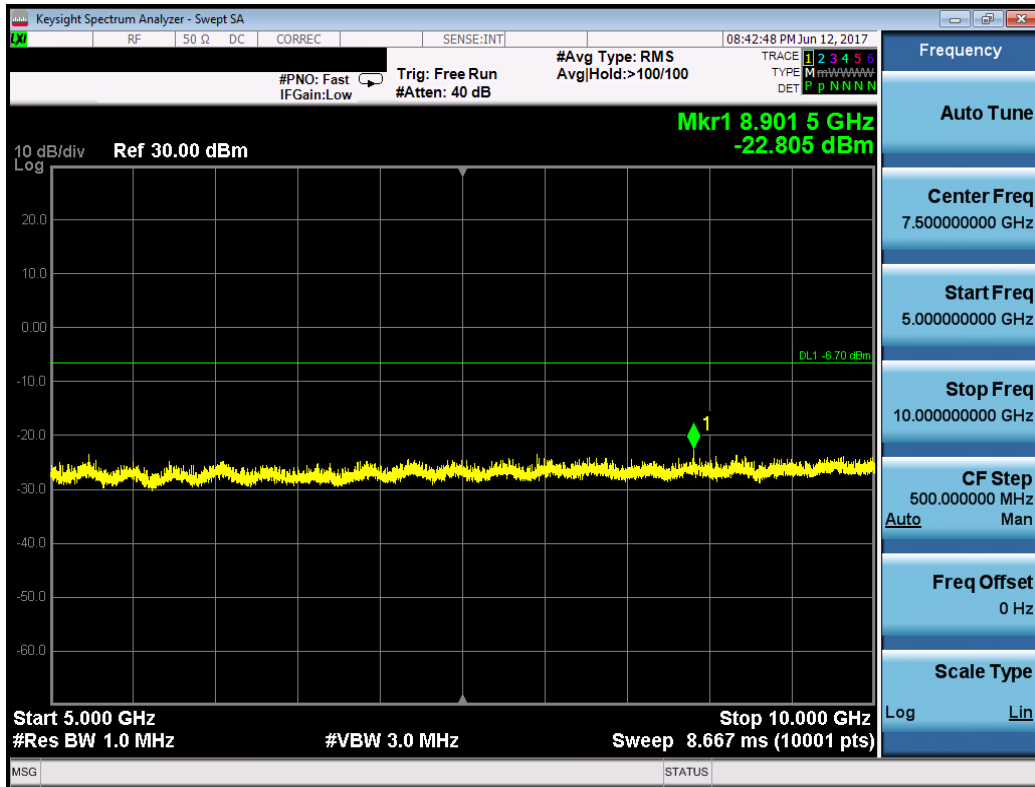


Plot 7-35. Conducted Spurious Plot (125kHz, Mid Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 39 of 60



Plot 7-36. Conducted Spurious Plot (125kHz, High Channel)



Plot 7-37. Conducted Spurious Plot (125kHz, High Channel)

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 40 of 60





**7.10 Radiated Spurious Emission Measurements**  
**§15.205, §15.209, §15.247(d)**

**Test Overview and Limit**

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-6 per Section 15.209.***

Frequency	Field Strength [ $\mu\text{V/m}$ ]	Measured Distance [Meters]
Above 960.0 MHz	500	3

**Table 7-6. Radiated Limits**

**Test Procedures Used**

ANSI C63.10-2013 Section 11.12.2.5

**Test Settings**

**Average Field Strength Measurements for DTS Operation (Section 11.12.2.5.1)**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power averaging (RMS)
5. Number of measurement points = 1001 (Number of points must be  $\geq 2 \times \text{span/RBW}$ )
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces

**Average Field Strength Measurements for DSS Operation (Section 11.12.2.5.3)**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz (video filtering performed with detector mode set to RMS)
4. Detector = peak
5. Number of measurement points = 1001 (Number of points must be  $\geq 2 \times \text{span/RBW}$ )
6. Sweep time = auto
7. Max Hold function was performed over at least 100 traces

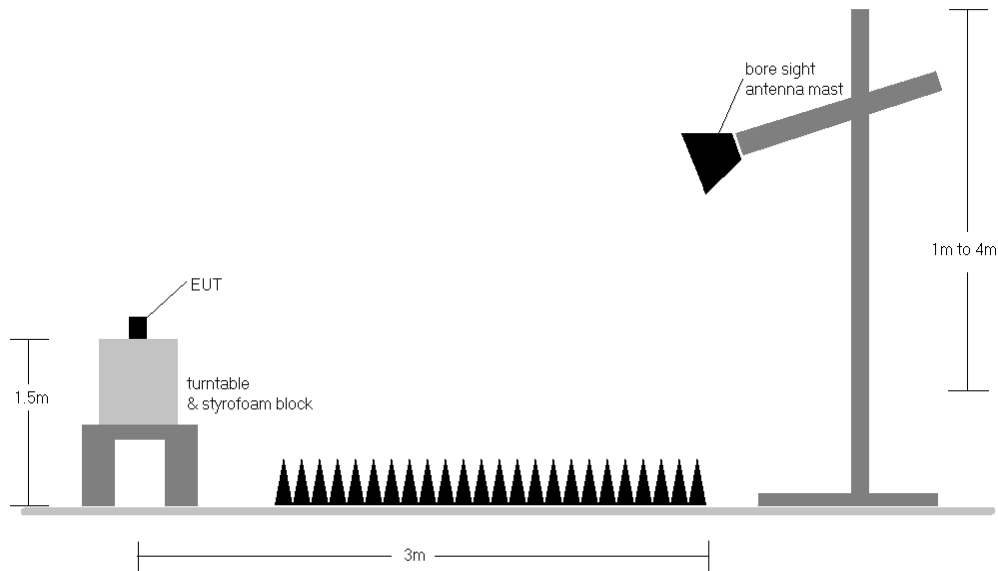
FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 41 of 60	

**Peak Field Strength Measurements per Section 11.12.2.5.1 of ANSI C63.10-2013**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Test Setup**



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-9. Radiated Test Setup >1GHz**

**Test Notes**

1. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of ANSI C63.10-2013 were not used to evaluate this device for compliance to radiated limits. All radiated spurious emissions levels were measured in a radiated test setup.
2. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-6.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.



FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 42 of 60	

5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
6. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section. Rohde & Schwarz EMC32, Version 9.15.00 automated test software was used to perform the Radiated Spurious Emissions Pre-Scan testing.
7. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

## **Sample Calculations**

### **Determining Spurious Emissions Levels**

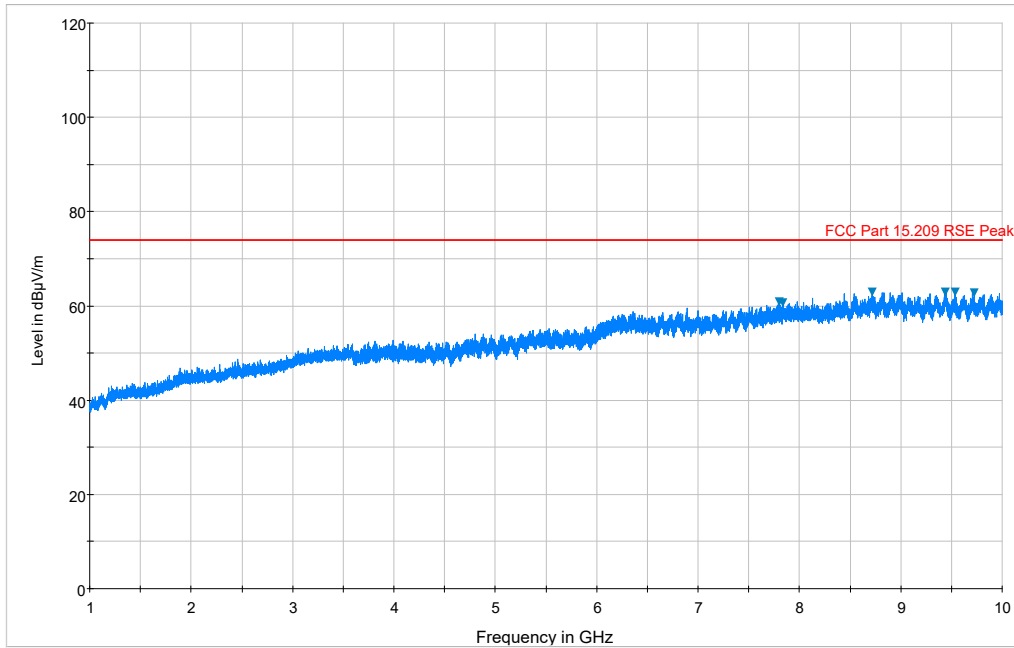
- Field Strength Level [dB $\mu$ V/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- Margin [dB] = Field Strength Level [dB $\mu$ V/m] – Limit [dB $\mu$ V/m]

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 43 of 60	

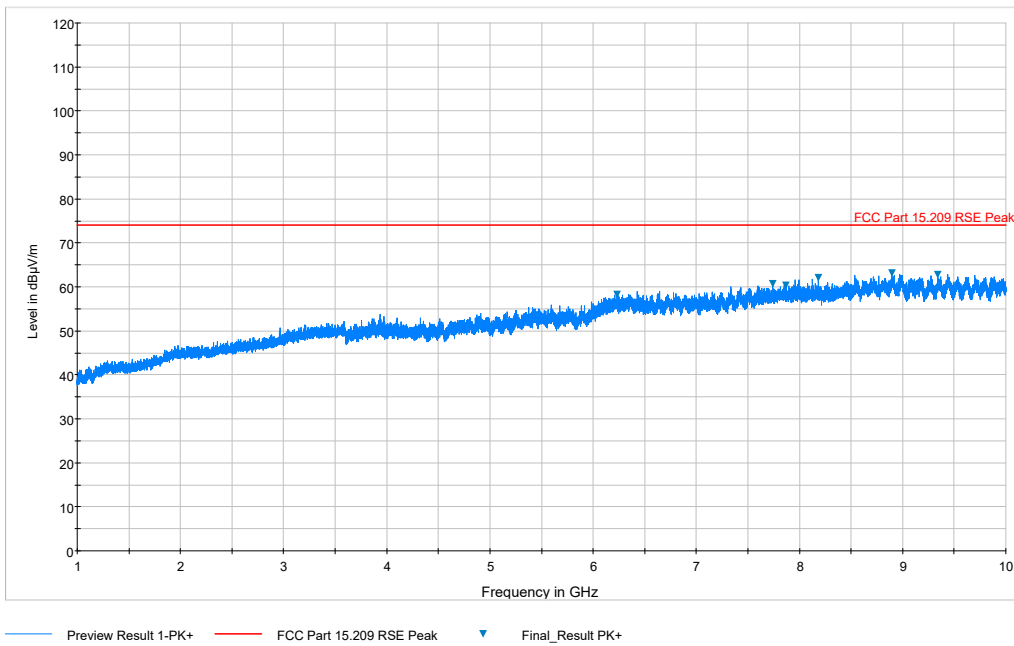
# Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

## 500kHz Channel Bandwidth

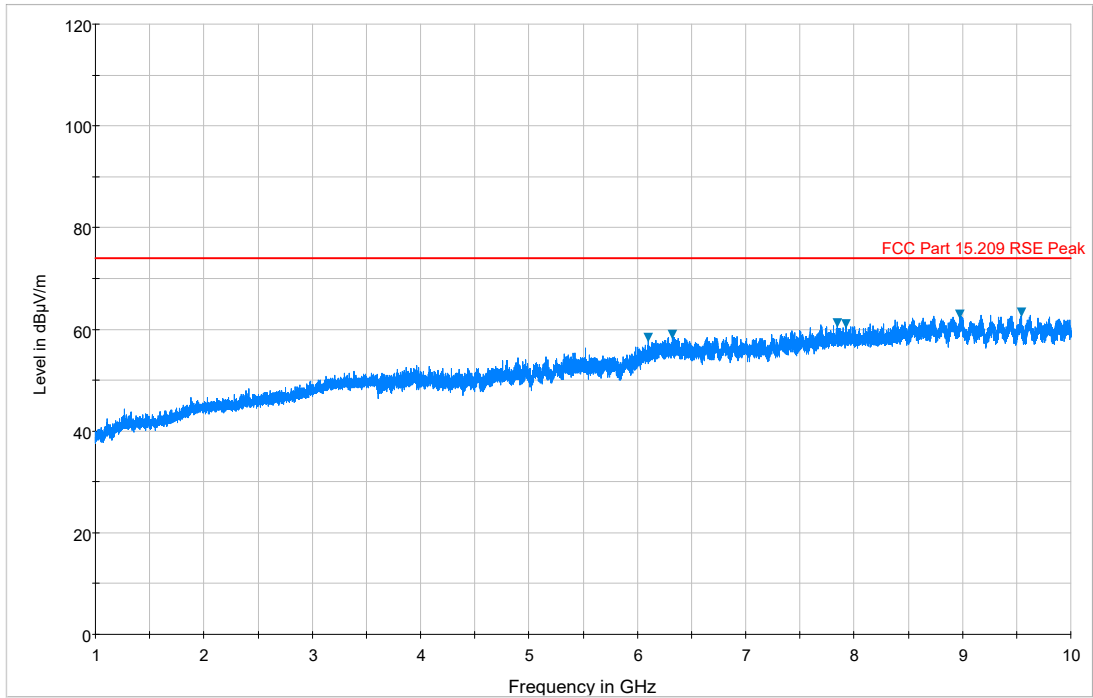


**Plot 7-38. Radiated Spurious Plot above 1GHz (500kHz, Low Channel, Ant. Pol. H)**



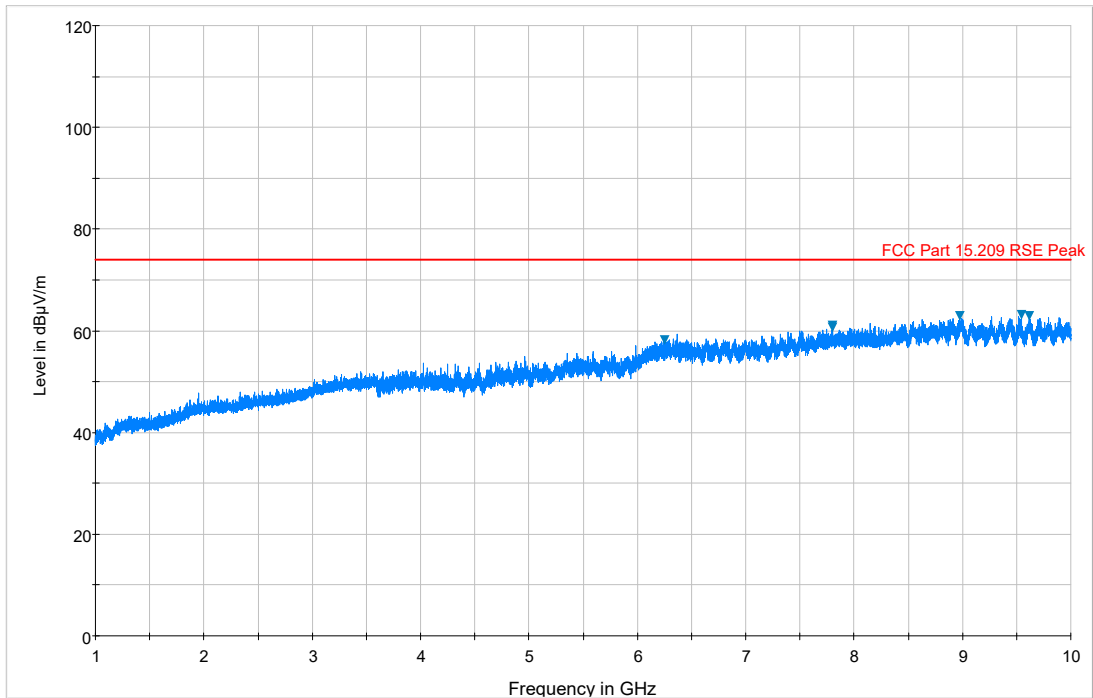
**Plot 7-39. Radiated Spurious Plot above 1GHz (500kHz, Low Channel, Ant. Pol. V)**

<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 44 of 60	



— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

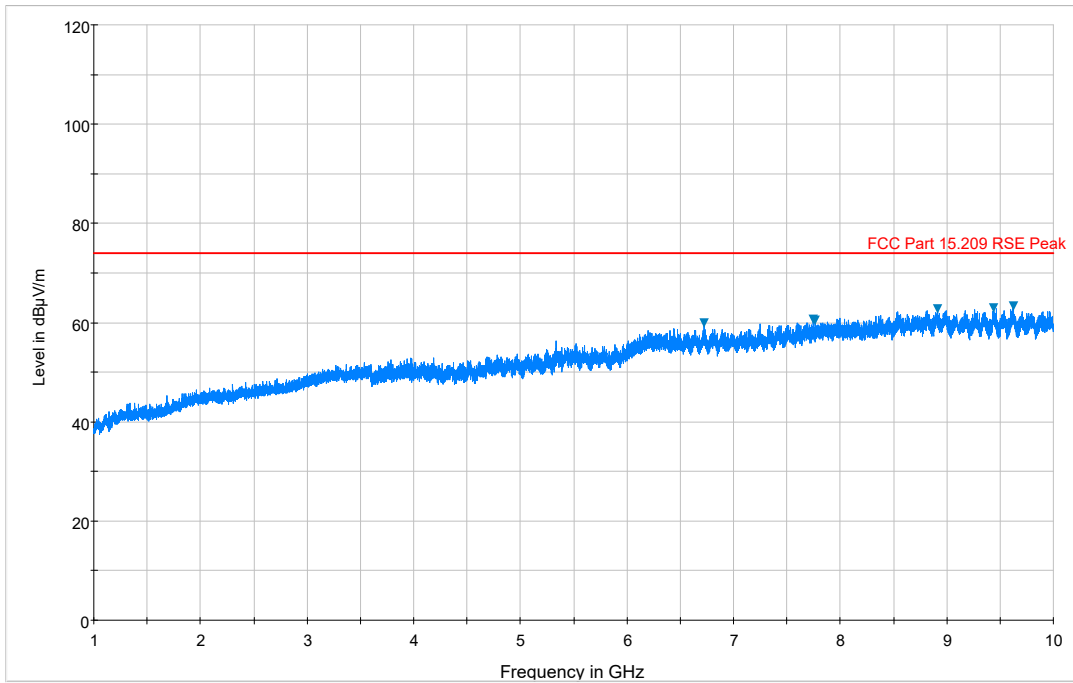
**Plot 7-40. Radiated Spurious Plot above 1GHz (500kHz, Mid Channel, Ant. Pol. H)**



— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

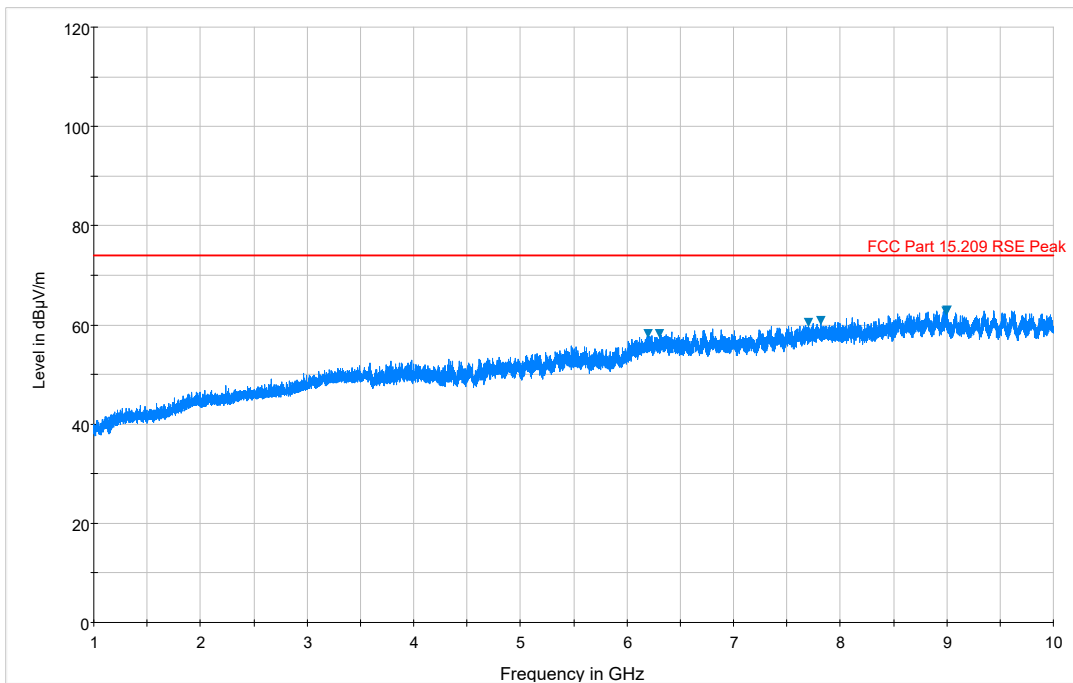
**Plot 7-41. Radiated Spurious Plot above 1GHz (500kHz, Mid Channel, Ant. Pol. V)**

<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 45 of 60	



— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

**Plot 7-42. Radiated Spurious Plot above 1GHz (500kHz, High Channel, Ant. Pol. H)**

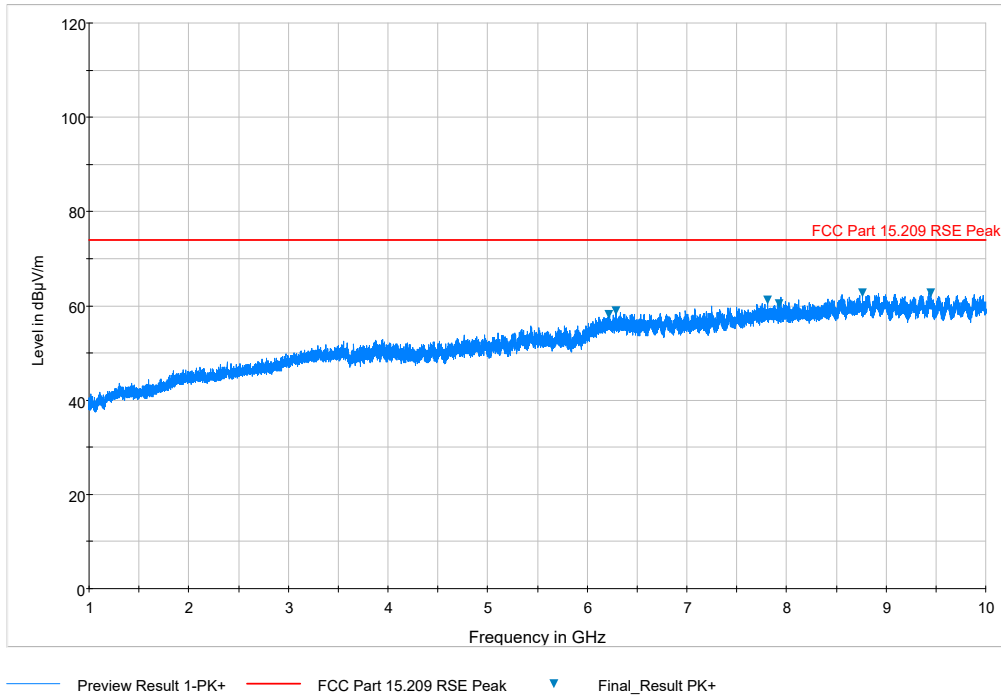


— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

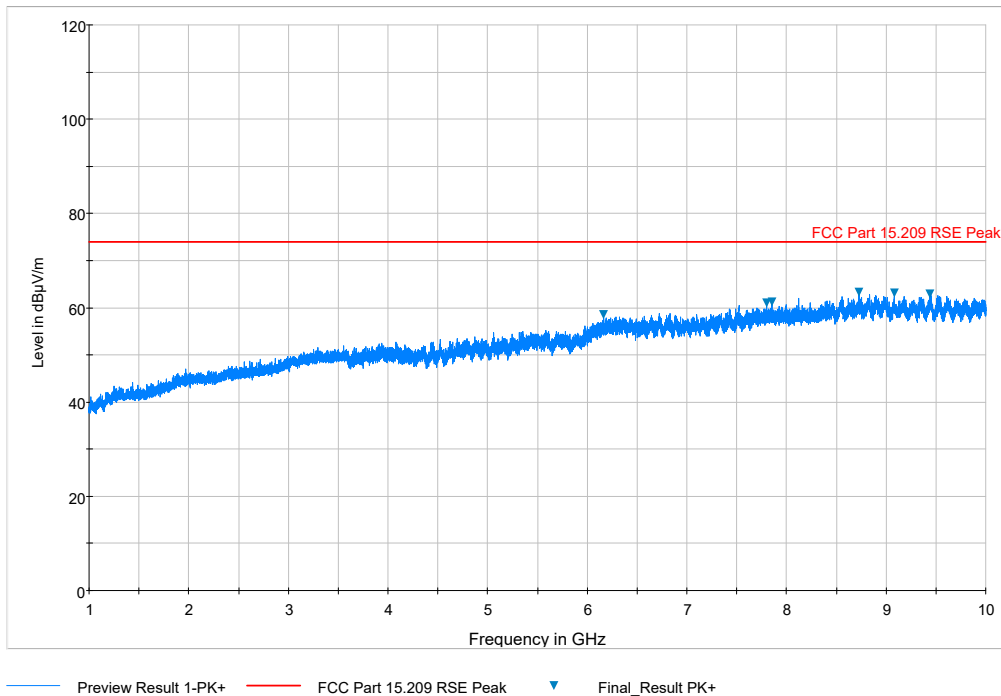
**Plot 7-43. Radiated Spurious Plot above 1GHz (500kHz, High Channel, Ant. Pol. V)**

<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 46 of 60	

## 125kHz Channel Bandwidth

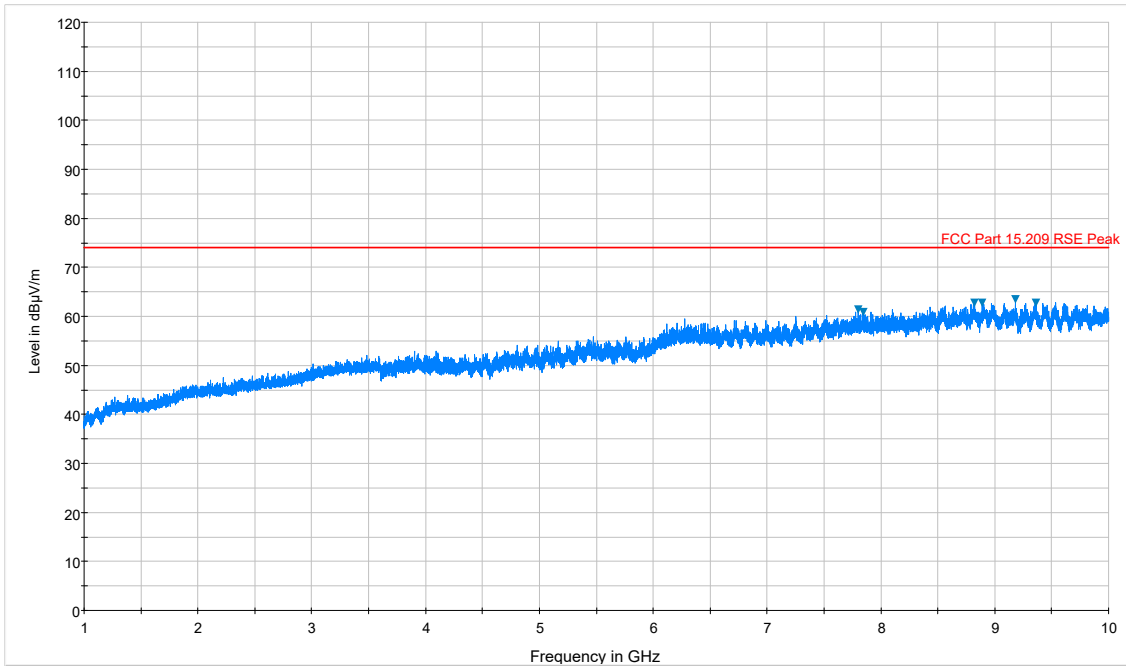


**Plot 7-44. Radiated Spurious Plot above 1GHz (125kHz, Low Channel, Ant. Pol. H)**

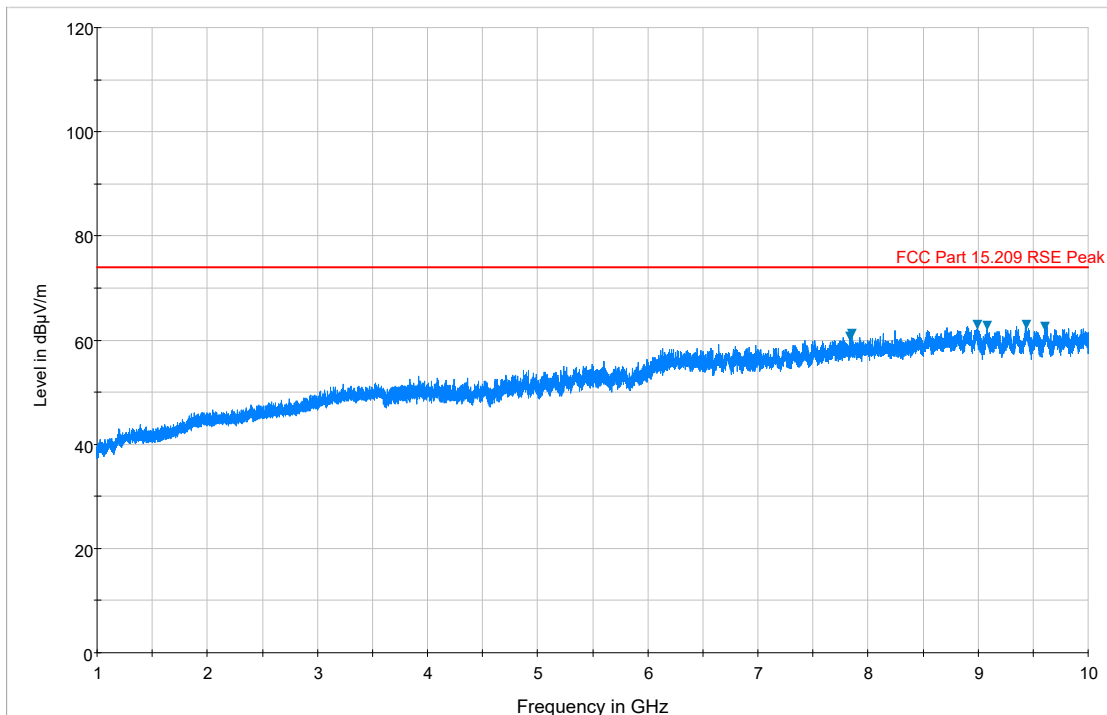


**Plot 7-45. Radiated Spurious Plot above 1GHz (125kHz, Low Channel, Ant. Pol. V)**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 47 of 60



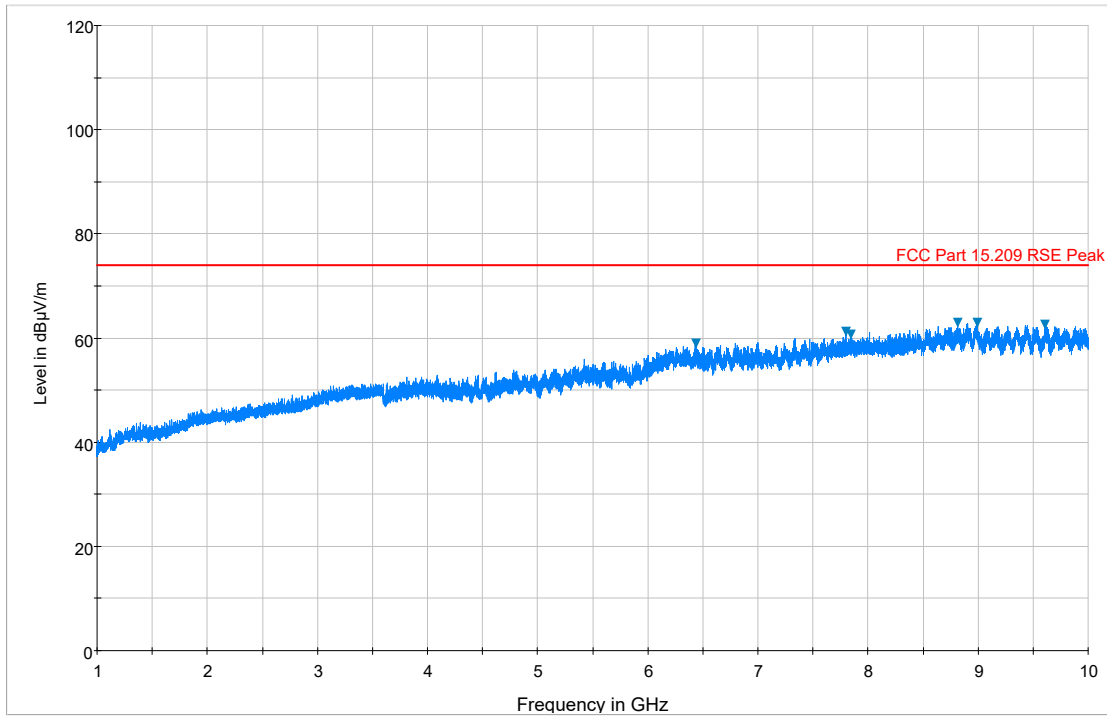
**Plot 7-46. Radiated Spurious Plot above 1GHz (125kHz, Mid Channel, Ant. Pol. H)**



**Plot 7-47. Radiated Spurious Plot above 1GHz (125kHz, Mid Channel, Ant. Pol. V)**

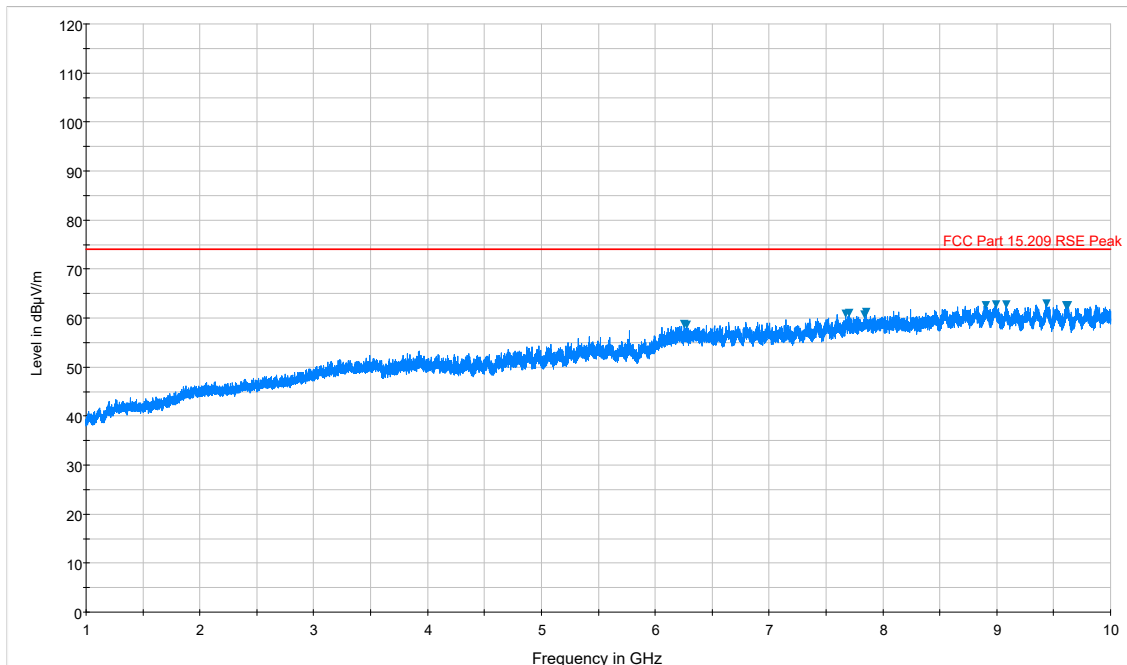
<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 48 of 60	





— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

**Plot 7-48. Radiated Spurious Plot above 1GHz (125kHz, High Channel, Ant. Pol. H)**



— Preview Result 1-PK+    — FCC Part 15.209 RSE Peak    ▼ Final\_Result PK+

**Plot 7-49. Radiated Spurious Plot above 1GHz (125kHz, High Channel, Ant. Pol. V)**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 49 of 60	



## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)

Distance of Measurements: 3 Meters  
 Operating Frequency: 903MHz  
 Channel Bandwidth: 500kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2709.00	Avg	H	-	-	-83.83	-0.61	22.56	53.98	-31.42
2709.00	Peak	H	-	-	-72.82	-0.61	33.57	73.98	-40.41
3612.00	Avg	H	-	-	-80.83	-0.01	26.16	53.98	-27.82
3612.00	Peak	H	-	-	-69.74	-0.01	37.25	73.98	-36.73
4515.00	Avg	H	-	-	-81.29	2.43	28.14	53.98	-25.84
4515.00	Peak	H	-	-	-70.50	2.43	38.93	73.98	-35.05
5418.00	Avg	H	-	-	-81.02	4.24	30.22	53.98	-23.76
5418.00	Peak	H	-	-	-70.37	4.24	40.87	73.98	-33.11
8127.00	Avg	H	-	-	-80.78	10.22	36.44	53.98	-17.54
8127.00	Peak	H	-	-	-70.38	10.22	46.84	73.98	-27.14
9030.00	Avg	H	-	-	-80.86	10.97	37.11	53.98	-16.87
9030.00	Peak	H	-	-	-70.39	10.97	47.58	73.98	-26.40

Table 7-7. Radiated Measurements @ 3 meters

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 50 of 60	



## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)

Distance of Measurements: 3 Meters  
 Operating Frequency: 909.4MHz  
 Channel Bandwidth 500kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2728.20	Avg	H	-	-	-83.83	-0.58	22.59	53.98	-31.39
2728.20	Peak	H	-	-	-72.82	-0.58	33.60	73.98	-40.38
3637.60	Avg	H	-	-	-80.83	0.11	26.28	53.98	-27.70
3637.60	Peak	H	-	-	-69.74	0.11	37.37	73.98	-36.61
4547.00	Avg	H	-	-	-81.29	2.26	27.97	53.98	-26.01
4547.00	Peak	H	-	-	-70.50	2.26	38.76	73.98	-35.22
5456.40	Avg	H	-	-	-81.02	4.48	30.46	53.98	-23.52
5456.40	Peak	H	-	-	-70.37	4.48	41.11	73.98	-32.87
7275.20	Avg	H	-	-	-80.93	10.79	36.86	53.98	-17.12
7275.20	Peak	H	-	-	-70.65	10.79	47.14	73.98	-26.84
8184.60	Avg	H	-	-	-80.78	10.23	36.45	53.98	-17.53
8184.60	Peak	H	-	-	-70.38	10.23	46.85	73.98	-27.13
9094.00	Avg	H	-	-	-80.86	10.67	36.81	53.98	-17.17
9094.00	Peak	H	-	-	-70.39	10.67	47.28	73.98	-26.70

**Table 7-8. Radiated Measurements @ 3 meters**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 51 of 60	



## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)

Distance of Measurements: 3 Meters  
 Operating Frequency: 914.2MHz  
 Channel Bandwidth: 500kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2742.60	Avg	H	-	-	-83.83	-0.51	22.66	53.98	-31.32
2742.60	Peak	H	-	-	-72.82	-0.51	33.67	73.98	-40.31
3656.80	Avg	H	-	-	-80.83	0.33	26.50	53.98	-27.48
3656.80	Peak	H	-	-	-69.74	0.33	37.59	73.98	-36.39
4571.00	Avg	H	-	-	-81.29	2.65	28.36	53.98	-25.62
4571.00	Peak	H	-	-	-70.50	2.65	39.15	73.98	-34.83
5485.20	Avg	H	-	-	-81.02	4.27	30.25	53.98	-23.73
5485.20	Peak	H	-	-	-70.37	4.27	40.90	73.98	-33.08
7313.60	Avg	H	-	-	-80.93	10.33	36.40	53.98	-17.58
7313.60	Peak	H	-	-	-70.65	10.33	46.68	73.98	-27.30
8227.80	Avg	H	-	-	-80.78	10.19	36.41	53.98	-17.57
8227.80	Peak	H	-	-	-70.38	10.19	46.81	73.98	-27.17
9142.00	Avg	H	-	-	-80.86	10.90	37.04	53.98	-16.94
9142.00	Peak	H	-	-	-70.39	10.90	47.51	73.98	-26.47

**Table 7-9. Radiated Measurements @ 3 meters**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 52 of 60	



## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)

Distance of Measurements: 3 Meters  
 Operating Frequency: 902.3MHz  
 Channel Bandwidth: 125kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2706.90	Avg	H	-	-	-83.60	-0.60	22.80	53.98	-31.18
2706.90	Peak	H	-	-	-72.51	-0.60	33.89	73.98	-40.09
3609.20	Avg	H	-	-	-80.77	-0.03	26.20	53.98	-27.77
3609.20	Peak	H	-	-	-69.15	-0.03	37.82	73.98	-36.15
4511.50	Avg	H	-	-	-81.75	2.43	27.68	53.98	-26.29
4511.50	Peak	H	-	-	-70.06	2.43	39.37	73.98	-34.60
5413.80	Avg	H	-	-	-81.60	4.23	29.63	53.98	-24.35
5413.80	Peak	H	-	-	-70.25	4.23	40.98	73.98	-33.00
8120.70	Avg	H	-	-	-81.13	10.22	36.09	53.98	-17.89
8120.70	Peak	H	-	-	-70.00	10.22	47.22	73.98	-26.76
9023.00	Avg	H	-	-	-81.51	10.75	36.24	53.98	-17.74
9023.00	Peak	H	-	-	-69.58	10.75	48.17	73.98	-25.81

**Table 7-10. Radiated Measurements @ 3 meters**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 53 of 60	



## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)

Distance of Measurements: 3 Meters  
 Operating Frequency: 908.7MHz  
 Channel Bandwidth 125kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2726.10	Avg	H	-	-	-83.60	-0.59	22.81	53.98	-31.17
2726.10	Peak	H	-	-	-72.51	-0.59	33.90	73.98	-40.08
3634.80	Avg	H	-	-	-80.77	0.10	26.33	53.98	-27.65
3634.80	Peak	H	-	-	-69.15	0.10	37.95	73.98	-36.03
4543.50	Avg	H	-	-	-81.75	2.13	27.38	53.98	-26.60
4543.50	Peak	H	-	-	-70.06	2.13	39.07	73.98	-34.91
5452.20	Avg	H	-	-	-81.60	4.45	29.85	53.98	-24.13
5452.20	Peak	H	-	-	-70.25	4.45	41.20	73.98	-32.78
7269.60	Avg	H	-	-	-81.47	10.83	36.36	53.98	-17.62
7269.60	Peak	H	-	-	-70.14	10.83	47.69	73.98	-26.29
8178.30	Avg	H	-	-	-81.13	10.25	36.12	53.98	-17.86
8178.30	Peak	H	-	-	-70.00	10.25	47.25	73.98	-26.73
9087.00	Avg	H	-	-	-81.51	10.77	36.26	53.98	-17.72
9087.00	Peak	H	-	-	-69.58	10.77	48.19	73.98	-25.79

Table 7-11. Radiated Measurements @ 3 meters

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 54 of 60	

## Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247(d)



Distance of Measurements: 3 Meters

Operating Frequency: 914.9MHz

Channel Bandwidth: 125kHz

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2744.70	Avg	H	-	-	-83.83	-0.51	22.66	53.98	-31.32
2744.70	Peak	H	-	-	-72.82	-0.51	33.67	73.98	-40.31
3659.60	Avg	H	-	-	-80.83	0.40	26.57	53.98	-27.41
3659.60	Peak	H	-	-	-69.74	0.40	37.66	73.98	-36.32
4574.50	Avg	H	-	-	-81.29	2.59	28.30	53.98	-25.68
4574.50	Peak	H	-	-	-70.50	2.59	39.09	73.98	-34.89
5489.40	Avg	H	-	-	-81.02	4.26	30.24	53.98	-23.74
5489.40	Peak	H	-	-	-70.37	4.26	40.89	73.98	-33.09
7319.20	Avg	H	-	-	-80.93	10.10	36.17	53.98	-17.81
7319.20	Peak	H	-	-	-70.65	10.10	46.45	73.98	-27.53
8234.10	Avg	H	-	-	-80.78	10.18	36.40	53.98	-17.58
8234.10	Peak	H	-	-	-70.38	10.18	46.80	73.98	-27.18
9149.00	Avg	H	-	-	-80.86	11.36	37.50	53.98	-16.48
9149.00	Peak	H	-	-	-70.39	11.36	47.97	73.98	-26.01

Table 7-12. Radiated Measurements @ 3 meters

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 55 of 60	

## 7.11 Radiated Spurious Emission Measurements – Below 1GHz

### §15.209

#### Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum power and at the appropriate frequencies. All modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

**All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-13 per Section 15.209.**

Frequency	Field Strength [ $\mu\text{V/m}$ ]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

**Table 7-13. Radiated Limits**



#### Test Procedures Used

ANSI C63.10-2013

#### Test Settings

##### Quasi-Peak Field Strength Measurements

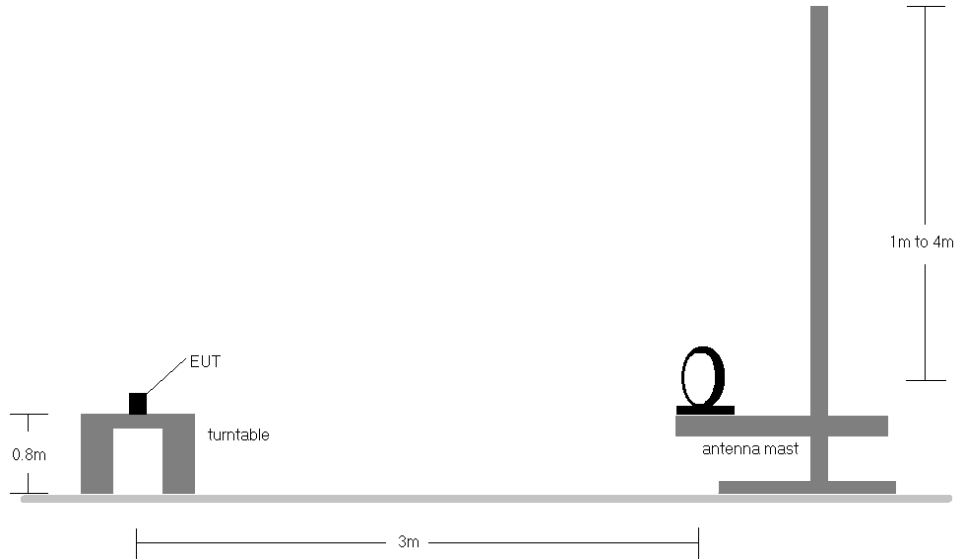
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 56 of 60	

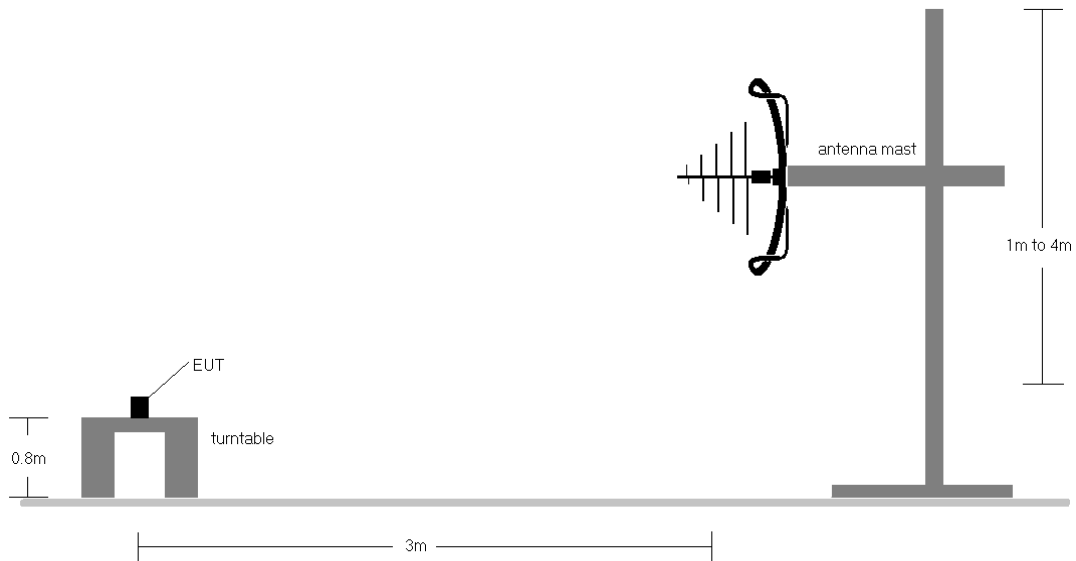


### Test Setup



The EUT and measurement equipment were set up as shown in the diagrams below.



**Figure 7-10. Radiated Test Setup < 30Mhz**





**Figure 7-11. Radiated Test Setup < 1GHz**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)	 Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser	Page 57 of 60



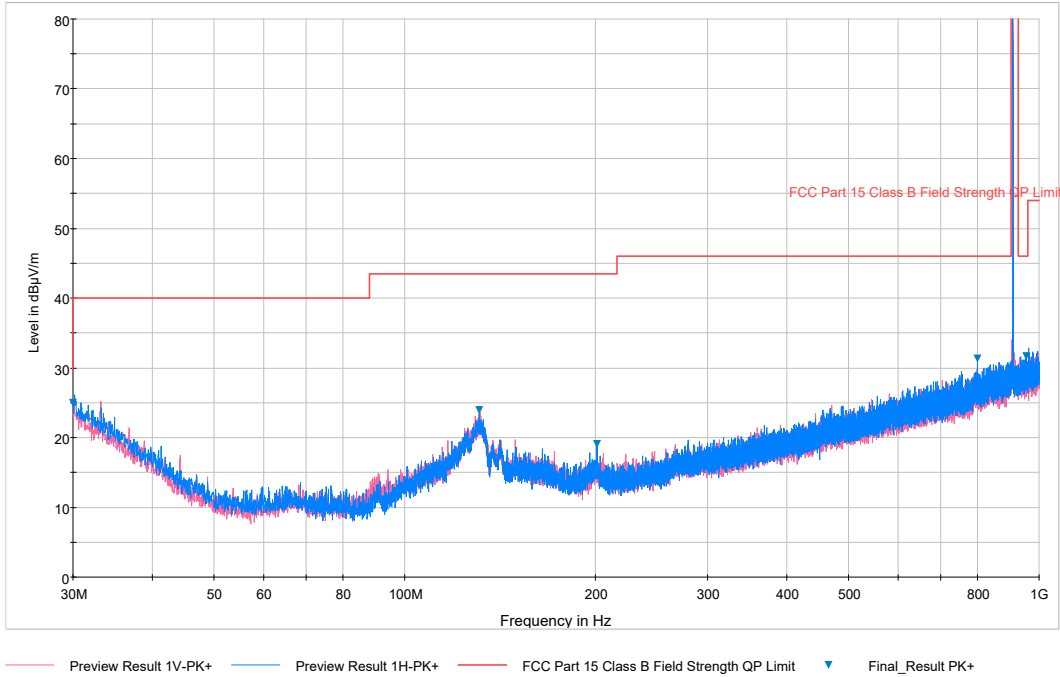
## Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-13.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No significant spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

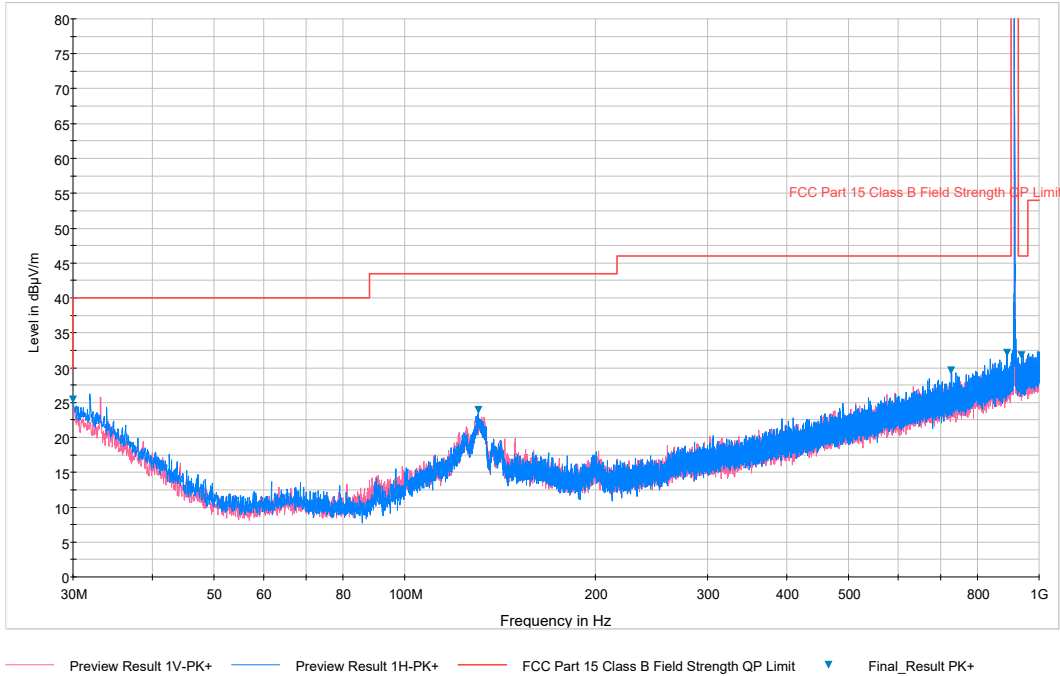
<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser	Page 58 of 60	

# Radiated Spurious Emissions Measurements (Below 1GHz)

§15.209



**Plot 7-50. Radiated Spurious Plot below 1GHz (500kHz, Mid Channel)**





**Plot 7-51. Radiated Spurious Plot below 1GHz (125kHz, Mid Channel)**

FCC ID: 2ANCJ-R37615-00		FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1706070189-02.2ANCJ	Test Dates: 6/8 - 7/5/2017	EUT Type: Soap Dispenser		Page 59 of 60

## 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Diversey Soap Dispenser FCC ID: 2ANCJ-R37615-00** is compliant with Part 15C of the FCC Rules.

<b>FCC ID:</b> 2ANCJ-R37615-00		<b>FCC Pt. 15.247 900MHz ISM TEST REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1706070189-02.2ANCJ	<b>Test Dates:</b> 6/8 - 7/5/2017	<b>EUT Type:</b> Soap Dispenser		Page 60 of 60