MEASUREMENT REPORT

FCC PART 15.247 & IC RSS-247 WLAN 802.11b/g/n

FCC ID:	2ALGLE1000
IC:	22505-E1000
APPLICANT:	Cassia Networks Inc.

Application Type:	Certification
Product:	Cassia Bluetooth Router
Model No.:	E1000, E1000-10, E1000-20
Brand Name:	CASSIA
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part15 Subpart C (Section 15.247)
IC Rule(s):	RSS-247 Issue 2, RSS-GEN Issue 4
Test Procedure(s):	ANSI C63.10-2013, KDB 558074 D01v04
Test Date:	November 24 ~ December 13, 2017

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)

The test results relate only to the samples tested.

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 KDB 558074 D01v04. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1711RSU04001	Rev. 01	Initial report	12-13-2017	Valid

CONTENTS

Description Page

§2.1033 General Information

Applicant:	Cassia Networks Inc.
Applicant Address:	1840 Majestic Way, San Jose, CA 95132
Manufacturer:	Cassia Networks Inc.
Manufacturer Address:	1840 Majestic Way, San Jose, CA 95132
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
IC Registration No.:	11384A-1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (G20034, R-20025, T-20020, C-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

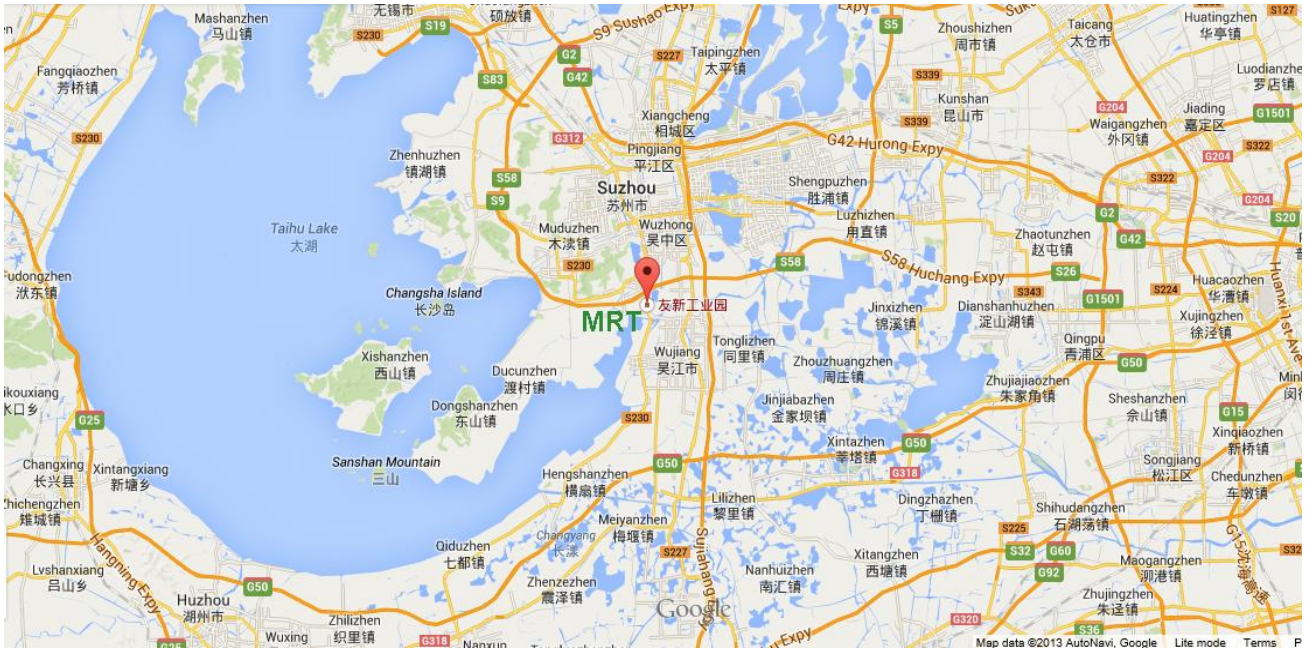
1. INTRODUCTION

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. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	Cassia Bluetooth Router
Model No.:	E1000, E1000-10, E1000-20
Brand Name:	CASSIA
Wi-Fi Specification:	802.11a/b/g/n/ac
Bluetooth Version:	v4.2 single mode
Power Type:	POE input or AC adapter input
Components	
Adapter	M/N: A8A-050200U-US1 INPUT: 100-240V ~ 50/60Hz, 0.35A OUTPUT: 5Vdc, 2.0A

2.2. Product Specification Subjective to this Report

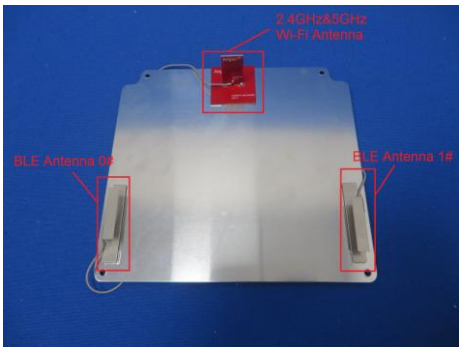
Frequency Range:	802.11b/g/n-HT20: 2412 ~ 2462 MHz
Type of Modulation:	802.11b: DSSS 802.11g/n: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 72.2Mbps
Maximum Output Power:	802.11b: 20.78dBm 802.11g: 25.02dBm 802.11n-HT20: 25.07dBm

Note: For other features of this EUT, test report will be issued separately.

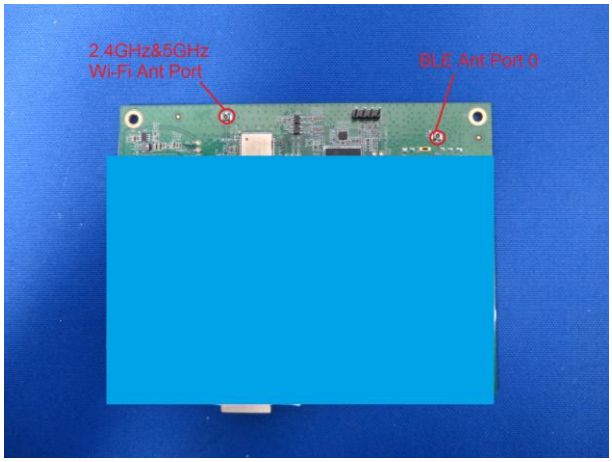
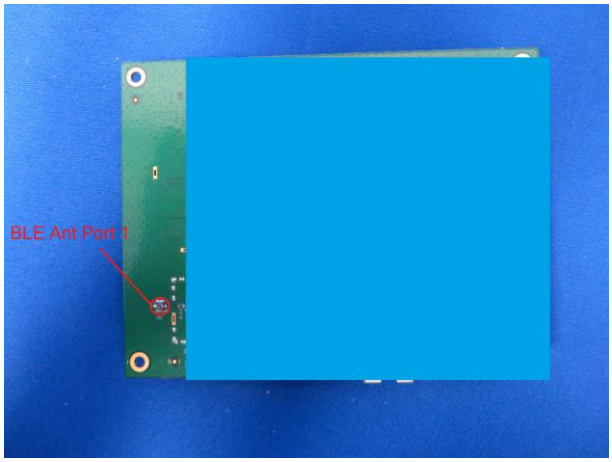
2.3. Working Frequencies for this report

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	Ant Gain (dBi)	Tx Paths
	2400 ~ 2483.5 (Wi-Fi)	3.7	1
	2400 ~ 2483.5 (BLE)	5.0	1
	5150 ~ 5250	6.6	1
	5745 ~ 5825	7.3	1

2.5. Description of Antenna RF Port

Antenna RF Port			
---	2.4GHz&5GHz Wi-Fi RF Port	2.4GHz BLE RF Port	
Software Control Port	--	Ant 0	Ant 1
			

2.6. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)

2.7. Description of Test Software

The test utility software used during testing was “engineering order” provided by the applicant.

Final Power Parameter Value of the test software.

Test Mode	Test Channel (MHz)	Power Parameter Value
802.11b	2412	18.0
	2437	18.0
	2462	18.0
802.11g	2412	18.0
	2437	17.0
	2462	17.0
802.11n-HT20	2412	18.0
	2437	18.0
	2462	17.0

2.8. Device Capabilities

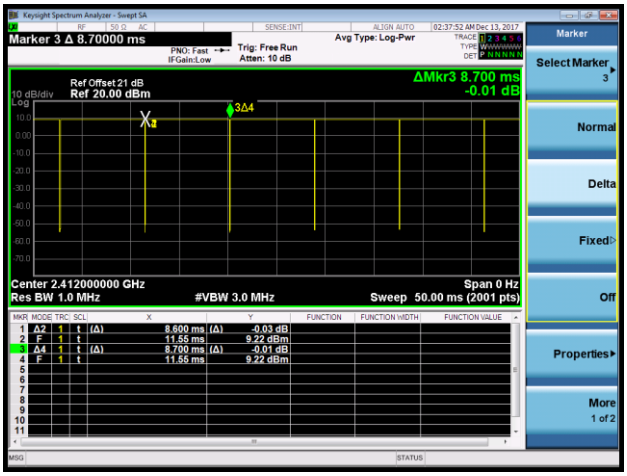
This device contains the following capabilities:

2.4GHz WLAN (DTS), 5GHzWLAN (NII) and Bluetooth (v4.2)

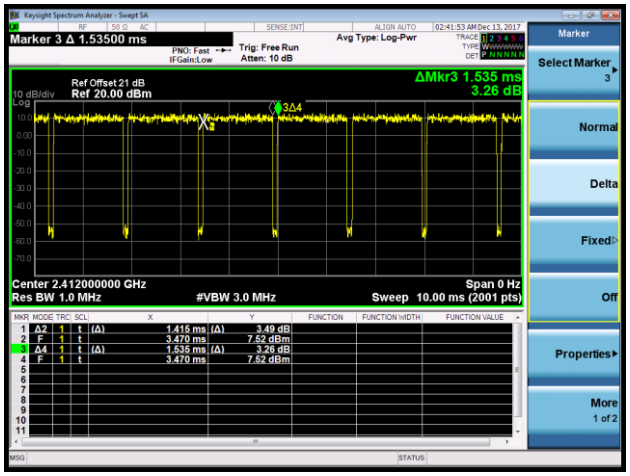
Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section 6.0 b) of KDB 558074 D01v04. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11b	98.85%
802.11g	92.18%
802.11n-HT20	92.01%

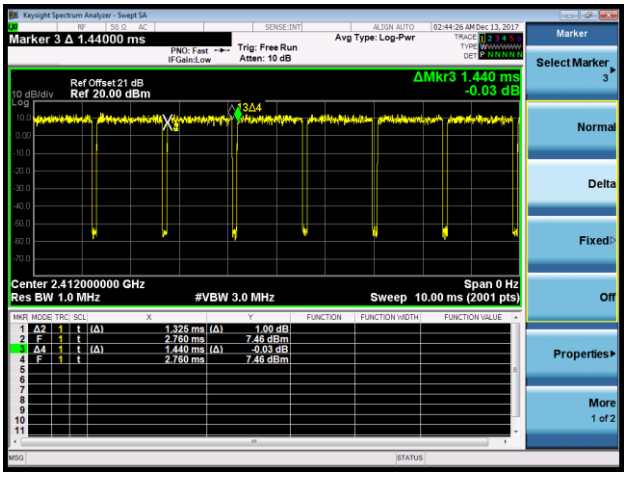
802.11b - Duty Cycle



802.11g - Duty Cycle



802.11n-HT20 - Duty Cycle



2.9. Test Configuration

The **Cassia Bluetooth Router** was tested per the guidance of KDB 558074 D01v04. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.10. EMI Suppression Device(s)/Modifications

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

2.11. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

RSP-100 Issue 11 Section 3

The manufacturer, importer or distributor shall meet the labelling requirements set out in this section for every unit:

(i) prior to marketing in Canada, for products manufactured in Canada

(ii) prior to importation into Canada, for imported products

For information regarding the e-labelling option, see Notice 2014–DRS1003. The label for the certified product represents the manufacturer's or importer's compliance with Innovation, Science and Economic Development Canada's (ISED) regulatory requirements.

Please see attachment for IC label and label location.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 558074 D01v04 were used in the measurement of the **Cassia Bluetooth Router.**

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

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 RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. 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. For measurements above 1GHz 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 below 1GHz, the absorbers are removed. A MF Model 210SS 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. An 80cm high PVC support structure is placed on top of the turntable.
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 for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 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, clock speed, mode of operation or video resolution, if applicable, 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. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. 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 of the **Cassia** is **permanently attached.**
- There are no provisions of connects to an external antenna.

Conclusion:

The **Cassia Bluetooth Router** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2018/04/24
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2018/06/20
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2018/06/20
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06181	1 year	2017/12/20
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	1 year	2018/05/10

Radiated Disturbance - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/03
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2017/12/21
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2018/04/16
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2018/11/19
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/03/28
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06183	1 year	2018/10/21
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
USB Wideband Power Sensor	Boonton	55006	MRTSUE06109	1 year	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06184	1 year	2017/12/22

Software	Version	Function
e3	V8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
Spurious Emissions, Conducted - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Product Name: **Cassia Bluetooth Router**

FCC ID: **2ALGLE1000**

IC: **22505-E1000**

FCC Section(s)	IC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	RSS-247 [5.2]	6dB Bandwidth	≥ 500kHz	Conducted	Pass	Section 7.2
15.247(b)(3)	RSS-247 [5.4(d)]	Output Power EIRP	≤ 30dBm ≤ 36dBm		Pass	Section 7.3
15.247(e)	RSS-247 [5.2]	Power Spectral Density	≤ 8dBm/3kHz		Pass	Section 7.4
15.247(d)	RSS-247 [5.5]	Band Edge / Out-of-Band Emissions	≥ 20dBc		Pass	Section 7.5
15.205 15.209	RSS-247 [5.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6 & 7.7
15.207	RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) 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.

7.2. 6dB Bandwidth Measurement

7.2.1.Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

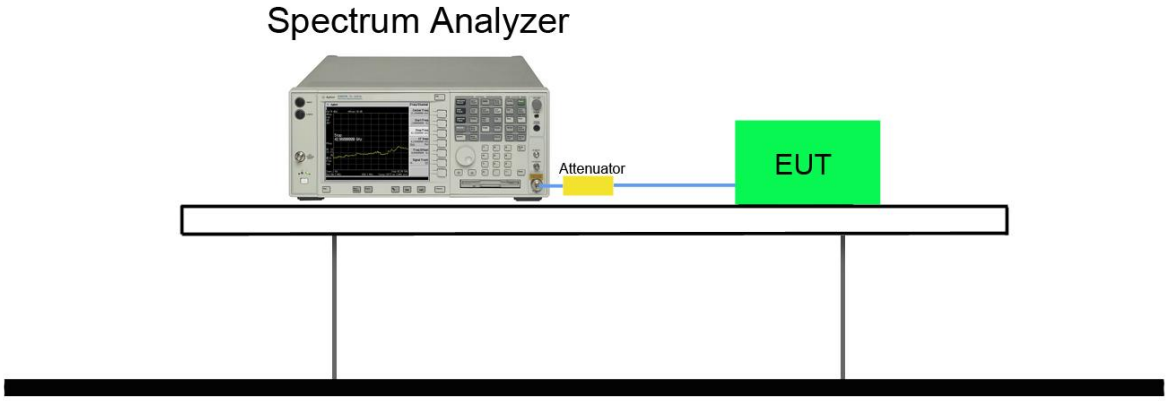
7.2.2.Test Procedure used

KDB 558074 D01v04 - Section 8.2 Option 2

7.2.3.Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize

7.2.4.Test Setup

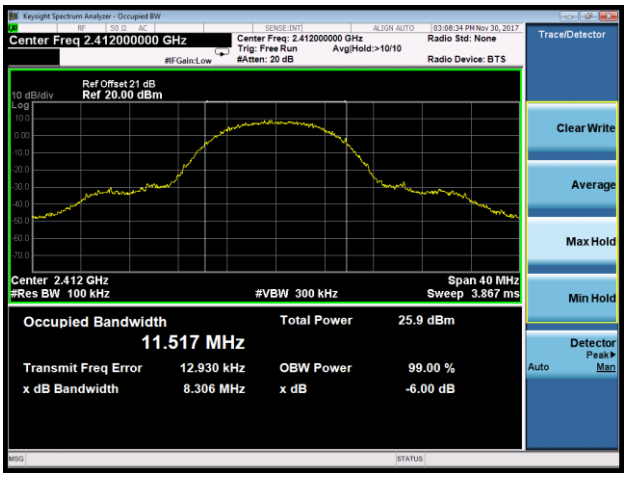
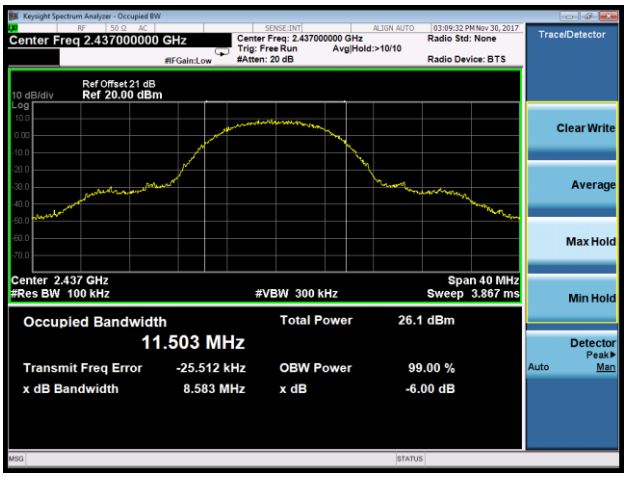
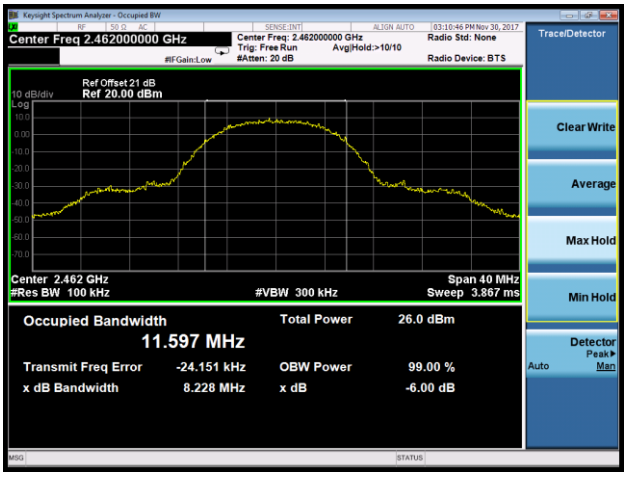


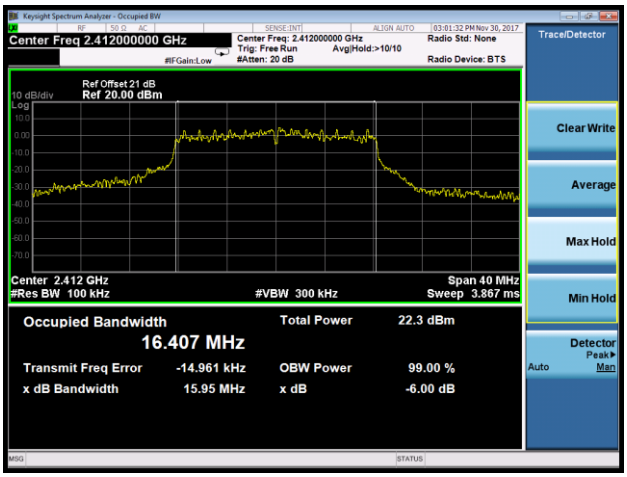
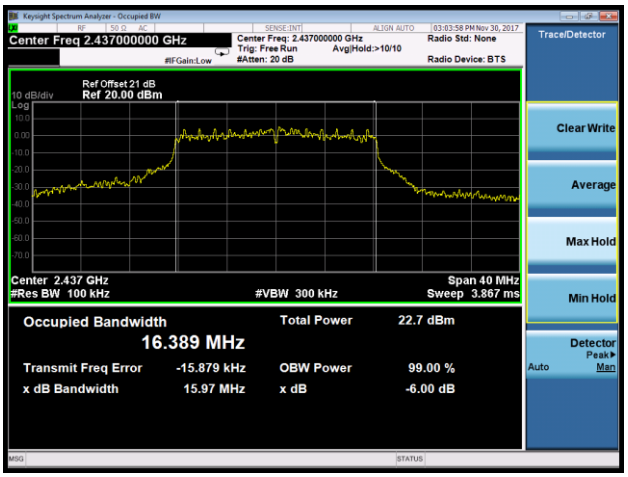
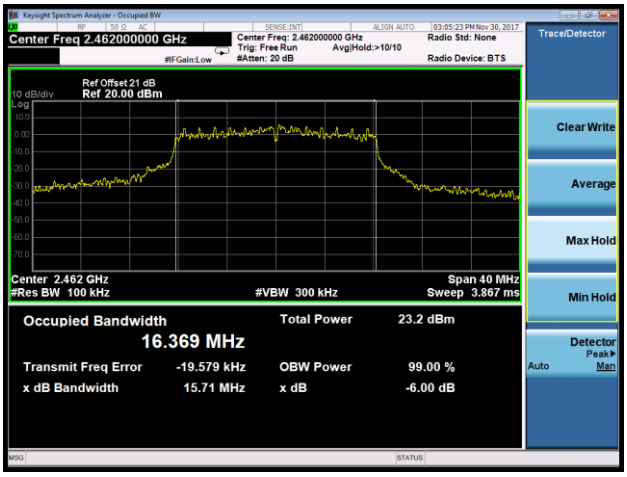
7.2.5.Test Result

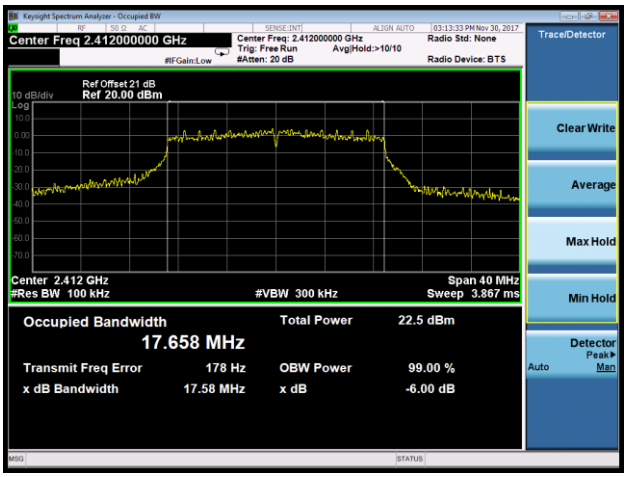
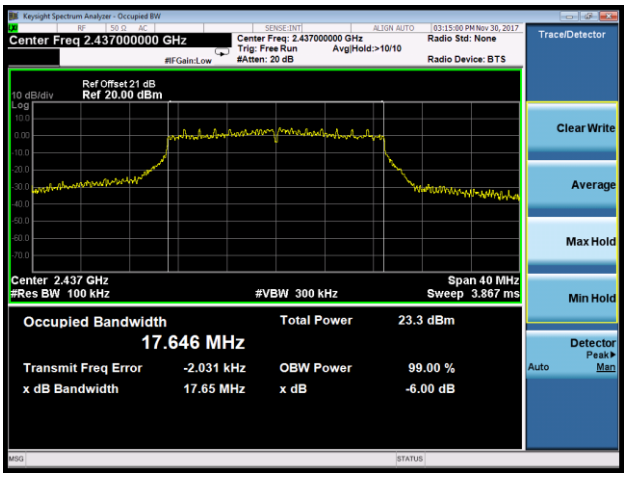
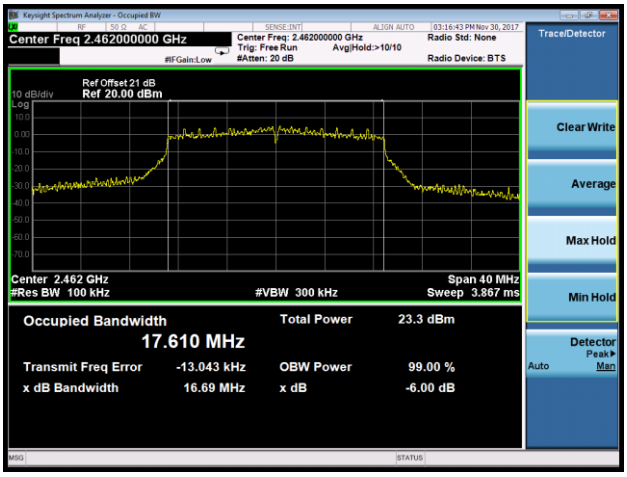
Product	Cassia	Temperature	27°C
Test Engineer	Ben Zhu	Relative Humidity	57%
Test Site	TR3	Test Date	2017/11/30

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1Mbps	01	2412	8.31	≥ 0.5	Pass
802.11b	1Mbps	06	2437	8.58	≥ 0.5	Pass
802.11b	1Mbps	11	2462	8.23	≥ 0.5	Pass
802.11g	6Mbps	01	2412	15.95	≥ 0.5	Pass
802.11g	6Mbps	06	2437	15.97	≥ 0.5	Pass
802.11g	6Mbps	11	2462	15.71	≥ 0.5	Pass
802.11n-HT20	6.5Mbps	01	2412	17.58	≥ 0.5	Pass
802.11n-HT20	6.5Mbps	06	2437	17.65	≥ 0.5	Pass
802.11n-HT20	6.5Mbps	11	2462	17.69	≥ 0.5	Pass

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	99% Bandwidth (MHz)
802.11b	1Mbps	01	2412	11.52
802.11b	1Mbps	06	2437	11.50
802.11b	1Mbps	11	2462	11.60
802.11g	6Mbps	01	2412	16.41
802.11g	6Mbps	06	2437	16.39
802.11g	6Mbps	11	2462	16.37
802.11n-HT20	6.5Mbps	01	2412	17.66
802.11n-HT20	6.5Mbps	06	2437	17.65
802.11n-HT20	6.5Mbps	11	2462	17.61

802.11b 6dB Bandwidth	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11g 6dB Bandwidth	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT20 6dB Bandwidth	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

7.3. Output Power Measurement

7.3.1.Test Limit

The maximum out power shall be less 1 Watt and the E.I.R.P shall not exceed 4 Watt.

7.3.2.Test Procedure Used

KDB 558074 D01v04 - Section 9.1.3 PKPM1 Peak Power Method (for signals with BW ≤ 50MHz)

KDB 558074 D01v04 - Section 9.2.3.2 AVGPM-G Average Power Method

7.3.3.Test Setting

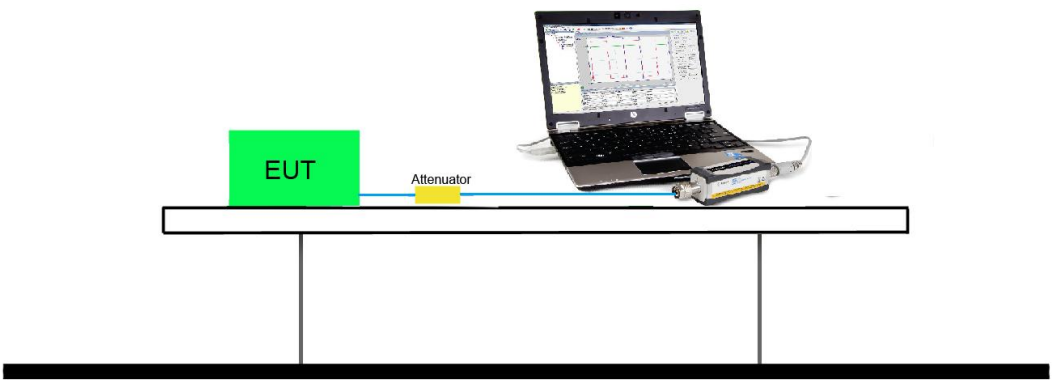
Method PKPM1

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

Average Power Measurement

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

7.3.4.Test Setup



7.3.5.Test Result of Output Power

Power output test was verified over all data rates of each mode shown as below table, and then choose the maximum power output (gray marker) for final test of each channel.

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate/ MCS	Peak Power (dBm)
802.11b	20	6	2437	1Mbps	17.46
				5.5Mbps	17.18
				11Mbps	16.79
802.11g	20	6	2437	6Mbps	17.21
				24Mbps	17.03
				54Mbps	16.76
802.11n	20	6	2437	MCS0	17.88
				MCS3	17.49
				MCS7	17.12

Product	Cassia Bluetooth Router	Temperature	27°C
Test Engineer	Ben Zhu	Relative Humidity	57%
Test Site	TR3	Test Date	2017/11/25

Test Result of Peak Output Power

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
802.11b	1Mbps	01	2412	20.30	≤ 30	Pass
802.11b	1Mbps	06	2437	20.59	≤ 30	Pass
802.11b	1Mbps	11	2462	20.78	≤ 30	Pass
802.11g	6Mbps	01	2412	24.84	≤ 30	Pass
802.11g	6Mbps	06	2437	24.87	≤ 30	Pass
802.11g	6Mbps	11	2462	25.02	≤ 30	Pass
802.11n-HT20	MCS0	01	2412	24.91	≤ 30	Pass
802.11n-HT20	MCS0	06	2437	25.04	≤ 30	Pass
802.11n-HT20	MCS0	11	2462	25.07	≤ 30	Pass

Note: EIRP (dBm) = Max Conducted Power (dBm) + Antenna Gain (dBi) = 25.07 dBm + 3.7 dBi = 28.77 dBm.

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Result
802.11b	1Mbps	01	2412	17.16	≤ 30	Pass
802.11b	1Mbps	06	2437	17.46	≤ 30	Pass
802.11b	1Mbps	11	2462	17.72	≤ 30	Pass
802.11g	6Mbps	01	2412	17.78	≤ 30	Pass
802.11g	6Mbps	06	2437	17.21	≤ 30	Pass
802.11g	6Mbps	11	2462	17.58	≤ 30	Pass
802.11n-HT20	MCS0	01	2412	17.34	≤ 30	Pass
802.11n-HT20	MCS0	06	2437	17.88	≤ 30	Pass
802.11n-HT20	MCS0	11	2462	17.13	≤ 30	Pass

Note: EIRP (dBm) = Max Conducted Power (dBm) + Antenna Gain (dBi) = 17.88 dBm + 3.7 dBi = 21.58 dBm.

7.4. Power Spectral Density Measurement

7.4.1.Test Limit

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

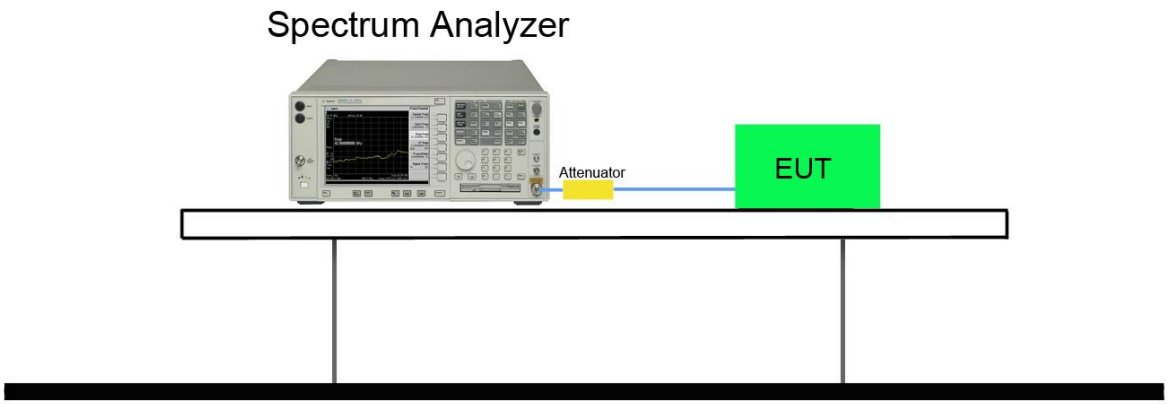
7.4.2.Test Procedure Used

KDB 558074 D01v04 - Section 10.2 Method PKPSD

7.4.3.Test Setting

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 x DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the RBW ≥ 3 x RBW.
5. Detector = Peak
6. Sweep time = auto couple
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limits, reduce RBW (no less than 3 kHz) and repeat.

7.4.4.Test Setup

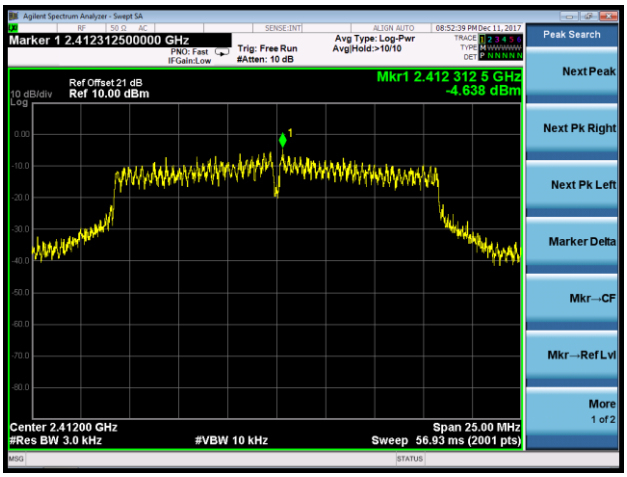
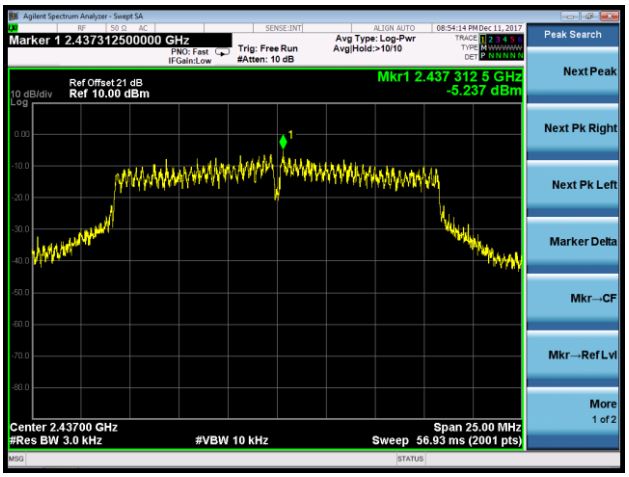
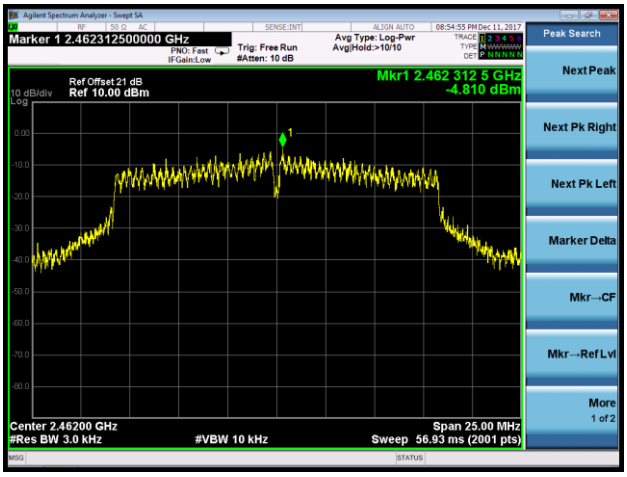


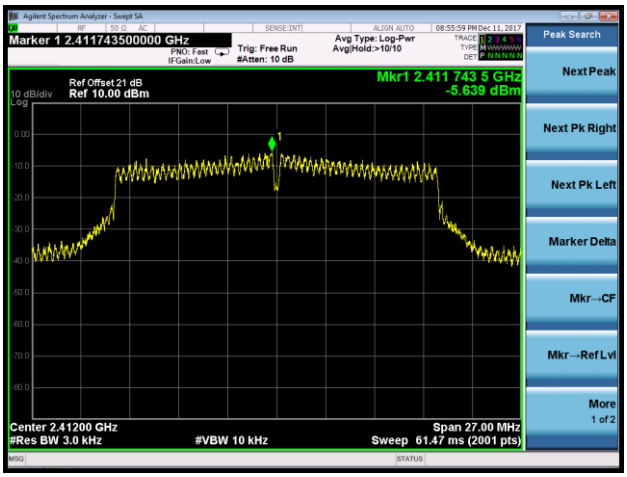
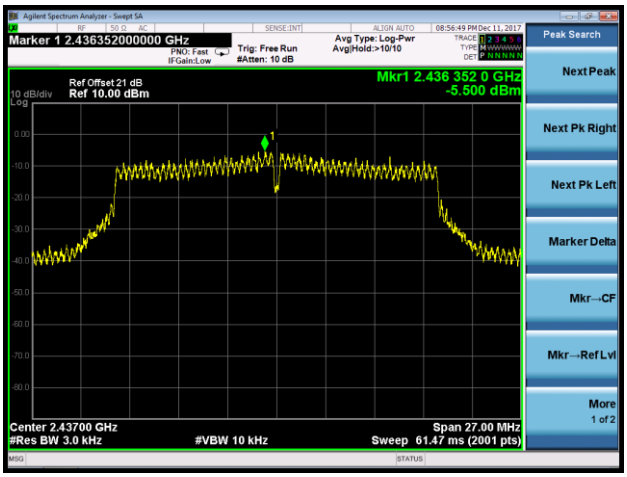
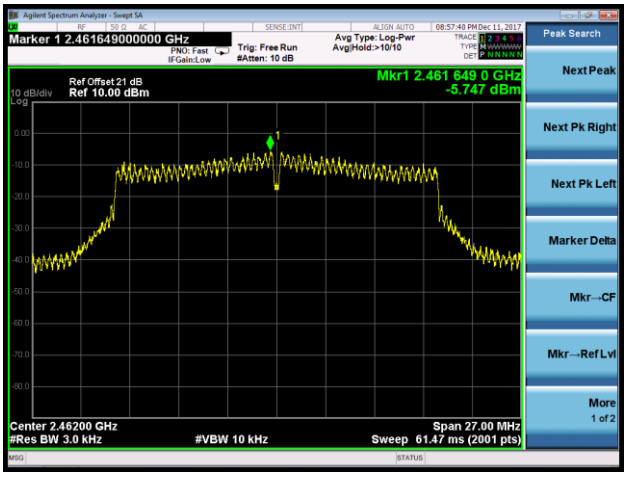
7.4.5.Test Result

Product	Cassia	Temperature	27°C
Test Engineer	Ben Zhu	Relative Humidity	57%
Test Site	TR3	Test Date	2017/12/11

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	PKPSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
802.11b	1Mbps	01	2412	-4.38	≤ 8	Pass
802.11b	1Mbps	06	2437	-4.37	≤ 8	Pass
802.11b	1Mbps	11	2462	-3.80	≤ 8	Pass
802.11g	6Mbps	01	2412	-4.56	≤ 8	Pass
802.11g	6Mbps	06	2437	-5.24	≤ 8	Pass
802.11g	6Mbps	11	2462	-4.81	≤ 8	Pass
802.11n-HT20	MCS0	01	2412	-5.64	≤ 8	Pass
802.11n-HT20	MCS0	06	2437	-5.50	≤ 8	Pass
802.11n-HT20	MCS0	11	2462	-5.75	≤ 8	Pass

802.11b PKPSD	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11g PKPSD	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT20 PKPSD	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1.Test Limit

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 100 kHz bandwidth per the PSD procedure.

7.5.2.Test Procedure Used

KDB 558074 D01v04 - Section 11.2 & Section 11.3

7.5.3.Test Settitng

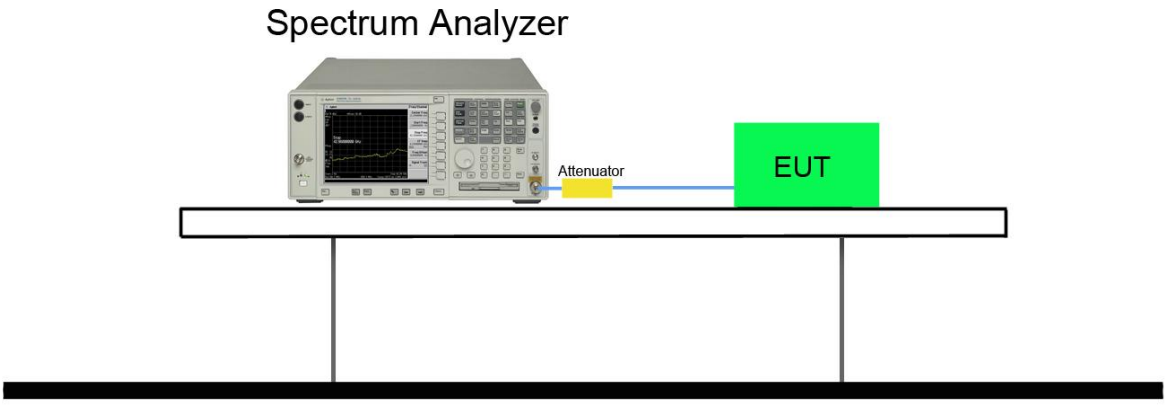
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

7.5.4.Test Setup



7.5.5.Test Result

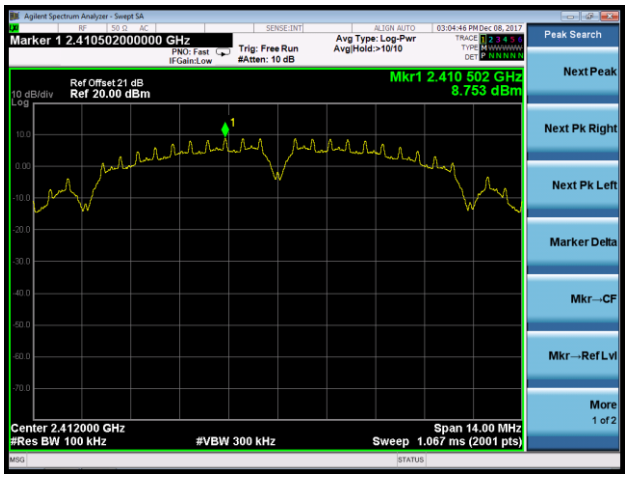
Product	Cassia	Temperature	27°C
Test Engineer	Bruce Wang	Relative Humidity	57%
Test Site	TR3	Test Date	2017/12/08

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit	Result
802.11b	1Mbps	01	2412	20dBc	Pass
802.11b	1Mbps	06	2437	20dBc	Pass
802.11b	1Mbps	11	2462	20dBc	Pass
802.11g	6Mbps	01	2412	20dBc	Pass
802.11g	6Mbps	06	2437	20dBc	Pass
802.11g	6Mbps	11	2462	20dBc	Pass
802.11n-HT20	MCS0	01	2412	20dBc	Pass
802.11n-HT20	MCS0	06	2437	20dBc	Pass
802.11n-HT20	MCS0	11	2462	20dBc	Pass

802.11b Out-of-Band Emissions

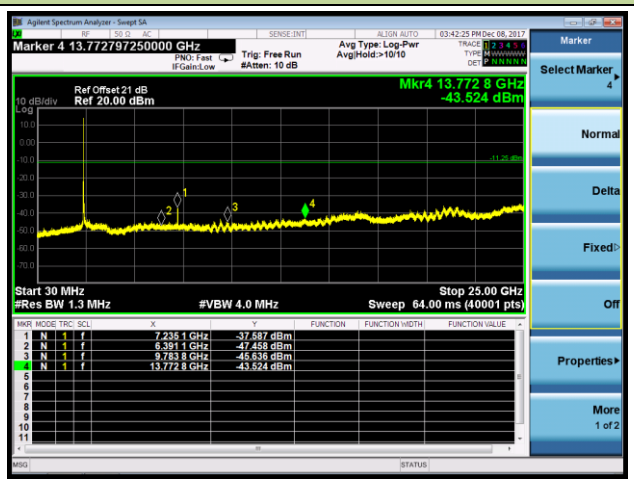
Channel 01 (2412MHz)

100kHz PSD Reference Level



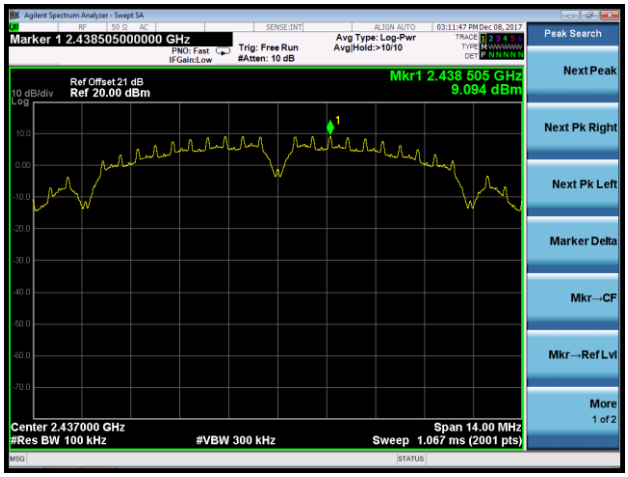
Low Band Edge

Spurious Emission

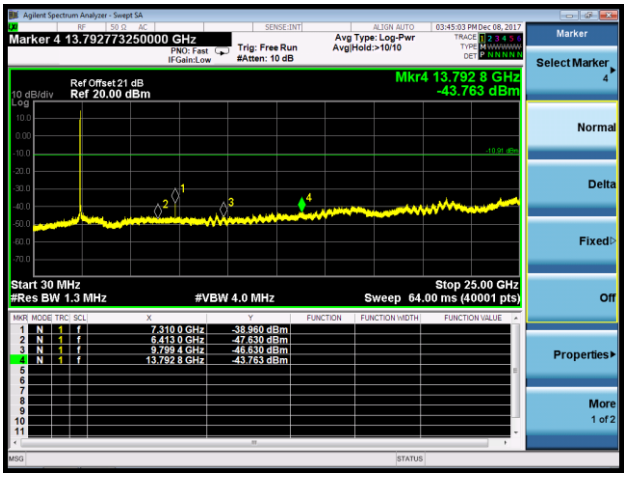


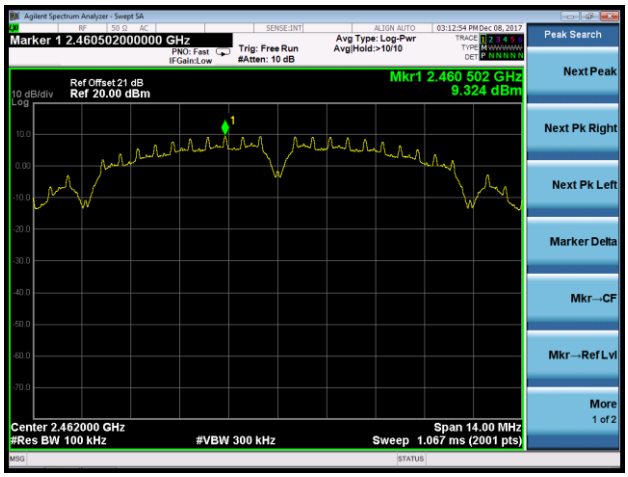
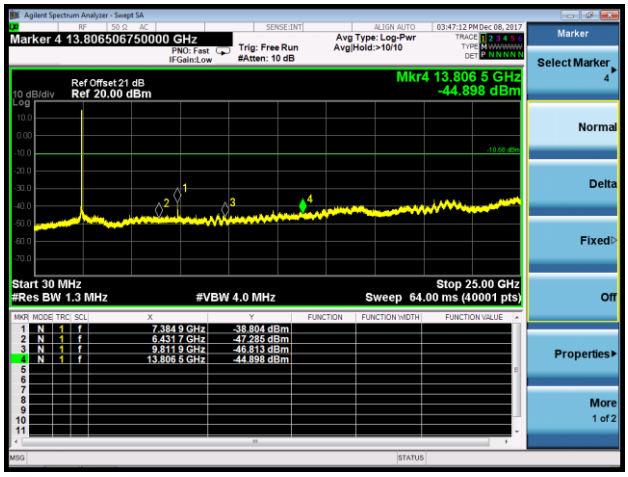
Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission

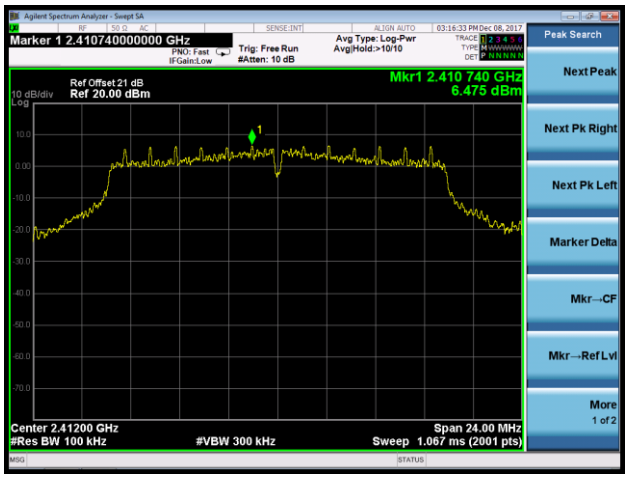


Channel 11 (2462MHz)	
100kHz PSD Reference Level	**High Band Edge**
	
Spurious Emission	
	

802.11g Out-of-Band Emissions

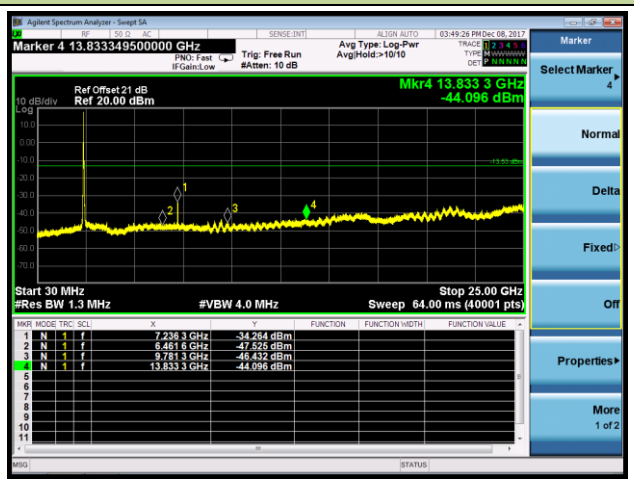
Channel 01 (2412MHz)

100kHz PSD Reference Level



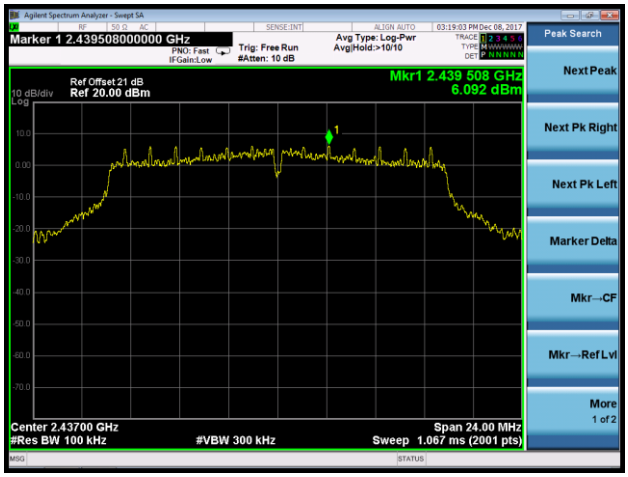
Low Band Edge

Spurious Emission

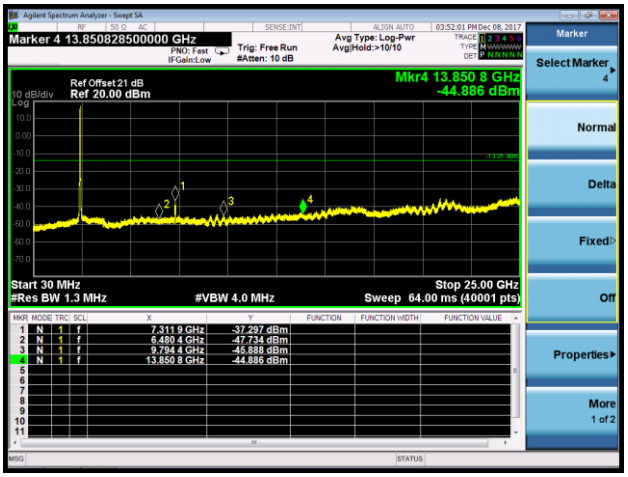


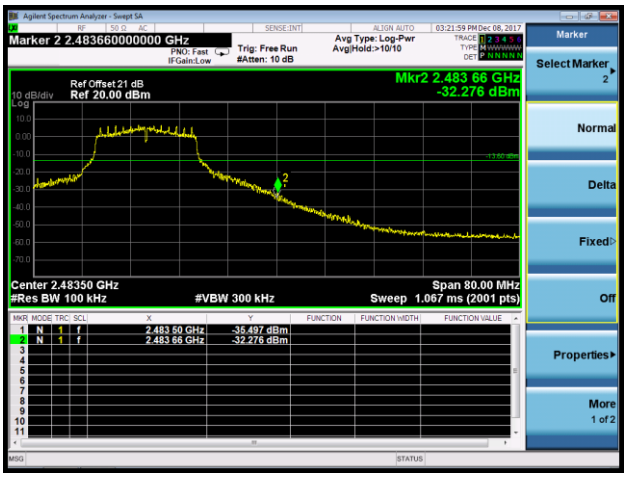
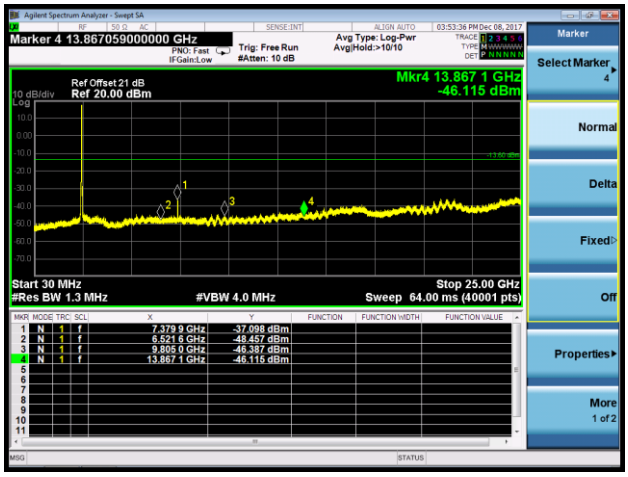
Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission

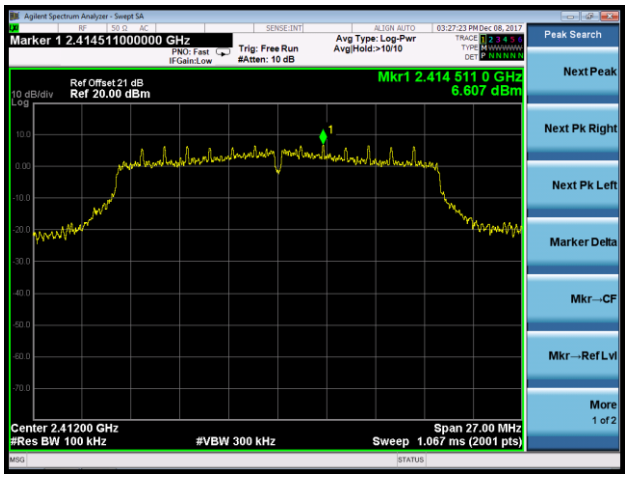


Channel 11 (2462MHz)	
100kHz PSD Reference Level	**High Band Edge**
	
Spurious Emission	
	

802.11n-HT20 Out-of-Band Emissions

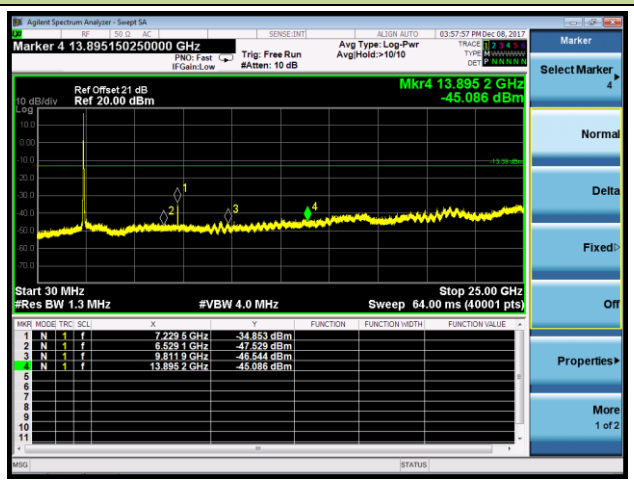
Channel 01 (2412MHz)

100kHz PSD Reference Level



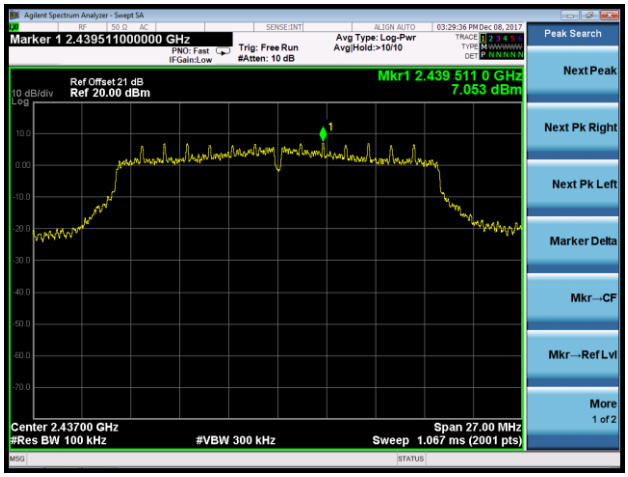
Low Band Edge

Spurious Emission

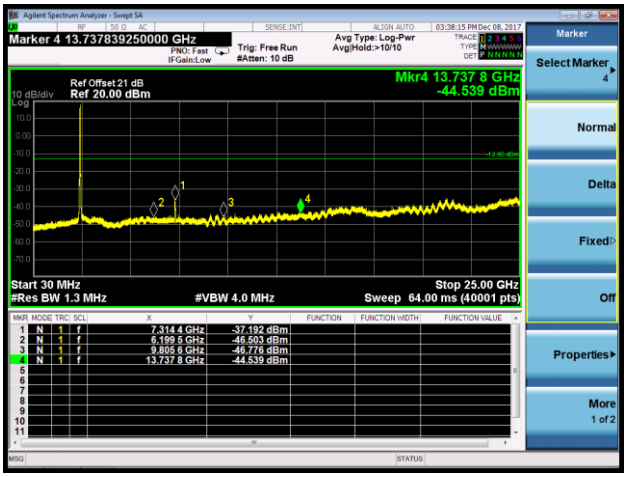


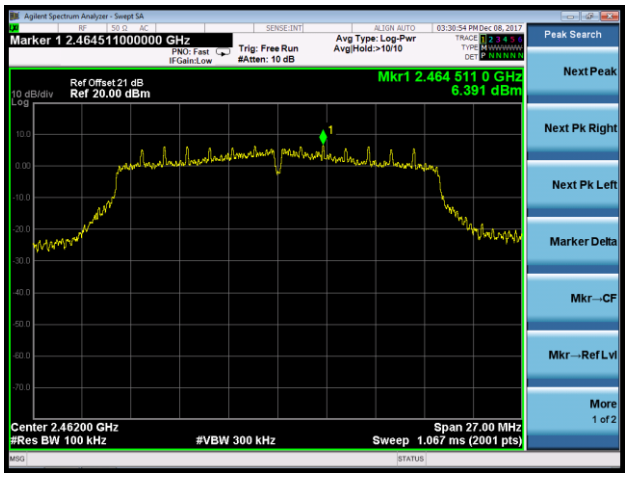
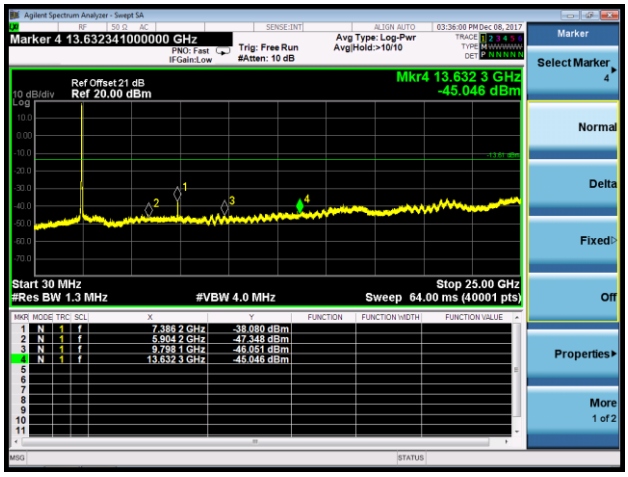
Channel 06 (2437MHz)

100kHz PSD Reference Level



Spurious Emission



Channel 11 (2462MHz)	
100kHz PSD Reference Level	**High Band Edge**
	
Spurious Emission	
	

7.6. Radiated Spurious Emission Measurement

7.6.1.Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42-16.423	399.9 - 410	4.5-5.15
[1] 0.495 - 0.505	16.69475-16.69525	608 - 614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960 - 1240	7.25-7.75
4.125-4.128	25.5 -25.67	1300 - 1427	8.25 - 8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660 - 1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123 - 138	2200 - 2300	14.47-14.5
8.291-8.294	149.9-150.05	2310–2390	15.35-16.2
8.362-8.366	156.52475-156.525	2483.5 - 2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690 - 2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260 - 3267	23.6-24.0
12.29-12.293	167.72-173.2	3332 - 3339	31.2-31.8
12.51975-12.52025	240 - 285	3345.8 - 3358	36.43-36.5
12.57675-12.57725	322-335.4	3600 - 4400	([2])
13.36-13.41	--	--	--