

# TEST REPORT

of

## FCC Part 15 Subpart C

### Limited Modular Approval

New Application;  Class I PC;  Class II PC

**Product :** Aria

**Brand:** amino, entone

**Model:** XYZaZZZZZZZZ where "X" can be 6, 7, 8 for marketing purpose. "Y" can be 0~9 for marketing purpose. "Z" - can be 0~9. Among 0~9, number 1 & 3 are fixed for with WiFi model, others are for marketing purpose.

"a" - can be 0~9, A~Z, a~z, "-", "p", "~". Capital letter "P" is fixed for Bluetooth model; lowercase letter "r" is fixed for RF4CE model; others are for marketing purpose.

"ZZZZZZZZ" - can be any combination of "0-9", "A-Z", "a-z", "-", "p", "~" or blank for marketing purpose.

**Model Difference:** For market segmentation

**FCC ID:** XVG50-0102-R4-00

**FCC Rule Part:** §15.249

**Applicant:** Amino Communications Ltd

**Address:** Buckingham Business Park, Anderson Road, Swavesey, Cambridge CB24 4UQ, United Kingdom

**Test Performed by:**

**International Standards Laboratory**

<Lung-Tan LAB>

\*Site Registration No.

BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

\*Address:

No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

\*Tel : 886-3-407-1718; Fax: 886-3-407-1738

**Report No.: ISL-17LR134FCDXX**

**Issue Date : 2017/11/24**



Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

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## VERIFICATION OF COMPLIANCE

**Applicant:** Amino Communications Ltd

**Product Description:** Aria

**Brand Name:** amino, entone  
XYZazzzzzzzz where “X” can be 6, 7, 8 for marketing purpose. “Y” can be 0~9 for marketing purpose. “Z” - can be 0~9. Among 0~9, number 1 & 3 are fixed for with WiFi model, others are for marketing purpose.

**Model No.:** “a” - can be 0~9, A~Z, a~z, “-“, “/“, “~“. Capital letter “I” is fixed for Bluetooth model; lowercase letter “r” is fixed for RF4CE model; others are for marketing purpose.  
“zzzzzzzz” – can be any combination of “0-9”, “A-Z”, “a-z”, “-“, “/“, “~” or blank for marketing purpose.

**Model Difference:** For market segmentation

**FCC ID:** XVG50-0102-R4-00

**Date of test:** 2017/06/03 ~ 2017/07/23

**Date of EUT Received:** 2017/06/03

### We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

<b>Test By:</b>	<u>Lake Cheng</u>	<b>Date:</b>	<u>2017/11/24</u>
	Lake Cheng / Engineer		
<b>Prepared By:</b>	<u>Gigi yeh</u>	<b>Date:</b>	<u>2017/11/24</u>
	Gigi Yeh / Specialist		
<b>Approved By:</b>	<u>DinoChen</u>	<b>Date:</b>	<u>2017/11/24</u>
	Dino Chen / Sr. Engineer		

## Version

Version No.	Date	Description
00	2017/11/24	Initial creation of document

## Table of Contents

<b>1.</b>	<b>GENERAL INFORMATION .....</b>	<b>5</b>
1.1.	PRODUCT DESCRIPTION .....	5
1.2.	RELATED SUBMITTAL(S) / GRANT (S) .....	7
1.3.	TEST METHODOLOGY.....	7
1.4.	TEST FACILITY .....	7
1.5.	SPECIAL ACCESSORIES .....	7
1.6.	EQUIPMENT MODIFICATIONS .....	7
<b>2.</b>	<b>SYSTEM TEST CONFIGURATION .....</b>	<b>8</b>
2.1.	EUT CONFIGURATION.....	8
2.2.	EUT EXERCISE .....	8
2.3.	TEST PROCEDURE.....	8
2.4.	LIMITATION .....	9
2.5.	CONFIGURATION OF TESTED SYSTEM.....	11
<b>3.</b>	<b>SUMMARY OF TEST RESULTS .....</b>	<b>12</b>
<b>4.</b>	<b>CONDUCTED EMISSIONS TEST .....</b>	<b>13</b>
4.1	MEASUREMENT PROCEDURE: .....	13
4.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	13
4.3	MEASUREMENT EQUIPMENT USED: .....	13
4.4	MEASUREMENT RESULT: N/A.....	13
<b>5.</b>	<b>RADIATED EMISSION TEST .....</b>	<b>16</b>
5.1	MEASUREMENT PROCEDURE.....	16
5.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	16
5.3	MEASUREMENT EQUIPMENT USED: .....	17
5.4	FIELD STRENGTH CALCULATION .....	18
5.5	MEASUREMENT RESULT .....	19
<b>6.</b>	<b>20 DB BAND WIDTH MEASUREMENT.....</b>	<b>27</b>
6.1	MEASUREMENT PROCEDURE.....	27
6.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	27
6.3	MEASUREMENT EQUIPMENT USED: .....	27
6.4	MEASUREMENT RESULTS:.....	27

## 1. GENERAL INFORMATION

### 1.1. Product Description

General:

Product Name:	Aria
Brand:	amino, entone
Model:	XYZazzzzzzzz where “X” can be 6, 7, 8 for marketing purpose. “Y” can be 0~9 for marketing purpose. “Z” - can be 0~9. Among 0~9, number 1 & 3 are fixed for with WiFi model, others are for marketing purpose. “a” - can be 0~9, A~Z, a~z, “-“, “/”, “~”. Capital letter “I” is fixed for Bluetooth model; lowercase letter “r” is fixed for RF4CE model; others are for marketing purpose. “zzzzzzzz” – can be any combination of “0-9”, “A-Z”, “a-z”, “-“, “/”, “~” or blank for marketing purpose.
Model different:	For market segmentation
Power Supply:	3.3Vdc

Host product details:

Product Name:	Aria	
Brand:	amino, entone	
Model:	XYZazzzzzzzz where “X” can be 6, 7, 8 for marketing purpose. “Y” can be 0~9 for marketing purpose. “Z” - can be 0~9. Among 0~9, number 1 & 3 are fixed for with WiFi model, others are for marketing purpose. “a” - can be 0~9, A~Z, a~z, “-“, “/”, “~”. Capital letter “I” is fixed for Bluetooth model; lowercase letter “r” is fixed for RF4CE model; others are for marketing purpose. “zzzzzzzz” – can be any combination of “0-9”, “A-Z”, “a-z”, “-“, “/”, “~” or blank for marketing purpose.	
Model different:	For market segmentation	
Power Supply:	12Vdc from AC/DC adapter	
	Adapter:	Model: MSA-C1000IC12.0-12W-DE

IEEE 802.15.4

Frequency Range(MHz)	2425MHz, 2450MHz, 2475MHz
Modulation type	OQPSK
Channel Number	CH 15 : 2425MHz CH 20 : 2450MHz CH 25 : 2475MHz
Measured Power	90.02dBuV/m at 3 m
Antenna Designation:	Fixed Printed Antenna

The EUT is compliance with IEEE 802.15.4. standard.

The Test report is applied for RF4CE.

**1.2. Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended for FCC ID: XVG50-0102-R4-00 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

**1.3. Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013 and RSS-Gen issue 4: 2014. Radiated testing was performed at an antenna to EUT distance 3 meters.

**1.4. Test Facility**

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 872200; Designation Number is: TW1036, Canada Registration Number: 4067B-3.

**1.5. Special Accessories**

Not available for this EUT intended for grant.

**1.6. Equipment Modifications**

Not available for this EUT intended for grant.

## **2. System Test Configuration**

### **2.1. EUT Configuration**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### **2.2. EUT Exercise**

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed at 2425, 2450 and 2475MHz which were for the purpose of the measurements.

### **2.3. Test Procedure**

#### **2.3.1 Conducted Emissions**

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of ANSI C63.10: 2013 and RSS-Gen issue 4: 2014. Con-ducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

#### **2.3.2 Radiated Emissions**

The EUT is a placed on as turn table which is 0.8 m/1.5m(Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 6 and 11 of ANSI C63.10: 2013.



## 2.4. Limitation

### (1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

### (2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3

**(3) Radiated Emission 15.249 (d)**

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

**(4) Radiated Emission 15.249(e)**

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

- Remark:
1. Emission level in  $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$
  2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
  3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of  $\xi$  15.205
  4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of  $\xi$  15.205, then the general radiated emission limits in  $\xi$  15.209 apply.

## 2.5. Configuration of Tested System

Fig. 1 Configuration of Tested System



Table 1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	HP	440G1	2CE40911GZ	Non-shield	Non-shield

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

**Grounding:** Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

### 3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207/	Conducted Emission	Compliant
§15.249(a)(d)(e)	Field Strength Measurement	Compliant
§15.215(c)	20dB band width Measurement	Compliant

#### Description of test modes

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receive mode is programmed.

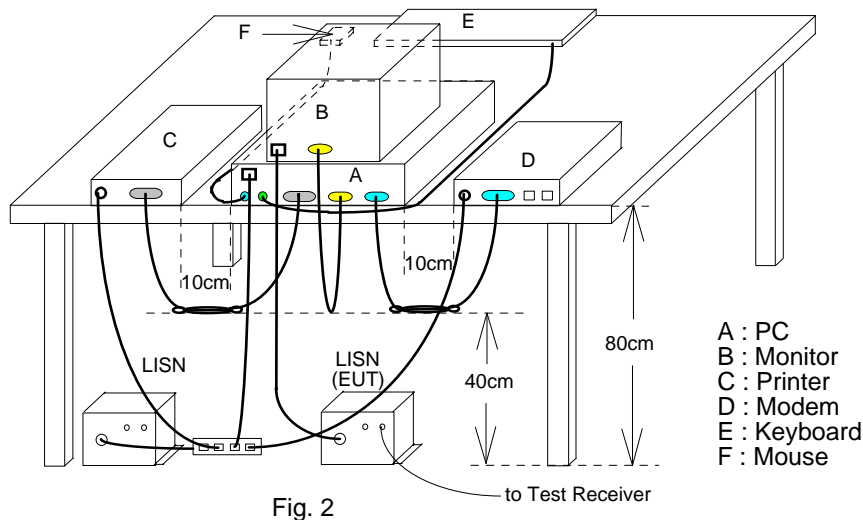
Channel low (2425MHz) 、 mid (2450MHz) and high (2475MHz) with highest data rate are chosen for full testing.

## 4. Conducted Emissions Test

### 4.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 4.2 Test SET-UP (Block Diagram of Configuration)



### 4.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	09/11/2017	09/10/2018
EMI Receiver 16	Rohde & Schwarz	ESCI	101221	10/23/2017	10/22/2018
LISN 18	ROHDE & SCHWARZ	ENV216	101424	02/05/2017	02/04/2018
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/07/2017	03/06/2018
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

### 4.4 Measurement Result:

Note: Refer to next page for measurement data and plots.

## AC POWER LINE CONDUCTED EMISSION TEST DATA

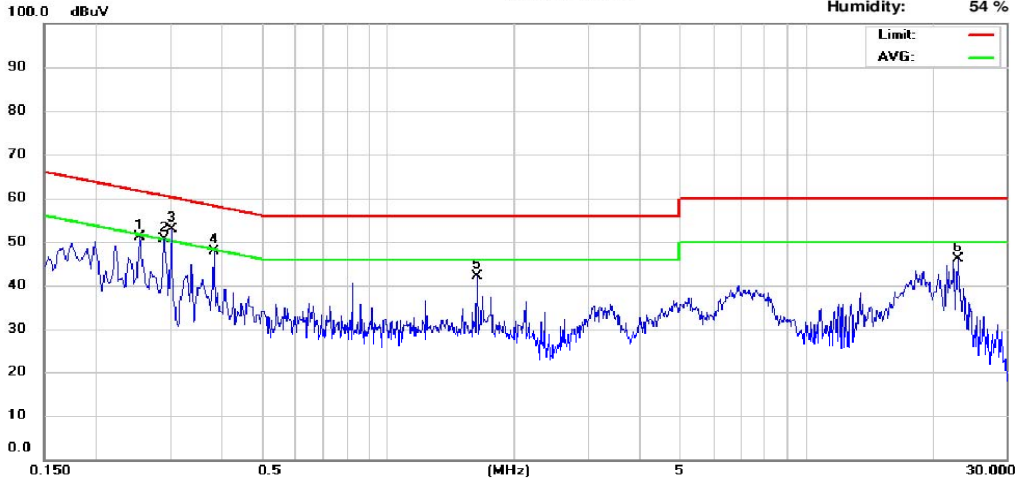
Operation Mode:	Normal Operation	Test Date:	2017/06/22
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Address: No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,  
Tao Yuan City 325, Taiwan.  
Tel: 03-4071718

### Conducted Emission Measurement

operator: SAWYER  
Temperature: 26 °C  
Humidity: 54 %



Site: Conduction 04

Phase: *L1*

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.254	31.10	19.84	9.69	40.79	61.63	-20.84	29.53	51.63	-22.10
2	0.290	27.57	16.70	9.70	37.27	60.52	-23.25	26.40	50.52	-24.12
3	0.302	26.33	12.91	9.69	36.02	60.19	-24.17	22.60	50.19	-27.59
4	0.382	22.70	9.37	9.69	32.39	58.24	-25.85	19.06	48.24	-29.18
5	1.630	16.99	7.90	9.74	26.73	56.00	-29.27	17.64	46.00	-28.36
6	23.130	35.78	31.87	10.09	45.87	60.00	-14.13	41.96	50.00	-8.04



Address: No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,  
Tao Yuan City 325, Taiwan.  
Tel: 03-4071718

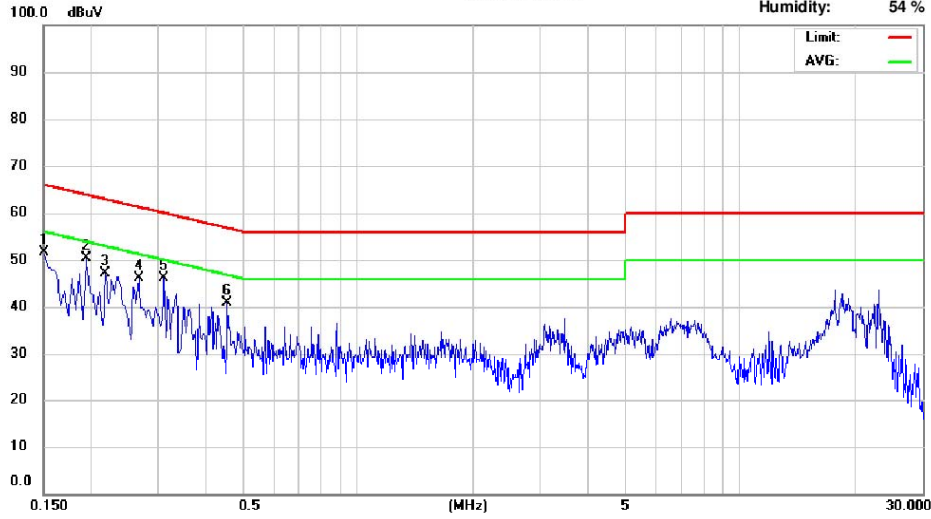
Conducted Emission Measurement

Date: 2017/6/22

operator: SAWYER

Temperature: 26 °C

Humidity: 54 %



Site: Conduction 04

Phase: N

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.150	37.96	19.69	9.68	47.64	66.00	-18.36	29.37	56.00	-26.63
2	0.194	35.14	20.16	9.68	44.82	63.86	-19.04	29.84	53.86	-24.02
3	0.218	33.40	20.50	9.68	43.08	62.89	-19.81	30.18	52.89	-22.71
4	0.266	26.62	13.51	9.68	36.30	61.24	-24.94	23.19	51.24	-28.05
5	0.310	26.40	11.56	9.68	36.08	59.97	-23.89	21.24	49.97	-28.73
6	0.454	22.36	10.77	9.69	32.05	56.80	-24.75	20.46	46.80	-26.34

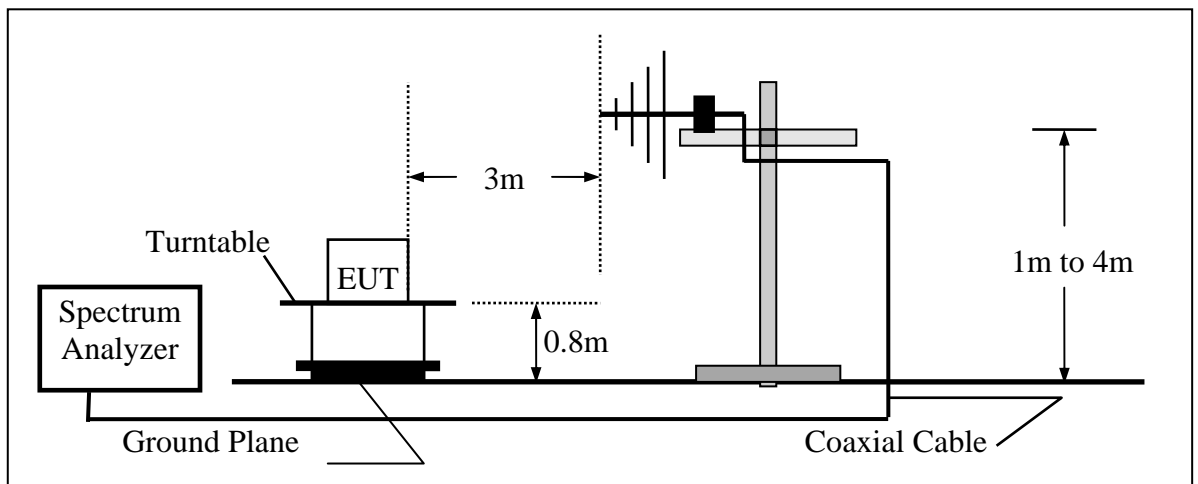
## 5. Radiated Emission Test

### 5.1 Measurement Procedure

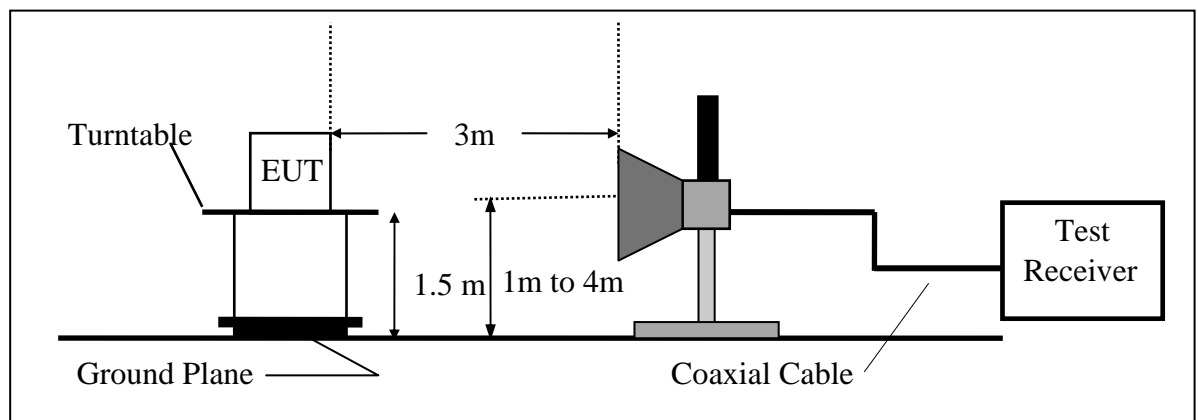
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

### 5.2 Test SET-UP (Block Diagram of Configuration)

#### (A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



#### (B) Radiated Emission Test Set-UP Frequency Over 1 GHz





### 5.3 Measurement Equipment Used:

Chamber 14(966)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
966 Chamber	Chance Most	Chamber 19	N/A	08/14/2017	08/13/2018
Spectrum Analyzer 21(3Hz-44GHz)	Agilent	N9030A	MY51360021	11/14/2017	11/13/2018
Loop Antenna(9K-30M)	EM	EM-6879	271	11/01/2016	10/31/2018
Bilog Antenna (30M-1G)	SCHWARZBECK	VULB9168 w 5dB Att	736	07/21/2017	07/20/2018
Horn antenna (1G-18G)	SCHWARZBECK	9120D	9120D-1627	07/21/2016	07/20/2018
Horn antenna (18G-26G)	Com-power	AH-826	081001	07/23/2017	07/22/2019
Horn antenna (26G-40G)	Com-power	AH-640	100A	02/22/2017	02/21/2019
Preamplifier (9k-1000M)	HP	8447F	3113A06362	11/13/2017	11/12/2018
Preamplifier(1G-26G)	Agilent	8449B	3008A02471	08/24/2017	08/23/2018
RF Cable (9k-18G)	HUBER SUHNER	SUCOFLEX 104A	MY1397/4A	08/24/2017	08/23/2018
RF cable (18G~40G)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/03/2017	11/02/2019
2.4G Filter	Micro-Tronics	Brm50702	76	12/25/2016	12/24/2017
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

#### 5.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

## 5.5 Measurement Result

### Fundamental Emission Measurement Result

Operation Mode : TX mode Test Date : 2017/06/14  
 Fundamental Frequency : 2425 MHz, 2450 MHz, 2475MHz Test By : Dino  
 Temp : 25 °C Hum. : 60%

#### CH Low:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2425.00	93.77	-5.59	88.18	114.00	-25.82	Peak	VERTICAL
1	2425.00	66.46	-5.59	60.87	114.00	-53.13	Peak	HORIZONTAL

#### CH Mid:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2450.00	95.54	-5.52	90.02	114.00	-23.98	Peak	VERTICAL
1	2450.00	68.68	-5.52	63.16	114.00	-50.84	Peak	HORIZONTAL

#### CH High:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2475.00	93.07	-5.44	87.63	114.00	-26.37	Peak	VERTICAL
1	2475.00	68.22	-5.44	62.78	114.00	-51.22	Peak	HORIZONTAL

#### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 10KHz.

**Radiated Spurious Emission Measurement Result (below 1GHz)**

Operation Mode	TX CH Low	Test Date	2017/06/14
Fundamental Frequency	2425 MHz	Test By	Dino
Temperature	25 °C	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	76.56	41.97	-11.23	30.74	40.00	-9.26	Peak	VERTICAL
2	297.72	37.08	-6.13	30.95	46.00	-15.05	Peak	VERTICAL
3	760.41	34.26	2.39	36.65	46.00	-9.35	Peak	VERTICAL
4	784.66	33.89	2.64	36.53	46.00	-9.47	Peak	VERTICAL
5	860.32	34.59	3.84	38.43	46.00	-7.57	Peak	VERTICAL
6	894.27	36.87	4.49	41.36	46.00	-4.64	Peak	VERTICAL
1	201.69	37.97	-9.81	28.16	43.50	-15.34	Peak	HORIZONTAL
2	336.52	34.47	-5.40	29.07	46.00	-16.93	Peak	HORIZONTAL
3	536.34	30.35	-1.60	28.75	46.00	-17.25	Peak	HORIZONTAL
4	784.66	32.84	2.64	35.48	46.00	-10.52	Peak	HORIZONTAL
5	935.01	31.05	5.21	36.26	46.00	-9.74	Peak	HORIZONTAL
6	959.26	31.45	5.58	37.03	46.00	-8.97	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (below 1GHz)**

Operation Mode	TX CH Mid	Test Date	2017/06/14
Fundamental Frequency	2450 MHz	Test By	Dino
Temperature	25 °C	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	76.56	41.88	-11.23	30.65	40.00	-9.35	Peak	VERTICAL
2	298.69	36.76	-6.09	30.67	46.00	-15.33	Peak	VERTICAL
3	760.41	33.50	2.39	35.89	46.00	-10.11	Peak	VERTICAL
4	784.66	33.28	2.64	35.92	46.00	-10.08	Peak	VERTICAL
5	860.32	33.39	3.84	37.23	46.00	-8.77	Peak	VERTICAL
6	896.21	34.98	4.53	39.51	46.00	-6.49	Peak	VERTICAL
1	202.66	37.45	-9.82	27.63	43.50	-17.56	Peak	HORIZONTAL
2	336.52	34.14	-5.40	28.74	46.00	-18.88	Peak	HORIZONTAL
3	784.66	32.54	2.64	35.18	46.00	-18.18	Peak	HORIZONTAL
4	809.88	32.77	2.96	35.73	46.00	-22.17	Peak	HORIZONTAL
5	894.27	31.12	4.49	35.61	46.00	-23.61	Peak	HORIZONTAL
6	959.26	31.61	5.58	37.19	46.00	-21.51	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (below 1GHz)**

Operation Mode	TX CH High	Test Date	2017/06/14
Fundamental Frequency	2475 MHz	Test By	Dino
Temperature	25 °C	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	199.75	36.77	-9.81	26.96	43.50	-16.54	Peak	VERTICAL
2	336.52	34.58	-5.40	29.18	46.00	-16.82	Peak	VERTICAL
3	585.81	29.39	-0.58	28.81	46.00	-17.19	Peak	VERTICAL
4	784.66	32.13	2.64	34.77	46.00	-11.23	Peak	VERTICAL
5	898.15	30.47	4.57	35.04	46.00	-10.96	Peak	VERTICAL
6	959.26	31.23	5.58	36.81	46.00	-9.19	Peak	VERTICAL
1	199.75	37.59	-9.81	27.78	43.50	-15.72	Peak	HORIZONTAL
2	336.52	33.86	-5.40	28.46	46.00	-17.54	Peak	HORIZONTAL
3	536.34	30.26	-1.60	28.66	46.00	-17.34	Peak	HORIZONTAL
4	835.10	32.82	3.39	36.21	46.00	-9.79	Peak	HORIZONTAL
5	890.39	31.35	4.42	35.77	46.00	-10.23	Peak	HORIZONTAL
6	959.26	31.44	5.58	37.02	46.00	-8.98	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode	: TX CH Low	Test Date	: 2017/06/14
Fundamental Frequency	: 2425 MHz	Test By	: Dino
Temp	: 25 °C	Hum.	: 60%

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	4850.00	46.58	1.02	47.60	54.00	-6.40	Average	VERTICAL
2	4850.00	55.19	1.02	56.21	74.00	-17.79	Peak	VERTICAL
1	4850.00	38.22	1.02	39.24	74.00	-34.76	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode : TX CH Mid Test Date : 2017/06/14  
 Fundamental Frequency : 2450 MHz Test By : Dino  
 Temp : 25 °C Hum. : 60%

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	4900.00	44.76	1.13	45.89	54.00	-8.11	Average	VERTICAL
2	4900.00	53.68	1.13	54.81	74.00	-19.19	Peak	VERTICAL
1	4900.00	36.05	1.13	37.18	74.00	-36.82	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode	: TX CH High	Test Date	: 2017/06/14
Fundamental Frequency	: 2475 MHz	Test By	: Dino
Temp	: 25 °C	Hum.	: 60%

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over L imit dB	Remark	Pol V/H
1	4950.00	43.26	1.23	44.49	54.00	-9.51	Average	VERTICAL
2	4950.00	52.69	1.23	53.92	74.00	-20.08	Peak	VERTICAL
1	4950.00	36.53	1.23	37.76	74.00	-36.24	Peak	HORIZONTAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.
- 4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

## Radiated Spurious Emission Measurement Result (Band Edge)

Operation Mode : Band Edge Test Date : 2017/06/14  
Temp./Hum. : 25 °C / : 60% Test By : Dino

### CH Low

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2395.79	55.44	-5.68	49.76	74.00	-24.24	Peak	VERTICAL
2	2400.00	51.56	-5.66	45.90	74.00	-28.10	Peak	VERTICAL
3	2425.64	95.70	-5.59	90.11	--	P	Peak	VERTICAL
1	2400.00	51.57	-5.66	45.91	74.00	-28.09	Peak	HORIZONTAL
2	2424.58	72.43	-5.59	66.84	--	P	Peak	HORIZONTAL

### CH High

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2474.49	96.99	-5.44	91.55	--	P	Peak	VERTICAL
2	2483.50	53.40	-5.41	47.99	74.00	-26.01	Peak	VERTICAL
1	2475.53	75.87	-5.44	70.43	--	P	Peak	HORIZONTAL
2	2483.50	49.79	-5.41	44.38	74.00	-29.62	Peak	HORIZONTAL

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 10MHz.

## **6. 20 dB Band Width Measurement**

### **6.1 Measurement Procedure**

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span = 5MHz.
4. Set SPA Max hold. Mark peak, -20dB.

### **6.2 Test SET-UP (Block Diagram of Configuration)**

Same as 4.2 Radiated Emission Measurement.

### **6.3 Measurement Equipment Used:**

Same as 4.2 Radiated Emission Measurement.

### **6.4 Measurement Results:**

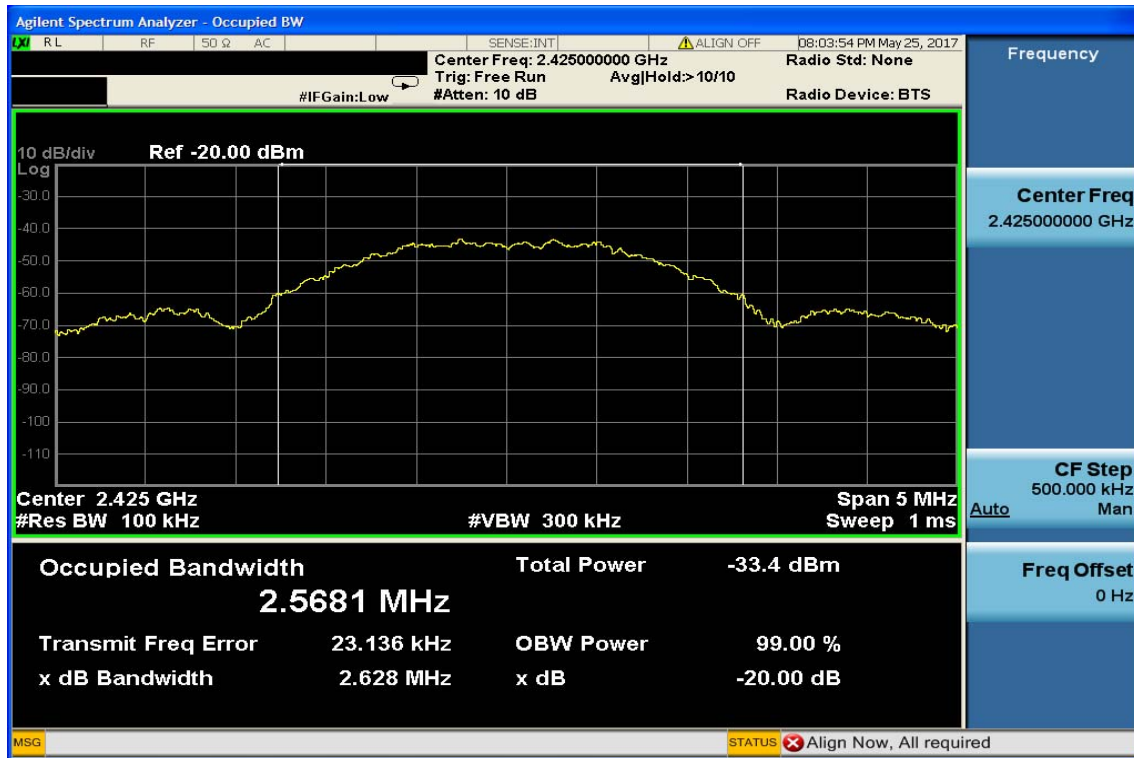
2425 Channel = 2.628MHz

2445 Channel = 2.613MHz

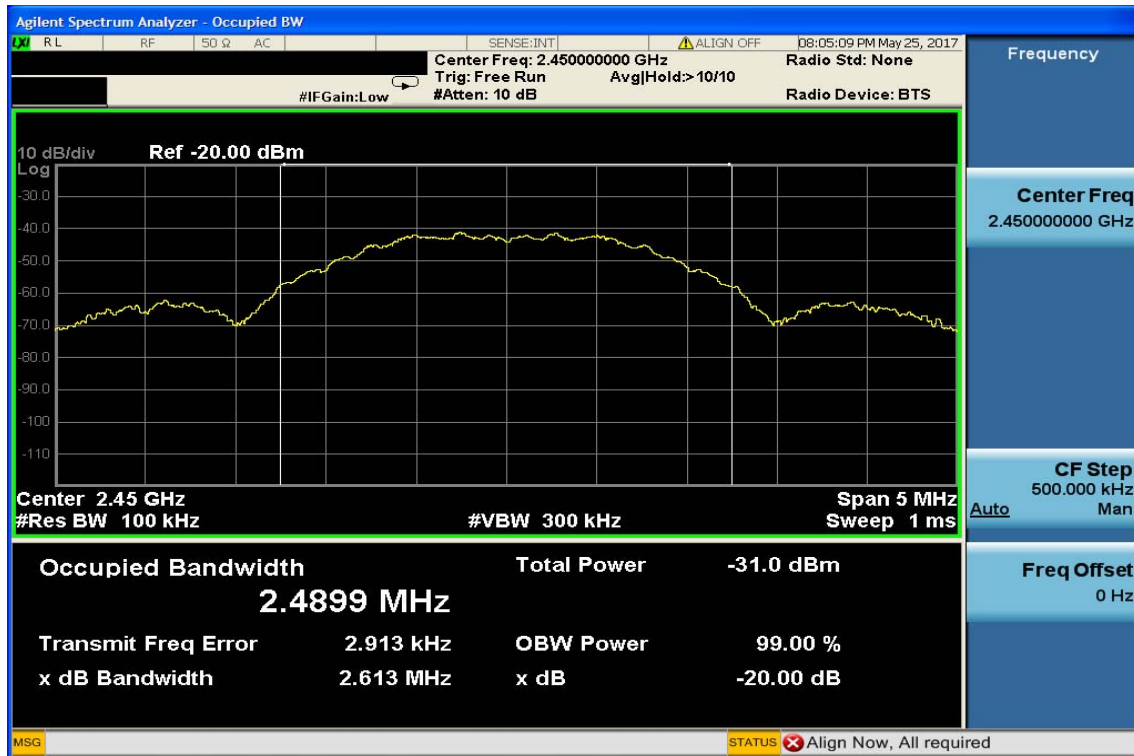
2475 Channel = 2.617MHz

Refer to attached data chart.

## 20dB Band Width test Plot CH Low



## CH Mid



CH High

