

FCC Report (Bluetooth)

Product Name : IEEE 802.11 a/b/g/n/ac 2T2R SDIO WIFI And BT Module
Trade mark : LB-LINK
Model No. : BL-8822SSA3
FCC ID : 2AL6K-8822SSA3
Report Number : BLA-EMC-201903-A37-03
Date of sample receipt : March 18, 2019
Date of Test : March 18, 2019 –April 16, 2019
Date of Issue : April 18, 2019
Test standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247
Test result : PASS

Prepared for:

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Prepared by:

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Date: April 18, 2019





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2 Version

Version No.	Date	Description
00	April 18, 2019	Original

BlueAsia



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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	N/A
Conducted Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10:2013.

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.



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5 General Information

5.1 General Description of EUT

Product Name:	IEEE 802.11 a/b/g/n/ac 2T2R SDIO WIFI And BT Module
Model No.:	BL-8822SSA3
Serial No.:	N/A
Sample(s) Status	Engineer sample
Operation Frequency:	2402MHz-2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	External Antenna
Antenna Gain:	2.0dBi
Power Supply:	DC 3.3V



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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
...
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz



5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
DELL	MONITOR	S2817Q	N/A
DELL	KEYBOARD	KB216d	05HDWJ
Lenovo	MOUSE	SM-8823	SM50L24506
DELL	PC	Vostro3668	B070NR2

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **FCC — Designation No.: CN1252**

Qianhai BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Designation CN1252.

• **ISED — CAB identifier No.: CN0028**

Qianhai BlueAsia of Technical Services(Shenzhen) Co., Ltd has been registered by Certification and Engineering Bureau of ISED for radio equipment testing with CAB identifier CN0028

5.5 Test Location

All tests were performed at:
All tests were performed at: Qianhai BlueAsia of Technical Services(Shenzhen) Co., Ltd. IOT Test Centre of BlueAsia No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen, China Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673 No tests were sub-contracted.



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6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m SAC	SKET	9m*6 m*6m	966	06-10-2018	06-09-2023
2	Broadband Antenna	SCHWARZBECK	VULB9168	00836 P:00227	07-14-2018	07-13-2019
3	Horn Antenna	SCHWARZBECK	9120D	01892 P:00331	07-14-2018	07-13-2019
4	EMI Test Software	EZ	EZ	N/A	N/A	N/A
5	Pre-amplifier	SKET	N/A	N/A	07-19-2018	07-18-2019
6	Spectrum analyzer	Rohde & Schwarz	FSP40	100817	05-24-2018	05-23-2019
7	EMI Test Receiver	Rohde & Schwarz	ESR7	101199	03-21-2019	03-20-2020
8	Controller	SKET	N/A	N/A	N/A	N/A
9	Vector Signal Generator	Agilent	E4438C	MY45092582	05-24-2018	05-23-2019
10	Signal Generator	Agilent	E8257D	MY44320250	05-24-2018	05-23-2019

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	EMI Test Receiver	Rohde & Schwarz	ESPI3	101082	06-10-2018	06-09-2019
2	LISN	CHASE	MN2050D	1447	12-18-2018	12-17-2019
3	LISN	Rohde & Schwarz	ENV216	3560.6550.15	07-19-2018	07-18-2019
4	EMI Test Software	EZ	EZ	N/A	N/A	N/A
5	Temperature Humidity Chamber	Mingle	TH101B	N/A	07-19-2018	07-18-2019



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RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Spectrum Analyzer	Agilent	N9030A	MY50510123	05-24-2018	05-23-2019
2	Spectrum analyzer	Rohde & Schwarz	FSP40	100817	05-24-2018	05-23-2019
3	Vector Signal Generator	Agilent	E4438C	MY45092582	05-24-2018	05-23-2019
4	Signal Generator	Agilent	E8257D	MY44320250	05-24-2018	05-23-2019
5	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO27	05-24-2018	05-23-2019
6	Power Sensor	D.A.R.E	RPR3006W	17I00015SNO28	05-24-2018	05-23-2019
7	DC Power Supply	LODESTAR	LP305DE	N/A	07-19-2018	07-18-2019
8	Temperature Humidity Chamber	Mingle	TH101B	N/A	07-19-2018	07-18-2019



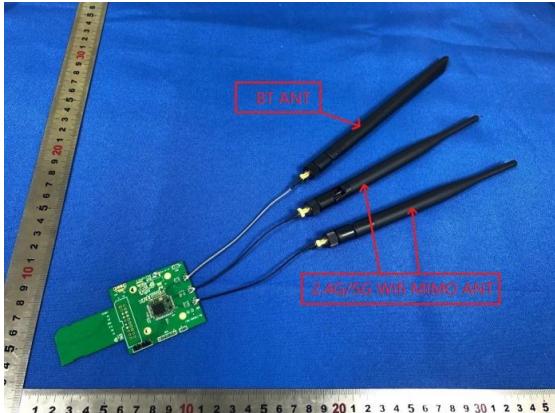
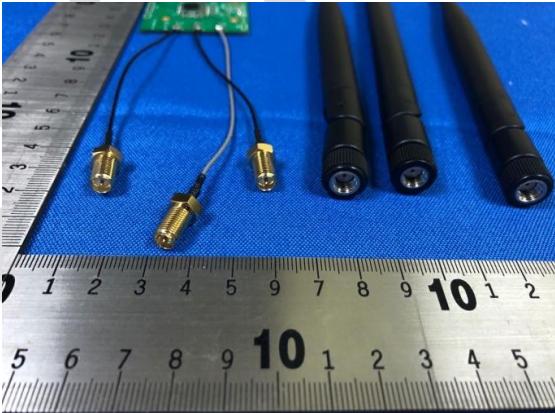
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7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna: <i>The antenna is External antenna, the best case gain of the antenna is 2.0dBi</i>	
 A photograph showing a green printed circuit board (PCB) with two black antennas connected by wires. A red box labeled 'BT ANT' points to the shorter antenna, and another red box labeled '2.4G/5G WiFi MIMO ANT' points to the longer antenna. A metal ruler is placed next to the PCB for scale.	 A photograph showing a metal ruler and several antenna components. The ruler is marked in centimeters, with '10' clearly visible. Next to the ruler are two black cylindrical antennas, a small green PCB, and two gold-colored SMA connectors.



7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.10:2013																
Test Frequency Range:	150KHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
	* Decreases with the logarithm of the frequency.																
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>40cm</p> <p>80cm</p> <p>AUX Equipment</p> <p>E.U.T.</p> <p>Test table/Insulation plane</p> <p>EMI Receiver</p> <p>Filter</p> <p>AC power</p> <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement. 																
Test Instruments:	Refer to section 6.0 for details																
Test mode:	Refer to section 5.2 for details																
Test results:	N/A																

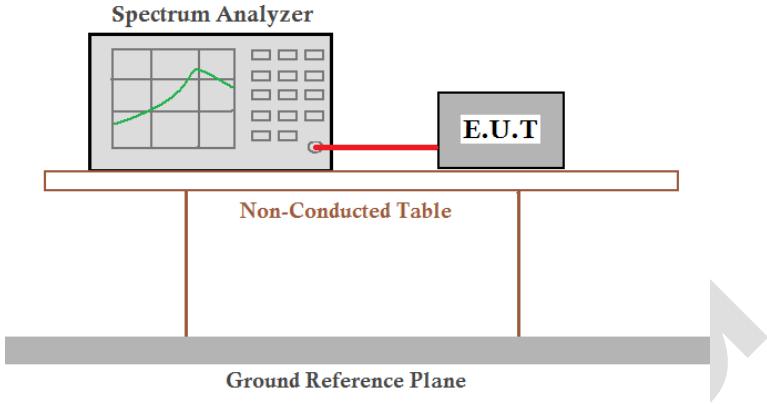


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7.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixC: Maximum conducted output power



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7.4 Channel Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixA: DTS Bandwidth

AppendixB: Occupied Channel Bandwidth

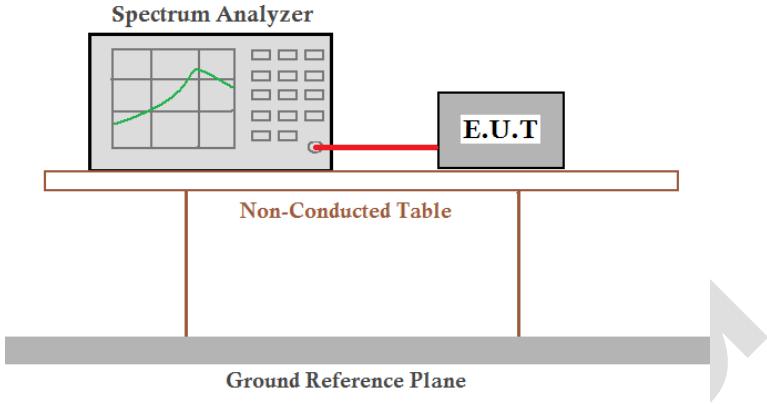


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7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixD: Maximum power spectral density



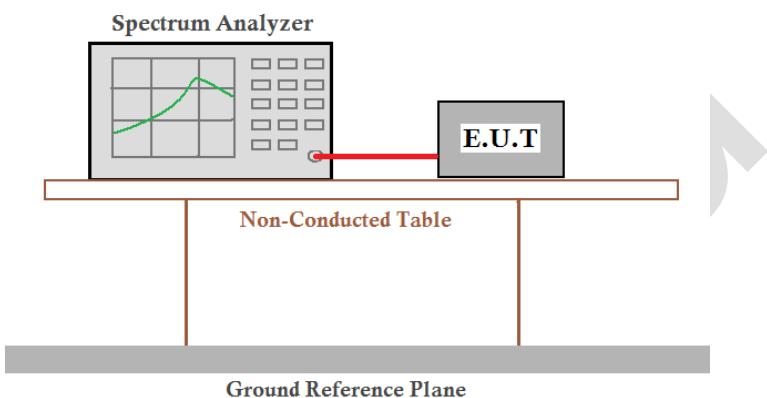
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7.6 Band edges

7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixE:Band edge measurements



7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205								
Test Method:	ANSI C63.10:2013								
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2390MHz, 2483.5MHz to 2500MHz) data was showed.								
Test site:	Measurement Distance: 3m								
Receiver setup:	Frequency	Detector	RBW	VBW	Value				
	Above 1GHz	Peak	1MHz	3MHz	Peak				
		RMS	1MHz	3MHz	Average				
Limit:	Frequency	Limit (dB _V /m @3m)		Value					
	Above 1GHz	54.00		Average					
		74.00		Peak					
Test setup:									
Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. 								
Test Instruments:	Refer to section 6.0 for details								
Test mode:	Refer to section 5.2 for details								
Test results:	Pass								

Measurement data:

Remark: The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

Test channel:	Lowest
---------------	--------

Peak value:

Qianhai BlueAsia of Technical Services(Shenzhen) Co., Ltd.

IOT Test Centre of BlueAsia,

No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673



Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	55.41	-14.56	40.85	74.00	-33.15	Horizontal
2390.00	56.23	-14.19	42.04	74.00	-31.96	Horizontal
2310.00	53.47	-14.85	38.62	74.00	-35.38	Vertical
2390.00	56.71	-14.52	42.19	74.00	-31.81	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	40.03	-14.56	25.47	54.00	-28.53	Horizontal
2390.00	41.18	-14.19	26.99	54.00	-27.01	Horizontal
2310.00	41.20	-14.85	26.35	54.00	-27.65	Vertical
2390.00	40.76	-14.52	26.24	54.00	-27.76	Vertical

Test channel:	Highest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	58.23	-13.66	44.57	74.00	-29.43	Horizontal
2500.00	54.15	-13.57	40.58	74.00	-33.42	Horizontal
2483.50	57.72	-14.05	43.67	74.00	-30.33	Vertical
2500.00	53.39	-13.97	39.42	74.00	-34.58	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	40.35	-13.66	26.69	54.00	-27.31	Horizontal
2500.00	41.14	-13.57	27.57	54.00	-26.43	Horizontal
2483.50	41.53	-14.05	27.48	54.00	-26.52	Vertical
2500.00	42.28	-13.97	28.31	54.00	-25.69	Vertical

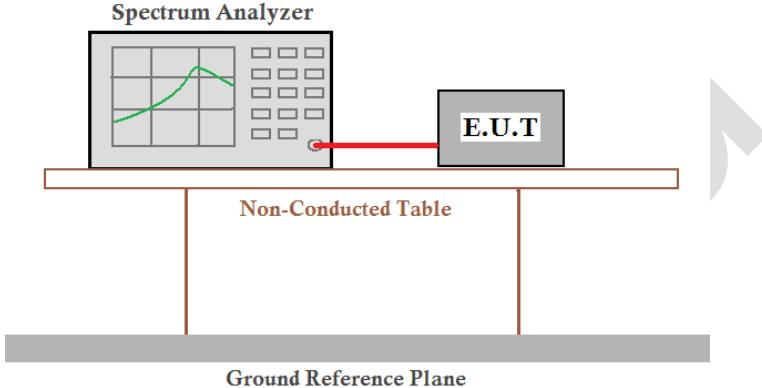
Remark:

1. *Final Level* = Receiver Read level + Correct factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor



7.7 Spurious Emission

7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

AppendixF: Conducted Spurious Emission



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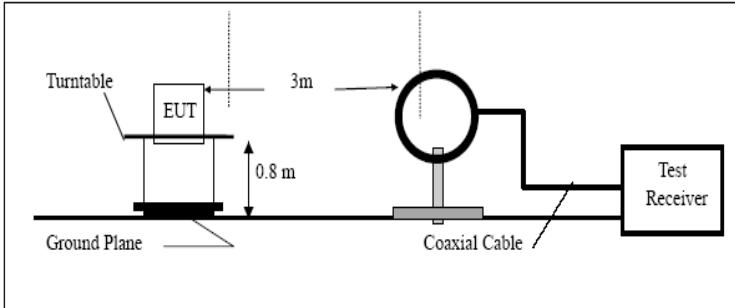
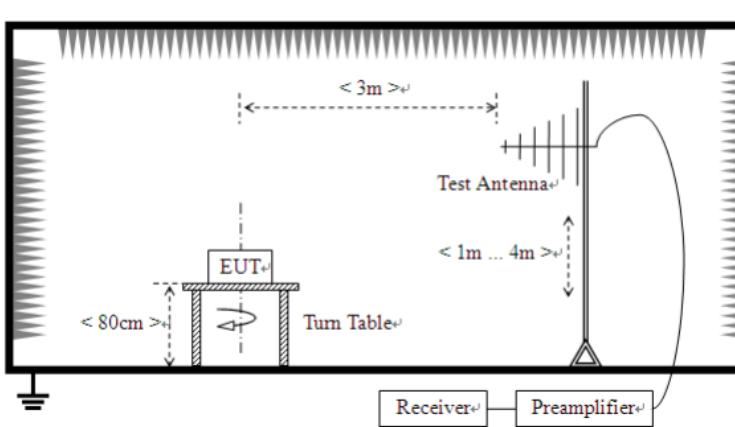
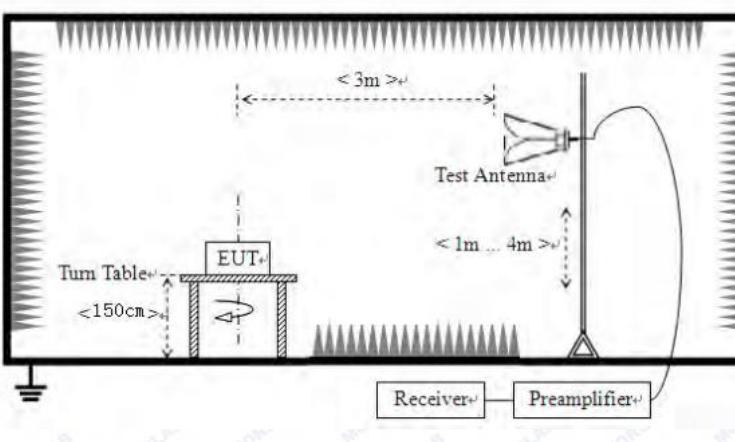
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7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	300m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				



Test setup:	<p>Below 30MHz</p>  <p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Procedure:	<ol style="list-style-type: none">1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the



	<p>measurement.</p> <p>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement Data**■ 9 kHz ~ 30 MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.



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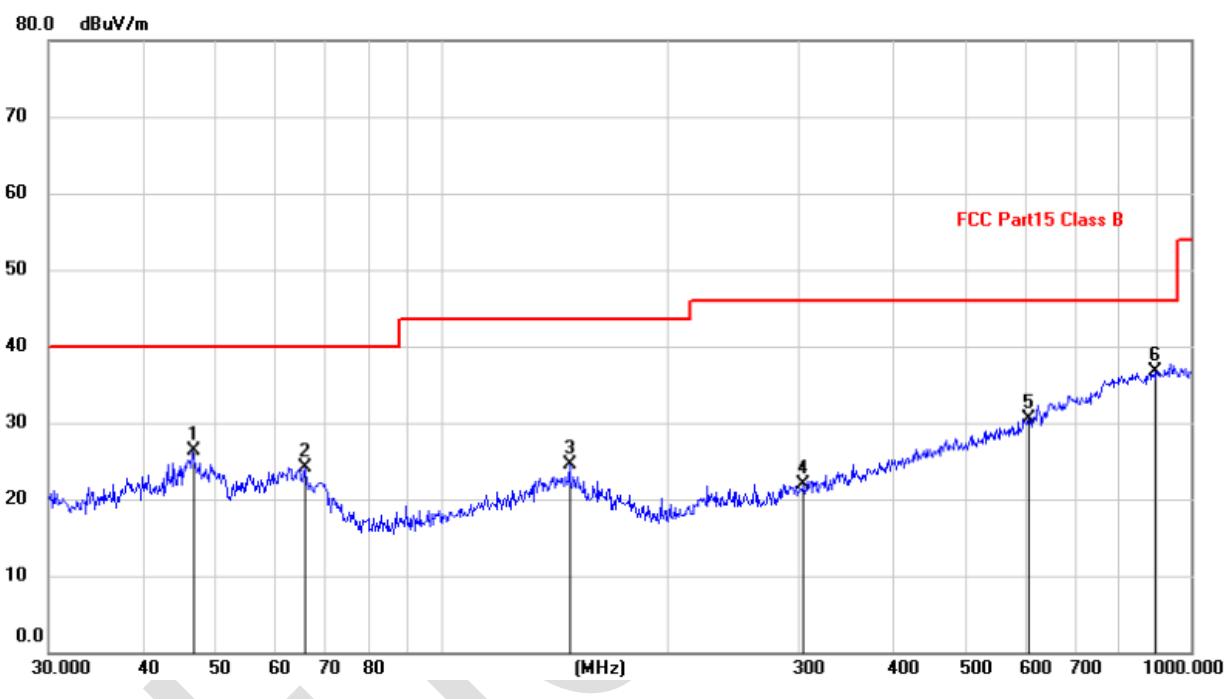
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■ Below 1GHz

Horizontal:

EUT:	I IEEE 802.11 a/b/g/n/ac 2T2R SDIO WIFI And BT Module	Polarization:	Horizontal
Model:	BL-8822SSA3	Power Source:	AC120V/60Hz
Mode:	BLE mode	Test by:	Eason
Temp./Hum.(%H):	26°C/60%RH		



No.	Mk.	Freq.	Reading	Correct Factor	Measure-	Limit	Over	Over
			Level		ment			
1		46.6664	12.48	13.88	26.36	40.00	-13.64	QP
2		65.8031	12.47	11.67	24.14	40.00	-15.86	QP
3		148.4410	11.39	13.04	24.43	43.50	-19.07	QP
4		304.6099	8.28	13.59	21.87	46.00	-24.13	QP
5		607.7866	9.53	21.04	30.57	46.00	-15.43	QP
6	*	896.9963	11.70	25.02	36.72	46.00	-9.28	QP



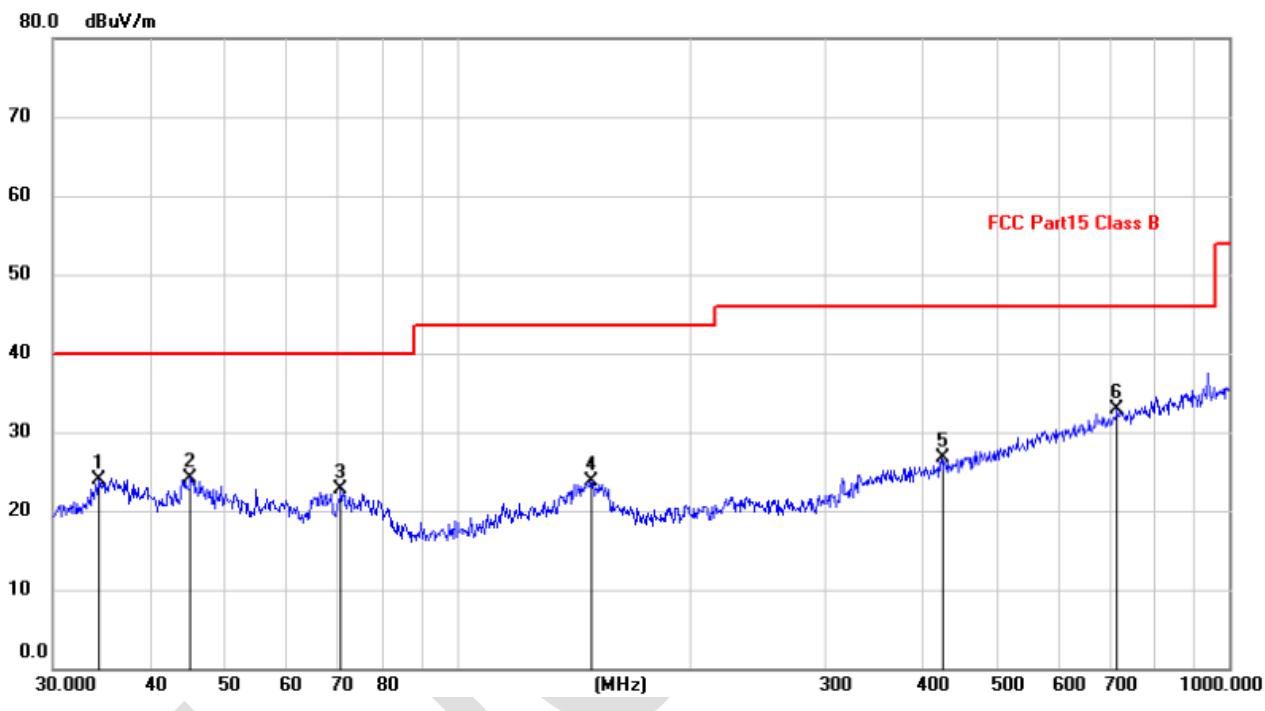
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Vertical:

EUT:	IEEE 802.11 a/b/g/n/ac 2T2R SDIO WIFI And BT Module	Polarization:	Vertical
Model:	BL-8822SSA3	Power Source:	AC120V/60Hz
Mode:	BLE mode	Test by:	Eason
Temp./Hum.(%H): 26°C/60%RH			



No.	Mk.	Freq.	Reading	Correct Factor	Measure-	Limit	Over	Over
			Level		ment			
1		34.3962	11.35	12.52	23.87	40.00	-16.13	QP
2		45.2165	10.25	13.84	24.09	40.00	-15.91	QP
3		70.8315	11.97	10.68	22.65	40.00	-17.35	QP
4		148.9625	10.66	13.05	23.71	43.50	-19.79	QP
5		423.5403	9.65	17.06	26.71	46.00	-19.29	QP
6	*	716.6820	10.18	22.66	32.84	46.00	-13.16	QP



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■ Above 1GHz

Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	55.23	-7.43	47.80	74.00	-26.20	Vertical
7206.00	57.15	-2.42	54.73	74.00	-19.27	Vertical
9608.00	58.27	-2.38	55.89	74.00	-18.11	Vertical
12010.00	*			74.00		Vertical
14412.00	*			74.00		Vertical
4804.00	53.54	-7.43	46.11	74.00	-27.89	Horizontal
7206.00	56.72	-2.42	54.30	74.00	-19.70	Horizontal
9608.00	57.39	-2.38	55.01	74.00	-18.99	Horizontal
12010.00	*			74.00		Horizontal
14412.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	43.31	-7.43	35.88	54.00	-18.12	Vertical
7206.00	44.07	-2.42	41.65	54.00	-12.35	Vertical
9608.00	44.18	-2.38	41.80	54.00	-12.20	Vertical
12010.00	*			54.00		Vertical
14412.00	*			54.00		Vertical
4804.00	44.39	-7.43	36.96	54.00	-17.04	Horizontal
7206.00	45.51	-2.42	43.09	54.00	-10.91	Horizontal
9608.00	45.23	-2.38	42.85	54.00	-11.15	Horizontal
12010.00	*			54.00		Horizontal
14412.00	*			54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Correct factor
2. **, means this data is the too weak instrument of signal is unable to test.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor



Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	54.23	-7.49	46.74	74.00	-27.26	Vertical
7326.00	56.64	-2.40	54.24	74.00	-19.76	Vertical
9768.00	58.21	-2.38	55.83	74.00	-18.17	Vertical
12210.00	*			74.00		Vertical
14652.00	*			74.00		Vertical
4884.00	53.84	-7.49	46.35	74.00	-27.65	Horizontal
7326.00	57.05	-2.40	54.65	74.00	-19.35	Horizontal
9768.00	58.22	-2.38	55.84	74.00	-18.16	Horizontal
12210.00	*			74.00		Horizontal
14652.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	42.12	-7.49	34.63	54.00	-19.37	Vertical
7326.00	42.26	-2.40	39.86	54.00	-14.14	Vertical
9768.00	43.31	-2.38	40.93	54.00	-13.07	Vertical
12210.00	*			54.00		Vertical
14652.00	*			54.00		Vertical
4884.00	42.51	-7.49	35.02	54.00	-18.98	Horizontal
7326.00	43.39	-2.40	40.99	54.00	-13.01	Horizontal
9768.00	42.21	-2.38	39.83	54.00	-14.17	Horizontal
12210.00	*			54.00		Horizontal
14652.00	*			54.00		Horizontal

Remark:

1. Final Level =Receiver Read level +Correct factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
- 3 . Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor



Test channel:	Highest					
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	53.85	-7.47	46.38	74.00	-27.62	Vertical
7440.00	57.01	-2.45	54.56	74.00	-19.44	Vertical
9920.00	58.66	-2.37	56.29	74.00	-17.71	Vertical
12400.00	*			74.00		Vertical
14880.00	*			74.00		Vertical
4960.00	54.41	-7.47	46.94	74.00	-27.06	Horizontal
7440.00	56.86	-2.45	54.41	74.00	-19.59	Horizontal
9920.00	58.13	-2.37	55.76	74.00	-18.24	Horizontal
12400.00	*			74.00		Horizontal
14880.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Correct factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	42.11	-7.47	34.64	54.00	-19.36	Vertical
7440.00	42.54	-2.45	40.09	54.00	-13.91	Vertical
9920.00	43.13	-2.37	40.76	54.00	-13.24	Vertical
12400.00	*			54.00		Vertical
14880.00	*			54.00		Vertical
4960.00	41.77	-7.47	34.30	54.00	-19.70	Horizontal
7440.00	41.59	-2.45	39.14	54.00	-14.86	Horizontal
9920.00	42.86	-2.37	40.49	54.00	-13.51	Horizontal
12400.00	*			54.00		Horizontal
14880.00	*			54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Correct factor.
2. ** means this data is the too weak instrument of signal is unable to test.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor.



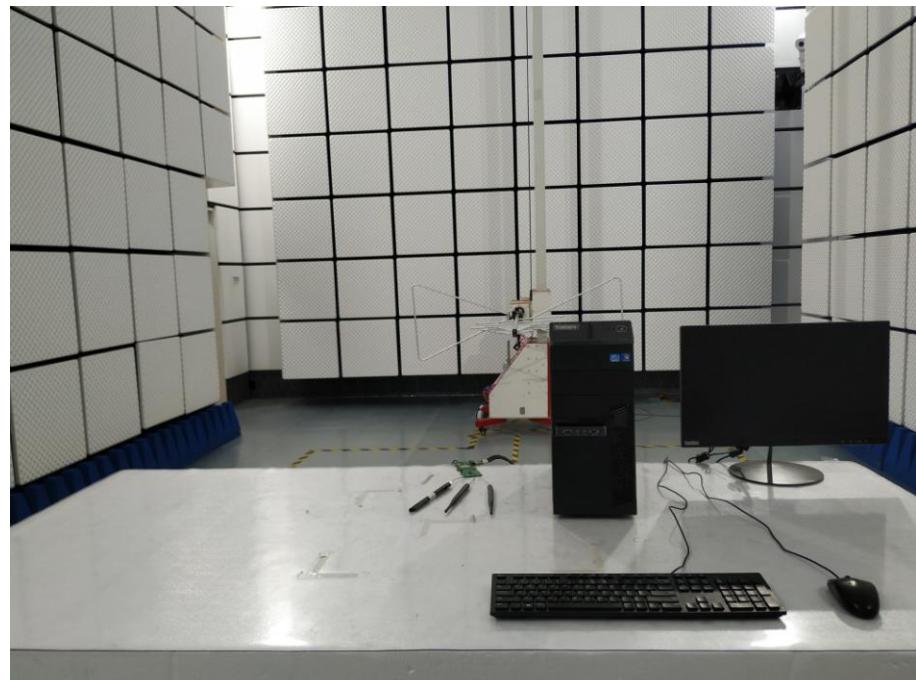
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8 Test Setup Photo

Radiated Emission





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9 EUT Constructional Details

Reference to the test report No. BLA-EMC-201903-A37-01

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10 Appendix

Refer to the following attachments.

*** End of Report ***

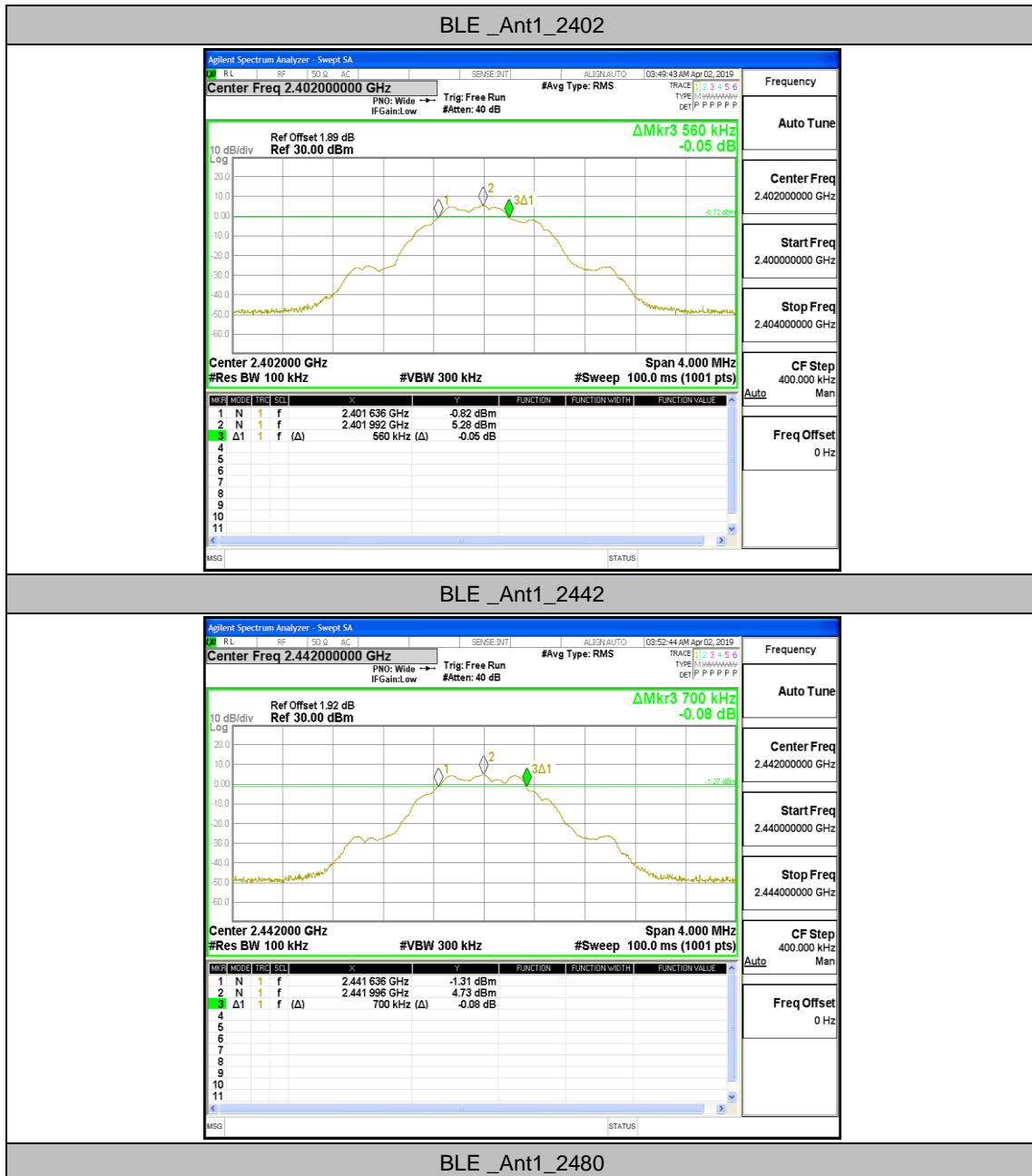
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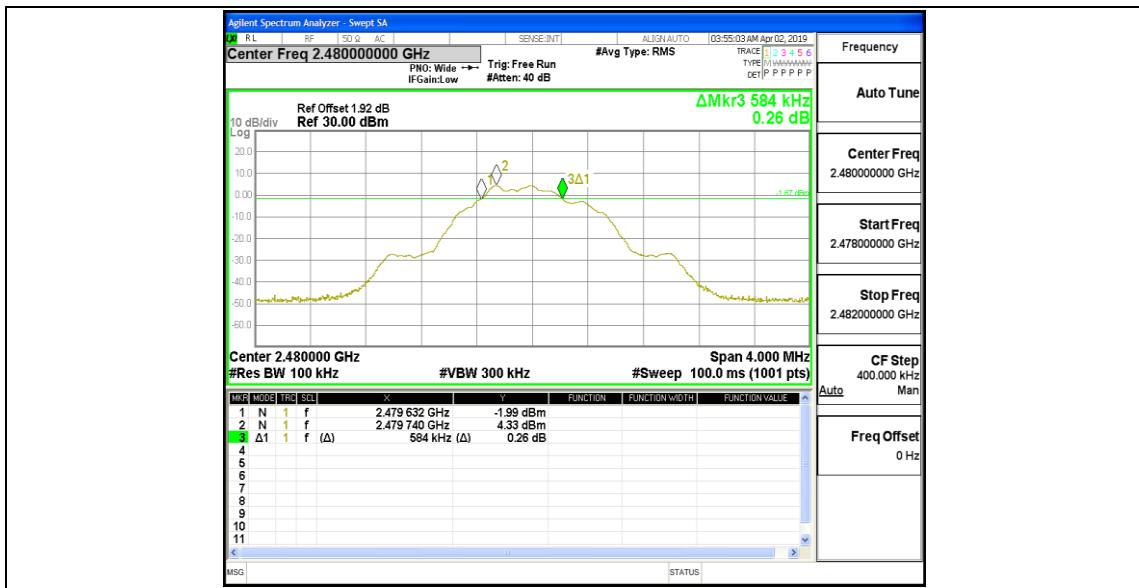
AppendixA: DTS Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	0.560	2401.636	2402.196	---	PASS
		2442	0.700	2441.636	2442.336	---	PASS
		2480	0.584	2479.632	2480.216	---	PASS

Test Graphs



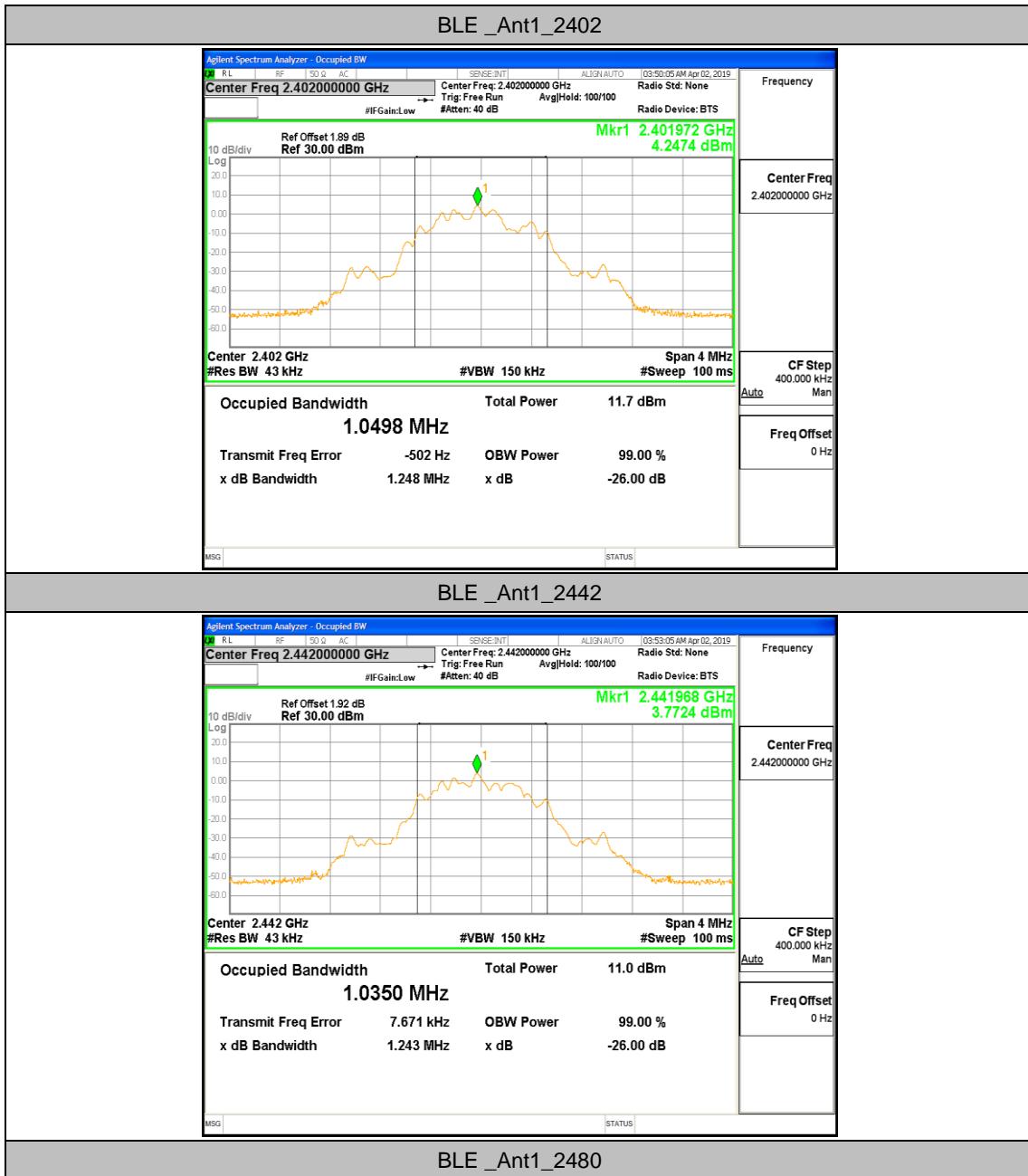


AppendixB: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	1.0498	2401.475	2402.524	---	PASS
		2442	1.0350	2441.490	2442.525	---	PASS
		2480	1.0458	2479.483	2480.529	---	PASS

Test Graphs



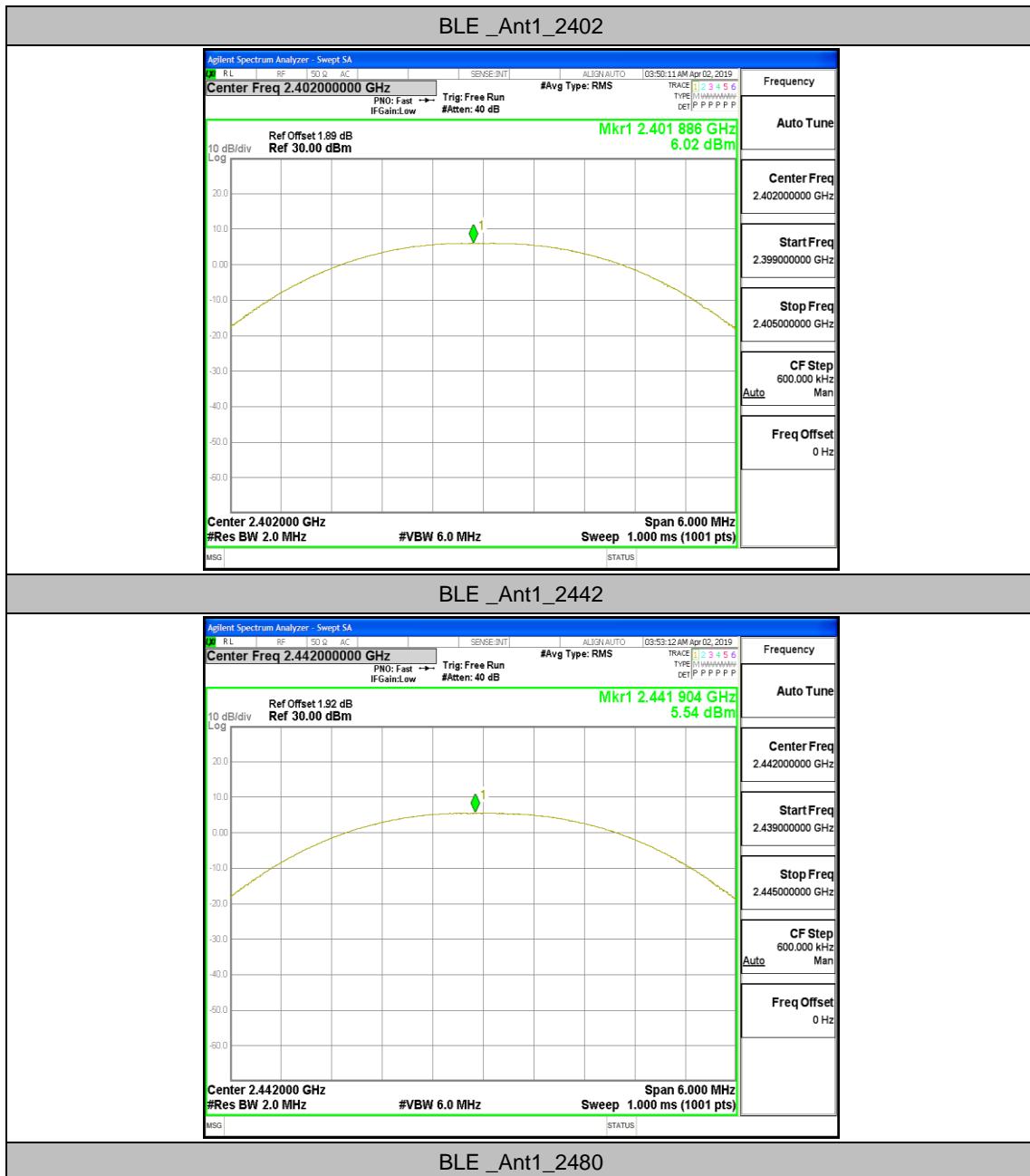


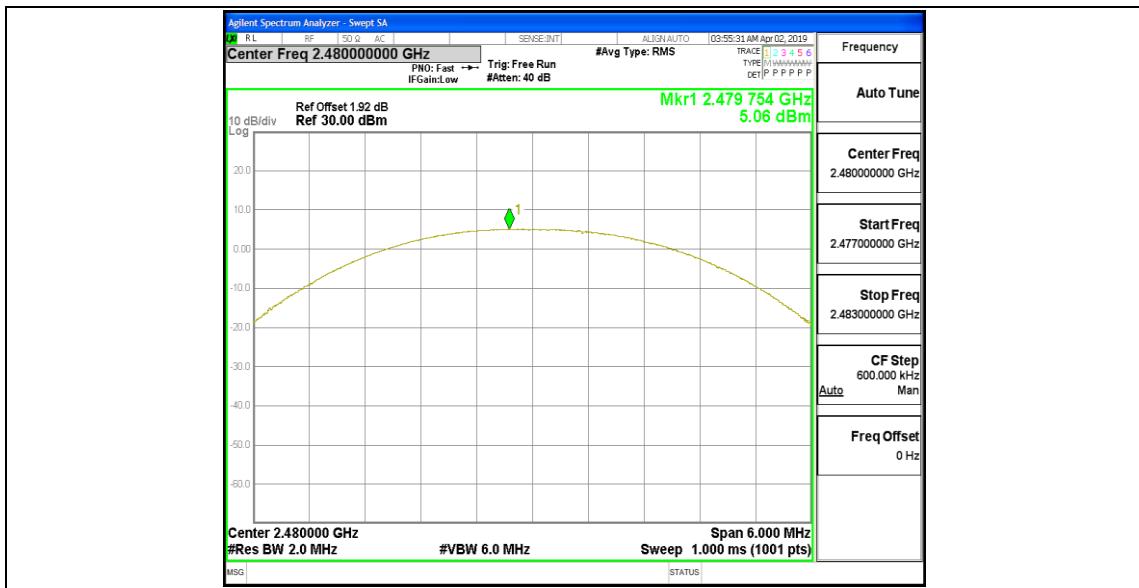
AppendixC: Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	6.02	<=30	PASS
		2442	5.54	<=30	PASS
		2480	5.06	<=30	PASS

Test Graphs



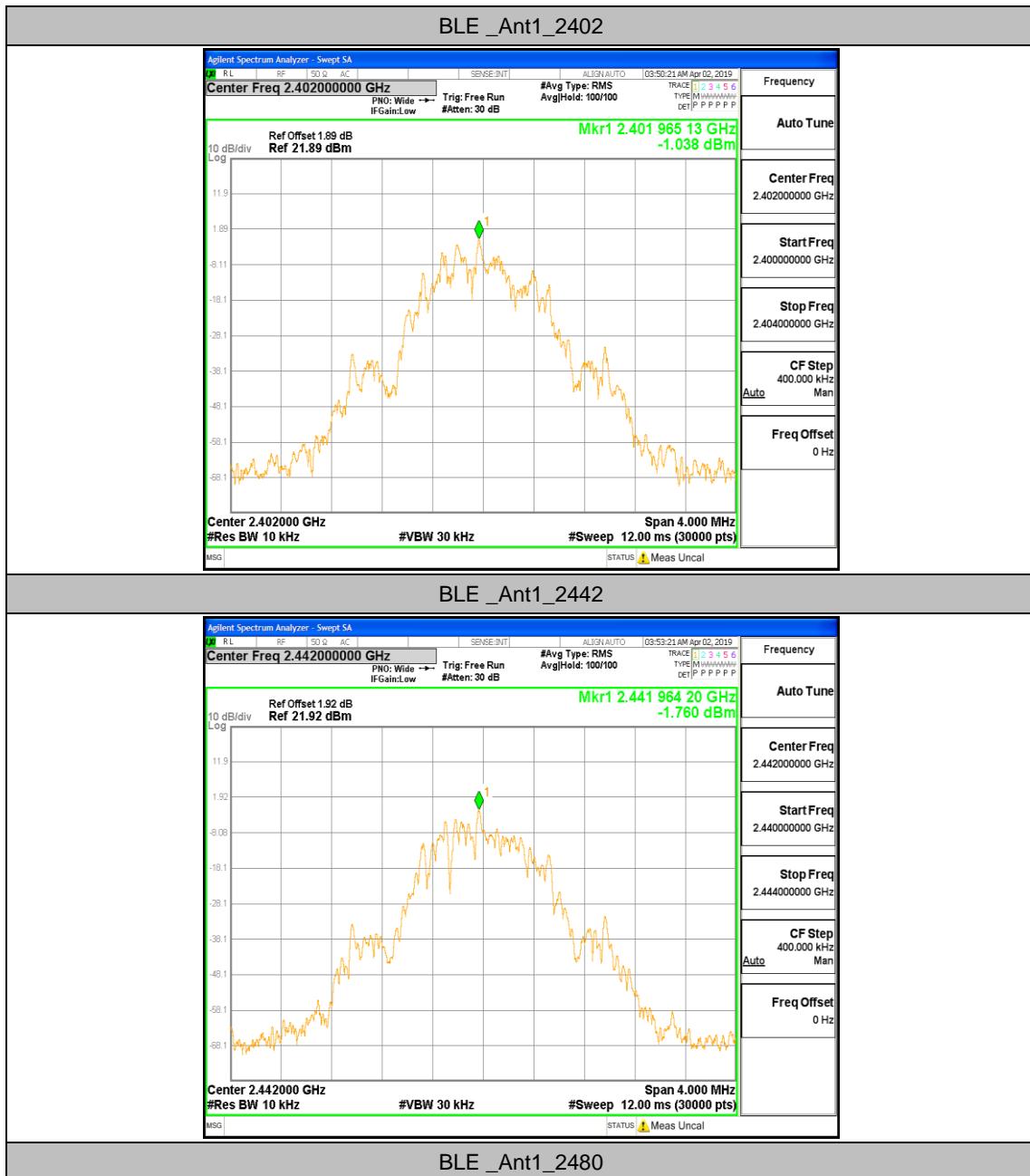


AppendixD: Maximum power spectral density

Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE	Ant1	2402	-1.04	<=8	PASS
		2442	-1.76	<=8	PASS
		2480	-1.87	<=8	PASS

Test Graphs



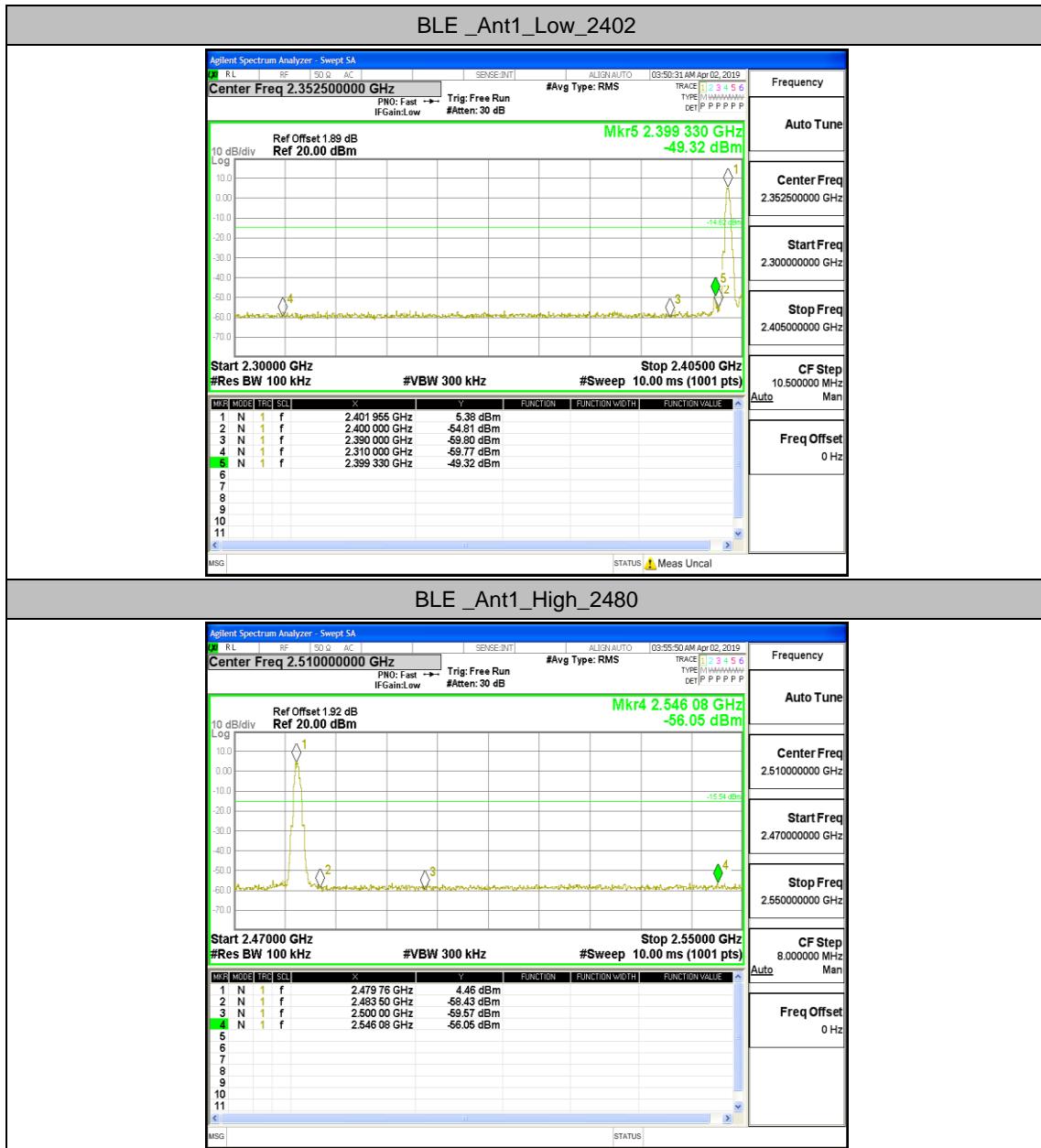


AppendixE:Band edge measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	Low	2402	5.38	-49.33	<=-14.62	PASS
		High	2480	4.46	-56.05	<=-15.54	PASS

Test Graphs

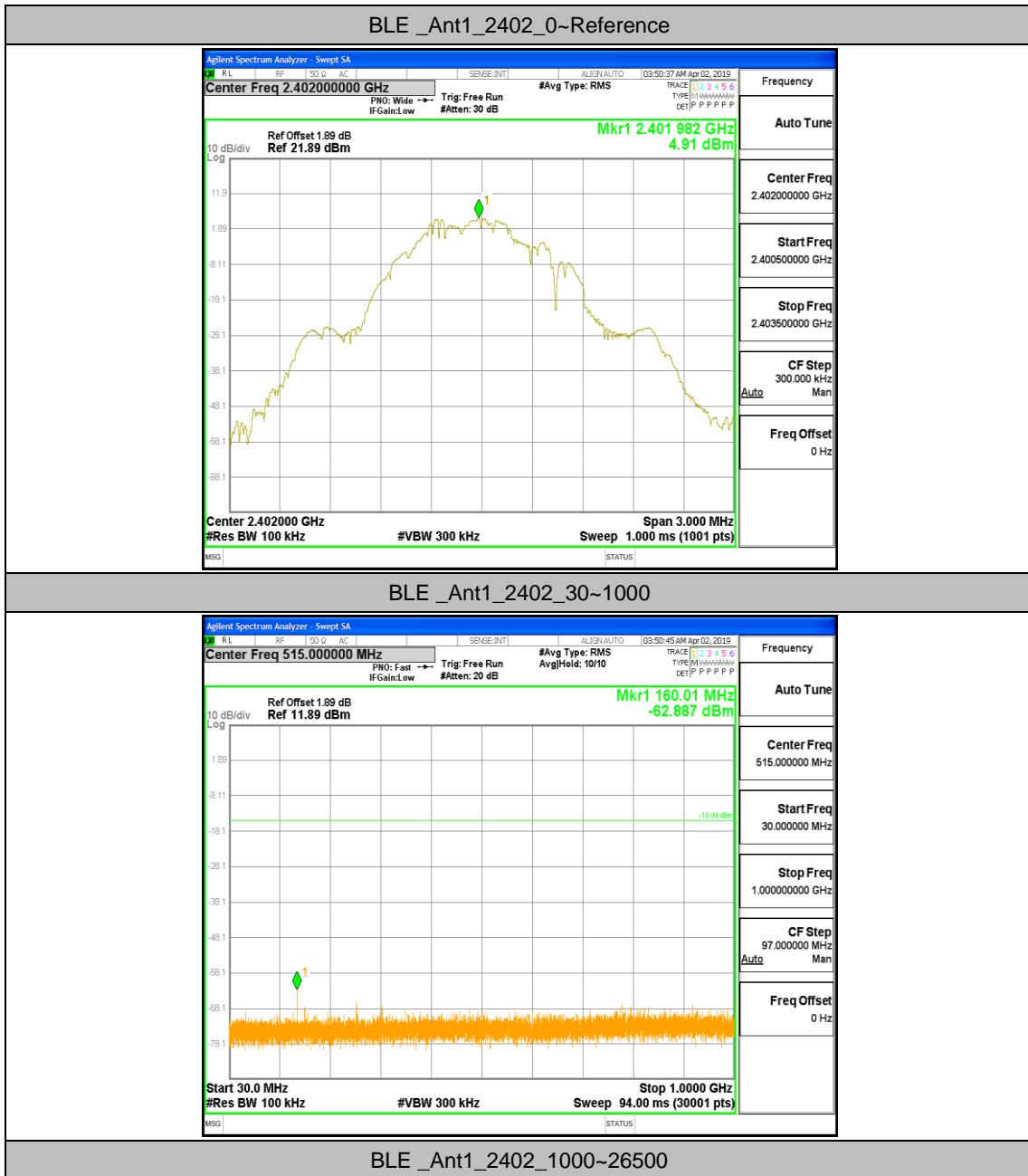


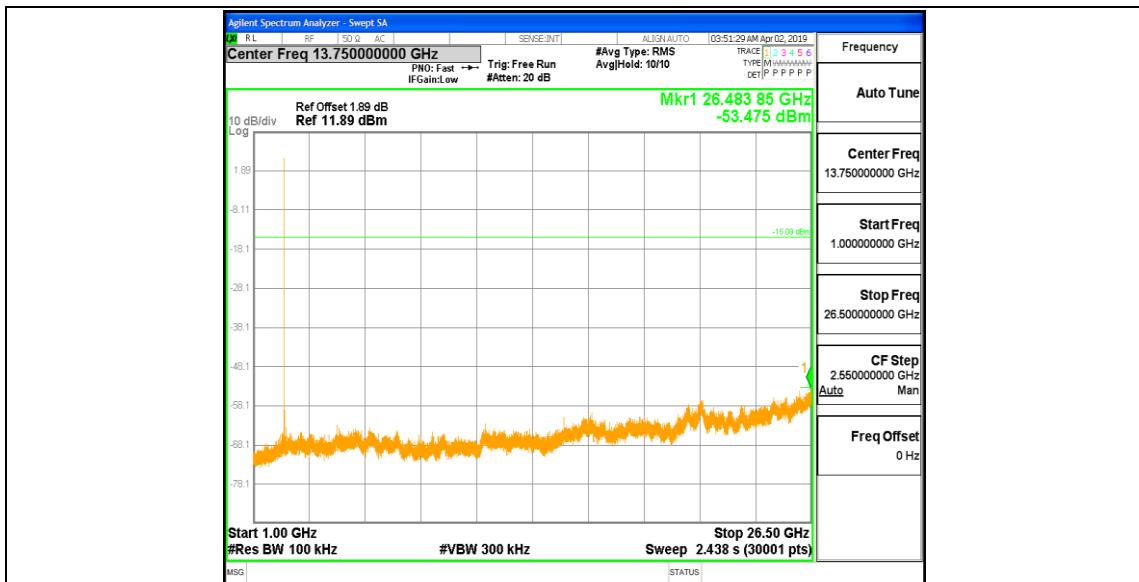
AppendixF:Conducted SpuriousEmission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	Reference	4.91	4.91	---	PASS
			30~1000	30~1000	-62.887	<=-15.086	PASS
			1000~26500	1000~26500	-53.475	<=-15.086	PASS
		2442	Reference	4.54	4.54	---	PASS
			30~1000	30~1000	-62.79	<=-15.461	PASS
			1000~26500	1000~26500	-53.833	<=-15.461	PASS
		2480	Reference	4.19	4.19	---	PASS
			30~1000	30~1000	-60.237	<=-15.808	PASS
			1000~26500	1000~26500	-53.953	<=-15.808	PASS

Test Graphs

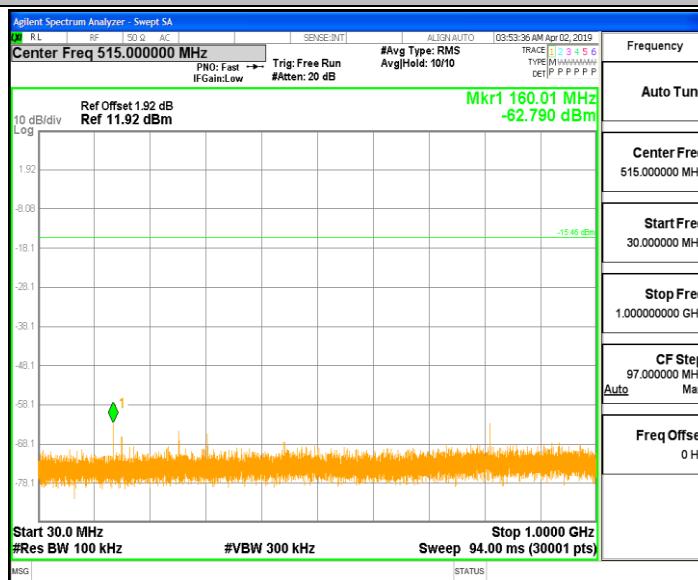




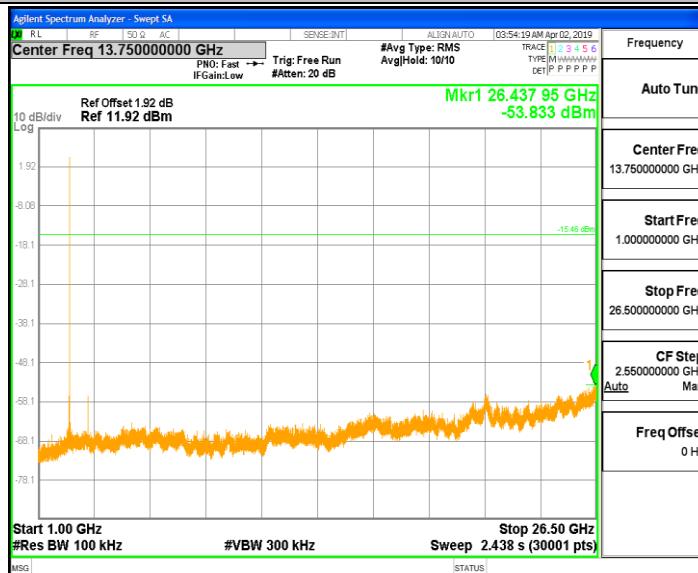
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BLE_Ant1_2442_30~1000



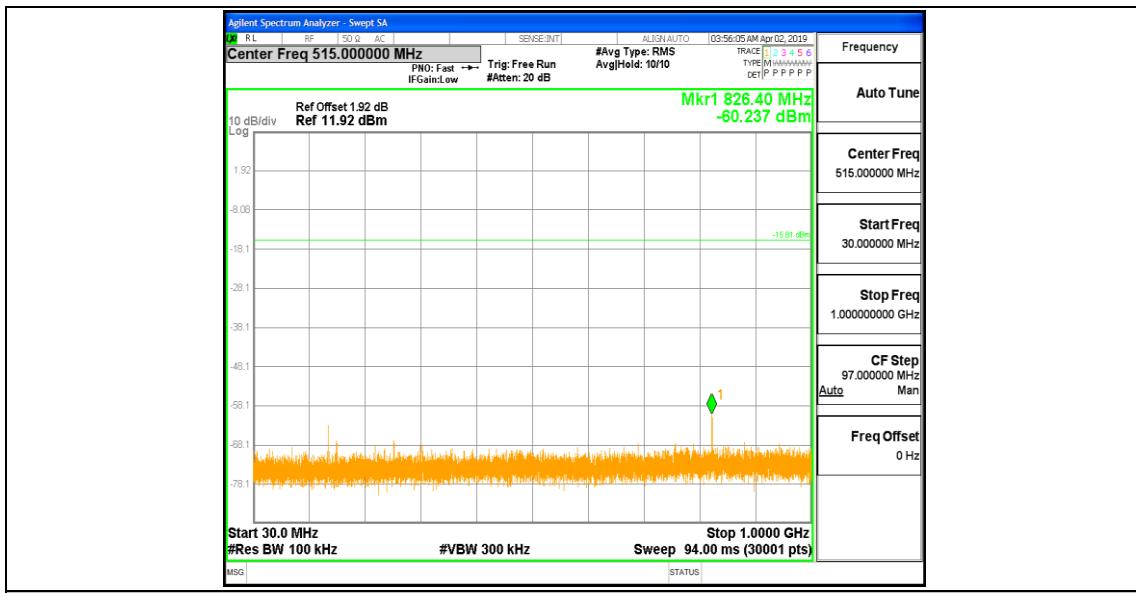
BLE_Ant1_2442_1000~26500



BLE_Ant1_2480_0~Reference



BLE_Ant1_2480_30~1000



BLE_Ant1_2480_1000~26500

