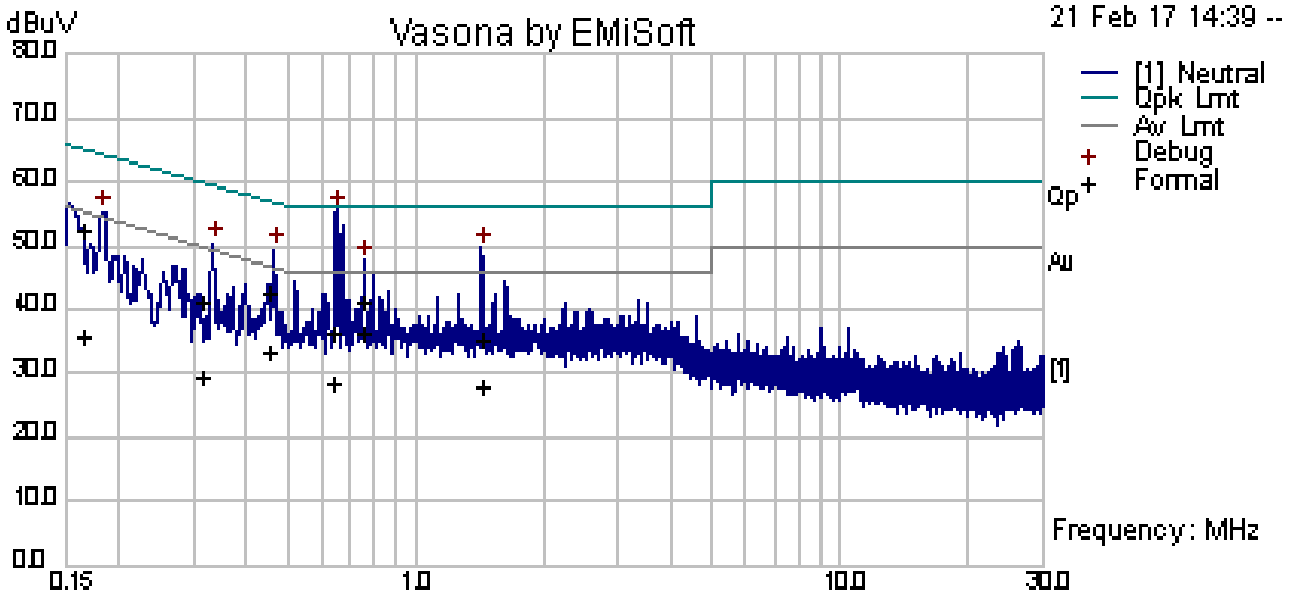
Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	02/21/2017			
Remarks	AC Line @ Neutral			



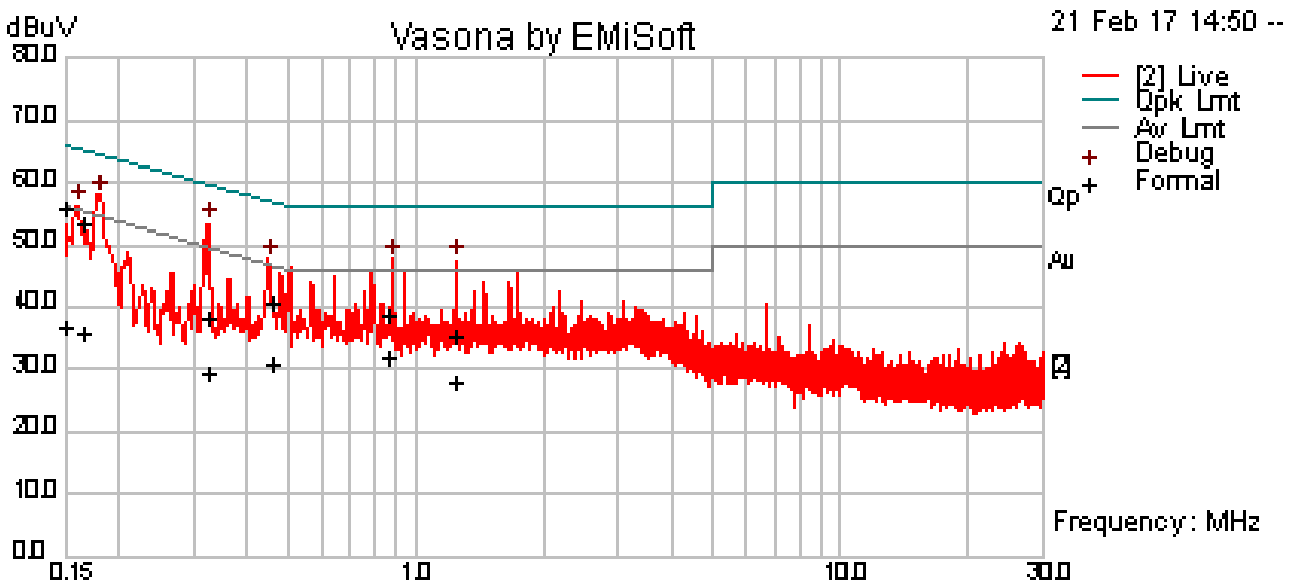
Neutral Plot at 120Vac, 60Hz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.64	25.71	10.01	0.58	36.30	Quasi Peak	Neutral	56.00	-19.70	Pass
1.44	24.72	10.02	0.51	35.25	Quasi Peak	Neutral	56.00	-20.75	Pass
0.45	32.21	10.01	0.66	42.88	Quasi Peak	Neutral	56.87	-14.00	Pass
0.76	30.80	10.01	0.55	41.37	Quasi Peak	Neutral	56.00	-14.63	Pass
0.17	41.15	10.00	1.54	52.69	Quasi Peak	Neutral	65.14	-12.45	Pass
0.32	30.52	10.00	0.82	41.34	Quasi Peak	Neutral	59.77	-18.43	Pass
0.64	17.87	10.01	0.58	28.46	Average	Neutral	46.00	-17.54	Pass
1.44	17.36	10.02	0.51	27.89	Average	Neutral	46.00	-18.11	Pass
0.45	22.84	10.01	0.66	33.51	Average	Neutral	46.87	-13.36	Pass
0.76	25.84	10.01	0.55	36.41	Average	Neutral	46.00	-9.59	Pass
0.17	24.17	10.00	1.54	35.72	Average	Neutral	55.14	-19.42	Pass
0.32	18.69	10.00	0.82	29.51	Average	Neutral	49.77	-20.26	Pass

Note: The results above show only the worst case.

Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	21	Result:	☒ Pass ☐ Fail
	Humidity (%):	42		
	Atmospheric(mbar):	1021		
Mains Power:	120Vac, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	02/21/2017			
Remarks	AC Line @ Line			



Line Plot at 120Vac, 60Hz

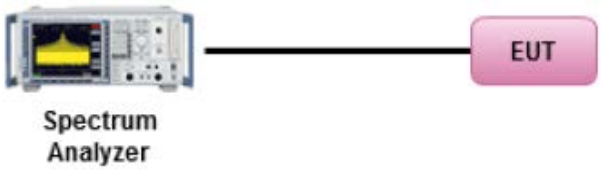
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line	Limit (dBuV)	Margin (dB)	Pass /Fail
0.33	27.66	10.01	0.80	38.46	Quasi Peak	Live	59.50	-21.04	Pass
0.16	41.93	10.00	1.57	53.50	Quasi Peak	Live	65.25	-11.75	Pass
0.86	27.96	10.01	0.54	38.51	Quasi Peak	Live	56.00	-17.49	Pass
1.24	24.72	10.02	0.52	35.25	Quasi Peak	Live	56.00	-20.75	Pass
0.46	30.16	10.01	0.65	40.82	Quasi Peak	Live	56.63	-15.81	Pass
0.15	44.03	10.00	1.74	55.77	Quasi Peak	Live	66.00	-10.23	Pass
0.33	18.56	10.01	0.80	29.36	Average	Live	49.50	-20.14	Pass
0.16	24.26	10.00	1.57	35.83	Average	Live	55.25	-19.43	Pass
0.86	21.51	10.01	0.54	32.06	Average	Live	46.00	-13.94	Pass
1.24	17.60	10.02	0.52	28.14	Average	Live	46.00	-17.86	Pass
0.46	20.27	10.01	0.65	30.93	Average	Live	46.63	-15.69	Pass
0.15	25.27	10.00	1.74	37.01	Average	Live	56.00	-18.99	Pass

Note: The results above show only the worst case.

10.2 Channel Separation (Bluetooth BDR/EDR)

Requirement(s):

Spec	Item	Requirement	Applicable
47 CFR §15.247 (e) RSS-247 (A2.6)	a)	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.	☒

Test Setup				
Test Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems Channel Separation procedure - The EUT must have its hopping function enabled. - Span = wide enough to capture the peaks of two adjacent channels - Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span - Video (or Average) Bandwidth (VBW) ≥ RBW. - Detector = Peak. - Trace mode = max hold. - Use the marker-delta function to determine the separation between the peaks of the adjacent channels.			
Test Date	02/14/2017	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	21ºC 46% 1019mbar
Remark	NONE			
Result	☒ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

Configuration : Bluetooth Mode , BDR Mode

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>2/3 20dB Bandwidth (MHz)	Pass/Fail
Low	2402	0.994	>0.663	Pass
Mid	2441	0.962	>0.641	Pass
High	2480	1.030	>0.687	Pass

Configuration : Bluetooth Mode , EDR Mode

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>2/3 20dB Bandwidth (MHz)	Pass/Fail
Low	2402	0.996	>0.664	Pass
Mid	2441	0.988	>0.659	Pass
High	2480	1.022	>0.681	Pass

Note: The results of 20dB BW can be found in section 10.3.

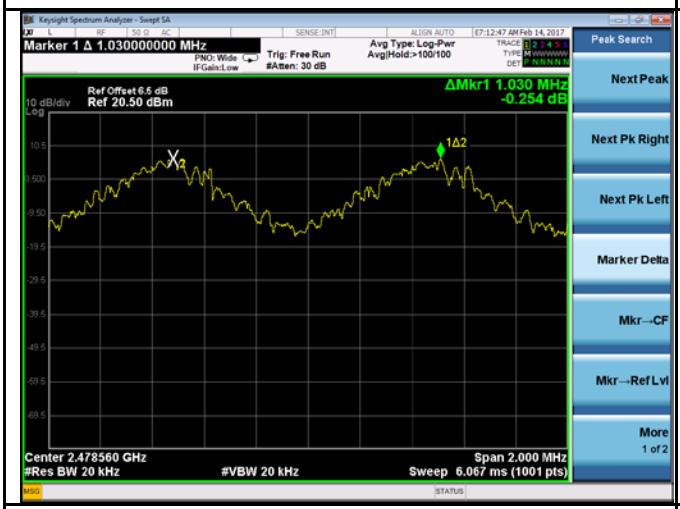
Channel Separation Test Plot (Bluetooth BDR/EDR)

Channel Separation-BDR 2402MHz

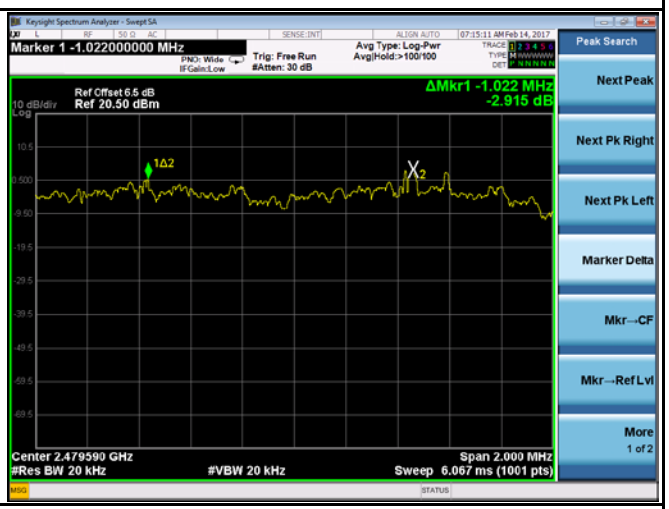
Channel Separation-EDR 2402MHz

Channel Separation-BDR 2441MHz

Channel Separation-EDR 2441MHz



Channel Separation-BDR 2480MHz

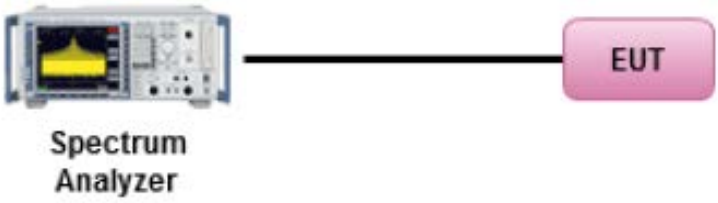


Channel Separation-EDR 2480MHz

10.3 20dB and 99% Occupied Bandwidth (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 2/3 of 20 dB bandwidth of the hopping channel, whichever is greater.	☒
RSS Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth	☒

Test Setup				
Procedure	20dB Emission bandwidth measurement procedure - Set RBW ≥ 1% of 20dB Bandwidth - Set the video bandwidth (VBW) ≥ RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 99% bandwidth measurement procedure 1. EUT was set for low , mid, high channel with modulated mode and highest RF output power. 2. The spectrum analyzer was connected to the antenna terminal.			
Test Date	02/14/2017	Environmental condition	Temperature Relative Humidity Atmospheric Pressure	23oC 47% 1019mbar
Remark	-			
Result	☐ Pass ☐ Fail			

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

Configuration : Bluetooth mode , BDR Mode

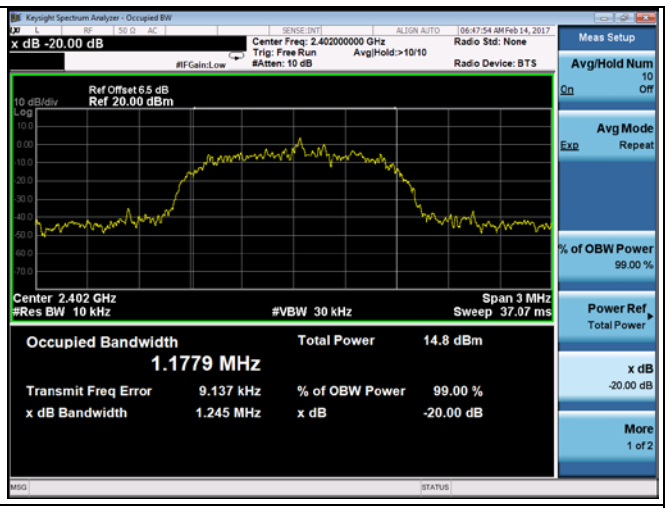
Channel	Channel Frequency (MHz)	OBW		2/3 20dB Bandwidth (KHz)
		99% (KHz)	20dB(KHz)	
Low	2402	888.10	920.20	613.47
Mid	2441	891.16	920.10	613.40
High	2480	888.14	919.00	612.67

Configuration : Bluetooth mode , EDR mode

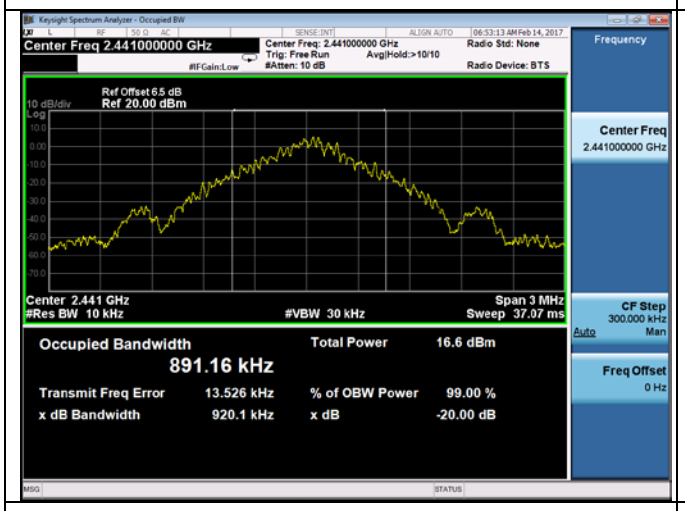
Channel	Channel Frequency (MHz)	OBW		2/3 20dB Bandwidth (MHz)
		99%(MHz)	20dB(MHz)	
Low	2402	1.178	1.245	0.830
Mid	2441	1.178	1.244	0.829
High	2480	1.175	1.244	0.829

99% & 20dB Bandwidth Test Plots(Bluetooth BDR, EDR)

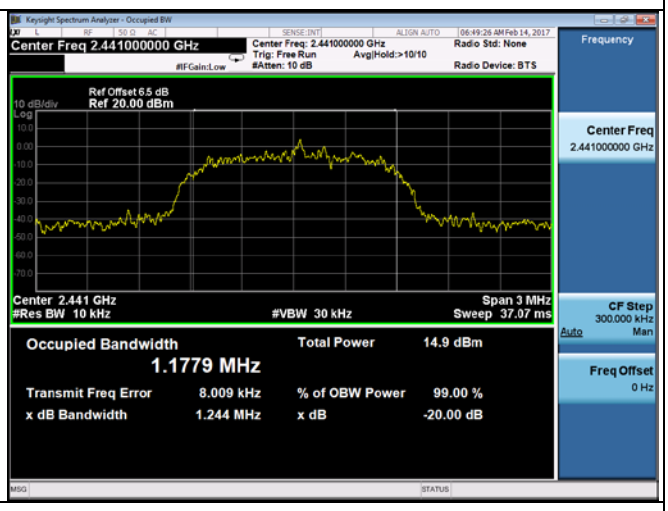
99% and 20dB BW –Bluetooth BDR 2402MHz



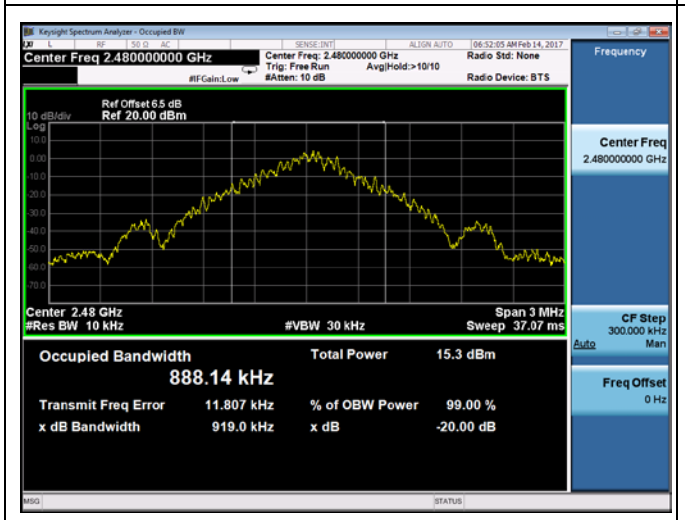
99% and 20dB BW –Bluetooth EDR 2402MHz



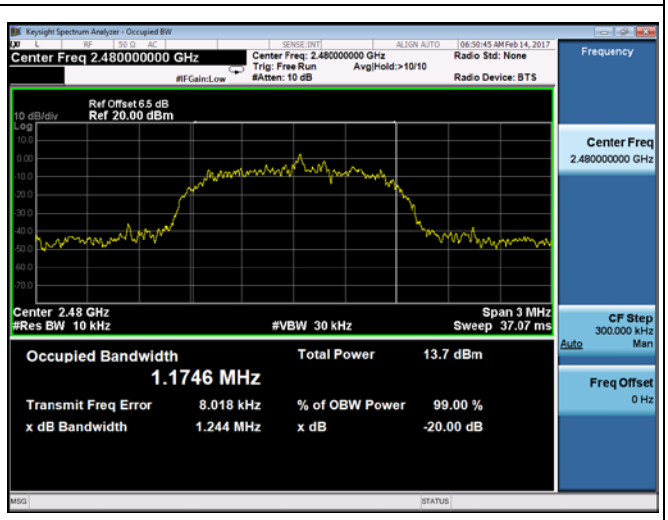
99% and 20dB BW –Bluetooth BDR 2441MHz



99% and 20dB BW –Bluetooth EDR 2441MHz



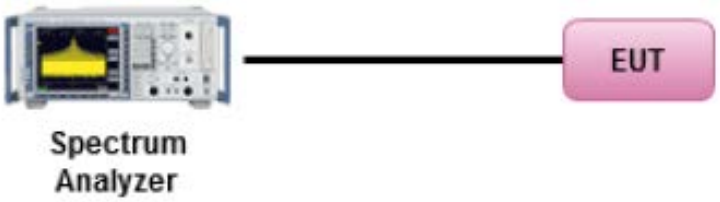
99% and 20dB BW –Bluetooth BDR 2480MHz



99% and 20dB BW –Bluetooth EDR 2480MHz

10.4 Number of Hopping Channel (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS247 (5.1.5)	For frequency hopping systems in the 2400-2483.5MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: below 1 Watt (inclusive).	☒
Test Setup		
Procedure	Number of hopping frequencies procedure 1. The EUT must have its hopping function enabled 2. Span = the frequency band of operation. 3. Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span. 4. Video (or Average) Bandwidth (VBW) ≥ RBW. 5. Detector = peak. 6. Sweep time = auto couple. 7. Trace mode = max hold. 8. Allow trace to fully stabilize. 9. Save the plot	
Test Date	02/15/2017	Environmental condition: Temperature 23oC; Relative Humidity 47%; Atmospheric Pressure 1019mbar
Remark	-	
Result	☒ Pass ☐ Fail	

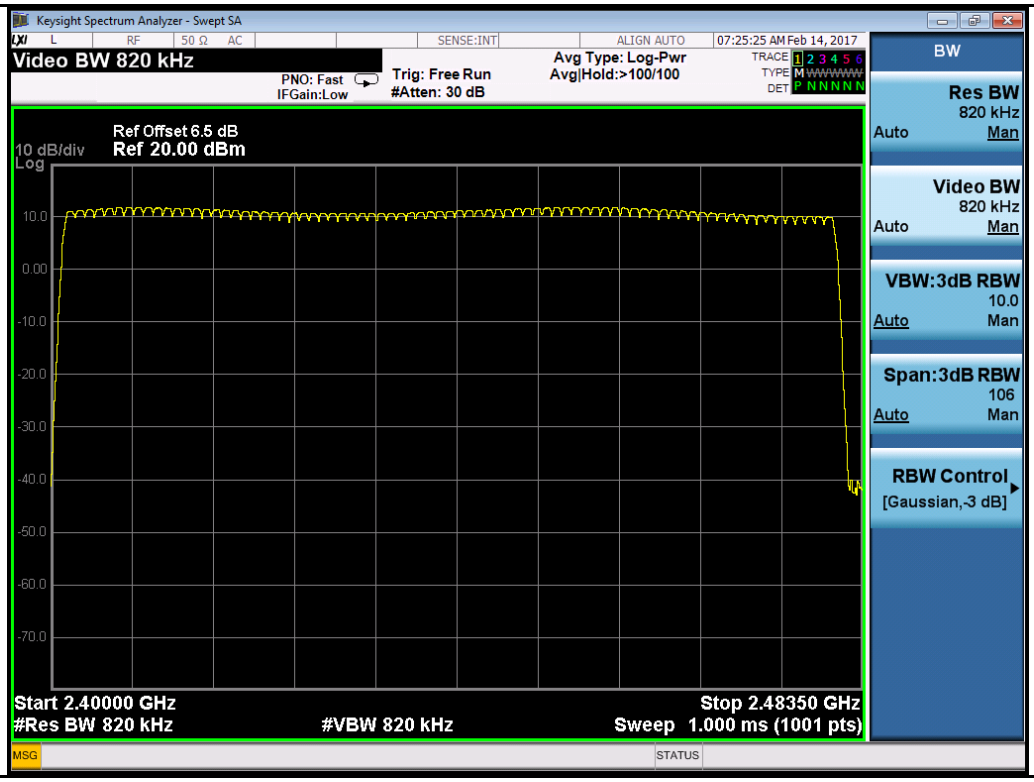
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

Channel Number	Limit	Pass/Fail
79	>15	Pass

Hopping Channel Test Plots(Bluetooth BDR, EDR)



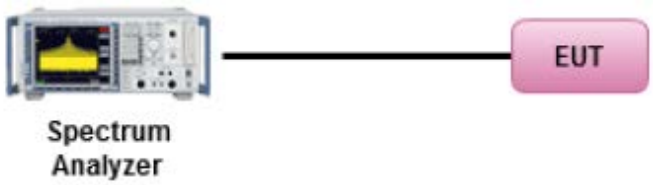
BDR – 79 Channels

EDR – 79 Channels

10.5 Time of Occupancy (Bluetooth BDR/EDR)

Requirement(s):

Spec	Requirement	Applicable
47 CFR §15.247 RSS247 (5.1.5)	Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions.	☒

Test Setup			
Test Procedure	DA 00-705 Measurement Guidelines for Frequency Hopping Spread Spectrum Systems Channel Separation procedure - The EUT must have its hopping function enabled. - Span = zero span - centered on a hopping channel - RBW = 1 MHz; VBW ≥ RBW - Sweep = as necessary to capture the entire dwell time per hopping channel. - Detector = Peak. - Trace mode = max hold. - If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.		
Test Date	02/15/2017	Environmental condition	Temperature 21ºC Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	Dwell Time=Pulse time*(1600/6/79)*31.6s		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

Bluetooth BDR Test Mode

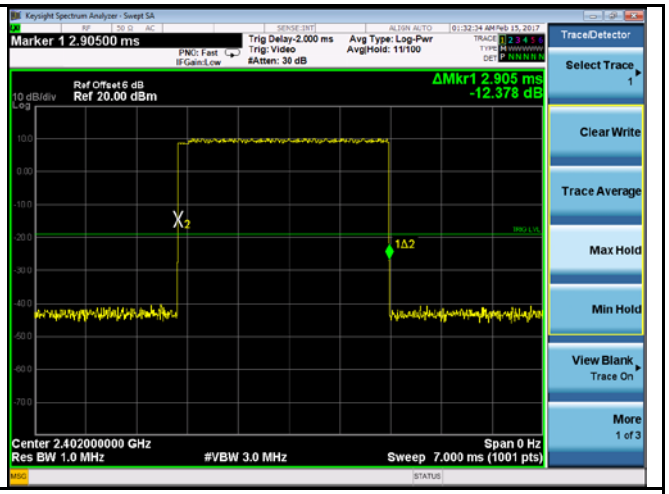
Channel	Channel Frequency (MHz)	On Time (mSec)	Dwell Time (Sec)	Limit (Sec)
Low	2402	2.91	0.31	0.4
Mid	2441	2.90	0.31	0.4
High	2480	2.90	0.31	0.4

Bluetooth EDR Test Mode

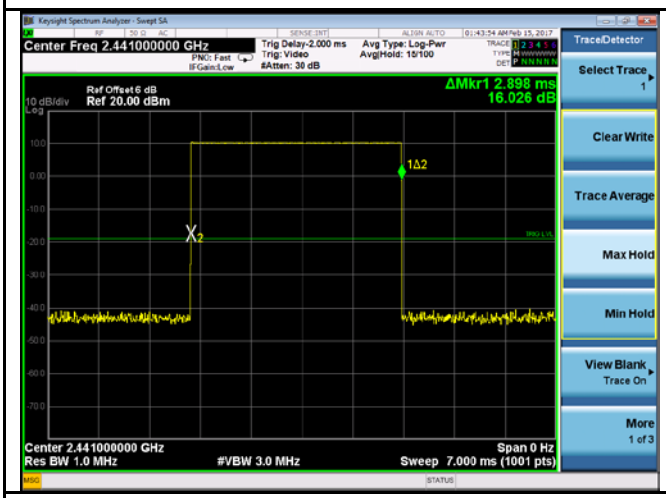
Channel	Channel Frequency (MHz)	On Time (mSec)	Dwell Time (Sec)	Limit (Sec)
Low	2402	2.91	0.31	0.4
Mid	2441	2.91	0.31	0.4
High	2480	2.91	0.31	0.4

Time of Occupancy Test Plot (Bluetooth BDR/EDR)

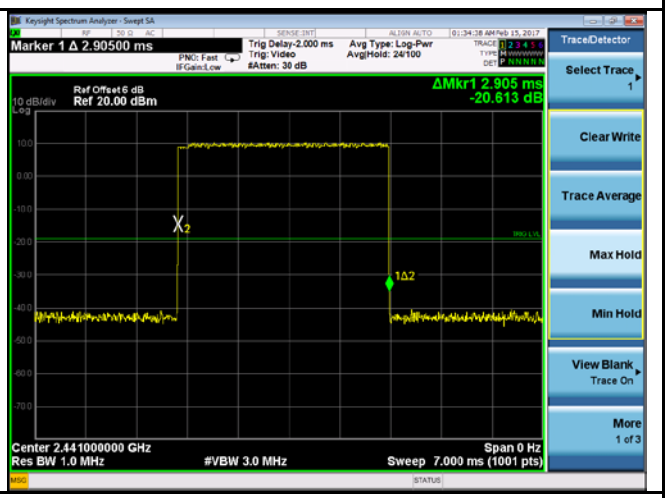
BDR Low Channel (On-Time)



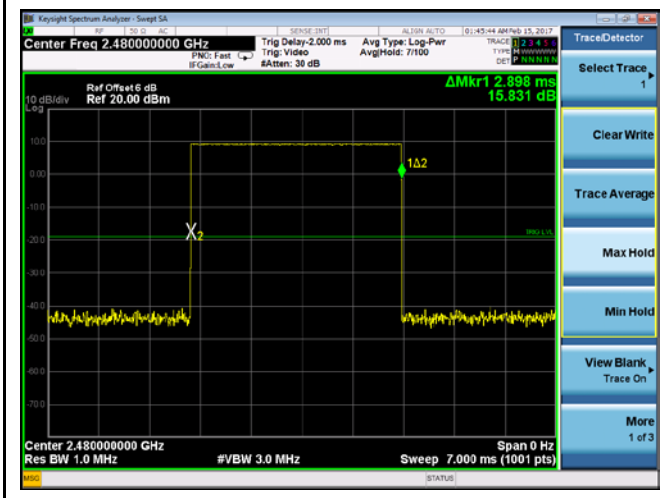
EDR Low Channel (On-Time)



BDR Middle Channel (On-Time)



EDR Middle Channel (On-Time)



BDR High Channel (On-Time)

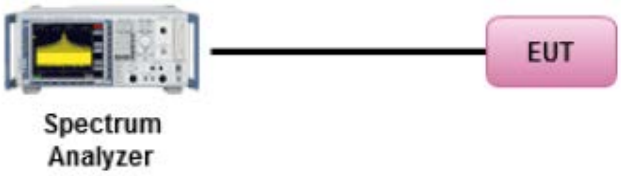
EDR High Channel (On-Time)

Note: The results above show only the worst case. DH5 used for testing.

10.6 Peak Output Power (Bluetooth BDR/EDR)

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	a)	For frequency hopping systems in the 2400-2483.5MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: below 1 Watt (inclusive).	☒
	b)	Power reduction (antenna gain > 6dBi)	☐
§ 15.247		Frequency hopping systems operated in 2400-2483.5MHz with output power not greater than 125mW, the intervals of hopping channel carrier frequencies shall not be less than 25kHz or two thirds of the 20dB bandwidth of the hopping channel, whichever is greater.	☐

Test Setup			
Test Procedure	Maximum output power measurement procedure - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel. - RBW > 20 dB bandwidth of the emission being measured; - VBW ≥ RBW. - Detector = peak. - Sweep time = auto couple. - Trace mode = max hold. - Allow trace to fully stabilize. - Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.		
Test Date	02/15/2017	Environmental condition	Temperature 21ºC Relative Humidity 46% Atmospheric Pressure 1019mbar
Remark	NONE		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

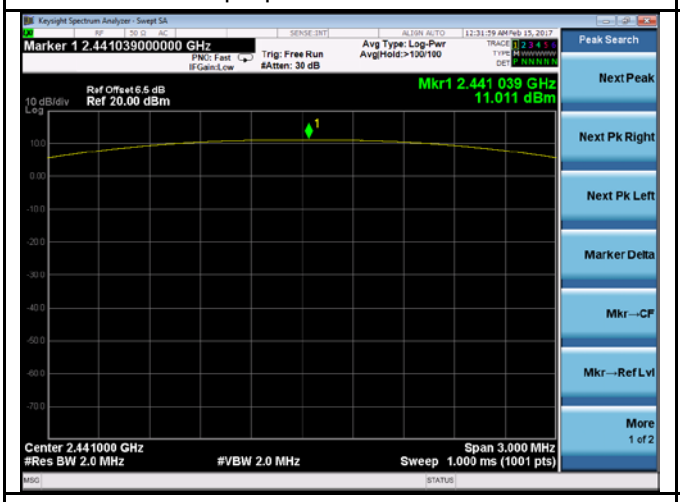
Output Power measurement results

Type	Freq (MHz)	Test mode	CH	Conducted Power (dBm)	Limit (dBm)	Result
Output power	2402	Bluetooth BDR	Low	10.92	≤30	Pass
	2441	Bluetooth BDR	Mid	11.01	≤30	Pass
	2480	Bluetooth BDR	High	9.97	≤30	Pass
	2402	Bluetooth EDR	Low	10.93	≤30	Pass
	2441	Bluetooth EDR	Mid	11.05	≤30	Pass
	2480	Bluetooth EDR	High	9.96	≤30	Pass

Peak Output Power Test Plot (Bluetooth BDR/EDR)

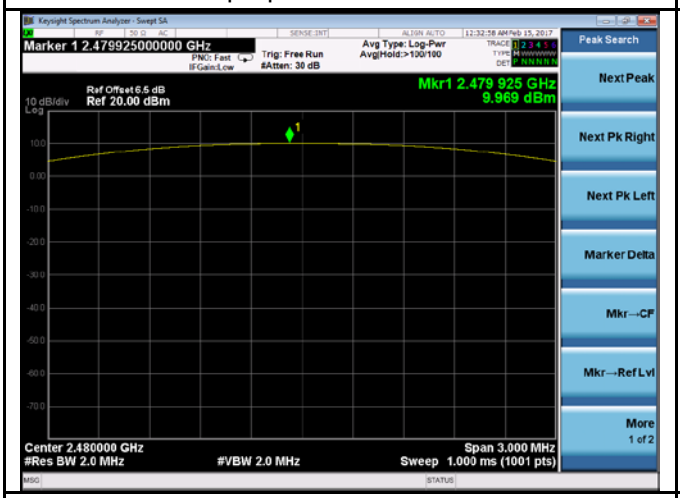
Output power - BDR 2402MHz

Output power - EDR 2402MHz

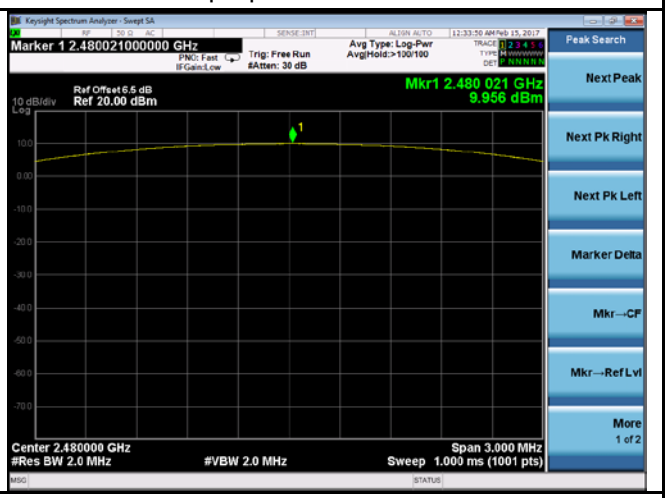


Output power - BDR 244MHz

Output power - EDR 2441MHz



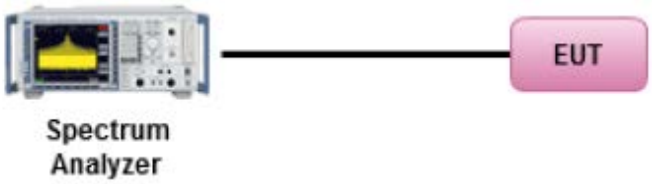
Output power - BDR 2480MHz



Output power - EDR 2480MHz

10.7 Band Edge (Bluetooth BDR/EDR)

Requirement(s):

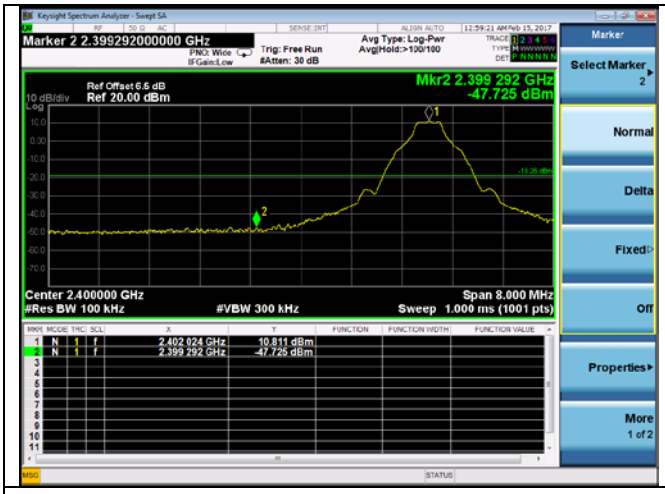
Spec	Item	Requirement	Applicable
§ 15.247	d)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209 (a) is not required ☒ 20 dB down ☐ 30 dB down	☒
Test Setup			
Test Procedure	Band Edge measurement procedure 1. Set the EUT to maximum power setting and enable the EUT transmit continuously. 2. Band edge emissions must be at least 30 dB down from the highest emission level within the authorized band as a measured. The attenuation shall be be 30 dB instead of 20 dB when Peak conducted output power procedure is used. 3. Change modulation and channel bandwidth then repeat step 1 to 2. 4. Measured and record the results in the test report.		
Test Date	02/15/2017	Environmental condition	Temperature 22ºC Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	N/A		
Result	☒ Pass ☐ Fail		

Test Data ☐ Yes ☒ N/A

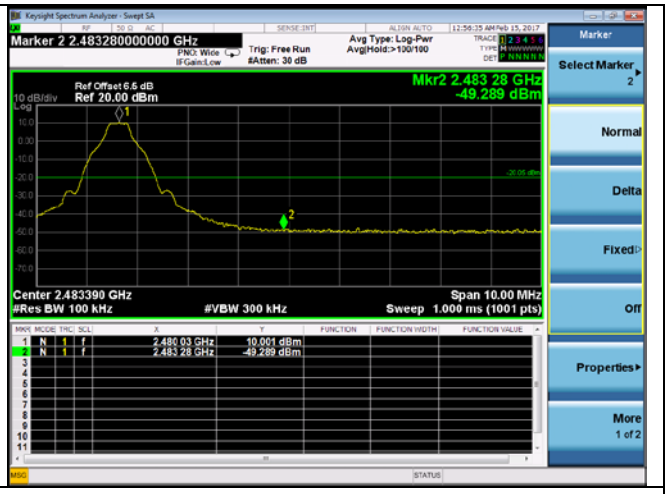
Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *RF Test Site*.

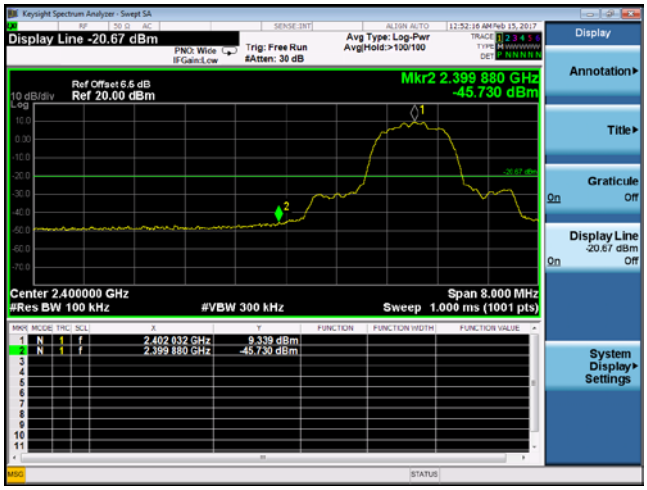
Band Edge Test Plots (Bluetooth)



Band Edge -BDR 2402MHz



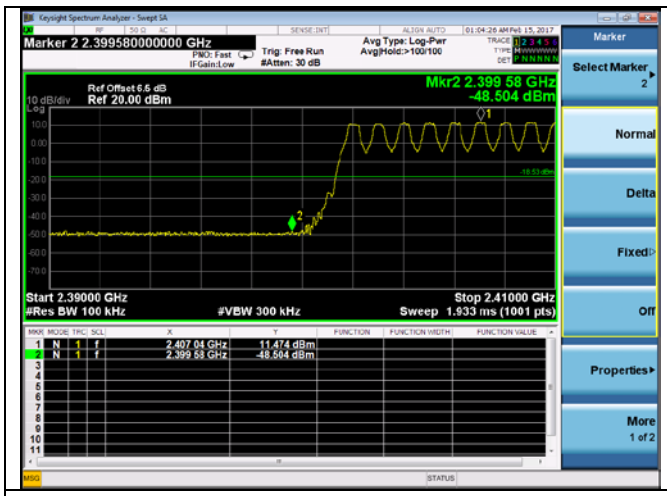
Band Edge -BDR 2480MHz



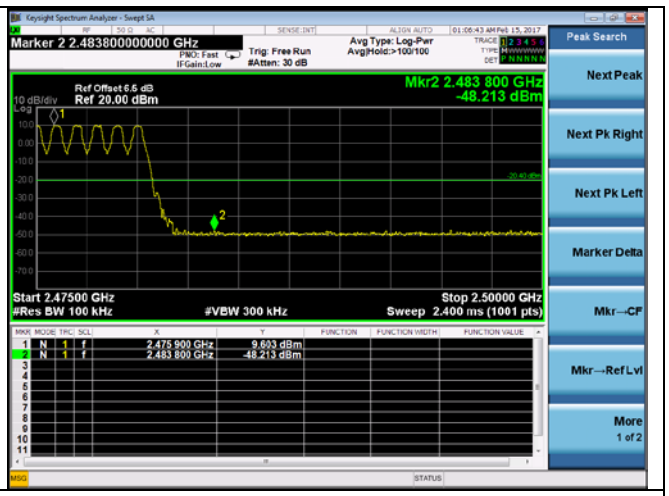
Band Edge -EDR 2402MHz

Band Edge -EDR 2480MHz

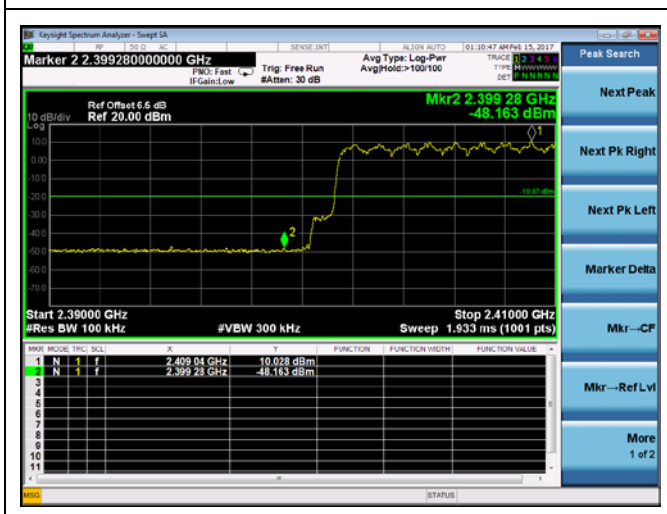
Band Edge Hopping Test Plots (Bluetooth)



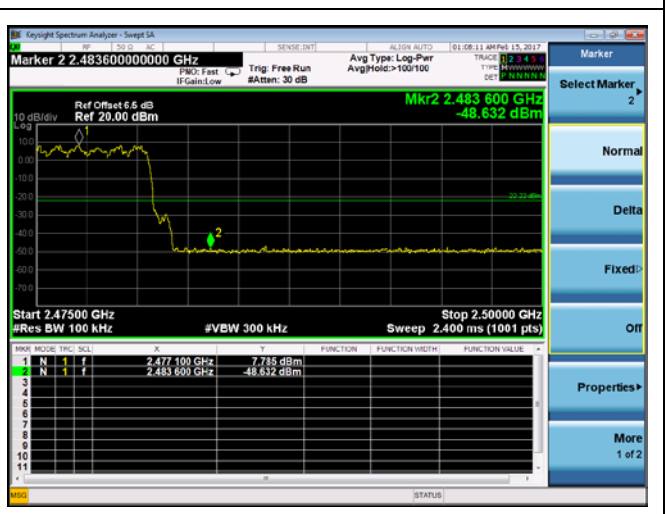
Band Edge-Hopping-BDR 2402MHz



Band Edge- Hopping-BDR 2480MHz



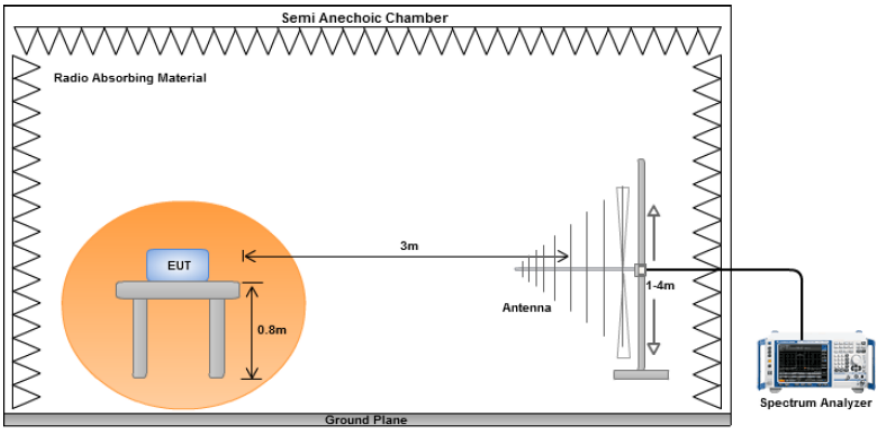
Band Edge- Hopping-EDR 2402MHz



Band Edge- Hopping-EDR 2480MHz

10.8 Transmitter Radiated Spurious Emissions Below 1GHz

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.247(d), RSS247(5.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. A Quasi-peak measurement was then made for that frequency point.
4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Remark</td><td colspan="3">The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td colspan="3">☒ Pass ☐ Fail</td></tr>
</table>

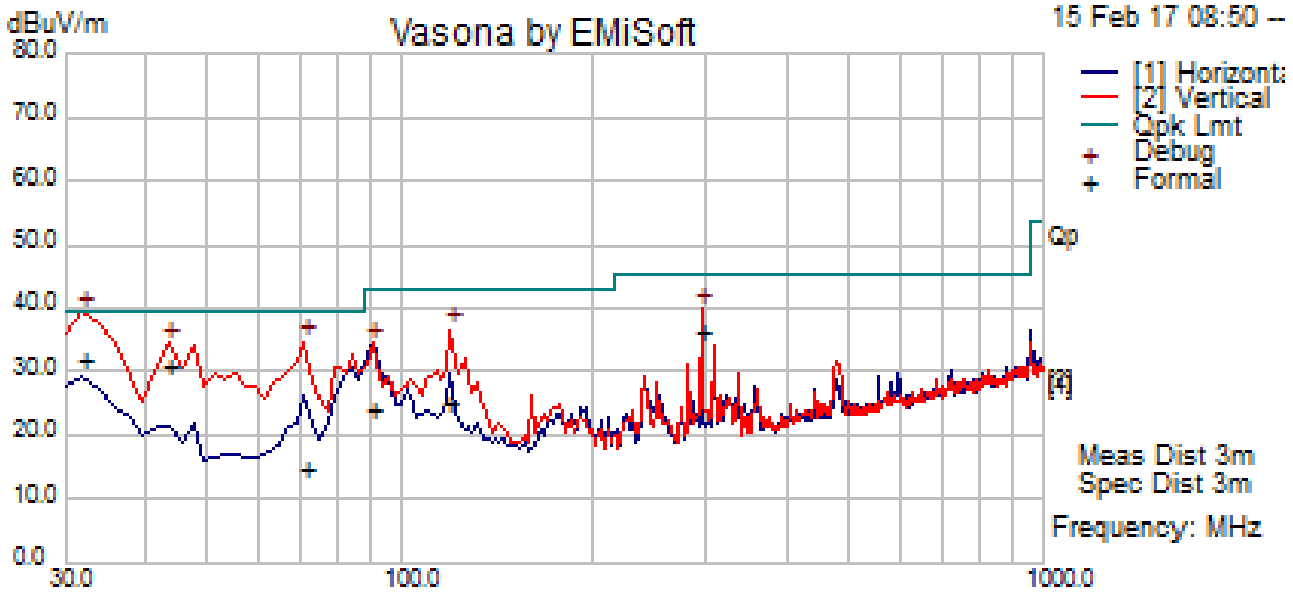
Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test was done by *Rachana Khanduri* at *10m Chamber.*

Radiated Emission Test Results (Below 1GHz)

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	22	Result :	☒ Pass ☐ Fail
	Humidity (%):	37		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	02/15/2017			
Remarks:	BDR 2441MHz			

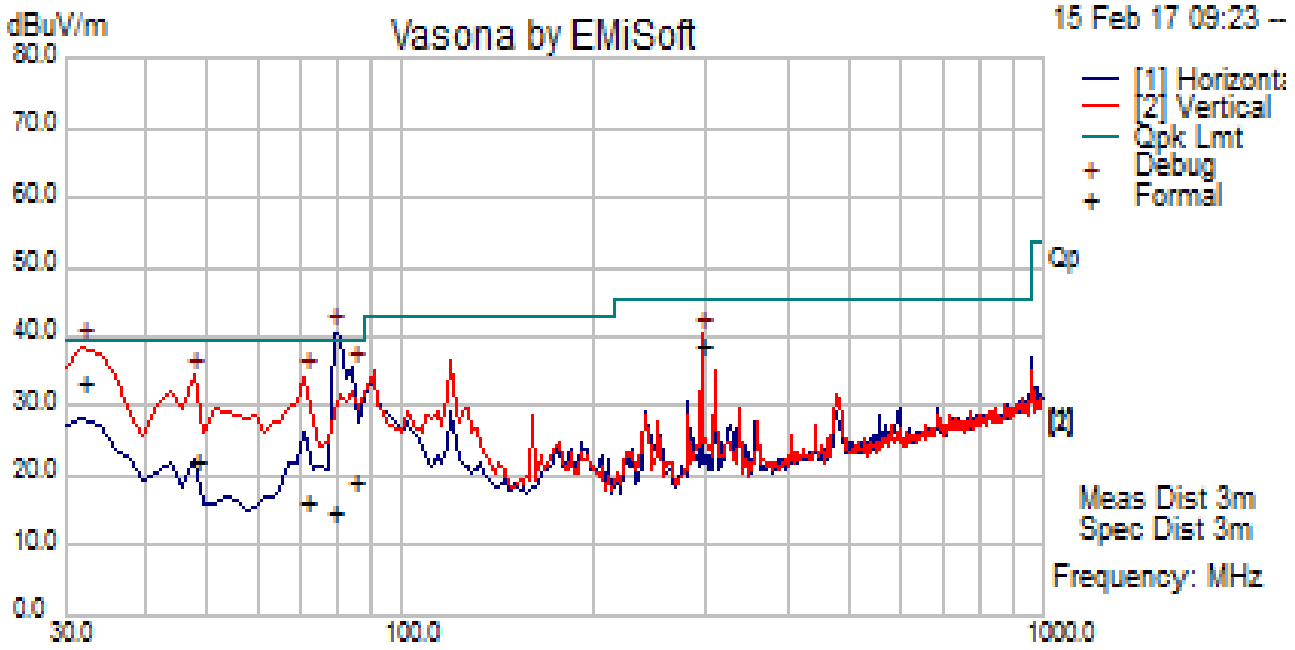


Quasi Max Measurement

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
31.92	46.51	1.03	-15.60	31.94	Quasi Max	V	120	145	39.50	-7.56	Pass
70.92	41.25	1.48	-28.16	14.57	Quasi Max	V	212	286	39.50	-24.93	Pass
43.55	53.86	1.22	-24.14	30.93	Quasi Max	V	110	287	39.50	-8.57	Pass
294.62	56.46	2.87	-22.95	36.38	Quasi Max	H	110	172	45.50	-9.12	Pass
119.25	45.79	1.80	-22.80	24.79	Quasi Max	V	107	185	43.00	-18.21	Pass
90.17	50.64	1.59	-27.94	24.28	Quasi Max	V	318	199	43.00	-18.72	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Test specification:	Radiated Spurious Emissions (30MHz – 1000MHz)			
Environmental Conditions:	Temp(°C):	22	Result :	☒ Pass ☐ Fail
	Humidity (%):	37		
	Atmospheric(mbar):	1021		
Mains Power:	120VAC, 60Hz			
Tested by:	Rachana Khanduri			
Test Date:	02/15/2017			
Remarks:	EDR 2441MHz			

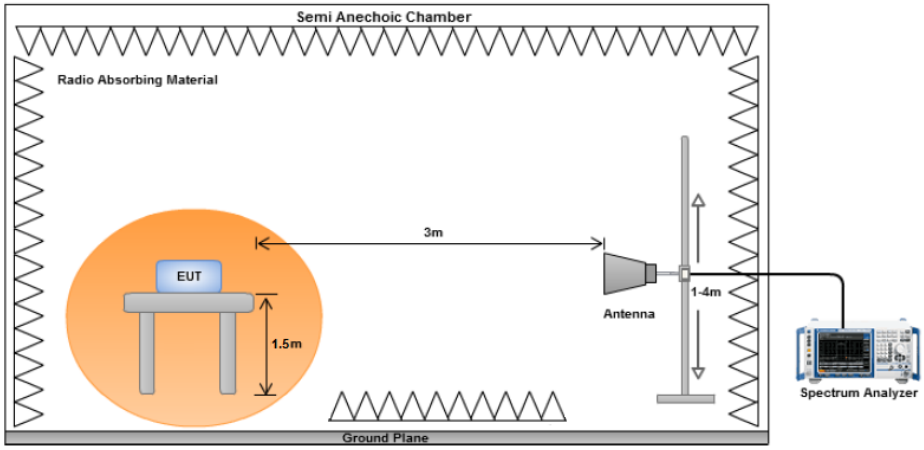


Quasi Max Measurement

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
78.80	41.36	1.52	-28.33	14.55	Quasi Max	H	281	105	39.50	-24.95	Pass
31.93	48.02	1.03	-15.60	33.45	Quasi Max	V	110	316	39.50	-6.05	Pass
84.37	46.22	1.55	-28.43	19.34	Quasi Max	H	145	126	39.50	-20.16	Pass
294.61	59.07	2.87	-22.95	38.99	Quasi Max	V	117	345	45.50	-6.51	Pass
47.74	47.49	1.29	-26.49	22.29	Quasi Max	V	113	322	39.50	-17.21	Pass
70.66	42.98	1.48	-28.19	16.27	Quasi Max	V	120	203	39.50	-23.23	Pass

10.9 Transmitter Radiated Spurious Emissions > 1GHz & Restricted band & non-restricted band emission

Requirement(s):

Spec	Item	Requirement	Applicable
47CFR§15.247(d), RSS247(5.5)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required ☒ 20 dB down ☐ 30 dB down	☒
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	☒
Test Setup			
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. An average measurement was then made for that frequency point. 4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.		
Remark	The EUT was scanned up to 26GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.		
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes (See below) ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test was done by *Rachana Khanduri* at *3m Chamber.*

Radiated Emission Test Results

Bluetooth BDR – 2402MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1683.49	68.02	2.92	-14.13	56.82	Peak Max	H	184	40	74	-17.19	Pass
17983.90	38.19	9.15	8.17	55.5	Peak Max	V	291	136	74	-18.5	Pass
4804.37	39.85	4.71	-4.97	39.58	Peak Max	H	225	88	74	-34.42	Pass
1683.49	48.03	2.92	-14.13	36.82	Average Max	H	184	40	54	-17.18	Pass
17983.90	26.11	9.15	8.17	43.43	Average Max	V	291	136	54	-10.57	Pass
4804.37	27.89	4.71	-4.97	27.63	Average Max	H	225	88	54	-26.37	Pass

Bluetooth BDR – 2441MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1683.64	66.98	2.92	-14.13	55.78	Peak Max	H	197	70	74	-18.22	Pass
17899.18	37.78	9.13	8.60	55.51	Peak Max	H	340	305	74	-18.49	Pass
4837.06	40.05	4.67	-5.03	39.69	Peak Max	V	302	119	74	-34.31	Pass
1683.64	47.17	2.92	-14.13	35.97	Average Max	H	197	70	54	-18.04	Pass
17899.18	25.98	9.13	8.60	43.71	Average Max	H	340	305	54	-10.29	Pass
4837.06	28.37	4.67	-5.03	28.01	Average Max	V	302	119	54	-25.99	Pass

Bluetooth BDR – 2480MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1641.34	66.31	2.87	-14.6	54.59	Peak Max	H	218	34	74	-19.42	Pass
17734.28	39.13	9.09	8.17	56.39	Peak Max	H	180	222	74	-17.61	Pass
4888.87	41.33	4.61	-5.12	40.82	Peak Max	V	400	258	74	-33.18	Pass
1641.34	41.52	2.87	-14.6	29.80	Average Max	H	218	34	54	-24.20	Pass
17734.28	26.11	9.09	8.17	43.37	Average Max	H	180	222	54	-10.63	Pass
4888.87	28.89	4.61	-5.12	28.38	Average Max	V	400	258	54	-25.62	Pass

Bluetooth EDR – 2402MHz

Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
17904.74	38.23	9.13	8.59	55.95	Peak Max	V	216	80	74	-18.05	Pass
1683.56	70.52	2.92	-14.13	59.31	Peak Max	H	164	21	74	-14.69	Pass
4937.95	39.69	4.55	-5.13	39.11	Peak Max	V	165	74	74	-34.89	Pass
17904.74	26.20	9.13	8.59	43.92	Average Max	V	216	80	54	-10.08	Pass
1683.56	50.30	2.92	-14.13	39.09	Average Max	H	164	21	54	-14.91	Pass
4937.95	28.04	4.55	-5.13	27.46	Average Max	V	165	74	54	-26.54	Pass

Bluetooth EDR – 2441MHz

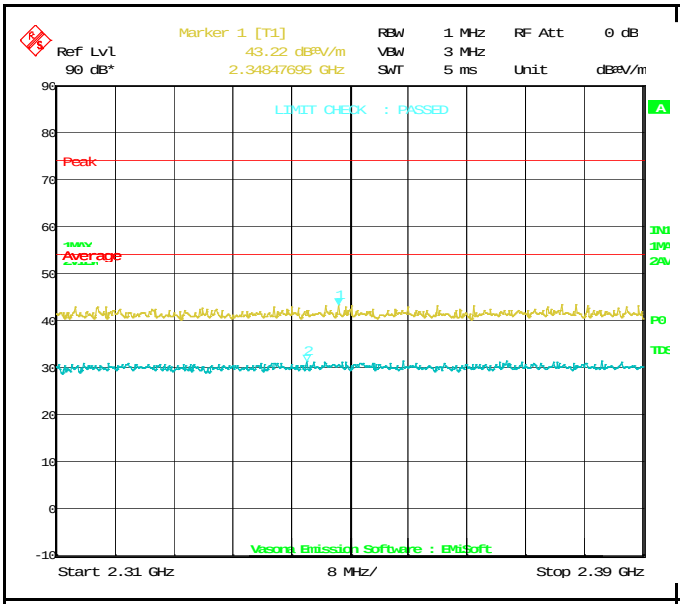
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1683.47	69.05	2.92	-14.13	57.84	Peak Max	H	135	16	74	-16.16	Pass
17978.13	37.89	9.15	8.20	55.24	Peak Max	H	130	356	74	-18.76	Pass
4873.22	40.94	4.63	-5.09	40.47	Peak Max	V	388	44	74	-33.53	Pass
1683.47	48.83	2.92	-14.13	37.62	Average Max	H	135	16	54	-16.38	Pass
17978.13	26.21	9.15	8.20	43.55	Average Max	H	130	356	54	-10.45	Pass
4873.22	28.97	4.63	-5.09	28.51	Average Max	V	388	44	54	-25.49	Pass

Bluetooth EDR – 2480MHz

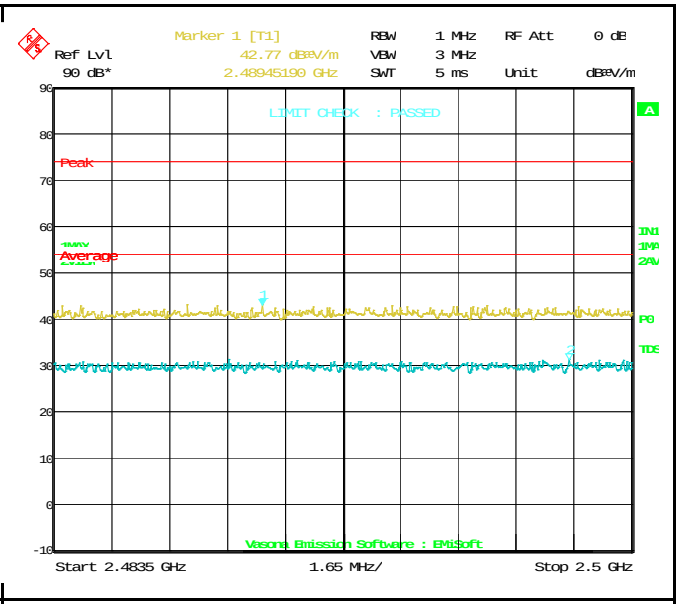
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	AF (dB)	Level (dBuV/m)	Measurement Type	Pol (V/H)	Hgt (cm)	Azt (Deg)	Limit (dBuV/m)	Margin (dB)	Pass /Fail
1683.60	69.40	2.92	-14.13	58.19	Peak Max	H	162	32	74	-15.81	Pass
17889.70	37.50	9.13	8.51	55.13	Peak Max	H	108	311	74	-18.87	Pass
4886.39	41.54	4.61	-5.11	41.04	Peak Max	V	353	226	74	-32.97	Pass
1683.60	49.44	2.92	-14.13	38.23	Average Max	H	162	32	54	-15.77	Pass
17889.70	26.12	9.13	8.51	43.76	Average Max	H	108	311	54	-10.24	Pass
4886.39	29.13	4.61	-5.11	28.63	Average Max	V	353	226	54	-25.38	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

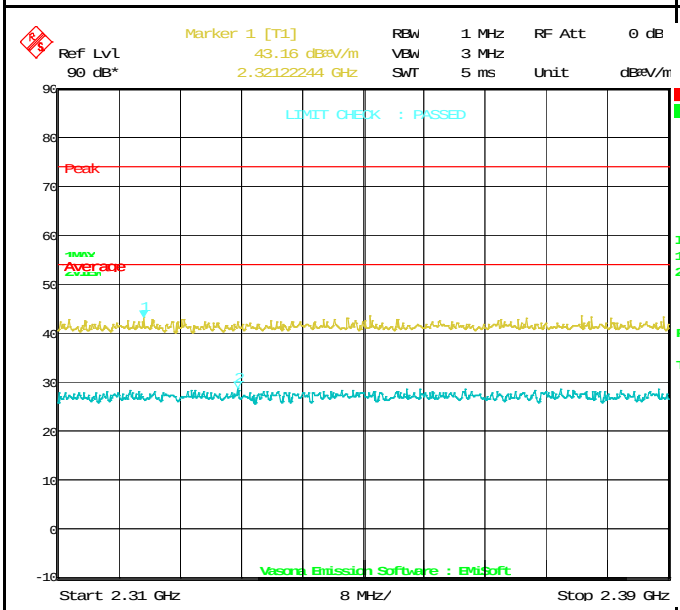
Restricted Band Test plot (Bluetooth BDR/EDR)



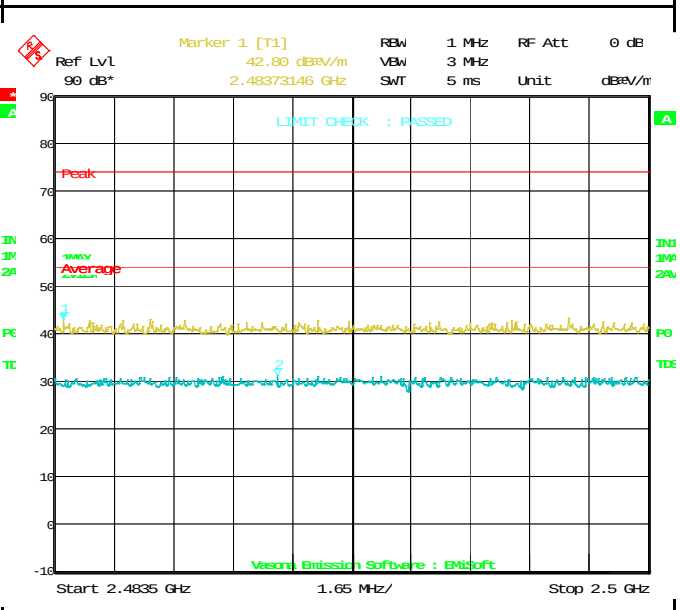
Restricted Band BDR 2402MHz



Restricted Band BDR 2480MHz



Restricted Band EDR 2402MHz



Restricted Band EDR 2480MHz

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
R & S Receiver	ESIB 40	100179	06/08/2016	1 Year	06/08/2017	☑
CHASE LISN	MN2050B	1018	08/16/2016	1 Year	08/16/2017	☑
Radiated Emissions						
R & S Receiver	ESIB 40	1018	06/08/2016	1 Year	06/08/2017	☑
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	01/13/2017	1 Year	01/13/2018	☑
Horn Antenna (1GHz~26GHz)	3115	100059	08/11/2016	1 Year	08/11/2017	☑
Pre-Amplifier (1-26.5GHz)	8449B	3008A00715	03/30/2016	1 Year	03/30/2017	☑
Preamplifier (100KHz-7GHz)	LPA-6-30	11140711	02/09/2017	1 Year	02/09/2018	☑
3 Meters SAC	3M	N/A	06/09/2016	1 Year	06/09/2017	☐
10 Meters SAC	10M	N/A	07/06/2016	1 Year	07/06/2017	☑
RF Conducted Measurement						
Spectrum Analyzer	N9010A	10SL0219	11/16/2016	1 Year	11/16/2017	☑

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)		Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		Radio: A1. Terminal equipment for purpose of calling Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law
Korea CAB Accreditation		EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS
		Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68
		Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		R-3083: Radiation 3 meter site C-3421: Main Ports Conducted Interference Measurement T-1597: Telecommunication Ports Conducted Interference Measurement
Australia CAB Recognition		EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4
		Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771
		Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016,AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2