
	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	6 dB Single Channel Bandwidth	
DNB Job Number:	86022	Date:	10 Oct 2017
Customer:	Orbit Irrigation Products Inc.		Conformance Standard FCC Part 15
Model Number:	BH1		
Description:	BLE Transmitter		Clause 15.247(a,2)
	Test Procedure		
Environmental Conditions			
Ambient Temperature		Relative Humidity	
21 °C		25 %	
		Barometric Pressure	
		101.2 kPa	
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>			

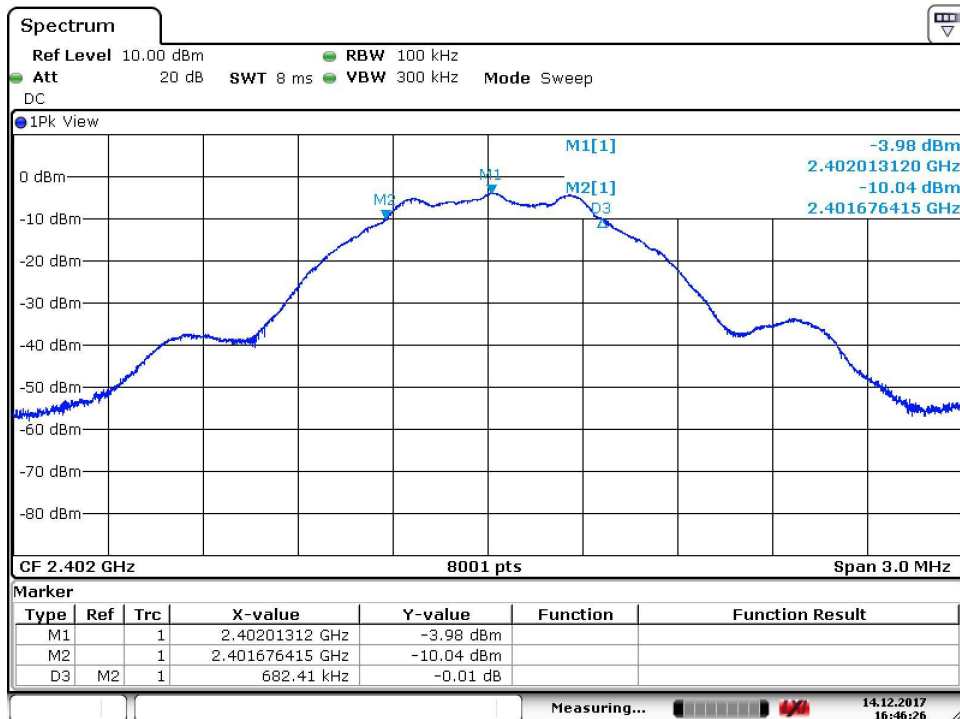
6 dB Bandwidth

ANSI C63.10-2013 Clause 11.8.1


The steps are as follows:

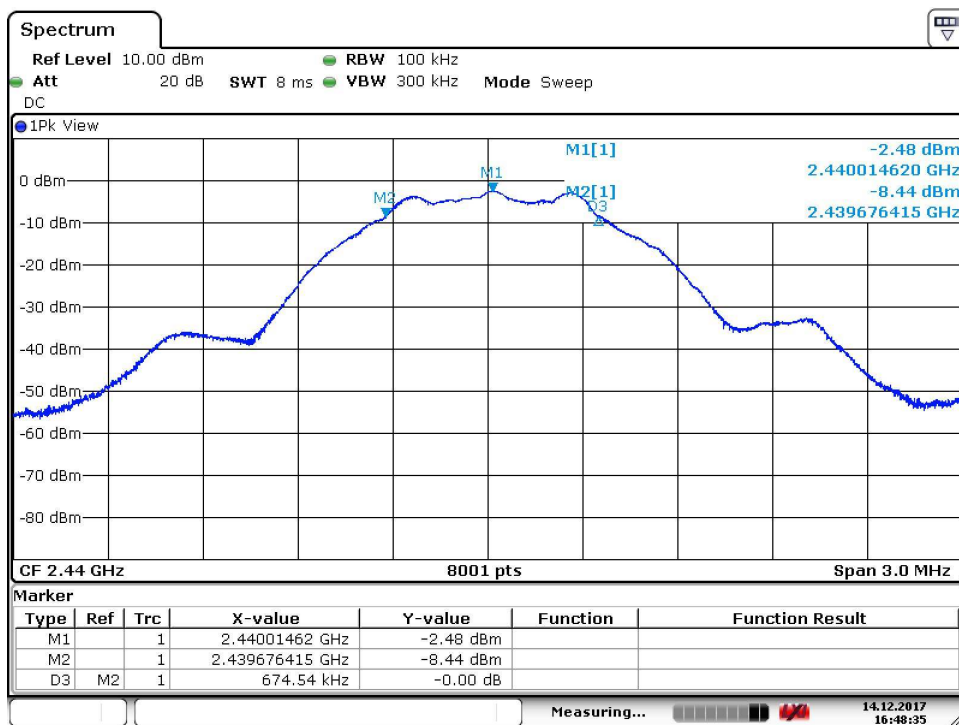
- a) Set RBW = 100 kHz
- b) Set the VBW \geq [3 x RBW]
* per ANSI C63.10-2013 clause 6.9.2 Set the span to 2 to 5 times the OBW
- c) Detector = peak
- d) Trace mode = max hold
- e) Sweep = auto couple
- f) Allow trace to stabilize
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.
- h) Submit this plot(s).

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		6 dB Single Channel Bandwidth	
	DNB Job Number:	86022	Date:	14 Dec 2017
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter			
	1 Mbps (Basic data rate)			
Environmental Conditions				
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>				
Channel	Chl Freq (MHz)	6dB BW (kHz)	Limit	Pass/Fail
Low	2402	682.410	> 500 kHz	Pass




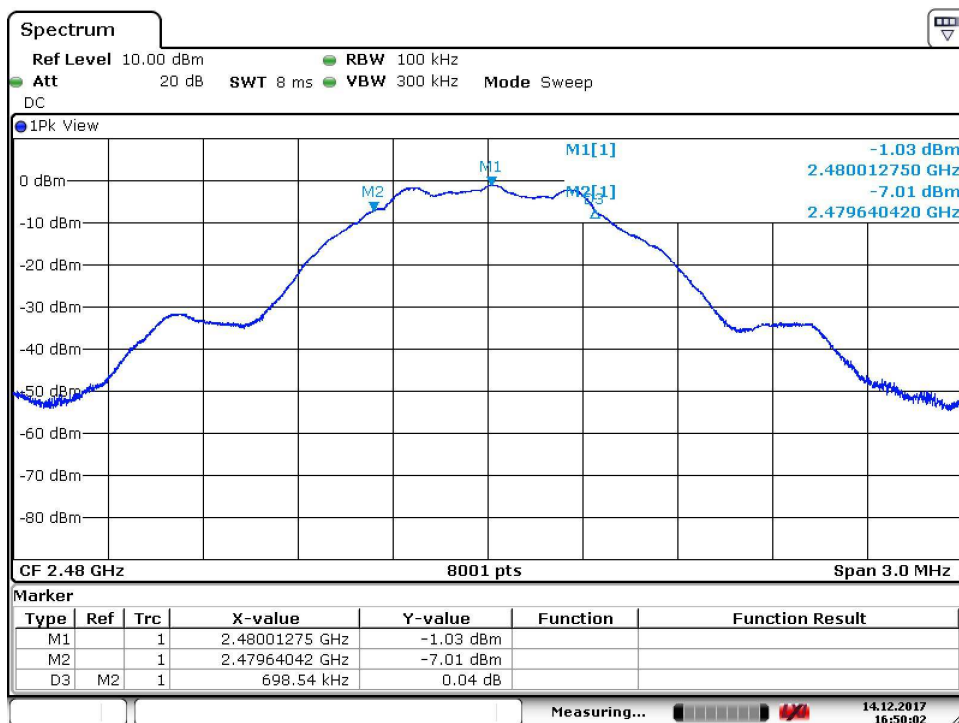
Date: 14.DEC.2017 16:46:26

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		6 dB Single Channel Bandwidth	
DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter 1 Mbps (Basic data rate)			
Environmental Conditions				
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>				
Channel	Chl Freq (MHz)	6dB BW (kHz)	Limit	Pass/Fail
Middle	2440	674.540	> 500 kHz	Pass




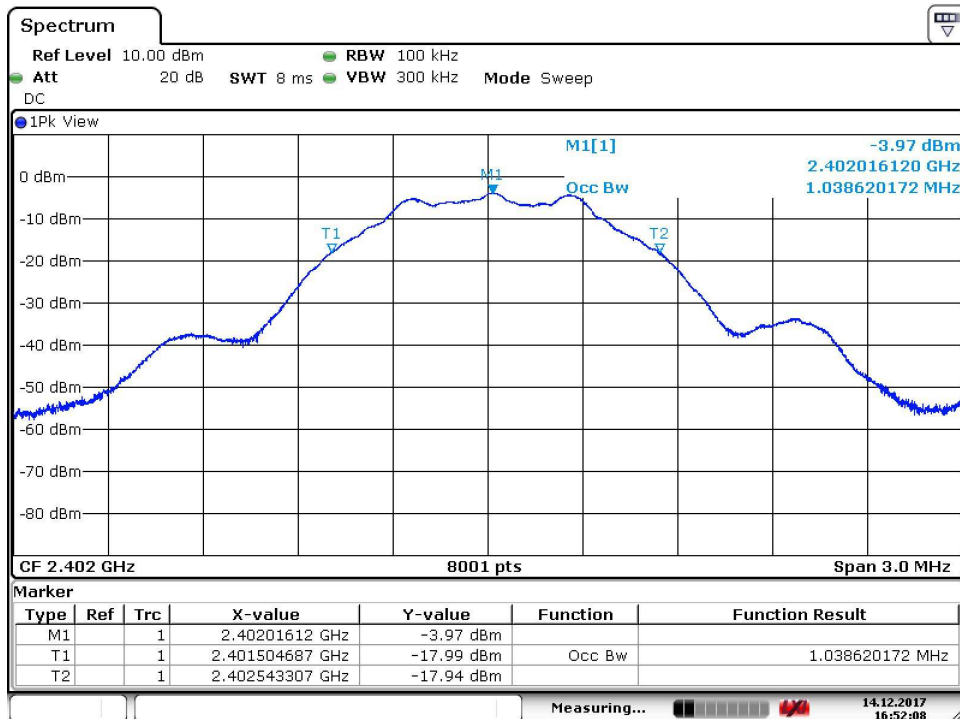
Date: 14.DEC.2017 16:48:35

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		6 dB Single Channel Bandwidth	
DNB Job Number: 86022		Date: 14 Dec 2017		Conformance Standard FCC Part 15 Clause 15.247(a,2)	
Customer: Orbit Irrigation Products Inc.					
Model Number: BH1					
Description: BLE Transmitter 1 Mbps (Basic data rate)					
Environmental Conditions					
Ambient Temperature 26 °C		Relative Humidity 30 %		Barometric Pressure 101.35 kPa	
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>					
Channel	Chl Freq (MHz)	6dB BW (kHz)	Limit	Pass/Fail	
High	2480	698.540	> 500 kHz	Pass	




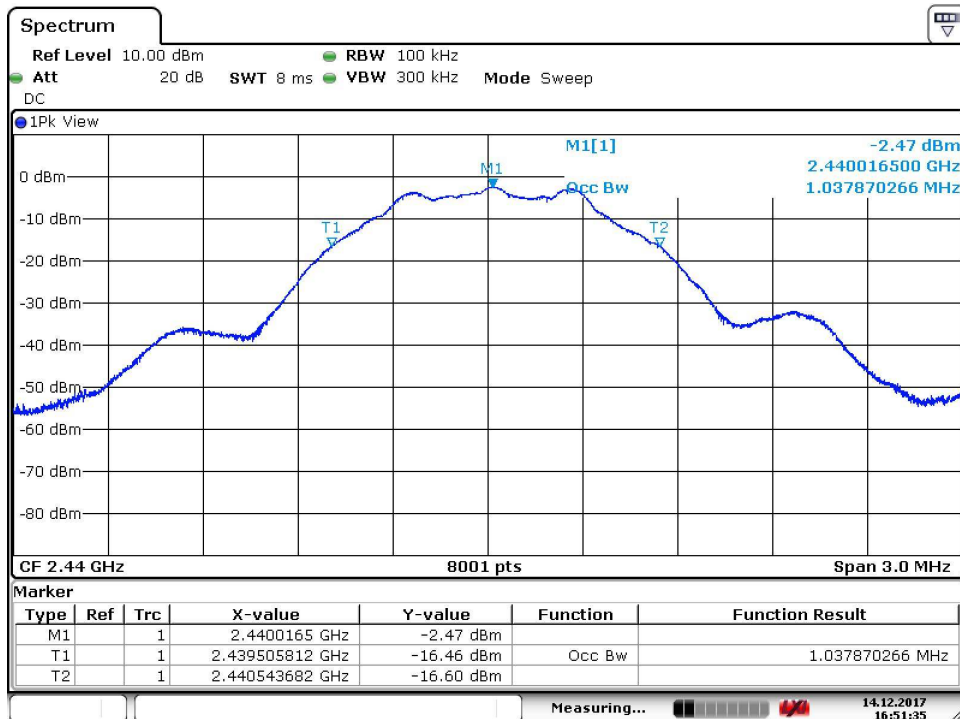
Date: 14.DEC.2017 16:50:02

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		99% Occupied Bandwidth	
	DNB Job Number: 86022	Date: 14 Dec 2017	Conformance Standard RSS-Gen Clause Section 6.6	
Customer: Orbit Irrigation Products Inc.	Model Number: BH1			
Description: BLE Transmitter 1 Mbps (Basic data rate)				
Environmental Conditions				
Ambient Temperature 26 °C	Relative Humidity 30 %	Barometric Pressure 101.35 kPa		
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>CL Payne</i>				
Channel	Chl Freq (MHz)	99% BW (MHz)		
Low	2402	1.038620172		




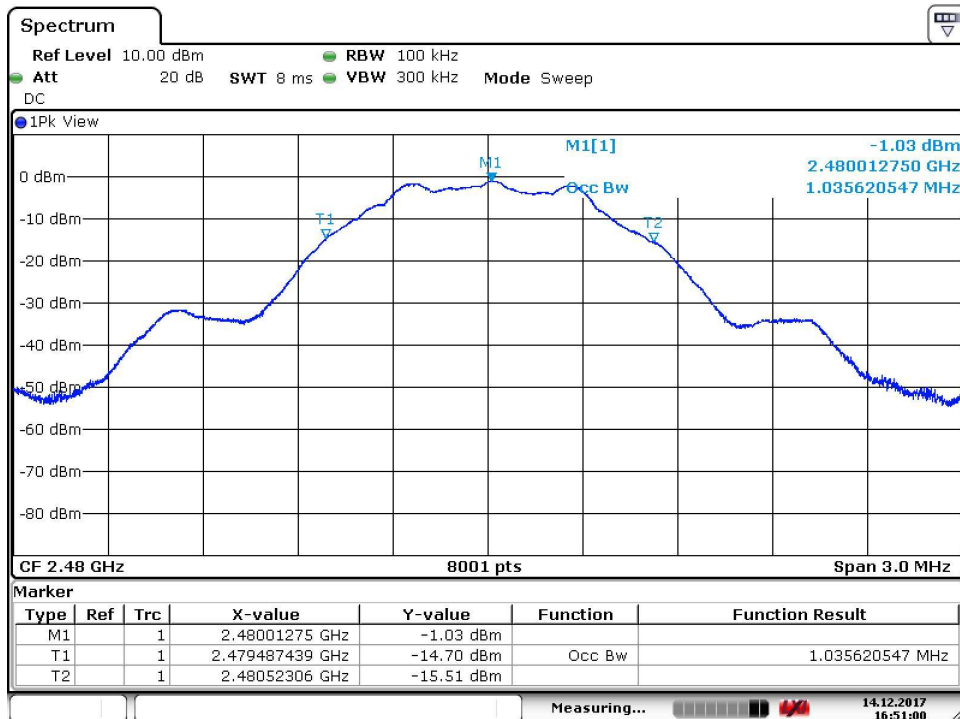
Date: 14.DEC.2017 16:52:09

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		99% Occupied Bandwidth	
	DNB Job Number: 86022	Date: 14 Dec 2017	Conformance Standard RSS-Gen Clause Section 6.6	
Customer: Orbit Irrigation Products Inc.	Model Number: BH1			
Description: BLE Transmitter 1 Mbps (Basic data rate)				
Environmental Conditions				
Ambient Temperature 26 °C	Relative Humidity 30 %	Barometric Pressure 101.35 kPa		
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>CL Payne</i>				
Channel	Chl Freq (MHz)	99% BW (MHz)		
Middle	2440	1.037870266		



Date: 14.DEC.2017 16:51:36

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		99% Occupied Bandwidth	
DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard RSS-Gen Clause Section 6.6
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter 1 Mbps (Basic data rate)			
Environmental Conditions				
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>CL Payne</i>				
Channel	Chl Freq (MHz)	99% BW (MHz)		
High	2480	1.035620547		



Date: 14.DEC.2017 16:51:01

15.247 (a,2,b3) Maximum Peak Output Power (Conducted)

Test Procedure: ANSI C63.10-2013

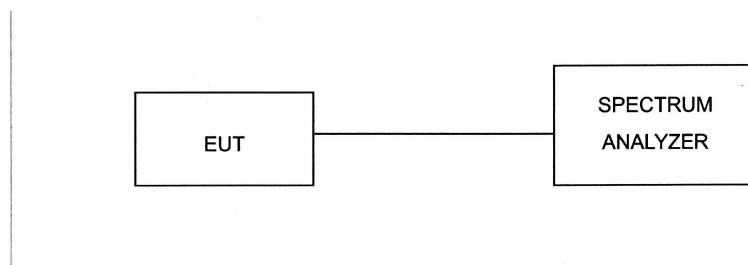
Peak Output Power

Per clause 11.9.1.1 $RBW \geq DTS \text{ Bandwidth}$

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement.

- a) Set the $RBW \geq DTS \text{ bandwidth}$
- b) Set the $VBW \geq [3 \times RBW]$
- c) Set span $\geq [3 \times RBW]$
- d) Sweep time = auto couple
- e) Detector = peak
- f) Trace mode = max hold
- g) Allow trace to fully stabilize
- h) Use peak marker function to determine the peak amplitude
- i) Submit plots

Test Set Up:

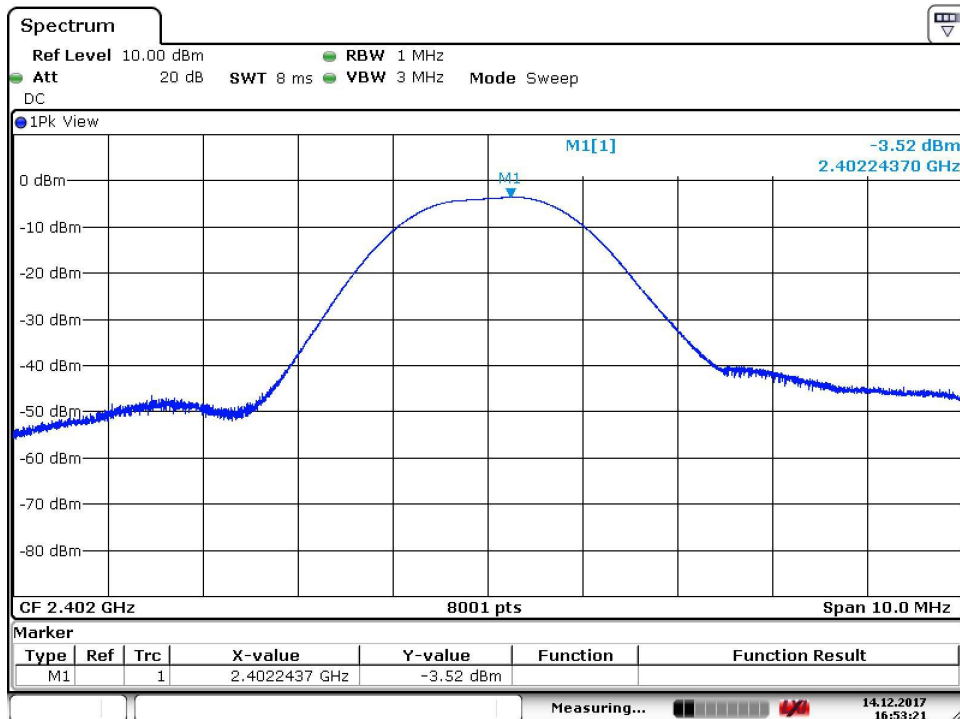





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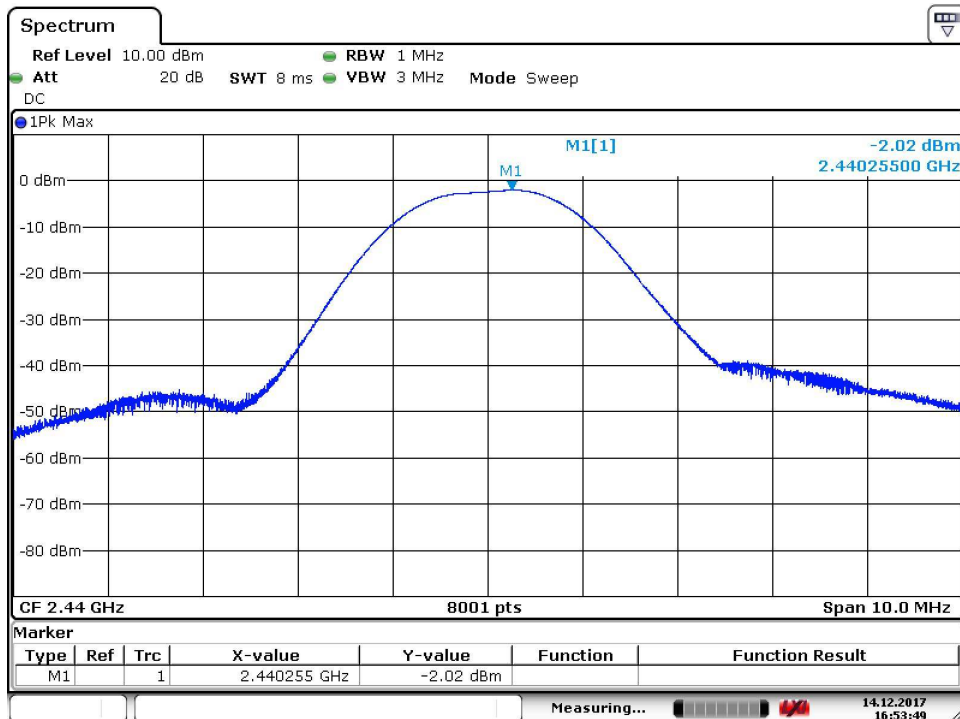
Peak Output Power (Cond)

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(b)			
Customer:	Orbit Irrigation Products Inc.						
Model Number:	BH1						
Description:	BLE Transmitter Low Channel - 1 Mbps (Basic data rate)						
Environmental Conditions							
Ambient Temperature		Relative Humidity		Barometric Pressure			
26 °C		30 %		101.35 kPa			
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Les Payne							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2402	-3.52	30.00	-33.52	0.445	1000	-999.555	Pass




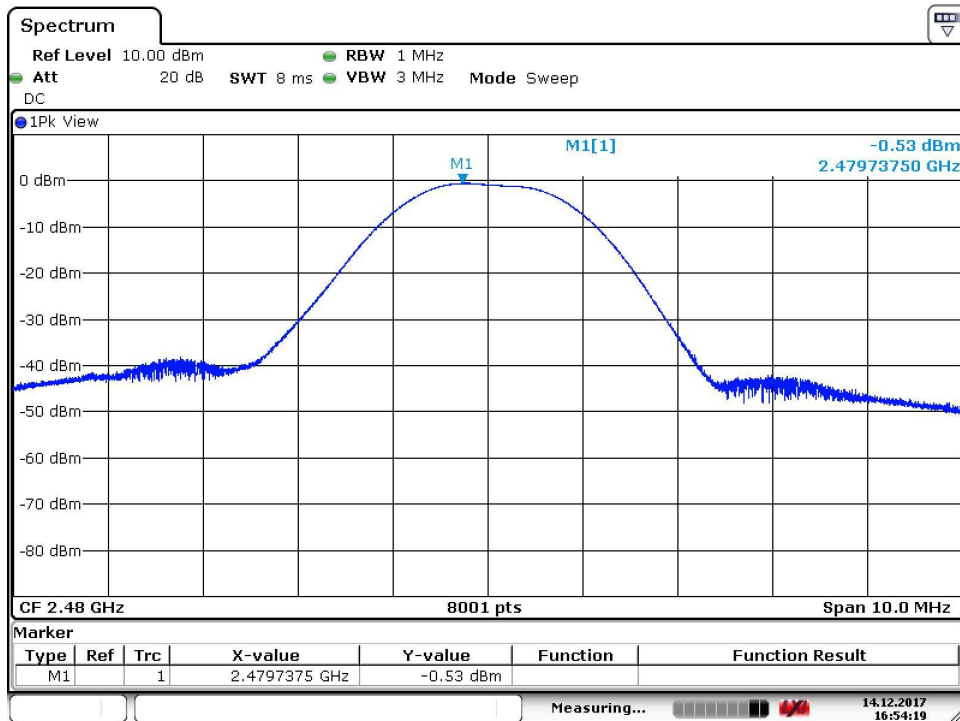
Date: 14.DEC.2017 16:53:21

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		Peak Output Power (Cond)			
DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(b)			
Customer:	Orbit Irrigation Products Inc.						
Model Number:	BH1						
Description:	BLE Transmitter						
	Middle Channel - 1 Mbps (Basic data rate)						
Environmental Conditions							
Ambient Temperature		Relative Humidity		Barometric Pressure			
26 °C		30 %		101.35 kPa			
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2440	-2.02	30.00	-32.02	0.628	1000	-999.372	Pass



Date: 14.DEC.2017 16:53:50

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		Peak Output Power (Cond)			
DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(b)			
Customer:	Orbit Irrigation Products Inc.						
Model Number:	BH1						
Description:	BLE Transmitter High Channel - 1 Mbps (Basic data rate)						
Environmental Conditions							
Ambient Temperature		Relative Humidity		Barometric Pressure			
26 °C		30 %		101.35 kPa			
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2480	-0.530	30.00	-30.53	0.855	1000	-999.145	Pass



Date: 14.DEC.2017 16:54:19

15.247 (a,2,d) Conducted Band Edge and Out of Band Emissions

Test Procedure: ANSI C63.10-2013

Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation

RBW 1% of the span

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

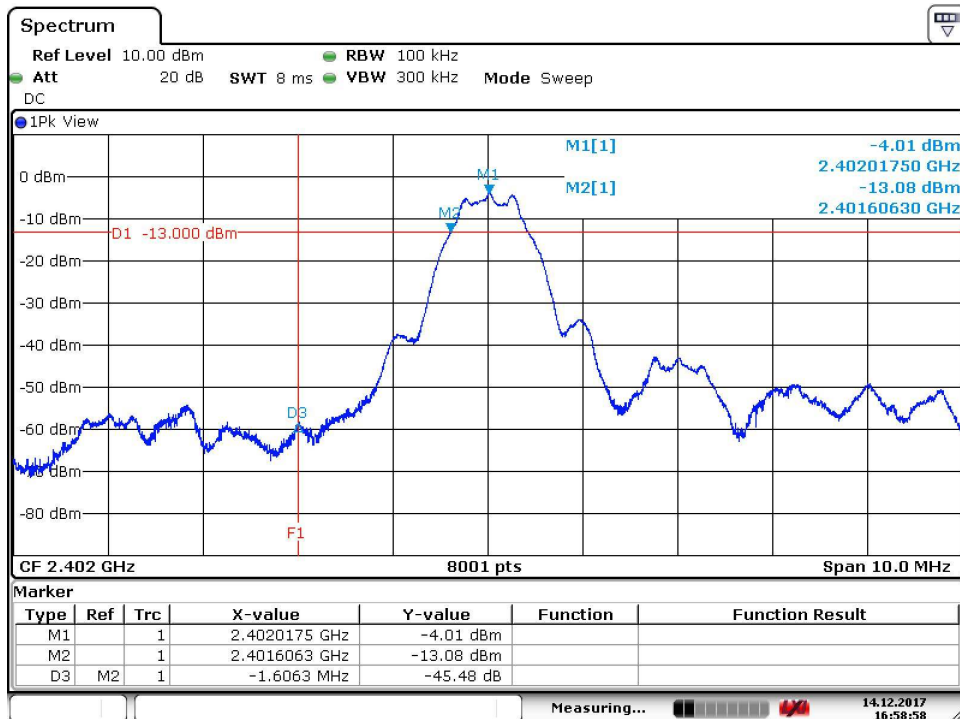
Test Set Up: Same as 15.247 (a,2) 6dB Emission Bandwidth



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Band Edge Measurements

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2,d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter 1 Mbps (Basic data rate)			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne				
Conducted Band Edge Measurement			Freq Delta (MHz)	Pass/Fail
Limit	Lower (MHz)	Upper (MHz)		
2400	2401.606300		1.606	Pass



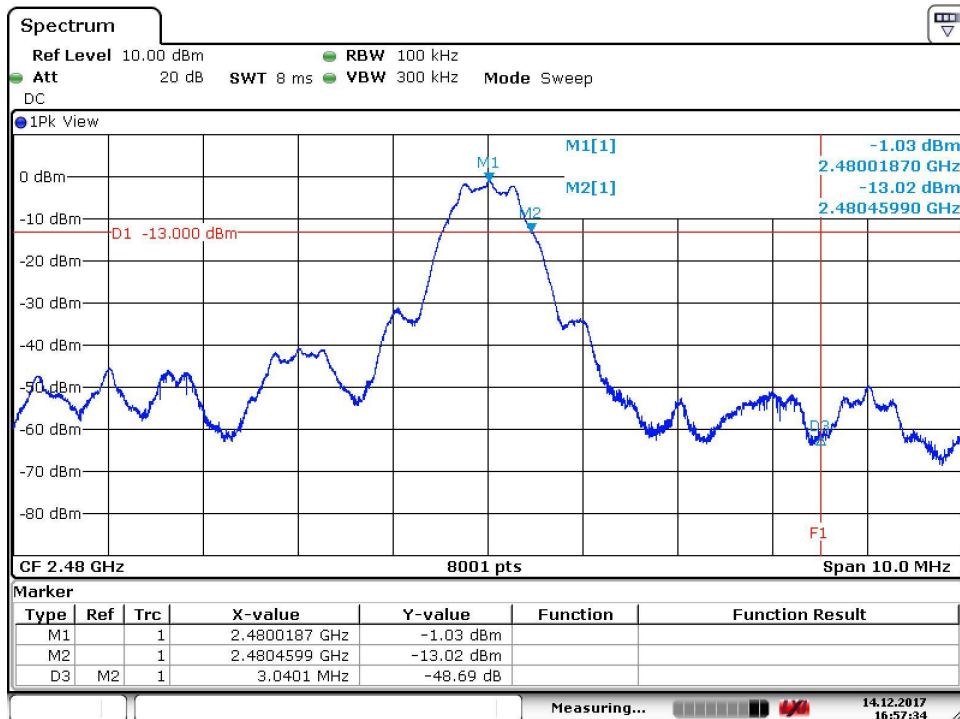
Date: 14.DEC.2017 16:58:59



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Band Edge Measurements

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2,d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter 1 Mbps (Basic data rate)			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard [X] Yes [] No CL Payne				
Conducted Band Edge Measurement			Freq Delta (MHz)	Pass/Fail
Limit	Lower (MHz)	Upper (MHz)		
2483.5		2480.459900	3.040	Pass



Date: 14.DEC.2017 16:57:35

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		Conducted Spurious	
DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter			Clause 15.247(a,2,d)
	Test Procedure			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Les Payne				

Test Procedure: ANSI C63.10-2013

15.247 (a,2,d) Spurious RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.

Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

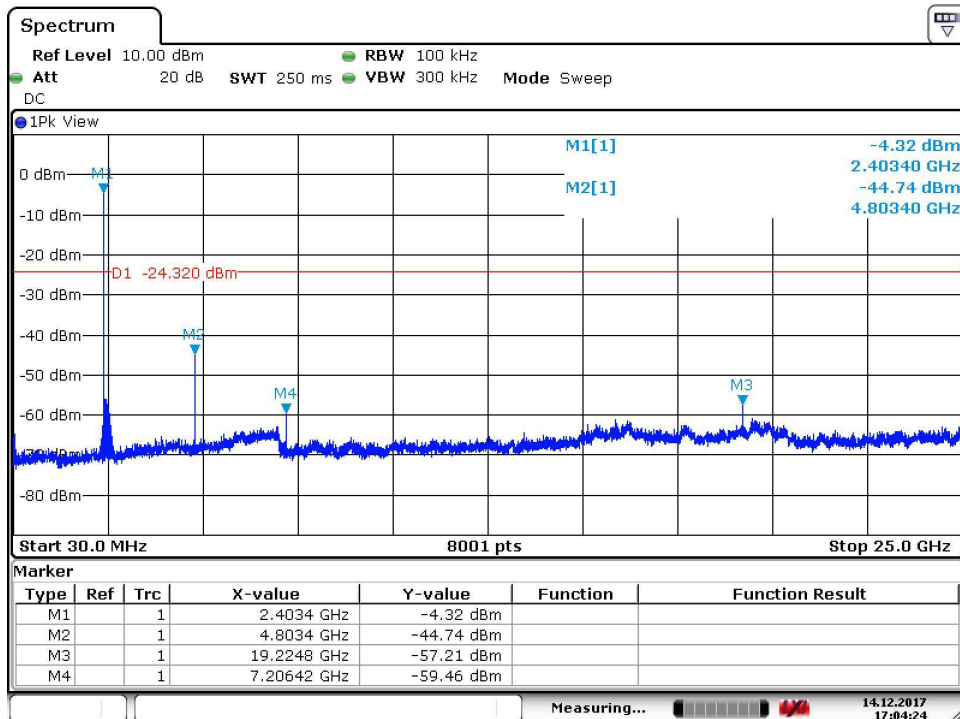
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section. Submit these plots.



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Conducted Spurious

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2,d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter Low Channel - 1 Mbps (Basic data rate)			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne				
Peak Output Power	Reading (dBm)	-20dBc (dBm)	Pass/Fail	
-3.52 dBm	-4.32	-24.32	Pass	



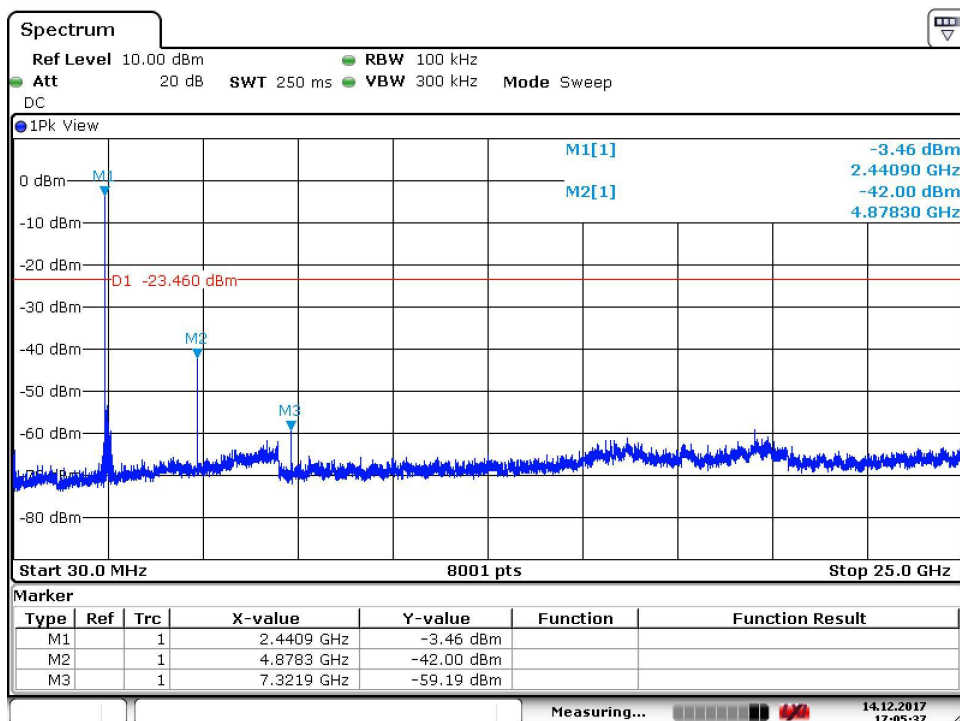
Date: 14.DEC.2017 17:04:24



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Conducted Spurious

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2,d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter Middle Channel - 1 Mbps (Basic data rate)			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne				
Peak Output Power	Reading (dBm)	-20dBc (dBm)	Pass/Fail	
-2.02 dBm	-3.46	-23.46	Pass	



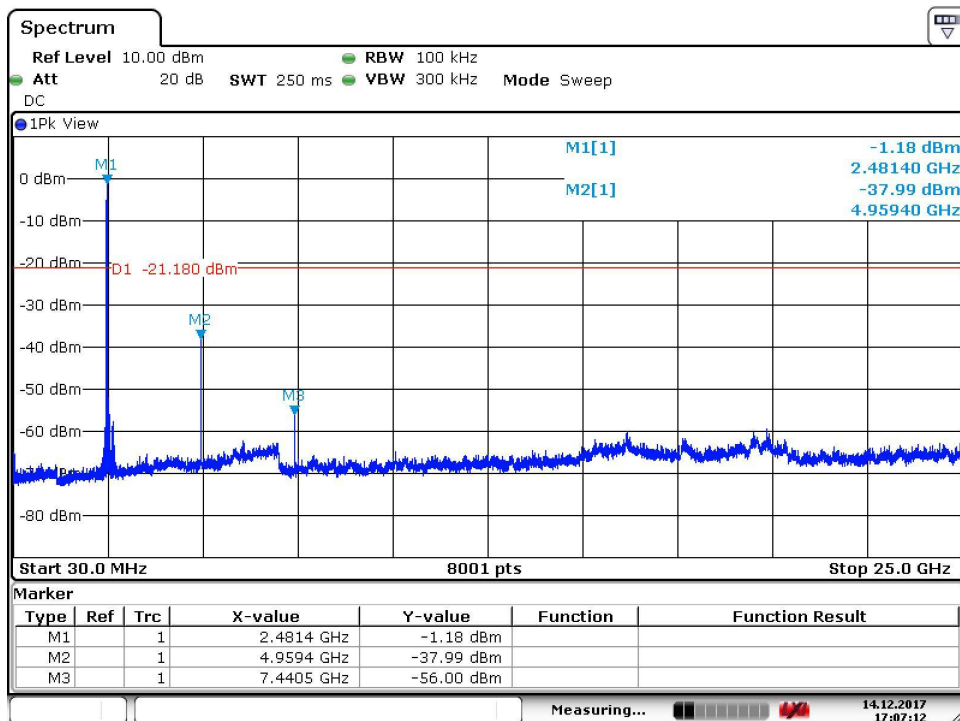
Date: 14.DEC.2017 17:05:37



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Conducted Spurious

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(a,2,d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter High Channel - 1 Mbps (Basic data rate)			
Ambient Temperature		Relative Humidity		Barometric Pressure
26 °C		30 %		101.35 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne				
Peak Output Power	Reading (dBm)	-20dBc (dBm)	Pass/Fail	
-0.53 dBm	-1.18	-21.18	Pass	



Date: 14.DEC.2017 17:07:11

15.247(a,2,e): Power spectral density(PSD).

Test Procedure: ANSI C63.10-2013

Clause 11.10.2 Method PKPSD (peak PSD)

The following procedure shall be used if the maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

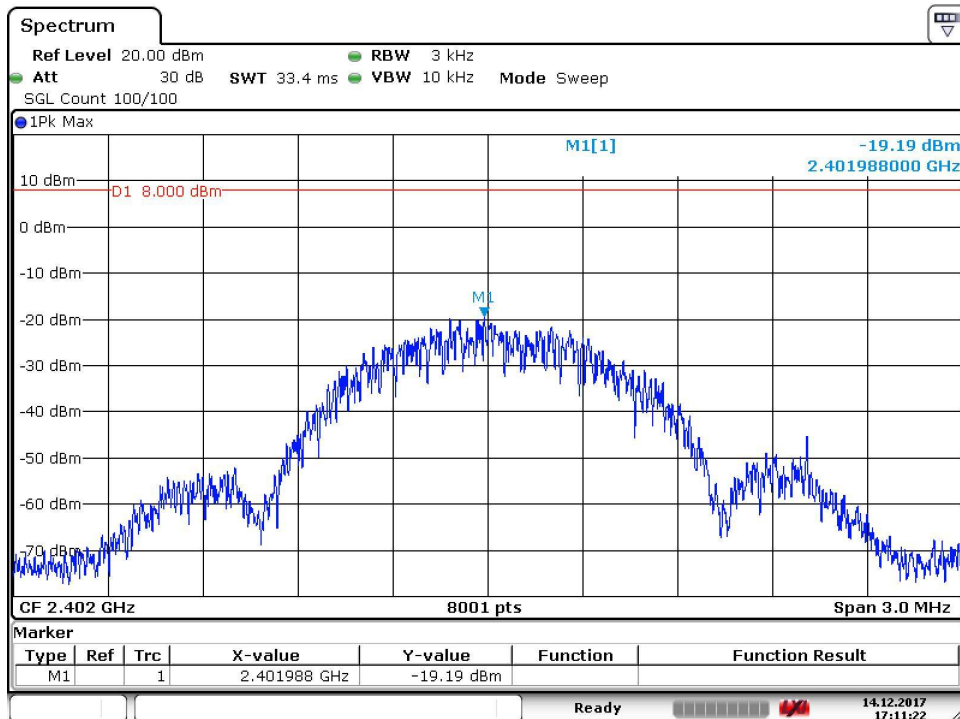
- a) Set analyzer center frequency to DTS channel center frequency
- b) Set the span to 1.5 times the DTS bandwidth
- c) Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- d) Set the VBW $\geq [3 \times \text{RBW}]$
- e) Detector = peak
- f) Sweep time = auto couple
- g) Trace mode = max hold
- h) Allow trace to fully stabilize
- i) Use the peak marker function to determine the maximum amplitude level within the RBW
- j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat
- k) Submit plots




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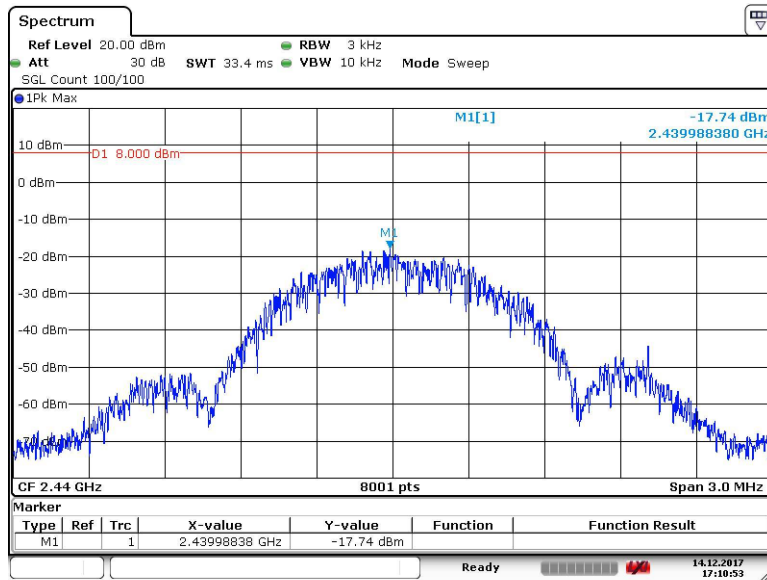
Power Spectral Density

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(d)	
Customer:	Orbit Irrigation Products Inc.				
Model Number:	BH1				
Description:	BLE Transmitter Low Channel - 1 Mbps (Basic data rate)				
Environmental Conditions					
Ambient Temperature		Relative Humidity		Barometric Pressure	
26 °C		30 %		101.35 kPa	
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne					
Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
Low	2402	-19.19	8.0	-27.19	Pass



Date: 14.DEC.2017 17:11:23

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		Power Spectral Density	
DNB Job Number:		86022		Date: 14 Dec 2017	
Customer:		Orbit Irrigation Products Inc.			
Model Number:		BH1			
Description:		BLE Transmitter			
		Middle Channel - 1 Mbps (Basic data rate)			
Environmental Conditions					
Ambient Temperature		Relative Humidity		Barometric Pressure	
26 °C		30 %		101.35 kPa	
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No CL Payne					
Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
Middle	2440	-17.74	8.0	-25.74	Pass



Date: 14.DEC.2017 17:10:54



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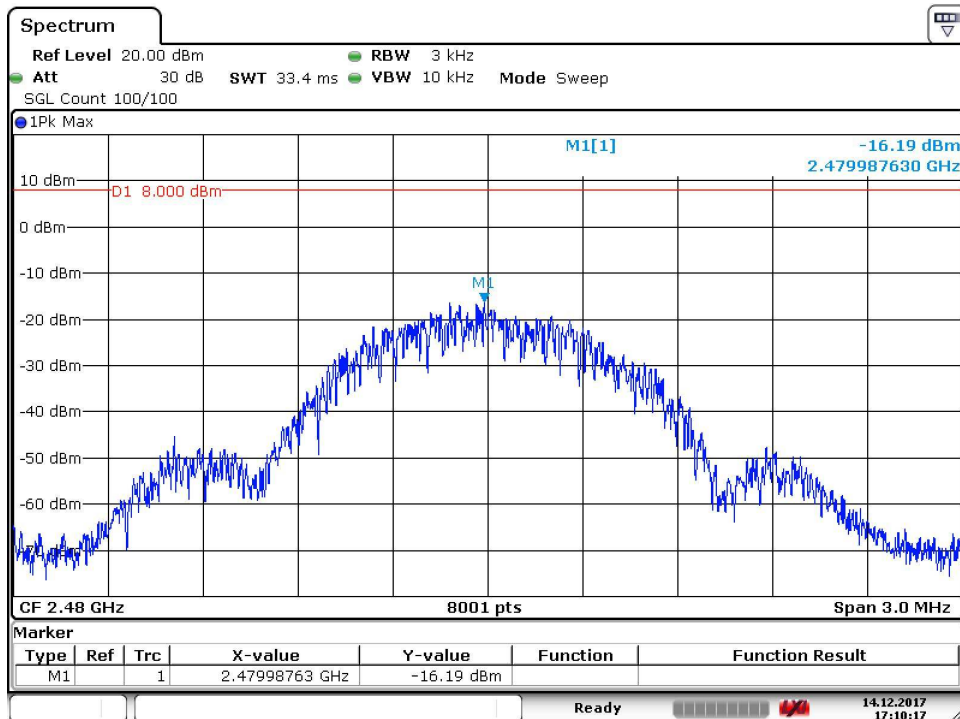
Power Spectral Density

DNB Job Number:	86022	Date:	14 Dec 2017	Conformance Standard FCC Part 15 Clause 15.247(d)
Customer:	Orbit Irrigation Products Inc.			
Model Number:	BH1			
Description:	BLE Transmitter High Channel - 1 Mbps (Basic data rate)			

Environmental Conditions		
Ambient Temperature	Relative Humidity	Barometric Pressure
26 °C	30 %	101.35 kPa

EUT performed within the requirements of the applicable standard Yes No CL Payne

Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
High	2480	-16.19	8.0	-24.19	Pass



Date: 14.DEC.2017 17:10:17

2.1033 (b) (7) Equipment Photographs

Supplied separately for confidentiality

End of Report UT86022B-002