COMPLIANCE WORLDWIDE INC.
TEST REPORT 407-18R1

In Accordance with the Requirements of

ETSI EN 300 328 V2.2.2 (2019-07)

Wideband transmission systems;
Data transmission equipment operating in the 2,4 GHz band;
Harmonised Standard for access to radio spectrum

DecaWave Ltd.
Adelaide Chambers, Peter Street
Dublin, Ireland D08 T6YA

for the

DWM1001C

Original Report Issued on November 30, 2018
Revision R1 Issued on January 31, 2022

Tested by

Brian F. Breault

Reviewed by

Larry K. Stillings

Table of Contents

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1. Scope

This test report certifies that the Decawave Ltd. DWM1001C 2.4 GHz Bluetooth Low Energy radio, as tested, meets the ETSI EN 300 328 V2.2.2 (2019-07) standard. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required. Revision R1 updates this report to V2.2.2 by performing the delta testing between the two versions.

2. Product Details

2.1. Manufacturer:	Decawave Ltd
2.2. Model Number:	DWM1001C
2.3. Serial Number:	18230049E4
2.4. Description:	The DWM1001 RTLS Module is a full-function real-time location system (or RTLS) subsystem in a compact factor. The DWM1001C module system enables customers to quickly get a RTLS system up-and-running. The system is design to operate on 6.490 GHz (Channel 5) Centre Frequencies Nominal with a 500 MHz Bandwidth and a data rate of 6.8 Mbps only.
2.5. Power Source:	2.8 – 3.6 VDC
2.6. Hardware Revision:	N/A
2.7. Software Version:	N/A
2.8. Modulation Type:	GFSK
2.9. Operating Frequency:	2402 to 2480 MHz
2.10. EMC Modifications:	None

3. Product Configuration

3.1. Operational Characteristics & Software

Emissions:

The DW1001 was pre-configured with firmware that enabled it to be configured for testing. Commands from the PC were sent to the device under test via a USB type A to micro USB cable. A terminal emulator on the PC is used to generate the required commands. Note that once the serial port settings have been entered into the terminal emulator, the reset button located nearest the edge of the DUT host module must be pressed. The following setup is employed by the DW1001:

Baud rate:	115,200
Data bits:	8
Stop bits:	1
Parity:	None

The command instructions used for device testing are as follows:

Start channel:	a<enter>CH<enter> (CH = 02, 40, 80)
Modulated Tx Carrier:	o
Output power:	p OP [OP = 0 (+4), 1 (0), 2 (-4), 3 (-8) 4 (-12), 5 (-16), 6 (-20), 7 (-30)]
Print current setup:	s

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3. Product Configuration (continued)

3.1. Operational Characteristics & Software (continued)

Receiver Blocking:

The DW1001 was re-configured with firmware that enabled it to receive data transmitted by the CBT 32 Bluetooth Tester and report the number of packets received. The Nordic nRFgo Studio software package was used to control the device under test and report the number of received packets.

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
Decawave	DWM1001	18230049E4	3.6	DC	UWB / BLE Module

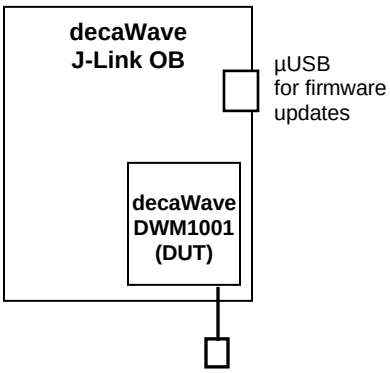
3.3. EUT Cables/Transducers

Cable Type	Length	Shield	From	To
USB	2M	Yes	EUT	USB Charger

3.4. Support Equipment

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
Dell	Inspirion E1505	5573349937	120	60	Laptop for Configuration

3.5. Block Diagram



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4. Measurement Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz – 7GHz [1]	Rohde & Schwarz	ESR7	101156	09/10/2021	2 Years
Spectrum Analyzer 20 Hz – 40 GHz [2]	Rohde & Schwarz	FSV40	100899	09/10/2021	3 Years
Spectrum Analyzer, 9 kHz – 40 GHz [3]	Rohde & Schwarz	FSVR40	100909	5/3/2019	2 Years
Spectrum Analyzer, 2 Hz – 26 GHz [4]	Rohde & Schwarz	FSW26	102057	09/13/2020	2 Years
EMI Receiver	Hewlett Packard	8546A	3650A00360	09/11/2020	2 Years
Biconilog Antenna, 30 MHz to 2 GHz	Sunol Sciences	JB1	A050913	6/3/2019	2 Years
Horn Antenna, 960 MHz to 18 GHz	Electro-Metrics	EM-6961	6337	10/3/2020	2 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B	3008A00329	09/11/2021	3 Years
Vector Signal Generator, 9 kHz to 6 GHz	Rohde & Schwarz	SMBV100A	257046	09/11/2020	2 Years
3-Way Pwr Splitter/Combiner 2-4.2 GHz	Mini-Circuits	ZA3PD-4-S	134600708	03/14/2019	1 Year
LISN 50 ohm 50 µH, 9 kHz to 30 MHz	EMCO	3825/2	9109-1860	09/10/2020	2 Years
2.4 GHz Band Reject Filter	Micro-Tronics	BRM50702	150	3/23/2021	1 Year
Power Splitter/Combiner, w/SMA	RF Bay, Inc.	PSC-2R-42	14110126	3/14/2019	1 Year
Digital Barometer	Control Company	4195	ID236	4/3/2020	2 Years
Digital Multi-meter	Fluke	187	83030167	3/30/2019	1 Year

[1] ESR7 Firmware revision: V3.36, Date installed: 05/16/2017 Previous V2.26 SP2, installed 11/15/2016.
[2] FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016 Previous V2.30 SP1, installed 10/22/2014.
[3] FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016 Previous V2.23, installed 10/20/2014.
[4] FSW26 Firmware revision: V2.61 SP1, Date installed: 04/04/2017 Previous V2.40, installed 05/04/2016.

Revision R1 Test Equipment List

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz – 7GHz [1]	Rohde & Schwarz	ESR7	101156	10/16/2023	2 Years
EMI Test Receiver, 10 Hz – 7GHz [1]	Rohde & Schwarz	ESR7	101770	7/23/2023	2 Years
Spectrum Analyzer, 9 kHz to 40 GHz[2]	Rohde & Schwarz	FSV40	100899	8/12/2022	2 Years
Spectrum Analyzer 10 Hz – 40 GHz[3]	Rohde & Schwarz	FSVR40	100909	9/18/2022	2 Years
Biconilog Antenna, 30 MHz – 2 GHz	Sunol Sciences	JB1	A050913	7/1/2023	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00143292	3/21/2022	3 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B H02	3008A00329	1/20/2024	2 Years
Signal Generator, 100 kHz to 40 GHz	Rohde & Schwarz	SMB 100A	175352	2/2/2022	2 Years
3-Way Power Splitter, 2 to 4.2 GHz	Mini-Circuits	ZA3PD-4-S	134600708	6/17/2022	2 Years
Power Splitter/Combiner, to 4.2 GHz	RF Bay, Inc.	PSC-2R-42	14110124	6/16/2022	2 Years
2.4 GHz Band Reject Filter	Micro-Tronics	BRM50702	150	3/30/2022	2 Years
SMA Fixed Attenuator Kit	Mini-Circuits	K2-BW3+	00812	CBU	N/A
Digital Barometer	Control Company	4195	ID236	1/27/2023	1 Year
Bluetooth 4.0 Tester	Rohde & Schwarz	CBT32	100473	CBU	N/A

[1] ESR7 Firmware revision: V3.48 SP3, Date installed: 09/30/2020 Previous V3.48 SP2, installed 07/23/2020.
[2] FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016 Previous V2.30 SP1, installed 10/22/2014.
[3] FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016 Previous V2.23, installed 10/22/2014.

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4. Measurements Parameters (continued)

4.2. Measurement Software

Not used for the generation of this report.

4.3. Measurement & Equipment Setup

Test Dates:	Nov. 26, 2018 to Nov. 30, 2018, 10/8/2021, 11/19/2021, 1/14/2022
Test Engineer:	Brian Breault, Sean Defelice
Normal Site Temperature (15 - 35°C):	20.7
Relative Humidity (20 -75%RH):	33%
Frequency Range:	30 MHz to 12.75 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	100 or 120 kHz - 30 MHz to 1 GHz 1 MHz - Above 1 GHz
EMI Receiver Avg Bandwidth:	≥ 3 * RBW or IF(BW)
Detector Function:	Peak, RMS - 30 MHz to 1 GHz Peak, RMS - Above 1 GHz

4.4. Measurement Procedure

All references to ETSI EN 300 328 refer to version 2.2.2 (2019-07).

Test measurements were made in accordance ETSI EN 300 328, clause 5: Testing for compliance with technical requirements.

Normal and Extreme Test Conditions

Normal test conditions are defined as the ambient temperature and humidity of the test site at the time a particular test was performed. This information is specified in Section 5.2 of this report and falls within the requirements outlined in ETSI EN 300 328, clause 5.1.2.1. Power for this device is provided by a lithium polymer battery. Nominal voltage for this product is 3.7 volts DC. To ensure a consistent supply voltage, a calibrated voltage source was substituted in place of the lithium polymer battery.

In addition to the normal test conditions, the extreme test temperatures of -40º to +85ºC were selected in accordance with the manufacturer's specifications and ETSI EN 300 328, Clause 5.1.3.

Conducted Measurement Correction Factors (dB)

Channel	Freq.	RF Cable
37	2402	1.40
17	2440	1.41
39	2480	1.40
Average		**1.40**

Notes: RF cable calibration was performed immediately before testing.

Insertion loss calibrations and calculations for the receiver blocking measurements were performed separately and are detailed in Section 7.10.

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4. Measurements Parameters (continued)

4.4. Measurement Procedure (continued)

Antenna Gain

The antenna contained in the device under test has a peak gain of -3.0 dBi.

Duty Cycle

A duty cycle measurement was performed on the device under test and is detailed in section 7.1.2 of this report.

4.5. Measurement Uncertainty

The following uncertainties are expressed for an expansion/coverage factor of K=2.

Parameter	Uncertainty
RF output power, conducted	±1.5 dB
Duty Cycle	±5 %
Power Spectral Density, conducted	±3 dB
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±1 °C
Humidity	±5 %
DC and low frequency voltages	±3 %
Time	±5 %

5. Choice of Equipment for Test Suites

5.1. Choice of Model

This test report is based on the test sample supplied by the manufacturer and is reported by the manufacturer to be equivalent to the production units.

5.2. Choice of Operating Frequencies

In accordance with ETSI EN 300 328, clauses 5.4.2.1 and 5.4.3.1, the lowest, middle and highest channels were selected for test. For the other tests, the lowest and highest channels were selected. The choice of operating frequencies selected for the testing detailed in this report are outlined in the following table:

Low:	37	2402
Middle:	17	2440
High:	39	2480

5.3. Presentation

This test sample was tested complete with all required ancillary equipment. Refer to Section 3 of this report for the product equipment configuration.

5.4. Worst Case Test Mode

The operational characteristics of the device under test, as supplied by the manufacturer, were configured as they would be for the end user.

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5. Choice of Equipment for Test Suites (continued)

5.5 Receiver Category & Medium Utilization (MU) Factor

Category 2 - Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2equipment.

Medium Utilization (MU) Factor

The Medium Utilization (MU) factor is a measure to quantify the amount of resources (Power and Time) used by non-adaptive equipment. The Medium Utilization factor is defined by the formula:

$$MU = (P / 100\ mW) \times DC$$

MU is Medium Utilization factor in %.
P is the RF output power as defined in section 7.1 expressed in mW.
DC is the Duty Cycle as defined in clause 4.3.1.3.2 expressed in %.

P = 4.34 dBm = 2.71 mW
DC = 89.9 %
MU = (2.71 / 100 mW) × 89.90% = 2.44%
MU = 2.44%

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6. Measurement Summary

Transmitter Test Requirement	ETSI EN 300 328 Reference	Test Report Section	Result	Comment
RF Output Power	5.4.2	7.1	Compliant	
Duty Cycle	5.4.2	7.1.2	Observed	
Tx-sequence, Tx-gap	5.4.2	7.1.3	Not Required	Requirement applies to non-adaptive equipment.
Medium Utilization	5.4.2	7.1.3	Not Required	Requirement applies to non-adaptive equipment.
RF Power Spectral Density	5.4.3	7.2	Compliant	
Accumulated Transmit Time	5.4.4	7.3.1	Not Required	Does not apply to equipment using wide band modulations other than FHSS.
Frequency Occupation	5.4.4	7.3.2	Not Required	Does not apply to equipment using wide band modulations other than FHSS.
Hopping Sequence	5.4.4	7.3.3	Not Required	Does not apply to equipment using wide band modulations other than FHSS.
Hopping Frequency Separation	5.4.5	7.4	Not Required	Does not apply to equipment using wide band modulations other than FHSS.
Adaptivity (Channel Access Mechanism)	5.4.6	7.5	Not Required	Does not apply to equipment using wide band modulations other than FHSS.
Occupied Channel Bandwidth	5.4.7	7.6	Compliant	
Transmitter Unwanted Emissions in the Out-of-Band Domain	5.4.8	7.7	Compliant	
Transmitter Unwanted Emissions in the Spurious Domain	5.4.9	7.8	Compliant	

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7. Measurement Data

7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2)

Requirement:	For equipment using FHSS modulation, the measurements shall be performed during normal operation (hopping) and the equipment is assumed to have no blacklisted frequencies (operating on all hopping positions). For equipment using wide band modulations other than FHSS, the measurement shall be performed at the lowest, the middle, and the highest channel on which the equipment can operate. These frequencies shall be recorded. For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm. (clause 4.3.2.2.3)
Test Conditions:	The measurements for RF output power shall be performed at both normal environmental conditions and at the extremes of the operating temperature range. (clause 5.4.2.1)
Test Method:	The test method for RF output power is detailed in ETSI EN 300 328, clause 5.4.2.2, Annex B and Annex C. For systems using wide band modulations other than FHSS, the measurement shall be performed at the lowest, the middle, and the highest channel on which the equipment can operate. These frequencies shall be recorded. (clause 5.4.2.1)
Test Notes:	The software for the device under test was configured based on the operating instructions detailed in section 3.2 of this test report.
Test Results	Compliant

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7. Measurement Data

7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.1. Measurement Results - Normal Test Conditions 21.7ºC, 3.7 VDC

Ch.	Frequency (MHz)	Amplitude (dBm)	Ant. Gain (dBi)	RF Output Power (eirp) (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	3.500	0.00	3.50	20	-16.50	Compliant
17	2440	3.448	0.00	3.45	20	-16.55	Compliant
39	2480	3.368	0.00	3.37	20	-16.63	Compliant

7.1.1.2. Measurement Results – Extreme Test Conditions -40ºC, 3.7 VDC

Ch.	Frequency (MHz)	Amplitude (dBm)	Ant. Gain (dBi)	RF Output Power (eirp) (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	4.254	0.00	4.25	20	-15.75	Compliant
17	2440	4.337	0.00	4.34	20	-15.66	Compliant
39	2480	4.229	0.00	4.23	20	-15.77	Compliant

7.1.1.3. Measurement Results – Extreme Test Conditions +85ºC, 3.7 VDC

Ch.	Frequency (MHz)	Amplitude (dBm)	Ant. Gain (dBi)	RF Output Power (eirp) (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	2.583	0.00	2.58	20	-17.42	Compliant
17	2440	2.539	0.00	2.54	20	-17.46	Compliant
39	2480	2.400	0.00	2.40	20	-17.60	Compliant

7.1.1.4. Measurement Results – Worst Case

Ch.	Frequency (MHz)	Amplitude (dBm)	Ant. Gain (dBi)	RF Output Power (eirp) (dBm)	Limit (dBm)	Margin (dB)	Condition	Result
37	2402	4.254	0.00	4.25	20	-15.75	-40ºC, 3.7 VDC	Compliant
17	2440	4.337	0.00	4.34	20	-15.66	-40ºC, 3.7 VDC	Compliant
39	2480	4.229	0.00	4.23	20	-15.77	-40ºC, 3.7 VDC	Compliant

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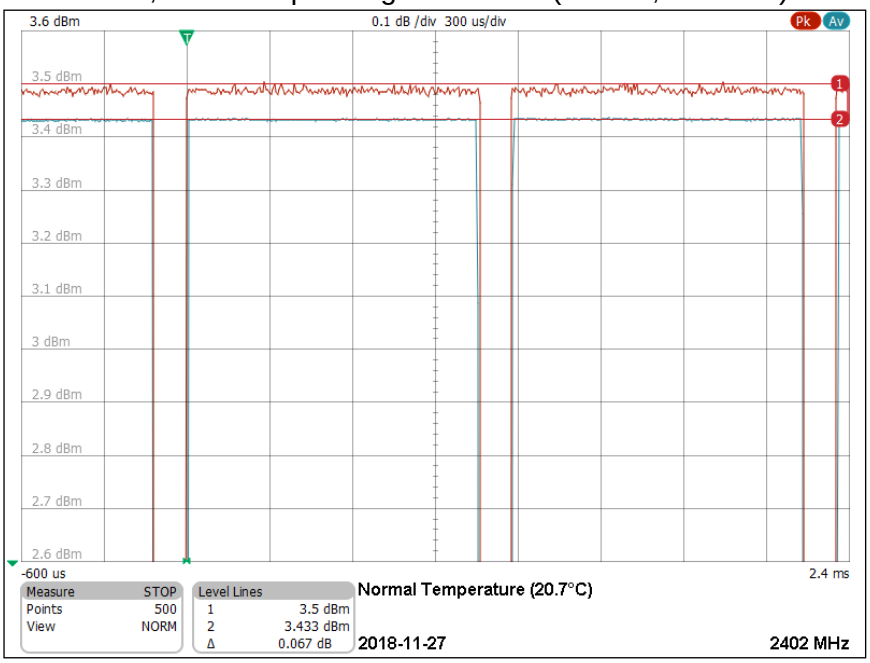
7. Measurement Data

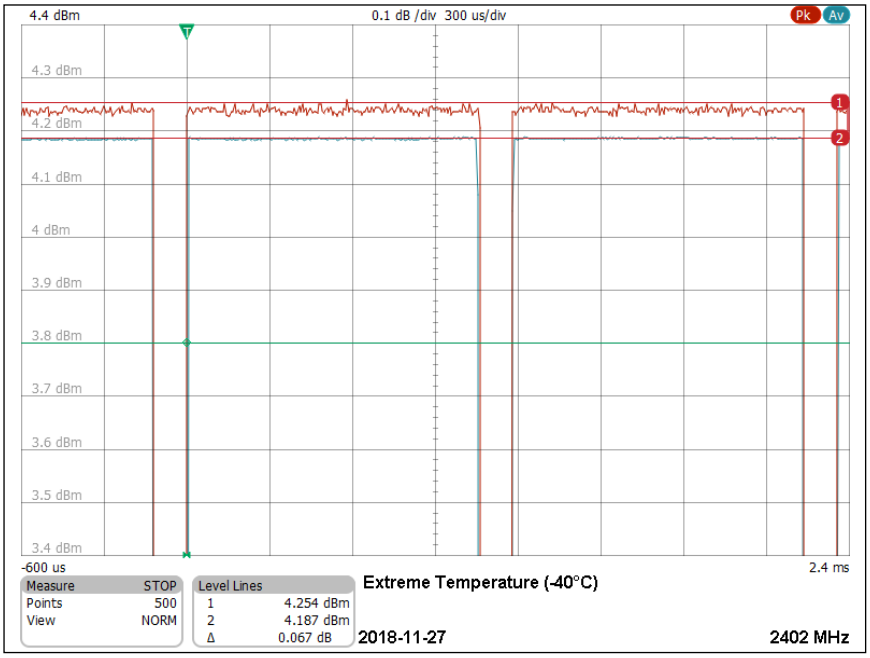
7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.1. 2402 MHz, Normal Operating Conditions (20.7°C, 3.7 VDC)



7.1.1.2. 2402 MHz, Extreme Operating Conditions (-40°C, 3.7 VDC)



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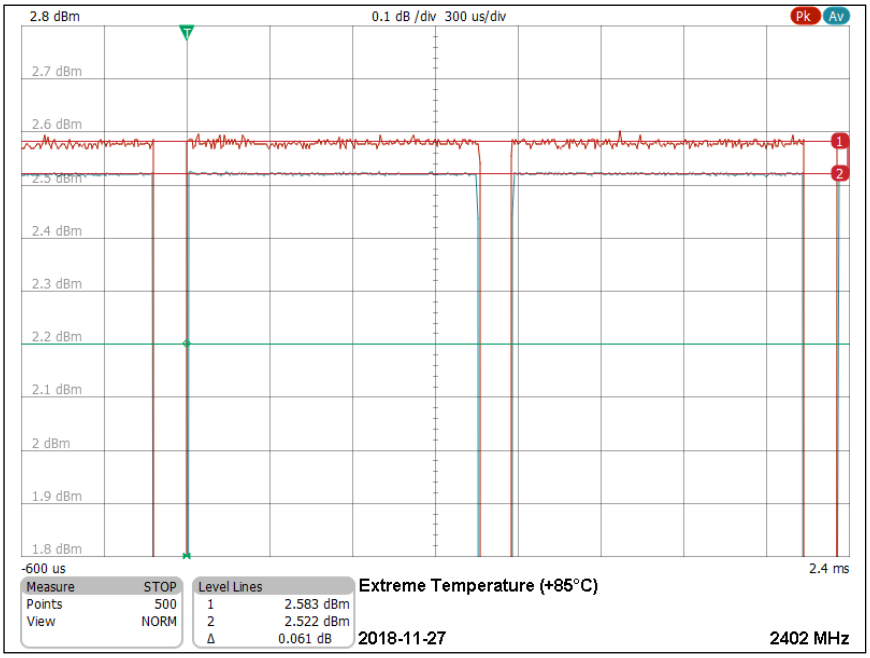
7. Measurement Data

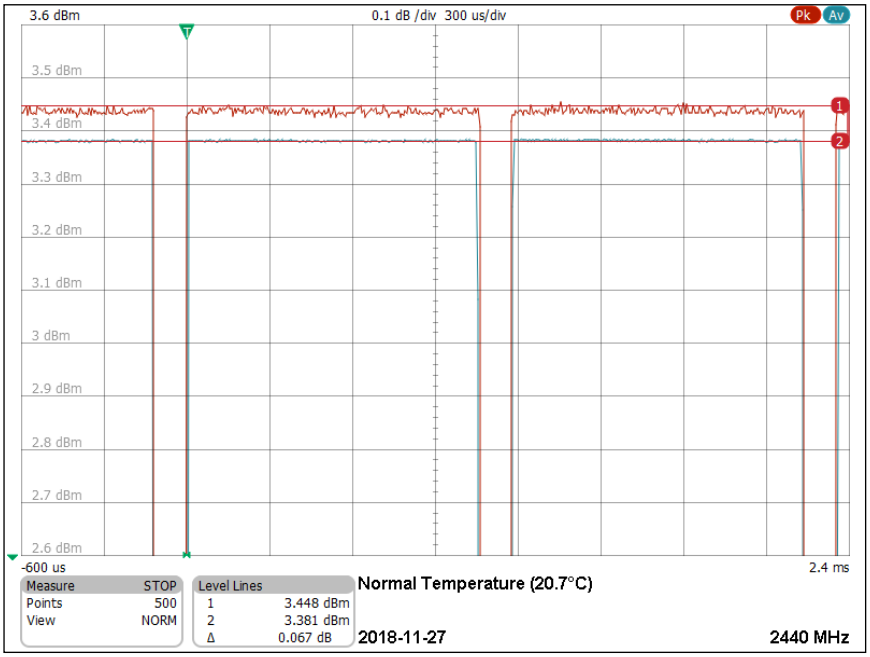
7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.3. 2402 MHz, Extreme Operating Conditions (+85°C, 3.7 VDC)



7.1.1.4. 2440 MHz, Normal Operating Conditions (20.7°C, 3.7 VDC)



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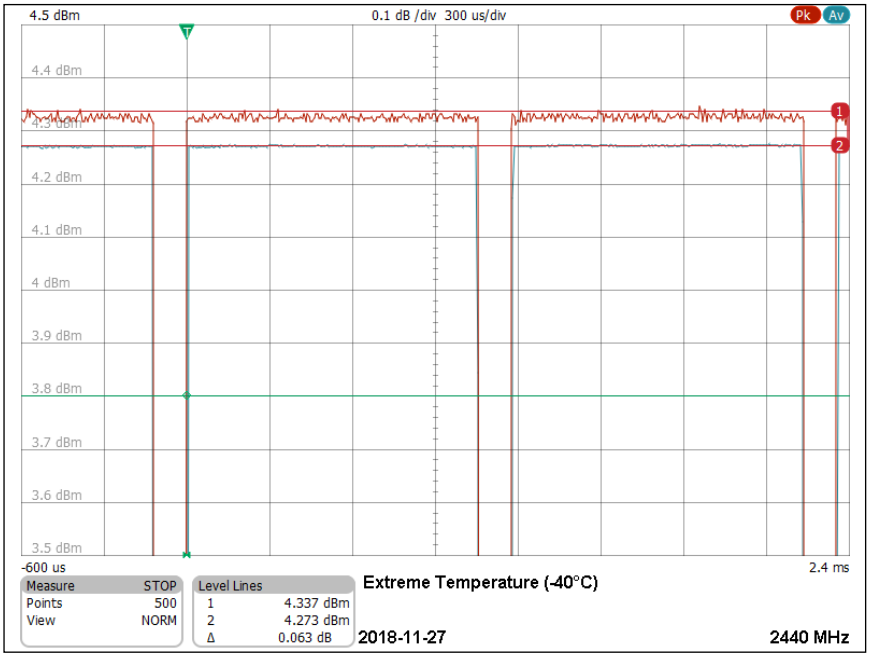
7. Measurement Data

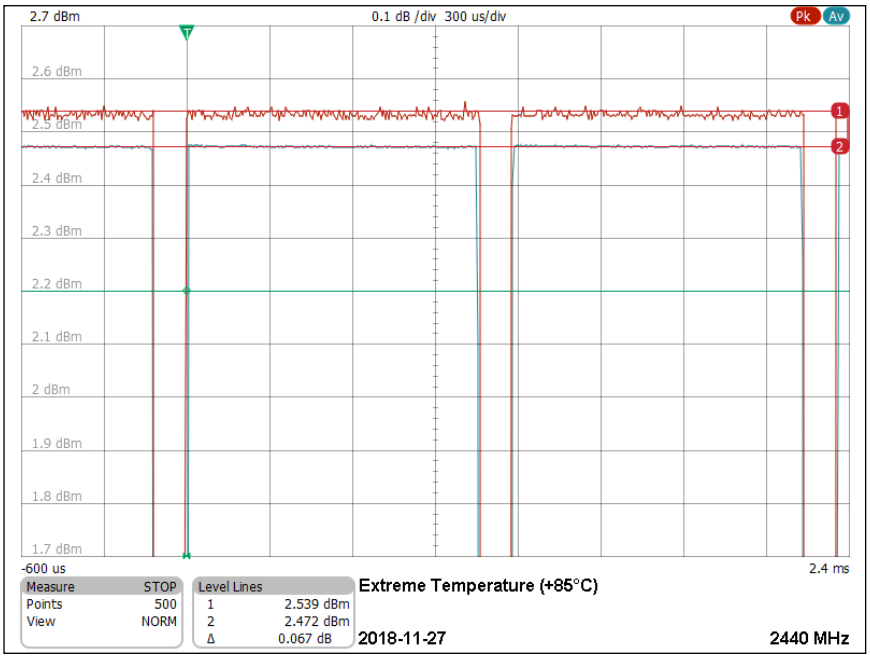
7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.5. 2440 MHz, Extreme Operating Conditions (-40°C, 3.7 VDC)



7.1.1.6. 2440 MHz, Extreme Operating Conditions (+85°C, 3.7 VDC)



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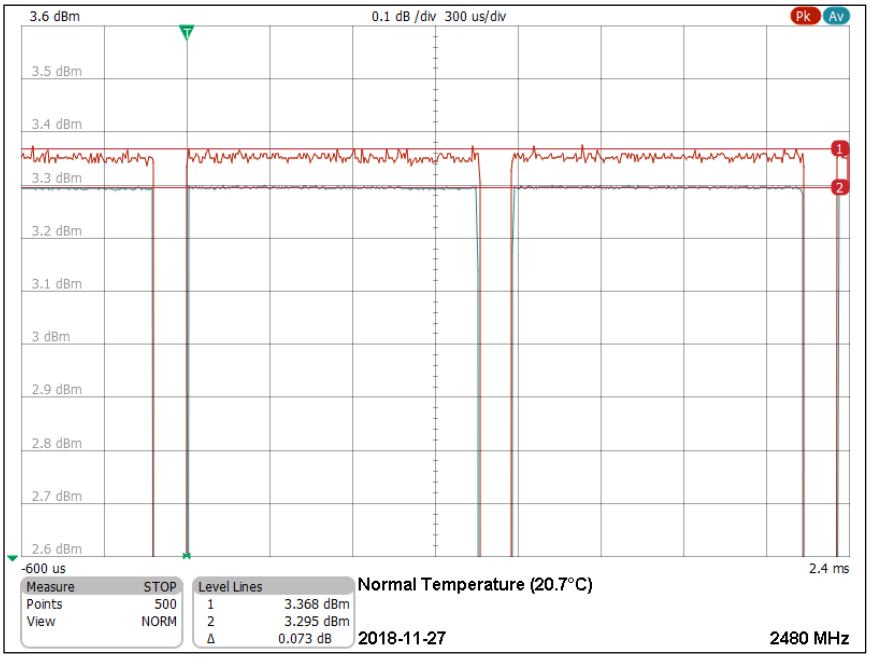
7. Measurement Data

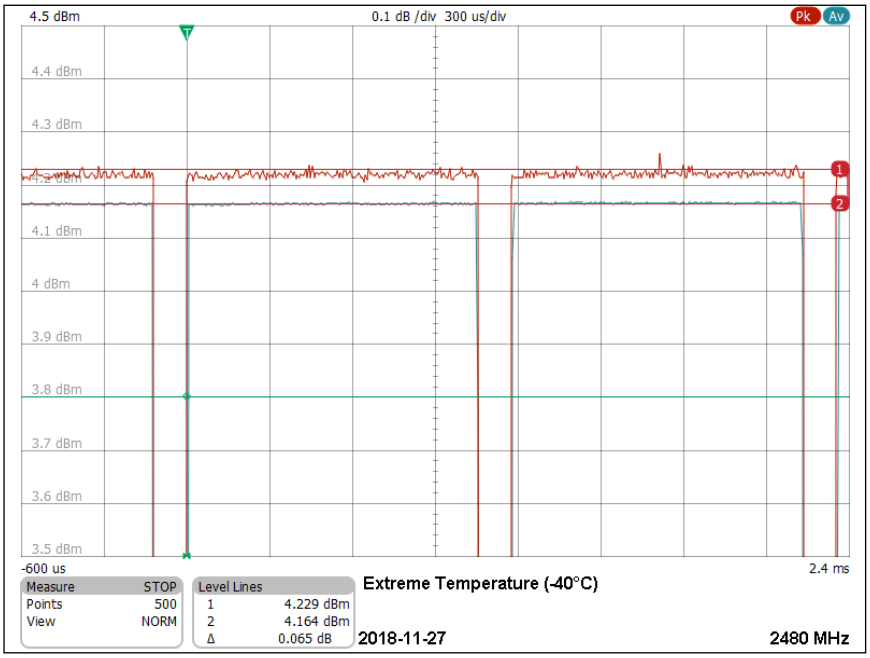
7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.7. 2480MHz, Normal Operating Conditions (20.7°C, 3.7 VDC)



7.1.1.8. 2480 MHz, Extreme Operating Conditions (-40°C, 3.7 VDC)



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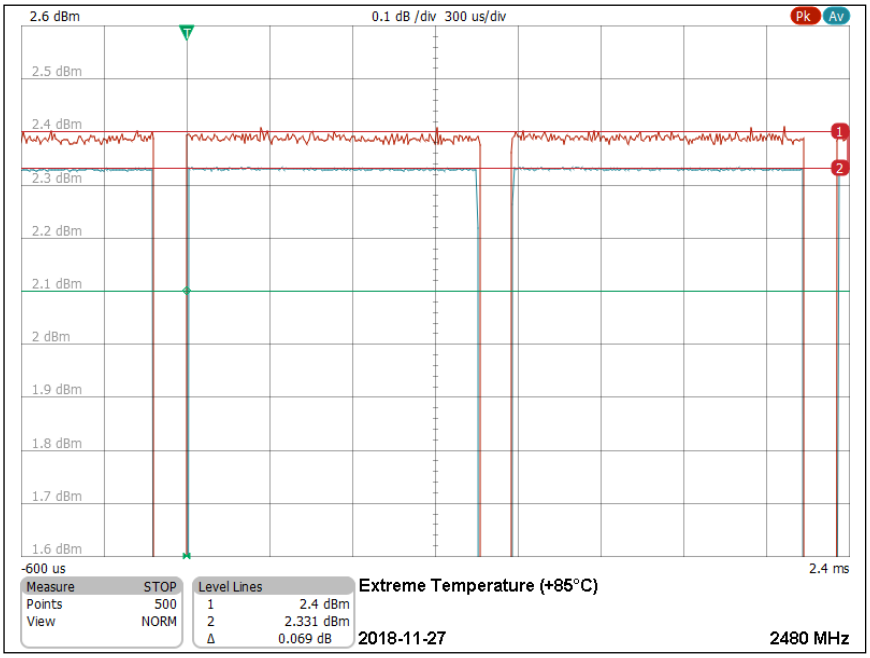
7. Measurement Data

7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2) (continued)

7.1.1. RF Output Power Utilization (Clause 5.4.2.2.1) (continued)

7.1.1.9. 2480 MHz, Extreme Operating Conditions (+85°C, 3.7 VDC)



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7. Measurement Data (continued)

7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2)

7.1.2. Duty Cycle (Clause 5.4.2.2.1.3)

Requirement: The calculated value for Duty Cycle (DC) shall be recorded in the test report. This value shall be equal to or less than the maximum value declared by the manufacturer.

Test Conditions: Duty cycle measurements were performed at normal conditions.

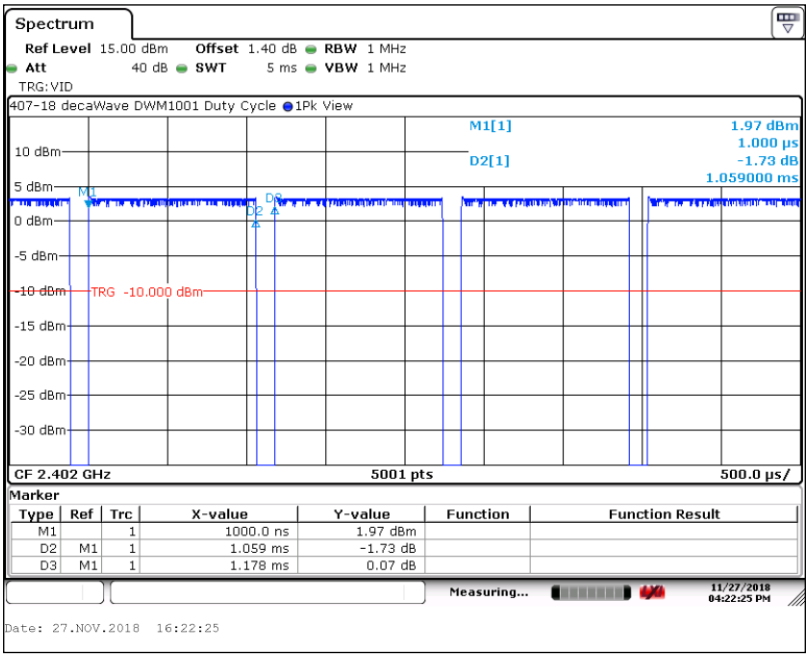
Test Method: The duty cycle measurements were performed in accordance with the requirements detailed in clause 5.4.2.2.1.3. The test method for RF output power is detailed in ETSI EN 300 328, clause 5.4.2.2, Annex B and Annex C.

Requirement: Required for power spectral density measurement.

Results:

Ch.	Frequency (MHz)	TX_{On} (mS)	TX_{On} + TX_{Off} (mS)	Duty Cycle	Duty Cycle %
37	2402	1.05900	1.17800	0.89898	89.90
17	2440	1.05900	1.17800	0.89898	89.90
39	2480	1.05900	1.17800	0.89898	89.90

7.1.2.1. Duty Cycle – TX_{On} and TX_{On} + TX_{Off}, Channel 37



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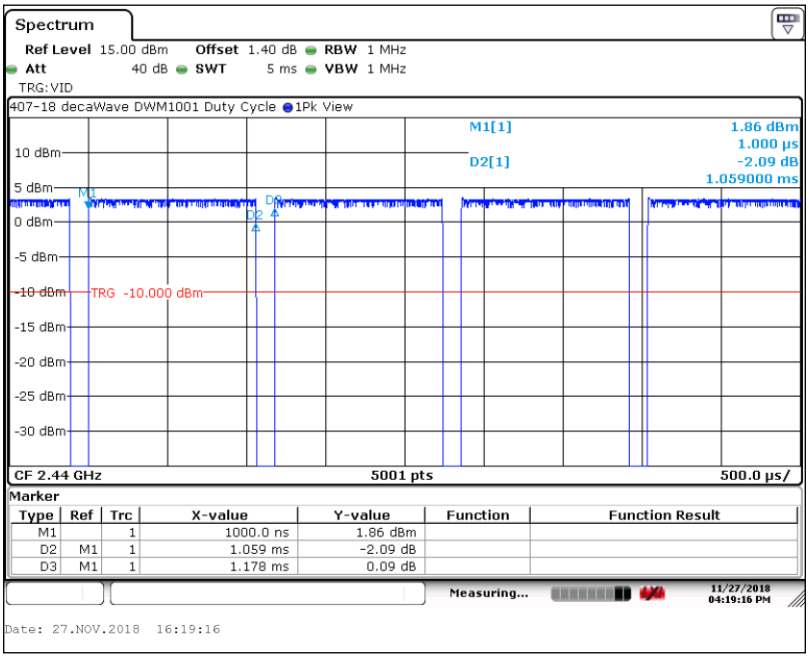
7. Measurement Data (continued)

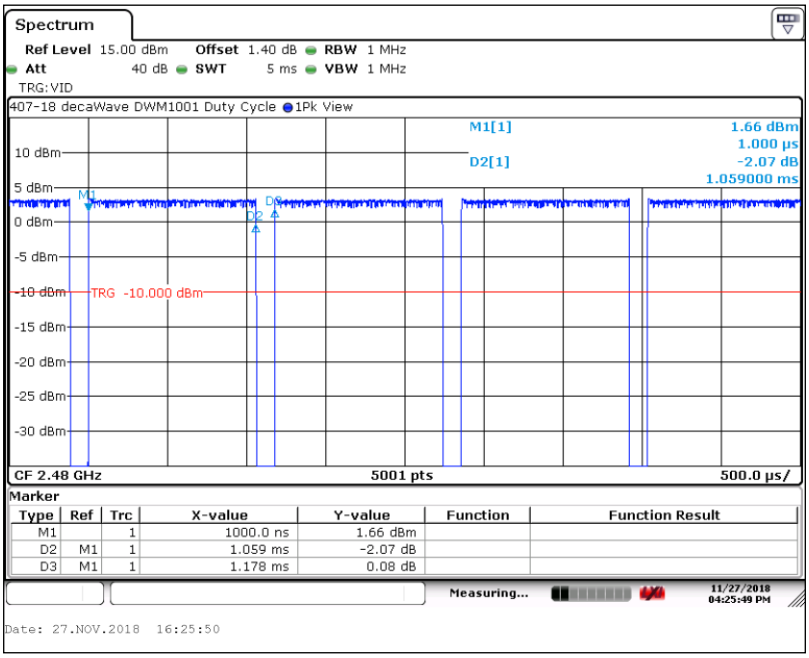
7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2)

7.1.2. Duty Cycle (Clause 5.4.2.2.1.3)

7.1.2.2. Duty Cycle – TX_{On} and TX_{On} + TX_{Off}, Channel 17



7.1.2.3. Duty Cycle - TX_{On} and TX_{On} + TX_{Off}, Channel 39



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7. Measurement Data (continued)

7.1. RF Output Power, Duty Cycle, Tx-Sequence, Tx-Gap, Medium Utilization (Clause 5.4.2)

7.1.3. Tx-sequence, Tx-gap (5.4.2.2.1.3)

Requirement: This test is not required for this device.
This requirement applies to non-adaptive equipment.

7.1.4. Medium Utilization (5.4.2.2.1.4)

Requirement: This test is not required for this device.
This requirement applies to non-adaptive equipment.

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7. Measurement Data (continued)

7.2. RF Power Spectral Density (Clause 5.4.3)

Requirement: The Power Spectral Density (PSD) is the mean equivalent isotropically radiated power (e.i.r.p.) spectral density in a 1 MHz bandwidth during a transmission burst. This requirement applies to all types of equipment using wide band modulations other than FHSS.

Test Conditions: The measurements for power spectral density shall be performed at normal environmental conditions only. Reference ETSI EN 300 328, clause 5.4.3.1.

Test Method: The test method for RF output power is detailed in ETSI EN 300 328, clause 5.4.3.2.1, Option 1.

Test Notes: The software for the device under test was configured exactly as it would have been in an end-user environment. The hardware was modified with the addition of an SMA connector to facilitate conducted mode measurements.

Test Results Compliant

Ch.	Channel Frequency (MHz)	Measured Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	2401.985	0.12	10	-9.88	Compliant
17	2440	2439.980	0.13	10	-9.87	Compliant
39	2480	2479.985	0.15	10	-9.85	Compliant

Note: PSD was determined by capturing the trace data from the plots on the next two pages and using the procedure detailed in Option 1 of section 5.4.3.2.1.

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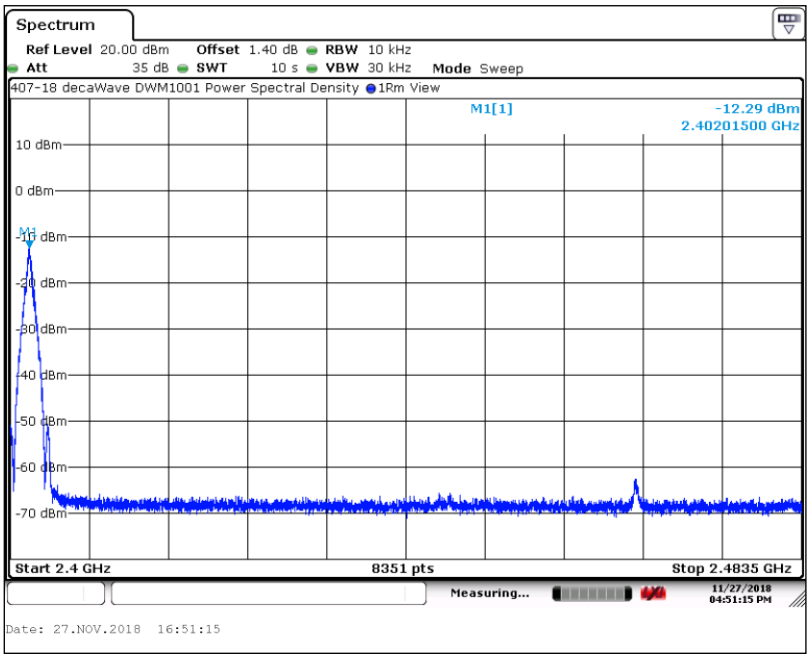
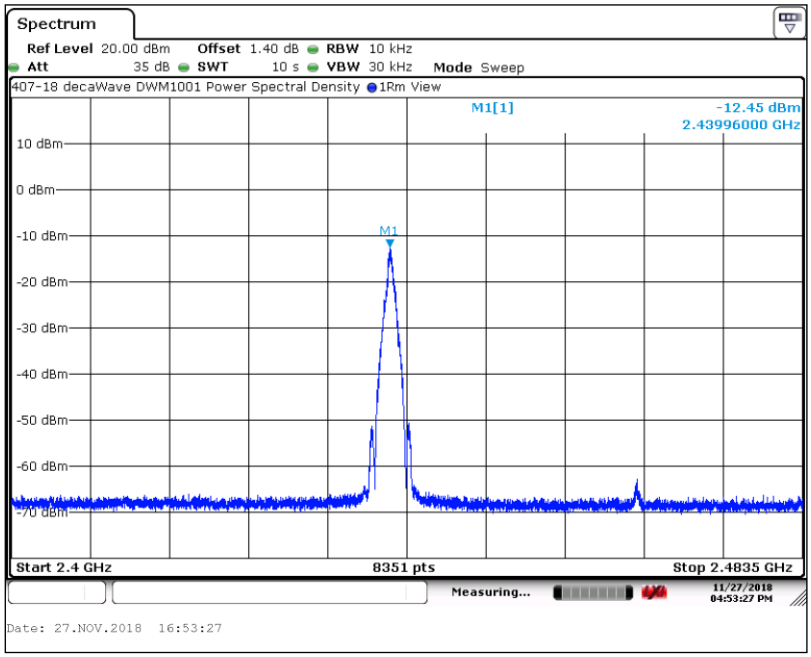
7. Measurement Data (continued)

7.2. RF Power Spectral Density (Clause 5.4.3) (continued)

7.2.1. Low Frequency, Channel 37, 2402 MHz



7.2.2. Middle Frequency, Channel 17, 2440 MHz



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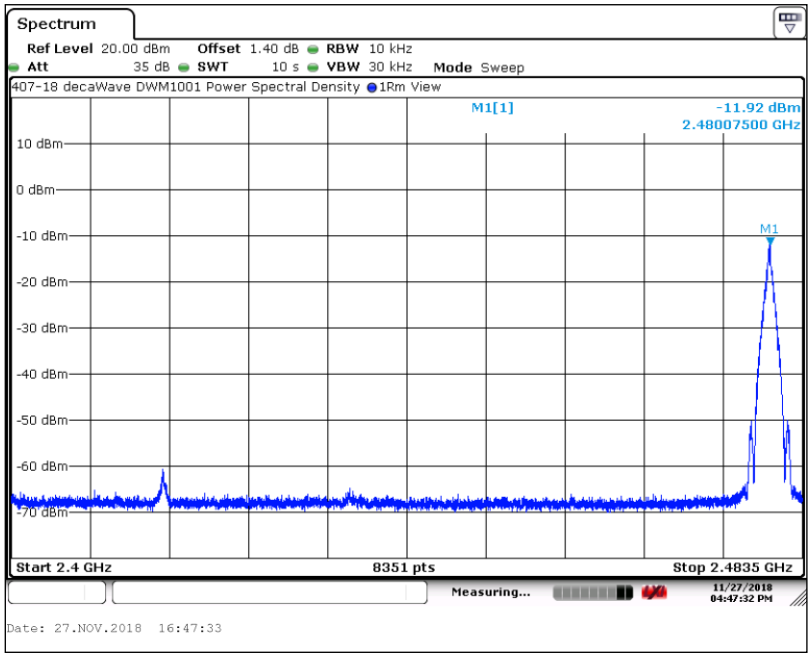
7. Measurement Data (continued)

7.2. RF Power Spectral Density (Clause 5.4.3) (continued)

7.2.3. High Frequency, Channel 39, 2480 MHz



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7. Measurement Data (continued)

7.3. Accumulated Transmit Time, Frequency Occupation and Hopping Sequence (Clause 5.4.4)

7.3.1. Accumulated Transmit Time (Clause 5.4.4)

Definition: The Accumulated Transmit Time is the time that a particular hopping frequency would be occupied by the transmitter during a single hop. This requirement does not apply to equipment using wide band modulations other than FHSS.

7.3.2. Frequency Occupation (Clause 5.4.4)

Definition: The minimum frequency occupation time is the minimum time each hopping frequency shall be occupied within a given period. This requirement does not apply to equipment using wide band modulations other than FHSS.

7.3.3. Hopping Sequence (Clause 5.4.4)

Definition: The Hopping sequence of a frequency hopping system is the unrepeated pattern of the hopping frequencies used by the equipment. This requirement does not apply to equipment using wide band modulations other than FHSS.

7.4. Hopping Frequency Separation (Clause 5.4.5)

Definition: The hopping frequency separation is the frequency separation between two adjacent hopping frequencies. This requirement does not apply to equipment using wide band modulations other than FHSS.

7.5. Adaptivity (Channel Access Mechanism) (Clause 5.4.6)

Definition: Adaptive frequency hopping using LBT based DAA is a mechanism by which a given hopping frequency is made 'unavailable' because signal was detected before any transmission on that frequency. This requirement does not apply to equipment using wide band modulations other than FHSS.

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7. Measurement Data (continued)

7.6. Occupied Channel Bandwidth (Clause 5.4.7)

Definition: The occupied channel bandwidth is the bandwidth that contains 99 % of the power of the signal. (4.3.2.7.2).

Requirement: The occupied channel bandwidth shall fall completely within the 2.4 GHz to 2.4835 GHz band. In addition, for non-adaptive systems using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz. (4.3.2.7.3).

Test Conditions: Performed at normal temperature conditions only (clause 5.4.7.1).

Test Method: The test method for occupied channel bandwidth is detailed in ETSI EN 300 328, clause 5.4.7.2.1.

Test Notes: All tabled measurements are in dB.

The occupied bandwidth is determined from the leading edge of the occupied bandwidth of the lowest channel and the trailing edge of the occupied bandwidth of the highest channel.

Test Results: Compliant

Ch.	Frequency (MHz)	Channel Bandwidth (MHz)	Leading & Trailing Edges (MHz)	Requirement	Result
37	2402	1.7848	2401.1055	>2400.0	Compliant
39	2480	1.8106	2480.9065	<2483.5	Compliant

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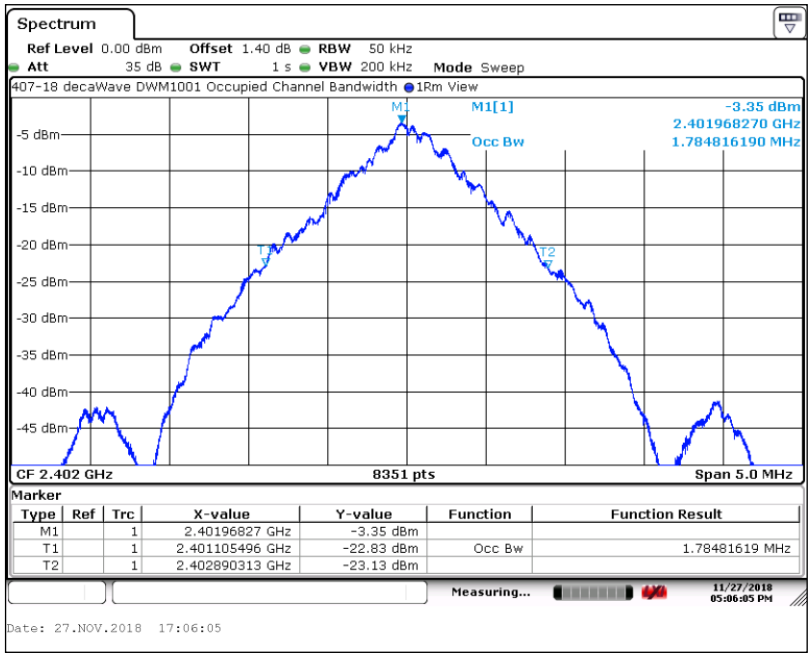
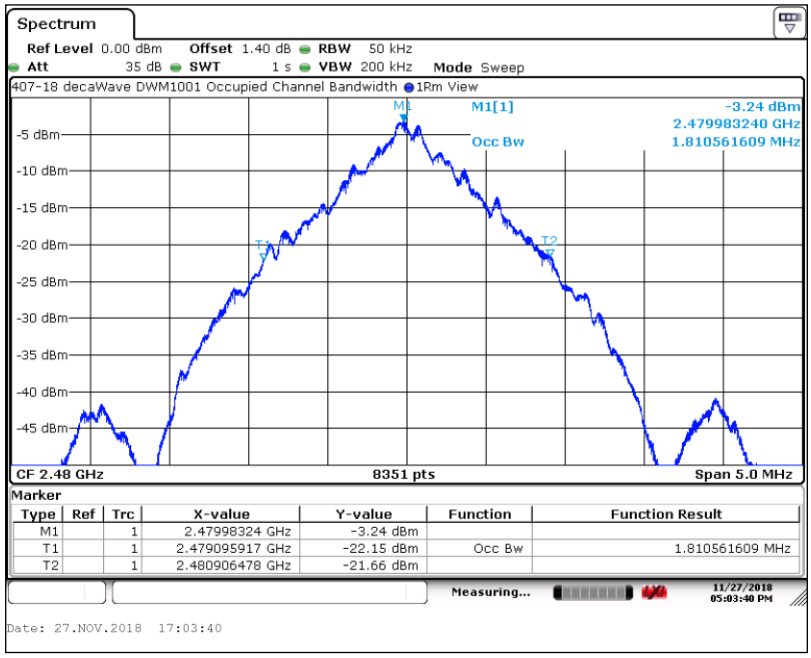
7. Measurement Data (continued)

7.6. Occupied Channel Bandwidth (Clause 5.4.7)

7.6.1. Occupied Channel Bandwidth, Lowest Channel (Channel 37, 2402 MHz)



7.6.2. Occupied Channel Bandwidth, Highest Channel (Channel 39, 2480 MHz)



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7. Measurement Data (continued)

7.7. Transmitter Unwanted Emissions in the Out-of-Band Domain (Clause 5.4.8)

Definition: Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious. (clause 4.3.2.8.2)

Requirement: The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the following mask. Signal bandwidth for this device is 1 MHz.

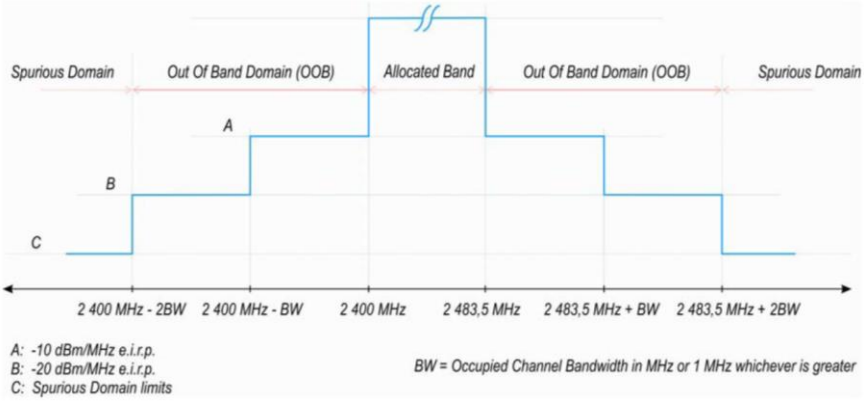

Figure 1

Test Conditions: To be performed at normal environmental conditions only. (clause 5.4.8.2).

Test Method: The test method for transmitter unwanted emissions in the out-of-band domain is detailed in ETSI EN 300 328, clause 5.4.8.2.1.

Test Note: The occupied channel bandwidth is detailed in the previous section.

Test Results: Compliant

Band	Worst Case Emission (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
2398.2 to 2400.0	-34.34	0.00	-34.34	-6.50	-27.84	Compliant
2396.4 to 2398.2	-39.93	0.00	-39.93	-16.50	-23.43	Compliant
2394.6 to 2396.4	-40.22	0.00	-40.22	-30.00	-10.22	Compliant
2483.5 to 2485.3	-34.50	0.00	-34.50	-6.63	-27.87	Compliant
2485.3 to 2487.1	-36.57	0.00	-36.57	-16.63	-19.94	Compliant
2487.1 to 2488.9	-36.84	0.00	-36.84	-30.00	-6.84	Compliant

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7. Measurement Data (continued)

7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9)

Definition: Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the Out-of-band Domain as indicated when the equipment is in Transmit mode. (clause 5.4.9.2)

Requirement: The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the following table. (clause 4.3.2.9.3)

Frequency Range	Maximum Power, ERP (≤ 1 GHz) EIRP (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87.5 MHz	-36 dBm	100 kHz
87.5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

Test Conditions: Performed at normal temperature conditions only. (clause 5.4.9.1).

Test Method: Measurements need to be performed at the lowest and the highest operating frequencies. The test method for transmitter unwanted emissions in the spurious domain is detailed in ETSI EN 300 328, clause 5.4.9.2.1.

Test Notes: Measurements include all correction factors.

A notch filter specifically designed to reduce the levels of wanted emissions in the 2.4 GHz ISM band was installed to ensure that inaccurate measurement results due to preamp gain compression did not occur.

Test Results: Compliant

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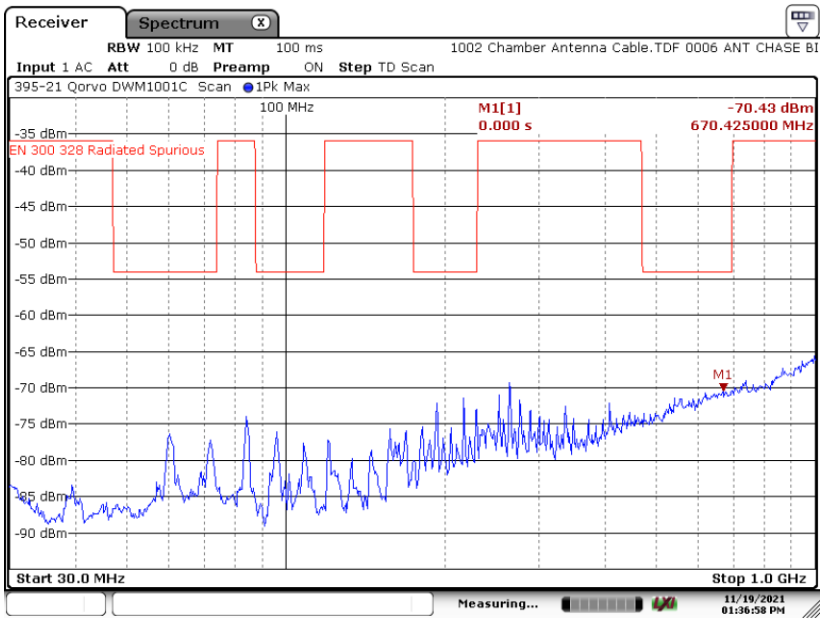
7. Measurement Data (continued)

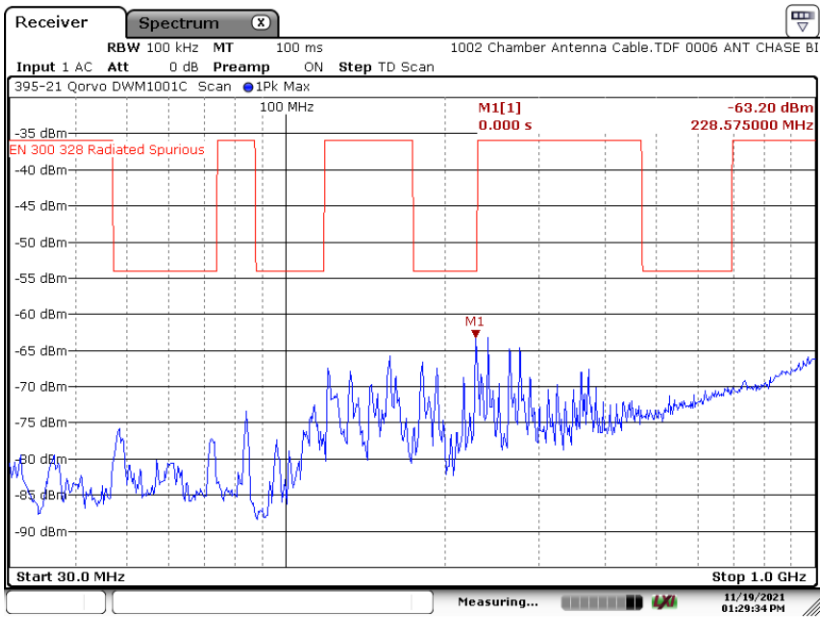
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9)

7.8.1. Low Channel 37 (2402 MHz) Radiated 30 to 1000 MHz Horizontal



Date: 19.NOV.2021 13:36:58

7.8.2. Low Channel 37 (2402 MHz) Radiated 30 to 1000 MHz Vertical



Date: 19.NOV.2021 13:29:35

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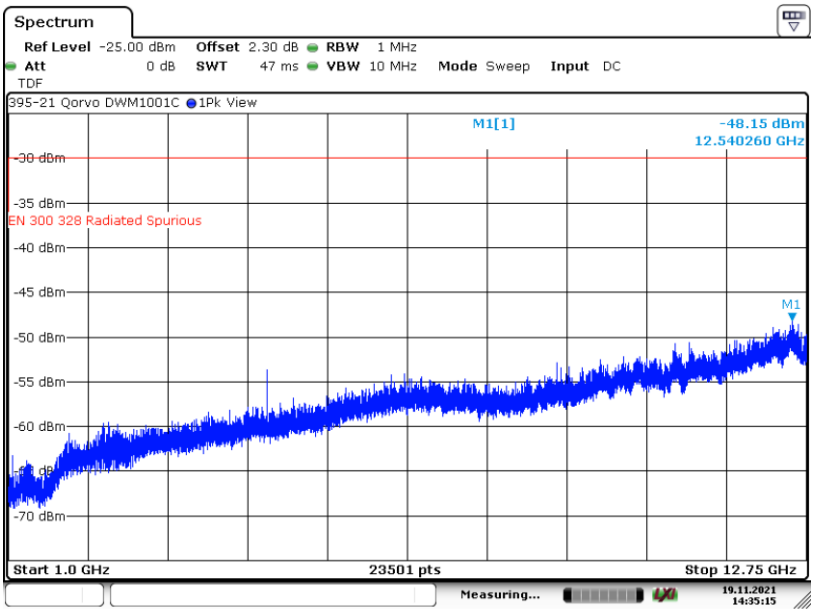
7. Measurement Data (continued)

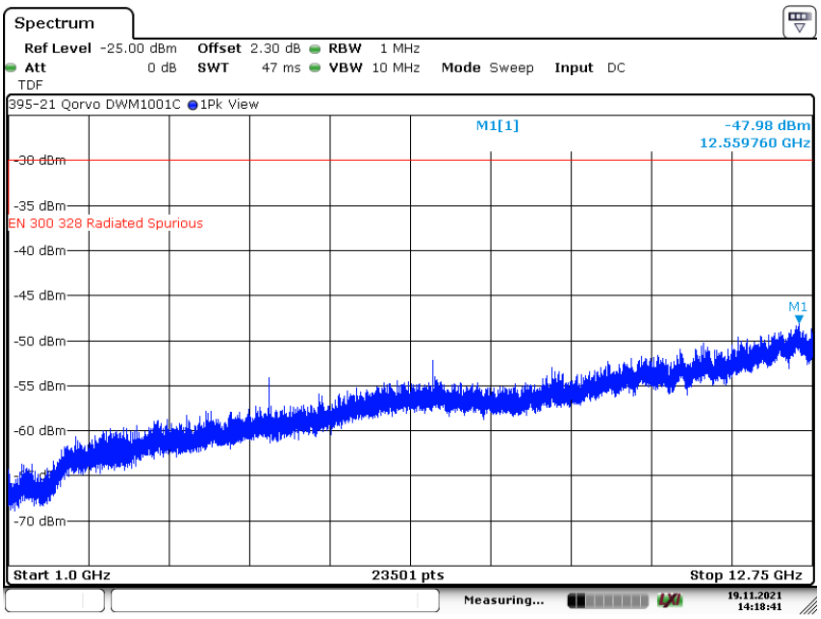
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9)

7.8.3. Low Channel 37 (2402 MHz) Radiated 1000 to 12750 MHz Horizontal



Date: 19.NOV.2021 14:35:16

7.8.4. Low Channel 37 (2402 MHz) Radiated 1000 to 12750 MHz Vertical



Date: 19.NOV.2021 14:18:40

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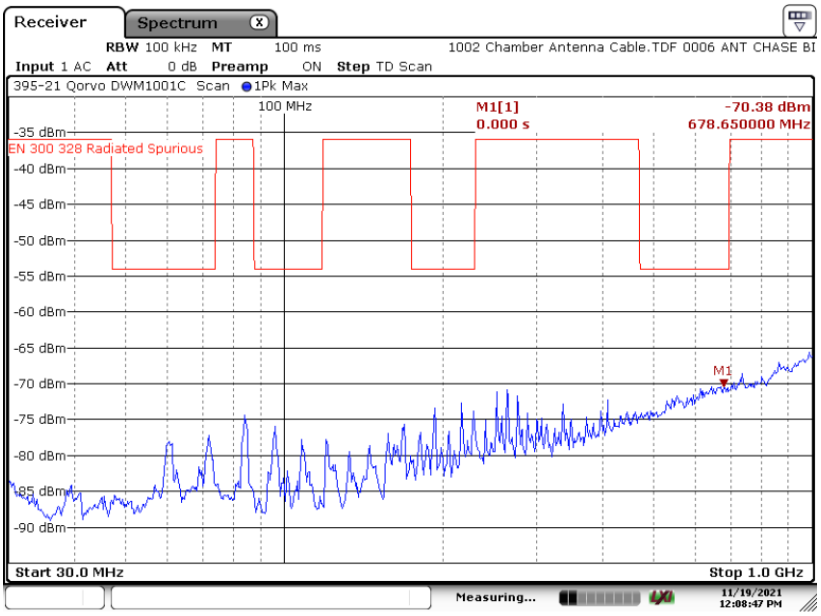
7. Measurement Data (continued)

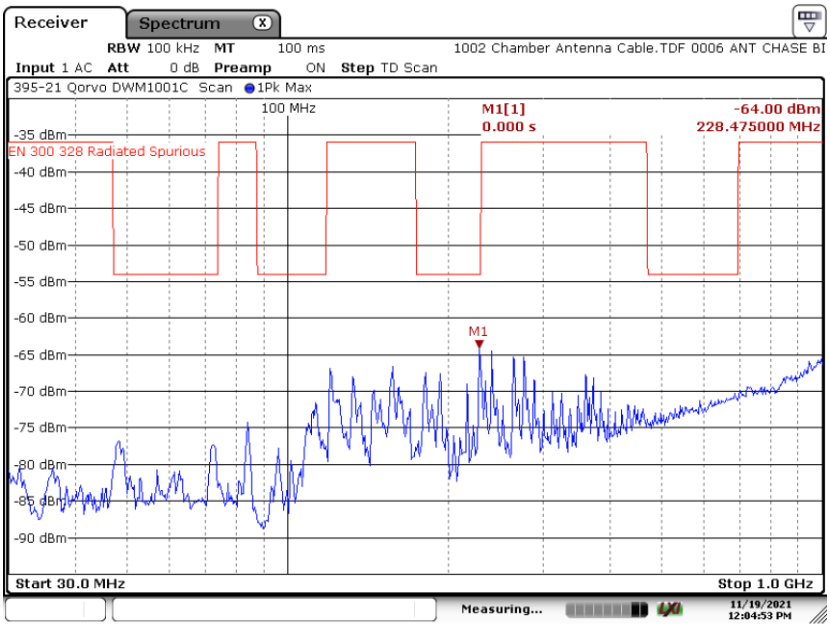
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9) (Cont'd)

7.8.5. High Channel 39 (2480 MHz) 30 to 1000 MHz Horizontal



Date: 19.NOV.2021 12:08:47

7.8.6. High Channel 39 (2480 MHz) 30 to 1000 MHz Vertical



Date: 19.NOV.2021 12:04:53

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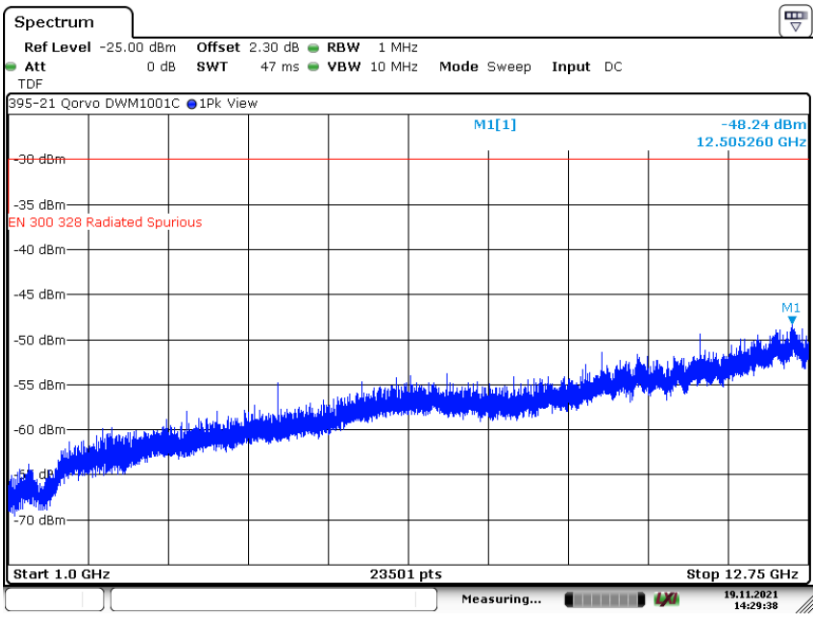
7. Measurement Data (continued)

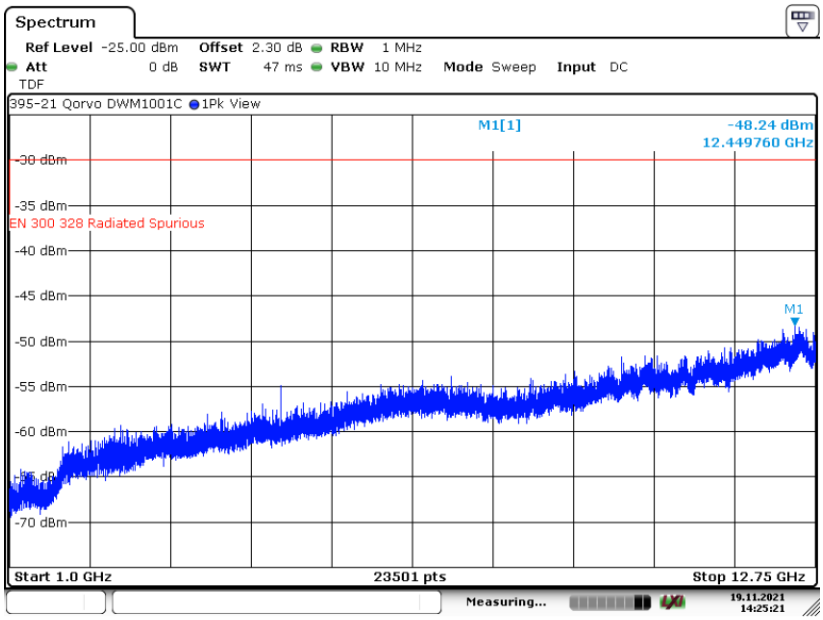
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9) (Cont'd)

7.8.7. High Channel 39 (2480 MHz) 1000 to 12750 MHz Horizontal



Date: 19.NOV.2021 14:29:39

7.8.8. High Channel 39 (2480 MHz) 30 to 1000 MHz Vertical



Date: 19.NOV.2021 14:25:22

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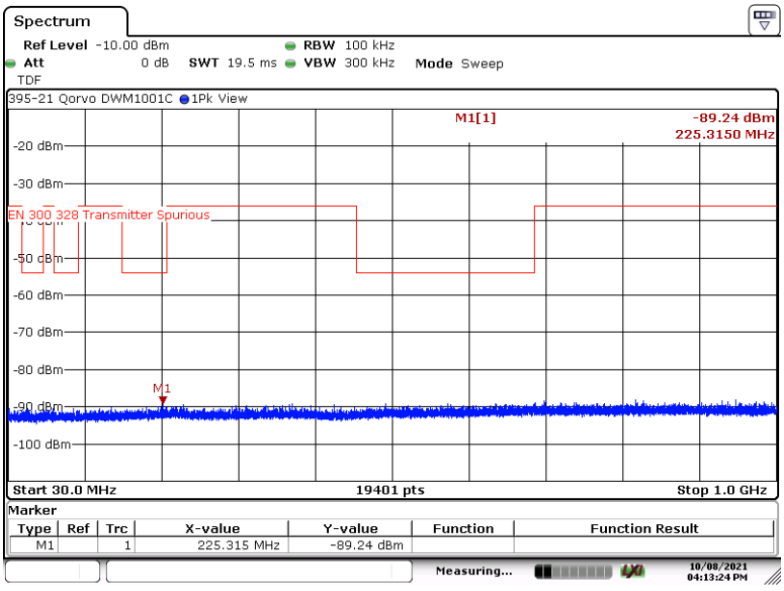
7. Measurement Data (continued)

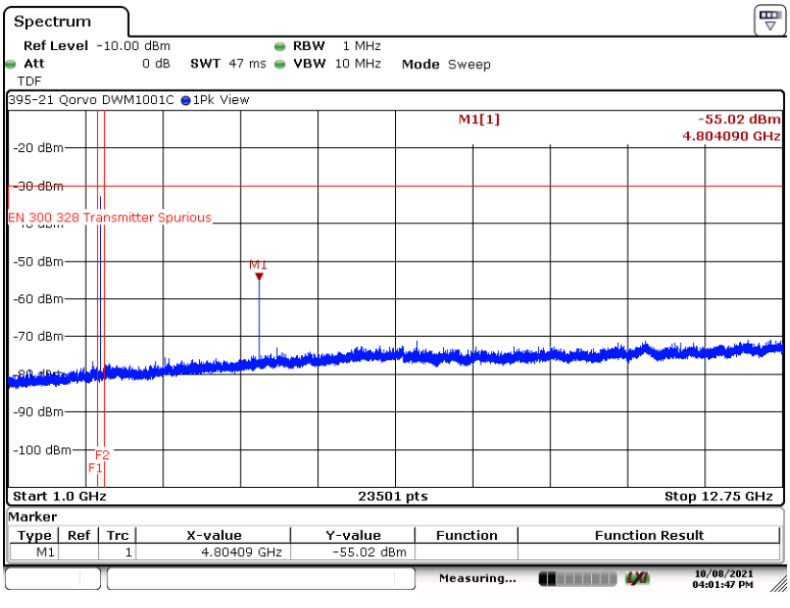
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9) (Cont'd)

7.8.9. Measurement Plots

7.8.9.1. Low Channel 37 (2402 MHz), 30 MHz to 1 GHz



7.8.9.2. Low Channel 37 (2402 MHz), 1 GHz to 12.75 GHz



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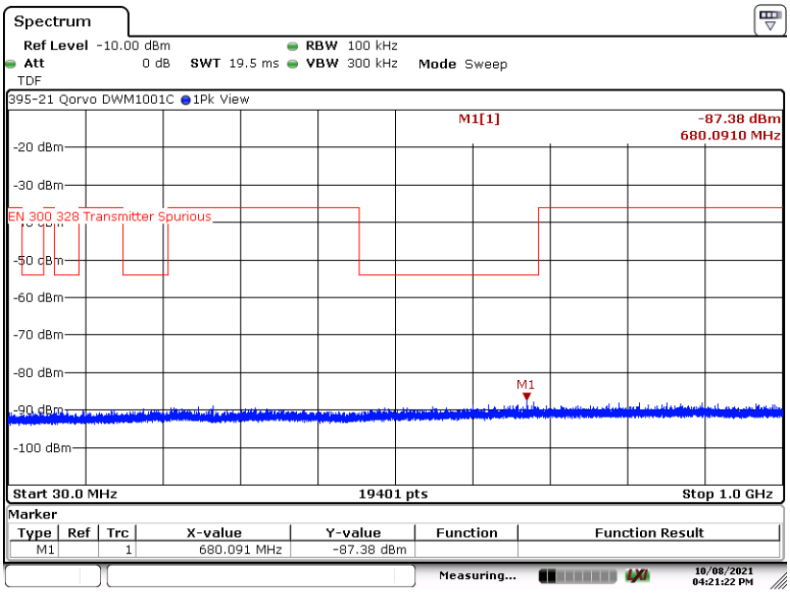
7. Measurement Data (continued)

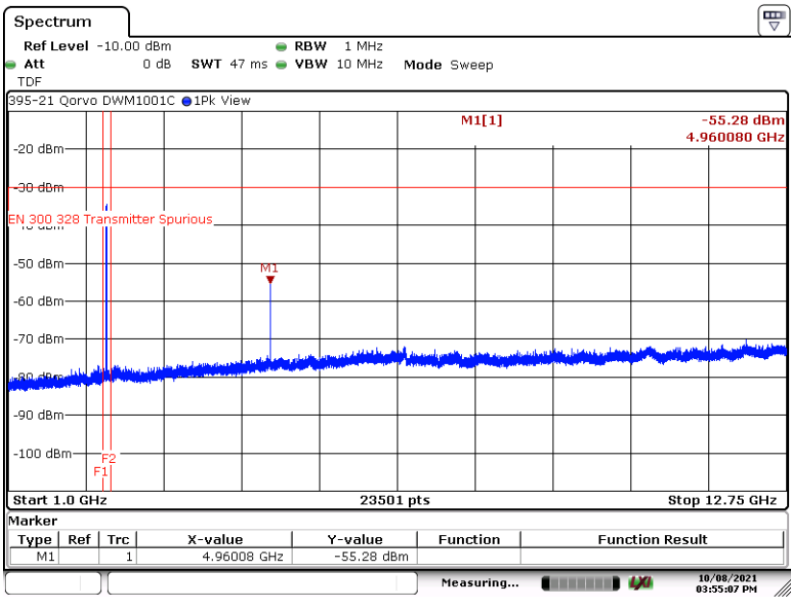
7.8. Transmitter Unwanted Emissions in the Spurious Domain (Clause 5.4.9) (Cont'd)

7.8.9. Measurement Plots

7.8.9.3. High Channel 39 (2480 MHz), 30 MHz to 1 GHz



7.8.9.4. High Channel 39 (2480 MHz), 1 GHz to 12.75 GHz



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7. Measurement Data (continued)

7.9. Receiver Spurious Emissions (Clause 5.4.10)

Definition: Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode. (clause 4.3.2.10.2)

Requirement: The spurious emissions of the receiver shall not exceed the values given in the following table. (clause 4.3.2.10.3)

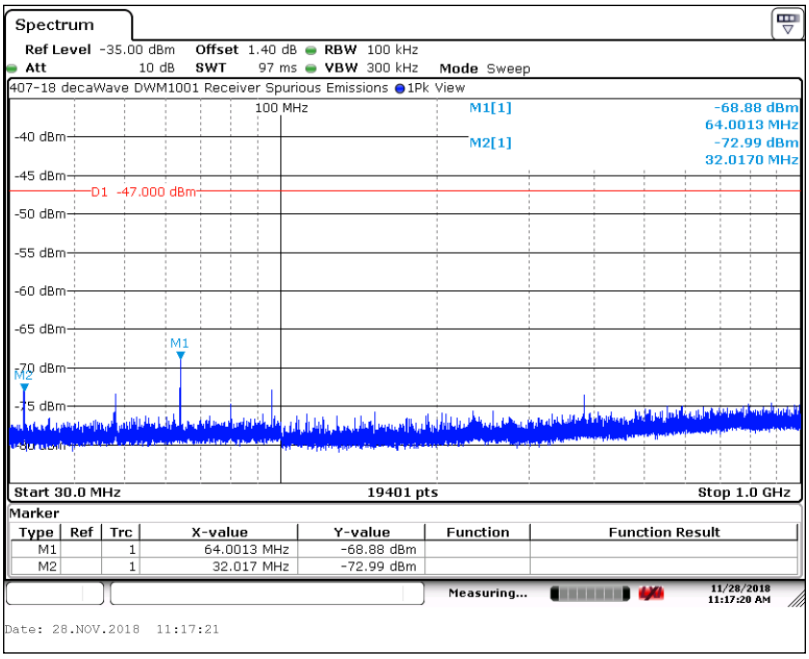
Frequency Range	Maximum Power, ERP (≤ 1 GHz) EIRP (> 1 GHz)	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

Test Conditions: Testing shall be performed when the equipment is in a receive-only mode. Performed at normal temperature conditions only. (clause 5.4.10.1).Test Method: The test method for transmitter unwanted emissions in the spurious domain is detailed in ETSI EN 300 328, clause 5.4.10.2.1.

Test Note: Measurements include all correction factors.

Test Results: Compliant

7.9 1. Receiver Spurious Emissions, 30 MHz to 1 GHz



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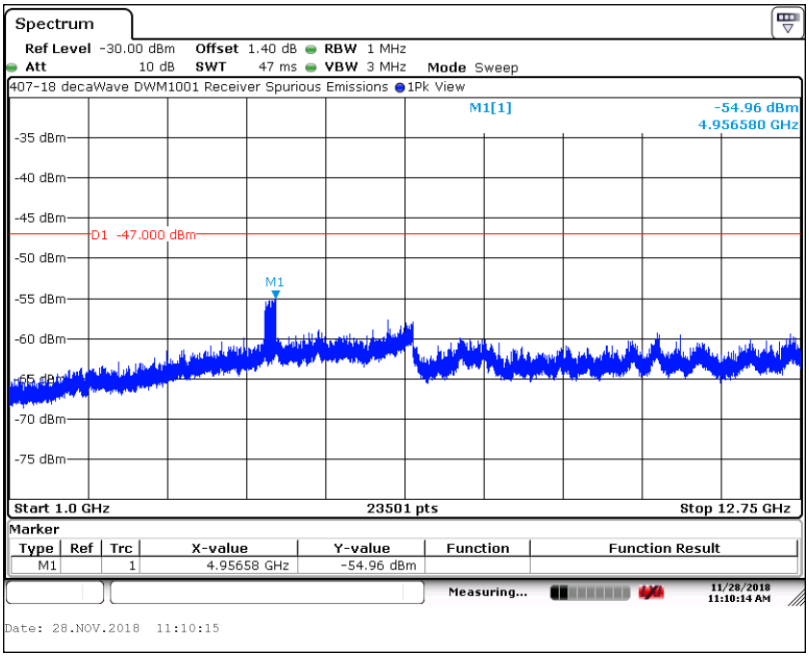
7. Measurement Data (continued)

7.9. Receiver Spurious Emissions (Clause 5.3.11)

7.9 2. Receiver Spurious Emissions, 1 GHz to 12.75 GHz



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Measurement Data (continued)

7.10. Receiver Blocking (Clause 5.4.11)

Definition: Receiver blocking is a measure of the ability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation in the presence of an unwanted signal (blocking signal) at frequencies other than those of the operating band. (clause 4.3.2.11.2)

Requirement: This requirement applies to all receiver categories as defined in clause 4.2.3 of EN 300 328. The minimum performance criterion shall be a packet error rate (PER) of less than or equal to 10%.

The specific test limits were set in accordance with EN 300 328, clause 4.3.2.11.4.4, Table 16.

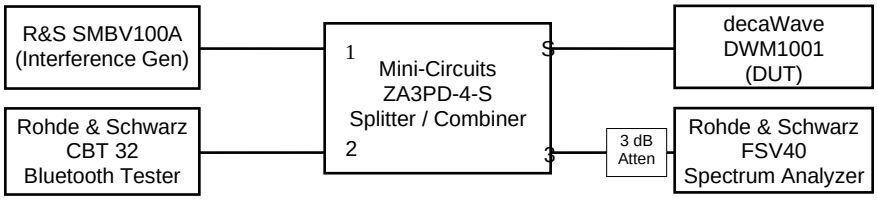
Test Conditions: The testing was performed with the equipment is in a receive-only mode at normal temperature conditions only. (clause 5.4.11.1).

Test Method: The test method for receiver blocking is detailed in ETSI EN 300 328, clause 5.4.11.2.

Test Notes: The test setup was configured as detailed in the following block diagram The Rohde & Schwarz CBT 32 is capable of 1 dB adjustments in amplitude, eliminating the need for an external variable attenuator. The CBT 32 output was monitored on the spectrum analyzer as the testing took place. The signal level to the device under test was adjusted until the minimum input signal that would maintain normal operating conditions (≤ 10% PER) was determined. All insertion loss values were taken into account.

Splitter/ Combiner	From	To	Applied Insertion Loss[1]	
			LF	HF
1 to S	R&S Signal Gen.	decaWave DWM1000	6.13	5.97
2 to S	Rohde & Schwarz CBT 32	decaWave DWM1000	5.84	5.95
S to 3	decaWave DWM1000	R&S Spectrum Analyzer	Used for informational purposes only	

[1]Includes cable, splitter combiner and adapter to the device under test.



Test Results: Compliant. For all required modes, the DUT maintained a PER of ≤ 10% at both the lowest and highest operating frequencies in the presence of the required blocking signal frequencies.

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Measurement Data (continued)

7.10. Receiver Blocking (Clause 5.4.11)

Receiver Category 2

Wanted Signal Mean Power: (-139 dBm + 10 × log10(OCBW) +10 dB) or -74 dBm + 10 dB whichever is less	Power Level Used -66.48 dBm	Channel Frequency	Blocking signal power (dBm)	Results
Blocking Signal Frequencies:	2300 MHz	2402	-34	Passed
	2380 MHz	2402		Passed
	2504 MHz	2480		Passed
	2584 MHz	2480		Passed

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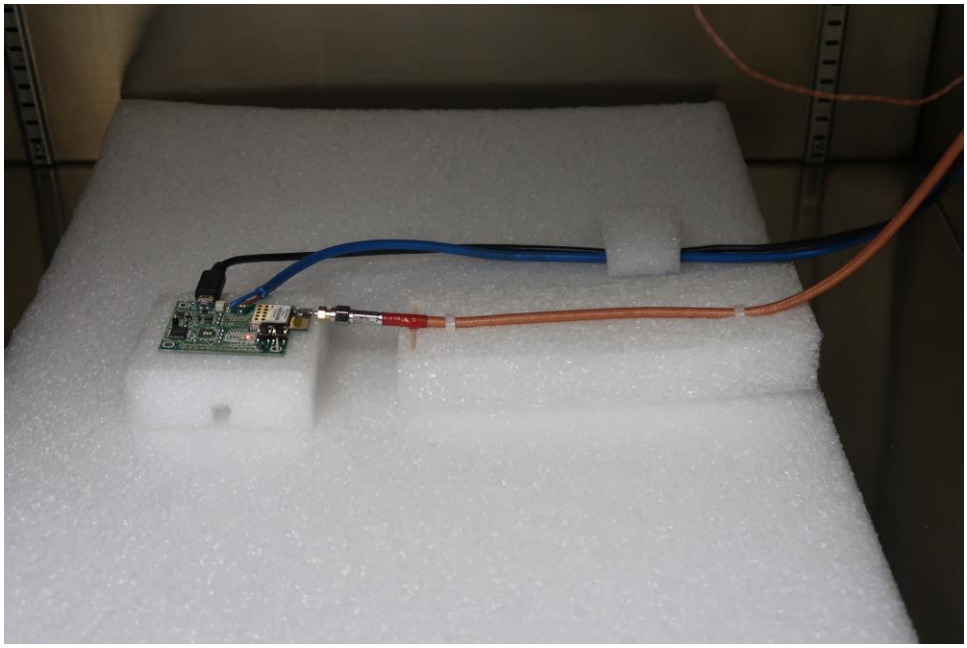
8. Test Images

8.1. Power Measurements (Extreme Temperature) 1 of 2

8.2. Power Measurements (Extreme Temperature) 2 of 2, Device Under Test



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8. Test Images

8.3. Other Measurements (DUT remained in thermal chamber at ambient temperature)

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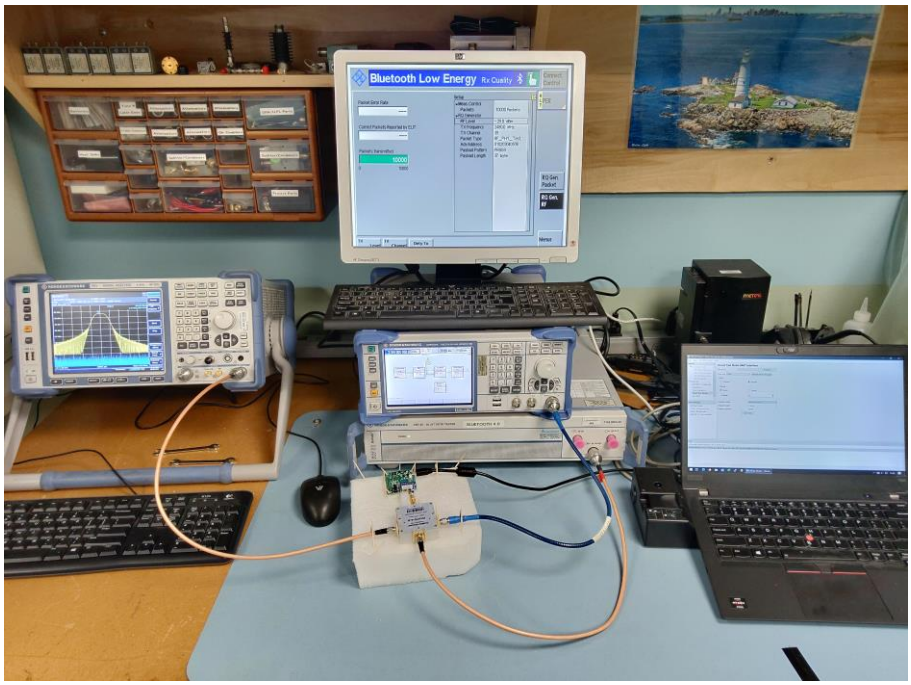
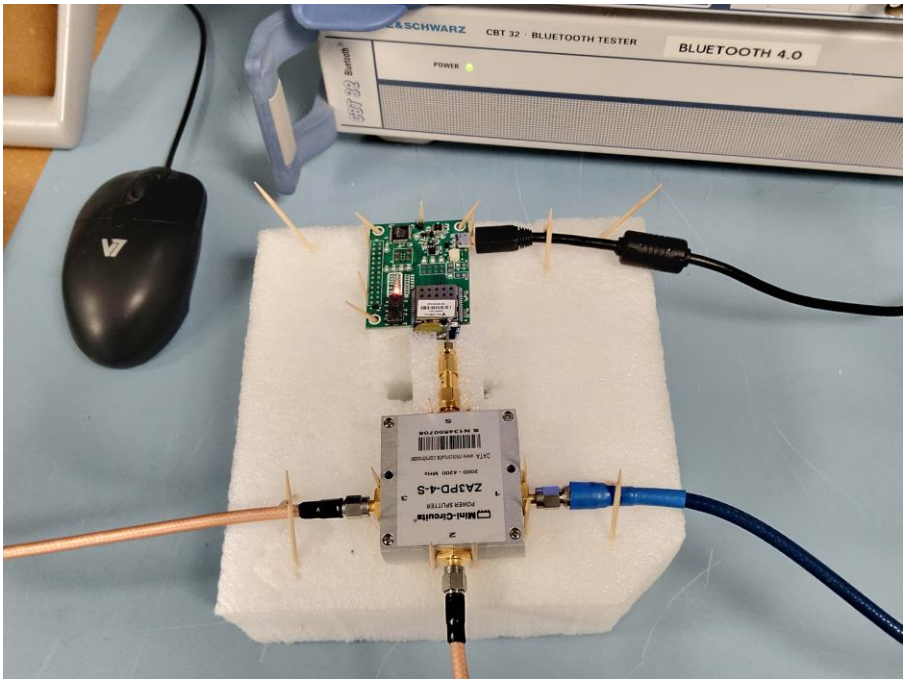
8. Test Images (continued)

8.4. Receiver Blocking Test Setup



8.5. Receiver Blocking Test Setup, Device Under Test



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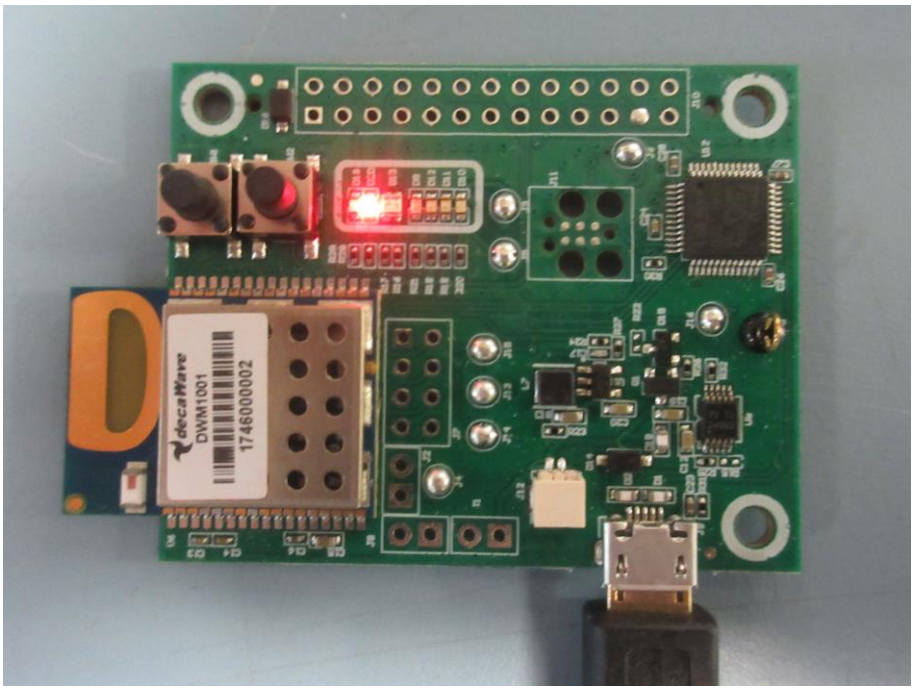
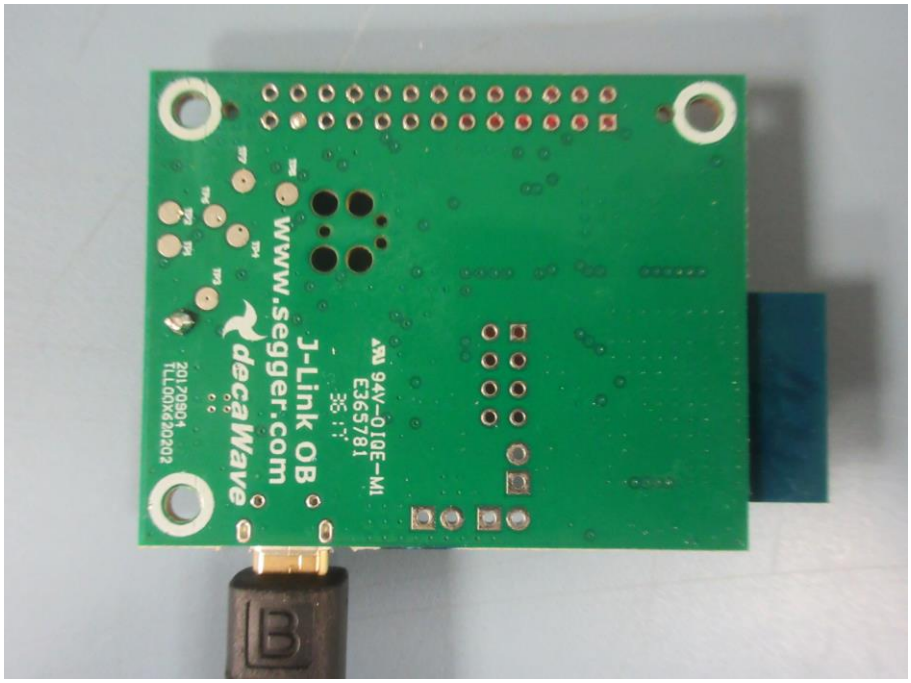
8. Test Images (continued)

8.6. Top of Evaluation board with Module Installed



8.7. Bottom of Evaluation board



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9. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with the Federal Communications Commission (FCC) and Industry Canada standards. Through our American Association for Laboratory Accreditation (A2LA) ISO Guide 17025 Accreditation our test sites are designated with the FCC (designation number **US1091**), Industry Canada (file number **IC 3023A-1)** and VCCI (Member number 3168) under registration number A-0274.

Compliance Worldwide is also designated as a Phase 1 CAB under APEC-MRA (US0132) for Australia/New Zealand AS/NZS CISPR 22, Chinese-Taipei (Taiwan) BSMI CNS 13438 and Korea (RRA) KN 11, KN 13, KN 14-1, KN 22, KN 32, KN 61000-6-3, KN 61000-6-4.

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required. A second conducted emissions site is also located in the basement of the OATS site with a 2.3 x 2.5 meter ground plane and a 2.4 x 2.4 meter vertical wall.

The radiated emissions test site for measurements above 1GHz is a 3 Meter open area test site (OATS) with a 3.6 by 3.6 meter anechoic absorber floor patch to achieve a quasi-free space measurement environment per ANSI C63.4/C63.10 and CISPR 16-1-4 standards.

The sites are designed to test products or systems 1.5 meters W x 1.5 meters L x 2.0 meters H, floor standing or table top.

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Annex A. Application Form for Testing (EN 300 328, Annex E)

This application form should form an integral part of the test report.

In accordance with EN 300 328, clause 5.4.1, the following information is provided by the manufacturer.

a) The type of modulation used by the equipment:

- ☐ FHSS
- ☑ Other forms of modulation

b) In case of FHSS modulation:

- In case of non-Adaptive Frequency Hopping equipment:
  The number of Hopping Frequencies: _____
- In case of Adaptive Frequency Hopping Equipment:
  The maximum number of Hopping Frequencies: _____
  The minimum number of Hopping Frequencies: _____
- The (average) Dwell Time: _____

c) Adaptive / non-adaptive equipment:

- ☐ Non-adaptive Equipment
- ☑ Adaptive equipment without the possibility to switch to a non-adaptive mode
- ☐ Adaptive equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The maximum Channel Occupancy Time implemented by the equipment: 0.4mS

- ☐ The equipment has implemented an LBT based DAA mechanism
  - In case of equipment using modulation different from FHSS:
    - ☐ The equipment is Frame Based equipment
    - ☑ The equipment is Load Based equipment
    - ☐ The equipment can switch dynamically between Frame Based and Load Based equipment

  The CCA time implemented by the equipment:
- ☐ The equipment has implemented an non-LBT based DAA mechanism
- ☐ The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): 4.337 dBm

The maximum (corresponding) Duty Cycle: 89.9 %

Equipment with dynamic behavior, that behavior is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

f) The worst case operational mode for each of the following tests:

- RF Output Power
  Reference Section 7.1.1.
- Power Spectral Density
  Reference Section 5.4.3.
- Duty cycle, Tx-Sequence, Tx-gap
  Reference Section 7.1.2.
- Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment)
- Hopping Frequency Separation (only for FHSS equipment)
- Medium Utilization
  Not applicable
- Adaptivity & Receiver Blocking
  Reference Section 7.10.
- Occupied Channel Bandwidth
  Reference Section 7.6
- Transmitter unwanted emissions in the OOB domain
  Reference Section 7.7
- Transmitter unwanted emissions in the spurious domain
  Reference Section 7.8
- Receiver spurious emissions
  Reference Section 7.9

g) The different transmit operating modes (tick all that apply):

- ☑ Operating mode 1: Single Antenna Equipment
  - ☑ Equipment with only 1 antenna
  - ☐ Equipment with two diversity antennas but only one antenna active at any moment in time
  - ☐ Smart Antenna Systems with two or more antennas, but operating in a (legacy) mode where only one antenna is used (e.g. IEEE 802.11™ [i.3] legacy mode in
- ☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming.
  - ☐ Single spatial stream /Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

  NOTE 1: Add more lines if more channel bandwidths are supported.
- ☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
  - ☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

  NOTE 2: Add more lines if more channel bandwidths are supported.

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
- ☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
- ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
- ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE 2: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:
- The number of Receive chains: _____
- The number of Transmit chains: _____
  - ☐ Asymmetrical power distribution
  - ☐ Asymmetrical power distribution

In case of beam forming, the maximum beam forming gain: ___ dB
NOTE: Beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:
- Operating Frequency Range 1: **2402** MHz to **2480** MHz
- Operating Frequency Range 2: _____ MHz to _____ MHz

NOTE: Add more lines if more Frequency Ranges are supported.

j) Nominal Channel Bandwidth(s):
- Nominal Channel Bandwidth 1: **1.7848** MHz (Channel 37)
- Nominal Channel Bandwidth 2: **1.8106** MHz (Channel 39)

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

☑ Stand-alone

☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)

☐ Plug-in radio device (Equipment intended for a variety of host systems)

Other _____

l) The normal and extreme operating conditions that apply to the equipment:

Normal operating conditions (if applicable):

Operating temperature: 20.7 °C
Other (please specify if applicable):_____

Extreme operating conditions:

Operating temperature range: Minimum: **-40 °C** Maximum +85 **°C**
Other (please specify, if applicable):_____ Minimum: ___°C Maximum: ___°C
Operating voltage range: 3.3 to 3.7 V DC
Details provided are for the: ☑ Stand-alone equipment
☐ Combined (or host) equipment
☐ Test jig

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:

• Antenna Type:

☑ Integral Antenna Antenna (information to be provided in case of conducted measurements)

Antenna Gain: **0.0** **dBi**

If applicable, additional beam forming gain (excluding basic antenna gain): _____ dB

☐ Temporary RF connector provided

☑ No temporary RF connector provided

Two units were provided for test.

☐ Dedicated Antennas (equipment with antenna connector)

☑ Single power level with corresponding antenna(s)

☐ Multiple power settings and corresponding antenna(s)

Number of different Power Levels: **1 fixed**

Power Level 1: +4.0 dBm

Power Level 2: _____ dBm

Power Level 3: _____ dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

- For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: Unspecified dBm

Number of antenna assemblies provided for this power level: 1 internal

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE 3: Add more rows in case more antenna assemblies are supported for this power level.

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

Power Level 2:_____ dBm

Number of antenna assemblies provided for this power level: _____

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE 4: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 3:_____ dBm

Number of antenna assemblies provided for this power level: _____

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			

NOTE 5: Add more rows in case more antenna assemblies are supported for this power level.

n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:

Details provided are for the: ☑ stand-alone equipment
☐ Combined (or host) equipment
☐ Combined (or host) equipment

Supply Voltage ☐ AC mains. State AC voltage _____V
☑ DC. State DC voltage **3.7 V**

In case of DC, indicate the type of power source

☐ Internal Power Supply
☐ External Power Supply or AC/DC adapter
☐ Battery
☑ Other: + 3.7 VDC Lithium-Ion battery

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

o) Describe the test modes available which can facilitate testing:
GFSK

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):
Bluetooth Low Energy

q) If applicable, the statistical analysis referred to in clause 5.4.1 q)
(to be provided as separate attachment)

r) If applicable, the statistical analysis referred to in clause 5.4.1 r)
(to be provided as separate attachment)

s) Geo-location capability supported by the equipment:

- ☐ Yes
  - ☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user
- ☑ No

t) Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or clause 4.3.2.11.3):

E.4 Additional Information provided by the manufacturer

E.4.1 Modulation

ITU Class(es) of emission:_____**(please verify this is correct designation for BLE)**
Can the transmitter operate unmodulated? ☑ Yes **(for testing only)** ☐ No

E.4.2 Duty Cycle

The transmitter is intended for:
- ☐ Continuous duty
- ☑ Intermittent duty
- ☐ Continuous operation possible for testing purposes

E.4.3 About the UUT

- ☑ The equipment submitted are representative production models
- ☐ If not, the equipment submitted are pre-production models?
- ☐ If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested
- ☐ If not, supply full details

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Annex A. Application Form for Testing (EN 300 328, Annex E) (continued)

E.4.4 Additional items and/or supporting equipment provided

- ☐ Spare batteries (e.g. for portable equipment)
- ☐ Battery charging device
- ☐ External Power Supply or AC/DC adapter
- ☐ External Power Supply or AC/DC adapter
- ☐ RF test fixture (for equipment with integrated antennas)

Host System ☐ Manufacturer: _____
☐ Model #:
☐ Model name:

Combined equipment ☐ Manufacturer: _____
☐ Model #: _____
☐ Model name: _____

- ☐ User Manual
- ☐ Technical documentation (Handbook and circuit diagrams)

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