Digi International Inc

Digi XBee LR RF Module for LoRaWAN

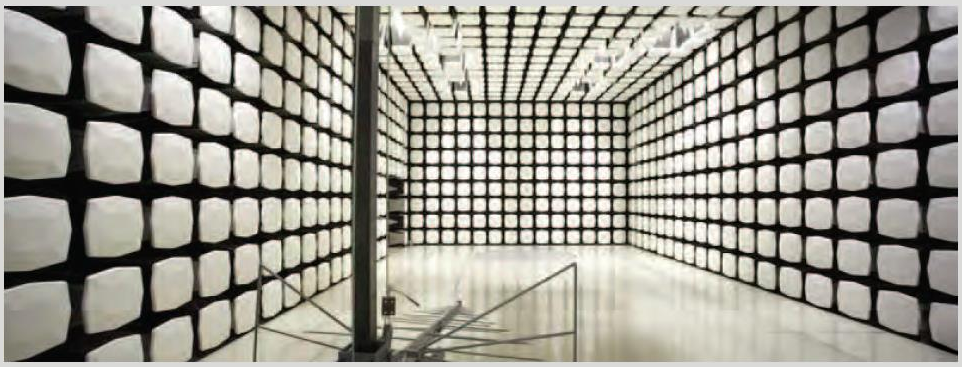
FCC 15.247:2025

RSS-Gen Issue 5:2018+A1:2019+A2:2021

RSS-247 Issue 3:2023

LoRa FHSS Transceiver

Report: DGII0507.3 Rev. 01, Issue Date: August 11, 2025



ACCREDITED
CERT #3310.05

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element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: January 24, 2025
Digi International Inc
EUT: Digi XBee LR RF Module for LoRaWAN

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2025	ANSI C63.10:2020 + Cor.1: 2023
RSS-Gen Issue 5:2018+A1:2019+A2:2021	
RSS-247 Issue 3:2023	

Guidance

FCC KDB 558074 v05r02:2019

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions (Transmitter)	Pass	15.207	RSS-Gen 8.8	6.2	
Spurious Radiated Emissions	Pass	15.247(d)	RSS-247 5.5	6.5, 6.6	
Duty Cycle	Pass	15.247	RSS-Gen 3.2	7.5	
Carrier Frequency Separation	Pass	15.247(a)(1)	RSS-247 5.1(b)	7.8.2	
Number of Hopping Frequencies	Pass	15.247(a)(1)	RSS-247 5.1(d)	7.8.3	
Dwell Time	Pass	15.247(a)(1)	RSS-247 5.1(d)	7.8.4	
Output Power	Pass	15.247(b)	RSS-247 5.4(d)	7.8.5	
Equivalent Isotropic Radiated Power (EIRP)	Pass	15.247(b)	RSS-247 5.4(d)	7.8.5	
Band Edge Compliance	Pass	15.247(d)	RSS-247 5.5	7.8.6	
Band Edge Compliance - Hopping Mode	Pass	15.247(d)	RSS-247 5.5	7.8.7	
Emissions Bandwidth (dB)	Pass	15.247(a)	RSS-247 5.2(a)	7.8.7	
Occupied Bandwidth (99%)	Pass	15.247(a)	RSS-Gen 6.7	7.8.6	
Spurious Conducted Emissions	Pass	15.247(d)	RSS-247 5.5	7.8.8	
Power Spectral Density	N/A	15.247(e)	RSS-247 5.2(b)	11.10.2	Not required for FHSS devices.

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

CERTIFICATE OF TEST

Powerline Conducted Emissions (Receiver)	N/A	15.101, 15.107	RSS-Gen 5.2	ANSI C63.4 - 12.2.4	Not included per FCC 15.101 as this will be covered under SDoC rules for the FCC. RSS-Gen section 7 stated receiver requirements only apply to standalone receivers operating in the 30-960 MHz band and this is not a standalone receiver.
Radiated Emissions for Receiver	N/A	15.101, 15.109	RSS-Gen 5.2	ANSI C63.4 - 12.2.5	Not included per FCC 15.101 as this will be covered under SDoC rules for the FCC. RSS-Gen section 7 stated receiver requirements only apply to standalone receivers operating in the 30-960 MHz band and this is not a standalone receiver.

Deviations From Test Standards

None

Approved By:

Jeff Alcoke, Senior EMC Test Engineer
Signed for and on behalf of Element

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		
01	Updated measurement method to ANSI C63.10:2020	2025-08-11	3, 22, 24, 28, 31, 39, 43, 46, 48-49, 52-53, 55-56, 59, 62, 67-68,
	Clarified language in footnote for change in FCC specification year.		3
	Removed accreditation page from report		6
	Removed CAB Identifier from report		7
	Corrected the typo in the radio modulation type listed.		13
	Corrected calibration date for MNH		26
	Added missing configurations DGII0507-17 and DGII0507-18 to Spurious Radiated Emissions and a comment about their usage in the test report.		27
	Updated limits		43
	Updated test description for Dwell Time, and added comment to data set		48-49
	Corrected data table for improved clarity on collected measurements		49

FACILITIES

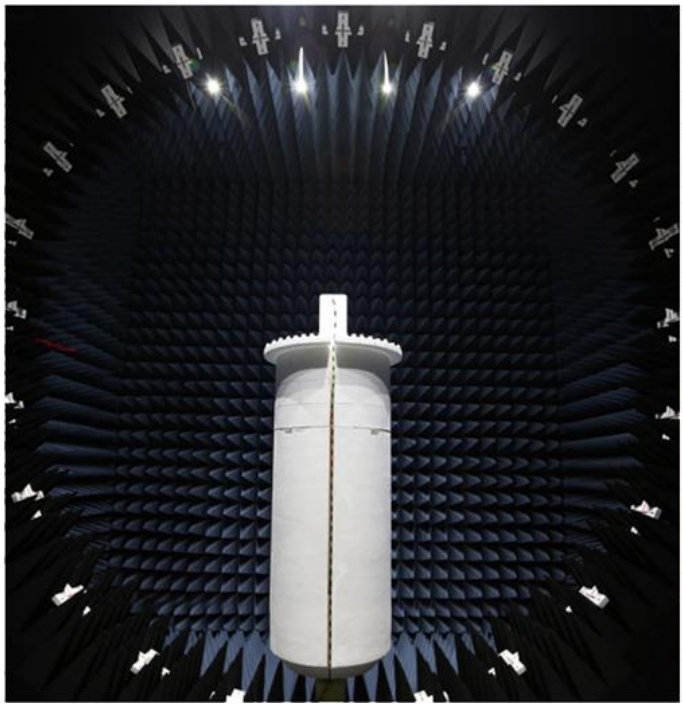
element
2024.09.23

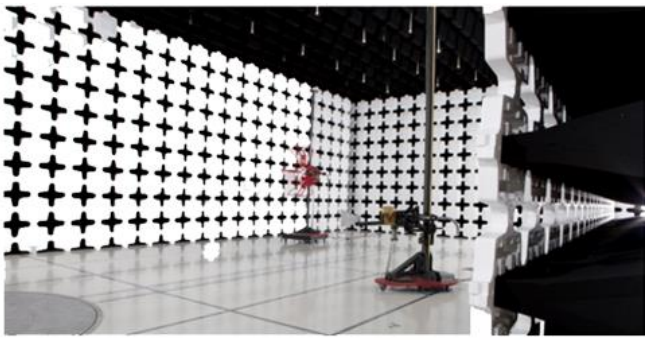
Testing was performed at the following location(s)

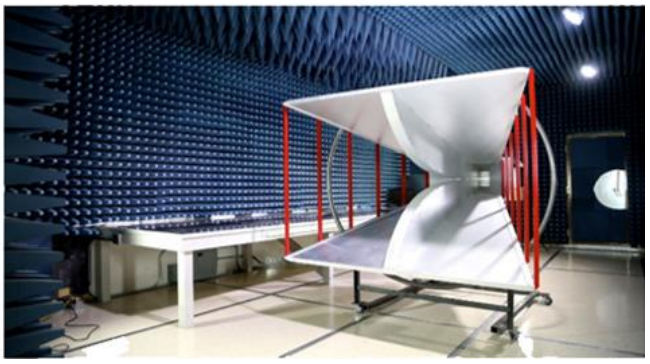
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	FDA (6)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	TL-57
☐	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	TL-56
☐	Plano Texas	PT01-15	1701 E Plano Pkwy, Ste 150 Plano, TX 75074 (972) 509-2566	214.19	32637	SL2-IN-E-057R	A-0426	N/A
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) FDA ASCA No.







MEASUREMENT UNCERTAINTY

element
MU 2023-09-21

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (k=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable) and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Various Measurements

Test	All Labs (+/-)
Frequency Accuracy (%)	0.0007
Amplitude Accuracy (dB)	1.2
Conducted Power (dB)	1.2
Radiated Power via Substitution (dB)	0.7
Temperature (degrees C)	0.7
Humidity (% RH)	2.5
Voltage (AC) (%)	1
Voltage (DC) (%)	0.7

Field Strength Measurements (dB)

Range	MN05 (+/-)
10kHz-30MHz	1.8
30MHz-1GHz 3m	4.6
1GHz-6GHz	5.1
6GHz-40GHz	5.2

AC Powerline Conducted Emissions Measurements (dB)

Range	MN03 (+/-)
9kHz-150kHz LISN	3.6
150kHz-30MHz LISN	3.2
150kHz-30MHz CVP	3
150kHz-30MHz Telecom-ISN	4.4

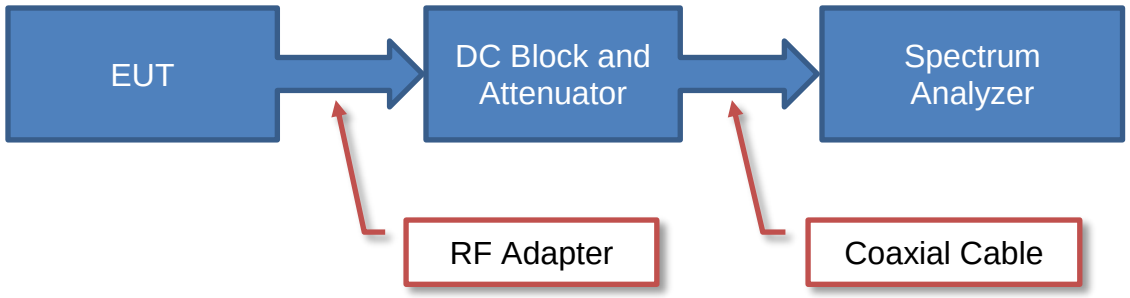
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

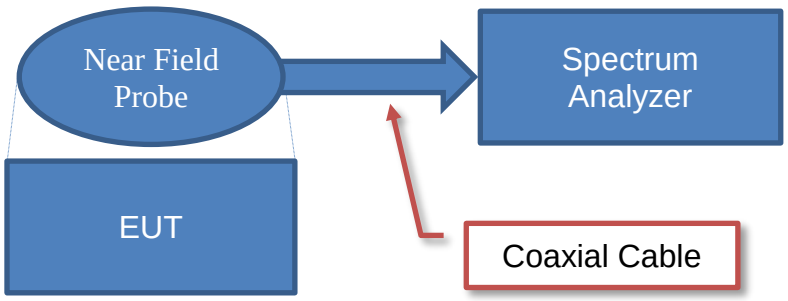
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

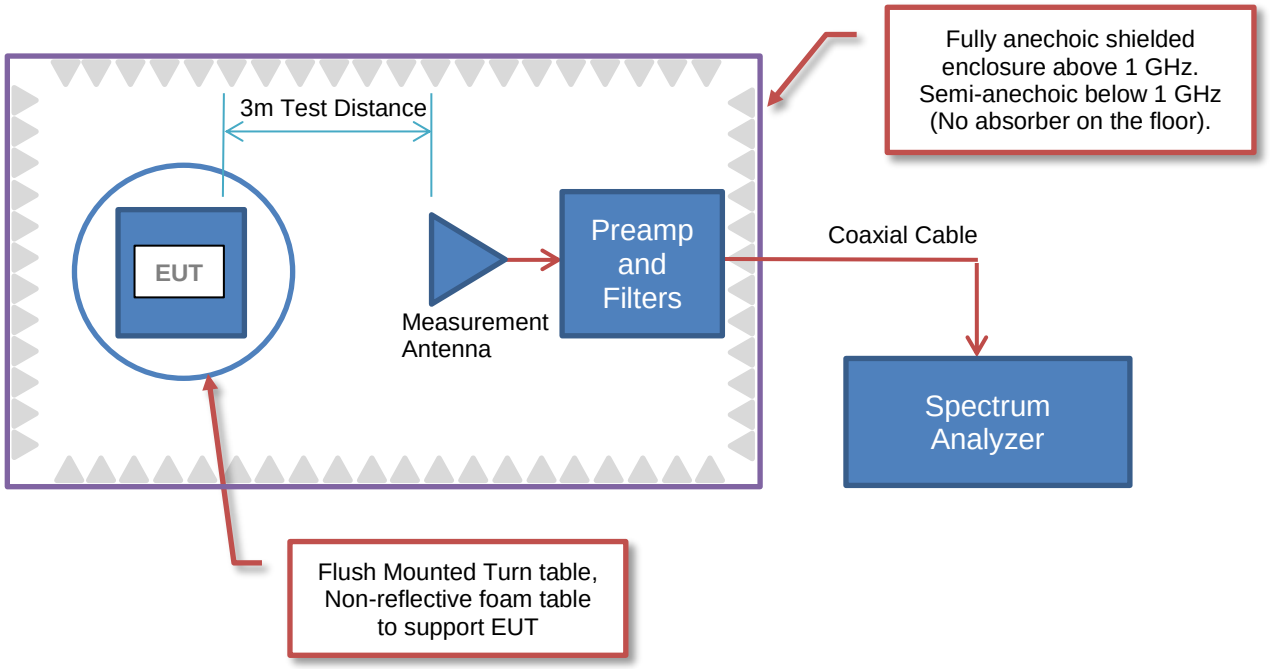


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

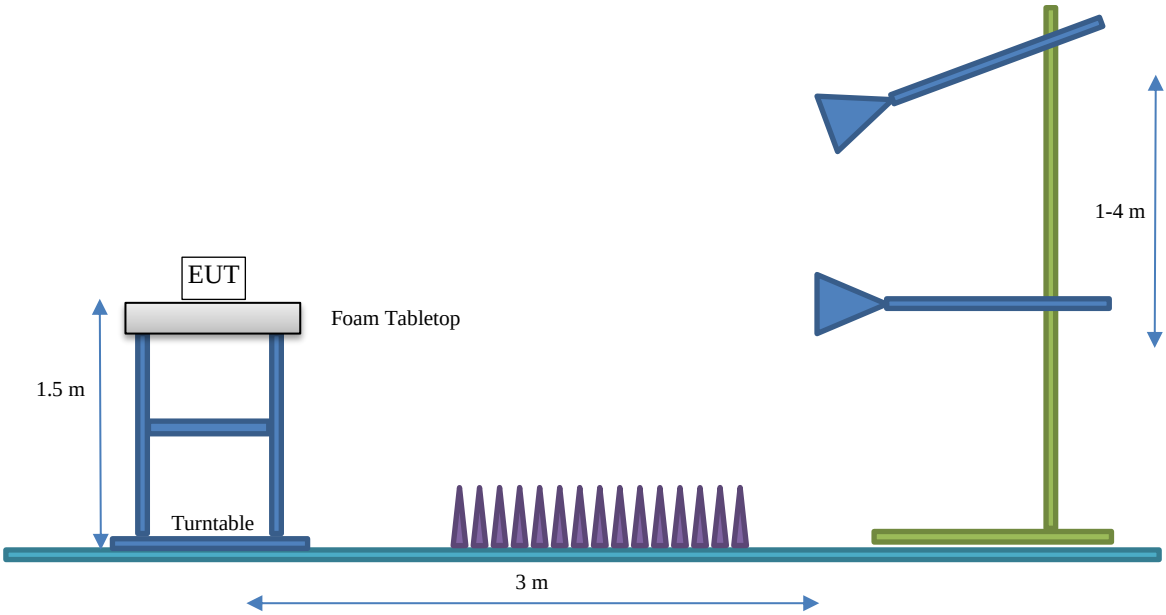
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Digi International Inc
Address:	9350 Excelsior Blvd.
City, State, Zip:	Hopkins, MN 55343
Test Requested By:	Matt Schellin
EUT:	Digi XBee LR RF Module for LoRaWAN
First Date of Test:	September 3, 2024
Last Date of Test:	January 24, 2025
Receipt Date of Samples:	September 3, 2024
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
A wireless communications module that OEMs incorporate into end-node sensor products. Radio is a LoRaWan device.

Testing Objective:
Seeking to demonstrate compliance of the LoRa radio with operation under FCC 15.247:2024 and RSS-Gen Issue 5:2018+A1:2019+A2:2021, RSS-247 Issue 3:2023 specifications under technology category Other.

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Flex PCB, Taoglas FXP895.07.0200C	Taoglas	902-928	2.83
Dipole, TE (Linx) ANT-916-CW-HWR-SMA	Linx	902-928	1.2

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☒ Test software settings
☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Position (if multiple channels)	Power Setting (hex / dBm)
LoRa CSS Modulation (125kHz BW)	Low Channel (902.3 MHz)	0x1F / 22
	Mid Channel (908.5 MHz)	0x1F / 22
	High Channel (914.9 MHz)	0x1F / 22

Firmware Version:
82004787, revision 05 and 5037

CONFIGURATIONS

Configuration DGII0507-1

Software/Firmware Running During Test	
Description	**Version**
FW	82004787, revision 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
LoRa Module	Digi International, Inc	DEV 001149	EUT #2
Flex Antenna	Taoglas	FXP895	None

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Dev Board 1	Digi International, Inc	Xbee Micro Development Board	None
Variable DC Supply	Agilent	E3631A	MY40035429
HP Laptop	HP	Elitebook 850 G4	5CG74260WL
Laptop Power Supply	HP	L25298-001	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads (SRE)	No	1.6 m	No	DC Supply	Dev Board 1
USB Cable (SRE)	Yes	2.9 m	No	Laptop	Dev Board 1
AC Cable (Laptop Power Supply)	No	0.9 m	No	AC Mains	Laptop Power Supply
DC Cable (Laptop Power Supply)	No	1.8 m	No	Laptop Power Supply	Laptop
AC Cable (Agilent Supply)	No	1.7 m	No	AC Mains	Agilent Power Supply

CONFIGURATIONS

Configuration DGII0507-2

Software/Firmware Running During Test	
Description	**Version**
FW	82004787, revision 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
LoRa Module	Digi International, Inc	DEV 001149	EUT #2
1/2 Wave Dipole	Linx	ANT-916-CW-HWR	None

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Dev Board 1	Digi International, Inc	Xbee Micro Development Board	None
Variable DC Supply	Agilent	E3631A	MY40035429
HP Laptop	HP	Elitebook 850 G4	5CG74260WL
Laptop Power Supply	HP	L25298-001	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads (SRE)	No	1.6 m	No	DC Supply	Dev Board 1
USB Cable (SRE)	Yes	2.9 m	No	Laptop	Dev Board 1
AC Cable (Laptop Power Supply)	No	0.9 m	No	AC Mains	Laptop Power Supply
DC Cable (Laptop Power Supply)	No	1.8 m	No	Laptop Power Supply	Laptop
AC Cable (Agilent Supply)	No	1.7 m	No	AC Mains	Agilent Power Supply

CONFIGURATIONS

Configuration DGII0507-3

Software/Firmware Running During Test	
Description	**Version**
FW	82004787, revision 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #1

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	Elitebook 850 G4	5CG74260WL
DC Power Supply	Agilent	E3634A	MY51270001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads (Direct Connect)	No	0.9 m	No	DC Supply	Dev Board
USB Cable (Direct Connect)	Yes	1 m	No	Laptop	Dev Board

CONFIGURATIONS

Configuration DGII0507-4

Software/Firmware Running During Test	
Description	**Version**
FW	82004787, revision 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Flex Antenna	Taoglas	FXP895	None
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #1

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Agilent	E3634A	MY51270001
Dev Board 1	Digi International, Inc	Xbee Micro Development Board	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	Elitebook 850 G7	5CG0387DYW
Laptop Power Supply	HP	854055-002	WFTKV0ENJC31W8
HP Laptop	HP	Elitebook 8570p	N/A
Laptop Power Supply	HP	75613-001	WECJN0A1R27MSL
Mouse	Kensington	K72356	B1350A003513
Dev Board 2	Digi International, Inc	Xbee Micro Development Board	None
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #3
Flex Antenna 2	Taoglas	FXP895	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	4.6 m	No	DIgi XBee LR RF Module for LoRaWAN	HP Laptop
DC Cable (Laptop Power Supply)	No	1.7 m	No	HP Laptop	Laptop Power Supply
AC Cable (Laptop Power Supply)	No	0.9 m	No	Laptop Power Supply	AC Mains
DC Leads Immunity	No	0.9 m	No	DC Supply	Dev Board 1
AC Cable (Agilent Supply)	No	1.8 m	No	DC Power Supply	AC Mains
USB Cable Mouse	Yes	1.8 m	No	Mouse	HP Laptop
USB Cable	Yes	1 m	No	HP Laptop	Dev Board 2
DC Cable (Laptop Power Supply)	No	1.8 m	No	HP Laptop	Laptop Power Supply
AC Cable (Laptop Power Supply)	No	0.9 m	No	Laptop Power Supply	AC Mains

CONFIGURATIONS

Configuration DGII0507-11

Software/Firmware Running During Test	
Description	**Version**
FW	82004787, revision 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #3

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	Elitebook 850 G4	5CG74260WL
DC Power Supply	Agilent	E3634A	MY51270001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads (Direct Connect)	No	0.9 m	No	DC Supply	Dev Board
USB Cable (Direct Connect)	Yes	1 m	No	Laptop	Dev Board

Configuration DGII0507-17

Software/Firmware Running During Test	
Description	**Version**
FW	5037

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Flex Antenna	Taoglas	FXP895	None
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #7

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Dev Board 2	Digi International, Inc	Xbee Micro Development Board	None
Battery Box	None	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Battery Leads	No	0.2m	No	Battery Box	Dev Board

CONFIGURATIONS

Configuration DGII0507-18

Software/Firmware Running During Test	
Description	**Version**
FW	5037

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
1/2 Wave Dipole	Linx	ANT-916-CW-HWR	None
DIgi XBee LR RF Module for LoRaWAN	Digi International, Inc	DEV 001149	EUT #7

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Dev Board 2	Digi International, Inc	Xbee Micro Development Board	None
Battery Box	None	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Battery Leads	No	0.2m	No	Battery Box	Dev Board

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-09-03	Emissions Bandwidth (dB)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2024-09-03	Equivalent Isotropic Radiated Power (EIRP)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2024-09-03	Occupied Bandwidth (99%)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2024-09-03	Output Power	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2024-09-03	Band Edge Compliance	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2024-09-03	Spurious Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2024-09-04	Powerline Conducted Emissions (Transmitter)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2024-09-09	Carrier Frequency Separation	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2024-09-09	Band Edge Compliance - Hopping Mode	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	2024-09-09	Number of Hopping Frequencies	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
11	2024-09-09	Dwell Time	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
12	2024-09-12	Duty Cycle	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
13	2025-01-24	Spurious Radiated Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	2024-03-27	2025-03-27
LISN	Solar Electronics	9252-50-R-24-BNC	LIQ	2024-03-27	2025-03-27
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK, VAE	MNCA	2024-03-11	2025-03-11
Receiver	Gauss Instruments	TDEMI 30M	ARS	2024-05-07	2025-05-07

CONFIGURATIONS INVESTIGATED

DGII0507-4

MODES INVESTIGATED

Continuous packet transmit, Taoglass FXP895 antenna, transmitting on Mid channel at 908.5 MHz, Bandwidth 125 kHz, FHSS

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT#1	Date:	2024-09-04
Customer:	Digi International Inc	Temperature:	22°C
Attendees:	David Lentz	Relative Humidity:	52.9%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	3.3 VDC	Configuration:	DGII0507-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2020

TEST PARAMETERS

Run #:	8	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Measuring off of the AC side of the linear power supply providing the DC power.

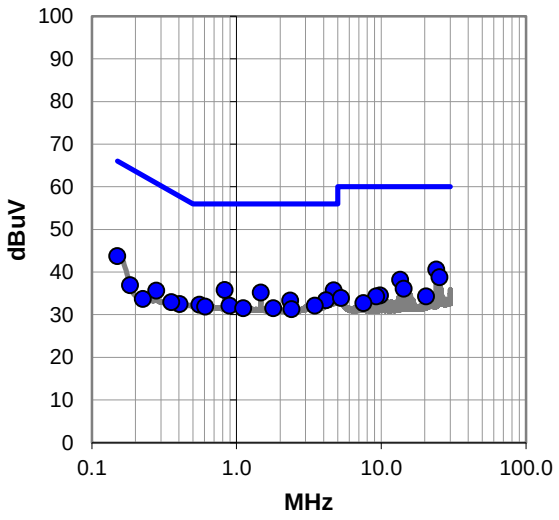
EUT OPERATING MODES

Continuous packet transmit, Taoglass FXP895 antenna, transmitting on Mid channel at 908.5 MHz, Bandwidth 125 kHz, FHSS

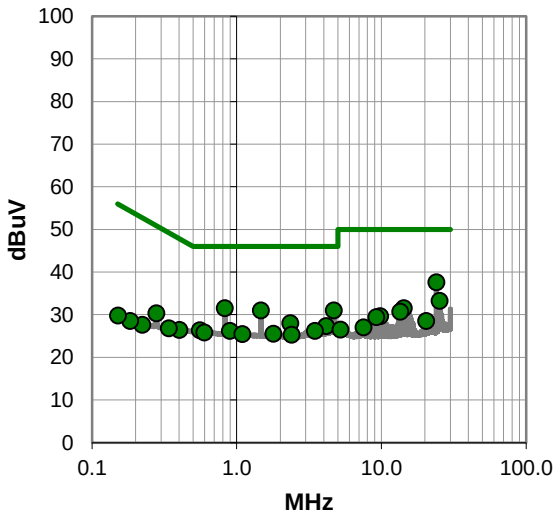
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.000	18.4	22.2	40.6	60.0	-19.4
0.829	15.7	20.1	35.8	56.0	-20.2
4.692	15.3	20.4	35.7	56.0	-20.3
1.470	15.0	20.2	35.2	56.0	-20.8
25.359	16.4	22.4	38.8	60.0	-21.2
13.560	17.0	21.2	38.2	60.0	-21.8
0.150	23.1	20.6	43.7	66.0	-22.3
4.160	13.0	20.4	33.4	56.0	-22.6
2.346	13.0	20.3	33.3	56.0	-22.7
0.554	12.2	20.1	32.3	56.0	-23.7
0.896	12.0	20.1	32.1	56.0	-23.9
3.481	11.7	20.4	32.1	56.0	-23.9
14.280	14.8	21.3	36.1	60.0	-23.9
0.606	11.8	20.1	31.9	56.0	-24.1
1.113	11.3	20.2	31.5	56.0	-24.5
1.796	11.3	20.2	31.5	56.0	-24.5
2.401	11.0	20.3	31.3	56.0	-24.7
0.278	15.4	20.2	35.6	60.9	-25.3
0.405	12.4	20.1	32.5	57.8	-25.3
9.799	13.5	21.0	34.5	60.0	-25.5
20.440	12.5	21.8	34.3	60.0	-25.7
9.241	13.5	20.8	34.3	60.0	-25.7
0.354	12.8	20.1	32.9	58.9	-26.0
5.272	13.3	20.6	33.9	60.0	-26.1
7.520	11.9	20.8	32.7	60.0	-27.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.000	15.4	22.2	37.6	50.0	-12.4
0.831	11.4	20.1	31.5	46.0	-14.5
4.691	10.6	20.4	31.0	46.0	-15.0
1.470	10.8	20.2	31.0	46.0	-15.0
25.359	10.8	22.4	33.2	50.0	-16.8
2.346	7.7	20.3	28.0	46.0	-18.0
14.320	10.2	21.3	31.5	50.0	-18.5
4.160	6.9	20.4	27.3	46.0	-18.7
13.560	9.5	21.2	30.7	50.0	-19.3
0.556	6.2	20.1	26.3	46.0	-19.7
0.898	6.1	20.1	26.2	46.0	-19.8
3.481	5.8	20.4	26.2	46.0	-19.8
0.597	5.7	20.1	25.8	46.0	-20.2
9.799	8.6	21.0	29.6	50.0	-20.4
1.795	5.3	20.2	25.5	46.0	-20.5
0.278	10.1	20.2	30.3	50.9	-20.6
1.094	5.2	20.2	25.4	46.0	-20.6
9.239	8.6	20.8	29.4	50.0	-20.6
2.401	5.0	20.3	25.3	46.0	-20.7
0.402	6.3	20.1	26.4	47.8	-21.4
20.440	6.7	21.8	28.5	50.0	-21.5
0.339	6.7	20.1	26.8	49.2	-22.4
7.520	6.2	20.8	27.0	50.0	-23.0
5.239	5.9	20.6	26.5	50.0	-23.5
0.223	7.4	20.2	27.6	52.7	-25.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT#1	Date:	2024-09-04
Customer:	Digi International Inc	Temperature:	22°C
Attendees:	David Lentz	Relative Humidity:	52.9%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	William Hoffa	Job Site:	MN03
Power:	3.3 VDC	Configuration:	DGII0507-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2024	ANSI C63.10:2020

TEST PARAMETERS

Run #:	9	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Measuring off of the AC side of the linear power supply providing the DC power.

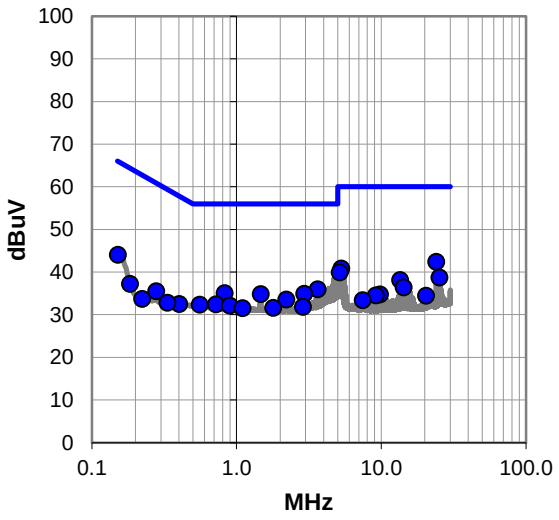
EUT OPERATING MODES

Continuous packet transmit, Taoglass FXP895 antenna, transmitting on Mid channel at 908.5 MHz, Bandwidth 125 kHz, FHSS

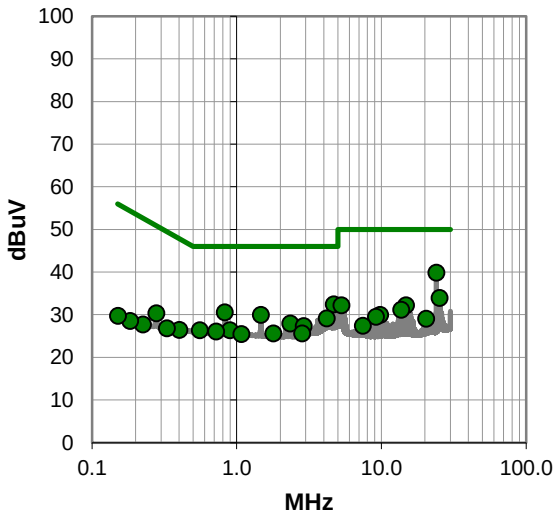
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.000	20.2	22.2	42.4	60.0	-17.6
5.310	20.2	20.6	40.8	60.0	-19.2
3.640	15.5	20.4	35.9	56.0	-20.1
5.178	19.3	20.6	39.9	60.0	-20.1
0.829	14.9	20.1	35.0	56.0	-21.0
2.944	14.5	20.4	34.9	56.0	-21.1
1.470	14.6	20.2	34.8	56.0	-21.2
25.359	16.3	22.4	38.7	60.0	-21.3
13.559	16.9	21.2	38.1	60.0	-21.9
0.152	23.4	20.6	44.0	65.9	-21.9
2.207	13.2	20.3	33.5	56.0	-22.5
0.724	12.3	20.1	32.4	56.0	-23.6
14.320	15.1	21.3	36.4	60.0	-23.6
0.556	12.2	20.1	32.3	56.0	-23.7
0.898	12.0	20.1	32.1	56.0	-23.9
2.880	11.4	20.4	31.8	56.0	-24.2
1.796	11.4	20.2	31.6	56.0	-24.4
1.099	11.3	20.2	31.5	56.0	-24.5
0.402	12.4	20.1	32.5	57.8	-25.3
9.799	13.7	21.0	34.7	60.0	-25.3
0.278	15.3	20.2	35.5	60.9	-25.4
9.200	13.7	20.8	34.5	60.0	-25.5
20.440	12.6	21.8	34.4	60.0	-25.6
0.333	12.7	20.1	32.8	59.4	-26.6
7.480	12.6	20.8	33.4	60.0	-26.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.000	17.6	22.2	39.8	50.0	-10.2
4.692	12.0	20.4	32.4	46.0	-13.6
0.831	10.4	20.1	30.5	46.0	-15.5
25.359	11.5	22.4	33.9	50.0	-16.1
1.470	9.7	20.2	29.9	46.0	-16.1
4.201	8.7	20.4	29.1	46.0	-16.9
5.319	11.6	20.6	32.2	50.0	-17.8
14.799	10.9	21.3	32.2	50.0	-17.8
2.346	7.6	20.3	27.9	46.0	-18.1
2.912	6.9	20.4	27.3	46.0	-18.7
13.719	9.9	21.2	31.1	50.0	-18.9
0.556	6.2	20.1	26.3	46.0	-19.7
0.898	6.2	20.1	26.3	46.0	-19.7
0.724	5.9	20.1	26.0	46.0	-20.0
9.801	8.9	21.0	29.9	50.0	-20.1
1.795	5.4	20.2	25.6	46.0	-20.4
2.834	5.2	20.4	25.6	46.0	-20.4
9.200	8.7	20.8	29.5	50.0	-20.5
0.278	10.1	20.2	30.3	50.9	-20.6
1.081	5.2	20.2	25.4	46.0	-20.6
20.439	7.2	21.8	29.0	50.0	-21.0
0.402	6.3	20.1	26.4	47.8	-21.4
7.480	6.6	20.8	27.4	50.0	-22.6
0.330	6.7	20.1	26.8	49.5	-22.7
0.225	7.5	20.2	27.7	52.6	-24.9

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies (in no-hop, single channel mode) and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

RMS measurements taken for a FHSS radio also may have a duty cycle correction subtracted using the formula 10*log(DC), where DC is the worst-case dwell time of the radio while in a hopping mode in a 100 ms period.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2023-10-02	2025-10-02
Cable	ESM Cable Corp.	Bilog Cables	MNH	2023-10-08	2024-10-08
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-01-08	2025-01-08
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Filter - Low Pass	Micro-Tronics	LPM50003	LFJ	2024-08-25	2025-08-25
Filter - High Pass	Micro-Tronics	HPM50108	LFM	2024-08-25	2025-08-25
Filter - Low Pass	Micro-Tronics	LPM50004	HGW	2024-09-10	2025-09-10
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12
Attenuator	Fairview Microwave	SA18H-20	VAF	2024-08-25	2025-08-25
Filter – Notch	K&L Microwave	3TNF-500/1000-N/N	HGS	2024-06-18	2025-06-18

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 GHz TO 12.4 GHz

POWER INVESTIGATED

3.3 VDC

CONFIGURATIONS INVESTIGATED

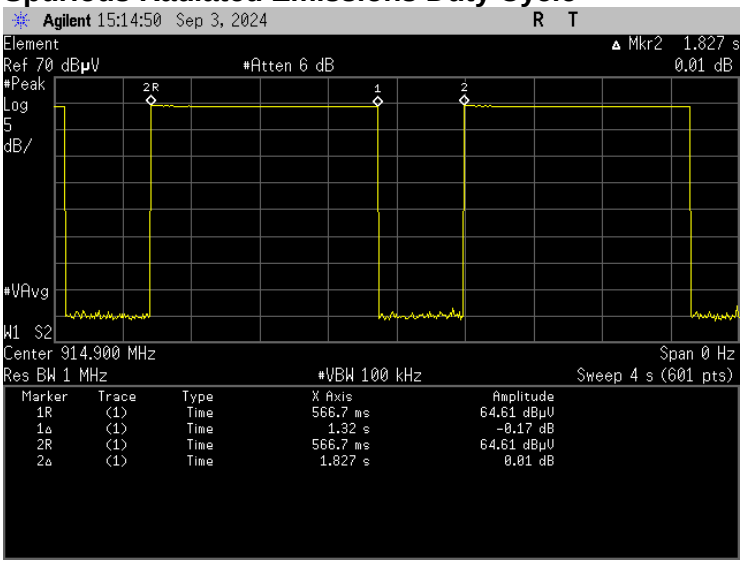
DGII0507-1
DGII0507-2
DGII0507-17*
DGII0507-18*

*Due to excessive noise generated by the support laptop, these configurations were used for frequency investigations below 1 GHz.

MODES INVESTIGATED

Transmitting LoRa, 125 kHz BW, Spreading Factor 10

Spurious Radiated Emissions Duty Cycle



SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #2	Date:	2024-09-04
Customer:	Digi International Inc	Temperature:	21.8°C
Attendees:	David Lentz	Relative Humidity:	53.4%
Customer Project:	None	Bar. Pressure (PMSL):	1020 mb
Tested By:	Arnauld Dedry	Job Site:	MN05
Power:	3.3 VDC	Configuration:	DGII0507-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020

TEST PARAMETERS

Run #:	19	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

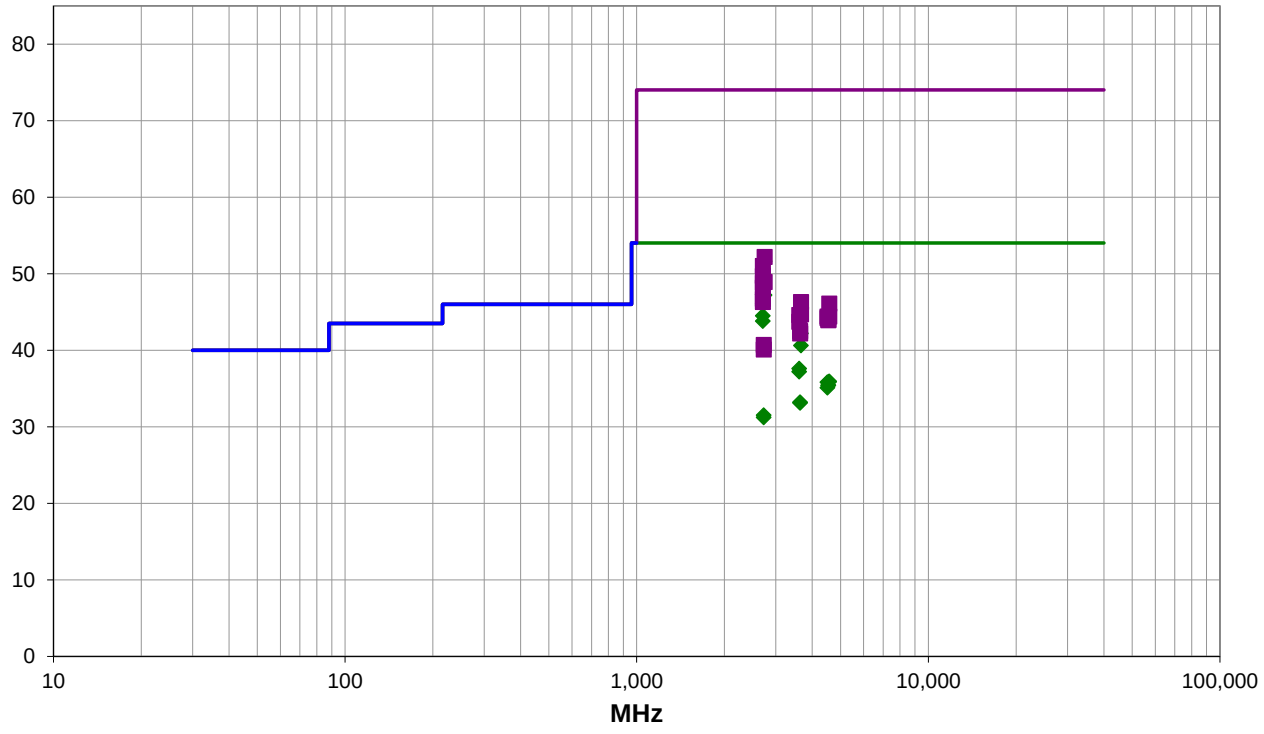
The test mode is 72% duty cycle. A duty cycle correction factor (DCCF) was added to the average measurements using DCCF=10*log(1/duty cycle) = 1.4 dB.

EUT OPERATING MODES

Transmitting LoRa, Low, Mid and High Channels (902.3, 908.5 and 914.9 MHz) 125 kHz BW, Spreading Factor 10.
Linx ANT-916-CW-HWR.

DEVIATIONS FROM TEST STANDARD

None



Run #: 19 PK AV QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #19

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2744.700	52.5	-2.3	2.8	328.0	1.4	0.0	Horz	AV	0.0	51.6	54.0	-2.4	EUT Horz, High Ch, 125 KHz
2706.867	51.5	-2.3	2.9	326.9	1.4	0.0	Horz	AV	0.0	50.6	54.0	-3.4	EUT Horz, Low Ch, 125 KHz
2707.025	49.8	-2.3	1.4	199.0	1.4	0.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT Vert, Low Ch, 125 KHz
2707.017	48.2	-2.3	1.6	96.9	1.4	0.0	Vert	AV	0.0	47.3	54.0	-6.7	EUT On Side, Low Ch 125 KHz
2744.500	48.1	-2.3	1.5	311.9	1.4	0.0	Vert	AV	0.0	47.2	54.0	-6.8	EUT On Side, High Ch, 125 KHz
2706.808	47.0	-2.3	1.5	210.0	1.4	0.0	Horz	AV	0.0	46.1	54.0	-7.9	EUT On Side, Low Ch 125 KHz
2706.717	45.4	-2.3	1.5	196.9	1.4	0.0	Vert	AV	0.0	44.5	54.0	-9.5	EUT Vert, Low Ch, 125 KHz
2706.792	44.7	-2.3	1.1	175.9	1.4	0.0	Vert	AV	0.0	43.8	54.0	-10.2	EUT Horz, Low Ch, 125 KHz
3659.692	40.0	0.8	2.7	252.0	1.4	0.0	Vert	AV	0.0	42.2	54.0	-11.8	EUT On Side, High Ch, 125 KHz
3659.390	38.4	0.8	1.1	173.0	1.4	0.0	Horz	AV	0.0	40.6	54.0	-13.4	EUT Horz, High Ch, 125 KHz
3609.192	35.6	0.6	1.8	258.9	1.4	0.0	Vert	AV	0.0	37.6	54.0	-16.4	EUT On Side, Low Ch 125 KHz
3609.150	35.2	0.6	3.1	206.0	1.4	0.0	Horz	AV	0.0	37.2	54.0	-16.8	EUT Horz, Low Ch, 125 KHz
4576.133	30.3	4.2	1.5	325.0	1.4	0.0	Horz	AV	0.0	35.9	54.0	-18.1	EUT Horz, High Ch, 125 KHz
4576.233	30.3	4.2	3.1	306.0	1.4	0.0	Vert	AV	0.0	35.9	54.0	-18.1	EUT On Side, High Ch, 125 KHz
4511.600	30.5	3.9	3.1	56.9	1.4	0.0	Horz	AV	0.0	35.8	54.0	-18.2	EUT Horz, Low Ch, 125 KHz
4542.667	29.9	4.1	2.2	178.0	1.4	0.0	Horz	AV	0.0	35.4	54.0	-18.6	EUT Horz, Mid Ch, 125 KHz
4542.483	29.9	4.1	1.5	31.9	1.4	0.0	Vert	AV	0.0	35.4	54.0	-18.6	EUT On Side, Mid Ch, 125 KHz
4511.750	29.8	3.9	1.5	211.9	1.4	0.0	Vert	AV	0.0	35.1	54.0	-18.9	EUT On Side, High Ch, 125 KHz
3634.608	31.1	0.7	1.3	157.9	1.4	0.0	Vert	AV	0.0	33.2	54.0	-20.8	EUT On Side, Mid Ch, 125 KHz
3635.392	31.0	0.7	1.5	150.9	1.4	0.0	Horz	AV	0.0	33.1	54.0	-20.9	EUT Horz, Mid Ch, 125 KHz
2744.620	54.5	-2.3	2.8	328.0	0.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	EUT Horz, High Ch, 125 KHz
2727.717	32.4	-2.3	3.2	134.0	1.4	0.0	Vert	AV	0.0	31.5	54.0	-22.5	EUT On Side, Mid Ch, 125 KHz
2727.508	32.1	-2.3	1.5	264.9	1.4	0.0	Horz	AV	0.0	31.2	54.0	-22.8	EUT Horz, Mid Ch, 125 KHz
2706.933	53.3	-2.3	2.9	326.9	0.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	EUT Horz, Low Ch, 125 KHz
2706.783	52.0	-2.3	1.4	199.0	0.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	EUT Vert, Low Ch, 125 KHz
2744.950	51.2	-2.3	1.5	311.9	0.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1	EUT On Side, High Ch, 125 KHz
2706.842	51.1	-2.3	1.6	96.9	0.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	EUT On Side, Low Ch 125 KHz
2706.975	50.5	-2.3	1.5	210.0	0.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	EUT On Side, Low Ch 125 KHz
2706.875	49.0	-2.3	1.5	196.9	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	EUT Vert, Low Ch, 125 KHz
2707.175	48.6	-2.3	1.1	175.9	0.0	0.0	Vert	PK	0.0	46.3	74.0	-27.7	EUT Horz, Low Ch, 125 KHz
3659.633	45.5	0.8	2.7	252.0	0.0	0.0	Vert	PK	0.0	46.3	74.0	-27.7	EUT On Side, High Ch, 125 KHz
4576.533	41.9	4.2	1.5	325.0	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT Horz, High Ch, 125 KHz
3659.680	43.9	0.8	1.1	173.0	0.0	0.0	Horz	PK	0.0	44.7	74.0	-29.3	EUT Horz, High Ch, 125 KHz
3609.492	44.0	0.6	1.8	258.9	0.0	0.0	Vert	PK	0.0	44.6	74.0	-29.4	EUT On Side, Low Ch 125 KHz
4510.617	40.5	3.9	1.5	211.9	0.0	0.0	Vert	PK	0.0	44.4	74.0	-29.6	EUT On Side, High Ch, 125 KHz
4575.683	40.2	4.2	3.1	306.0	0.0	0.0	Vert	PK	0.0	44.4	74.0	-29.6	EUT On Side, High Ch, 125 KHz
4509.467	40.3	3.9	3.1	56.9	0.0	0.0	Horz	PK	0.0	44.2	74.0	-29.8	EUT Horz, Low Ch, 125 KHz
4543.308	39.9	4.1	2.2	178.0	0.0	0.0	Horz	PK	0.0	44.0	74.0	-30.0	EUT Horz, Mid Ch, 125 KHz
4540.850	39.8	4.1	1.5	31.9	0.0	0.0	Vert	PK	0.0	43.9	74.0	-30.1	EUT On Side, Mid Ch, 125 KHz
3609.033	43.1	0.6	3.1	206.0	0.0	0.0	Horz	PK	0.0	43.7	74.0	-30.3	EUT Horz, Low Ch, 125 KHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3631.792	41.8	0.7	1.5	150.9	0.0	0.0	Horz	PK	0.0	42.5	74.0	-31.5	EUT Horz, Mid Ch, 125 KHz
3635.683	41.5	0.7	1.3	157.9	0.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	EUT On Side, Mid Ch, 125 KHz
2727.833	43.0	-2.3	1.5	264.9	0.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	EUT Horz, Mid Ch, 125 KHz
2727.367	42.4	-2.3	3.2	134.0	0.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9	EUT On Side, Mid Ch, 125 KHz

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #2	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.9°C
Attendees:	David Lentz	Relative Humidity:	53.3%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	3.3 VDC	Configuration:	DGII0507-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020

TEST PARAMETERS

Run #:	10	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

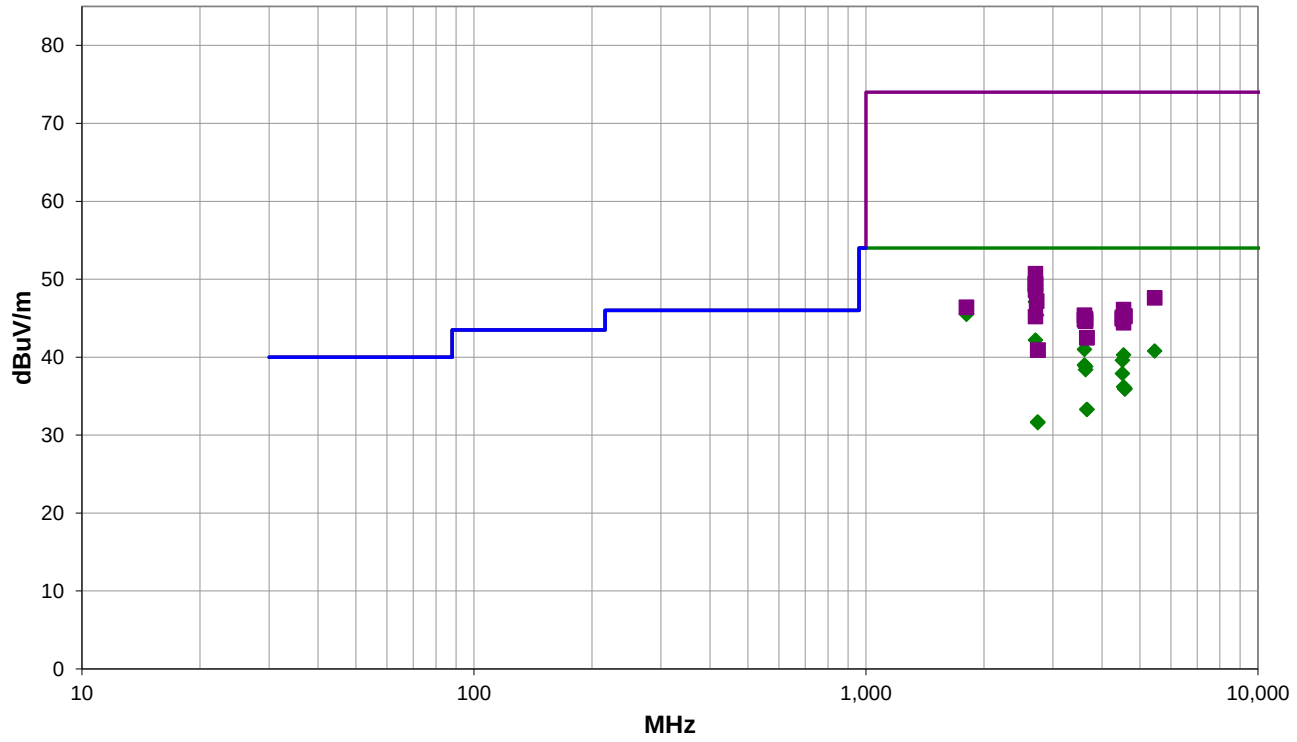
The test mode is 72% duty cycle. A duty cycle correction factor (DCCF) was added to the average measurements using DCCF=10*log(1/duty cycle) = 1.4 dB.

EUT OPERATING MODES

Transmitting LoRa, Low, Mid, and High Channels (902.3, 908.5, and 914.9 MHz), 125 kHz BW, Spreading Factor 10. Taoglas FXP895 antenna.

DEVIATIONS FROM TEST STANDARD

None



Run #: 10 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #10

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2707.083	50.7	-2.3	1.0	336.0	1.4	0.0	Horz	AV	0.0	49.8	54.0	-4.2	EUT Horz, Low Ch, 125 kHz BW
2706.783	49.5	-2.3	1.5	232.9	1.4	0.0	Vert	AV	0.0	48.6	54.0	-5.4	EUT On Side, Low Ch, 125 kHz BW
2707.008	49.3	-2.3	2.9	139.9	1.4	0.0	Horz	AV	0.0	48.4	54.0	-5.6	EUT On Side, Low Ch, 125 kHz BW
2706.650	49.3	-2.3	1.2	206.0	1.4	0.0	Horz	AV	0.0	48.4	54.0	-5.6	EUT Vert, Low Ch, 125 kH?z BW
2707.008	48.0	-2.3	1.1	188.0	1.4	0.0	Vert	AV	0.0	47.1	54.0	-6.9	EUT Vert, Low Ch, 125 kH?z BW
1804.567	48.6	-4.5	1.5	329.9	1.4	0.0	Horz	AV	0.0	45.5	54.0	-8.5	EUT Horz, Low Ch, 125 kHz BW
2725.250	46.3	-2.3	1.5	279.9	1.4	0.0	Vert	AV	0.0	45.4	54.0	-8.6	EUT On Side, Mid Ch, 125 kHz BW
2706.967	43.1	-2.3	2.6	200.9	1.4	0.0	Vert	AV	0.0	42.2	54.0	-11.8	EUT Horz, Low Ch, 125 kHz BW
3609.117	39.0	0.6	3.0	243.9	1.4	0.0	Horz	AV	0.0	41.0	54.0	-13.0	EUT Horz, Low Ch, 125 kHz BW
5451.192	32.8	6.6	1.1	34.0	1.4	0.0	Horz	AV	0.0	40.8	54.0	-13.2	EUT Horz, Mid Ch, 125 kHz BW
4542.325	34.8	4.1	3.1	30.9	1.4	0.0	Horz	AV	0.0	40.3	54.0	-13.7	EUT Horz, Mid Ch, 125 kHz BW
4511.667	34.3	3.9	3.5	15.0	1.4	0.0	Horz	AV	0.0	39.6	54.0	-14.4	EUT Horz, Low Ch, 125 kHz BW
3609.200	37.0	0.6	1.5	124.9	1.4	0.0	Vert	AV	0.0	39.0	54.0	-15.0	EUT On Side, Low Ch, 125 kHz BW
3633.875	36.7	0.7	1.4	124.9	1.4	0.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT On Side, Mid Ch, 125 kHz BW
3634.042	36.3	0.7	1.1	51.0	1.4	0.0	Horz	AV	0.0	38.4	54.0	-15.6	EUT Horz, Mid Ch, 125 kHz BW
4511.158	32.6	3.9	1.5	40.0	1.4	0.0	Vert	AV	0.0	37.9	54.0	-16.1	EUT On Side, Low Ch, 125 kHz BW
4542.758	30.7	4.1	1.5	119.0	1.4	0.0	Vert	AV	0.0	36.2	54.0	-17.8	EUT On Side, Mid Ch, 125 kHz BW
4575.700	30.4	4.2	1.5	153.9	1.4	0.0	Vert	AV	0.0	36.0	54.0	-18.0	EUT On Side, High Ch, 125 kHz BW
4576.525	30.3	4.2	2.1	41.9	1.4	0.0	Horz	AV	0.0	35.9	54.0	-18.1	EUT Horz, High CH, 125 kHz BW
3661.950	31.1	0.8	1.0	131.0	1.4	0.0	Horz	AV	0.0	33.3	54.0	-20.7	EUT Horz, High CH, 125 kHz BW
3661.625	31.1	0.8	1.5	358.0	1.4	0.0	Vert	AV	0.0	33.3	54.0	-20.7	EUT On Side, High Ch, 125 kHz BW
2742.425	32.6	-2.3	3.8	346.0	1.4	0.0	Horz	AV	0.0	31.7	54.0	-22.3	EUT Horz, High CH, 125 kHz BW
2743.692	32.5	-2.3	1.4	207.0	1.4	0.0	Vert	AV	0.0	31.6	54.0	-22.4	EUT On Side, High Ch, 125 kHz BW
2706.792	53.0	-2.3	1.0	336.0	0.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3	EUT Horz, Low Ch, 125 kHz BW
2706.975	51.8	-2.3	1.2	206.0	0.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	EUT Vert, Low Ch, 125 kH?z BW
2706.983	51.7	-2.3	2.9	139.9	0.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	EUT On Side, Low Ch, 125 kHz BW
2707.050	51.6	-2.3	1.5	232.9	0.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7	EUT On Side, Low Ch, 125 kHz BW
2706.908	50.9	-2.3	1.1	188.0	0.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	EUT Vert, Low Ch, 125 kH?z BW
5451.142	41.0	6.6	1.1	34.0	0.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	EUT Horz, Mid Ch, 125 kHz BW
2725.483	49.5	-2.3	1.5	279.9	0.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	EUT On Side, Mid Ch, 125 kHz BW
1804.575	50.9	-4.5	1.5	329.9	0.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	EUT Horz, Low Ch, 125 kHz BW
4542.567	42.0	4.1	3.1	30.9	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT Horz, Mid Ch, 125 kHz BW
3609.208	44.8	0.6	3.0	243.9	0.0	0.0	Horz	PK	0.0	45.4	74.0	-28.6	EUT Horz, Low Ch, 125 kHz BW
4574.667	41.1	4.2	1.5	153.9	0.0	0.0	Vert	PK	0.0	45.3	74.0	-28.7	EUT On Side, High Ch, 125 kHz BW
2706.892	47.5	-2.3	2.6	200.9	0.0	0.0	Vert	PK	0.0	45.2	74.0	-28.8	EUT Horz, Low Ch, 125 kHz BW
4573.517	41.0	4.2	2.1	41.9	0.0	0.0	Horz	PK	0.0	45.2	74.0	-28.8	EUT Horz, High CH, 125 kHz BW
4511.333	41.2	3.9	3.5	15.0	0.0	0.0	Horz	PK	0.0	45.1	74.0	-28.9	EUT Horz, Low Ch, 125 kHz BW
4511.808	41.0	3.9	1.5	40.0	0.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	EUT On Side, Low Ch, 125 kHz BW
3633.800	44.2	0.7	1.4	124.9	0.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	EUT On Side, Mid Ch, 125 kHz BW
3609.200	44.2	0.6	1.5	124.9	0.0	0.0	Vert	PK	0.0	44.8	74.0	-29.2	EUT On Side, Low Ch, 125 kHz BW

SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3634.208	43.9	0.7	1.1	51.0	0.0	0.0	Horz	PK	0.0	44.6	74.0	-29.4	EUT Horz, Mid Ch, 125 kHz BW
4542.608	40.3	4.1	1.5	119.0	0.0	0.0	Vert	PK	0.0	44.4	74.0	-29.6	EUT On Side, Mid Ch, 125 kHz BW
3661.617	41.7	0.8	1.0	131.0	0.0	0.0	Horz	PK	0.0	42.5	74.0	-31.5	EUT Horz, High CH, 125 kHz BW
3659.608	41.7	0.8	1.5	358.0	0.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5	EUT On Side, High Ch, 125 kHz BW
2743.708	43.2	-2.3	3.8	346.0	0.0	0.0	Horz	PK	0.0	40.9	74.0	-33.1	EUT Horz, High CH, 125 kHz BW
2745.708	43.2	-2.3	1.4	207.0	0.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	EUT On Side, High Ch, 125 kHz BW

CONCLUSION

Pass

Tested By

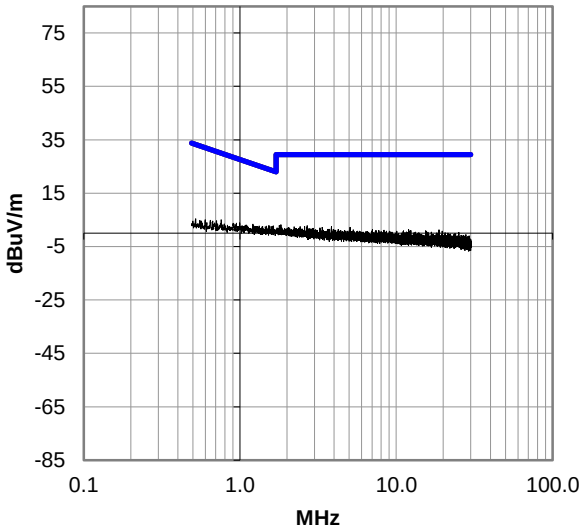
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

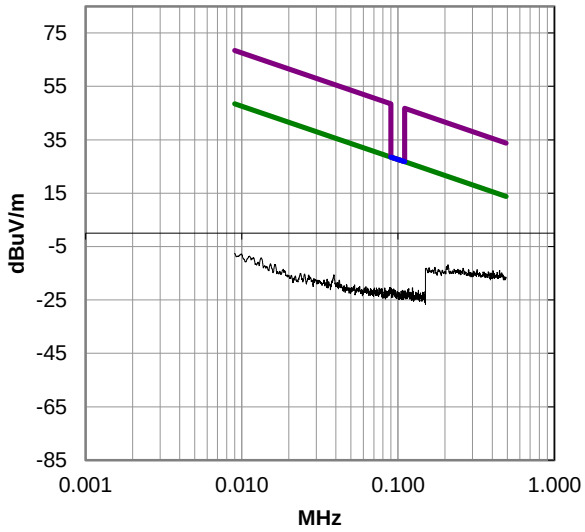
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

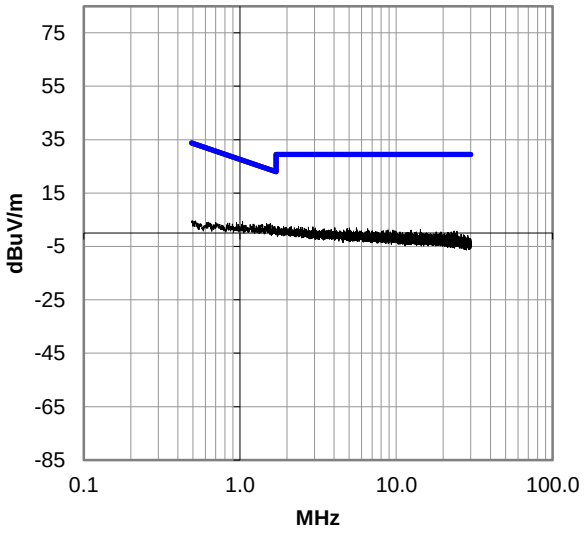
0.49-30 MHz, Linx



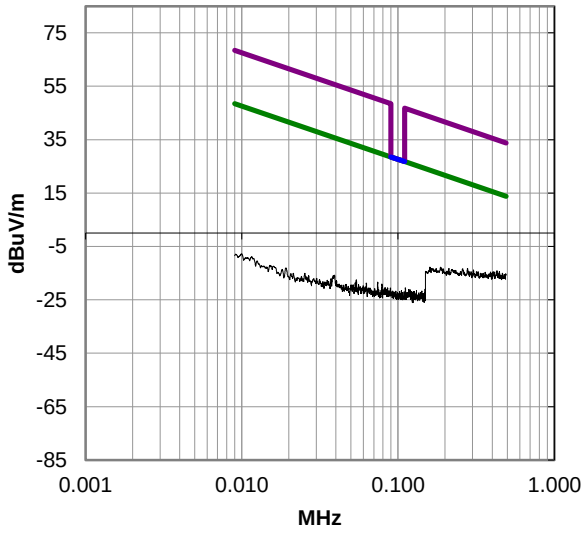
0.009-0.49 MHz, Linx



0.49-30 MHz, Taoglas



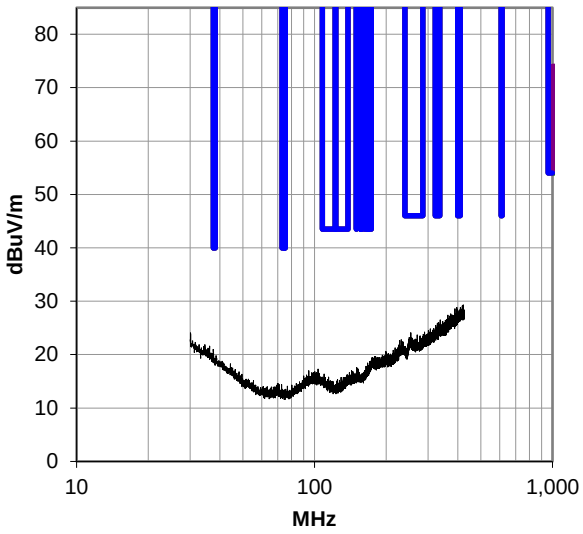
0.009-0.49 MHz, Taoglas



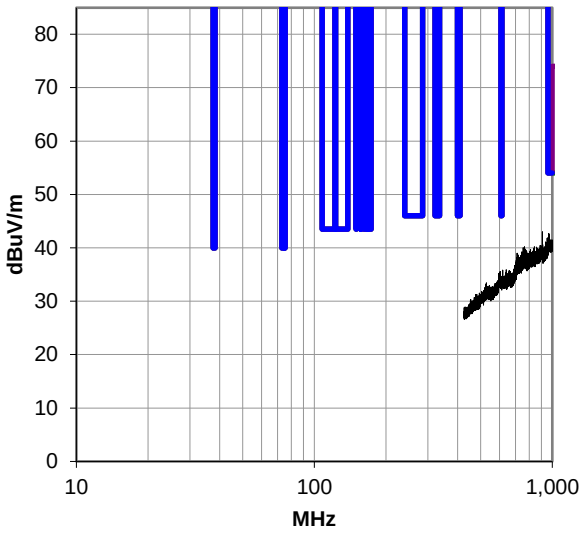
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

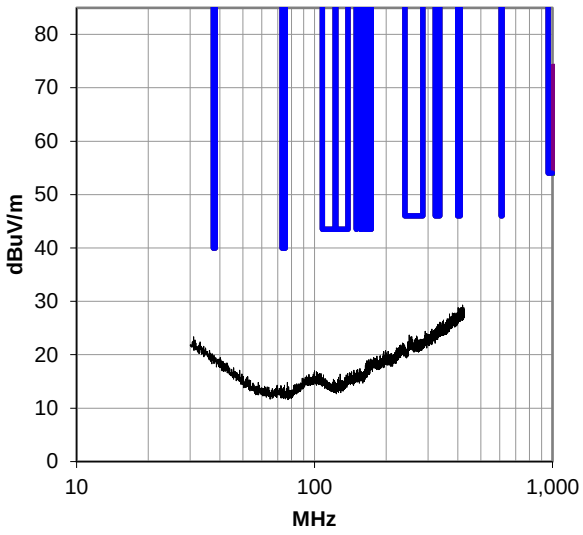
30 – 425 MHz, Taoglass



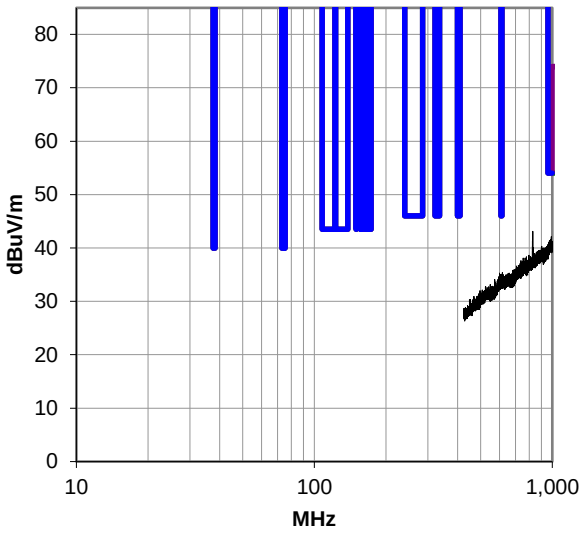
425-1000 MHz, Taoglass



30 – 425 MHz, Linx



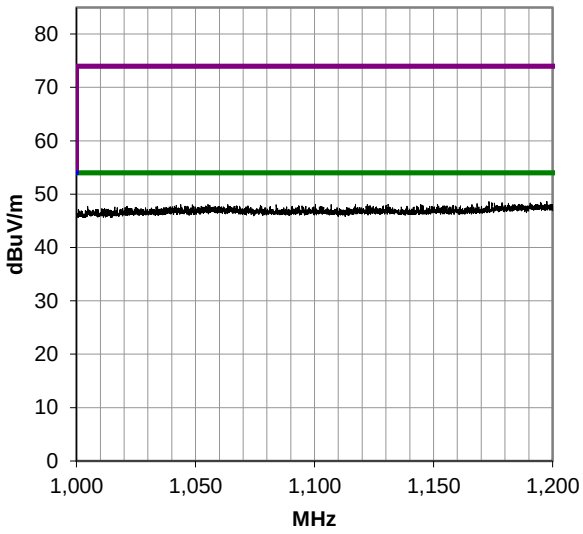
425-1000 MHz, Linx



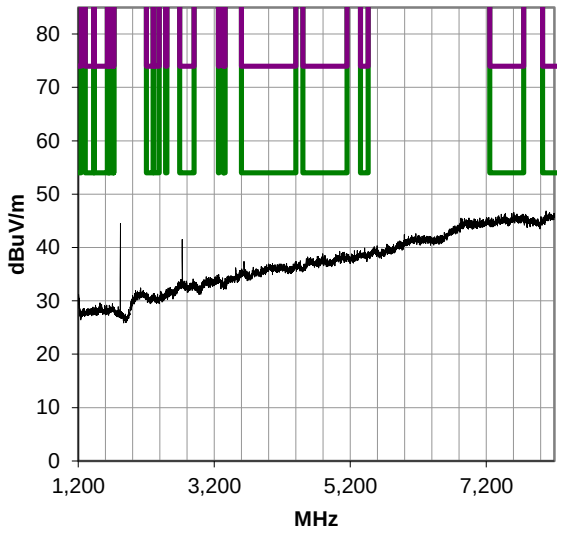
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

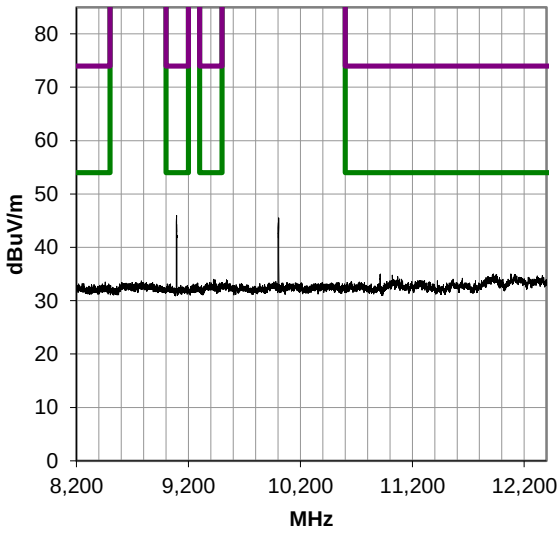
1000-1200 MHz, Taoglas Antenna



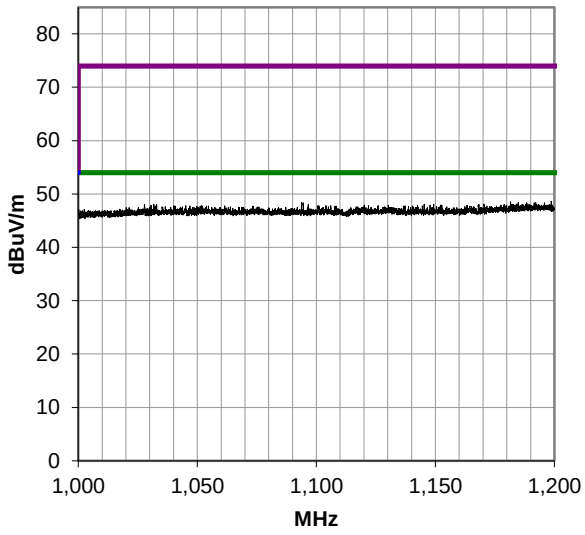
1200-8200 MHz, Taoglas Antenna



8200-12400 MHz, Taoglas Antenna



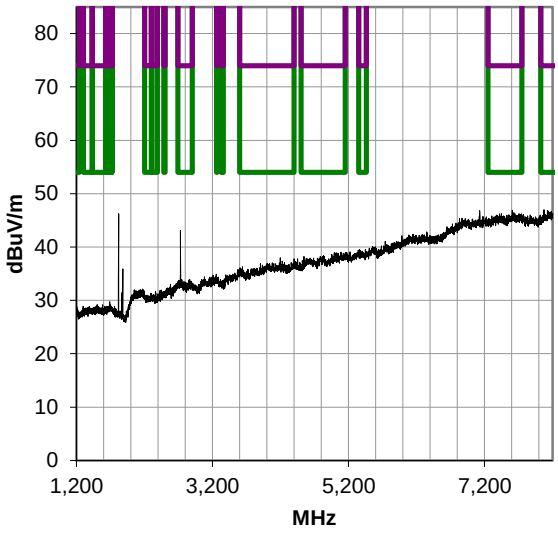
1000-1200 MHz, Linx Antenna



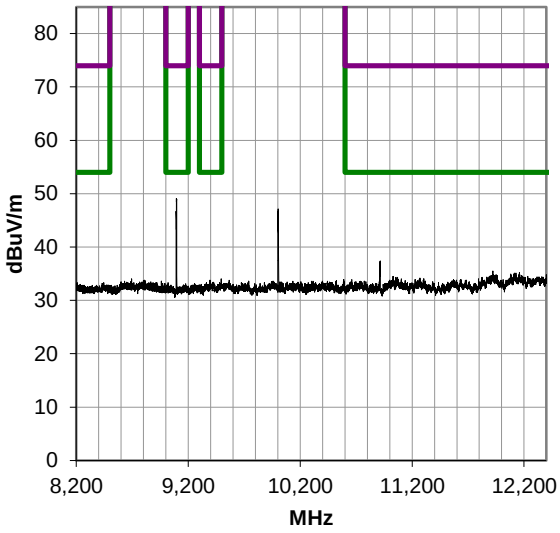
SPURIOUS RADIATED EMISSIONS

element
WTD.2023.11.13.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

1200-8200 MHz, Linx Antenna



8200-12400 MHz, Linx Antenna



DUTY CYCLE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

DUTY CYCLE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #3	Date:	2024-09-12
Customer:	Digi International Inc	Temperature:	22.1°C
Attendees:	Matt Schellin	Relative Humidity:	54.9%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-11

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

0.35 Customer Cable Loss factor is included in the reference level offset. 22 dBm power setting (1F in software).

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

N/A

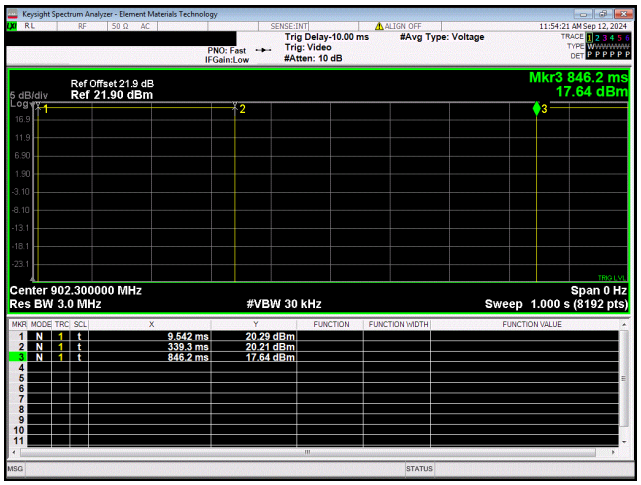
Tested By

TEST RESULTS

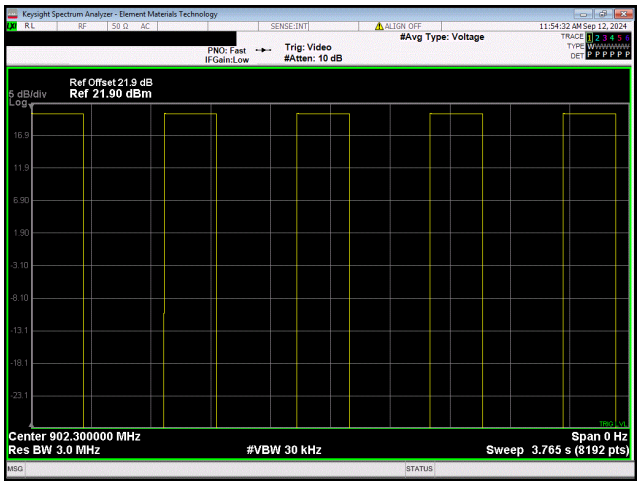
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
LoRa CSS						
Low Channel (902.3 MHz)	329.78 ms	836.692 ms	1	39.4	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel (908.5 MHz)	329.948 ms	836.849 ms	1	39.4	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel (914.9 MHz)	329.684 ms	836.693 ms	1	39.4	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

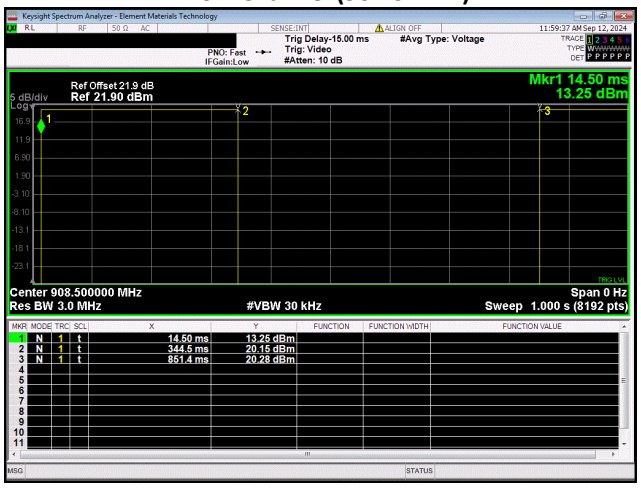
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



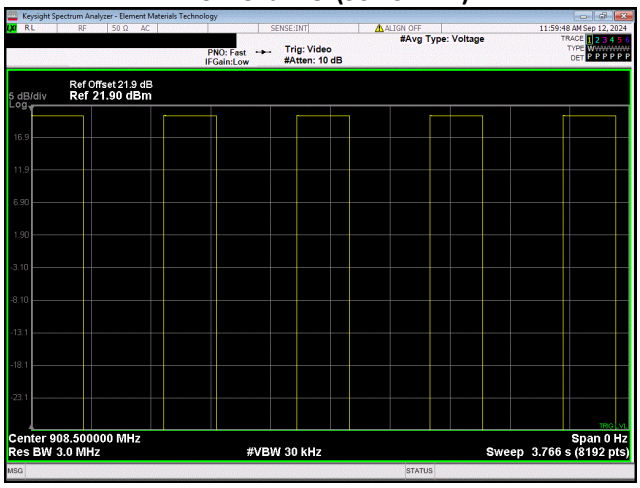
LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
Low Channel (902.3 MHz)



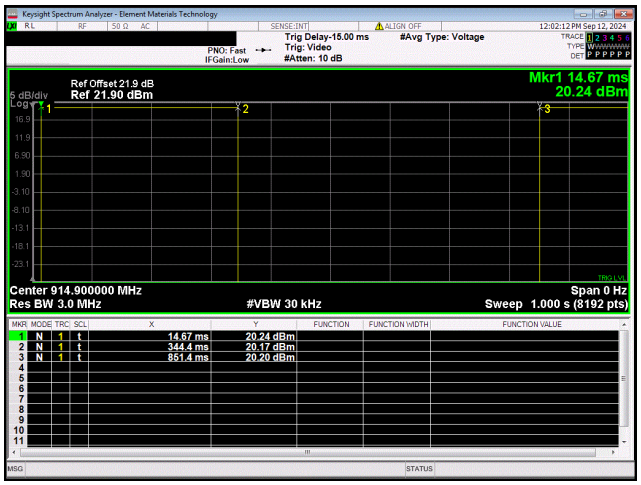
LoRa CSS
Mid Channel (908.5 MHz)



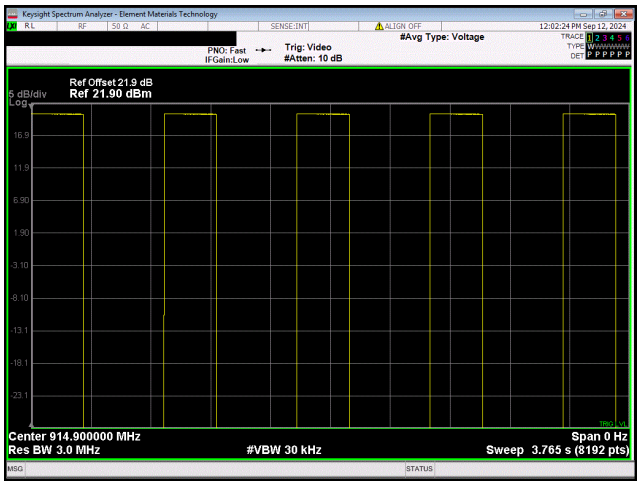
LoRa CSS
Mid Channel (908.5 MHz)

DUTY CYCLE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
High Channel (914.9 MHz)



LoRa CSS
High Channel (914.9 MHz)

CARRIER FREQUENCY SEPARATION

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The channel carrier frequencies in the 902-928 MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

CARRIER FREQUENCY SEPARATION

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #3	Date:	2024-09-09
Customer:	Digi International Inc	Temperature:	21.9°C
Attendees:	David Lentz	Relative Humidity:	53.3%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-11

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

0.35 Customer Cable Loss factor is included in the reference level offset. 22 dBm power setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

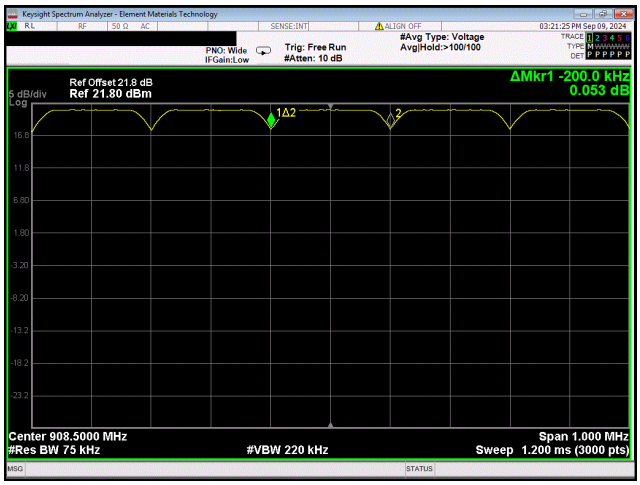
Tested By

TEST RESULTS

	Value	Limit (≥ kHz)	Results
Hopping Mode (All Channels)			
Measurement on Mid Channel (908.5 MHz)	0.2 MHz	135.767	Pass

CARRIER FREQUENCY SEPARATION

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)

NUMBER OF HOPPING FREQUENCIES

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

NUMBER OF HOPPING FREQUENCIES

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #3	Date:	2024-09-09
Customer:	Digi International Inc	Temperature:	22°C
Attendees:	David Lentz	Relative Humidity:	53.4%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-11

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

0.35 Customer Cable Loss factor is included in the reference level offset. 22 dBm power setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

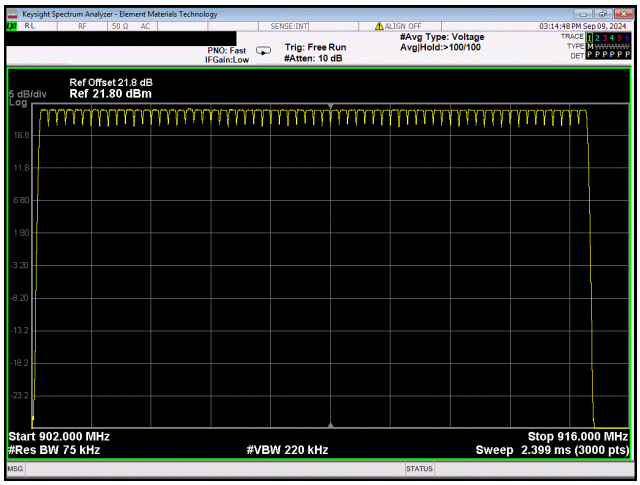
Tested By

TEST RESULTS

	Number of Channels	Limit (≥)	Results
Hopping Mode (All Channels)			
Measurement on Mid Channel (908.5 MHz)	64	50	Pass

NUMBER OF HOPPING FREQUENCIES

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)

DWELL TIME

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Per ANSI C63.10:2020 clause 7.8.4:
The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period.

The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The hopping function of the EUT was enabled.

Observation period is based on the Number of Hopping Channels * 400 mS. For an FHSS radio with 64 channels, this would be:

64 Channels * 400mS = 25.6 Sec.

On Time During 25.6 Sec = Pulse Width * Number of pulses

The measurement was repeated 4 times, and the measured results were compared to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

DWELL TIME

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #3	Date:	2024-09-09
Customer:	Digi International Inc	Temperature:	21.8°C
Attendees:	David Lentz	Relative Humidity:	53%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-11

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

0.35 Customer Cable Loss factor is included in the reference level offset. 22 dBm power setting.

Lower amplitude emissions noted in each sample are from other channels in the 64-channel hopping set and do not factor in the dwell time calculation.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

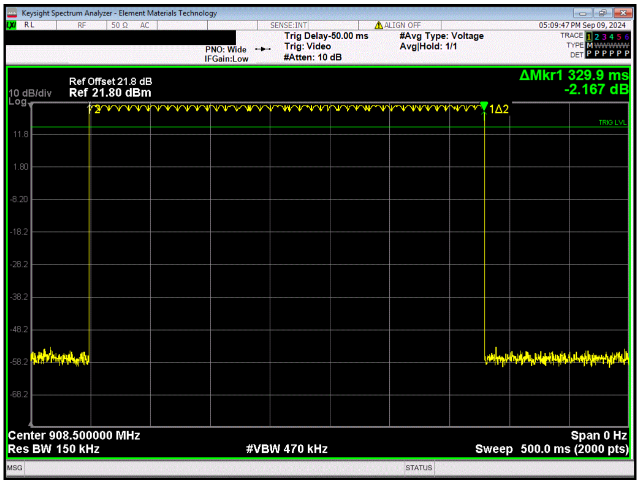
Tested By

TEST RESULTS

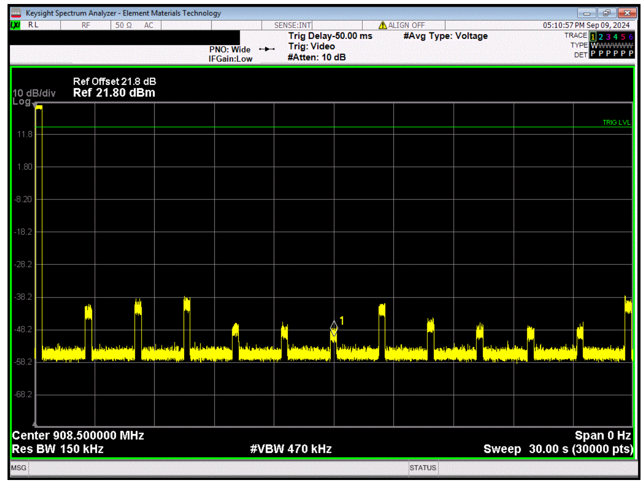
	Pulse Width (ms)	Number of Pulses		Scale Factor	On Time (ms) During 25.6 s	Limit (ms)	Results
Hopping Mode (All Channels)							
Measurement on Mid Channel (908.5 MHz)	329.911	N/A		N/A	N/A	N/A	N/A
	329.911	1		1	329.911	400	Pass
	329.911	1		1	329.911	400	Pass
	329.911	1		1	329.911	400	Pass
	329.911	1		1	329.911	400	Pass

DWELL TIME

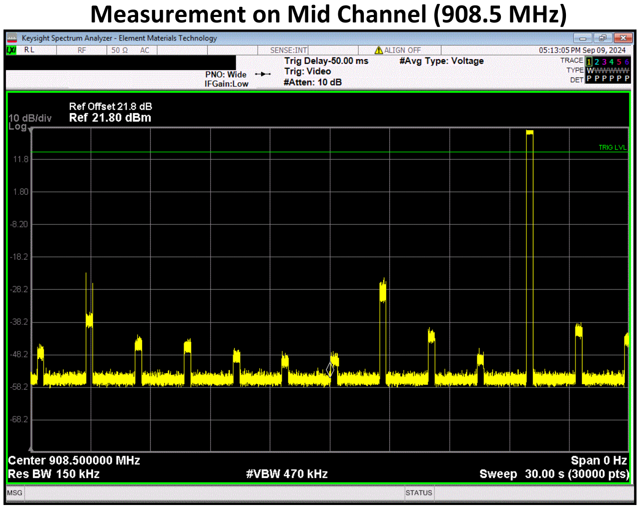
TbtTx 2024.05.24.1
WTD.2024.01.16.0



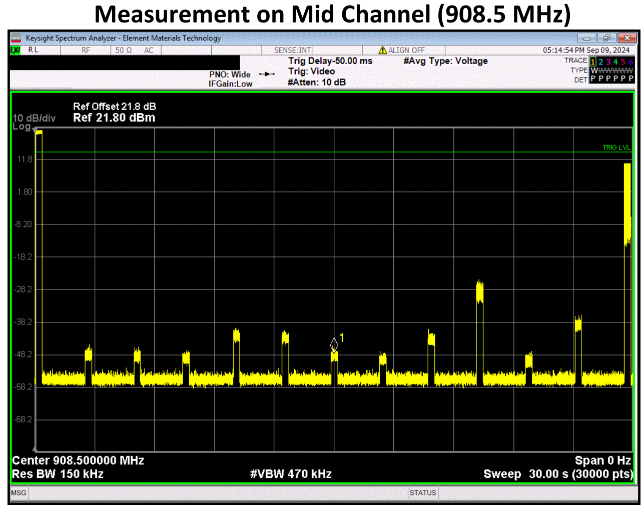
Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)



Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)

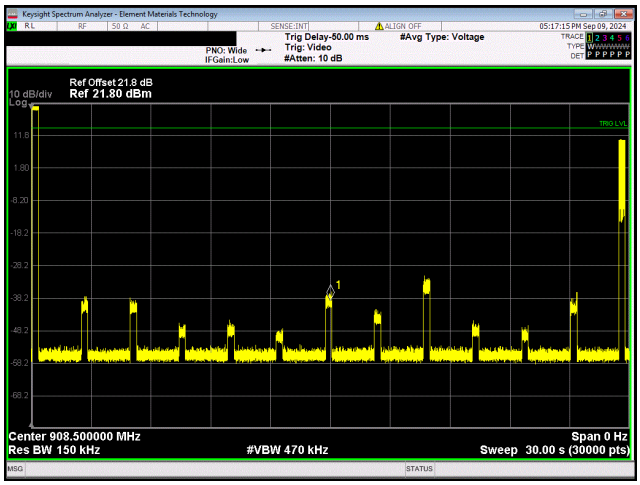


Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)



Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)

DWELL TIME



Hopping Mode (All Channels)
Measurement on Mid Channel (908.5 MHz)

OUTPUT POWER

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2020 Section 7.8.5 was used for a FHSS radio.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

OUTPUT POWER

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.8°C
Attendees:	David Lentz	Relative Humidity:	52.3%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

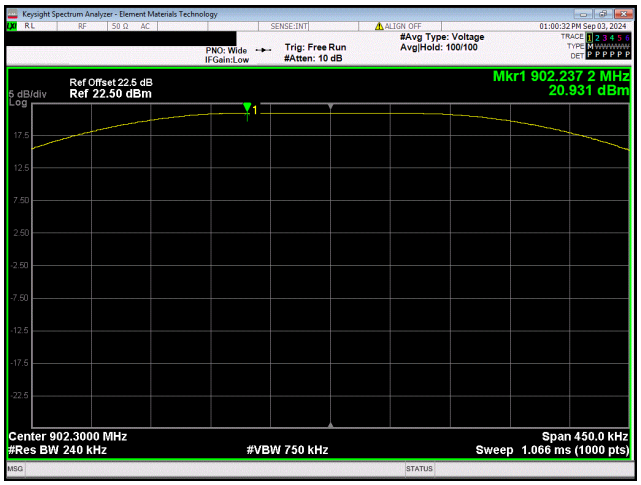
Tested By

TEST RESULTS

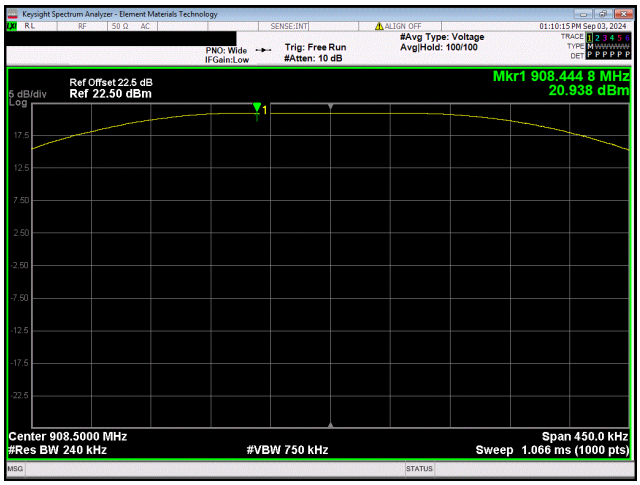
	Out Pwr (dBm)	Limit (dBm)	Result
LoRa CSS			
Low Channel (902.3 MHz)	20.931	30	Pass
Mid Channel (908.5 MHz)	20.938	30	Pass
High Channel (914.9 MHz)	20.903	30	Pass

OUTPUT POWER

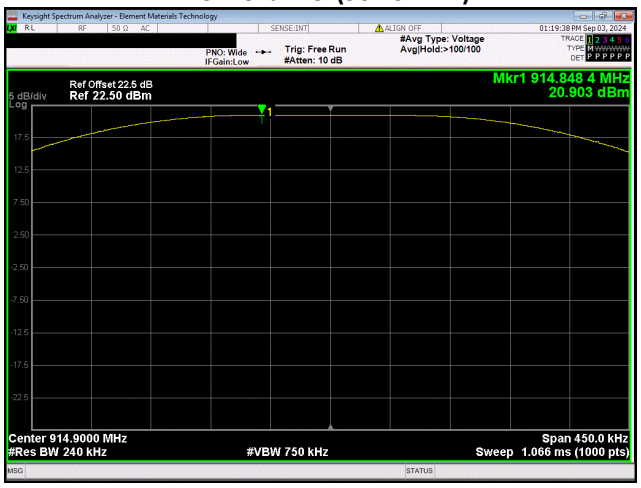
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
Mid Channel (908.5 MHz)



LoRa CSS
High Channel (914.9 MHz)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2020 Section 7.8.5 was used for a FHSS radio.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.8°C
Attendees:	David Lentz	Relative Humidity:	52.5%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

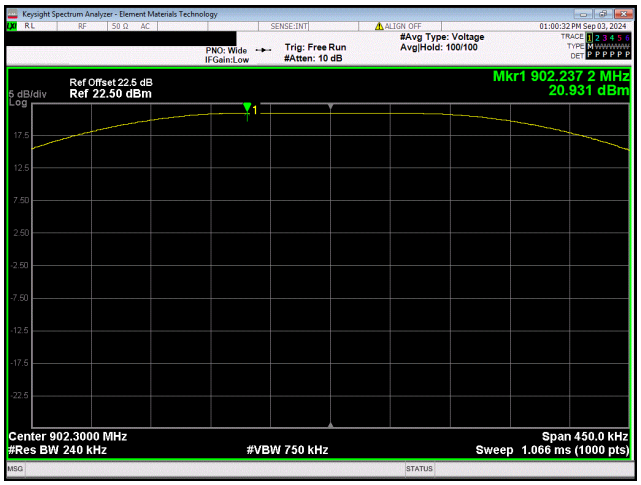
Tested By

TEST RESULTS

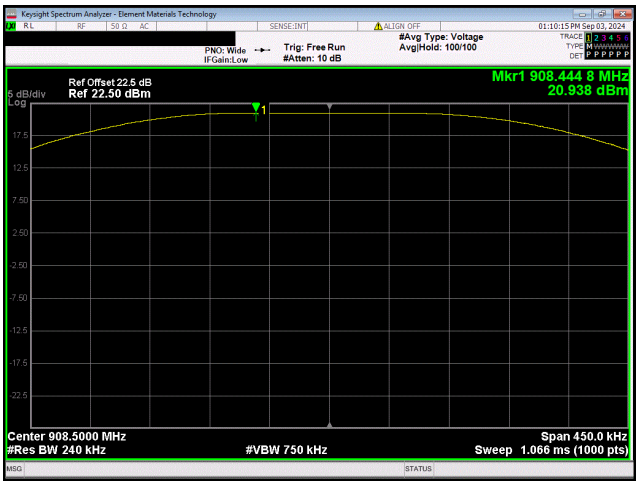
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
LoRa CSS					
Low Channel (902.3 MHz)	20.931	2.83	23.761	36	Pass
Mid Channel (908.5 MHz)	20.938	2.83	23.768	36	Pass
High Channel (914.9 MHz)	20.903	2.83	23.733	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

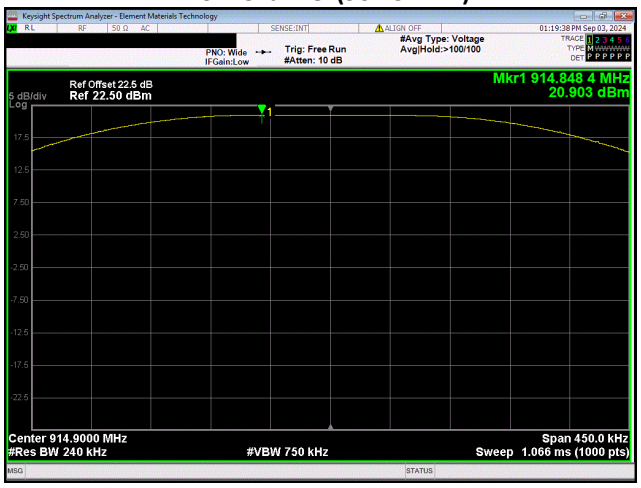
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
Mid Channel (908.5 MHz)



LoRa CSS
High Channel (914.9 MHz)

BAND EDGE COMPLIANCE - HOPPING MODE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge. The analyzer screen captures for this test show an example of the emission mask for the test mode also used during the radiated spurious emissions at the restricted band edges test.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31

BAND EDGE COMPLIANCE - HOPPING MODE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #3	Date:	2024-09-09
Customer:	Digi International Inc	Temperature:	21.8°C
Attendees:	David Lentz	Relative Humidity:	53%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-11

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2020
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

0.35 Customer Cable Loss factor is included in the reference level offset. 22 dBm power setting.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

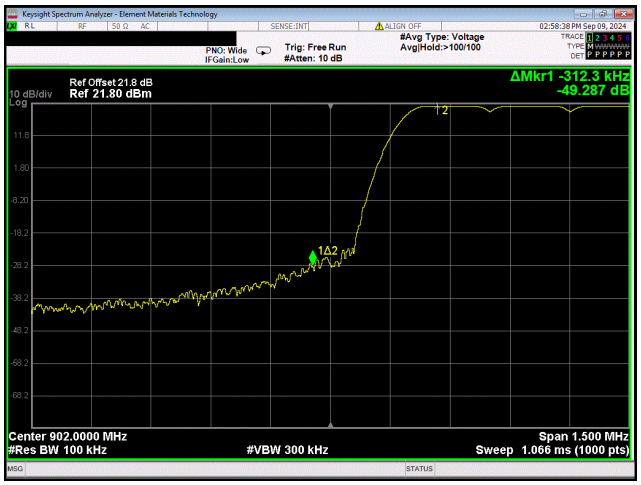
Tested By

TEST RESULTS

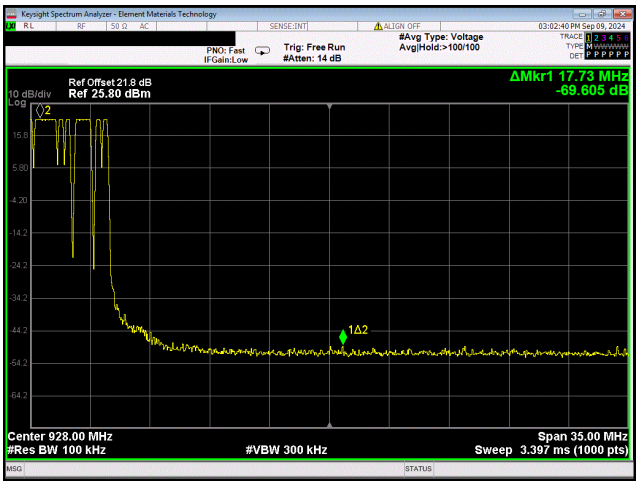
	Value (dBc)	Limit ≤ (dBc)	Result
Hopping Mode (All Channels)			
Measurement on Low Channel (902.3 MHz)	-49.29	-20	Pass
Measurement on High Channel (914.9 MHz)	-69.61	-20	Pass

BAND EDGE COMPLIANCE - HOPPING MODE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Hopping Mode (All Channels)
Measurement on Low Channel (902.3 MHz)



Hopping Mode (All Channels)
Measurement on High Channel (914.9 MHz)

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

The spectrum was scanned below the lower band edge and above the higher band edge. The analyzer screen captures for this test show an example of the emission mask for the test mode also used during the radiated spurious emissions at the restricted band edges test.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	22°C
Attendees:	David Lentz	Relative Humidity:	52.8%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

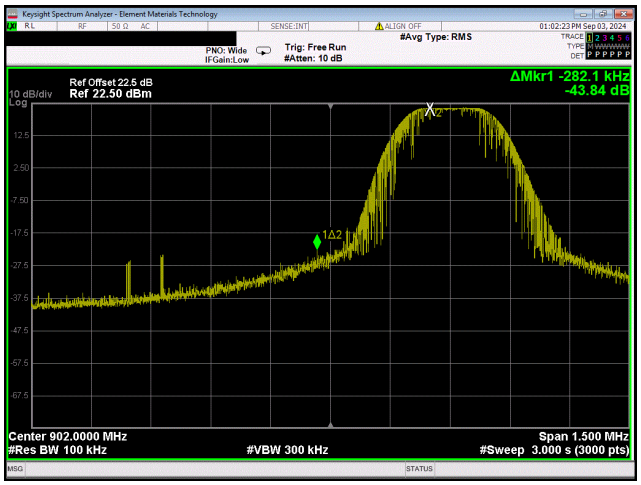
Tested By

TEST RESULTS

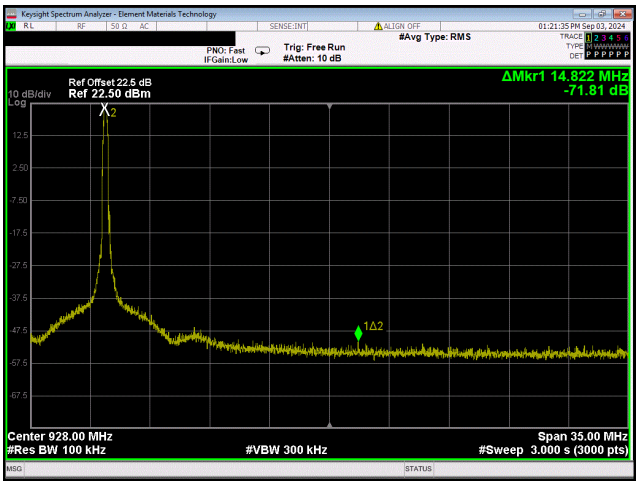
	Value (dBc)	Limit ≤ (dBc)	Result
LoRa CSS			
Low Channel (902.3 MHz)	-43.84	-20	Pass
High Channel (914.9 MHz)	-71.81	-20	Pass

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
High Channel (914.9 MHz)

EMISSIONS BANDWIDTH

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 20 dB emissions bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

EMISSIONS BANDWIDTH

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.9°C
Attendees:	David Lentz	Relative Humidity:	52.7%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

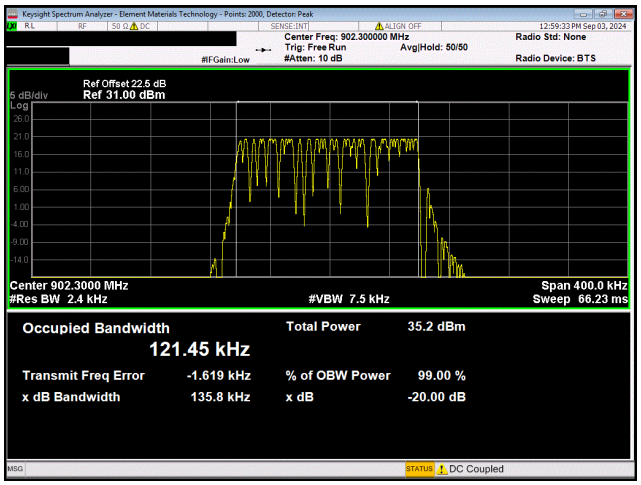
Tested By

TEST RESULTS

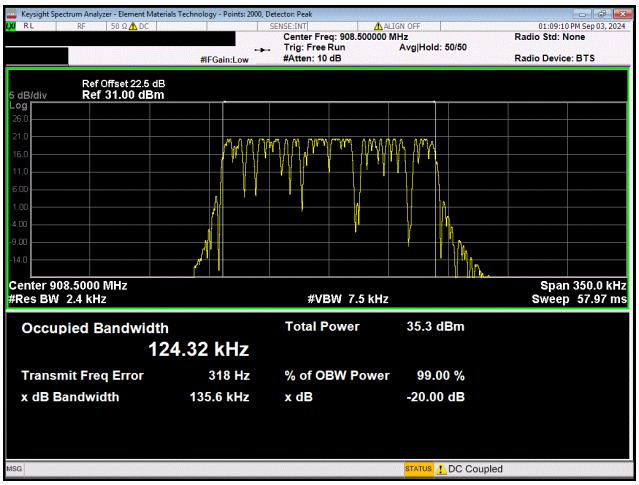
	Value	Limit (<)	Result
LoRa CSS			
Low Channel (902.3 MHz)	135.767 kHz	500 kHz	Pass
Mid Channel (908.5 MHz)	135.578 kHz	500 kHz	Pass
High Channel (914.9 MHz)	135.051 kHz	500 kHz	Pass

EMISSIONS BANDWIDTH

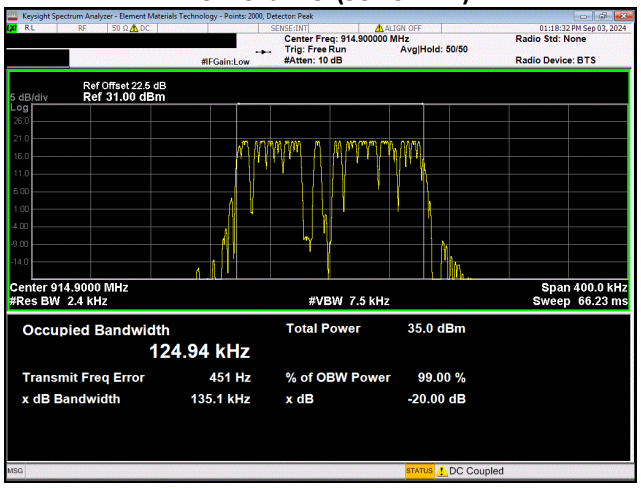
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
Mid Channel (908.5 MHz)



LoRa CSS
High Channel (914.9 MHz)

OCCUPIED BANDWIDTH

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2020, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

OCCUPIED BANDWIDTH

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.9°C
Attendees:	David Lentz	Relative Humidity:	52.5%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

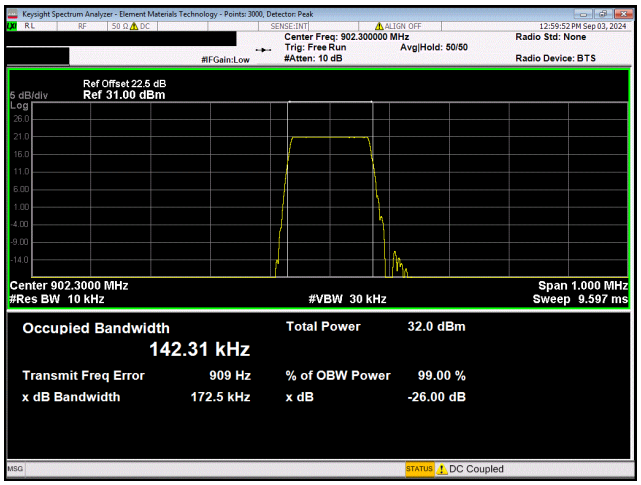
Tested By

TEST RESULTS

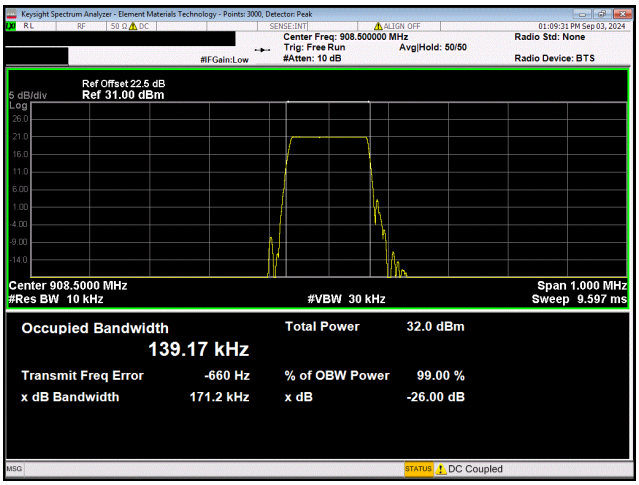
	Value	Limit	Result
LoRa CSS			
Low Channel (902.3 MHz)	142.312 kHz	N/A	N/A
Mid Channel (908.5 MHz)	139.166 kHz	N/A	N/A
High Channel (914.9 MHz)	139.845 kHz	N/A	N/A

OCCUPIED BANDWIDTH

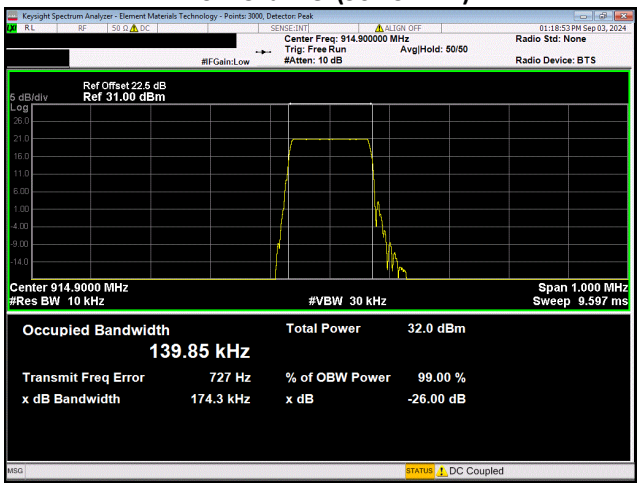
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS
Mid Channel (908.5 MHz)



LoRa CSS
High Channel (914.9 MHz)

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28
Attenuator	Fairview Microwave	SA4014-20	AQI	2024-08-28	2025-08-28
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2024-08-28	2025-08-28

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Digi XBee LR RF Module for LoRaWAN	Work Order:	DGII0507
Serial Number:	EUT #1	Date:	2024-09-03
Customer:	Digi International Inc	Temperature:	21.9°C
Attendees:	David Lentz	Relative Humidity:	52.7%
Customer Project:	None	Bar. Pressure (PMSL):	1022 mbar
Tested By:	Arnauld Dedry	Job Site:	MN11
Power:	3.3 VDC	Configuration:	DGII0507-3

TEST SPECIFICATIONS

Specification:	Method:
RSS-247 Issue 3:2023	ANSI C63.10:2020

COMMENTS

.35 Customer Cable Loss factor, for direct connect cable. 125 KHz

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

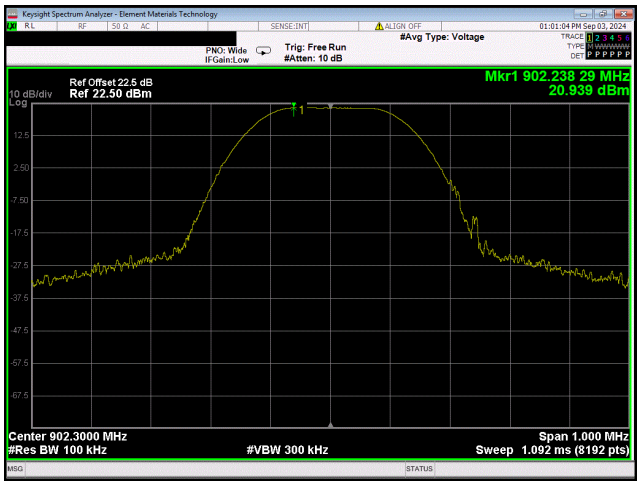
TEST RESULTS

	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
LoRa CSS					
Low Channel (902.3 MHz)	Fundamental	902.24	N/A	N/A	N/A
	30 MHz - 10 GHz	901.51	*See note	-20	Pass
Mid Channel (908.5 MHz)	Fundamental	908.46	N/A	N/A	N/A
	30 MHz - 10 GHz	2726.08	-68.61	-20	Pass
High Channel (914.9 MHz)	Fundamental	914.85	N/A	N/A	N/A
	30 MHz - 10 GHz	5809.22	-69.99	-20	Pass

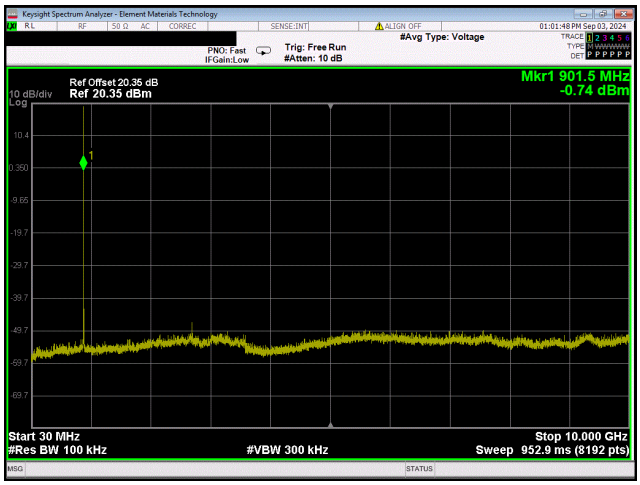
*The measured results contained in Band Edge compliance on pages 61 and 62 would be considered representative of the worst case dBc value in the 30 MHz – 10 GHz frequency range. No other emissions are within 60 dB of the fundamental measurement.

SPURIOUS CONDUCTED EMISSIONS

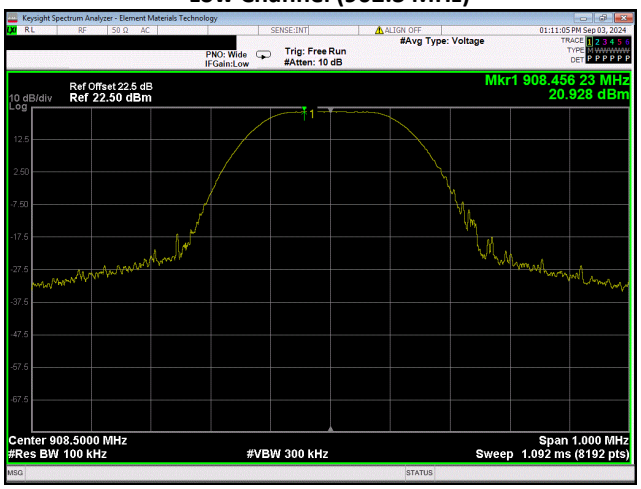
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



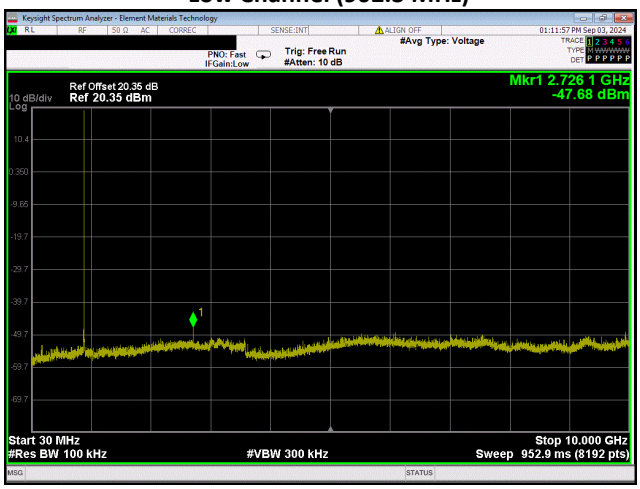
LoRa CSS
Low Channel (902.3 MHz)



LoRa CSS *
Low Channel (902.3 MHz)



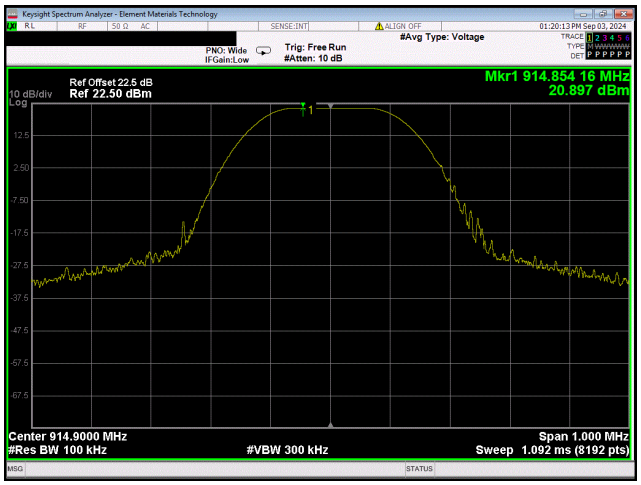
LoRa CSS
Mid Channel (908.5 MHz)



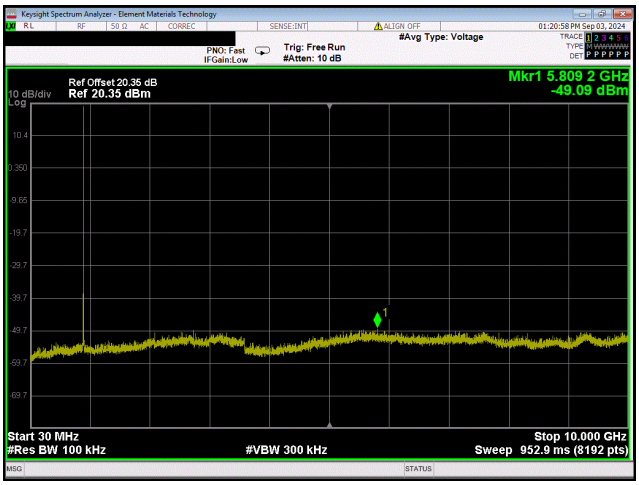
LoRa CSS
Mid Channel (908.5 MHz)

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



LoRa CSS
High Channel (914.9 MHz)



LoRa CSS
High Channel (914.9 MHz)

End of Test Report