



element

Emerson/Rosemount

Emerson Synchros 9000X,

Model: 9000X

FCC 15.247:2025

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

RSS-247 Issue 3:2023

2.4 GHz DTS Transceiver

Report: EMPM0186.0 Rev. 01, Issue Date: July 16, 2025



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CERTIFICATE OF TEST



Last Date of Test: December 19, 2024
Emerson/Rosemount
EUT: 9000X

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2025	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013
RSS-247 Issue 3:2023	

Note: FCC 15.247 has been updated superseding prior issues. The changes between the specifications do not affect the results of the prior testing. The manufacturer attests that no changes have been made to the product.

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)	N/A	15.207	RSS-Gen 8.8	6.2	Not required for a battery powered EUT.
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 -8.6, 8.7	RSS-247 5.5	6.5, 6.6, 11.12.1, 11.13.2	
Occupied Bandwidth (99%)	Pass	KDB 558074 -2.1	RSS-Gen 6.7	6.9.3	
Duty Cycle	Pass	15.247, KDB 558074 -6.0	RSS-Gen 3.2	11.6	
Emissions Bandwidth (dB)	Pass	15.247(a), KDB 558074 -8.2	RSS-247 5.2(a)	11.8.2	
Output Power	Pass	15.247(b), KDB 558074 -8.3	RSS-247 5.4(d)	11.9.1.1	
Equivalent Isotropic Radiated Power (EIRP)	Pass	15.247(b), KDB 558074 -8.3	RSS-247 5.4(d)	11.9.1.1	
Band Edge Compliance	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4	RSS-247 5.2(b)	11.10.2	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Powerline Conducted Emissions (Receiver)	N/A	15.101, 15.107	RSS-Gen 5.2	ANSI C63.4 - 12.2.4	Not required for a battery powered EUT.
Radiated Emissions for Receiver	N/A	15.101, 15.109	RSS-Gen 5.2	ANSI C63.4 - 12.2.5	Not required as FCC 15.101 and RSS-Gen section 7 state receiver requirements only apply to receivers operating in the 30-960 MHz band.

Deviations From Test Standards

None

Approved By:

Jeff Alcocke, 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 FCC specification year from 2024 to 2025	2025-07-09	1, 3, 10
	Added foot note that the update in specification year from 2024 to 2025 does not change the results of the data contained in this test report.	2025-07-09	3
01	Corrected the operating frequency typo for low channel from 2404 MHz to 2405 MHz.	2025-07-09	16, 17, 20
	Added the calculation for the duty cycle correction factor.	2025-07-09	16, 19
	Removed Accreditation and Authorization page	2025-07-16	Removed
	Updated Measurement Uncertainty page	2025-07-16	6
	Updated Facilities page	2025-07-16	5

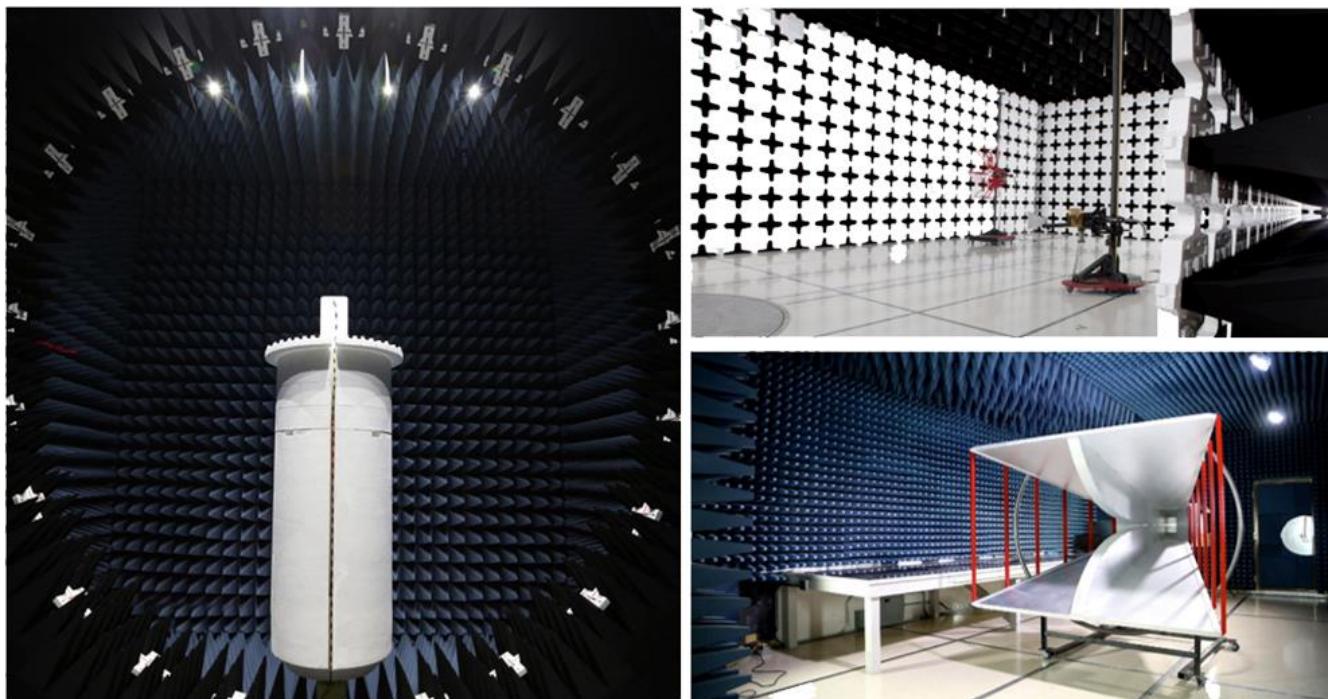
FACILITIES

Testing was performed at the following location(s)

Location	Labs ⁽¹⁾	Address	A2LA ⁽²⁾	ISED ⁽³⁾	BSMI ⁽⁴⁾	VCCI ⁽⁵⁾	CAB ⁽⁶⁾	FDA ⁽⁷⁾
<input type="checkbox"/> California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
<input checked="" type="checkbox"/> Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
<input type="checkbox"/> Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
<input type="checkbox"/> Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
<input type="checkbox"/> Offsite	N/A	See Product Description	N/A	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) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MOC, NCC, OFCA
- (7) FDA ASCA No.



MEASUREMENT UNCERTAINTY



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 reported is based on statistical analysis that was performed by the laboratory. 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
Near-field Measurement of E-Field (dB)	1.89
Near-field Measurement of H-Field (dB)	2.65

Field Strength Measurements (dB)

Range	MN05 (+/-)
10kHz-30MHz	1.8
30MHz-1GHz 3m	4.6
1GHz-6GHz	5.1
6GHz-40GHz	5.3

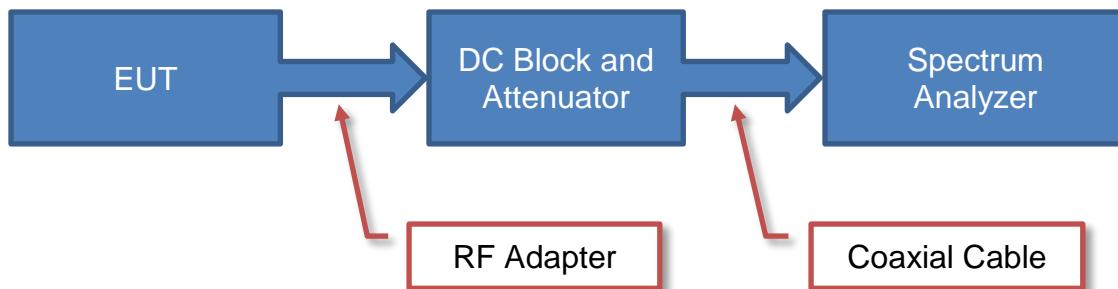
TEST SETUP BLOCK DIAGRAMS

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.

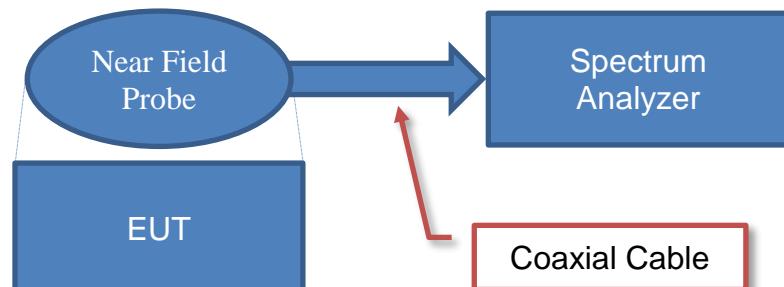
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

$$\begin{array}{ccc} \text{Measured} & \text{Measured} & \text{Reference} \\ \text{Value} & = & \text{Level} \\ 71.2 & = & 42.6 \\ & & + \\ & & \text{Level} \\ & & \text{Offset} \\ & & 28.6 \end{array}$$

Near Field Test Fixture Measurements

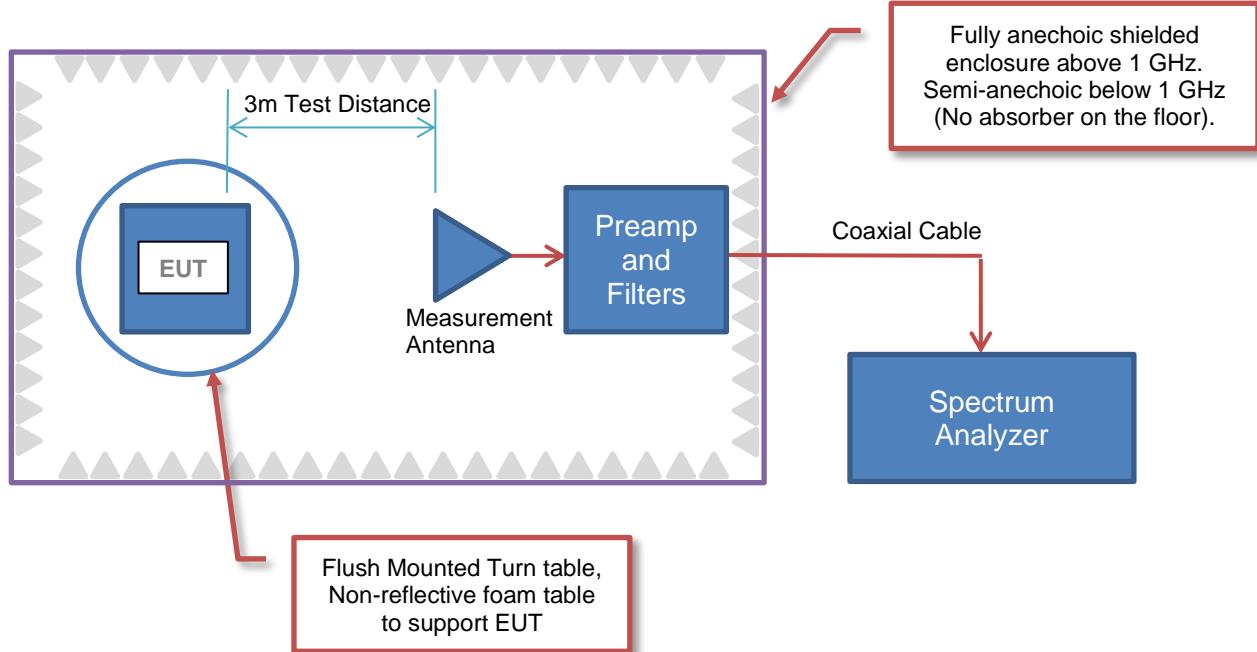


Sample Calculation (logarithmic units)

$$\begin{array}{ccc} \text{Measured} & \text{Measured} & \text{Reference} \\ \text{Value} & = & \text{Level} \\ 71.2 & = & 42.6 \\ & & + \\ & & \text{Level} \\ & & \text{Offset} \\ & & 28.6 \end{array}$$

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Factor						
Measured Level (Amplitude)	Antenna Factor	Cable 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:

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

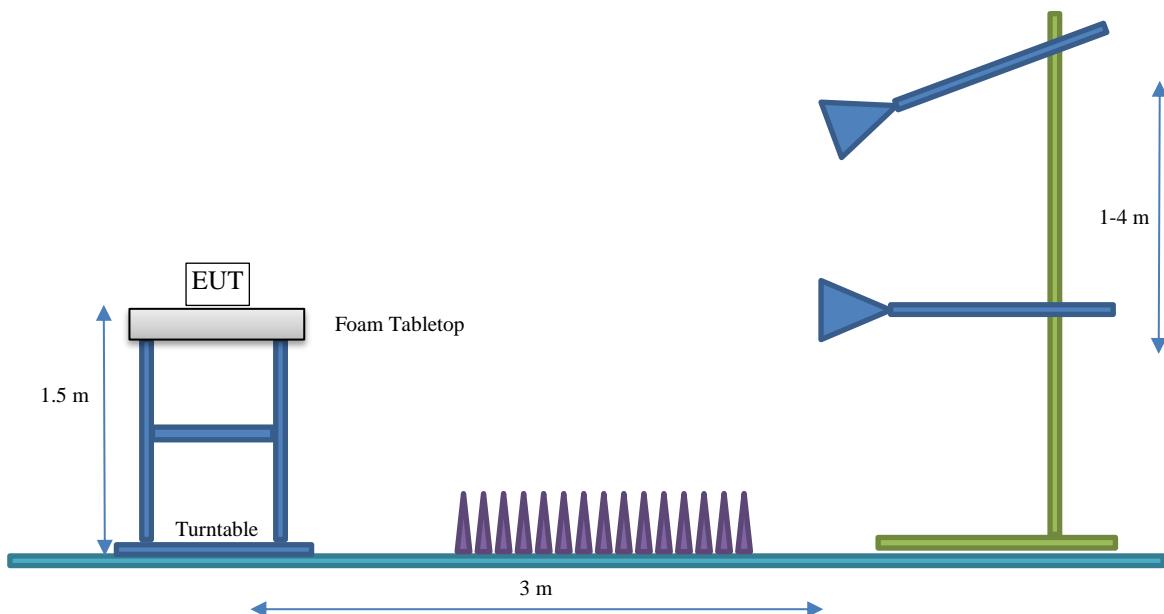
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)	10.0	+	Substitution Antenna Factor (dBi)	6.0	-	EIRP to ERP (if applicable)	2.15	=	Measured power (dBm ERP/EIRP)
									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:	Emerson/Rosemount
Address:	6021 Innovation Blvd
City, State, Zip:	Shakopee, MN 55379
Test Requested By:	Erin Snell
EUT:	9000X
First Date of Test:	December 12, 2024
Last Date of Test:	December 19, 2024
Receipt Date of Samples:	December 12, 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:

Emerson Synchros WirelessHART Platform, model: 9000X, is a communication device that pairs with various sensors to allow continuous monitoring in a wide variety of industrial applications. 9000X uses a chip radio to communicate wirelessly in a network utilizing a 2.4 GHz WirelessHART protocol. It is battery powered. In the initial launch, 9000X is available in two configurations: WirelessHART Repeater (9000X) and Temperature Monitor (9000XTM). This test report reflects the WirelessHART Repeater configuration.

Testing Objective:

Seeking to demonstrate compliance of the 2.4 GHz radio with operation under FCC 15.247:2025 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)
Dolo SR4W089 SMD Linearly Polarized Antenna	Antenova	2400-2500	3.0

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 (dBm)
OQPSK Modulation	Low Channel (2405 MHz)	8
	Mid Channel (2440 MHz)	8
	High Channel (2475 MHz)	8

CONFIGURATIONS



Configuration EMPM0186-1

Software/Firmware Running During Test	
Description	Version
Hart Talk	1.1.43.0A
Firmware	247.2.4

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
9000X	Emerson/Rosemount	9000X	24BKWC000022 (Sample 1047)

Peripherals in Test Setup Boundary				
Description	Manufacturer	Model/Part Number	Serial Number	
Laptop	Dell	Precision 3581	DT3P114	
USB Interface for HART Networks	Viator	HM-PF-USB-010031	3969384	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Programming Leads	No	1.9 m	No	USB HART Interface	9000X
USB	Yes	0.3 m	No	Laptop	USB HART Interface

Configuration EMPM0186-4

Software/Firmware Running During Test	
Description	Version
Hart Talk	1.1.43.0A
Firmware	247.2.4

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
9000X	Emerson /Rosemount	9000X	24BKWC000023

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-12-12	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.
2	2024-12-12	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.
3	2024-12-12	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.
4	2024-12-12	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.
5	2024-12-12	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.
6	2024-12-12	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.
7	2024-12-12	Power Spectral Density	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	2024-12-12	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.
9	2024-12-19	Spurious Radiated Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

SPURIOUS RADIATED EMISSIONS



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 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 within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

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 $10 \times \log(1/dc)$.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-11-26	2025-11-26
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Attenuator	Fairview Microwave	SA18H-20	VAF	2024-08-25	2025-08-25
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2024-08-25	2025-08-25
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2024-11-26	2025-11-26
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2024-01-08	2025-01-08
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2024-01-08	2025-01-08
Attenuator	Fairview Microwave	SA18E-10	TYA	2024-08-25	2025-08-25
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2024-09-05	2025-09-05
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2024-09-05	2025-09-05
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2023-10-02	2025-10-02
Cable	ESM Cable Corp.	Bilog Cables	MNH	2024-11-26	2025-11-26
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	2024-10-09	2025-10-09
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	2024-08-25	2025-08-25

SPURIOUS RADIATED EMISSIONS

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12

FREQUENCY RANGE INVESTIGATED

9 kHz TO 26500 MHz

POWER INVESTIGATED

Battery (3.6VDC)

CONFIGURATIONS INVESTIGATED

EMPM0186-4

MODES INVESTIGATED

Transmitting OQPSK, Low, Mid, and High Channels (2405, 2440, and 2475 MHz)

SPURIOUS RADIATED EMISSIONS



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000023	Date:	2024-12-18
Customer:	Emerson/Rosemount	Temperature:	22.5°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	24.1%
Customer Project:	None	Bar. Pressure (PMSL):	1028 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-4

TEST PARAMETERS

Run #:	12	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

The test mode operates at a duty cycle of 41.1%. The RMS Average measurements were corrected to 100% duty cycle using the following correction factor:

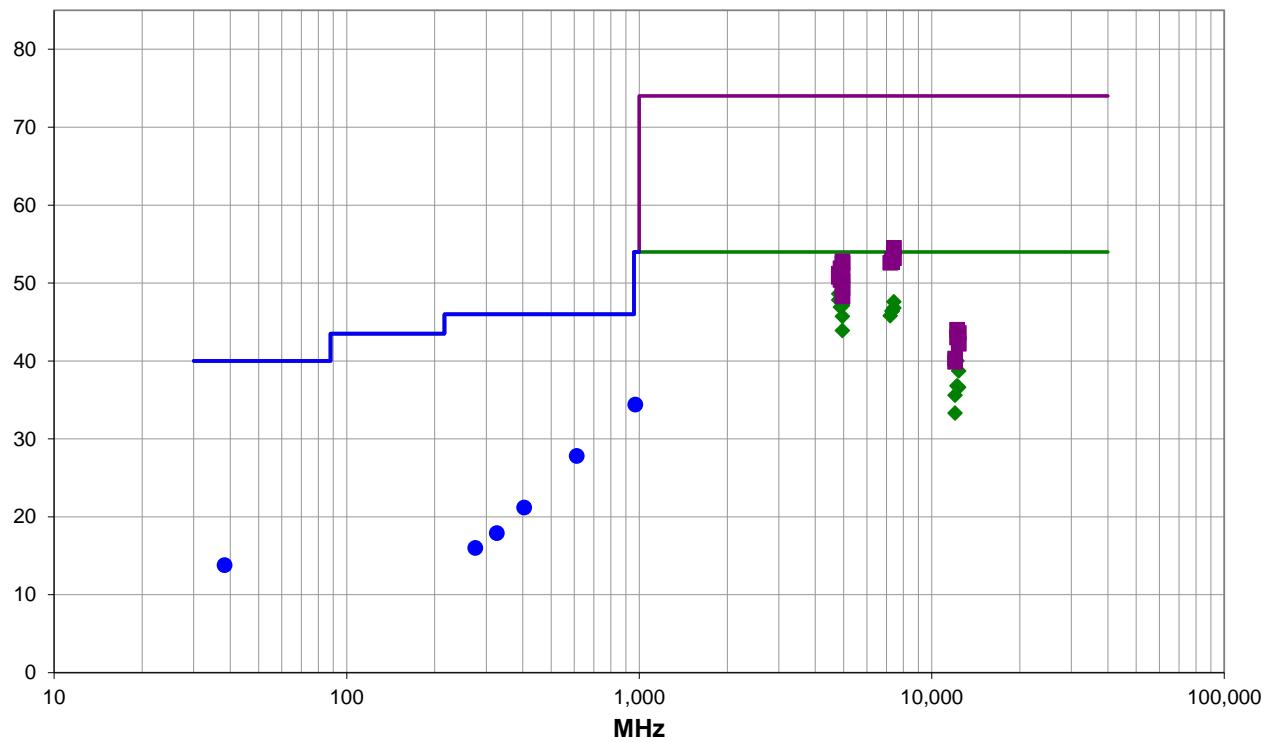
$$DCCF = 10^{\log(1/dc)} = 10^{\log(1 / 0.41)} = 3.9 \text{ dB.}$$

EUT OPERATING MODES

Transmitting OQPSK, Low, Mid, and High Channels (2405, 2440, and 2475 MHz)

DEVIATIONS FROM TEST STANDARD

None



Run #: 12

PK AV QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #12

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4950.967	41.2	5.4	2.8	321.0	3.9	0.0	Horz	AV	0.0	50.5	54.0	-3.5	EUT Horz, High Ch
4950.933	41.1	5.4	3.4	66.0	3.9	0.0	Horz	AV	0.0	50.4	54.0	-3.6	EUT On Side, High Ch
4881.017	39.9	4.9	2.5	317.0	3.9	0.0	Horz	AV	0.0	48.7	54.0	-5.3	EUT Horz, Mid Ch
4810.983	40.3	4.4	2.3	322.9	3.9	0.0	Horz	AV	0.0	48.6	54.0	-5.4	EUT Horz, Low Ch
4810.975	39.5	4.4	3.6	1.9	3.9	0.0	Vert	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch
7426.383	30.2	13.5	1.5	293.0	3.9	0.0	Horz	AV	0.0	47.6	54.0	-6.4	EUT Horz, High Ch
4950.933	38.0	5.4	2.0	344.9	3.9	0.0	Vert	AV	0.0	47.3	54.0	-6.7	EUT On Side, High Ch
4951.000	37.8	5.4	1.7	311.9	3.9	0.0	Vert	AV	0.0	47.1	54.0	-6.9	EUT Vert, High Ch
4880.950	38.1	4.9	3.6	360.0	3.9	0.0	Vert	AV	0.0	46.9	54.0	-7.1	EUT On Side, Mid Ch
7426.150	29.4	13.5	2.2	254.9	3.9	0.0	Vert	AV	0.0	46.8	54.0	-7.2	EUT On Side, High Ch
7321.592	29.4	13.1	1.5	311.0	3.9	0.0	Horz	AV	0.0	46.4	54.0	-7.6	EUT Horz, Mid Ch
7321.617	29.4	13.1	1.5	322.0	3.9	0.0	Vert	AV	0.0	46.4	54.0	-7.6	EUT On Side, Mid Ch
7216.808	29.3	12.6	1.0	330.9	3.9	0.0	Vert	AV	0.0	45.8	54.0	-8.2	EUT On Side, Low Ch
4950.983	36.4	5.4	1.5	324.0	3.9	0.0	Vert	AV	0.0	45.7	54.0	-8.3	EUT Horz, High Ch
4951.000	34.6	5.4	1.5	66.9	3.9	0.0	Horz	AV	0.0	43.9	54.0	-10.1	EUT Vert, High Ch
12202.480	37.0	-0.9	1.9	45.0	3.9	0.0	Horz	AV	0.0	40.0	54.0	-14.0	EUT Horz, Mid Ch
12372.540	35.0	-0.2	2.7	0.0	3.9	0.0	Horz	AV	0.0	38.7	54.0	-15.3	EUT Horz, High Ch
12202.420	33.8	-0.9	1.5	139.9	3.9	0.0	Vert	AV	0.0	36.8	54.0	-17.2	EUT On Side, Mid Ch
12372.530	32.9	-0.2	1.5	106.9	3.9	0.0	Vert	AV	0.0	36.6	54.0	-17.4	EUT On Side, High Ch
611.389	17.0	10.8	1.5	33.0	0.0	0.0	Vert	QP	0.0	27.8	46.0	-18.2	EUT Horz, Low Ch
12027.500	33.7	-2.0	2.3	211.9	3.9	0.0	Horz	AV	0.0	35.6	54.0	-18.4	EUT Horz, Low Ch
7426.567	41.0	13.5	1.5	293.0	0.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	EUT Horz, High Ch
969.318	16.8	17.6	2.0	268.9	0.0	0.0	Vert	QP	0.0	34.4	54.0	-19.6	EUT Horz, High Ch
12013.040	31.8	-2.4	1.5	29.0	3.9	0.0	Vert	AV	0.0	33.3	54.0	-20.7	EUT On Side, Low Ch
7426.100	39.7	13.5	2.2	254.9	0.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8	EUT On Side, High Ch
7318.525	40.0	13.1	1.5	311.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	EUT Horz, Mid Ch
4949.183	47.4	5.4	3.4	66.0	0.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	EUT On Side, High Ch
7318.108	39.6	13.1	1.5	322.0	0.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	EUT On Side, Mid Ch
7215.033	40.0	12.6	1.0	330.9	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	EUT On Side, Low Ch
4951.125	47.1	5.4	2.8	321.0	0.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	EUT Horz, High Ch
4881.183	47.0	4.9	2.5	317.0	0.0	0.0	Horz	PK	0.0	51.9	74.0	-22.1	EUT Horz, Mid Ch
4808.850	46.8	4.4	3.6	1.9	0.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	EUT On Side, Low Ch
4950.933	45.6	5.4	1.7	311.9	0.0	0.0	Vert	PK	0.0	51.0	74.0	-23.0	EUT Vert, High Ch
4811.117	46.4	4.4	2.3	322.9	0.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	EUT Horz, Low Ch
4878.792	45.5	4.9	3.6	360.0	0.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	EUT On Side, Mid Ch
4951.250	44.9	5.4	2.0	344.9	0.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	EUT On Side, High Ch
4950.942	43.9	5.4	1.5	324.0	0.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7	EUT Horz, High Ch
403.960	17.0	4.2	1.0	19.9	0.0	0.0	Horz	QP	0.0	21.2	46.0	-24.8	EUT Horz, Low Ch
4950.792	42.9	5.4	1.5	66.9	0.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	EUT Vert, High Ch
38.262	17.4	-3.6	1.5	91.9	0.0	0.0	Horz	QP	0.0	13.8	40.0	-26.2	EUT Horz, Mid Ch

SPURIOUS RADIATED EMISSIONS



Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
326.051	17.1	0.8	2.8	83.0	0.0	0.0	Vert	QP	0.0	17.9	46.0	-28.1	EUT Horz, High Ch
12197.650	44.9	-0.9	1.9	45.0	0.0	0.0	Horz	PK	0.0	44.0	74.0	-30.0	EUT Horz, Mid Ch
274.939	17.2	-1.2	3.8	178.0	0.0	0.0	Vert	QP	0.0	16.0	46.0	-30.0	EUT Horz, Mid Ch
12372.660	43.8	-0.2	2.7	0.0	0.0	0.0	Horz	PK	0.0	43.6	74.0	-30.4	EUT Horz, High Ch
12202.140	43.9	-0.9	1.5	139.9	0.0	0.0	Vert	PK	0.0	43.0	74.0	-31.0	EUT On Side, Mid Ch
12377.050	42.4	-0.2	1.5	106.9	0.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	EUT On Side, High Ch
12027.460	42.3	-2.0	1.5	29.0	0.0	0.0	Vert	PK	0.0	40.3	74.0	-33.7	EUT On Side, Low Ch
12025.960	41.9	-2.0	2.3	211.9	0.0	0.0	Horz	PK	0.0	39.9	74.0	-34.1	EUT Horz, Low Ch

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000023	Date:	2024-12-19
Customer:	Emerson/Rosemount	Temperature:	22.6°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	24.4%
Customer Project:	None	Bar. Pressure (PMSL):	1014 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-4

TEST PARAMETERS

Run #:	71	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

The test mode operates at a duty cycle of 41.1%. The RMS Average measurements were corrected to 100% duty cycle using the following correction factor:

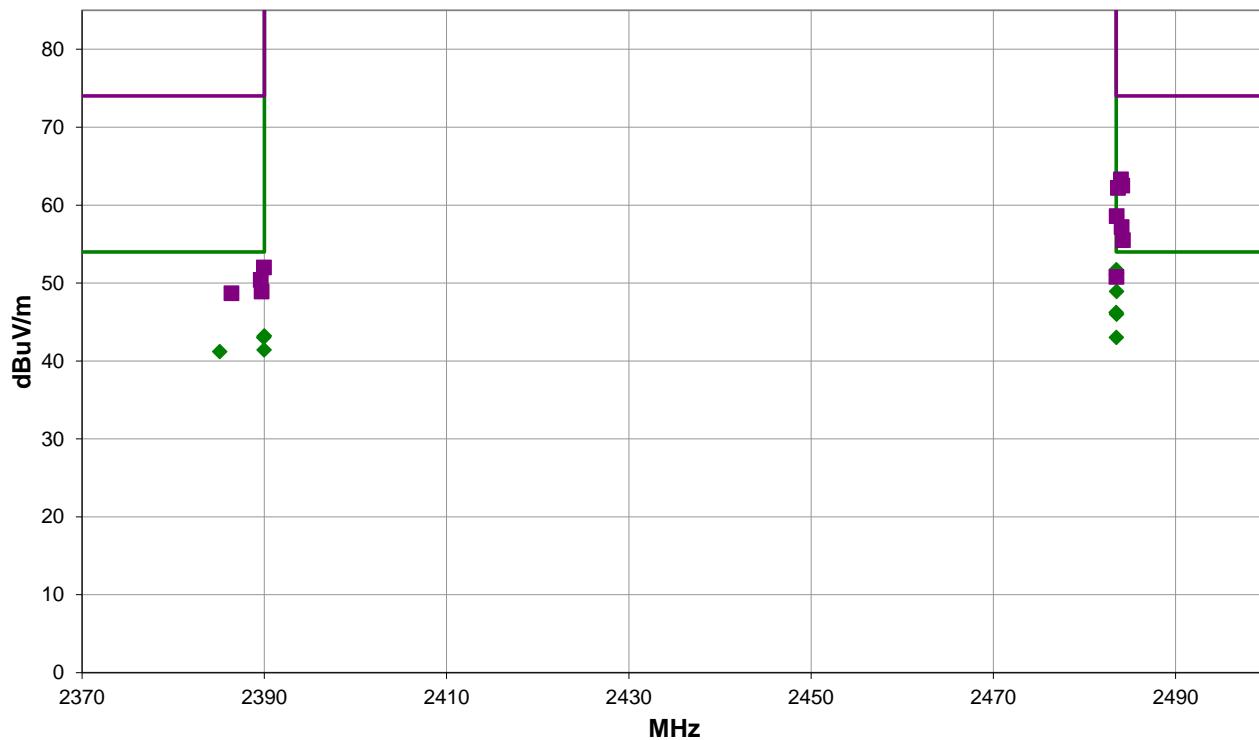
$$DCCF = 10^{\log(1/dc)} = 10^{\log(1 / 0.41)} = 3.9 \text{ dB.}$$

EUT OPERATING MODES

Transmitting OQPSK, Low and High Channels (2405 and 2475 MHz)

DEVIATIONS FROM TEST STANDARD

None



Run #: 71

PK AV QP

SPURIOUS RADIATED EMISSIONS



RESULTS - Run #71

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/Transducer	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.508	41.3	-3.5	2.21	15.0	3.9	10.0	Horz	AV	0.0	51.7	54.0	-2.3	EUT Vert, High Ch
2483.533	40.9	-3.5	4.0	160.0	3.9	10.0	Horz	AV	0.0	51.3	54.0	-2.7	EUT Horz, High Ch
2483.508	40.7	-3.5	2.25	0.0	3.9	10.0	Horz	AV	0.0	51.1	54.0	-2.9	EUT Vert, High Ch
2483.542	38.5	-3.5	1.5	234.0	3.9	10.0	Vert	AV	0.0	48.9	54.0	-5.1	EUT On Sid, High Ch
2483.500	35.8	-3.5	2.85	108.0	3.9	10.0	Vert	AV	0.0	46.2	54.0	-7.8	EUT Vert, High Ch
2483.542	35.6	-3.5	3.87	41.9	3.9	10.0	Horz	AV	0.0	46.0	54.0	-8.0	EUT On Sid, High Ch
2484.008	56.8	-3.5	2.21	15.0	0.0	10.0	Horz	PK	0.0	63.3	74.0	-10.7	EUT Vert, High Ch
2390.000	33.5	-4.2	4.0	358.9	3.9	10.0	Horz	AV	0.0	43.2	54.0	-10.8	EUT Vert, Low Ch
2483.525	32.6	-3.5	2.15	1.0	3.9	10.0	Vert	AV	0.0	43.0	54.0	-11.0	EUT Horz, High Ch
2389.925	33.3	-4.2	1.5	178.0	3.9	10.0	Vert	AV	0.0	43.0	54.0	-11.0	EUT On Side, Low Ch
2484.167	56.0	-3.5	2.25	0.0	0.0	10.0	Horz	PK	0.0	62.5	74.0	-11.5	EUT Vert, High Ch
2483.692	55.7	-3.5	4.0	160.0	0.0	10.0	Horz	PK	0.0	62.2	74.0	-11.8	EUT Horz, High Ch
2389.983	31.7	-4.2	1.82	92.9	3.9	10.0	Vert	AV	0.0	41.4	54.0	-12.6	EUT Vert, Low Ch
2385.117	31.5	-4.2	1.5	142.0	3.9	10.0	Horz	AV	0.0	41.2	54.0	-12.8	EUT On Side, Low Ch
2483.542	52.1	-3.5	1.5	234.0	0.0	10.0	Vert	PK	0.0	58.6	74.0	-15.4	EUT On Sid, High Ch
2484.092	50.7	-3.5	2.85	108.0	0.0	10.0	Vert	PK	0.0	57.2	74.0	-16.8	EUT Vert, High Ch
2484.233	49.0	-3.5	3.87	41.9	0.0	10.0	Horz	PK	0.0	55.5	74.0	-18.5	EUT On Sid, High Ch
2389.950	46.2	-4.2	4.0	358.9	0.0	10.0	Horz	PK	0.0	52.0	74.0	-22.0	EUT Vert, Low Ch
2483.517	44.3	-3.5	2.15	1.0	0.0	10.0	Vert	PK	0.0	50.8	74.0	-23.2	EUT Horz, High Ch
2389.608	44.6	-4.2	1.5	178.0	0.0	10.0	Vert	PK	0.0	50.4	74.0	-23.6	EUT On Side, Low Ch
2389.700	43.1	-4.2	1.82	92.9	0.0	10.0	Vert	PK	0.0	48.9	74.0	-25.1	EUT Vert, Low Ch
2386.383	42.9	-4.2	1.5	142.0	0.0	10.0	Horz	PK	0.0	48.7	74.0	-25.3	EUT On Side, Low Ch

CONCLUSION

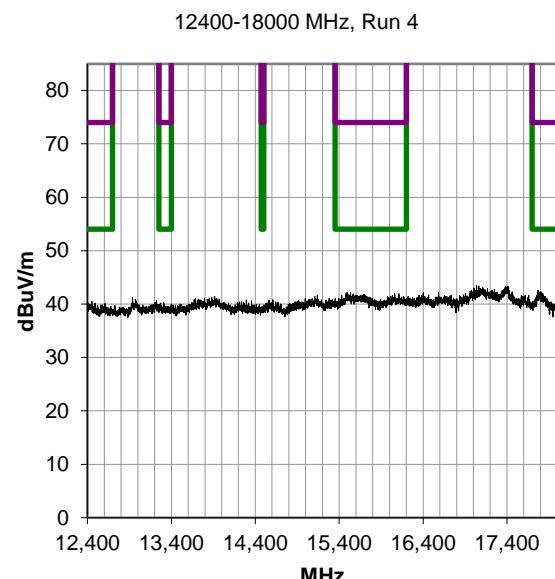
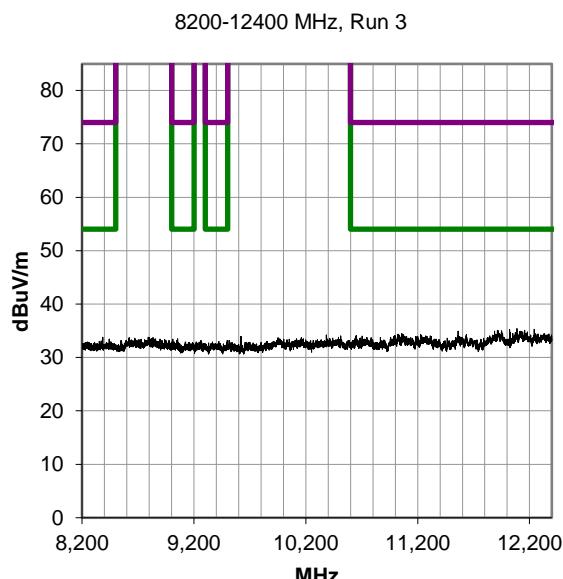
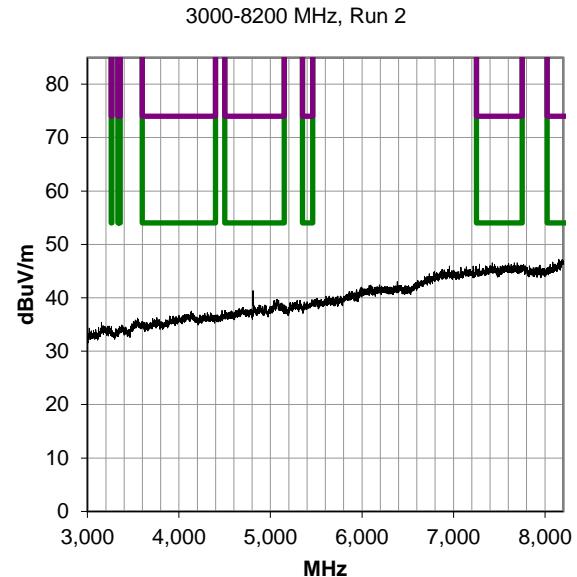
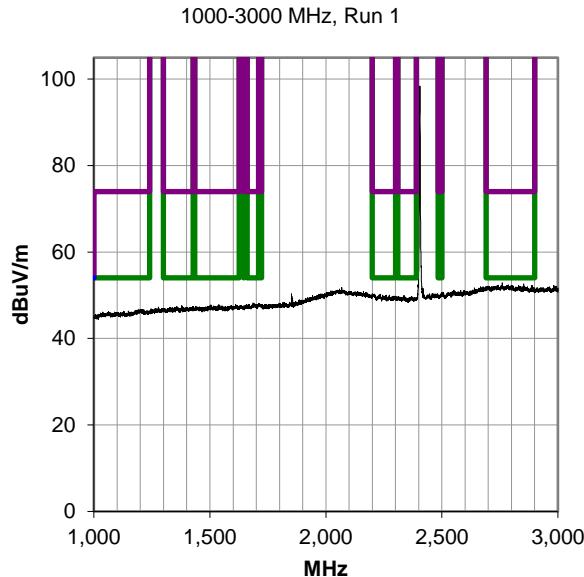
Pass

Tested By

SPURIOUS RADIATED EMISSIONS

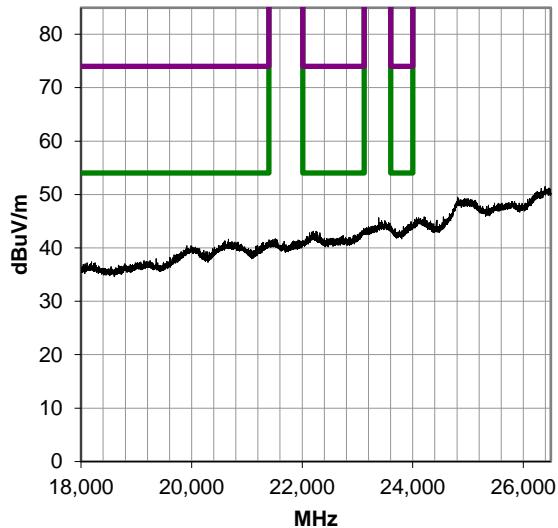
PRESCAN DATA

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.

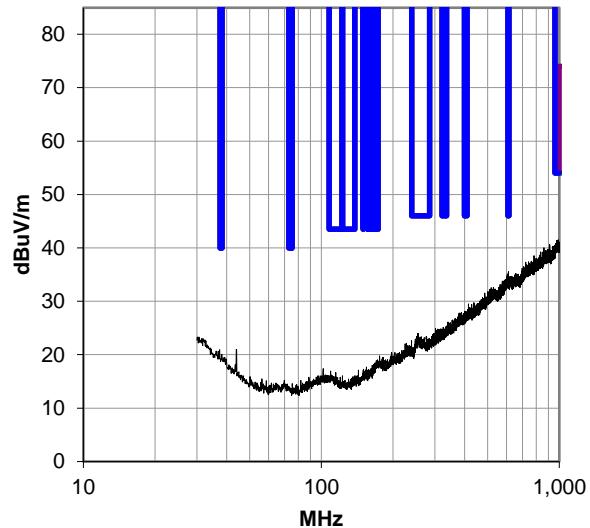


SPURIOUS RADIATED EMISSIONS

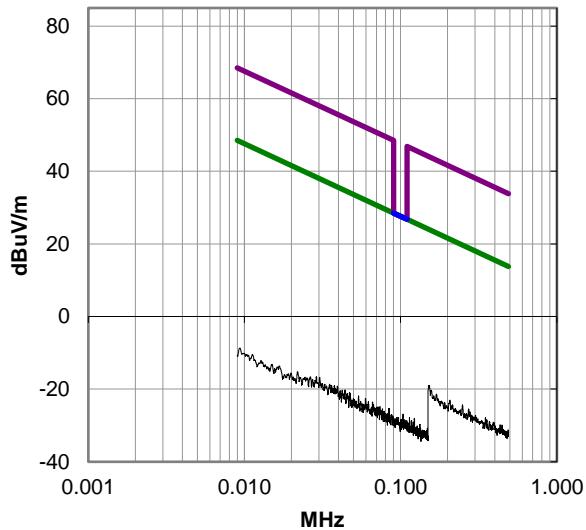
18000-26500 MHz, Run 34



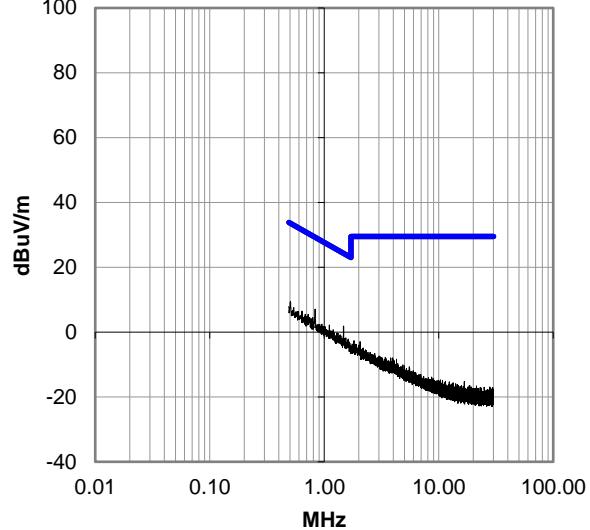
30-1000 MHz, Run 36



0.009-0.49 MHz, Run 39



0.49-30 MHz, Run 40



OCCUPIED BANDWIDTH (99%)

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 C63.10:2013, 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	N5182A	TIF	2023-07-27	2026-07-27
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

OCCUPIED BANDWIDTH (99%)



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.8°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17.1%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

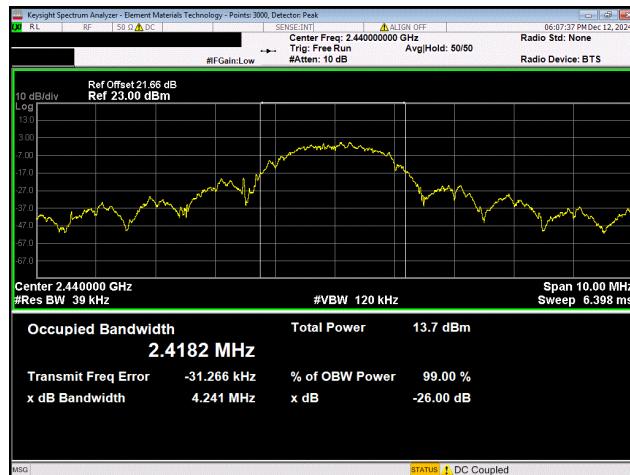
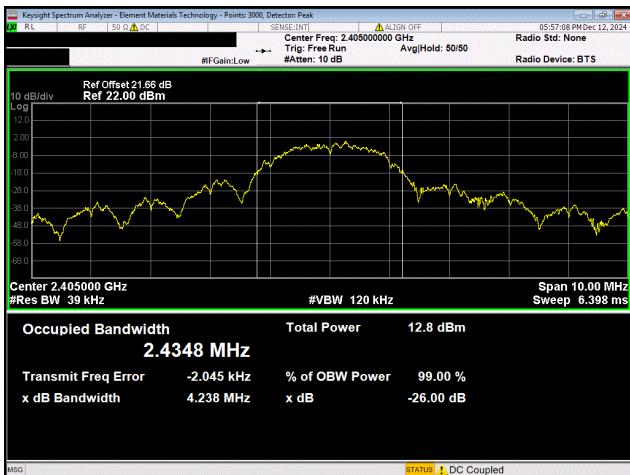
N/A

Tested By

TEST RESULTS

	Value	Limit	Result
OQPSK Modulated			
Low Channel, 2405 MHz	2.435 MHz	N/A	N/A
Mid Channel, 2440 MHz	2.418 MHz	N/A	N/A
High Channel, 2475 MHz	2.481 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)



OQPSK Modulated Low Channel, 2405 MHz



OQPSK Modulated High Channel, 2475 MHz

OQPSK Modulated Mid Channel, 2440 MHz

DUTY CYCLE

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	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

DUTY CYCLE



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.8°C
Attendees:	Stacy Lukaskawcz, Erin Snell	Relative Humidity:	17.2%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

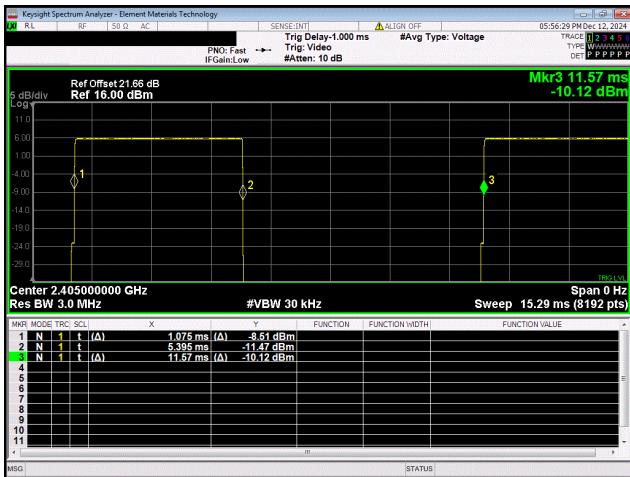
N/A

Tested By

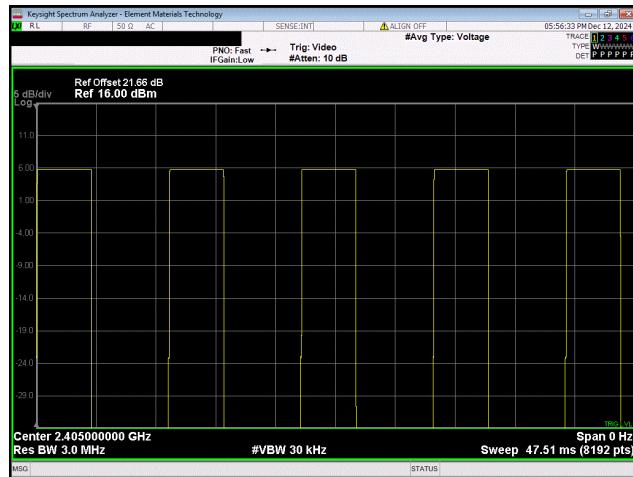
TEST RESULTS

	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
OQPSK Modulated						
Low Channel, 2405 MHz	4.32 ms N/A	10.496 ms N/A	1 5	41.2 N/A	N/A N/A	N/A N/A
Mid Channel, 2440 MHz	4.316 ms N/A	10.494 ms N/A	1 5	41.1 N/A	N/A N/A	N/A N/A
High Channel, 2475 MHz	4.314 ms N/A	10.498 ms N/A	1 5	41.1 N/A	N/A N/A	N/A N/A

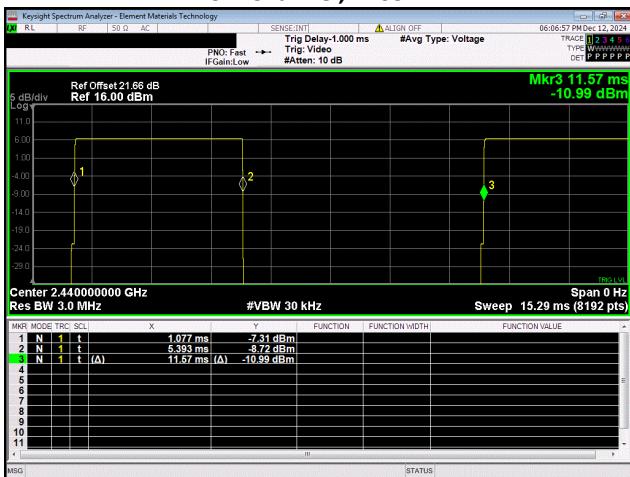
DUTY CYCLE



**OQPSK Modulated
Low Channel, 2405 MHz**



**OQPSK Modulated
Low Channel, 2405 MHz**

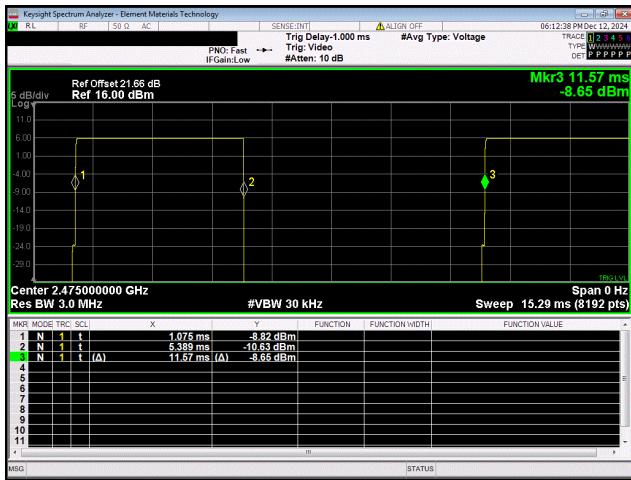


**OQPSK Modulated
Mid Channel, 2440 MHz**



**OQPSK Modulated
Mid Channel, 2440 MHz**

DUTY CYCLE



**OQPSK Modulated
High Channel, 2475 MHz**



**OQPSK Modulated
High Channel, 2475 MHz**

DTS BANDWIDTH (6dB)

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 EUT was set to the channels and modes listed in the datasheet.

The 6dB DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. 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	N5182A	TIF	2023-07-27	2026-07-27
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

DTS BANDWIDTH (6dB)

EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKW000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.8°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17.2%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	Value	Limit	Result
		(≥)	
OQPSK Modulated			
Low Channel, 2405 MHz	1.558 MHz	500 kHz	Pass
Mid Channel, 2440 MHz	1.628 MHz	500 kHz	Pass
High Channel, 2475 MHz	1.511 MHz	500 kHz	Pass

DTS BANDWIDTH (6dB)



**OQPSK Modulated
Low Channel, 2405 MHz**



**OQPSK Modulated
High Channel, 2475 MHz**

OUTPUT POWER

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 transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

OUTPUT POWER

EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.7°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17.1%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	Out Pwr (dBm)	Limit (dBm)	Result
OQPSK Modulated			
Low Channel, 2405 MHz	6.087	30	Pass
Mid Channel, 2440 MHz	6.823	30	Pass
High Channel, 2475 MHz	6.232	30	Pass

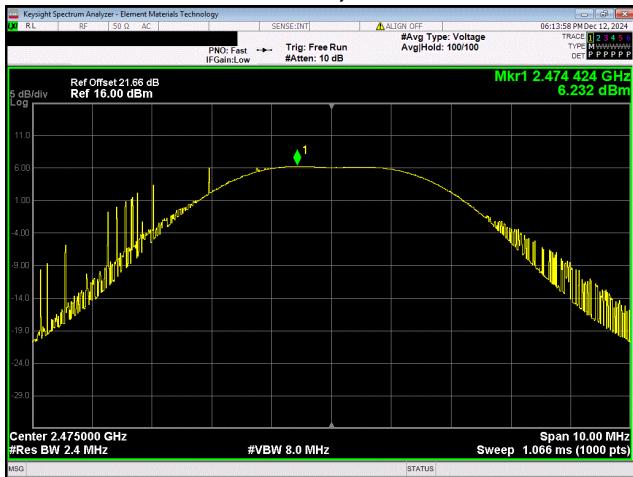
OUTPUT POWER



**OQPSK Modulated
Low Channel, 2405 MHz**



**OQPSK Modulated
Mid Channel, 2440 MHz**



**OQPSK Modulated
High Channel, 2475 MHz**

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



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 transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the 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	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.7°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17.1%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
OQPSK Modulated					
Low Channel, 2405 MHz	6.087	3	9.087	36	Pass
Mid Channel, 2440 MHz	6.823	3	9.823	36	Pass
High Channel, 2475 MHz	6.232	3	9.232	36	Pass

BAND EDGE COMPLIANCE



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 bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. 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	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

BAND EDGE COMPLIANCE



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.7°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

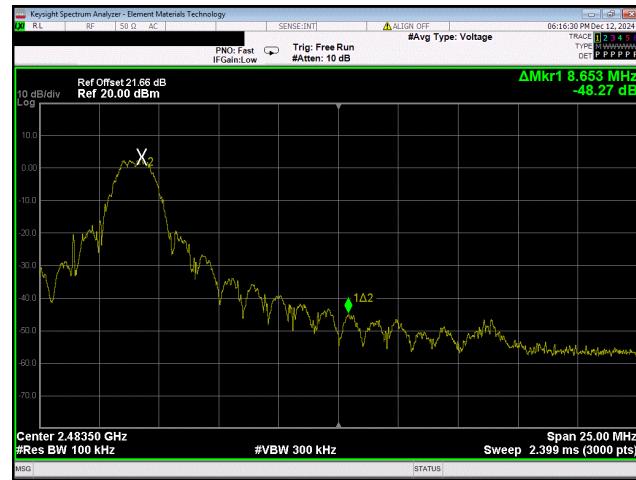
Pass

Tested By

TEST RESULTS

	Value (dBc)	Limit ≤ (dBc)	Result
OQPSK Modulated			
Low Channel, 2405 MHz	-41.59	-20	Pass
High Channel, 2475 MHz	-48.27	-20	Pass

BAND EDGE COMPLIANCE



POWER SPECTRAL DENSITY



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 maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

POWER SPECTRAL DENSITY



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKWC000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.7°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

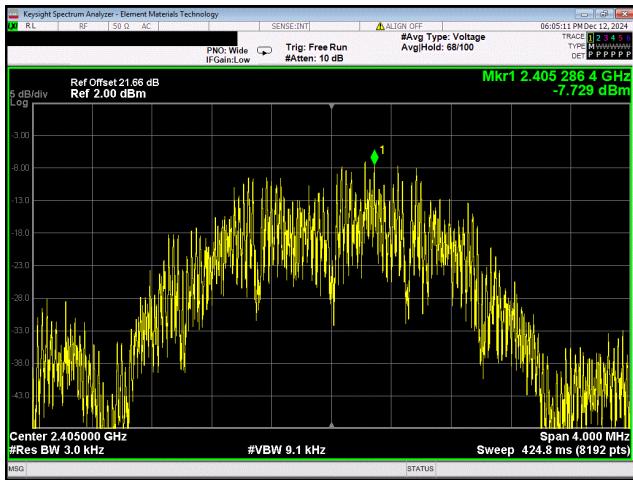
Pass

Tested By

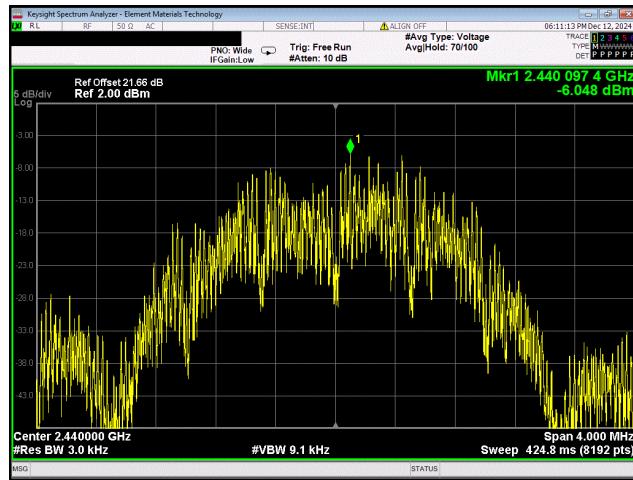
TEST RESULTS

	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
OQPSK Modulated			
Low Channel, 2405 MHz	-7.729	8	Pass
Mid Channel, 2440 MHz	-6.048	8	Pass
High Channel, 2475 MHz	-6.366	8	Pass

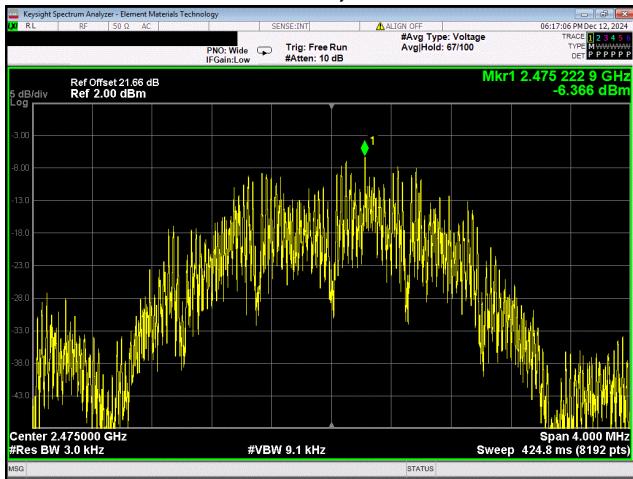
POWER SPECTRAL DENSITY



OQPSK Modulated
Low Channel, 2405 MHz



OQPSK Modulated
Mid Channel, 2440 MHz



OQPSK Modulated
High Channel, 2475 MHz

SPURIOUS CONDUCTED EMISSIONS



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. 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	N5182A	TIF	2023-07-27	2026-07-27
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
Attenuator	S.M. Electronics	SA26B-20	RFW	2024-01-31	2025-01-31
Block - DC	Fairview Microwave	SD3379	ANH	2024-08-28	2025-08-28

SPURIOUS CONDUCTED EMISSIONS



EUT:	9000X	Work Order:	EMPM0186
Serial Number:	24BKW000022	Date:	2024-12-12
Customer:	Emerson/Rosemount	Temperature:	22.7°C
Attendees:	Stacy Lukaskawcez, Erin Snell	Relative Humidity:	17.1%
Customer Project:	None	Bar. Pressure (PMSL):	1029 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	Battery (3.6VDC)	Configuration:	EMPM0186-1

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

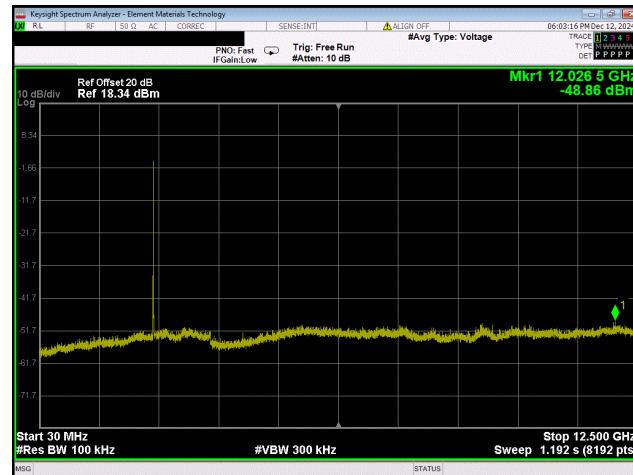
TEST RESULTS

	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
OQPSK Modulated					
Low Channel, 2405 MHz	Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2405.26 12026.53 24769.56	N/A -51.92 -39.66	N/A -20 -20	N/A Pass Pass
Mid Channel, 2440 MHz	Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2440.25 9333.4 24919.12	N/A -52.25 -40.28	N/A -20 -20	N/A Pass Pass
High Channel, 2475 MHz	Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	2475.27 11909.31 24876.39	N/A -52.49 -40.12	N/A -20 -20	N/A Pass Pass

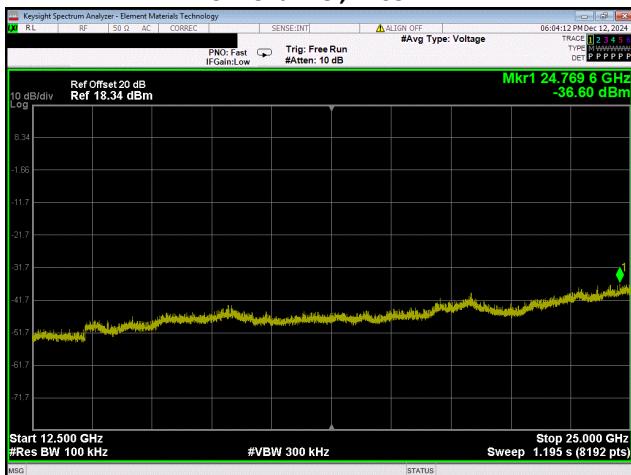
SPURIOUS CONDUCTED EMISSIONS



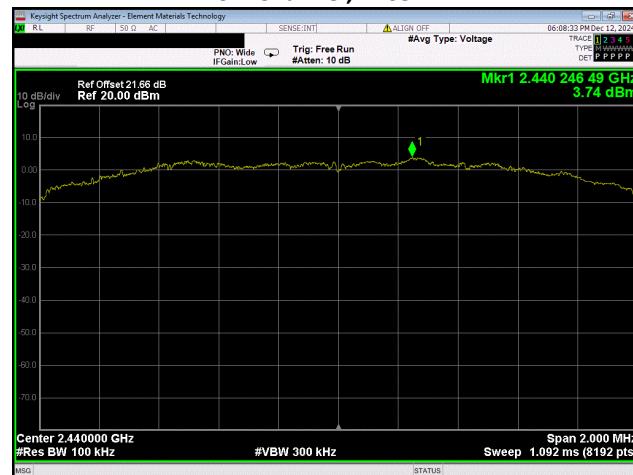
**OQPSK Modulated
Low Channel, 2405 MHz**



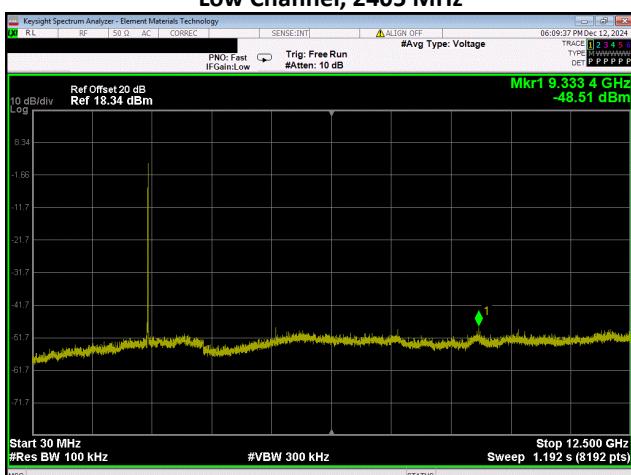
**OQPSK Modulated
Low Channel, 2405 MHz**



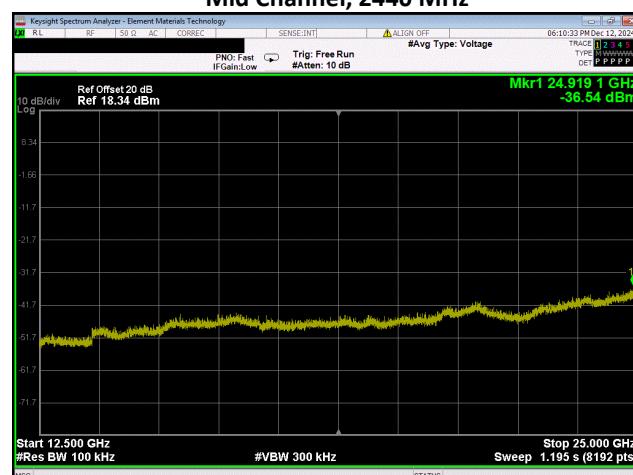
**OQPSK Modulated
Low Channel, 2405 MHz**



**OQPSK Modulated
Mid Channel, 2440 MHz**



**OQPSK Modulated
Mid Channel, 2440 MHz**

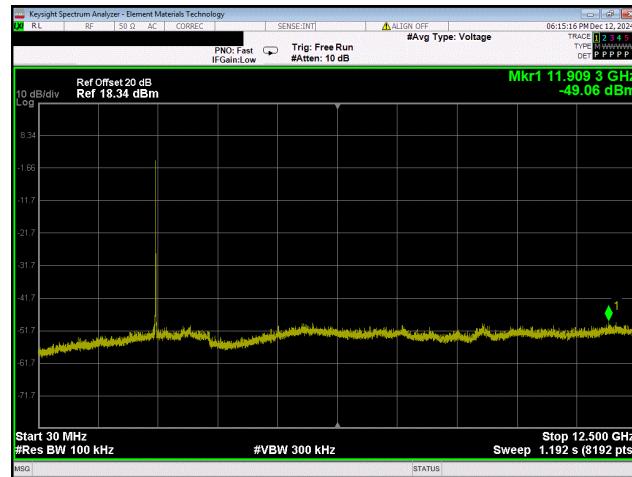


**OQPSK Modulated
Mid Channel, 2440 MHz**

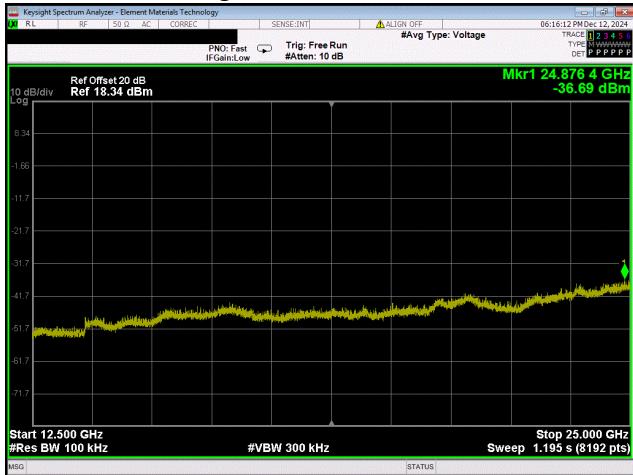
SPURIOUS CONDUCTED EMISSIONS



**OQPSK Modulated
High Channel, 2475 MHz**



**OQPSK Modulated
High Channel, 2475 MHz**



**OQPSK Modulated
High Channel, 2475 MHz**

End of Test Report