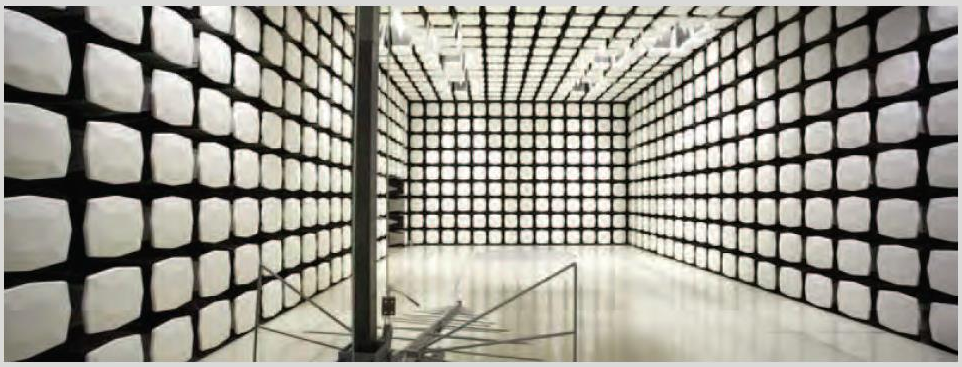
Walt Disney Parks and Resorts US, Inc.

RadioNode

FCC 15.247:2021
DTS

Report: SYNA0309.1, Issue Date: April 6, 2021



NVLAP LAB CODE: 200629-0
NVLAP LAB CODE: 200676-0

CERTIFICATE OF TEST

Last Date of Test: January 5, 2021
Walt Disney Parks and Resorts US, Inc.
EUT: RadioNode

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2020	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required.
11.6	Duty Cycle	No	N/A	Not required.
11.8.2	Occupied Bandwidth	No	N/A	Not required.
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated Power	No	N/A	Not required.
11.10.2	Power Spectral Density	No	N/A	Not required.
11.11	Band Edge Compliance	No	N/A	Not required.
11.11	Spurious Conducted Emissions	No	N/A	Not required.
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

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		

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

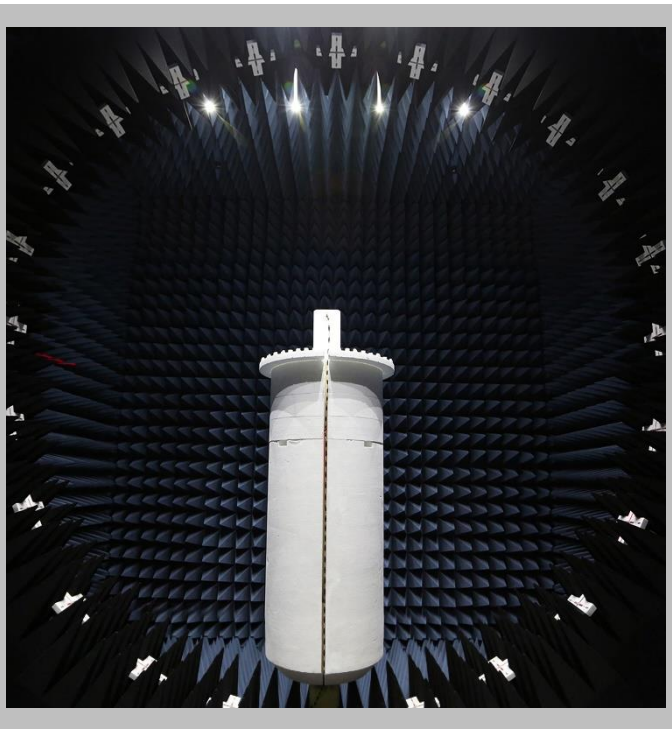
MIC – Recognized by MIC as a CAB for the acceptance of test data.

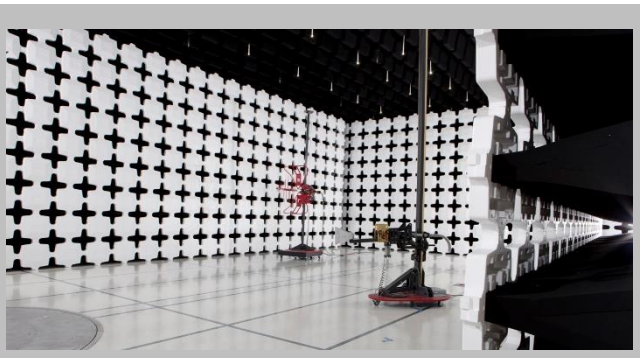
SCOPE

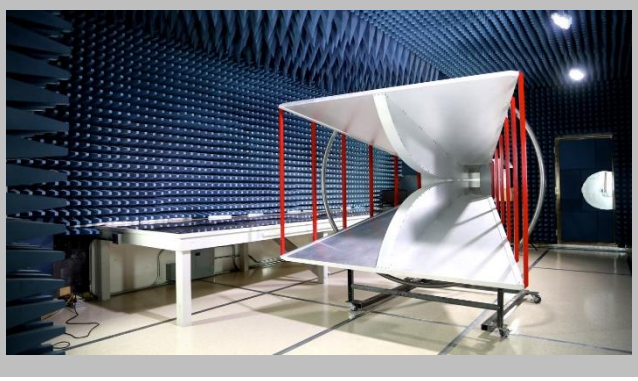
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

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.

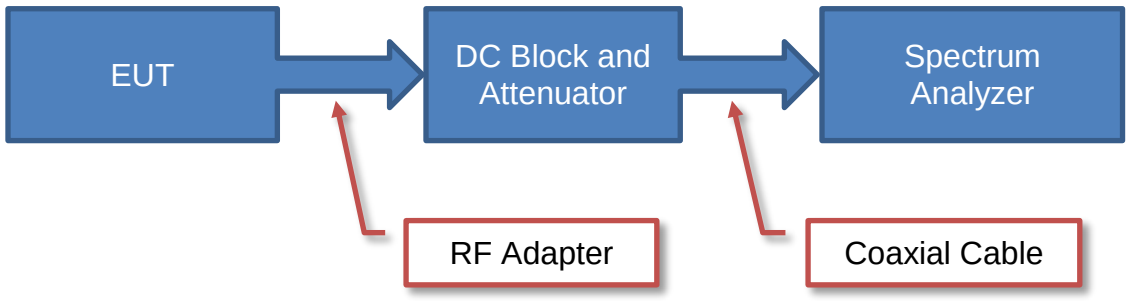
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. 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.

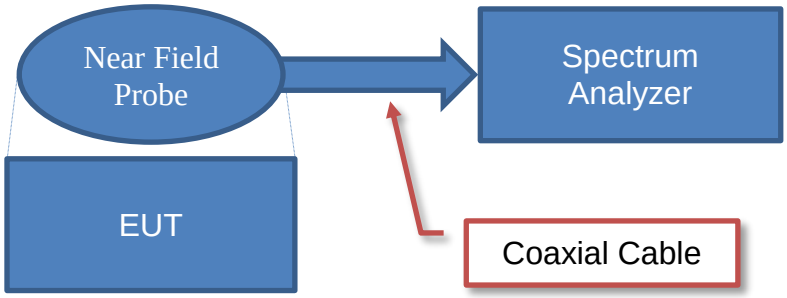
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

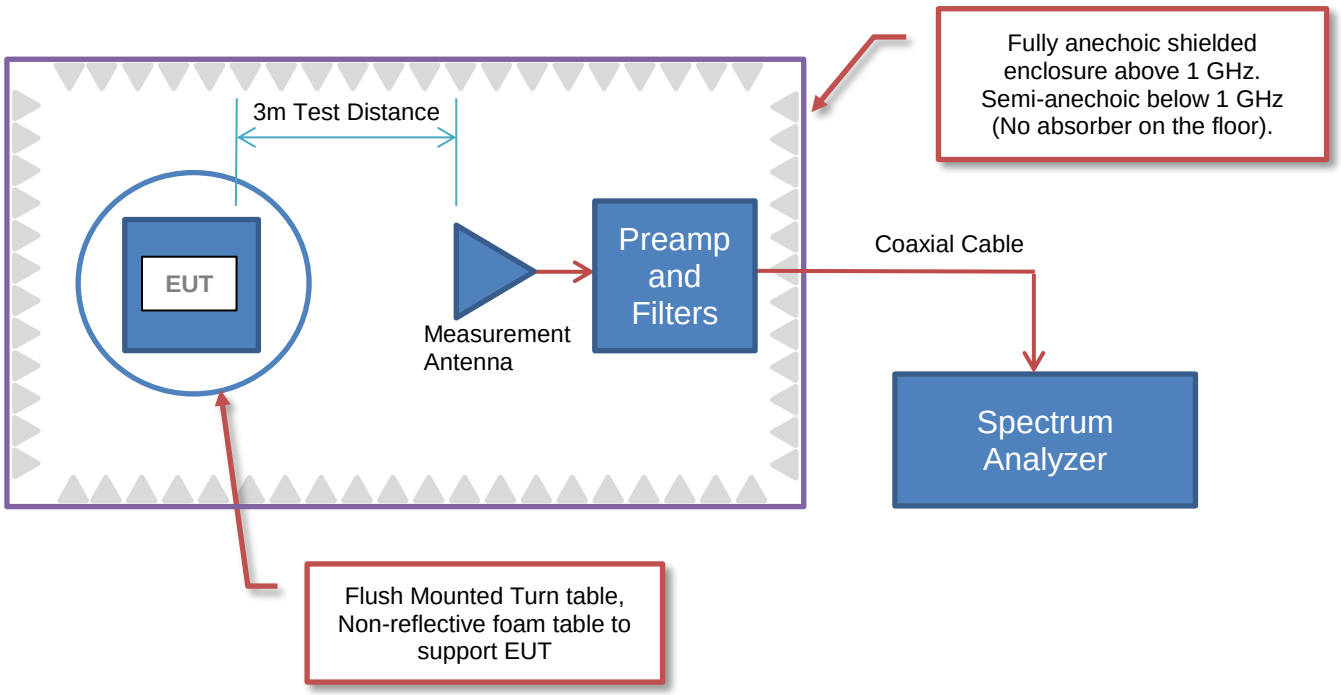
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Walt Disney Parks and Resorts US, Inc.
Address:	PO Box 10000
City, State, Zip:	Lake Buena Vista, FL 32830
Test Requested By:	Hattie Spetla
EUT:	RadioNode
First Date of Test:	August 25, 2020
Last Date of Test:	January 5, 2021
Receipt Date of Samples:	August 25, 2020
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Device is a multi port BLE and a proprietary single channel radio operating at 2.482 GHz radio. It provides two transmitters and multiple receivers to collect data. This data can be then sent over a wired Ethernet connection to server side systems to act on the collected data. Additional external interface include POE, DMX, RS-232, RS-485, audio output, USB2.0 (2), Relays (2) and Opto-isolated Inputs(2) for general purpose peripheral control. The device is powered either by Power over Ethernet Plus, following the IEEE 802.3at standard, or a 24VDC supply.

Testing Objective:
To demonstrate compliance of the 2.4 GHz DTS radio to FCC 15.247 requirements.

CONFIGURATIONS

Configuration SYNA0306- 4

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop

CONFIGURATIONS

Configuration SYNA0309- 1

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Linx	ANT-2.4-CW-HWR-SMA	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated

CONFIGURATIONS

Configuration SYNA0309- 2

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Linx	ANT-2.4-CW-HWR-SMA	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains

CONFIGURATIONS

Configuration SYNA0309- 3

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Taoglas	GW.26.0111	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated

CONFIGURATIONS

Configuration SYNA0309- 4

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Taoglas	GW.26.0111	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains

CONFIGURATIONS

Configuration SYNA0309- 5

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Single Element Patch Antenna	L-com	RE09P-NM	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Single Element Patch Antenna

CONFIGURATIONS

Configuration SYNA0309- 6

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Single Element Patch Antenna	L-com	RE09P-NM	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Single Element Patch Antenna

CONFIGURATIONS

Configuration SYNA0309- 7

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Yagi Antenna	Disney	C3EY	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Coaxial Cable	Yes	0.9m	No	RadioNode	Yagi Antenna

CONFIGURATIONS

Configuration SYNA0309- 8

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Yagi Antenna	Disney	C3EY	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Coaxial Cable	Yes	0.9m	No	RadioNode	Yagi Antenna

CONFIGURATIONS

Configuration SYNA0309- 9

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Taoglas	WSA.2400.A.101151	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated

CONFIGURATIONS

Configuration SYNA0309- 10

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 002
Dipole Antenna	Taoglas	WSA.2400.A.101151	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains

CONFIGURATIONS

Configuration SYNA0309- 11

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0309- 12

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
4-Element Patch Array Antenna	Ventev	T24130P10006GT	N/A
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 004

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains

CONFIGURATIONS

Configuration SYNA0309- 14

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Patch Array - 3x3 (9 elements) Antenna	Disney	3x3	N/A
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 004

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains

CONFIGURATIONS

Configuration SYNA0309- 16

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
4-Element Patch Array Antenna	Ventev	T24130P10006GT	N/A
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 004

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0309- 17

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Patch Array - 3x3 (9 elements) Antenna	Disney	3x3	N/A
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 012

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0309- 18

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 012
Panel Antenna	Ventev	T24190P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0309- 19

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 012
Panel Antenna	Ventev	T24190P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9
Laptop PC (ASUS)	ASUS	UL20FT	A8N0AS133997328
AC/DC Power Adapter - Laptop PC (ASUS)	ASUS	ADP-65JH	660W0BB0J5T

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna
DC Power Cable - Laptop (ASUS)	No	1.8m	Yes	Laptop PC (ASUS)	AC/DC Power Adapter - Laptop PC (ASUS)
AC Power Cable - Laptop (ASUS)	No	1.5m	No	AC/DC Power Adapter - Laptop PC (ASUS)	AC Mains

CONFIGURATIONS

Configuration SYNA0313- 1

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
Dual Port Monopole Antenna	Taoglas	MA510.C.CG.005	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Coaxial Cable x2	Yes	0.8m	No	RadioNode	MA510.C.CG.005 Antenna

CONFIGURATIONS

Configuration SYNA0313- 2

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
Dual Port Monopole Antenna	Taoglas	MA510.C.CG.005	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Laptop
Coaxial Cable x2	Yes	0.8m	No	RadioNode	MA510.C.CG.005 Antenna

CONFIGURATIONS

Configuration SYNA0313- 5

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral	RadioNode
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Ethernet Cable	No	1m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0317- 1

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
4-Element Patch Array Antenna	Ventev	T24130P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral/DC Power Supply	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna

CONFIGURATIONS

Configuration SYNA0317- 2

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
4-Element Patch Array Antenna	Ventev	T24130P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral/DC Power Supply	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Ethernet Cable	No	1m	No	RadioNode	Laptop
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0317- 3

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
Panel Antenna	Ventev	T24190P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4
AC/DC Power Adapter - Switch	Netgear	NUA3-6540240-11	N/A
Switch	Netgear	GS108pp	58617ADUA11A9

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
DC Power Cable - Switch	No	1.5m	No	Switch	AC/DC Power Adapter - Switch
AC Power Cable - Switch	No	2m	No	AC/DC Power Adapter - Switch	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral/DC Power Supply	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	7.5m	No	RadioNode	Switch
Ethernet Cable	No	1m	No	Switch	Laptop
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna

CONFIGURATIONS

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Configuration SYNA0317- 4

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007
Panel Antenna	Ventev	T24190P10006GT	N/A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral/DC Power Supply	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
Ethernet Cable	No	1m	No	RadioNode	Unterminated
USB Cable	No	1.6m	No	RadioNode	Unterminated
USB Cable	No	1m	No	RadioNode	Unterminated
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Ethernet Cable	No	1m	No	RadioNode	Laptop
Antenna Patch Cable	Yes	1.25m	No	RadioNode	Panel Antenna
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

CONFIGURATIONS

Configuration SYNA0317- 5

Software/Firmware Running during test	
Description	**Version**
Radio Tool	08/02/2018

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RadioNode	Walt Disney Parks and Resorts US, Inc.	300-004195	Rev. 10 - 007

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Audio Peripheral	Synapse Product Development, Inc.	Two	N/A
DC Power Supply	Tektronix	PS280	TW55636

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter - Laptop	HP	608428-001	2306691807
Laptop	HP	ProBook 4540s	2CE3201RB4

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable - Laptop	No	2m	Yes	Laptop	AC/DC Power Adapter - Laptop
AC Power Cable - Laptop	No	2m	No	AC/DC Power Adapter - Laptop	AC Mains
Relay & DC Out Cable	No	1.5m	No	Audio Peripheral/DC Power Supply	RadioNode
Audio DMX Cable	No	3m	No	Audio Peripheral	RadioNode
DC Power Supply Cable	No	1.6m	No	DC Power Supply	AC Mains
Ethernet Cable	No	7.5m	No	RadioNode	Laptop

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2020-08-25	Output Power, 0dBm	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	2020-09-28	Spurious Radiated Emissions, RE09P-NM	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	2020-09-29	Spurious Radiated Emissions, ANT-2.4-CW-HWR-SMA	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	2020-09-29	Spurious Radiated Emissions, GW.26.0111	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	2020-09-30	Spurious Radiated Emissions, C3EY	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	2020-10-05	Spurious Radiated Emissions, WSA.2400.A.101151	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	2020-10-14	Output Power, -4dBm	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	2020-10-27	Spurious Radiated Emissions, 3x3	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	2020-11-20	Spurious Radiated Emissions, T24130P10006GT	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	2020-11-23	Spurious Radiated Emissions, T24190P10006GT	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	2020-11-24	Output Power, -8dBm	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	2020-12-16	Spurious Radiated Emissions, MA510.C.CG.005	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.

MODIFICATIONS

13	2020-12-21	Output Power, -4dBm	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
14	2021-01-04	Spurious Radiated 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.
15	2021-01-05	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Dipole	Linx, PN: ANT-2.4-CW-HWR-SMA	2300-2600	3.2
Patch Array – 3x3 (9 elements)	Disney, PN: 3x3	2400-2500	12
Yagi	Disney, PN: C3EY	2400-2500	6.3
Dipole	Taoglas, PN: GW.26.011	2400-2500	1.2
Dipole	Taoglas, PN: WSA.2400.A.101151	2400-2500	3.2
Patch Array (4 elements)	Ventev, PN: T24130P10006GT	2400-2500	13
Patch Array (16 elements)	Ventev, PN: T24190P10006GT	2400-2500	19
Patch (single element)	L-com, PN: RE09P-NM	2400-2500	8
Dipole	Taoglas, PN: MA510.C.CG.005	2400-2500	3.9

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

ANT-2.4-CW-HWR-SMA, C3EY, GW.26.011, WSA.2400.A.101151, RE09P-NM, MA510.C.CG.005

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
GFSK/1 Mbps	DTS	40	2482	0 dBm

3x3 & T24190P10006GT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
GFSK /1 Mbps	DTS	40	2482	-4 dBm

T24130P10006GT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
GFSK /1 Mbps	DTS	40	2482	-8 dBm

OUTPUT POWER

XMit 2020.12.30.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Weinschel	54A-20	TYR	2021-01-21	2022-01-21
Block - DC	Weinschel Corp.	7006	AMS	2021-01-21	2022-01-21
Cable	Micro-Coax	D150A-1-0720-200	NCS	2021-01-21	2022-01-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2020-12-08	2021-12-08
Generator - Signal	Agilent	E4422B	TGR	2020-08-11	2021-08-11

TEST DESCRIPTION

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.

OUTPUT POWER

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	**Radio Node**			**Work Order:**	**SYNA0309**
Serial Number:	**Rev. 10 - 007**			**Date:**	**6-Apr-21**
Customer:	**Synapse Product Development, Inc.**			**Temperature:**	**22.6 °C**
Attendees:	**None**			**Humidity:**	**25.5% RH**
Project:	**None**			**Barometric Pres.:**	**1024 mbar**
Tested by:	**Brian Fahey**	**Power:**	**24VDC via 120VAC/60Hz**	**Job Site:**	**NC0A**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

Reference level offset includes RF measurement cable, DC block, and 20 dB attenuator. Power setting = 0 dBm.

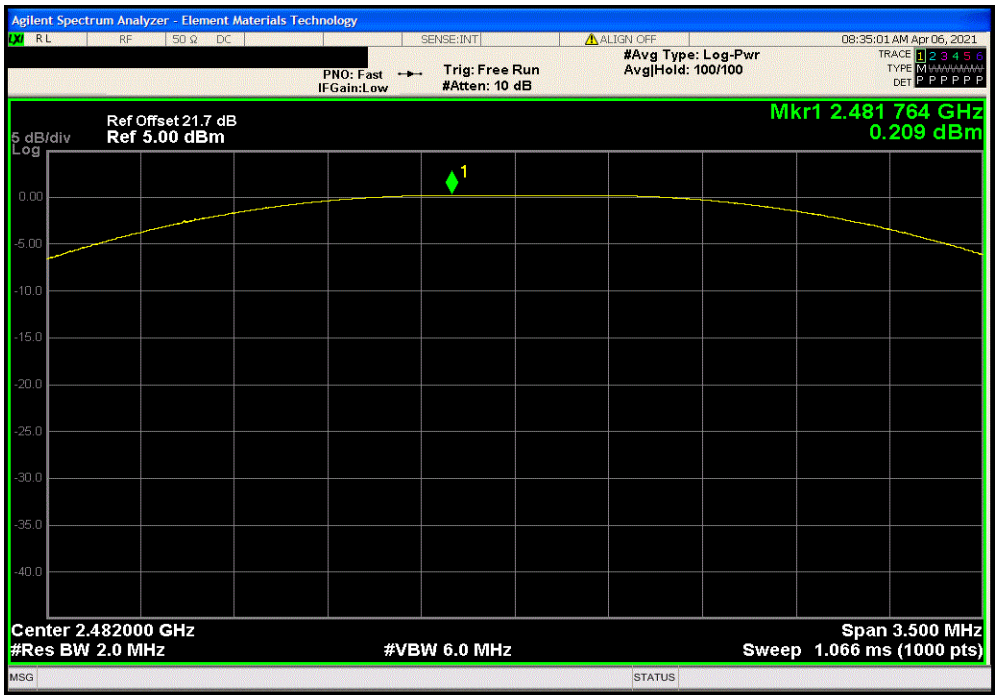
DEVIATIONS FROM TEST STANDARD

None

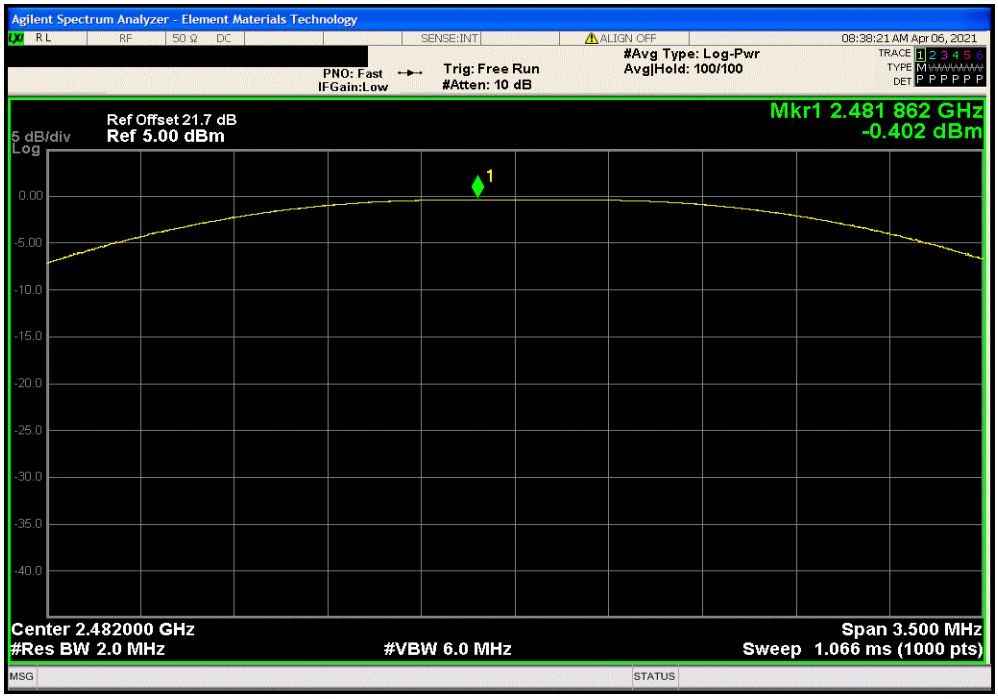
Configuration #	**11**	*Signature* 

	Out Pwr (dBm)	**Limit (dBm)**	**Result**
Port 7, DTS/GFSK 1 Mbps High Channel, 2482 MHz	0.209	30	Pass
Port 8, DTS/GFSK 1 Mbps High Channel, 2482 MHz	-0.402	30	Pass

Port 7, DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				0.209	30	Pass



Port 8, DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.402	30	Pass



OUTPUT POWER

XMit 2020.03.25.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Weinschel Corp.	7006	AMS	17-Jan-20	17-Jan-21
Attenuator	Weinschel	54A-20	TYR	17-Jan-20	17-Jan-21
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	17-Jan-20	17-Jan-21
Generator - Signal	Agilent	E4422B	TGR	11-Aug-20	11-Aug-23
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	25-Jun-20	25-Jun-21

TEST DESCRIPTION

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.

OUTPUT POWER

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	RadioNode			**Work Order:**	SYNA0309
Serial Number:	Rev. 10 - 007			**Date:**	14-Oct-20
Customer:	Walt Disney Parks and Resorts US, Inc.			**Temperature:**	23.1 °C
Attendees:	None			**Humidity:**	42.8% RH
Project:	None			**Barometric Pres.:**	1031 mbar
Tested by:	Brian Fahey	**Power:**	24VDC via 120VAC/60Hz	**Job Site:**	NC0A

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes RF measurement cable, DC block, and 20 dB attenuator. Power setting = -4 dBm.

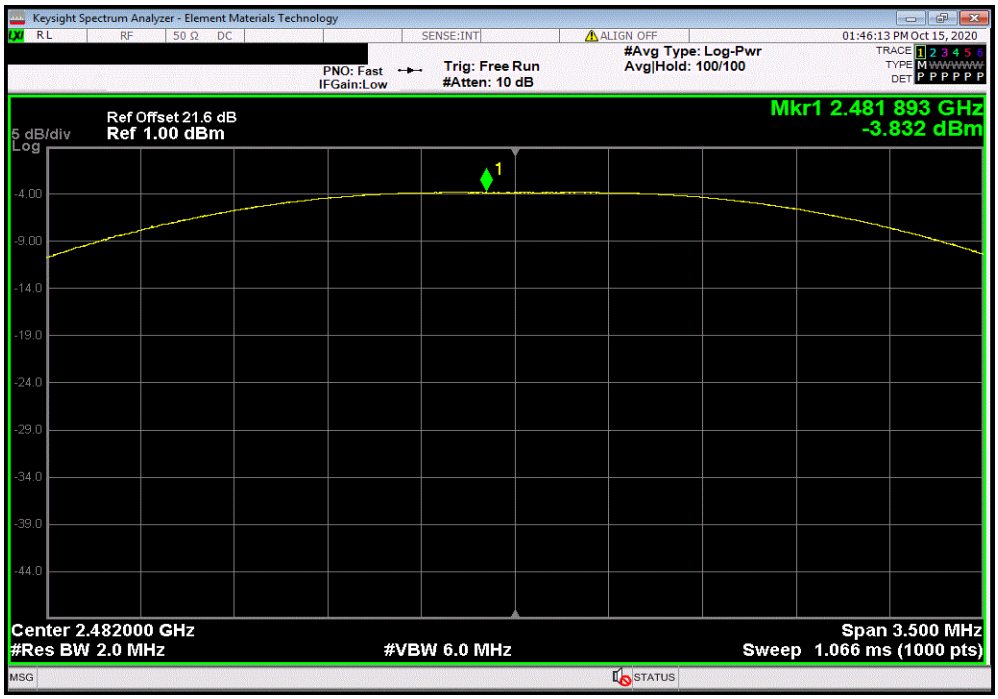
DEVIATIONS FROM TEST STANDARD

None

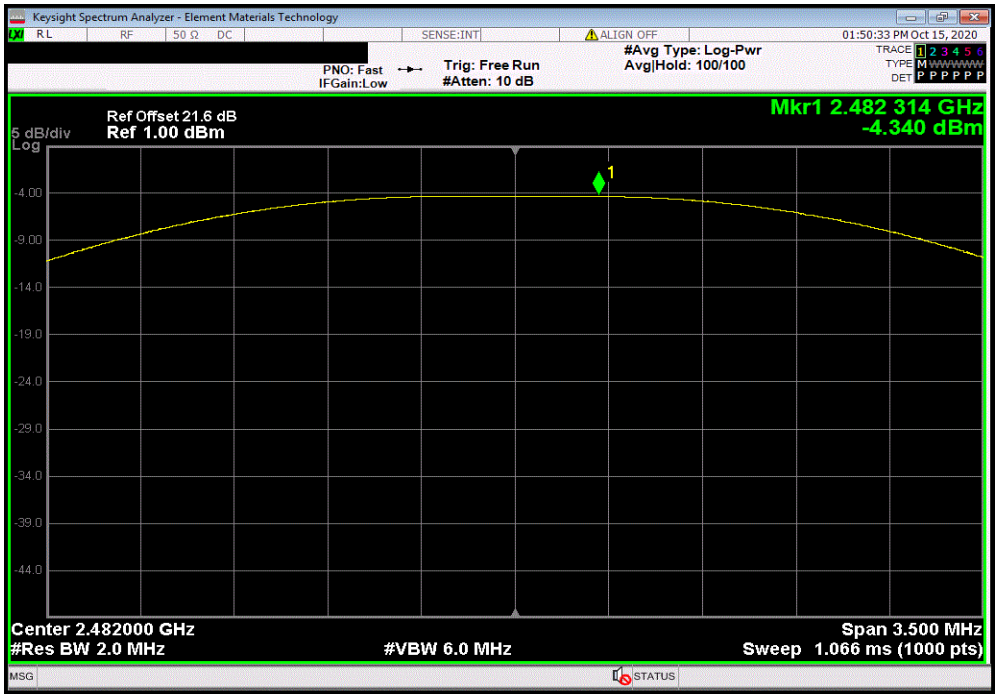
Configuration #	**11**	*Signature*

	Out Pwr (dBm)	Limit (dBm)	Result
Port 7, DTS/GFSK 1 Mbps High Channel, 2482 MHz	-3.832	30	Pass
Port 8, DTS/GFSK 1 Mbps High Channel, 2482 MHz	-4.34	30	Pass

DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-3.832	30	Pass



DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-4.34	30	Pass



OUTPUT POWER

XMit 2020.03.25.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Weinschel Corp.	7006	AMS	17-Jan-20	17-Jan-21
Attenuator	Weinschel	54A-20	TYR	17-Jan-20	17-Jan-21
Cable	Micro-Coax	UFD150A-1-0720-200200	NCS	17-Jan-20	17-Jan-21
Generator - Signal	Agilent	E4422B	TGR	11-Aug-20	11-Aug-23
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFO	25-Jun-20	25-Jun-21

TEST DESCRIPTION

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.

OUTPUT POWER

TbtTx 2019.08.30.0 XMit 2020.03.25.0

EUT:	RadioNode			**Work Order:**	SYNA0317
Serial Number:	Rev. 10 - 007			**Date:**	24-Nov-20
Customer:	Walt Disney Parks and Resorts US, Inc.			**Temperature:**	22.8 °C
Attendees:	None			**Humidity:**	37.7% RH
Project:	None			**Barometric Pres.:**	1015 mbar
Tested by:	Brian Fahey	**Power:**	24VDC via 120VAC/60Hz	**Job Site:**	NC0A

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

COMMENTS

Reference level offset includes DC block, 20 dB attenuator, and RF measurement cable. Power setting = -8 dBm.

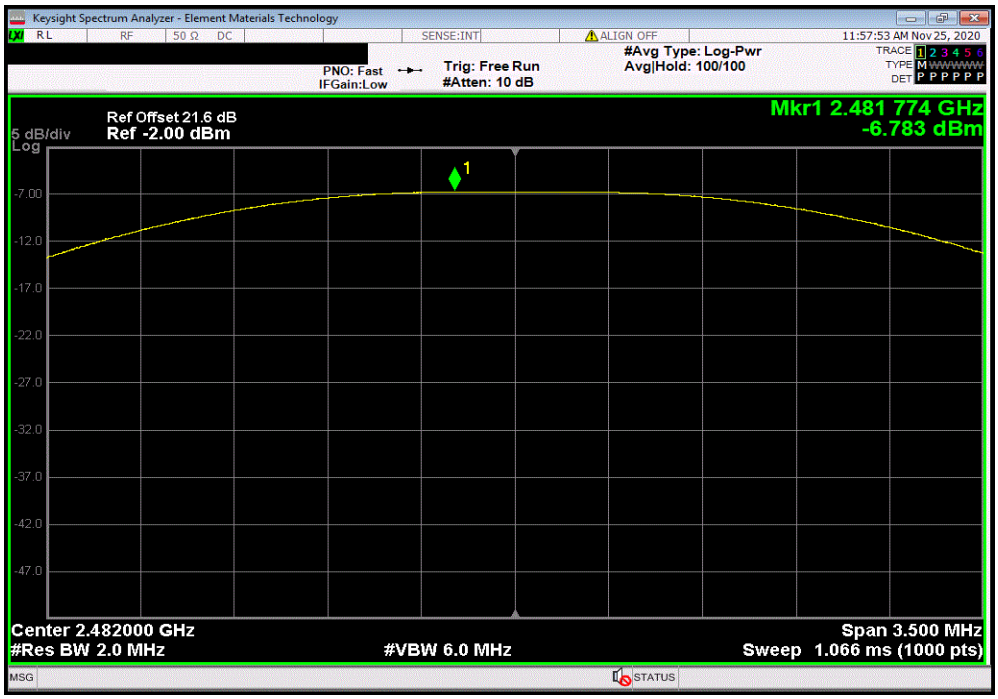
DEVIATIONS FROM TEST STANDARD

None

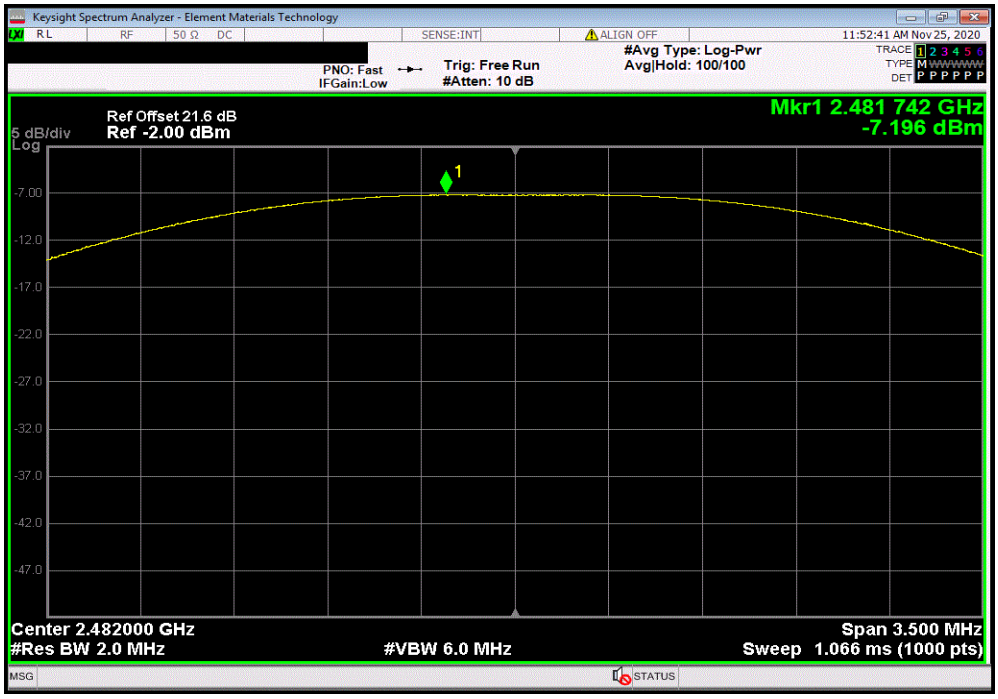
Configuration #	**5**	*Signature*

	Out Pwr (dBm)	Limit (dBm)	Result
Port 7, DTS/GFSK 1 Mbps High Channel, 2482 MHz	-6.783	30	Pass
Port 8, DTS/GFSK 1 Mbps High Channel, 2482 MHz	-7.196	30	Pass

Port 7, DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-6.783	30	Pass



Port 8, DTS/GFSK 1 Mbps High Channel, 2482 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-7.196	30	Pass



SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: 3x3, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

POE via 120VAC/60Hz

24VDC

CONFIGURATIONS INVESTIGATED

SYNA0309 - 14

SYNA0309 - 17

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Standard Gain	EMCO	3160-08	AHK	NCR	0 mo
Spectrum Analyzer	Agilent	N9010A	AFJ	2020-01-06	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	NCR	0 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	2020-07-07	24 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXV	2020-06-03	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	2020-03-02	12 mo
Antenna - Biconilog	EMCO	3142	AXB	2020-04-15	24 mo
Cable	D-Coax	None	OC4	2019-12-16	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	2020-05-01	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	2020-03-02	12 mo
Cable	ESM Cable Corp.	8-18GHz cables	OCY	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2020-07-01	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	2019-12-16	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGC	2020-03-11	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2020-01-20	12 mo
Attenuator	S.M. Electronics	SA6-20	REO	2020-01-21	12 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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. These “pre-scans” are not 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).

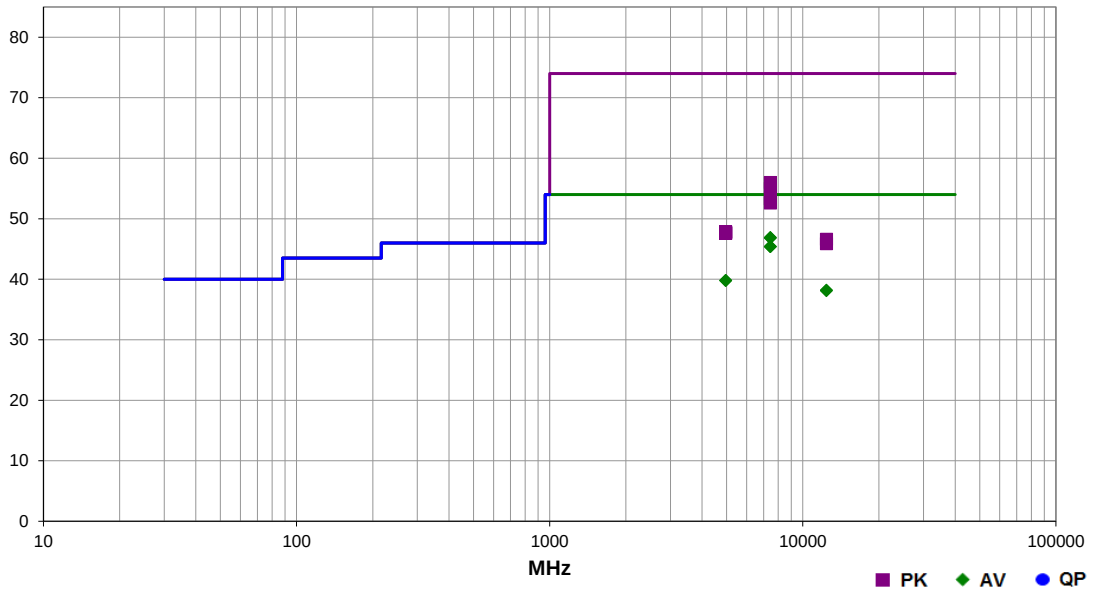
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-22		
Project:	None	**Temperature:**	22.7 °C		
Job Site:	OC07	**Humidity:**	47.9% RH		
Serial Number:	Rev. 10 - 004	**Barometric Pres.:**	1014 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	14				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: 3x3, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	51	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7443.808	31.4	12.3	1.5	340.0	3.2	0.0	Vert	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT Horz, Ant Horz
7444.458	31.3	12.3	3.4	242.0	3.2	0.0	Horz	AV	0.0	46.8	54.0	-7.2	High Ch, Port 8, EUT Vert, Ant Vert
7445.887	27.2	15.0	1.5	285.0	3.2	0.0	Horz	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Vert, Ant Vert
7445.127	27.2	15.0	1.2	248.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Horz, Ant Horz
4961.592	32.2	4.4	1.0	105.0	3.2	0.0	Horz	AV	0.0	39.8	54.0	-14.2	High Ch, Port 8, EUT Vert, Ant Vert
4962.275	32.2	4.4	1.5	197.0	3.2	0.0	Vert	AV	0.0	39.8	54.0	-14.2	High Ch, Port 8, EUT Horz, Ant Horz
12407.930	29.1	5.9	3.1	313.0	3.2	0.0	Horz	AV	0.0	38.2	54.0	-15.8	High Ch, Port 8, EUT Vert, Ant Vert
12407.780	29.0	5.9	2.2	358.0	3.2	0.0	Vert	AV	0.0	38.1	54.0	-15.9	High Ch, Port 8, EUT Horz, Ant Horz
7445.458	43.7	12.3	1.5	340.0	0.0	0.0	Vert	PK	0.0	56.0	74.0	-18.0	High Ch, Port 8, EUT Horz, Ant Horz
7446.383	42.7	12.3	3.4	242.0	0.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	High Ch, Port 8, EUT Vert, Ant Vert
7446.117	38.3	15.0	1.5	285.0	0.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	High Ch., Port 7, EUT Vert, Ant Vert
7446.627	37.6	15.0	1.2	248.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., Port 7, EUT Horz, Ant Horz
4963.983	43.3	4.5	1.0	105.0	0.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	High Ch, Port 8, EUT Vert, Ant Vert
4961.692	43.2	4.4	1.5	197.0	0.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	High Ch, Port 8, EUT Horz, Ant Horz
12410.670	40.7	5.9	2.2	358.0	0.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	High Ch, Port 8, EUT Horz, Ant Horz
12409.920	40.0	5.9	3.1	313.0	0.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	High Ch, Port 8, EUT Vert, Ant Vert

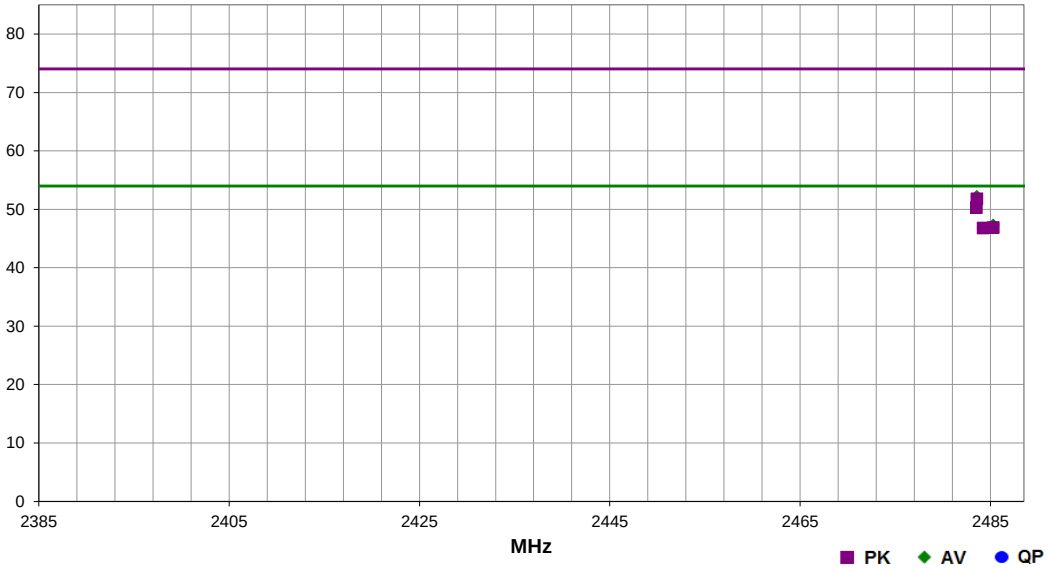
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-22		
Project:	None	**Temperature:**	22.7 °C		
Job Site:	OC07	**Humidity:**	47.9% RH		
Serial Number:	Rev. 10 - 004	**Barometric Pres.:**	1014 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	14				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: 3x3, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	53	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

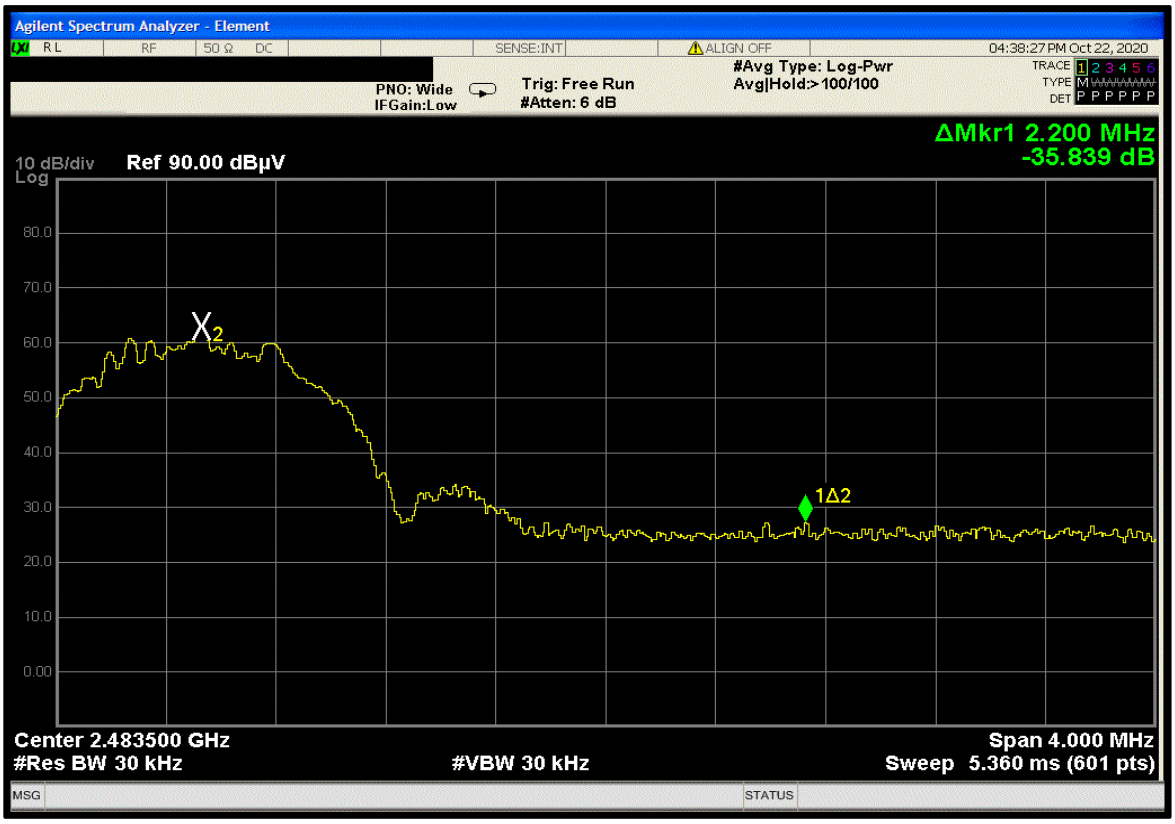


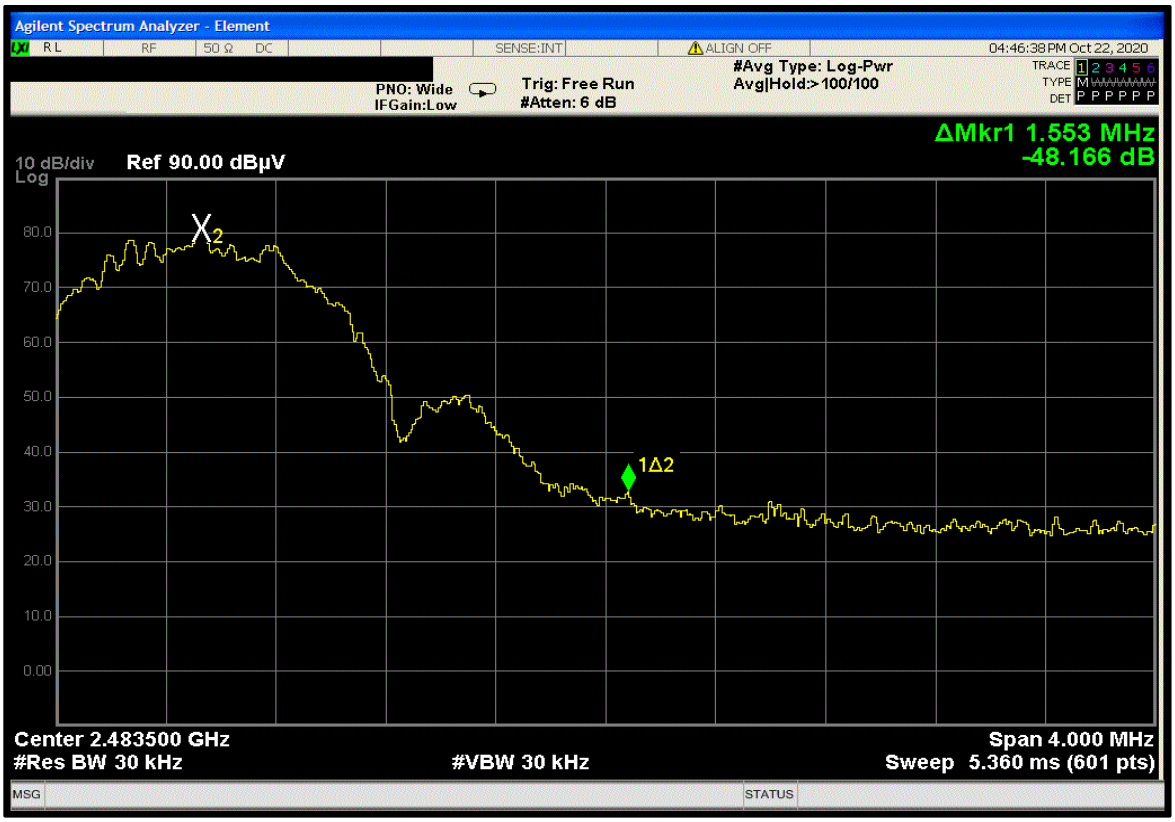
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.580	33.2	-4.2	1.4	191.0	3.2	20.0	Horz	AV	0.0	52.2	54.0	-1.8	High Ch, Port 8, EUT Vert, Antenna Vert: Fund 81.4dBuV + -48.2dBc = 33.2dBuV (calc. amp.)
2483.520	28.3	-0.8	1.5	167.0	3.2	20.0	Horz	AV	0.0	50.7	54.0	-3.3	High Ch., Port 7, EUT Vert, Ant Vert: Fund 75.6dBuV + -47.3dBc = 28.3dBuV (calc. amp.)
2485.293	24.9	-0.8	1.0	166.0	3.2	20.0	Vert	AV	0.0	47.3	54.0	-6.7	High Ch., Port 7, EUT Horz, Ant Horz: Fund 70.6dBuV + -45.7dBc = 24.9dBuV (calc. amp.)
2484.227	27.8	-4.2	1.5	291.0	3.2	20.0	Vert	AV	0.0	46.8	54.0	-7.2	High Ch, Port 8, EUT Horz, Antenna Horz: Fund 63.6dBuV + -35.8dBc = 27.8dBuV (calc. amp.)
2483.580	36.0	-4.2	1.4	191.0	0.0	20.0	Horz	PK	0.0	51.8	74.0	-22.2	High Ch, Port 8, EUT Vert, Antenna Vert: Fund 84.2dBuV + -48.2dBc = 36.0dBuV (calc. amp.)
2483.520	31.1	-0.8	1.5	167.0	0.0	20.0	Horz	PK	0.0	50.3	74.0	-23.7	High Ch., Port 7, EUT Vert, Ant Vert: Fund 78.4dBuV + -47.3dBc = 31.1dBuV (calc. amp.)
2485.293	27.7	-0.8	1.0	166.0	0.0	20.0	Vert	PK	0.0	46.9	74.0	-27.1	High Ch., Port 7, EUT Horz, Ant Horz: Fund 73.4dBuV + -45.7dBc = 27.7dBuV (calc. amp.)
2484.227	31.0	-4.2	1.5	291.0	0.0	20.0	Vert	PK	0.0	46.8	74.0	-27.2	High Ch, Port 8, EUT Horz, Antenna Horz: Fund 66.8dBuV + -35.8dBc = 31.0dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch, Port 8, EUT Horz, Antenna Horz

PSA-ESCI 2020.06.24.2



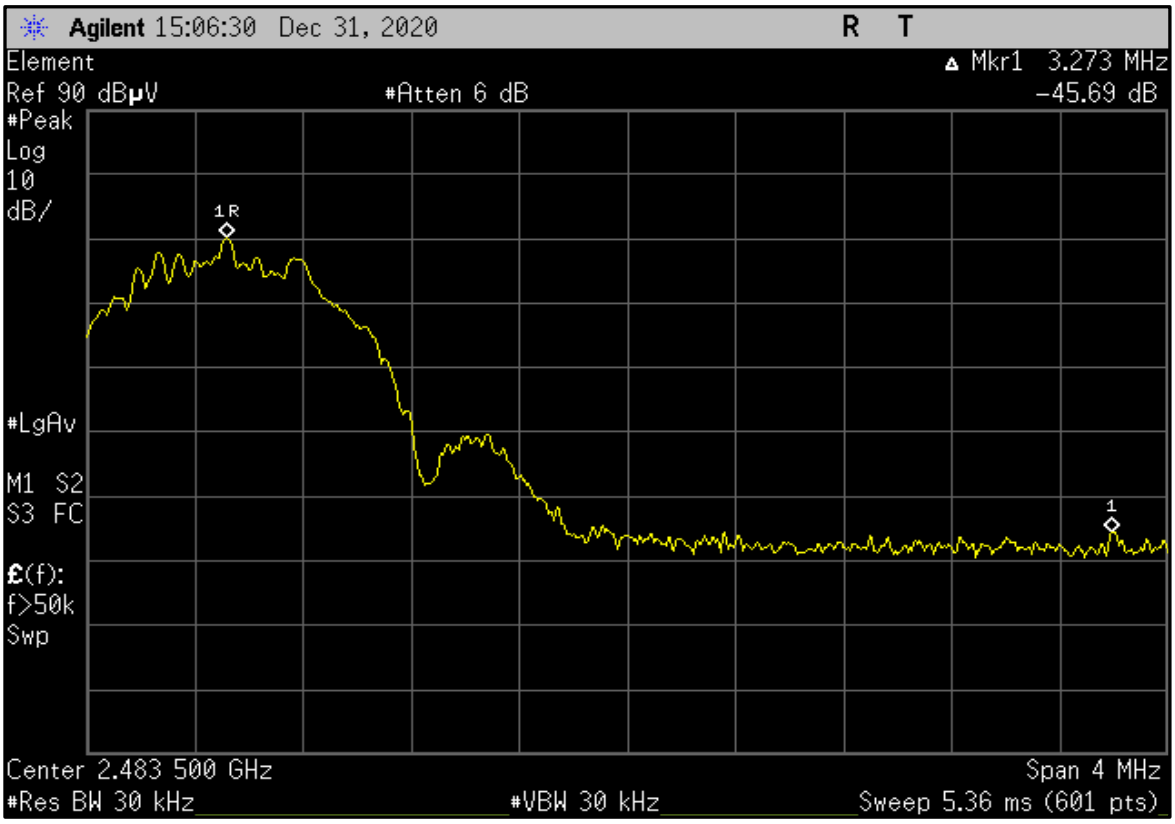


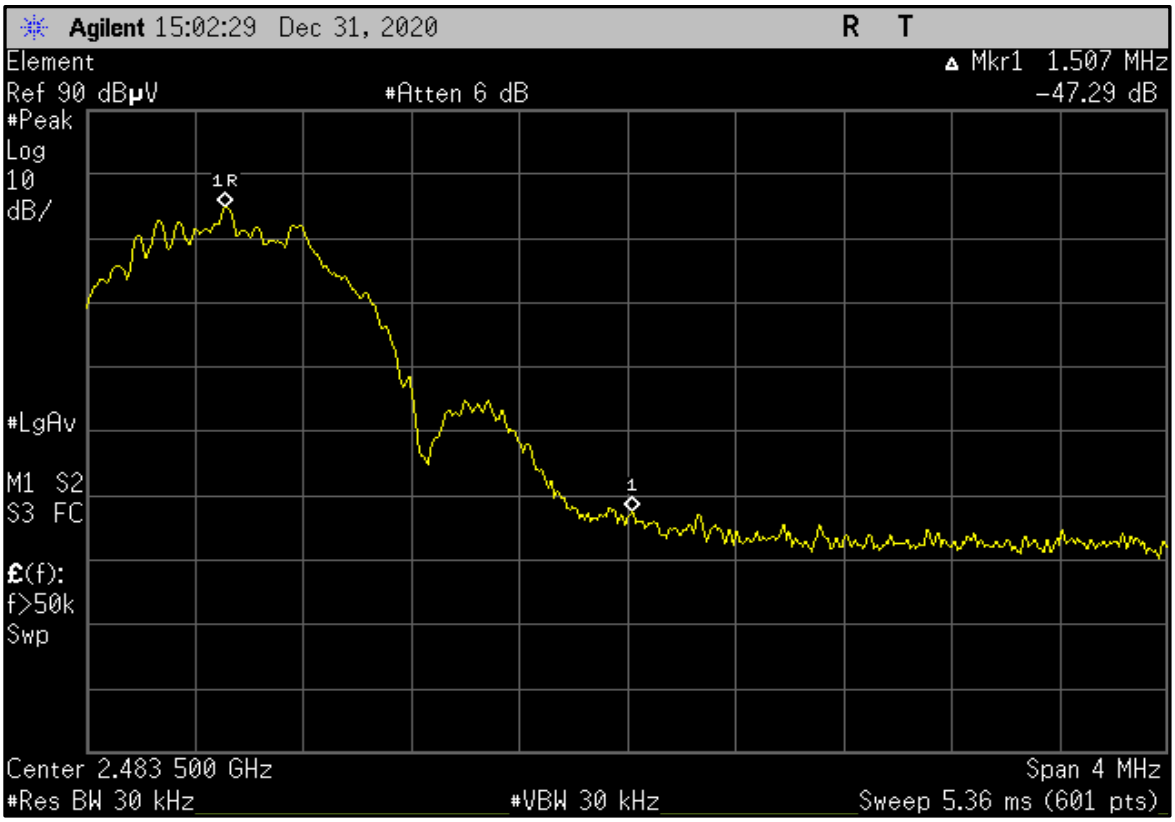
High Ch, Port 8, EUT Vert, Antenna Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2





High Ch., Port 7, EUT Vert, Ant Vert

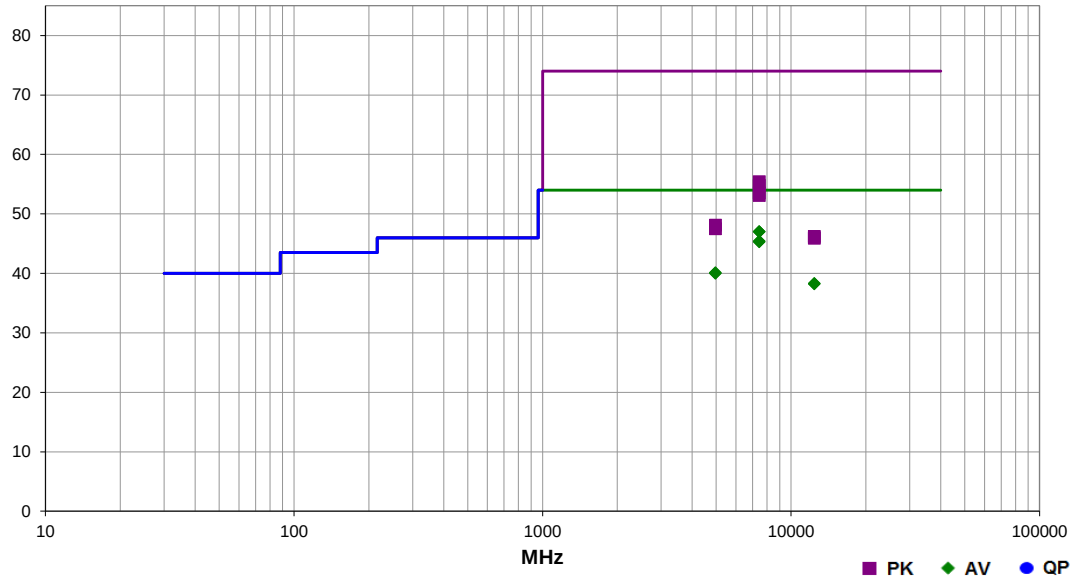
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-27		
Project:	None	**Temperature:**	20.6 °C		
Job Site:	OC07	**Humidity:**	23.4% RH		
Serial Number:	Rev. 10 - 012	**Barometric Pres.:**	1020 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	17				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC				
Operating Mode:	DTS Tx, Antenna PN: 3x3, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	105	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7444.187	31.5	12.3	2.0	140.0	3.2	0.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch, Port 8, EUT Vert, Antenna Vert
7444.240	31.5	12.3	2.2	141.0	3.2	0.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch, Port 8, EUT Horz, Antenna Horz
7446.247	27.2	15.0	3.9	237.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Horz, Ant Horz
7445.050	27.1	15.0	1.5	88.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT Vert Ant Vert
4962.827	32.4	4.5	1.5	289.0	3.2	0.0	Vert	AV	0.0	40.1	54.0	-13.9	High Ch, Port 8, EUT Horz, Antenna Horz
4962.820	32.3	4.5	1.7	186.0	3.2	0.0	Horz	AV	0.0	40.0	54.0	-14.0	High Ch, Port 8, EUT Vert, Antenna Vert
12408.370	29.2	5.9	1.2	50.0	3.2	0.0	Vert	AV	0.0	38.3	54.0	-15.7	High Ch, Port 8, EUT Horz, Antenna Horz
12410.150	29.1	5.9	3.8	232.0	3.2	0.0	Horz	AV	0.0	38.2	54.0	-15.8	High Ch, Port 8, EUT Vert, Antenna Vert
7444.947	43.1	12.3	2.0	140.0	0.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	High Ch, Port 8, EUT Vert, Antenna Vert
7445.073	42.5	12.3	2.2	141.0	0.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	High Ch, Port 8, EUT Horz, Antenna Horz
7445.657	38.5	15.0	3.9	237.0	0.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	High Ch., Port 7, EUT Horz, Ant Horz
7445.437	38.1	15.0	1.5	88.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	High Ch., Port 7, EUT Vert Ant Vert
4965.133	43.6	4.5	1.5	289.0	0.0	0.0	Vert	PK	0.0	48.1	74.0	-25.9	High Ch, Port 8, EUT Horz, Antenna Horz
4962.447	43.1	4.4	1.7	186.0	0.0	0.0	Horz	PK	0.0	47.5	74.0	-26.5	High Ch, Port 8, EUT Vert, Antenna Vert
12408.180	40.3	5.9	3.8	232.0	0.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	High Ch, Port 8, EUT Vert, Antenna Vert
12410.390	40.0	5.9	1.2	50.0	0.0	0.0	Vert	PK	0.0	45.9	74.0	-28.1	High Ch, Port 8, EUT Horz, Antenna Horz

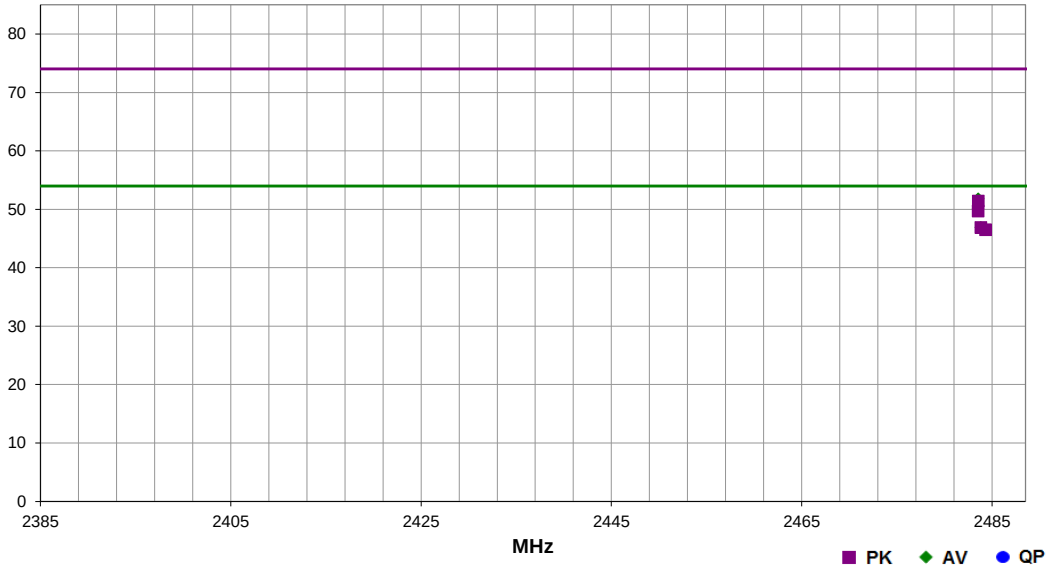
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-27		
Project:	None	**Temperature:**	20.6 °C		
Job Site:	OC07	**Humidity:**	23.4% RH		
Serial Number:	Rev. 10 - 012	**Barometric Pres.:**	1020 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	17				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC				
Operating Mode:	DTS Tx, Antenna PN: 3x3, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	104	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

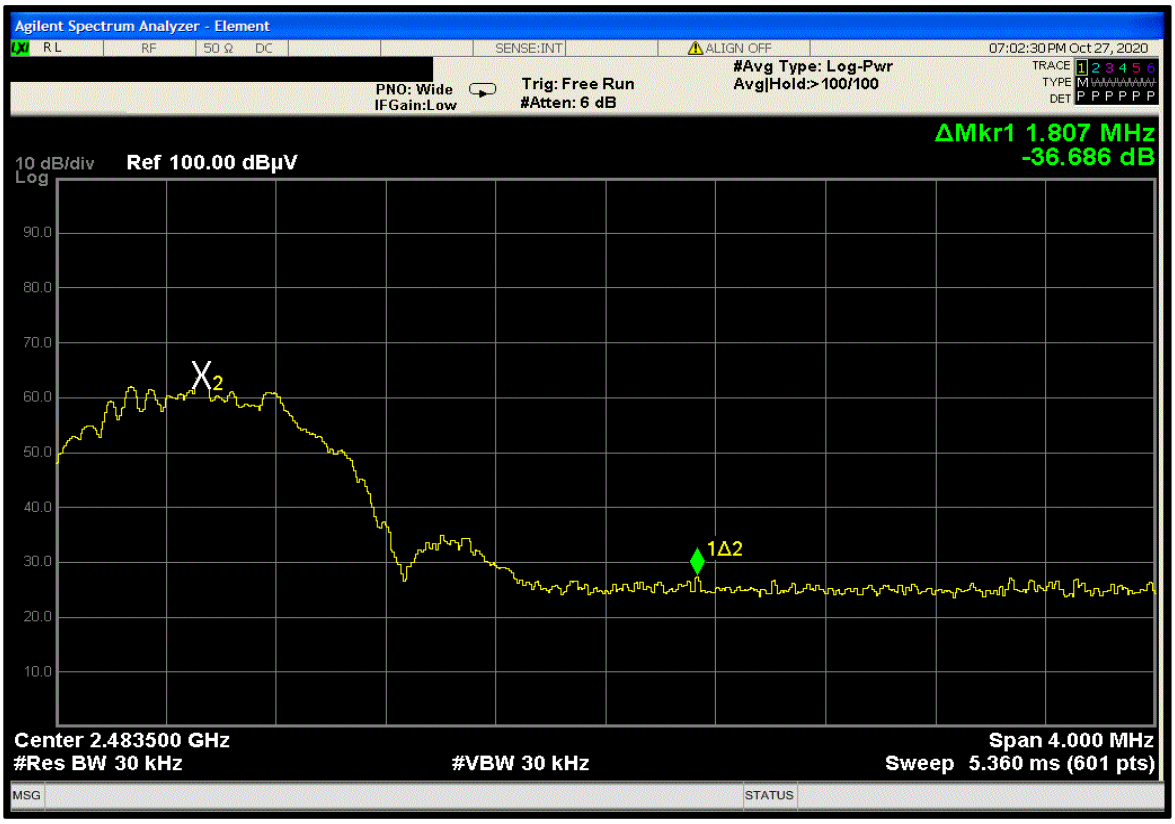


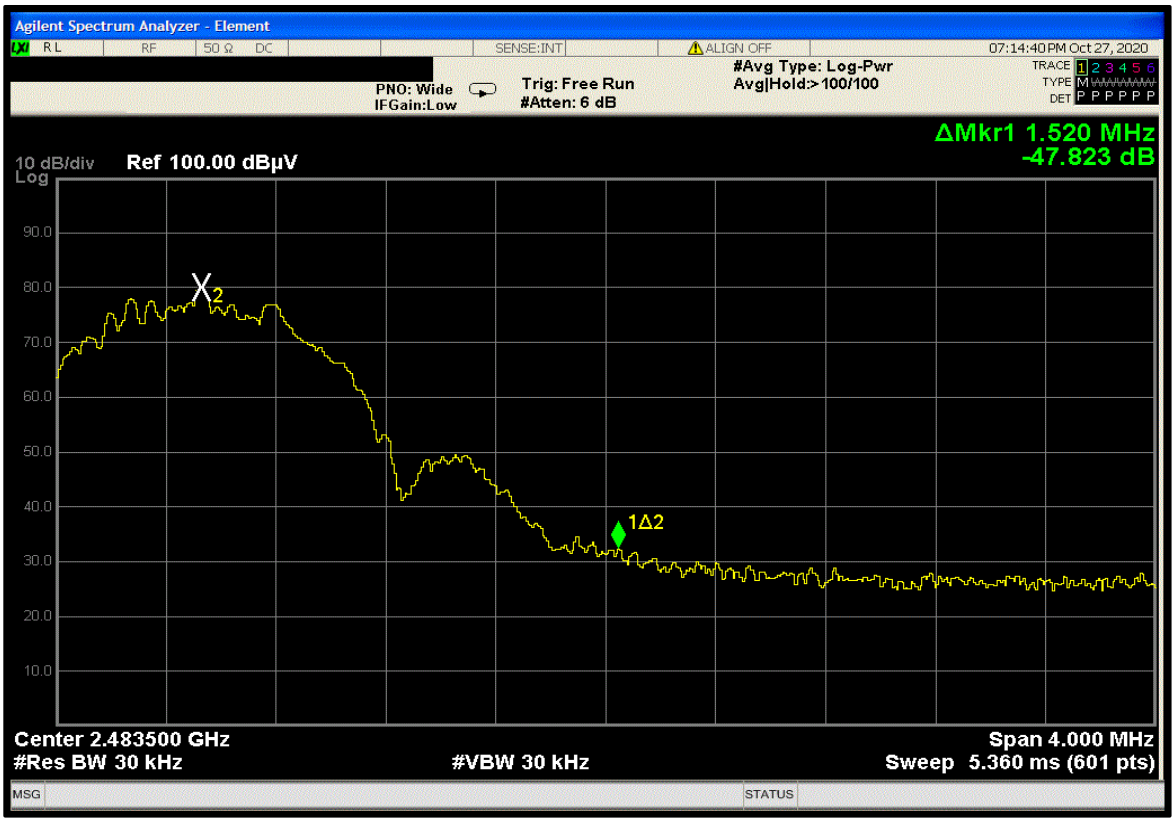
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.547	32.8	-4.2	2.0	187.0	3.2	20.0	Horz	AV	0.0	51.8	54.0	-2.2	High Ch, Port 8, EUT Vert, Antenna Vert: Fund 80.6dBuV + -47.8dBc = 32.8dBuV (calc. amp.)
2483.540	27.7	-0.8	1.9	160.0	3.2	20.0	Horz	AV	0.0	50.1	54.0	-3.9	High Ch., Port 7, EUT Vert, Ant Vert: Fund 76.7dBuV + -49.0dBc = 27.7dBuV (calc. amp.)
2483.833	27.9	-4.2	1.1	293.0	3.2	20.0	Vert	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT Horz, Antenna Vert: Fund 64.6dBuV + -36.7dBc = 27.9dBuV (calc. amp.)
2484.313	24.1	-0.8	1.2	86.0	3.2	20.0	Vert	AV	0.0	46.5	54.0	-7.5	High Ch., Port 7, EUT Horz, Ant Horz: Fund 60.2dBuV + -36.1dBc = 24.1dBuV (calc. amp.)
2483.547	35.6	-4.2	2.0	187.0	0.0	20.0	Horz	PK	0.0	51.4	74.0	-22.6	High Ch, Port 8, EUT Vert, Antenna Vert: Fund 83.4dBuV + -47.8dBc = 35.6dBuV (calc. amp.)
2483.540	30.5	-0.8	1.9	160.0	0.0	20.0	Horz	PK	0.0	49.7	74.0	-24.3	High Ch., Port 7, EUT Vert, Ant Vert: Fund 79.5dBuV + -49.0dBc = 30.5dBuV (calc. amp.)
2483.833	31.1	-4.2	1.1	293.0	0.0	20.0	Vert	PK	0.0	46.9	74.0	-27.1	High Ch, Port 8, EUT Horz, Antenna Vert: Fund 67.8dBuV + -36.7dBc = 31.1dBuV (calc. amp.)
2484.313	27.3	-0.8	1.2	86.0	0.0	20.0	Vert	PK	0.0	46.5	74.0	-27.5	High Ch., Port 7, EUT Horz, Ant Horz: Fund 63.4dBuV + -36.1dBc = 27.3dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch, Port 8, EUT Horz, Antenna Horz

PSA-ESCI 2020.06.24.2



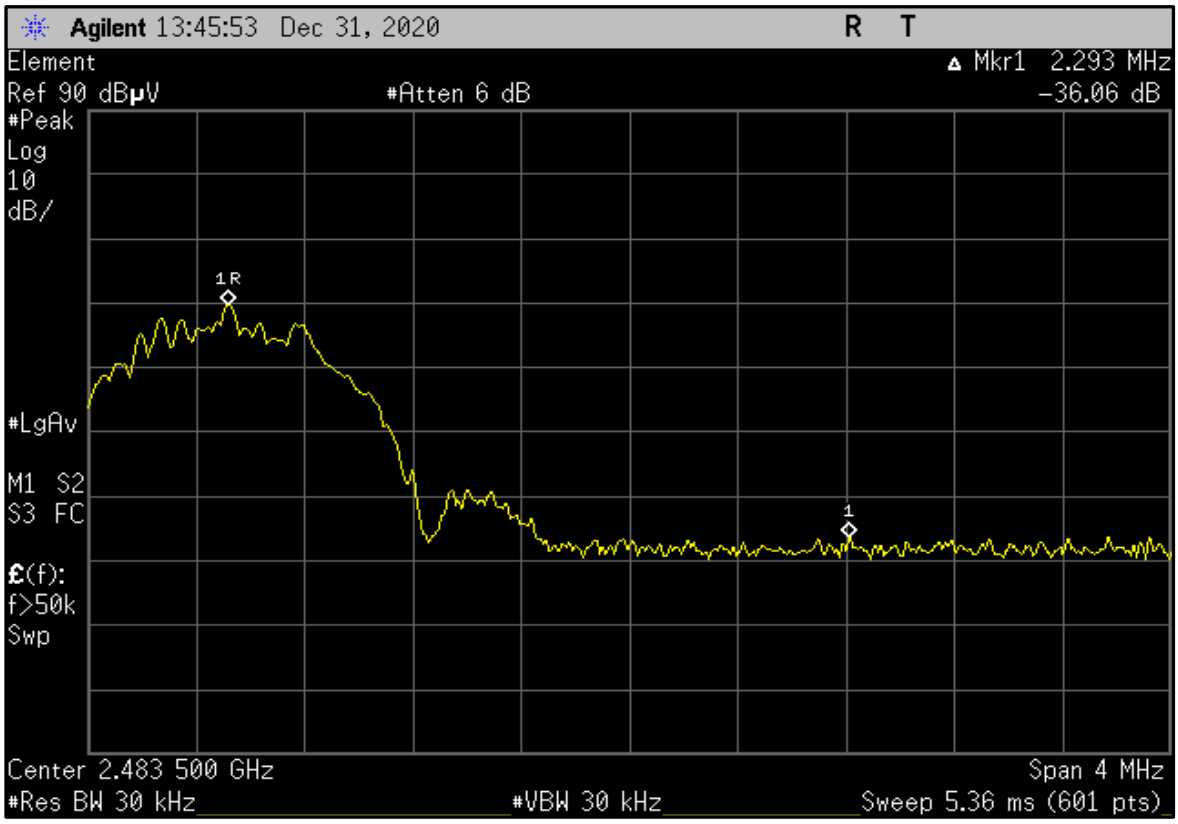


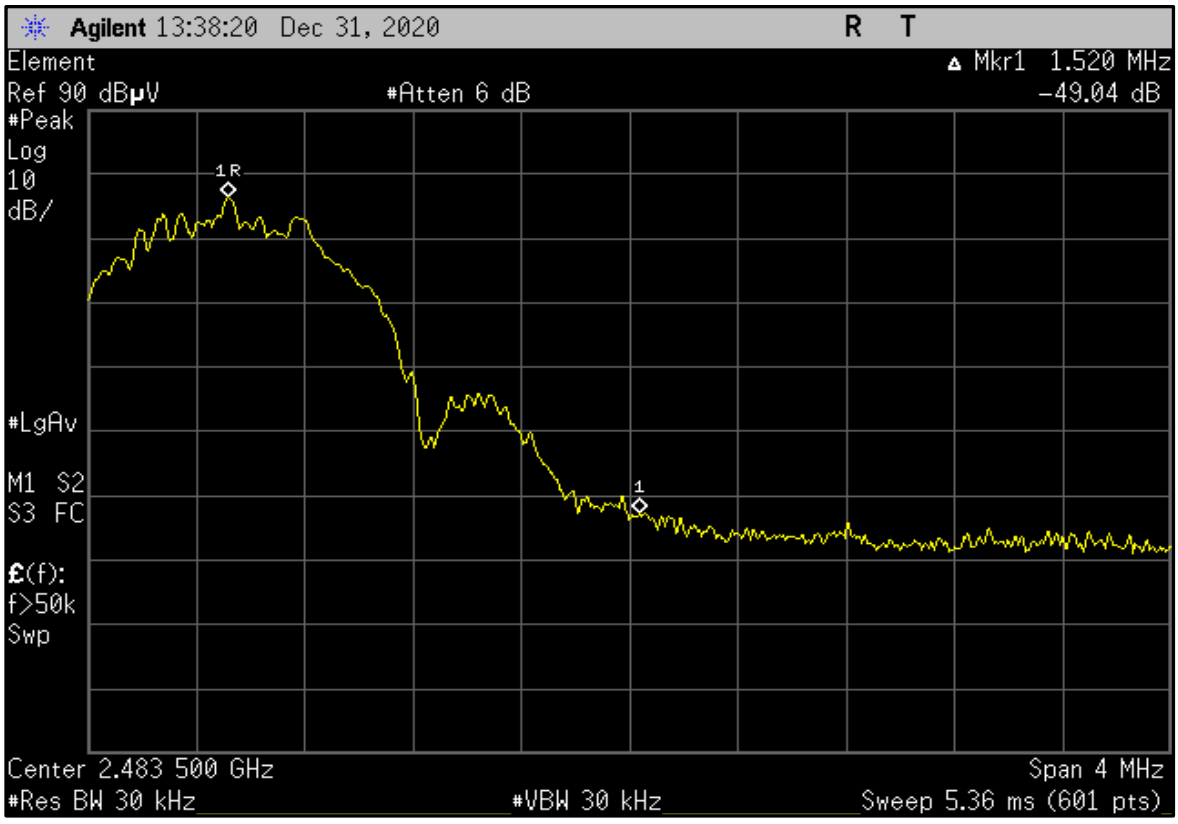
High Ch, Port 8, EUT Vert, Antenna Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2





High Ch., Port 7, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

element

PSA-ESCI 2020.04.03.0

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: ANT-2.4-CW-HWR-SMA, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

24VDC via 120VAC/60Hz
POE via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 2
SYNA0309 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2019-11-08	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

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. These “pre-scans” are not 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).

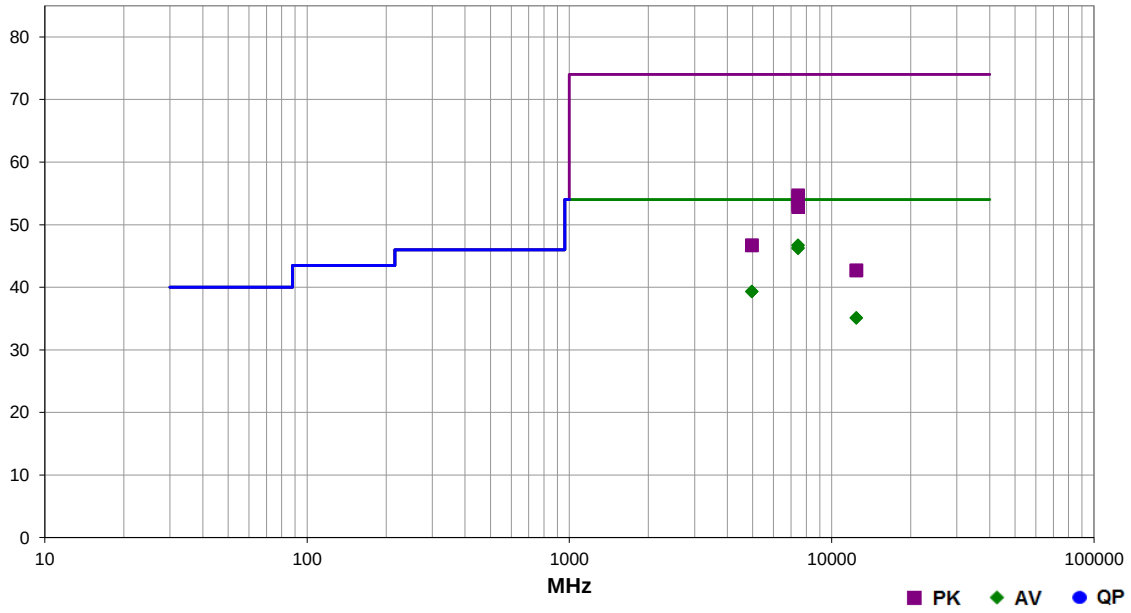
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.04.20.0 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-25		
Project:	None	**Temperature:**	22.4 °C		
Job Site:	NC01	**Humidity:**	56% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1028 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: ANT-2.4-CW-HWR-SMA, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz. Power setting = 0 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/5/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	23	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.570	28.5	15.0	2.4	249.0	3.2	0.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch., Port 8, EUT Vert
7446.708	28.5	15.0	4.0	243.0	3.2	0.0	Horz	AV	0.0	46.7	54.0	-7.3	High Ch., Port 7, EUT on Side
7446.658	28.1	15.0	4.0	168.0	3.2	0.0	Vert	AV	0.0	46.3	54.0	-7.7	High Ch., Port 7, EUT Vert
7445.627	28.0	15.0	1.5	130.0	3.2	0.0	Horz	AV	0.0	46.2	54.0	-7.8	High Ch., Port 8, EUT on Side
4964.710	26.6	9.5	1.5	150.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT Vert
4963.493	26.6	9.5	1.5	112.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT on Side
12409.720	26.9	5.0	1.5	23.0	3.2	0.0	Horz	AV	0.0	35.1	54.0	-18.9	High Ch., Port 8, EUT on Side
12409.230	26.9	5.0	1.5	80.0	3.2	0.0	Vert	AV	0.0	35.1	54.0	-18.9	High Ch., Port 8, EUT Vert
7445.370	39.7	15.0	1.5	130.0	0.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	High Ch., Port 8, EUT on Side
7446.977	39.4	15.0	2.4	249.0	0.0	0.0	Vert	PK	0.0	54.4	74.0	-19.6	High Ch., Port 8, EUT Vert
7445.967	38.2	15.0	4.0	243.0	0.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	High Ch., Port 7, EUT on Side
7446.008	37.8	15.0	4.0	168.0	0.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2	High Ch., Port 7, EUT Vert
4963.597	37.2	9.5	1.5	150.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	High Ch., Port 8, EUT Vert
4964.993	37.2	9.5	1.5	112.0	0.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	High Ch., Port 8, EUT on Side
12410.550	37.7	5.0	1.5	23.0	0.0	0.0	Horz	PK	0.0	42.7	74.0	-31.3	High Ch., Port 8, EUT on Side
12410.480	37.7	5.0	1.5	80.0	0.0	0.0	Vert	PK	0.0	42.7	74.0	-31.3	High Ch., Port 8, EUT Vert

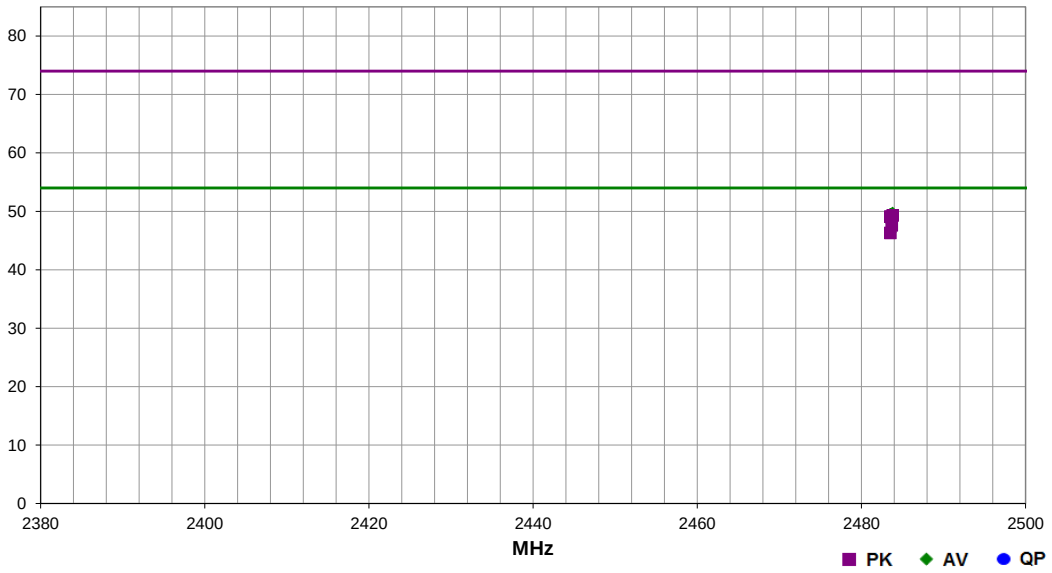
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-29		
Project:	None	**Temperature:**	23.5 °C		
Job Site:	NC01	**Humidity:**	48.4% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: ANT-2.4-CW-HWR-SMA, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz. Power setting = 0 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/5/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	119	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

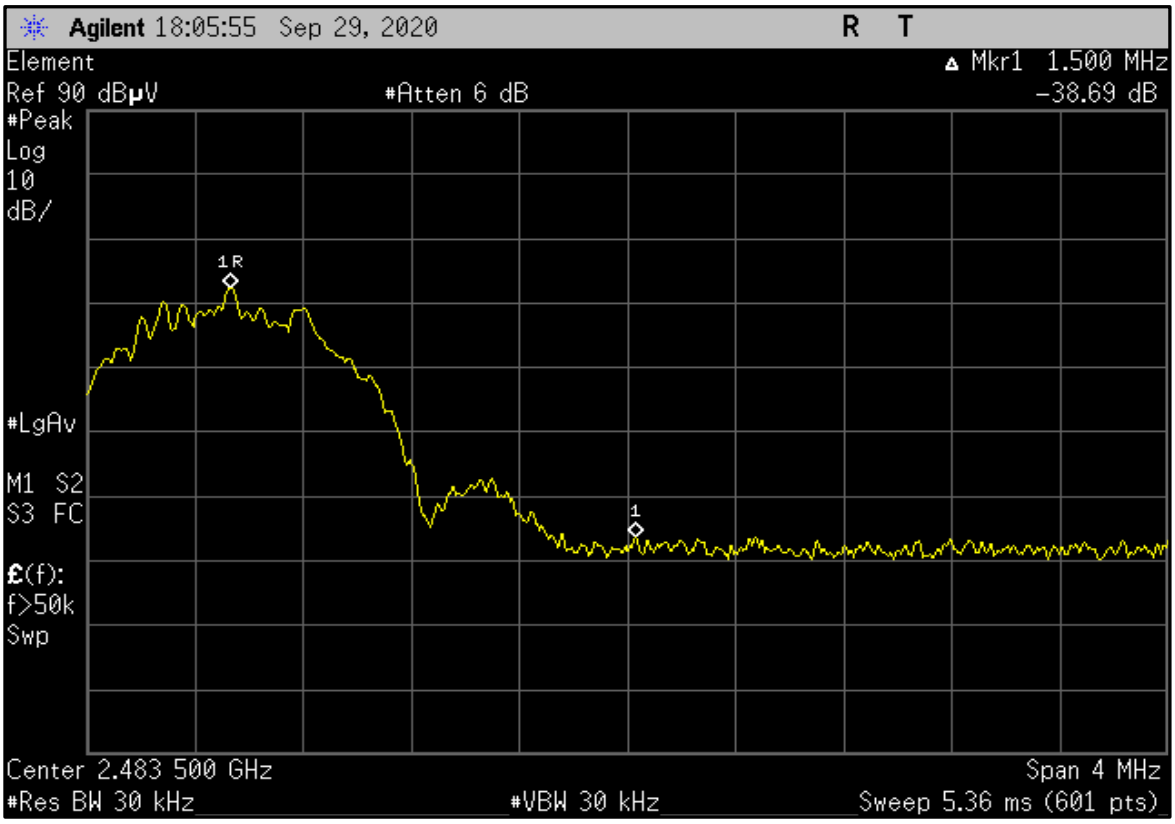


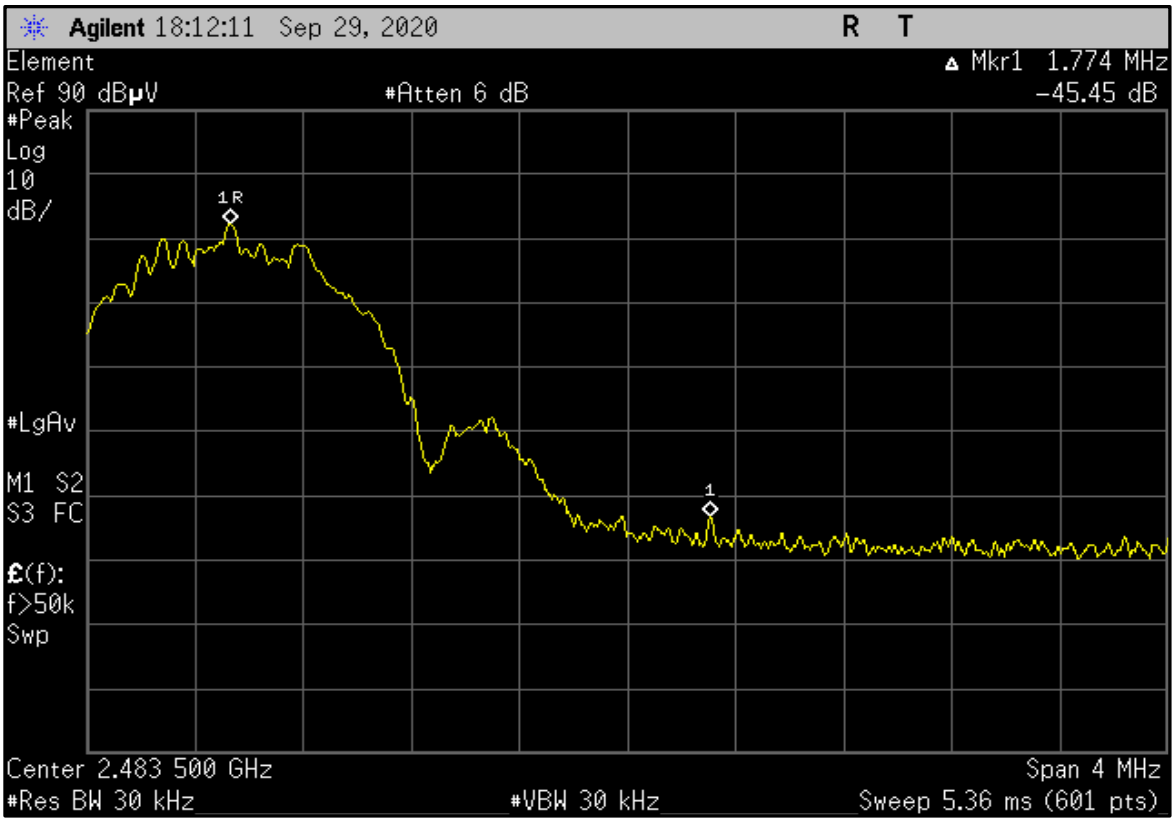
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.807	27.3	-0.8	1.6	337.0	3.2	20.0	Vert	AV	0.0	49.7	54.0	-4.3	High Ch., Port 8, EUT Vert: Fund 72.8dBuV + -45.5dBc = 27.3dBuV (calc. amp.)
2483.533	27.1	-0.8	1.9	263.0	3.2	20.0	Horz	AV	0.0	49.5	54.0	-4.5	High Ch., Port 7, EUT Vert: Fund 74.5dBuV + -47.4dBc = 27.1dBuV (calc. amp.)
2483.693	25.6	-0.8	3.4	163.0	3.2	20.0	Vert	AV	0.0	48.0	54.0	-6.0	High Ch., Port 7, EUT Vert: Fund 70.9dBuV + -45.3dBc = 25.6dBuV (calc. amp.)
2483.533	24.0	-0.8	1.5	187.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., Port 8, EUT Vert: Fund 62.7dBuV + -38.7dBc = 24.0dBuV (calc. amp.)
2483.807	30.1	-0.8	1.6	337.0	0.0	20.0	Vert	PK	0.0	49.3	74.0	-24.7	High Ch., Port 8, EUT Vert: Fund 75.6dBuV + -45.5dBc = 30.1dBuV (calc. amp.)
2483.533	29.9	-0.8	1.9	263.0	0.0	20.0	Horz	PK	0.0	49.1	74.0	-24.9	High Ch., Port 7, EUT Vert: Fund 77.3dBuV + -47.4dBc = 29.9dBuV (calc. amp.)
2483.693	28.4	-0.8	3.4	163.0	0.0	20.0	Vert	PK	0.0	47.6	74.0	-26.4	High Ch., Port 7, EUT Vert: Fund 73.7dBuV + -45.3dBc = 28.4dBuV (calc. amp.)
2483.533	27.1	-0.8	1.5	187.0	0.0	20.0	Horz	PK	0.0	46.3	74.0	-27.7	High Ch., Port 8, EUT Vert: Fund 65.8dBuV + -38.7dBc = 27.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Vert

PSA-ESCI 2020.04.03.0



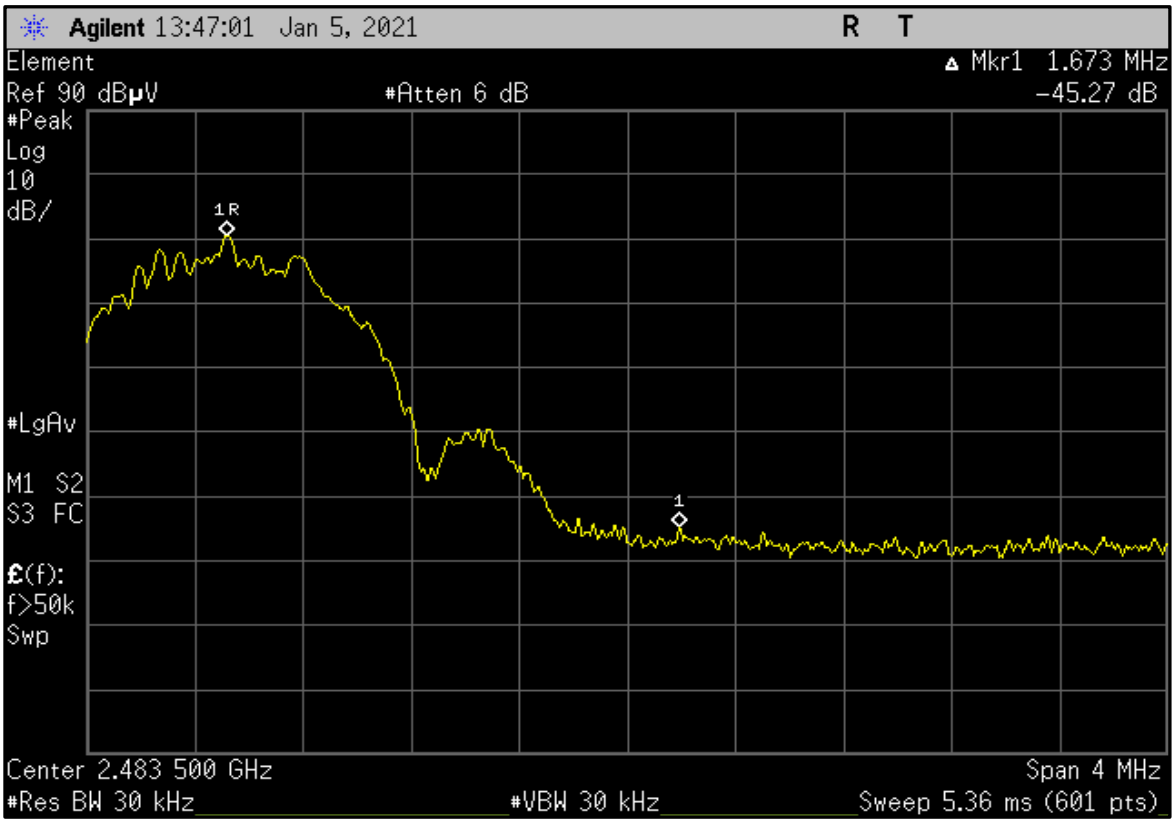


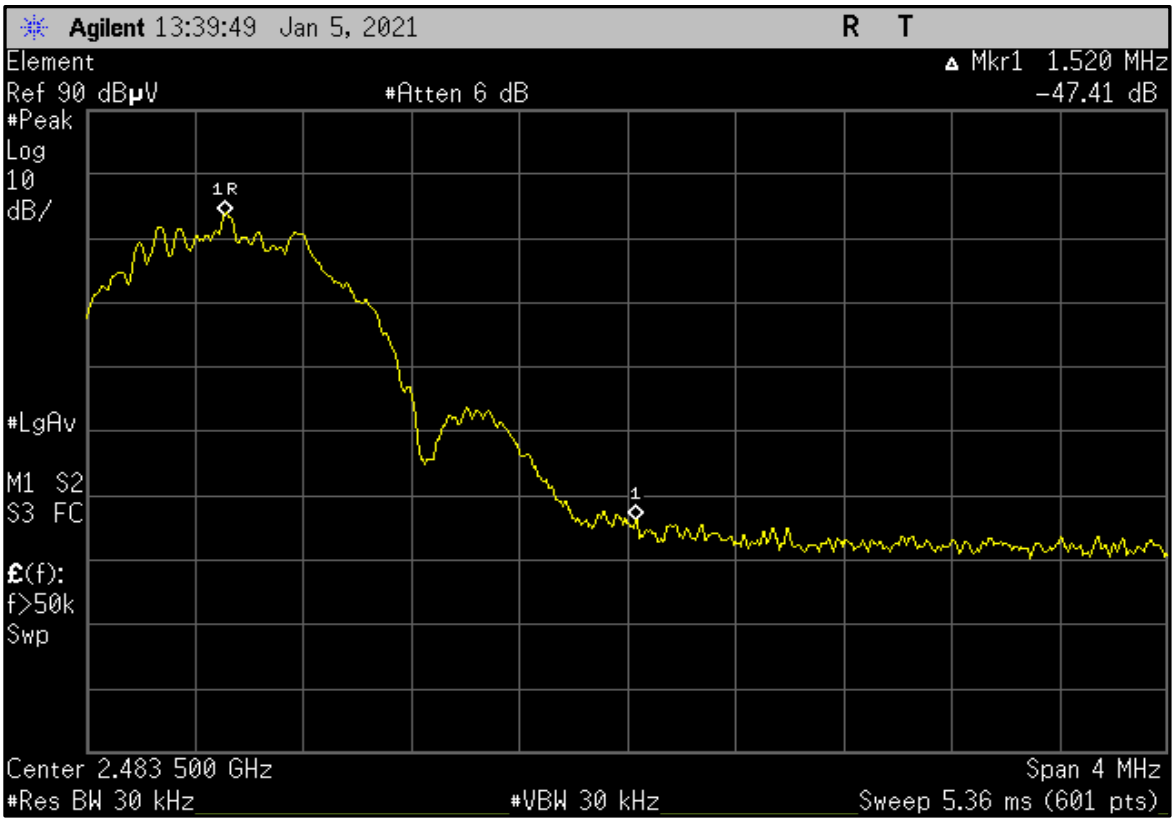
High Ch., EUT Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Vert

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT Vert

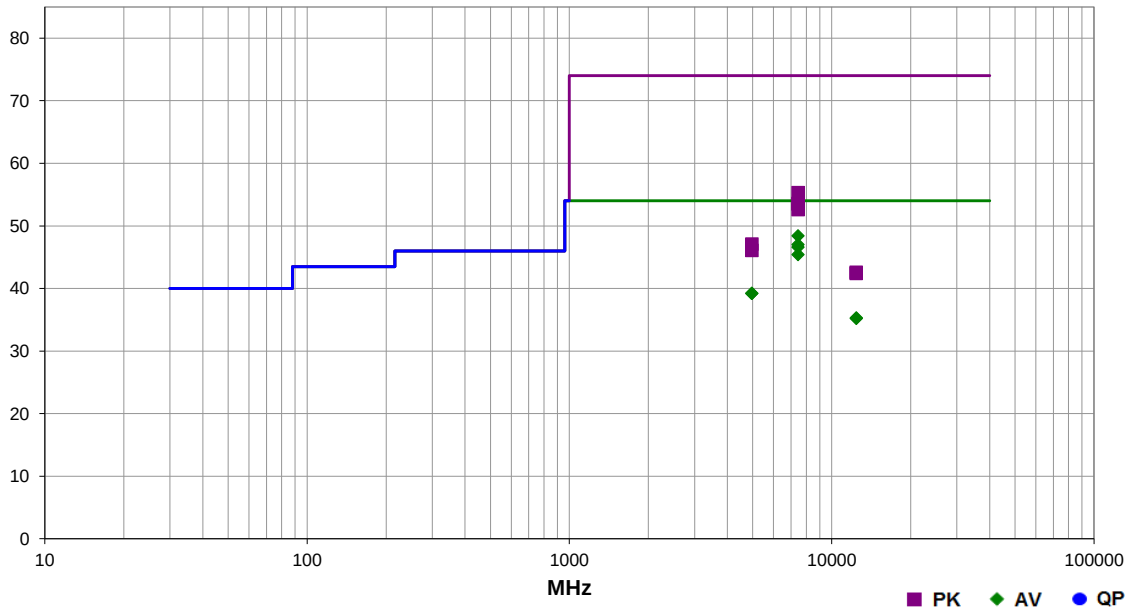
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.04.20.0 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-25		
Project:	None	**Temperature:**	22.4 °C		
Job Site:	NC01	**Humidity:**	56% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1028 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: ANT-2.4-CW-HWR-SMA, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz. Power setting = 0 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8%. Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/5/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	18	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.600	30.2	15.0	2.8	204.0	3.2	0.0	Horz	AV	0.0	48.4	54.0	-5.6	High Ch., Port 8, EUT on Side
7446.575	28.8	15.0	1.0	246.0	3.2	0.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch., Port 7, EUT on Side
7445.625	28.4	15.0	1.8	299.0	3.2	0.0	Vert	AV	0.0	46.6	54.0	-7.4	High Ch., Port 8, EUT Vert
7446.350	27.2	15.0	1.5	166.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Vert
4962.800	26.5	9.5	3.5	302.0	3.2	0.0	Vert	AV	0.0	39.2	54.0	-14.8	High Ch., Port 8, EUT Vert
4962.000	26.5	9.5	1.5	333.0	3.2	0.0	Horz	AV	0.0	39.2	54.0	-14.8	High Ch., Port 8, EUT on Side
12411.470	27.1	5.0	1.2	303.0	3.2	0.0	Horz	AV	0.0	35.3	54.0	-18.7	High Ch., Port 8, EUT on Side
7446.708	40.3	15.0	2.8	204.0	0.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	High Ch., Port 8, EUT on Side
12412.160	27.0	5.0	1.5	151.0	3.2	0.0	Vert	AV	0.0	35.2	54.0	-18.8	High Ch., Port 8, EUT Vert
7446.842	38.6	15.0	1.0	246.0	0.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	High Ch., Port 7, EUT on Side
7446.508	38.5	15.0	1.8	299.0	0.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	High Ch., Port 8, EUT Vert
7447.517	37.6	15.0	1.5	166.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., Port 7, EUT Vert
4964.958	37.6	9.5	3.5	302.0	0.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	High Ch., Port 8, EUT Vert
4964.933	36.6	9.5	1.5	333.0	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	High Ch., Port 8, EUT on Side
12407.530	37.6	5.0	1.5	151.0	0.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	High Ch., Port 8, EUT Vert
12408.380	37.4	5.0	1.2	303.0	0.0	0.0	Horz	PK	0.0	42.4	74.0	-31.6	High Ch., Port 8, EUT on Side

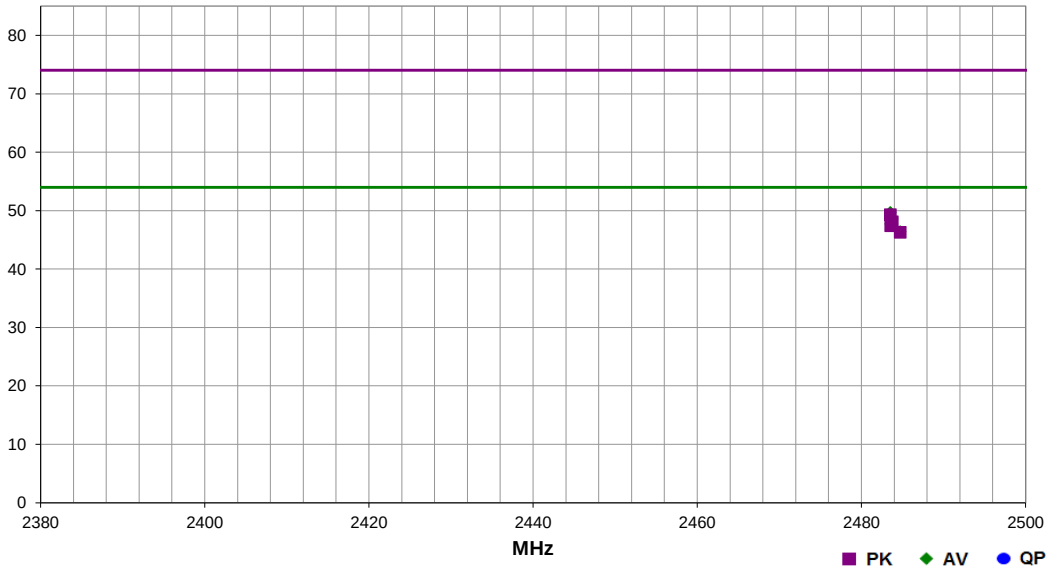
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-29		
Project:	None	**Temperature:**	23.5 °C		
Job Site:	NC01	**Humidity:**	48.4% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: ANT-2.4-CW-HWR-SMA, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz. Power setting = 0 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/5/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	120	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

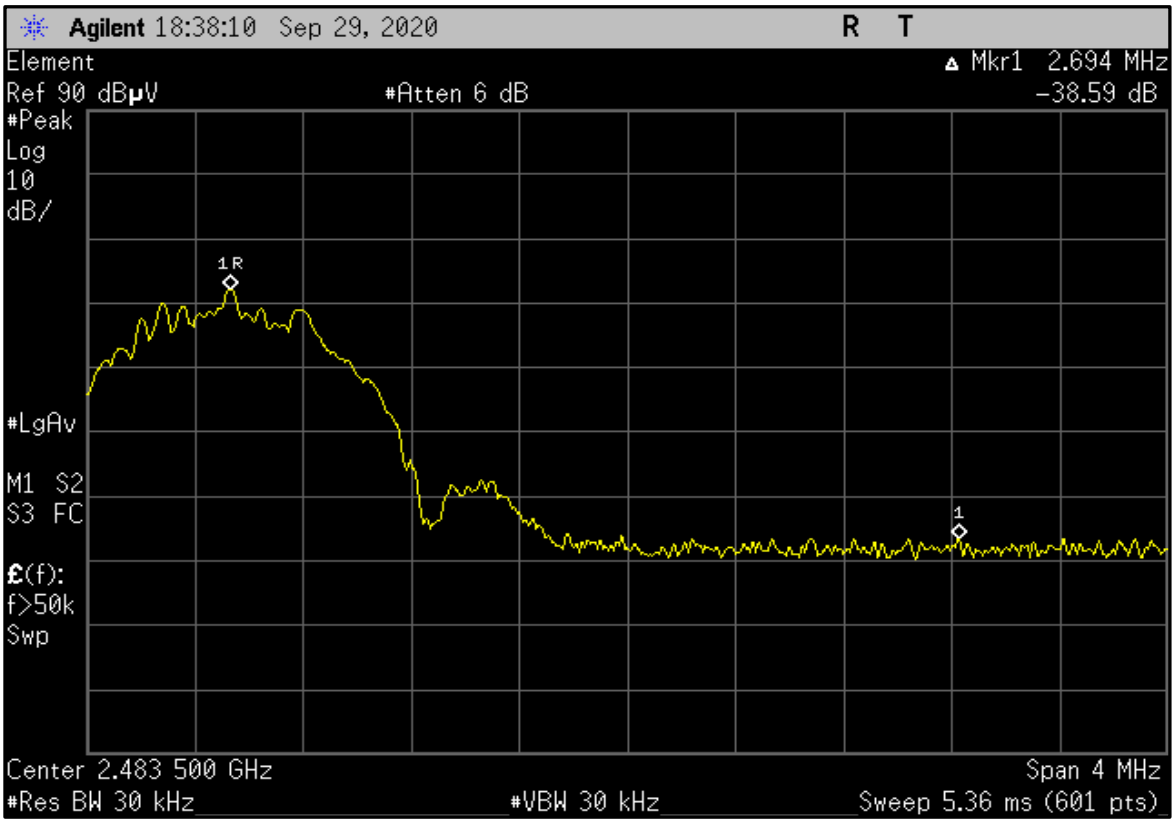


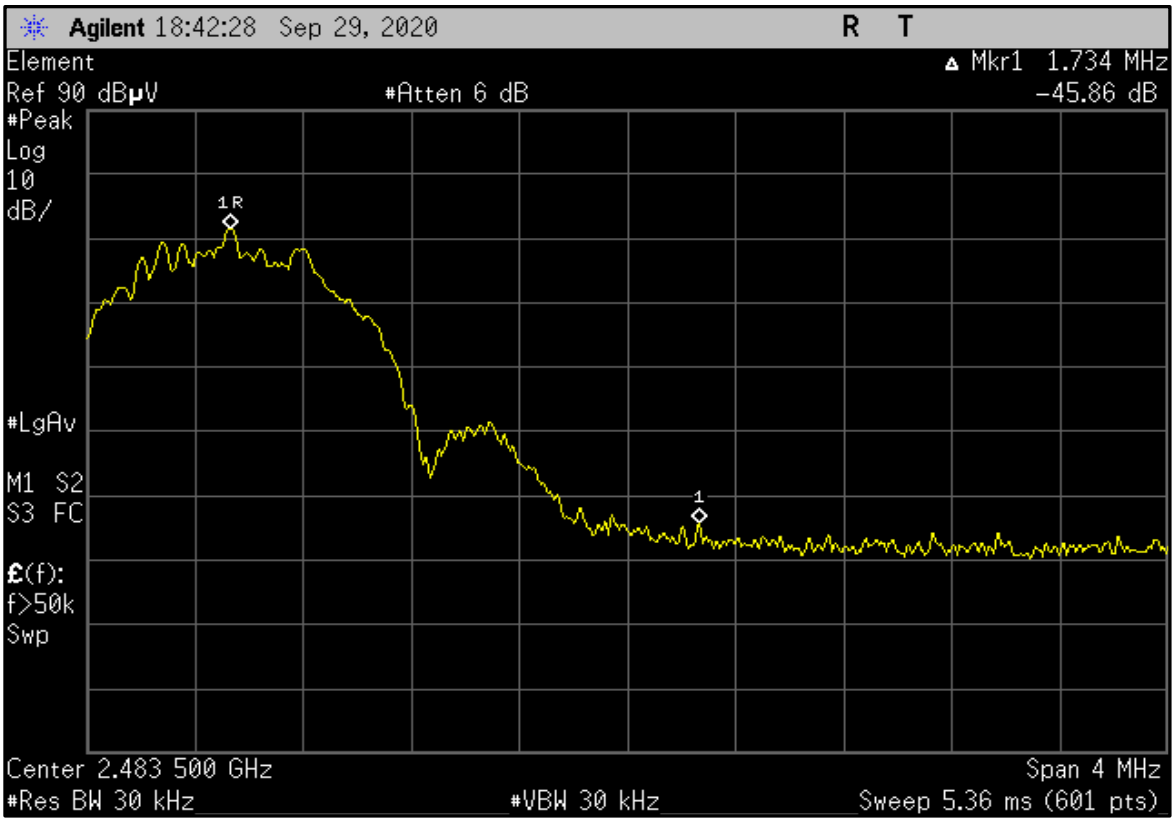
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.533	27.3	-0.8	1.9	264.0	3.2	20.0	Horz	AV	0.0	49.7	54.0	-4.3	High Ch., Port 7, EUT Vert: Fund 74.2dBuV + -46.9dBc = 27.3dBuV (calc. amp.)
2483.767	26.2	-0.8	1.6	338.0	3.2	20.0	Vert	AV	0.0	48.6	54.0	-5.4	High Ch., Port 8, EUT Vert: Fund 72.1dBuV + -45.9dBc = 26.2dBuV (calc. amp.)
2483.580	25.3	-0.8	3.3	163.0	3.2	20.0	Vert	AV	0.0	47.7	54.0	-6.3	High Ch., Port 7, EUT Vert: Fund 71.1dBuV + -45.8dBc = 25.3dBuV (calc. amp.)
2484.727	24.0	-0.8	1.5	187.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., Port 8, EUT Vert: Fund 62.6dBuV + -38.6dBc = 24.0dBuV (calc. amp.)
2483.533	30.1	-0.8	1.9	264.0	0.0	20.0	Horz	PK	0.0	49.3	74.0	-24.7	High Ch., Port 7, EUT Vert: Fund 77.0dBuV + -46.9dBc = 30.1dBuV (calc. amp.)
2483.767	28.9	-0.8	1.6	338.0	0.0	20.0	Vert	PK	0.0	48.1	74.0	-25.9	High Ch., Port 8, EUT Vert: Fund 74.8dBuV + -45.9dBc = 28.9dBuV (calc. amp.)
2483.580	28.2	-0.8	3.3	163.0	0.0	20.0	Vert	PK	0.0	47.4	74.0	-26.6	High Ch., Port 7, EUT Vert: Fund 74.0dBuV + -45.8dBc = 28.2dBuV (calc. amp.)
2484.727	27.1	-0.8	1.5	187.0	0.0	20.0	Horz	PK	0.0	46.3	74.0	-27.7	High Ch., Port 8, EUT Vert: Fund 65.7dBuV + -38.6dBc = 27.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Vert

PSA-ESCI 2020.04.03.0



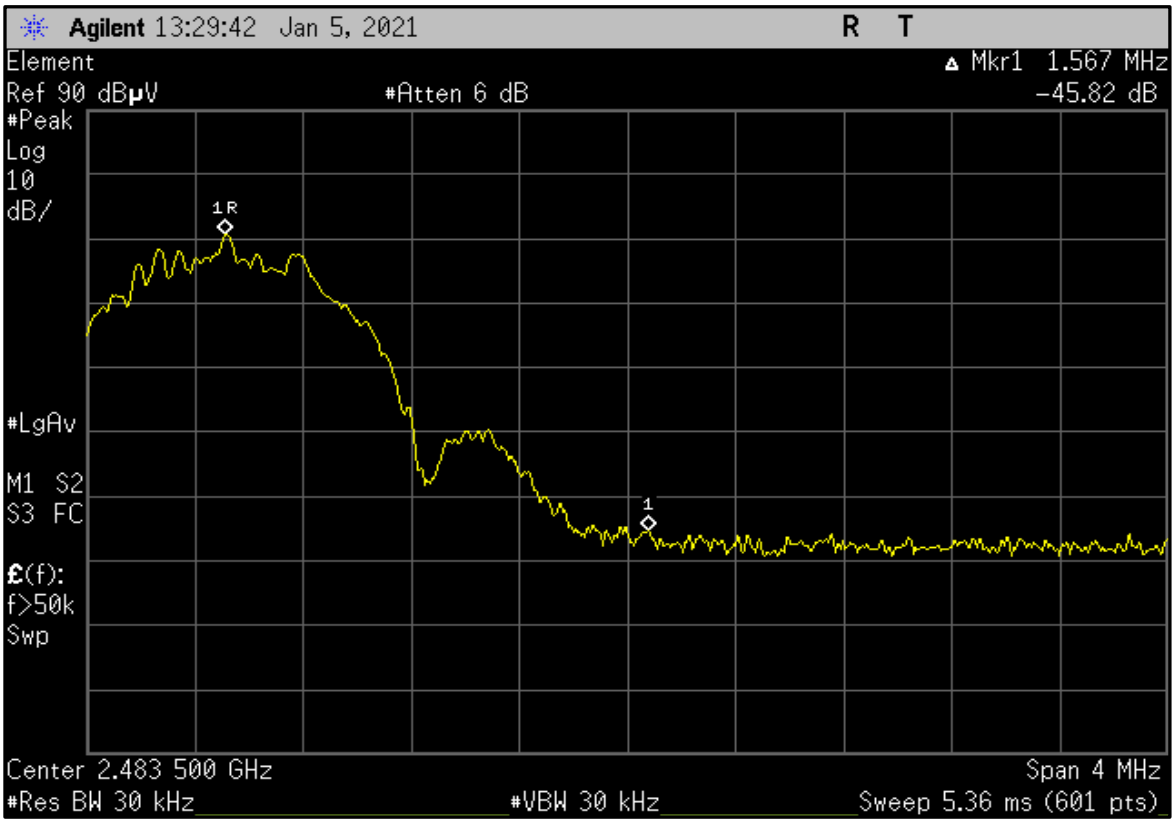


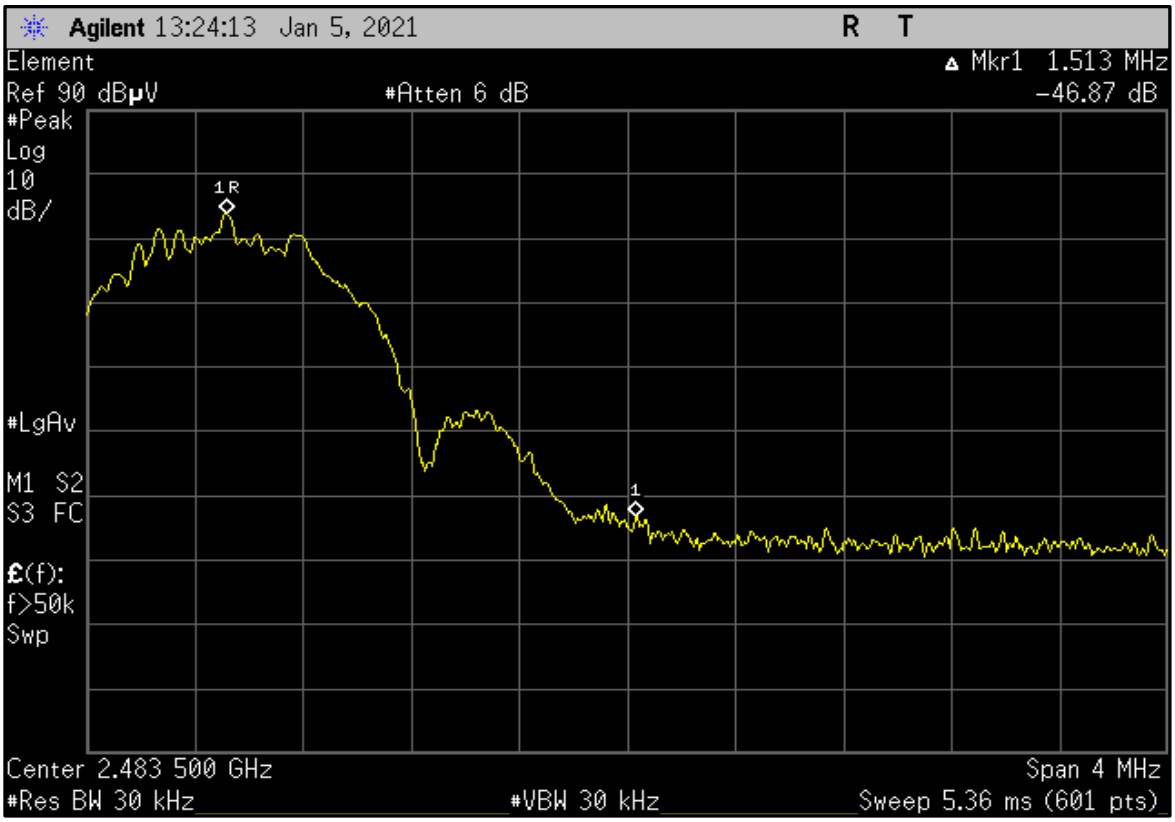
High Ch., EUT Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Vert

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT Vert

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.04.03.0

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: C3EY, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

24VDC via 120VAC/60Hz

POE via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 8

SYNA0309 - 7

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2019-11-08	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

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. These “pre-scans” are not 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).

SPURIOUS RADIATED EMISSIONS

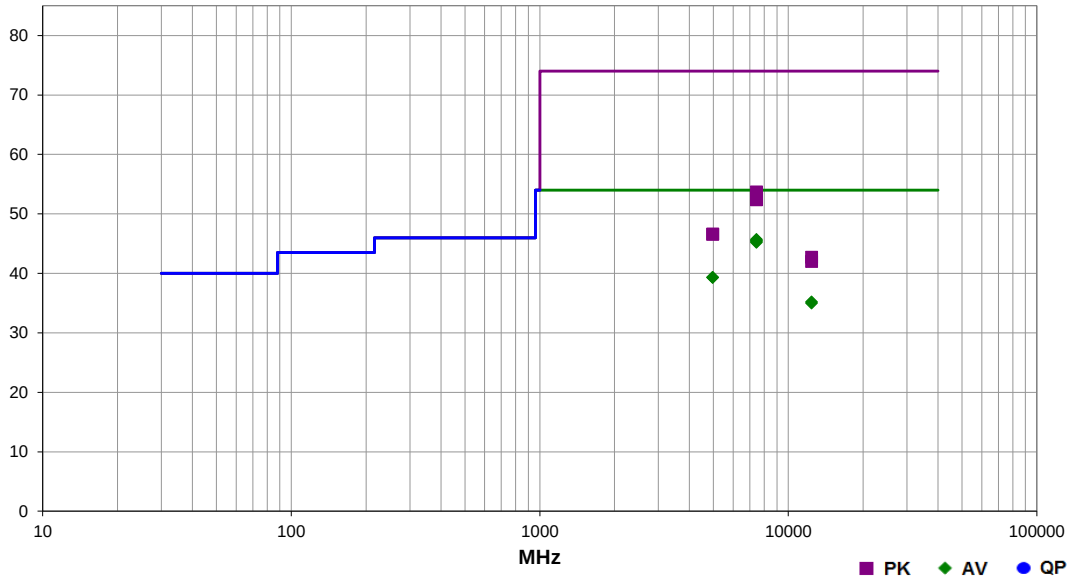
element

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-30		
Project:	None	**Temperature:**	23.3 °C		
Job Site:	NC01	**Humidity:**	54.3% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1024 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	7				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: C3EY, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	138	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.417	27.5	15.0	4.0	305.0	3.2	0.0	Vert	AV	0.0	45.7	54.0	-8.3	High Ch., Port 8, EUT Vert, Ant Vert
7445.483	27.3	15.0	1.5	139.0	3.2	0.0	Horz	AV	0.0	45.5	54.0	-8.5	High Ch., Port 7, EUT on Side, ANT on Side
7445.400	27.2	15.0	1.5	244.0	3.2	0.0	Horz	AV	0.0	45.4	54.0	-8.6	High Ch., Port 8, EUT on Side, Ant on Side
7446.583	27.0	15.0	3.0	338.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 7, EUT Vert, ANT Vert
4963.792	26.6	9.5	1.5	220.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT Vert, Ant Vert
4963.075	26.6	9.5	1.5	335.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT on Side, Ant on Side
12408.410	27.0	5.0	1.5	302.0	3.2	0.0	Vert	AV	0.0	35.2	54.0	-18.8	High Ch., Port 8, EUT Vert, Ant Vert
12412.380	26.8	5.0	1.5	0.0	3.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	High Ch., Port 8, EUT on Side, Ant on Side
7448.425	38.7	15.0	3.0	338.0	0.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	High Ch., Port 7, EUT Vert, ANT Vert
7445.233	38.0	15.0	1.5	139.0	0.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	High Ch., Port 7, EUT on Side, ANT on Side
7447.550	37.4	15.0	4.0	305.0	0.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	High Ch., Port 8, EUT Vert, Ant Vert
7446.950	37.4	15.0	1.5	244.0	0.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	High Ch., Port 8, EUT on Side, Ant on Side
4962.442	37.1	9.5	1.5	220.0	0.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	High Ch., Port 8, EUT Vert, Ant Vert
4964.283	37.1	9.5	1.5	335.0	0.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	High Ch., Port 8, EUT on Side, Ant on Side
12409.430	37.7	5.0	1.5	302.0	0.0	0.0	Vert	PK	0.0	42.7	74.0	-31.3	High Ch., Port 8, EUT Vert, Ant Vert
12408.090	37.0	5.0	1.5	0.0	0.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	High Ch., Port 8, EUT on Side, Ant on Side

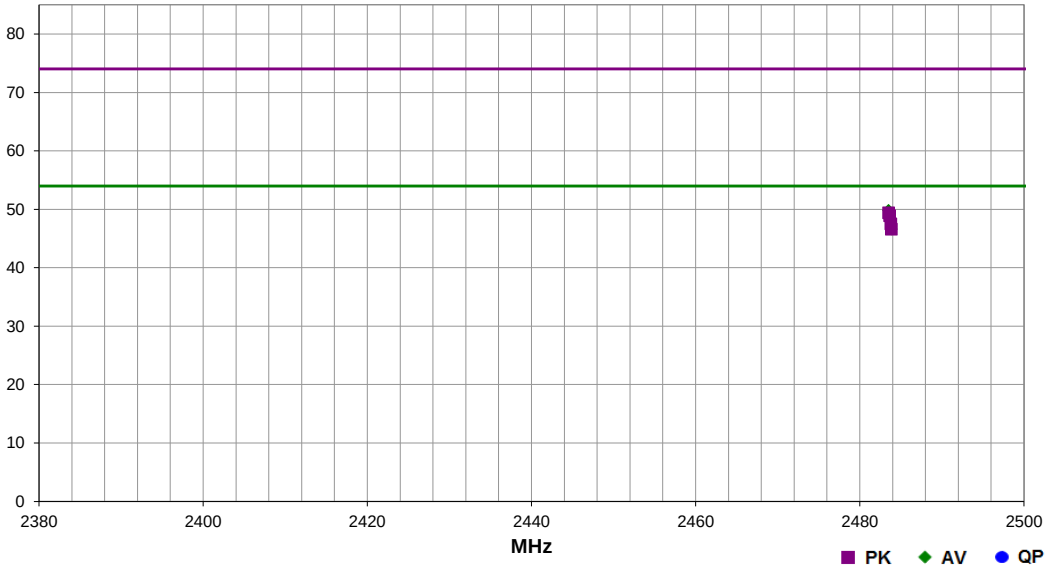
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-30		
Project:	None	**Temperature:**	23.3 °C		
Job Site:	NC01	**Humidity:**	54.3% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1024 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	7				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: C3EY, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	140	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

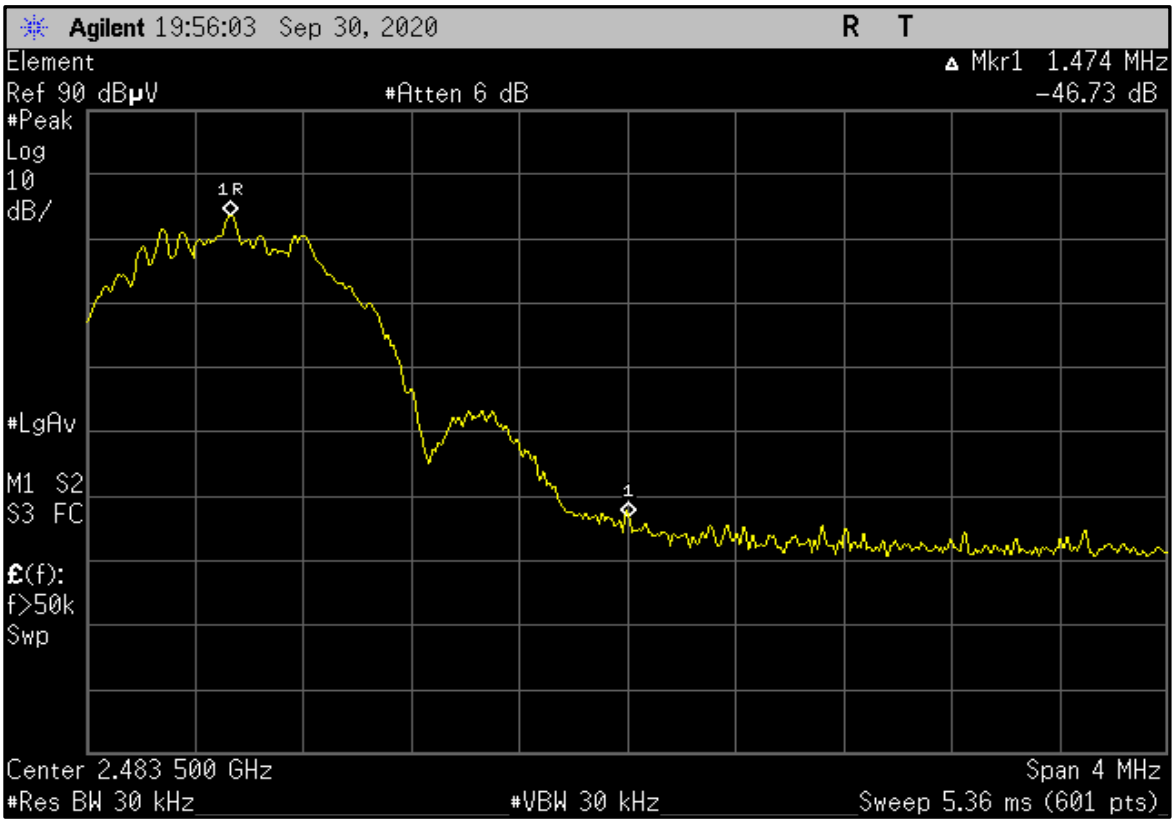


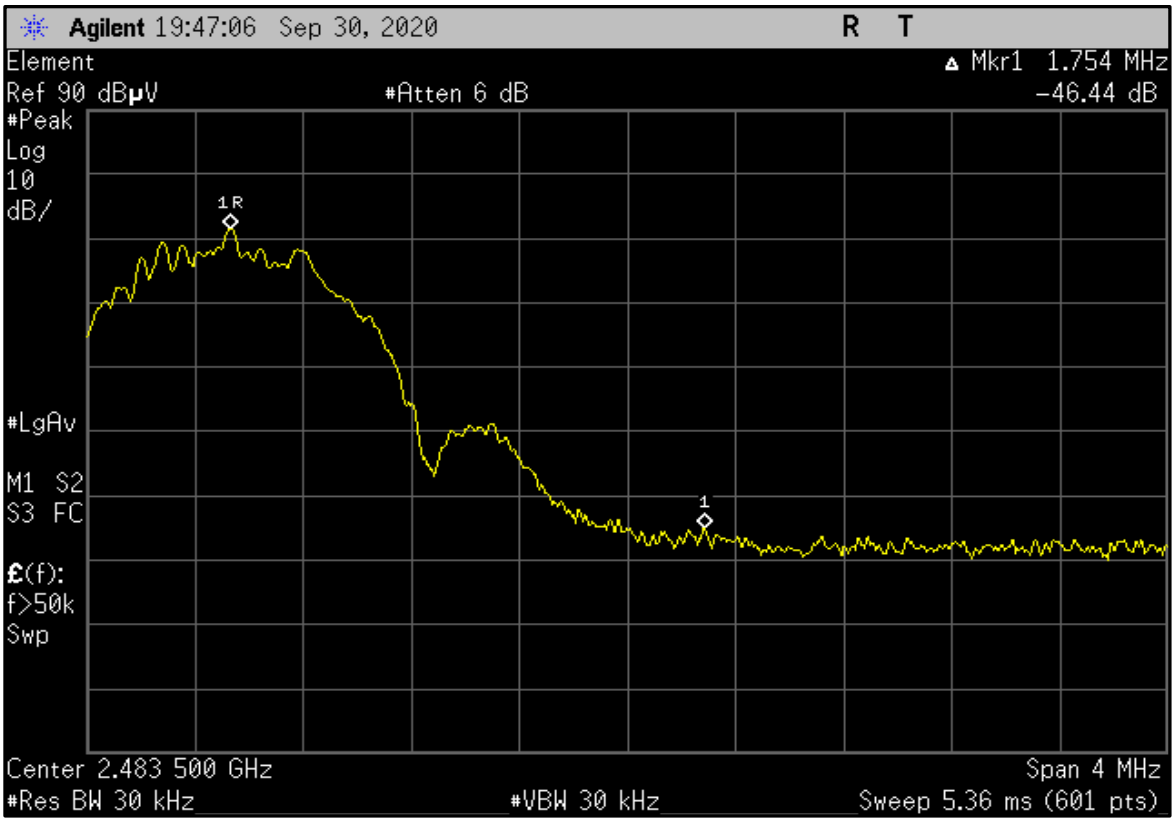
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.507	27.4	-0.8	1.5	257.0	3.2	20.0	Vert	AV	0.0	49.8	54.0	-4.2	High Ch., Port 8, EUT on Side, Ant on Side: Fund 74.1dBuV + -46.7dBc = 27.4dBuV (calc. amp.)
2483.633	26.9	-0.8	1.5	89.0	3.2	20.0	Vert	AV	0.0	49.3	54.0	-4.7	High Ch., Port 7, EUT on Side, ANT on Side: Fund 75.0dBuV + -48.1dBc = 26.9dBuV (calc. amp.)
2483.787	25.5	-0.8	2.1	104.0	3.2	20.0	Horz	AV	0.0	47.9	54.0	-6.1	High Ch., Port 8, EUT Vert, Ant Vert: Fund 71.9dBuV + -46.4dBc = 25.5dBuV (calc. amp.)
2483.853	24.2	-0.8	1.5	25.0	3.2	20.0	Horz	AV	0.0	46.6	54.0	-7.4	High Ch., Port 7, EUT Vert, ANT Vert: Fund 60.6dBuV + -36.4dBc = 24.2dBuV (calc. amp.)
2483.507	30.2	-0.8	1.5	257.0	0.0	20.0	Vert	PK	0.0	49.4	74.0	-24.6	High Ch., Port 8, EUT on Side, Ant on Side: Fund 76.9dBuV + -46.7dBc = 30.2dBuV (calc. amp.)
2483.633	29.7	-0.8	1.5	89.0	0.0	20.0	Vert	PK	0.0	48.9	74.0	-25.1	High Ch., Port 7, EUT on Side, ANT on Side: Fund 77.8dBuV + -48.1dBc = 29.7dBuV (calc. amp.)
2483.787	28.3	-0.8	2.1	104.0	0.0	20.0	Horz	PK	0.0	47.5	74.0	-26.5	High Ch., Port 8, EUT Vert, Ant Vert: Fund 74.7dBuV + -46.4dBc = 28.3dBuV (calc. amp.)
2483.853	27.4	-0.8	1.5	25.0	0.0	20.0	Horz	PK	0.0	46.6	74.0	-27.4	High Ch., Port 7, EUT Vert, ANT Vert: Fund 63.8dBuV + -36.4dBc = 27.4dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.04.03.0



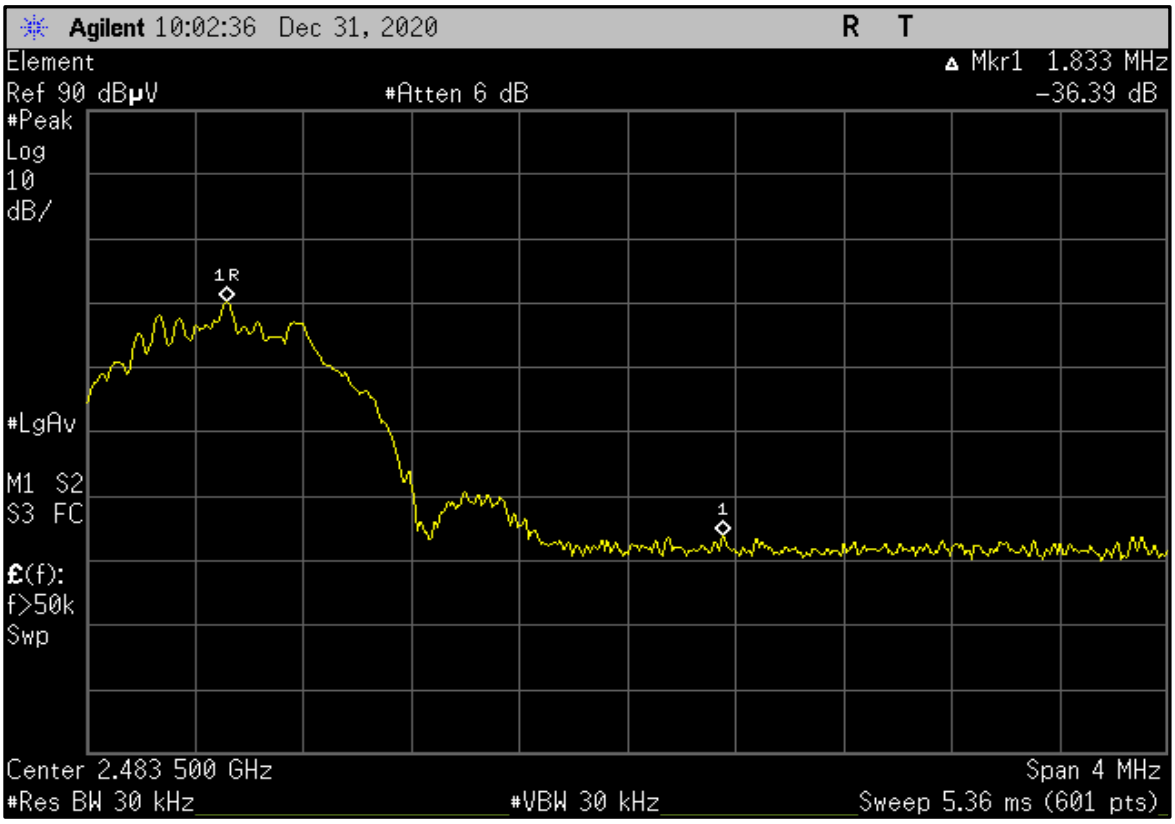


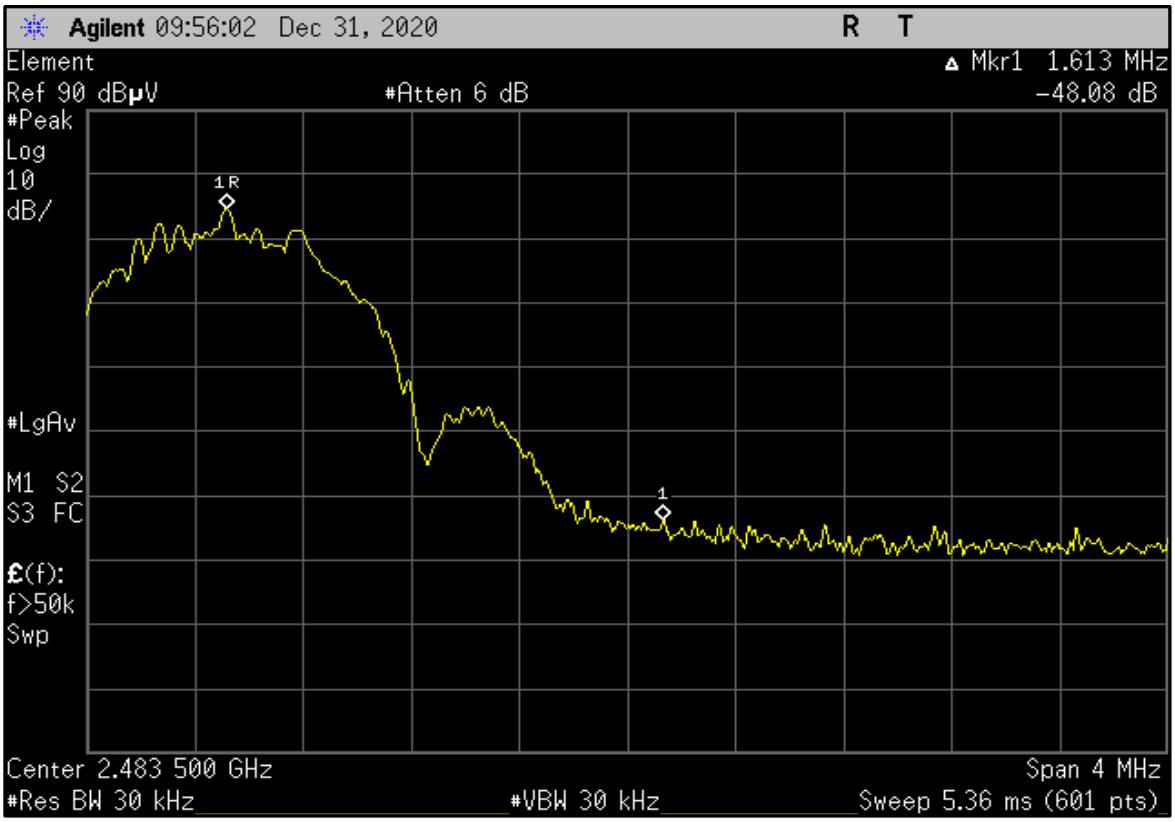
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Vert, ANT Vert

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT on Side, ANT on Side

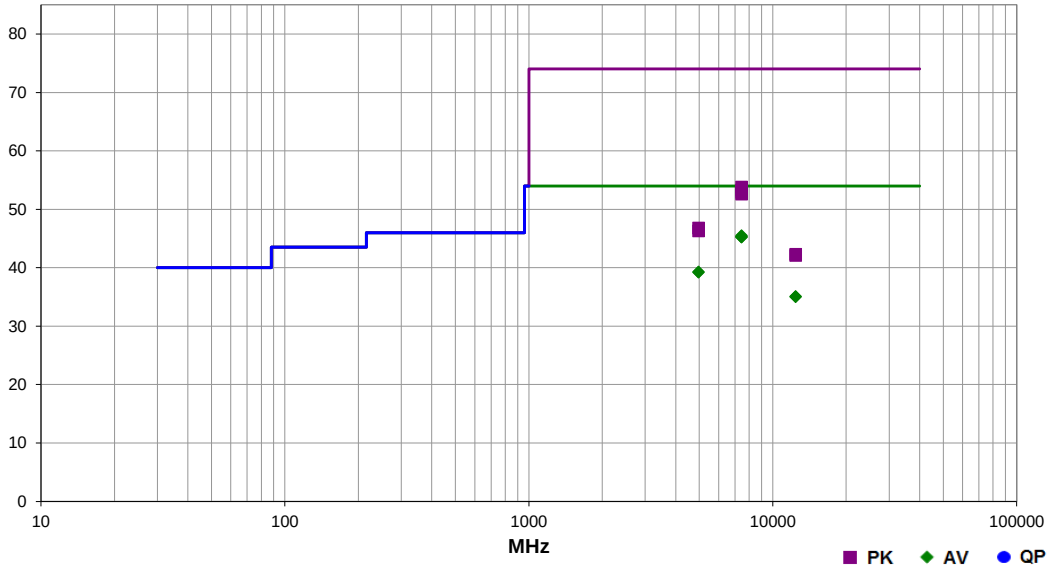
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-30		
Project:	None	**Temperature:**	23.6 °C		
Job Site:	NC01	**Humidity:**	56% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1022 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	8				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: C3EY, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	158	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.567	27.3	15.0	3.3	11.0	3.2	0.0	Vert	AV	0.0	45.5	54.0	-8.5	High Ch., Port 8, EUT Vert, Ant Vert
7444.050	27.1	15.0	1.5	3.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 8, EUT on Side, Ant on Side
7446.475	27.1	15.0	1.5	315.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT on Side, ANT on Side
7447.050	27.0	15.0	2.3	56.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 7, EUT Vert, ANT Vert
4963.858	26.6	9.5	3.2	168.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT Vert, Ant Vert
4961.725	26.5	9.5	1.0	228.0	3.2	0.0	Horz	AV	0.0	39.2	54.0	-14.8	High Ch., Port 8, EUT on Side, Ant on Side
12412.300	26.9	5.0	1.5	255.0	3.2	0.0	Vert	AV	0.0	35.1	54.0	-18.9	High Ch., Port 8, EUT Vert, Ant Vert
12412.490	26.8	5.0	1.5	222.0	3.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	High Ch., Port 8, EUT on Side, Ant on Side
7448.092	38.8	15.0	1.5	3.0	0.0	0.0	Horz	PK	0.0	53.8	74.0	-20.2	High Ch., Port 8, EUT on Side, Ant on Side
7444.717	38.3	15.0	1.5	315.0	0.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	High Ch., Port 7, EUT on Side, ANT on Side
7445.833	37.9	15.0	3.3	11.0	0.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	High Ch., Port 8, EUT Vert, Ant Vert
7446.417	37.6	15.0	2.3	56.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., Port 7, EUT Vert, ANT Vert
4965.542	37.3	9.5	3.2	168.0	0.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	High Ch., Port 8, EUT Vert, Ant Vert
4964.867	36.8	9.5	1.0	228.0	0.0	0.0	Horz	PK	0.0	46.3	74.0	-27.7	High Ch., Port 8, EUT on Side, Ant on Side
12412.270	37.3	5.0	1.5	255.0	0.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	High Ch., Port 8, EUT Vert, Ant Vert
12407.840	37.1	5.0	1.5	222.0	0.0	0.0	Horz	PK	0.0	42.1	74.0	-31.9	High Ch., Port 8, EUT on Side, Ant on Side

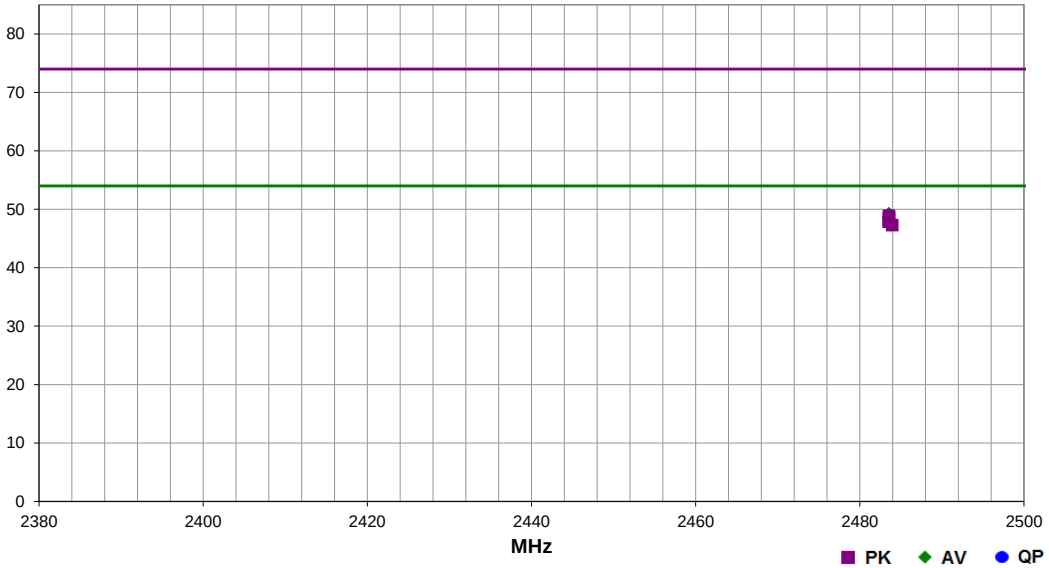
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-30		
Project:	None	**Temperature:**	23.6 °C		
Job Site:	NC01	**Humidity:**	56% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1022 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	8				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: C3EY, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	160	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

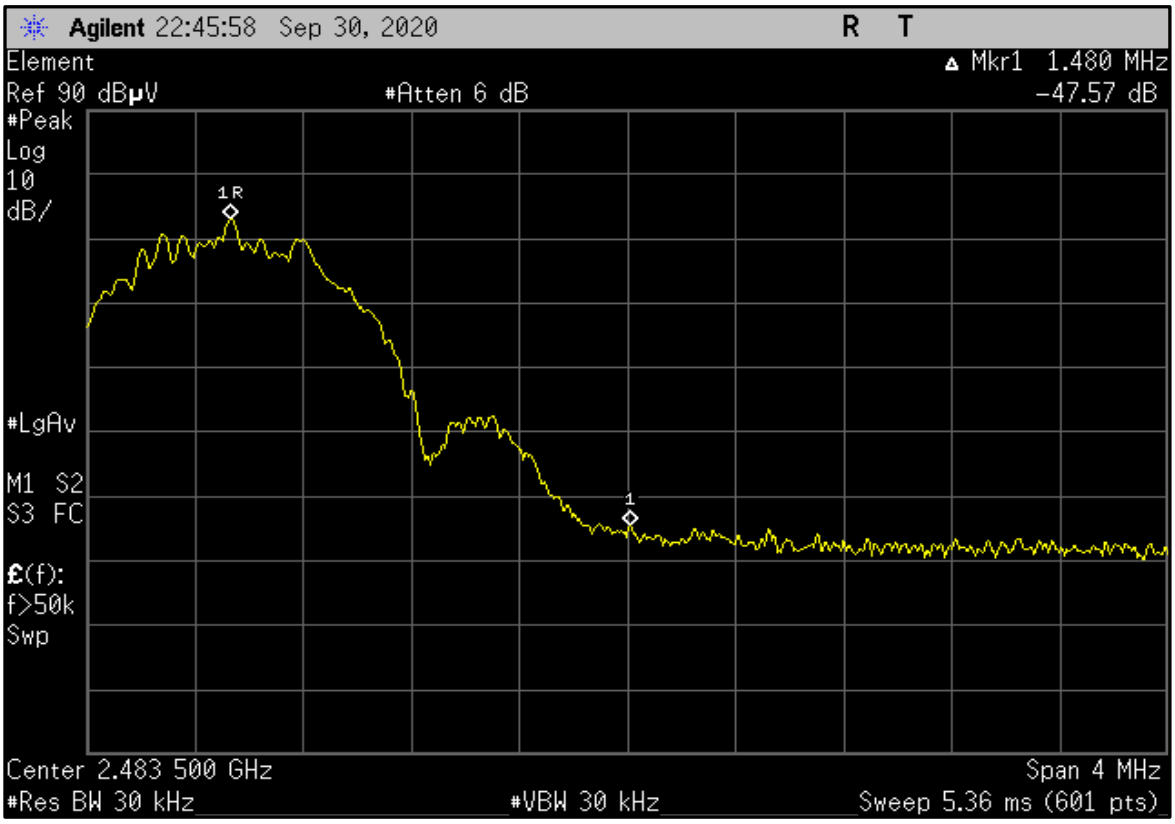


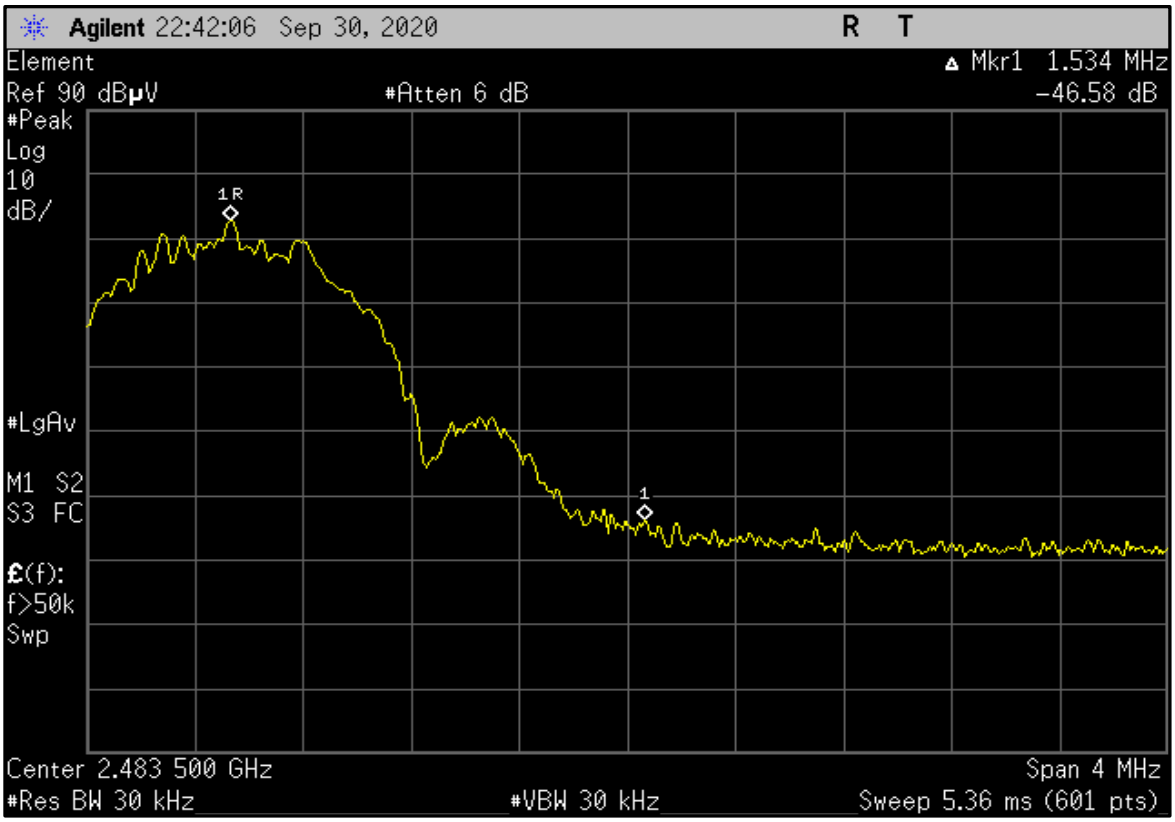
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.540	26.9	-0.8	1.5	88.0	3.2	20.0	Vert	AV	0.0	49.3	54.0	-4.7	High Ch., Port 7, EUT on Side, Ant on Side: Fund 75.7dBuV + -48.8dBc = 26.9dBuV (calc. amp.)
2483.567	26.7	-0.8	2.0	103.0	3.2	20.0	Horz	AV	0.0	49.1	54.0	-4.9	High Ch., Port 8, EUT Vert, Ant Vert: Fund 73.3dBuV + -46.6dBc = 26.7dBuV (calc. amp.)
2483.513	26.0	-0.8	1.5	304.0	3.2	20.0	Vert	AV	0.0	48.4	54.0	-5.6	High Ch., Port 8, EUT on Side, Ant on Side: Fund 73.6dBuV + -47.6dBc = 26.0dBuV (calc. amp.)
2483.940	25.3	-0.8	3.2	96.0	3.2	20.0	Horz	AV	0.0	47.7	54.0	-6.3	High Ch., Port 7, EUT Vert, Ant Vert: Fund 72.8dBuV + -47.5dBc = 25.3dBuV (calc. amp.)
2483.540	29.7	-0.8	1.5	88.0	0.0	20.0	Vert	PK	0.0	48.9	74.0	-25.1	High Ch., Port 7, EUT on Side, Ant on Side: Fund 78.5dBuV + -48.8dBc = 29.7dBuV (calc. amp.)
2483.567	29.4	-0.8	2.0	103.0	0.0	20.0	Horz	PK	0.0	48.6	74.0	-25.4	High Ch., Port 8, EUT Vert, Ant Vert: Fund 76.0dBuV + -46.6dBc = 29.4dBuV (calc. amp.)
2483.513	28.7	-0.8	1.5	304.0	0.0	20.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch., Port 8, EUT on Side, Ant on Side: Fund 76.3dBuV + -47.6dBc = 28.7dBuV (calc. amp.)
2483.940	28.1	-0.8	3.2	96.0	0.0	20.0	Horz	PK	0.0	47.3	74.0	-26.7	High Ch., Port 7, EUT Vert, Ant Vert: Fund 75.6dBuV + -47.5dBc = 28.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.04.03.0



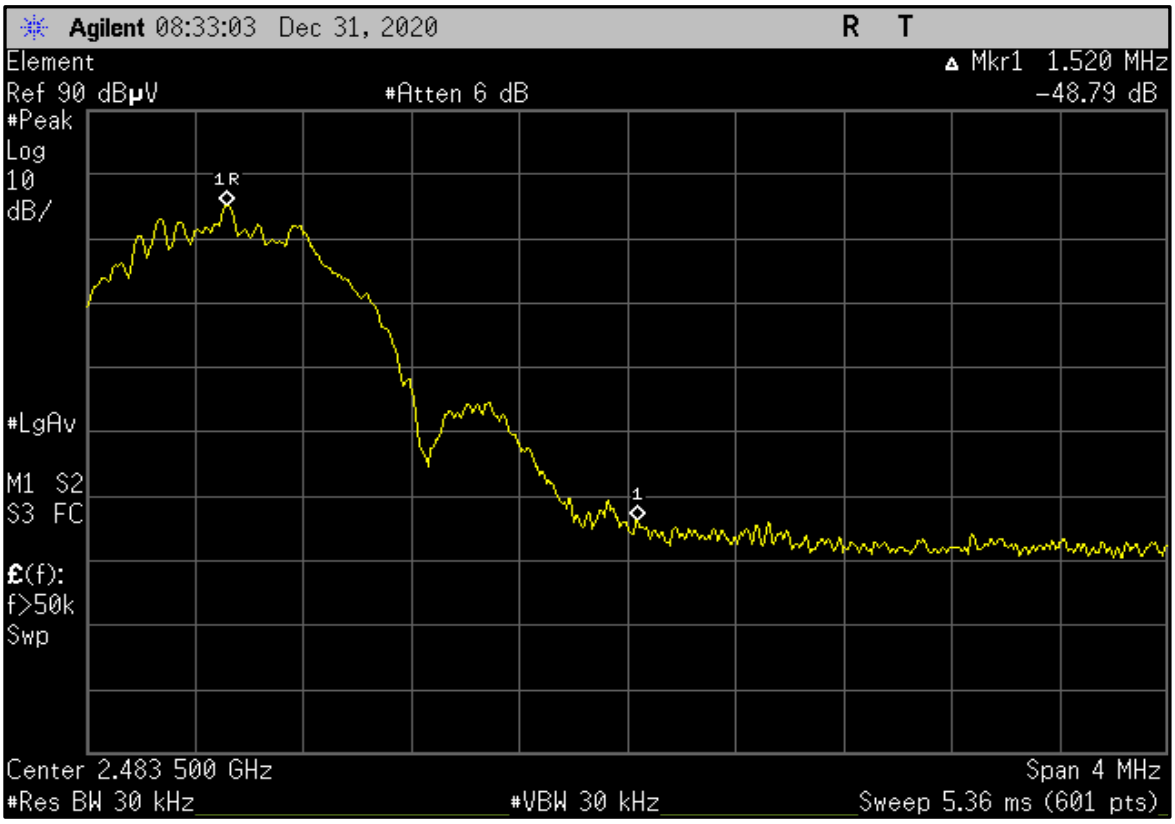


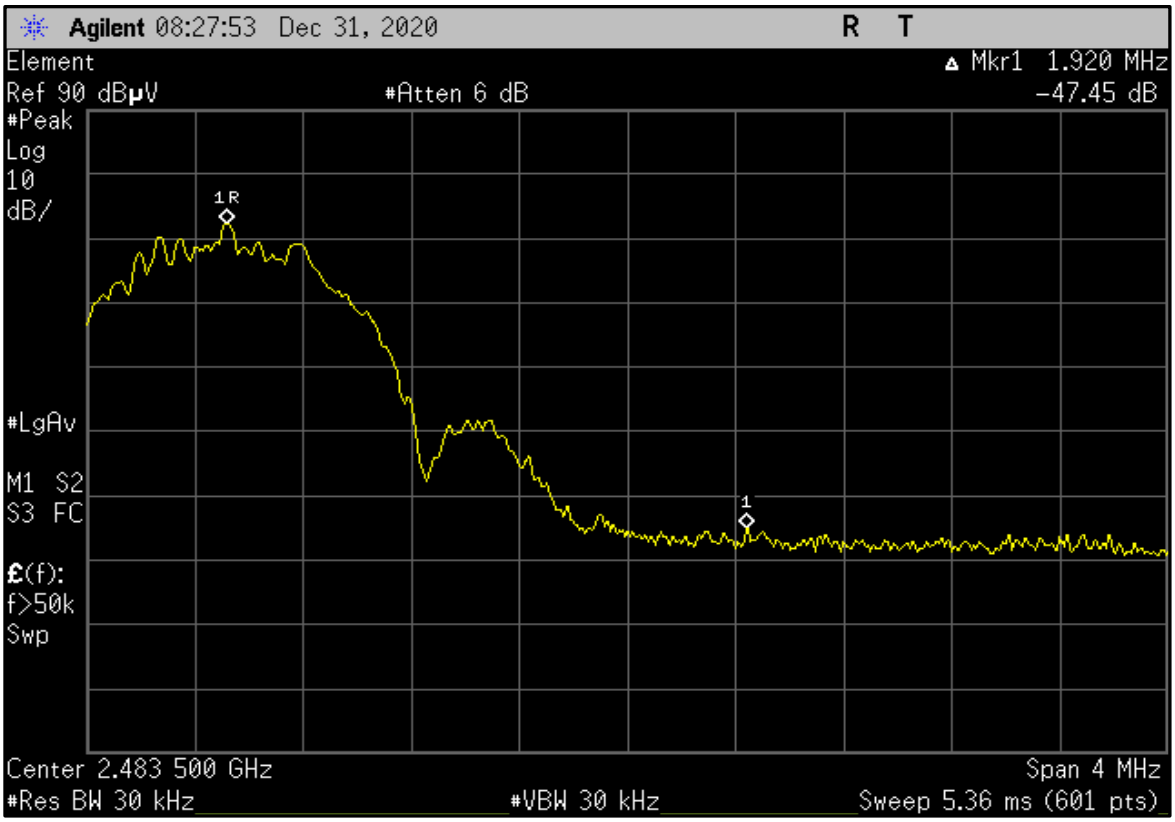
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT on Side, Ant on Side

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.04.03.0

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Port 8, Antenna PN: GW.26.0111, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

POE via 120VAC/60Hz

24VDC via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 3

SYNA0309 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2019-11-08	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.04.03.0

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 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. These “pre-scans” are not 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).

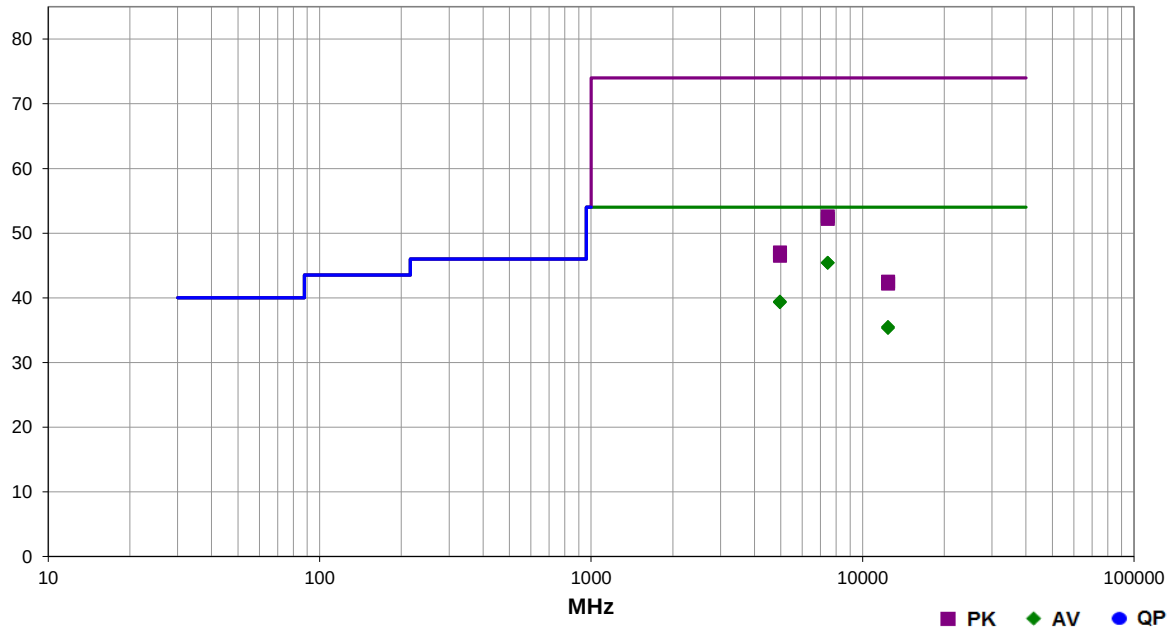
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.04.20.0 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-26		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	NC01	**Humidity:**	53.9% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1028 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	4				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: GW.26.0111, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	56	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.383	27.2	15.0	1.5	15.0	3.2	0.0	Horz	AV	0.0	45.4	54.0	-8.6	High Ch., EUT Horz
7448.400	27.2	15.0	2.2	191.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., EUT on Side
4964.267	26.7	9.5	1.5	124.0	3.2	0.0	Horz	AV	0.0	39.4	54.0	-14.6	High Ch., EUT Horz
4961.983	26.6	9.5	1.5	55.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., EUT on Side
12412.200	27.3	5.0	1.3	183.0	3.2	0.0	Vert	AV	0.0	35.5	54.0	-18.5	High Ch., EUT on Side
12411.780	27.1	5.0	1.5	360.0	3.2	0.0	Horz	AV	0.0	35.3	54.0	-18.7	High Ch., EUT Horz
7446.450	37.6	15.0	2.2	191.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., EUT on Side
7446.142	37.2	15.0	1.5	15.0	0.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	High Ch., EUT Horz
4965.325	37.5	9.5	1.5	55.0	0.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch., EUT on Side
4962.383	37.0	9.5	1.5	124.0	0.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	High Ch., EUT Horz
12411.990	37.5	5.0	1.3	183.0	0.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5	High Ch., EUT on Side
12407.880	37.2	5.0	1.5	360.0	0.0	0.0	Horz	PK	0.0	42.2	74.0	-31.8	High Ch., EUT Horz

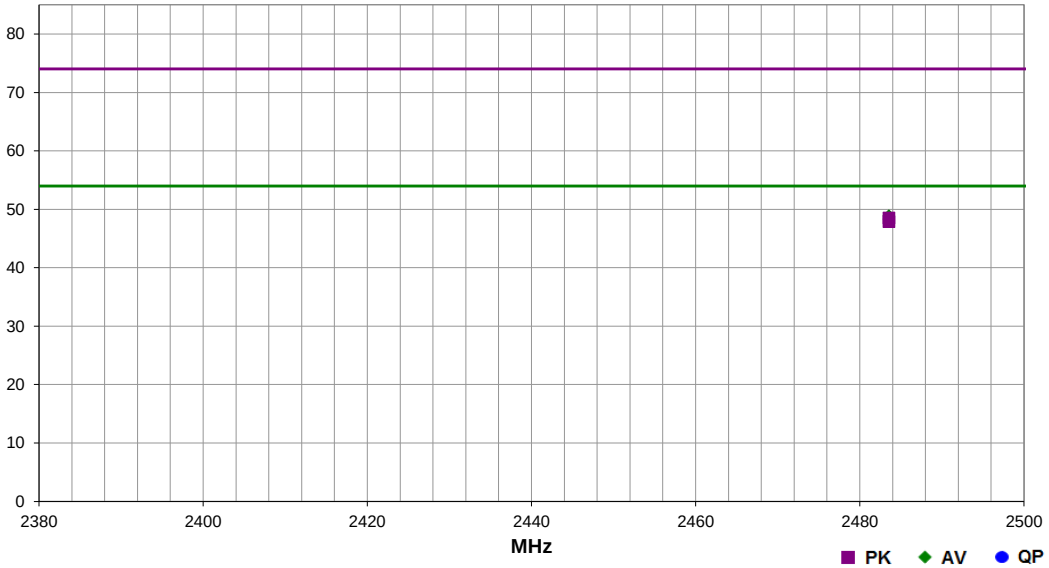
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-29		
Project:	None	**Temperature:**	23.7 °C		
Job Site:	NC01	**Humidity:**	49.2% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1019 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	4				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: GW.26.0111, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	118	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

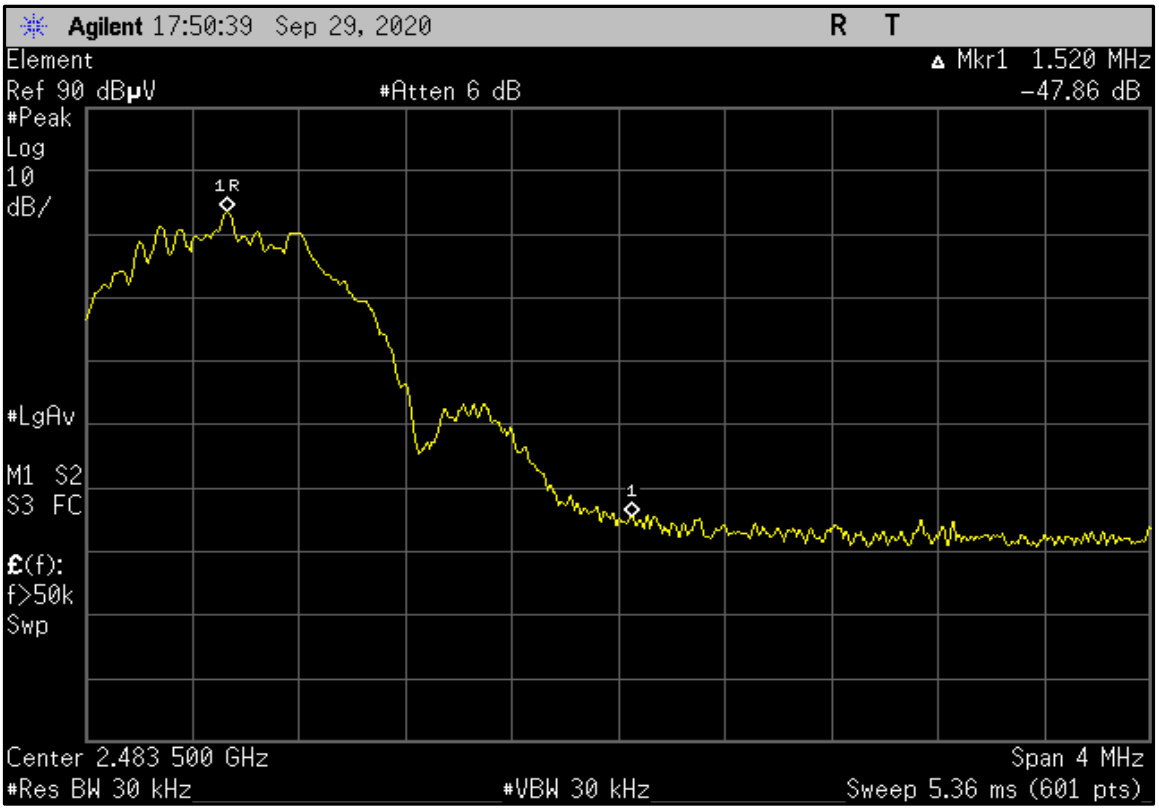


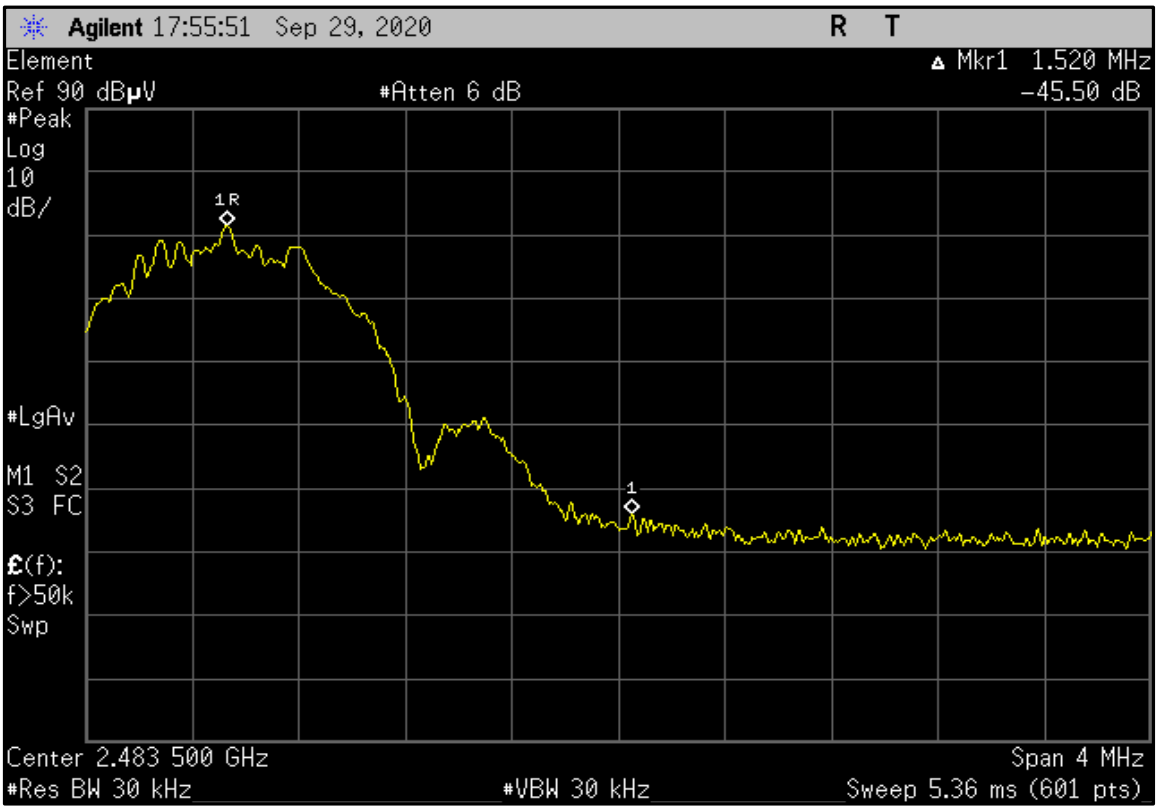
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.553	26.5	-0.8	1.6	152.0	3.2	20.0	Horz	AV	0.0	48.9	54.0	-5.1	High Ch., EUT Vert: Fund 72.0dBuV + -45.5dBc = 26.5dBuV (calc. amp.)
2483.553	25.9	-0.8	4.0	136.0	3.2	20.0	Vert	AV	0.0	48.3	54.0	-5.7	High Ch., EUT Horz: Fund 73.8dBuV + -47.9dBc = 25.9dBuV (calc. amp.)
2483.553	29.3	-0.8	1.6	152.0	0.0	20.0	Horz	PK	0.0	48.5	74.0	-25.5	High Ch., EUT Vert: Fund 74.8dBuV + -45.5dBc = 29.3dBuV (calc. amp.)
2483.553	28.7	-0.8	4.0	136.0	0.0	20.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch., EUT Horz: Fund 76.6dBuV + -47.9dBc = 28.7dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Horz

PSA-ESCI 2020.04.03.0





High Ch., EUT Vert

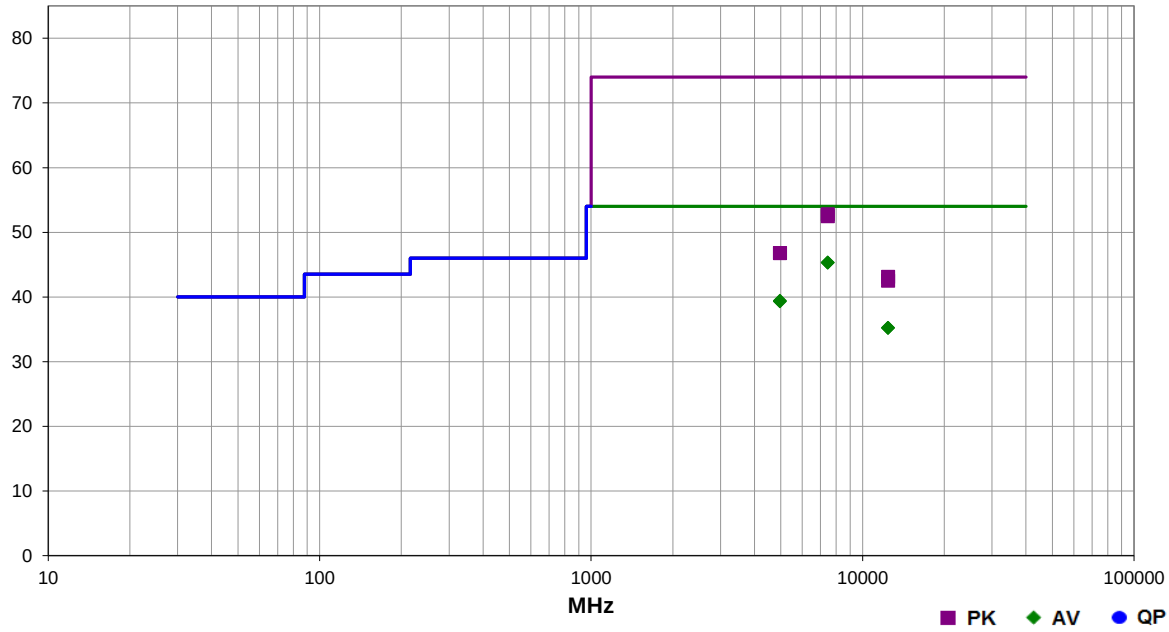
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-29		
Project:	None	**Temperature:**	23.7 °C		
Job Site:	NC01	**Humidity:**	49.2% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1019 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	3				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: GW.26.0111, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	115	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7444.592	27.1	15.0	2.0	303.0	3.2	0.0	Vert	AV	0.0	45.3	54.0	-8.7	High Ch., EUT on Side
7446.358	27.1	15.0	1.0	310.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., EUT Horz
4961.633	26.7	9.5	1.5	314.0	3.2	0.0	Vert	AV	0.0	39.4	54.0	-14.6	High Ch., EUT on Side
4961.600	26.6	9.5	3.9	7.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Horz
12409.620	27.0	5.0	1.5	59.0	3.2	0.0	Horz	AV	0.0	35.2	54.0	-18.8	High Ch., EUT Horz
12412.450	27.0	5.0	1.5	276.0	3.2	0.0	Vert	AV	0.0	35.2	54.0	-18.8	High Ch., EUT on Side
7448.250	37.8	15.0	1.0	310.0	0.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	High Ch., EUT Horz
7443.642	37.5	15.0	2.0	303.0	0.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	High Ch., EUT on Side
4963.767	37.3	9.5	1.5	314.0	0.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	High Ch., EUT on Side
4963.717	37.3	9.5	3.9	7.0	0.0	0.0	Horz	PK	0.0	46.8	74.0	-27.2	High Ch., EUT Horz
12410.550	38.1	5.0	1.5	59.0	0.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	High Ch., EUT Horz
12409.070	37.5	5.0	1.5	276.0	0.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5	High Ch., EUT on Side

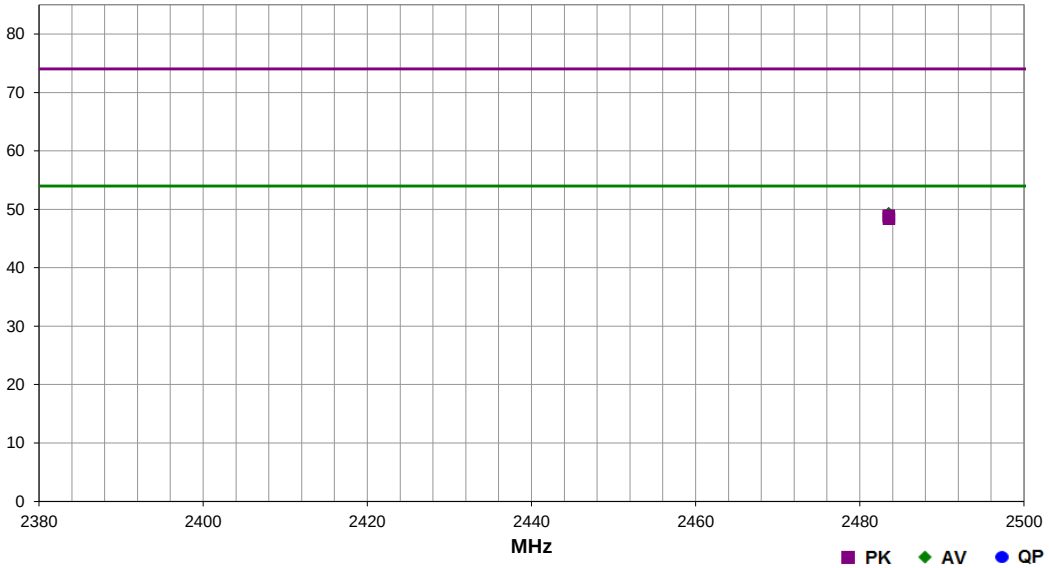
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-29		
Project:	None	**Temperature:**	23.7 °C		
Job Site:	NC01	**Humidity:**	49.2% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1019 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	3				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: GW.26.0111, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	117	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

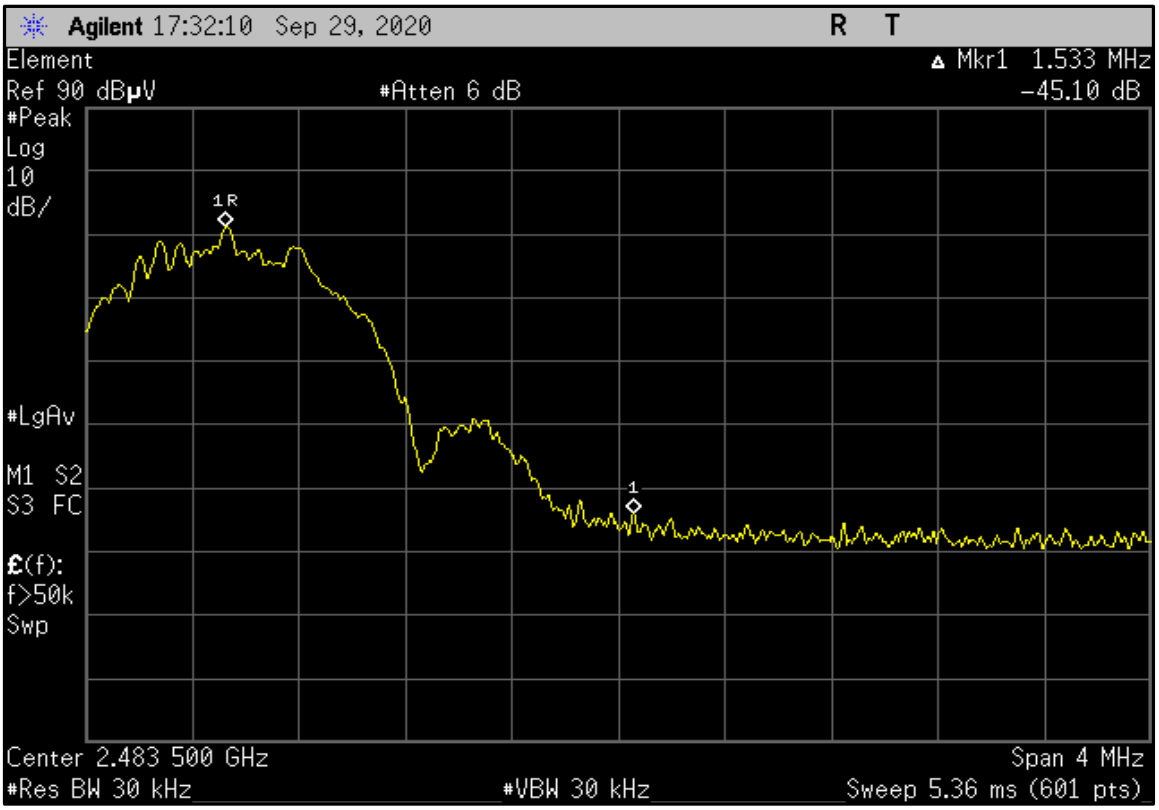


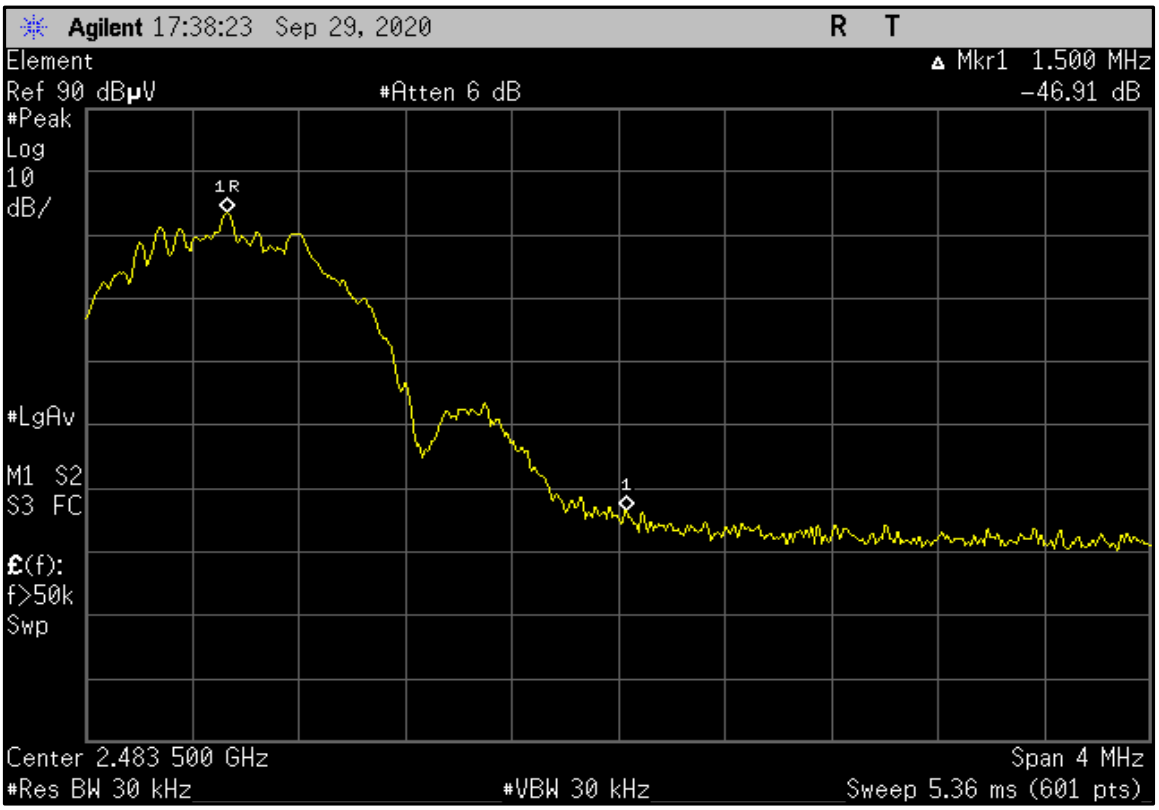
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.533	26.9	-0.8	4.0	137.0	3.2	20.0	Vert	AV	0.0	49.3	54.0	-4.7	High Ch., EUT Horz: Fund 73.8dBuV + -46.9dBc = 26.9dBuV (calc. amp.)
2483.560	26.4	-0.8	1.5	150.0	3.2	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch., EUT Vert: Fund 71.5dBuV + -45.1dBc = 26.4dBuV (calc. amp.)
2483.533	29.7	-0.8	4.0	137.0	0.0	20.0	Vert	PK	0.0	48.9	74.0	-25.1	High Ch., EUT Horz: Fund 76.6dBuV + -46.9dBc = 29.7dBuV (calc. amp.)
2483.560	29.2	-0.8	1.5	150.0	0.0	20.0	Horz	PK	0.0	48.4	74.0	-25.6	High Ch., EUT Vert: Fund 74.3dBuV + -45.1dBc = 29.2dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Vert

PSA-ESCI 2020.04.03.0





High Ch., EUT Horz

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.04.03.0

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: RE09P-NM, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

24VDC via 120VAC/60Hz

POE via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 6

SYNA0309 - 5

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2019-11-08	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

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. These “pre-scans” are not 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).

SPURIOUS RADIATED EMISSIONS

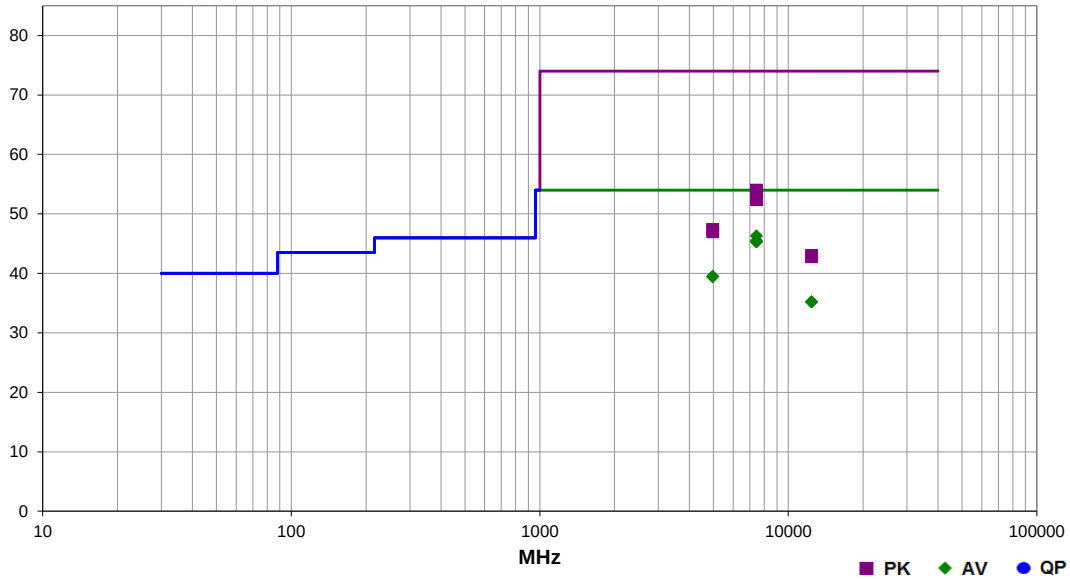
element

EmiR5 2020.04.20.0 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-28		
Project:	None	**Temperature:**	23.1 °C		
Job Site:	NC01	**Humidity:**	49.5% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1028 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	5				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: RE09P-NM, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	89	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.463	28.1	15.0	1.5	41.0	3.2	0.0	Horz	AV	0.0	46.3	54.0	-7.7	High Ch., Port 8, EUT on Side, Ant on Side
7445.973	27.3	15.0	1.5	41.0	3.2	0.0	Vert	AV	0.0	45.5	54.0	-8.5	High Ch., Port 8, EUT on Side, Ant on Side
7446.433	27.1	15.0	1.0	298.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT on Side, Ant on Side
7444.792	27.1	15.0	1.5	10.0	3.2	0.0	Vert	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT on Side, Ant on Side
4963.383	26.8	9.5	1.5	296.0	3.2	0.0	Horz	AV	0.0	39.5	54.0	-14.5	High Ch., Port 8, EUT on Side, Ant on Side
4963.653	26.7	9.5	1.5	6.0	3.2	0.0	Vert	AV	0.0	39.4	54.0	-14.6	High Ch., Port 8, EUT on Side, Ant on Side
12409.200	27.0	5.0	1.5	28.0	3.2	0.0	Horz	AV	0.0	35.2	54.0	-18.8	High Ch., Port 8, EUT on Side, Ant on Side
12409.270	27.0	5.0	1.5	13.0	3.2	0.0	Vert	AV	0.0	35.2	54.0	-18.8	High Ch., Port 8, EUT on Side, Ant on Side
7445.897	39.0	15.0	1.5	41.0	0.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	High Ch., Port 8, EUT on Side, Ant on Side
7445.603	38.3	15.0	1.5	41.0	0.0	0.0	Vert	PK	0.0	53.3	74.0	-20.7	High Ch., Port 8, EUT on Side, Ant on Side
7445.150	37.8	15.0	1.0	298.0	0.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	High Ch., Port 7, EUT on Side, Ant on Side
7444.967	37.4	15.0	1.5	10.0	0.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	High Ch., Port 7, EUT on Side, Ant on Side
4963.630	37.9	9.5	1.5	6.0	0.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	High Ch., Port 8, EUT on Side, Ant on Side
4963.337	37.5	9.5	1.5	296.0	0.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	High Ch., Port 8, EUT on Side, Ant on Side
12409.440	38.0	5.0	1.5	28.0	0.0	0.0	Horz	PK	0.0	43.0	74.0	-31.0	High Ch., Port 8, EUT on Side, Ant on Side
12410.270	37.8	5.0	1.5	13.0	0.0	0.0	Vert	PK	0.0	42.8	74.0	-31.2	High Ch., Port 8, EUT on Side, Ant on Side

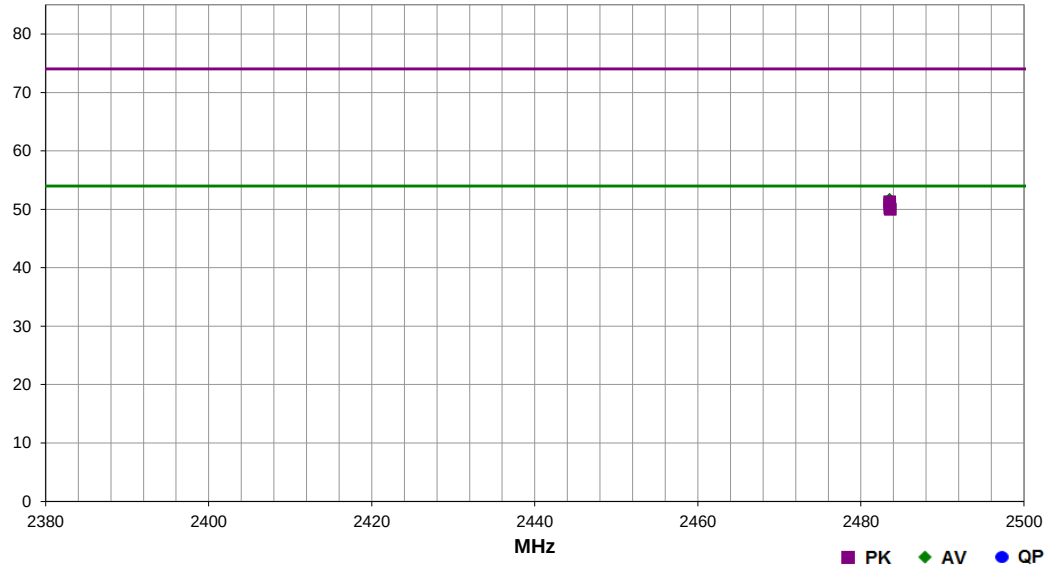
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-28		
Project:	None	**Temperature:**	23.3 °C		
Job Site:	NC01	**Humidity:**	49.5% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1021 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	5				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: RE09P-NM, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	111	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

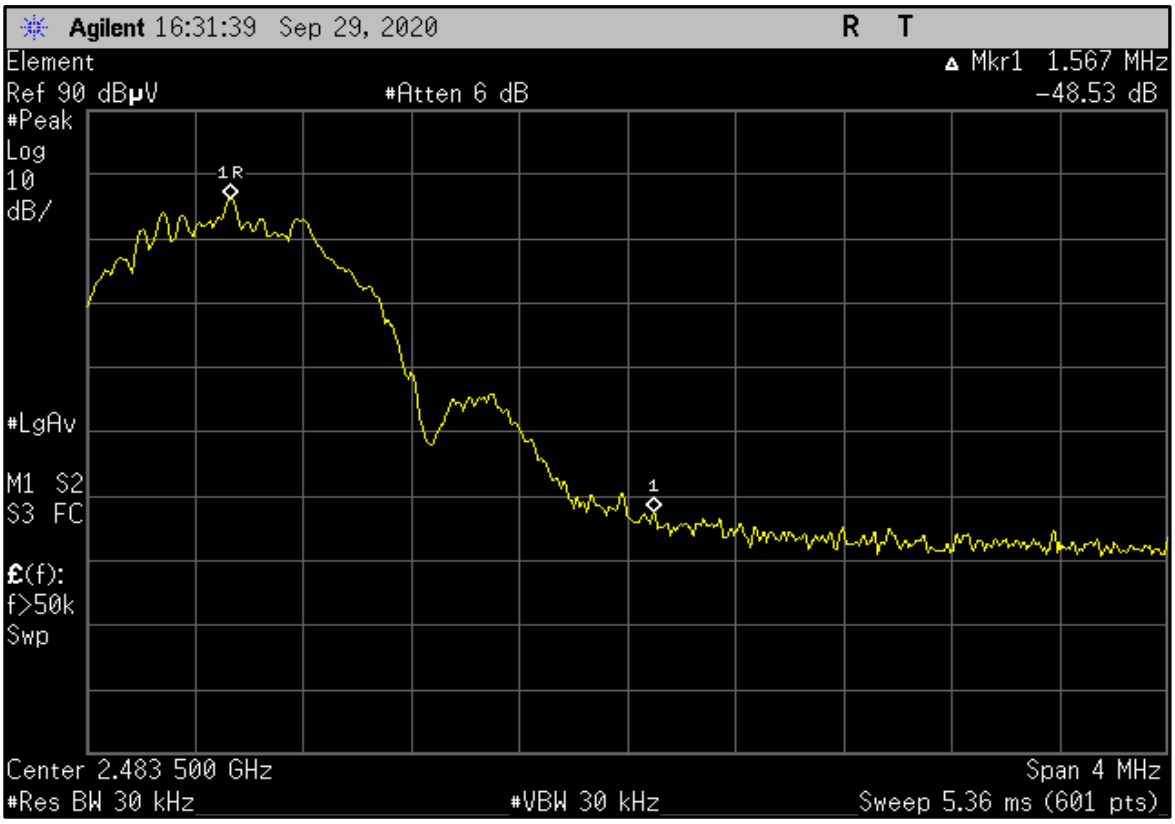


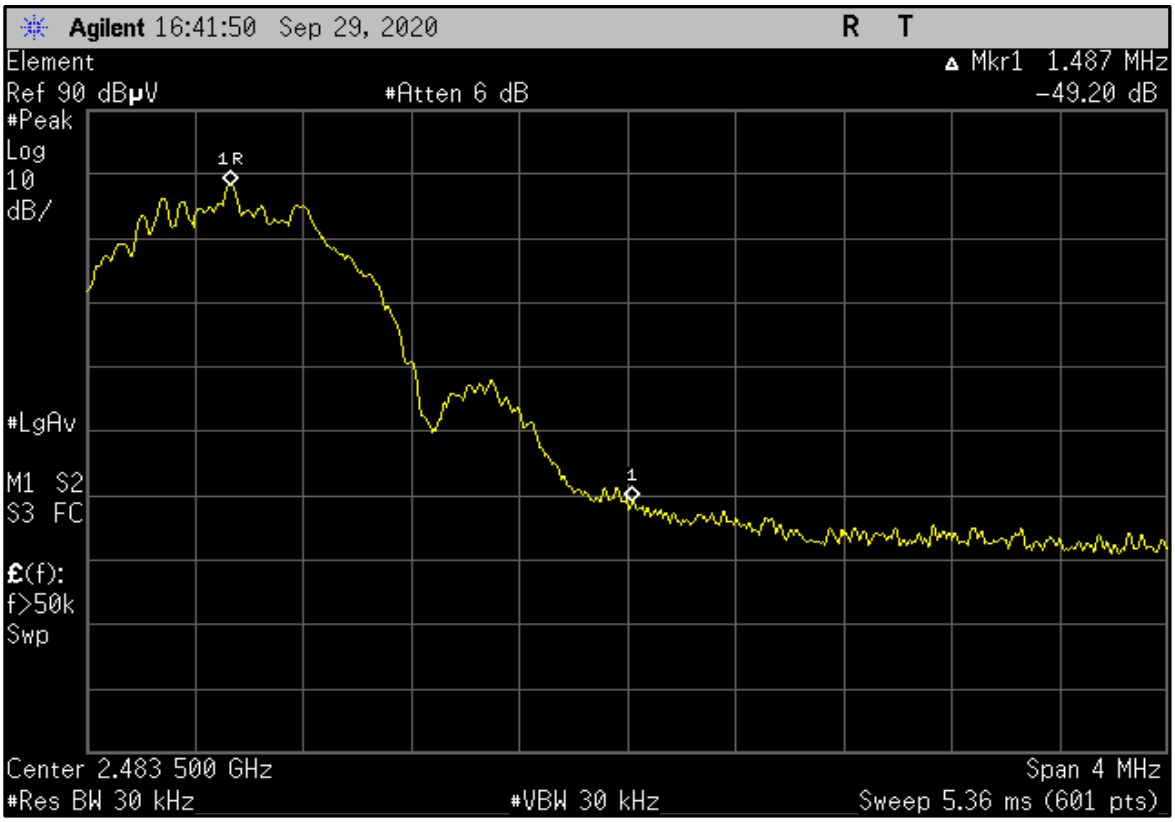
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.520	29.3	-0.8	3.9	355.0	3.2	20.0	Horz	AV	0.0	51.7	54.0	-2.3	High Ch., Port 8, EUT on Side, Ant on Side: Fund 78.7dBuV + -49.4dBc = 29.3dBuV (calc. amp.)
2483.547	28.8	-0.8	1.0	159.0	3.2	20.0	Vert	AV	0.0	51.2	54.0	-2.8	High Ch., Port 7, EUT Vert, Ant Vert: Fund 76.7dBuV + -47.9dBc = 28.8dBuV (calc. amp.)
2483.540	28.3	-0.8	1.7	159.0	3.2	20.0	Horz	AV	0.0	50.7	54.0	-3.3	High Ch., Port 7, EUT on Side, Ant on Side: Fund 77.1dBuV + -48.8dBc = 28.3dBuV (calc. amp.)
2483.600	28.1	-0.8	3.4	346.0	3.2	20.0	Vert	AV	0.0	50.5	54.0	-3.5	High Ch., Port 8, EUT Vert, Ant Vert: Fund 76.6dBuV + -48.5dBc = 28.1dBuV (calc. amp.)
2483.520	32.1	-0.8	3.9	355.0	0.0	20.0	Horz	PK	0.0	51.3	74.0	-22.7	High Ch., Port 8, EUT on Side, Ant on Side: Fund 81.5dBuV + -49.4dBc = 32.1dBuV (calc. amp.)
2483.547	31.6	-0.8	1.0	159.0	0.0	20.0	Vert	PK	0.0	50.8	74.0	-23.2	High Ch., Port 7, EUT Vert, Ant Vert: Fund 79.5dBuV + -47.9dBc = 31.6dBuV (calc. amp.)
2483.540	31.0	-0.8	1.7	159.0	0.0	20.0	Horz	PK	0.0	50.2	74.0	-23.8	High Ch., Port 7, EUT on Side, Ant on Side: Fund 79.8dBuV + -48.8dBc = 31.0dBuV (calc. amp.)
2483.600	30.8	-0.8	3.4	346.0	0.0	20.0	Vert	PK	0.0	50.0	74.0	-24.0	High Ch., Port 8, EUT Vert, Ant Vert: Fund 79.3dBuV + -48.5dBc = 30.8dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Vert, Ant Vert

PSA-ESCI 2020.04.03.0



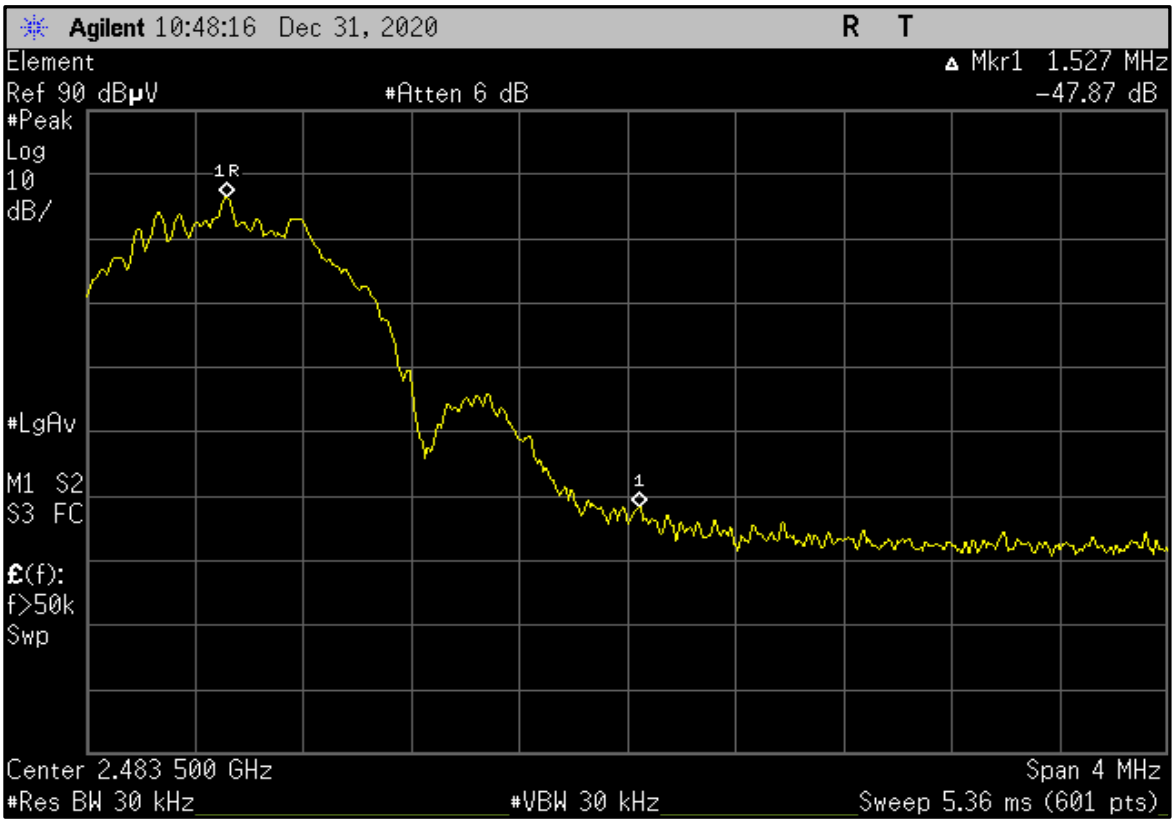


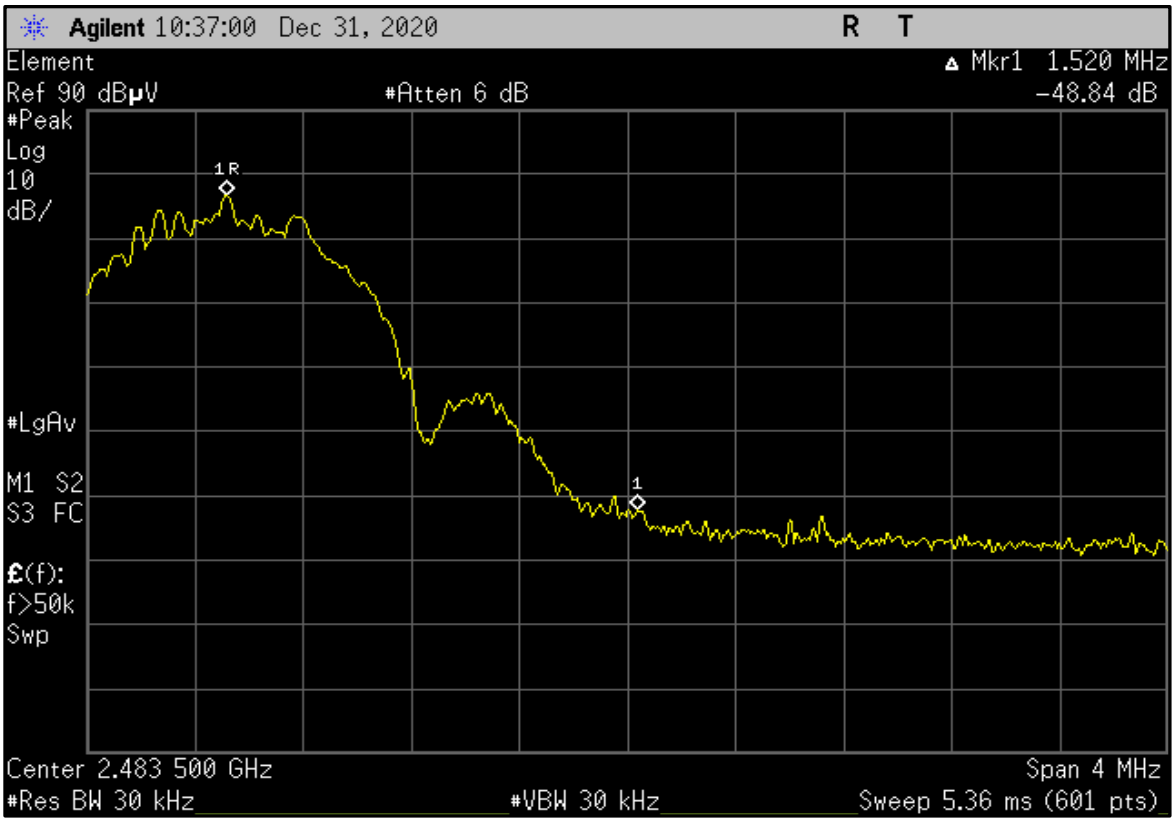
High Ch., Port 8, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Vert, Ant Vert

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

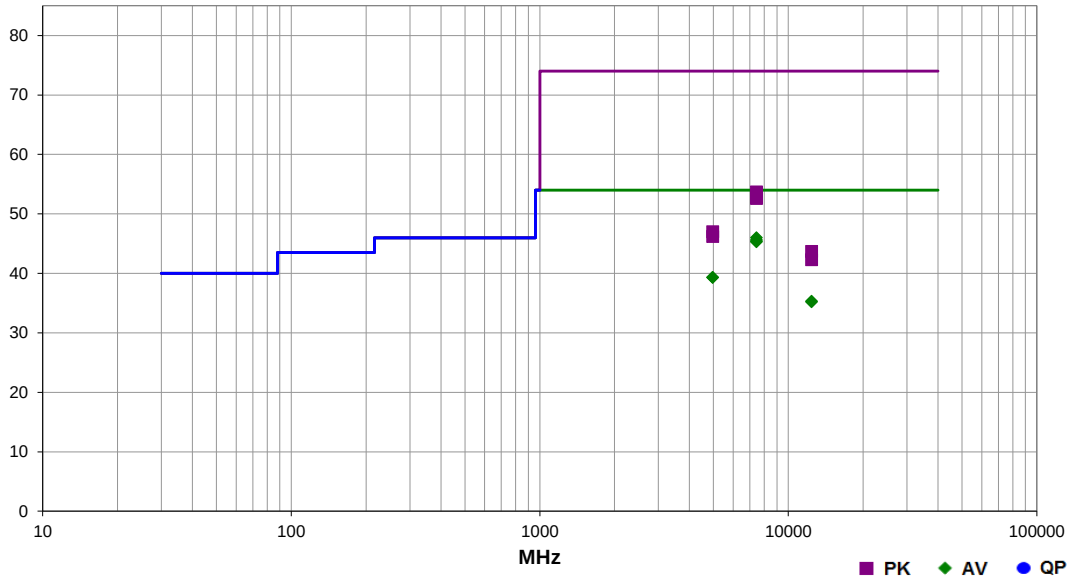
element

EmiR5 2020.04.20.0 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-28		
Project:	None	**Temperature:**	23.1 °C		
Job Site:	NC01	**Humidity:**	49.5% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1028 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	6				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: RE09P-NM, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	94	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.517	27.8	15.0	1.5	40.0	3.2	0.0	Horz	AV	0.0	46.0	54.0	-8.0	High Ch., Port 8, EUT on Side, Ant on Side
7445.470	27.4	15.0	1.5	128.0	3.2	0.0	Horz	AV	0.0	45.6	54.0	-8.4	High Ch., Port 7, EUT on Side, Ant on Side
7445.508	27.2	15.0	2.6	191.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 8, EUT on Side, Ant on Side
7445.030	27.1	15.0	2.6	83.0	3.2	0.0	Vert	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT on Side, Ant on Side
4962.383	26.6	9.5	1.5	182.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT on Side, Ant on Side
4962.050	26.6	9.5	1.5	46.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., Port 8, EUT on Side, Ant on Side
12411.600	27.1	5.0	1.5	255.0	3.2	0.0	Vert	AV	0.0	35.3	54.0	-18.7	High Ch., Port 8, EUT on Side, Ant on Side
12411.530	27.0	5.0	1.5	277.0	3.2	0.0	Horz	AV	0.0	35.2	54.0	-18.8	High Ch., Port 8, EUT on Side, Ant on Side
7444.867	38.7	15.0	1.5	40.0	0.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	High Ch., Port 8, EUT on Side, Ant on Side
7445.643	38.2	15.0	1.5	128.0	0.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	High Ch., Port 7, EUT on Side, Ant on Side
7445.967	37.7	15.0	2.6	83.0	0.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	High Ch., Port 7, EUT on Side, Ant on Side
7443.633	37.6	15.0	2.6	191.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., Port 8, EUT on Side, Ant on Side
4964.425	37.5	9.5	1.5	182.0	0.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	High Ch., Port 8, EUT on Side, Ant on Side
4962.833	36.7	9.5	1.5	46.0	0.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	High Ch., Port 8, EUT on Side, Ant on Side
12407.760	38.7	5.0	1.5	277.0	0.0	0.0	Horz	PK	0.0	43.7	74.0	-30.3	High Ch., Port 8, EUT on Side, Ant on Side
12411.230	37.3	5.0	1.5	255.0	0.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	High Ch., Port 8, EUT on Side, Ant on Side

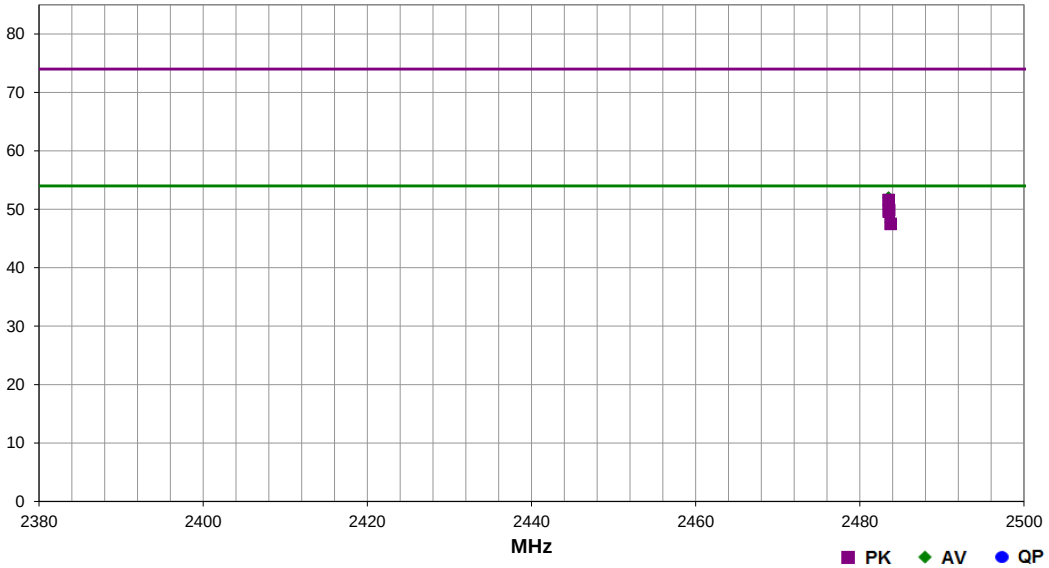
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.3 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-09-28		
Project:	None	**Temperature:**	23.3 °C		
Job Site:	NC01	**Humidity:**	49.5% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1021 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	6				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: RE09P-NM, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	96	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

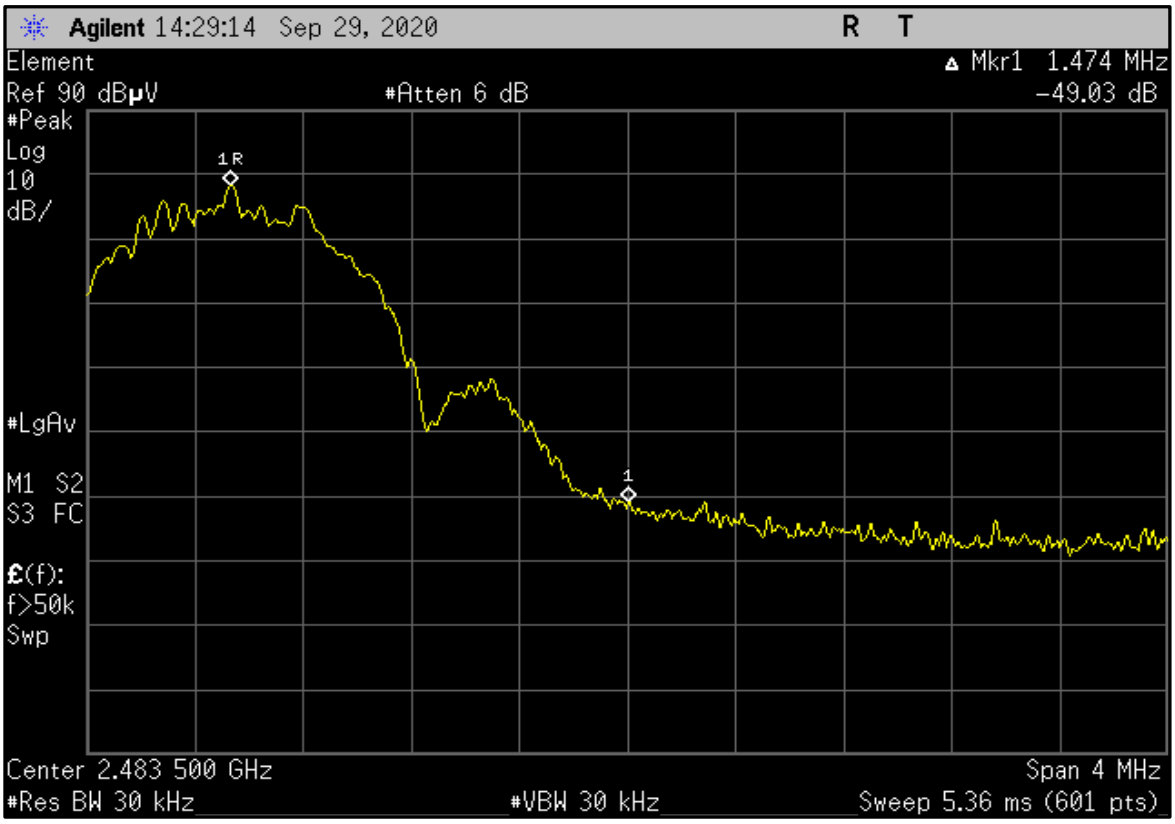


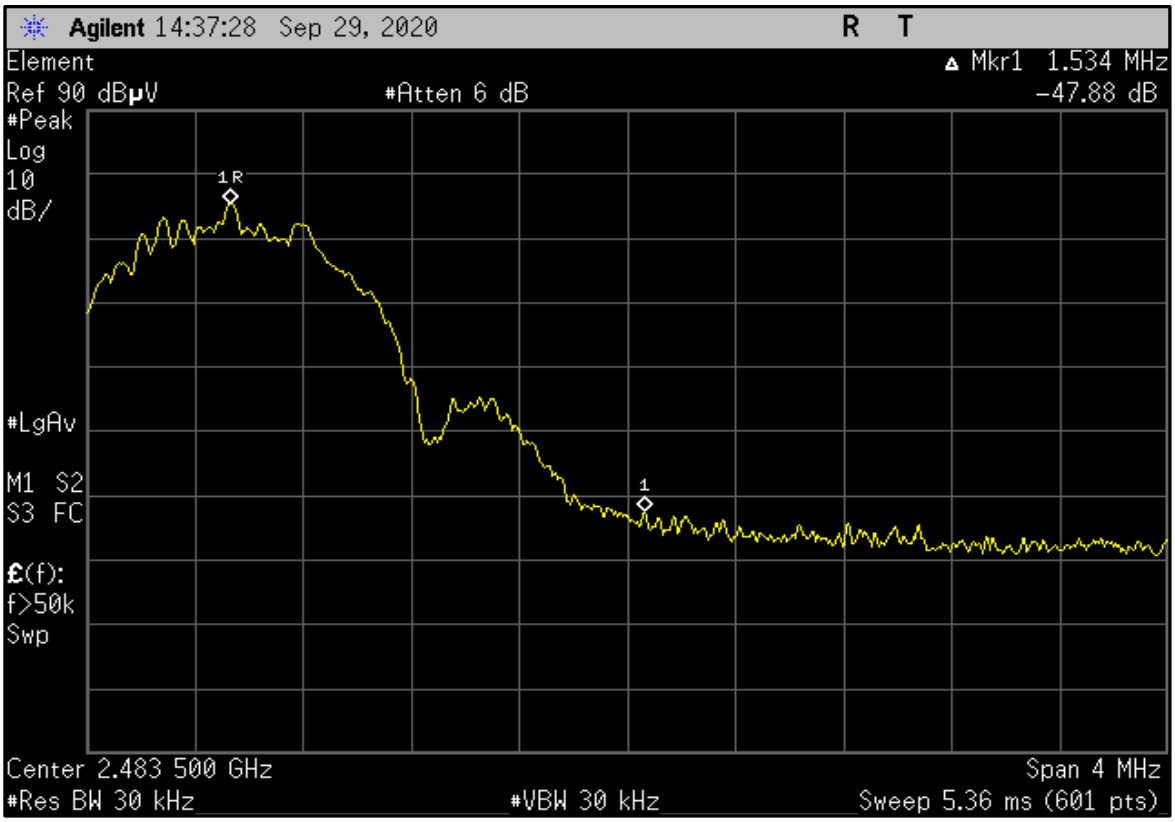
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.507	29.6	-0.8	3.3	2.0	3.2	20.0	Horz	AV	0.0	52.0	54.0	-2.0	High Ch., Port 8, EUT on Side, Ant on Side: Fund 78.6dBuV + -49.0dBc = 29.6dBuV (calc. amp.)
2483.567	28.0	-0.8	1.5	360.0	3.2	20.0	Vert	AV	0.0	50.4	54.0	-3.6	High Ch., Port 8, EUT Vert, Ant Vert: Fund 75.9dBuV + -47.9dBc = 28.0dBuV (calc. amp.)
2483.533	27.6	-0.8	1.6	146.0	3.2	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch., Port 7, EUT on Side, Ant on Side: Fund 76.7dBuV + -49.1dBc = 27.6dBuV (calc. amp.)
2483.767	25.4	-0.8	4.0	124.0	3.2	20.0	Vert	AV	0.0	47.8	54.0	-6.2	High Ch., Port 7, EUT Vert, Ant Vert: Fund 69.8dBuV + -44.4dBc = 25.4dBuV (calc. amp.)
2483.507	32.4	-0.8	3.3	2.0	0.0	20.0	Horz	PK	0.0	51.6	74.0	-22.4	High Ch., Port 8, EUT on Side, Ant on Side: Fund 81.4dBuV + -49.0dBc = 32.4dBuV (calc. amp.)
2483.567	30.7	-0.8	1.5	360.0	0.0	20.0	Vert	PK	0.0	49.9	74.0	-24.1	High Ch., Port 8, EUT Vert, Ant Vert: Fund 78.6dBuV + -47.9dBc = 30.7dBuV (calc. amp.)
2483.533	30.4	-0.8	1.6	146.0	0.0	20.0	Horz	PK	0.0	49.6	74.0	-24.4	High Ch., Port 7, EUT on Side, Ant on Side: Fund 79.5dBuV + -49.1dBc = 30.4dBuV (calc. amp.)
2483.767	28.3	-0.8	4.0	124.0	0.0	20.0	Vert	PK	0.0	47.5	74.0	-26.5	High Ch., Port 7, EUT Vert, Ant Vert: Fund 72.7dBuV + -44.4dBc = 28.3dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.04.03.0



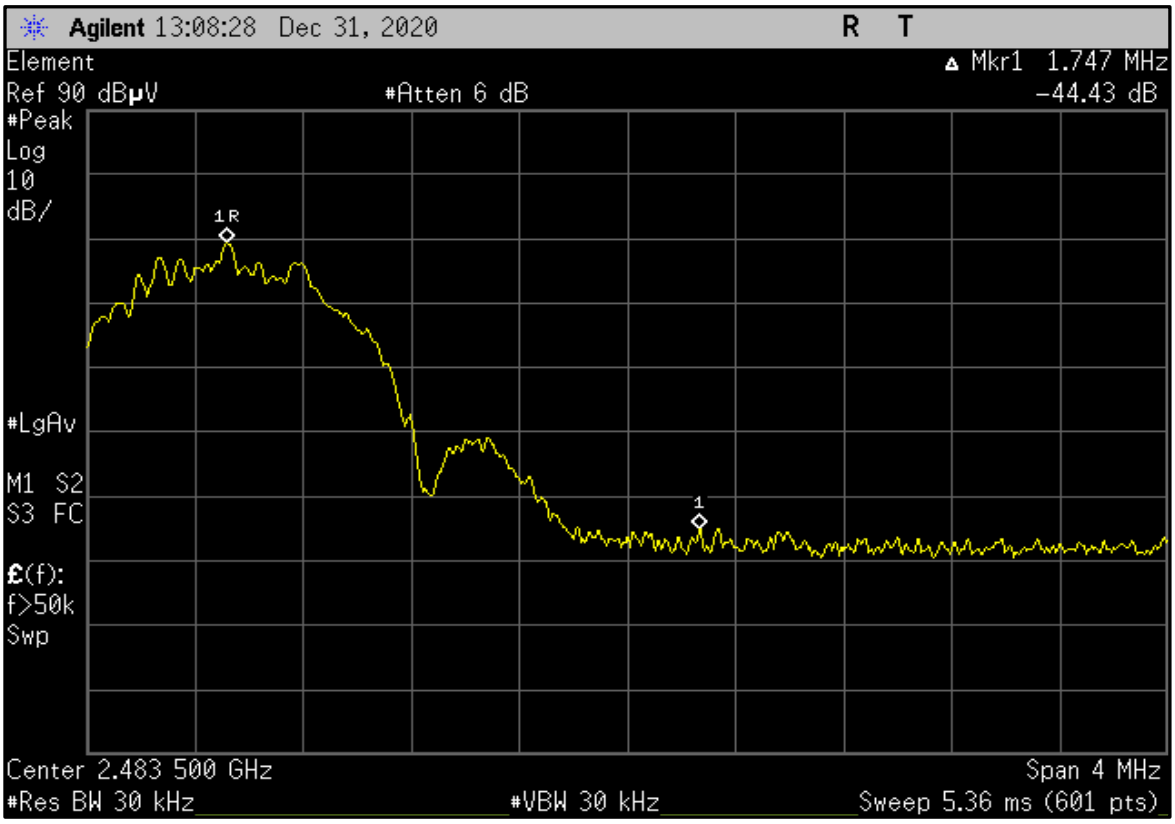


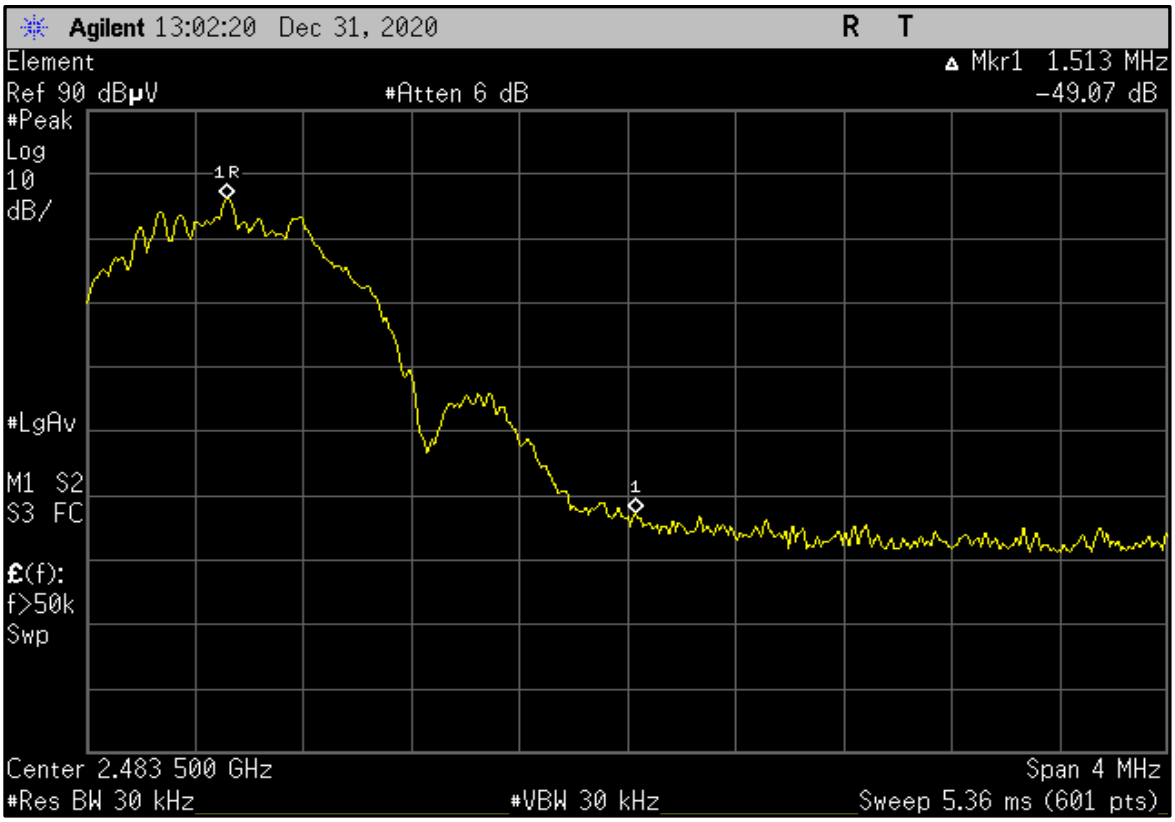
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Vert, Ant Vert

PSA-ESCI 2020.04.03.0





High Ch., Port 7, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

element

PSA-ESCI 2020.06.24.2

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.
DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -8 dBm, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

24VDC
POE via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 16
SYNA0309 - 12
SYNA0317 - 1
SYNA0317 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator	S.M. Electronics	SA6-20	REO	2020-01-21	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2020-01-20	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGC	2020-03-11	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	2019-12-16	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2020-07-01	12 mo
Cable	ESM Cable Corp.	8-18GHz cables	OCY	2020-03-02	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	2020-03-02	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	2020-05-01	12 mo
Cable	D-Coax	None	OC4	2019-12-16	12 mo
Antenna - Biconilog	EMCO	3142	AXB	2020-04-15	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	2020-03-02	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	2020-07-07	24 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXV	2020-06-03	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	NCR	0 mo
Antenna - Standard Gain	EMCO	3160-08	AHK	NCR	0 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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. These “pre-scans” are not 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).

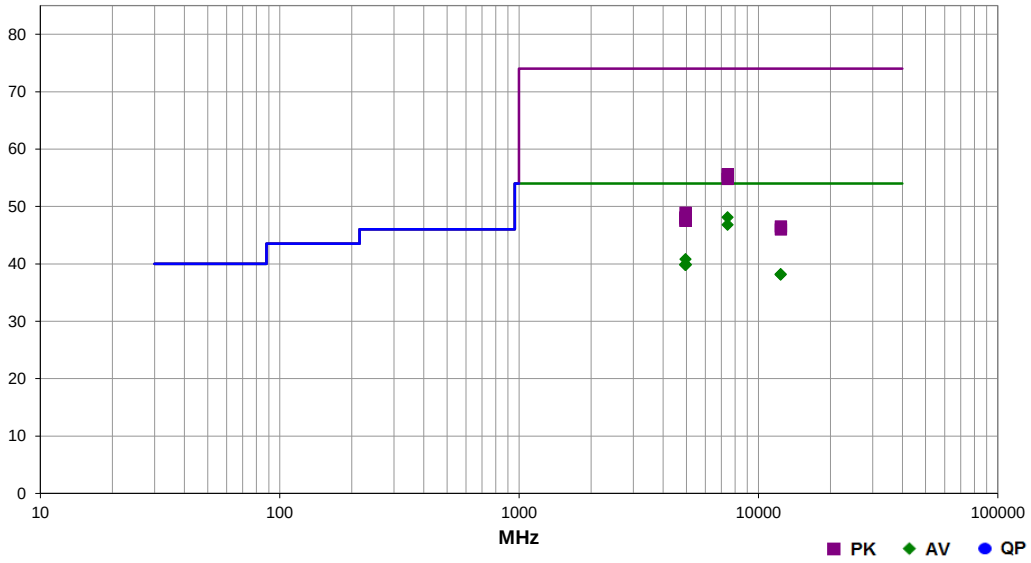
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-20		
Project:	None	**Temperature:**	24.8 °C		
Job Site:	OC07	**Humidity:**	49% RH		
Serial Number:	Rev. 10 - 004	**Barometric Pres.:**	1012 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	12				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS LE Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	29	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.383	32.6	12.3	1.5	212.0	3.2	0.0	Vert	AV	0.0	48.1	54.0	-5.9	High Ch, Port 8, EUT Vert, Antenna Vert
7445.108	31.3	12.3	1.5	87.0	3.2	0.0	Horz	AV	0.0	46.8	54.0	-7.2	High Ch, Port 8, EUT Vert, Antenna Vert
4964.050	33.1	4.5	1.6	238.0	3.2	0.0	Horz	AV	0.0	40.8	54.0	-13.2	High Ch, Port 8, EUT Vert, Antenna Vert
4961.533	32.3	4.4	2.3	0.0	3.2	0.0	Vert	AV	0.0	39.9	54.0	-14.1	High Ch, Port 8, EUT Vert, Antenna Vert
4961.525	32.3	4.4	1.5	349.0	3.2	0.0	Vert	AV	0.0	39.9	54.0	-14.1	High Ch, Port 8, EUT On Side, Antenna On Side
4961.675	32.3	4.4	1.5	216.0	3.2	0.0	Horz	AV	0.0	39.9	54.0	-14.1	High Ch, Port 8, EUT Horz, Antenna Horz
4961.542	32.2	4.4	1.5	295.0	3.2	0.0	Horz	AV	0.0	39.8	54.0	-14.2	High Ch, Port 8, EUT On Side, Antenna On Side
4961.725	32.2	4.4	3.8	74.0	3.2	0.0	Vert	AV	0.0	39.8	54.0	-14.2	High Ch, Port 8, EUT Horz, Antenna Horz
12407.780	29.1	5.9	1.5	62.0	3.2	0.0	Vert	AV	0.0	38.2	54.0	-15.8	High Ch, Port 8, EUT Vert, Antenna Vert
12407.600	29.0	5.9	3.8	185.0	3.2	0.0	Horz	AV	0.0	38.1	54.0	-15.9	High Ch, Port 8, EUT Vert, Antenna Vert
7446.825	43.3	12.3	1.5	212.0	0.0	0.0	Vert	PK	0.0	55.6	74.0	-18.4	High Ch, Port 8, EUT Vert, Antenna Vert
7445.575	42.5	12.3	1.5	87.0	0.0	0.0	Horz	PK	0.0	54.8	74.0	-19.2	High Ch, Port 8, EUT Vert, Antenna Vert
4964.725	44.4	4.5	1.6	238.0	0.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	High Ch, Port 8, EUT Vert, Antenna Vert
4966.200	43.5	4.6	1.5	295.0	0.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	High Ch, Port 8, EUT On Side, Antenna On Side
4964.142	43.5	4.5	2.3	0.0	0.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	High Ch, Port 8, EUT Vert, Antenna Vert
4962.067	43.5	4.4	1.5	349.0	0.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch, Port 8, EUT On Side, Antenna On Side
4962.492	43.1	4.4	1.5	216.0	0.0	0.0	Horz	PK	0.0	47.5	74.0	-26.5	High Ch, Port 8, EUT Horz, Antenna Horz
4962.000	43.1	4.4	3.8	74.0	0.0	0.0	Vert	PK	0.0	47.5	74.0	-26.5	High Ch, Port 8, EUT Horz, Antenna Horz
12411.950	40.6	5.9	1.5	62.0	0.0	0.0	Vert	PK	0.0	46.5	74.0	-27.5	High Ch, Port 8, EUT Vert, Antenna Vert
12411.170	40.1	5.9	3.8	185.0	0.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	High Ch, Port 8, EUT Vert, Antenna Vert

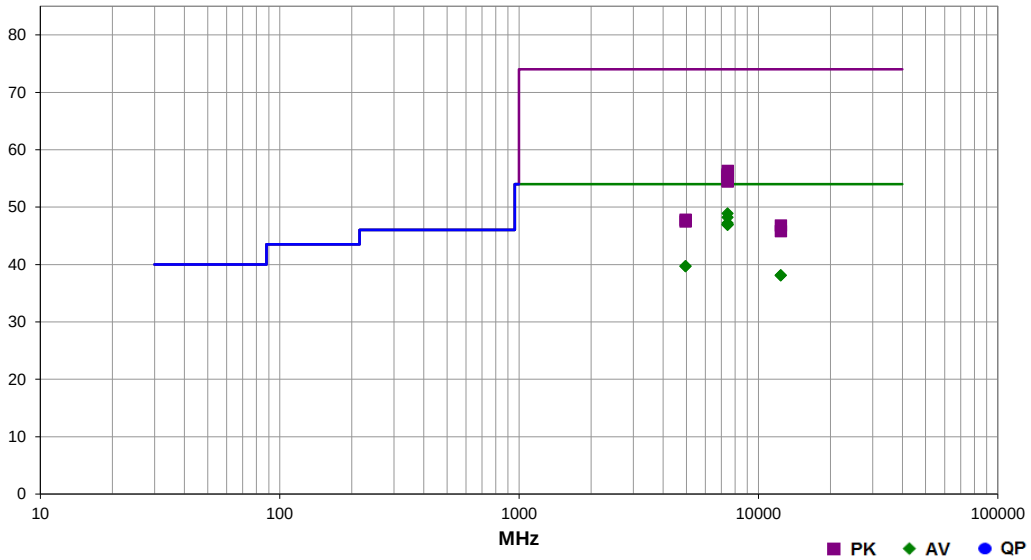
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-26		
Project:	None	**Temperature:**	20 °C		
Job Site:	OC07	**Humidity:**	31.3% RH		
Serial Number:	Rev. 10 - 004	**Barometric Pres.:**	1020 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	16				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC				
Operating Mode:	DTS LE Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	83	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.442	33.4	12.3	1.5	188.0	3.2	0.0	Horz	AV	0.0	48.9	54.0	-5.1	High Ch, Port 8, EUT Vert, Antenna Vert
7446.533	32.7	12.3	3.2	236.0	3.2	0.0	Horz	AV	0.0	48.2	54.0	-5.8	High Ch, Port 8, EUT On Side, Antenna On Side
7445.308	31.7	12.3	3.9	137.0	3.2	0.0	Vert	AV	0.0	47.2	54.0	-6.8	High Ch, Port 8, EUT Vert, Antenna Vert
7446.325	31.5	12.3	1.5	185.0	3.2	0.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch, Port 8, EUT Horz, Antenna Horz
7445.467	31.4	12.3	3.4	234.0	3.2	0.0	Vert	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT On Side, Antenna On Side
7444.058	31.4	12.3	1.5	20.0	3.2	0.0	Horz	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT Horz, Antenna Horz
4963.200	32.0	4.5	1.5	348.0	3.2	0.0	Horz	AV	0.0	39.7	54.0	-14.3	High Ch, Port 8, EUT Vert, Antenna Vert
4961.500	32.1	4.4	1.5	286.0	3.2	0.0	Vert	AV	0.0	39.7	54.0	-14.3	High Ch, Port 8, EUT Vert, Antenna Vert
12410.080	29.0	5.9	1.6	37.0	3.2	0.0	Horz	AV	0.0	38.1	54.0	-15.9	High Ch, Port 8, EUT Vert, Antenna Vert
12408.980	29.0	5.9	3.2	185.0	3.2	0.0	Vert	AV	0.0	38.1	54.0	-15.9	High Ch, Port 8, EUT Vert, Antenna Vert
7446.958	44.0	12.3	1.5	188.0	0.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	High Ch, Port 8, EUT Vert, Antenna Vert
7445.392	43.4	12.3	3.2	236.0	0.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	High Ch, Port 8, EUT On Side, Antenna On Side
7444.783	43.2	12.3	1.5	185.0	0.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	High Ch, Port 8, EUT Horz, Antenna Horz
7445.158	43.0	12.3	3.9	137.0	0.0	0.0	Vert	PK	0.0	55.3	74.0	-18.7	High Ch, Port 8, EUT Vert, Antenna Vert
7444.883	42.2	12.3	3.4	234.0	0.0	0.0	Vert	PK	0.0	54.5	74.0	-19.5	High Ch, Port 8, EUT On Side, Antenna On Side
7444.692	42.2	12.3	1.5	20.0	0.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	High Ch, Port 8, EUT Horz, Antenna Horz
4964.058	43.3	4.5	1.5	348.0	0.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	High Ch, Port 8, EUT Vert, Antenna Vert
4961.775	43.1	4.4	1.5	286.0	0.0	0.0	Vert	PK	0.0	47.5	74.0	-26.5	High Ch, Port 8, EUT Vert, Antenna Vert
12410.200	40.9	5.9	3.2	185.0	0.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	High Ch, Port 8, EUT Vert, Antenna Vert
12412.000	39.9	5.9	1.6	37.0	0.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	High Ch, Port 8, EUT Vert, Antenna Vert

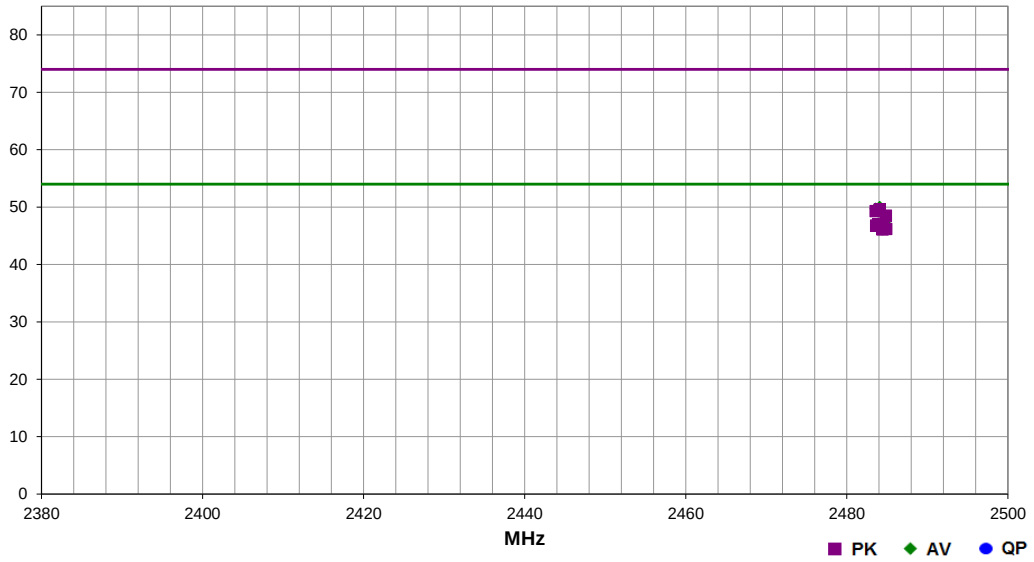
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-20		
Project:	None	**Temperature:**	23.9 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1033 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -8 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/4/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	5	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



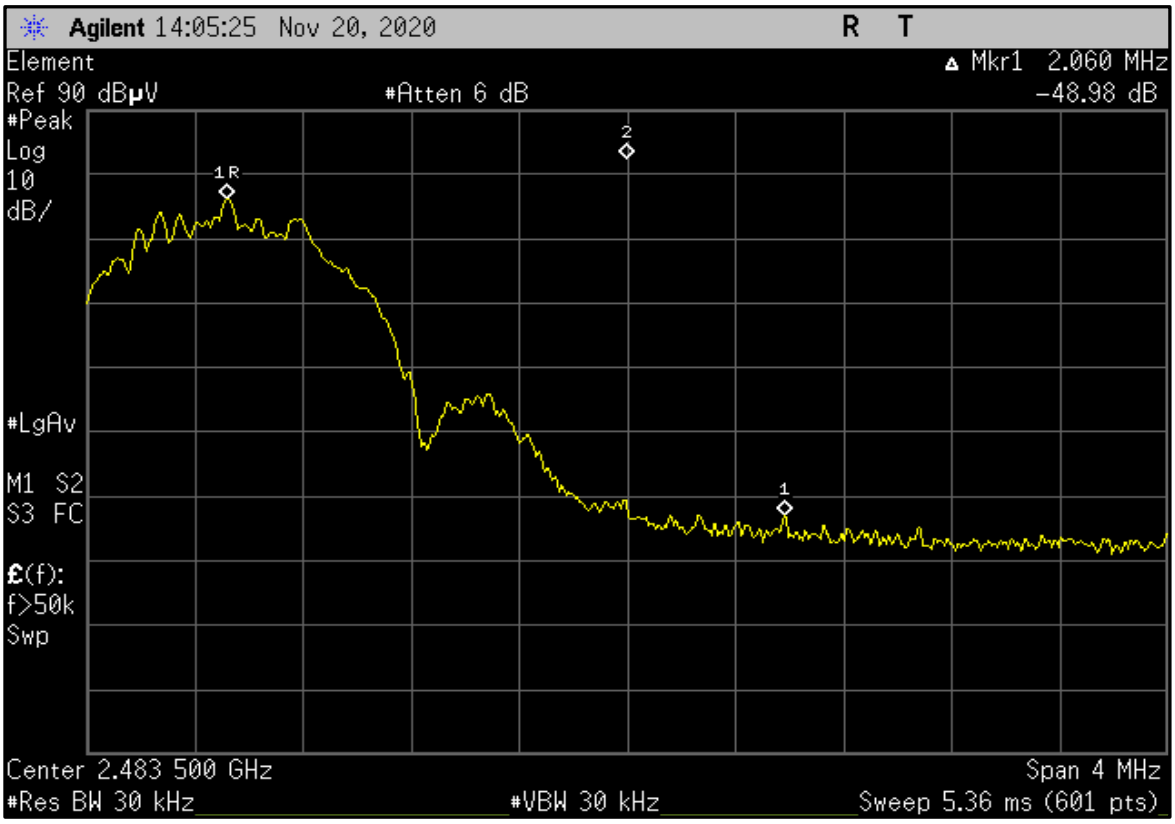
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.080	27.6	-0.8	1.9	160.0	3.2	20.0	Horz	AV	0.0	50.0	54.0	-4.0	High Ch., Port 8, EUT on Side, Ant on Side: Fund 76.6dBuV + -49.0dBc = 27.6dBuV (calc. amp.)
2483.573	27.3	-0.8	1.0	169.0	3.2	20.0	Vert	AV	0.0	49.7	54.0	-4.3	High Ch., Port7, EUT on Side, Ant on Side: Fund 75.3dBuV + -48.0dBc = 27.3dBuV (calc. amp.)
2484.853	25.2	-0.8	1.5	226.0	3.2	20.0	Horz	AV	0.0	47.6	54.0	-6.4	High Ch., Port7, EUT on Side, Ant on Side: Fund 49.9dBuV + -24.7dBc = 25.2dBuV (calc. amp.)
2483.887	24.7	-0.8	4.0	175.0	3.2	20.0	Vert	AV	0.0	47.1	54.0	-6.9	High Ch., Port 8, EUT on Side, Ant on Side: Fund 60.1dBuV + -35.4dBc = 24.7dBuV (calc. amp.)
2484.507	24.6	-0.8	3.2	83.0	3.2	20.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch., Port 8, EUT Horz, Ant Horz: Fund 64.2dBuV + -39.6dBc = 24.6dBuV (calc. amp.)
2483.653	24.3	-0.8	1.2	197.0	3.2	20.0	Horz	AV	0.0	46.7	54.0	-7.3	High Ch., Port 8, EUT Vert, Ant Vert: Fund 58.1dBuV + -33.8dBc = 24.3dBuV (calc. amp.)
2484.893	23.9	-0.8	4.0	164.0	3.2	20.0	Vert	AV	0.0	46.3	54.0	-7.7	High Ch., Port 8, EUT Horz, Ant Horz: Fund 62.0dBuV + -38.1dBc = 23.9dBuV (calc. amp.)
2484.427	23.7	-0.8	1.6	120.0	3.2	20.0	Vert	AV	0.0	46.1	54.0	-7.9	High Ch., Port 8, EUT Vert, Ant Vert: Fund 59.7dBuV + -36.0dBc = 23.7dBuV (calc. amp.)
2484.080	30.4	-0.8	1.9	160.0	0.0	20.0	Horz	PK	0.0	49.6	74.0	-24.4	High Ch., Port 8, EUT on Side, Ant on Side: Fund 79.4dBuV + -49.0dBc = 30.4dBuV (calc. amp.)
2483.573	30.1	-0.8	1.0	169.0	0.0	20.0	Vert	PK	0.0	49.3	74.0	-24.7	High Ch., Port7, EUT on Side, Ant on Side: Fund 78.1dBuV + -48.0dBc = 30.1dBuV (calc. amp.)
2484.853	29.3	-0.8	1.5	226.0	0.0	20.0	Horz	PK	0.0	48.5	74.0	-25.5	High Ch., Port7, EUT on Side, Ant on Side: Fund 54.0dBuV + -24.7dBc = 29.3dBuV (calc. amp.)
2483.887	27.8	-0.8	4.0	175.0	0.0	20.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch., Port 8, EUT on Side, Ant on Side: Fund 63.2dBuV + -35.4dBc = 27.8dBuV (calc. amp.)
2483.653	27.6	-0.8	1.2	197.0	0.0	20.0	Horz	PK	0.0	46.8	74.0	-27.2	High Ch., Port 8, EUT Vert, Ant Vert: Fund 61.4dBuV + -33.8dBc = 27.6dBuV (calc. amp.)
2484.507	27.6	-0.8	3.2	83.0	0.0	20.0	Horz	PK	0.0	46.8	74.0	-27.2	High Ch., Port 8, EUT Horz, Ant Horz: Fund 67.2dBuV + -39.6dBc = 27.6dBuV (calc. amp.)
2484.893	27.0	-0.8	4.0	164.0	0.0	20.0	Vert	PK	0.0	46.2	74.0	-27.8	High Ch., Port 8, EUT Horz, Ant Horz: Fund 65.1dBuV + -38.1dBc = 27.0dBuV (calc. amp.)

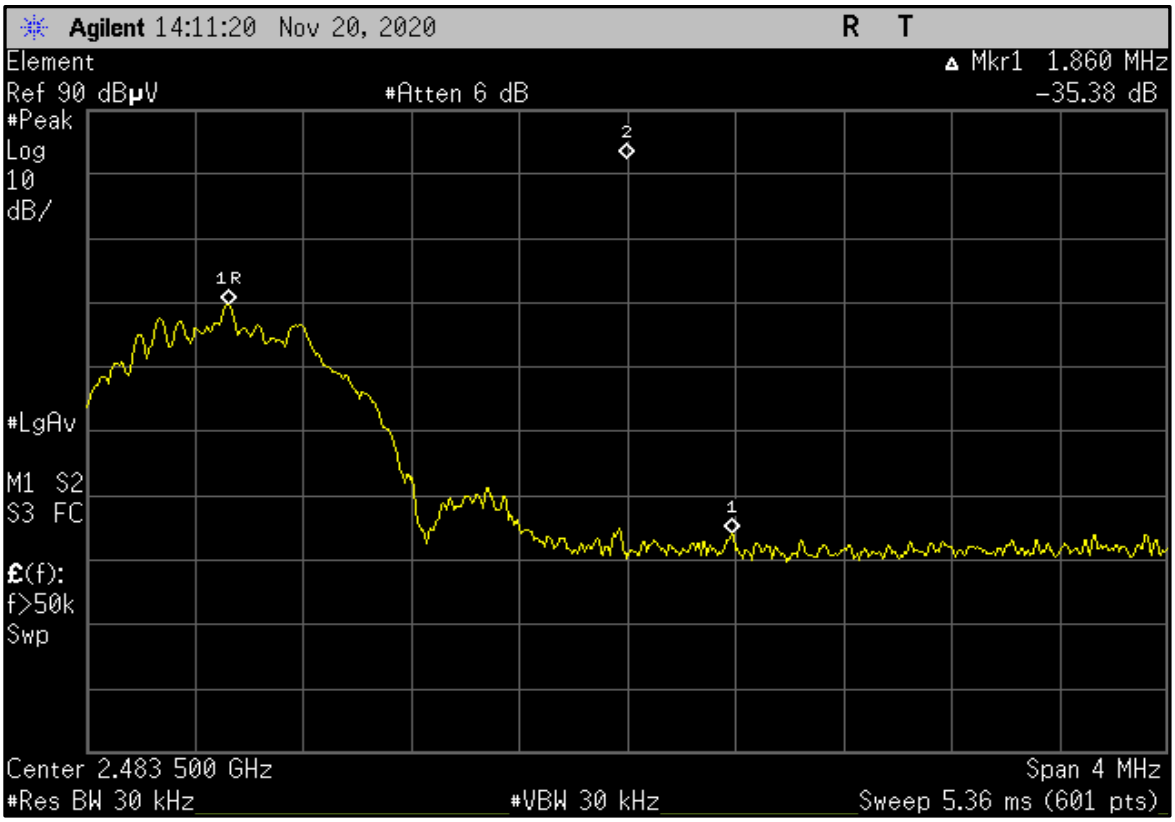
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.427	26.9	-0.8	1.6	120.0	0.0	20.0	Vert	PK	0.0	46.1	74.0	-27.9	High Ch., Port 8, EUT Vert, Ant Vert: Fund 62.9dBuV + -36.0dBc = 26.9dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2



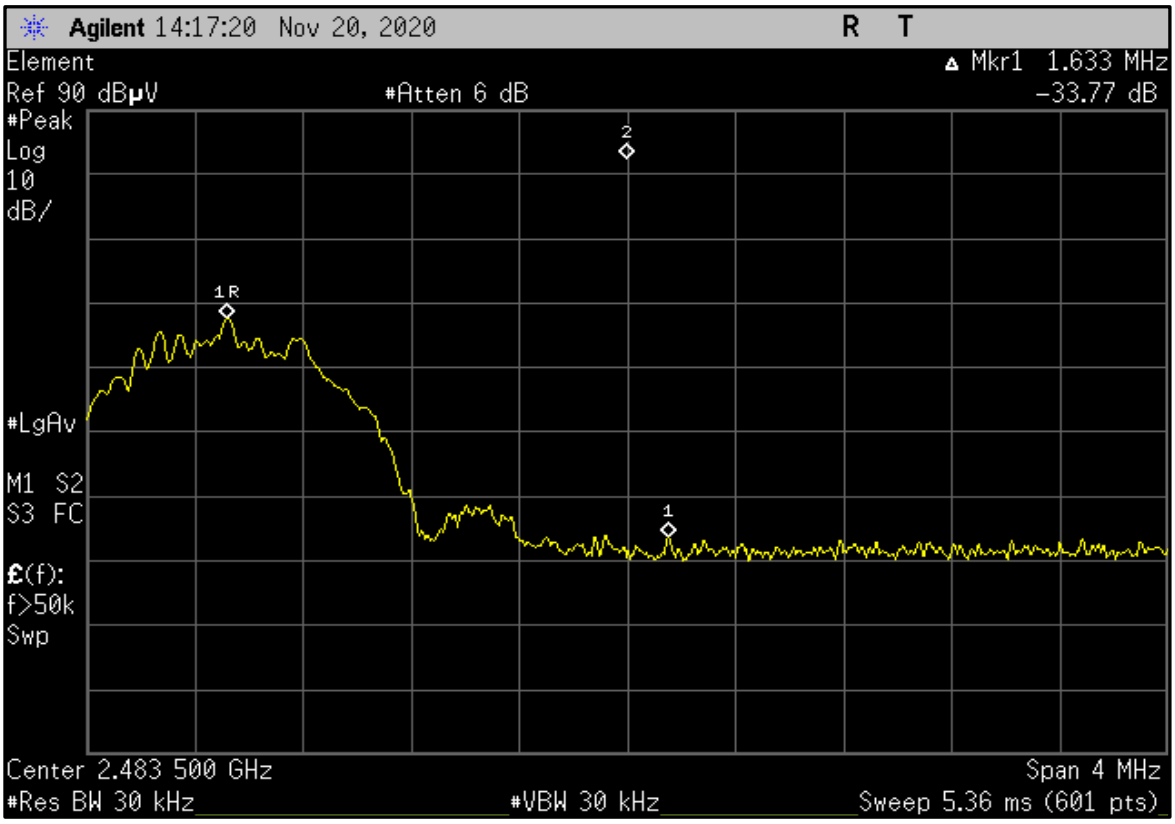


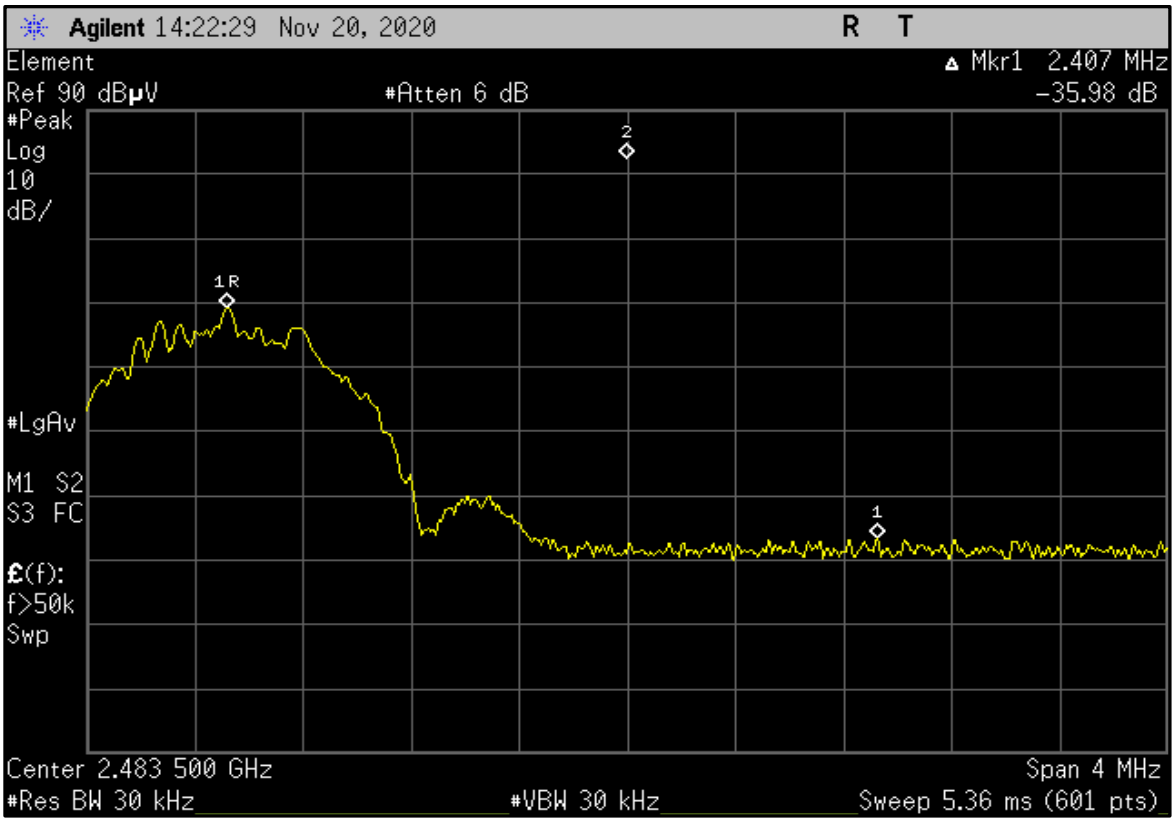
High Ch., Port 8, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2



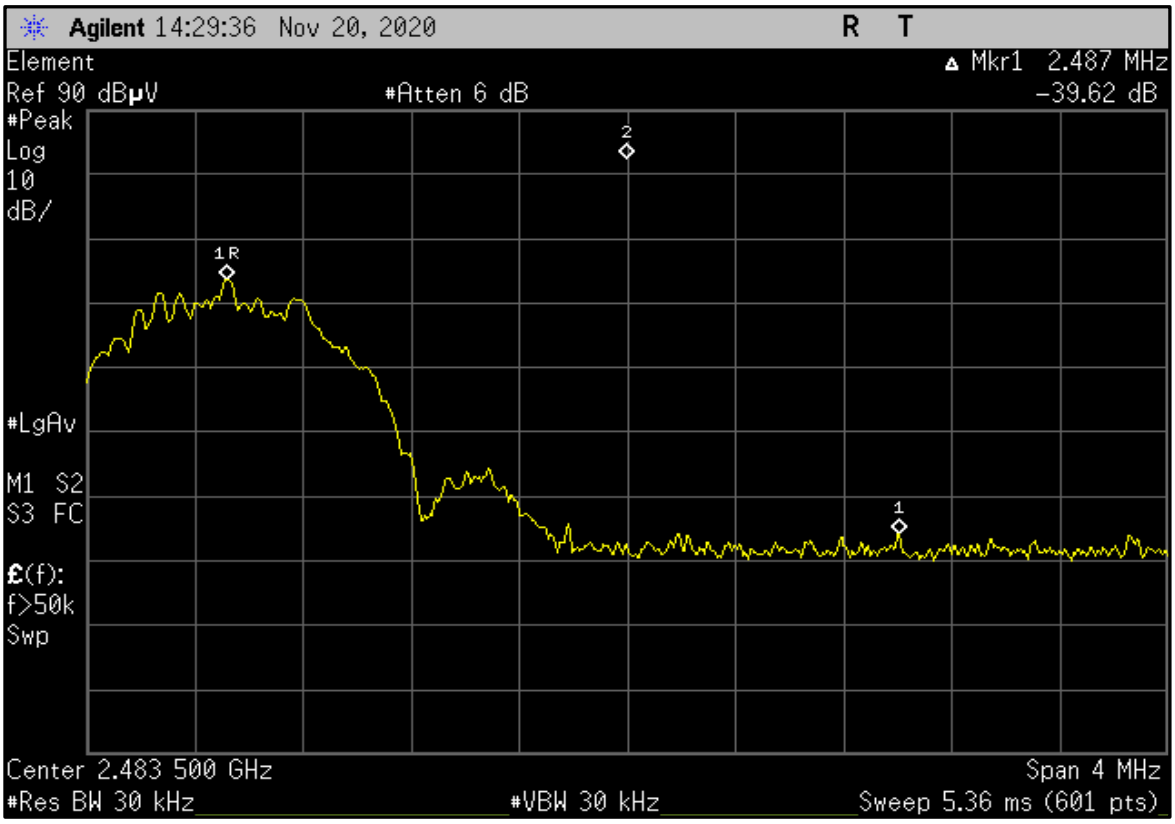


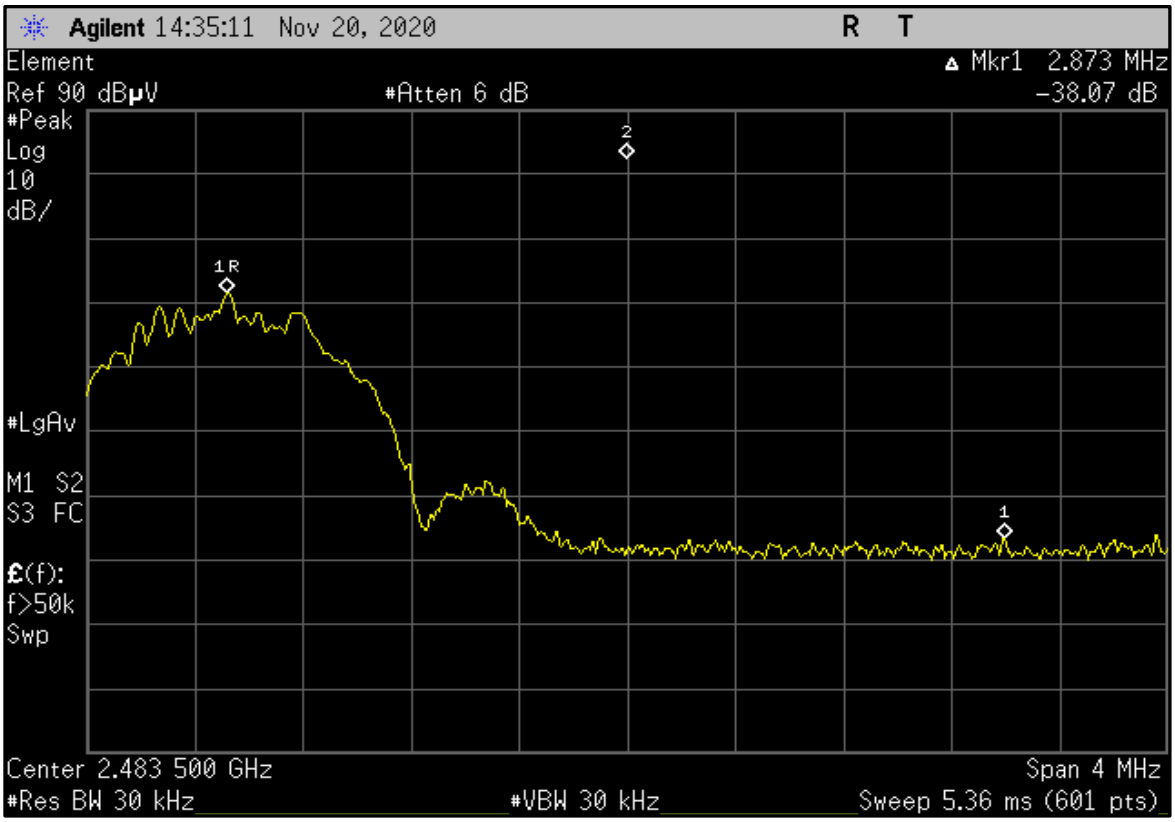
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2



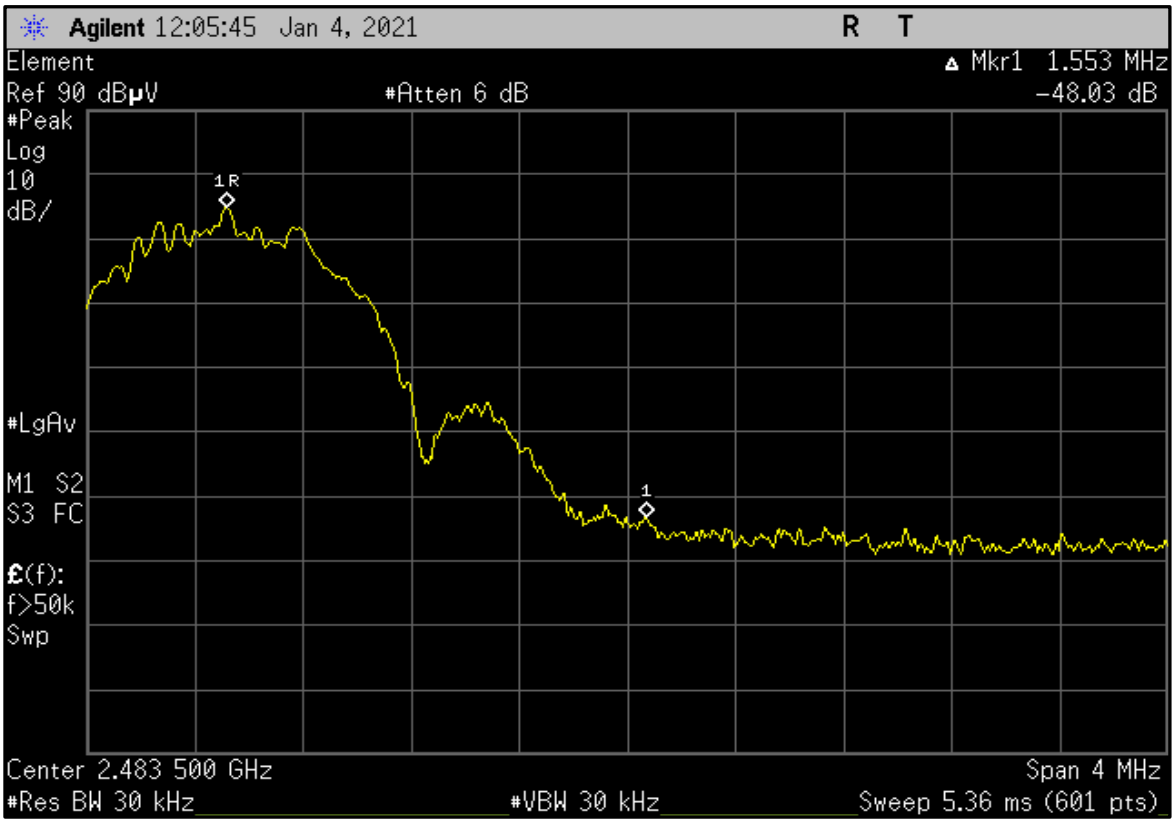


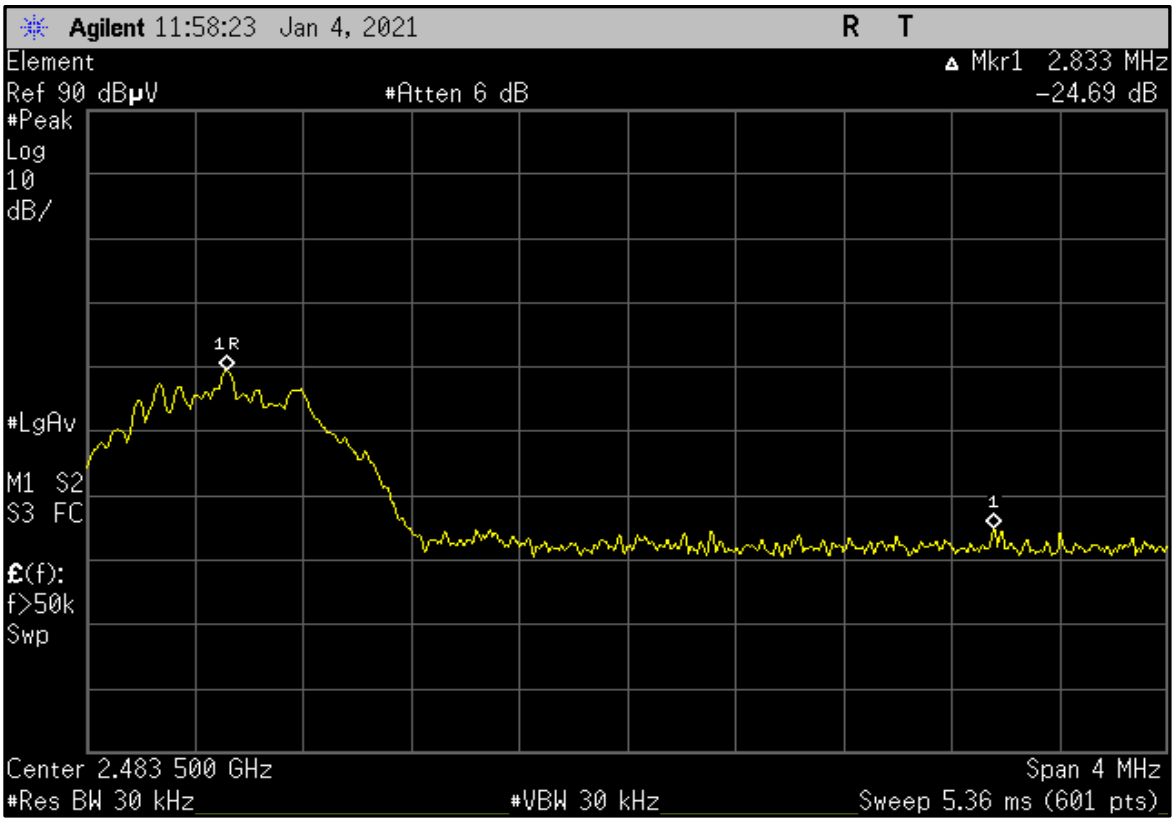
High Ch., Port 8, EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

High Ch., Port7, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





High Ch., Port7, EUT on Side, Ant on Side

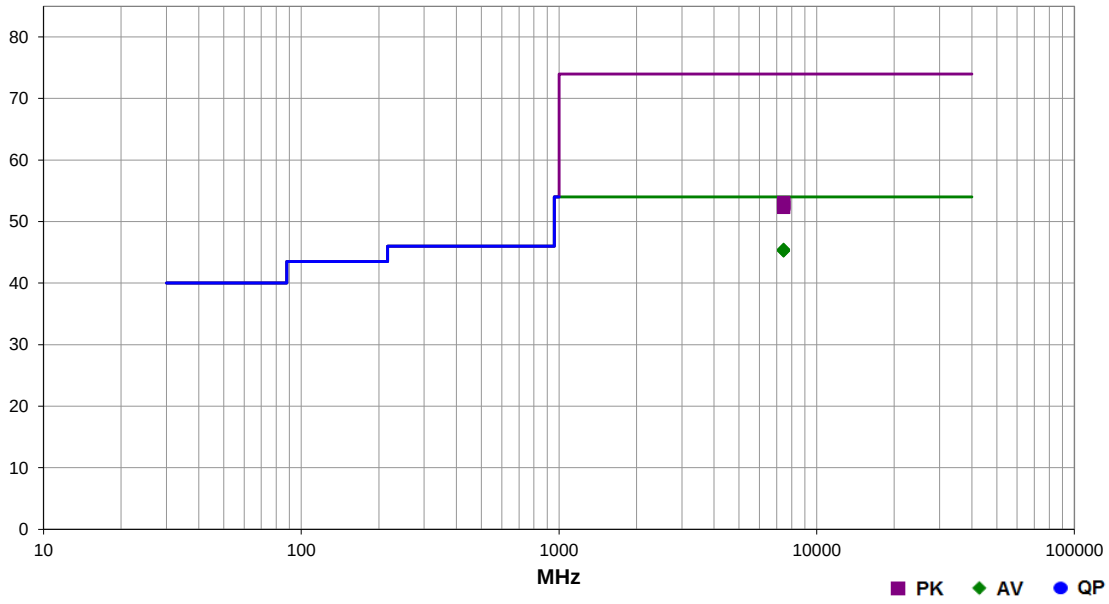
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-20		
Project:	None	**Temperature:**	23.9 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1033 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -8 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. Spot check for worst case harmonic from 0 dBm power setting measurements. Port 7 measurements were taken on 1/4/21. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	6	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.950	27.3	15.0	1.5	104.0	3.2	0.0	Horz	AV	0.0	45.5	54.0	-8.5	High Ch., Port 7, EUT Vert, Ant Vert
7445.675	27.2	15.0	1.5	187.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Vert, Ant Vert
7447.067	27.1	15.0	1.5	158.0	3.2	0.0	Vert	AV	0.0	45.3	54.0	-8.7	High Ch., Port 8, EUT Vert, Ant Vert
7446.333	27.0	15.0	4.0	8.0	3.2	0.0	Horz	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Vert, Ant Vert
7444.092	38.1	15.0	1.5	187.0	0.0	0.0	Vert	PK	0.0	53.1	74.0	-20.9	High Ch., Port 7, EUT Vert, Ant Vert
7447.808	37.9	15.0	1.5	158.0	0.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	High Ch., Port 8, EUT Vert, Ant Vert
7445.292	37.8	15.0	1.5	104.0	0.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	High Ch., Port 7, EUT Vert, Ant Vert
7446.908	37.3	15.0	4.0	8.0	0.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	High Ch., Port 8, EUT Vert, Ant Vert

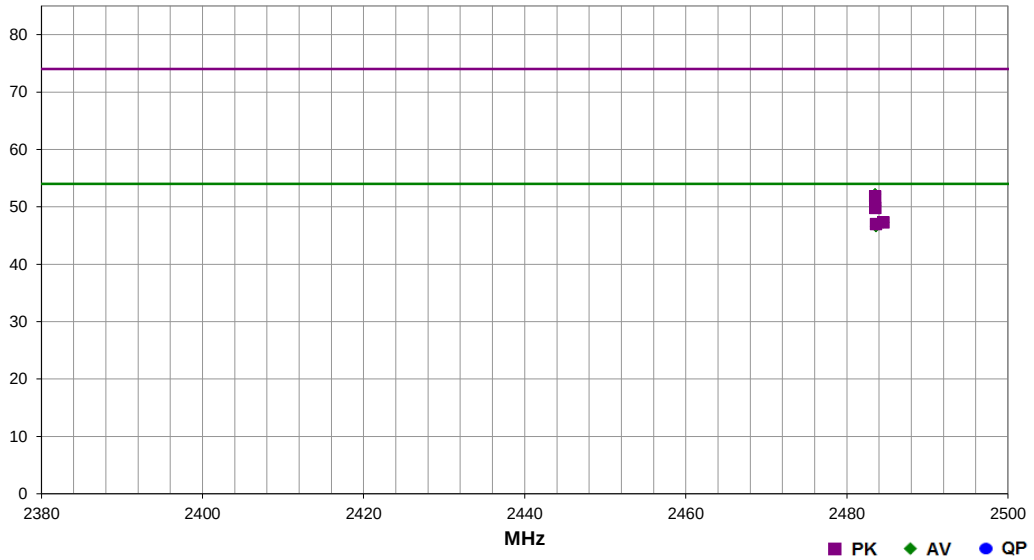
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-20		
Project:	None	**Temperature:**	23.9 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1033 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -8 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/4/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	7	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

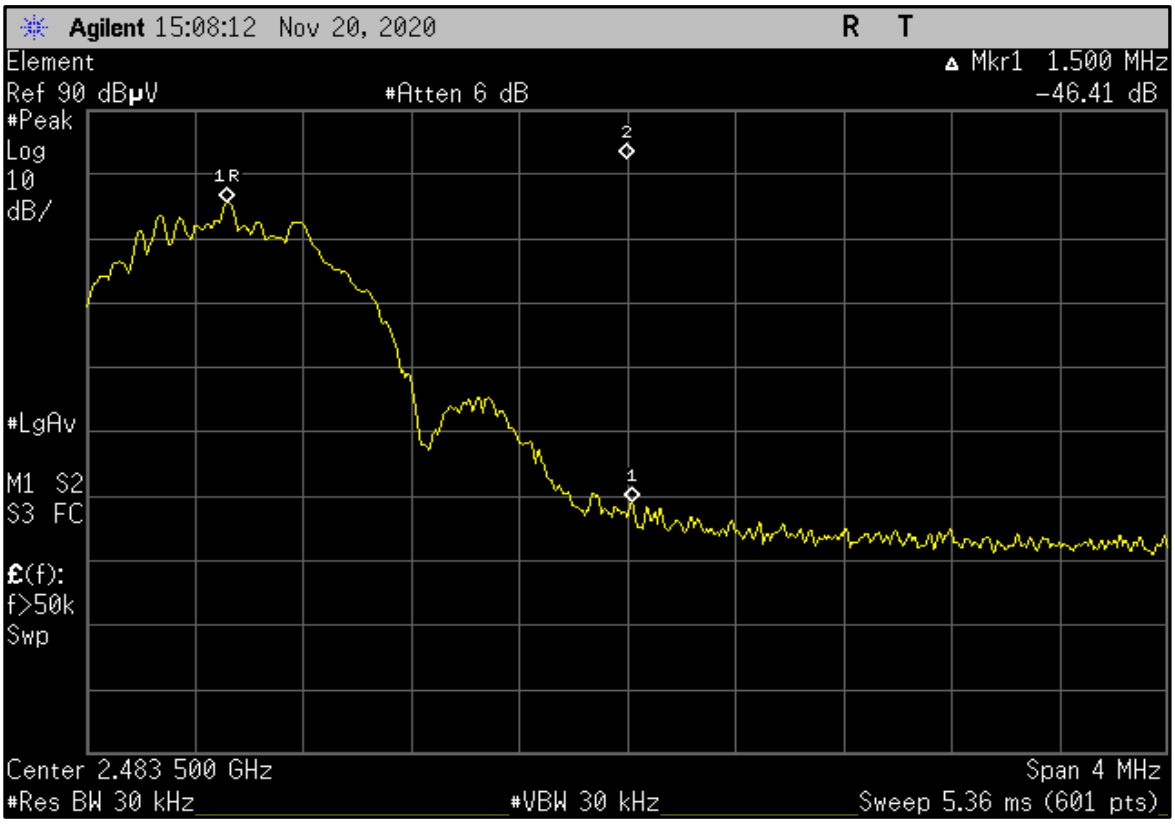


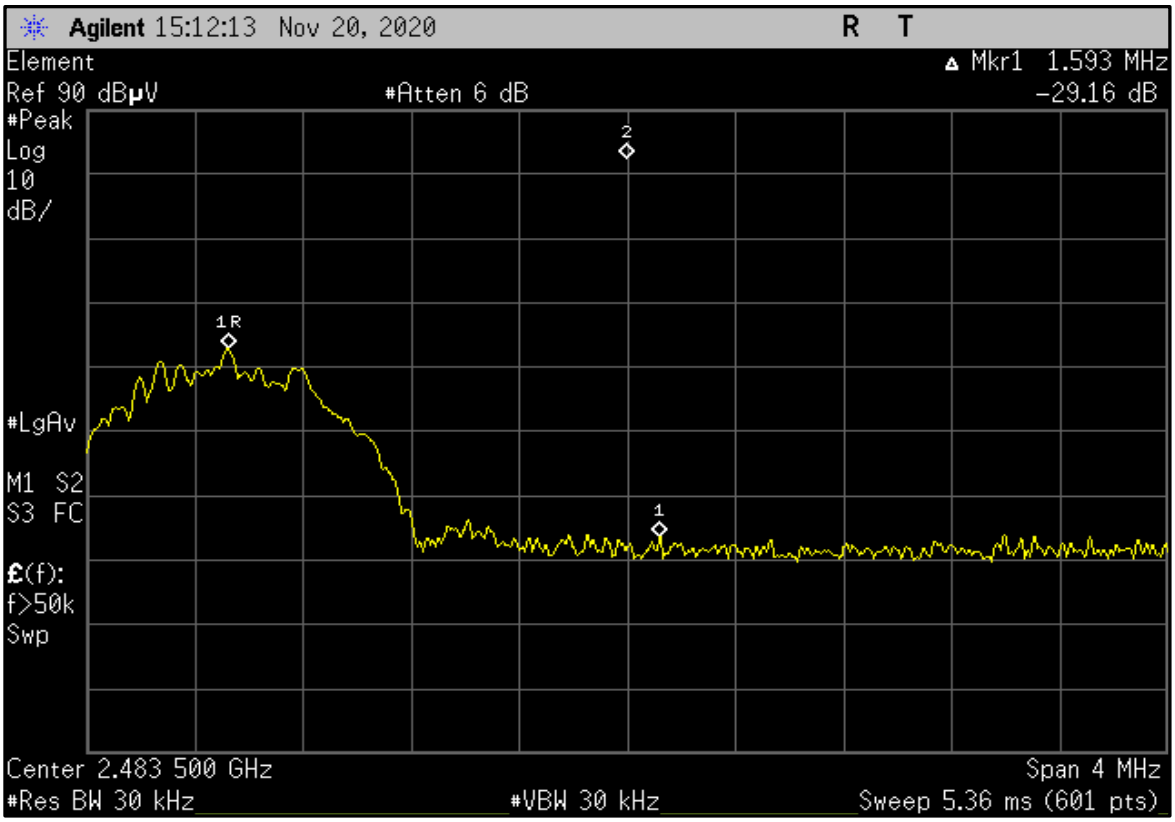
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.520	29.8	-0.8	1.5	152.0	3.2	20.0	Horz	AV	0.0	52.2	54.0	-1.8	High Ch., Port 8, EUT on Side, Ant on Side: Fund 76.2dBuV + -46.4dBc = 29.8dBuV (calc. amp.)
2483.540	27.8	-0.8	1.5	160.0	3.2	20.0	Horz	AV	0.0	50.2	54.0	-3.8	High Ch., Port 7, EUT on Side, Ant on Side: Fund 75.6dBuV + -47.8dBc = 27.8dBuV (calc. amp.)
2484.540	24.9	-0.8	3.8	182.0	3.2	20.0	Vert	AV	0.0	47.3	54.0	-6.7	High Ch., Port 7, EUT on Side, Ant on Side: Fund 60.2dBuV + -35.3dBc = 24.9dBuV (calc. amp.)
2483.620	24.2	-0.8	1.6	230.0	3.2	20.0	Vert	AV	0.0	46.6	54.0	-7.4	High Ch., Port 8, EUT on Side, Ant on Side: Fund 53.4dBuV + -29.2dBc = 24.2dBuV (calc. amp.)
2483.520	32.6	-0.8	1.5	152.0	0.0	20.0	Horz	PK	0.0	51.8	74.0	-22.2	High Ch., Port 8, EUT on Side, Ant on Side: Fund 79.0dBuV + -46.4dBc = 32.6dBuV (calc. amp.)
2483.540	30.6	-0.8	1.5	160.0	0.0	20.0	Horz	PK	0.0	49.8	74.0	-24.2	High Ch., Port 7, EUT on Side, Ant on Side: Fund 78.4dBuV + -47.8dBc = 30.6dBuV (calc. amp.)
2484.540	28.1	-0.8	3.8	182.0	0.0	20.0	Vert	PK	0.0	47.3	74.0	-26.7	High Ch., Port 7, EUT on Side, Ant on Side: Fund 63.4dBuV + -35.3dBc = 28.1dBuV (calc. amp.)
2483.620	27.8	-0.8	1.6	230.0	0.0	20.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch., Port 8, EUT on Side, Ant on Side: Fund 57.0dBuV + -29.2dBc = 27.8dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2



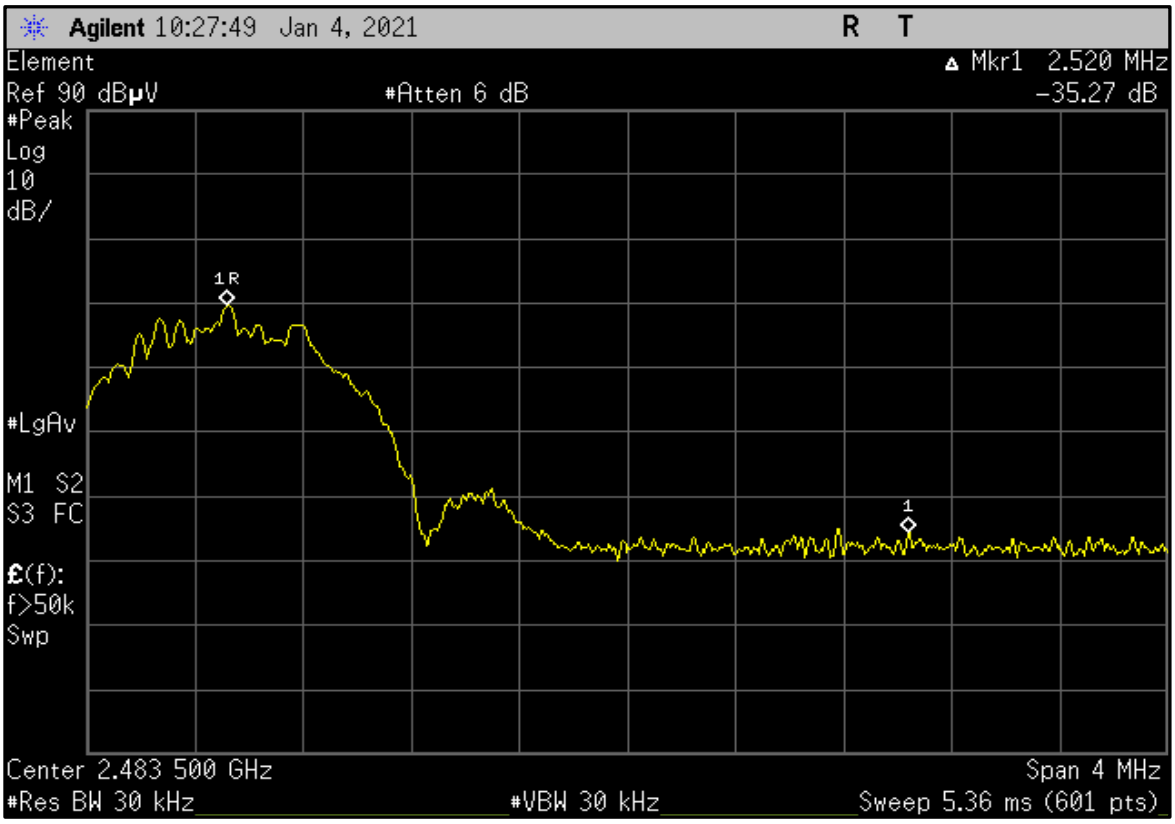


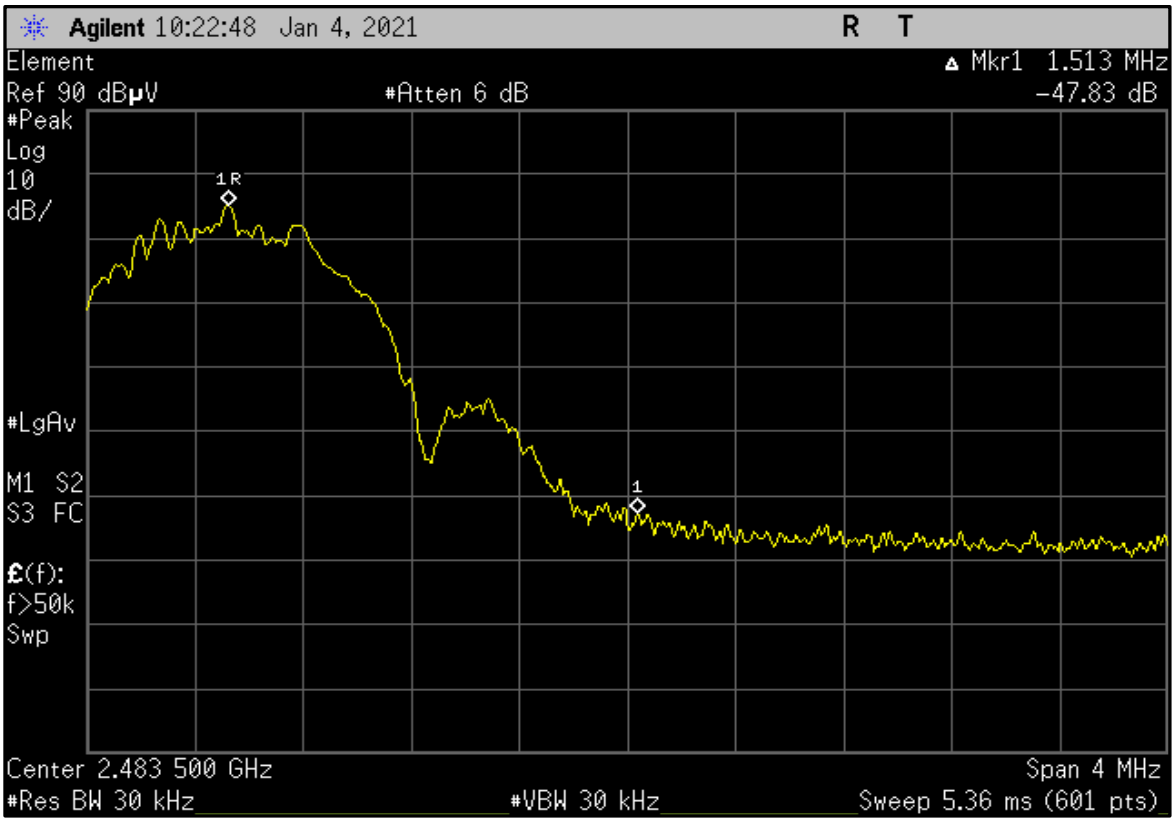
High Ch., Port 8, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





High Ch., Port 7, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

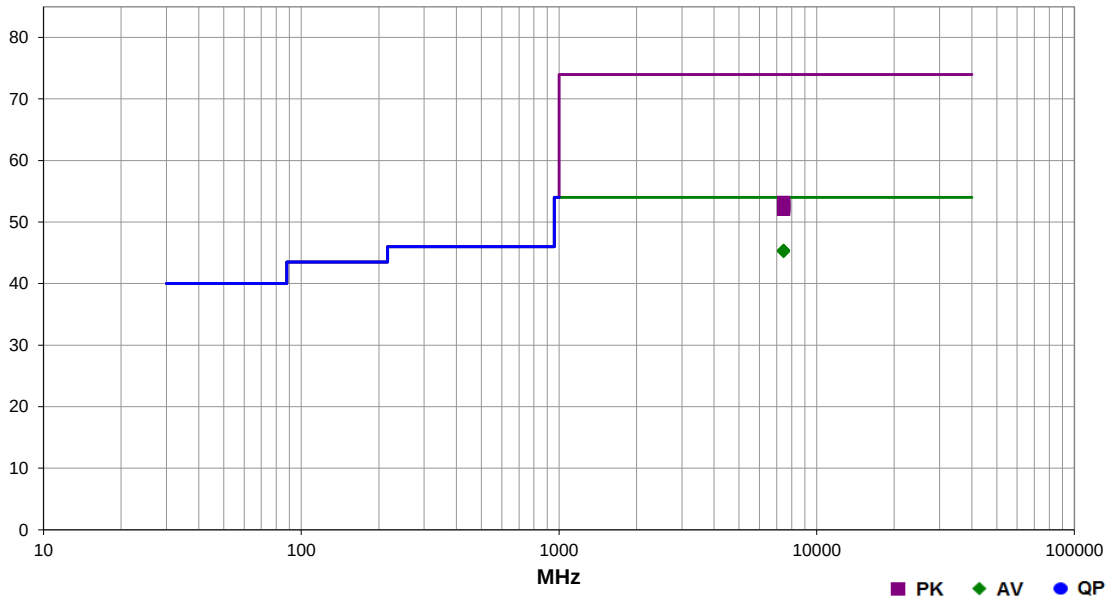
element

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-20		
Project:	None	**Temperature:**	23.9 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1033 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24130P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -8 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. Spot check for worst case harmonic from 0 dBm power setting measurements. Port 7 measurements were taken on 1/4/21. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7443.592	27.2	15.0	1.1	289.0	3.2	0.0	Horz	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Vert, Ant Vert
7445.958	27.2	15.0	1.5	193.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT Vert, Ant Vert
7445.325	27.1	15.0	1.5	341.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 8, EUT Vert, Ant Vert
7444.467	27.0	15.0	1.5	86.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Vert, Ant Vert
7446.925	38.2	15.0	1.5	86.0	0.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8	High Ch., Port 8, EUT Vert, Ant Vert
7448.433	37.7	15.0	1.5	193.0	0.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	High Ch., Port 7, EUT Vert, Ant Vert
7443.817	37.5	15.0	1.5	341.0	0.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	High Ch., Port 8, EUT Vert, Ant Vert
7448.150	37.1	15.0	1.1	289.0	0.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	High Ch., Port 7, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Antenna PN: T24190P10006GT, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.

DTS Tx, Antenna PN: T24190P10006GT, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

POE via 120VAC/60Hz
24VDC via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 19
SYNA0309 - 18
SYNA0317 - 3
SYNA0317 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26000 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Standard Gain	EMCO	3160-08	AHK	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	NCR	0 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	2020-07-07	24 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXV	2020-06-03	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	2020-03-02	12 mo
Antenna - Biconilog	EMCO	3142	AXB	2020-04-15	24 mo
Cable	D-Coax	None	OC4	2019-12-16	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	2020-05-01	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	2020-03-02	12 mo
Cable	ESM Cable Corp.	8-18GHz cables	OCY	2020-03-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2020-07-01	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	2019-12-16	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGC	2020-03-11	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2020-01-20	12 mo
Attenuator	S.M. Electronics	SA6-20	REO	2020-01-21	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

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. These “pre-scans” are not 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).

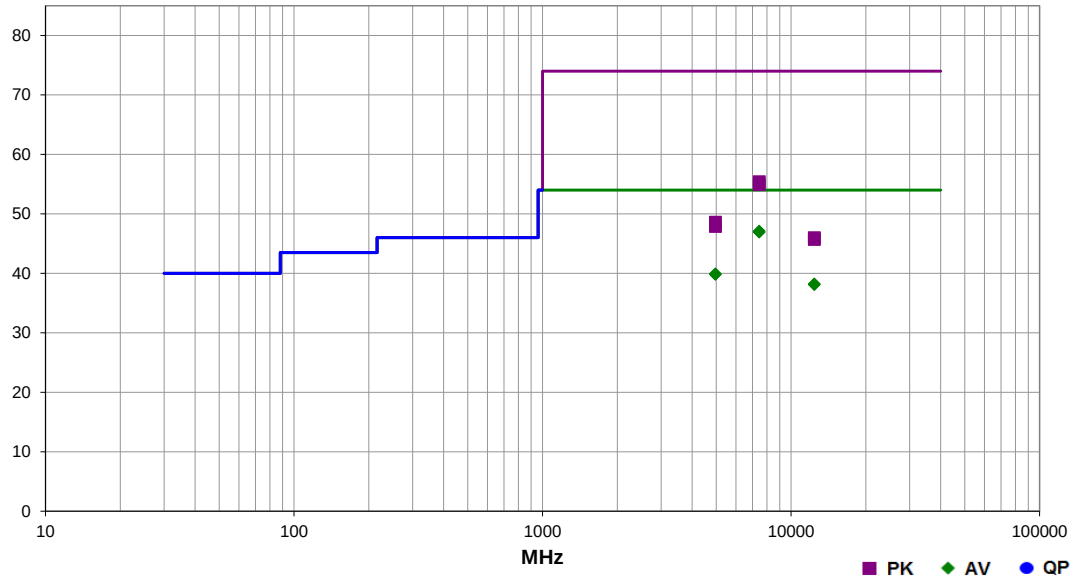
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-29		
Project:	None	**Temperature:**	19.5 °C		
Job Site:	OC07	**Humidity:**	41.8% RH		
Serial Number:	Rev. 10 - 012	**Barometric Pres.:**	1019 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	19				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous BTLE testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	147	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.340	31.6	12.3	2.9	105.0	3.2	0.0	Vert	AV	0.0	47.1	54.0	-6.9	High Ch, Port 8, EUT Horz, Antenna Horz
7445.403	31.4	12.3	1.5	20.0	3.2	0.0	Horz	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT Vert, Antenna Vert
4963.200	32.2	4.5	1.5	352.0	3.2	0.0	Horz	AV	0.0	39.9	54.0	-14.1	High Ch, Port 8, EUT Vert, Antenna Vert
4963.287	32.1	4.5	2.8	258.0	3.2	0.0	Vert	AV	0.0	39.8	54.0	-14.2	High Ch, Port 8, EUT Horz, Antenna Horz
12410.930	29.1	5.9	1.5	299.0	3.2	0.0	Vert	AV	0.0	38.2	54.0	-15.8	High Ch, Port 8, EUT Horz, Antenna Horz
12409.400	29.0	5.9	1.4	360.0	3.2	0.0	Horz	AV	0.0	38.1	54.0	-15.9	High Ch, Port 8, EUT Vert, Antenna Vert
7445.060	43.1	12.3	2.9	105.0	0.0	0.0	Vert	PK	0.0	55.4	74.0	-18.6	High Ch, Port 8, EUT Horz, Antenna Horz
7446.833	42.6	12.3	1.5	20.0	0.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	High Ch, Port 8, EUT Vert, Antenna Vert
4963.207	44.1	4.5	1.5	352.0	0.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	High Ch, Port 8, EUT Vert, Antenna Vert
4964.703	43.4	4.5	2.8	258.0	0.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch, Port 8, EUT Horz, Antenna Horz
12410.450	40.1	5.9	1.4	360.0	0.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	High Ch, Port 8, EUT Vert, Antenna Vert
12409.910	39.8	5.9	1.5	299.0	0.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	High Ch, Port 8, EUT Horz, Antenna Horz

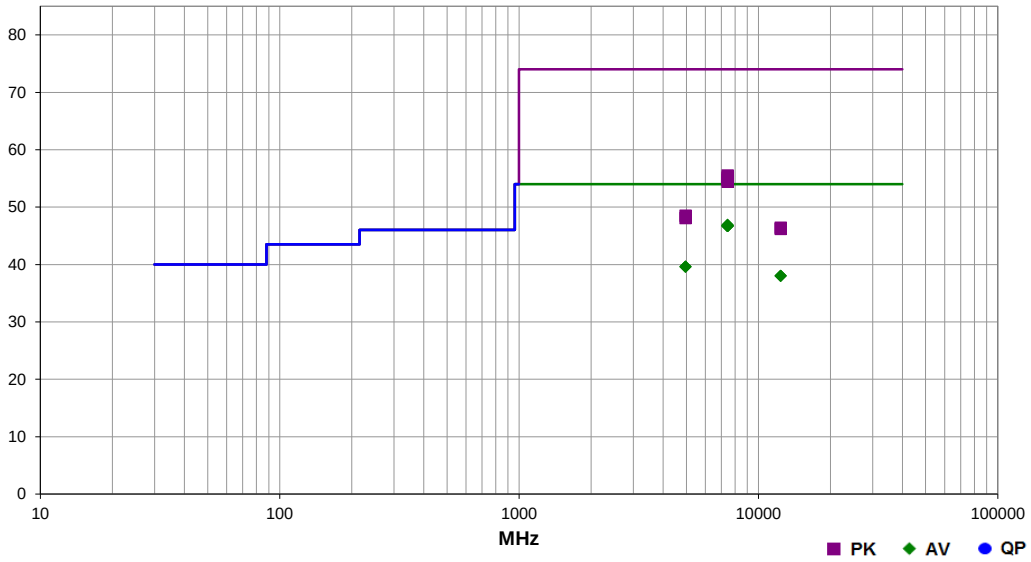
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0309	**Date:**	2020-10-28		
Project:	None	**Temperature:**	20 °C		
Job Site:	OC07	**Humidity:**	33.6% RH		
Serial Number:	Rev. 10 - 012	**Barometric Pres.:**	1021 mbar	**Tested by:**	Nolan De Ramos
EUT:	RadioNode				
Configuration:	18				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = 0 dBm, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478)				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	126	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7444.067	31.4	12.3	1.5	303.0	3.2	0.0	Horz	AV	0.0	46.9	54.0	-7.1	High Ch, Port 8, EUT On Side, Antenna On Side
7444.425	31.3	12.3	1.5	288.0	3.2	0.0	Vert	AV	0.0	46.8	54.0	-7.2	High Ch, Port 8, EUT On Side, Antenna On Side
7444.608	31.2	12.3	1.5	288.0	3.2	0.0	Horz	AV	0.0	46.7	54.0	-7.3	High Ch, Port 8, EUT Vert, Antenna Vert
7445.375	31.2	12.3	3.7	0.0	3.2	0.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch, Port 8, EUT Vert, Antenna Vert
7443.692	31.2	12.3	1.8	151.0	3.2	0.0	Horz	AV	0.0	46.7	54.0	-7.3	High Ch, Port 8, EUT Horz, Antenna Horz
7444.983	31.2	12.3	1.5	73.0	3.2	0.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch, Port 8, EUT Horz, Antenna Horz
4962.042	32.0	4.4	1.5	21.0	3.2	0.0	Horz	AV	0.0	39.6	54.0	-14.4	High Ch, Port 8, EUT On Side, Antenna On Side
4961.550	32.0	4.4	1.5	164.0	3.2	0.0	Vert	AV	0.0	39.6	54.0	-14.4	High Ch, Port 8, EUT On Side, Antenna On Side
12409.720	28.9	5.9	1.6	44.0	3.2	0.0	Horz	AV	0.0	38.0	54.0	-16.0	High Ch, Port 8, EUT On Side, Antenna On Side
12407.790	28.9	5.9	1.9	73.0	3.2	0.0	Vert	AV	0.0	38.0	54.0	-16.0	High Ch, Port 8, EUT On Side, Antenna On Side
7444.658	43.2	12.3	1.5	288.0	0.0	0.0	Horz	PK	0.0	55.5	74.0	-18.5	High Ch, Port 8, EUT Vert, Antenna Vert
7448.108	42.9	12.3	1.5	73.0	0.0	0.0	Vert	PK	0.0	55.2	74.0	-18.8	High Ch, Port 8, EUT Horz, Antenna Horz
7446.083	42.8	12.3	1.5	303.0	0.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	High Ch, Port 8, EUT On Side, Antenna On Side
7445.050	42.5	12.3	3.7	0.0	0.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	High Ch, Port 8, EUT Vert, Antenna Vert
7448.267	42.4	12.3	1.8	151.0	0.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	High Ch, Port 8, EUT Horz, Antenna Horz
7445.042	42.1	12.3	1.5	288.0	0.0	0.0	Vert	PK	0.0	54.4	74.0	-19.6	High Ch, Port 8, EUT On Side, Antenna On Side
4962.308	44.1	4.4	1.5	164.0	0.0	0.0	Vert	PK	0.0	48.5	74.0	-25.5	High Ch, Port 8, EUT On Side, Antenna On Side
4966.183	43.5	4.6	1.5	21.0	0.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	High Ch, Port 8, EUT On Side, Antenna On Side
12408.950	40.5	5.9	1.9	73.0	0.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	High Ch, Port 8, EUT On Side, Antenna On Side
12407.500	40.3	5.9	1.6	44.0	0.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	High Ch, Port 8, EUT On Side, Antenna On Side

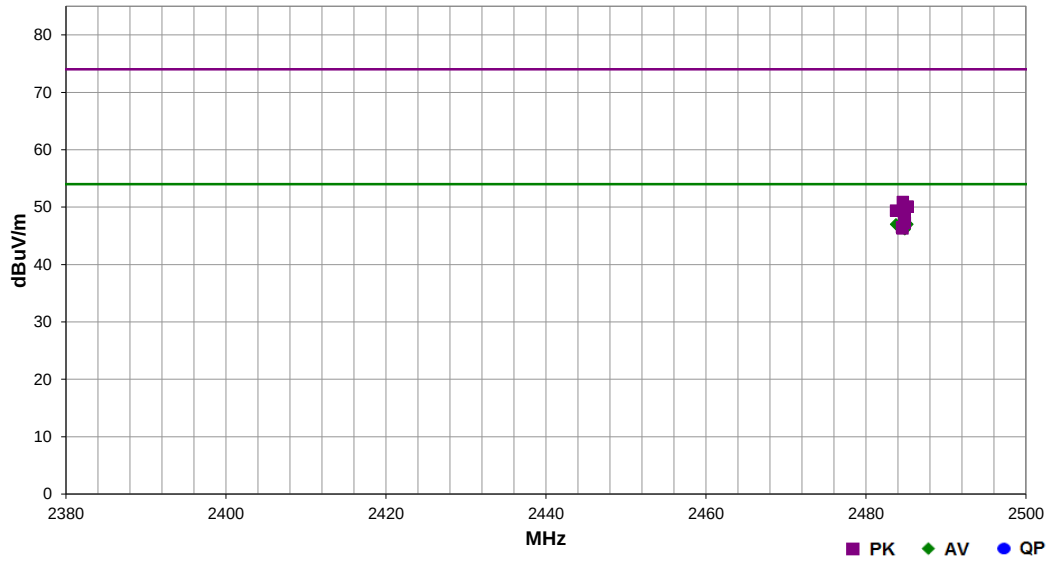
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-23		
Project:	None	**Temperature:**	22 °C		
Job Site:	NC01	**Humidity:**	38.1% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	3				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/4/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	43	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



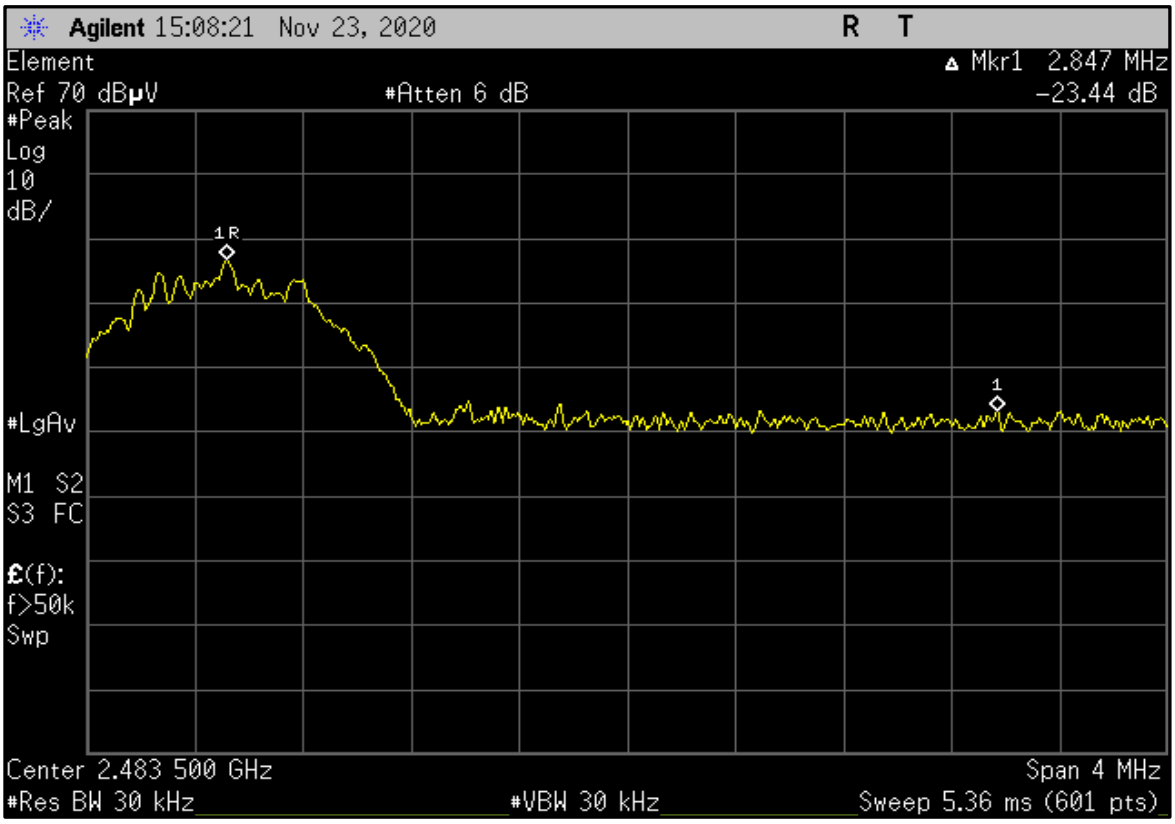
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.620	25.0	-0.8	1.5	331.0	3.2	20.0	Horz	AV	0.0	47.4	54.0	-6.6	High Ch., Port 7, EUT Vert, Ant Vert: Fund 38.4dBuV + -13.4dBc = 25.0dBuV (calc. amp.)
2484.840	24.7	-0.8	4.0	160.0	3.2	20.0	Vert	AV	0.0	47.1	54.0	-6.9	High Ch., Port 8, EUT Horz, Ant Horz: Fund 47.8dBuV + -23.1dBc = 24.7dBuV (calc. amp.)
2485.207	24.6	-0.8	1.5	82.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch., Port 8, EUT on Side, Ant on Side: Fund 40.5dBuV + -15.9dBc = 24.6dBuV (calc. amp.)
2483.760	24.6	-0.8	3.4	9.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch., Port 7, EUT Horz, Ant Horz: Fund 42.4dBuV + -17.8dBc = 24.6dBuV (calc. amp.)
2484.787	24.3	-0.8	1.8	134.0	3.2	20.0	Horz	AV	0.0	46.7	54.0	-7.3	High Ch., Port 8, EUT Vert, Ant Vert: Fund 44.0dBuV + -19.7dBc = 24.3dBuV (calc. amp.)
2484.513	24.2	-0.8	1.8	163.0	3.2	20.0	Vert	AV	0.0	46.6	54.0	-7.4	High Ch., Port 8, EUT Vert, Ant Vert: Fund 60.2dBuV + -36.0dBc = 24.2dBuV (calc. amp.)
2484.573	24.0	-0.8	1.5	161.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., Port 8, EUT on Side, Ant on Side: Fund 61.0dBuV + -37.0dBc = 24.0dBuV (calc. amp.)
2484.867	23.7	-0.8	3.6	82.0	3.2	20.0	Horz	AV	0.0	46.1	54.0	-7.9	High Ch., Port 8, EUT Horz, Ant Horz: Fund 47.1dBuV + -23.4dBc = 23.7dBuV (calc. amp.)
2484.620	31.7	-0.8	1.5	331.0	0.0	20.0	Horz	PK	0.0	50.9	74.0	-23.1	High Ch., Port 7, EUT Vert, Ant Vert: Fund 45.1dBuV + -13.4dBc = 31.7dBuV (calc. amp.)
2485.207	30.9	-0.8	1.5	82.0	0.0	20.0	Vert	PK	0.0	50.1	74.0	-23.9	High Ch., Port 8, EUT on Side, Ant on Side: Fund 46.8dBuV + -15.9dBc = 30.9dBuV (calc. amp.)
2483.760	30.2	-0.8	3.4	9.0	0.0	20.0	Vert	PK	0.0	49.4	74.0	-24.6	High Ch., Port 7, EUT Horz, Ant Horz: Fund 48.0dBuV + -17.8dBc = 30.2dBuV (calc. amp.)
2484.787	29.3	-0.8	1.8	134.0	0.0	20.0	Horz	PK	0.0	48.5	74.0	-25.5	High Ch., Port 8, EUT Vert, Ant Vert: Fund 49.0dBuV + -19.7dBc = 29.3dBuV (calc. amp.)
2484.840	29.1	-0.8	4.0	160.0	0.0	20.0	Vert	PK	0.0	48.3	74.0	-25.7	High Ch., Port 8, EUT Horz, Ant Horz: Fund 52.2dBuV + -23.1dBc = 29.1dBuV (calc. amp.)
2484.867	28.1	-0.8	3.6	82.0	0.0	20.0	Horz	PK	0.0	47.3	74.0	-26.7	High Ch., Port 8, EUT Horz, Ant Horz: Fund 51.5dBuV + -23.4dBc = 28.1dBuV (calc. amp.)
2484.513	27.3	-0.8	1.8	163.0	0.0	20.0	Vert	PK	0.0	46.5	74.0	-27.5	High Ch., Port 8, EUT Vert, Ant Vert: Fund 63.3dBuV + -36.0dBc = 27.3dBuV (calc. amp.)

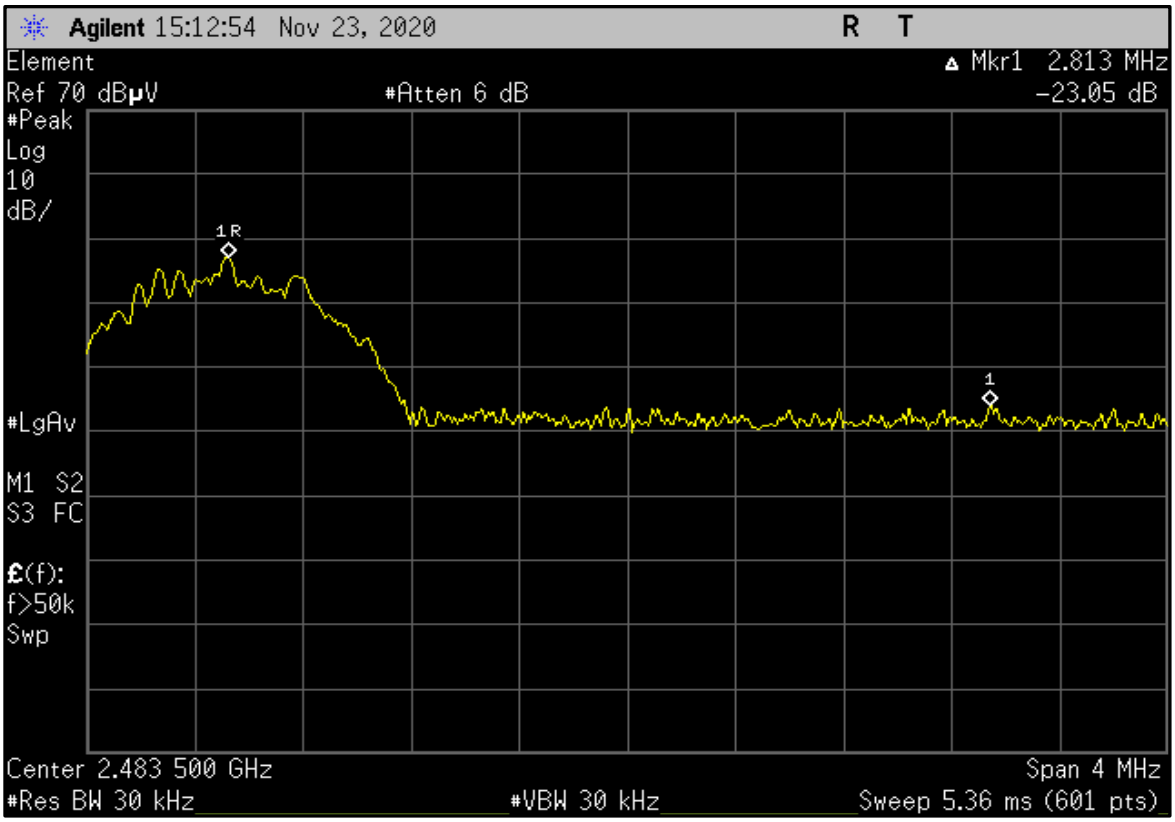
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.573	27.1	-0.8	1.5	161.0	0.0	20.0	Horz	PK	0.0	46.3	74.0	-27.7	High Ch., Port 8, EUT on Side, Ant on Side: Fund 64.1dBuV + -37.0dBc = 27.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2



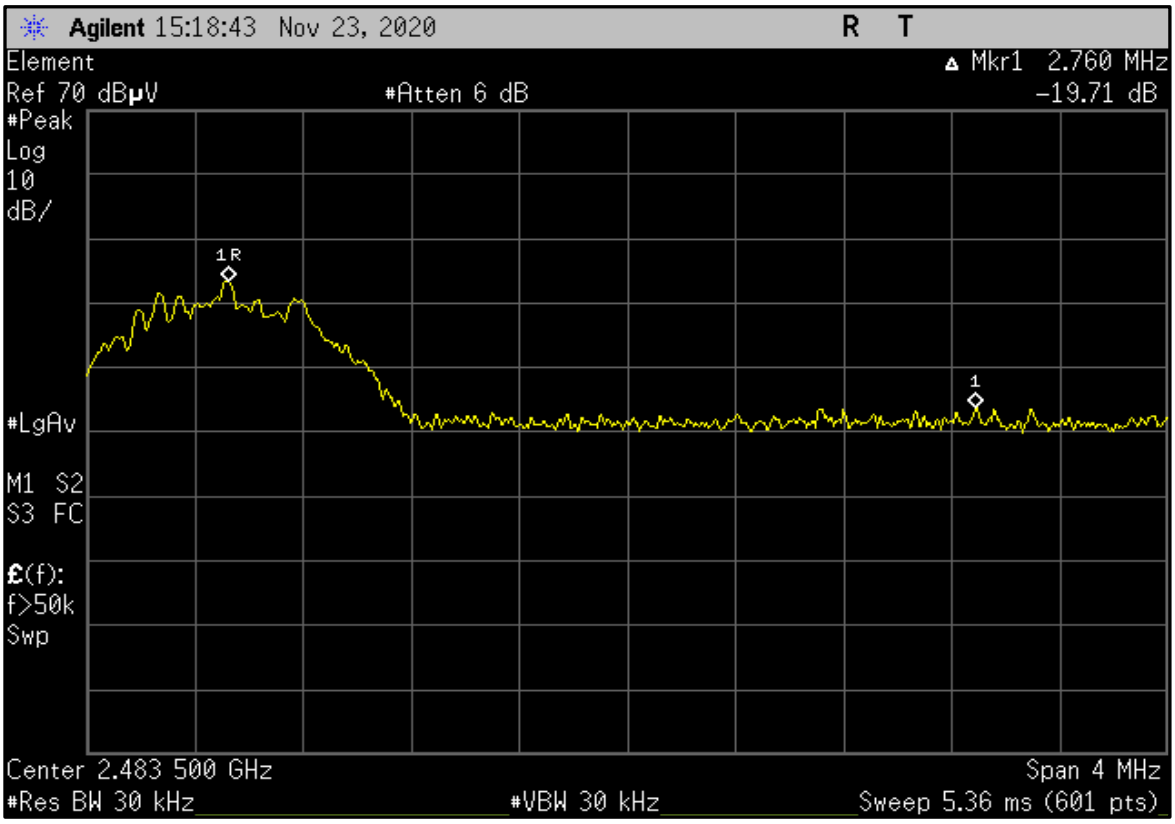


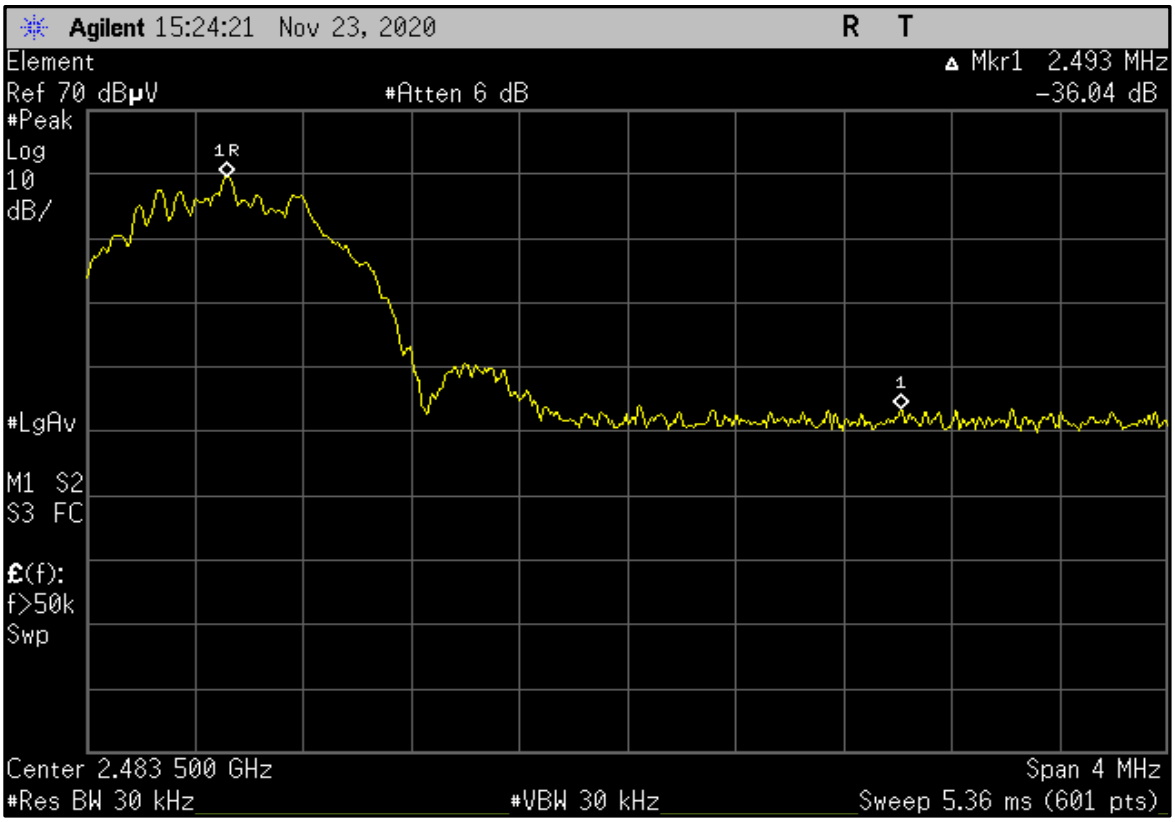
High Ch., Port 8, EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2



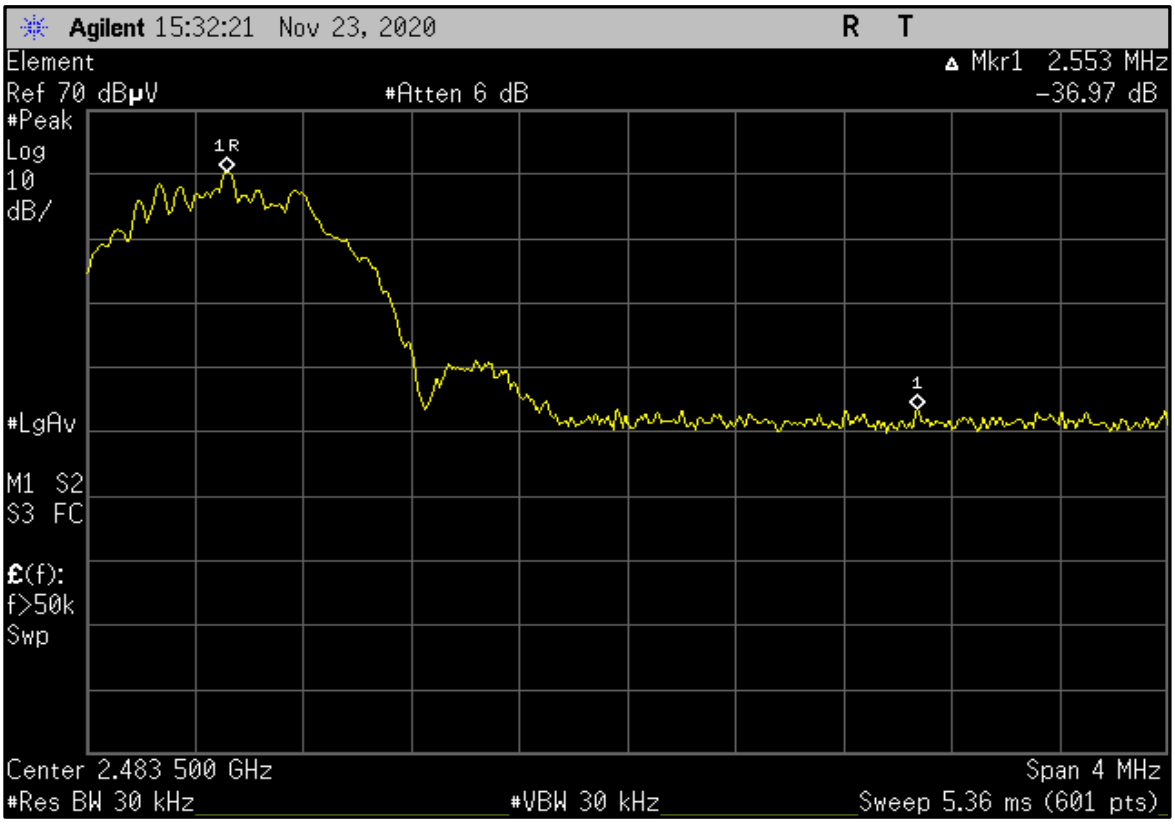


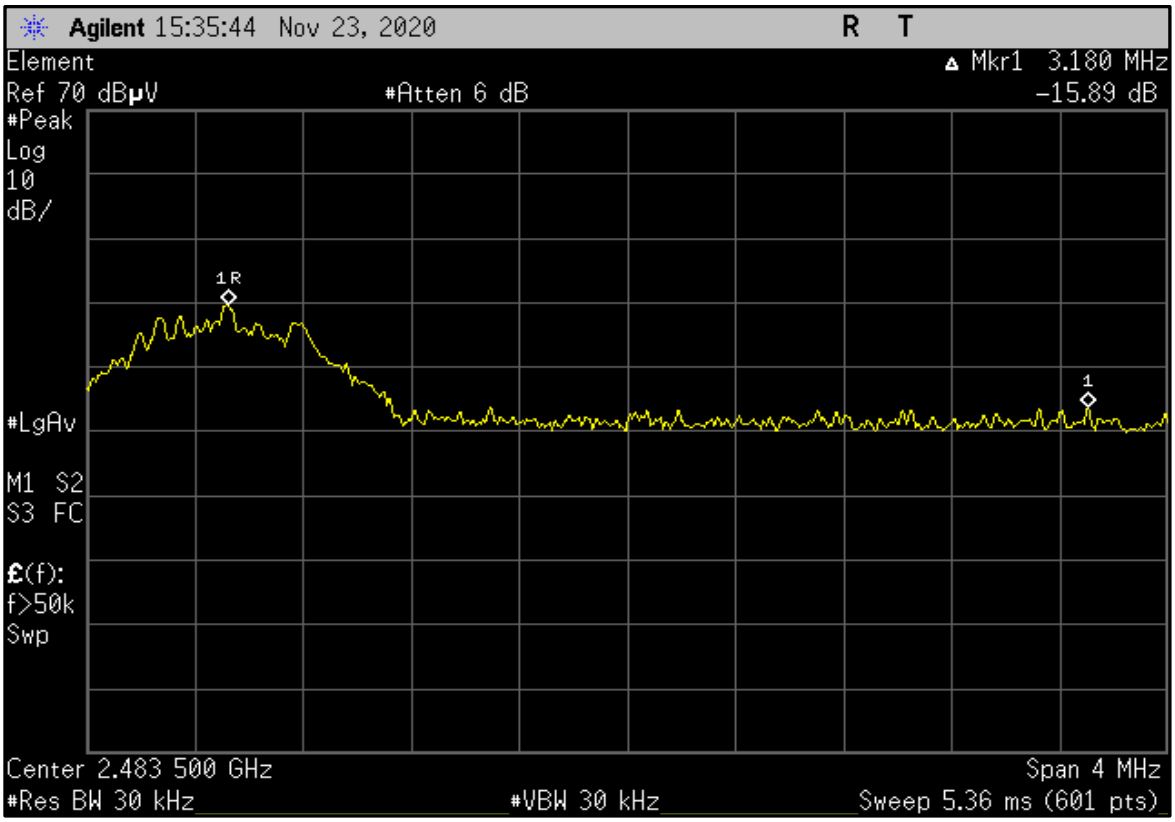
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2



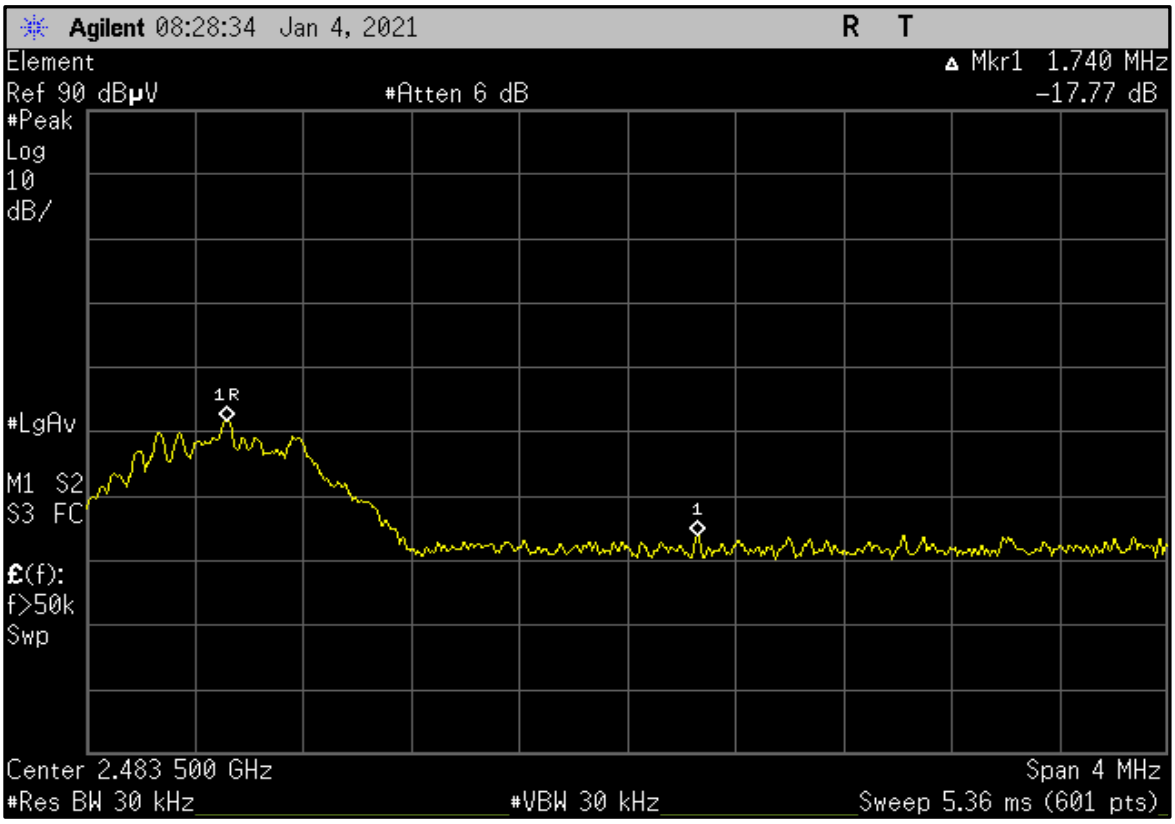


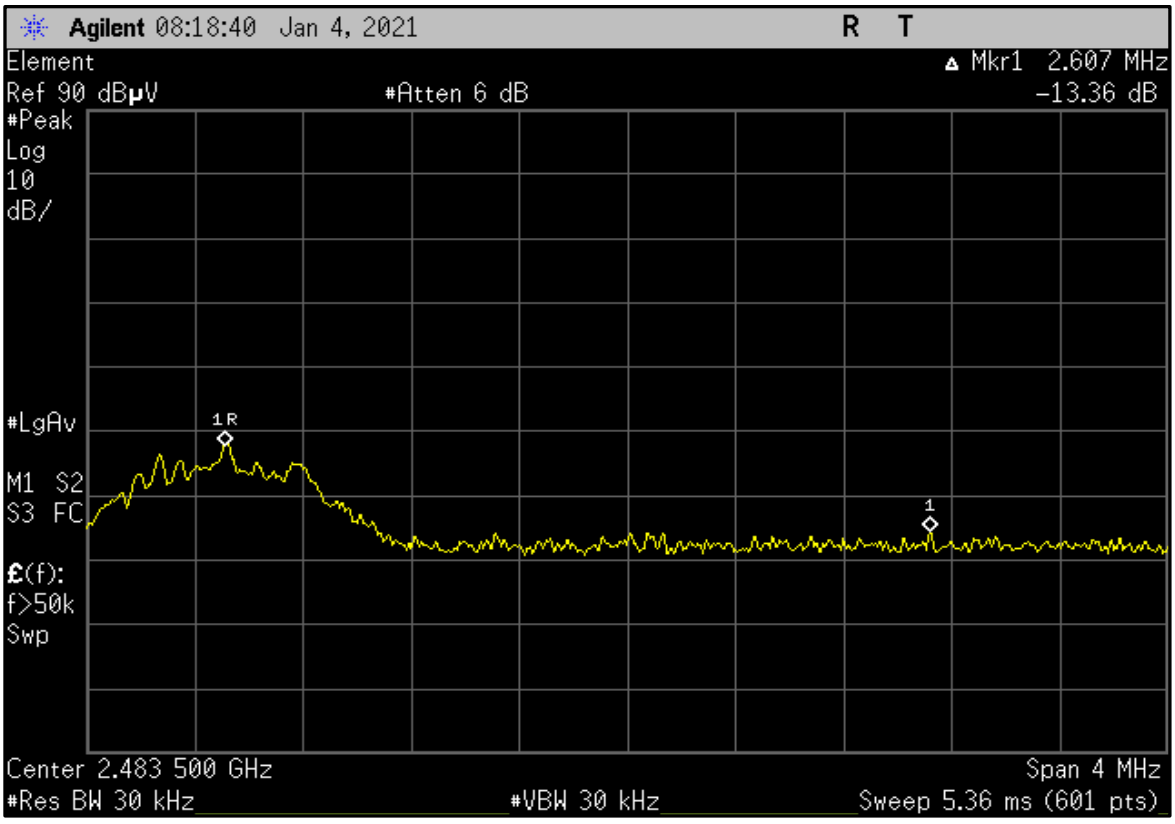
High Ch., Port 8, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2





High Ch., Port 7, EUT Vert, Ant Vert

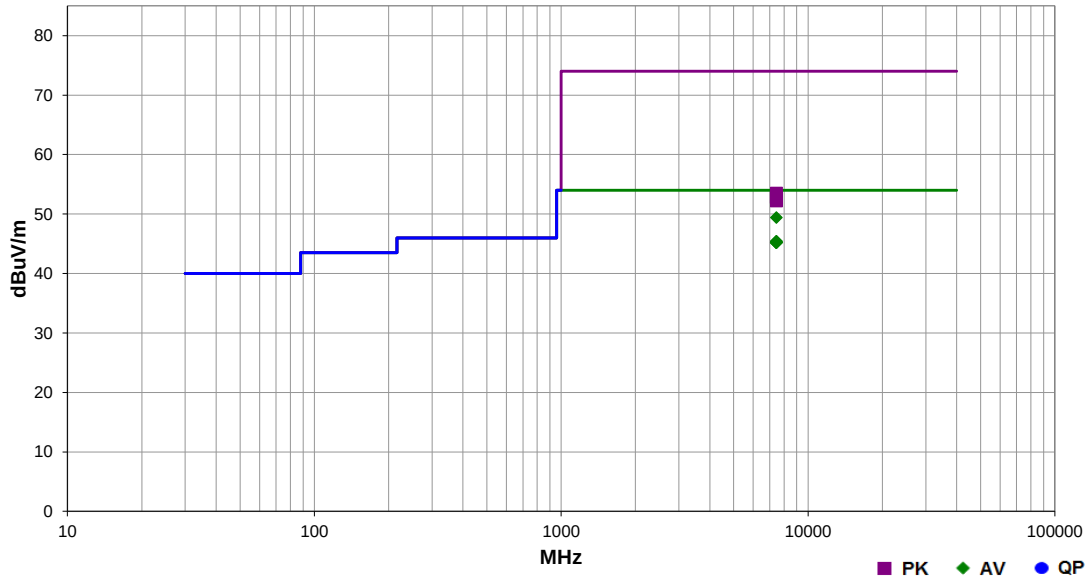
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-23		
Project:	None	**Temperature:**	22 °C		
Job Site:	NC01	**Humidity:**	38.1% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	3				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. Spot check for worst case harmonic from 0 dBm power setting measurements due to a reduction in power. Port 7 measurements were taken on 1/4/21. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	44	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7444.892	31.2	15.0	1.5	201.0	3.2	0.0	Horz	AV	0.0	49.4	54.0	-4.6	High Ch., Port 8, EUT on Side, Ant on Side
7445.108	27.2	15.0	3.6	119.0	3.2	0.0	Horz	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT on Side, Ant on Side
7445.033	27.2	15.0	1.9	155.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT on Side, Ant on Side
7445.708	27.0	15.0	1.5	172.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT on Side, Ant on Side
7444.008	27.0	15.0	1.3	1.0	3.2	0.0	Horz	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Vert, Ant Vert
7445.258	27.0	15.0	1.8	58.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Vert, Ant Vert
7445.592	27.0	15.0	1.5	2.0	3.2	0.0	Horz	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Horz, Ant Horz
7446.967	27.0	15.0	1.5	168.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT Horz, Ant Horz
7447.825	38.5	15.0	1.5	201.0	0.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	High Ch., Port 8, EUT on Side, Ant on Side
7444.992	38.1	15.0	3.6	119.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	High Ch., Port 7, EUT on Side, Ant on Side
7448.333	38.0	15.0	1.9	155.0	0.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	High Ch., Port 7, EUT on Side, Ant on Side
7443.733	37.8	15.0	1.8	58.0	0.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2	High Ch., Port 8, EUT Vert, Ant Vert
7447.175	37.7	15.0	1.5	2.0	0.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	High Ch., Port 8, EUT Horz, Ant Horz
7446.808	37.5	15.0	1.3	1.0	0.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	High Ch., Port 8, EUT Vert, Ant Vert
7447.508	37.3	15.0	1.5	168.0	0.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	High Ch., Port 8, EUT Horz, Ant Horz
7448.300	37.2	15.0	1.5	172.0	0.0	0.0	Vert	PK	0.0	52.2	74.0	-21.8	High Ch., Port 8, EUT on Side, Ant on Side

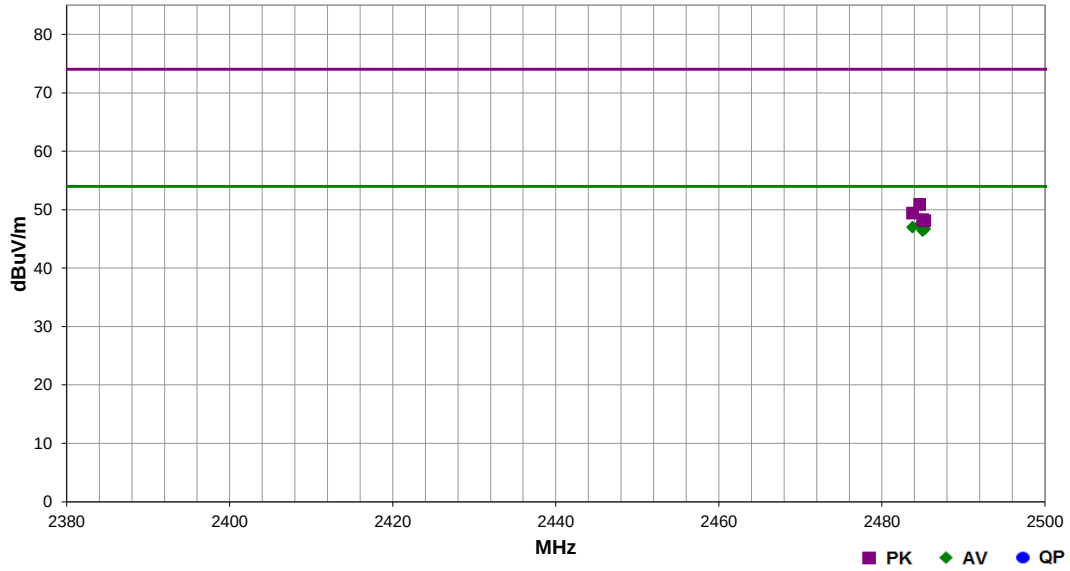
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-23		
Project:	None	**Temperature:**	22.9 °C		
Job Site:	NC01	**Humidity:**	37% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1017 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	4				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Port 7 measurements were taken on 1/4/21.				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	77	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

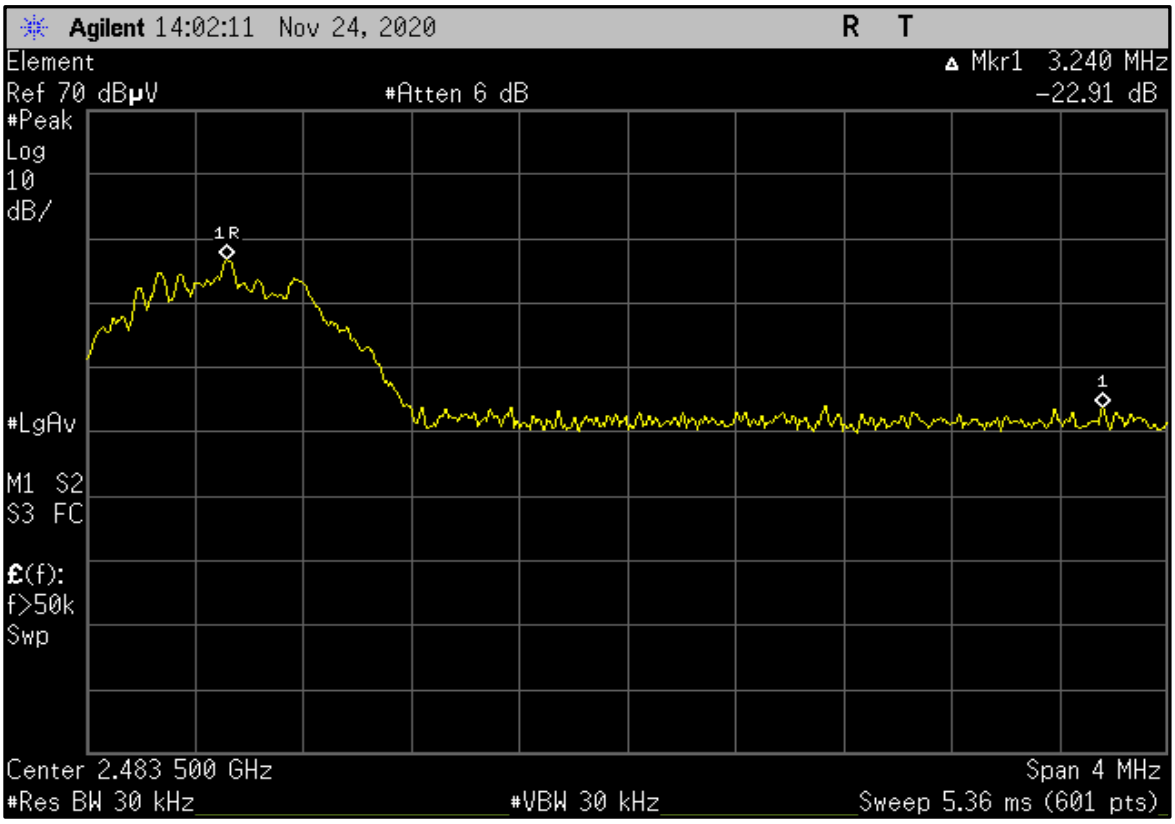


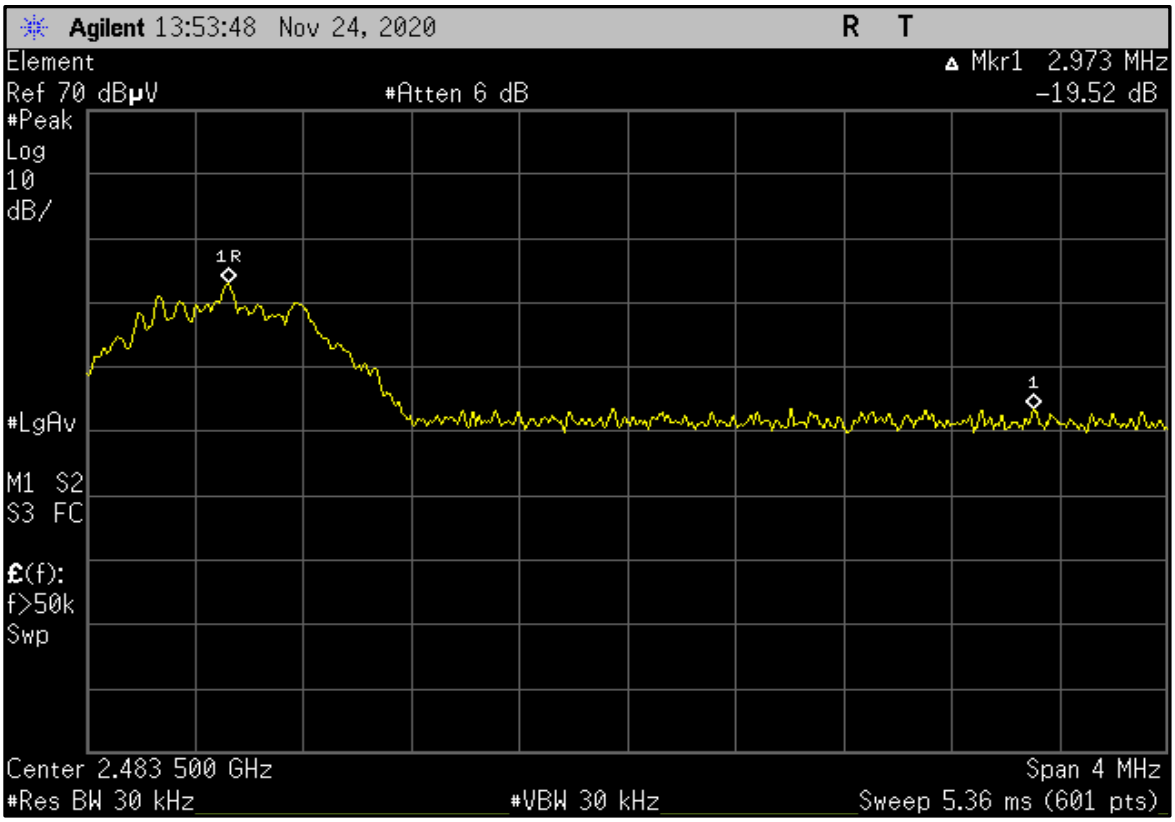
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.620	25.0	-0.8	1.5	331.0	3.2	20.0	Horz	AV	0.0	47.4	54.0	-6.6	High Ch., Port 7, EUT Vert, Ant Vert: Fund 38.4dBuV + -13.4dBc = 25.0dBuV (calc. amp.)
2483.760	24.6	-0.8	3.4	9.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch., Port 7, EUT Horz, Ant Horz: Fund 42.4dBuV + -17.8dBc = 24.6dBuV (calc. amp.)
2485.260	24.3	-0.8	4.0	158.0	3.2	20.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch., Port 8, EUT Horz, Ant Horz: Fund 47.2dBuV + -22.9dBc = 24.3dBuV (calc. amp.)
2485.000	24.0	-0.8	1.5	134.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., Port 8, EUT Vert, Ant Vert: Fund 43.5dBuV + -19.5dBc = 24.0dBuV (calc. amp.)
2484.620	31.7	-0.8	1.5	331.0	0.0	20.0	Horz	PK	0.0	50.9	74.0	-23.1	High Ch., Port 7, EUT Vert, Ant Vert: Fund 45.1dBuV + -13.4dBc = 31.7dBuV (calc. amp.)
2483.760	30.2	-0.8	3.4	9.0	0.0	20.0	Vert	PK	0.0	49.4	74.0	-24.6	High Ch., Port 7, EUT Horz, Ant Horz: Fund 48.0dBuV + -17.8dBc = 30.2dBuV (calc. amp.)
2485.000	29.1	-0.8	1.5	134.0	0.0	20.0	Horz	PK	0.0	48.3	74.0	-25.7	High Ch., Port 8, EUT Vert, Ant Vert: Fund 48.6dBuV + -19.5dBc = 29.1dBuV (calc. amp.)
2485.260	28.9	-0.8	4.0	158.0	0.0	20.0	Vert	PK	0.0	48.1	74.0	-25.9	High Ch., Port 8, EUT Horz, Ant Horz: Fund 51.8dBuV + -22.9dBc = 28.9dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., Port 8, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2



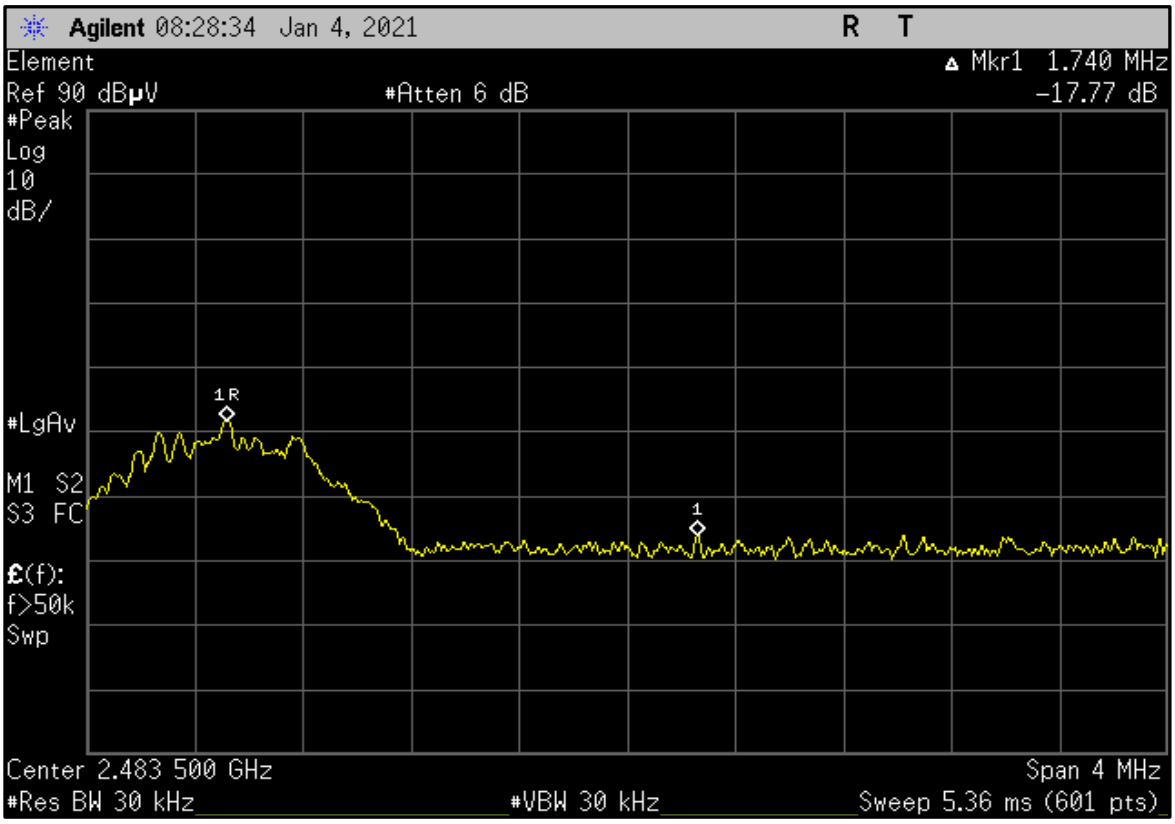


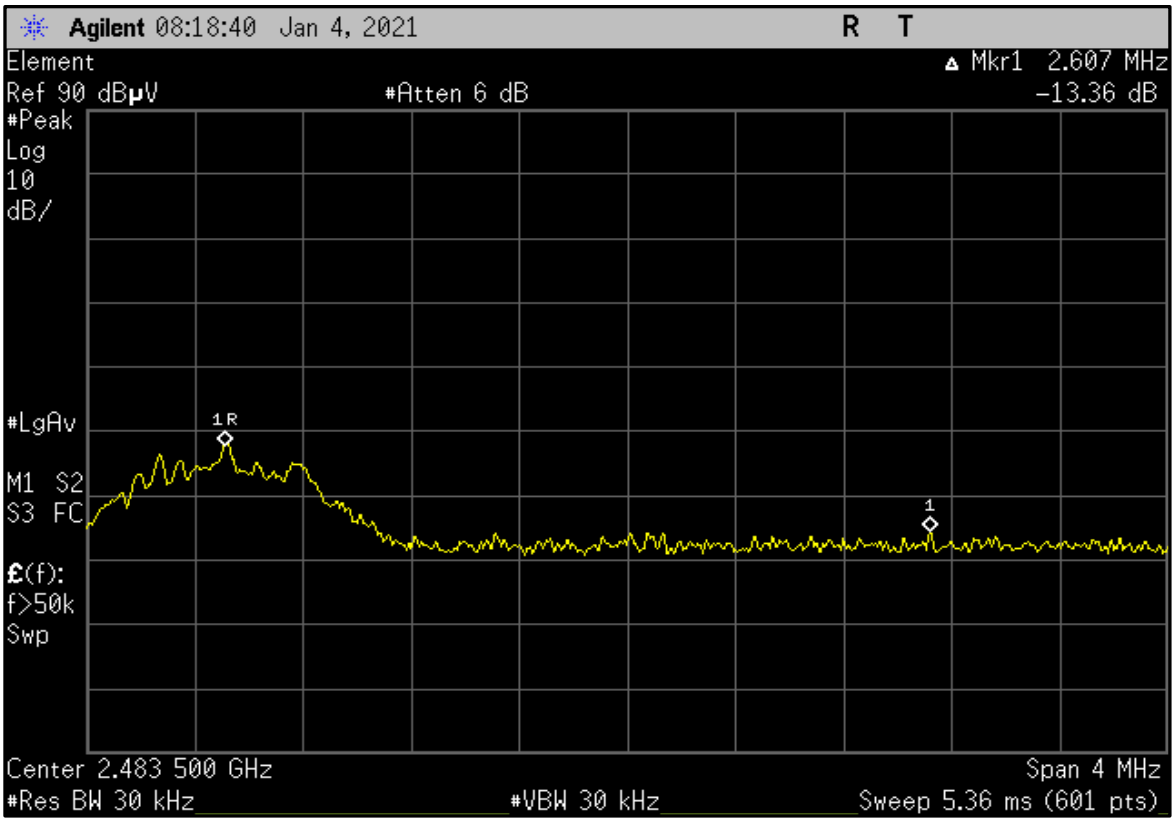
High Ch., Port 8, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

High Ch., Port 7, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2





High Ch., Port 7, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

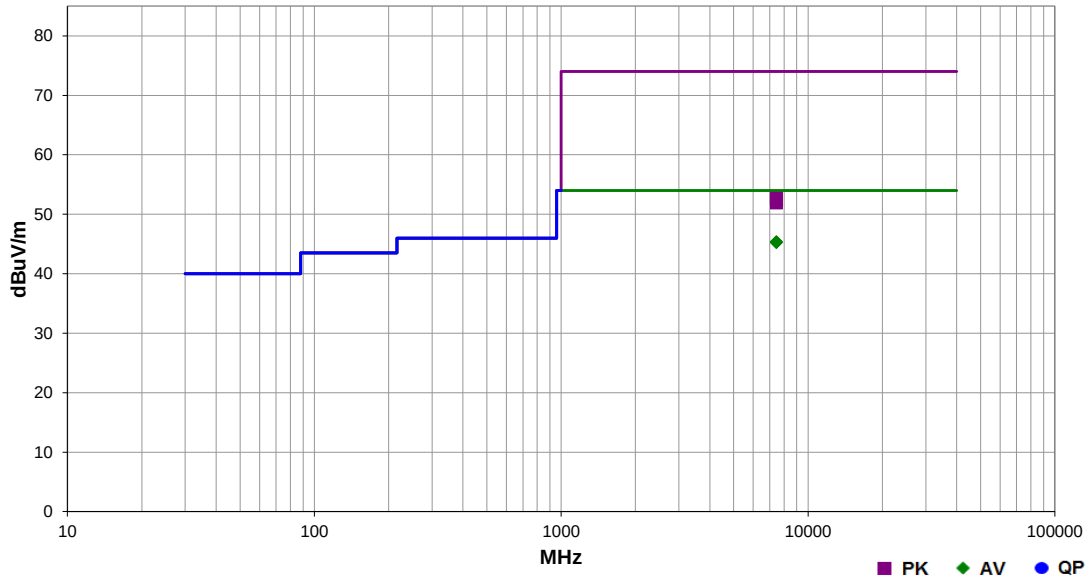
element

EmiR5 2020.06.24.4 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0317	**Date:**	2020-11-23		
Project:	None	**Temperature:**	22 °C		
Job Site:	NC01	**Humidity:**	38.1% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	4				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Antenna PN: T24190P10006GT, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Power Setting = -4 dBm, High Channel = 2482 MHz				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. Spot check for worst case harmonic from 0 dBm power setting measurements due to a reduction in power. Port 7 measurements were taken on 1/4/21. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

Run #	46	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7447.175	27.2	15.0	1.6	38.0	3.2	0.0	Vert	AV	0.0	45.4	54.0	-8.6	High Ch., Port 7, EUT on Side, Ant on Side
7447.108	27.1	15.0	1.5	264.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 8, EUT on Side, Ant on Side
7446.867	27.1	15.0	1.5	242.0	3.2	0.0	Horz	AV	0.0	45.3	54.0	-8.7	High Ch., Port 7, EUT on Side, Ant on Side
7447.158	27.0	15.0	1.5	283.0	3.2	0.0	Vert	AV	0.0	45.2	54.0	-8.8	High Ch., Port 8, EUT on Side, Ant on Side
7447.125	37.7	15.0	1.5	264.0	0.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	High Ch., Port 8, EUT on Side, Ant on Side
7443.600	37.6	15.0	1.5	242.0	0.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	High Ch., Port 7, EUT on Side, Ant on Side
7445.850	37.3	15.0	1.5	283.0	0.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	High Ch., Port 8, EUT on Side, Ant on Side
7447.417	36.9	15.0	1.6	38.0	0.0	0.0	Vert	PK	0.0	51.9	74.0	-22.1	High Ch., Port 7, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.04.03.0

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Port 8, Antenna PN: WSA.2400.A.101151, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

POE via 120VAC/60Hz
24VDC via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0309 - 9
SYNA0309 - 10

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2019-11-08	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo

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. These “pre-scans” are not 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

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).

SPURIOUS RADIATED EMISSIONS

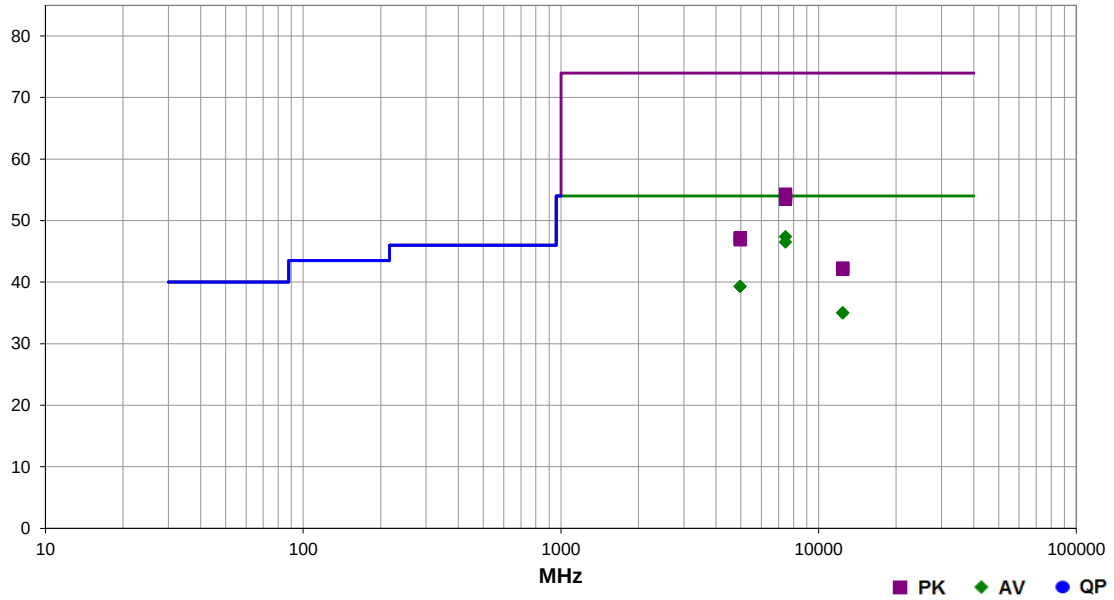
element

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-10-05		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	NC01	**Humidity:**	55.9% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	10				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: WSA.2400.A.101151, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	177	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.692	29.2	15.0	3.1	56.0	3.2	0.0	Vert	AV	0.0	47.4	54.0	-6.6	High Ch., EUT on Side, Ant on Side
7446.600	28.3	15.0	1.5	104.0	3.2	0.0	Horz	AV	0.0	46.5	54.0	-7.5	High Ch., EUT Horz, Ant Horz
4962.775	26.6	9.5	1.5	208.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Horz, Ant Horz
4962.750	26.6	9.5	1.5	23.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., EUT on Side, Ant on Side
12412.080	26.8	5.0	1.5	305.0	3.2	0.0	Vert	AV	0.0	35.0	54.0	-19.0	High Ch., EUT on Side, Ant on Side
12412.080	26.8	5.0	1.5	40.0	3.2	0.0	Horz	AV	0.0	35.0	54.0	-19.0	High Ch., EUT Horz, Ant Horz
7446.575	39.3	15.0	3.1	56.0	0.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	High Ch., EUT on Side, Ant on Side
7446.892	38.5	15.0	1.5	104.0	0.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	High Ch., EUT Horz, Ant Horz
4962.958	37.7	9.5	1.5	23.0	0.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	High Ch., EUT on Side, Ant on Side
4962.058	37.4	9.5	1.5	208.0	0.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	High Ch., EUT Horz, Ant Horz
12411.660	37.3	5.0	1.5	40.0	0.0	0.0	Horz	PK	0.0	42.3	74.0	-31.7	High Ch., EUT Horz, Ant Horz
12408.380	37.1	5.0	1.5	305.0	0.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	High Ch., EUT on Side, Ant on Side

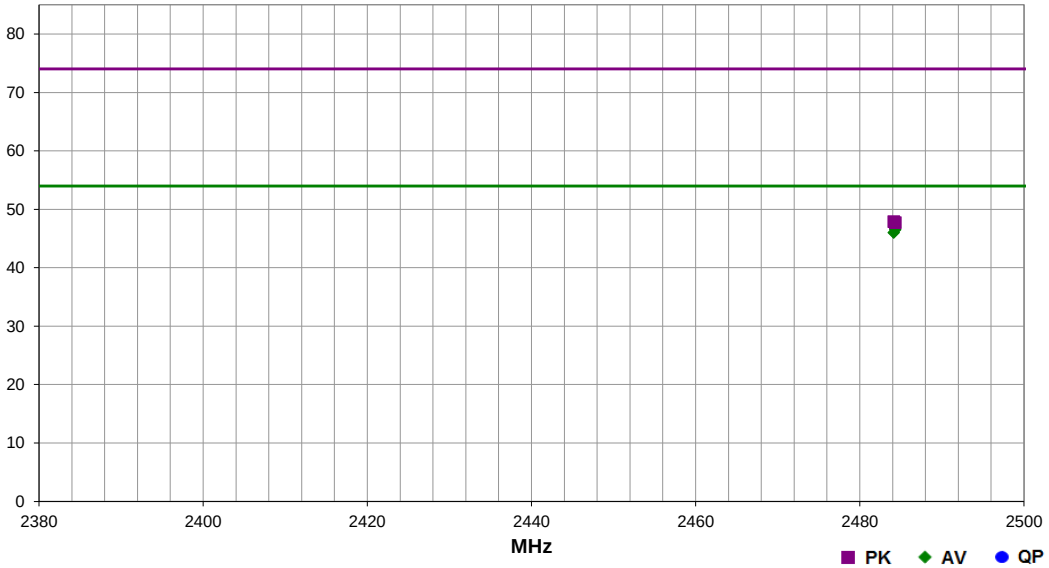
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-10-05		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	NC01	**Humidity:**	55.9% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	10				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: WSA.2400.A.101151, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	179	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

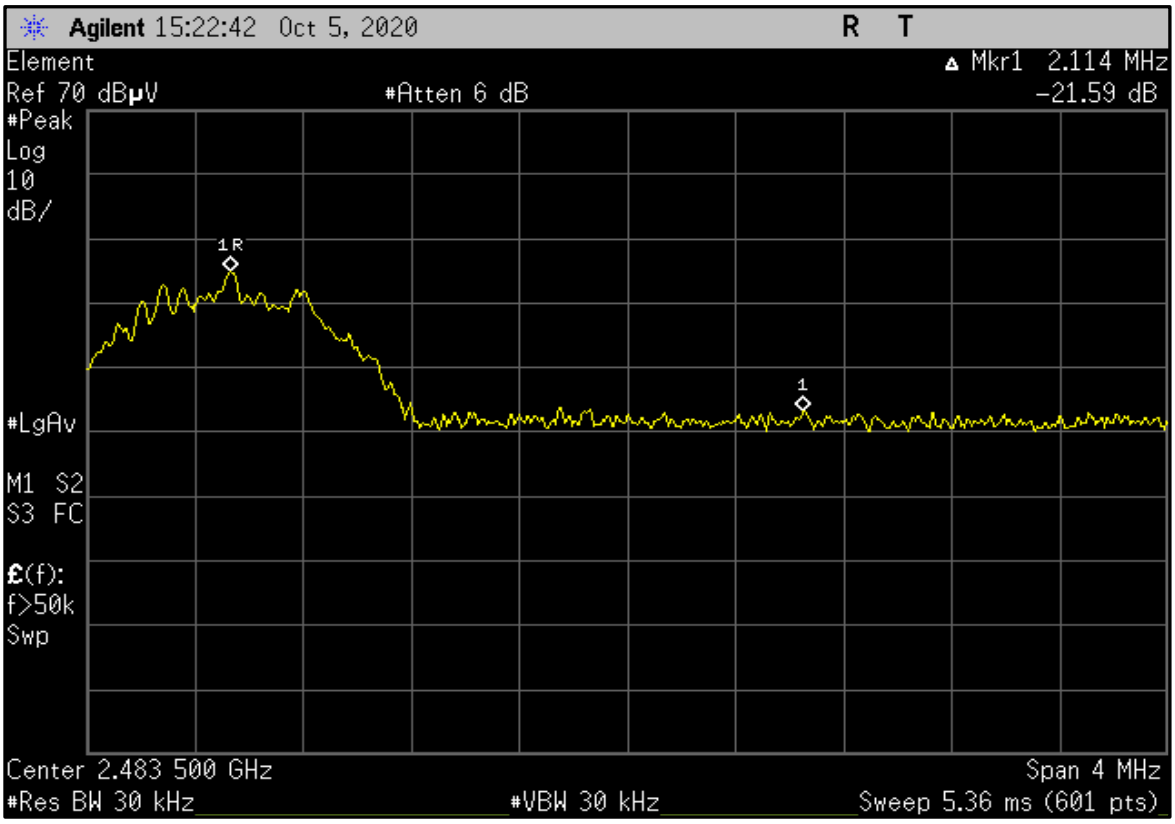


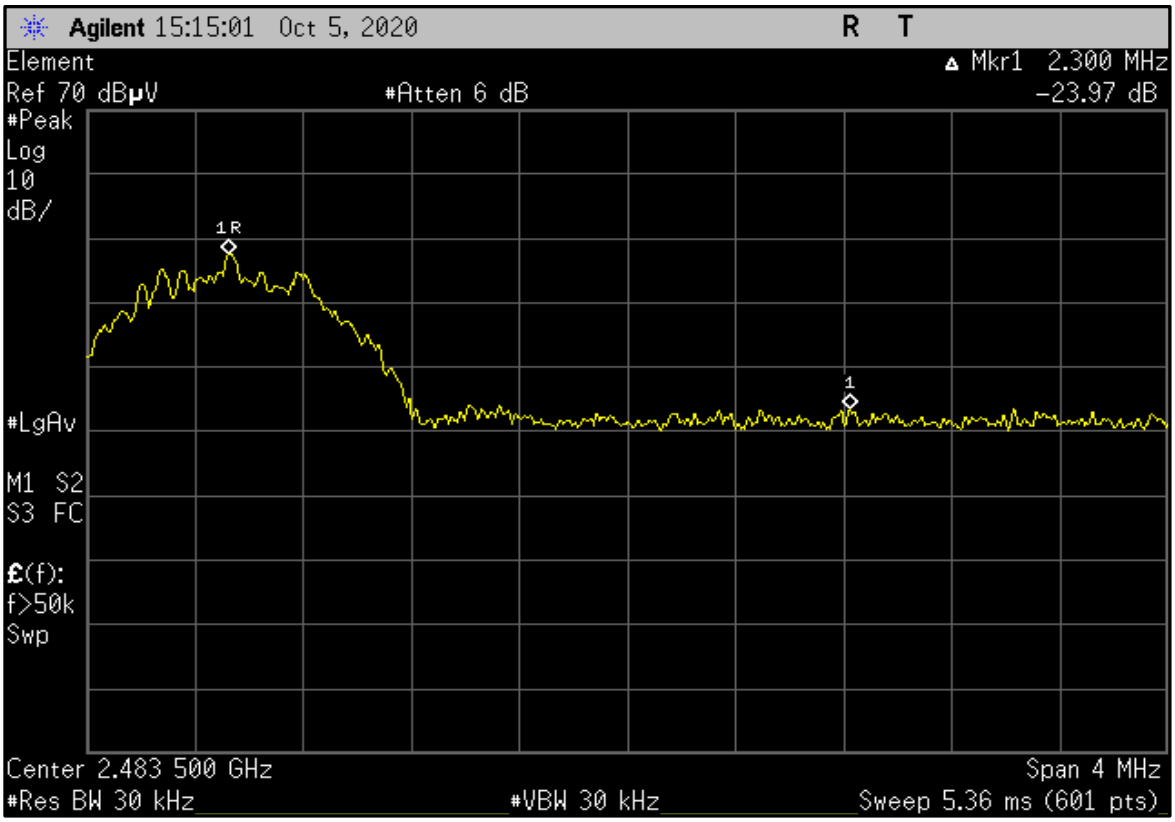
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.327	24.1	-0.8	1.5	324.0	3.2	20.0	Horz	AV	0.0	46.5	54.0	-7.5	High Ch., EUT Horz, Ant Horz: Fund 48.1dBuV + · 24.0dBc = 24.1dBuV (calc. amp.)
2484.147	23.6	-0.8	3.3	303.0	3.2	20.0	Vert	AV	0.0	46.0	54.0	-8.0	High Ch., EUT Horz, Ant Horz: Fund 45.2dBuV + · 21.6dBc = 23.6dBuV (calc. amp.)
2484.147	28.7	-0.8	3.3	303.0	0.0	20.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch., EUT Horz, Ant Horz: Fund 50.3dBuV + · 21.6dBc = 28.7dBuV (calc. amp.)
2484.327	28.5	-0.8	1.5	324.0	0.0	20.0	Horz	PK	0.0	47.7	74.0	-26.3	High Ch., EUT Horz, Ant Horz: Fund 52.5dBuV + · 24.0dBc = 28.5dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT on Side, Ant on Side

PSA-ESCI 2020.04.03.0





High Ch., EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

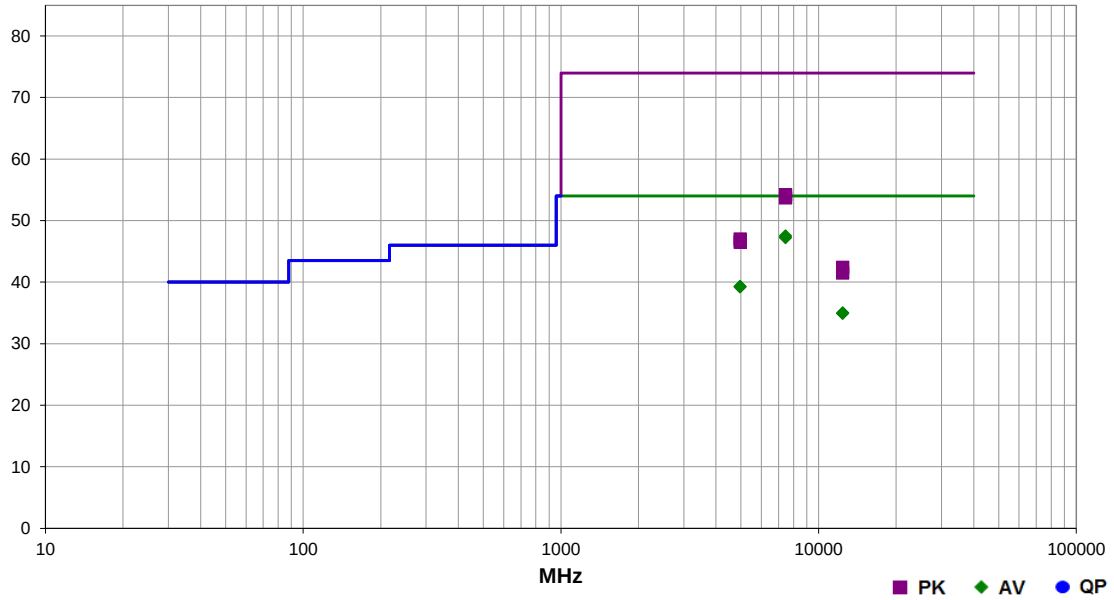
element

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-10-05		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	NC01	**Humidity:**	55.9% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	9				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: WSA.2400.A.101151, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	183	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.683	29.3	15.0	1.4	68.0	3.2	0.0	Vert	AV	0.0	47.5	54.0	-6.5	High Ch., EUT on Side, Ant on Side
7445.508	29.0	15.0	2.5	300.0	3.2	0.0	Horz	AV	0.0	47.2	54.0	-6.8	High Ch., EUT Horz, Ant Horz
4962.167	26.6	9.5	1.5	184.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Horz, Ant Horz
4962.258	26.5	9.5	4.0	12.0	3.2	0.0	Vert	AV	0.0	39.2	54.0	-14.8	High Ch., EUT on Side, Ant on Side
12411.840	26.8	5.0	1.5	0.0	3.2	0.0	Vert	AV	0.0	35.0	54.0	-19.0	High Ch., EUT on Side, Ant on Side
12410.930	26.7	5.0	1.5	172.0	3.2	0.0	Horz	AV	0.0	34.9	54.0	-19.1	High Ch., EUT Horz, Ant Horz
7446.817	39.2	15.0	1.4	68.0	0.0	0.0	Vert	PK	0.0	54.2	74.0	-19.8	High Ch., EUT on Side, Ant on Side
7445.467	38.7	15.0	2.5	300.0	0.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	High Ch., EUT Horz, Ant Horz
4962.608	37.5	9.5	4.0	12.0	0.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch., EUT on Side, Ant on Side
4963.675	37.0	9.5	1.5	184.0	0.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	High Ch., EUT Horz, Ant Horz
12409.680	37.4	5.0	1.5	0.0	0.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	High Ch., EUT on Side, Ant on Side
12408.400	36.5	5.0	1.5	172.0	0.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	High Ch., EUT Horz, Ant Horz

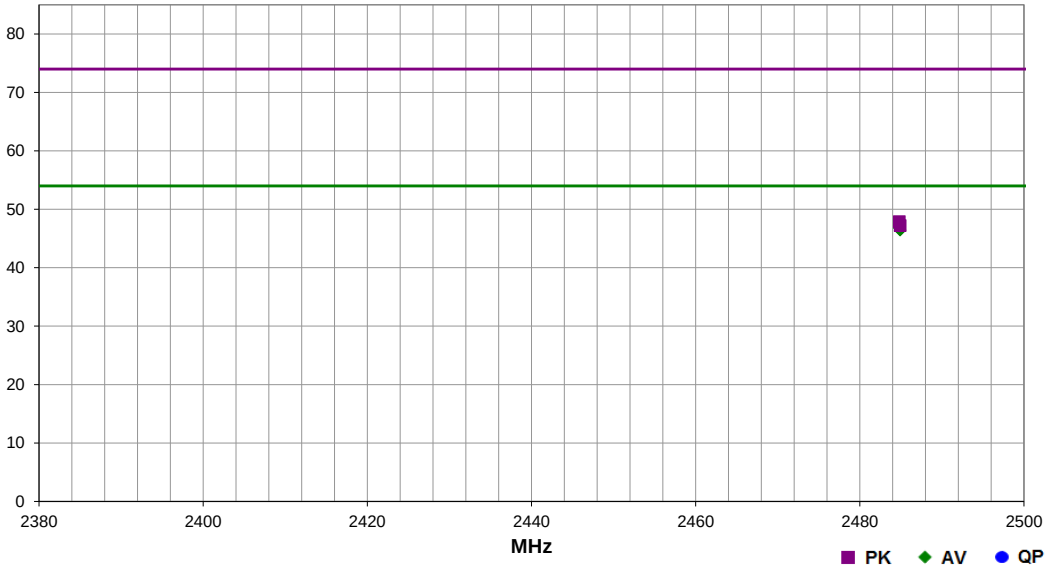
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.06.24.4 PSA-ESCI 2020.04.03.0

Work Order:	SYNA0309	**Date:**	2020-10-05		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	NC01	**Humidity:**	55.9% RH		
Serial Number:	Rev. 10 - 002	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	9				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Antenna PN: WSA.2400.A.101151, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2482 MHz.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478).				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	185	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

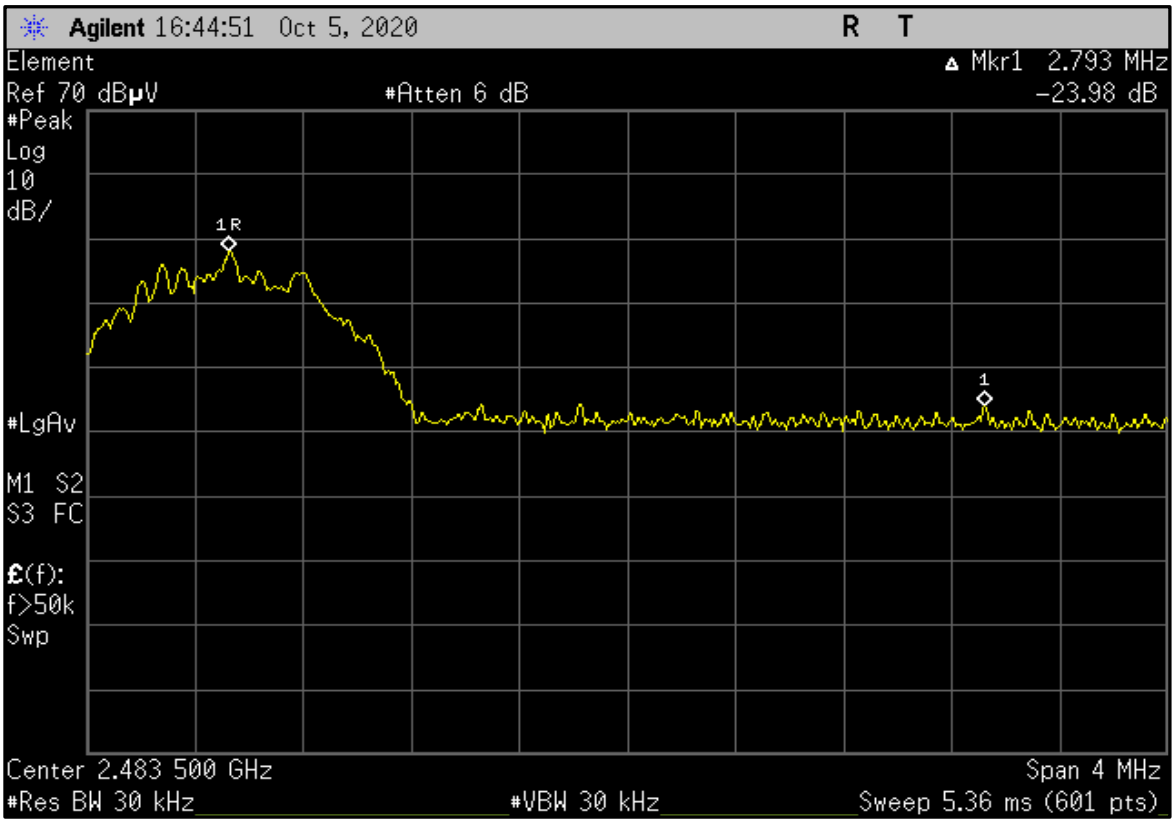


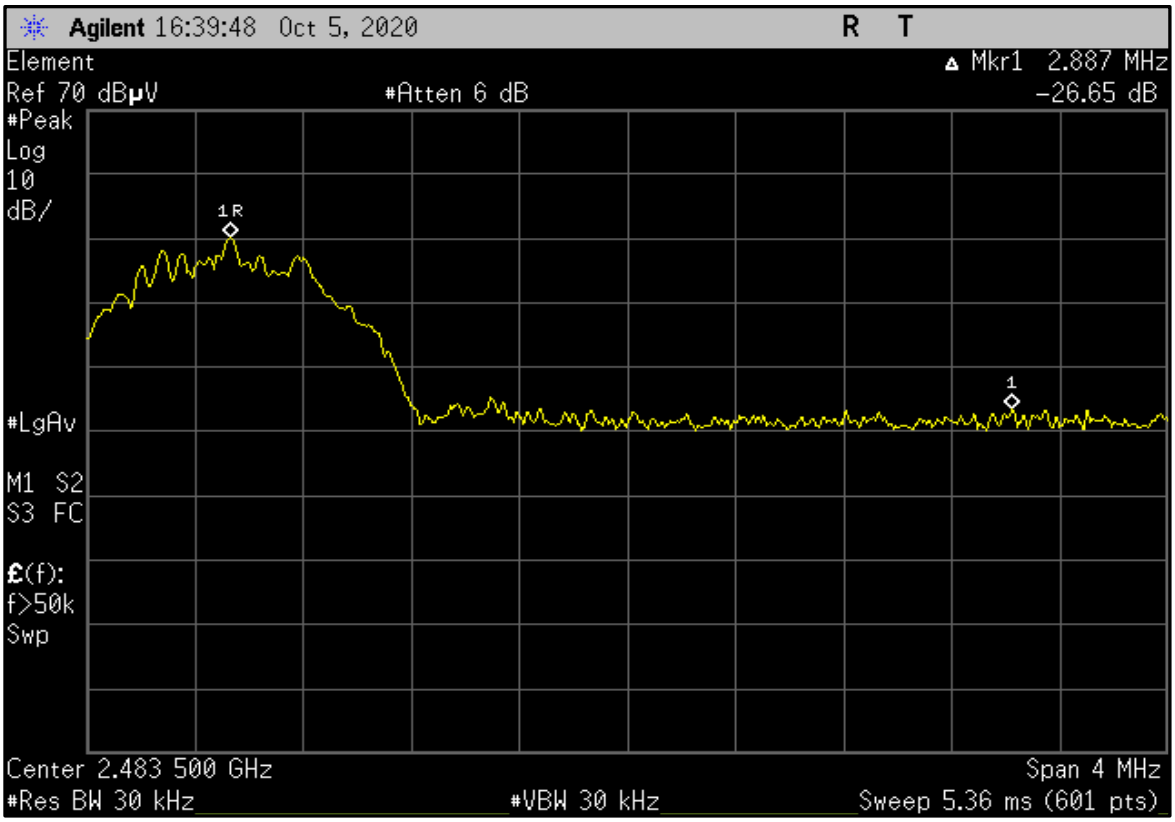
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.820	24.4	-0.8	4.0	90.0	3.2	20.0	Vert	AV	0.0	46.8	54.0	-7.2	High Ch., EUT Horz, Ant Horz: Fund 48.4dBuV + · 24.0dBc = 24.4dBuV (calc. amp.)
2484.920	24.0	-0.8	1.0	320.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., EUT Horz, Ant Horz: Fund 50.6dBuV + · 26.6dBc = 24.0dBuV (calc. amp.)
2484.820	28.7	-0.8	4.0	90.0	0.0	20.0	Vert	PK	0.0	47.9	74.0	-26.1	High Ch., EUT Horz, Ant Horz: Fund 52.7dBuV + · 24.0dBc = 28.7dBuV (calc. amp.)
2484.920	28.0	-0.8	1.0	320.0	0.0	20.0	Horz	PK	0.0	47.2	74.0	-26.8	High Ch., EUT Horz, Ant Horz: Fund 54.6dBuV + · 26.6dBc = 28.0dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Horz, Ant Horz

PSA-ESCI 2020.04.03.0





High Ch., EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.

Simultaneous Tx mode: BTLE Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.

POWER SETTINGS INVESTIGATED

POE via 120VAC/60Hz

24VDC via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0313 - 1

SYNA0313 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2020-11-06	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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. These “pre-scans” are not 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).

SPURIOUS RADIATED EMISSIONS

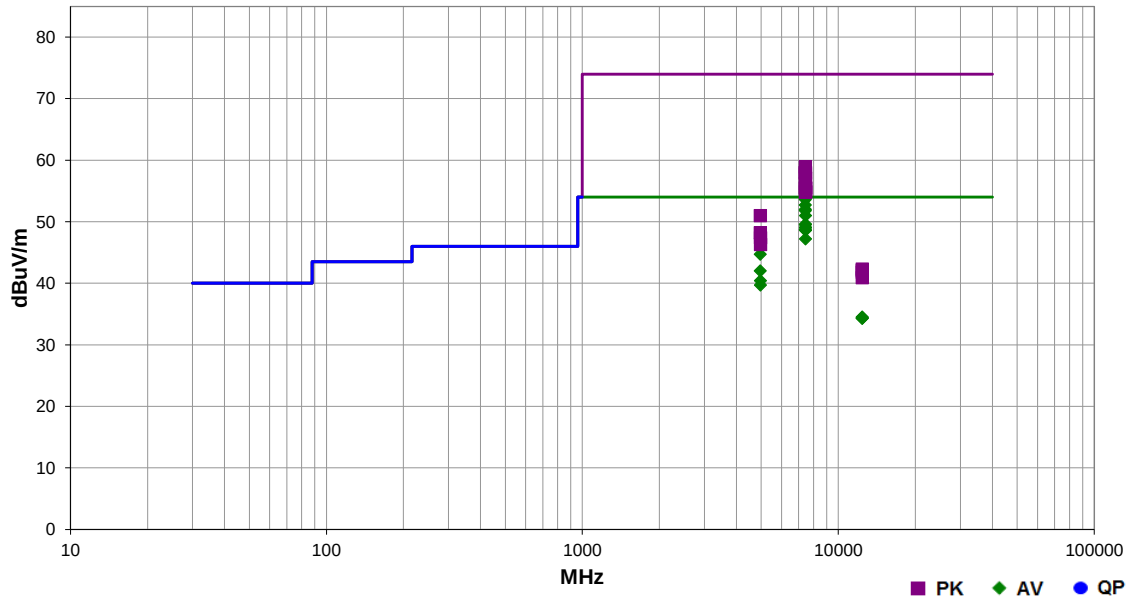
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	5	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7440.650	35.4	15.0	1.5	15.0	3.2	0.0	Horz	AV	0.0	53.6	54.0	-0.4	High Ch., EUT Horz, Ant Horz
7439.467	34.5	15.0	3.2	320.0	3.2	0.0	Vert	AV	0.0	52.7	54.0	-1.3	High Ch., EUT Vert, Ant Vert
7440.567	33.8	15.0	2.2	255.0	3.2	0.0	Horz	AV	0.0	52.0	54.0	-2.0	High Ch., EUT on Side, Ant on Side
7440.617	33.6	15.0	1.6	106.0	3.2	0.0	Horz	AV	0.0	51.8	54.0	-2.2	DTS, EUT Vert, Ant Vert
7446.708	32.8	15.0	2.0	249.0	3.2	0.0	Horz	AV	0.0	51.0	54.0	-3.0	DTS, EUT on Side, Ant on Side
7446.592	31.4	15.0	1.5	54.0	3.2	0.0	Horz	AV	0.0	49.6	54.0	-4.4	DTS, EUT Horz, Ant Horz
7440.517	31.3	15.0	1.8	27.0	3.2	0.0	Vert	AV	0.0	49.5	54.0	-4.5	High Ch., EUT Horz, Ant Horz
7446.525	30.9	15.0	1.5	357.0	3.2	0.0	Vert	AV	0.0	49.1	54.0	-4.9	DTS, EUT Vert, Ant Vert
7445.433	30.8	15.0	1.5	48.0	3.2	0.0	Vert	AV	0.0	49.0	54.0	-5.0	DTS, EUT Horz, Ant Horz
7440.775	30.5	15.0	1.4	87.0	3.2	0.0	Vert	AV	0.0	48.7	54.0	-5.3	High Ch., EUT on Side, Ant on Side
7445.542	30.4	15.0	3.1	200.0	3.2	0.0	Vert	AV	0.0	48.6	54.0	-5.4	DTS, EUT on Side, Ant on Side
7446.567	29.0	15.0	3.0	137.0	3.2	0.0	Horz	AV	0.0	47.2	54.0	-6.8	DTS, EUT Vert, Ant Vert
4959.992	32.0	9.5	1.0	54.0	3.2	0.0	Horz	AV	0.0	44.7	54.0	-9.3	High Ch., EUT Horz, Ant Horz
4960.050	29.3	9.5	3.3	149.0	3.2	0.0	Vert	AV	0.0	42.0	54.0	-12.0	High Ch., EUT Vert, Ant Vert
4964.042	27.7	9.5	1.5	355.0	3.2	0.0	Horz	AV	0.0	40.4	54.0	-13.6	DTS, EUT on Side, Ant on Side
4963.733	27.0	9.5	1.5	162.0	3.2	0.0	Vert	AV	0.0	39.7	54.0	-14.3	DTS, EUT Vert, Ant Vert
7440.767	43.9	15.0	1.5	15.0	0.0	0.0	Horz	PK	0.0	58.9	74.0	-15.1	High Ch., EUT Horz, Ant Horz
7440.125	43.0	15.0	1.6	106.0	0.0	0.0	Horz	PK	0.0	58.0	74.0	-16.0	High Ch., EUT Vert, Ant Vert
7440.517	43.0	15.0	3.2	320.0	0.0	0.0	Vert	PK	0.0	58.0	74.0	-16.0	High Ch., EUT Vert, Ant Vert
7439.242	42.8	15.0	2.2	255.0	0.0	0.0	Horz	PK	0.0	57.8	74.0	-16.2	High Ch., EUT on Side, Ant on Side
7446.525	42.1	15.0	2.0	249.0	0.0	0.0	Horz	PK	0.0	57.1	74.0	-16.9	DTS, EUT on Side, Ant on Side

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7440.867	41.2	15.0	1.8	27.0	0.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	High Ch., EUT Horz, Ant Horz
7445.450	40.5	15.0	1.5	54.0	0.0	0.0	Horz	PK	0.0	55.5	74.0	-18.5	DTS, EUT Horz, Ant Horz
7446.508	40.5	15.0	1.5	357.0	0.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	DTS, EUT Vert, Ant Vert
7439.292	40.5	15.0	1.4	87.0	0.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	High Ch., EUT on Side, Ant on Side
7446.858	40.0	15.0	1.5	48.0	0.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	DTS, EUT Horz, Ant Horz
7447.167	39.9	15.0	3.0	137.0	0.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	DTS, EUT Vert, Ant Vert
7446.117	39.8	15.0	3.1	200.0	0.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	DTS, EUT on Side, Ant on Side
12401.150	26.4	4.9	1.4	176.0	3.2	0.0	Vert	AV	0.0	34.5	54.0	-19.5	High Ch., EUT Vert, Ant Vert
12407.780	26.2	5.0	1.5	232.0	3.2	0.0	Horz	AV	0.0	34.4	54.0	-19.6	DTS, EUT on Side, Ant on Side
12401.540	26.2	4.9	1.5	245.0	3.2	0.0	Horz	AV	0.0	34.3	54.0	-19.7	High Ch., EUT Horz, Ant Horz
12412.230	26.1	5.0	1.5	98.0	3.2	0.0	Vert	AV	0.0	34.3	54.0	-19.7	DTS, EUT Vert, Ant Vert
4960.150	41.5	9.5	1.0	54.0	0.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	High Ch., EUT Horz, Ant Horz
4960.583	38.7	9.5	3.3	149.0	0.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	High Ch., EUT Vert, Ant Vert
4963.358	37.9	9.5	1.5	355.0	0.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	DTS, EUT on Side, Ant on Side
4966.325	36.8	9.5	1.5	162.0	0.0	0.0	Vert	PK	0.0	46.3	74.0	-27.7	DTS, EUT Vert, Ant Vert
12400.390	37.4	4.9	1.5	245.0	0.0	0.0	Horz	PK	0.0	42.3	74.0	-31.7	High Ch., EUT Horz, Ant Horz
12401.510	37.2	4.9	1.4	176.0	0.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	High Ch., EUT Vert, Ant Vert
12409.890	36.8	5.0	1.5	232.0	0.0	0.0	Horz	PK	0.0	41.8	74.0	-32.2	DTS, EUT on Side, Ant on Side
12407.930	35.9	5.0	1.5	98.0	0.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	DTS, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

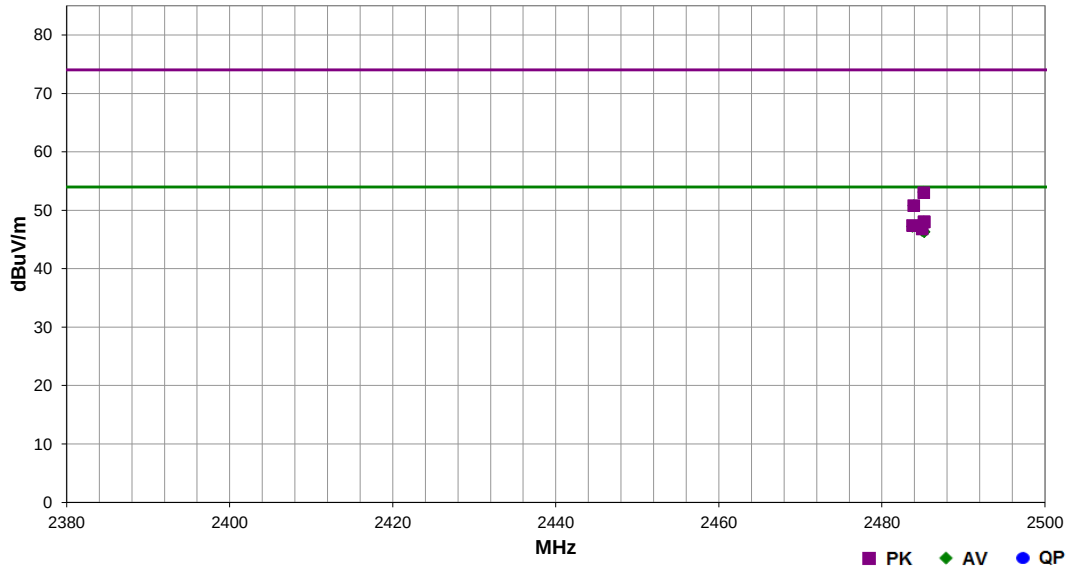
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	7	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

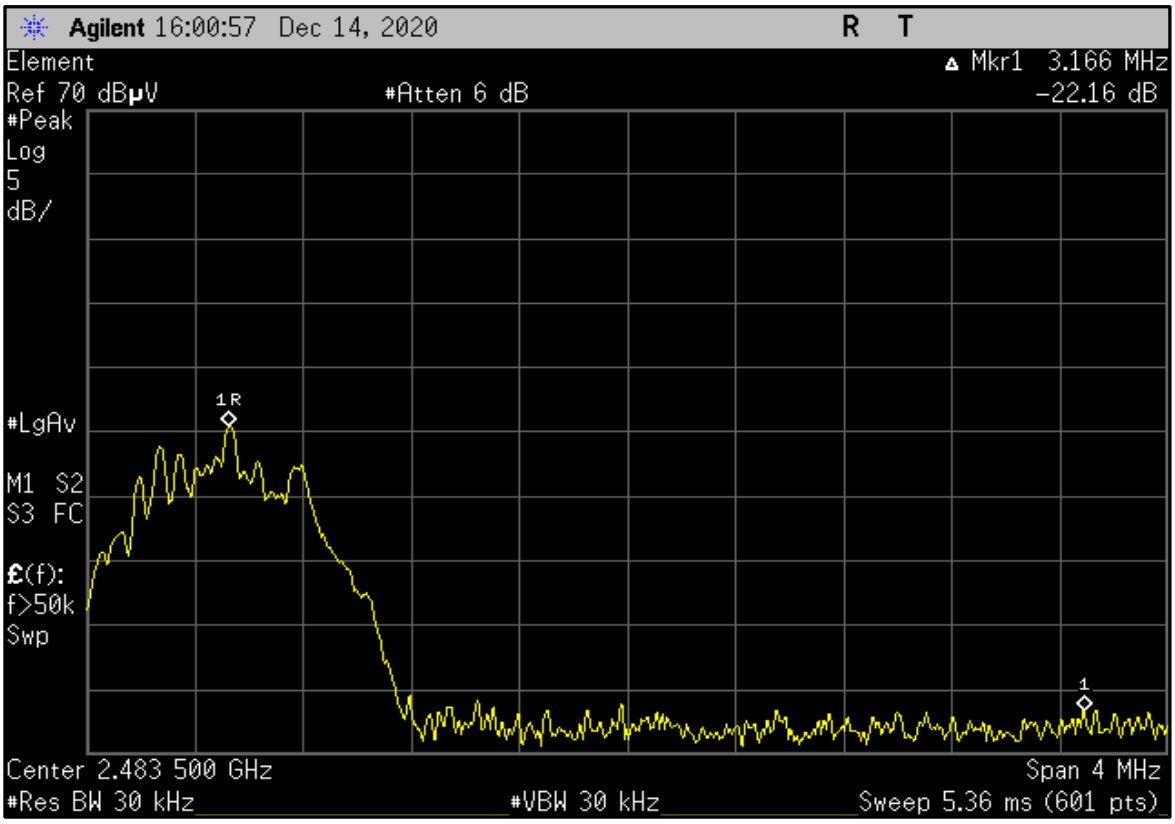


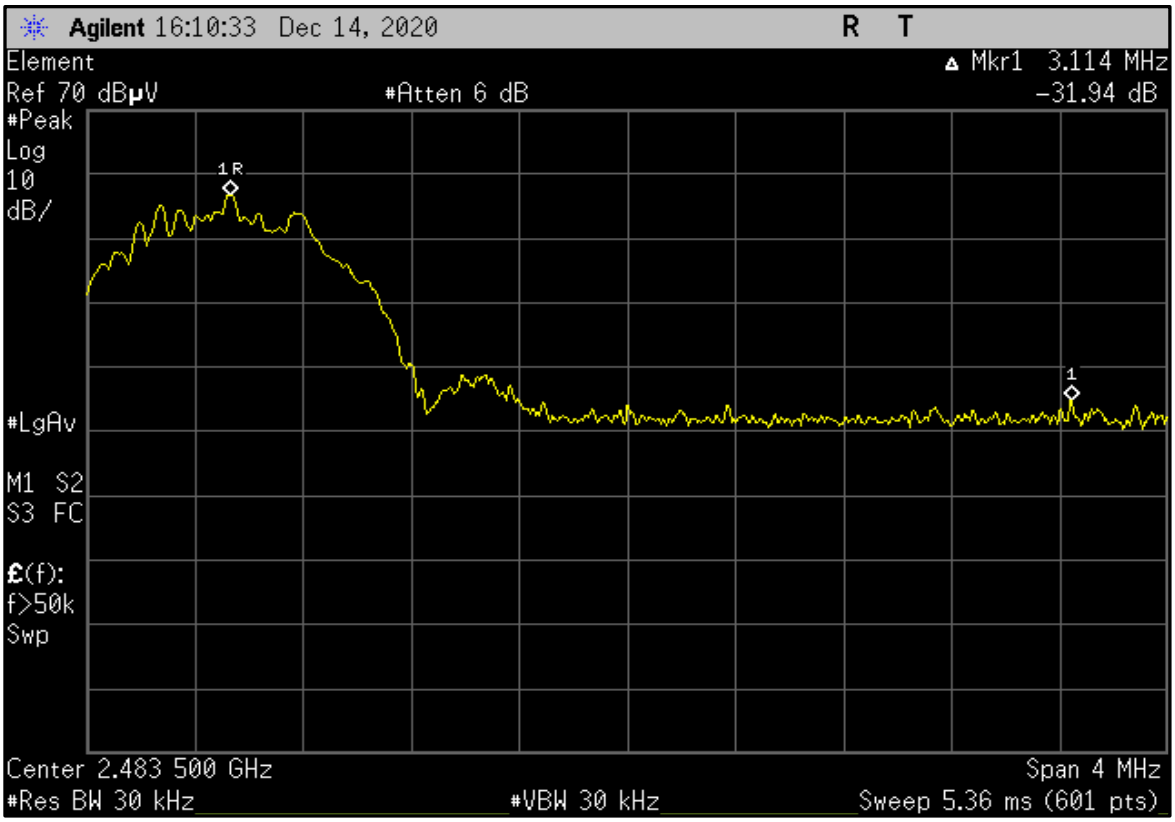
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.133	30.7	-0.8	1.5	336.0	3.2	20.0	Horz	AV	0.0	53.1	54.0	-0.9	DTS, EUT Horz, Ant Horz: Fund 62.0dBuV + -31.3dBc = 30.7dBuV (calc. amp.)
2483.900	28.4	-0.8	1.9	306.0	3.2	20.0	Horz	AV	0.0	50.8	54.0	-3.2	DTS, EUT Vert, Ant Vert: Fund 60.4dBuV + -32.0dBc = 28.4dBuV (calc. amp.)
2485.147	25.6	-0.8	1.9	304.0	3.2	20.0	Horz	AV	0.0	48.0	54.0	-6.0	DTS, EUT on Side, Ant on Side.: Fund 57.5dBuV + -31.9dBc = 25.6dBuV (calc. amp.)
2483.747	24.8	-0.8	1.5	157.0	3.2	20.0	Vert	AV	0.0	47.2	54.0	-6.8	DTS, EUT Vert, Ant Vert: Fund 56.9dBuV + -32.1dBc = 24.8dBuV (calc. amp.)
2484.933	24.1	-0.8	1.5	306.0	3.2	20.0	Vert	AV	0.0	46.5	54.0	-7.5	DTS, EUT on Side, Ant on Side.: Fund 53.3dBuV + -29.2dBc = 24.1dBuV (calc. amp.)
2485.193	23.9	-0.8	2.1	344.0	3.2	20.0	Vert	AV	0.0	46.3	54.0	-7.7	DTS, EUT Horz, Ant Horz: Fund 46.1dBuV + -22.2dBc = 23.9dBuV (calc. amp.)
2485.133	33.8	-0.8	1.5	336.0	0.0	20.0	Horz	PK	0.0	53.0	74.0	-21.0	DTS, EUT Horz, Ant Horz: Fund 65.1dBuV + -31.3dBc = 33.8dBuV (calc. amp.)
2483.900	31.6	-0.8	1.9	306.0	0.0	20.0	Horz	PK	0.0	50.8	74.0	-23.2	DTS, EUT Vert, Ant Vert: Fund 63.6dBuV + -32.0dBc = 31.6dBuV (calc. amp.)
2485.193	28.8	-0.8	2.1	344.0	0.0	20.0	Vert	PK	0.0	48.0	74.0	-26.0	DTS, EUT Horz, Ant Horz: Fund 51.0dBuV + -22.2dBc = 28.8dBuV (calc. amp.)
2485.147	28.8	-0.8	1.9	304.0	0.0	20.0	Horz	PK	0.0	48.0	74.0	-26.0	DTS, EUT on Side, Ant on Side.: Fund 60.7dBuV + -31.9dBc = 28.8dBuV (calc. amp.)
2483.747	28.2	-0.8	1.5	157.0	0.0	20.0	Vert	PK	0.0	47.4	74.0	-26.6	DTS, EUT Vert, Ant Vert: Fund 60.3dBuV + -32.1dBc = 28.2dBuV (calc. amp.)
2484.933	27.6	-0.8	1.5	306.0	0.0	20.0	Vert	PK	0.0	46.8	74.0	-27.2	DTS, EUT on Side, Ant on Side.: Fund 56.8dBuV + -29.2dBc = 27.6dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2



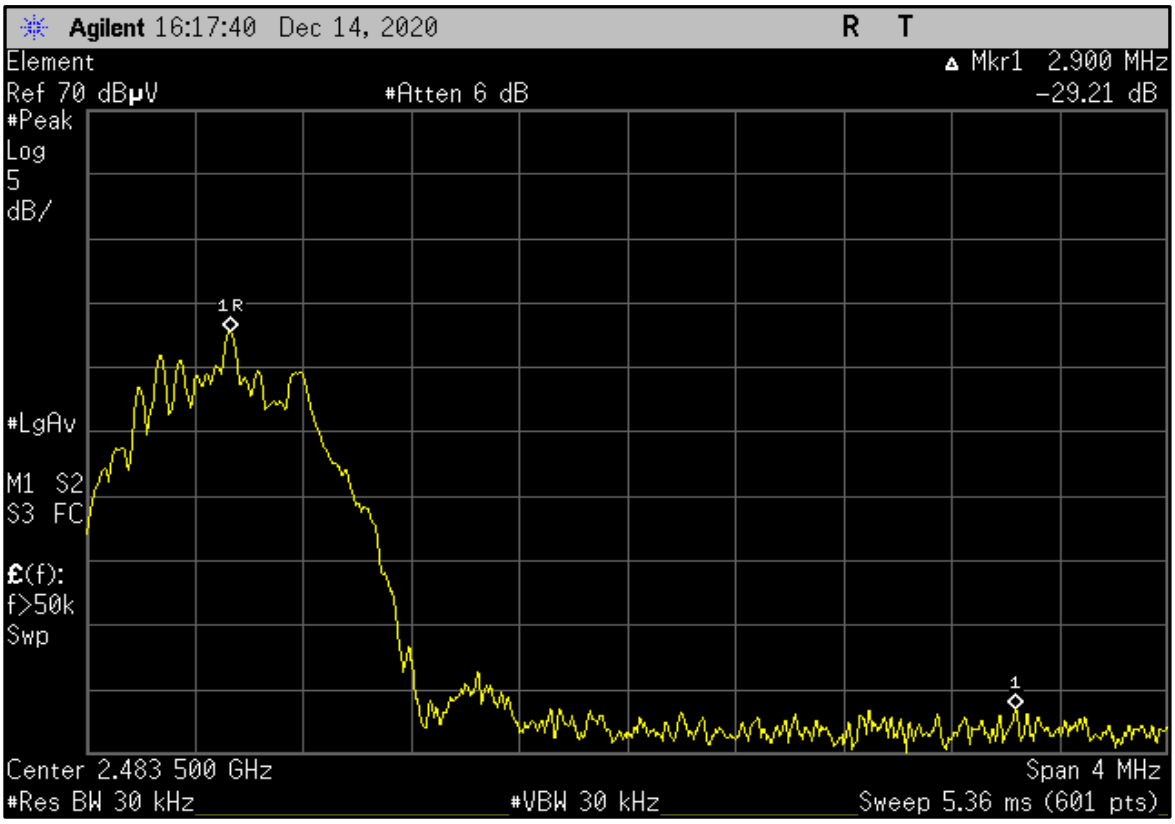


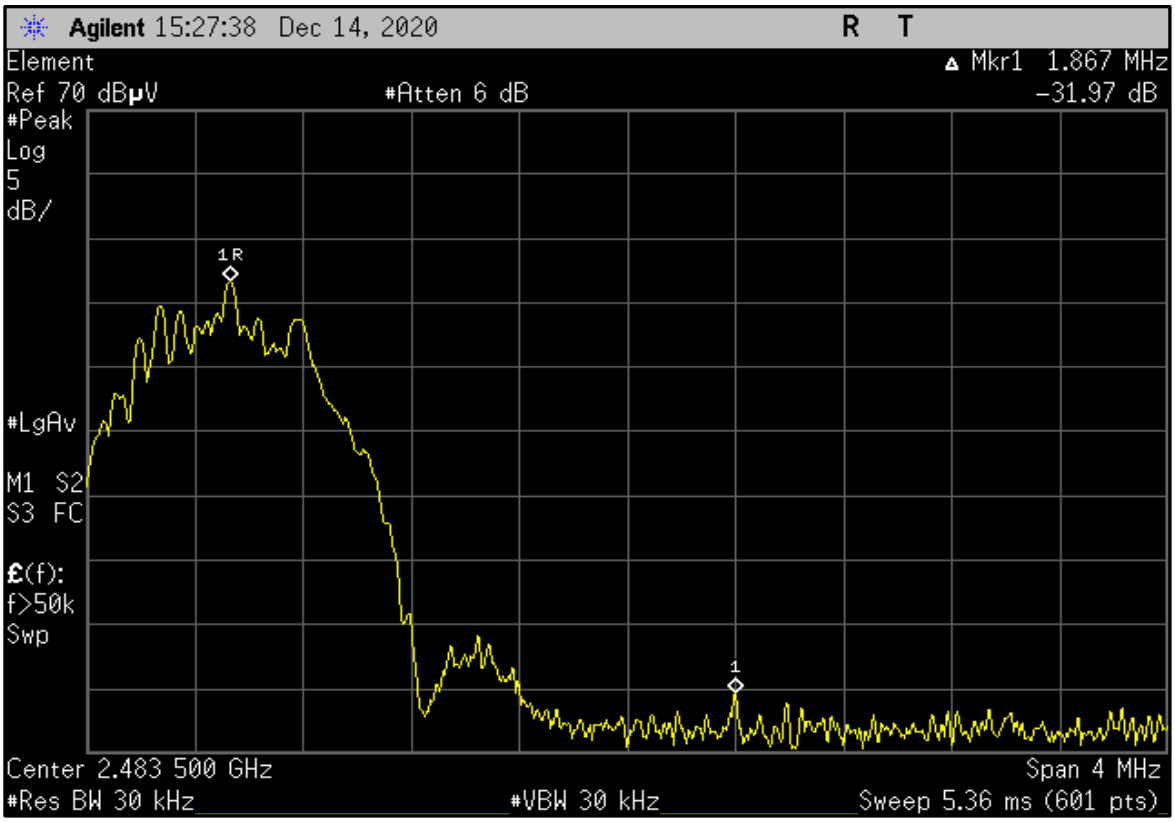
DTS, EUT on Side, Ant on Side.

SPURIOUS RADIATED EMISSIONS

DTS, EUT on Side, Ant on Side.

PSA-ESCI 2020.06.24.2



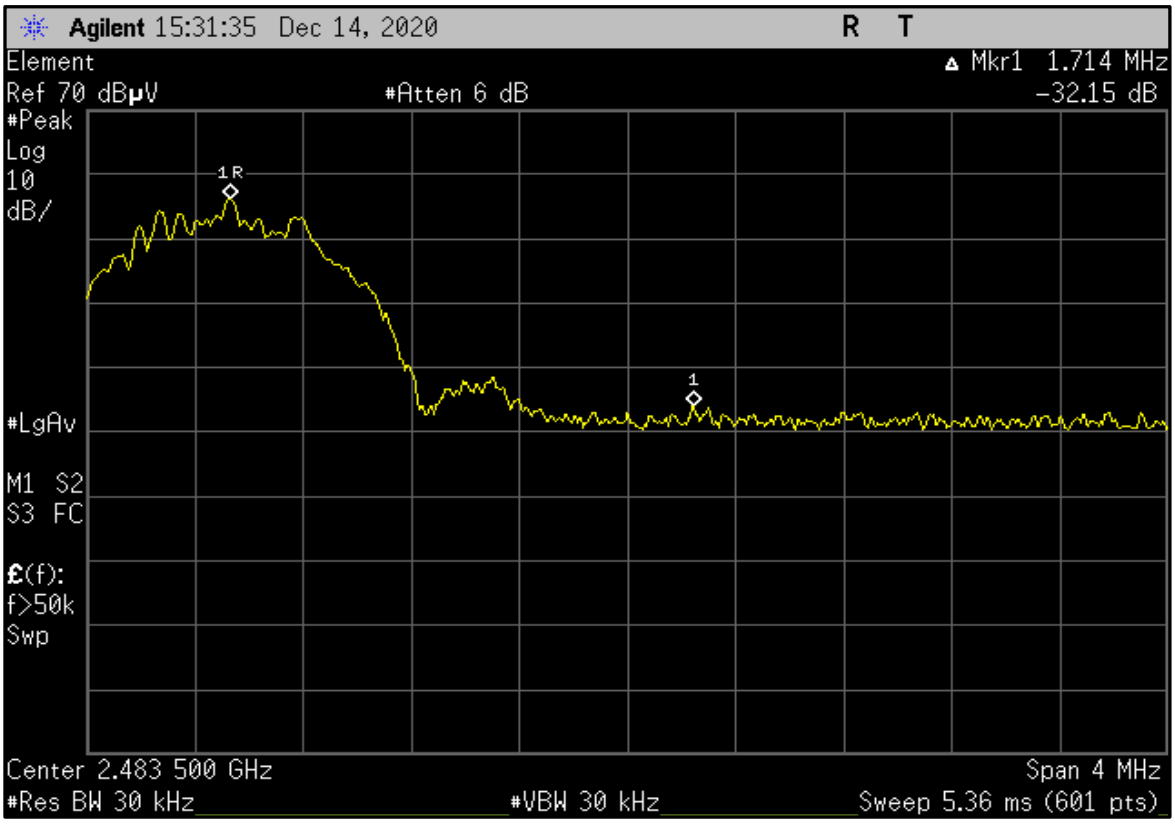


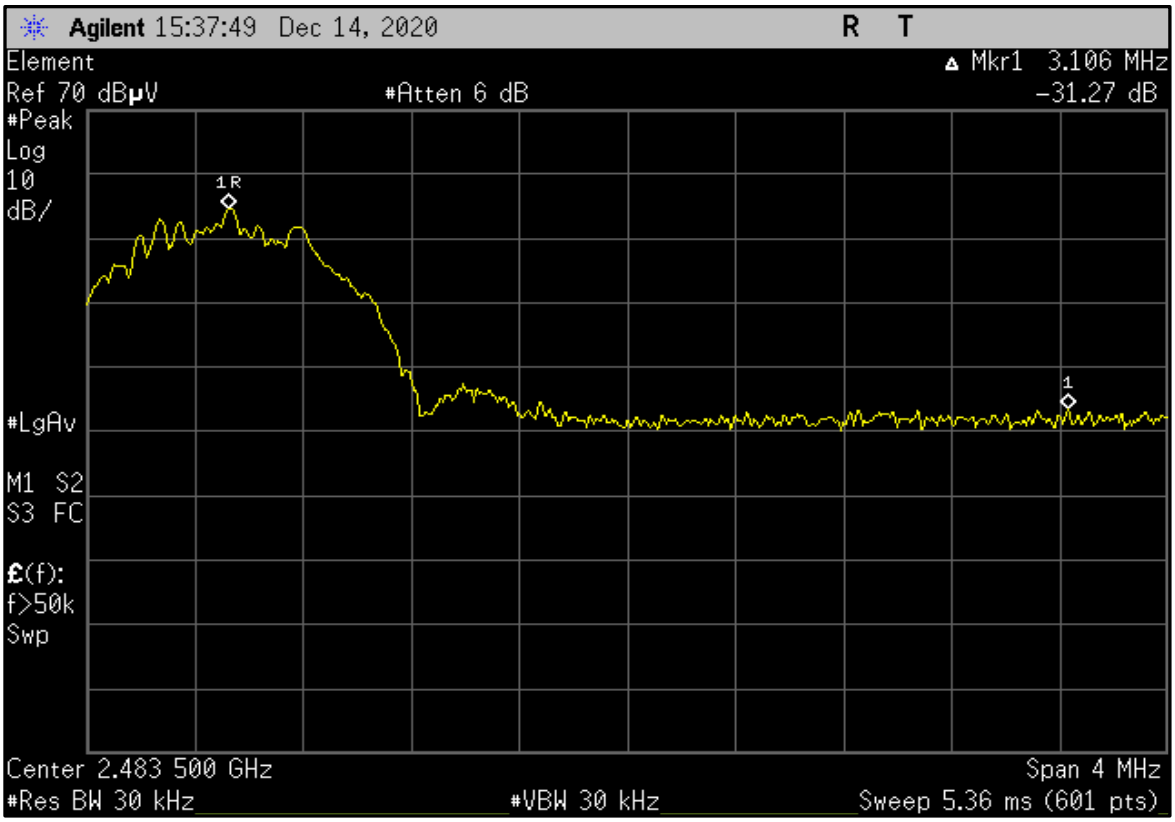
DTS, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT Horz, Ant Horz

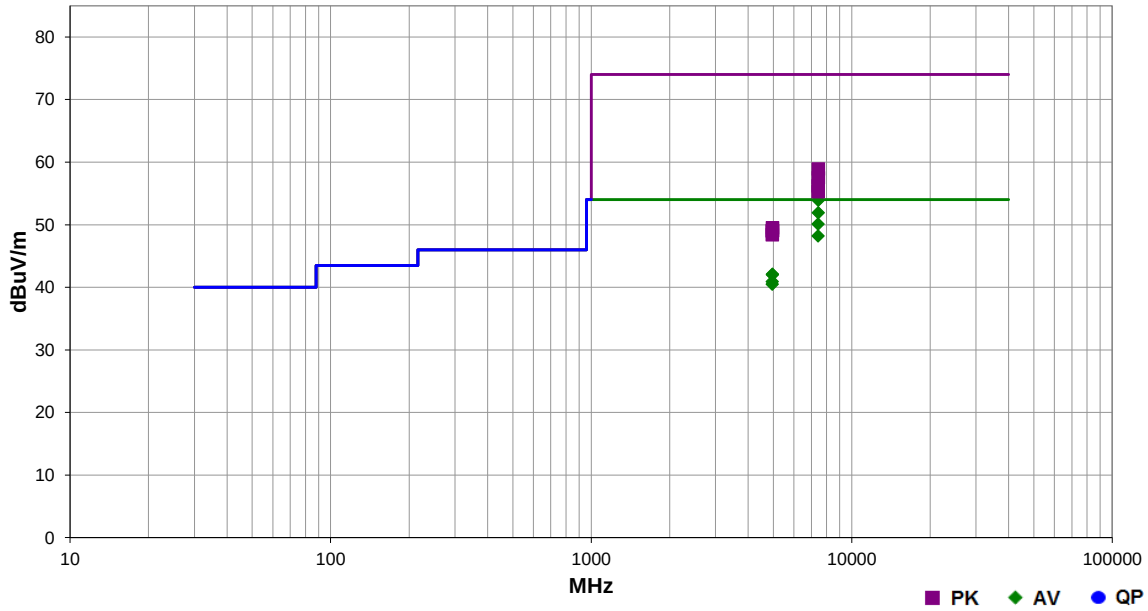
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	8	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.458	35.7	15.0	2.2	227.0	3.2	0.0	Horz	AV	0.0	53.9	54.0	-0.1	DTS, EUT on Side, Ant on Side
7446.625	33.7	15.0	1.6	328.0	3.2	0.0	Vert	AV	0.0	51.9	54.0	-2.1	DTS, EUT Vert, Ant Vert
7440.667	31.9	15.0	1.6	33.0	3.2	0.0	Horz	AV	0.0	50.1	54.0	-3.9	High Ch., EUT Horz, Ant Horz
7440.533	30.0	15.0	1.3	248.0	3.2	0.0	Vert	AV	0.0	48.2	54.0	-5.8	High Ch., EUT Vert, Ant Vert
4964.142	29.4	9.5	1.5	8.0	3.2	0.0	Horz	AV	0.0	42.1	54.0	-11.9	DTS, EUT Horz, Ant Horz
4963.900	29.3	9.5	1.4	323.0	3.2	0.0	Vert	AV	0.0	42.0	54.0	-12.0	DTS, EUT Vert, Ant Vert
4960.075	28.2	9.5	1.5	334.0	3.2	0.0	Horz	AV	0.0	40.9	54.0	-13.1	High Ch., EUT Horz, Ant Horz
4960.008	27.8	9.5	3.6	146.0	3.2	0.0	Vert	AV	0.0	40.5	54.0	-13.5	High Ch., EUT Vert, Ant Vert
7446.867	43.9	15.0	2.2	227.0	0.0	0.0	Horz	PK	0.0	58.9	74.0	-15.1	DTS, EUT on Side, Ant on Side
7445.200	42.5	15.0	1.6	328.0	0.0	0.0	Vert	PK	0.0	57.5	74.0	-16.5	DTS, EUT Vert, Ant Vert
7440.708	41.2	15.0	1.6	33.0	0.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	High Ch., EUT Horz, Ant Horz
7439.667	40.3	15.0	1.3	248.0	0.0	0.0	Vert	PK	0.0	55.3	74.0	-18.7	High Ch., EUT Vert, Ant Vert
4963.475	40.0	9.5	1.4	323.0	0.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	DTS, EUT Vert, Ant Vert
4963.800	39.6	9.5	1.5	8.0	0.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	DTS, EUT Horz, Ant Horz
4960.808	39.5	9.5	1.5	334.0	0.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	High Ch., EUT Horz, Ant Horz
4959.983	38.9	9.5	3.6	146.0	0.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	High Ch., EUT Vert, Ant Vert

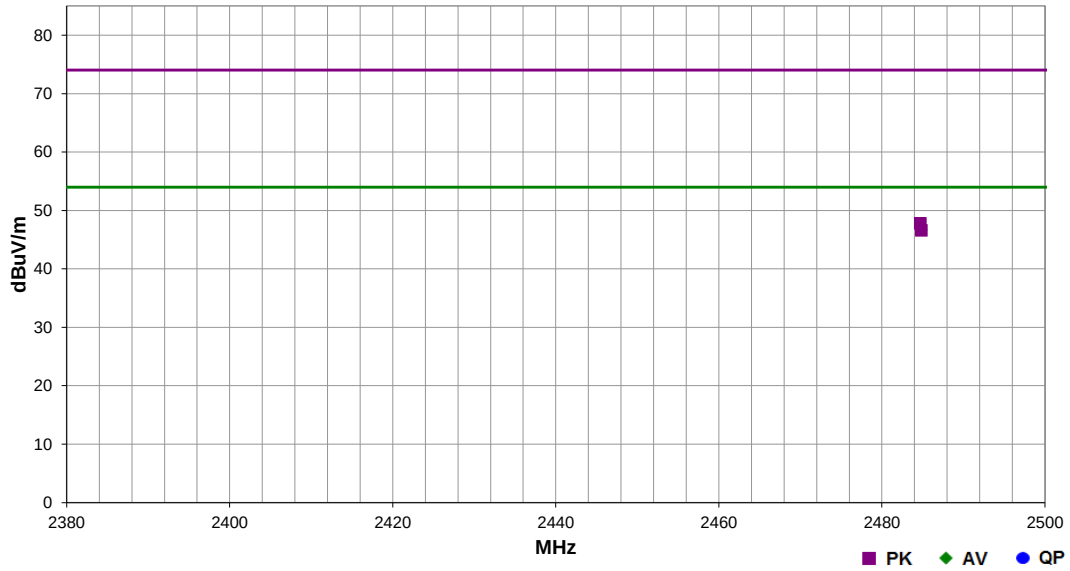
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	9	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

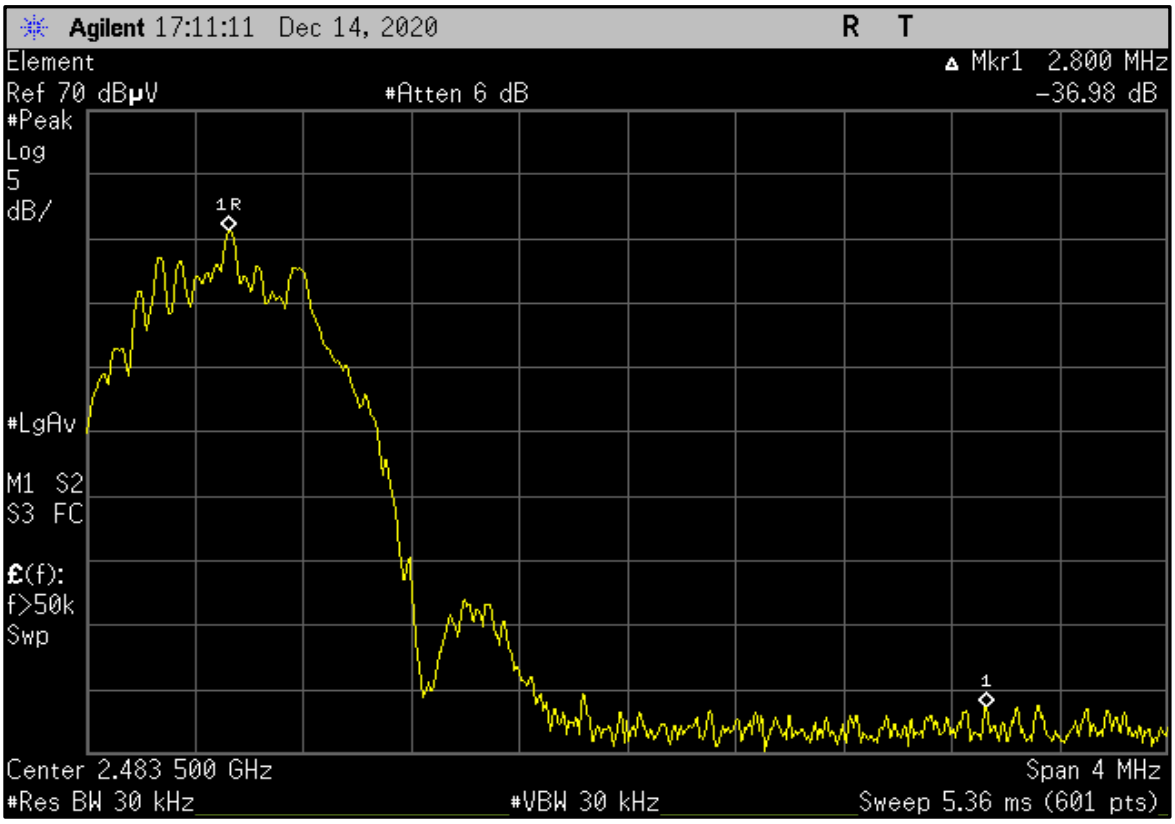


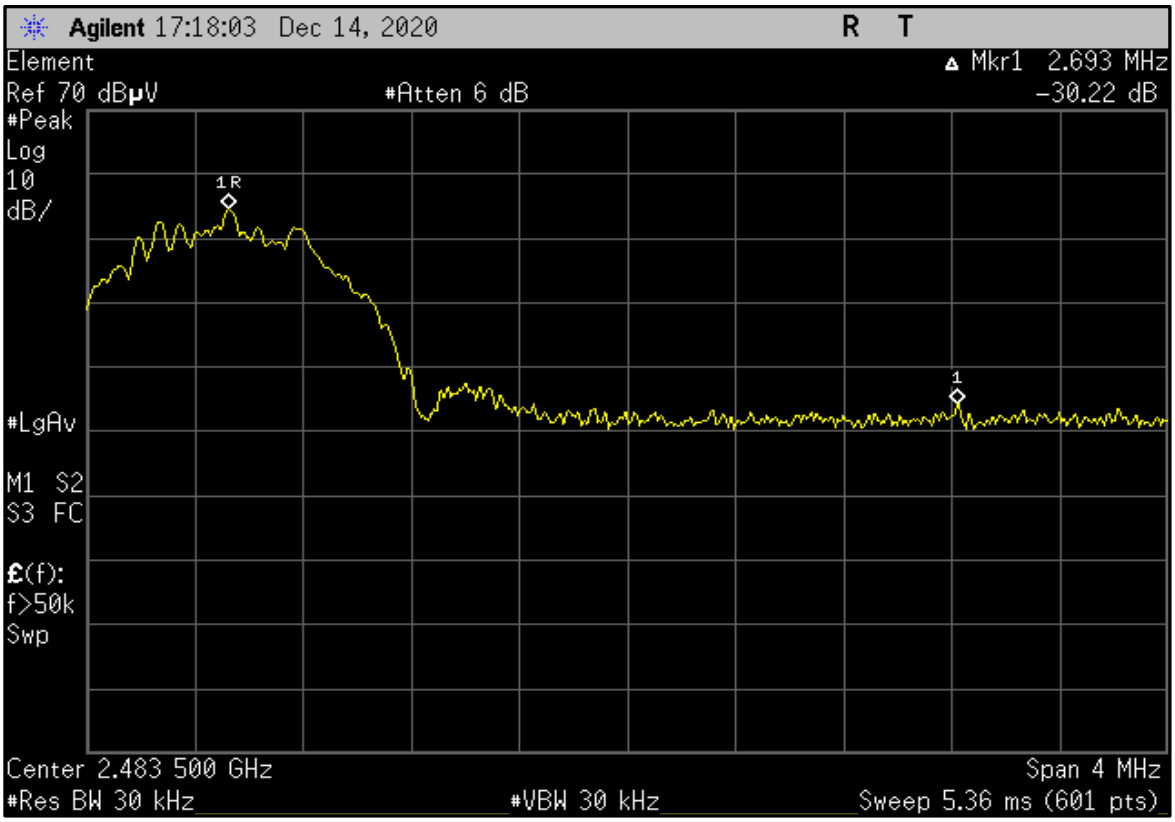
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.720	24.8	-0.8	1.5	154.0	3.2	20.0	Vert	AV	0.0	47.2	54.0	-6.8	DTS, EUT Vert, Ant Vert: Fund 55.0dBuV + -30.2dBc = 24.8dBuV (calc. amp.)
2484.827	24.3	-0.8	1.5	316.0	3.2	20.0	Horz	AV	0.0	46.7	54.0	-7.3	DTS, EUT Horz, Ant Horz: Fund 61.3dBuV + -37.0dBc = 24.3dBuV (calc. amp.)
2484.720	28.6	-0.8	1.5	154.0	0.0	20.0	Vert	PK	0.0	47.8	74.0	-26.2	DTS, EUT Vert, Ant Vert: Fund 58.8dBuV + -30.2dBc = 28.6dBuV (calc. amp.)
2484.827	27.4	-0.8	1.5	316.0	0.0	20.0	Horz	PK	0.0	46.6	74.0	-27.4	DTS, EUT Horz, Ant Horz: Fund 64.4dBuV + -37.0dBc = 27.4dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2





DTS, EUT Vert, Ant Vert

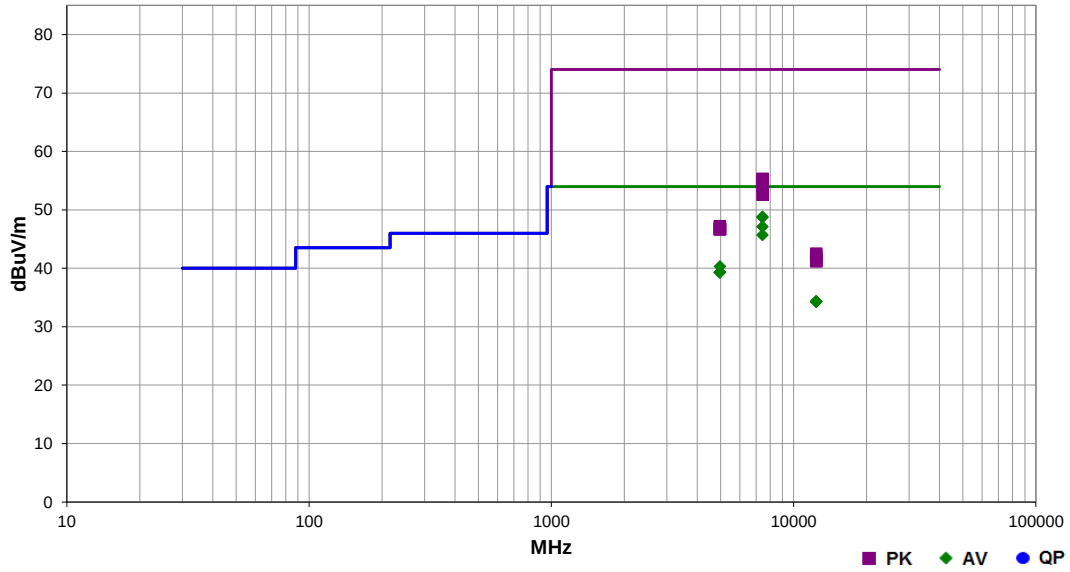
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	10	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.633	30.6	15.0	1.5	329.0	3.2	0.0	Horz	AV	0.0	48.8	54.0	-5.2	DTS, EUT on Side, Ant on Side
7446.567	30.5	15.0	1.5	74.0	3.2	0.0	Vert	AV	0.0	48.7	54.0	-5.3	DTS, EUT Vert, Ant Vert
7439.483	28.9	15.0	1.0	10.0	3.2	0.0	Horz	AV	0.0	47.1	54.0	-6.9	High Ch., EUT Horz, Ant Horz
7440.808	27.5	15.0	1.4	64.0	3.2	0.0	Vert	AV	0.0	45.7	54.0	-8.3	High Ch., EUT Vert, Ant Vert
4963.875	27.6	9.5	3.7	159.0	3.2	0.0	Horz	AV	0.0	40.3	54.0	-13.7	DTS, EUT on Side, Ant on Side
4961.167	26.6	9.5	1.4	206.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Vert, Ant Vert
4962.617	26.6	9.5	1.5	315.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	DTS, EUT Vert, Ant Vert
4959.608	26.6	9.5	1.5	114.0	3.2	0.0	Horz	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Horz, Ant Horz
7445.308	40.3	15.0	1.5	329.0	0.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	DTS, EUT on Side, Ant on Side
7445.583	40.0	15.0	1.5	74.0	0.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	DTS, EUT Vert, Ant Vert
12401.240	26.2	4.9	1.5	86.0	3.2	0.0	Horz	AV	0.0	34.3	54.0	-19.7	High Ch., EUT Horz, Ant Horz
12407.520	26.1	5.0	1.5	301.0	3.2	0.0	Horz	AV	0.0	34.3	54.0	-19.7	DTS, EUT on Side, Ant on Side
12401.700	26.2	4.9	1.5	53.0	3.2	0.0	Vert	AV	0.0	34.3	54.0	-19.7	High Ch., EUT Vert, Ant Vert
12409.190	26.1	5.0	1.5	147.0	3.2	0.0	Vert	AV	0.0	34.3	54.0	-19.7	DTS, EUT Vert, Ant Vert
7440.892	39.0	15.0	1.0	10.0	0.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	High Ch., EUT Horz, Ant Horz
7440.183	37.6	15.0	1.4	64.0	0.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	High Ch., EUT Vert, Ant Vert
4963.442	37.7	9.5	3.7	159.0	0.0	0.0	Horz	PK	0.0	47.2	74.0	-26.8	DTS, EUT on Side, Ant on Side
4959.517	37.2	9.5	1.4	206.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	High Ch., EUT Vert, Ant Vert
4963.567	37.2	9.5	1.5	315.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	DTS, EUT Vert, Ant Vert
4960.975	37.2	9.5	1.5	114.0	0.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	High Ch., EUT Horz, Ant Horz
12401.140	37.6	4.9	1.5	53.0	0.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5	High Ch., EUT Vert, Ant Vert
12401.300	37.1	4.9	1.5	86.0	0.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	High Ch., EUT Horz, Ant Horz
12408.770	36.4	5.0	1.5	147.0	0.0	0.0	Vert	PK	0.0	41.4	74.0	-32.6	DTS, EUT Vert, Ant Vert
12410.580	36.2	5.0	1.5	301.0	0.0	0.0	Horz	PK	0.0	41.2	74.0	-32.8	DTS, EUT on Side, Ant on Side

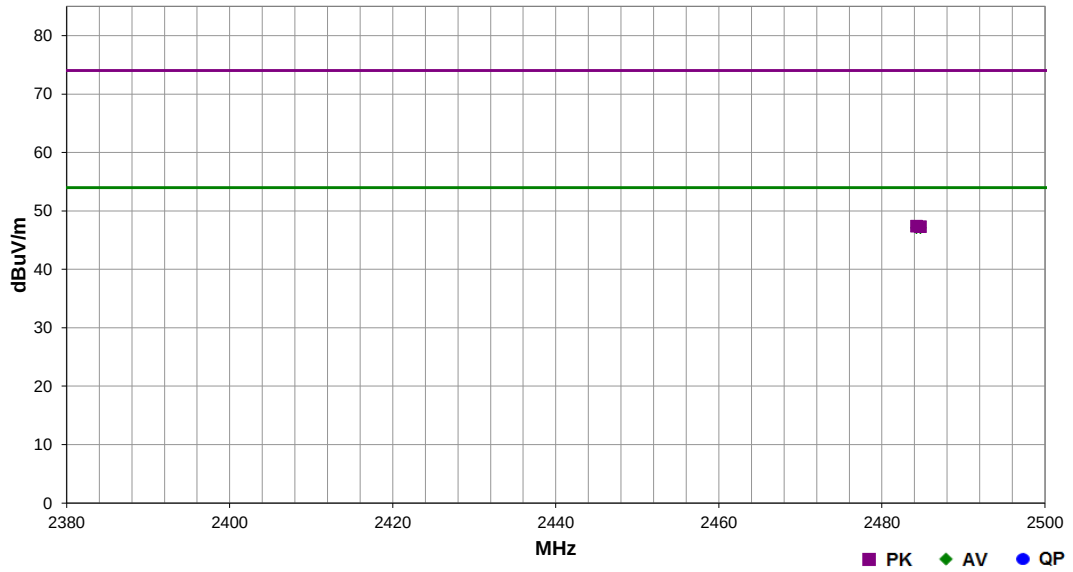
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.7 °C		
Job Site:	NC01	**Humidity:**	29.2% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1026 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	12	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

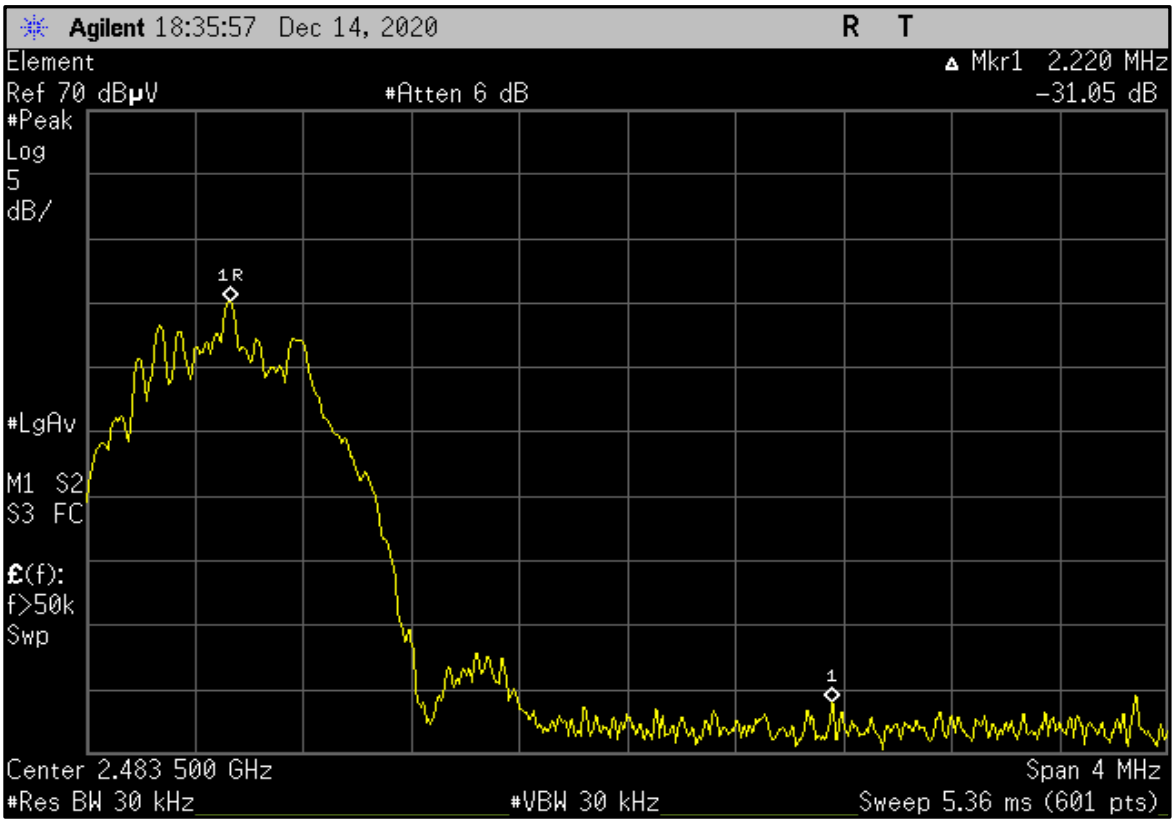


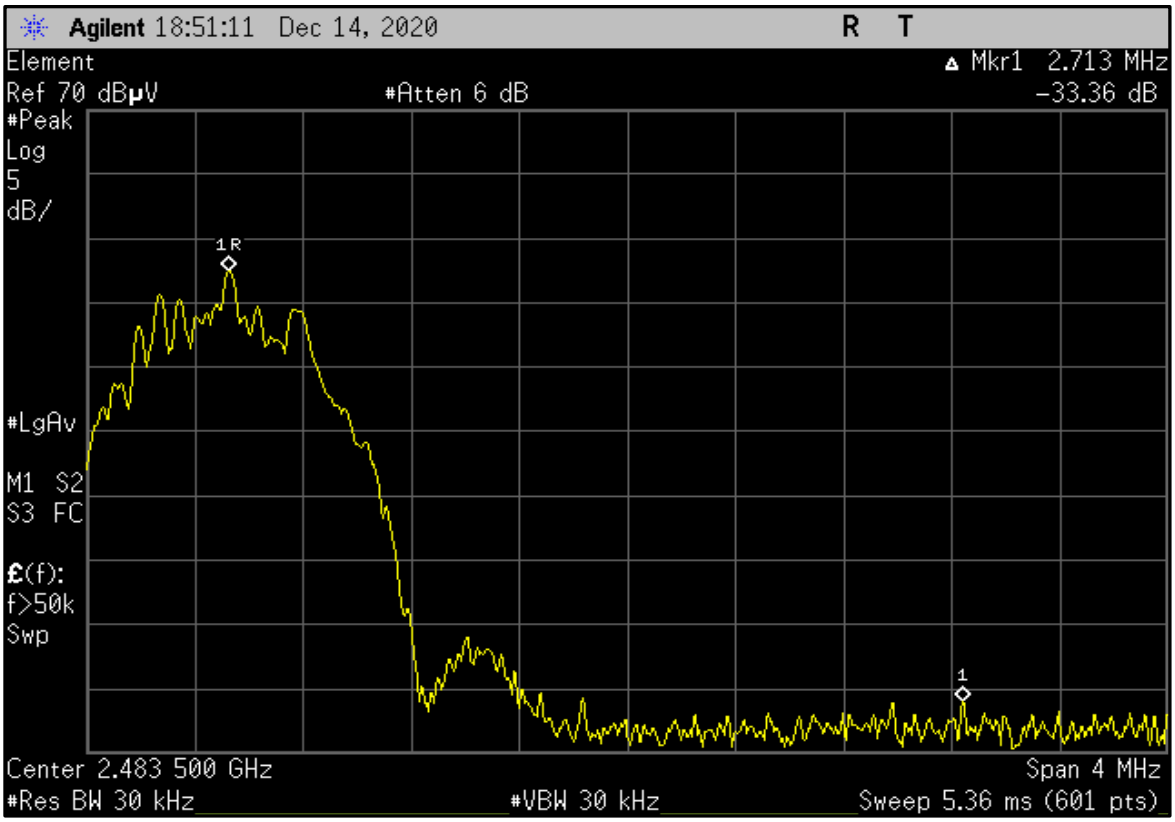
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.253	24.7	-0.8	1.5	234.0	3.2	20.0	Vert	AV	0.0	47.1	54.0	-6.9	DTS, EUT Vert, Ant Vert: Fund 55.8dBuV + -31.1dBc = 24.7dBuV (calc. amp.)
2484.740	24.7	-0.8	1.5	300.0	3.2	20.0	Horz	AV	0.0	47.1	54.0	-6.9	DTS, EUT Horz, Ant Horz: Fund 58.1dBuV + -33.4dBc = 24.7dBuV (calc. amp.)
2484.253	28.2	-0.8	1.5	234.0	0.0	20.0	Vert	PK	0.0	47.4	74.0	-26.6	DTS, EUT Vert, Ant Vert: Fund 59.3dBuV + -31.1dBc = 28.2dBuV (calc. amp.)
2484.740	28.1	-0.8	1.5	300.0	0.0	20.0	Horz	PK	0.0	47.3	74.0	-26.7	DTS, EUT Horz, Ant Horz: Fund 61.5dBuV + -33.4dBc = 28.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT Horz, Ant Horz

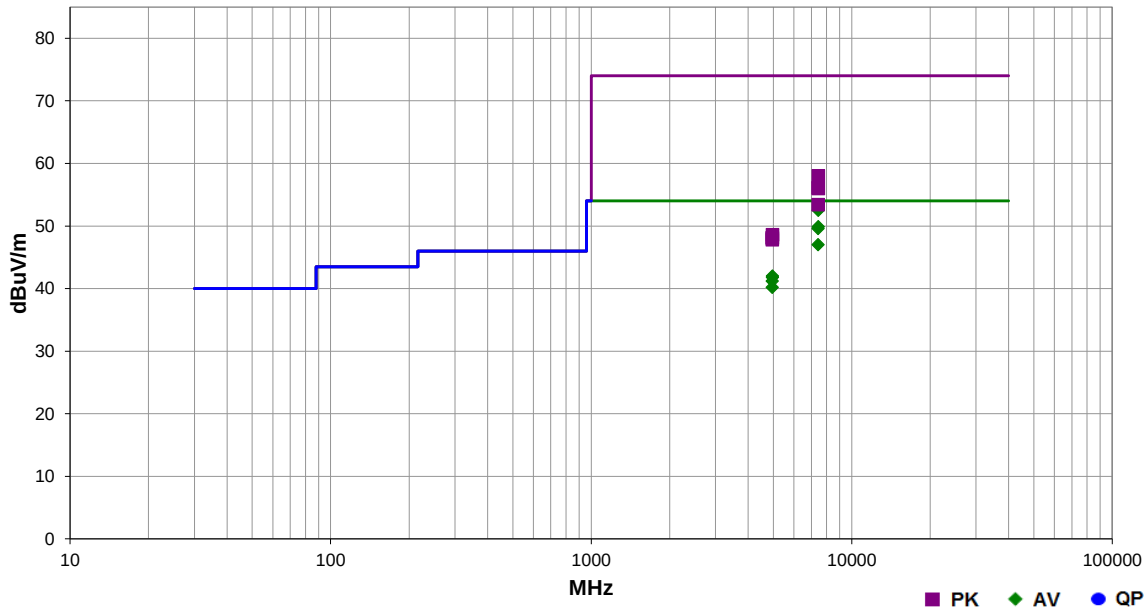
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.1 °C		
Job Site:	NC01	**Humidity:**	28.9% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1016 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	16	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.508	34.3	15.0	3.2	319.0	3.2	0.0	Horz	AV	0.0	52.5	54.0	-1.5	DTS, EUT on Side, Ant on Side
7446.683	31.7	15.0	1.5	179.0	3.2	0.0	Vert	AV	0.0	49.9	54.0	-4.1	DTS, EUT Vert, Ant Vert
7439.475	31.4	15.0	1.4	18.0	3.2	0.0	Horz	AV	0.0	49.6	54.0	-4.4	High Ch., EUT Horz, Ant Horz
7440.625	28.8	15.0	1.5	184.0	3.2	0.0	Vert	AV	0.0	47.0	54.0	-7.0	High Ch., EUT Vert, Ant Vert
4964.175	29.3	9.5	1.5	355.0	3.2	0.0	Horz	AV	0.0	42.0	54.0	-12.0	DTS, EUT on Side, Ant on Side
4963.992	29.1	9.5	2.6	328.0	3.2	0.0	Vert	AV	0.0	41.8	54.0	-12.2	DTS, EUT Vert, Ant Vert
4960.000	28.5	9.5	1.3	321.0	3.2	0.0	Horz	AV	0.0	41.2	54.0	-12.8	High Ch., EUT Horz, Ant Horz
4960.108	27.5	9.5	1.5	131.0	3.2	0.0	Vert	AV	0.0	40.2	54.0	-13.8	High Ch., EUT Vert, Ant Vert
7446.608	43.0	15.0	3.2	319.0	0.0	0.0	Horz	PK	0.0	58.0	74.0	-16.0	DTS, EUT on Side, Ant on Side
7440.700	41.1	15.0	1.4	18.0	0.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9	High Ch., EUT Horz, Ant Horz
7446.825	41.0	15.0	1.5	179.0	0.0	0.0	Vert	PK	0.0	56.0	74.0	-18.0	DTS, EUT Vert, Ant Vert
7439.075	38.4	15.0	1.5	184.0	0.0	0.0	Vert	PK	0.0	53.4	74.0	-20.6	High Ch., EUT Vert, Ant Vert
4963.892	39.1	9.5	2.6	328.0	0.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	DTS, EUT Vert, Ant Vert
4962.383	38.6	9.5	1.5	355.0	0.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	DTS, EUT on Side, Ant on Side
4959.267	38.6	9.5	1.5	131.0	0.0	0.0	Vert	PK	0.0	48.1	74.0	-25.9	High Ch., EUT Vert, Ant Vert
4961.175	38.3	9.5	1.3	321.0	0.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	High Ch., EUT Horz, Ant Horz

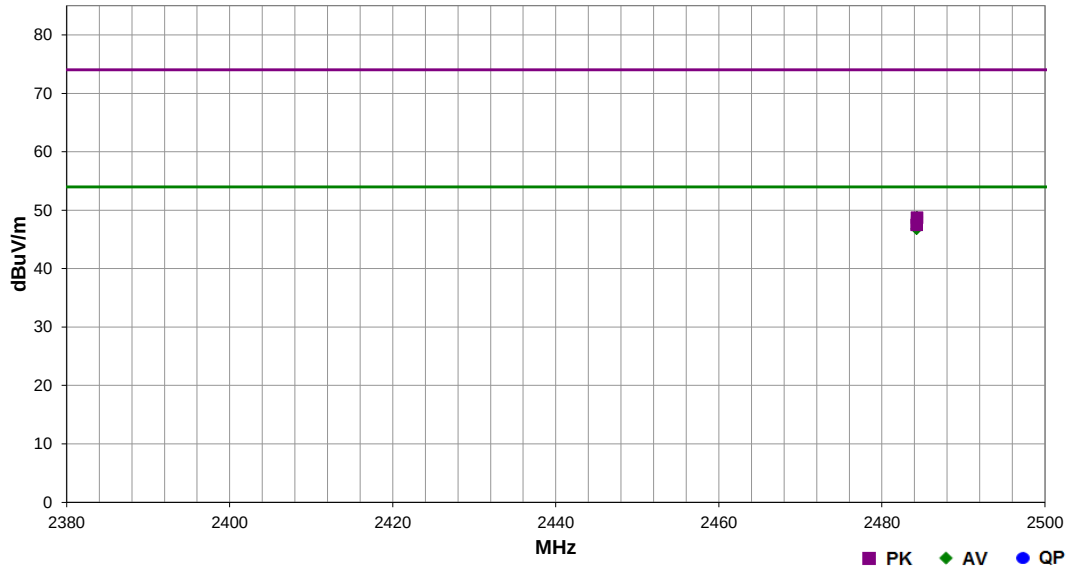
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-14		
Project:	None	**Temperature:**	25.1 °C		
Job Site:	NC01	**Humidity:**	28.9% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1016 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	Simultaneous Tx mode: BTLE Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, High Channel = 2480 MHz; DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. BLE Power setting = 0 dBm, DTS Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	17	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

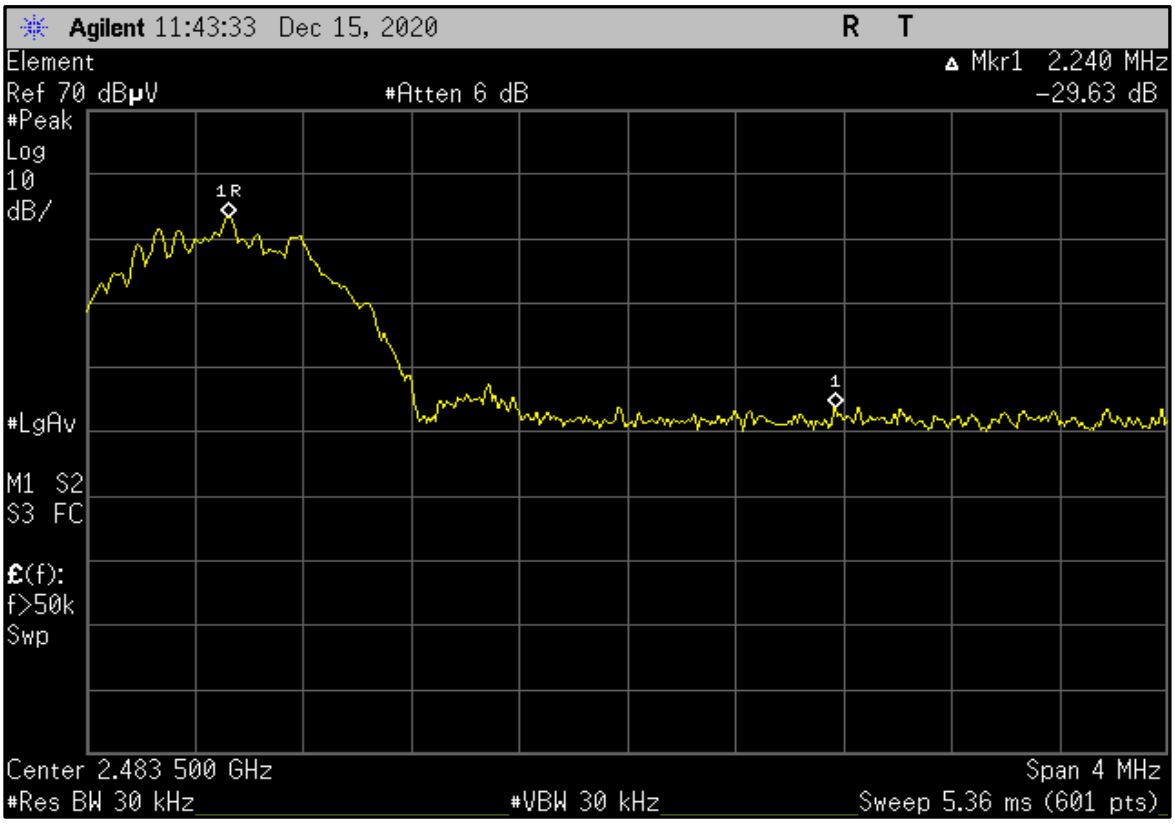


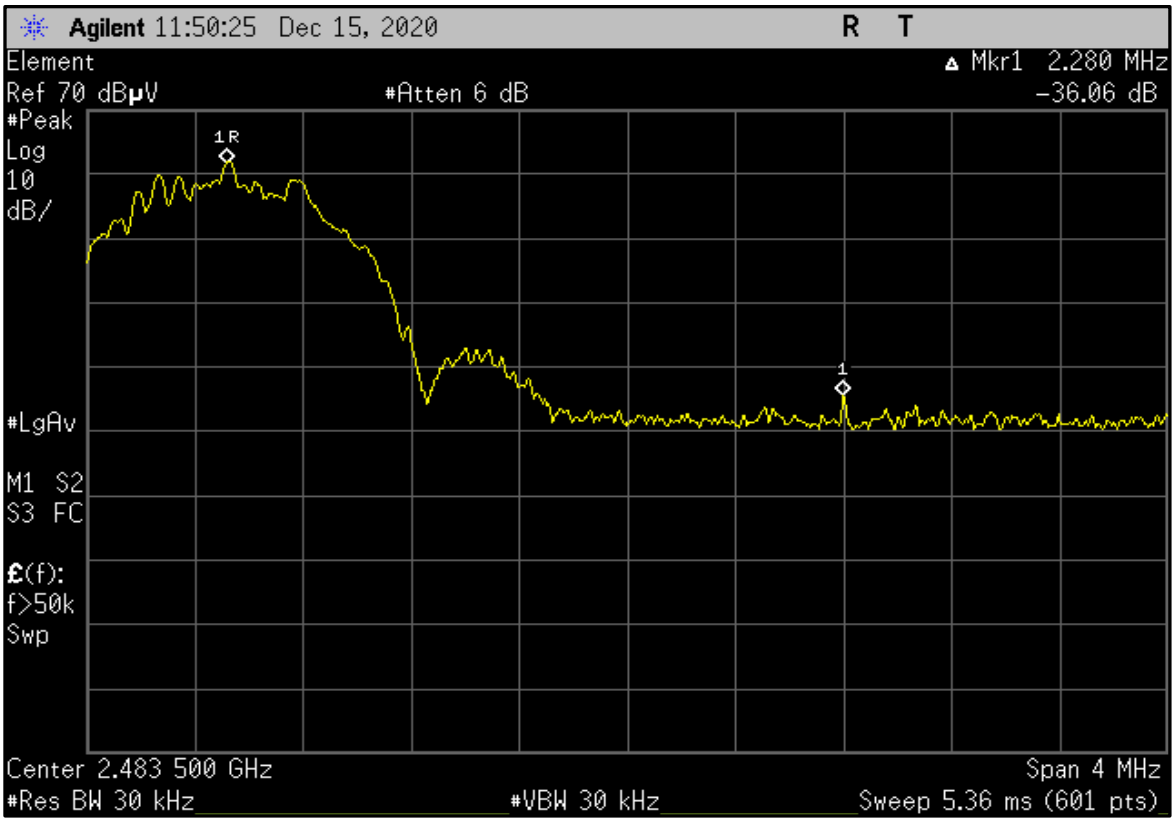
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.300	26.4	-0.8	1.5	321.0	3.2	20.0	Horz	AV	0.0	48.8	54.0	-5.2	DTS, EUT Horz, Ant Horz: Fund 62.5dBuV + -36.1dBc = 26.4dBuV (calc. amp.)
2484.267	24.4	-0.8	1.5	56.0	3.2	20.0	Vert	AV	0.0	46.8	54.0	-7.2	DTS, EUT Vert, Ant Vert: Fund 54.0dBuV + -29.6dBc = 24.4dBuV (calc. amp.)
2484.300	29.5	-0.8	1.5	321.0	0.0	20.0	Horz	PK	0.0	48.7	74.0	-25.3	DTS, EUT Horz, Ant Horz: Fund 65.6dBuV + -36.1dBc = 29.5dBuV (calc. amp.)
2484.267	28.3	-0.8	1.5	56.0	0.0	20.0	Vert	PK	0.0	47.5	74.0	-26.5	DTS, EUT Vert, Ant Vert: Fund 57.9dBuV + -29.6dBc = 28.3dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz.
DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz.
DTS Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz.
DTS Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz.

POWER SETTINGS INVESTIGATED

24VDC via 120VAC/60Hz
POE via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

SYNA0313 - 2
SYNA0313 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	Northwest EMC	N/A	NC8	2020-02-07	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	2020-02-07	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIY	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-08	AHO	NCR	0 mo
Cable	High Speed Interconnects	EW292A-NGNG-300	NC3	2020-08-28	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	2020-08-26	12 mo
Antenna - Standard Gain	EMCO	3160-07	AHP	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHI	2020-09-25	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	2020-07-28	12 mo
Cable	Northwest EMC	3115 Horn Cable	NC2	2020-04-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	2020-04-20	12 mo
Antenna - Double Ridge	EMCO	3115	AHM	2020-07-01	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAB	2020-01-28	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYL	2019-09-25	24 mo
Cable	Northwest EMC	Bilog Cables	NC1	2020-01-28	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFF	2020-11-06	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	2020-04-15	12 mo

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2020.06.24.2

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. These “pre-scans” are not 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).

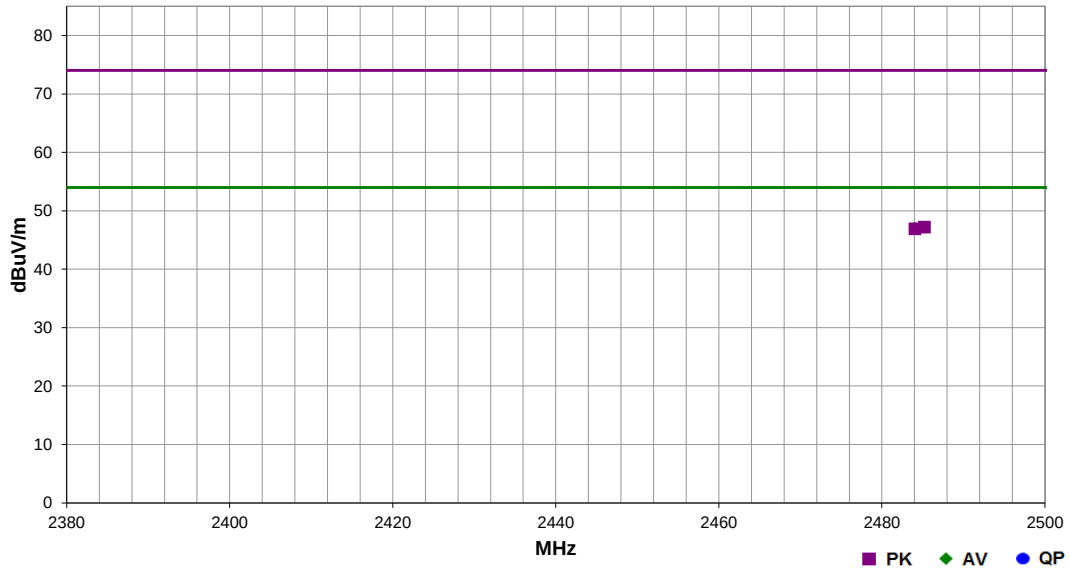
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	26.4 °C		
Job Site:	NC01	**Humidity:**	29.5% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 2, full test based on the client's test plan. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	67	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

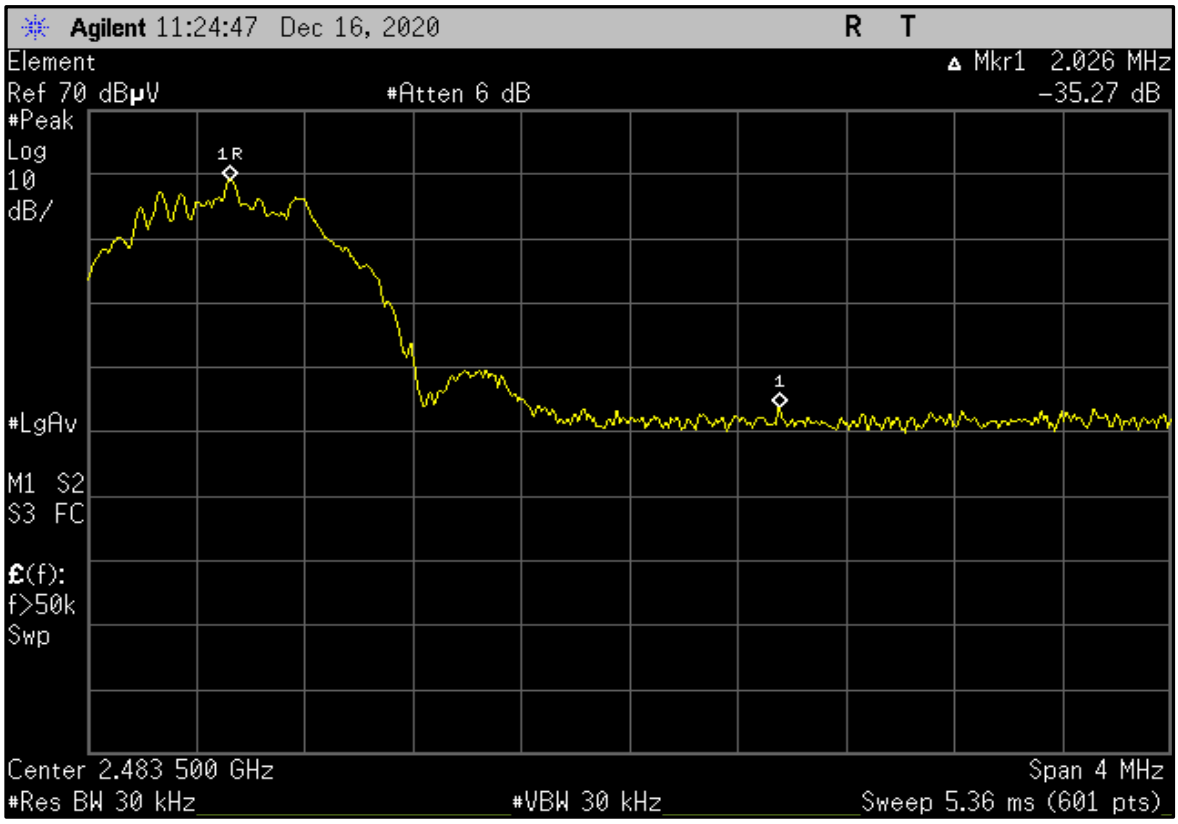


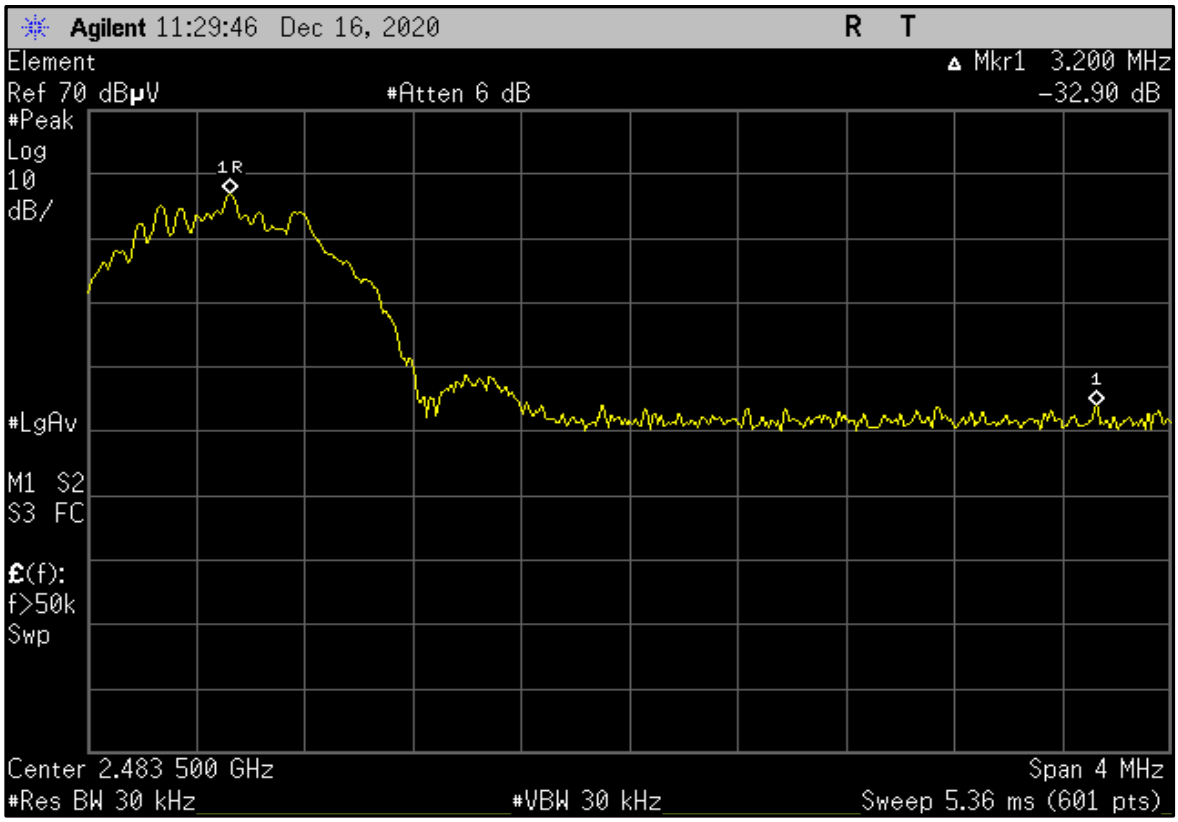
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.227	24.8	-0.8	1.5	325.0	3.2	20.0	Horz	AV	0.0	47.2	54.0	-6.8	DTS, EUT Vert, Ant Vert: Fund 57.7dBuV + -32.9dBc = 24.8dBuV (calc. amp.)
2484.053	24.6	-0.8	1.4	300.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	DTS, EUT on Side, Ant on Side: Fund 59.9dBuV + -35.3dBc = 24.6dBuV (calc. amp.)
2485.227	28.0	-0.8	1.5	325.0	0.0	20.0	Horz	PK	0.0	47.2	74.0	-26.8	DTS, EUT Vert, Ant Vert: Fund 60.9dBuV + -32.9dBc = 28.0dBuV (calc. amp.)
2484.053	27.7	-0.8	1.4	300.0	0.0	20.0	Vert	PK	0.0	46.9	74.0	-27.1	DTS, EUT on Side, Ant on Side: Fund 63.0dBuV + -35.3dBc = 27.7dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





DTS, EUT Vert, Ant Vert

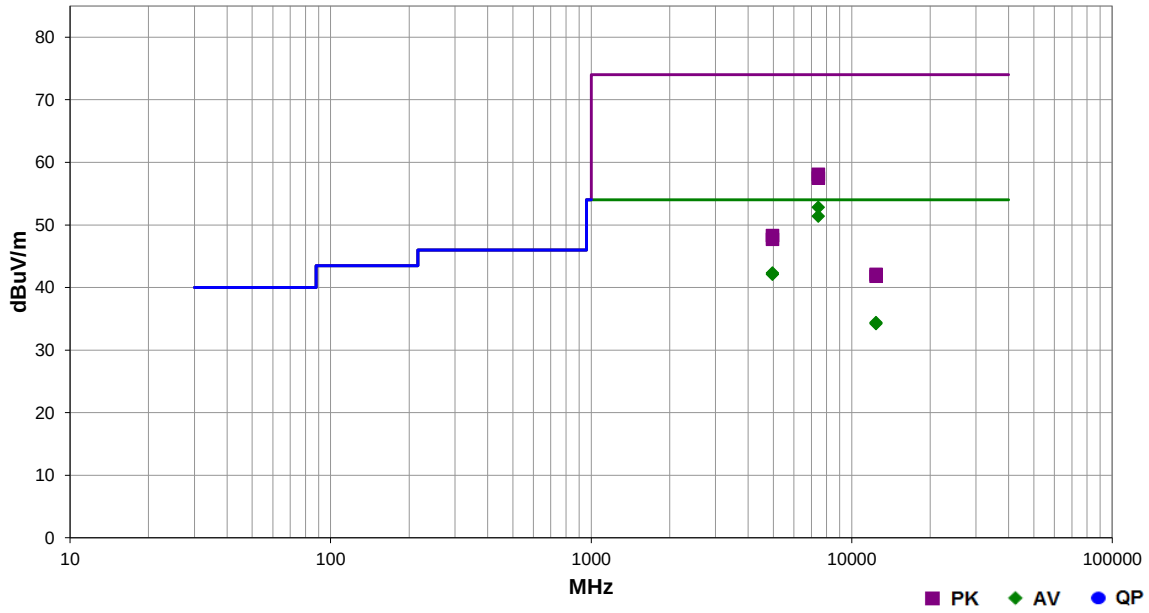
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 2, full test based on the client's test plan. The worst case EUT orientations from the previous testing were used. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	68	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.567	34.6	15.0	2.7	332.0	3.2	0.0	Vert	AV	0.0	52.8	54.0	-1.2	DTS, EUT Vert, Ant Vert
7446.592	33.2	15.0	1.7	216.0	3.2	0.0	Horz	AV	0.0	51.4	54.0	-2.6	DTS, EUT on Side, Ant on Side
4963.875	29.6	9.5	4.0	336.0	3.2	0.0	Vert	AV	0.0	42.3	54.0	-11.7	DTS, EUT Vert, Ant Vert
4964.117	29.4	9.5	2.8	247.0	3.2	0.0	Horz	AV	0.0	42.1	54.0	-11.9	DTS, EUT on Side, Ant on Side
7445.533	43.1	15.0	2.7	332.0	0.0	0.0	Vert	PK	0.0	58.1	74.0	-15.9	DTS, EUT Vert, Ant Vert
7446.542	42.5	15.0	1.7	216.0	0.0	0.0	Horz	PK	0.0	57.5	74.0	-16.5	DTS, EUT on Side, Ant on Side
12408.850	26.2	5.0	1.5	126.0	3.2	0.0	Vert	AV	0.0	34.4	54.0	-19.6	DTS, EUT Vert, Ant Vert
12407.680	26.0	5.0	1.5	8.0	3.2	0.0	Horz	AV	0.0	34.2	54.0	-19.8	DTS, EUT on Side, Ant on Side
4963.467	38.8	9.5	4.0	336.0	0.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	DTS, EUT Vert, Ant Vert
4963.625	38.2	9.5	2.8	247.0	0.0	0.0	Horz	PK	0.0	47.7	74.0	-26.3	DTS, EUT on Side, Ant on Side
12409.630	37.1	5.0	1.5	126.0	0.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	DTS, EUT Vert, Ant Vert
12409.790	36.8	5.0	1.5	8.0	0.0	0.0	Horz	PK	0.0	41.8	74.0	-32.2	DTS, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

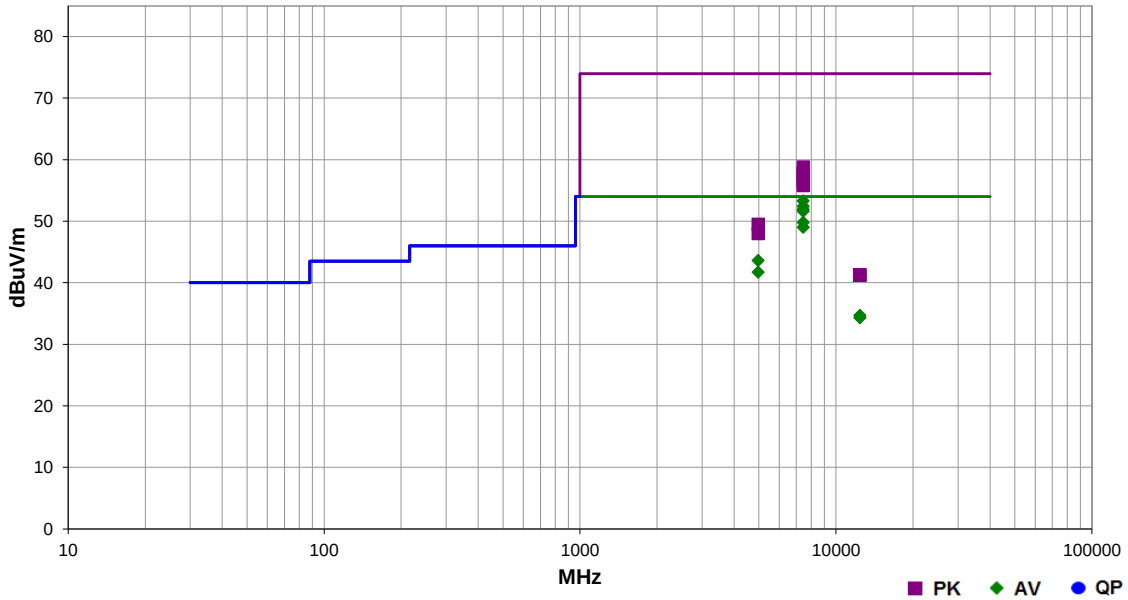
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-15		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	34.5% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1017 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 2, full test based on the client's test plan. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	63	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.617	35.1	15.0	1.7	234.0	3.2	0.0	Horz	AV	0.0	53.3	54.0	-0.7	DTS, EUT on Side, Ant on Side
7445.517	34.2	15.0	1.2	14.0	3.2	0.0	Horz	AV	0.0	52.4	54.0	-1.6	DTS, EUT Horz, Ant Horz
7445.475	33.7	15.0	1.5	327.0	3.2	0.0	Vert	AV	0.0	51.9	54.0	-2.1	DTS, EUT Vert, Ant Vert
7446.625	33.4	15.0	2.5	352.0	3.2	0.0	Vert	AV	0.0	51.6	54.0	-2.4	DTS, EUT Horz, Ant Horz
7445.533	31.6	15.0	1.7	315.0	3.2	0.0	Vert	AV	0.0	49.8	54.0	-4.2	DTS, EUT on Side, Ant on Side
7445.458	30.8	15.0	1.5	299.0	3.2	0.0	Horz	AV	0.0	49.0	54.0	-5.0	DTS, EUT Vert, Ant Vert
4964.058	30.9	9.5	1.1	108.0	3.2	0.0	Horz	AV	0.0	43.6	54.0	-10.4	DTS, EUT on Side, Ant on Side
4964.200	29.0	9.5	1.4	307.0	3.2	0.0	Vert	AV	0.0	41.7	54.0	-12.3	DTS, EUT Vert, Ant Vert
7446.750	43.8	15.0	1.7	234.0	0.0	0.0	Horz	PK	0.0	58.8	74.0	-15.2	DTS, EUT on Side, Ant on Side
7445.733	42.9	15.0	1.2	14.0	0.0	0.0	Horz	PK	0.0	57.9	74.0	-16.1	DTS, EUT Horz, Ant Horz
7446.925	42.8	15.0	1.5	327.0	0.0	0.0	Vert	PK	0.0	57.8	74.0	-16.2	DTS, EUT Vert, Ant Vert
7445.308	42.0	15.0	2.5	352.0	0.0	0.0	Vert	PK	0.0	57.0	74.0	-17.0	DTS, EUT Horz, Ant Horz
7446.433	41.3	15.0	1.7	315.0	0.0	0.0	Vert	PK	0.0	56.3	74.0	-17.7	DTS, EUT on Side, Ant on Side
7446.833	40.8	15.0	1.5	299.0	0.0	0.0	Horz	PK	0.0	55.8	74.0	-18.2	DTS, EUT Vert, Ant Vert
12409.080	26.5	5.0	1.5	205.0	3.2	0.0	Vert	AV	0.0	34.7	54.0	-19.3	DTS, EUT Vert, Ant Vert
12409.200	26.1	5.0	1.5	72.0	3.2	0.0	Horz	AV	0.0	34.3	54.0	-19.7	DTS, EUT on Side, Ant on Side
4964.733	40.0	9.5	1.1	108.0	0.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	DTS, EUT on Side, Ant on Side
4964.267	38.5	9.5	1.4	307.0	0.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	DTS, EUT Vert, Ant Vert
12409.210	36.3	5.0	1.5	205.0	0.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	DTS, EUT Vert, Ant Vert
12409.140	36.2	5.0	1.5	72.0	0.0	0.0	Horz	PK	0.0	41.2	74.0	-32.8	DTS, EUT on Side, Ant on Side

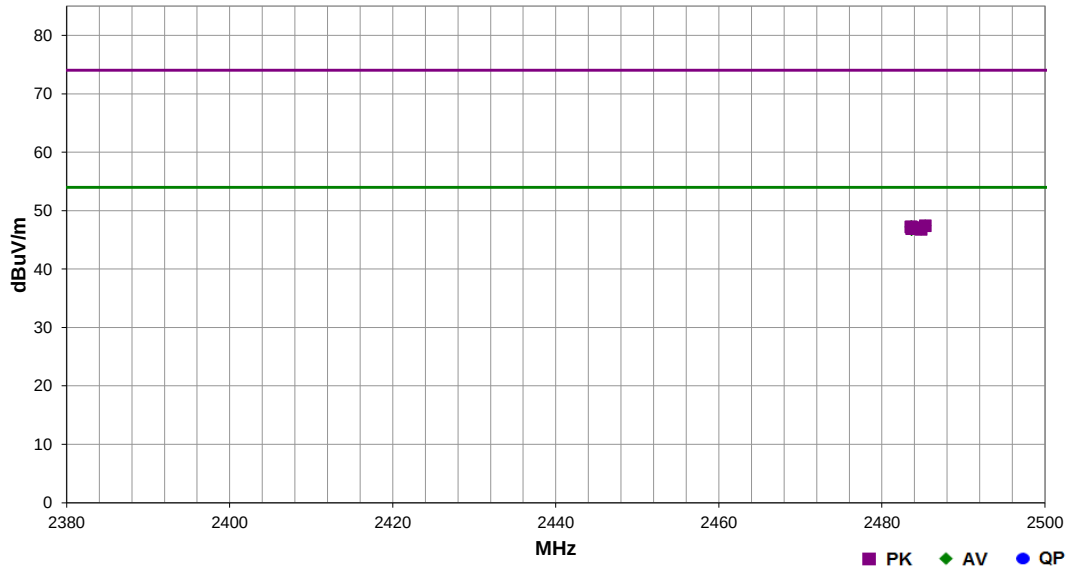
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	26.4 °C		
Job Site:	NC01	**Humidity:**	29.5% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Ch. = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 2, full test based on the client's test plan. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	66	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

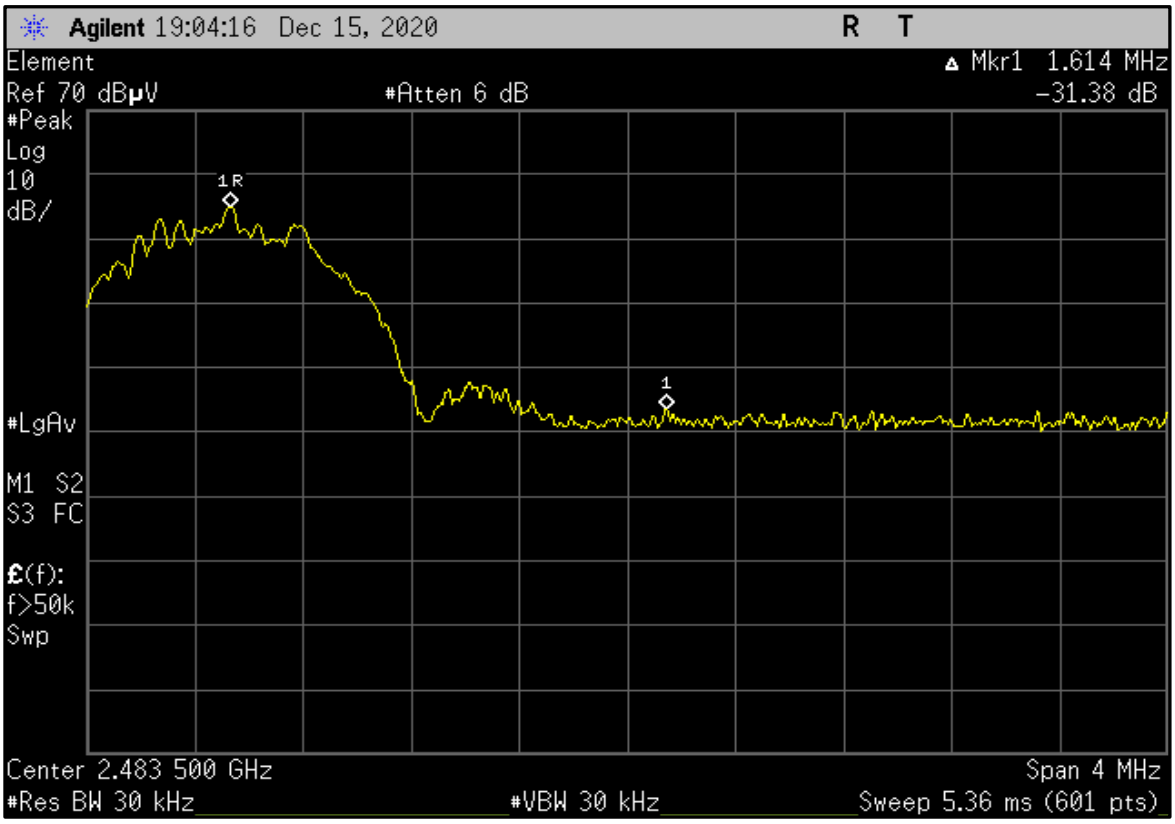


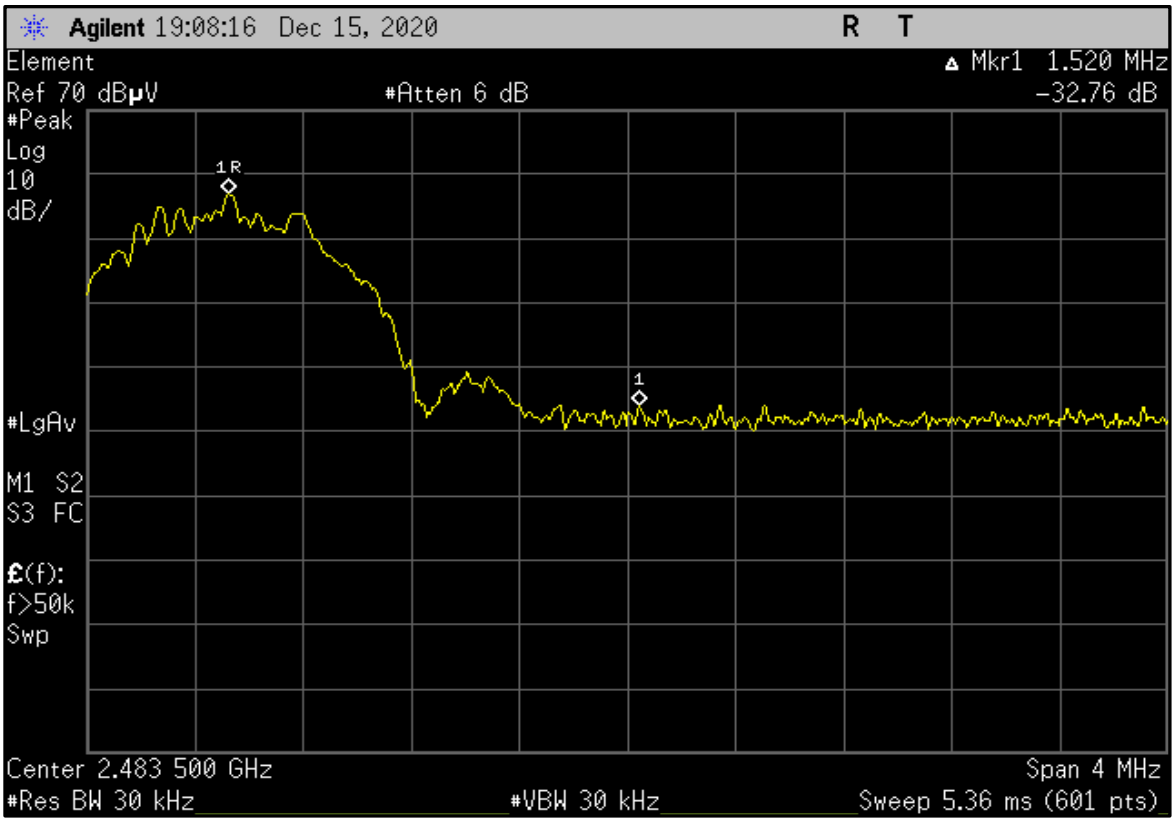
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.327	25.0	-0.8	1.5	325.0	3.2	20.0	Horz	AV	0.0	47.4	54.0	-6.6	DTS, EUT Vert, Ant Vert: Fund 57.5dBuV + -32.5dBc = 25.0dBuV (calc. amp.)
2483.627	24.9	-0.8	2.0	301.0	3.2	20.0	Vert	AV	0.0	47.3	54.0	-6.7	DTS, EUT on Side, Ant on Side: Fund 59.5dBuV + -34.6dBc = 24.9dBuV (calc. amp.)
2483.547	24.8	-0.8	1.9	235.0	3.2	20.0	Vert	AV	0.0	47.2	54.0	-6.8	DTS, EUT Horz, Ant Horz: Fund 57.6dBuV + -32.8dBc = 24.8dBuV (calc. amp.)
2484.740	24.6	-0.8	1.6	106.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	DTS, EUT Vert, Ant Vert: Fund 57.0dBuV + -32.4dBc = 24.6dBuV (calc. amp.)
2484.807	24.4	-0.8	1.5	309.0	3.2	20.0	Horz	AV	0.0	46.8	54.0	-7.2	DTS, EUT on Side, Ant on Side: Fund 59.3dBuV + -34.9dBc = 24.4dBuV (calc. amp.)
2483.647	24.3	-0.8	1.5	30.0	3.2	20.0	Horz	AV	0.0	46.7	54.0	-7.3	DTS, EUT Horz, Ant Horz: Fund 55.7dBuV + -31.4dBc = 24.3dBuV (calc. amp.)
2485.327	28.2	-0.8	1.5	325.0	0.0	20.0	Horz	PK	0.0	47.4	74.0	-26.6	DTS, EUT Vert, Ant Vert: Fund 60.7dBuV + -32.5dBc = 28.2dBuV (calc. amp.)
2483.547	28.0	-0.8	1.9	235.0	0.0	20.0	Vert	PK	0.0	47.2	74.0	-26.8	DTS, EUT Horz, Ant Horz: Fund 60.8dBuV + -32.8dBc = 28.0dBuV (calc. amp.)
2483.627	28.0	-0.8	2.0	301.0	0.0	20.0	Vert	PK	0.0	47.2	74.0	-26.8	DTS, EUT on Side, Ant on Side: Fund 62.6dBuV + -34.6dBc = 28.0dBuV (calc. amp.)
2484.740	27.9	-0.8	1.6	106.0	0.0	20.0	Vert	PK	0.0	47.1	74.0	-26.9	DTS, EUT Vert, Ant Vert: Fund 60.3dBuV + -32.4dBc = 27.9dBuV (calc. amp.)
2483.647	27.7	-0.8	1.5	30.0	0.0	20.0	Horz	PK	0.0	46.9	74.0	-27.1	DTS, EUT Horz, Ant Horz: Fund 59.1dBuV + -31.4dBc = 27.7dBuV (calc. amp.)
2484.807	27.6	-0.8	1.5	309.0	0.0	20.0	Horz	PK	0.0	46.8	74.0	-27.2	DTS, EUT on Side, Ant on Side: Fund 62.5dBuV + -34.9dBc = 27.6dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Horz, Ant Horz

PSA-ESCI 2020.06.24.2



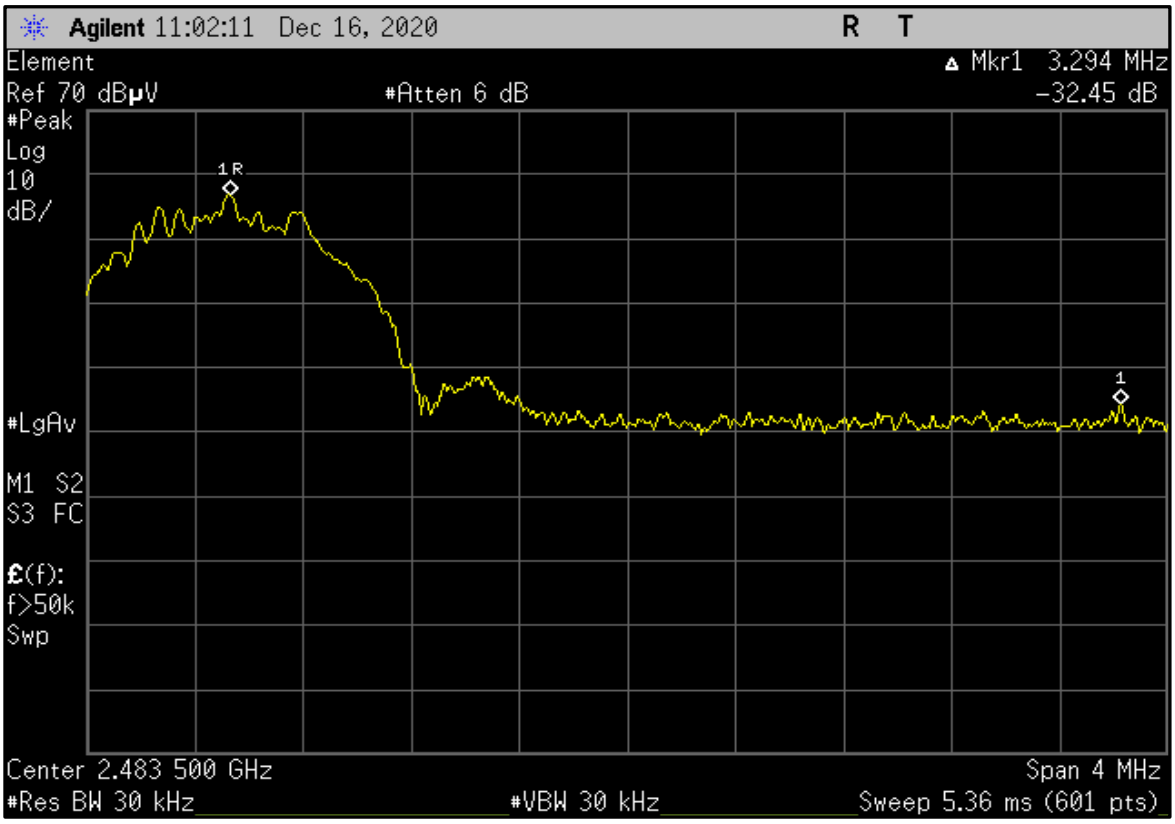


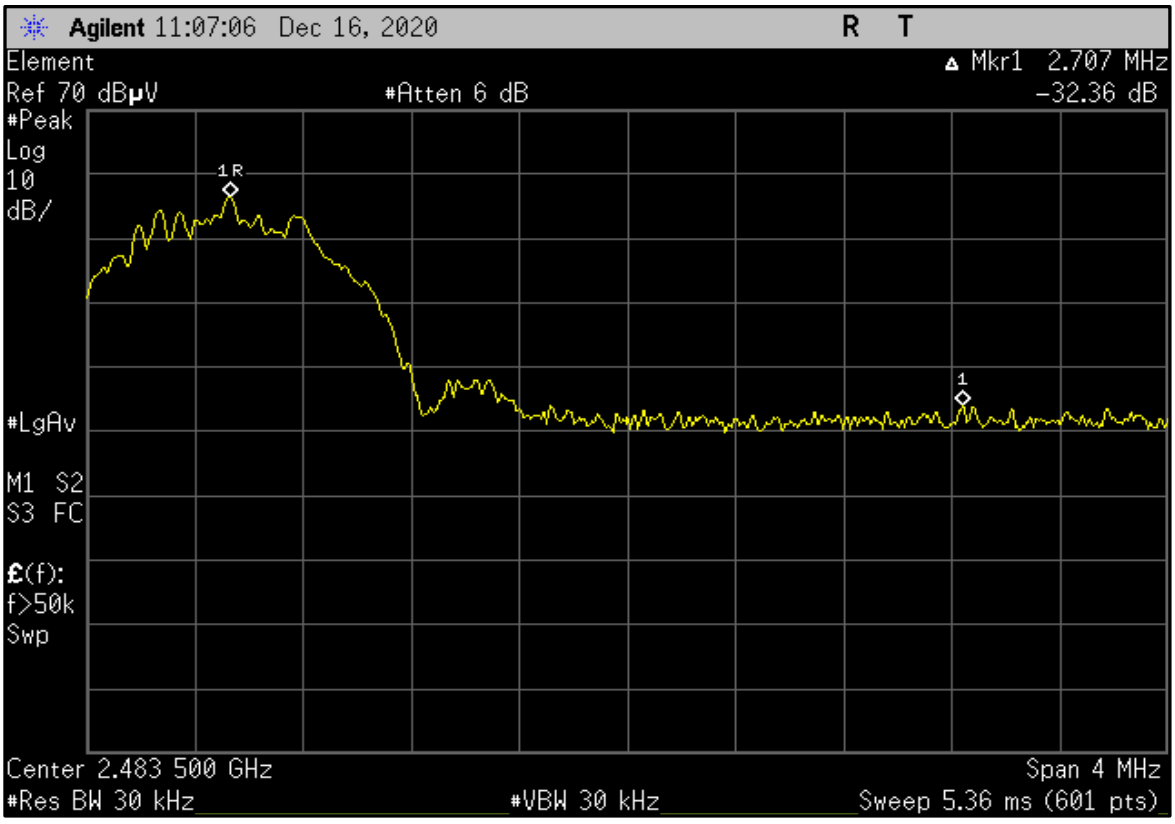
DTS, EUT Horz, Ant Horz

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2



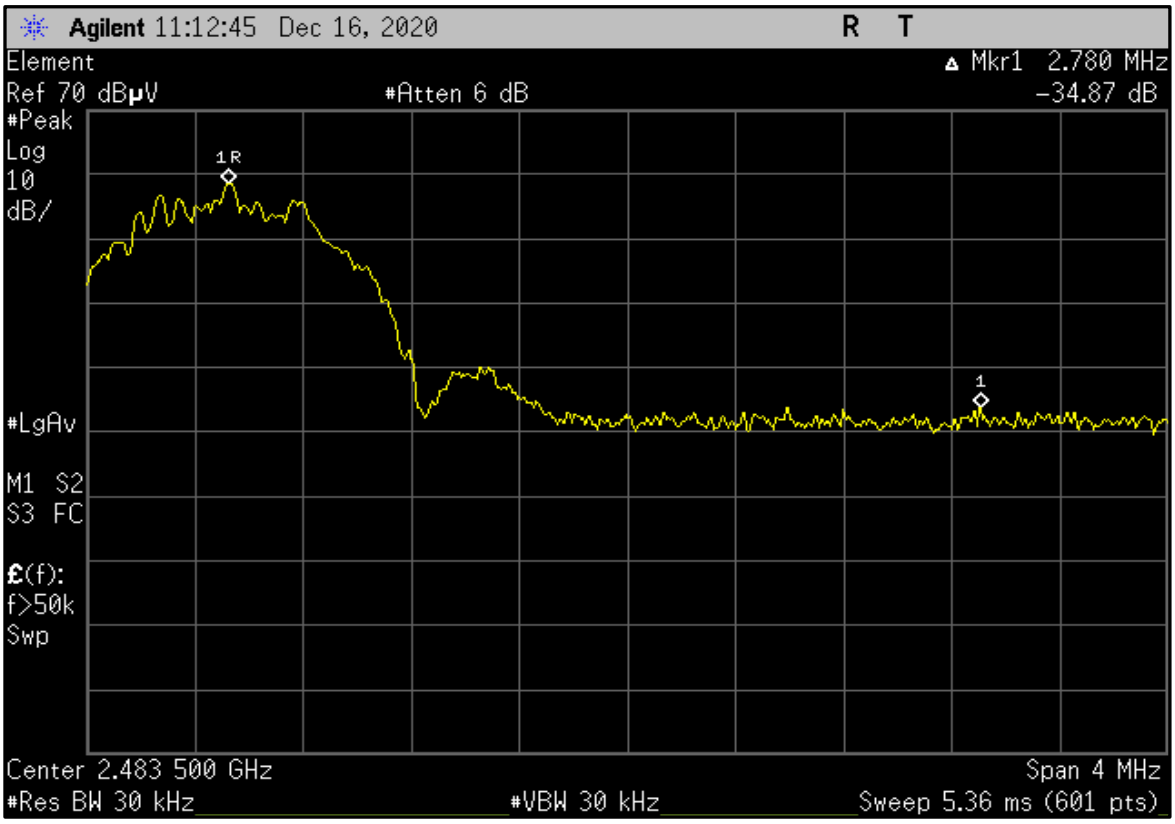


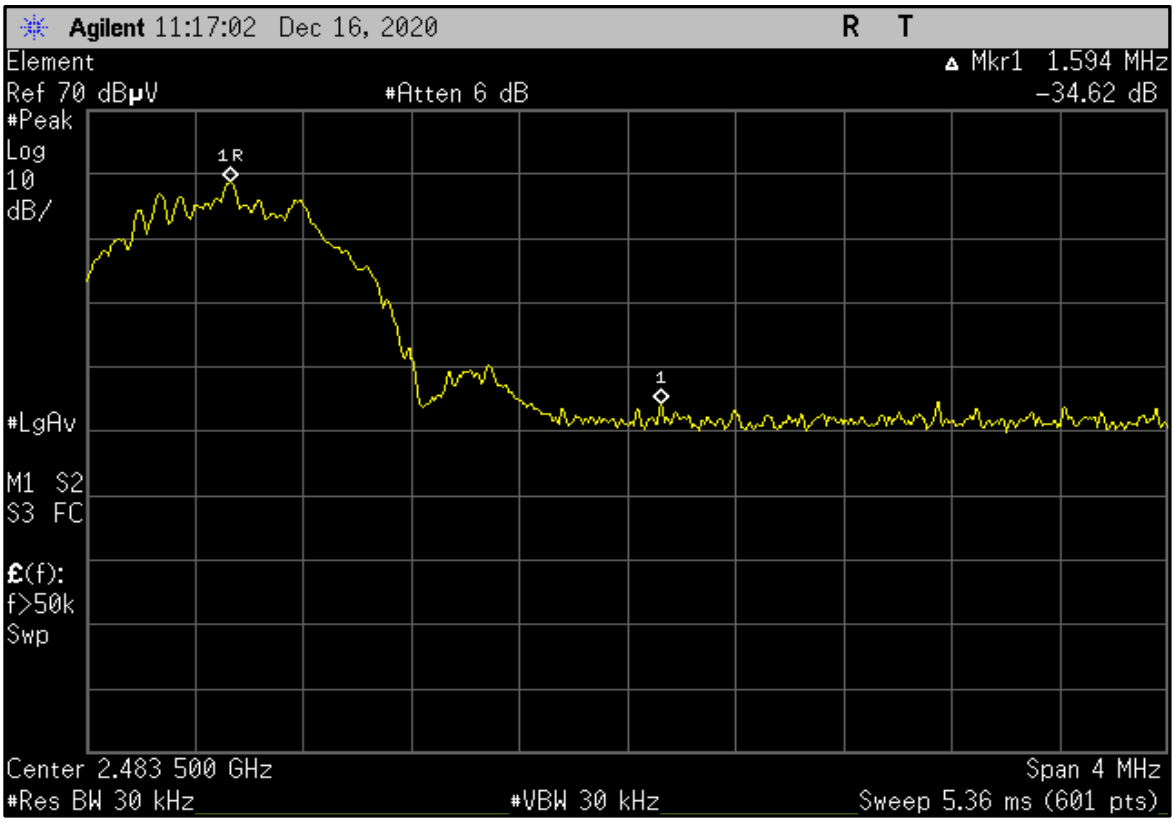
DTS, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

DTS, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





DTS, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

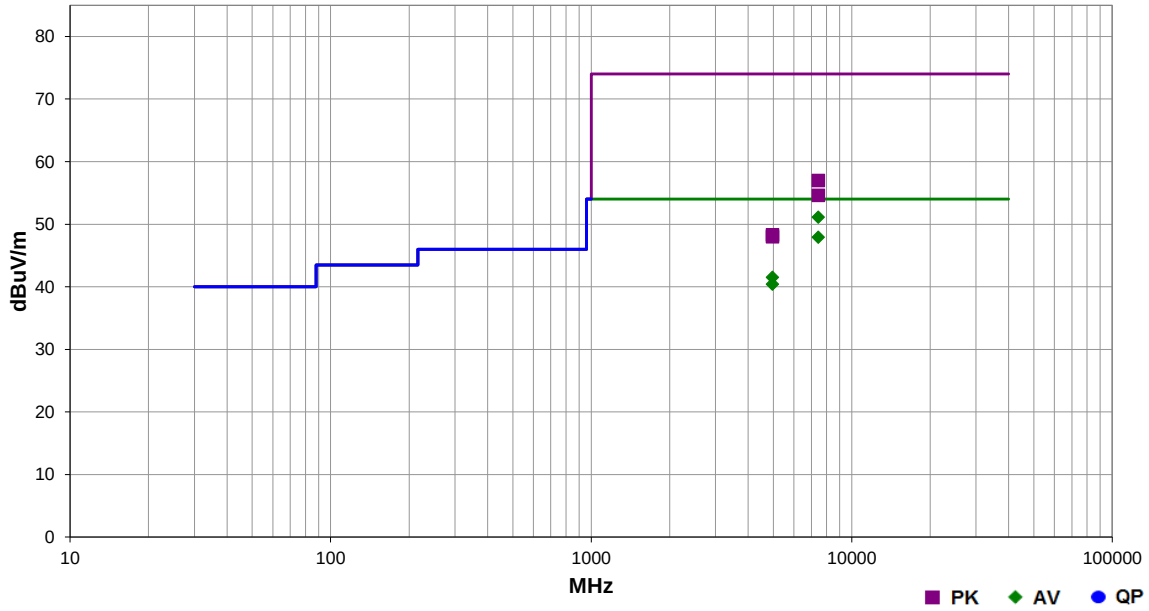
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 4, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	90	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.558	32.9	15.0	2.1	237.0	3.2	0.0	Horz	AV	0.0	51.1	54.0	-2.9	DTS, EUT on Side, Ant on Side
7446.658	29.7	15.0	1.5	173.0	3.2	0.0	Vert	AV	0.0	47.9	54.0	-6.1	DTS, EUT Vert, Ant Vert
4963.917	28.8	9.5	2.3	260.0	3.2	0.0	Vert	AV	0.0	41.5	54.0	-12.5	DTS, EUT Vert, Ant Vert
4963.933	27.7	9.5	1.5	275.0	3.2	0.0	Horz	AV	0.0	40.4	54.0	-13.6	DTS, EUT on Side, Ant on Side
7446.808	42.0	15.0	2.1	237.0	0.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	DTS, EUT on Side, Ant on Side
7446.725	39.6	15.0	1.5	173.0	0.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	DTS, EUT Vert, Ant Vert
4963.675	38.8	9.5	2.3	260.0	0.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	DTS, EUT Vert, Ant Vert
4963.775	38.5	9.5	1.5	275.0	0.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	DTS, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

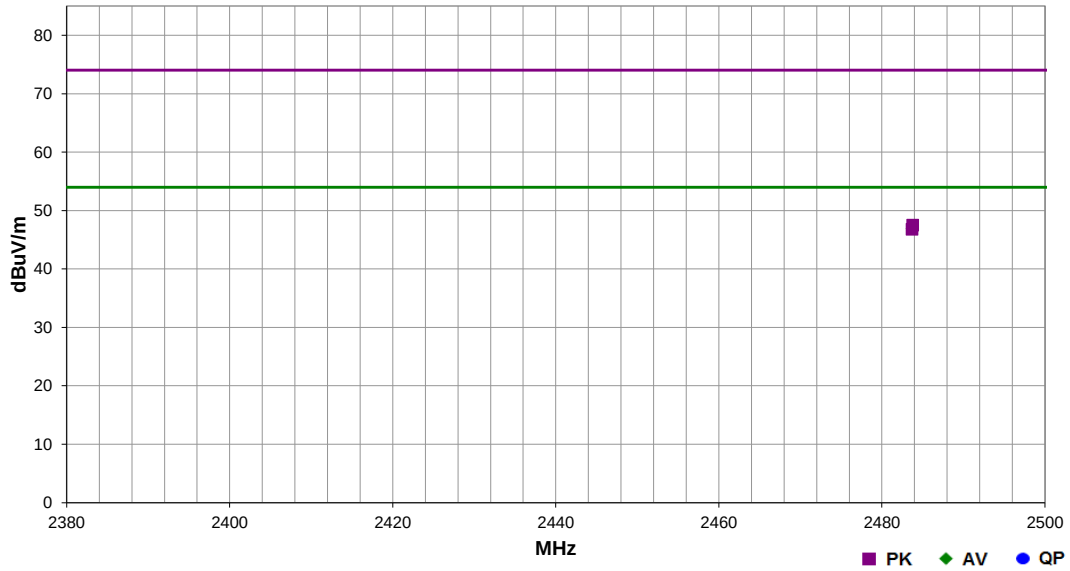
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 4, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	91	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

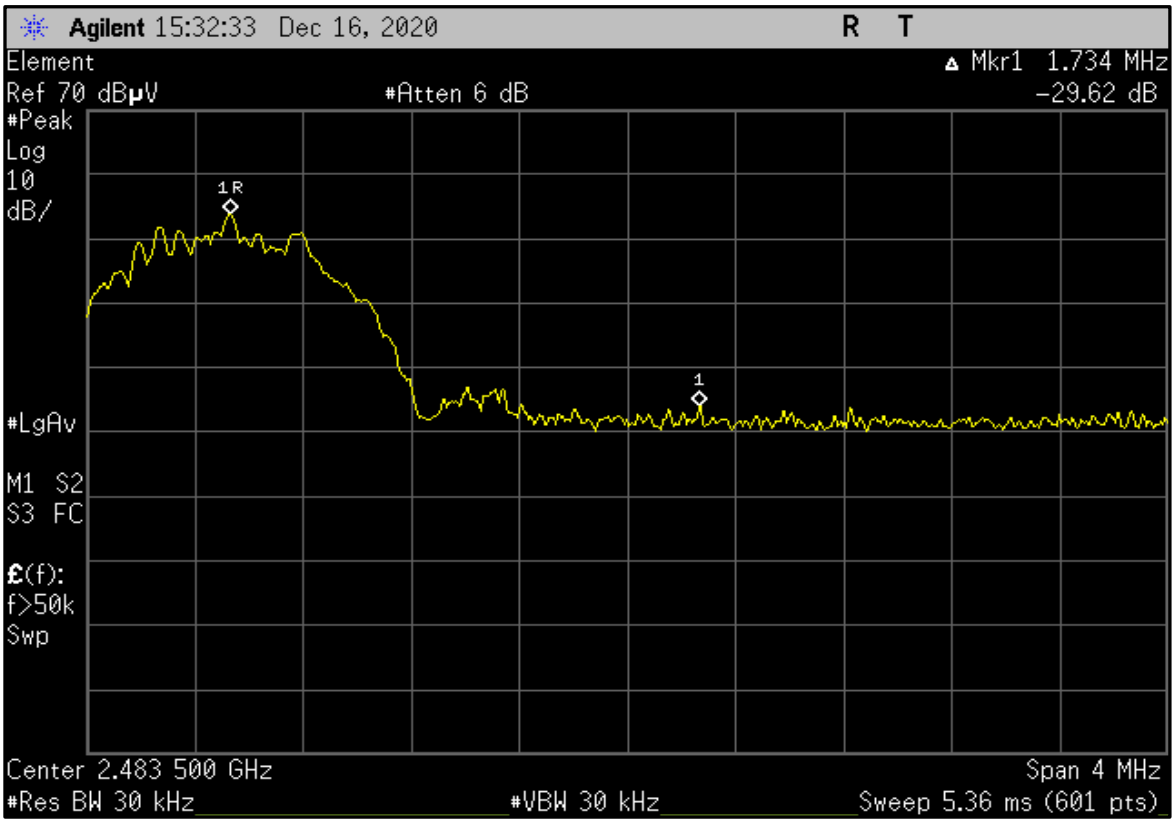


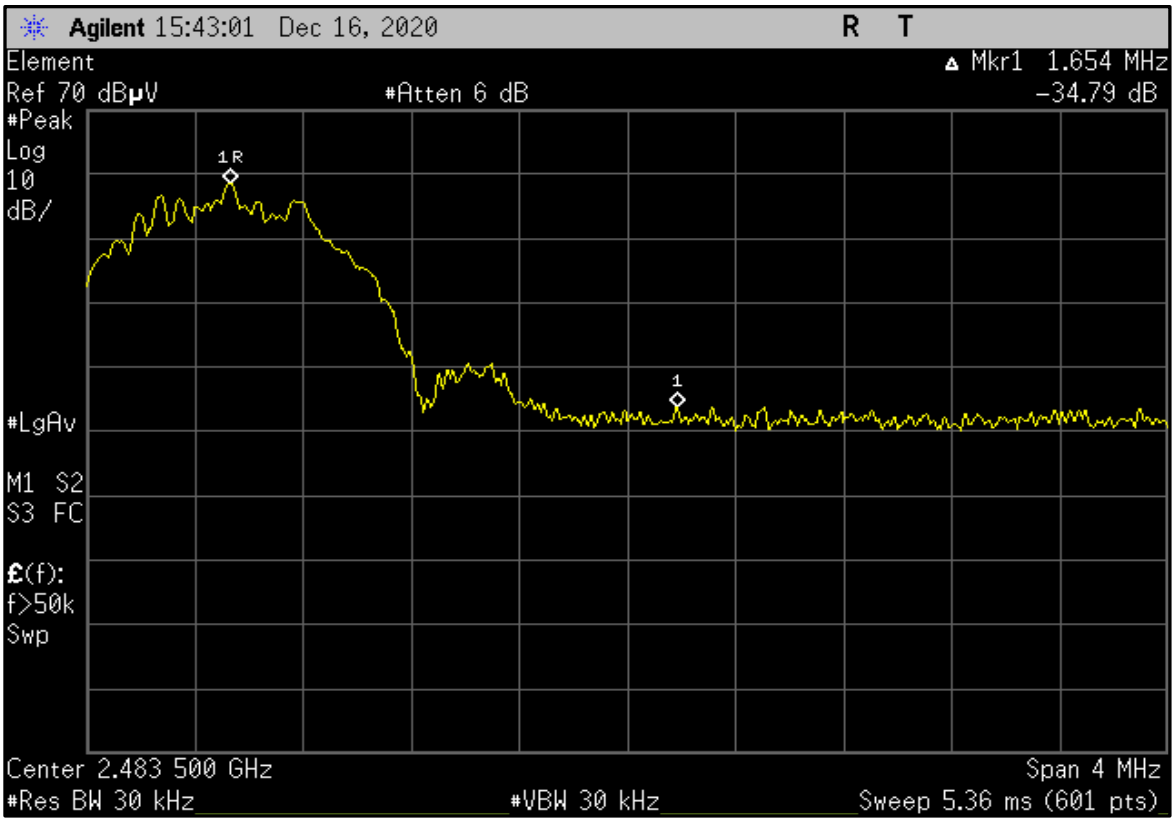
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.767	24.8	-0.8	1.7	315.0	3.2	20.0	Horz	AV	0.0	47.2	54.0	-6.8	DTS, EUT Vert, Ant Vert: Fund 54.4dBuV + -29.6dBc = 24.8dBuV (calc. amp.)
2483.687	24.5	-0.8	1.0	275.0	3.2	20.0	Vert	AV	0.0	46.9	54.0	-7.1	DTS, EUT on Side, Ant on Side: Fund 59.3dBuV + -34.8dBc = 24.5dBuV (calc. amp.)
2483.767	28.3	-0.8	1.7	315.0	0.0	20.0	Horz	PK	0.0	47.5	74.0	-26.5	DTS, EUT Vert, Ant Vert: Fund 57.9dBuV + -29.6dBc = 28.3dBuV (calc. amp.)
2483.687	27.6	-0.8	1.0	275.0	0.0	20.0	Vert	PK	0.0	46.8	74.0	-27.2	DTS, EUT on Side, Ant on Side: Fund 62.4dBuV + -34.8dBc = 27.6dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT on Side, Ant on Side

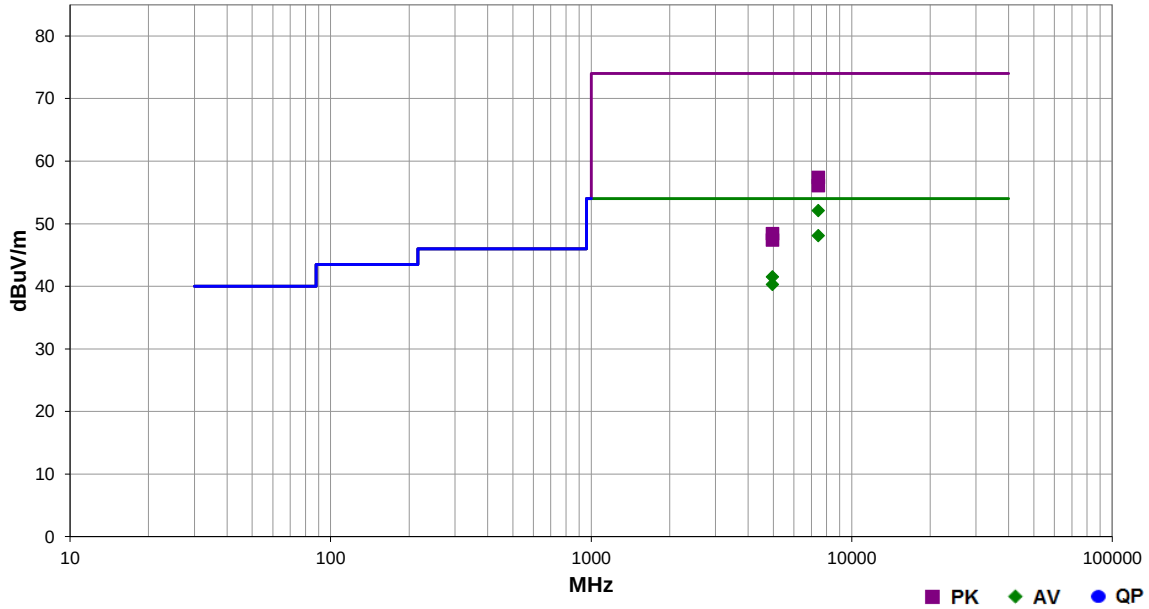
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 4, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	92	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.583	33.9	15.0	2.2	233.0	3.2	0.0	Horz	AV	0.0	52.1	54.0	-1.9	DTS, EUT on Side, Ant on Side
7446.583	29.9	15.0	1.6	173.0	3.2	0.0	Vert	AV	0.0	48.1	54.0	-5.9	DTS, EUT Vert, Ant Vert
4963.992	28.8	9.5	1.3	323.0	3.2	0.0	Horz	AV	0.0	41.5	54.0	-12.5	DTS, EUT on Side, Ant on Side
4963.775	27.6	9.5	1.5	141.0	3.2	0.0	Vert	AV	0.0	40.3	54.0	-13.7	DTS, EUT Vert, Ant Vert
7446.483	42.4	15.0	2.2	233.0	0.0	0.0	Horz	PK	0.0	57.4	74.0	-16.6	DTS, EUT on Side, Ant on Side
7446.725	41.1	15.0	1.6	173.0	0.0	0.0	Vert	PK	0.0	56.1	74.0	-17.9	DTS, EUT Vert, Ant Vert
4963.808	38.9	9.5	1.3	323.0	0.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	DTS, EUT on Side, Ant on Side
4965.242	37.9	9.5	1.5	141.0	0.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	DTS, EUT Vert, Ant Vert

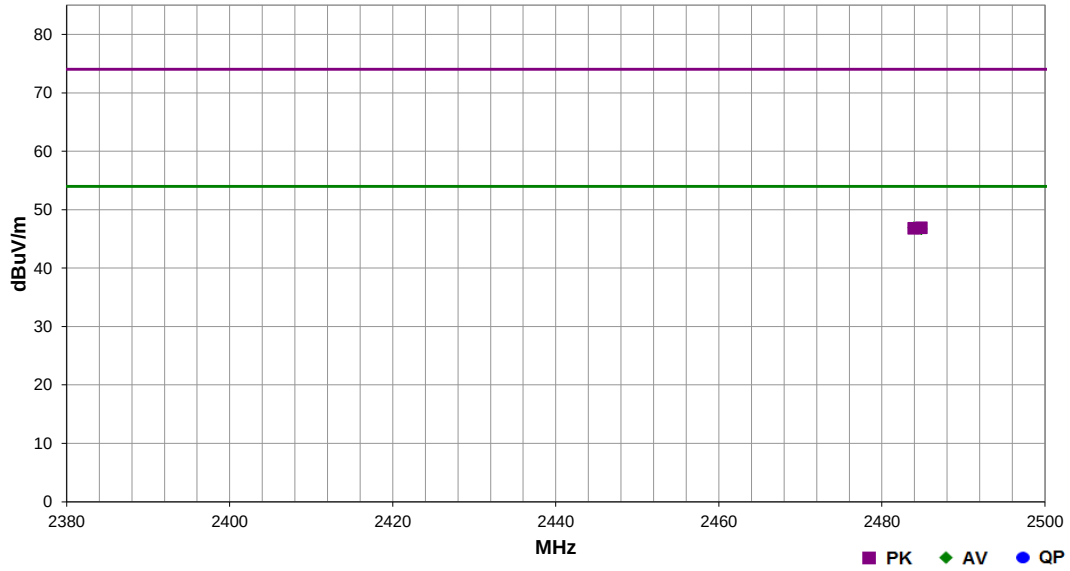
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A1, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 4, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	93	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

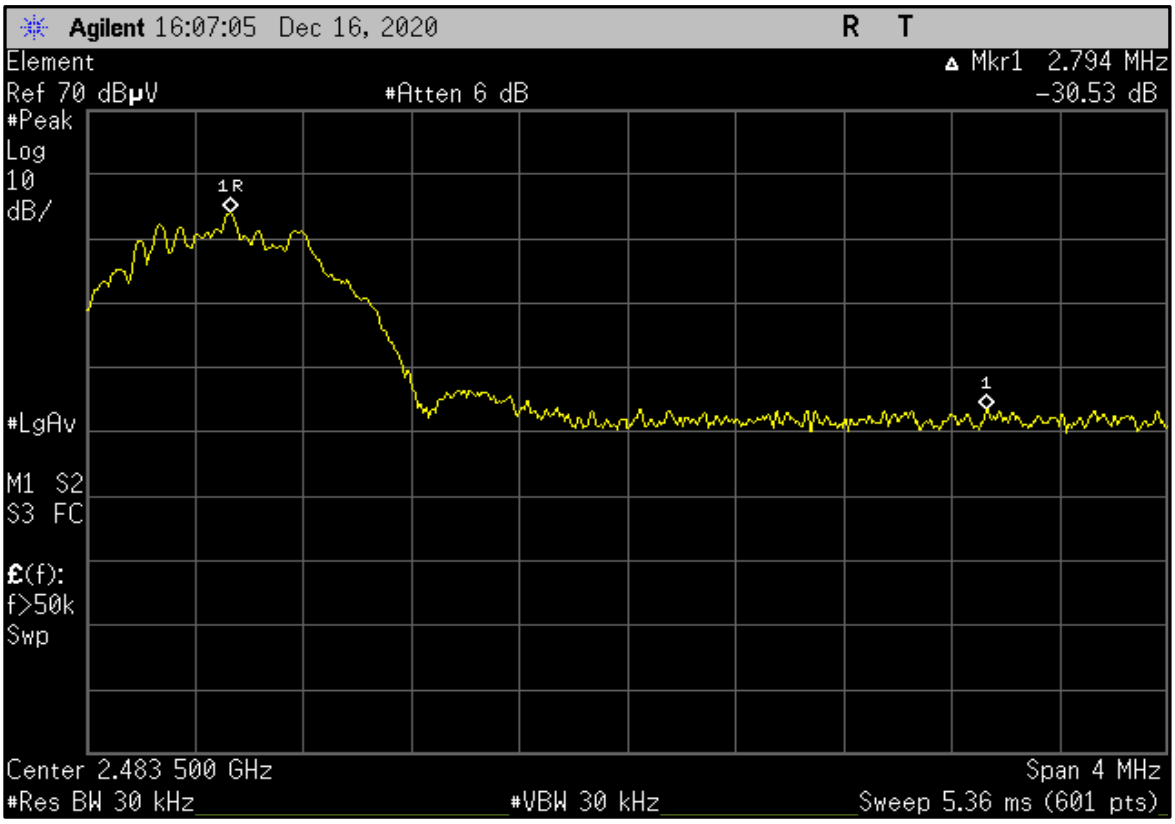


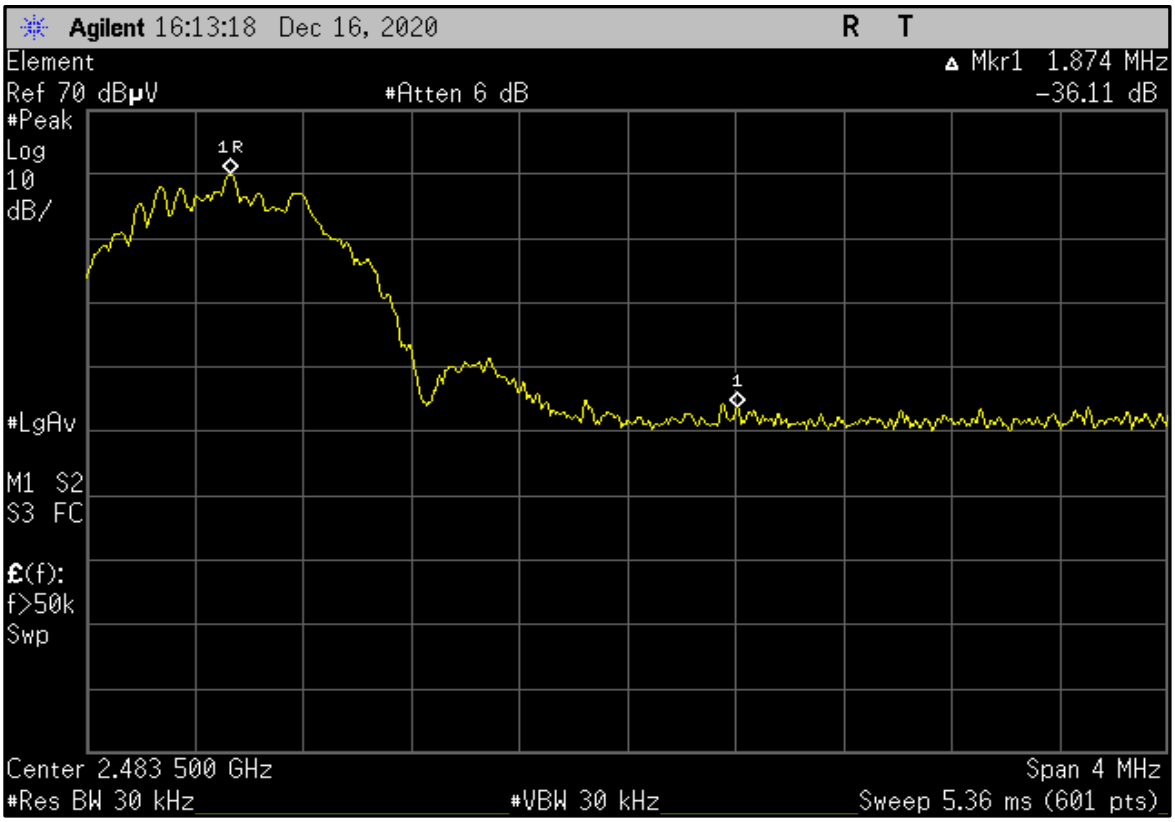
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.907	24.5	-0.8	1.0	272.0	3.2	20.0	Vert	AV	0.0	46.9	54.0	-7.1	DTS, EUT on Side, Ant on Side: Fund 60.6dBuV + -36.1dBc = 24.5dBuV (calc. amp.)
2484.827	24.3	-0.8	1.8	316.0	3.2	20.0	Horz	AV	0.0	46.7	54.0	-7.3	DTS, EUT Vert, Ant Vert: Fund 54.8dBuV + -30.5dBc = 24.3dBuV (calc. amp.)
2484.827	27.7	-0.8	1.8	316.0	0.0	20.0	Horz	PK	0.0	46.9	74.0	-27.1	DTS, EUT Vert, Ant Vert: Fund 58.2dBuV + -30.5dBc = 27.7dBuV (calc. amp.)
2483.907	27.6	-0.8	1.0	272.0	0.0	20.0	Vert	PK	0.0	46.8	74.0	-27.2	DTS, EUT on Side, Ant on Side: Fund 63.7dBuV + -36.1dBc = 27.6dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

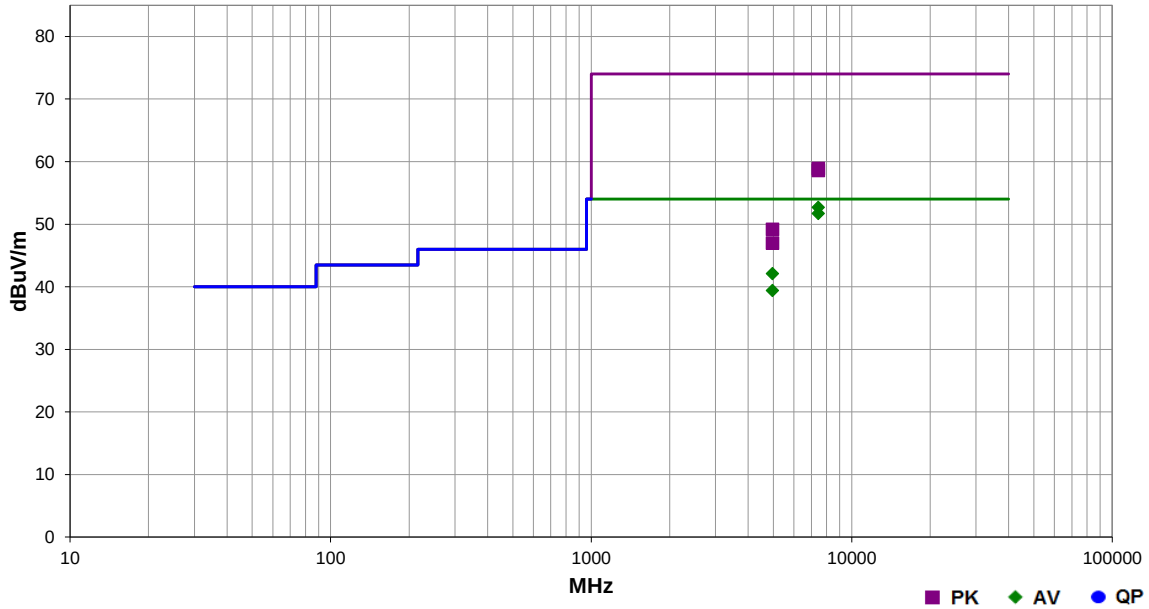
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 6, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	100	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7445.523	34.5	15.0	2.1	146.0	3.2	0.0	Horz	AV	0.0	52.7	54.0	-1.3	DTS, EUT on Side, Ant on Side
7445.513	33.5	15.0	2.3	184.0	3.2	0.0	Vert	AV	0.0	51.7	54.0	-2.3	DTS, EUT Vert, Ant Vert
4963.970	29.4	9.5	1.5	246.0	3.2	0.0	Horz	AV	0.0	42.1	54.0	-11.9	DTS, EUT on Side, Ant on Side
4964.003	26.7	9.5	1.5	200.0	3.2	0.0	Vert	AV	0.0	39.4	54.0	-14.6	DTS, EUT Vert, Ant Vert
7445.240	43.9	15.0	2.1	146.0	0.0	0.0	Horz	PK	0.0	58.9	74.0	-15.1	DTS, EUT on Side, Ant on Side
7446.837	43.6	15.0	2.3	184.0	0.0	0.0	Vert	PK	0.0	58.6	74.0	-15.4	DTS, EUT Vert, Ant Vert
4964.150	39.7	9.5	1.5	246.0	0.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	DTS, EUT on Side, Ant on Side
4964.183	37.5	9.5	1.5	200.0	0.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	DTS, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

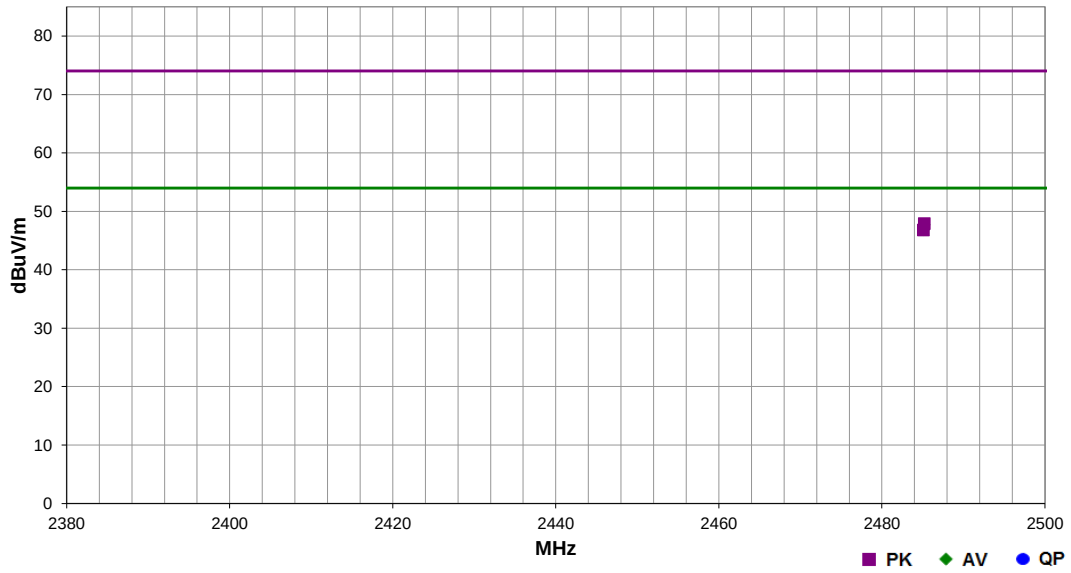
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 6, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	101	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

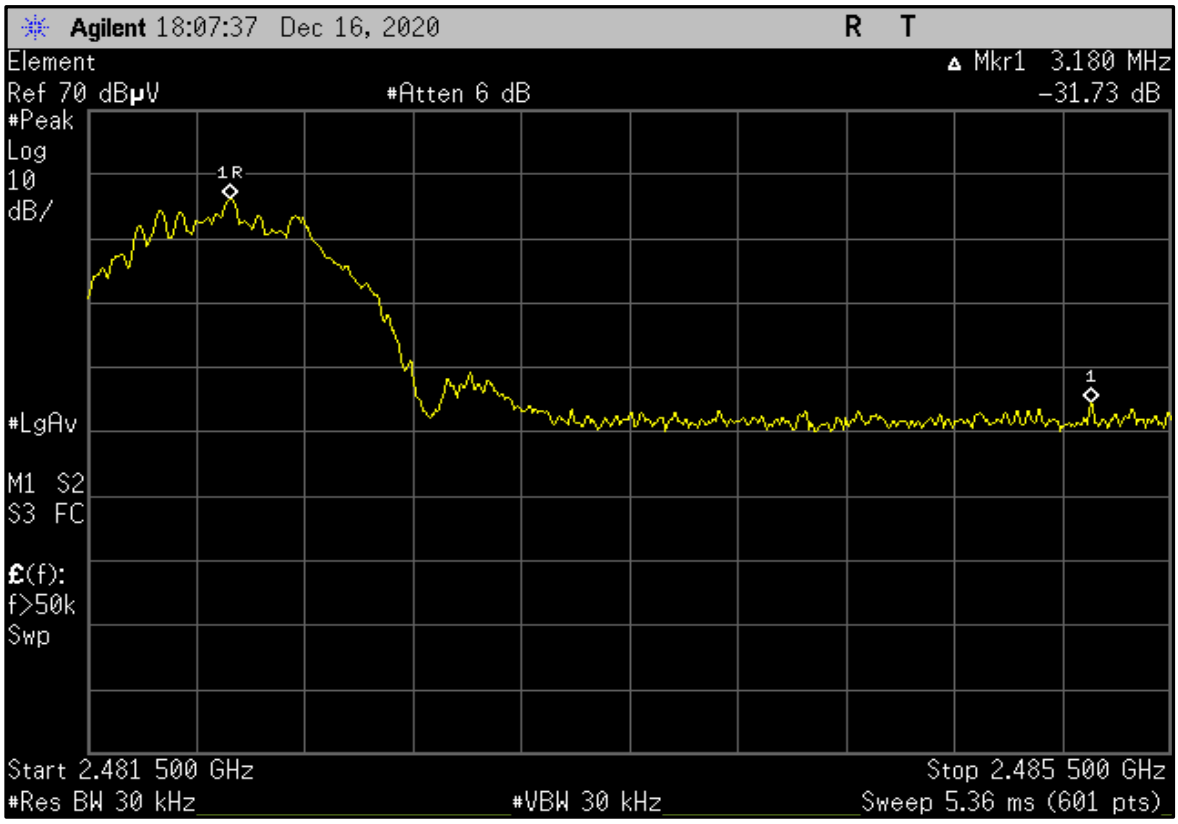


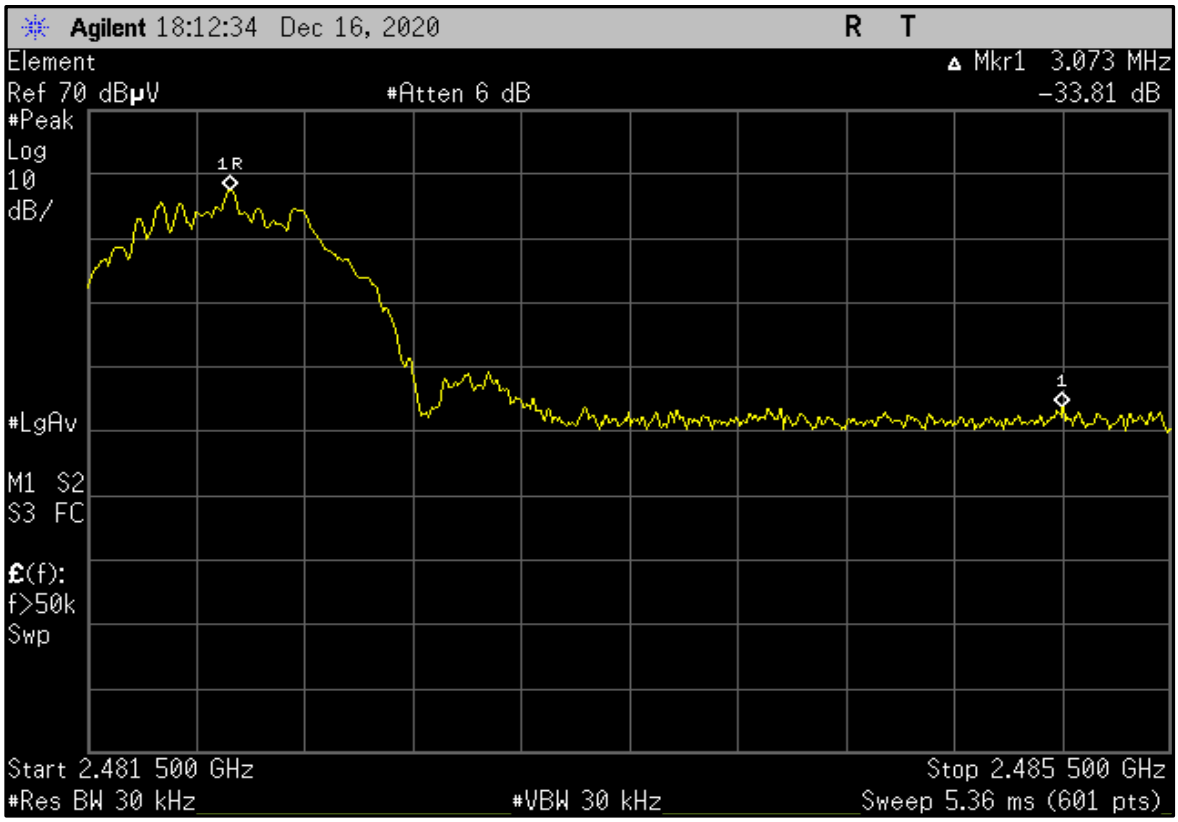
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.207	25.3	-0.8	1.5	153.0	3.2	20.0	Vert	AV	0.0	47.7	54.0	-6.3	DTS, EUT on Side, Ant on Side: Fund 57.0dBuV + -31.7dBc = 25.3dBuV (calc. amp.)
2485.100	24.4	-0.8	1.5	4.0	3.2	20.0	Horz	AV	0.0	46.8	54.0	-7.2	DTS, EUT Vert, Ant Vert: Fund 58.2dBuV + -33.8dBc = 24.4dBuV (calc. amp.)
2485.207	28.7	-0.8	1.5	153.0	0.0	20.0	Vert	PK	0.0	47.9	74.0	-26.1	DTS, EUT on Side, Ant on Side: Fund 60.4dBuV + -31.7dBc = 28.7dBuV (calc. amp.)
2485.100	27.6	-0.8	1.5	4.0	0.0	20.0	Horz	PK	0.0	46.8	74.0	-27.2	DTS, EUT Vert, Ant Vert: Fund 61.4dBuV + -33.8dBc = 27.6dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





DTS, EUT Vert, Ant Vert

SPURIOUS RADIATED EMISSIONS

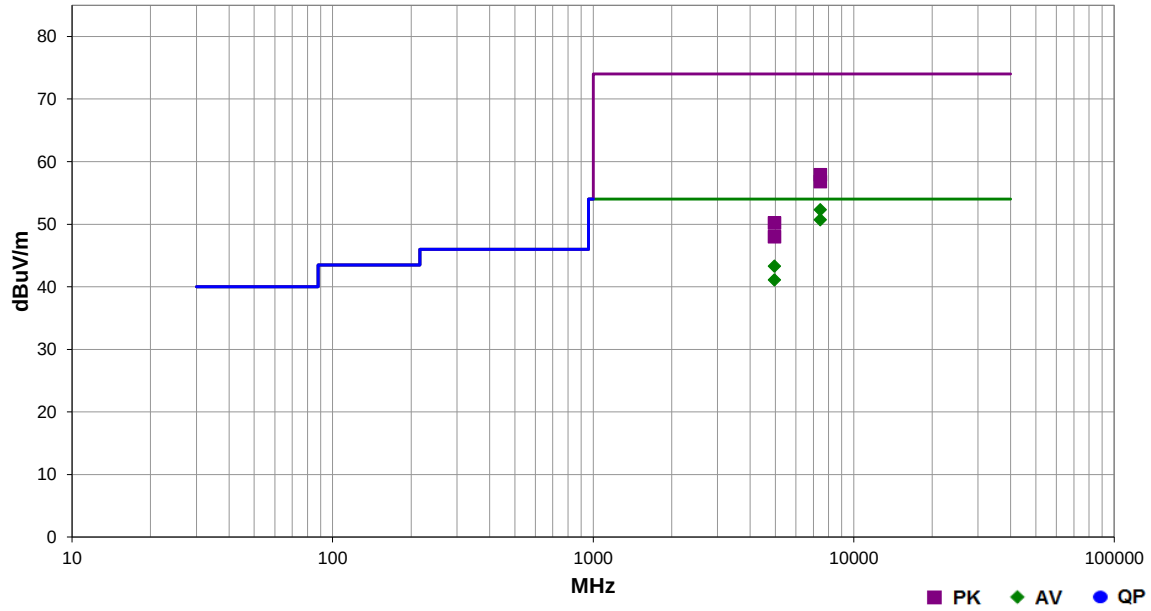
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 6, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	94	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.708	34.1	15.0	1.9	174.0	3.2	0.0	Horz	AV	0.0	52.3	54.0	-1.7	DTS, EUT on Side, Ant on Side
7445.475	32.5	15.0	1.5	273.0	3.2	0.0	Vert	AV	0.0	50.7	54.0	-3.3	DTS, EUT Vert, Ant Vert
4963.942	30.6	9.5	2.4	246.0	3.2	0.0	Horz	AV	0.0	43.3	54.0	-10.7	DTS, EUT on Side, Ant on Side
4964.050	28.4	9.5	3.7	257.0	3.2	0.0	Vert	AV	0.0	41.1	54.0	-12.9	DTS, EUT Vert, Ant Vert
7445.317	42.9	15.0	1.9	174.0	0.0	0.0	Horz	PK	0.0	57.9	74.0	-16.1	DTS, EUT on Side, Ant on Side
7445.425	41.8	15.0	1.5	273.0	0.0	0.0	Vert	PK	0.0	56.8	74.0	-17.2	DTS, EUT Vert, Ant Vert
4963.992	40.7	9.5	2.4	246.0	0.0	0.0	Horz	PK	0.0	50.2	74.0	-23.8	DTS, EUT on Side, Ant on Side
4964.400	38.5	9.5	3.7	257.0	0.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	DTS, EUT Vert, Ant Vert

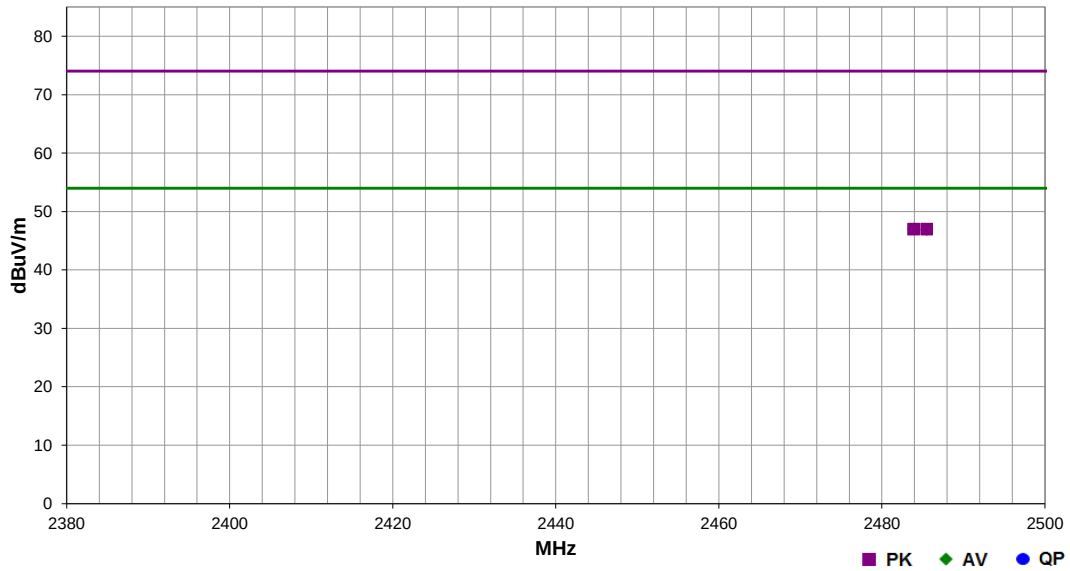
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 7, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 6, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	95	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

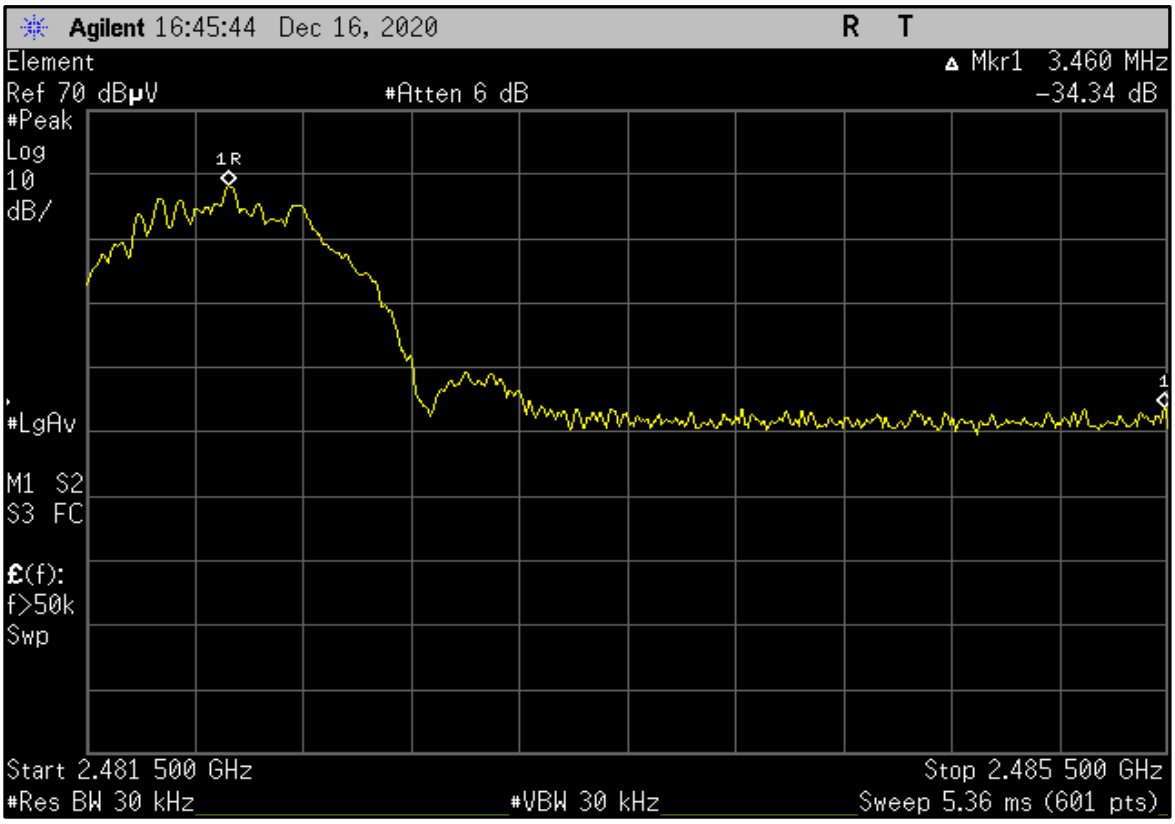


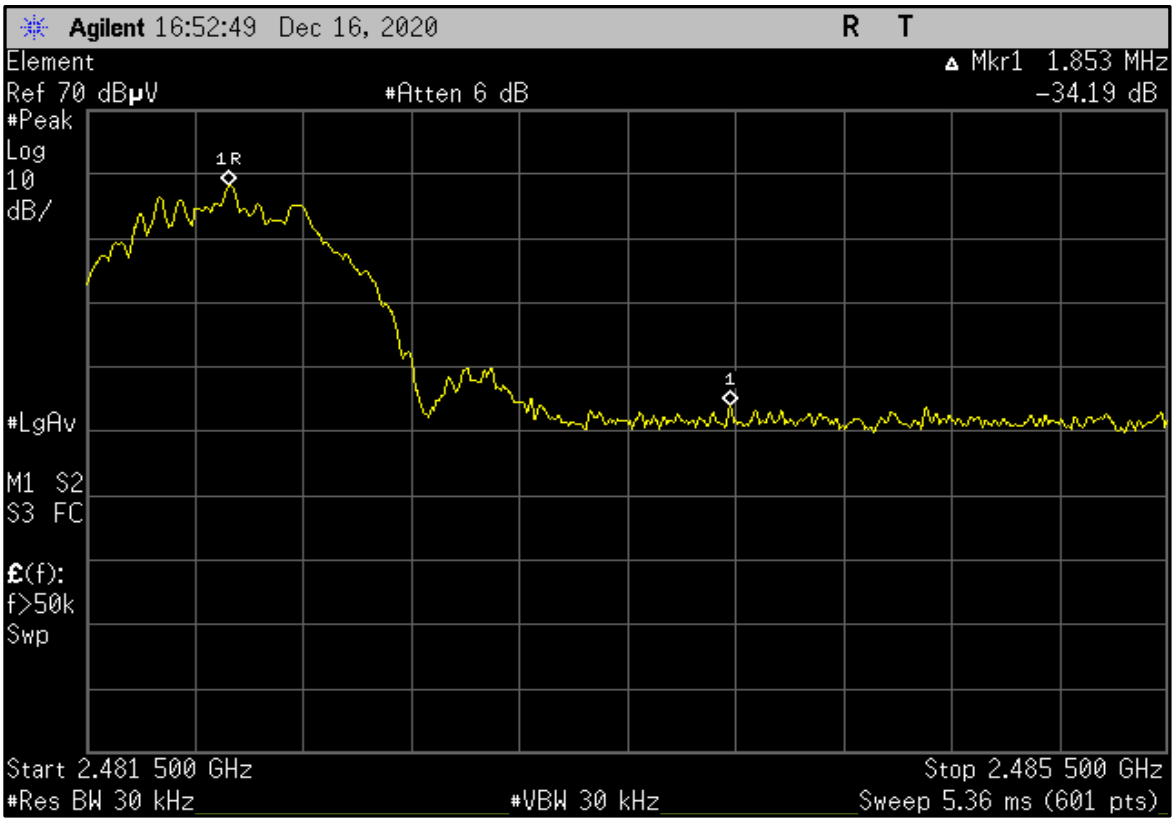
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2483.880	24.6	-0.8	2.0	232.0	3.2	20.0	Vert	AV	0.0	47.0	54.0	-7.0	DTS, EUT on Side, Ant on Side: Fund 58.8dBuV + -34.2dBc = 24.6dBuV (calc. amp.)
2485.487	24.5	-0.8	1.5	44.0	3.2	20.0	Horz	AV	0.0	46.9	54.0	-7.1	DTS, EUT Vert, Ant Vert: Fund 58.8dBuV + -34.3dBc = 24.5dBuV (calc. amp.)
2485.487	27.8	-0.8	1.5	44.0	0.0	20.0	Horz	PK	0.0	47.0	74.0	-27.0	DTS, EUT Vert, Ant Vert: Fund 62.1dBuV + -34.3dBc = 27.8dBuV (calc. amp.)
2483.880	27.8	-0.8	2.0	232.0	0.0	20.0	Vert	PK	0.0	47.0	74.0	-27.0	DTS, EUT on Side, Ant on Side: Fund 62.0dBuV + -34.2dBc = 27.8dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





DTS, EUT on Side, Ant on Side

SPURIOUS RADIATED EMISSIONS

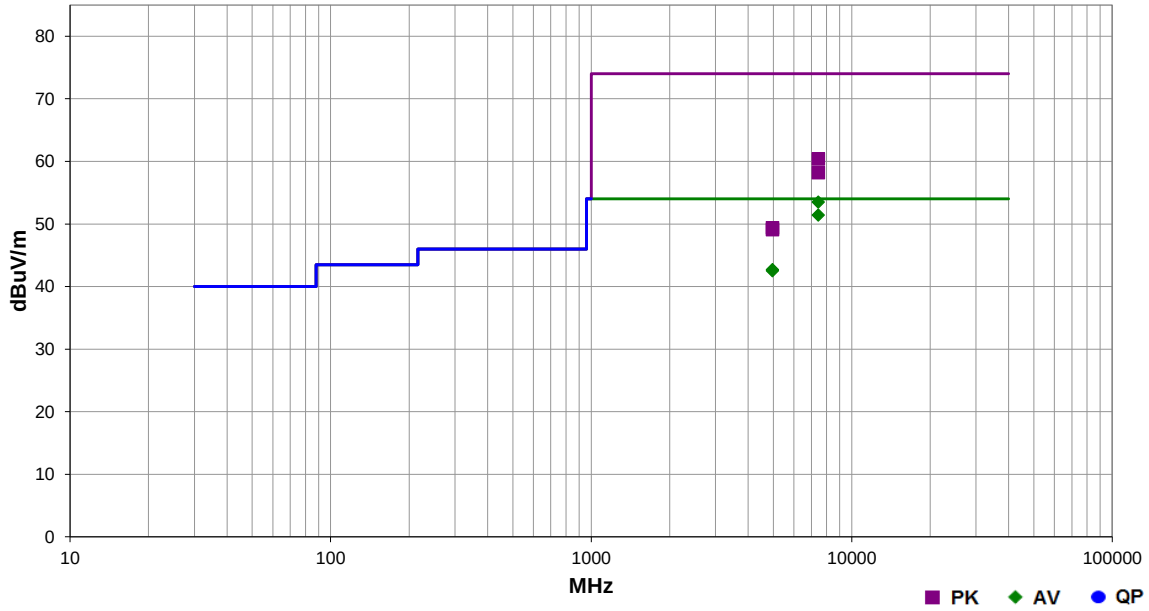
element

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	35.3% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1018 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 8, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	102	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.640	35.3	15.0	2.1	250.0	3.2	0.0	Horz	AV	0.0	53.5	54.0	-0.5	DTS, EUT on Side, Ant on Side
7445.557	33.2	15.0	1.5	318.0	3.2	0.0	Vert	AV	0.0	51.4	54.0	-2.6	DTS, EUT Vert, Ant Vert
4963.963	30.0	9.5	1.8	322.0	3.2	0.0	Vert	AV	0.0	42.7	54.0	-11.3	DTS, EUT Vert, Ant Vert
4964.027	29.8	9.5	1.5	272.0	3.2	0.0	Horz	AV	0.0	42.5	54.0	-11.5	DTS, EUT on Side, Ant on Side
7445.247	45.4	15.0	2.1	250.0	0.0	0.0	Horz	PK	0.0	60.4	74.0	-13.6	DTS, EUT on Side, Ant on Side
7445.733	43.2	15.0	1.5	318.0	0.0	0.0	Vert	PK	0.0	58.2	74.0	-15.8	DTS, EUT Vert, Ant Vert
4964.080	39.9	9.5	1.8	322.0	0.0	0.0	Vert	PK	0.0	49.4	74.0	-24.6	DTS, EUT Vert, Ant Vert
4963.740	39.6	9.5	1.5	272.0	0.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	DTS, EUT on Side, Ant on Side

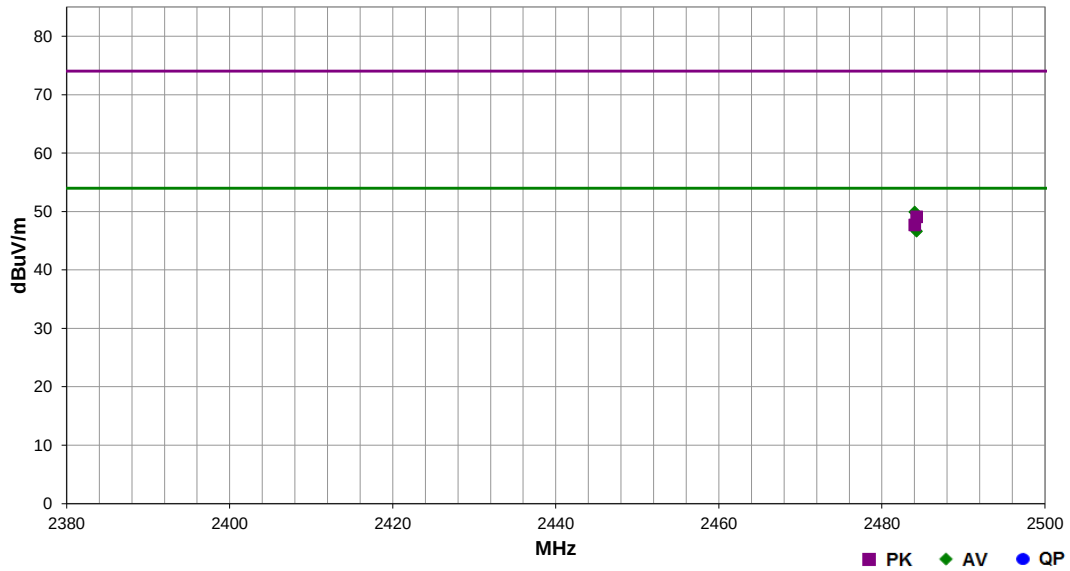
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	36.4% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1006 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	1				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	POE via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 8, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	103	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

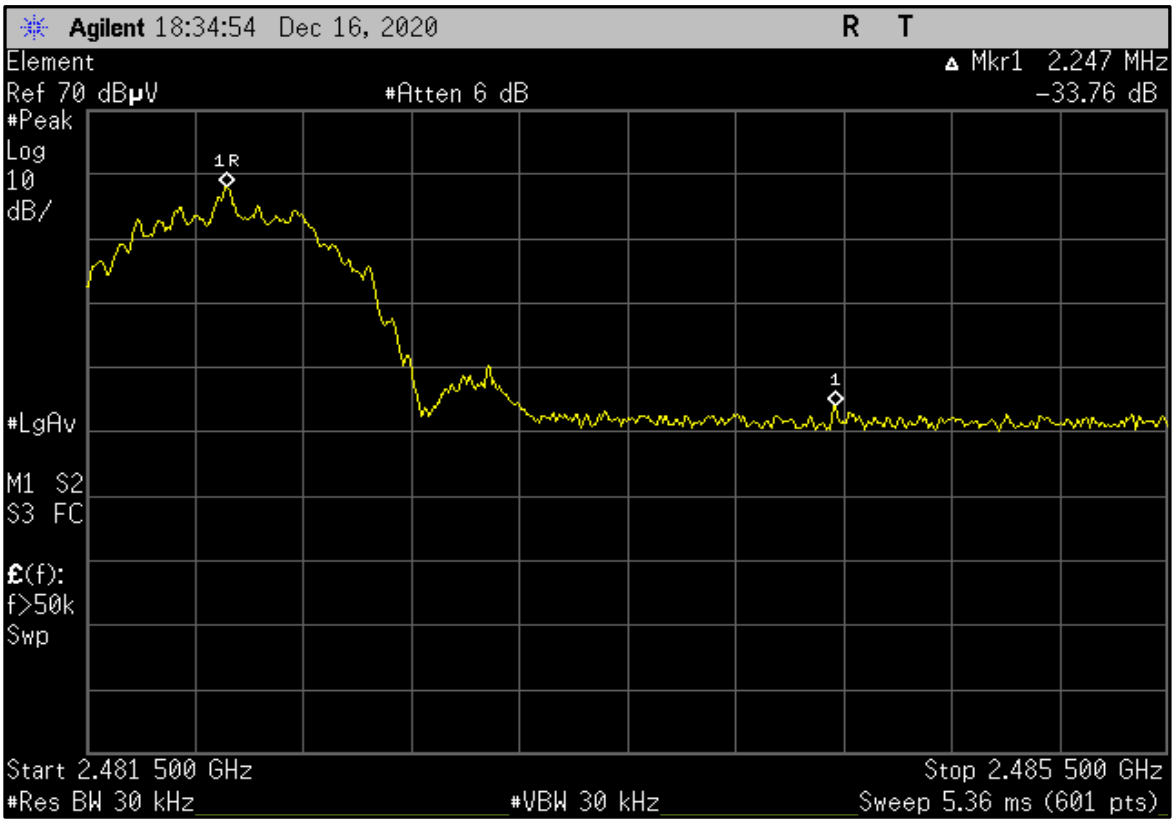


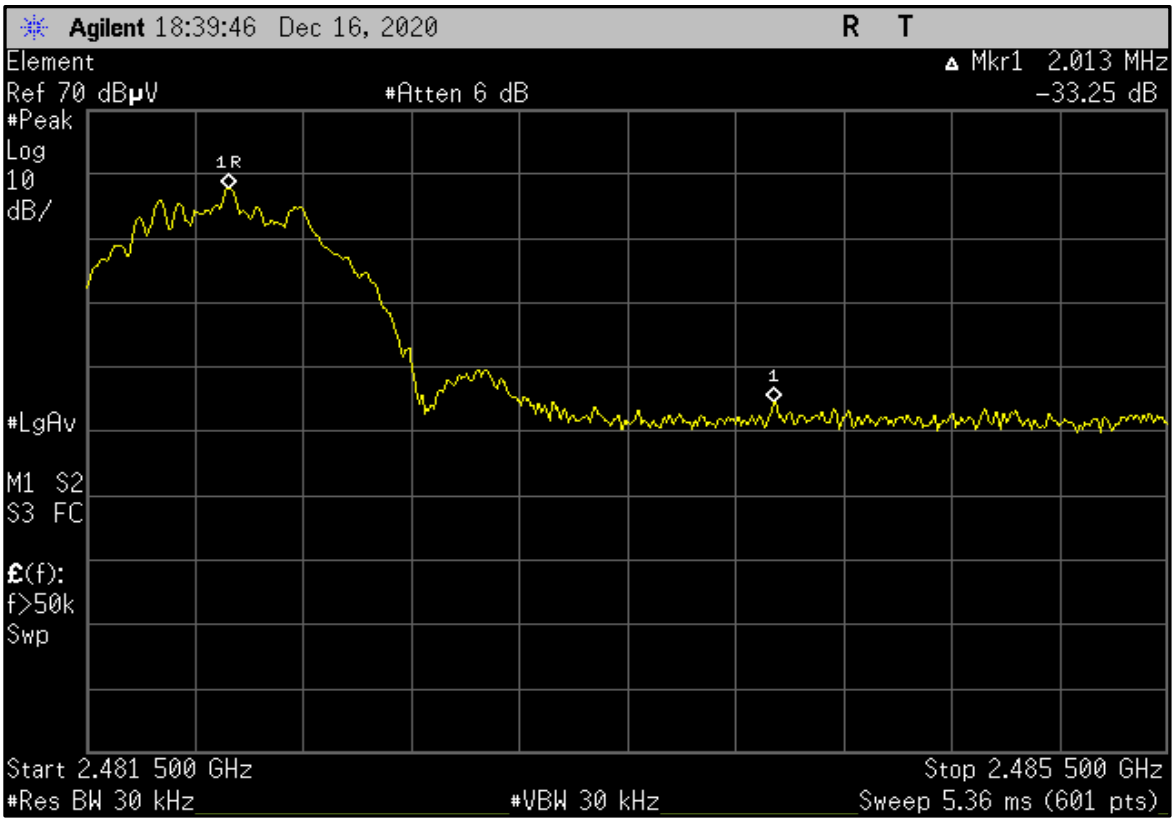
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2484.040	27.5	-0.8	1.5	317.0	3.2	20.0	Horz	AV	0.0	49.9	54.0	-4.1	DTS, EUT Vert, Ant Vert: Fund 60.7dBuV + -33.2dBc = 27.5dBuV (calc. amp.)
2484.267	24.2	-0.8	1.5	258.0	3.2	20.0	Vert	AV	0.0	46.6	54.0	-7.4	DTS, EUT on Side, Ant on Side: Fund 58.0dBuV + -33.8dBc = 24.2dBuV (calc. amp.)
2484.267	29.9	-0.8	1.5	258.0	0.0	20.0	Vert	PK	0.0	49.1	74.0	-24.9	DTS, EUT on Side, Ant on Side: Fund 63.7dBuV + -33.8dBc = 29.9dBuV (calc. amp.)
2484.040	28.5	-0.8	1.5	317.0	0.0	20.0	Horz	PK	0.0	47.7	74.0	-26.3	DTS, EUT Vert, Ant Vert: Fund 61.7dBuV + -33.2dBc = 28.5dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

DTS, EUT on Side, Ant on Side

PSA-ESCI 2020.06.24.2





DTS, EUT Vert, Ant Vert

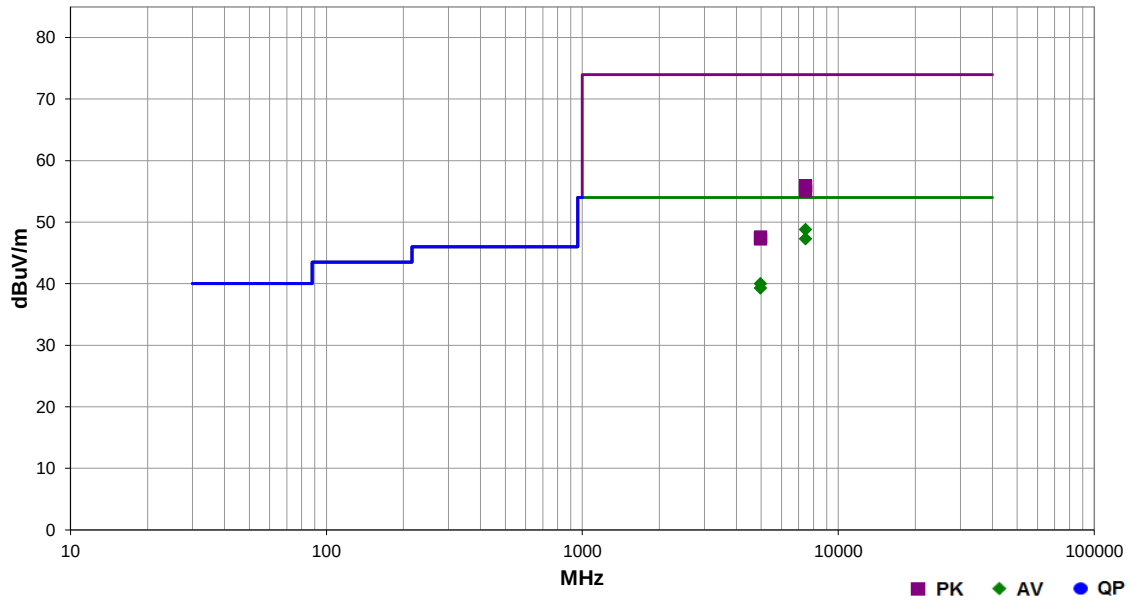
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	36.4% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1006 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 8, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	108	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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
7446.703	30.6	15.0	1.0	26.0	3.2	0.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch., EUT on Side, Ant on Side
7446.617	29.1	15.0	1.6	31.0	3.2	0.0	Vert	AV	0.0	47.3	54.0	-6.7	High Ch., EUT Vert, Ant Vert
4963.940	27.3	9.5	3.3	4.0	3.2	0.0	Horz	AV	0.0	40.0	54.0	-14.0	High Ch., EUT on Side, Ant on Side
4964.093	26.6	9.5	1.7	226.0	3.2	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch., EUT Vert, Ant Vert
7445.197	40.9	15.0	1.0	26.0	0.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	High Ch., EUT on Side, Ant on Side
7446.920	40.1	15.0	1.6	31.0	0.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	High Ch., EUT Vert, Ant Vert
4964.030	38.1	9.5	3.3	4.0	0.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	High Ch., EUT on Side, Ant on Side
4964.143	37.8	9.5	1.7	226.0	0.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	High Ch., EUT Vert, Ant Vert

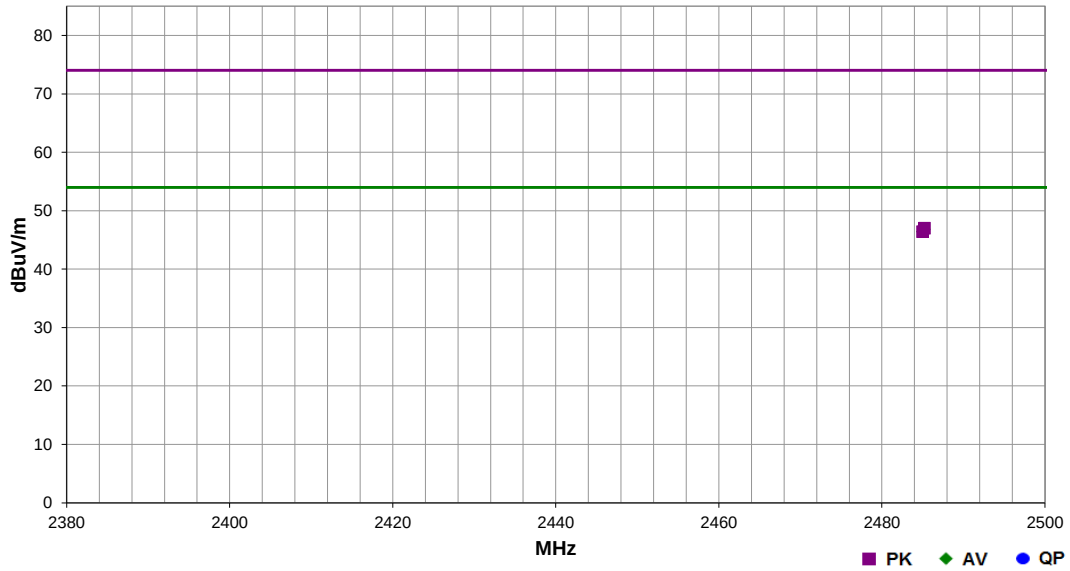
SPURIOUS RADIATED EMISSIONS

EmiR5 2020.12.09.0 PSA-ESCI 2020.06.24.2

Work Order:	SYNA0313	**Date:**	2020-12-16		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	NC01	**Humidity:**	36.4% RH		
Serial Number:	Rev. 10 - 007	**Barometric Pres.:**	1006 mbar	**Tested by:**	Brian Fahey
EUT:	RadioNode				
Configuration:	2				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	None				
EUT Power:	24VDC via 120VAC/60Hz				
Operating Mode:	DTS Tx, Port 8, Ant Cable A2, Antenna PN: MA510.C.CG.005, GFSK, Packet Length = 63, PRBS9, 1 Mbps, Single Channel = 2482 MHz. Power setting = 4 dBm.				
Deviations:	None				
Comments:	See comments below for Channel, EUT orientations. Step 8, spot check based on the client's test plan. The worst case EUT orientations were used from previous testing. The provided test software configured the radio with a duty cycle of 47.8% . Per ANSI C63.10 test methods, the RMS data was corrected with a carrier duty cycle correction factor (DCCF) of 3.2 dB. DCCF (dB) = 10*log(1/0.478). Final product output power setting will not exceed 0 dBm.				

Test Specifications	**Test Method**
FCC 15.247:2020	ANSI C63.10:2013

Run #	109	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

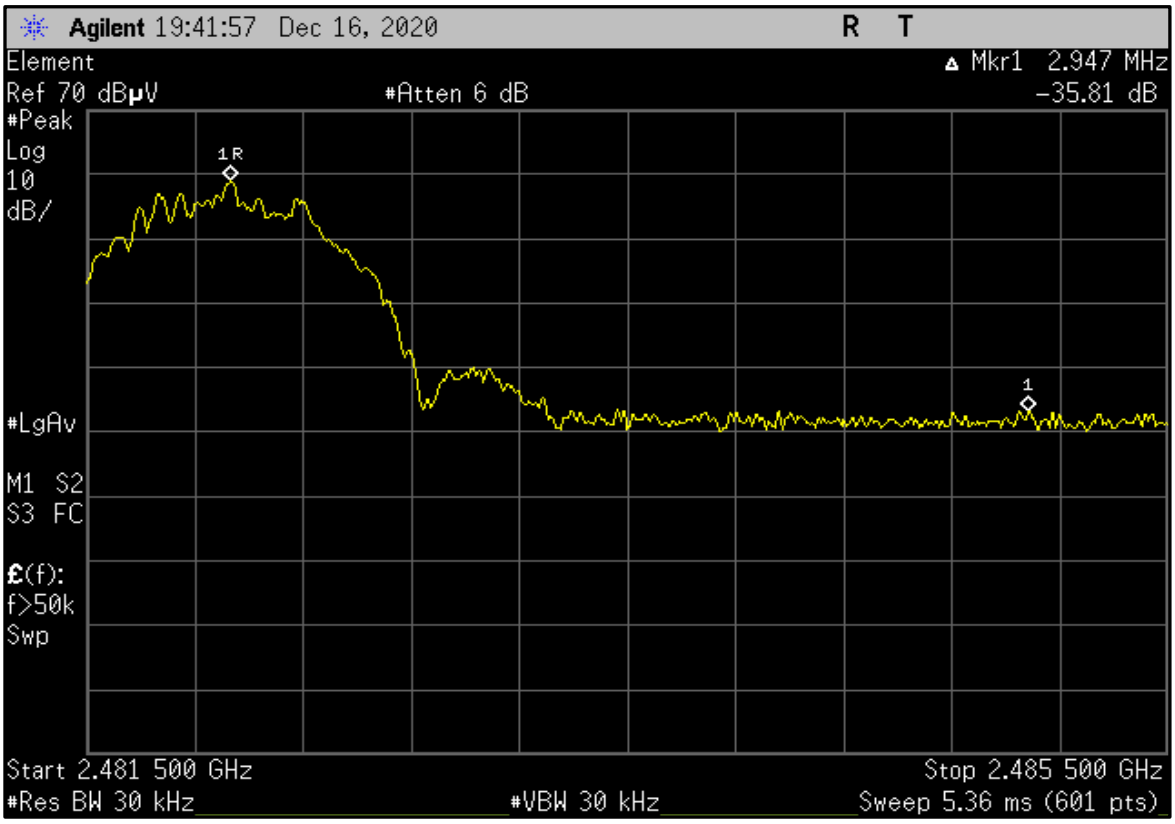


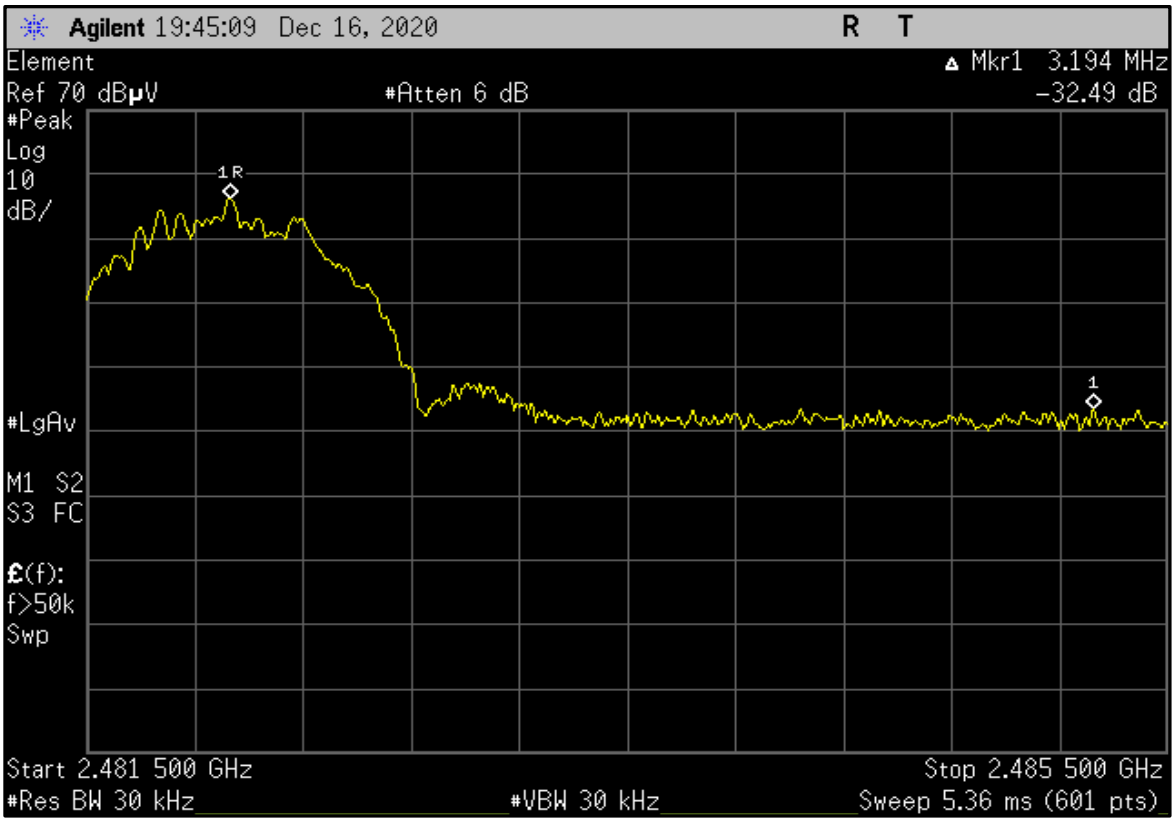
Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.227	24.4	-0.8	1.4	285.0	3.2	20.0	Vert	AV	0.0	46.8	54.0	-7.2	High Ch., EUT on Side, Ant on Side: Fund 56.9dBuV + -32.5dBc = 24.4dBuV (calc. amp.)
2484.980	24.0	-0.8	1.5	314.0	3.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	High Ch., EUT Vert, Ant Vert: Fund 59.8dBuV + -35.8dBc = 24.0dBuV (calc. amp.)
2485.227	27.8	-0.8	1.4	285.0	0.0	20.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch., EUT on Side, Ant on Side: Fund 60.3dBuV + -32.5dBc = 27.8dBuV (calc. amp.)
2484.980	27.2	-0.8	1.5	314.0	0.0	20.0	Horz	PK	0.0	46.4	74.0	-27.6	High Ch., EUT Vert, Ant Vert: Fund 63.0dBuV + -35.8dBc = 27.2dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

High Ch., EUT Vert, Ant Vert

PSA-ESCI 2020.06.24.2





High Ch., EUT on Side, Ant on Side