NORTHWEST EMC

Walt Disney Parks and Resorts US, Inc.

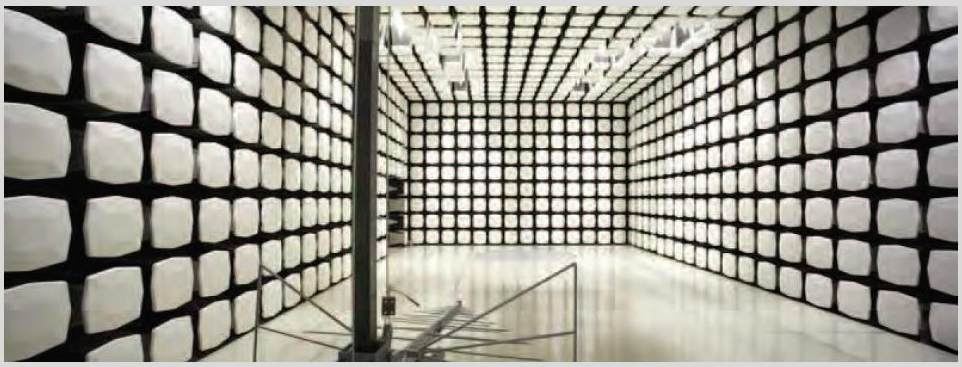
TPv2 (DAP 2)

FCC 15.207:2016

FCC 15.247:2016

902 – 928 MHz UHF RFID Transceiver

Report # SYNA0194.7



NVLAP TESTING

NVLAP Lab Code: 200630-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: September 14, 2016
Walt Disney Parks and Resorts US, Inc.
Model: TPv2 (DAP 2)

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2016	ANSI C63.10:2013
FCC 15.247:2016	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC - Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	No	N/A	See CKC Test Report #93909-18B
7.8.2	Carrier Frequency Separation	No	N/A	
7.8.3	Number of Hopping Frequencies	No	N/A	
7.8.4	Dwell Time	No	N/A	
7.8.5	Output Power	Yes	Pass	
7.8.6	Band Edge Compliance	No	N/A	See CKC Test Report #93909-18B
7.8.6	Band Edge Compliance - Hopping Mode	No	N/A	
7.8.7	Occupied Bandwidth	No	N/A	
7.8.8	Spurious Conducted Emissions	No	N/A	
11.10.2	Power Spectral Density	No	N/A	

Deviations From Test Standards

None

Approved By:

Rod Munro, 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.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2016.7.25

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 Northwest EMC 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). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Validated by the European Commission as a Notified Body under the R&TTE Directive.

Australia/New Zealand

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

Korea

MSIP / 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:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

MEASUREMENT UNCERTAINTY

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.

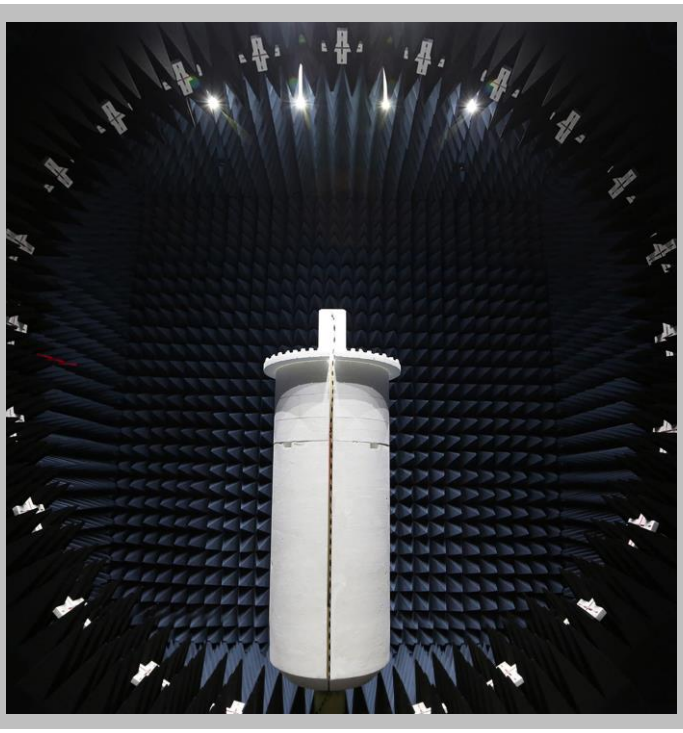
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

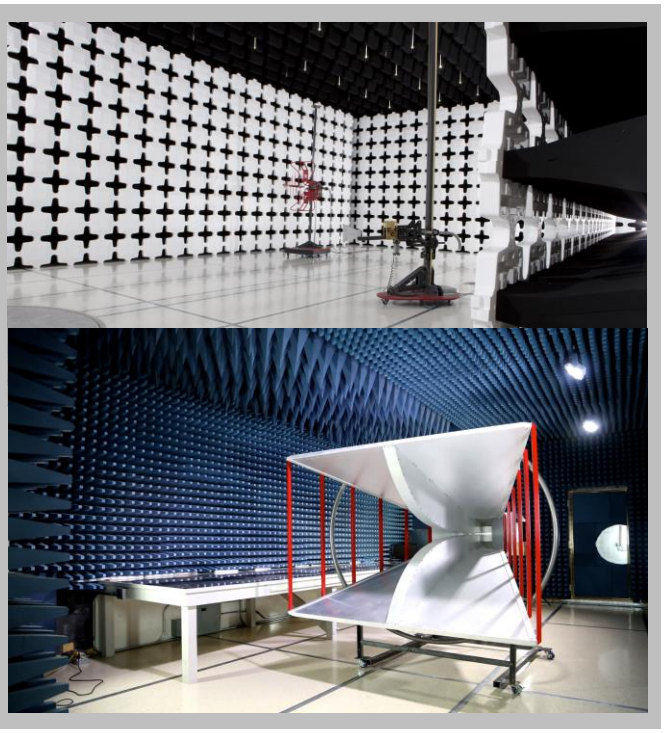
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

FACILITIES

REV 2016.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy 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: 200761-0	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	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157





PRODUCT DESCRIPTION

2014-12-10

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:	Brian Piquette of Synapse Product Development LLC
Model:	TPv2 (DAP 2)
First Date of Test:	September 06, 2016
Last Date of Test:	September 14, 2016
Receipt Date of Samples:	August 31, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Multi-ticket media reader with Ethernet network interface Device containing an HF RFID reader (ISO 14443), UHF RFID Reader (ISO 18000), BT/BLE Radio, and proprietary 2.4GHz DTS radio.

Testing Objective:
Seeking to demonstrate compliance of the 915 MHz UHF RFID radio to FCC 15.247 requirements.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration SYNA0194- 4

Software/Firmware Running during test	
Description	**Version**
UHFTool (900 MHz)	0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Point	Walt Disney Parks and Resorts US, Inc.	TPv2	850-1631035

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable	No	.5m	No	Access Point	DC Power Supply

Configuration SYNA0194- 6

Software/Firmware Running during test	
Description	**Version**
LRR Firmware (2.4 GHz)	0.10F

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Point	Walt Disney Parks and Resorts US, Inc.	TPv2	850-1631028

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Point Fixture	Walt Disney Parks and Resorts US, Inc.	310-019778-Rev-01	No
Scanner	Zebra	SE4710	Unknown

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
POE Injector	Unknown	Unknown	Unknown
Laptop	Apple	Macbook Air	C02NP2WDG5RQ

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	6m	No	Access Point	POE Injector
USB Cable	Yes	1m	No	Access Point	Scanner
Ethernet Cable	No	1m	No	POE Injector	Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration SYNA0194- 7

Software/Firmware Running during test	
Description	**Version**
UHFTool (900 MHz)	0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Piont	Walt Disney Parks and Resorts US, Inc.	TPv2	850-1631004

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Access Point Fixture	Walt Disney Parks and Resorts US, Inc.	310-019778-Rev-01	No
Scanner	Zebra	SE4710	Unknown

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
POE Injector	Unknown	Unknown	Unknown
Laptop	Apple	Macbook Air	C02NP2WDG5RQ
DC Power Supply	Topward Electronics	TPS-2000	TPD

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable	No	.5m	No	Access Point	DC Power Supply
Ethernet Cable	No	6m	No	Access Point	POE Injector
USB Cable	Yes	1m	No	Access Point	Scanner
Ethernet Cable	No	1m	No	POE Injector	Laptop
AC Power	No	2.5m	No	DC Power Supply	AC mains

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/6/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	9/12/2016	AC – Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	9/14/2016	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

AC POWERLINE CONDUCTED EMISSIONS

WTD.2016.05.18

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	5/10/2016	5/10/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	1/27/2015	1/27/2017
Receiver	Rohde & Schwarz	ESCI	ARH	3/21/2016	3/21/2017
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

SYNA0194-6

MODES INVESTIGATED

Transmit, 900 MHz

AC POWERLINE CONDUCTED EMISSIONS

EUT:	TPv2 (DAP 2)	Work Order:	SYNA0194
Serial Number:	850-1631004	Date:	09/12/2016
Customer:	Synapse Product Development LLC	Temperature:	23.3°C
Attendees:	None	Relative Humidity:	40.5%
Customer Project:	None	Bar. Pressure:	1022 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	24 VDC	Configuration:	SYNA0194-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

face plate # 3691-3605.

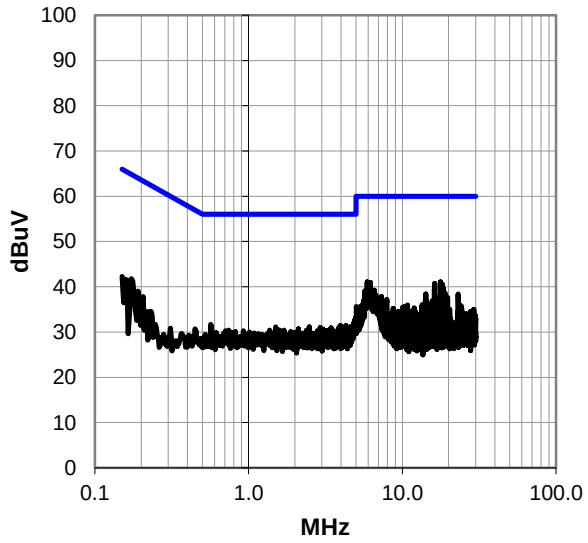
EUT OPERATING MODES

Transmit, UHF Radio 915.250 MHz

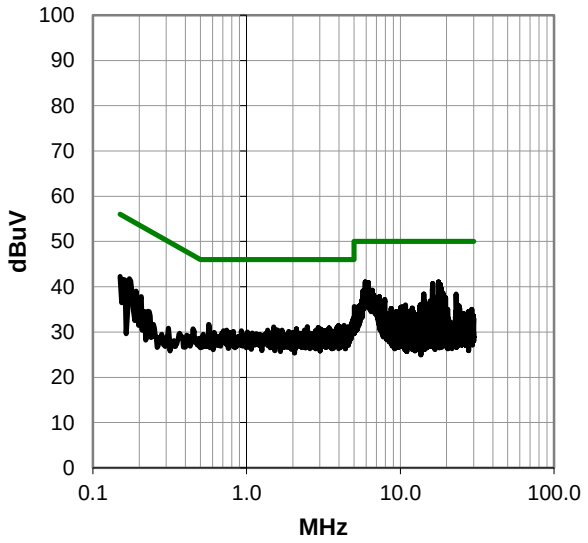
DEVIATIONS FROM TEST STANDARD

None.

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #9

Peak Data - vs - Quasi Peak Limit

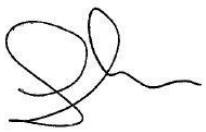
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.910	21.0	20.1	41.1	60.0	-18.9
17.692	20.5	20.6	41.1	60.0	-18.9
6.209	20.8	20.1	40.9	60.0	-19.1
6.022	20.6	20.1	40.7	60.0	-19.3
16.230	20.3	20.4	40.7	60.0	-19.3
18.241	19.9	20.6	40.5	60.0	-19.5
6.183	20.2	20.1	40.3	60.0	-19.7
18.304	19.2	20.6	39.8	60.0	-20.2
18.364	19.1	20.7	39.8	60.0	-20.2
16.166	19.2	20.4	39.6	60.0	-20.4
6.563	19.1	20.1	39.2	60.0	-20.8
5.728	19.0	20.1	39.1	60.0	-20.9
6.407	19.0	20.1	39.1	60.0	-20.9
18.912	18.0	20.7	38.7	60.0	-21.3
6.470	18.4	20.1	38.5	60.0	-21.5
14.211	18.0	20.4	38.4	60.0	-21.6
23.124	17.6	20.8	38.4	60.0	-21.6
6.664	18.1	20.1	38.2	60.0	-21.8
6.701	18.1	20.1	38.2	60.0	-21.8
18.487	17.5	20.7	38.2	60.0	-21.8
6.806	17.7	20.1	37.8	60.0	-22.2
7.313	17.7	20.1	37.8	60.0	-22.2
17.935	17.2	20.6	37.8	60.0	-22.2
17.080	17.1	20.6	37.7	60.0	-22.3
19.707	16.9	20.7	37.6	60.0	-22.4
7.921	17.1	20.1	37.2	60.0	-22.8

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.910	21.0	20.1	41.1	50.0	-8.9
17.692	20.5	20.6	41.1	50.0	-8.9
6.209	20.8	20.1	40.9	50.0	-9.1
6.022	20.6	20.1	40.7	50.0	-9.3
16.230	20.3	20.4	40.7	50.0	-9.3
18.241	19.9	20.6	40.5	50.0	-9.5
6.183	20.2	20.1	40.3	50.0	-9.7
18.304	19.2	20.6	39.8	50.0	-10.2
18.364	19.1	20.7	39.8	50.0	-10.2
16.166	19.2	20.4	39.6	50.0	-10.4
6.563	19.1	20.1	39.2	50.0	-10.8
5.728	19.0	20.1	39.1	50.0	-10.9
6.407	19.0	20.1	39.1	50.0	-10.9
18.912	18.0	20.7	38.7	50.0	-11.3
6.470	18.4	20.1	38.5	50.0	-11.5
14.211	18.0	20.4	38.4	50.0	-11.6
23.124	17.6	20.8	38.4	50.0	-11.6
6.664	18.1	20.1	38.2	50.0	-11.8
6.701	18.1	20.1	38.2	50.0	-11.8
18.487	17.5	20.7	38.2	50.0	-11.8
6.806	17.7	20.1	37.8	50.0	-12.2
7.313	17.7	20.1	37.8	50.0	-12.2
17.935	17.2	20.6	37.8	50.0	-12.2
17.080	17.1	20.6	37.7	50.0	-12.3
19.707	16.9	20.7	37.6	50.0	-12.4
7.921	17.1	20.1	37.2	50.0	-12.8

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	TPv2 (DAP 2)	Work Order:	SYNA0194
Serial Number:	850-1631004	Date:	09/12/2016
Customer:	Synapse Product Development LLC	Temperature:	23.3°C
Attendees:	None	Relative Humidity:	40.5%
Customer Project:	None	Bar. Pressure:	1022 mb
Tested By:	Jared Ison	Job Site:	EV07
Power:	24 VDC	Configuration:	SYNA0194-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	10	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

face plate # 3691-3605.

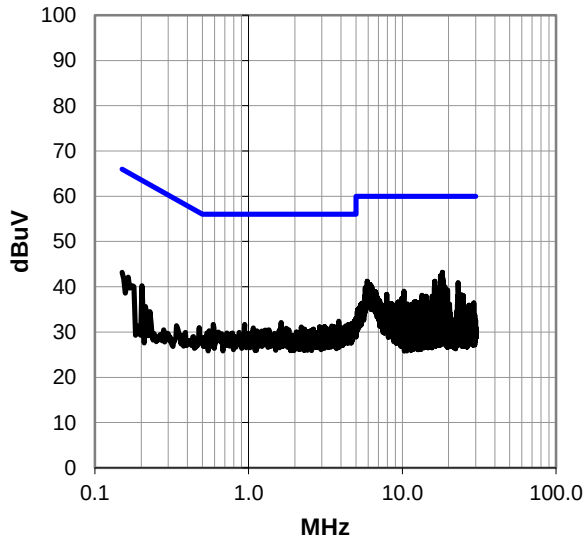
EUT OPERATING MODES

Transmit, UHF Radio 915.250 MHz

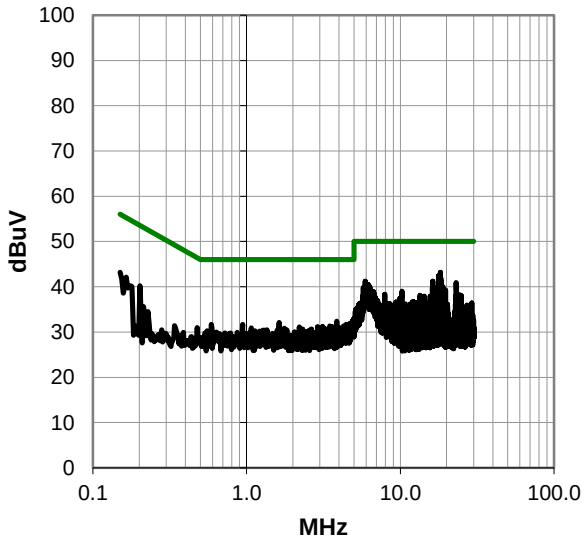
DEVIATIONS FROM TEST STANDARD

None.

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #10

Peak Data - vs - Quasi Peak Limit

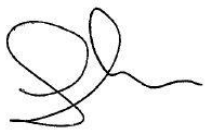
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.241	22.6	20.6	43.2	60.0	-16.8
17.692	21.8	20.6	42.4	60.0	-17.6
18.304	21.3	20.6	41.9	60.0	-18.1
18.364	20.7	20.7	41.4	60.0	-18.6
5.907	21.1	20.1	41.2	60.0	-18.8
16.226	20.8	20.4	41.2	60.0	-18.8
23.124	20.1	20.8	40.9	60.0	-19.1
6.164	20.4	20.1	40.5	60.0	-19.5
6.310	20.0	20.1	40.1	60.0	-19.9
18.912	19.3	20.7	40.0	60.0	-20.0
16.166	19.5	20.4	39.9	60.0	-20.1
5.746	19.7	20.1	39.8	60.0	-20.2
6.332	19.7	20.1	39.8	60.0	-20.2
16.897	19.1	20.6	39.7	60.0	-20.3
5.985	19.3	20.1	39.4	60.0	-20.6
6.399	19.3	20.1	39.4	60.0	-20.6
17.938	18.8	20.6	39.4	60.0	-20.6
18.487	18.6	20.7	39.3	60.0	-20.7
5.873	19.1	20.1	39.2	60.0	-20.8
19.707	18.5	20.7	39.2	60.0	-20.8
10.242	18.8	20.2	39.0	60.0	-21.0
6.701	18.8	20.1	38.9	60.0	-21.1
17.569	18.3	20.6	38.9	60.0	-21.1
5.783	18.7	20.1	38.8	60.0	-21.2
6.511	18.6	20.1	38.7	60.0	-21.3
6.735	18.5	20.1	38.6	60.0	-21.4

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.241	22.6	20.6	43.2	50.0	-6.8
17.692	21.8	20.6	42.4	50.0	-7.6
18.304	21.3	20.6	41.9	50.0	-8.1
18.364	20.7	20.7	41.4	50.0	-8.6
5.907	21.1	20.1	41.2	50.0	-8.8
16.226	20.8	20.4	41.2	50.0	-8.8
23.124	20.1	20.8	40.9	50.0	-9.1
6.164	20.4	20.1	40.5	50.0	-9.5
6.310	20.0	20.1	40.1	50.0	-9.9
18.912	19.3	20.7	40.0	50.0	-10.0
16.166	19.5	20.4	39.9	50.0	-10.1
5.746	19.7	20.1	39.8	50.0	-10.2
6.332	19.7	20.1	39.8	50.0	-10.2
16.897	19.1	20.6	39.7	50.0	-10.3
5.985	19.3	20.1	39.4	50.0	-10.6
6.399	19.3	20.1	39.4	50.0	-10.6
17.938	18.8	20.6	39.4	50.0	-10.6
18.487	18.6	20.7	39.3	50.0	-10.7
5.873	19.1	20.1	39.2	50.0	-10.8
19.707	18.5	20.7	39.2	50.0	-10.8
10.242	18.8	20.2	39.0	50.0	-11.0
6.701	18.8	20.1	38.9	50.0	-11.1
17.569	18.3	20.6	38.9	50.0	-11.1
5.783	18.7	20.1	38.8	50.0	-11.2
6.511	18.6	20.1	38.7	50.0	-11.3
6.735	18.5	20.1	38.6	50.0	-11.4

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22

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

Tx continuous, Low Ch. 902.750 MHz PRASK SRD
Tx continuous, Mid Ch. 915.250 MHz PRASK SRD
Tx continuous, High Ch. 927.250 MHz PRASK SRD

POWER SETTINGS INVESTIGATED

POE
24VDC

CONFIGURATIONS INVESTIGATED

SYNA0194 - 7

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 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
Cable	None	Standard Gain Horns Cable	EVF	3/11/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	3/11/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Attenuator	Coaxicom	3910-20	AXZ	5/18/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	HFV	3/22/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFB	5/18/2016	12 mo
Cable	N/A	Double Ridge Horn Cables	EVB	3/11/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	3/11/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2/3/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	3/11/2016	12 mo
Cable	N/A	Bilog Cables	EVA	3/11/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AXR	6/30/2016	24 mo

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

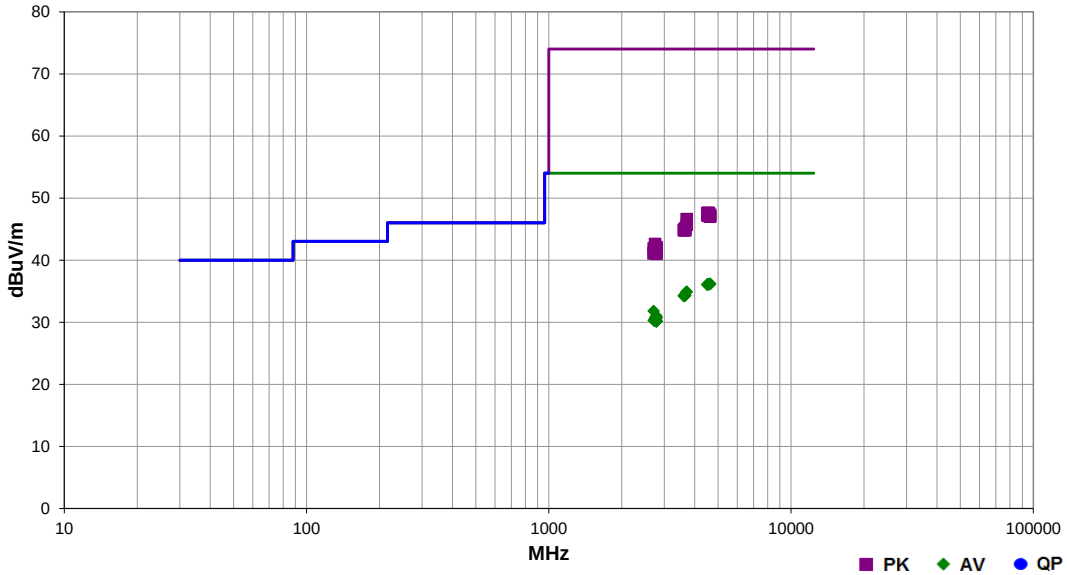
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.07.22.1

Work Order:	SYNA0194	**Date:**	09/06/16		
Project:	None	**Temperature:**	22.9 °C		
Job Site:	EV01	**Humidity:**	46% RH		
Serial Number:	850-1631004	**Barometric Pres.:**	1017 mbar	**Tested by:**	Brandon Hobbs
EUT:	TPv2 (DAP 2)				
Configuration:	7				
Customer:	Walt Disney Parks and Resorts US, Inc.				
Attendees:	Hattie Spetla				
EUT Power:	Please refer to EUT comments				
Operating Mode:	Tx continuous, PRASK Modulation SRD, Please reference the data comments for more specific operating modes.				
Deviations:	None				
Comments:	Face Plate # 3691-3605. Please reference the data comments for frequency, channel and EUT orientation. Extra USB and I/O ports are not used. Futher, they are not customer accessible. Can be powered by either POE or 24VDC.				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	22	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4637.635	27.5	8.7	2.2	31.0	3.0	0.0	Vert	AV	0.0	36.2	54.0	-17.8	High Ch. 927.250MHz, POE, EUT Horz
4637.515	27.4	8.7	1.1	69.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	High Ch. 927.250MHz, POE, EUT Vert
4577.525	27.5	8.6	1.0	84.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	Mid Ch. 915.250MHz, POE, EUT Vert
4577.640	27.5	8.6	1.0	0.0	3.0	0.0	Vert	AV	0.0	36.1	54.0	-17.9	Mid Ch. 915.250MHz, POE, EUT Horz
4514.150	27.6	8.5	3.5	108.0	3.0	0.0	Vert	AV	0.0	36.1	54.0	-17.9	Low Ch. 902.750MHz, POE, EUT Horz
4514.345	27.5	8.5	1.0	17.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	High Ch. 902.750MHz, POE, EUT Vert
3707.825	28.4	6.5	1.0	45.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	High Ch. 927.250MHz, POE, EUT Vert
3708.265	28.4	6.5	1.7	360.0	3.0	0.0	Vert	AV	0.0	34.9	54.0	-19.1	High Ch. 927.250MHz, POE, EUT Horz
3662.030	28.1	6.2	1.5	124.0	3.0	0.0	Horz	AV	0.0	34.3	54.0	-19.7	Mid Ch. 915.250MHz, POE, EUT Vert
3661.435	28.1	6.2	1.0	146.0	3.0	0.0	Vert	AV	0.0	34.3	54.0	-19.7	Mid Ch. 915.250MHz, POE, EUT Horz
3610.135	28.3	6.0	1.5	157.0	3.0	0.0	Vert	AV	0.0	34.3	54.0	-19.7	Low Ch. 902.750MHz, POE, EUT Horz
3610.115	28.2	6.0	1.0	127.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Low Ch. 902.750MHz, POE, EUT Vert
2708.280	31.8	0.0	1.0	112.0	3.0	0.0	Vert	AV	0.0	31.8	54.0	-22.2	Low Ch. 902.750MHz, POE, EUT Horz
2781.755	30.7	0.3	1.1	47.0	3.0	0.0	Vert	AV	0.0	31.0	54.0	-23.0	High Ch. 927.250MHz, POE, EUT Horz
2781.855	30.5	0.3	2.8	64.0	3.0	0.0	Horz	AV	0.0	30.8	54.0	-23.2	High Ch. 927.250MHz, POE, EUT Vert
2781.750	30.5	0.3	1.0	48.0	3.0	0.0	Vert	AV	0.0	30.8	54.0	-23.2	High Ch. 927.250MHz, 24VDC, EUT Horz
2745.580	30.6	0.1	3.3	314.0	3.0	0.0	Horz	AV	0.0	30.7	54.0	-23.3	Mid Ch. 915.250MHz, POE, EUT Vert
2781.645	30.3	0.3	2.4	198.0	3.0	0.0	Horz	AV	0.0	30.6	54.0	-23.4	High Ch. 927.250MHz, POE, EUT On Side
2708.555	30.2	0.1	1.0	28.0	3.0	0.0	Horz	AV	0.0	30.3	54.0	-23.7	Low Ch. 902.750MHz, POE, EUT Vert
2782.475	29.9	0.3	1.0	99.0	3.0	0.0	Vert	AV	0.0	30.2	54.0	-23.8	High Ch. 927.250MHz, POE, EUT Vert
2782.610	29.9	0.3	1.0	176.0	3.0	0.0	Horz	AV	0.0	30.2	54.0	-23.8	High Ch. 927.250MHz, POE, EUT Horz
2744.675	30.1	0.1	3.2	185.0	3.0	0.0	Vert	AV	0.0	30.2	54.0	-23.8	Mid Ch. 915.250MHz, POE, EUT Vert
2782.195	29.8	0.3	1.0	193.0	3.0	0.0	Vert	AV	0.0	30.1	54.0	-23.9	High Ch. 927.250MHz, POE, EUT On Side
2783.035	29.8	0.3	1.0	194.0	3.0	0.0	Horz	AV	0.0	30.1	54.0	-23.9	High Ch. 927.250MHz, 24VDC, EUT Vert
4574.900	39.1	8.5	1.0	84.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Mid Ch. 915.250MHz, POE, EUT Vert
4515.115	39.1	8.5	1.0	17.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Low Ch. 902.750MHz, POE, EUT Vert
4636.920	38.6	8.7	1.1	69.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	High Ch. 927.250MHz, POE, EUT Vert
4513.925	38.7	8.5	3.5	108.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Low Ch. 902.750MHz, POE, EUT Horz
4576.730	38.5	8.6	1.0	0.0	3.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	Mid Ch. 915.250MHz, POE, EUT Horz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4635.270	38.3	8.7	2.2	31.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	High Ch. 927.250MHz, POE, EUT Horz
3709.465	40.1	6.5	1.0	45.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	High Ch. 927.250MHz, POE, EUT Vert
3708.385	39.2	6.5	1.7	360.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	High Ch. 927.250MHz, POE, EUT Horz
3660.810	38.9	6.2	1.0	146.0	3.0	0.0	Vert	PK	0.0	45.1	74.0	-28.9	Mid Ch. 915.250MHz, POE, EUT Horz
3611.525	38.9	6.0	1.5	157.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	Low Ch. 902.750MHz, POE, EUT Horz
3661.035	38.6	6.2	1.5	124.0	3.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	Mid Ch. 915.250MHz, POE, EUT Vert
3611.815	38.8	6.0	1.0	127.0	3.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	Low Ch. 902.750MHz, POE, EUT Vert
2746.495	42.5	0.1	3.2	185.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	Mid Ch. 915.250MHz, POE, EUT Horz
2781.630	41.8	0.3	2.8	64.0	3.0	0.0	Horz	PK	0.0	42.1	74.0	-31.9	High Ch. 927.250MHz, POE, EUT Vert
2780.540	41.6	0.3	1.0	48.0	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	High Ch. 927.250MHz, 24VDC, EUT Horz
2708.855	41.8	0.1	1.0	112.0	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	Low Ch. 902.750MHz, POE, EUT Horz
2781.740	41.5	0.3	1.0	193.0	3.0	0.0	Vert	PK	0.0	41.8	74.0	-32.2	High Ch. 927.250MHz, POE, EUT On Side
2781.675	41.2	0.3	2.4	198.0	3.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	High Ch. 927.250MHz, POE, EUT On Side
2781.200	41.2	0.3	1.0	176.0	3.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	High Ch. 927.250MHz, POE, EUT Horz
2781.735	41.1	0.3	1.1	47.0	3.0	0.0	Vert	PK	0.0	41.4	74.0	-32.6	High Ch. 927.250MHz, POE, EUT Horz
2782.995	41.0	0.3	1.0	99.0	3.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	High Ch. 927.250MHz, POE, EUT Vert
2745.635	41.1	0.1	3.3	314.0	3.0	0.0	Horz	PK	0.0	41.2	74.0	-32.8	Mid Ch. 915.250MHz, POE, EUT Vert
2707.180	41.1	0.0	1.0	28.0	3.0	0.0	Horz	PK	0.0	41.1	74.0	-32.9	Low Ch. 902.750MHz, POE, EUT Vert
2783.195	40.7	0.3	1.0	194.0	3.0	0.0	Horz	PK	0.0	41.0	74.0	-33.0	High Ch. 927.250MHz, 24VDC, EUT Vert

OUTPUT POWER

XMit 2016.05.06

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	S.M. Electronics	SA26B-20	AUY	6/27/2016	6/27/2017
Block - DC	Pasternack	PE8210	AME	10/1/2015	10/1/2016
Cable	ESM Cable Corp.	TT	EV1	NCR	NCR
Generator - Signal	Keysight	N5182B	TFU	10/27/2015	10/27/2018
Meter - Multimeter	Tektronix	DMM912	MMH	2/17/2016	2/17/2019
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	8/10/2016	8/10/2017

TEST DESCRIPTION

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

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2016.05.06

EUT:	TPv2 (DAP 2)			**Work Order:**	SYNA0194
Serial Number:	850-1631035			**Date:**	09/14/16
Customer:	Walt Disney Parks and Resorts US, Inc.			**Temperature:**	22.5 °C
Attendees:	None			**Humidity:**	37.4% RH
Project:	None			**Barometric Pres.:**	1020 mbar
Tested by:	Jared Ison	**Power:**	24 VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

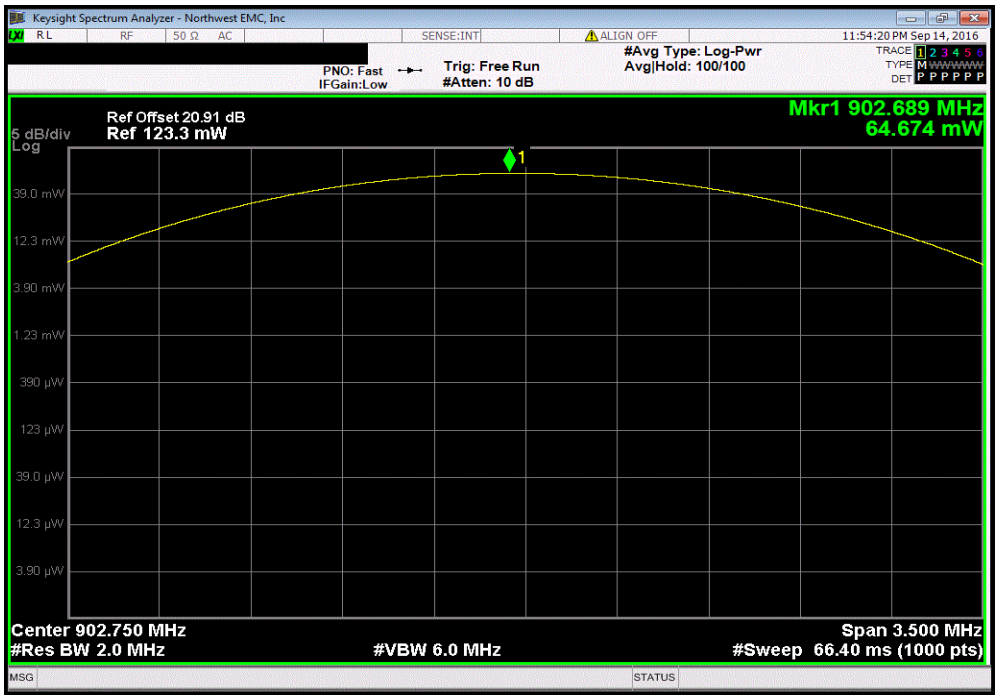
DEVIATIONS FROM TEST STANDARD

None

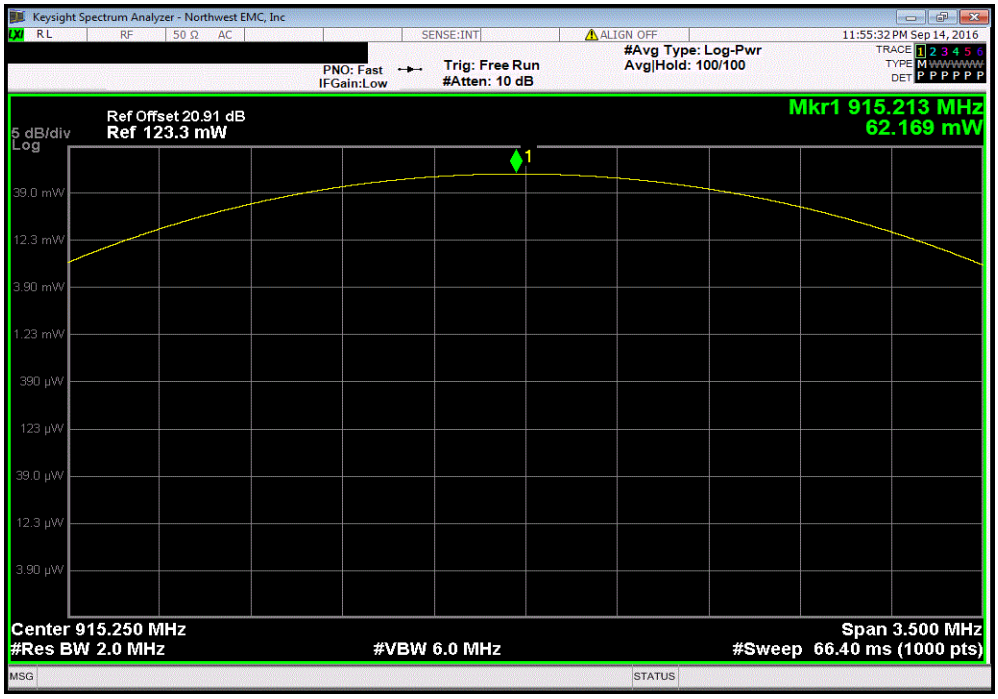
Configuration #	4	Signature

		Value	Limit (<)	Result
902 - 928 MHz Band				
	ASK			
	Low Ch. 902.750 MHz	64.674 mW	1 W	Pass
	Mid Ch., 915.250 MHz	62.169 mW	1 W	Pass
	High Ch., 927.250 MHz	58.859 mW	1 W	Pass

902 - 928 MHz Band, ASK, Low Ch. 902.750 MHz						
				Value	Limit (<)	Result
				64.674 mW	1 W	Pass



902 - 928 MHz Band, ASK, Mid Ch., 915.250 MHz						
				Value	Limit (<)	Result
				62.169 mW	1 W	Pass



OUTPUT POWER

XMit 2016.05.06

902 - 928 MHz Band, ASK, High Ch., 927.250 MHz						
				Value	Limit (<)	Result
				58.859 mW	1 W	Pass