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ELECTROMAGNETIC COMPATIBILITY TEST REPORT

PREPARED FOR TANTALUS SYSTEMS CORP.
BY QAI LABORATORIES

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Laboratory Accreditations (per ISO/IEC 17025:2005):

American Association for Laboratory Accreditation Certificate Number: 3657.02

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EMC Client:	Tantalus Systems Corp.
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Applicable Test Standards:	FCC Title 47 CFR Part 15: Subpart B FCC Title 47 CFR Part 15: Subpart C ICES-003 Issue 6 RSS-247 Issue 2 RSS-Gen Issue 4

Equipment Tested	SC-5410A
Tantalus Part Number:	100-0183-K
FCC ID:	OZFSC5411A
IC Certification Number:	3669A-SC5411A
Manufacturer:	Tantalus Systems Corp.

REVISION HISTORY

Date	Report Number	Rev #	Details	Author's Initials
May 23, 2017	E10402-1703_SC-5411A	0.0	Initial Release	HZ
May 23, 2017	E10402-1703_SC-5420B	1.0	Signed Release	HZ
June 12, 2017	E10402-1703_SC-5420B	2.0	Data Update -AC Conducted Emissions -Unintentional Radiated Emissions	HZ
June 13, 2017	E10402-1703_SC-5410A	3.0	Part No. Correction	HZ
June 21, 2017	E10402-1703_SC-5410A	4.0	Report update as per TCB review	HZ

All previous versions of this report have been superseded by the latest dated revision as listed in the above table. Please dispose of all previous electronic and paper printed revisions accordingly.

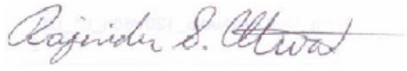
REPORT AUTHORIZATION

The data documented in this report is for the test equipment provided by Tantalus Systems Corp. Tests were conducted on the sample equipment as requested by Tantalus Systems Corp. for the purpose of demonstrating compliance with FCC Title 47 CFR Part 15: Subpart B, FCC Title 47 CFR Part 15: Subpart C, ICES-003 Issue 6, RSS-247 Issue 2, and RSS-Gen Issue 4 as agreed upon by Tantalus Systems Corp. as per Quote 17SH02082.

Tantalus Systems Corp. is responsible for the tested product configuration, continued product compliance, and for the appropriate auditing of subsequent products as required. This report may comprise partial list of tests that are required for FCC and IC Declaration of Conformity and can only be produced by the manufacturer.

This is to certify that the following report is true and correct to the best of our knowledge.

Written by HP Enriquez
EMC Technical Writer



Tested by Raj Atwal
EMC Engineer

Reviewed by Aman Jathaul
EMC Engineering Manager

Approved by Parminder Singh
Director for the EMC Department

QAI FACILITIES

Founded in 1994 by a group of experienced certification and testing experts, QAI is an independent third-party testing, inspection and certification organization which serves the building industry, government and individuals with cost effective solutions through our in-house capabilities / services, and an established world-wide network of qualified affiliates. To help get your product to market, trust the provider that many leading global manufacturers do: QAI.

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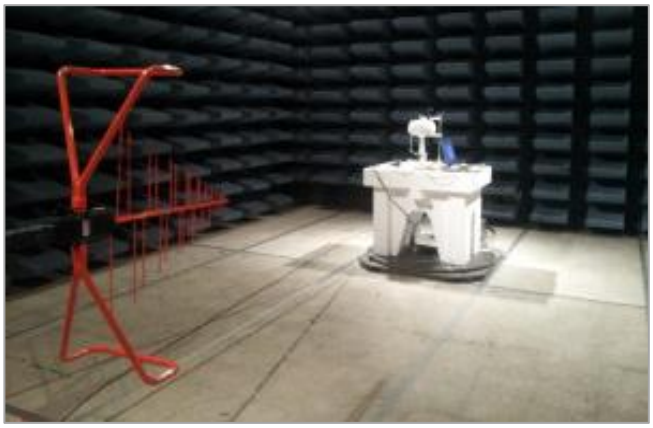
QAI EMC ACCREDITATION

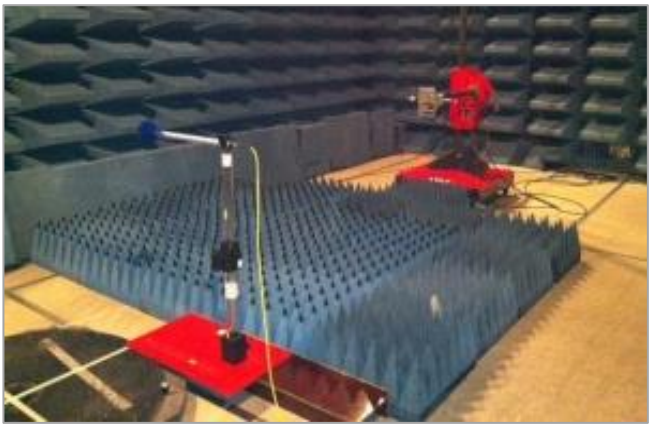
QAI EMC is your one-stop regulatory compliance partner for electromagnetic compatibility (EMC) and electromagnetic interference (EMI). Products are tested to the latest and applicable EMC/EMI requirements for domestic and international markets. QAI EMC goes above and beyond being a testing facility—we are your regulatory compliance partner. QAI EMC has the capability to perform RF Emissions and Immunity for all types of electronics manufacturing including Industrial, Scientific, Medical, Information Technology, Telecom, Wireless, Automotive, Marine and Avionics.

EMC Laboratory Location	FCC Designation (3m SAC)	IC Registration (3m SAC)	A2LA Certificate
Burnaby, BC Canada	CA9543	21146-1	3657.02

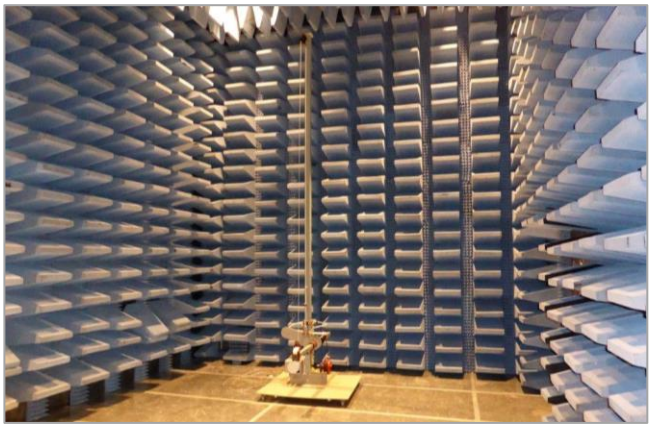
Headquarters & EMC Laboratory in Burnaby, BC



Chamber 1- 3m Semi-Anechoic Chamber (SAC) in Burnaby, BC



Chamber 1- 3m Semi-Anechoic Chamber (SAC) in Burnaby, BC



Chamber 2- 3m Semi-Anechoic Chamber (SAC) in Burnaby, BC

Chamber 2- 3m Semi-Anechoic Chamber (SAC) in Burnaby, BC

10m Open Area Test Site (OATS) in British Columbia, Canada

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Section I: EXECUTIVE SUMMARY

1.1 Purpose

The purpose of this report is to demonstrate and document the compliance of "SC-5410A" as per Sections 1.2 & 1.3 of this report.

1.2 Scope

The information documented in this report is based on the test methods and levels as per Quote 17SH02082:

- **FCC CFR 47 Part 15 –** Radio Frequency Devices, Subpart B – Unintentional Radiators
- **FCC CFR 47 Part 15 –** Radio Frequency Devices, Subpart C – Intentional Radiators
    - 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5875 MHz
- **ICES-003 Issue 6 –** Information Technology Equipment (Including Digital Apparatus) - Limits and Methods of Measurement
- **RSS-247 Issue 2 –** Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
- **RSS-Gen Issue 4 –** General Requirements and Information for the Certification of Radio Apparatus

The tests documented in this report were performed in accordance with ANSI C63.4-2014, ANSI C63.10-2013, RSS-Gen Issue 4 and FCC KDB 558074 D01 DTS Meas Guidance v04.

1.3 Summary of Results

The following tests demonstrate the testimony to "FCC and IC" Mark Electromagnetic compatibility testing for "SC-5410A" manufactured by Tantalus Systems Corp.

The following testing was performed pursuant to the FCC and IC Radio and RF Emissions Standards:

Test or Measurement	Applicable FCC and IC Standard	Clause	Result
AC Mains Conducted Emissions	FCC Title 47 CFR Part 15: Subpart C	§15.207	Complies
Unintentional Radiated Spurious Emissions	FCC Title 47 CFR Part 15: Subpart B	§15.109	Complies
	ICES-003 Issue 6 RSS-Gen Issue 4	6.2 7.1	
Intentional Radiated Spurious Emissions	FCC Title 47 CFR Part 15: Subpart C	§15.209 §15.205	Complies
	RSS-Gen Issue 4	8.9 8.10	
Antenna Requirement	FCC Title 47 CFR Part 15: Subpart C	§15.203	Complies
	RSS-Gen Issue 4	8.3	
RF Peak Power Output	FCC Title 47 CFR Part 15: Subpart C	§15.247 (b)(2)	Complies
	RSS-247 Issue 2	5.4 (1)	
20dB Occupied Bandwidth	FCC Title 47 CFR Part 15: Subpart C	§15.247 (a)(1)(i)	Complies
	RSS-247 Issue 2	5.1 (3)	
Out-of-Band Emissions (Band Edge)	FCC Title 47 CFR Part 15: Subpart C	§15.247 (d)	Complies
	RSS-247 Issue 2	5.5	
Channel Separation	FCC Title 47 CFR Part 15: Subpart C	§15.247 (a)(1)	Complies
	RSS-247 Issue 2	5.1 (2)	
Number of Hopping Channels	FCC Title 47 CFR Part 15: Subpart C	§15.247 (a)(1)(i)	Complies
	RSS-247 Issue 2	5.1 (3)	
Dwell Time	FCC Title 47 CFR Part 15: Subpart C	§15.247 (a)(1)(i)	Complies
	RSS-247 Issue 2	5.1 (3)	
Time Occupancy	FCC Title 47 CFR Part 15: Subpart C	§15.247 (a)(1)(i)	Complies
	RSS-247 Issue 2	5.1 (3)	

Section II: GENERAL INFORMATION

2.1 Product Description

The information provided in this section is for the Equipment Under Test (EUT) and the corresponding Ancillary/Auxiliary Equipment needed to perform the tests as complete system.

Equipment Under Test (EUT) Information

EUT	SC-5410A
Functional Description	Network Interface Card
FCC ID	OZFSC5411A
IC Certification Number	3669A-SC5411A
Manufacturer	Tantalus Systems Corp.
Tantalus Part No.	100-0183-K
Serial No.	002426204E

2.2 Environmental Conditions

The equipment under test was operated and tested under the following environmental conditions:

Parameter	Conditions
Location	Indoors
Temperature	22-28ºC
Relative Humidity	39.7 - 54.4%

2.3 Measurement Uncertainty

Parameter	Uncertainty
Radiated Emissions, 30MHz-1GHz	± 2.40 dB
Radiated Emissions, 1GHz-40GHz	± 2.48 dB
Radio Frequency	±1,5 x 10-5 MHz
Total RF Power Conducted	±1.36 dB
Spurious Emissions, Conducted	±1.36 dB
RF Power Density, Conducted	±1.36 dB
Temperature	±1ºC
Humidity	±5 %
DC and low frequency voltages	±3 %

2.4 Worst Test Case

Worst-case orientation was determined during the preliminary testing. The final radiated emissions were performed in the worst-case orientation.

2.5 Sample Calculations of Emissions Data

Radiated and conducted emissions were performed using EMC32 software developed by Rohdes & Schwarz. Transducer factors like Antenna factors, Cable Losses and Amplifier gains were stored in the test templates which are used to perform the emissions measurements. After test is finished, data is generated from the EMC32 consisting of product details, emission plots and final data tables as shown below.

Frequency (MHz)	Quasi-Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
42.663900	33.0	1000.000	120.000	100.0	H	70.0	13.2	7.5	40.5

Quasi Peak reading shown in the table above is already corrected by the software using correction factor shown in column "Corr." The correction factor listed under "Corr." table calculated as:

Corr.(dB) = Antenna factor + Cable loss

Or

Corr.(dB) = Antenna factor + Cable Loss - Amp gain (if pre-amplifier was used)

The final Quasi peak reading shown in the data is calculated by the software using following equation:

Corrected Quasi Peak(dBµV/m) = Raw Quasi Peak Reading + Antenna factor + Cable loss

To obtain the final Quasi-Peak or Average reading during power line conducted emissions, transducer factors are included in the final measurement as shown below.

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150	44.3	1000.000	9.000	0.6	21.7	66.0

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150	27.2	1000.000	9.000	0.6	28.8	56.0

Note: *Data shown above are sample data and are not relevant to the EUT's actual data.*

Quasi Peak or Average reading shown in above table is already corrected by the software using the correction factor shown in column "Corr." The correction factor listed under "Corr." table calculated as:

Corr.(dB) = Antenna factor + Cable loss

The final Quasi peak or Average reading shown in the data is calculated by the software using following equation:

Corr. Quasi Peak/Average Reading (dBµV) = Raw Quasi Peak/Average Reading + Antenna factor + Cable loss

The allowable margin from the limits, as per the standards, were calculated for both radiated and conducted emissions:

Margin(dB) = Limit – Quasi-Peak or Average reading

2.6 Test Equipment List

The tables below contain all the equipment used by QAI Laboratories in conducting all tests on the Equipment Under Test (EUT) as per Section 1.3.

Emissions Test Equipment

Manufacturer	Model	Description	Serial No.	Calibration Due Date
Sunol Sciences	SM46C	Turntable	051204-2	N/A
Sunol Sciences	TWR95	Mast	TREML0001	N/A
Sunol Sciences	JB3	Biconilog Antenna 30MHz – 3GHz	A120106	24-Sep-2017
Sunol Sciences	DRH-118	Horn Antenna 1GHz-18GHz	A050905	10-Mar-2019
ETS Lindgren	3160-09	Horn Antenna 18GHz-26.5GHz	9701-1071	30-Aug-2017
ETS Lindgren	3160-10	Horn Antenna 26.5GHz-40.0GHz	9708-1075	30-Aug-2017
ETS Lindgren	6502	Active Loop Antenna 10kHz – 30MHz	2178	21-Aug-2017
ETS Lindgren	2165	Turntable	00043677	N/A
ETS Lindgren	2125	Mast	00077487	N/A
Rohde & Schwarz	ESU40	EMI Receiver	100011	20-Nov-2017
Fischer	FCC-LISN-50-25-2-08	LISN (150kHz-30MHz)	2041	19-Nov-2018
ETS Lindgren	S201	5-meter Semi-Anechoic Chamber	1030	N/A
AH Systems	PAM118	Amplifier 10KHz-18GHz	189	Conditional Use
California Instruments	PACS-1	Harmonics and flicker analyzer	72569	18 July 2018
California Instruments	OMNI 1-18 I	Programmable Impedance Flicker test	-	18 July 2018
California Instruments	3001ix	Power supply	HK52117	18 July 2018

Note: *Equipment listed above have a 3 years calibration interval.*

Measurement Software List

Manufacturer	Model	Version	Description
Rhode & Schwarz	EMC 32	6.20.0	Emissions Test Software
ETS-Lindgren	Tile7	7.3.15	Emissions Test Software

Section III: Unintentional Radiated Emissions Test Result

3.1 AC Mains Conducted Emissions

Date Performed:

June 5, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.207

Test Method:

- ANSI C63.4-2014

Test Requirement:

Limit:

Frequency (kHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
535 – 1705	60	46

Method of Measurement:

Measurements were made using a test receiver with 9kHz bandwidth, CISPR Quasi-Peak and Average detector.

Modifications:

No modification was required to comply for this test.

Result:

The EUT complies with the applicable standard.

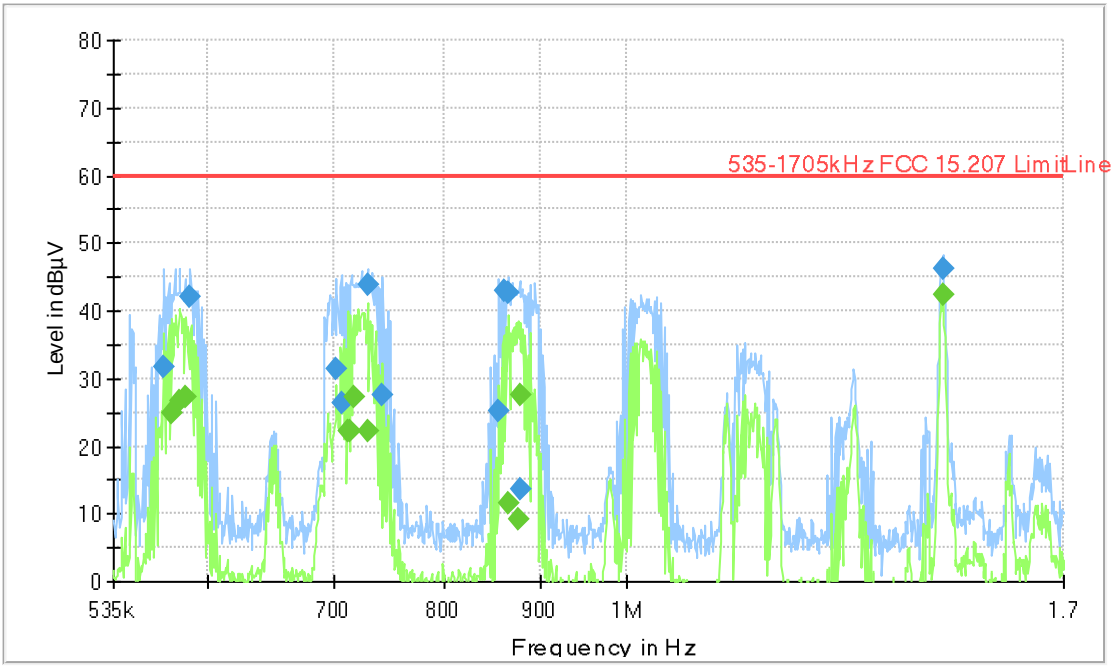
Measurement Data and Plot:

Test Mains Voltage Used:

- Line 1, 120Vac/60Hz

Frequency Range:

- 535 kHz to 1.7MHz



Plot 1: Conducted Emissions – Line 1, 120Vac/60Hz

Table 1: QPeak Data of Conducted Emissions – Line 1, 120Vac/60Hz

Frequency (MHz)	QPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.569050	42.8	1000.000	9.000	GND	10.2	17.2	60.0
0.587545	42.0	1000.000	9.000	GND	10.2	18.0	60.0
0.701951	43.4	1000.000	9.000	GND	10.1	16.6	60.0
0.706173	42.3	1000.000	9.000	GND	10.1	17.7	60.0
0.729125	43.8	1000.000	9.000	GND	10.1	16.2	60.0
0.743103	42.8	1000.000	9.000	GND	10.1	17.2	60.0
0.856423	43.0	1000.000	9.000	GND	10.1	17.0	60.0
0.861574	42.9	1000.000	9.000	GND	10.1	17.1	60.0
0.866757	42.7	1000.000	9.000	GND	10.1	17.3	60.0
0.878092	42.7	1000.000	9.000	GND	10.1	17.3	60.0
1.470700	46.2	1000.000	9.000	GND	10.1	13.8	60.0

Table 2: Average Data of Conducted Emissions – Line 1, 120Vac/60Hz

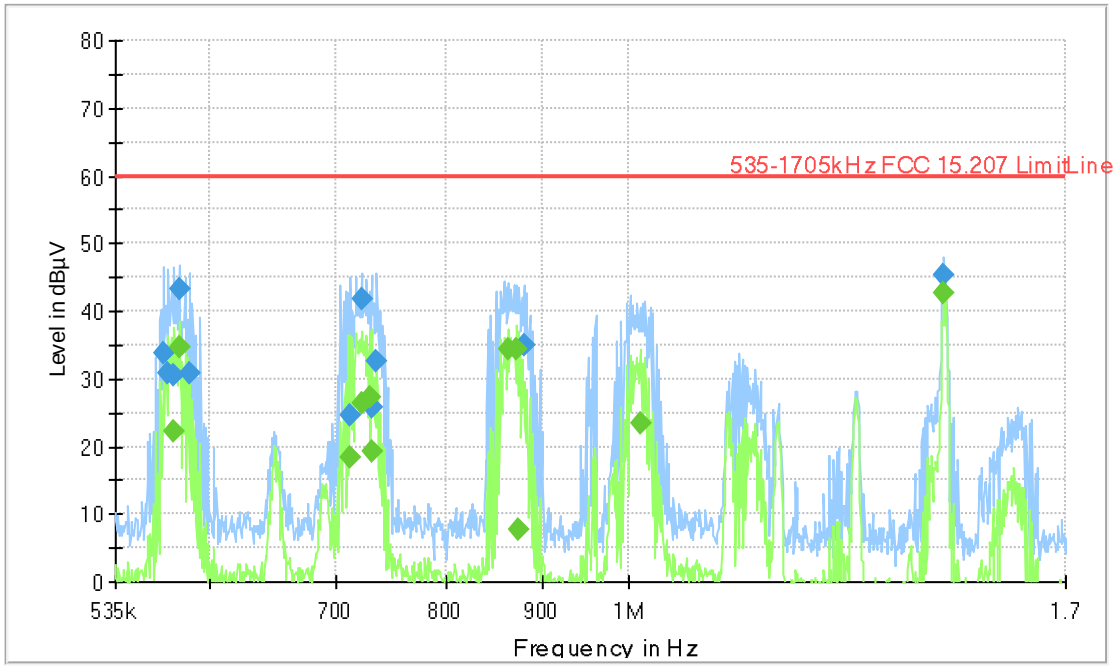
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.574192	24.9	1000.000	9.000	GND	10.2	21.1	46.0
0.579960	26.5	1000.000	9.000	GND	10.2	19.5	46.0
0.584032	27.1	1000.000	9.000	GND	10.2	18.9	46.0
0.712554	22.1	1000.000	9.000	GND	10.1	23.9	46.0
0.714694	22.3	1000.000	9.000	GND	10.1	23.7	46.0
0.716840	27.3	1000.000	9.000	GND	10.1	18.7	46.0
0.729125	22.1	1000.000	9.000	GND	10.1	23.9	46.0
0.866757	11.4	1000.000	9.000	GND	10.1	34.6	46.0
0.876339	9.3	1000.000	9.000	GND	10.1	36.7	46.0
0.878971	27.5	1000.000	9.000	GND	10.1	18.5	46.0
1.470700	42.4	1000.000	9.000	GND	10.1	3.6	46.0

Test Mains Voltage Used:

- Line 2, 120Vac/60Hz

Frequency Range:

- 535 kHz to 1.7MHz



Plot 2: Conducted Emissions – Line 2, 120Vac/60Hz

Table 3: QPeak Data of Conducted Emissions – Line 2, 120Vac/60Hz

Frequency (MHz)	QPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.567347	41.6	1000.000	9.000	GND	10.2	18.4	60.0
0.570759	43.0	1000.000	9.000	GND	10.2	17.0	60.0
0.574766	43.7	1000.000	9.000	GND	10.2	16.3	60.0
0.578224	43.2	1000.000	9.000	GND	10.2	16.8	60.0
0.585786	43.8	1000.000	9.000	GND	10.2	16.2	60.0
0.712554	41.7	1000.000	9.000	GND	10.1	18.3	60.0
0.721873	41.8	1000.000	9.000	GND	10.1	18.2	60.0
0.731314	42.5	1000.000	9.000	GND	10.1	17.5	60.0
0.735713	42.3	1000.000	9.000	GND	10.1	17.7	60.0
0.880729	41.5	1000.000	9.000	GND	10.1	18.5	60.0
1.469231	46.0	1000.000	9.000	GND	10.1	14.0	60.0

Table 4: Average Data of Conducted Emissions – Line 2, 120Vac/60Hz

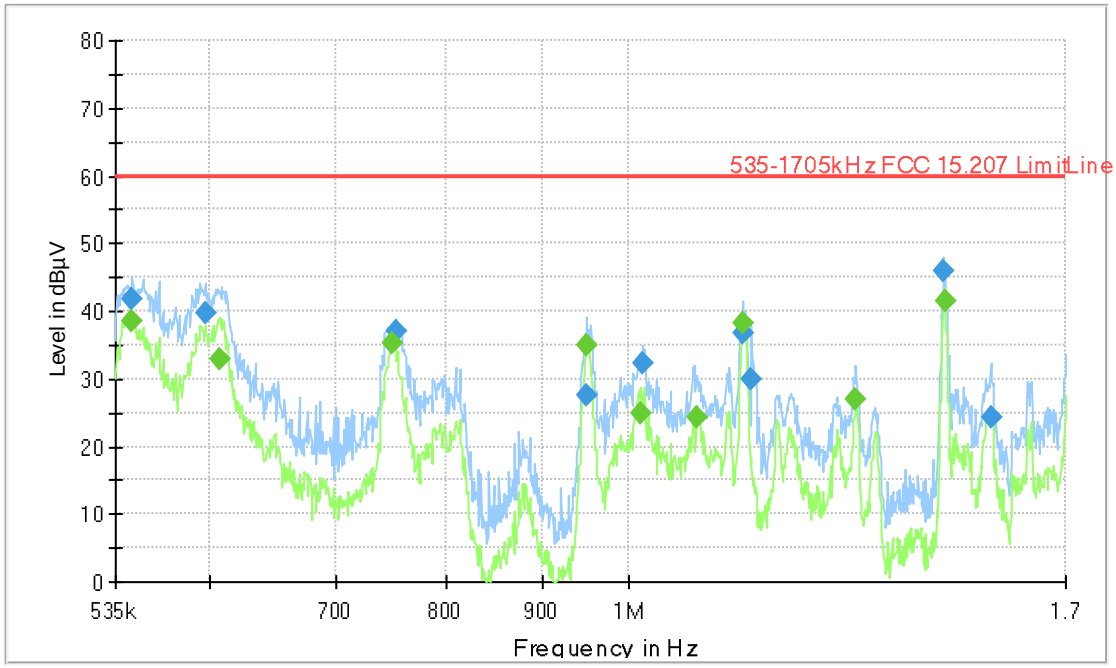
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.574766	22.2	1000.000	9.000	GND	10.2	23.8	46.0
0.578224	34.7	1000.000	9.000	GND	10.2	11.3	46.0
0.712554	18.4	1000.000	9.000	GND	10.1	27.6	46.0
0.721873	26.4	1000.000	9.000	GND	10.1	19.6	46.0
0.729125	27.2	1000.000	9.000	GND	10.1	18.8	46.0
0.731314	19.1	1000.000	9.000	GND	10.1	26.9	46.0
0.864162	34.5	1000.000	9.000	GND	10.1	11.5	46.0
0.872842	34.4	1000.000	9.000	GND	10.1	11.6	46.0
0.875463	7.6	1000.000	9.000	GND	10.1	38.4	46.0
1.015036	23.4	1000.000	9.000	GND	10.0	22.6	46.0
1.469231	42.6	1000.000	9.000	GND	10.1	3.4	46.0

Test Mains Voltage Used:

- Line 1, 240Vac/60Hz

Frequency Range:

- 535 kHz to 1.7MHz



Plot 3: Conducted Emissions – Line 1, 240Vac/60Hz

Table 5: QPeak Data of Conducted Emissions – Line 1, 240Vac/60Hz

Frequency (MHz)	QPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546202	43.3	1000.000	9.000	GND	10.2	16.7	60.0
0.597017	41.5	1000.000	9.000	GND	10.2	18.5	60.0
0.788078	42.2	1000.000	9.000	GND	10.1	17.8	60.0
0.969969	41.9	1000.000	9.000	GND	10.0	18.1	60.0
1.018084	35.7	1000.000	9.000	GND	10.0	24.3	60.0
1.108591	40.9	1000.000	9.000	GND	10.1	19.111	60.0
1.150258	41.3	1000.000	9.000	GND	10.1	18.7	60.0
1.470032	47.3	1000.000	9.000	GND	10.1	12.7	60.0
1.556921	29.2	1000.000	9.000	GND	10.1	30.8	60.0

Table 6: Average Data of Conducted Emissions – Line 1, 240Vac/60Hz

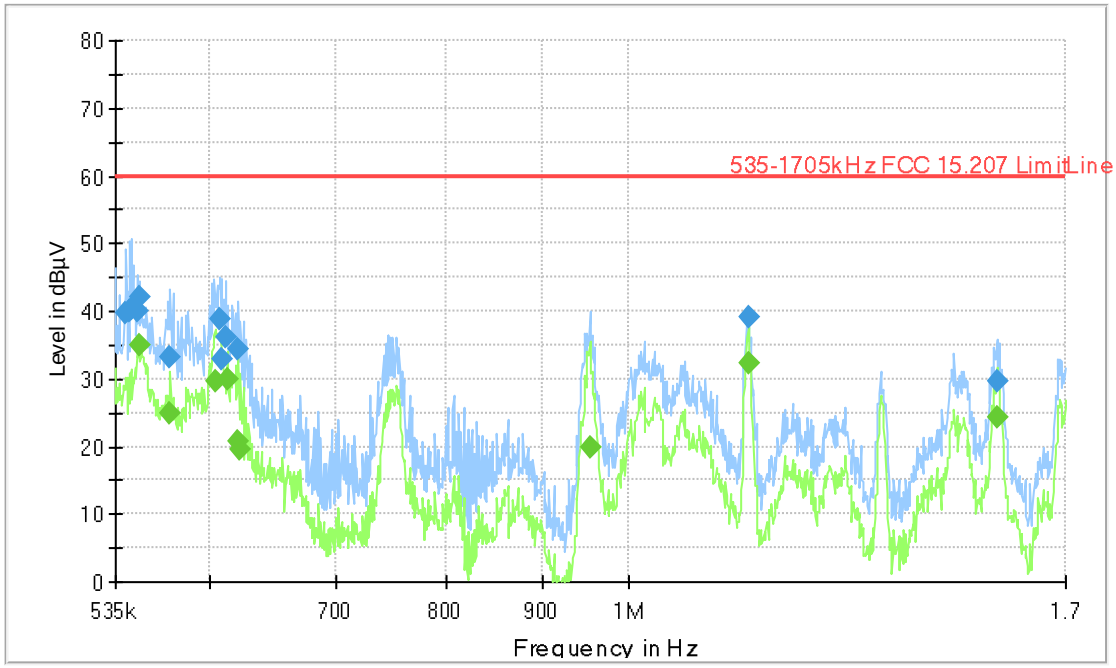
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.546202	38.5	1000.000	9.000	GND	10.2	7.5	46.0
0.607247	33.0	1000.000	9.000	GND	10.2	13.0	46.0
0.750568	35.3	1000.000	9.000	GND	10.1	10.7	46.0
0.950238	35.0	1000.000	9.000	GND	10.0	11.0	46.0
1.015036	24.9	1000.000	9.000	GND	10.0	21.1	46.0
1.087509	24.4	1000.000	9.000	GND	10.1	21.6	46.0
1.150115	38.3	1000.000	9.000	GND	10.1	7.7	46.0
1.320213	26.9	1000.000	9.000	GND	10.1	19.1	46.0
1.472171	41.4	1000.000	9.000	GND	10.1	4.6	46.0
1.705170	22.5	1000.000	9.000	GND	10.1	23.5	46.0

Test Mains Voltage Used:

- Line 2, 240Vac/60Hz

Frequency Range:

- 535 kHz to 1.7MHz



Plot 4: Conducted Emissions – Line 2, 240Vac/60Hz

Table 7: QPeak Data of Conducted Emissions – Line 2, 240Vac/60Hz

Frequency (MHz)	QPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.534857	47.7	1000.000	9.000	GND	10.2	12.3	60.0
0.541852	41.3	1000.000	9.000	GND	10.2	18.7	60.0
0.544567	41.2	1000.000	9.000	GND	10.2	18.8	60.0
0.545657	40.4	1000.000	9.000	GND	10.2	19.6	60.0
0.549488	44.0	1000.000	9.000	GND	10.2	16.0	60.0
0.550587	41.7	1000.000	9.000	GND	10.2	18.3	60.0
0.571901	41.2	1000.000	9.000	GND	10.2	18.8	60.0
0.607855	42.0	1000.000	9.000	GND	10.2	18.0	60.0
0.609071	41.9	1000.000	9.000	GND	10.2	18.1	60.0
0.612122	41.4	1000.000	9.000	GND	10.2	18.6	60.0
0.621369	39.2	1000.000	9.000	GND	10.2	20.8	60.0
1.158190	39.0	1000.000	9.000	GND	10.1	21.0	60.0
1.567852	29.7	1000.000	9.000	GND	10.1	30.3	60.0

Table 8: Average Data of Conducted Emissions – Line 2, 240Vac/60Hz

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.534857	22.1	1000.000	9.000	GND	10.2	23.9	46.0
0.550587	34.9	1000.000	9.000	GND	10.2	11.1	46.0
0.571901	25.0	1000.000	9.000	GND	10.2	21.0	46.0
0.604220	29.5	1000.000	9.000	GND	10.2	16.5	46.0
0.613347	29.8	1000.000	9.000	GND	10.2	16.2	46.0
0.621369	20.7	1000.000	9.000	GND	10.2	25.3	46.0
0.623235	19.6	1000.000	9.000	GND	10.2	26.4	46.0
0.954045	20.0	1000.000	9.000	GND	10.0	26.0	46.0
1.158190	32.2	1000.000	9.000	GND	10.1	13.8	46.0
1.567852	24.2	1000.000	9.000	GND	10.1	21.8	46.0

3.2 Unintentional Radiated Emissions

Date Performed:

June 5, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart B §15.109
- ICES-003 Issue 6: Clause 6.2
- RSS-Gen Issue 4: Clause 7.1

Test Method:

- ANSI C63.4-2014

Test Requirement:

FCC/IC Limit:

Frequency (MHz)	Field Strength Quasi Peak dBµV/m @ 3m
30 – 88	49.5
88 – 216	54.0
216 – 960	56.9
Above 960	60.0

Method of Measurement:

The EUT was positioned in the center of the turntable in the SAC. The EUT was then measured for all the radiated emissions in the frequency range of 30MHz – 1GHz. Measurements were made using the spectrum analyzer and receiver using the appropriate antennas, amplifiers, attenuators, and filters.

The required Quasi-Peak CISPR bandwidth shall be 120 kHz for the range 30 – 1000 MHz. A 1 MHz Resolution Bandwidth (RBW, CISPR Band E) shall be used and a 10 Hz Video Bandwidth (VBW). The ANSI C63.4:2014 requirement for the placement of RF Absorber on the turntable Ground Plane shall be satisfied.

Emissions in both horizontal and vertical polarizations were measured while rotating the Equipment Under Test (EUT) on the turntable to maximize signal strength. In the case of high ambient noises, the measurements are performed at a closer distance and the limit is adjusted per the equation below. The result is added or subtracted to the required emission level to ensure compliance at the new distance.

$$20 \log\left(\frac{D1}{D2}\right);$$ Where D1 = Current Distance, D2 = Required Distance

Modifications:

No modification was required to comply for this test.

Result:

The EUT complies with the applicable standard.

Measurement Data and Plot:

EUT Test Mode:

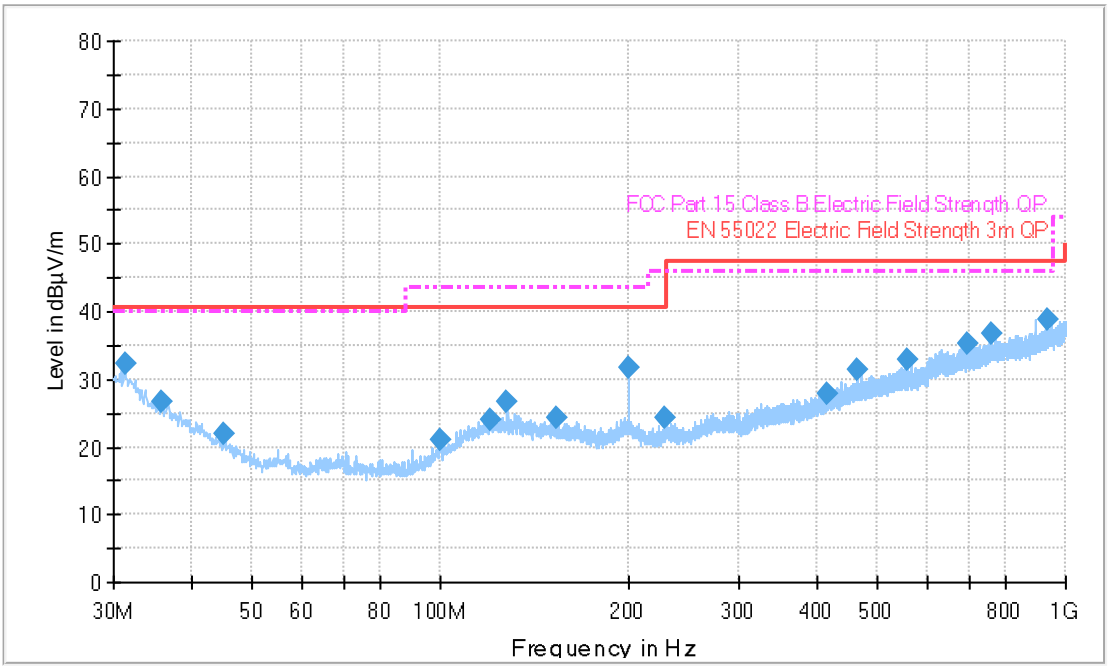
- Run Mode, No TX

Test Mains Voltage Used:

- 120Vac/60Hz

Frequency Range:

- 30MHz to 1GHz



Plot 5: Radiated Emissions scanned at 3m SAC

Note 1: The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part. - *§15.31 (o)*

Section IV: RF Devices Intentional Radiators Test Result

4.1 Antenna Requirements

Date Performed:

April 7, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.203
- RSS-Gen Issue 4: Clause 8.3

Applicable Regulation:

The purpose of this requirement is to make certain that no other antenna, except for that provided by the responsible party, shall be used with the Equipment-Under-Test (EUT) as defined in FCC CFR 47 Part 15.203 & RSS-Gen Issue 4:

> "An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited." … "the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded."

Modifications:

No modification was required to comply for this test.

Result:

An integrated antenna is used on this product and it is not field replaceable.

4.2 RF Peak Power Output

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (b) (2)
- RSS-247 Issue 2: Clause 5.4 (1)

Test Method:

- FCC KDB 558074 D01 DTS Meas Guidance v04

Test Requirement:

For FHSs operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

Power meter was used for this radio therefore there was no plots generated.

Modifications:

No modification was required to comply for this test.

Result:

The EUT complies with the applicable standard.

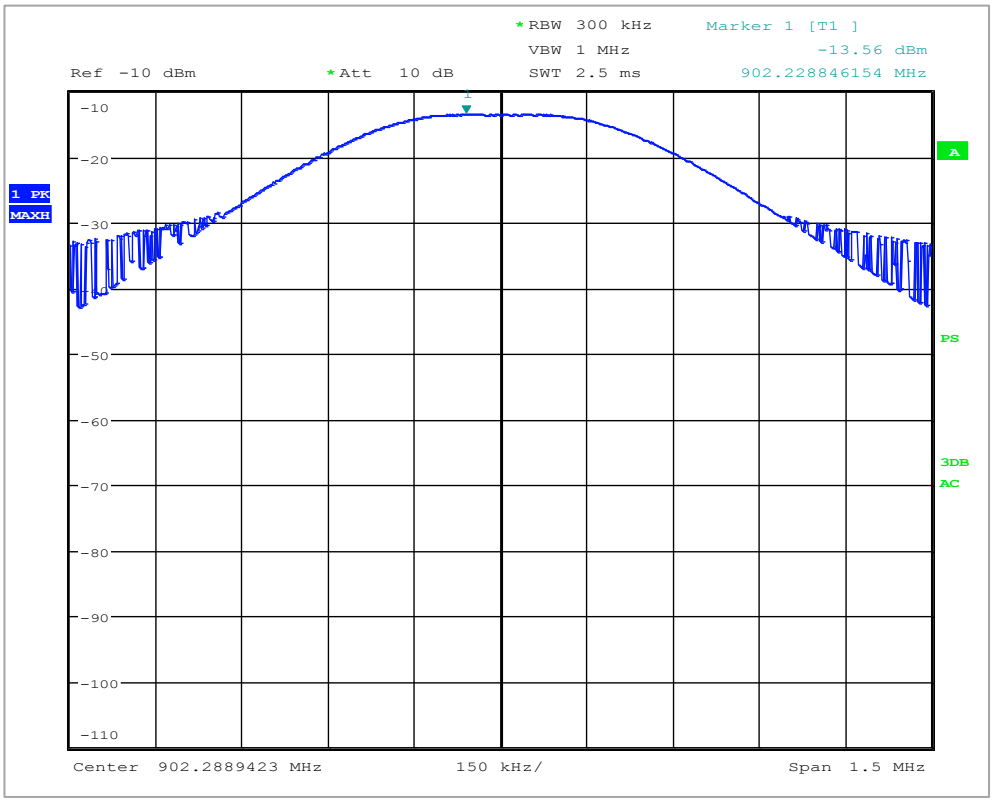
Measurement Data and Plot:

Table 9: E.I.R.P measurements

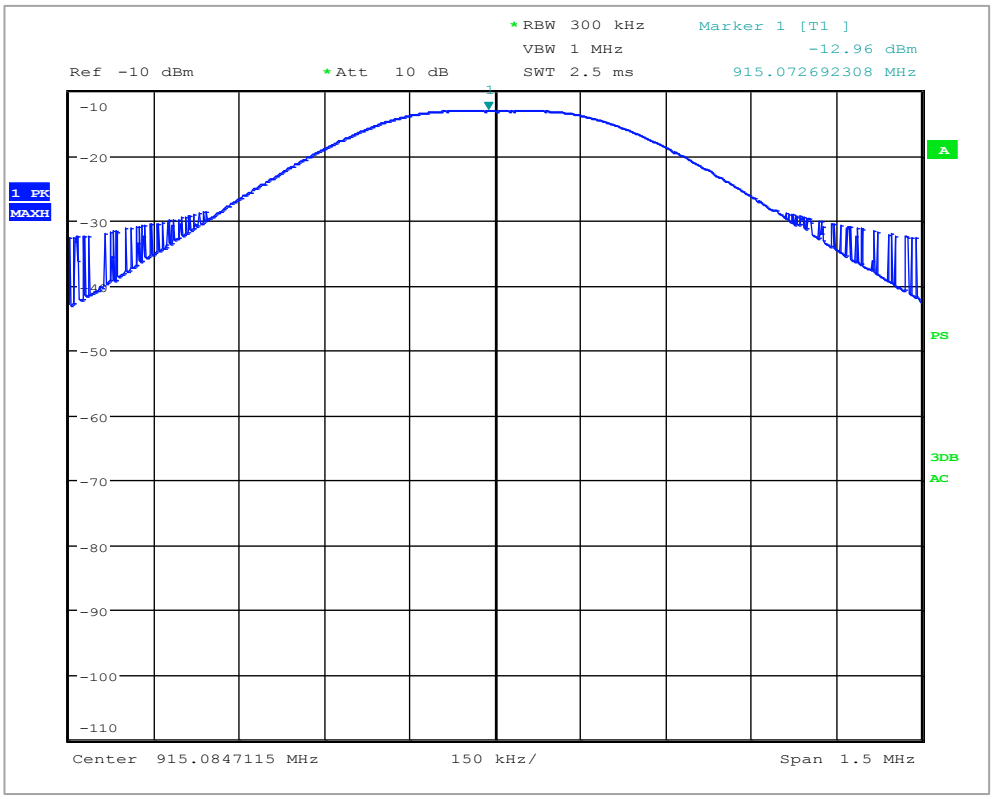
Channel	Freq. (MHz)	Raw Peak (dBµV)	Pol (V or H)	Turn Table (deg)	Ant. Ht. (cm)	Ant. Factors (dBµV)	Cable Loss (dB)	Atten. (dB)	Corr. Peak (dBµV)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low	902.2	75.5	V	144.4	100.0	22.2	3.3	16.0	117.0	21.7	36	14.3
	902.2	87.5	H	39.8	215.3	22.2	3.3	16.0	129.0	33.8	36	2.2
Middle	915.1	72.7	V	150.6	100.0	22.4	3.3	16.0	114.4	19.1	36	16.9
	915.1	85.7	H	22.7	198.4	22.4	3.3	16.0	127.4	32.1	36	3.9
High	927.7	71.9	V	285.5	260.0	22.5	3.3	16.0	113.8	18.5	36	17.5
	927.7	83.2	H	7.6	173.0	22.5	3.3	16.0	125.1	29.8	36	6.2

Table 10: Conducted output power measurements

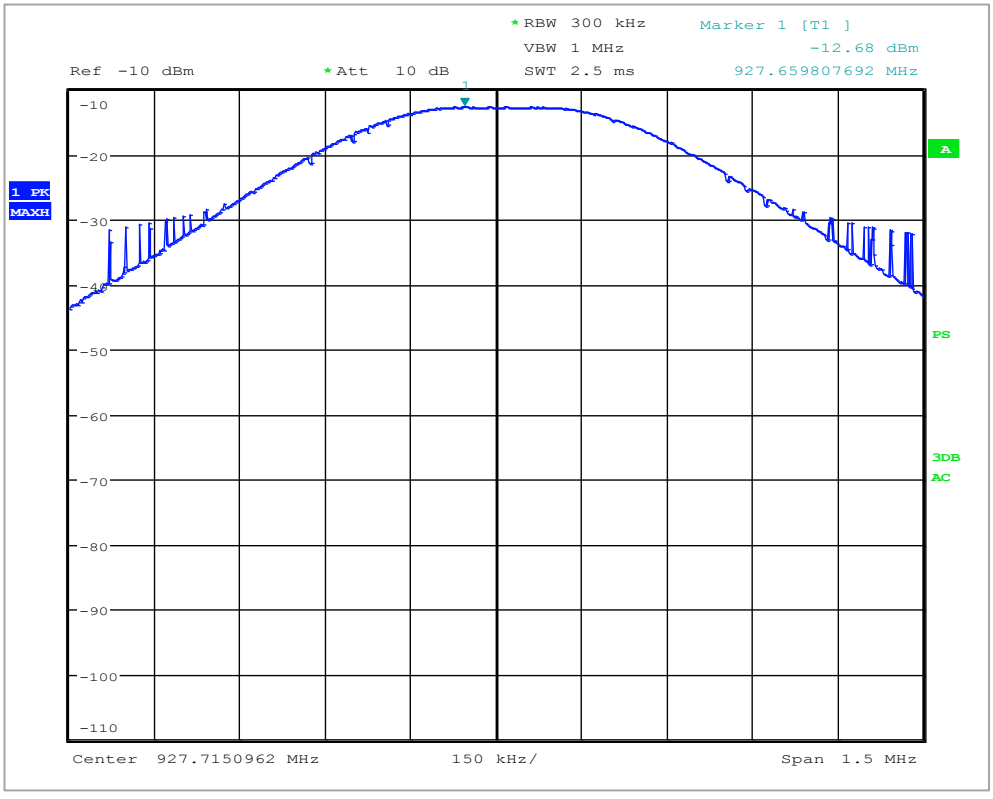
Channel	Freq. (MHz)	Measured Output Power (dBm)	Correction Factor (dB)	Corrected Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.2	-13.56	42	28.44	30	1.56
Middle	915.1	-12.96	42	29.04	30	0.96
High	927.7	-12.68	42	29.32	30	0.68



Plot 6: RF Peak Conducted Power Output (Low Channel ~902.2MHz)



Plot 7: RF Peak Conducted Power Output (Mid Channel ~915.1MHz)



Plot 8: RF Peak Conducted Power Output (High Channel ~927.7MHz)

4.3 20dB Occupied Bandwidth

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (a)(1)(i)
- RSS-247 Issue 2: Clause 5.1 (3)

Test Method:

- ANSI C63.10:2013

Test Requirement:

For FHSs in the band 902-928 MHz: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

As called in ANSI C63.10-2013.

Modifications:

No modification was required to comply for this test.

Result:

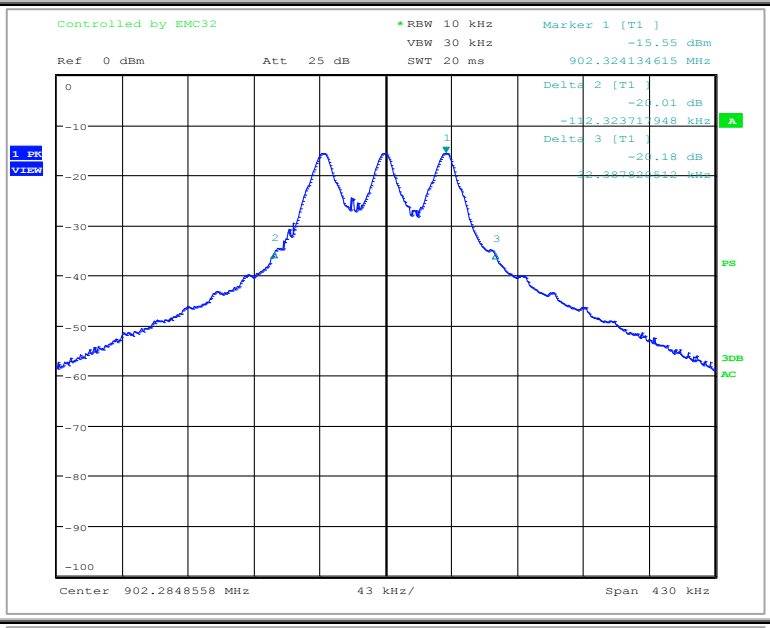
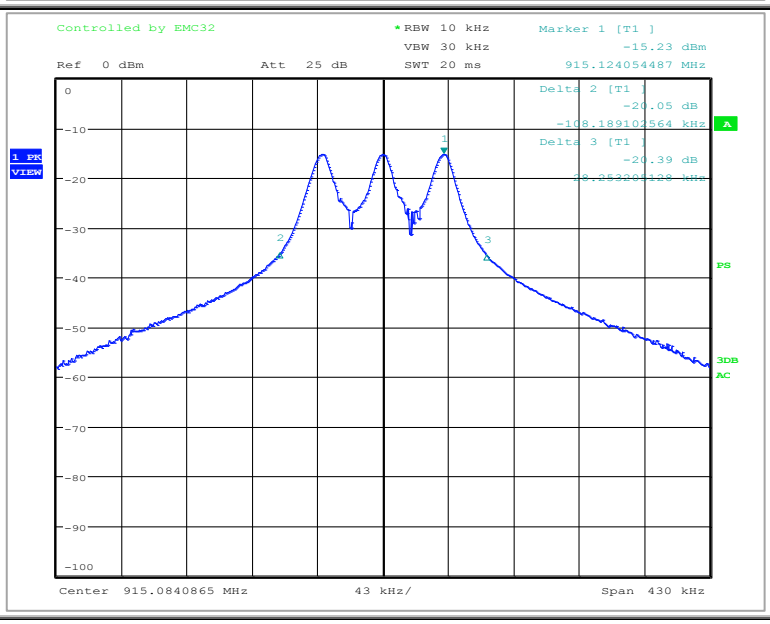
The EUT complies with the applicable standard.

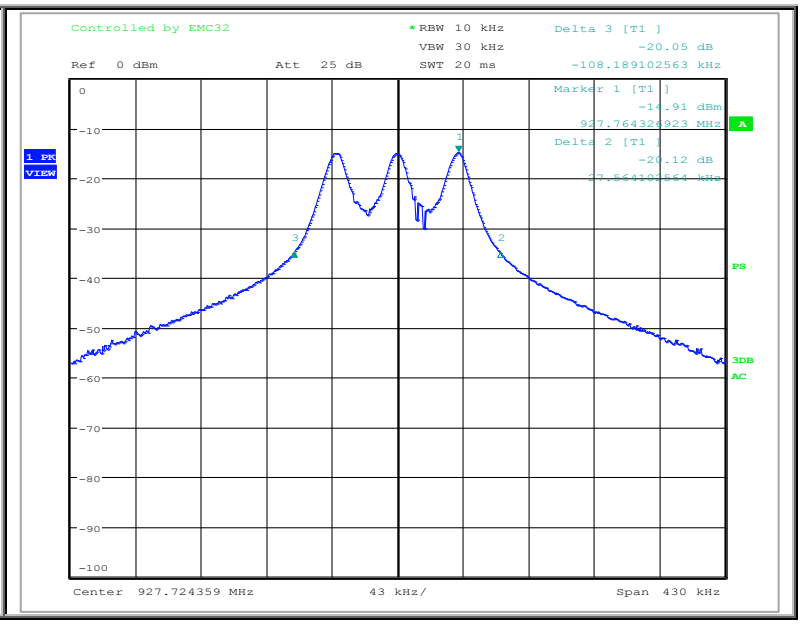
Measurement Data and Plot:

Low Data Rate

Table 11: 20dB Occupied Bandwidth Data on Low Data Rate

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	902.32	144.71
Middle	915.12	136.44
High	927.76	135.75

Channel	Plot
Low	
Middle	

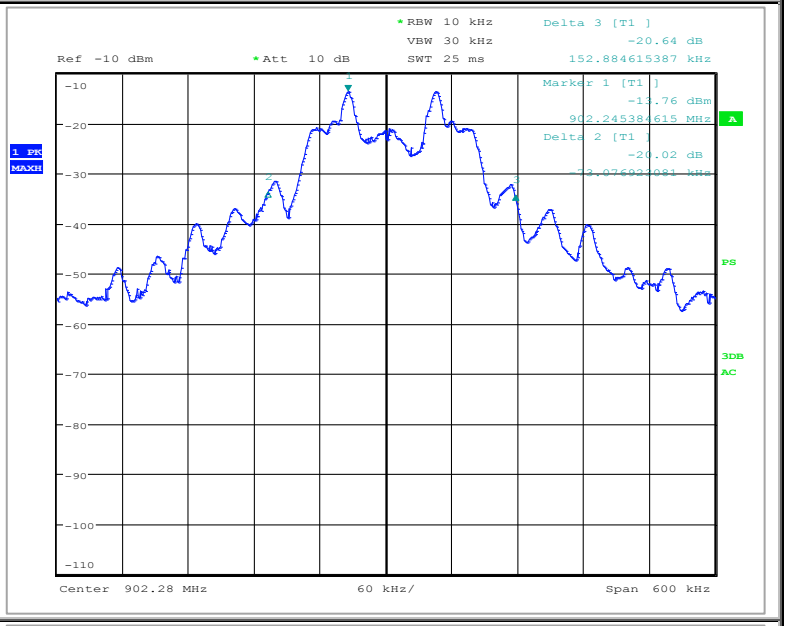
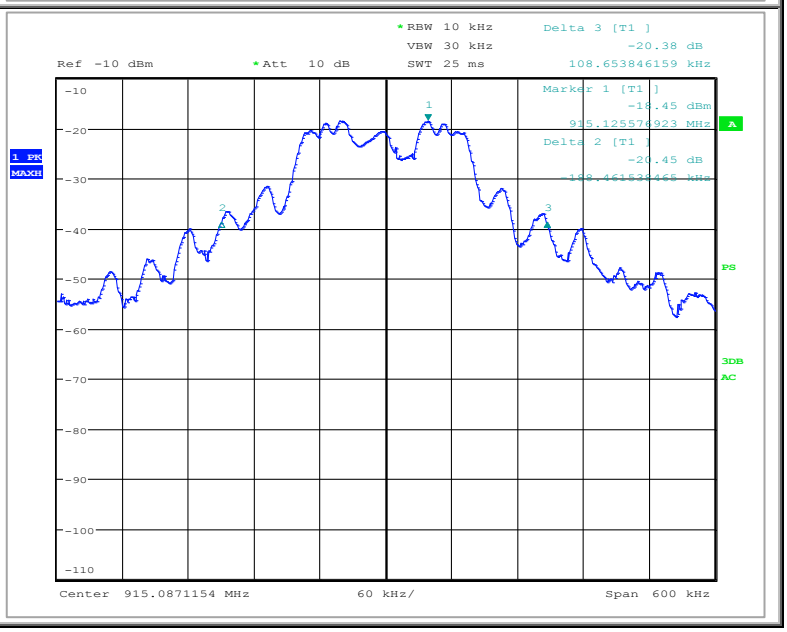
High	

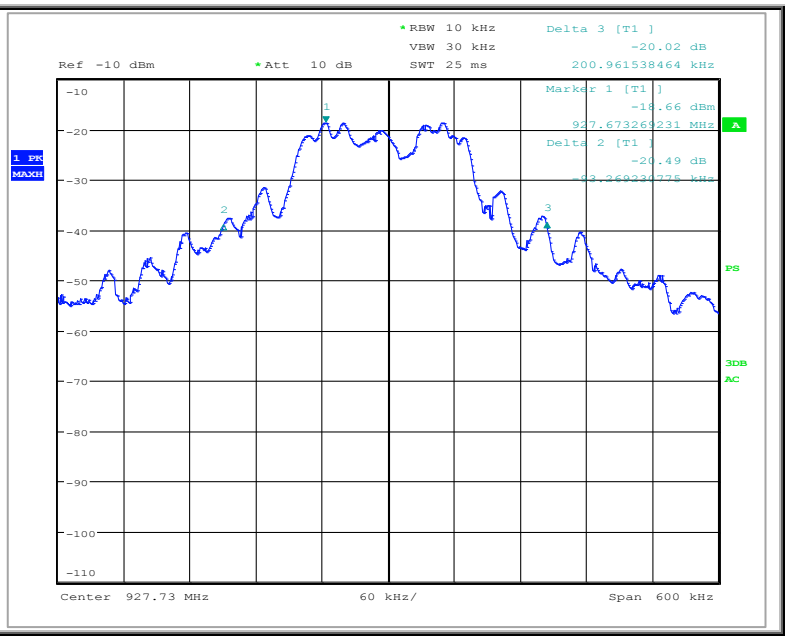
Plot 9: 20dB Occupied Bandwidth Plot (Low Data Rate)

High Data Rate

Table 12: 20dB Occupied Bandwidth Data on High Data Rate

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	902.25	225.96
Middle	915.13	297.11
High	927.67	294.23

Channel	Plot
Low	
Middle	

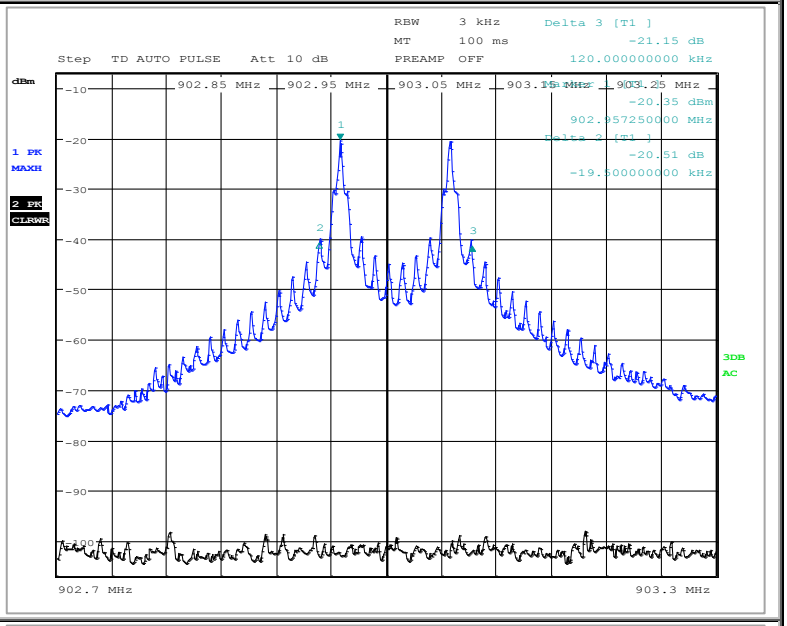
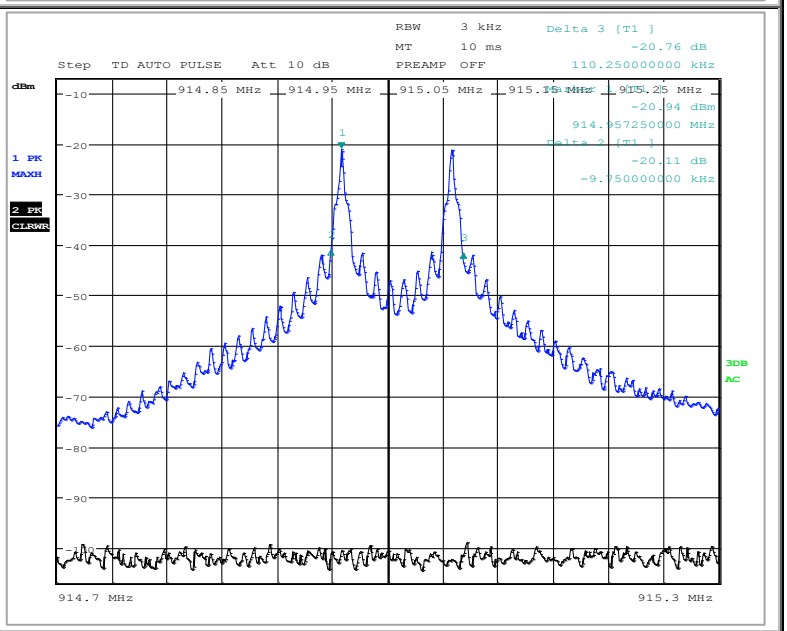
High	

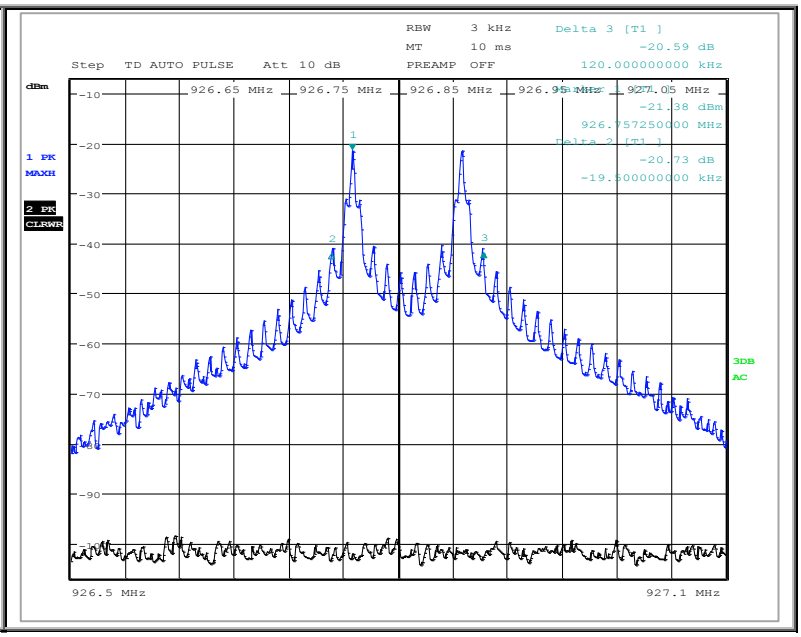
Plot 10: 20dB Occupied Bandwidth Plot (High Data Rate)

Data rate for communication to approved Part 15 device

Table 13: 20dB Occupied Bandwidth "Data rate for communication to approved Part 15 device"

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	902.96	139.5
Middle	914.96	120.0
High	926.76	139.5

Channel	Plot
Low	
Middle	

High	

Plot 11: 20dB Occupied Bandwidth Plot (Data rate for communication to approved Part 15 device)

4.4 Out of Band Emissions (Band Edge)

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (d)
- RSS-247 Issue 2: Clause 5.5

Test Method:

- ANSI C63.10:2013

Test Requirement:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20dB. Attenuation below the general field strength limits specified in RSS-Gen Issue 4 is not required.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

The measurement method used for both radios was Section 6.10.6.2 Marker-delta Method of ANSI C63.10-2013 standard.

Modifications:

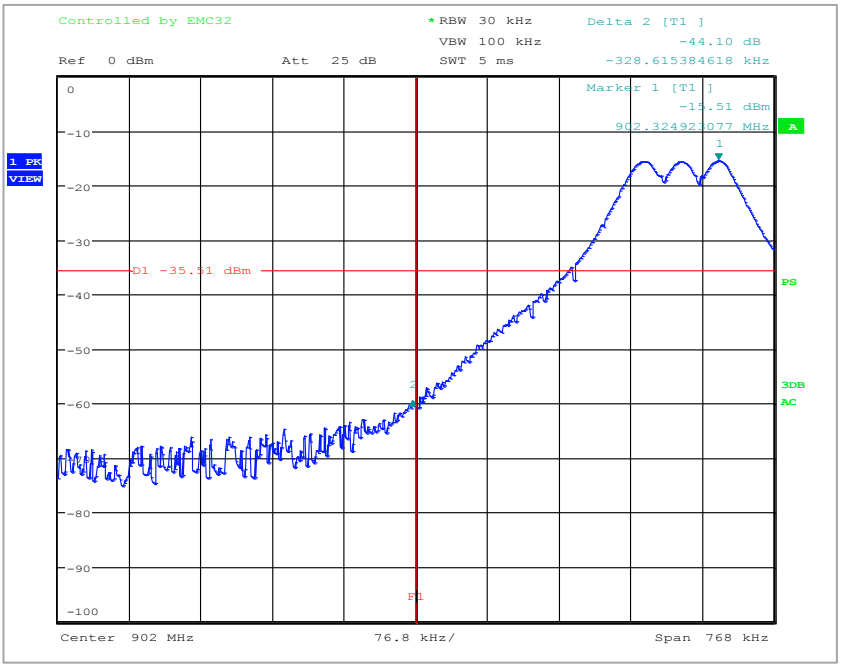
No modification was required to comply for this test.

Result:

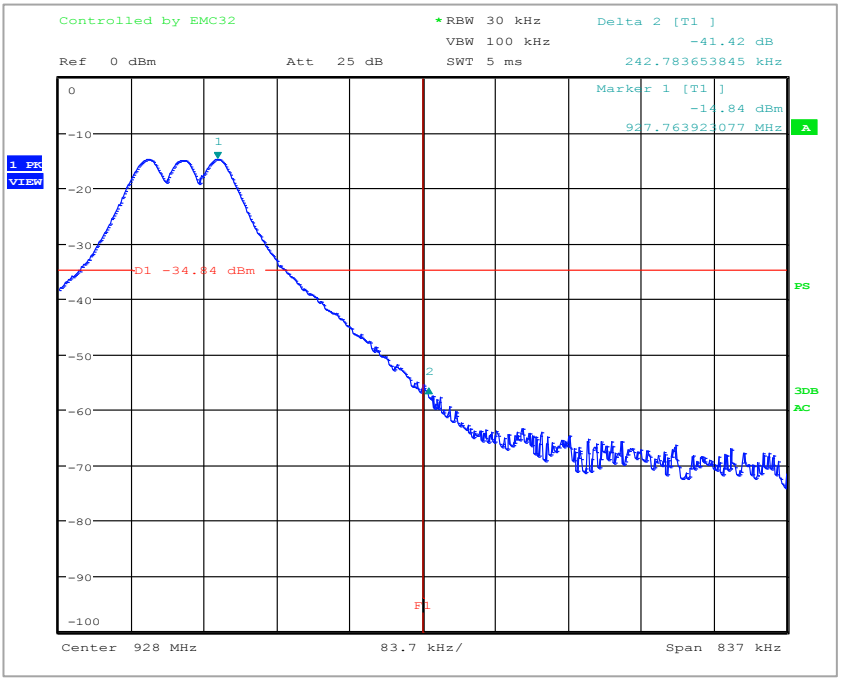
The EUT complies with the applicable standard.

Measurement Data and Plot:

Low Data Rate

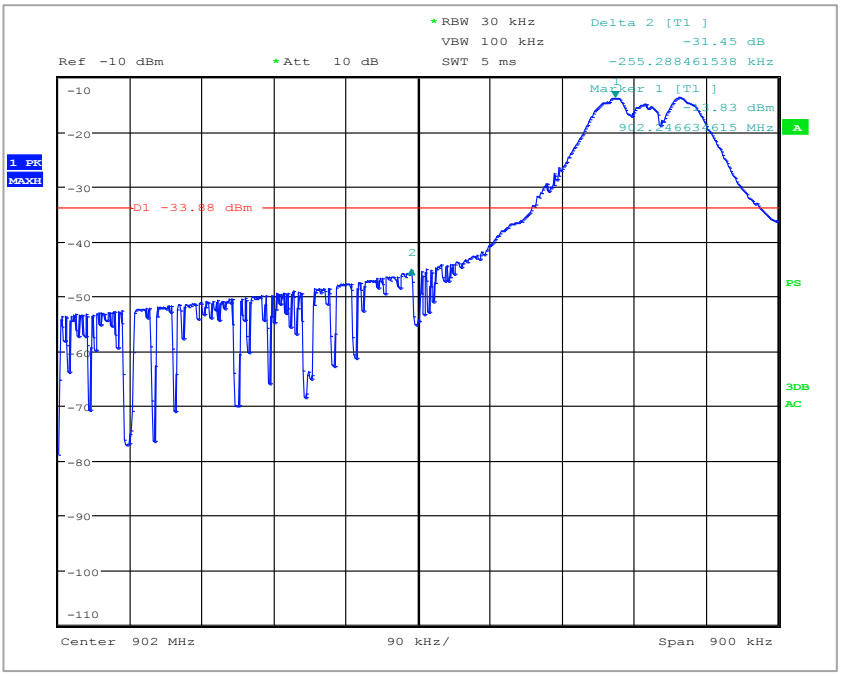


Plot 12: Band Edge Plot (Low Channel ~902.3MHz)

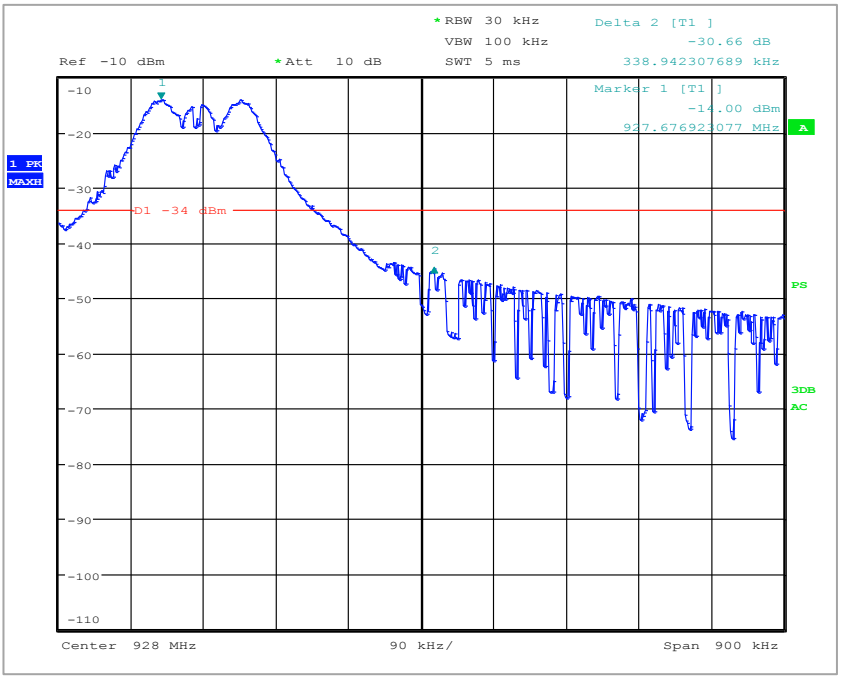


Plot 13: Band Edge Plot (High Channel ~927.8MHz)

High Data Rate

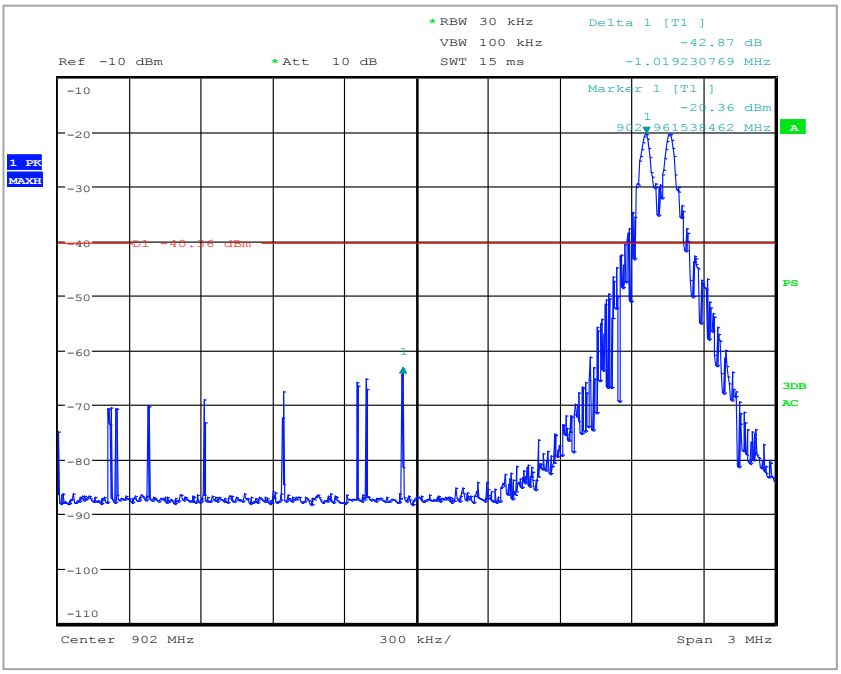


Plot 14: Band Edge Plot (Low Channel ~902.2MHz)

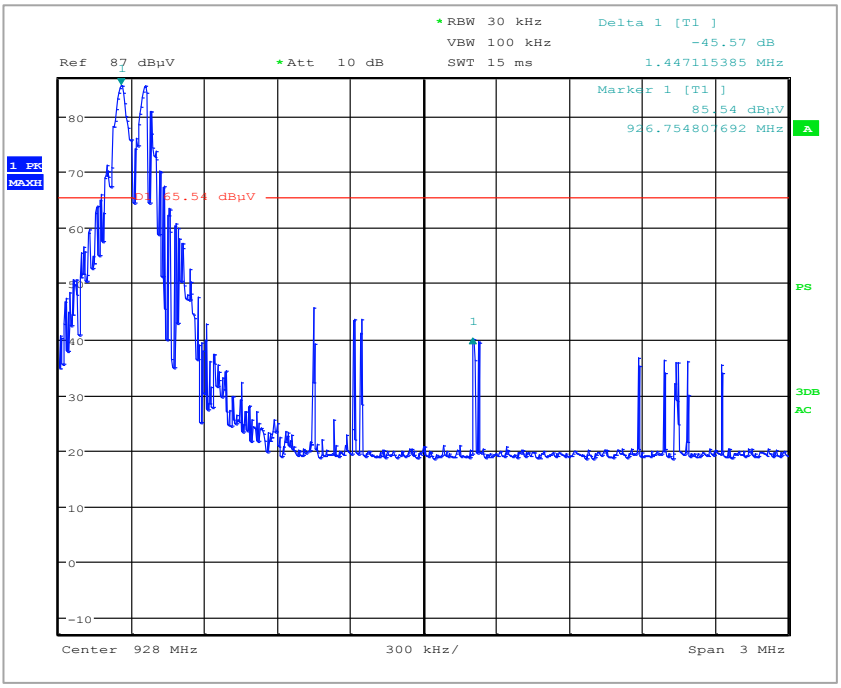


Plot 15: Band Edge Plot (High Channel ~927.7MHz)

Data rate for communication to approved Part 15 device



Plot 16: Band Edge Plot (Low Channel ~902.9MHz)



Plot 17: Band Edge Plot (High Channel ~926.8MHz)

4.5 Channel Separation

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (a)(1)
- RSS-247 Issue 2: Clause 5.1 (2)

Test Method:

- ANSI C63.10:2013

Test Requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

As called in ANSI C63.10-2013.

Modifications:

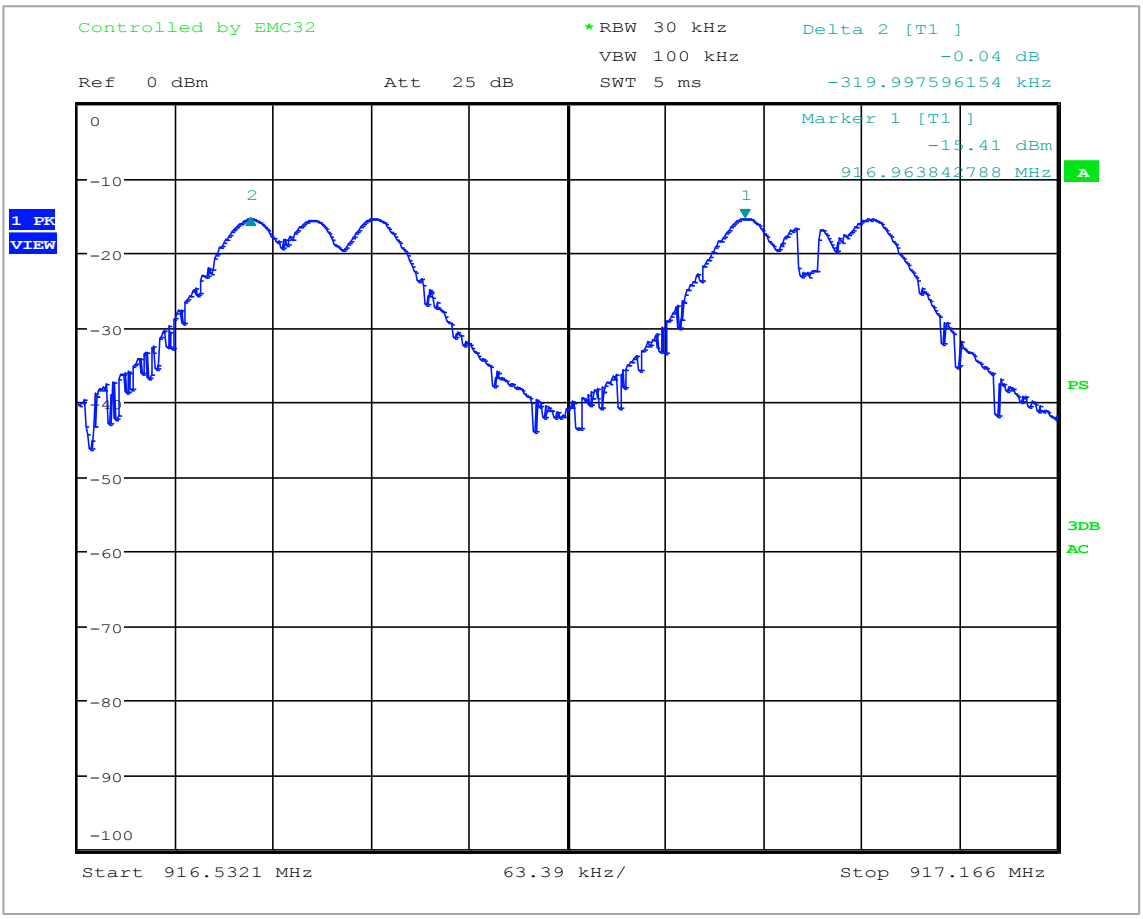
No modification was required to comply for this test.

Result:

The EUT complies with the applicable standard.

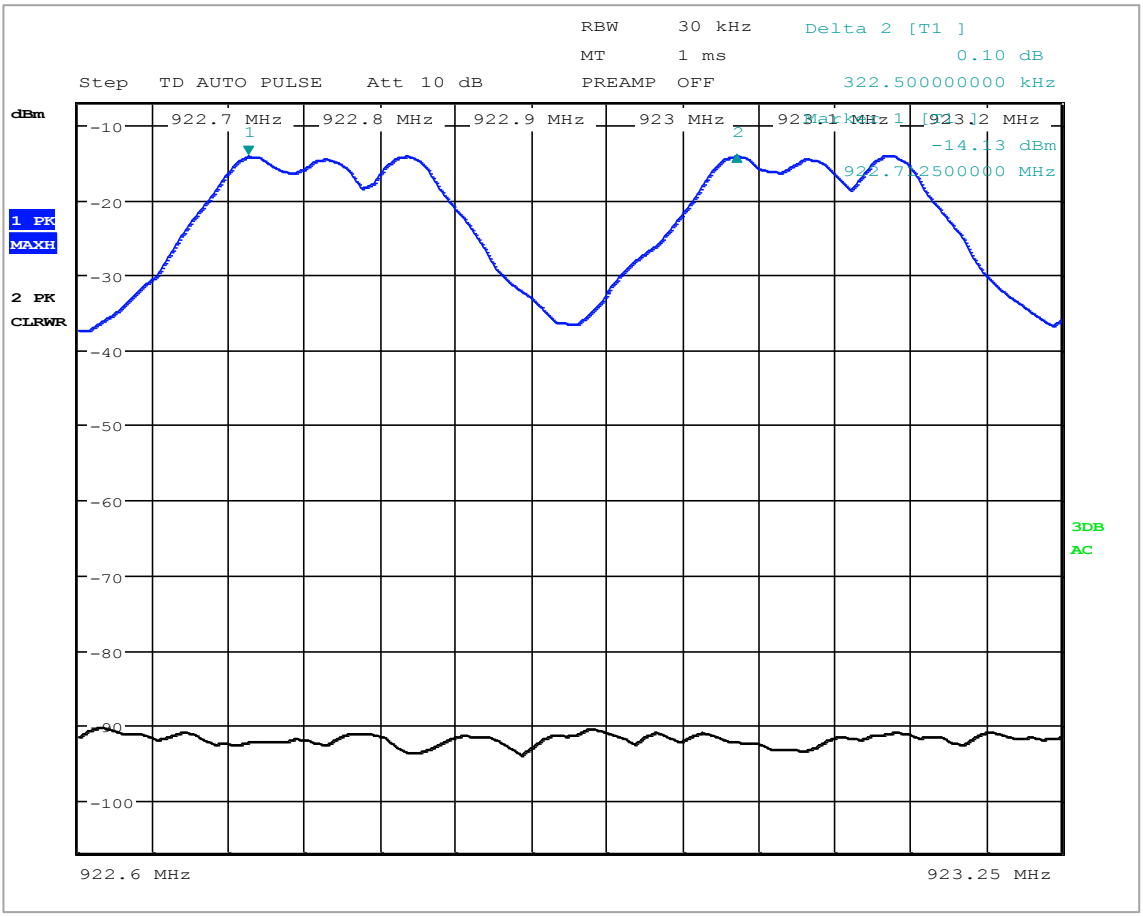
Measurement Data and Plot:

Low Data Rate



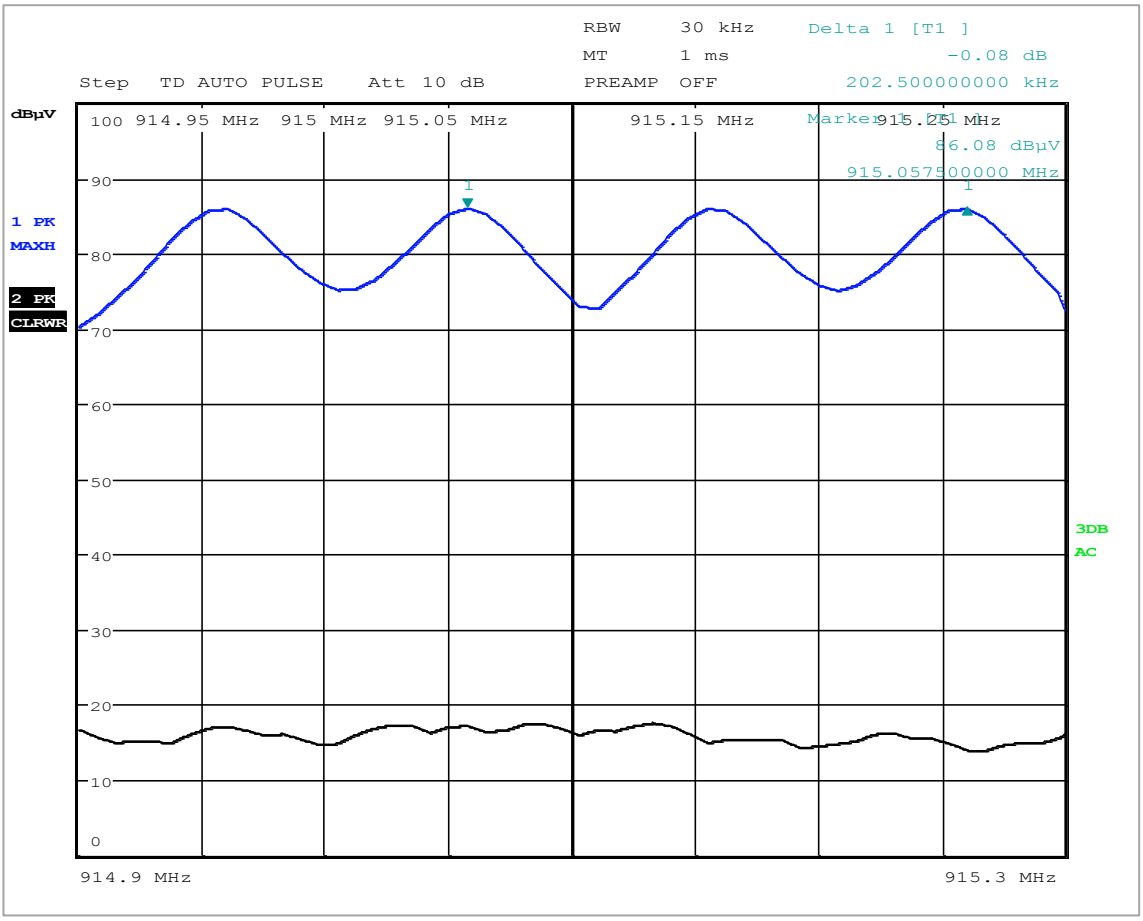
Plot 18: Channel Separation → 320 kHz

High Data Rate



Plot 19: Channel Separation → 322.50 kHz

Data rate for communication to approved Part 15 device



Plot 20: Channel Separation → 202.50 kHz

4.6 Number of Hopping Channels

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (a)(1)(i)
- RSS-247 Issue 2: Clause 5.1 (3)

Test Method:

- ANSI C63.10:2013

Test Requirement:

For FHSs in the band 902-928 MHz: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

As called in ANSI C63.10-2013.

Modifications:

No modification was required to comply for this test.

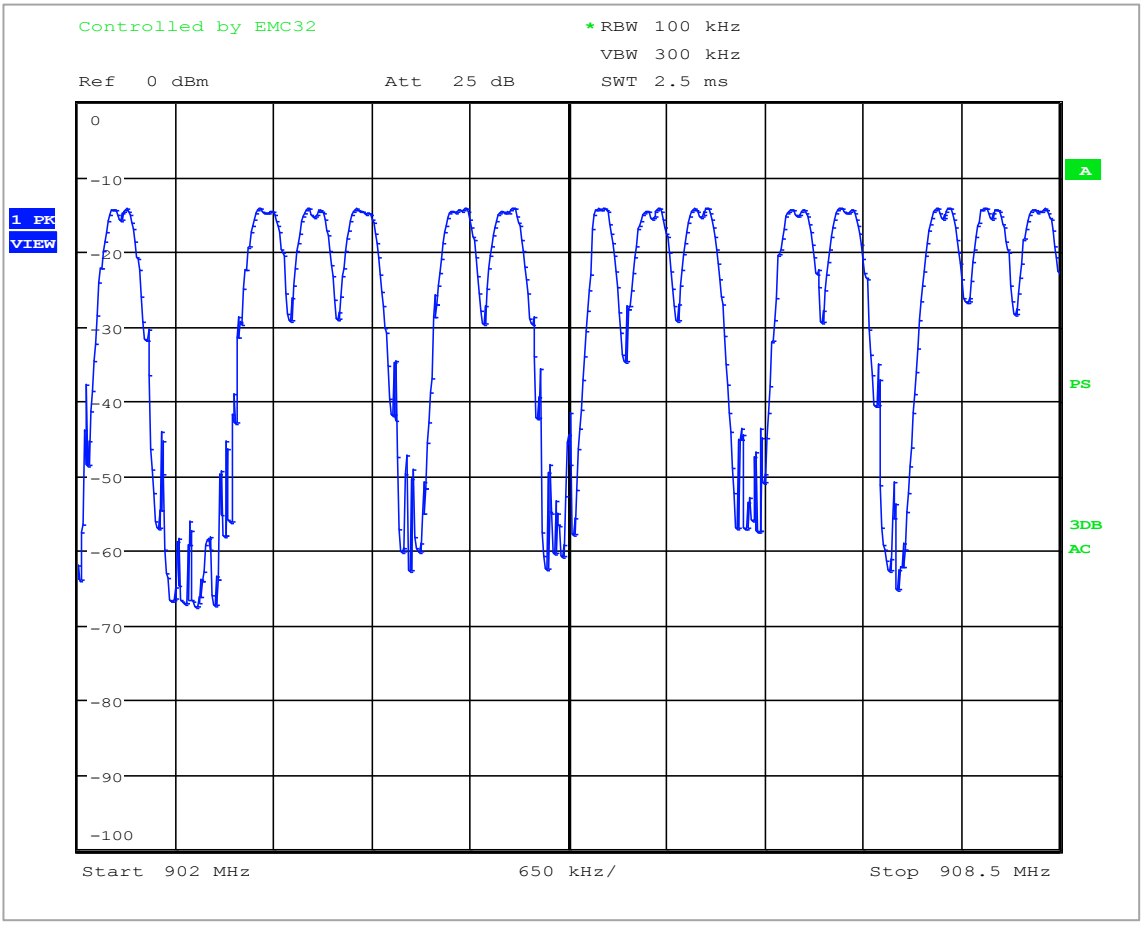
Result:

The EUT complies with the applicable standard.

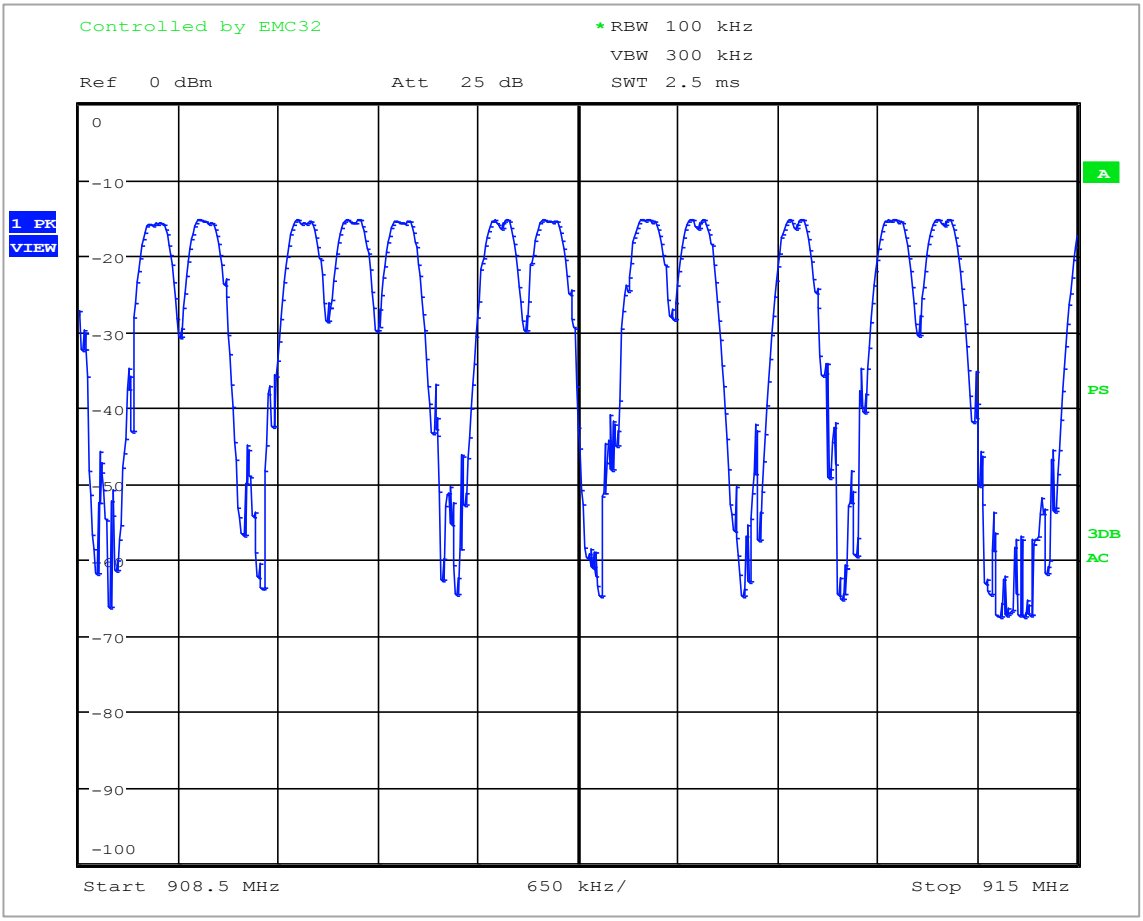
Data Rate	Frequency Range	Number of Hopping Frequencies
Low Data Rate & High Data Rate	902MHz to 908MHz	14
	908MHz to 915MHz	12
	915MHz to 921MHz	13
	921MHz to 928MHz	11
Data rate for communication to approved Part 15 device	902MHz to 905MHz	10
	905MHz to 908MHz	15
	908MHz to 911MHz	15
	911MHz to 914MHz	14
	914MHz to 917MHz	15
	917MHz to 920MHz	14
	920MHz to 923MHz	14
	923MHz to 926MHz	13
	926MHz to 928MHz	5

Measurement Data and Plot:

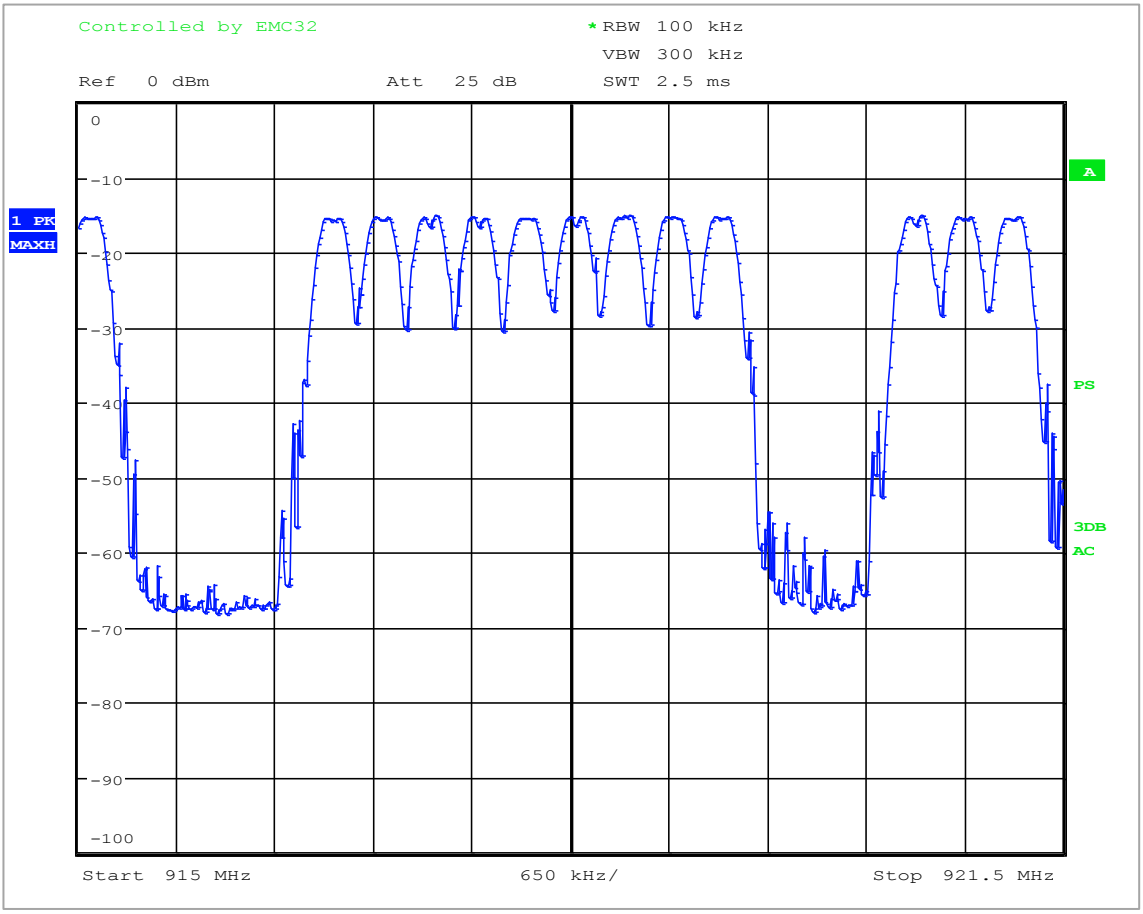
Low Data Rate



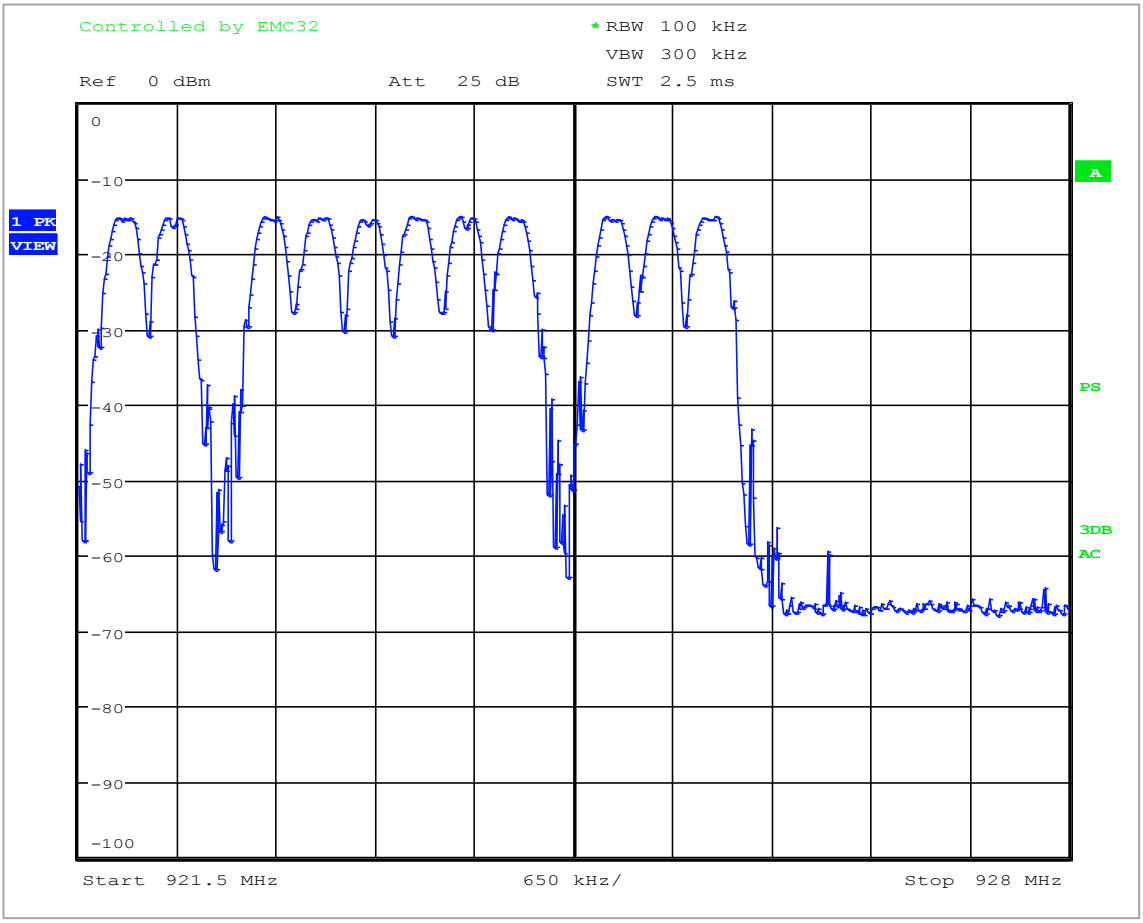
Plot 21: Number of Hopping Channels → 902MHz to 908MHz ~14 frequencies



Plot 22: Number of Hopping Channels → 908MHz to 915MHz ~12 frequencies

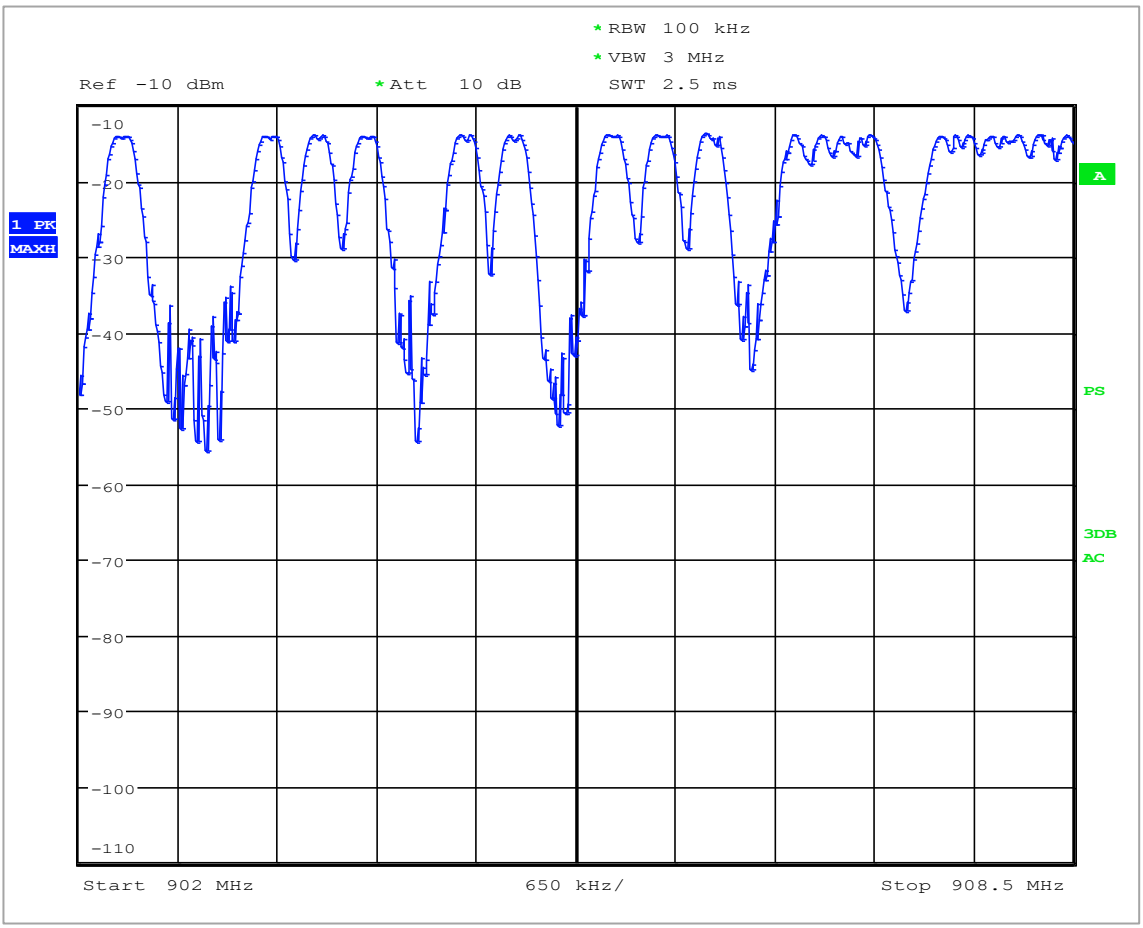


Plot 23: Number of Hopping Channels → 915MHz to 921MHz ~13 frequencies

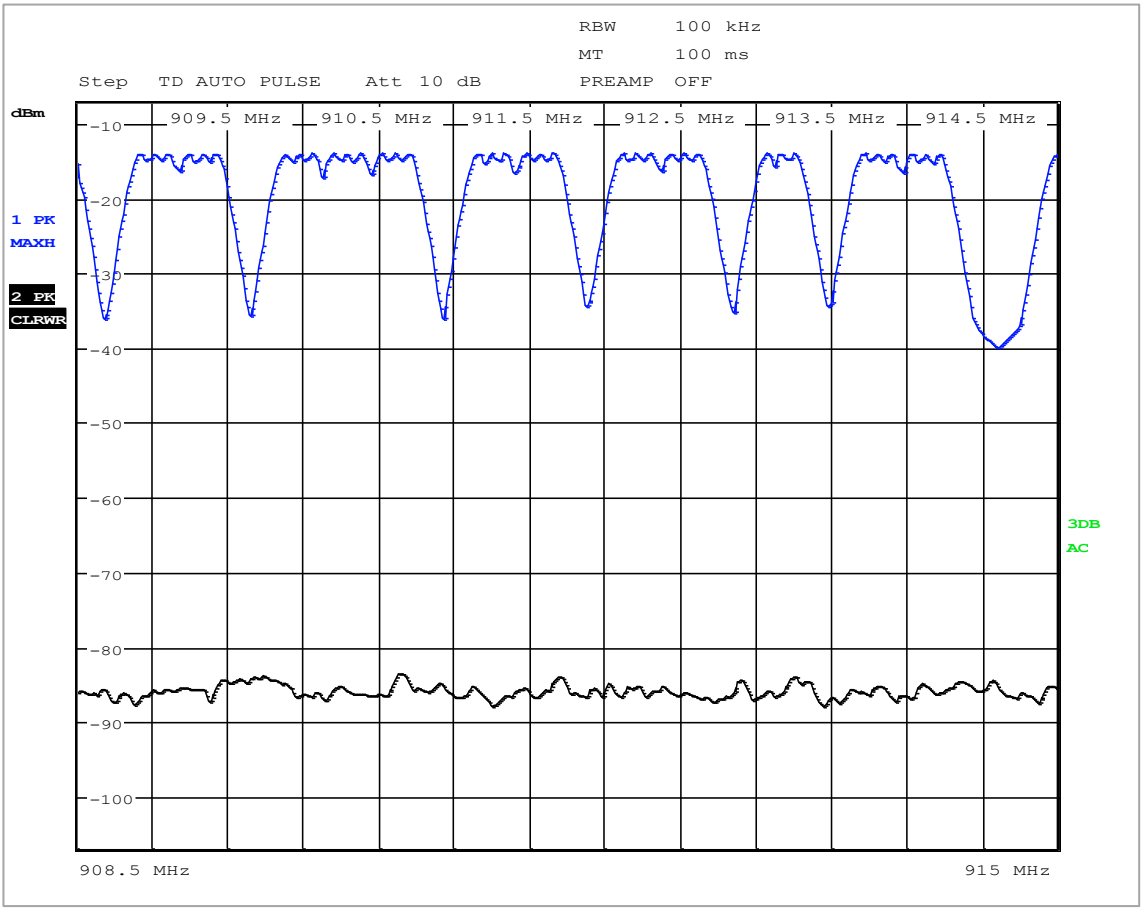


Plot 24: Number of Hopping Channels → 921MHz to 928MHz ~11 frequencies

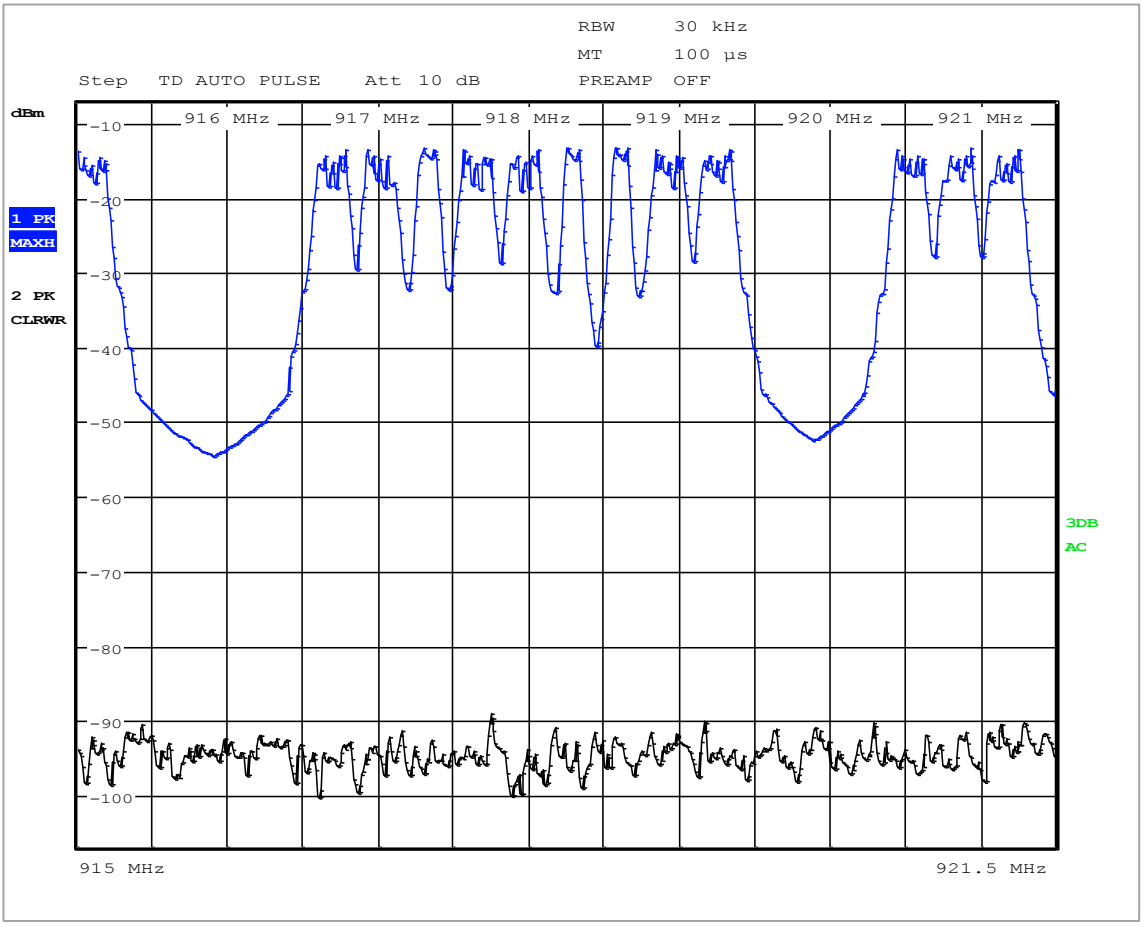
High Data Rate



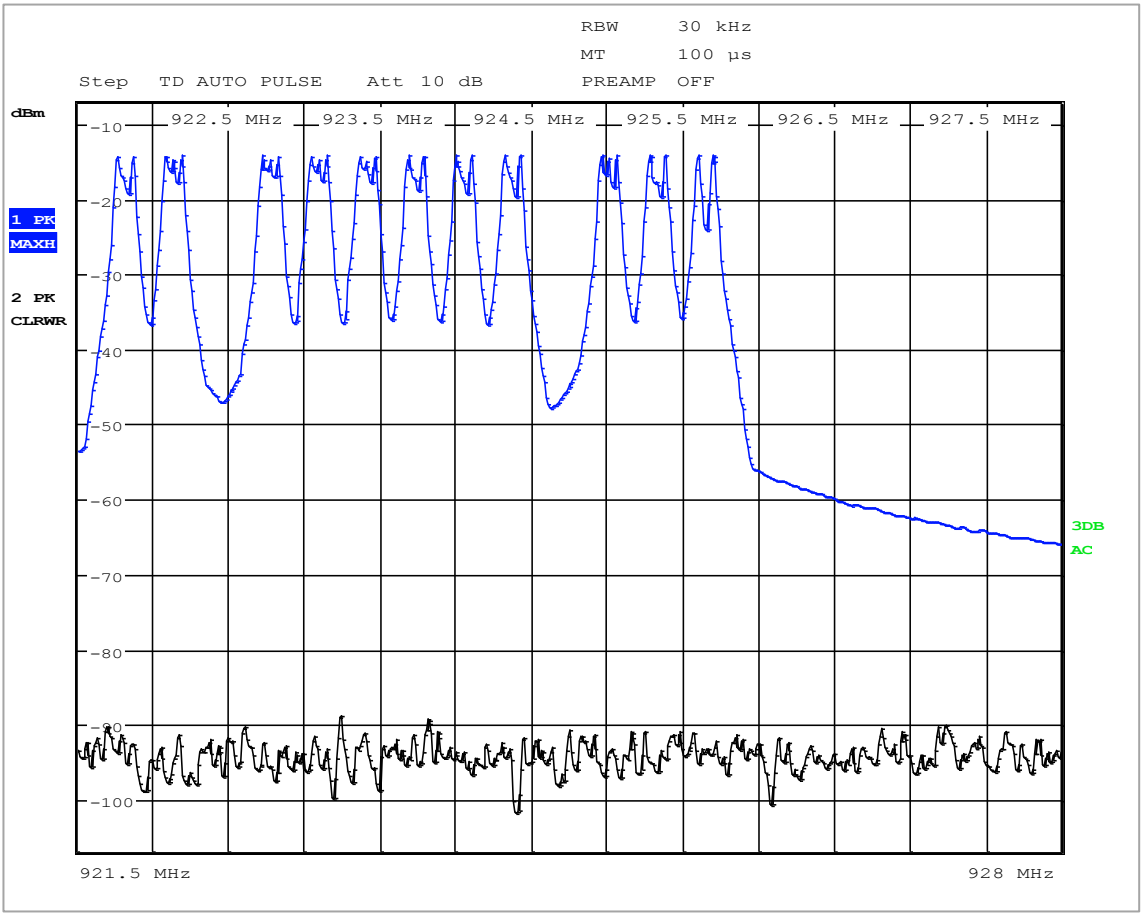
Plot 25: Number of Hopping Channels → 902MHz to 908MHz ~14 frequencies



Plot 26: Number of Hopping Channels → 908MHz to 915MHz ~12 frequencies

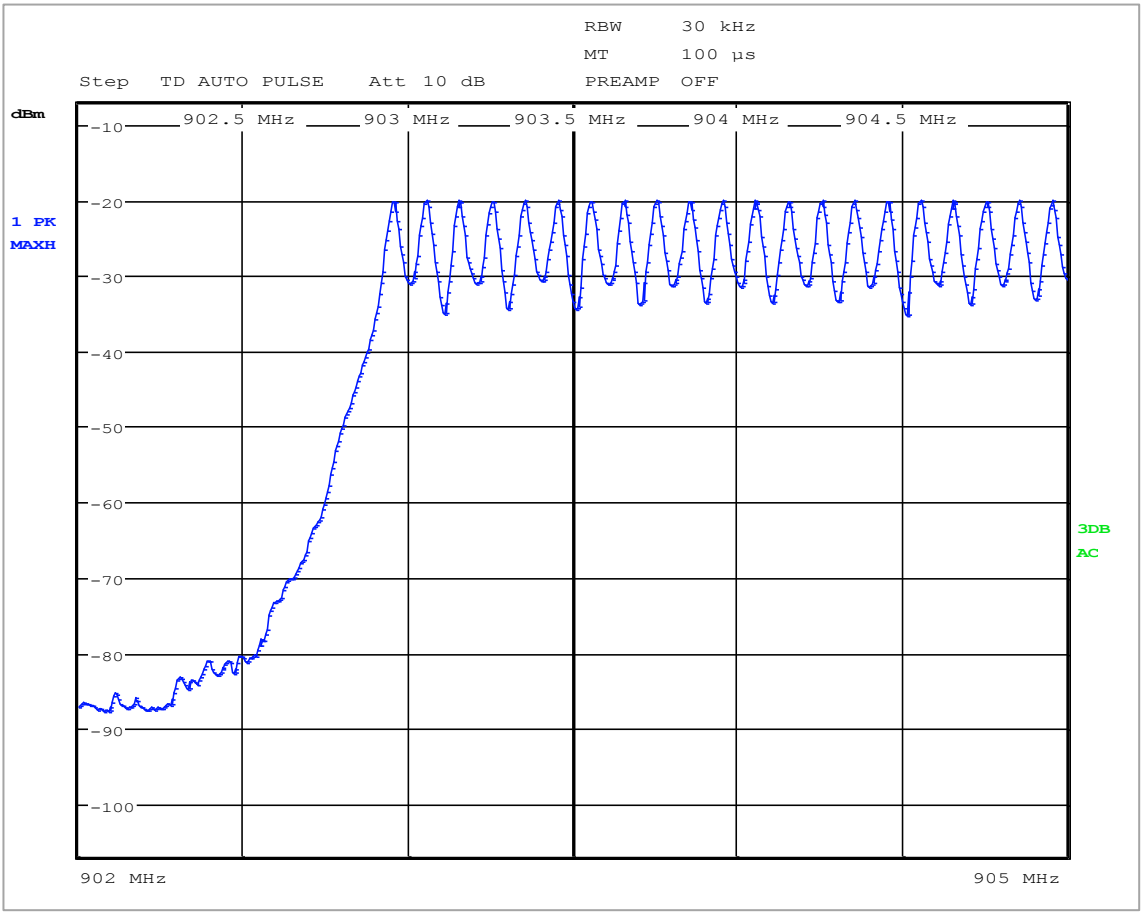


Plot 27: Number of Hopping Channels → 915MHz to 921MHz ~13 frequencies

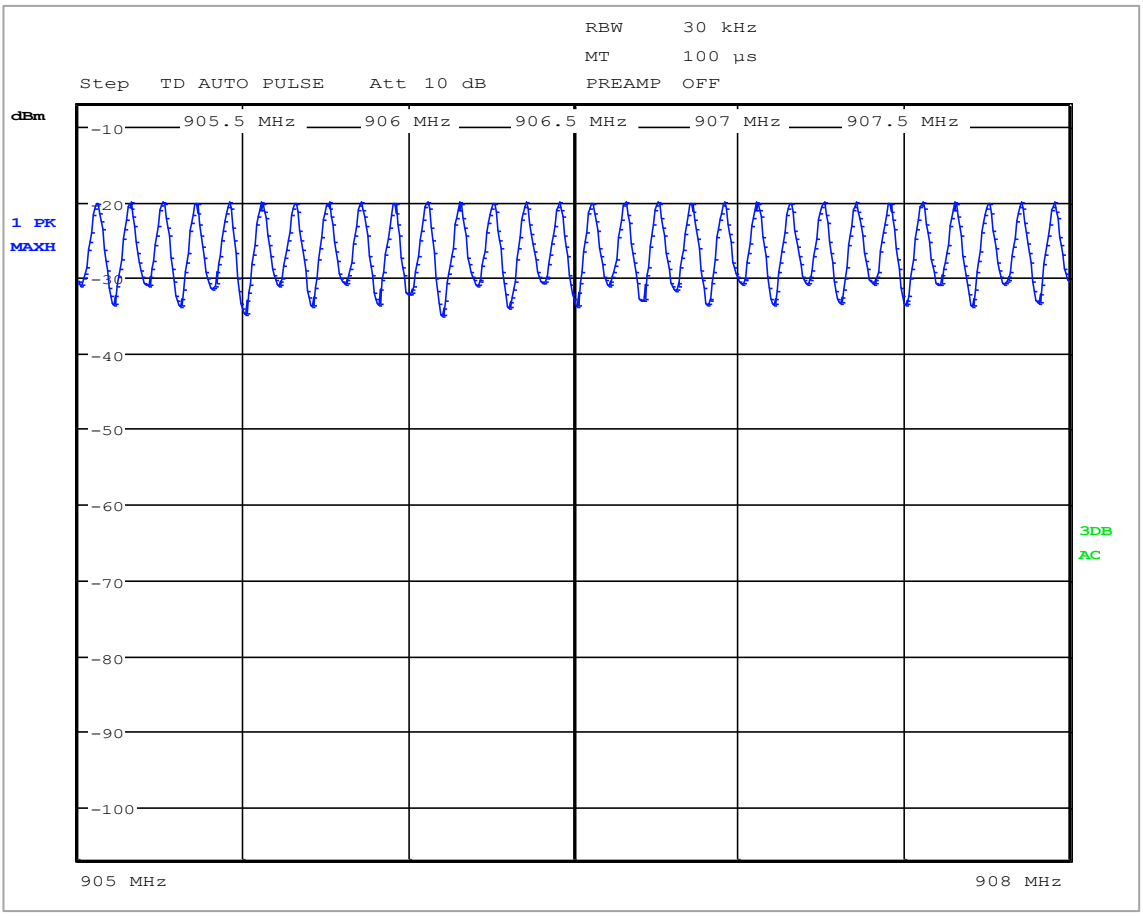


Plot 28: Number of Hopping Channels → 921MHz to 928MHz ~11 frequencies

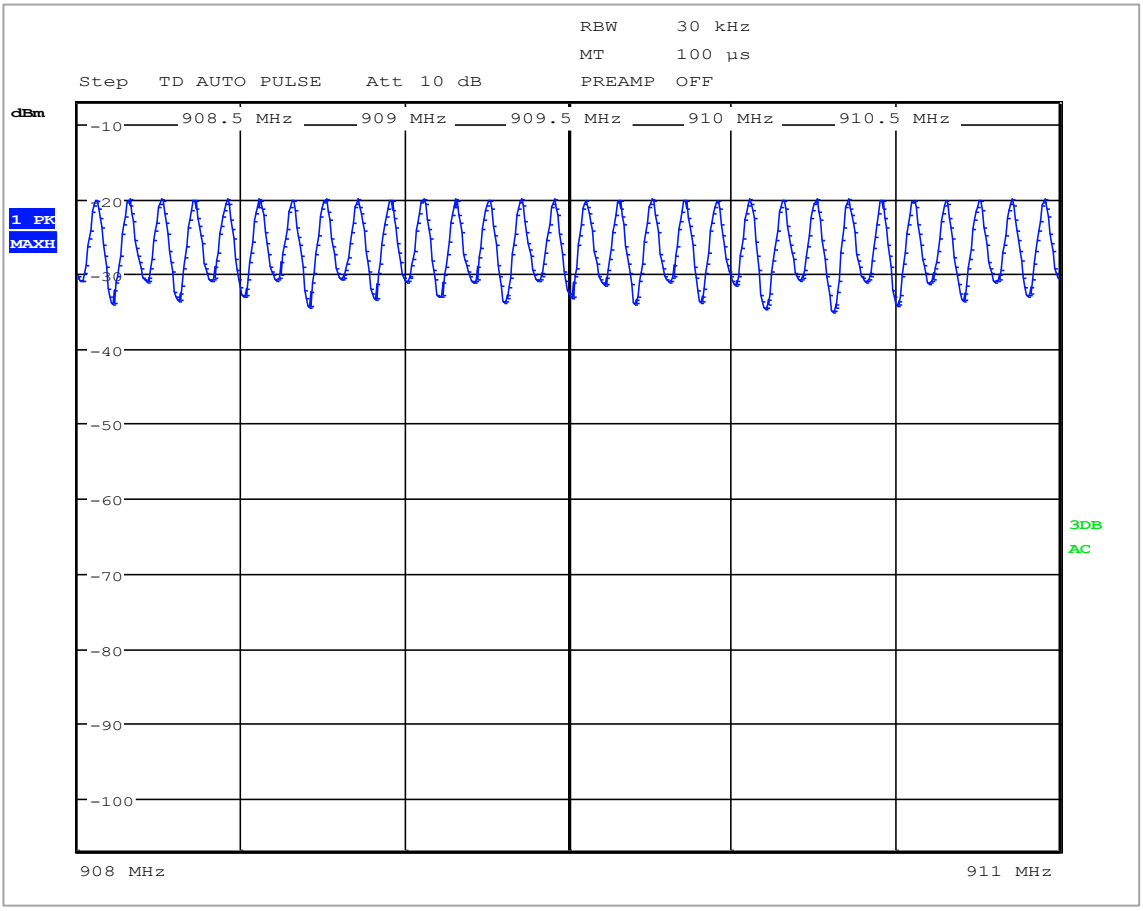
Data rate for communication to approved Part 15 device



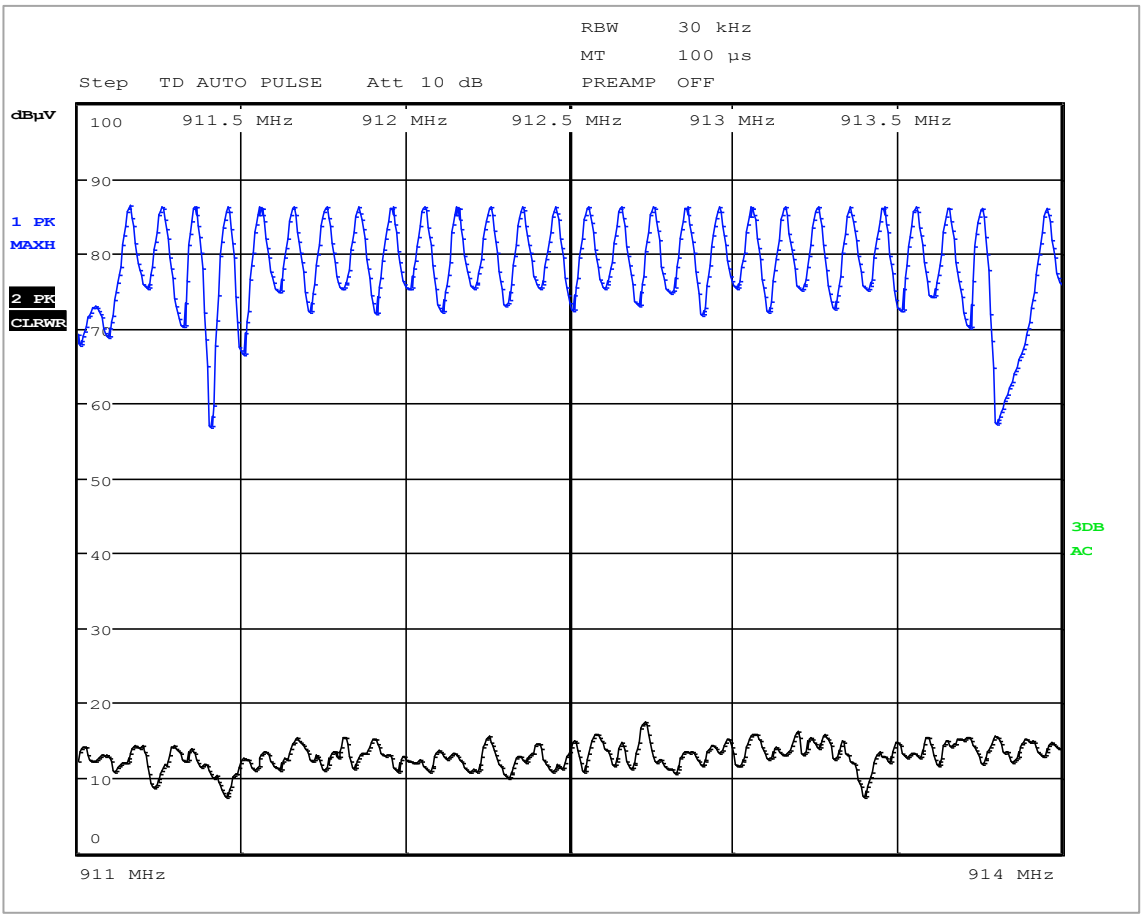
Plot 29: Number of Hopping Channels → 902MHz to 905MHz ~10 frequencies



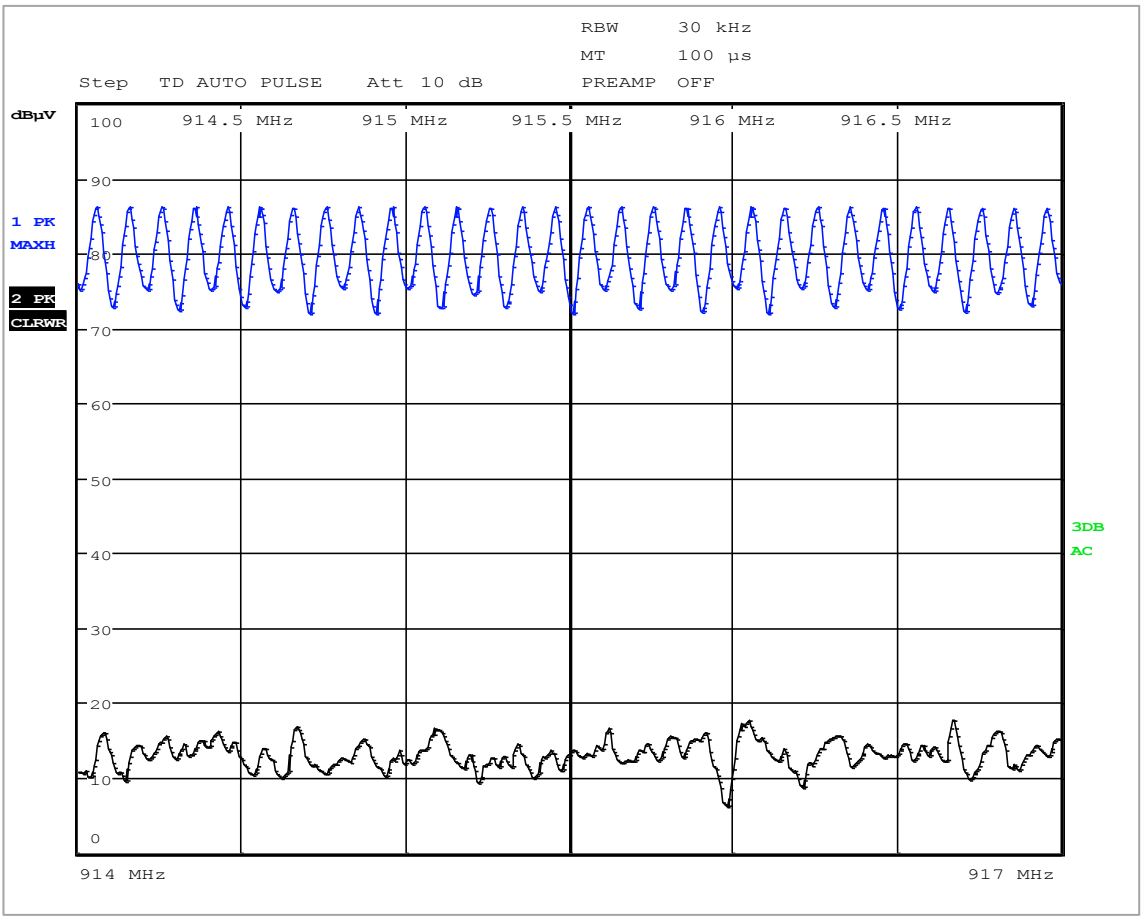
Plot 30: Number of Hopping Channels → 905MHz to 908MHz ~15 frequencies



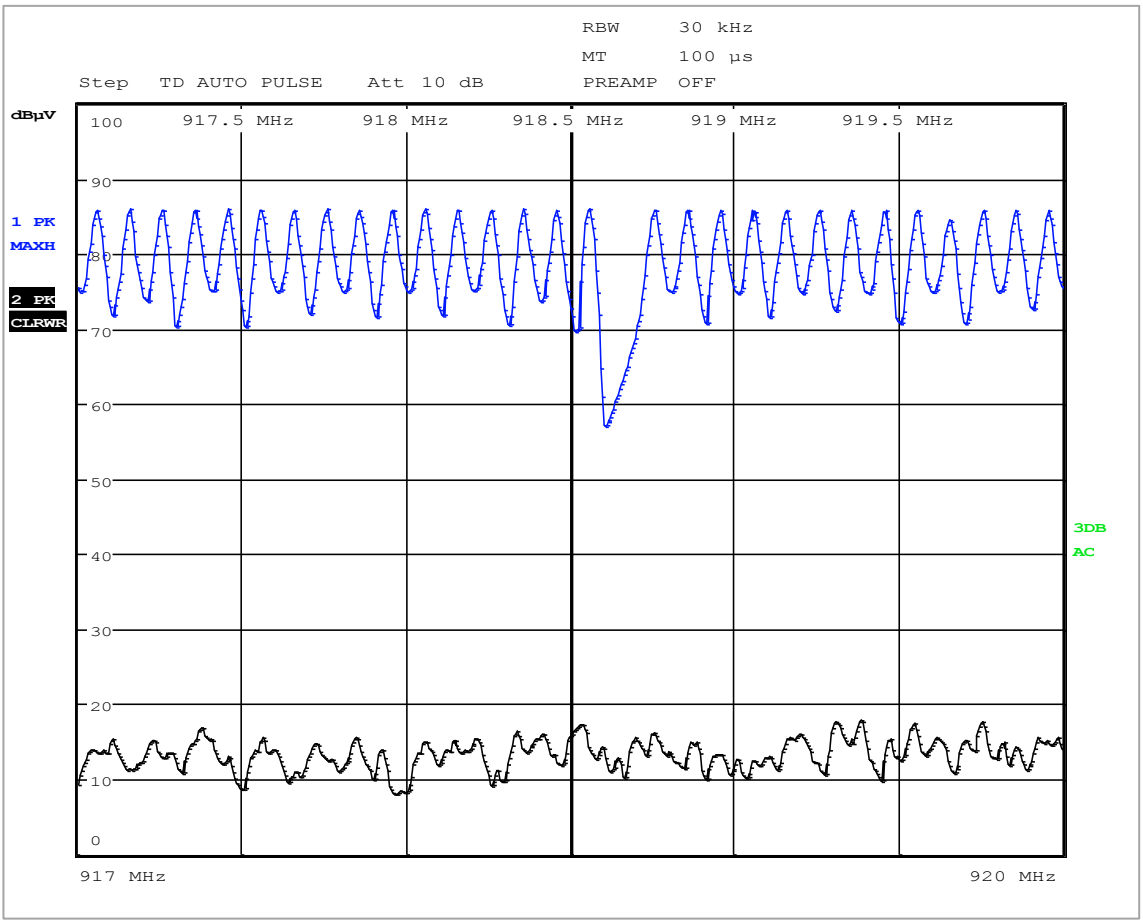
Plot 31: Number of Hopping Channels → 908MHz to 911MHz ~15 frequencies



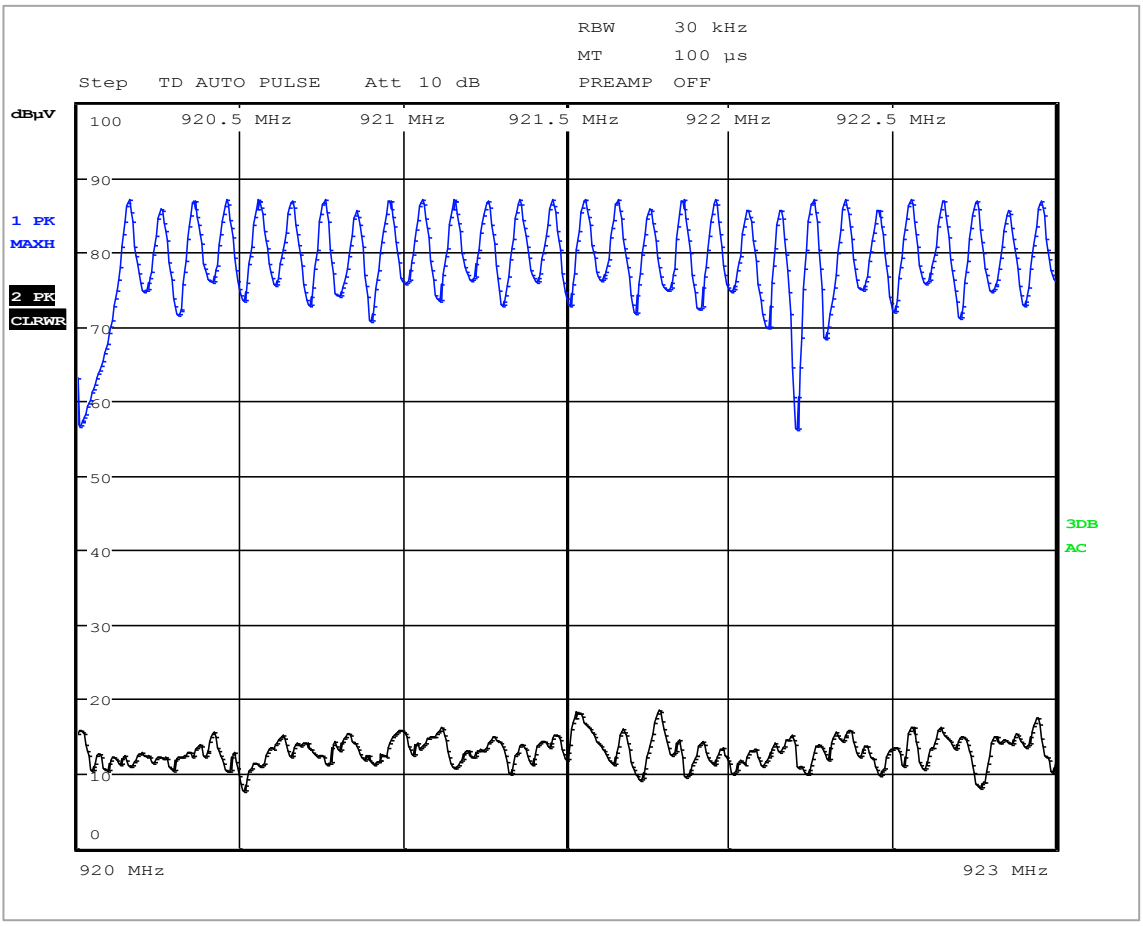
Plot 32: Number of Hopping Channels → 911MHz to 914MHz ~14 frequencies



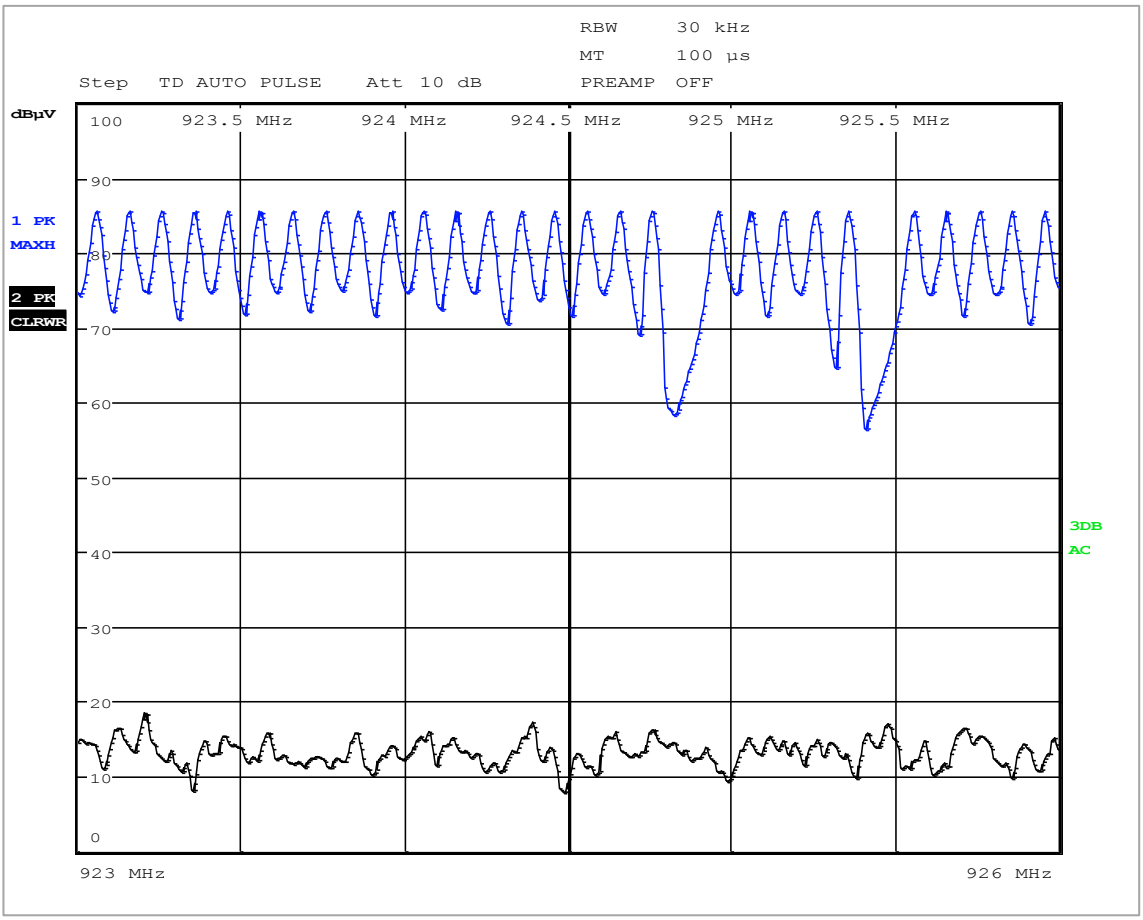
Plot 33: Number of Hopping Channels → 914MHz to 917MHz ~15 frequencies



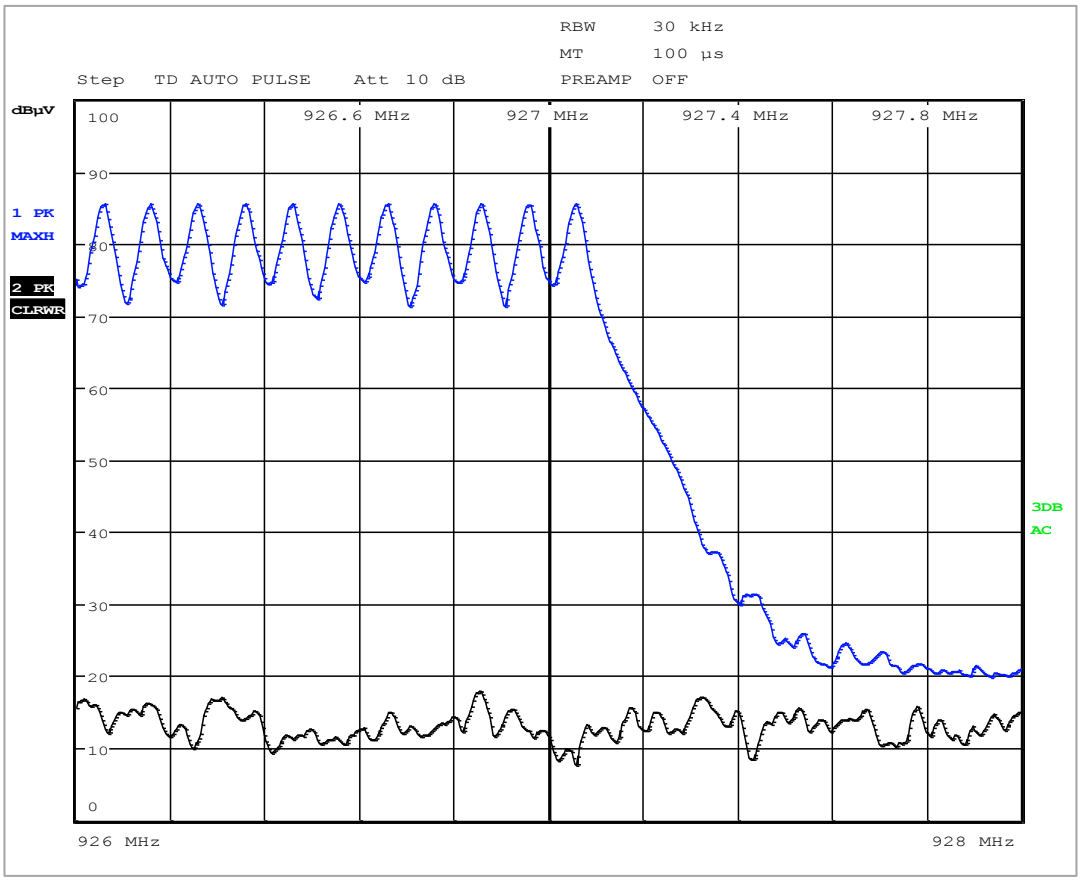
Plot 34: Number of Hopping Channels → 917MHz to 920MHz ~14 frequencies



Plot 35: Number of Hopping Channels → 920MHz to 923MHz ~14 frequencies



Plot 36: Number of Hopping Channels → 923MHz to 926MHz ~13 frequencies



Plot 37: Number of Hopping Channels → 926MHz to 928MHz ~5 frequencies

4.7 Dwell Time and Time Occupancy Per Frequency

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.247 (a)(1)(i)
- RSS-247 Issue 2: Clause 5.1 (3)

Test Method:

- ANSI C63.10:2013

Test Requirement:

For FHSs in the band 902-928 MHz: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be500 kHz.

Test Setup:

The antenna port of EUT was directly connected to a spectrum analyzer.

Measurement Method:

As called in ANSI C63.10-2013.

Modifications:

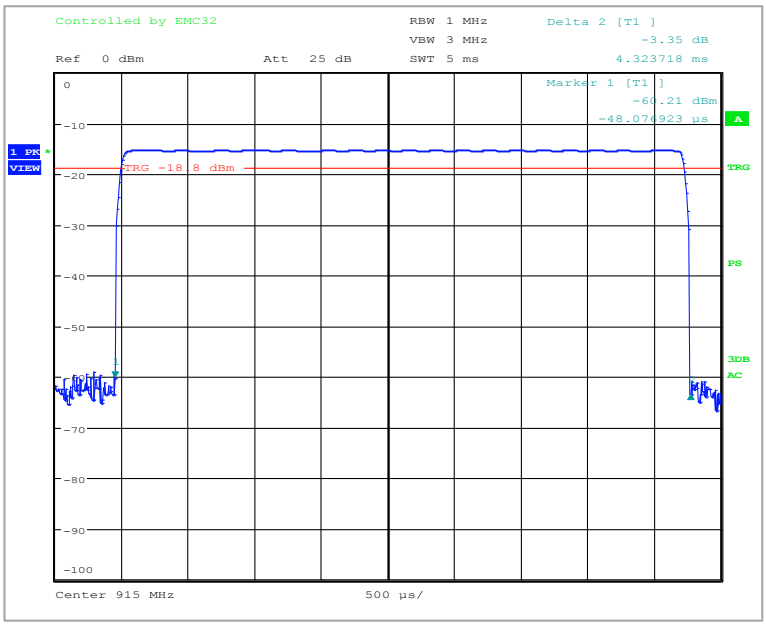
No modification was required to comply for this test.

Result:

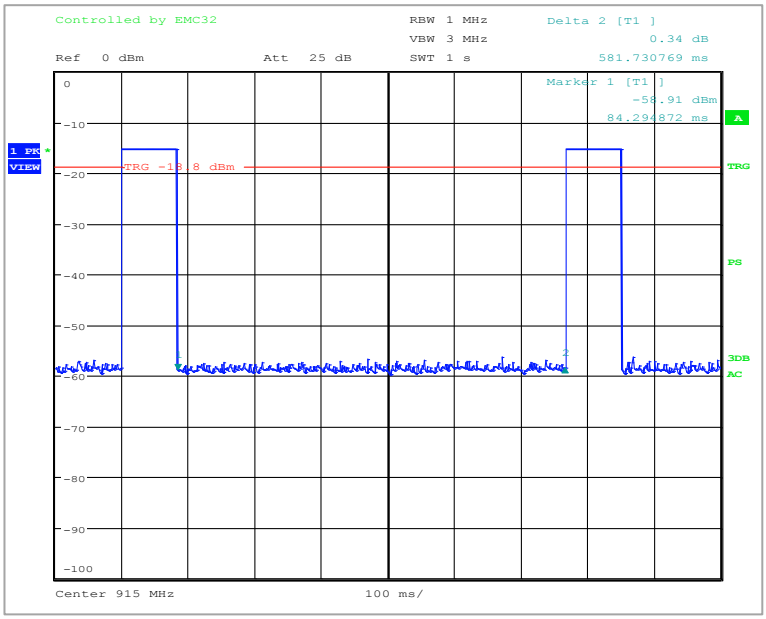
The EUT complies with the applicable standard.

Measurement Data and Plot:

Low Data Rate



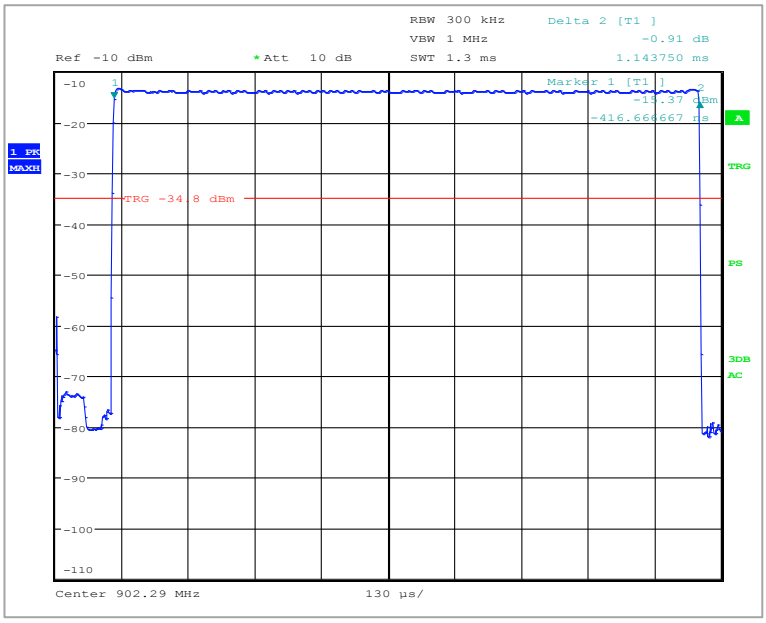
Plot 38: Dwell Time → 4.324ms



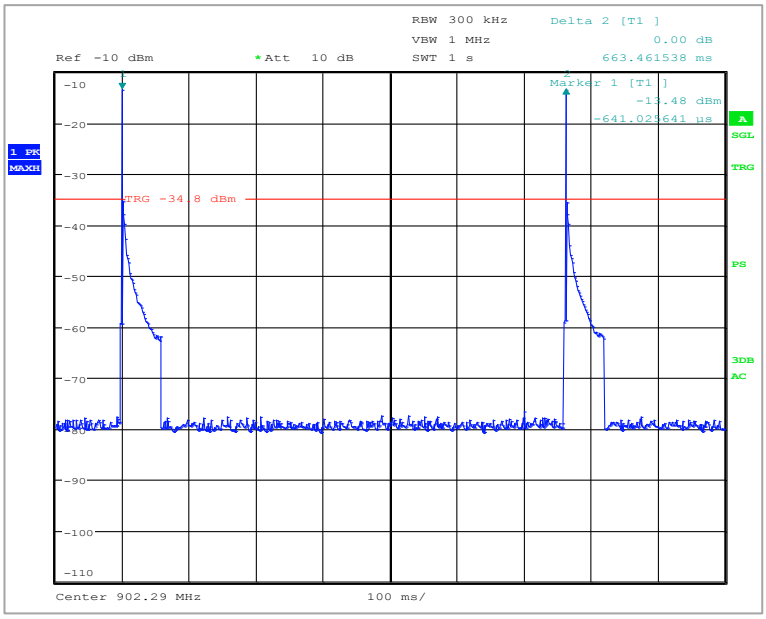
Plot 39: Time Occupancy Per Frequency → 149ms

Time between 2 consecutive transmissions on the same frequency is 0.582s
Dwell time per frequency is 4.324ms
Therefore, occupancy time per frequency within 20 seconds' period is $\frac{0.004324s \times 20s}{0.582s} = 149ms$

High Data Rate



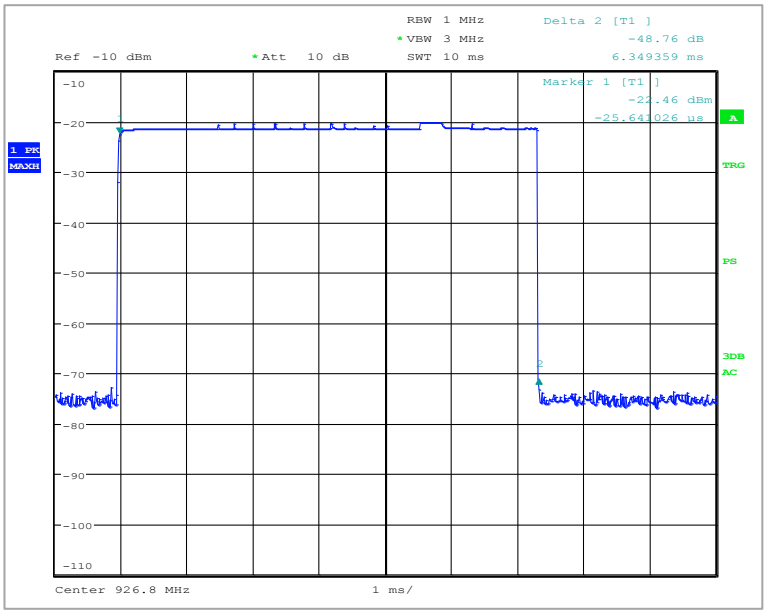
Plot 40: Dwell Time → 1.144ms



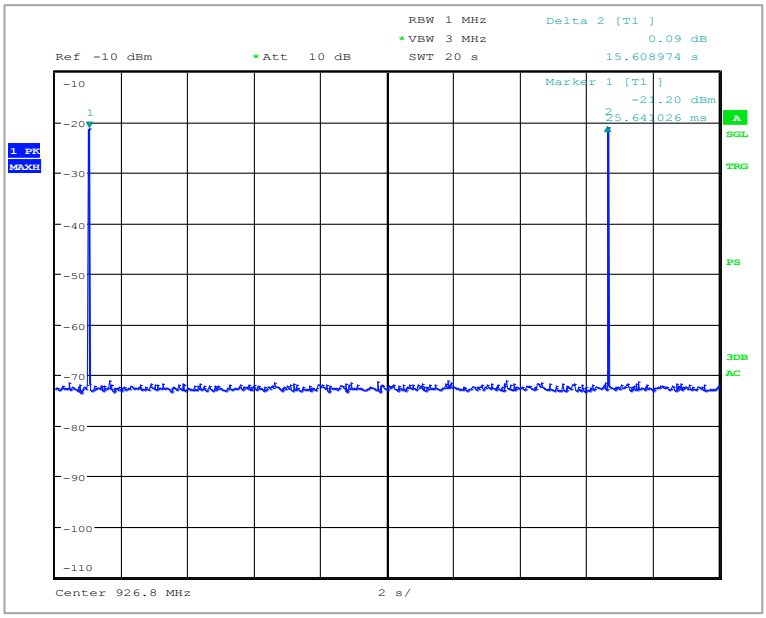
Plot 41: Time Occupancy Per Frequency → 34.5ms

Time between 2 consecutive transmissions on the same frequency is 0.663s
Dwell time per frequency is 1.144ms
Therefore, occupancy time per frequency within 20 seconds' period is $\frac{0.001144s \times 20s}{0.663s} = 34.5ms$

Data rate for communication to approved Part 15 device



Plot 42: Dwell Time → 6.35ms



Plot 43: Time Occupancy Per Frequency → 1.104ms

There are 115 channels in the pseudo random sequence when EUT is communicating to OEM Part 15 approved device, therefore, next same channel will be used is in 115s
Dwell time per frequency is 6.35ms
Therefore, occupancy time per frequency within 20 seconds' period is $\frac{0.00635s \times 20s}{115s} = 1.104ms$

4.8 Radiated Spurious Emissions Transmit Mode

Date Performed:

April 7-10, 2017

Test Standard:

- FCC Title 47 CFR Part 15: Subpart C §15.209
- FCC Title 47 CFR Part 15: Subpart C §15.205
- RSS-Gen Issue 4: Clause 8.9
- RSS-Gen Issue 4: Clause 8.10

Test Method:

- ANSI C63.10:2013

Test Requirement:

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20 dB below the level of the fundamental or to the general field strength limits listed in Rss-Gen Issue 4, whichever is less stringent.

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency if the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. **Unwanted emissions falling into restricted bands of shall comply with the limits specified below**

Frequency (MHz)	Field Strength (dBµV/m) at 3m
0.009 – 0.490	128.5 – 93.8
0.490 – 1.705	73.8 – 63.0
1.705 – 30.0	69.5

Frequency (MHz)	Field Strength Quasi Peak dBµV/m @ 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0

FCC PART 15.205-RESTRICTED BANDS OF OPERATION

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1] 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

*** - note FCC-specific .**

Canada-specific frequency ranges in MHz – 3.020-3.026, 5.677–5.683, 121.94-123.0. 149.9-150.05, 162.0125-167.17, 167.72-173.2, 1300-1427, 2483.5-2500, 3500-3600,

(2) Above 38,6 GHz

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.

RESTRICTED FREQUENCY BANDS (RSS-GEN ISSUE 4)

MHz
0.090-0.110
2.1735-2.1905
3.020-3.026
4.125-4.128
4.17725-4.17775
4.20725-4.20775
5.677-5.683
6.215-6.218
6.26775-6.26825
6.31175-6.31225
8.291-8.294
8.362-8.366
8.37625-8.38675
8.41425-8.41475
12.29-12.293
12.51975-12.52025
12.57675-12.57725
13.36-13.41
16.42-16.423
16.69475-16.69525
16.80425-16.80475
25.5-25.67
37.5-38.25
73-74.6
74.8-75.2
108-138
156.52475-156.52525
156.7-156.9

MHz
240-285
322-335.4
399.9-410
608-614
960-1427
1435-1626.5
1645.5-1646.5
1660-1710
1718.8-1722.2
2200-2300
2310-2390
2655-2900
3260-3267
3332-3339
3345.8-3358
3500-4400
4500-5150
5350-5460
7250-7750
8025-8500

GHz
9.0-9.2
9.3-9.5
10.6-12.7
13.25-13.4
14.47-14.5
15.35-16.2
17.7-21.4
22.01-23.12
23.6-24.0
31.2-31.8
36.43-36.5
Above 38.6

Note: Certain frequency bands listed in Table 3 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in the 200– and 300– series RSSs, such as RSS-210 and RSS-310, which contain the requirements that apply to licence-exempt radio apparatus.

Test Setup:

The EUT was tested in our 3 m SAC and was positioned on the center of the turntable. The transmitter was set for continuous transmission. The lowest, middle and highest channels in the 902-928 MHz bands were measured for all radiated emissions 10kHz to 18 GHz. The EUT was pre-scanned in 3 different orthogonal orientations and was found to radiate highest when placed flat on the table top as indicated in the test photos.

Measurement Method:

ANSI C63.10:2013 radiated emissions procedure was followed to demonstrate the compliance of EUT.

Modifications:

No modification was required to comply for this test.

Result:

The EUT complies with the applicable standard.

Measurement Data and Plot:

EUT Test Mode:

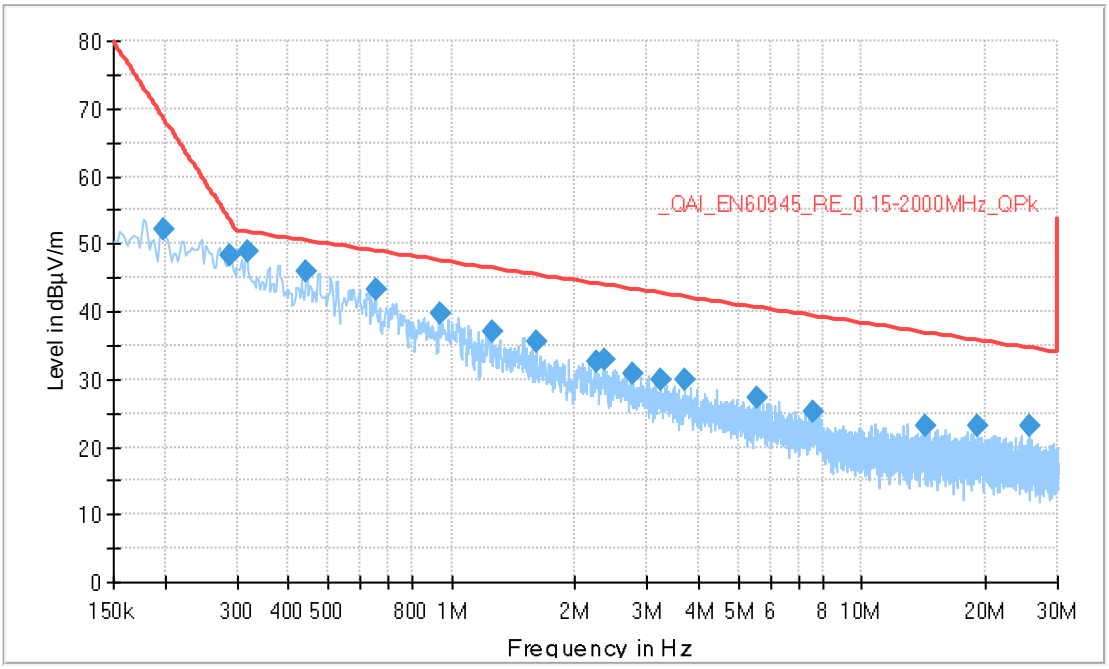
- Transmit Mode

Test Mains Voltage Used:

- 120Vac/60Hz

Frequency Range:

- 150kHz to 30MHz



Plot 44: Radiated Emissions scanned at 3m SAC

Note 1: The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part. - *§15.31 (o)*

EUT Test Mode:

- Low Channel ~902.2MHz

Test Mains Voltage Used:

- 120Vac/60Hz

Frequency Range:

- 1GHz to 18GHz

Table 14: Average and Peak Data of Radiated Emissions measured 3m SAC – FCC/IC Class B Limit

Freq.	Pol		Corrected Peak	Peak Limit	Peak Margin		Duty Cycle Correction	Corrected Average	Average Limit	Average Margin
MHz	V or H		dBµV/m	dBµV/m	dB		dB	dBµV/m	dBµV/m	dB
2706.9	V		67.0	74	7.0		23.94	35.96	54	18.04
2706.6	H		70.27	74	3.73		23.94	41.36	54	12.64
3608.6	V		62.96	74	11.04		23.94	33.39	54	20.61
3608.6	H		63.94	74	10.06		23.94	34.59	54	19.41
4511.3	V		56.19	74	17.81		23.94	24.76	54	29.24
4511.3	H		57.37	74	16.63		23.94	28.06	54	25.94
5413.7	V		64.84	74	9.16		23.94	32.36	54	21.64
5413.7	H		62.73	74	11.27		23.94	34.56	54	19.44
8120.5	V		54.28	74	19.72		23.94	13.4	54	40.6
8120.5	H		54.76	74	19.24		23.94	13.7	54	40.3
9022.7	V		61.27	74	12.73		23.94	18.19	54	35.81
9022.7	H		59.94	74	14.06		23.94	28.09	54	25.91

Remark:

- Correction factor includes antenna factor, cable loss, and pre-amp gain (if used).
- The EUT's longest dwell time per frequency was measured to be 6.35ms per 100ms. This equates to a duty cycle correction factor of -23.94dB that has been applied to the measured average values in accordance with Part 15.35(c). In accordance with 15.31(o) emissions that are 20dB below the permissible value have not been reported.

EUT Test Mode:

- Mid Channel ~915.1MHz

Test Mains Voltage Used:

- 120Vac/60Hz

Frequency Range:

- 1GHz to 18GHz

Table 15: Average and Peak Data of Radiated Emissions measured 3m SAC – FCC/IC Class B Limit

Freq.	Pol		Corrected Peak	Peak Limit	Peak Margin		Duty Cycle Correction	Corrected Average	Average Limit	Average Margin
MHz	V or H		dBµV/m	dBµV/m	dB		dB	dBµV/m	dBµV/m	dB
2745.4	V		63.26	74	10.74		23.94	34.76	54	19.24
2745.4	H		67.19	74	6.81		23.94	38.46	54	15.54
3660.1	V		60.85	74	13.15		23.94	30.66	54	23.34
3660.1	H		62.1	74	11.9		23.94	30.86	54	23.14
4575.3	V		56.65	74	17.35		23.94	24.72	54	29.28
4575.3	H		55.71	74	18.29		23.94	24.22	54	29.78
5490.4	V		64.37	74	9.63		23.94	29.06	54	24.94
5490.4	H		61.78	74	12.22		23.94	29.96	54	24.04
7320.6	V		61.77	74	12.23		23.94	29.76	54	24.24
7320.6	H		60.9	74	13.1		23.94	28.46	54	25.54
8235.7	V		57.74	74	16.26		23.94	13.05	54	40.95
8235.7	H		58.08	74	15.92		23.94	16.95	54	37.05
9150	V		61.24	74	12.76		23.94	18.78	54	35.22
9150	H		60.46	74	13.54		23.94	26.38	54	27.62

Remark:

- Correction factor includes antenna factor, cable loss, and pre-amp gain (if used).
- The EUT's longest dwell time per frequency was measured to be 6.35ms per 100ms. This equates to a duty cycle correction factor of -23.94dB that has been applied to the measured average values in accordance with Part 15.35(c). In accordance with 15.31(o) emissions that are 20dB below the permissible value have not been reported.

EUT Test Mode:

- High Channel ~927.7MHz

Test Mains Voltage Used:

- 120Vac/60Hz

Frequency Range:

- 1GHz to 18GHz

Table 16: Average and Peak Data of Radiated Emissions measured 3m SAC – FCC/IC Class B Limit

Freq.	Pol		Corrected Peak	Peak Limit	Peak Margin		Duty Cycle Correction	Corrected Average	Average Limit	Average Margin
MHz	V or H		dBµV/m	dBµV/m	dB		dB	dBµV/m	dBµV/m	dB
2783.15	V		65.45	74	8.55		23.94	36.96	54	17.04
2783.15	H		66.52	74	7.48		23.94	37.66	54	16.34
3711.5	V		61.87	74	12.13		23.94	29.36	54	24.64
3711.4	H		60.59	74	13.41		23.94	29.96	54	24.04
4638.5	V		54.38	74	19.62		23.94	21.07	54	32.93
4638.7	H		54.29	74	19.71		23.94	22.57	54	31.43
7421.7	V		54.53	74	7.84		23.94	30.8	54	23.2
7421.7	H		54.2	74	8.64		23.94	33.56	54	20.44
8349.5	V		66.16	74	19.47		23.94	12.16	54	41.84
8349.5	H		65.36	74	19.8		23.94	12.36	54	41.64

Remark:

- Correction factor includes antenna factor, cable loss, and pre-amp gain (if used).
- The EUT's longest dwell time per frequency was measured to be 6.35ms per 100ms. This equates to a duty cycle correction factor of -23.94dB that has been applied to the measured average values in accordance with Part 15.35(c). In accordance with 15.31(o) emissions that are 20dB below the permissible value have not been reported.

Appendix A: TEST SETUP PICTURES

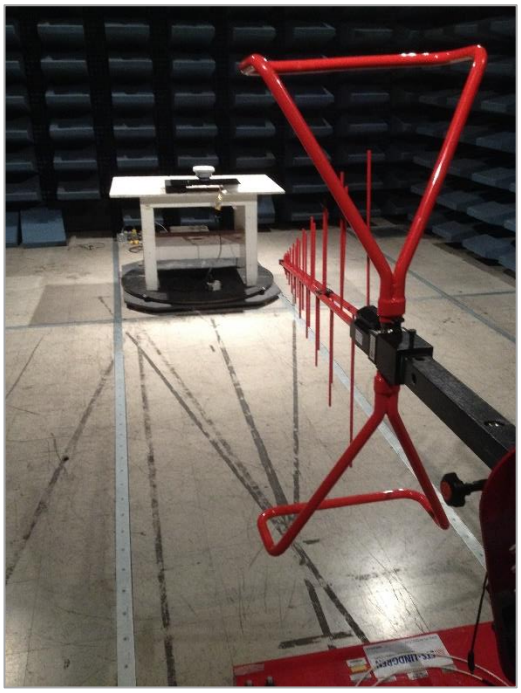


Figure 1: Radiated Emissions (below 1GHz) Test Setup

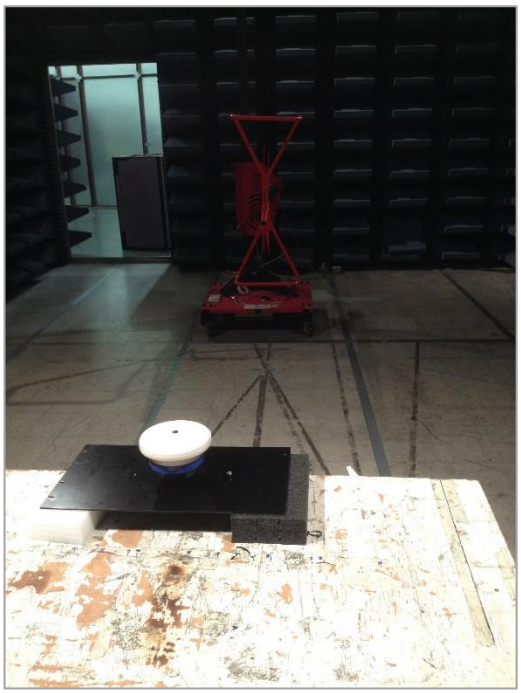


Figure 2: Radiated Emissions (close-up view) Test Setup

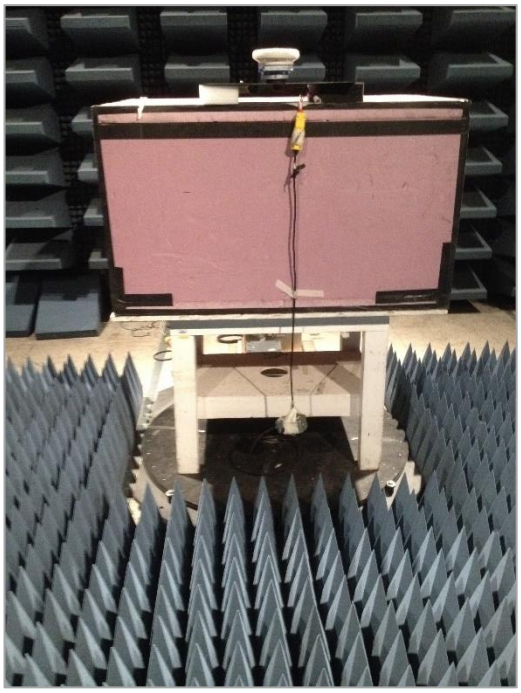


Figure 3: Radiated Emissions (close-up view) Test Setup

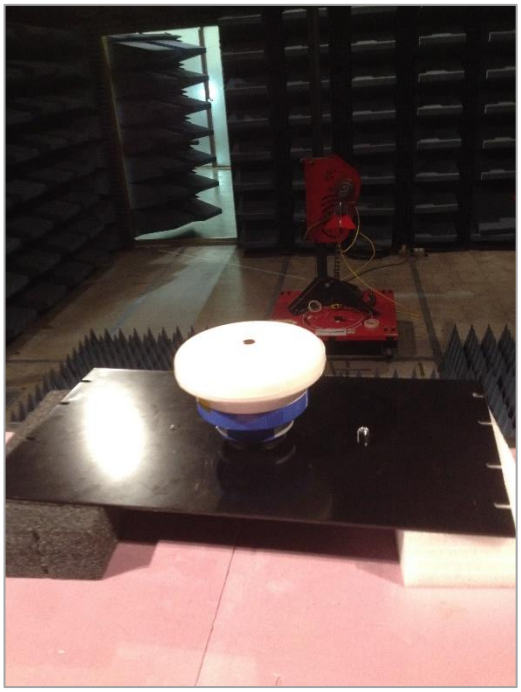


Figure 4: Radiated Emissions (above 1GHz) Test Setup

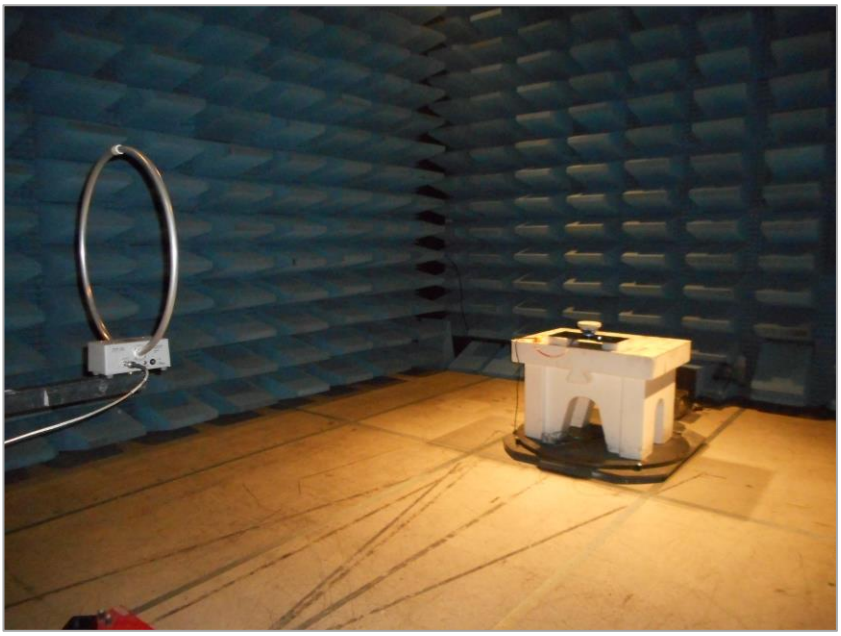


Figure 5: Radiated Emissions (below 30MHz) Test Setup

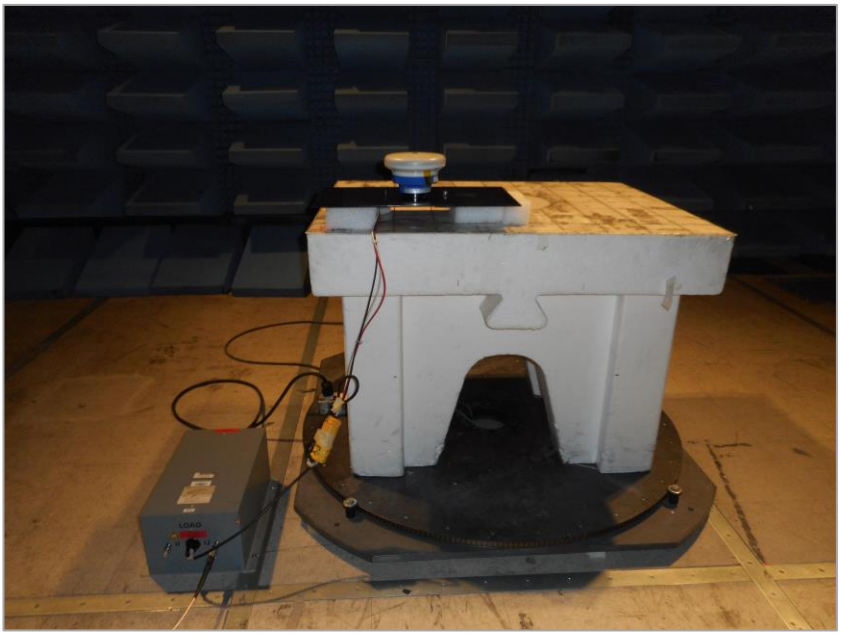


Figure 6: Conducted Emissions Test Setup

Appendix B: ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
DC	Direct Current
E.I.R.P.	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EUT	Equipment Under Test
FCC	Federal Communications Commission
IC	Industry Canada
ICES	Interference-Causing Equipment Standard
LISN	Line Impedance Stabilizing Network
OATS	Open Area Test Site
RF	Radio Frequency
RMS	Root-Mean-Square
RSS	Radio Standards Specifications
SAC	Semi-Anechoic Chamber

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END OF REPORT