



Electromagnetic Compatibility Test Report

Test Report No: PET 270714
Issued on: July 27, 2014

Product Name
PetPace GateWay

Tested According to
FCC 47 CFR, Part 15, Subparts C
IC RSS-210, Issue 8

Tests Performed for
PetPace Ltd.

7 Haavoda street, Ramat Hasharon 47445, Israel
Tel: 072-2159073

QualiTech EMC Laboratory

30 Hasivim Street, P.O.Box 7500
Petah-Tikva, 4951169, Israel
Tel: +972-3-926 6994
Fax: +972-3-928 7490



The information contained herein is the property of QualiTech, EMC Lab and is supplied without liability for errors or omissions.

*The copyright for this document vests in QualiTech, EMC Lab.
All rights reserved.*

This Test Report may not be reproduced, by any method, without the written permission of the QualiTech, EMC Lab.

If and when such permission is granted, the report must be reproduced only in the full format.

Test Personnel



Tests Performed By: -----

Dmitry Isaev



Report Prepared By: -----

Bina Talkar



Report Approved By: -----

Rami Nataf
EMC Lab. Manager
QualiTech EMC Laboratory

Test Report details:

Test commencement date: 13.07.2014
Test completion date: 23.07.2014
Customer's Representative: Tomer Fadlon
Issued on: 27.07.2014

Assessment information:

This report contains an assessment of the EUT against Electromagnetic Compatibility based upon tests carried out on the samples submitted. The results contained in this report relate only to the items tested. Manufactured products will not necessarily give identical results due to production and measurement tolerances. QualiTech, EMC Lab does not assume responsibility for any conclusion and generalization drawn from the test results with regards to other specimens or samples of type of the equipment represented by test item.

The EUT was setup and exercised using the configuration, modes of operation and arrangements defined in this report only.

Modifications:

Modifications made to the EUT

None

Modifications made to the Test Standard

None

Summary of Compliance Status

Test Spec. Clause	Test Case	Remarks
47 CFR §15.247 (a) (1), DA 00-705, RSS-210 section A8.1 (a)	20dB Bandwidth	Pass
47 CFR §15.247 (a) (1), DA 00-705, RSS-210 section A8.1 (b)	Carrier Frequency Separation	Pass
47 CFR §15.247 (a) (1)(iii), DA 00-705, RSS-210 section A8.1 (c)	Number of Hopping Channels	Pass
47 CFR §15.247 (a) (1) (iii), DA 00-705, RSS-210 section A8.1 (c)	Average Time of Occupancy (Dwell Time)	Pass
47 CFR §15.247 (b) (1), DA 00-705, RSS-210 section A8.1 (2)	Maximum Peak Output Power	Pass
47 CFR §15.247 (d), DA 00-705, RSS-210 Section A8.5	Band-edge compliance of RF Conducted Emission	Pass
47 CFR §15.247 (d), §15.209(a) & DA 00-705, RSS-210 Section A8.5	Radiated Spurious Emissions, Restricted Bands (2310-2390MHz, 2483.5-2500MHz)	Pass
47 CFR §15.247 (d), DA 00-705, RSS-210 Section A8.5	Spurious Emission - Conducted	Pass
47 CFR §15.247 (d) , §15.209(a) & DA 00-705, RSS-210 Section A8.5	Spurious Emissions - Radiated	Pass
47 CFR §15.203, RSS-Gen, Section 7.1.4	Antenna Connector Requirements	Pass
47 CFR §15.407(b)(6) & §15.107/207, ICES-003 RSS-GEN section 7.2.3.2	Power line Emission measurements	Pass

Table of Contents

1. GENERAL DESCRIPTION.....	6
2. METHOD OF MEASUREMENTS	7
2.1. Conducted RF Measurements:	7
2.2. Radiated Emissions Measurements in the restricted bands:	7
2.3. Radiated Emission measurements:.....	7
2.4. Worst Case Results:	8
2.5. Power Line Emission measurements:.....	8
3. TEST FACILITY & UNCERTAINTY OF MEASUREMENT	9
3.1. Accreditation/ Registration reference:.....	9
3.2. Test Facility description	9
3.3. Uncertainty of Measurement:.....	10
4. BLUETOOTH: REPORT OF MEASUREMENTS AND EXAMINATIONS.....	11
4.1. 20dB Bandwidth	11
4.2. Carrier Frequency Separation	14
4.3. Number of Hopping Channels	15
4.4. Average Time of Occupancy (Dwell Time).....	16
4.5. Maximum Peak Output Power	18
4.6. Band-edge compliance of RF Conducted Emission	21
4.7. Spurious Emission- Conducted Measurements.....	24
4.8. Spurious Emissions – Radiated Measurements.....	29
4.9. Antenna Connector Requirements	34
4.10. Power Line Emissions measurements	35
5. APPENDIX	39

1. General Description

Description of the EUT system/test Item:

Product name: PetPace GateWay

Model: G202B

FCC ID: 2ACUDG202B

IC ID: 12216A-G202B

Description: A stationary device to bridge remote collar communication to the cloud

Protocol: proprietary

Maximum Peak Output Power: 11.62 dBm

Frequency range: 902 -928 MHz

Type of Modulation:

Protocol	Modulation
Bluetooth	FSK

Antenna Specification:

Type: Printed

Antenna Gain:-3dBi in the range 902 – 928 MHz

2. Method of Measurements

2.1. Conducted RF Measurements:

The RF output of the transmitter under test was directly connected to the input of the Spectrum analyzer through a specialized antenna connector provided by the manufacturer, and an attenuator as specified. The external attenuator and cable loss were added to the reading. Worst-case results of the various modulation modes (where applicable) were reported.

For carrier frequency separation, number of hopping frequencies, time of occupancy, 20dB BW, peak output power, band edge emissions, and spurious emissions were measured according the guidelines in DA 00-705.

For PSD, emission peak was zoomed within the pass band with spectrum analyzer's settings as reported (Sweep time=Span/3kHz). Transmitter outputs transmitting simultaneously were aggregated through a combiner.

For Maximum Conducted Output Power, the spectrum analyzer was set for free ran, and 100 traces were averaged in power averaging mode. The transmitter was continuously transmitting, at a duty cycle of about 99%, and power was integrated across a bandwidth of the 26dB EBW of the signal, using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. Alternatively, Peak Output Power was measured using a Peak Power Meter.

For spurious emissions measurement, the spectrum from 9 kHz to 25GHz was investigated with the transmitter set to the lowest, middle and highest channel frequencies.

2.2. Radiated Emissions Measurements in the restricted bands:

For radiated emissions, which fall in the restricted bands the spectrum from 30MHz to 25GHz was investigated following the guidelines in ANSI C63.4-2003, with the transmitter set to the lowest, middle and highest channel frequencies. Measurements were performed with peak detector and repeated averaged with VBW=10Hz. Only Peak detection plots are presented.

2.3. Radiated Emission measurements:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table/support, 0.8m above the turntable, was configured, arranged and operated in a manner consistent with typical application and load conditions. The test program of exercising the equipment ensured that various parts of the EUT were exercised to permit detection of all EUT disturbances.

An appropriate antenna depending upon the frequency range, per ANSI C63.4-2003 clause 4.1.5 was used. While the turntable was being rotated, the height of the antenna was varied from 1 to 4m for the frequency range of 30MHz to 1GHz. The highest radiated emission was detected by manipulating the system cables to the worst-case position. This process was repeated for both antenna polarizations. The spectrum up to 40GHz was investigated for spurious emissions, using a band-reject filter where appropriate.

The amplitudes of worst-case emission were measured with the detector modes and resolution bandwidths over various frequency ranges according to the requirements of ANSI C63.4-2003 clause 4.2.

2.4. Worst Case Results:

Worst case result is determined as the channel with the highest output power. Pre-scan has been conducted to determine the worst-case. Worst-case results of various modulation modes/data rates were determined as the modulation with the highest output power, and that was reported.

2.5. Power Line Emission measurements:

The EUT was placed on a non-conductive table/support 80 cm above the reference ground plane. The EUT was configured in accordance with ANSI C63.4-2003 using a 50 μ H/50 ohm LISN.

Compliance with the provisions was based on the measurements of the radio frequency voltage between each line and the ground at the power terminal.

The EUT was operated in receive mode and then with DSS, DTS and DSS transmitters operating alternately and the worst case results were presented.

3. Test Facility & Uncertainty of Measurement

3.1. Accreditation/ Registration reference:

- A2LA Certificate Number: 1633.01

3.2. Test Facility description

The tests were performed at the EMC Laboratory, QualiTech Division, ECI Telecom Group

Address: 30, Hasivim St., Petah Tikva, Israel.

Tel: 972-3-926-6994

3m Anechoic Chamber:

The 3m-screened chamber is used in two configurations: the semi-anechoic configuration for Radiated Emission measurements and the full-anechoic configuration for Radiated Immunity tests.

Semi Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field $\geq 80\text{dB}$ at 15 kHz $\geq 90\text{dB}$ at 100 kHz Electric field $>120\text{dB}$ from 1MHz to 1GHz $>110\text{dB}$ from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Emerson and Cuming absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	$\pm 3.9\text{dB}$, 30MHz to 200MHz $\pm 3\text{dB}$, 200MHz to 1000MHz
Transmission Loss measured at 5 positions, at 1.5m height	$\pm 3\text{dB}$, 1GHz to 18GHz

Full-Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	7m x 4m x 3m
Antenna height	1.55m at Horizontal & Vertical polarizations
Shielding Effectiveness	Magnetic field $\geq 80\text{dB}$ at 15 kHz $\geq 90\text{dB}$ at 100 kHz Electric field $>120\text{dB}$ from 1MHz to 1GHz $>110\text{dB}$ from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Emerson and Cuming absorbing material in selected positions on the walls and floor
Field Uniformity to EN61000-4-3	$\pm 3\text{dB}$ 80MHz to 18GHz

3.3. Uncertainty of Measurement:

Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements”. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Name	Range	Expanded U lab Uncertainty	U CISPR Uncertainty
Radiated Emission	30MHz÷200MHz, Horiz. Polar.	± 4.77 dB	±5.06
	30MHz÷200MHz, Ver. Polar.	± 4.90 dB	±5.17
	200MHz÷1000MHz, Horiz. Polar.	± 4.96 dB	±5.34
	200MHz÷1000MHz, Vert. Polar.	± 6.15 dB	±6.32
	1.0GHz -6.0GHz	± 4.33 dB	±5.18
	6.0GHz-18.0GHz	± 4.75 dB	±5.48
Conducted Emission	9 kHz÷150 kHz	± 3.47 dB	±3.83
	150 kHz÷30MHz	± 3.18 dB	±3.44

Note: QualiTech EMC labs expanded measurement instrumentation has less uncertainty than the industry norm and compliance is deemed to occur as no measured disturbance exceeds the disturbance limit.

Note: The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

4. Bluetooth: Report of Measurements and examinations

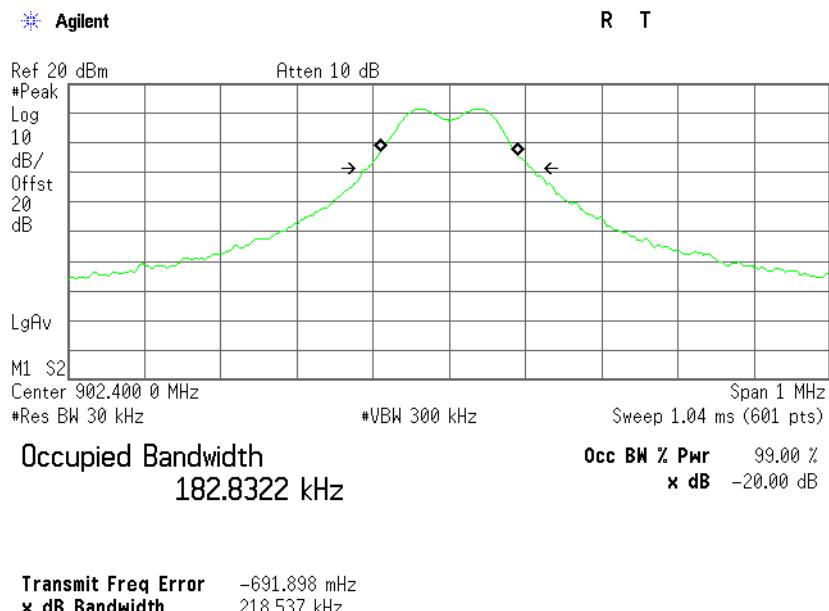
4.1. 20dB Bandwidth

Reference document:	47 CFR §15.247 (a) (1) & DA 00-705		
Test Requirements:	20dB Bandwidth of the hopping channel		
Test setup:	See Sec. 2.1	Pass	Pass
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 30kHz, VBW: 300kHz, Span: 1MHz		
Hopping function:	Disabled		
Environment conditions:	Ambient Temperature: 23.7 °C	Relative Humidity: 53.3%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 – 4.1.3	

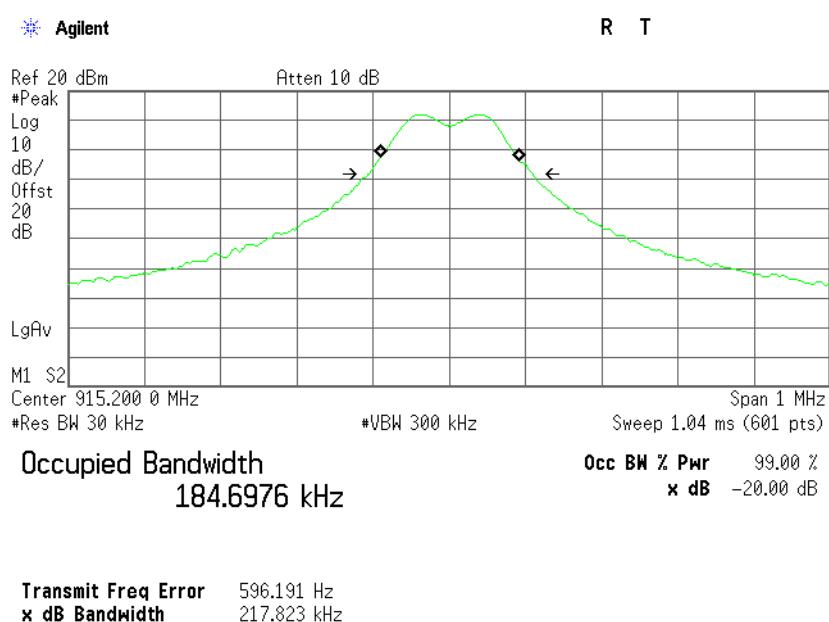
Test results:

Channel	Frequency, [MHz]	20dB BW, [kHz]	Limit, [kHz]	Delta, [kHz]	Pass/Fail
FSK					
1	902.400	218.537	500	-281.463	Pass
33	915.200	217.823		-282.177	Pass
64	927.600	213.164		-286.836	Pass

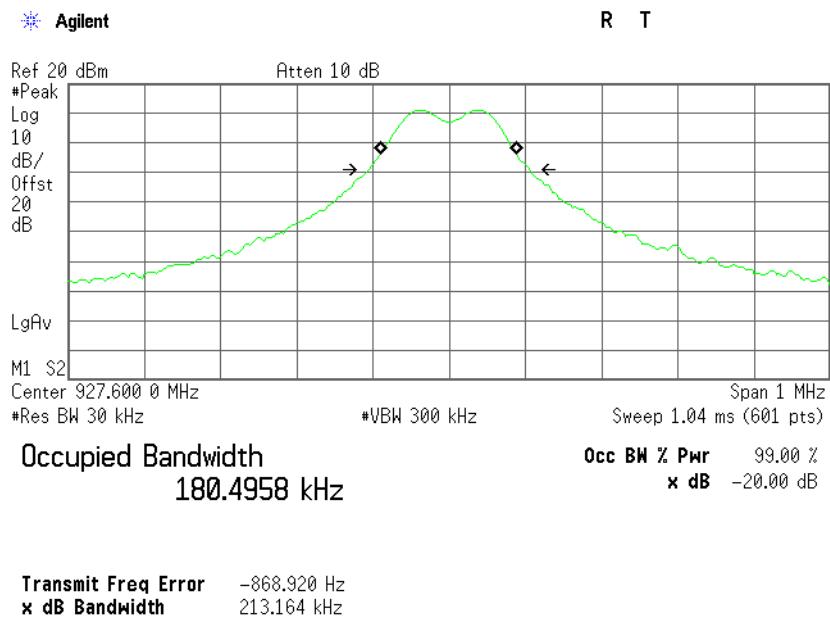
Plot 4.1.1 20dB bandwidth test results, FSK, channel 1, 902.400MHz



Plot 4.1.2 20dB bandwidth test results, FSK, channel 33, 915.200MHz



Plot 4.1.3 20dB bandwidth test results, FSK, channel 64, 927.600MHz



4.2. Carrier Frequency Separation

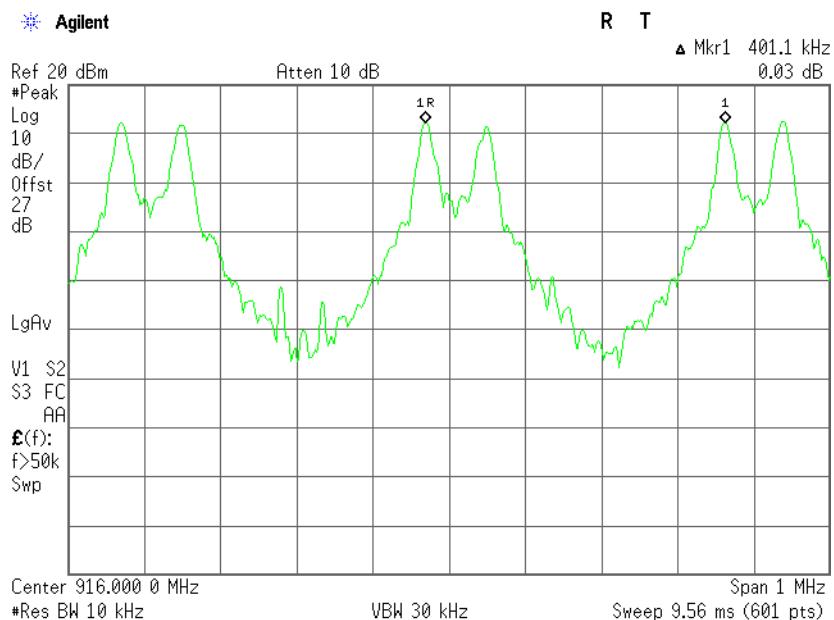
Reference document:	47 CFR §15.247 (a) (1) & DA 00-705		
Test Requirements:	In the 902 - 928 MHz band may have hopping channel carrier frequencies that are separated by a minimum of 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz		
Hopping function:	Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 53%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.2.1	

Test results:

Type of Modulation	Measured Carrier separation [kHz]	Limit*, [kHz]	Pass/Fail
FSK	401.1	≥218.537	Pass

*The limit is 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.

Plot 4.2.1 Carrier Frequency Separation test results, FSK



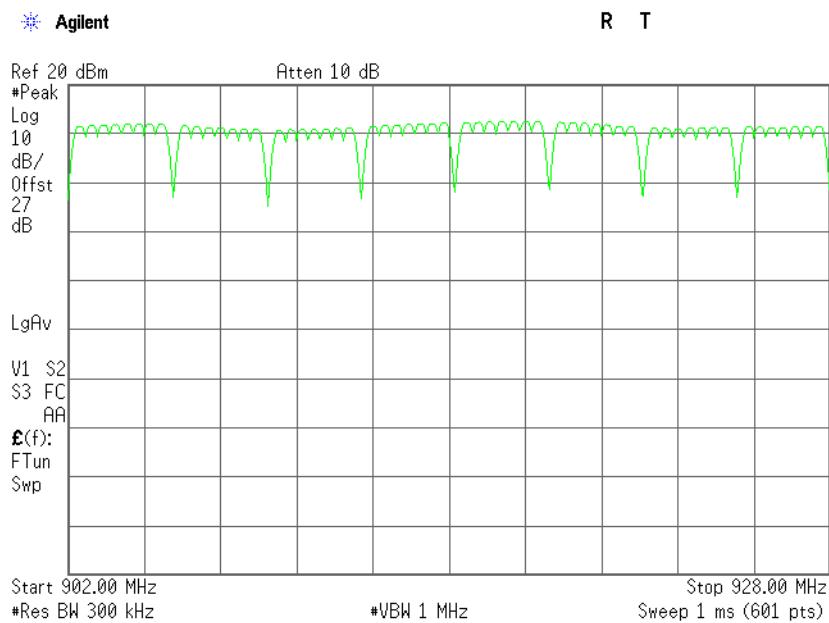
4.3. Number of Hopping Channels

Reference document:	47 CFR §15.247 (a) (1)(i) & DA 00-705		
Test Requirements:	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies		
Test setup:	See Sec. 2.1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 300kHz, VBW: 1MHz		
Hopping function:	Enabled		
Environment conditions:	Ambient Temperature: 22°C	Relative Humidity: 51%	Atmospheric Pressure: 1011.4 hPa
Test Result:	57 hopping channels	See Plot 4.3.1	

Test results:

Type of Modulation	Number of Hopping Channels	Limit	Pass/Fail	Notes
FSK	57	≥15	Pass	-

Plot 4.3.1 Number of Hopping Channels test results, FSK



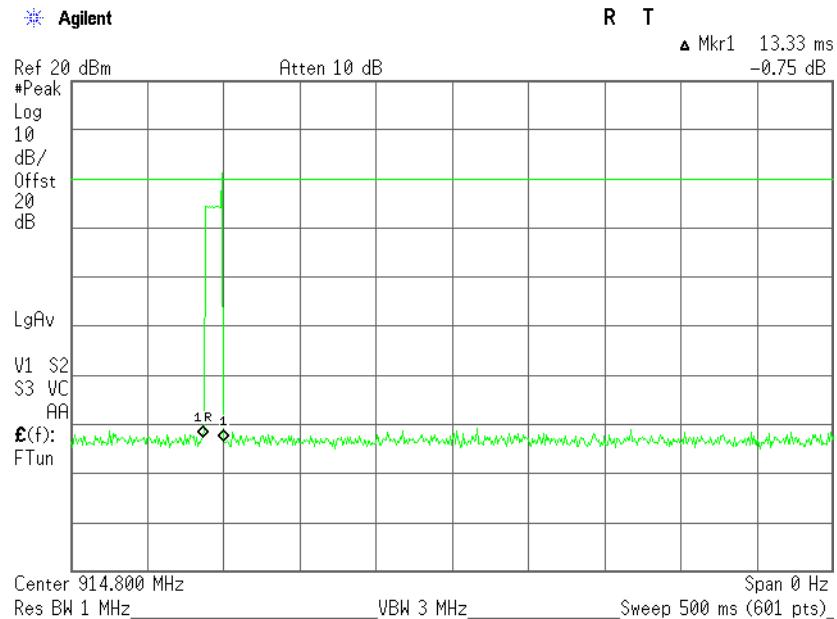
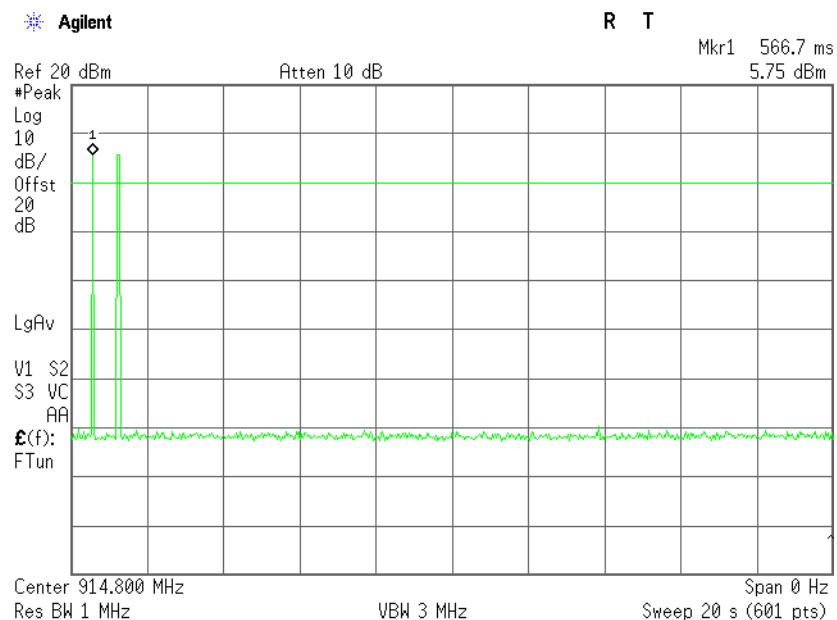
4.4. Average Time of Occupancy (Dwell Time)

Reference document:	47 CFR §15.247 (a) (1) (i) & DA 00-705		
Test Requirements:	The average time of occupancy on any frequency shall not be greater than 400 ms within a period of 20 s.		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz, Span:0 centered on hopping channel		
Hopping function:	Enabled		
Environment conditions:	Ambient Temperature: 23.5°C	Relative Humidity: 54.3%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1 – Plot 4.4.2	

Test results:

Type of Modulation	Frequency, MHz	Pulse length, msec	Period Time, s	Number of Hops in Period Time	Dwell time, ms*	Limit, [msec]	Pass/Fail
FSK	914.8	13.3	20	2	26.6	400.0	Pass

*Dwell Time = Pulse length × Number of Hops in Period time

Plot 4.4.1 Average Time of Occupancy (Dwell Time) test results, Time slot length, FSK, channel 32

Plot 4.4.2 Average Time of Occupancy (Dwell Time) test results, Number of Slots in a Period, FSK, channel 32


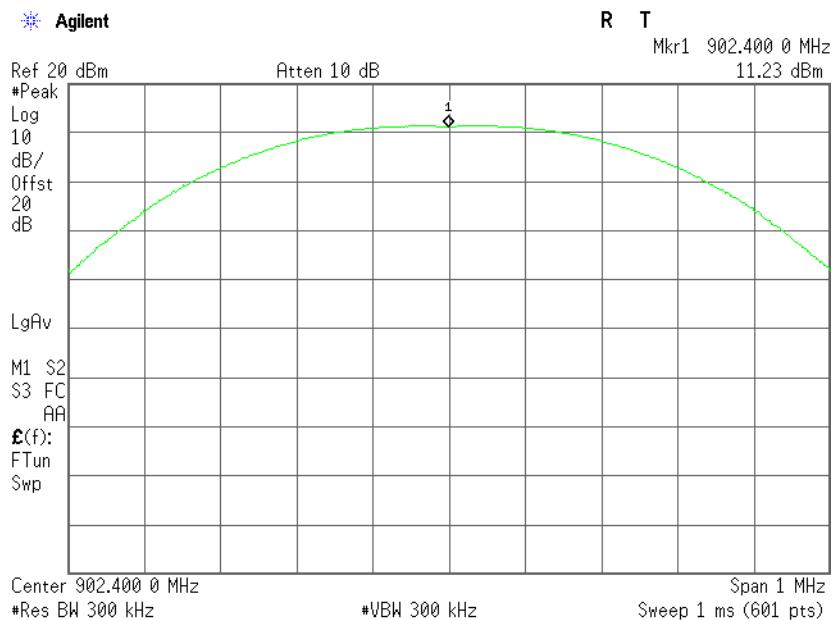
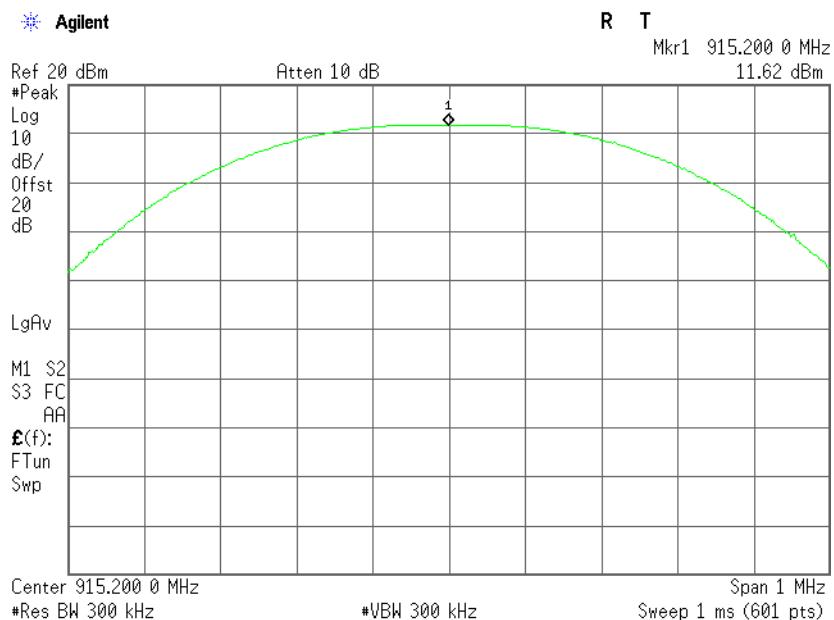
4.5. Maximum Peak Output Power

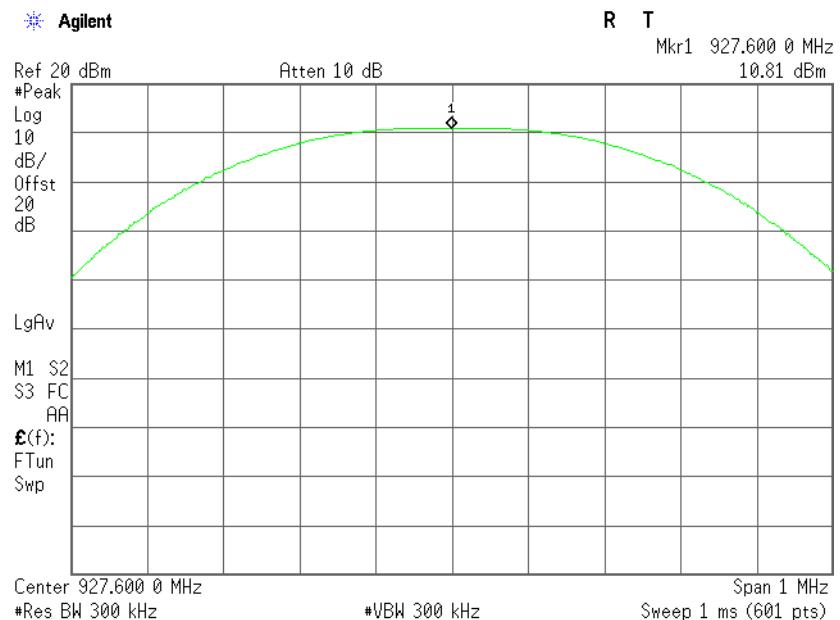
Reference document:	47 CFR §15.247 (b) (1) & DA 00-705		
Test Requirements:	The maximum peak output power shall not exceed 1Watt (30dBm)		
Test setup:	See Sec. 2.1	Pass	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 300kHz, VBW: 300kHz,		
Hopping function:	Disabled		
Environment conditions:	Ambient Temperature: 22.6°C	Relative Humidity: 54%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.5.1 – Plot 4.5.3	

Test results:

Type of Modulation	Channel	Frequency, [MHz]	Max. Peak Output power*, [dBm]	Limt, [dBm]	Delta, [dB]	Pass/Fail
FSK	1	902.400	11.23	30.00	-18.77	Pass
	33	915.200	11.62	30.00	-18.38	Pass
	64	927.600	10.81	30.00	-19.19	Pass

*Corrected for external attenuations & cable, antenna gain -3dB

Plot 4.5.1 Maximum Peak Output Power test results, FSK, channel 1, 902.400MHz

Plot 4.5.2 Maximum Peak Output Power test results, FSK, channel 33, 915.200MHz


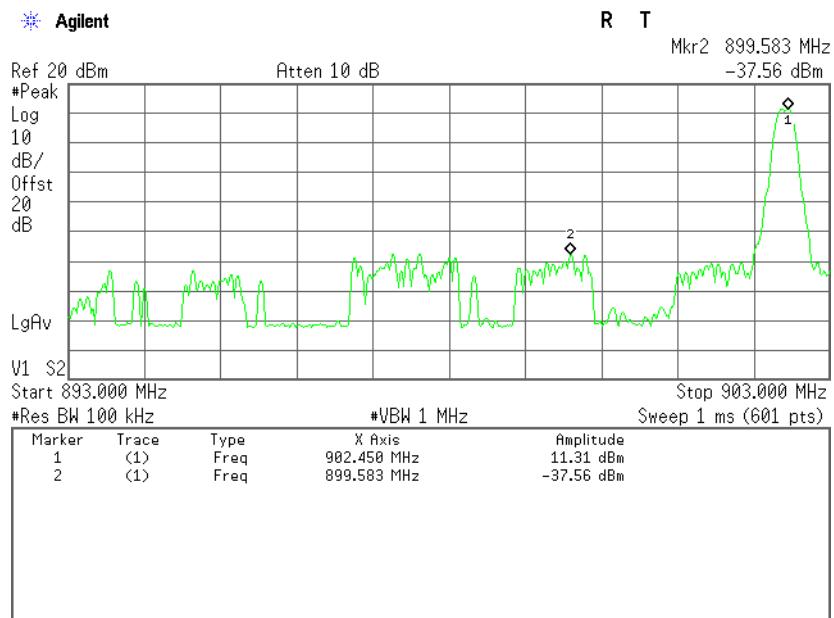
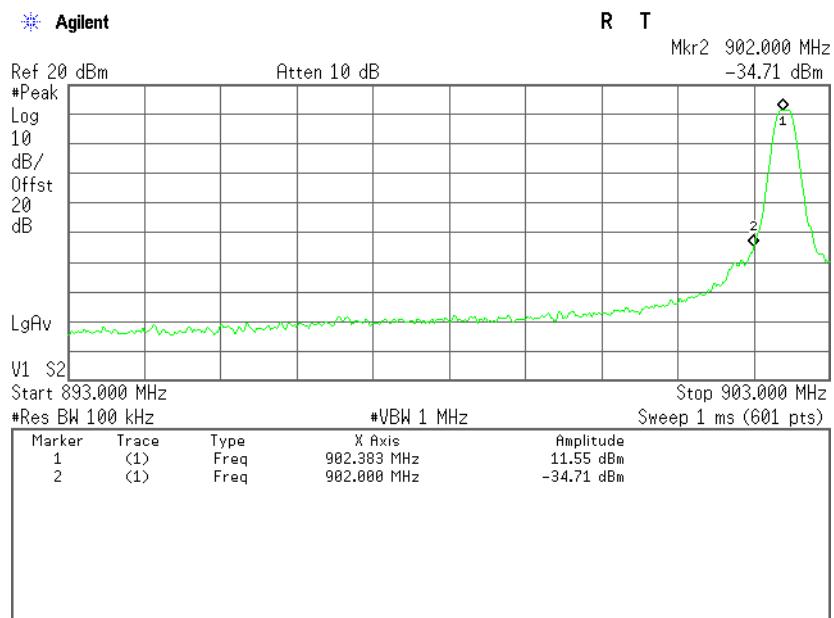
Plot 4.5.3 Maximum Peak Output Power test results, FSK, channel 64, 927.600MHz


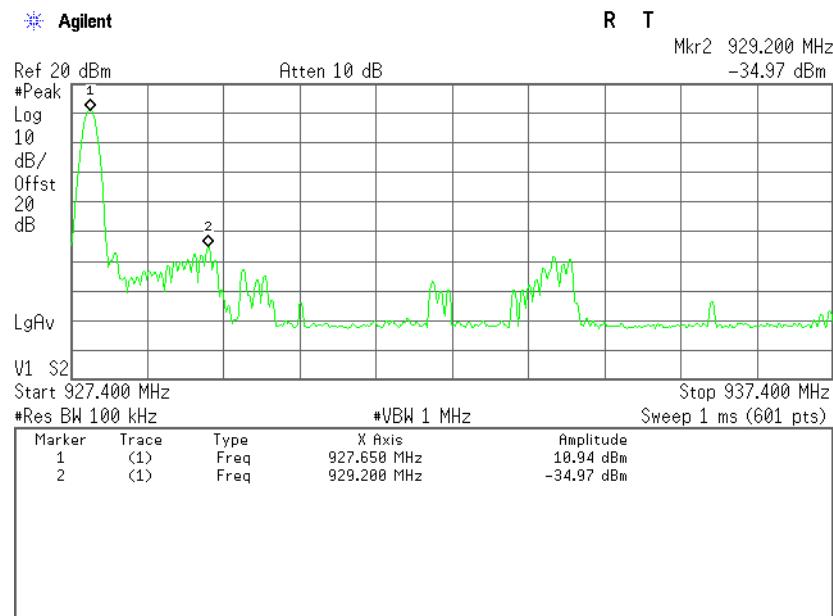
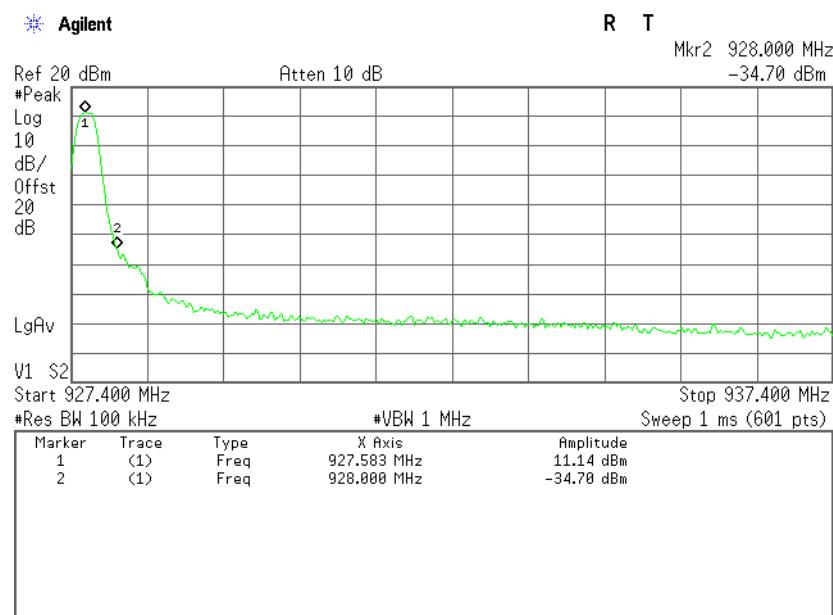
4.6. Band-edge compliance of RF Conducted Emission

Reference document:	47 CFR §15.247 (d) & DA 00-705		
Test Requirements and limit:	<p>In any 100 kHz bandwidth outside the frequency band in which the digitally modulated radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in Section §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (See §15.205(c)).</p>		
Test setup:	See Sec. 2.1		
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 1MHz		
Hopping function:	Disabled/Enabled		
Environment conditions:	Ambient Temperature: 23°C	Relative Humidity: 51%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.6.1 – Plot 4.6.4	

Test results

Type of Modulation	Mode	Channel	Measured emission, [dBc]	Limit, [dBc]	Pass/Fail
FSK	Hopping ON	1	-48.87	-20.00	Pass
		64	-45.91	-20.00	Pass
	Hopping OFF	1	-46.26	-20.00	Pass
		64	-45.84	-20.00	Pass

Plot 4.6.1 Band-edge test results, FSK, channel 1, Hopping ON

Plot 4.6.2 Band-edge test results, FSK, channel 1, Hopping OFF


Plot 4.6.3 Band-edge test results, FSK, channel 64, Hopping ON

Plot 4.6.4 Band-edge test results, FSK, channel 64, Hopping OFF


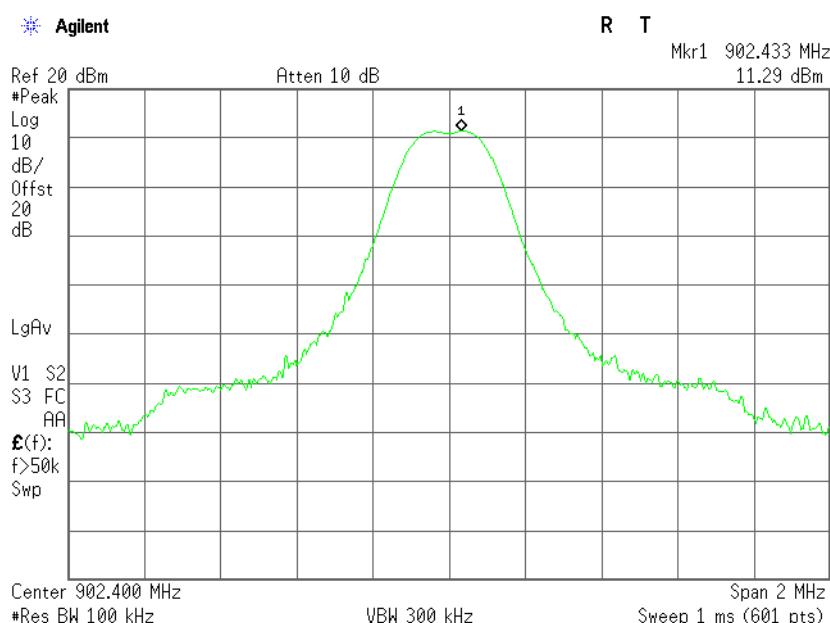
4.7. Spurious Emission- Conducted Measurements

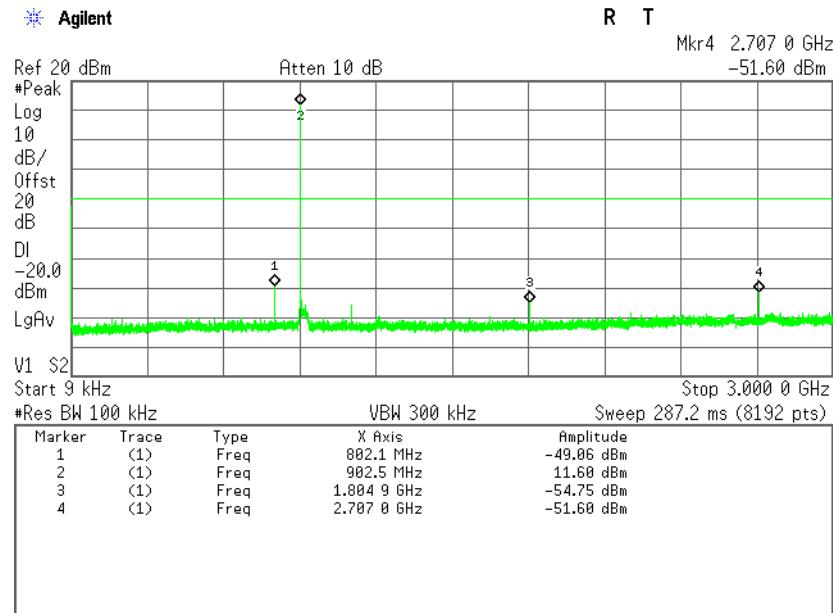
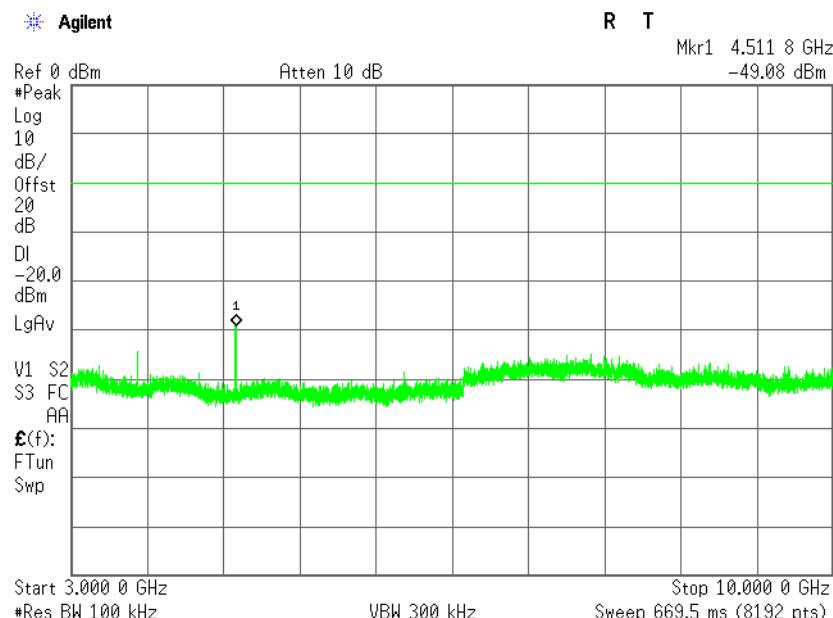
Reference document:	47 CFR §15.247 (d) & DA 00-705		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band at least 20 dB below the highest level of the desired power.		
Test setup:	See Sec. 2.1	Pass	Pass
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz		
Hopping function:	Disabled (lowest, middle, and highest channels to be investigated)		
Environment conditions:	Ambient Temperature: 23.6°C	Relative Humidity: 53%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.7.1 – Plot 4.7.9	

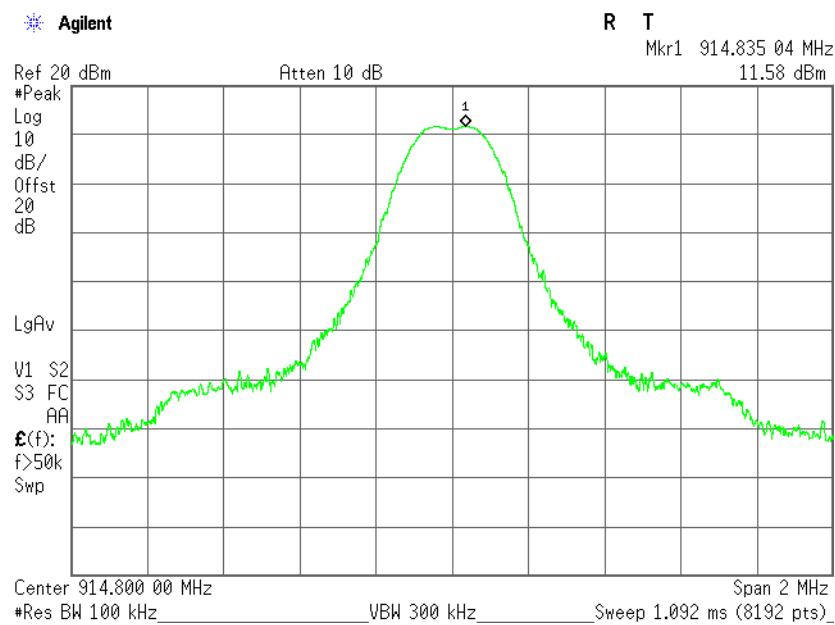
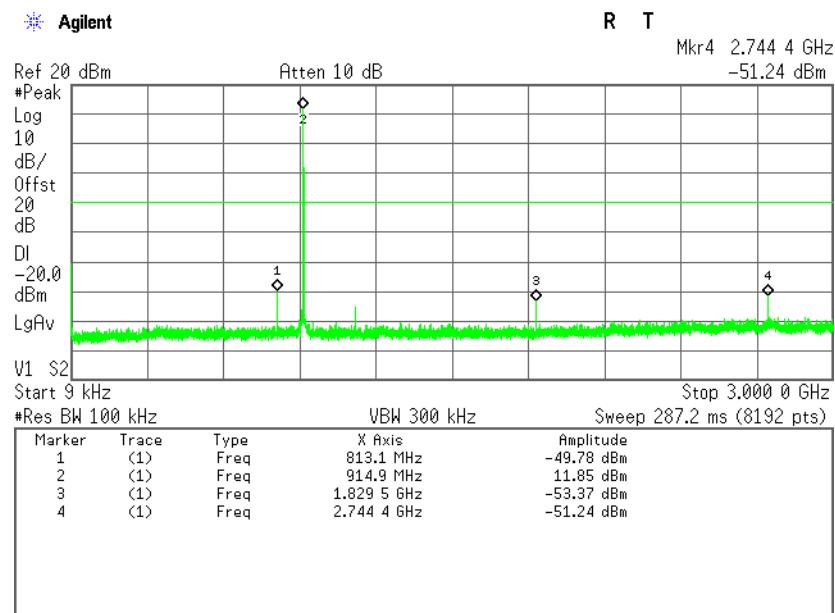
Test results:

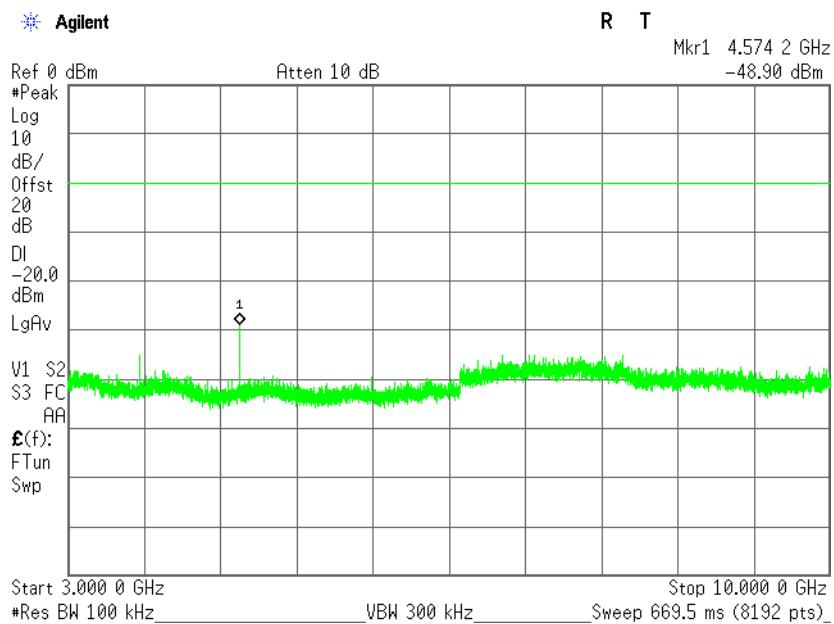
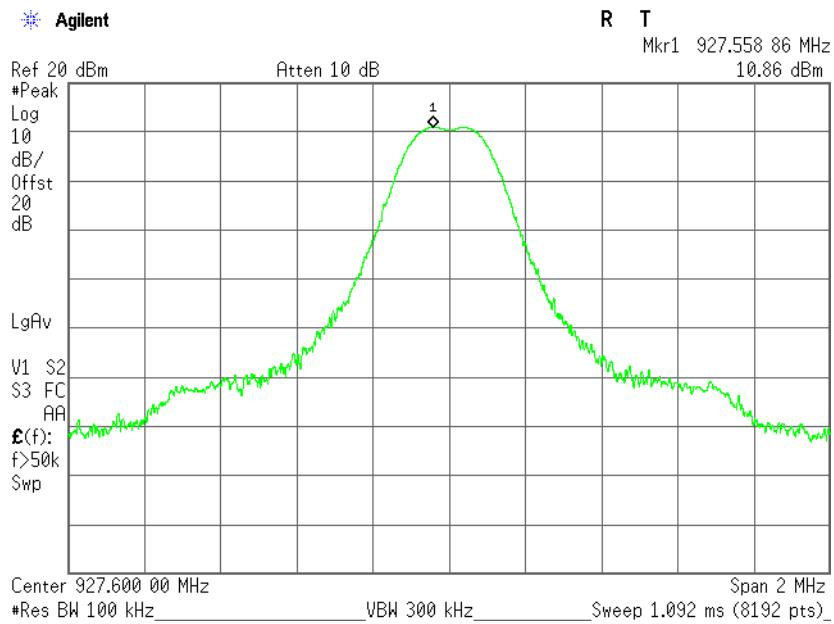
Frequency, [MHz]	Channel	Emission Frequency, [MHz]	Antenna Polarization	Emission Level, [dB μ V/m]	Limit, dBc	Pass/Fail
All emissions are at least 20 dB below the Limit			-20.0		Pass	

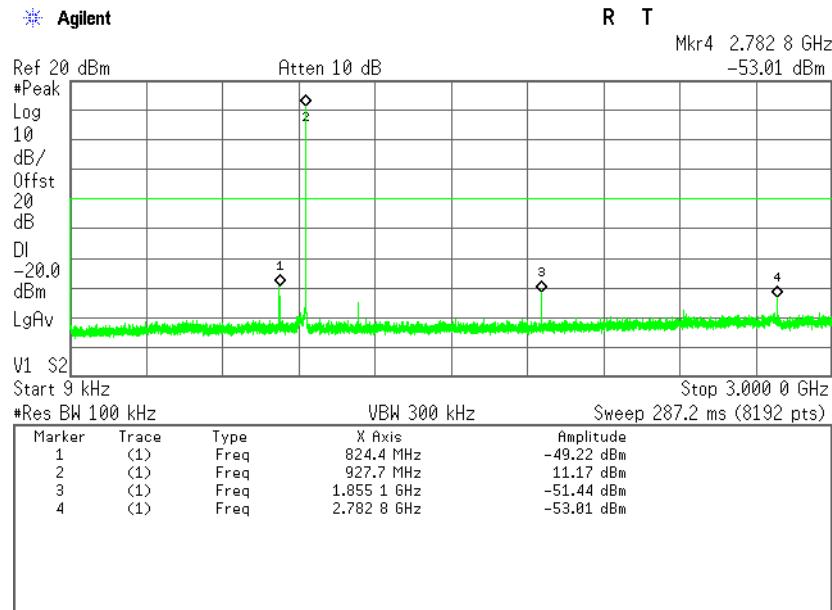
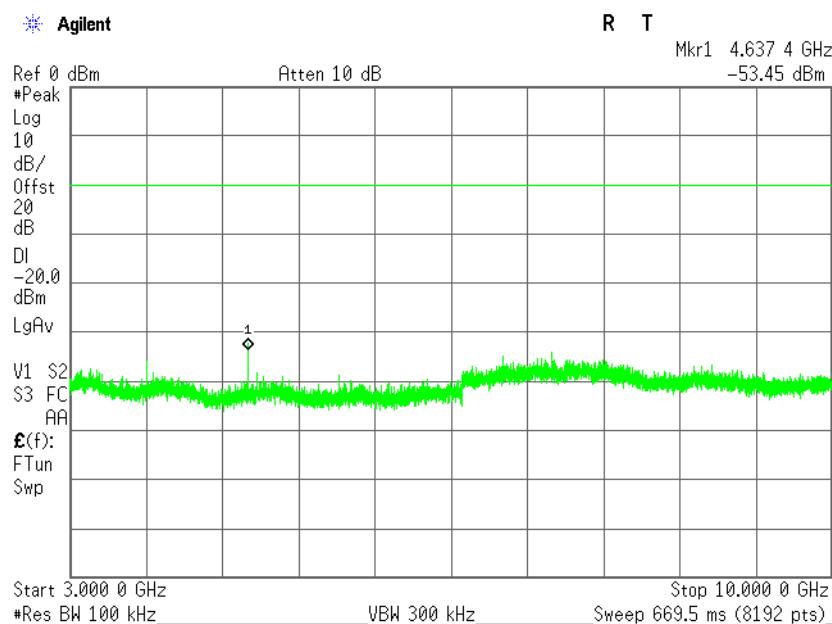
Plot 4.7.1 Conducted Spurious Emission, FSK, channel 1, reference level



Plot 4.7.2 Conducted Spurious Emission, FSK, channel 1, 9 kHz – 3 GHz range

Plot 4.7.3 Conducted Spurious Emission, FSK, channel 1, 3 GHz – 10 GHz range


Plot 4.7.4 Conducted Spurious Emission, FSK, channel 32, reference level

Plot 4.7.5 Conducted Spurious Emission, FSK, channel 32, 9 kHz – 3 GHz range


Plot 4.7.6 Conducted Spurious Emission, FSK, channel 32, 3 GHz – 10 GHz range

Plot 4.7.7 Conducted Spurious Emission, FSK, channel 64, reference level


Plot 4.7.8 Conducted Spurious Emission, FSK, channel 64, 9 kHz – 3 GHz range

Plot 4.7.9 Conducted Spurious Emission, FSK, channel 64, 3 GHz – 10 GHz range


4.8. Spurious Emissions – Radiated Measurements

Reference document:	47 CFR §15.247 (d) & §15.209(a) & DA 00-705		
Test Requirements:	The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.209(a).		
Test setup:	See Sec. 2.2		
Operating conditions:	Under normal test conditions		
Method of testing:	Radiated		
S.A. Settings:	f > 1GHz: Peak: RBW = 1MHz, VBW = 3MHz, Average: VBW = 10 Hz f < 1GHz: RBW: 120kHz, VBW: 300kHz		
Hopping function:	Disabled (lowest, middle, and highest channels to be investigated)		
Environment conditions:	Ambient Temperature: 23.7 °C	Relative Humidity: 53.3%	Atmospheric Pressure: hPa
Test Result:	See below	Plots 4.8.1 – Plot 4.8.8	

All measurements were done in horizontal and vertical polarizations; the results show the worst case.

Test results below 1GHz:

Emission Frequency, [MHz]	Detector Type	Antenna Polarization	Emission Level, [dB μ V/m]	Limit, [dB μ V/m]	Delta, [dB]	Pass/Fail
32.91	QP	Vertical	22.34	40	-17.66	Pass
47.03	QP	Vertical	26.20	40	-13.8	Pass
60.03	QP	Vertical	24.02	40	-15.98	Pass
73.2	QP	Vertical	25.20	40	-14.8	Pass
132	QP	Vertical	15.11	43.5	-28.39	Pass

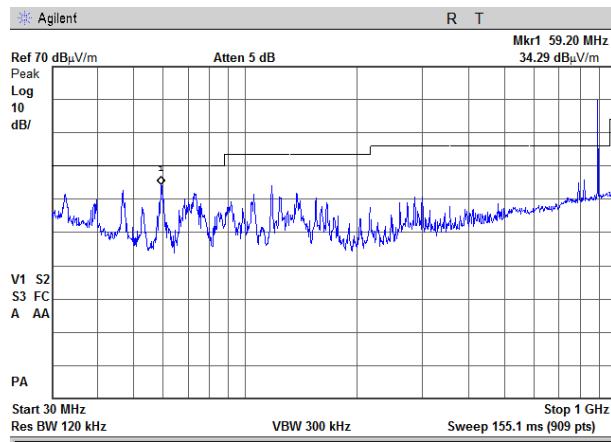
Test results above 1GHz:

Emission Frequency, [MHz]	Detector Type	Antenna Polarization	Emission Level, [dB μ V/m]	Limit, [dB μ V/m]	Delta, [dB]	Pass/Fail
Lowest Frequency, 902.4 MHz						
1103.000	AVG	V	30.12	54.00	-23.88	Pass
4512.000	AVG	V	42.90	54.00	-11.1	Pass
Middle Frequency, 914.8 MHz						
1118.000	AVG	V	28.42	54.00	-25.58	Pass
4574.000	AVG	V	41.31	54.00	-12.69	Pass
Highest Frequency, 927.6 MHz						
1134.000	AVG	V	30.68	54.00	-23.32	Pass
4638.000	AVG	V	44.10	54.00	-9.9	Pass

Note: Emission Level [dB μ V/m] = Measured Emission [dB μ V] + Correction-factor [dB (1/m)]

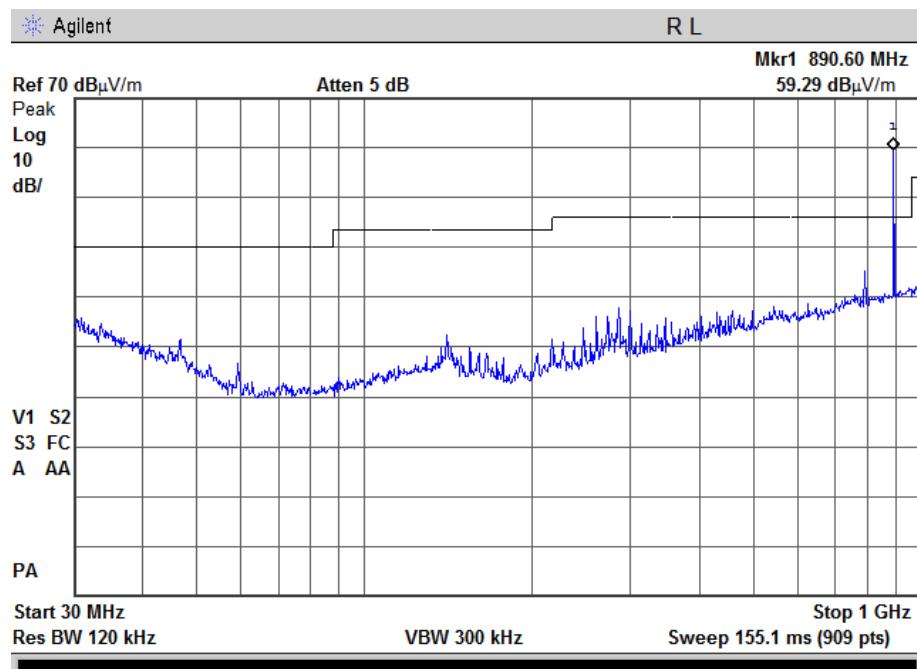
Correction Factor = Antenna factor + Cable Loss + Filter I/L

Plot 4.8.1 Radiated Spurious Emission in 30 MHz – 1 GHz range, Worst case for all frequencies(channel 1), Vertical

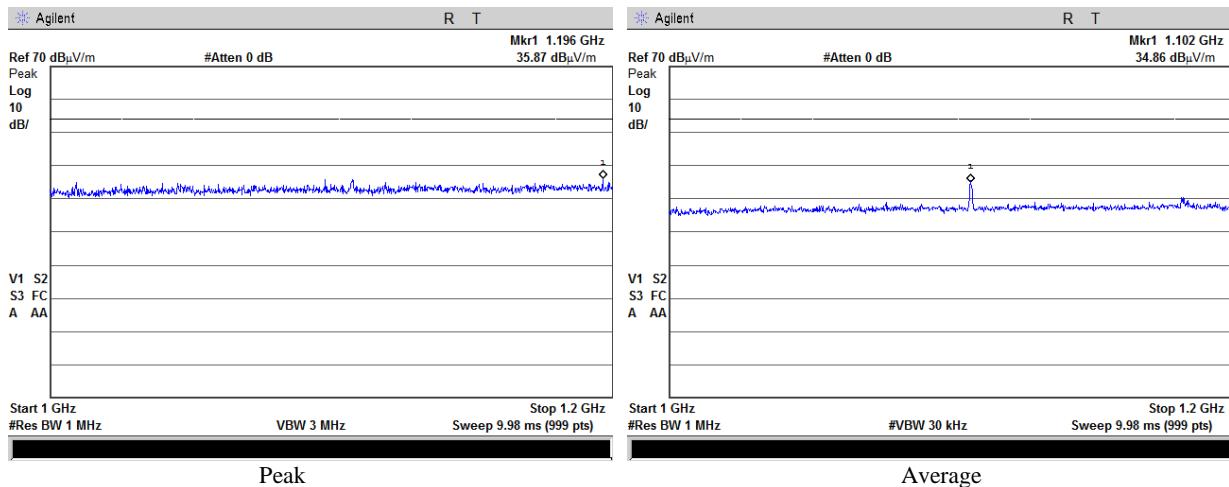
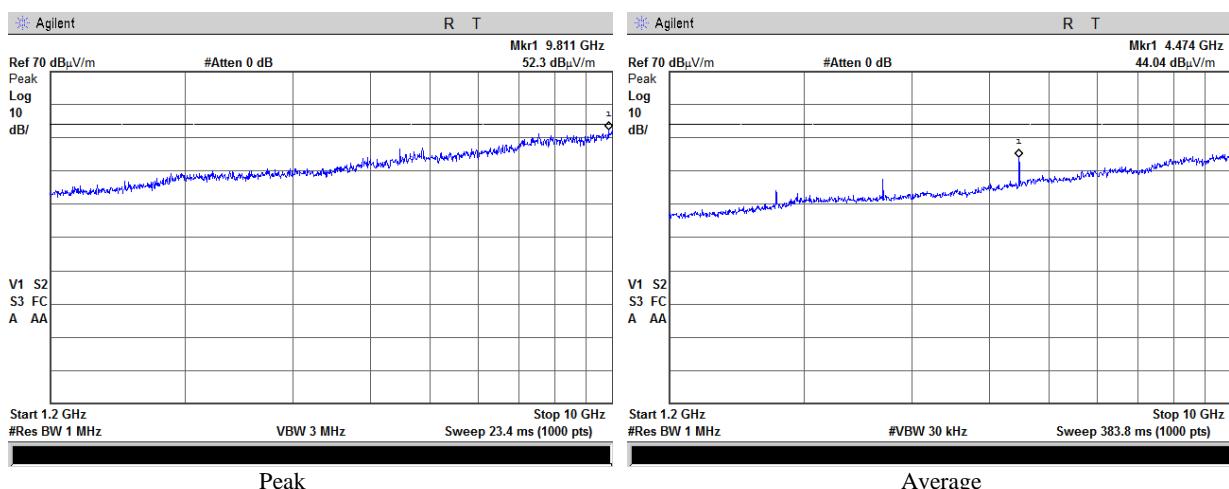


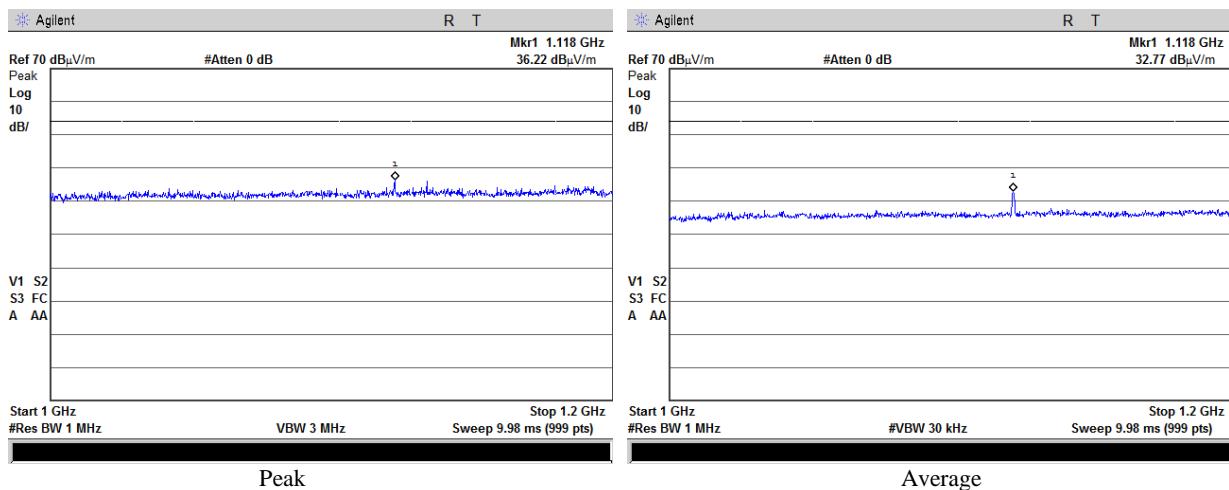
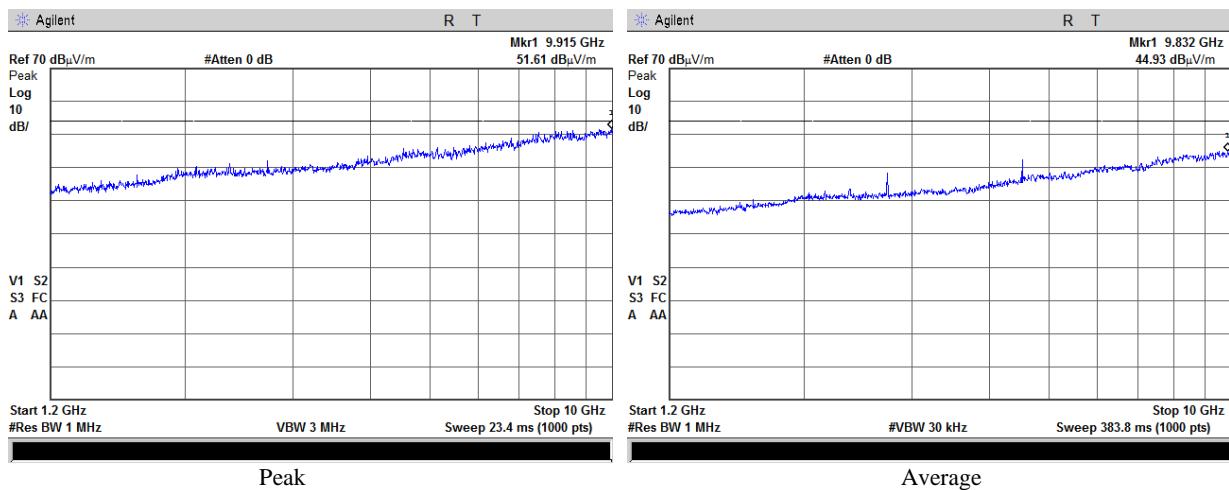
With tunable bandreject filter

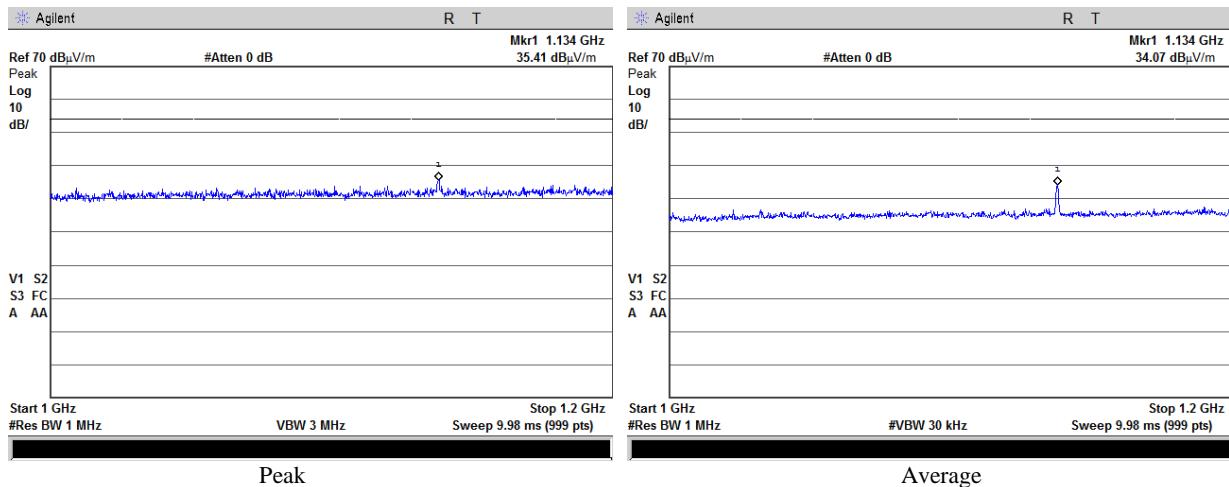
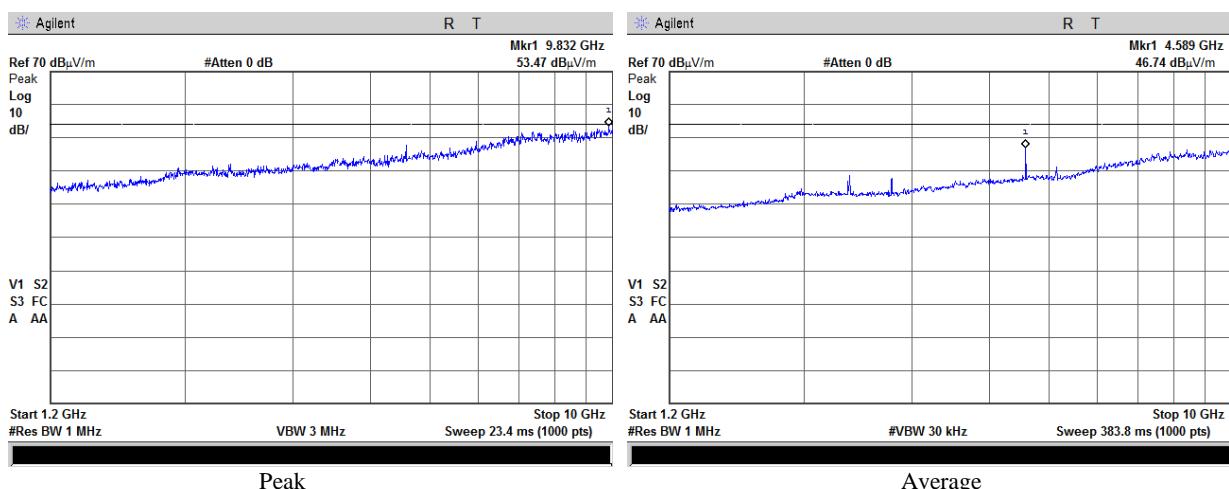
Plot 4.8.2 Radiated Spurious Emission in 30 MHz – 1 GHz range, Worst case for all frequencies(channel 1), Horizontal



With tunable bandreject filter

Plot 4.8.3 Radiated Spurious Emission in 1 – 1.2 GHz range, Fc = 902.4 MHz, Horizontal & Vertical

Plot 4.8.4 Radiated Spurious Emission in 1.2 – 10 GHz range, Fc = 902.4 MHz, Horizontal & Vertical


Plot 4.8.5 Radiated Spurious Emission in 1 – 1.2 GHz range, Fc = 914.8 MHz, Horizontal & Vertical

Plot 4.8.6 Radiated Spurious Emission in 1.2 – 10 GHz range, Fc = 914.8 MHz, Horizontal & Vertical


Plot 4.8.7 Radiated Spurious Emission in 1 – 1.2 GHz range, Fc = 927.6 MHz, Horizontal & Vertical

Plot 4.8.8 Radiated Spurious Emission in 1.2 – 10 GHz range, Fc = 927.6 MHz, Horizontal & Vertical


4.9. Antenna Connector Requirements

Reference document:	47 CFR §15.203	
Test Requirements:	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 provisions of this section.	
Test Result:	The antenna is permanently installed –printed antenna	Pass

4.10. Power Line Emissions measurements

Reference document:	47 CFR §15.207			
Test Requirements:	The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.207. Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Sec.15.207.			
Test setup:	See Sec. 2.5			
Operating conditions:	Under normal test conditions			
Method of testing:	Conducted Emissions			
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz			
Radio device:	Idle			
Environment conditions:	Ambient Temperature: 23 °c		Relative Humidity: 54%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below		See Plot 4.10.1 - Plot 4.10.4	

Test Results:

Worst case results of unintentional emissions and emissions while NII, DTS and BT transmitters are operating alternately, measured at the charger 110VAC port.

Table 4.10.1: Power Supply Ports 110 VAC, Gateway power supply Model: SJB 0500500PU

“Phase” Lead

Frequency [MHz]	Measured Result [dB μ V]		Limit [dB μ V]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.22709	30.7	20	62.56	52.56	-31.86	-32.56	Pass
0.154475	32.8	27.8	65.76	55.76	-32.96	-27.96	Pass
0.311205	40	28.9	59.94	49.94	-19.94	-21.04	Pass
0.867109	28.4	19.4	56.00	46.00	-27.60	-26.60	Pass
0.95537	28.8	18.6	56.00	46.00	-27.20	-27.40	Pass
1.28	28.9	19.6	56.00	46.00	-27.10	-26.40	Pass

“Neutral” Lead

Frequency [MHz]	Measured Result [dB μ V]		Limit [dB μ V]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.310465	35.7	23.1	59.96	49.96	-24.26	-26.86	Pass
0.519244	26.7	16.4	56.00	46.00	-29.30	-29.60	Pass
0.953639	27	15.4	56.00	46.00	-29.00	-30.60	Pass
1.279225	27	16.4	56.00	46.00	-29.00	-29.60	Pass
1.626476	25.4	14.9	56.00	46.00	-30.60	-31.10	Pass
25	25.4	15.2	60.00	50.00	-34.60	-34.80	Pass

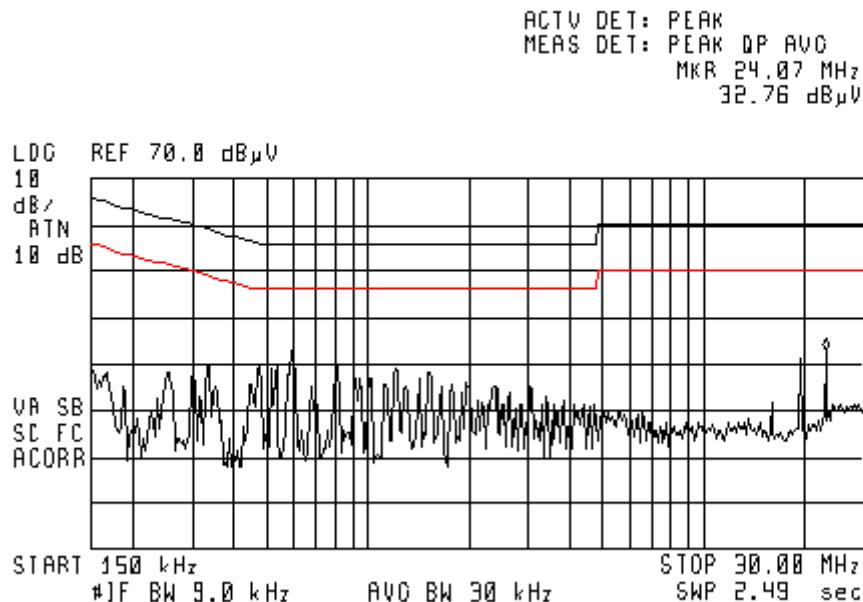
Table 4.10.2: Power Supply Ports 110 VAC, Gateway power supply Model: SAW-0500500
“Phase” Lead

Frequency [MHz]	Measured Result [dB μ V]		Limit [dB μ V]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.618726	53.7	39.4	56.00	46.00	-2.30	-6.60	Pass
2.710413	45.1	29.4	56.00	46.00	-10.90	-16.60	Pass
2.463034	47.7	31.9	56.00	46.00	-8.30	-14.10	Pass
16.89655	34.6	18.5	60.00	50.00	-25.40	-31.50	Pass
10.008705	37.5	23.1	60.00	50.00	-22.50	-26.90	Pass
10.63	36.5	21.5	60.00	50.00	-23.50	-28.50	Pass

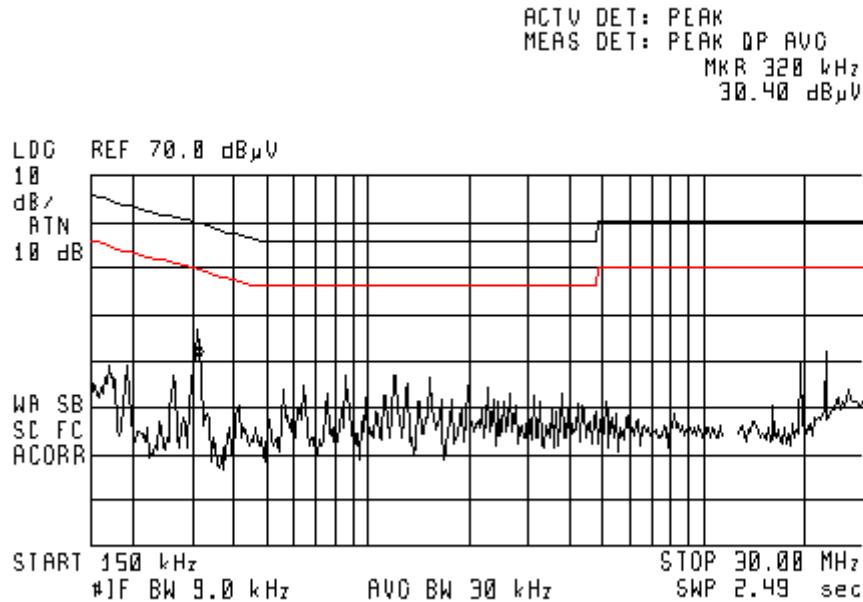
“Neutral” Lead

Frequency [MHz]	Measured Result [dB μ V]		Limit [dB μ V]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.423893	46.9	27.2	57.37	47.37	-10.47	-20.17	Pass
2.074431	45.3	22.5	56.00	46.00	-10.70	-23.50	Pass
2.444919	45.5	26.4	56.00	46.00	-10.50	-19.60	Pass
15.281961	32.2	14.7	60.00	50.00	-27.80	-35.30	Pass
11.921028	35	16.8	60.00	50.00	-25.00	-33.20	Pass
667	52.7	31.4	60.00	50.00	-7.30	-18.60	Pass

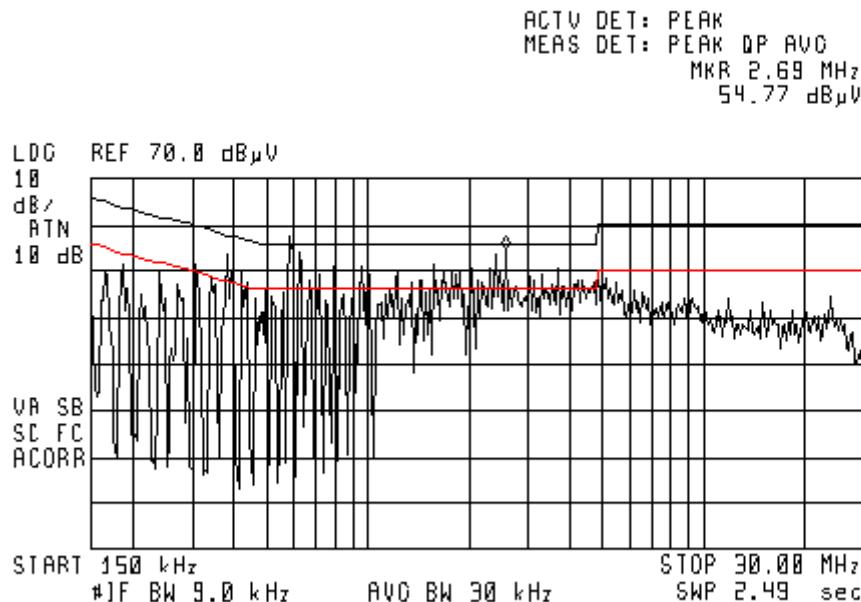
Plot 4.1: Power Supply Ports 110 VAC, Gateway power supply Model: SJB 0500500PU, 150kHz – 30MHz, “Phase” Lead



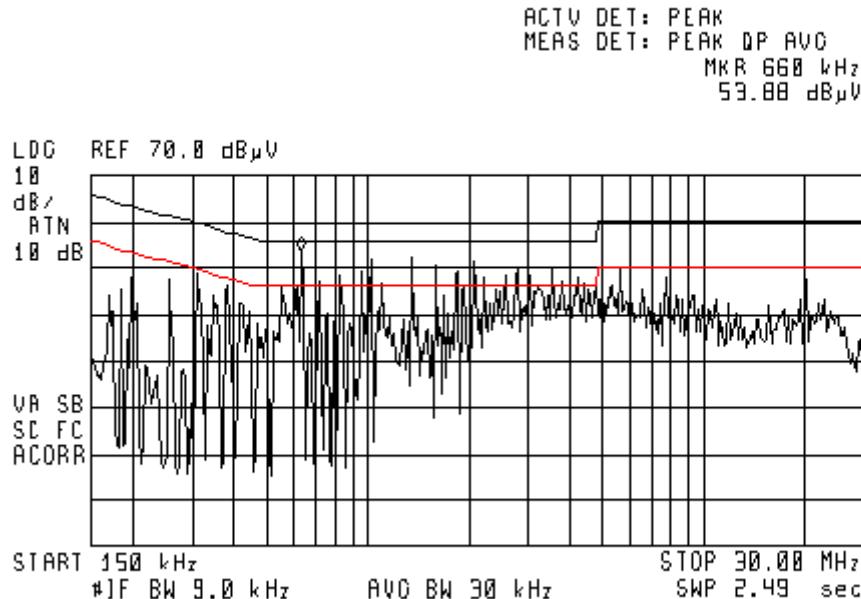
Plot 4.2: Power Supply Ports 110 VAC, Gateway power supply Model: SJB 0500500PU 150kHz – 30MHz, “Neutral” Lead



Plot 4.3: Power Supply Ports 110 VAC, Gateway power supply Model: SAW-0500500, 150kHz – 30MHz, “Phase” Lead



Plot 4.4: Power Supply Ports 110 VAC, Gateway power supply Model: SAW-0500500, 150kHz – 30MHz, “Neutral” Lead



5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	30-08-2014
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-08-2014
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-08-2014
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	01-01-2015
Power meter	Agilent N1911A	MY45100784	30-08-2014
Dual Ridged Guide Ant.1-18 GHz	EMCO 3115	9602-4677	01-01-2015
Antenna 15 GHz ÷ 40 GHz	Schwarzbeck BBHA 9170	BBHA9170214	01-01-2015
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-2015
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-2015
Pre-Amplifier	MiTeq, AMF-5F-18002650-30-10P	945372	30-08-2014
LISN	Fischer 50/250-25-2	-	01-01-2015
Transient Limiter	HP11947A	-	01-01-2015
Notch Filter	Micro-Tronics BRM50702-05	0001	01-01-2015

Appendix C: Accreditation Certificate



Accredited Laboratory

A2LA has accredited

QUALITECH

Petach-Tikva, Israel
for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 7th day of December 2012.


Peter Myer
President & CEO
For the Accreditation Council
Certificate Number 1633.01
Valid to September 30, 2014



For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

End of the Test Report