FCC Test Report

Product Name	Shriker-G0+ Evaluation Kit
Model No.	SHKG0P
FCC ID.	2AGYI-SHKG0P

Applicant	MegaChips Corporation
Address	1-1-1, Miyahara, Yodogawa-ku, Osaka 532-0003 ,Japan

Date of Receipt	Feb. 18, 2016
Issued Date	Mar. 21, 2016
Report No.	1620292R-RFUSP02V00
Report Version	V1.0

Testing Laboratory
3023

Test Report

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Manufacturer	MegaChips Corporation
Model No.	SHKG0P
FCC ID.	2AGYI-SHKG0P
EUT Rated Voltage	DC 5V
EUT Test Voltage	DC 5V by adapter
Trade Name	MegaChips
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Leven Huang

(Senior Adm. Specialist / Leven Huang)

Tested By : Anson Lu

(Engineer / Anson Lu)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Shriker-G0+ Evaluation Kit
Trade Name	MegaChips
Model No.	SHKG0P
FCC ID.	2AGYI-SHKG0P
Frequency Range	902.50 – 927.50MHz
Channel Number	51CH
Type of Modulation	FHSS: GFSK
Antenna Type	Inverted F antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	NISSEI	N/A	Inverted F antenna	0.43dBi

Note:

1. The antenna of EUT conforms to FCC 15.203.

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	902.50 MHz	Channel 13:	909.00 MHz	Channel 26:	915.50 MHz	Channel 39:	922.00 MHz
Channel 01:	903.00 MHz	Channel 14:	909.50 MHz	Channel 27:	916.00 MHz	Channel 40:	922.50 MHz
Channel 02	903.50 MHz	Channel 15:	910.00 MHz	Channel 28:	916.50 MHz	Channel 41:	923.00 MHz
Channel 03:	904.00 MHz	Channel 16:	910.50 MHz	Channel 29:	917.00 MHz	Channel 42:	923.50 MHz
Channel 04:	904.50 MHz	Channel 17:	911.00 MHz	Channel 30:	917.50 MHz	Channel 43:	924.00 MHz
Channel 05:	905.00 MHz	Channel 18:	911.50 MHz	Channel 31:	918.00 MHz	Channel 44:	924.50 MHz
Channel 06:	905.50 MHz	Channel 19:	912.00 MHz	Channel 32:	918.50 MHz	Channel 45:	925.00 MHz
Channel 07:	906.00 MHz	Channel 20:	912.50 MHz	Channel 33:	919.00 MHz	Channel 46:	925.50 MHz
Channel 08:	906.50 MHz	Channel 21:	913.00 MHz	Channel 34:	919.50 MHz	Channel 47:	926.00 MHz
Channel 09:	907.00 MHz	Channel 22:	913.50 MHz	Channel 35:	920.00 MHz	Channel 48:	926.50 MHz
Channel 10:	907.50MHz	Channel 23:	914.00 MHz	Channel 36:	920.50 MHz	Channel 49:	927.00 MHz
Channel 11:	908.00 MHz	Channel 24:	914.50 MHz	Channel 37:	921.00 MHz	Channel 50:	927.50 MHz
Channel 12:	908.50 MHz	Channel 25:	915.00 MHz	Channel 38:	921.50 MHz		

Note:

1. The EUT is a Shriker-G0+ Evaluation Kit with a built-in 902-928MHz FHSS transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of 902-928MHz FHSS transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.

Test Mode	Mode 1: Transmit

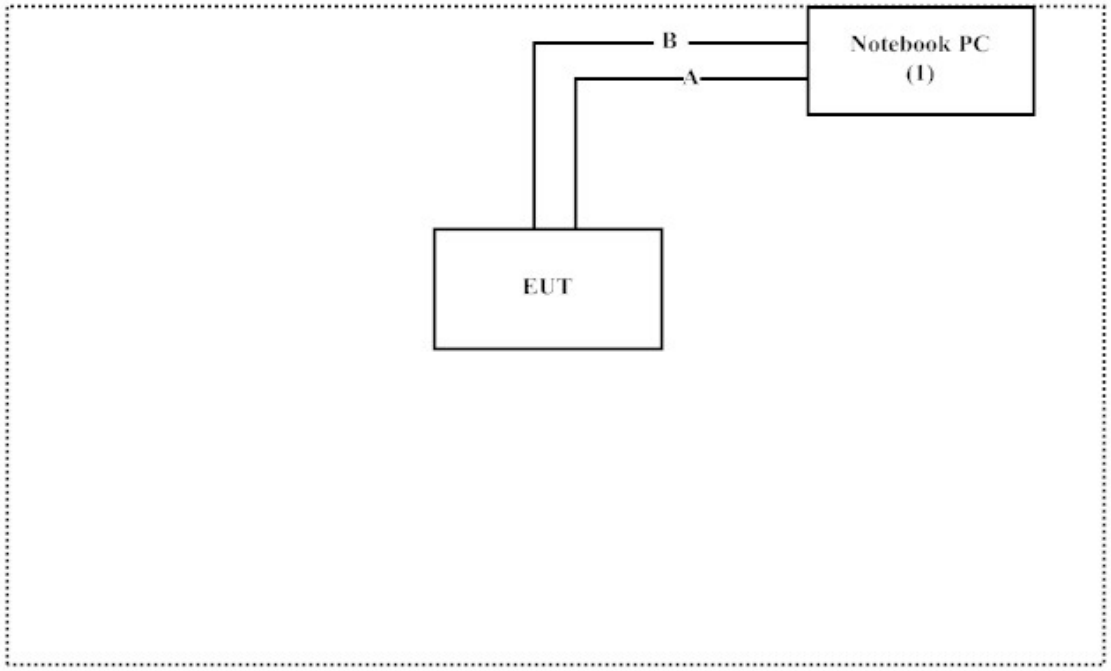
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude E5440	FS9TK32	Non-Shielded, 0.8m

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1.30m, with two ferrite cores bonded.
B	USB Cable	Shielded, 0.40m.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “scenario tool 0.2.12” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site: http://www.quietek.com/chinese/about/certificates.aspx?bval=5
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng,
Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

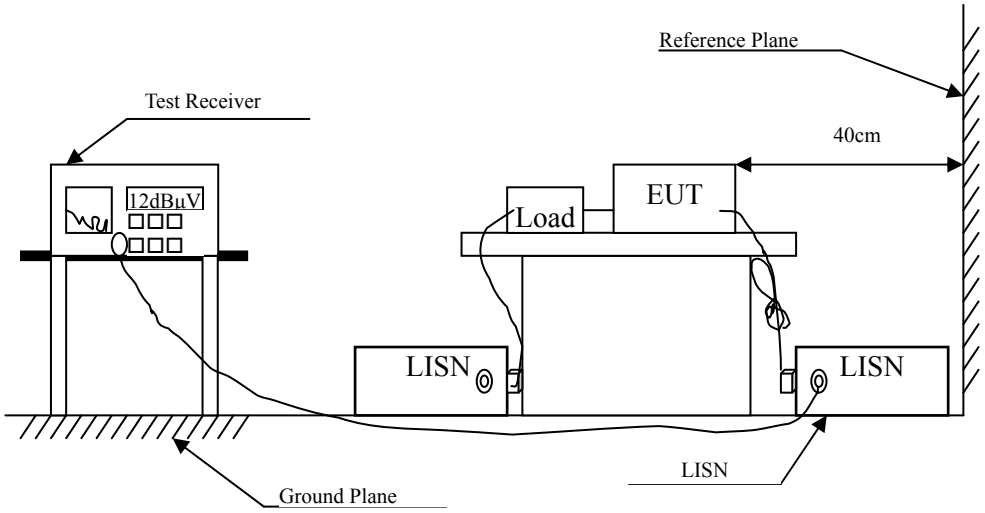
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2015	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2016	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2016	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2016	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2016	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 3 MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Shriker-G0+ Evaluation Kit
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit (915MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV	dB	dBμV
LINE 1					
Quasi-Peak					
0.201	9.775	24.200	33.975	-30.568	64.543
0.482	9.787	25.460	35.247	-21.267	56.514
3.170	9.967	18.970	28.937	-27.063	56.000
14.220	10.144	31.690	41.834	-18.166	60.000
21.673	10.188	36.440	46.628	-13.372	60.000
26.349	10.190	42.810	53.000	-7.000	60.000
Average					
0.201	9.775	11.270	21.045	-33.498	54.543
0.482	9.787	23.320	33.107	-13.407	46.514
3.170	9.967	14.820	24.787	-21.213	46.000
14.220	10.144	24.520	34.664	-15.336	50.000
21.673	10.188	24.610	34.798	-15.202	50.000
26.349	10.190	31.500	41.690	-8.310	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Shriker-G0+ Evaluation Kit
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit (915MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.185	9.834	25.890	35.724	-29.276	65.000
0.486	9.857	20.620	30.477	-25.923	56.400
1.314	9.921	13.450	23.371	-32.629	56.000
14.216	10.274	30.070	40.344	-19.656	60.000
21.545	10.378	36.880	47.258	-12.742	60.000
26.330	10.410	41.850	52.260	-7.740	60.000
Average					
0.185	9.834	11.740	21.574	-33.426	55.000
0.486	9.857	16.160	26.017	-20.383	46.400
1.314	9.921	10.870	20.791	-25.209	46.000
14.216	10.274	19.750	30.024	-19.976	50.000
21.545	10.378	26.440	36.818	-13.182	50.000
26.330	10.410	33.190	43.600	-6.400	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

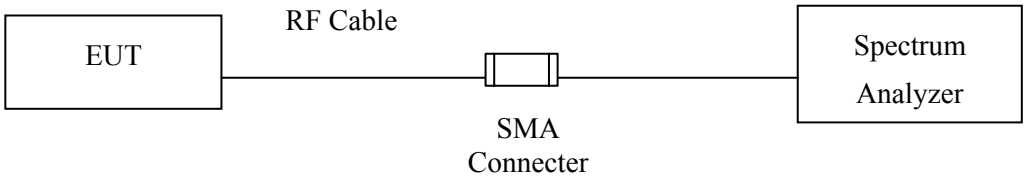
3. Occupied Bandwidth

3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup



3.3. Limits

According to FCC Section 15.247(a)(1)(i). The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz

3.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 150Hz

3.6. Test Result of Occupied Bandwidth

Product : Shriker-G0+ Evaluation Kit
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	902.50	325	<500	PASS
25	915.00	330	<500	PASS
50	927.50	330	<500	PASS

Figure Channel 00:

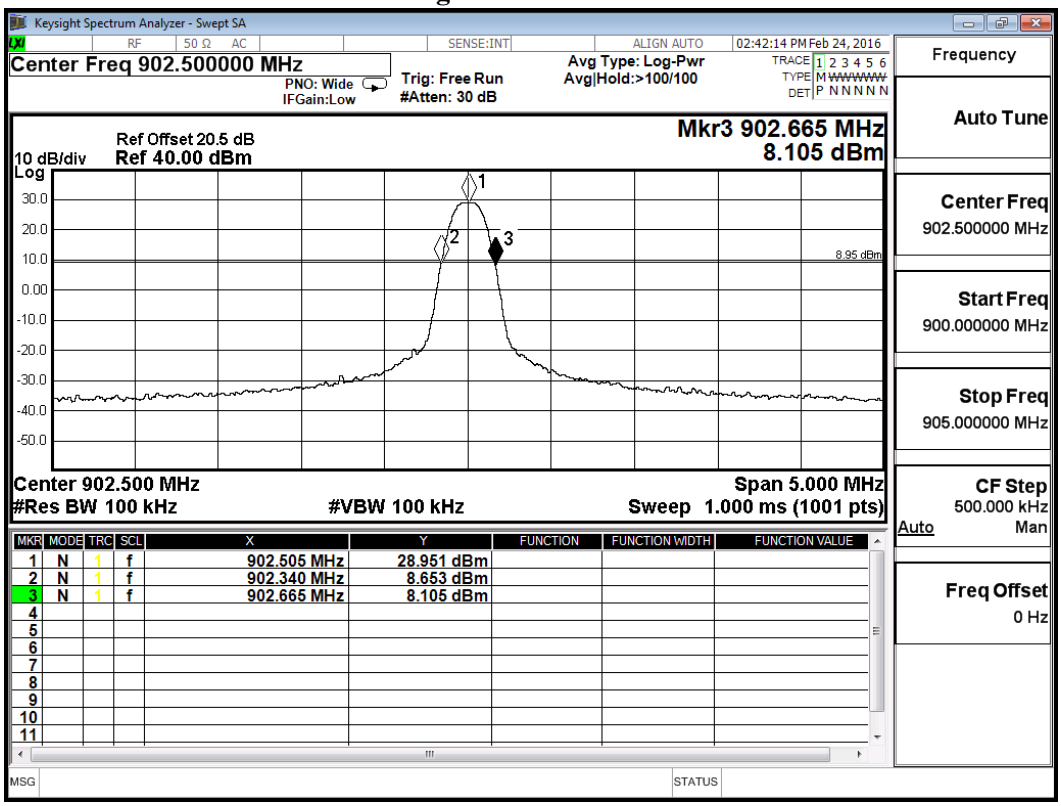


Figure Channel 25:

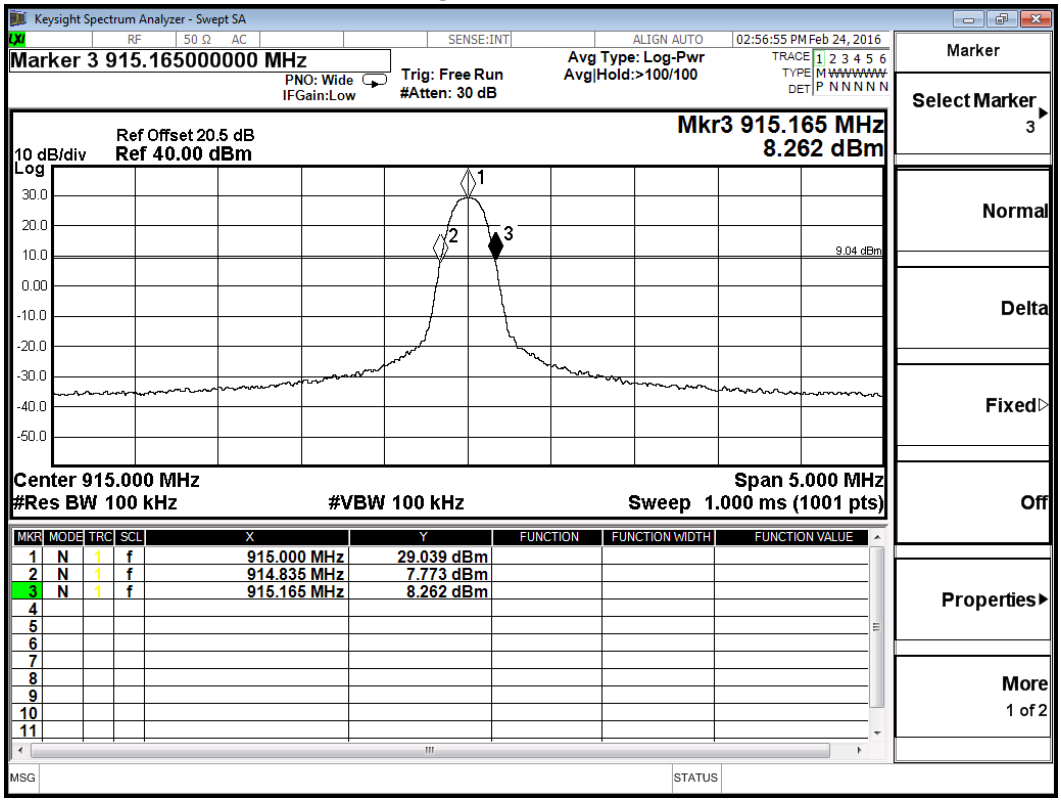
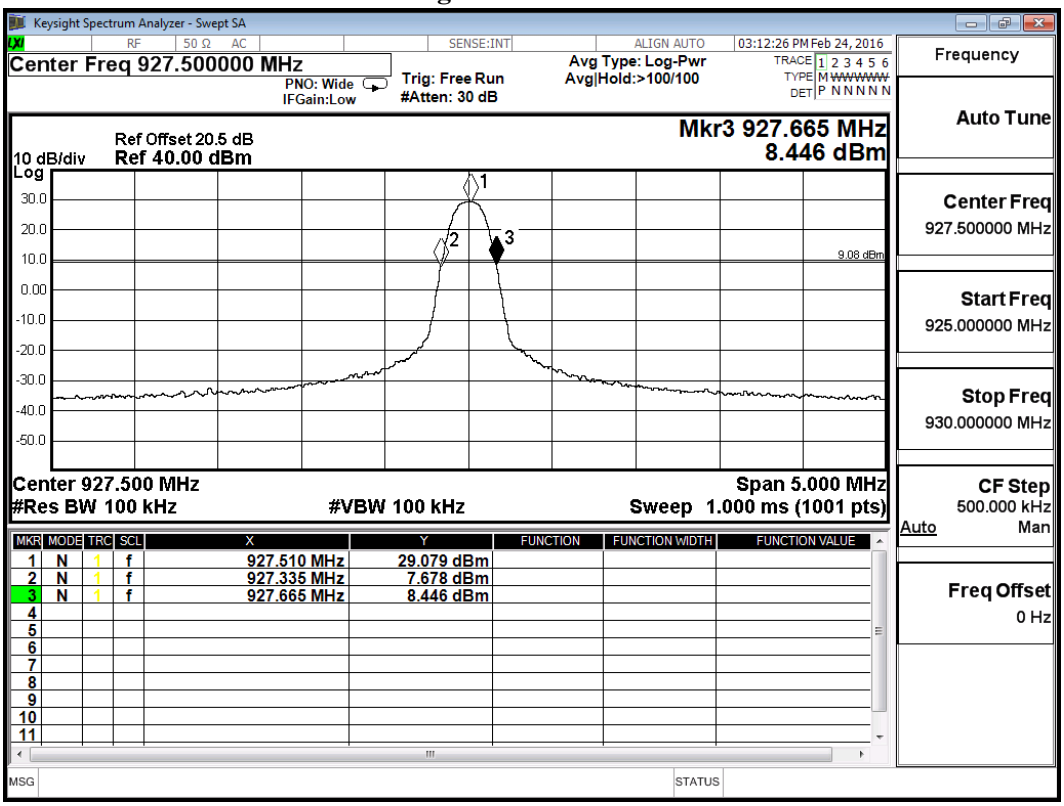


Figure Channel 50:



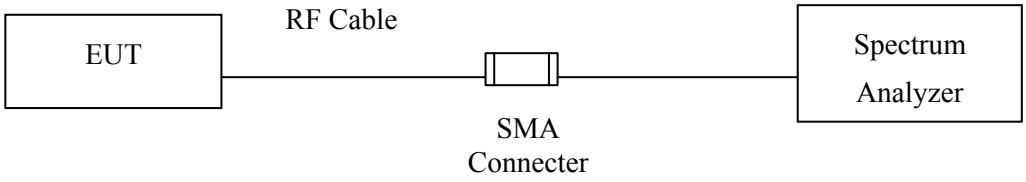
4. Channel Number

4.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup



4.3. Limit

According to FCC Section 15.247(a)(1)(i)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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

4.5. Uncertainty

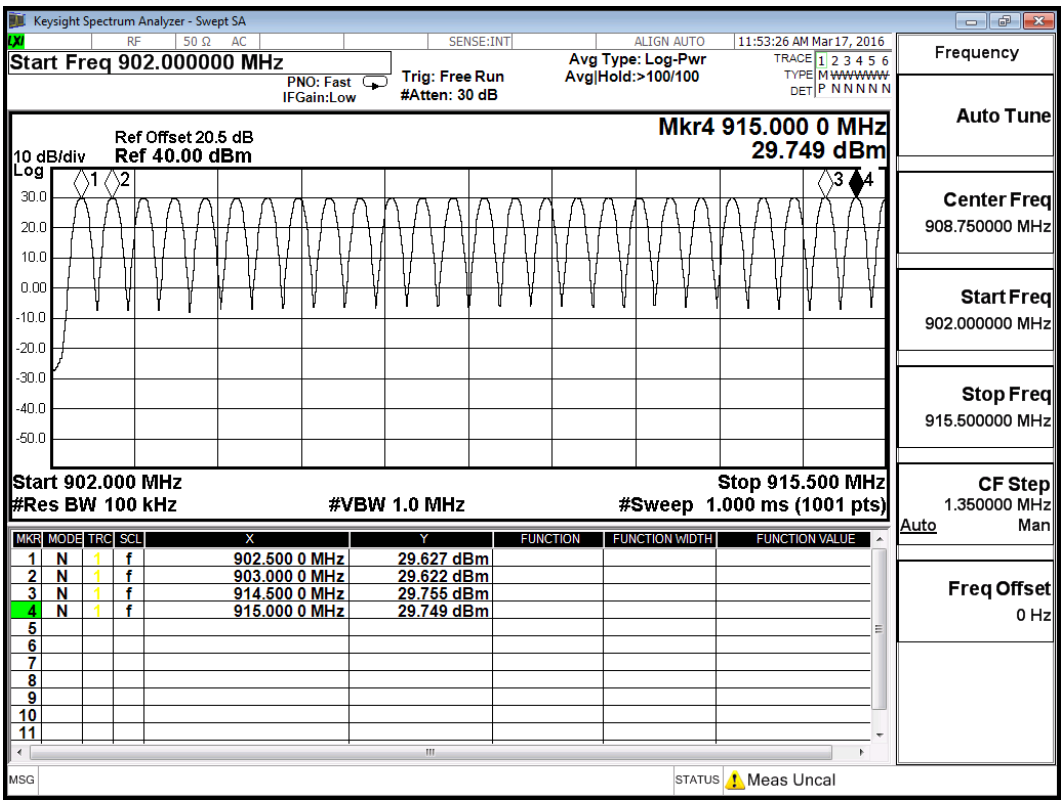
N/A

4.6. Test Result of Channel Number

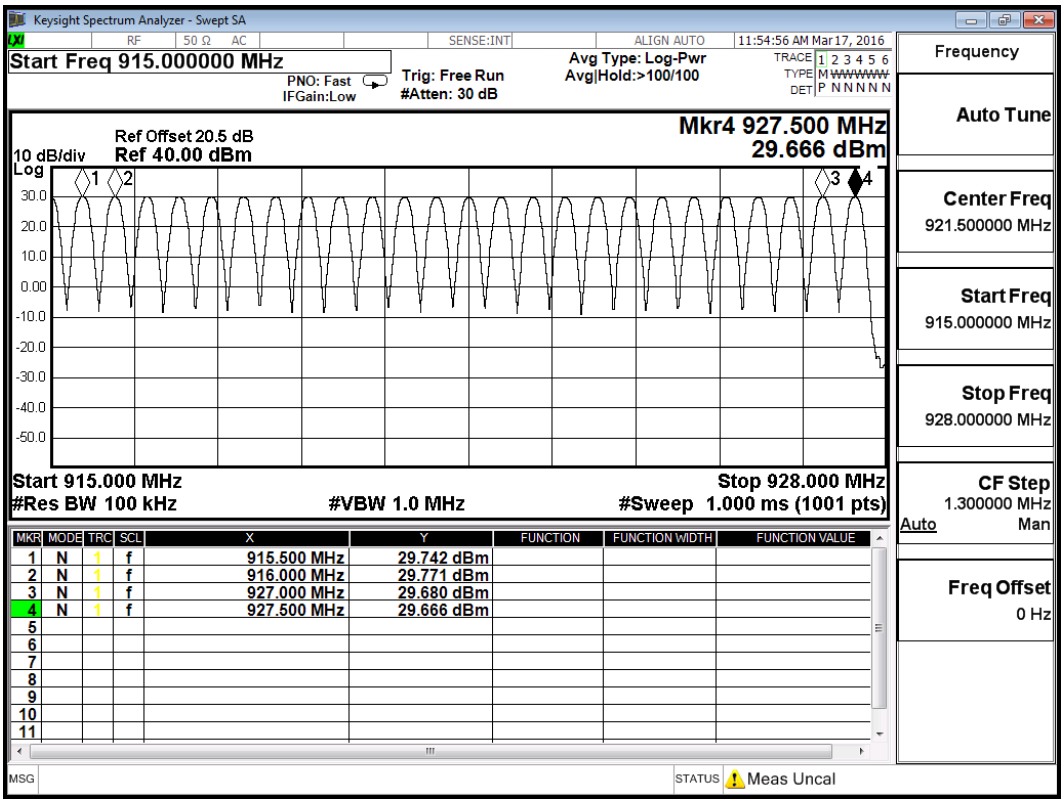
Product : Shriker-G0+ Evaluation Kit
Test Item : Channel Number
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
902.50 ~ 927.50	51	>25	Pass

902.00-915.00MHz



915.50-927.50MHz



5. Peak Power Output

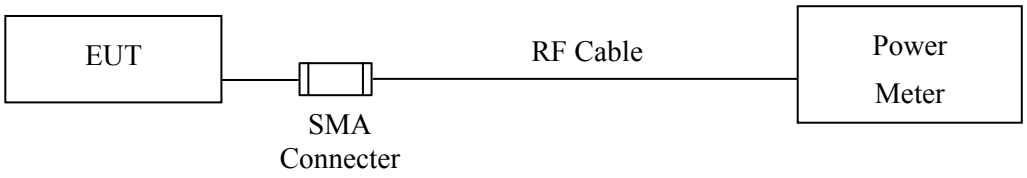
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2015
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2015

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

5.2. Test Setup



5.3. Limit

According to FCC Section 15.247(b)(2). For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

5.5. Uncertainty

± 1.27 dB

5.6. Test Result of Peak Power Output

Product : Shriker-G0+ Evaluation Kit
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	902.50	29.72	1 Watt= 30 dBm	Pass
Channel 25	915.00	29.78	1 Watt= 30 dBm	Pass
Channel 50	927.50	29.70	1 Watt= 30 dBm	Pass

Note: Peak Power Output Value =Reading value on power meter + cable loss

6. Radiated Emission

6.1. Test Equipment

The following test equipments are used during the radiated emission test:

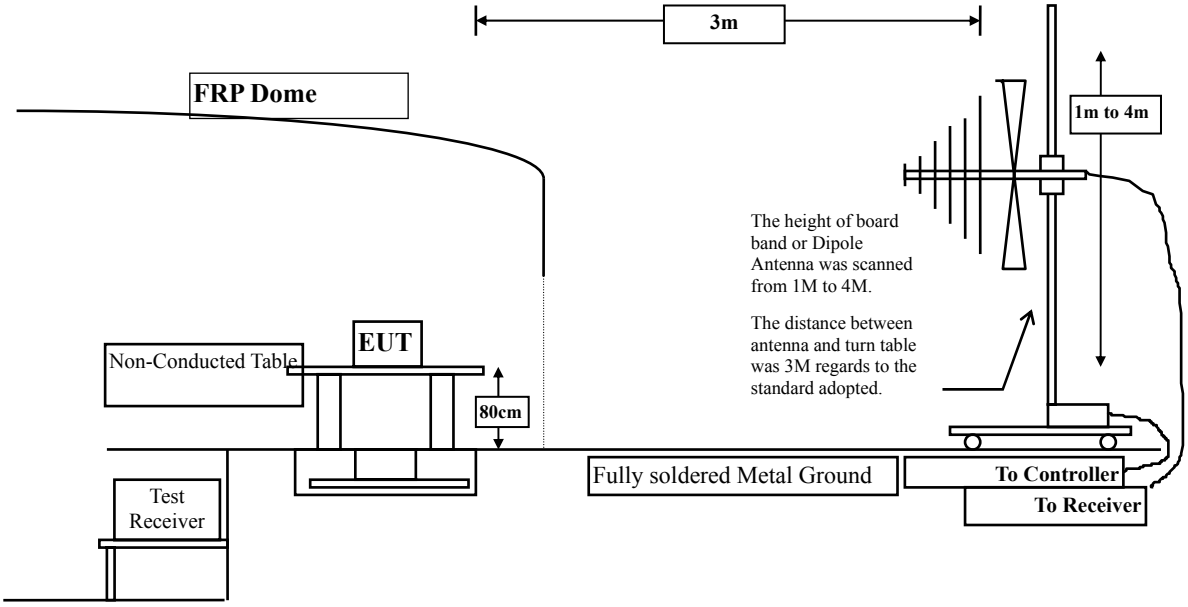
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep, 2015
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun., 2015
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun., 2015
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun., 2015
	X	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun., 2015

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒CB # 8	X	Spectrum Analyzer	R&S	FSP40/ 100339	Oct., 2015
	X	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2016
	X	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan., 2016
	X	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2015
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2015

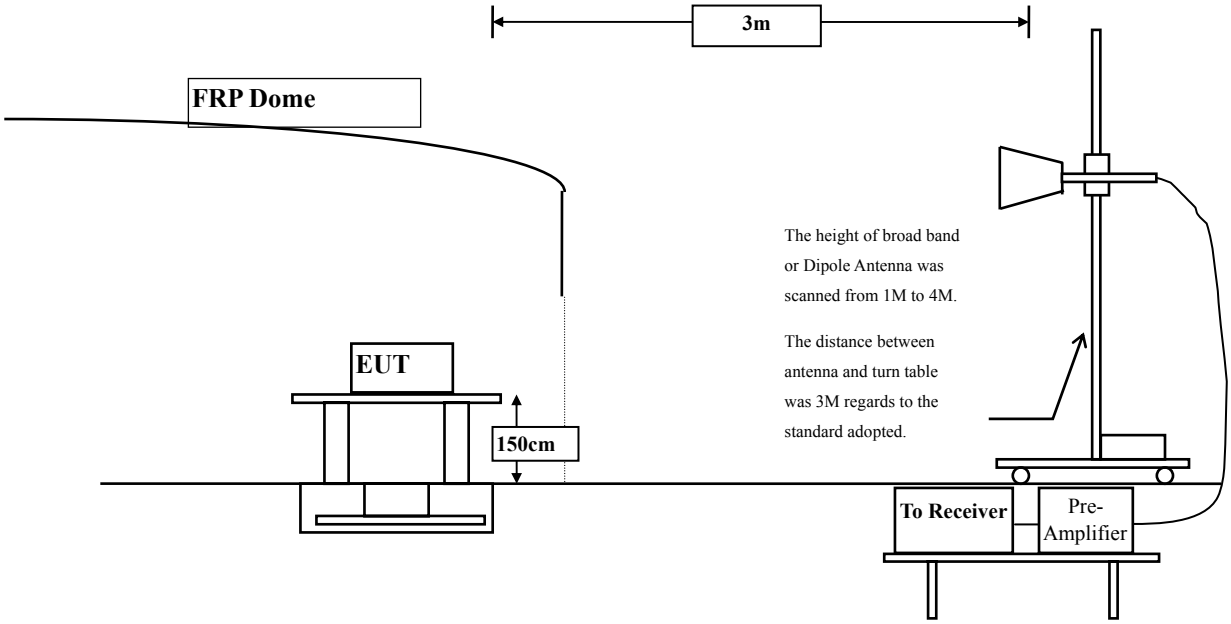
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

6.2. Test Setup

Below 1GHz


3m
FRP Dome
1m to 4m
The height of board band or Dipole Antenna was scanned from 1M to 4M.
The distance between antenna and turn table was 3M regards to the standard adopted.
EUT
Non-Conducted Table
80cm
Test Receiver
Fully soldered Metal Ground
To Controller
To Receiver

Above 1GHz


3m
FRP Dome
The height of broad band or Dipole Antenna was scanned from 1M to 4M.
The distance between antenna and turn table was 3M regards to the standard adopted.
EUT
150cm
To Receiver
Pre-Amplifier

6.3. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBμV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: 1. RF Voltage (dBμV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 3 MHz setting on the field strength meter is 9kHz and 3 MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 3 MHz are made using Loop Antenna and 3 MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Radiated Emission

Product : Shriker-G0+ Evaluation Kit
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (902.50MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal Peak Detector:					
1805.000	-0.029	41.720	41.691	-32.309	74.000
2707.500	-2.303	53.300	50.997	-23.003	74.000
3610.000	-1.094	43.770	42.676	-31.324	74.000
4512.500	0.762	50.520	51.282	-22.718	74.000
5415.000	3.308	41.320	44.628	-29.372	74.000
6317.500	5.628	39.220	44.847	-29.153	74.000
7220.000	9.542	35.110	44.651	-29.349	74.000
8122.500	9.873	34.650	44.523	-29.477	74.000
9025.000	11.441	36.320	47.761	-26.239	74.000
Average Detector:					
--					
Vertical Peak Detector:					
1805.000	0.900	41.120	42.020	-31.980	74.000
2707.500	-3.130	52.940	49.810	-24.190	74.000
3610.000	-1.079	45.370	44.291	-29.709	74.000
4512.500	2.395	51.830	54.225	-19.775	74.000
5415.000	3.694	37.270	40.964	-33.036	74.000
6317.500	5.168	40.160	45.328	-28.672	74.000
7220.000	10.029	35.650	45.679	-28.321	74.000
8122.500	11.139	35.370	46.509	-27.491	74.000
9025.000	11.656	35.080	46.736	-27.264	74.000
Average Detector:					
4512.500	36.025	37.530	39.925	-14.075	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Shriker-G0+ Evaluation Kit
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (915.00MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal Peak Detector:					
1830.000	-1.193	40.960	39.766	-34.234	74.000
2745.000	-1.929	51.940	50.011	-23.989	74.000
3660.000	-1.580	42.650	41.070	-32.930	74.000
4575.000	0.680	52.030	52.710	-21.290	74.000
5490.000	4.343	41.250	45.594	-28.406	74.000
6405.000	5.889	40.520	46.409	-27.591	74.000
7320.000	9.901	38.230	48.131	-25.869	74.000
8235.000	10.574	37.450	48.024	-25.976	74.000
9150.000	11.388	36.380	47.769	-26.231	74.000
Average Detector:					
--					
Vertical Peak Detector:					
1830.000	-0.544	41.550	41.005	-32.995	74.000
2745.000	-2.802	52.230	49.428	-24.572	74.000
3660.000	-1.375	42.360	40.985	-33.015	74.000
4575.000	2.296	52.560	54.856	-19.144	74.000
5490.000	4.357	41.180	45.537	-28.463	74.000
6405.000	6.015	40.560	46.575	-27.425	74.000
7320.000	10.505	37.250	47.755	-26.245	74.000
8235.000	11.466	36.660	48.127	-25.873	74.000
9150.000	11.497	36.650	48.147	-25.853	74.000
Average Detector:					
4575.000	2.296	42.290	44.586	-9.414	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Shriker-G0+ Evaluation Kit
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (927.50MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal Peak Detector:					
1855.000	-2.396	42.780	40.384	-33.616	74.000
2782.500	-1.816	51.820	50.004	-23.996	74.000
3710.000	-2.059	44.380	42.321	-31.679	74.000
4637.500	0.730	50.340	51.070	-22.930	74.000
5565.000	4.369	40.870	45.239	-28.761	74.000
6492.500	6.583	39.880	46.463	-27.537	74.000
7420.000	10.481	36.120	46.601	-27.399	74.000
8347.500	11.475	36.020	47.496	-26.504	74.000
9275.000	11.408	38.820	50.228	-23.772	74.000
Average Detector:					
--					
Vertical Peak Detector:					
1855.000	-2.037	43.880	41.843	-32.157	74.000
2782.500	-2.737	50.710	47.973	-26.027	74.000
3710.000	-1.701	43.250	41.549	-32.451	74.000
4637.500	2.233	49.680	51.914	-22.086	74.000
5565.000	4.390	41.780	46.170	-27.830	74.000
6492.500	6.519	39.470	45.989	-28.011	74.000
7420.000	11.235	35.260	46.495	-27.505	74.000
8347.500	12.569	35.110	47.679	-26.321	74.000
9275.000	11.374	37.780	49.154	-24.846	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Shriker-G0+ Evaluation Kit
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (902.50MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
30.000	-0.150	34.937	34.787	-5.213	40.000
70.768	-15.669	41.121	25.451	-14.549	40.000
363.174	0.137	33.726	33.862	-12.138	46.000
423.623	-0.234	32.460	32.226	-13.774	46.000
827.087	7.360	24.347	31.707	-14.293	46.000
903.000	5.938	28.518	34.456	-11.544	46.000
Vertical					
30.000	-3.010	32.808	29.798	-10.202	40.000
70.768	-11.539	40.101	28.561	-11.439	40.000
363.174	-0.109	32.261	32.152	-13.848	46.000
392.696	-1.188	28.052	26.864	-19.136	46.000
540.304	2.156	24.345	26.501	-19.499	46.000
807.406	3.447	24.683	28.130	-17.870	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Shriker-G0+ Evaluation Kit
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (915.00MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
30.000	-0.150	33.535	33.385	-6.615	40.000
70.768	-15.669	39.679	24.009	-15.991	40.000
361.768	-0.003	31.700	31.696	-14.304	46.000
423.623	-0.234	31.749	31.515	-14.485	46.000
856.609	7.077	23.212	30.289	-15.711	46.000
915.652	6.413	31.386	37.799	-8.201	46.000
Vertical					
30.000	-3.010	32.527	29.517	-10.483	40.000
70.768	-11.539	39.138	27.598	-12.402	40.000
363.174	-0.109	31.583	31.474	-14.526	46.000
538.899	2.099	23.872	25.971	-20.029	46.000
603.565	2.036	24.947	26.984	-19.016	46.000
915.652	-1.105	31.888	30.783	-15.217	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Shriker-G0+ Evaluation Kit
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (927.50MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
30.000	-0.150	33.014	32.864	-7.136	40.000
70.768	-15.669	38.207	22.537	-17.463	40.000
149.493	-7.848	31.619	23.772	-19.728	43.500
363.174	0.137	32.159	32.295	-13.705	46.000
423.623	-0.234	31.779	31.545	-14.455	46.000
928.304	7.246	33.088	40.334	-5.666	46.000
Vertical					
30.000	-3.010	33.339	30.329	-9.671	40.000
70.768	-11.539	38.931	27.391	-12.609	40.000
363.174	-0.109	31.577	31.468	-14.532	46.000
392.696	-1.188	27.381	26.193	-19.807	46.000
822.870	3.068	23.365	26.432	-19.568	46.000
928.304	3.652	29.918	33.570	-12.430	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

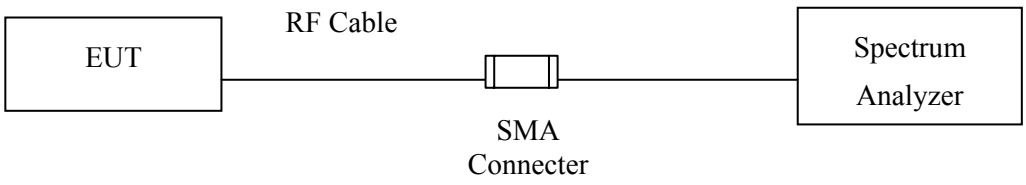
7. RF Antenna Conducted Test

7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments Marked "X" are used to measure the final test results.

7.2. Test Setup



7.3. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

7.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

± 150Hz

7.6. Test Result of RF Antenna Conducted Test

Product : Shriker-G0+ Evaluation Kit
Test Item : RF Antenna Conducted Test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Figure Channel 00:

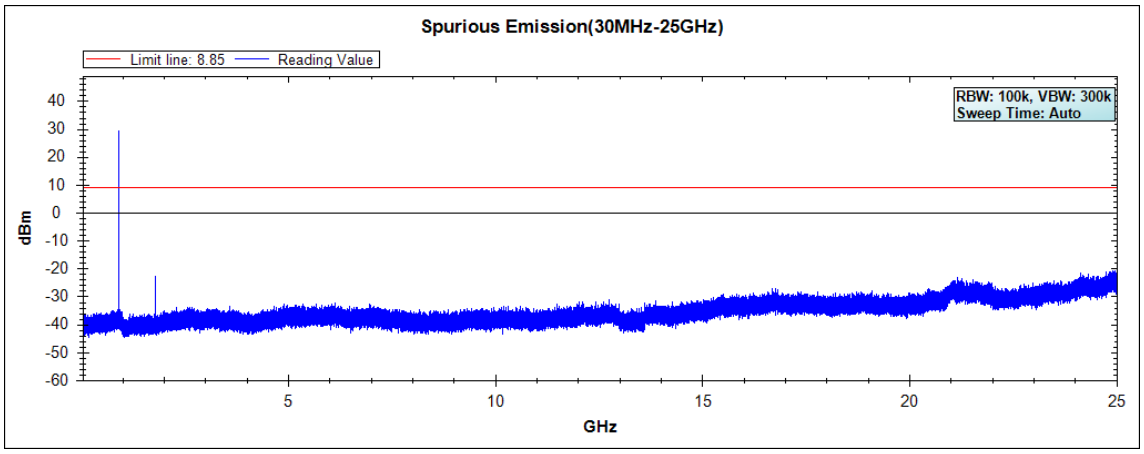


Figure Channel 25:

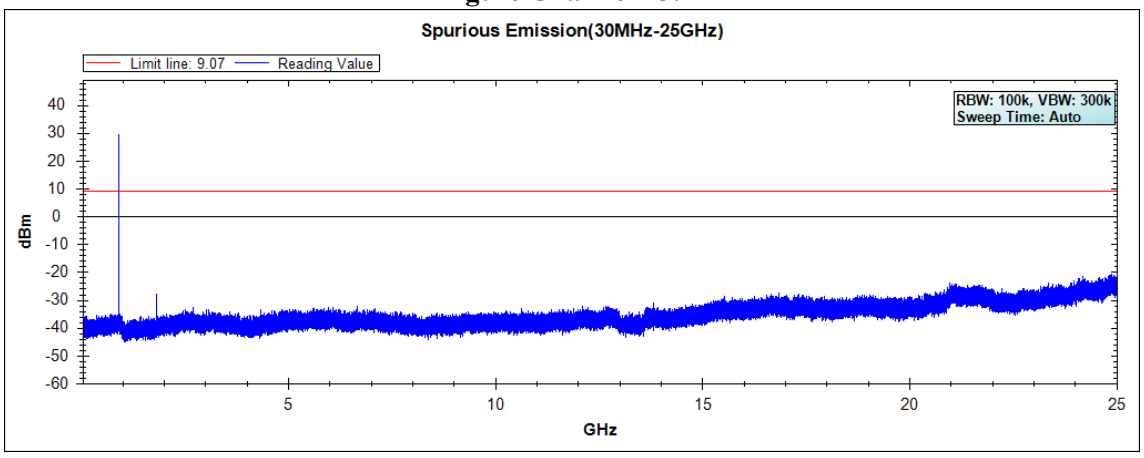
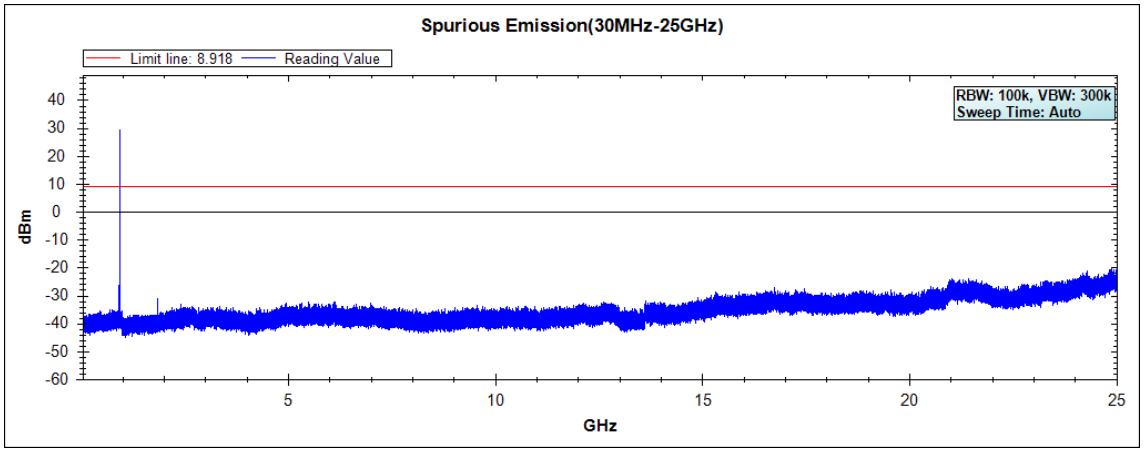


Figure Channel 50:



Note: The above test pattern is synthesized by multiple of the frequency range.

8. Band Edge

8.1. Test Equipment

RF Conducted Measurement

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

RF Radiated Measurement

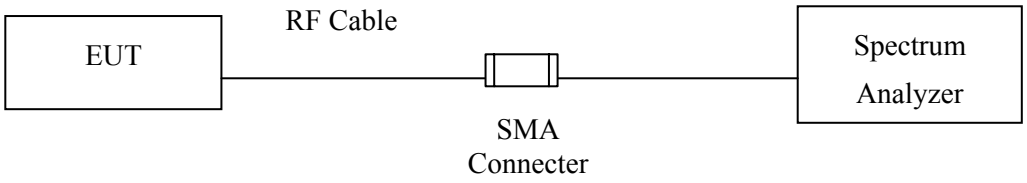
The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep, 2015
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun, 2015
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun, 2015
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun, 2015
	X	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun, 2015

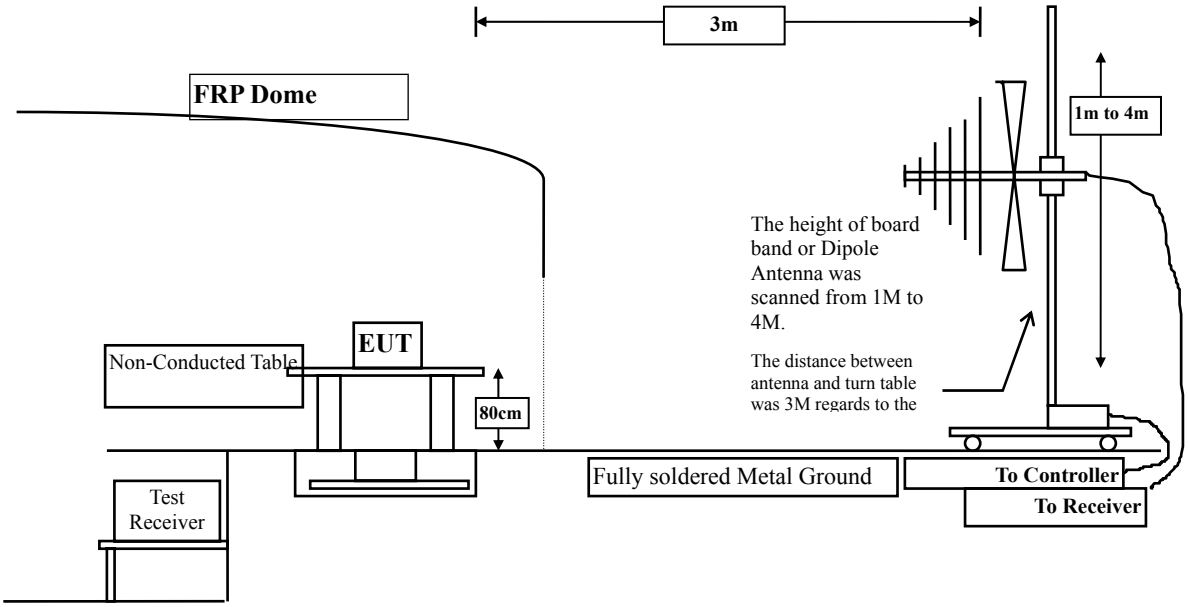
Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

8.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement



8.3. Limit

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBμV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: 1. RF Voltage (dBμV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional 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. 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 Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

8.4. Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

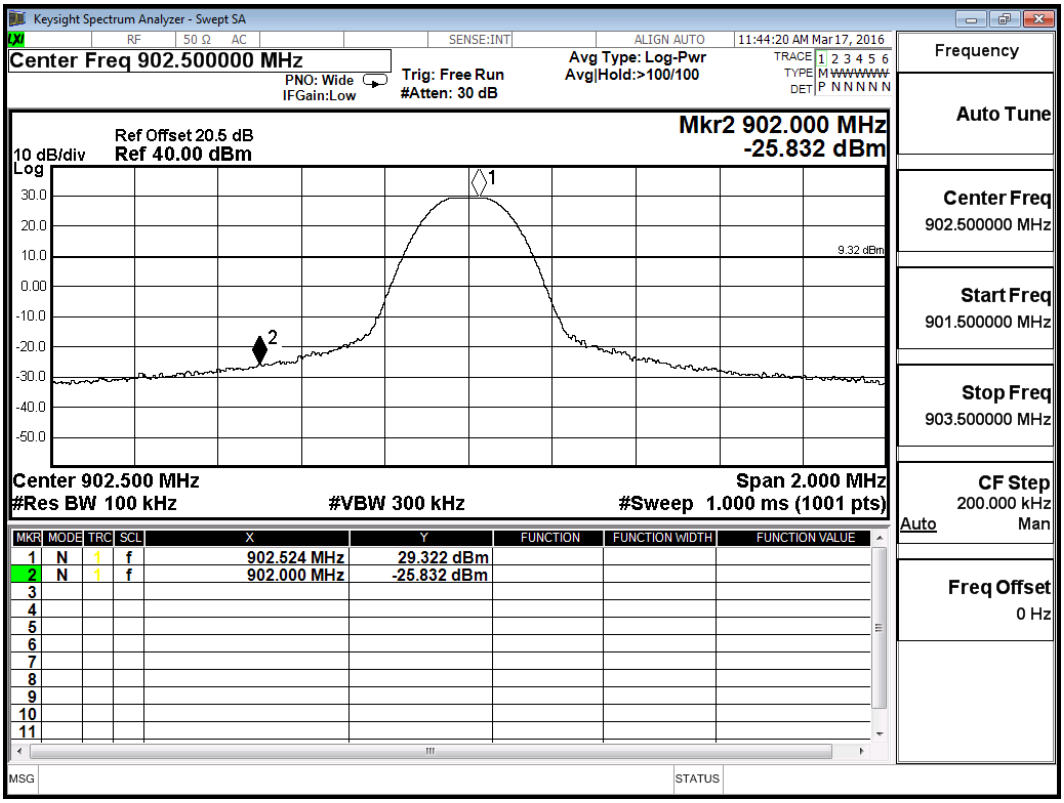
8.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

8.6. Test Result of Band Edge

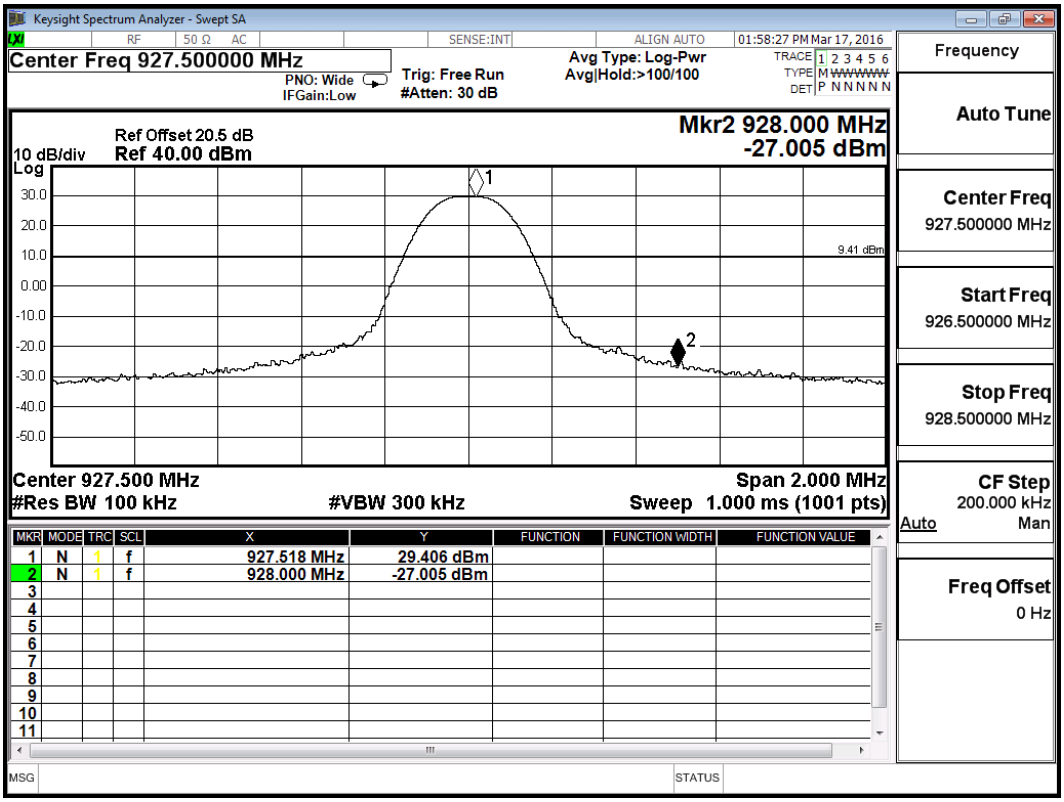
Product : Shriker-G0+ Evaluation Kit
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (902.50MHz)

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
902.50	55.154	>20	PASS



Product : Shriker-G0+ Evaluation Kit
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (927.50MHz)

Test Frequency (MHz)	Measurement Level Δ (dB)	Limit Δ (dB)	Result
927.50	56.411	>20	PASS



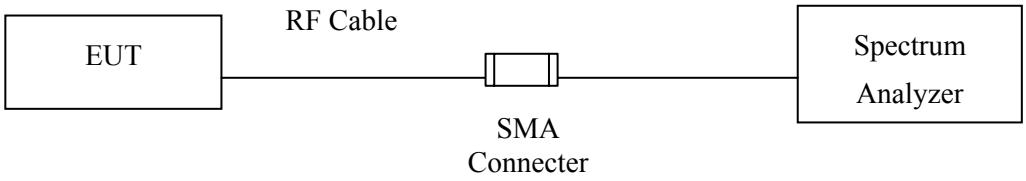
9. Channel Separation

9.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments mark by "X" are used to measure the final test results.

9.2. Test Setup



9.3. Limit

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.

9.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.5. Uncertainty

± 150Hz

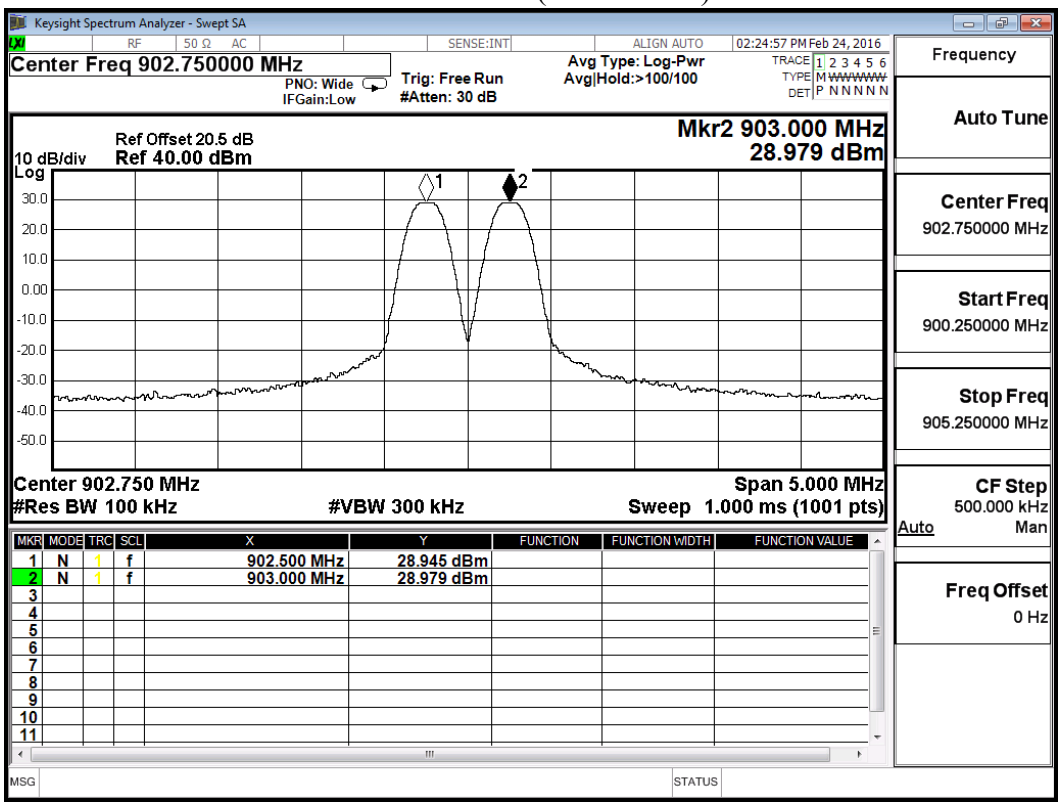
9.6. Test Result of Channel Separation

Product : Shriker-G0+ Evaluation Kit
Test Item : Channel Separation
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

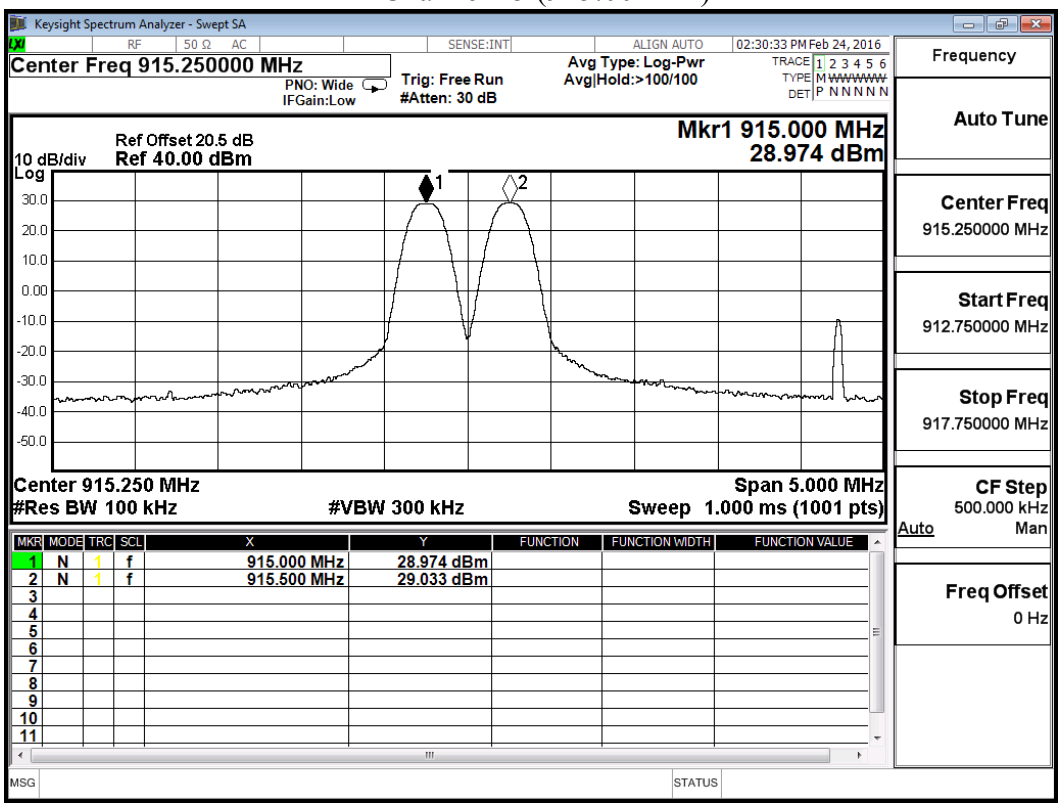
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of 20dB Bandwidth (kHz)	Result
00	902.50	500	>25 kHz	325.0	Pass
25	915.00	500	>25 kHz	330.0	Pass
50	927.50	500	>25 kHz	330.0	Pass

NOTE: The 20dB Bandwidth is refer to section 3.

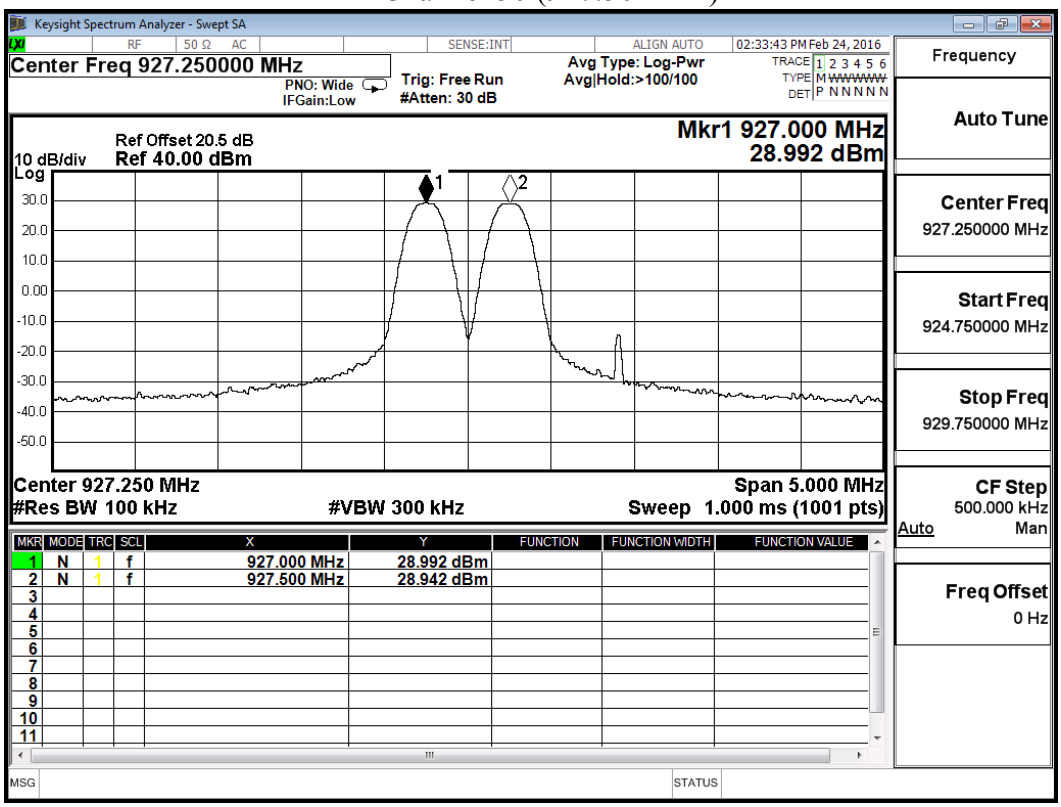
Channel 00 (902.50MHz)



Channel 25 (915.00MHz)



Channel 50 (927.50 MHz)



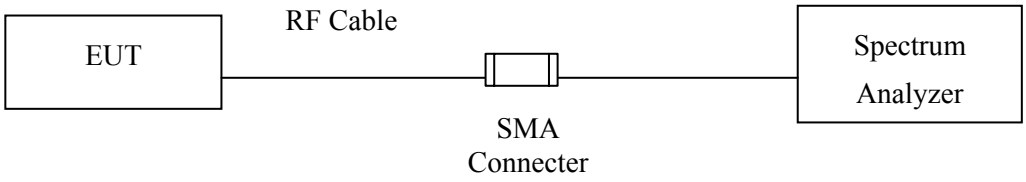
10. Dwell Time

10.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

10.2. Test Setup



10.3. Limit

According to FCC Section 15.247(a)(1)(i). If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

10.4. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.5. Uncertainty

± 25msec

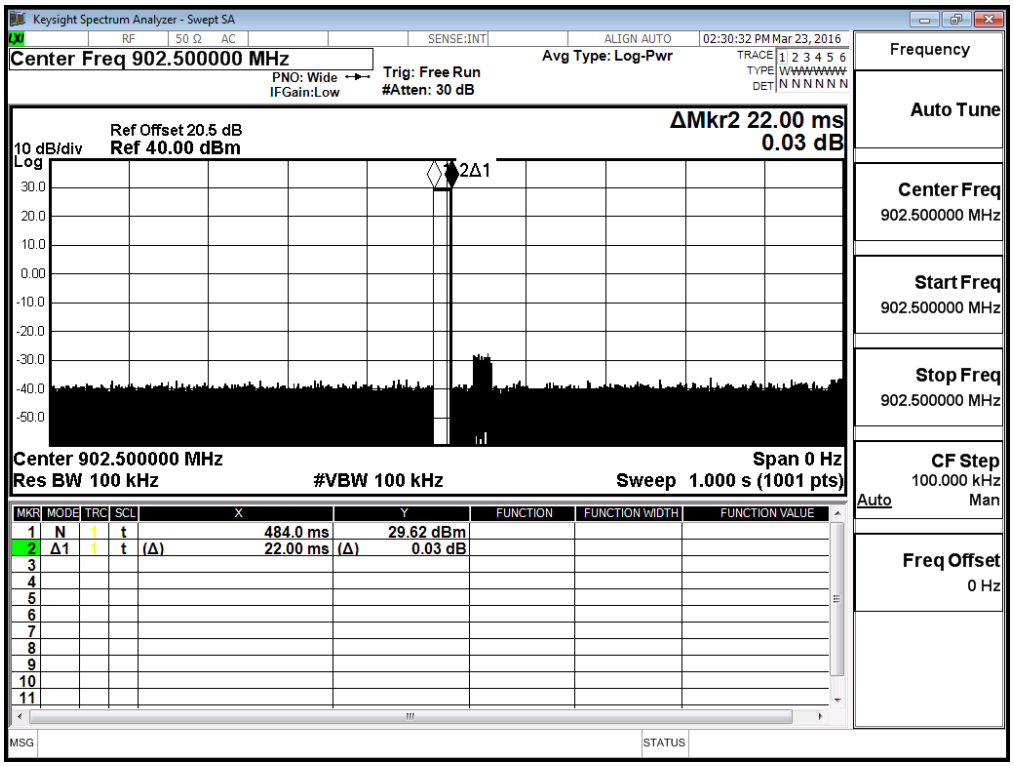
10.6. Test Result of Dwell Time

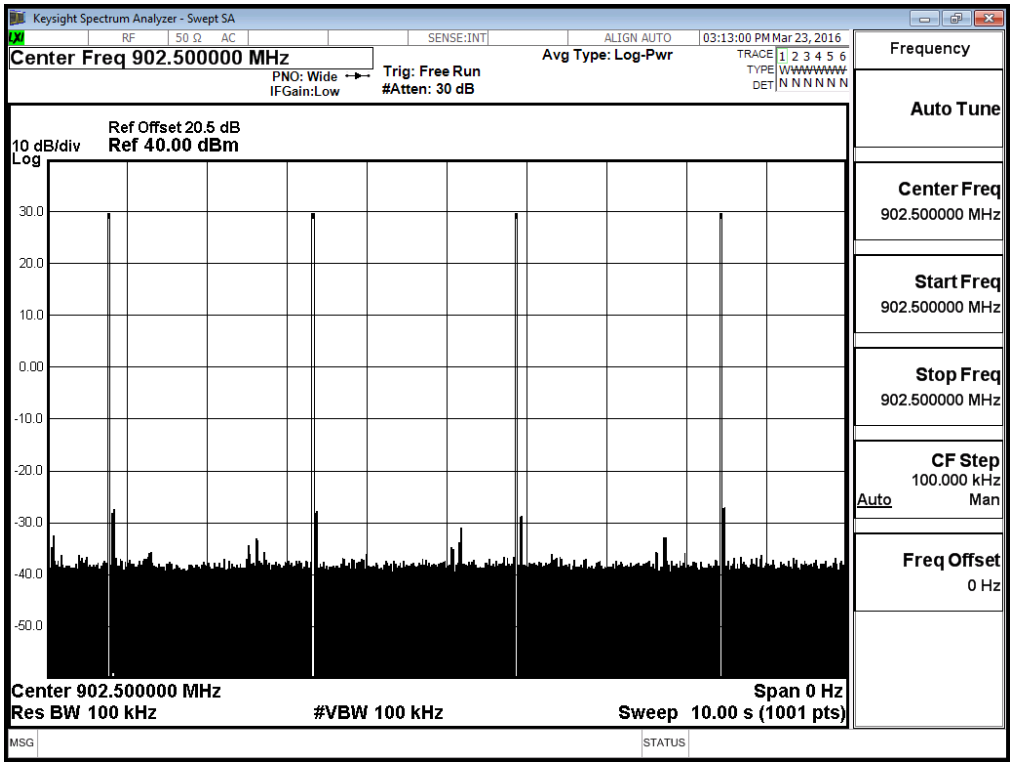
Product : Shriker-G0+ Evaluation Kit
Test Item : Dwell Time
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Frequency (MHz)	Dwell Time (Sec)	Limit (Sec)	Result
902.50	0.088	0.4	Pass
915.00	0.088	0.4	Pass
927.50	0.088	0.4	Pass

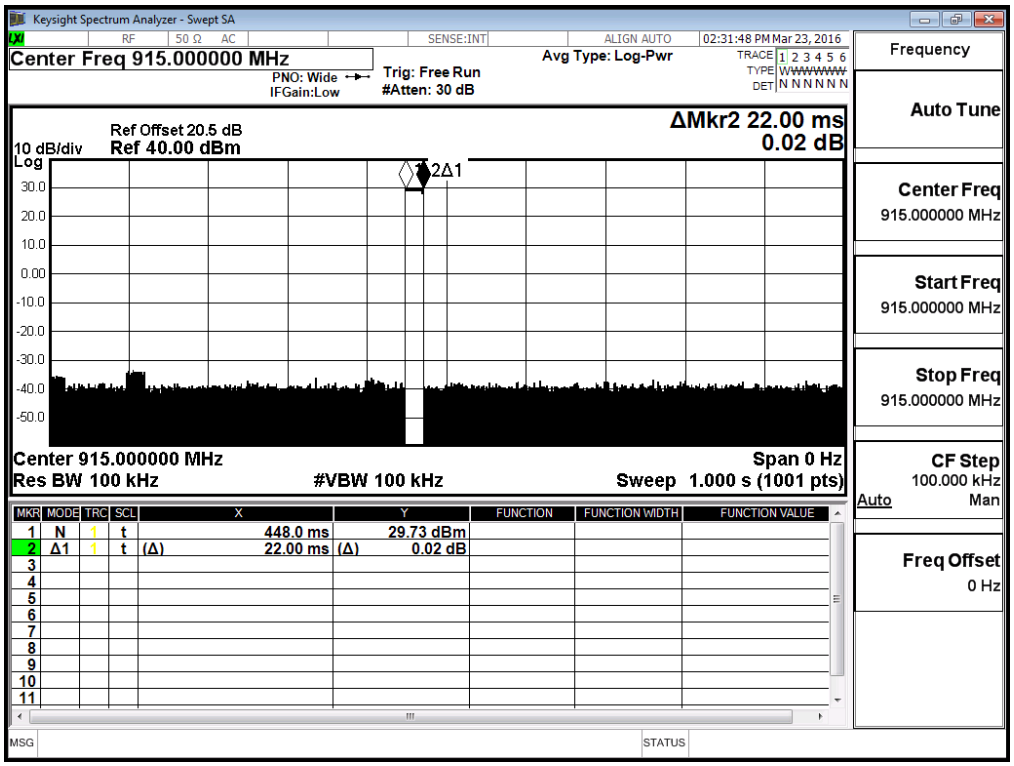
Note: The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

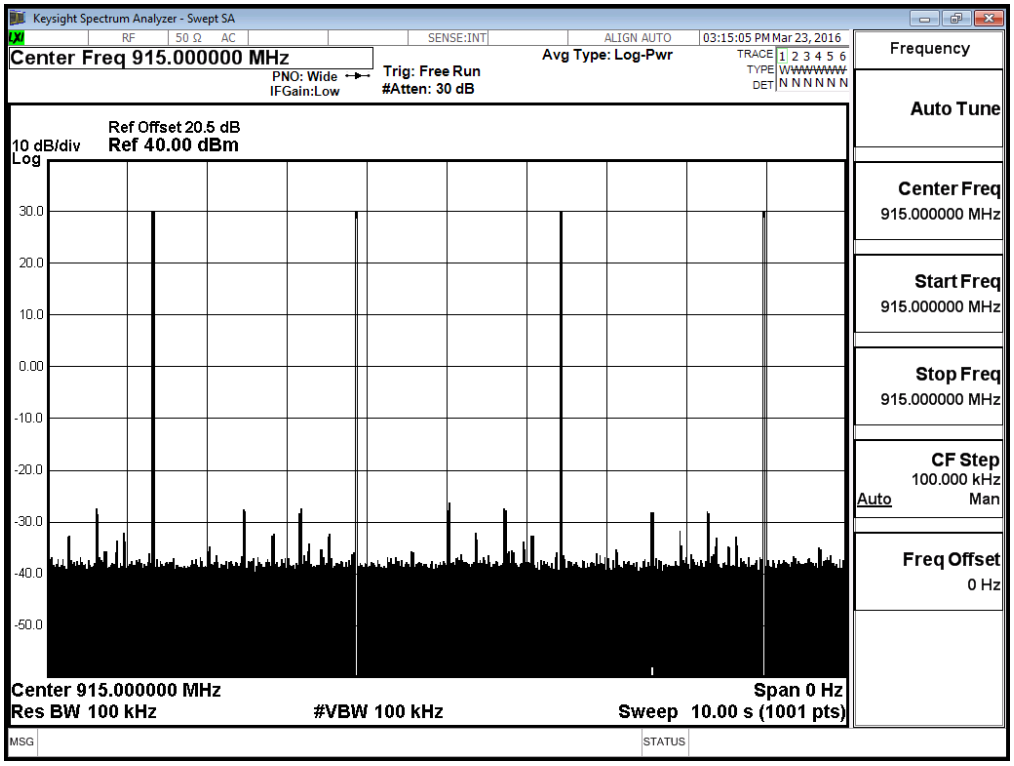
Channel 00


Keysight Spectrum Analyzer - Swept SA
Center Freq 902.500000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:30:32 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Log
Ref 40.00 dBm
ΔMkr2 22.00 ms
0.03 dB
Center 902.500000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 1.000 s (1001 pts)
1 N 1 t 484.0 ms 29.62 dBm
2 Δ1 1 t (Δ) 22.00 ms (Δ) 0.03 dB
Frequency
Auto Tune
Center Freq
902.500000 MHz
Start Freq
902.500000 MHz
Stop Freq
902.500000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz

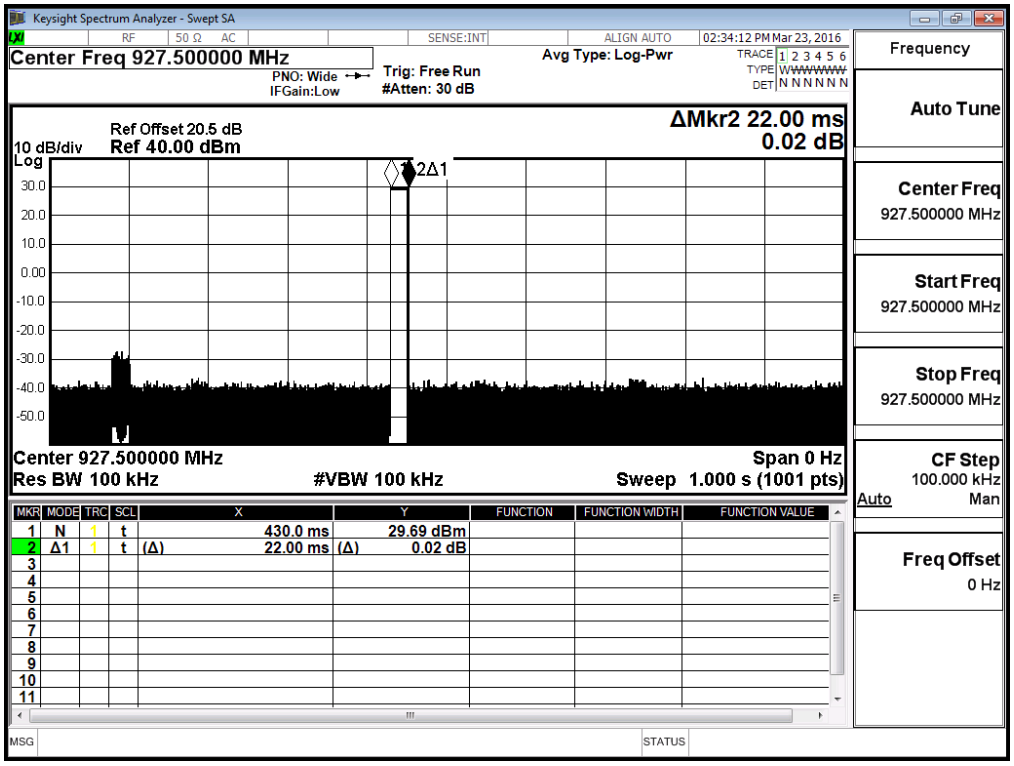

Keysight Spectrum Analyzer - Swept SA
Center Freq 902.500000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
03:13:00 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Log
Ref 40.00 dBm
Center 902.500000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 10.00 s (1001 pts)
Frequency
Auto Tune
Center Freq
902.500000 MHz
Start Freq
902.500000 MHz
Stop Freq
902.500000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz

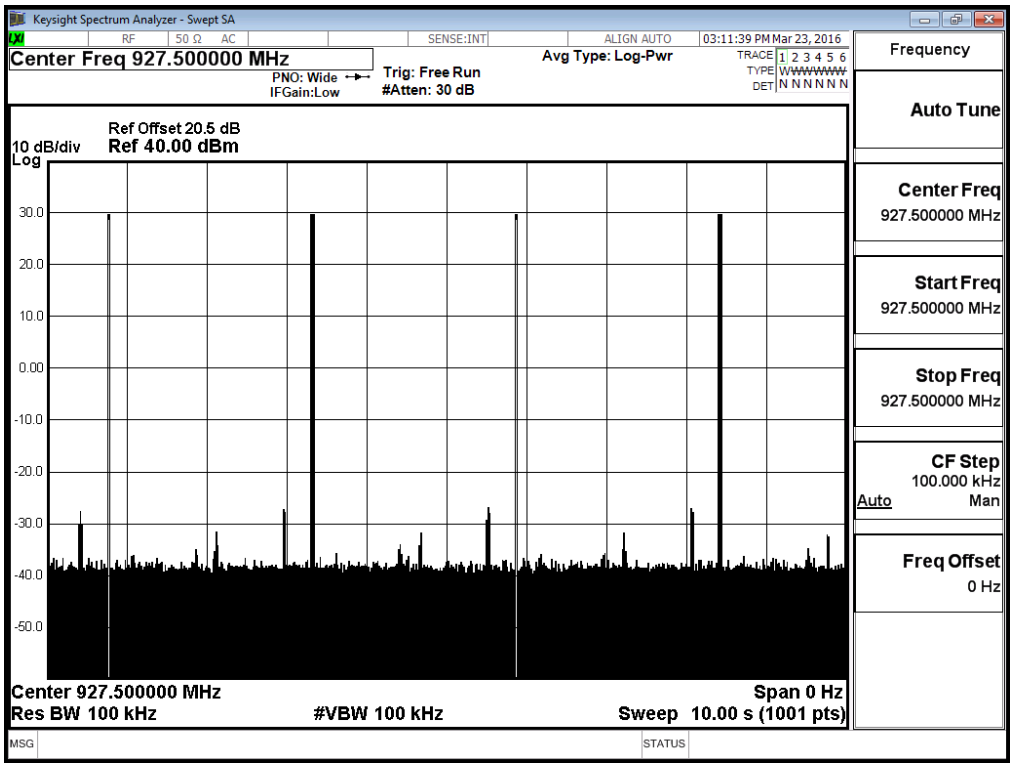
Channel 25


Keysight Spectrum Analyzer - Swept SA
Center Freq 915.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:31:48 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Ref 40.00 dBm
ΔMkr2 22.00 ms
0.02 dB
Center 915.000000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 1.000 s (1001 pts)
1 N 1 t 448.0 ms 29.73 dBm
2 Δ1 1 t (Δ) 22.00 ms (Δ) 0.02 dB
Frequency
Auto Tune
Center Freq
915.000000 MHz
Start Freq
915.000000 MHz
Stop Freq
915.000000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz


Keysight Spectrum Analyzer - Swept SA
Center Freq 915.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
03:15:05 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Ref 40.00 dBm
Center 915.000000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 10.00 s (1001 pts)
Frequency
Auto Tune
Center Freq
915.000000 MHz
Start Freq
915.000000 MHz
Stop Freq
915.000000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz

Channel 50


Keysight Spectrum Analyzer - Swept SA
Center Freq 927.500000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:34:12 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Ref 40.00 dBm
ΔMkr2 22.00 ms
0.02 dB
Center 927.500000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 1.000 s (1001 pts)
1 N 1 t 430.0 ms 29.69 dBm
2 Δ1 1 t (Δ) 22.00 ms (Δ) 0.02 dB
Frequency
Auto Tune
Center Freq 927.500000 MHz
Start Freq 927.500000 MHz
Stop Freq 927.500000 MHz
CF Step 100.000 kHz
Auto Man
Freq Offset 0 Hz


Keysight Spectrum Analyzer - Swept SA
Center Freq 927.500000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
03:11:39 PM Mar 23, 2016
Ref Offset 20.5 dB
10 dB/div
Ref 40.00 dBm
Center 927.500000 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 10.00 s (1001 pts)
Frequency
Auto Tune
Center Freq 927.500000 MHz
Start Freq 927.500000 MHz
Stop Freq 927.500000 MHz
CF Step 100.000 kHz
Auto Man
Freq Offset 0 Hz

11. EMI Reduction Method During Compliance Testing

No modification was made during testing.