

EMC Test Report

Project Number: 3775885

Report Number: 3775885EMC01 **Revision Level:** 0

Client: Hi-P (SINGAPORE) TECHNOLOGY PTE LTD

Equipment Under Test: iDEN Phone with Mototalk

Model: H375i

FCC ID: 2ACUZH375I

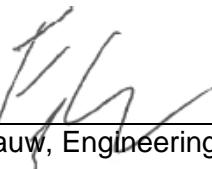
Applicable Standards: FCC Part 15 Subpart C, § 15.247

ANSI C63.10: 2009

Report issued on: 24 Jun 2015

Test Result: Compliant

Tested by:


Fendy Ljauw, Engineering Technician

Reviewed by:


David Schramm, EMC/RF/SAR/HAC Manager

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or Testing done by SGS International Electrical Approvals in connection with distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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1 Summary of Test Results

Test Description	Test Specification	Test Result
Occupied Bandwidth	15.247(a) (1)	Compliant
Peak Power Output	15.247(a) (1)	Compliant
Conducted Spurious Emissions	15.247(d)	Compliant
Radiated Spurious Emissions	15.247(d), 15.35(b), 15.209	Compliant
Dwell time	15.247(a) (1)(iii)	Compliant
Number of Hopping Frequencies	15.247(a) (1)(iii)	Compliant
Channel separation	15.247(a)(1)	Compliant
AC Power Line Conducted Emission	FCC Part 15, Subpart B ANSI C63.4:2009	Compliant

1.1 ***Modifications Required for Compliance***

None

2 General Information

2.1 Client Information

Name: Hi-P (SINGAPORE) TECHNOLOGY PTE LTD
Address: 12 ANG MO KIO STREET 64 #03-02, UE BIZHUB CENTRAL (BLK A)
City, State, Zip, Country: SINGAPORE
569088

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

2.3 General Information of EUT

Marketing Name: H375i
Model Number: H375i101B32A
Serial Number: 364KRJ028W

FCC ID: 2ACUZH375i
Frequency Range: 902.525 to 927.475 MHz
Number of channels: 500 (10 lots of 50 hopping channels)
Modulation type: 8FSK
Channel spacing: 50 kHz
Antenna: Integral

Rated Voltage: 3.7 VDC Internal Battery

Sample Received Date: 08 Jun 2015
Dates of testing: 11 – 16 Jun 2015

Operating Modes and Conditions

The EUT was configured in software to allow the user to control the EUT to run continuously exercising all modes of operation.

During testing, the hopping sequence was stopped in accordance with Section 5.1 of ANSI C63.10-2009 so that the low, mid and high channels could be tested independently.

Modulations used: For fundamental and spurious measurements, the EUT was configured to operate continuously with 8FSK modulation enabled.

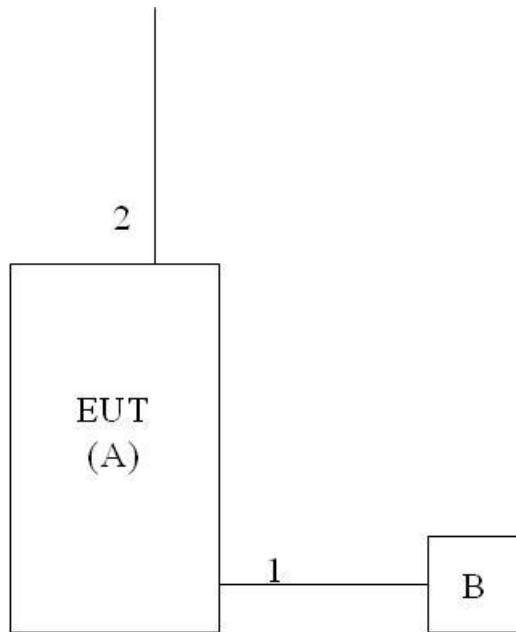
As specified in Section 5.10.5 of ANSI C63.10:2009:

- Software was designed to allow the EUT to operate
 - at 95.139 % duty cycle
 - at the worst-case duty cycle to allow measurements in instances where an average correction factor needs to be determined to calculate the average field strength from the measured peak field strength
- The software allowed configuration and operation on all available unlicensed wireless device

channels.

- The software allowed configuration and operation using all available modulations and data rates
- The software allowed configuration and operation on all available power out levels
- Since this is a frequency hopping system, the software allowed the hopping sequence to be turned off

2.4 **EUT Connection Block Diagram**



2.5 **System Configurations**

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Hi-P	EUT	H375i101B32A	364KRJ028W
B	Motorola	AC Adapter	MU06-H050100-A1	Not Labeled

2.6 **Cable List**

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	AC Main Line	EUT	Adapter	1.88	No	No
2	I/O	EUT	Ear Phone	1.12	No	No

3 Occupied Bandwidth

3.1 Test Result

Test Description	Basic Standards	Test Result
20 dB bandwidth	15.247(a) (1)	Pass

3.2 Test Method

The procedures from ANSI C63.10 (2009) clause 6.9 were used to determine the 20 dB bandwidth.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.7 °C

Relative Humidity: 51.5 %

3.4 Test Equipment

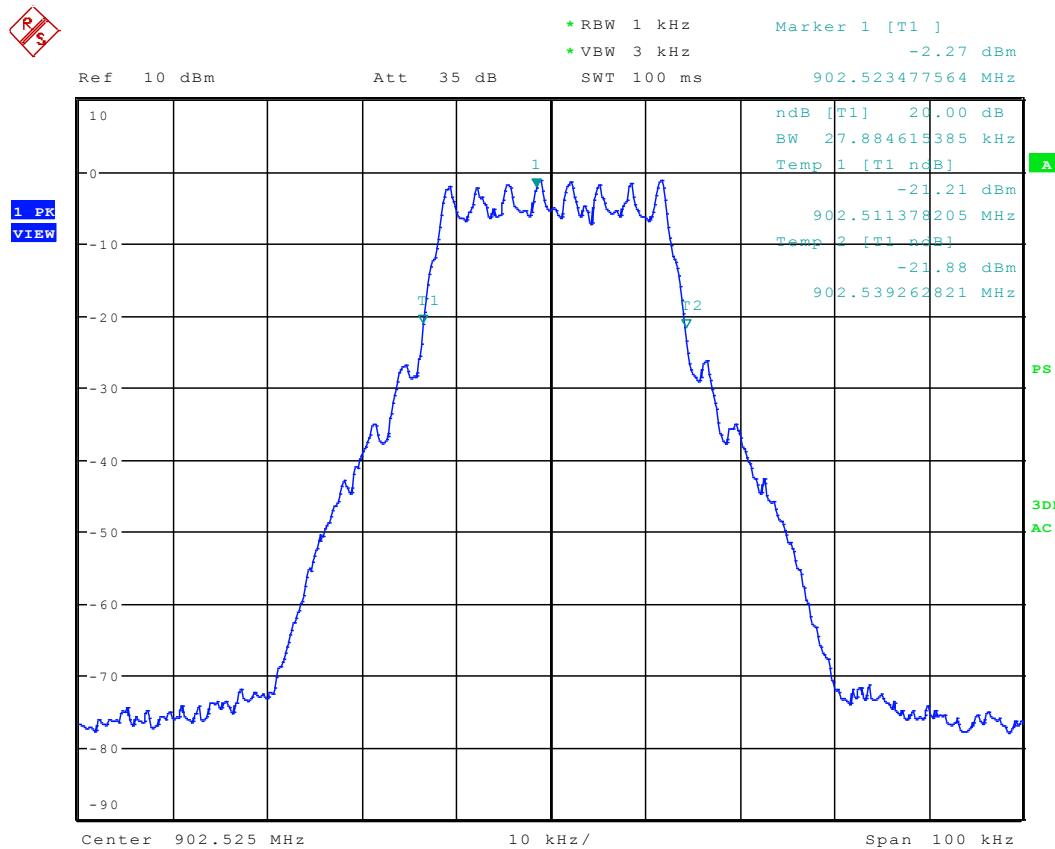
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	28 JUL 2015
RF Cable	Sucoflex 102	Huber-Suhner	B079823	06 AUG 2015
30dB Attenuator	K2-BW1+	Mini Circuits	B079794	CNR

Note: The calibration period equipment is 1 year.

3.5 Test Data

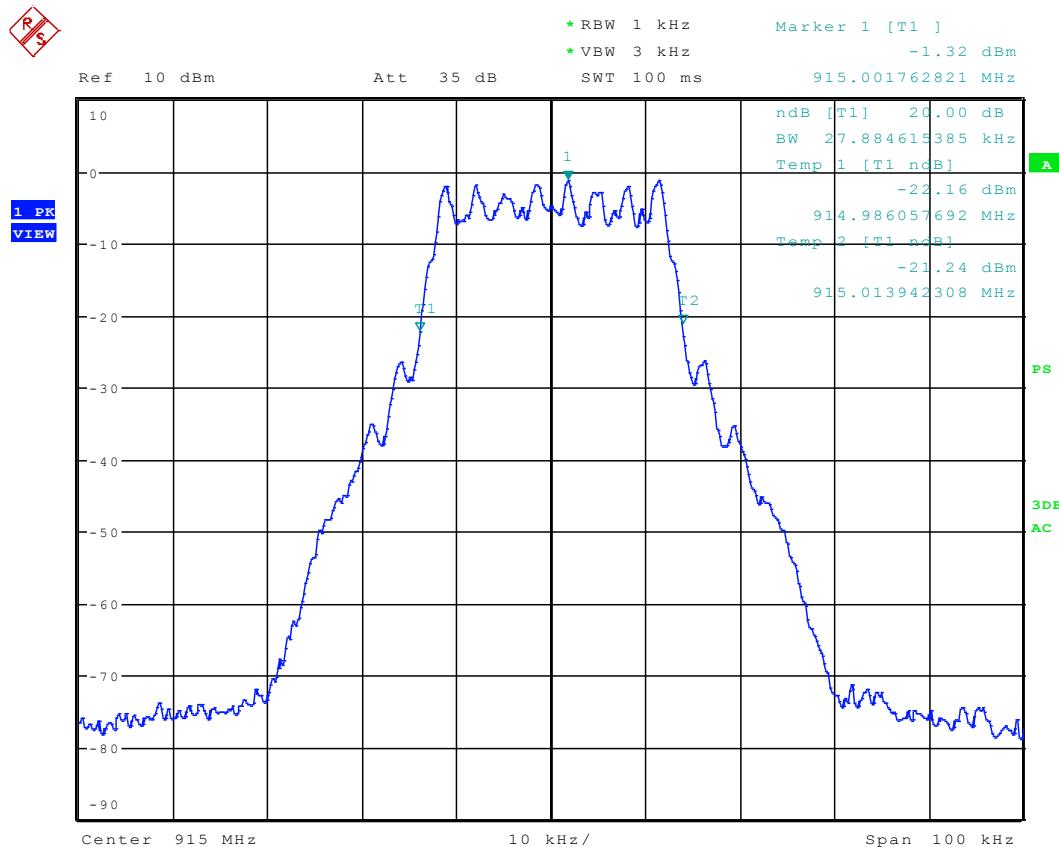
Frequency	20 dB bandwidth kHz
902.525MHz	27.9
915MHz	27.9
927.475MHz	27.7

902.525MHz



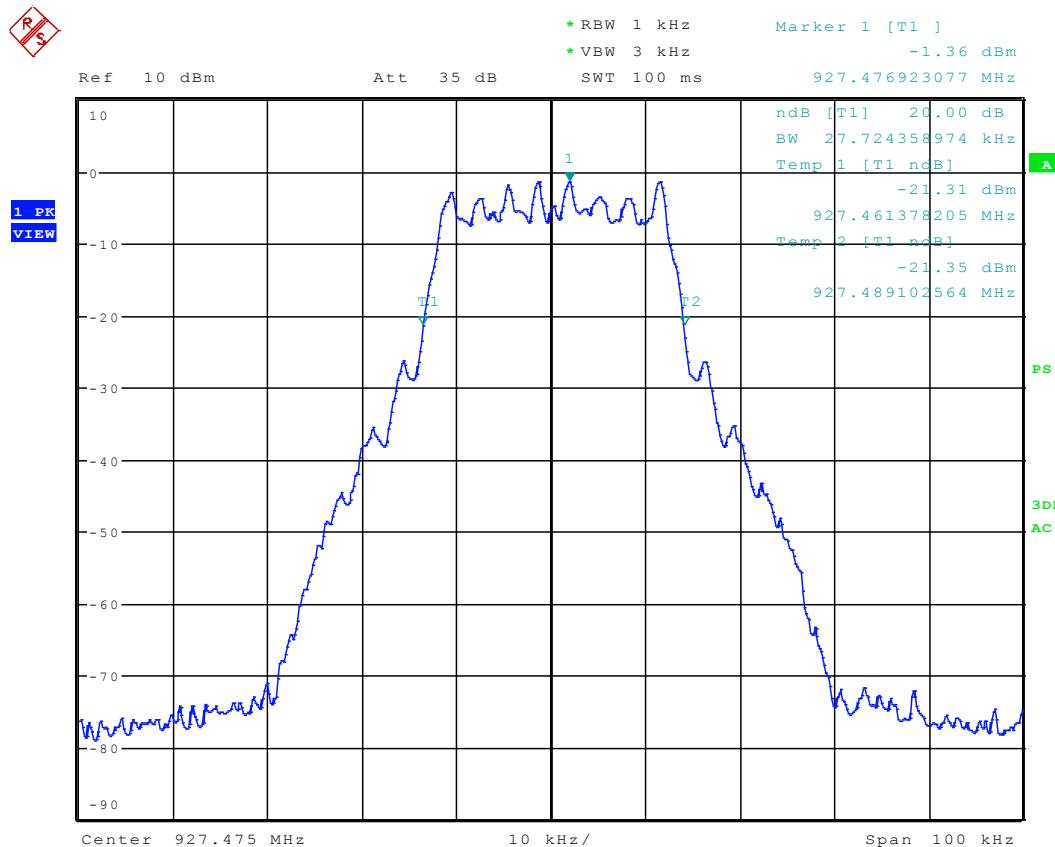
Date: 16.JUN.2015 09:02:58

915MHz



Date: 16.JUN.2015 09:05:09

927.475MHz



Date: 16.JUN.2015 09:09:13

4 Peak Output Power

4.1 Test Result

Test Description	Test Specification	Test Result
Peak Output Power	15.247(a) (1)	Compliant

4.2 Test Method

The test data was measured using a spectrum analyzer with Peak detector and a resolution bandwidth of 3 MHz.

Limit

For frequency hopping systems operating in the 902.525-927.475 MHz band employing at least 50 hopping channels: 1 watt.

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.4 °C

Relative Humidity: 52.6 %

4.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	28 JUL 2015
RF Cable	Sucoflex 102	Huber-Suhner	B079823	06 AUG 2015
30dB Attenuator	K2-BW1+	Mini Circuits	B079794	CNR

Note: The calibration period equipment is 1 year.

4.5 **Test Data**

Frequency	Peak Output Power (dBm)	Peak Output Power (W)
902.525 MHz	29.0	0.800
915 MHz	29.0	0.800
927.475 MHz	29.0	0.800

5 Conducted Spurious Emissions

5.1 Test Result

Test Description	Test Specification	Test Result
Conducted Spurious Emissions	15.247(d)	Compliant

5.2 Test Method

The test data was measured using a spectrum analyzer with

- Peak detector, max hold
- Resolution bandwidth of at least 100 kHz
- Video bandwidth at least 3x RBW
- Frequency range: 30 MHz to 26 GHz

The limit is 20 dB below the measured peak power.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.4 °C

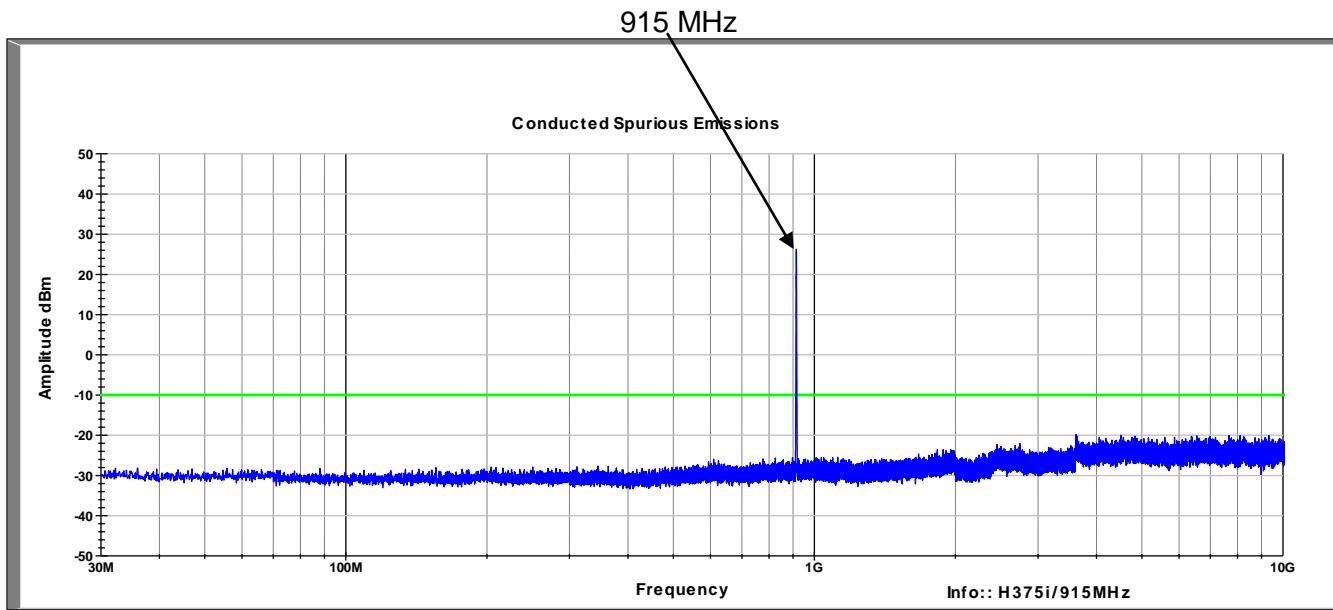
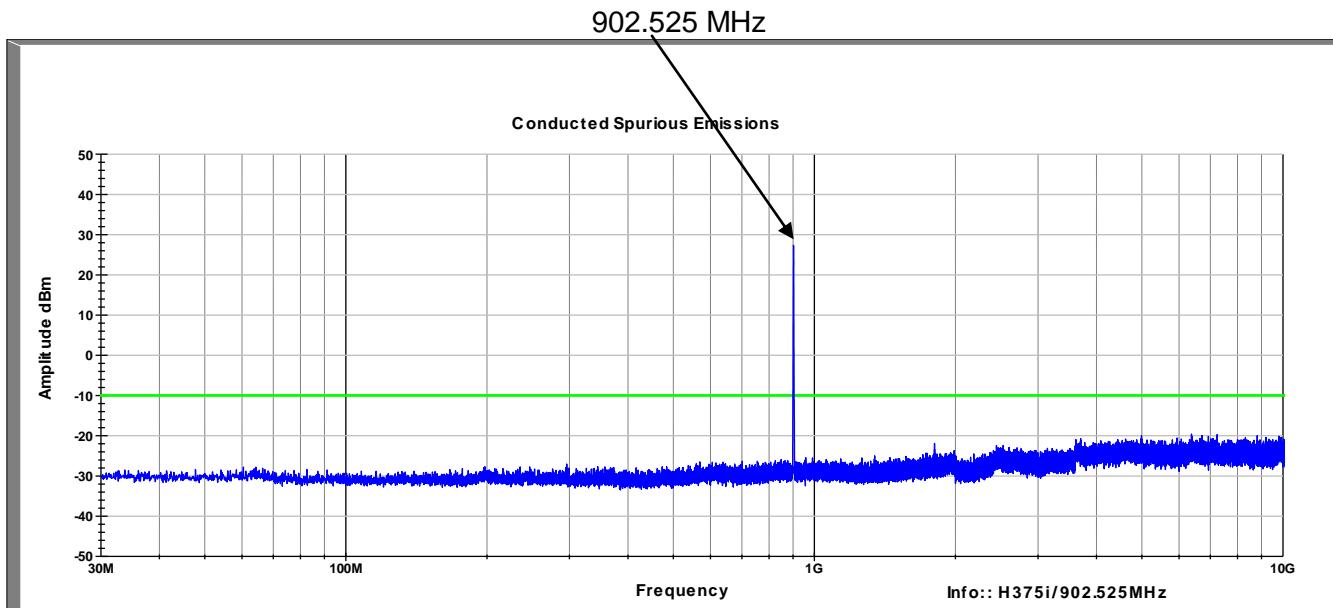
Relative Humidity: 52.6 %

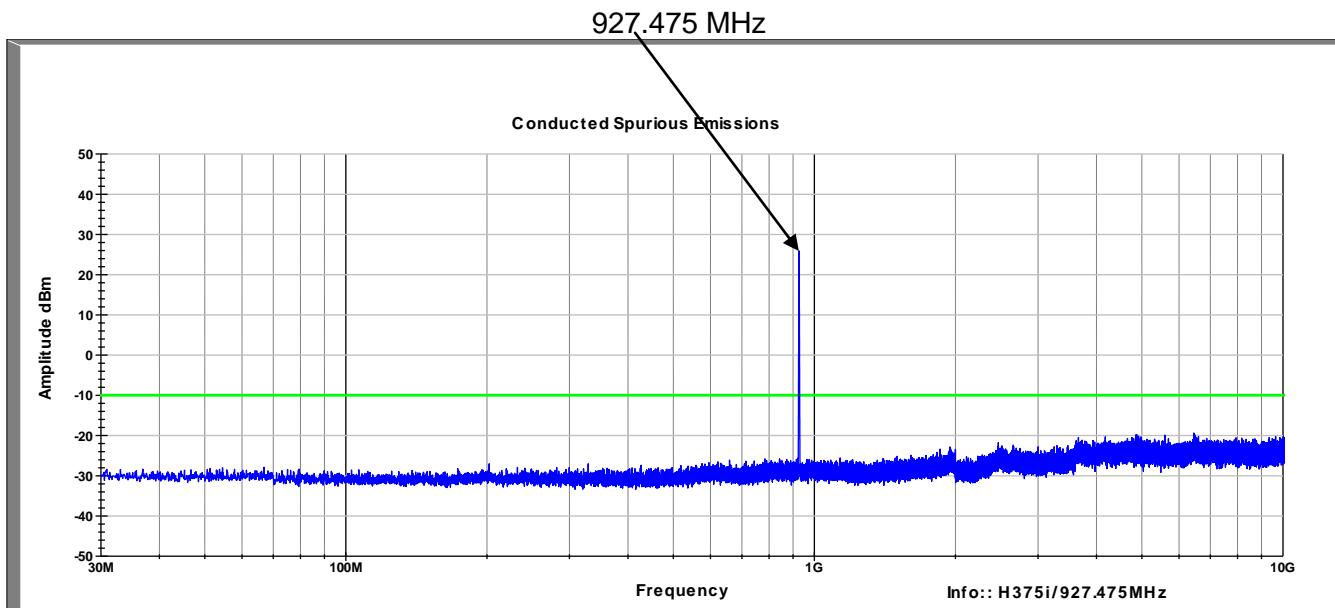
5.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	28 JUL 2015
RF Cable	Sucoflex 102	Huber-Suhner	B079823	06 AUG 2015
30dB Attenuator	K2-BW1+	Mini Circuits	B079794	CNR

Note: The calibration period equipment is 1 year.

5.5 Test Data





6 Field Strength of Spurious Radiation

6.1 Test Result

Test Description	Test Specification	Test Result
Field strength of spurious radiation	15.249 (a) and 15.209 RSS 210 2.6, A2.9 (1)(2)	Compliant

6.2 Test Method

The initial preliminary exploratory scans were performed over the frequency range as indicated in the tables below using the max hold function and incorporating a Peak detector and using TILE! software. The final test data was measured using a Quasi-Peak detector below 1GHz and a Peak detector above 1GHz. For harmonics of the fundamental, Average measurements were made by correcting the peak value with the duty cycle correction factor. For emissions other than harmonics of the fundamental, the Average measurements were made using the Average detector. The receivers resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements for 1GHz and higher. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

The device was manipulated through three orthogonal axes.

Test distance:

30 MHz to 1 GHz - The EUT to measurement antenna distance is 3 meters

1 to 18 GHz - The EUT to measurement antenna distance is 3 meters

18 to 40 GHz - The EUT to measurement antenna distance is 1 meter

Frequency	Limits ⁽¹⁾		Peak Limits dBuV/m
	Microvolts/m	dBuV/m	
30 - 88 MHz	100	40 ⁽²⁾	--
88 - 216 MHz	150	43.5 ⁽²⁾	--
216 - 960 MHz	200	46 ⁽²⁾	--
960 - 1000 MHz	500	54 ⁽²⁾	--
1 - 40 GHz	500	54 ⁽³⁾	74

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

6.3 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions

Temperature: 22.2 °C

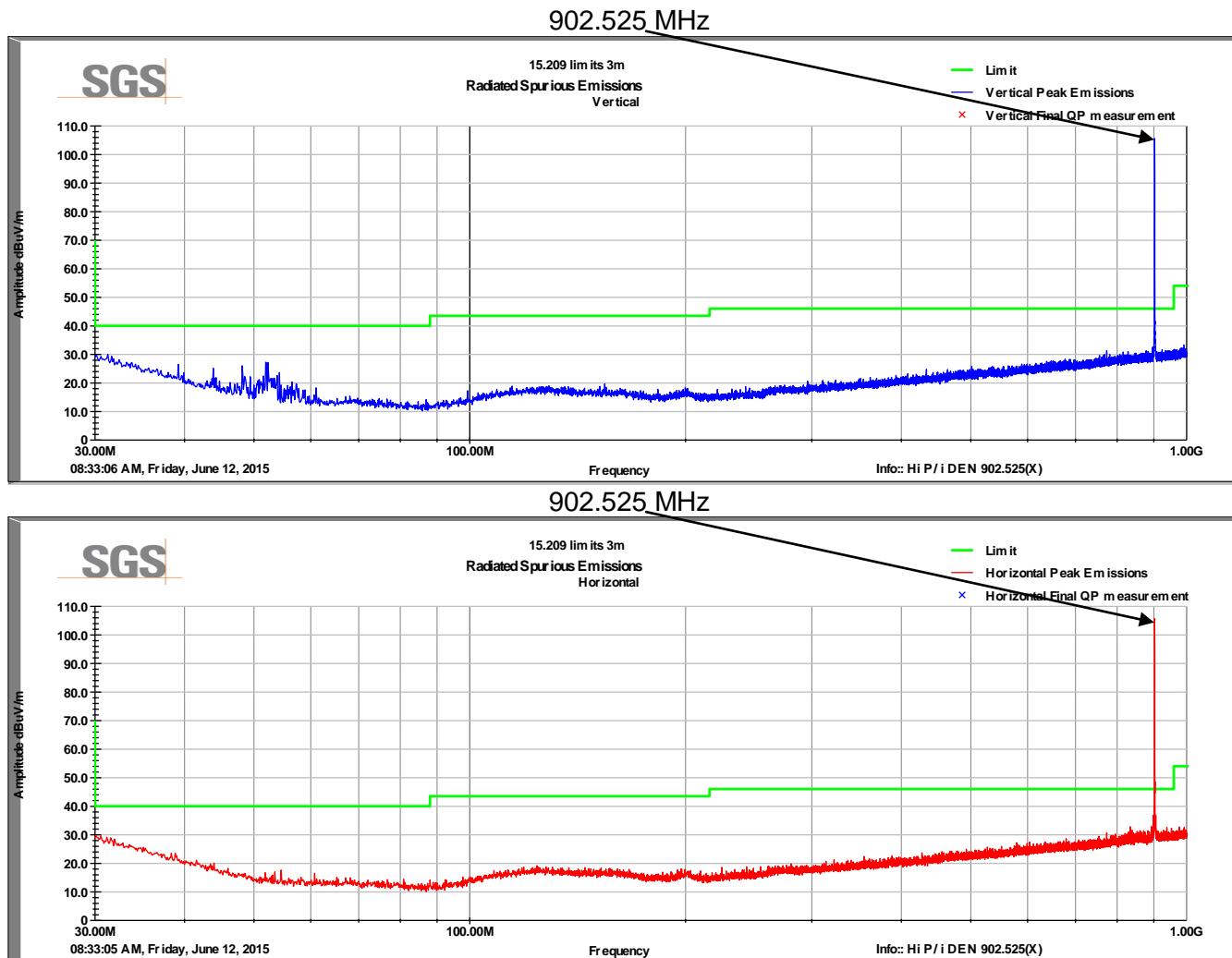
Relative Humidity: 53.6 %

6.4 Test Equipment

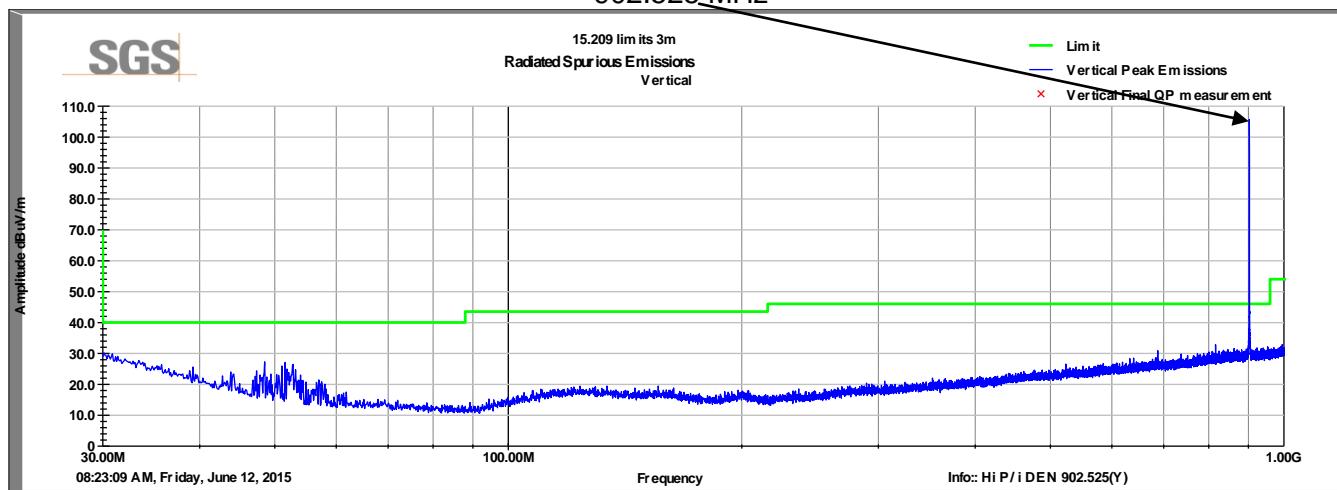
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
HIGH PASS FILTER	HPM50108	MICRO-TRONICS	B079802	26-Sep-2015
17 FT N TYPE COAX CABLE	HS 84133232	HUBER&SUHNER	B079661	4-Aug-2015
COAXIAL CABLE	1134	GORE	B094785	5-Aug-2015
RF CABLE	SF106	HUBER&SUHNER	B085903	4-Aug-2015
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	28-Jul-2015
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	24-Jun-2015
ANTENNA, BILOG	JB6	SUNOL	B079689	3-Sep-2015
DESKTOP AMPLIFIER 30M-18GHZ	NSP1800-25-HG	MITEQ	B085930	30-Mar-2016

Note: The calibration period equipment is 1 year.

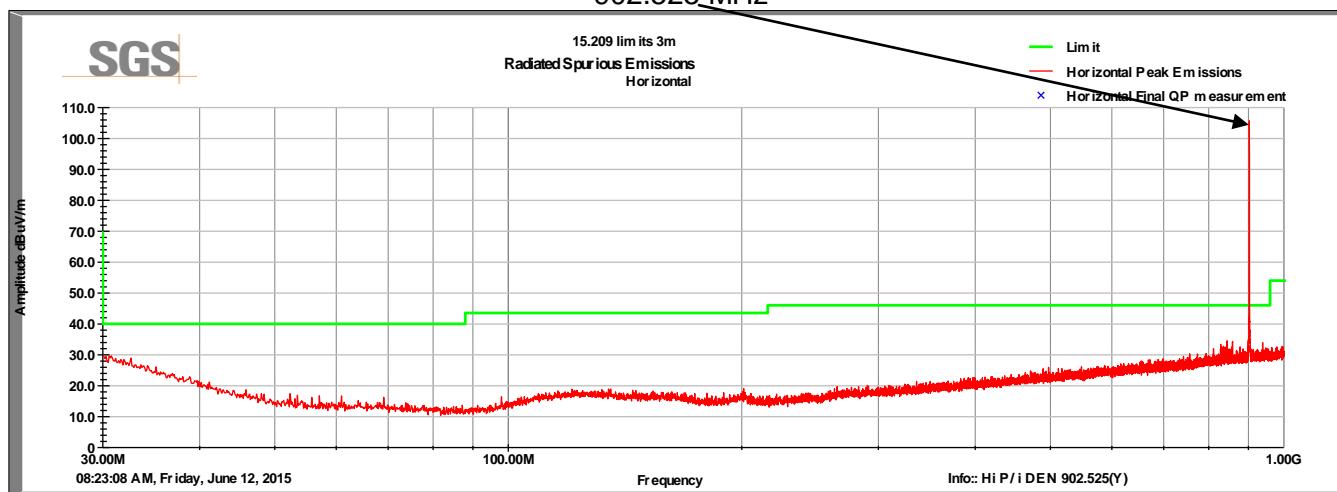
6.5 Test Data



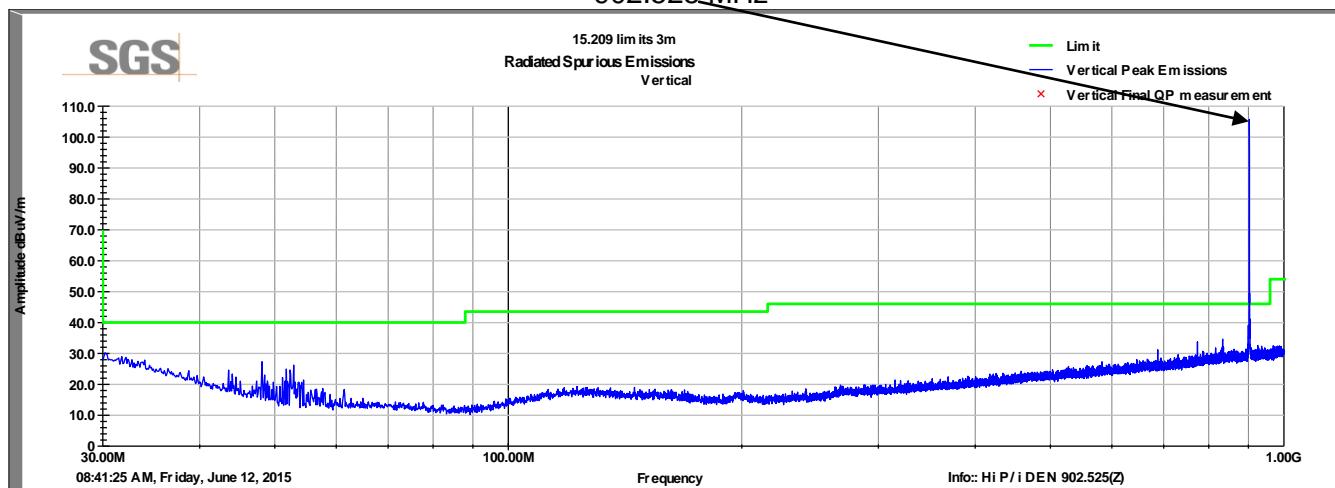
902.525 MHz



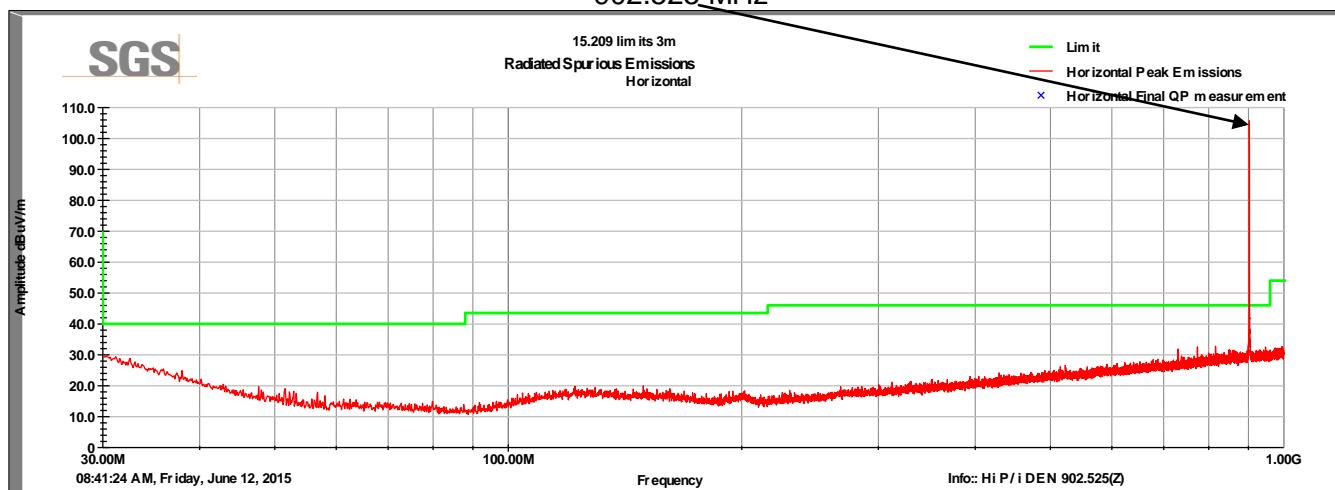
902.525 MHz

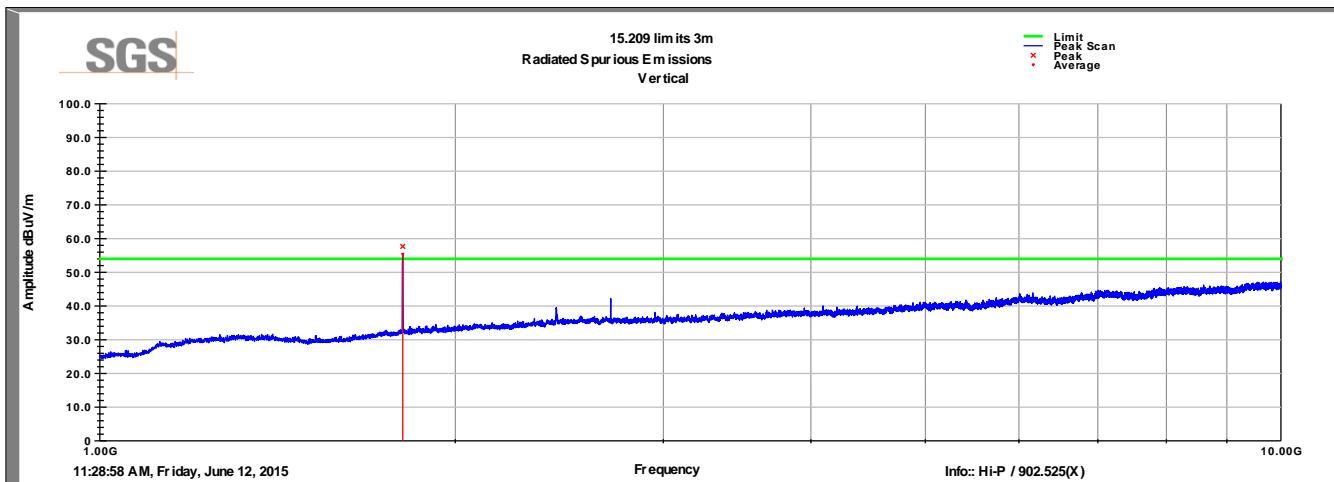


902.525 MHz

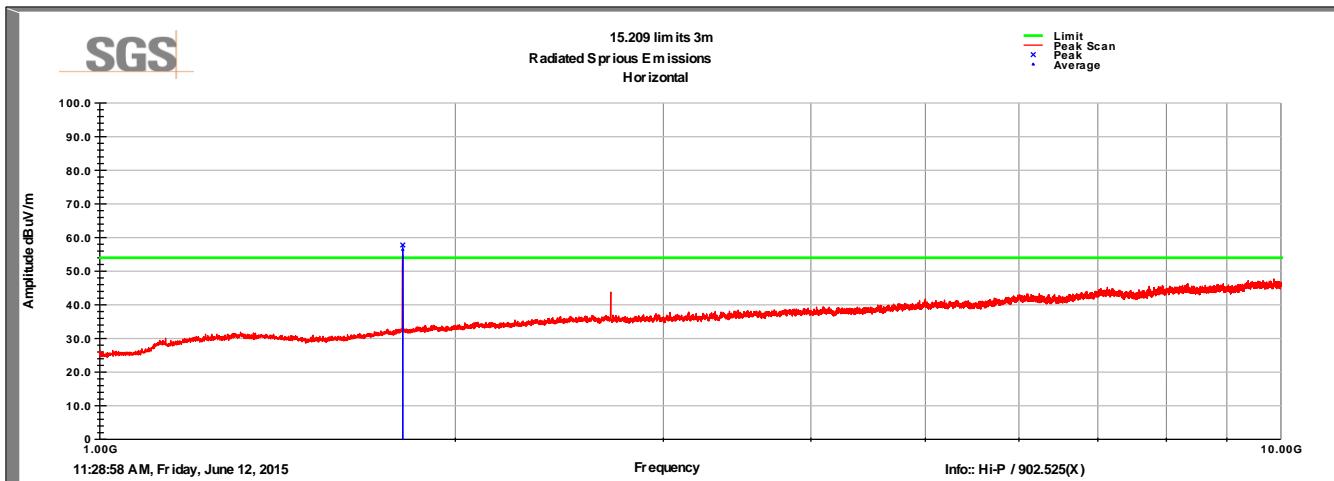


902.525 MHz



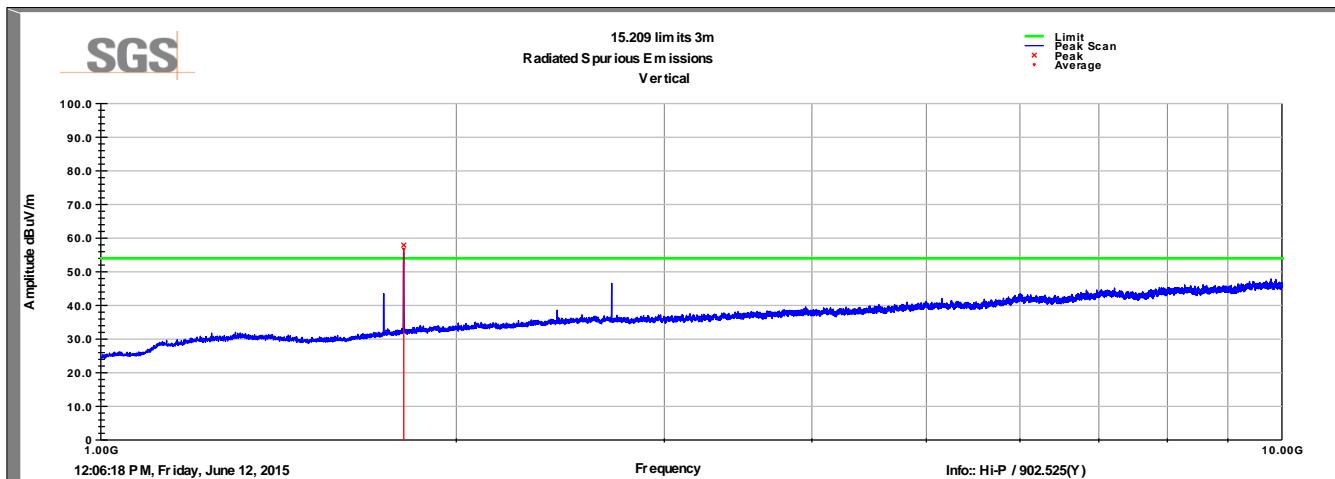


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1805.05	62.9	V	188.0	165.0	30.1	5.2	42.9	55.4	85.0	-29.6
2434.60	44.9	V	182.0	175.0	32.1	6.1	43.7	39.5	85.0	-45.5
2707.75	47.3	V	272.0	325.0	32.4	6.4	44.0	42.2	54.0	-11.8
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

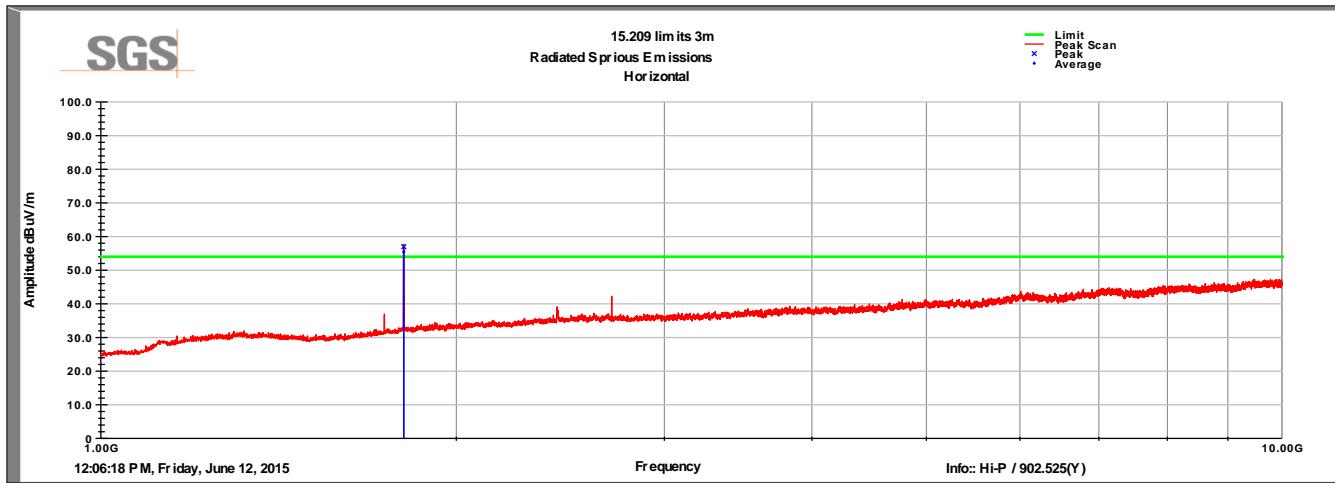


Frequency MHz	Raw AVG (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	AVG value dBuV/m	Peak Limit (dBuV/m)	Margin (dB)
1805.05	64.0	H	49.0	268.0	30.1	5.2	42.9	56.4	85.0	-28.6
2707.75	48.9	H	0.0	325.0	32.4	6.4	44.0	43.8	54.0	-10.2
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

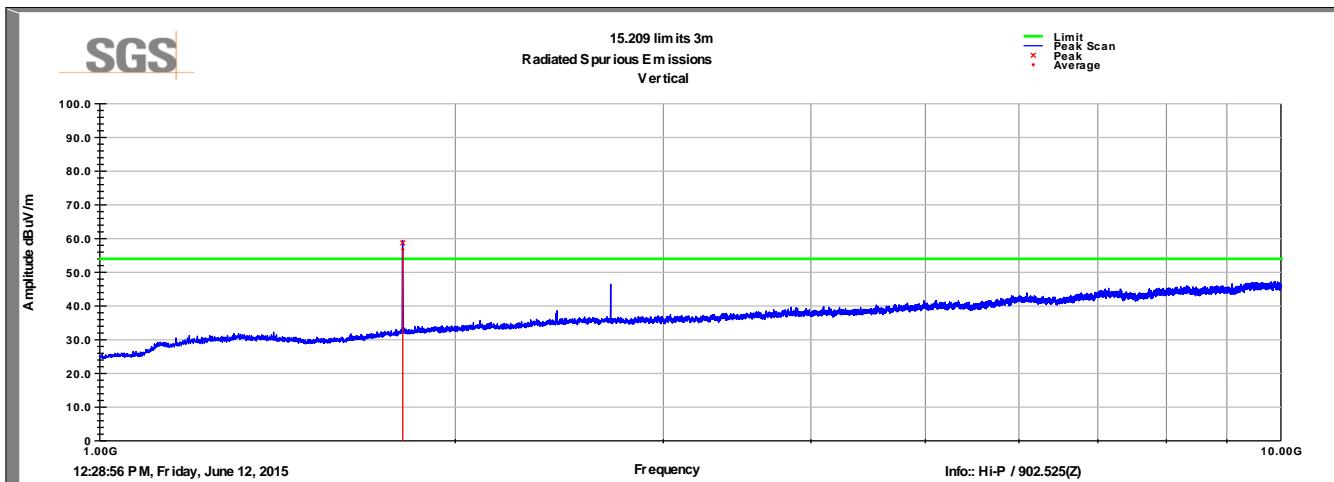


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1735.75	51.1	V	92.6	175.0	29.1	5.1	42.8	43.5	85.0	-41.5
1805.05	64.2	V	333.0	232.0	30.1	5.2	42.9	56.7	85.0	-28.3
2707.75	51.7	V	272.6	325.0	32.4	6.4	44.0	46.6	54.0	-7.4
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

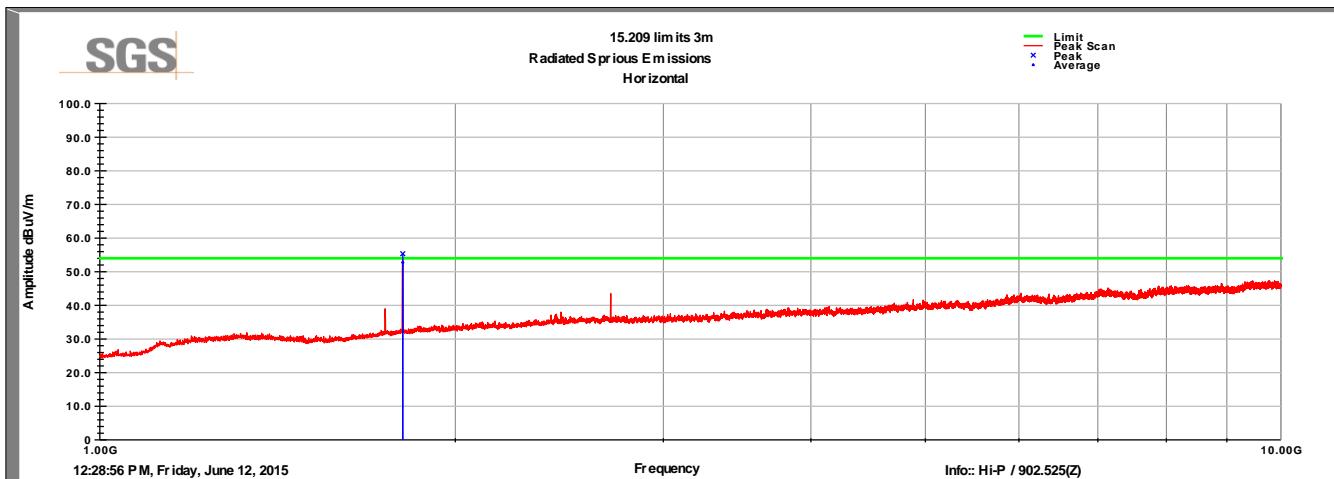


Frequency MHz	Raw AVG (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	AVG value dBuV/m	Peak Limit (dBuV/m)	Margin (dB)
1805.05	63.1	H	79.0	370.0	30.1	5.2	42.9	55.5	85.0	-29.5
2434.60	44.5	H	0.0	325.0	32.1	6.1	43.7	39.1	85.0	-45.9
2707.30	47.3	H	182.6	325.0	32.4	6.4	44.0	42.2	54.0	-11.8
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.



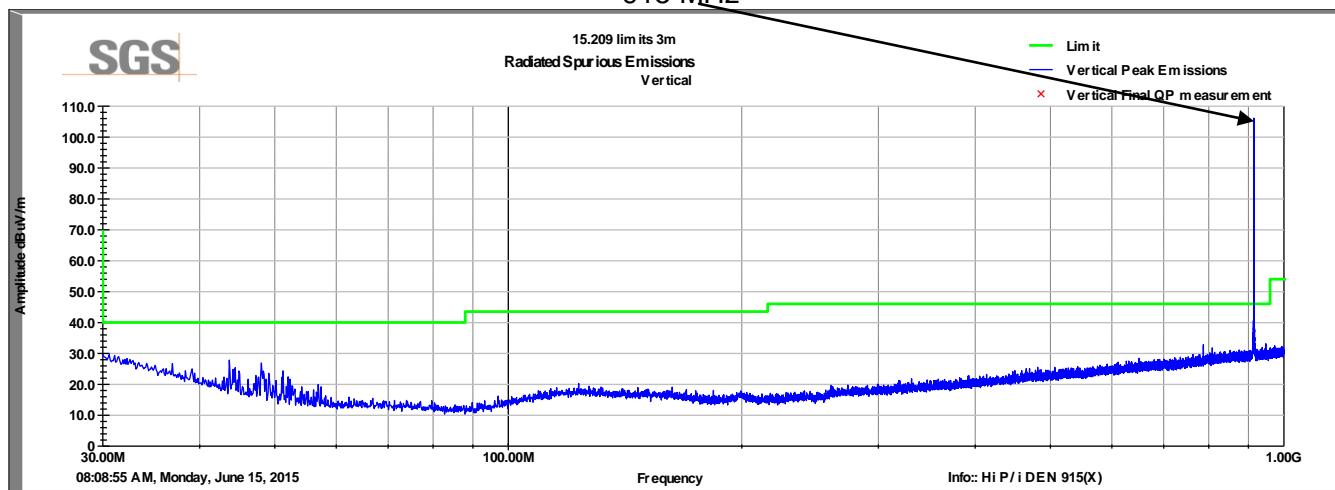
Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1805.05	64.2	V	105.0	344.0	30.1	5.2	42.9	56.6	85.0	-28.4
2707.30	51.5	V	47.7	325.0	32.4	6.4	44.0	46.4	54.0	-7.6
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										



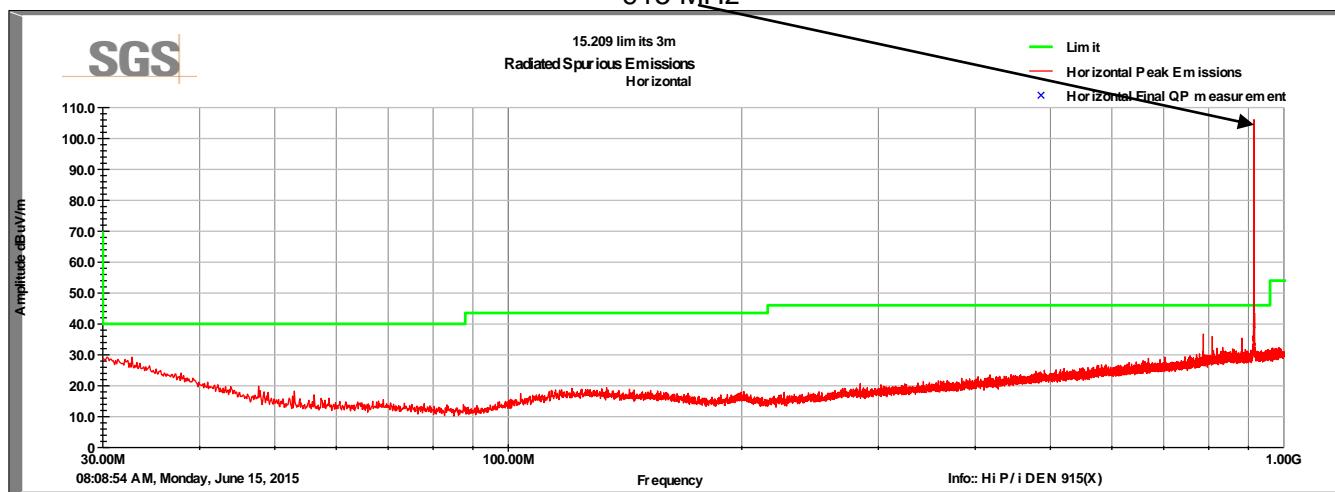
Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1744.30	47.2	H	227.6	175.0	29.1	5.1	42.8	39.0	85.0	-46.0
1805.05	60.4	H	37.0	183.0	30.1	5.2	42.9	52.8	85.0	-32.2
2707.30	48.6	H	182.6	175.0	32.4	6.4	44.0	43.5	54.0	-10.5
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

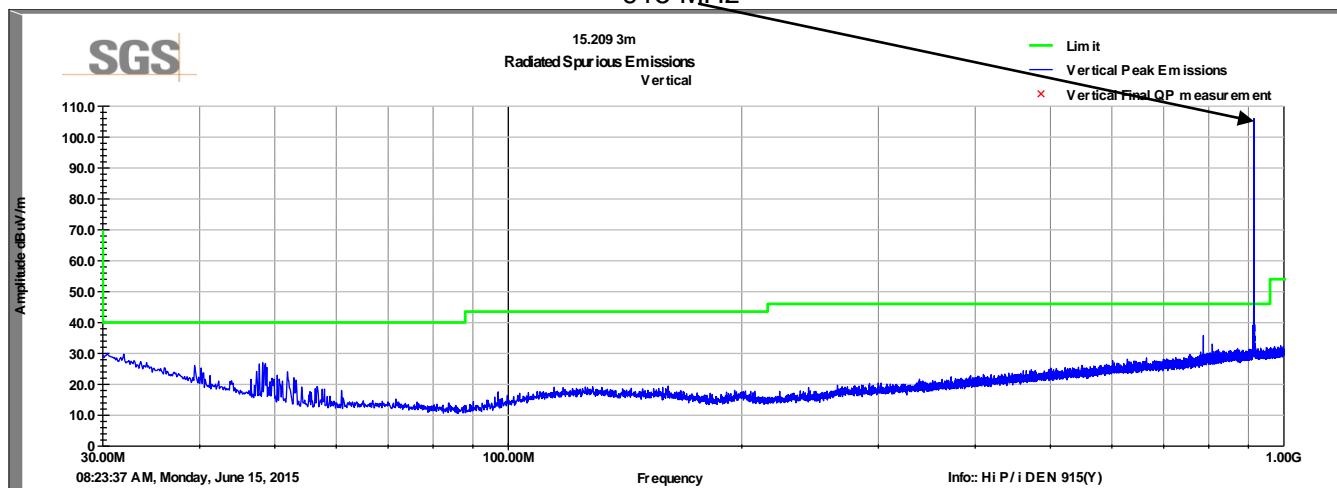
915 MHz



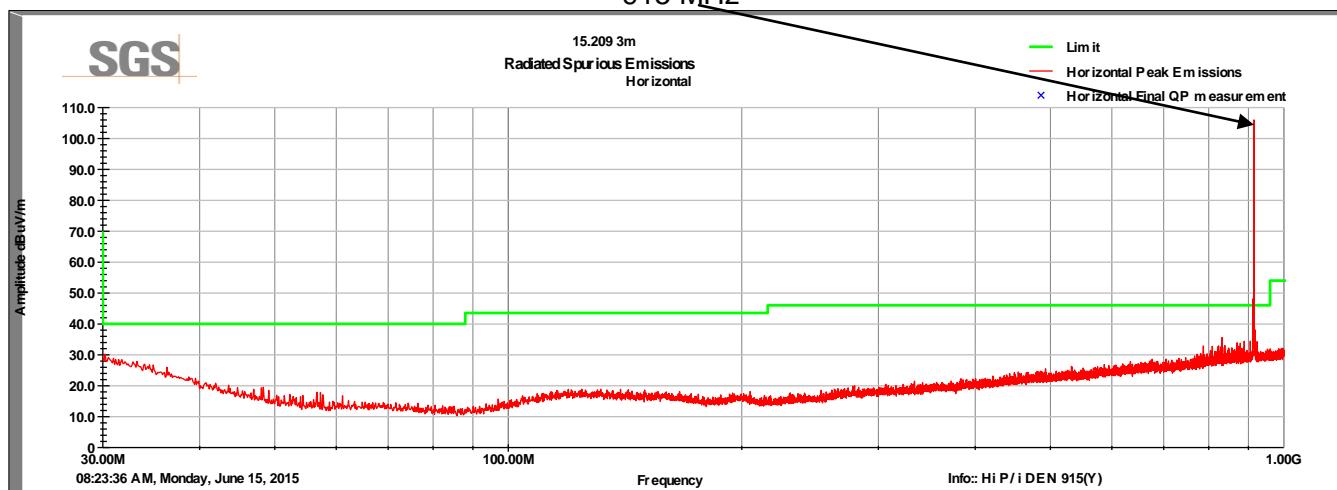
915 MHz



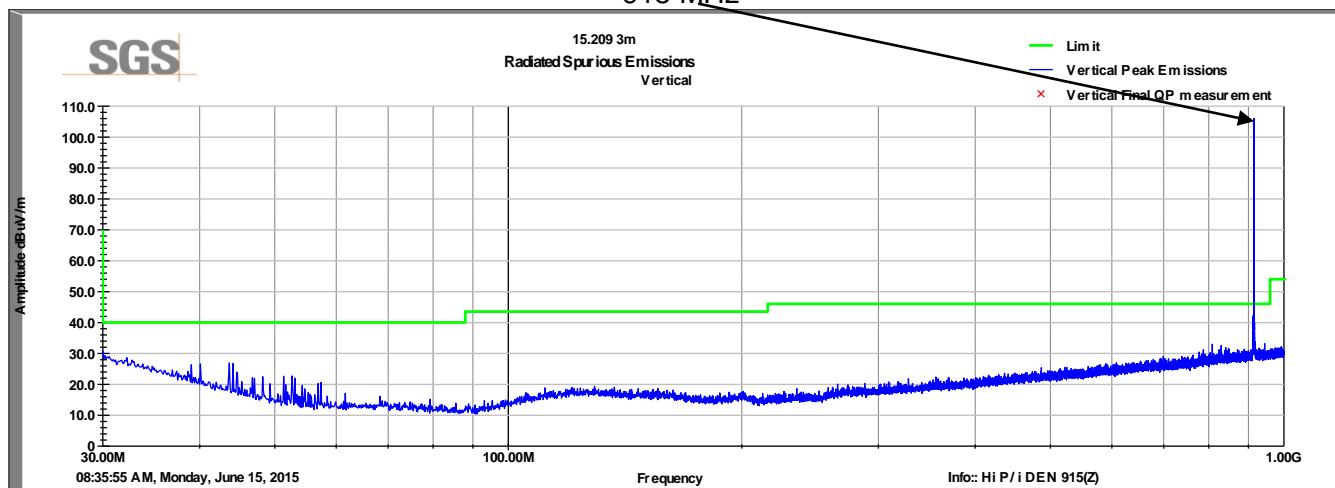
915 MHz



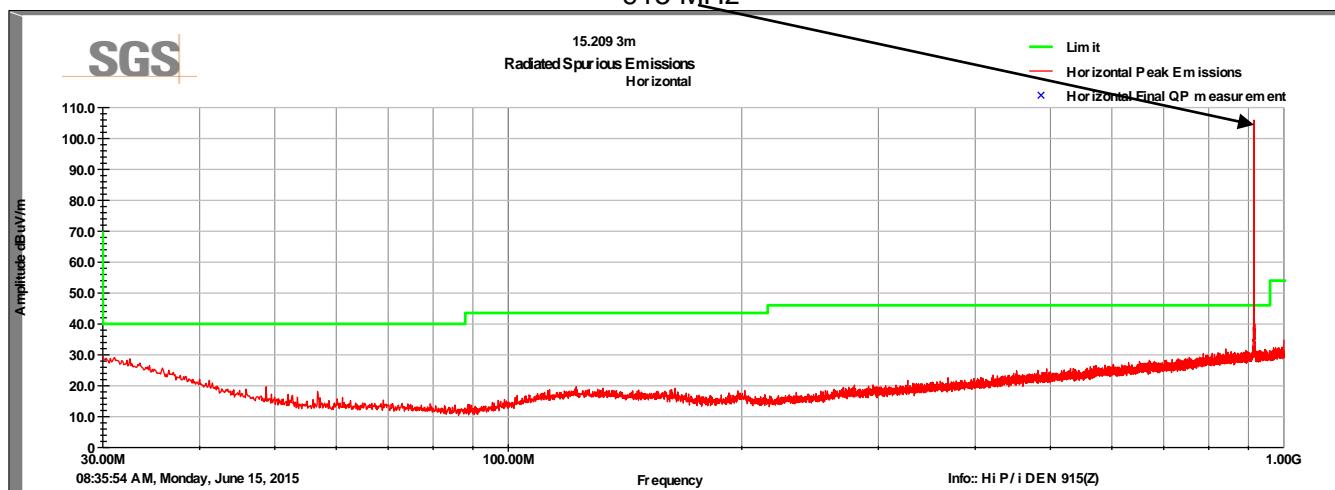
915 MHz

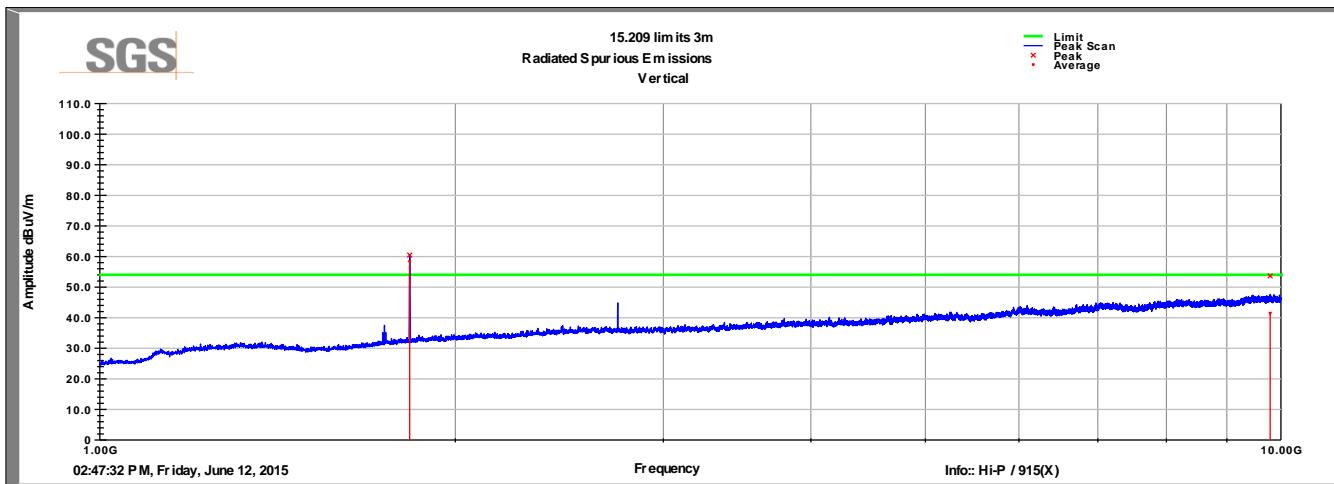


915 MHz

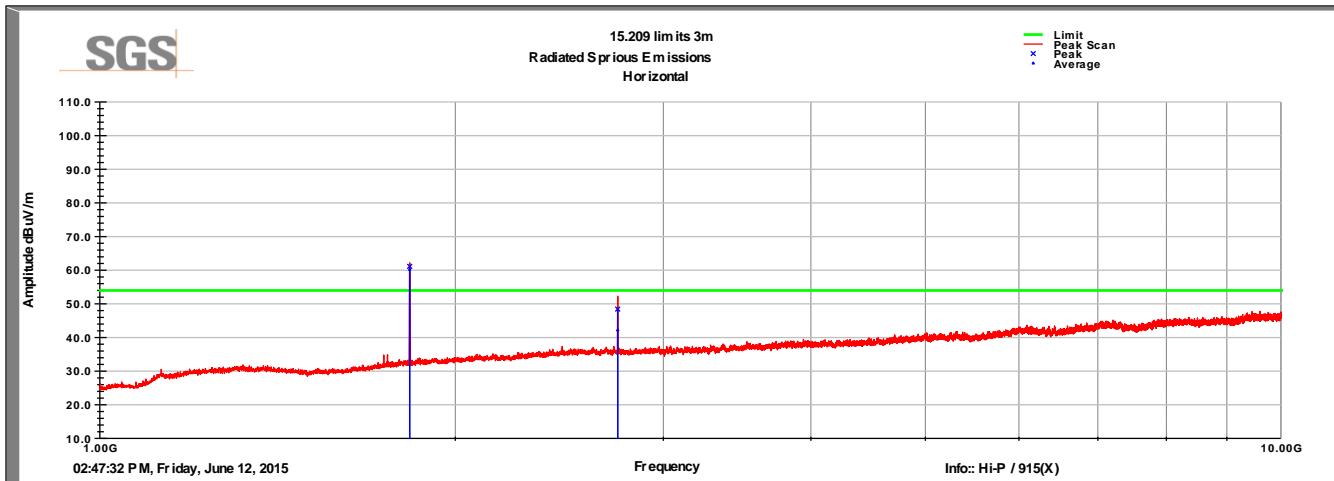


915 MHz



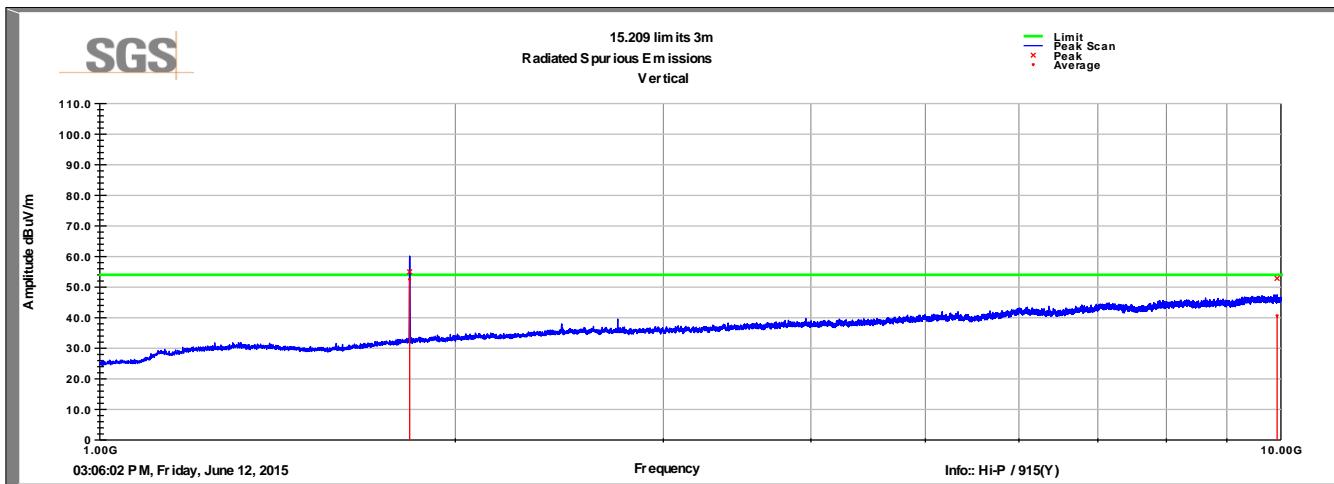


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1829.80	65.7	V	194.0	306.0	30.3	5.2	42.9	58.4	85.0	-26.6
2745.10	50.0	V	317.6	325.0	32.4	6.5	44.0	44.8	54.0	-9.2
9793.45	30.7	V	81.0	265.0	37.0	12.9	39.1	41.5	85.0	-43.5
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

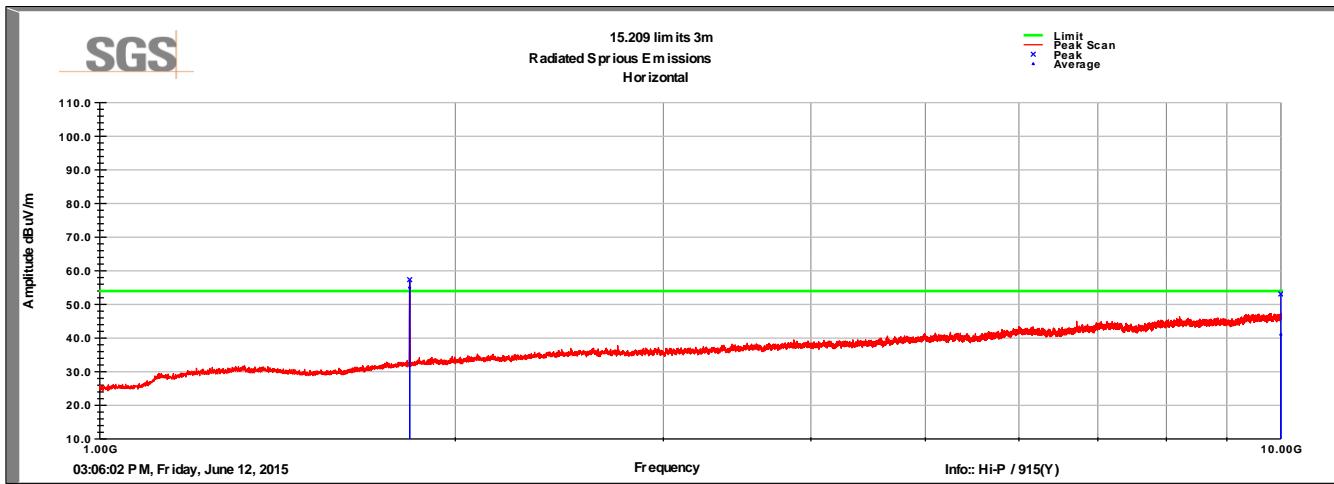


Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1829.80	67.6	H	4.0	363.0	30.3	5.2	42.9	60.2	85.0	-24.8
2744.65	47.4	H	45.0	120.0	32.3	6.5	44.0	42.2	54.0	-11.8
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

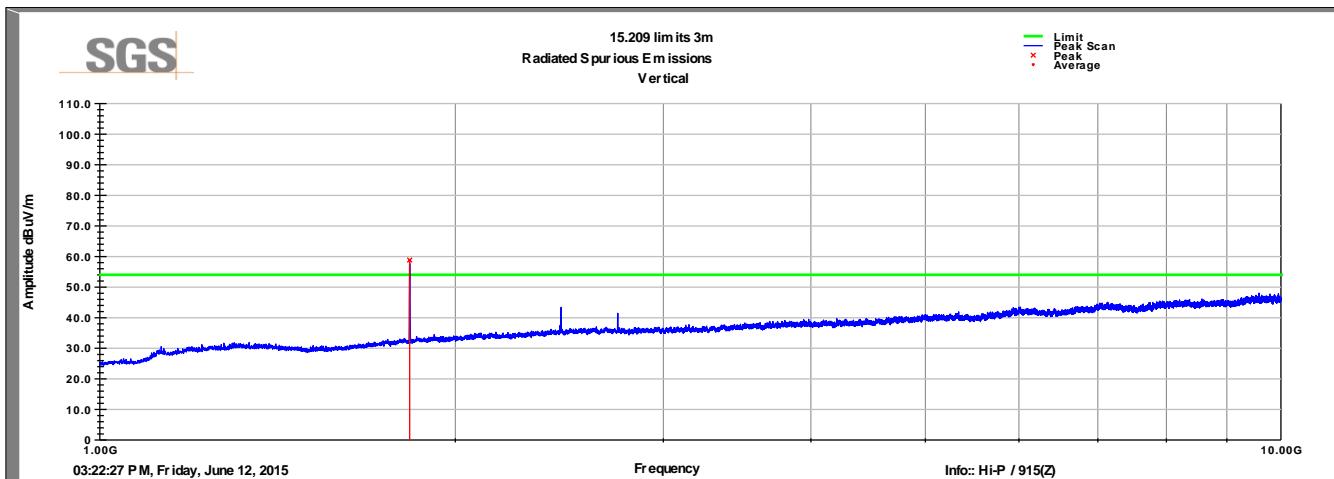


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1829.80	59.8	V	52.0	336.0	30.3	5.2	42.9	52.4	85.0	-32.6
9926.65	29.7	V	162.0	249.0	37.1	12.9	39.1	40.6	85.0	-44.4
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

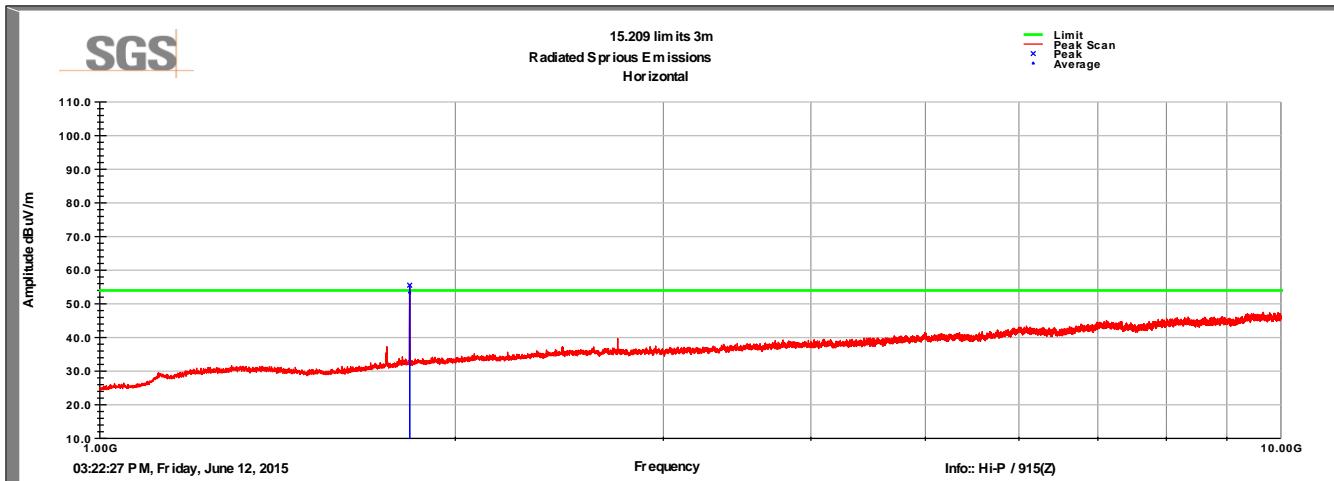


Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1829.80	62.5	H	34.0	100.0	30.3	5.2	42.9	55.1	85.0	-29.9
9999.10	30.1	H	338.0	327.0	37.1	13.0	39.1	41.1	85.0	-43.9
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.



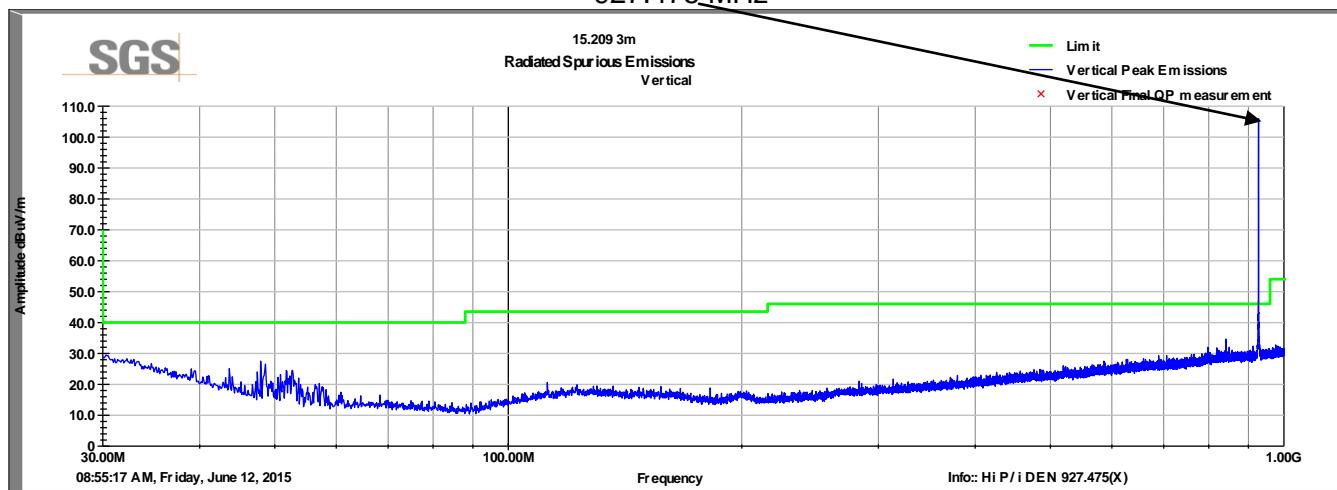
Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1829.80	66.0	V	110.0	337.0	30.3	5.2	42.9	58.7	85.0	-26.3
2458.00	48.7	V	47.6	325.0	32.3	6.5	43.7	43.4	85.0	-41.6
2744.65	46.6	V	92.6	325.0	32.4	6.5	44.0	41.4	54.0	-12.6
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										



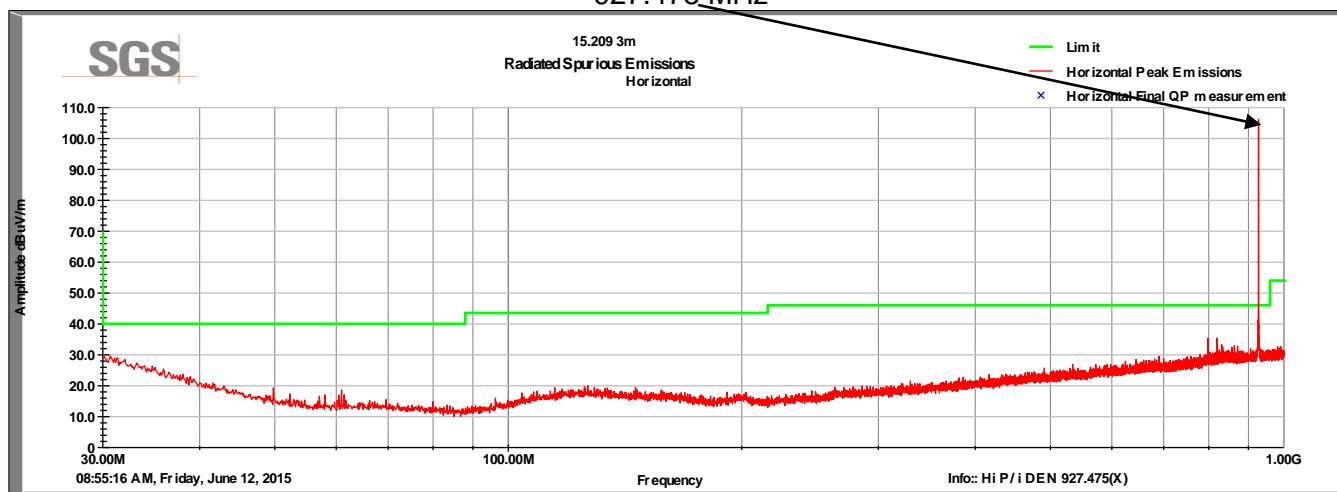
Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1750.15	45.4	H	137.6	175.0	29.1	5.1	42.8	37.3	85.0	-47.7
1829.80	60.8	H	13.0	346.0	30.3	5.2	42.9	53.4	85.0	-31.6
2745.10	44.8	H	92.6	325.0	32.3	6.5	44.0	39.6	54.0	-14.4
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

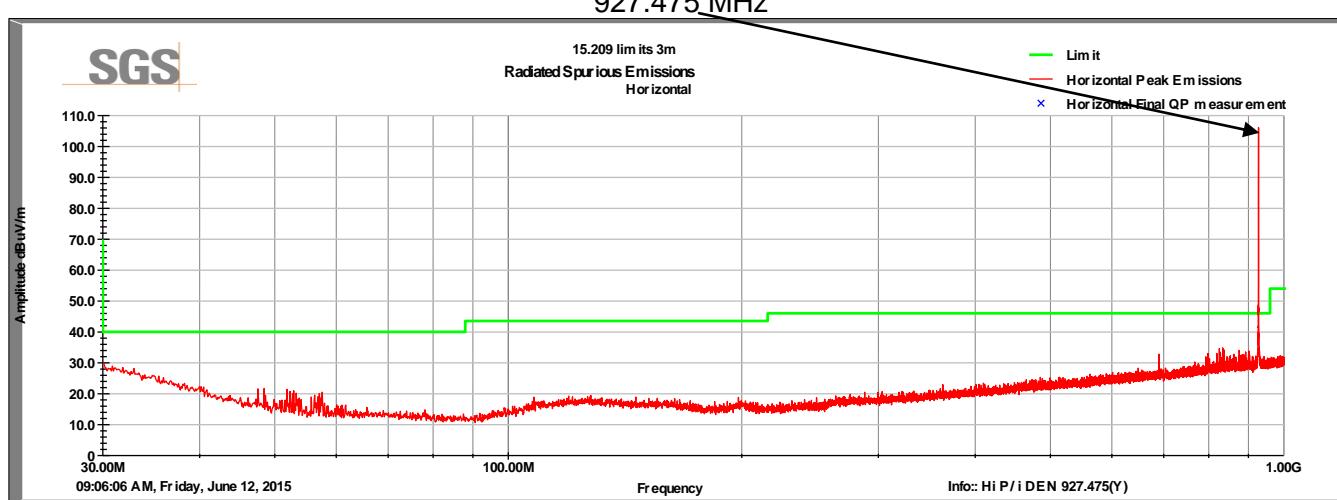
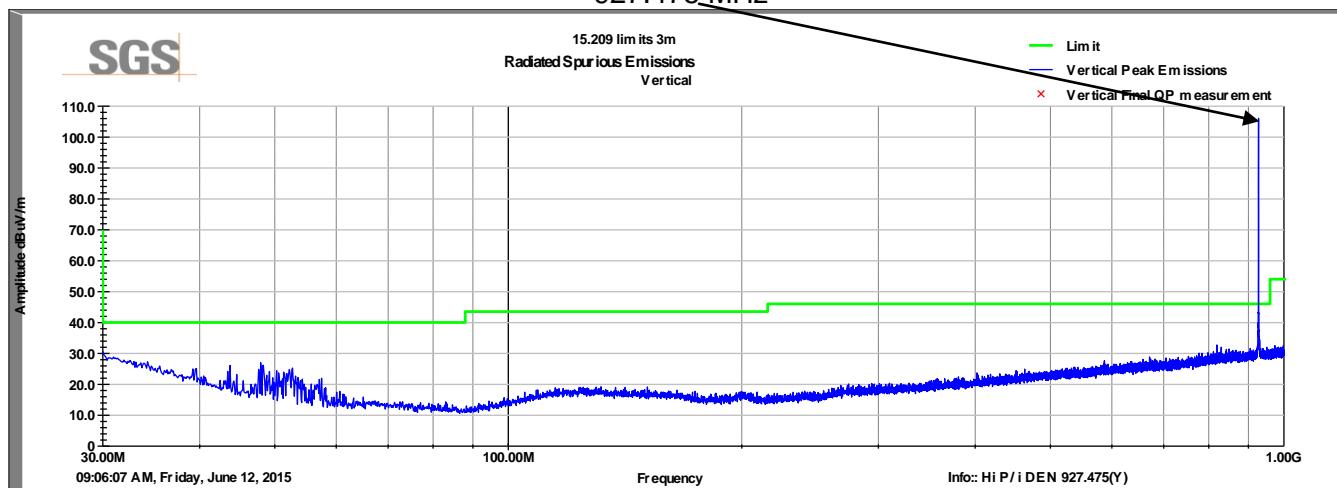
927.475 MHz



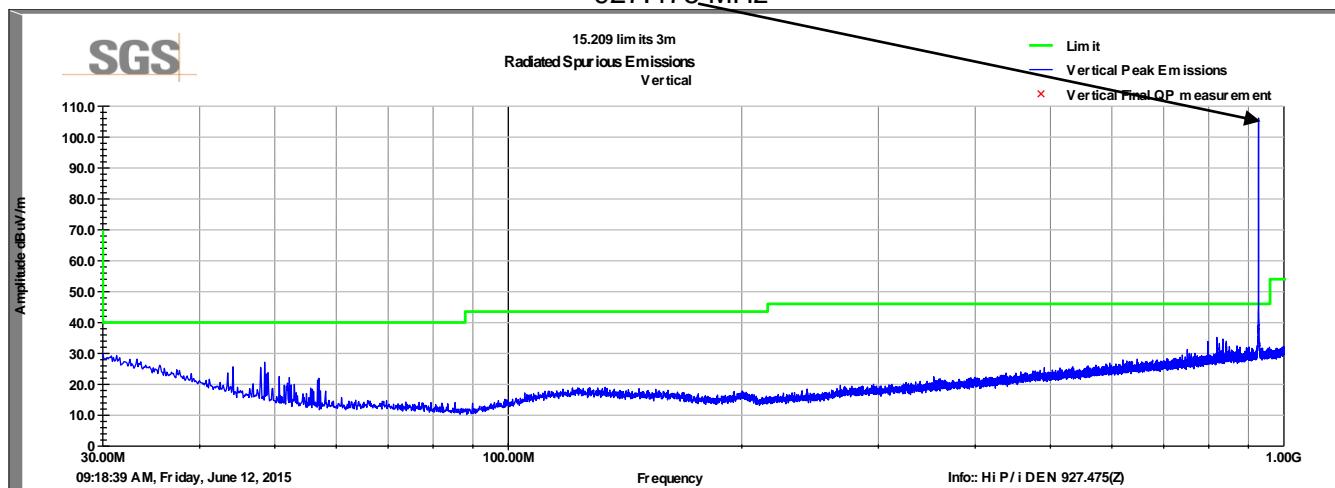
927.475 MHz



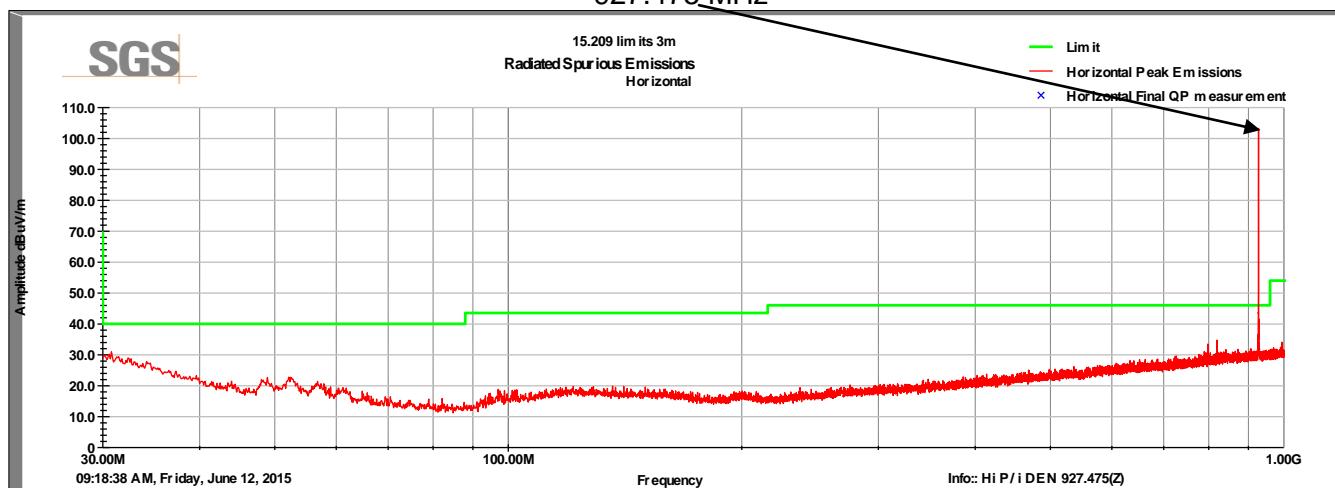
927.475 MHz

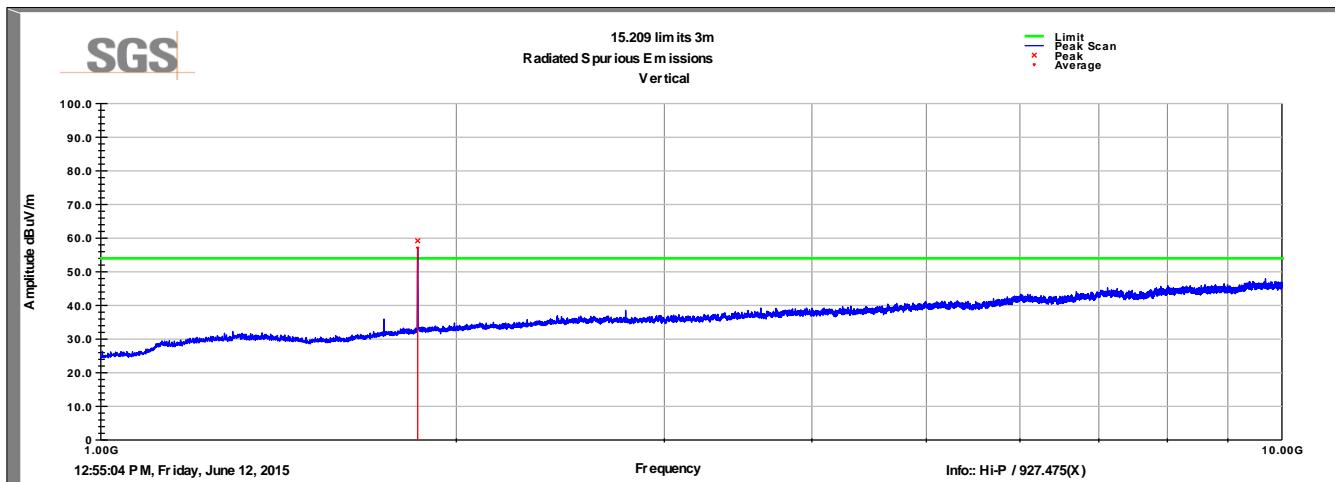


927.475 MHz

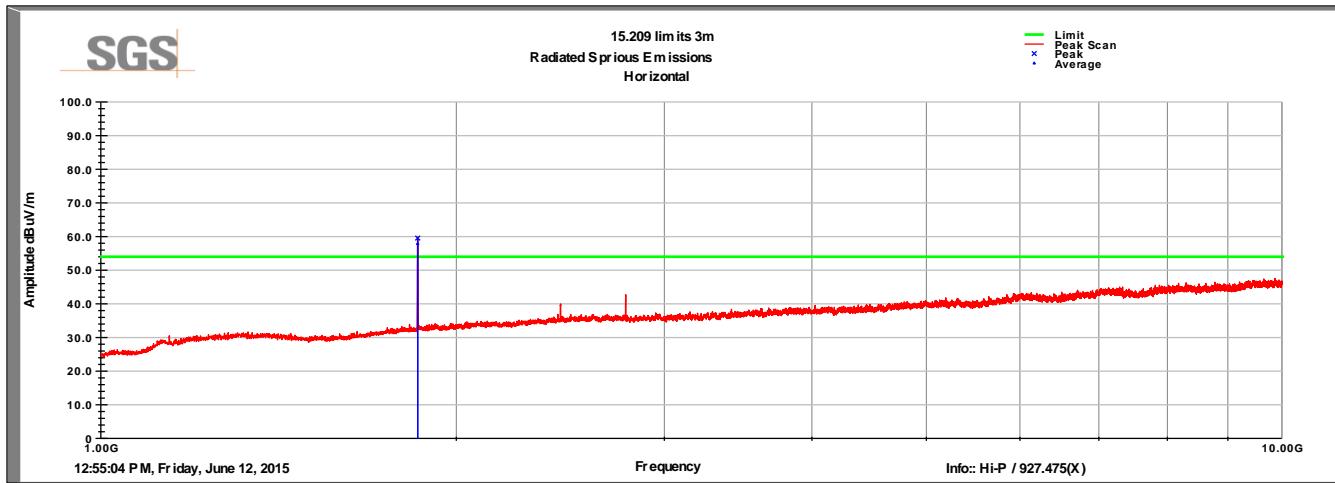


927.475 MHz



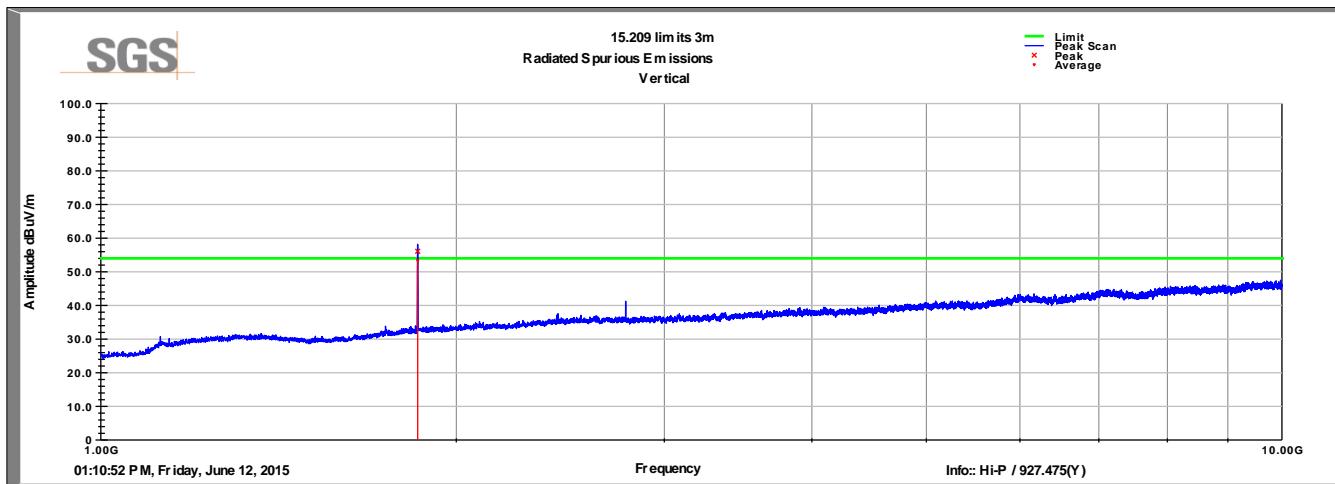


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1737.10	44.3	V	47.6	325.0	29.1	5.1	42.8	35.9	85.0	-49.1
1855.00	64.2	V	181.0	220.0	30.5	5.2	42.9	57.0	85.0	-28.0
2782.00	43.8	V	317.6	325.0	32.2	6.6	44.1	38.5	54.0	-15.5
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

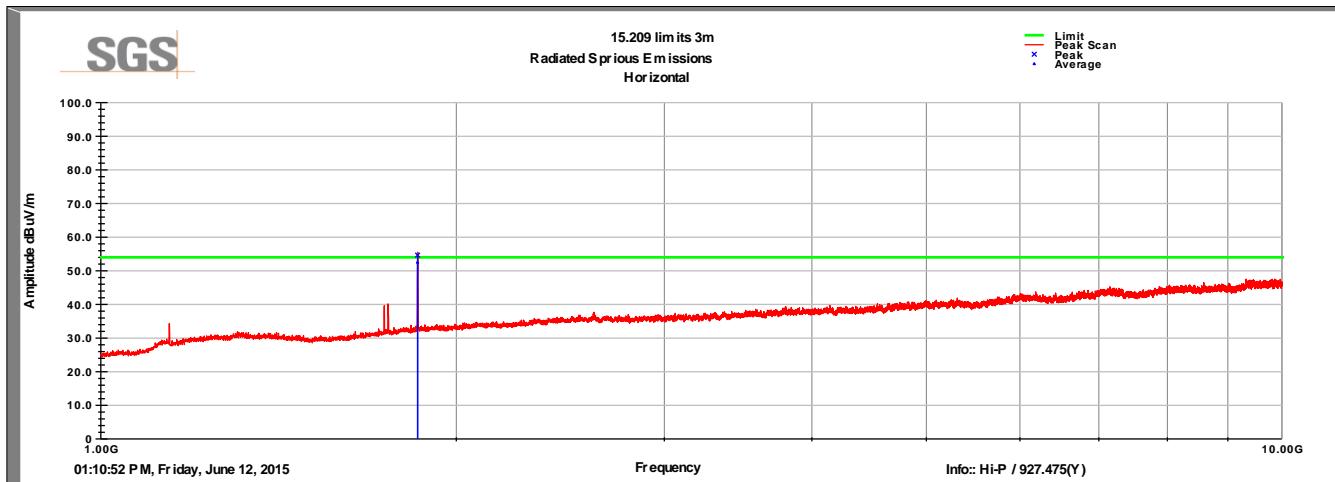


Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1855.00	65.1	H	34.0	107.0	30.5	5.2	42.9	57.9	85.0	-27.1
2451.25	45.3	H	92.6	175.0	32.3	6.1	43.7	39.9	85.0	-45.1
2782.45	47.9	H	0.0	175.0	32.2	6.6	44.1	42.7	54.0	-11.3
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

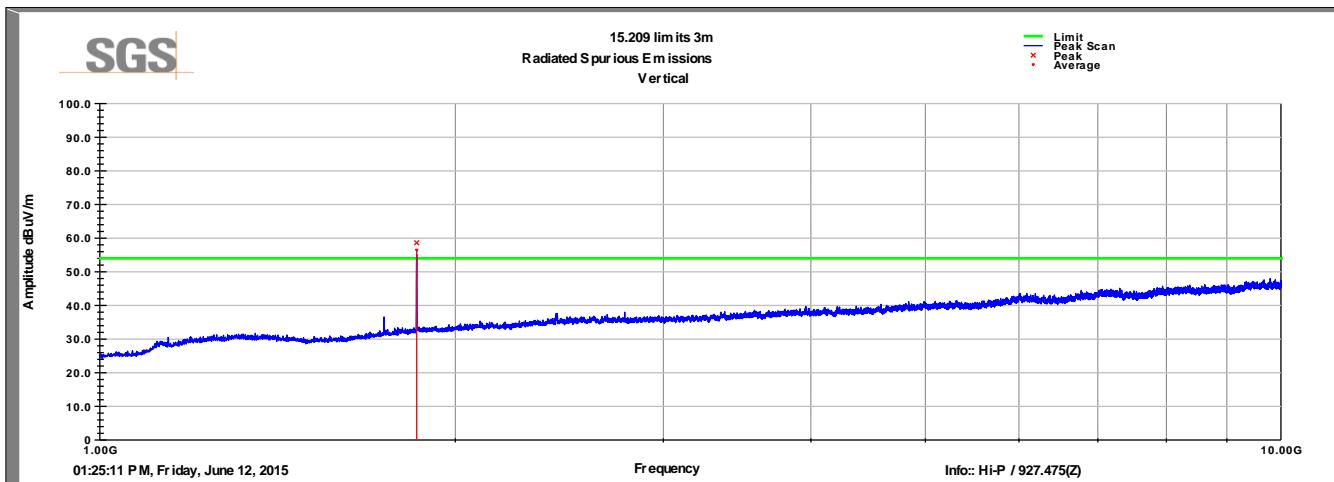


Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1855.00	60.5	V	125.0	316.0	30.5	5.2	42.9	53.4	85.0	-31.6
2782.45	46.5	V	92.6	175.0	32.2	6.6	44.1	41.2	54.0	-12.8
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

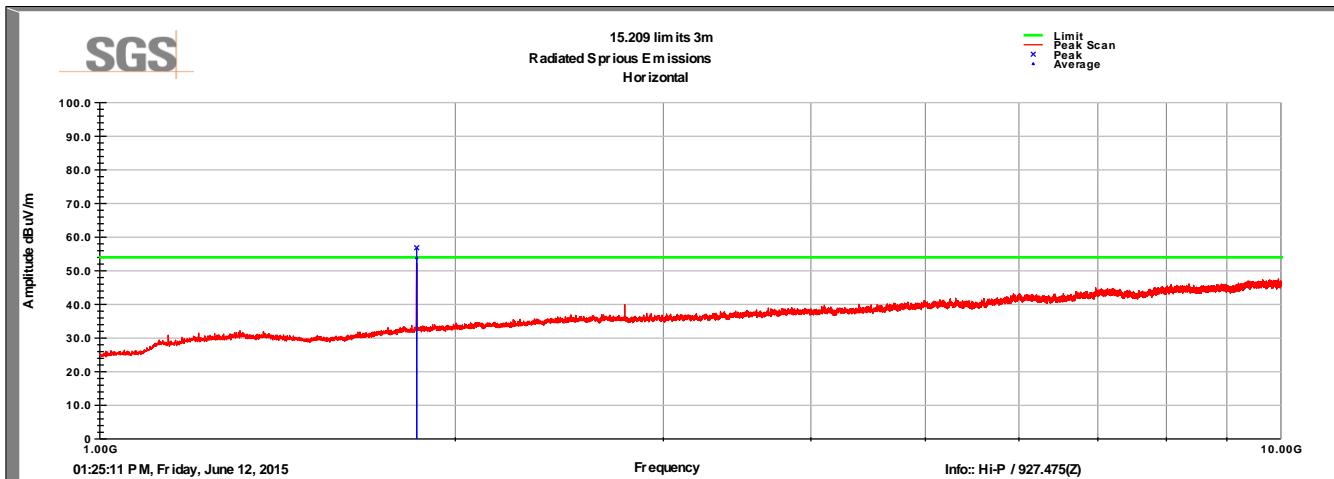


Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1143.10	45.5	H	137.6	175.0	26.8	4.0	42.6	34.3	85.0	-50.7
1854.55	59.7	H	47.0	240.0	30.5	5.2	42.9	52.5	85.0	-32.5
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.



Frequency MHz	Raw Avg (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1740.70	44.8	V	47.6	325.0	29.1	5.1	42.8	36.6	85.0	-48.4
1855.00	63.6	V	143.0	400.0	30.5	5.2	42.9	56.4	85.0	-28.6
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										



Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
1855.00	61.0	H	22.0	232.0	30.5	5.2	42.9	53.8	85.0	-31.2
2782.45	45.2	H	47.6	325.0	32.2	6.6	44.1	39.9	54.0	-14.1
Avg Value = Level + AF + CL - Amp										
Margin = Avg Value - Limit										

Note: Limit on this plot is the 15.209 limit which applies to restricted bands, the emission shown on the plot does not fall into the restricted band. The limit of 20dB below the fundamental was applied.

7 Pseudo-Random Hop Sequence

7.1 Test Result

Test Description	Test Specification	Test Result
Pseudo-Random Hop Sequence	RSS-210 A8.1(a)	Compliant ⁽¹⁾

Note (1): The theory of operation states that the device is Mototalk and operates using a pseudo-random hopping technique.

7.2 Test Method

Compliance is demonstrated by Manufacturer's declaration or is stated in the Theory of Operation.

Requirement

The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset, while the long-term distribution appears evenly distributed.

8 Channel Separation

8.1 Test Result

Test Description	Test Specification	Test Result
Number of Hopping Channels	RSS-210 A8.1(b)	Compliant

8.2 Test Method

The test data was measured using a spectrum analyzer with Peak detector (max hold) and a resolution bandwidth of 100 kHz. The trace was allowed to stabilize until all channels were displayed.

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. Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.7 °C

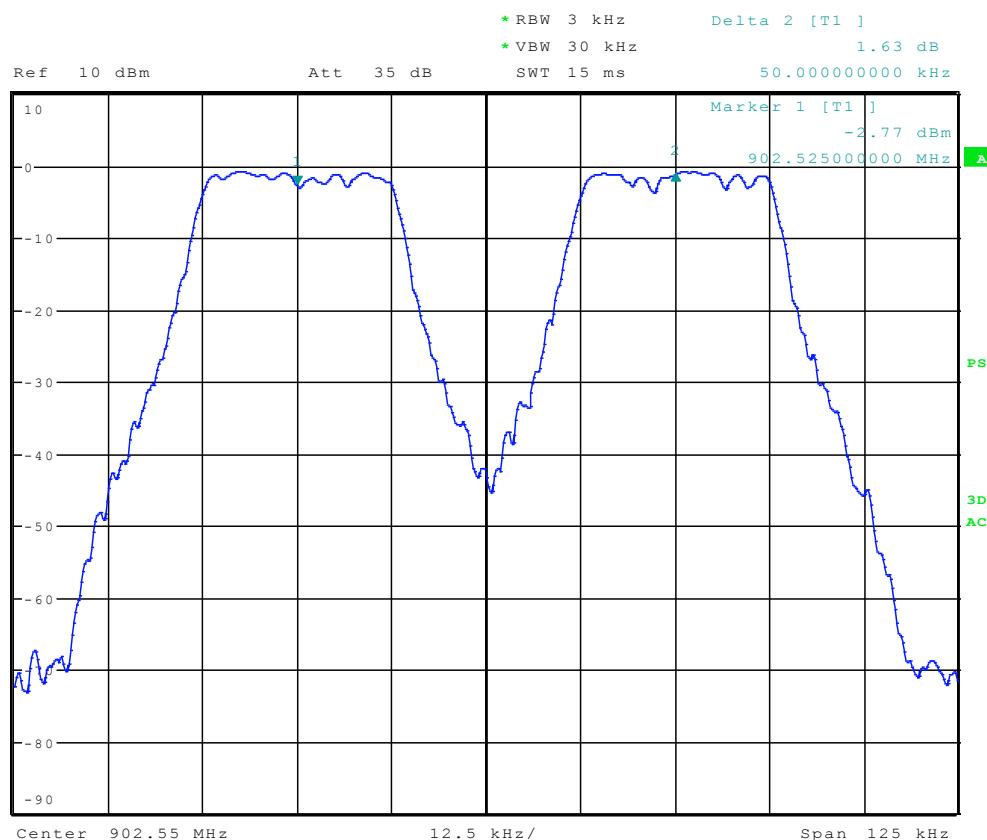
Relative Humidity: 51.5 %

8.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	28-Jul-2015
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079823	6-Aug-2015
30dB Attenuator	K2-BW1+	Mini Circuits	B079794	CNR

Note: The calibration period equipment is 1 year.

8.5 Test Data



Date: 16.JUN.2015 08:53:47

9 Number of Hopping Channels

9.1 Test Result

Test Description	Test Specification	Test Result
Number of Hopping Channels	RSS-210 A8.1(d)	Compliant

Theory of operation states, the radio splits the 500 carriers up into 10 hopsets of 50 carriers each

10 Dwell Time

10.1 Test Result

Test Description	Test Specification	Test Result
Dwell Time	RSS-210 A8.1(d)	Compliant

10.2 Test Method

Measure the pulse width and calculate dwell time based on Mototalk protocol.

Requirement

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed.

10.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.7 °C

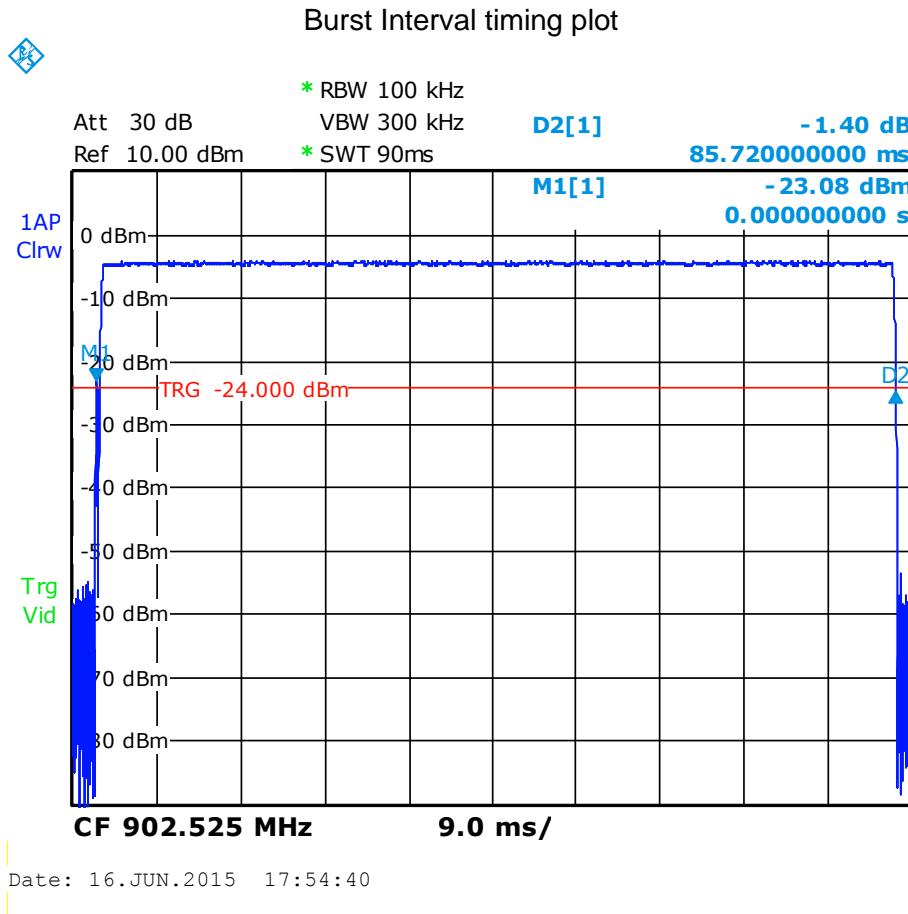
Relative Humidity: 51.5 %

10.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU08	R&S	B085759	26 JUN 2015
Coaxial Cable	141	Huber-Suhner	B095589	06 AUG 2015
30dB Attenuator	K2-BW1+	Mini Circuits	B079794	CNR

Note: The calibration period equipment is 1 year.

10.5 Test Data



85.72 ms bursts at 90 ms intervals (hop intervals)

20 seconds per window / 0.09 seconds per hop = 222.22 hops per window

222.22 hops / 50 carriers = 4.444 bursts per carrier window

0.08572 seconds per burst * 4.444 bursts = 0.381 seconds

The calculations show the average time of occupancy of 0.4 seconds or less.

11 AC Power Line Conducted Emissions

11.1 Test Result

Test Description	Basic Standards	Test Result
Conducted Emissions, Class B	FCC Part 15, Subpart B ANSI C63.4:2009	Compliant

11.2 Test Method

With the receivers resolution bandwidth was set to 9 kHz the initial preliminary exploratory scans were performed over the measuring frequency range (0.15MHz to 30MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Class A Limits (dBuV)		Class B Limits (dBuV)	
	FCC	CISPR	FCC	CISPR
0.15 to 0.5 MHz	Avg 66 QP 79		Avg 56 to 46 QP 66 to 56	
0.5 to 5 MHz	Avg 60 QP 73		Avg 46 Pk 56	
5 to 30 MHz	Avg 60 QP 73		Avg 50 Pk 60	

11.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.4°C

Relative Humidity: 52.6%

11.4 Test Equipment

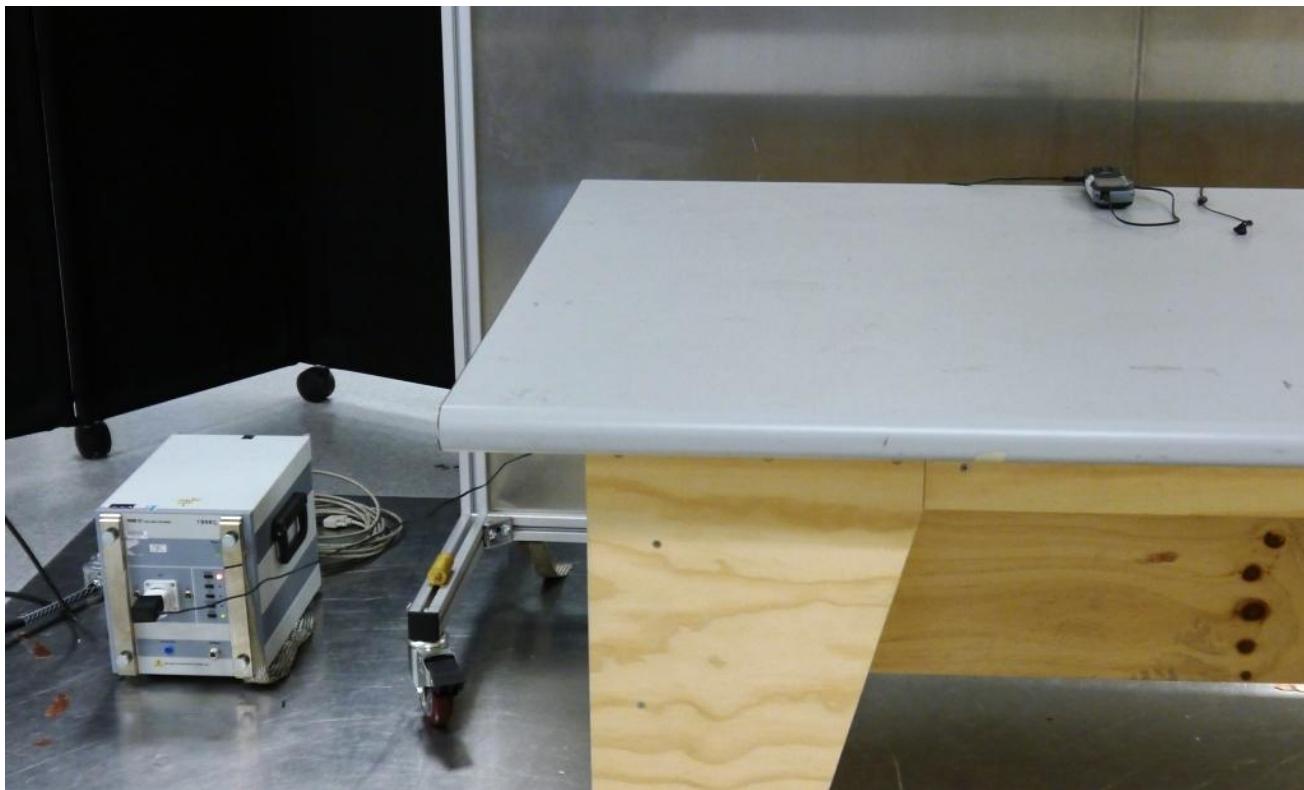
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
TWO-LINE V-NETWORK	NNB 51	TESEQ	B085882	23-Sep-2015
COAXIAL CABLE	CBL-25FT-NMNM	Mini-Circuit	B094941	5-Aug-2015
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	28-Jun-2015

Note: The calibration period equipment is 1 year.

Software:

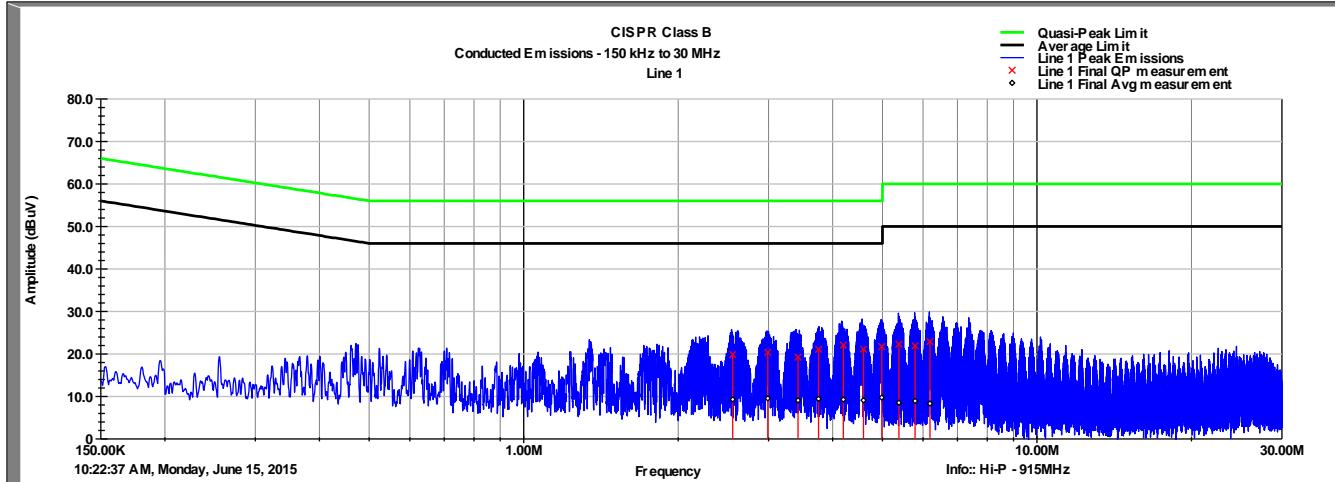
“Conducted Emissions” TILE! profile dated 6 Mar 2013

11.5 Test Setup Photographs



11.6 Test Data

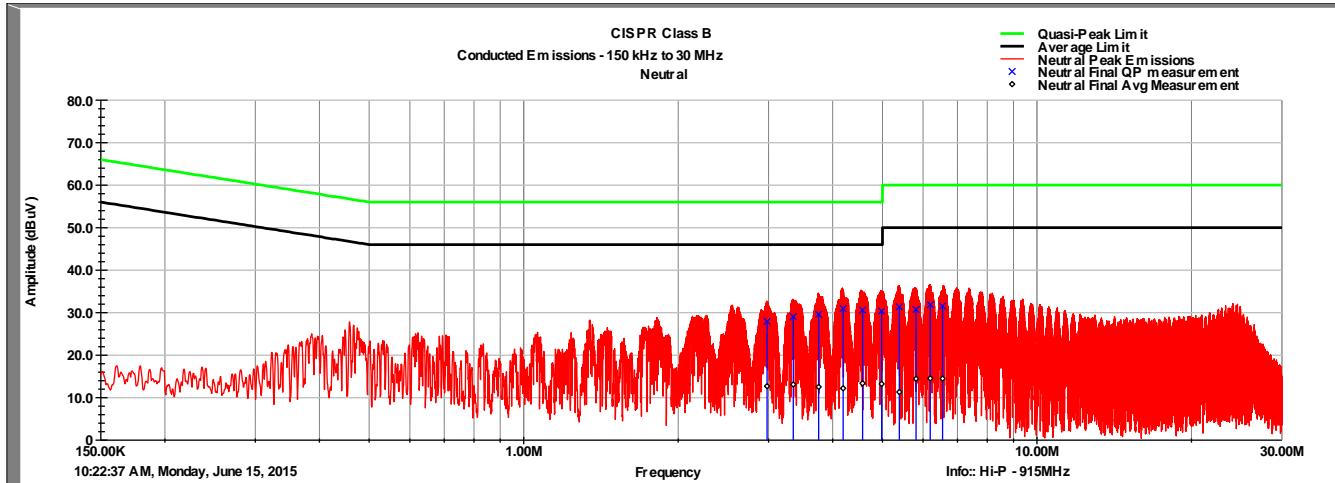
Conducted Emissions Plot 150-30MHz
Line 1



Conducted Emissions Data 150-30MHz
Line 1

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
2.553	19.9	56.0	-36.1	9.3	46.0	-36.7
2.990	20.4	56.0	-35.6	9.5	46.0	-36.5
3.423	19.2	56.0	-36.8	9.1	46.0	-36.9
3.754	21.1	56.0	-34.9	9.4	46.0	-36.6
4.195	22.1	56.0	-33.9	9.3	46.0	-36.7
4.591	21.1	56.0	-34.9	9.1	46.0	-36.9
4.984	21.7	56.0	-34.3	9.7	46.0	-36.3
5.382	22.3	60.0	-37.7	8.5	50.0	-41.5
5.789	21.9	60.0	-38.1	8.9	50.0	-41.1
6.188	22.9	60.0	-37.1	8.3	50.0	-41.7

Conducted Emissions Plot 150-30MHz Neutral



Conducted Emissions Data 150-30MHz Neutral

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
2.979	27.9	56.0	-28.1	12.7	46.0	-33.3
3.352	29.1	56.0	-26.9	13.1	46.0	-32.9
3.756	29.6	56.0	-26.4	12.5	46.0	-33.5
4.191	30.9	56.0	-25.1	12.2	46.0	-33.8
4.572	30.6	56.0	-25.4	13.4	46.0	-32.6
4.981	30.4	56.0	-25.6	13.2	46.0	-32.8
5.392	31.3	60.0	-28.7	11.3	50.0	-38.7
5.814	30.8	60.0	-29.2	14.4	50.0	-35.6
6.197	31.9	60.0	-28.1	14.5	50.0	-35.5
6.547	31.5	60.0	-28.5	14.5	50.0	-35.5

12 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	24 Jun 2015