LS RESEARCH, LLC
Wireless Product Development

W66 N220 Commerce Court ● Cedarburg, WI 53012 USA ● Phone: 262.375.4400 ● Fax: 262.375.4248 ● www.lsr.com

ENGINEERING TEST REPORT # 315006
LSR Job #: C-2148

Compliance Testing of:
Caretaker Sentry Emergency Wall Communicator

Test Date(s):
September 11, 12, 13, 16, 17, 27, and October 3, 4, 7 2013
February 4-6, and March 5 2015

Prepared For:
Logic Mark, LLC
Attn: Douglas L. Ringer
10106 Bluegrass Parkway
Louisville, Kentucky 40299

This Test Report is issued under the Authority of: Adam Alger, EMC Engineer

Signature: Date: 3-26-15

Test Report Reviewed by:	**Report by:**
Peter Feilen, EMC Engineer	Adam Alger, EMC Engineer
Signature: Date: 3-23-15	Signature: Date: 3-13-15

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LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

TESTING CERT #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Industrie Canada Industry Canada

Canada

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: IC 3088-A
On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: IC 3088

U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2).
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.
Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

1.0 Summary of Test Report

In September – October 2013 and January – February 2015 the EUT known as Caretaker Sentry Emergency Wall Communicator unit was tested and MEETS the following requirements for a Class II permissive change:

RF Related Measurements

FCC Rule Part	IC RSS-213 Section	ANSI C63.17 Section	Test Requirements	Compliance
15.323(a)	5.5	6.1.3	Emission Bandwidth	Yes
15.319(c)	5.6	6.1.2	Peak Transmit Power	Yes
15.319(d)	5.7	6.1.5	Power Spectral Density	Yes
15.323(d)	5.8.2	6.1.6	Transmitter Emissions Inside the band	Yes
15.323(d)	5.8.1	6.1.6	Transmitter Emissions Outside the band	Yes
15.323(e)	5.2 (13)	6.2.2/6.2.3	Frame period stability	Yes
15.323(f)	5.3	6.2.1.1/6.2.1.2 / 6.2.1.3	Carrier Frequency Stability	Yes
15.315 15.207	5.4	ANSI C63.4-2014	AC Conducted Emissions	N/A
15.317 / 15.203	RSS-GEN 6.7	N/A	Antenna Requirement	[2]Yes
15.319(e)	5.6	4.3.1	Antenna Gain	[2]Yes
15.319(i)	RSS-102	N/A	RF Exposure Compliance	[1]Yes
15.109	N/A	ANSI C63.4-2014	Receiver and digital device emissions	Yes

[1]Seperate exhibit
[2]Manufactuer declares maximum integral antenna with 1.2 dBi max peak gain

Spectrum Etiquette Criteria

Note – Due to the nature of the proposed modifications, the spectrum etiquette parameters and data submitted the EUT's original application remain applicable to this C2PC application.

2.0 Test Facilities

All testing was performed at:

LS Research, LLC
W66 N220 Commerce Court
Cedarburg, Wisconsin, 53012 USA

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to the requirements of ISO/IEC 17025, 2005 "General Requirements for the Competence of Calibration and Testing Laboratories".
LS Research, LLC's scope of accreditation includes all test methods listed herein, unless otherwise noted.

3.0 Client Information

Manufacturer Name:	LogicMark, LLC.
Address:	10106 Bluegrass Parkway Louisville, Kentucky 40299
Contact Person:	Douglas L. Ringer

3.1 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	Caretaker Sentry Emergency Wall Communicator
Model Number:	41920
Serial Number:	N/A (Engineering Sample)
FCC ID	TYD-CS41920
IC Number	8471A-CS41920

3.2 Product Description

EUT uses integral antenna with a maximum 1.2 dBi peak gain. EUT fitted with a temporary connection (U.FL) for RF Conducted measurements.
EUT utilizes 5 RF Channels (1921.536-1928.448 MHz) with 6 timeslots for 30 TDMA Duplex Channels

3.3 Modifications Incorporated In the EUT for Compliance Purposes

None noted at time of test

3.4 Deviations & Exclusions from Test Specifications

None noted at time of test

3.5 Additional Information

EUT was programmed into continuous transmit via hyper-terminal commands for RF tests. Normal mode of operation achieved with companion device for spectrum etiquette tests.
Device has identical RF section and similar board layout to pendant used in system. Conducted measurements therefore similar while radiated measurements differ.

4.0 Conditions of Test

Environmental:

Temperature: 20-25º C
Relative Humidity: 30-60%
Atmospheric Pressure: 86-106 kPa

Battery Voltage: 3.7 VDC

5.0 Test Equipment

All test equipment is calibrated by a calibration laboratory accredited by A2LA to the requirements of ISO 17025. For a complete list of test equipment and calibration dates, see Appendix A. Unless otherwise noted, resolution bandwidth of measuring instrument used during testing for given frequency range, see below.

Frequency Range	Resolution Bandwidth
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz
30 MHz – 1000 MHz	120 kHz
Above 1000 MHz	1 MHz

6.0 Conformance Summary

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Subpart D, 15.109, and Industry Canada RSS-213, Issue 3 (2015), RSS-GEN Issue 4 (2014).

If some emissions are seen to be within 3 dB of their respective limits:
As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

Appendix A – Test Equipment

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 26-Aug-2013 Type Test : All Job # : C-1790

Prepared By: Adam A Customer : LogicMark Quote #: 313224

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	CC 000213C	Signal Generator	HP	E4432B	US38220562	11/17/2012	11/17/2013	Active Calibration
2	EE 960016	2.4 GHz Signal Generator	Marconi	2024	112120/044	3/13/2013	3/13/2014	Active Calibration
3	EE 960013	EMI Receiver	HP	8546A System	3617A00320;3448A	2/11/2013	2/11/2014	Active Calibration
4	EE 960014	EMI Receiver-filter section	HP	85460A	3448A00296	2/11/2013	2/11/2014	Active Calibration
5	EE 960084	LISN - 15A	COM-POWER	LI-215A	191920	2/6/2013	2/6/2014	Active Calibration
6	AA 960072	Transient Limiter	HP	11947A	3107A02515	2/15/2013	2/15/2014	Active Calibration
7	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	8/7/2013	8/7/2014	Active Calibration
8	EE 960156	100kHz-1GHz Analog Signal Generator	Agilent	N5181A	MY49060062	9/5/2013	9/5/2014	Active Calibration
9	EE 960157	3Hz-13.2GHz Spectrum Analyzer	Agilent	E4445A	MY48250225	9/5/2013	9/5/2014	Active Calibration
10	EE 960158	RF Preselecter	Agilent	N9039A	MY46520110	9/5/2013	9/5/2014	Active Calibration
11	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	6/10/2013	6/10/2014	Active Calibration
12	AA 960150	Bicon Antenna	ETS	3110B	0003-3346	12/12/2012	12/12/2013	Active Calibration
13	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	12/10/2012	12/10/2013	Active Calibration
14	EE 960146	Std. Gain Horn Ant. w/preamp	Adv. Micro / EMC	WLA622-4 / 3160-09	123001	9/24/2013	9/24/2014	Active Calibration
15	AA 960081	Double Ridge Horn Antenna	EMCO	3115	6907	1/29/2013	1/29/2014	Active Calibration
16	EE 960147	Pre-Amp	Adv. Micro	WLA612	123101	2/1/2013	2/1/2014	Active Calibration
17	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	5/28/2013	5/28/2014	Active Calibration

Project Engineer: Quality Assurance:

LS RESEARCH LLC
Wireless Product Development
Equipment Calibration

Date : 9-Jan-2015 Type Test : Conducted and Radiated Emissions Job # : C-2148

Prepared By: Adam Alger Customer : LogicMark Quote #: 315006

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	10/19/2014	10/19/2015	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	6/20/2014	6/20/2015	Active Calibration
3	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	740411007	6/20/2014	6/20/2015	Active Calibration
4	EE 960088	8GHz MXE Spectrum Analyzer	Agilent	N9038A	MY51210138	1/9/2015	1/9/2016	Active Calibration
5	AA 960005	Biconical Antenna	EMCO	93110B	9601-2280	8/7/2014	8/7/2015	Active Calibration
6	AA 960004	Log Periodic Antenna	EMCO	93146	9512-4276	8/22/2014	8/22/2015	Active Calibration
7	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/11/2014	12/11/2015	Active Calibration
8	EE 960146	Std. Gain Horn Ant. w/preamp	Adv. Micro / EMC	WLA622-4 / 3160-09	123001	8/20/2014	8/20/2015	Active Calibration

Project Engineer: Quality Assurance:

Appendix B – Test Data
B.1 – RF Conducted Emissions

Manufacturer	Logic Mark, LLC.
Test Location	LS Research, LLC
Rule Part	FCC Subpart D / RSS-213
General Measurement Procedure	ANSI C63.17-2013
General Description of Measurement using Spectrum Analyzer	A direct measurement of the transmitted signal was performed at the antenna port of the EUT via a cable connection to a spectrum analyzer. An attenuator was placed in series with the cable to protect the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements, without the need for any further corrections. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source.
General Description of Measurement using R&S CMD60	A direct measurement of the transmitted signal was performed at the antenna port of the EUT via a cable connection to the R&S CMD60. The Radio communication tester has the ability to connect to the EUT and measure parameters specific to the digital modulation scheme.

B.1.1 – RF Conducted – Fundamental Bandwidth

Manufacturer	Logic Mark, LLC.
Date	2-5, 2-6 2015
Operator	Adam A
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.323(a) / RSS-213 Section 5.5
Specific Measurement Procedure	ANSI C63.17- Section 6.1.3
Additional Description of Measurement	RBW Approximately 1% of emission bandwidth with peak detection on max hold
Additional Notes	1) 26 dB bandwidth between 50 kHz and 2.5 MHz 2) Continuous transmit modulated used for this test.

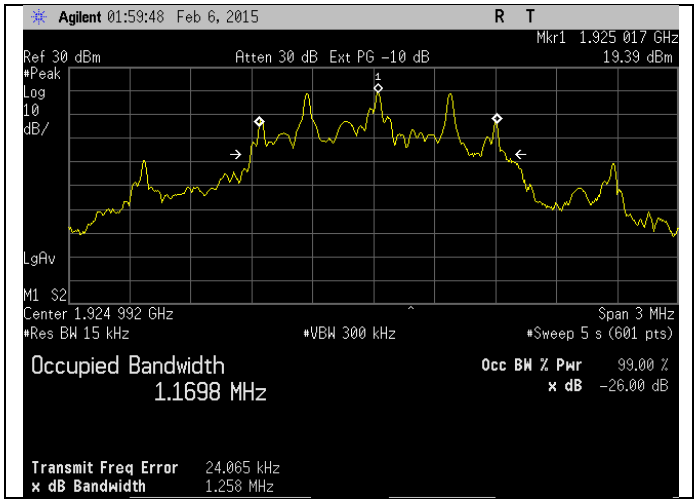
Table

Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
1921.536	1.255	1.1681
1924.992	1.258	1.1698
1928.448	1.253	1.1713

Plots

Low Channel – 1921.536 MHz

Mid Channel – 1924.992 MHz



High Channel – 1928.448 MHz

B.1.2 – RF Conducted – Fundamental Power and Spectral Density

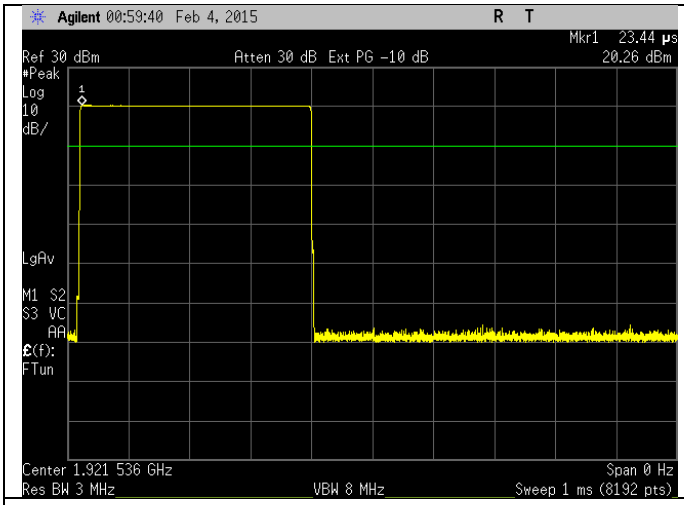
Manufacturer	Logic Mark, LLC.
Date	2-4, 2-6 2015
Operator	Adam A
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.319(c) and (d) / RSS-213 Section 5.6 and 5.7
Specific Measurement Procedure	ANSI C63.17- Section 6.1.2 and 6.1.5
Additional Description of Measurement	Power: RBW > Emission Bandwidth PSD: RBW = 3 kHz
Additional Notes	Continuous transmit modulated used for this test. Sample Calculations: Peak transmit power limit = 100 µW * $\sqrt{26\ dB\ BW\ (Hz)}$ PSD Limit = 3 mW in 3 kHz BW = 4.77 dBm / 3 kHz BW Margin (dB) = Limit – Measured level

Tables

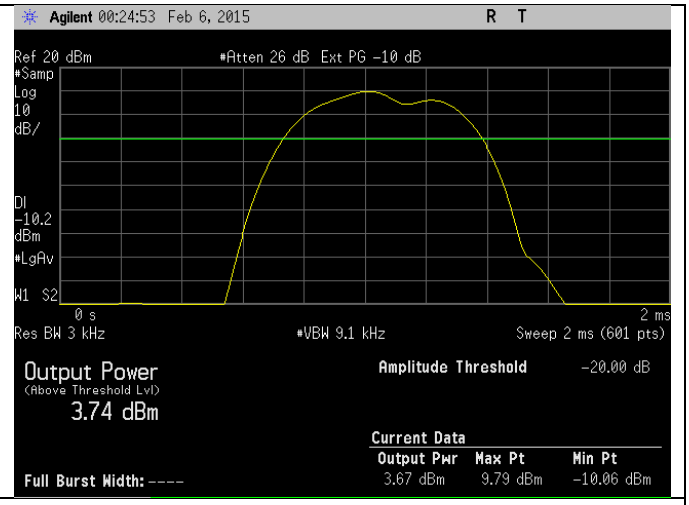
Frequency (MHz)	26 dB BW (MHz)	Power (dBm)	Power Limit (dBm)	Margin (dB)	PSD (dBm/3kHz)	PSD Limit (dBm/3 kHz)	Margin (dB)
1921.536	1.255	20.26	20.49	0.2	3.74	4.77	1.0
1924.992	1.258	20.19	20.50	0.3	3.00	4.77	1.8
1928.448	1.253	20.14	20.49	0.3	3.09	4.77	1.7

Plots

Low Channel – 1921.536 MHz

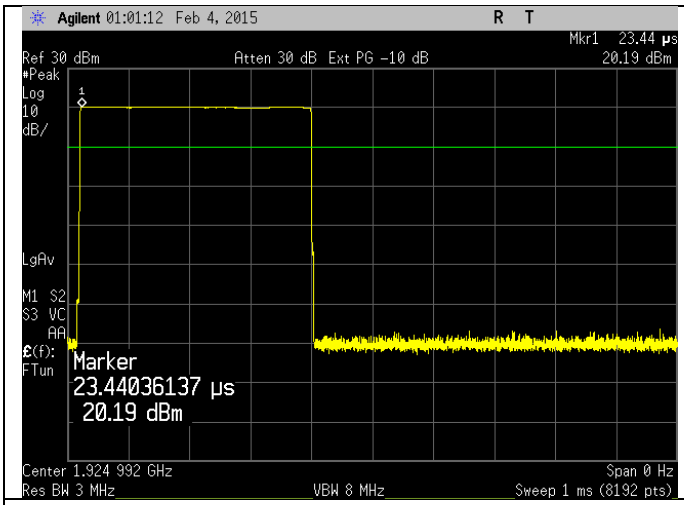


Power

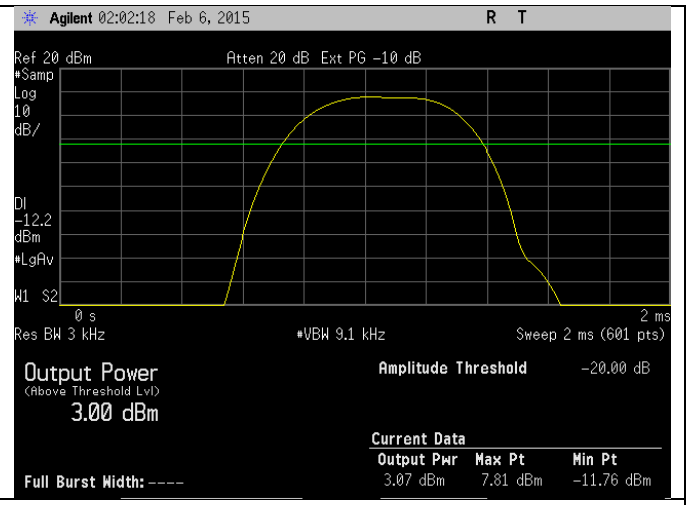


PSD

Mid Channel – 1924.992 MHz

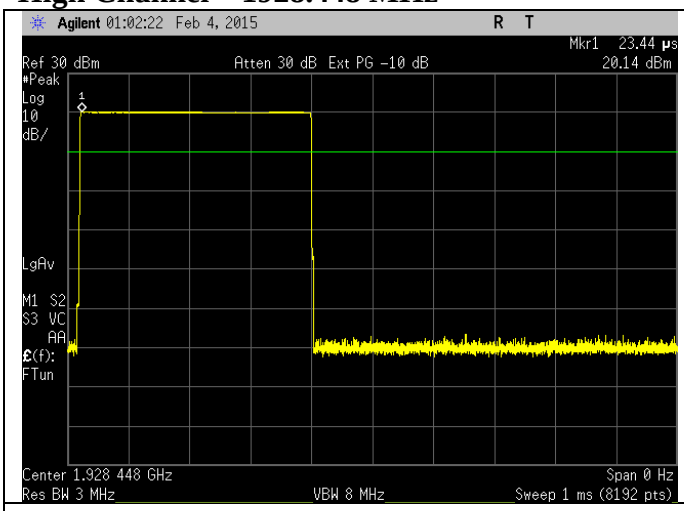


Power

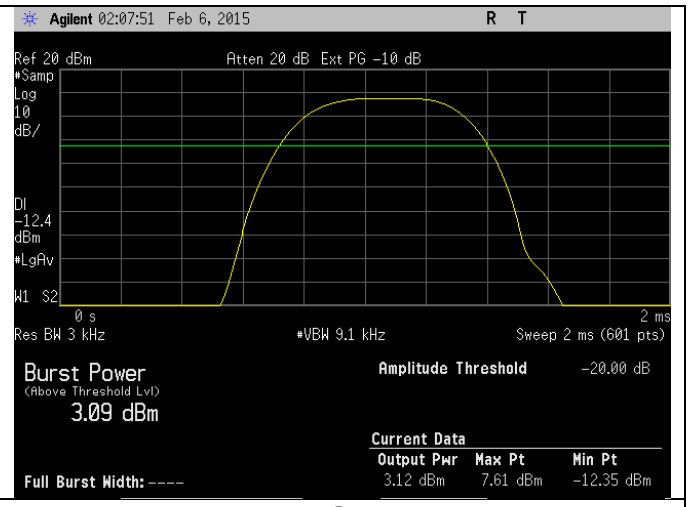


PSD

High Channel – 1928.448 MHz



Power



PSD

B.1.3 – RF Conducted – Emissions inside the band

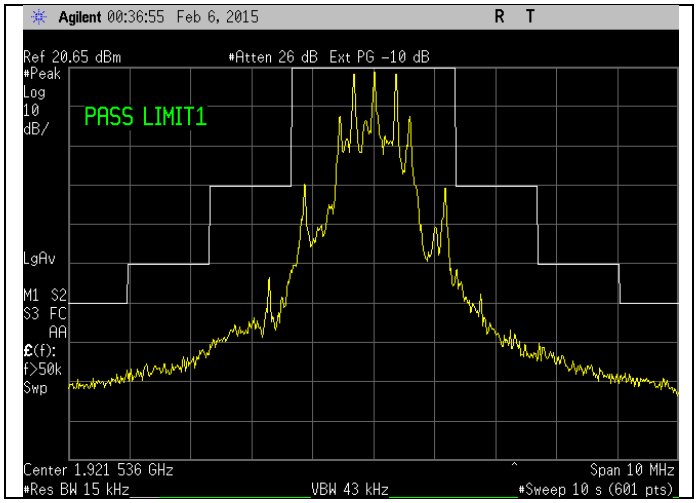
Manufacturer	LogicMark, LLC.
Date	2-6-15
Operator	Adam A
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.323(d) / RSS-213 Section 5.8.2
Specific Measurement Procedure	ANSI C63.17- Section 6.1.6
Additional Description of Measurement	RBW Approximately 1% of emission bandwidth (15 kHz used)
Additional Notes	Continuous transmit modulated used for this test.

The resolution bandwidth used is approximately 1% of the emissions bandwidth (B).

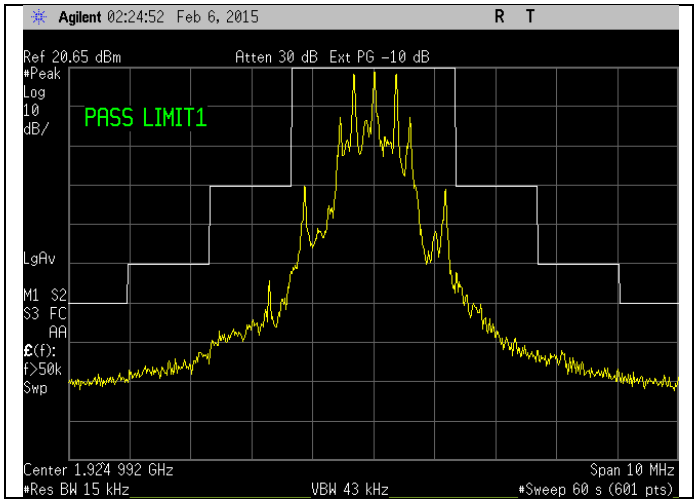
B= 1.26 MHz * .01 = 12.6 kHz however 15 kHz used because of spectrum analyzer limitations and a greater RBW will yield a worst case result.

Plots

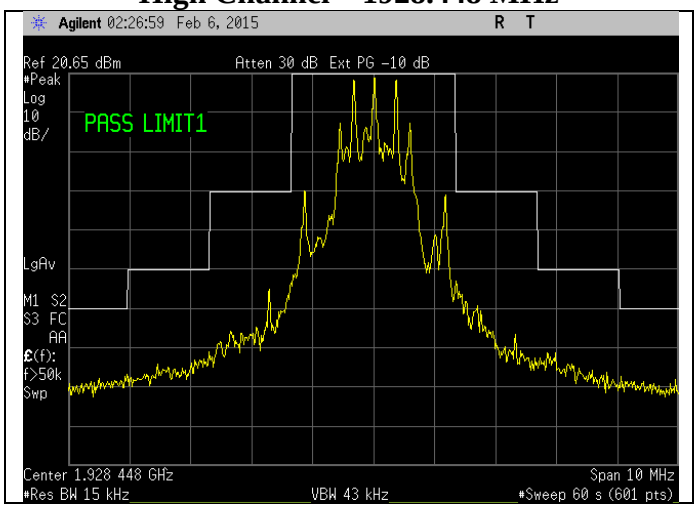
Low Channel – 1921.536 MHz



Mid Channel – 1924.992 MHz



High Channel – 1928.448 MHz



B.1.4 – RF Conducted – Emissions outside the band

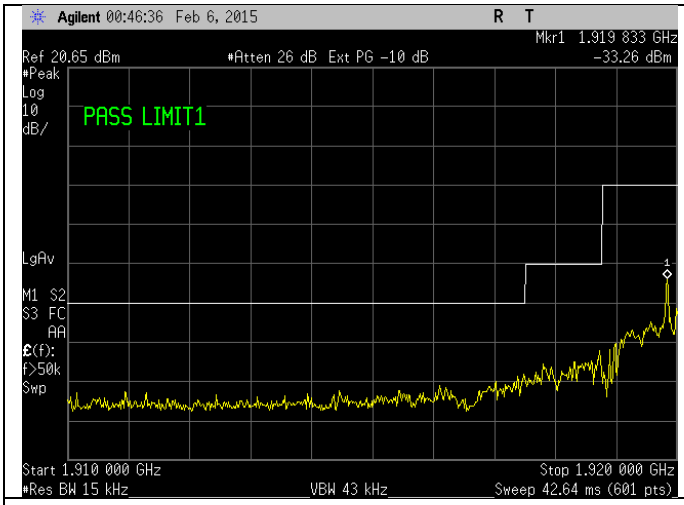
Manufacturer	LogicMark, LLC.
Date	2-4, 2-6 2015
Operator	Adam A
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.323(d) / RSS-213 Section 5.8.1
Specific Measurement Procedure	ANSI C63.17- Section 6.1.6
Additional Description of Measurement	RBW Approximately 1% of emission bandwidth (15 kHz used)
Additional Notes	Continuous transmit modulated used for this test. Per ANSI C63.17- Section 6.1.6.2 (c) emissions meet and exceed -39.5 dBm limit as RF Conducted test. Radiated test not required. All other emissions measured greater than 20 dB below limit. Worst case reported.

Table

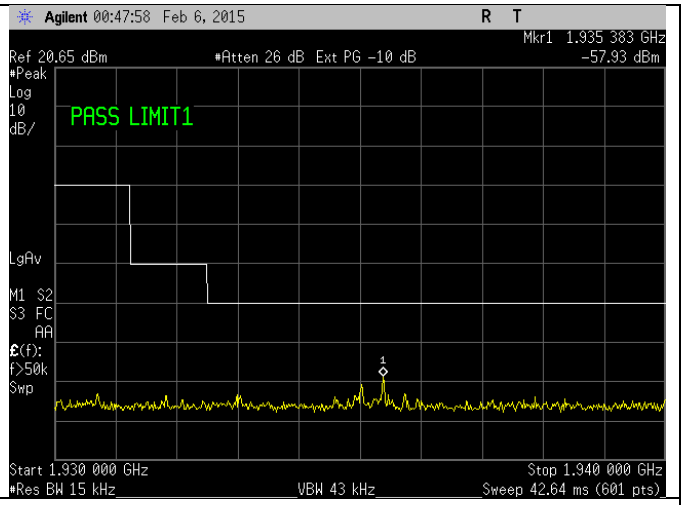
Channel	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
23	3843.072	-45.27	-39.5	5.8
25	3849.984	-45.12	-39.5	5.6
27	3856.896	-45.23	-39.5	5.7
23	5764.608	-60.03	-39.5	20.5
25	5774.976	-61.28	-39.5	21.8
27	5785.344	-61.78	-39.5	22.3
23	7686.144	-51.94	-39.5	12.4
25	7699.968	-52.02	-39.5	12.5
27	7713.792	-52.35	-39.5	12.9
23	9607.68	-45.60	-39.5	6.1
25	9624.96	-45.56	-39.5	6.1
27	9642.24	-45.93	-39.5	6.4
23	11529.216	-47.04	-39.5	7.5
25	11549.952	-47.30	-39.5	7.8
27	11570.688	-47.07	-39.5	7.6

Plots (Band-edge)

Low Channel – 1921.536 MHz

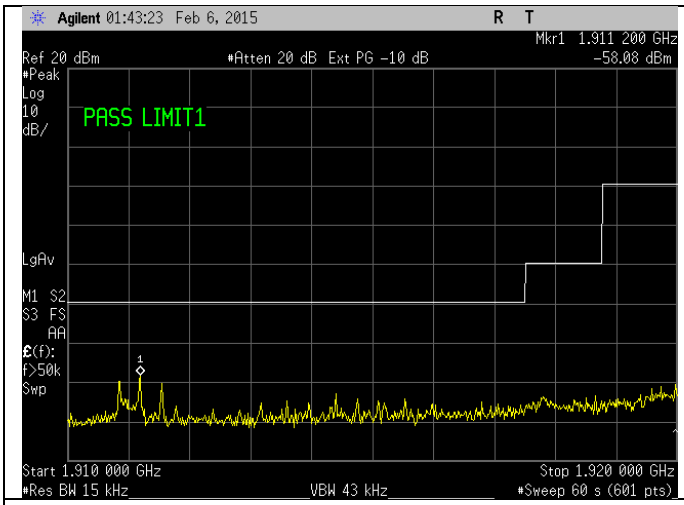


Lower



Upper

Mid Channel – 1924.992 MHz



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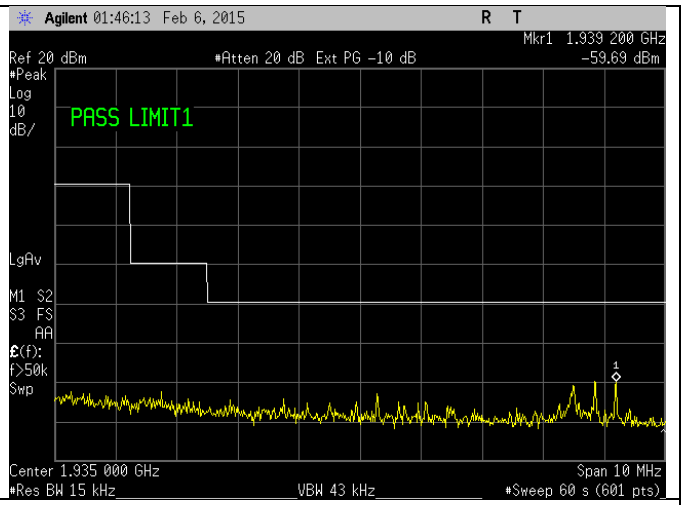
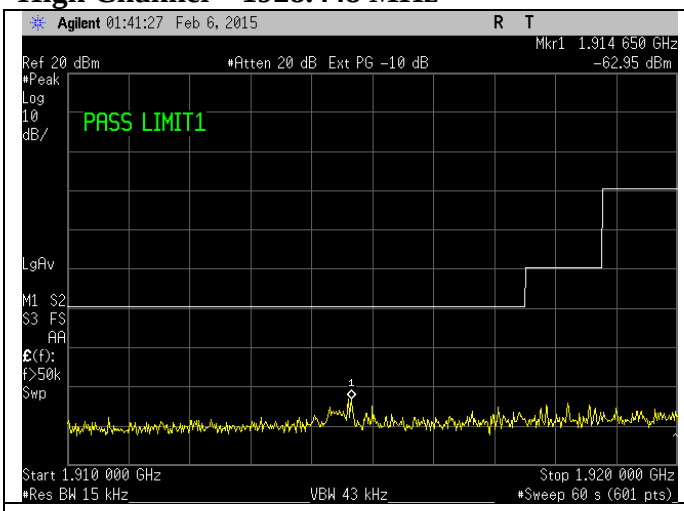
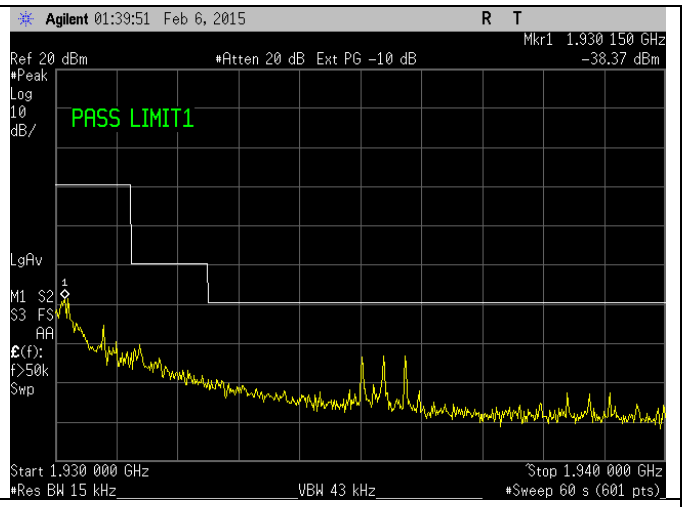


Upper

High Channel – 1928.448 MHz

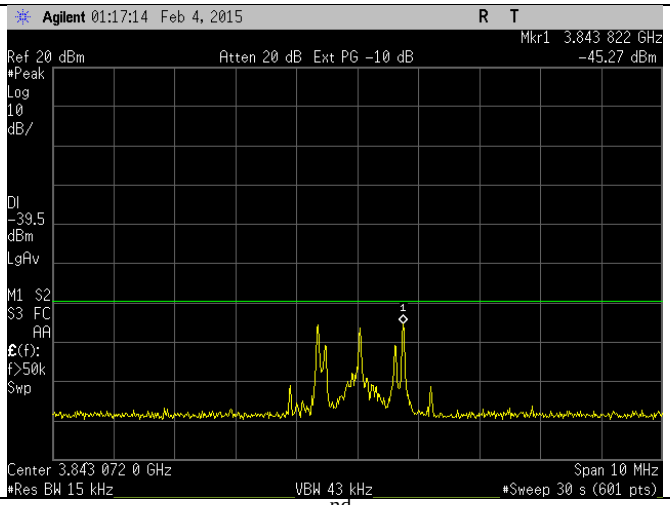


Lower

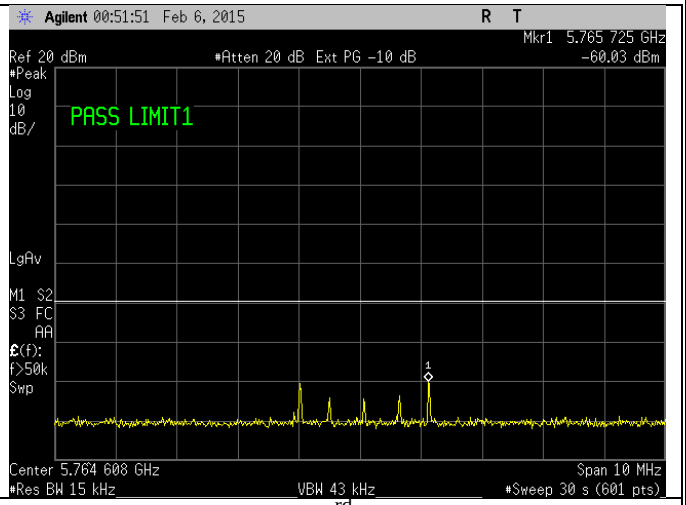


Upper

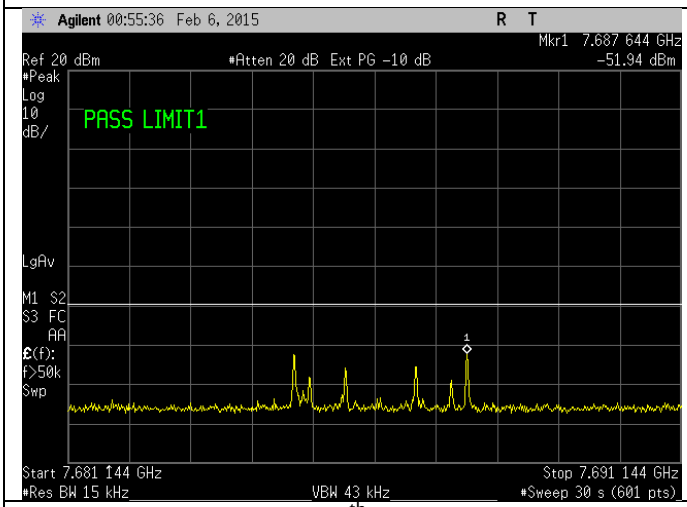
Plots (Harmonics)
Low Channel – 1921.536 MHz



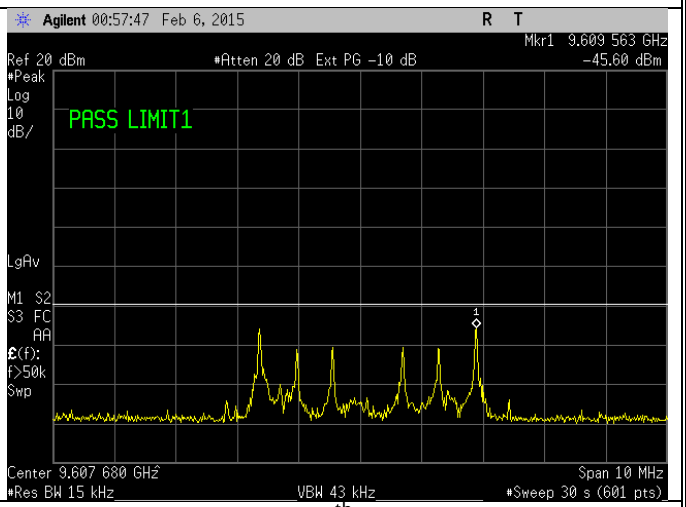
2nd



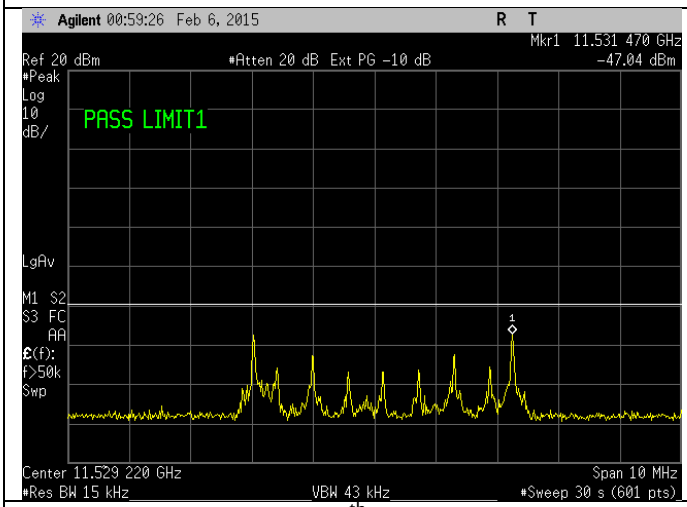
3rd



4th

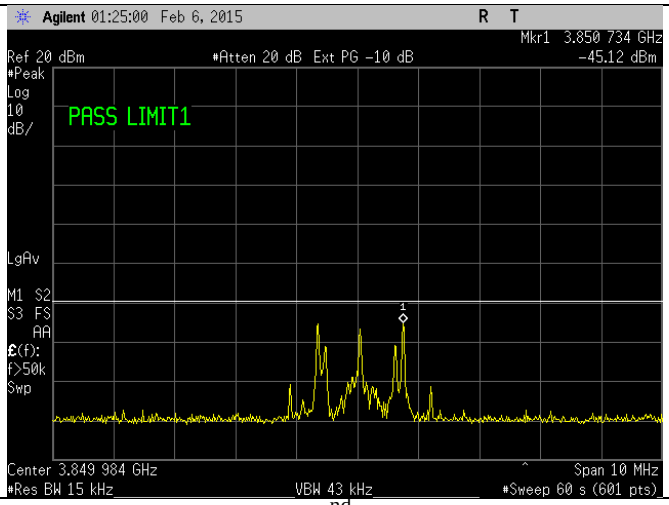


5th

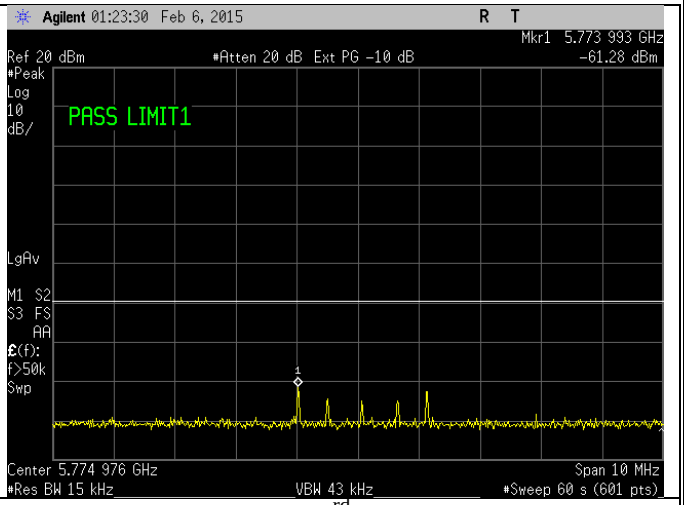


6th

Plots (Harmonics)
Mid Channel – 1924.992 MHz



2nd



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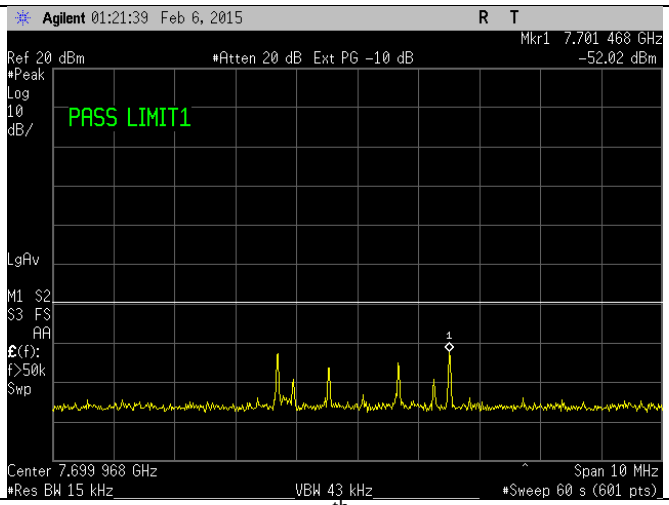

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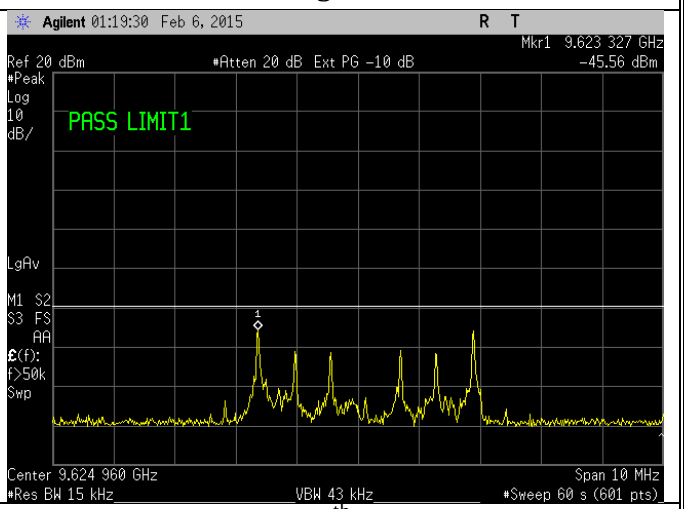

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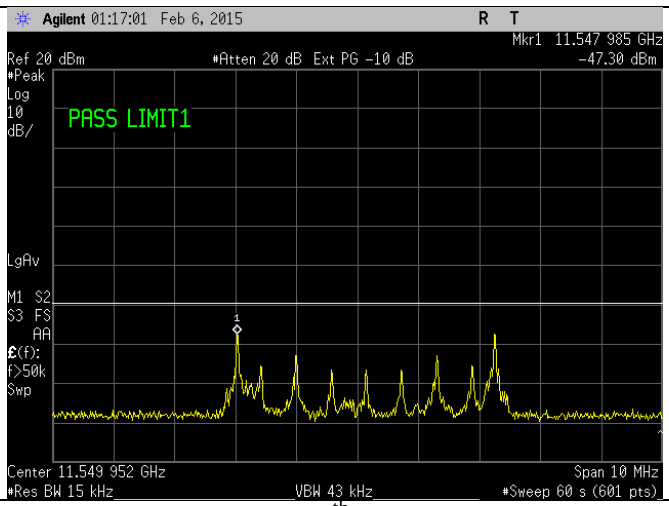
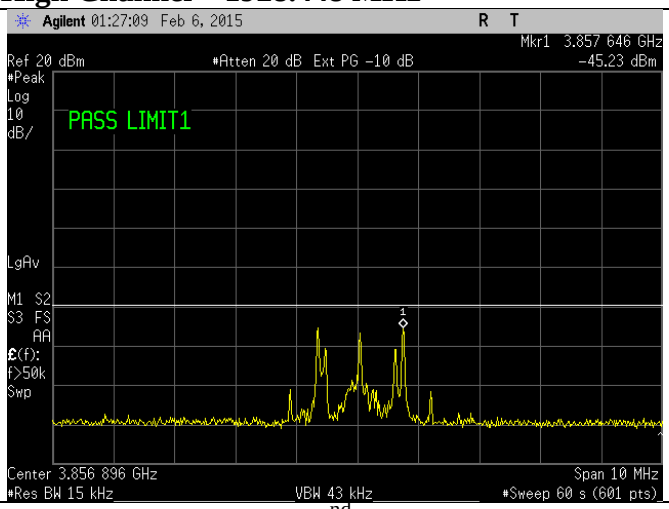


6th

Plots (Harmonics)
High Channel – 1928.448 MHz



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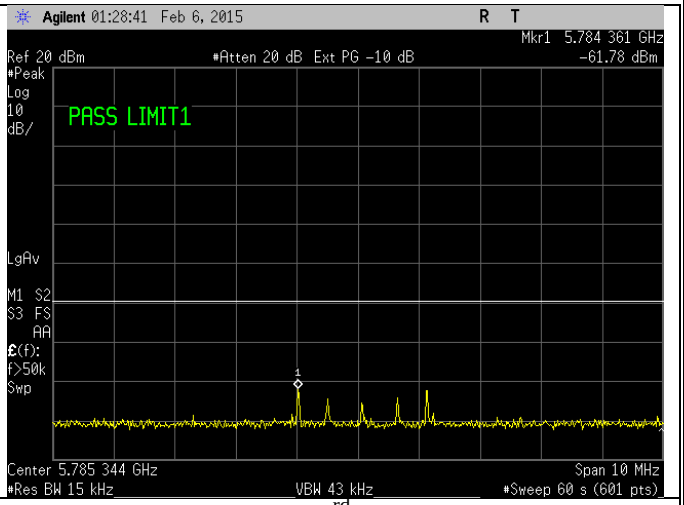
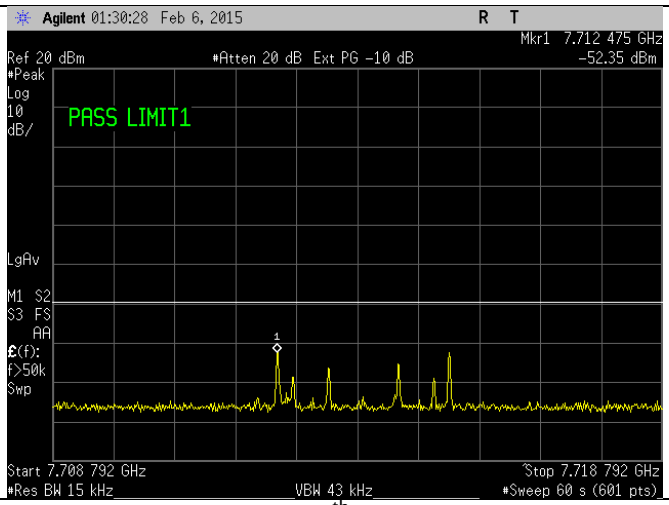
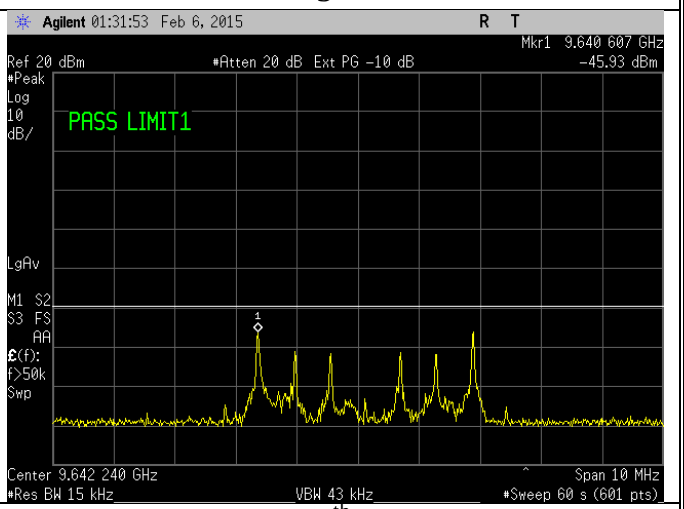


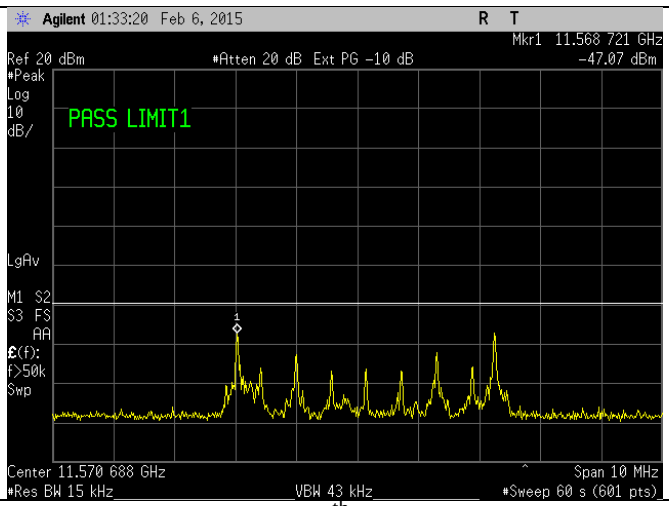
3rd



4th

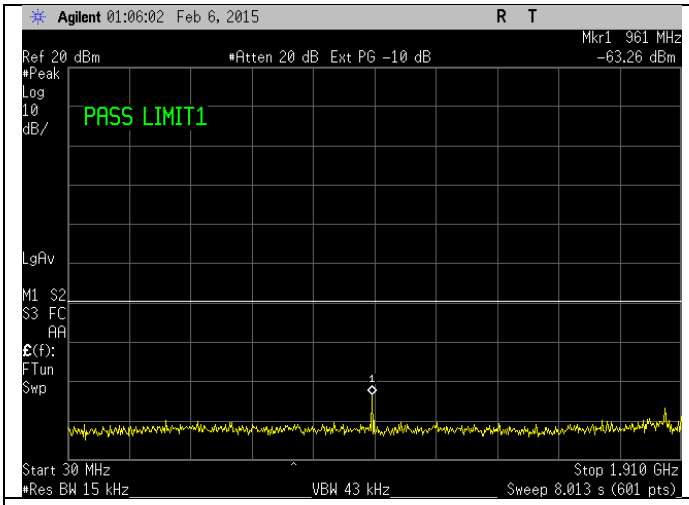


5th

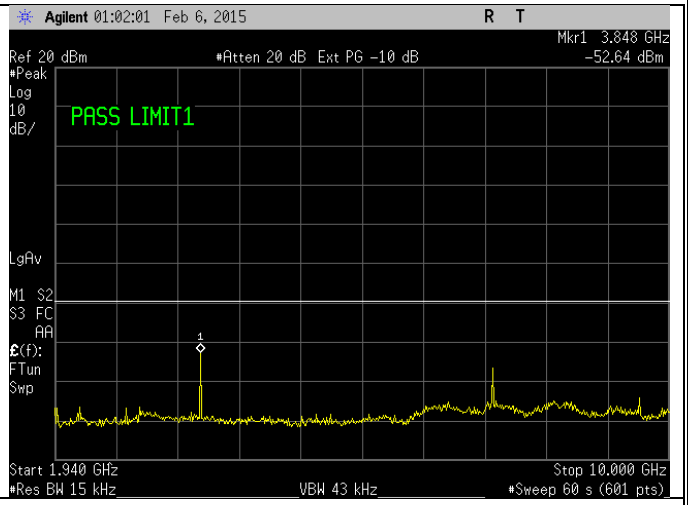


6th

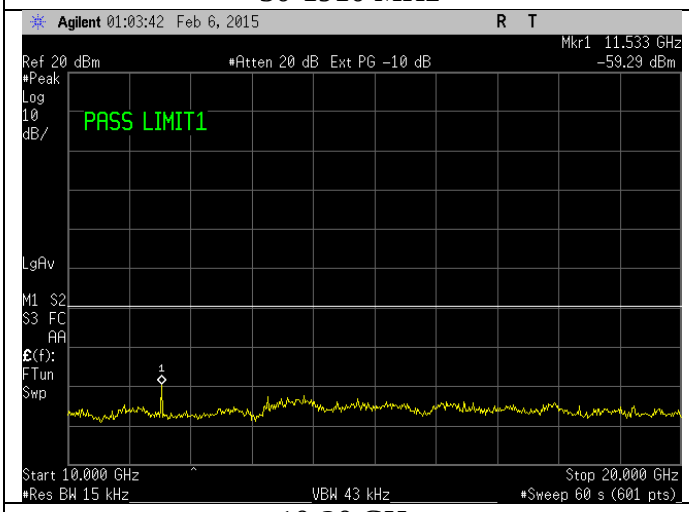
Plots (Spurious Transmitter Emissions)
Low Channel – 1921.536 MHz



30-1910 MHz

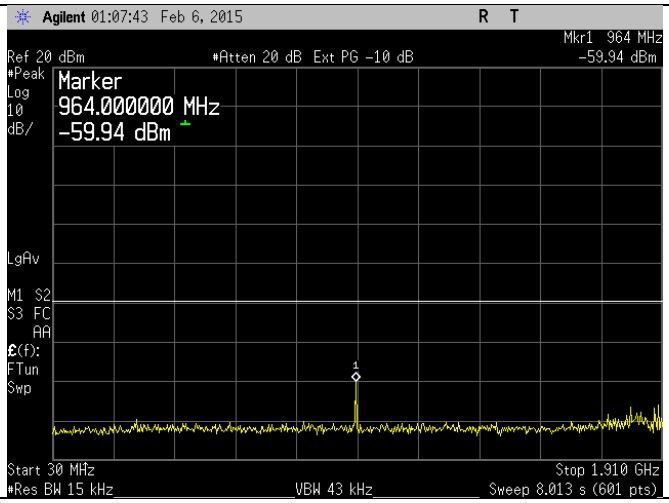


1940-10000 MHz

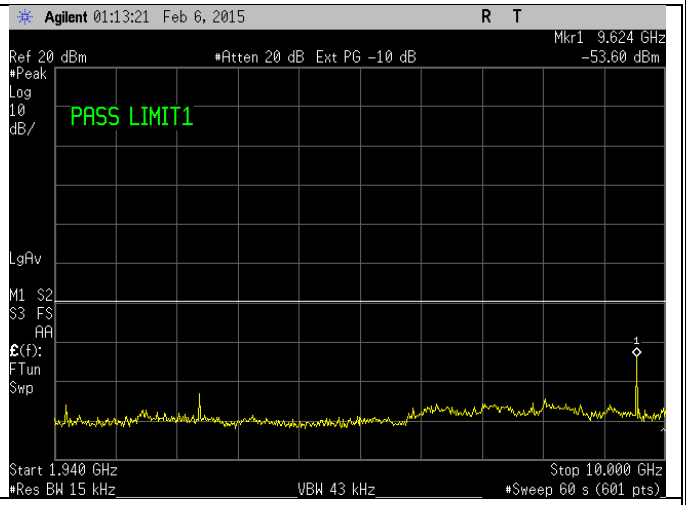


10-20 GHz

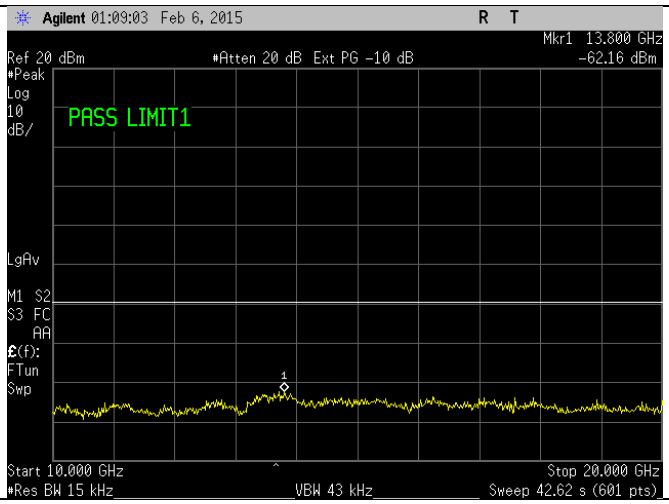
Plots (Spurious Transmitter Emissions)
Mid Channel – 1924.992 MHz



30-1910 MHz

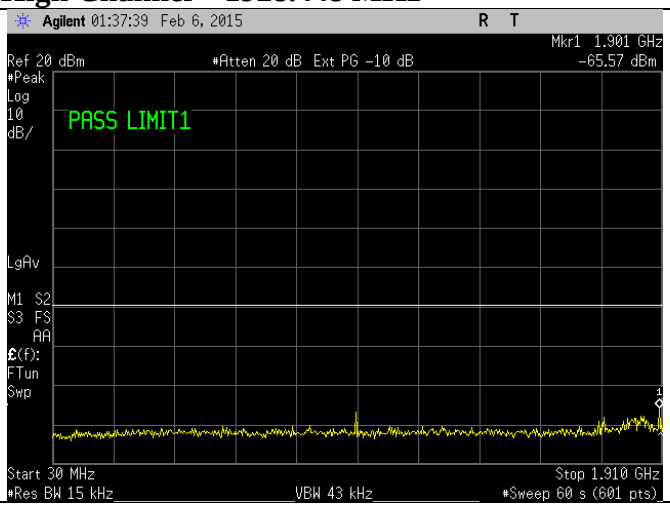


1940-10000 MHz

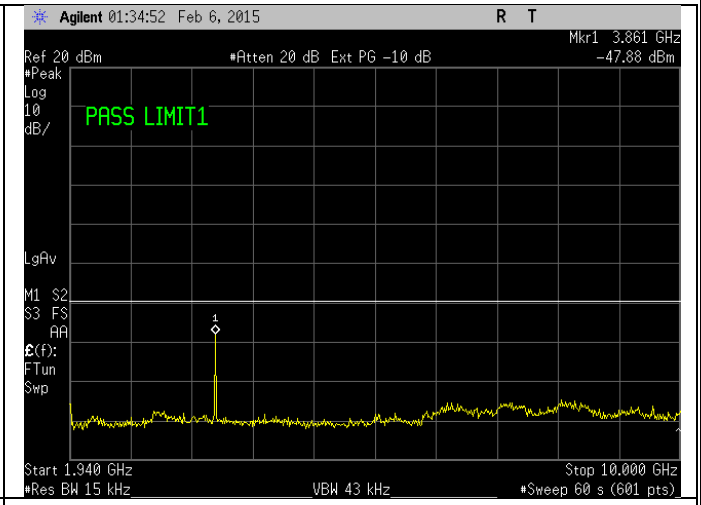


10-20 GHz

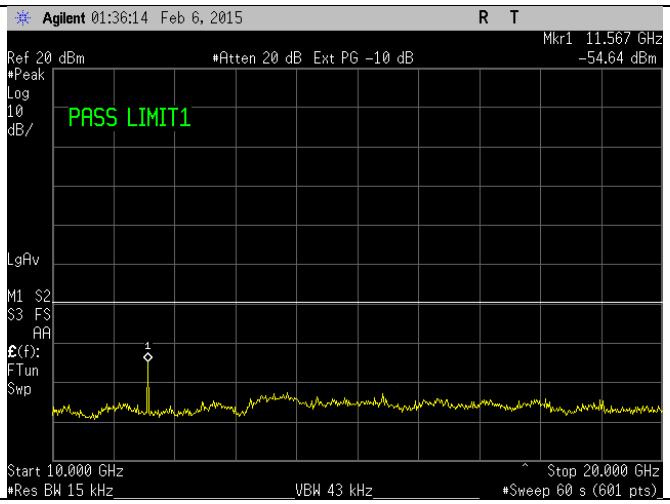
Plots (Spurious Transmitter Emissions)
High Channel – 1928.448 MHz



30-1910 MHz



1940-10000 MHz



10-20 GHz

B.1.5 – RF Conducted – Frame period stability

Manufacturer	LogicMark, LLC.
Date	9-27-13
Operator	Aidi
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.323(e) / RSS-213 Section 5.2 (13)
Specific Measurement Procedure	ANSI C63.17- Section 6.2.2 and 6.2.3
Additional Description of Measurement	Measurements made with R&S CMD60 Digital Radiocommunication Tester observed at least over a 1 hour period of time
Additional Notes	RF Conducted measurement

Frame Repetition Stability

Carrier Frequency (MHz)	Frame repetition rate (ppm)	Limit (ppm)
1924.992	+0.16	±10

Frame Period and Jitter

Carrier Frequency (MHz)	Max positive jitter (µs)	Max negative jitter (µs)	Max Jitter (µs)
1924.992	0.15	-0.15	25

Maximum results reported.

B.1.6 – RF Conducted – Carrier frequency stability over temperature

Manufacturer	LogicMark, LLC.
Date	9-17-13
Operator	Adam A
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	FCC Subpart D 15.323(f) / RSS-213 Section 5.3
Specific Measurement Procedure	ANSI C63.17- Section 6.2.1.1 / 6.2.1.2 / 6.2.1.3
Additional Description of Measurement	Measurements made with R&S CMD60 Digital Radiocommunication Tester and Spectrum analyzer observed at least over a 1 hour period of time
Additional Notes	RF Conducted measurement

Carrier Frequency Stability over Time at Nominal Temperature

Carrier Frequency (MHz)	Max Dev. (kHz)	Max Dev. (ppm)	Limit (ppm)
1924.992	8.3	4.3	±10

Frequency Stability over Power Supply Voltage at Nominal Temperature

Test not applicable device is battery operated only

Frequency Stability over Temperature

Temperature (°C)	Max Dev. (±kHz)	Max Dev. (ppm)	Limit (ppm)
+20	8.1	4.2	±10
+50	5.8	3.0	±10
-20	-2.8	1.5	±10

B.2 – Spectrum Etiquette

Note – Due to the nature of the proposed modifications, the spectrum etiquette parameters and data submitted the EUT's original application remain applicable to this C2PC application.

B.3 – Radiated Emissions (Receiver and Digital Device)

Rule Part(s)	FCC: 15.109 IC: RSS-GEN			
Measurement Procedure	ANSI C63.4 - 2014			
Test Location	LS Research, LLC - FCC Listed 3 meter Semi-Anechoic Chamber			
Test Distance	See data section			
EUT Placement	80 cm height non-conductive table above reference ground plane (covered with absorbers)			
Frequency Range of Measurement	Biconical: 30-300 MHz	Log Periodic Dipole Array: 300-1000 MHz	Double-Ridged Waveguide Horn: 1-18 GHz	Standard gain horn: 18-26 GHz
Measurement Detectors	30-1000MHz RBW: 120 kHz VBW: At least 300 kHz		1 - 40 GHz: RBW : 1MHz VBW: At least 3 (MHz) Peak 10 Hz Average	
Description of Measurement	1) The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are preformed. The data is gathered and reported as the corrected values. 2) The EUT is placed on a non-conductive pedestal made of expanded polyethylene foam centered on a turn-table in the test location with the antenna at the test distance from the EUT 3) Maximum radiated RF emissions are determined by rotation of azimuth and scanning the sense antenna between 1 and 4 meters in height using both horizontal and vertical antenna polarities. Maximized levels are manually noted at degree values of azimuth and at sense antenna height.			
Example Calculations	Reported Measurement data = Raw receiver measurement + Antenna Correction Factor + Cable factor (dB) - amplification factor (when applicable) + Additional factor (when applicable)			

FCC Part 15.109 / IC RSS-GEN

Frequency (MHz)	3 m Limit (µV/m)	3 m Limit (dBµV/m)	Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	Quasi-Peak
216-960	200	46.0	Quasi-Peak
Above 960	500	54.0	Average (>1 GHz)

B.3.1 – Radiated Emissions Receive Mode

Manufacturer	LogicMark, LLC
Date	2-6, 3-5 2015
Operator	Adam A / Peter F
Temp. / R.H.	20 - 25º C / 30-60% R.H.
Rule Part	15.109
Measurement Procedure	ANSI C63.4 - 2014
Test Distance	3 meter 30-18000 MHz; 1 meter 18-26 GHz
EUT Placement	80 cm height non-conductive table centered on turn-table
Detectors	Peak, Quasi-Peak, Average
Additional Notes	1) Tested in receive and normal mode of operation 2) Maximum results reported 3) All other emissions greater than 20 below applicable limit

Example Calculation:

Limit (dBµV/m) – Reading (dBµV/m) = Margin

Table 30-4000 MHz

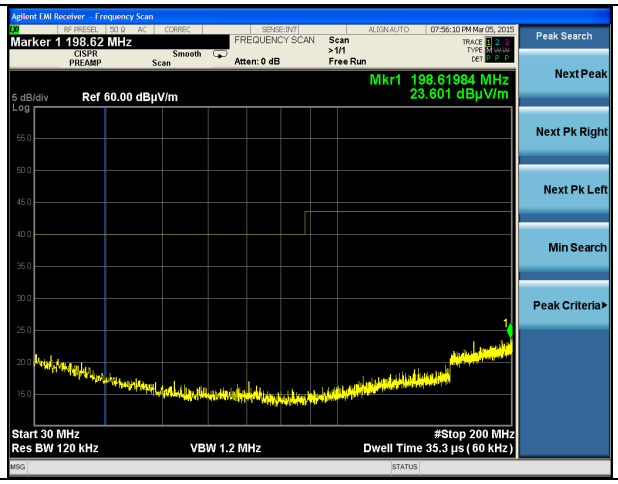
Frequency (MHz)	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)	Antenna Polarity
192.0	100	0	24.01	43.5	19.5	Horizontal
198.6	100	0	23.60	43.5	19.9	Vertical
951.1	100	0	34.92	46.0	11.1	Vertical
968.7	100	0	34.51	54.0	19.5	Horizontal
4000.0	100	0	31.75	54.0	22.3	Horizontal
3979.0	100	0	32.65	54.0	21.4	Vertical

Note: Measurements that of system noise floor.

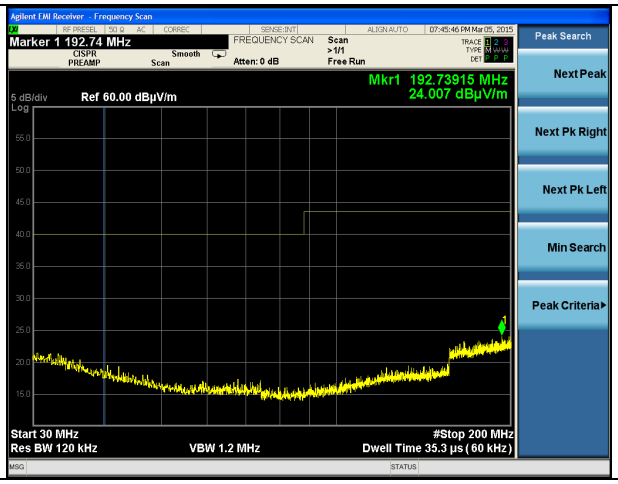
Table 4-26 GHz

EUT Channel	Frequency (MHz)	Antenna Polarity	Azimuth (degree)	Height (cm)	Average Reading (dBµV/m)	Peak Reading (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Peak Limit (dBµV/m)	Peak Margin (dB)
25	7703	Vertical	309	118	35.92	45.33	54	18.1	74	28.7
25	7703	Horizontal	303	110	38.59	47.32		15.4		26.7
23	7689	Vertical	303	113	36.01	45.96		18.0		28.0
23	7689	Horizontal	53	196	39.30	46.40		14.7		27.6
27	7717	Vertical	301	100	36.30	45.71		17.7		28.3
27	7717	Horizontal	26	122	38.95	45.99		15.1		28.0

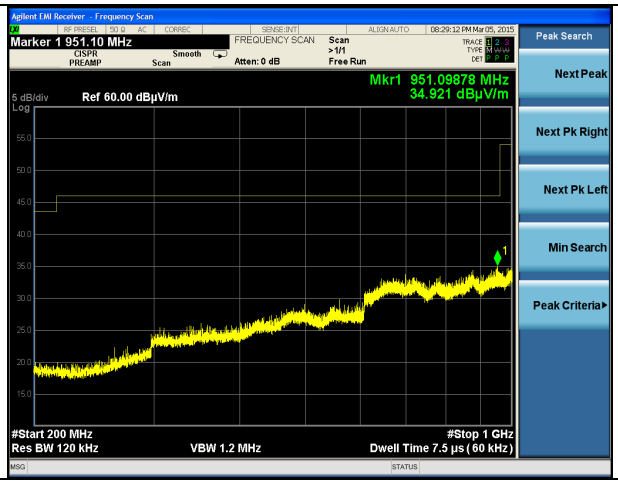
Plots 30-4000 MHz



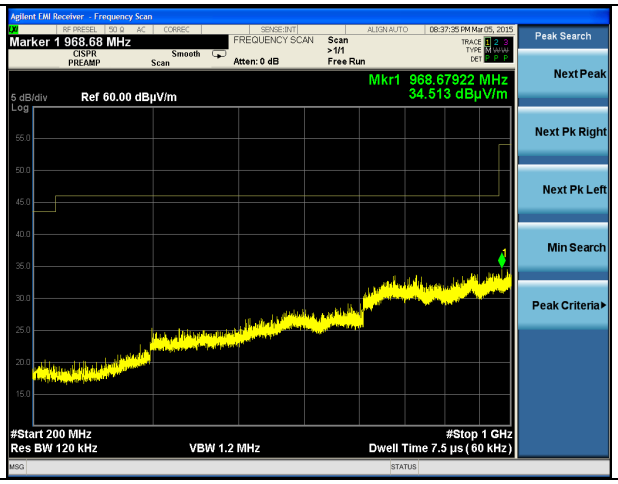
30-200 MHz Vertical



30-200 MHz Horizontal



200-1000 MHz Vertical

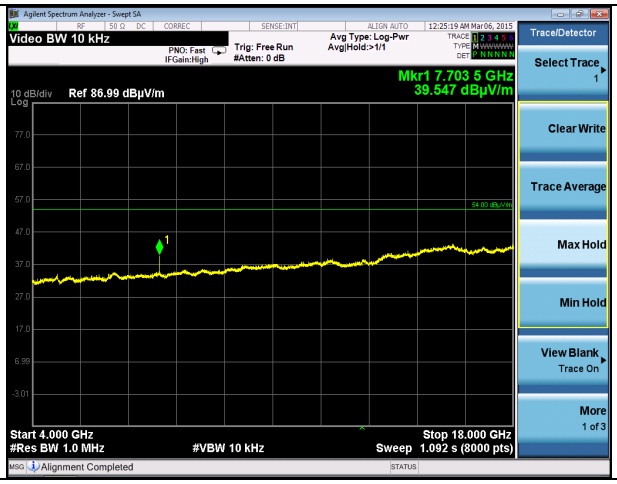


200-1000 MHz Horizontal

1000-4000 MHz Vertical

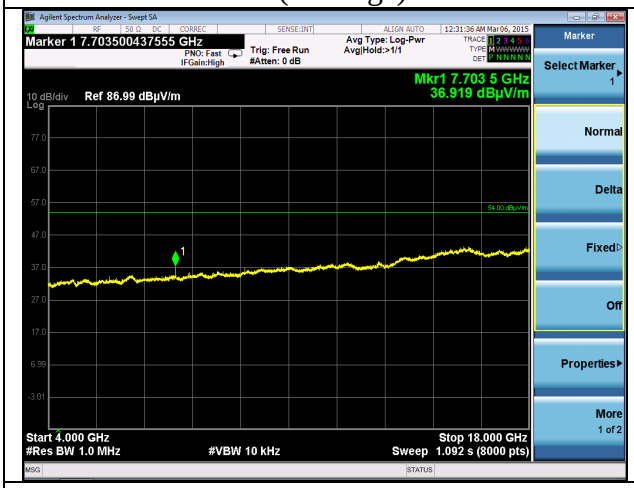
1000-4000 MHz Horizontal

Plots 4-26 GHz

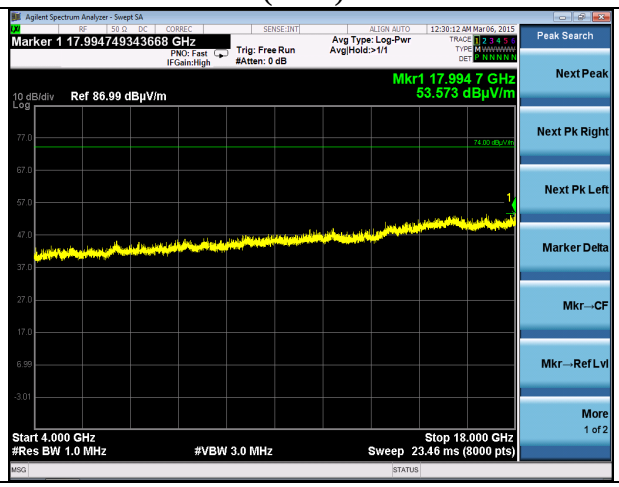


4-18 GHz (Average) Horizontal

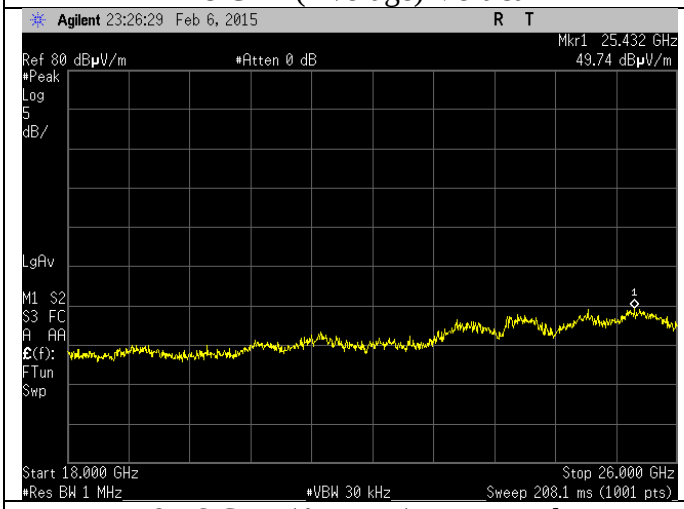
4-18 GHz (Peak) Horizontal



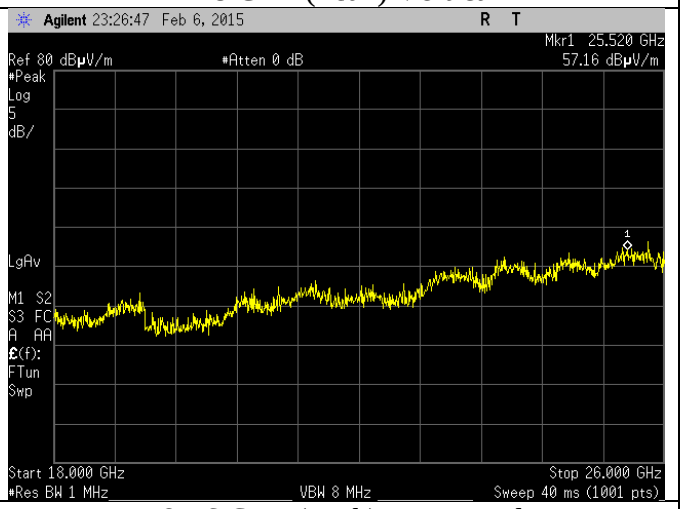
4-18 GHz (Average) Vertical



4-18 GHz (Peak) Vertical



18-26 GHz (Average) Horizontal



18-26 GHz (Peak) Horizontal

B.4 – AC Mains Conducted Emissions

This test is not applicable. EUT is battery operated only.

Appendix C - Uncertainty Summary

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k=2.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.82 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.88 dB
Radiated Emissions	3-Meter Chamber, Horn Antenna	4.85 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.32 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.63 dB
Absolute Conducted Emissions	Agilent PSA/ESA Series	1.38 dB
AC Line Conducted Emissions	Shielded Room/EMCO LISN	3.20 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	2.05 Volts/Meter
Conducted Immunity	3 Volts level	2.33 V
EFT Burst, Surge, VDI	230 VAC	54.4 V
ESD Immunity	Discharge at 15kV	3200 V
Temperature/Humidity	Thermo-hygrometer	0.64°/ 2.88 %RH

Appendix D - References

Publication	Year	Title
FCC CFR Parts 0-15	2015	Code of Federal Regulations – Telecommunications
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
RSS-213 Issue 3	2015	2 GHz Licence-exempt Personal Communications Service Devices (LE-PCS)
RSS-GEN Issue 4	2014	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.17	2013	American National Standard Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices

END OF REPORT

Date	Version	Comments	Person
3-13-15	V0	Initial Draft Release	Adam A
3-23-15	V0	Review completed. Few grammatical corrections	Peter F
3-26-15	V1	Final Release	Adam A
4-22-15	V1a	Updated References to ANSI C63.17 2013	Adam A
9-9-15	V1b	TCB Comments addressed	Adam A