

*FCC PART 15, SUBPART B and C
TEST REPORT*

for

900 MHz FHSS TRANSCEIVER

MODEL: STORMX

Prepared for

UPTIME SOLUTIONS
2000 MOUTAINVIEW ROAD
AUSTIN, TX 78703

Prepared by: _____



KENNETH LEE

Approved by: _____



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DATE: FEBRUARY 18, 2015

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Device Tested: 900 MHz FHSS Transceiver
Model: Stormx
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Customer: Uptime Solutions
2000 Mountainview Rd.
Austin, TX 78703

Test Dates: November 18, 20, 21 and 24, 2014; and February 17, 2015

Test Specifications: Emissions requirements
CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247

Test Procedure: ANSI C63.4

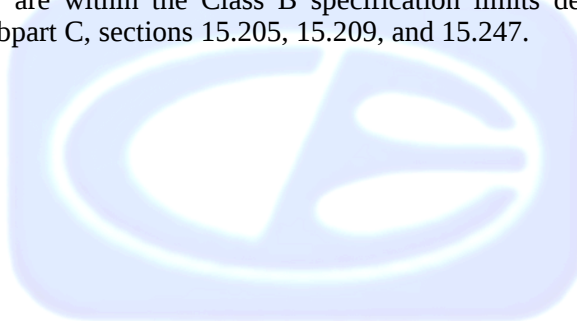
Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, section 15.207.
2	Radiated RF Emissions, 10 kHz – 9300 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15 Subpart C, 15.209 and 15.247 (d)
3	20 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1)(i)
4	Peak Power Output	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(2)
5	RF Conducted Antenna Test	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d)
6	Carrier Frequency Separation	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1)
7	Average Time of Occupancy	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1)(i)
8	Peak Power Spectral Density from the International Radiator to the Antenna	This test was not performed because the EUT is a frequency hopper.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the 900 MHz FHSS Transceiver, Model: Stormx. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Uptime Solutions

Jim Girardeau CTO

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer
Kenneth Lee	Test Technician

2.4 Date Test Sample was Received

The test sample was received on November 17, 2014.

2.5 Disposition of the Test Sample

The test sample has not been returned to Uptime Solutions as of the date of this test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
N/A	Not Applicable

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this emissions Test Report.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators
ANSI C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
DA 00-705: 2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
EN 50147-2 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation.

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - Emissions

The 900 MHz FHSS Transceiver, Model: Stormx (EUT) is powered by a battery pack with three 3.6 VDC batteries, or an external AC power supply in conjunction with the battery pack.

The EUT was tested for emissions at the low, middle, and high channels while in the X and Y axis, while in both battery and external AC power modes. The EUT was continuously transmitting.

The final radiated data for the EUT as was taken in the mode described above. Please see Appendix E for the data sheets.

4.2 Cable Construction and Termination

Cable 1 This is a two meter, foil shielded cable that connects to EUT to the AC adaptor. It has an eight pin power connector at the EUT end and is hardwired to the AC adaptor.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
900 MHz FHSS Transceiver	UPTIME SOLUTIONS	STORMX	N/A	2ADT3-BA1000
AC Adaptor	MEAN WELL	ELN-30-5	HB34280041	N/A

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED IN LAB B					
Computer	Compaq	CQ5210F	CNX9360CF9	N/A	N/A
Monitor	Hewlett Packard	HPs2031a	3CQ046N3MD	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100194	December 4, 2014	1 Year
EMI Receiver, 20 Hz – 26.5 GHz	Agilent Technologies	N9038A	MY51100115	March 6, 2014	2 Year
GENERAL TEST EQUIPMENT USED IN LAB D					
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver, 20 Hz – 26.5 GHz	Agilent Technologies	N9038A	MY51100115	March 6, 2014	2 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	May 20, 2014	1 Year
Preamplifier	Com-Power	PA-118	181656	January 13, 2014	1 Year
Loop Antenna	Com-Power	AL-130	17089	January 29, 2013	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2014	2 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A

Emissions test equipment continued

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
RF CONDUCTED EMISSIONS TEST EQUIPMENT					
Shield Room Test	Compatible Electronics	11CD	N/A	N/A	N/A
LISN	Com-Power	LI-215	12082	June 12, 2014	1 Year
LISN	Com-Power	LI-215	12090	June 12, 2014	1 Year
Transient Limiter	Com-Power	252A910	1	October 10, 2014	1 Year
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	May 20, 2014	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A14530	May 20, 2014	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	May 20, 2014	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for emissions test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was grounded via the third wire safety ground in the AC power cable during external power testing. The EUT was not grounded during the internal battery mode testing.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Radiated Emissions (Spurious and Harmonics) Test – Lab B

The EMI Receiver was used as a measuring meter. A preamplifier was used to increase the sensitivity of the instrument. The Com Power Microwave Preamplifier Model: PA-118 was used for frequencies above 1 GHz. The EMI Receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI Receiver records the highest measured reading over all the sweeps.

For frequencies above 1 GHz, the readings were averaged by a "duty cycle correction factor", derived from 20 log (dwell time / 100 ms). This duty cycle correction factor was then subtracted from the peak reading.

The measurement bandwidth and transducer used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

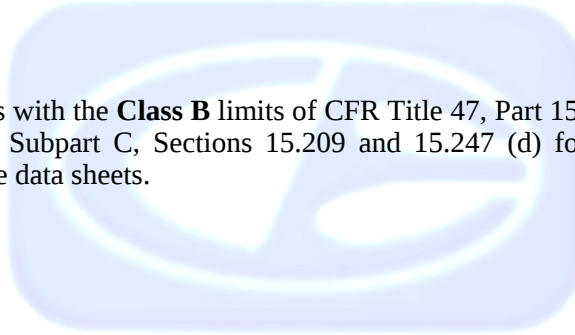
The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2009. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT by the Radiated Emission Manual Test software. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test -- Lab B (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 1 GHz to 9.3 GHz to obtain the final test data.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.209 and 15.247 (d) for radiated emissions. Please see Appendix E for the data sheets.



7.1.2 Radiated Emissions (Spurious and Harmonics) Test – Lab D

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was used to increase the sensitivity of the instrument. The EMI Receiver was initially used in the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4, EN 50147-2 and CISPR 22. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT.

The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna

The EUT was tested at a 3 meter test distance. The six highest emissions are listed in Table 1.0.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.209 and 15.247 (d) for radiated emissions. Please see Appendix E for the data sheets.

7.1.3 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The six highest emissions are listed in Table 2.0. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the Class B limits of CFR Title 47, Part 15, Subpart B and the limits of CFR Title 47, part 15, subpart C, section 15.207 for conducted emissions.

7.1.4 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
900 MHz FHSS Transceiver, Model: Stormx

Frequency MHz	Average Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
37.20 (H) (X-Axis) (High Channel) (Battery Mode)	31.42 (A)	40.00	-8.58
32.10 (H) (Y-Axis) (High Channel) (Battery Mode)	31.01 (A)	40.00	-8.99
2778.83 (V) (Y-Axis) (High Channel) (External AC Mode)	42.82 (A)	54.00	-11.18
2445.00 (V) (Y-Axis) (Middle Channel) (External AC Mode)	42.39 (A)	54.00	-11.61
2778.83 (V) (X-Axis) (High Channel) (External AC Mode)	42.02 (A)	54.00	-11.98
2745 (V) (Y-Axis) (Middle Channel) (Battery Mode)	41.79 (A)	54.00	-12.21

Notes:

- * The complete emissions data is given in Appendix E of this report.
- (H) Horizontal
- (V) Vertical
- (A) Average Reading

RF Emissions Test Results (Continued)Table 2.0 CONDUCTED EMISSION RESULTS
900 MHz FHSS Transceiver, Model: Stormx

Frequency MHz	Average Emission Level* dBuV	Average Specification Limit dBuV	Delta (Emission – Spec. Limit) dB
0.637 (WL)	38.34	46.00	-7.66
0.641 (BL)	37.84	46.00	-8.16
0.831 (BL)	37.54	46.00	-8.46
0.634 (BL)	37.34	46.00	-8.66
1.763 (BL)	37.32	46.00	-8.68
0.895 (BL)	37.04	46.00	-8.96
0.831 (WL)	37.04	46.00	-8.96

Notes:

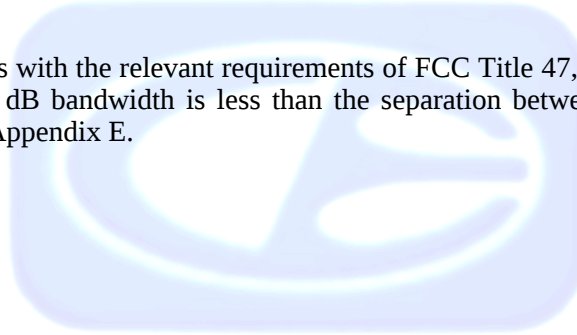
- * The complete emissions data is given in Appendix E of this report.
- (BL) Black Lead
- (WL) White Lead

7.2 20 dB Bandwidth

The 20 dB Bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the RF output of the EUT. The resolution bandwidth was 5.1 kHz and the video bandwidth was 20 kHz.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(1)(i). The 20 dB bandwidth is less than the separation between channels. Please see the data sheets located in Appendix E.



7.3 Peak Output Power

The Peak Output Power was measured using the EMI Receiver. The peak output power was measured using a direct connection from the RF output of the EUT. The resolution bandwidth was 3 MHz and the video bandwidth was 8 MHz. The cable loss was also added back into the reading using the reference level offset.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (b)(2). The maximum peak output power is less than 250 mW. Please see the data sheets located in Appendix E.

7.4 RF Antenna Conducted Test

The RF antenna conducted test was performed using the EMI Receiver. The RF antenna conducted test measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The resolution bandwidth was 100 kHz, and the video bandwidth was 510 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power that is produced by the intentional radiator is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power. Please see the radiated emission data sheets located in Appendix E.

7.5 RF Band Edges

The RF band edges were taken at the edges of the ISM spectrum (902 MHz when the EUT was on the low channel and 928 MHz when the EUT was on the high channel) using the EMI Receiver. The RBW was set to 100 kHz and the VBW was set to 510 kHz. Plots of the fundamental were taken to ensure the amplitude at the band edges were at least 20 dB down from the peak of the fundamental emission.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power at the band edges at 902 MHz and 928 MHz meet the requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). Please see the data sheets located in Appendix E.

7.6 Carrier Frequency Separation

The Channel Hopping Separation Test was measured using the EMI Receiver. The EUT was operating in its normal operating mode. The resolution bandwidth was 30 kHz, and the video bandwidth 100 kHz. The frequency span was wide enough to include the peaks of two adjacent channels.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(1). The Channel Hopping Separation is greater than the 20 dB bandwidth. Please see the data sheets located in Appendix E.

7.7 Number of Hopping Frequencies

The Channel Hopping Separation Test was measured using the EMI Receiver. The EUT was operating in its normal operating mode. The resolution bandwidth was 100 kHz, and the video bandwidth was 300 kHz. The frequency span was wide enough to include all of the peaks in the frequency band of operation.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(1) and 15.247 (a)(1)(i). The number of hopping frequencies is 26. Please see the data sheets located in Appendix E.

7.8 Average Time of Occupancy Test

The Average Time of Occupancy Test was measured using the EMI Receiver. The EUT was operating in normal operating mode. The frequency span was taken to 0 Hz to determine the time for each transmission.

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 10 seconds.

The sweep time was then changed to 1 second and the number of pulses taken. The number of pulses was then multiplied by 10 to determine the number of pulses in a 10 second period. The number of pulses in a 10 second period was then multiplied by the time for each pulse to determine the average time of occupancy.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(1)(i). The EUT does not transmit for more than 400 msec in a 10 second period on any frequency. Please see the data sheets located in Appendix E.

7.9 Spectral Density Test

The spectrum density output was measured using the EMI Receiver. The spectral density output was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The resolution bandwidth 3 kHz, and the video bandwidth was 10 kHz. The highest 1.5 MHz of the signal was used as the frequency span with the sweep rate being 1 second for every 3 kHz of span.

Test Results:

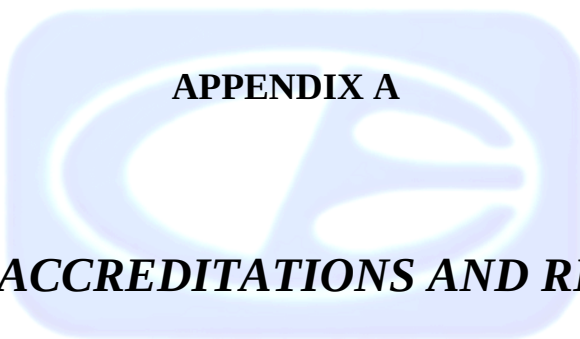
This test was not performed because the EUT is a frequency hopper.



8. CONCLUSIONS

The 900 MHz FHSS Transceiver, Model: Stormx, as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B, and Subpart C, sections 15.205, 15.209, and 15.247.





APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

LABORATORY ACCREDITATIONS AND RECOGNITIONS



For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025. Please follow the link to the NIST/NVLAP site for each of our facilities' NVLAP certificate and scope of accreditation

NVLAP listing links

[Agoura Division](#) / [Brea Division](#) / [Silverado/Lake Forest Division](#)

.Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."



ANSI listing [CETCB](#)



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).

US/EU MRA list [NIST MRA site](#)



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

APEC MRA list [NIST MRA site](#)

We are also listed for IT products by the following country/agency:



VCCI Support member: Please visit http://www.vcci.jp/vcci_e/



FCC Listing, from FCC OET site

[FCC test lab search](#) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.247 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

The EUT was not modified during the testing.



APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

900 MHz FHSS Transceiver

Model: Stormx

S/N: N/A

There were no additional models covered under this report.

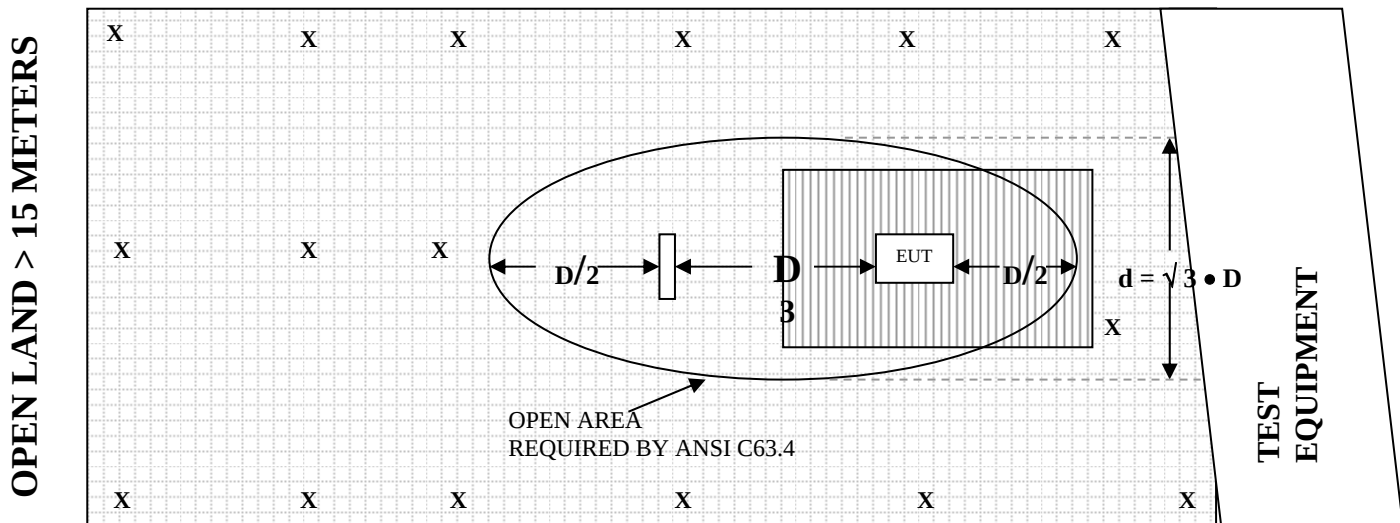


APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

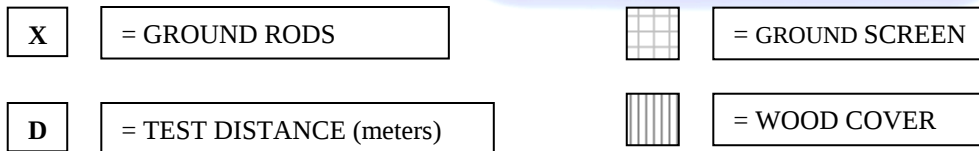


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER

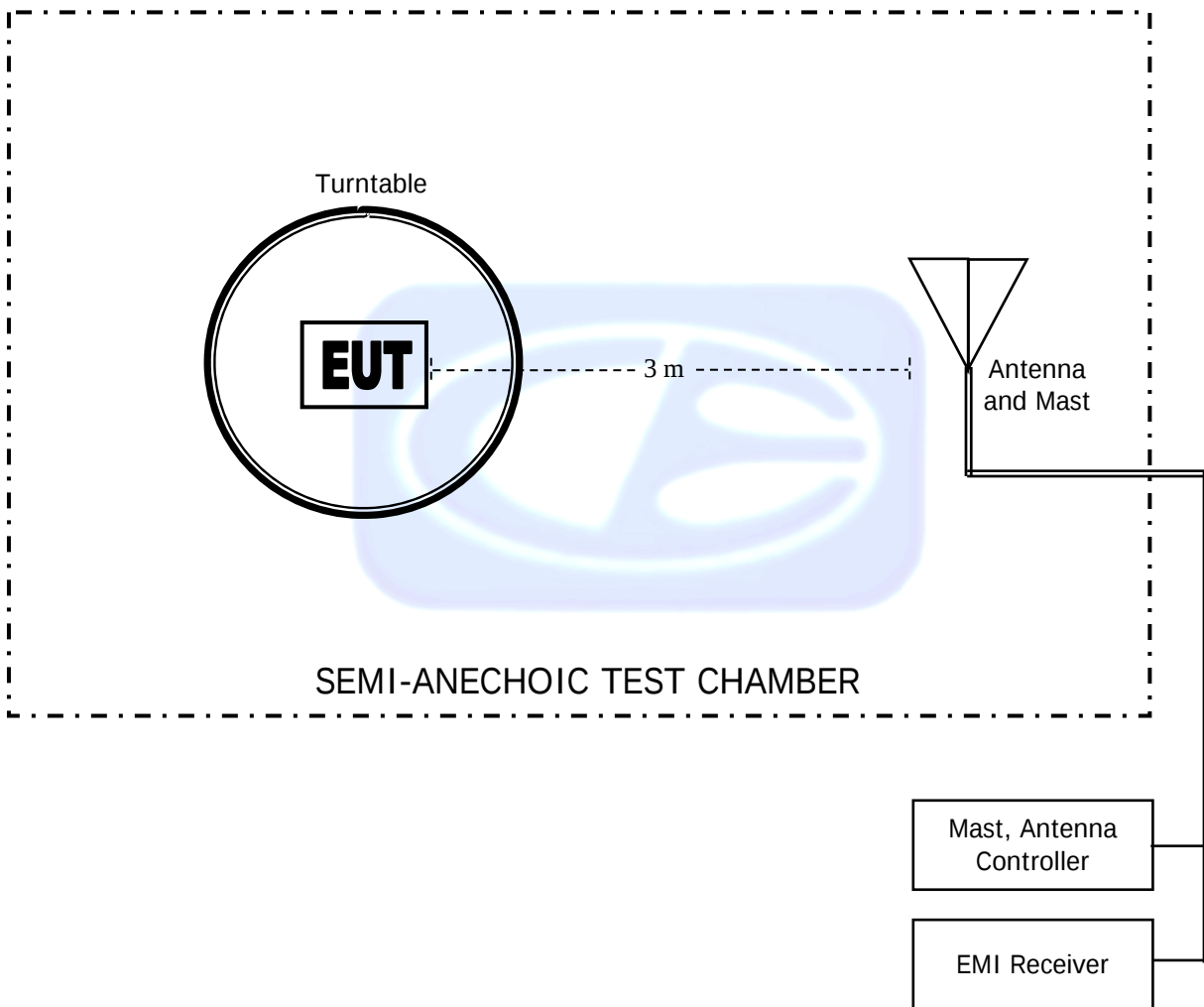
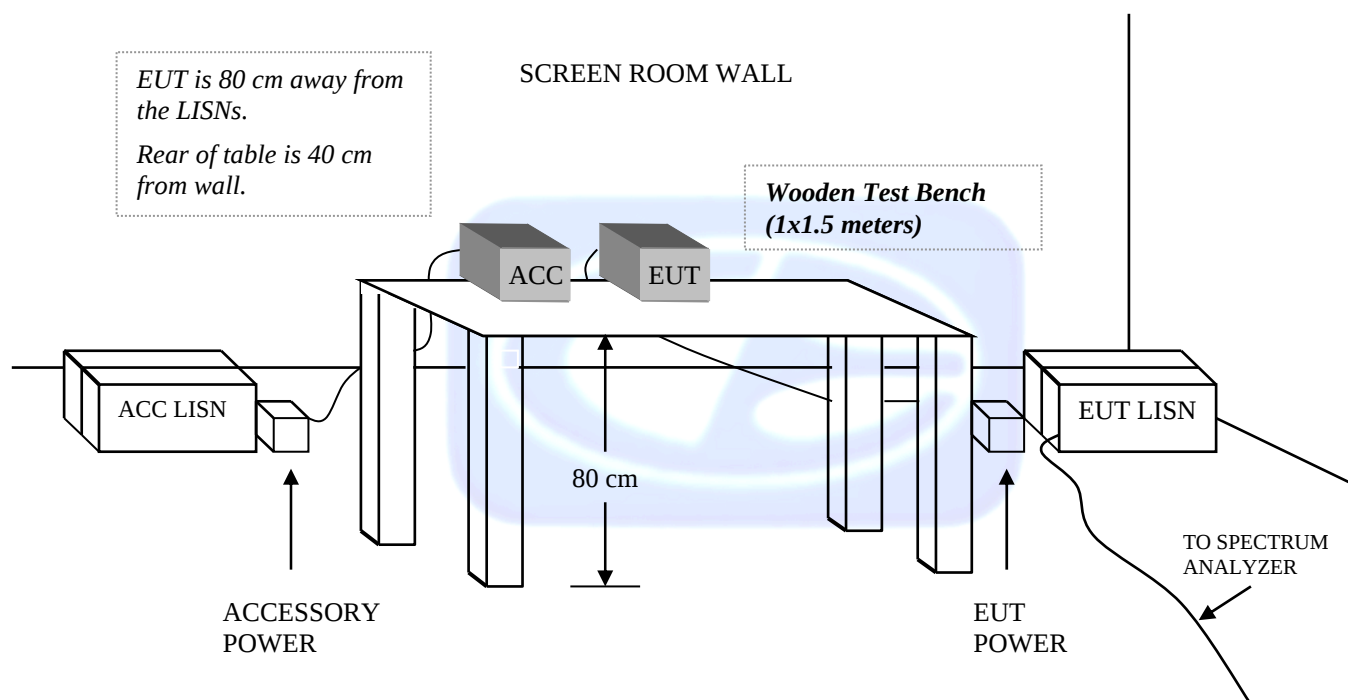


FIGURE 3: CONDUCTED EMISSIONS TEST SETUP



COM-POWER AL-130**LOOP ANTENNA**

S/N: 17089

CALIBRATION DATE: JANUARY 29, 2013

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-42.5	9
0.01	-42.3	9.2
0.02	-42.1	9.4
0.03	-41.4	10.1
0.04	-41.8	9.7
0.05	-42.4	9.1
0.06	-42.3	9.2
0.07	-42.5	9
0.08	-42.4	9.1
0.09	-42.5	9
0.1	-42.5	9
0.2	-42.7	8.8
0.3	-42.6	8.9
0.4	-42.5	9
0.5	-42.7	8.8
0.6	-42.7	8.8
0.7	-42.5	9
0.8	-42.3	9.2
0.9	-42.2	9.3
1	-42.2	9.3
2	-41.8	9.7
3	-41.7	9.8
4	-41.7	9.8
5	-41.5	10
6	-41.6	9.9
7	-41.4	10.1
8	-41	10.5
9	-40.8	10.7
10	-41.3	10.2
15	-41.4	10.1
20	-41.2	10.3
25	-42.6	8.9
30	-41.7	9.8

COM-POWER AC-220**COMBILOG ANTENNA****S/N: 61060****CALIBRATION DATE: MAY 20, 2014**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.40	200	14.40
35	23.70	250	16.40
40	24.20	300	17.90
45	22.60	350	15.60
50	22.10	400	19.90
60	17.90	450	20.40
70	12.70	500	21.60
80	11.60	550	21.50
90	12.20	600	22.30
100	13.20	650	23.50
120	15.70	700	23.70
125	15.80	750	25.90
140	13.60	800	25.90
150	16.90	850	26.40
160	14.20	900	27.00
175	14.90	950	27.70
180	15.00	1000	27.50

COM POWER AH-118**HORN ANTENNA****S/N: 071175****CALIBRATION DATE: FEBRUARY 26, 2014**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.23	10.0	38.43
1.5	25.84	10.5	40.19
2.0	28.14	11.0	40.49
2.5	29.51	11.5	41.39
3.0	31.20	12.0	42.02
3.5	32.17	12.5	43.30
4.0	31.40	13.0	42.77
4.5	31.86	13.5	40.18
5.0	34.82	14.0	42.59
5.5	34.38	14.5	41.74
6.0	36.31	15.0	41.84
6.5	34.81	15.5	38.48
7.0	37.48	16.0	39.52
7.5	36.98	16.5	37.85
8.0	36.66	17.0	41.33
8.5	38.47	17.5	44.96
9.0	37.22	18.0	48.50
9.5	37.86		

COM-POWER PA-118**PREAMPLIFIER**

S/N: 181656

CALIBRATION DATE: JANUARY 13, 2014

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.90	6.0	25.40
1.1	25.30	6.5	25.20
1.2	26.00	7.0	24.40
1.3	26.20	7.5	24.00
1.4	26.30	8.0	23.90
1.5	26.40	8.5	24.50
1.6	26.50	9.0	25.20
1.7	26.60	9.5	24.80
1.8	26.50	10.0	24.90
1.9	26.60	11.0	25.40
2.0	26.70	12.0	24.50
2.5	26.90	13.0	24.30
3.0	27.00	14.0	25.20
3.5	27.10	15.0	25.90
4.0	26.60	16.0	25.60
4.5	26.10	17.0	23.70
5.0	26.40	18.0	25.80
5.5	25.80		



FRONT VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
BATTERY MODE
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
BATTERY MODE

FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
EXTERNAL MODE

FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
EXTERNAL MODE
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
BATTERY MODE

FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
BATTERY MODE

FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
EXTERNAL MODE
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
EXTERNAL MODE
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
FCC SUBPART B AND C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

UPTIME SOLUTIONS
900 MHz FHSS TRANSCEIVER
MODEL: STORMX
FCC SUBPART B AND C – CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/18/2014
Lab: B
Tested By: Kyle FujimotoInternal Battery Mode
Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	59.75	V	74	-14.25	Peak	1.5	135	
2708.91	39.75	V	54	-14.25	Avg	1.5	135	
3611.88	44.06	V	74	-29.94	Peak	2.25	135	
3611.88	24.06	V	54	-29.94	Avg	2.25	135	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014

Lab: B

Tested By: Kyle Fujimoto

Internal Battery Mode
Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	59.05	V	74	-14.95	Peak	1.5	135	
2708.91	39.05	V	54	-14.95	Avg	1.5	135	
3611.88	43.36	V	74	-30.64	Peak	1.5	225	
3611.88	23.36	V	54	-30.64	Avg	1.5	225	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/18/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	47.46	H	74	-26.54	Peak	1.25	90	
2708.91	27.46	H	54	-26.54	Avg	1.25	90	
3611.88	43.06	H	74	-30.94	Peak	12.5	135	
3611.88	23.06	H	54	-30.94	Avg	1.25	135	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	47.16	H	74	-26.84	Peak	1.5	225	
2708.91	27.16	H	54	-26.84	Avg	1.5	225	
3611.88	42.96	H	74	-31.04	Peak	1.5	225	
3611.88	22.96	H	54	-31.04	Avg	1.5	225	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	60.79	V	74	-13.21	Peak	1.25	155	
2745	40.79	V	54	-13.21	Avg	1.25	155	
3660	46.35	V	74	-27.65	Peak	1.35	165	
3660	26.35	V	54	-27.65	Avg	1.35	165	
4575								No Emissions
4575								Detected
5490								No Emissions
5490								Detected
6405								No Emissions
6405								Detected
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	61.79	V	74	-12.21	Peak	1.5	225	
2745	41.79	V	54	-12.21	Avg	1.5	225	
3660	46.25	V	74	-27.75	Peak	1.5	225	
3660	26.25	V	54	-27.75	Avg	1.5	225	
4575								No Emissions
4575								Detected
5490								No Emissions
5490								Detected
6405								No Emissions
6405								Detected
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	49.79	H	74	-24.21	Peak	1.25	155	
2745	29.79	H	54	-24.21	Avg	1.25	155	
3660	45.35	H	74	-28.65	Peak	1.35	145	
3660	25.35	H	54	-28.65	Avg	1.35	145	
4575								No Emissions Detected
4575								
5490								No Emissions Detected
5490								
6405								No Emissions Detected
6405								
7320								No Emissions Detected
7320								
8235								No Emissions Detected
8235								
9150								No Emissions Detected
9150								

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	51.59	H	74	-22.41	Peak	1.25	155	
2745	31.59	H	54	-22.41	Avg	1.25	155	
3660	39.85	H	74	-34.15	Peak	1.25	45	
3660	19.85	H	54	-34.15	Avg	1.25	45	
4575								No Emissions Detected
4575								
5490								No Emissions Detected
5490								
6405								No Emissions Detected
6405								
7320								No Emissions Detected
7320								
8235								No Emissions Detected
8235								
9150								No Emissions Detected
9150								

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	61.42	V	74	-12.58	Peak	1.25	155	
2778.83	41.42	V	54	-12.58	Avg	1.25	155	
3705.11	44.73	V	74	-29.27	Peak	1.55	225	
3705.11	24.73	V	54	-29.27	Avg	1.55	225	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Uptime Solutions
 900 MHz FHSS Transceiver
 Model: Stormx

Date: 11/20/2014
 Lab: B
 Tested By: Kyle Fujimoto

Internal Battery Mode
 High Channel
 Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	61.52	V	74	-12.48	Peak	1.25	155	
2778.83	41.52	V	54	-12.48	Avg	1.25	155	
3705.11	45.03	V	74	-28.97	Peak	1.35	165	
3705.11	25.03	V	54	-28.97	Avg	1.35	165	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

Internal Battery Mode
High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	55.2	H	74	-18.8	Peak	1.25	225	
2778.83	35.2	H	54	-18.8	Avg	1.25	225	
3705.11	43.13	H	74	-30.87	Peak	1.35	265	
3705.11	23.13	H	54	-30.87	Avg	1.35	265	
4631.39								No Emissions Detected
5557.66								No Emissions Detected
5557.66								
6483.94								No Emissions Detected
6483.94								
7410.22								No Emissions Detected
7410.22								
8336.49								No Emissions Detected
8336.49								
9262.77								No Emissions Detected
9262.77								

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/20/2014
Lab: B
Tested By: Kyle FujimotoInternal Battery Mode
High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	55.02	H	74	-18.98	Peak	1.25	155	
2778.83	35.02	H	54	-18.98	Avg	1.25	155	
3705.11	44.43	H	74	-29.57	Peak	1.35	165	
3705.11	24.43	H	54	-29.57	Avg	1.35	165	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/18/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode

Low Channel

Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	59.95	V	74	-14.05	Peak	1.1	190	
2708.91	39.95	V	54	-14.05	Avg	1.1	190	
3611.88	45.56	V	74	-28.44	Peak	1	350	
3611.88	25.56	V	54	-28.44	Avg	1	350	
4514.86								No Emissions Detected
4514.86								
5417.83								No Emissions Detected
5417.83								
6320.8								No Emissions Detected
6320.8								
7223.77								No Emissions Detected
7223.77								
8126.74								No Emissions Detected
8126.74								
9029.71								No Emissions Detected
9029.71								

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	60.75	V	74	-13.25	Peak	1	180	
2708.91	40.75	V	54	-13.25	Avg	1	180	
3611.88	47.06	V	74	-26.94	Peak	1.25	160	
3611.88	27.06	V	54	-26.94	Avg	1.25	160	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/18/2014
Lab: B
Tested By: Kyle Fujimoto**External AC Mode**
Low Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	53.86	H	74	-20.14	Peak	1.25	250	
2708.91	33.86	H	54	-20.14	Avg	1.25	250	
3611.88	45.66	H	74	-28.34	Peak	1	270	
3611.88	25.66	H	54	-28.34	Avg	1	270	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
Low Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1805.94								Done Via Conducted
1805.94								Not in Restricted Band
2708.91	55.75	H	74	-18.25	Peak	1	100	
2708.91	35.75	H	54	-18.25	Avg	1	100	
3611.88	45.26	H	74	-28.74	Peak	1	300	
3611.88	25.26	H	54	-28.74	Avg	1	300	
4514.86								No Emissions
4514.86								Detected
5417.83								No Emissions
5417.83								Detected
6320.8								No Emissions
6320.8								Detected
7223.77								No Emissions
7223.77								Detected
8126.74								No Emissions
8126.74								Detected
9029.71								No Emissions
9029.71								Detected

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/20/2014
Lab: B
Tested By: Kyle FujimotoExternal AC Mode
Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	61.49	V	74	-12.51	Peak	1	160	
2745	41.49	V	54	-12.51	Avg	1	160	
3660	46.05	V	74	-27.95	Peak	1.75	45	
3660	26.05	V	54	-27.95	Avg	1.75	45	
4575								No Emissions
4575								Detected
5490								No Emissions
5490								Detected
6405								No Emissions
6405								Detected
7320								No Emissions
7320								Detected
8235								No Emissions
8235								Detected
9150								No Emissions
9150								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	62.39	V	74	-11.61	Peak	1	190	
2745	42.39	V	54	-11.61	Avg	1	190	
3660	47.15	V	74	-26.85	Peak	1	180	
3660	27.15	V	54	-26.85	Avg	1	180	
4575								No Emissions Detected
5490								No Emissions Detected
6405								No Emissions Detected
7320								No Emissions Detected
8235								No Emissions Detected
9150								No Emissions Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014

Lab: B

Tested By: Kyle Fujimoto

External AC Mode
Middle Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	53.79	H	74	-20.21	Peak	1.25	45	
2745	33.79	H	54	-20.21	Avg	1.25	45	
3660	46.75	H	74	-27.25	Peak	1.1	90	
3660	26.75	H	54	-27.25	Avg	1.1	90	
4575								No Emissions Detected
5490								No Emissions Detected
6405								No Emissions Detected
7320								No Emissions Detected
8235								No Emissions Detected
9150								No Emissions Detected

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/20/2014
Lab: B
Tested By: Kyle FujimotoExternal AC Mode
Middle Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830								Done Via Conducted
1830								Not in Restricted Band
2745	55.69	H	74	-18.31	Peak	1.1	250	
2745	35.69	H	54	-18.31	Avg	1.1	250	
3660	45.55	H	74	-28.45	Peak	1.5	90	
3660	25.55	H	54	-28.45	Avg	1.5	90	
4575								No Emissions Detected
4575								
5490								No Emissions Detected
5490								
6405								No Emissions Detected
6405								
7320								No Emissions Detected
7320								
8235								No Emissions Detected
8235								
9150								No Emissions Detected
9150								

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	62.02	V	74	-11.98	Peak	1	160	
2778.83	42.02	V	54	-11.98	Avg	1	160	
3705.11	45.53	V	74	-28.47	Peak	1.25	240	
3705.11	25.53	V	54	-28.47	Avg	1.25	240	
4631.39								No Emissions Detected
4631.39								
5557.66								No Emissions Detected
5557.66								
6483.94								No Emissions Detected
6483.94								
7410.22								No Emissions Detected
7410.22								
8336.49								No Emissions Detected
8336.49								
9262.77								No Emissions Detected
9262.77								

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	62.82	V	74	-11.18	Peak	1	200	
2778.83	42.82	V	54	-11.18	Avg	1	200	
3705.11	45.83	V	74	-28.17	Peak	1	180	
3705.11	25.83	V	54	-28.17	Avg	1	180	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247Uptime Solutions
900 MHz FHSS Transceiver
Model: StormxDate: 11/20/2014
Lab: B
Tested By: Kyle FujimotoExternal AC Mode
High Channel
Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	53.72	H	74	-20.28	Peak	1	145	
2778.83	33.72	H	54	-20.28	Avg	1	145	
3705.11	45.13	H	74	-28.87	Peak	1	190	
3705.11	25.13	H	54	-28.87	Avg	1	190	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247

Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

External AC Mode
High Channel
Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1852.55								Done Via Conducted
1852.55								Not in Restricted Band
2778.83	54.42	H	74	-19.58	Peak	1	240	
2778.83	34.42	H	54	-19.58	Avg	1	240	
3705.11	45.73	H	74	-28.27	Peak	1	270	
3705.11	25.73	H	54	-28.27	Avg	1	270	
4631.39								No Emissions
4631.39								Detected
5557.66								No Emissions
5557.66								Detected
6483.94								No Emissions
6483.94								Detected
7410.22								No Emissions
7410.22								Detected
8336.49								No Emissions
8336.49								Detected
9262.77								No Emissions
9262.77								Detected

FCC 15.247 and FCC Class B
Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/21/2014
Lab: D
Tested By: Kenneth Lee

Non Harmonic Emissions from the Tx and Digital Portion -- 10 kHz to 9300 MHz
Battery Power Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
37.2	35.56	H	40	-4.44	Peak	3.99	0	
37.2	31.42	H	40	-8.58	QP	3.99	0	No Other Emissions Found for the Digital Portion
960.1	43.56	V	54	-10.44	Peak	3.84	204	from 10 kHz to 9300 MHz
960.1	39.53	V	54	-14.47	QP	3.84	204	for both Vertical and Horizontal Polarizations
960.1	44.38	H	54	-9.62	Peak	3.04	80	
960.1	39.49	H	54	-14.51	QP	3.04	80	No Other Non Harmonic Emissions Found for the Tx Mode
								from 10 kHz to 9300 MHz
								for both Vertical and Horizontal Polarizations
901.4								Done Via Conducted Not in Restricted Band*
934.9								Done Via Conducted Not in Restricted Band*

* The frequencies at 901.4 and 934.9 MHz were determined to be part of the radio frequency power that is being produced. Per FCC 15.247 (d), attenuation below the general limits specified in 15.209 (a) is not required as these frequencies are not in the restricted bands defined by 15.205 (a)

FCC 15.247 and FCC Class B
Uptime Solutions
900 MHz FHSS Transceiver
Model: Stormx

Date: 11/20/2014
Lab: D
Tested By: Kenneth Lee

Non Harmonic Emissions from the Tx and Digital Portion -- 10 kHz to 9300 MHz
External AC Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
960.2	45.25	H	54	-8.75	Peak	1.63	207.67	
960.2	40.29	H	54	-13.71	QP	1.63	207.67	No Other Emissions Found for the
								Digital Portion
960.3	44.07	V	54	-9.93	Peak	2.24	64.5	from 10 kHz to 9300 MHz
960.3	40.13	V	54	-13.87	QP	2.24	64.5	for both Vertical and Horizontal
								Polarizations
996.3	44.58	H	54	-9.42	Peak	1.43	106.75	
996.3	40.43	H	54	-13.57	QP	1.43	106.75	No Other Non Harmonic Emissions
								Found for the Tx Mode
996.4	44.73	V	54	-9.27	Peak	2.55	232	from 10 kHz to 9300 MHz
996.4	40.13	V	54	-13.87	QP	2.55	232	for both Vertical and Horizontal
								Polarizations
901.4								Done Via Conducted
								Not in Restricted Band*
901.5								Done Via Conducted
								Not in Restricted Band*
934.8								Done Via Conducted
								Not in Restricted Band*

* The frequencies at 901.4, 901.5, and 934.8 MHz were determined to be part of the radio frequency power that is being produced. Per FCC 15.247 (d), attenuation below the general limits specified in 15.209 (a) is not required as these frequencies are not in the restricted bands defined by 15.205 (a)

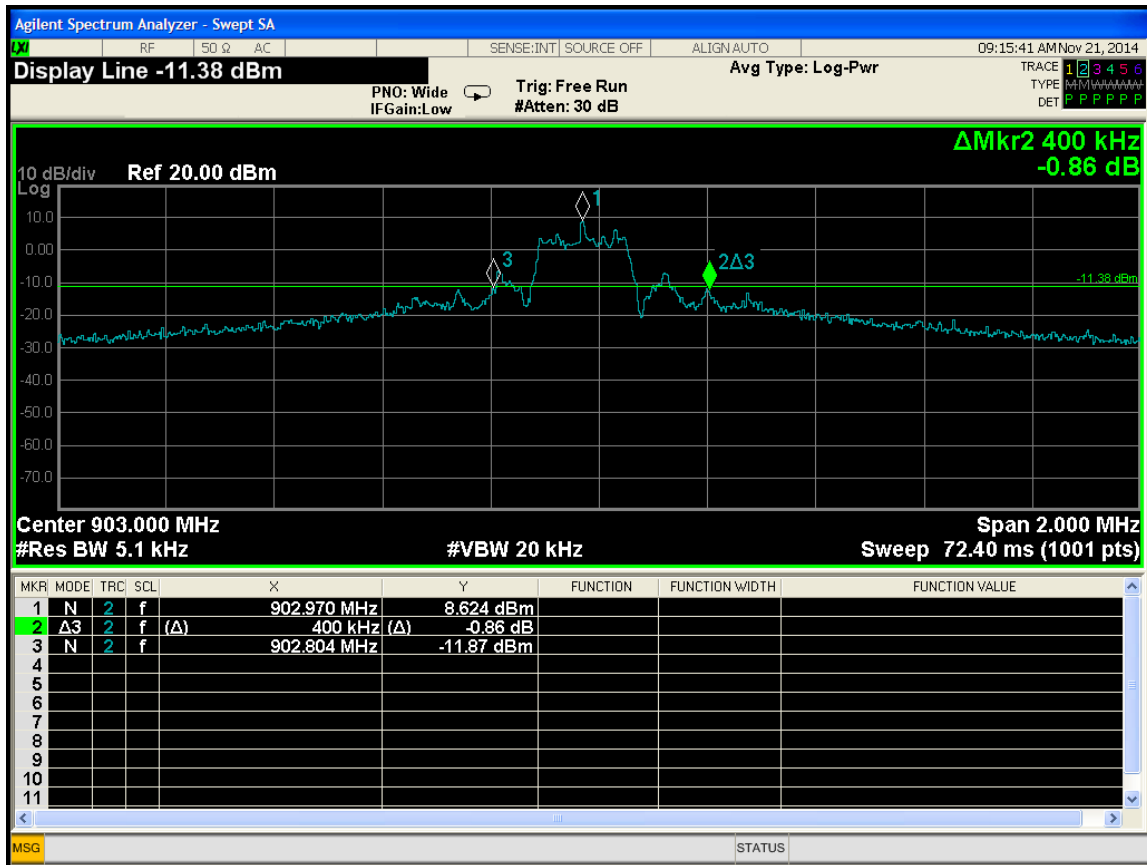


Date: 11/20/2014
Lab: B
Tested By: Kyle Fujimoto

[illegible]

-20 dB BANDWIDTH

DATA SHEETS



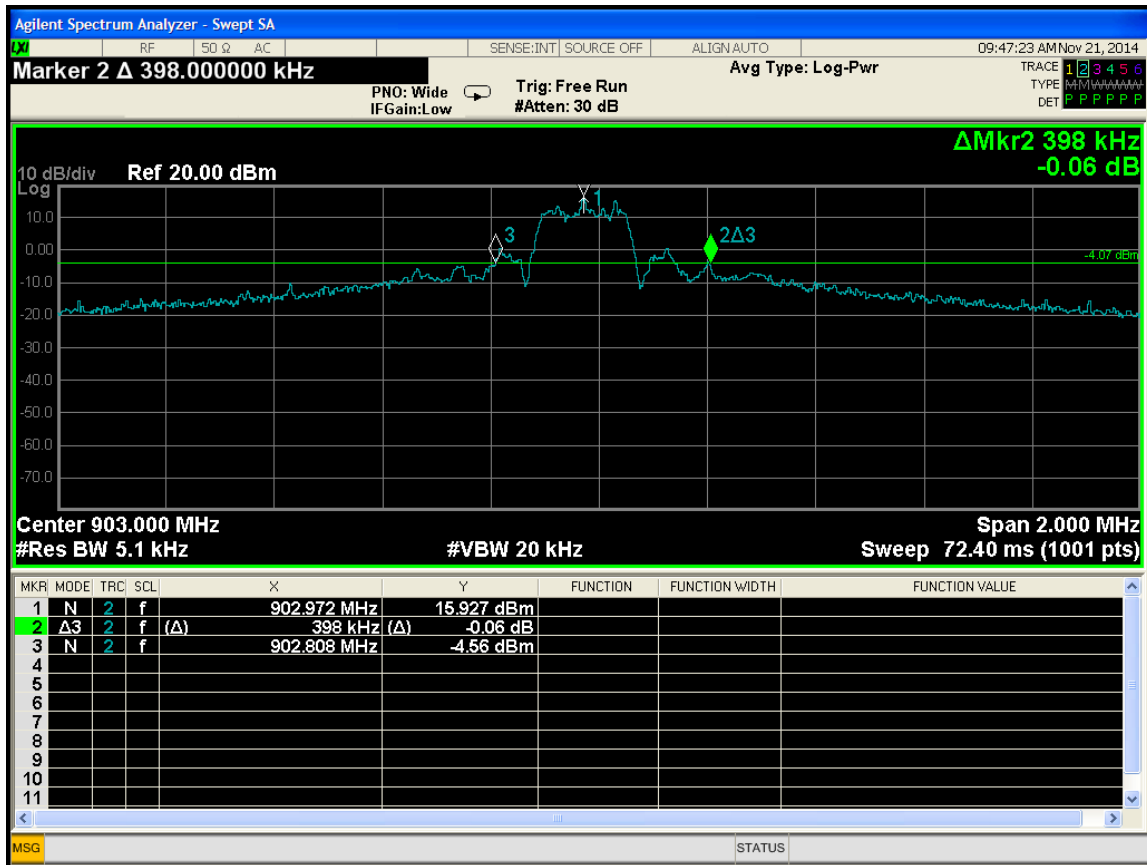
-20 dB Bandwidth Low Channel Battery Mode



-20 dB Bandwidth Mid Channel Battery Mode



-20 dB Bandwidth High Channel Battery Mode



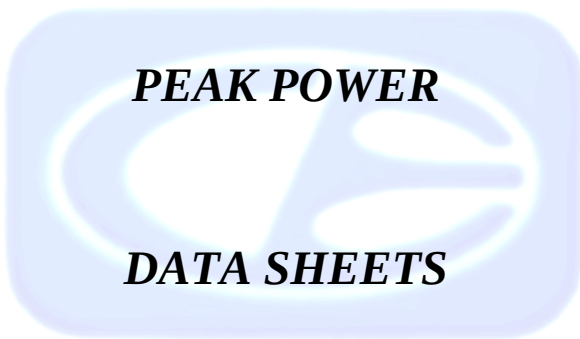
-20 dB Bandwidth Low Channel External AC Mode



-20 dB Bandwidth Mid Channel External AC Mode

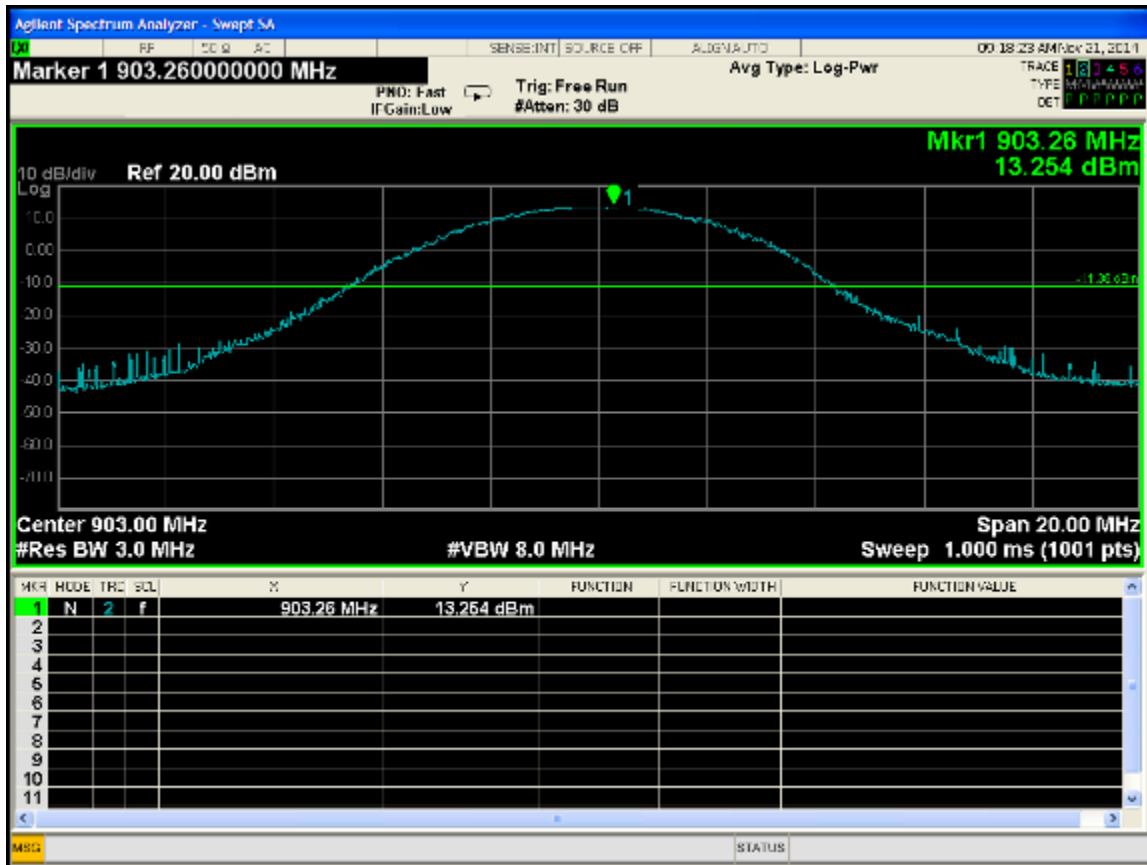


-20 dB Bandwidth High Channel External AC Mode

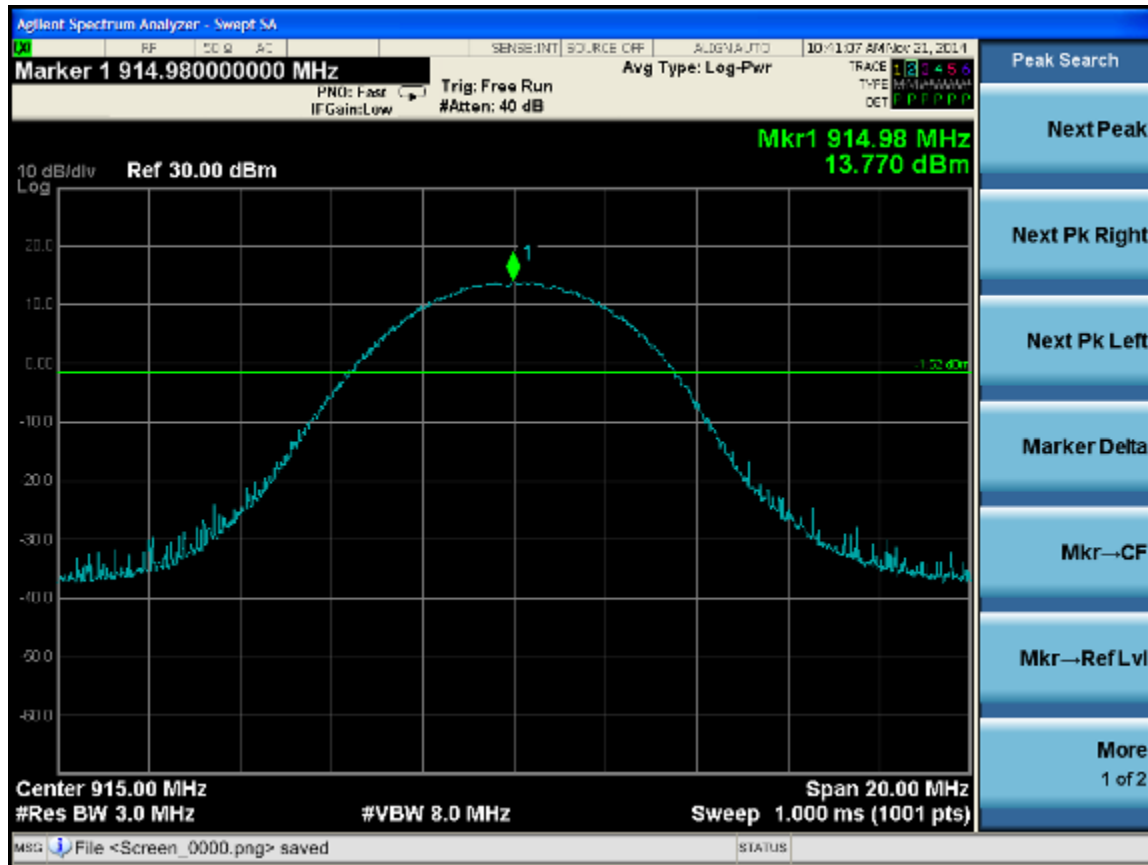


PEAK POWER

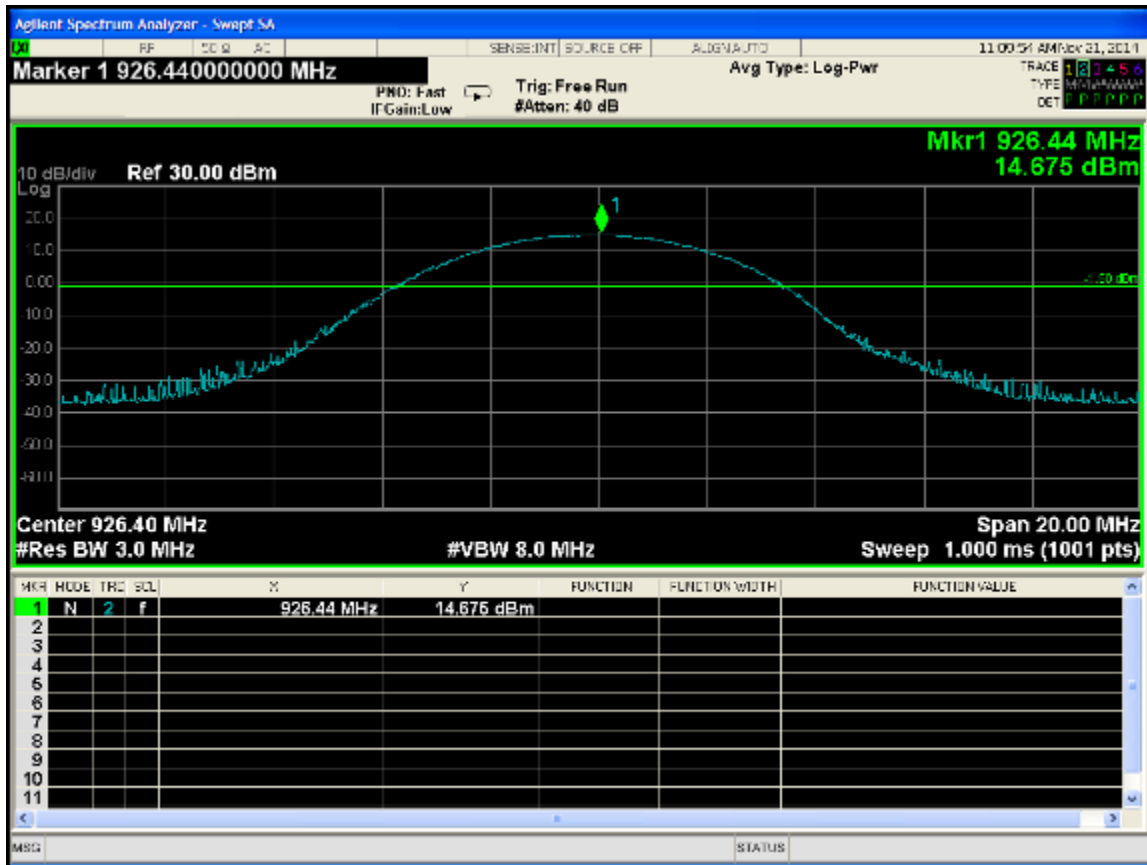
DATA SHEETS



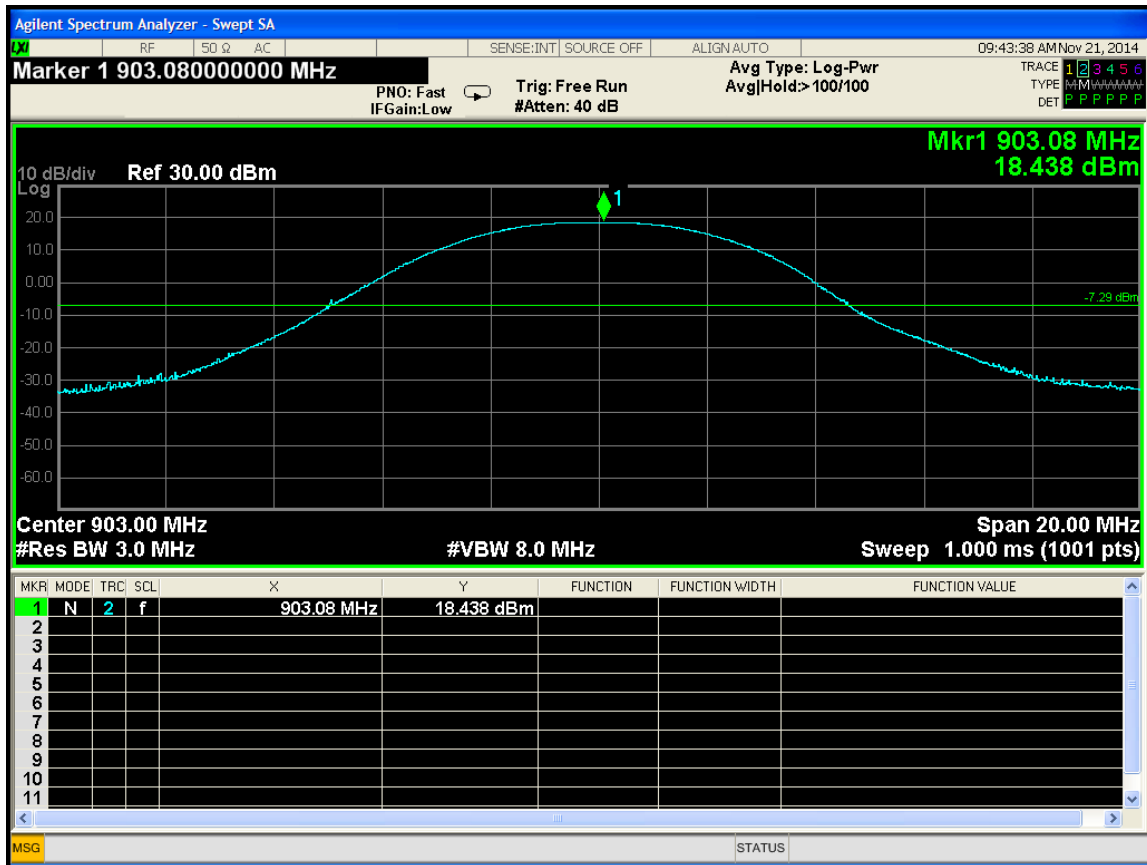
Peak Power Output Low Channel Battery Mode



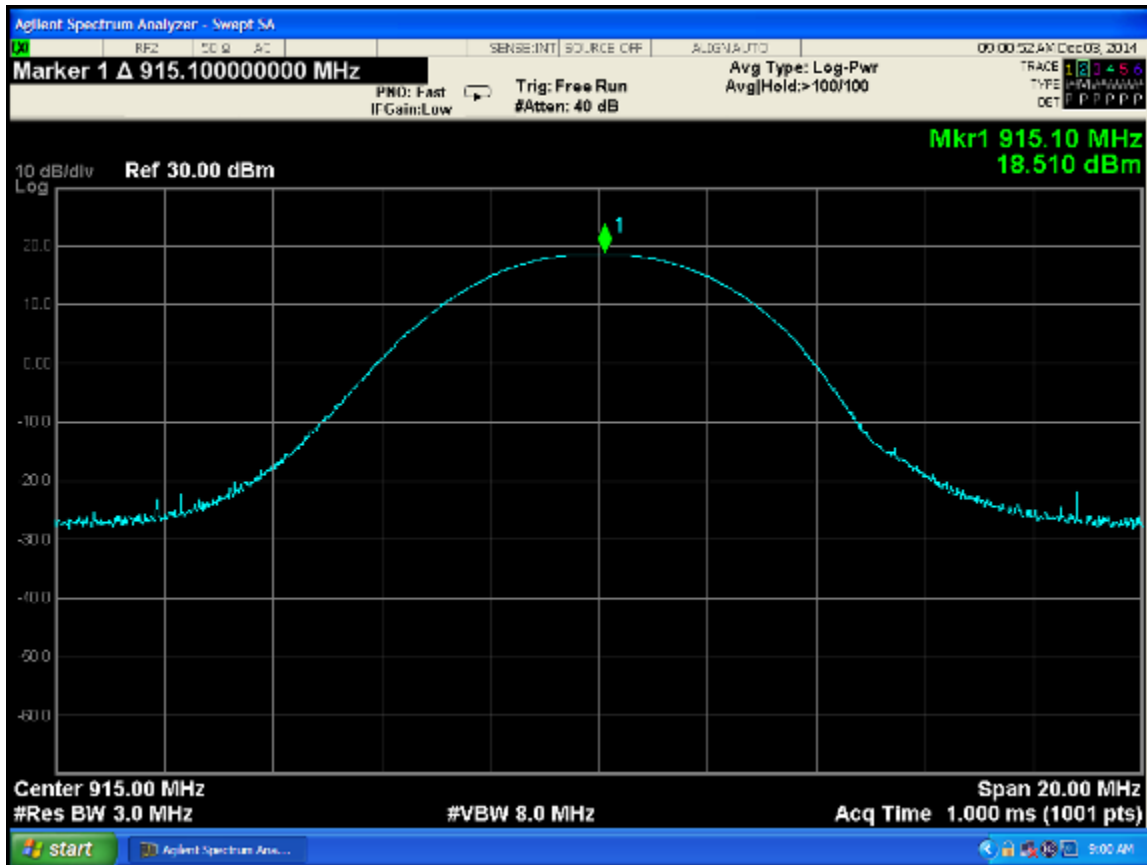
Peak Power Output Mid Channel Battery Mode



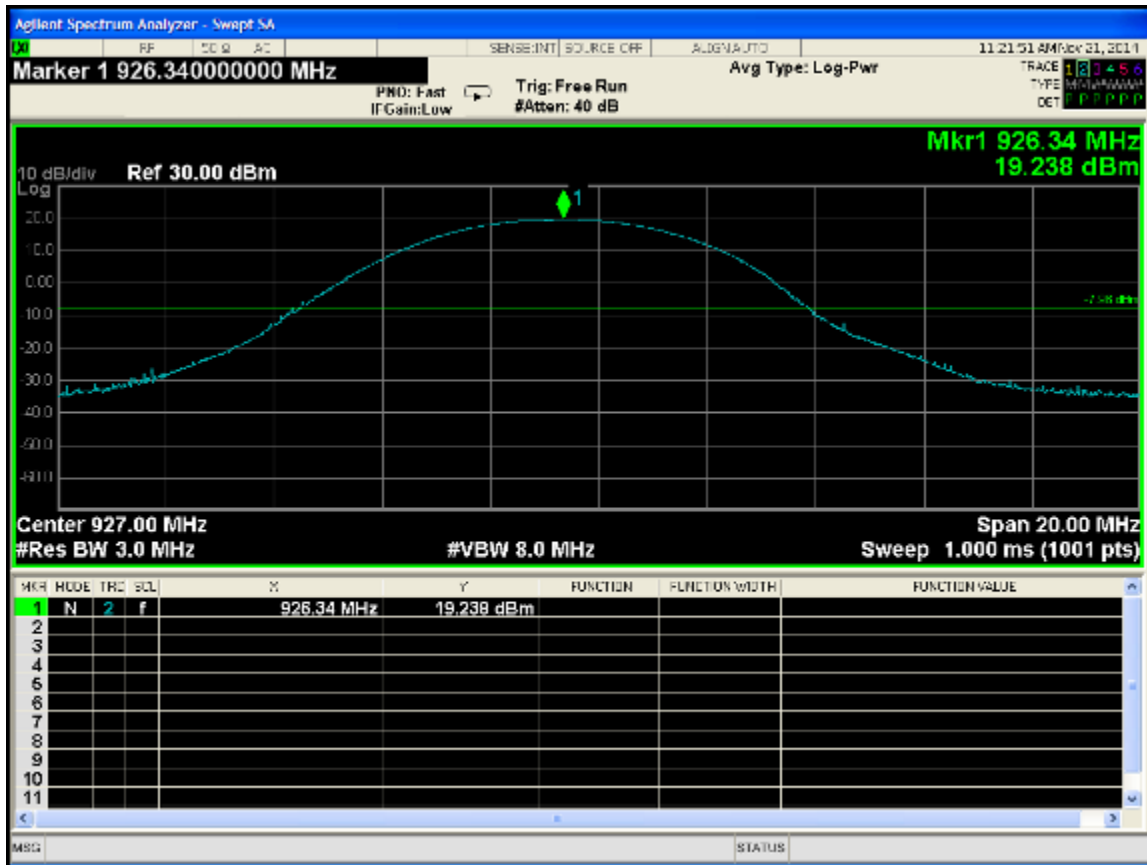
Peak Power Output High Channel Battery Mode



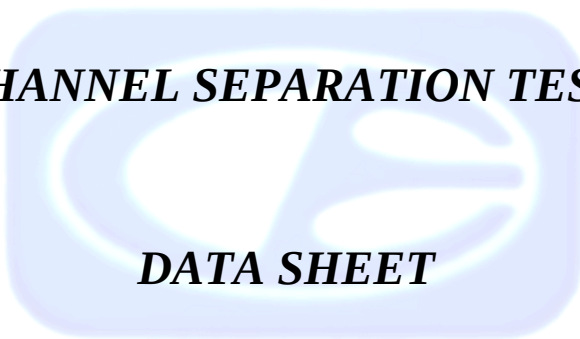
Peak Power Output Low Channel External AC Mode



Peak Power Output Mid Channel External AC Mode



Peak Power Output High Channel External AC Mode



CHANNEL SEPARATION TEST

DATA SHEET



Channel Separation Test

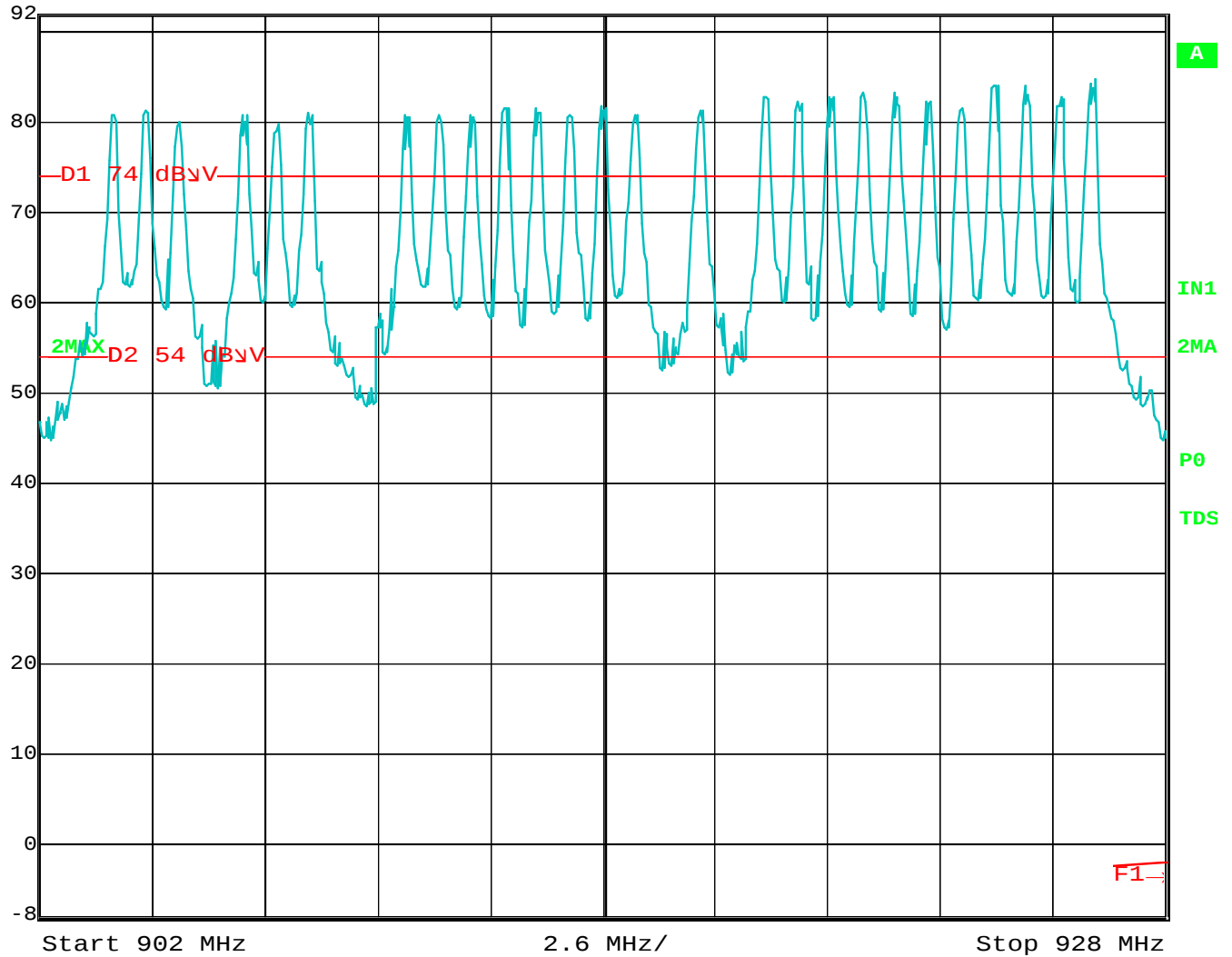
NUMBER OF FREQUENCIES

DATA SHEETS



Ref Lvl
92 dBμV

RBW 100 kHz RF Att 0 dB
VBW 300 kHz
SWT 6.5 ms Unit dBμV

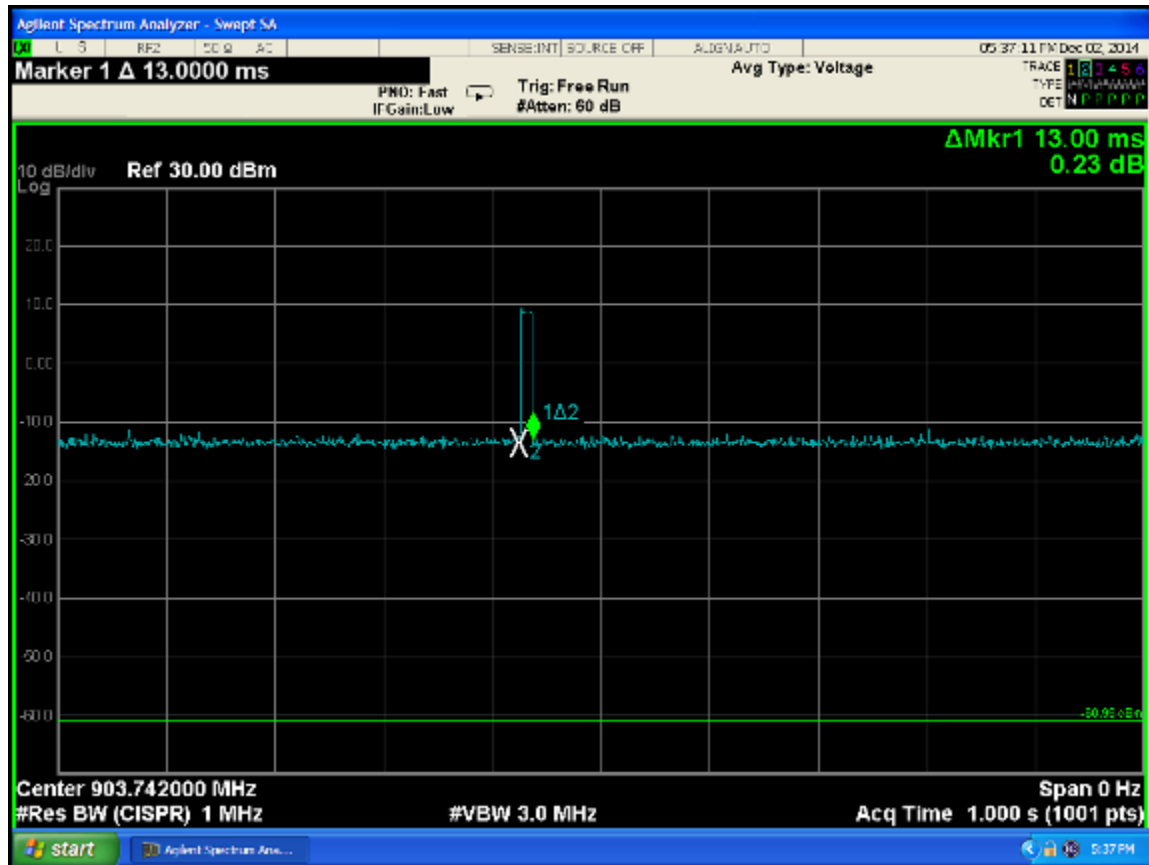


Date: 17.FEB.2015 13:30:14

Number of Hopping Frequencies is 26

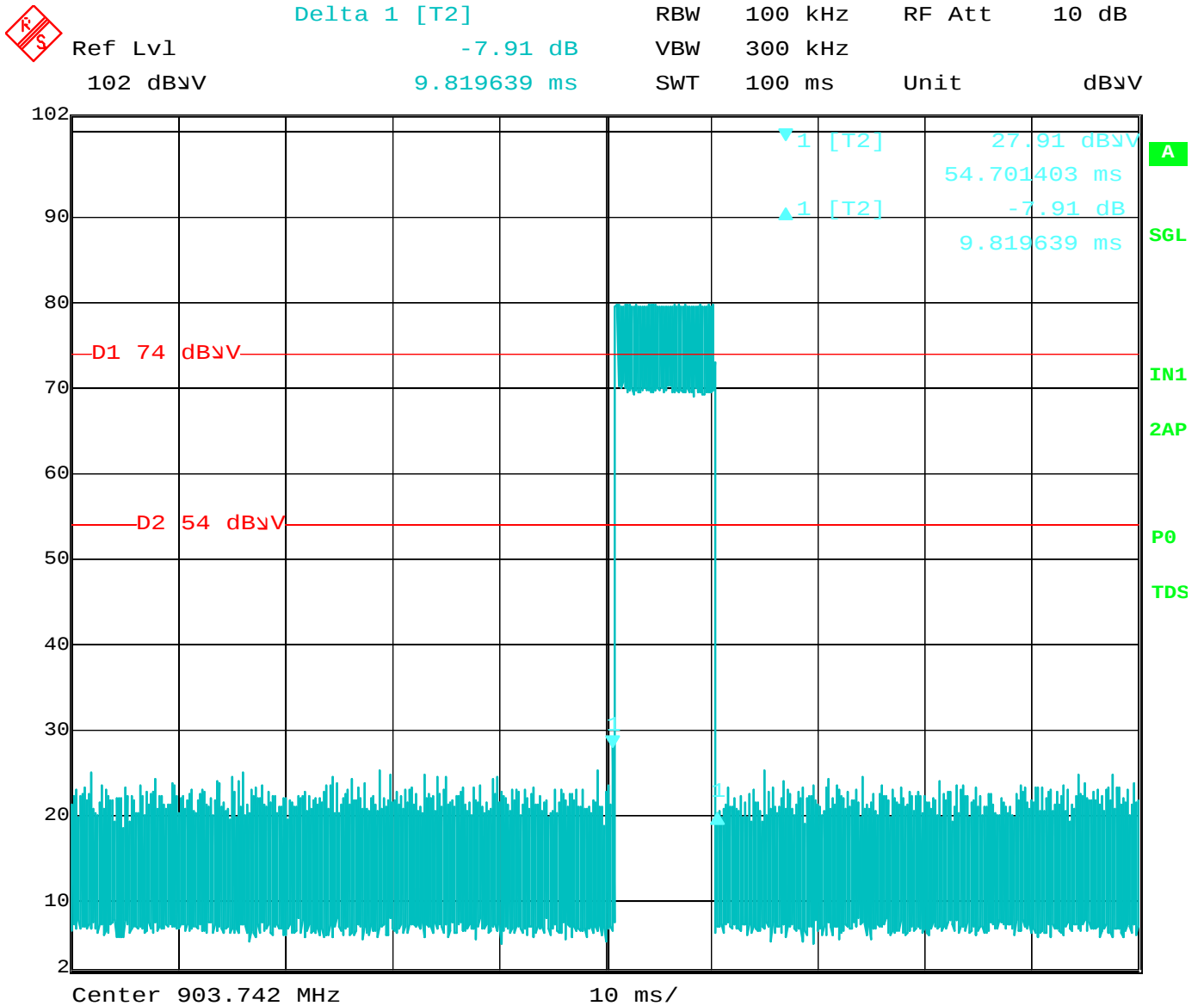
TIME OF OCCUPANCY

DATA SHEETS



Number of Pulses over 1 Second

Number of Pulses over 10 Seconds is 10.

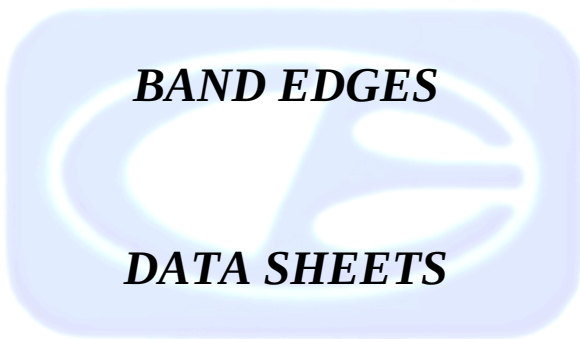


Date: 17.FEB.2015 14:18:59

Time of One Pulse

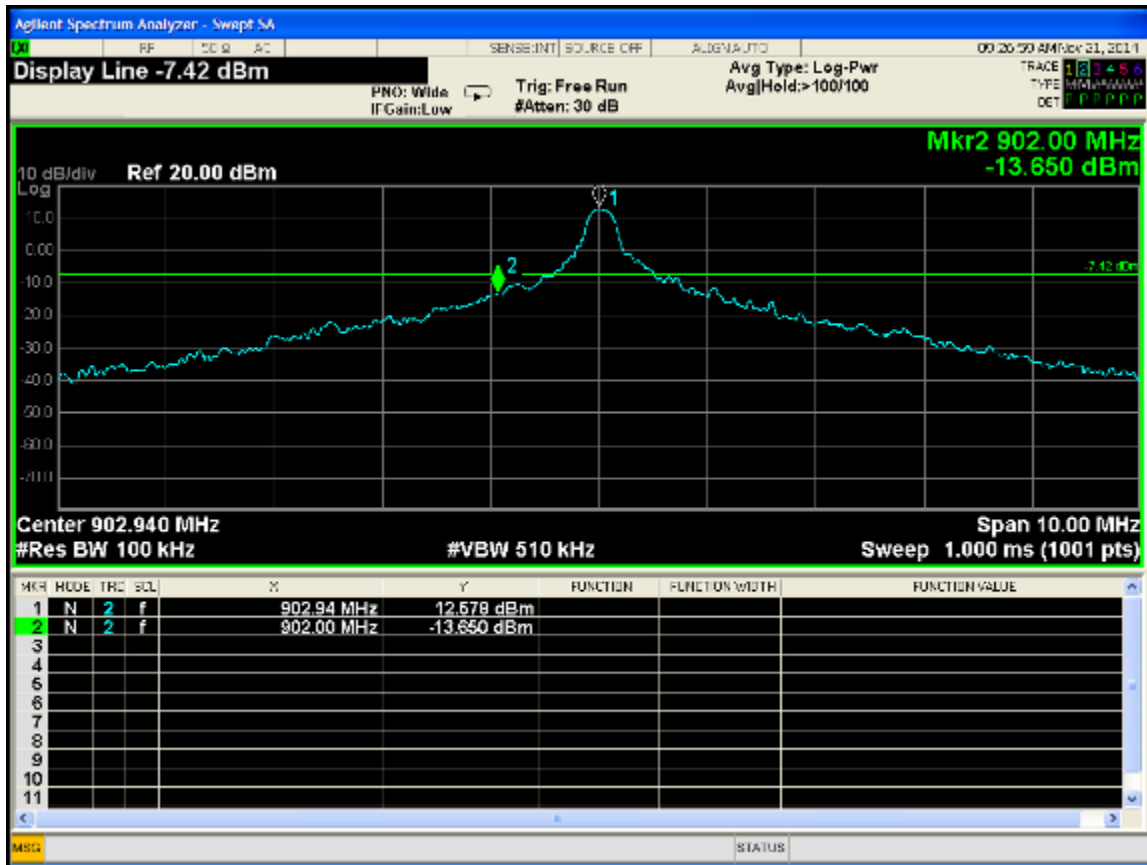
Time of Occupancy = 9.819639 ms*10 = 98.19639 ms

Limit = 400 ms

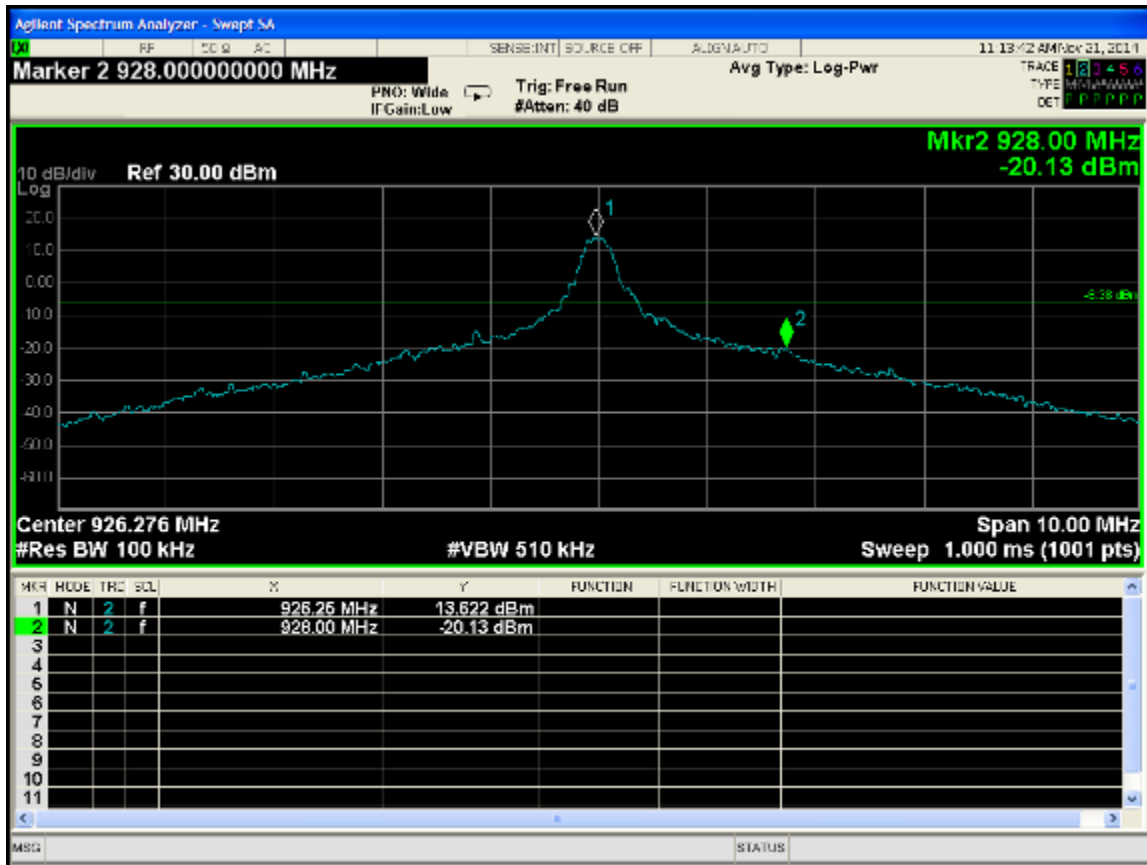


BAND EDGES

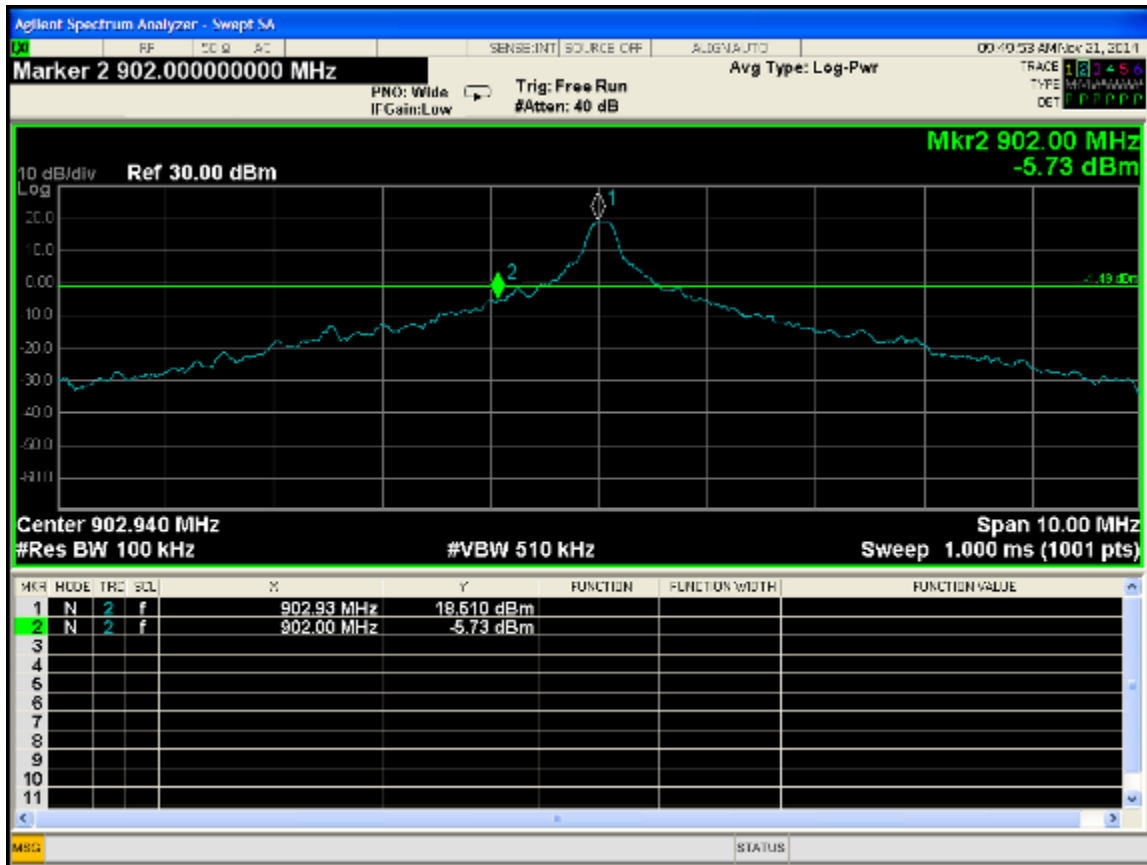
DATA SHEETS



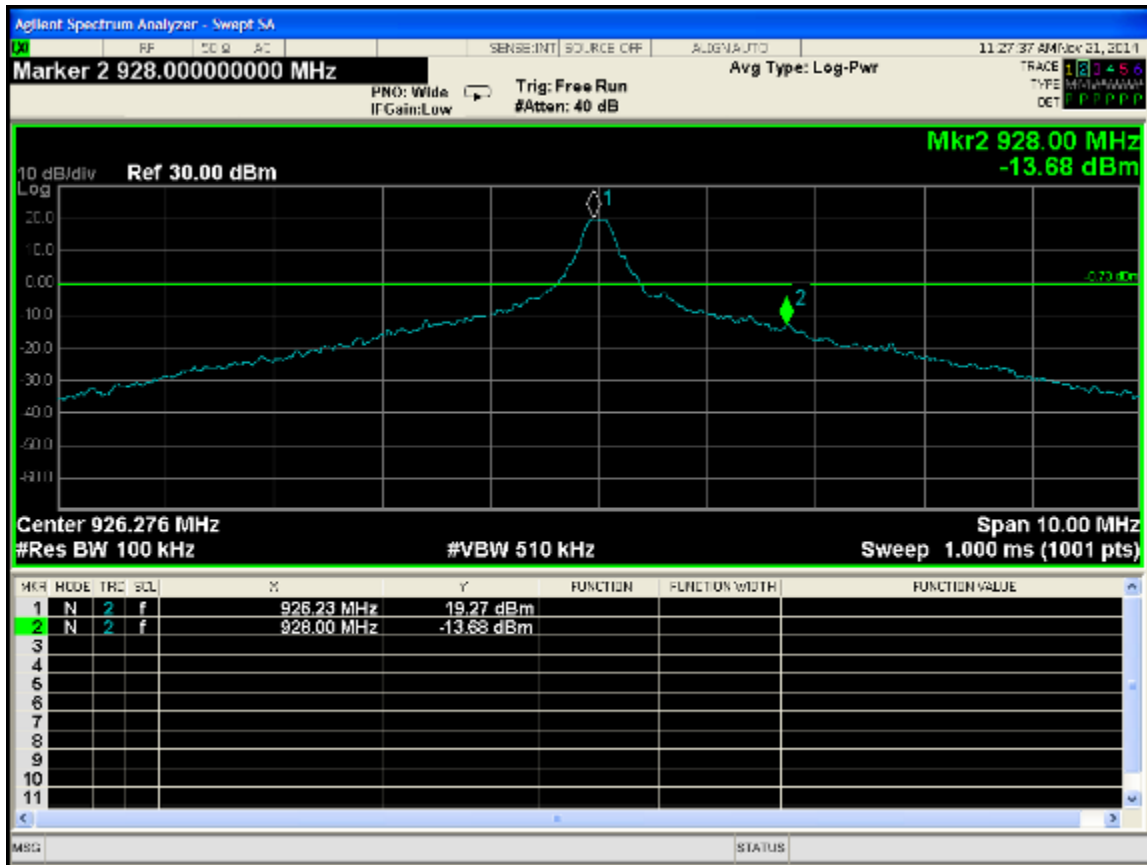
Band Edges Low Channel Battery Mode



Band Edges High Channel Battery Mode



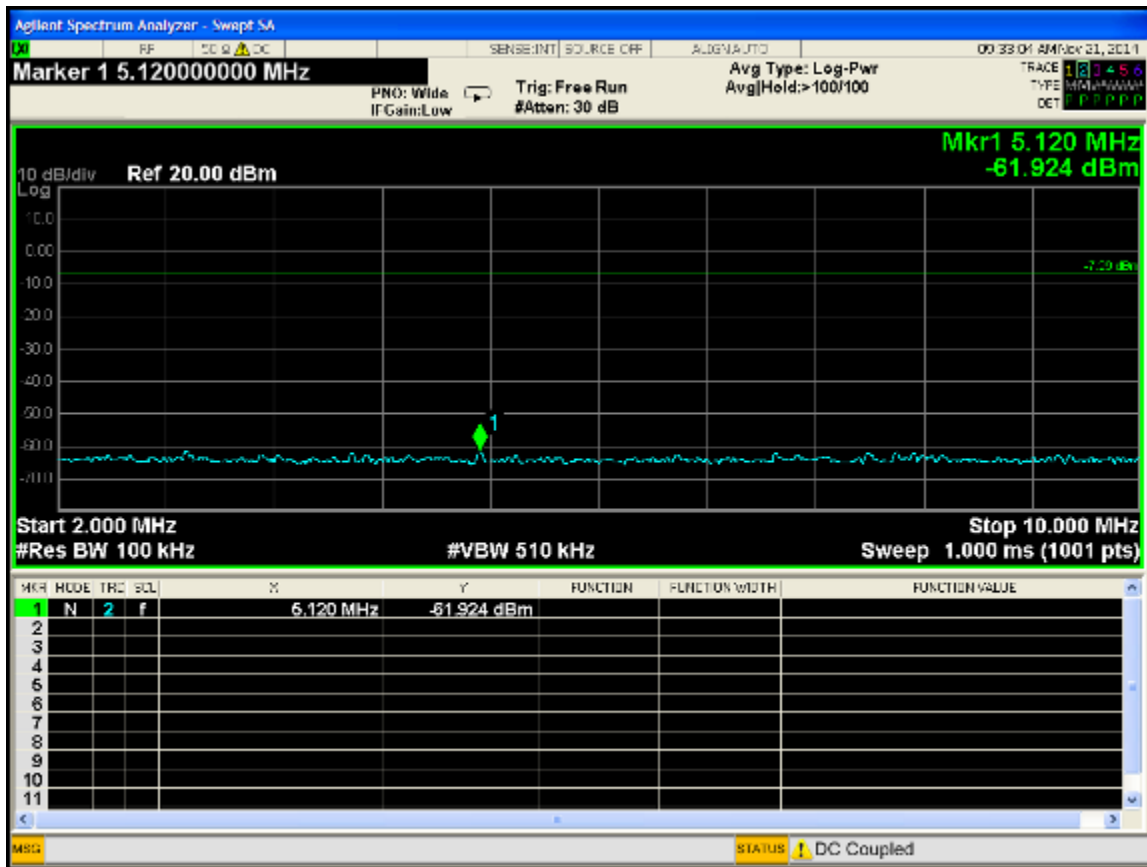
Band Edges Low Channel External AC Mode



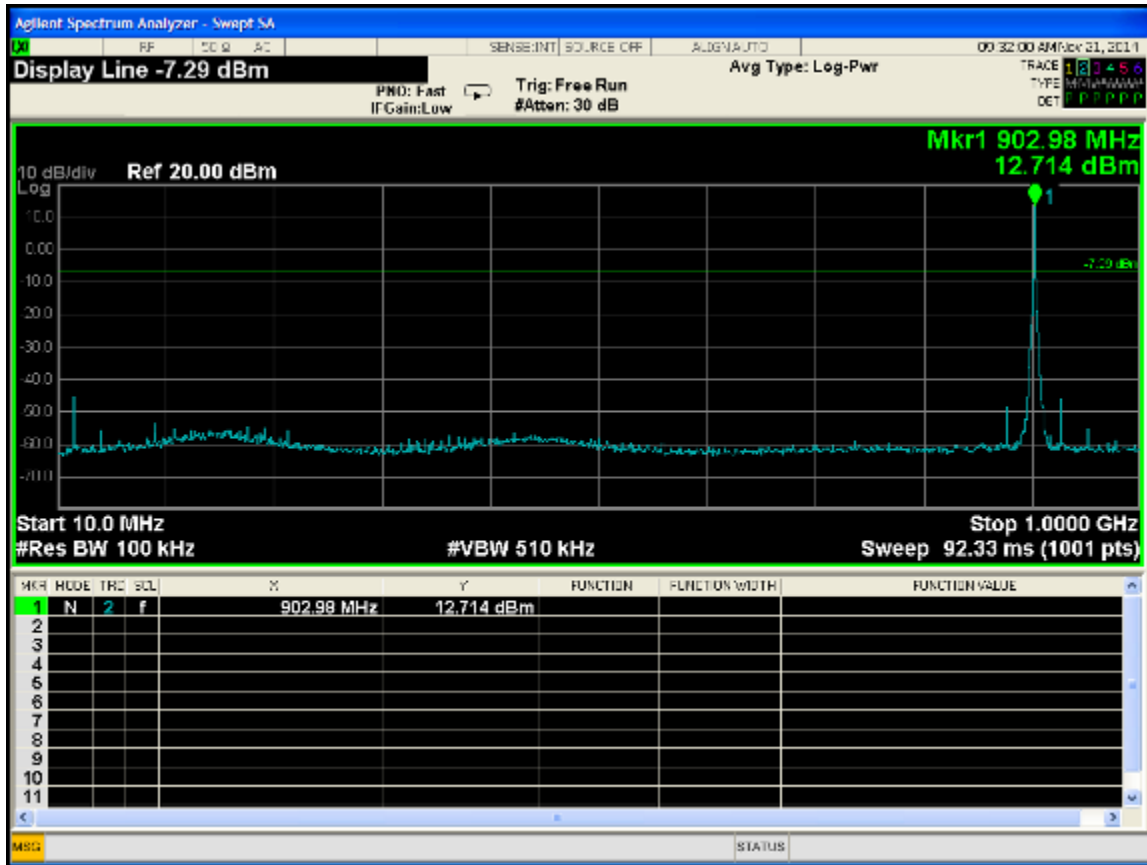
Band Edges High Channel External AC Mode

RF ANTENNA CONDUCTED

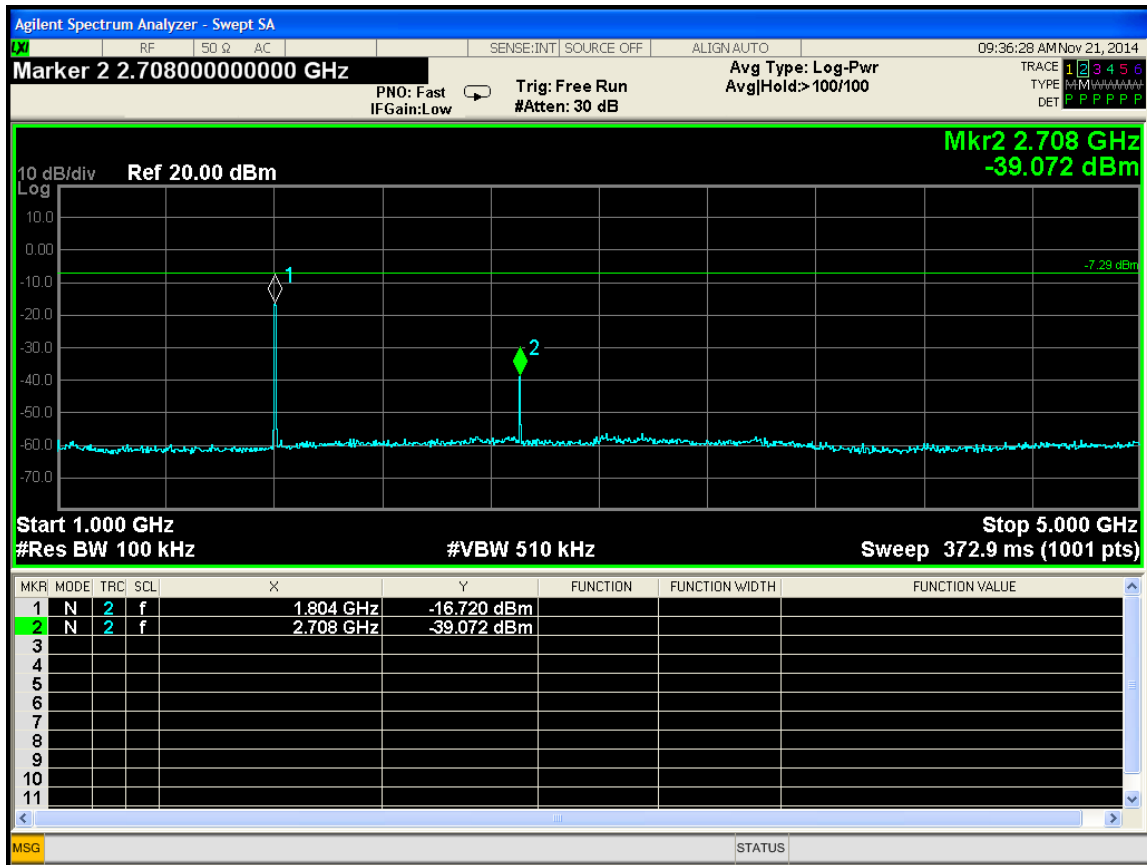
DATA SHEETS



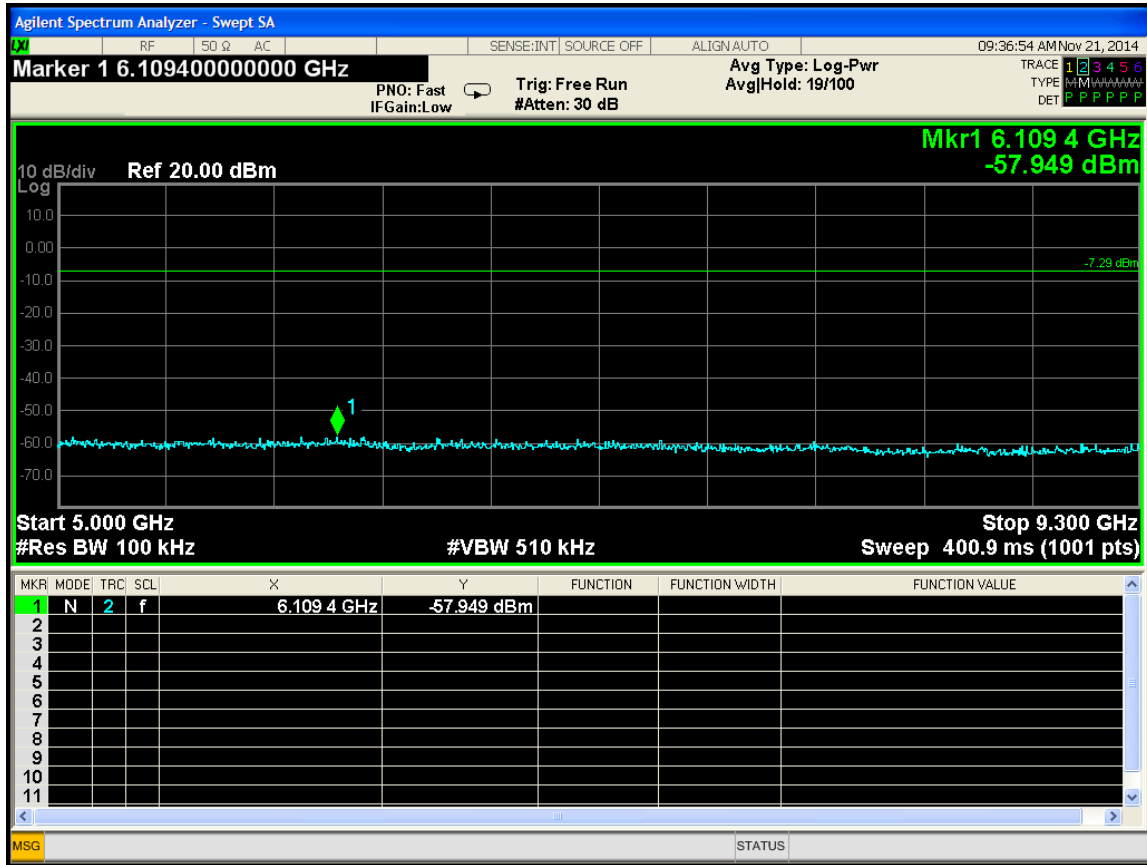
RF Antenna Conducted 2 MHz to 10 MHz Low Channel Battery Mode



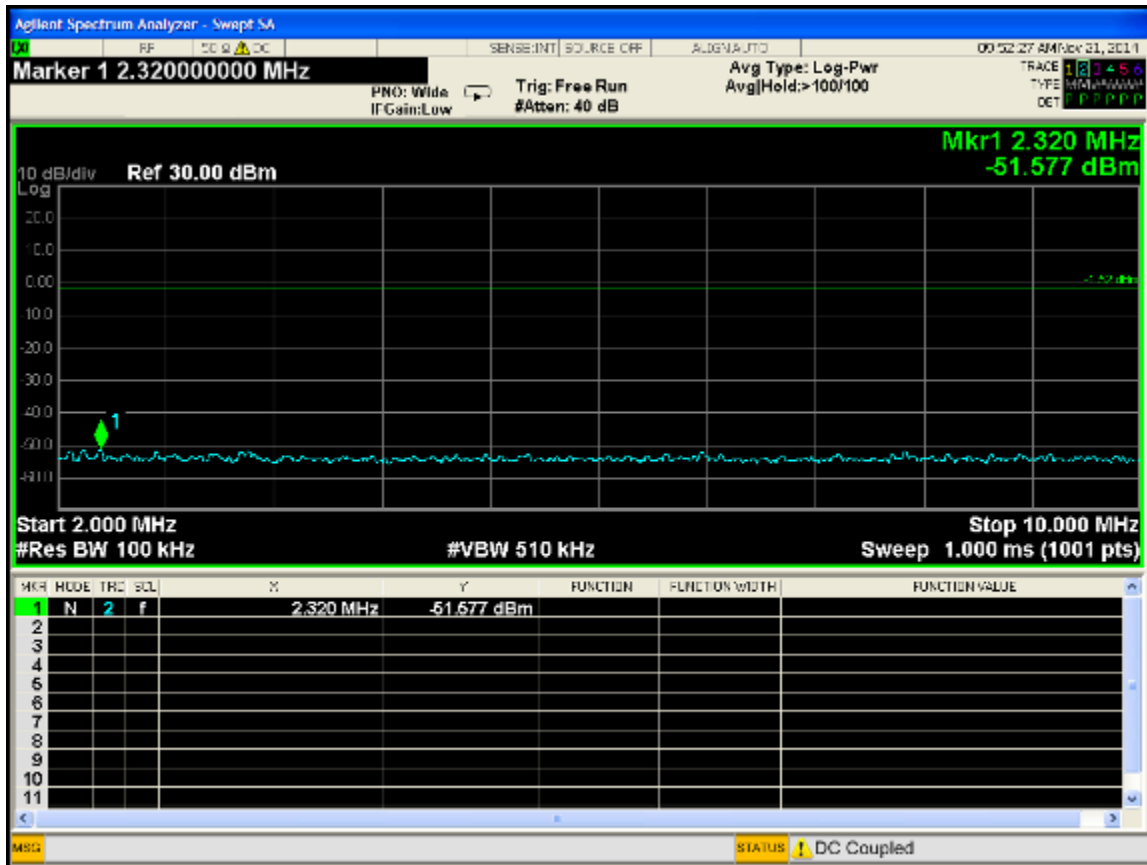
RF Antenna Conducted 10 MHz to 1 GHz Low Channel Battery Mode



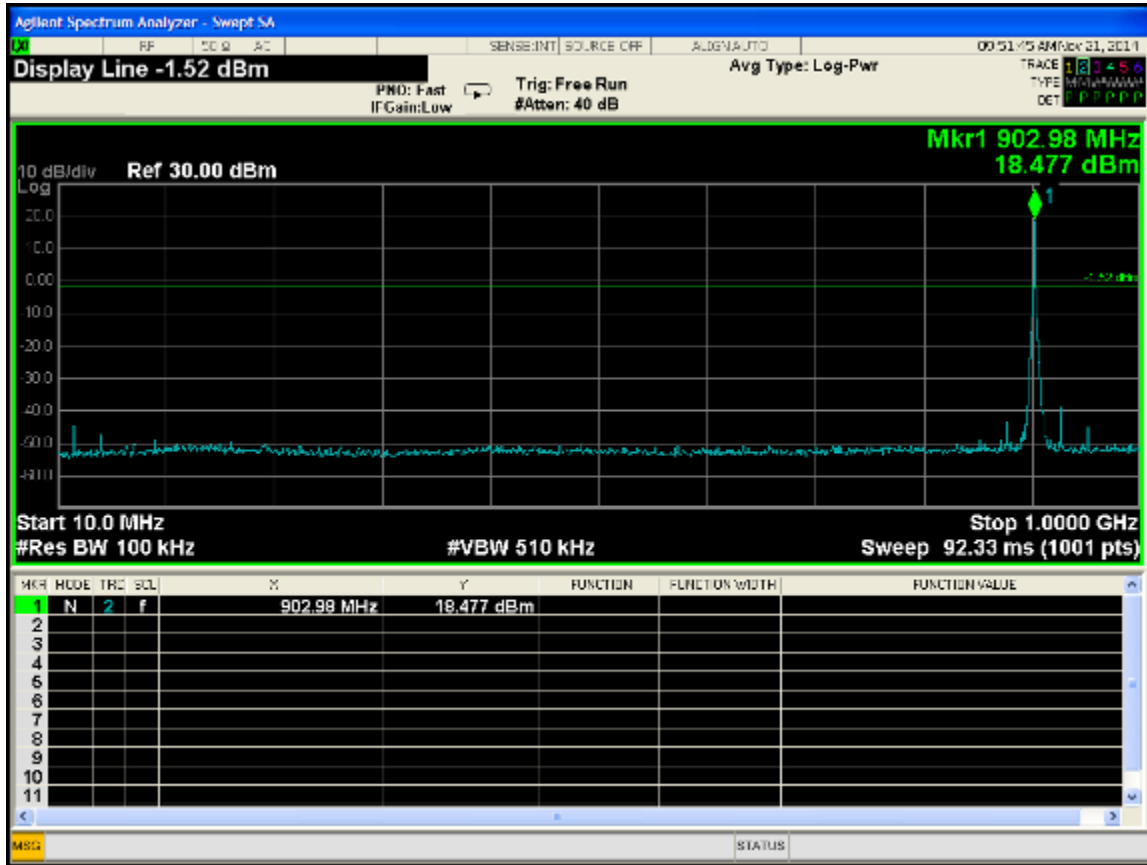
RF Antenna Conducted 1 GHz to 5 GHz Low Channel Battery Mode



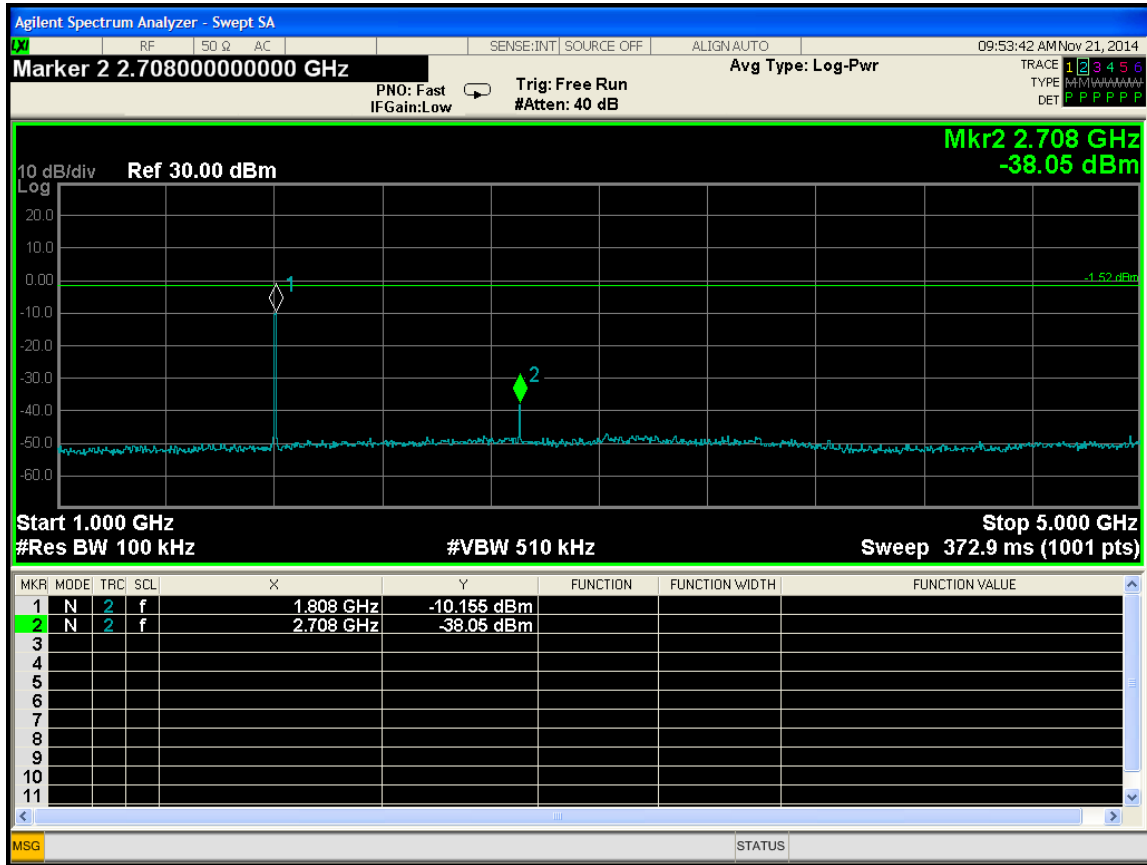
RF Antenna Conducted 5 GHz to 9.3 GHz Low Channel Battery Mode



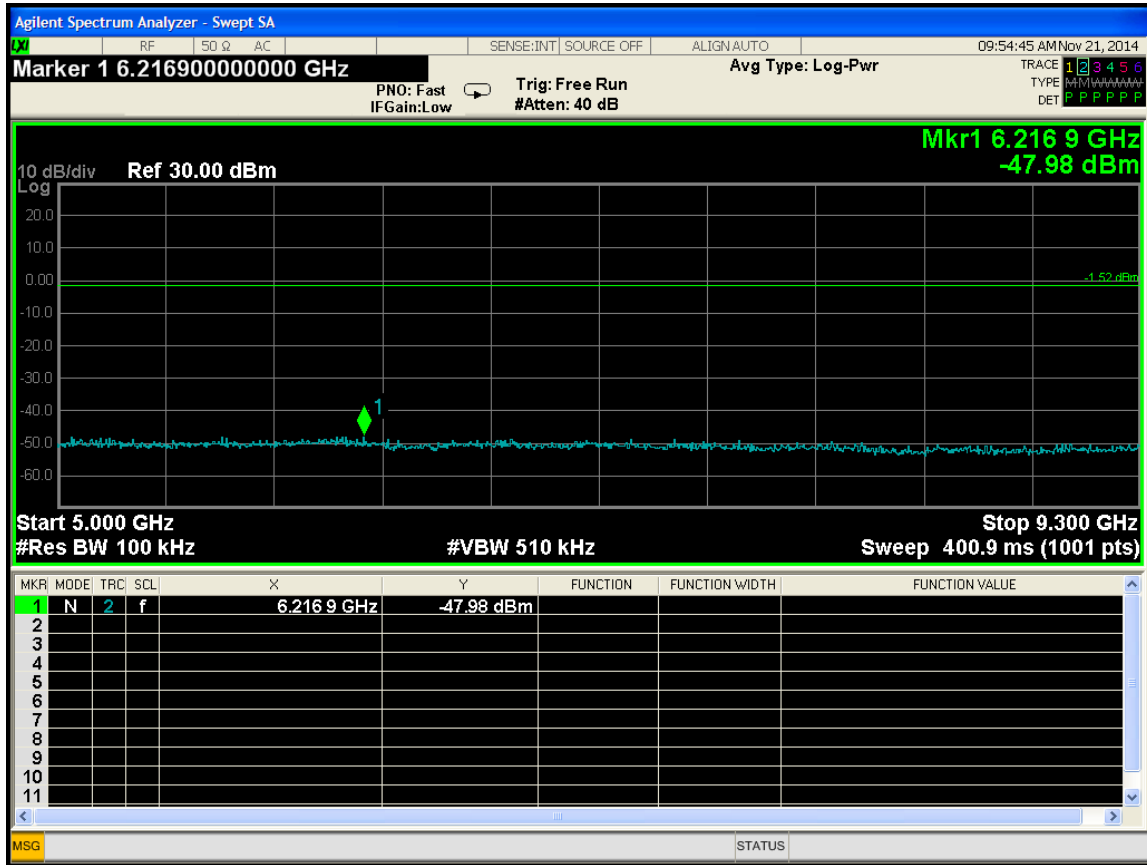
RF Antenna Conducted 2 MHz to 10 MHz Low Channel External AC Mode



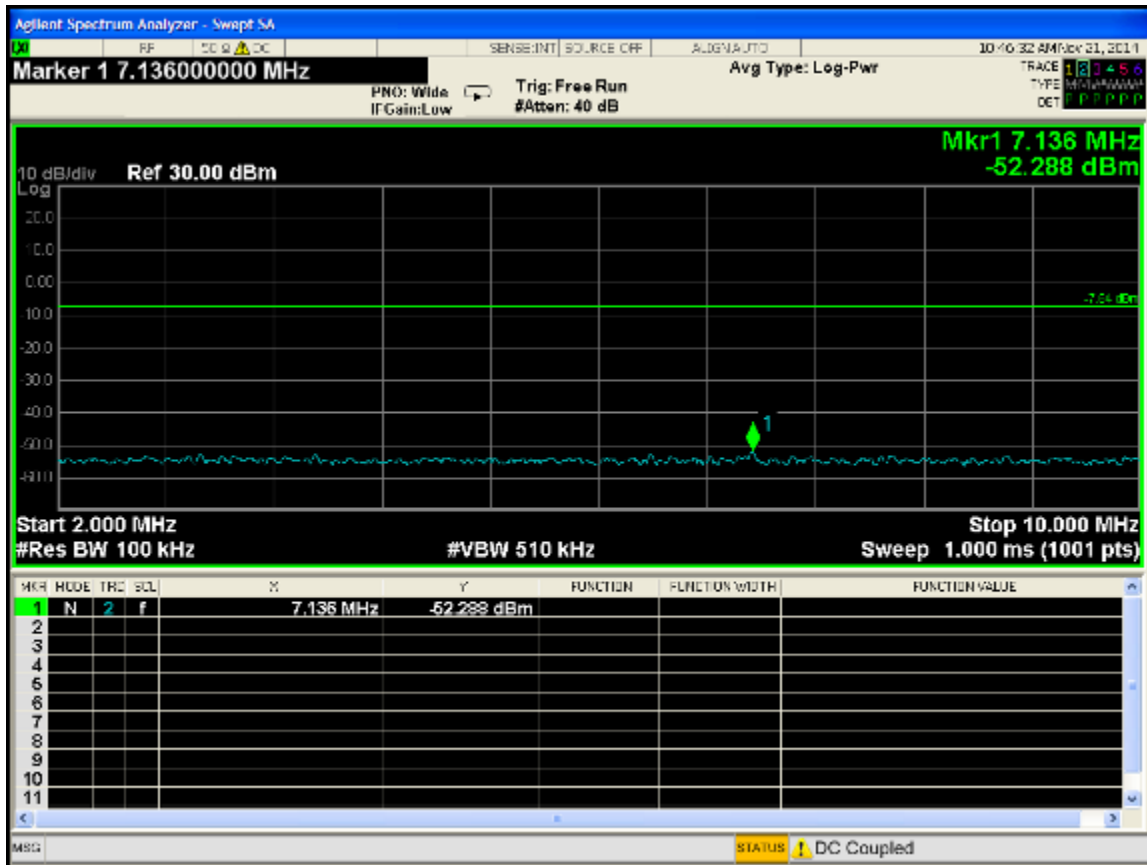
RF Antenna Conducted 10 MHz to 1 GHz Low Channel External AC Mode



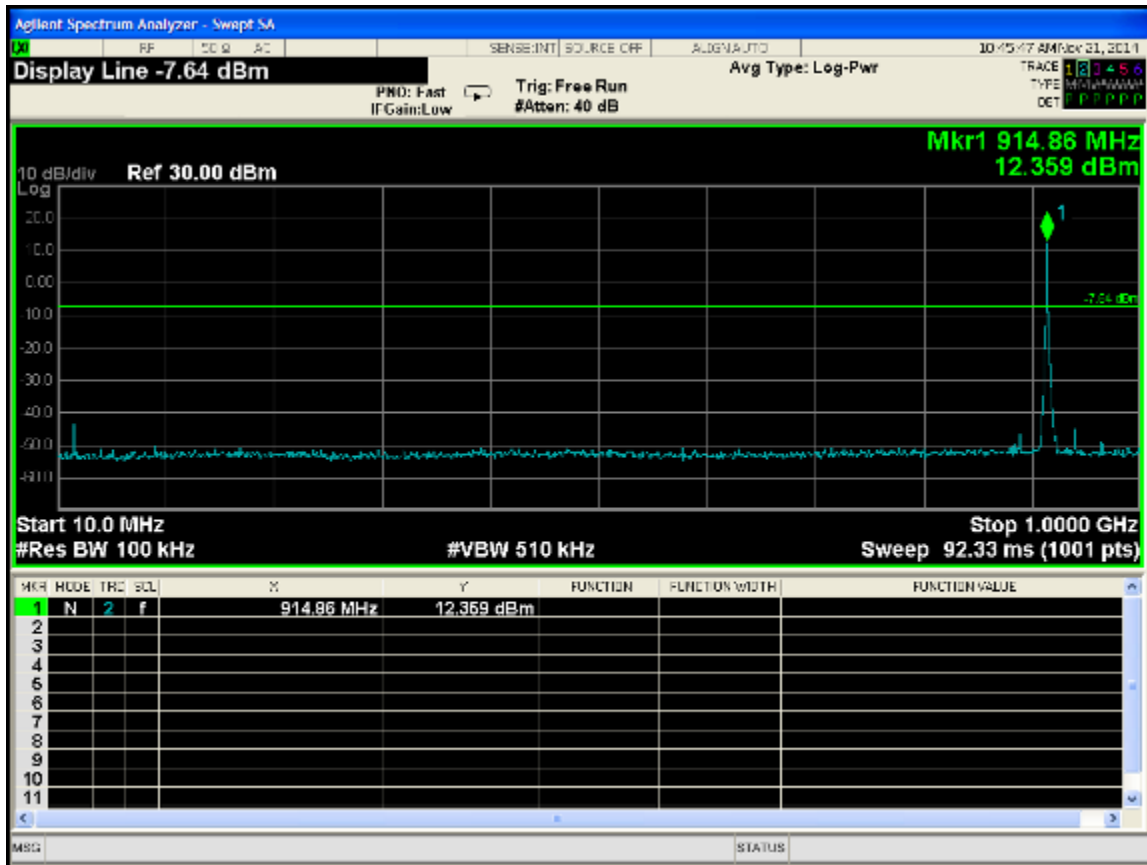
RF Antenna Conducted 1 GHz to 5 GHz Low Channel External AC Mode



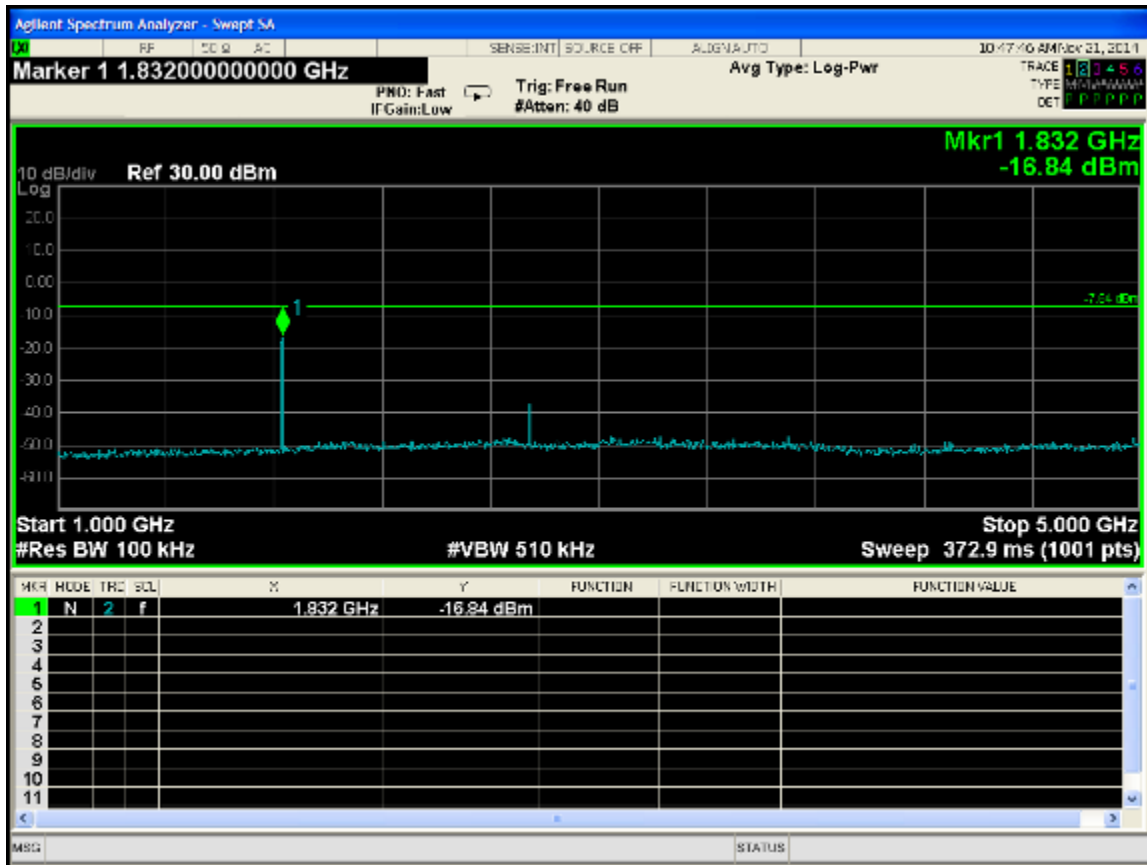
RF Antenna Conducted 5 GHz to 9.3 GHz Low Channel External AC Mode



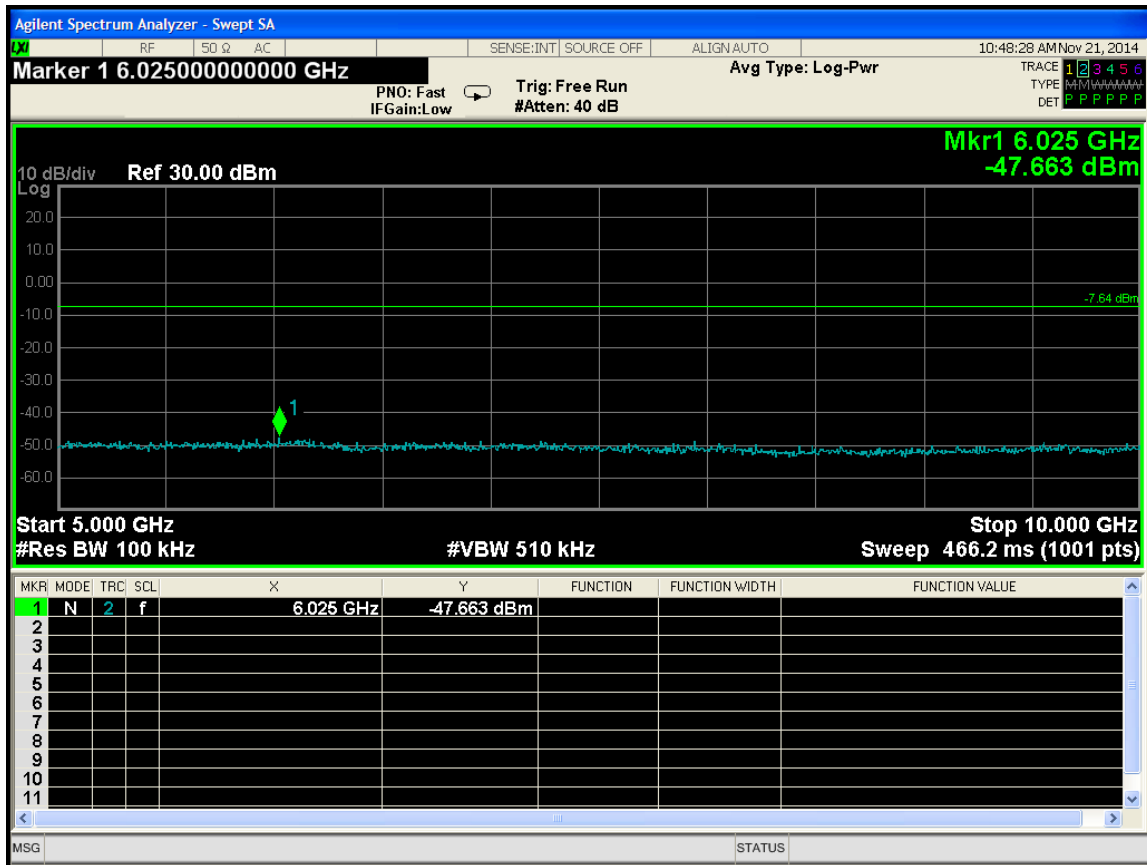
RF Antenna Conducted 2 MHz to 10 MHz Mid Channel Battery Mode



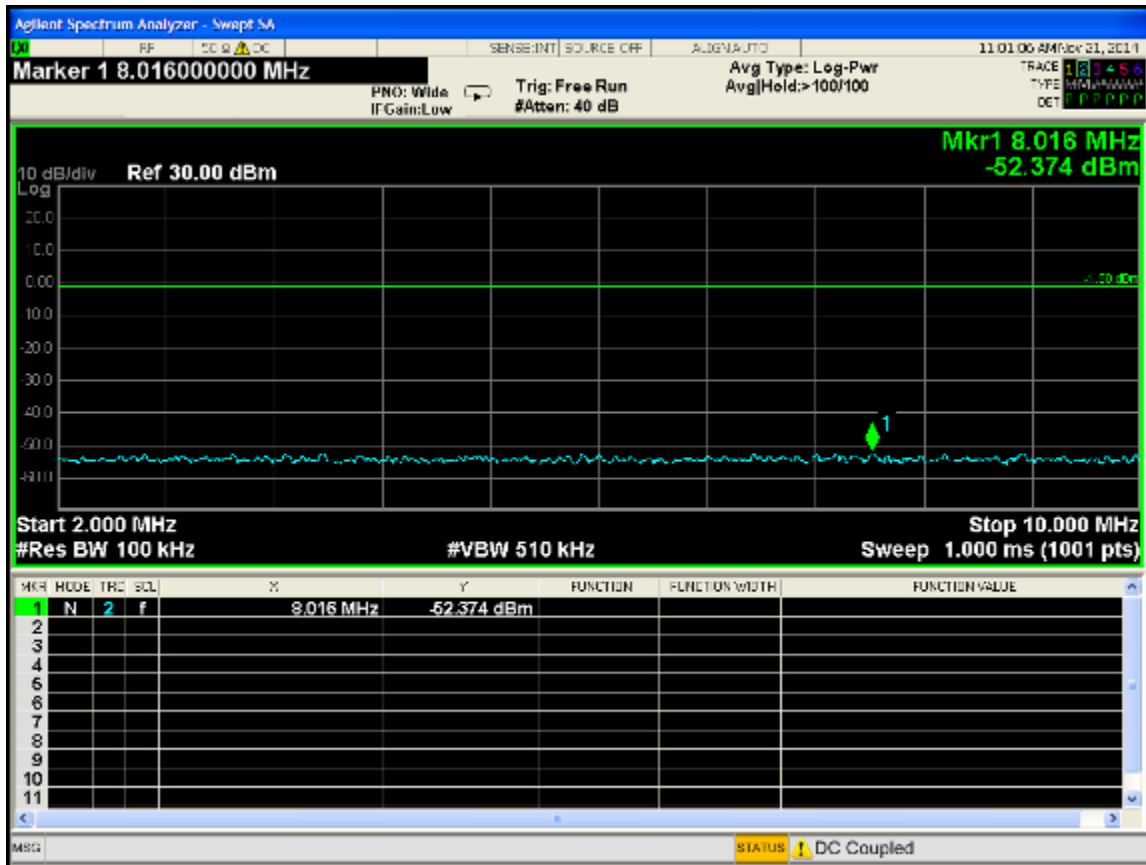
RF Antenna Conducted 10 MHz to 1 GHz Mid Channel Battery Mode



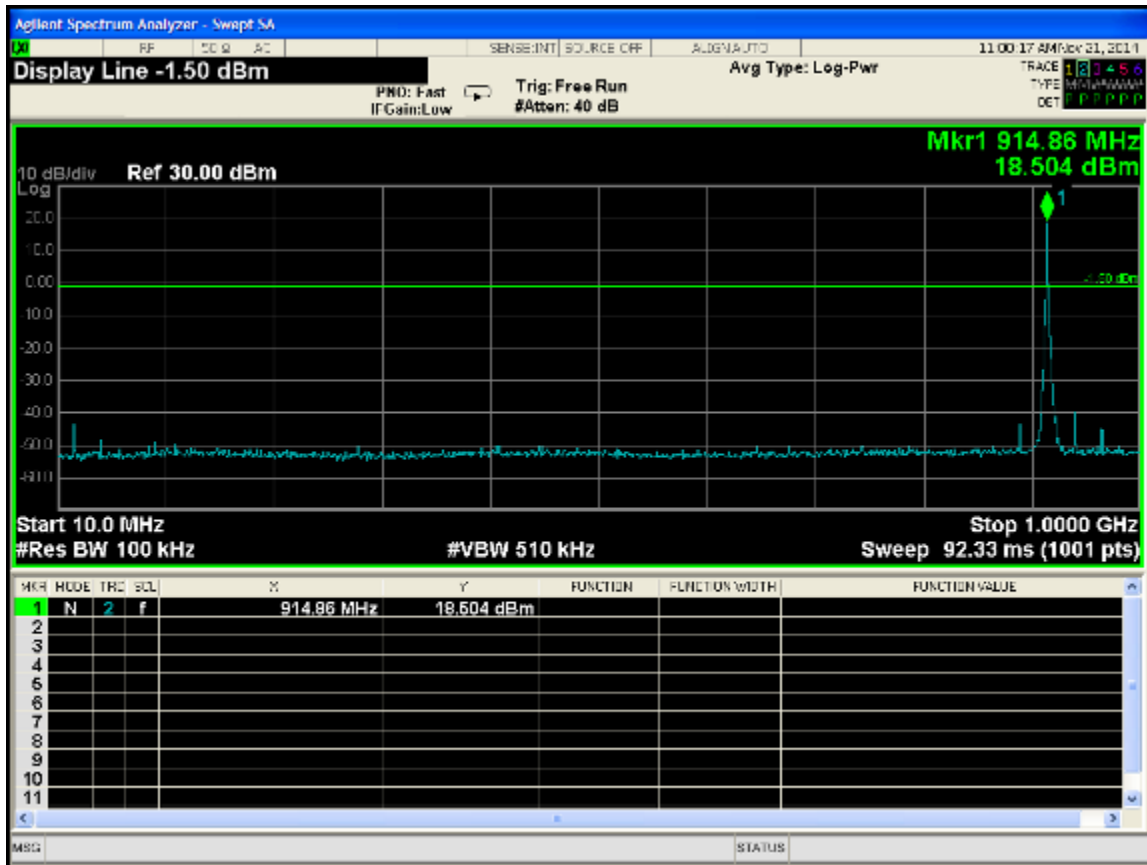
RF Antenna Conducted 1 GHz to 5 GHz Mid Channel Battery Mode



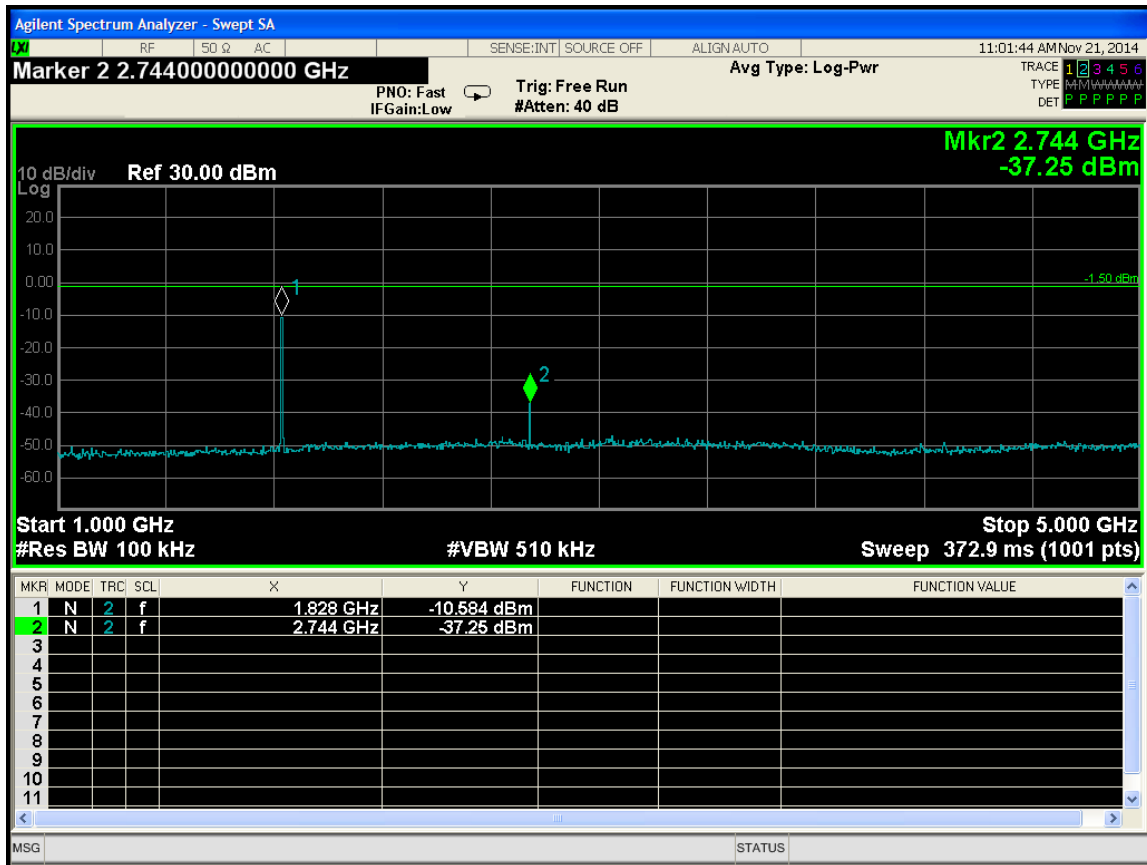
RF Antenna Conducted 5 GHz to 10 GHz Mid Channel Battery Mode



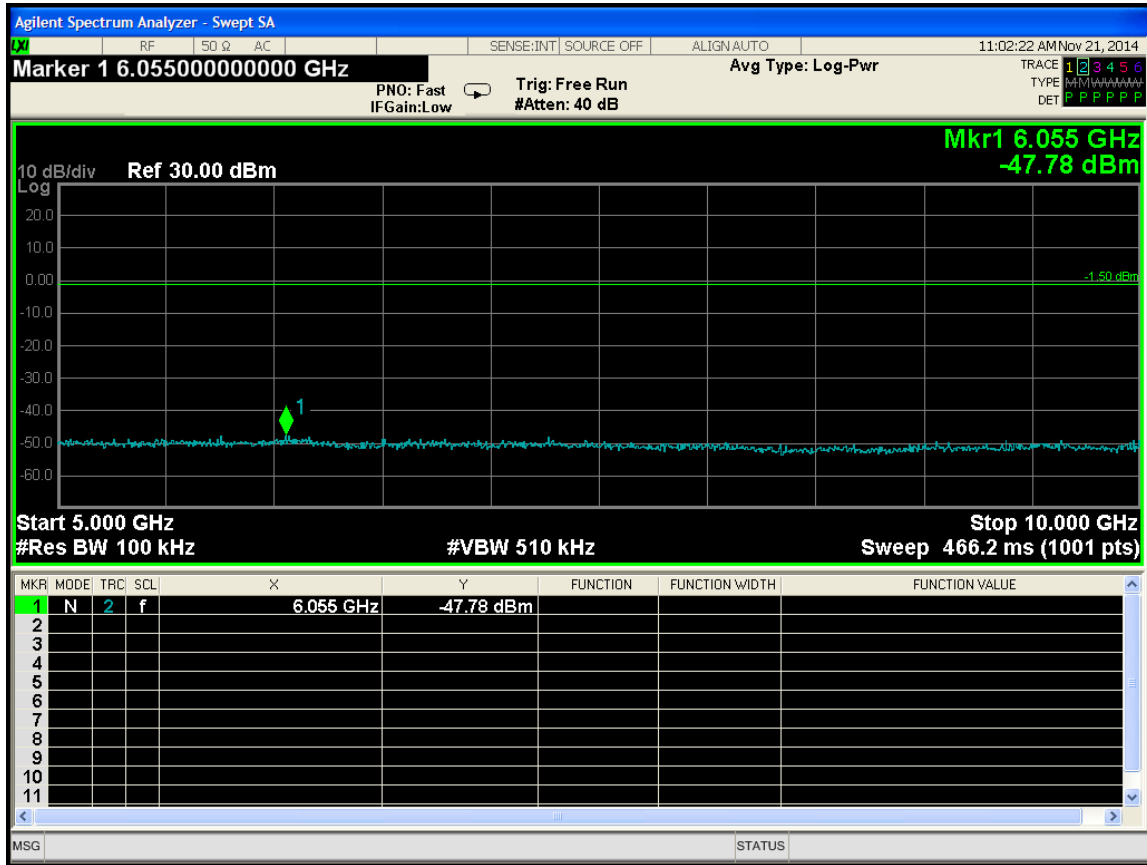
RF Antenna Conducted 2 MHz to 10 MHz Mid Channel External AC Mode



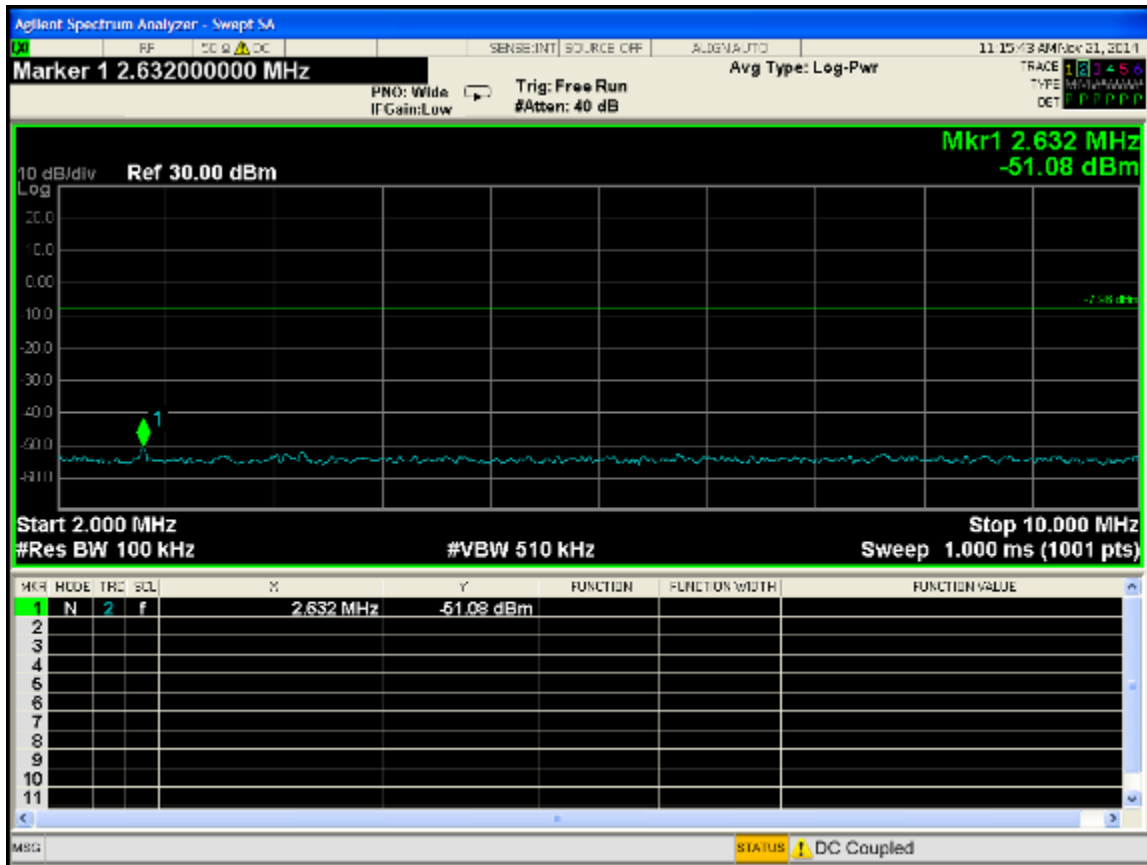
RF Antenna Conducted 10 MHz to 1 GHz Mid Channel External AC Mode



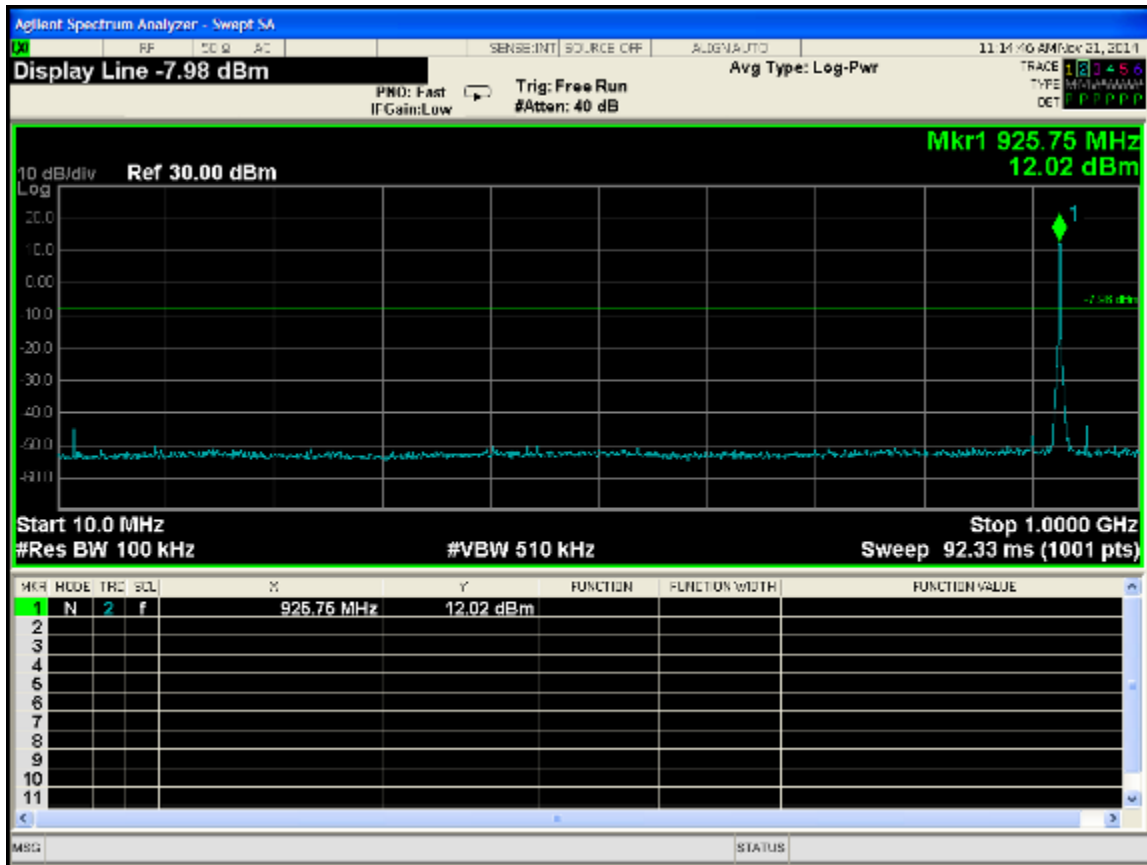
RF Antenna Conducted 1 GHz to 5 GHz Mid Channel External AC Mode



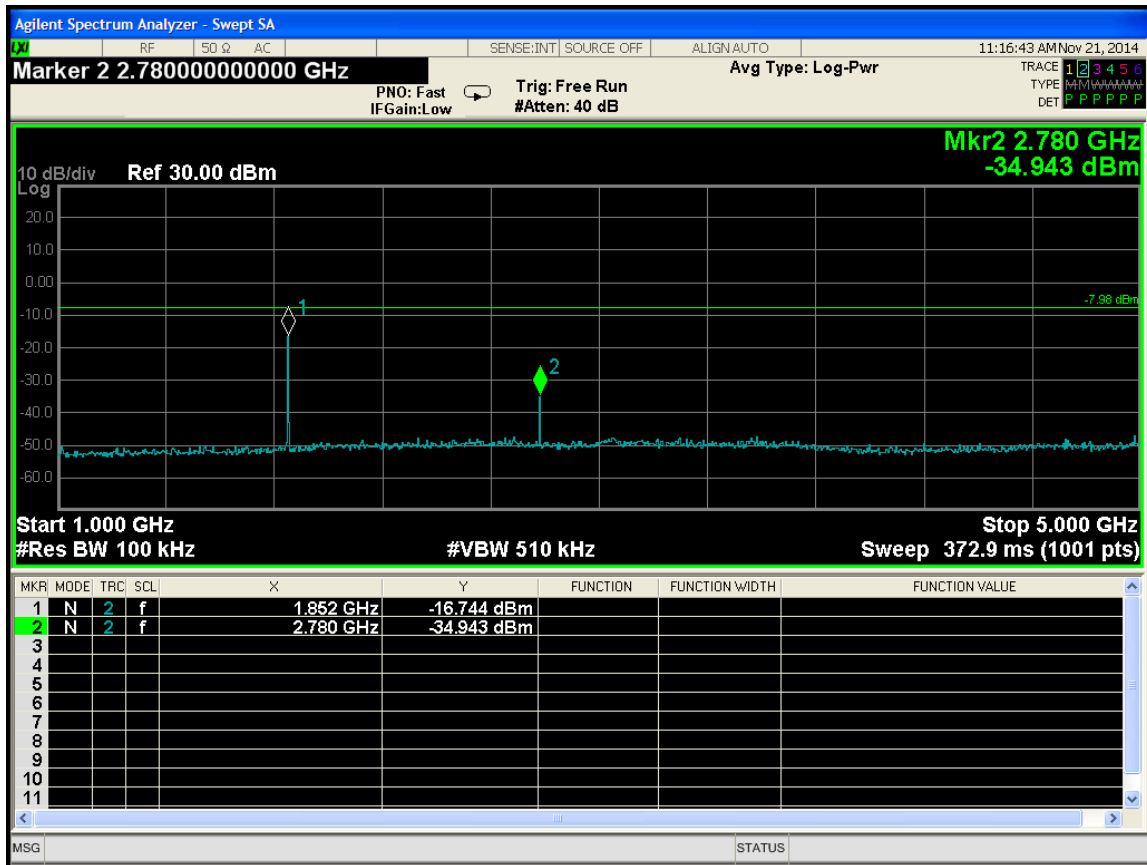
RF Antenna Conducted 5 GHz to 10 GHz Mid Channel External AC Mode



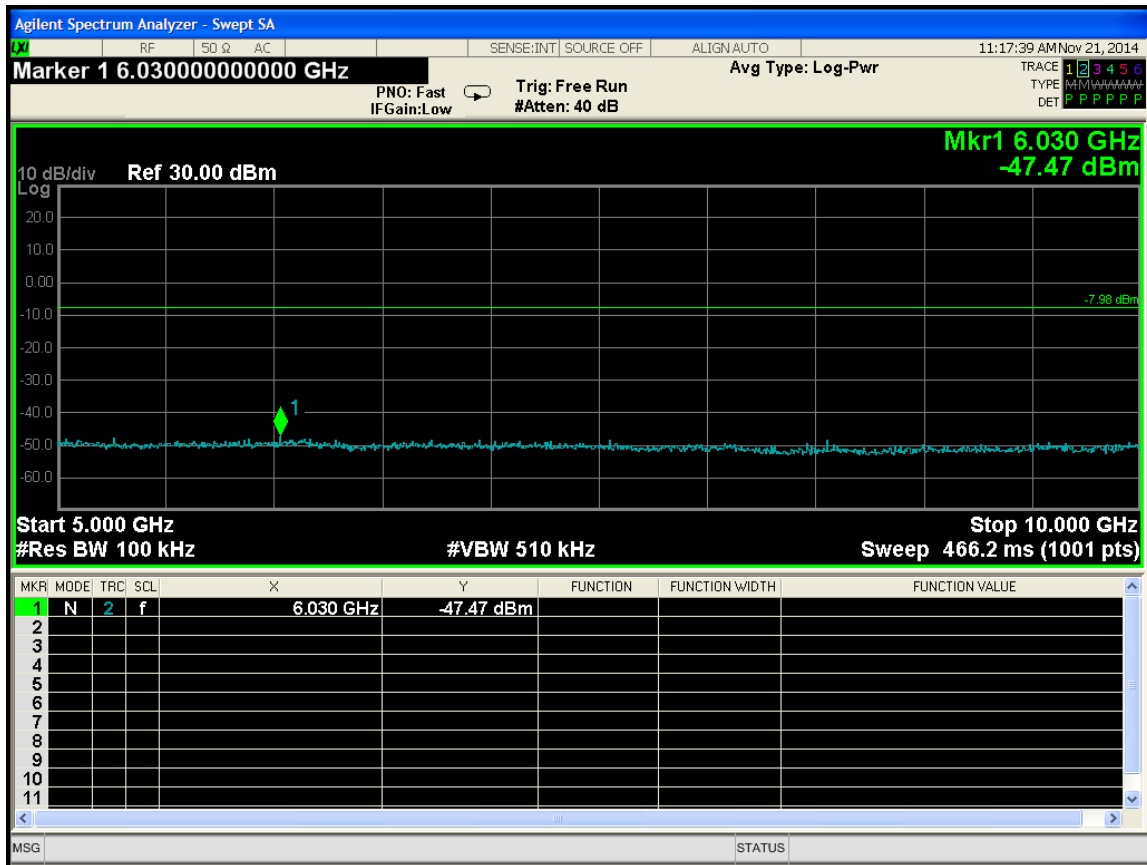
RF Antenna Conducted 2 MHz to 10 MHz High Channel Battery Mode



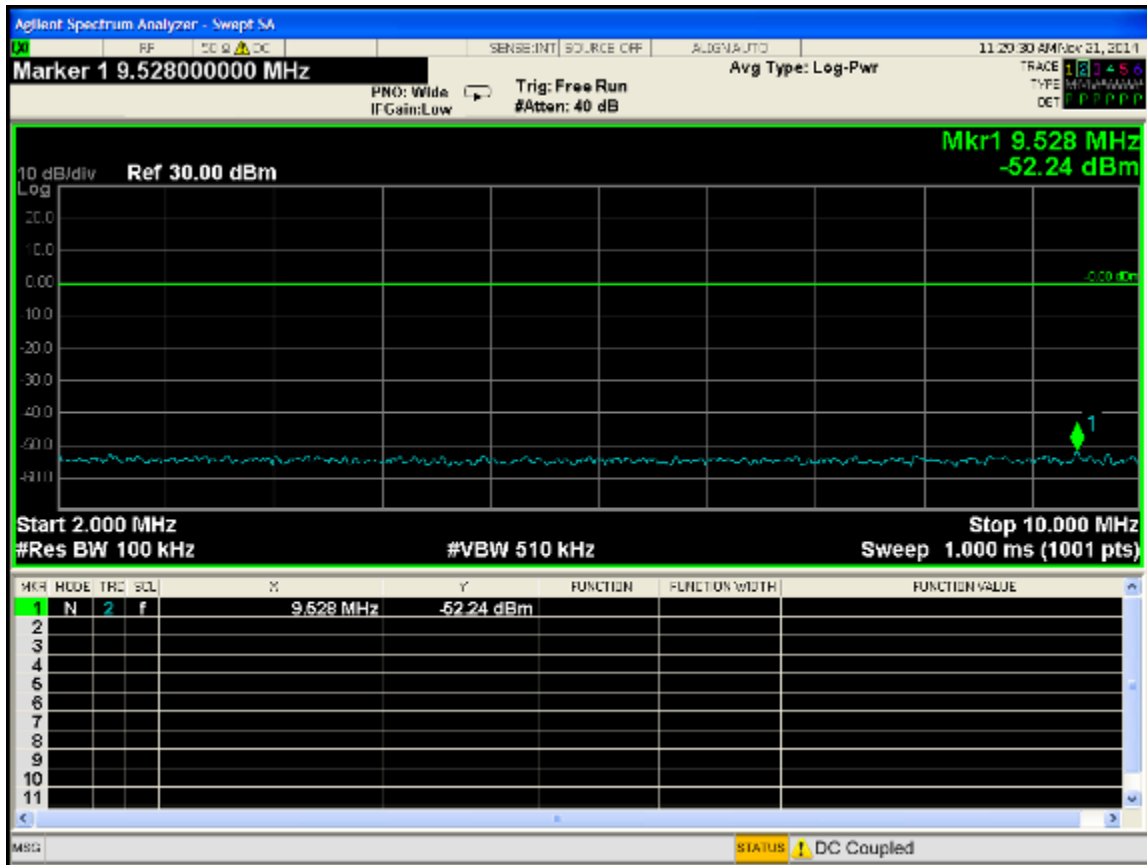
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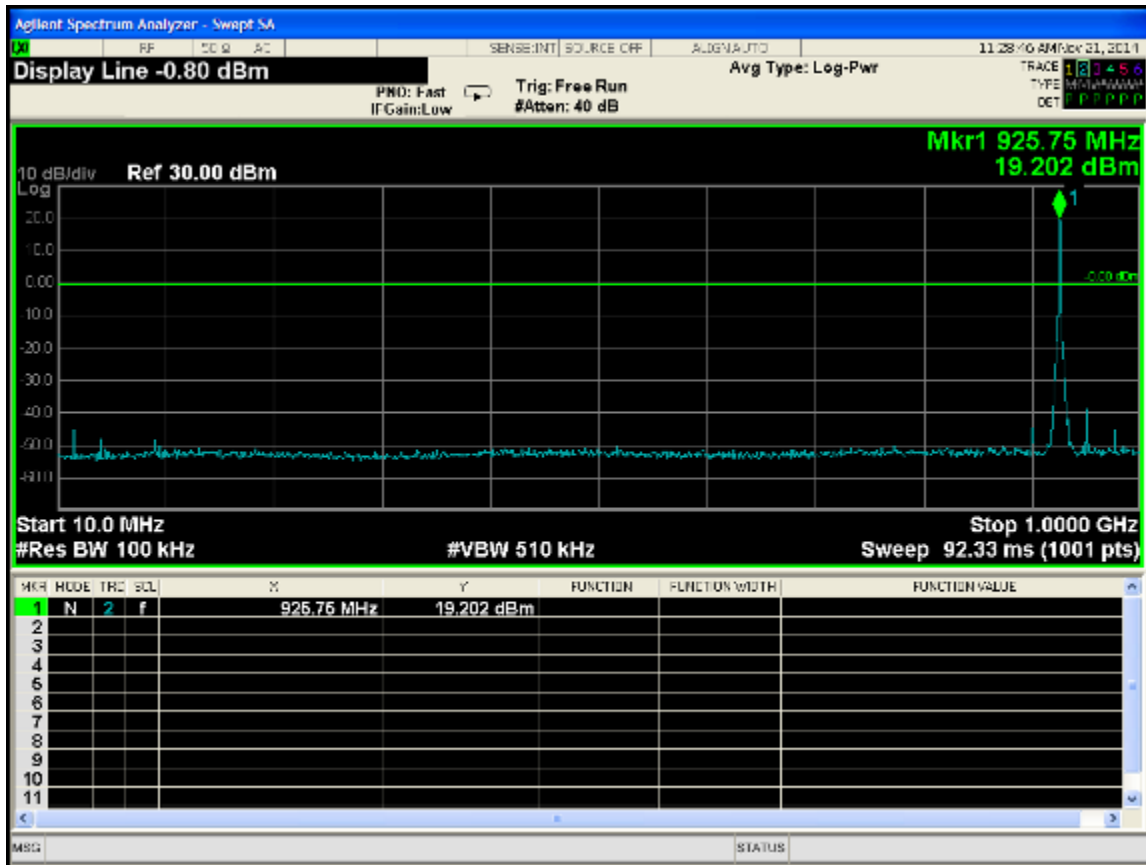
RF Antenna Conducted 1 GHz to 5 GHz High Channel Battery Mode



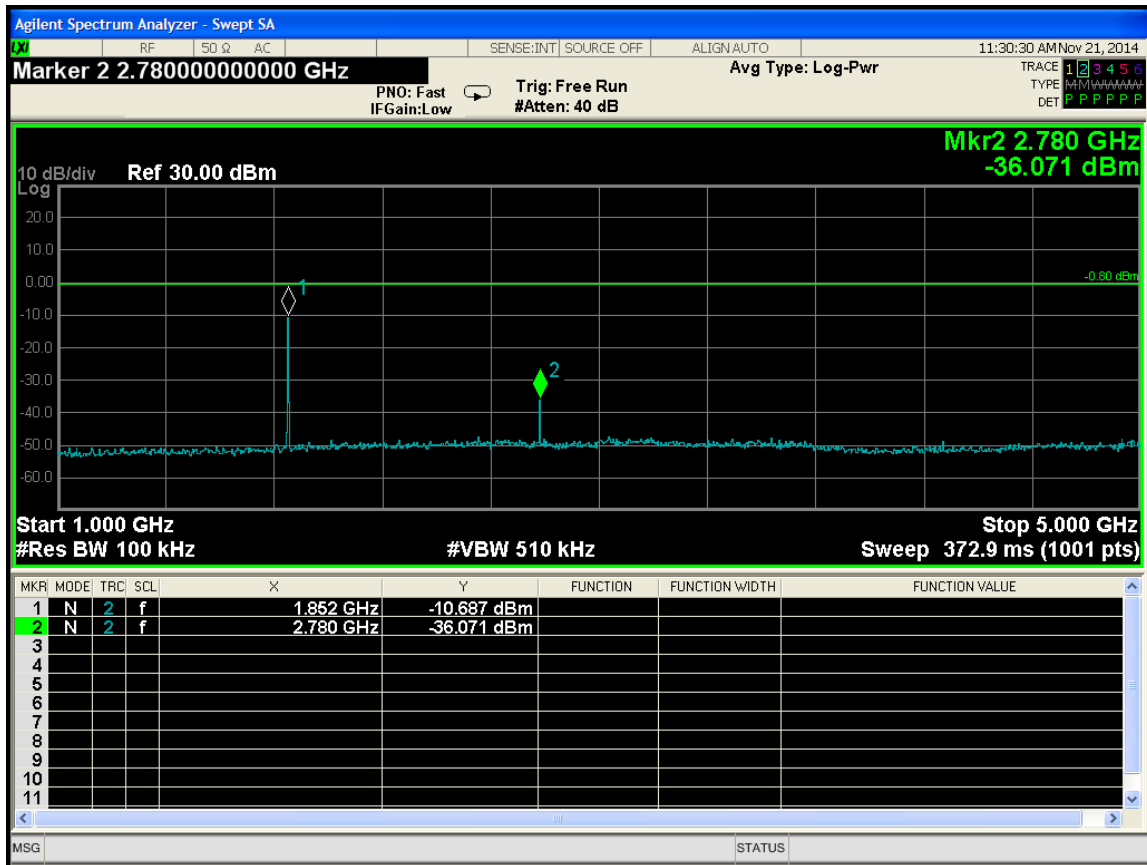
RF Antenna Conducted 5 GHz to 10 GHz High Channel Battery Mode



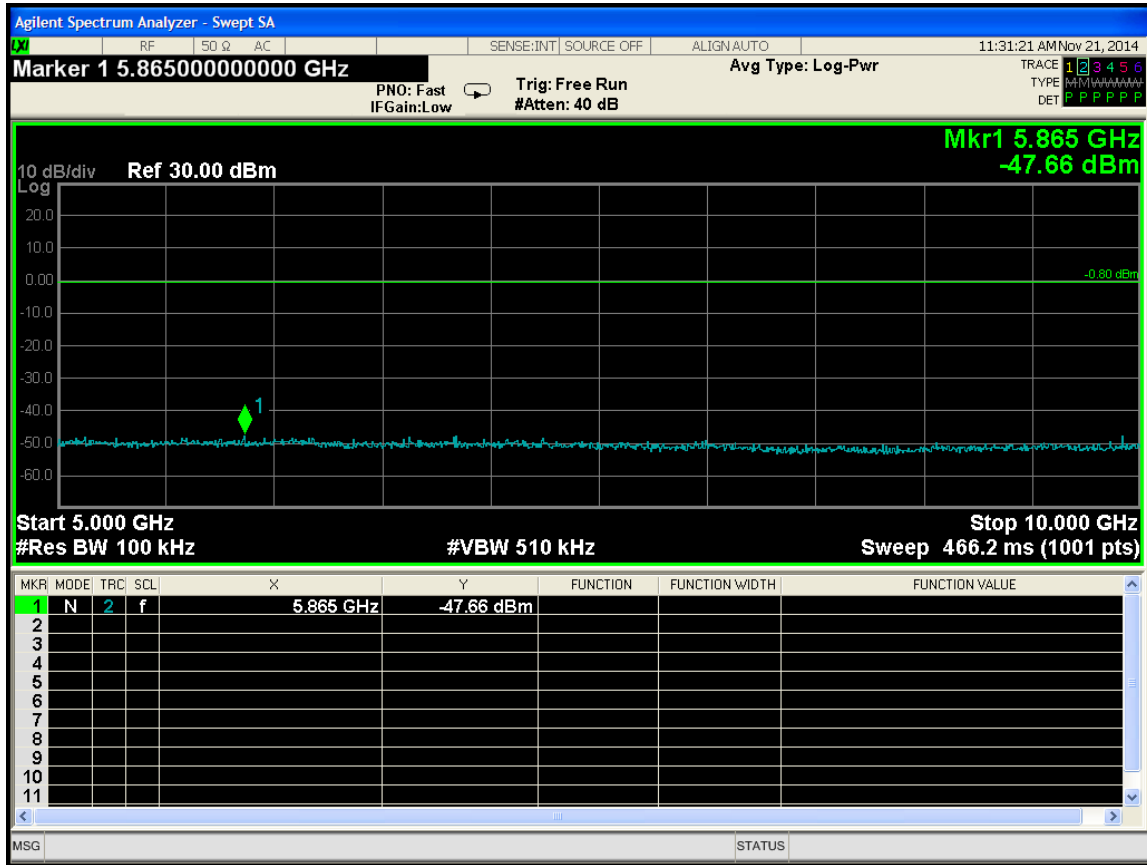
RF Antenna Conducted 2 MHz to 10 MHz High Channel External AC Mode



RF Antenna Conducted 10 MHz to 1 GHz High Channel External AC Mode



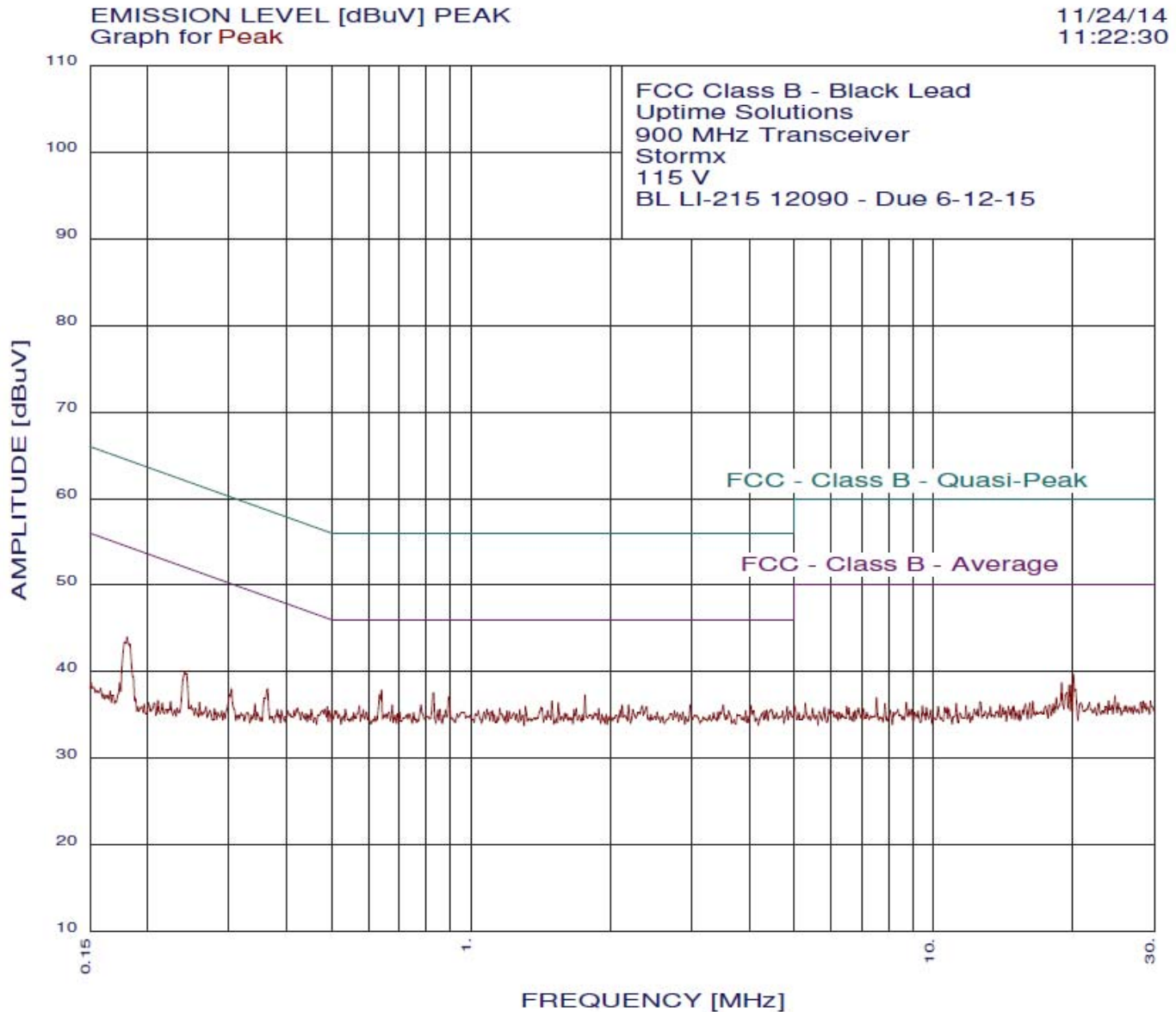
RF Antenna Conducted 1 GHz to 5 GHz High Channel External AC Mode



RF Antenna Conducted 5 GHz to 10 GHz High Channel External AC Mode

CONDUCTED EMISSIONS

DATA SHEETS



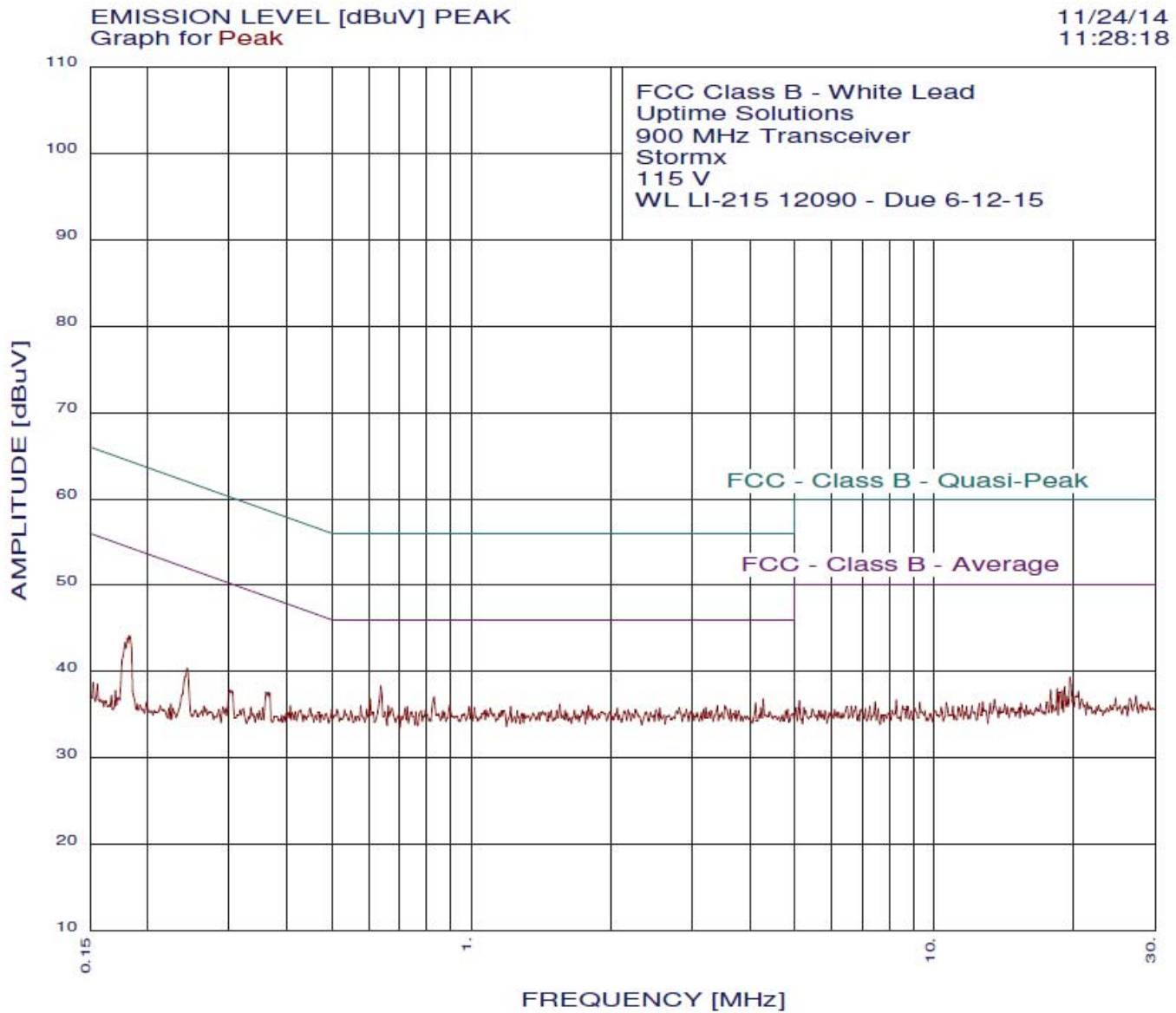
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FCC Class B - Black Lead
Uptime Solutions
900 MHz Transceiver
Stormx
115 V
BL LI-215 12090 - Due 6-12-15
Test Engineer : Kenneth Lee

30 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 0.10 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.641	37.84	46.00	-8.16
2	0.831	37.54	46.00	-8.46
3	0.634	37.34	46.00	-8.66
4	1.763	37.32	46.00	-8.68
5	0.895	37.04	46.00	-8.96
6	1.496	36.59	46.00	-9.41
7	1.544	36.39	46.00	-9.61
8	3.511	36.14	46.00	-9.86
9	2.979	36.14	46.00	-9.86
10	0.676	36.14	46.00	-9.86
11	2.190	36.14	46.00	-9.86
12	2.123	36.14	46.00	-9.86
13	0.779	36.14	46.00	-9.86
14	4.029	36.05	46.00	-9.95
15	0.573	36.04	46.00	-9.96
16	2.346	36.04	46.00	-9.96
17	1.311	35.97	46.00	-10.03
18	4.825	35.95	46.00	-10.05
19	2.397	35.94	46.00	-10.06
20	1.419	35.88	46.00	-10.12
21	0.489	35.94	46.18	-10.24
22	1.154	35.75	46.00	-10.25
23	1.889	35.73	46.00	-10.27
24	1.690	35.71	46.00	-10.29
25	1.083	35.65	46.00	-10.35
26	4.456	35.65	46.00	-10.35
27	0.535	35.64	46.00	-10.36
28	2.238	35.64	46.00	-10.36
29	0.858	35.64	46.00	-10.36
30	20.059	39.64	50.00	-10.36



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FCC Class B - White Lead
Uptime Solutions
900 MHz Transceiver
Stormx
115 V
WL LI-215 12090 - Due 6-12-15
Test Engineer : Kenneth Lee

30 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 0.10 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.637	38.34	46.00	-7.66
2	0.831	37.04	46.00	-8.96
3	0.605	36.84	46.00	-9.16
4	4.272	36.84	46.00	-9.16
5	4.114	36.34	46.00	-9.66
6	1.552	36.19	46.00	-9.81
7	0.899	36.14	46.00	-9.86
8	0.577	36.04	46.00	-9.96
9	3.529	36.04	46.00	-9.96
10	3.401	36.04	46.00	-9.96
11	0.662	36.04	46.00	-9.96
12	1.790	36.02	46.00	-9.98
13	1.217	35.96	46.00	-10.04
14	0.990	35.94	46.00	-10.06
15	0.728	35.94	46.00	-10.06
16	4.227	35.84	46.00	-10.16
17	3.209	35.84	46.00	-10.16
18	2.811	35.84	46.00	-10.16
19	1.016	35.84	46.00	-10.16
20	1.000	35.84	46.00	-10.16
21	0.183	44.15	54.37	-10.22
22	1.100	35.75	46.00	-10.25
23	0.672	35.74	46.00	-10.26
24	2.554	35.74	46.00	-10.26
25	2.066	35.74	46.00	-10.26
26	0.720	35.74	46.00	-10.26
27	0.513	35.65	46.00	-10.35
28	0.595	35.64	46.00	-10.36
29	4.825	35.64	46.00	-10.36
30	3.624	35.64	46.00	-10.36
