FCC PART 15, SUBPART B and C
TEST REPORT

for

TURBO ANTENNA

MODEL: TMA-2000

Prepared for

MOJIX, INC.
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KYLE FUJIMOTO

Approved by:_____

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DATE: AUGUST 14, 2017

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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:	Turbo Antenna Model: TMA-2000 S/N: N/A
Product Description:	The EUT is a system that is used to read passive UHF RFID tags.
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	Mojix, Inc. 11075 Santa Monica Boulevard, Suite 350 Los Angeles, California 90025
Test Dates:	June 19, 20, 21, and 22, 2017

Test Specifications covered by accreditation:

CFR Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.207, 15.209, and 15.247

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Test Procedures: ANSI C63.4: 2014 and ANSI C63.10: 2013

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. Highest reading in relation to spec limit: 39.86 dBuV @ 24.582 MHz (*U =2.88 dB)
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, 15.205, 15.209 and 15.247 (d) Highest reading in relation to spec limit: 46.90 dBuV @ 3611.00 MHz (*U = 3.70 dB)
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	This test was not performed because the emissions were all taken via the radiated method.
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	Number of Hopping Frequencies	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1) and 15.247 (a)(1)(i)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Turbo Antenna, Model: TMA-2000. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. 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, 15.207, 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

Mojix, Inc.

Jalal Alisobhani	Senior V.P. Engineering
Hassan Syed	Manager RF Design Group
Gus Mendoza	Engineer

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on June 19, 2017.

2.5 Disposition of the Test Sample

The test sample was returned to Mojix, Inc. on June 22, 2017.

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
LISN	Line Impedance Stabilization Network
N/A	Not Applicable
Tx	Transmit
Rx	Receive

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
EN 50147-2: 1997	Anechoic chambers. Alternative test site suitability with respect to site attenuation
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
ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – (Emissions)

Stand Alone Mode: The Turbo Antenna, Model: TMA-2000 (EUT) was connected to a StarFlex and directly connected to a terminator via its Input and Output ports. The StarFlex was also connected to a power supply, GPIO, laptop, and four terminators via its power, GPIO, ethernet, and Ant 1 through 4 ports, respectively. The GPIO was also connected to four 10-centimeter unterminated cables. The laptop was also connected to a power supply.

Daisy Chain Mode: The configuration is similar to the Stand Alone Mode, except that the terminator was connected to the EUT's output via a 12.19-meter long cable instead of being directly connected.

For both modes, the EUT was continuously transmitting and/or receiving using a program on the laptop called MOJO. MOJO is a special programming software that allows the EUT to transmit or receive at the low, middle, or high channel on a continuous basis.

The input voltage was varied ±15%; the transmitting signal amplitude and frequency did not vary.

Both the stand alone and daisy chain modes were investigated and the worst case was determined to be the daisy chain mode.

The final radiated as well as the conducted data for the EUT were taken in the worst case configuration described above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 This is a 2-meter unshielded cable connecting the StarFlex to the power supply. The cable has a 1/8 inch power connector at the StarFlex end and is hard wired into the power supply. The cable has a molded ferrite at the power supply end.

Cable 2 This is a 30-centimeter unshielded cable connecting the GPIO to the StarFlex. The cable has a 5-pin connector at the StarFlex end and is hardwired into the GPIO.

Cable 3 This is a 10-centimeter unshielded, unterminated cable connected to the Port 1 of the GPIO. The cable has a 10-pin terminal block at the unterminated end and is hard wired into the GPIO.

Cable 4 This is a 10-centimeter unshielded, unterminated cable connected to the Port 2 of the GPIO. The cable has a 10-pin terminal block at the unterminated end and is hard wired into the GPIO.

Cable 5 This is a 10-centimeter unshielded, unterminated cable connected to the Port 3 of the GPIO. The cable has a 10-pin terminal block at the unterminated end and is hard wired into the GPIO.

Cable 6 This is a 10-centimeter unshielded, unterminated cable connected to the Port 4 of the GPIO. The cable has a 10-pin terminal block at the unterminated end and is hard wired into the GPIO.

Cable 7 This is a 30-meter braid and foil shielded cable connecting the StarFlex to the laptop. The cable has a metallic RJ-45 connector at each end. The shield of the cable was grounded to the chassis via the connectors.

Cable 8 This is a 30.48-meter braid shielded cable connecting the StarFlex to the EUT. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 9 **(Daisy Chain Mode Only)** This is a 12.19-meter braid shielded cable connecting the EUT's output port to a 50 ohm terminator. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.
Note: for the stand alone mode the 50 ohm terminator is directly connected to the EUT's output port.

Cable 10 This is a 6.096-meter braid shielded cable connecting the StarFlex Antenna 4 port to a 50 ohm terminator. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.

Cable Construction and Termination (continued)

Cable 11 This is a 6.096-meter braid shielded cable connecting the StarFlex Antenna 3 port to a 50 ohm terminator. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 12 This is a 6.096-meter braid shielded cable connecting the StarFlex Antenna 2 port to a 50 ohm terminator. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 13 This is a 6.096-meter braid shielded cable connecting the StarFlex Antenna 1 port to a 50 ohm terminator. The cable has a TNC connector at each end. The cable was coiled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connectors.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER	FCC ID
TURBO ANTENNA (EUT)	MOJIX, INC.	TMA-2000	N/A	VEDTMA-200
FIRMWARE FOR EUT*	MOJIX, INC.	MOJO	N/A	N/A
STARFLEX	MOJIX, INC.	STARFLEX STR-400-F (P/N: 850-4500-001)	001F483BF7DD	VEDSTARFLEX
GPIO	MOJIX, INC.	GPO-3008-W (P/N: 860-3200-001)	N/A	N/A
POWER SUPPLY FOR STARFLEX	ADAPTER TECH.	ATS090-P240	N/A	N/A
AC ADATPER FOR LAPTOP	HEWLETT PACKARD	PPP009D	N/A	N/A
LAPTOP	DELL	14-k112nr	CND4031BLR	DoC
(5) 50 OHM TERMINATORS	MINI-CIRCUITS	VAT-2W	N/A	N/A

***Located on the laptop.**

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED IN LAB D					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
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	Keysight	N9038A	MY51210150	December 29, 2015	2 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	September 3, 2015	2 Year
Preamplifier	Com-Power	PAM-118A	551024	May 12, 2016	2 Year
Loop Antenna	Com-Power	AL-130	121090	February 9, 2017	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2016	2 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
High Pass Filter	Microwave Circuits	H3G020G4	481459	July 25, 2015	2 Year
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
RF CONDCUTED EMISSIONS TEST EQUIPMENT					
LISN	Com-Power	LI-215A	191951	May 17, 2017	1 Year
Transient Limiter	Com-Power	252A910	N/A	October 26, 2016	1 Year
VARIATION OF THE INPUT POWER TEST EQUIPMENT					
Variable Auto Transformer	Staco Energy Products	3PN1010	N/A	N/A	N/A
Multimeter	Fluke	87	58450372	March 14, 2017	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

For frequencies 1 GHz and below: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 1.5 meters above the ground plane.

The Turbo Antenna was grounded to the chassis of the StarFlex via the shield of the cable connected to its input port.

The StarFlex was grounded to earth ground via the safety ground of the power supply.

7. CHARACTERISTICS OF THE TRANSMITTER

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

7.1 Channel Number and Frequencies

The FHSS uses 50 channels and uses DSB-ASK and PR-ASK modulations. The channel separation is 500 kHz.

Channel 1 = 902.75 MHz
Channel 2 = 903.25 MHz
Channel 3 = 903.75 MHz
Channel 50 = 927.25 MHz

7.2 Antenna

The antenna has a gain of 12 dBi.

8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. A transient limiter was used for the protection of the EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the EMI Receiver. 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 63:4. 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 computer software. The final qualification data is located in Appendix E.

The EUT was tested at 120 VAC. 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, Section 15.207 for conducted emissions. Please see Appendix E for the data sheets.

8.1.2 Radiated Emissions Test

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 with 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 effective measurement bandwidth used for the radiated emissions test was according to the frequency measured (200 Hz for 10 kHz to 150 kHz, 9 kHz for 150 kHz to 30 MHz, 120 kHz for 30 MHz to 1 GHz and 1 MHz for 1 GHz to 9.3 GHz).

The frequencies above 1 GHz were averaged by using duty cycle correction factor.

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 gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

The EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 2.0.

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	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	CombiLog Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and Subpart C sections 15.205, 15.209, and 15.247 (d) for radiated emissions.

8.1.3 RF Emissions Test Results

Table 1.0 CONDUCTED EMISSION RESULTS
TURBO ANTENNA
Model: TMA-2000

Frequency MHz	Average Corrected Reading* dBuV	Average Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
24.582 (BL) (Tx)	39.86	50.00	-10.14
24.578 (WL) (Tx)	39.03	50.00	-10.97
24.598 (WL) (Rx)	36.87	50.00	-13.13
24.098 (WL) (Tx)	31.82	50.00	-18.18
0.162 (WL) (Rx)	36.90	55.42	-18.52
24.558 (WL) (Tx)	30.85	50.00	-19.15

Table 2.0 RADIATED EMISSION RESULTS
TURBO ANTENNA
Model: TMA-2000

Frequency MHz	EMI Reading (dBuV)	Specification Limit (dBuV)	Delta (Cor. Reading – Spec. Limit) dB)
3611.00 (V)	46.90	53.97	-7.07
5416.50 (V)	45.36	53.97	-8.61
5416.50 (H)	44.32	53.97	-9.65
3611.00 (H)	42.80	53.97	-11.17
3709.00 (V)	42.54	53.97	-11.43
3709.00 (H)	41.52	53.97	-12.46

Notes:

* The complete emissions data is given in Appendix E of this report.
(BL) Black Lead
(WL) White Lead
(V) Vertical
(H) Horizontal
(Tx) Transmit
(Rx) Receive

8.2 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 ≥ 1 % of the bandwidth and the video bandwidth was ≥ RBW.

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.

8.3 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 greater than the 20 dB bandwidth and the video bandwidth was ≥ RBW. 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 1 watt. Please see the data sheets located in Appendix E.

8.4 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 300 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

This test was not performed because the all of the emissions were taken via radiated methods.

8.5 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 300 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. The plots were taken in both frequency hopping mode and single channel mode.

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.

8.6 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 approximately 30% of the channel spacing, and the video bandwidth ≥ RBW. 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.

8.7 Number of Hopping Frequencies

The Number of Hopping Frequencies was measured using the EMI Receiver. The EUT was operating in its normal operating mode. The resolution bandwidth was set to approximately 30% of the channel spacing, and the video bandwidth was ≥ RBW. 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). Please see the data sheets located in Appendix E.

8.8 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 and the number of transmissions over a 20 second period. The RBW was set to be less than the channel spacing.

Test Results:

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

8.9 Duty Cycle Calculation

The fundamental and harmonics were measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Where

$$\delta(\mathrm{dB}) = 20\log\left[\sum(nt_1 + mt_2 + \ldots + \xi t_x)/T\right]$$

n is the number of pulses of duration *t*1
m is the number of pulses of duration *t*2
ξ is the number of pulses of duration *tx*
T is the period of the pulse train or 100 ms if the pulse train length is greater than 100 ms

Worst Case 100 ms = 14.79 ms on time

Total On Time = 14.79 ms

35 ms / 100 mS = 14.79% duty cycle

Peak to average ratio = -16.6

8.10 Variation of the Input Power

The variation of the input power test was performed using the EMI Receiver. The EUT input power was varied between 85% and 115% of the nominal rated supply voltage. The carrier frequency was monitored for any change in amplitude.

Test Results:

The EUT complies with the relevant requirement of FCC Title 47, Part 15, Subpart C section 15.31 (e).

9. CONCLUSIONS

The Turbo Antenna, Model: TMA-2000, as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP® TESTING
NVLAP LAB CODE 200528-0

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For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.
For the most up-to-date version of our scopes and certificates please visit http://celectronics.com/quality/scope/

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."

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.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Turbo Antenna
Models: TMA-2000
S/N: N/A

There are no additional models covered under this report.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

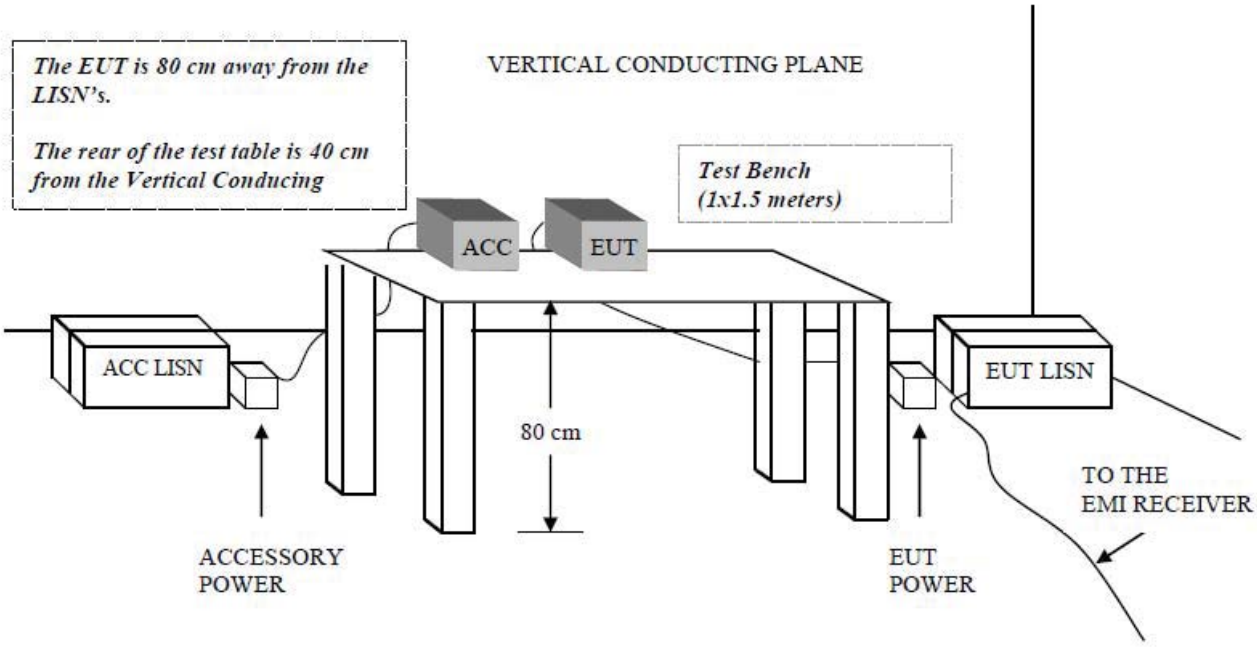
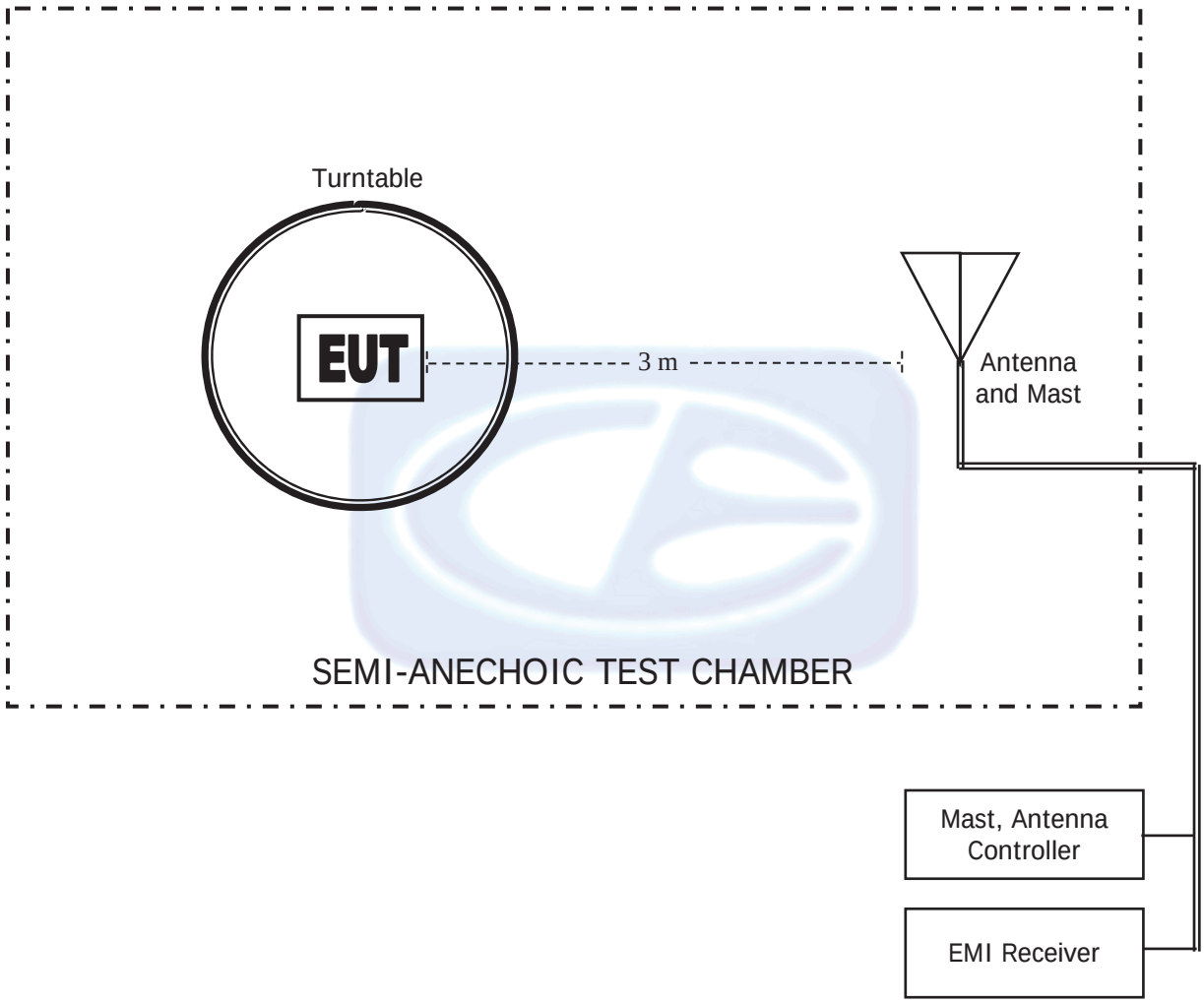


FIGURE 2: LAYOUT OF THE SEMI MI-ANECHOIC TEST CHAMBER



COM-POWER AL-130

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 9, 2017

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-36.17	15.33
0.01	-35.86	15.64
0.02	-37.30	14.20
0.03	-36.58	14.92
0.04	-36.99	14.51
0.05	-37.66	13.84
0.06	-37.53	13.97
0.07	-37.64	13.86
0.08	-37.52	13.98
0.09	-37.62	13.88
0.1	-37.59	13.91
0.2	-37.79	13.71
0.3	-37.80	13.70
0.4	-37.70	13.80
0.5	-37.79	13.71
0.6	-37.79	13.71
0.7	-37.69	13.81
0.8	-37.49	14.01
0.9	-37.39	14.11
1	-37.39	14.11
2	-37.09	14.41
3	-37.09	14.41
4	-37.19	14.31
5	-36.98	14.52
6	-37.17	14.33
7	-37.05	14.45
8	-36.85	14.65
9	-36.84	14.66
10	-36.75	14.75
15	-37.16	14.34
20	-36.44	15.06
25	-37.88	13.62
30	-39.14	12.36

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61060

CALIBRATION DATE: SEPTEMBER 3, 2015

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	24.00	200	13.00
35	24.30	250	15.30
40	25.40	300	18.20
45	21.50	350	17.90
50	22.50	400	18.60
60	15.40	450	19.80
70	12.70	500	21.60
80	11.10	550	22.40
90	13.40	600	23.70
100	13.80	650	24.30
120	15.40	700	24.00
125	15.40	750	24.50
140	13.10	800	24.30
150	17.20	850	26.30
160	13.20	900	26.90
175	14.20	950	26.00
180	14.30	1000	25.60

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: FEBRUARY 26, 2016

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.93	10.0	39.33
1.5	25.54	10.5	39.64
2.0	28.09	11.0	41.04
2.5	30.21	11.5	44.29
3.0	30.15	12.0	41.22
3.5	30.17	12.5	41.50
4.0	31.90	13.0	41.62
4.5	33.51	13.5	40.63
5.0	33.87	14.0	39.94
5.5	35.08	14.5	41.84
6.0	34.81	15.0	42.69
6.5	34.26	15.5	39.03
7.0	36.33	16.0	39.07
7.5	37.03	16.5	41.40
8.0	37.56	17.0	43.18
8.5	40.07	17.5	47.01
9.0	38.92	18.0	46.48
9.5	38.21		

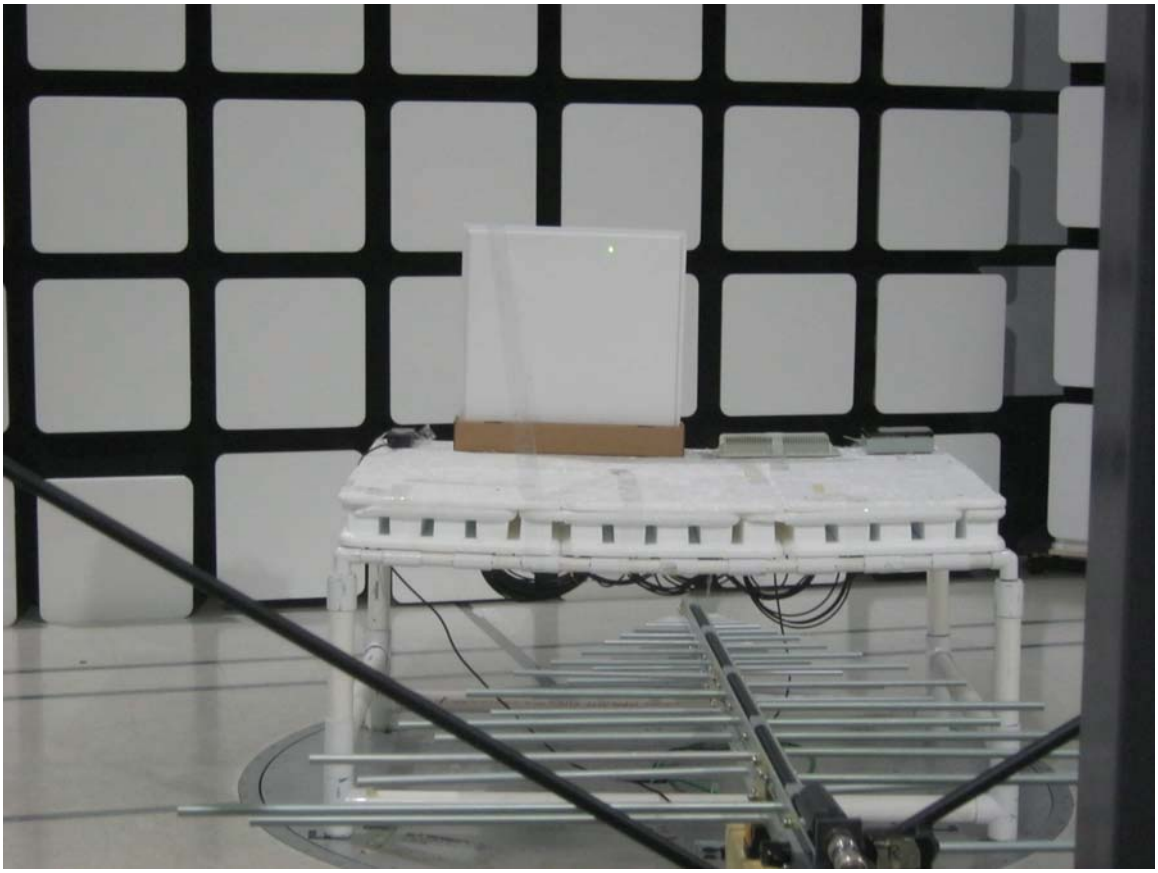
COM-POWER PA-118

PREAMPLIFIER

S/N: 551024

CALIBRATION DATE: MAY 12, 2016

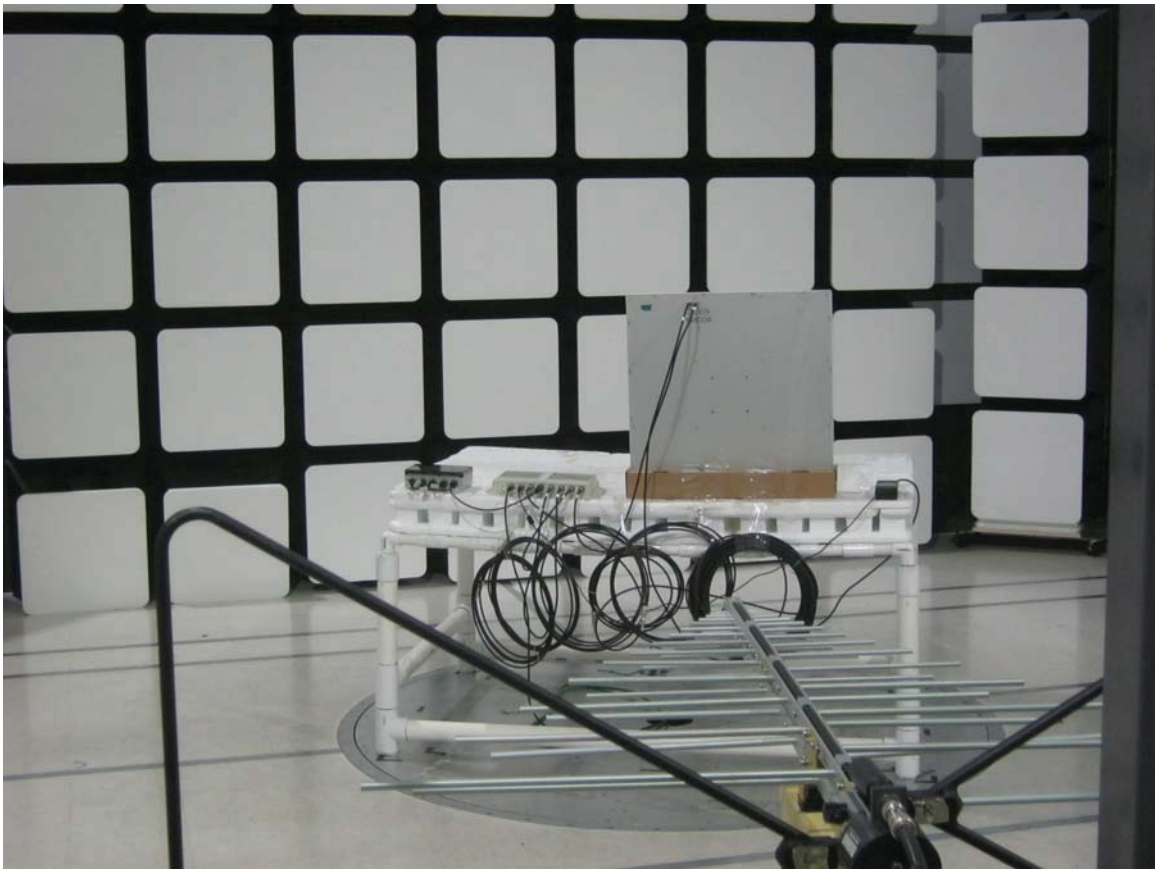
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	39.84	6.0	39.05
1.1	39.40	6.5	38.94
1.2	39.58	7.0	39.25
1.3	39.68	7.5	39.09
1.4	39.91	8.0	39.01
1.5	39.78	8.5	38.60
1.6	39.50	9.0	38.64
1.7	39.81	9.5	39.67
1.8	39.89	10.0	39.30
1.9	39.94	11.0	39.15
2.0	39.57	12.0	39.24
2.5	40.39	13.0	39.49
3.0	40.63	14.0	39.44
3.5	40.80	15.0	39.94
4.0	40.86	16.0	40.09
4.5	39.94	17.0	40.06
5.0	34.47	18.0	39.76
5.5	39.32		



FRONT VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

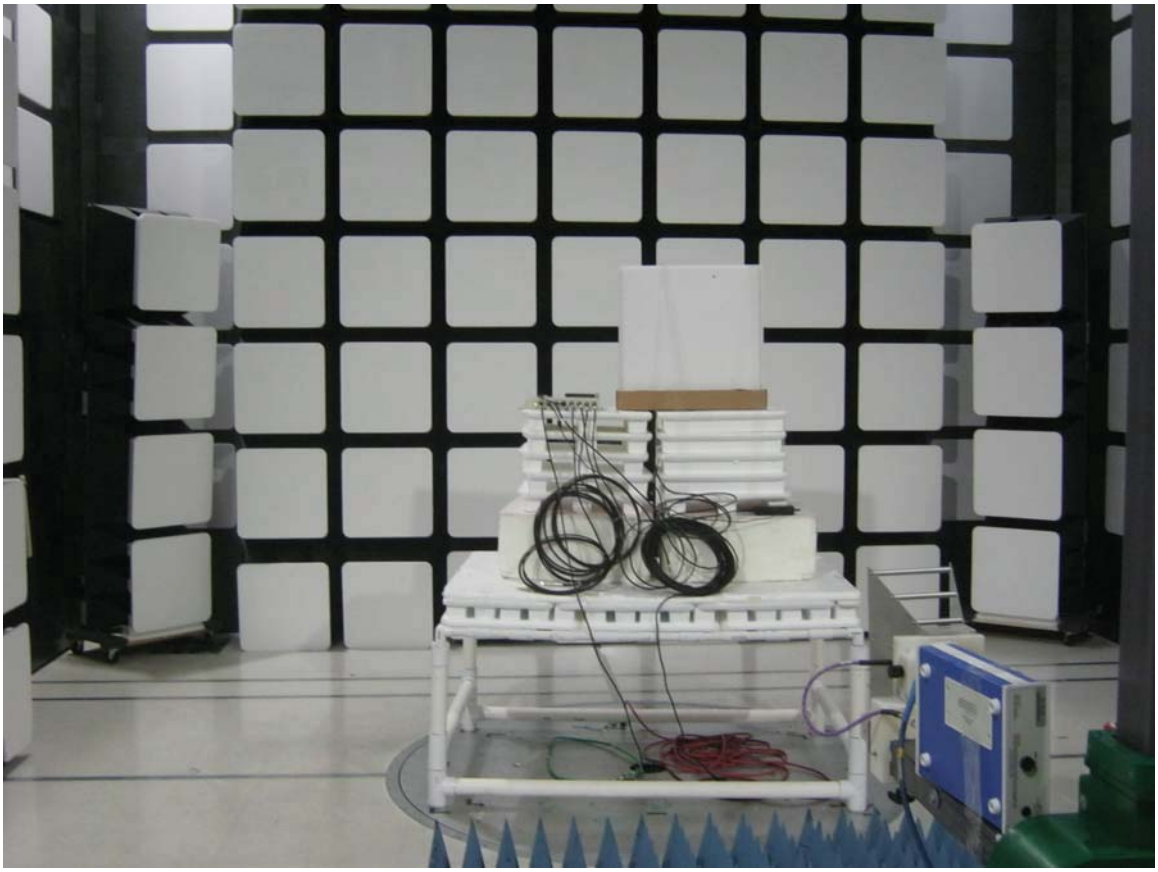
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

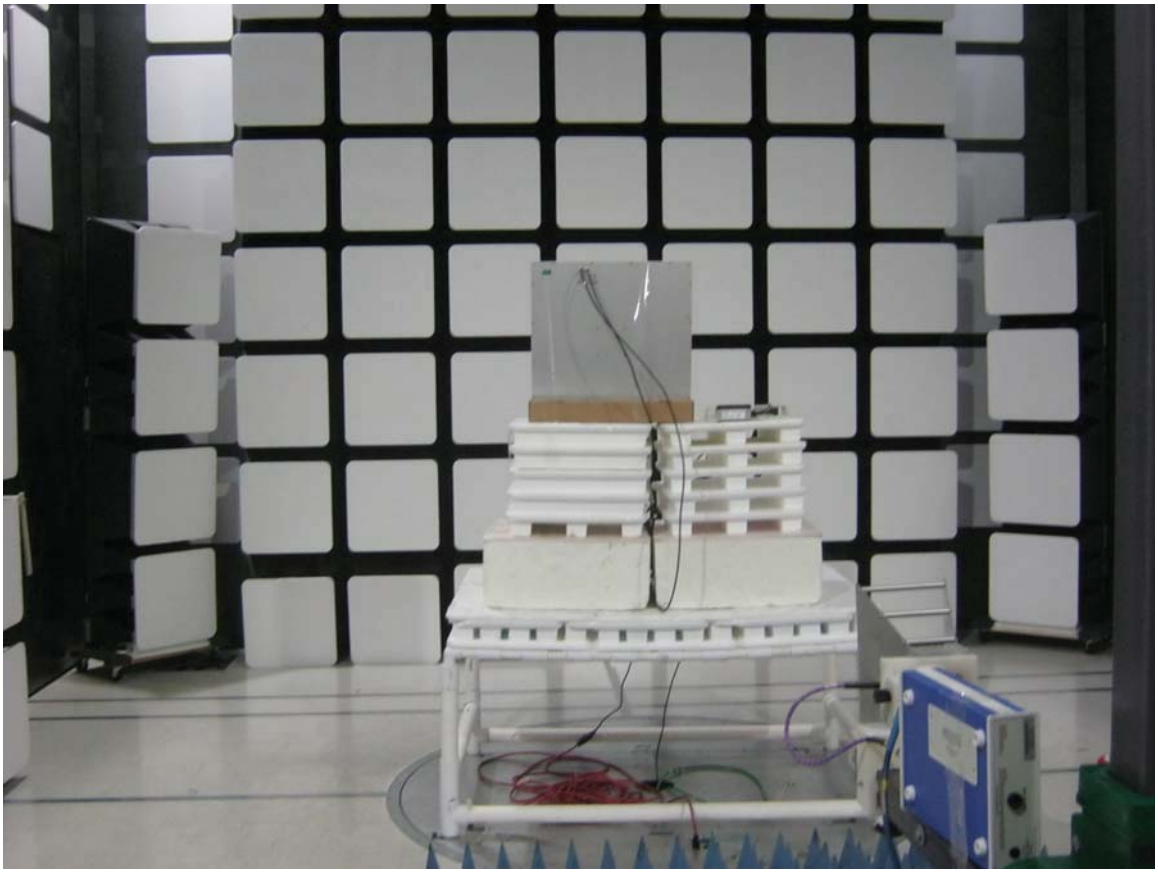
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

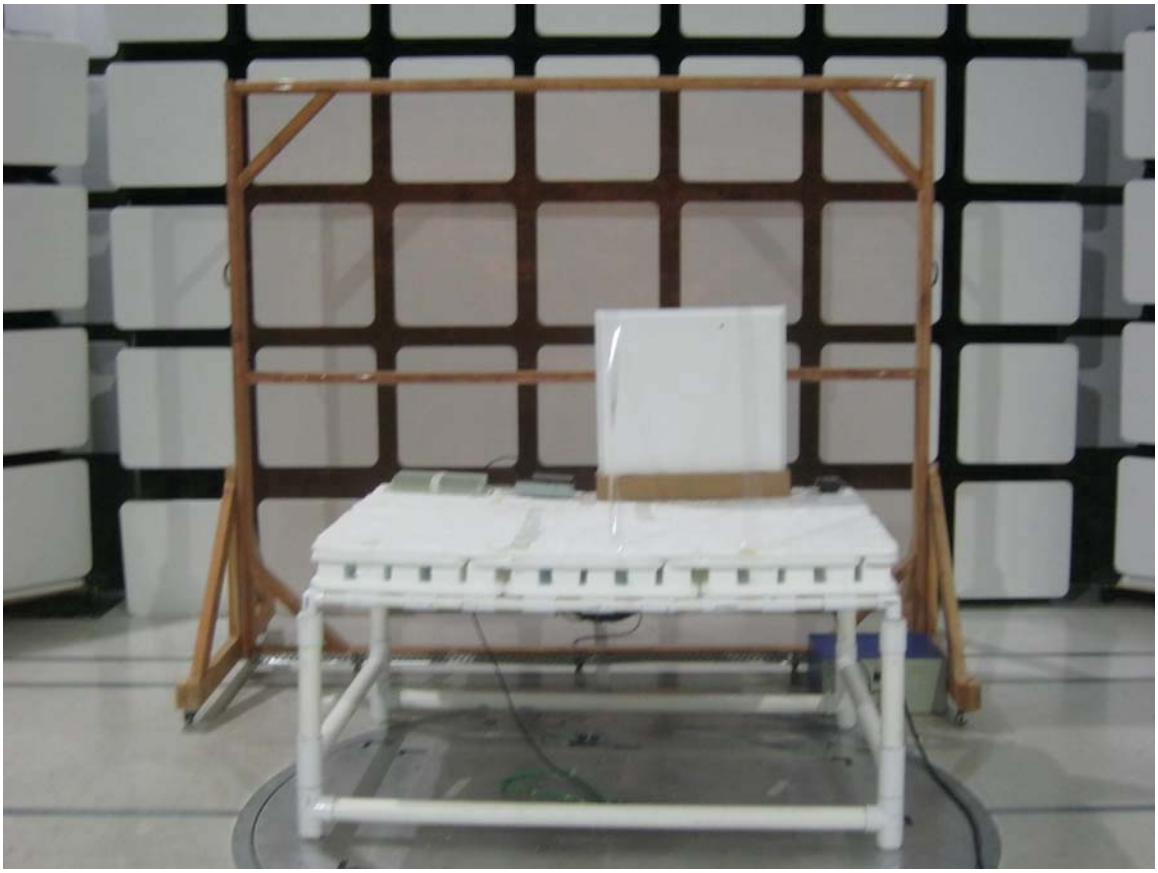
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

MOJIX, INC.
TURBO ANTENNA
MODEL: TMA-2000
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS DATA SHEETS

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

Low Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
902.75	115.23	V	—	—	Peak	2.25	150.32	
1805.50	63.38	V	95.23	-31.85	Peak	101.00	127.77	**Not in Restricted Band**
2708.25	46.96	V	73.97	-27.01	Peak	288.00	130.22	
2708.25	30.03	V	53.97	-23.94	Avg	288.00	130.22	
3611.00	63.83	V	73.97	-10.14	Peak	161.25	161.26	
3611.00	46.90	V	53.97	-7.07	Avg	161.25	161.26	
4513.75	54.84	V	73.97	-19.13	Peak	165.00	159.29	
4513.75	37.91	V	53.97	-16.06	Avg	165.00	159.29	
5416.50	62.29	V	73.97	-11.68	Peak	152.00	152.16	
5416.50	45.36	V	53.97	-8.61	Avg	152.00	126.16	
6319.25	53.83	V	95.23	-41.40	Peak	140.00	177.38	**Not in Restricted Band**
7222.00	50.91	V	95.23	-44.32	Peak	125.25	151.11	**Not in Restricted Band**
8124.75	48.85	V	73.97	-25.12	Peak	146.50	131.35	
8124.75	31.92	V	53.97	-22.05	Avg	146.50	131.35	
9027.50	50.10	V	73.97	-23.87	Peak	140.25	130.25	
9027.50	33.17	V	53.97	-20.80	Avg	140.25	130.25	

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

Low Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
902.75	128.32	H	—	—	Peak	11.00	152.35	
1805.50	64.85	H	108.32	-43.47	Peak	84.00	199.47	**Not in Restricted Band**
2708.25	52.62	H	73.97	-21.35	Peak	131.75	153.74	
2708.25	35.69	H	53.97	-18.28	Avg	131.75	153.74	
3611.00	59.73	H	73.97	-14.24	Peak	125.75	115.47	
3611.00	42.80	H	53.97	-11.17	Avg	125.70	115.47	
4513.75	46.62	H	73.97	-27.35	Peak	27.25	135.89	
4513.75	29.69	H	53.97	-24.28	Avg	27.25	135.89	
5416.50	61.25	H	73.97	-12.72	Peak	160.25	122.46	
5416.50	44.32	H	53.97	-9.65	Avg	160.25	122.46	
6319.25	51.62	H	108.32	-56.70	Peak	139.25	178.04	**Not in Restricted Band**
7222.00	52.13	H	108.32	-56.19	Peak	177.25	212.13	**Not in Restricted Band**
8124.75	47.50	H	73.97	-26.48	Peak	113.75	229.14	
8124.75	30.57	H	53.97	-23.41	Avg	113.75	229.14	
9027.50	47.97	H	73.97	-26.00	Peak	202.00	168.13	
9027.50	31.04	H	53.97	-22.93	Avg	202.00	168.13	

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

Middle Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
915.25	113.46	V	—	—	Peak	3.50	150.21	
1830.50	60.21	V	93.46	-33.25	Peak	99.50	149.80	**Not in Restricted Band**
2745.75	51.67	V	73.97	-22.31	Peak	70.50	138.22	
2745.75	34.74	V	53.97	-19.24	Avg	70.50	138.22	
3611.00	54.33	V	73.97	-19.64	Peak	102.00	142.46	
3611.00	37.40	V	53.97	-16.57	Avg	102.00	142.46	
4576.25	53.99	V	73.97	-19.99	Peak	143.75	142.76	
4576.25	37.06	V	53.97	-16.92	Avg	143.75	142.76	
5491.50	55.97	V	93.46	-37.49	Peak	124.75	179.95	**Not in Restricted Band**
6406.75	52.96	V	93.46	-40.50	Peak	125.25	148.91	**Not in Restricted Band**
7322.00	49.01	V	73.97	-24.96	Peak	1.00	143.83	
7322.00	32.08	V	53.97	-21.89	Avg	1.00	143.83	
8237.25	49.80	V	73.97	-24.17	Peak	134.75	204.90	
8237.25	32.87	V	53.97	-21.10	Avg	134.75	204.90	
9152.25	48.22	V	73.97	-25.76	Peak	151.25	179.11	
9152.25	31.29	V	53.97	-22.69	Avg	151.25	179.11	

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

Middle Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
915.25	131.00	H	—	—	Peak	15.50	149.32	
1830.50	61.79	H	111.00	-49.21	Peak	29.75	198.58	**Not in Restricted Band**
2745.75	54.04	H	73.97	-19.93	Peak	125.50	249.68	
2745.75	37.11	H	53.97	-16.86	Avg	125.50	249.68	
3611.00	57.13	H	73.97	-16.85	Peak	157.75	120.61	
3611.00	40.20	H	53.97	-13.78	Avg	157.75	120.61	
4576.25	51.61	H	73.97	-22.36	Peak	160.00	178.76	
4576.25	34.68	H	53.97	-19.29	Avg	160.00	178.76	
5491.50	53.18	H	111.00	-57.82	Peak	244.75	208.91	**Not in Restricted Band**
6406.75	56.53	H	111.00	-54.47	Peak	172.25	100.23	**Not in Restricted Band**
7322.00	48.53	H	73.97	-25.45	Peak	68.00	127.29	
7322.00	31.60	H	53.97	-22.38	Avg	68.00	127.29	
8237.25	48.86	H	73.97	-25.11	Peak	116.75	125.86	
8237.25	31.93	H	53.97	-22.04	Avg	116.75	125.86	
9152.25	48.73	H	73.97	-25.24	Peak	67.50	125.25	
9152.25	31.80	H	53.97	-22.17	Avg	67.50	125.25	

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

High Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
927.25	113.44	V	—	—	Peak	2.25	150.32	
1854.50	54.72	V	93.44	-38.72	Peak	118.75	100.85	**Not in Restricted Band**
2781.75	54.22	V	73.97	-19.75	Peak	174.75	148.91	
2781.75	37.29	V	53.97	-16.68	Avg	174.75	148.91	
3709.00	59.47	V	73.97	-14.50	Peak	138.75	151.00	
3709.00	42.54	V	53.97	-11.43	Avg	138.75	151.00	
4636.25	55.64	V	73.97	-18.33	Peak	201.75	189.74	
4636.25	38.71	V	53.97	-15.26	Avg	201.75	189.74	
5563.50	56.44	V	93.44	-37.00	Peak	179.75	158.28	**Not in Restricted Band**
6490.75	55.53	V	93.44	-36.86	Peak	84.75	147.47	**Not in Restricted Band**
7418.00	50.19	V	73.97	-23.78	Peak	92.75	179.11	
7418.00	33.26	V	53.97	-20.71	Avg	92.75	179.11	
8345.25	48.09	V	73.97	-25.88	Peak	144.50	214.76	
8345.25	31.16	V	53.97	-22.81	Avg	144.50	214.76	
9272.50	48.37	V	93.44	-45.07	Peak	89.75	215.25	**Not in Restricted Band**

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

High Channel
Transmit Mode

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
927.25	130.93	H	—	—	Peak	1.25	148.32	
1854.50	54.03	H	110.93	-56.90	Peak	135.75	101.22	**Not in Restricted Band**
2781.75	54.03	H	73.97	-19.94	Peak	122.25	167.59	
2781.75	37.10	H	53.97	-16.87	Avg	122.25	167.59	
3709.00	58.45	H	73.97	-15.53	Peak	154.00	156.79	
3709.00	41.52	H	53.97	-12.46	Avg	154.00	156.79	
4636.25	54.71	H	73.97	-19.26	Peak	157.25	196.13	
4636.25	37.78	H	53.97	-16.19	Avg	157.25	196.13	
5563.50	57.85	H	110.93	-53.08	Peak	150.25	185.32	**Not in Restricted Band**
6490.75	62.09	H	110.93	-48.84	Peak	149.25	157.50	**Not in Restricted Band**
7418.00	49.37	H	73.97	-24.60	Peak	82.00	170.58	
7418.00	32.44	H	53.97	-21.53	Avg	82.00	170.58	
8345.25	48.45	H	73.97	-25.52	Peak	5.00	139.52	
8345.25	31.52	H	53.97	-22.45	Avg	5.00	139.52	
9272.50	48.38	H	110.93	-62.55	Peak	56.25	120.25	**Not in Restricted Band**

FCC Class B and RSS-210

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

Date: 06/21/2017
Lab: D
Tested By: Kyle Fujimoto

Non Harmonic Emissions from the Tx - 10 kHz to 30 MHz and 1 GHz to 9.3 GHz
Digital Portion from the EUT - 10 kHz to 30 MHz and 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected
								from the Non Harmonic Emissions
								from the Tx
								10 kHz to 30 MHz
								No Emissions Detected
								for the Non Harmonic Emissions
								from the Tx
								1 GHz to 9.3 GHz
								No Emissions Detected
								from the Digital Portion
								of the EUT from
								10 kHz to 30 MHz
								No Emissions Detected
								from the Digital Portion
								of the EUT from
								1 GHz to 9.3 GHz
								Tested in both Horizontal and
								Vertical Polarizations

FCC 15.247

Mojix, inc.
Turbo Antenna
Model: TMA-2000
Daisy Chain Mode

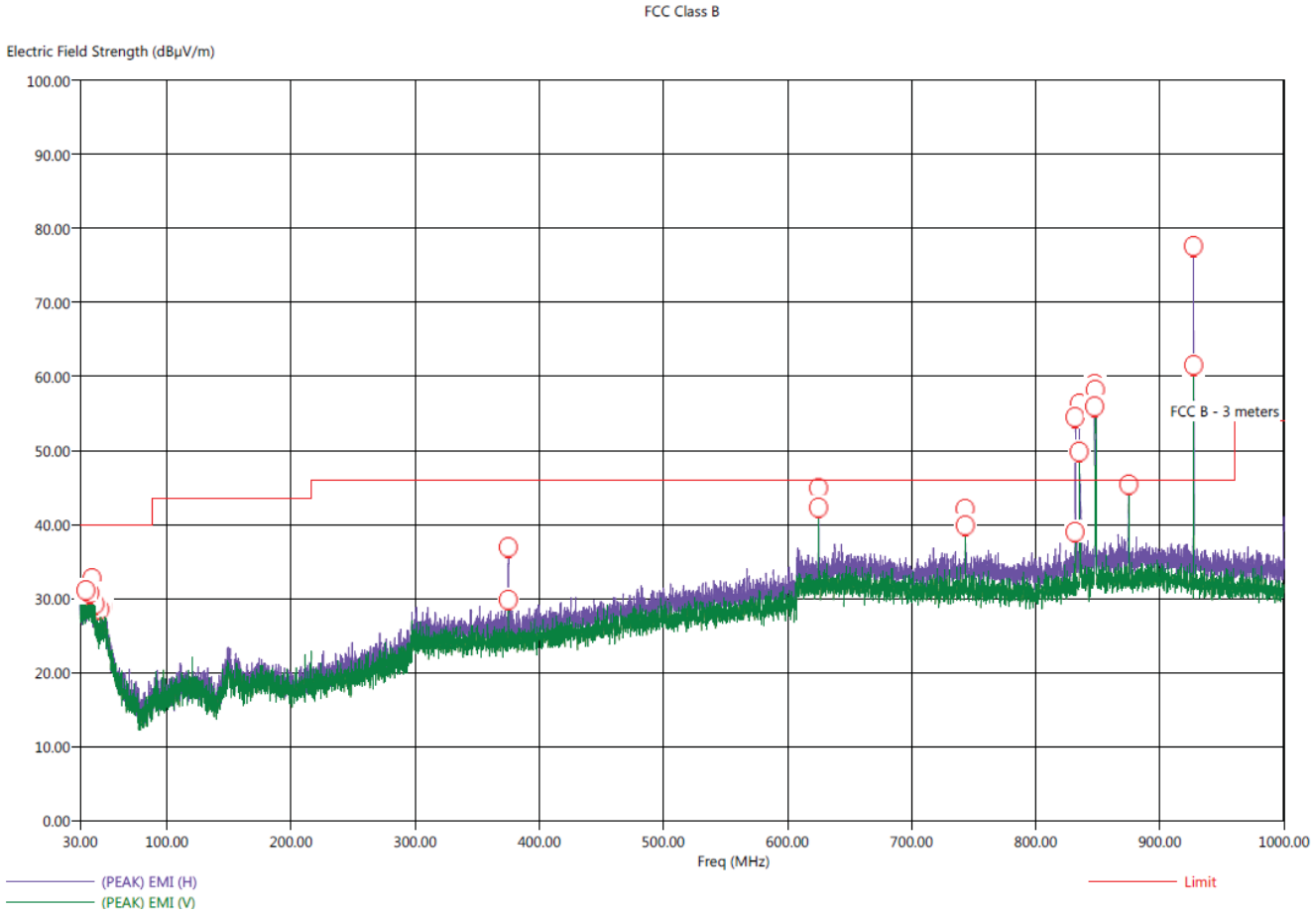
Date: 06/21/2017
Lab: D
Tested By: Kyle Fujimoto

Receiver Mode - 30 MHz to 1 GHz and 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected
								from the Receiver Mode
								for the EUT from
								30 MHz to 1 GHz
								No Emissions Detected
								from the Receiver Mode
								for the EUT from
								1 GHz to 9.3 GHz
								Tested in both Horizontal and
								Vertical Polarizations

Title: Pre-Scan - FCC Class B
File: 1 - Agilent - Pre-Scan - Extra RF Absorber - High Channel - FCC Class B - 30 MHz to 1000 MHz - 6-19-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmitting at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000
Note: The frequencies at 375 MHz, 625 MHz, and from 743.1 MHz to 927.25 MHz are from the intentional radiator and not in the restricted band and thus subject to FCC 15.247 (d) limits instead.

6/20/2017 9:06:27 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: 1 - Agilent - Final Scan - Extra RF Absorber - High Channel - FCC Class B - 30 MHz to 1000 MHz - 6-19-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmitting at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/20/2017 9:24:39 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
34.80	V	32.28	26.70	-7.72	-13.30	40.00	24.28	0.35	280.75	287.95
37.90	V	32.09	27.04	-7.91	-12.96	40.00	24.95	0.38	68.75	399.11
39.60	H	32.70	27.41	-7.30	-12.59	40.00	25.33	0.40	33.75	272.43
42.10	H	32.14	25.84	-7.86	-14.16	40.00	23.80	0.40	244.00	191.11
46.00	H	28.47	23.77	-11.53	-16.23	40.00	21.70	0.40	264.50	335.29
47.70	H	30.44	24.23	-9.56	-15.77	40.00	22.05	0.40	274.75	157.98
375.00	H	41.84	40.61	-4.16	-5.39	46.00	18.26	1.65	229.50	110.88
375.00	V	34.74	29.74	-11.26	-16.26	46.00	18.26	1.65	359.75	111.17
625.00	H	50.07	48.94	4.07	2.94	46.00	24.01	2.10	34.75	112.43
625.00	V	47.81	42.96	1.81	-3.04	46.00	24.01	2.10	183.50	111.29
743.10	H	50.03	48.19	4.03	2.19	46.00	24.43	2.56	330.75	111.00
743.30	V	44.80	42.63	-1.20	-3.37	46.00	24.43	2.56	22.00	111.11
831.80	H	56.90	51.38	10.90	5.38	46.00	25.59	2.53	28.50	143.29
831.80	V	42.47	38.82	-3.53	-7.18	46.00	25.59	2.53	359.75	112.49
835.10	V	55.00	53.97	9.00	7.97	46.00	25.72	2.54	30.50	110.46
835.20	H	56.20	55.49	10.20	9.49	46.00	25.72	2.54	332.50	175.41
847.50	H	37.76	32.62	-8.24	-13.38	46.00	26.21	2.59	265.00	367.59
847.60	V	37.84	32.61	-8.16	-13.39	46.00	26.21	2.59	144.25	337.02
848.10	V	37.23	32.64	-8.77	-13.36	46.00	26.22	2.59	92.75	303.95
875.00	V	49.80	48.62	3.80	2.62	46.00	26.60	2.60	360.00	111.23

Note: The frequencies at 375 MHz, 625 MHz, and from 743.1 MHz to 927.25 MHz are from the intentional radiator and not in the restricted band and thus subject to FCC 15.247 (d) limits instead. Please see the next page for the highest emissions that are subject to the FCC 15.247 (d) limits.

FCC 15.247
Mojix, Inc.
Turbo Antenna
Model: TMA-2000

Date: 06/20/2017
Lab: D
Tested By: Kyle Fujimoto

Emissions in Non-Restricted Frequency Bands

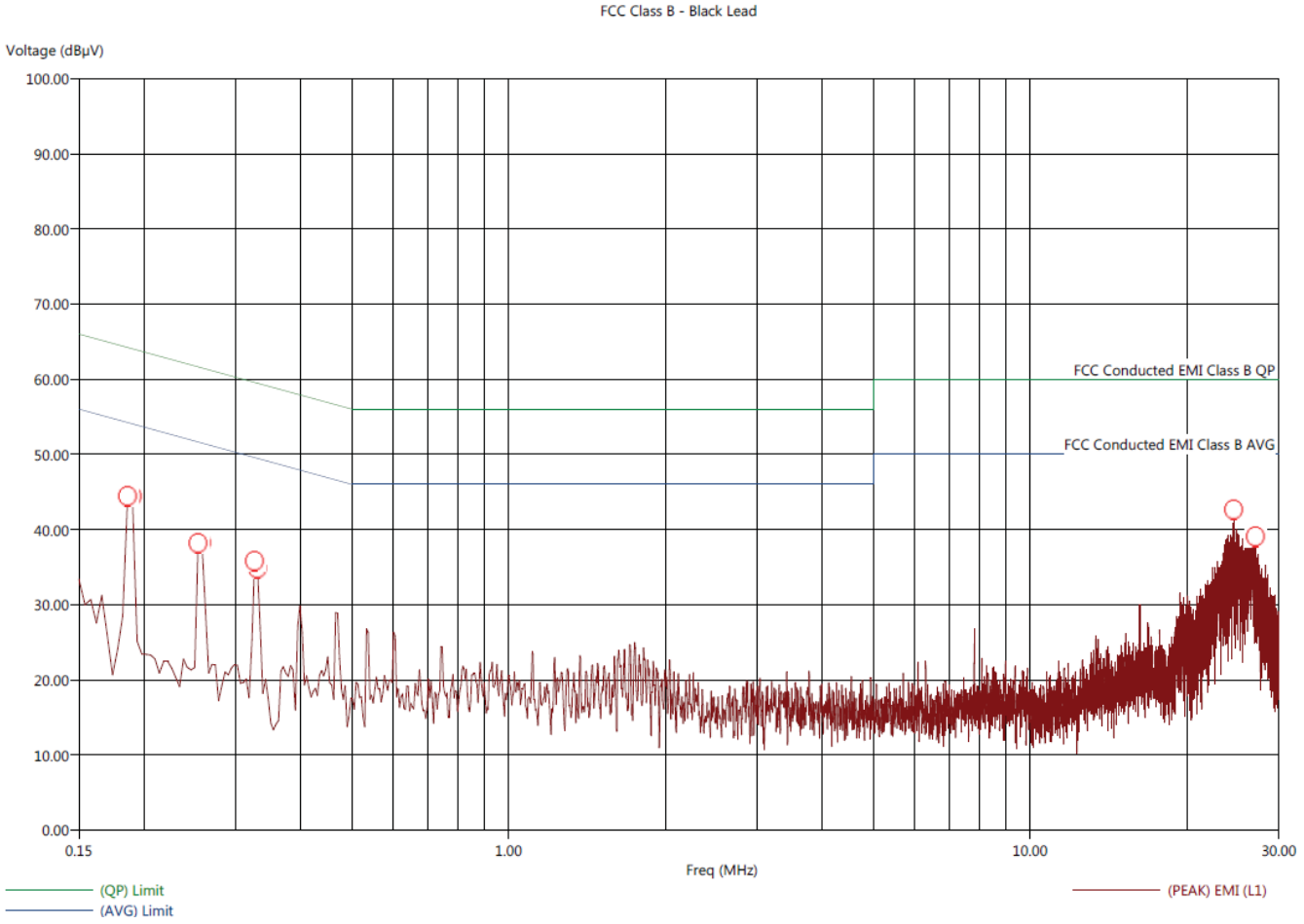
Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit (dBuV/m)	Margin	Peak / QP / Avg	Comments
625.00	50.07	H	110.93	-60.86	Peak	
625.00	47.81	V	110.93	-63.12	Peak	
743.10	50.03	H	110.93	-60.90	Peak	
743.10	44.80	V	110.93	-66.13	Peak	
831.80	56.90	H	110.93	-54.03	Peak	
831.80	42.47	V	110.93	-68.46	Peak	
835.10	55.00	V	110.93	-55.93	Peak	
835.20	56.20	H	110.93	-54.73	Peak	
875.00	49.80	V	110.93	-61.13	Peak	

Highest Non-Restricted Band Emissions
Note: The limit is based on 20 dB down from the high channel when taken with a 100 kHz RBW at 3 Meters.
See the band edge plot for the fundamental of the high channel taken at 100 kHz RBW

CONDUCTED EMISSIONS DATA SHEETS

Title: FCC Class B - Black Lead
File: 1 - CE - Pre-Scan - Tx Mode - Black Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmitting at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/22/2017 11:41:51 AM
Sequence: Preliminary Scan



Title: FCC Class B - Black Lead
File: 1 - CE - Final Scan - Tx Mode - Black Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmitting at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

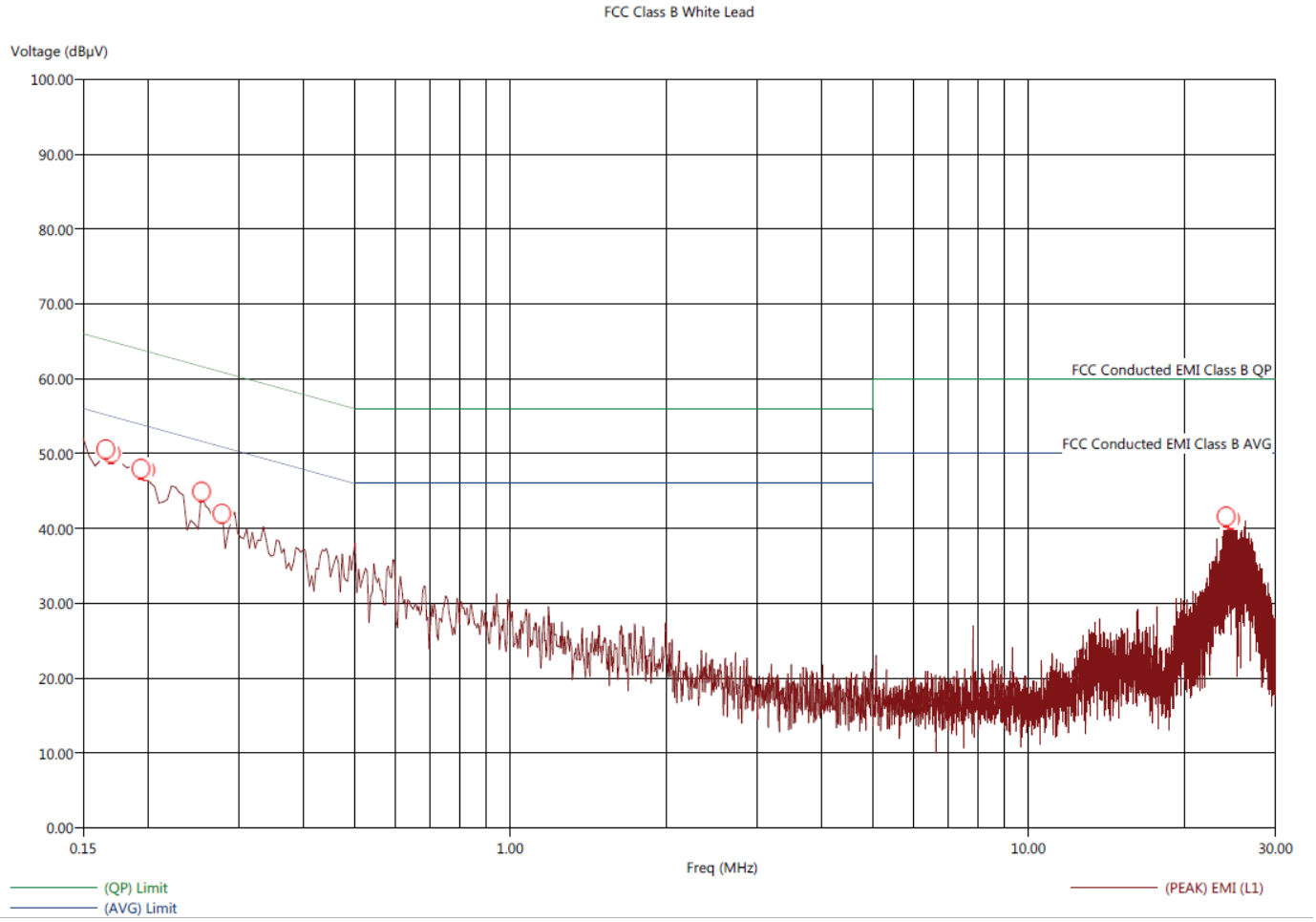
6/22/2017 11:45:12 AM
Sequence: Final Measurements

FCC Class B - Conducted Emissions - Black Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin AVL (dB)	(AVG) Margin AVL (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)
0.186	49.12	29.02	-5.18	-25.28	54.30	0.09	0.40
0.190	48.49	28.71	-5.78	-25.56	54.28	0.09	0.40
0.254	42.38	26.26	-9.21	-25.33	51.59	0.10	0.22
0.258	40.81	26.28	-10.68	-25.21	51.49	0.10	0.21
0.326	37.57	23.99	-12.28	-25.86	49.85	0.10	0.10
0.330	36.46	23.33	-12.76	-25.89	49.22	0.10	0.06
24.582	46.91	39.86	-3.09	-10.14	50.00	0.55	0.19
27.070	41.15	29.40	-8.85	-20.60	50.00	0.57	0.23

Title: FCC Class B - White Lead
File: 2 - CE - Pre-Scan - Tx Mode - White Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmitting at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/22/2017 11:50:15 AM
Sequence: Preliminary Scan



Title: FCC Class B - White Lead
File: 2 - CE - Final Scan - Tx Mode - White Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously transmittinng at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

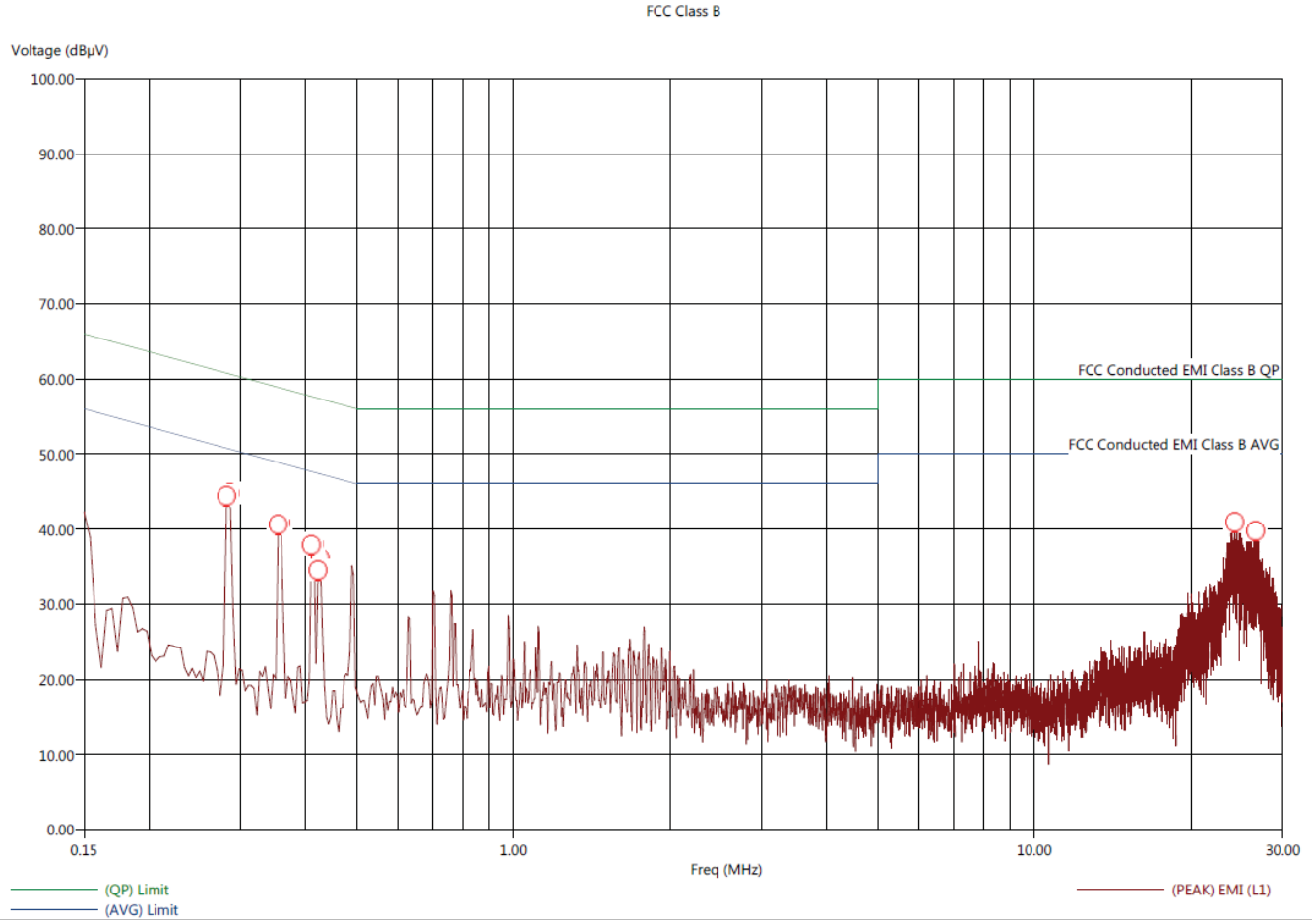
6/22/2017 11:53:40 AM
Sequence: Final Measurements

FCC Class B - Conducted Emissions - White Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin AVL (dB)	(AVG) Margin AVL (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)
0.166	49.56	28.84	-5.88	-26.60	55.44	0.07	0.46
0.170	48.67	28.80	-6.57	-26.44	55.24	0.07	0.45
0.194	45.16	25.56	-8.53	-28.13	53.69	0.10	0.35
0.198	45.24	25.66	-8.44	-28.02	53.68	0.10	0.34
0.254	40.44	26.24	-11.10	-25.30	51.54	0.10	0.20
0.278	40.19	25.78	-11.16	-25.57	51.35	0.10	0.19
24.098	43.82	31.82	-6.18	-18.18	50.00	0.55	0.09
24.558	42.53	30.85	-7.47	-19.15	50.00	0.55	0.08
24.578	46.58	39.03	-3.42	-10.97	50.00	0.55	0.09
24.770	42.25	30.34	-7.75	-19.66	50.00	0.55	0.09

Title: FCC Class B - Black Lead
File: 3 - CE - Pre-Scan - Rx Mode - Black Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously receiving at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/22/2017 1:30:04 PM
Sequence: Preliminary Scan



Title: FCC Class B - Black Lead
File: 3 - CE - Final Scan - Rx Mode - Black Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously receiving at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

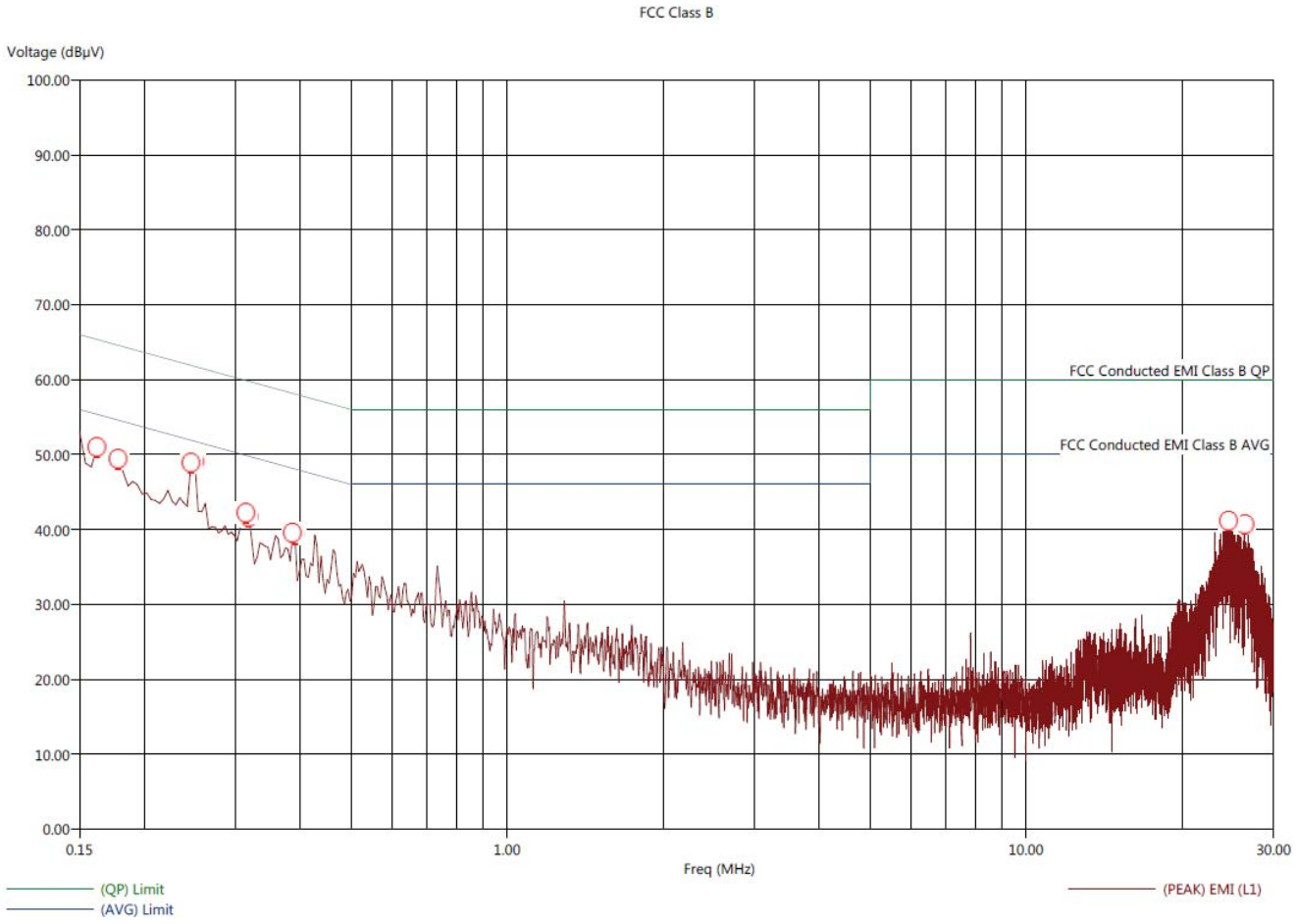
6/22/2017 1:31:36 PM
Sequence: Final Measurements

FCC Class B - Conducted Emissions - Black Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin AVL (dB)	(AVG) Margin AVL (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)
0.282	46.23	27.61	-4.42	-23.04	50.66	0.10	0.15
0.286	45.99	27.64	-4.47	-22.82	50.46	0.10	0.14
0.354	42.71	24.48	-6.06	-24.29	48.77	0.10	0.04
0.358	42.66	24.68	-6.34	-24.32	49.01	0.10	0.04
0.410	40.13	23.29	-7.70	-24.54	47.83	0.10	0.05
0.414	39.99	22.47	-7.27	-24.79	47.26	0.10	0.05
0.422	40.71	23.15	-6.93	-24.49	47.64	0.10	0.05
0.426	40.88	23.04	-6.68	-24.52	47.56	0.10	0.05
24.290	41.25	29.35	-8.75	-20.65	50.00	0.55	0.19
26.614	40.40	28.68	-9.60	-21.32	50.00	0.57	0.23

Title: FCC Class B - White Lead
File: 4 - CE - Pre-Scan - Rx Mode - White Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously receiving at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/22/2017 1:25:34 PM
Sequence: Preliminary Scan



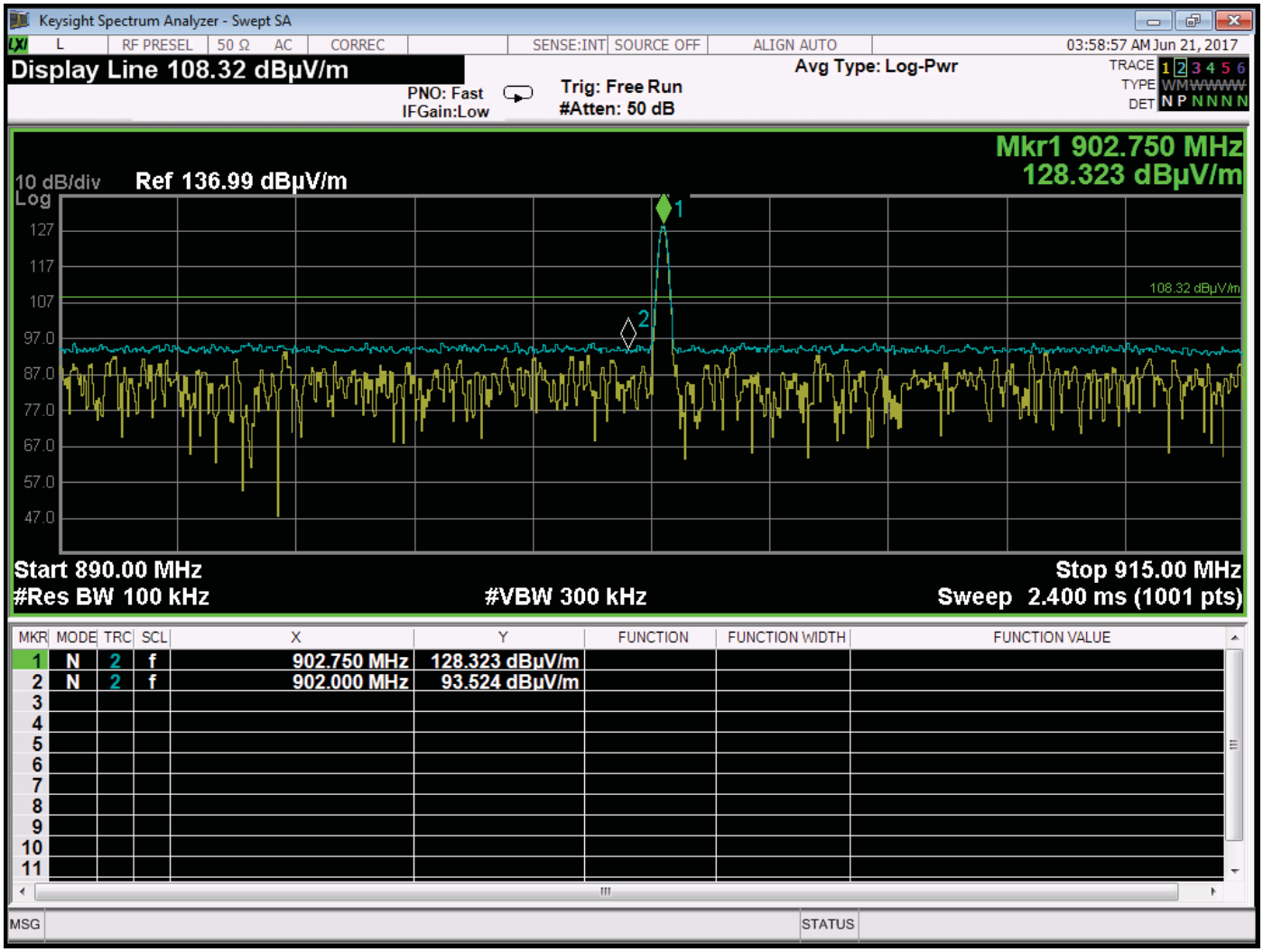
Title: FCC Class B - White Lead
File: 4 - CE - Final Scan - Rx Mode - White Lead - FCC Class B - 6-22-2017.set
Operator: Kyle Fujimoto
EUT Type: Turbo Antenna
EUT Condition: The EUT is continuously receiving at the High Channel (Worst Case)
Comments: Company: Mojix, Inc.
Model: TMA-2000

6/22/2017 1:27:10 PM
Sequence: Final Measurements

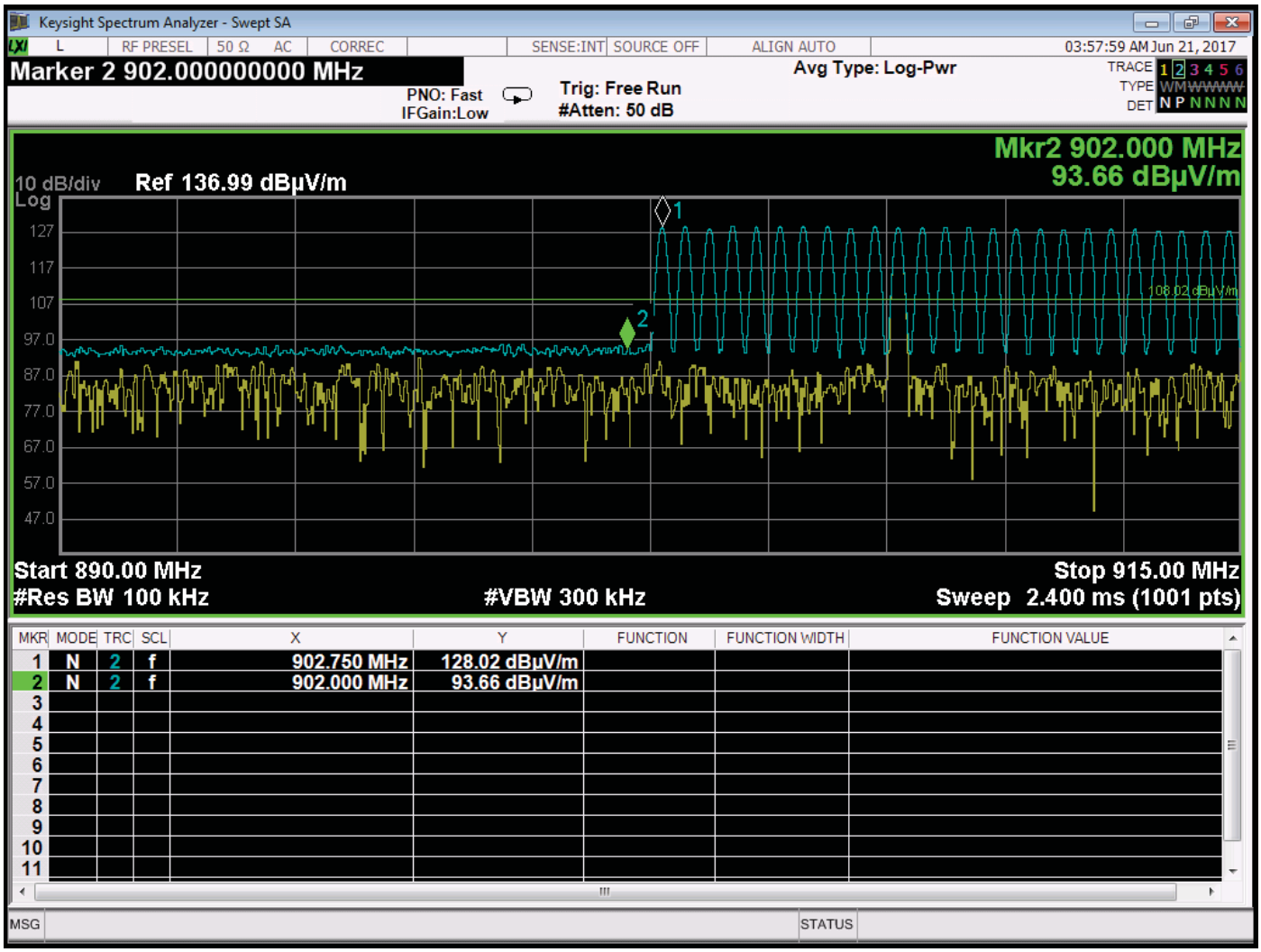
FCC Class B - Conducted Emissions - White Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin AVL (dB)	(AVG) Margin AVL (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)
0.162	58.32	36.90	2.90	-18.52	55.42	0.07	0.46
0.178	55.85	34.53	1.34	-19.98	54.52	0.08	0.40
0.246	49.21	29.47	-2.49	-22.23	51.70	0.10	0.21
0.250	49.92	29.05	-2.07	-22.94	51.99	0.10	0.23
0.314	44.78	26.42	-5.18	-23.54	49.95	0.10	0.10
0.318	45.21	26.53	-4.83	-23.51	50.04	0.10	0.10
0.386	42.31	23.92	-5.95	-24.34	48.25	0.10	0.04
0.390	41.19	23.56	-7.03	-24.66	48.22	0.10	0.04
24.598	45.22	36.87	-4.78	-13.13	50.00	0.55	0.09
26.422	41.18	29.10	-8.82	-20.90	50.00	0.57	0.10

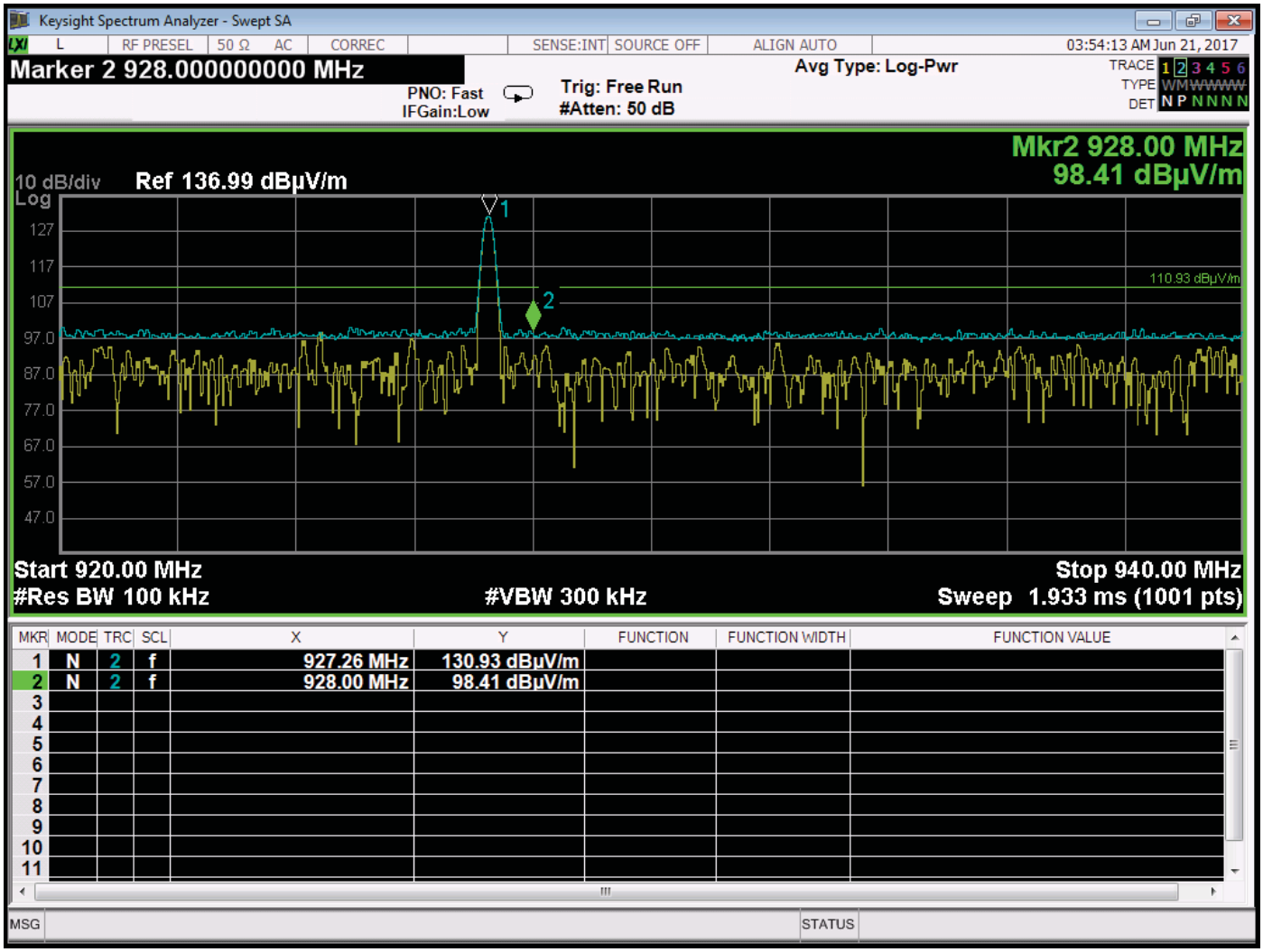
BAND EDGES DATA SHEETS



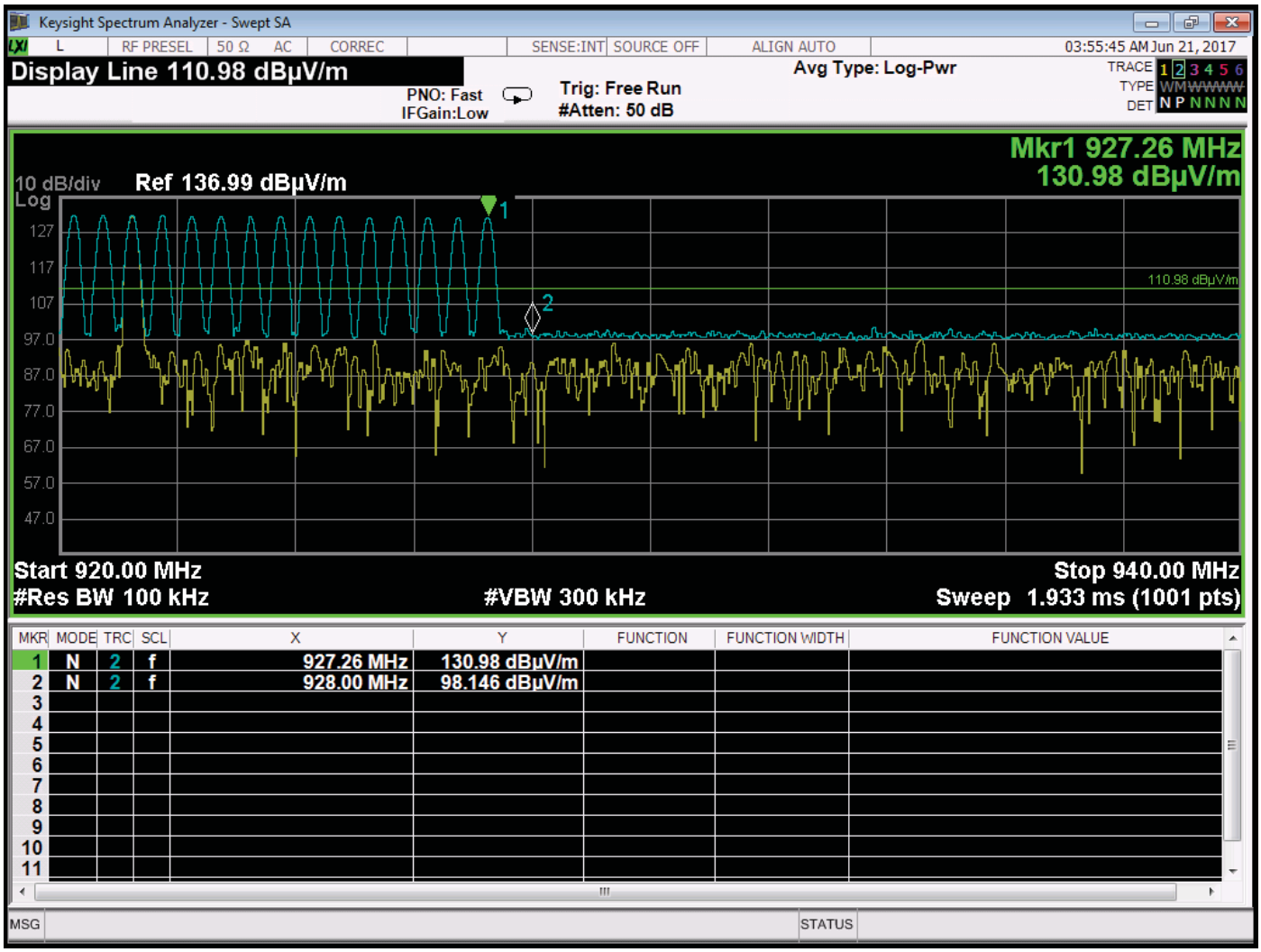
Band Edge – Low Channel – Fixed Frequency Mode



Band Edge – Low Channel – Frequency Hopping Mode

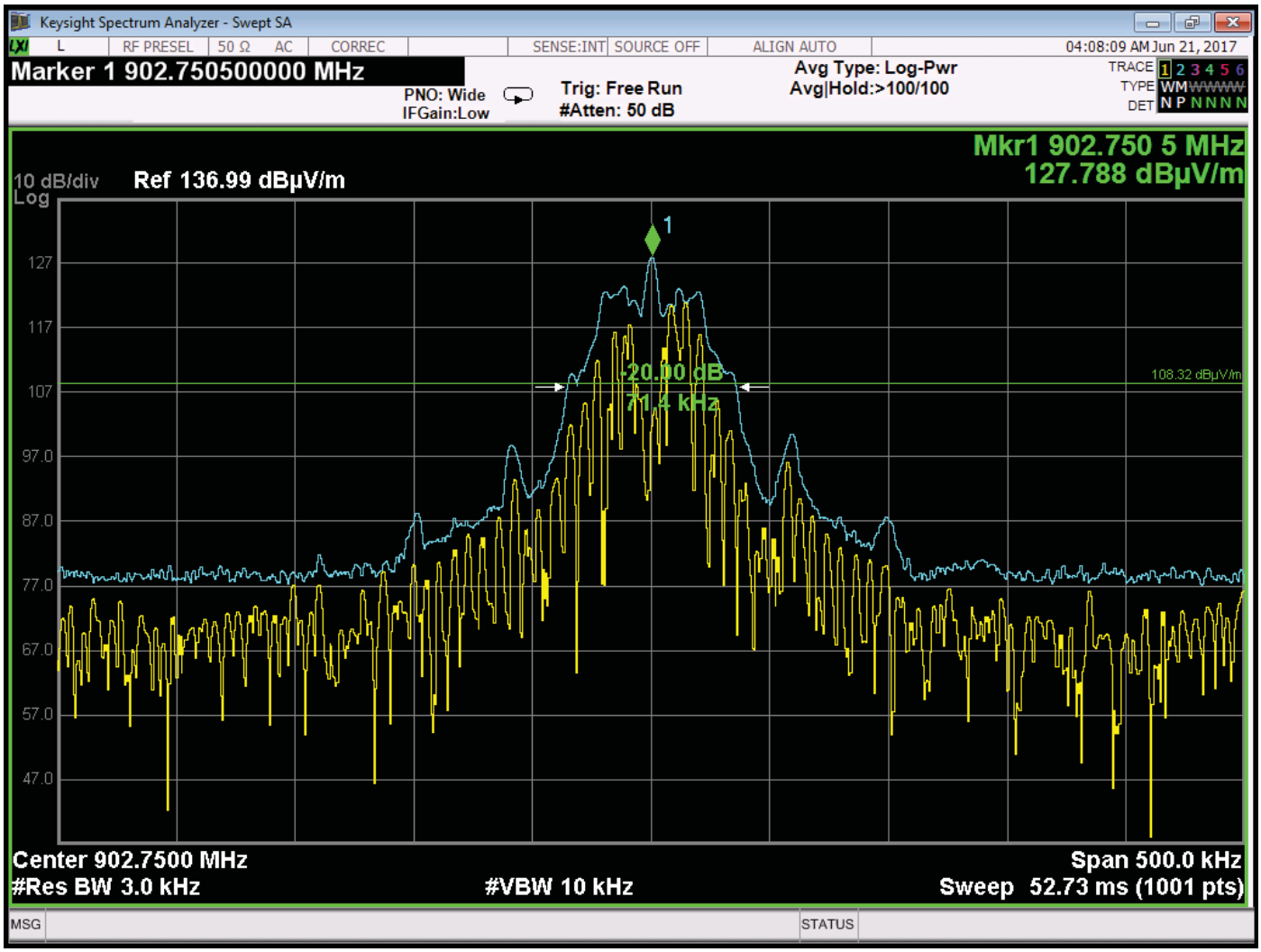


Band Edge – High Channel – Fixed Frequency Mode

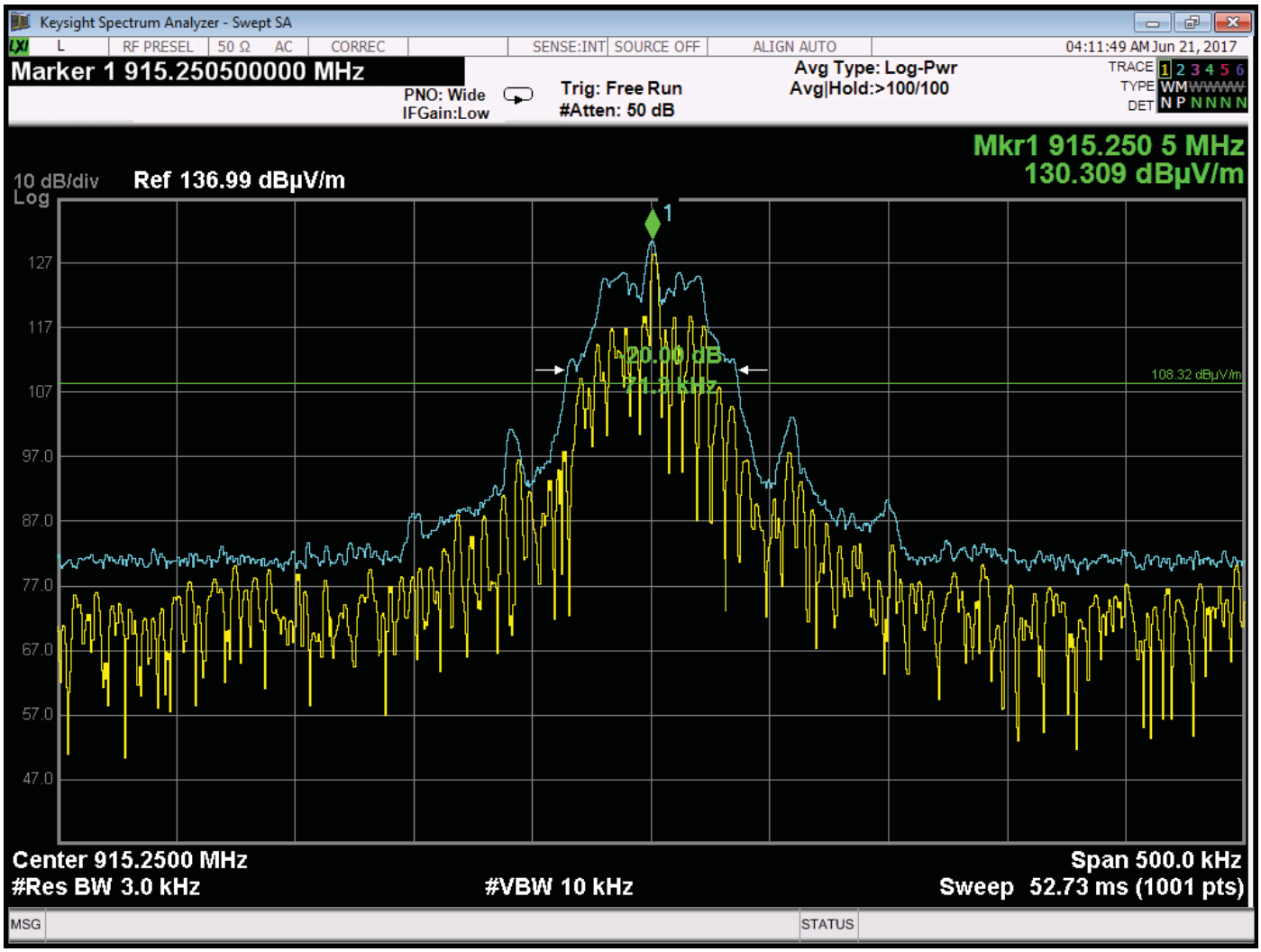


Band Edge – High Channel – Frequency Hopping Mode

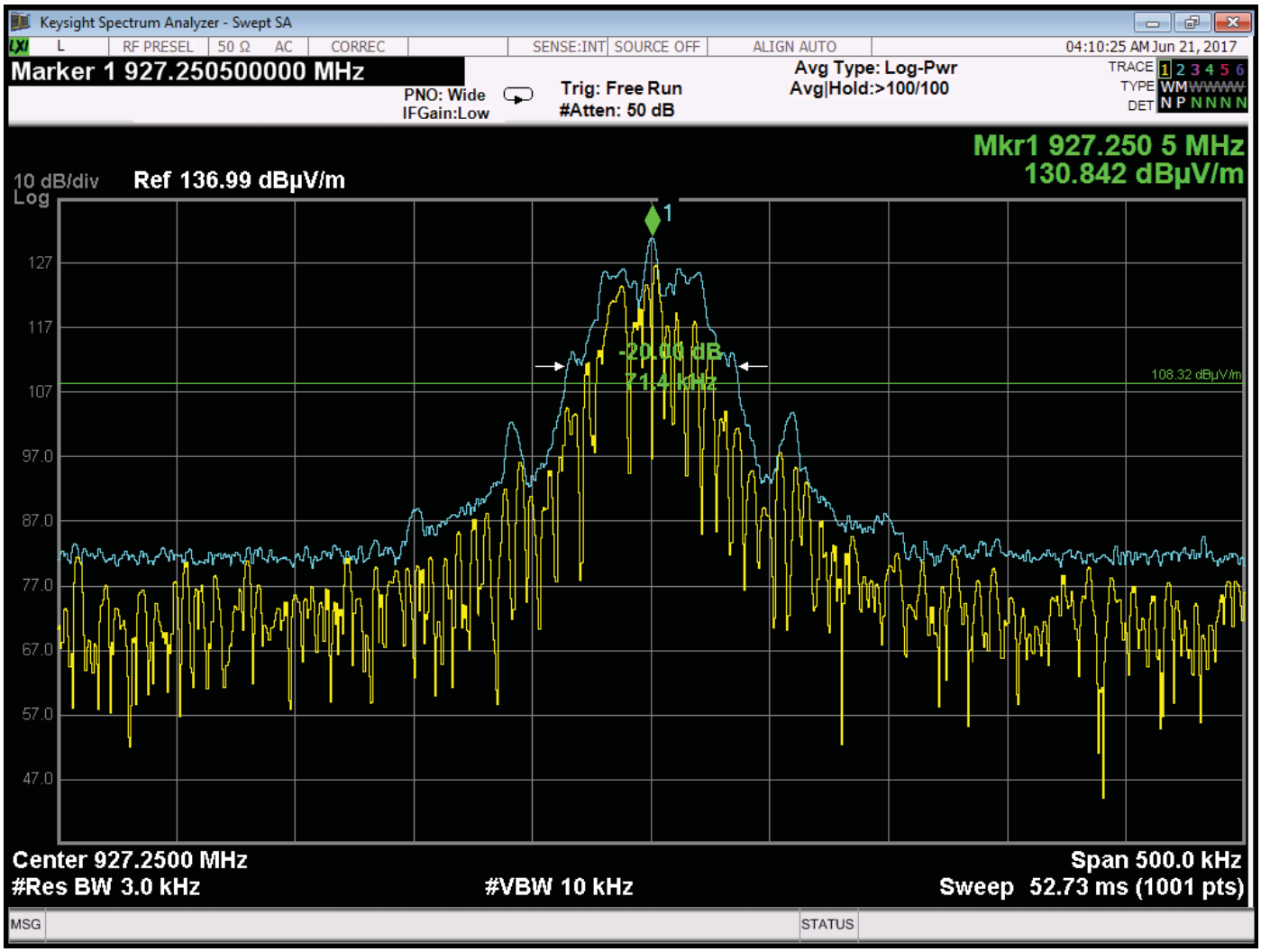
-20 DB BANDWIDTH DATA SHEETS



-20 dB Bandwidth – Low Channel



-20 dB Bandwidth – Middle Channel



-20 dB Bandwidth – High Channel

PEAK POWER OUTPUT DATA SHEETS

FCC 15.247
Mojix, inc.
Turbo Antenna
Model: TMA-2000

Date: 06/19/2017
Lab: D
Tested By: Kyle Fujimoto

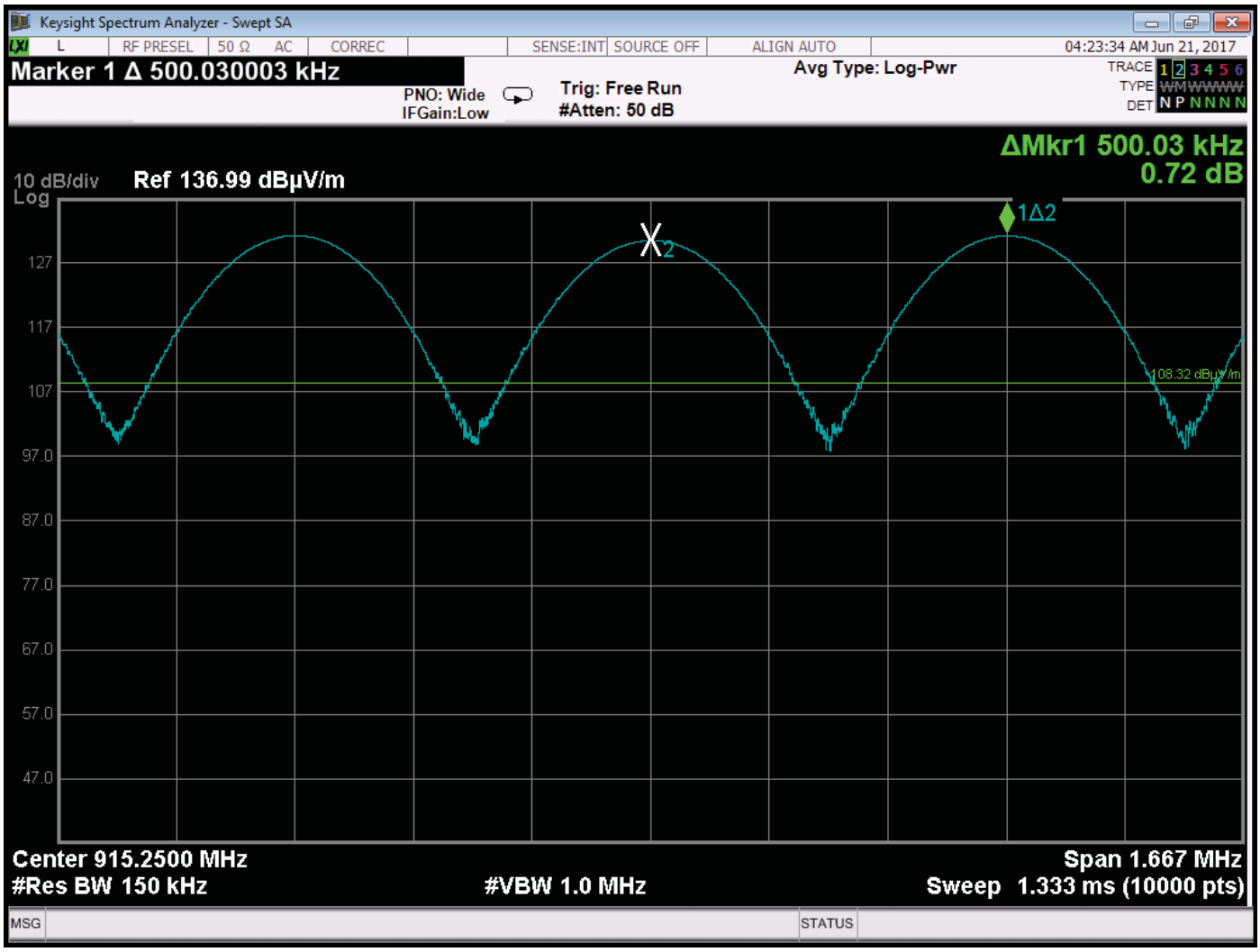
Limit = 24 dBm due to 12 dBi Gain Antenna
With Cable and then Terminator to simulate Daisy Chain
Peak Output Power

Freq. (MHz)	Level (dBuV/m)	Level (V/m)	Numeric Gain	Power Output (Watts)	Power Output (mW)	Power Output (dBm)	Margin	Comments
902.75	115.53	0.597723	15.8489	0.0067627	6.76272	8.30	-15.70	Vert. - 0 Degrees
915.25	113.46	0.4709773	15.8489	0.0041988	4.19876	6.23	-17.77	Vert. - 0 Degrees
927.25	113.44	0.4697318	15.8489	0.0041766	4.17658	6.21	-17.79	Vert. - 0 Degrees
902.75	128.32	2.6070538	15.8489	0.1286534	128.653	21.09	-2.91	Horiz. - 0 Degrees
915.25	131.00	3.5481339	15.8489	0.2382985	238.298	23.77	-0.23	Horiz. - 0 Degrees
927.25	130.93	3.5196542	15.8489	0.2344883	234.488	23.70	-0.30	Horiz. - 0 Degrees

The Power in Watts is obtained by the following Formula Below:

P=[(E*D)^2]/(30*G)
P = Power in Watts
E = The Measured Maximum Field Strength in V/m
G = The Numeric Gain of the Transmitting Antenna over an Isotropic Radiator

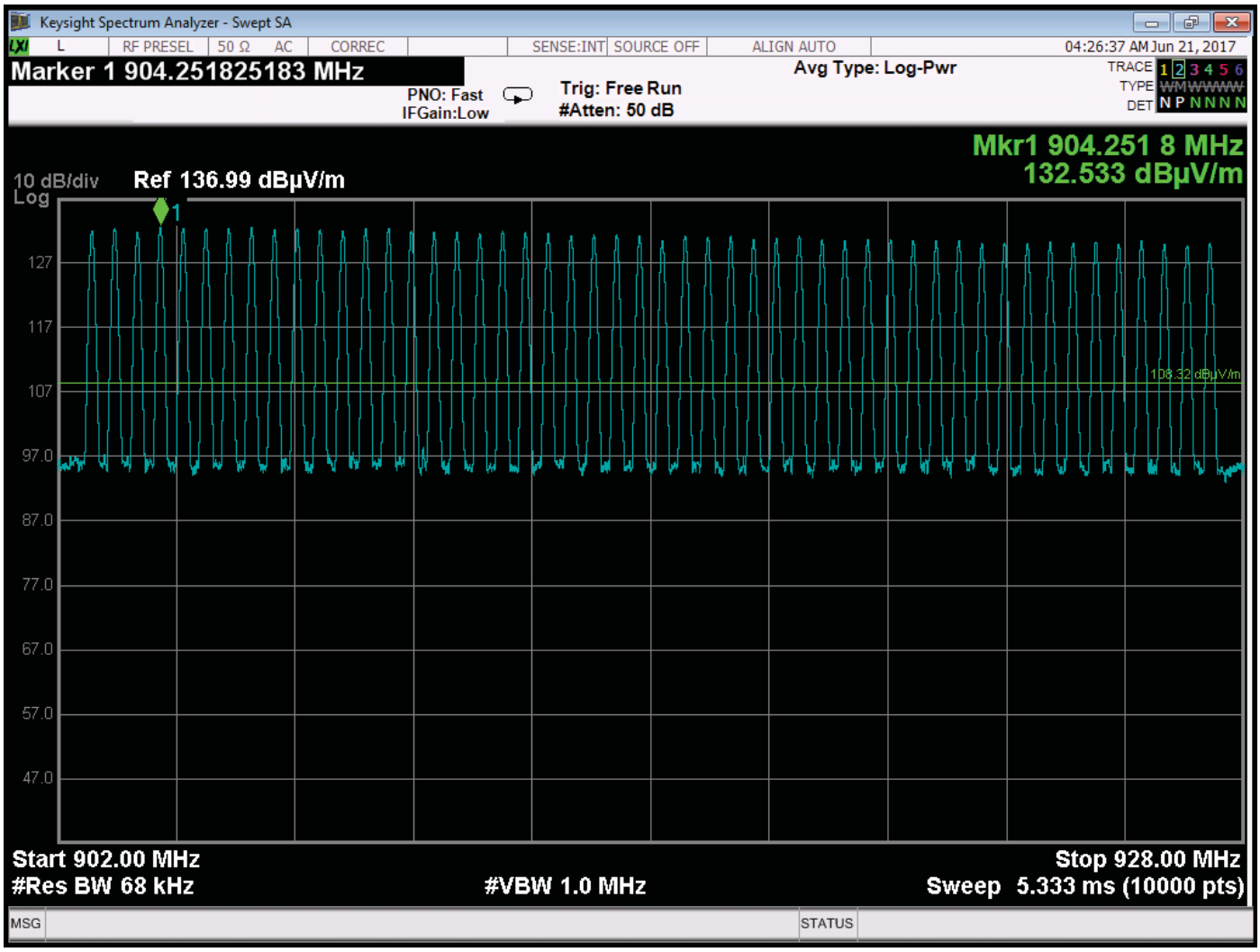
CHANNEL FREQUENCY SEPARATION DATA SHEET



Channel Frequency Separation

NUMBER OF FREQUENCIES

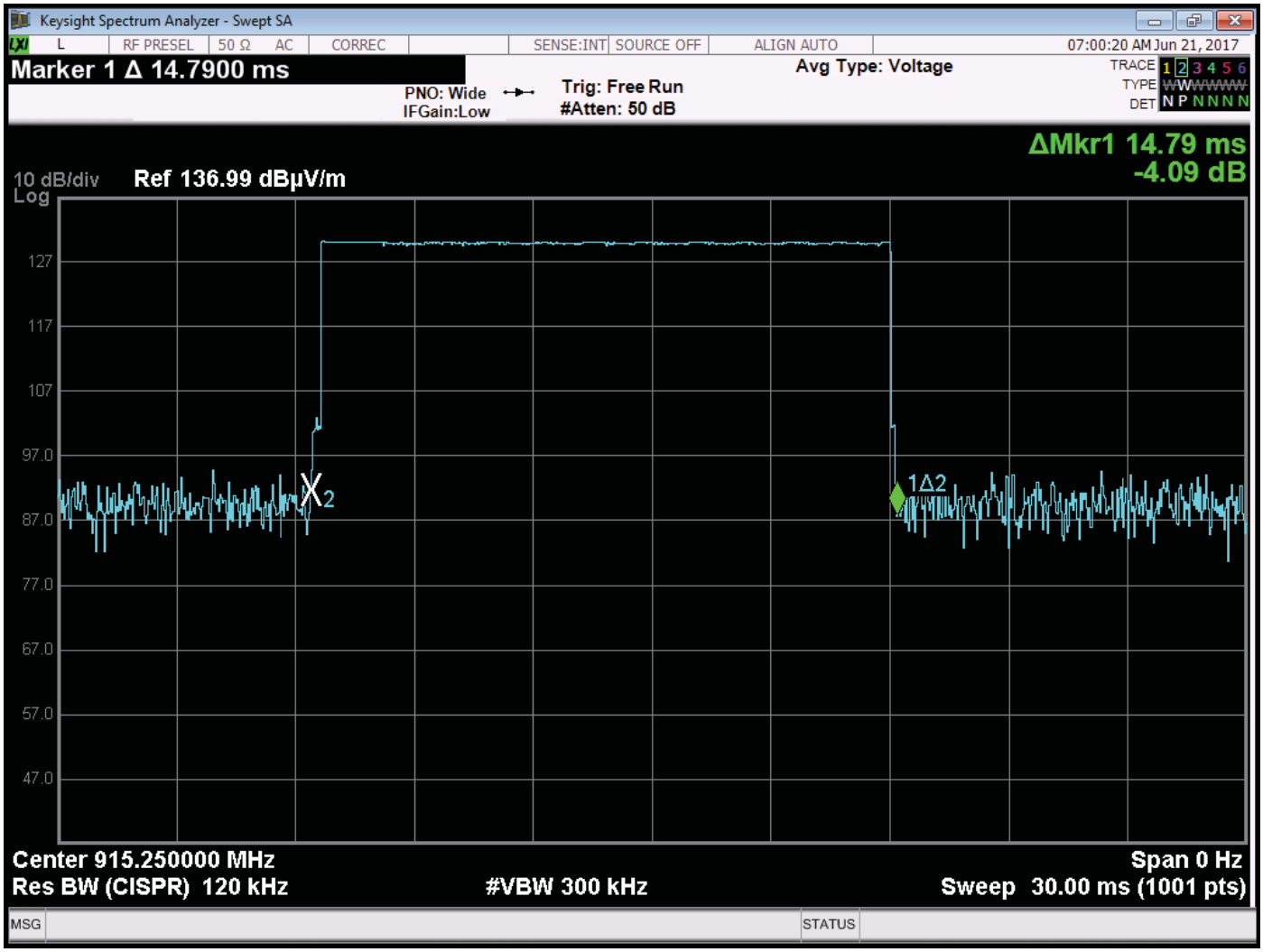
DATA SHEET



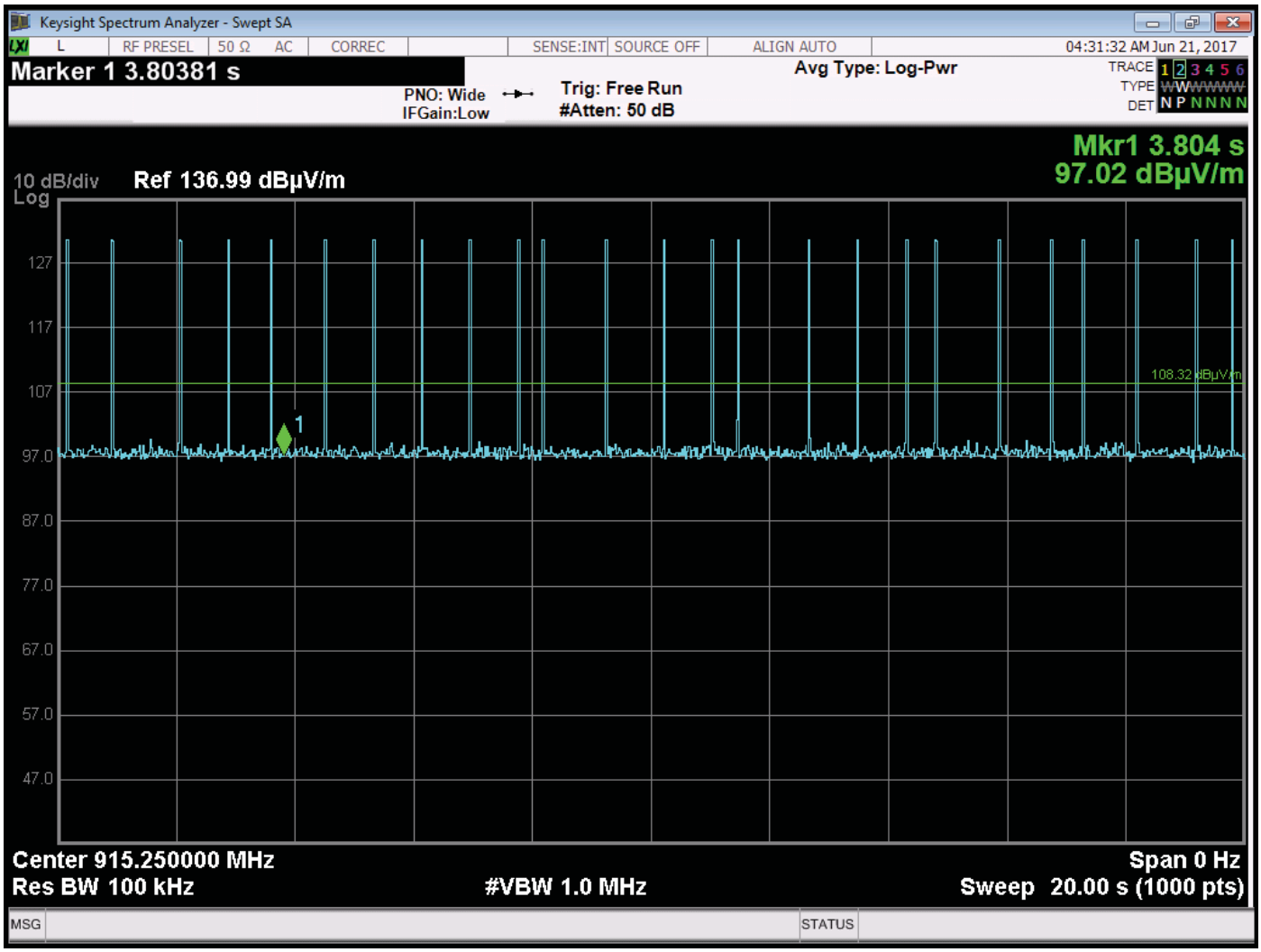
Number of Channels is 50

TIME OF OCCUPANCY

DATA SHEET



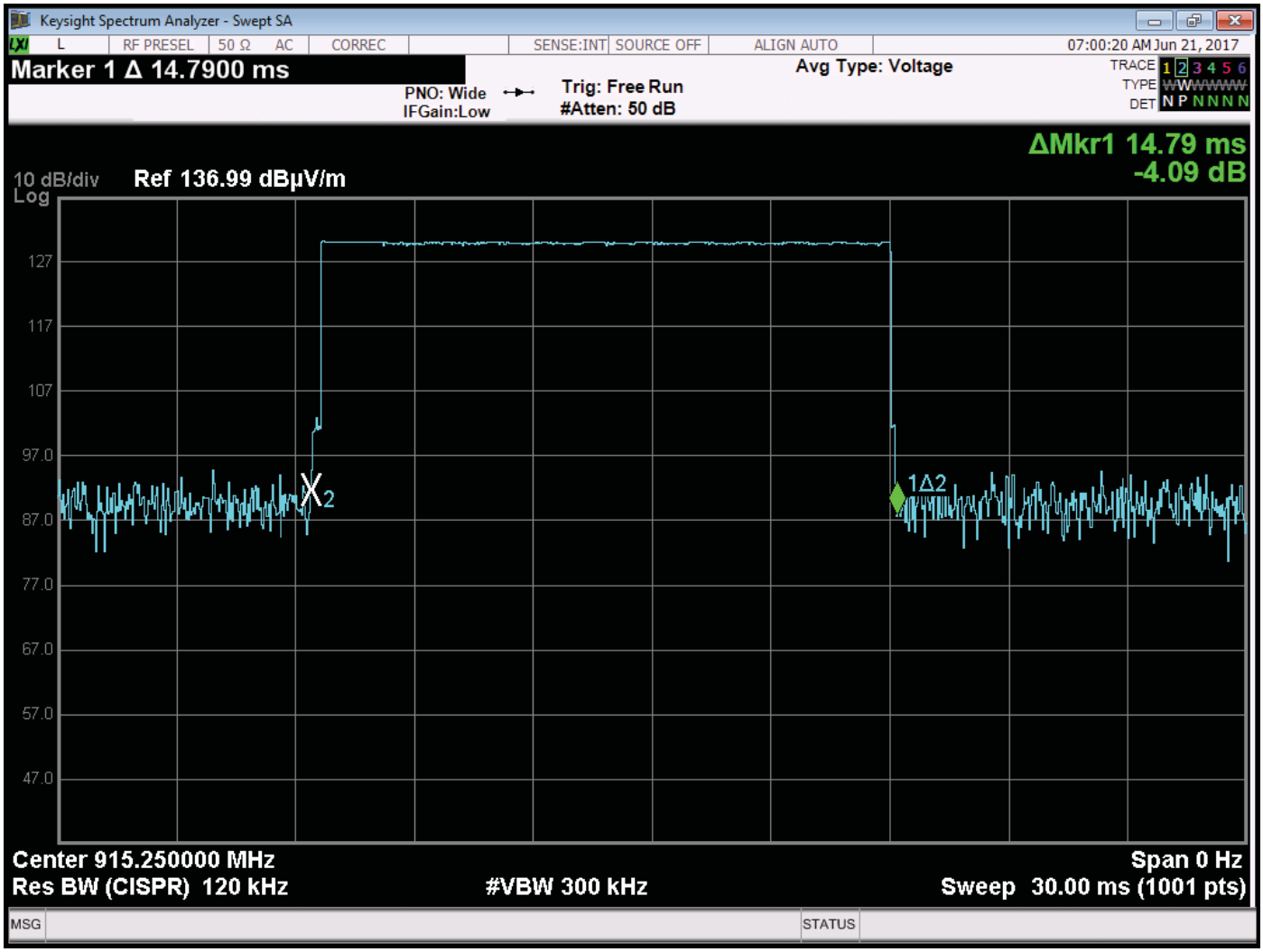
Time of One Pulse = 14.79 ms



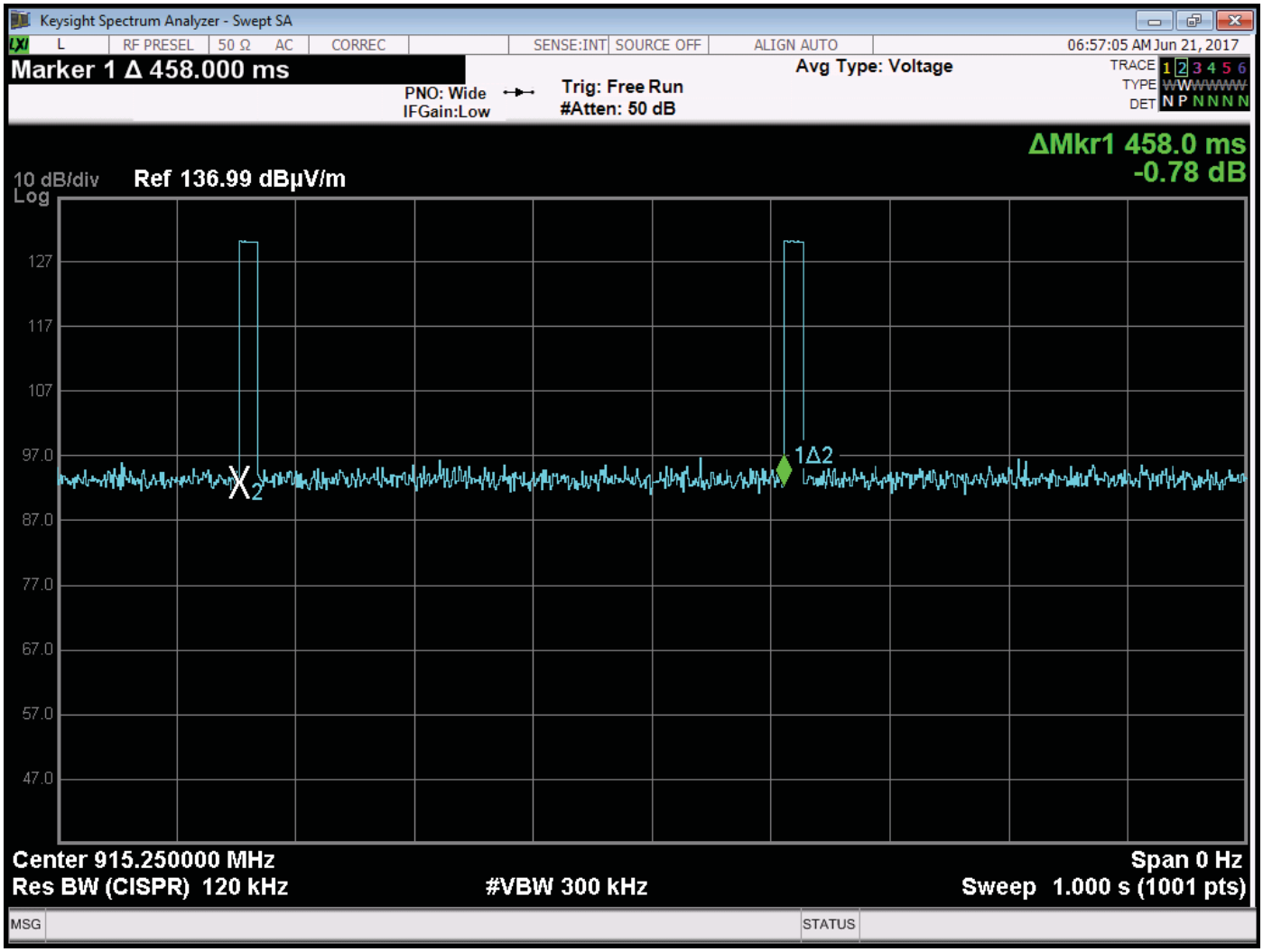
Worst Case of 25 pulses in 20 seconds
Total Dwell Time = 14.79* 25 = 369.75 ms
Limit = 400 ms in a 20 second period

DUTY CYCLE

DATA SHEETS



Time of one Pulse = 14.79 ms



One Pulse per 100 ms

Total Duty Cycle = 14.79 ms / 100 ms = 14.79%

Peak to Average Ratio = -16.6 dB