FCC PART 15, SUBPART B and C; RSS-247 and RSS-GEN
TEST REPORT

for

BRIDGE

MODEL: MMS100

Prepared for

NORTEK SECURITY & CONTROL, LLC
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CARLSBAD, CALIFORNIA 92010

Prepared by:_____

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DATE: NOVEMBER 26, 2019

	REPORT BODY	APPENDICES					TOTAL
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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:	Bridge Model: MMS100 S/N: N/A
Product Description:	The EUT acts as a WiFi access point to allow communication between the customers home WiFi and automatic gate controller.
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	Nortek Security & Control, LLC 5919 Sea Otter Place Carlsbad, California 92010
Test Dates:	October 1, 3, 16, 17, and 18, 2019; November 7, 2019; and April 8, 2020

Test Specifications covered by accreditation:

Emissions requirements
CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247;
RSS-247 and RSS-GEN
Test Procedure: ANSI C63.4 and ANSI C63.10

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SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; the limits of CFR Title 47, Part 15, Subpart C, section 15.207; RSS-247 and RSS-GEN See section 6.3 for Measurement Uncertainty
2	Radiated RF Emissions, 9 kHz – 9300 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; the limits of CFR Title 47, Part 15, Subpart C, section 15.209; RSS-247 and RSS-GEN See section 6.3 for Measurement Uncertainty
3	20 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1)(i); RSS-247 and RSS-GEN
4	Peak Power Output	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(2); RSS-247 and RSS-GEN
5	RF Band Edges	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d); RSS-247 and RSS-GEN
6	Number of Hopping Frequencies	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (a)(1)(i); RSS-247 and RSS-GEN
7	RF Conducted Antenna Test	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (d); RSS-247 and RSS-GEN
8	Carrier Frequency Separation	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1); RSS-247 and RSS-GEN
9	Average Time of Occupancy	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (a)(1)(i); RSS-247 and RSS-GEN
10	Variation of Input Power	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart A, section 15.31 (e); RSS-247 and RSS-GEN

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Bridge, Model: MMS100. 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; RSS-247 and RSS-GEN.

Note: This test report only covers the DSS requirements of the EUT. For the DTS requirements, please see test report B91028D1.

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

Nortek Security & Control, LLC

Josh Hansen	Engineering Manager, Regulatory

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on prior to the initial test date.

2.5 Disposition of the Test Sample

The test sample has not been returned to Nortek Secuity & Control, LLC 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
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
558074 D01 DTS Meas Guidance v05r02	Guidance for Performing Compliance Measurements on Digital Transmissions Systems (DTS) Operating Under Section 15.247
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
RSS-Gen Issue 5 April 2019 Amendment 1	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmissions Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

4. DESCRIPTION OF TEST CONFIGURATION

The Bridge, Model: MMS100 (EUT) was connected to a switching power supply via its power in port.

When being programmed, the EUT was also connected to a laptop. The laptop was also connected to an AC Adapter. The programming allowed the EUT to operate at the low, middle, and high channels for 802.11b, 802.11g, 802.11n, and 900 MHz FHSS. The programming also allowed the EUT to transmit the WiFi and the 900 MHz FHSS simultaneously. The laptop was removed prior to the testing.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The final emissions data was taken in this mode of operation and any cables were maximized. All initial investigations were performed with the EMI Receiver in manual mode scanning the frequency range continuously. Photographs of the test setup are in Appendix D of this report.

4.1.1 Cable Construction and Termination

Cable 1 This is a 1.2 meter unshielded cable connecting the EUT to the switching power supply. The cable has a 1/8 inch power connector at the EUT end and is hard wired into the switching power supply

Cable 2 This is a 2 meter braid shielded cable connecting the EUT to the laptop. The cable has 3 jumpers at the EUT and a USB type 'A' connector at the laptop end. The shield of the cable was grounded to the chassis via the connector. This cable was removed prior to the testing as it was only used to program the EUT.

Cable 3 This is a 2 meter unshielded cable connecting the laptop to the AC Adapter. The cable has a 1-pin connector at the laptop end and is hard wired into the AC Adapter. The cable has a molded ferrite at the EUT end. The cable was removed prior to the testing as it was only used with the laptop to program the EUT.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
BRIDGE (EUT)	NORTEK SECURITY & CONTROL, LLC	MMS100	N/A	I6H-MMS100
SWITCH POWER SUPPLY (EUT)	N/A	MKS-0502000H	N/A	N/A
LAPTOP	LENOVO	T430	101-2037	DoC
FIRMWARE*	TEXAS INSTRUMENTS	CC310013200	V1.2.5942.19689	N/A
AC ADAPTER (LAPTOP)	LENOVO	DCWP CM-2	11592P1156Z1ZDXN01L1ND	N/A

*****This is the software used to program the EUT so that it can transmit in the low, middle, and high channels and also transmit in its normal operation on a continuous basis.

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
RADIATED AND CONDUCTED EMISSIONS TEST EQUIPMENT					
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 Technologies	N9038A	MY5120150	August 23, 2019	1 Year
CombiLog Antenna	Com-Power	AC-220	061093	June 5, 2019	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
Turntable	Com-Power	TT-100	N/A	N/A	N/A
Antenna-Mast	Com-Power	AM-100	N/A	N/A	N/A
Horn Antenna	Com-Power	AH-118	071302	February 22, 2018	2 Year
Preamplifier	Com-Power	PA-118	181653	January 25, 2019	1 Year
Loop Antenna	Com-Power	AL-130R	121090	February 5, 2019	2 Year
LISN (EUT)	Com-Power	LI-215A	191951	August 7, 2019	1 Year
LISN (ACC)	Com-Power	LI-215A	191952	August 7, 2019	1 Year
Attenuator 10 dB	SureCall	SC-ATT-10	17100025	November 27, 2018	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 EUT was not grounded.

6.3 Measurement Uncertainty

Compatible Electronics' U_{lab} value is less than U_{cispr}, thus based on this − compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

MEASUREMENT TYPE	UNCERTAINTY VALUES
Radiated Emissions 30 MHz to 1000 MHz	3.26 dB (Vertical) 3.19 dB (Horizontal)
Radiated Emissions 1 GHz to 40 GHz	3.67 dB (Both Vertical and Horizontal)
AC Line Conducted Emissions 0.15 MHz to 30 MHz	2.72 dB (Line and Neutral Leads)

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 Description and Frequencies

The EUT operates on fifty channels. The low channel is at 902.3 MHz, the middle channel at 915 MHz, and the high channel at 927.8 MHz.

7.2 Antenna Gain

The gain of the 900 MHz antenna is 2.5 dBi.
The gain for the chip antenna is 1.9 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 10 dB Attenuator 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 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 computer software. The final qualification data is located in Appendix E.

The six highest reading are listed in Table 2.

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; the limits of CFR Title 47, Part 15, Subpart C, Section 15.207; and RSS-GEN. Please see Appendix E for the data sheets.

8.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. Preamplifiers were 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. The effective measurement bandwidth used for the radiated emissions test was according to the frequency measured.

The frequencies below 1 GHz were quasi-peaked using the quasi-peak detector of the EMI Receiver.

The frequencies above 1 GHz were averaged using a 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. 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 EUT was tested at a 3-meter test distance. The six highest emissions are listed in Table 1.0.

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 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); and RSS-247 and RSS-GEN for radiated emissions.

8.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
Bridge
Model: MMS100

Frequency MHz	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) dB)
8235.00 (H) (Y-Axis)	53.61 (Avg)	53.97	-0.36
2706.90 (H) (Z-Axis)	53.55 (Avg)	53.97	-0.42
8350.20 (V) (X-Axis)	52.77 (Avg)	53.97	-1.20
2745.00 (V) (Y-Axis)	52.39 (Avg)	53.97	-1.58
2745.00 (V) (X-Axis)	51.88 (Avg)	53.97	-2.10
2745.00 (H) (Z-Axis)	51.66 (Avg)	53.97	-2.31

Notes:
* The complete emissions data is given in Appendix E of this report.
(AVG) Average
(H) Horizontal
(V) Vertical

Table 2.0 CONDUCTED EMISSION RESULTS
Bridge
Model: MMS100

Frequency MHz	EMI Reading (dBuV/m)	Specification Limit (dBuV/m)	Delta (Cor. Reading – Spec. Limit) dB)
0.542 (802.11g) (BL)	34.61 (Avg)	46.00	-11.39
0.550 (802.11b) (BL)	34.50 (Avg)	46.00	-11.50
0.550 (802.11g) (BL)	34.48 (Avg)	46.00	-11.52
0.546 (802.11g) (BL)	34.38 (Avg)	46.00	-11.62
0.550 (802.11n) (BL)	34.21 (Avg)	46.00	-11.79
0.554 (802.11g) (BL)	34.09 (Avg)	46.00	-11.91

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

8.2 20 dB Bandwidth

The 20 dB Bandwidth was measured using the EMI Receiver. The resolution bandwidth was within 1 % to 5 % of the occupied bandwidth and the VBW ≥ [3 X RBW].

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(1)(i); and RSS-247. 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 Maximum Peak Conducted Output Power was measured using the EMI Receiver. The Maximum Peak Conducted Output Power was measured using the procedure described in section 7.8.5 of ANSI C63.10. The Maximum Peak Conducted Output Power was then taken. The following steps were performed for measuring the Maximum Peak Conducted Output Power.

1. Set the RBW ≥ 20 dB Bandwidth
2. Set VBW ≥ RBW
3. Set span ≥ [5 x RBW]
4. Sweep time = auto couple
5. Detector = peak
6. Trace mode = max hold
7. Allow trace to fully stabilize
8. Use peak marker function to determine the peak amplitude level

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (b)(2); and RSS-247.

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:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d); and RSS-247.

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); and RSS-247. 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); and RSS-247. 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 less than 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); and RSS-247. 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 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); and RSS-247. Please see the data sheets located in Appendix E.

8.9 Field Strength (Duty Cycle Calculations)

The Peak Transmit Radiated Field Strength was measured at a 3-meter test distance. The EMI Receiver was used to obtain the duty cycle. The data sheets are located in Appendix E.

Where

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

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

Duty Cycle Correction Factor = -14.56 dB

Pulse = 1 * 18.70 ms

Total On Time = 18.70 ms

Pulse only appears once every 100 ms; therefore 100 mS span was used.

18.7 ms / 100 ms = 18.70%

20 log (0.1870) = -14.56 dB correction factor

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 requirements of FCC Title 47, Part 15, Subpart A section 15.31 (e); and RSS-247.

9. CONCLUSIONS

The Bridge, Model: MMS100, 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; RSS-GEN and RSS-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; RSS-GEN and RSS-210 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

Bridge
Models: MMS100
S/N: N/A

There are no additional models covered under this report.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

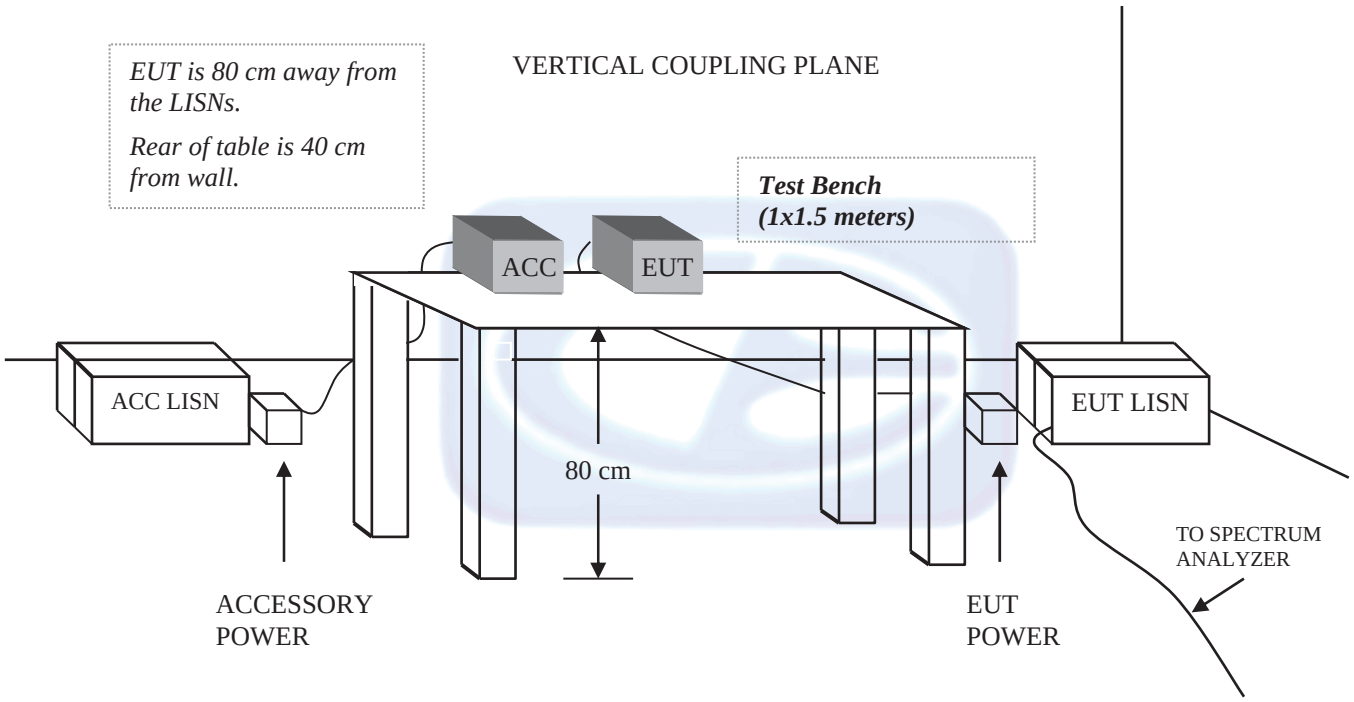
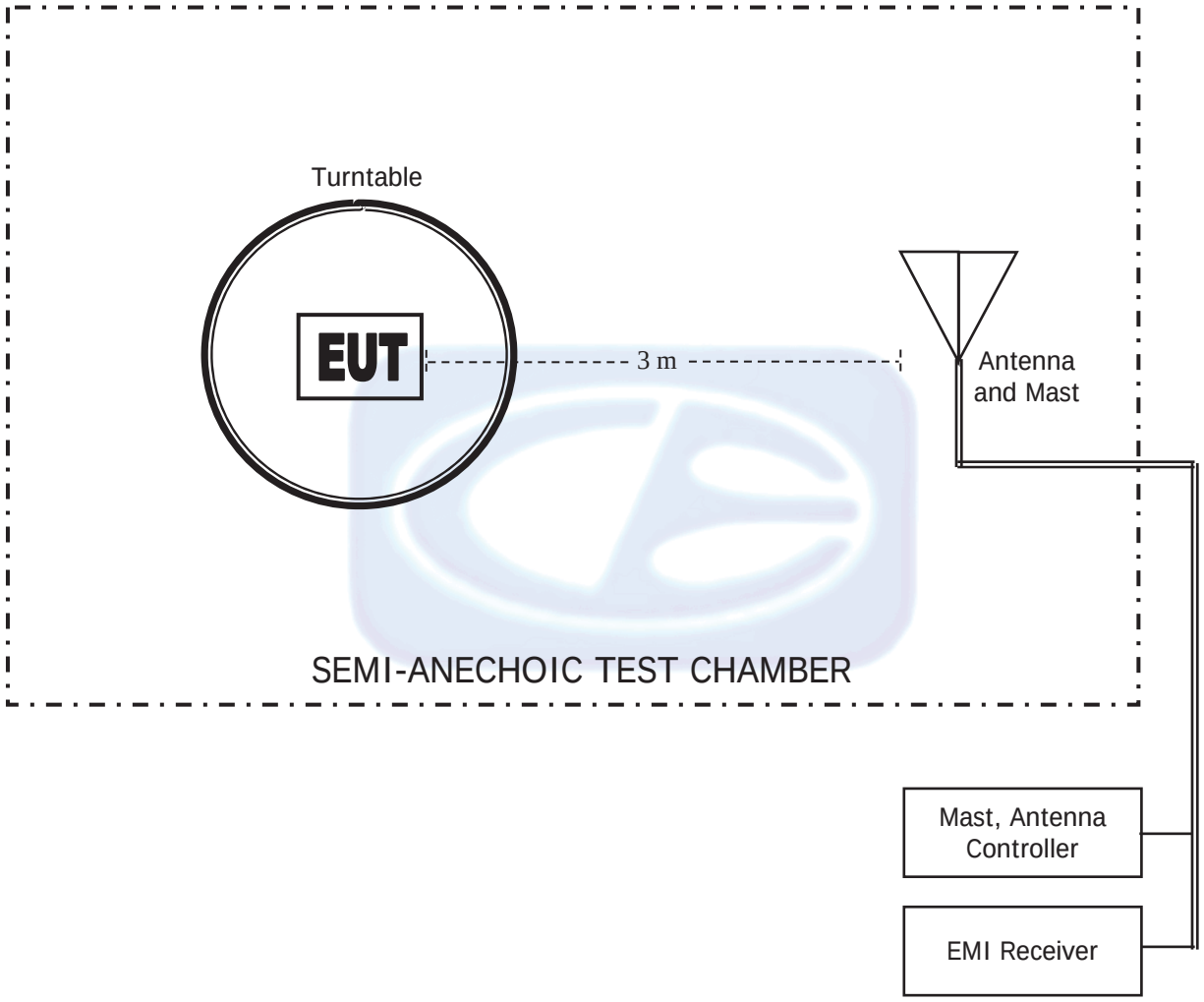


FIGURE 2: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



COM-POWER AL-130R

LOOP ANTENNA

S/N: 121090

CALIBRATION DATE: FEBRUARY 5, 2019

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.01	15.6	-35.9
0.02	14.8	-36.7
0.03	15.6	-35.9
0.04	15.1	-36.4
0.05	14.4	-37.0
0.06	14.6	-36.9
0.07	14.4	-37.1
0.08	14.3	-37.1
0.09	14.5	-36.9
0.10	14.1	-37.3
0.20	14.1	-37.3
0.30	14.0	-37.4
0.40	14.0	-37.4
0.50	14.2	-37.2
0.60	14.2	-37.2
0.70	14.2	-37.2
0.80	14.2	-37.3
0.90	14.3	-37.2
1.00	14.5	-37.0
2.00	14.5	-36.9
3.00	14.5	-36.9
4.00	14.7	-36.8
5.00	14.6	-36.9
6.00	14.6	-36.9
7.00	14.6	-36.9
8.00	14.6	-36.9
9.00	14.6	-36.9
10.00	14.8	-36.6
11.00	14.9	-36.6
12.00	14.8	-36.6
13.00	14.8	-36.7
14.00	14.6	-36.8
15.00	14.5	-36.9
16.00	14.5	-37.0
17.00	14.6	-36.9
18.00	14.7	-36.7
19.00	14.8	-36.6
20.00	14.9	-36.6
21.00	14.6	-36.8
22.00	14.2	-37.2
23.00	13.7	-37.7
24.00	13.3	-38.2
25.00	13.0	-38.5
26.00	12.9	-38.6
27.00	13.0	-38.5
28.00	13.1	-38.4
29.00	13.1	-38.4
30.00	12.9	-38.5

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61093

CALIBRATION DATE: JUNE 5, 2019

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.10	200	15.30
35	20.90	250	16.80
40	20.10	300	19.00
45	19.40	350	19.60
50	18.40	400	21.70
60	15.10	450	21.60
70	12.00	500	22.20
80	11.60	550	22.70
90	13.50	600	24.20
100	14.70	650	24.40
120	15.90	700	24.50
125	15.90	750	25.40
140	14.80	800	26.30
150	15.50	850	26.70
160	19.80	900	27.50
175	15.20	950	27.80
180	14.90	1000	27.90

COM POWER AH-118

HORN ANTENNA

S/N: 071302

CALIBRATION DATE: FEBRUARY 22, 2018

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.87	10.0	38.74
1.5	25.54	10.5	39.65
2.0	28.81	11.0	38.53
2.5	28.16	11.5	39.28
3.0	29.32	12.0	40.28
3.5	30.05	12.5	41.69
4.0	30.79	13.0	41.61
4.5	32.15	13.5	41.71
5.0	34.04	14.0	40.75
5.5	33.79	14.5	41.40
6.0	34.50	15.0	42.87
6.5	35.42	15.5	41.05
7.0	37.20	16.0	40.43
7.5	37.21	16.5	40.17
8.0	37.70	17.0	42.63
8.5	37.68	17.5	43.83
9.0	38.45	18.0	46.38
9.5	39.44		

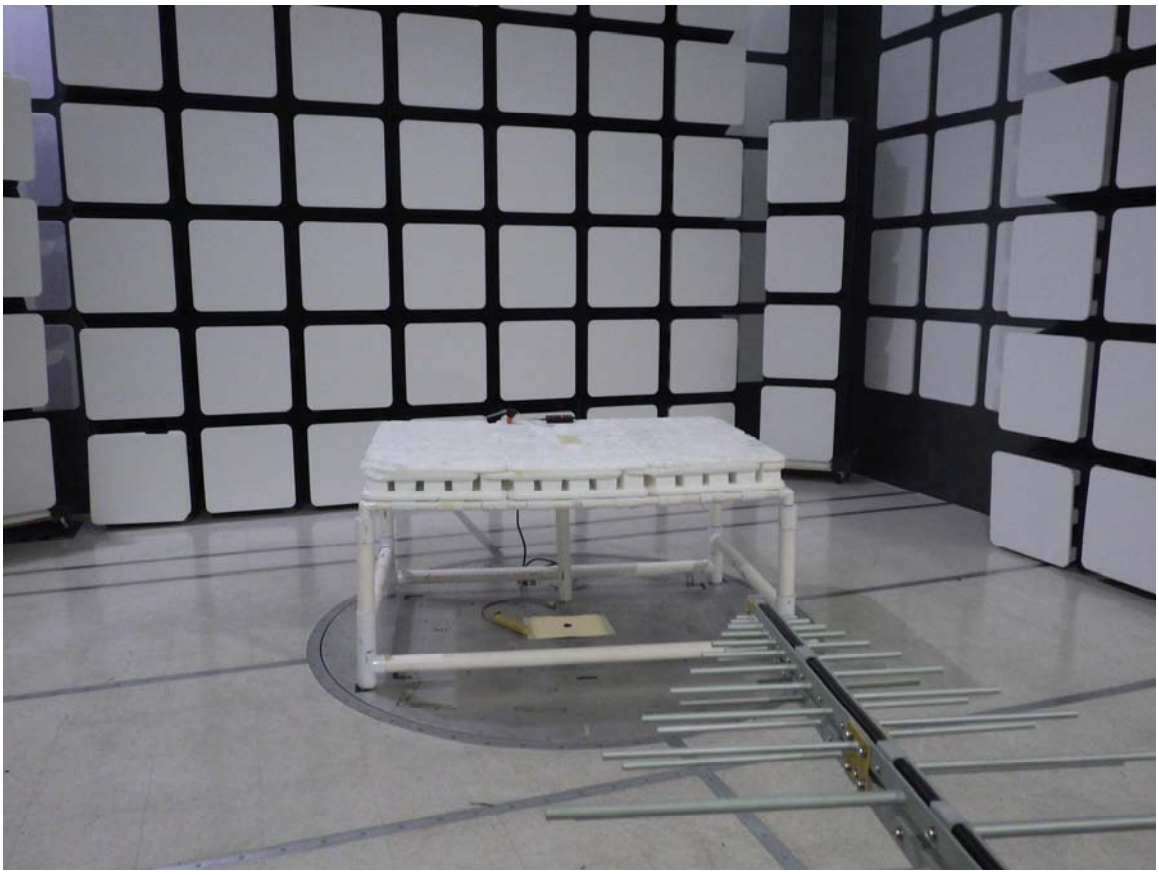
COM-POWER PA-118

PREAMPLIFIER

S/N: 181653

CALIBRATION DATE: JANUARY 25, 2019

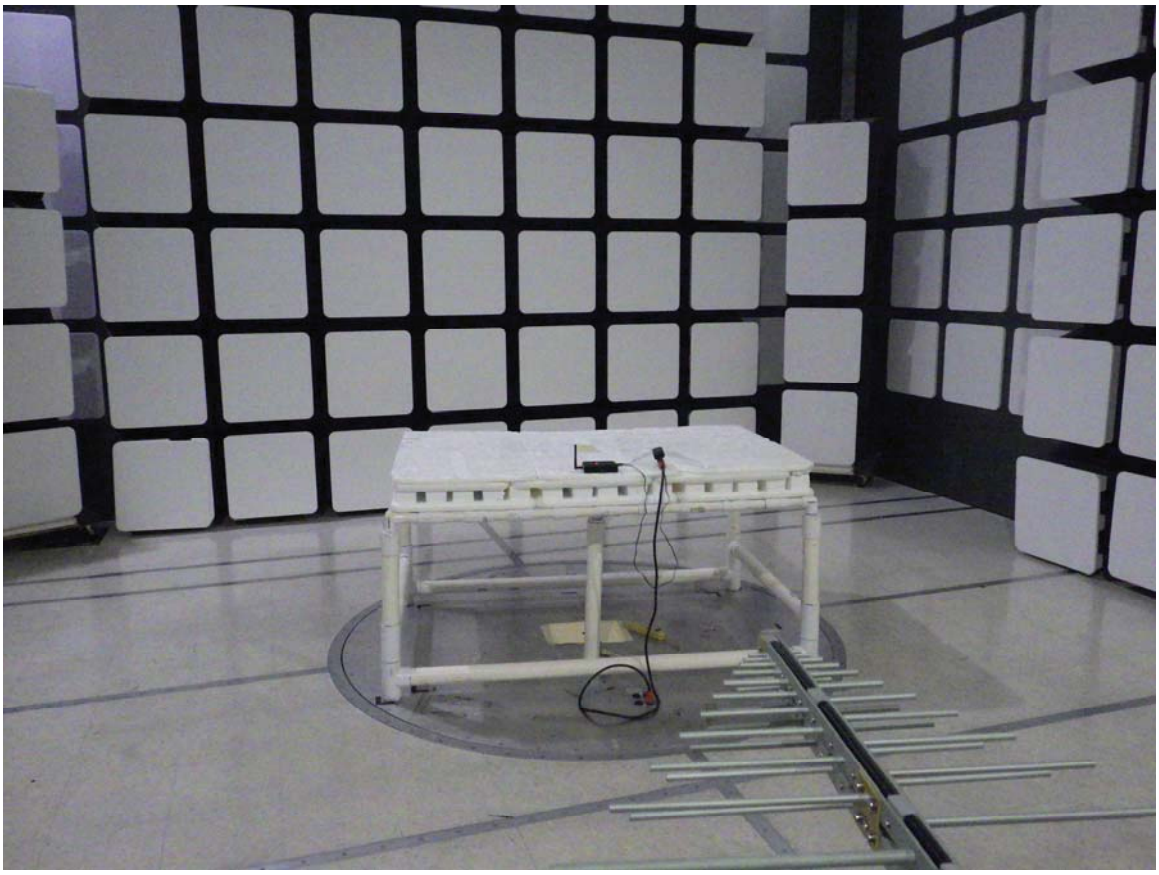
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	40.10	6.0	40.60
1.1	40.10	6.5	39.50
1.2	40.00	7.0	39.40
1.3	39.70	7.5	39.30
1.4	39.60	8.0	39.20
1.5	39.90	8.5	40.50
1.6	40.00	9.0	39.60
1.7	39.70	9.5	39.50
1.8	39.50	10.0	38.80
1.9	39.60	11.0	38.70
2.0	39.90	12.0	42.20
2.5	40.10	13.0	40.00
3.0	40.80	14.0	40.30
3.5	40.60	15.0	40.20
4.0	40.50	16.0	41.00
4.5	41.60	17.0	39.70
5.0	39.20	18.0	40.90
5.5	40.00		



FRONT VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – 30 MHz to 1000 MHz

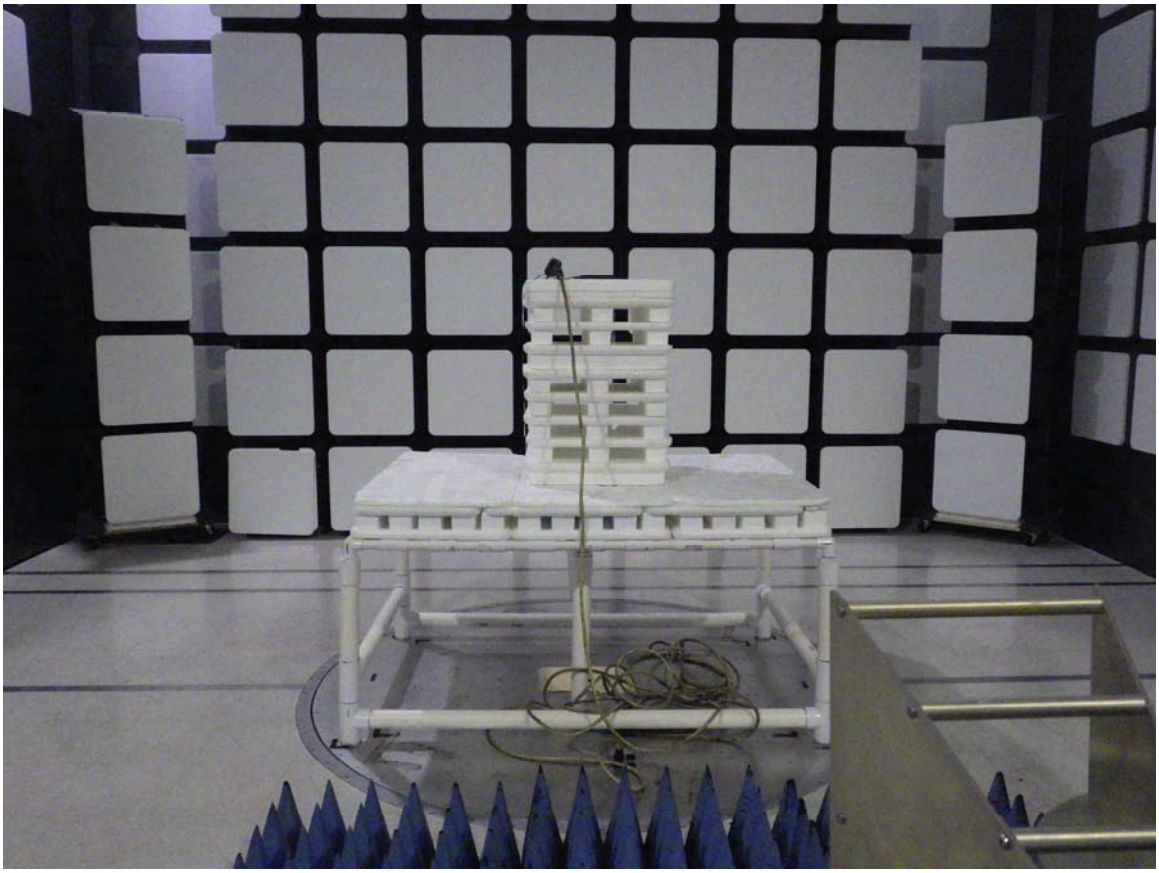
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – 30 MHz to 1000 MHz

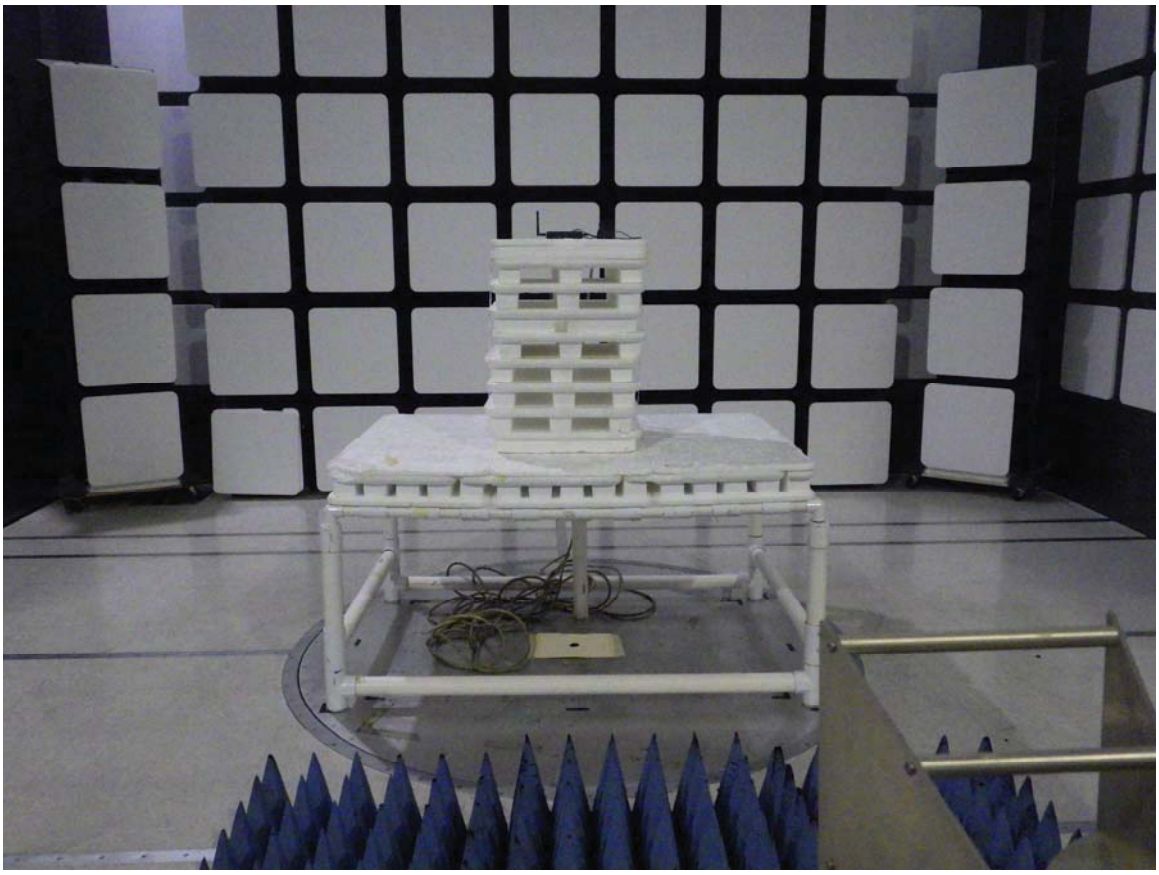
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – ABOVE 1 GHz

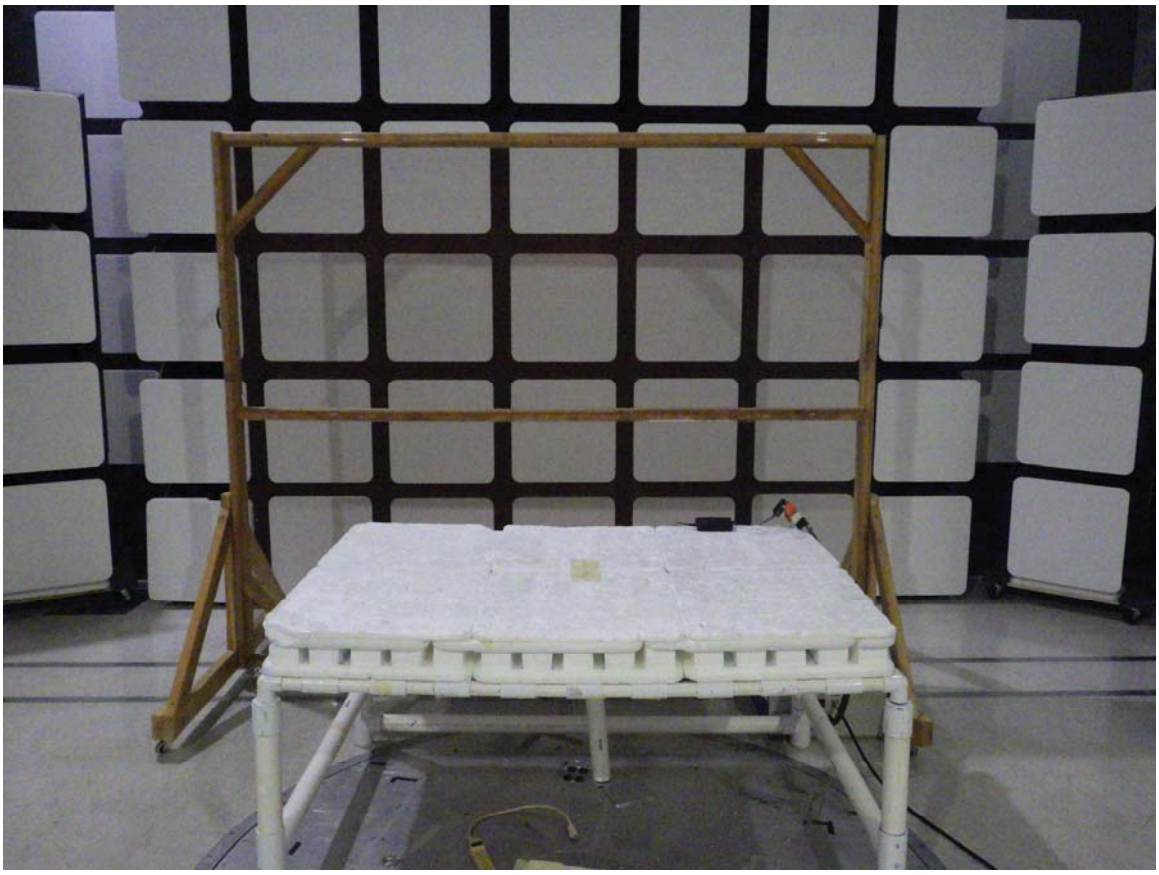
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – RADIATED EMISSIONS – ABOVE 1 GHz

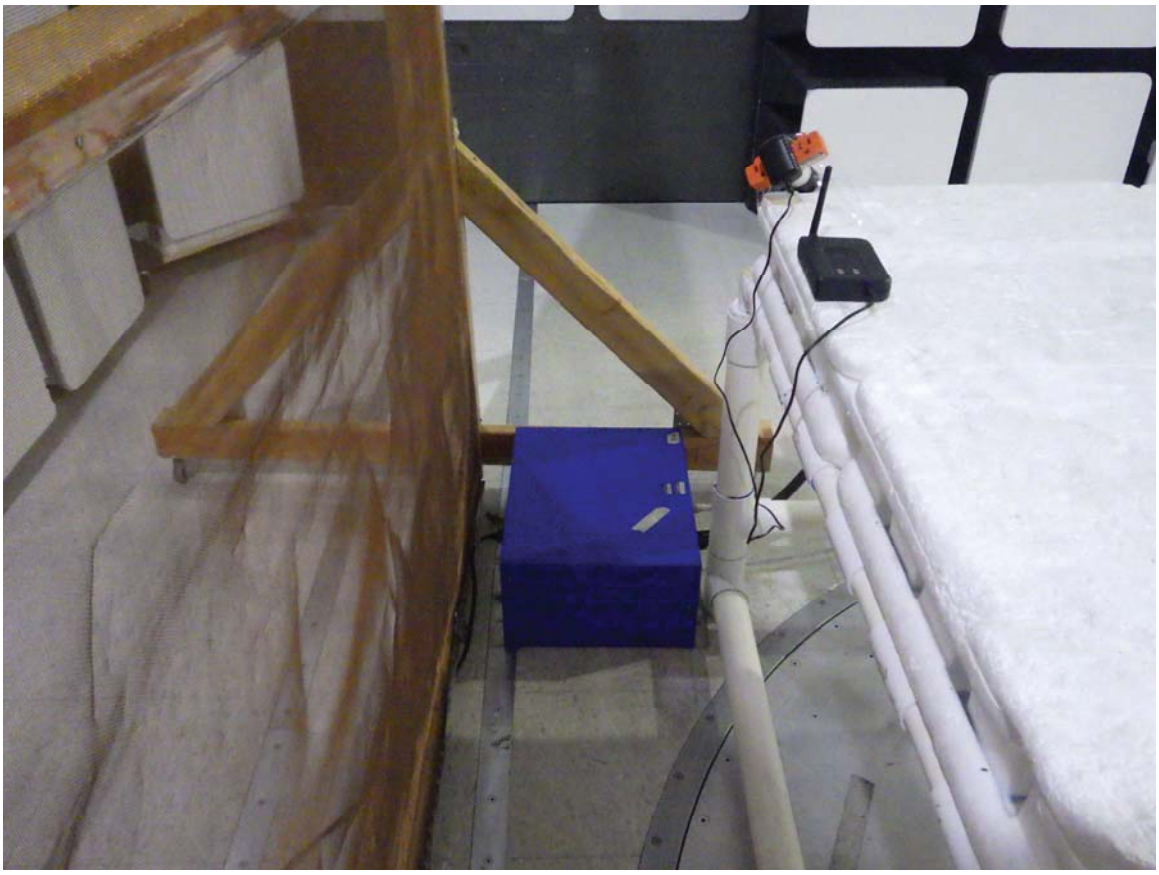
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

NORTEK SECURITY & CONTROL, LLC
BRIDGE
MODEL: MMS100
FCC SUBPART B AND C; RSS-GEN and RSS-247 – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS DATA SHEETS

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	65.80	V	73.97	-8.17	Peak	115.50	199.50	
2706.90	51.24	V	53.97	-2.73	Avg	115.50	199.50	
3609.20	59.30	V	73.97	-14.67	Peak	351.00	165.23	
3609.20	44.74	V	53.97	-9.23	Avg	351.00	165.23	
4511.50	58.32	V	73.97	-15.65	Peak	265.50	162.43	
4511.50	43.76	V	53.97	-10.21	Avg	265.50	162.43	
5413.80	62.48	V	73.97	-11.49	Peak	47.75	143.92	
5413.80	47.92	V	53.97	-6.05	Avg	47.75	143.92	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	61.32	V	73.97	-12.65	Peak	153.75	210.91	
8120.70	46.76	V	53.97	-7.21	Avg	153.75	210.91	
9023.00	61.48	V	73.97	-12.49	Peak	148.00	227.02	
9023.00	46.92	V	53.97	-7.05	Avg	148.00	227.02	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								**N/A - Done via Conducted**
1830.00								**Not in Restricted Band**
2745.00	66.44	V	73.97	-7.54	Peak	50.50	175.98	
2745.00	51.88	V	53.97	-2.10	Avg	50.50	175.98	
3660.00	56.18	V	73.97	-17.79	Peak	329.00	181.53	
3660.00	41.62	V	53.97	-12.35	Avg	329.00	181.53	
4575.00	54.60	V	73.97	-19.37	Peak	264.75	158.19	
4575.00	40.04	V	53.97	-13.93	Avg	264.75	158.19	
5490.00								**N/A - Done via Conducted**
5490.00								**Not in Restricted Band**
6405.00								**N/A - Done via Conducted**
6405.00								**Not in Restricted Band**
7320.00	57.40	V	73.97	-16.57	Peak	309.50	100.00	
7320.00	42.84	V	53.97	-11.13	Avg	309.50	100.00	
8235.00	66.03	V	73.97	-7.94	Peak	143.25	234.01	
8235.00	51.47	V	53.97	-2.50	Avg	143.25	234.01	
9150.00	56.13	V	73.97	-17.84	Peak	219.75	100.00	
9150.00	41.57	V	53.97	-12.40	Avg	219.75	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	65.76	V	73.97	-8.21	Peak	85.25	212.70	
2783.40	51.20	V	53.97	-2.77	Avg	85.25	212.70	
3711.20	59.25	V	73.97	-14.72	Peak	335.00	177.05	
3711.20	44.69	V	53.97	-9.28	Avg	335.00	177.05	
4639.00	54.76	V	73.97	-19.21	Peak	46.75	135.80	
4639.00	40.20	V	53.97	-13.77	Avg	46.75	135.80	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	56.96	V	73.97	-17.01	Peak	139.00	100.00	
7422.40	42.40	V	53.97	-11.57	Avg	139.00	100.00	
8350.20	67.33	V	73.97	-6.64	Peak	147.25	100.00	
8350.20	52.77	V	53.97	-1.20	Avg	147.25	100.00	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	62.89	H	73.97	-11.08	Peak	112.75	100.00	
2706.90	48.33	H	53.97	-5.64	Avg	112.75	100.00	
3609.20	59.57	H	73.97	-14.40	Peak	189.50	145.65	
3609.20	45.01	H	53.97	-8.96	Avg	189.50	145.65	
4511.50	54.23	H	73.97	-19.74	Peak	177.75	126.67	
4511.50	39.67	H	53.97	-14.30	Avg	177.75	126.67	
5413.80	58.42	H	73.97	-15.55	Peak	269.50	210.19	
5413.80	43.86	H	53.97	-10.11	Avg	269.50	210.19	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	55.53	H	73.97	-18.44	Peak	332.50	119.50	
8120.70	40.97	H	53.97	-13.00	Avg	332.50	119.50	
9023.00	55.62	H	73.97	-18.35	Peak	164.00	100.00	
9023.00	41.06	H	53.97	-12.91	Avg	164.00	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								**N/A - Done via Conducted**
1830.00								**Not in Restricted Band**
2745.00	62.91	H	73.97	-11.06	Peak	335.25	158.67	
2745.00	48.35	H	53.97	-5.62	Avg	335.25	158.67	
3660.00	54.69	H	73.97	-19.28	Peak	326.75	197.23	
3660.00	40.13	H	53.97	-13.84	Avg	326.75	197.23	
4575.00	50.82	H	73.97	-23.15	Peak	167.25	134.91	
4575.00	36.26	H	53.97	-17.71	Avg	167.25	134.91	
5490.00								**N/A - Done via Conducted**
5490.00								**Not in Restricted Band**
6405.00								**N/A - Done via Conducted**
6405.00								**Not in Restricted Band**
7320.00	48.74	H	73.97	-25.23	Peak	345.75	149.05	
7320.00	34.18	H	53.97	-19.79	Avg	345.75	149.05	
8235.00	58.96	H	73.97	-15.01	Peak	192.00	100.00	
8235.00	44.40	H	53.97	-9.57	Avg	192.00	100.00	
9150.00	54.02	H	73.97	-19.95	Peak	190.25	100.00	
9150.00	39.46	H	53.97	-14.51	Avg	190.25	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - X-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	63.01	H	73.97	-10.96	Peak	75.00	235.25	
2783.40	48.45	H	53.97	-5.52	Avg	75.00	235.25	
3711.20	55.02	H	73.97	-18.95	Peak	95.00	238.25	
3711.20	40.46	H	53.97	-13.51	Avg	95.00	238.25	
4639.00	50.54	H	73.97	-23.43	Peak	105.00	240.02	
4639.00	35.98	H	53.97	-17.99	Avg	105.00	240.02	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	48.56	H	73.97	-25.41	Peak	110.00	245.25	
7422.40	34.00	H	53.97	-19.97	Avg	110.00	245.25	
8350.20	57.26	H	73.97	-16.71	Peak	125.00	250.00	
8350.20	42.70	H	53.97	-11.27	Avg	125.00	250.00	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	65.58	V	73.97	-8.39	Peak	329.75	174.37	
2706.90	51.02	V	53.97	-2.95	Avg	329.75	174.37	
3609.20	61.70	V	73.97	-12.27	Peak	324.25	220.88	
3609.20	47.14	V	53.97	-6.83	Avg	324.25	220.88	
4511.50	54.94	V	73.97	-19.03	Peak	13.75	215.68	
4511.50	40.38	V	53.97	-13.59	Avg	13.75	215.68	
5413.80	59.35	V	73.97	-14.62	Peak	158.25	100.00	
5413.80	44.79	V	53.97	-9.18	Avg	158.25	100.00	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	58.53	V	73.97	-15.44	Peak	12.00	100.00	
8120.70	43.97	V	53.97	-10.00	Avg	12.00	100.00	
9023.00	52.81	V	73.97	-21.16	Peak	11.00	100.00	
9023.00	38.25	V	53.97	-15.72	Avg	11.00	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								**N/A - Done via Conducted**
1830.00								**Not in Restricted Band**
2745.00	66.95	V	73.97	-7.02	Peak	0.00	134.91	
2745.00	52.39	V	53.97	-1.58	Avg	0.00	134.91	
3660.00	58.95	V	73.97	-15.02	Peak	326.75	153.41	
3660.00	44.39	V	53.97	-9.58	Avg	326.75	153.41	
4575.00	51.20	V	73.97	-22.78	Peak	317.00	100.00	
4575.00	36.64	V	53.97	-17.34	Avg	317.00	100.00	
5490.00								**N/A - Done via Conducted**
5490.00								**Not in Restricted Band**
6405.00								**N/A - Done via Conducted**
6405.00								**Not in Restricted Band**
7320.00	55.50	V	73.97	-18.47	Peak	313.25	112.58	
7320.00	40.94	V	53.97	-13.03	Avg	313.25	112.58	
8235.00	62.11	V	73.97	-11.86	Peak	19.00	100.00	
8235.00	47.55	V	53.97	-6.42	Avg	19.00	100.00	
9150.00	51.03	V	73.97	-22.94	Peak	281.00	100.00	
9150.00	36.47	V	53.97	-17.50	Avg	281.00	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	62.26	V	73.97	-11.71	Peak	1.25	135.26	
2783.40	47.70	V	53.97	-6.27	Avg	1.25	135.26	
3711.20	56.25	V	73.97	-17.72	Peak	2.25	138.25	
3711.20	41.69	V	53.97	-12.28	Avg	2.25	138.25	
4639.00	50.26	V	73.97	-23.71	Peak	102.25	125.58	
4639.00	35.70	V	53.97	-18.27	Avg	102.25	125.58	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	54.26	V	73.97	-19.71	Peak	103.50	126.58	
7422.40	39.70	V	53.97	-14.27	Avg	103.50	126.58	
8350.20	61.26	V	73.97	-12.71	Peak	104.50	127.54	
8350.20	46.70	V	53.97	-7.27	Avg	104.50	127.54	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	64.49	H	73.97	-9.48	Peak	305.25	105.59	
2706.90	49.93	H	53.97	-4.04	Avg	305.25	105.59	
3609.20	62.53	H	73.97	-11.44	Peak	284.50	143.74	
3609.20	47.97	H	53.97	-6.00	Avg	284.50	143.74	
4511.50	54.18	H	73.97	-19.79	Peak	0.00	100.00	
4511.50	39.62	H	53.97	-14.35	Avg	0.00	100.00	
5413.80	60.27	H	73.97	-13.70	Peak	288.50	100.00	
5413.80	45.71	H	53.97	-8.26	Avg	288.50	100.00	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	63.83	H	73.97	-10.14	Peak	27.75	134.31	
8120.70	49.27	H	53.97	-4.70	Avg	27.75	134.31	
9023.00	63.75	H	73.97	-10.22	Peak	30.25	120.16	
9023.00	49.19	H	53.97	-4.78	Avg	30.25	120.16	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								N/A - Done via Conducted
1830.00								Not in Restricted Band
2745.00	65.36	H	73.97	-8.61	Peak	307.75	125.23	
2745.00	50.80	H	53.97	-3.18	Avg	307.75	125.23	
3660.00	57.61	H	73.97	-16.36	Peak	322.50	114.91	
3660.00	43.05	H	53.97	-10.92	Avg	322.50	114.91	
4575.00	51.57	H	73.97	-22.40	Peak	13.50	100.00	
4575.00	37.01	H	53.97	-16.96	Avg	13.50	100.00	
5490.00								N/A - Done via Conducted
5490.00								Not in Restricted Band
6405.00								N/A - Done via Conducted
6405.00								Not in Restricted Band
7320.00	55.74	H	73.97	-18.23	Peak	61.25	100.00	
7320.00	41.18	H	53.97	-12.79	Avg	61.25	100.00	
8235.00	68.17	H	73.97	-5.80	Peak	26.00	121.11	
8235.00	53.61	H	53.97	-0.36	Avg	26.00	121.11	
9150.00	59.28	H	73.97	-14.69	Peak	55.00	118.00	
9150.00	44.72	H	53.97	-9.25	Avg	55.00	118.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - Y-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	64.26	H	73.97	-9.71	Peak	302.25	124.26	
2783.40	49.70	H	53.97	-4.27	Avg	320.25	124.26	
3711.20	55.38	H	73.97	-18.59	Peak	321.25	113.25	
3711.20	40.82	H	53.97	-13.15	Avg	321.25	113.25	
4639.00	53.58	H	73.97	-20.39	Peak	14.50	90.00	
4639.00	39.02	H	53.97	-14.95	Avg	14.50	90.00	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	54.65	H	73.97	-19.32	Peak	62.25	90.00	
7422.40	40.09	H	53.97	-13.88	Avg	62.25	90.00	
8350.20	65.26	H	73.97	-8.71	Peak	27.00	122.22	
8350.20	50.70	H	53.97	-3.27	Avg	27.00	122.22	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	63.25	V	73.97	-10.72	Peak	325.00	106.43	
2706.90	48.69	V	53.97	-5.28	Avg	325.00	106.43	
3609.20	59.95	V	73.97	-14.02	Peak	356.25	113.35	
3609.20	45.39	V	53.97	-8.58	Avg	356.25	113.35	
4511.50	53.30	V	73.97	-20.67	Peak	30.75	165.89	
4511.50	38.74	V	53.97	-15.23	Avg	30.75	165.89	
5413.80	59.00	V	73.97	-14.97	Peak	294.25	100.00	
5413.80	44.44	V	53.97	-9.53	Avg	294.25	100.00	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	59.12	V	73.97	-14.85	Peak	337.50	100.00	
8120.70	44.56	V	53.97	-9.41	Avg	337.50	100.00	
9023.00	58.24	V	73.97	-15.73	Peak	343.25	100.00	
9023.00	43.68	V	53.97	-10.29	Avg	343.25	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								**N/A - Done via Conducted**
1830.00								**Not in Restricted Band**
2745.00	64.75	V	73.97	-9.22	Peak	311.25	184.16	
2745.00	50.19	V	53.97	-3.78	Avg	311.25	184.16	
3660.00	58.10	V	73.97	-15.88	Peak	355.75	100.00	
3660.00	43.54	V	53.97	-10.44	Avg	355.75	100.00	
4575.00	49.90	V	73.97	-24.07	Peak	314.75	151.44	
4575.00	35.34	V	53.97	-18.63	Avg	314.75	151.44	
5490.00								**N/A - Done via Conducted**
5490.00								**Not in Restricted Band**
6405.00								**N/A - Done via Conducted**
6405.00								**Not in Restricted Band**
7320.00	54.23	V	73.97	-19.74	Peak	288.75	100.00	
7320.00	39.67	V	53.97	-14.30	Avg	288.75	100.00	
8235.00	64.53	V	73.97	-9.44	Peak	344.00	100.00	
8235.00	49.97	V	53.97	-4.00	Avg	344.00	100.00	
9150.00	56.61	V	73.97	-17.36	Peak	346.50	100.00	
9150.00	42.05	V	53.97	-11.92	Avg	346.50	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	63.29	V	73.97	-10.68	Peak	302.25	183.25	
2783.40	48.73	V	53.97	-5.24	Avg	302.25	183.25	
3711.20	57.26	V	73.97	-16.71	Peak	225.00	181.25	
3711.20	42.70	V	53.97	-11.27	Avg	225.00	181.25	
4639.00	50.26	V	73.97	-23.71	Peak	125.25	175.25	
4639.00	35.70	V	53.97	-18.27	Avg	125.25	175.25	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	52.26	V	73.97	-21.71	Peak	120.00	105.25	
7422.40	37.70	V	53.97	-16.27	Avg	120.00	105.25	
8350.20	63.25	V	73.97	-10.72	Peak	57.00	115.25	
8350.20	48.69	V	53.97	-5.28	Avg	57.00	115.25	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Low Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1804.60								**N/A - Done via Conducted**
1804.60								**Not in Restricted Band**
2706.90	68.11	H	73.97	-5.86	Peak	29.25	165.95	
2706.90	53.55	H	53.97	-0.42	Avg	29.25	165.95	
3609.20	63.85	H	73.97	-10.12	Peak	315.25	165.23	
3609.20	49.29	H	53.97	-4.68	Avg	315.25	165.23	
4511.50	58.94	H	73.97	-15.03	Peak	273.75	100.00	
4511.50	44.38	H	53.97	-9.59	Avg	273.75	100.00	
5413.80	63.09	H	73.97	-10.88	Peak	265.75	119.32	
5413.80	48.49	H	53.97	-5.48	Avg	265.75	119.32	
6316.10								**N/A - Done via Conducted**
6316.10								**Not in Restricted Band**
7218.40								**N/A - Done via Conducted**
7218.40								**Not in Restricted Band**
8120.70	57.13	H	73.97	-16.84	Peak	251.00	100.00	
8120.70	42.57	H	53.97	-11.40	Avg	251.00	100.00	
9023.00	56.54	H	73.97	-17.43	Peak	302.50	128.46	
9023.00	41.98	H	53.97	-11.99	Avg	302.50	128.46	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - Middle Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1830.00								**N/A - Done via Conducted**
1830.00								**Not in Restricted Band**
2745.00	66.22	H	73.97	-7.75	Peak	332.25	100.00	
2745.00	51.66	H	53.97	-2.31	Avg	332.25	100.00	
3660.00	59.97	H	73.97	-14.00	Peak	338.50	153.17	
3660.00	45.41	H	53.97	-8.56	Avg	338.50	153.17	
4575.00	55.70	H	73.97	-18.27	Peak	274.00	100.00	
4575.00	41.14	H	53.97	-12.83	Avg	274.00	100.00	
5490.00								**N/A - Done via Conducted**
5490.00								**Not in Restricted Band**
6405.00								**N/A - Done via Conducted**
6405.00								**Not in Restricted Band**
7320.00	56.62	H	73.97	-17.35	Peak	251.00	100.00	
7320.00	42.06	H	53.97	-11.91	Avg	251.00	100.00	
8235.00	62.14	H	73.97	-11.83	Peak	299.25	147.80	
8235.00	47.58	H	53.97	-6.39	Avg	299.25	147.80	
9150.00	52.73	H	73.97	-21.24	Peak	306.50	100.00	
9150.00	38.17	H	53.97	-15.80	Avg	306.50	100.00	

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Harmonics - High Channel
Transmit Mode - Z-Axis
Duty Cycle: 18.70%

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1855.60								**N/A - Done via Conducted**
1855.60								**Not in Restricted Band**
2783.40	65.26	H	73.97	-8.71	Peak	302.50	95.00	
2783.40	50.70	H	53.97	-3.27	Avg	302.50	95.00	
3711.20	60.26	H	73.97	-13.71	Peak	337.50	152.25	
3711.20	45.70	H	53.97	-8.27	Avg	337.50	152.25	
4639.00	56.25	H	73.97	-17.72	Peak	273.00	102.52	
4639.00	41.69	H	53.97	-12.28	Avg	273.00	105.52	
5566.80								**N/A - Done via Conducted**
5566.80								**Not in Restricted Band**
6494.60								**N/A - Done via Conducted**
6494.60								**Not in Restricted Band**
7422.40	55.26	H	73.97	-18.71	Peak	249.00	102.25	
7422.40	40.70	H	53.97	-13.27	Avg	249.00	102.25	
8350.20	61.15	H	73.97	-12.82	Peak	302.25	103.35	
8350.20	46.59	H	53.97	-7.38	Avg	302.25	103.35	
9278.00								**N/A - Done via Conducted**
9278.00								**Not in Restricted Band**

FCC 15.247
Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

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
								9 kHz to 30 MHz
								No Emissions Detected
								from the Non Harmonic Emissions
								from the Tx
								1 GHz to 9.3 GHz
								No Emissions Detected
								from the Digital Portion
								of the EUT
								9 kHz to 30 MHz
								No Emissions Detected
								from the Digital Portion
								of the EUT
								1 GHz to 9.3 GHz
								Tested in both Horizontal and
								Vertical Polarizations

FCC 15.247 and FCC Class B

Nortek Security & Control, LLC
Bridge
Model: MMS100

Date: 10/03/2019
Lab: D
Tested By: Harvey Samaco

Non Harmonic Emissions from the Receiver Portion - 9 kHz to 30 MHz
Non Harmonic Emissions from the Receiver Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
								No Emissions Detected
								from 9 kHz to 30 MHz
								for the receiver portion
								of the EUT
								No Emissions Detected
								from 1 GHz to 9.3 GHz
								for the receiver portion
								of the EUT

Title: Pre-Scan - FCC Class B
File: Pre-Scan - 30MHz - 1000MHz - b Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 b and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 b Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and subject to the rules of FCC 15.247 instead

10/1/2019 9:28:33 AM
Sequence: Preliminary Scan

Title: Radiated Final - FCC Class B
File: Final Scan - 30MHz - 1000MHz - b Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 b and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 b Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and subject to the rules of FCC 15.247 instead

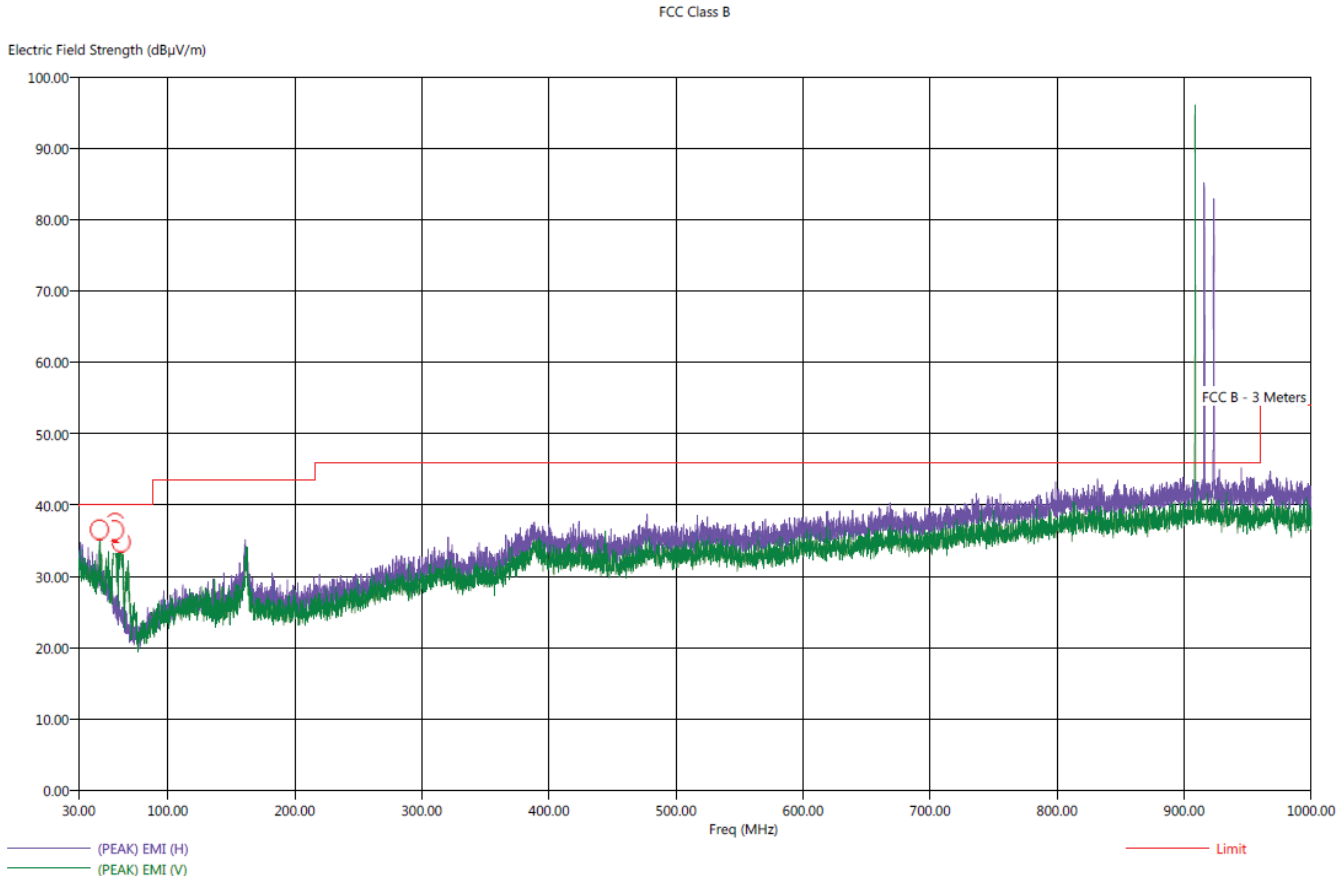
10/1/2019 9:40:03 AM
Sequence: Final Measurements

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)
46.70	V	34.84	19.96	-5.16	-20.04	40.00	19.06	0.90	351.25	333.29
58.50	V	42.40	16.51	2.40	-23.49	40.00	15.61	0.90	22.25	111.32
58.90	V	42.46	16.48	2.46	-23.52	40.00	15.58	0.90	359.75	111.26
59.40	V	41.85	16.26	1.85	-23.74	40.00	15.36	0.90	309.00	127.26
59.80	V	41.16	16.13	1.16	-23.87	40.00	15.23	0.90	54.75	111.02
60.20	V	41.14	15.99	1.14	-24.01	40.00	15.09	0.90	341.25	143.14

Title: Pre-Scan - FCC Class B
File: Pre-Scan - 30MHz - 1000MHz - g Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 g and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 g Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and subject to the rules of FCC 15.247 instead

10/1/2019 9:58:27 AM
Sequence: Preliminary Scan



Title: Radiated Final - FCC Class B
File: Final Scan - 30MHz - 1000MHz - g Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 g and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 g Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and subject to the rules of FCC 15.247 instead

10/1/2019 10:06:56 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 Aql (deg)	Twr Ht (cm)
46.30	V	37.41	19.99	-2.59	-20.01	40.00	19.09	0.90	224.50	111.32
58.20	V	39.78	16.68	-0.22	-23.32	40.00	15.78	0.90	0.50	158.85
58.60	V	41.37	16.56	1.37	-23.44	40.00	15.66	0.90	321.75	111.02
59.00	V	41.24	16.41	1.24	-23.59	40.00	15.51	0.90	18.75	143.02
59.40	V	41.38	16.30	1.38	-23.70	40.00	15.40	0.90	360.00	127.20
63.30	V	38.17	14.96	-1.83	-25.04	40.00	14.03	0.93	14.00	127.14

Title: Pre-Scan - FCC Class B
File: Pre-Scan - 30MHz - 1000MHz - n Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 n and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 n Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and subject to the rules of FCC 15.247 Instead

10/1/2019 10:25:37 AM
Sequence: Preliminary Scan

Title: Radiated Final - FCC Class B
File: Final Scan - 30MHz - 1000MHz - n Mode - Low Ch - X-axis - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 2412 MHz 802.11 n and FHSS from 902 to 928 MHz
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11 n Mode
X-Axis - Worst Case
Note: The frequencies from 902 MHz to 928 MHz are from the FHSS and are subject to the rules of FCC 15.247 instead

10/1/2019 10:34:07 AM
Sequence: Final Measurements

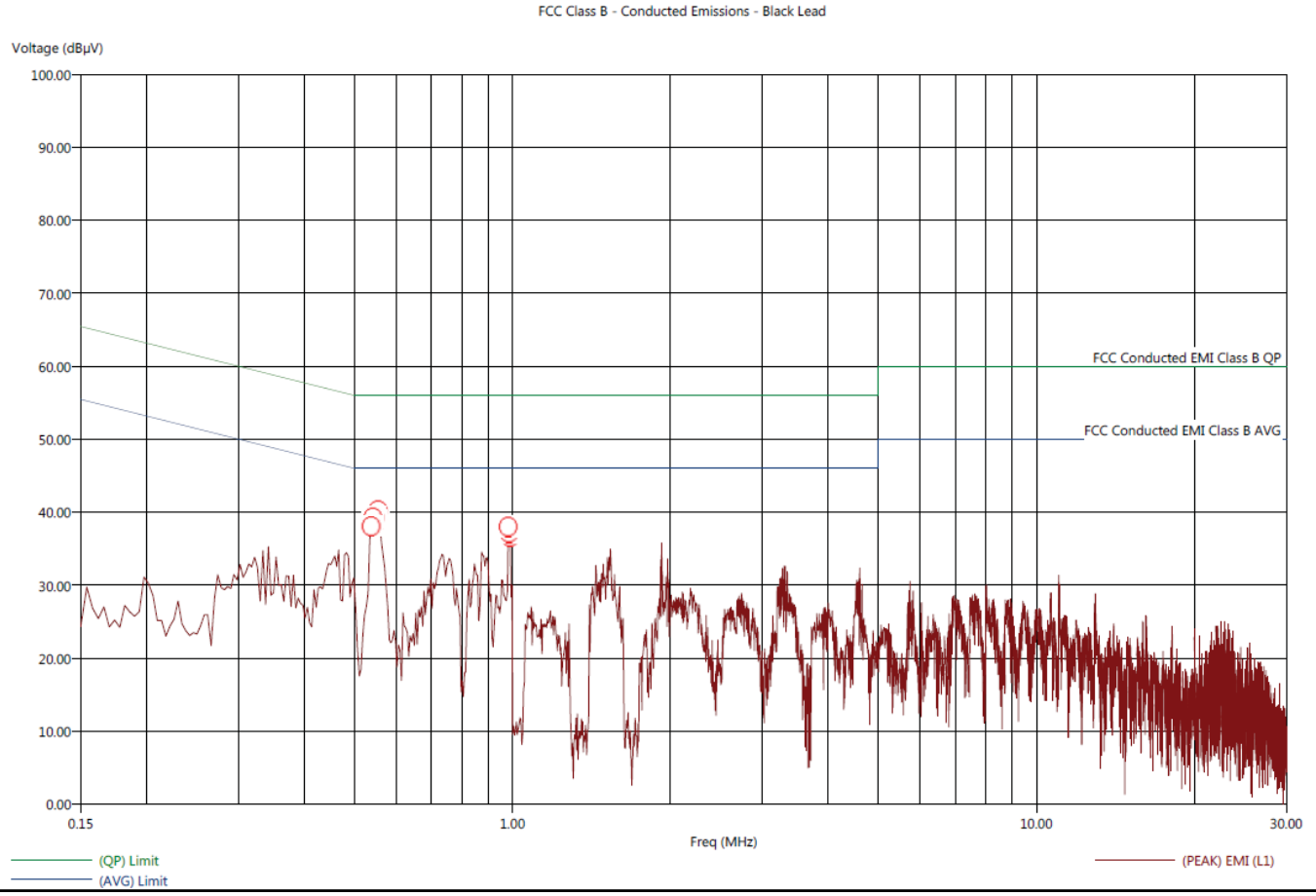
FCC Class B

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)
46.90	V	39.13	19.95	-0.87	-20.05	40.00	19.05	0.90	187.25	111.26
57.90	V	40.34	16.66	0.34	-23.34	40.00	15.76	0.90	22.00	143.08
58.60	V	40.64	16.56	0.64	-23.44	40.00	15.66	0.90	359.50	127.08
59.00	V	40.94	16.46	0.94	-23.54	40.00	15.56	0.90	6.25	143.14
59.50	V	40.39	16.27	0.39	-23.73	40.00	15.37	0.90	343.00	143.20
62.30	V	36.45	15.28	-3.55	-24.72	40.00	14.36	0.92	70.00	174.67

CONDUCTED EMISSIONS DATA SHEETS

Title: FCC-B - Conducted Emissions - Black Lead
File: 4 - Keysight - Pre-Scan - Receive mode - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously receiving at 902.3 MHz in the low channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
Receive mode - Channel 1 - Worst Case

10/17/2019 8:26:06 AM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - Black Lead
File: 4 - Keysight - Final Scan - Receive mode - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously receiving at 902.3 MHz in the low channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
Receive mode - Channel 1 - Worst Case

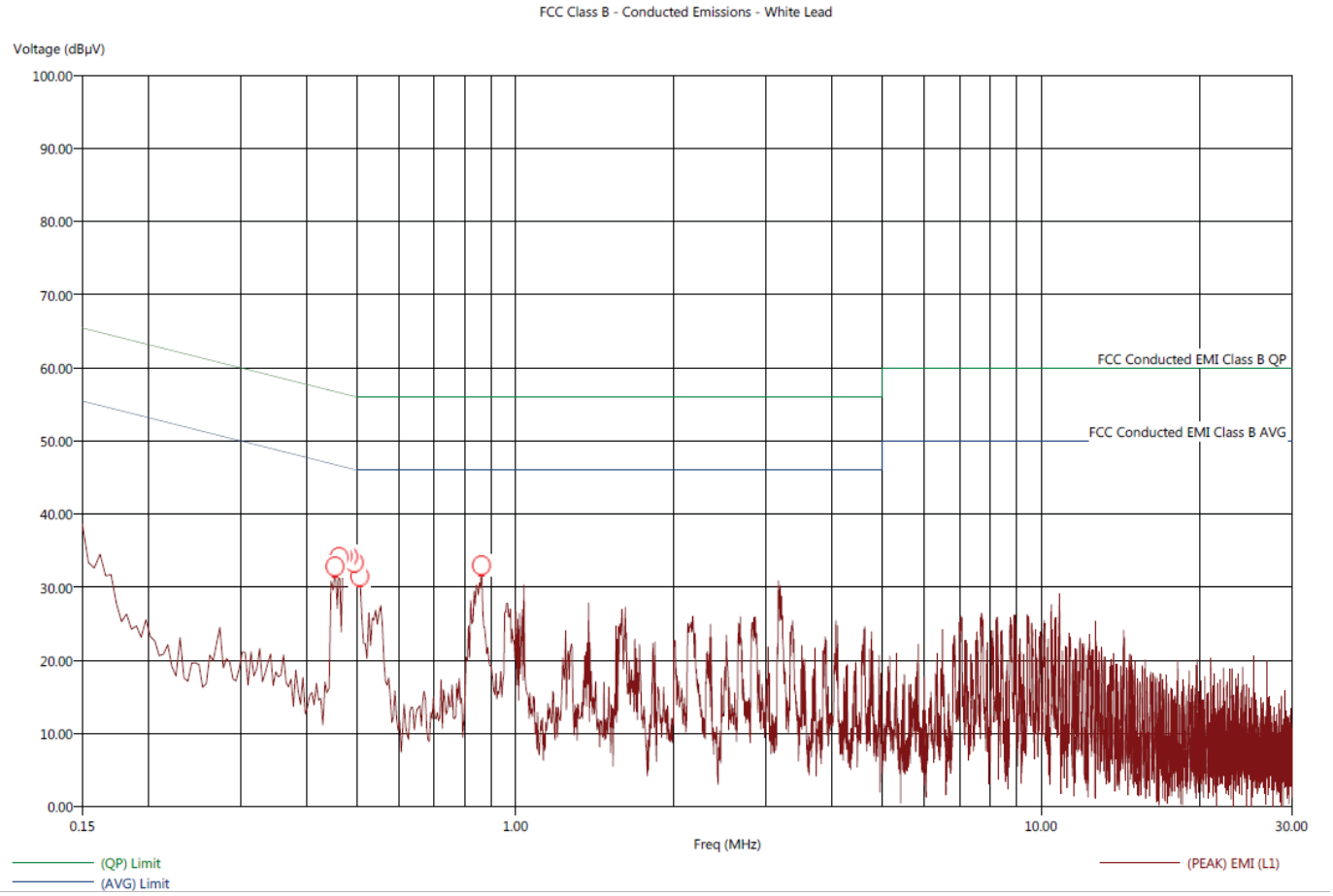
10/17/2019 8:28:05 AM
Sequence: Final Measurements

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)	Filter (dB)
0.538	47.97	34.02	1.97	-11.98	46.00	0.09	0.02	9.73
0.542	47.40	29.29	1.40	-16.71	46.00	0.09	0.02	9.72
0.546	46.95	30.66	0.95	-15.34	46.00	0.09	0.02	9.73
0.550	47.38	30.35	1.38	-15.65	46.00	0.09	0.02	9.73
0.554	47.22	30.58	1.22	-15.42	46.00	0.09	0.02	9.73
0.982	38.96	21.77	-7.04	-24.23	46.00	0.00	0.02	9.90
0.986	40.23	19.01	-5.77	-26.99	46.00	0.00	0.02	9.90
0.990	39.00	20.87	-7.00	-25.13	46.00	0.00	0.02	9.90

Title: FCC-B - Conducted Emissions - White Lead
File: 4 - Keysight - Pre-Scan - Receive mode - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously receiving at 902.3 MHz in the low channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
Receive mode - Channel 1 - Worst Case

10/17/2019 8:30:34 AM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - White Lead
File: 4 - Keysight - Final Scan - Receive mode - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously receiving at 902.3 MHz in the low channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
Receive mode - Channel 1 - Worst Case

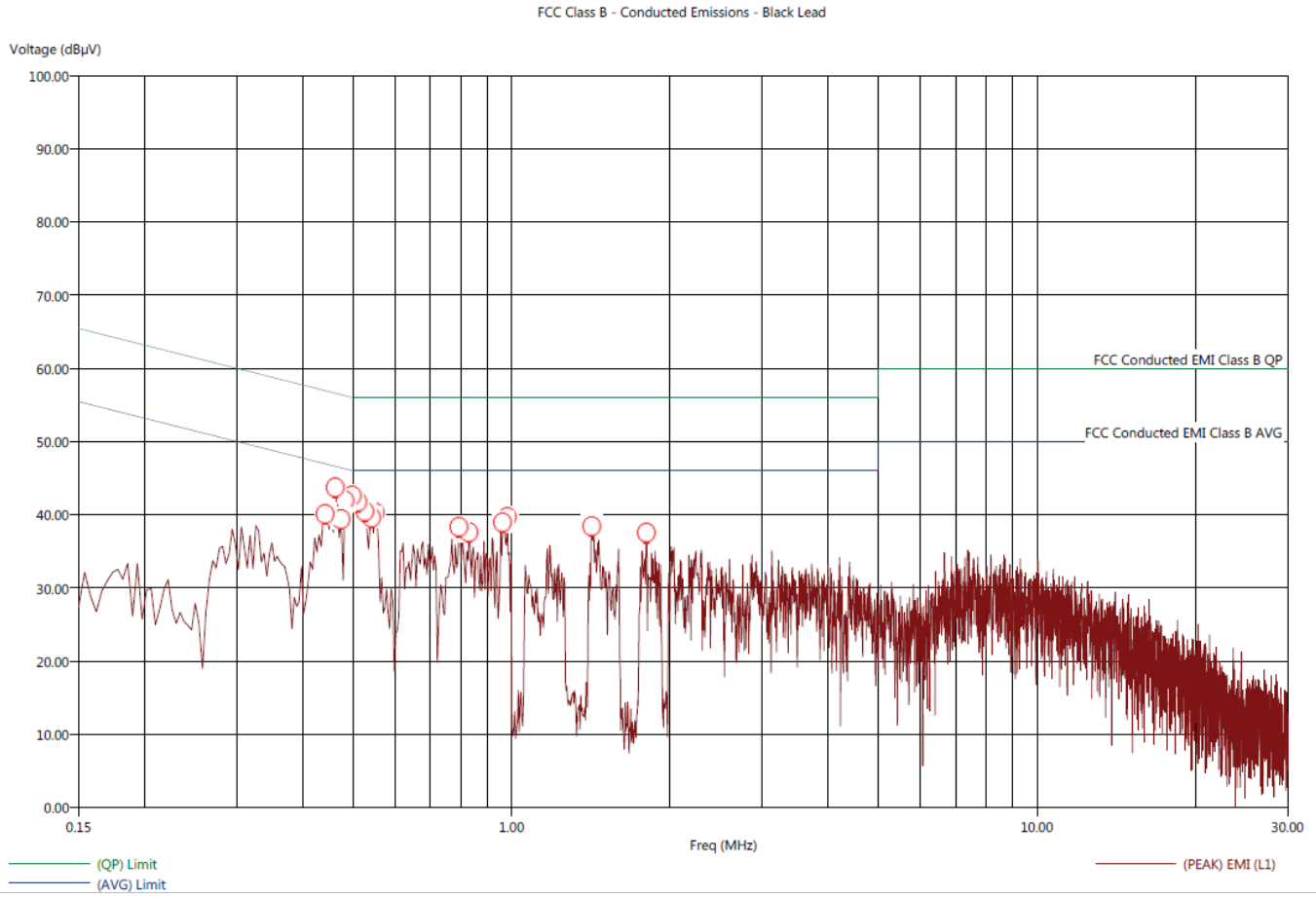
10/17/2019 8:31:54 AM
Sequence: Final Measurements

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)	Filter (dB)
0.454	36.85	19.02	-9.98	-27.81	46.83	0.09	0.04	9.71
0.462	38.48	19.43	-8.29	-27.34	46.77	0.09	0.04	9.71
0.470	39.20	19.69	-7.49	-27.00	46.69	0.09	0.04	9.71
0.482	57.46	19.86	11.16	-26.44	46.30	0.10	0.04	9.70
0.494	40.10	19.88	-6.30	-26.52	46.40	0.09	0.04	9.71
0.506	43.35	21.86	-2.65	-24.14	46.00	0.09	0.04	9.71
0.862	34.37	16.01	-11.63	-29.99	46.00	0.03	0.04	9.85

Title: FCC-B - Conducted Emissions - Black Lead
File: 1 - Keysight - Pre-Scan - 802.11b - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11b - Channel 11

10/16/2019 3:33:17 PM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - Black Lead
File: 1 - Keysight - Final Scan - 802.11b - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11b - Channel 11

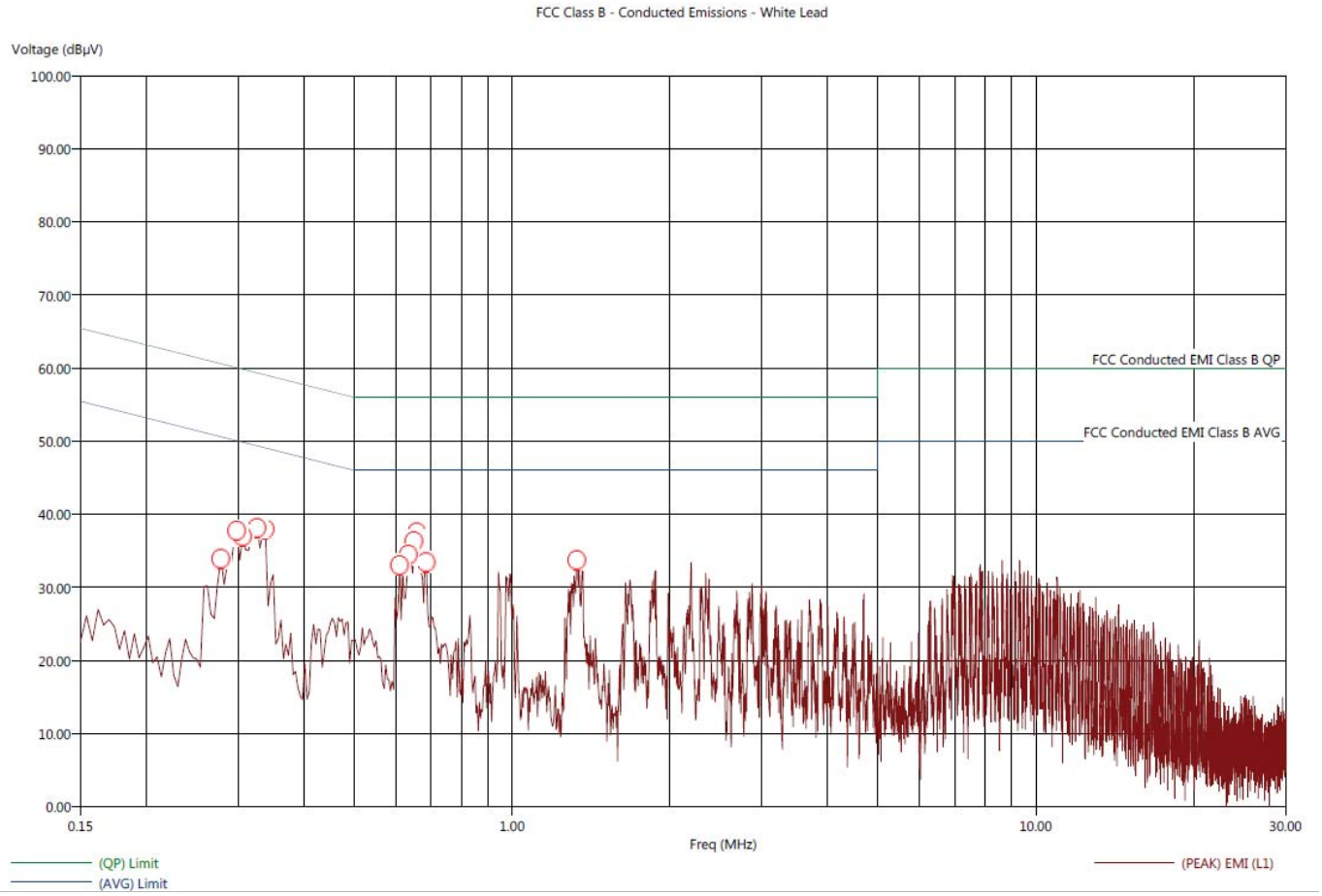
10/16/2019 3:35:07 PM
Sequence: Final Measurements

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)	Filter (dB)
0.442	43.97	30.40	-2.70	-16.27	46.67	0.09	0.02	9.71
0.462	43.77	29.79	-3.05	-17.03	46.82	0.09	0.02	9.71
0.474	45.38	30.53	-1.02	-15.87	46.40	0.09	0.02	9.71
0.482	45.60	30.27	-0.56	-15.89	46.16	0.10	0.02	9.70
0.498	45.93	30.26	-0.07	-15.74	46.00	0.10	0.02	9.70
0.510	49.20	33.41	3.20	-12.59	46.00	0.09	0.02	9.72
0.526	46.08	30.38	0.08	-15.62	46.00	0.09	0.02	9.71
0.542	46.83	31.93	0.83	-14.07	46.00	0.08	0.02	9.73
0.550	49.16	34.50	3.16	-11.50	46.00	0.09	0.02	9.73
0.794	41.81	27.73	-4.19	-18.27	46.00	0.03	0.02	9.84
0.830	42.01	27.12	-3.99	-18.88	46.00	0.03	0.02	9.84
0.962	40.89	26.18	-5.11	-19.82	46.00	0.01	0.02	9.88
0.982	40.81	26.13	-5.19	-19.87	46.00	0.01	0.02	9.89
1.422	38.82	23.97	-7.18	-22.03	46.00	0.05	0.02	9.85
1.806	36.92	23.30	-9.08	-22.70	46.00	0.09	0.02	9.81

Title: FCC-B - Conducted Emissions - White Lead
File: 1 - Keysight - Pre-Scan - 802.11b - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11b - Channel 11

10/16/2019 3:38:30 PM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - White Lead
File: 1 - Keysight - Final Scan - 802.11b - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11b - Channel 11

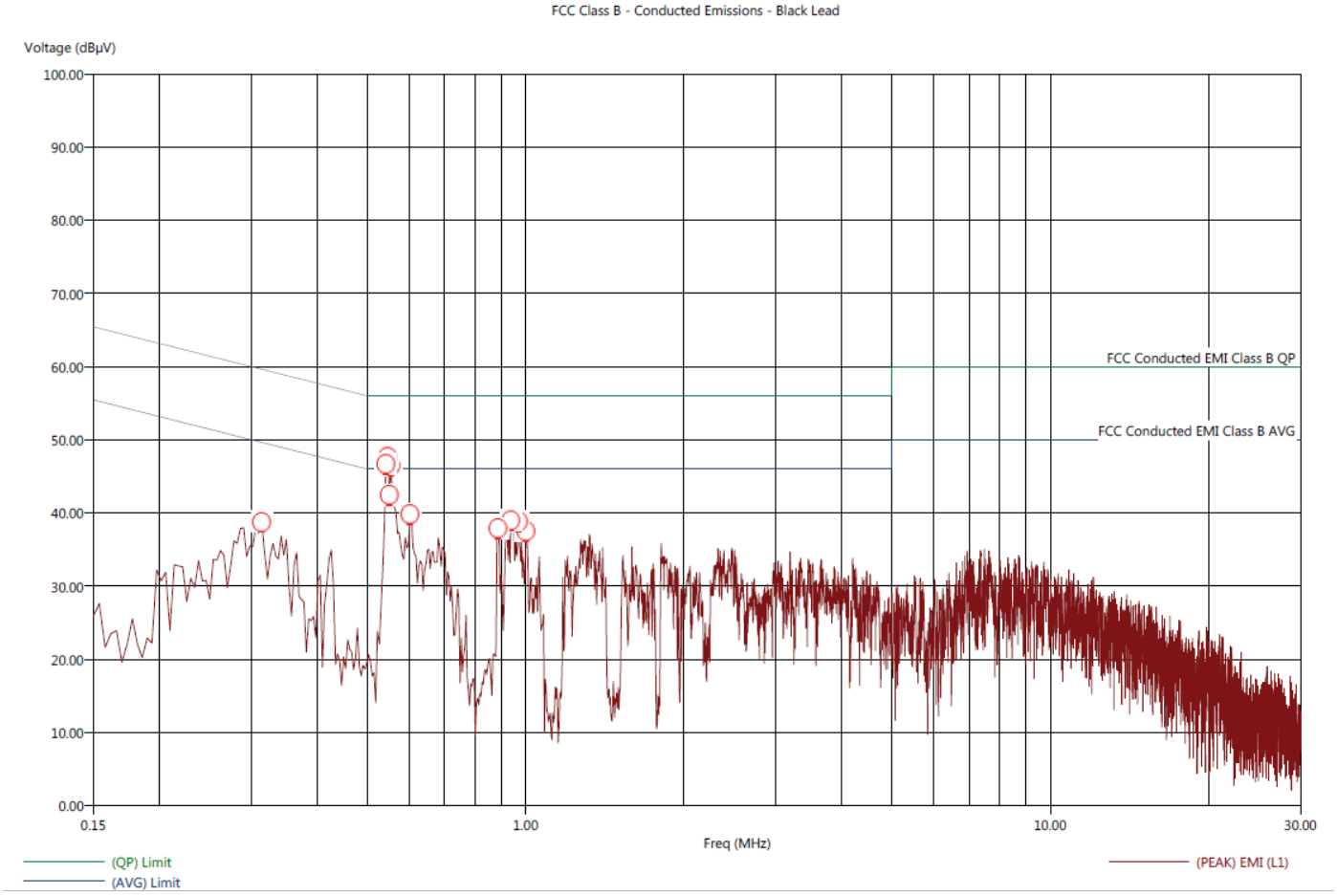
10/16/2019 3:40:19 PM
Sequence: Final Measurements

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)	Filter (dB)
0.278	40.00	21.47	-10.38	-28.91	50.38	0.04	0.04	9.76
0.298	40.12	21.87	-9.93	-28.18	50.05	0.04	0.04	9.76
0.306	39.58	22.21	-10.31	-27.68	49.89	0.05	0.04	9.75
0.326	40.37	22.69	-9.01	-26.69	49.38	0.05	0.04	9.75
0.338	40.76	22.16	-8.45	-27.05	49.21	0.06	0.04	9.74
0.610	39.55	14.90	-6.45	-31.10	46.00	0.08	0.04	9.75
0.634	37.25	17.40	-8.75	-28.60	46.00	0.06	0.04	9.77
0.650	38.48	17.78	-7.52	-28.22	46.00	0.06	0.04	9.77
0.654	38.26	20.12	-7.74	-25.88	46.00	0.06	0.04	9.79
0.658	38.96	20.31	-7.04	-25.69	46.00	0.05	0.04	9.79
0.686	38.28	20.86	-7.72	-25.14	46.00	0.05	0.04	9.80
1.330	34.90	17.57	-11.10	-28.43	46.00	0.04	0.04	9.86

Title: FCC-B - Conducted Emissions - Black Lead
File: 2 - Keysight - Pre-Scan - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11g - Channel 11

10/16/2019 3:13:49 PM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - Black Lead
File: 2 - Keysight - Final Scan - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11g - Channel 11

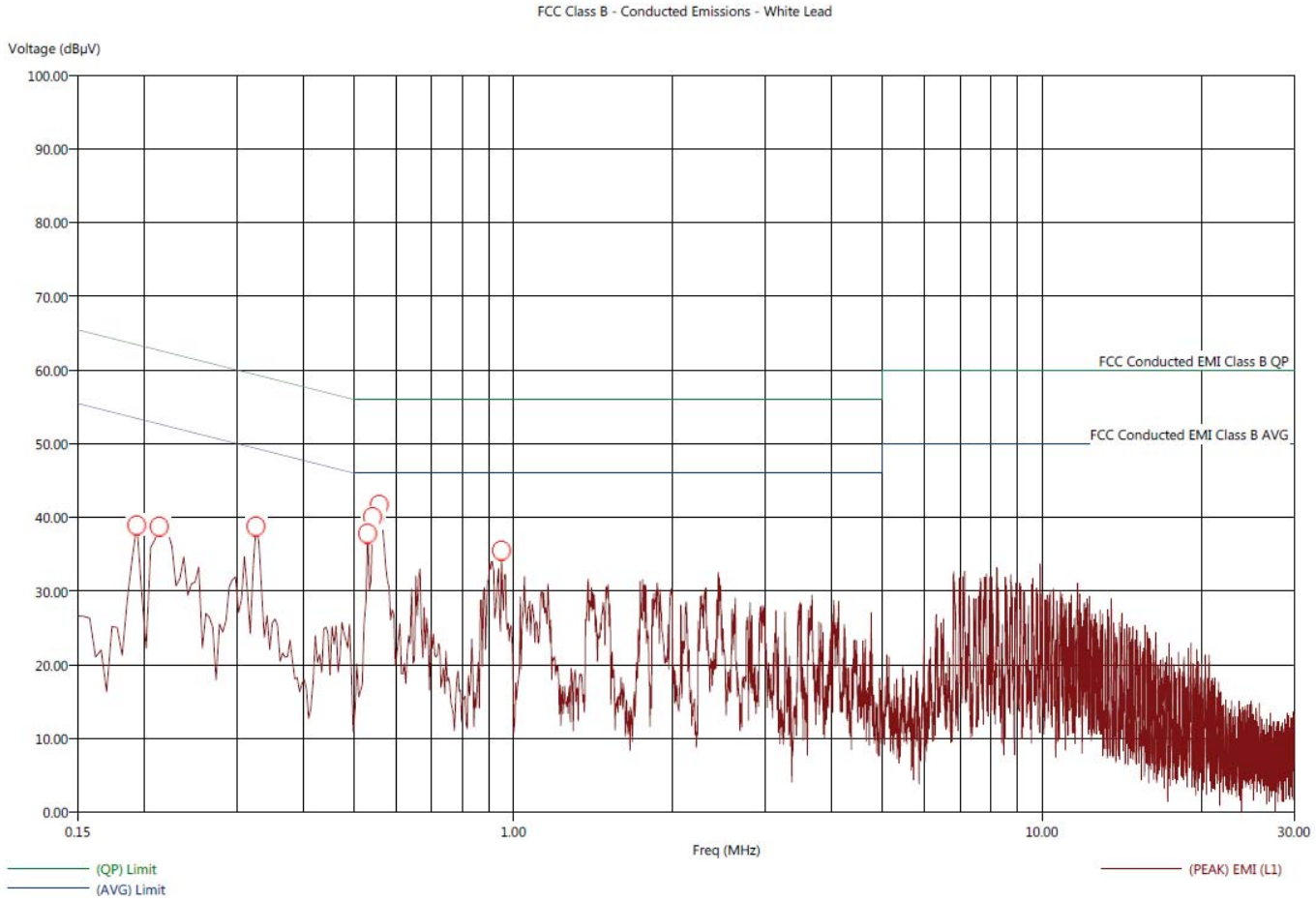
10/16/2019 3:17:46 PM
Sequence: Final Measurements

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)	Filter (dB)
0.314	40.08	26.89	-9.80	-22.99	49.88	0.05	0.02	9.75
0.542	49.60	34.61	3.60	-11.39	46.00	0.09	0.02	9.73
0.546	49.28	34.38	3.28	-11.62	46.00	0.09	0.02	9.73
0.550	48.47	34.48	2.47	-11.52	46.00	0.09	0.02	9.73
0.554	49.30	34.09	3.30	-11.91	46.00	0.09	0.02	9.72
0.602	38.84	20.76	-7.16	-25.24	46.00	0.07	0.02	9.76
0.886	42.77	27.12	-3.23	-18.88	46.00	0.02	0.02	9.86
0.938	41.02	25.83	-4.98	-20.17	46.00	0.01	0.02	9.88
0.970	40.25	25.18	-5.75	-20.82	46.00	0.00	0.02	9.89
1.002	40.05	25.23	-5.95	-20.77	46.00	0.00	0.02	9.89

Title: FCC-B - Conducted Emissions - White Lead
File: 2 - Keysight - Pre-Scan - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11g - Channel 11

10/16/2019 3:20:04 PM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - White Lead
File: 2 - Keysight - Final Scan - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11g - Channel 11

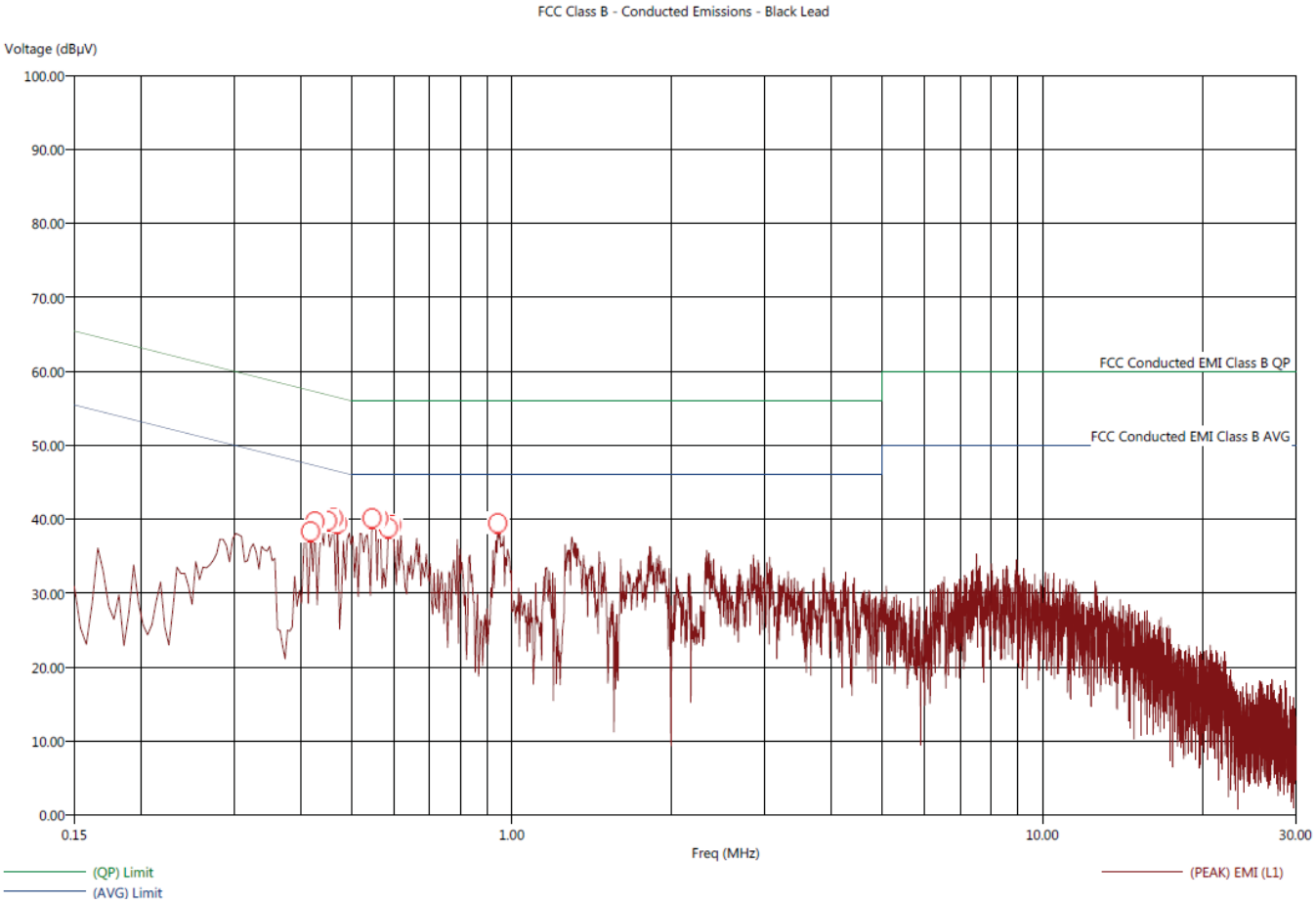
10/16/2019 3:21:36 PM
Sequence: Final Measurements

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)	Filter (dB)
0.194	40.40	22.20	-13.02	-31.22	53.43	0.00	0.06	9.80
0.214	39.01	20.88	-13.52	-31.65	52.53	0.01	0.06	9.79
0.326	40.09	22.71	-9.18	-26.56	49.27	0.05	0.04	9.75
0.530	45.43	25.74	-0.57	-20.26	46.00	0.09	0.04	9.72
0.542	45.95	27.31	-0.05	-18.69	46.00	0.09	0.04	9.73
0.546	46.72	27.57	0.72	-18.43	46.00	0.09	0.04	9.73
0.558	46.02	27.43	0.02	-18.57	46.00	0.09	0.04	9.73
0.950	37.54	18.74	-8.46	-27.26	46.00	0.01	0.04	9.88

Title: FCC-B - Conducted Emissions - Black Lead
File: 3 - Keysight - Pre-Scan - 802.11n - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11n - Channel 11

10/16/2019 3:46:29 PM
Sequence: Preliminary Scan



Title: FCC-B - Conducted Emissions - Black Lead
File: 3 - Keysight - Final Scan - 802.11n - Black Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11n - Channel 11

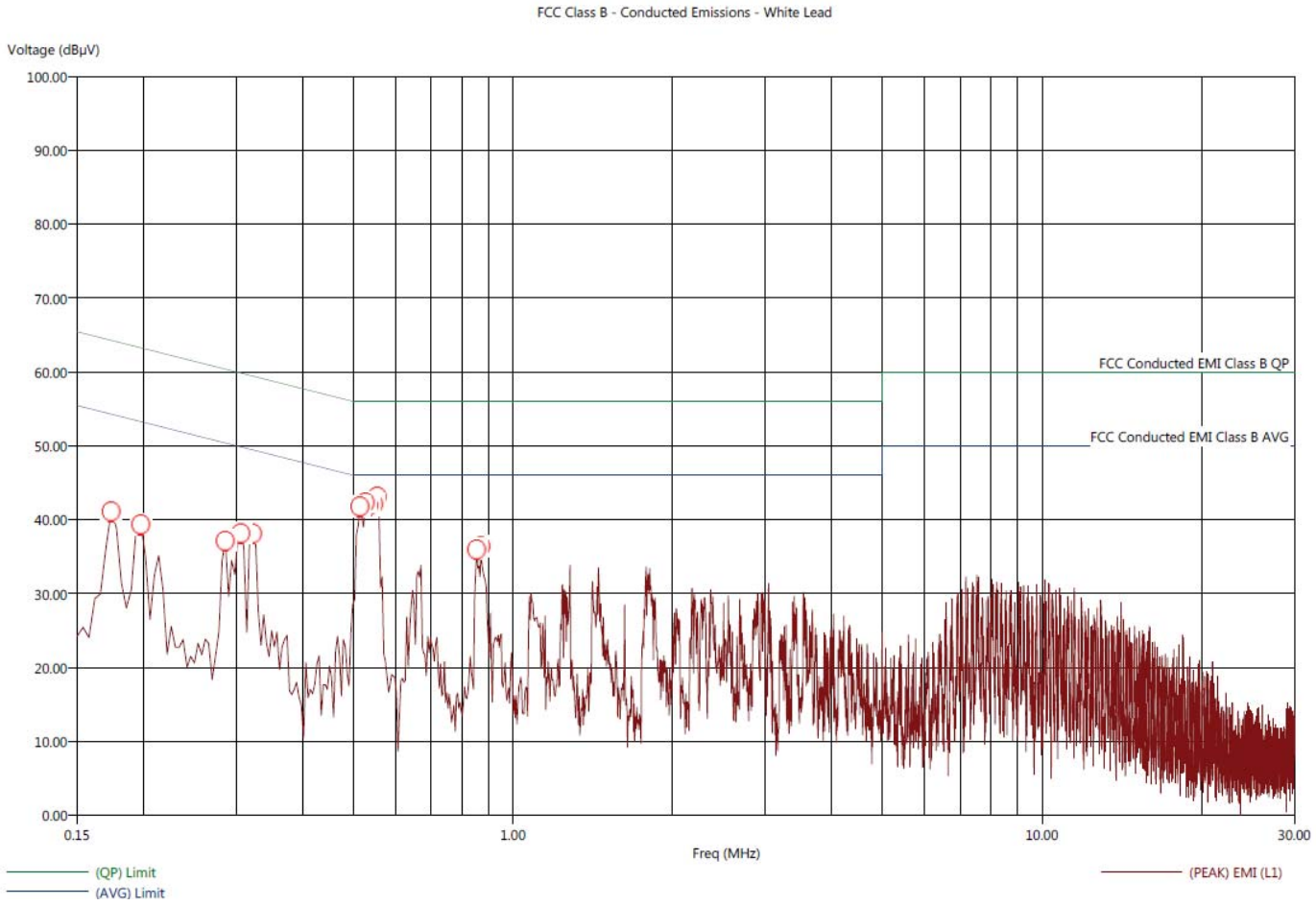
10/16/2019 3:47:51 PM
Sequence: Final Measurements

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)	Filter (dB)
0.418	42.59	28.24	-4.38	-18.73	46.97	0.09	0.02	9.71
0.426	43.56	30.22	-3.23	-16.57	46.79	0.09	0.02	9.71
0.450	44.17	30.02	-2.42	-16.57	46.59	0.09	0.02	9.71
0.462	44.81	31.00	-1.64	-15.45	46.45	0.09	0.02	9.71
0.470	46.23	30.27	-0.12	-16.08	46.35	0.10	0.02	9.70
0.546	49.42	33.60	3.42	-12.40	46.00	0.09	0.02	9.72
0.550	49.34	34.21	3.34	-11.79	46.00	0.09	0.02	9.72
0.562	47.50	33.42	1.50	-12.58	46.00	0.09	0.02	9.73
0.586	45.57	30.27	-0.43	-15.73	46.00	0.08	0.02	9.73
0.594	43.64	27.43	-2.36	-18.57	46.00	0.08	0.02	9.74
0.942	40.31	25.87	-5.69	-20.13	46.00	0.01	0.02	9.88

Title: FCC-B - Conducted Emissions - White Lead
File: 3 - Keysight - Pre-Scan - 802.11n - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11n - Channel 11

10/16/2019 3:50:10 PM
Sequence: Preliminary Scan



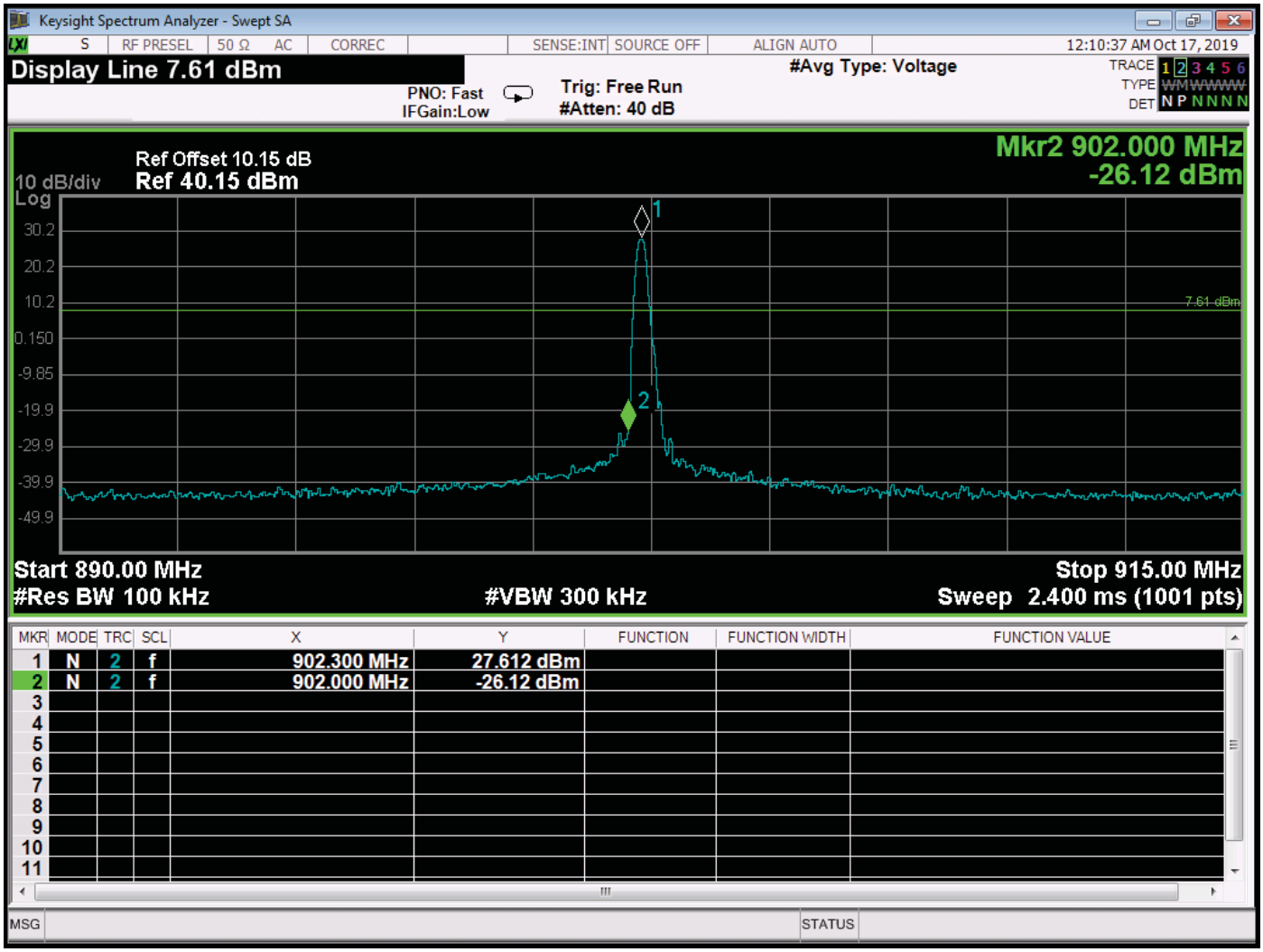
Title: FCC-B - Conducted Emissions - White Lead
File: 3 - Keysight - Final Scan - 802.11n - White Lead - FCC-B.set
Operator: Harvey Samaco
EUT Type: Bridge
EUT Condition: The EUT is continuously transmitting at 902.3 MHz in the high channel with WiFi on
Company: Nortek Security & Control, LLC
Model: MMS100
S/N: N/A
802.11n - Channel 11

10/16/2019 3:51:29 PM
Sequence: Final Measurements

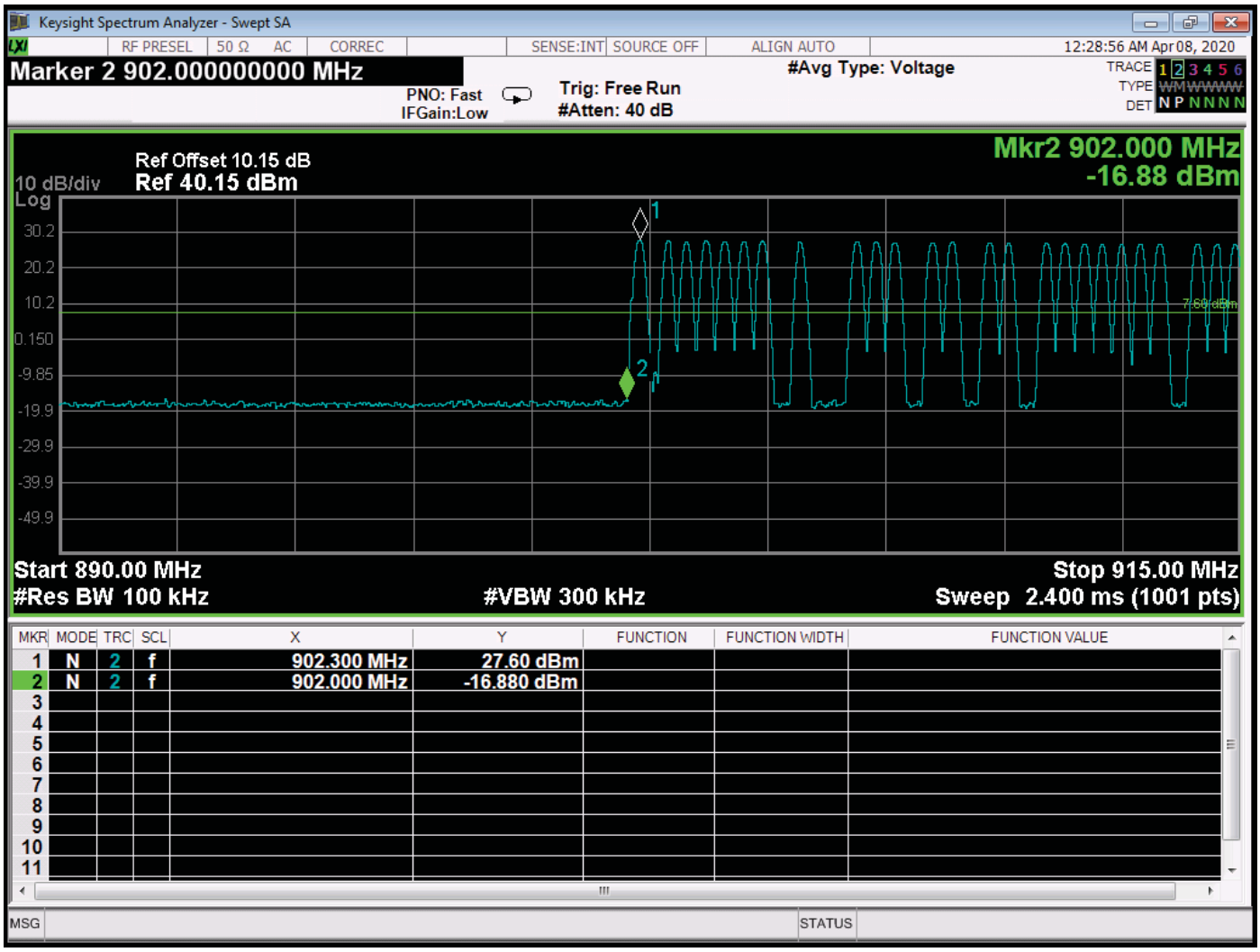
FCC Class B - Conducted Emissions - White Lead

Freq (MHz)	(PEAK) EMI (dBµV)	(AVG) EMI (dBµV)	(PEAK) Margin AVL (dB)	(AVG) Margin AVL (dB)	(AVG) Limit (dBµV)	Cable (dB)	Transducer (dB)	Filter (dB)
0.174	40.94	21.53	-13.15	-32.56	54.09	0.00	0.07	9.80
0.198	39.99	21.22	-13.25	-32.02	53.24	0.00	0.06	9.80
0.286	39.43	21.72	-10.94	-28.65	50.37	0.04	0.04	9.76
0.306	39.43	21.72	-10.31	-28.02	49.74	0.05	0.04	9.75
0.322	40.31	22.76	-8.96	-26.51	49.27	0.05	0.04	9.75
0.514	44.28	25.64	-1.72	-20.36	46.00	0.09	0.04	9.71
0.526	43.85	26.18	-2.15	-19.82	46.00	0.08	0.04	9.73
0.534	43.21	25.58	-2.79	-20.42	46.00	0.09	0.04	9.71
0.546	47.30	27.09	1.30	-18.91	46.00	0.09	0.04	9.72
0.554	43.40	25.41	-2.60	-20.59	46.00	0.08	0.04	9.73
0.854	38.62	21.32	-7.38	-24.68	46.00	0.03	0.04	9.85
0.870	38.85	20.48	-7.15	-25.52	46.00	0.02	0.04	9.86

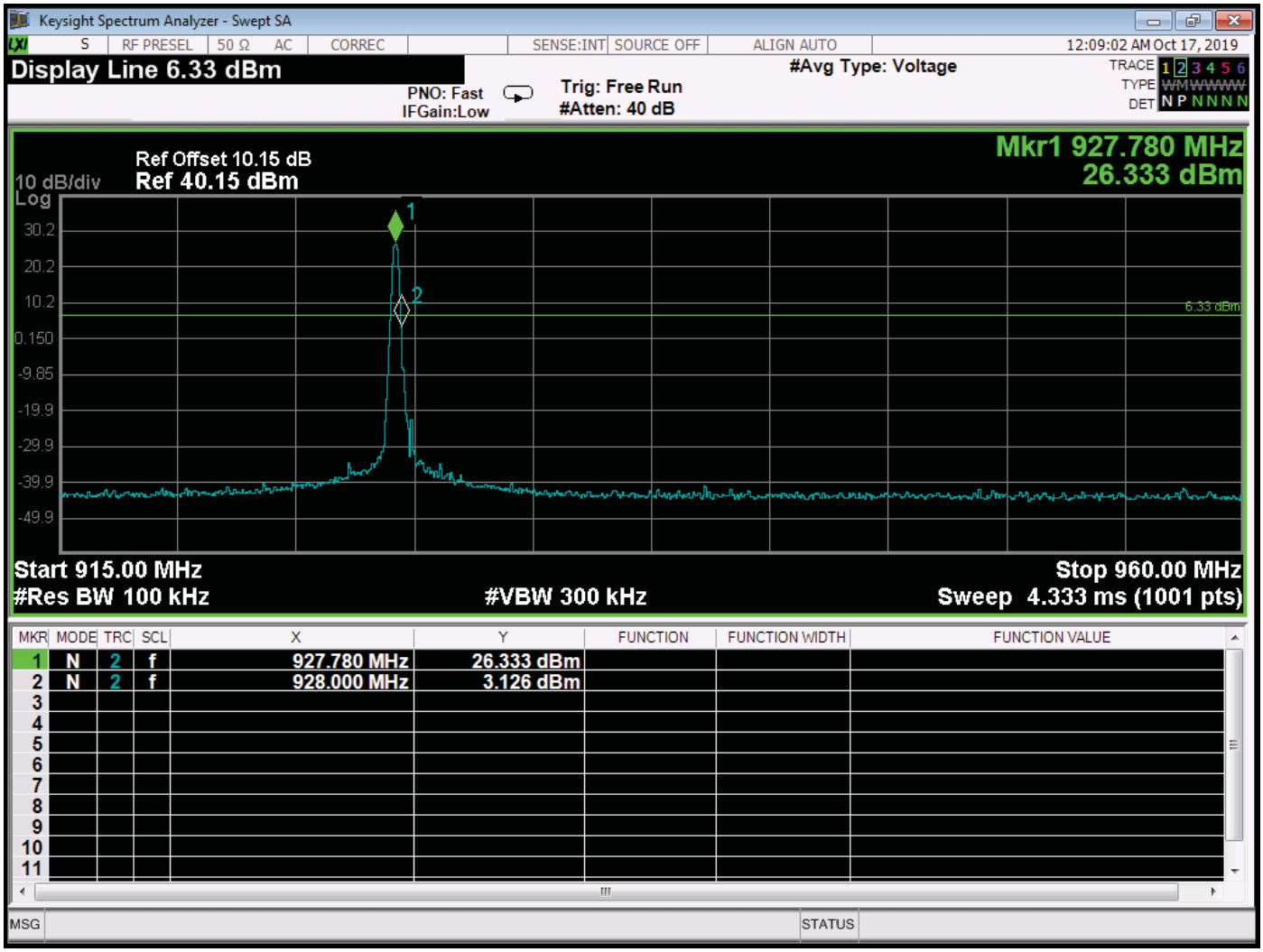
BAND EDGES DATA SHEETS



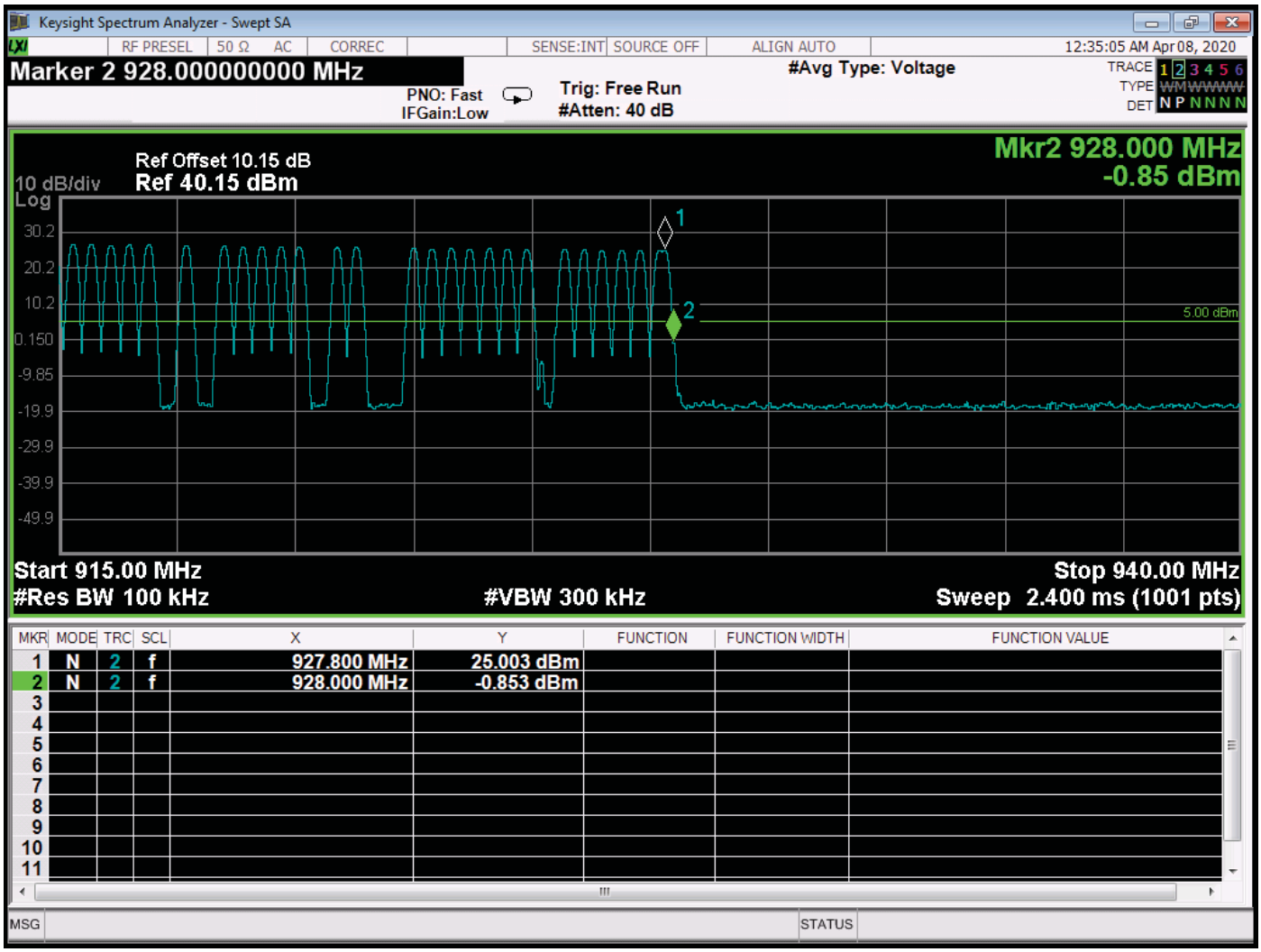
Band Edge – Low Channel – Fixed Frequency Mode



Band Edge – Low Channel – Frequency Hopping Mode

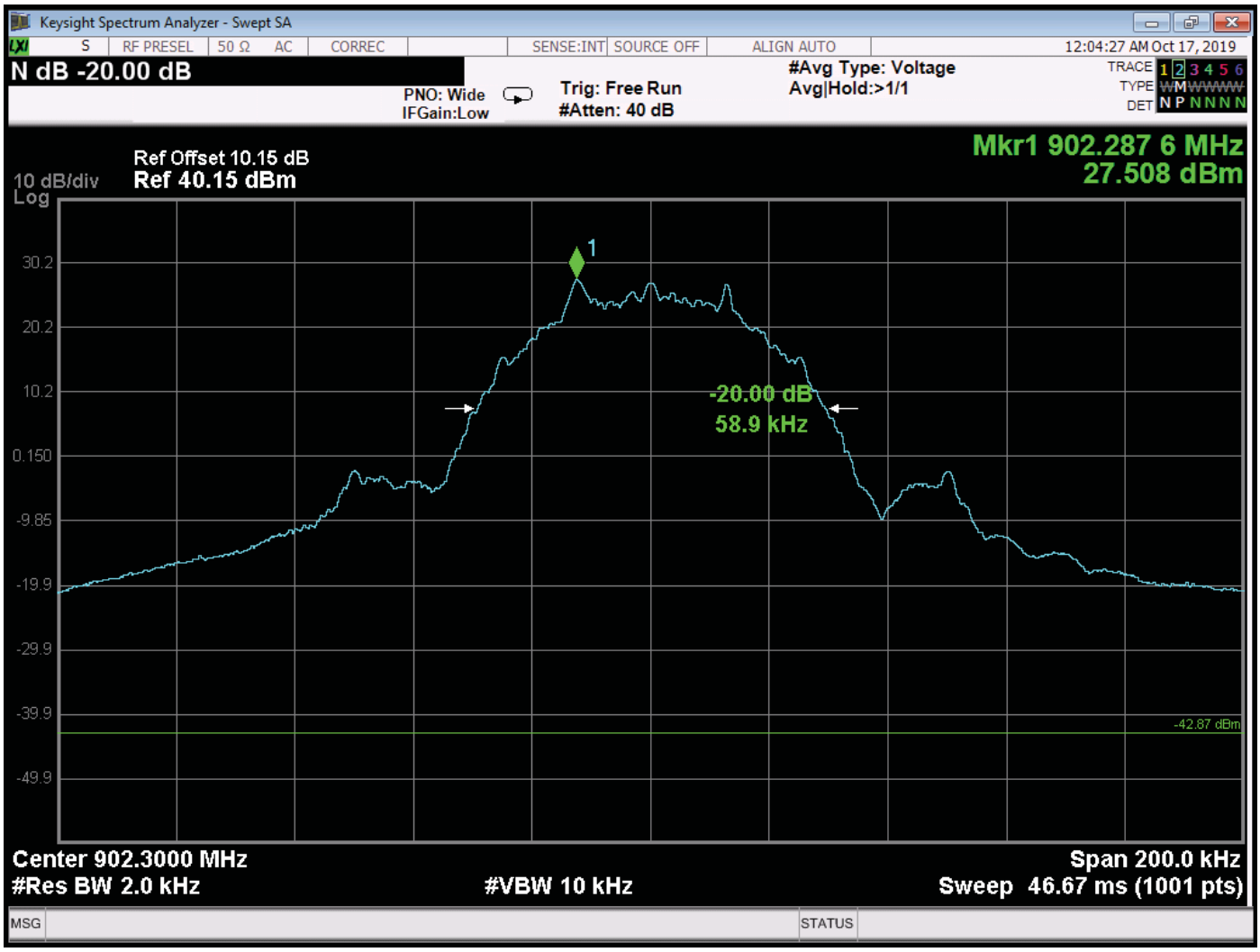


Band Edge – High Channel – Fixed Frequency Mode



Band Edge – High Channel – Frequency Hopping Mode

-20 DB BANDWIDTH DATA SHEETS

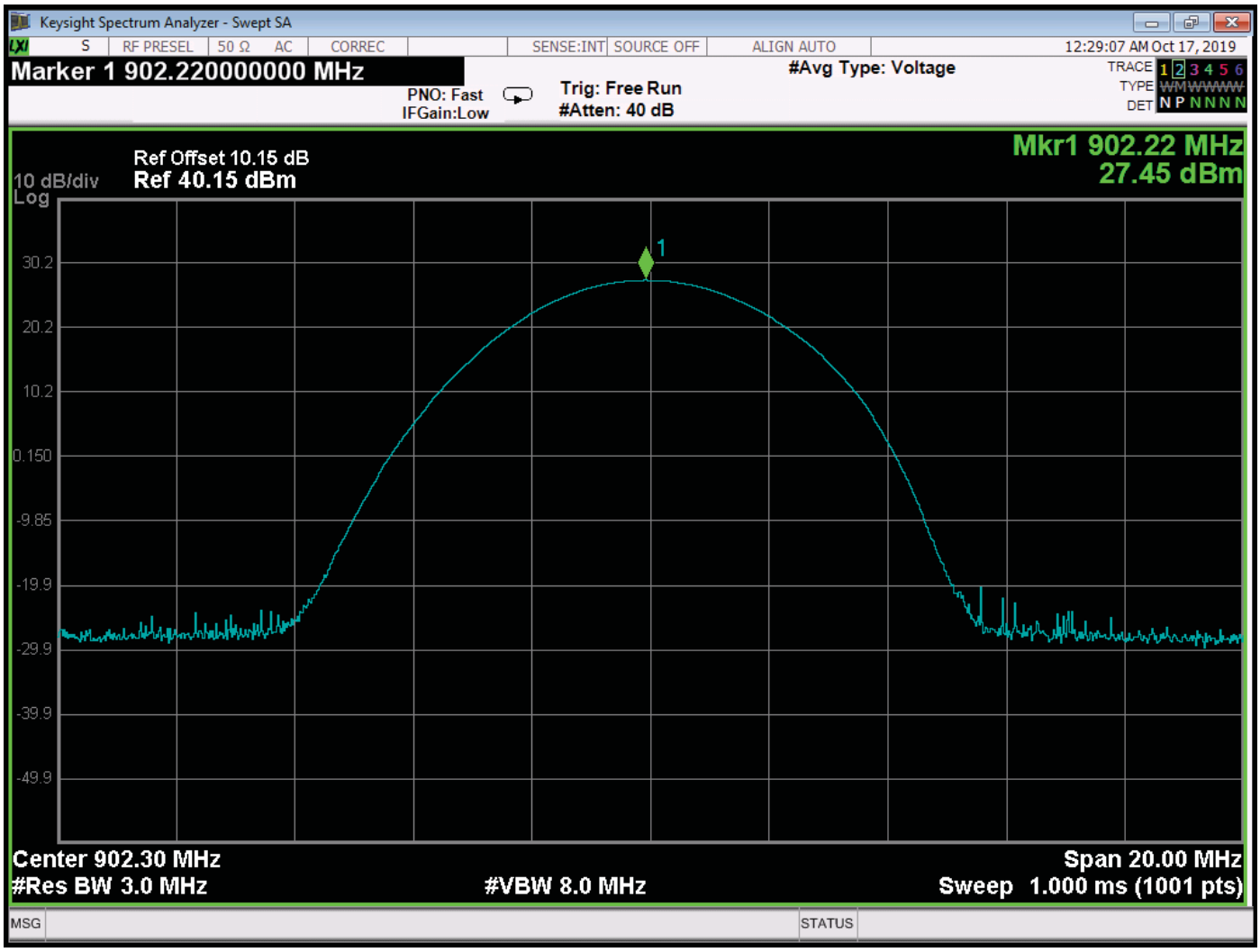


-20 dB Bandwidth – Low Channel

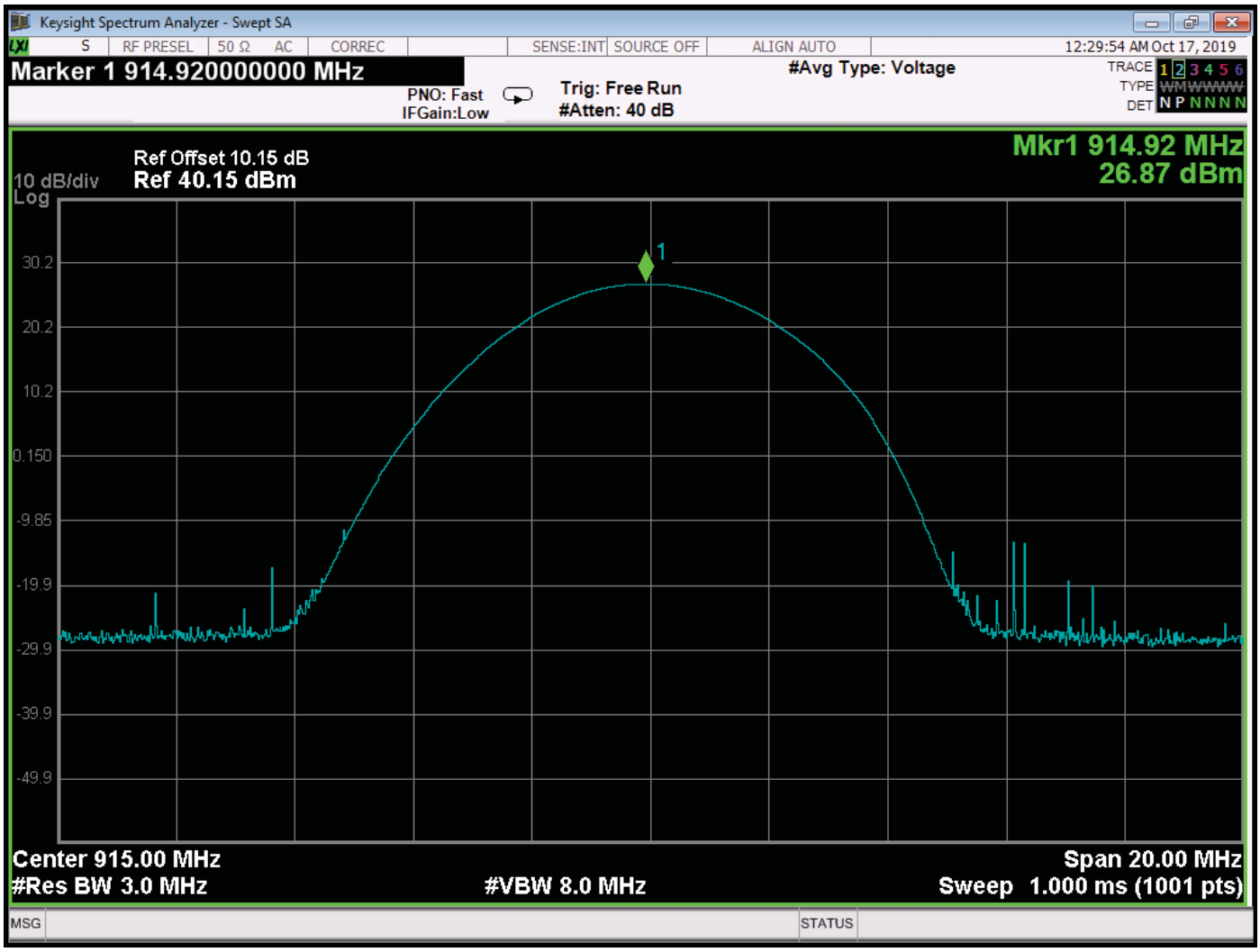
-20 dB Bandwidth – Middle Channel

-20 dB Bandwidth – High Channel

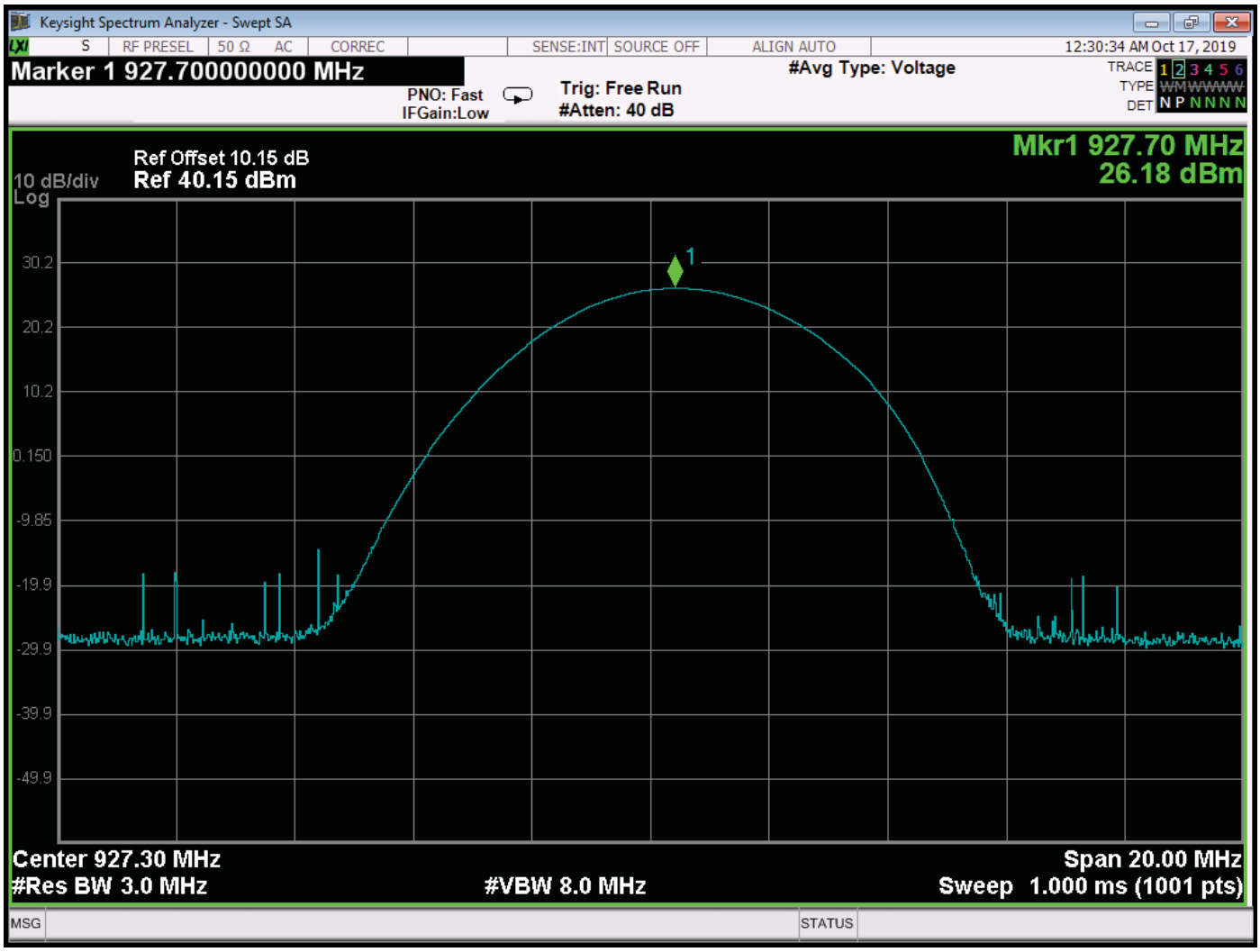
PEAK POWER OUTPUT DATA SHEETS



Peak Power Output – Low Channel

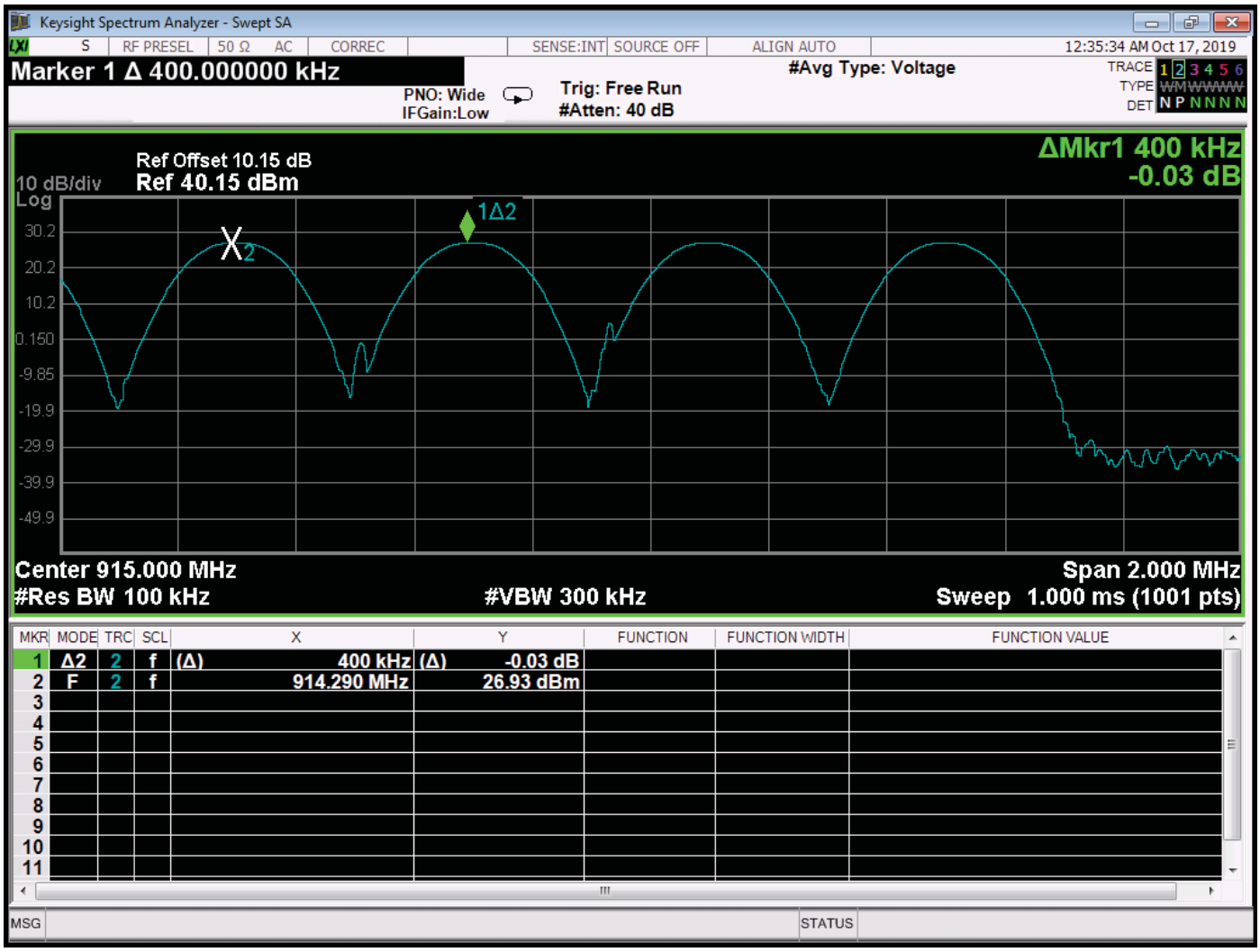


Peak Power Output – Middle Channel



Peak Power Output – High Channel

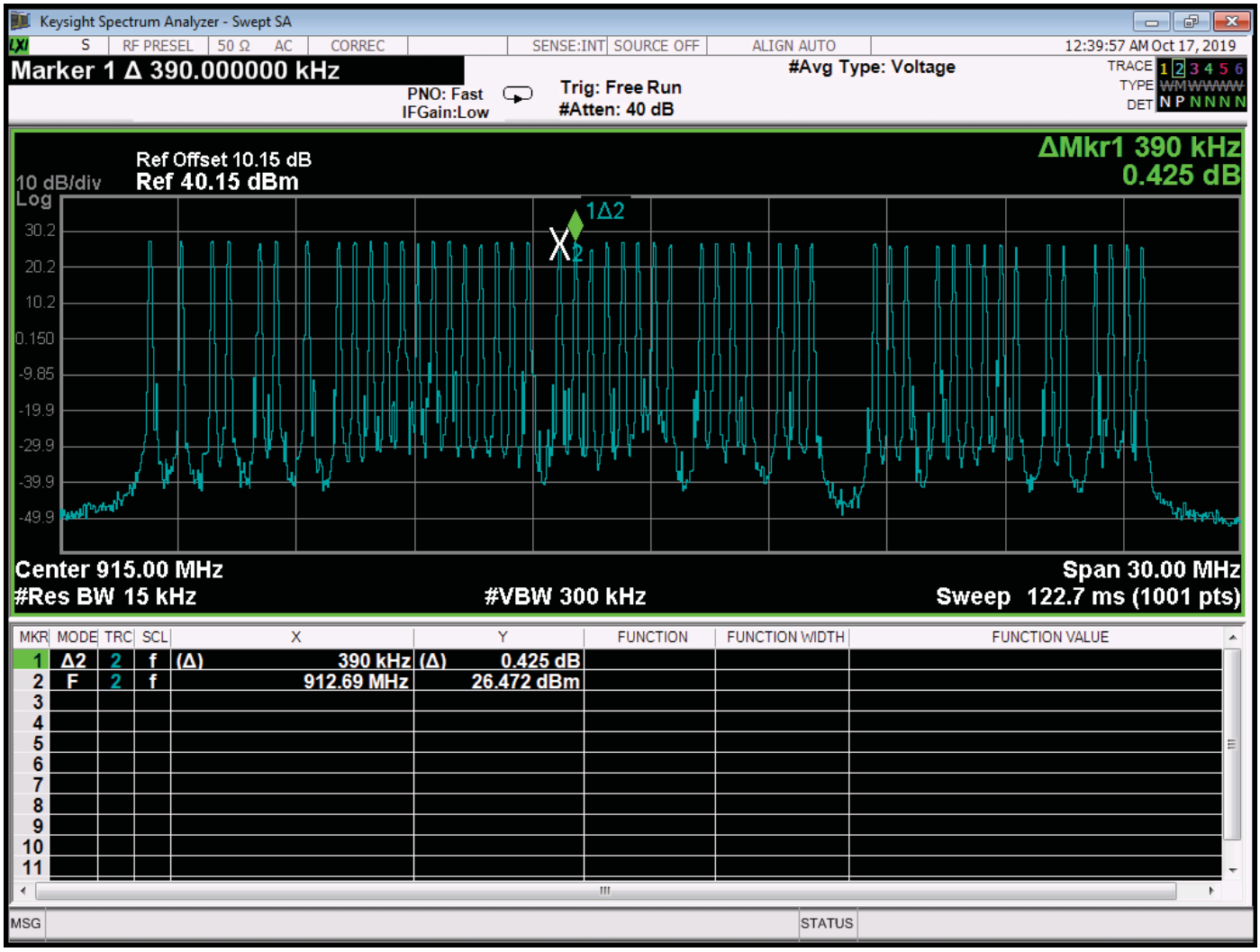
CHANNEL FREQUENCY SEPARATION DATA SHEET



Channel Frequency Separation

NUMBER OF FREQUENCIES

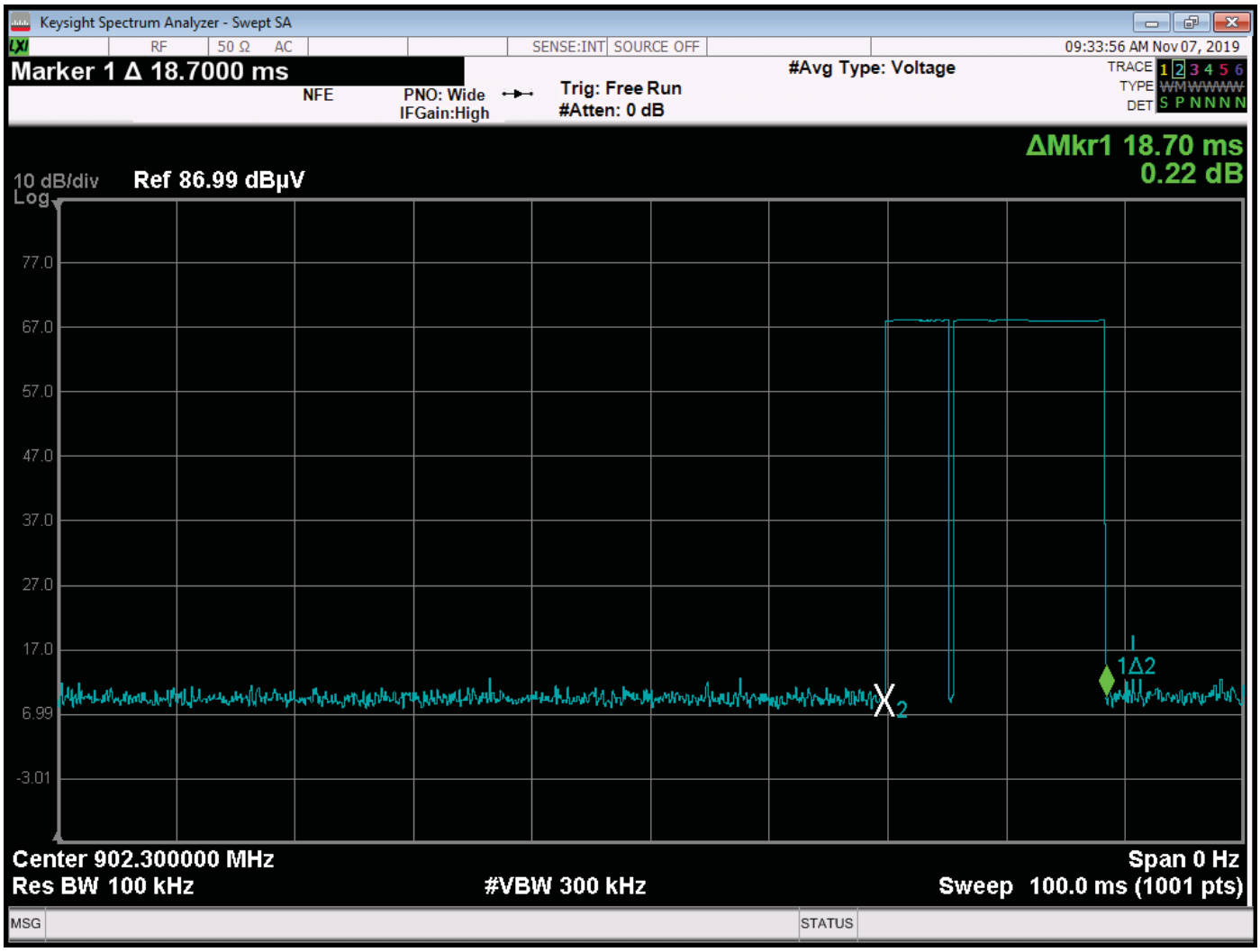
DATA SHEET



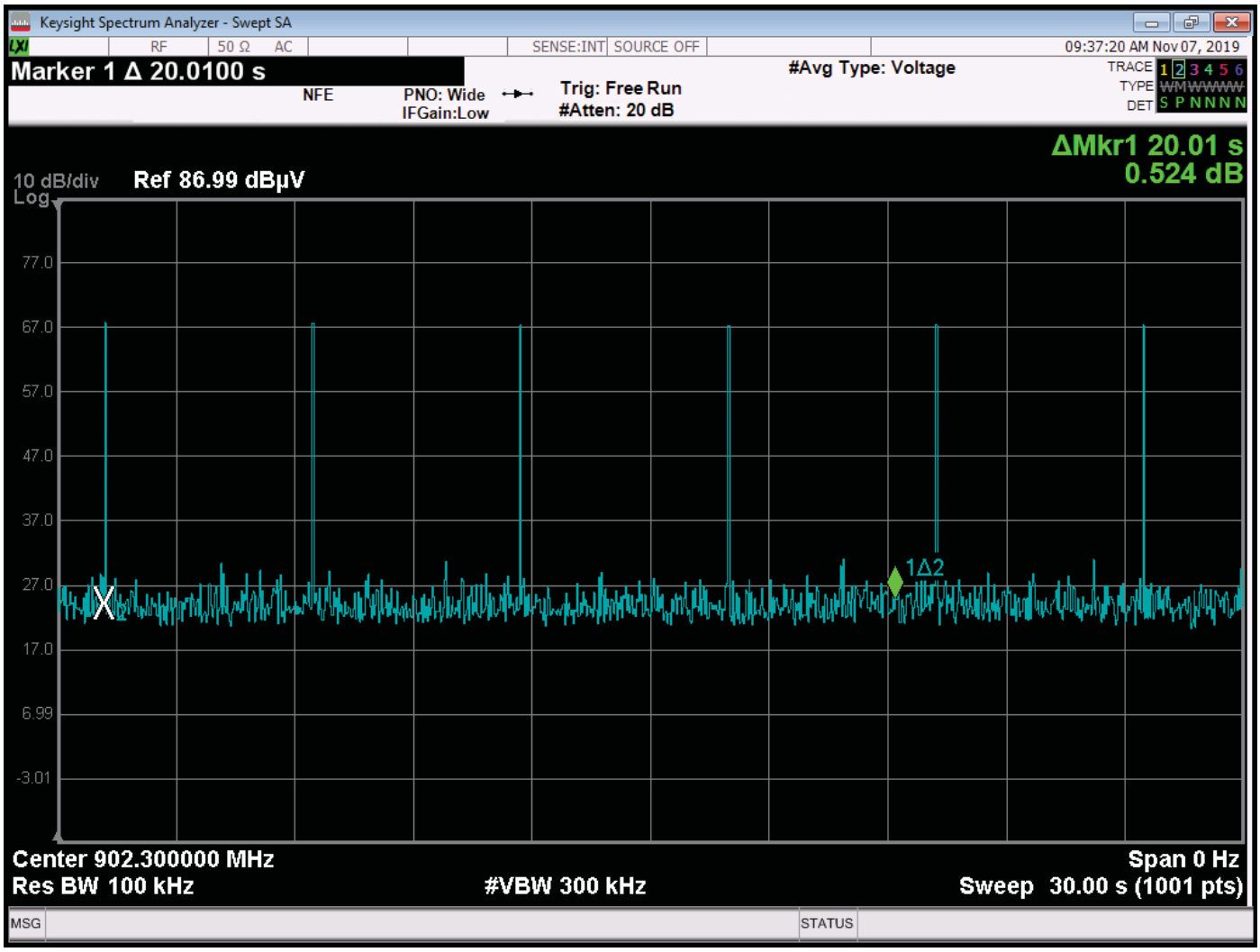
Number of Channels is 50

TIME OF OCCUPANCY

DATA SHEETS



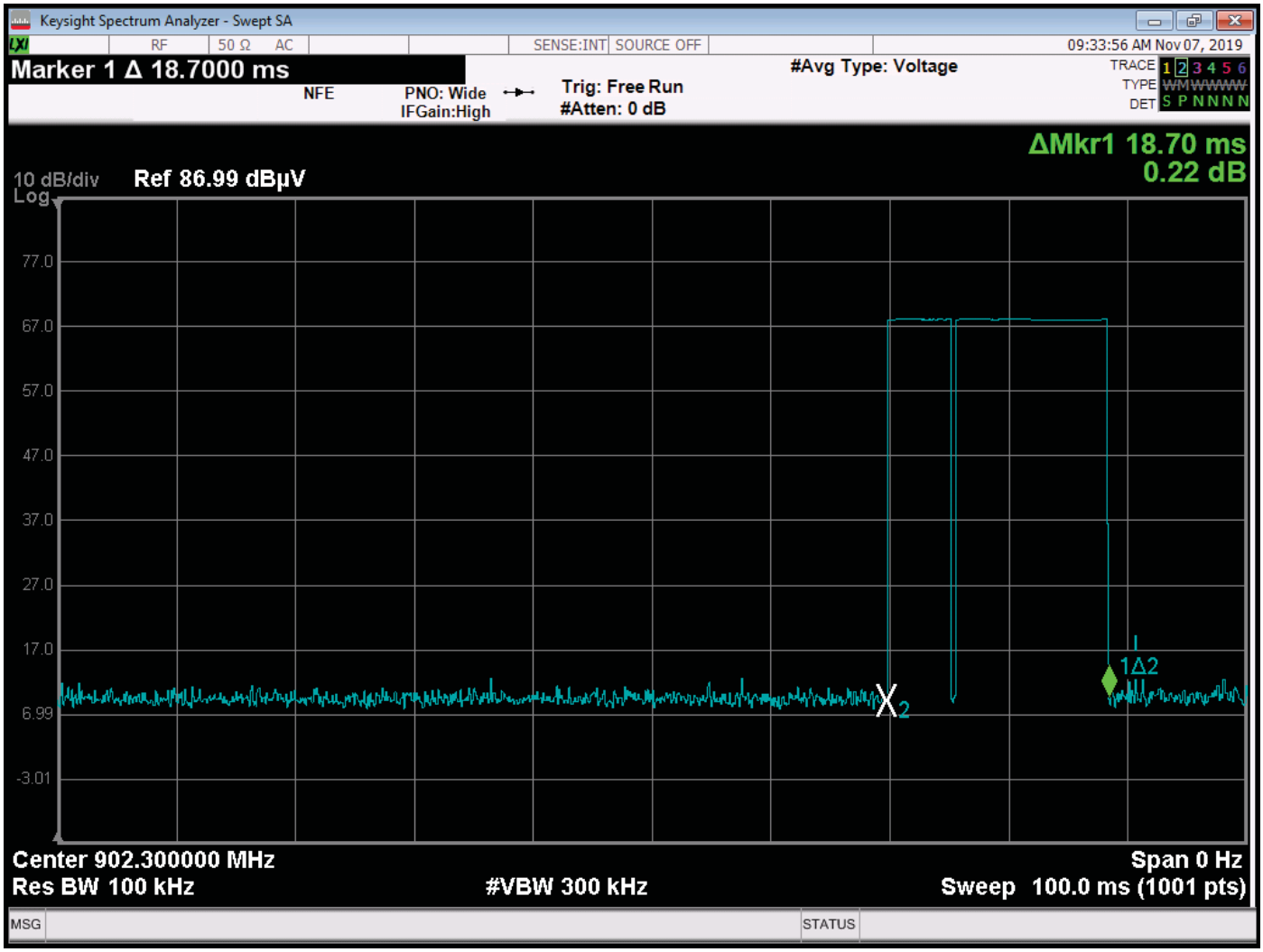
Time of One Pulse – 18.70 ms



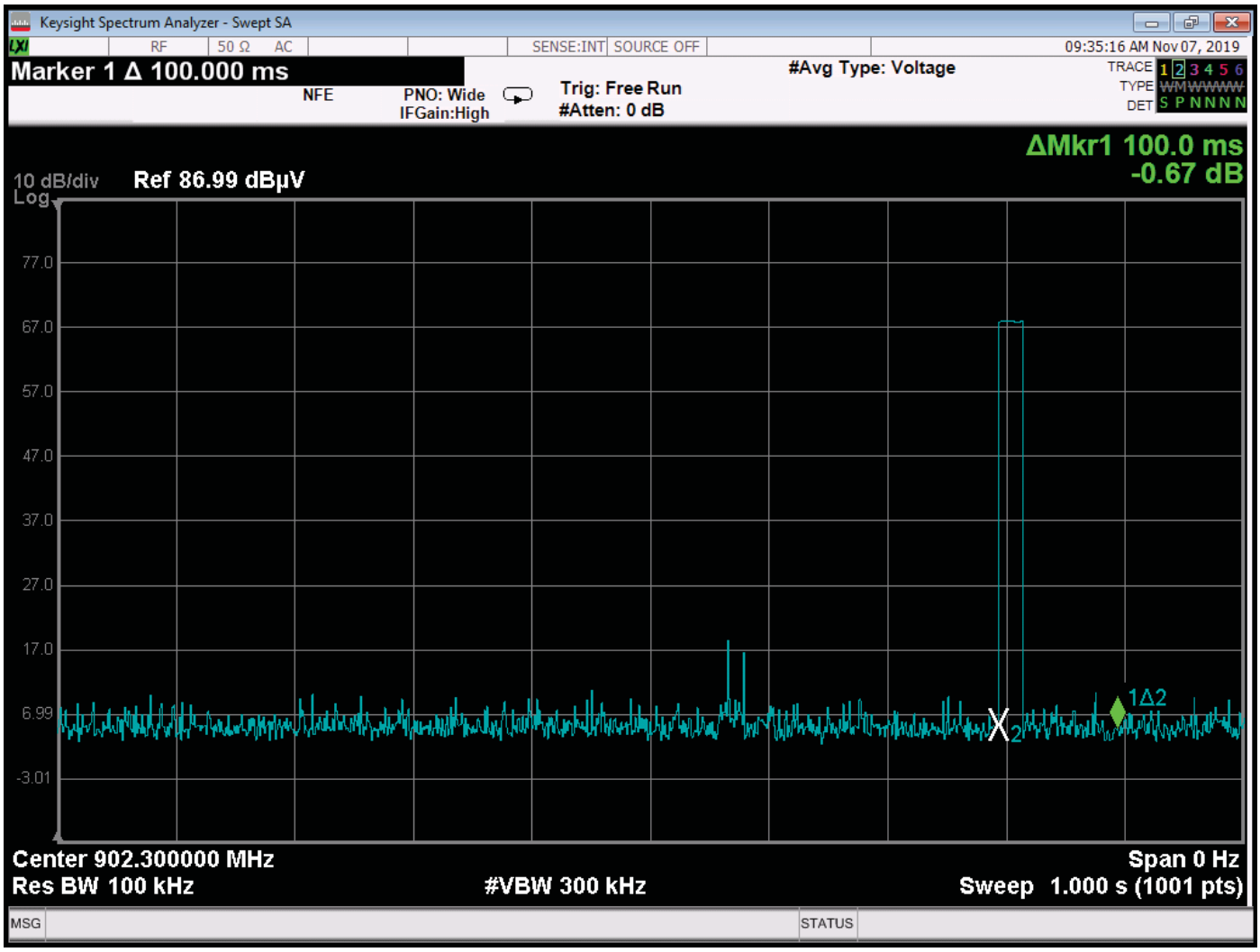
Four Pulses Per 20 Seconds
Total Time = 74.8 ms per 20 seconds
Limit = 400 ms per 20 seconds

DUTY CYCLE

DATA SHEETS



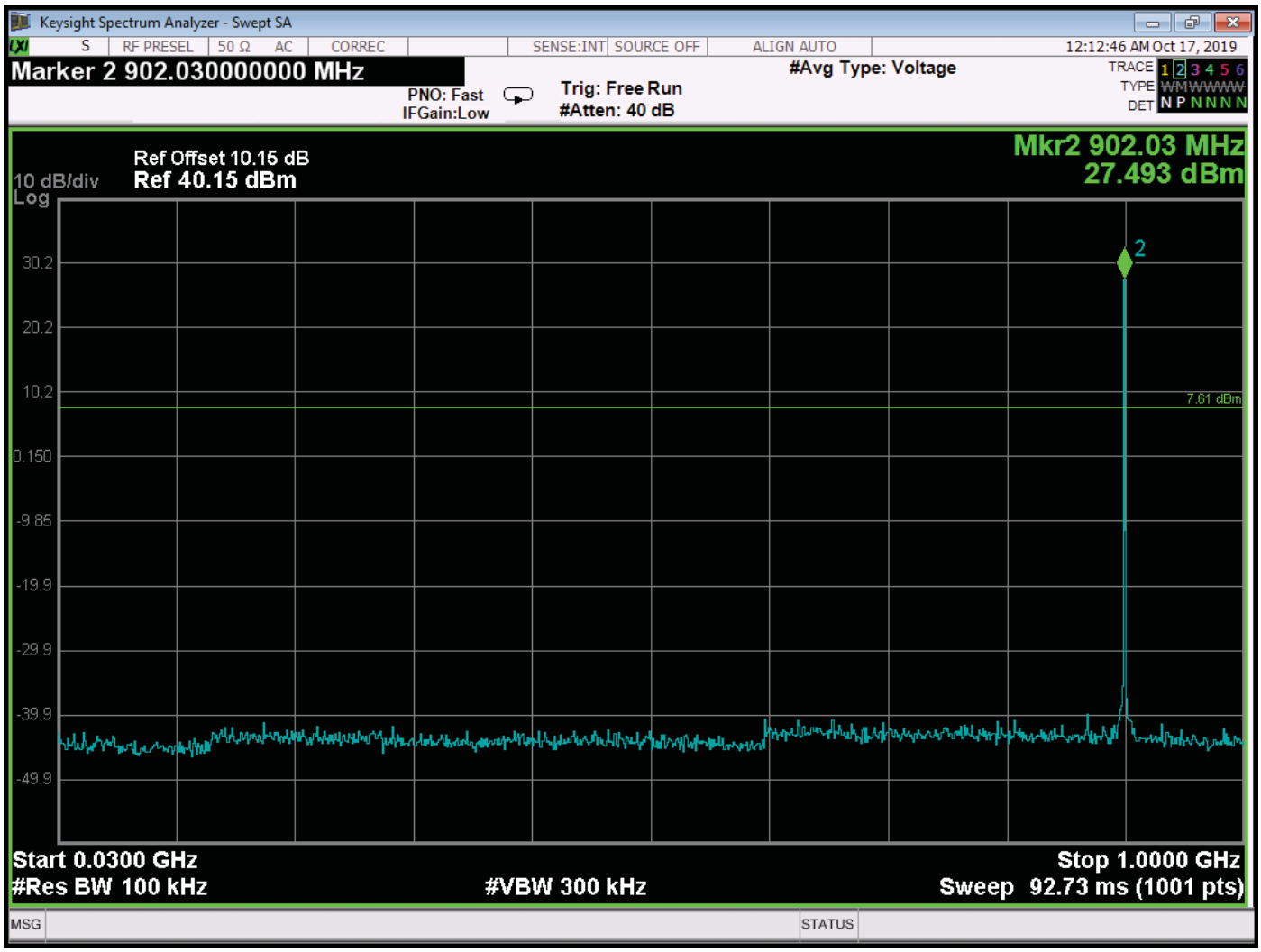
Time of One Pulse – 18.70 ms



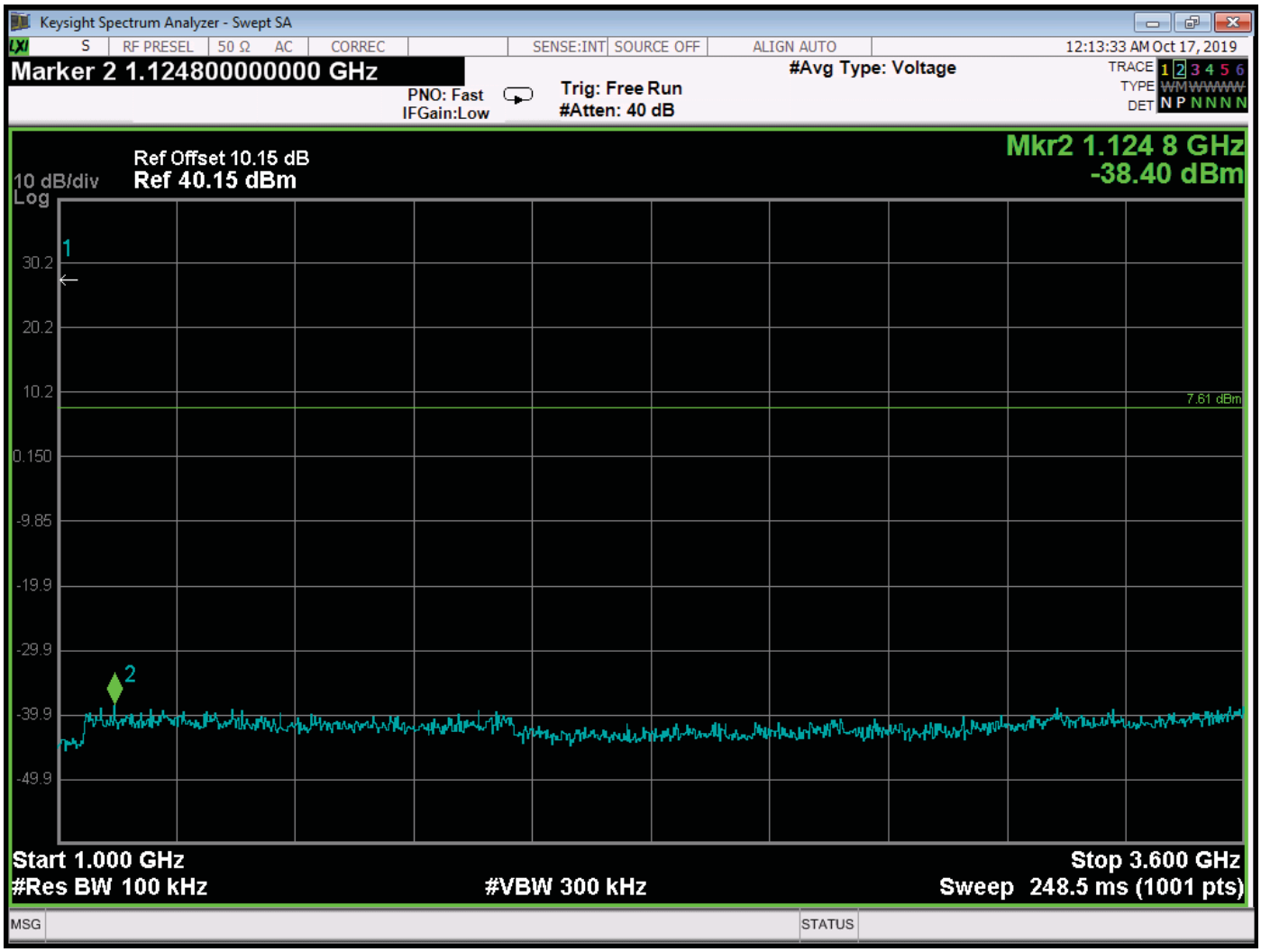
One pulse worst case per 100 ms
Total duty cycle = 18.70 ms / 100 ms = 18.7%

RF ANTENNA CONDUCTED

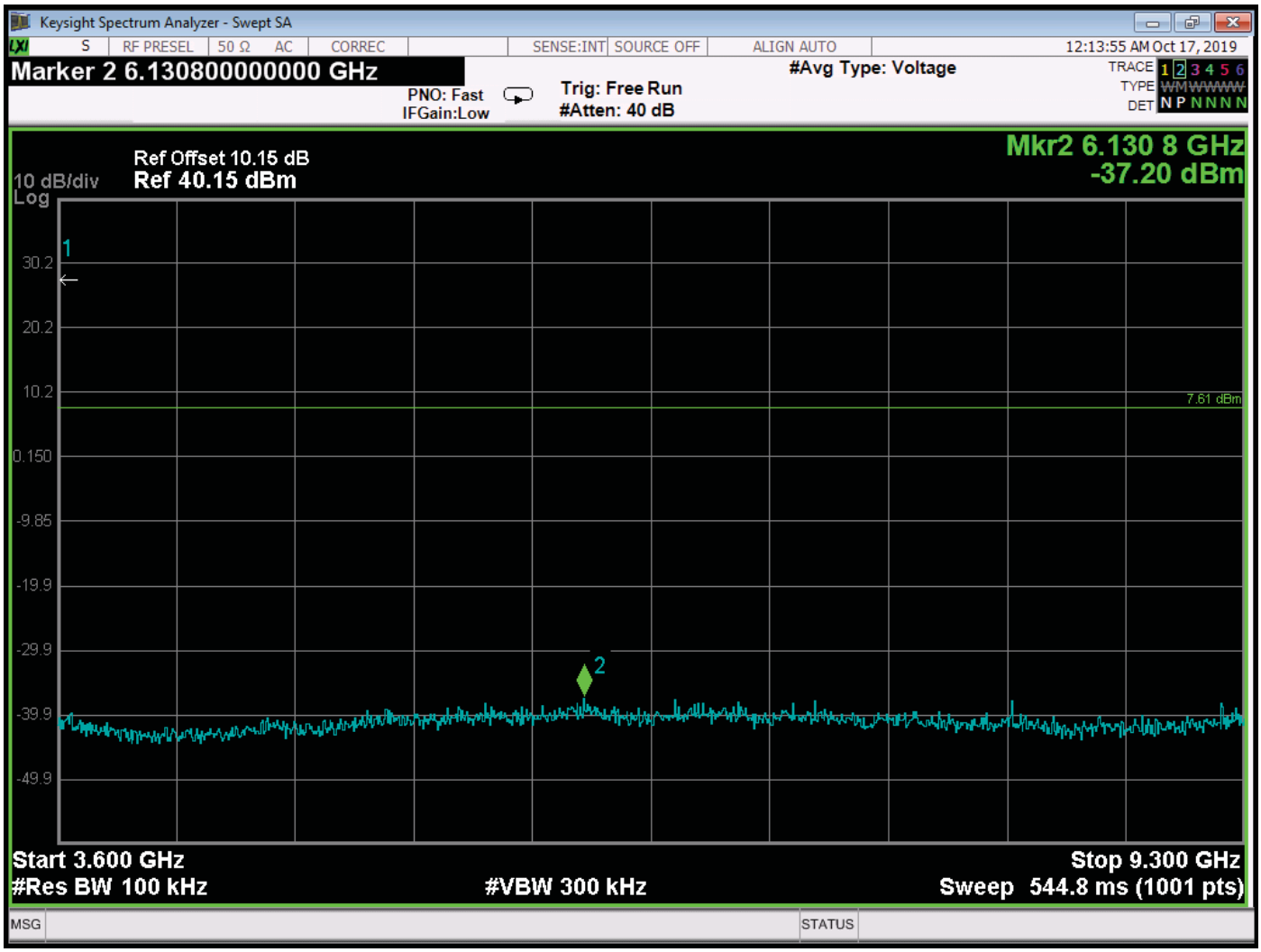
DATA SHEETS



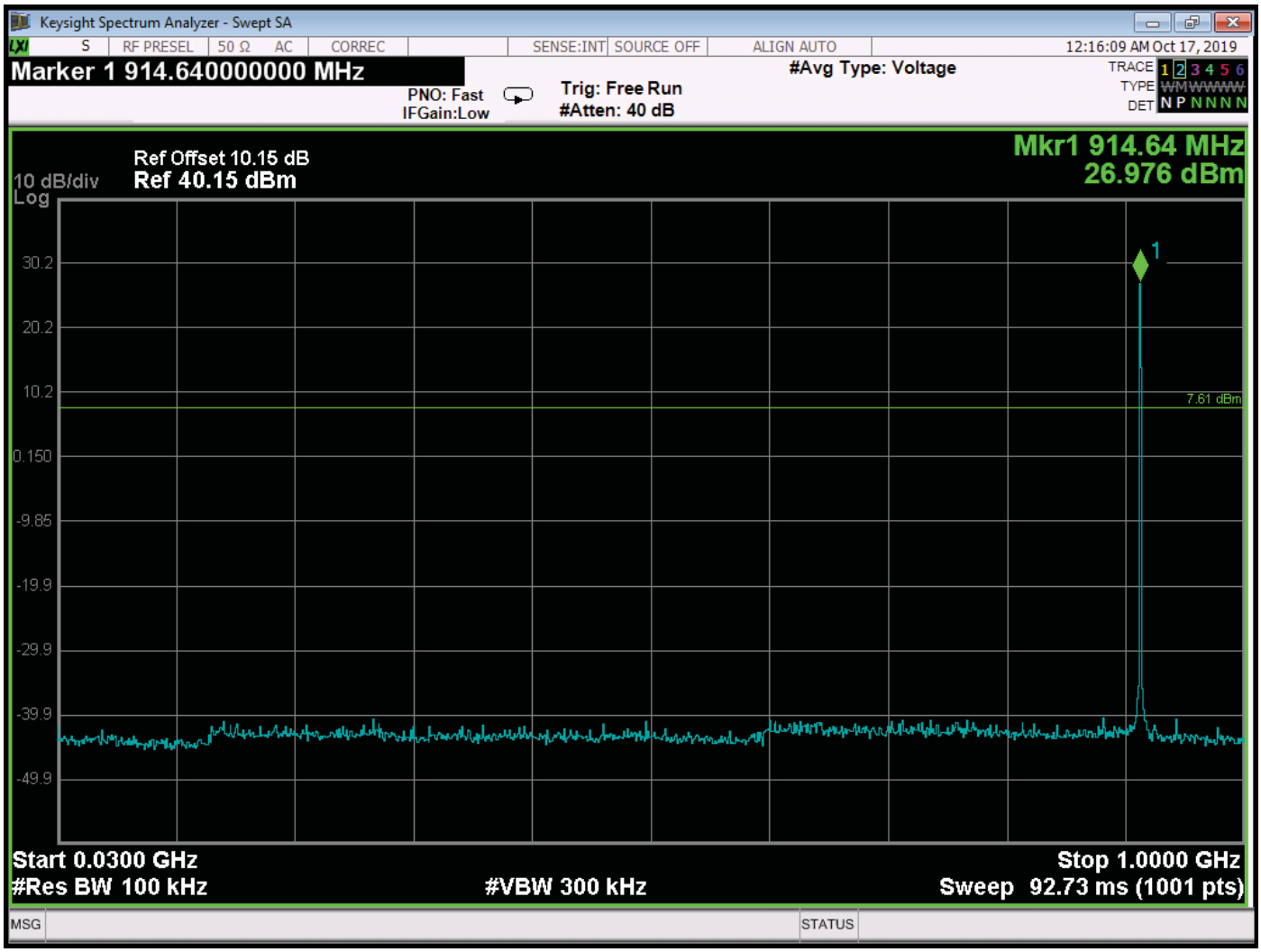
RF Antenna Conducted – Low Channel – 30 MHz to 1000 MHz



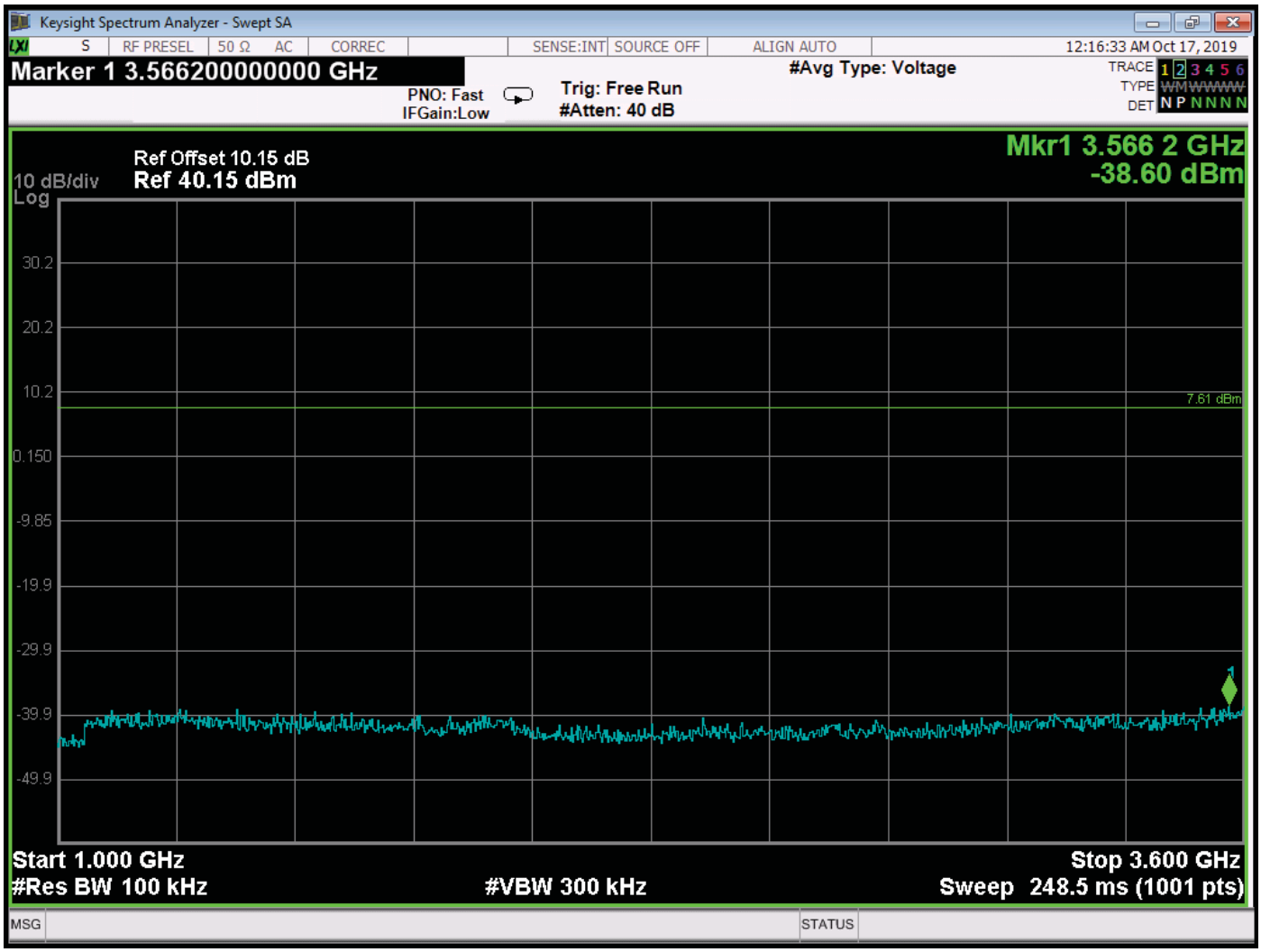
RF Antenna Conducted – Low Channel – 1000 MHz to 3600 MHz



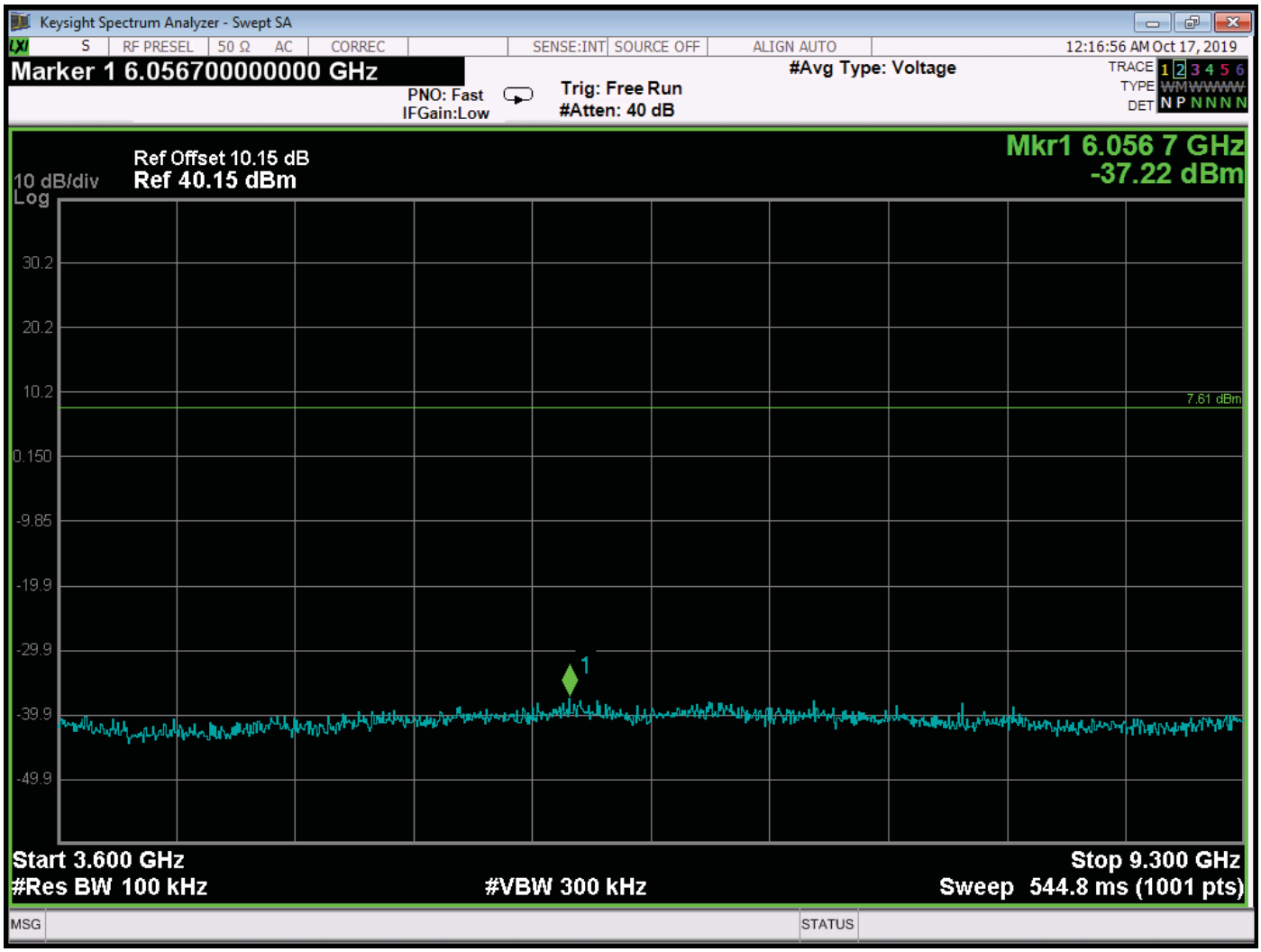
RF Antenna Conducted – Low Channel – 3600 MHz to 9300 MHz



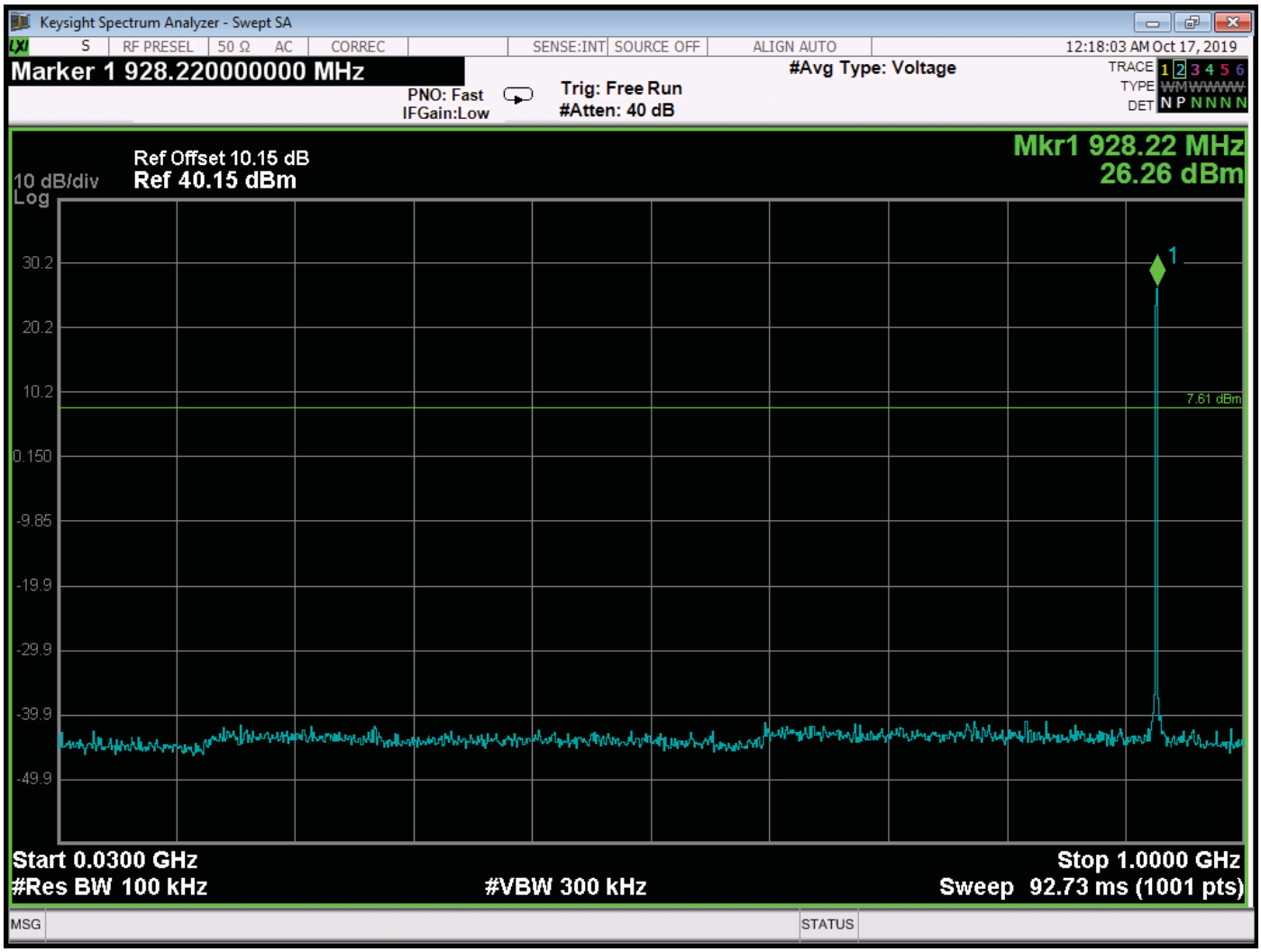
RF Antenna Conducted – Middle Channel – 30 MHz to 1000 MHz



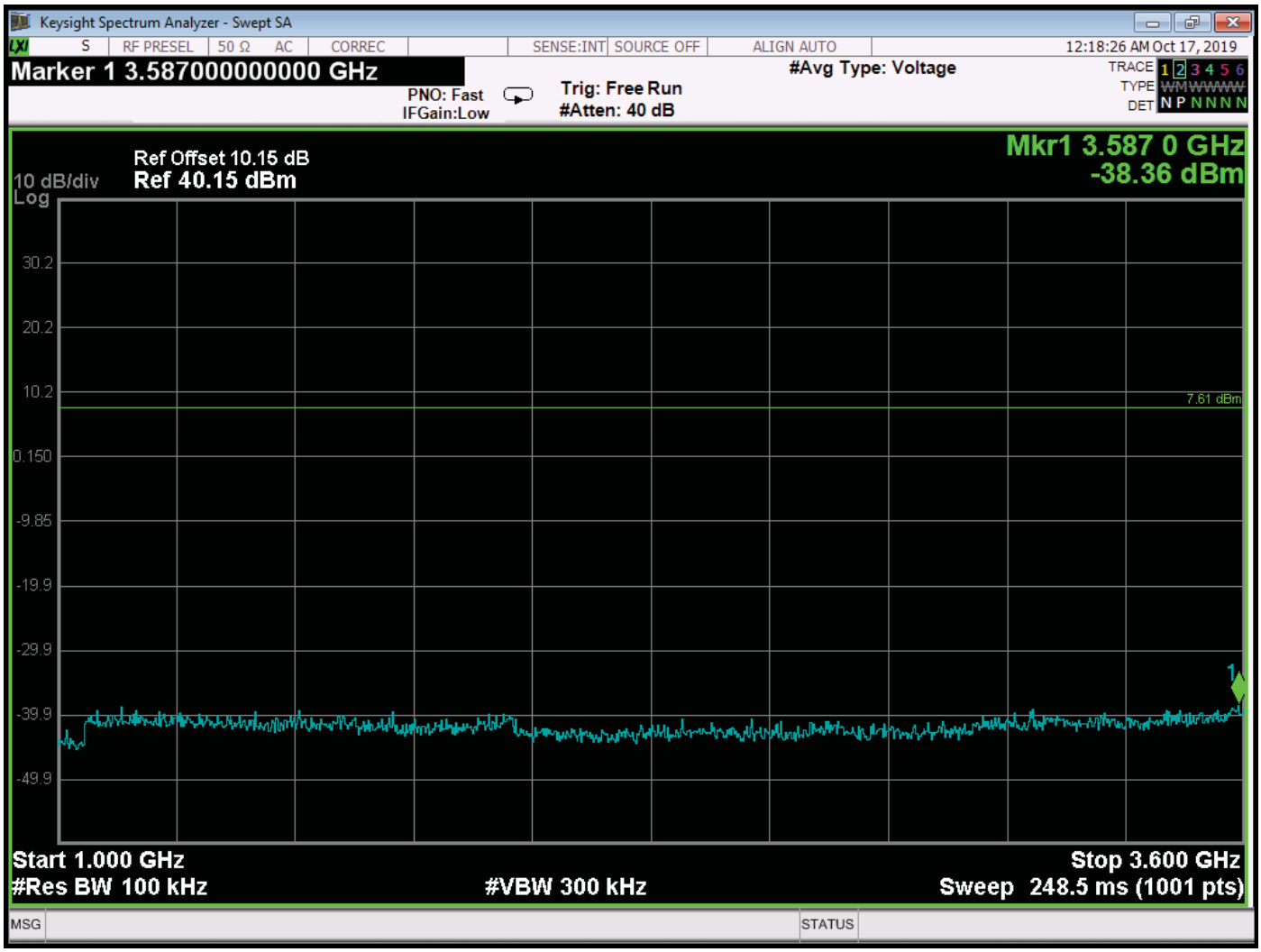
RF Antenna Conducted – Middle Channel – 1000 MHz to 3600 MHz



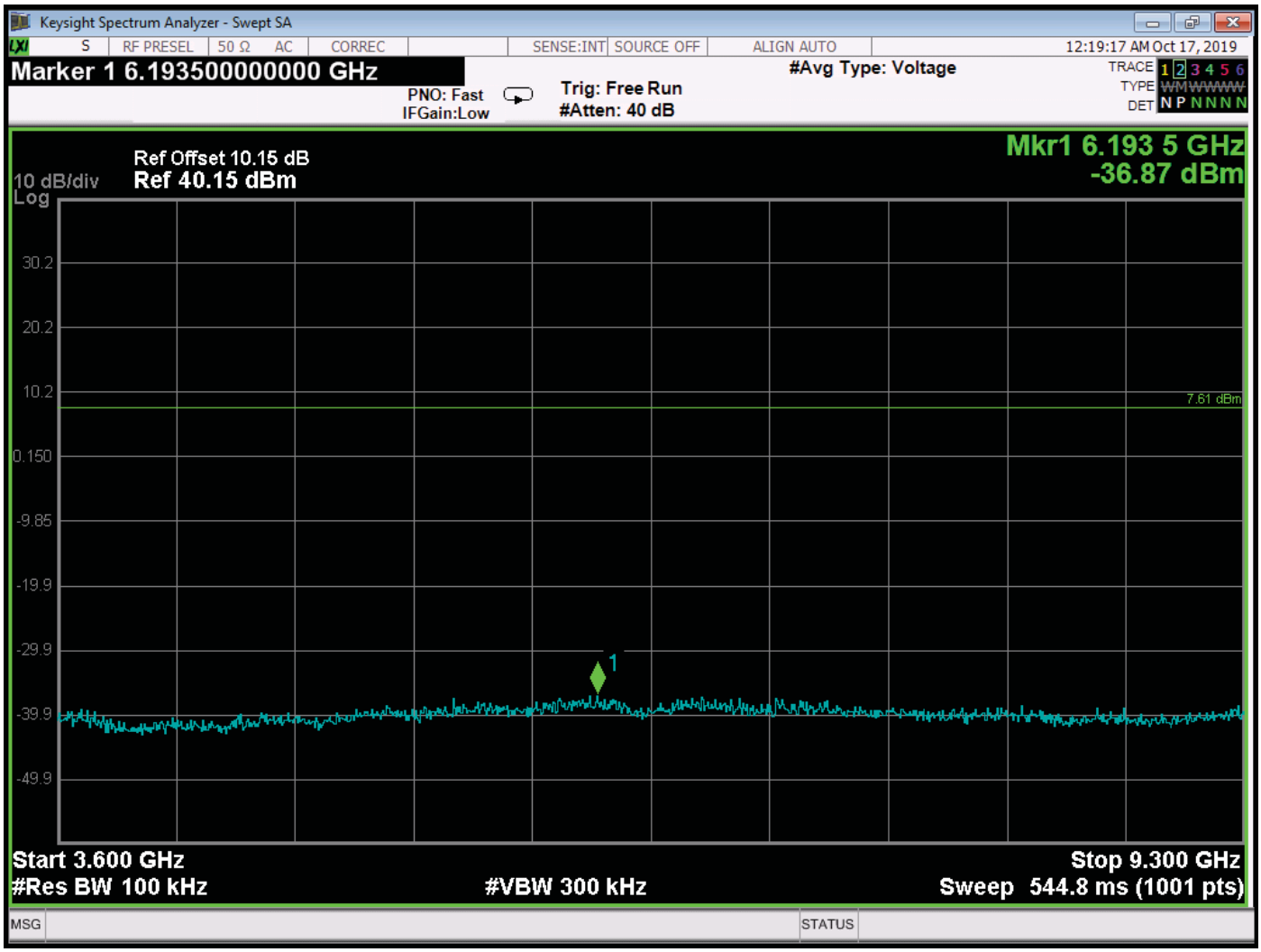
RF Antenna Conducted – Middle Channel – 3600 MHz to 9300 MHz



RF Antenna Conducted – High Channel – 30 MHz to 1000 MHz



RF Antenna Conducted – High Channel – 1000 MHz to 3600 MHz



RF Antenna Conducted – High Channel – 3600 MHz to 9300 MHz