Electromagnetic Compatibility Tests On Two (2) Wireless Microphone Transmitters, Model Nos. MX690 and MX890

For	:	Shure Inc. 5800 West Touhy Avenue Niles, IL 60714
P.O. No.	:	4500331667
Dates Tested	:	June 14-18, 2016
Test Personnel	:	Richard E. King
Specification	:	FCC "Code of Federal Regulations" Title 47 Part 74 Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By : Richard E. King

Richard E. King
EMC Engineer

Approved By : Raymond J. Klouda

Raymond J. Klouda
Registered Professional Engineer of Illinois - 44894

Elite Electronic Engineering Inc.
1516 Centre Circle
Downers Grove, IL 60515
Tel : (630) 495-9770
Fax: (630) 495-9785
www.elitetest.com

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REPORT REVISION HISTORY

Revision	Date	Description
--	12 July 2016	Initial release

Electromagnetic Compatibility Tests on Two (2) Wireless Microphone Transmitters, Model Nos. MX690 and MX890

1. INTRODUCTION

1.1 Scope of Tests

This document presents the results of a series of electromagnetic compatibility (EMC) tests performed on a Wireless Microphone Transmitters, Model Nos. MX690 and MX890, Serial Numbers 2PE0535856, 2PQ1178040 and 2PD1178047 (hereinafter referred to as the Equipment Under Test EUT). The EUT were manufactured and submitted for testing by Shure Inc. located in Niles, IL.

1.2 Purpose

The test series was performed to determine if the EUT would meet selected requirements of the FCC Part 74 for low power auxiliary station bands and Industry Canada RSS-210 Low Power Licensed Radio communication Devices.

1.3 Deviations, Additions, and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 EMC Laboratory Identification

The electromagnetic compatibility tests were performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois.

1.5 Laboratory Conditions

The temperature at the time of the test was 22°C and the relative humidity was 29%.

2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 74, dated 1 October 2015
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2015
- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements and Information for the Certification of Radiocommunication Equipment”, Issue 4, November 2014
- RSS-210, "Radio Standards Specification License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment” Issue 8, Amendment 1, February 2015
- TIA-603-D-2010, “Land Mobile FM or PM Communications Equipment Measurement and Performance Standard”
- 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"

3. EUT SETUP AND OPERATION

3.1 General Description

The EUT is a Wireless Microphone Transmitters, Model Nos. MX690 and MX890. A block diagram of the EUT setup is shown as Figure 1.

3.1.1 Power Input

Each EUT was powered with 3VDC from two 1.5VDC alkaline batteries.

3.1.2 Peripheral Equipment

The EUT Model MX890 was submitted for testing with a Shure gooseneck microphone.

3.1.3 Signal Input/Output Leads

The EUTs do not have signal input or output leads.

3.1.4 Grounding

The EUTs were not grounded during testing.

3.1.5 Frequency of EUT

Per CFR Title 47, Section 2, part 1057, for spurious emissions measurements at the antenna terminal and for spurious radiated emissions measurements, the frequency spectrum shall be investigated up to at least the tenth harmonic of the highest fundamental frequency.

3.2 Operational Mode

All emissions tests were performed separately in the following modes:

Band	Frequency (MHz)	Group	Channel	Nominal Output Power (mW)
H19 542 - 572MHz	542.275	3	1	5.1
	566.5	3	10	0
	571.675	2	12	-1.7

3.3 EUT Modifications

No modifications were required for compliance.

4. TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2009 and ANSI C63.4-2014 for site attenuation.

4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in **Table 10-1**.

4.3 Calibration Traceability

Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4 Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5. TEST PROCEDURES

5.1 RF POWER OUTPUT MEASUREMENTS

5.1.1 Requirements

In accordance with paragraph 74.861(e)(1)(ii), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed 250 milliwatts in the 470-608 and 614-806MHz bands. In accordance with paragraph 74.861(d)(1), for low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the maximum transmitter power which will be authorized is 1 watt.

For certification to paragraph 6.1 of the Industry Canada's RSS-210 requirement, the RF power output must not exceed 250 milliwatts mean power as listed in Table 1.

5.1.2 Procedures

The output from the antenna port of the EUT was connected to a power meter. The output power of each EUT frequency was then measured.

5.1.3 Results

The output power measurements are presented on pages 17 through 18. As can be seen from the data, the power output of each transmitter is within the requirements of Part 74.861 and RSS-210.

5.2 FREQUENCY STABILITY

5.2.1 Requirements

In accordance with paragraph 74.861(e)(4) and paragraph 7 of RSS-210 Table 1, for low power auxiliary stations operating in the bands allocated for TV broadcasting, the frequency tolerance of the transmitter shall be 0.005 percent.

5.2.2 Procedures

The EUT was connected to a frequency counter through the antenna output of each transmitter. The EUT was then placed in a humidity temperature chamber.

a) The nominal frequency of the transmitter was measured and recorded.

b) The temperature chamber was then set to -30ºC.

c) Once the temperature had reached -30ºC the EUT was allowed to soak for 30 minutes.

d) After soaking at -30ºC for thirty minutes the EUT was turned on and the transmit frequency was measured and recorded.

e) Steps (b) through (d) were repeated for each temperature in 10ºC steps from -20ºC to +50ºC.

f) The EUT was then removed from the temperature chamber and allowed to adjust to nominal room temperature (22ºC).

g) The battery voltage was checked and adjusted to the nominal level. The frequency was measured and recorded.

h) The battery voltage was then varied to 85% of its nominal level. The frequency was measured and recorded.

i) The battery voltage was then varied to 115% of its nominal level. The frequency was measured and recorded.

5.2.3 Results

The frequency stability measurements are presented on pages 18 and 23. As can be seen from the data the test frequency deviation was within the 0.005 percent limit. A photograph of the test setup is shown in Figure 2.

5.3 OCCUPIED BANDWIDTH MEASUREMENTS

5.3.1 Requirements

In accordance with paragraph 74.861(e)(5) and (6), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

a) The operating bandwidth shall not exceed 200 kHz.

b) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

   i. On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

   ii. On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

   iii. On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

For certification to the RSS-210 paragraph 6.3.1, the power of unwanted emissions shall be attenuated below the mean transmitter power in accordance with the following schedule:

a) On any frequency removed from the carrier frequency by more than 50% up to and including 100% of the authorized bandwidth: at least 25 dB.

b) On any frequency removed from the carrier frequency by more than 100% up to and including 250% of the authorized bandwidth: at least 35 dB.

c) On any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth: at least 55 + 10 Log (Pmean) dB.

5.3.2 Procedures

a) The EUT was connected to a spectrum analyzer through 40 dB of attenuation. The unmodulated carrier signal level was measured and recorded.

b) The EUT was modulated with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of the rated system deviation.

c) The EUT was modulated with a 15 kHz sine wave at an input level necessary to produce 85% of the rated system deviation.

d) Steps (a) through (c) were repeated separately for each of the remaining frequencies. The bandwidth of the spectrum analyzer was set to 2kHz (1% of Authorized BW).

5.3.3 Results

The plots of the occupied bandwidth measured are presented on pages 24 through 41. The limits, shown on the plots, are referenced to the power measured from the unmodulated carrier, the power when modulated with a 2500 Hz sine wave at an input 16dB greater than that necessary to produce 50% of the rated deviation and a 15 kHz sine wave at 85% of the maximum deviation.

The operating bandwidth was determined using Carson's rule:
Bn = 2M + 2DK where Bn = bandwidth, M= Maximum modulating frequency and D = Peak Deviation. With

K = 1, M = 500Hz and D = 53kHz resulting in an operating bandwidth of 107kHz. Data supplied to Elite by Shure Inc.

The maximum Industry Canada 99% bandwidth measurement was 146.05kHz.

As can be seen from the data, the EUTs met all occupied bandwidth requirements.

5.4 FIELD STRENGTH OF SPURIOUS EMISSIONS

5.4.1 Requirements

In accordance with paragraph 74.861 of CFR 47, the power of any emission on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated by at least 43 + 10 log (P) dB.

In accordance with RSS-210 paragraph 6.3.1, the power of any emission on any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth shall be attenuated by at least 55 + 10 log (P) dB.

5.4.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2009 and ANSI C63.4-2014for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

1. Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. With the EUT at one set position and the measurement antenna at a set height (i.e. without maximizing), the radiated emissions were measured using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3 meter distance from the EUT. This data was then automatically plotted. All preliminary tests were performed separately with the EUT operating in the modes listed in Para. 3.2.
2. All significant broadband and narrowband signals found in the preliminary sweeps were then measured using a peak detector at a test distance of 3 meters. The measurements were made with a bilog antenna over the frequency range of 30MHz to 1GHz, and a double ridged waveguide antenna was used for frequencies above 1GHz.
3. To ensure that maximum emission levels were measured, the following steps were taken:
    a. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
    b. Since the measuring antennas are linearly polarized, both horizontal and vertical field components were measured.
    c. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, another antenna was set in place of the EUT and connected to a calibrated signal generator. (A tuned dipole was used for all measurements below 1GHz and a double ridged waveguide antenna was used for all measurements above 1GHz.) The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and for frequencies above 1GHz, increased by the gain of the waveguide.

5.4.3 Results

The preliminary plots peak levels for the EUT in the H19 band are presented on pages 42 through 65. Factors for the antennas and cables were added to the data before it was plotted. This data is only presented for a reference, and is not used as official data. All significant radiated emissions were subsequently measured using the substitution method.

The final radiated levels are presented on pages 66 through 77. The radiated emissions were measured through the 10th harmonic. All emissions measured from the EUT were within the specification limits.

Photographs of the test setup are shown in Figure 3 and Figure 4.

6. OTHER TEST CONDITIONS

6.1 Test Personnel and Witnesses

All EMC tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was partially witnessed by Shure Inc. personnel.

6.2 Disposition of the EUT

The EUT and all associated equipment were returned to Shure Inc. upon completion of the tests.

7. CONCLUSION

It was found that the Shure Inc., models MX690 and MX890 Wireless Microphone Transmitters, serial numbers 2PE0535856, 2PQ1178040 and 2PD1178047, did comply with the RF power output, the occupied bandwidth, the frequency stability, the spurious emissions at antenna terminal, and the field strength of spurious emissions requirements of FCC Part 74 for low power auxiliary station bands and Industry Canada RSS-210 Low Power Licensed Radio communication Devices.

8. CERTIFICATION

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specification. The data presented in this test report pertains only to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

9. ENDORSEMENT DISCLAIMER

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

10. EQUIPMENT LIST

Table 10-1

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW11	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	4/18/2016	4/18/2017
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
ETD0	ENV CHAMBER (AUTO)	THERMOTRON	S-8	15461	-70 to 150 C	NOTE 1	
ETDC	CONTROLLER	THERMOTRON	2800	753726	PROGRAMABLE	NOTE 1	
GRE1	SIGNAL GENERATOR	AGILENT	E4438C	MY42081749	250KHZ-6GHZ	12/16/2015	12/16/2016
GWH6	10MHZ DDS FUNCTION GENERATOR	WAVETEK	29	154849	0.0001HZ-10MHZ	9/30/2015	9/30/2016
GWH8	10MHZ DDS FUNCTION GENERATOR	WAVETEK	29	053221	0.0001HZ-10MHZ	10/5/2015	10/5/2016
MFB0	FREQUENCY COUNTER	HEWLETT PACKARD	5334A	2426A02162	0-100MHZ	5/20/2016	5/20/2017
MPC2	DUAL POWER METER	HEWLETT PACKARD	EPM-442A	US37480150	0.1MHZ-50GHZ	2/25/2016	2/25/2017
MPDA	POWER SENSOR (DCC-MATC)	HEWLETT PACKARD	8481A	US37294991	10MHZ-18GHZ	5/31/2016	5/31/2017
NLVA	LOOP ANTENNA (6CM)	ETS LINDGREN	7405-901	165728	790MHz	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	3/23/2016	3/23/2017
NWQ0	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66657	1GHZ-18GHZ	5/18/2016	5/18/2018
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	4/4/2016	4/4/2018
RAKG	RF SECTION	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	2/22/2016	2/22/2017
RAKH	RF FILTER SECTION	HEWLETT PACKARD	85460A	3448A00324	---	2/22/2016	2/22/2017
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/2/2016	3/2/2017
RBA1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100146	20HZ-26.5GHZ	2/12/2016	2/12/2017
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	2/16/2016	2/16/2017
RYE0	MODULATION ANALYZER	HEWLETT PACKARD	8901B	3104A03410	0.15-1300MHZ	9/8/2015	9/8/2016
T1EE	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2321	DC-18GHZ	6/13/2016	6/13/2018
WQC0	HF_8546A						
XLT3	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	1/14/2016	1/14/2018

I/O: Initial Only
N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

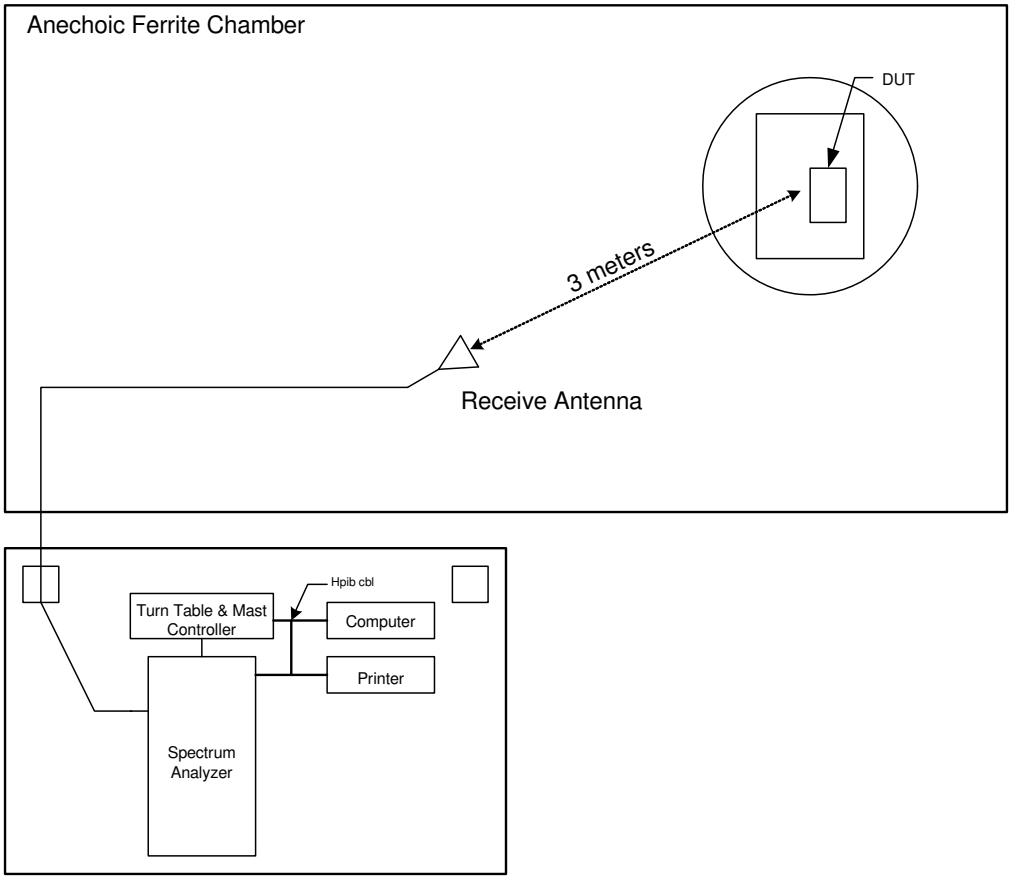
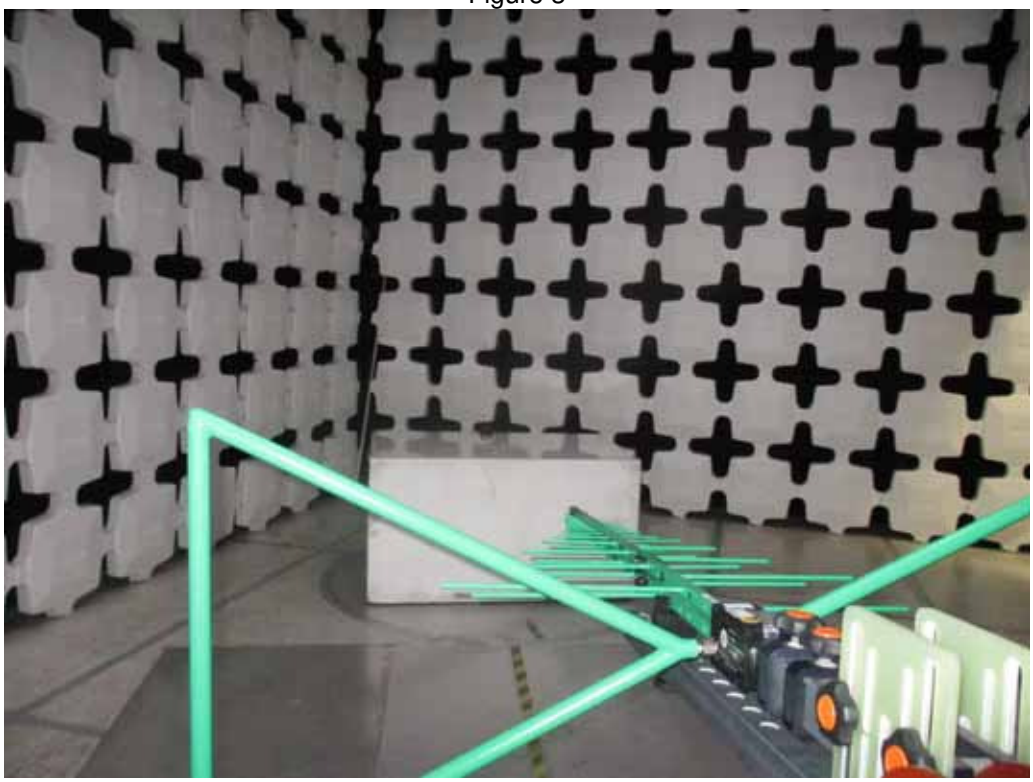


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

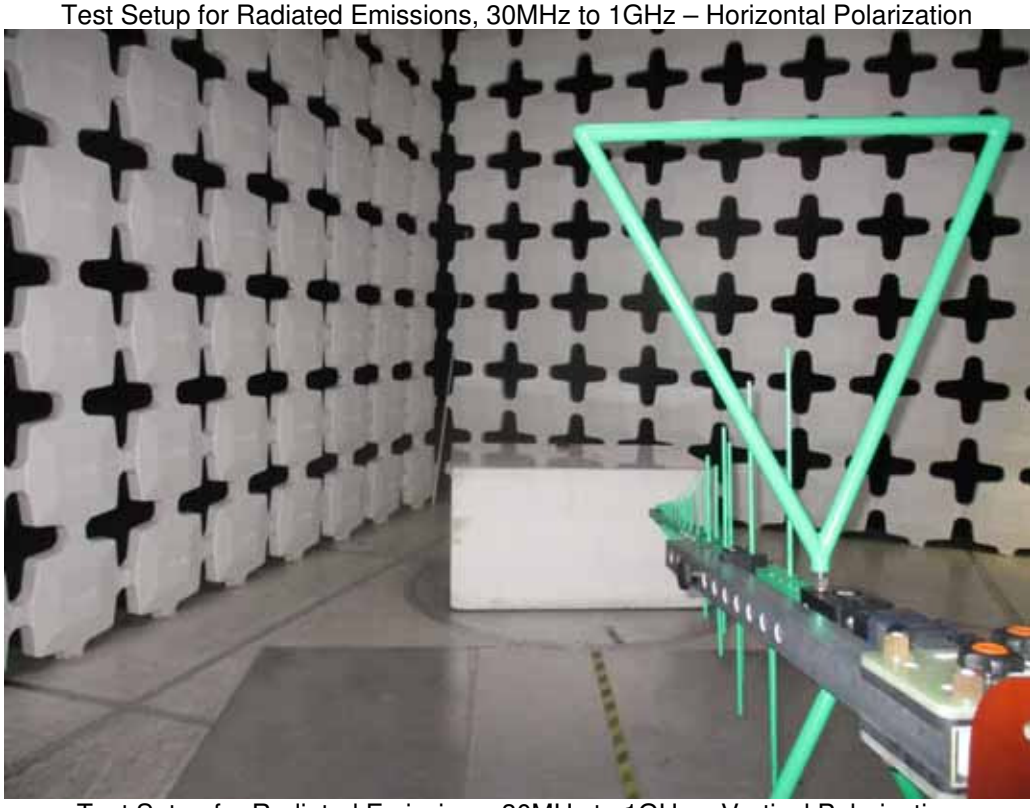
Figure 2

Test Setup for Occupied Bandwidth Test

Figure 3

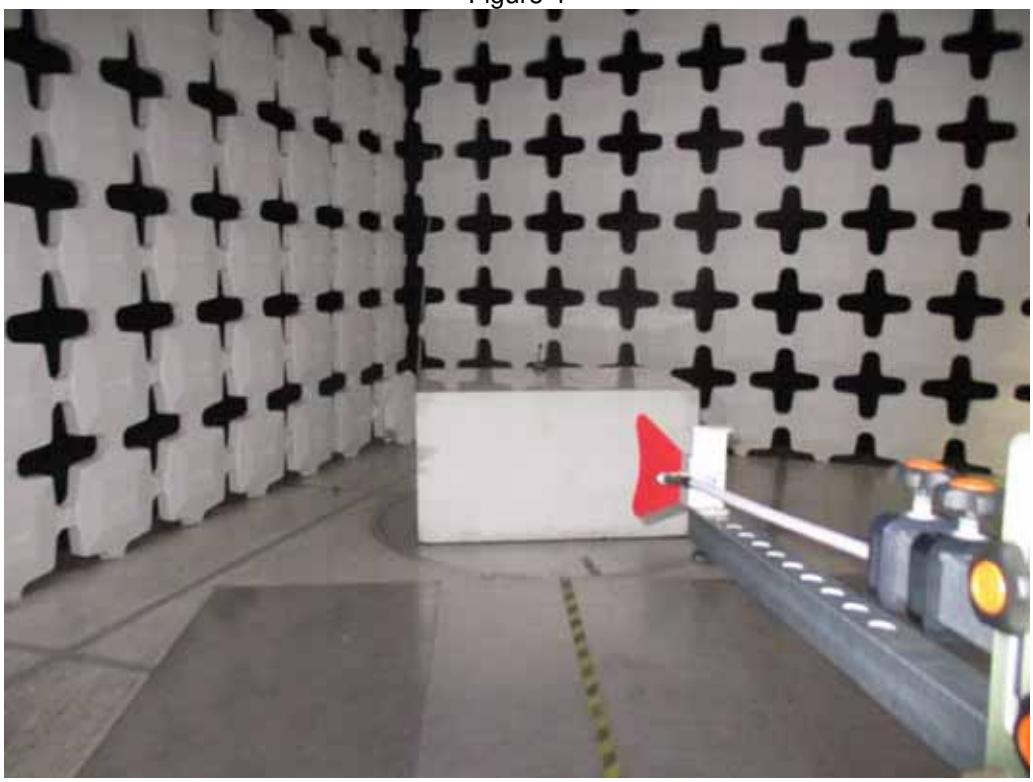


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

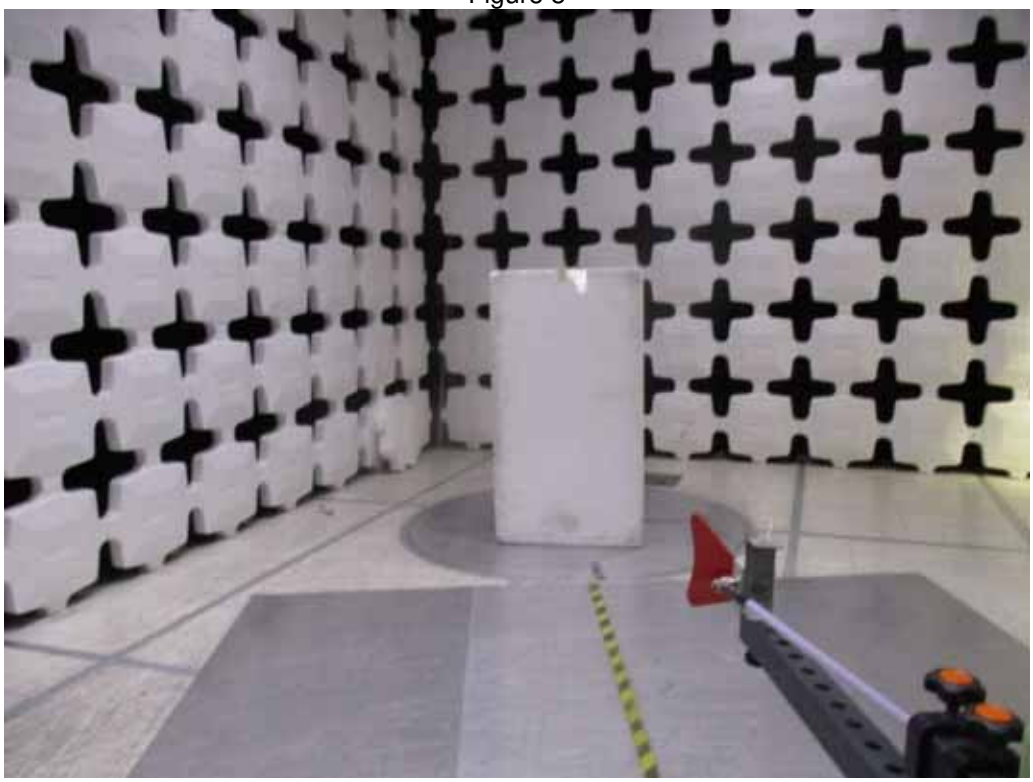
Figure 4



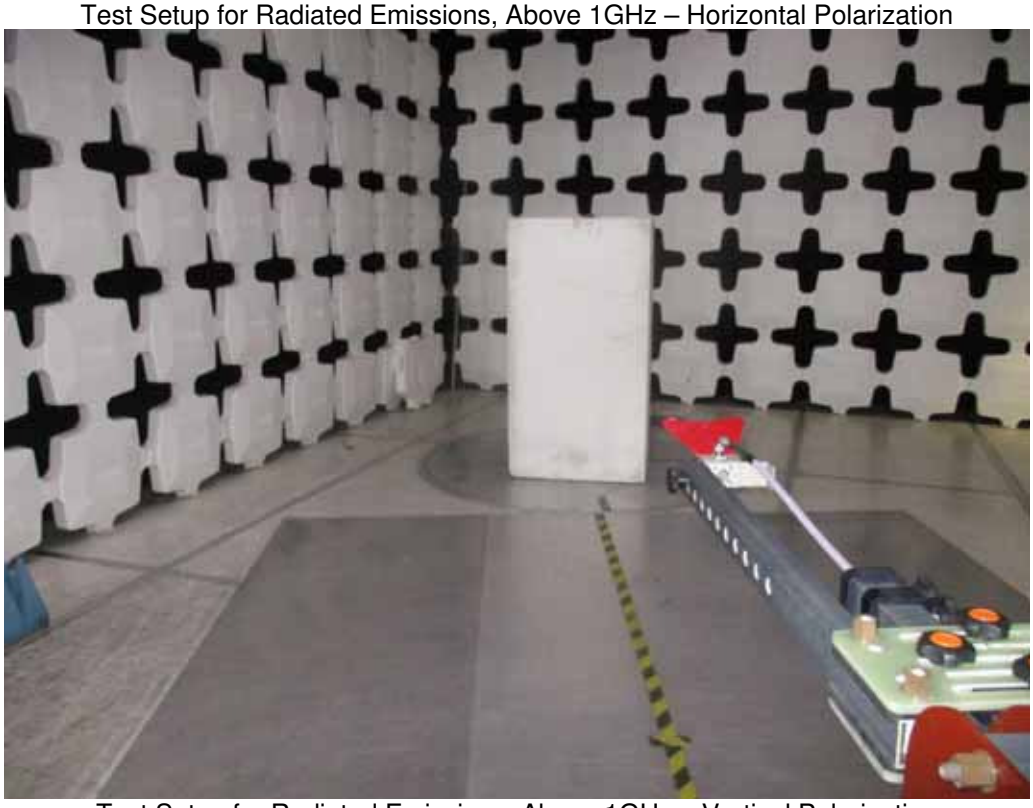
Test Setup for Radiated Emissions, Above 1GHz – Horizontal Polarization

Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization

Figure 5



Test Setup for Radiated Emissions, Above 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 RF Power Output
DATE : June 13-18, 2016
MODE : Transmit H19 Band
EQUIPMENT USED : MPW0

Frequency MHz	Nominal Power dBm (+/- 2dB)	Nominal Power mW	Measured Power dBm	Measured Power mW	FCC-74 Limit mW	RSS-210 Limit mW
542.275	5.1	3.2	4.87	3.0	250	250
566.5	0	1.0	-0.79	0.80	250	250
571.675	-1.7	0.6	-2.38	0.57	250	250

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : June 13-18, 2018
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Temperature ℃	Nominal Frequency Hz	Frequency Variation in %				
		Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
-30	542,275,000	542,275,060	-0.005000000	0.000011064	0.005000000	Pass
-20	542,275,000	542,275,050	-0.005000000	0.000009220	0.005000000	Pass
-10	542,275,000	542,275,040	-0.005000000	0.000007376	0.005000000	Pass
0	542,275,000	542,275,090	-0.005000000	0.000016597	0.005000000	Pass
+10	542,275,000	542,275,150	-0.005000000	0.000027661	0.005000000	Pass
+20	542,275,000	542,274,999	-0.005000000	-0.000000184	0.005000000	Pass
+30	542,275,000	542,275,150	-0.005000000	0.000027661	0.005000000	Pass
+40	542,275,000	542,275,110	-0.005000000	0.000020285	0.005000000	Pass
+50	542,275,000	542,275,040	-0.005000000	0.000007376	0.005000000	Pass

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : June 13-18, 2018
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Temperature ℃	Input Voltage	Nominal Frequency Hz	Frequency Variation in %				
			Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
+20	3.0	542,275,000	542275143	-0.005000000	0.000026370	0.005000000	Pass
+20	2.55	542,275,000	542275145	-0.005000000	0.000026739	0.005000000	Pass
+20	3.45	542,275,000	542275146	-0.005000000	0.000026924	0.005000000	Pass

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : June 13-18, 2018
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Temperature ℃	Nominal Frequency Hz	Frequency Variation in %				
		Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
-30	566,500,000	566,500,040	-0.005000000	0.000007061	0.005000000	Pass
-20	566,500,000	566,500,120	-0.005000000	0.000021183	0.005000000	Pass
-10	566,500,000	566,500,040	-0.005000000	0.000007061	0.005000000	Pass
0	566,500,000	566,500,100	-0.005000000	0.000017652	0.005000000	Pass
+10	566,500,000	566,500,140	-0.005000000	0.000024713	0.005000000	Pass
+20	566,500,000	566,500,019	-0.005000000	0.000003354	0.005000000	Pass
+30	566,500,000	566,500,150	-0.005000000	0.000026478	0.005000000	Pass
+40	566,500,000	566,500,120	-0.005000000	0.000021183	0.005000000	Pass
+50	566,500,000	566,500,050	-0.005000000	0.000008826	0.005000000	Pass

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : July 8, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Nominal Temperature ℃	Input Voltage	Nominal Frequency Hz	Frequency Variation in %				
			Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
+20	3.0	566,500,000	566,500,153	-0.005000000	0.000027008	0.005000000	Pass
+20	2.55	566,500,000	566,500,154	-0.005000000	0.000027184	0.005000000	Pass
+20	3.45	566,500,000	566,500,152	-0.005000000	0.000026831	0.005000000	Pass

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : June 13-18, 2018
MODE : Transmit at 571.675MHz
BAND : H19 Group 2 Channel 12

Temperature ℃	Nominal Frequency Hz	Frequency Variation in %				
		Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
-30	571,675,000	571,675,260	-0.005000000	0.000045480	0.005000000	Pass
-20	571,675,000	571,675,080	-0.005000000	0.000013994	0.005000000	Pass
-10	571,675,000	571,675,050	-0.005000000	0.000008746	0.005000000	Pass
0	571,675,000	571,675,060	-0.005000000	0.000010495	0.005000000	Pass
+10	571,675,000	571,675,160	-0.005000000	0.000027988	0.005000000	Pass
+20	571,675,000	571,675,190	-0.005000000	0.000033236	0.005000000	Pass
+30	571,675,000	571,675,160	-0.005000000	0.000027988	0.005000000	Pass
+40	571,675,000	571,675,120	-0.005000000	0.000020991	0.005000000	Pass
+50	571,675,000	571,675,040	-0.005000000	0.000006997	0.005000000	Pass

Checked BY Richard E. King :

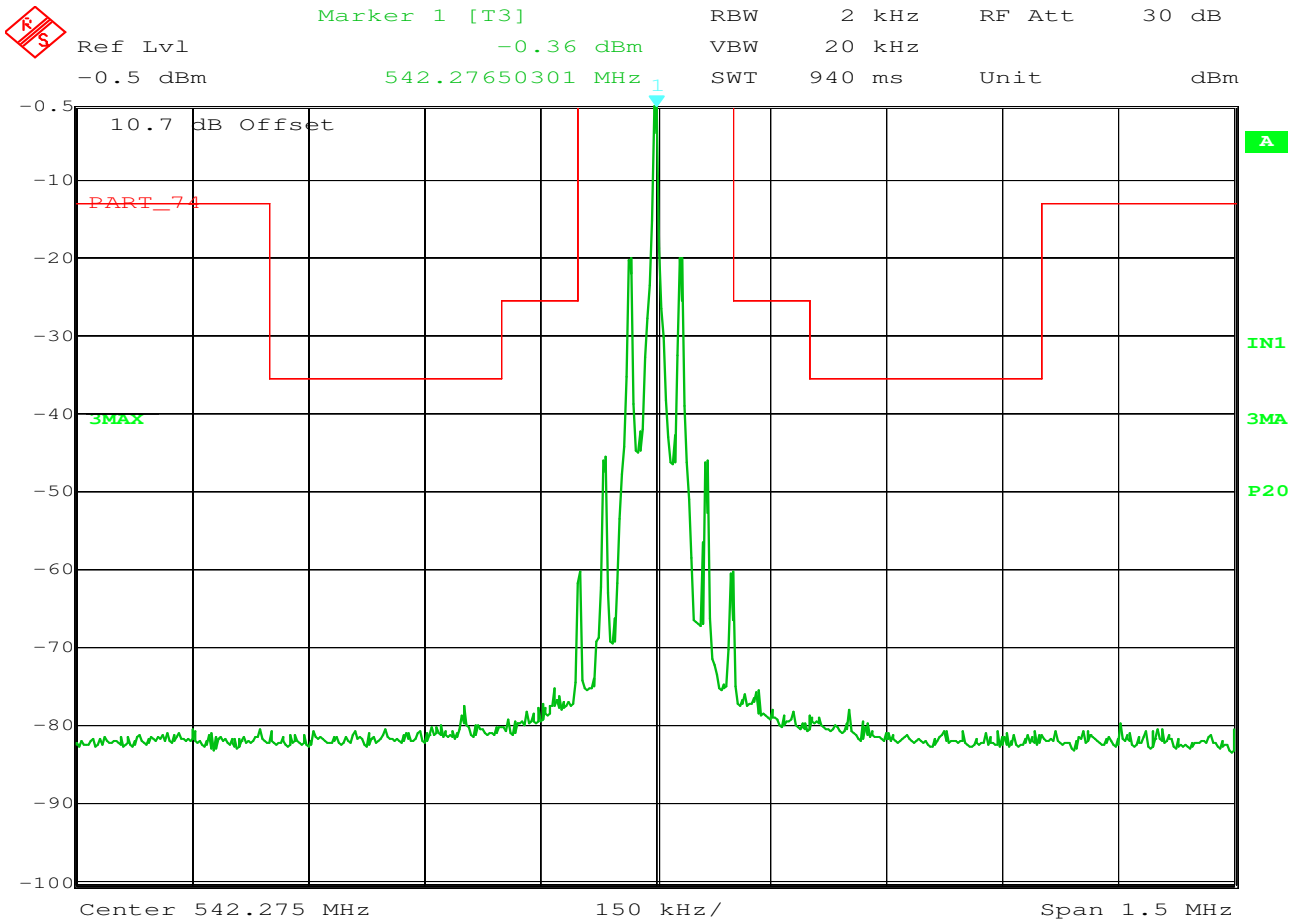
Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 and RSS-210 Frequency Stability
DATE : July 8, 2016
MODE : Transmit at 571.675MHz
BAND : H19 Group 2 Channel 12

Temperature ºC	Input Voltage	Nominal Frequency Hz	Frequency Variation in %				
			Measured Frequency Hz	Lower Limit %	Measured Variation %	Upper Limit %	Pass/Fail
+20	3.0	571,675,000	571,675,155	-0.005000000	0.000027113	0.005000000	Pass
+20	2.55	571,675,000	571,675,155	-0.005000000	0.000027113	0.005000000	Pass
+20	3.45	571,675,000	571,675,156	-0.005000000	0.000027288	0.005000000	Pass

Checked BY Richard E. King :

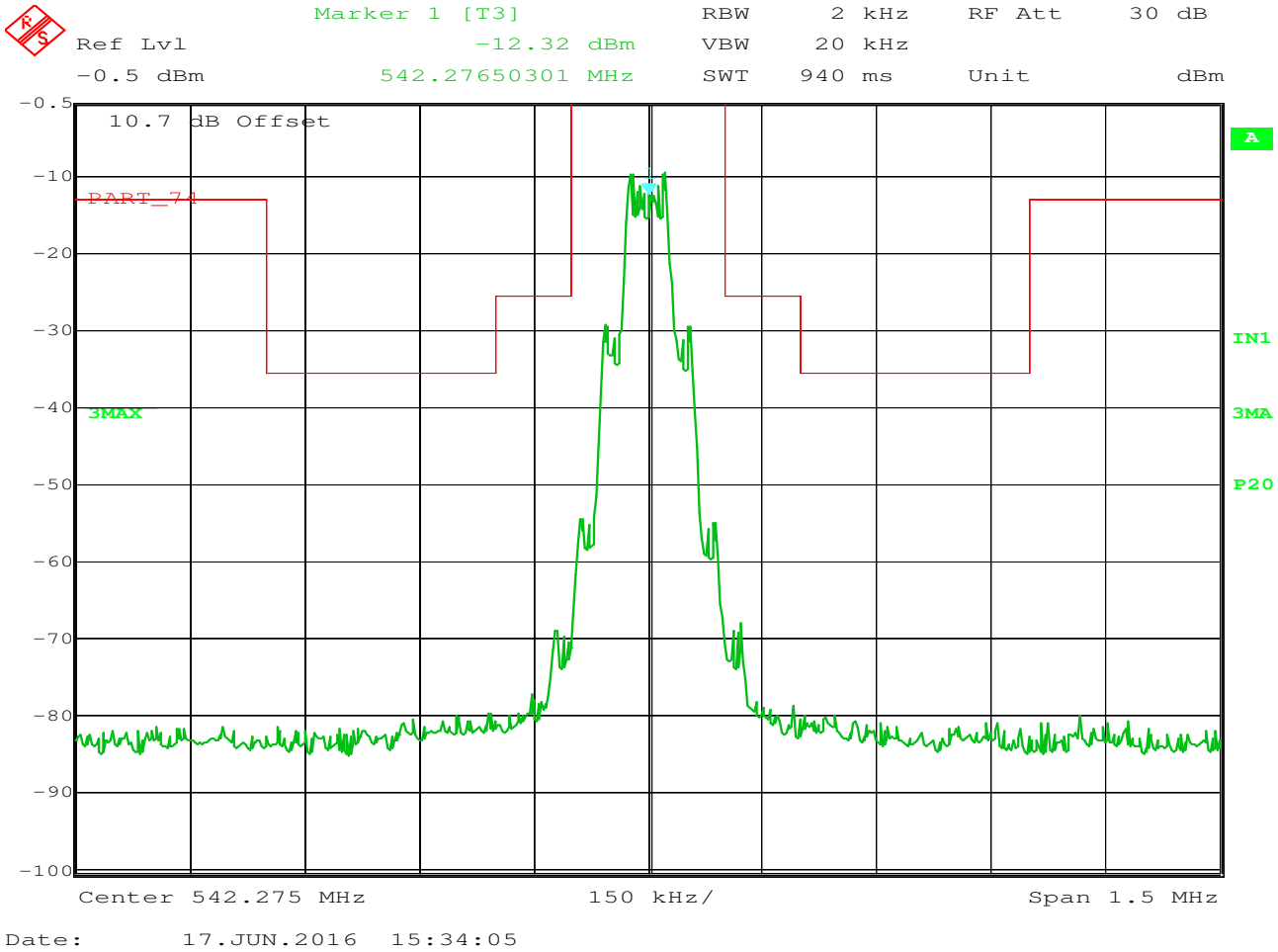
Richard E. King



FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: Un-Modulated Carrier

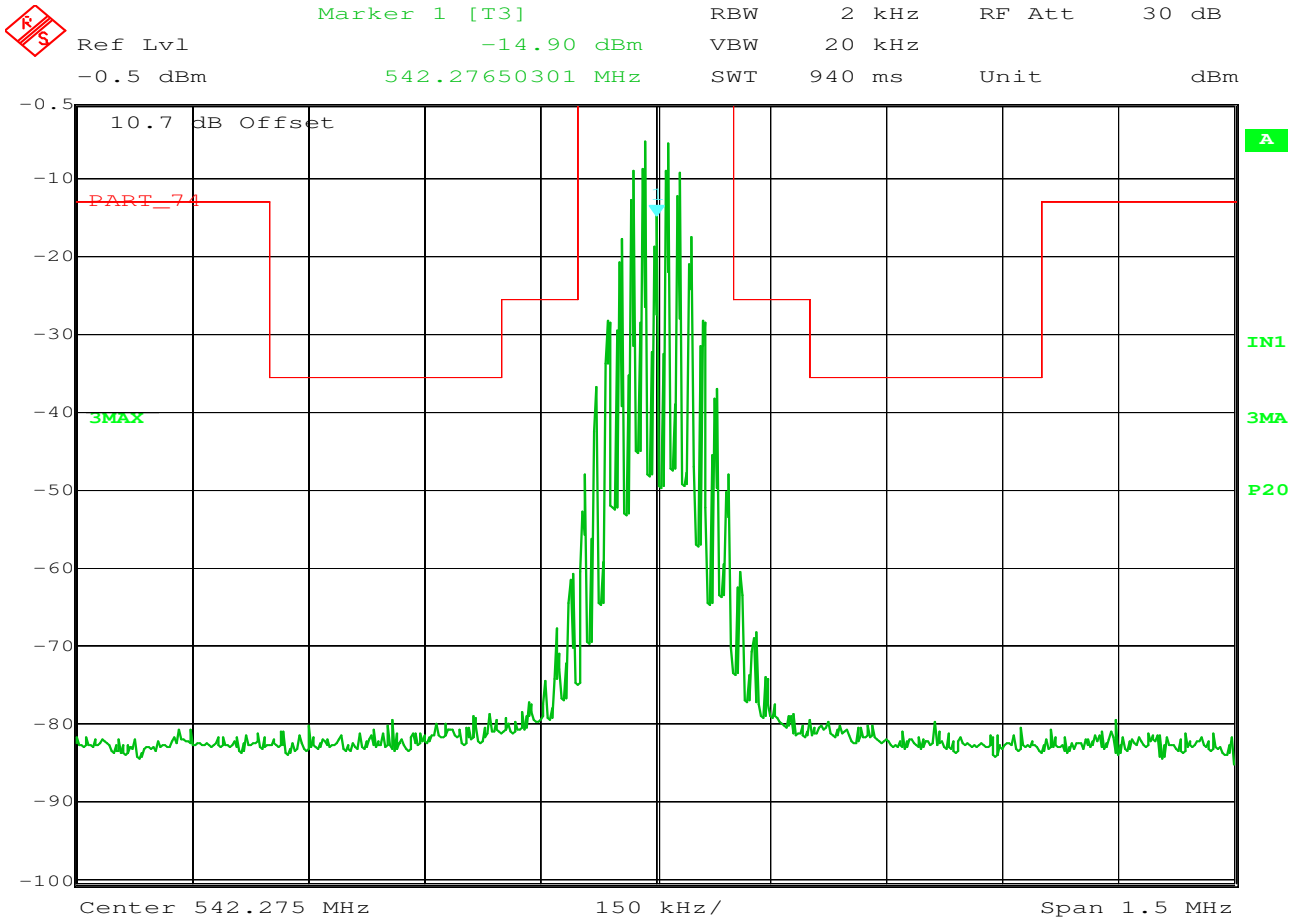
NOTES



FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50%

NOTES

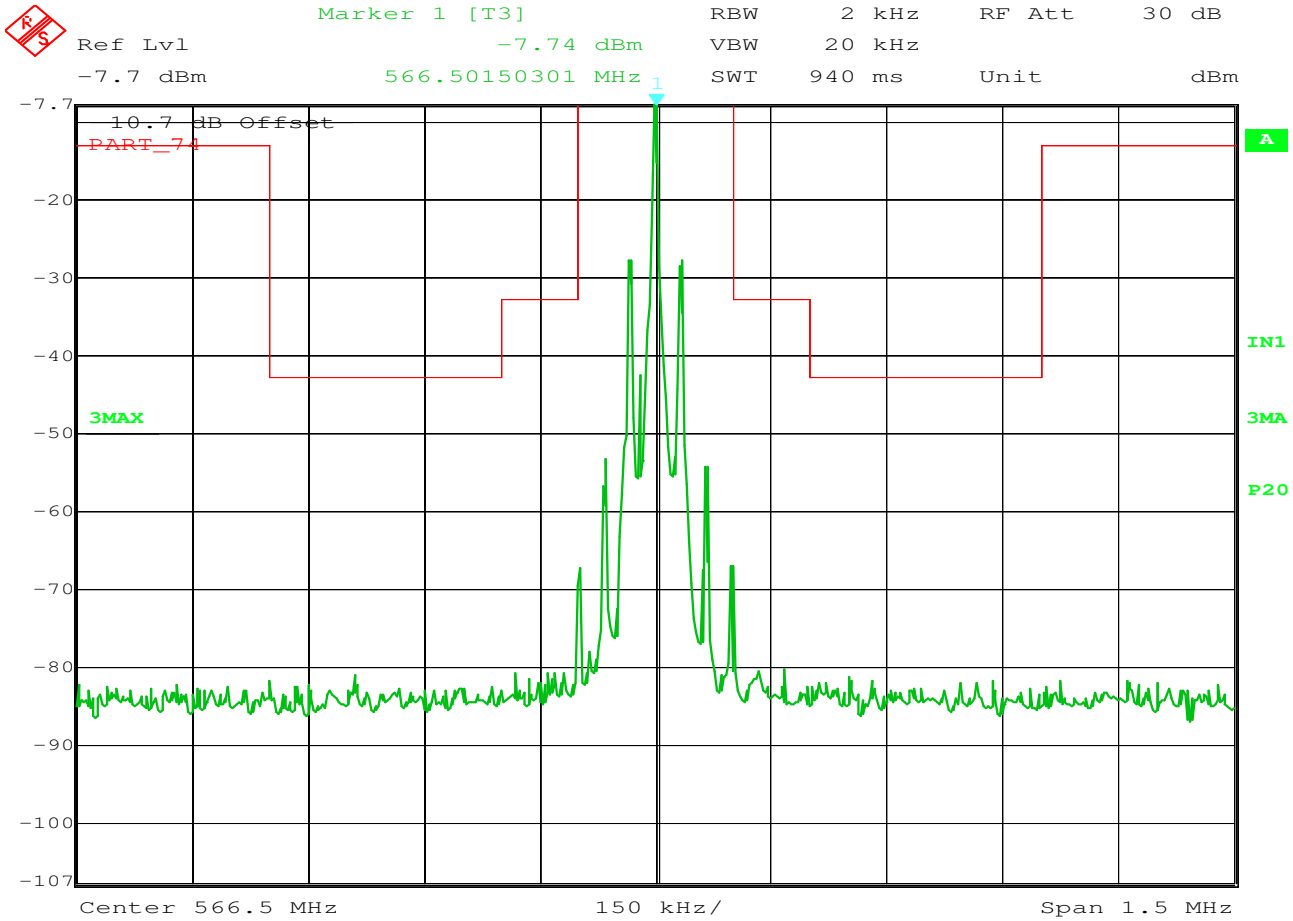


Date: 17.JUN.2016 15:36:21

FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

NOTES

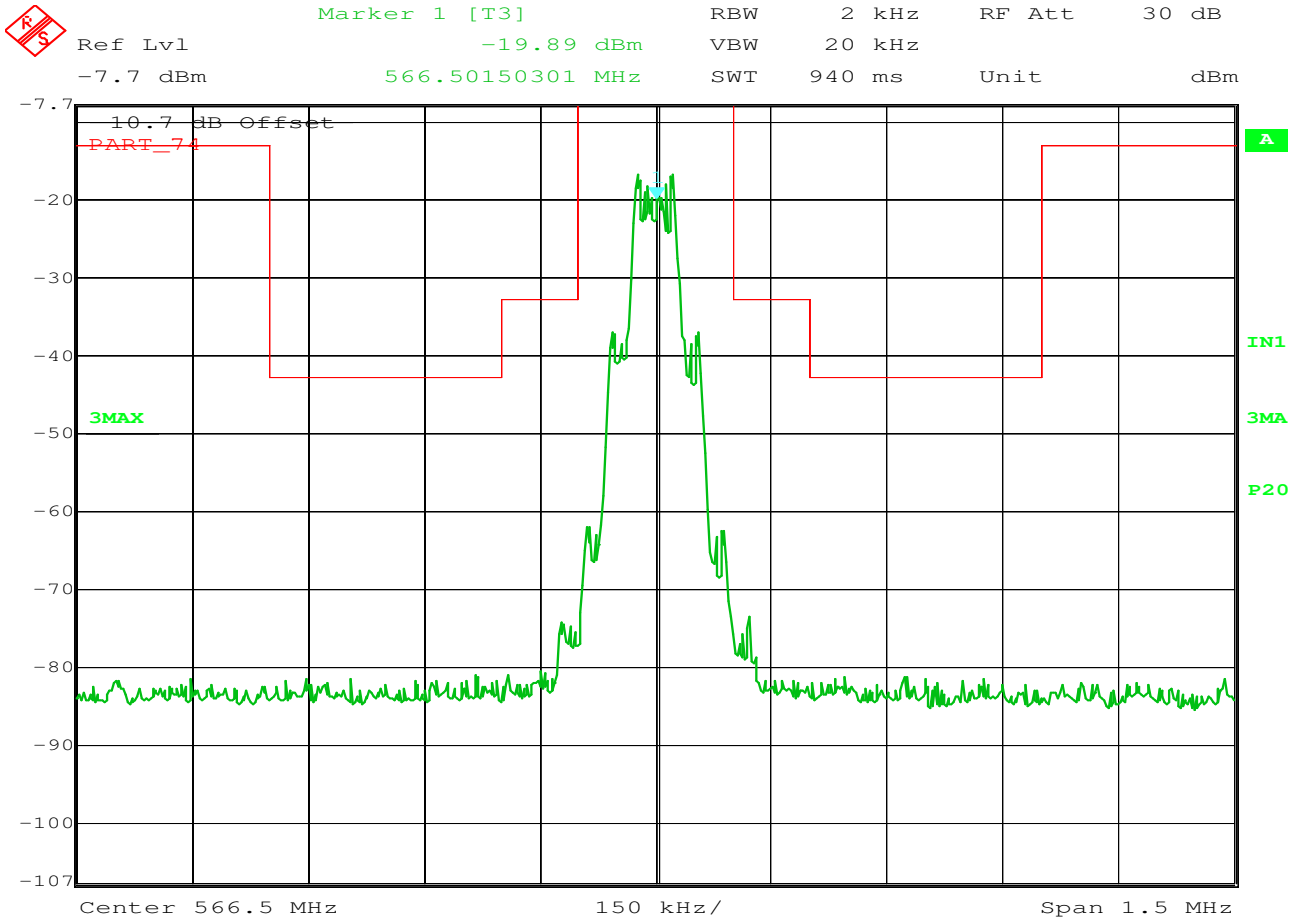


Date: 17.JUN.2016 15:46:32

FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: Un-Modulated Carrier

NOTES

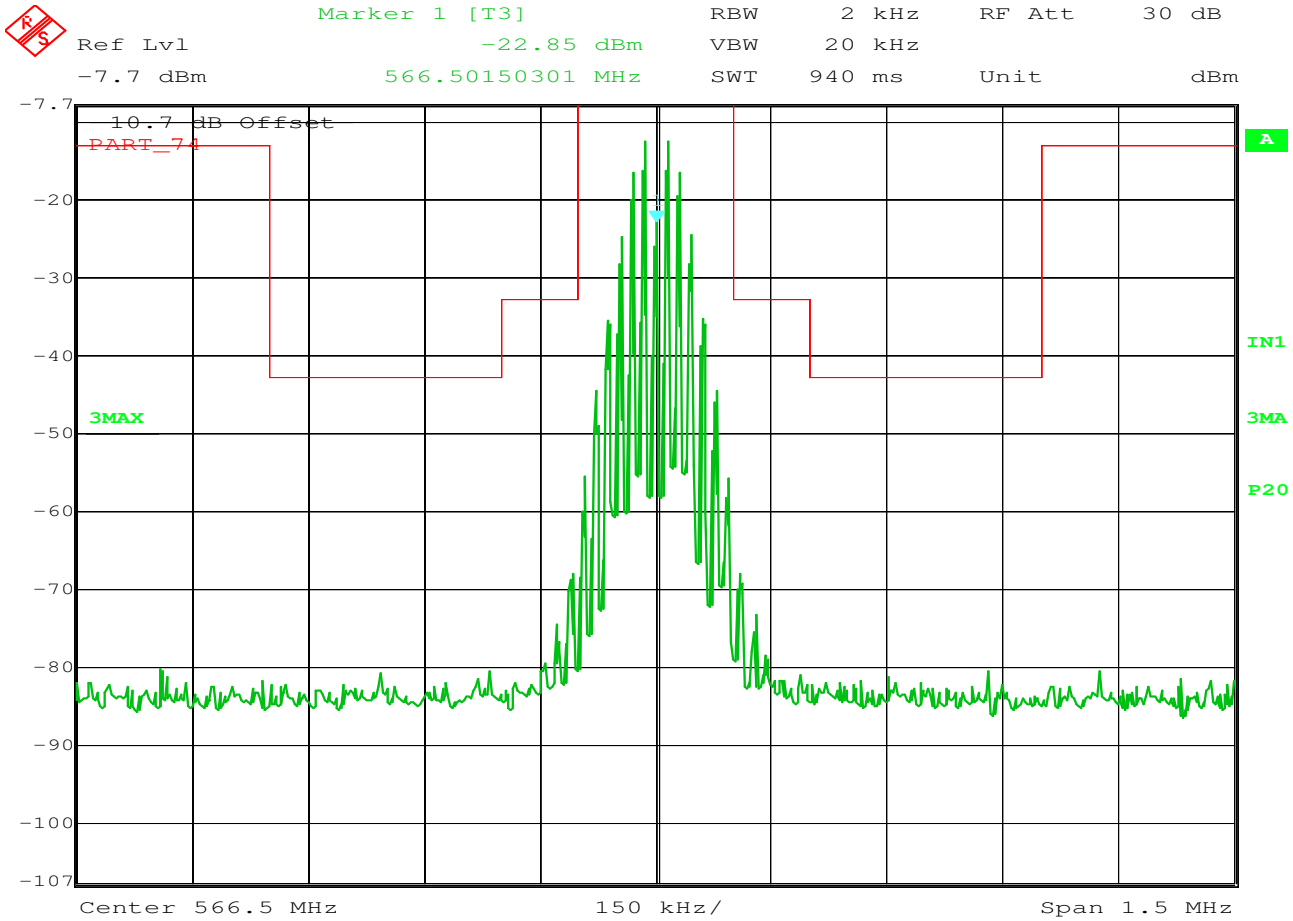


Date: 17.JUN.2016 15:53:07

FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50%

NOTES

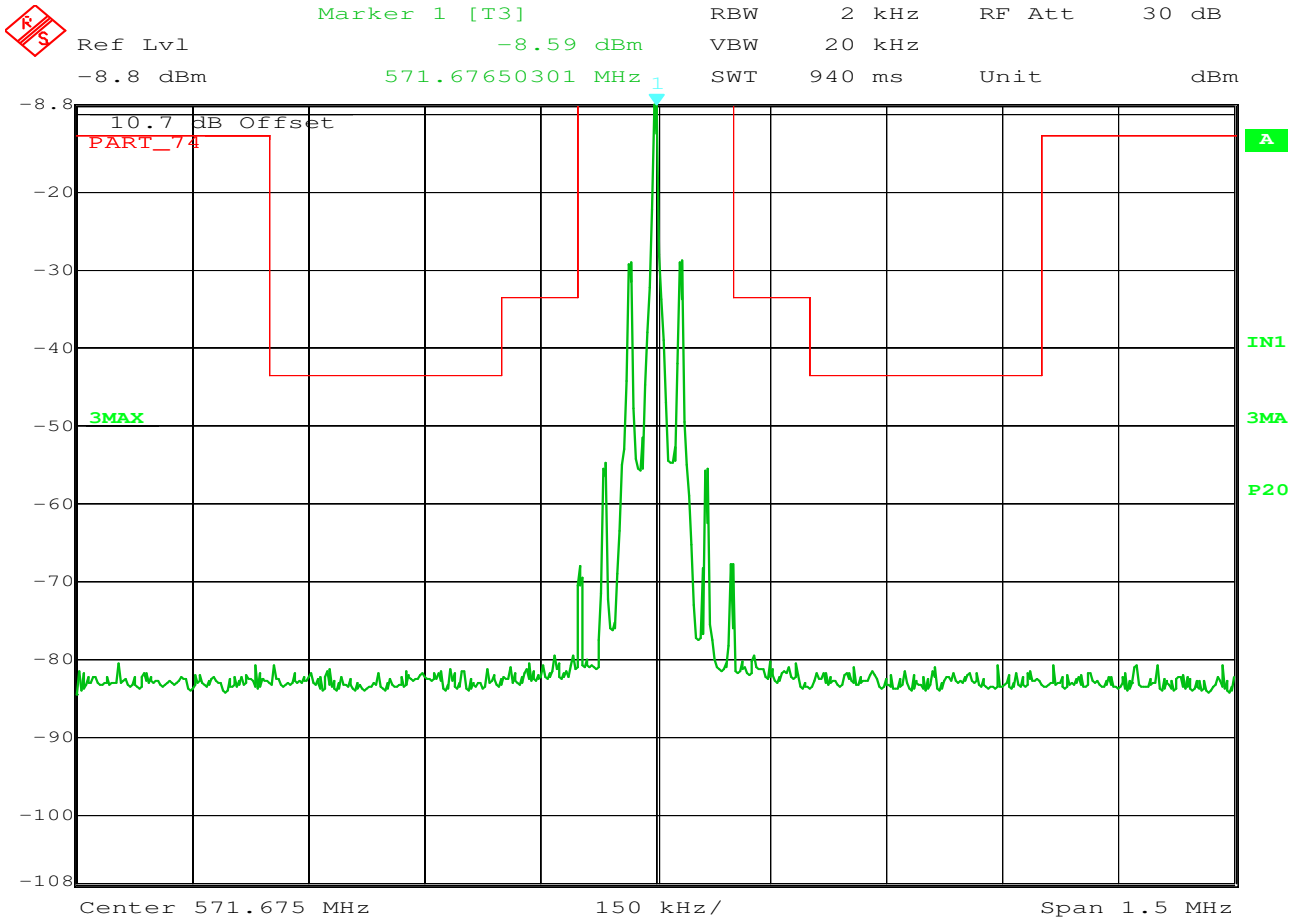


Date: 17.JUN.2016 15:54:57

FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

NOTES

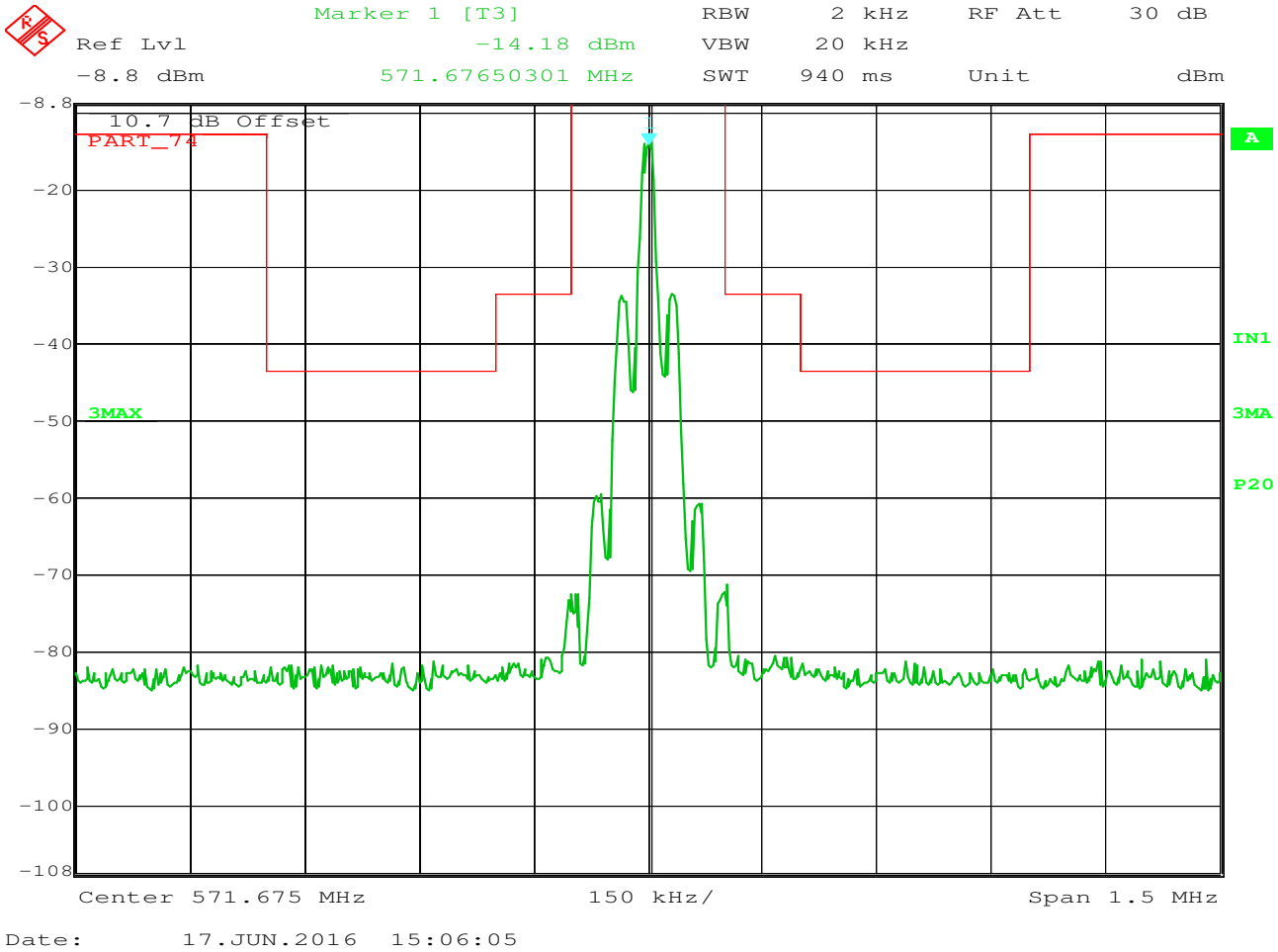


Date: 17.JUN.2016 15:00:22

FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	:Un-Modulated Carrier

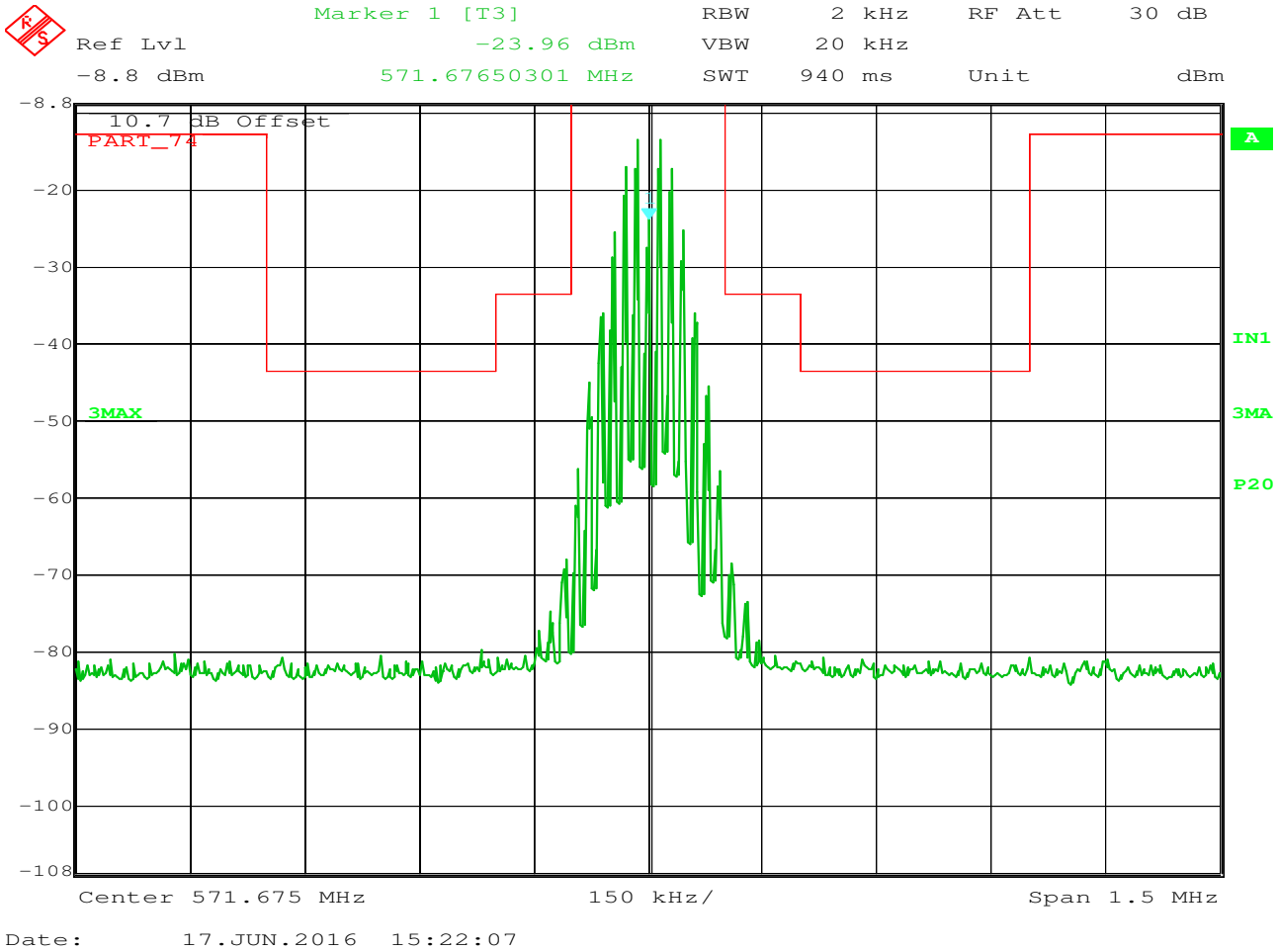
NOTES



FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50% modulation

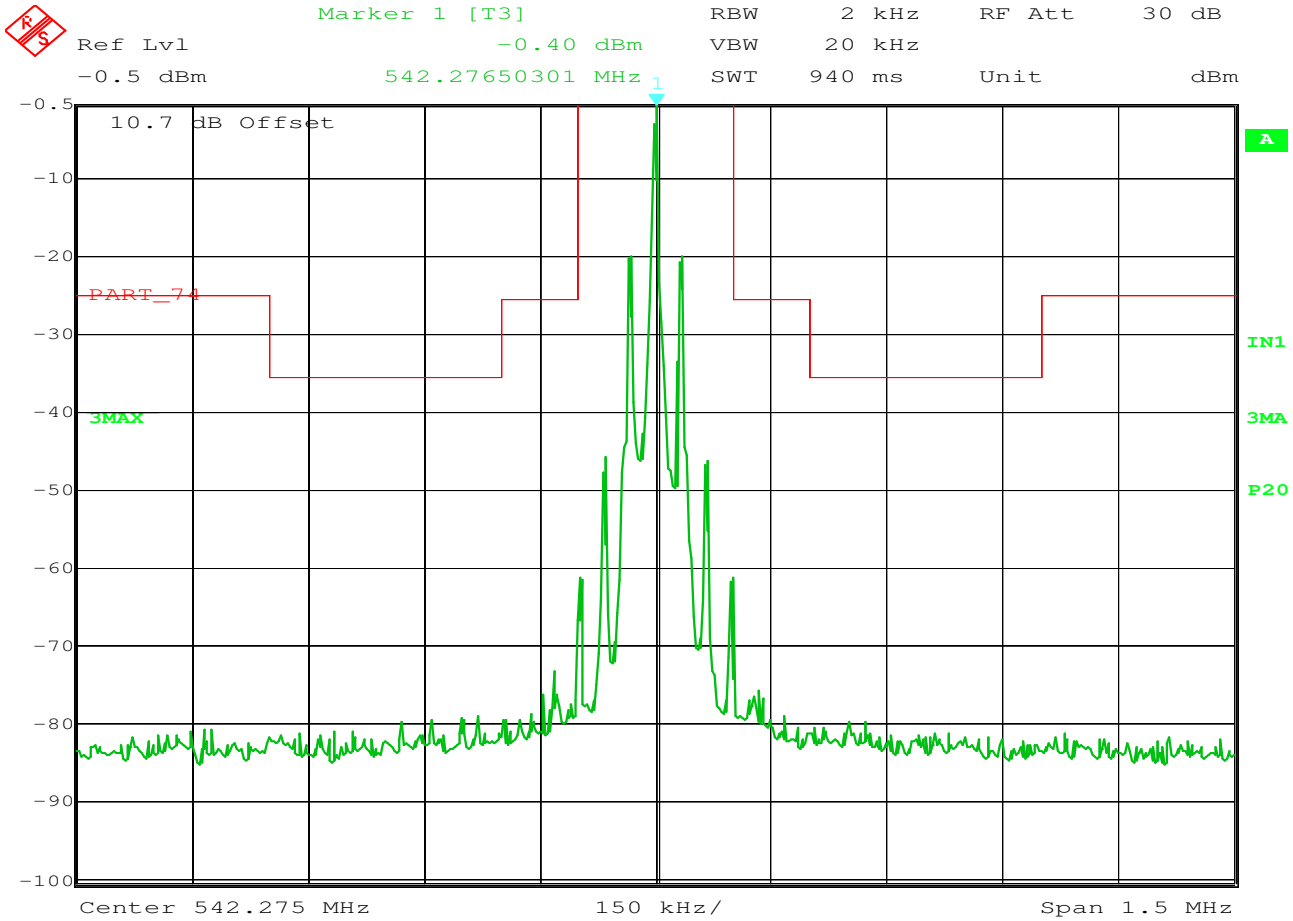
NOTES



FCC 15C 74.861 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

NOTES

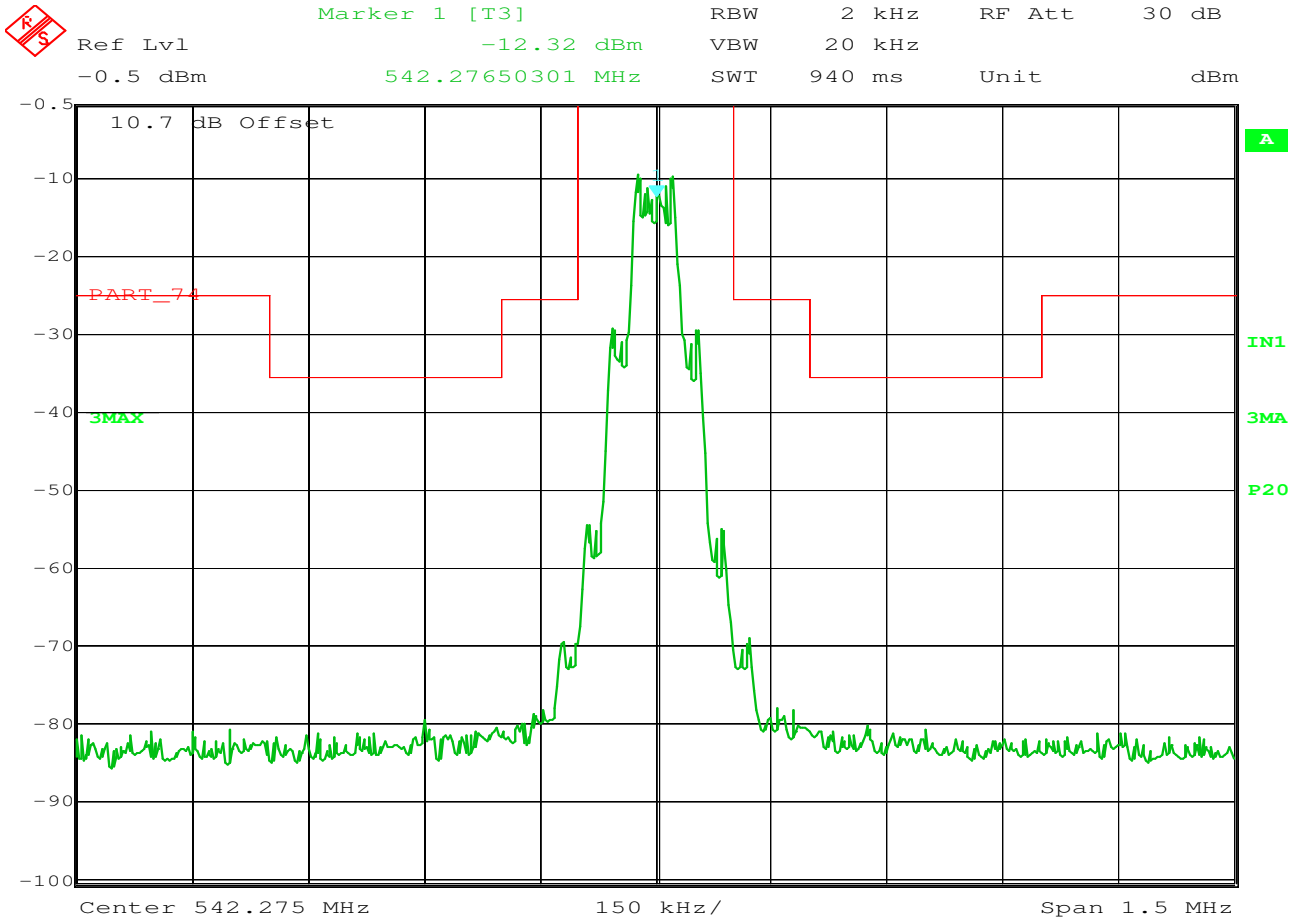


Date: 17.JUN.2016 15:42:21

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: Un-Modulated Carrier

NOTES

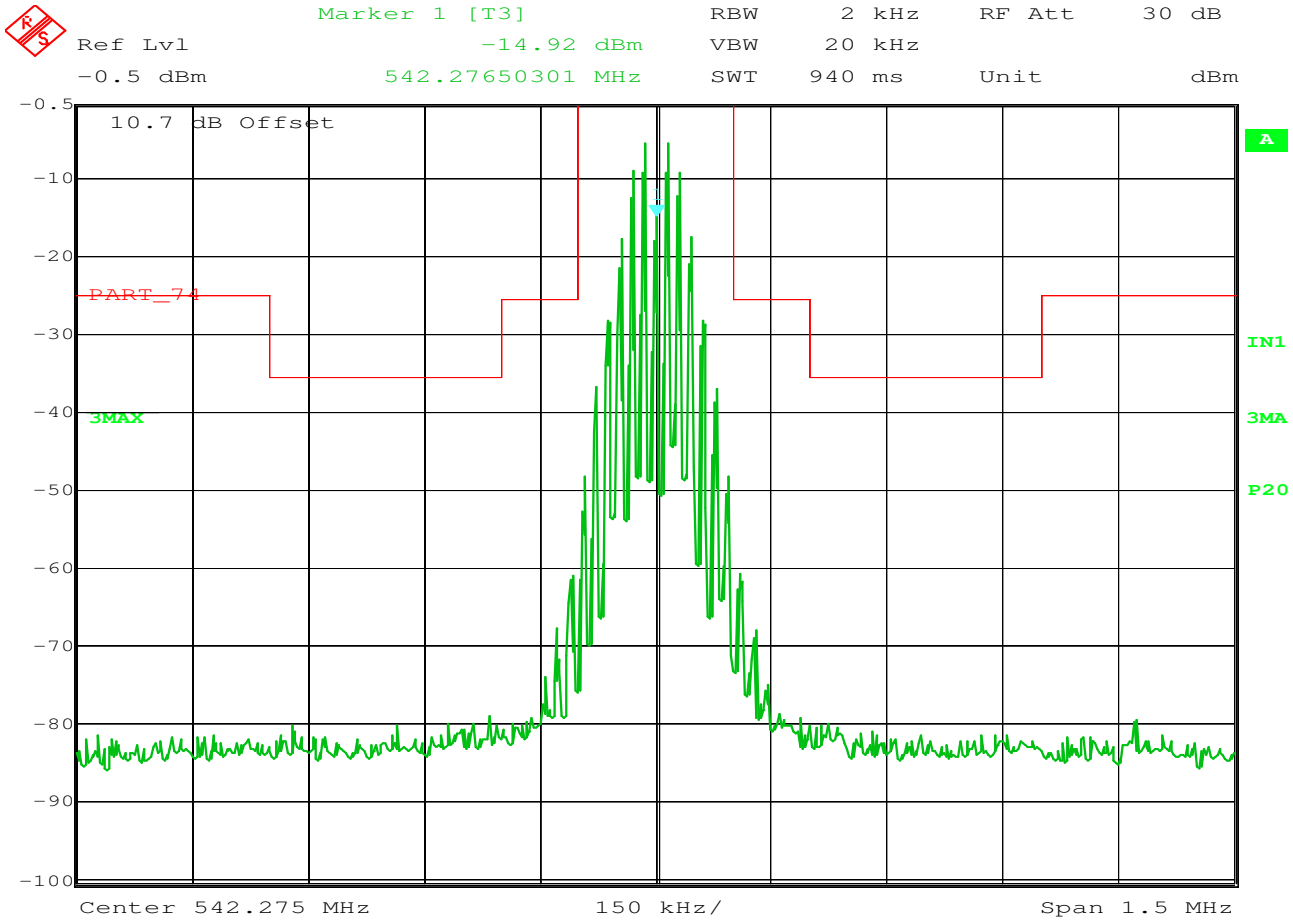


Date: 17.JUN.2016 15:40:53

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50%

NOTES

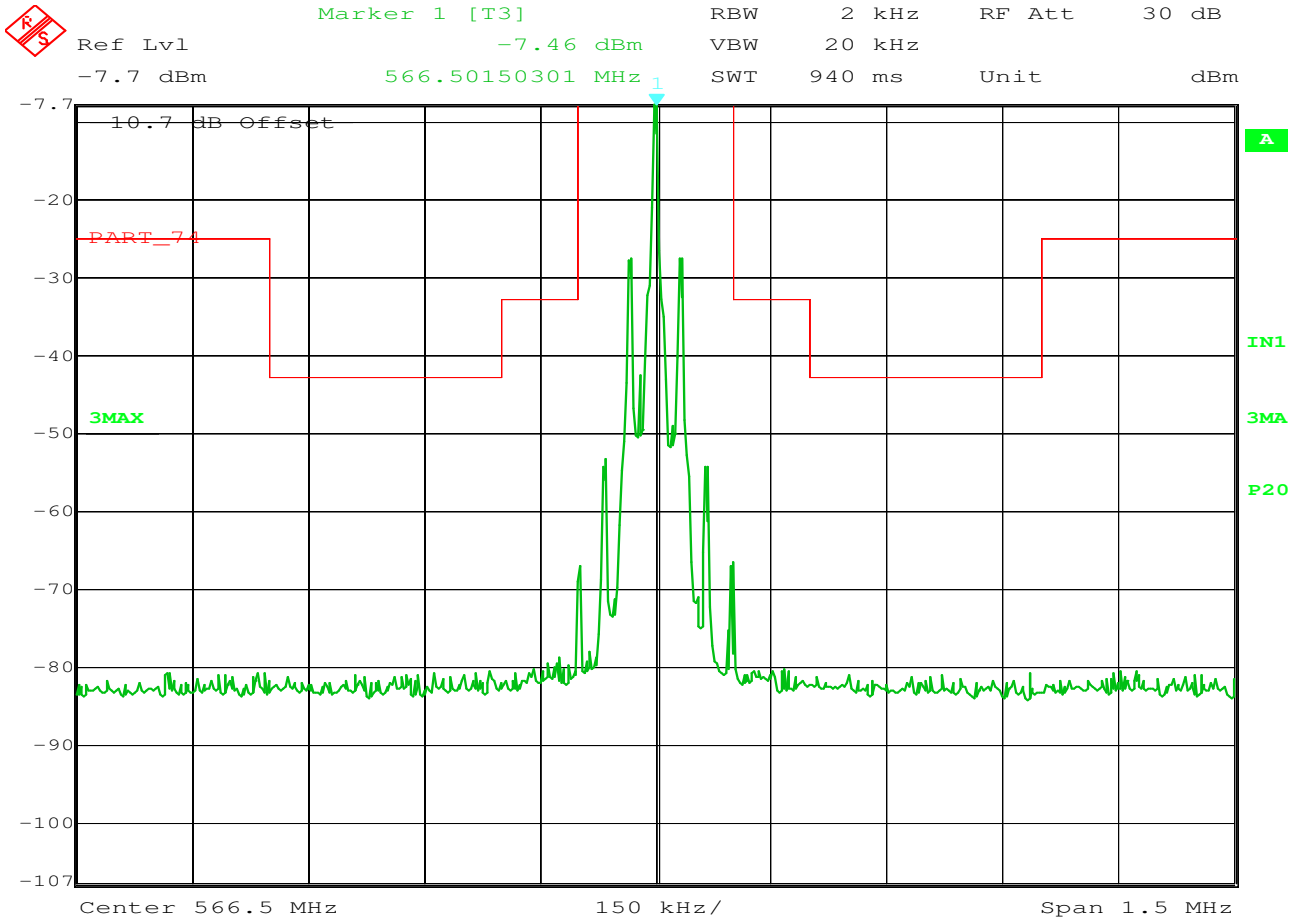


Date: 17.JUN.2016 15:38:51

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 542.275MHz
TEST PARAMETERS	:H19 Group 3 Channel 1
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

NOTES

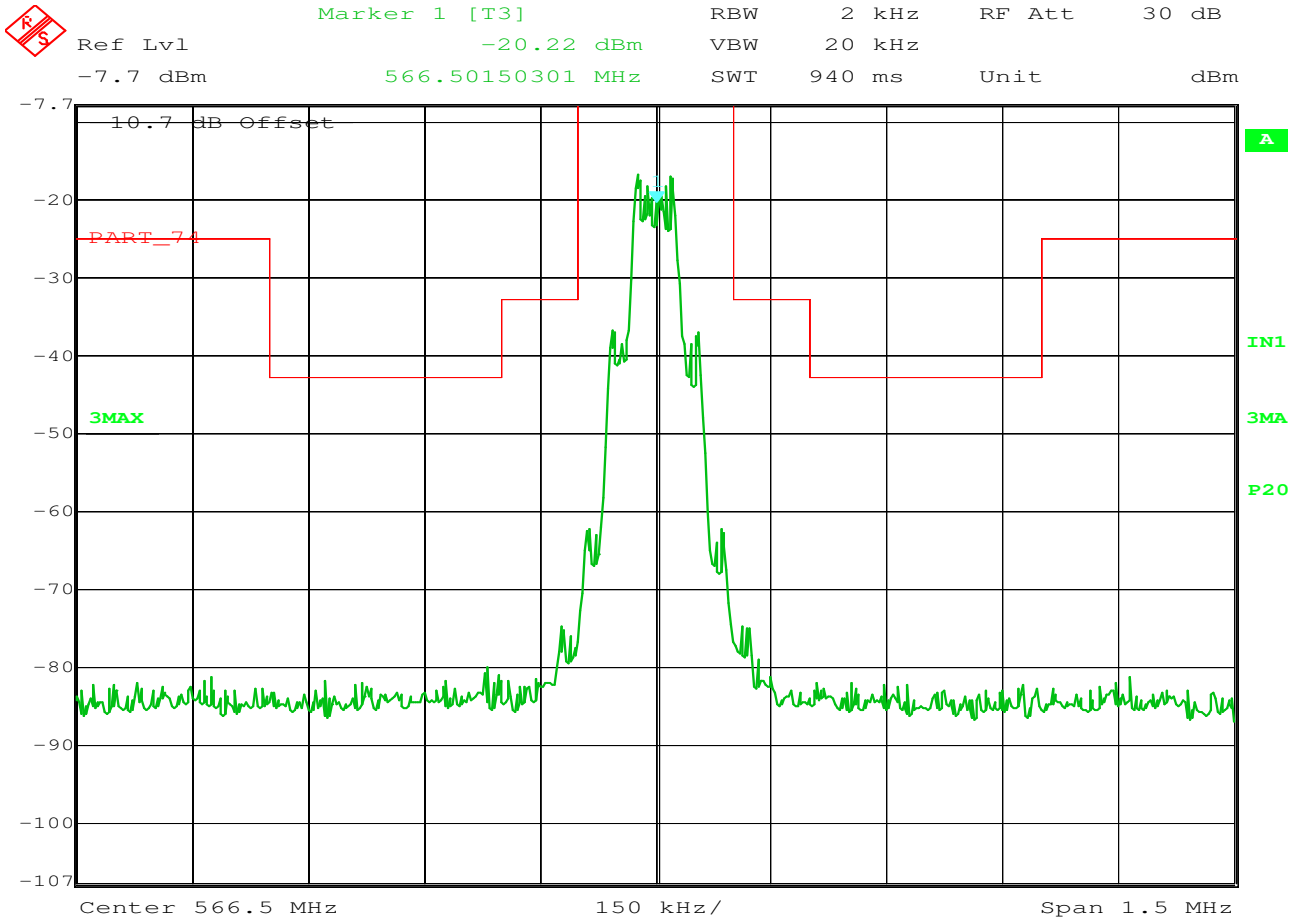


Date: 17.JUN.2016 15:48:21

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: Un-Modulated Carrier

NOTES

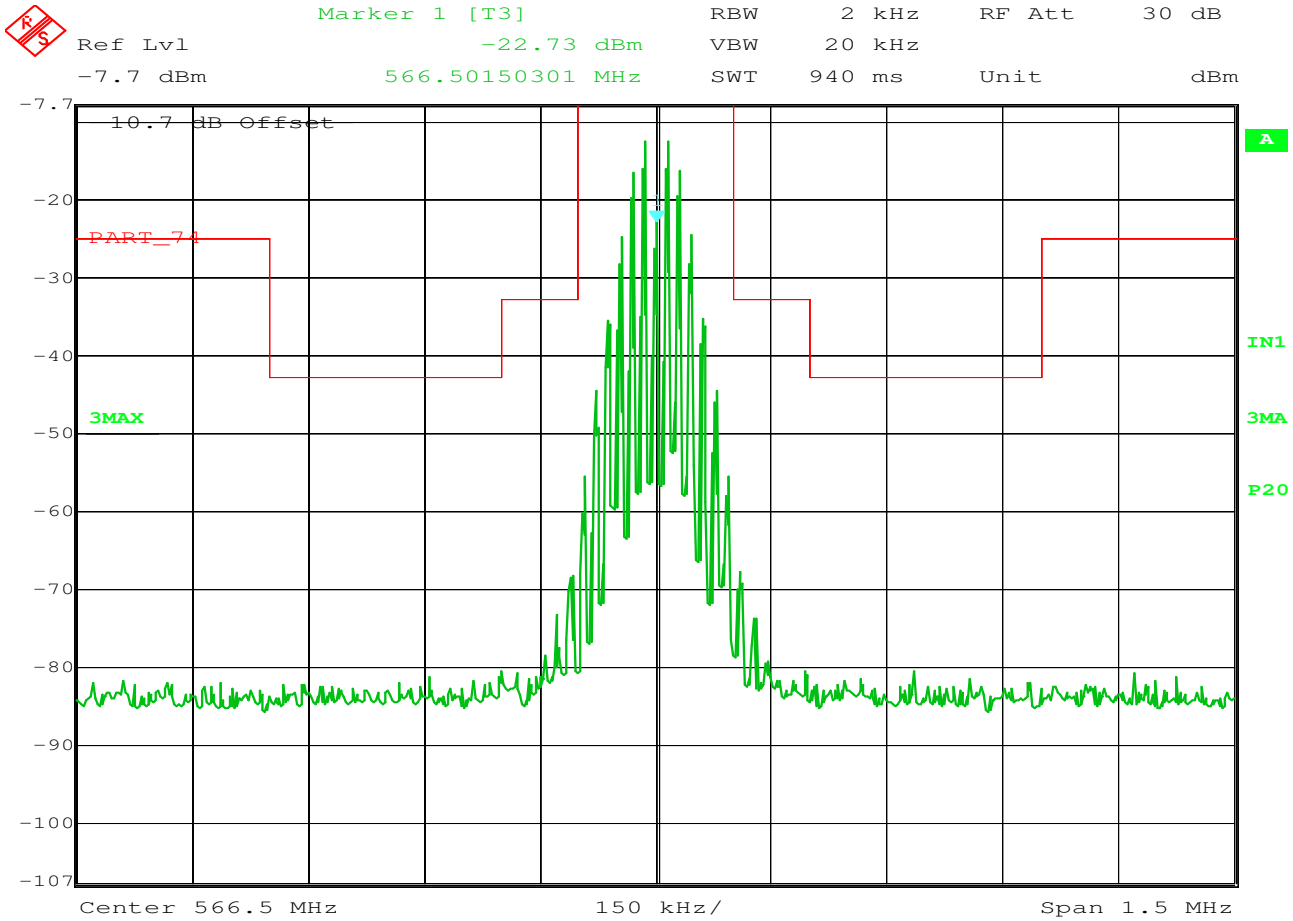


Date: 17.JUN.2016 15:50:23

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50%

NOTES

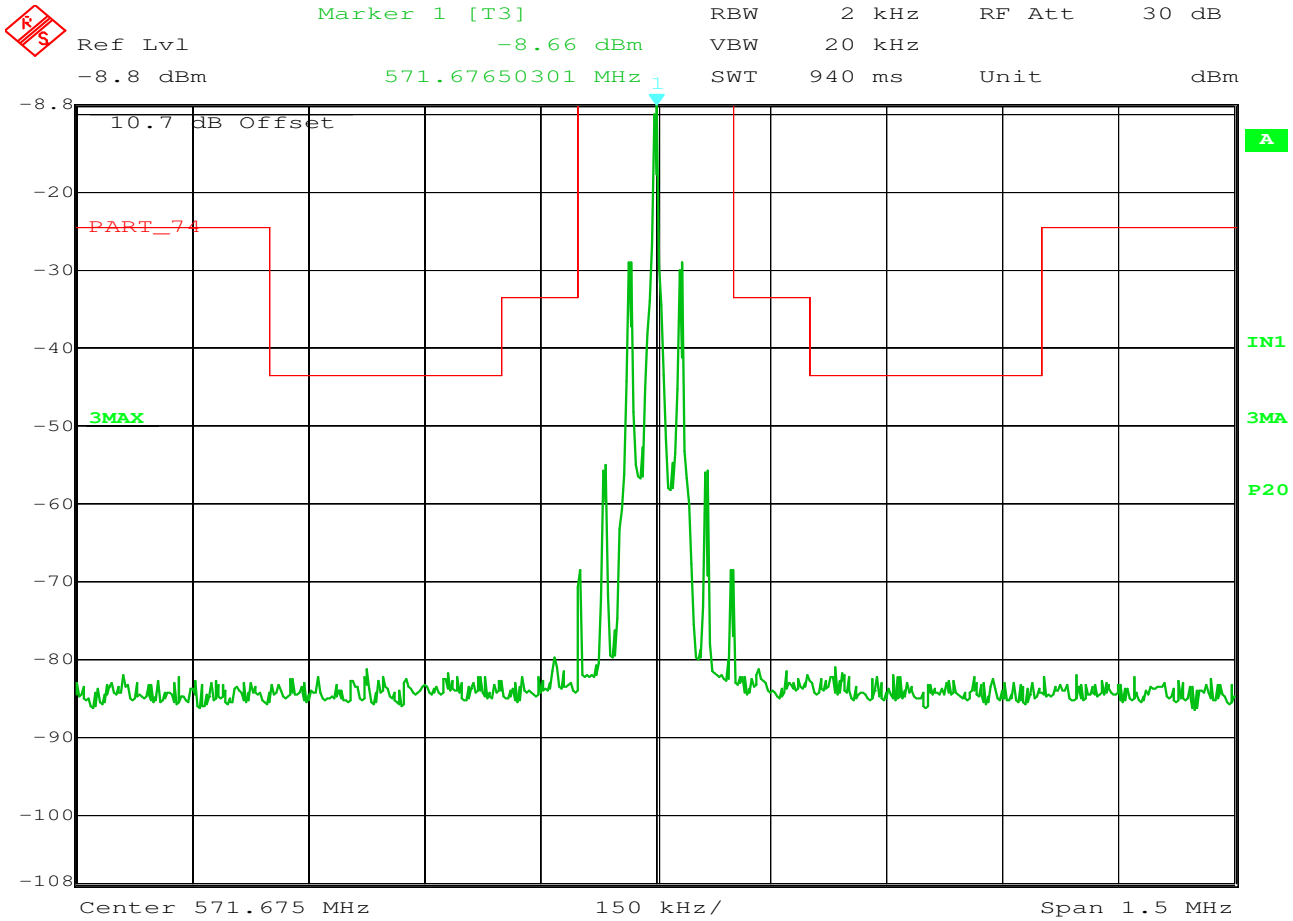


Date: 17.JUN.2016 15:57:56

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 566.5MHz
TEST PARAMETERS	:H19 Group 3 Channel 10
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

NOTES

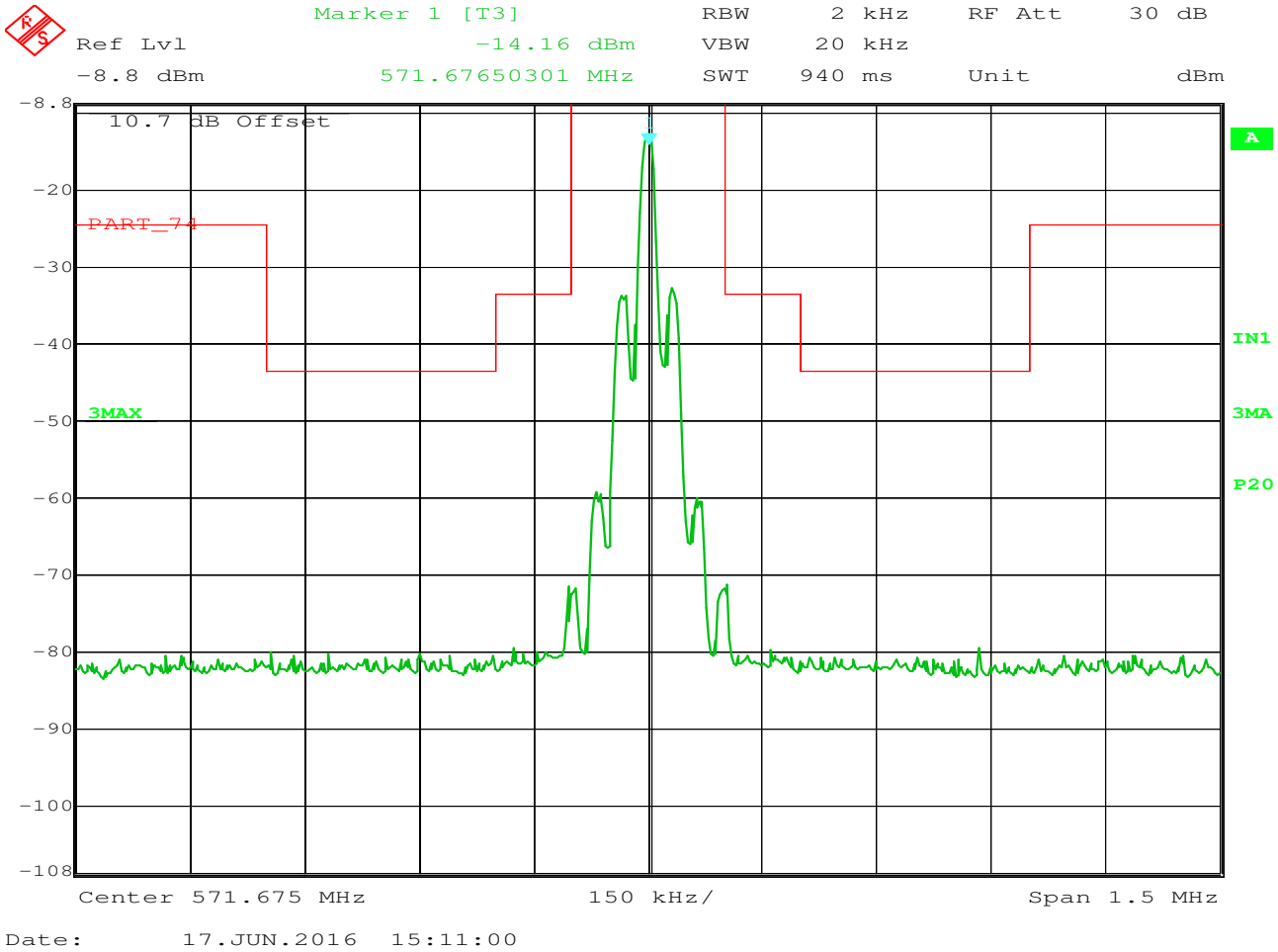


Date: 17.JUN.2016 15:15:11

RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: Un-Modulated Carrier

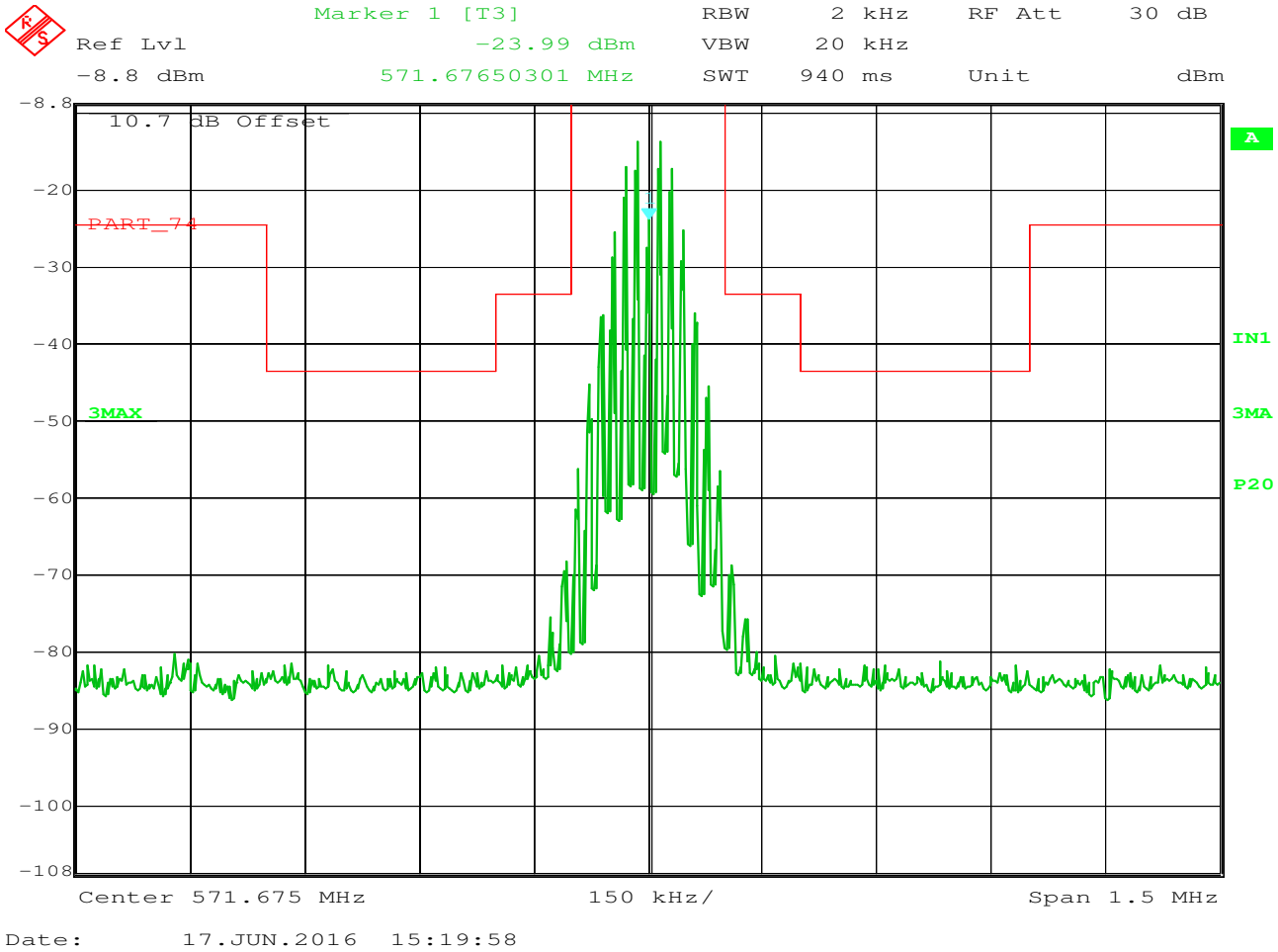
NOTES



RSS 210 Occupied Bandwidth Compliance

MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 2.5kHz at 16 dB over 50% modulation

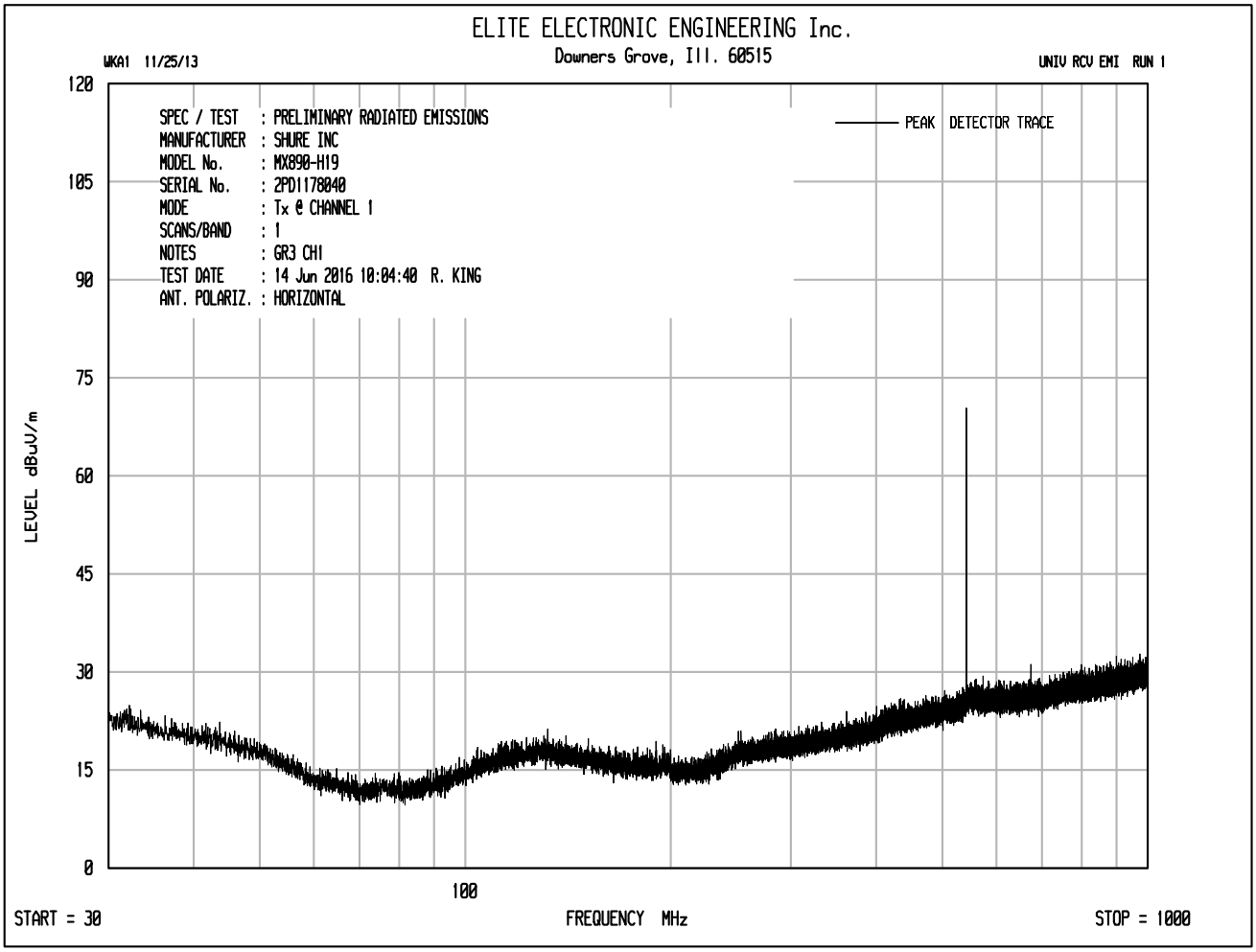
NOTES

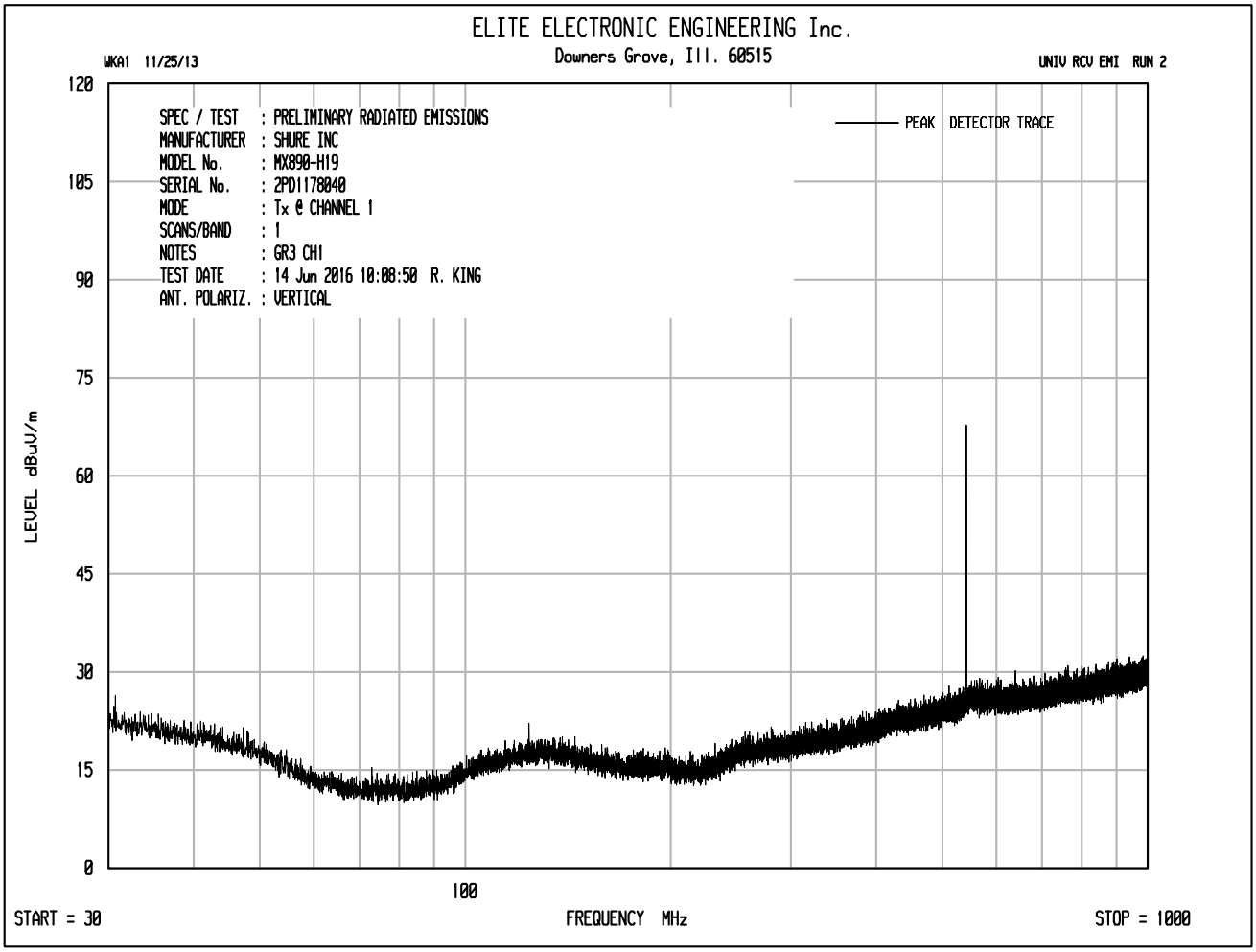


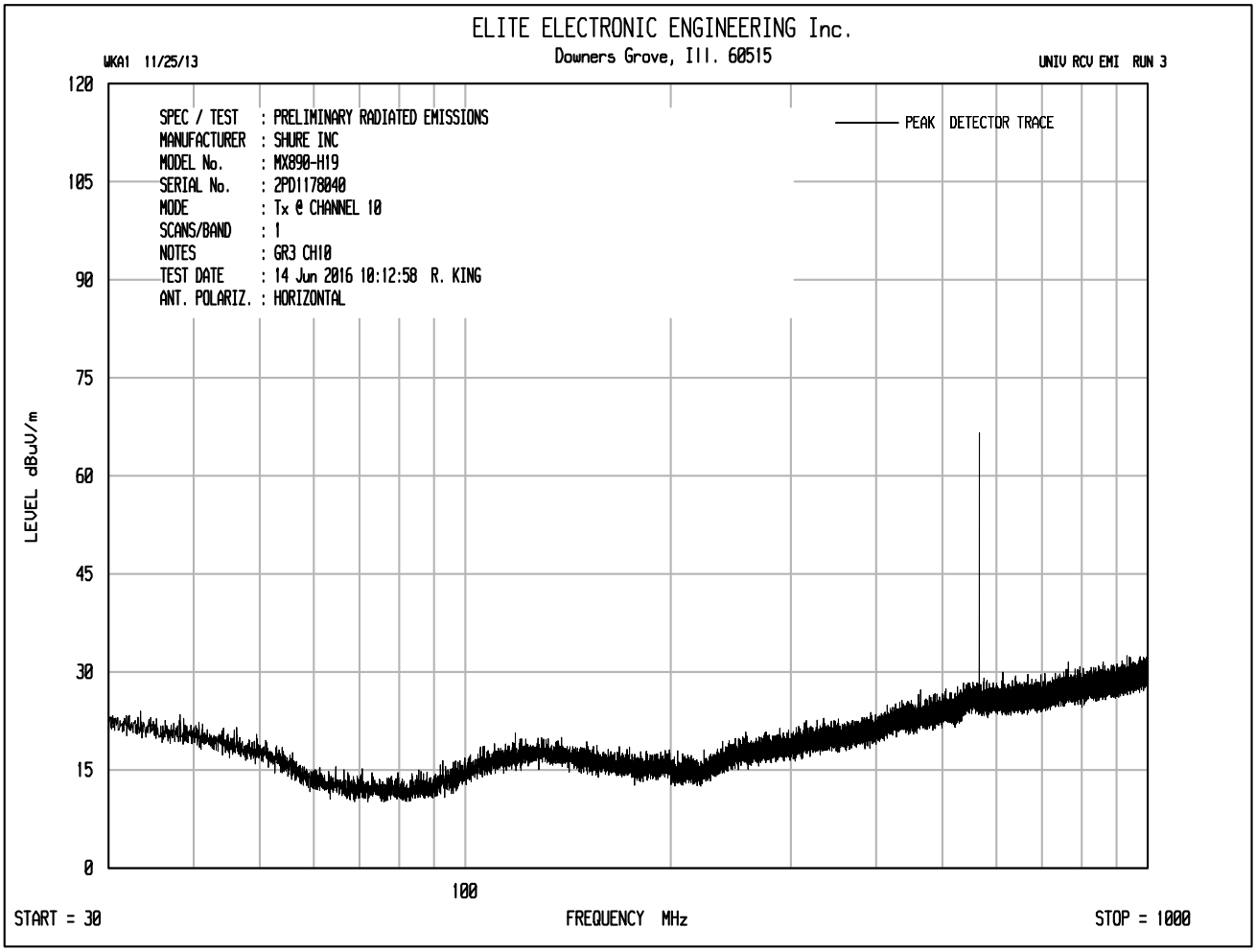
RSS 210 Occupied Bandwidth Compliance

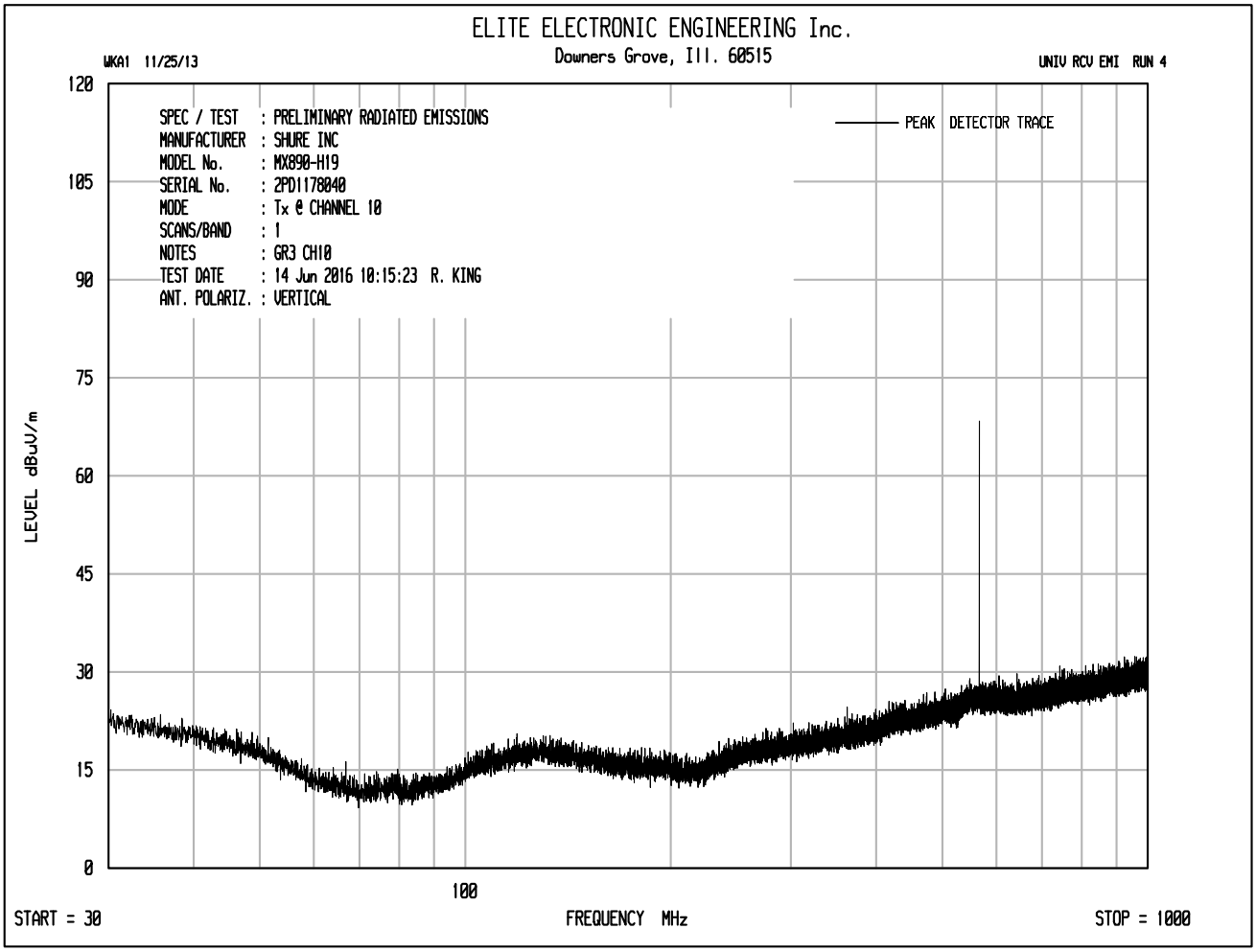
MANUFACTURER	:Shure Incorporated
MODEL NUMBER	:MX690; MX890
SERIAL NUMBER	:2PD1178047
TEST MODE	:Tx @ 571.675MHz
TEST PARAMETERS	:H19 Group 2 Channel 12
EQUIPMENT USED	:RBB0, T2DA, T1EE, RYE0, GWH8
NOTES	: 15kHz at 85% modulation

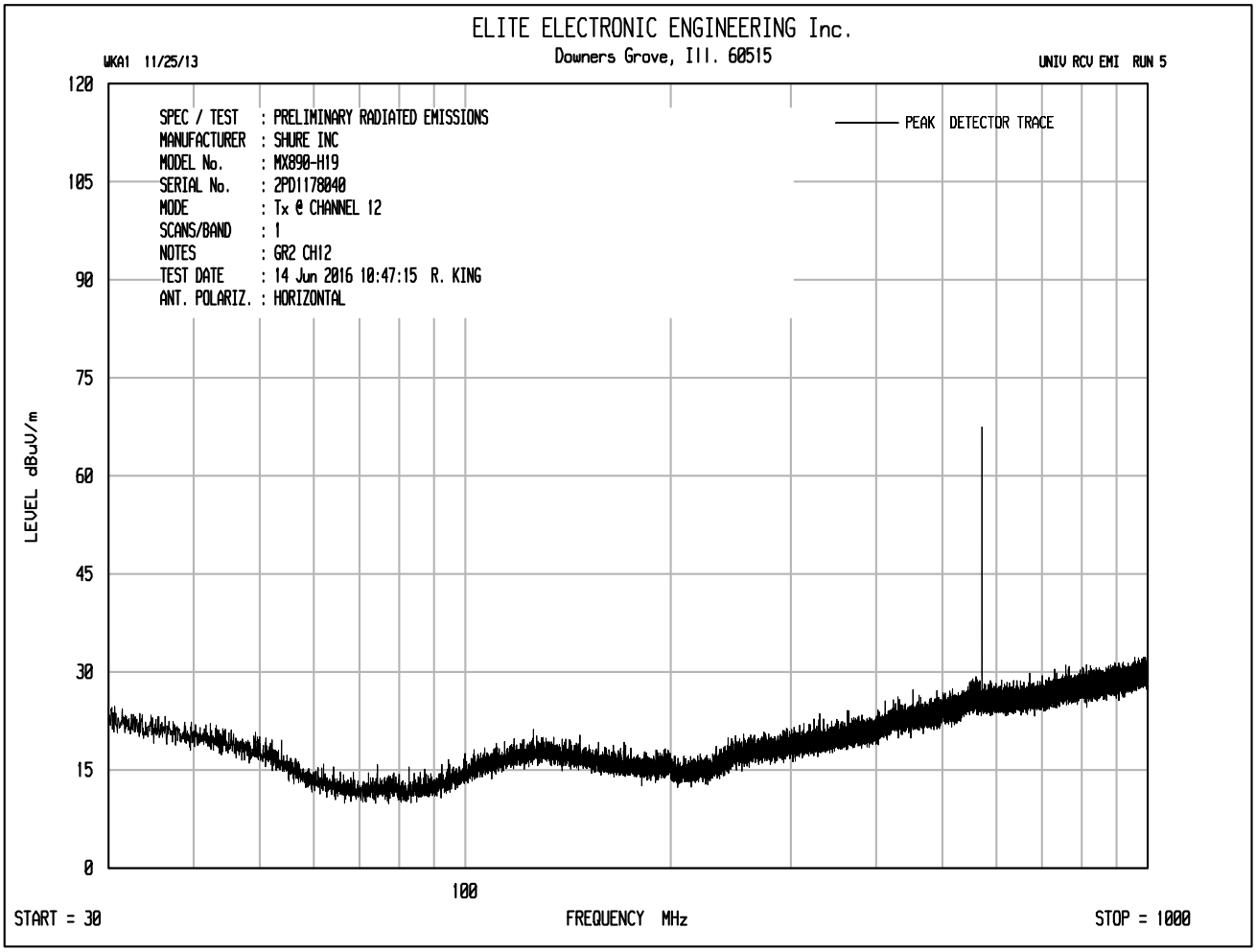
NOTES

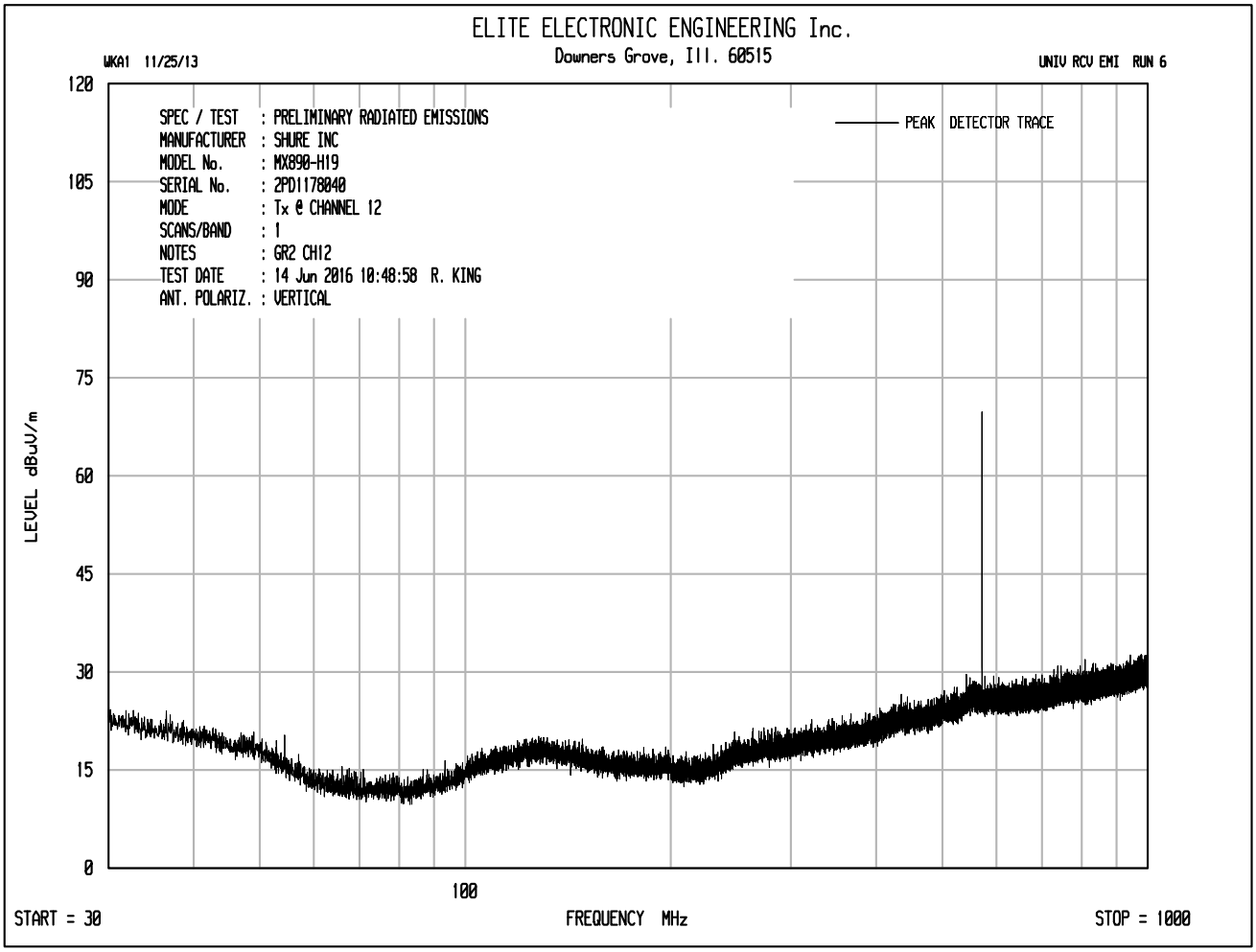

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 10:04:40 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

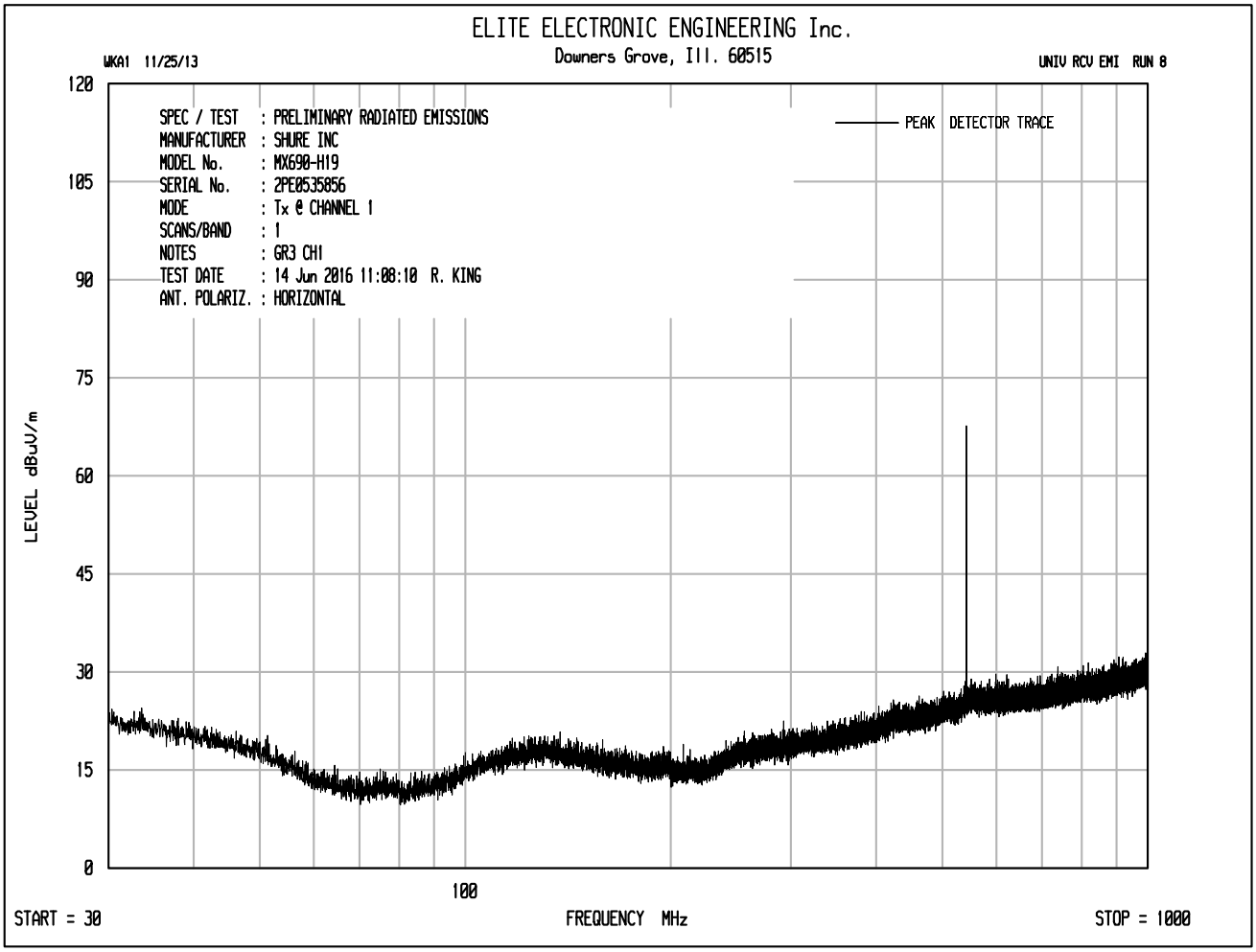

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 10:08:50 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

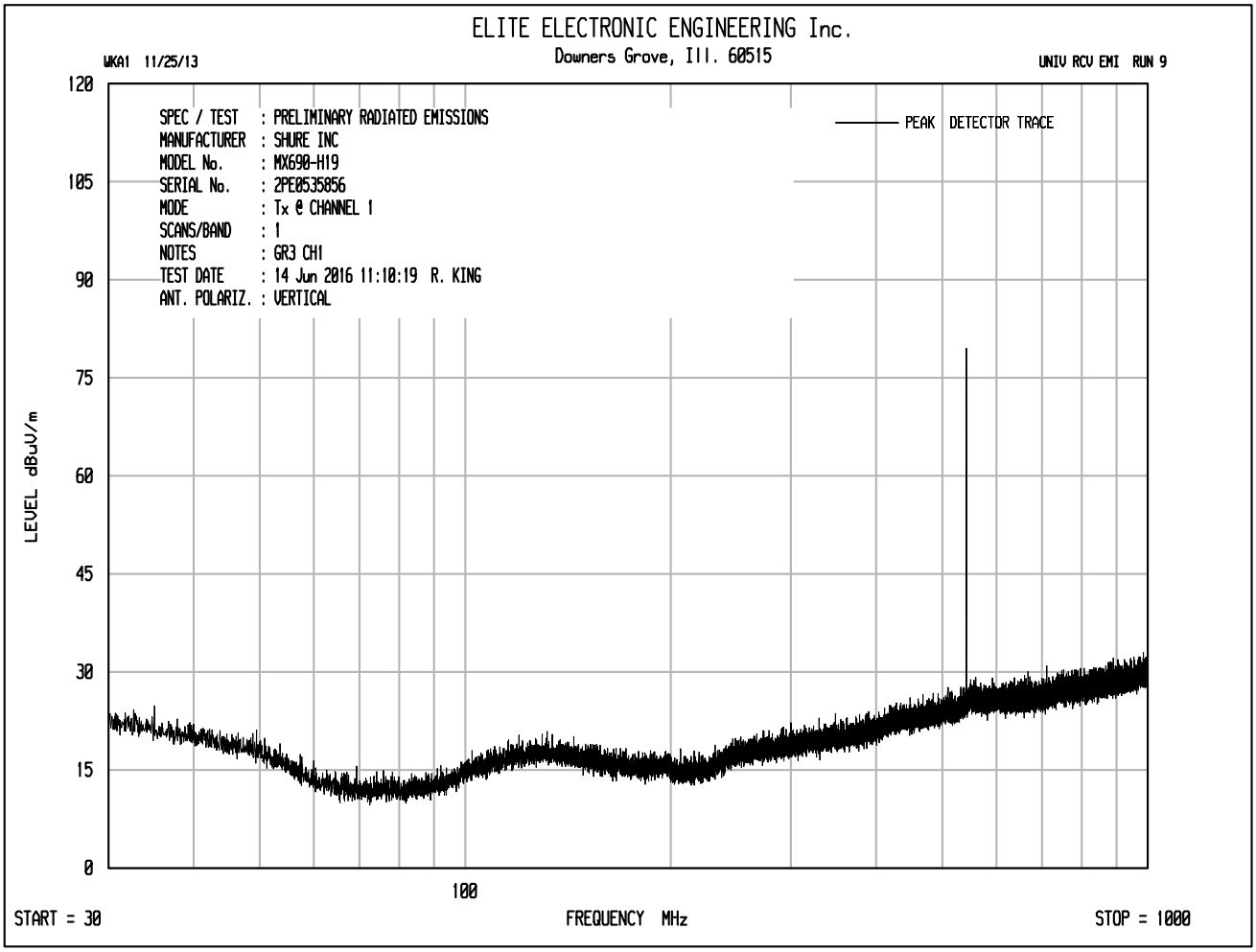

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 10:12:58 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

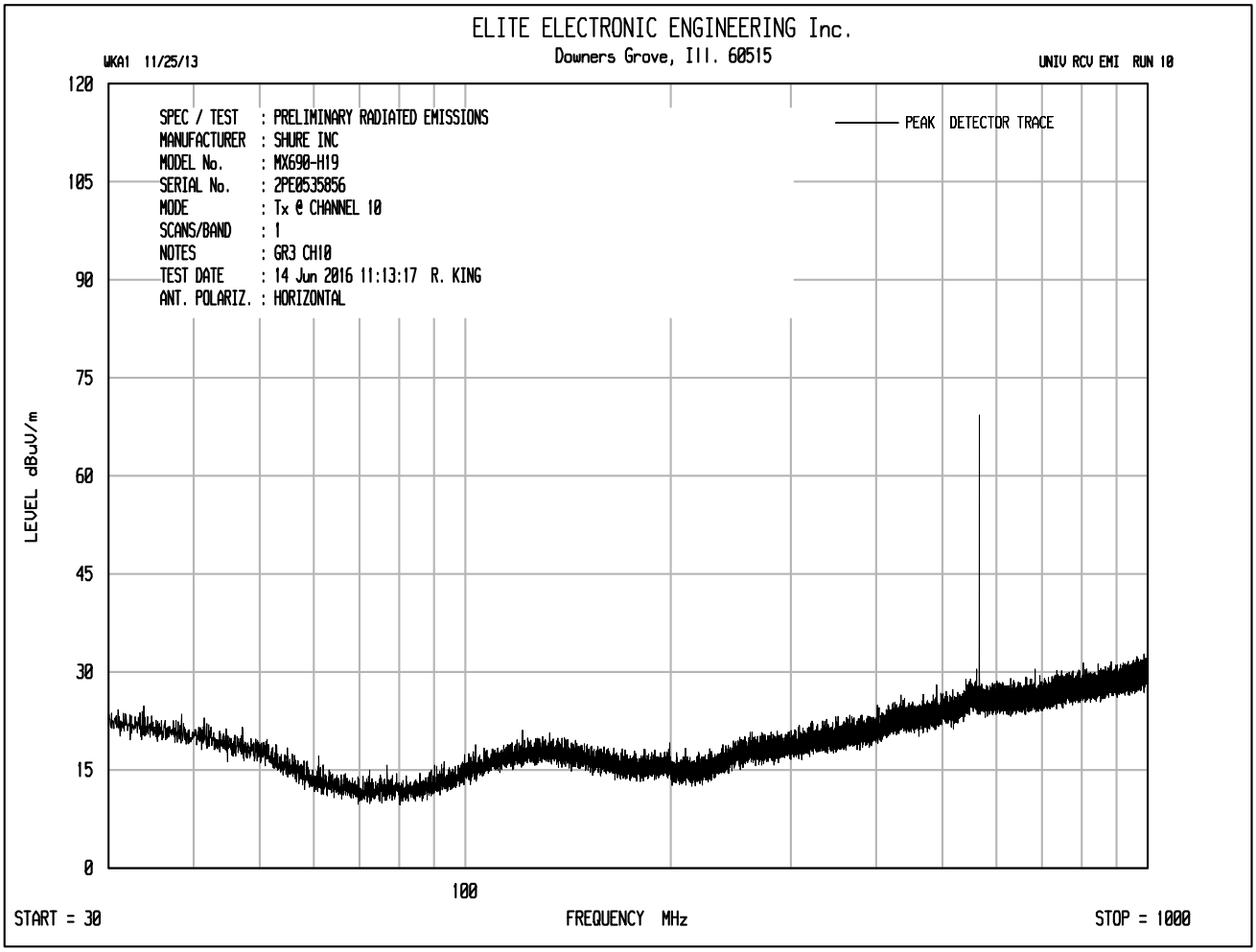

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 10:15:23 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

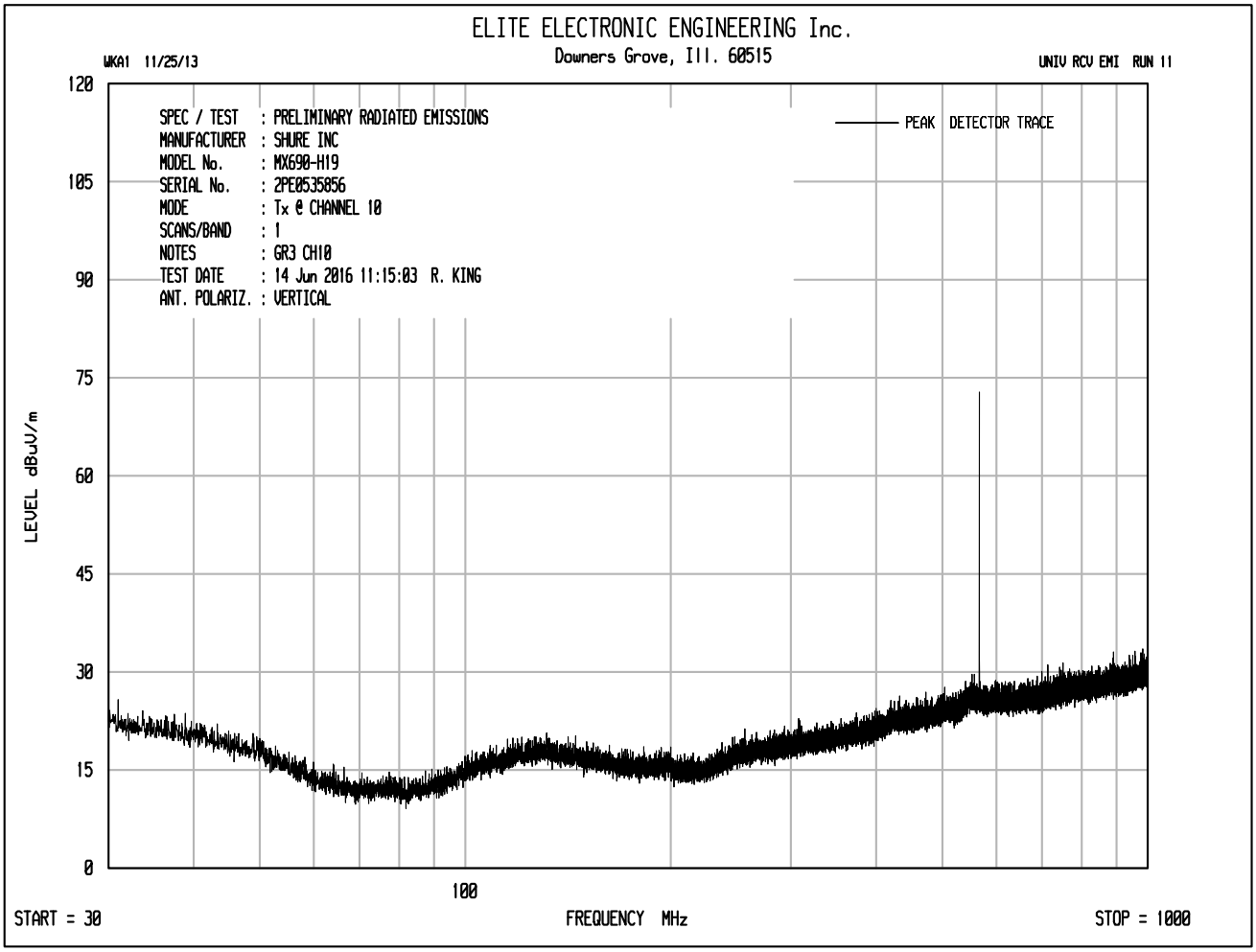

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 10:47:15 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

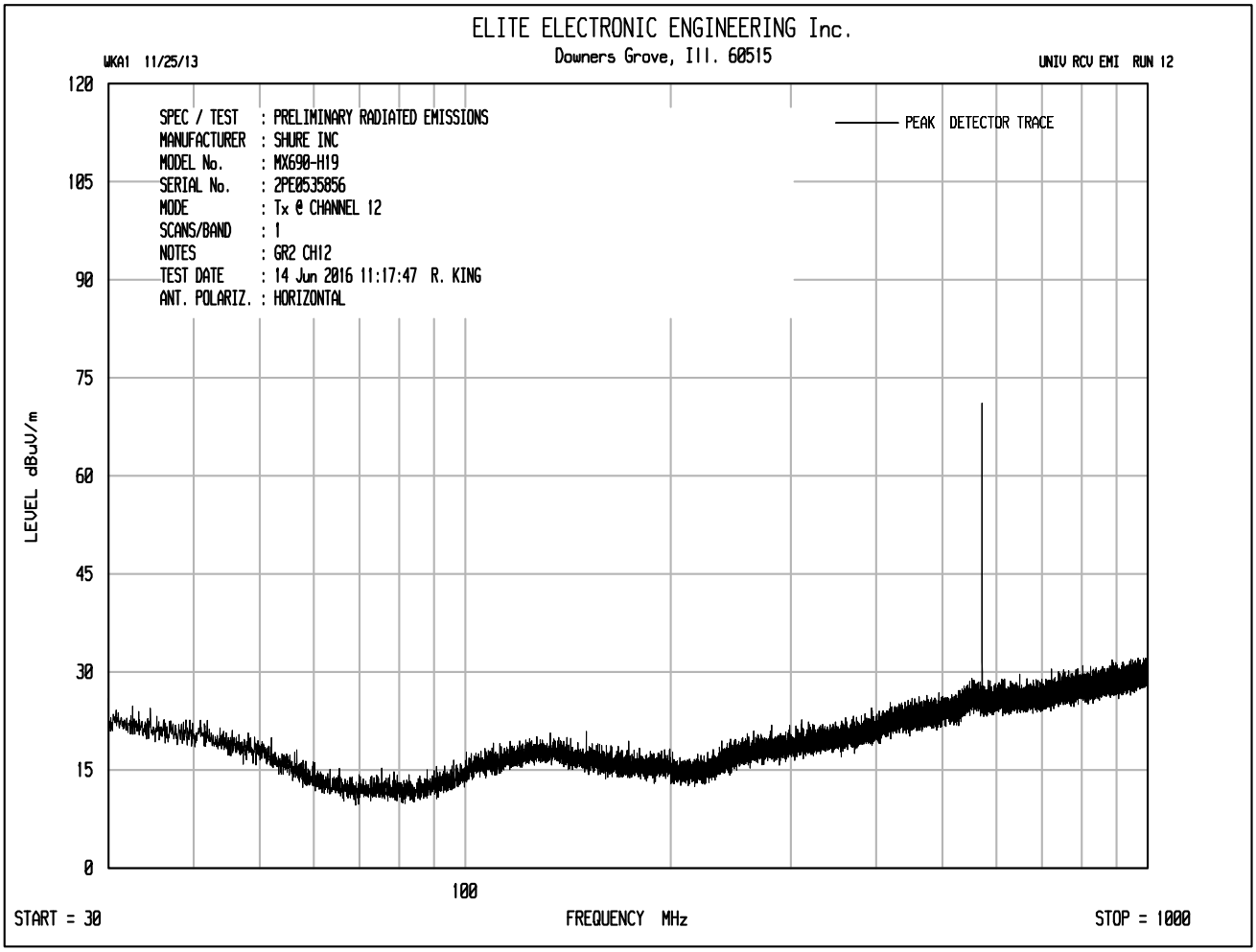

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 10:48:58 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

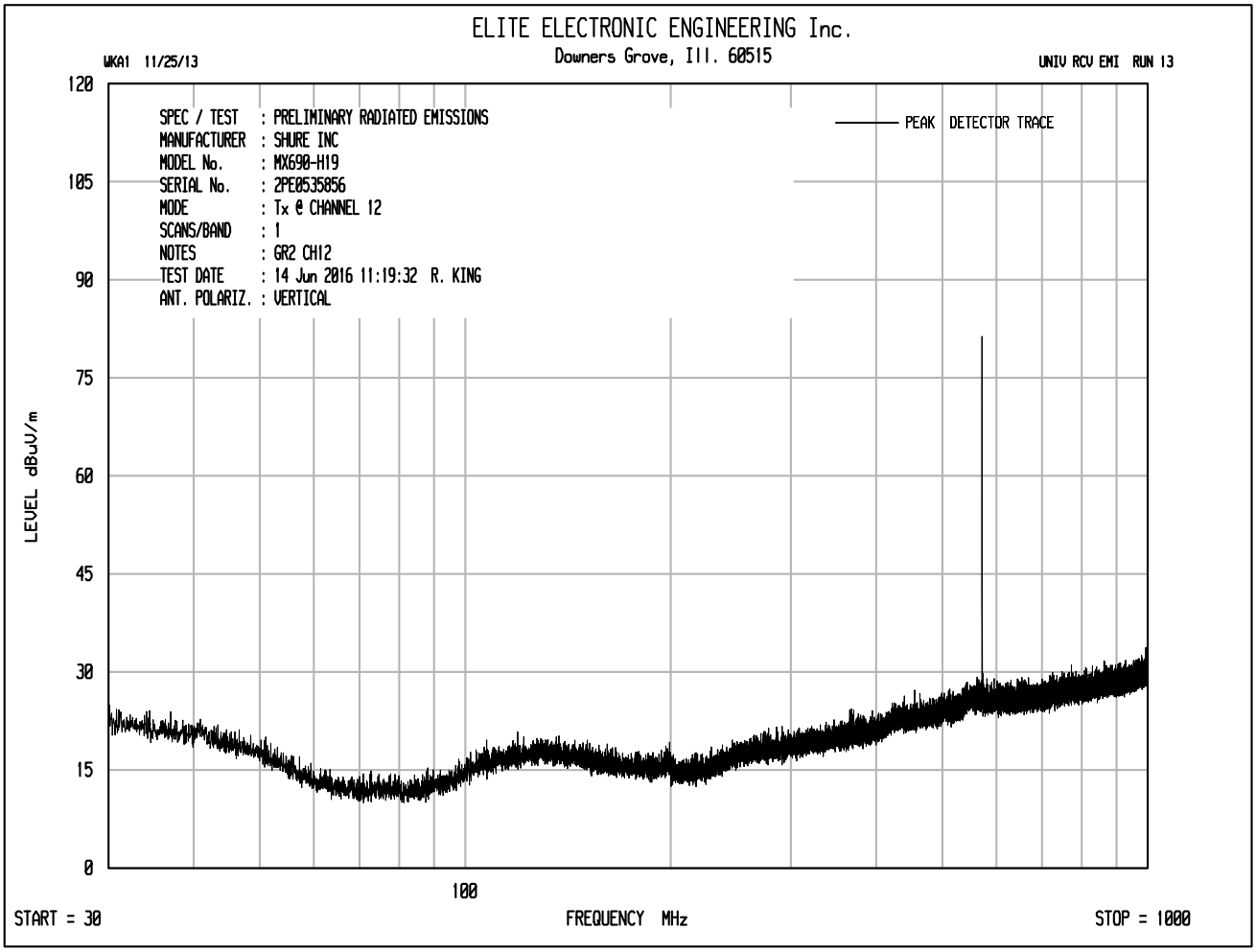

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 11:08:10 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

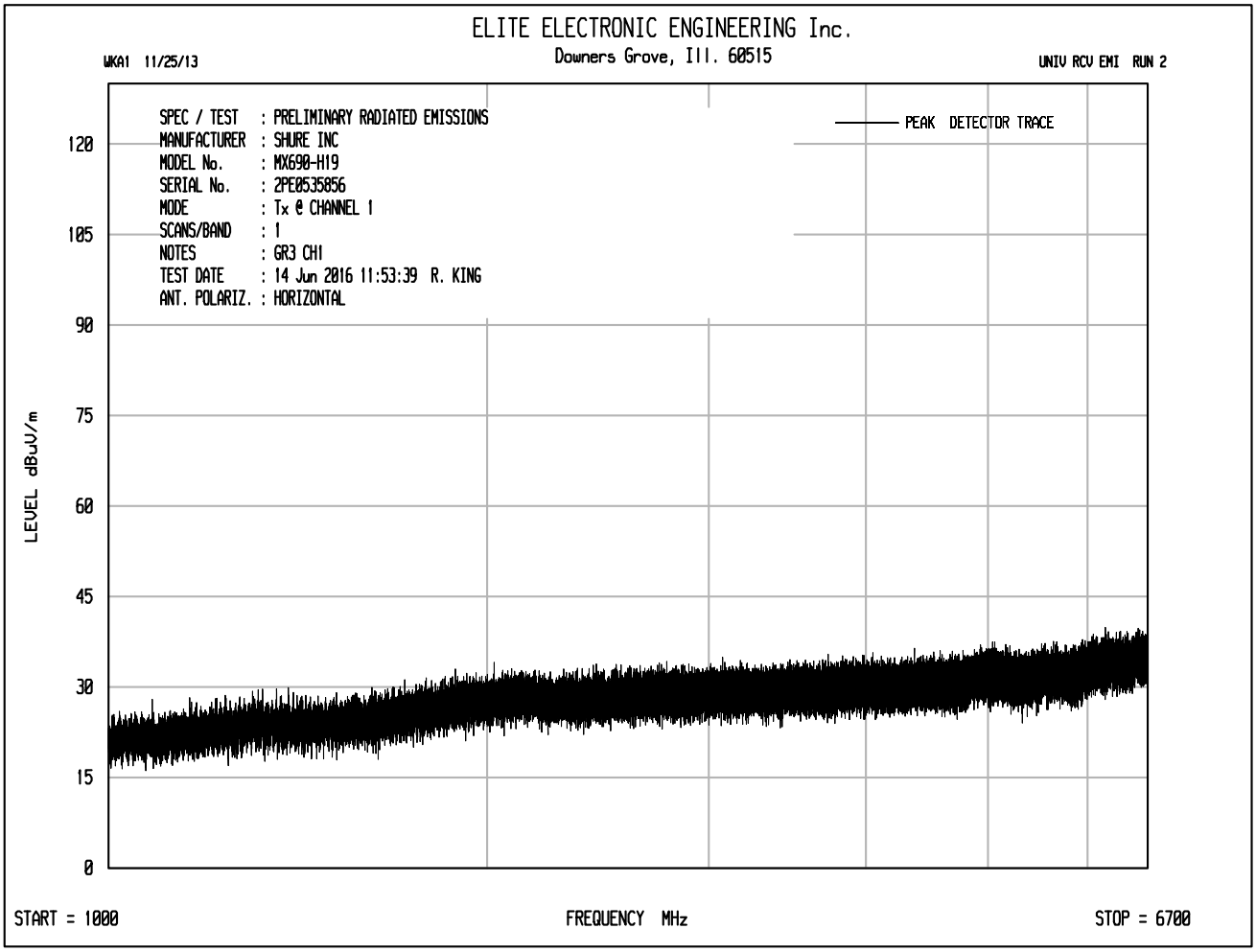

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 9
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 11:10:19 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

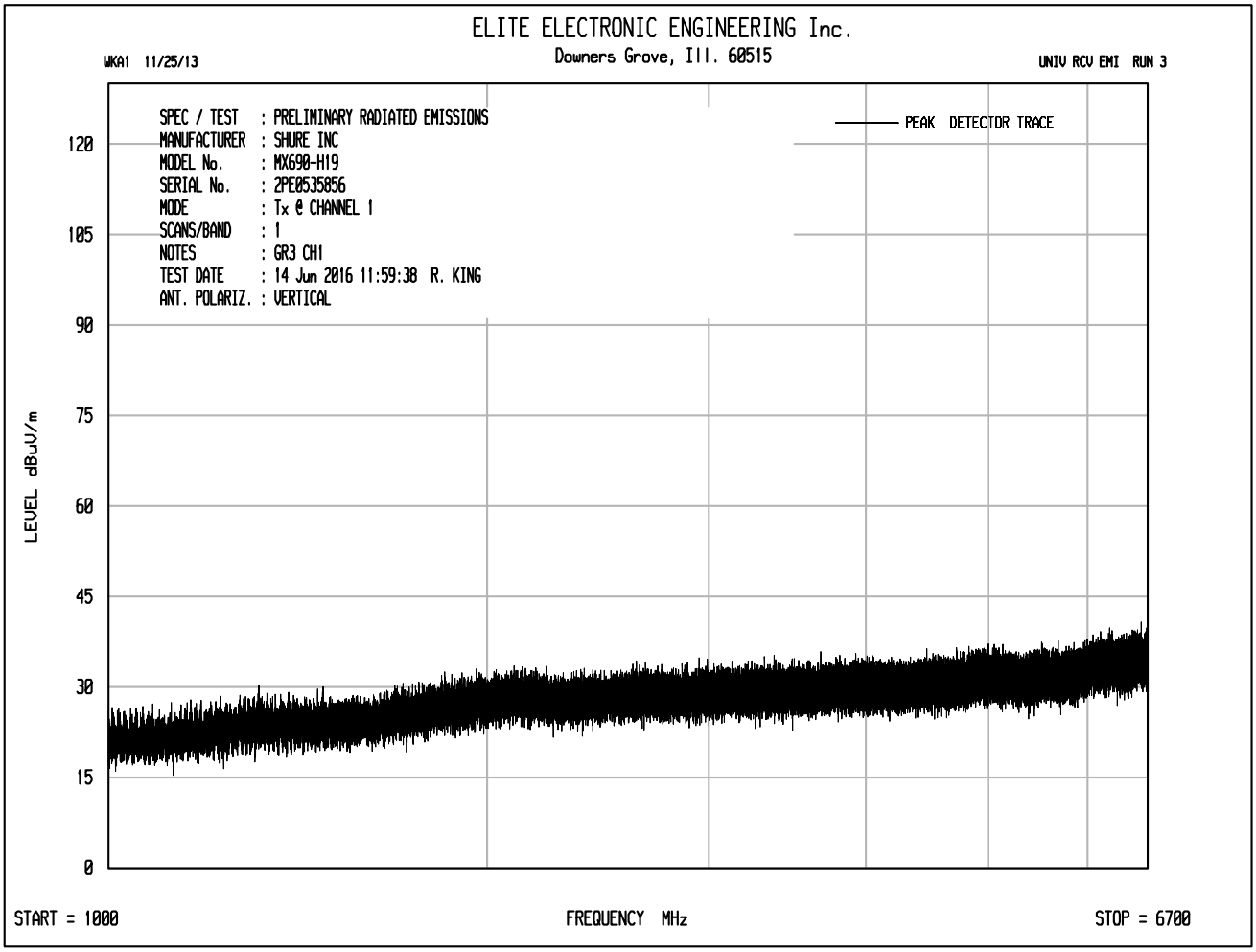

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 11:13:17 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

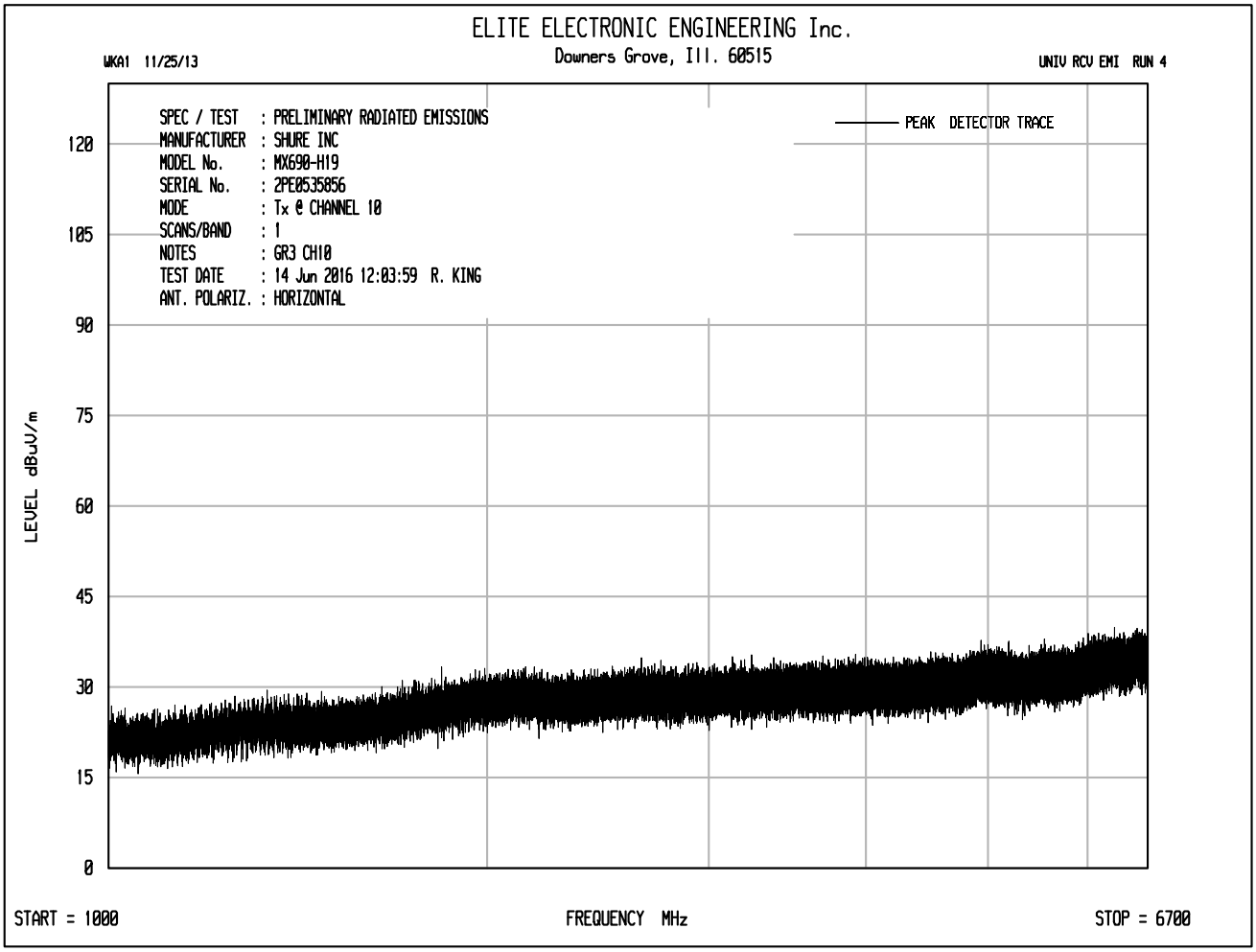

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 11:15:03 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

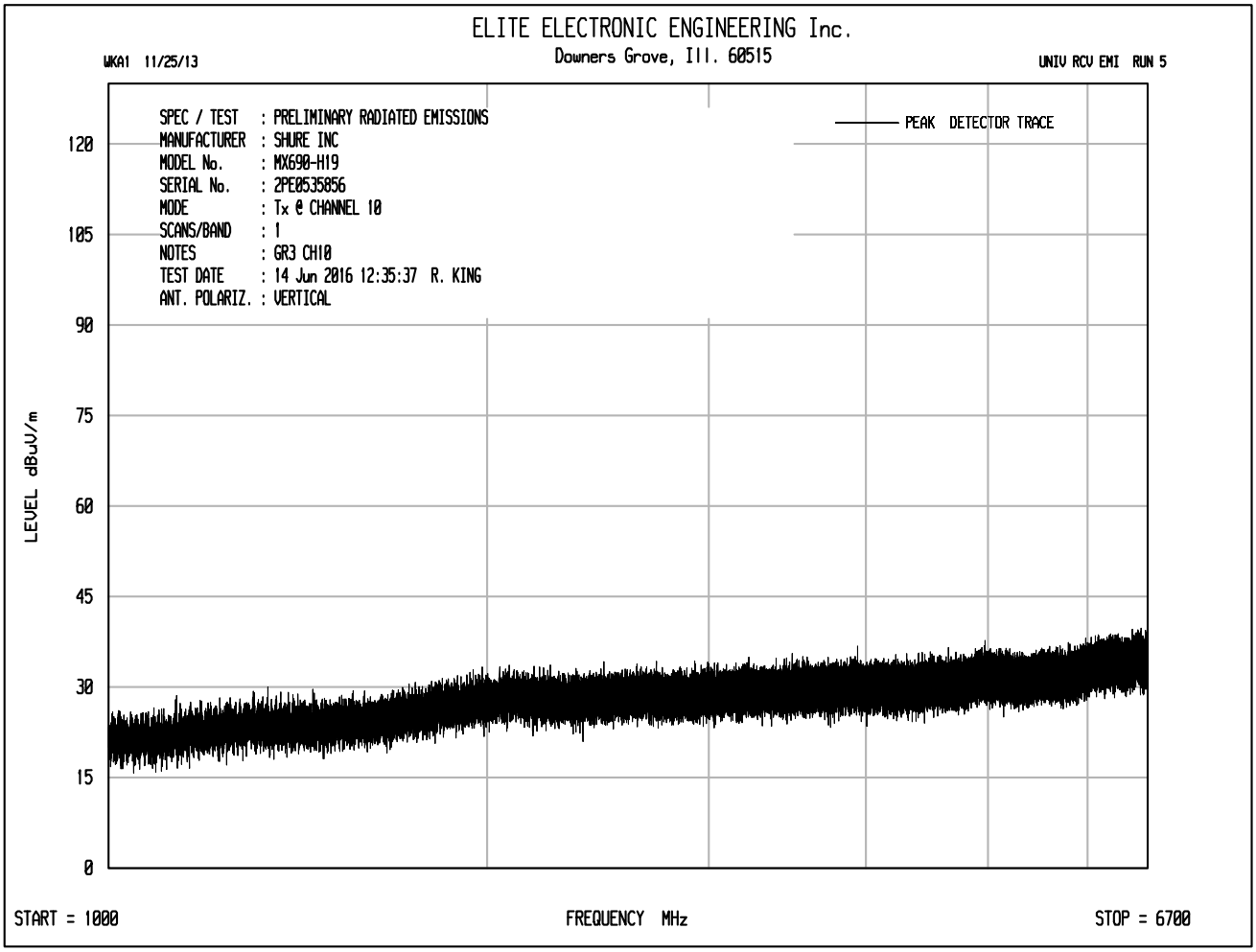

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 12
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 11:17:47 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

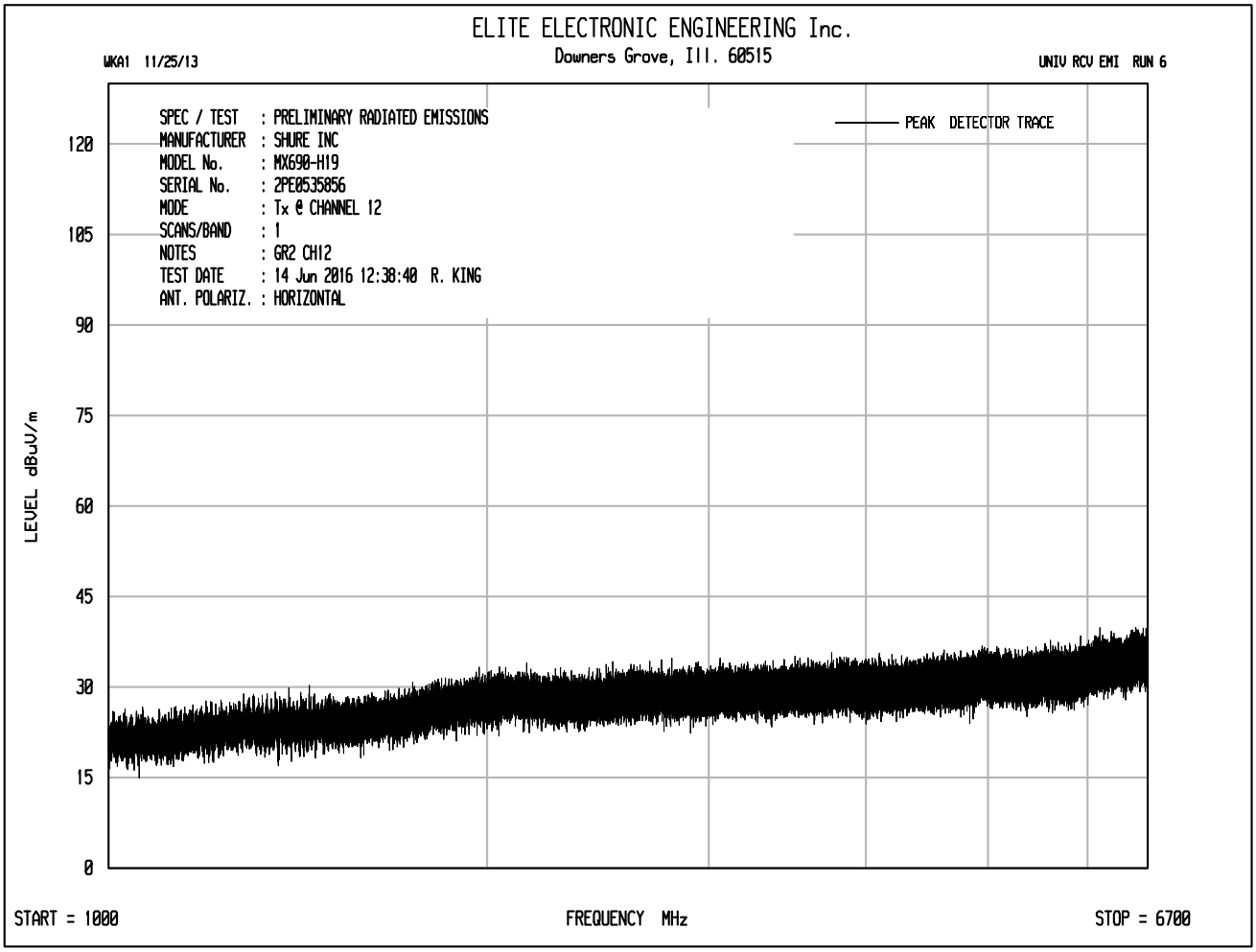

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 11:19:32 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

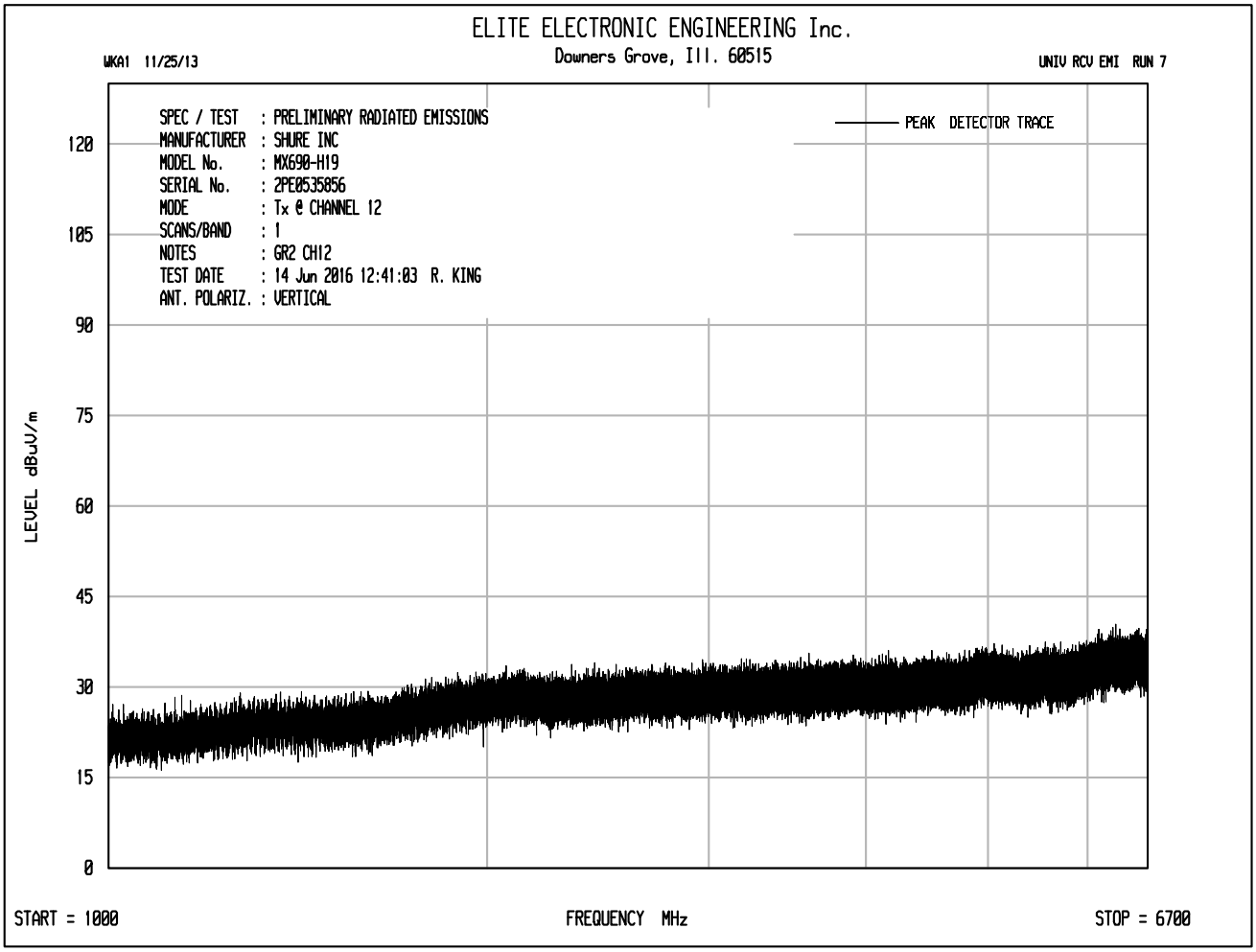

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 11:53:39 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

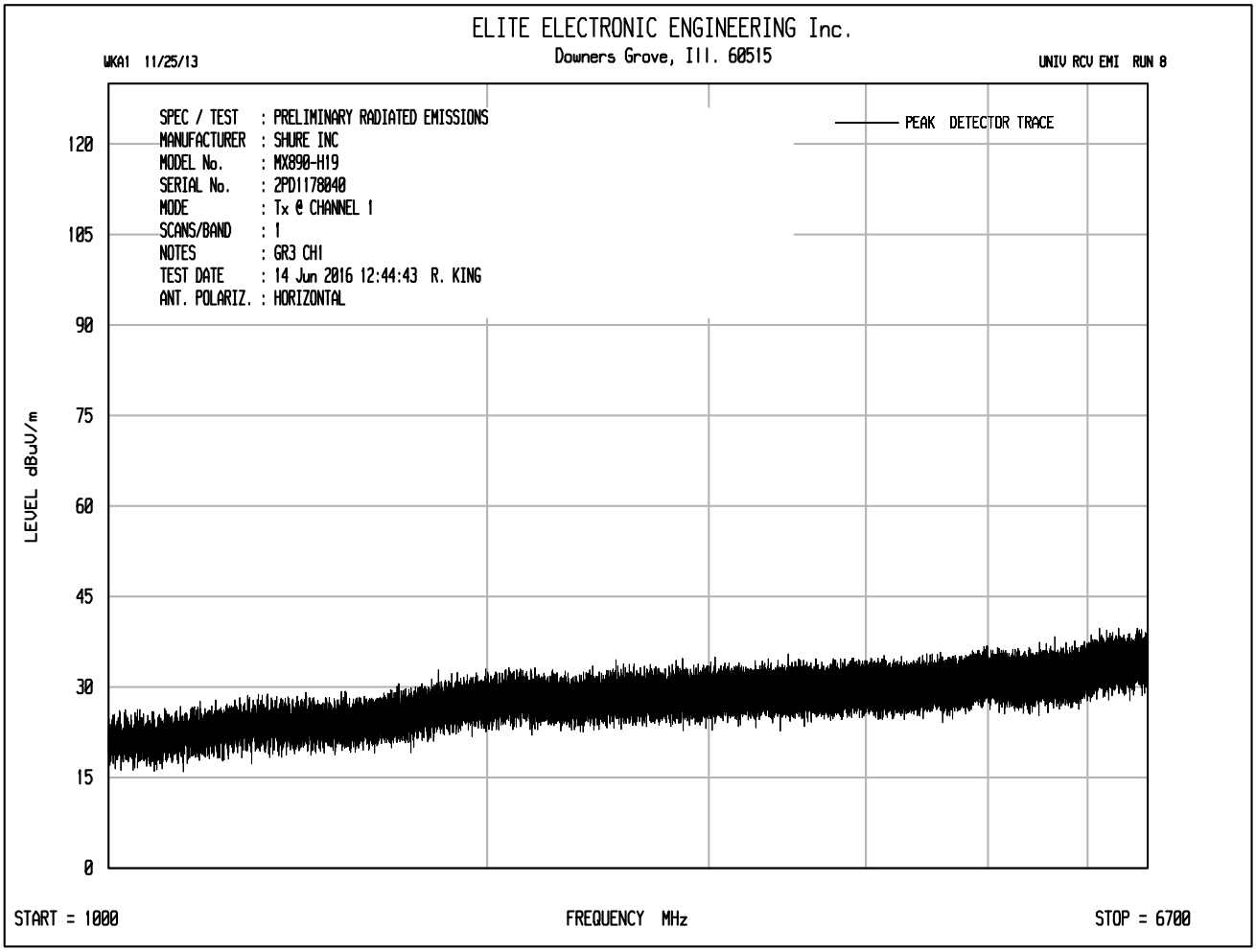

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 11:59:38 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

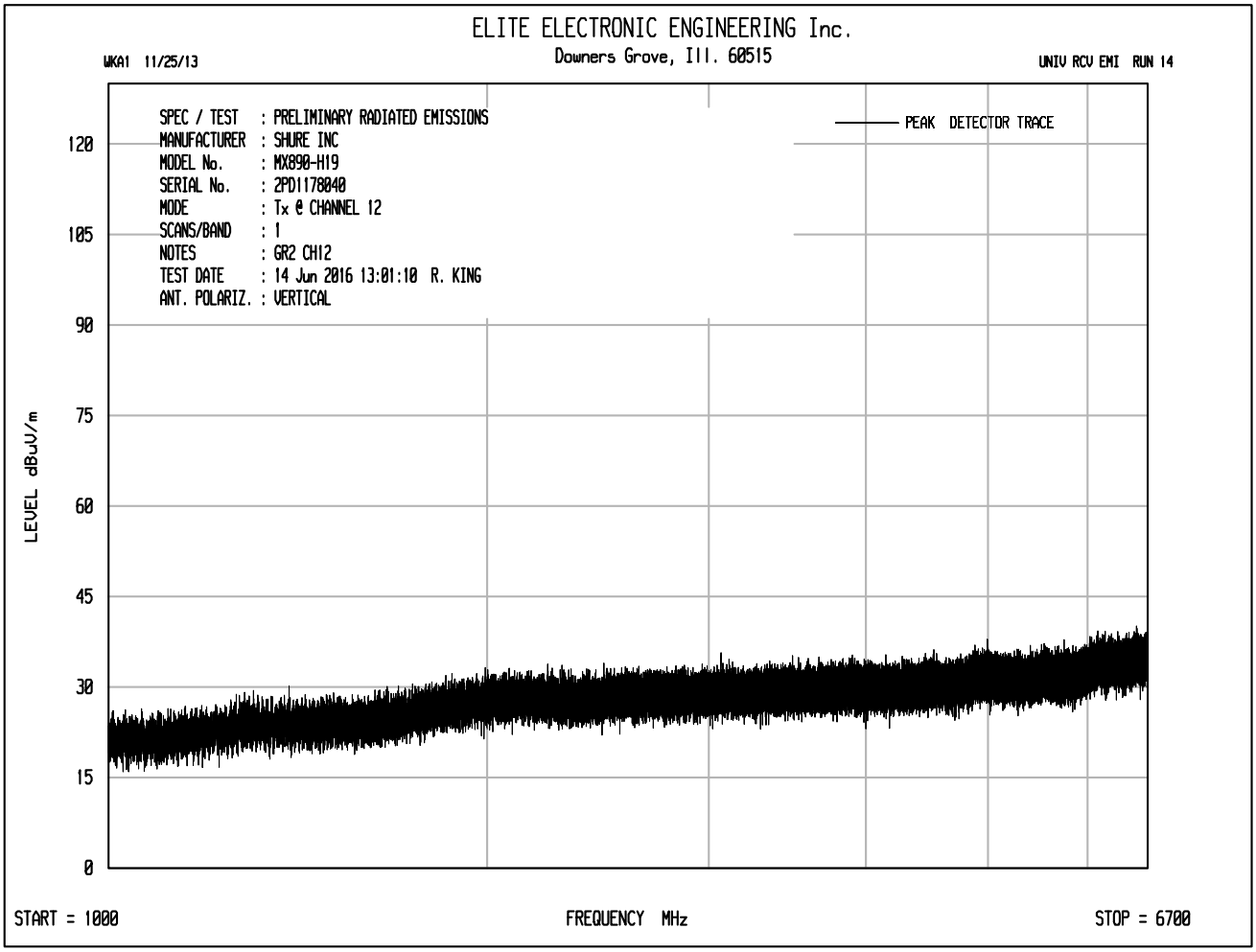

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 12:03:59 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

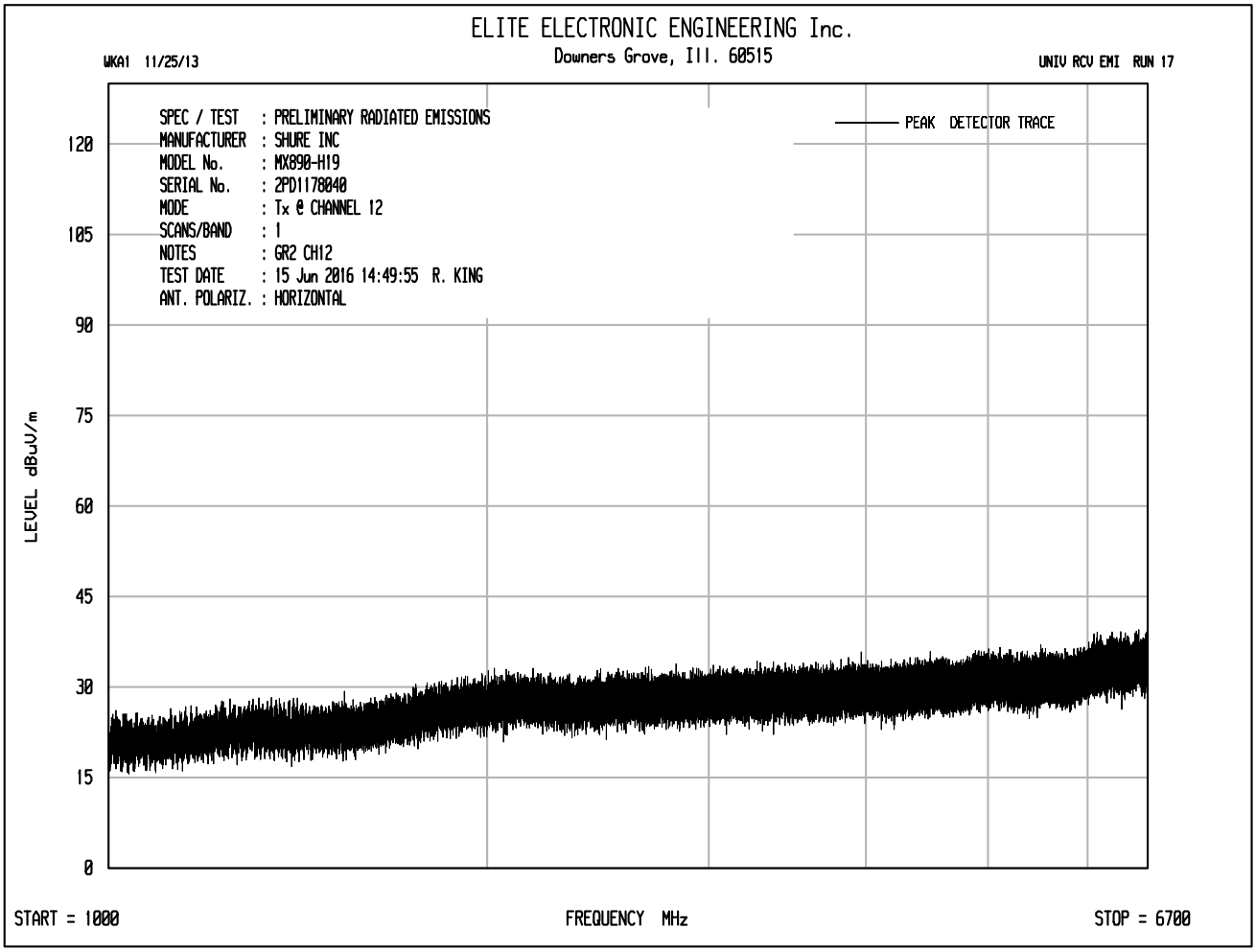

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 14 Jun 2016 12:35:37 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

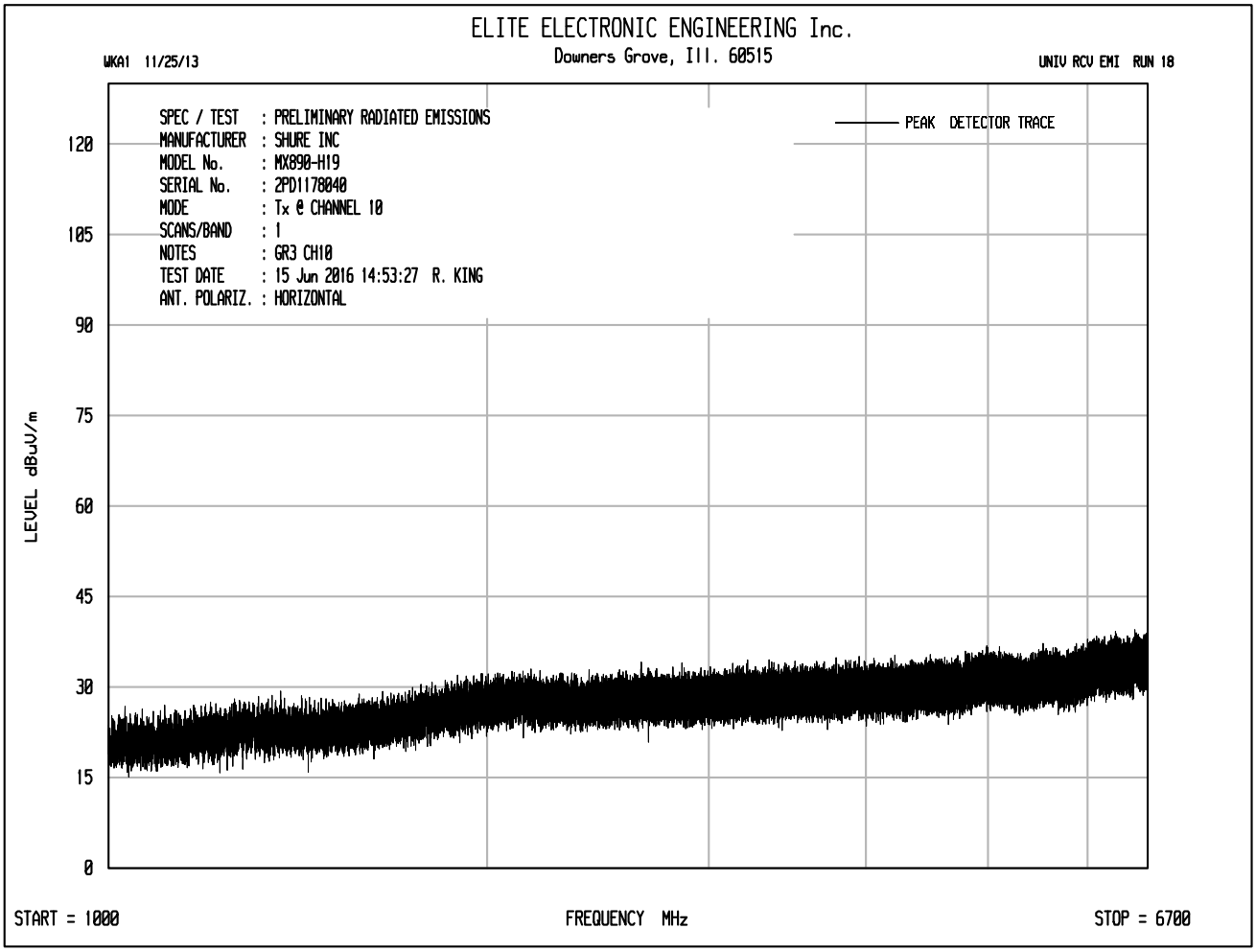

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 12:38:40 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

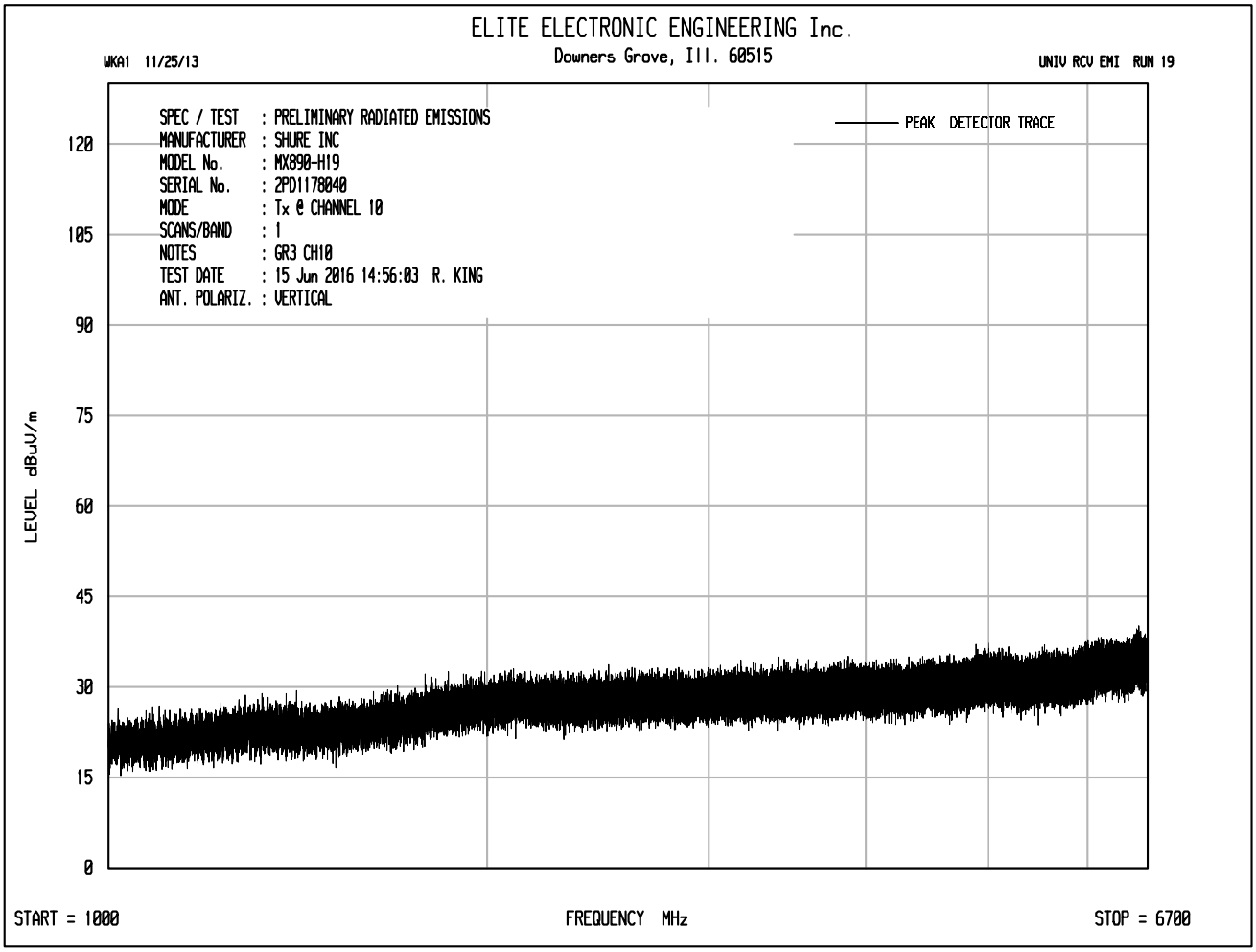

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX690-H19
SERIAL No. : 2PE0535856
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 12:41:03 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

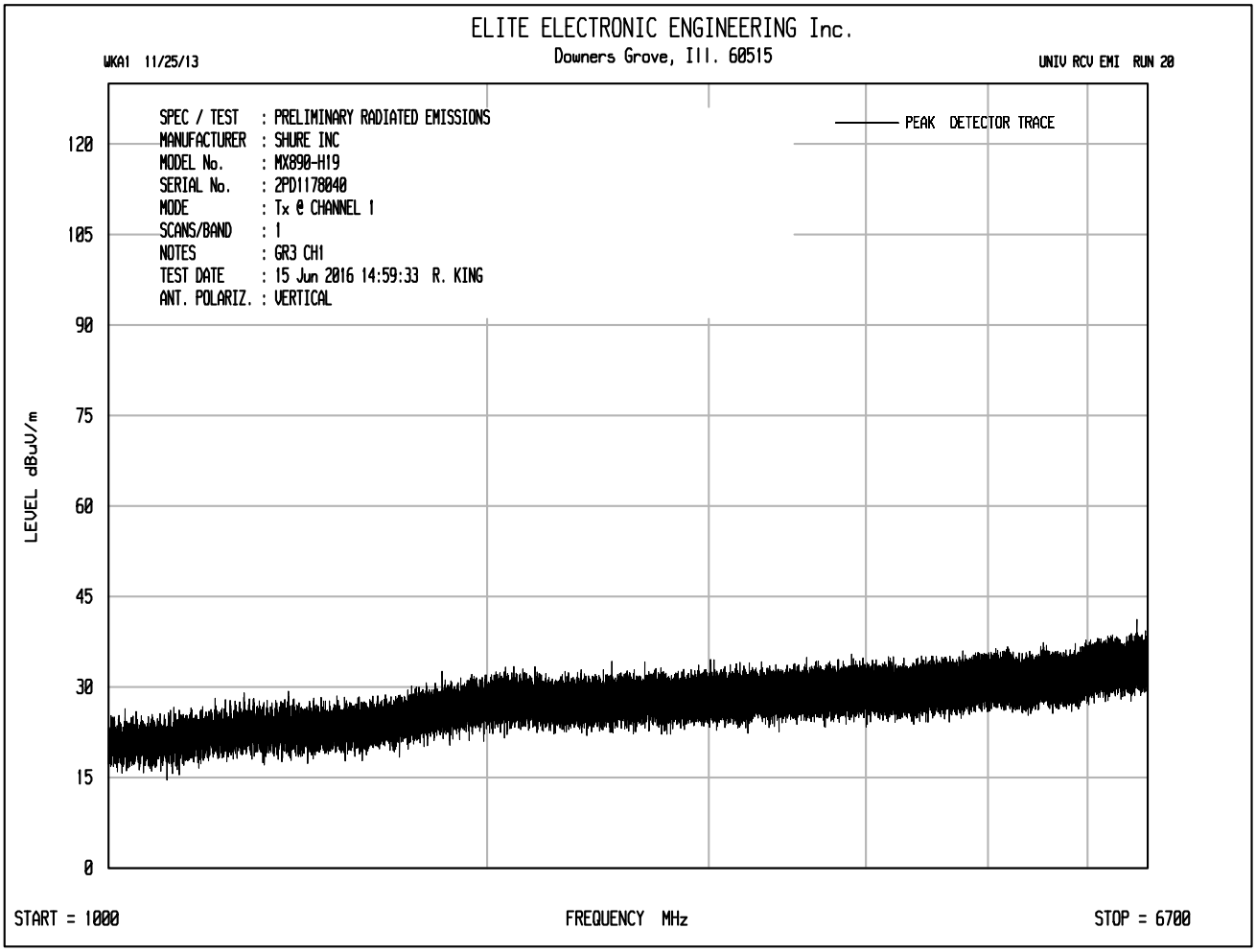

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 14 Jun 2016 12:44:43 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 14
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 14 Jun 2016 13:01:10 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 17
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 12
SCANS/BAND : 1
NOTES : GR2 CH12
TEST DATE : 15 Jun 2016 14:49:55 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 18
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 15 Jun 2016 14:53:27 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 19
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 10
SCANS/BAND : 1
NOTES : GR3 CH10
TEST DATE : 15 Jun 2016 14:56:03 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 20
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC
MODEL No. : MX890-H19
SERIAL No. : 2PD1178040
MODE : Tx @ CHANNEL 1
SCANS/BAND : 1
NOTES : GR3 CH1
TEST DATE : 15 Jun 2016 14:59:33 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 6700

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1084.55	H	60.6		-55.0	1.8	2.7	-55.9	61.0	18
1084.55	V	51.8		-64.6	1.8	2.7	-65.5	70.6	18
1626.83	H	49.1	*	-66.0	3.8	3.3	-65.6	70.6	18
1626.83	V	49.5	*	-65.0	3.8	3.3	-64.6	69.6	18
2169.10	H	49.7	*	-61.0	3.2	3.9	-61.7	66.7	18
2169.10	V	48.3	*	-65.4	3.2	3.9	-66.1	71.1	18
2711.38	H	48.7	*	-63.8	3.9	4.4	-64.3	69.3	18
2711.38	V	48.5	*	-62.6	3.9	4.4	-63.1	68.1	18
3253.65	H	48.2	*	-62.8	5.5	4.9	-62.2	67.2	18
3253.65	V	47.8	*	-64.6	5.5	4.9	-64.0	69.0	18
3795.93	H	47.1	*	-65.6	6.4	5.2	-64.4	69.4	18
3795.93	V	47.5	*	-63.4	6.4	5.2	-62.2	67.2	18
4338.20	H	47.2	*	-63.0	7.0	5.6	-61.6	66.6	18
4338.20	V	47.6	*	-62.4	7.0	5.6	-61.0	66.0	18
4880.48	H	47.3	*	-60.2	7.1	5.8	-59.0	64.0	18
4880.48	V	47.2	*	-63.0	7.1	5.8	-61.8	66.8	18
5422.75	H	47.3	*	-61.8	7.7	6.2	-60.2	65.3	18
5422.75	V	48.0	*	-58.8	7.7	6.2	-57.2	62.3	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1084.55	H	57.5		-55.2	1.8	2.7	-56.1	61.2	30
1084.55	V	38.1		-74.4	1.8	2.7	-75.3	80.4	30
1626.83	H	37.1		-78.0	3.8	3.3	-77.6	82.6	30
1626.83	V	36.5		-72.0	3.8	3.3	-71.6	76.6	30
2169.10	H	34.5	*	-70.7	3.2	3.9	-71.4	76.4	30
2169.10	V	33.1	*	-72.2	3.2	3.9	-72.8	77.9	30
2711.38	H	31.3	*	-74.7	3.9	4.4	-75.2	80.3	30
2711.38	V	31.5	*	-74.5	3.9	4.4	-75.0	80.1	30
3253.65	H	34.0		-68.0	5.5	4.9	-67.4	72.4	30
3253.65	V	34.8		-69.8	5.5	4.9	-69.2	74.2	30
3795.93	H	31.7	*	-71.7	6.4	5.2	-70.5	75.5	30
3795.93	V	31.6	*	-71.8	6.4	5.2	-70.6	75.6	30
4338.20	H	30.7	*	-71.7	7.0	5.6	-70.3	75.4	30
4338.20	V	32.8	*	-69.6	7.0	5.6	-68.2	73.3	30
4880.48	H	31.3	*	-69.4	7.1	5.8	-68.2	73.2	30
4880.48	V	32.0	*	-68.7	7.1	5.8	-67.5	72.5	30
5422.75	H	31.2	*	-68.5	7.7	6.2	-66.9	72.0	30
5422.75	V	31.7	*	-68.0	7.7	6.2	-66.5	71.5	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1133.00	H	59.3		-52.6	1.6	2.8	-53.8	58.8	18
1133.00	V	50.1		-66.0	1.6	2.8	-67.2	72.2	18
1699.50	H	48.6	*	-67.0	3.4	3.4	-67.0	72.1	18
1699.50	V	49.9	*	-63.4	3.4	3.4	-63.4	68.5	18
2266.00	H	48.2	*	-60.0	3.4	4.0	-60.6	65.6	18
2266.00	V	48.9	*	-65.2	3.4	4.0	-65.8	70.8	18
2832.50	H	48.0	*	-64.2	4.5	4.5	-64.2	69.3	18
2832.50	V	47.3	*	-61.6	4.5	4.5	-61.6	66.7	18
3399.00	H	47.7	*	-64.0	5.8	5.0	-63.2	68.3	18
3399.00	V	48.1	*	-59.6	5.8	5.0	-58.8	63.9	18
3965.50	H	47.3	*	-63.6	6.5	5.3	-62.4	67.5	18
3965.50	V	46.3	*	-64.0	6.5	5.3	-62.8	67.9	18
4532.00	H	47.2	*	-57.8	6.9	5.7	-56.5	61.6	18
4532.00	V	46.8	*	-62.2	6.9	5.7	-60.9	66.0	18
5098.50	H	47.0	*	-63.2	7.5	6.0	-61.7	66.8	18
5098.50	V	46.6	*	-60.2	7.5	6.0	-58.7	63.8	18
5665.00	H	47.2	*	-56.4	8.2	6.3	-54.5	59.6	18
5665.00	V	47.3	*	-56.8	8.2	6.3	-54.9	60.0	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1133.00	H	58.3		-51.0	1.6	2.8	-52.2	57.2	30
1133.00	V	47.3		-62.4	1.6	2.8	-63.6	68.6	30
1699.50	H	45.1		-59.8	3.4	3.4	-59.8	64.9	30
1699.50	V	38.4		-71.0	3.4	3.4	-71.0	76.1	30
2266.00	H	33.5	*	-72.0	3.4	4.0	-72.6	77.6	30
2266.00	V	33.6	*	-71.9	3.4	4.0	-72.5	77.5	30
2832.50	H	35.6		-65.2	4.5	4.5	-65.2	70.3	30
2832.50	V	34.2		-72.6	4.5	4.5	-72.6	77.7	30
3399.00	H	32.4	*	-72.8	5.8	5.0	-72.0	77.1	30
3399.00	V	31.9	*	-73.3	5.8	5.0	-72.5	77.6	30
3965.50	H	31.6	*	-72.1	6.5	5.3	-70.9	76.0	30
3965.50	V	31.2	*	-72.5	6.5	5.3	-71.3	76.4	30
4532.00	H	30.9	*	-70.8	6.9	5.7	-69.5	74.6	30
4532.00	V	30.7	*	-70.9	6.9	5.7	-69.6	74.7	30
5098.50	H	30.8	*	-69.6	7.5	6.0	-68.1	73.2	30
5098.50	V	31.3	*	-69.1	7.5	6.0	-67.6	72.7	30
5665.00	H	30.9	*	-67.9	8.2	6.3	-66.1	71.1	30
5665.00	V	31.8	*	-67.0	8.2	6.3	-65.1	70.2	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 571.675MHz
BAND : H19 Group 2 Channel 12

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1143.35	H	61.9		-48.8	1.5	2.8	-50.1	55.1	18
1143.35	V	55.3		-57.0	1.5	2.8	-58.3	63.3	18
1715.03	H	49.6	*	-63.8	3.3	3.4	-64.0	69.0	18
1715.03	V	48.2	*	-66.8	3.3	3.4	-67.0	72.0	18
2286.70	H	48.9	*	-62.6	3.5	4.0	-63.1	68.1	18
2286.70	V	48.5	*	-65.2	3.5	4.0	-65.7	70.7	18
2858.38	H	49.1	*	-62.8	4.6	4.5	-62.7	67.8	18
2858.38	V	49.2	*	-54.2	4.6	4.5	-54.1	59.2	18
3430.05	H	47.7	*	-64.0	5.7	5.0	-63.2	68.3	18
3430.05	V	47.5	*	-62.0	5.7	5.0	-61.2	66.3	18
4001.73	H	46.6	*	-63.0	6.6	5.4	-61.8	66.8	18
4001.73	V	46.2	*	-60.4	6.6	5.4	-59.2	64.2	18
4573.40	H	47.1	*	-52.6	6.9	5.7	-51.3	56.4	18
4573.40	V	46.3	*	-61.8	6.9	5.7	-60.5	65.6	18
5145.08	H	46.2	*	-66.4	7.5	6.0	-64.9	69.9	18
5145.08	V	46.1	*	-60.2	7.5	6.0	-58.7	63.7	18
5716.75	H	46.8	*	-57.2	8.1	6.4	-55.5	60.5	18
5716.75	V	46.5	*	-59.2	8.1	6.4	-57.5	62.5	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX690 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 2 Channel 12

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1143.35	H	60.5		-47.0	1.5	2.8	-48.3	53.3	30
1143.35	V	52.2		-57.0	1.5	2.8	-58.3	63.3	30
1715.03	H	48.6		-51.2	3.3	3.4	-51.4	56.4	30
1715.03	V	37.5		-70.2	3.3	3.4	-70.4	75.4	30
2286.70	H	33.1	*	-72.5	3.5	4.0	-73.0	78.1	30
2286.70	V	33.4	*	-72.3	3.5	4.0	-72.8	77.8	30
2858.38	H	36.9		-68.0	4.6	4.5	-67.9	73.0	30
2858.38	V	41.3		-63.4	4.6	4.5	-63.3	68.4	30
3430.05	H	31.9	*	-73.1	5.7	5.0	-72.3	77.4	30
3430.05	V	31.4	*	-73.5	5.7	5.0	-72.8	77.8	30
4001.73	H	31.7	*	-72.0	6.6	5.4	-70.8	75.9	30
4001.73	V	31.5	*	-72.2	6.6	5.4	-71.0	76.1	30
4573.40	H	30.7	*	-70.7	6.9	5.7	-69.5	74.5	30
4573.40	V	30.5	*	-70.9	6.9	5.7	-69.6	74.7	30
5145.08	H	30.9	*	-69.3	7.5	6.0	-67.7	72.8	30
5145.08	V	30.9	*	-69.3	7.5	6.0	-67.8	72.8	30
5716.75	H	31.5	*	-67.0	8.1	6.4	-65.3	70.4	30
5716.75	V	30.9	*	-67.7	8.1	6.4	-65.9	71.0	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1084.55	H	55.9		-59.4	1.8	2.7	-60.3	65.4	18
1084.55	V	50.9		-67.0	1.8	2.7	-67.9	73.0	18
1626.83	H	49.2	*	-65.6	3.8	3.3	-65.2	70.2	18
1626.83	V	48.8	*	-66.6	3.8	3.3	-66.2	71.2	18
2169.10	H	49.5	*	-61.6	3.2	3.9	-62.3	67.3	18
2169.10	V	49.6	*	-62.0	3.2	3.9	-62.7	67.7	18
2711.38	H	47.8	*	-64.2	3.9	4.4	-64.7	69.7	18
2711.38	V	47.6	*	-65.0	3.9	4.4	-65.5	70.5	18
3253.65	H	47.7	*	-65.4	5.5	4.9	-64.8	69.8	18
3253.65	V	47.1	*	-66.8	5.5	4.9	-66.2	71.2	18
3795.93	H	48.0	*	-64.0	6.4	5.2	-62.8	67.8	18
3795.93	V	47.5	*	-63.4	6.4	5.2	-62.2	67.2	18
4338.20	H	47.6	*	-63.4	7.0	5.6	-62.0	67.0	18
4338.20	V	48.1	*	-60.8	7.0	5.6	-59.4	64.4	18
4880.48	H	46.4	*	-62.6	7.1	5.8	-61.4	66.4	18
4880.48	V	46.3	*	-65.4	7.1	5.8	-64.2	69.2	18
5422.75	H	47.1	*	-62.6	7.7	6.2	-61.0	66.1	18
5422.75	V	46.7	*	-62.4	7.7	6.2	-60.8	65.9	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 542.275MHz
BAND : H19 Group 3 Channel 1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1084.55	H	52.7		-59.8	1.8	2.7	-60.7	65.8	30
1084.55	V	38.7		-72.0	1.8	2.7	-72.9	78.0	30
1626.83	H	37.8		-77.2	3.8	3.3	-76.8	81.8	30
1626.83	V	35.9		-73.4	3.8	3.3	-73.0	78.0	30
2169.10	H	35.3		-63.0	3.2	3.9	-63.7	68.7	30
2169.10	V	35.7		-64.8	3.2	3.9	-65.5	70.5	30
2711.38	H	32.8	*	-73.2	3.9	4.4	-73.7	78.8	30
2711.38	V	32.3	*	-73.7	3.9	4.4	-74.2	79.3	30
3253.65	H	32.6	*	-71.5	5.5	4.9	-70.9	75.9	30
3253.65	V	34.8		-69.8	5.5	4.9	-69.2	74.2	30
3795.93	H	31.9	*	-71.6	6.4	5.2	-70.4	75.4	30
3795.93	V	31.7	*	-71.7	6.4	5.2	-70.5	75.5	30
4338.20	H	30.0	*	-72.4	7.0	5.6	-71.0	76.0	30
4338.20	V	30.6	*	-71.8	7.0	5.6	-70.4	75.4	30
4880.48	H	31.4	*	-69.3	7.1	5.8	-68.1	73.1	30
4880.48	V	31.4	*	-69.3	7.1	5.8	-68.1	73.2	30
5422.75	H	32.9	*	-66.8	7.7	6.2	-65.3	70.3	30
5422.75	V	32.0	*	-67.7	7.7	6.2	-66.2	71.2	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1133.00	H	51.3		-63.0	1.6	2.8	-64.2	69.2	18
1133.00	V	50.5		-63.8	1.6	2.8	-65.0	70.0	18
1699.50	H	49.4	*	-64.4	3.4	3.4	-64.4	69.5	18
1699.50	V	49.6	*	-63.8	3.4	3.4	-63.8	68.9	18
2266.00	H	49.4	*	-58.2	3.4	4.0	-58.8	63.8	18
2266.00	V	49.1	*	-64.2	3.4	4.0	-64.8	69.8	18
2832.50	H	47.6	*	-65.6	4.5	4.5	-65.6	70.7	18
2832.50	V	48.7	*	-58.2	4.5	4.5	-58.2	63.3	18
3399.00	H	46.8	*	-66.4	5.8	5.0	-65.6	70.7	18
3399.00	V	47.6	*	-63.0	5.8	5.0	-62.2	67.3	18
3965.50	H	47.5	*	-63.0	6.5	5.3	-61.8	66.9	18
3965.50	V	47.5	*	-59.6	6.5	5.3	-58.4	63.5	18
4532.00	H	47.7	*	-55.6	6.9	5.7	-54.3	59.4	18
4532.00	V	48.0	*	-58.8	6.9	5.7	-57.5	62.6	18
5098.50	H	46.6	*	-64.2	7.5	6.0	-62.7	67.8	18
5098.50	V	46.8	*	-59.6	7.5	6.0	-58.1	63.2	18
5665.00	H	47.8	*	-55.6	8.2	6.3	-53.7	58.8	18
5665.00	V	48.0	*	-55.2	8.2	6.3	-53.3	58.4	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 566.5MHz
BAND : H19 Group 3 Channel 10

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1133.00	H	52.1		-57.2	1.6	2.8	-58.4	63.4	30
1133.00	V	38.5		-73.0	1.6	2.8	-74.2	79.2	30
1699.50	H	36.2		-71.0	3.4	3.4	-71.0	76.1	30
1699.50	V	35.4		-76.2	3.4	3.4	-76.2	81.3	30
2266.00	H	34.5		-75.4	3.4	4.0	-76.0	81.0	30
2266.00	V	36.7		-70.4	3.4	4.0	-71.0	76.0	30
2832.50	H	33.1		-68.2	4.5	4.5	-68.2	73.3	30
2832.50	V	35.2		-71.6	4.5	4.5	-71.6	76.7	30
3399.00	H	32.1	*	-73.1	5.8	5.0	-72.3	77.4	30
3399.00	V	36.1		-65.6	5.8	5.0	-64.8	69.9	30
3965.50	H	32.1	*	-71.5	6.5	5.3	-70.4	75.4	30
3965.50	V	33.1	*	-70.6	6.5	5.3	-69.4	74.5	30
4532.00	H	31.6	*	-70.1	6.9	5.7	-68.8	73.8	30
4532.00	V	30.3	*	-71.4	6.9	5.7	-70.1	75.2	30
5098.50	H	30.7	*	-69.8	7.5	6.0	-68.3	73.3	30
5098.50	V	31.0	*	-69.4	7.5	6.0	-67.9	73.0	30
5665.00	H	31.2	*	-67.6	8.2	6.3	-65.7	70.8	30
5665.00	V	32.1	*	-66.8	8.2	6.3	-64.9	70.0	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 571.675MHz
BAND : H19 Group 2 Channel 12

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1143.35	H	57.3		-61.6	1.5	2.8	-62.9	67.9	18
1143.35	V	51.3		-63.4	1.5	2.8	-64.7	69.7	18
1715.03	H	47.7	*	-66.4	3.3	3.4	-66.6	71.6	18
1715.03	V	49.5	*	-63.0	3.3	3.4	-63.2	68.2	18
2286.70	H	49.1	*	-64.2	3.5	4.0	-64.7	69.7	18
2286.70	V	49.6	*	-62.6	3.5	4.0	-63.1	68.1	18
2858.38	H	48.5	*	-63.8	4.6	4.5	-63.7	68.8	18
2858.38	V	48.6	*	-55.8	4.6	4.5	-55.7	60.8	18
3430.05	H	48.5	*	-62.8	5.7	5.0	-62.0	67.1	18
3430.05	V	48.1	*	-58.4	5.7	5.0	-57.6	62.7	18
4001.73	H	48.1	*	-58.0	6.6	5.4	-56.8	61.8	18
4001.73	V	47.5	*	-58.6	6.6	5.4	-57.4	62.4	18
4573.40	H	47.1	*	-52.6	6.9	5.7	-51.3	56.4	18
4573.40	V	46.8	*	-58.6	6.9	5.7	-57.3	62.4	18
5145.08	H	46.4	*	-65.6	7.5	6.0	-64.1	69.1	18
5145.08	V	47.2	*	-58.0	7.5	6.0	-56.5	61.5	18
5716.75	H	46.8	*	-57.4	8.1	6.4	-55.7	60.7	18
5716.75	V	47.3	*	-56.4	8.1	6.4	-54.7	59.7	18

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : Shure Inc.
MODEL : MX890 Wireless Microphone Transmitters
SPECIFICATION : RSS-210 Spurious Radiated Emissions
DATE : June 13-18, 2016
MODE : Transmit at 571.675MHz
BAND : H19 Group 2 Channel 12

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	RSS-210 Min. Attn. dB
1143.35	H	55.5		-52.0	1.5	2.8	-53.3	58.3	30
1143.35	V	39.9		-70.0	1.5	2.8	-71.3	76.3	30
1715.03	H	41.7		-58.6	3.3	3.4	-58.8	63.8	30
1715.03	V	34.1		-76.2	3.3	3.4	-76.4	81.4	30
2286.70	H	33.5		-75.4	3.5	4.0	-75.9	80.9	30
2286.70	V	36.9		-70.8	3.5	4.0	-71.3	76.3	30
2858.38	H	32.7	*	-73.1	4.6	4.5	-73.0	78.1	30
2858.38	V	35.4		-72.0	4.6	4.5	-71.9	77.0	30
3430.05	H	32.8	*	-72.1	5.7	5.0	-71.4	76.4	30
3430.05	V	32.8	*	-72.2	5.7	5.0	-71.4	76.5	30
4001.73	H	31.6	*	-72.2	6.6	5.4	-70.9	76.0	30
4001.73	V	31.7	*	-72.1	6.6	5.4	-70.8	75.9	30
4573.40	H	31.4	*	-70.0	6.9	5.7	-68.7	73.8	30
4573.40	V	30.9	*	-70.5	6.9	5.7	-69.3	74.3	30
5145.08	H	31.7	*	-68.5	7.5	6.0	-67.0	72.0	30
5145.08	V	32.0	*	-68.1	7.5	6.0	-66.6	71.7	30
5716.75	H	31.4	*	-67.1	8.1	6.4	-65.4	70.4	30
5716.75	V	32.0	*	-66.6	8.1	6.4	-64.8	69.9	30

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY Richard E. King :

Richard E. King