Intermodulation Radiated Emissions From a Model ADX2FD Digitally Modulated Handheld Microphone and a Model AD651B Talk Switch

For	Shure Incorporated 5800 West Touhy Avenue Niles, IL 60714
P.O. Number	4500398308
Date Tested	July 31, 2018 through August 7, 2018
Test Personnel	Mark Longinotti
Test Specification	FCC "Code of Federal Regulations" Title 47 Part 74 Subpart H, Section 74.861 FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Digital Modulation Intentional Radiators Operating within the band 2400-2483.5MHz

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THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF ELITE ELECTRONIC ENGINEERING INCORPORATED.

REVISION HISTORY

Revision	Date	Description
—	16 August 2018	Initial release

Measurement of Intermodulation Radiated Emissions from a Digitally Modulated Handheld Microphone, Model No. ADX2FD and a Talk Switch Model No. AD651B

1. INTRODUCTION

1.1. Scope of Tests

This document represents the results of the intermodulation radiated emissions measurements performed on a Shure Incorporated Digitally Modulated Handheld Microphone, Model No. ADX2FD, and a Shure Incorporated Talk Switch, Model No. AD651B(hereinafter referred to as the Equipment Under Test (EUTs)). The EUTs were manufactured and submitted for testing by Shure Incorporated located in Niles, IL.

The ADX2FD Digitally Modulated Handheld Microphone contained a transmitter that was designed to transmit in the following UHF frequency bands using an internal, non-removable antenna:

Band	Frequency (MHz)	Serial No. Used for Radiated Emissions Tests	FCC Rule Part	Mode	Output Power (mW)
G57	470.125 – 607.875	274	74.861	Non-Diversity	2,10, 50
G57	470.125 – 607.875	274	74.861	Diversity	2,10, 20
X55	941.625 – 951.875	185	74.861	Non-Diversity	2,10, 50
X55	941.625 – 951.875	185	74.861	Diversity	2,10
X55	952.975 – 956.125	185	74.861	Non-Diversity	2,10, 50
X55	952.975 – 956.125	185	74.861	Diversity	2,10
X55	956.575 – 959.725	185	74.861	Non-Diversity	2,10, 50
X55	956.575 - 959.725	185	74.861	Diversity	2,10

The ADX2FD Digitally Modulated Handheld Microphone also contained a digital modulation Zigbee transceiver. The transceiver was designed to transmit and receive in the 2400-2483.5 MHz band using an internal, non-removable antenna.

- See Elite Electronic Engineering, Inc. Engineering Test Report No. 1703407-01 for compliance testing on the ADX2FD Digitally Modulated Handheld Microphone UHF transmitter in the G57 band and the intermodulation testing on the UHF transmitter and Zigbee transmitter.

- See Elite Electronic Engineering, Inc. Engineering Test Report No. 1800007-03 for compliance testing on the ADX2FD Digitally Modulated Handheld Microphone UHF transmitter in the X55 band and the intermodulation testing on the UHF transmitter and Zigbee transmitter.

- See Elite Electronic Engineering, Inc. Engineering Test Report No. 1703407-02 for compliance testing on the ADX2FD Digitally Modulated Handheld Microphone Zigbee transceiver.

The AD651B Talk Switch contained a digital modulation Zigbee transmitter. The transmitter was designed to transmit in the 2400 -2483.5MHz band using an internal, non-removable antenna:

Model No.	Serial No.	Channel No.	Frequency MHz
AD651B	4181023003	26	2480

- See Elite Electronic Engineering, Inc. Engineering Test Report No. 1801451-01 for compliance testing on the AD651B Talk Switch Zigbee transmitter.

1.2. Purpose

The test series was performed to determine if the EUTs would meet the intermodulation requirements of FCC Part 74, Subpart H, Section 861, for low power auxiliary station. Testing was performed in accordance with ETSI EN 300 422-1 v1.4.2 and IEEE C63.26-2015.

The test series was also performed to determine if the EUTs would meet the intermodulation requirements of FCC Part 15, Subpart C, Section 247 for Intentional Radiators Operating within the 2400-2483.5 MHz band. Testing was performed in accordance with and IEEE C63.10-2013.

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

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the American Association for Laboratory Accreditation (A2LA), A2LA Lab Code: 1786-01.

1.5. Laboratory Conditions

The temperature at the time of the test was 23°C and the relative humidity was 44%.

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, Subpart H, Section 861

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2
-
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C, Section 247

- ETSI EN 300 422-1 V1.4.2 (2011-08) “Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement "

- IEEE C63.10-2014 “American National Standard of Procedures for Compliance Testing of
- Unlicensed Wireless Devices”

- IEEE C63.26-2015 “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services Accredited by the American National Standards Institute”

- Federal Communications Commission Office of Engineering and Technology Laboratory Division Basis Certification Requirements for Wireless Microphones dated December 13, 2017

3. EUT SETUP AND OPERATION

3.1. General Description

The EUTs are a Shure Incorporated, Digitally Modulated Handheld Microphone, Model No. ADX2FD and a Shure Incorporated Talk Switch, Model No. AD651B . A block diagram of the EUT setup is shown as Figure 1. Photographs of the EUTs are shown as Figure 2 and Figure 3.

3.1.1. Power Input

The Digitally Modulated Handheld Microphone, Model No. ADX2FD, was powered by 3.6VDC from a removable, rechargeable Li-ion Battery Pack, Shure Model No.: SB920.The Shure Incorporated Talk Switch, Model No. AD651B was powered by 1.55VDC from a removable 357/303 coin cell battery.

3.1.2. Peripheral Equipment

The following peripheral equipment was submitted with the EUT:

Item	Description
Shure SM58 Microphone	Connected to the microphone port of the EUT for all radiated emissions tests.

3.1.3. Signal Input/Output Leads

No interconnect cables were submitted with the EUT.

3.1.4. Grounding

The EUT was not grounded.

3.1.5. Frequency of EUT

Per the Federal Communications Commission Office of Engineering and Technology Laboratory Division, Basis Certification Requirements for Wireless Microphones dated December 13, 2017, section III, Additional Specific Guidance for Licensed Wireless Microphones Under Part 74, paragraph (c), spurious emissions shall be investigated up to the 10th harmonic of the fundamental.

Per the Federal Communications Commission Office of Engineering and Technology Laboratory Division, Basis Certification Requirements for Wireless Microphones dated December 13, 2017, section IV, Additional Specific Guidance for Unlicensed (Part 15) Wireless Microphones, paragraph (d), spurious emissions shall be investigated up to the 10th harmonic of the fundamental.

3.2. Software

For all tests, the AD651B Talk Switch had Firmware Version BH_FOB_0_0_0_13 loaded onto the device to provide correct load characteristics.

3.3. Operational Mode

For intermodulation tests, the unit was programmed to operate in each of the following modes:

G57:

- ADX2FD: Channel 1:Transmit at 470.125MHz, 20mW,
  Channel 2: Transmit at 607.875MHz, 20mW, Diversity On
  Zigbee Transmit at 2445MHz (Ch. 19) mid power level
- AD651B: Transmit at 2480MHz (Ch. 26), zbpwr = 19

- ADX2FD: Channel 1:539MHz, 50mW
  Channel 2: Off Diversity Off
  Zigbee Transmit at 2445MHz (Ch. 19) mid power level
- AD651B: Transmit at 2480MHz (Ch. 26), zbpwr = 19

X55:

- ADX2FD: Channel 1: Transmit at 941.625MHz, 10mW
  Channel 2: Transmit at 959.725MHz, 10mW
  Zigbee Transmit at 2445MHz (Ch. 19) mid power level

- AD651B: Transmit at 2480MHz (Ch. 26), zbpwr = 19

- ADX2FD: Channel 1: Transmit at 958.150MHz, 50mW
  Channel 2: Off, Diversity Off
  Zigbee Transmit at 2445MHz (Ch. 19) mid power level
- AD651B: Transmit at 2480MHz (Ch. 26), zbpwr = 19

3.4. 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 C63.4-2014 and CISPR 16 for site attenuation.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

4.3. Calibration Traceability

Test equipment is maintained and calibrated on a regular basis with a calibration interval not greater than two years. 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:

Conducted Emissions Measurements		
Combined Standard Uncertainty	1.06	-1.06
Expanded Uncertainty (95% confidence)	2.12	-2.12

Radiated Emissions Measurements		
Combined Standard Uncertainty	2.09	-2.09
Expanded Uncertainty (95% confidence)	4.19	-4.19

5. TEST PROCEDURES

5.1. Intermodulation – Radiated Emissions

5.1.1. Requirements

Per a response to Inquiry to FCC (tracking number 294618), intermodulation testing must be performed on the EUT with simultaneous transmission of the worst case UHF transmitter and the worst case Part 15 (Zigbee) transmitter. Any intermodulation of the UHF transmitter and the Part 15.247 (Zigbee) transmitter must meet the appropriate requirements of 15.247, the appropriate requirements of 15.236(g), the appropriate requirements of 74.861(d)(4)(ii), and the appropriate requirements of 74.861(e)(7) for spurious emissions.

Per section 15.247(c), the spurious emissions in any 100 kHz BW outside the frequency band must be at least 20dB below the highest 100 kHz BW level measured within the band.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Paragraph 15.209(a) has the following radiated emission limits:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

Per 15.236(g), 74.861(d)(4)(ii), and 74.861(e)(7) emissions outside of the band from one megahertz below to one megahertz above the carrier frequency shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08). Per ETSI EN 300 422-1 v1.4.2 section 8.4, the power of the spurious emissions from an ETSI EN 300 422-1 transmitter shall not exceed the following limits:

State	Frequency		
	47MHz to 74MHz 87.5MHz to 137MHz 174 to 230MHz 470MHz to 862MHz	Other Frequencies below 1000MHz	Frequencies above 100MHz
Operation	4nW or -54dBm	250nW or -36dBm	1uW or -30dBm
Standby	2nW or -57dBm	2nW or -57dBm	20nW or -47dBm

5.1.2. Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. 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 emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 25MHz to 25GHz was investigated using a peak detector function.

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 25MHz 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 test item 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.

5.1.3. Results

Preliminary radiated emissions plots with the EUT transmitting at the worst case UHF transmitter frequency and the worst case Part 15 (Zigbee) transmitter frequency simultaneously are shown on pages 16 through 39. As can be seen from the data, addition of the AD651B Talk Switch to the ADX2FDDigitally Modulated Handheld Microphone did not generate additional spurious radiated emissions due to the intermodulation product of simultaneous transmissions from the EUTs. Since no intermodulation product was seen below 18GHz, no testing was performed above 18GHz.

6. Other Test Conditions

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

6.2. Disposition of the EUT

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

7. Conclusions

The Shure Incorporated Digitally Modulated Handheld Microphone, Model No. ADX2FD and Shure Incorporated Talk Switch, Model No. AD651B did fully meet the intermodulation radiated emissions requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.247 and Part 74, Subpart H, Section 74.861, and response to Inquiry to FCC (tracking number 294618), when tested per ETSI EN 300 422-1 V1.4.2 (2011-08), IEEE C63.10-2014, and IEEE C63.26-2015.

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 specifications.

The data presented in this test report pertains 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.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST or any agency of the Federal Government.

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW10	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL9609/1139	1GHZ-20GHZ	4/5/2018	4/5/2019
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	9/11/2017	9/11/2018
NWQ0	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66657	1GHZ-18GHZ	5/31/2018	5/31/2020
RBG2	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101591	2HZ-44GHZ	2/23/2018	2/23/2019
XPQ4	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000-O/O	1	4.8-20GHZ	9/12/2017	9/12/2019

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.

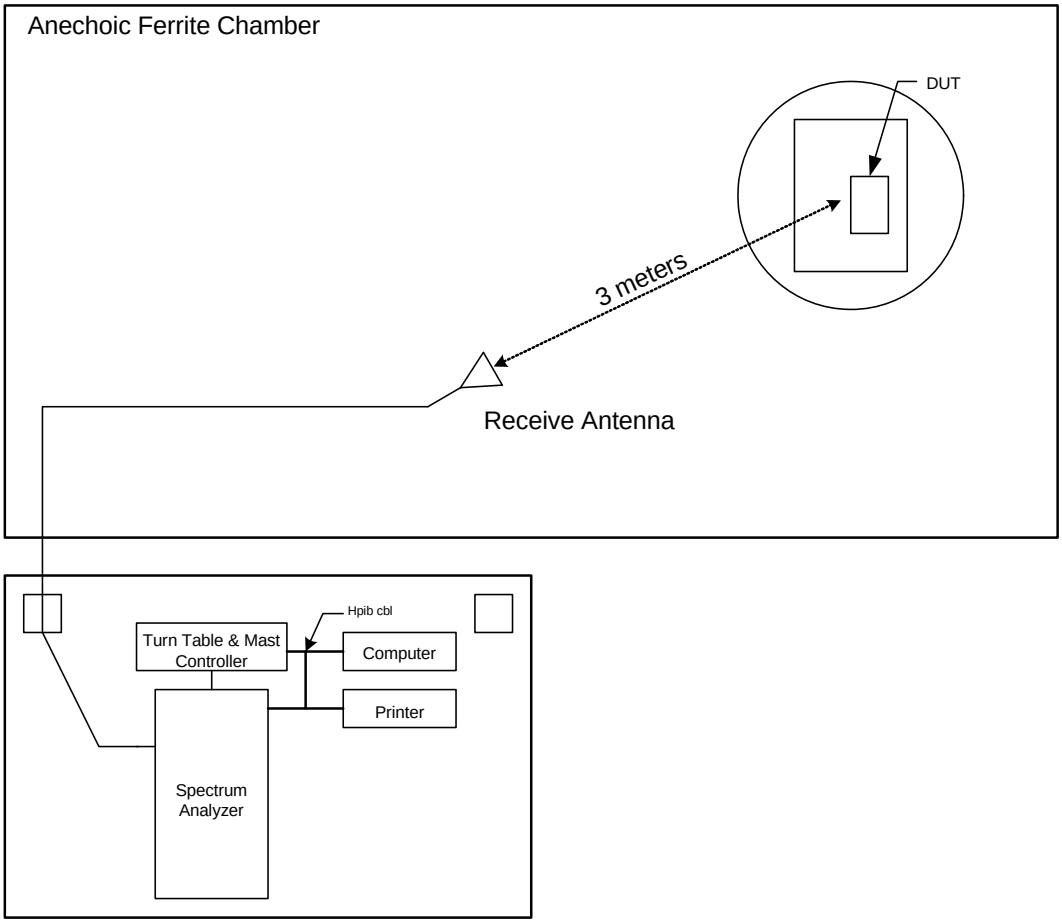


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2

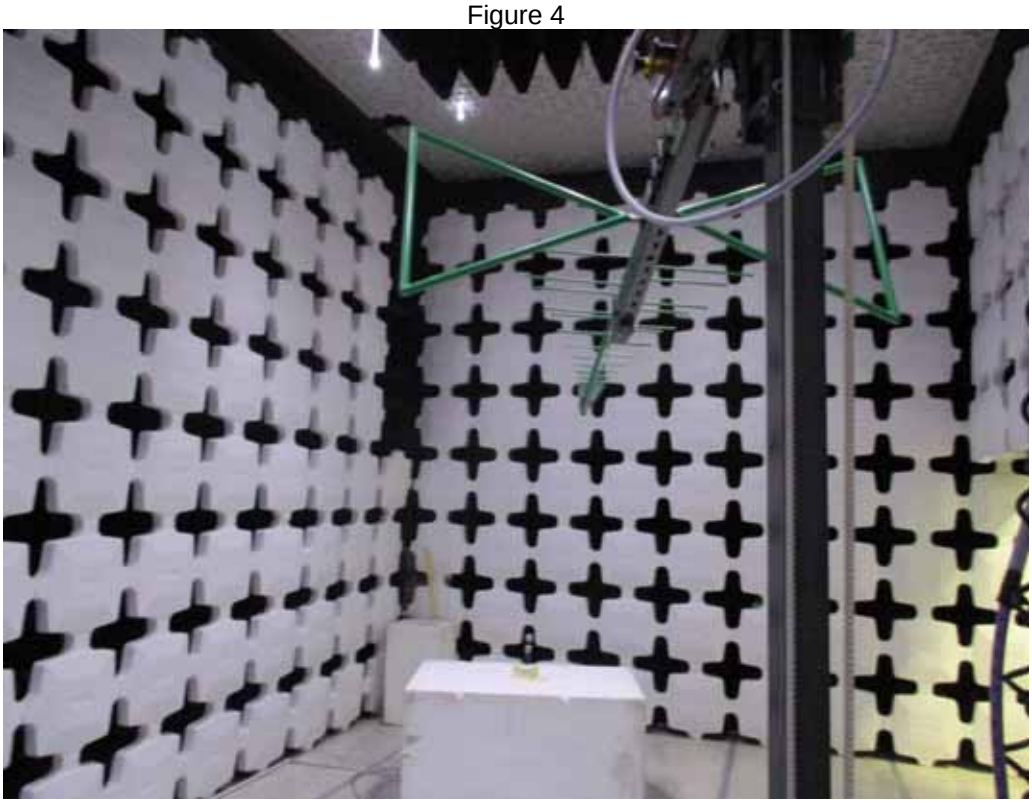
Photograph of the ADX2FD Digitally Modulated Handheld Microphone

Photograph of the AD651B Talk Switch

Figure 3

Photograph of the AD651B Talk Switch inserted in the ADX2FD Digitally Modulated Handheld Microphone

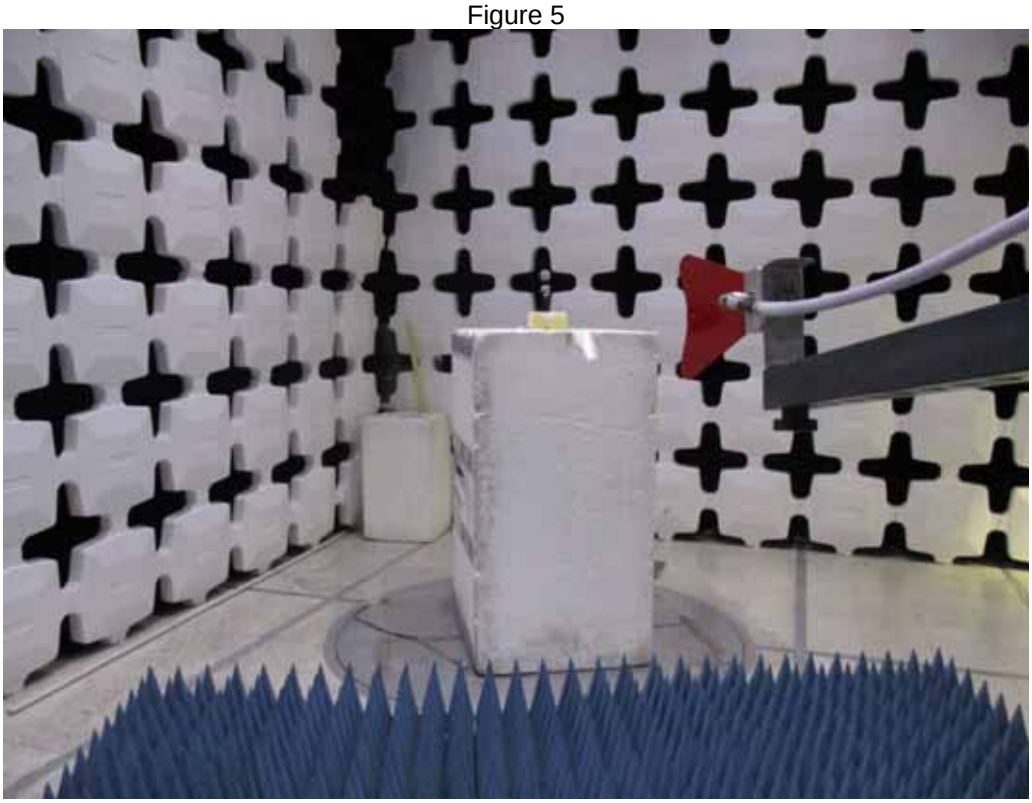
Figure 4



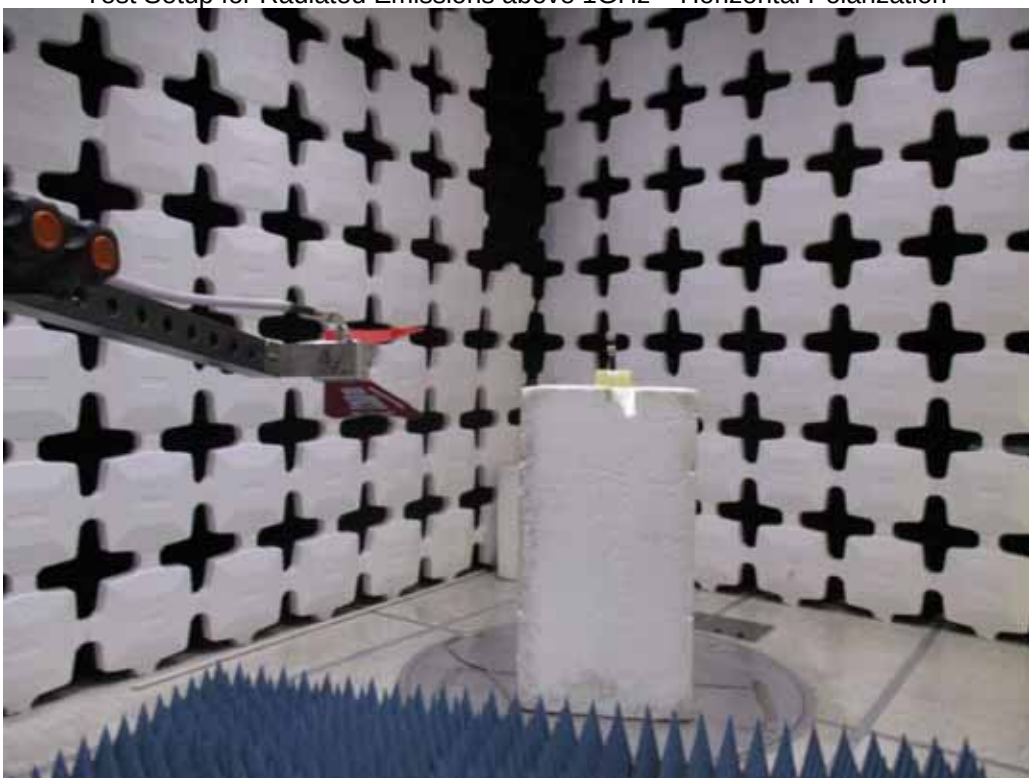
Test Setup for Radiated Emissions, 25MHz to 1GHz – Horizontal Polarization

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

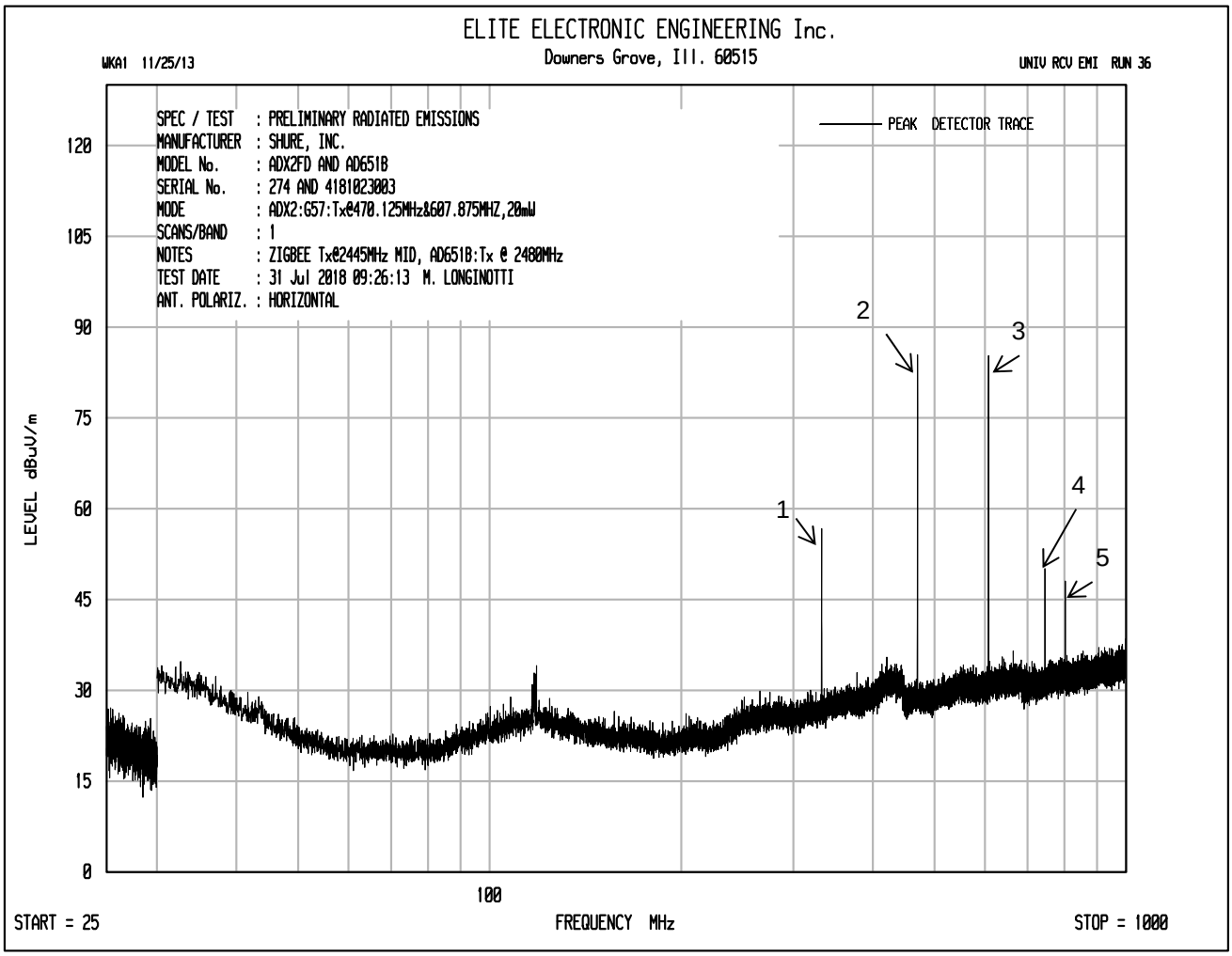
Figure 5



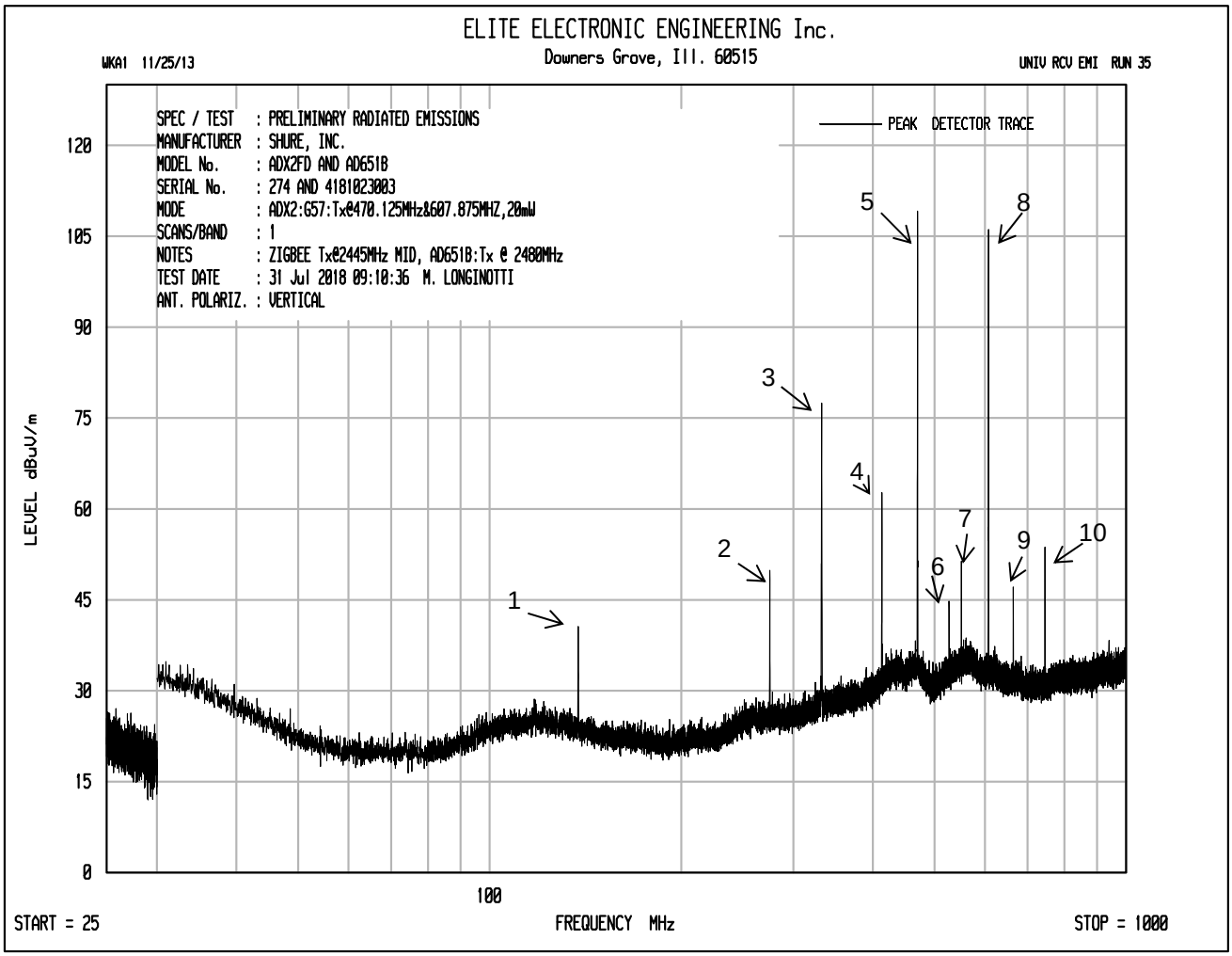
Test Setup for Radiated Emissions above 1GHz – Horizontal Polarization



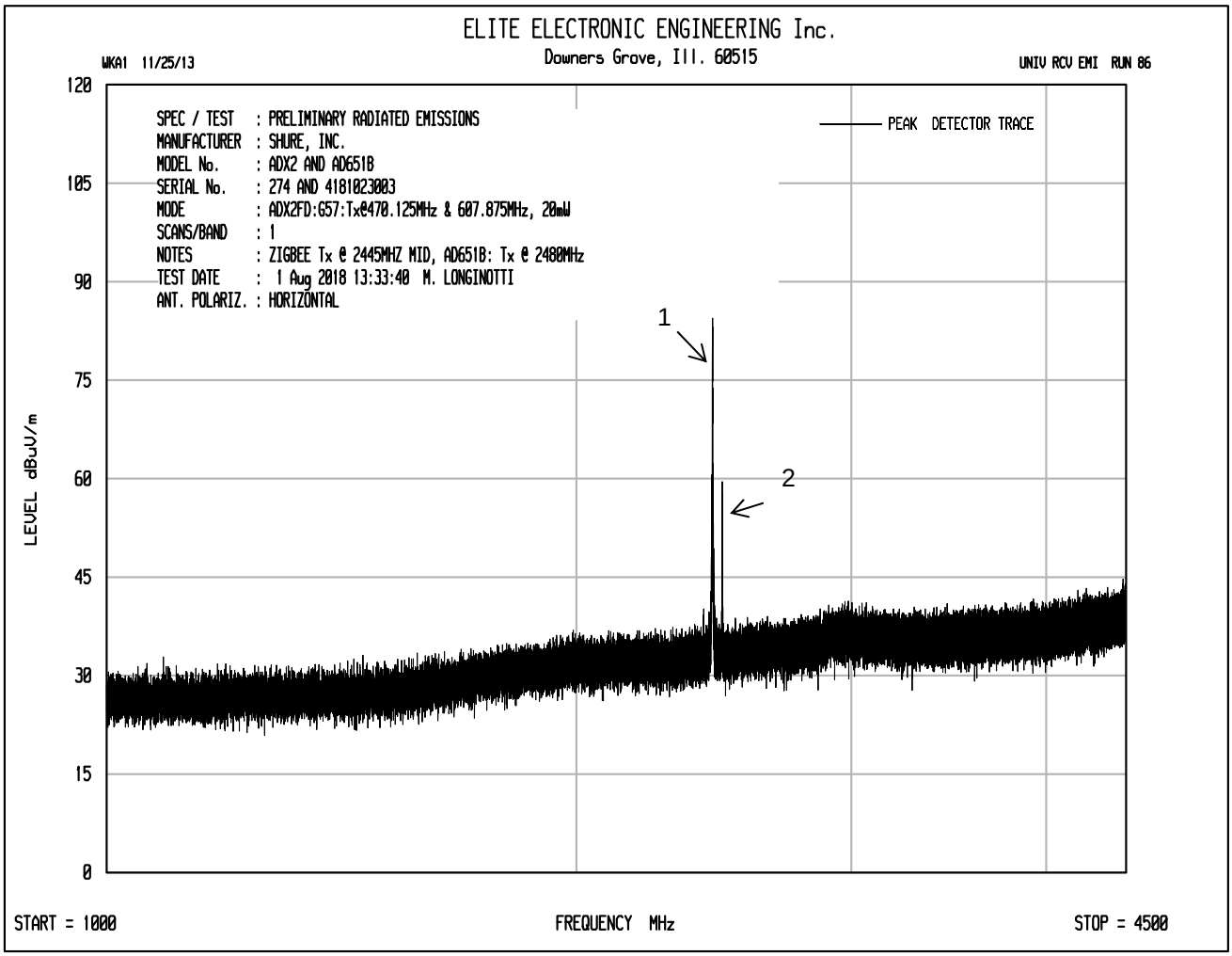
Test Setup for Radiated Emissions above 1GHz – Vertical Polarization



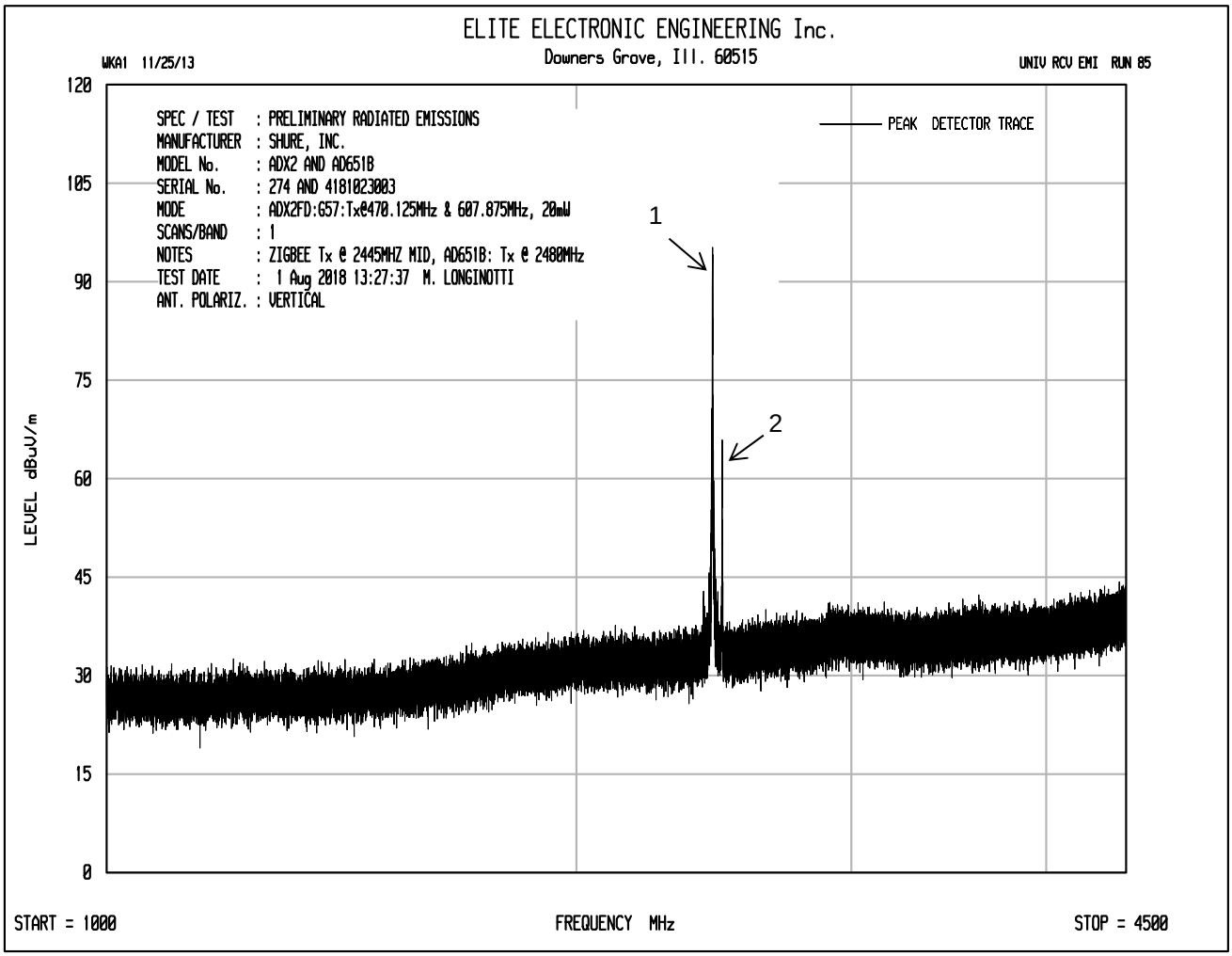
1 - Plot shows emissions at 332.375MHz (2x 470.125MHz – 607.875MHz)
2 - Plot shows emissions at 470.125MHz from UHF transmitter.
3 - Plot shows emissions at 607.875MHz from UHF transmitter.
4 - Plot shows emissions at 745.625MHz (2x 607.875MHz – 470.125MHz)
5 - Plot shows emissions at 802.500MHz (3x 470.125MHz – 2 x 607.875MHz)



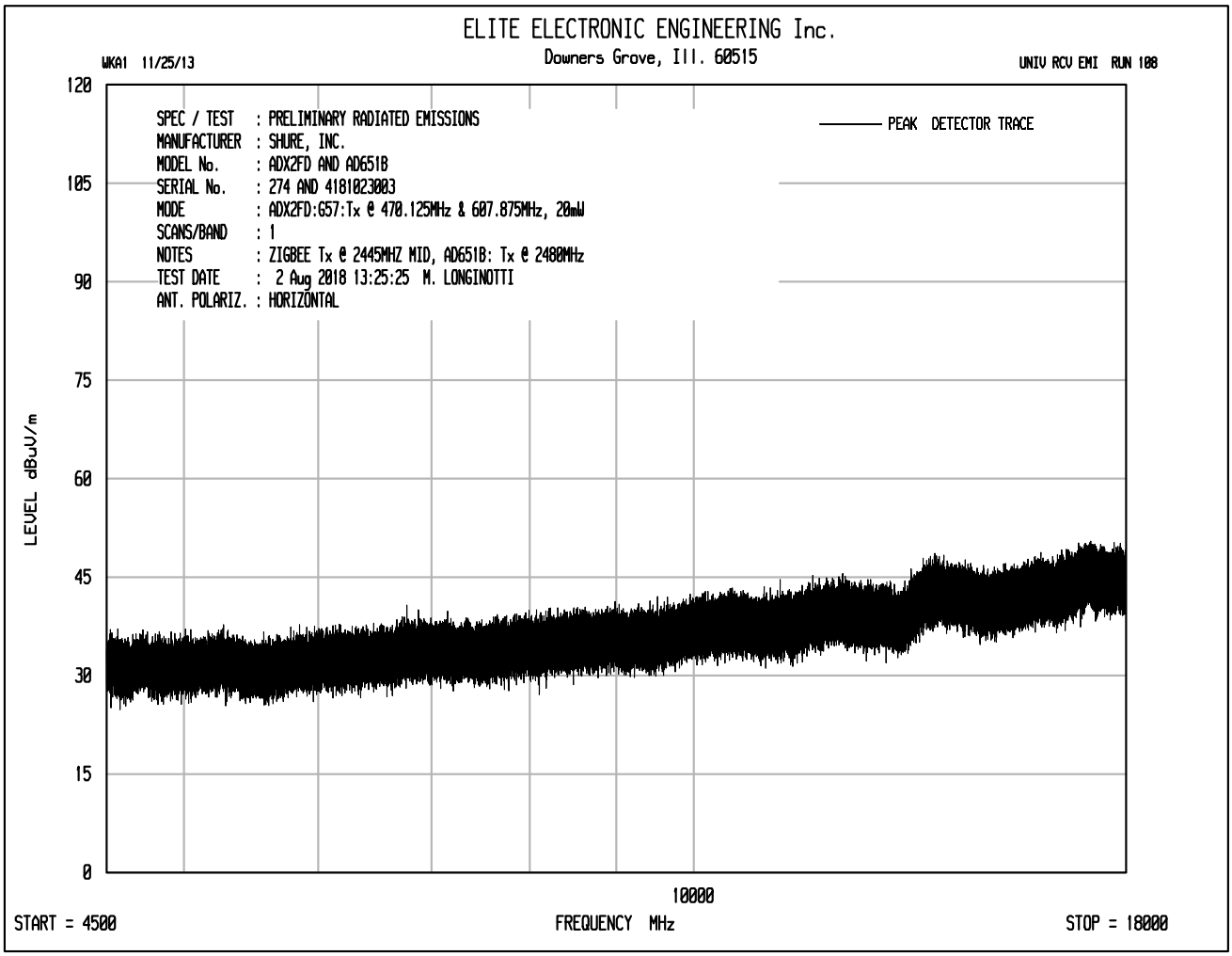
1 – Plot shows emissions at 137.750MHz (607.875MHz – 470.125MHz)
2 – Plot shows emissions at 275.500MHz (2 x 607.875MHz – 2 x 470.125MHz)
3 - Plot shows emissions at 332.375MHz (2x 470.125MHz – 607.875MHz)
4 – Plot shows emissions at 413.250MHz (3 x 607.875MHz – 3 x 470.125MHz)
5 - Plot shows emissions at 470.125MHz from UHF transmitter.
6 – Plot shows emissions at 527.000MHz (5 x 470.125MHz – 3 x 607.875MHz)
7 – Plot shows emissions at 551.000MHz (4 x 607.875MHz – 4 x 470.125MHz)
8 - Plot shows emissions at 607.875MHz from UHF transmitter.
9 - Plot shows emissions at 664.750MHz (4 x 470.125MHz – 2 x 607.875MHz)
10 - Plot shows emissions at 745.625MHz (2x 607.875MHz – 470.125MHz)

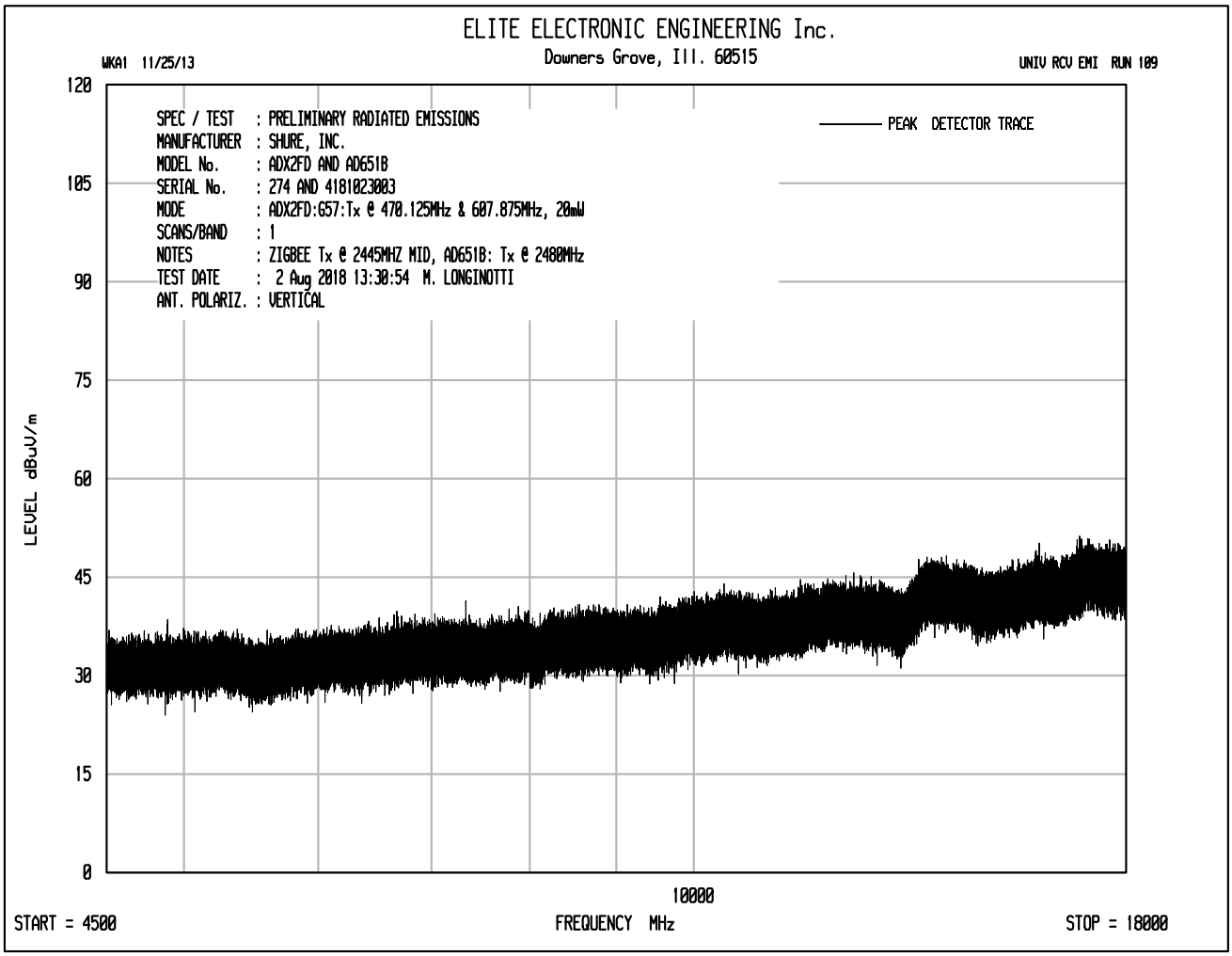


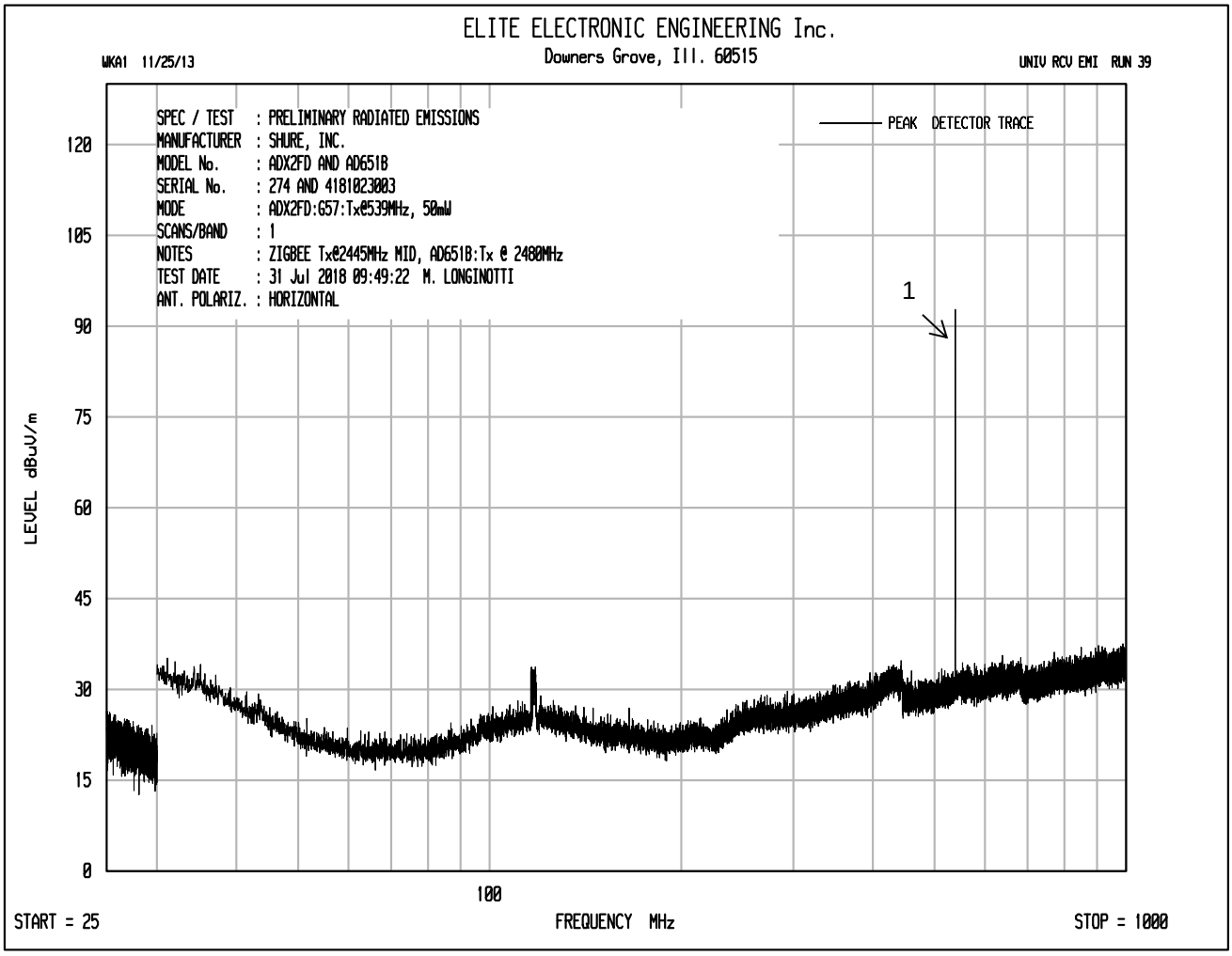
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.



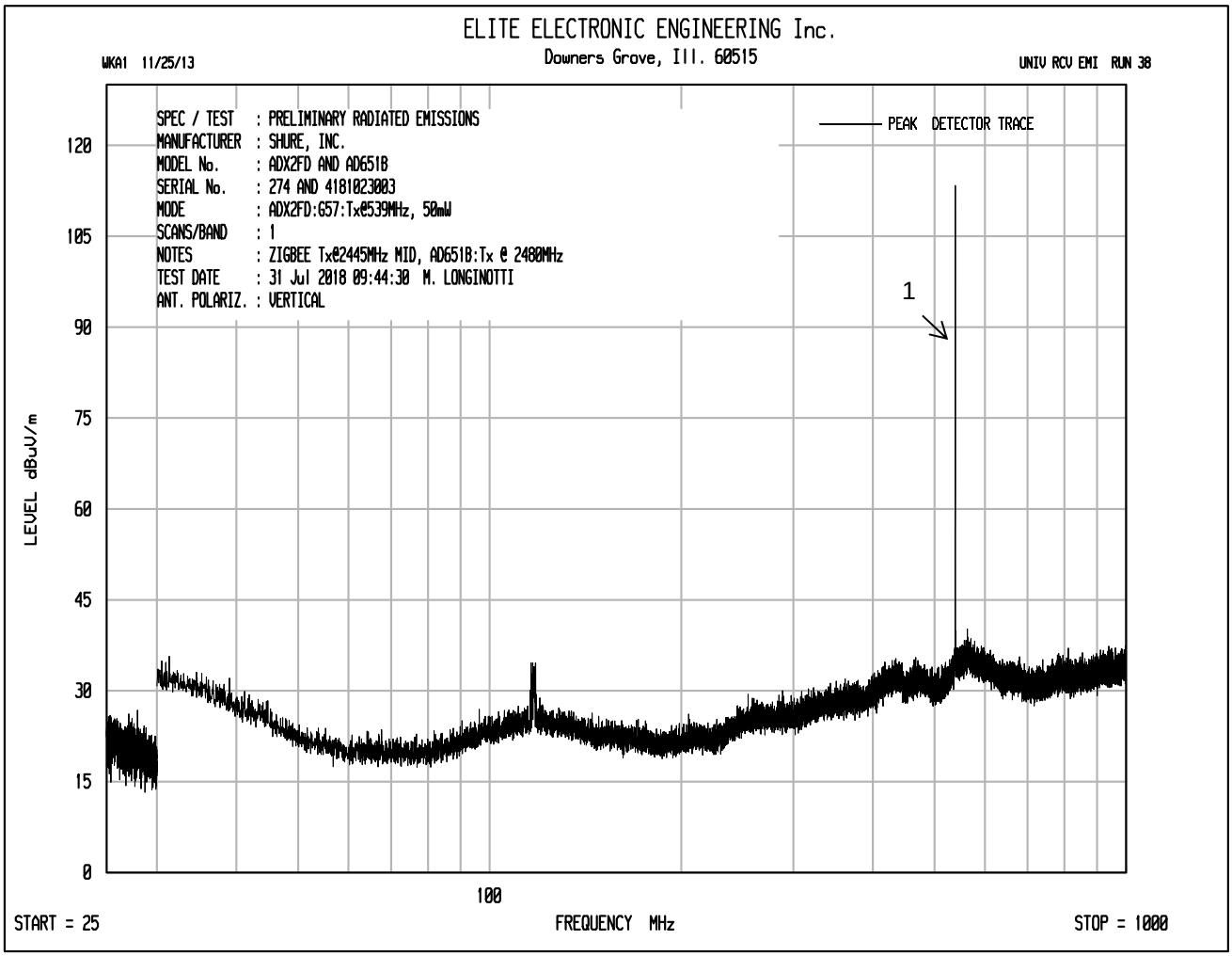
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 108
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 274 AND 4181023003
MODE : ADX2FD:G57:Tx @ 470.125MHz & 607.875MHz, 20mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHZ MID, AD651B: Tx @ 2480MHz
TEST DATE : 2 Aug 2018 13:25:25 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000

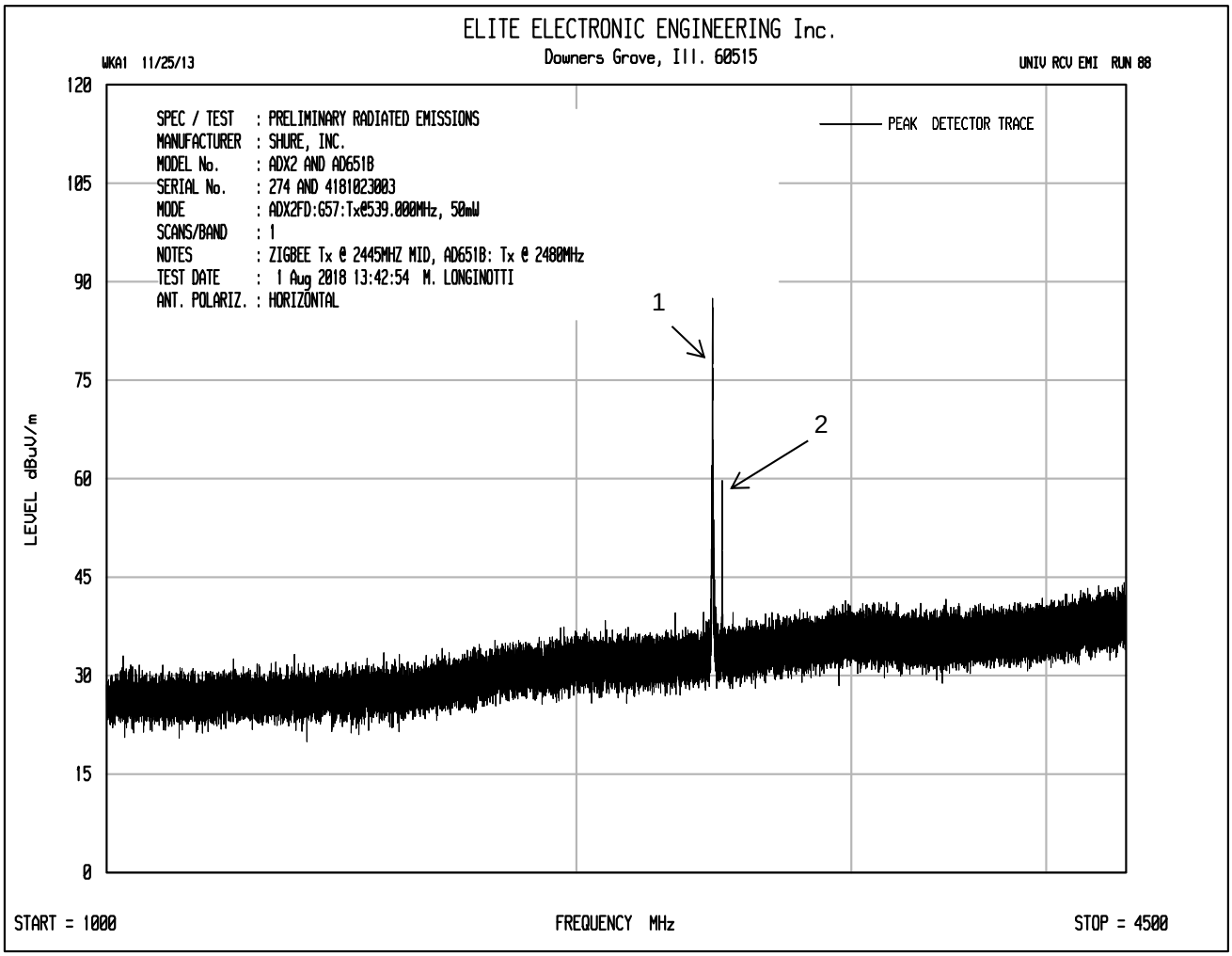

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 109
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 274 AND 4181023003
MODE : ADX2FD:G57:Tx @ 470.125MHz & 607.875MHz, 20mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHZ MID, AD651B: Tx @ 2480MHz
TEST DATE : 2 Aug 2018 13:30:54 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000



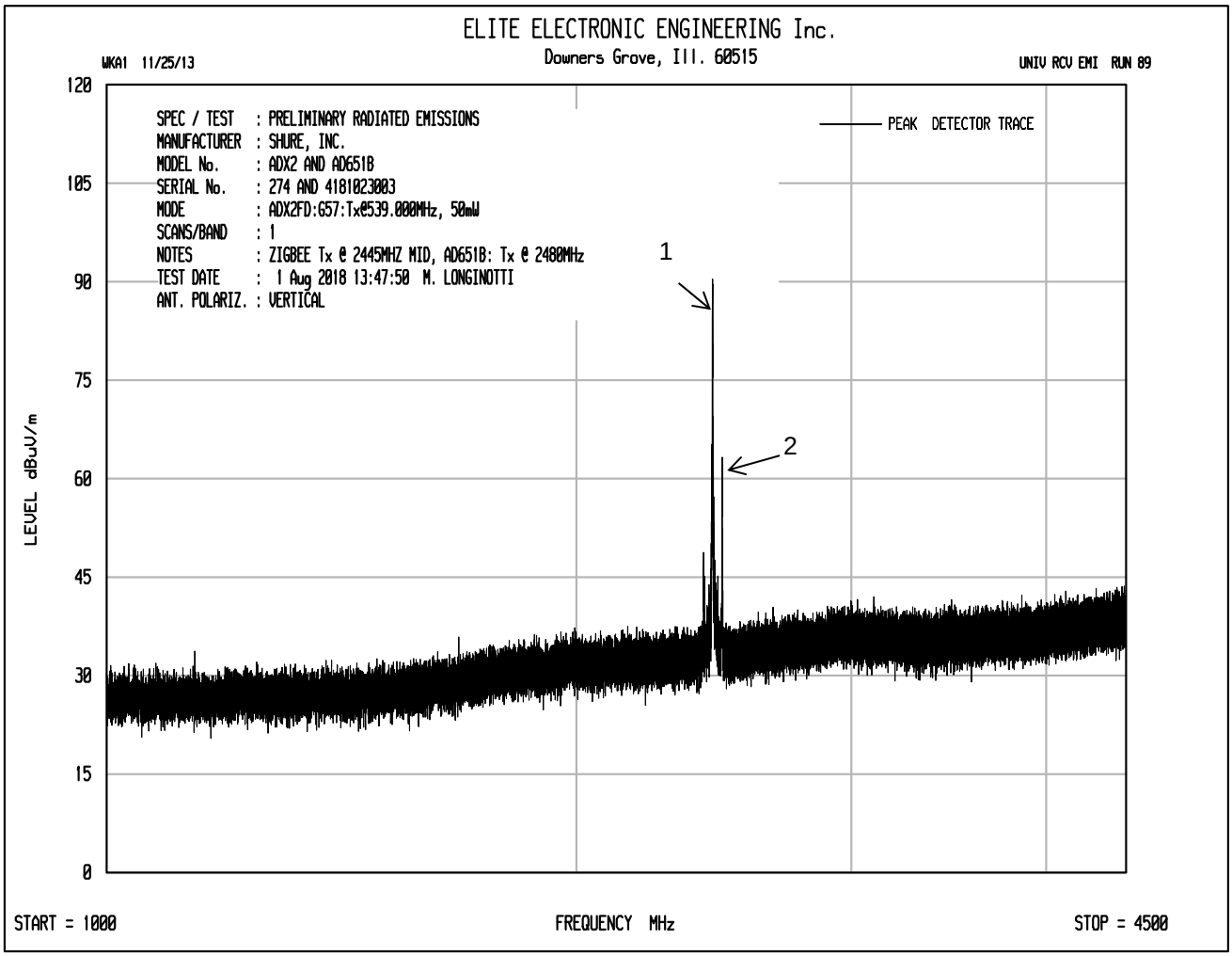
1 - Plot shows emissions at 539.000MHz from UHF transmitter.



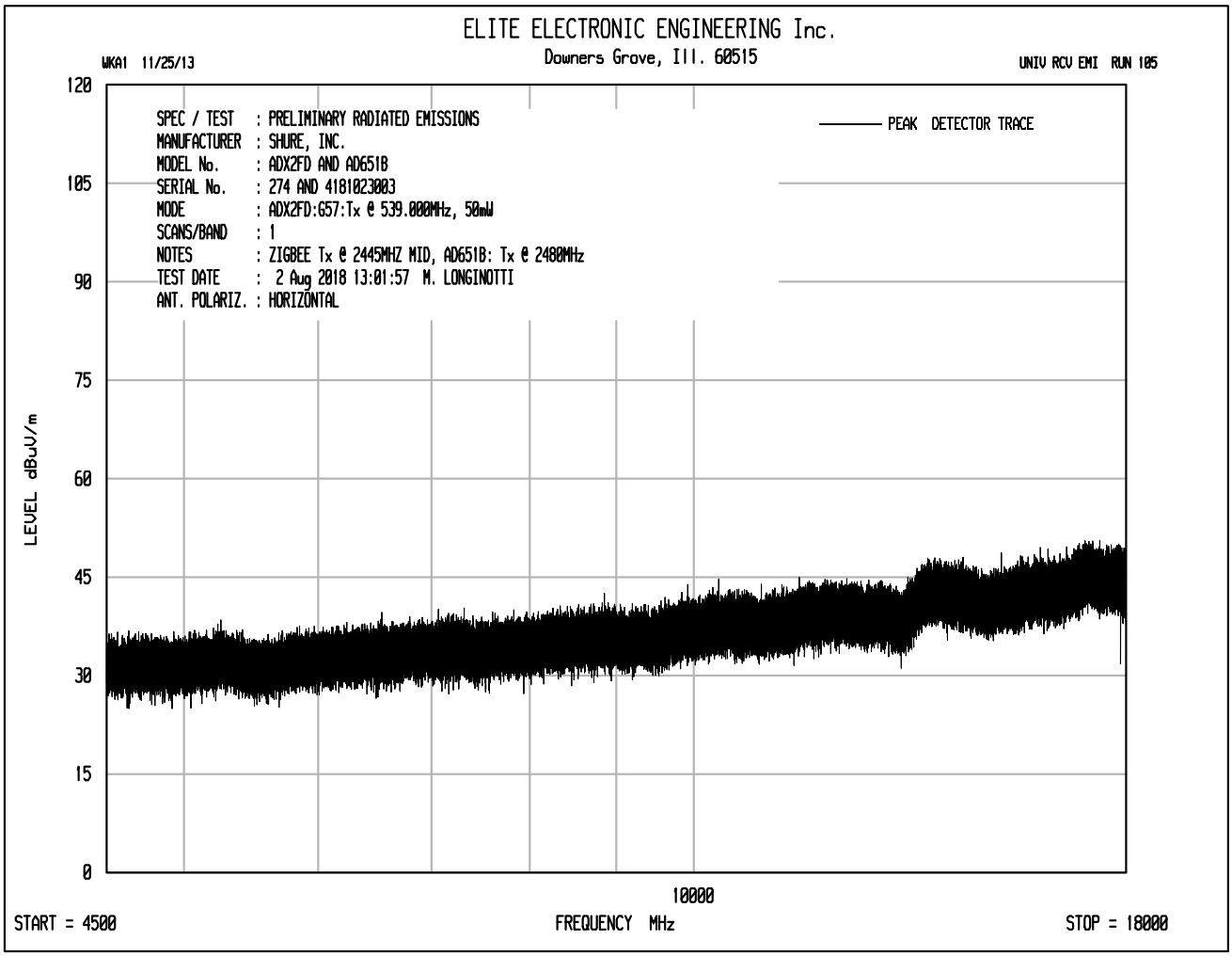
1 - Plot shows emissions at 539.000MHz from UHF transmitter.

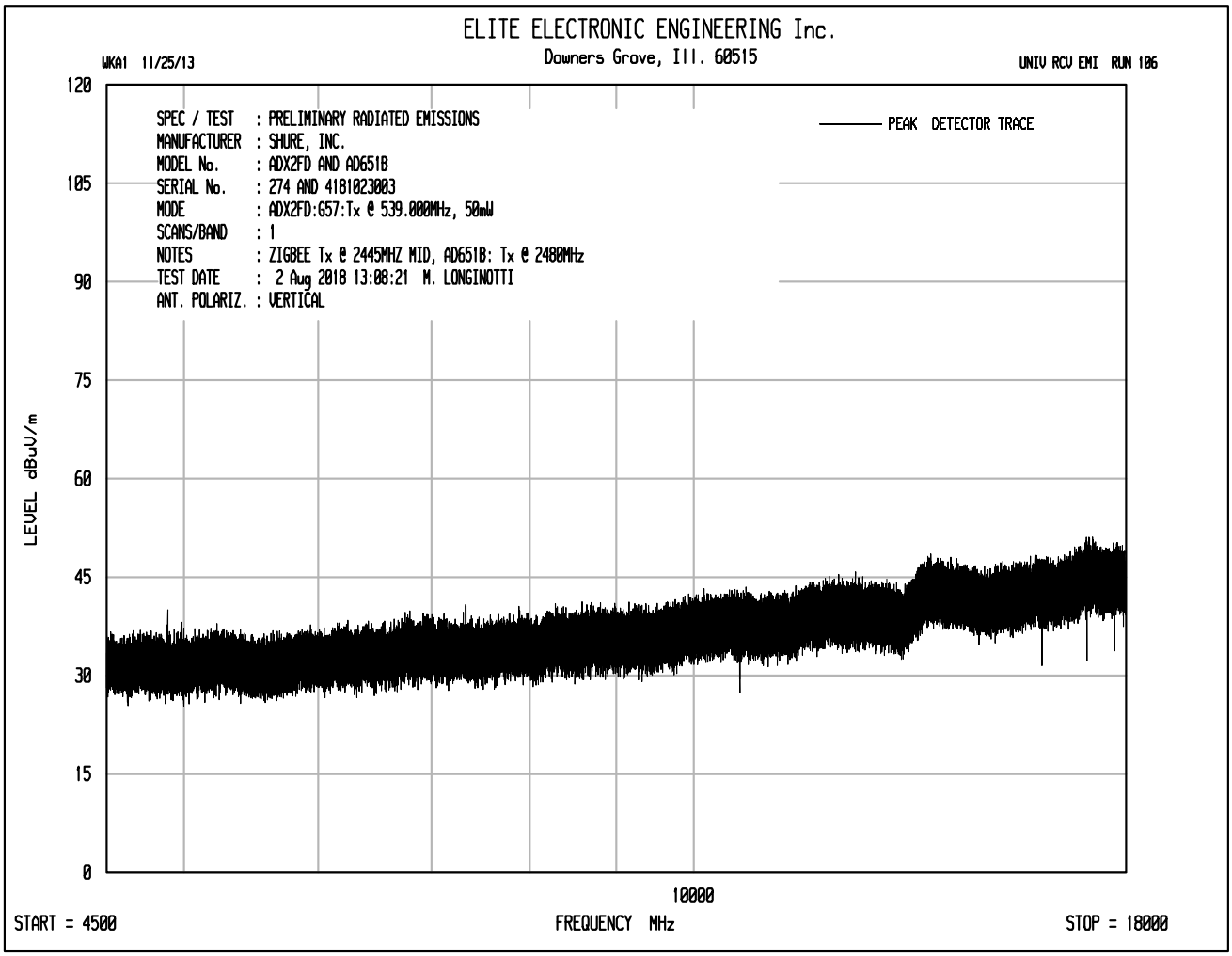


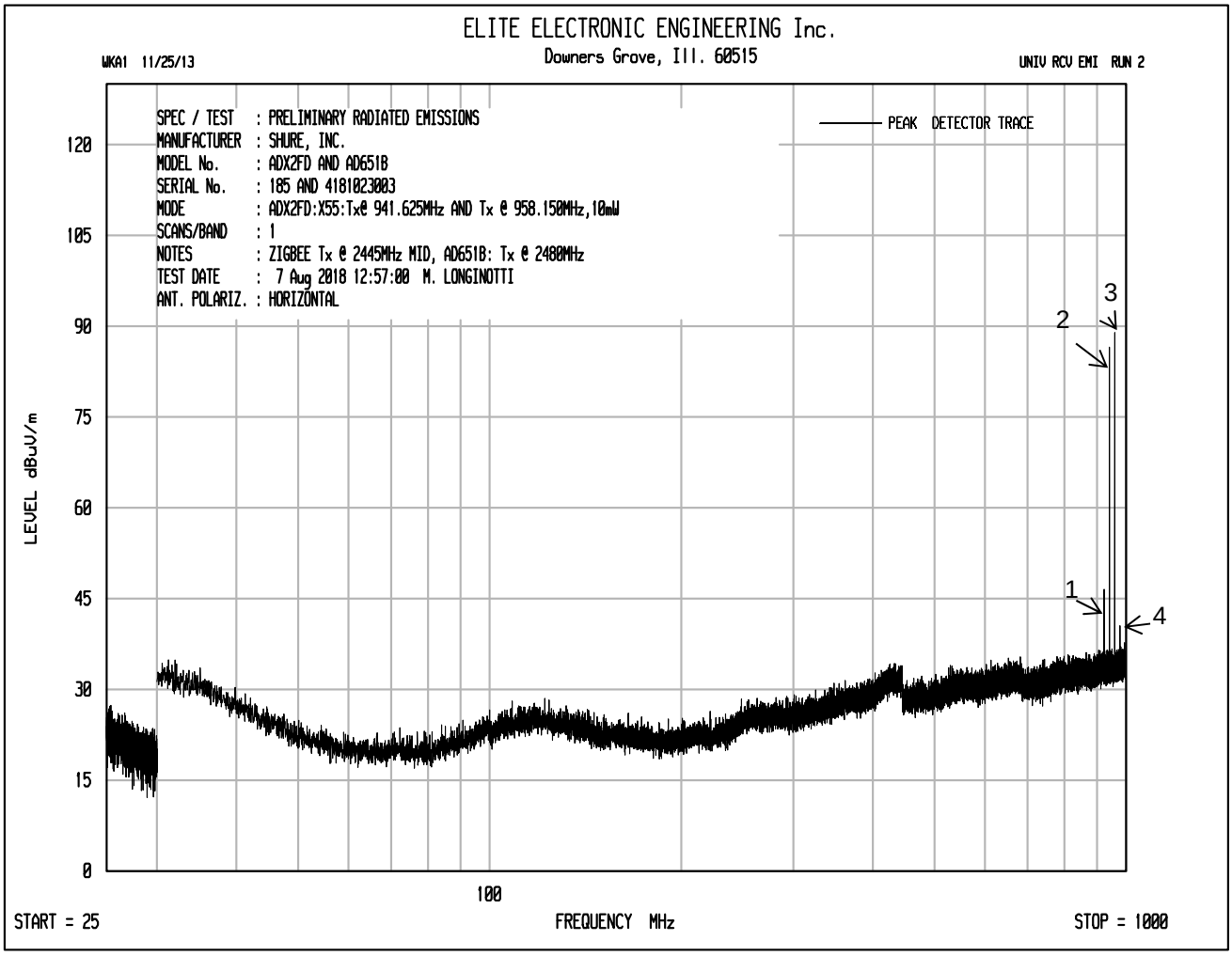
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.



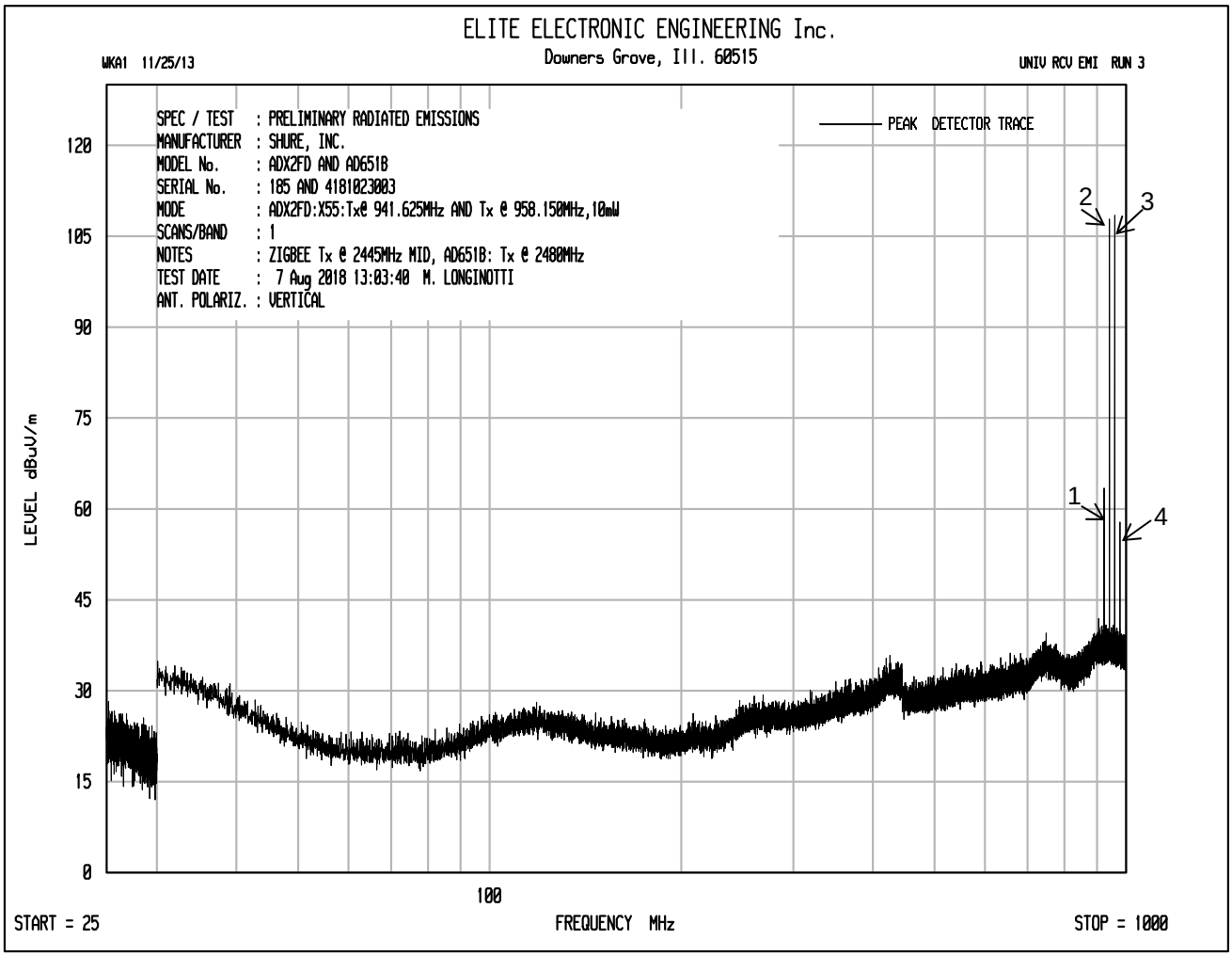
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 105
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 274 AND 4181023003
MODE : ADX2FD:G57:Tx @ 539.000MHz, 50mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHZ MID, AD651B: Tx @ 2480MHz
TEST DATE : 2 Aug 2018 13:01:57 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000

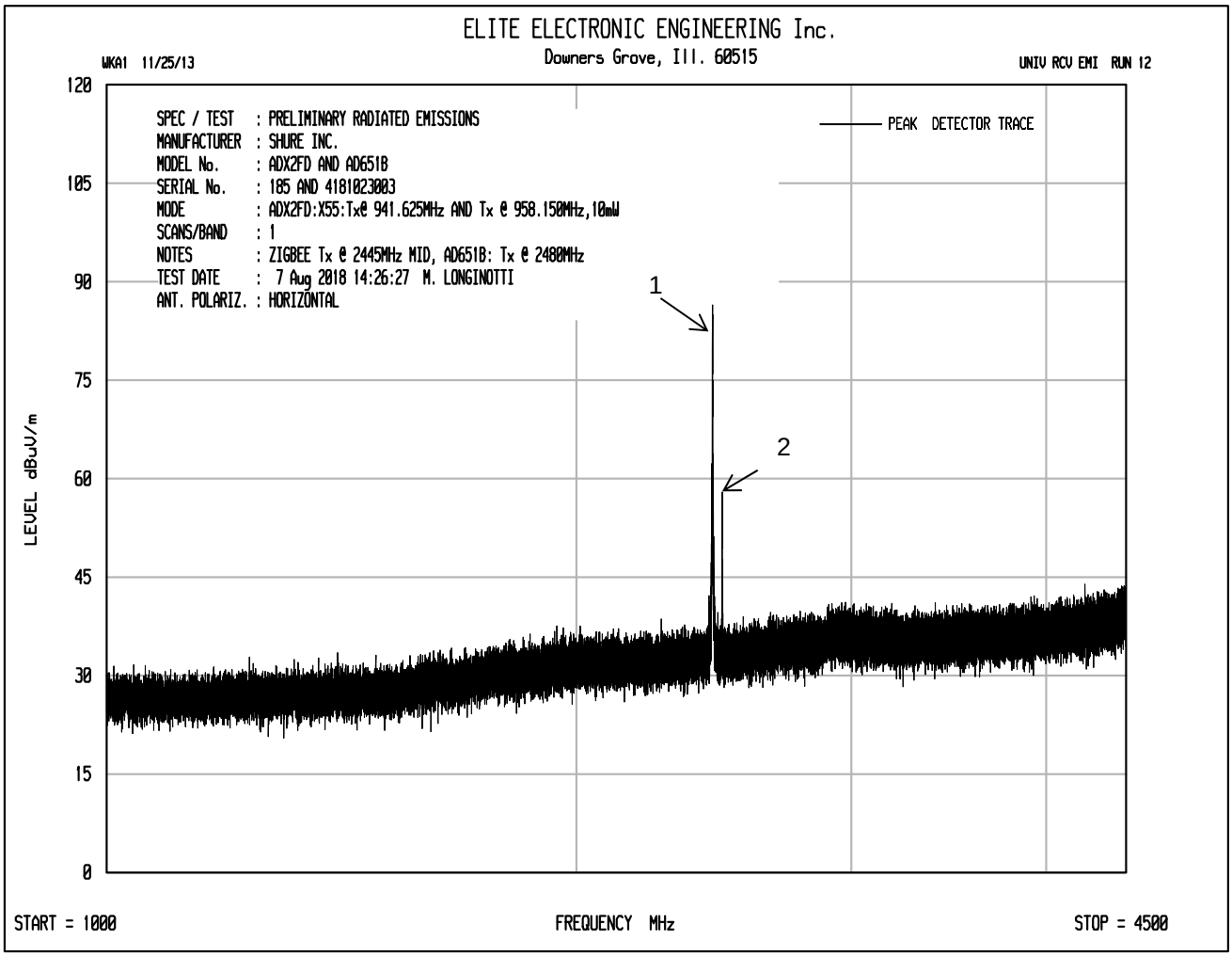

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 106
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 274 AND 4181023003
MODE : ADX2FD:G57:Tx @ 539.000MHz, 50mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHZ MID, AD651B: Tx @ 2480MHz
TEST DATE : 2 Aug 2018 13:08:21 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000



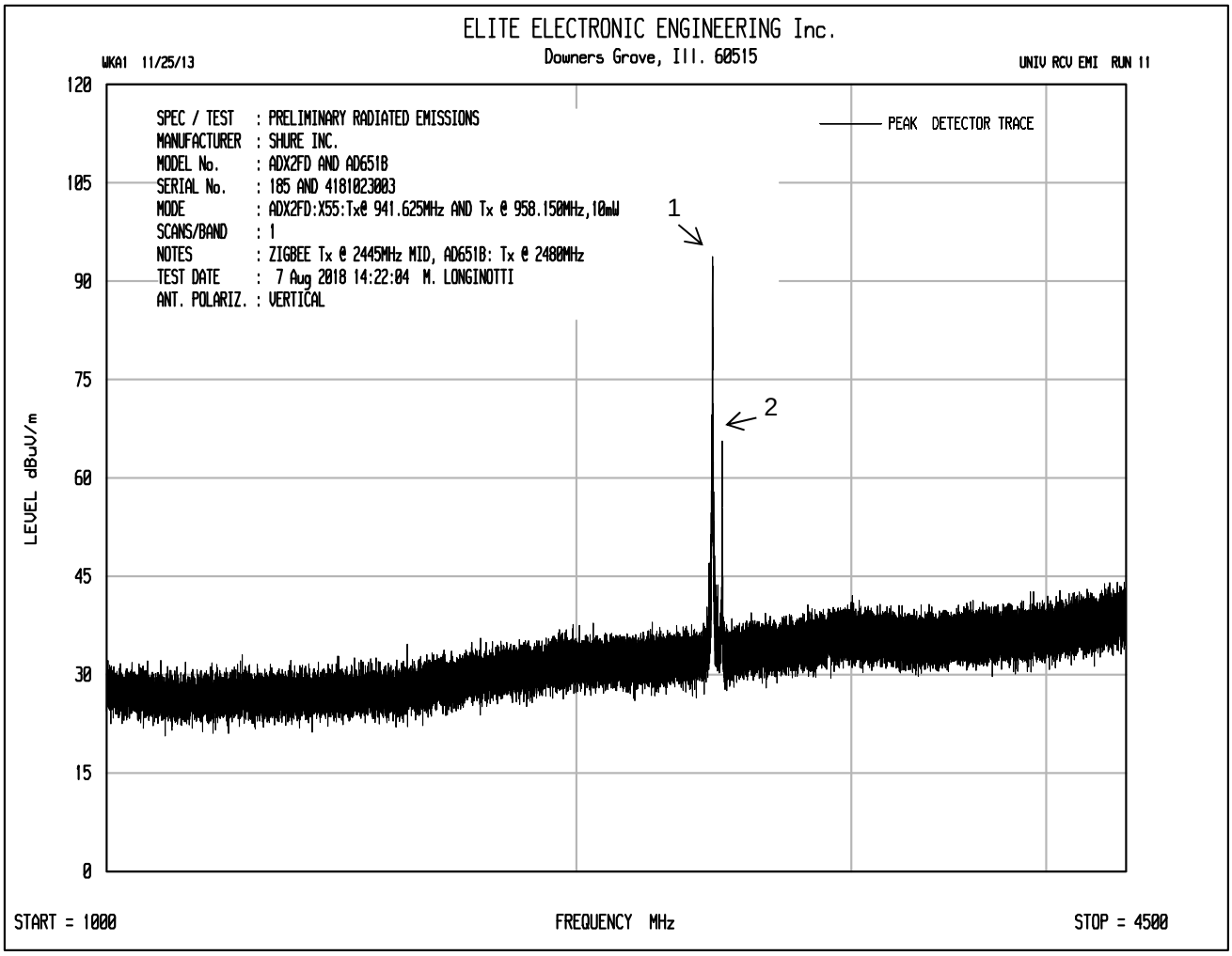
1 – Plot shows emissions at 923.525MHz (2 x 941.625MHz – 959.725MHz)
2 - Plot shows emissions at 941.625MHz from UHF transmitter.
3 - Plot shows emissions at 959.725MHz from UHF transmitter.
4 - Plot shows emissions at 977.825MHz (2 x 959.725 – 941.625)



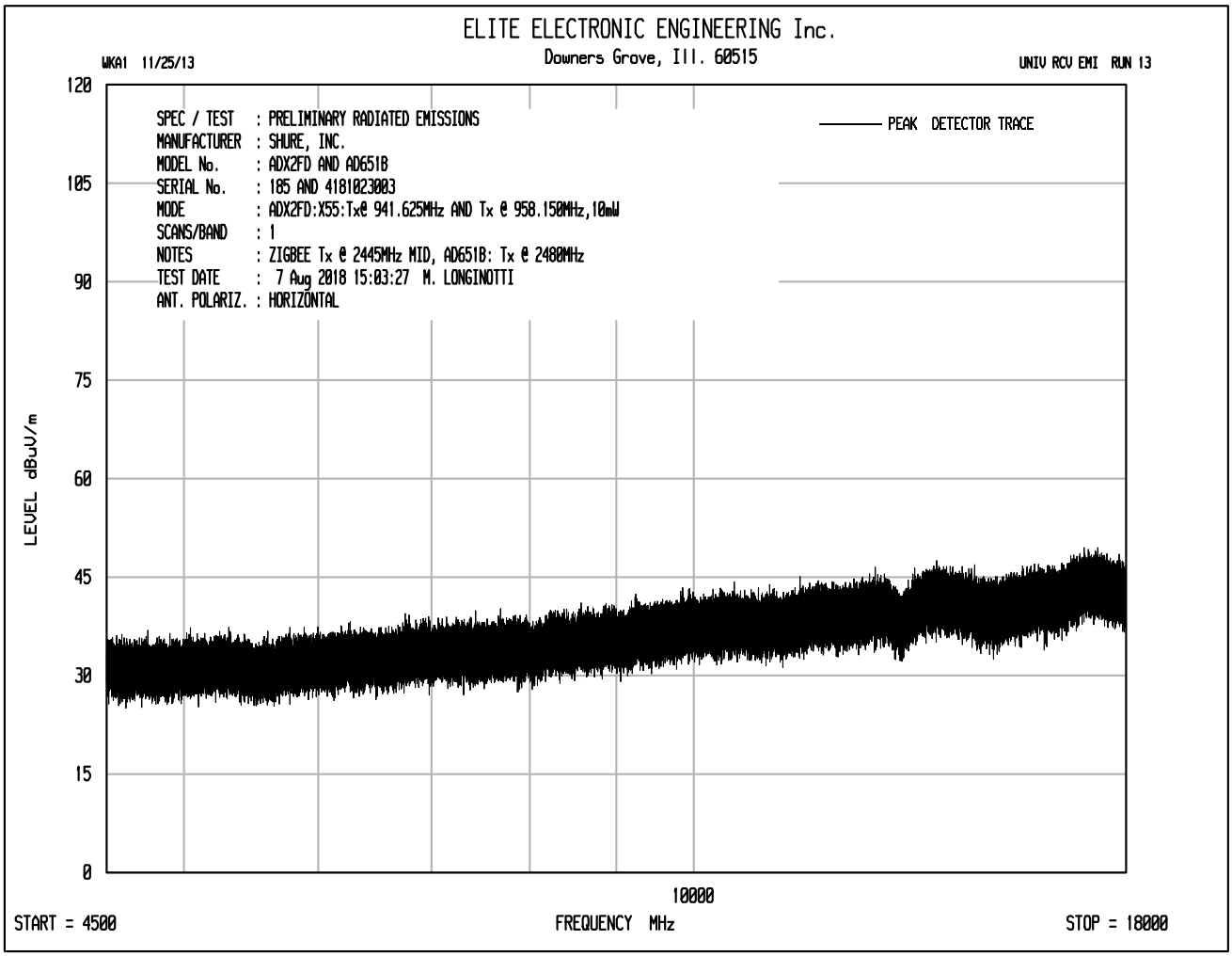
1 – Plot shows emissions at 923.525MHz (2 x 941.625MHz – 959.725MHz)
2 - Plot shows emissions at 941.625MHz from UHF transmitter.
3 - Plot shows emissions at 959.725MHz from UHF transmitter.
4 - Plot shows emissions at 977.825MHz (2 x 959.725 – 941.625)

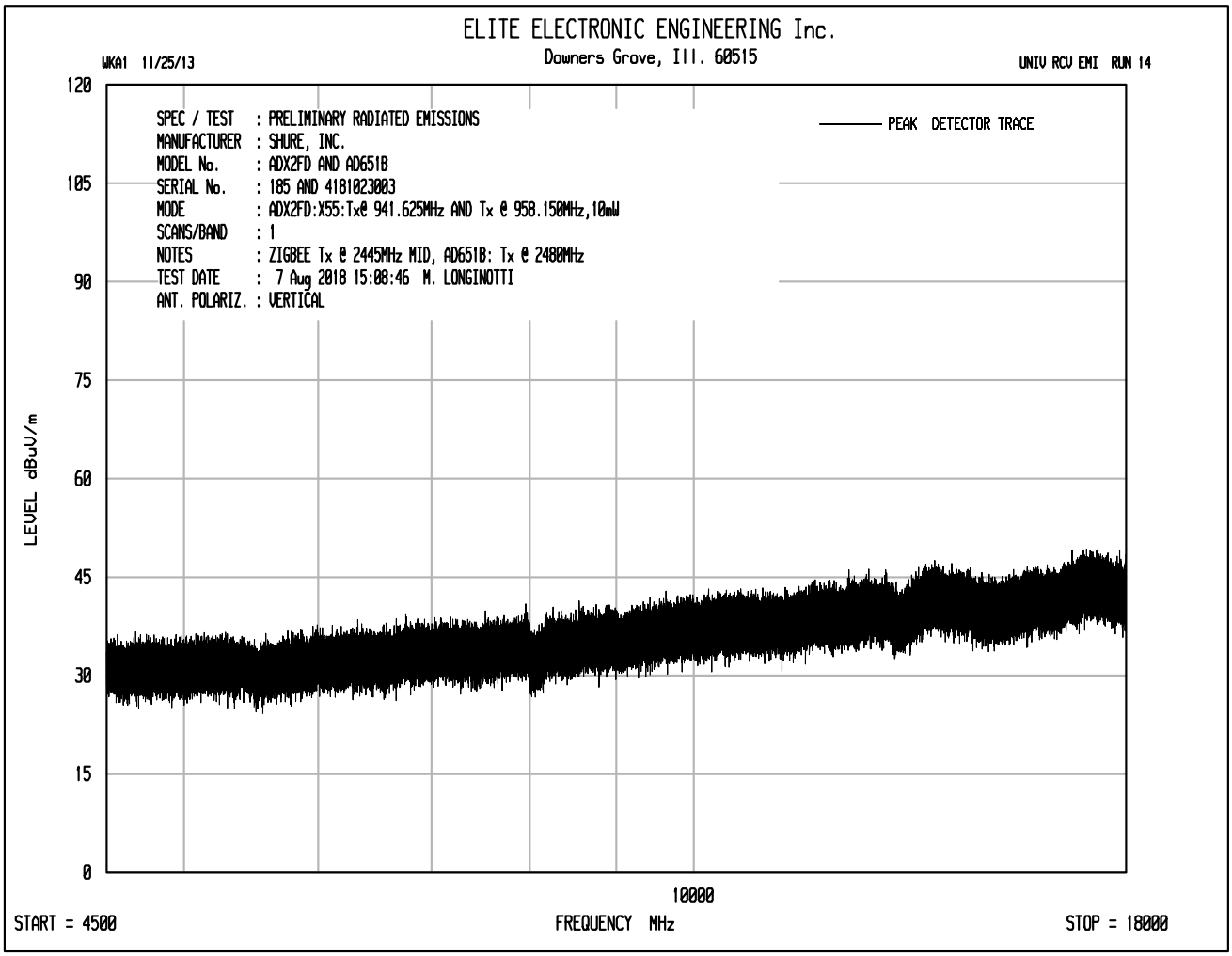


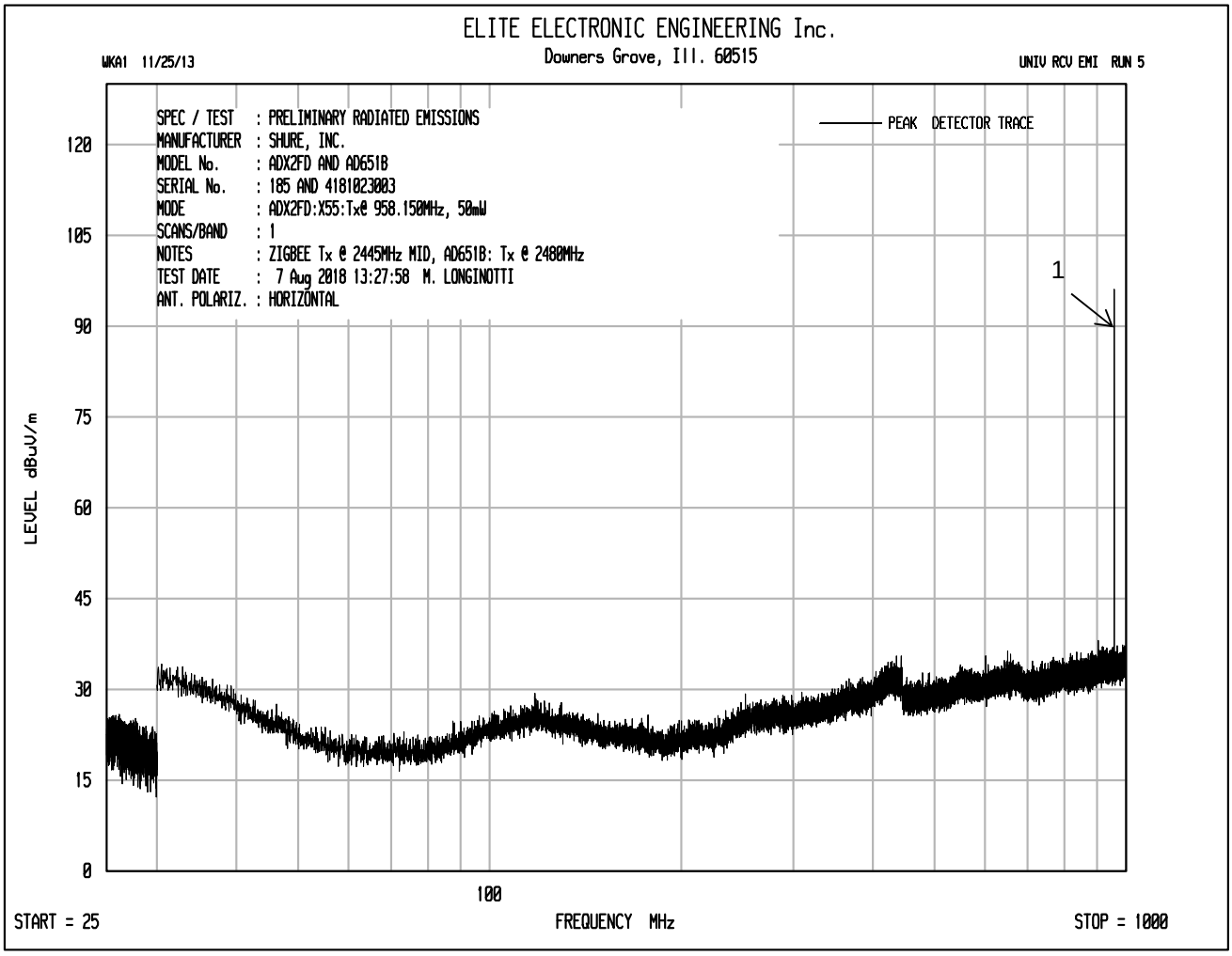
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.



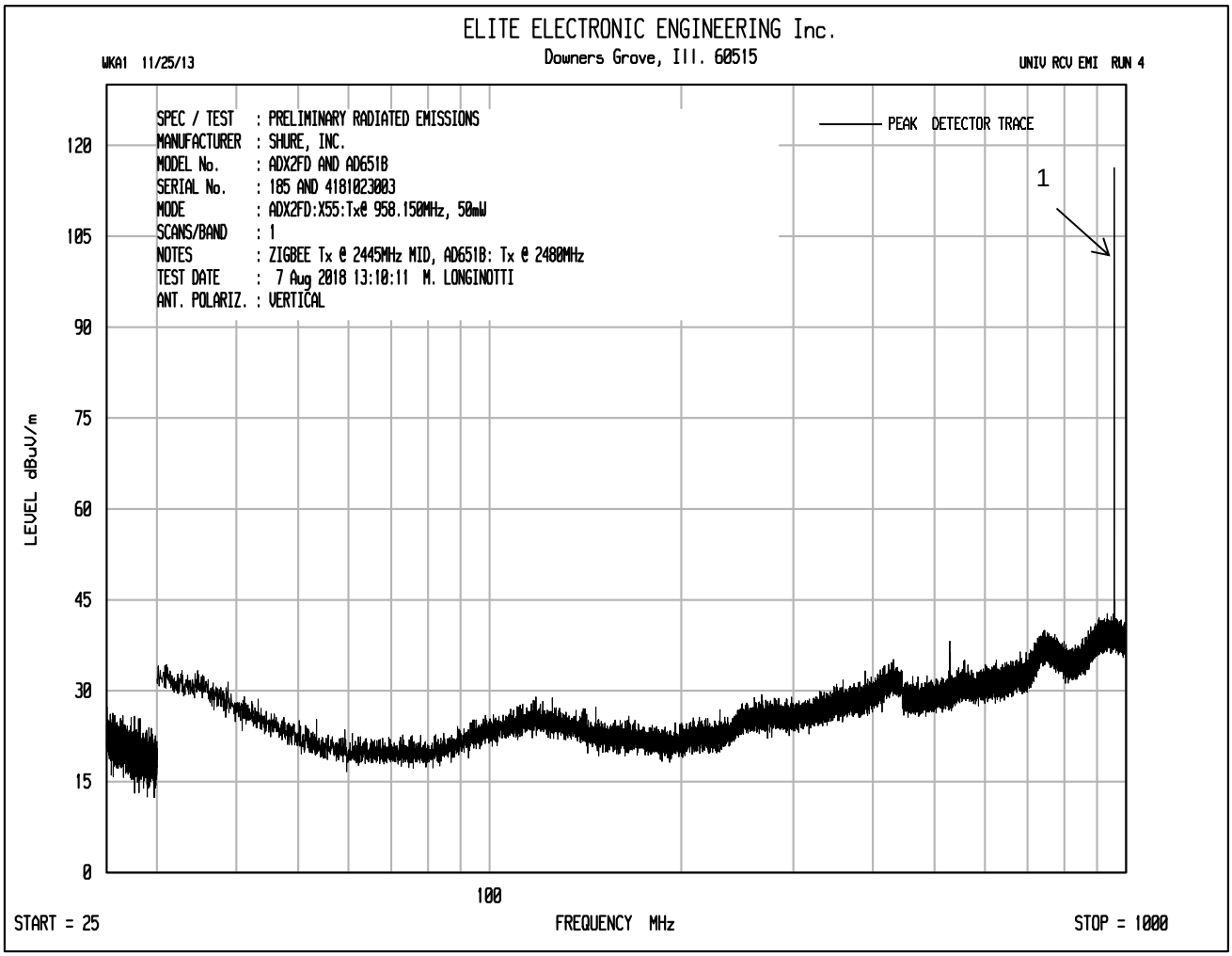
1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.


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. : ADX2FD AND AD651B
SERIAL No. : 185 AND 4181023003
MODE : ADX2FD:X55:Tx@ 941.625MHz AND Tx @ 958.150MHz,10mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHz MID, AD651B: Tx @ 2480MHz
TEST DATE : 7 Aug 2018 15:03:27 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000

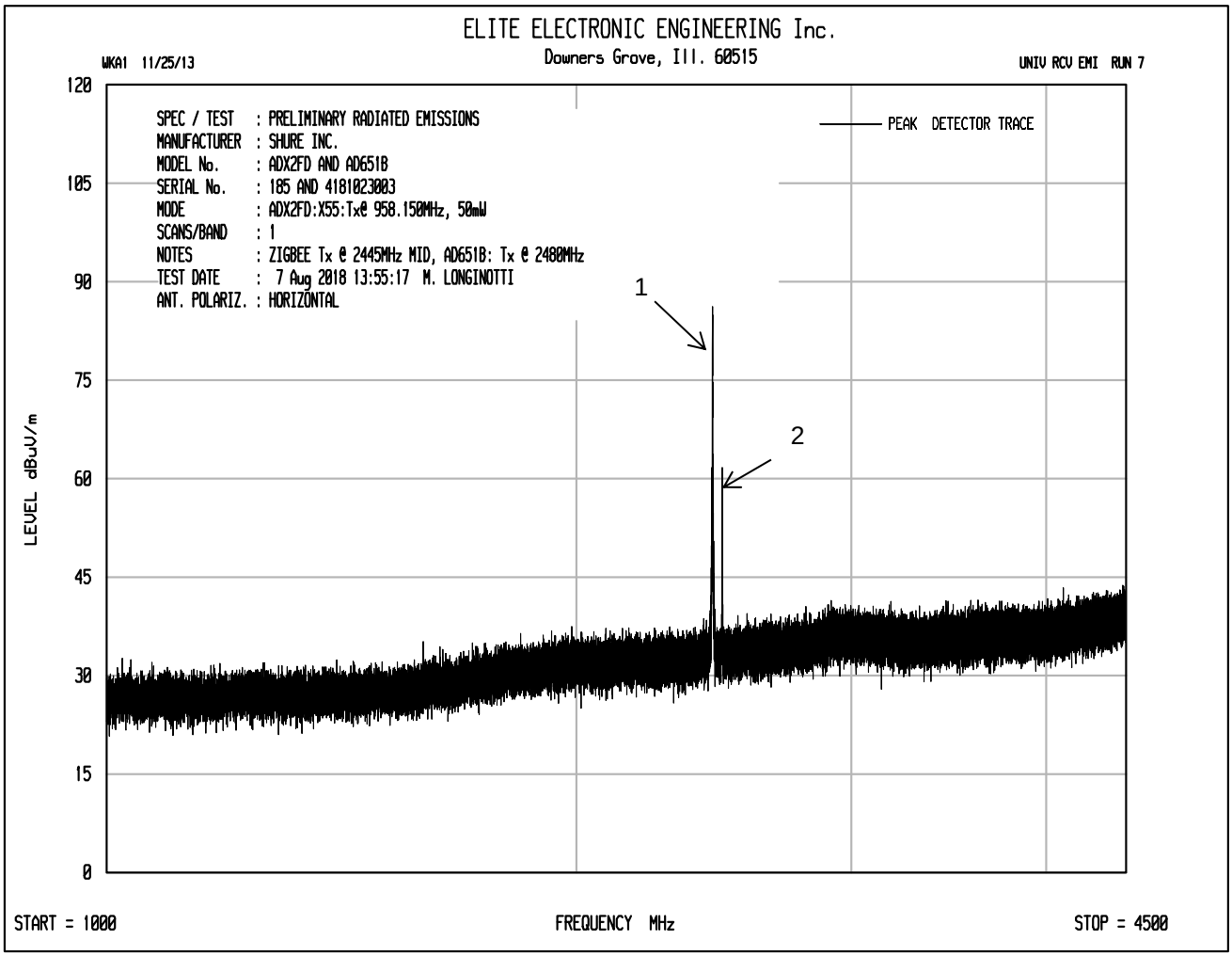

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 14
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 185 AND 4181023003
MODE : ADX2FD:X55:Tx@ 941.625MHz AND Tx @ 958.150MHz,10mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHz MID, AD651B: Tx @ 2480MHz
TEST DATE : 7 Aug 2018 15:08:46 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000



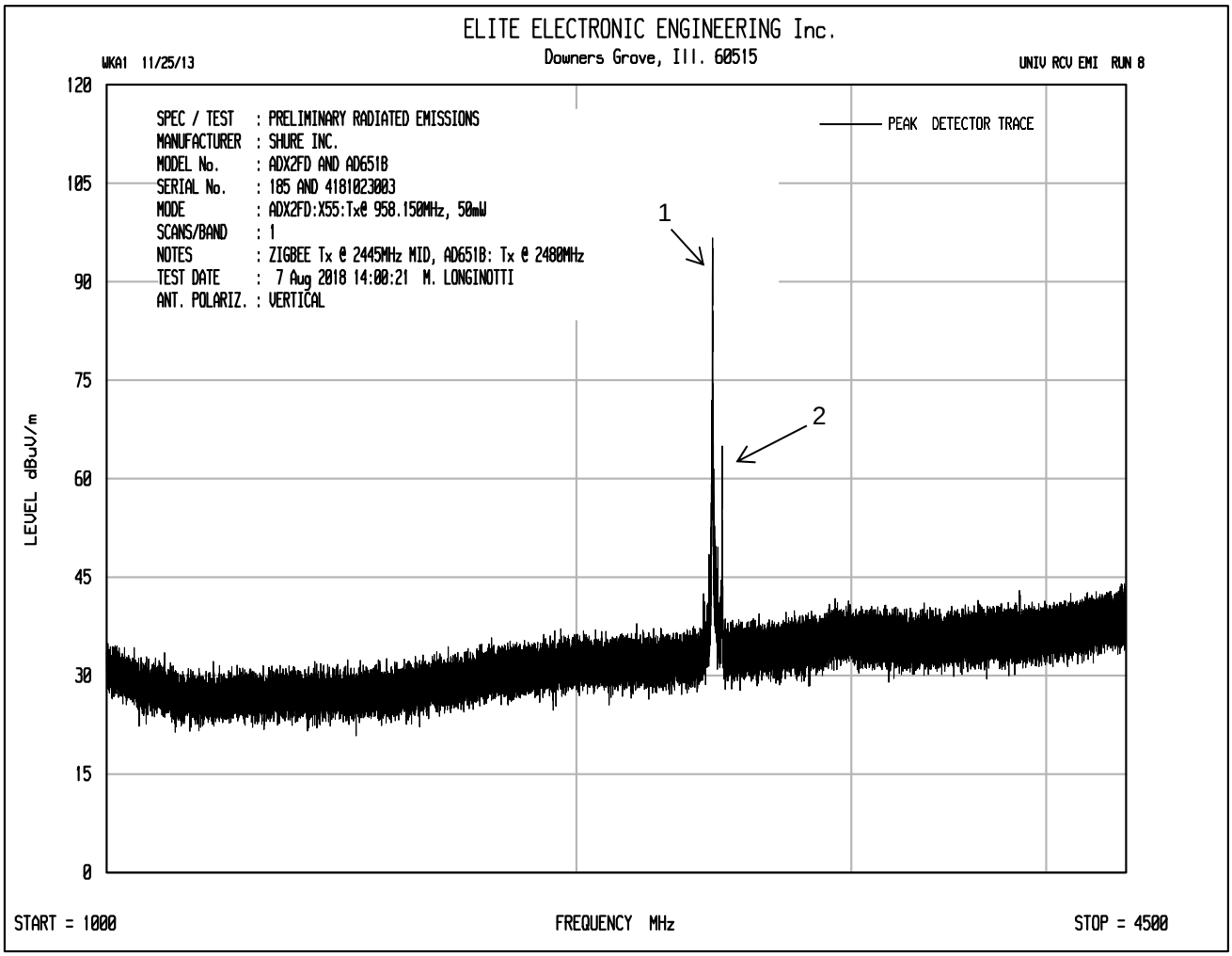
1 - Plot shows emissions at 958.150MHz from UHF transmitter.



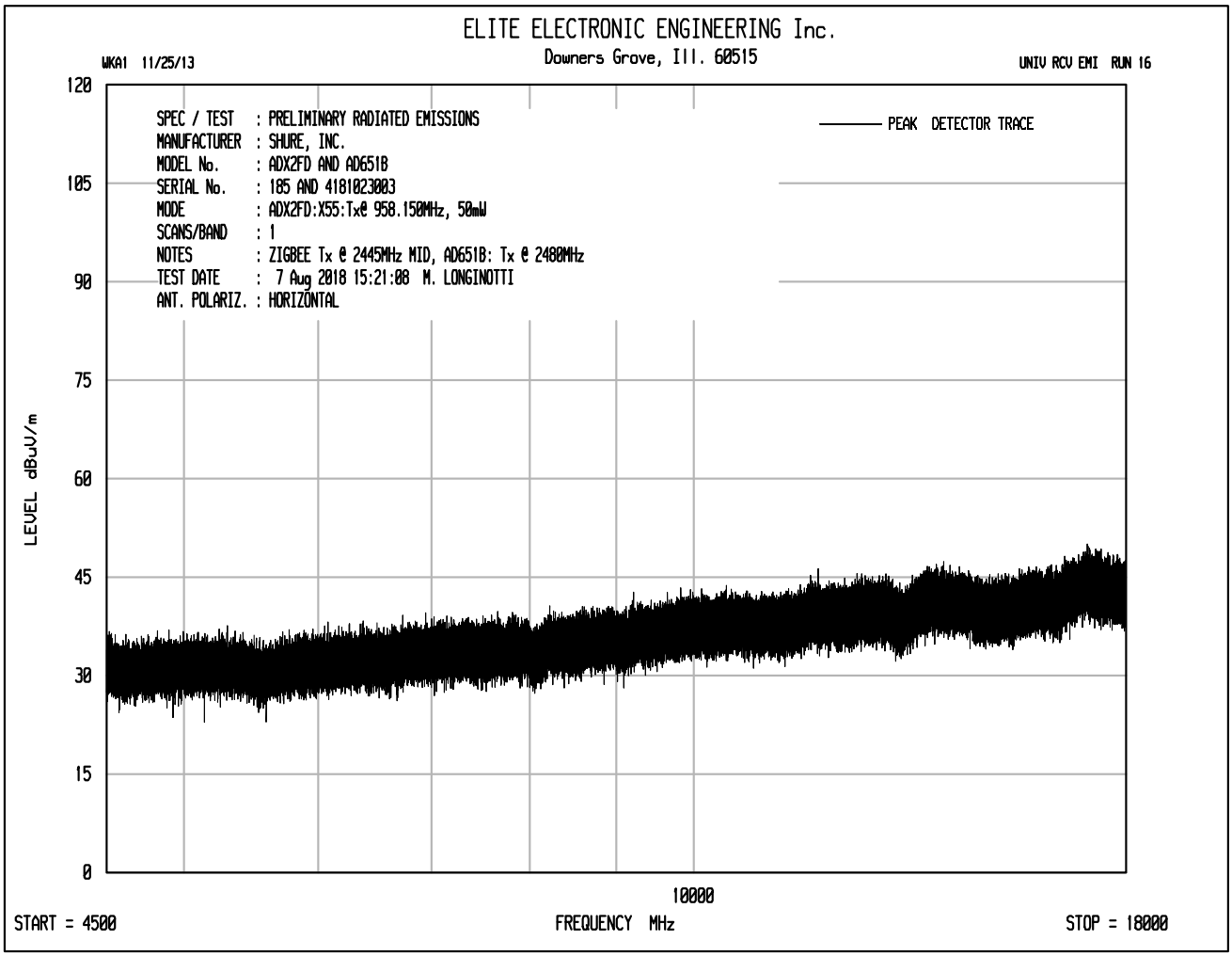
1 - Plot shows emissions at 958.150MHz from UHF transmitter.

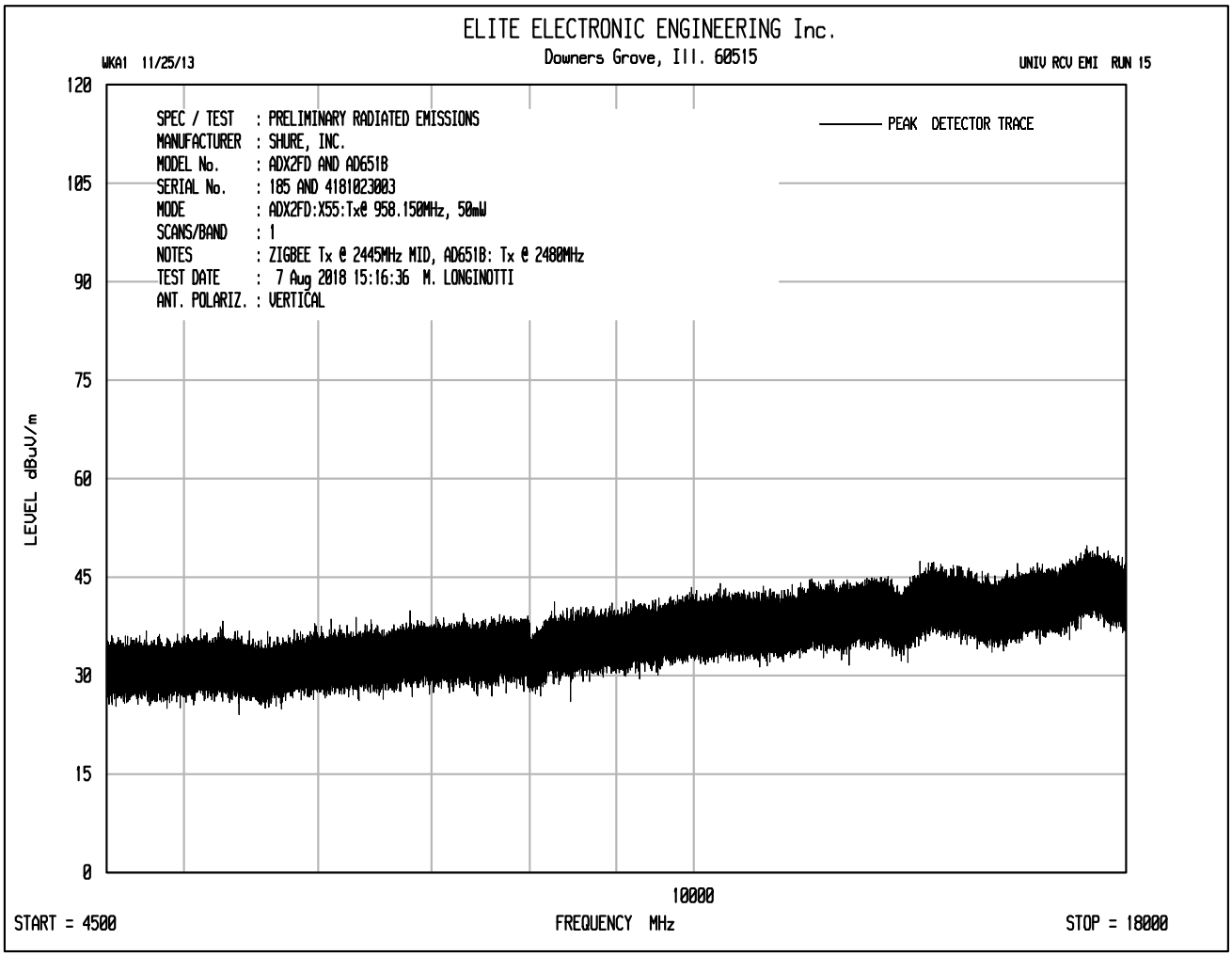


1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.



1 - Plot shows emissions at 2445MHz from ADX2 Zigbee transmitter.
2 - Plot shows emissions at 2480MHz from AD651B Zigbee transmitter.


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 16
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 185 AND 4181023003
MODE : ADX2FD:X55:Tx@ 958.150MHz, 50mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHz MID, AD651B: Tx @ 2480MHz
TEST DATE : 7 Aug 2018 15:21:08 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 15
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : ADX2FD AND AD651B
SERIAL No. : 185 AND 4181023003
MODE : ADX2FD:X55:Tx@ 958.150MHz, 50mW
SCANS/BAND : 1
NOTES : ZIGBEE Tx @ 2445MHz MID, AD651B: Tx @ 2480MHz
TEST DATE : 7 Aug 2018 15:16:36 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 4500
FREQUENCY MHz
STOP = 18000