FCC PART 15, SUBPART B and C
TEST REPORT

for

SMOKE DETECTOR UNIT

MODELS: SD-001 and SD-002

Prepared for

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DATE: MAY 9, 2016

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

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

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

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

Device Tested:	Smoke Detector Unit Models: SD-001 and SD-002 S/N: 16779
Product Description:	The EUT is wireless smoke sensor designed for aircraft installation.
Modifications:	The EUT was not modified during the testing.
Customer:	Ontic Engineering & Manufacturing Inc. 20400 Plummer Street Chatsworth, California 91311
Test Dates:	April 25 and 26, 2016
Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247
Test Procedure:	ANSI C63.10 and ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	The EUT does not connect directly or indirectly to the AC mains, thus this test was not performed.
2	Spurious Radiated RF Emissions, 30 MHz – 1000 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, section 15.209
3	Spurious Radiated RF Emissions, 10 kHz – 30 MHz and 1000 MHz – 9300 MHz	The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.247(d)
4	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 10 kHz – 9.3 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d)
5	Emissions produced by the intentional radiator in restricted bands, 10 kHz – 9.3 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209, and section 15.247 (d)
6	DTS Bandwidth	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (a)(2)
7	Peak Power Output	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.247 (b)(3)
8	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (d)
9	Peak Power Spectral Density from the Intentional Radiator to the Antenna	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (e)

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Smoke Detector Unit, Models: SD-001 and SD-002. The emissions measurements were performed according to the measurement procedure described in ANSI C63.10 and ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

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

2.2 Traceability Statement

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

2.3 Cognizant Personnel

Ontic Engineering & Manufacturing Inc.

Edmond Issakhanian	CTO

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on April 25, 2016.

2.5 Disposition of the Test Sample

The test sample was returned to Ontic Engineering & Manufacturing Inc. on April 26, 2016.

2.6 Abbreviations and Acronyms

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

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

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.4 2014	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10 2013	American National Standard for Testing Unlicensed Wireless Devices
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators
KDB 558074 D01 v03r05	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The Smoke Detector Unit Models: SD-001 and SD-002 (EUT) was tested as a standalone device and was connected to a shorting connector. The EUT was tested in three orthogonal axis. During the testing, the EUT was continuously transmitting.

The EUT was tested in the X, Y and Z axis. The X orientation is when the EUT is parallel to the ground. The Y orientation is when the EUT is perpendicular to the ground mounted vertically. The Z orientation is when the EUT is perpendicular to the ground mounted horizontally.

The EUT was tested with a fresh set of batteries.

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

4.1.1 Cable Construction and Termination

The EUT has no cables, however it does have a 7-pin shorting connector with a 20 cm lanyard connected to it.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
SMOKE DETECTOR UNIT	ONTIC ENGINEERING & MANUFACTURING INC.	SD-001 and SD-002	16779	2AHE4ONT-SD001-2-4

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
RF RADIATED EMISSIONS TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100194	December 4, 2014	2 Year
CombiLog Antenna	Com-Power	AC-220	61060	September 3, 2015	1 Year
Preamplifier	Com-Power	PA-118	551024	March 6, 2015	2 Year
Loop Antenna	Com-Power	AL-130	17089	February 6, 2015	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2016	2 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

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

6.2 EUT Mounting, Bonding and Grounding

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

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

The EUT was not grounded.

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Description and Frequencies

The EUT operates on only a single channel, 923.58 MHz.

7.2 Antenna Gain

The EUT utilizes an integral antenna which has a gain of -2.5 dBi.

8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

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

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

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

Test Results:

The EUT does not connect directly or indirectly to the AC mains, thus this test was not performed.

8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI Receiver was used as the measuring meter. Below 1 GHz, a built-in, internal preamplifier was used to increase the sensitivity of the instrument. At frequencies above 1 GHz, external preamplifiers were used. The Com Power Microwave Preamplifier Model: PA-118 was used for frequencies above from 1 GHz to 9.3 GHz. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets.

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

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	Combilog Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

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

Test Results:

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

8.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
Smoke Detector Unit, Models: SD-001 and SD-002

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
967.50 (H)(Z-axis)(SD-001)	52.89 (QP)	54.00	-1.11
542.50 (H)(Z-axis)(SD-002)	44.41 (QP)	46.00	-1.59
967.70 (H)(Z-axis)(SD-001)	52.01 (QP)	54.00	-1.99
967.50 (H)(Z-axis)(SD-002)	51.92 (QP)	54.00	-2.08
542.50 (H)(Z-axis)(SD-001)	43.53 (QP)	46.00	-2.47
967.90 (H)(Z-axis)(SD-001)	51.09 (QP)	54.00	-2.91

Notes:

*	The complete emissions data is given in Appendix E of this report.		
Pk	Peak Reading	A	Average Reading
H	Horizontal Polarization	V	Vertical Polarization
QP	Quasi-Peak Reading		

8.2 DTS Bandwidth

The DTS Bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the EUT. The following steps were performed for measuring the DTS Bandwidth.

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW) to equal or greater than 3 times the RBW
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep = Auto Couple
6. Allow the trace to stabilize
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (a)(2).

8.3 Peak Output Power

The Peak Output Power was measured using the EMI Receiver. The peak output power was measured using a direct connection from the EUT. The resolution bandwidth was 3 MHz and the video bandwidth was 10 MHz. The cable loss was also added back into the reading using the reference level offset. The Peak Output Power was then taken.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (b)(3).

8.4 Emissions in Non-Restricted Bands

The emissions in the non-restricted frequency bands measurements were performed using the EMI receiver directly connected to the EUT. The reference level was established by setting the instrument center frequency to DTS channel center frequency. The span was set to ≥ 1.5 times the DTS bandwidth. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with sweep set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the level and 20 dB below that was the reference level. For emission level measurement, the center frequency and span were set to encompass the frequency range to be measured. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than the span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

Test Results:

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

8.5 RF Band Edges

The RF band edges were taken at 902 MHz when the EUT was on the low channel and 928 MHz when the EUT was on the high channel using the EMI Receiver. The band edges were measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The RBW was set to 100 kHz and the VBW was set to 300 kHz. A peak detector was used with sweep set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the peak level and 20 dB below at the band edge.

Test Results:

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

8.6 Spectral Density Test

The spectrum density output was measured using the EMI Receiver. The spectral density output was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The following steps were performed for measuring the spectral density.

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to 3 kHz <= RBW <= 100 kHz
4. Set the VBW >= 3 X RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize
9. Use the peak marker function to determine the maximum amplitude level within the RBW
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (e).

9. CONCLUSIONS

The Smoke Detector Unit, Models: SD-001 and SD-002, as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B, and Subpart C, sections 15.205, 15.209 and 15.247.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP LAB CODES 200063-0, 200528-0, 200527-0

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

NVLAP listing links

Agoura Division / **Brea Division** / **Silverado/Lake Forest Division**

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

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

ANSI listing CETCB

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

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

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

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

FCC Listing, from FCC OET site
FCC test lab search https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm

Industry Canada Industrie Canada

Compatible Electronics IC listing can be found at:
http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

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

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

The EUT was not modified during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Smoke Detector Unit Models: SD-001 and SD-002 S/N: N/A
ADDITIONAL MODELS COVERED:	The following models are considered by the manufacturer to be similar to the samples tested, however the test results contained in this report relate only to the sample tested. Models: • SD-004

Per the manufacturer, the additional model has the identical electronics and mechanical packaging. The differences between the additional model is described below:

- SD-004 is a new model number for the SD-001, the two models are identical.

APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER

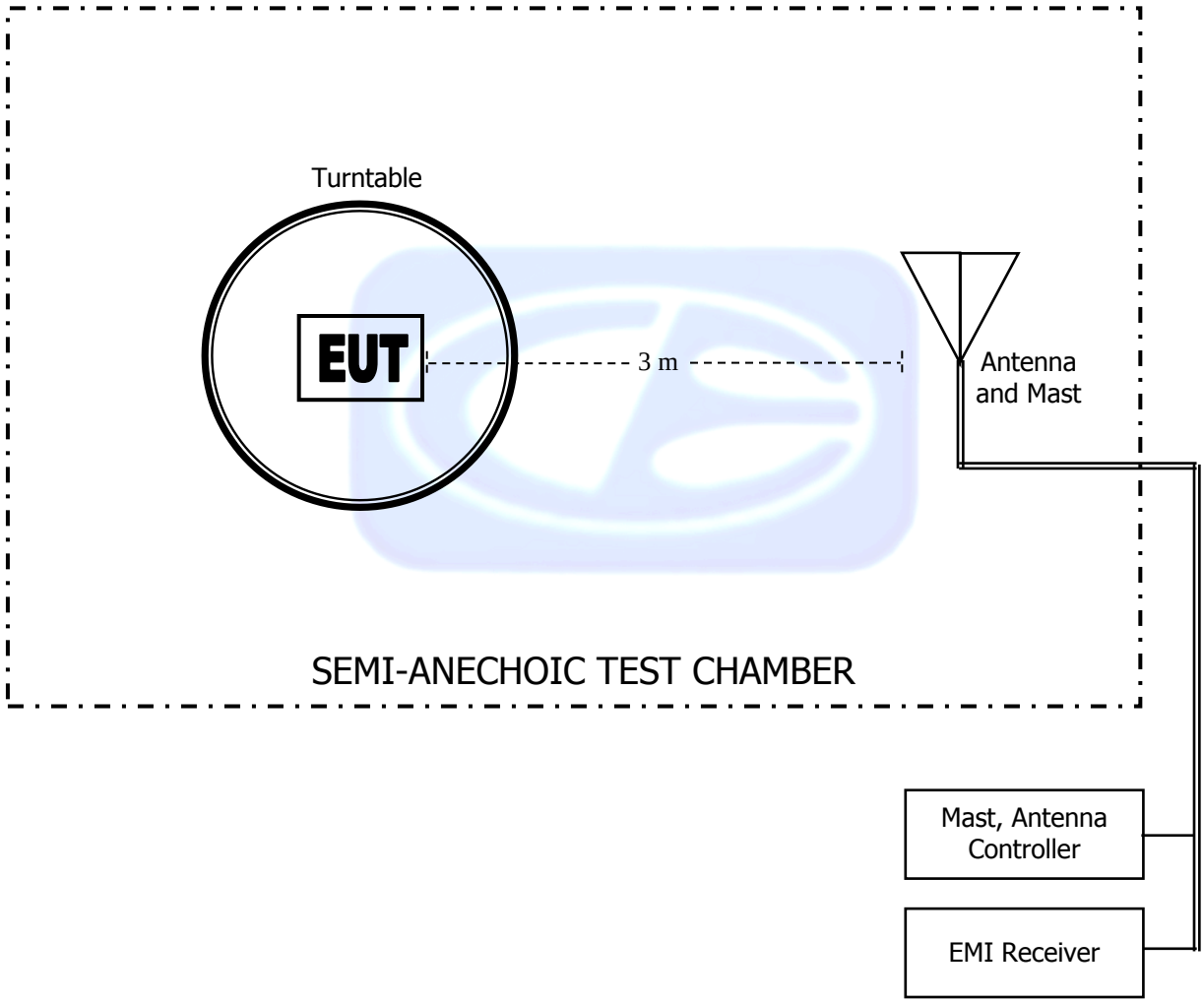
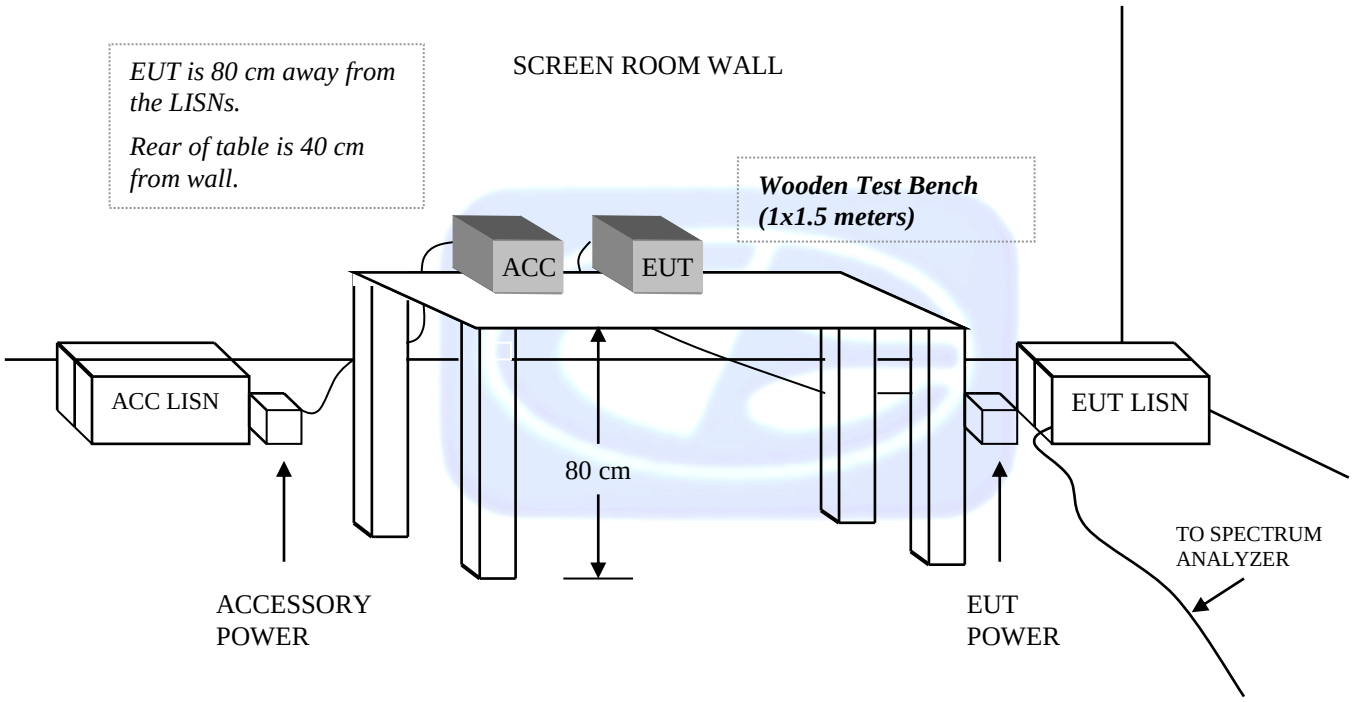


FIGURE 2: CONDUCTED EMISSIONS TEST SETUP



COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: FEBRUARY 6, 2015

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-33.18	18.32
0.01	-34.10	17.40
0.02	-38.65	12.85
0.03	-39.28	12.22
0.04	-40.09	11.41
0.05	-40.85	10.65
0.06	-40.88	10.62
0.07	-41.07	10.43
0.08	-41.04	10.46
0.09	-41.19	10.31
0.1	-41.20	10.30
0.2	-41.52	9.98
0.3	-41.53	9.97
0.4	-41.42	10.08
0.5	-41.53	9.97
0.6	-41.53	9.97
0.7	-41.43	10.07
0.8	-41.23	10.27
0.9	-41.13	10.37
1	-41.14	10.36
2	-40.80	10.70
3	-40.66	10.84
4	-40.61	10.89
5	-40.33	11.17
6	-40.53	10.97
7	-40.47	11.03
8	-40.48	11.02
9	-39.93	11.57
10	-39.81	11.69
15	-43.35	8.15
20	-39.16	12.34
25	-40.24	11.26
30	-43.18	8.32

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61060

CALIBRATION DATE: SEPTEMBER 3, 2015

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

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: FEBRUARY 26, 2016

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

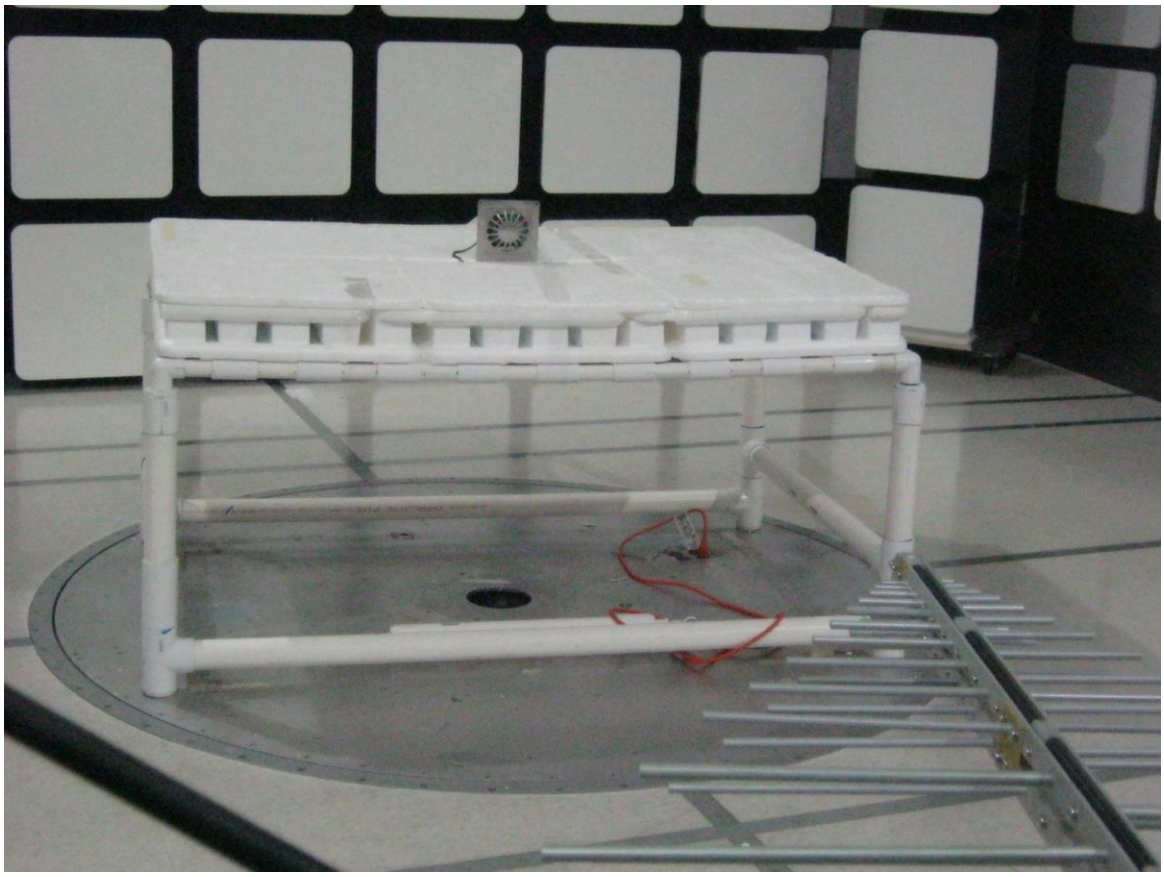
COM-POWER PA-118

PREAMPLIFIER

S/N: 551024

CALIBRATION DATE: MARCH 6, 2015

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	39.76	6.0	38.77
1.1	40.46	6.5	38.46
1.2	40.05	7.0	38.27
1.3	40.58	7.5	38.77
1.4	39.50	8.0	39.25
1.5	39.92	8.5	38.63
1.6	40.40	9.0	39.58
1.7	40.10	9.5	42.12
1.8	40.49	10.0	38.53
1.9	38.86	11.0	40.21
2.0	41.53	12.0	41.15
2.5	41.05	13.0	40.51
3.0	40.29	14.0	40.32
3.5	40.82	15.0	39.47
4.0	40.88	16.0	39.88
4.5	41.37	17.0	39.79
5.0	40.73	18.0	40.61
5.5	39.05		



FRONT VIEW

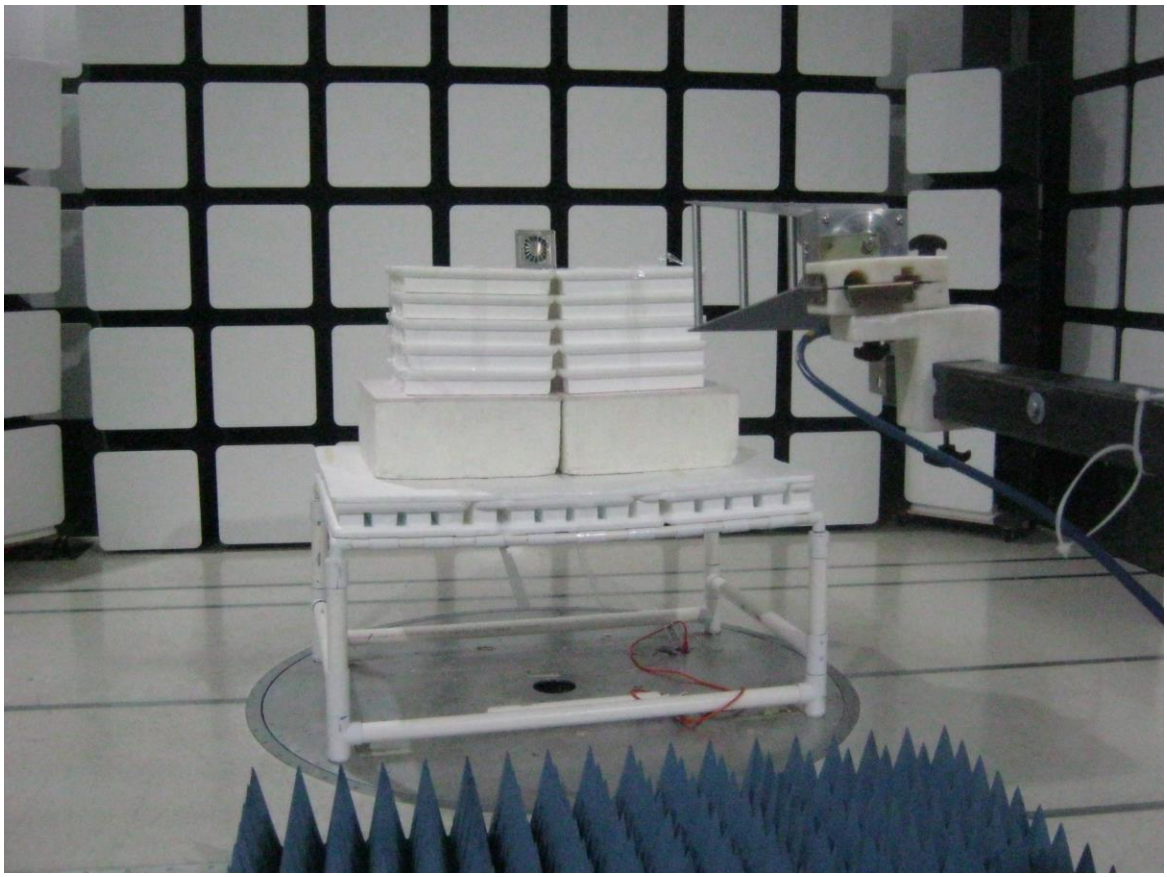
ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-001
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

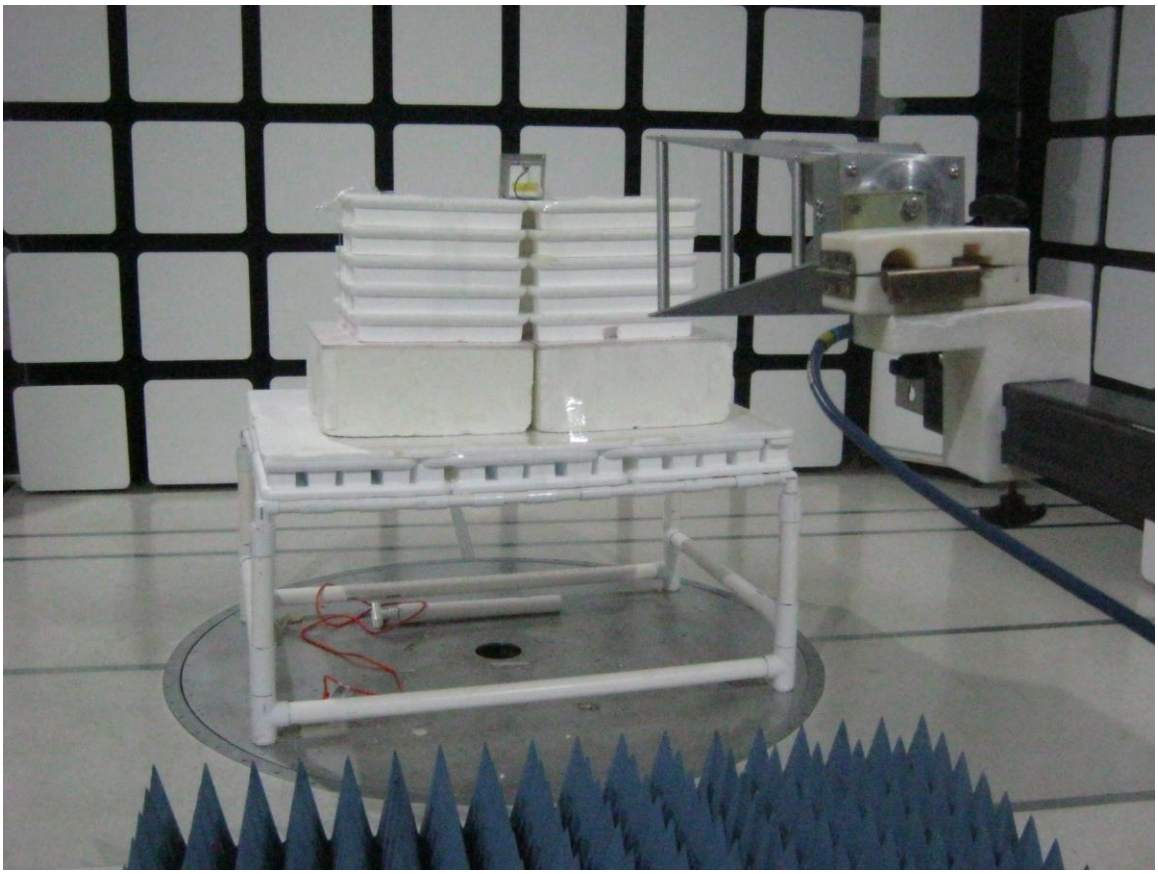
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-001
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

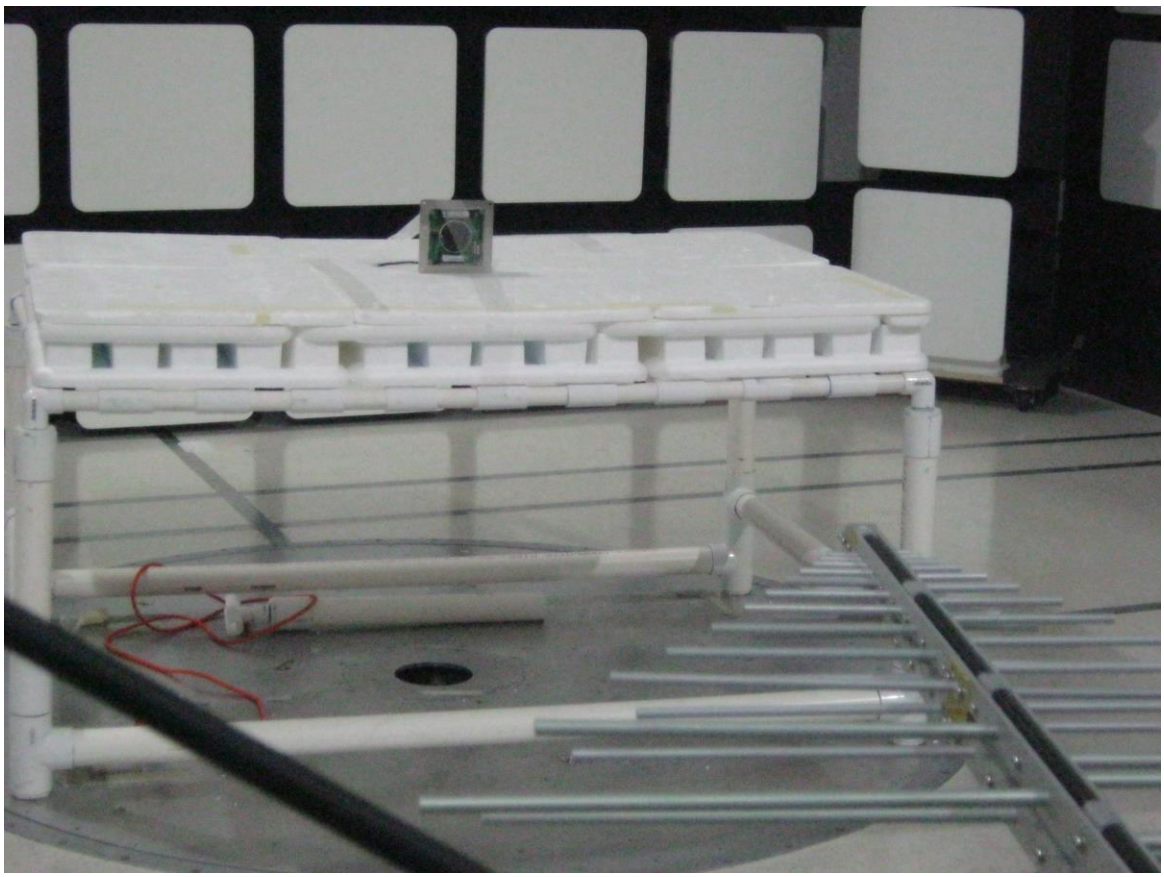
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-001
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

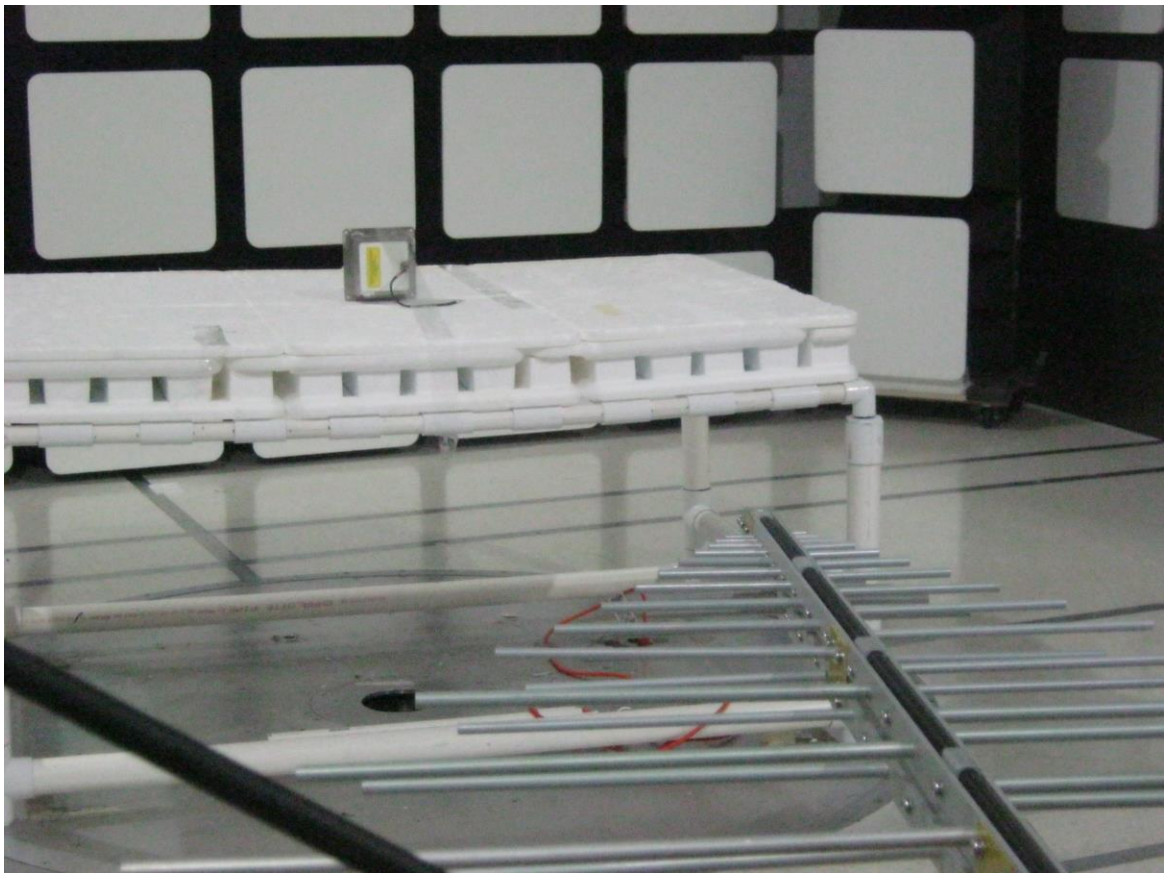
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-002
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

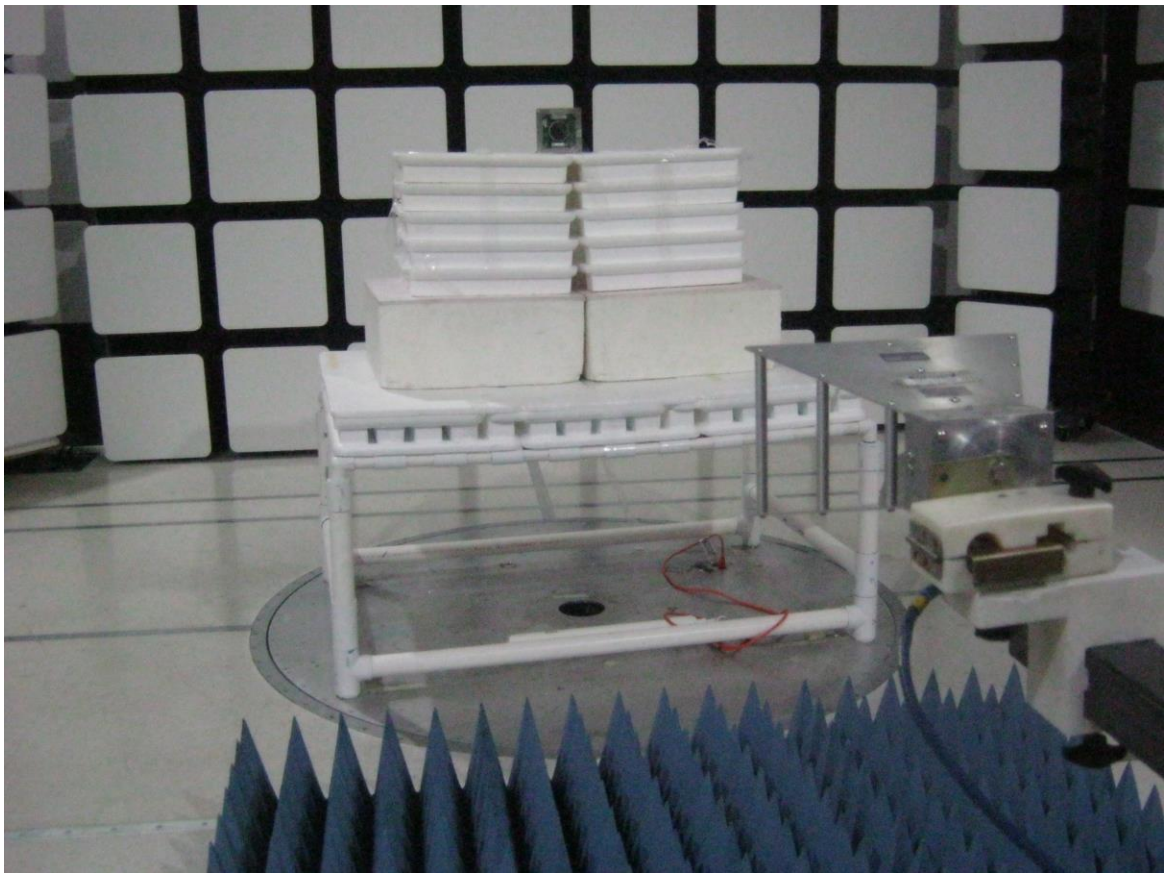
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-002
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-002
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

ONTIC ENGINEERING & MANUFACTURING INC.
SMOKE DETECTOR UNIT
MODEL: SD-002
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

MODEL SD-001

FCC 15.247

Ontic Engineering & Manufacturing, Inc. Date: 04/25/2016
Smoke Detector Unit Lab: D
Model: SD-001 . Tested By: Kyle Fujimoto

Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	45.71	V	74.00	-28.29	Peak	87.00	205.87	
2770.74	25.71	V	54.00	-28.29	Avg	87.00	205.47	
3694.32	45.37	V	74.00	-28.63	Peak	172.00	163.92	
3694.32	25.37	V	54.00	-28.63	Avg	172.00	163.92	
4617.90	46.24	V	74.00	-27.76	Peak	257.50	155.20	
4617.90	26.24	V	54.00	-27.76	Avg	257.50	155.20	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/25/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	48.31	V	74.00	-25.69	Peak	317.50	280.64	
2770.74	28.31	V	54.00	-25.69	Avg	317.50	208.64	
3694.32	48.28	V	74.00	-25.72	Peak	355.00	129.77	
3694.32	28.28	V	54.00	-25.72	Avg	355.00	129.77	
4617.90	50.20	V	74.00	-23.80	Peak	330.50	225.77	
4617.90	30.20	V	54.00	-23.80	Avg	330.50	225.77	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/25/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	47.86	V	74.00	-26.14	Peak	345.50	187.26	
2770.74	27.86	V	54.00	-26.14	Avg	345.50	187.26	
3694.32	50.92	V	74.00	-23.08	Peak	319.75	123.56	
3694.32	30.92	V	54.00	-23.08	Avg	319.75	123.56	
4617.90	49.06	V	74.00	-24.94	Peak	102.25	107.62	
4617.90	29.06	V	54.00	-24.94	Avg	102.25	107.62	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/25/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	42.64	H	74.00	-31.36	Peak	19.00	170.97	
2770.74	22.64	H	54.00	-31.36	Avg	19.00	170.97	
3694.32	46.46	H	74.00	-27.54	Peak	155.00	183.74	
3694.32	26.46	H	54.00	-27.54	Avg	155.00	183.74	
4617.9	47.99	H	74.00	-26.01	Peak	162.50	176.88	
4617.9	27.99	H	54.00	-26.01	Avg	162.50	176.88	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.8								**Not in**
9235.8								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/25/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	49.86	H	74	-24.14	Peak	208.25	125.53	
2770.74	29.86	H	54	-24.14	Avg	208.25	125.53	
3694.32	48.84	H	74	-25.16	Peak	194.75	102.61	
3694.32	28.84	H	54	-25.16	Avg	194.75	102.61	
4617.9	50.89	H	74	-23.11	Peak	184.25	127.62	
4617.9	30.89	H	54	-23.11	Avg	184.25	127.62	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.8								**Not in**
9235.8								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/25/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	49.62	H	74.00	-24.38	Peak	7.25	144.28	
2770.74	29.62	H	54.00	-24.38	Avg	7.25	144.28	
3694.32	49.21	H	74.00	-24.79	Peak	355.00	168.46	
3694.32	29.21	H	54.00	-24.79	Avg	355.00	168.46	
4617.90	50.92	H	74.00	-23.08	Peak	47.25	176.82	
4617.90	30.92	H	54.00	-23.08	Avg	47.25	176.82	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247 and FCC Class B

Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

X-Axis

Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	70.52	V	74.00	-3.48	Peak	177.00	182.97	**S/N: 16779 - X-Axis**
1231.38	50.52	V	54.00	-3.48	Avg	177.00	182.97	**With Grille**
1231.38	66.22	H	74.00	-7.78	Peak	116.00	168.46	**S/N: 16779 - X-Axis**
1231.38	46.22	H	54.00	-7.78	Avg	116.00	168.46	**With Grille**
1539.24	55.42	V	74.00	-18.58	Peak	226.00	146.97	**S/N: 16779 - X-Axis**
1539.24	35.42	V	54.00	-18.58	Avg	226.00	146.97	**With Grille**
1539.24	50.13	H	74.00	-23.87	Peak	268.75	144.94	**S/N: 16779 - X-Axis**
1539.24	30.13	H	54.00	-23.87	Avg	268.75	144.94	**With Grille**

FCC 15.247 and FCC Class B

Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Y-Axis
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	70.18	V	74.00	-3.82	Peak	165.00	210.55	**S/N: 16779 - Y-Axis**
1231.38	50.18	V	54.00	-3.82	Avg	165.00	210.55	**With Grille**
1231.38	67.62	H	74.00	-6.38	Peak	217.25	188.64	**S/N: 16779 - Y-Axis**
1231.38	47.62	H	54.00	-6.38	Avg	217.25	188.64	**With Grille**
1539.24	52.83	V	74.00	-21.17	Peak	182.00	111.20	**S/N: 16779 - Y-Axis**
1539.24	32.83	V	54.00	-21.17	Avg	182.00	111.20	**With Grille**
1539.24	51.24	H	74.00	-22.76	Peak	128.25	116.76	**S/N: 16779 - Y-Axis**
1539.24	31.24	H	54.00	-22.76	Avg	128.25	116.76	**With Grille**

FCC 15.247 and FCC Class B

Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-001

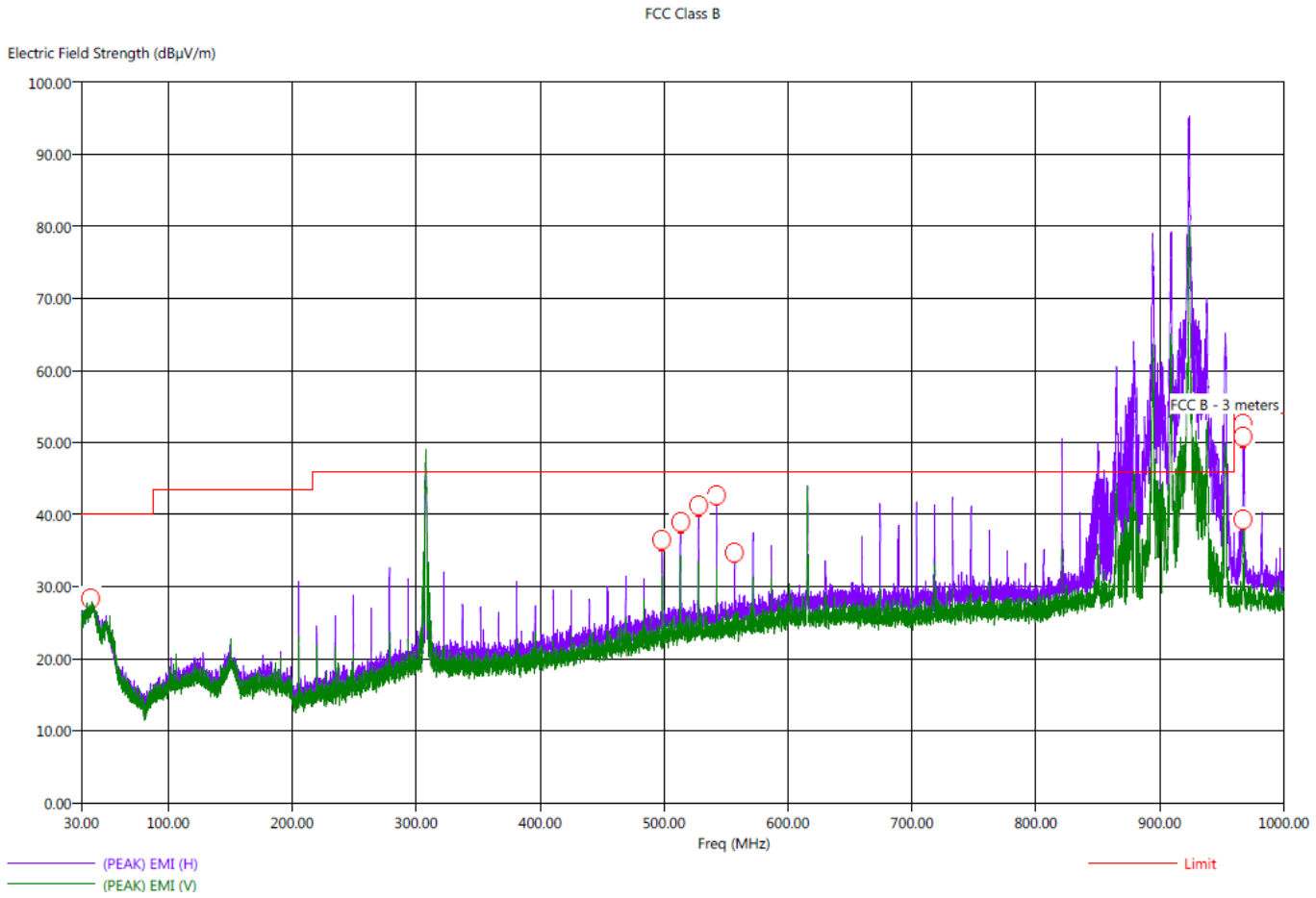
Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Z-Axis
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	64.79	V	74.00	-9.21	Peak	334.75	161.23	**S/N: 16779 - Z-Axis**
1231.38	44.79	V	54.00	-9.21	Avg	334.75	161.23	**With Grille**
1231.38	70.99	H	74.00	-3.01	Peak	294.00	197.53	**S/N: 16779 - Z-Axis**
1231.38	50.99	H	54.00	-3.01	Avg	294.00	197.53	**With Grille**
1539.24	50.66	V	74.00	-23.34	Peak	22.00	141.47	**S/N: 16779 - Z-Axis**
1539.24	30.66	V	54.00	-23.34	Avg	22.00	141.47	**With Grille**
1539.24	56.20	H	74.00	-17.80	Peak	272.25	138.13	**S/N: 16779 - Z-Axis**
1539.24	36.20	H	54.00	-17.80	Avg	272.25	138.13	**With Grille**

Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - Z-Axis - FCC Class B - SD-001 - 30 MHz to 1000 MHz - 04-25-2016.set
Operator: Kyle Fujimoto
EUT Type: Smoke Detector Unit
EUT Condition: The EUT is Continuously Transmitting - Z-Axis
Comments: Company: Ontic Engineering & Manufacturing, Inc.
Model: SD-001
Note #1: Frequencies at 615.71 MHz to 959.99 MHz have the same Modulation as the Transmitter and are not in the restricted band, so subject to FCC 15.247 (d) limits
Note #2: The frequency at 307.85 MHz also has the same Modulation as the Transmitter and is not in the restricted band, so subject to FCC 15.247 (d) limits

4/25/2016 2:09:52 PM
Sequence: Preliminary Scan



No additional emissions were found between 10 kHz – 30 MHz.

Title: Radiated Final - FCC Class B
File: Rohde & Schwarz - Final Scan - Z-Axis - FCC Class B - SD-001 - 30 MHz to 1000 MHz - 04-25-2016.set
Operator: Kyle Fujimoto
EUT Type: Smoke Detector Unit
EUT Condition: The EUT is Continuously Transmitting - Z-Axis - Worst Case
Comments: Company: Ontic Engineering & Manufacturing, Inc.
Model: SD-001
Note #1: No Frequencies Detected below 30 MHz

4/25/2016 3:31:17 PM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Agl (deg)	Twr Ht (cm)
37.40	H	28.31	22.74	-11.69	-17.26	40.00	24.82	0.38	156.25	327.62
498.50	H	39.55	37.43	-6.45	-8.57	46.00	21.55	1.74	13.25	177.05
513.10	H	42.19	40.47	-3.81	-5.53	46.00	21.82	1.78	350.75	177.05
527.80	H	44.01	42.59	-1.99	-3.41	46.00	22.05	1.83	29.00	161.77
542.50	H	44.68	43.53	-1.32	-2.47	46.00	22.28	1.88	39.25	161.17
557.00	H	41.95	39.73	-4.05	-6.27	46.00	22.59	1.91	23.25	194.07
967.30	H	52.65	50.33	-1.35	-3.67	54.00	25.86	2.69	315.00	227.08
967.50	H	54.97	52.89	0.97	-1.11	54.00	25.86	2.69	346.25	144.70
967.60	V	44.08	40.62	-9.92	-13.38	54.00	25.86	2.69	278.25	258.61
967.70	H	54.13	52.01	0.13	-1.99	54.00	25.86	2.69	306.50	144.52
967.90	H	53.36	51.09	-0.64	-2.91	54.00	25.86	2.69	304.75	143.68

RADIATED EMISSIONS

DATA SHEETS

MODEL SD-002

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	47.92	V	74.00	-26.08	Peak	286.00	165.05	
2770.74	27.92	V	54.00	-26.08	Avg	286.00	165.05	
3694.32	49.25	V	74.00	-24.75	Peak	315.75	255.56	
3694.32	29.25	V	54.00	-24.75	Avg	315.75	255.56	
4617.90	50.88	V	74.00	-23.12	Peak	133.00	144.10	
4617.90	30.88	V	54.00	-23.12	Avg	133.00	144.10	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	49.26	V	74.00	-24.74	Peak	355.00	136.16	
2770.74	29.26	V	54.00	-24.74	Avg	355.00	136.16	
3694.32	49.24	V	74.00	-24.76	Peak	355.00	155.98	
3694.32	29.24	V	54.00	-24.76	Avg	355.00	155.98	
4617.90	50.36	V	74.00	-23.64	Peak	316.25	172.58	
4617.90	30.36	V	54.00	-23.64	Avg	316.25	172.58	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	47.90	V	74.00	-26.10	Peak	316.25	181.47	
2770.74	27.90	V	54.00	-26.10	Avg	316.25	181.47	
3694.32	49.15	V	74.00	-24.85	Peak	190.00	188.22	
3694.32	29.15	V	54.00	-24.85	Avg	190.00	188.22	
4617.90	50.60	V	74.00	-23.40	Peak	358.25	240.28	
4617.90	30.60	V	54.00	-23.40	Avg	358.25	240.28	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	42.53	H	74.00	-31.47	Peak	352.25	109.35	
2770.74	22.53	H	54.00	-31.47	Avg	352.25	109.35	
3694.32	46.58	H	74.00	-27.42	Peak	98.00	161.71	
3694.32	26.58	H	54.00	-27.42	Avg	98.00	161.71	
4617.90	48.52	H	74.00	-25.48	Peak	302.25	128.04	
4617.90	28.52	H	54.00	-25.48	Avg	302.25	128.04	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	49.97	H	74.00	-24.03	Peak	15.50	183.38	
2770.74	29.97	H	54.00	-24.03	Avg	15.50	183.38	
3694.32	49.17	H	74.00	-24.83	Peak	339.25	145.26	
3694.32	29.17	H	54.00	-24.83	Avg	339.25	145.26	
4617.90	50.71	H	74.00	-23.29	Peak	236.75	145.41	
4617.90	30.71	H	54.00	-23.29	Avg	236.75	145.41	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1847.16								**Not in**
1847.16								**Restricted Band**
2770.74	48.70	H	74.00	-25.30	Peak	327.25	133.00	
2770.74	28.70	H	54.00	-25.30	Avg	327.25	133.00	
3694.32	50.64	H	74.00	-23.36	Peak	11.25	242.01	
3694.32	30.64	H	54.00	-23.36	Avg	11.25	242.01	
4617.90	50.71	H	74.00	-23.29	Peak	134.75	256.94	
4617.90	30.71	H	54.00	-23.29	Avg	134.75	256.94	
5541.48								**Not in**
5541.48								**Restricted Band**
6465.06								**Not in**
6465.06								**Restricted Band**
7388.64								**No Emission**
7388.64								**Detected**
8312.22								**No Emission**
8312.22								**Detected**
9235.80								**Not in**
9235.80								**Restricted Band**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

X-Axis
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	70.86	V	74.00	-3.14	Peak	351.75	246.61	**S/N: 16779 - X-Axis**
1231.38	50.86	V	54.00	-3.14	Avg	351.75	246.61	**No Grille**
1231.38	65.50	H	74.00	-8.50	Peak	279.00	165.47	**S/N: 16779 - X-Axis**
1231.38	45.50	H	54.00	-8.50	Avg	279.00	165.47	**No Grille**
1539.24	55.11	V	74.00	-18.89	Peak	361.25	209.65	**S/N: 16779 - X-Axis**
1539.24	33.11	V	54.00	-20.89	Avg	361.25	209.65	**No Grille**
1539.24	50.09	H	74.00	-23.91	Peak	87.50	116.94	**S/N: 16779 - X-Axis**
1539.24	30.09	H	54.00	-23.91	Avg	87.50	116.94	**No Grille**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Y-Axis
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	69.07	V	74.00	-4.93	Peak	355.00	161.00	**S/N: 16779 - Y-Axis**
1231.38	49.07	V	54.00	-4.93	Avg	355.00	161.00	**No Grille**
1231.38	66.15	H	74.00	-7.85	Peak	69.00	144.82	**S/N: 16779 - Y-Axis**
1231.38	46.15	H	54.00	-7.85	Avg	69.00	144.82	**No Grille**
1539.24	52.45	V	74.00	-21.55	Peak	166.50	144.58	**S/N: 16779 - Y-Axis**
1539.24	32.45	V	54.00	-21.55	Avg	166.50	144.58	**No Grille**
1539.24	54.01	H	74.00	-19.99	Peak	207.50	150.37	**S/N: 16779 - Y-Axis**
1539.24	34.01	H	54.00	-19.99	Avg	207.50	150.37	**No Grille**

FCC 15.247
Ontic Engineering & Manufacturing, Inc.
Smoke Detector Unit
Model: SD-002

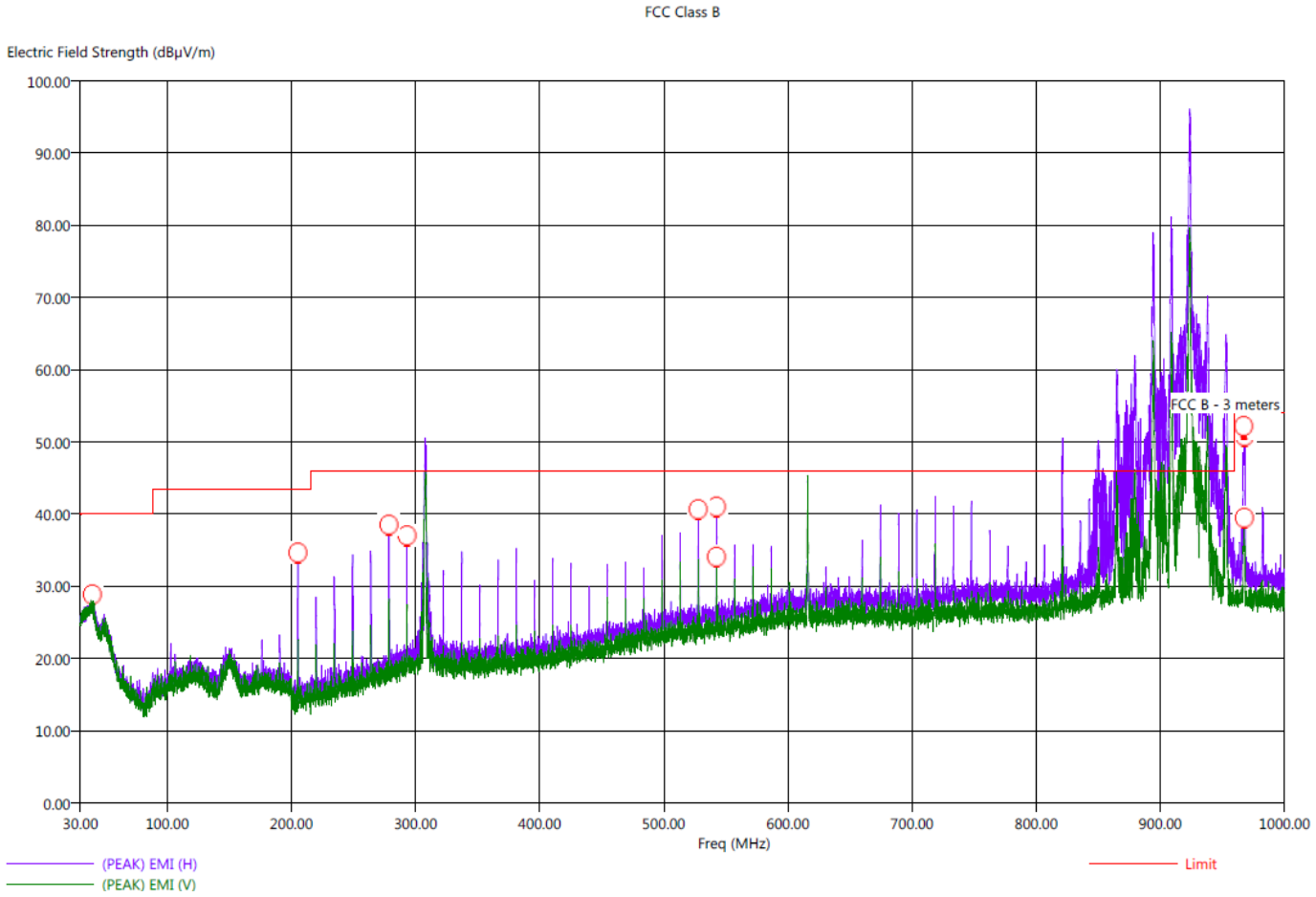
Date: 04/26/2016
Lab: D
Tested By: Kyle Fujimoto

Z-Axis
Non Harmonic Emissions from the Tx and Digital Portion - 1 GHz to 9.3 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
1231.38	64.78	V	74.00	-9.22	Peak	88.25	100.04	**S/N: 16779 - Z-Axis**
1231.38	44.78	V	54.00	-9.22	Avg	88.25	100.04	**No Grille**
1231.38	70.20	H	74.00	-3.80	Peak	5.00	136.04	**S/N: 16779 - Z-Axis**
1231.38	50.20	H	54.00	-3.80	Avg	5.00	136.04	**No Grille**
1539.24	53.67	V	74.00	-20.33	Peak	133.00	125.89	**S/N: 16779 - Z-Axis**
1539.24	33.67	V	54.00	-20.33	Avg	133.00	125.89	**No Grille**
1539.24	56.17	H	74.00	-17.83	Peak	81.75	149.00	**S/N: 16779 - Z-Axis**
1539.24	36.17	H	54.00	-17.83	Avg	81.75	149.00	**No Grille**

Title: Pre-Scan - FCC Class B
File: Rohde & Schwarz - Pre-Scan - Z-Axis - FCC Class B - SD-002 - 30 MHz to 1000 MHz - 04-25-2016.set
Operator: Kyle Fujimoto
EUT Type: Smoke Detector Unit
EUT Condition: The EUT is Continuously Transmitting - Z-Axis
Comments: Company: Ontic Engineering & Manufacturing, Inc.
Model: SD-002
Note #1: Frequencies at 615.71 MHz to 959.99 MHz have the same Modulation as the Transmitter and are not in the restricted band, so subject to FCC 15.247 (d) limits
Note #2: The frequency at 307.85 MHz also has the same Modulation as the Transmitter and is not in the restricted band, so subject to FCC 15.247 (d) limits

4/25/2016 10:59:18 AM
Sequence: Preliminary Scan



No additional emissions were found between 10 kHz – 30 MHz.

Title: Radiated Final - FCC Class B
File: Rohde & Schwarz - Final Scan - Z-Axis - FCC Class B - SD-002 - 30 MHz to 1000 MHz - 04-25-2016.set
Operator: Kyle Fujimoto
EUT Type: Smoke Detector Unit
EUT Condition: The EUT is Continuously Transmitting - Z-Axis - Worst Case
Comments: Company: Ontic Engineering & Manufacturing, Inc.
Model: SD-002
Note #1: No Frequencies Detected below 30 MHz

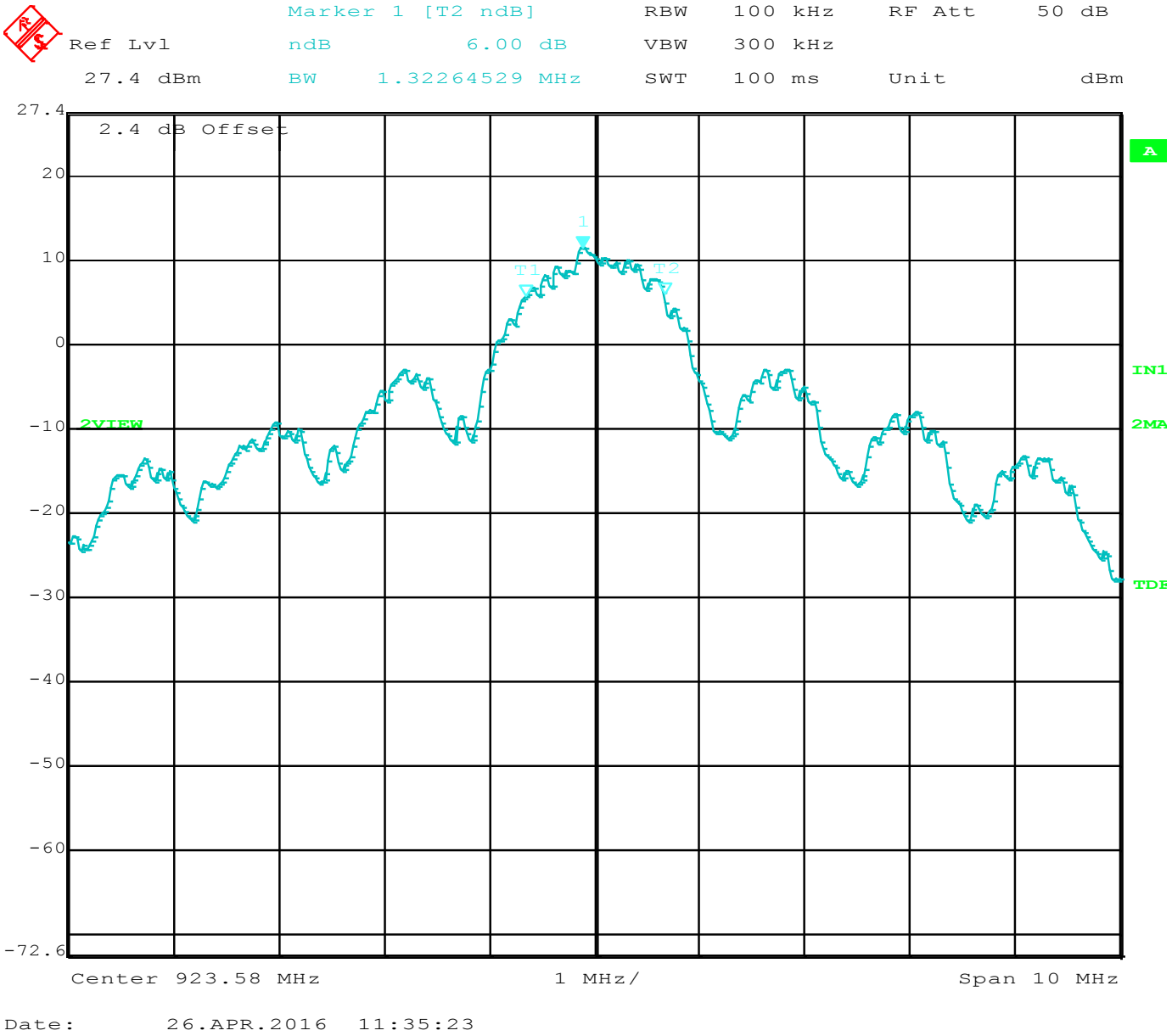
4/25/2016 11:27:03 AM
Sequence: Final Measurements

FCC Class B

Freq (MHz)	Pol	(PEAK) EMI (dBµV/m)	(QP) EMI (dBµV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBµV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (deg)	Twr Ht (cm)
39.60	H	28.55	23.29	-11.45	-16.71	40.00	25.35	0.39	23.25	161.65
205.20	H	34.47	33.49	-9.03	-10.01	43.50	13.27	1.11	110.25	210.49
278.60	H	38.25	36.94	-7.75	-9.06	46.00	17.02	1.29	105.75	161.05
293.20	H	35.08	33.09	-10.92	-12.91	46.00	17.83	1.35	47.75	128.70
527.80	H	43.95	42.43	-2.05	-3.57	46.00	22.05	1.83	211.00	160.76
542.50	H	45.49	44.41	-0.51	-1.59	46.00	22.28	1.88	208.00	161.00
542.50	V	40.62	38.81	-5.38	-7.19	46.00	22.28	1.88	203.00	111.86
967.20	H	43.17	39.93	-10.83	-14.07	54.00	25.86	2.69	346.25	111.74
967.50	H	54.12	51.92	0.12	-2.08	54.00	25.86	2.69	210.75	144.64
967.70	V	43.15	39.62	-10.85	-14.38	54.00	25.86	2.69	178.00	194.73
967.90	H	44.45	40.91	-9.55	-13.09	54.00	25.86	2.69	346.50	210.97

-6 dB BANDWIDTH

DATA SHEETS



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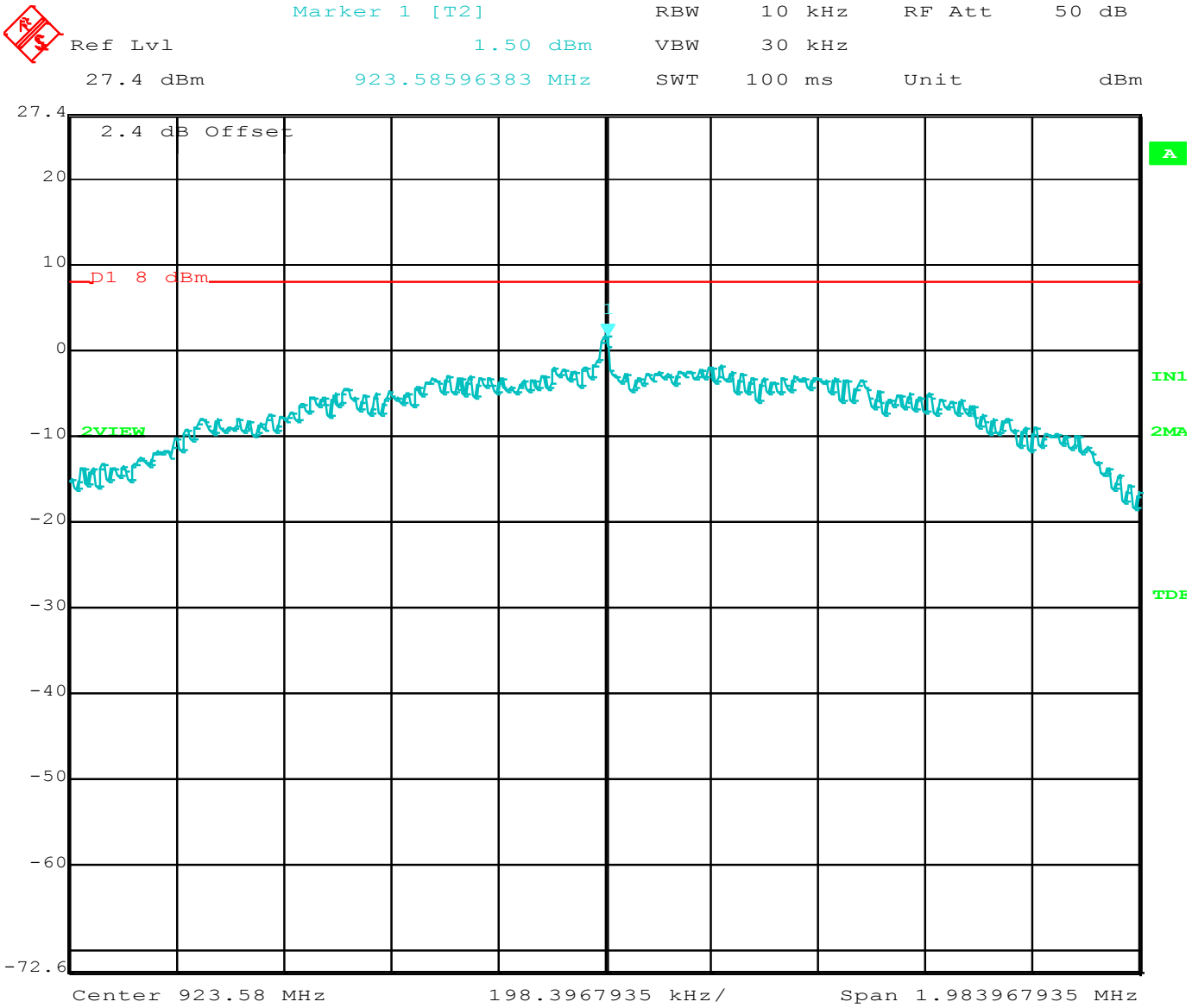
-6 dB Bandwidth

SPECTRAL DENSITY OUTPUT

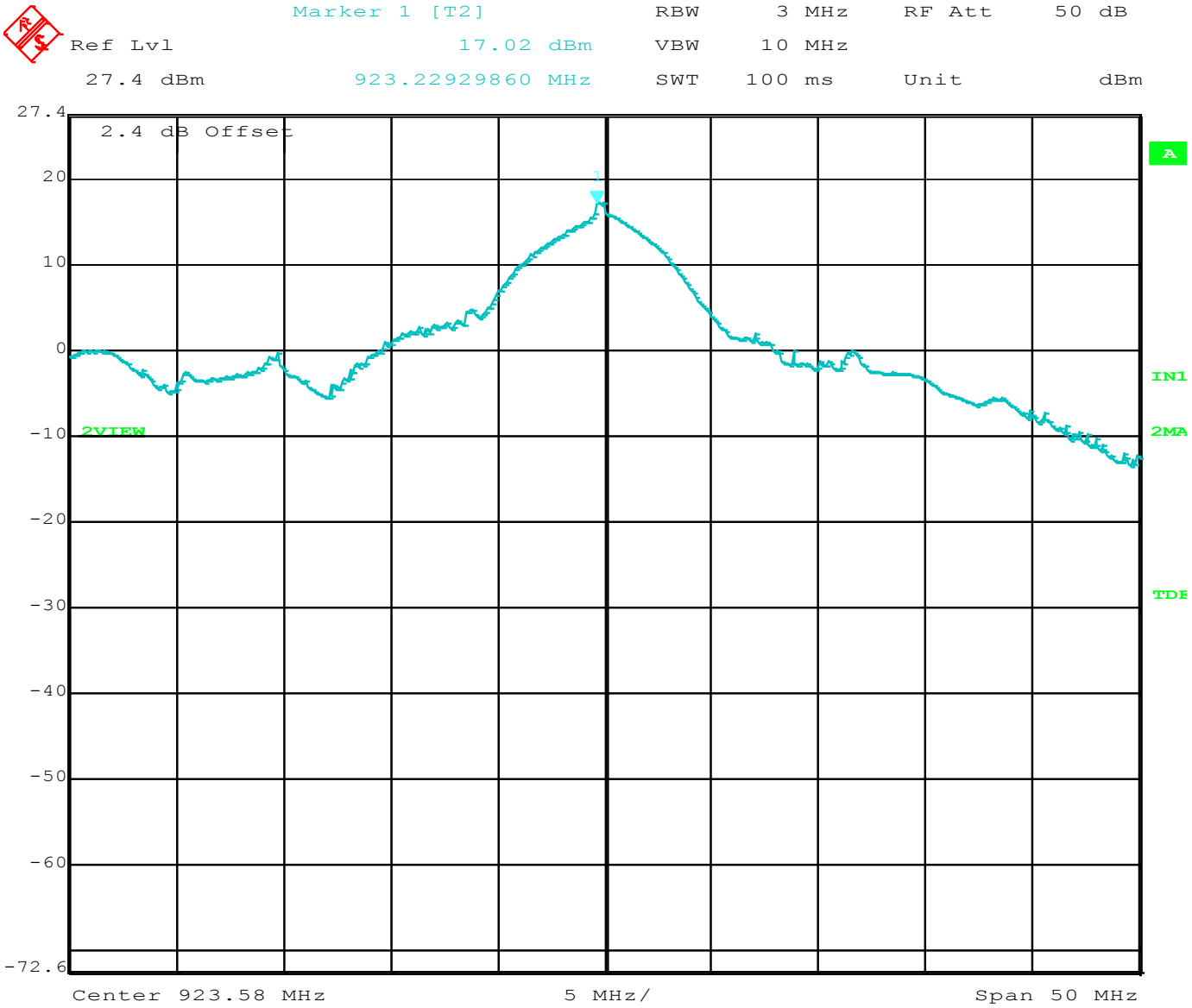
DATA SHEETS



Spectral Density

PEAK POWER

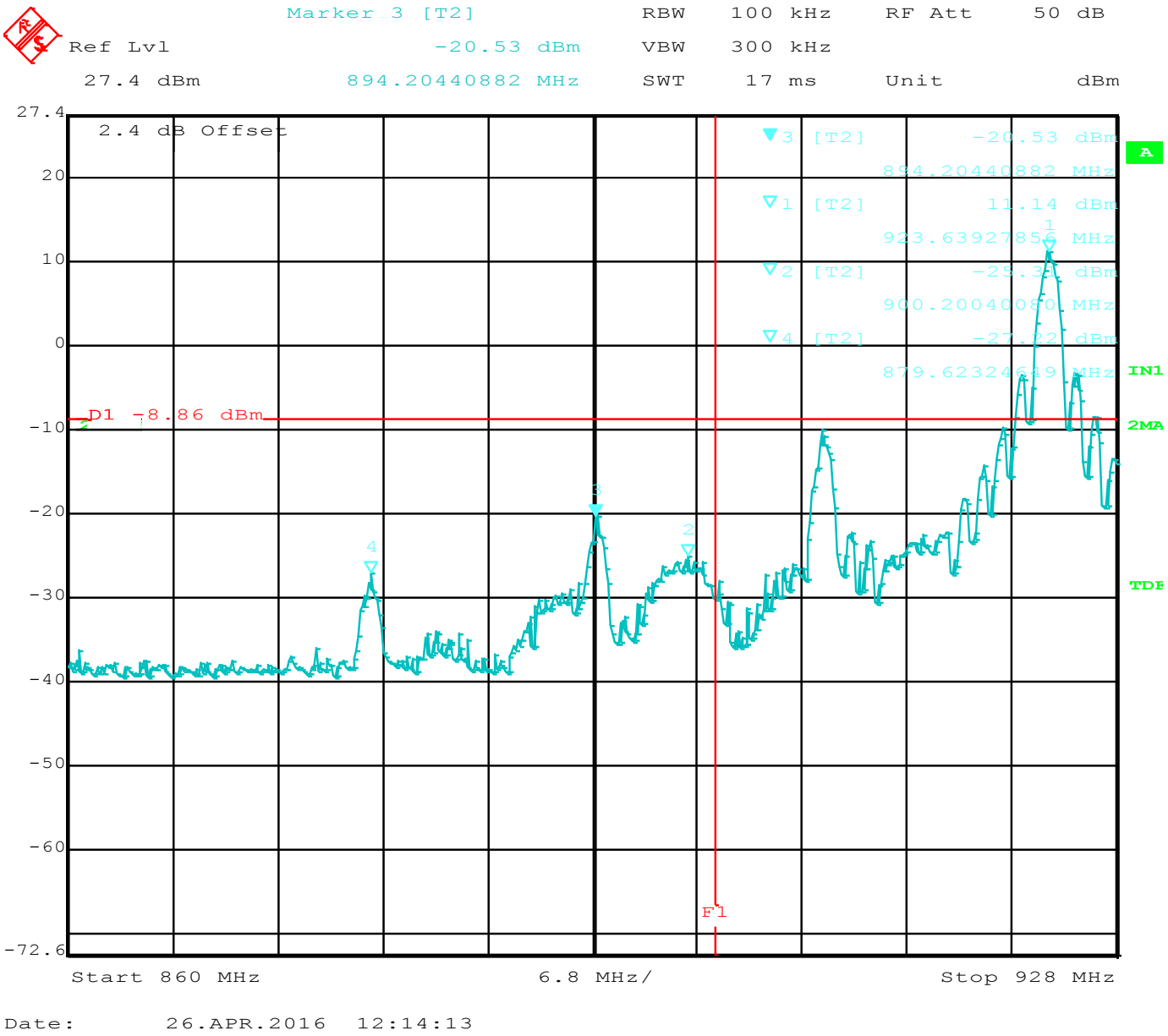
DATA SHEETS



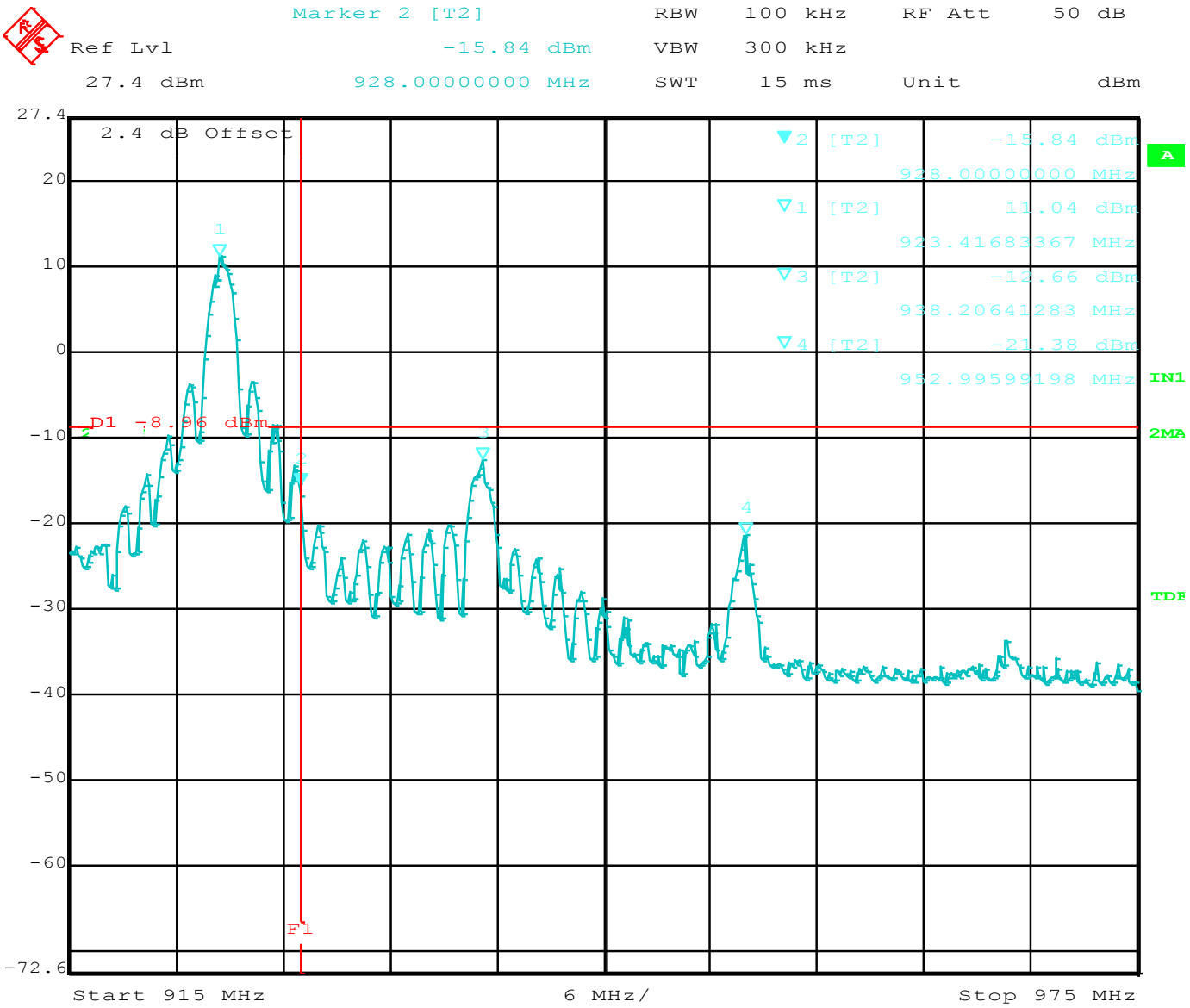
Peak Power Output

BAND EDGES

DATA SHEETS



Low Band Edge



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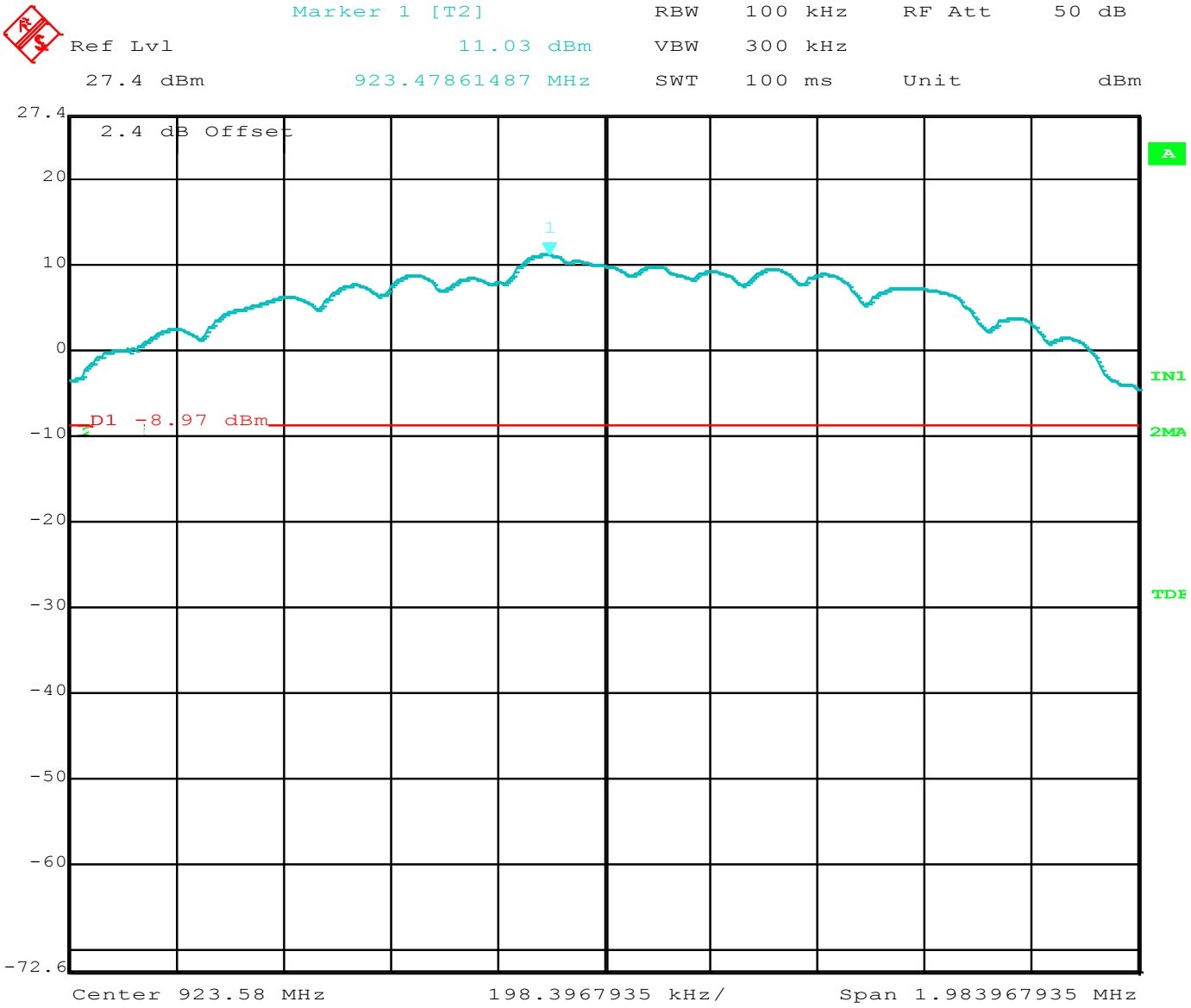
High Band Edge

EMISSIONS IN
NON-RESRTICTED BANDS
DATA SHEETS



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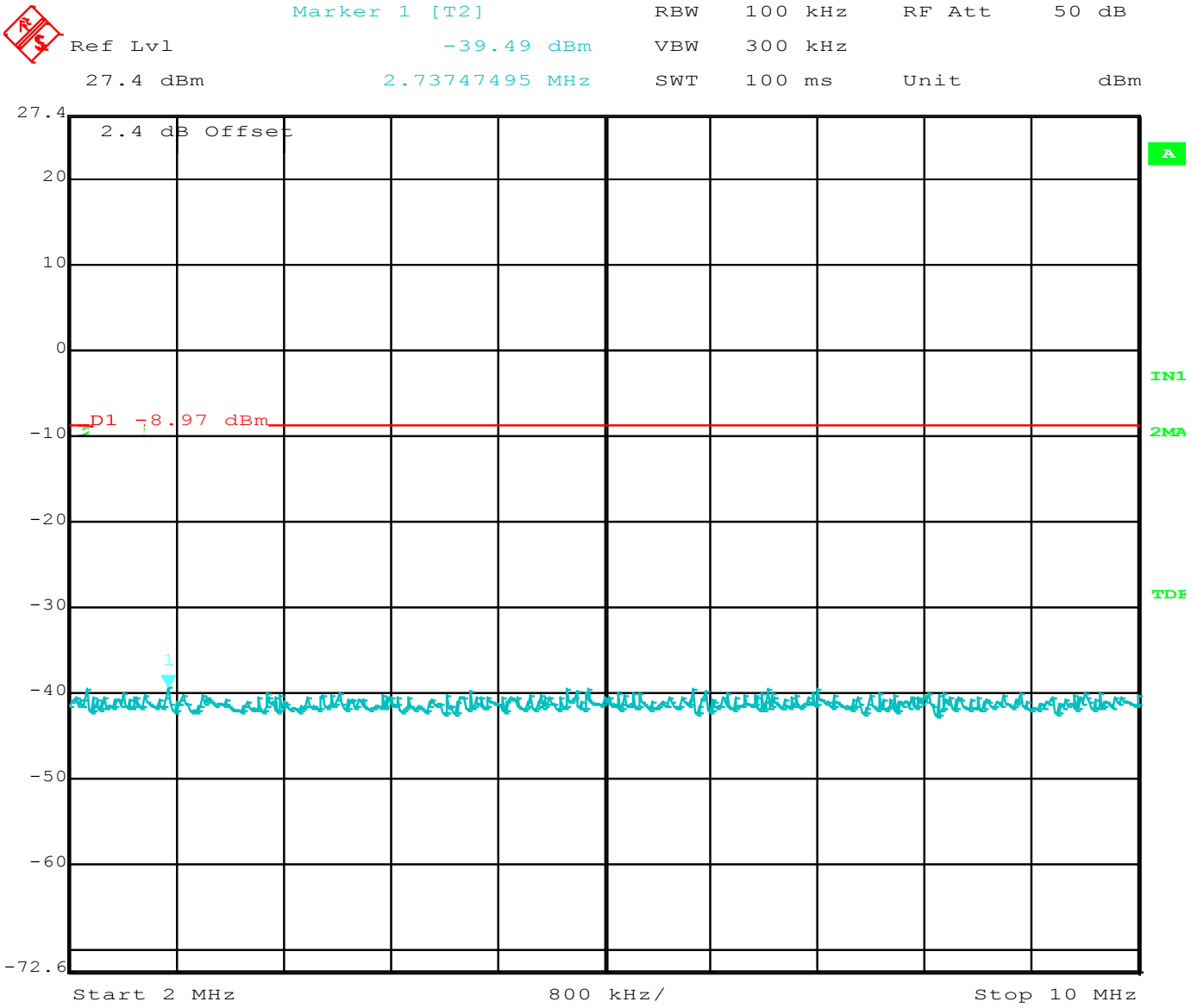

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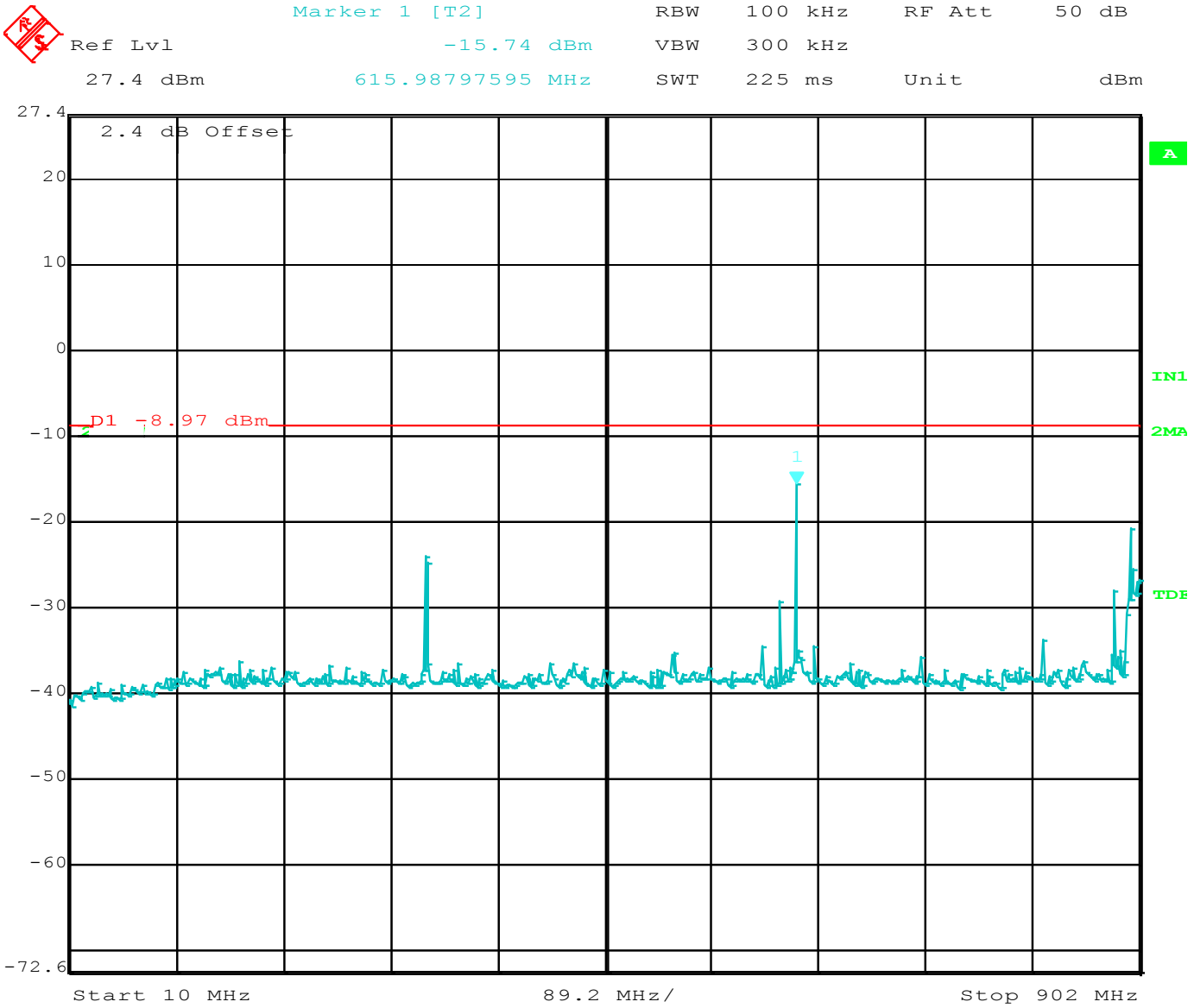

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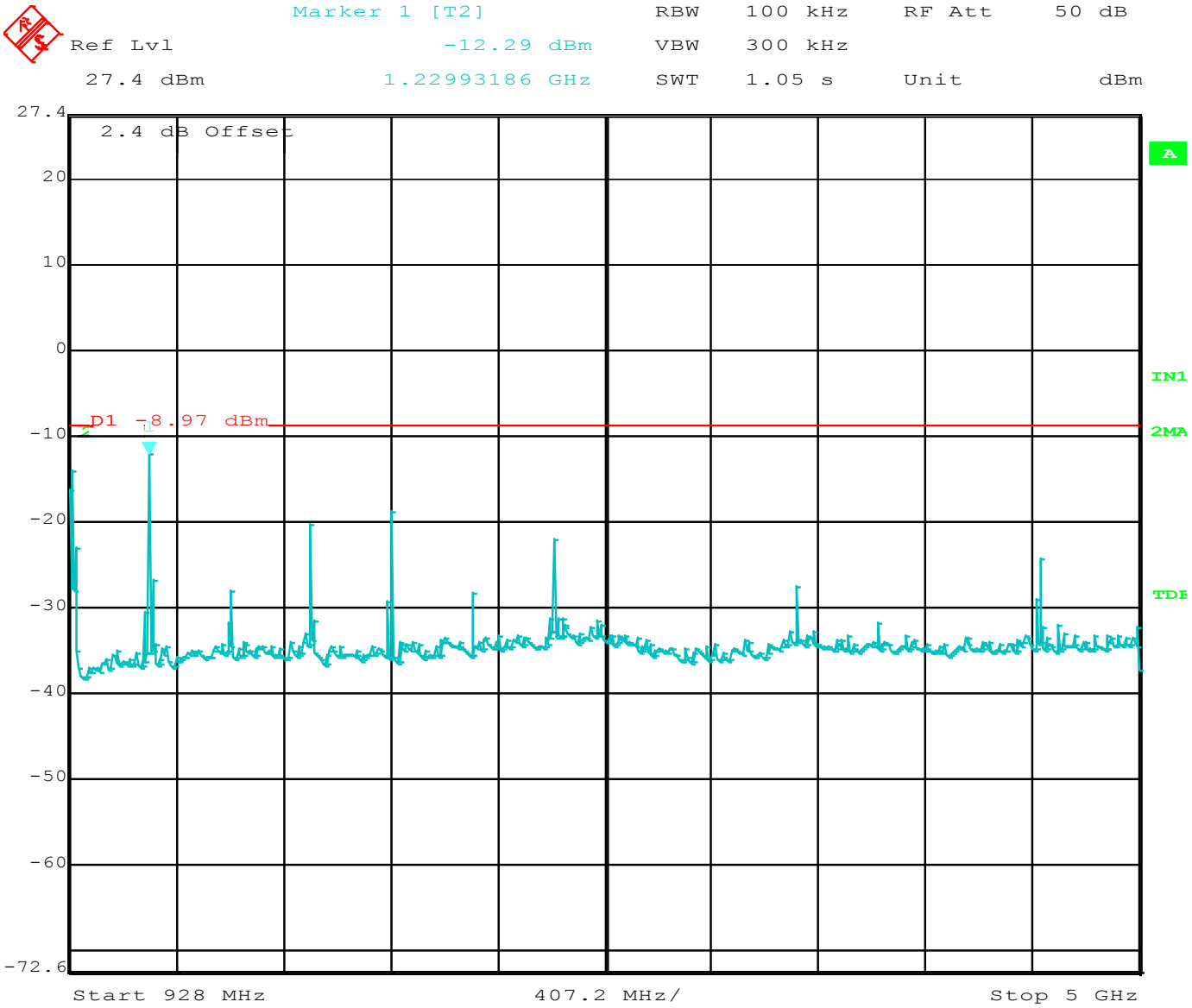

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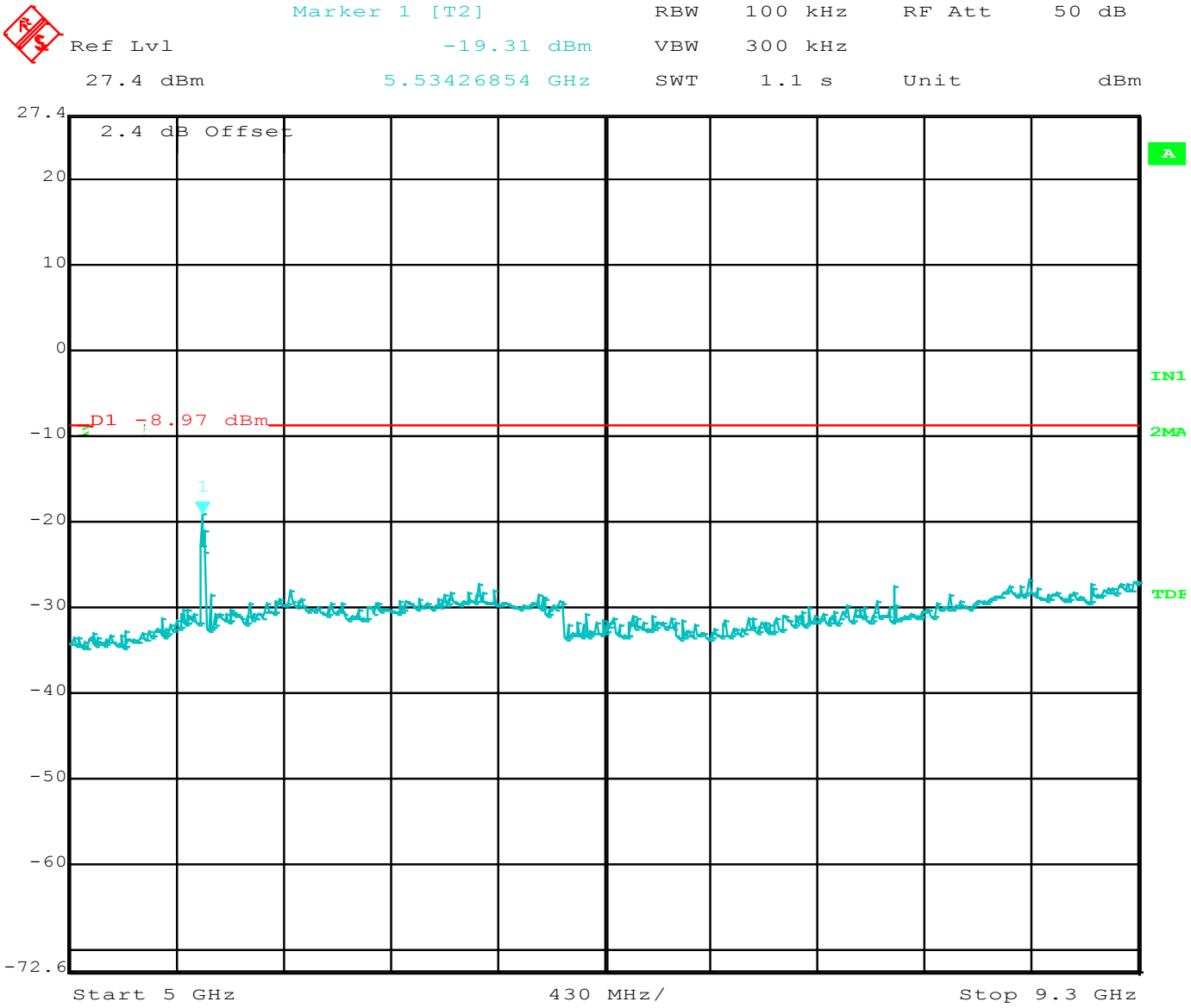

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