FCC PART 15, SUBPART B and C
TEST REPORT

for

SMART PROFILE

MODEL: 15051102-A

Prepared for

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DATE: DECEMBER 29, 2010

	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 endorsement by NVLAP, NIST, or any other agency of the U.S. Government.

Device Tested:	Smart Profile Model: 15051102-A S/N: N/A
Product Description:	See Expository Statement.
Modifications:	The EUT was not modified during the testing.
Manufacturer:	Smartfield, Inc. 2601 SE Loop 289 Lubbock, Texas 79404
Test Dates:	December 13, 15, and 17, 2010
Test Specifications:	EMI requirements Limits: CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247
Test Procedure:	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	This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.
2	Spurious Radiated RF Emissions, 10 kHz – 9.3 GHz	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) Highest reading in relation to spec limit: 31.19 dBuV @ 49.87 MHz (*U = 3.18 dB)
3	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)
4	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(a), and section 15.247 (d)
5	6 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(a)(2)
6	Peak Power Output	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(b)(3)
7	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d)
8	Peak Power Spectral Density Conducted 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 Electromagnetic Interference (EMI) tests performed on the Smart Profile, Model: 15051102-A. The EMI measurements were performed according to the measurement procedure described in 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 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 EMI tests of the testing described herein were performed at the test facility of Compatible Electronics at 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

Smartfield, Inc.

Tommy Martin	CEO
Joel Hohenberger	Engineer

Compatible Electronics, Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer
Alex Benitez	Test Technician

2.4 Date Test Sample was Received

The test sample was received prior to the first date of testing.

2.5 Disposition of the Test Sample

The sample has not been returned to Smartfield, Inc. as of December 29, 2010.

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
LO	Local Oscillator
LISN	Line Impedance Stabilization Network
NCR	No Calibration Required
N/A	Not Available or Not Applicable
Tx	Transmitter
Rx	Receive or Receiver

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.4 2009	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
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The Smart Profile, Model: 15051102-A (EUT), was connected to (4) watermark sensors and (4) temperature sensors via its WM and TH ports, respectively. The EUT was also connected to the antenna via its RF port. The EUT operates on battery power.

The EUT was continuously transmitting or receiving depending on the test being performed.

The channel for the EUT was changed via connecting a serial cable from the EUT's diagnostic port to a computer system. This cable was only connected when the channel needed to be changed and was removed during the testing. This cable is only connected for development and testing purposes and is not available to the end user.

Note: Two different antennas will be used on the RF output. As both antennas are of the same type, only the highest gain version was tested.

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

4.1.1 Cable Construction and Termination

Cable 1 This is a 5-meter unshielded cable connecting temperature sensor #1 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 2 This is a 2-meter unshielded cable connecting watermark sensor #1 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 3 This is a 5-meter unshielded cable connecting temperature sensor #2 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 4 This is a 2-meter unshielded cable connecting watermark sensor #2 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 5 This is a 5-meter unshielded cable connecting temperature sensor #3 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 6 This is a 2-meter unshielded cable connecting watermark sensor #3 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 7 This is a 5-meter unshielded cable connecting temperature sensor #4 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 8 This is a 2-meter unshielded cable connecting watermark sensor #4 to the EUT. The cable is hard wired at each end. The cable was bundled to a length of 1-meter.

Cable 9 This is a 2.5-meter braid shielded cable connecting the antenna to the EUT. The cable has an SMA connector at the EUT end and is hard wired into the antenna. The cable was bundled to a length of 1-meter. The shield of the cable was grounded to the chassis via the connector.

4.1.2 Cable Construction and Termination (Continued)

Cable 10 **(To Change Channels Only)**
This is a 20-centimeter unshielded cable connecting the EUT to the TTL converter. The cable has a 14 pin connector at the EUT end and a D-9 pin metallic connector at the TTL converter end.

Cable 11 **(To Change Channels Only)**
This is a 2-meter braid and foil shielded cable connecting the computer to the TTL converter. The cable has a D-9 pin metallic connector at each end. The shield of the cable was grounded to the chassis via the connectors.

Cable 12 **(To Change Channels Only)**
This is a 2-meter braid and foil shielded connecting the computer to the monitor. The cable has a high desntiy D-15 metallic connector at at the computer end and is hard wired into the monitor. The shield of the cable was grounded to the chassis via the connector.

Cable 13 **(To Change Channels Only)**
This is a 2-meter foil shielded connecting the computer to the keyboard. The cable has a 6 pin mini DIN connector at the computer end and is hard wired into the keyboard. The shield of the cable was grounded to the chassis via the connector.

Cable 14 **(To Change Channels Only)**
This is a 2-meter foil shielded connecting the computer to the mouse. The cable has a 6 pin mini DIN connector at the computer end and is hard wired into the mouse. The shield of the cable was grounded to the chassis via the connector.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
SMART PROFILE (EUT)	SMARTFIELD, INC.	15051102-A	N/A	**W9B15051102-A**
(4) WATERMARK SENSORS	SMARTFIELD, INC.	N/A	N/A	**N/A**
(4) TEMPERATURE SENSORS	SMARTFIELD, INC.	N/A	N/A	**N/A**
BATTERY	POWER SONIC	PS-612	N/A	**N/A**
ANTENNA	N/A	BBT-Q081805GH	N/A	**N/A**
TTL CONVERTER (for changing channels only)	B&B ELECTRONICS	232LPTTL33	N/A	**N/A**
COMPUTER (for changing channels only)	DELL	DH6	HC7R431	**DoC**
MONITOR (for changing channels only)	ALAWAR	P/N: 997-2282-00	23T234400800	**DoC**
KEYBOARD (for changing channels only)	DELL	RT7D20	CN-04N454-37172-4C3-010J	**AQ6-7D20**
MOUSE (for changing channels only)	DELL	M056V0A	G0P028G6	**DoC**

5.2 EMI Test Equipment for Brea Facility

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100218	April 9, 2009	April 9, 2011
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT					
Biconical Antenna	Com-Power	AB-900	15250	June 18, 2010	June 18, 2011
Log Antenna	Com-Power	AL-100	16252	June 9, 2010	June 9, 2011
Preamplifier	Com-Power	PA-102	1017	January 6, 2010	January 6, 2011
Horn Antenna	Com-Power	AH-118	071175	March 18, 2010	March 18, 2012
Loop Antenna	Com-Power	AL-130	17089	September 29, 2008	September 29, 2011
Microwave Preamplifier	Com-Power	PA-122	181921	March 10, 2010	March 10, 2011
Antenna Mast	Com Power	AM-100	N/A	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 EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Antenna Gain

The Model: BBT-Q081805GH antenna has a gain of 5 dBi. The Model: TQC-800 / 1900-3B antenna has a gain of 3 dBi. As both antennas are of the same type, only the Model: BBT-Q081805GH antenna was tested.

8. TEST PROCEDURES

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

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI Receiver was used as a measuring meter. 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 EMI Receiver input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the EMI Receiver. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

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

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

Test Results:

This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.

8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI Receiver was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifiers Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies from 1 GHz to 9.3 GHz. The EMI Receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI Receiver records the highest measured reading over all the sweeps.

The quasi-peak function was used only for those readings which are marked accordingly on the data sheets.

The frequencies above 1 GHz were averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated.

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to 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 by the Radiated Emission Manual Test software. 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.

Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3-meter test distance to obtain the final data.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247 (d). Please see the data sheets located in Appendix E.

8.2 6 dB Bandwidth

The 6 dB bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the RF out on the EUT. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Test Results:

This test complies with the relevant requirements of CFR 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 RF output of 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.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (b)(3).

8.4 RF Antenna Conducted Test

The RF antenna conducted test was taken using the EMI Receiver. The RF antenna conducted test was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The resolution bandwidth was 100 kHz, and the video bandwidth 1 MHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (d).

8.5 Spectral Density Output

The spectral 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 resolution bandwidth was 3 kHz, and the video bandwidth was 10 kHz. The highest 1.5 MHz of the signal was used as the frequency span with the sweep rate being 1 second for every 3 kHz of span.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (e).

8.6 RF Band Edges

The RF band edges were taken at the edges of the ISM spectrum (902 MHz when the EUT was on the low channel and 928 MHz when the EUT was on the high channel) using the EMI Receiver. The RBW was set to 100 kHz and the VBW was set to 300 kHz. Plots of the fundamental were taken to ensure the amplitude at the band edges were at least 20 dB down from the peak of the fundamental emission.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power at the band edges at 902 MHz and 928 MHz meet the requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). Please see the data sheets located in Appendix E.

9. CONCLUSIONS

The Smart Profile, Model: 15051102-A (EUT), 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 Subpart C specifications.

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

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Smart Profile Model: 15051102-A S/N: N/A

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

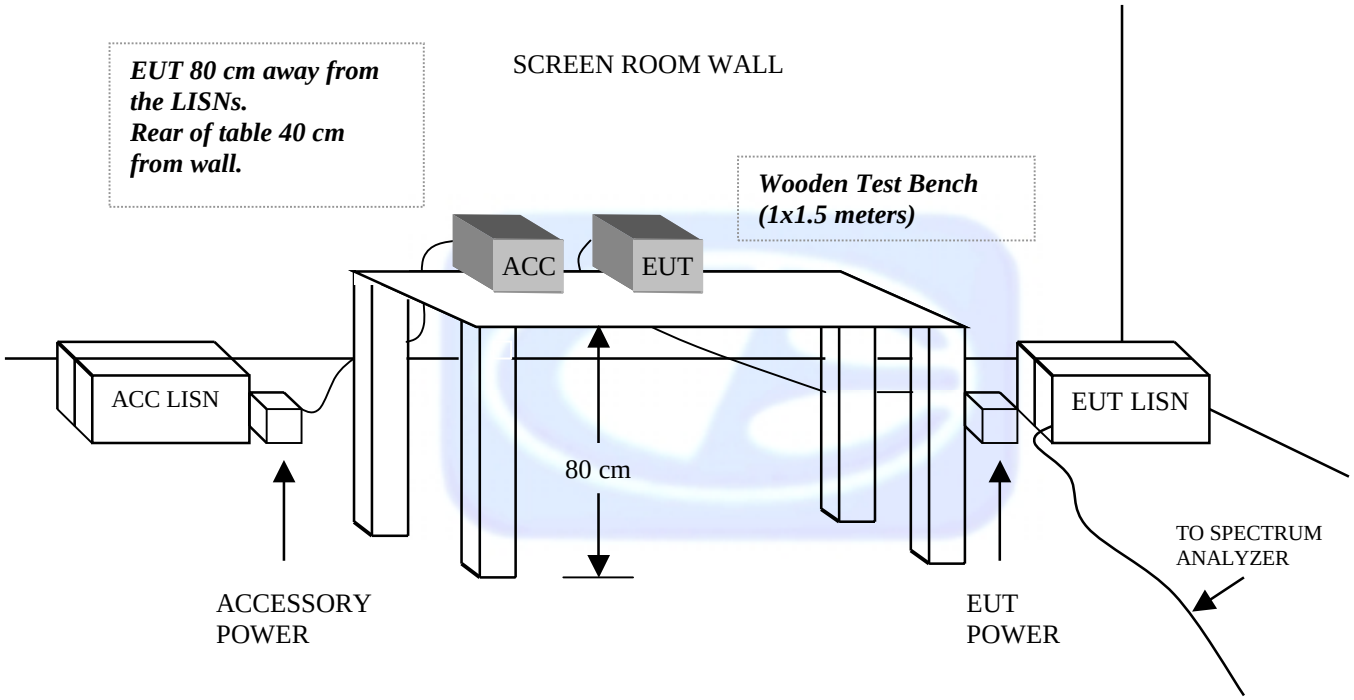
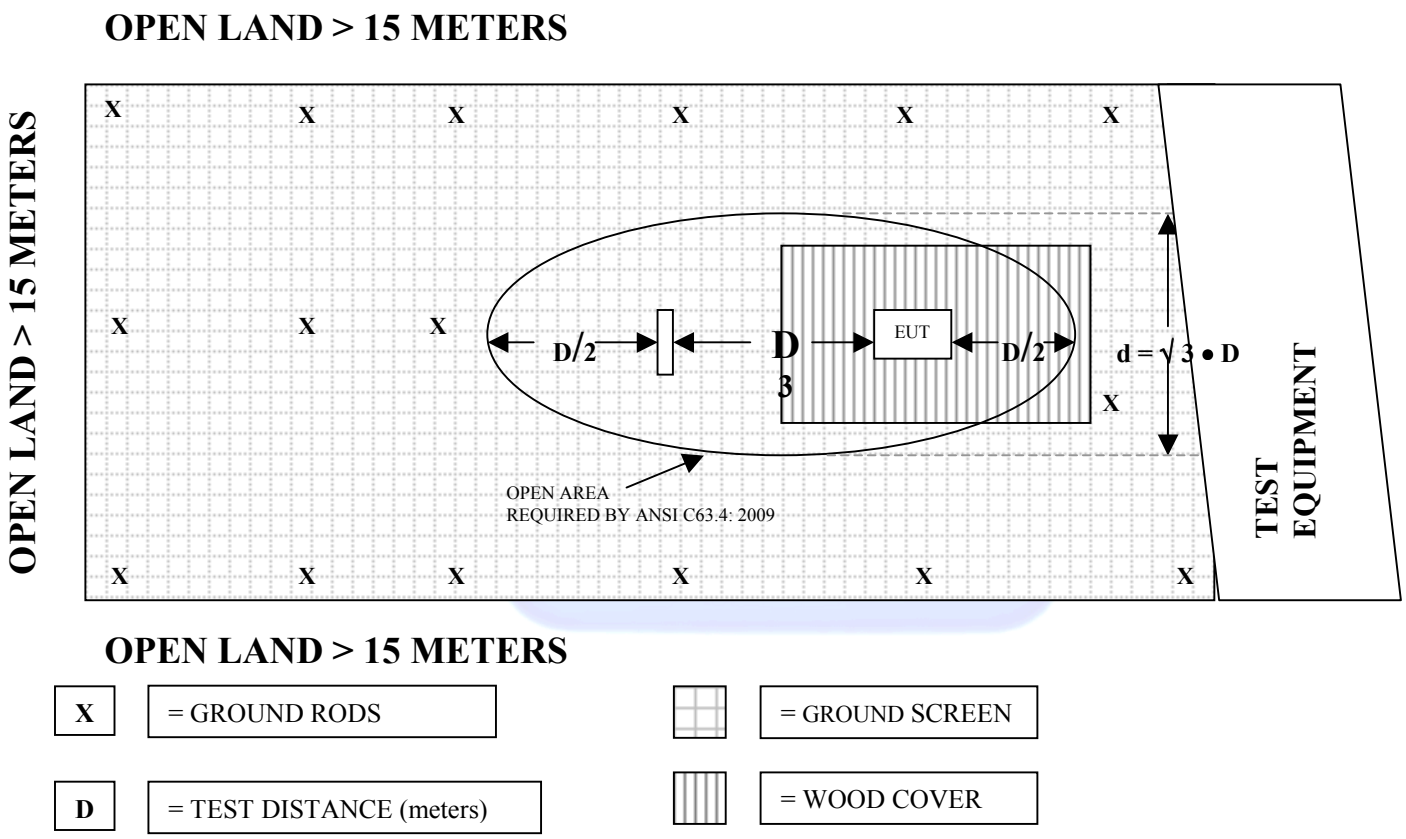


FIGURE 2: PLOT MAP AND LAYOUT OF 3 METER RADIATED SITE



FRONT VIEW

SMARTFIELD, INC.
SMART PROFILE
MODEL: 15051102-A
FCC SUBPART B and C – RADIATED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

SMARTFIELD, INC.
SMART PROFILE
MODEL: 15051102-A
FCC SUBPART B and C – RADIATED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15250

CALIBRATION DATE: JUNE 18, 2010

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	12.8	100	11.5
35	11.3	120	13.6
40	10.8	140	12.5
45	10.1	160	13.2
50	11.0	180	15.5
60	11.1	200	16.9
70	7.3	250	16.4
80	7.5	275	18.7
90	8.3	300	19.5

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16252

CALIBRATION DATE: JUNE 9, 2010

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.7	700	19.5
400	16.1	800	20.9
500	16.9	900	20.8
600	20.1	1000	21.5

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 6, 2010

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.3	300	38.2
40	38.4	350	38.1
50	38.2	400	38.5
60	38.2	450	38.0
70	38.3	500	37.9
80	38.1	550	38.2
90	38.2	600	38.2
100	38.3	650	37.7
125	38.2	700	38.3
150	38.3	750	38.3
175	38.3	800	37.4
200	38.1	850	37.5
225	38.2	900	37.6
250	38.3	950	37.4
275	38.2	1000	37.3

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: MARCH 18, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	22.2	10.0	39.8
1.5	24.2	10.5	40.2
2.0	27.2	11.0	39.7
2.5	27.8	11.5	39.9
3.0	30.5	12.0	41.7
3.5	30.9	12.5	42.7
4.0	31.9	13.0	42.3
4.5	33.2	13.5	40.3
5.0	33.6	14.0	42.6
5.5	36.2	14.5	43.4
6.0	35.8	15.0	41.9
6.5	36.1	15.5	40.8
7.0	37.9	16.0	41.0
7.5	37.4	16.5	41.5
8.0	38.0	17.0	44.5
8.5	38.8	17.5	47.6
9.0	38.0	18.0	50.8
9.5	39.2		

COM-POWER PA-122

PREAMPLIFIER

S/N: 181921

CALIBRATION DATE: MARCH 10, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	35.53	10.0	34.78
1.5	34.92	10.5	34.36
2.0	34.63	11.0	33.14
2.5	34.42	11.5	34.42
3.0	34.40	12.0	34.24
3.5	34.36	12.5	34.95
4.0	34.11	13.0	34.62
4.5	33.61	13.5	35.24
5.0	33.83	14.0	35.40
5.5	34.53	14.5	36.66
6.0	35.09	15.0	35.98
6.5	35.58	15.5	35.94
7.0	36.50	16.0	35.80
7.5	34.83	16.5	34.98
8.0	34.08	17.0	35.00
8.5	33.57	17.5	34.25
9.0	34.68	18.0	33.51
9.5	35.84	18.5	32.88

COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: SEPTEMBER 29, 2008

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-41.57	9.93
0.01	-42.06	9.44
0.02	-42.43	9.07
0.05	-42.50	9.00
0.07	-42.10	9.40
0.1	-42.03	9.47
0.2	-44.50	7.00
0.3	-41.93	9.57
0.5	-41.90	9.60
0.7	-41.73	9.77
1	-41.23	10.27
2	-40.90	10.60
3	-41.20	10.30
4	-41.30	10.20
5	-40.70	10.80
10	-41.10	10.40
15	-42.17	9.33
20	-42.00	9.50
25	-42.20	9.30
30	-43.10	8.40

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
904.16		V	--	--	Peak			Measurement
904.16		V	--	--	Avg			Taken via Conducted
1808.3		V	--	--	Peak			Not in
1808.3		V	--	--	Avg			Restricted Band
2712.4	39.14	V	74	-34.86	Peak	1.25	165	
2712.4	27.63	V	54	-26.37	Avg	1.25	165	
3616.6	39.64	V	74	-34.36	Peak	1.35	180	
3616.6	26.95	V	54	-27.05	Avg	1.35	180	
4520.8	41.51	V	74	-32.49	Peak	1.25	135	
4520.8	29.24	V	54	-24.76	Avg	1.25	135	
5424.9	49.79	V	74	-24.21	Peak	1.35	165	
5424.9	37.32	V	54	-16.68	Avg	1.35	165	
6329.1								No Emission
6329.1								Detected
7233.2								No Emission
7233.2								Detected
8137.4								No Emission
8137.4								Detected
9041.6								No Emission
9041.6								Detected

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
904.16		H	--	--	Peak			Measurement
904.16		H	--	--	Avg			Taken via Conducted
1808.3		H	--	--	Peak			Not in
1808.3		H	--	--	Avg			Restricted Band
2712.4	41.25	H	74	-32.75	Peak	1.25	180	
2712.4	27.65	H	54	-26.35	Avg	1.25	180	
3616.6	38.98	H	74	-35.02	Peak	1.35	225	
3616.6	27.21	H	54	-26.79	Avg	1.35	225	
4520.8	41.59	H	74	-32.41	Peak	1.25	270	
4520.8	29.35	H	54	-24.65	Avg	1.25	270	
5424.9	49.09	H	74	-24.91	Peak	1.35	235	
5424.9	36.03	H	54	-17.97	Avg	1.35	235	
6329.1								No Emission
6329.1								Detected
7233.2								No Emission
7233.2								Detected
8137.4								No Emission
8137.4								Detected
9041.6								No Emission
9041.6								Detected

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
913.94		V	--	--	Peak			Measurement
913.94		V	--	--	Avg			Taken via Conducted
1827.88		V	--	--	Peak			Not in
1827.88		V	--	--	Avg			Restricted Band
2741.82	43.83	V	74	-30.17	Peak	2.25	180	
2741.82	29.06	V	54	-24.94	Avg	2.25	180	
3655.76	42.61	V	74	-31.39	Peak	2.55	165	
3655.76	27.79	V	54	-26.21	Avg	2.55	165	
4569.7	45.16	V	74	-28.84	Peak	1.35	255	
4569.7	31.51	V	54	-22.49	Avg	1.35	255	
5483.64		V	--	--	Peak			Not in
5483.64		V	--	--	Avg			Restricted Band
6397.58								No Emission
6397.58								Detected
7311.52								No Emission
7311.52								Detected
8225.46								No Emission
8225.46								Detected
9139.4								No Emission
9139.4								Detected

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
913.94		H	--	--	Peak			Measurement
913.94		H	--	--	Avg			Taken via Conducted
1827.88		H	--	--	Peak			Not in
1827.88		H	--	--	Avg			Restricted Band
2741.82	43.39	H	74	-30.61	Peak	1.25	135	
2741.82	30.64	H	54	-23.36	Avg	1.25	135	
3655.76	39.37	H	74	-34.63	Peak	1.35	145	
3655.76	27.06	H	54	-26.94	Avg	1.35	145	
4569.7	45.31	H	74	-28.69	Peak	1.25	155	
4569.7	30.25	H	54	-23.75	Avg	1.25	155	
5483.64		H	--	--	Peak			Not in
5483.64		H	--	--	Avg			Restricted Band
6397.58								No Emission
6397.58								Detected
7311.52								No Emission
7311.52								Detected
8225.46								No Emission
8225.46								Detected
9139.4								No Emission
9139.4								Detected

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

High Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
926.17		V	--	--	Peak			Measurement
926.17		V	--	--	Avg			Taken via Conducted
1852.3		V	--	--	Peak			Not in
1852.3		V	--	--	Avg			Restricted Band
2778.5	41.36	V	74	-74	Peak	1.25	135	
2778.5	28.09	V	54	-25.91	Avg	1.25	135	
3704.6	40.13	V	74	-33.87	Peak	1.35	165	
3704.6	27.45	V	54	-26.55	Avg	1.35	165	
4630.8	44.43	V	74	-29.57	Peak	1.25	175	
4630.8	31.66	V	54	-22.34	Avg	1.25	175	
5557		V	--	--	Peak			Not in
5557		V	--	--	Avg			Restricted Band
6483.1								No Emission
6483.1								Detected
7409.3								No Emission
7409.3								Detected
8335.5								No Emission
8335.5								Detected
9261.7								No Emission
9261.7								Detected

FCC 15.247
Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date: 12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

High Channel
Transmit Mode

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
926.17		H	--	--	Peak			Measurement
926.17		H	--	--	Avg			Taken via Conducted
1852.3		H	--	--	Peak			Not in
1852.3		H	--	--	Avg			Restricted Band
2778.5	41.42	H	74	-32.58	Peak	1.25	155	
2778.5	28.64	H	54	-25.36	Avg	1.25	155	
3704.6	41.01	H	74	-32.99	Peak	1.25	135	
3704.6	27.91	H	54	-26.09	Avg	1.25	135	
4630.8	45.68	H	74	-28.32	Peak	1.55	180	
4630.8	33.86	H	54	-20.14	Avg	1.55	180	
5557		H	--	--	Peak			Not in
5557		H	--	--	Avg			Restricted Band
6483.1								No Emission
6483.1								Detected
7409.3								No Emission
7409.3								Detected
8335.5								No Emission
8335.5								Detected
9261.7								No Emission
9261.7								Detected

FCC Class B and RSS-210

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Receiver Portion - 1 GHz to 9.3 GHz
Low Channel

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

FCC Class B and RSS-210

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Receiver Portion - 1 GHz to 9.3 GHz
Middle Channel

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

FCC Class B and RSS-210

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

Receiver Portion - 1 GHz to 9.3 GHz
High Channel

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

FCC 15.247 and FCC Class B

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1004.07	30.01	H	54	-23.99	Peak	1.25	135	
1004.11	27.72	V	54	-26.28	Peak	1.25	155	
1104.31	29.41	H	54	-24.59	Peak	1.25	180	
1104.31	29.61	V	54	-24.39	Peak	1.35	175	
4414.12	41.63	V	54	-12.37	Peak	1.25	185	
4418.76	42.15	H	54	-11.85	Peak	1.25	135	
4619.26	41.41	H	54	-12.59	Peak	1.35	155	
4619.29	41.45	V	54	-12.55	Peak	1.25	165	
5222.33	46.55	H	54	-7.45	Peak	1.25	165	
5222.36	44.06	V	54	-9.94	Peak	1.35	185	
5322.49	44.16	H	54	-9.84	Peak	1.35	175	

FCC 15.247 and FCC Class B

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1015.61	27.89	H	54	-26.11	Peak	1.35	155	
1015.73	29.07	V	54	-24.93	Peak	1.25	135	
1116.4	33.64	V	54	-20.36	Peak	1.35	155	
1117.6	32.46	H	54	-21.54	Peak	1.25	165	
4468.92	41.38	H	54	-12.62	Peak	1.35	165	
4469.06	41.61	V	54	-12.39	Peak	1.25	155	
4670.11	42.04	H	54	-11.96	Peak	1.35	315	
4670.18	41.72	V	54	-12.28	Peak	1.25	225	
4722.37	42.11	H	54	-11.89	Peak	1.55	0	
4722.57	41.25	V	54	-12.75	Peak	1.35	235	
5281.35	44.11	V	54	-9.89	Peak	1.25	225	
5281.49	45.04	H	54	-8.96	Peak	1.25	135	
5383.25	45.79	H	54	-8.21	Peak	1.15	0	

FCC 15.247 and FCC Class B

Smartfield, Inc.
Smart Profile
Model: 15051102-A

Date:12/17/2010
Labs: B and D
Tested By: Kyle Fujimoto

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

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1028.97	28.53	V	54	-25.47	Peak	1.25	135	
1131.33	34.06	V	54	-19.94	Peak	1	155	
4734.05	42.63	V	54	-11.37	Peak	1.25	135	
1029	28.42	H	54	-25.58	Peak	1.35	155	
1132.49	34.01	H	54	-19.99	Peak	1.25	135	
4731.71	42.51	H	54	-11.49	Peak	1.35	155	

FCC 15.247 and FCC Class B

Smartfield, Inc.
Smart Profile
Model: 15051102-A

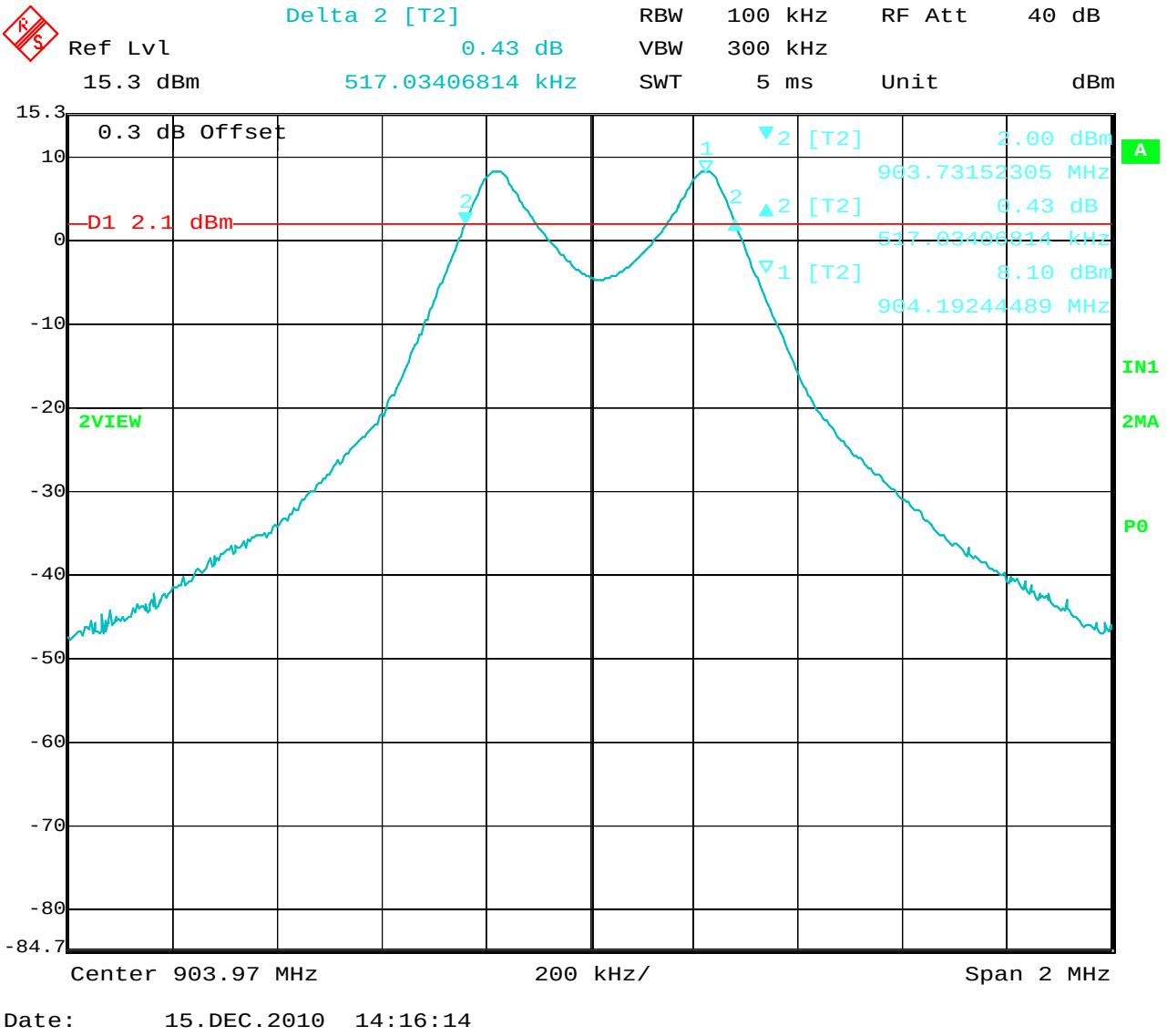
Date: 12/13/2010
Lab: B
Tested By: Kyle Fujimoto

Digital Portion - Transmit Mode (Worst Case) - 10 kHz to 1 GHz
Middle Channel (Worst Case)

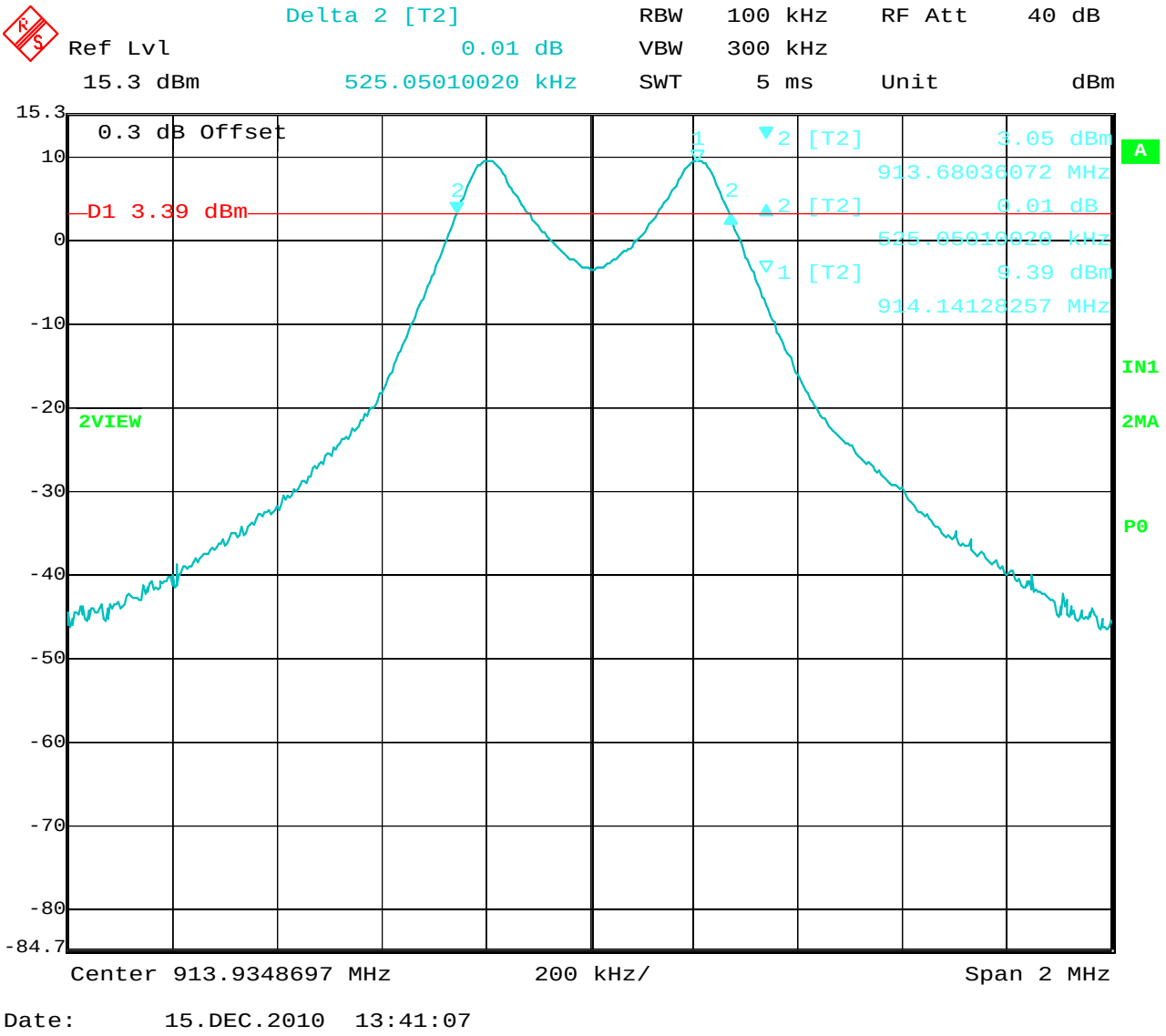
Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
49.87	31.19	V	40	-8.81	Peak	1.25	195	
119.77	20.76	V	43.5	-22.74	Peak	1.25	205	The EUT was verified in
140.09	26.92	V	43.5	-16.58	Peak	1.25	205	Receive Mode.
144.9	24.81	V	43.5	-18.69	Peak	1.25	205	
250.02	15.32	V	46	-30.68	Peak	1.25	205	The emissions are not higher
305.14	14.21	V	46	-31.79	Peak	1.35	175	in Receive Mode.
305.29	20.43	H	46	-25.57	Peak	1.35	180	
400.39	17.34	H	46	-28.66	Peak	1.25	175	
508.44	18.38	V	46	-27.62	Peak	1.25	185	
508.58	22.82	H	46	-23.18	Peak	1.35	185	
632.33	30.91	H	46	-15.09	Peak	1.25	195	
813.59	20.98	V	46	-25.02	Peak	1.25	180	

-6 dB BANDWIDTH

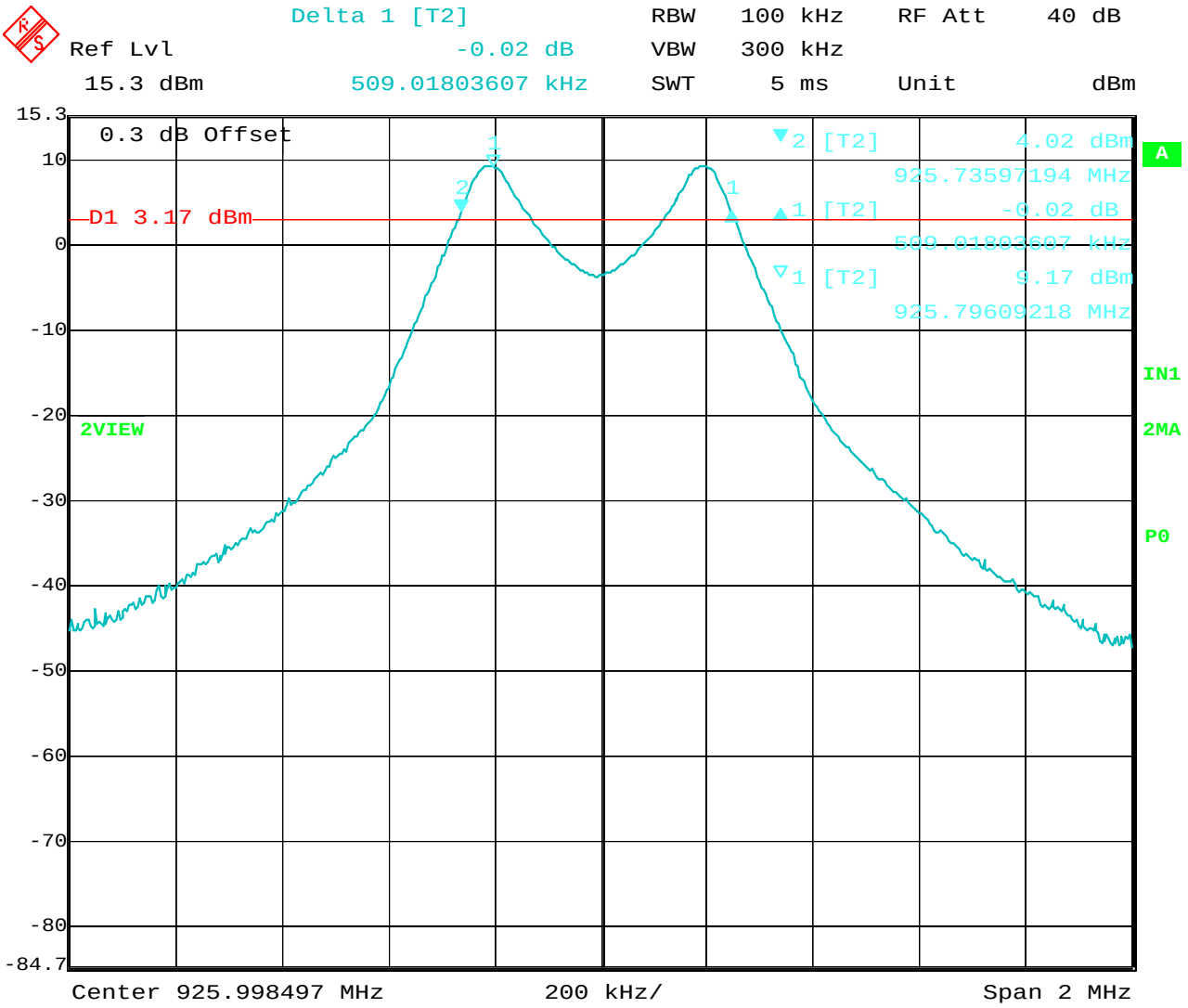
DATA SHEETS



Bandwidth 6 dB – Low Channel



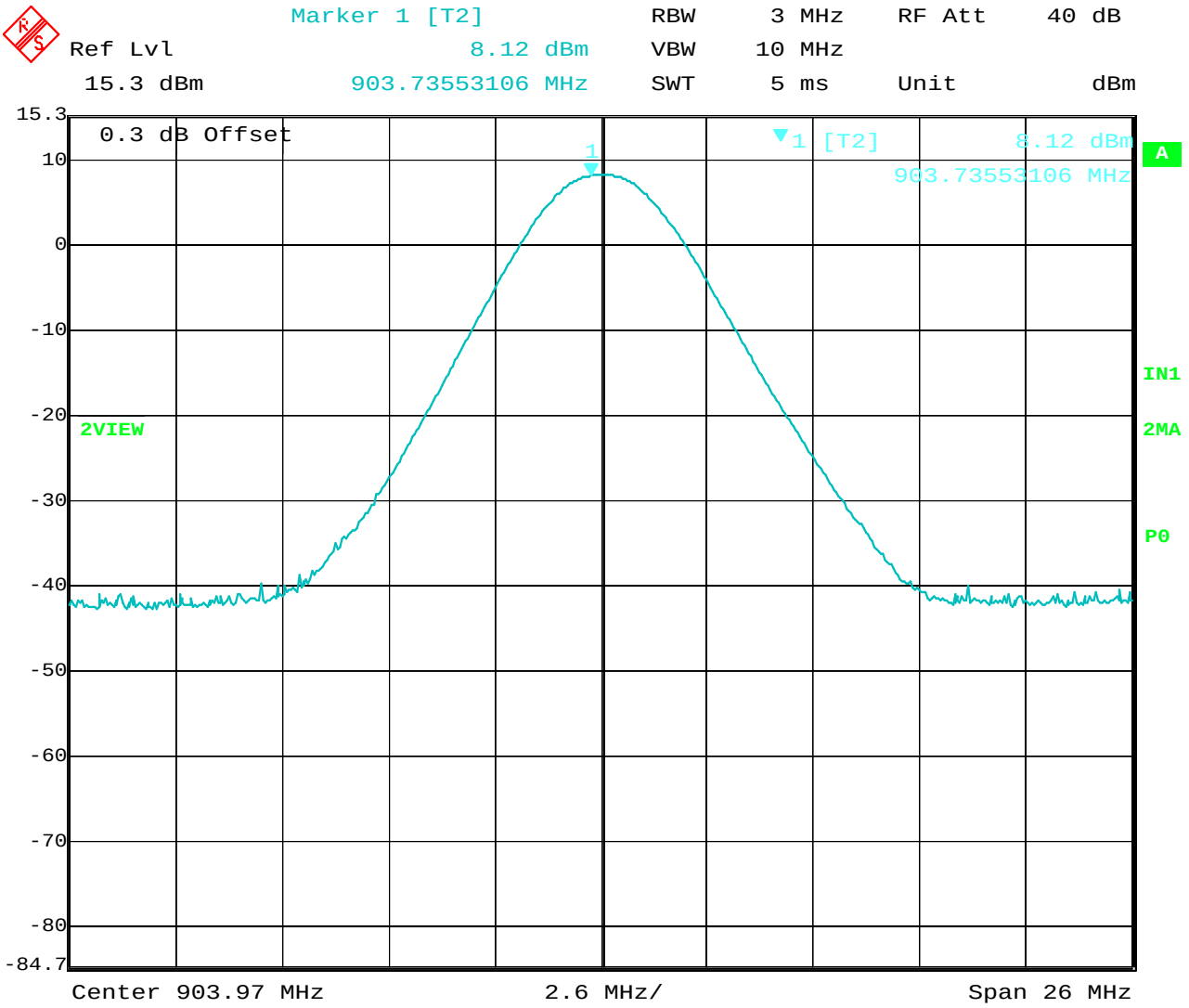
Bandwidth 6 dB – Middle Channel



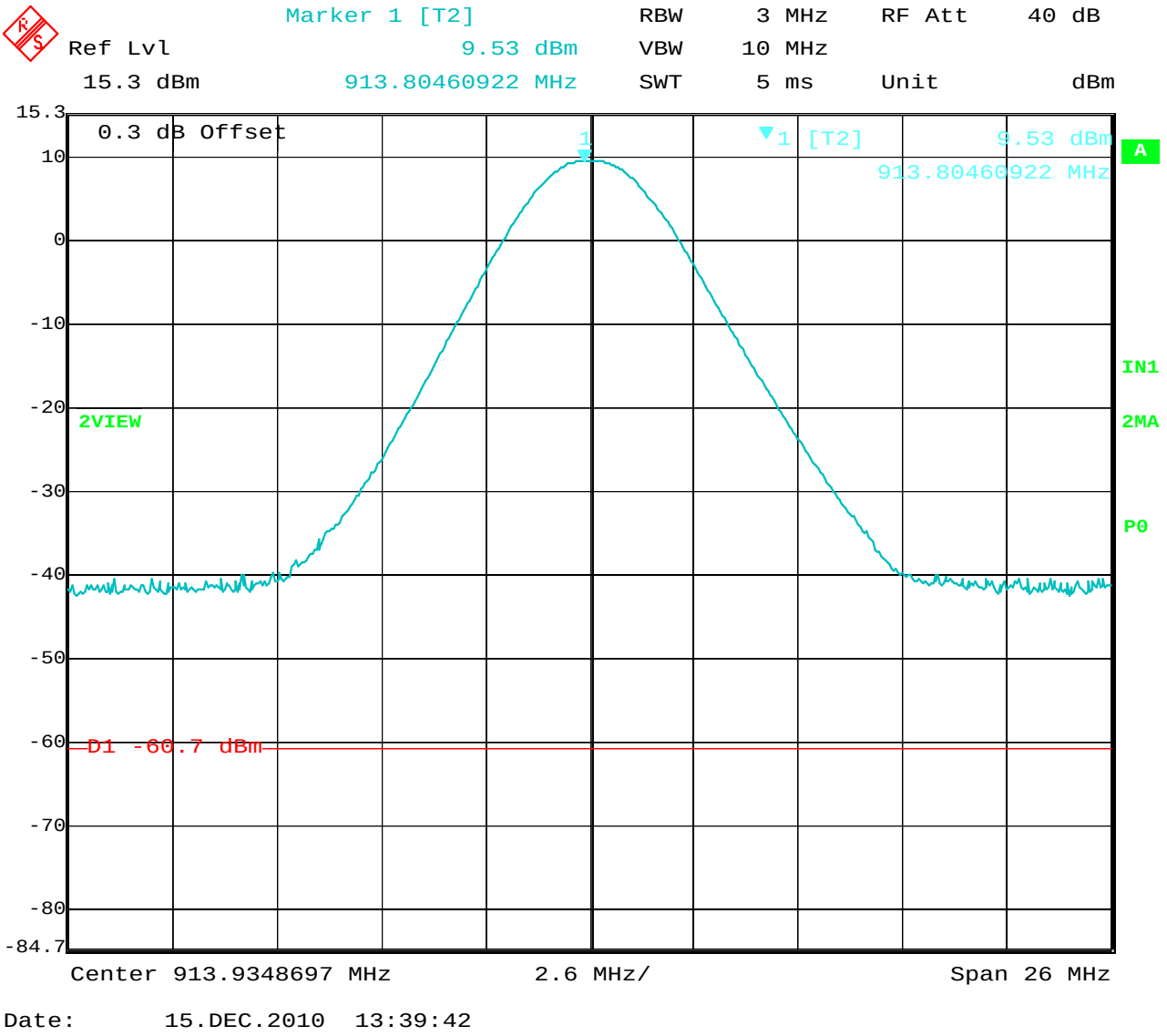
Bandwidth 6 dB – High Channel

PEAK POWER OUTPUT

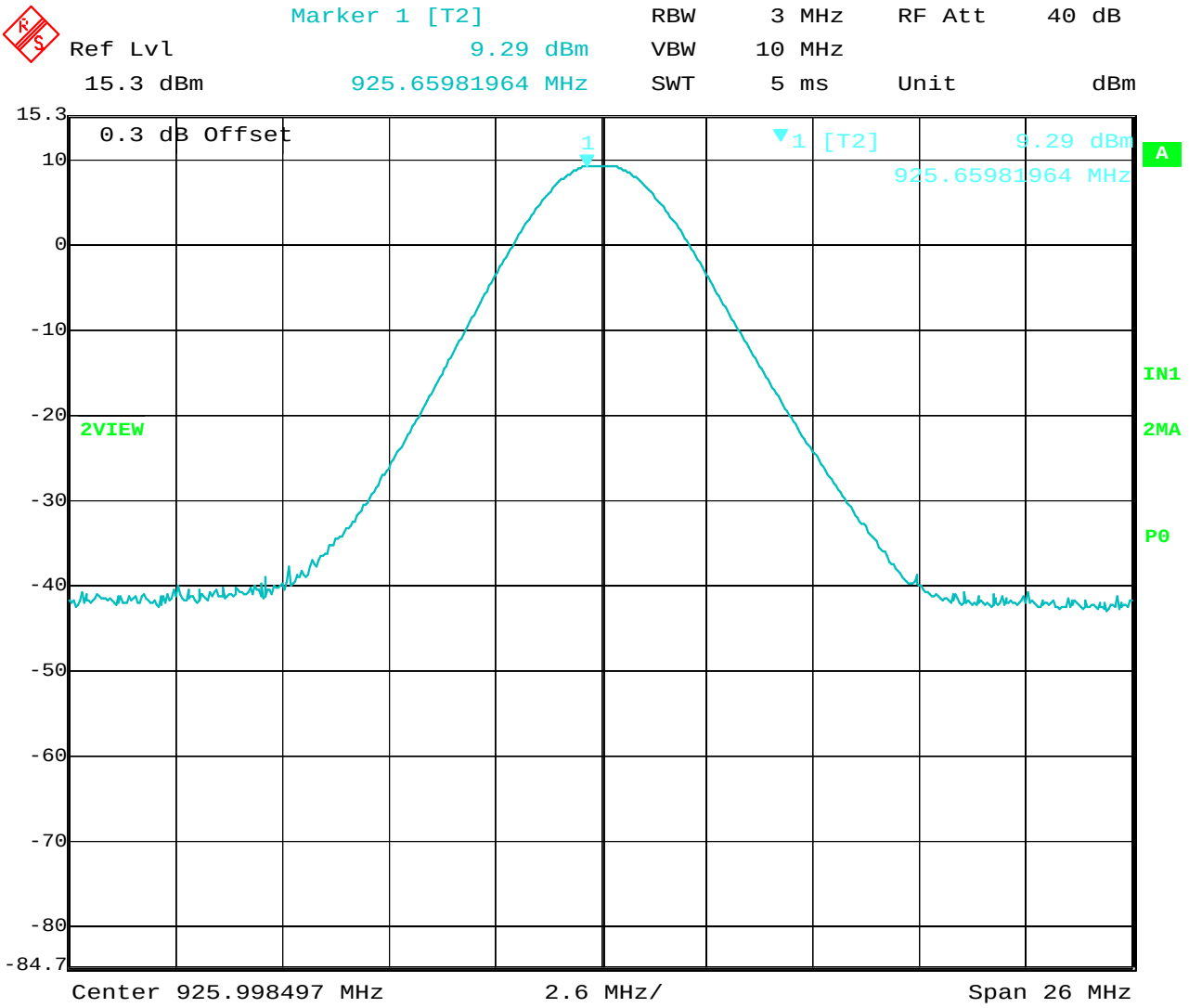
DATA SHEETS



Peak Power Output – Low Channel



Peak Power Output – Middle Channel

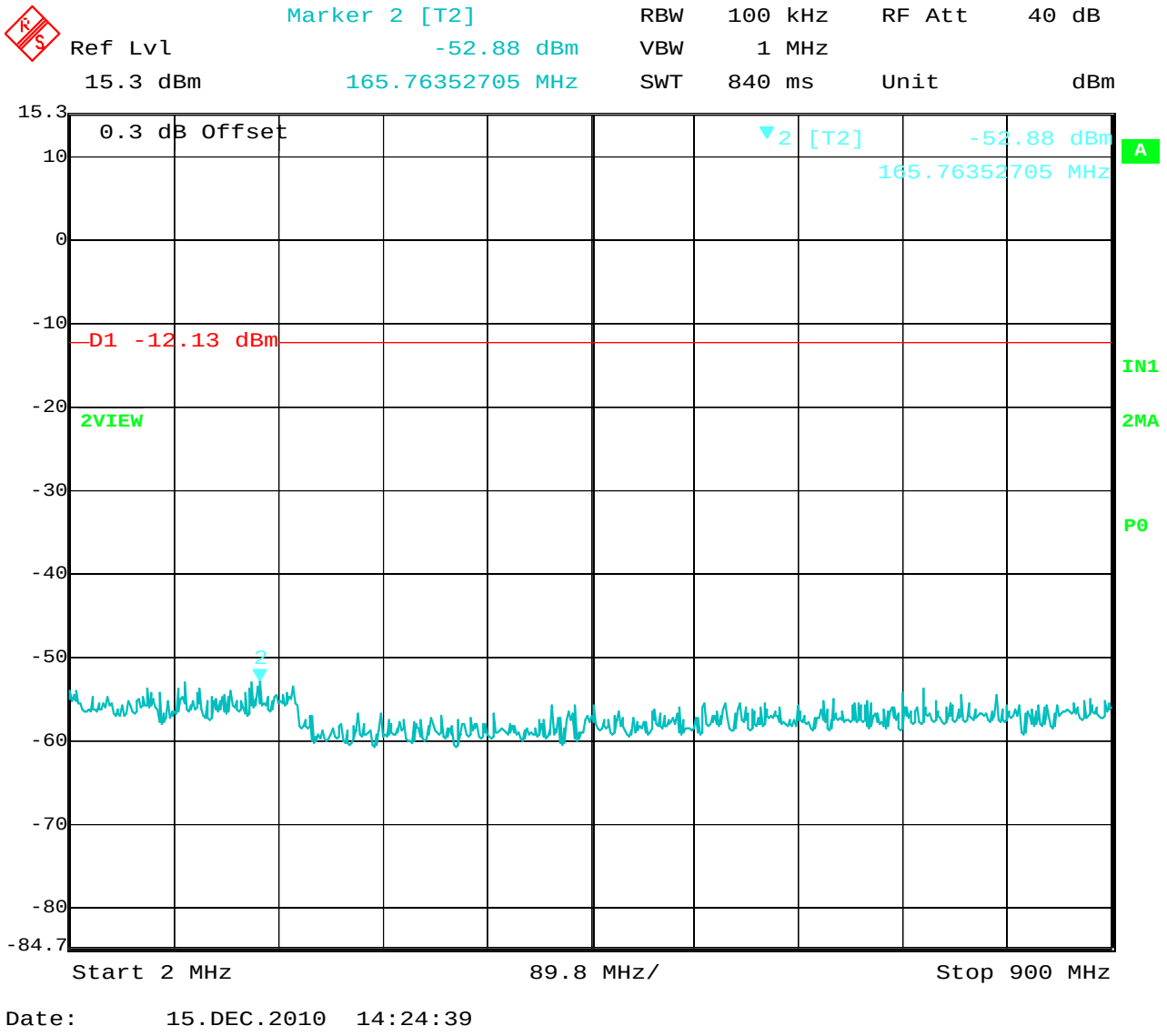


Date: 15.DEC.2010 14:37:39

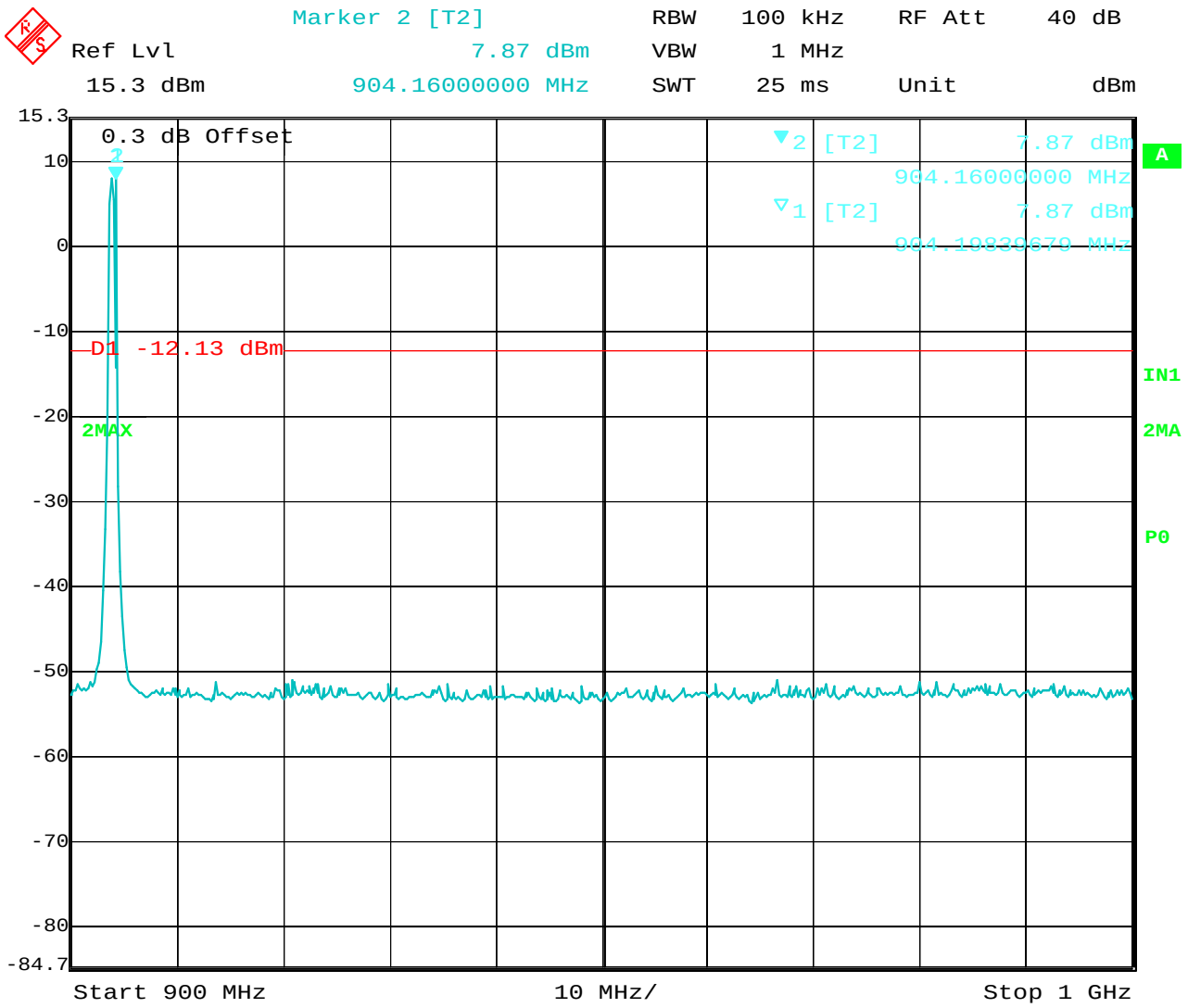
Peak Power Output – High Channel

RF ANTENNA CONDUCTED

DATA SHEETS

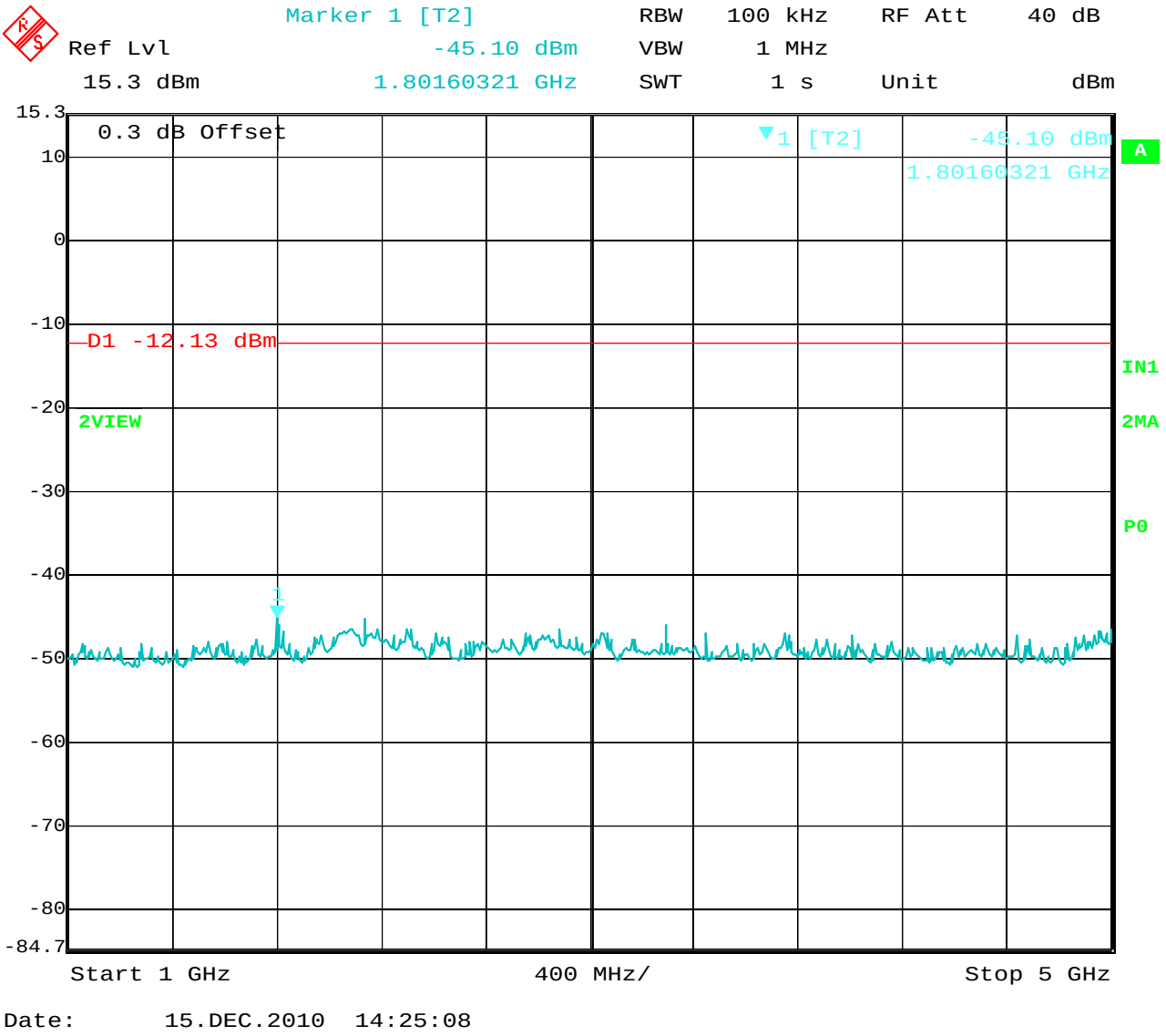


RF Antenna Conducted Test – Low Channel – 2 MHz to 900 MHz



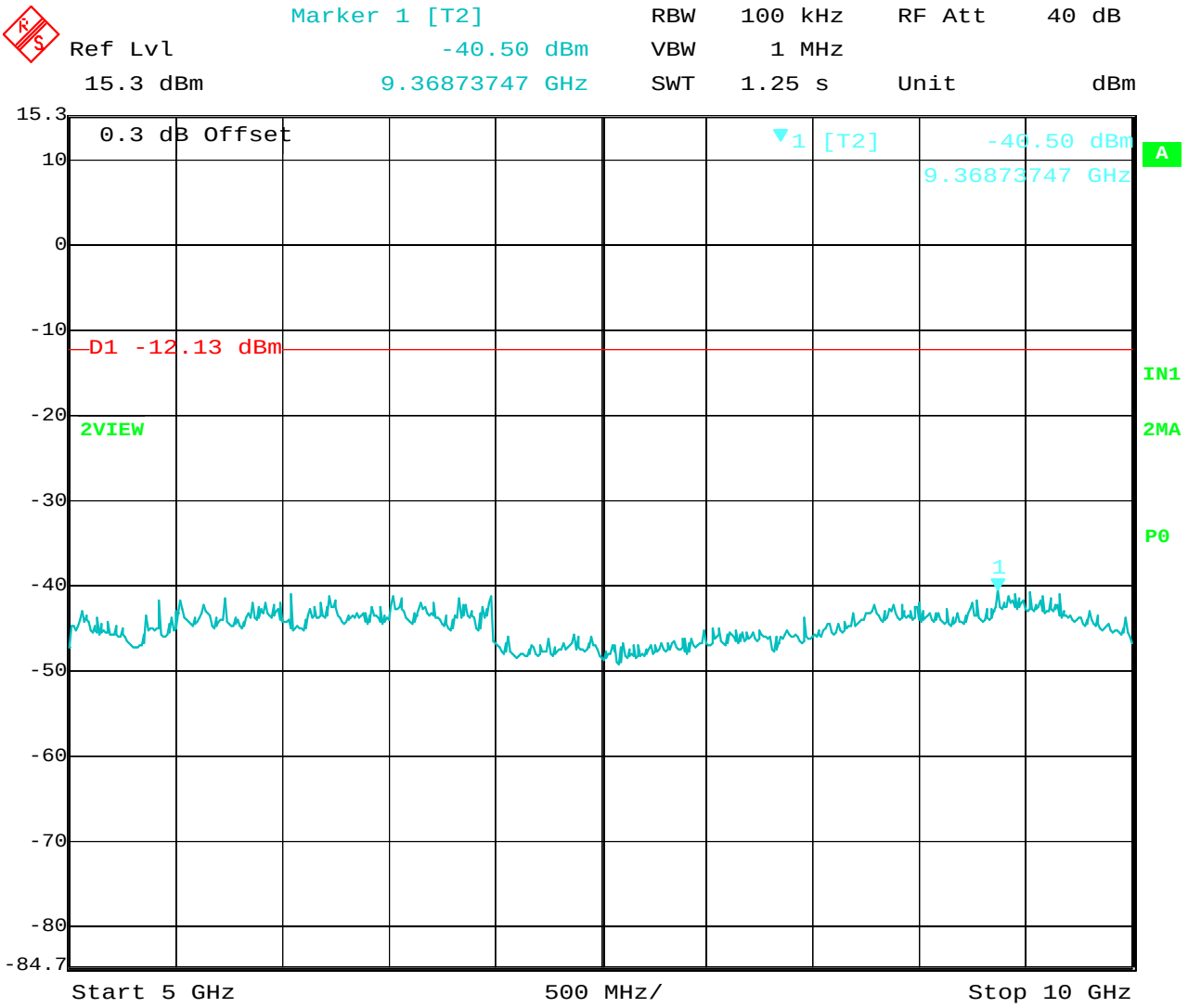
Date: 15.DEC.2010 14:23:41

RF Antenna Conducted Test – Low Channel – 900 MHz to 1 GHz



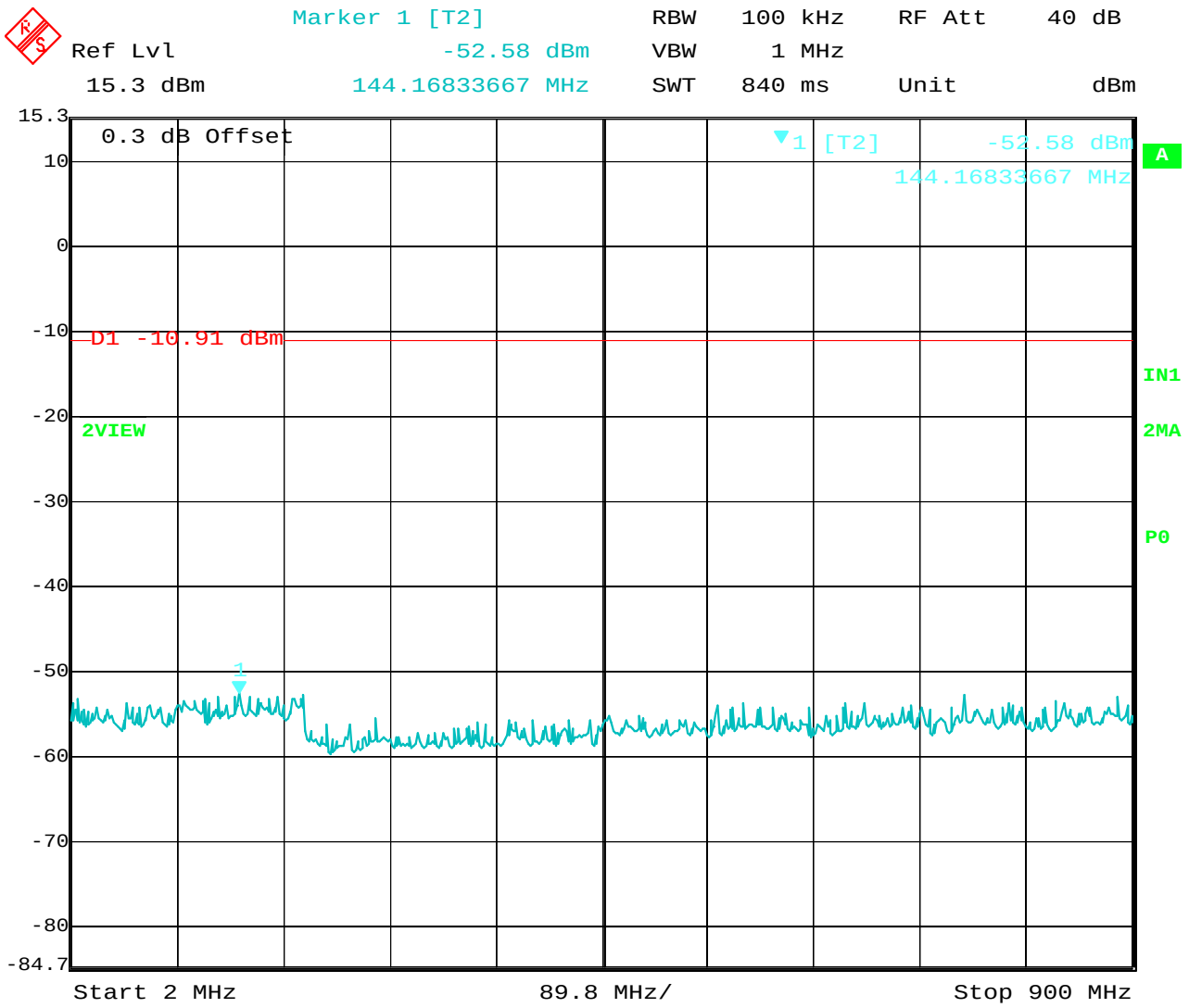
Date: 15.DEC.2010 14:25:08

RF Antenna Conducted Test – Low Channel – 1 GHz to 5 GHz



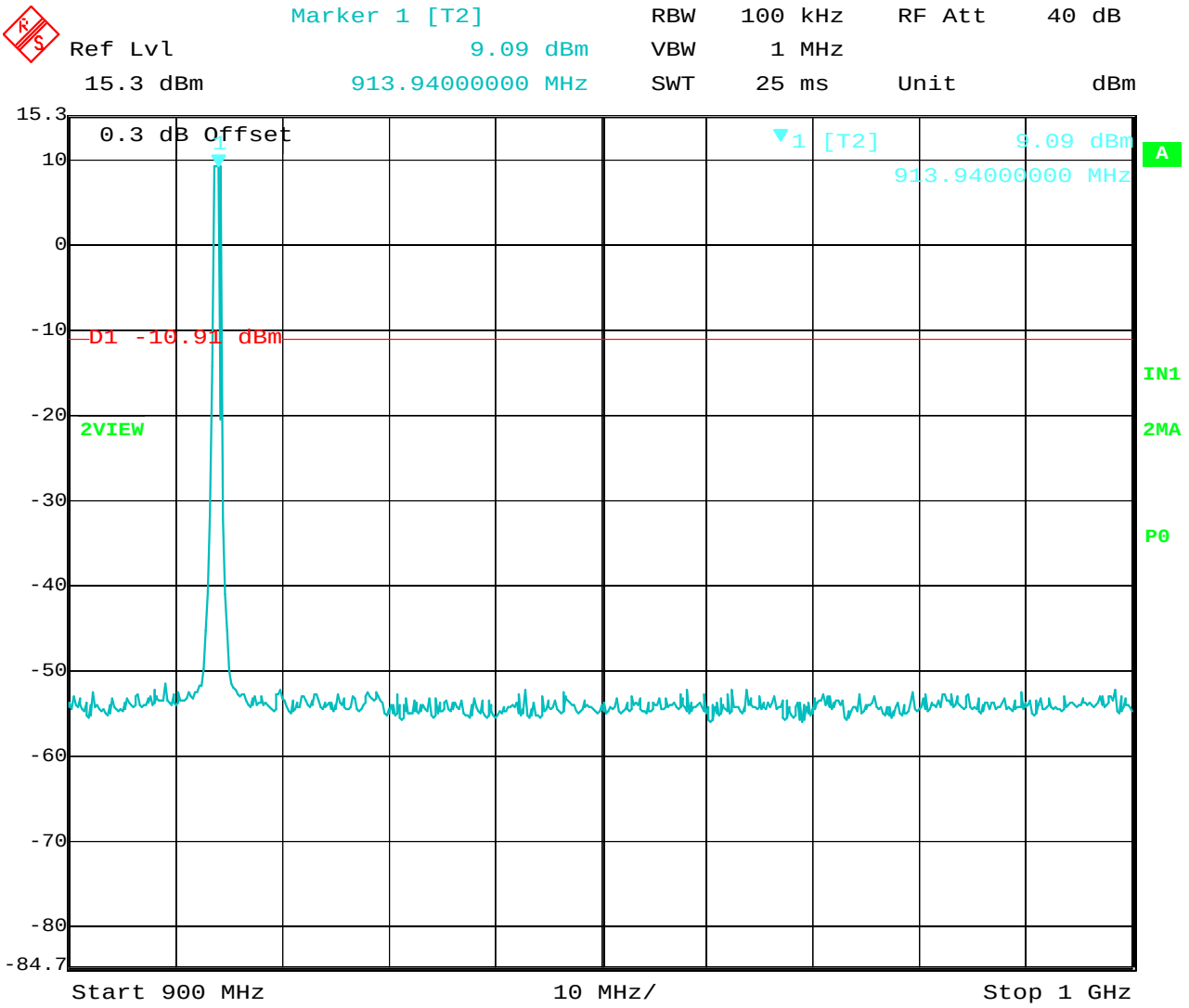
Date: 15.DEC.2010 14:26:02

RF Antenna Conducted Test – Low Channel – 5 GHz to 10 GHz



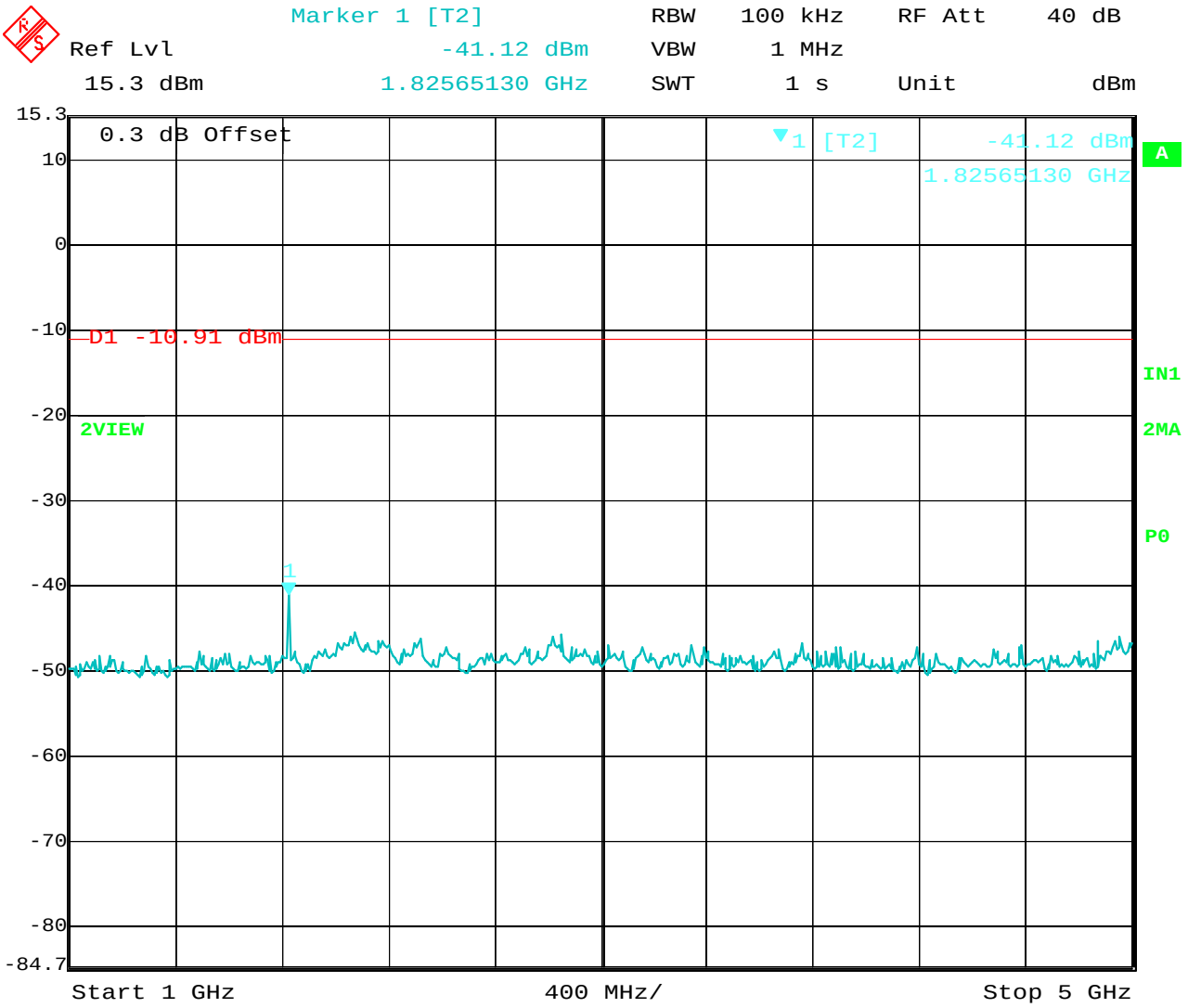
Date: 15.DEC.2010 13:49:02

RF Antenna Conducted Test – Middle Channel – 2 MHz to 900 MHz



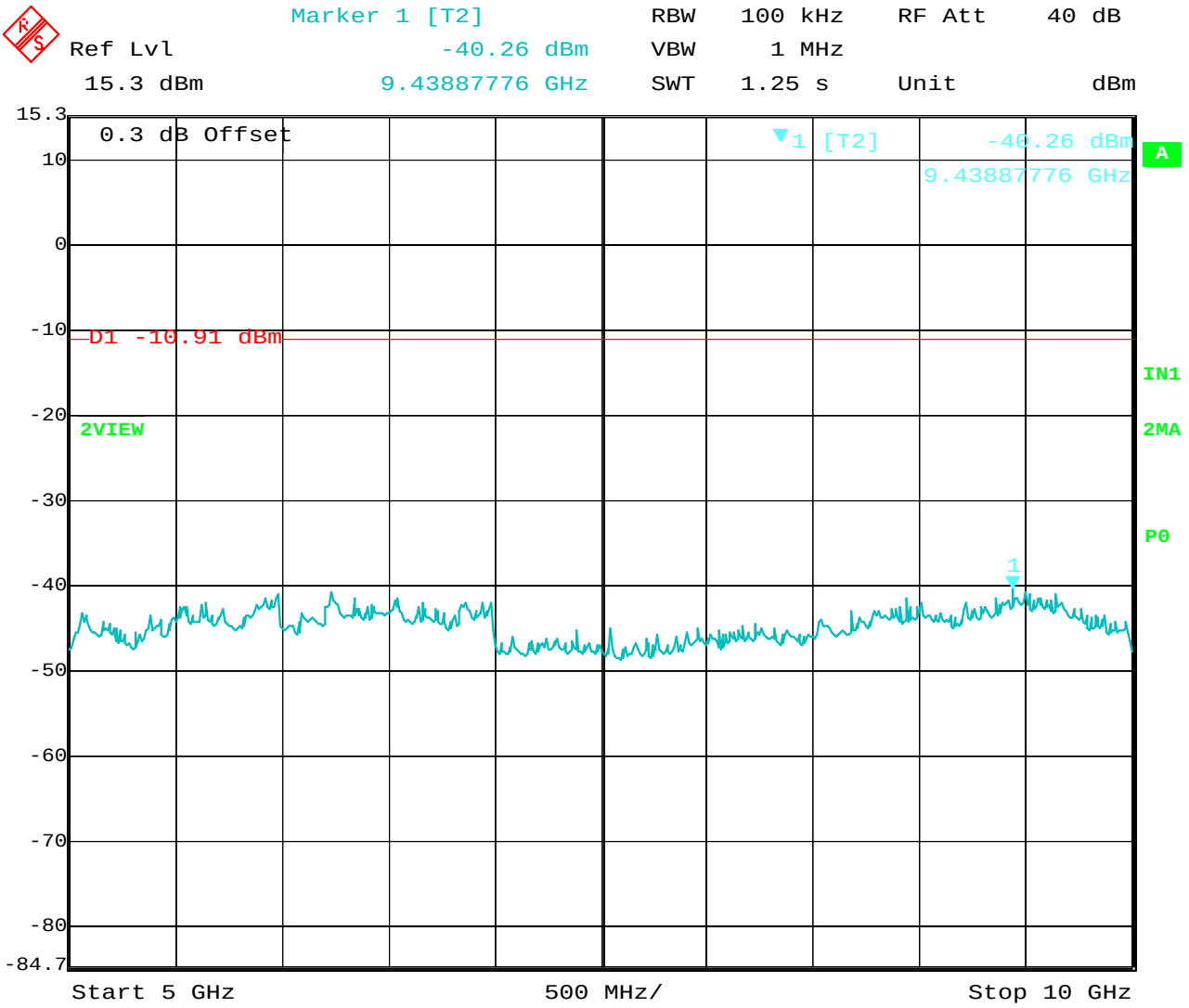
Date: 15.DEC.2010 13:48:31

RF Antenna Conducted Test – Middle Channel – 900 MHz to 1 GHz

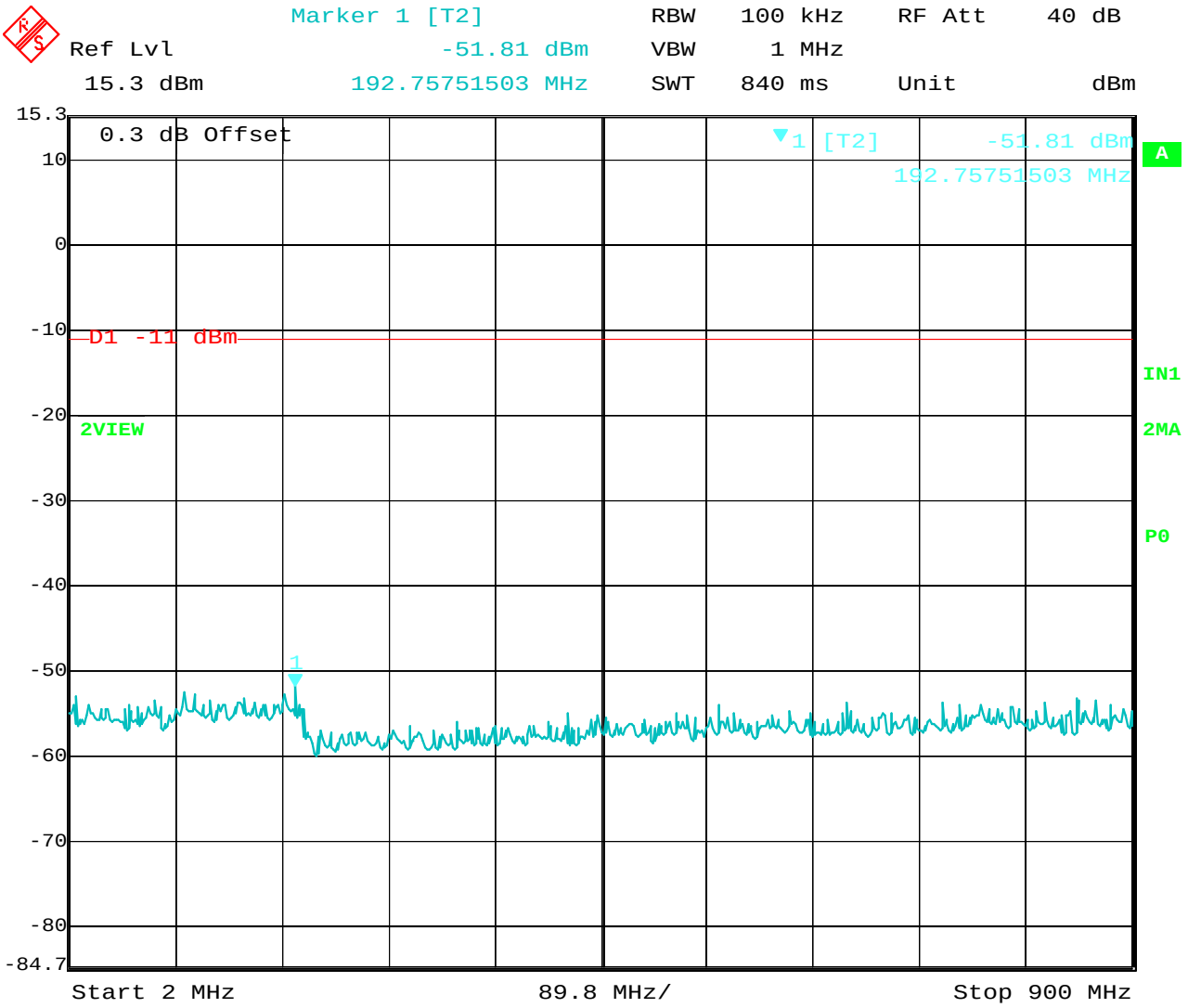


Date: 15.DEC.2010 13:49:29

RF Antenna Conducted Test – Middle Channel – 1 GHz to 5 GHz



RF Antenna Conducted Test – Middle Channel – 5 GHz to 10 GHz



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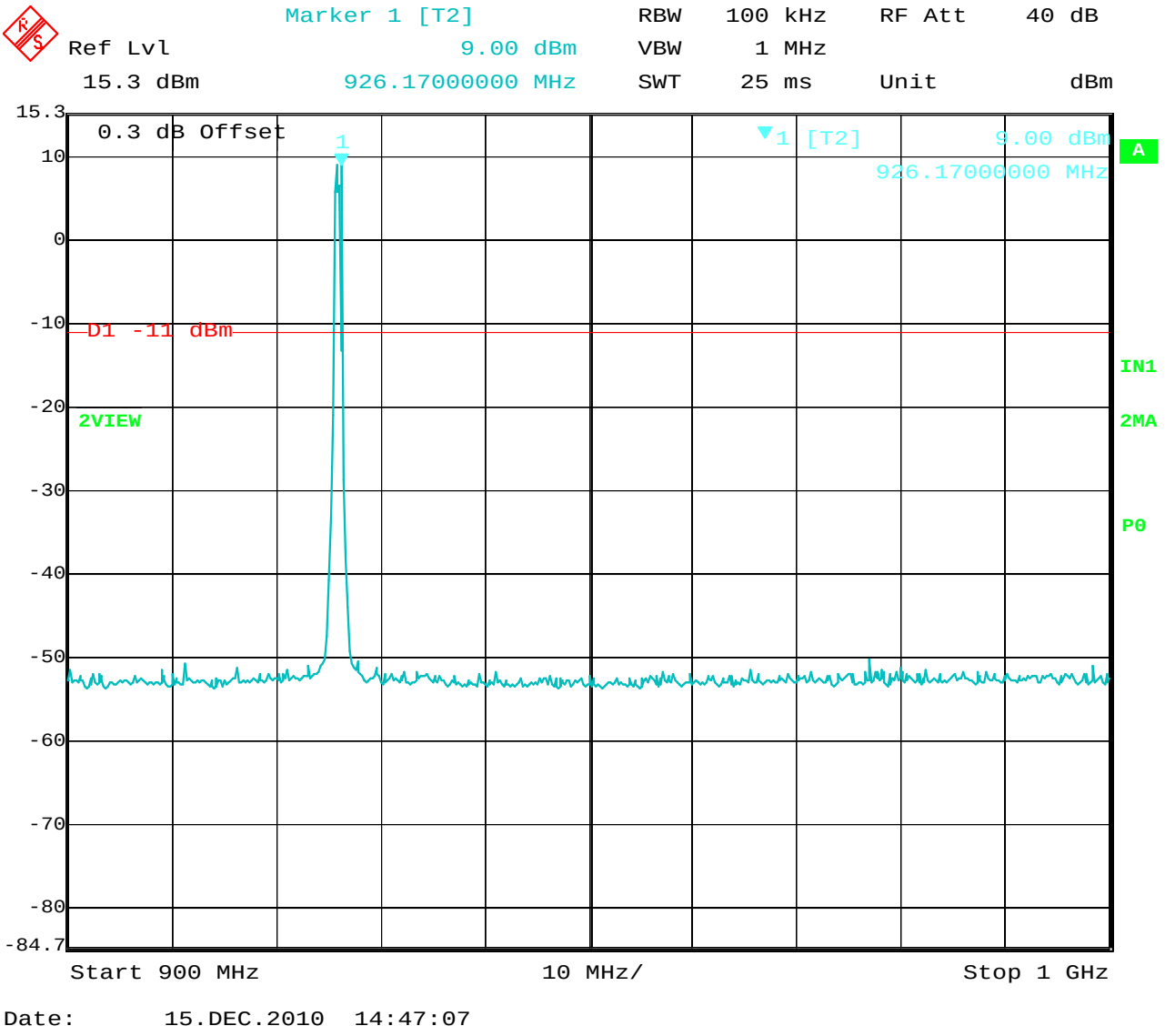
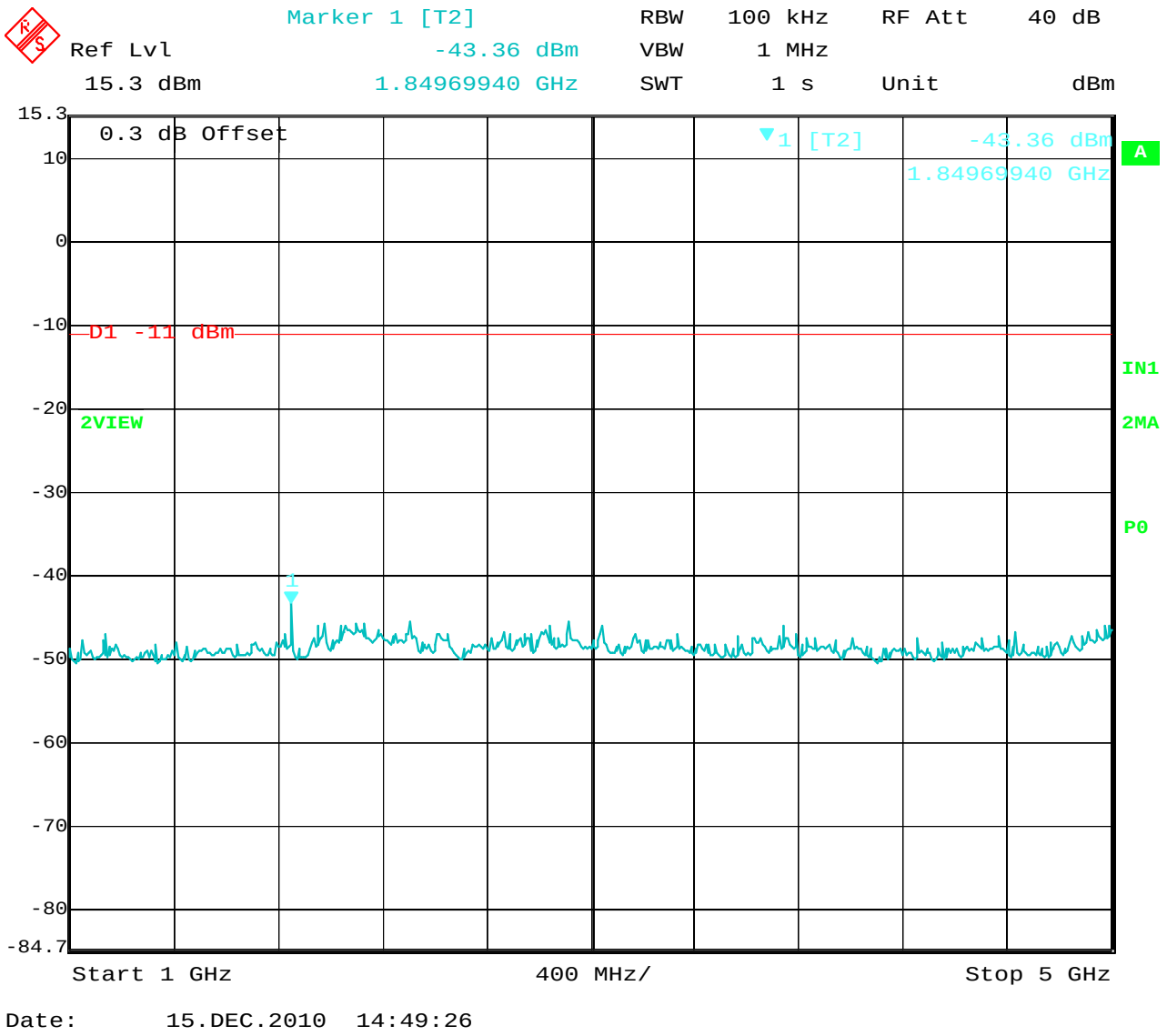
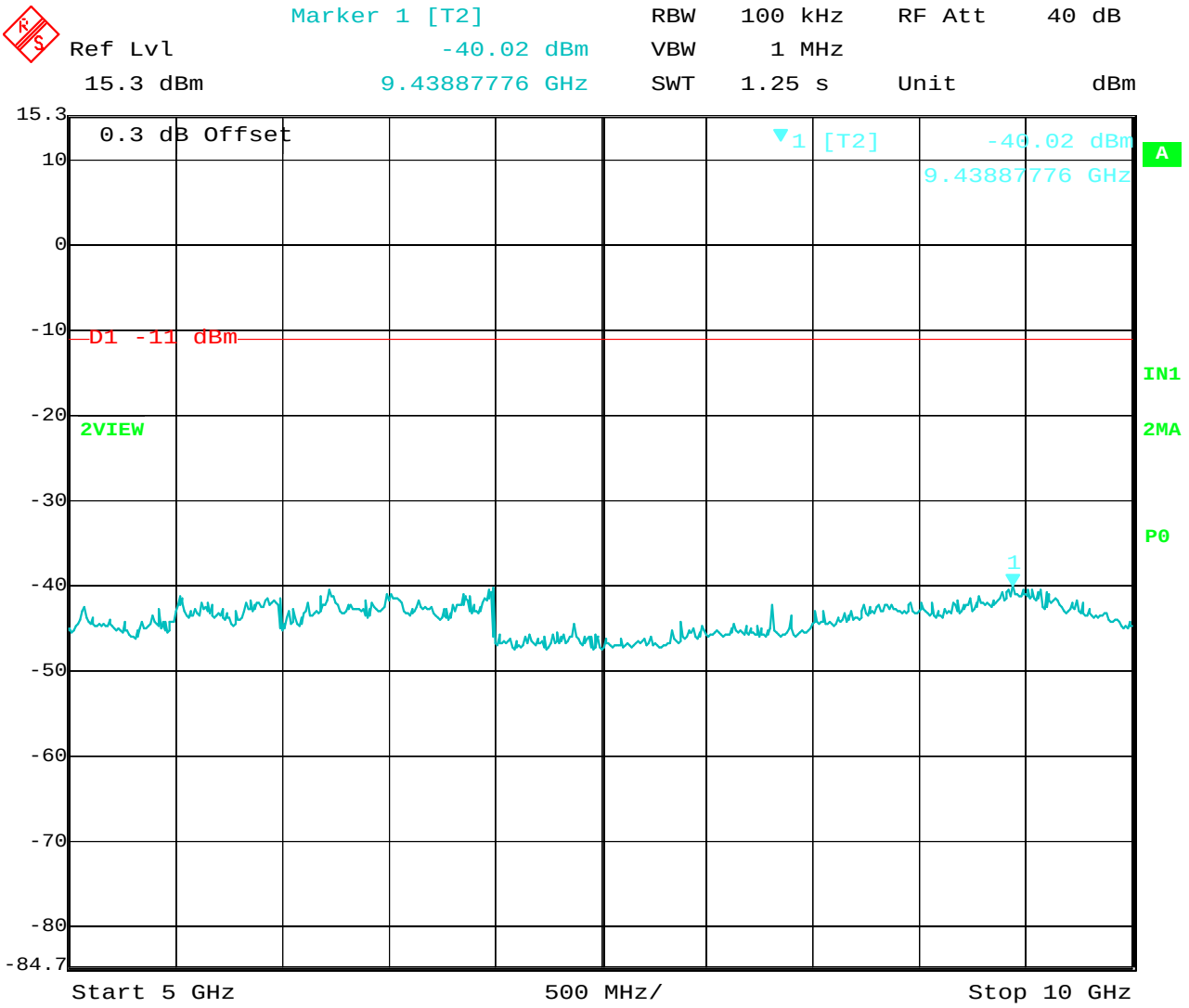
RF Antenna Conducted Test – High Channel – 2 MHz to 900 MHz



RF Antenna Conducted Test – High Channel – 900 MHz to 1 GHz



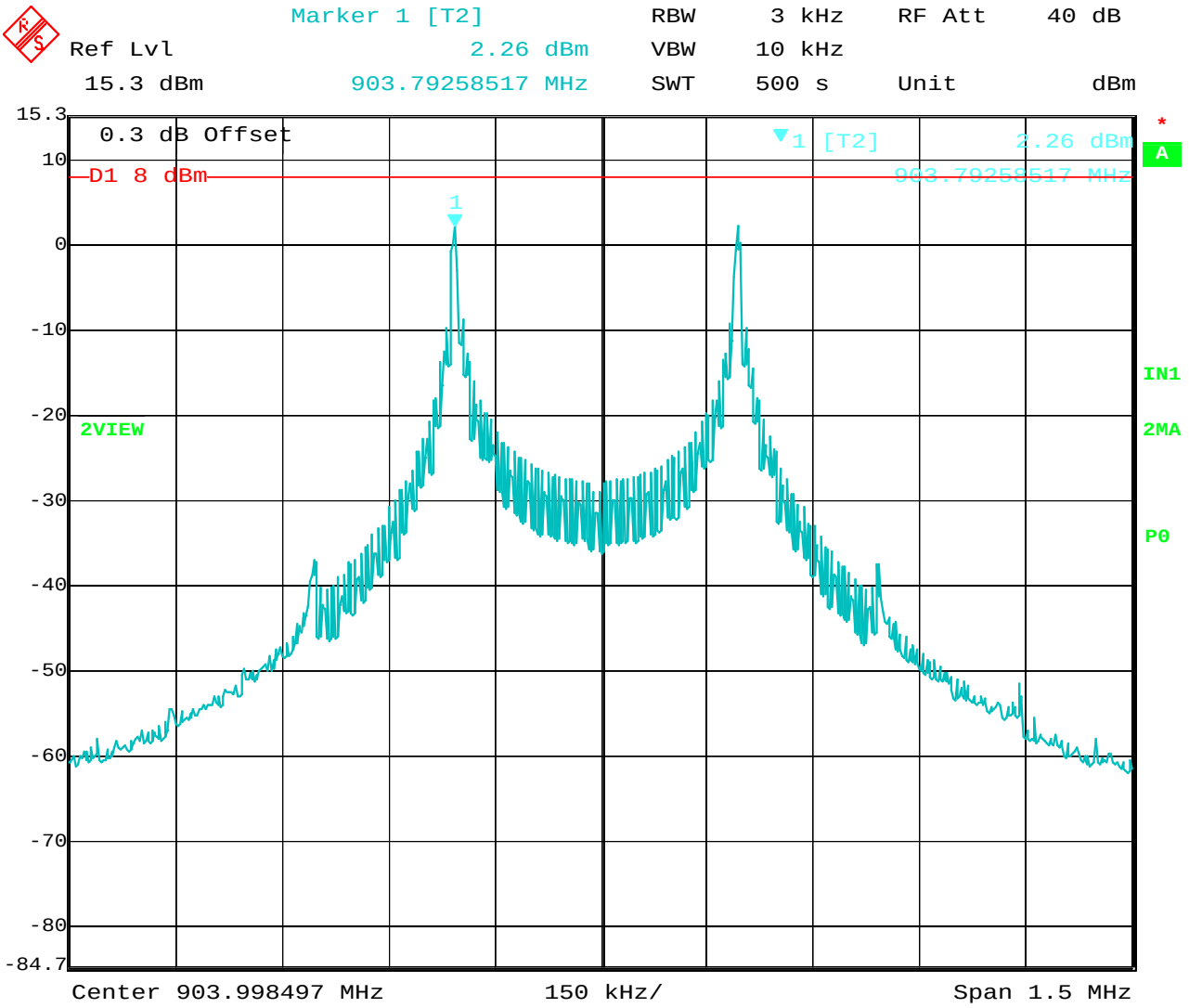
RF Antenna Conducted Test – High Channel – 1 GHz to 5 GHz



RF Antenna Conducted Test – High Channel – 5 GHz to 10 GHz

PEAK POWER SPECTRAL DENSITY

DATA SHEETS



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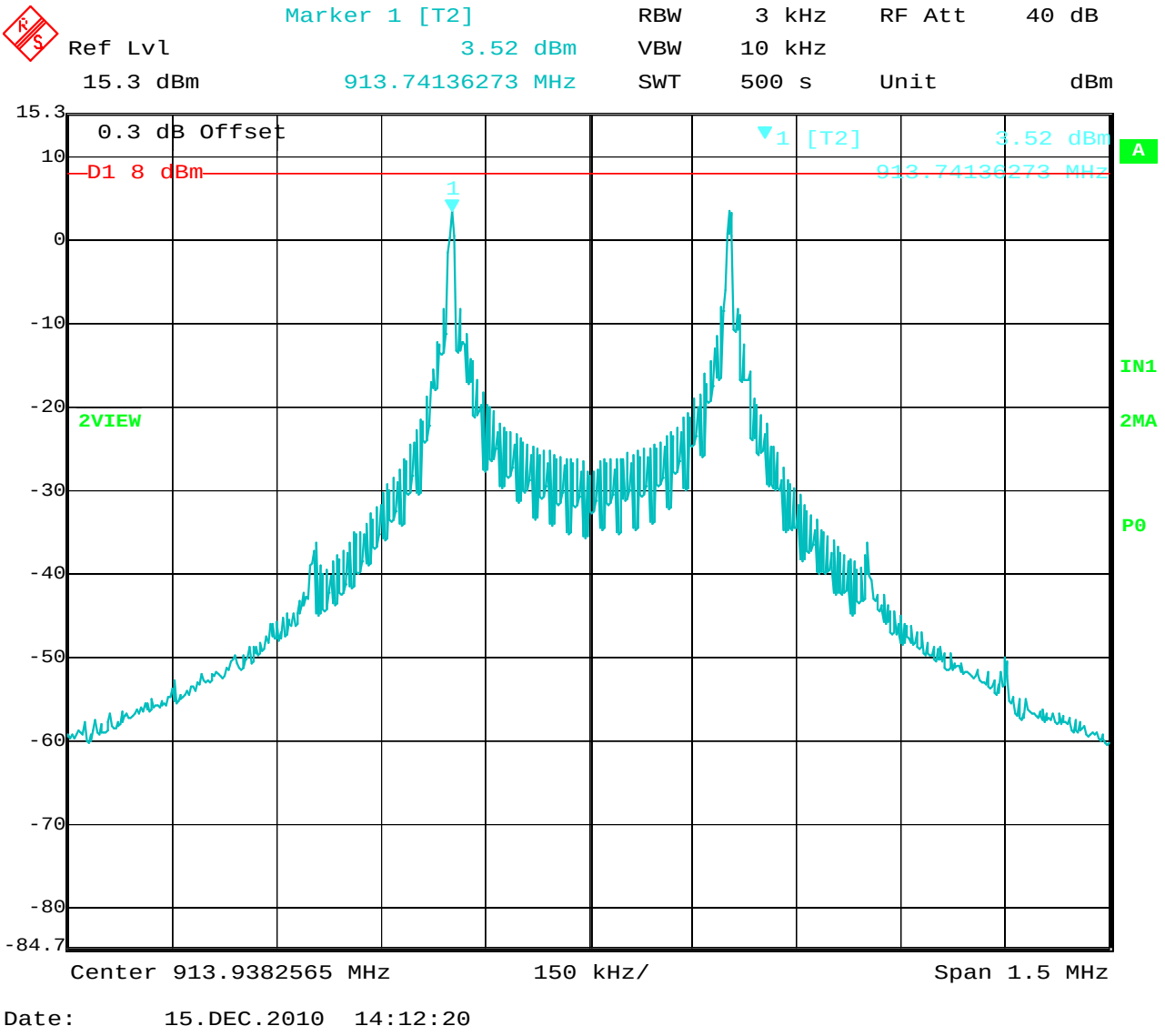
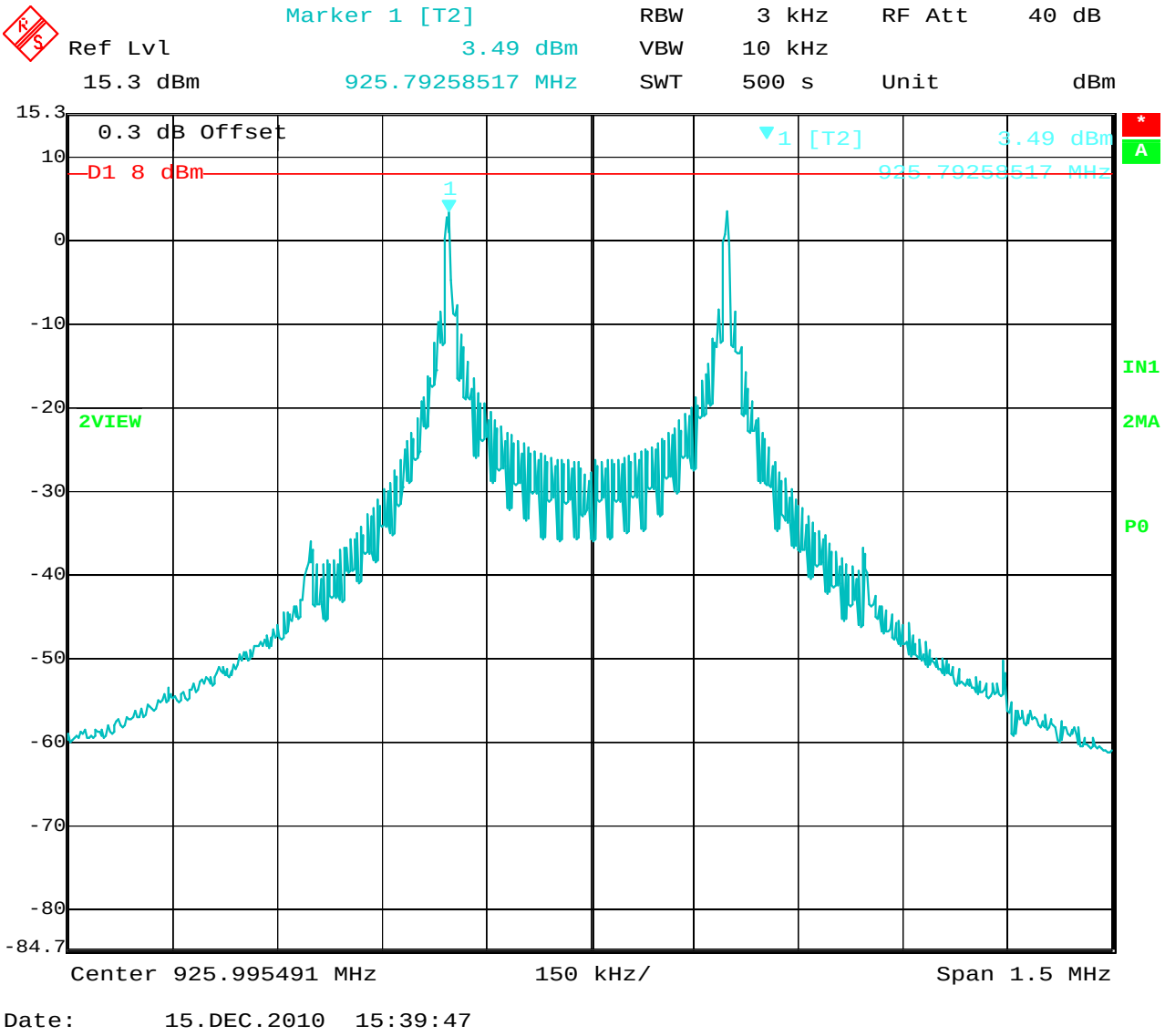
Spectral Density Output – Low Channel



Date: 15.DEC.2010 14:12:20

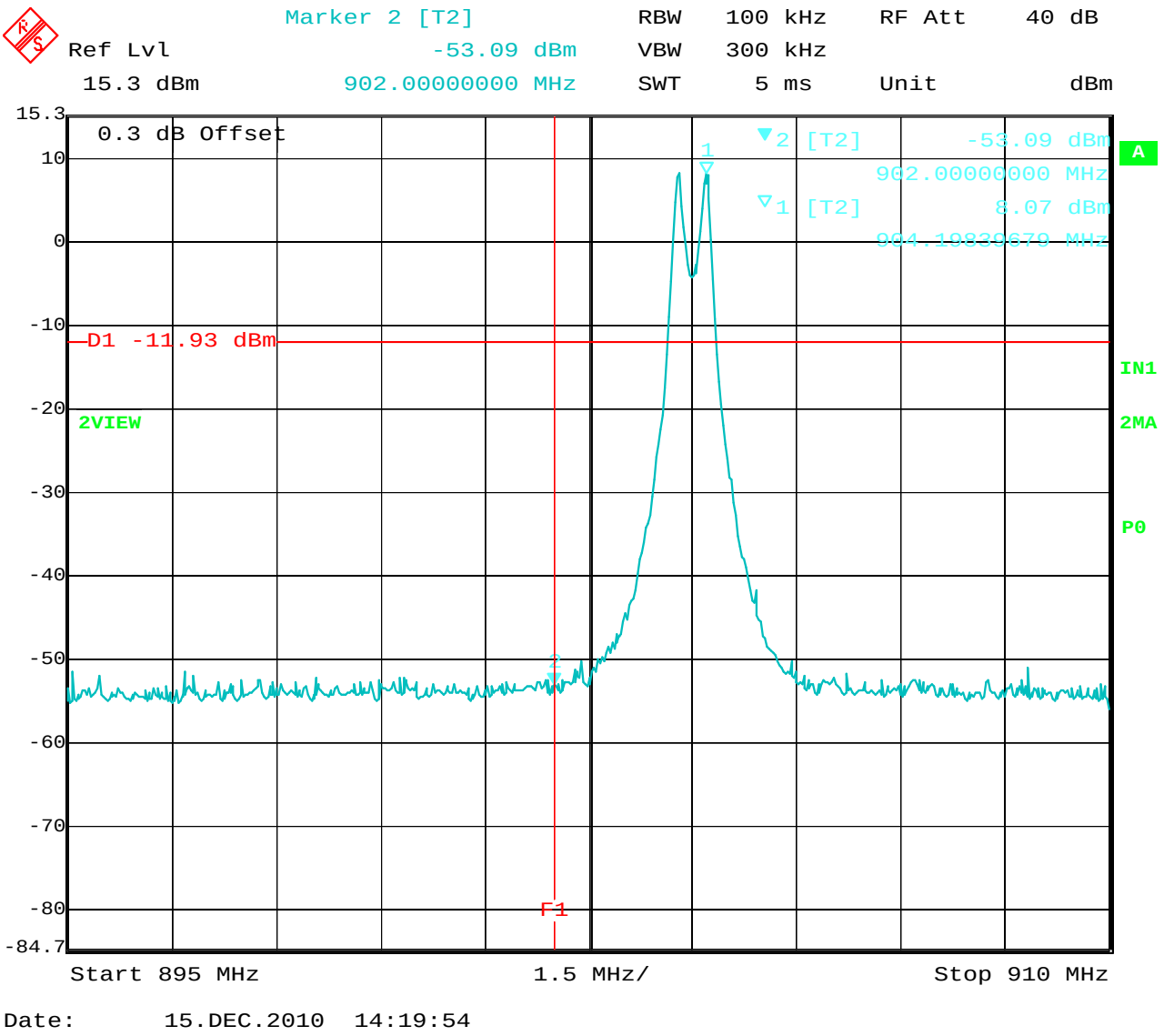
Spectral Density Output – Middle Channel



Spectral Density Output – High Channel

BAND EDGE

DATA SHEETS



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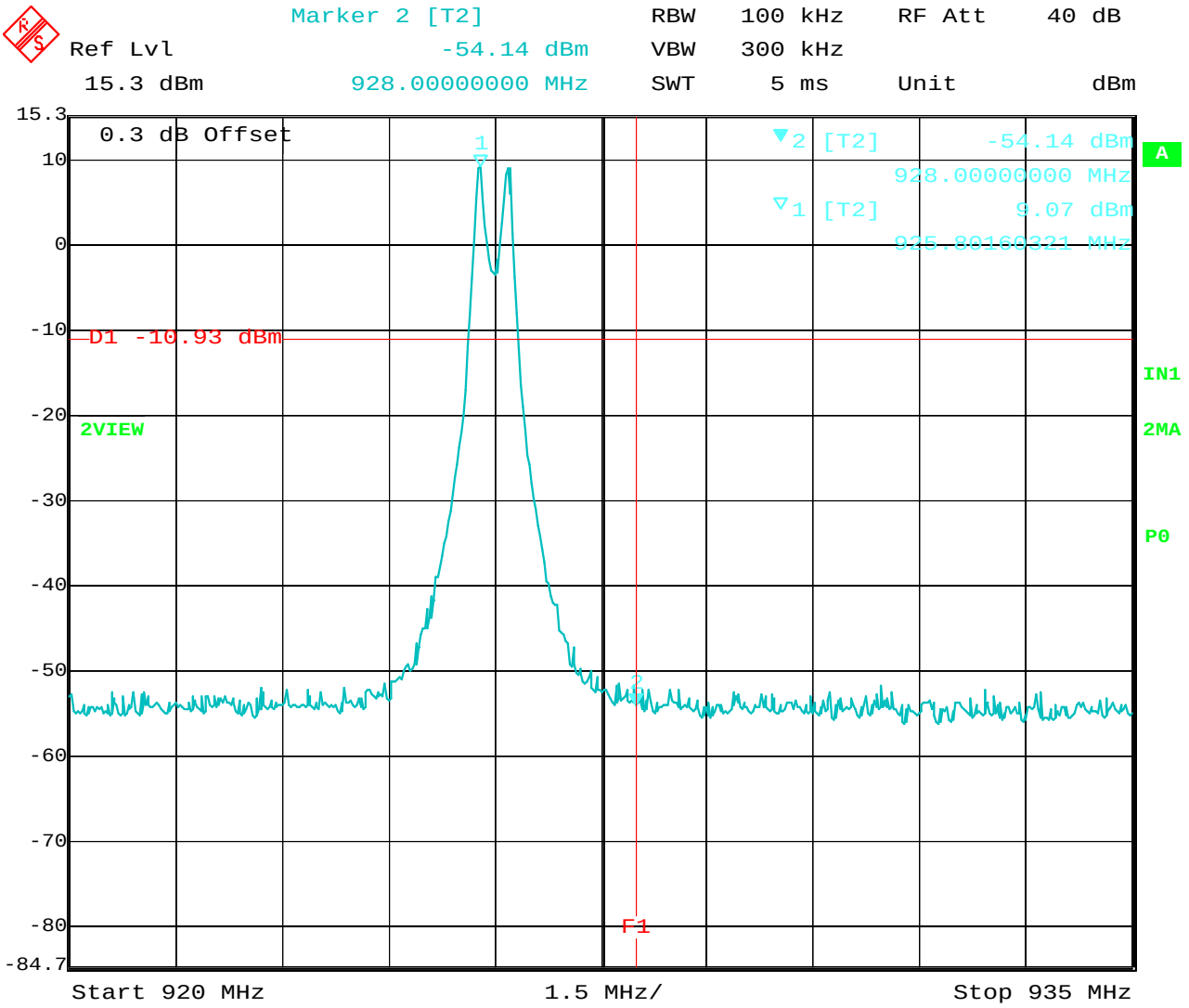
Band Edge – Low Channel



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Band Edge – High Channel