1809 10th St. # 400
Plano TX 75074

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TEST REPORT

Report Number: **100603150DAL-001**
Project Number: **G100603150**

Report Issue Date: **January 24th, 2012**

Product Name: **RFS1231 Frequency Hopping Data Radio**
FCCID: **SX9RFS1**
ICID: **5675A-RFS1**
Standards: **FCC 47CFR 15C*BEI** Issued:2007/10/01 Title 47 CFR Part 15 Subpart C: Intentional Radiators.
RSS 210*BEI Issued:2007/06/01 Issue:7 Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

Tested by:
Intertek Testing Services NA, Inc.
1809 10th ST #400
Plano, TX 75074 - USA

Client:
DLP Design, Inc.
1605 Roma Lane
Allen, TX 75013 - USA

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EMC Engineer

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1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Dallas is located at 1809 10th St. # 400, Plano TX 75074. The radiated emission test site is a 3-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
6	Peak Conducted Power	§ 15.247(b)(3)(4)	RSS-210 (A8.4)	Pass
8	Occupied Bandwidth	§ 15.247(a)(2)	RSS-210 (A8.2), RSS-GEN (4.6.1)	Pass
18	Conducted and Band Edge Spurious Emissions	§ 15.247(d)	RSS-210 (A8.5)	Pass
26	Timing, Channel Separation and Number of Hopping Channels	§ 15.247(e)	RSS-210 A8.2(B)	Pass
30	Radiated Spurious Emissions (Transmitter)	§ 15.247(d), § 15.209, and § 15.205	RSS-210 (2.2)	Pass
39	Radiated Spurious Emissions (Receiver)	§ 15.109	RSS-Gen (6.1)	N/A (1)
39	AC Power Line Conducted Emissions	§ 15.107, § 15.207	RSS-Gen (7.2.4)	N/A (2)
39	Antenna Requirement per FCC 15.203	§ 15.203	RSS-Gen (7.1.2)	Pass

Note 1: This device does not contain a separate receive function. The nature of this device is that it will only receive while transmitting. Therefore, the spurious emissions produced in transmit mode are the spurious emissions produced in receive mode.
Note 2: This device is powered by 3 AA Batteries.

Description of Equipment Under Test

Equipment Under Test	
Manufacturer	DLP Design
Model Number	RFS1231
Serial Number	1
FCC Identifier	SX9RFS1
IC Identifier	5675A-RFS1
Receive Date	January 3rd, 2012
Test Start Date	January 3rd, 2011
Test End Date	January 23rd, 2012
Device Received Condition	Pre-production Prototype
Test Sample Type	Frequency Hopping Data Radio
Frequency Band	902-928MHz
Mode(s) of Operation	Transmit/Receive
Modulation Type	FSK, OOK
Duty Cycle	Up to 100% (Continuous). Supports voice quality streaming audio
Maximum Output Power	16.62dBm
Test Channels	902, 915, 928
Antenna Type (15.203)	Compliant
Operating Voltage	DC Battery-powered

Description of Equipment Under Test
The DLP Design, Inc. RFS1231 is a 902-928MHz frequency hopping data radio intended for the simple development of wireless data transmission systems. The modular design allows for easy integration into the operator's system. All of the DLP-RFS1231's electronics reside within the compact unit, and a u.fl port is available for connecting to an external antenna.

Operating modes of the EUT:

No.	**Descriptions of EUT Exercising**
1	For Peak Power and Radiated Emissions testing EUT was operating in a constant transmit, un-modulated mode.
2	For all other testing EUT was operated in modulated and frequency hopping mode as dictated by the FCC 15.247/RSS210
3	The EUT continuously transmitted at maximum power.
4	The EUT was tuned to a low, middle, and high channel to perform power, occupied bandwidth, and spurious/harmonic tests.

Note: The **DLP Design, Inc. RFS1231** was tested to and found to be in compliance with FCC 47 CFR Part 15 and IC RSS-210 issue 7.

System setup including cable interconnection details, support equipment and simplified block diagram

2.1 EUT Block Diagram:

The test sample was tested in stand alone mode and was not connected to any support equipment during the evaluation.

2.2 Cables:

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Antenna Cable	6.0 inches	yes	no	TX port	Antenna

2.3 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

3 Peak Conducted Power

3.1 Test Limits

§ 15.247(b)(3): For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

§ 15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247). The peak output power was measured using the channel power function of the spectrum analyzer.

3.3 Test Equipment Used:

Description	Manufacturer	Model	Serial Number	Cal Date	Cal Due
EMI Receiver	Rhode & Schwarz	ESI	100044	03/29/11	03/29/12
Cable	Insulated Wire	NPS-2301-180-SPS	AID 803	07/15/11	07/15/12

3.4 Results:

Project #	Date	Rule	Distance	Antenna	RBW	VBW	Detector
G100603150	01/05/2011	15.247	N/A	Direct	1MHz	1MHz	Peak

Conducted-Transmitting

Frequency (MHz)	Recorded Level (dBm)	Cable Loss (dB)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
902	16.16	0.19	16.35	21	-4.65
915	16.27	0.19	16.46	21	-4.54
928	16.43	0.19	16.62	21	-4.38

Results: Pass

4 Occupied Bandwidth

4.1 Test Limits

§ 15.247(a)(2): Occupied bandwidth measurements were performed on the EUT to determine compliance with FCC 15.247(a)(2) and RSS-210.For digital modulation systems, the minimum 6dB bandwidth shall be at least 500kHz.

4.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).
The occupied bandwidth was measured with a spectrum analyzer directly connected to the EUT while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. Display line and marker delta functions were used to measure the occupied bandwidth of the EUT. However, the 20 or 26dB bandwidth is referenced to a peak power measurement taken at the entire bandwidth or more for RBW, then using 1% RBW for the 20 or 26 dB bandwidth. Measurements were made at three frequencies.

The 20 dB bandwidth must be measured and reported for the FCC and the 26dB bandwidth must be measured and reported for IC.

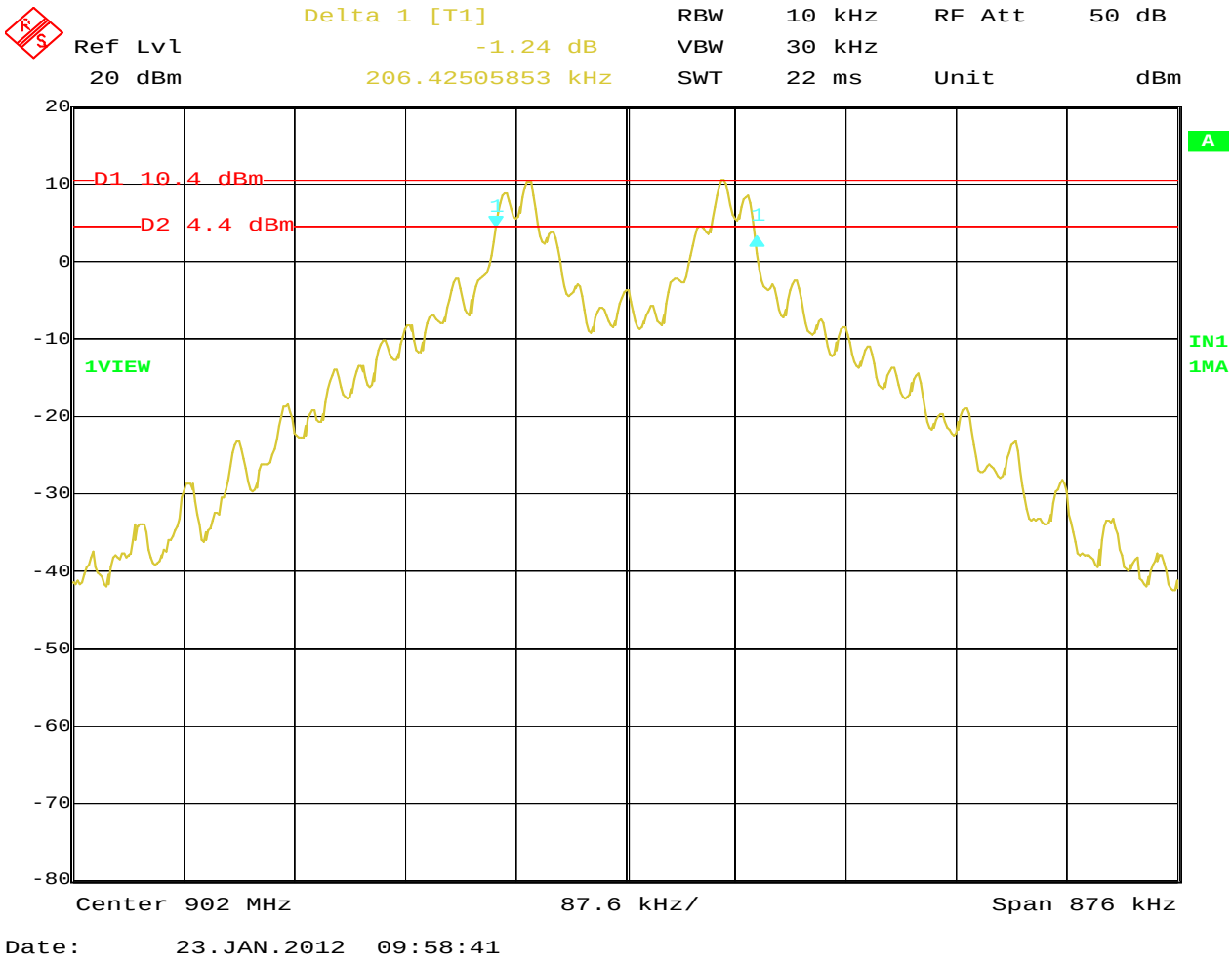
4.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI	100044	03/29/11	03/29/12
Cable	Insulated Wire	NPS-2301-180-SPS	AID 803	07/15/11	07/15/12

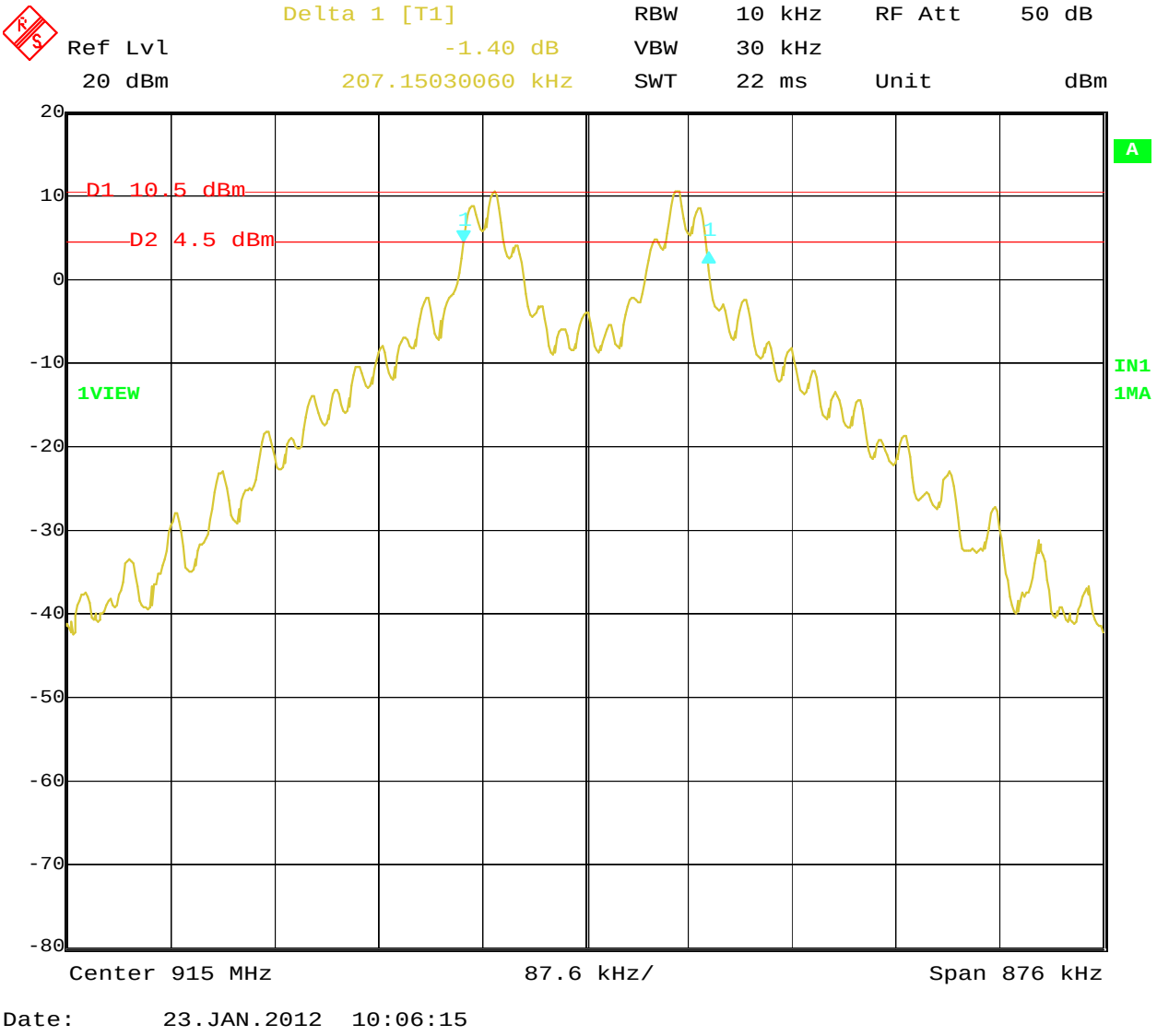
4.4 Results:

Mode	Channel Number	Frequency (MHz)	Bandwidth (KHz)	Result
6 dB BW	Low	902	206.4	Pass
6 dB BW	Mid	905	207.1	Pass
6 dB BW	High	928	207.1	Pass
20 dB BW	Low	902	353.7	Pass
20 dB BW	Mid	905	354.6	Pass
20 dB BW	High	928	398.5	Pass
26 dB BW	Low	902	469.7	Pass
26 dB BW	Mid	905	470.5	Pass
26 dB BW	High	928	546.0	Pass

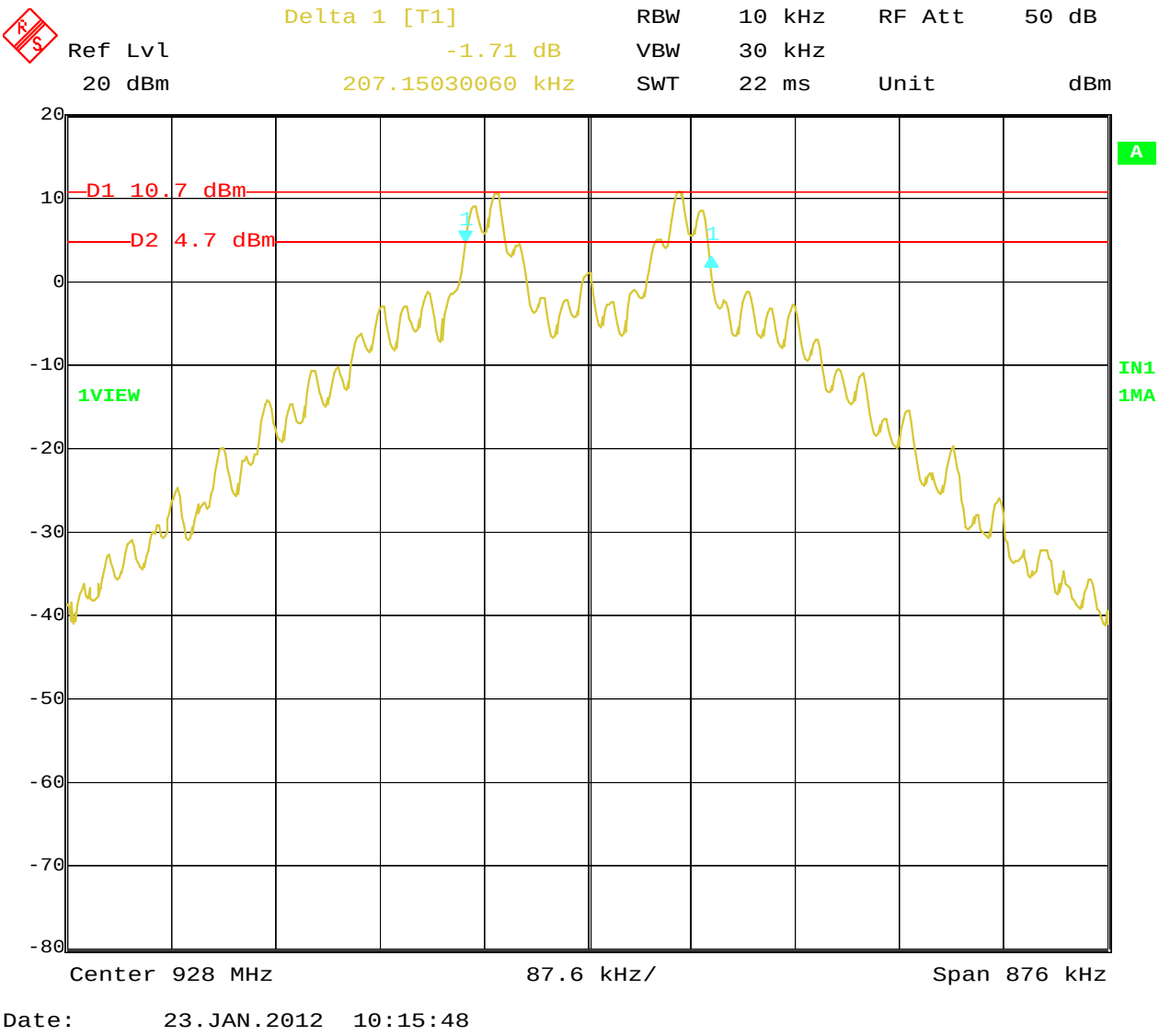
Results: Pass



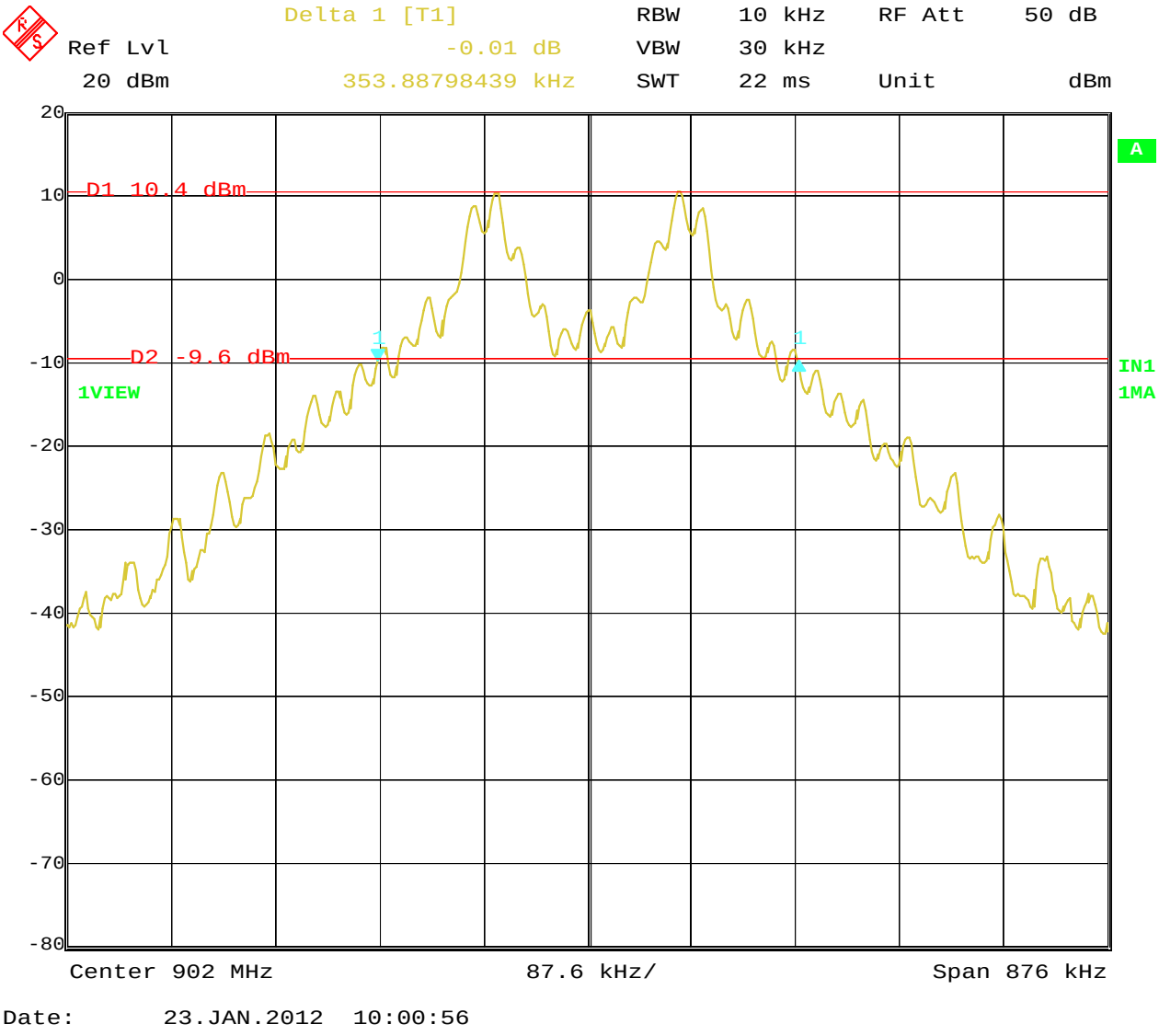
6dB Bandwidth Plot (Low Channel)



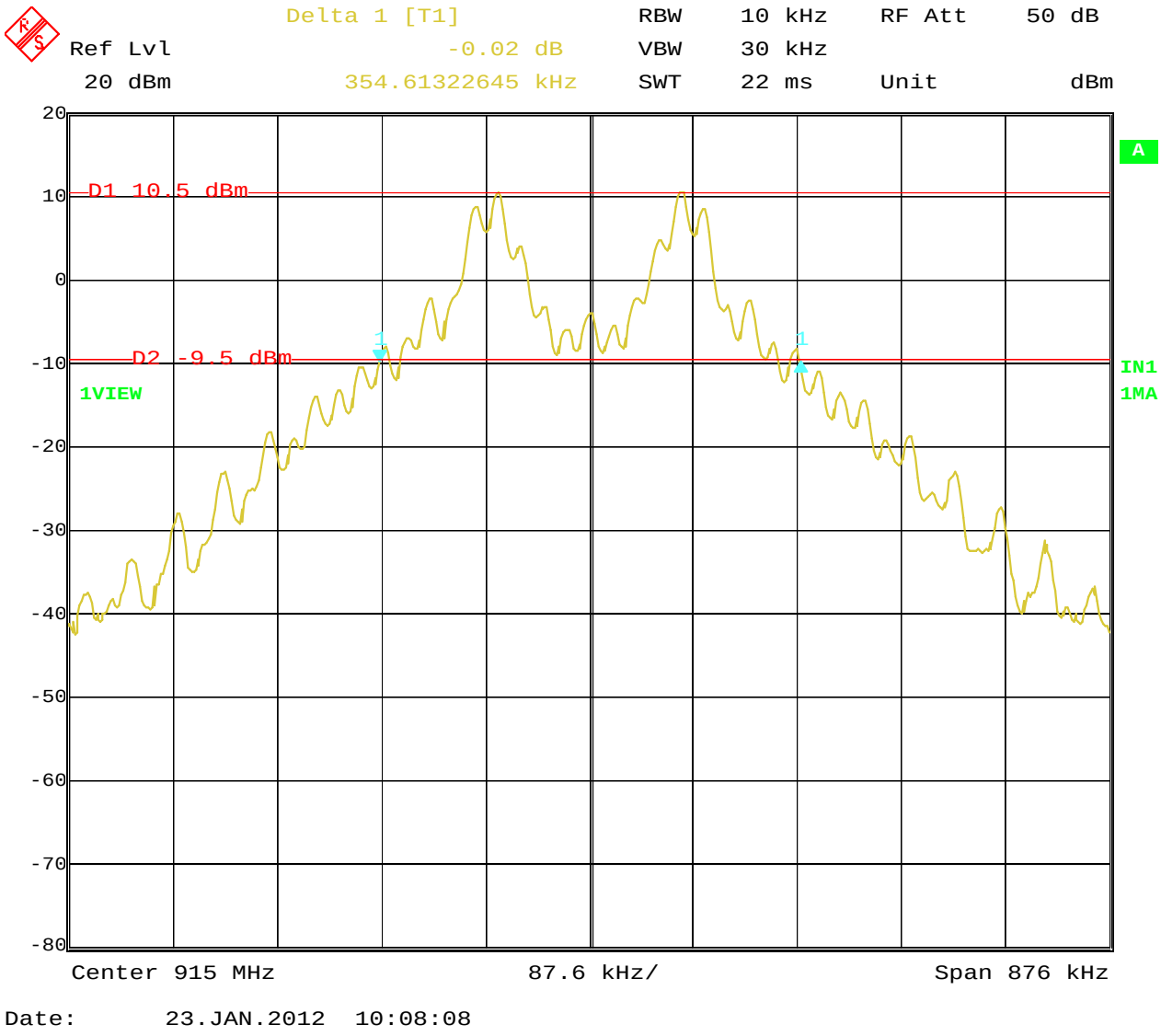
6dB Bandwidth Plot (Mid Channel)



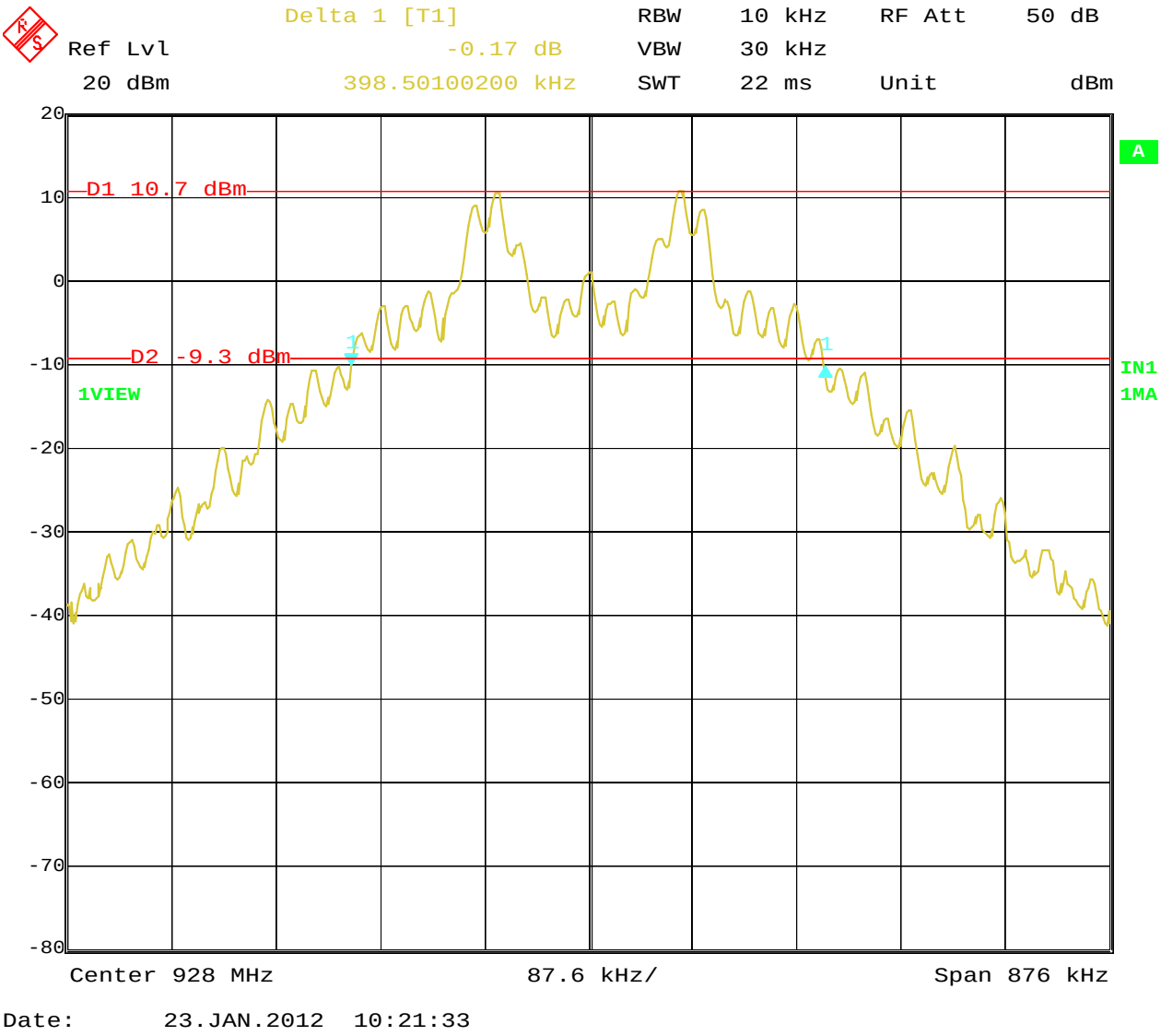
6dB Bandwidth Plot (High Channel)



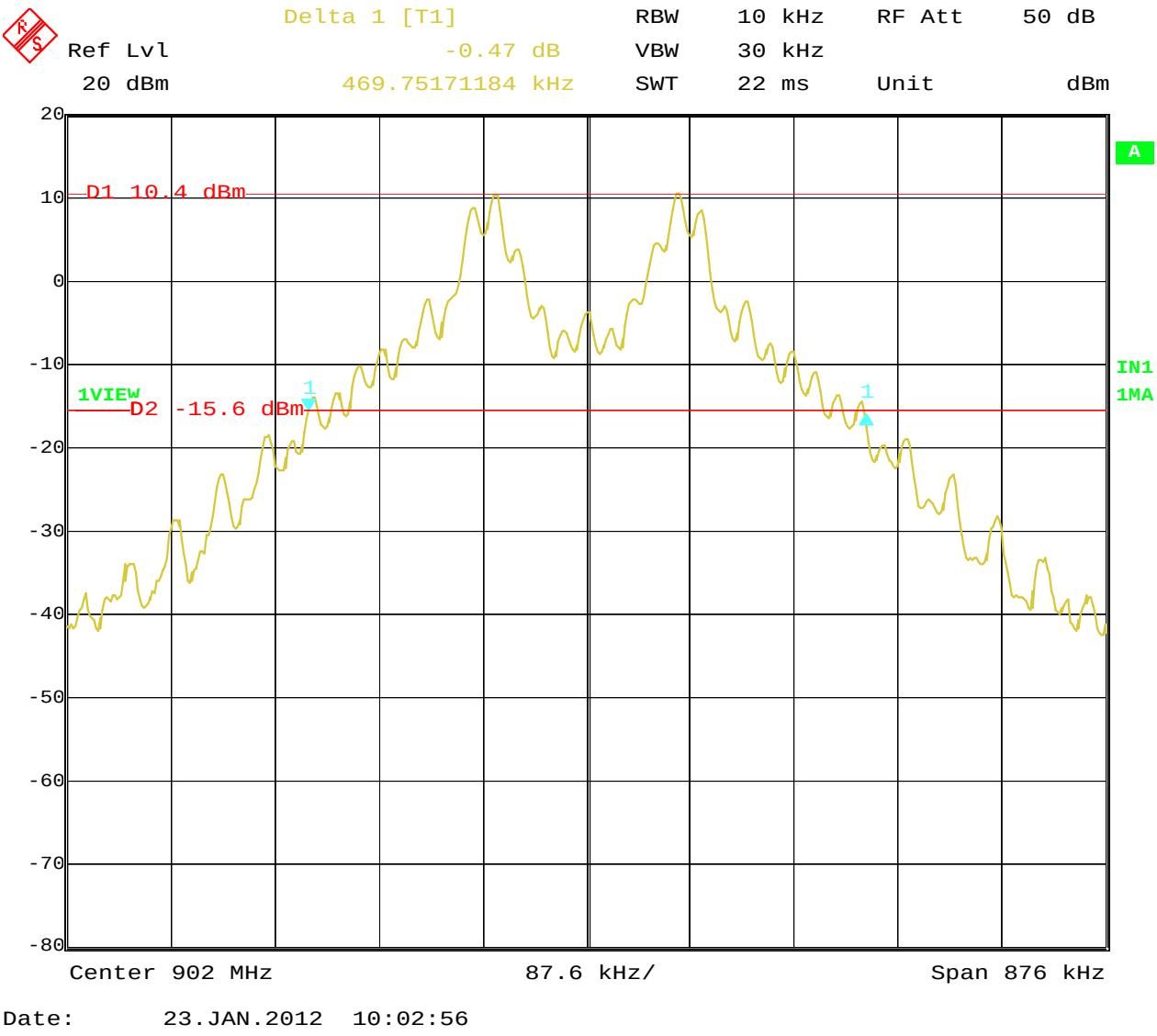
20dB Bandwidth Plot (Low Channel)



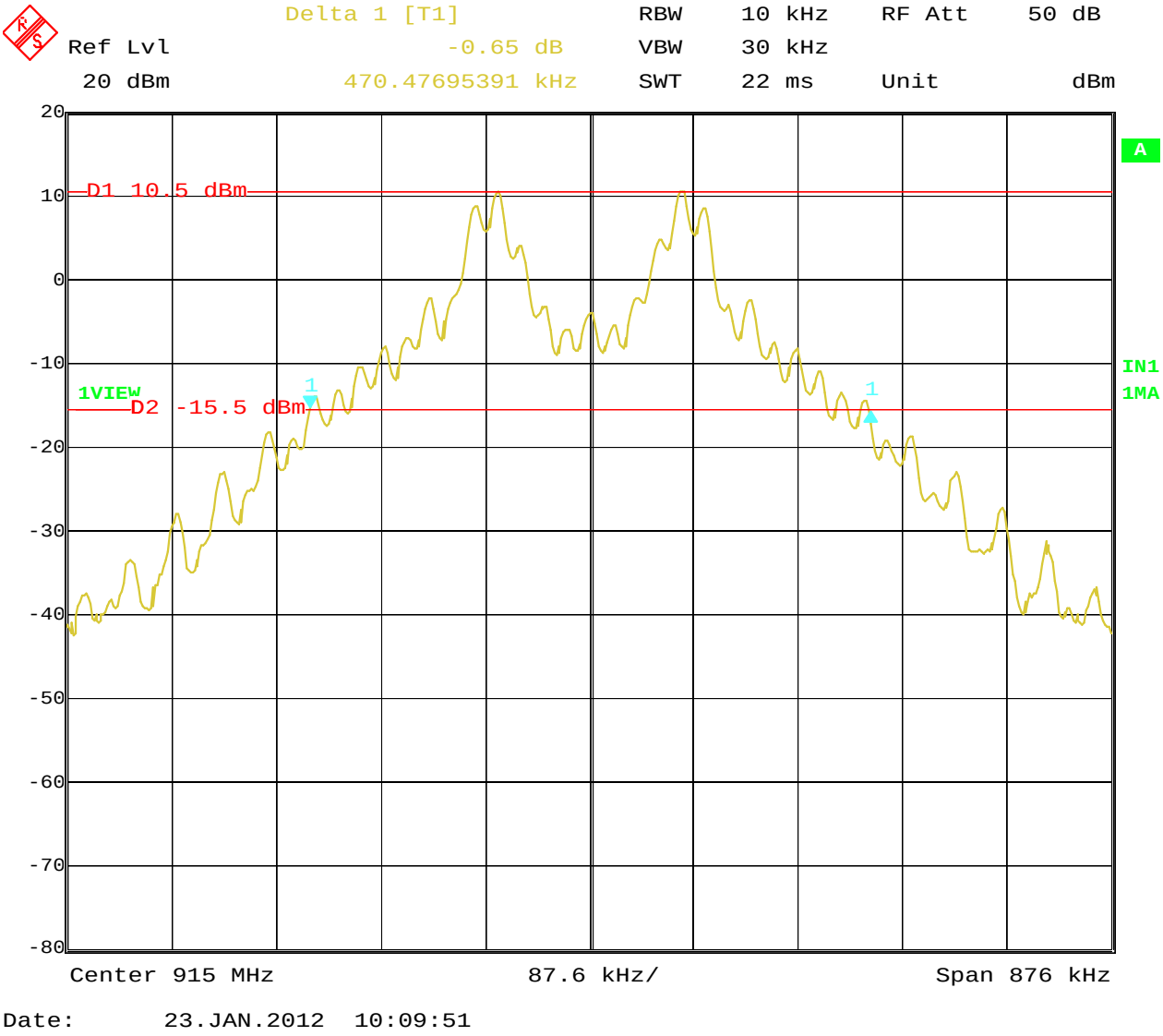
20dB Bandwidth Plot (Mid Channel)



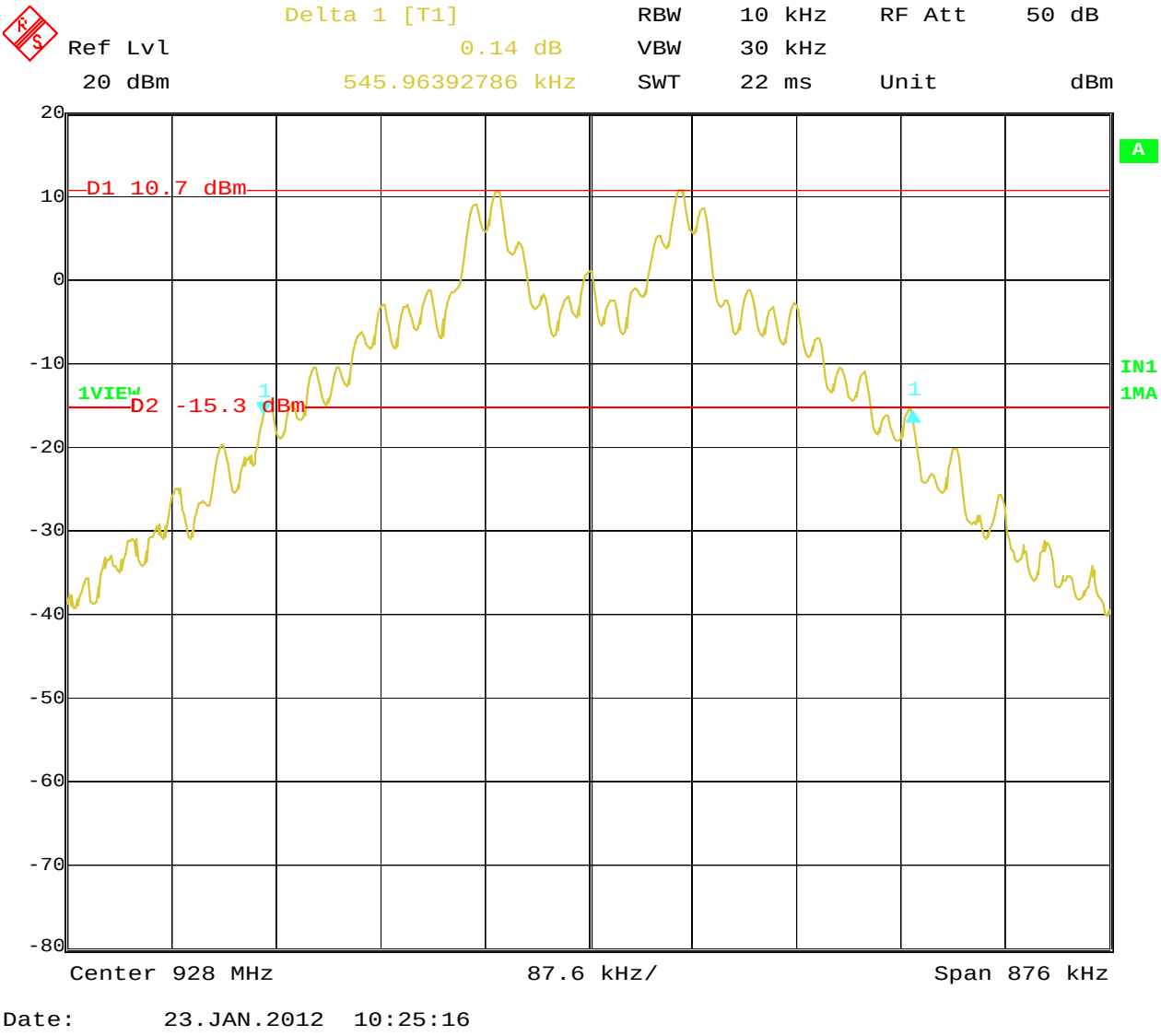
20dB Bandwidth Plot (High Channel)



26dB Bandwidth Plot (Low Channel)



26dB Bandwidth Plot (Mid Channel)



26dB Bandwidth Plot (High Channel)

5 Conducted Spurious Emissions and Band Edge Spurious Emissions

5.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.2 Test Procedure Conducted Spurious Emissions

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)
Peak spurious measurements were made in the frequency range of 500 MHz to a minimum of the 7th harmonic range while the EUT was tuned to the lowest, middle, and highest channels. The EUT was directly connected to a spectrum analyzer with a calibrated measurement cable.

The RBW of the Spectrum analyzer was 1 MHz and the peak detector was employed**.**

5.3 Test Procedure Band Edge Emissions

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)
Band Edge measurements were made while the EUT was tuned to the lowest and highest channels. The EUT radiated measurements were taken in a 3 meter semi-anechoic chamber.

The RBW of the Spectrum analyzer was 100 KHz and the peak detector was employed**.**
All band edge emissions were attenuated by at least 20dB below the level of the fundamental.

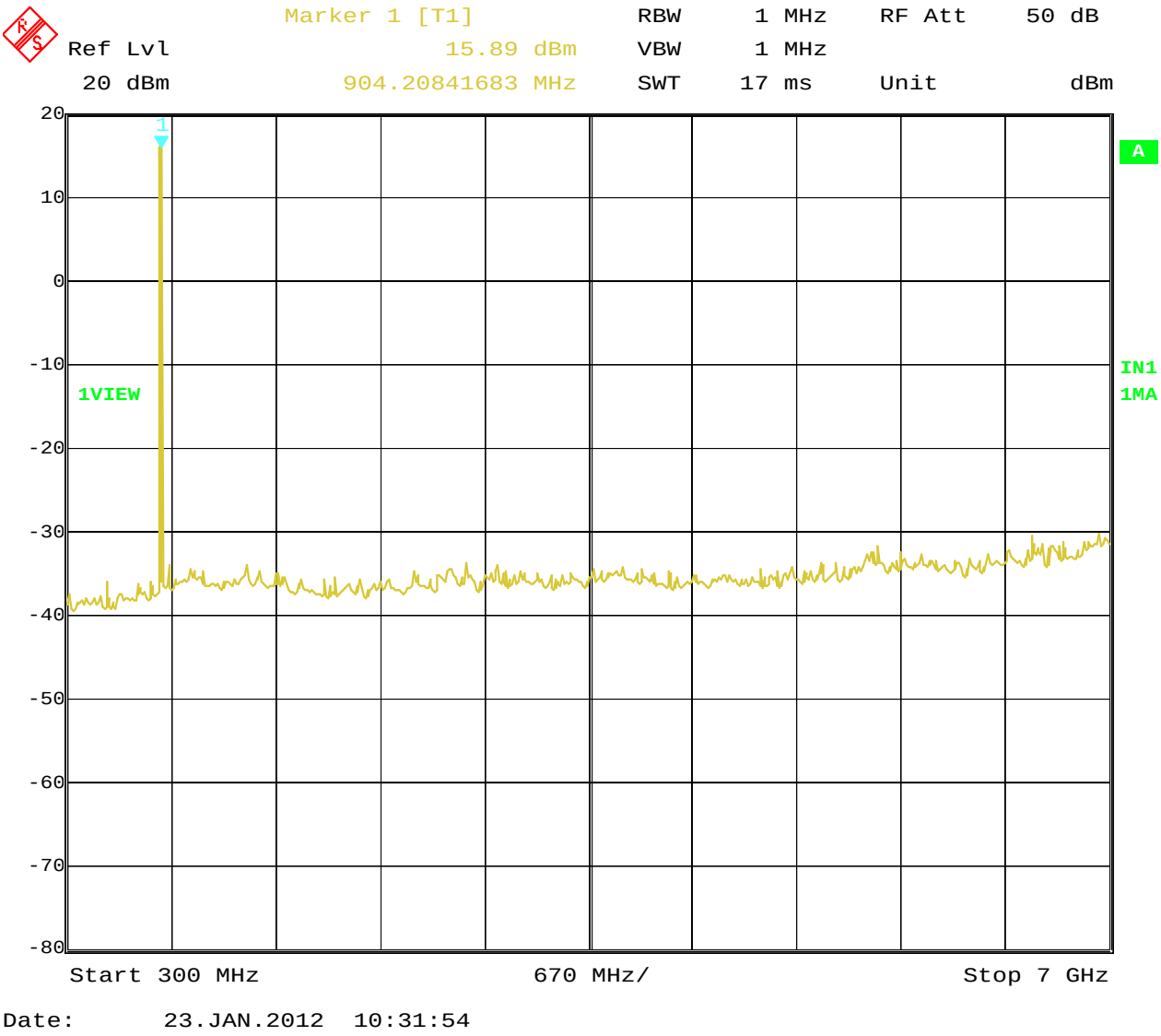
5.4 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI	100044	03/29/11	03/29/12
Cable	Insulated Wire	NPS-2301-180-SPS	AID 803	07/15/11	07/15/12
Bi-ConiLog Antenna	Chase	CBL6112B	2726	08/10/11	08/10/12
RF Cable	MegaPhase	F520NKNK315	11111301002	09/14/11	09/14/12
RF Cable	SemFlex	RF Coax Cable	AID 243	07/15/11	07/15/12
RF Pre-amplifier 1 to 18GHz	Miteq	AMF-50-00501800-28-1	1469795	05/10/11	05/10/12

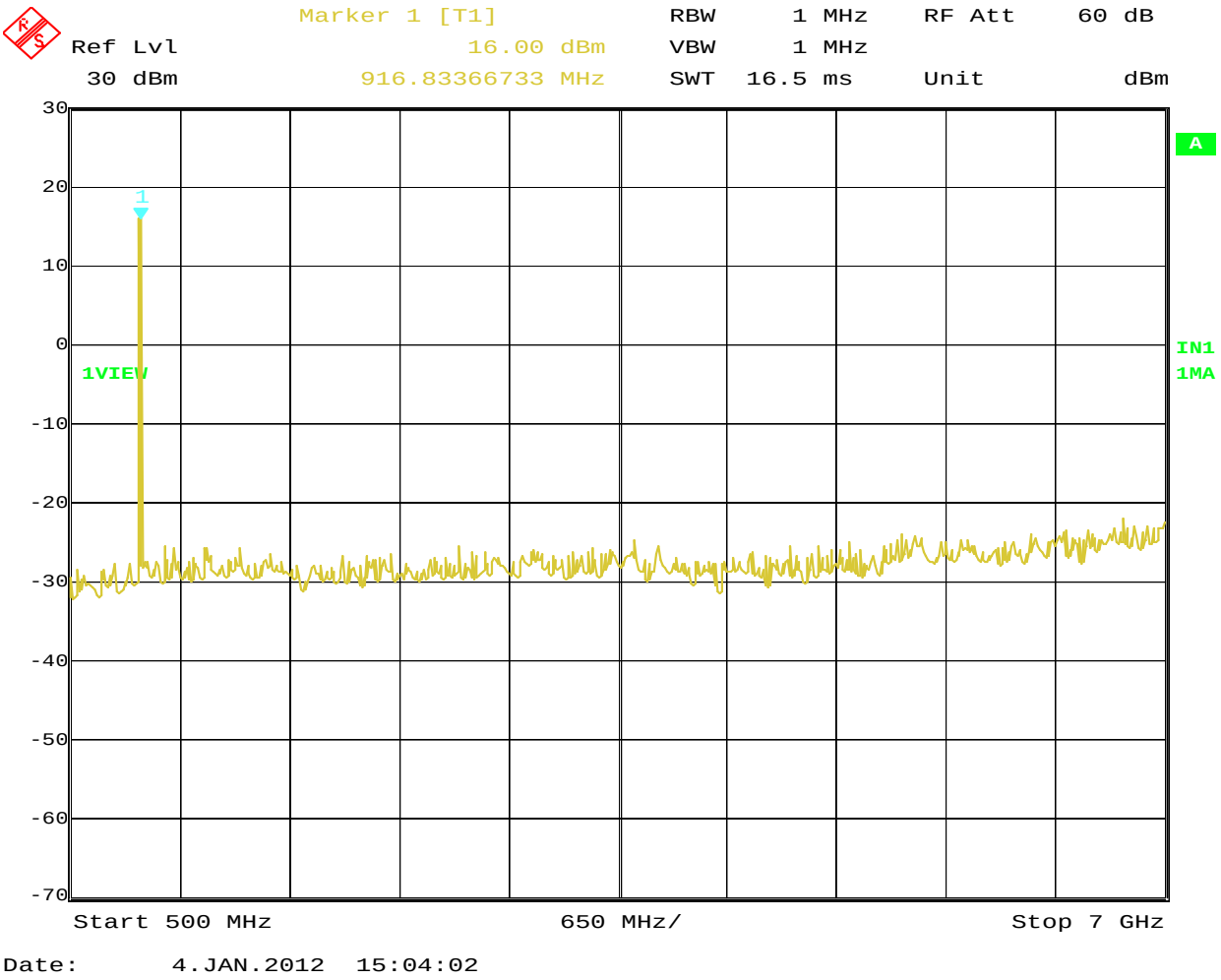
5.5 Results:

The following plots show that there are no conducted spurious emissions exceeding the 20dB down criteria.

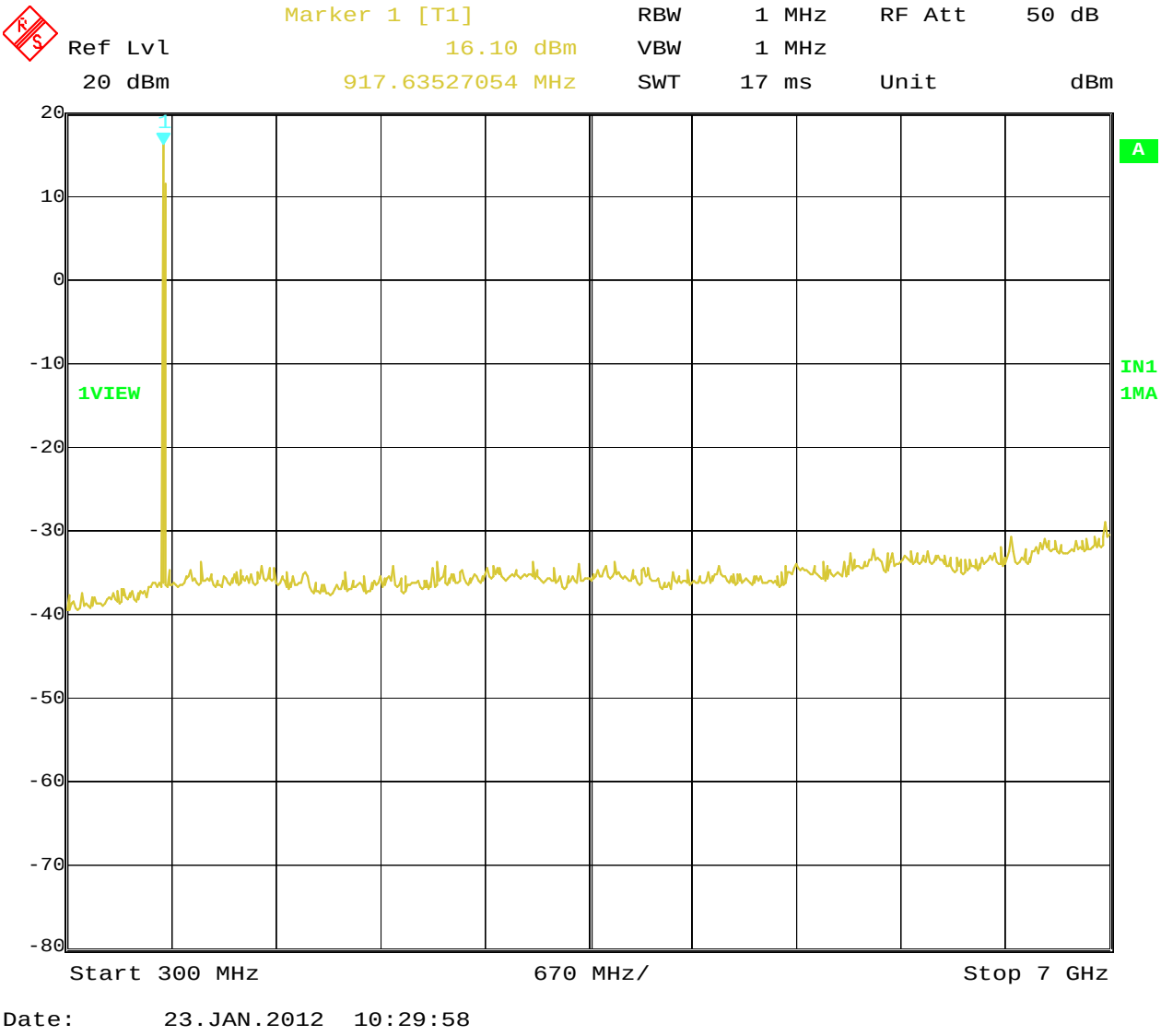
Results: Pass



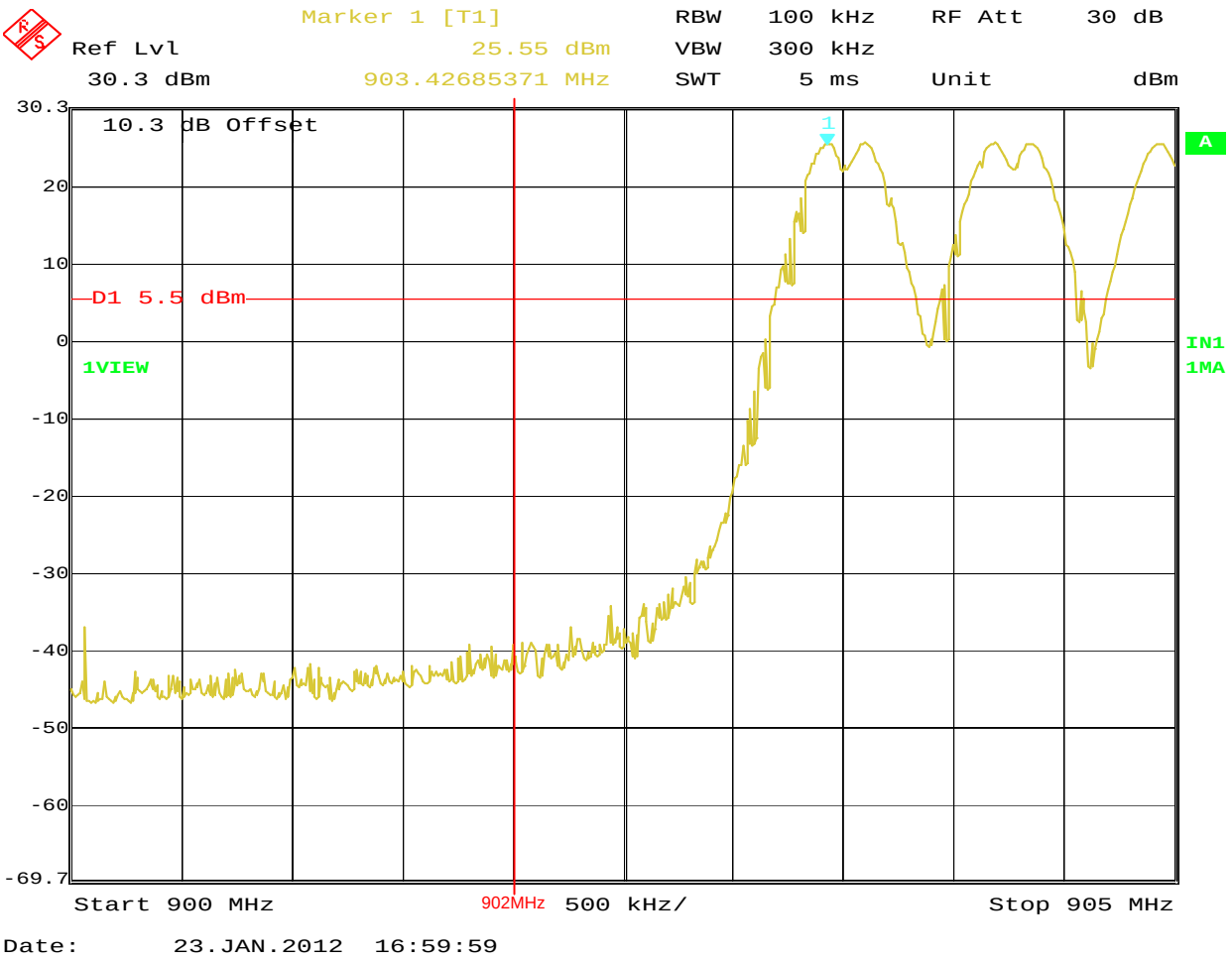
Conducted Spurious Emissions –Low Channel



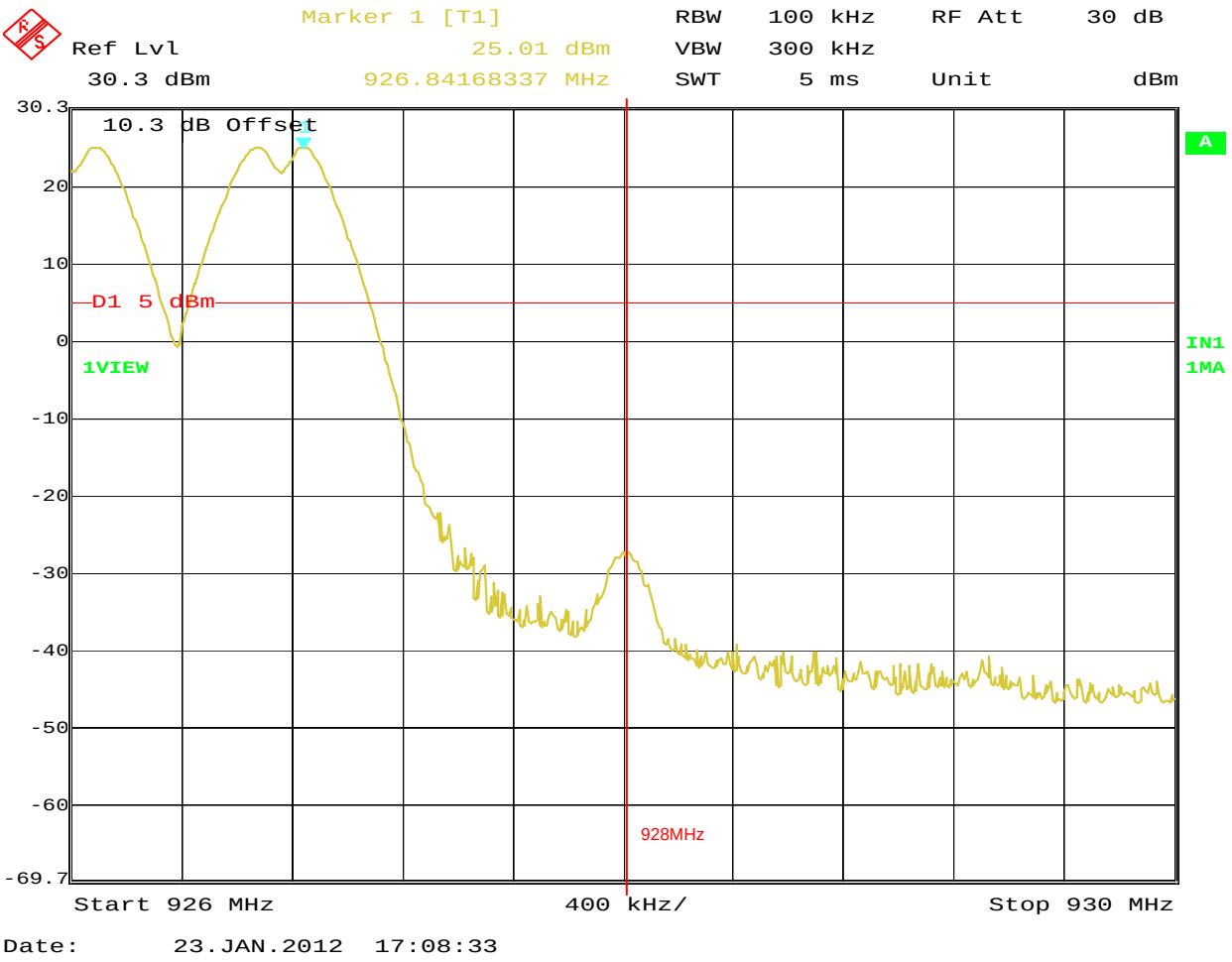
Conducted Spurious Emissions –Mid Channel



Conducted Spurious Emissions - High Channel



Radiated Emissions Band Edge - Low Channel



Radiated Emissions Band Edge - High Channel

6 Timing, Channel Separation and Number of Hopping Channels

Plots were captured of the all hopping channels and the time occupied on each channel. The bandwidth between the channels was measured from the plot of all the hopping channels in order to determine compliance with FCC 15.247and RSS-210.

6.1 Test Procedure

In order to measure the number of channels and the channel separation the EUT was transmitting in its normal mode the spectrum analyzer was set to max hold while being tuned across the entire band.. Approximately 10 minutes is given to allow all of the channels to be captured. Delta markers were used to measure the channel separation.

In order to measure the timing the spectrum analyzer was set to the frequency of one of the channels while in zero span. The occupancy time on the channel was also monitored for a total of 10 seconds to ensure all transmissions in a 10 second period are accounted for. Plots presented following the data sheets

6.2 Test Criteria

According to section FCC 15.247 and RSS-210 the system must use at least 25 hopping channels as the channel bandwidth is greater than 250 kHz (determined by the 20 dB occupied bandwidth). The channels must be separated by at least the channel bandwidth. The maximum occupancy time on any channel may not exceed 0.4 seconds in any 10 second period.

6.3 Test Equipment Used:

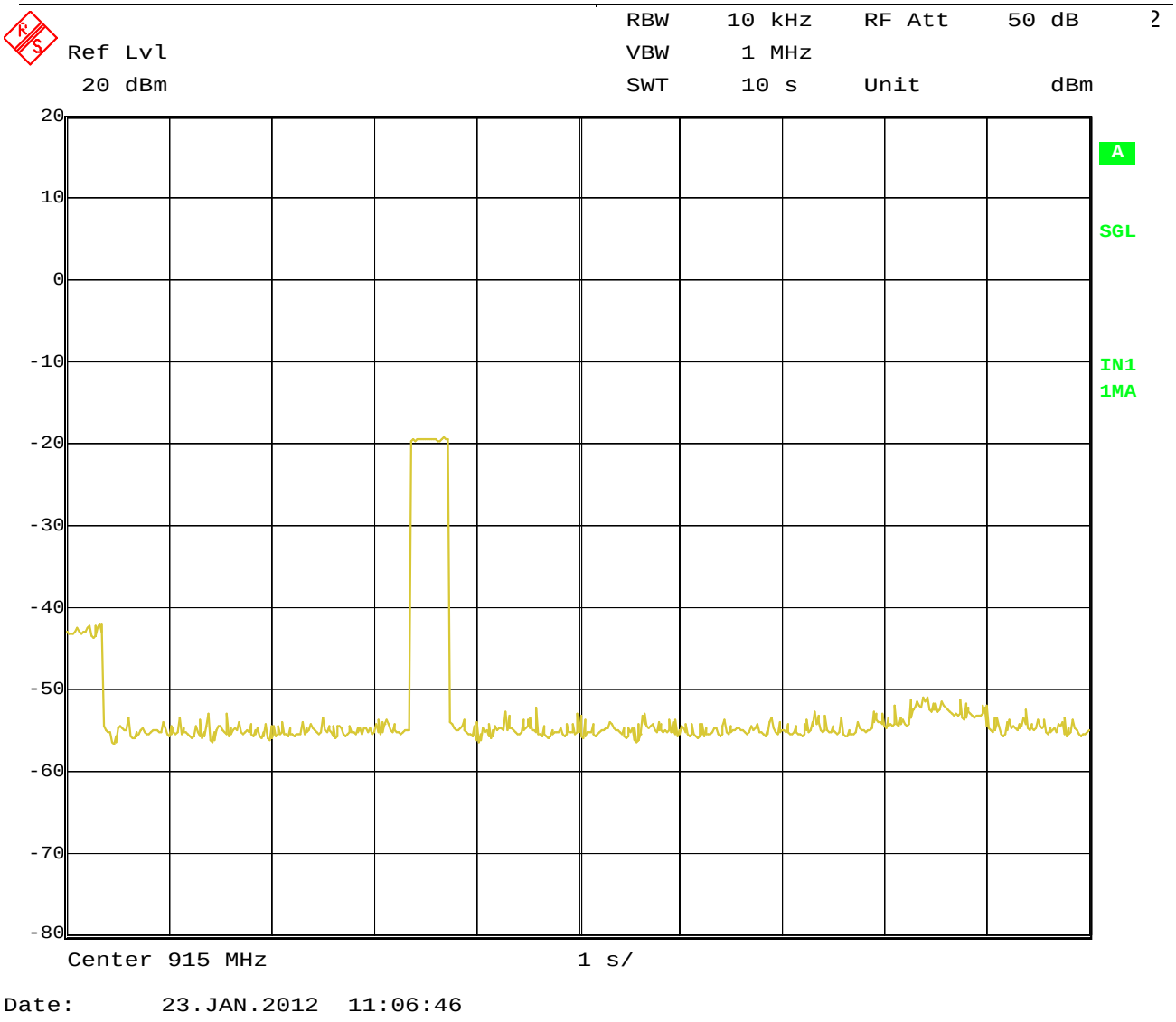
Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Receiver	Rhode & Schwarz	ESI	100044	03/29/11	03/29/12
Cable	Insulated Wire	NPS-2301-180-SPS	AID 803	07/15/11	07/15/12

6.4 Timing Data Sheet:

Sweep Time	DATE	Time/sec	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
10 Sec.	01/23/12	367.7 mSec	N/A	Direct	10KHz	1MHz	Peak
1 Sec. (1)	01/23/12	367.7 mSec	N/A	Direct	10KHz	1MHz	Peak

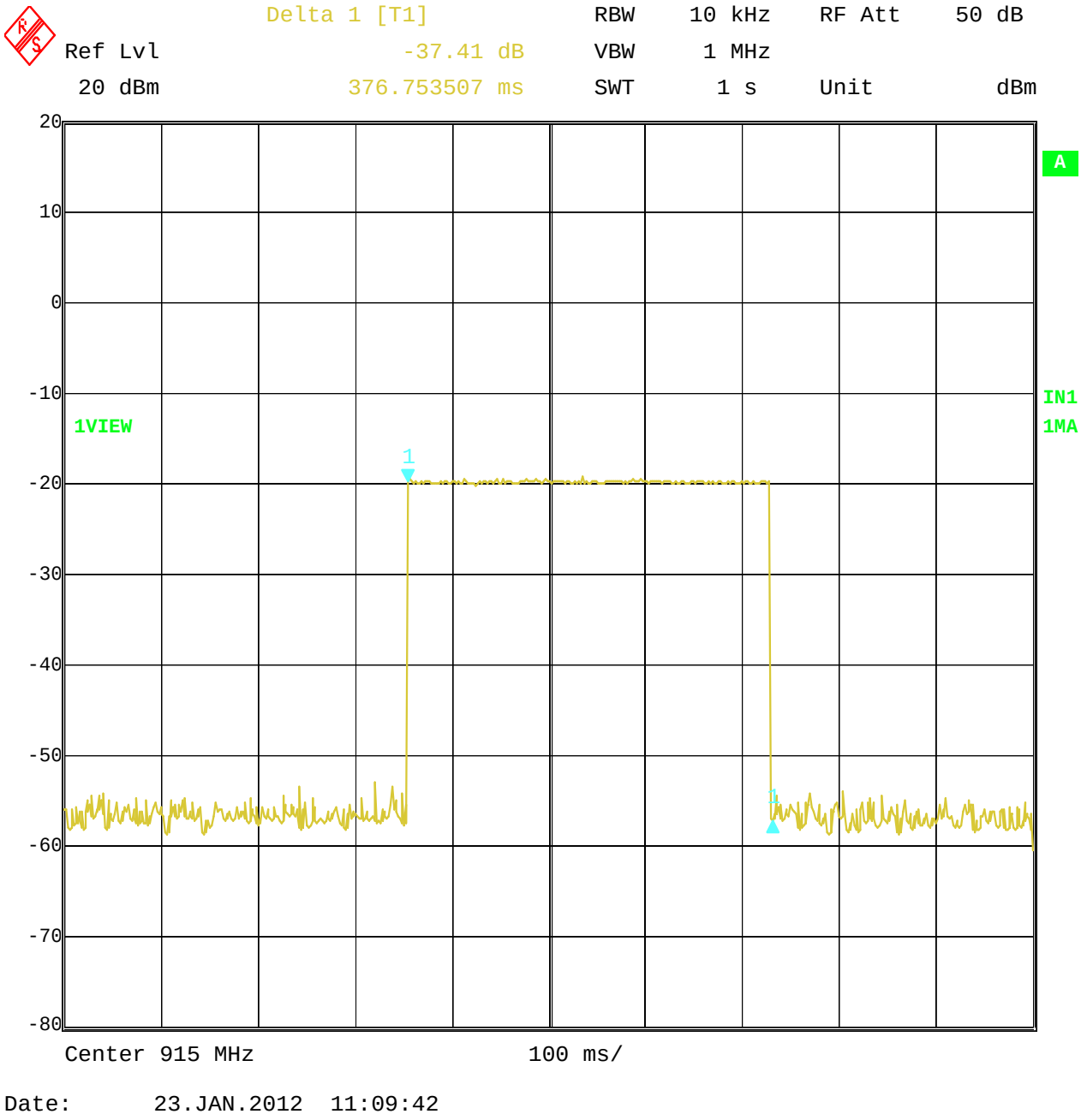
Note (1): 1 second test for reference only.

Results: Pass



Channel Occupation in a 10 second period.

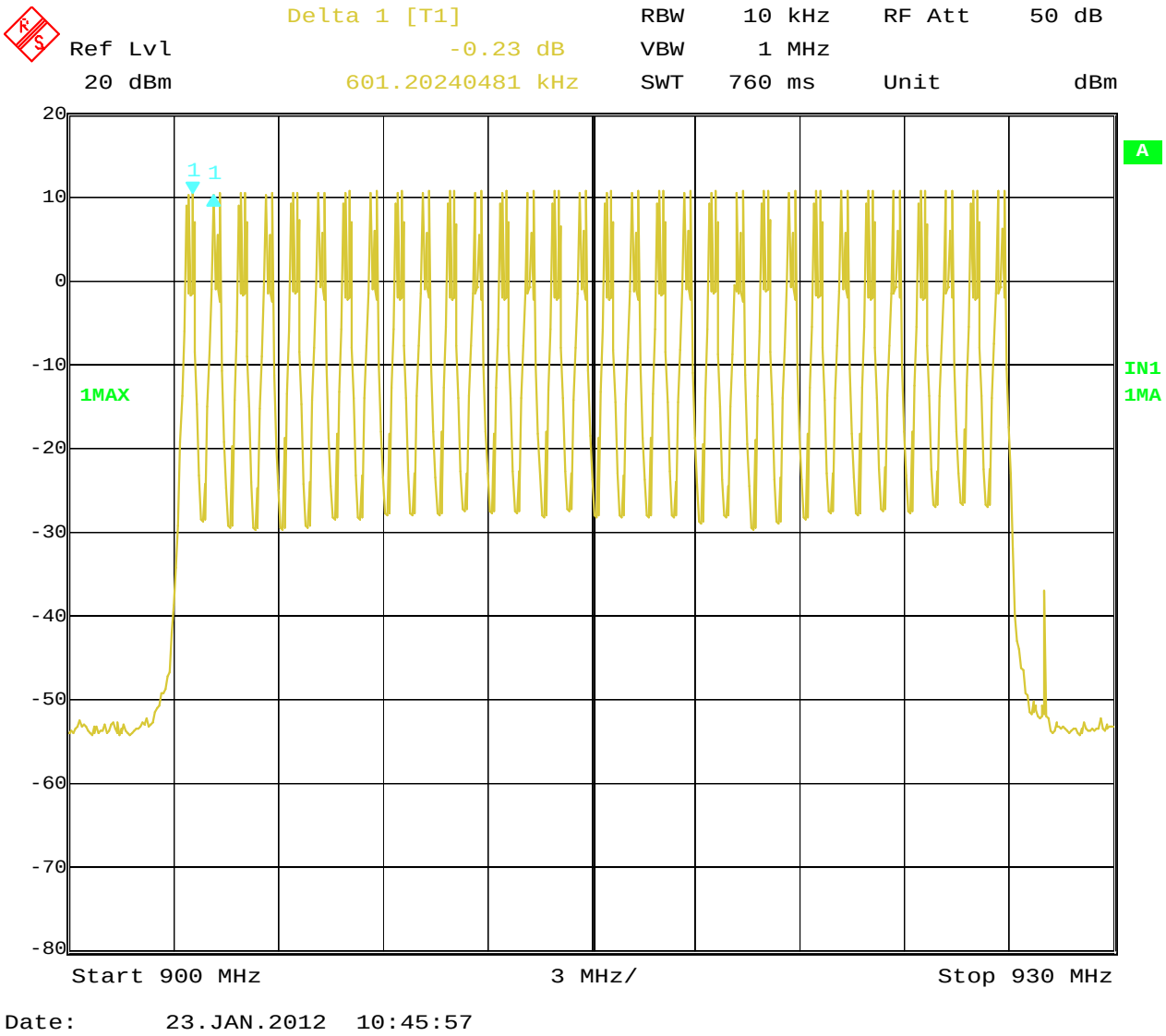
Result: PASS



Ch. Occupation 1 Sec sweep 376.7 mSec

6.5 Number of Hopping Channels and Channel Separation Data Sheet

Sweep Rate/ Time	DATE	Number of Channels	Channel Separation (KHz)	ANTENNA	RBW	VBW	DETECTOR
760ms /10 Min ET	01/23/12	32	601.2	Direct	10KHz	1MHz	Peak



Number of Channels/Separation plot

7 Radiated Spurious Emissions (Transmitter)

7.1 Test Limits

§ 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Part 15.205(a): Restricted Bands of Operations

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	[2]
13.36–13.41.			

[1] Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2] Above 38.6

Part 15.209(a): Field Strength Limits for Restricted Bands of Operation

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

7.2 Test Procedure

ANSI C63.10: 2009 and KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

7.3 Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculations are listed below:

Formula:
FS = RA + AF + CF

FS = Field Strength in dBμV/m
RA = Receiver Amplitude in dBμV
AF = Antenna Factor in dB
CF = Cable Attenuation Factor in dB (Including preamplifier and filter attenuation)

Example Calculation:

RA = 19.48 dBμV
AF = 18.52 dB
CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBμV/m
Level in μV/m = Common Antilogarithm [(38.78 dBμV/m)/20] = 86.89 μV/m

7.4 Test Equipment Used:

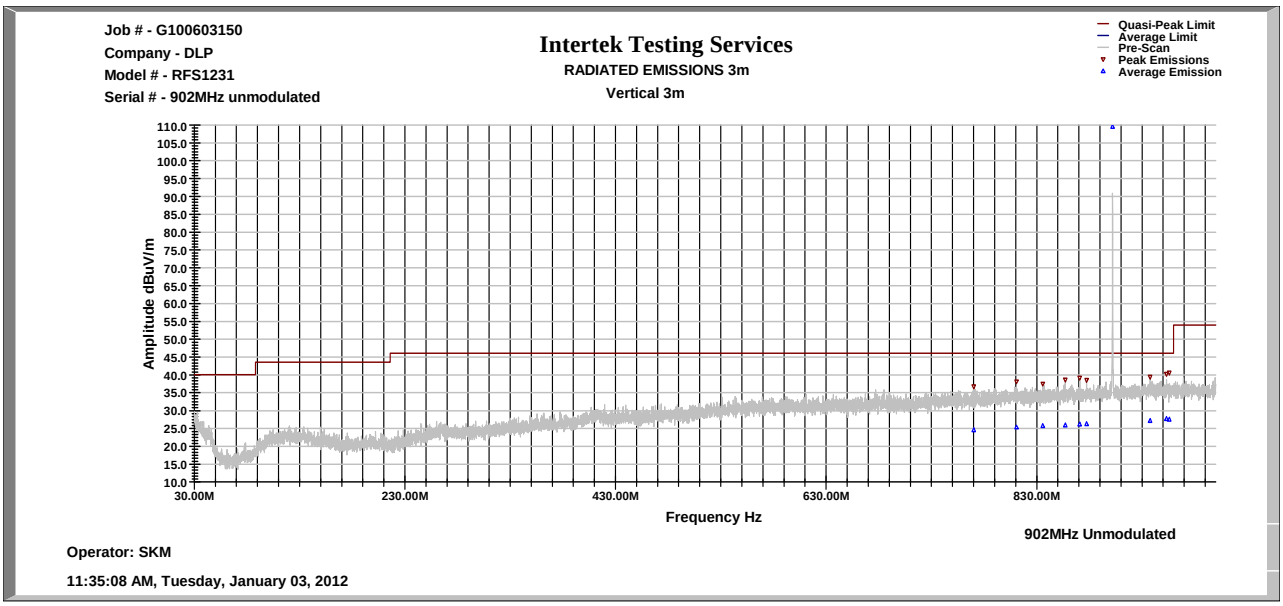
Description	Manufacturer	Model	Serial Number	Cal Date	Cal Due
EMI Receiver	Rhode & Schwarz	ESI	100044	03/29/11	03/29/12
Bi-ConiLog Antenna	Chase	CBL6112B	2726	08/10/11	08/10/12
RF Cable	MegaPhase	F520NKNK315	11111301002	09/14/11	09/14/12
RF Cable	SemFlex	RF Coax Cable	AID 243	07/15/11	07/15/12
Handheld Manometer	Omega	OM-CP-PRHTemp2000	N10673	05/11/11	05/11/12
EMI Receiver	Agilent	E7405A	US40240235	03/21/11	03/21/12
Horn Antenna 700MHz-18GHz	A H Systems	SAS-571	787	04/07/11	04/07/12
RF Pre-amplifier 1 to 18GHz	Miteq	AMF-50-00501800-28-1	1469795	05/10/11	05/10/12

7.5 Results:

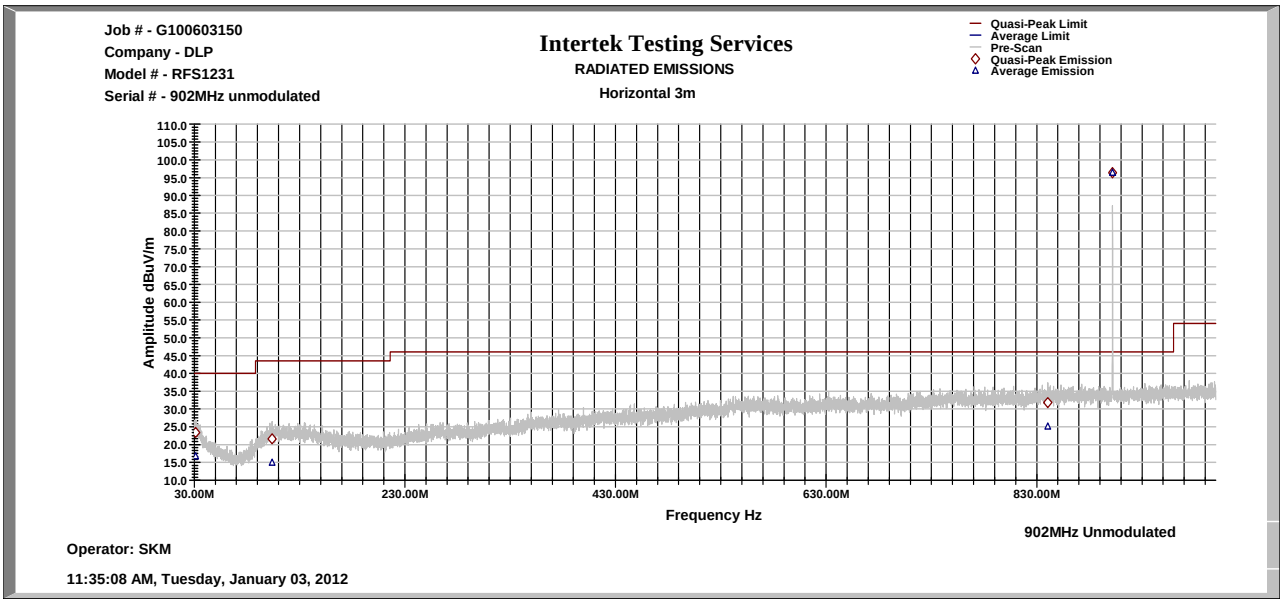
All spurious emissions were attenuated by at least 20dB below the level of the fundamental as required by Part 15.247(d). Additionally, all emissions falling within restricted bands of operation and at the band edges were found to be below the limit specified in Part 15.209(a). The spurious emissions listed in the following tables are the worst case emissions.

Worst Case Spurious Measurements

*Emissions were investigated through 3 orthogonal axis to determine the worst case.



30 to 1000MHz Scan Vertical Antenna Position



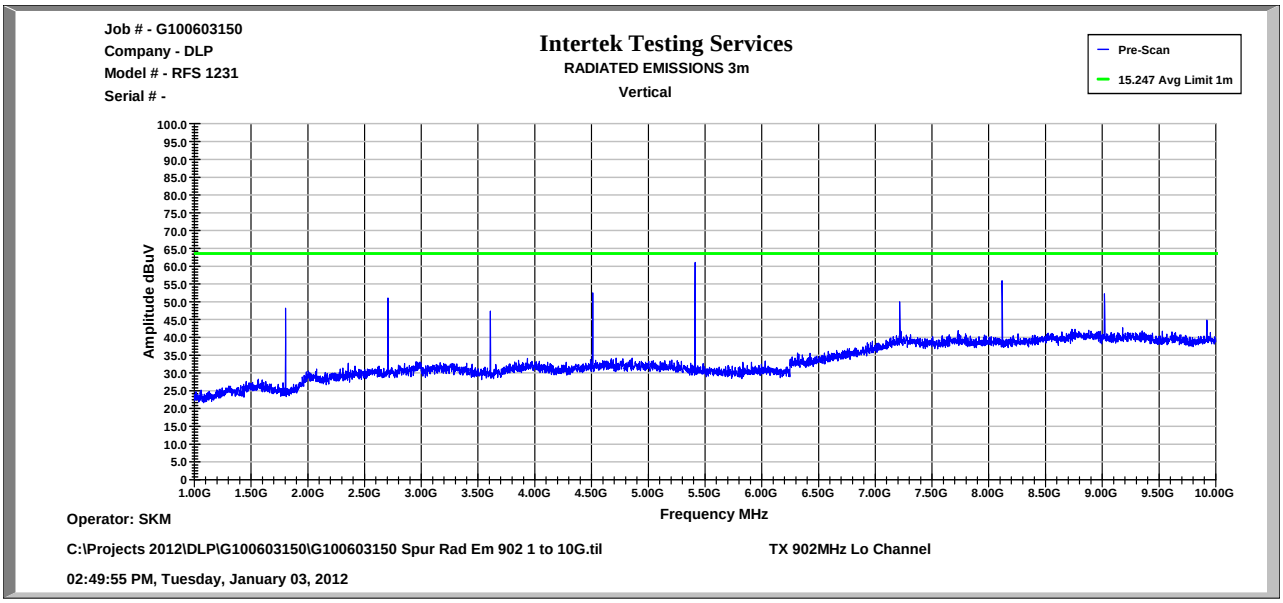
30 to 1000MHz Scan Horizontal Antenna Position

7.6 Data Sheet: 30 to 100MHz Radiated Scans

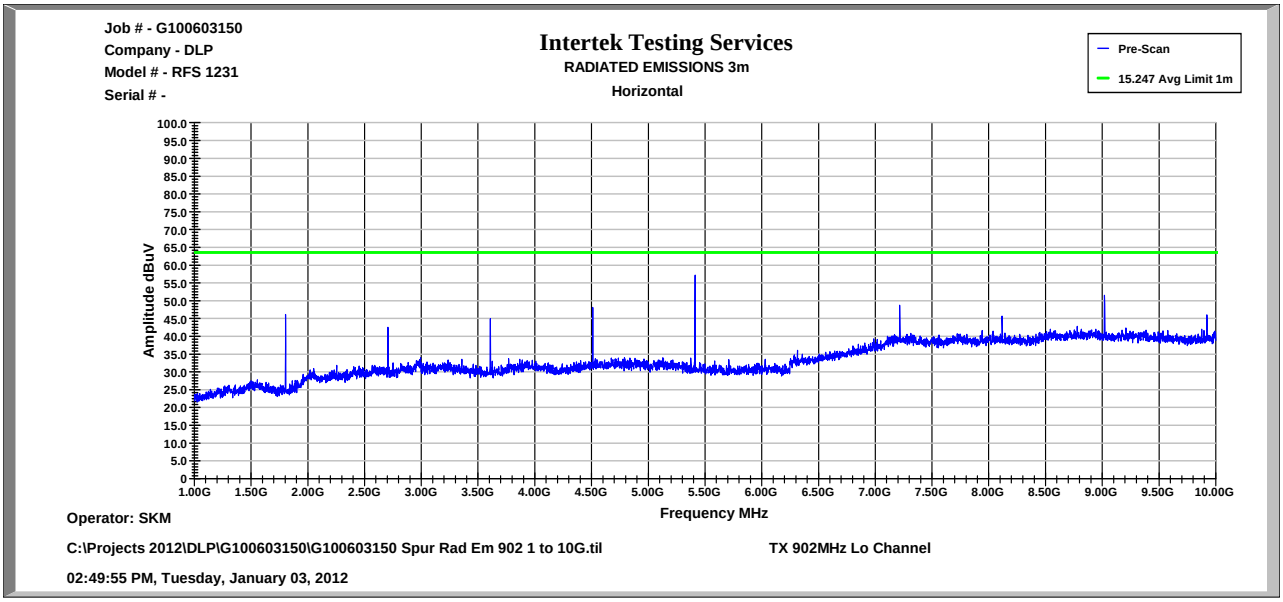
Polarization H/V	Frequency MHz	Height cm	Azimuth	QP Reading (dBuV/m)	Antenna Factor	Cable Factor	QP Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
V	770.19	340	209	9.492	20.6	1.152	31.243	46.021	-14.777
V	810.76	390	134	9.684	21.015	1.316	32.015	46.021	-14.005
V	835.74	151	95	9.918	21.23	1.234	32.382	46.021	-13.639
V	857.16	366	13	9.918	21.457	1.234	32.609	46.021	-13.412
V	870.91	179	51	10.191	21.418	1.233	32.842	46.021	-13.179
V	877.36	122	181	10.055	21.547	1.323	32.926	46.021	-13.095
V	937.66	209	229	10.412	22.1	1.299	33.81	46.021	-12.21
V	953.24	122	58	10.754	22.23	1.373	34.356	46.021	-11.664
V	955.9	340	106	10.499	22.318	1.393	34.21	46.021	-11.811
H	31.23	377	55	6.912	16.262	0.224	23.397	40	-16.603
H	103.85	363	155	7.956	13.185	0.455	21.596	43.522	-21.926
H	840.51	261	48	9.825	20.7	1.227	31.752	46.021	-14.269

Results: Pass

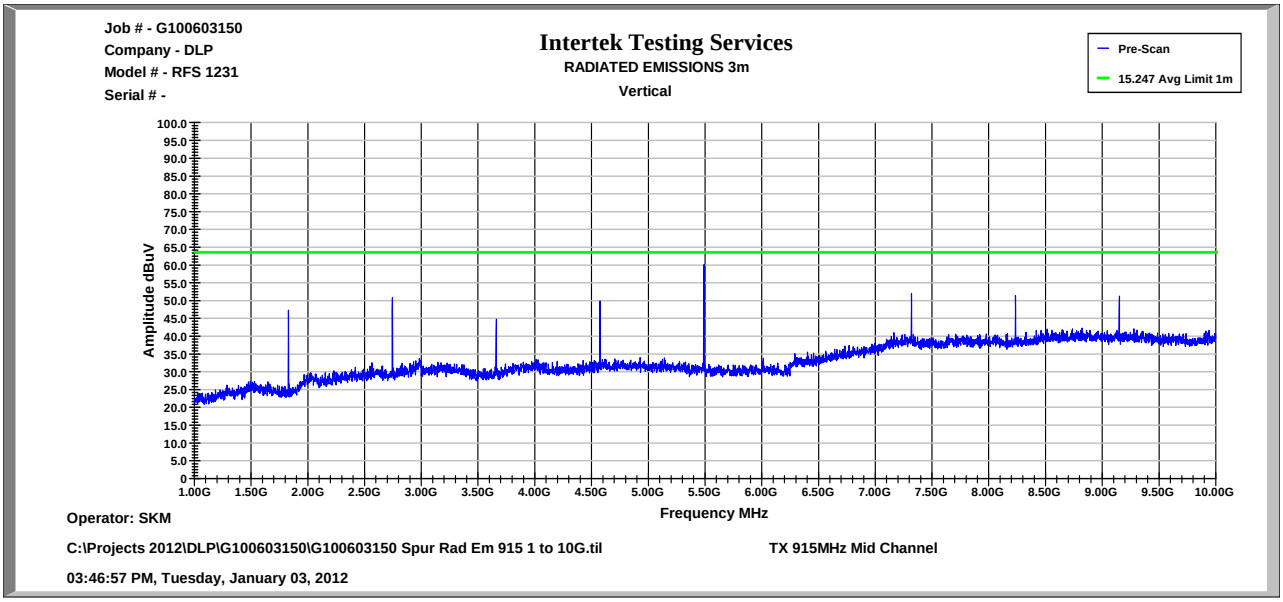
Note: Above 1 GHz testing was completed at 3 transmit frequencies to determine compliance.



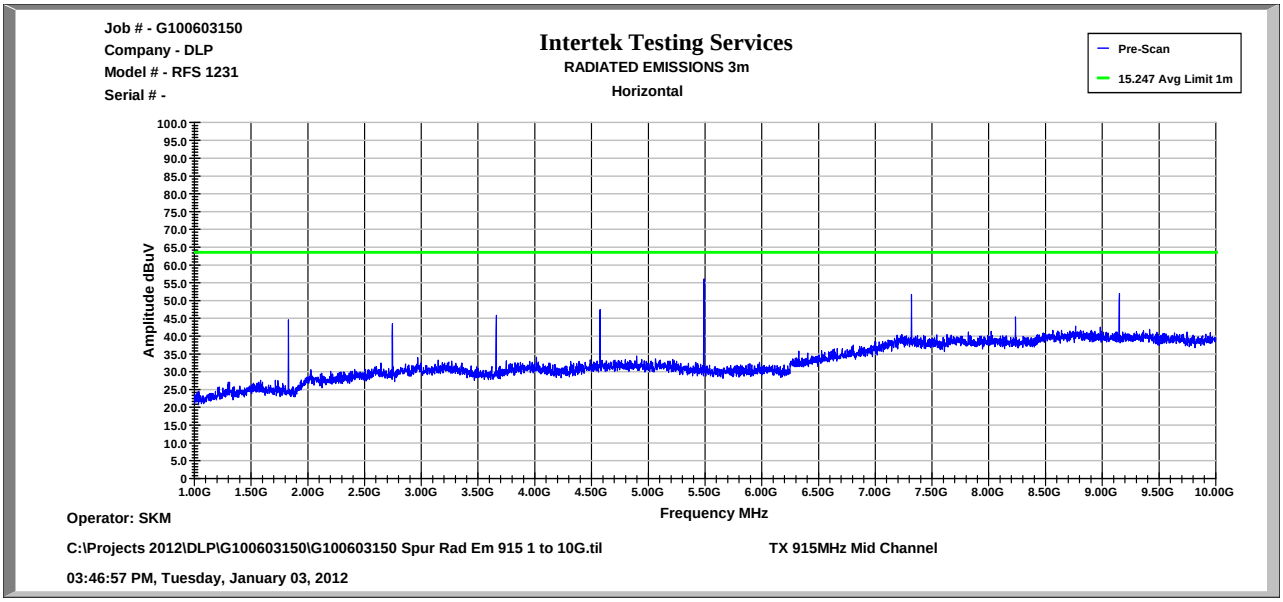
Low Channel, 1 to 10GHz Vertical Antenna Scan Plot



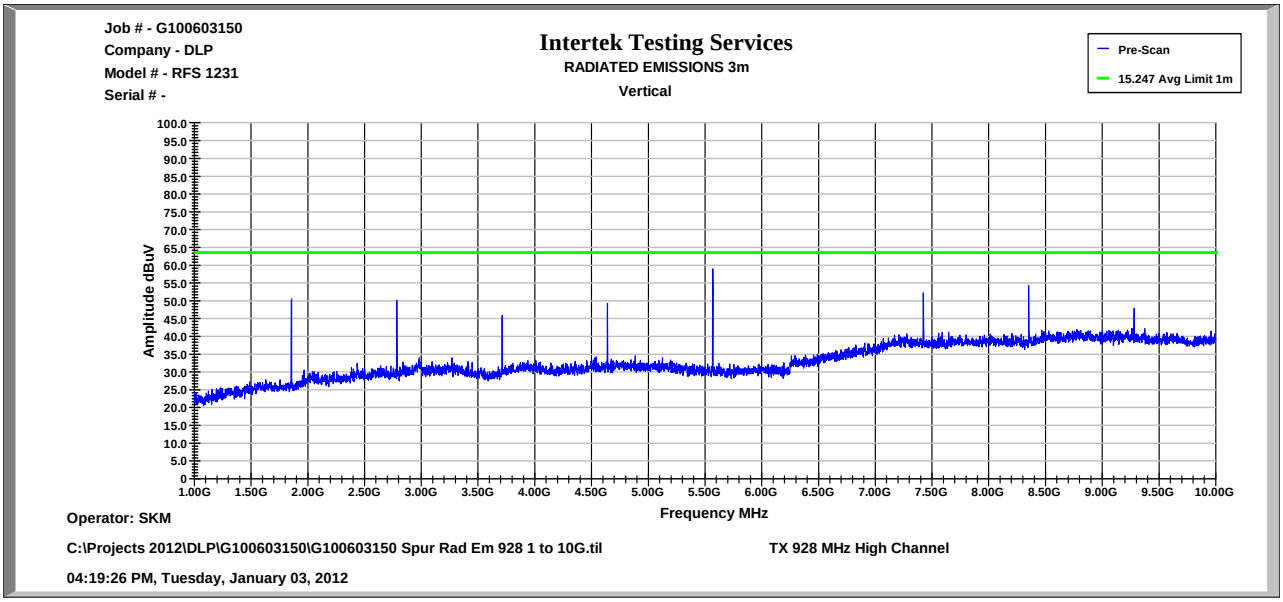
Low Channel, 1 to 10GHz Horizontal Antenna Scan Plot



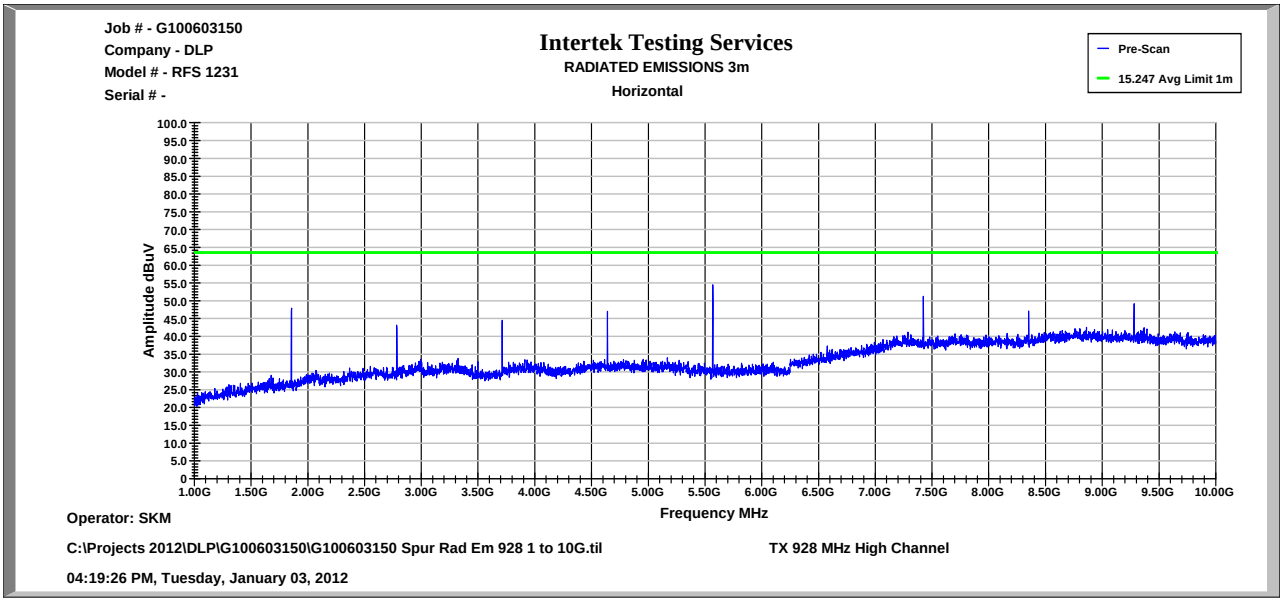
Mid Channel, 1 to 10GHz Vertical Antenna Scan Plot



Mid Channel, 1 to 10GHz Horizontal Antenna Scan Plot



High Channel, 1 to 10GHz Vertical Antenna Scan Plot



High Channel, 1 to 10GHz Horizontal Antenna Scan Plot

7.7 Data Sheet: 1 to 10GHz Radiated Scans

Frequency Range (GHz): 1 to 10 **Test Distance (m):** 1
Input power: Battery **Limit:** FCC15.247
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
902MHz Lo Channel Transmitting									
V	1804.000	51.6	26.2	6.6	38.0	46.4	63.5	-17.1	Avg 1m/3m
V	2706.000	46.6	29.5	8.3	37.9	46.5	63.5	-17.0	Avg 1m/3m
V	3608.000	43.5	30.8	9.6	38.0	45.9	63.5	-17.6	Avg 1m/3m
V	4510.000	44.5	32.1	10.5	37.1	50.0	63.5	-13.5	Avg 1m/3m
V	5412.000	53.7	33.7	11.7	39.1	60.0	63.5	-3.5	Avg 1m/3m
V	7215.000	34.5	37.3	13.9	38.4	47.3	63.5	-16.2	Avg 1m/3m
V	8117.000	37.8	37.0	15.7	38.1	52.4	63.5	-11.1	Avg 1m/3m
V	9019.000	31.5	37.5	17.1	37.1	49.0	63.5	-14.5	Avg 1m/3m
H	1804.000	50.0	26.2	6.6	38.0	44.8	63.5	-18.7	Avg 1m/3m
H	2706.000	42.1	29.5	8.3	37.9	42.0	63.5	-21.5	Avg 1m/3m
H	3608.000	43.0	30.8	9.6	38.0	45.4	63.5	-18.1	Avg 1m/3m
H	4510.000	41.4	32.1	10.5	37.1	46.9	63.5	-16.6	Avg 1m/3m
H	5412.000	48.8	33.7	11.7	39.1	55.1	63.5	-8.4	Avg 1m/3m
H	7215.000	36.6	37.3	13.9	38.4	49.4	63.5	-14.1	Avg 1m/3m
H	8117.000	31.5	37.0	15.7	38.1	46.1	63.5	-17.4	Avg 1m/3m
H	9019.000	33.5	37.5	17.1	37.1	51.0	63.5	-12.5	Avg 1m/3m
915 MHz Mid Channel Transmitting									
V	1830.000	50.8	26.2	6.6	38.0	45.6	63.5	-17.9	Avg 1m/3m
V	2745.000	47.2	29.5	8.3	37.9	47.1	63.5	-16.4	Avg 1m/3m
V	3660.000	44.8	30.8	9.6	38.0	47.2	63.5	-16.3	Avg 1m/3m
V	4575.000	41.0	32.1	10.5	37.1	46.5	63.5	-17.0	Avg 1m/3m
V	5490.000	52.2	33.7	11.7	39.1	58.5	63.5	-5.0	Avg 1m/3m
V	7320.000	35.2	37.3	13.9	38.4	48.0	63.5	-15.5	Avg 1m/3m
V	8235.000	32.5	37.0	15.7	38.1	47.1	63.5	-16.4	Avg 1m/3m
V	9150.000	31.5	37.5	17.1	37.1	49.0	63.5	-14.5	Avg 1m/3m
H	1830.000	50.2	26.2	6.6	38.0	45.0	63.5	-18.5	Avg 1m/3m
H	2745.000	43.5	29.5	8.3	37.9	43.4	63.5	-20.1	Avg 1m/3m
H	3660.000	42.2	30.8	9.6	38.0	44.6	63.5	-18.9	Avg 1m/3m
H	4575.000	40.5	32.1	10.5	37.1	46.0	63.5	-17.5	Avg 1m/3m
H	5490.000	50.1	33.7	11.7	39.1	56.4	63.5	-7.1	Avg 1m/3m
H	7320.000	34.5	37.3	13.9	38.4	47.3	63.5	-16.2	Avg 1m/3m
H	8235.000	29.5	37.0	15.7	38.1	44.1	63.5	-19.4	Avg 1m/3m
H	9150.000	30.5	37.5	17.1	37.1	48.0	63.5	-15.5	Avg 1m/3m
926.75 MHz High Channel Transmitting									
V	1856.000	52.6	26.2	6.6	38.0	47.4	63.5	-16.1	Avg 1m/3m
V	2784.000	47.8	29.5	8.3	37.9	47.7	63.5	-15.8	Avg 1m/3m
V	3712.000	42.2	30.8	9.6	38.0	44.6	63.5	-18.9	Avg 1m/3m
V	4640.000	40.1	32.1	10.0	37.1	45.1	63.5	-18.4	Avg 1m/3m
V	5568.000	49.9	33.7	12.1	39.1	56.6	63.5	-6.9	Avg 1m/3m
V	7423.000	36.8	37.3	14.1	38.4	49.8	63.5	-13.7	Avg 1m/3m
V	8352.000	33.2	37.0	15.9	38.1	48.0	63.5	-15.5	Avg 1m/3m
V	9280.000	27.5	37.5	17.4	37.1	45.3	63.5	-18.2	Avg 1m/3m
H	1856.000	51.1	26.2	6.6	38.0	45.9	63.5	-17.6	Avg 1m/3m
H	2784.000	42.0	29.5	8.3	37.9	41.9	63.5	-21.6	Avg 1m/3m
H	3712.000	40.5	30.8	10.0	38.0	43.3	63.5	-20.2	Avg 1m/3m
H	4640.000	39.4	32.1	10.5	37.1	44.9	63.5	-18.6	Avg 1m/3m
H	5568.000	45.5	33.7	12.1	39.1	52.2	63.5	-11.3	Avg 1m/3m
H	7423.000	34.6	37.3	14.1	38.4	47.6	63.5	-15.9	Avg 1m/3m
H	8352.000	30.5	37.0	15.9	38.1	45.3	63.5	-18.2	Avg 1m/3m
H	9280.000	30.0	37.5	17.4	37.1	47.8	63.5	-15.7	Avg 1m/3m
Calculations		G=C+D+E-F		I=G-H					

7.8 Data Sheet: 1 to 10GHz Restricted Band

Frequency Range (GHz): 1 to 10 **Test Distance (m):** 1
Input power: Battery **Limit:** FCC15.247
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
Restricted Bands Lo Mid and High Channels									
V	2706.000	46.6	29.5	8.3	37.9	46.5	63.5	-17.0	Avg 1m/10Hz
V	2745.000	47.2	29.5	8.3	37.9	47.1	63.5	-16.4	Avg 1m/10Hz
V	2784.000	47.8	29.5	8.3	37.9	47.7	63.5	-15.8	Avg 1m/10Hz
V	3608.000	43.5	30.8	9.6	38.0	45.9	63.5	-17.6	Avg 1m/10Hz
V	3660.000	44.8	30.8	9.6	38.0	47.2	63.5	-16.3	Avg 1m/10Hz
V	3712.000	42.2	30.8	9.6	38.0	44.6	63.5	-18.9	Avg 1m/10Hz
V	4510.000	44.5	32.1	10.5	37.1	50.0	63.5	-13.5	Avg 1m/10Hz
V	4575.000	41.0	32.1	10.5	37.1	46.5	63.5	-17.0	Avg 1m/10Hz
V	4640.000	40.1	32.1	10.0	37.1	45.1	63.5	-18.4	Avg 1m/10Hz
V	5412.000	53.7	33.7	11.7	39.1	60.0	63.5	-3.5	Avg 1m/10Hz
V	7320.000	35.2	37.3	13.9	38.4	48.0	63.5	-15.5	Avg 1m/10Hz
V	7423.000	36.8	37.3	14.1	38.4	49.8	63.5	-13.7	Avg 1m/10Hz
V	8117.000	37.8	37.0	15.7	38.1	52.4	63.5	-11.1	Avg 1m/10Hz
V	8235.000	32.5	37.0	15.7	38.1	47.1	63.5	-16.4	Avg 1m/10Hz
V	8352.000	33.2	37.0	15.9	38.1	48.0	63.5	-15.5	Avg 1m/10Hz
V	9019.000	31.5	37.5	17.1	37.1	49.0	63.5	-14.5	Avg 1m/10Hz
V	9150.000	31.5	37.5	17.1	37.1	49.0	63.5	-14.5	Avg 1m/10Hz
H	2706.000	42.1	29.5	8.3	37.9	42.0	63.5	-21.5	Avg 1m/10Hz
H	2745.000	43.5	29.5	8.3	37.9	43.4	63.5	-20.1	Avg 1m/10Hz
H	2784.000	42.0	29.5	8.3	37.9	41.9	63.5	-21.6	Avg 1m/10Hz
H	3608.000	43.0	30.8	9.6	38.0	45.4	63.5	-18.1	Avg 1m/10Hz
H	3660.000	42.2	30.8	9.6	38.0	44.6	63.5	-18.9	Avg 1m/10Hz
H	3712.000	40.5	30.8	10.0	38.0	43.3	63.5	-20.2	Avg 1m/10Hz
H	4510.000	41.4	32.1	10.5	37.1	46.9	63.5	-16.6	Avg 1m/10Hz
H	4575.000	40.5	32.1	10.5	37.1	46.0	63.5	-17.5	Avg 1m/10Hz
H	4640.000	39.4	32.1	10.5	37.1	44.9	63.5	-18.6	Avg 1m/10Hz
H	5412.000	48.8	33.7	11.7	39.1	55.1	63.5	-8.4	Avg 1m/10Hz
H	7320.000	34.5	37.3	13.9	38.4	47.3	63.5	-16.2	Avg 1m/10Hz
H	7423.000	34.6	37.3	14.1	38.4	47.6	63.5	-15.9	Avg 1m/10Hz
H	8117.000	31.5	37.0	15.7	38.1	46.1	63.5	-17.4	Avg 1m/10Hz
H	8235.000	29.5	37.0	15.7	38.1	44.1	63.5	-19.4	Avg 1m/10Hz
H	8352.000	30.5	37.0	15.9	38.1	45.3	63.5	-18.2	Avg 1m/10Hz
H	9019.000	33.5	37.5	17.1	37.1	51.0	63.5	-12.5	Avg 1m/10Hz
H	9150.000	30.5	37.5	17.1	37.1	48.0	63.5	-15.5	Avg 1m/10Hz
Calculations		G=C+D+E-F		I=G-H					

Results: Pass

8 Radiated Spurious Emissions (Receiver)

Not Applicable: This device does not contain a separate receive function. The nature of this device is that it will only receive while transmitting. Therefore, the spurious emissions produced in transmit mode are the spurious emissions produced in receive mode.

9 AC Power Line Conducted Emissions

Not Applicable: EUT is a battery-powered device.

10 Antenna Requirement per FCC Part 15.203

10.1 Test Limits

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2 Results:

The sample tested met the antenna requirement.

a) The antenna must use a unique type of connector to attach to the EUT. EUT uses a u.fl connector.
b) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: Pass

11 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	±3.9dB	
Radiated emissions, 1 to 18 GHz	±4.2dB	
Radiated emissions, 18 to 40 GHz	±4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	±2.8dB	

12 Revision History

Revision Level	Date	Report Number	Notes
0	January 24th, 2012	100603150DAL-001	Original Issue