

# Electromagnetic Compatibility Test Report

*Prepared in accordance with*

**FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10**

On

## **Motion Detector**



## **ISC-PDL1-WC30G**

Bosch Security Systems  
130 Perinton Parkway  
Fairport, NY 14450

Prepared by:

**TUV Rheinland of North America, Inc.**

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<b>Client:</b>		Bosch Security Systems 130 Perinton Parkway Fairport, NY 14450	Frank Mioduszewski 585-223-4060 / 585-289-4263 Frank.Ski@us.bosch.com
<b>Identification:</b>	Motion Detector	<b>Serial No.:</b>	VG7
<b>Test item:</b>	ISC-PDL1-WC30G	<b>Date tested:</b>	3/17/2011
<b>Testing location:</b>	TUV Rheinland of North America 336 Initiative Drive Rochester, NY 14624 U.S.A.	Tel: (585) 426-5555 Fax: (585)-568-8338	
<b>Test specification:</b>	Emissions: FCC Part 15 subpart C, RSS-210 Issue 8 FCC Part 15.209(a) FCC Part 15.205(a) RSS-210 Annex 8 and RSS-GEN FCC Part 15.245(a) and RSS-210 Annex 8, FCC Part 15.215(c) and RSS-210 2.2 RSS-GEN 4.6.1, FCC Part 2.1093 and RSS-102 Issue 4,		
<b>Test Result:</b>	<b>The above product was found to be Compliant to the above test standard(s)</b>		
<b>tested by:</b> Randall Masline		<b>reviewed by:</b> Cecil Gittens	
31 March 2011 <i>Date</i>		31 March 2011 <i>Date</i>	
<i>Name</i>		<i>Name</i>	
<i>Signature</i>		<i>Signature</i>	
<b>Other Aspects:</b>	<b>None</b>		
Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable			
		<b>Industry Canada</b>	<b>BSMI</b>
<b>US5253</b>	<b>NVLAP Lab Code (200313-0)</b>	<b>34661C-1</b>	<b>SL2-IN-E-050R</b>

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## 1 General Information

### 1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10 based on the results of testing performed on 3/17/2011 on the Motion Detector, Model No. ISC-PDL1-WC30G, manufactured by Bosch Security Systems. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

### 1.2 Purpose

Testing was performed to evaluate the performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

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### 1.3 Summary of Test Results

<b>Applicant</b>	Bosch Security Systems 130 Perinton Parkway Fairport, NY 14450	<b>Tel</b>	585-223-4060	<b>Contact</b>	Frank Mioduszewski
		<b>Fax</b>	585-289-4263	<b>e-mail</b>	Frank.Ski@us.bosch.com
<b>Description</b>	Motion Detector	<b>Model Number</b>	ISC-PDL1-WC30G		
<b>Serial Number</b>	VG7	<b>Test Voltage/Freq.</b>	12VDC		
<b>Test Date Completed:</b>	3/17/2011	<b>Test Engineer</b>	Randall Masline		
<b>Standards</b>	<b>Description</b>	<b>Severity Level or Limit</b>		<b>Criteria</b>	<b>Test Result</b>
FCC Part 15 subpart C Standard	Radio Frequency Devices - Subpart C: Intentional Radiators	See called out parts below		See Below	<b>Complies</b>
RSS-210 Issue 8 Standard	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment	See called out parts below		See Below	<b>Complies</b>
FCC Part 15.209(a) FCC Part 15.205(a) RSS-210 Annex 8 and RSS-GEN	Radiated Emissions Restricted Bands	Class B, 30 - 1000 MHz		Limit	<b>Complies</b>
FCC Part 15.207(a) and RS-GEN	Conducted Emissions	Class B, 150kHz - 30MHz		Limit	<b>Complies</b>
FCC Part 15.245(a) and RSS-210 Annex 8	Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500 - 10550MHz and 24075-24175 MHz	2500mv/m Fundamental 25.0mv/m Harmonics		Limit	<b>Complies</b>
FCC Part 15.215(c) and RSS-210 2.2	Band Edge Requirements	Per Section 15.215(c) of the standard		Limit	<b>Complies</b>
RSS-GEN 4.6.1	Occupied Bandwidth	99%		NA	<b>Complies</b>
FCC Part 2.1093 and RSS-102 Issue 4	RF Exposure	MPE or SAR Requirements (Mobile)		NA	<b>Complies</b>

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## Manufacturer's statement - attestation

The manufacturer; **Bosch Security Systems Inc**, as the responsible party for the equipment tested, hereby affirms:

- a) That they have reviewed and concur that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;
- b) That the device in this test report will be representative of production units;
- c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.
- d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.

**Frank Mioduszewski**

Printed name of official



Signature of official

**130 Perinton Parkway  
Fairport NY, 14450**

Address

**3/28/2011**

Date

**585-223-4060**

Telephone number

**Frank.Ski@us.bosch.com**

Email address of official

## Laboratory Information

### 2.1 Accreditations & Endorsements

#### 2.1.1 US Federal Communications Commission (Expires 12/7/2013)

TUV Rheinland of North America located at 336 Initiative Dr, Rochester NY is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No US90575). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

#### 2.1.2 NIST / NVLAP (Expires 6/30/2011)

Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code: 200313-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

#### 2.1.3 VCCI

VCCI Accredited test lab. Registration numbers R-1065, C-1120, C-1121

#### 2.1.4 Industry Canada (Expires 1/22/2012)

Registration No.: 3466C-1. The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2003.

#### 2.1.5 BSMI

Registration No.: SL2-IN-E-050R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

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### 2.1.6 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB $\mu$ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

**Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)**

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

### 2.2 Measurement Uncertainty Emissions

Measurement	<i>U<sub>lab</sub></i>	<i>U<sub>cispr</sub></i>
<b>Radiated Disturbance @ 10m</b>		
30 MHz – 1000 MHz	4.57 dB	5.2 dB
<b>Conducted Disturbance @ Mains Terminals</b>		
150 kHz – 30 MHz	2.62 dB	3.6 dB
<b>Disturbance Power</b>		
30 MHz – 300 MHz	3.88 dB	4.5 dB

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### **Measurement Uncertainty Immunity**

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 1.6$ dB.
--

The estimated combined standard uncertainty for conducted emissions measurements is $\pm 1.2$ dB.
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The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

### **2.3 Calibration Traceability**

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSS Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

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## 2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Ref.	Serial #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Horn	EMCO	3115	C031	9812-5635	16-Mar 10	16-Mar 12	RE
BiLog	Chase	CBL6111	C041	1170	1-Mar-10	1-Mar-11	RE
EMI Receiver	Rohde & Schwarz	ESVS 30	C310	826006/015	12-Dec-10	12-Dec-11	RE
Analyzer w RF Filter Section 85460A	HP	8546A	C311	3325A00127	28-Jul-10	28-Jul-11	RE, CE
Receiver (20Hz-40GHz)	Rohde & Schwarz	ESI 40	C320	839283/005	11-Dec-10	11-Dec-11	RE,CE
Temp./Humidity Chart Recorder	Honeywell		C419	639971	30-Dec-09	30-Dec-10	RE
Horn	EMCO	3160-09	C447	03-0338-018	17-Nov-10	17-Nov-12	RE
BiLog	Chase	CBL6111B	C448	2081	16-Nov-10	16-Nov-11	RE
Multimeter	Fluke	8062A	C452	4715199	12-Dec-10	12-Dec-11	All tests
Digital Pressure/Temp/RH	Davis	Perception II	C470	PB00218A16	23-Jun-10	23-Jun-11	All tests
Analyzer w RF Filter Section 85460A	HP	8546A	D004	3625A00356	28-Jul-10	28-Jul-11	CE
Horn	ATM	28-442-6		G047702-01	1/12/2010	1/12/2012	RE

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### **3 Product Information**

#### **3.1 Product Description**

See Appendix A

#### **3.2 Equipment Modifications**

No modifications were needed to bring product into compliance.

#### **3.3 Test Plan**

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report

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Figure 1 – External Photo of EUT

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## 4 Emissions

### 4.1 Radiated Emissions

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

#### 4.1.1 Over View of Test

<b>Results</b>	<b>Complies</b> (as tested per this report)				<b>Date</b>	3/9/2011	
<b>Standard</b>	FCC Part 15.209(a) FCC Part 15.205(a) RSS-210 Annex 8 and RSS-GEN						
<b>Product Model</b>	ISC-PDL1-WC30G			<b>Serial#</b>	VG7		
<b>Configuration</b>	See test plan for details						
<b>Test Set-up</b>	Tested on 10m O.A.T.S. at 3 meters, placed on turn-table, see test plans for details						
<b>EUT Powered By</b>	12VDC	<b>Temp</b>	22°C	<b>Humidity</b>	47%	<b>Pressure</b>	1026mbar
<b>Frequency Range</b>	30 - 1000 MHz @ 10m						
<b>Perf. Criteria</b>	Class B. (Below Limit)		<b>Perf. Verification</b>	Readings Under Limit			
<b>Mod. to EUT</b>	None		<b>Test Performed By</b>	Randall Masline			

#### 4.1.2 Test Procedure

Radiated and FCC emissions tests were performed using the procedures of ANSI C63.10 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 30 - 1000 MHz was investigated for radiated emissions.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 10 m OATS.

#### 4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan for the radiated emission test.

#### 4.1.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

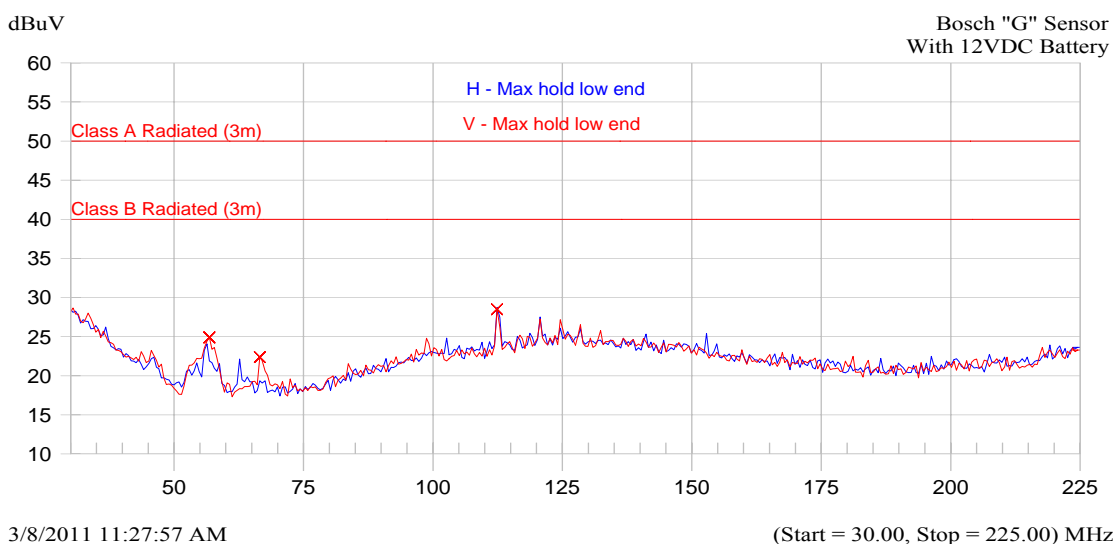
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### 4.1.5 Final Graphs

NOTES:

**Radiated Emissions Prescan**  
**Vertical / Horizontal**

#### Max hold low end



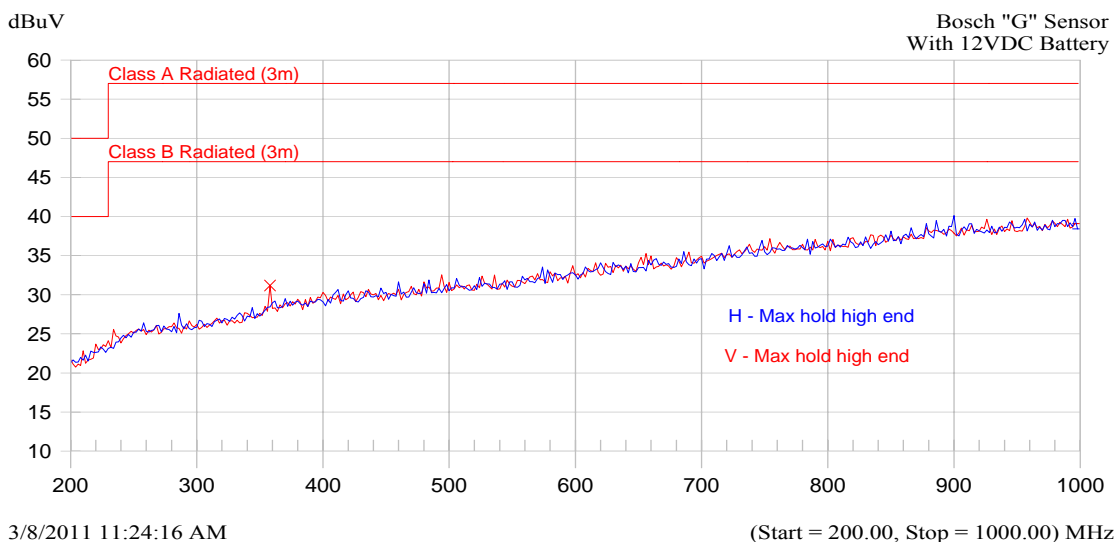
Frequency MHz	Peak dBuV	QP dBuV	Class B-QP dB	Class A-QP dB	Trace Name
56.813	24.9				V - Max hold low end
66.563	22.4				V - Max hold low end
112.388	28.5				V - Max hold low end

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NOTES:

**Radiated Emissions Prescan**  
**Vertical / Horizontal**

**Max hold high end**



Frequency MHz	Peak dBuV	QP dBuV	Class B-QP dB	Class A-QP dB	Trace Name
358.000	31.2				V - Max hold high end

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#### 4.1.6 Final Tabulated Data

<b>Standard:</b>	Class B FCC Part 15.209 (a)				final		<b>Date:</b>	3/17/2011	
<b>Device Tested:</b>	Bosch Model G				3		<b>File:</b>	.xls	
	Measured Level				19 Deg C 33%	995mb			
Meas #	Freq (MHz)	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Δ	Result	Polarization	Angle (degrees)	Antenna Height (meters)	Comment
1	56.8130	27.60	40.00	-12.40	Complied	Horizontal	0	4.00	
2	66.5630	30.10	40.00	-9.90	Complied	Horizontal	0	4.00	Maximum Emissions
3	112.3880	23.10	40.00	-16.90	Complied	Horizontal	0	4.00	
4	112.3880	19.40	40.00	-20.60	Complied	Vertical	0	4.00	
5	86.5630	17.30	40.00	-22.70	Complied	Vertical	0	4.00	
6	56.8130	19.90	40.00	-20.10	Complied	Vertical	0	4.00	

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## 4.2 Conducted Emissions

This test measures the electromagnet levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other near by electronic equipment.

### 4.2.1 Over View of Test

<b>Results</b>	<b>Complies</b> (as tested per this report)					<b>Date</b>	3/11/2011	
<b>Standard</b>	FCC Part 15.209(a) FCC Part 15.205(a) RSS-210 Annex 8 and RSS-GEN							
<b>Product Model</b>	ISC-PDL1-WC30G				<b>Serial#</b>	VG7		
<b>Configuration</b>	See test plan for details							
<b>Test Set-up</b>	Tested in shielded room		EUT placed on table		see test plans for details			
<b>EUT Powered By</b>	12VDC	<b>Temp</b>	22° C	<b>Humidity</b>	46%	<b>Pressure</b>	1021mbar	
<b>Frequency Range</b>	150kHz - 30MHz							
<b>Perf. Criteria</b>	Class B (Below Limit )		<b>Perf. Verification</b>	Readings Under Limit				
<b>Mod. to EUT</b>	None		<b>Test Performed By</b>	Randall Masline				

### 4.2.2 Test Procedure

Conducted and FCC emissions tests were performed using the procedures of ANSI C63.10 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 150kHz - 30MHz was investigated for conducted emissions.

Conducted Emissions measurements were performed in the shielded room using procedures specified in the test plan and standard.

### 4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emission test.

### 4.2.4 Final Test

All final conducted emissions measurements were below (in compliance) the limits.

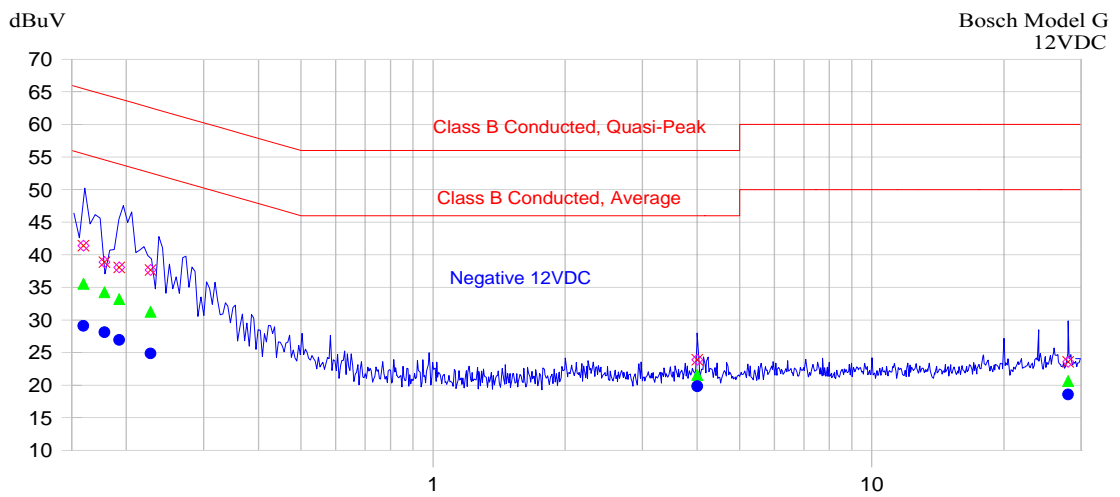
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### 4.2.5 Final Graphs

NOTES:

**Conducted Emissions @ 12VDC**  
 Positive 12VDC / Negative 12VDC

#### Negative 12VDC



3/11/2011 6:27:50 AM

(Start = 0.15, Stop = 30.00) MHz

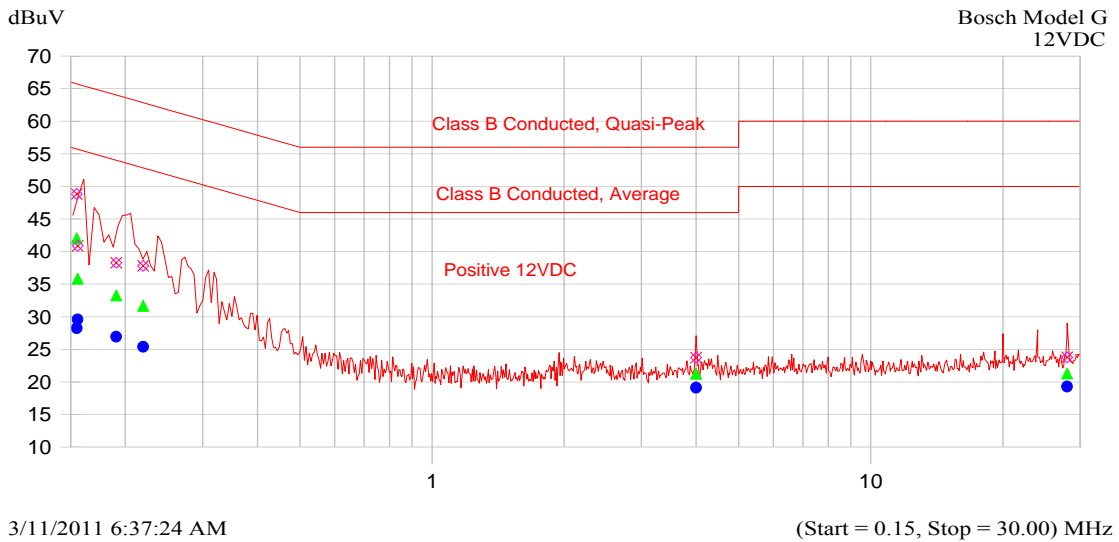
Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Transducer Correction dB	Cable Correction dB
0.160	41.4	35.6	-29.9	29.1	-26.4	-0.8	10.0
0.178	38.9	34.3	-30.3	28.1	-26.4	-0.5	10.0
0.193	38.0	33.2	-30.7	27.0	-27.0	-0.2	10.1
0.227	37.7	31.3	-31.3	24.9	-27.7	-0.1	10.1
4.001	23.9	21.6	-34.4	19.8	-26.2	-0.1	10.5
28.003	23.6	20.6	-39.4	18.6	-31.4	-0.3	11.4

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NOTES:

**Conducted Emissions @ 12VDC**  
**Positive 12VDC / Negative 12VDC**

**Positive 12VDC**



Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP dB	Limit	Avg dBuV	Delta Avg-Avg dB	Limit	Transducer Correction dB	Cable Correction dB
0.156	40.9	35.8	-29.9		29.6	-26.1		-0.9	10.0
0.155	48.8	42.0	-23.7		28.3	-27.5		-0.9	10.0
0.191	38.3	33.3	-30.7		26.9	-27.1		-0.2	10.1
0.220	37.8	31.7	-31.2		25.4	-27.4		-0.1	10.1
3.999	23.7	21.3	-34.7		19.1	-26.9		-0.1	10.5
28.001	23.8	21.3	-38.7		19.3	-30.7		-0.3	11.4

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### 4.3 Field Strength of Fundamental and Harmonic Emissions

This test measures the electromagnetic levels of fundamental and spurious signals generated by the EUT that radiated from the EUT.

#### 4.3.1 Test Over View

<b>Results</b>	<b>Complies</b> (as tested per this report)				<b>Date</b>	3/9/2011	
<b>Standard</b>	FCC Part 15.245(a) and RSS-210 Annex 8						
<b>Product Model</b>	ISC-PDL1-WC30G			<b>Serial#</b>	VG7		
<b>Configuration</b>	See test plan for details						
<b>Test Set-up</b>	Tested at O.A.T.S.		EUT placed on table		See test plan for details		
<b>EUT Powered By</b>	12VDC	<b>Temp</b>	22° C	<b>Humidity</b>	47%	<b>Pressure</b>	1026mbar
<b>Perf. Criteria</b>	2500mv/m (Below Limit)			<b>Perf. Verification</b>	Readings under Limit		
<b>Mod to EUT</b>	None			<b>Test Performed By</b>	Randall Masline		

#### 4.3.2 Test Procedure

Field Strength and FCC emissions tests were performed using the procedures of ANSI C63.10 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

Radiated emission testing measurements will be made on the 10 m OATS, at a 3m distance.

#### 4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the radiated emission test.

#### 4.3.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

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#### 4.3.5 Final Data

Frequency (GHz)	Field Strength (dBm) at 3 m	Antenna Height (m)	Antenna Polarity (H/V)	Limit (dBm)	Result
10.52144289	+6.07	1	H	20.9	<b>Complies</b>
10.52144289	-10.61	1	V	20.9	<b>Complies</b>

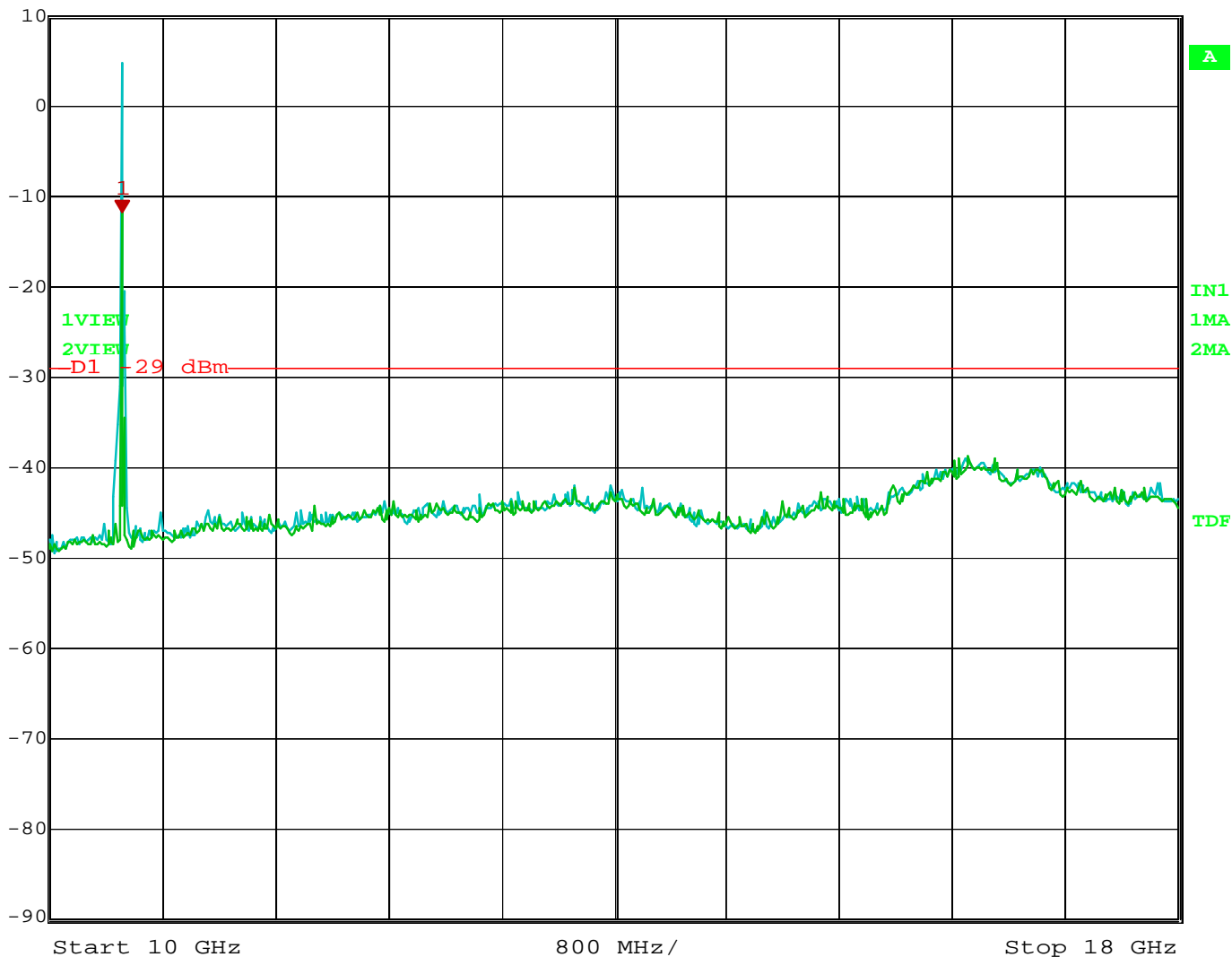
Table 1 – Field Strength of EUT Fundamental at 3 m distance from Antenna

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Ref Lvl	10 dBm	Marker 1 [T1]	10.51302605 GHz	RBW	1 MHz	RF Att	20 dB
				VBW	3 MHz		
				SWT	80 ms	Unit	dBm



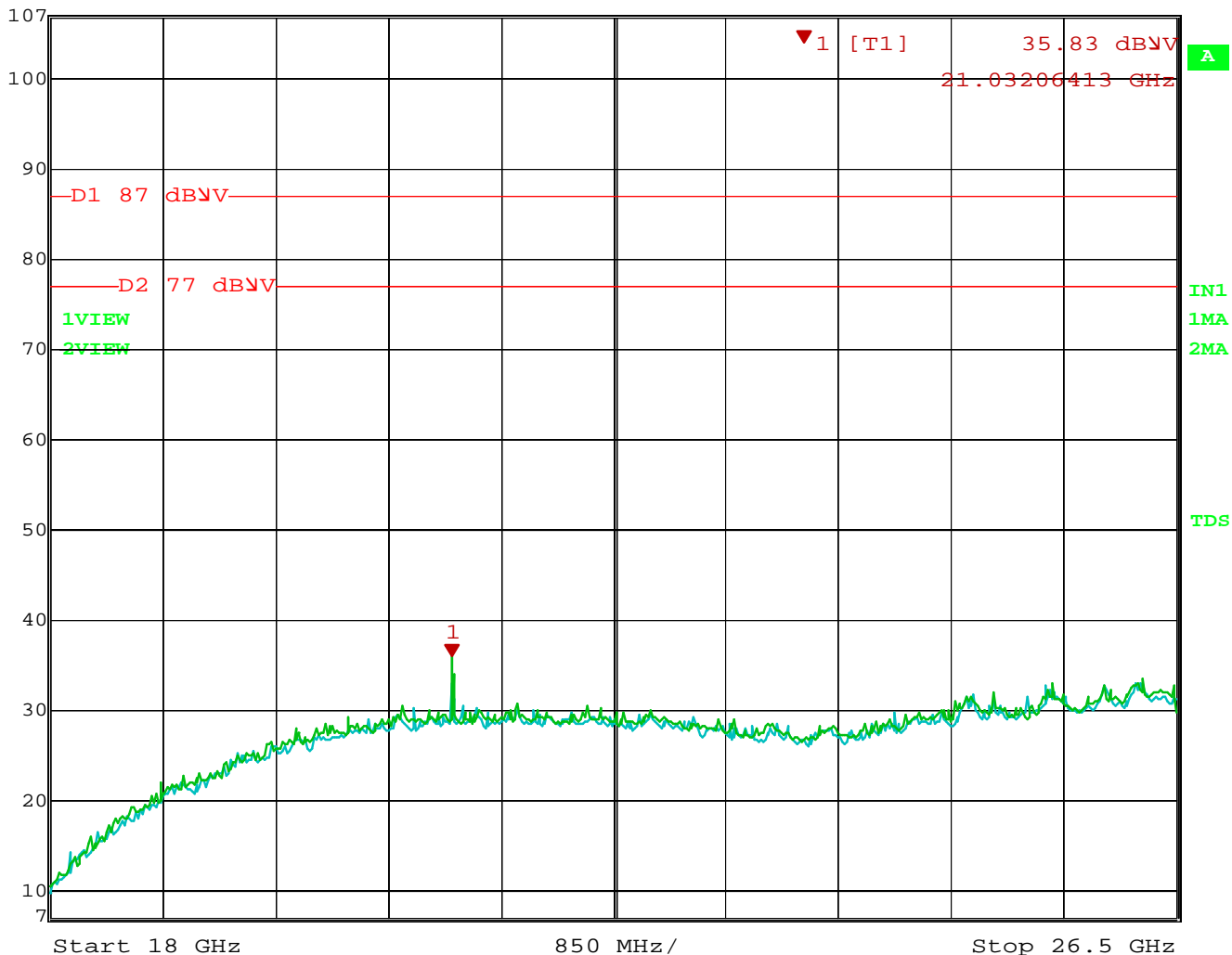
Date: 8.MAR.2011 14:54:50

Figure 3 – Field strength of Harmonic Emissions 10 - 18 GHz

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Marker 1 [T1]	RBW	1 MHz	RF Att	10 dB
Ref Lvl	35.83 dBµV	VBW	1 MHz	
107 dBµV	21.03206413 GHz	SWT	86 ms	Unit dBµV



Date: 9.MAR.2011 14:49:18

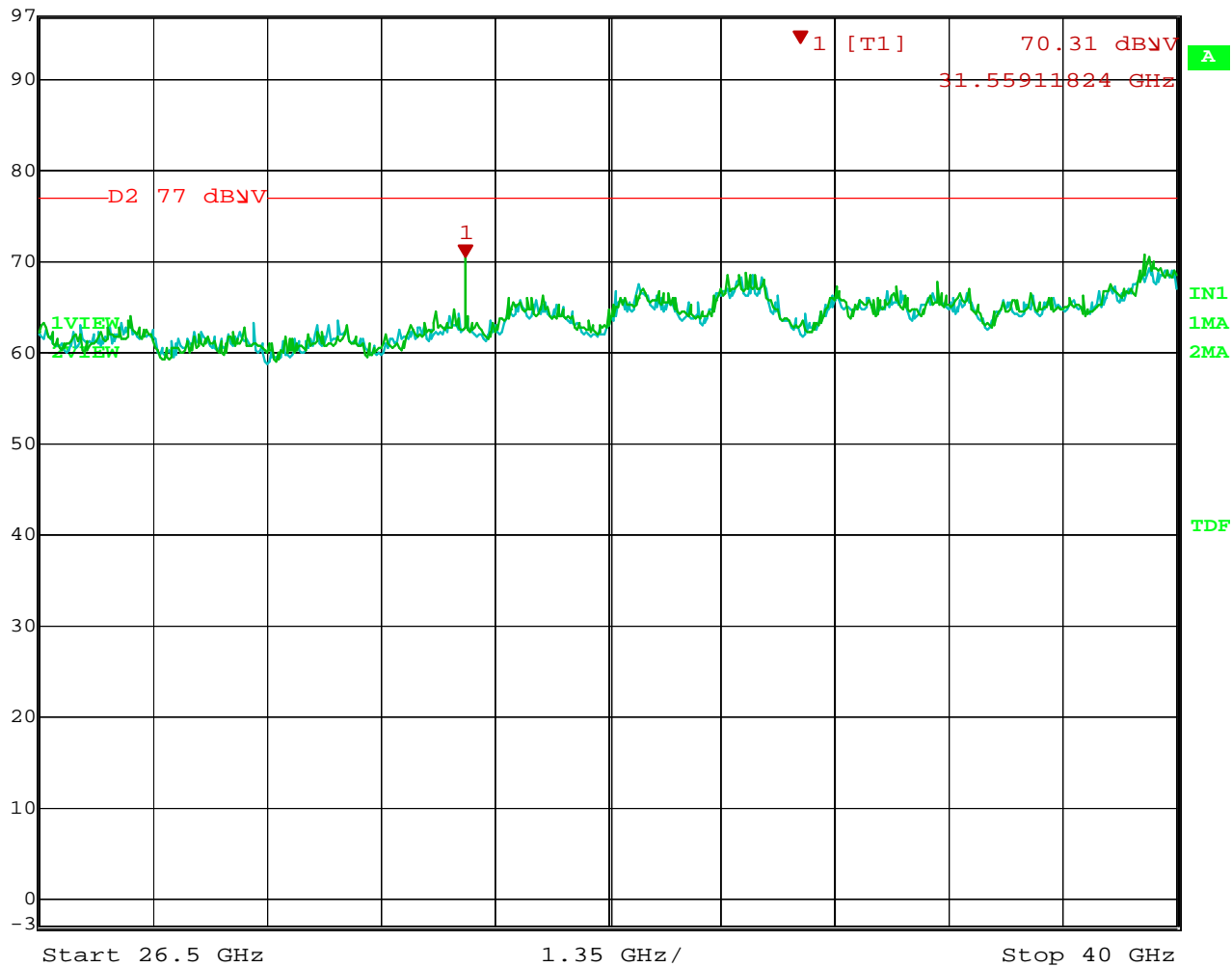
Figure 4 – Field strength of Harmonic Emissions 18 - 26.5 GHz

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Marker 1 [T1] RBW 100 kHz RF Att 0 dB  
 Ref Lvl 70.31 dBµV VBW 100 kHz  
 97 dBµV 31.55911824 GHz SWT 3.4 s Unit dBµV



Date: 9.MAR.2011 16:58:06

Figure 5 – Field strength of Harmonic Emissions 26.5 - 40 GHz

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#### 4.4 Band Edge Requirements

The requirement is to ensure the 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified, is contained within the frequency band designated in the rule section under which the equipment is operated. The designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperatures and supply voltage.

##### 4.4.1 Test Over View

<b>Results</b>	<b>Complies</b> (as tested per this report)				<b>Date</b>	3/9/2011	
<b>Standard</b>	FCC Part 15.215(c) and RSS-210 2.2						
<b>Product Model</b>	ISC-PDL1-WC30G			<b>Serial#</b>	VG7		
<b>Configuration</b>	See test plan for details						
<b>Test Set-up</b>	Tested in shielded room EUT placed on table See test plan for details						
<b>EUT Powered By</b>	12VDC	<b>Temp</b>	22° C	<b>Humidity</b>	47%	<b>Pressure</b>	1026mbar
<b>Perf. Criteria</b>	Per Section 15.215(c) of the standard		<b>Perf. Verification</b>		Readings within the permitted band		
<b>Mod to EUT</b>	None		<b>Test Performed By</b>		Randall Masline		

##### 4.4.2 Test Procedure

The measurement will be made using guidance from ANSI C63.10.

##### 4.4.3 Deviations

There were no deviations from the test methodology.

##### 4.4.4 Final Test

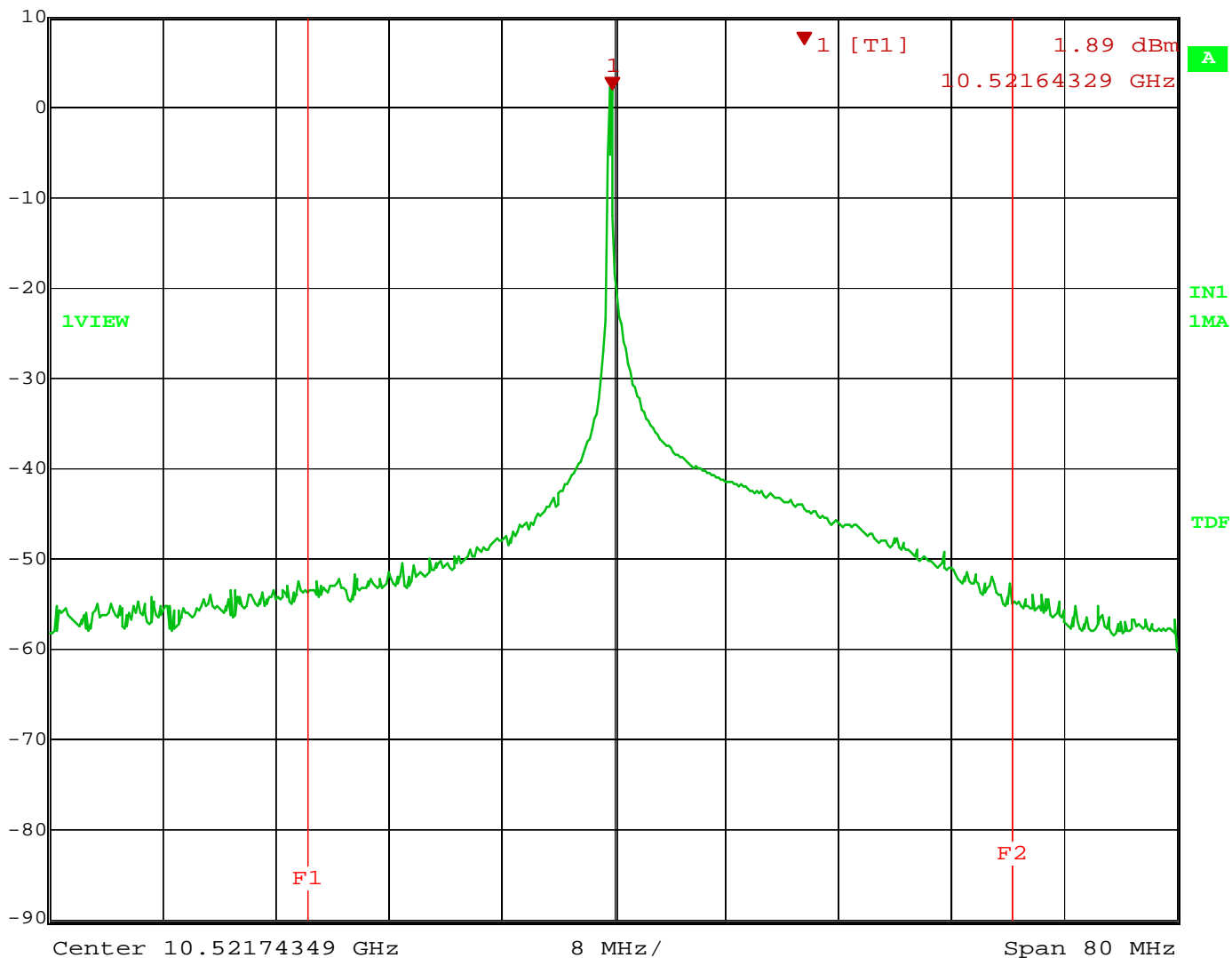
The band edge requirements of the EUT were within the limits specified in the standard.

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### 4.4.5 Band Edge Requirement Data



	Marker 1 [T1]	RBW	100 kHz	RF Att	20 dB
Ref Lvl	1.89 dBm	VBW	100 kHz		
10 dBm	10.52164329 GHz	SWT	20 ms	Unit	dBm



Date: 8.MAR.2011 17:30:34

Figure 6 – Band Edge

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#### 4.5 Occupied Bandwidth 99%

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

##### 4.5.1 Test Over View

<b>Results</b>	<b>Complies</b> (as tested per this report)				<b>Date</b>	3/9/2011	
<b>Standard</b>	RSS-GEN 4.6.1						
<b>Product Model</b>	ISC-PDL1-WC30G			<b>Serial#</b>	VG7		
<b>Configuration</b>	See test plan for details						
<b>Test Set-up</b>	Tested in shielded room EUT placed on table See test plan for details						
<b>EUT Powered By</b>	12VDC	<b>Temp</b>	22° C	<b>Humidity</b>	47%	<b>Pressure</b>	1026mbar
<b>Mod to EUT</b>	None			<b>Test Performed By</b>	Randall Masline		

##### 4.5.2 Test Procedure

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

##### 4.5.3 Deviations

There were no deviations from the test methodology listed in the test plan.

##### 4.5.4 Final Test

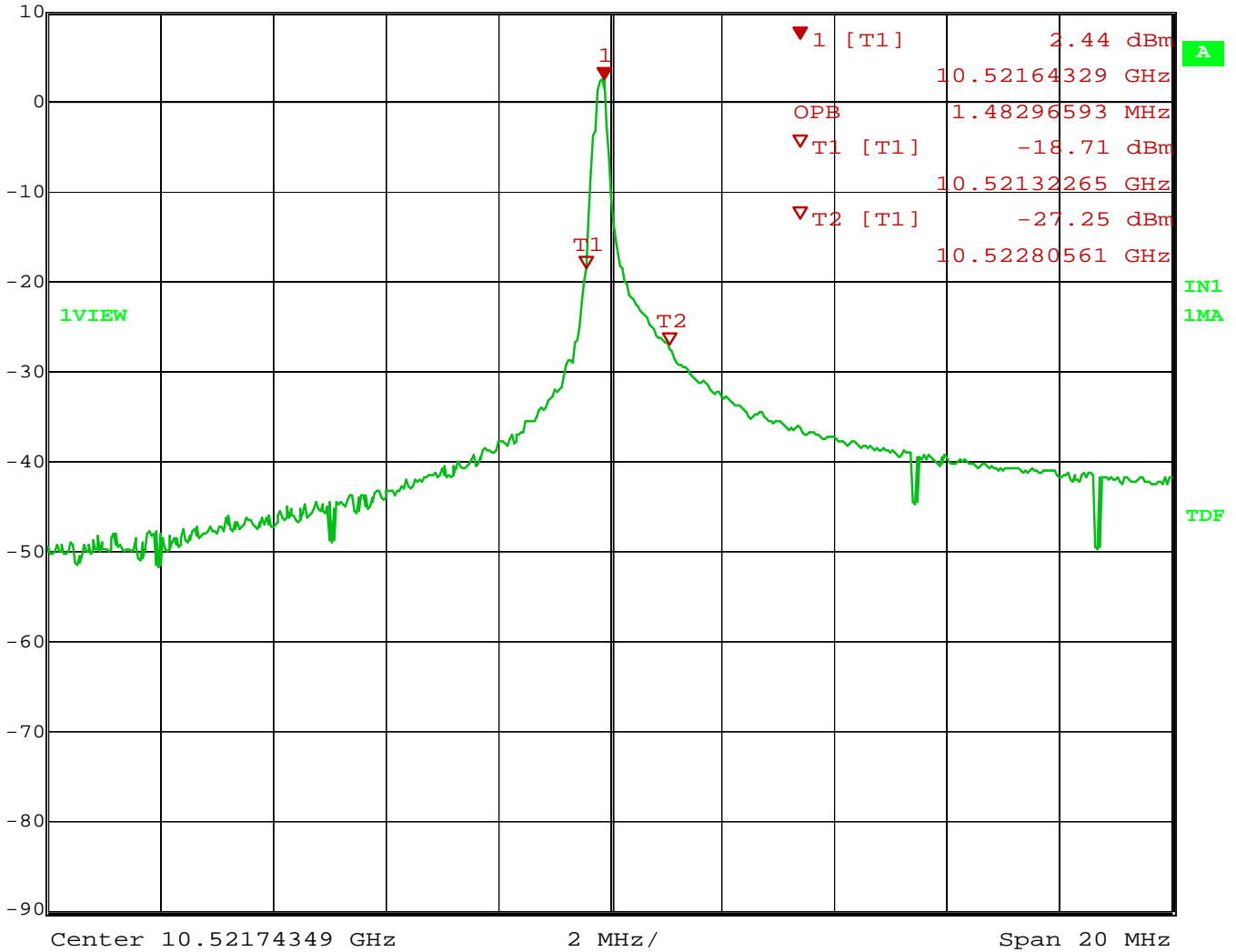
The EUT met the performance criteria requirement as specified in the test plan of this report.

##### 4.5.5 Final Data

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Marker 1 [T1] RBW 100 kHz RF Att 20 dB  
 Ref Lvl 2.44 dBm VBW 100 kHz  
 10 dBm 10.52164329 GHz SWT 5 ms Unit dBm



Date: 8.MAR.2011 17:27:29

Figure 7 – Occupied Bandwidth

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## 4.6 RF Exposure Measurement (Mobile Device)

### 4.6.1 Test Methodology

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Semi-Anechoic Chamber, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula (see section 4.9.6) and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

### 4.6.2 RF Exposure Limit

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
300-1500	...	...	$f / 1500$	6
1500-100,000	...	...	1.0	30

$f$  = Frequency in MHz

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### 4.6.3 EUT Operating condition

The EUT transmits at a single frequency and at the highest output power.

### 4.6.4 Classification

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. Therefore, this device is classified as a **Mobile Device**.

### 4.6.5 Test Results

### 4.6.6 Antenna Gain

The maximum Gain measured in Semi-Anechoic Chamber is 0.63 dBi or 1.16 (numeric).

### 4.6.7 Output Power into Antenna & RF Exposure value at distance 20cm:

Calculations for this report are based on highest power measurement and the highest gain of the antenna. Limit for MPE (from FCC part 1.1310 table 1) is  $f \text{ (MHz)} / 1500 = 927.6 / 1500 = 0.62 \text{ mW/cm}^2$

Highest Pout is 4.0mW, highest antenna gain (in linear scale) is 1.16, R is 20cm, and  $f = 10525 \text{ MHz}$

$P_d = (4.0 * 1.16) / (1600\pi) = \underline{0.009 \text{ mW/cm}^2}$ , which is 0.591 mW/cm<sup>2</sup> below to the limit.

Note: This calculation is assuming 100% duty cycle, which would not be the case in normal operation.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

### 4.6.8 Sample Calculation

The Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where;

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi \approx 3.1416$

$R$  = distance between observation point and center of the radiator in cm

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

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## Appendix A

### 5 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

#### 5.1 General Information

<b>Client</b>	Bosch Security Systems
<b>Address 1</b>	130 Perinton Parkway
<b>Address 2</b>	Fairport, NY 14450
<b>Contact Person</b>	Frank Mioduszewski
<b>Telephone</b>	585-223-4060
<b>Fax</b>	585-289-4263
<b>e-mail</b>	Frank.Ski@us.bosch.com

#### 5.2 Model(s) Name

ISC-PDL1-WC30G

#### 5.3 Type of Product

Motion Detector

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#### 5.4 Equipment Under Test (EUT) Description

The EUT is a Combination Microwave/PIR Passive Infra –Red and Microwave Motion Detector operating at 10525 MHz.

#### 5.5 Modifications

No modifications were necessary to meet compliance limits.

#### 5.6 Product Environment

<input type="checkbox"/>	<b>Residential</b>	<input type="checkbox"/>	<b>Hospital</b>
<input checked="" type="checkbox"/>	<b>Light Industrial</b>	<input type="checkbox"/>	<b>Small Clinic</b>
<input checked="" type="checkbox"/>	<b>Industrial</b>	<input type="checkbox"/>	<b>Doctor's office</b>
<input type="checkbox"/>	<b>Other</b>		

\*Check all that apply

#### 5.7 Countries

<input checked="" type="checkbox"/>	<b>USA</b>
<input checked="" type="checkbox"/>	<b>Canada</b>

\*Check all that apply

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## 5.8 Applicable Documents

Standards	Description
FCC Part 15 subpart C Standard	Radio Frequency Devices - Subpart C: Intentional Radiators
RSS-210 Issue 8 Standard	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment
FCC Part 15.209(a) FCC Part 15.205(a) RSS-210 Annex 8 and RSS-GEN	Radiated Emissions
FCC Part 15.207(a) and RS-GEN	Conducted Emissions
FCC Part 15.245(a) and RSS-210 Annex 8	Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500 – 10550MHz and 24075-24175 MHz
FCC Part 15.215(c) and RSS-210 2.2	Band Edge Requirements
RSS-GEN 4.6.1	Occupied Bandwidth
FCC Part 2.1093 and RSS-102 Issue 4	RF Exposure

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### 5.9 General Product Information

<b>Size</b>	<b>H</b>	13cm	<b>W</b>	6cm	<b>L</b>	6.5cm
<b>Weight</b>	≤1kg		<b>Fork-Lift Needed</b>	No		
<b>Notes</b>						

### 5.10 EUT Electrical Powered Information

#### 5.10.1 Electrical Power Type

<input type="checkbox"/>	AC	<input checked="" type="checkbox"/>	DC	<input type="checkbox"/>	Batteries	<input type="checkbox"/>	Host -
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#### 5.10.2 Electrical Power Information

Name	Type	Voltage		Frequency	Current	Notes
		min	max			
Main	DC	9	15			
<b>Notes</b>						

### 5.11 EUT Modes of Operation

The EUT is powered by a 12VDC Battery and goes into continues operation scanning for motion.

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### 5.12 Electrical Support Equipment

Type	Manufacture	Model	Connected To
Battery			EUT Power

### 5.13 Non - Electrical Support Equipment

Item	Notes
Gas	
Water	

### 5.14 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Cable Type		
			Length	Shielded	Bead
Power	Battery	top	3m	No	No

### 5.15 EUT Test Program

No test Program, EUT was operational and Scanning.

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