EMC EMISSIONS - TEST REPORT (Full)

Test Report No.	**3140351DEN-003** Issue Date: **Wed 12/December/2007**
Model / Serial No.	**MN: R2 /SN: Rev. C**
Product Type	**Utility meter transceiver**
Client	**Transparent Technologies**
Manufacturer	**Transparent Technologies**
License holder	**Transparent Technologies**
Address	**5665 Airport Blvd.**
	Boulder, CO 80303
Test Criteria Applied	**FCC CFR47 Part 15.247** **IC RSS-210 issue 7**
Test Result	**PASS**
Test Project Number	**3140351**
References	Title 47 CFR 15: RADIO FREQUENCY DEVICES
Total Pages Including Appendices:	**39**
	Low-power License-exempt Radio Communication Devices (All Frequency Bands): Category I Equipment

Tested By : Mike Spataro

Reviewed By : Robert Cresswell

REVISION SUMMARY - The following changes have been made to this Report:

Rev.	Revision Statement	Author	Revision Date
	Initial Release of Document	See above	See above

Lab Code:200264-0

D I R E C T O R Y

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STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be ±2.30dB and for Radiated Emissions is calculated to be ±3.60dB in the frequency range of 30MHz – 200MHz and ±3.38dB in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 10-Dec-2007

Testing Start Date: 10-Dec-2007

Testing End Date: 11-Dec-2007

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The tests were performed according to following regulations :

1. FCC CFR47 Part 15 subpart C
2. FCC CFR47 Part 15 subpart B
3. IC RSS-210e Issue 7 2007
4. IC RSS-GEN Issue 2 2007
5. ICES-003

Emission Test Results:

Conducted Emissions, Powerline 15.207 - NA

Test Result

Minimum limit margin	0.0	dB	at	0.0	MHz

Remarks: EUT is 12VDC automotive powered

Radiated Emissions 15.209/15.109 - PASS

Test Result

Minimum limit margin	-0.8	dB	at	495.27	MHz

Remarks:

6dB Bandwidth 15.247 (a)(2) - PASS

Remarks:

Peak Output Power 15.247 (b)(3) - PASS

Test Result

Minimum limit margin	-16.7	dB	at	902.99	MHz

Remarks: Low Channel

Radiated Emissions 15.205/15.247(d) - PASS

Test Result

Minimum limit margin	-6.2	dB	at	2781.00	MHz

Remarks: High Channel

Power Spectral Density 15.247 (e) - PASS

Test Result

Minimum limit margin	-0.72	dB	at	902.76	MHz

Remarks: Low Channel

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GENERAL REMARKS:

The following remarks are to be considered as "where applicable" and are taken into account while completing any FCC/IC/ETSI radio tests at Intertek, ETL Semko.

Testing was performed in 3 different orthogonal axis to determine the worst case emissions from the device. The worst case emissions measurements are shown in this report.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was varied per Part 15.31 to find worst case emissions.

FCC CFR47 Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing the measurements within this report.

Whenever possible the approved test procedures specified in FCC KDB 558074 for DTS devices was used for testing.

Sample:
☐Production ☒Prototype ☐See RFQ

Modifications required to pass: None

Test Specification Deviations: Additions to or Exclusions from: None

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Required Information In Accordance to FCC CFR 47 Part 2.1033:

Rule Part 11, 15 & 18 Devices	*Other Rule Part Devices*	*Description*	*Comments*
2.1033(b)(1)	**2.1033(c)(1)**	*Manu. Contact*	See Page 1 of this report
2.1033(b)(2)	**2.1033(c)(2)**	*FCC Identifier*	Attached as Exhibit
2.1033(b)(3)	**2.1033(c)(3)**	*Users Manual to include Operating, installation*	Attached as Exhibit
	2.1033(c)(4)	*Emissions Designator per 2.*	Attached as Exhibit
	2.1033(c)(5)	*Frequency Range*	Not Applicable to Part 15 Devcies
	2.1033(c)(6)	*Power range and controls*	Not Applicable to Part 15 Devcies
	2.1033(c)(7)	*Maximum power ouput rating*	Not Applicable to Part 15 Devcies
	2.1033(c)(8)	*DC Voltage and Current suplying final RF stages*	Not Applicable to Part 15 Devcies
2.1033(b)(3)	**2.1033(c)(9)**	*Tune –up procedure*	Please refer to the users manual for applicability
2.1033(b)(4&5)	**2.1033(c)(10)**	*Complete Circuit Diagrams and circuit operation description*	Attached as Exhibit
2.1033(b)(7)	**2.1033(c)(11)**	*Photographs/drawings of the identification label & its location on the device*	Attached as Exhibit
2.1033(b)(7)	**2.1033(c)(12)**	*Photographs of the external and internal surfaces, and construction*	Attached as Exhibit
	2.1033(c)(13)	*Digital Modulation*	Attached as Exhibit
2.1033(b)(6)	**2.1033(c)(14)**	*Report of Measurement Data Required by 2.1046 – 2.1057*	See Data
2.1033(b)(8)		*Description of publicly available support equipment used during test*	Refer to Appendix B of this report (Client Test Plan)
2.1033(b)(9)		*Statement of Autorization to Part 15.37 of CFR47*	The equipment herein is being authorized in accordance to 15.37 of the CFR47 Rules.
2.1033(b)(10)		*Direct Sequence Spread Spectrum Devices (DSSS)*	NA
2.1033(b)(10)		*Frequency Hopping Devices*	NA
2.1033(b)(11)		*Scanning receiver construction*	Exhibit stating compliance to construction in accordance to 15.121.
15.31	**15.31**	*Transmitter Supply Voltage*	Testing herein was completed in accordance to FCC CFR47 Part 15.31

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MODIFICATION SHEET

Test Report No.	3140351	Test Area:	PW1	Date: 10/Dec/2007		
Test Method	**NA**	EUT Power:	12VDC Auto			
EUT Model No.	R2	Temp: 24.7°C Pressure: 101 kPA Humidity: 16.9 %				
EUT Serial No.	Rev. C					
EUT Mfgr:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Tested By:	Mike Spataro					
Data Sheet Reference:	Unintentional emissions	Modification No.	1	Photos Taken	1	

Modifications Made:

Added Steward model 28A2026-0A2 ferrite to the DC power cable.

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Test-setup photo(s):
Conducted Emissions

Not Applicable

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Test-setup photo(s):
Radiated Emissions:

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Test-setup photo(s):
Radiated Emissions:

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Appendix A

Test Data Sheets

and

Test Equipment Used

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Radiated Unintentional Emission
15.209

And

Spurious Emission
15.247 (d)

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Radiated Electromagnetic Emissions

Test Report #:	**3140351**	Test Area:	Pinewood Site 1 (3m)	Temperature:	24.7	°C
Test Method:	FCC Part 15.209	Test Date:	10-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev C.					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
33.36	33.8 Qp	0.6 / 12.2 / 28.1	18.5	V / 1.0 / 0.0	-21.5	N/A
48.02	38.1 Qp	0.7 / 10.1 / 28.0	20.9	V / 1.0 / 0.0	-19.1	N/A
48.47	35.1 Qp	0.7 / 10.0 / 28.0	17.9	V / 1.0 / 0.0	-22.1	N/A
33.44	35.5 Qp	0.6 / 12.2 / 28.1	20.3	V / 1.0 / 90.0	-19.7	N/A
50.01	36.5 Qp	0.7 / 9.8 / 28.0	19.0	V / 1.0 / 90.0	-21.0	N/A
33.36	33.5 Qp	0.6 / 12.2 / 28.1	18.3	V / 1.0 / 180.0	-21.7	N/A
33.44	35.2 Qp	0.6 / 12.2 / 28.1	19.9	V / 1.0 / 180.0	-20.1	N/A
50.01	37.1 Qp	0.7 / 9.8 / 28.0	19.6	V / 1.0 / 180.0	-20.4	N/A
33.36	33.2 Qp	0.6 / 12.2 / 28.1	17.9	V / 1.0 / 270.0	-22.1	N/A
33.44	35.1 Qp	0.6 / 12.2 / 28.1	19.9	V / 1.0 / 270.0	-20.1	N/A
50.01	37.4 Qp	0.7 / 9.8 / 28.0	19.9	V / 1.0 / 270.0	-20.1	N/A
The following were maximized between 30 and 200 MHz.						
33.36	34.4 Qp	0.6 / 12.2 / 28.1	19.1	V / 1.0 / 143.0	-20.9	N/A
33.44	36.5 Qp	0.6 / 12.2 / 28.1	21.2	V / 1.0 / 25.0	-18.8	N/A
No emissions found: Horizontal 30 to 200 MHz.						
Noise floor.						
30.00	23.5 Qp	0.5 / 12.8 / 28.1	8.7	H / 2.0 / 0.0	-31.3	N/A
80.00	33.4 Qp	0.9 / 6.8 / 27.9	13.2	H / 2.0 / 0.0	-26.8	N/A
195.00	24.4 Qp	1.5 / 13.1 / 27.3	11.5	H / 2.0 / 0.0	-32.0	N/A
297.20	44.0 Qp	1.9 / 13.8 / 26.9	32.6	V / 1.0 / 0.0	-13.4	N/A
396.28	28.0 Qp	2.2 / 15.3 / 27.6	17.9	V / 1.0 / 0.0	-28.1	N/A
440.50	30.8 Qp	2.4 / 16.4 / 27.9	21.7	V / 1.0 / 0.0	-24.3	N/A
495.31	55.9 Qp	2.6 / 17.9 / 28.2	48.2	V / 1.0 / 164.0	2.2 *	N/A
Removed USB cable and antenna.						
495.31	54.5 Qp	2.6 / 17.9 / 28.2	46.8	V / 1.0 / 217.0	0.8 *	N/A
Reconnected the antenna and added a Steward ferrite to the DC power cable.						

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
Steward ferrite # 28A2026-0A2						
495.24	51.7 Qp	2.6 / 17.9 / 28.2	44.0	V / 1.0 / 217.0	-2.0	N/A
Reconnected the USB cable.						
495.31	54.0 Qp	2.6 / 17.9 / 28.2	46.3	V / 1.0 / 162.0	0.3 *	N/A
Connected computer to the USB cable.						
495.27	52.9 Qp	2.6 / 17.9 / 28.2	45.2	V / 1.0 / 31.0	-0.8	N/A
495.27	52.8 Qp	2.6 / 17.9 / 28.2	45.0	H / 1.7 / 195.0	-1.0	N/A
503.99	42.7 Qp	2.6 / 18.2 / 28.2	35.3	V / 1.0 / 0.0	-10.7	N/A
527.99	42.6 Qp	2.6 / 17.7 / 28.2	34.7	V / 1.0 / 0.0	-11.3	N/A
576.00	40.0 Qp	2.8 / 18.5 / 28.2	33.2	V / 1.0 / 0.0	-12.8	N/A
623.99	47.1 Qp	3.0 / 19.3 / 28.2	41.3	V / 1.0 / 0.0	-4.7	N/A
700.55	39.9 Qp	3.3 / 21.2 / 28.1	36.2	V / 1.0 / 0.0	-9.8	N/A
240.00	43.2 Qp	1.7 / 11.5 / 27.1	29.3	V / 1.0 / 90.0	-16.7	N/A
252.01	45.0 Qp	1.7 / 12.6 / 27.1	32.2	V / 1.0 / 90.0	-13.8	N/A
263.89	41.2 Qp	1.8 / 12.7 / 27.0	28.6	V / 1.0 / 90.0	-17.4	N/A
288.00	36.8 Qp	1.9 / 13.2 / 26.9	24.9	V / 1.0 / 90.0	-21.1	N/A
297.15	46.2 Qp	1.9 / 13.8 / 26.9	34.9	V / 1.0 / 90.0	-11.1	N/A
299.97	42.0 Qp	1.9 / 13.9 / 27.0	30.8	V / 1.0 / 90.0	-15.2	N/A
336.00	48.3 Qp	2.0 / 14.2 / 27.2	37.3	V / 1.0 / 90.0	-8.7	N/A
348.06	38.9 Qp	2.1 / 14.4 / 27.3	28.1	V / 1.0 / 90.0	-17.9	N/A
360.02	41.5 Qp	2.1 / 14.8 / 27.3	31.1	V / 1.0 / 90.0	-14.9	N/A
384.02	41.5 Qp	2.1 / 15.0 / 27.5	31.1	V / 1.0 / 90.0	-14.9	N/A
396.02	39.5 Qp	2.2 / 15.3 / 27.6	29.4	V / 1.0 / 90.0	-16.6	N/A
297.15	47.4 Qp	1.9 / 13.8 / 26.9	36.0	V / 1.0 / 180.0	-10.0	N/A
396.28	33.6 Qp	2.2 / 15.3 / 27.6	23.5	V / 1.0 / 180.0	-22.5	N/A
216.08	44.6 Qp	1.6 / 11.2 / 27.3	30.1	V / 1.0 / 180.0	-15.9	N/A
240.00	43.0 Qp	1.7 / 11.6 / 27.1	29.1	V / 1.0 / 270.0	-16.9	N/A
252.01	46.9 Qp	1.7 / 12.6 / 27.1	34.1	V / 1.0 / 270.0	-11.9	N/A
297.15	46.7 Qp	1.9 / 13.8 / 26.9	35.4	V / 1.0 / 270.0	-10.6	N/A
440.50	35.7 Qp	2.4 / 16.4 / 27.9	26.6	V / 1.0 / 270.0	-19.4	N/A
503.99	43.6 Qp	2.6 / 18.2 / 28.2	36.2	V / 1.0 / 270.0	-9.8	N/A
623.99	47.0 Qp	3.0 / 19.3 / 28.2	41.1	V / 1.0 / 270.0	-4.9	N/A
444.06	44.0 Qp	2.4 / 16.4 / 27.9	35.0	V / 1.0 / 270.0	-11.0	N/A
492.01	46.3 Qp	2.6 / 17.7 / 28.2	38.4	V / 1.0 / 270.0	-7.6	N/A
The following were maximized between 200 and 1000 MHz.						
336.00	50.9 Qp	2.0 / 14.2 / 27.2	39.9	V / 1.0 / 60.0	-6.1	N/A
492.01	51.4 Qp	2.6 / 17.7 / 28.2	43.5	V / 1.3 / 28.0	-2.5	N/A
623.99	50.5 Qp	3.0 / 19.3 / 28.2	44.7	V / 1.0 / 12.0	-1.3	N/A
396.28	34.5 Qp	2.2 / 15.3 / 27.6	24.4	H / 2.0 / 0.0	-21.6	N/A

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
252.01	45.0 Qp	1.7 / 12.6 / 27.1	32.2	H / 2.0 / 90.0	-13.8	N/A
444.06	41.0 Qp	2.4 / 16.4 / 27.9	31.9	H / 2.0 / 90.0	-14.1	N/A
492.01	47.1 Qp	2.6 / 17.7 / 28.2	39.3	H / 2.0 / 90.0	-6.7	N/A
495.27	47.0 Qp	2.6 / 17.9 / 28.2	39.3	H / 2.0 / 90.0	-6.7	N/A
527.99	44.0 Qp	2.6 / 17.7 / 28.2	36.1	H / 2.0 / 90.0	-9.9	N/A
623.99	50.6 Qp	3.0 / 19.3 / 28.2	44.7	H / 2.0 / 90.0	-1.3	N/A
263.89	41.1 Qp	1.8 / 12.7 / 27.0	28.5	H / 2.0 / 180.0	-17.5	N/A
297.15	45.5 Qp	1.9 / 13.8 / 26.9	34.1	H / 2.0 / 180.0	-11.9	N/A
348.06	38.9 Qp	2.1 / 14.4 / 27.3	28.1	H / 2.0 / 180.0	-17.9	N/A
492.01	48.8 Qp	2.6 / 17.7 / 28.2	40.9	H / 2.0 / 180.0	-5.1	N/A
503.99	45.1 Qp	2.6 / 18.2 / 28.2	37.7	H / 2.0 / 180.0	-8.3	N/A
252.01	46.1 Qp	1.7 / 12.6 / 27.1	33.3	H / 2.0 / 270.0	-12.7	N/A
263.89	45.0 Qp	1.8 / 12.7 / 27.0	32.4	H / 2.0 / 270.0	-13.6	N/A
297.15	42.2 Qp	1.9 / 13.8 / 26.9	30.9	H / 2.0 / 270.0	-15.1	N/A
The following were maximized between 200 and 1000 MHz.						
492.01	50.2 Qp	2.6 / 17.7 / 28.2	42.4	H / 1.4 / 31.0	-3.6	N/A
503.99	48.7 Qp	2.6 / 18.2 / 28.2	41.3	H / 1.5 / 180.0	-4.7	N/A
623.99	51.0 Qp	3.0 / 19.3 / 28.2	45.1	H / 1.9 / 112.0	-0.9	N/A
No emissions found: 9kHz to 30MHz with antenna parallel.						
Noise floor.						
0.0100	33.4 Qp	0.0 / 18.9 / 0.0	52.2	V / 1.0 / 0.0	-75.4	N/A
0.100	32.5 Qp	0.1 / 10.9 / 0.0	43.5	V / 1.0 / 0.0	-64.1	N/A
10.05	7.8 Qp	0.2 / 10.7 / 0.0	18.7	V / 1.0 / 0.0	-50.8	N/A
No emissions found: 9kHz to 30MHz with antenna perpendicular.						
Noise floor.						
0.150	38.4 Qp	0.1 / 10.8 / 0.0	49.2	H / 1.0 / 0.0	-54.9	N/A
5.00	10.6 Qp	0.2 / 10.5 / 0.0	21.3	H / 1.0 / 0.0	-48.2	N/A
25.00	27.9 Qp	0.5 / 9.1 / 0.0	37.5	H / 1.0 / 0.0	-32.0	N/A
1000.66	38.9 Av	2.0 / 24.1 / 37.5	27.5	V / 1.0 / 0.0	N/A	-26.5
1007.57	39.2 Av	2.0 / 24.1 / 37.5	27.8	V / 1.0 / 0.0	N/A	-26.2
1105.89	41.4 Av	2.1 / 24.3 / 37.4	30.4	V / 1.0 / 0.0	N/A	-23.6
1100.73	41.2 Av	2.1 / 24.3 / 37.4	30.2	V / 1.0 / 0.0	N/A	-23.8
1130.44	43.1 Av	2.1 / 24.3 / 37.4	32.2	V / 1.0 / 0.0	N/A	-21.8
1155.02	44.4 Av	2.2 / 24.4 / 37.4	33.5	V / 1.0 / 0.0	N/A	-20.5
1179.60	45.4 Av	2.2 / 24.4 / 37.4	34.6	V / 1.0 / 0.0	N/A	-19.4
1300.86	41.9 Av	2.3 / 24.7 / 37.3	31.6	V / 1.0 / 0.0	N/A	-22.4
1572.79	40.0 Av	2.6 / 25.4 / 37.0	30.9	V / 1.0 / 0.0	N/A	-23.1
1601.06	50.2 Av	2.6 / 25.5 / 37.0	41.3	V / 1.0 / 0.0	N/A	-12.7
1701.14	47.0 Av	2.7 / 25.9 / 37.1	38.5	V / 1.0 / 0.0	N/A	-15.5
1089.49	52.6 Av	2.1 / 24.2 / 37.4	41.5	V / 1.0 / 90.0	N/A	-12.5
1485.62	42.8 Av	2.5 / 25.0 / 36.9	33.3	V / 1.0 / 90.0	N/A	-20.7

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(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
1683.71	48.0 Av	2.7 / 25.8 / 37.1	39.4	V / 1.0 / 90.0	N/A	-14.6
1881.87	42.4 Av	2.9 / 26.7 / 37.5	34.4	V / 1.0 / 90.0	N/A	-19.6
1485.62	43.0 Av	2.5 / 25.0 / 36.9	33.5	V / 1.0 / 180.0	N/A	-20.5
1501.01	44.6 Av	2.5 / 25.1 / 36.9	35.2	V / 1.0 / 180.0	N/A	-18.8
1881.87	43.0 Av	2.9 / 26.7 / 37.5	35.1	V / 1.0 / 270.0	N/A	-18.9
The following were maximized between 1 and 4 GHz.						
1089.49	53.9 Av	2.1 / 24.2 / 37.4	42.8	V / 1.0 / 168.0	N/A	-11.2
1601.06	50.0 Av	2.6 / 25.5 / 37.0	41.1	V / 1.0 / 168.0	N/A	-12.9
1683.71	50.9 Av	2.7 / 25.8 / 37.1	42.3	V / 1.0 / 168.0	N/A	-11.7
No higher emissions found: 0Deg, Horizontal.						
1089.49	47.8 Av	2.1 / 24.2 / 37.4	36.7	H / 1.0 / 90.0	N/A	-17.3
1089.49	50.2 Av	2.1 / 24.2 / 37.4	39.1	H / 1.0 / 180.0	N/A	-14.9
No higher emissions found: 270Deg, Horizontal.						
The following was maximized.						
1089.48	53.1 Av	2.1 / 24.2 / 37.4	42.1	H / 1.0 / 322.0	N/A	-11.9
No emissions found: 4 to 8 GHz Vertical.						
Noise floor.						
4000.00	33.4 Av	4.8 / 32.4 / 39.5	31.0	H / 1.0 / 0.0	N/A	-23.0
6000.00	31.4 Av	6.2 / 35.1 / 39.6	33.1	V / 1.0 / 0.0	N/A	-20.9
No emissions found: 4 to 8 GHz Horizontal.						
Noise floor.						
5000.00	33.1 Av	5.8 / 33.4 / 40.2	32.0	H / 1.0 / 0.0	N/A	-22.0
8000.00	32.8 Av	7.6 / 37.1 / 40.3	37.2	H / 1.0 / 0.0	N/A	-16.8
No emissions found: 8 to 10 GHz Horizontal.						
Noise floor.						
8500.00	43.1 Av	8.2 / 37.0 / 48.0	40.3	H / 1.0 / 0.0	N/A	-13.7
No emissions found: 8 to 10 GHz Vertical.						
Noise floor.						
10000.0	43.8 Av	8.8 / 38.1 / 49.2	41.4	H / 1.0 / 0.0	N/A	-12.6

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
********** Measurement Summary **********						
495.27	52.9 Qp	2.6 / 17.9 / 28.2	45.2	V / 1.0 / 31.0	-0.8	N/A
623.99	51.0 Qp	3.0 / 19.3 / 28.2	45.1	H / 1.9 / 112.0	-0.9	N/A
492.01	51.4 Qp	2.6 / 17.7 / 28.2	43.5	V / 1.3 / 28.0	-2.5	N/A
503.99	48.7 Qp	2.6 / 18.2 / 28.2	41.3	H / 1.5 / 180.0	-4.7	N/A
336.00	50.9 Qp	2.0 / 14.2 / 27.2	39.9	V / 1.0 / 60.0	-6.1	N/A
700.55	39.9 Qp	3.3 / 21.2 / 28.1	36.2	V / 1.0 / 0.0	-9.8	N/A
527.99	44.0 Qp	2.6 / 17.7 / 28.2	36.1	H / 2.0 / 90.0	-9.9	N/A
297.15	47.4 Qp	1.9 / 13.8 / 26.9	36.0	V / 1.0 / 180.0	-10.0	N/A
444.06	44.0 Qp	2.4 / 16.4 / 27.9	35.0	V / 1.0 / 270.0	-11.0	N/A
1089.49	53.9 Av	2.1 / 24.2 / 37.4	42.8	V / 1.0 / 168.0	N/A	-11.2
1683.71	50.9 Av	2.7 / 25.8 / 37.1	42.3	V / 1.0 / 168.0	N/A	-11.7
252.01	46.9 Qp	1.7 / 12.6 / 27.1	34.1	V / 1.0 / 270.0	-11.9	N/A
10000.0	43.8 Av	8.8 / 38.1 / 49.2	41.4	H / 1.0 / 0.0	N/A	-12.6
1601.06	50.2 Av	2.6 / 25.5 / 37.0	41.3	V / 1.0 / 0.0	N/A	-12.7
576.00	40.0 Qp	2.8 / 18.5 / 28.2	33.2	V / 1.0 / 0.0	-12.8	N/A
263.89	45.0 Qp	1.8 / 12.7 / 27.0	32.4	H / 2.0 / 270.0	-13.6	N/A
8500.00	43.1 Av	8.2 / 37.0 / 48.0	40.3	H / 1.0 / 0.0	N/A	-13.7
360.02	41.5 Qp	2.1 / 14.8 / 27.3	31.1	V / 1.0 / 90.0	-14.9	N/A
384.02	41.5 Qp	2.1 / 15.0 / 27.5	31.1	V / 1.0 / 90.0	-14.9	N/A
299.97	42.0 Qp	1.9 / 13.9 / 27.0	30.8	V / 1.0 / 90.0	-15.2	N/A
1701.14	47.0 Av	2.7 / 25.9 / 37.1	38.5	V / 1.0 / 0.0	N/A	-15.5
216.08	44.6 Qp	1.6 / 11.2 / 27.3	30.1	V / 1.0 / 180.0	-15.9	N/A
396.02	39.5 Qp	2.2 / 15.3 / 27.6	29.4	V / 1.0 / 90.0	-16.6	N/A
240.00	43.2 Qp	1.7 / 11.5 / 27.1	29.3	V / 1.0 / 90.0	-16.7	N/A
8000.00	32.8 Av	7.6 / 37.1 / 40.3	37.2	H / 1.0 / 0.0	N/A	-16.8
348.06	38.9 Qp	2.1 / 14.4 / 27.3	28.1	V / 1.0 / 90.0	-17.9	N/A
33.44	36.5 Qp	0.6 / 12.2 / 28.1	21.2	V / 1.0 / 25.0	-18.8	N/A
1501.01	44.6 Av	2.5 / 25.1 / 36.9	35.2	V / 1.0 / 180.0	N/A	-18.8
1881.87	43.0 Av	2.9 / 26.7 / 37.5	35.1	V / 1.0 / 270.0	N/A	-18.9
48.02	38.1 Qp	0.7 / 10.1 / 28.0	20.9	V / 1.0 / 0.0	-19.1	N/A
440.50	35.7 Qp	2.4 / 16.4 / 27.9	26.6	V / 1.0 / 270.0	-19.4	N/A
1179.60	45.4 Av	2.2 / 24.4 / 37.4	34.6	V / 1.0 / 0.0	N/A	-19.4
50.01	37.4 Qp	0.7 / 9.8 / 28.0	19.9	V / 1.0 / 270.0	-20.1	N/A
1155.02	44.4 Av	2.2 / 24.4 / 37.4	33.5	V / 1.0 / 0.0	N/A	-20.5
1485.62	43.0 Av	2.5 / 25.0 / 36.9	33.5	V / 1.0 / 180.0	N/A	-20.5
33.36	34.4 Qp	0.6 / 12.2 / 28.1	19.1	V / 1.0 / 143.0	-20.9	N/A
6000.00	31.4 Av	6.2 / 35.1 / 39.6	33.1	V / 1.0 / 0.0	N/A	-20.9
288.00	36.8 Qp	1.9 / 13.2 / 26.9	24.9	V / 1.0 / 90.0	-21.1	N/A
396.28	34.5 Qp	2.2 / 15.3 / 27.6	24.4	H / 2.0 / 0.0	-21.6	N/A
1130.44	43.1 Av	2.1 / 24.3 / 37.4	32.2	V / 1.0 / 0.0	N/A	-21.8
5000.00	33.1 Av	5.8 / 33.4 / 40.2	32.0	H / 1.0 / 0.0	N/A	-22.0
48.47	35.1 Qp	0.7 / 10.0 / 28.0	17.9	V / 1.0 / 0.0	-22.1	N/A
1300.86	41.9 Av	2.3 / 24.7 / 37.3	31.6	V / 1.0 / 0.0	N/A	-22.4
4000.00	33.4 Av	4.8 / 32.4 / 39.5	31.0	H / 1.0 / 0.0	N/A	-23.0

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
1572.79	40.0 Av	2.6 / 25.4 / 37.0	30.9	V / 1.0 / 0.0	N/A	-23.1
1105.89	41.4 Av	2.1 / 24.3 / 37.4	30.4	V / 1.0 / 0.0	N/A	-23.6
1100.73	41.2 Av	2.1 / 24.3 / 37.4	30.2	V / 1.0 / 0.0	N/A	-23.8
1007.57	39.2 Av	2.0 / 24.1 / 37.5	27.8	V / 1.0 / 0.0	N/A	-26.2
1000.66	38.9 Av	2.0 / 24.1 / 37.5	27.5	V / 1.0 / 0.0	N/A	-26.5
80.00	33.4 Qp	0.9 / 6.8 / 27.9	13.2	H / 2.0 / 0.0	-26.8	N/A
30.00	23.5 Qp	0.5 / 12.8 / 28.1	8.7	H / 2.0 / 0.0	-31.3	N/A
25.00	27.9 Qp	0.5 / 9.1 / 0.0	37.5	H / 1.0 / 0.0	-32.0	N/A
195.00	24.4 Qp	1.5 / 13.1 / 27.3	11.5	H / 2.0 / 0.0	-32.0	N/A
5.00	10.6 Qp	0.2 / 10.5 / 0.0	21.3	H / 1.0 / 0.0	-48.2	N/A
10.05	7.8 Qp	0.2 / 10.7 / 0.0	18.7	V / 1.0 / 0.0	-50.8	N/A
0.150	38.4 Qp	0.1 / 10.8 / 0.0	49.2	H / 1.0 / 0.0	-54.9	N/A
0.100	32.5 Qp	0.1 / 10.9 / 0.0	43.5	V / 1.0 / 0.0	-64.1	N/A
0.0100	33.4 Qp	0.0 / 18.9 / 0.0	52.2	V / 1.0 / 0.0	-75.4	N/A

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6dB Bandwidth

15.247 (a)(2)

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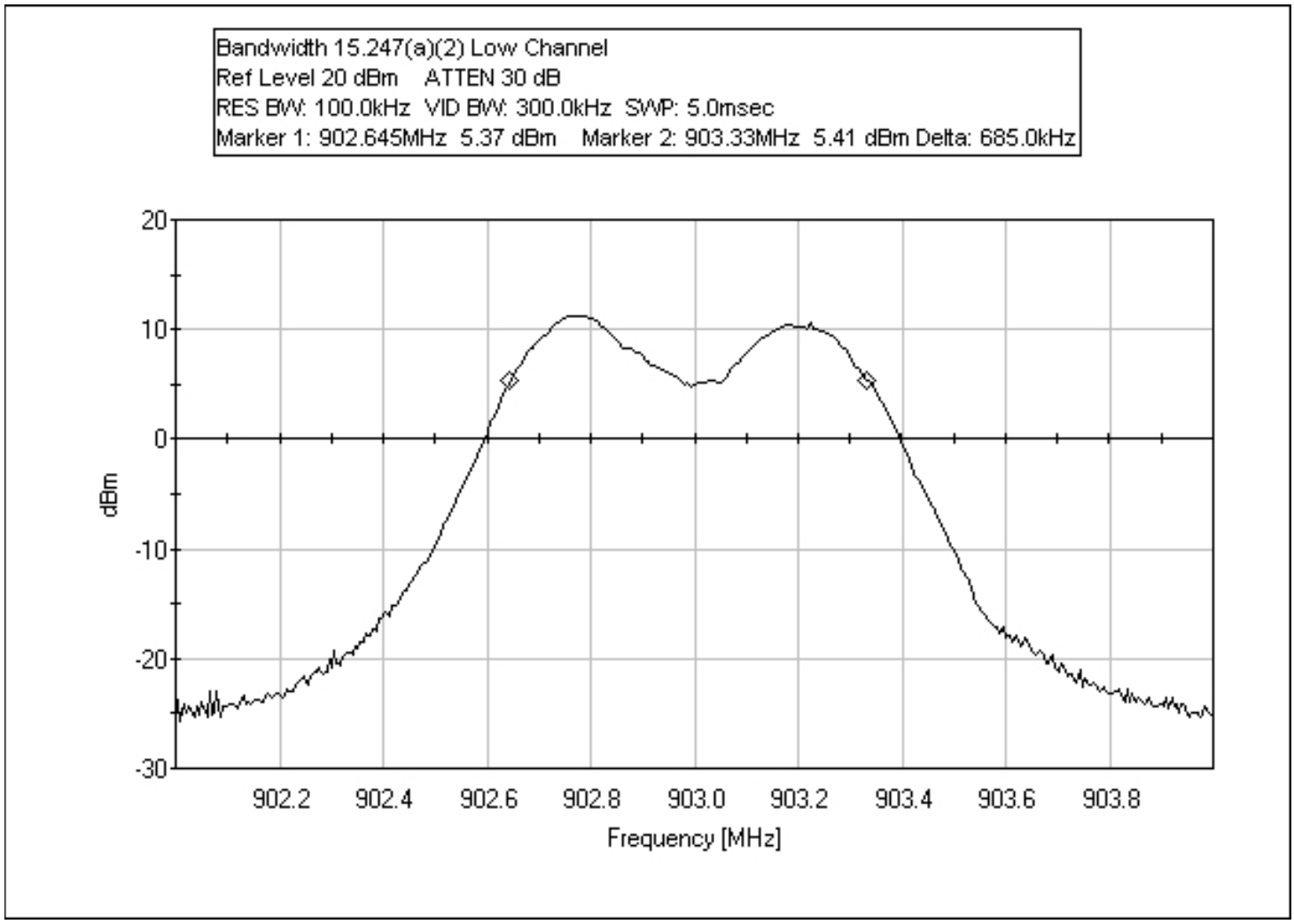
Bandwidth

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
Test Method:	FCC Part 15.247	Test Date:	11-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev. C					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	



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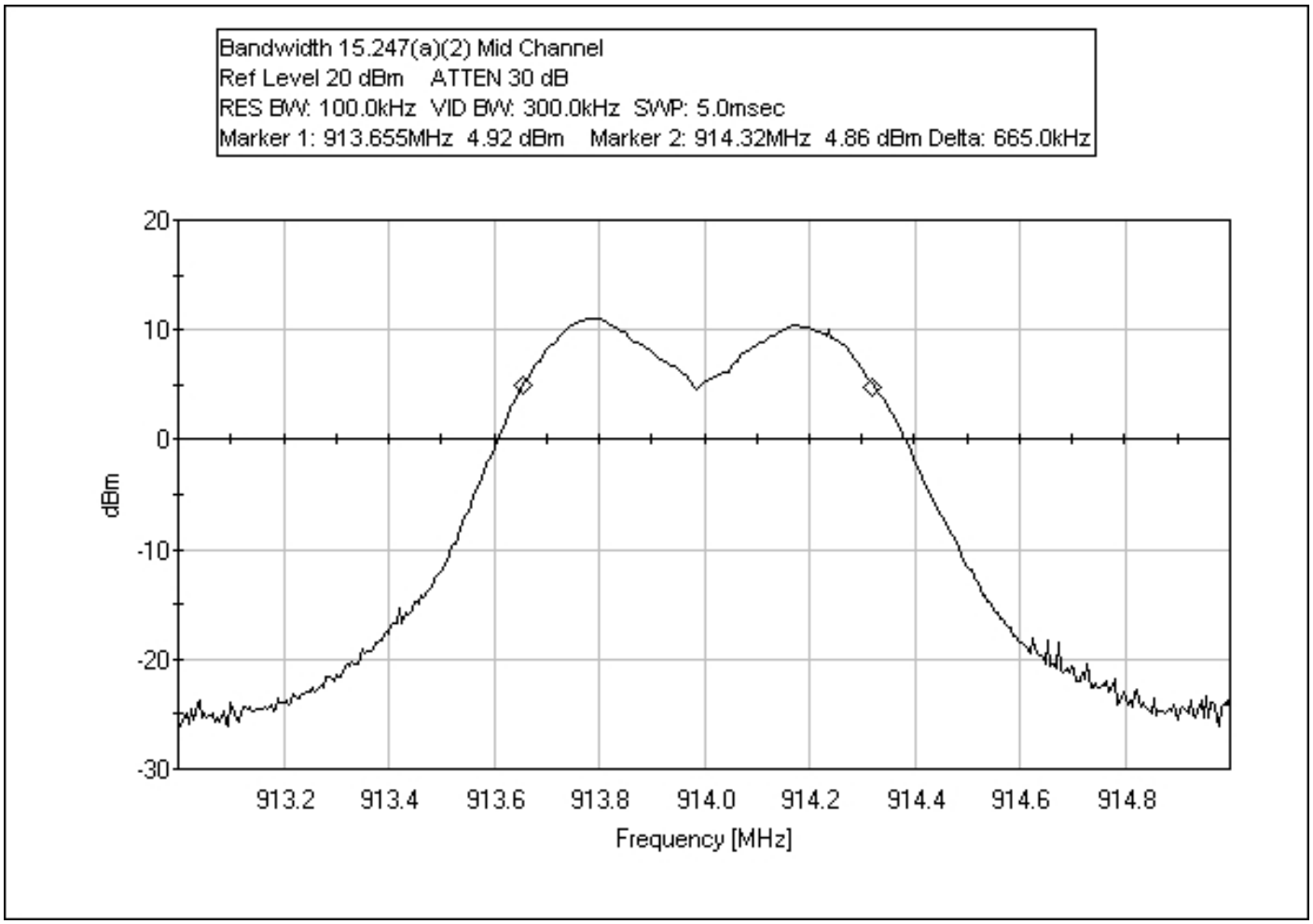
Bandwidth

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
Test Method:	FCC Part 15.247	Test Date:	11-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev. C					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	



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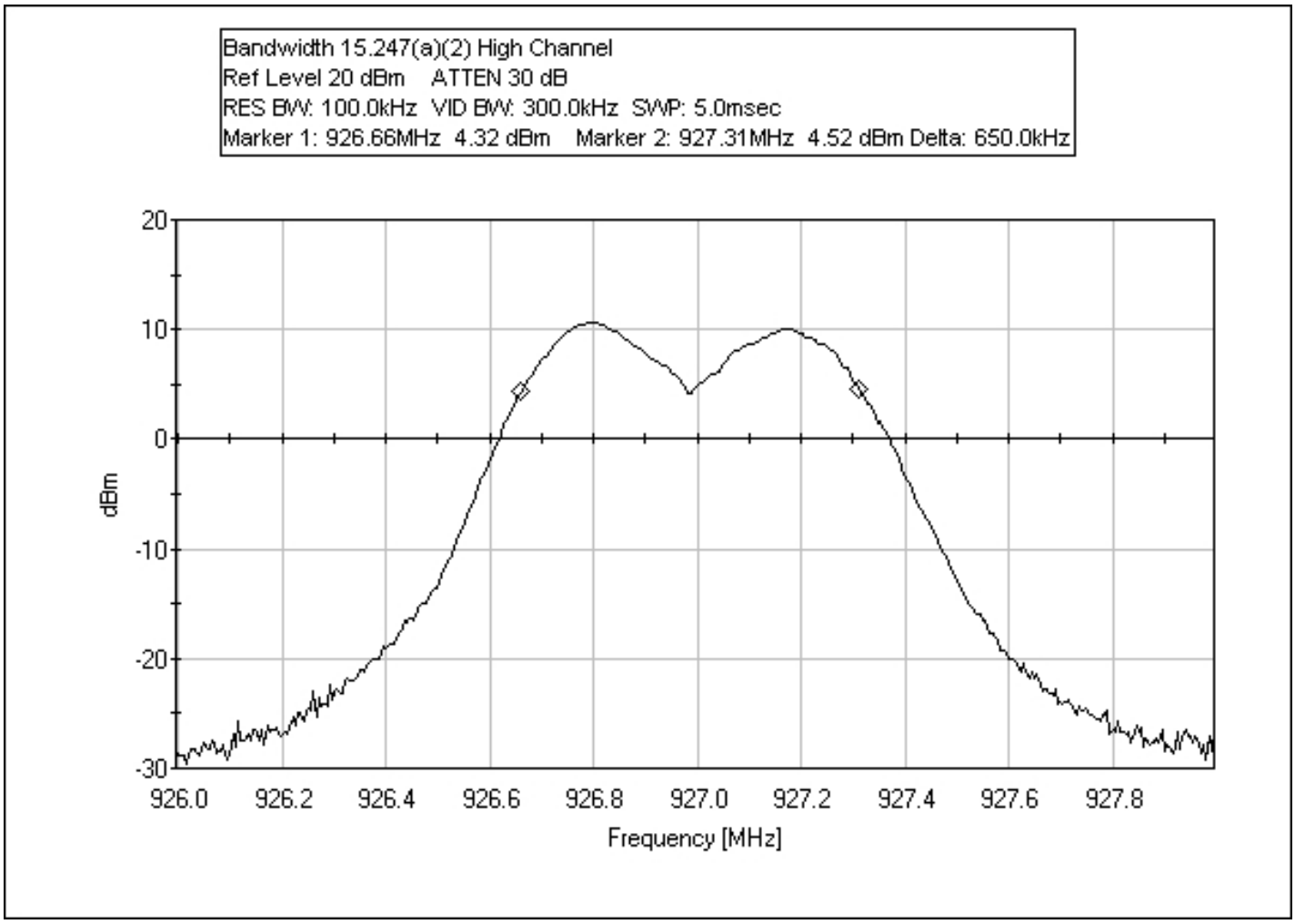
Bandwidth

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
Test Method:	FCC Part 15.247	Test Date:	11-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev. C					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	



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Fundamental field strength
And
Harmonics of the Fundamental

15.247 (b)(3), (d)/15.205

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Conducted Port Measurements
Fundamental and Harmonics

Test Report #:	**3140351**	Test Area:	0 dB site	Temperature:	21.1	°C
Test Method:	FCC part 15.247	Test Date:	11-Dec-2007	Relative Humidity:	22.0	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	100	kPa
EUT Serial #:	Rev C.					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					

Notes: Cable loss correction was added as an offset to the Spectrum Analyzer.

For harmonics that fall in the restricted bands specified in 15.205 see datasheet "Restricted Band Harmonics"

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Limit (dBm)	DELTA (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.247(b)(2)/(d)	15.247(b)(2)/(d)
High Channel						
927.00	12.7 Pk	0.0 / 0.0 / 0.0	12.7	V / 1.0 / 0.0	30	-17.3
1853.98	-50.7 Pk	0.0 / 0.0 / 0.0	-50.7	V / 1.0 / 0.0	-7.3	-43.4
2780.99	-43.2 Pk	0.0 / 0.0 / 0.0	-43.2	V / 1.0 / 0.0	-7.3	-35.9
3707.99	-59.9 Pk	0.0 / 0.0 / 0.0	-59.9	V / 1.0 / 0.0	-7.3	-52.6
4634.97	-75.0 Pk	0.0 / 0.0 / 0.0	-75.0	V / 1.0 / 0.0	-7.3	-67.7
5561.97	-76.0 Pk	0.0 / 0.0 / 0.0	-76.0	V / 1.0 / 0.0	-7.3	-68.7
6488.97	-75.7 Pk	0.0 / 0.0 / 0.0	-75.7	V / 1.0 / 0.0	-7.3	-68.4
7415.97	-72.9 Pk	0.0 / 0.0 / 0.0	-72.9	V / 1.0 / 0.0	-7.3	-65.6
8342.97	-73.2 Pk	0.0 / 0.0 / 0.0	-73.2	V / 1.0 / 0.0	-7.3	-65.9
9269.97	-72.2 Pk	0.0 / 0.0 / 0.0	-72.2	V / 1.0 / 0.0	-7.3	-64.9
Mid Channel						
914.00	12.9 Pk	0.0 / 0.0 / 0.0	12.9	V / 1.0 / 0.0	30	-17.1
1827.99	-52.1 Pk	0.0 / 0.0 / 0.0	-52.1	V / 1.0 / 0.0	-7.1	-45.0
2741.99	-42.6 Pk	0.0 / 0.0 / 0.0	-42.6	V / 1.0 / 0.0	-7.1	-35.5
3655.99	-62.4 Pk	0.0 / 0.0 / 0.0	-62.4	V / 1.0 / 0.0	-7.1	-55.3
4569.99	-74.1 Pk	0.0 / 0.0 / 0.0	-74.1	V / 1.0 / 0.0	-7.1	-67.0
5483.99	-74.2 Pk	0.0 / 0.0 / 0.0	-74.2	V / 1.0 / 0.0	-7.1	-67.1
6397.99	-67.6 Pk	0.0 / 0.0 / 0.0	-67.6	V / 1.0 / 0.0	-7.1	-60.5
7311.99	-70.3 Pk	0.0 / 0.0 / 0.0	-70.3	V / 1.0 / 0.0	-7.1	-63.2
8226.00	-68.0 Pk	0.0 / 0.0 / 0.0	-68.0	V / 1.0 / 0.0	-7.1	-60.9
9140.00	-69.0 Pk	0.0 / 0.0 / 0.0	-69.0	V / 1.0 / 0.0	-7.1	-61.9
Low Channel						
902.99	13.3 Pk	0.0 / 0.0 / 0.0	13.3	V / 1.0 / 0.0	30	-16.7
1805.99	-56.1 Pk	0.0 / 0.0 / 0.0	-56.1	V / 1.0 / 0.0	-6.7	-49.4
2708.99	-42.0 Pk	0.0 / 0.0 / 0.0	-42.0	V / 1.0 / 0.0	-6.7	-35.3
3611.99	-65.6 Pk	0.0 / 0.0 / 0.0	-65.6	V / 1.0 / 0.0	-6.7	-58.9
4514.99	-69.8 Pk	0.0 / 0.0 / 0.0	-69.8	V / 1.0 / 0.0	-6.7	-63.1
5417.99	-75.8 Pk	0.0 / 0.0 / 0.0	-75.8	V / 1.0 / 0.0	-6.7	-69.1

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Limit (dBm)	DELTA (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.247(b)(2)/(d)	15.247(b)(2)/(d)
6320.99	-75.8 Pk	0.0 / 0.0 / 0.0	-75.8	V / 1.0 / 0.0	-6.7	-69.1
7223.99	-73.6 Pk	0.0 / 0.0 / 0.0	-73.6	V / 1.0 / 0.0	-6.7	-66.9
8126.99	-73.6 Pk	0.0 / 0.0 / 0.0	-73.6	V / 1.0 / 0.0	-6.7	-66.9
9029.99	-71.0 Pk	0.0 / 0.0 / 0.0	-71.0	V / 1.0 / 0.0	-6.7	-64.3

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Restricted Band Harmonics

Test Report #:	**3140351**	Test Area:	Pinewood Site 1 (3m)	Temperature:	24.7	°C
Test Method:	FCC Part 15.209	Test Date:	10-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev C.					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
The following duty cycle was declared by the manufacturer.								
39mS								
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.								
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows:								
Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission								
The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated.								
the DTCF is calculated as follows $20*\log_{10}$(duty cycle in 100mS) “not to exceed 20dB”								
Part 15.247 and 15.205 Respectively								
low Channel								
2709.00	58.4 Av	3.5 / 29.7 / 37.9	53.5	H / 1.1 / 147.0	-8.0	45.5	54	-8.5
2709.00	59.4 Av	3.5 / 29.7 / 37.9	54.6	V / 1.0 / 140.0	-8.0	46.6	54	-7.4
3612.00	40.2 Av	4.5 / 31.7 / 38.4	38	H / 1.1 / 110.0	-8.0	30.0	54	-24.0
3612.00	50.9 Av	4.5 / 31.7 / 38.4	48.6	V / 1.0 / 174.0	-8.0	40.6	54	-13.4
4514.98	35.4 Av	5.3 / 32.3 / 40.3	32.6	H / 1.0 / 0.0	-8.0	24.6	54	-29.4
4514.99	35.9 Av	5.3 / 32.3 / 40.3	33.1	V / 1.0 / 195.0	-8.0	25.1	54	-28.9
5417.98	34.0 Av	6.0 / 34.3 / 39.9	34.4	H / 1.0 / 109.0	-8.0	26.4	54	-27.6
5417.99	34.1 Av	6.0 / 34.3 / 39.9	34.6	V / 1.0 / 149.0	-8.0	26.6	54	-27.4
No other harmonics seen.								
Mid Channel								
2742.00	60.2 Av	3.5 / 29.8 / 37.9	55.6	V / 1.0 / 125.0	-8.0	47.6	54	-6.4
2742.00	59.5 Av	3.5 / 29.8 / 37.9	54.8	H / 1.2 / 164.0	-8.0	46.8	54	-7.2
3655.97	46.7 Av	4.5 / 31.8 / 38.5	44.5	V / 1.0 / 105.0	-8.0	36.5	54	-17.5
3655.97	46.8 Av	4.5 / 31.8 / 38.5	44.6	H / 1.0 / 10.0	-8.0	36.6	54	-17.4
4569.98	43.0 Av	5.3 / 32.4 / 40.3	40.4	H / 1.9 / 305.0	-8.0	32.4	54	-21.6
4569.99	45.8 Av	5.3 / 32.4 / 40.3	43.2	V / 1.0 / 337.0	-8.0	35.2	54	-18.8
7311.95	33.0 Av	7.3 / 36.4 / 40.5	36.2	H / 1.0 / 10.0	-8.0	28.2	54	-25.8
7311.95	34.9 Av	7.3 / 36.4 / 40.5	38.1	V / 1.0 / 200.0	-8.0	30.1	54	-23.9
No other harmonics seen.								
high channel								
2781.00	57.3 Av	3.5 / 30.0 / 37.9	52.9	H / 1.2 / 125.0	-8.0	44.9	54	-9.1
2781.00	60.2 Av	3.5 / 30.0 / 37.9	55.8	V / 1.0 / 331.0	-8.0	47.8	54	-6.2
3708.00	46.2 Av	4.5 / 31.9 / 38.5	44.2	H / 1.0 / 0.0	-8.0	36.2	54	-17.8
3708.00	46.4 Av	4.5 / 31.9 / 38.5	44.3	V / 1.0 / 0.0	-8.0	36.3	54	-17.7
4634.99	34.6 Av	5.4 / 32.6 / 40.3	32.3	H / 1.0 / 0.0	-8.0	24.3	54	-29.7
4635.00	34.2 Av	5.4 / 32.6 / 40.3	31.9	V / 1.0 / 0.0	-8.0	23.9	54	-30.1
7415.98	31.6 Av	7.4 / 36.5 / 40.4	35.2	V / 1.0 / 0.0	-8.0	27.2	54	-26.8
7415.98	32.1 Av	7.4 / 36.5 / 40.4	35.6	H / 1.0 / 0.0	-8.0	27.6	54	-26.4
No other harmonics seen								

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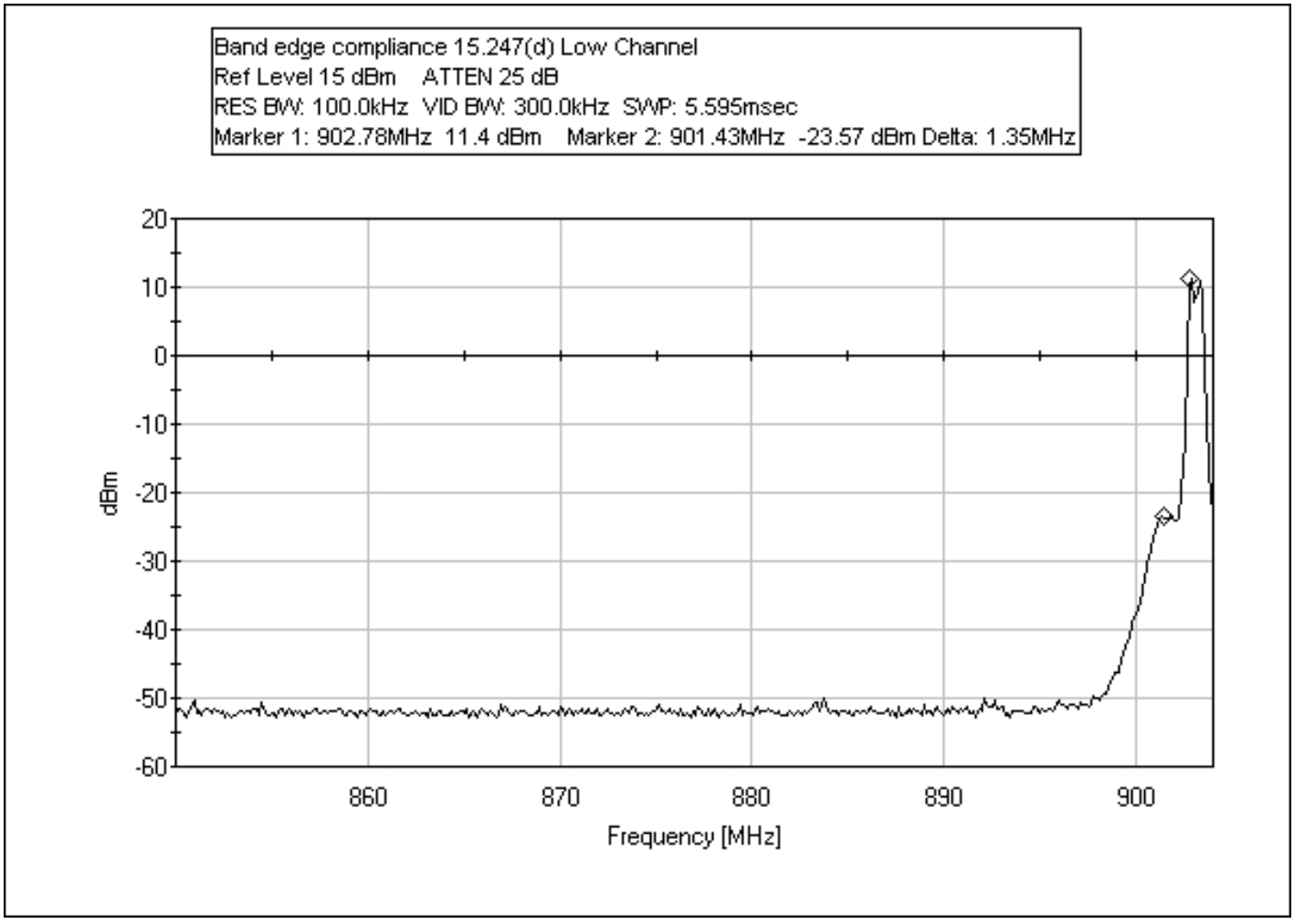
Band-edge

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
Test Method:	FCC Part 15.247	Test Date:	11-Dec-2007	Relative Humidity:	16.9	%
EUT Model #:	R2	EUT Power:	12VDC Auto	Air Pressure:	101	kPa
EUT Serial #:	Rev. C					
Manufacturer:	Transparent Technologies					
EUT Description:	Utility meter transceiver					
Notes:						

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	



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Band-edge

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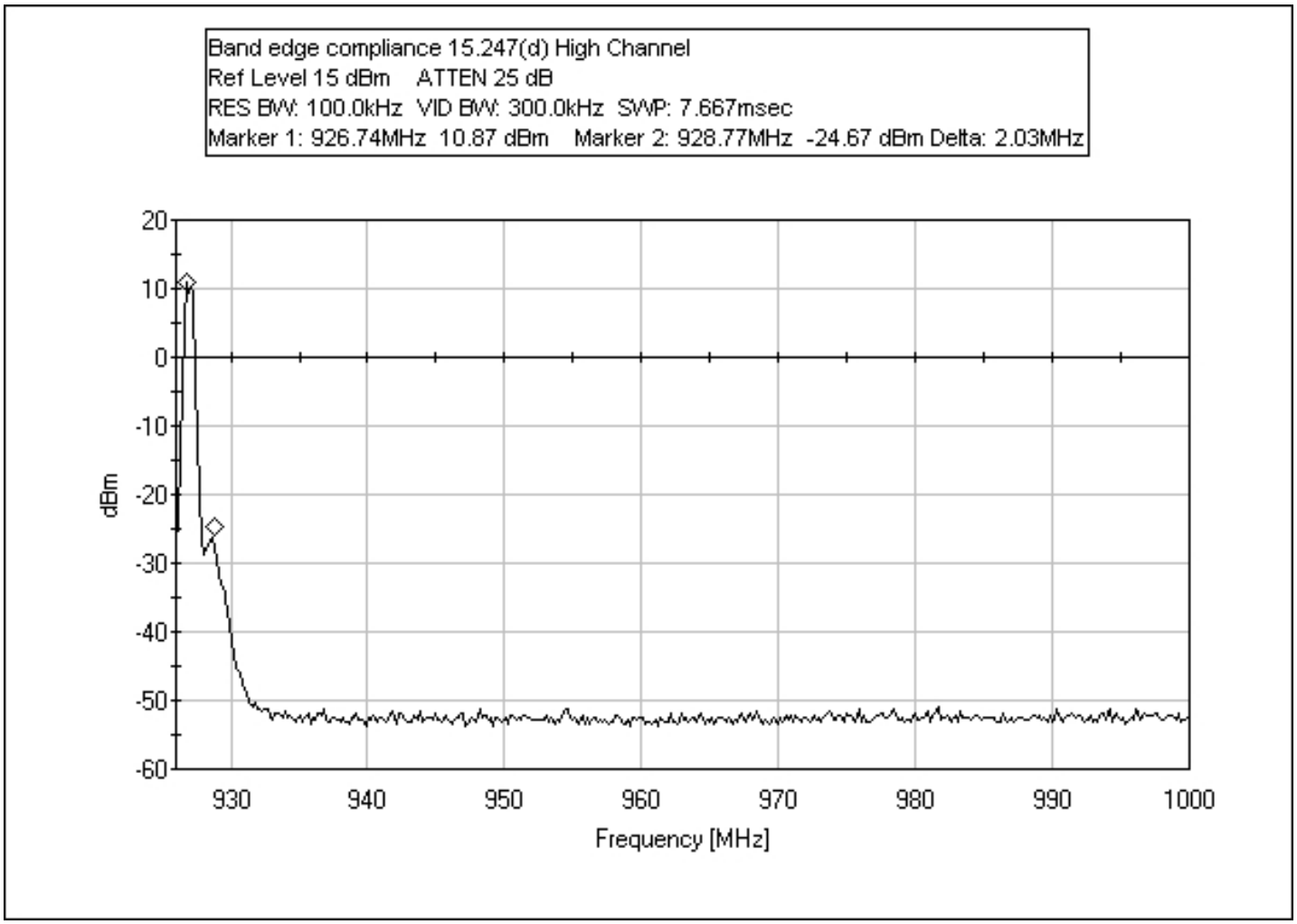

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Power Spectral Density

15.247 (e)

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Power Spectral Density

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
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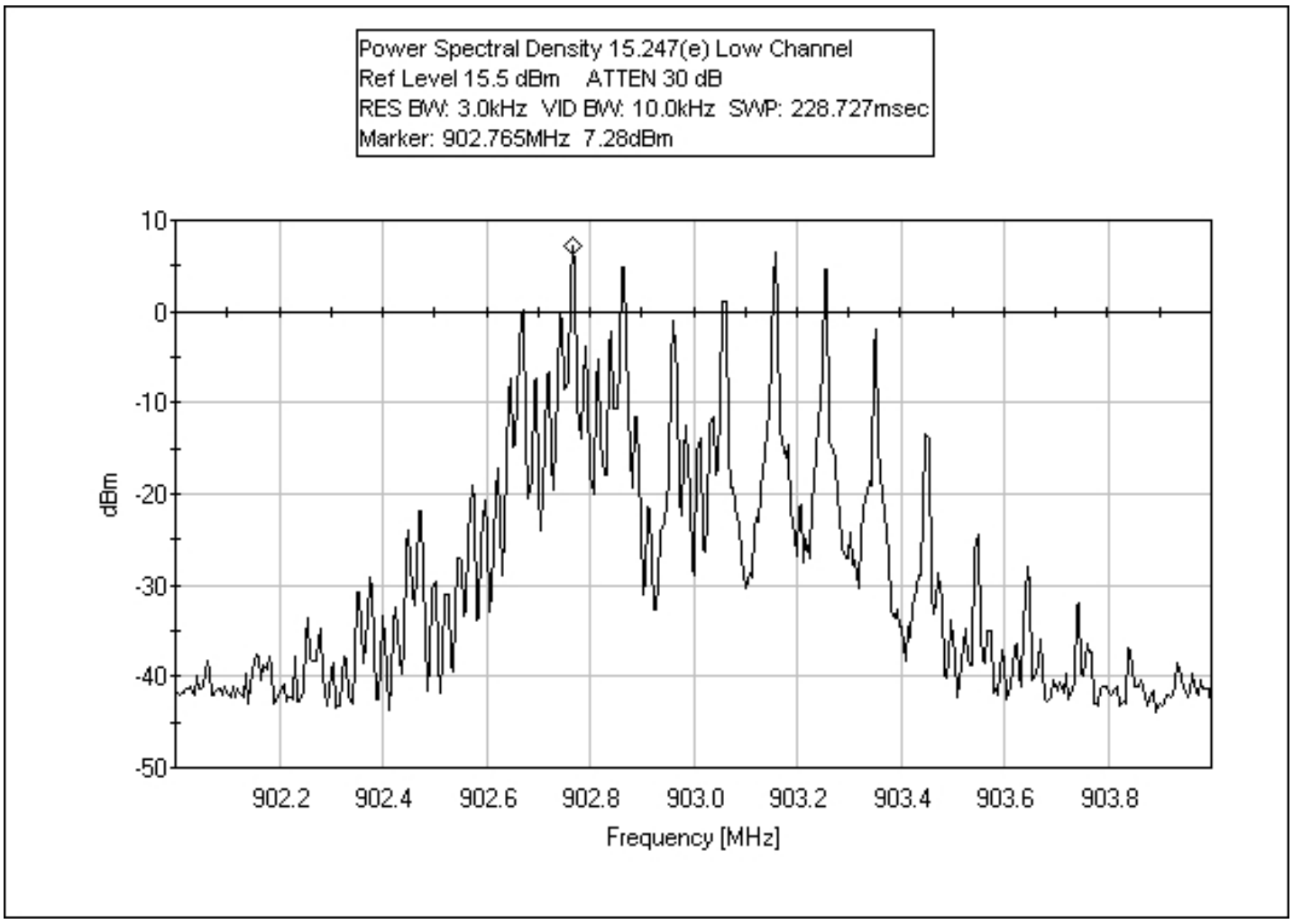

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Power Spectral Density

Test Report #:	**3140351**	Test Area:	PW1	Temperature:	24.7	°C
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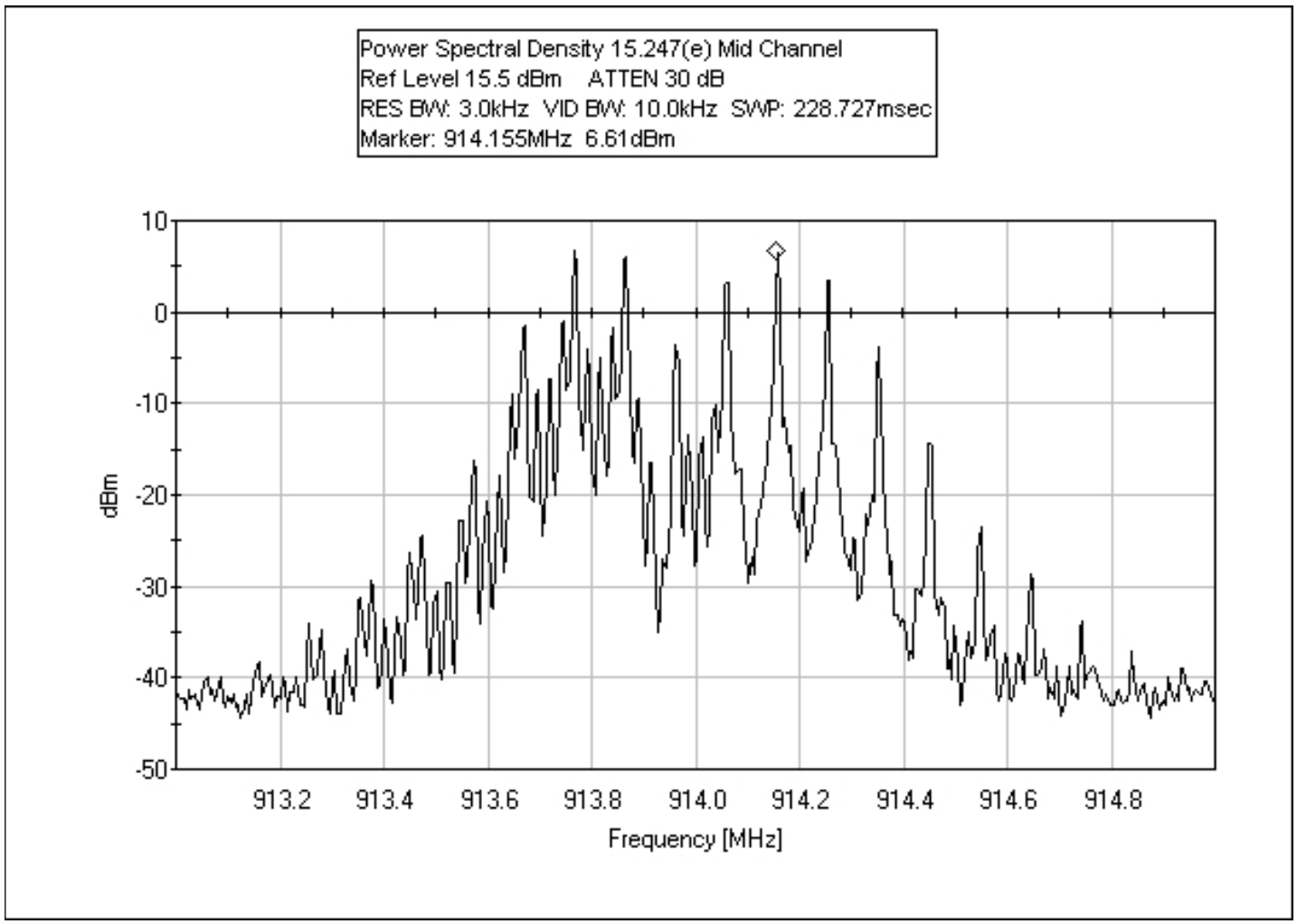

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Power Spectral Density

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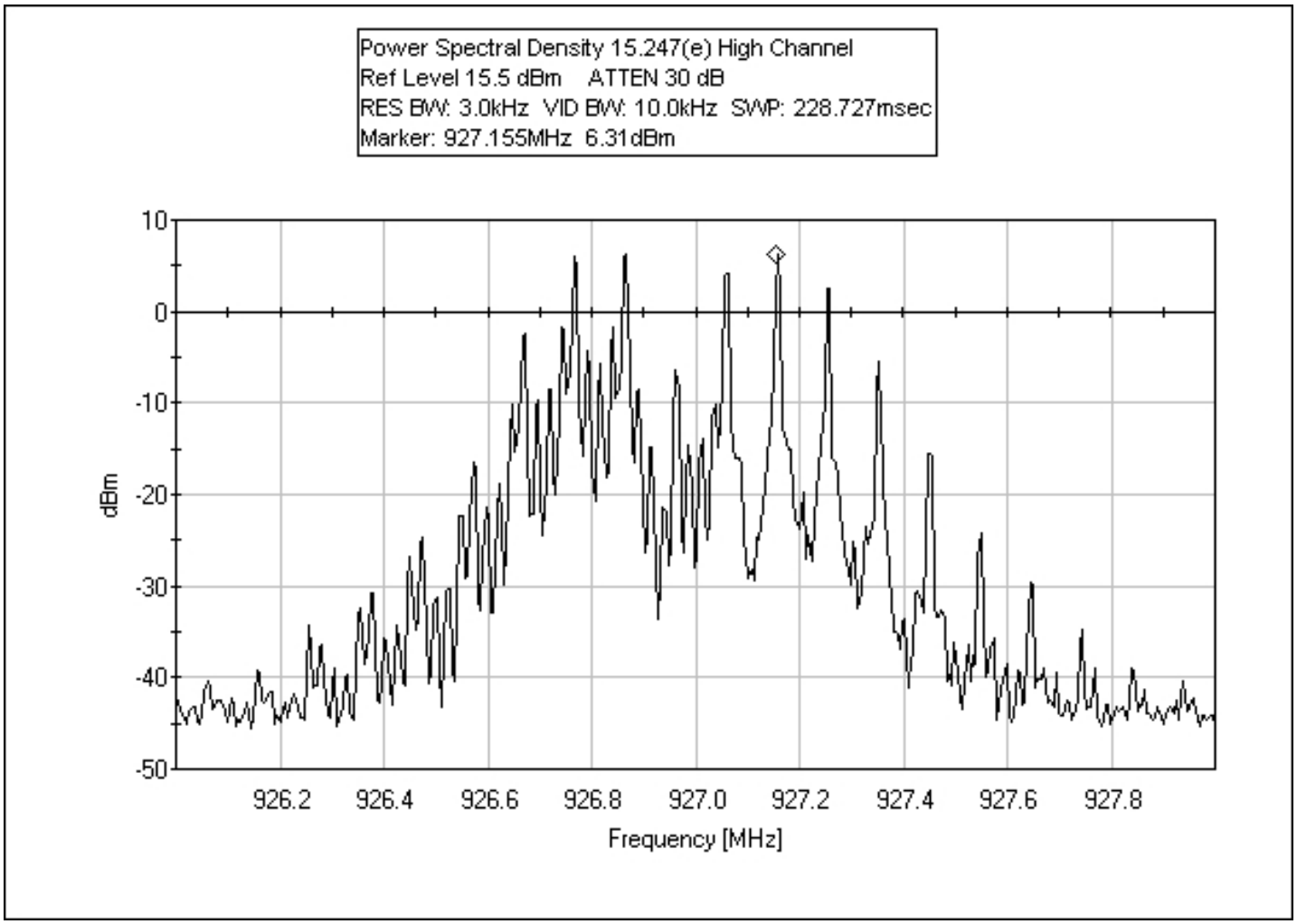

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List of Equipment Utilized for Final Test

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Project Report

Begin Date: 12/10/2007 **End Date:** 12/11/2007

Technician Mike Spataro **Project** 3140351

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Service Type	Service Date	Service Due
18808	EMCO	3146	9203-3376	Log Periodic Antenna	R Radiated Emissions	For Cal	10/12/2007	10/12/2008
18880	Hewlett-Packard	85650A	2811A01300	Q.P Adapter	R Radiated Emissions	For Cal	11/15/2007	11/15/2008
18882	Hewlett-Packard	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	R Radiated Emissions	For Cal	11/13/2007	11/13/2008
18887	EMCO	3115	9205-3886	Horn Antenna 1-18GHz	R Radiated Emissions	For Cal	3/6/2007	3/6/2008
18889	EMC TEST SYSTEMS	3109	3142	Biconical Antenna 30-300MHz	R Radiated Emissions	For Cal	10/11/2007	10/11/2008
18897	EMCO	6502	9205-2738	Magnetic loop	R Radiated Emissions	For Cal	8/27/2007	8/27/2008
18900	Avantek	AFT97-8434-10F	1007	RF Pre-Amplifier (4-8 GHz)	R Radiated Emissions	For Ver	5/1/2007	5/1/2008
18901	Avantek	AWT-18037	1002	RF Pre-Amplifier (8-18 GHz)	R Radiated Emissions	For Ver	5/1/2007	5/1/2008
18906	Mini-Circuits Lab	ZHL-42	N052792-2	Amplifier	R Radiated Emissions	For Ver	5/1/2007	5/1/2008
18912	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	For Ver	5/1/2007	5/1/2008
18913	Hewlett-Packard	E7405A	My44211889	Spectrum Analyzer	R Radiated Emissions	For Cal	2/23/2007	2/23/2008

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Appendix B

Test Plan

and

Constructional Data Form

To be supplied by the customer

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Appendix C

Measurement Protocol

And

Test Procedures

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MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dBμV and μV, the following conversions apply:

- dBμV = 20(log μV)
- μV = Inverse log(dBμV/20)

RADIATED EMISSIONS

The final level, expressed in dBμV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBμV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the applicable limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dBμV:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBμV)		(dB)		(dBμV/m)	(dBμV/m)		(dBμV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

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DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-2003 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

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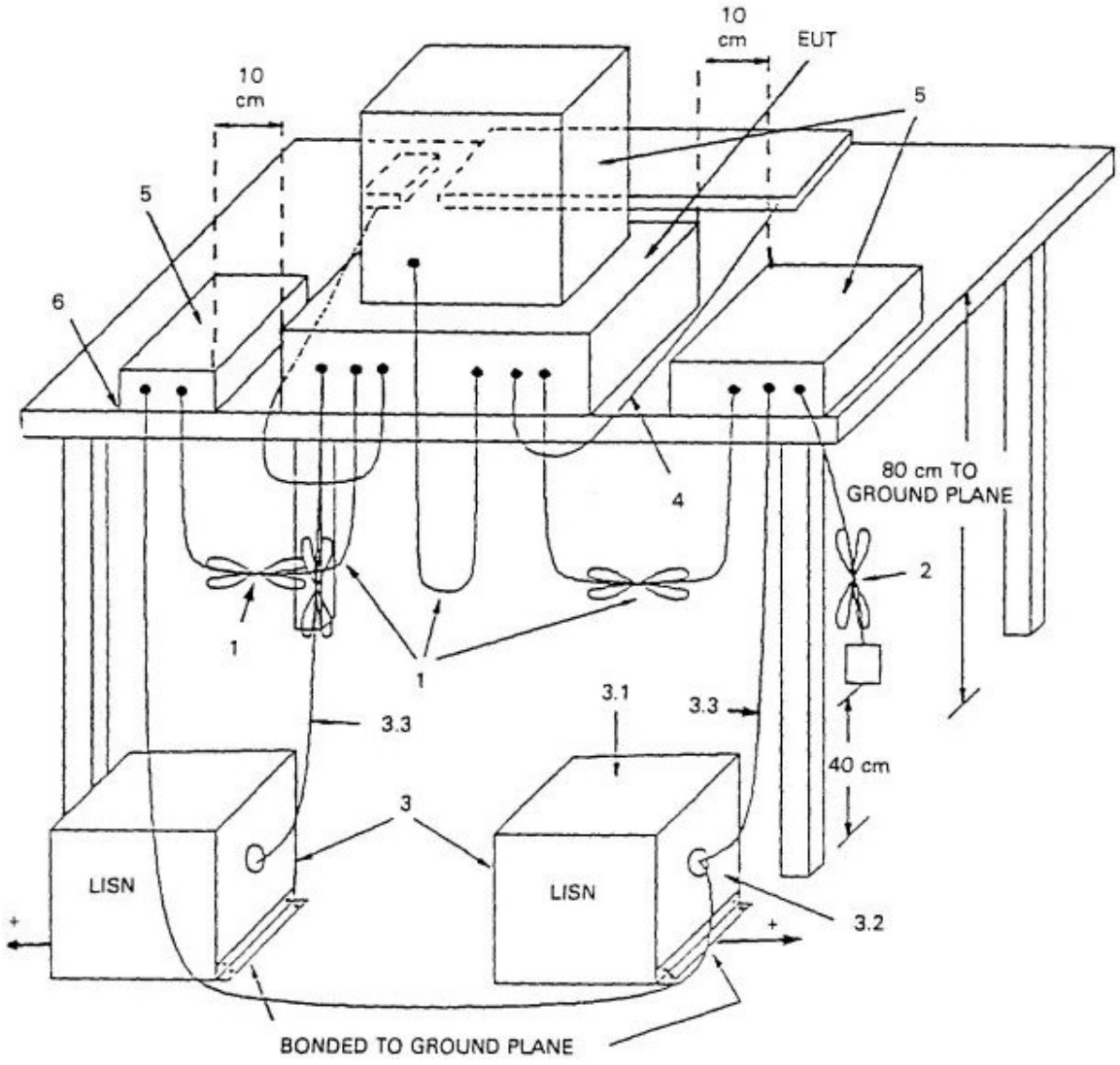
Conducted Emissions Diagram:



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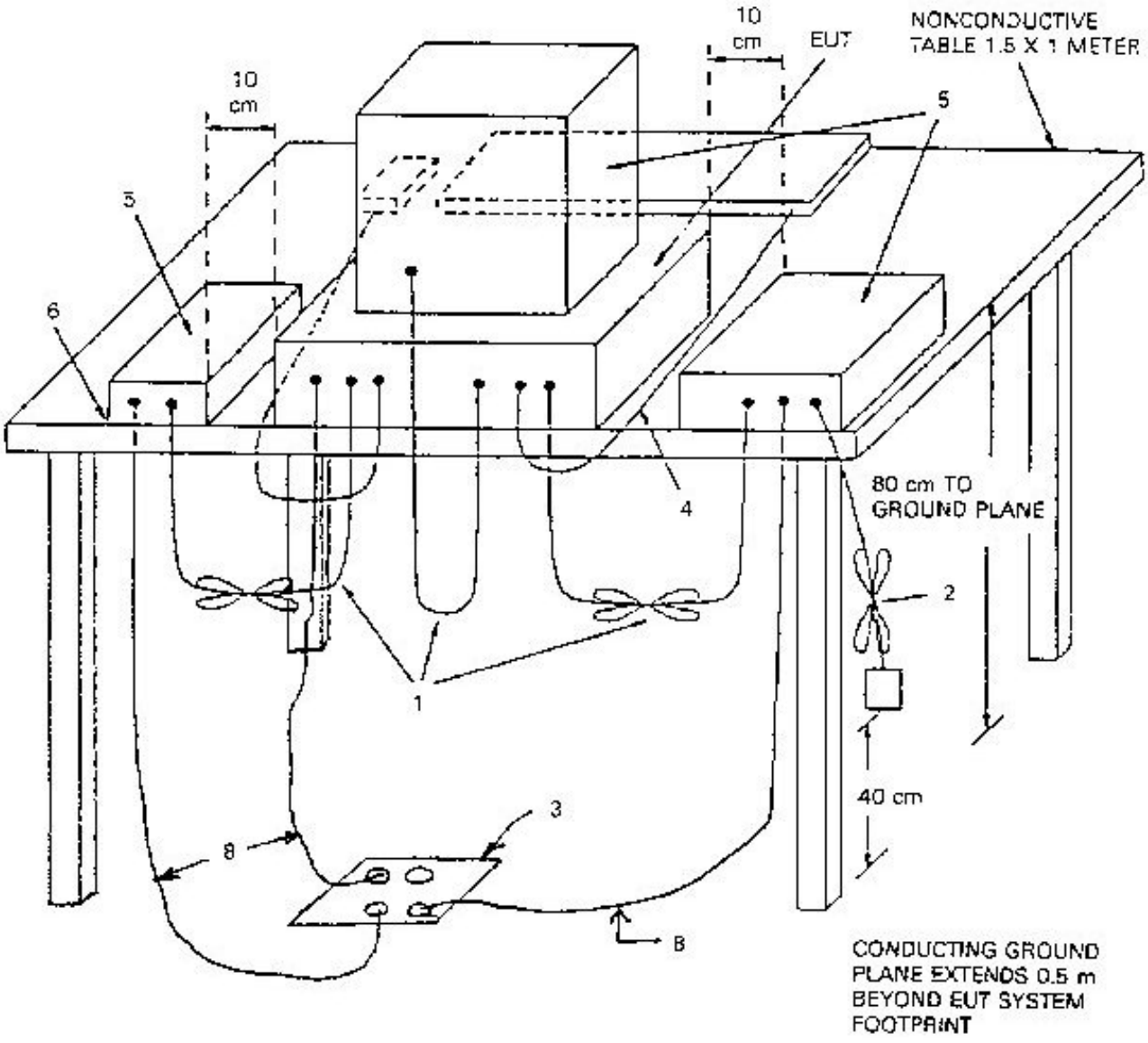
Radiated Emissions Diagram:



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