



Nemko Test Report: 10240453REU1 Rev2

Applicant: Texas Instruments, Inc.
12500 TI Boulevard
Dallas TX 75243

**Equipment Under Test:
(E.U.T.)** GASSENSOREVM

In Accordance With: **EN 300 328: V1.7.1**
Electromagnetic compatibility and Radio spectrum
Matters (ERM); Wideband transmission systems;
Data transmission equipment operating in the 2,4
GHz ISM band and using wide band modulation
techniques; Harmonized EN covering essential
requirements under article 3.2 of the R&TTE
Directive

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, TX 75057-3136

A handwritten signature in black ink, appearing to read "David Light".

TESTED BY: _____
David Light, Senior Wireless Engineer

DATE: _____
12 April 2013

APPROVED BY: _____
Tom Tidwell, Reviewer

A handwritten signature in black ink, appearing to read "Tom Tidwell".

DATE: _____
16-Jul-2013

Total Number of Pages: 23

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Section 1. Summary Of Test Results

Manufacturer: Texas Instruments, Inc.

Model No.: GASSENSOREVM

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with EN 300 328 V1.7.1: (2006-05)

Production Unit

Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



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Section 2. Test Results

2.1 Summary of Tests

EN Reference	Transmitter Parameters	P	F	NT	N A	Comment
4.3.1	Equivalent isotropically radiated power	X				
4.3.2	Maximum Spectral Power Density	X				
4.3.3	Frequency Range	X				
4.3.4	Frequency hopping requirements				X	1
4.3.6	Transmitter spurious emissions	X				

Receiver Parameters						
4.3.5	Receiver Spurious Emissions	X				
NOTE: These EN-Rs are justified under article 3.2 of the R&TTE Directive.						

P=Pass
 F=Fail
 NT=Not tested
 NA=Not applicable

Comments:

- 1) The EUT is not a frequency hopper.

Report revisions:

Rev.	Comment	Date
0	Initial release	5/11/13
1	Editorial changes	6/13/13
2	Changed to production unit, pg. 3	7/16/13

Section 3 Equivalent isotropically radiated power

NAME OF TEST: Equivalent isotropically radiated power	Clause 4.3.1
TESTED BY: David Light	DATE: 10 April 2013

Method of Measurement: EN 300 328 V1.7.1, clause 5.7.2

Test Conditions: Normal and Extreme (see clause EN 300 328 [3], clause 5.3):

Antenna gain: 2.1 dBi (see EN 300 328 [3], clause 5.7.2.2 step 2)
Power Setting: 0 dBm EIRP Conducted
Duty Cycle: 100 %
Rel. Humidity: 40 %
Temperature 23 °C

Test Equipment:	1036-1082-1469
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Test Results

Test Conditions:					Measured Power (dBm) <i>(see note)</i>	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)
Lowest Frequency: 2402 MHz								
T_{nom}	20	°C	V_{nom}	3.0 Vdc	0.7	2.8	20.0	17.2
T_{min}	-20	°C	V_{min}	2.5 Vdc	1.3	3.4	20.0	16.6
			V_{max}	3.5 Vdc	1.3	3.4	20.0	16.6
T_{max}	+55	°C	V_{min}	2.5 Vdc	0.0	2.1	20.0	17.9
			V_{max}	3.5 Vdc	0.0	2.1	20.0	17.9

Middle Frequency: 2440 MHz								
T_{nom}	+20	°C	V_{nom}	3.0 Vdc	0.3	2.4	20.0	17.6
T_{min}	-20	°C	V_{min}	2.5 Vdc	0.7	2.8	20.0	17.2
			V_{max}	3.5 Vdc	0.7	2.8	20.0	17.2
T_{max}	+55	°C	V_{min}	2.5 Vdc	-0.4	1.7	20.0	18.3
			V_{max}	3.5 Vdc	-0.4	1.7	20.0	18.3

Highest Frequency: 2480 MHz								
T_{nom}	+20	°C	V_{nom}	3.0 Vdc	-0.3	1.8	20.0	18.2
T_{min}	-20	°C	V_{min}	2.5 Vdc	0.2	2.3	20.0	17.7
			V_{max}	3.5 Vdc	0.2	2.3	20.0	17.7
T_{max}	+55	°C	V_{min}	2.5 Vdc	0.8	2.9	20.0	17.1
			V_{max}	3.5 Vdc	0.8	2.9	20.0	17.1

Measurements Uncertainty: +/-1.7 dB

Note: For radiated power measurements (EIRP), ignore this column and fill in the data directly into the column for EIRP

Section 4 Maximum spectral power density

NAME OF TEST: Maximum spectral power density	Clause 4.3.2
TESTED BY: David Light	DATE: 10 April 2013

Method of Measurement: See EN 300 328 V1.7.1, clause 5.7.3

Test Conditions: Normal only (see clause EN 300 328 [3], clause 5.3):

Antenna gain: 2.1 dBi (see EN 300 328 [3], clause 5.7.3 step 4)
 Power Setting: 0 dBm EIRP Conducted
 Duty Cycle: 100 %
 Rel. Humidity: 40 %
 Temperature 23 °C

Test Equipment Used:	1036-1082-1469
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Test Results

			Measured Frequency (MHz) (see note 1)	Measured Power Density (dBm) (see note 2)	EIRP Density (dBm/MHz)	EIRP Density Limit (dBm/MHz)	Margin (dB)
Lowest Freq:	2402	MHz	2401.96393	-9.4	-7.3	10.0	17.3
Middle Freq:	2440	MHz	2439.96794	-6.1	-4.0	10.0	14.0
Highest Freq:	2480	MHz	2479.93687	-7.0	-4.9	10.0	14.9

Measurement Uncertainty:	+/-1.7	dB			
NOTE 1:	See EN 300 328 [3] clause 5.7.3 step 3.				
Note 2:	For radiated power density measurements (EIRP), ignore this column and fill in the data directly into the column for EIRP density.				

Section 5 Frequency Range

NAME OF TEST: Frequency range	Clause 4.3.3
TESTED BY: David Light	DATE: 10 April 2013

Method of Measurement: See EN 300 328-1 V1.7.1, clause 5.7.4

Test Conditions: Normal only (see clause EN 300 328 [3], clause 5.3):

Antenna gain: 2.1 dBi (see EN 300 328 [3], clause 5.7.3 step 4)
Power Setting: 0 dBm EIRP Conducted
Duty Cycle: 100 %
Rel. Humidity: 40 %
Temperature 23 °C

Test Equipment Used:	1036-1082-1469
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Test Results

Test Conditions:				Frequency Low Measured (MHz)	Frequency Low Limit (MHz)	Margin (MHz)
Lowest Frequency: 2402 MHz						
T_{nom}	°C	V_{nom}	Vdc	2400.480	2400.0	0.480
T_{min}	°C	V_{min}	Vdc	2400.497	2400.0	0.497
		V_{max}	Vdc	2400.472	2400.0	0.472
T_{max}	°C	V_{min}	Vdc	2400.468	2400.0	0.468
		V_{max}	Vdc	2400.477	2400.0	0.477

Highest Frequency: 2480 MHz				Frequency Low Measured (MHz)	Frequency Low Limit (MHz)	Margin (MHz)
T_{nom}	°C	V_{nom}	Vdc	2480.586	2483.5	2.914
T_{min}	°C	V_{min}	Vdc	2480.609	2483.5	2.891
		V_{max}	Vdc	2480.599	2483.5	2.901
T_{max}	°C	V_{min}	Vdc	2480.609	2483.5	2.891
		V_{max}	Vdc	2400.605	2483.5	2.895

Measured lowest and highest frequencies (MHz): f_L : 2400.468 f_H : 2480.609

Measurements Uncertainty: 1×10^{-7} ppm

Section 6 Radiated Transmitter Spurious Emissions

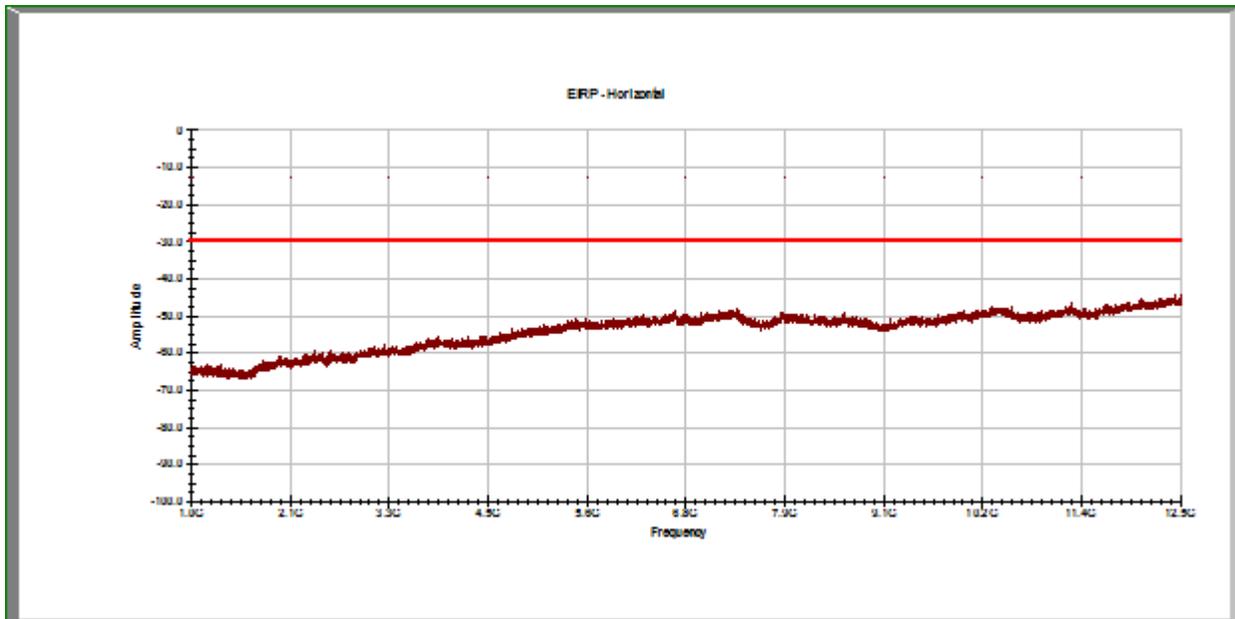
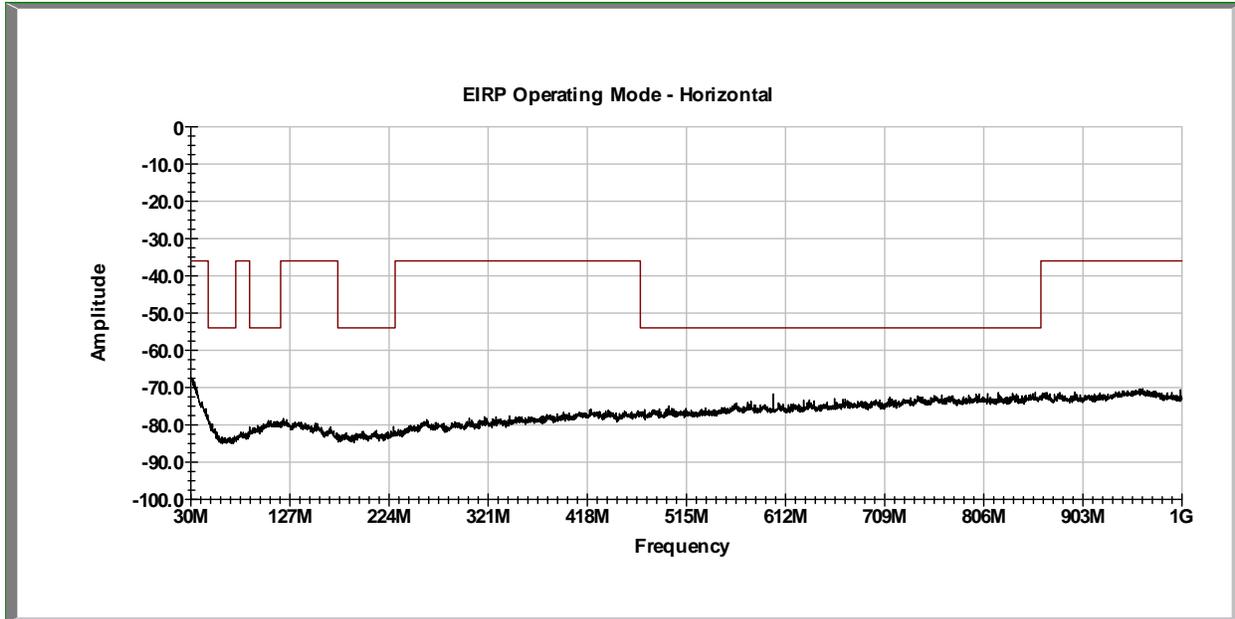
NAME OF TEST: Radiated transmitter spurious emissions	Clause 4.3.6
TESTED BY: David Light	DATE: 11 April 2013

Method of Measurement: See EN 300 328 V1.7.1, clause 5.7.5

Test Results: Complies. Refer to following pages

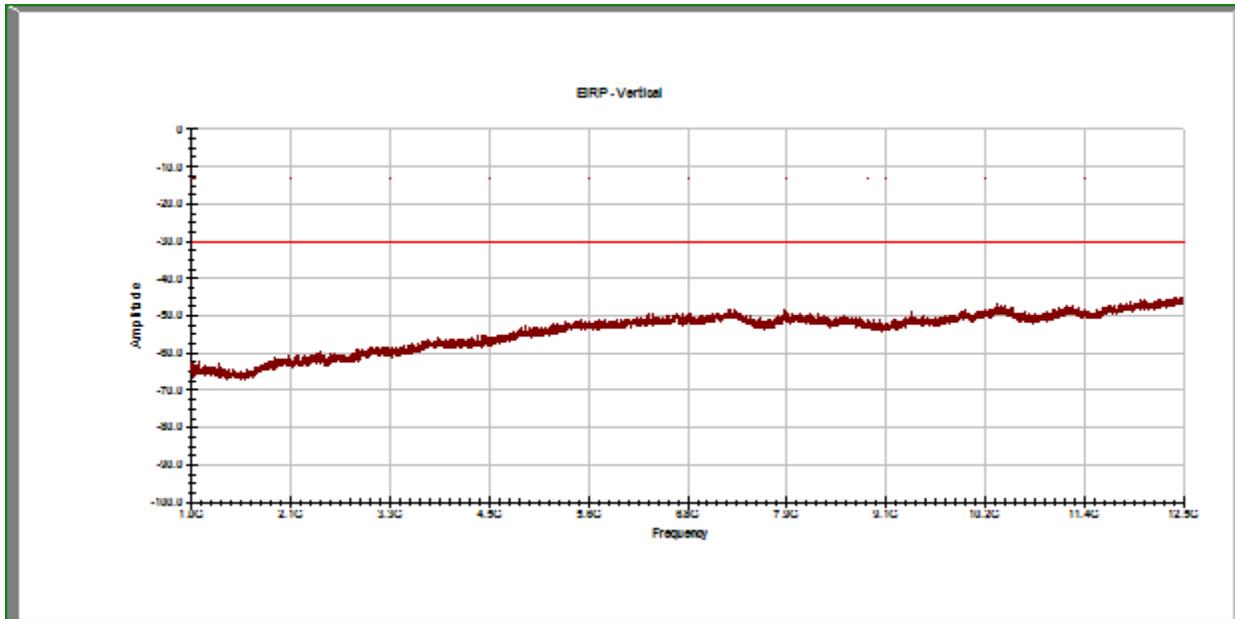
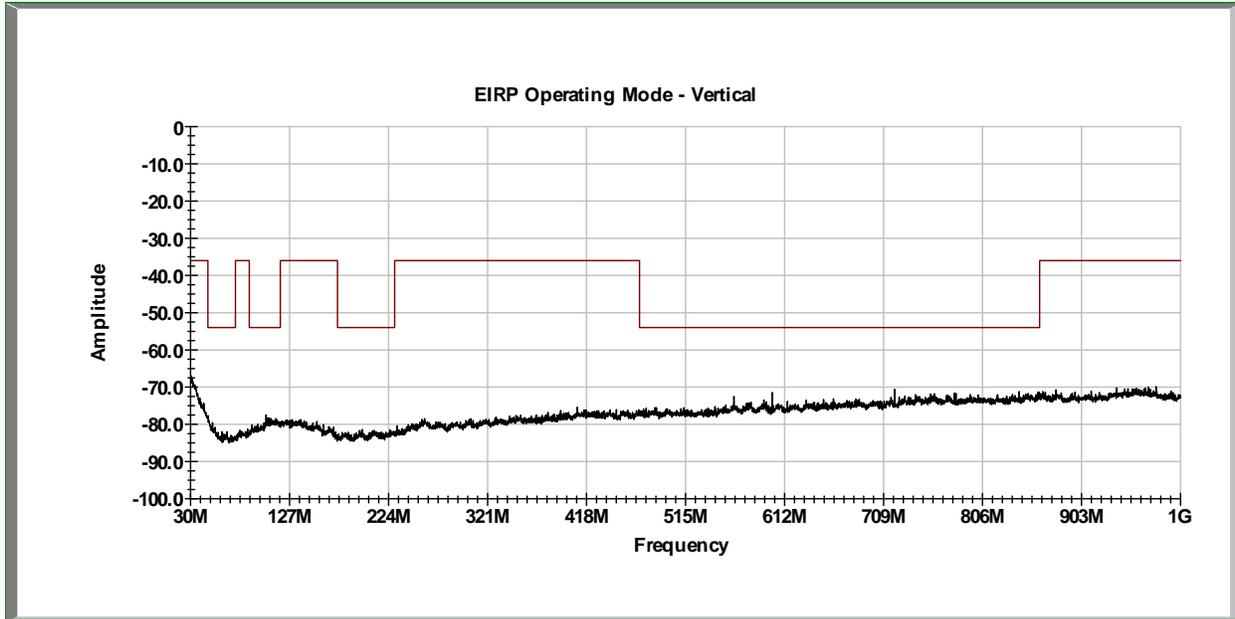
Test Equipment Used:	1763-1767-1783-1785-1304-1480
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Test Results



Carrier filtered.

Test Results



Section 7 Radiated receiver spurious emissions

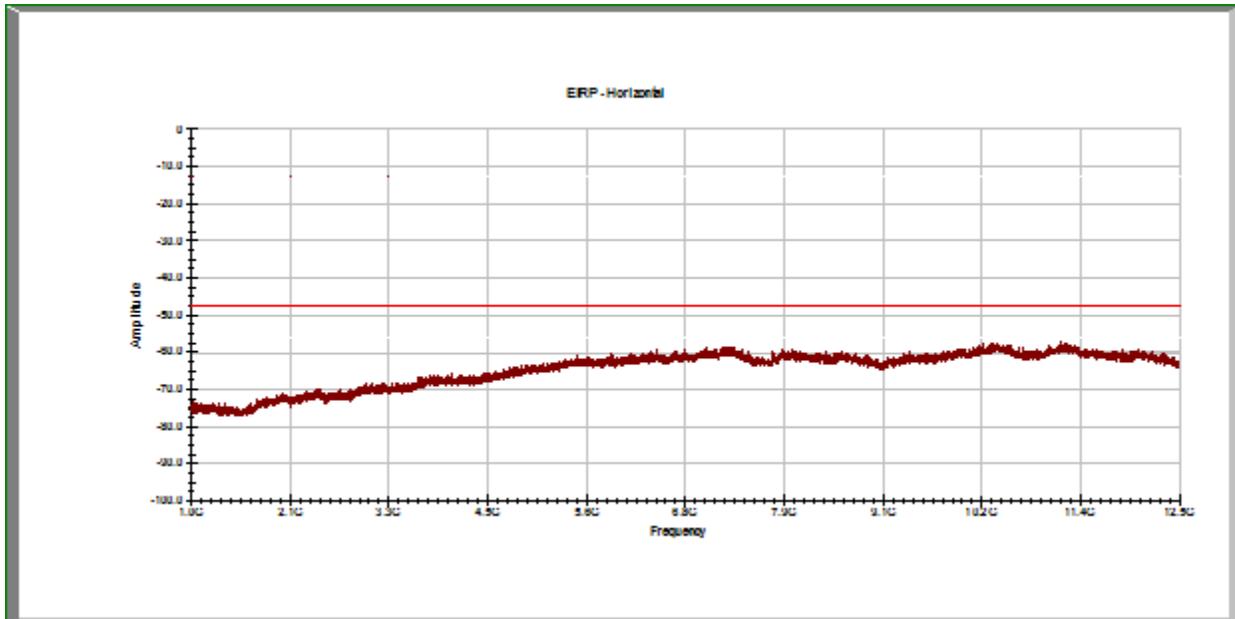
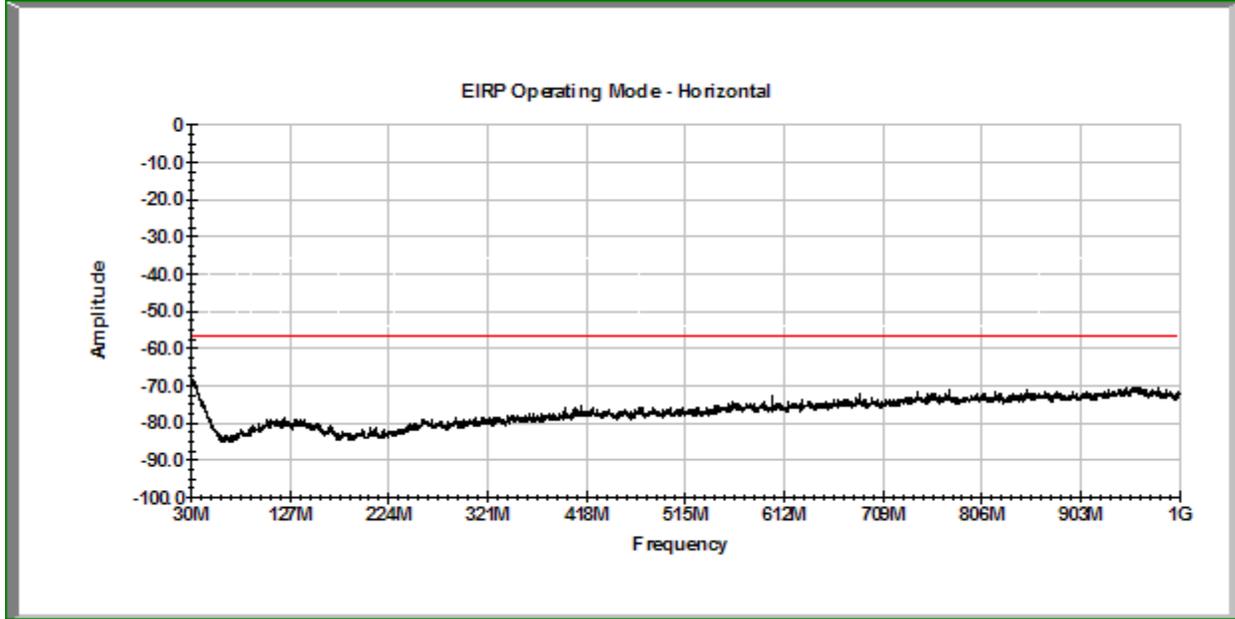
NAME OF TEST: Radiated receiver spurious emissions	Clause 4.3.7
TESTED BY: David Light	DATE: 11 April 2013

Method of Measurement: EN 300 328, clause 5.7.6

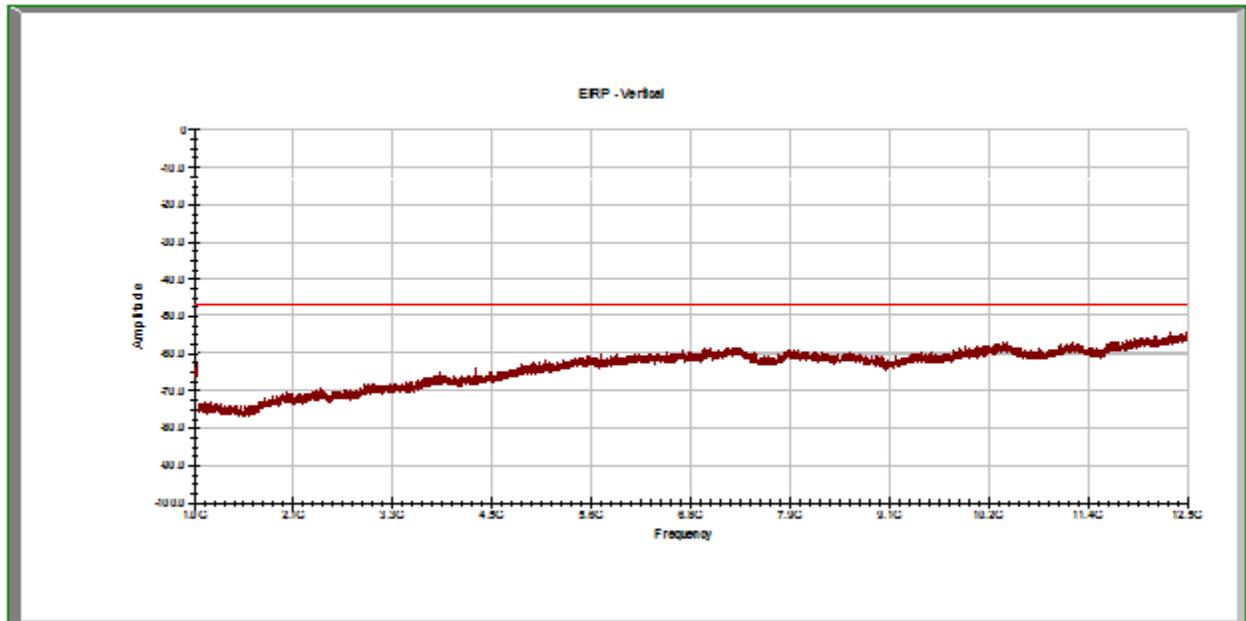
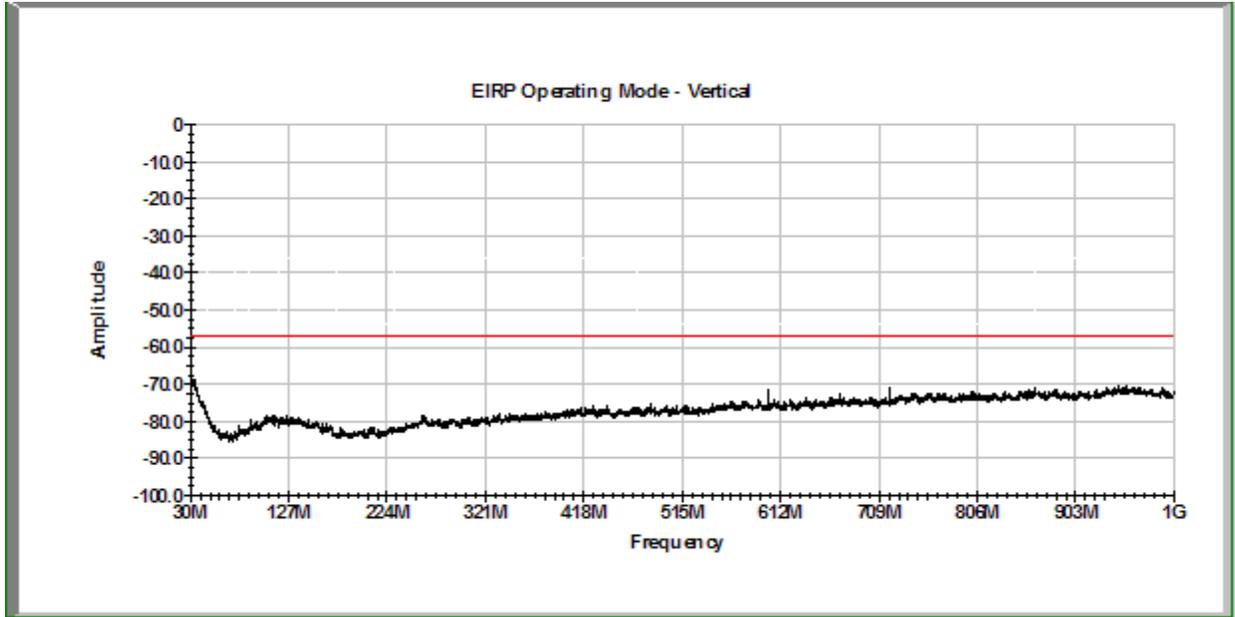
Test Results: Complies. Refer to following pages

Test Equipment Used:	1763-1767-1783-1785-1304-1480
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Test Results



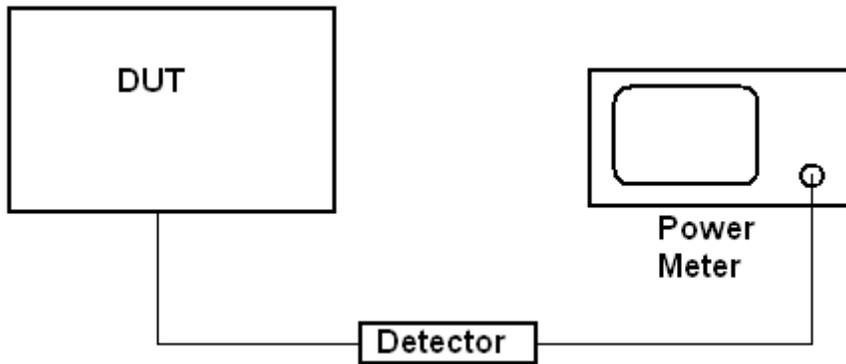
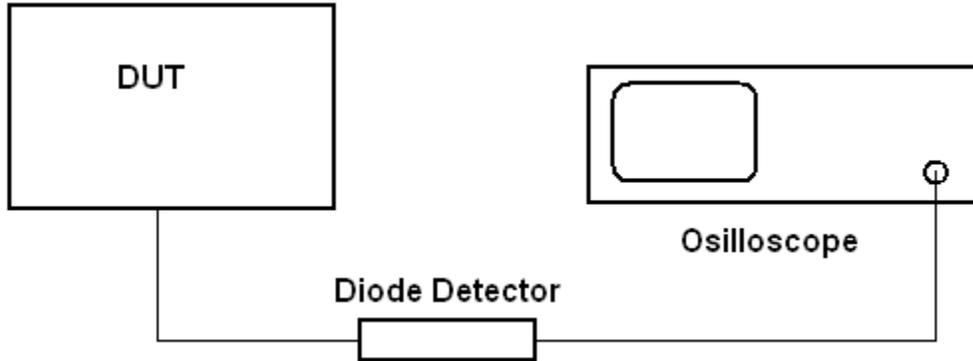
Test Results



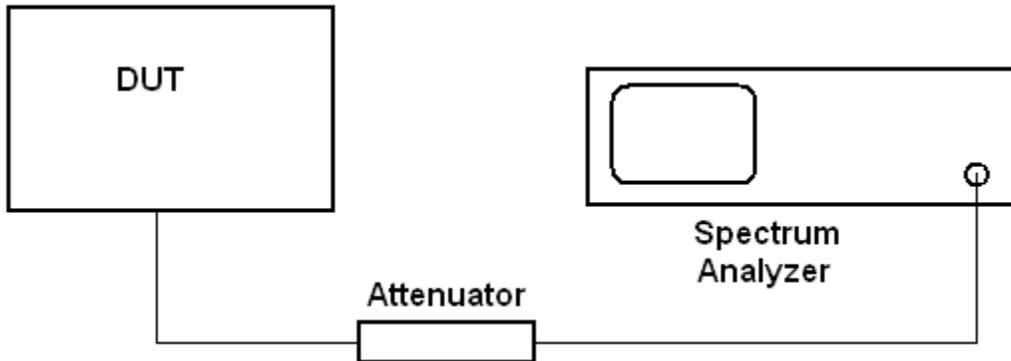
ANNEX A

Test Setups

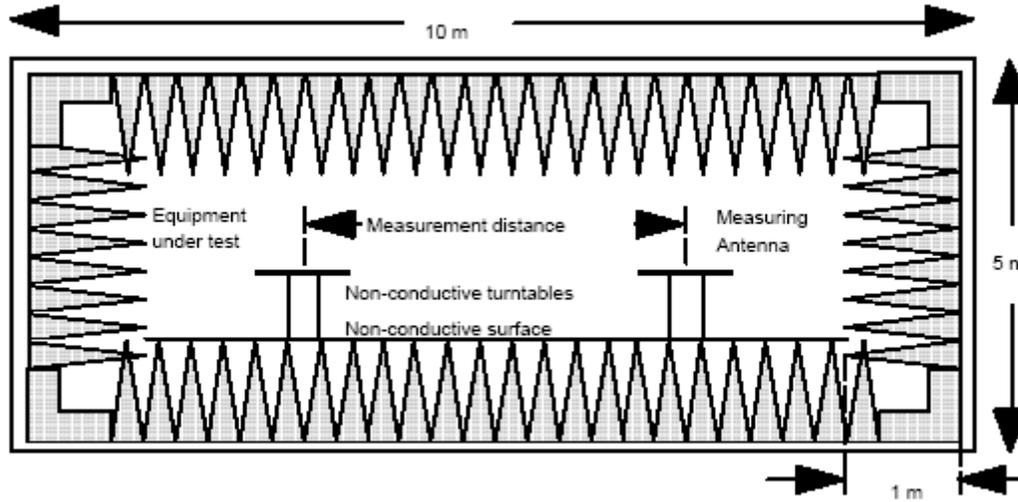
Equivalent isotropically radiated power



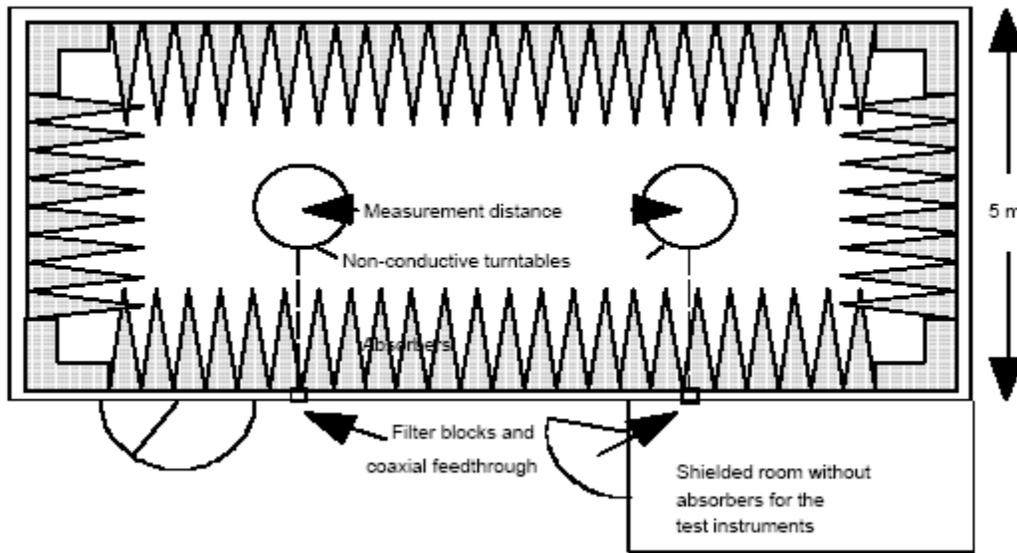
Maximum e.i.r.p. spectral
Frequency range
Hopping requirements
Conducted spurious emissions



Radiated measurements



Ground plan



ANNEX B

Photographs of DUT

Front



Rear



ANNEX C**Test Equipment**

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	23-Dec-2011	23-Dec-2013
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1304	Antenna, Horn	Electro Metrics	RGA-60	6151	24-Nov-2010	24-Nov-2012
1469	Attenuator, 10 db, DC 18 Ghz	MCL Inc.	BW-S10W2 10db-2WDC		N/R	
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	07-Mar-2013	07-Mar-2014
1767	Receiver, EMI Test 20Hz - 26.5 GHz - 150 - +30 dBm LCD	Rohde & Schwartz	ESIB26	837491/0002	19-Dec-2012	19-Dec-2013
1783	Cable Assy, 3m Chamber	Nemko	Chamber		26-Sep-2012	26-Sep-2013
1785	Preamplifier	A.H. Systems	PAM-0126	143	09-Jan-2013	09-Jan-2014