



**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

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

**APPROVED BY:** \_\_\_\_\_  
Tom Tidwell, Reviewer

**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".



NVLAP Lab Code 100426-0

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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

<b>Test Equipment:</b>	1036-1082-1469
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## Test Results

Test Conditions:					Measured Power (dBm) (see note)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)
<b>Lowest Frequency: 2402 MHz</b>								
$T_{nom}$	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

<b>Middle Frequency: 2440 MHz</b>								
$T_{nom}$	+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

<b>Highest Frequency: 2480 MHz</b>								
$T_{nom}$	+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

<b>Test Equipment Used:</b>	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

<b>Test Equipment Used:</b>	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 <sub>nom</sub>	°C	V <sub>nom</sub>	Vdc	2400.480	2400.0	0.480
		V <sub>min</sub>	Vdc	2400.497	2400.0	0.497
T <sub>min</sub>	°C	V <sub>max</sub>	Vdc	2400.472	2400.0	0.472
		V <sub>min</sub>	Vdc	2400.468	2400.0	0.468
T <sub>max</sub>	°C	V <sub>min</sub>	Vdc	2400.468	2400.0	0.468
		V <sub>max</sub>	Vdc	2400.477	2400.0	0.477

Highest Frequency: 2480 MHz				Frequency Low Measured (MHz)	Frequency Low Limit (MHz)	Margin (MHz)
T <sub>nom</sub>	°C	V <sub>nom</sub>	Vdc	2480.586	2483.5	2.914
		V <sub>min</sub>	Vdc	2480.609	2483.5	2.891
T <sub>min</sub>	°C	V <sub>max</sub>	Vdc	2480.599	2483.5	2.901
		V <sub>min</sub>	Vdc	2480.609	2483.5	2.891
T <sub>max</sub>	°C	V <sub>min</sub>	Vdc	2480.609	2483.5	2.891
		V <sub>max</sub>	Vdc	2400.605	2483.5	2.895

Measured lowest and highest frequencies (MHz):				f <sub>l</sub> : 2400.468	f <sub>h</sub> : 2480.609
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Measurements Uncertainty:  $1 \times 10^{-7}$  ppm

## **Section 6 Radiated Transmitter Spurious Emissions**

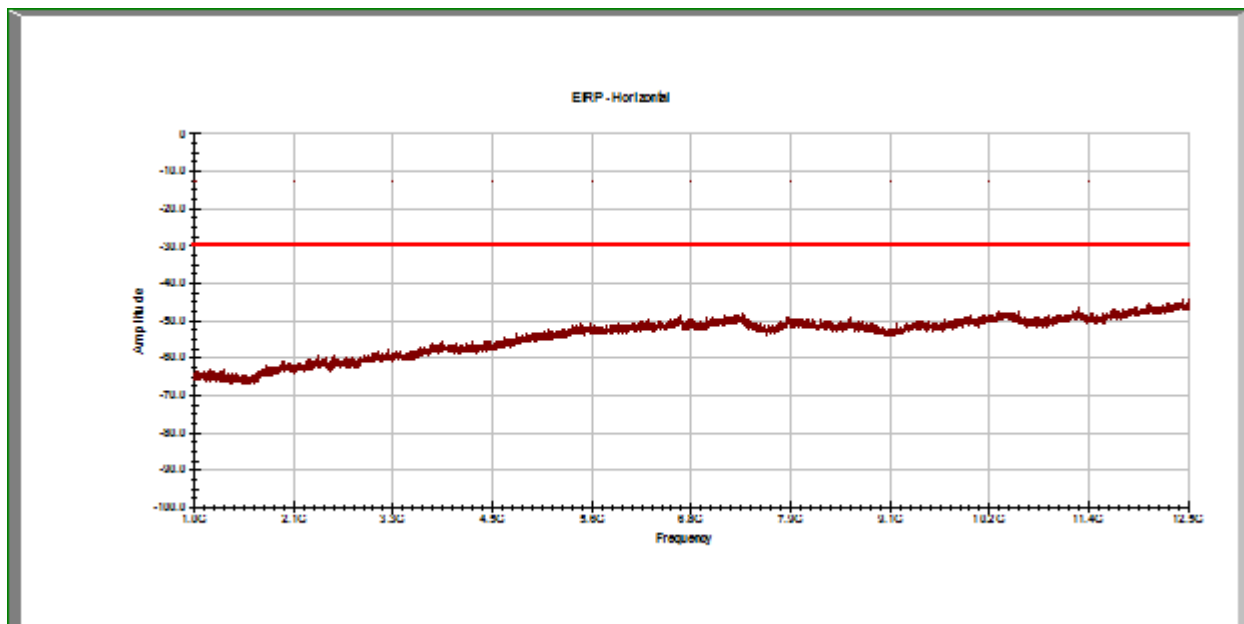
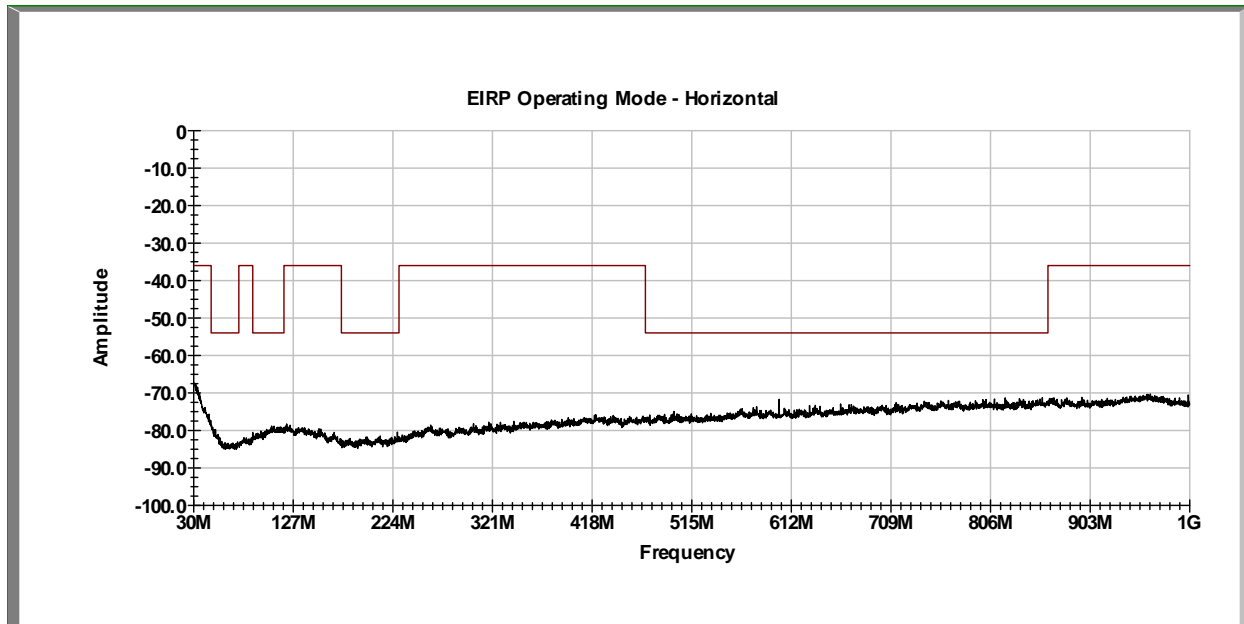
NAME OF TEST: Radiated transmitter spurious emissions	Clause 4.3.6
TESTED BY: David Light	DATE: 11 April 2013

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

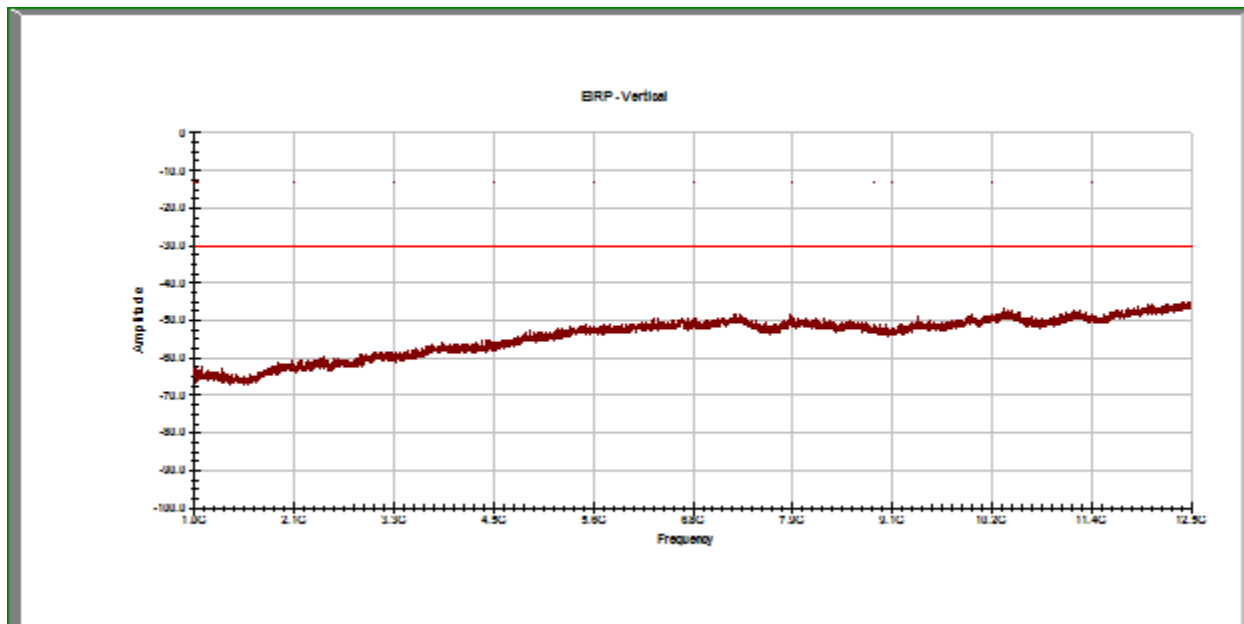
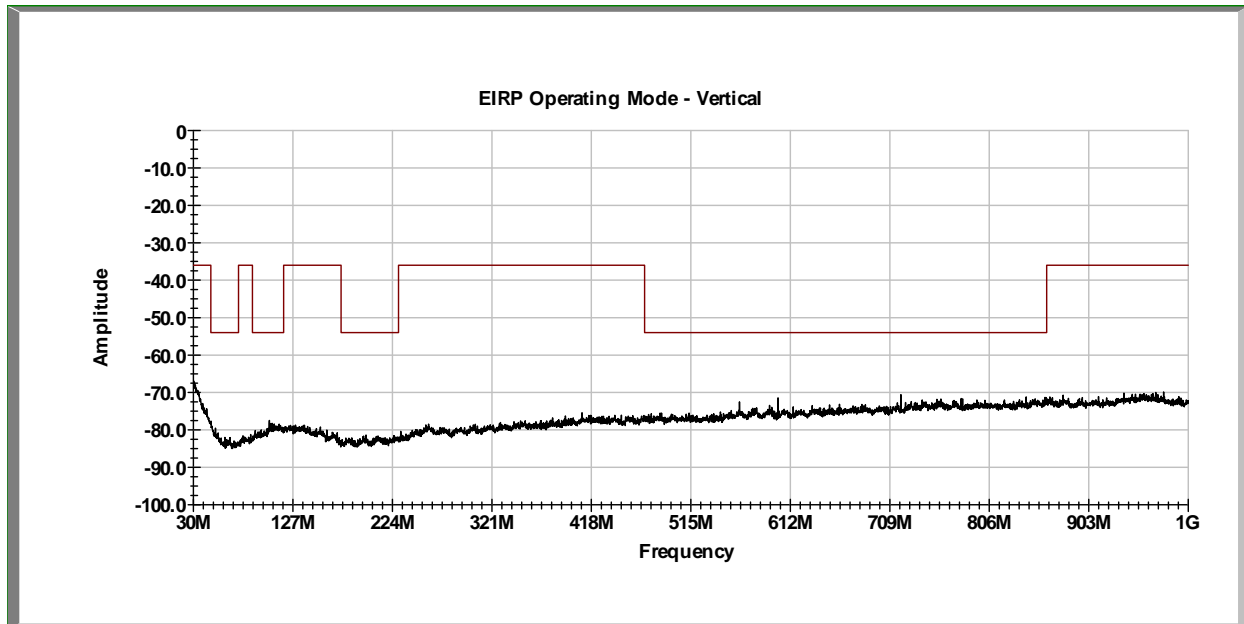
**Test Results:** Complies. Refer to following pages

<b>Test Equipment Used:</b>	1763-1767-1783-1785-1304-1480
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## Test Results



Carrier filtered.

**Test Results**

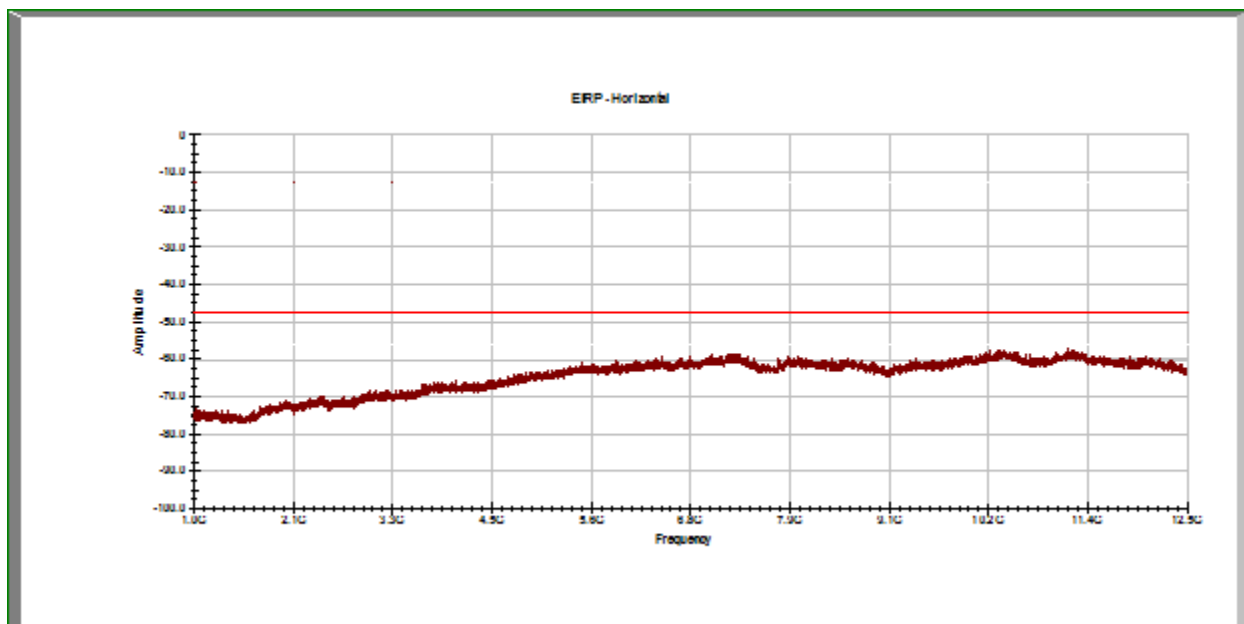
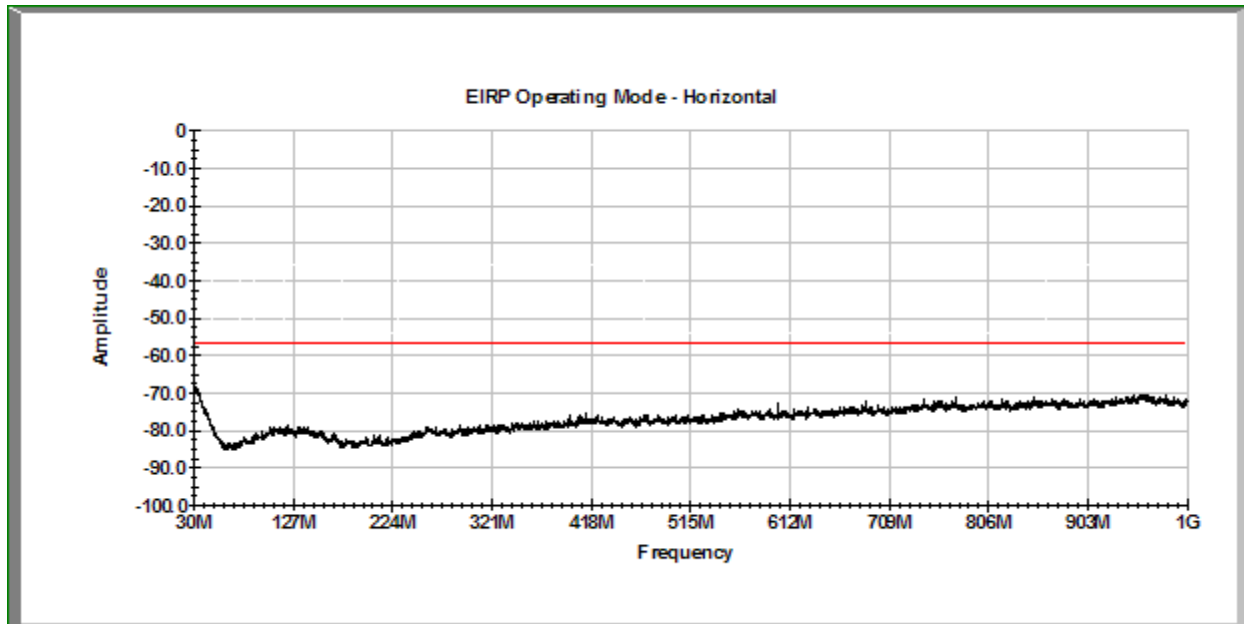
## **Section 7 Radiated receiver spurious emissions**

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

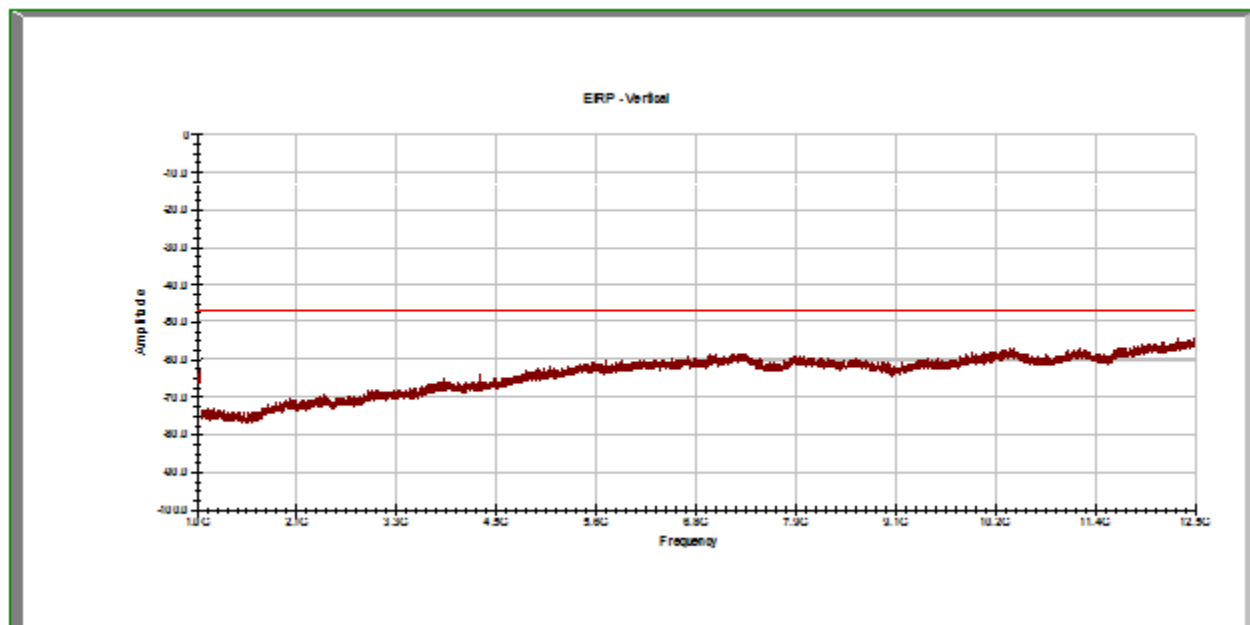
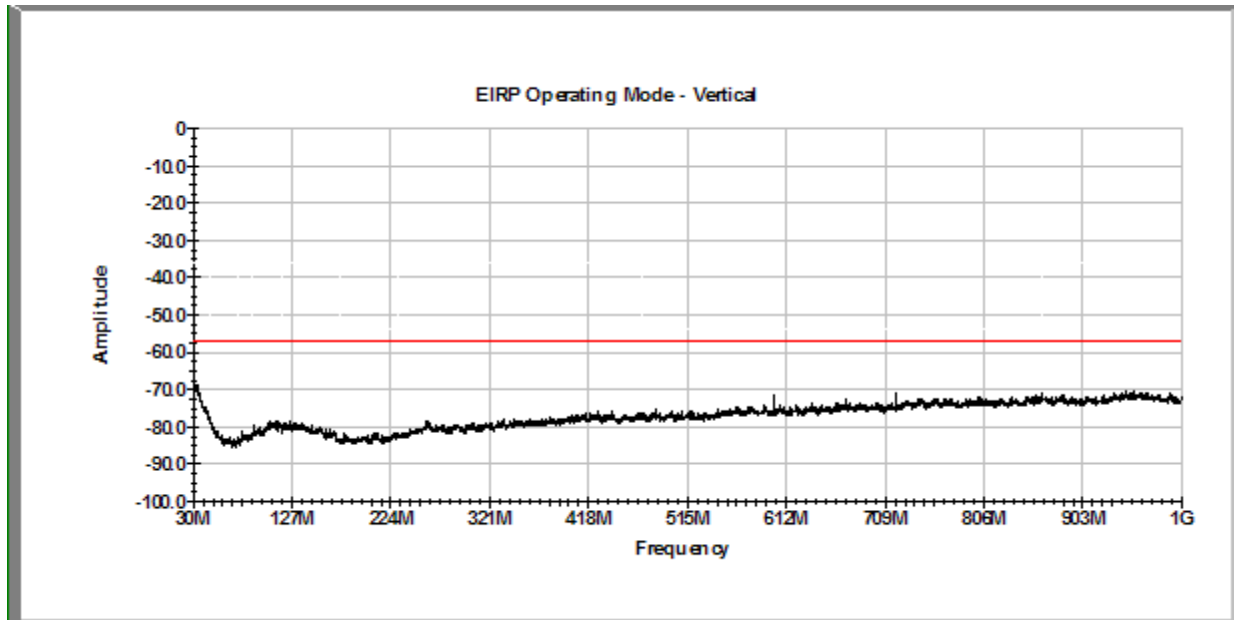
**Method of Measurement:** EN 300 328, clause 5.7.6

**Test Results:** Complies. Refer to following pages

<b>Test Equipment Used:</b>	1763-1767-1783-1785-1304-1480
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**Test Results**

## Test Results

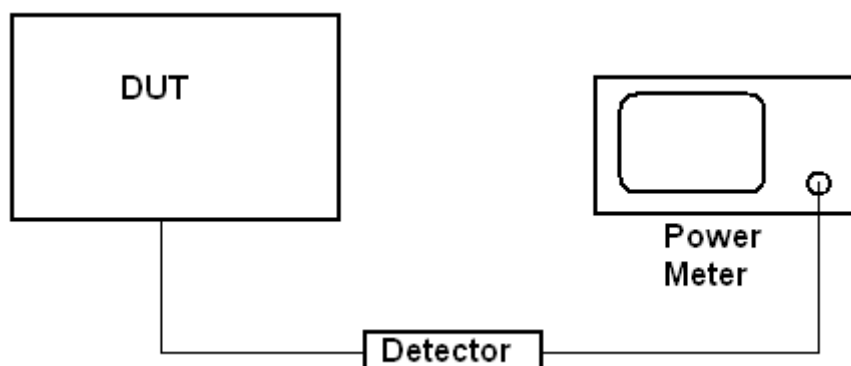
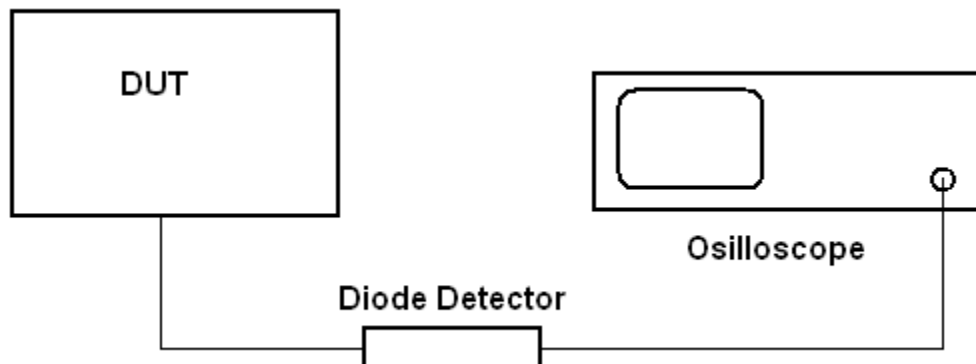


## **ANNEX A**

### **Test Setups**



**Equivalent isotropically radiated power**

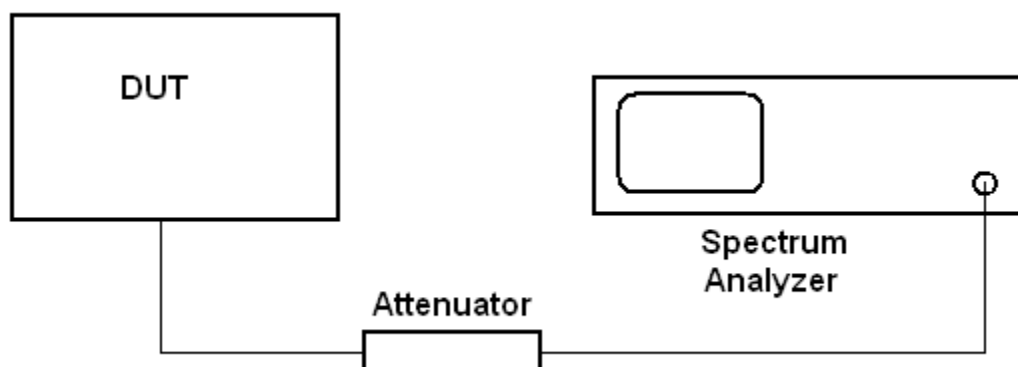


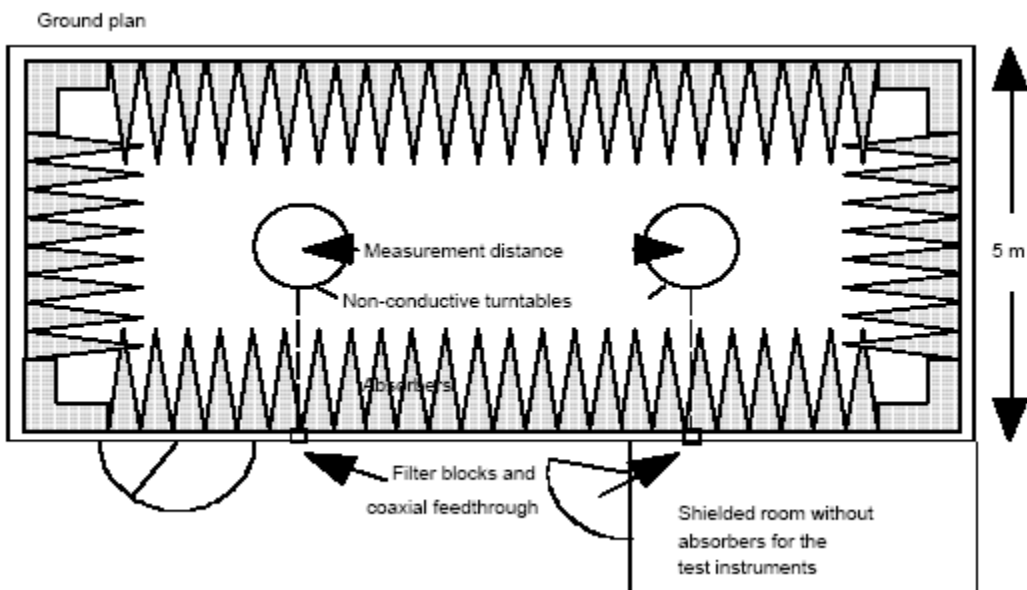
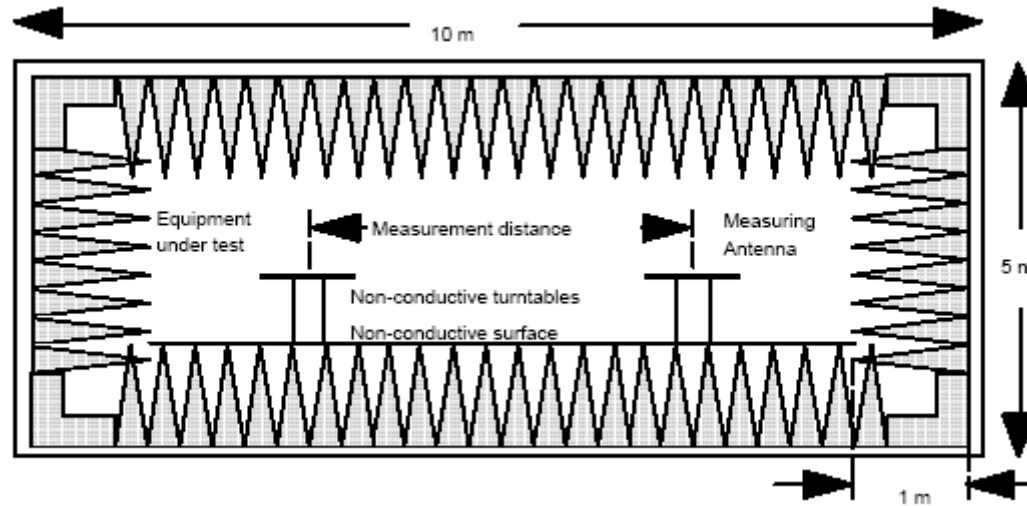
Maximum e.i.r.p. spectral

Frequency range

Hopping requirements

Conducted spurious emissions



**Radiated measurements**

## **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