

Application for FCC Certificate
On Behalf of
Hisense Electric Co., Ltd.

LED LCD TV

Model No.	Brand
LTDN55XT710XWUS3D	Hisense
55T710DW	

FCC ID : W9HLCDF0010

Prepared For : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy & Technology
Development Zone, Qingdao, China

Prepared By : Audix Technology (Shanghai) Co., Ltd.
3F and 4F, 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai 200233, China

Tel : +86-21-64955500

Fax : +86-21-64955491

Report No. : ACI-F12187
Date of Test : Nov 14, 2012
Date of Report : Nov 21, 2012

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TEST REPORT FOR FCC CERTIFICATION

Applicant : Hisense Electric Co., Ltd.
 Manufacturer : Hisense Electric Co., Ltd..
 EUT Description : LED LCD TV

Model No.	Brand	Power Supply
LTDN55XT710XWUS3D	Hisense	120V/60Hz
55T710DW		

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011
AND ANSI C63.4:2003*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits radiated emission.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report shows that the EUT (M/N: Refer to Sec2.1; S/N: Refer to Sec2.1), which was tested in 3m anechoic chamber on Nov 14, 2012 to be technically compliant with the FCC official limits also.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report contains data that are not covered by the NVLAP accreditation.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government by the client.

Date of Test : Nov 14, 2012 Date of Report : Nov 21, 2012

Producer : Yenny Yu.
YENNY YU / Assistant

Review : Dio Yang.
DIO YANG / Assistant Manager

AUDIX[®] For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : Sandy Chen
Authorized Signature EMC SAMMY CHEN / Deputy Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Meets Limit	Results
Conducted Emission at the Mains Terminal	FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011 AND ANSI C63.4:2003	15.207	N/A
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011 AND ANSI C63.4:2003	15.209	Pass
Fundamental and Harmonics Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011 AND ANSI C63.4:2003	15.249	Pass
Band-Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C OCTOBER 2011 AND ANSI C63.4:2003	15.249	Pass
N/A is an abbreviation for Not Applicable.			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : LED LCD TV

Type of EUT : Production Pre-product Pro-type

Model No.	Brand
LTDN55XT710XWUS3D	Hisense
55T710DW	

Note : The above models are all the same except for the different model name.
The LTDN50K316XWUS3D was tested and reported in the report.

Applicant : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China

Manufacturer : Hisense Electric Co., Ltd.
No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China

Modulation : MSK 500kbps

Operation Frequency : 2458 MHz

Frequency Channel : Total 1 Channel

Tested Frequency : 2458 MHz

Antenna Location : Top of the RF module
Please see Figure 21 in APPENDIX III
“Photographs of EUT” for further information.

Antenna Type : Internal permanently attached antenna

2.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber)	:	Sept. 17, 1998 file on Mar 16, 2012 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	:	Audix Technology (Shanghai) Co., Ltd.
Site Location	:	3F 34Bldg 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai 200233, China
FCC registration Number	:	91789
Accredited by NVLAP, Lab Code	:	200371-0

2.3 Measurement Uncertainty

Radiated Emission Expanded Uncertainty (30-200MHz):	U = 4.14 dB (Horizontal) U = 4.28 dB (Vertical)
Radiated Emission Expanded Uncertainty (200M-1GHz):	U = 4.18 dB (Horizontal) U = 4.26 dB (Vertical)
Radiated Emission Expanded Uncertainty (Above 1GHz):	U = 4.50 dB (Horizontal) U = 4.16 dB (Vertical)

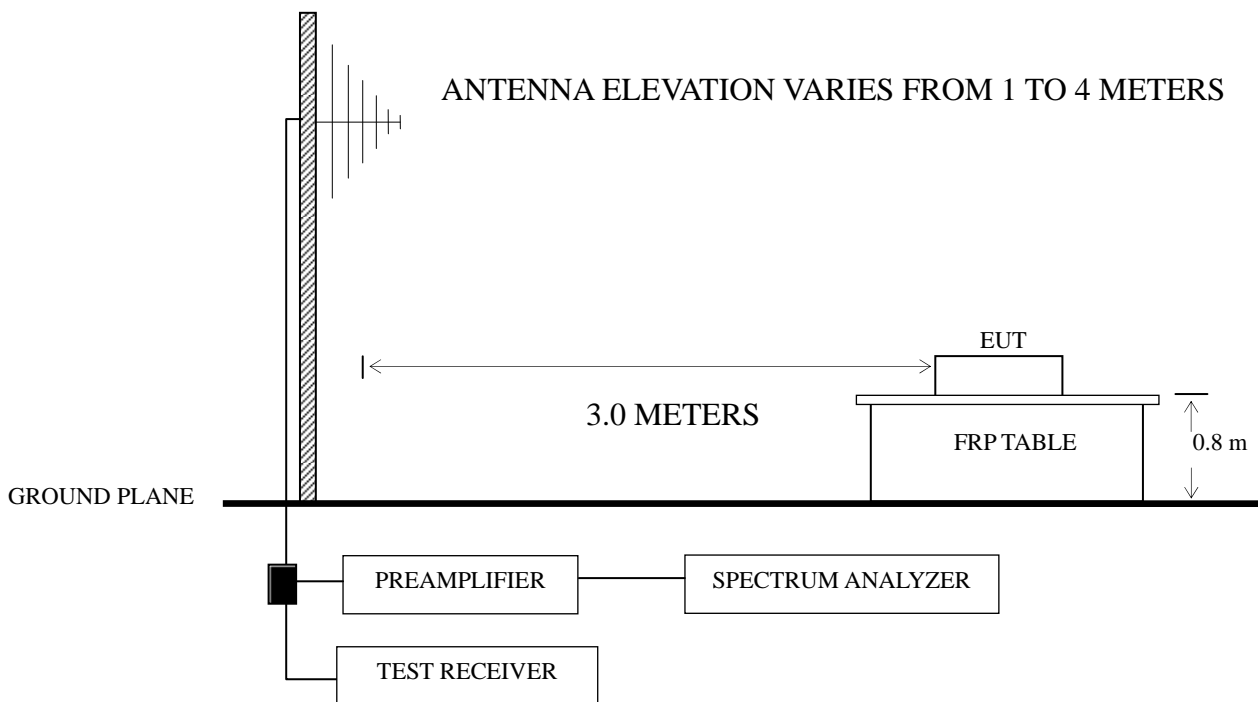
3 RADIATED EMISSION TEST

3.1 Test Equipment

The following test equipments are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2012	Mar 22, 2013
2.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 03, 2012	May 03, 2013
3.	Horn Antenna	EMCO	3115	9607-4878	May 06, 2012	May 06, 2013
4.	Horn Antenna	EMCO	3116	00062643	Jul 21, 2012	Jul 21, 2013
5.	Test Receiver	R&S	ESVS10	844594/001	Mar 22, 2012	Mar 22, 2013
6.	Preamplifier	HP	8447D	2944A10548	Sep 18, 2012	Mar 18, 2013
7.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2012	Apr 29, 2013
8.	50 Coaxial Switch	Anritsu	MP59B	6200426390	Sep 18, 2012	Mar 18, 2013
9.	Software	Audix	E3	SET00200 9912M295-2	--	--

3.2 Block Diagram of Test Setup



■ : 50 ohm Coaxial Switch

3.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]

Frequency (MHz)	Distance (m)	Field strength limits ($\mu\text{V/m}$)	
		($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = 20 lg Emission Level ($\mu\text{V/m}$)
 NOTE 2 - The tighter limit applies at the band edges.
 NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.
 NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

3.4 Test Configuration

The EUT was installed as show on Sec. 3.2 in radiated emission test to meet FCC requirement and operating in a manner, which tend to maximize emission level in a normal application.

3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipment.
- 3.5.3 Set the EUT on the test mode (Transmitting) and then test.

3.6 Test Procedures

The EUT was placed on a FRP turntable that is 0.8 meter above ground. The FRP turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Broadband antenna (Calibrated Bilog Antenna) and horn antenna was used as receiving antenna. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.4:2003 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz for frequency range from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent E7405A.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

The test mode (Transmitting) was done on radiated emission test.

Please refer to Sec.3.7.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)

NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss

- Preamp Factor (>1GHz)

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The emission levels which not reported are too low against the official limit.

NOTE 5 – All reading are Quasi-Peak values below or equal to 1GHz and Peak values and Average values above 1GHz. For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

EUT : LED LCD TV Temperature : 21

Model No. : LTDN55XT710XWUS3D Humidity : 51%RH

Test Mode : Transmitting 2458 MHz Date of Test : Nov. 14, 2012

Polarization	Frequency (MHz)	Read Level dB (μ V)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Cable Loss (dB)	Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	75.590	19.17	6.54	--	1.01	26.72	40.00	13.28	QP
	252.130	27.99	12.17	--	2.22	42.38	46.00	3.62	
	281.230	19.27	12.43	--	2.40	34.10	46.00	11.90	
	376.290	16.08	15.00	--	2.66	33.74	46.00	12.26	
	499.480	21.33	18.10	--	2.98	42.41	46.00	3.59	
	749.740	19.75	18.80	--	3.58	42.13	46.00	3.87	
	2720.00	46.10	30.67	35.99	5.74	46.52	74.00	27.48	PK
	4660.00	39.66	34.74	35.39	7.97	46.98	74.00	27.02	
	7201.00	47.30	37.64	34.73	9.83	60.04	74.00	13.96	
	9290.00	45.86	39.50	34.91	12.28	62.73	74.00	11.27	AV
	7201.00	29.13	37.64	34.73	9.83	41.87	54.00	12.13	
9290.00	26.62	39.50	34.91	12.28	43.49	54.00	10.51		
Vertical	31.940	18.45	16.50	--	0.68	35.63	40.00	4.37	QP
	145.430	22.03	10.28	--	1.62	33.93	43.50	9.57	
	204.6	24.58	7.87	--	1.97	34.42	43.50	9.08	
	252.130	30.24	12.17	--	2.22	44.63	46.00	1.37	
	499.480	19.19	18.10	--	2.98	40.27	46.00	5.73	
	750.00	21.80	18.80	--	3.58	44.18	46.00	1.82	
	2595.00	47.80	30.05	36.03	5.60	47.42	74.00	26.58	PK
	4324.00	45.96	33.64	35.55	8.64	52.69	74.00	21.31	
	6700.00	45.78	37.03	34.76	9.57	57.62	74.00	16.38	
	9333.00	43.09	39.50	34.92	12.42	60.09	74.00	13.91	AV
	6700.00	26.77	37.03	34.76	9.57	38.61	54.00	15.39	
9333.00	24.30	39.50	34.92	12.42	41.30	54.00	12.70		

TEST ENGINEER: RAVEN JIN

4 FUNDAMENTAL AND HARMONICS EMISSIONS TEST

4.1 Test Equipment

The following test equipments are used during the fundamental and spurious emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2012	Apr 29, 2013
2.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2012	Mar 22, 2013
3.	Horn Antenna	EMCO	3115	9607-4878	May 06, 2012	May 06, 2013
4.	Horn Antenna	EMCO	3116	00062643	Jul 21, 2012	Jul 21, 2013

4.2 Block Diagram of Test Setup

Same as Sec 3.2

4.3 Fundamental and Harmonics Emission Limit [FCC Part 15 Subpart C 15.249(a)]

Fundamental Frequency (MHz)	Distance (m)	Field Strength of Fundamental		Field Strength of Harmonics	
		(millivolts/meter)	dB ($\mu\text{V}/\text{m}$)	(microvolts/meter)	dB ($\mu\text{V}/\text{m}$)
2400 ~ 2483.5	3	50	94	500	54

NOTE 1 - Emission Level dB ($\mu\text{V}/\text{m}$) = 20 lg Emission Level ($\mu\text{V}/\text{m}$)
 NOTE 2 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 NOTE 3 - The limits shown are based on Average value detector.
 NOTE 4 - The limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

4.4 Test Configuration

The EUT was installed as show on Sec. 3.2 in fundamental and spurious emission test to meet ANSI C63.4:2003 requirements and operating in a manner that tend to maximize emission level in a normal application.

4.5 Operating Condition of EUT

- 4.5.1 Setup the EUT as shown in Sec. 3.2.
- 4.5.2 Turn on the power of all equipment.
- 4.5.3 Set the EUT on the test mode (Transmitting) and then test.

4.6 Test Procedures

The EUT was placed on a FRP turntable that is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to FCC PART 15 Subpart C and ANSI C63.4:2003 requirements during fundamental and harmonics emission test.

The frequency range from 2.4 GHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

The test mode (Transmitting) was done on Fundamental and Harmonics Emission test.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

NOTE 1 - All readings are Peak values.

NOTE 2 - The harmonics emission levels which not reported are too low against the official limit.

NOTE 3 - PK Level = Read Level + Factor

AV Level = PK Level – Correction Factor.

NOTE 4 - Factor = Antenna Factor + Cable Loss - Preamp Factor

NOTE 5 - Correction factor is measured as follows:

Duty Cycle $x = \text{Tx on} / (\text{Tx on} + \text{Tx off}) = 0.9691 / 16.76 = 0.0578$
Correction Factor = $ 20\log(\text{Duty Cycle}) = 24.76 \text{ dB}$

NOTE 6 - The duty cycle was calculated according to the plot in Appendix I

EUT : LED LCD TV Temperature : 21

Model No. : LTDN55XT710XWUS3D Humidity : 51% RH

Test Mode Transmitting 2458 MHz Date of Test : Nov. 14, 2012

Polarization	Frequency (MHz)	Read Level dB (μV)	Factor (dB/m)	Correction factor (dB)	Level dB ($\mu\text{V/m}$)	Limits dB ($\mu\text{V/m}$)	Margin (dB)	Remark
Horizontal	2458.00	90.33	0.37	--	90.70	114.00	23.30	PK
	4916.00	44.45	10.30	--	54.75	74.00	19.25	
	7374.00	46.17	13.44	--	59.61	74.00	14.39	
	9832.00	43.09	16.99	--	60.08	74.00	13.92	
	2458.00	--	--	24.76	65.94	94.00	28.06	AV
	4916.00	--	--	24.76	29.99	54.00	24.01	
	7374.00	--	--	24.76	34.85	54.00	19.15	
	9832.00	--	--	24.76	35.32	54.00	18.68	
Vertical	2458.00	93.36	0.34	--	93.70	114.00	20.30	PK
	4916.00	45.68	10.48	--	56.16	74.00	17.84	
	7374.00	45.88	13.29	--	59.17	74.00	14.83	
	9832.00	45.66	16.89	--	62.55	74.00	11.45	
	2458.00	--	--	24.76	68.94	94.00	25.06	AV
	4916.00	--	--	24.76	31.40	54.00	22.60	
	7374.00	--	--	24.76	34.41	54.00	19.59	
	9832.00	--	--	24.76	37.79	54.00	16.21	

TEST ENGINEER: RAVEN JIN

5 BAND-EDGE MEASUREMENT

5.1 Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY45106600	Mar 22, 2012	Mar 22, 2013
2.	Horn Antenna	EMCO	3115	9607-4878	May 06, 2012	May 06, 2013
3.	Preamplifier	HP	8449B	3008A00864	Apr 29, 2012	Apr 29, 2013
4.	Software	Audix	E3	SET00200 9912M295-2	--	--

5.2 Band-Edge Limit [FCC Part 15 Subpart C 15.249(d)]

Emissions radiated outside of the specified frequency bands, except for harmonic, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 whichever is the lesser attenuation.

For peak value, The RBW of Spectrum Analyzer Agilent E7405A was set at 1MHz and the VBW was set at 3MHz.

5.3 Test Results

<PASS>

Peak limit = 74.00 dBuV/m

Average limit = 54.00 dBuV/m

HORIZONTAL

Peak value @ 2390MHz = 43.11 dBuV/m

Average value @ 2390MHz = Peak value - Correction Factor
= 43.11 dBuV/m - 24.76 dB
= 18.35 dBuV/m

Peak value @ 2483.5MHz = 46.34 dBuV/m

Average value @ 2483.5MHz = Peak value - Correction Factor
= 46.34 dBuV/m - 24.76 dB
= 21.58 dBuV/m

VERTICAL

Peak value @ 2390MHz = 45.99 dBuV/m

Average value @ 2390MHz = Peak value - Correction Factor
= 45.99 dBuV/m - 24.76 dB
= 21.23 dBuV/m

Peak value @ 2483.5MHz = 47.65 dBuV/m

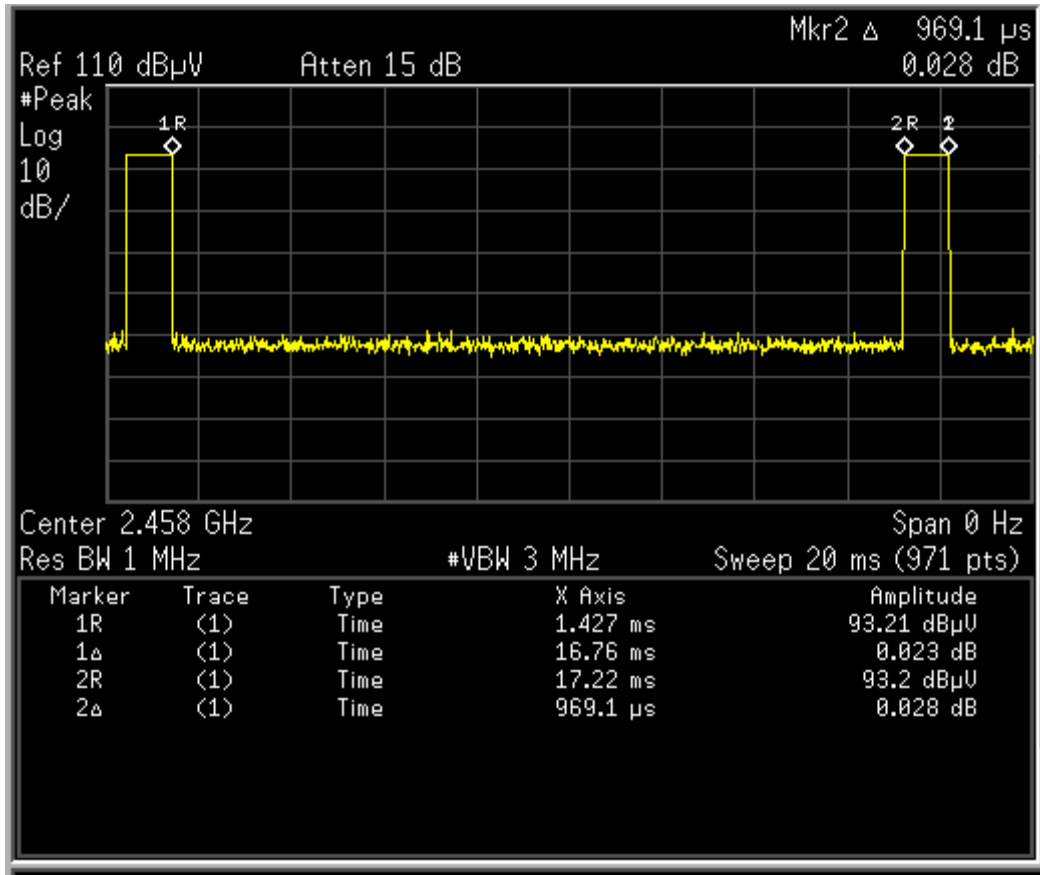
Average value @ 2483.5MHz = Peak value - Correction Factor
= 47.65 dBuV/m - 24.76 dB
= 22.89 dBuV/m

6 DEVIATION TO TEST SPECIFICATIONS

None.

APPENDIX I

PLOT OF DUTY CYCLE



DUTY CYCLE