SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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FCC TEST REPORT

Application No. :	SHEM1304000615RF
Applicant:	Philips Electronics (Suzhou) Co.,Ltd
	209 ZhuYuan Road, Building B-3rd, 19~21 floor, Suzhou new district, Suzhou
FCC ID:	ZQ8RC305B
Equipment Under Test (EUT):	
EUT Name:	Remote Control
Brand Name:	Not supplied by the client
Model No:	RC3053702/01BR
Remark:	Final customer Model No. is DIRECTV RC71
Standards:	CFR 47 FCC PART 15 SUBPART C, Section 15.249,
	ANSI C63.10: 2009
Date of Receipt:	Apr.18, 2013
Date of Test:	Apr.24, 2013 to Apr.25, 2013
Date of Issue:	Apr.26, 2013
Test Result :	**PASS ***

* In the configuration tested, the EUT complied with the standards specified abov

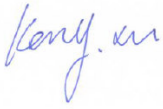
Tony Wu

E&E Section Manager

SGS-CSTC (Shanghai) Co., Ltd.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	Apr.26, 2013	/	Original

Authorized for issue by:				
Engineer		Zenger Zhang **Print Name**		
Clerk		Amy Wang **Print Name**		
Reviewer		Keny Xu **Print Name**		

3 Test Summary

Test	Standard Paragraph	Result
Antenna requirement	Section 15.203	PASS
Flied Strength of Fundamental	Section 15.249 (a)	PASS
Flied Strength of Unwanted Emissions	Section 15.209 & Section 15.249	PASS
20dB Occupied Bandwidth	Section 15.215 (c)	PASS
Band Edge	Section 15.249 (a) & 15.205(c)	PASS
99% Occupied Bandwidth	RSS-Gen section 4.6.1	PASS

4 Contents

5 General Information

5.1 Client Information

Applicant:	Philips Electronics (Suzhou) Co.,Ltd
Address of Applicant:	209 ZhuYuan Road, Building B-3rd, 19~21 floor, Suzhou new district, Suzhou
Manufacturer:	Not supplied by the client
Address of Manufacturer:	Not supplied by the client

5.2 General Description of E.U.T.

EUT Name:	Remote Control
Brand Name:	Not supplied by the client
Model No:	RC3053702/01BR
Remark:	Final customer Model No. is DIRECTV RC71

5.3 Details of E.U.T.

EUT Power Supply:	DC 3V (Battery Powered: 1.5V*2)
Modulation Type:	O-QPSK
Operation Frequency:	The EUT application supports only 3 RF-channels; these channels are the following: CH15: 2425 MHz (Low Channel) CH20: 2450 MHz (Middle Channel) CH25: 2475 MHz (High Channel)

5.4 Description of Support Units

Name	Model No.	Remark
NA	NA	NA

5.5 Standards Applicable for Testing

CFR 47 FCC PART 15 SUBPART C, Section 15.249,
ANSI C63.10: 2009

5.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel:+86 21 6191 5666 Fax:+86 21 6191 5655

No tests were sub-contracted.

5.7 Mode of operation during the test / Test peripherals used

While testing the EUT under RF transmiting mode, the internal modulation was used.
Since the EUT is portable device, so it was set up and tested in three axis (X-Lie Down, Y-Lie on Side and Z-Stand up). We have pre-tested in the three axis, and find the worst case is as below.

EUT orientation (Axis)	Measureing Antenna (Polarization)
X (Lie down)	Vertical
Z (Stand up)	Horizontal

In this report, the test data under worse case is recorded only.

5.8 Deviation from Standards

None.

5.9 Other Information Requested by the Customer

None.

5.10 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.

5.11 Test Equipments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2012-10-3	2013-10-2
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2012-10-3	2013-10-2
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2012-10-3	2013-10-2
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2012-6-3	2013-6-1
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2012-10-7	2013-10-5
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2009P	--	2012-10-3	2013-10-2
7	CLAMP METER	FLUKE	316	86080010	2012-10-3	2013-10-2
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2012-10-13	2013-10-11
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2012-6-17	2013-6-16
11	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT1800.0/ 2000.0-0.2/40-5SSK	11	2013-1-24	2014-1-23
12	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/880.0-0.2/40-5SSK	9	2013-1-24	2014-1-23
13	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2012-10-3	2013-10-2
14	Low nosie amplifier	TESEQ	LNA6900	70133	2012-7-5	2013-7-4
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2012-06-04	2013-06-03
16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2012-05-07	2013-05-06
18	AVG Power Sensor	Rohde & Schwarz	NRP-Z22	1137	2012-05-07	2013-05-06
20	Power meter	Rohde & Schwarz	NRP	101641	2012-05-05	2013-05-04

5.12 E.U.T. Operation

Input voltage:	3VDC (Battery 2*1.5V)
Operating Environment:	
Temperature:	22 - 25 °C
Humidity:	50-60 % RH
Atmospheric Pressure:	1010 mbar
EUT Operation:	The EUT has been tested under operating condition.Test grogram was used to control the EUT for staying in continuous Transmitting mode is programmed. Channel low (2425MHz), Channel mid(2450MHz), Channel high(2475MHz).

6 Test Procedure & Measurement Data

6.1 Antenna requirement

Standard Requirement: FCC Part 15C Section 15.203

15.203 Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Result:

The EUT antenna is internal Antenna. It comply with the standard requirement.

6.2 Test Procedure & Measurement Data

6.2.1 Test procedure

Test Requirement:	FCC Part15 C Section 15.249(a) & (d)
Test Method:	FCC Part15 C Section 15.249 & ANSI C63.10
Test Date:	Apr.24, 2013 to Apr.25, 2013
Measurement Distance:	3m
Frequency range	30 MHz - 25GHz for transmitting mode.
	Test instrumentation resolution bandwidth/Video bandwidth 120 kHz/300KHz (30 MHz - 1000 MHz), QP Detector
	1 MHz/1MHz (1GHz-25GHz) PK Detector
	1MHz/10Hz (1GHz-25GHz) PK Detector
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal, a turntable rotate through 360° in the horizontal plane and it is used to support the test sample at 0.8m above the ground plane,the EUT positional on X,Y,Z three axis.

Requirements:

FCC Part 15.249(a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBμV/m @ 3m)	Field Strength of Harmonics (dBμV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	**94.0**	**54.0**
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

FCC Part 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, 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.

Remark:

The fundamental frequency of the EUT is 2425MHz , 2450MHz and 2475MHz.

The limit for average field strength dBμv/m for the fundamental frequency = 94.0 dBμV/m.

The limit for peak field strength dBμv/m for the fundamental frequency = 114.0 dBμV/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dBμV/m for the harmonics = 54.0 dBμV/m.

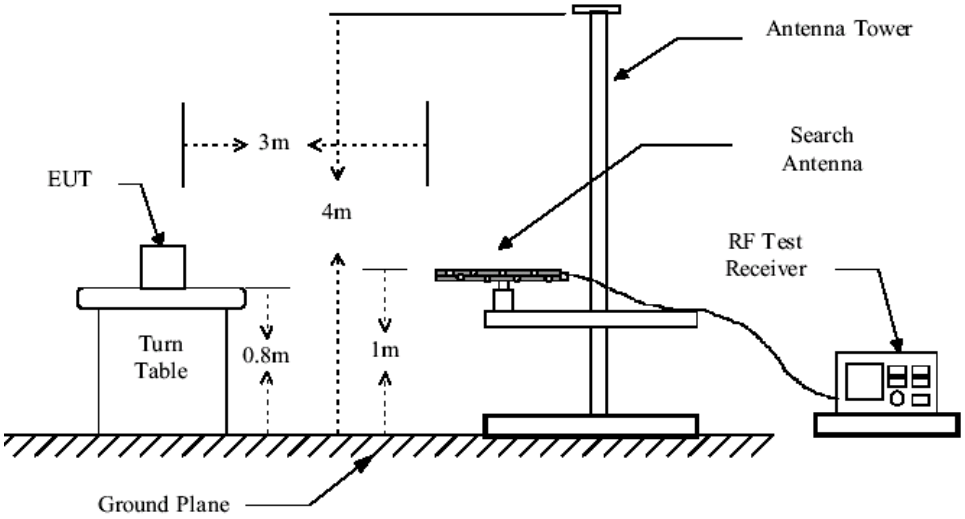
The limit for peak field strength dBμV/m for the harmonics = 74.0 dBμV/m.

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or 54.0 dBμV/m in 15.209. Here the limit for the other emission is 54.0 dBμV/m.

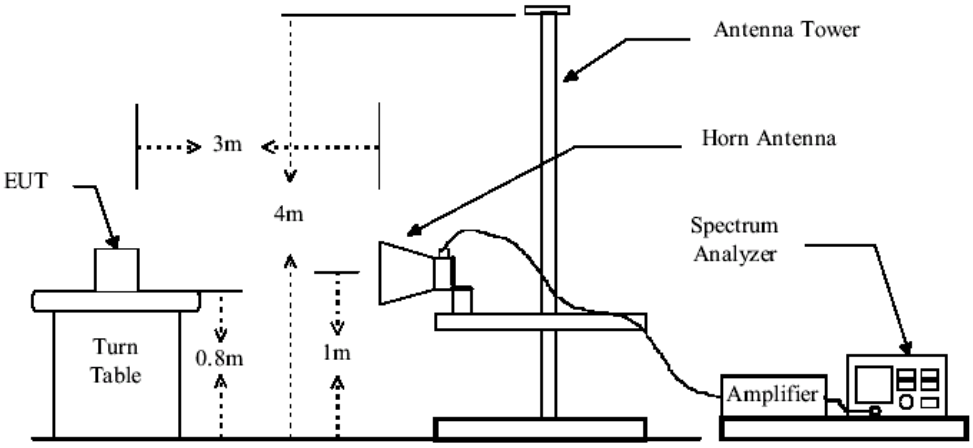
Test Procedure: The procedure used was ANSI Standard C63.10:2009. The measurment receiver was scanned from 30MHz to 25GHz.When an emission was found, the table was turned to produce the

maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Test Configuration:



For 30MHz to 1GHz



For above 1GHz

The field strength is calculated by adding the Antenna Factor, Cable Loss & preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level (Result) = Receiver Reading + Corrected Factor

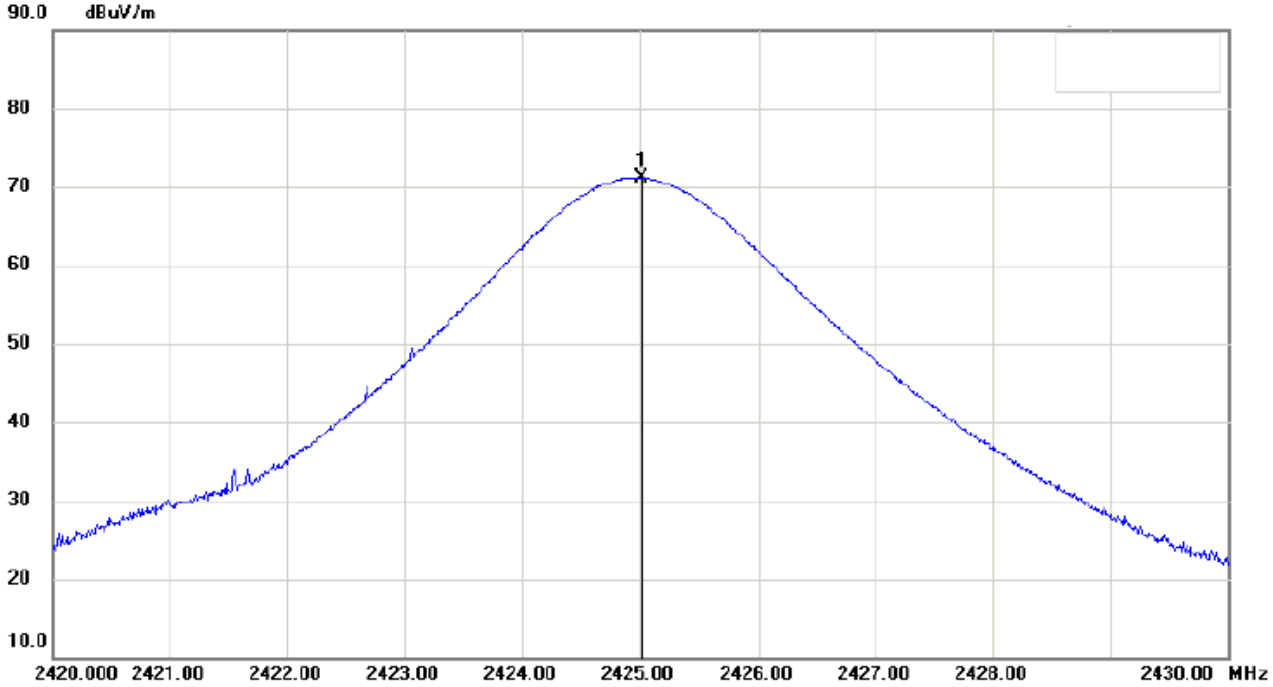
Corrected Factor = Antenna Factor + Cable Loss - Preamplifier Factor

Magin = Result - Limit

6.2.2 Fundamental emission

2425MHz :

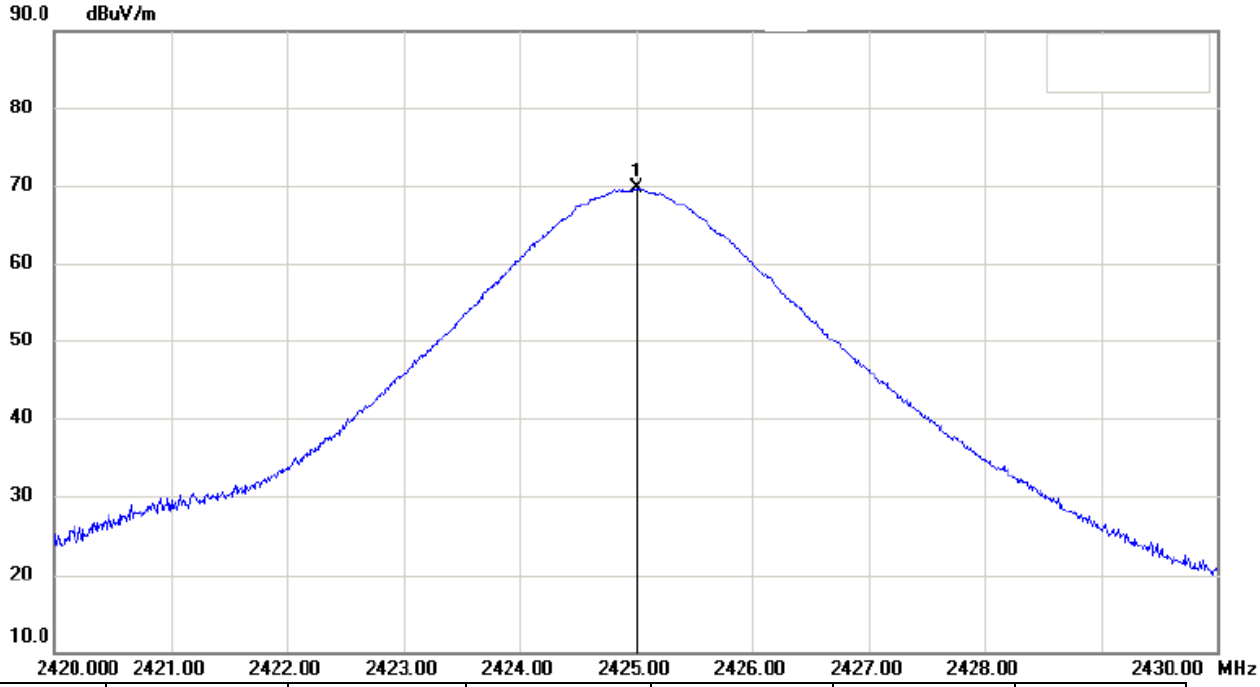
Vertifical:



Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2425.020	77.67	peak	-6.50	71.17	94.00	22.83

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

Horizontal:

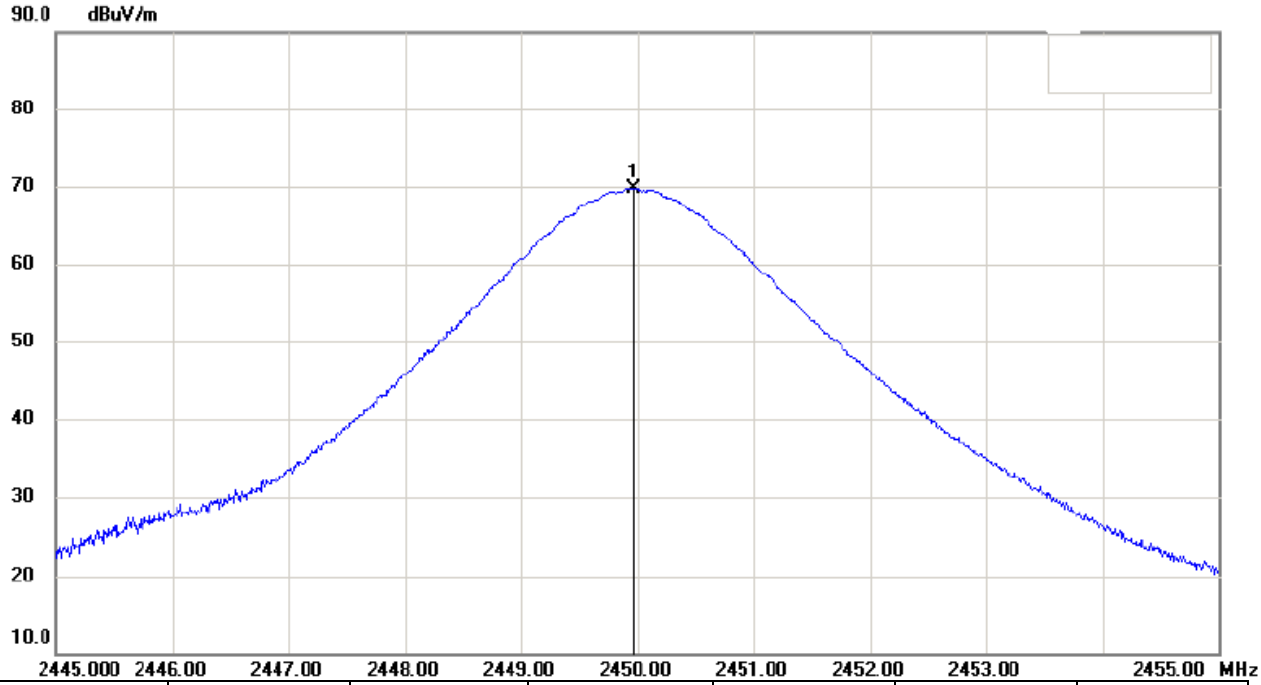


Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2425.010	76.12	peak	-6.50	69.62	94.00	24.38

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

2450MHz :

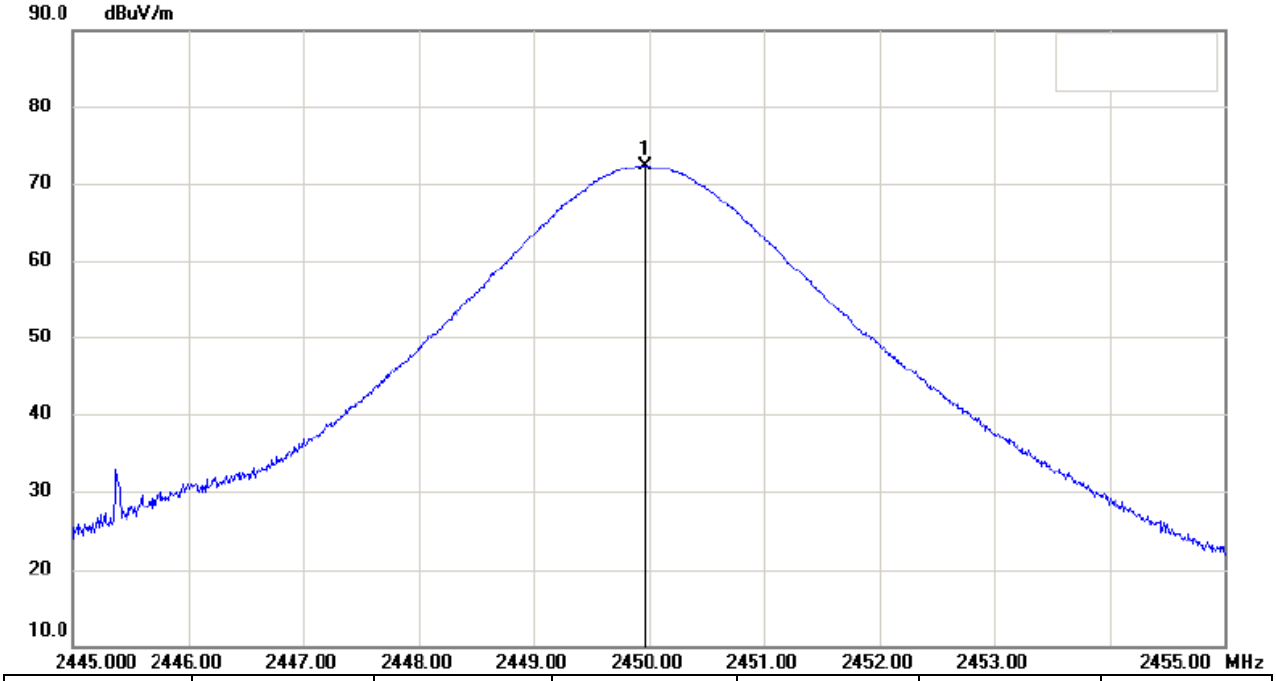
Vertifical:



Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2449.960	76.22	peak	-6.46	69.76	94.00	24.24

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

Horizontal:

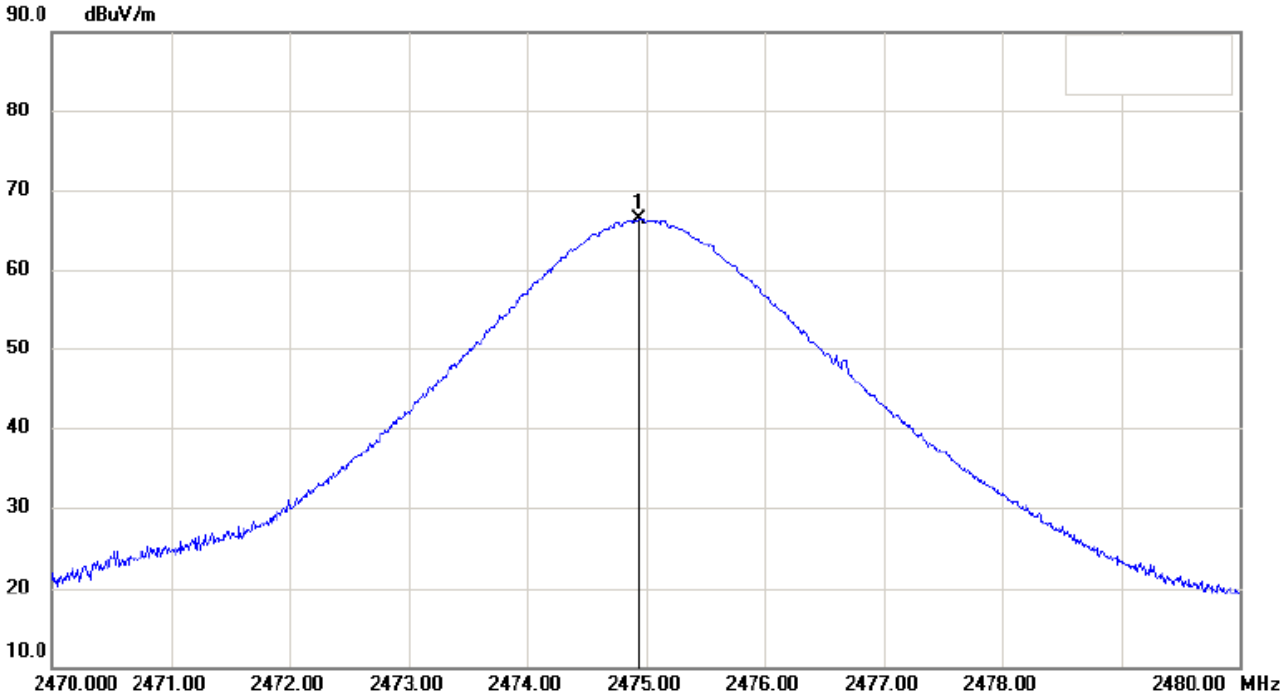


Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2449.960	78.79	peak	-6.46	72.33	94.00	21.67

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

2475MHz:

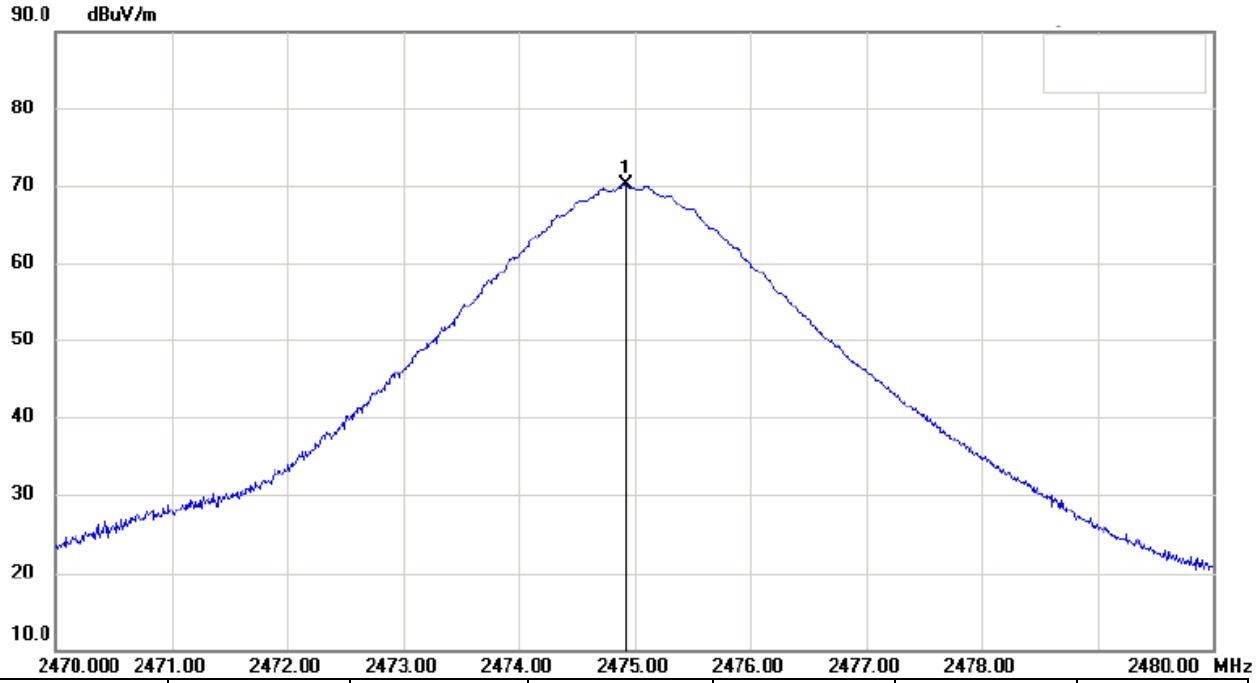
Vertifical:



Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2474.940	72.83	peak	-6.43	66.40	94.00	27.60

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

Horizontal:

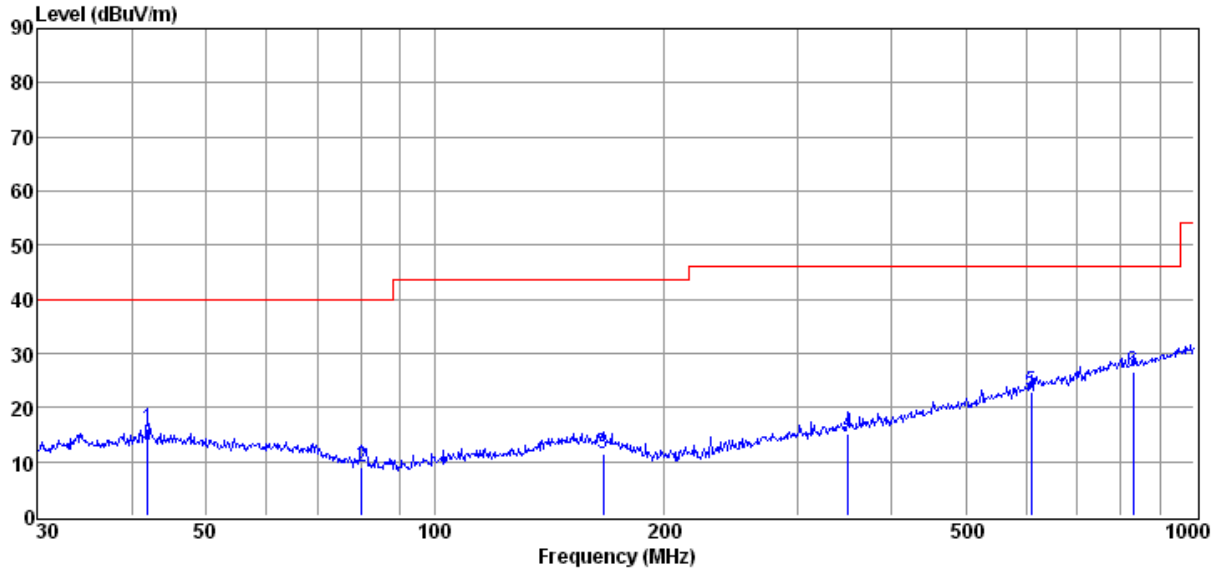


Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2474.920	76.56	peak	-6.43	70.13	94.00	23.87

Note: the Peak level less than the limit, so the average(AV) level doesn't need to be performed.

6.2.3 Radiated emission below 1GHz

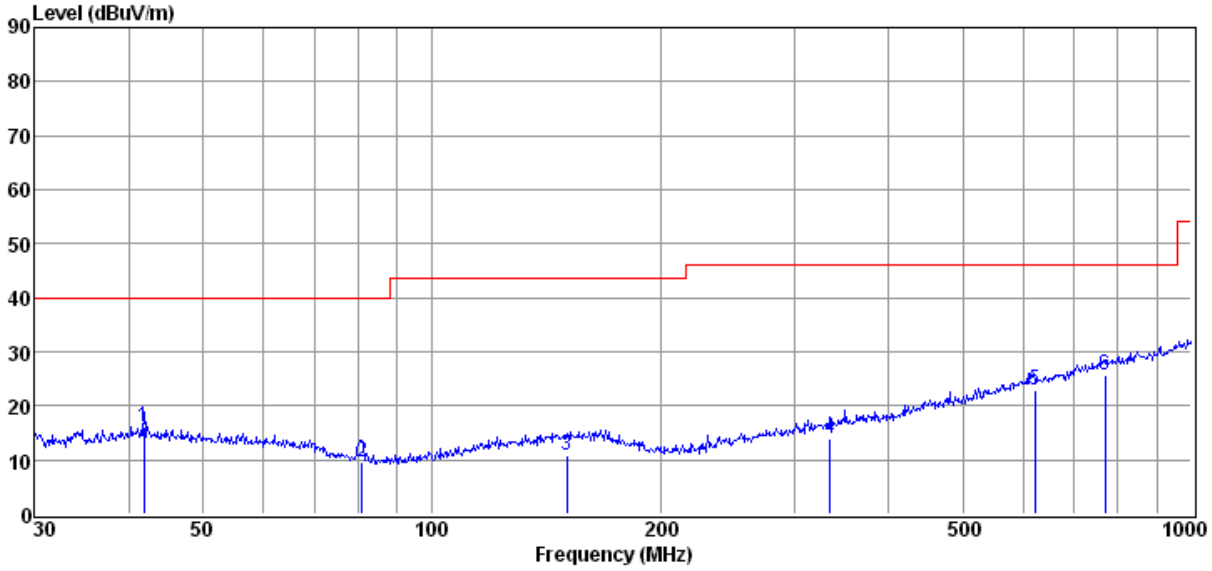
Vertical: Quasi-Peak Measurement



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	41.91	26.88	13.22	24.70	0.58	15.98	40.00	-24.02	QP	VERTICAL
2	80.08	24.07	8.80	24.70	0.87	9.04	40.00	-30.96	QP	VERTICAL
3	166.65	22.39	12.40	24.63	1.35	11.51	43.50	-31.99	QP	VERTICAL
4	350.48	23.96	13.61	24.50	2.12	15.19	46.00	-30.81	QP	VERTICAL
5	609.86	24.75	19.40	24.20	2.94	22.89	46.00	-23.11	QP	VERTICAL
6	831.42	24.57	22.45	23.90	3.52	26.64	46.00	-19.36	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor
2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

Horizontal: Quasi-Peak Measurement



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	41.80	26.88	13.23	24.70	0.57	15.98	40.00	-24.02	QP	HORIZONTAL
2	80.93	24.57	8.77	24.70	0.88	9.52	40.00	-30.48	QP	HORIZONTAL
3	150.54	21.67	12.69	24.70	1.27	10.93	43.50	-32.57	QP	HORIZONTAL
4	334.86	23.04	13.30	24.50	2.07	13.91	46.00	-32.09	QP	HORIZONTAL
5	621.88	24.53	19.64	24.20	2.97	22.94	46.00	-23.06	QP	HORIZONTAL
6	769.54	24.33	21.89	24.00	3.38	25.60	46.00	-20.40	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor
2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

Radiated emission above 1GHz

Operation Mode: TX Low CH (2425MHz)

Frequency (MHz)	Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Detector	AV Limit (dBμV/m)	Over Limit (dB)	Antenna polarization
4842	-8.31	39.22	30.91	Peak	54	-23.09	Vertical
7273	-3.19	39.36	36.17	Peak	54	-17.83	Vertical
9687	-0.05	40.34	40.29	Peak	54	-13.71	Vertical
12135	-2.92	41.52	38.60	Peak	54	-15.40	Vertical
4842	-8.31	39.72	31.41	Peak	54	-22.59	Horizontal
7273	-3.19	39.50	36.31	Peak	54	-17.69	Horizontal
9687	-0.05	39.50	39.45	Peak	54	-14.55	Horizontal
12135	-2.92	41.24	38.32	Peak	54	-15.68	Horizontal

Note: From the peak reading test found the emission below the AV limit, so the average(AV) test does not need to be performed.

Operation Mode: TX Mid CH (2450MHz)

Frequency (MHz)	Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Detector	AV Limit (dBμV/m)	Over Limit (dB)	Antenna polarization
4910	-8.13	39.67	31.54	Peak	54	-22.46	Vertical
7358	-2.82	41.29	38.47	Peak	54	-15.53	Vertical
9789	-0.13	40.84	40.71	Peak	54	-13.29	Vertical
12254	-3.10	40.23	37.13	Peak	54	-16.87	Vertical
4910	-8.13	40.39	32.26	Peak	54	-21.74	Horizontal
7358	-2.82	41.62	38.80	Peak	54	-15.20	Horizontal
9806	-0.14	40.19	40.05	Peak	54	-13.95	Horizontal
12254	-3.10	41.21	38.11	Peak	54	-15.89	Horizontal

Note: From the peak reading test found the emission below the AV limit, so the average(AV) test does not need to be performed.

Operation Mode: TX High CH (2475MHz)

Frequency (MHz)	Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Detector	AV Limit (dBμV/m)	Over Limit (dB)	Antenna polarization
4927	-8.09	41.21	33.12	Peak	54	-20.88	Vertical
7426	-2.53	40.43	37.90	Peak	54	-16.10	Vertical
9891	-0.21	40.17	39.96	Peak	54	-14.04	Vertical
12373	-3.29	40.94	37.65	Peak	54	-16.35	Vertical
4927	-8.09	40.11	32.02	Peak	54	-21.98	Horizontal
7426	-2.53	41.07	38.54	Peak	54	-15.46	Horizontal
9925	-0.23	40.67	40.44	Peak	54	-13.56	Horizontal
12373	-3.29	41.41	38.12	Peak	54	-15.88	Horizontal

Note: From the peak reading test found the emission below the AV limit, so the average(AV) test does not need to be performed.

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

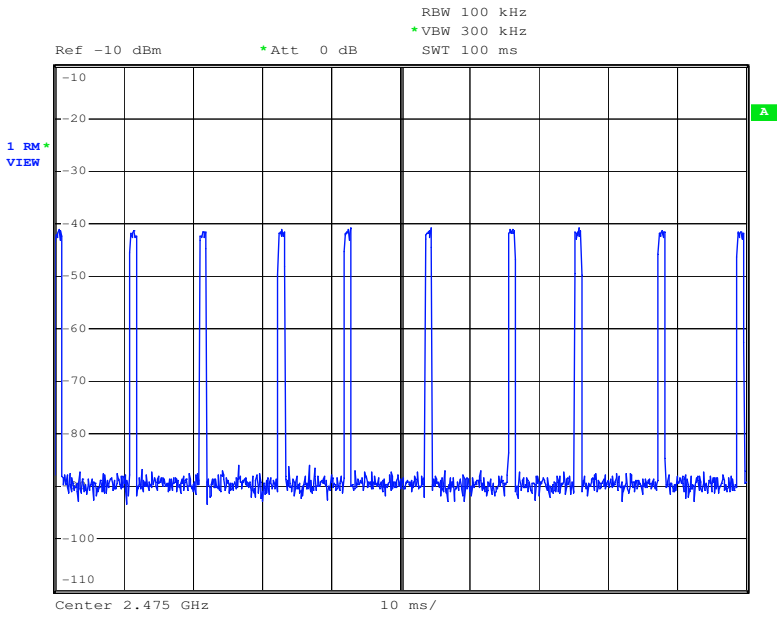
Emission Level=Reading Level+Factor(Antenna Factor+Cable Loss-Preamplifier Factor)

Duty Cycle Measurement Result:

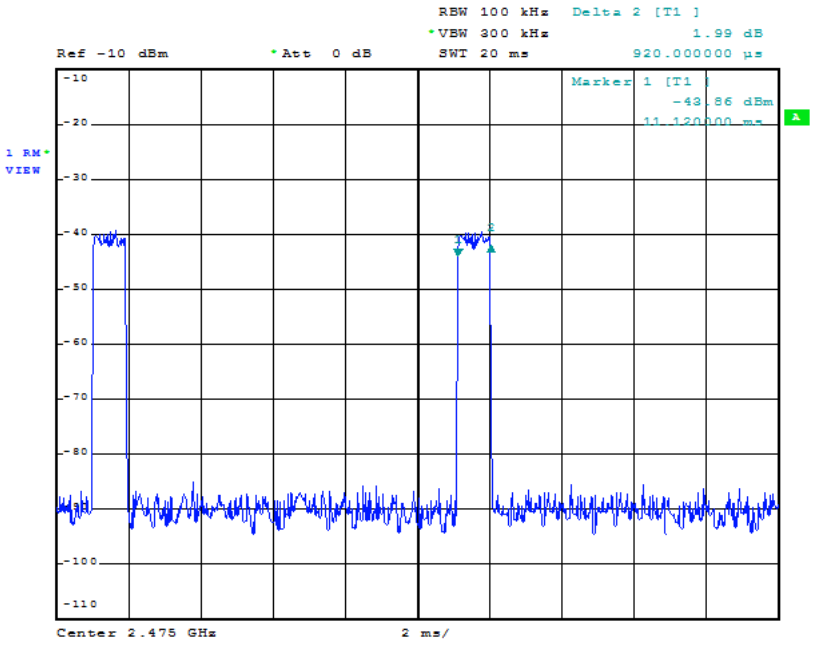
Test Requirement: ANSI C63.10 Section 6.5.4.2

Ton=960us, Tp=100ms

Duty Cycle Correction Factor = 20*log(10*Ton/Tp)=20*log(10*0.92/100)=-20.72dB



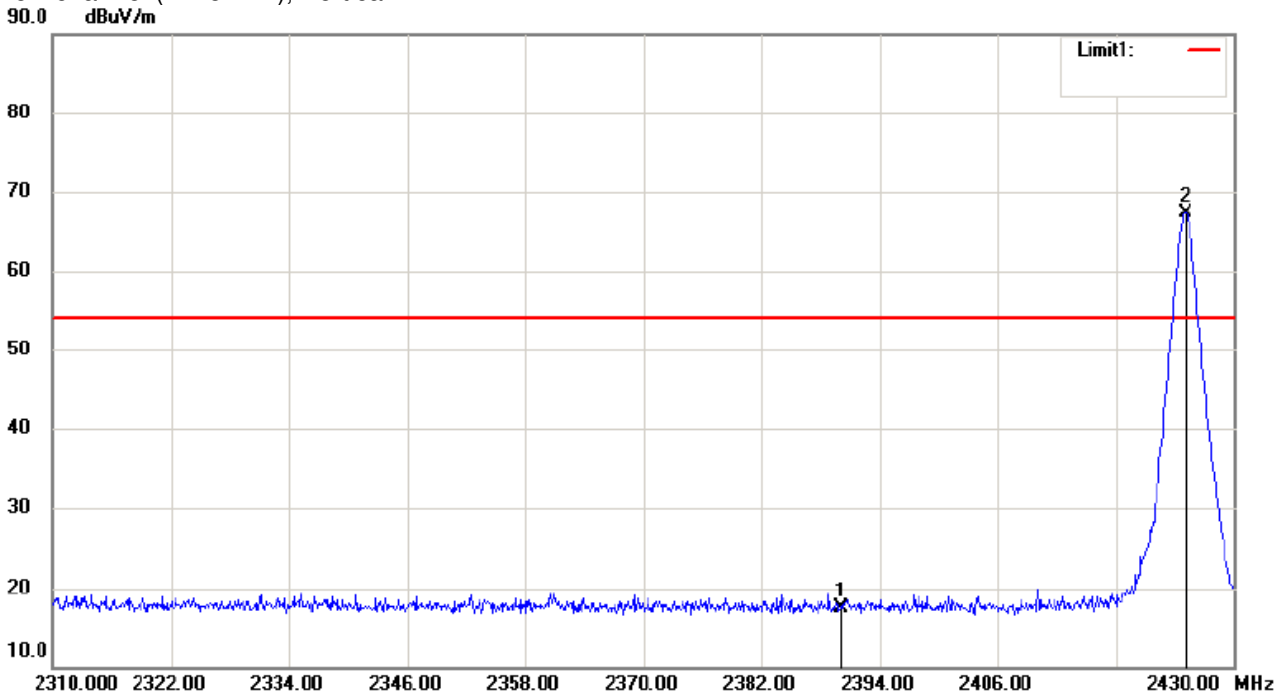
Ton = 920us = 0.92ms



Tp=100ms

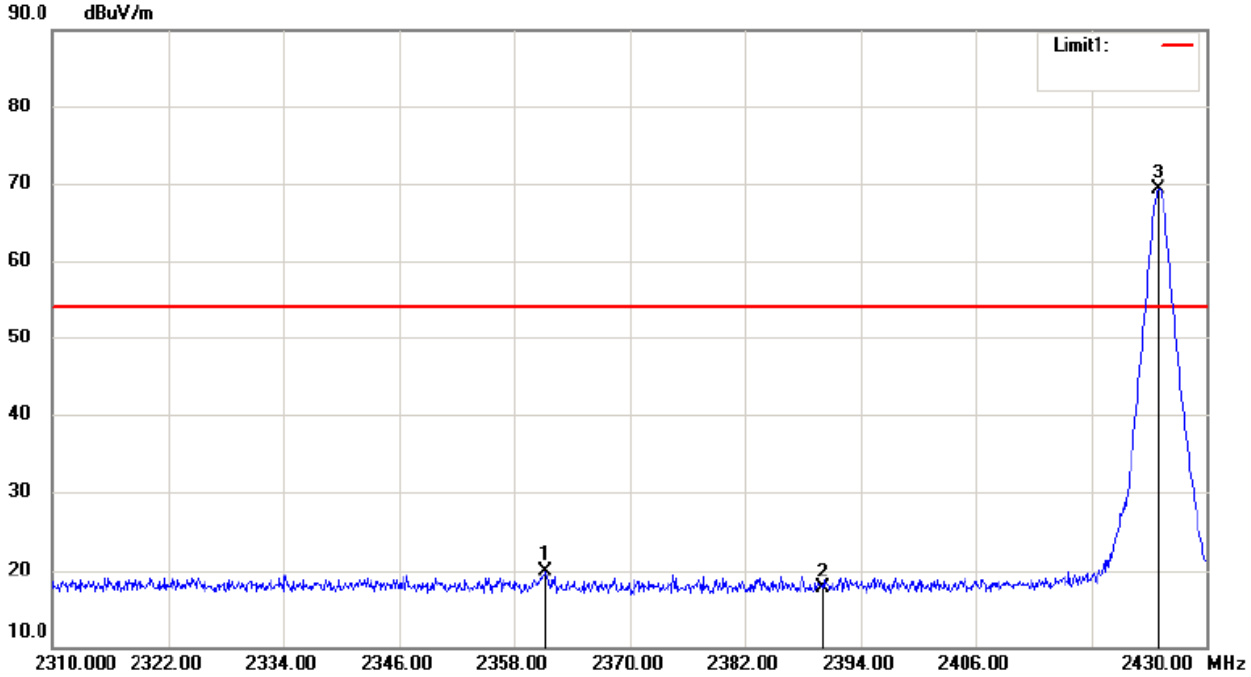
6.2.4 Band Edge

Low channel (2425MHz), Vertical:



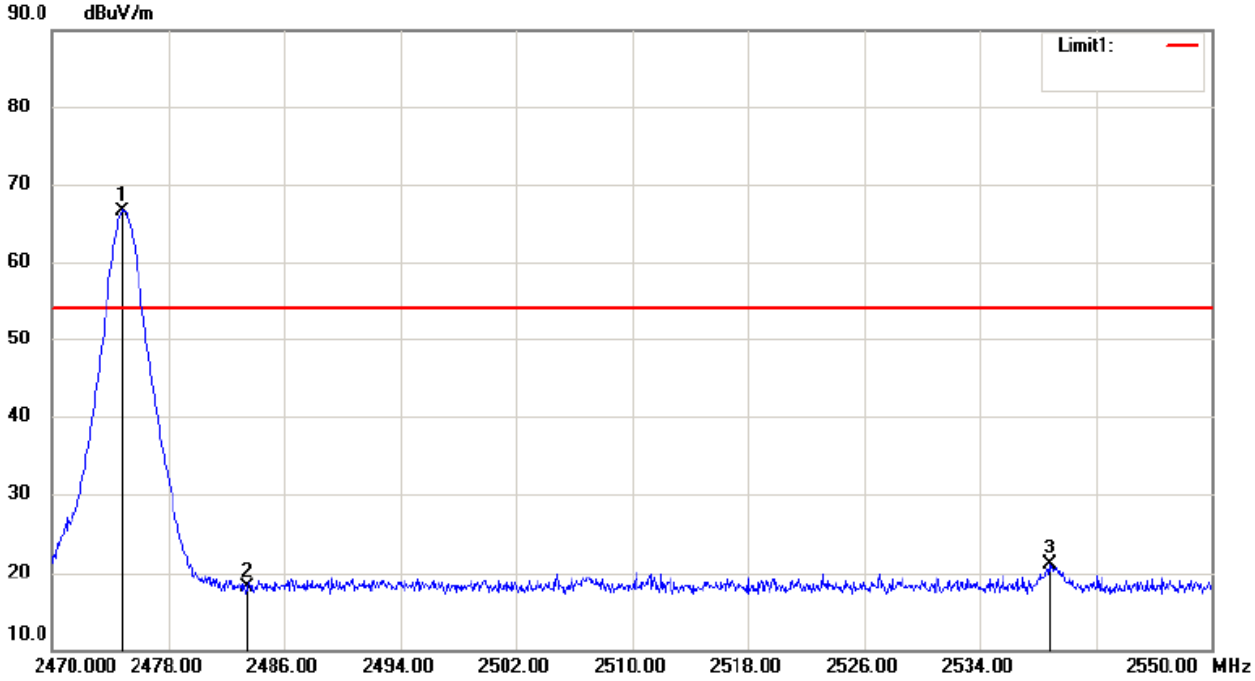
Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	2390.040	24.05	peak	-6.55	17.50	54.00	-36.50
2	2425.080	73.80	peak	-6.50	67.30	54.00	13.30

Low channel (2425MHz), Horizontal



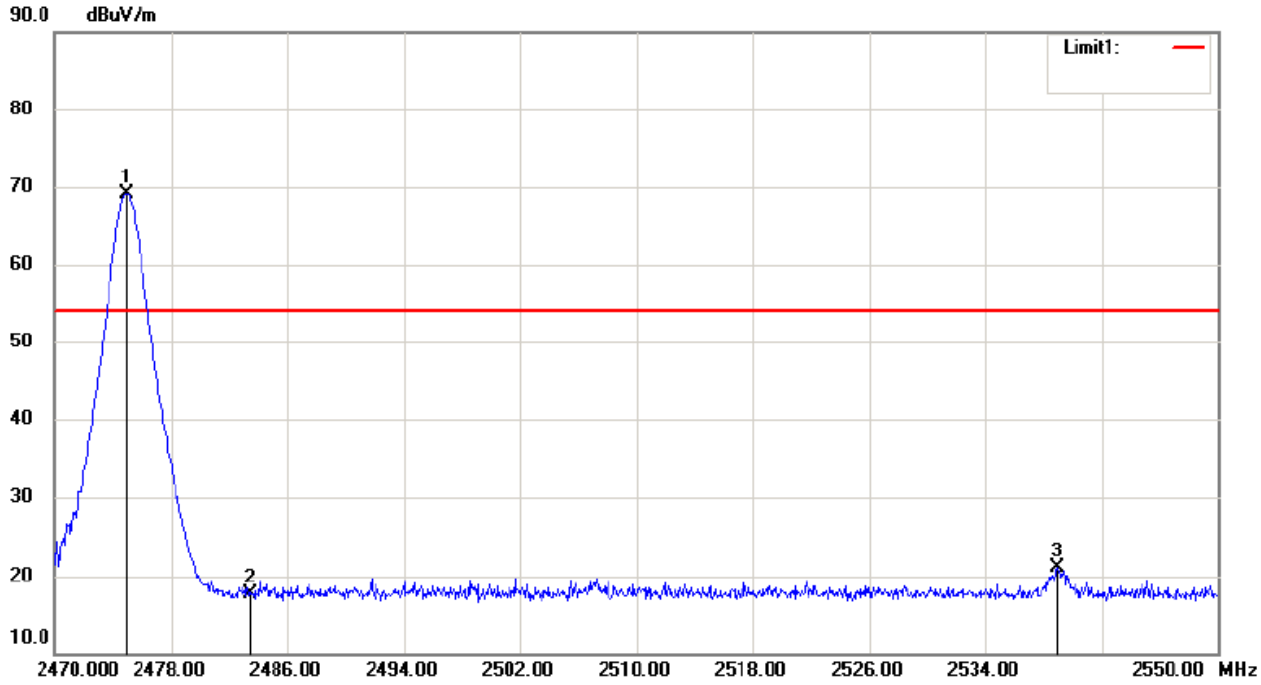
Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	2361.240	26.45	peak	-6.59	19.86	54.00	-34.14
2	2390.040	24.34	peak	-6.55	17.79	54.00	-36.21
3	2424.960	75.86	peak	-6.51	69.35	54.00	15.35

High channel (2475MHz),Vertical:



Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	2474.880	73.03	peak	-6.43	66.60	54.00	12.60
2	2483.520	24.47	peak	-6.41	18.06	54.00	-35.94
3	2538.800	27.33	peak	-6.30	21.03	54.00	-32.97

High channel (2475MHz), Horizontal



Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	2474.960	75.63	peak	-6.43	69.20	54.00	15.20
2	2483.520	24.18	peak	-6.41	17.77	54.00	-36.23
3	2538.960	27.33	peak	-6.30	21.03	54.00	-32.97

6.2.5 20dB Occupied Bandwidth

Test Requirement:	FCC Part 15 Section 15.249/15.215(c)
Test Method:	ANSI C63.10
	Operation within the band 2400-2483.5MHz
Test Date:	Apr.25, 2013
Requirements:	15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, 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.
Method of measurement:	A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken. Set RBW=100kHz, VBW=300kHz, sweep time = Auto.

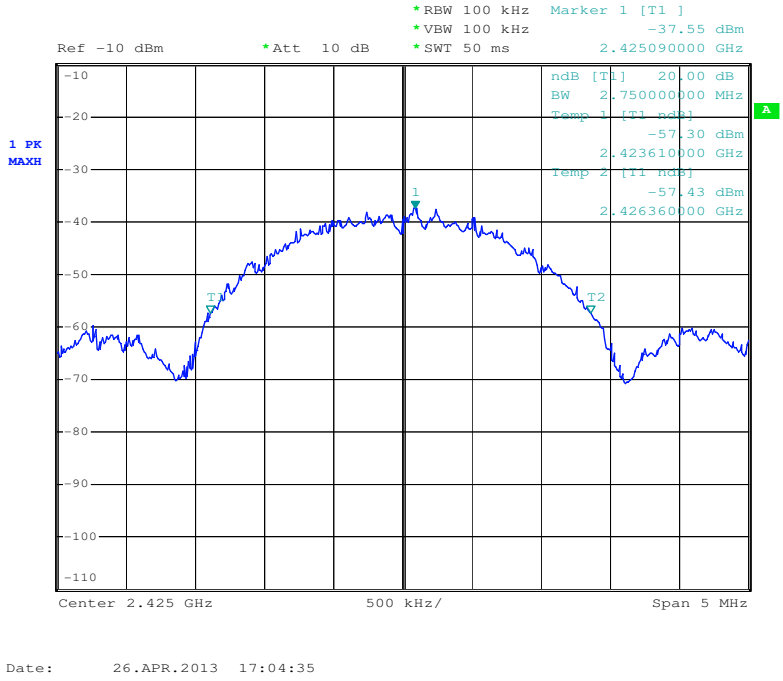
Occupied Bandwidth:

Test result:

Test Channel	20 dB bandwidth
Low channel (2425MHz)	272kHz
Middle channel (2450MHz)	274kHz
High channel (2475MHz)	274kHz

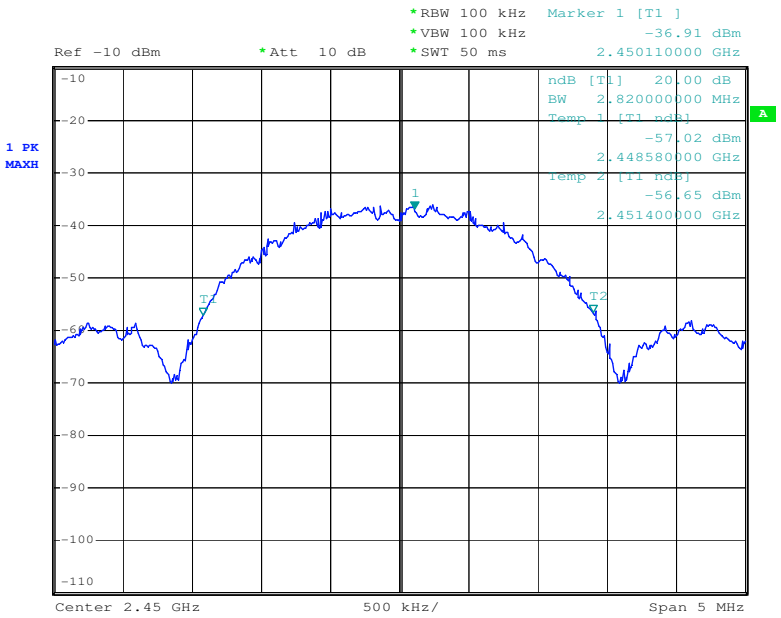
Test Plot:

Low Channel(2425MHz):



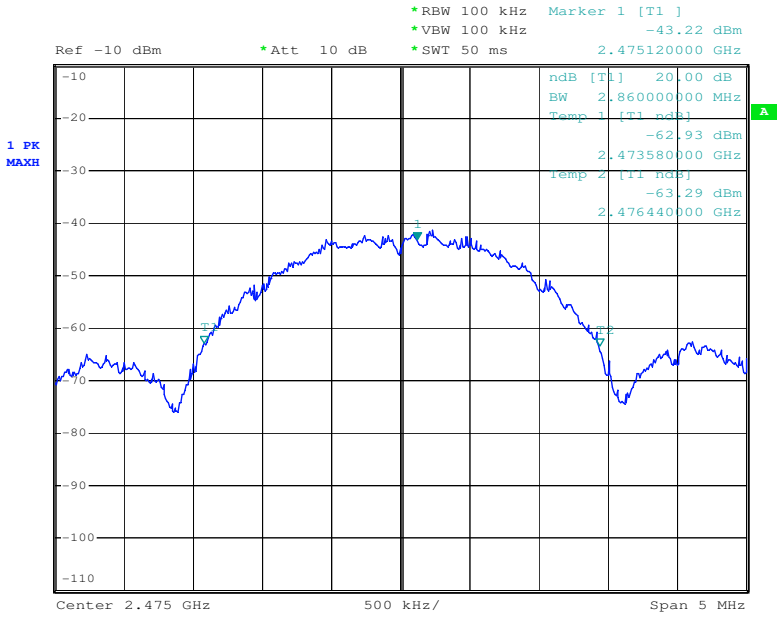
Date: 26.APR.2013 17:04:35

Middle Channel(2450MHz):

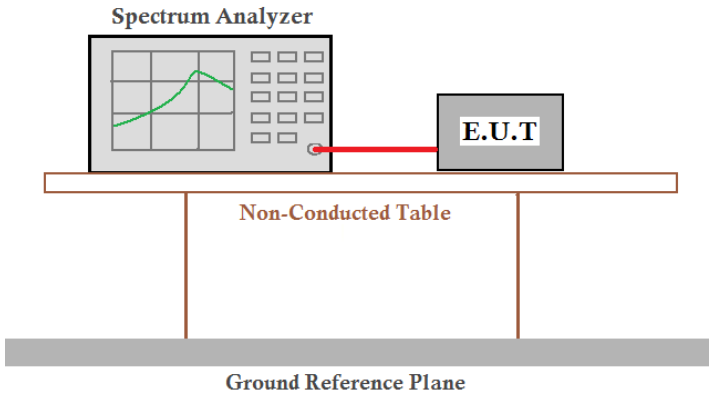


Date: 26.APR.2013 17:05:51

High Channel(2475MHz):



6.3 99% Occupied Bandwidth

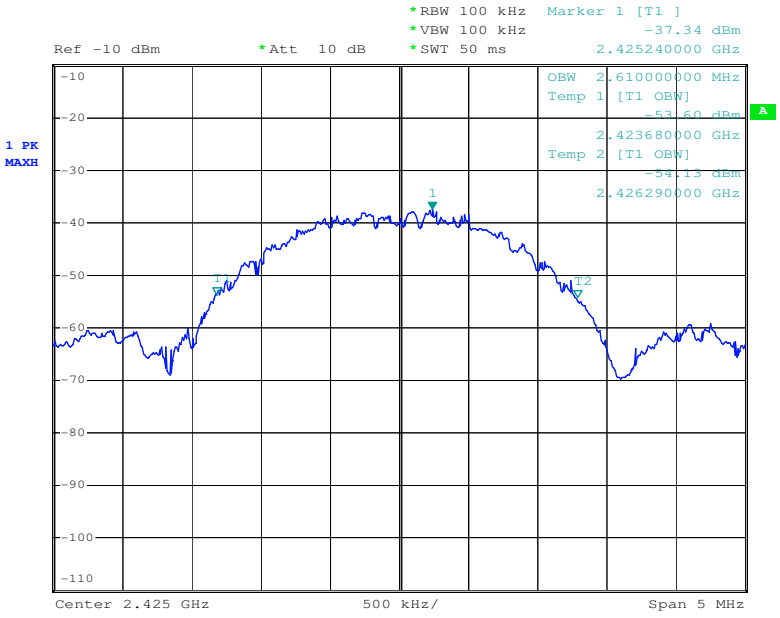
Test Requirement:	RSS-Gen section 4.6.1
Test Method:	RSS-Gen section 4.6.1
Test Setup:	
Instruments Used:	Refer to section 5.12 for details
Test mode:	Transmitting mode
Limit:	N/A
Test Results:	Pass

Measurement Data

Test channel	20dB bandwidth (MHz)
2425MHz	156.00
2450 MHz	116.00
2475 MHz	124.00

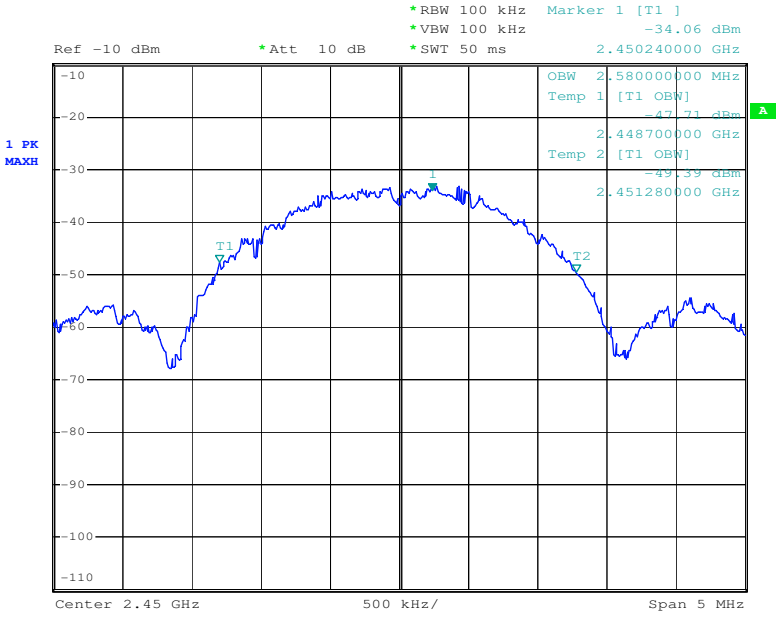
Test plot as follows:

Test channel:	2425MHz



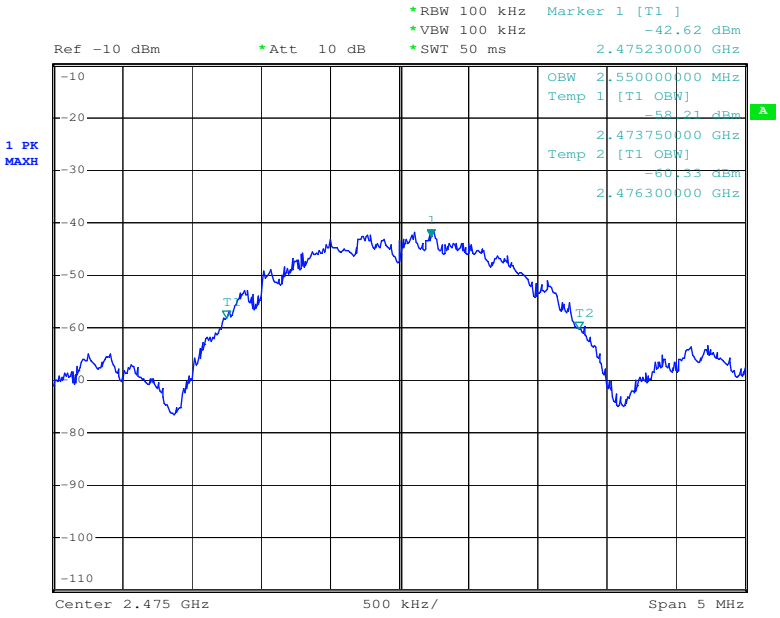
Date: 26.APR.2013 17:11:11

Test channel:	2450MHz



Date: 26.APR.2013 17:11:54

Test channel:	2475MHz



Date: 26.APR.2013 17:08:24

7 Test Setup Photographs

Refer to the < 305B_Test Setup photos>.

8 EUT Constructional Details

Refer to the <305B_External Photos > & < 305B_Internal Photos >.

End of the Report