







#### ISO/IEC17025Accredited Lab.

Report No: FCC 1303024 File reference No: 2013-03-13

Applicant: Shenzhen Soling Industrial Co., Ltd

Product: Car DVD Player

Model No: SL-6701, SL-6702, SL-6703, SL-6704, SL-6705, SL-6706, SL-6707, SL-6708,

SL-6709, SL-6710, SL-6711, SL-6712, SL-6713, SL-6714, SL-6715, SL-6716,

SL-6717, SL-6718, SL-6719, SL-6720, SL-6721, SL-6722, SL-6723, SL-6724, SL-6725,

SL-6726, SL-6727, SL-6728, SL-6729, SL-6730, SL-6731, SL-6732, SL-6733,

SL-6734, SL-6735, SL-6736, SL-6737, SL-6738, SL-6739, SL-6740, SL-6741, SL-6742, SL-6743, SL-6744, SL-6745, SL-6746, SL-6747, SL-6748, SL-6749, SL-6750, SL-6751, SL-6752, SL-6753, SL-6754, SL-6755, SL-6756, SL-6757, SL-6758, SL-6759, SL-6760,

SL-6761, SL-6762, SL-6763, SL-6764, SL-6765, SL-6766, SL-6767, SL-6768, SL-6769, SL-6770, SL-8171, Sl-8173, SL-8174, Sl-8175, SL-8176, Sl-8177,

SI-8179, SL-8187, SL-8195, SL-8196, SL-8197, SL-8198, SL-8199, SL-8186, SL-8188, SL-8189, SL-8190, SL-8191, SL-8192, SL-8193, SL-8194, SL-6200,

SL-6201, SL-6202, SL-6203, SL-6204, SL-6205, Sl-6900, Sl-6901, Sl-6902, Sl-6903,

S1-6905, S1-6906

Trademark: N/A

Test Standards: FCC Part 15 Subpart C, Paragraph 15.247

It is herewith confirmed and found to comply with the Test result:

requirements set up by ANSI C63.4&FCC Part 15 Subpart C, for the evaluation

Paragraph 15.247 regulations

electromagnetic compatibility

Approved By

Jack Chung

Jack Chung Manager

Dated: March 13, 2013

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen, CHINA.

> Tel (755) 83448688 Fax (755) 83442996

Report No: 1303024 Page 2 of 60

Date: 2013-03-13



# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

## **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

# IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

Page 3 of 60

Report No: 1303024 Date: 2013-03-13



# **Test Report Conclusion** Content

1.0	General Details	4
1.1	Test Lab Details	4
1.2	Applicant Details	4
1.3	Description of EUT	4
1.4	Submitted Sample.	4
1.5	Test Duration.	4
1.6	Test Uncertainty	4
1.7	Test By	5
2.0	List of Measurement Equipment.	5
3.0	Technical Details	6
3.1	Summary of Test Results	6
3.2	Test Standards	6
4.0	EUT Modification.	6
5.0	Power Line Conducted Emission Test.	7
5.1	Schematics of the Test.	7
5.2	Test Method and Test Procedure.	7
5.3	Configuration of the EUT	7
5.4	EUT Operating Condition.	8
5.5	Conducted Emission Limit.	8
5.6	Test Result.	8
6.0	Radiated Emission test	12
6.1	Test Method and Test Procedure.	12
6.2	Configuration of the EUT	12
6.3	EUT Operation Condition.	12
6.4	Radiated Emission Limit	13
7.0	20dB Bandwidth Measurement	22
8.0	Maximum Peak Output Power	26
9.0	Carrier Frequency Separation.	28
10.0	Number of Hopping Channel.	30
11.0	Time of Occupancy (Dwell Time)	32
12.0	Out of Band Measurement.	37
13.0	Antenna Requirement.	42
14.0	RF Exposure.	43
15.0	FCC Label.	44
16.0	Photo of Test Setup and EUT View.	45

Report No: 1303024 Page 4 of 60

Date: 2013-03-13



#### 1.0 General Details

## 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District,

Shenzhen, CHINA.

Telephone: (755) 83448688 Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

#### 1.2 Applicant Details

Applicant: Shenzhen Soling Industrial Co., Ltd

Address: Suoling Industrial Park, Xikeng Village, Fuming, Guanlan Town, Shenzhen, China.

Telephone: +86-755-28028099 Fax: +86-755-28028077

## 1.3 Description of EUT

Product: Car DVD Player

Manufacturer: Shenzhen Soling Industrial Co., Ltd

Address: Suoling Industrial Park, Xikeng Village, Fuming, Guanlan Town, Shenzhen,

China.

Brand Name: N/A
Model Number: SL-6703

Additional Model Name SL-6701, SL-6702, SL-6704, SL-6705, SL-6706, SL-6707, SL-6708, SL-6709,

SL-6710,SL-6711,SL-6712, SL-6713,SL-6714,SL-6715, SL-6716, SL-6717, SL-6718,SL-6719,SL-6720,SL-6721, SL-6722,SL-6723,SL-6724, SL-6725, SL-6726, SL-6727, SL-6728,SL-6729, SL-6730, SL-6731, SL-6732, SL-6733, SL-6734, SL-6735,SL-6736,SL-6737,SL-6738,SL-6739,SL-6740,SL-6741, SL-6742, SL-6743,SL-6744,SL-6745,SL-6746,SL-6747,SL-6748,SL-6749, SL-6750, SL-6751,SL-6752,SL-6753,SL-6754,SL-6755,SL-6756,SL-6757,

SL-6758, SL-6759, SL-6760, SL-6761, SL-6762, SL-6763, SL-6764, SL-6765, SL-6766, SL-6767, SL-6768, SL-6769, SL-6770, SL-8171, Sl-8173, SL-8174, Sl-8175, SL-8176, Sl-8177, Sl-8179, SL-8187, SL-8195, SL-8196, SL-8197, SL-8198, SL-8199, SL-8186, SL-8188, SL-8189, SL-8190, SL-8191, SL-8192, SL-8193, SL-8194, SL-6200, SL-6201, SL-6202, SL-6203, SL-6204, SL-6205,

S1-6900, S1-6901, S1-6902, S1-6903, S1-6905, S1-6906

Report No: 1303024 Page 5 of 60

Date: 2013-03-13



Additional Trade Name N/A

Type of Modulation GFSK

Frequency range 2402-2480MHz

Number of Channel 79

Frequency Selection By software

Antenna type PCB Printed antenna, the antenna gain is 0dBi

1.4 Submitted Sample: 1 Sample

1.5 Test Duration: 2013-03-04 to 2013-03-13

1.6 Test Uncertainty

Conducted Emissions Uncertainty = 3.6dB Radiated Emissions Uncertainty = 4.7dB

1.7 Test Engineer

Terry Tang

The sample tested by

Print Name: Terry Tang

Page 6 of 60

Report No: 1303024 Date: 2013-03-13



2.0		Test Equip	ments		
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2012-08-21	2013-08-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2012-08-21	2013-08-20
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2012-08-21	2013-08-20
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2012-08-21	2013-08-20
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2012-08-21	2013-08-20
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2012-08-21	2013-08-20
System Controller	CT	SC100	•	2012-08-21	2013-08-20
Printer	EPSON	РНОТО ЕХЗ	CFNH234850	2012-08-21	2013-08-20
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2012-08-21	2013-08-20
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2012-08-21	2013-08-20
3m OATS			N/A	2012-08-21	2013-08-20
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2012-08-21	2013-08-20
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2012-08-21	2013-08-20
Power meter	Anritsu	ML2487A	6K00003613	2012-08-21	2013-08-20
Power sensor	Anritsu	MA2491A	32263	2012-08-21	2013-08-20
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2012-08-21	2013-08-20
LISN	AFJ	LS16C	10010947251	2012-08-21	2013-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2012-08-21	2013-08-20
9*6*6 Anechoic			N/A	2012-08-21	2013-08-20
EMI Test Receiver	RS	ESCS30	100139	2012-08-21	2013-08-20
LISN	AFJ	LS16C	10010947251	2012-08-21	2013-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2012-08-21	2013-08-20

Report No: 1303024 Page 7 of 60

Date: 2013-03-13



## 3.0 Technical Details

# 3.1 Summary of test results

The EUT has been tested according to the following specifications:

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Spurious Emission, Band Edge, and	15.247(d),15.205(a),	PASS	Complies
Restricted bands	15.209 (a),15.109		
Conducted Emissions	15.207(a), 15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

## 3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

# 4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

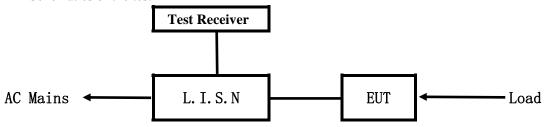
Report No: 1303024 Page 8 of 60

Date: 2013-03-13



## 5. Power Line Conducted Emission Test

## 5.1 Schematics of the test



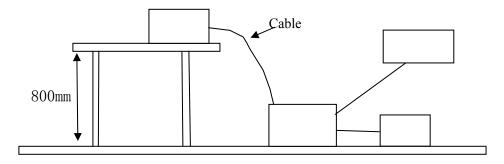
**EUT: Equipment Under Test** 

## 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4-2003.

Test Voltage:N/A

Block diagram of Test setup



## 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

79 channels are provided to the EUT

Page 9 of 60

Report No: 1303024 Date: 2013-03-13



#### A. EUT

Device Manufacturer		Model	FCC ID
Car DVD Player	Shenzhen Soling Industrial Co., Ltd	SL-6703	V4HSL-6703

## B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

# C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
USB	Kingston		DOC	
LCD Monitor	SAMSUNG	P2450	DOC	AC input cable 1.5m of length

## 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

## 5.5 Power line conducted Emission Limit according to Paragraph 15.107, 15.207

Frequency (MHz)		Class A Lim	its (dB µ V)	Class B Limits (dB µ V)		
		Quasi-peak Level	Average Level	Quasi-peak Level	Average Level	
	$0.15 \sim 0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*	
	$0.50 \sim 5.00$	73.0	60.0	56.0	46.0	
Ī	5.00 ~ 30.00	73.0	60.0	60.0	50.0	

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

# 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Report No: 1303024 Page 10 of 60

Date: 2013-03-13



#### A: Conducted Emission on Live Terminal (150kHz to 30MHz)

**EUT Operating Environment** 

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: --Equipment Level: Class B** 

Results: N/A

Please refer to following diagram for individual

Frequency	Line	Reading(	dBμV)	Limit(	dBμV)
(MHz)	Line	Quasi-peak	Average	Quasi-peak	Average
	Live				

Report No: 1303024 Page 11 of 60

Date: 2013-03-13



# B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

**EUT Operating Environment** 

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: --**

**Equipment Level: Class B** 

Results: N/A

Please refer to following diagram for individual

Frequency	Line	Reading(	dBμV)	Limit(c	dBμV)
(MHz)	Line	Quasi-peak	Average	Quasi-peak	Average
	Neutral				

Note: used in vehicle, so this test item is not applicable.

Report No: 1303024 Page 12 of 60

Date: 2013-03-13



#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.4 –2009. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

# Block diagram of Test setup Distance = 3m Computer Pre -Amplifier EUT Turn-table Receiver

- 6.2 Configuration of The EUT
  Same as section 5.3 of this report
- 6.3 EUT Operating Condition
  Same as section 5.4 of this report.

Report No: 1303024 Page 13 of 60

Date: 2013-03-13



## 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

# Frequencies in restricted band are complied to limit on Paragraph 15.109. 15.209

_		
Frequency Range (MHz)	Distance (m)	Field strength (dB µ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage  $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

Report No: 1303024 Page 14 of 60

Date: 2013-03-13



## Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

**EUT set Condition: Keep Transmitting** 

**Results: Pass** 

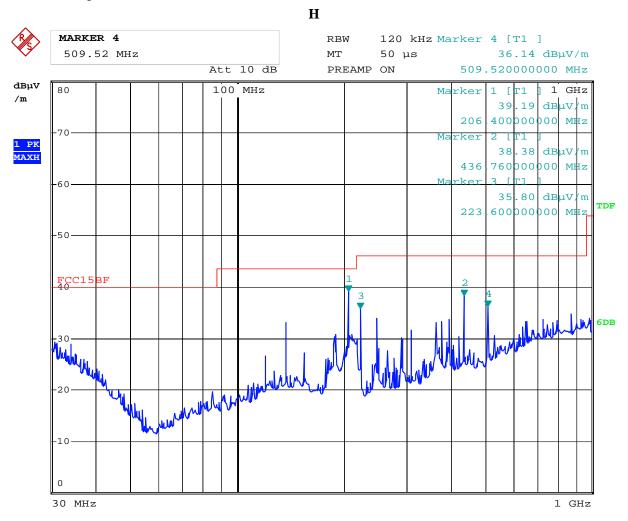
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)
206.400	39.19	Н	43.50
436.760	38.38	Н	46.00
223.600	35.80	Н	46.00
509.520	36.14	Н	46.00
137.600	41.23	V	43.50
247.480	40.78	V	46.00
120.400	36.67	V	43.50
509.520	37.10	V	46.00

Report No: 1303024 Page 15 of 60

Date: 2013-03-13



# Test Figure:



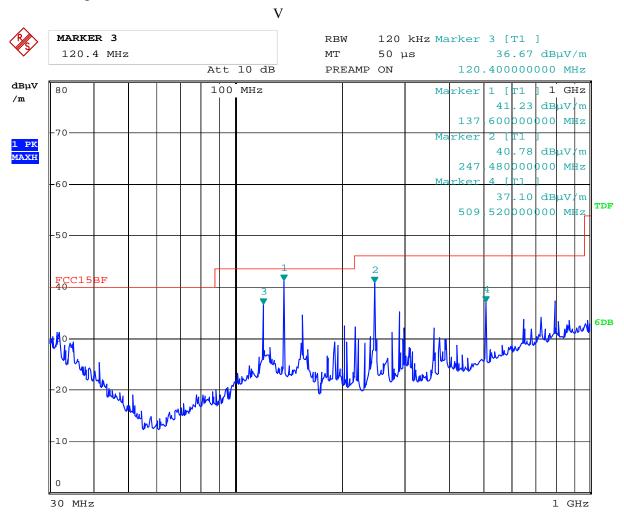
Date: 13.MAR.2013 09:38:10

Report No: 1303024 Page 16 of 60

Date: 2013-03-13



# Test Figure:



Date: 13.MAR.2013 09:39:44

Report No: 1303024 Page 17 of 60

Date: 2013-03-13



# **Operation Mode: Transmitting under Low Channel (2402MHz)**

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \mu V/m)
2402	85.48 (PK)	Н	Fundamental Frequency
2402	87.08 (PK)	V	Fundamental Frequency
4804	1	H/V	74(Peak)/ 54(AV)
7206		H/V	74(Peak)/ 54(AV)
9608	1	H/V	74(Peak)/ 54(AV)
12010	1	H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020	-	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

# **Operation Mode: Transmitting g under Middle Channel (2441MHz)**

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)	
2441	2441 87.28 (PK)		Even dominantal Emagyamay	
2441	86.52 (PK)	V	Fundamental Frequency	
4882	1	H/V	74(Peak)/ 54(AV)	
7323	-	H/V	74(Peak)/ 54(AV)	
9764	1	H/V	74(Peak)/ 54(AV)	
12205	-1	H/V	74(Peak)/ 54(AV)	
14646		H/V	74(Peak)/ 54(AV)	
17087		H/V	74(Peak)/ 54(AV)	
19528	-1	H/V	74(Peak)/ 54(AV)	
21969		H/V	74(Peak)/ 54(AV)	
24410		H/V	74(Peak)/ 54(AV)	

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

Report No: 1303024 Page 18 of 60

Date: 2013-03-13



# **Operation Mode: Transmitting under High Channel (2480MHz)**

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \( \mu \)V/m)	
2480	87.06 (PK)	Н	Fundamental Frequency	
2480	87.57 (PK)	V	Fundamental Frequency	
4960		H/V	74(Peak)/ 54(AV)	
7440		H/V	74(Peak)/ 54(AV)	
9920		H/V	74(Peak)/ 54(AV)	
12400		H/V	74(Peak)/ 54(AV)	
14880		H/V	74(Peak)/ 54(AV)	
17360		H/V	74(Peak)/ 54(AV)	
19840		H/V	74(Peak)/ 54(AV)	
22320		H/V	74(Peak)/ 54(AV)	
24800		H/V	74(Peak)/ 54(AV)	

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

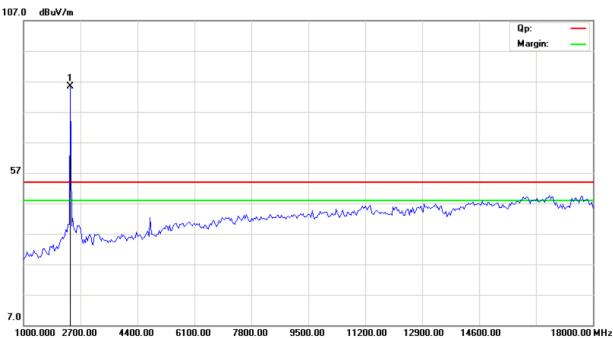
<sup>2.</sup> Remark "---" means that the emissions level is too low to be measured

Report No: 1303024 Date: 2013-03-13

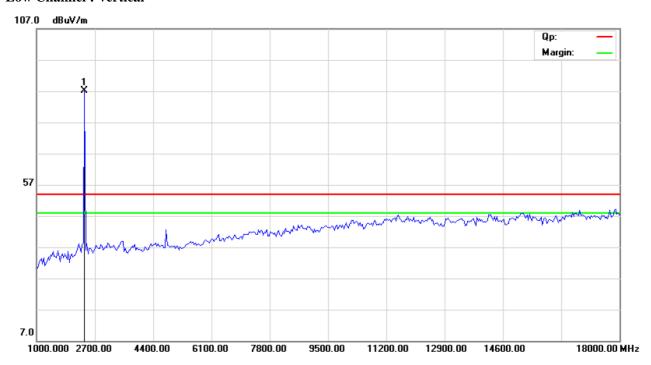


Please refer to the following test plots for details:

#### Low Channel: Horizontal



#### **Low Channel: Vertical**



The report refers only to the sample tested and does not apply to the bulk.

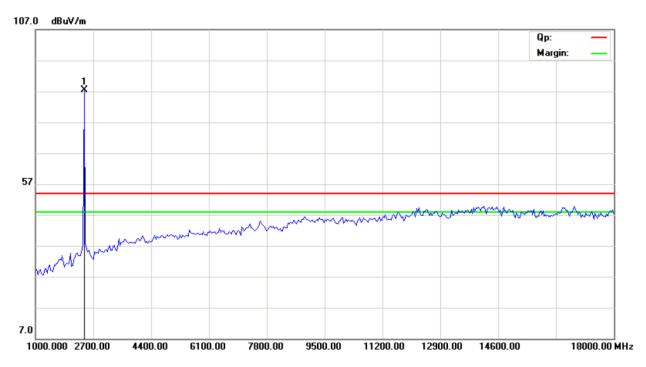
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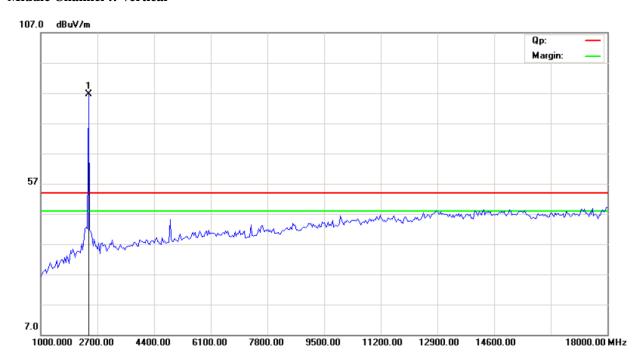
Report No: 1303024 Date: 2013-03-13



## **Middle Channel: Horizontal**



# **Middle Channel :: Vertical**



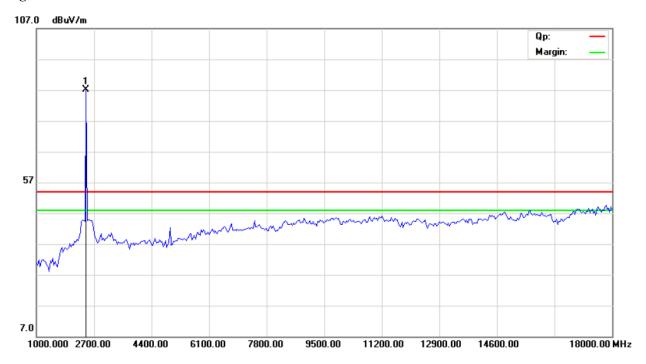
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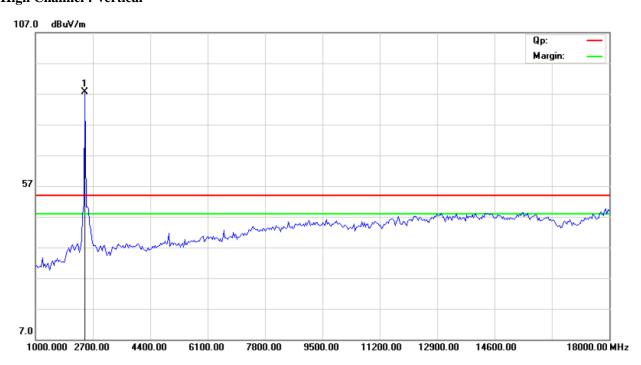
Report No: 1303024 Date: 2013-03-13



# **High Channel: Horizontal**



# **High Channel: Vertical**



# Note: for the radiated emissions above 18G, it is the floor noise.

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Report No: 1303024 Page 22 of 60

Date: 2013-03-13



## 7.0 20dB Bandwidth Measurement

## 7.1 Regulation

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

## 7.2 Limits of 20dB Bandwidth Measurement

N/A

## 7.3 Test Procedure.

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span =5MHz, VBW = RBW=100kHz, Sweep = auto Detector function = peak ,Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

#### 7.4 Test Result

EUT	Car D	Car DVD Player		Model		SL-6703	
Mode	Keep Transmitting		Input Voltage			DC12V	
Temperat	rature 24 deg. C,		Humidity			56% RH	
Channel	Channel Frequency (MHz) 20 dB Bandwi (kHz)		idth	Maximum Limit (kHz)		Pass/ Fail	
Low	2402	798				Pass	
Middle	2441	798				Pass	
High	2480	804				Pass	

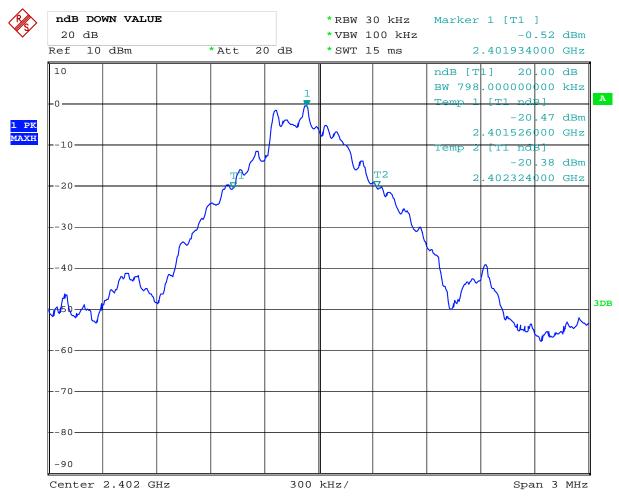
Report No: 1303024 Page 23 of 60

Date: 2013-03-13



# Test Figure:

#### 1. Condition: Low Channel



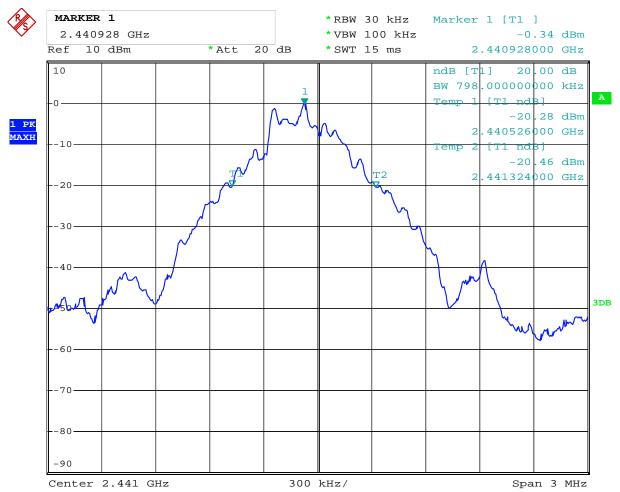
Date: 11.MAR.2013 09:50:22

Report No: 1303024 Page 24 of 60

Date: 2013-03-13



## 2. Condition: Middle Channel



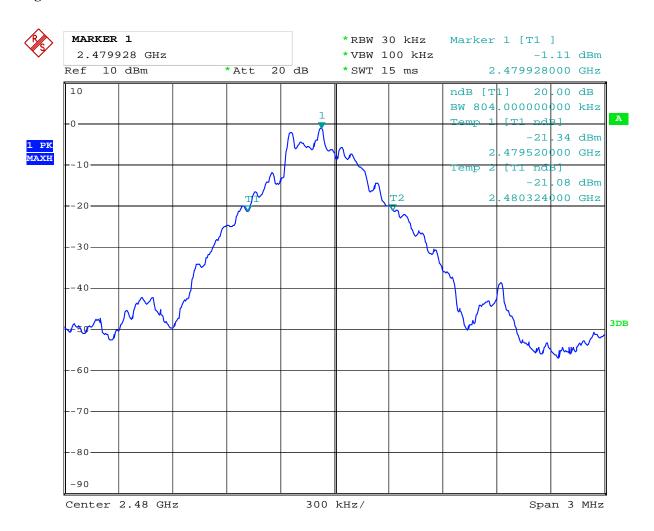
Date: 11.MAR.2013 09:54:15

Report No: 1303024 Page 25 of 60

Date: 2013-03-13



# 3. High Channel



Date: 11.MAR.2013 09:55:17

Report No: 1303024 Page 26 of 60

Date: 2013-03-13



# 8. Maximum Peak Output Power

## 8.1 Regulation

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

# 8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 21dBm.

#### **8.3 Test Procedure**

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW = RBW=3MHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
- 4. Repeat above procedures until all frequencies measured were complete.

Report No: 1303024 Page 27 of 60

Date: 2013-03-13



## **8.4Test Results**

EUT	Car D	Car DVD Player		SL-6703		
Mode	Keep Transmitting		Input Voltage	DC12V		
Temperatur	Temperature 24 deg. C,		Humidity	56% RH		
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail	
Low	2402	-0.81		30	Pass	
Middle	2441	-0.4	48	30	Pass	
High	2480	-0.4	48	30	Pass	

Note: 1. the result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

Report No: 1303024 Page 28 of 60

Date: 2013-03-13



# 9. Carrier Frequency Separation

## 9.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

# 9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

#### 9.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span; Video (or Average) Bandwidth (VBW)  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.

#### 9.4Test Result

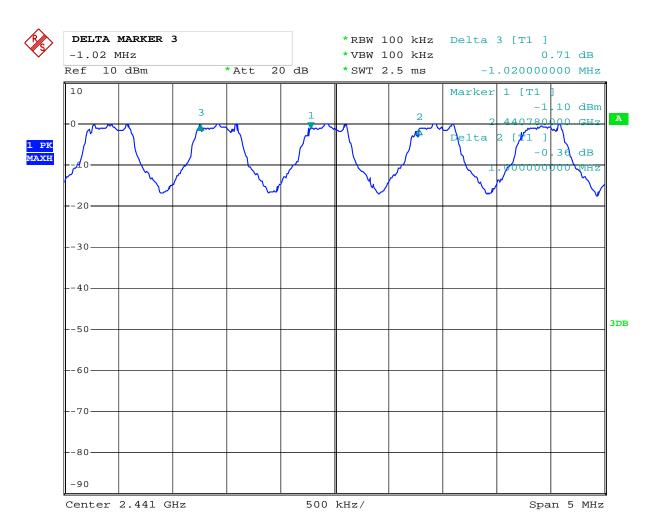
EUT	Car DVD Player		Model		SL-6703	
Mode	Keep Transmitting		Input Voltage		DC12V	
Temperature	24 deg. C,		Humidity	56% RH		
Carrier Frequency Separation		Limit		Pass/ Fail		
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		Pass		

Report No: 1303024 Page 29 of 60

Date: 2013-03-13



# **Test Plots**



Date: 11.MAR.2013 10:32:34

Report No: 1303024 Page 30 of 60

Date: 2013-03-13



# 10. Number of Hopping Channels

## 10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

# 10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

#### 10.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=30kHz, VBW 100kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

#### 10.4Test Result

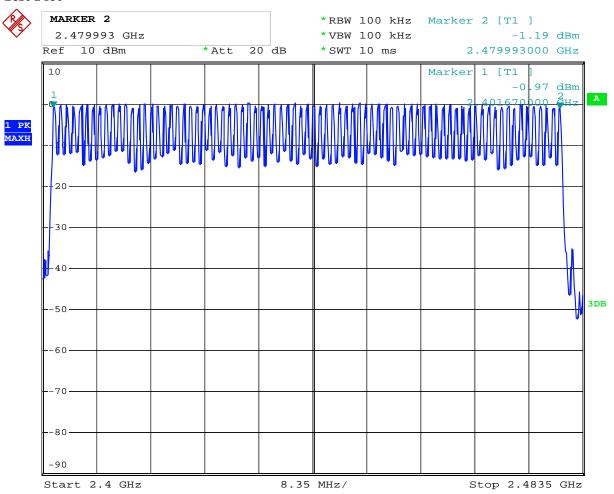
EUT	Car DVD Player		Model		SL-6703		
Mode	Keep Transmitting		Input Voltage			DC12V	
Temperature	24 deg. C,		Humidity			56% RH	
Operating Frequency Number of hopping channel		els	Limit Pass/ I		Pass/ Fail		
2402-2480MHz 79			≥ 1	5	Pass		

Report No: 1303024 Page 31 of 60

Date: 2013-03-13



# **Test Plot**



Date: 11.MAR.2013 10:27:46

Report No: 1303024 Page 32 of 60

Date: 2013-03-13



# 11. Time of Occupancy (Dwell Time)

## 11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

#### 11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

## 11.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW
- ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
- 3. Measure the dwell time using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.
- 5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

Report No: 1303024 Page 33 of 60

Date: 2013-03-13



## 11.4Test Result

EUT		Car DVD Playe	er	Model		SL-6703		
Mode		Keep Transmitti	ng	Input Voltage		DC12V		
Temperatur	re	24 deg. C,		Humidity		56% RH		
Channel		Reading		Hoping Rate		ual	Limit	
Low		3.08		266.667 hop/s		29	0.4s	
Middle		3.06		266.667 hop/s	0.3	26	0.4s	
High		3.08		266.667 hop/s	0.3	29	0.4s	

Actual = Reading  $\times$  (Hopping rate / Number of channels)  $\times$  Test period, Test period = 0.4 [seconds / channel]  $\times$  79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 $\mu$ s with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

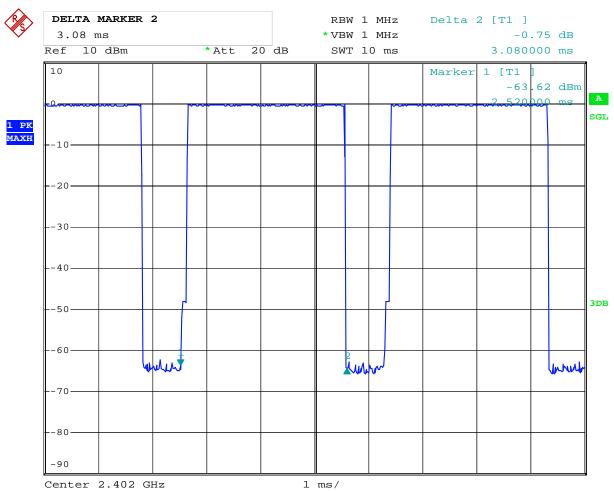
Report No: 1303024 Page 34 of 60

Date: 2013-03-13



## Test Plots:

## Low Channel:



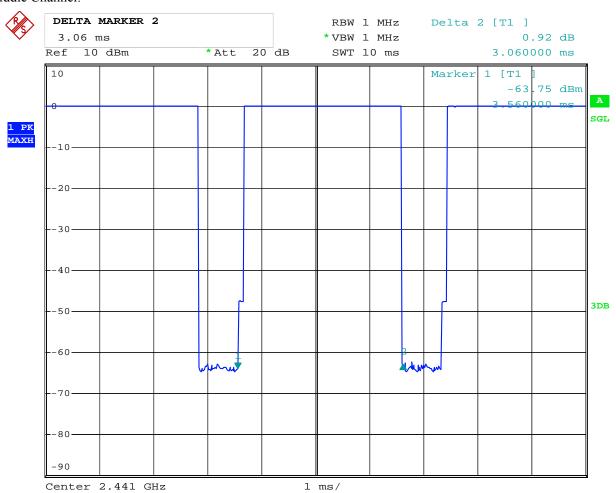
Date: 11.MAR.2013 10:35:20

Report No: 1303024 Page 35 of 60

Date: 2013-03-13



# Middle Channel:



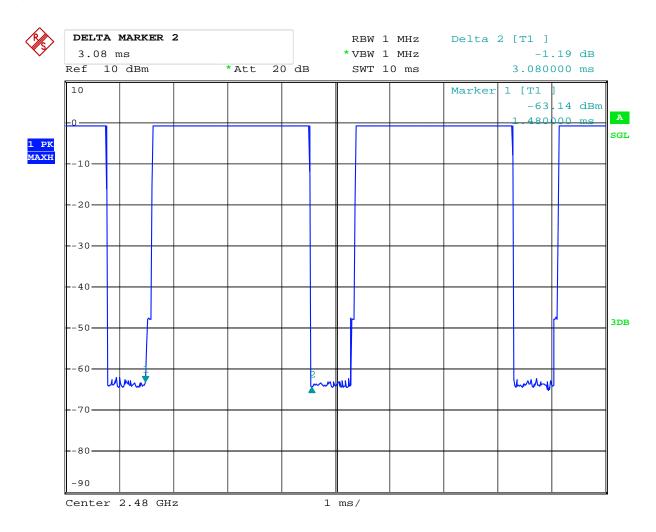
Date: 11.MAR.2013 10:36:22

Report No: 1303024 Page 36 of 60

Date: 2013-03-13



# High Channel



Date: 11.MAR.2013 10:37:29

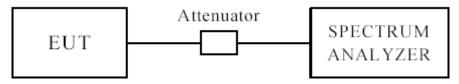
Report No: 1303024 Page 37 of 60

Date: 2013-03-13



# 12 Out of Band Measurement

# 12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

#### 12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

#### 12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

Page 38 of 60

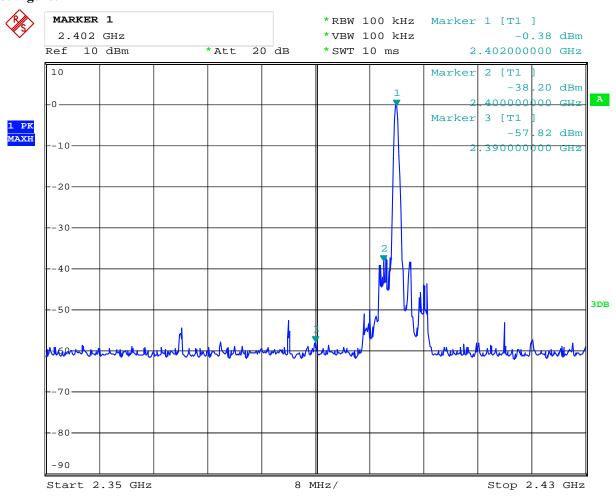
Report No: 1303024 Date: 2013-03-13



#### **12.4** Out of Band Test Result

Product:	Car DVD Player		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC12V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m)	45.6		$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBμV/m)
2390MHz				

#### **Test Figure:**



Date: 11.MAR.2013 10:05:45

Page 39 of 60

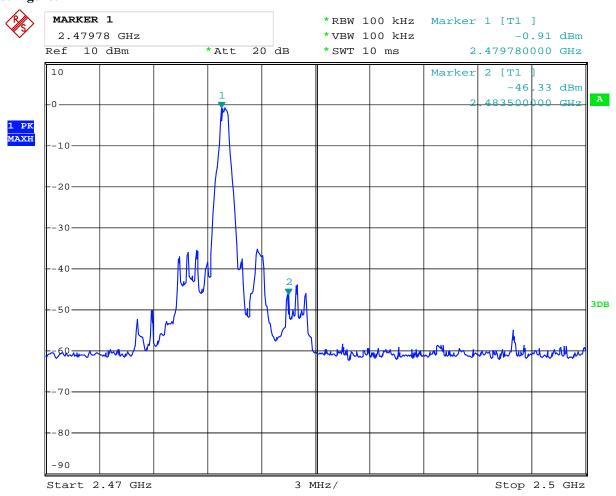
Report No: 1303024 Date: 2013-03-13



# 12.4 Out of Band Test Result

Product:	Car DVD Player		Test Mode:	High Channel
Mode	Keeping Transmitting		Input Voltage	DC12V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 42.3			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 11.MAR.2013 10:15:13

Page 40 of 60

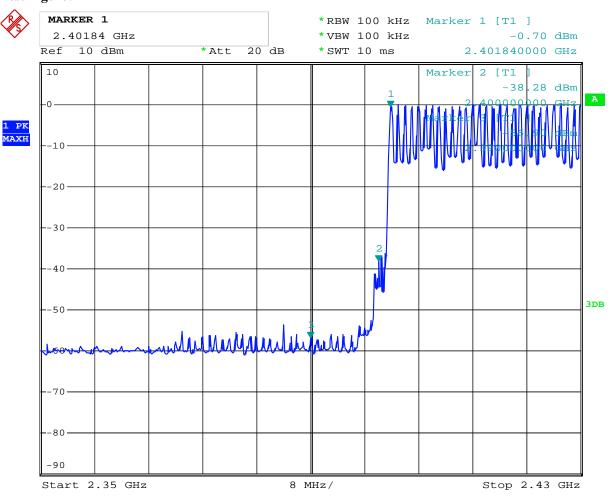
Report No: 1303024 Date: 2013-03-13



#### **12.4** Out of Band Test Result

Product:	Car DVD Player		Test Mode:	Hopping mode
Mode	Keeping Transmitting		Input Voltage	DC12V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 45.2			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2390MHz				

# **Test Figure:**



Date: 11.MAR.2013 10:10:58

Page 41 of 60

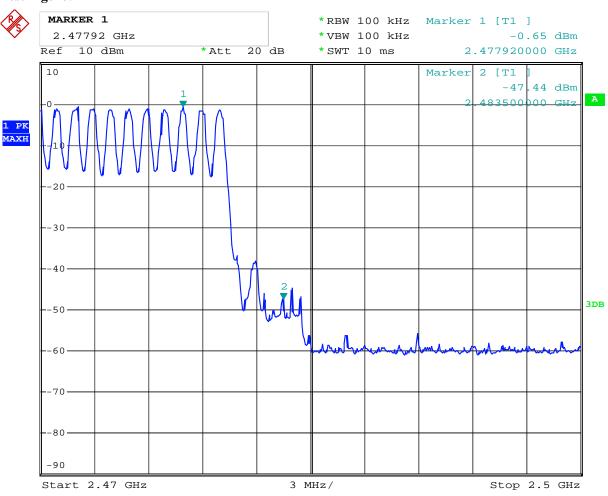
Report No: 1303024 Date: 2013-03-13



# 12.4 Out of Band Test Result

Product:	Car DVD Player		Test Mode:	Hopping mode
Mode	Keeping Transmitting		Input Voltage	DC12V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in	PK (dBμV/m) 42.2			$74(dB\mu V/m)$
Restrict Band	AV(dBμV/m)		Limit	54(dBµV/m)
2483.5MHz				

# **Test Figure:**



Date: 11.MAR.2013 10:13:24

Report No: 1303024 Page 42 of 60

Date: 2013-03-13



# 13.0 Antenna Requirement

## 13.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 13.2 Antenna Connected constructions

The antenna is PCB Printed antenna. The maximum Gain of this antenna is 0dBi

Report No: 1303024 Date: 2013-03-13



# 14.0 Maximum Permissible Exposure

# **Applicable Standard**

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

## (a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   2 ,   H   2 or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

# (b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1.0	30

Note: f=frequency in MHz; \*Plane-wave equivalent power density

### **MPE Calculation Method**

 $E(V/m) = (30*P*G)^{0.5}/d$  Power Density:  $Pd(W/m^2) = E^2/377$ 

 $\mathbf{E} = \text{Electric Field (V/m)}$ 

 $\mathbf{P} = \text{Peak RF output Power (W)}$ 

**G** = EUT Antenna numeric gain (numeric)

 $\mathbf{d}$  = Separation distance between radiator and human body (m)

The formula can be changed to

 $Pd = (30*P*G) / (377*d^2)$ 

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

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Report No: 1303024 Page 44 of 60

Date: 2013-03-13



#### **Calculated Result and Limit**

Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
1	-0.46	0.8995	0.000179	1	Compiles

Report No: 1303024 Page 45 of 60

Date: 2013-03-13



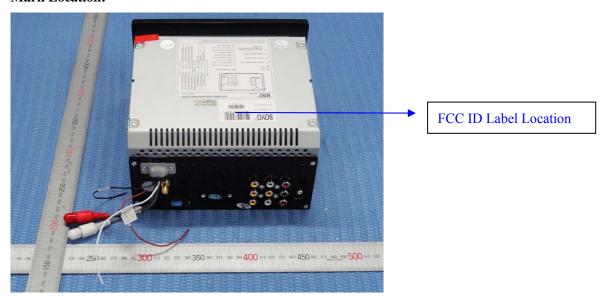
#### 15.0 FCC ID Label

#### **FCC ID: V4HSL-6703**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### **Mark Location:**



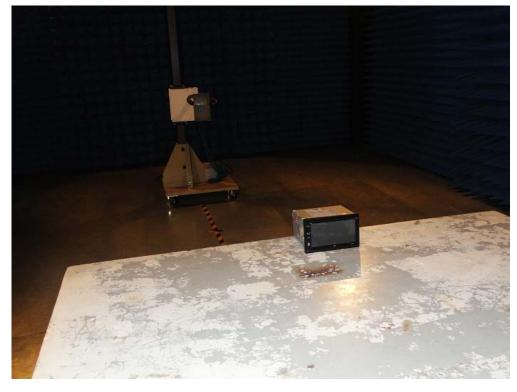
Report No: 1303024 Date: 2013-03-13



#### 16.0 Photo of testing

Conducted Emission Test Setup: -- N/A Radiated Emission Test Setup:





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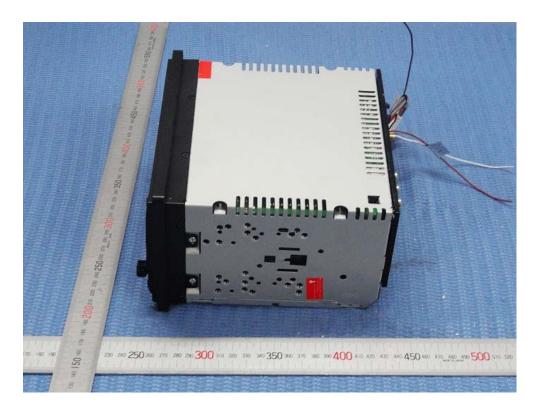
Report No: 1303024 Date: 2013-03-13



# Photographs - EUT

#### Outside view





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Page 48 of 60

Report No: 1303024 Date: 2013-03-13



Outside view





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Page 49 of 60

Report No: 1303024 Date: 2013-03-13



Inside view





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Page 50 of 60

Report No: 1303024 Date: 2013-03-13



#### Inside view





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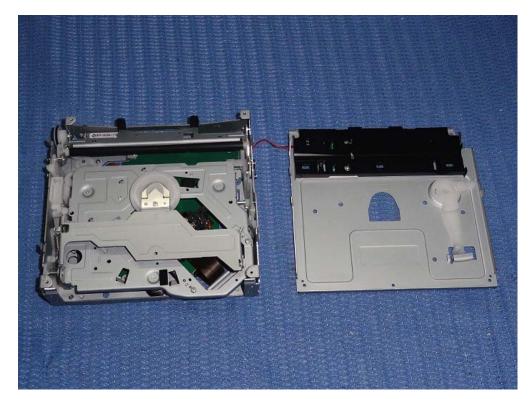
Page 51 of 60

Report No: 1303024 Date: 2013-03-13



Inside view





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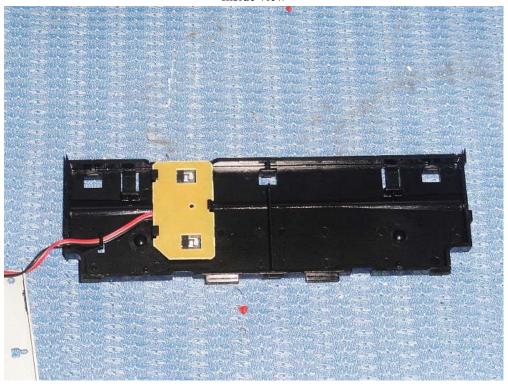
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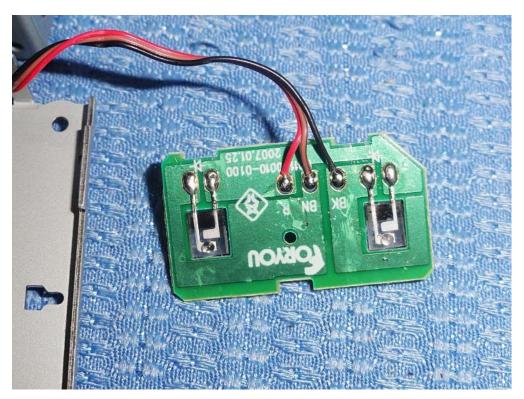
Page 52 of 60

Report No: 1303024 Date: 2013-03-13



# Inside view





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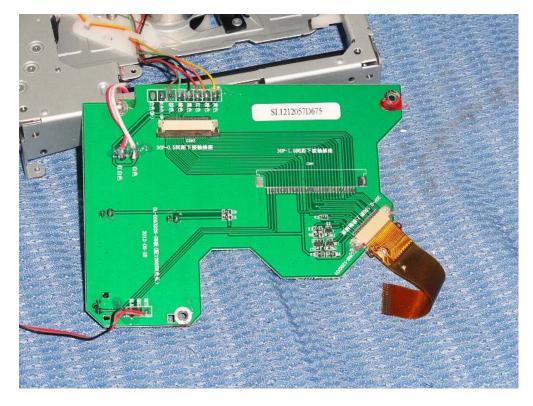
Page 53 of 60

Report No: 1303024 Date: 2013-03-13



#### Inside view





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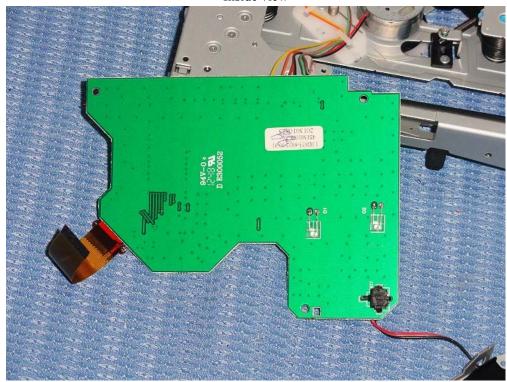
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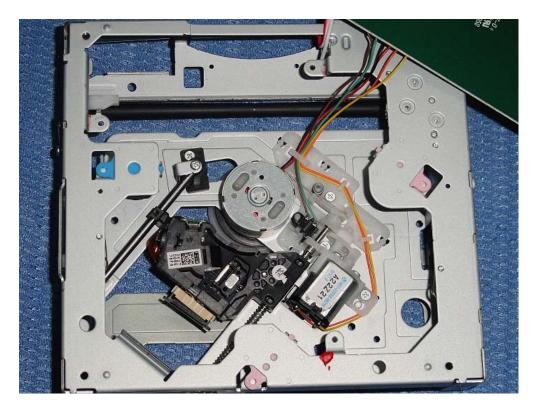
Page 54 of 60

Report No: 1303024 Date: 2013-03-13



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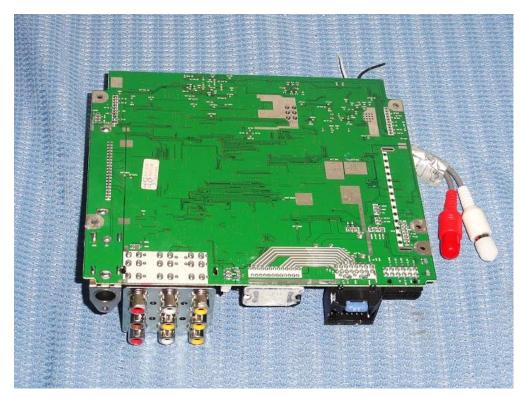
Page 55 of 60

Report No: 1303024 Date: 2013-03-13



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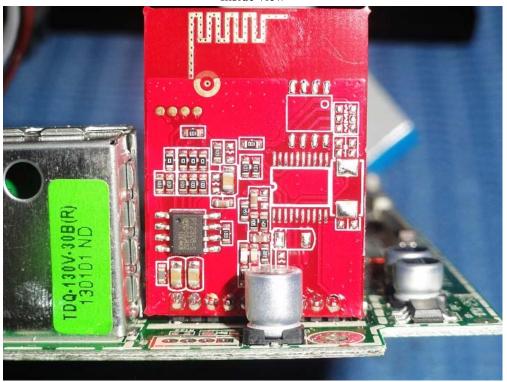
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Page 56 of 60

Report No: 1303024 Date: 2013-03-13



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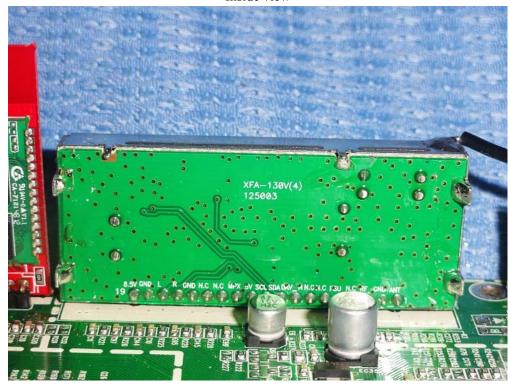
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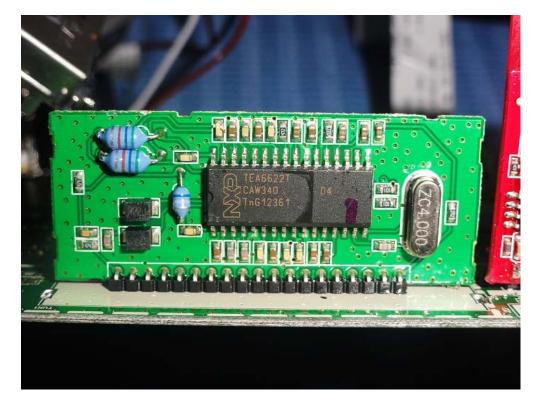
Page 57 of 60

Report No: 1303024 Date: 2013-03-13



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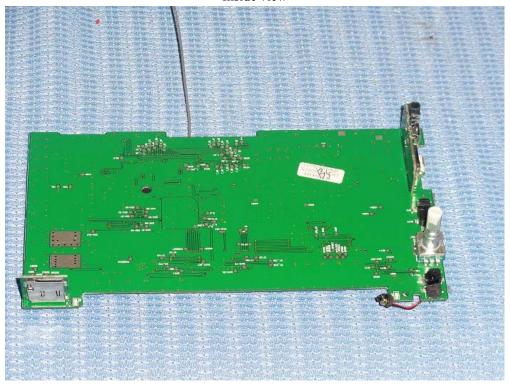
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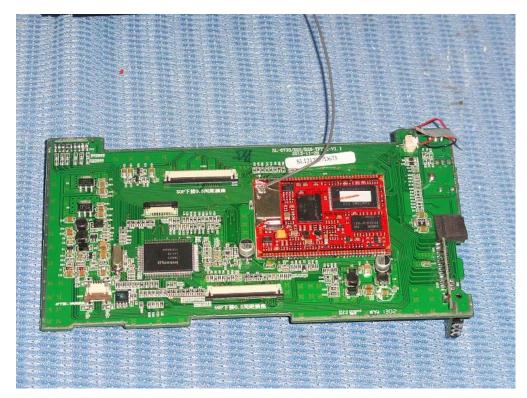
Page 58 of 60

Report No: 1303024 Date: 2013-03-13



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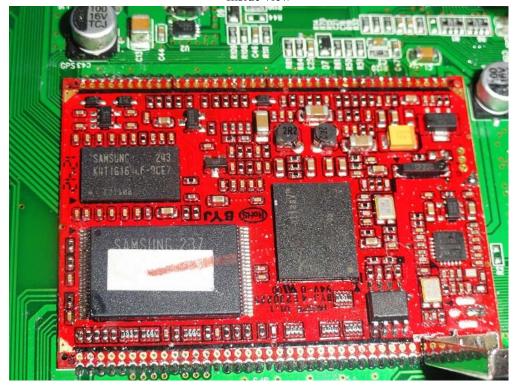
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Page 59 of 60

Report No: 1303024 Date: 2013-03-13



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Report No: 1303024 Page 60 of 60

Date: 2013-03-13



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End of the report