Shenzhen Huatongwei International Inspection Co., Ltd.
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CNASL1225

FCC PART 15 SUBPART C TEST REPORT FCC PART 15.247 & IC TEST REPORT RSS-210

Report Reference No.....:	**TRE1208004901**
FCC ID .....:	**DI2-TDL6192**
IC. .....:	**1700D-TDL6192**
Compiled by (position+printed name+signature)..:	File administrators Eric Zhang
Supervised by (position+printed name+signature)..:	Test Engineer Tim Zhang
Approved by (position+printed name+signature)..:	Manager Wenliang Li
Date of issue.....:	Sep 10, 2012
Testing Laboratory Name .....:	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address .....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Applicant's name.....:	**Computime Ltd.**
Address .....:	9/F, Tower One, Lippo Centre, 89 Queensway, Hong Kong
Test specification:	
Standard .....:	**FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz** **IC RSS-210** **IC RSS-Gen issue 3**
TRF Originator.....:	Shenzhen Huatongwei International Inspection CO., Ltd
Master TRF.....:	Dated 2006-06

Test item description .....:	US SMART PLUG
Trade Mark .....:	/
Model/Type reference.....:	TDL6192
Listed Models .....:	/
Result.....:	**Positive**

T E S T R E P O R T

Test Report No. :	TRE1208004901	Sep 10, 2012 Date of issue

Equipment under Test	:	US SMART PLUG
Model /Type	:	TDL6192
Listed Models	:	/
Applicant	:	**Computime Ltd.**
Address	:	9/F, Tower One, Lippo Centre, 89 Queensway, Hong Kong
Manufacturer		**Computime Ltd.**
Address	:	Computime Technology Park, DanZhuTou Cun, Buji, Longgang Region, Shenzhen, China

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:
FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices
KDB558074:DTS Meas Guidance v01 of Measurement Procedure
RSS-210 Issue 8 December 2010 : **Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment**
RSS-Gen Issue 3 December 2010 :General Requirements and Information for the Certification of Radio Apparatus

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Aug 15, 2012
Testing commenced on	:	Aug 15, 2012
Testing concluded on	:	Sep 10, 2012

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	●	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

2.3. Short description of the Equipment under Test (EUT)

2.4GHz (US SMART PLUG (TDL6192))

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides AT command to control the EUT for staying in continous transmitting and receiving mode for testing. There are sixteen channels of EUT, and the test carried out at the channel 11(lowest), channel 18(middle) and channel 26 (highest) channels.

Channel	Frequency	Channel	Frequency
11	**2405 MHz**	19	2445 MHz
12	2410 MHz	20	2450 MHz
13	2415 MHz	21	2455 MHz
14	2420 MHz	22	2460 MHz
15	2425 MHz	23	2465 MHz
16	2430 MHz	24	2470 MHz
17	2435 MHz	25	2475 MHz
18	**2440 MHz**	**26**	**2480 MHz**

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: DI2-TDL6192** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and **IC: 1700D-TDL6192**filing to comply with RSS-210.

2.7. Modifications

No modifications were implemented to meet testing criteria.

2.8. NOTE

1. The EUT is a an IEEE 802.15 ZigBee Standard type device,The functions of the EUT listed as below:

	Test Standards	Reference Report
Zigbee	FCC Part 15 Subpart C (Section15.247)& RSS-210	TRE1208004901
Zigbee	MPE report	TRE1208004902

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
Zigbee	√	—	—	—

3. The EUT provides one completed transmitter and receiver.

Modulation Mode	TX Function
Zigbee	1TX

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. 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 662850, Renewal date June. 01, 2012, valid time is until June 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the authorization is valid through July 07, 2013

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2009. Valid time is until Dec. 19, 2012.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2010. Valid time is until May 06, 2013.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC PART 15 15.247 & RSS-210 & RSS-Gen			
FCC Part 15.207	RSS-GEN	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	RSS-210 8.2(a)	6dB Bandwidth(FCC)/ 20dB Bandwidth(IC)	PASS
FCC Part 15.247(d)	RSS-210 8.5	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	RSS-210 8.4	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	RSS-210 8.2(b)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	RSS-GEN	Radiated Emissions	PASS
FCC Part 15.247(d)	RSS-210 8.5	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	RSS-GEN	Antenna Requirement	PASS
FCC Part1.1307 (b)	RSS-102	MPE Evaluation	PASS
N/A	RSS-Gen	Receiver Spurious Emissions	PASS

Remark: The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.6. Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ULTRA-BROADBAND ANTENNA	Rohde&Schwarz	HL562	100015	2011/10/23
2	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2011/10/23
3	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/ 0017	2011/10/23
4	TURNTABLE	ETS	2088	2149	2011/10/23
5	ANTENNA MAST	ETS	2075	2346	2011/10/23
6	EMI TEST OFTWARE	Rohde&Schwarz	ESK1	N/A	2011/10/23
7	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2011/10/23
8	Amplifer	Sonoma	310N	E009-13	2011/10/23
9	JS amplifer	Rohde&Schwarz	JS4-00101800-28-5A	F201504	2011/10/23
10	High pass filter	Compliance Direction systems	BSU-6	34202	2011/10/23
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	470	2011/10/23
12	Amplifer	Compliance Direction systems	PAP1-40	585	2011/10/23

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2011/10/23
2	Power Meter	Anritsu	ML2487A	6K00001568	2011/10/23
3	Power Meter Sensor	Anritsu	ML2491A	0630989	2011/10/23
4	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2011/10/23
5	Spectrum Analyzer	AGILENT	E4407B	MY44210775	2011/10/23

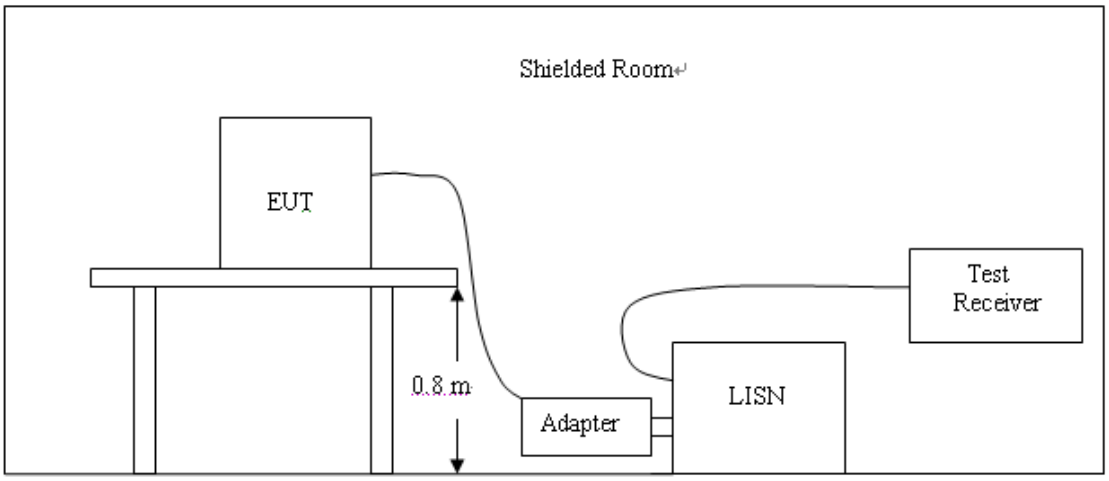
AC Power Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2011/10/23
2	EMI Test Receiver	Rohde&Schwarz	ESCS 30	100038	2011/10/23
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2011/10/23
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	2011/10/23

The Calibration Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
2 Support equipment, if needed, was placed as per ANSI C63.4-2009
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009
4 The EUT received DC12V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

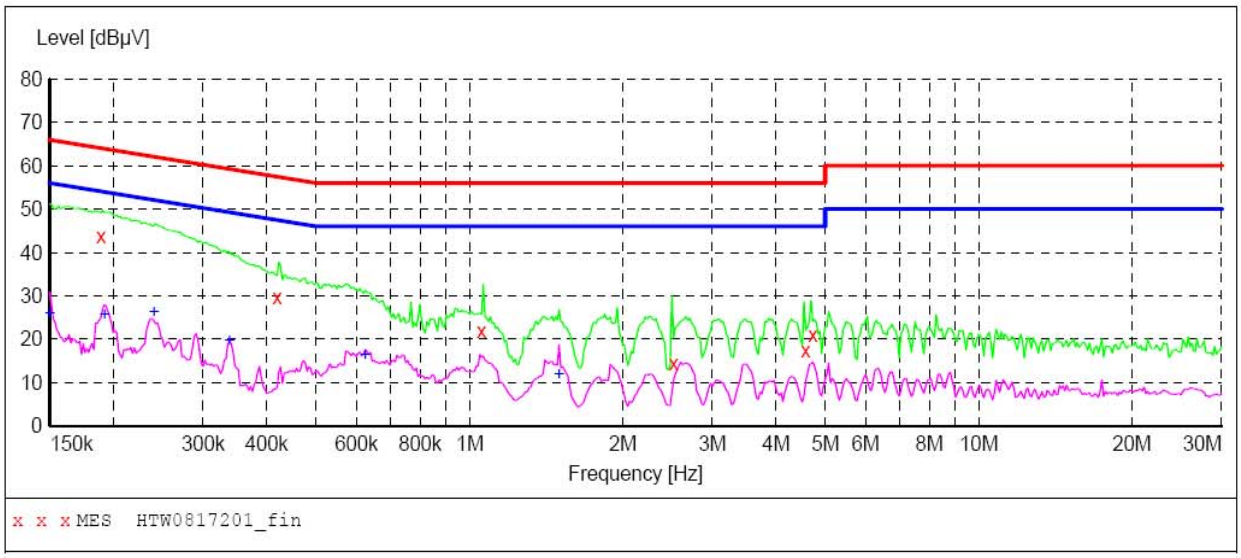
Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0817201_fin"

8/17/2012 9:19AM

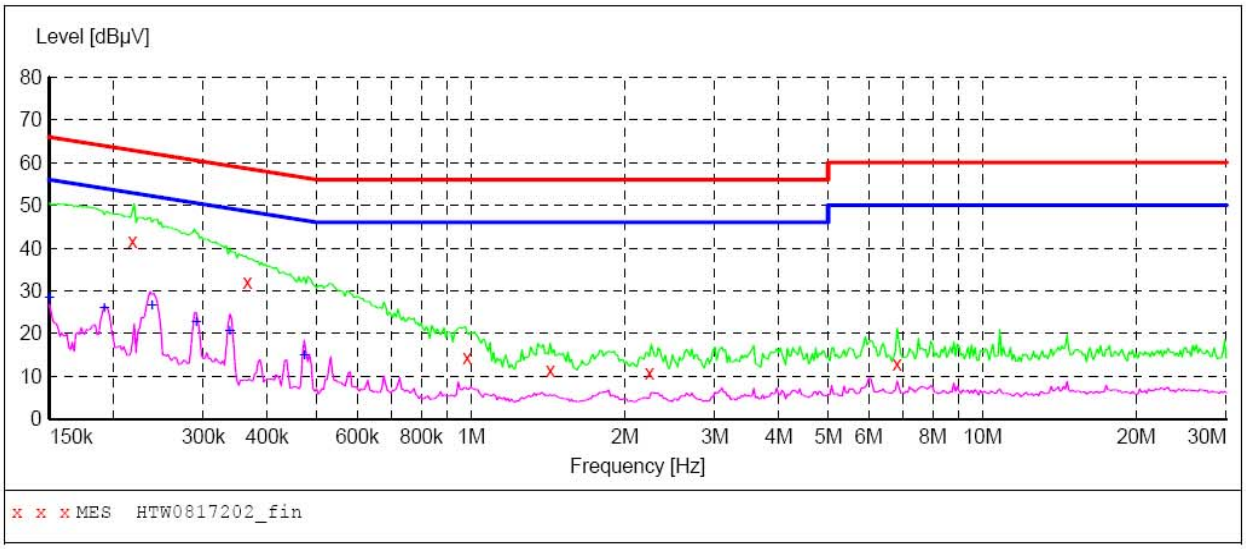
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.188990	43.80	9.7	64	20.3	QP	L1	GND
0.419270	29.70	9.7	58	27.8	QP	L1	GND
1.056620	22.00	9.9	56	34.0	QP	L1	GND
2.518365	14.30	9.8	56	41.7	QP	L1	GND
4.577820	17.50	9.8	56	38.5	QP	L1	GND
4.726080	20.90	9.8	56	35.1	QP	L1	GND

MEASUREMENT RESULT: "HTW0817201_fin2"

8/17/2012 9:19AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	25.90	9.8	56	30.1	AV	L1	GND
0.192024	25.50	9.7	54	28.4	AV	L1	GND
0.240020	26.20	9.7	52	25.9	AV	L1	GND
0.338113	19.60	9.7	49	29.6	AV	L1	GND
0.624486	16.40	9.8	46	29.6	AV	L1	GND
1.500317	11.60	9.9	46	34.4	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0817202_fin"

8/17/2012 9:28AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.218140	41.70	9.7	63	21.2	QP	N	GND
0.366150	32.10	9.7	59	26.5	QP	N	GND
0.983499	14.50	9.9	56	41.5	QP	N	GND
1.430281	11.40	9.9	56	44.6	QP	N	GND
2.234660	10.80	9.8	56	45.2	QP	N	GND
6.818455	13.10	9.8	60	46.9	QP	N	GND

MEASUREMENT RESULT: "HTW0817202_fin2"

8/17/2012 9:28AM

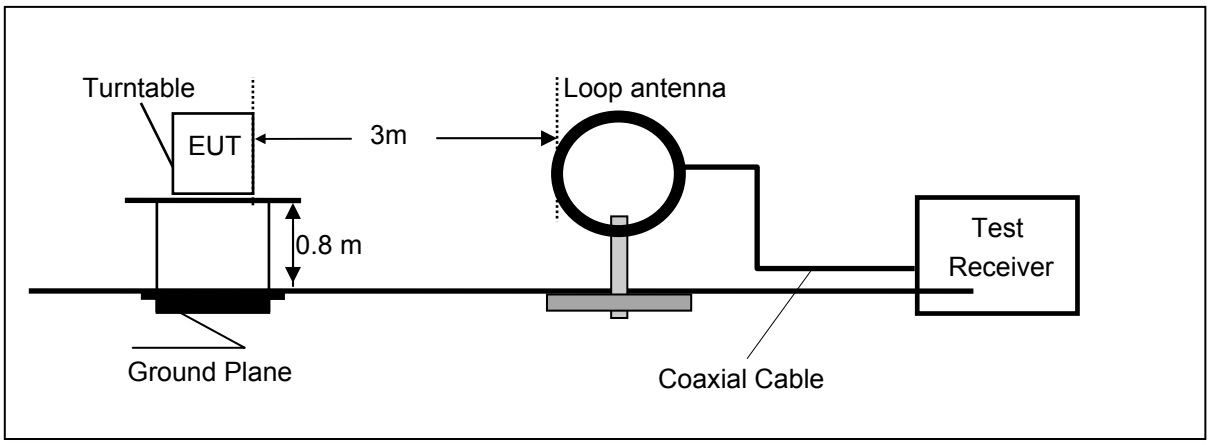
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	28.30	9.8	56	27.7	AV	N	GND
0.192024	25.90	9.7	54	28.0	AV	N	GND
0.238120	26.40	9.7	52	25.8	AV	N	GND
0.290606	22.40	9.7	51	28.1	AV	N	GND
0.338113	20.40	9.7	49	28.8	AV	N	GND
0.472500	14.60	9.7	47	31.9	AV	N	GND

4.2. Radiated Emission

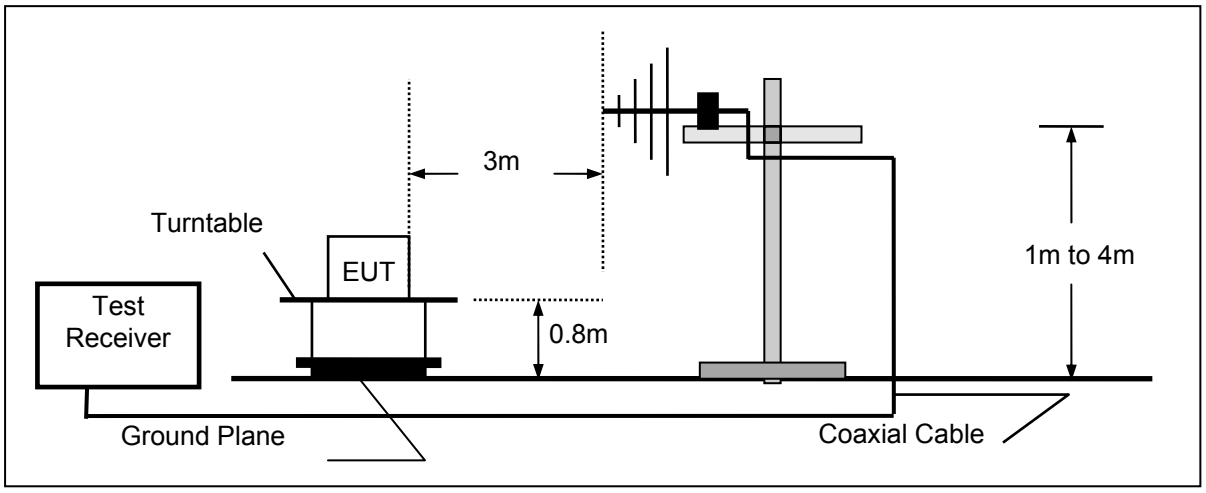
TEST CONFIGURATION

Radiated Emission Test Set-Up

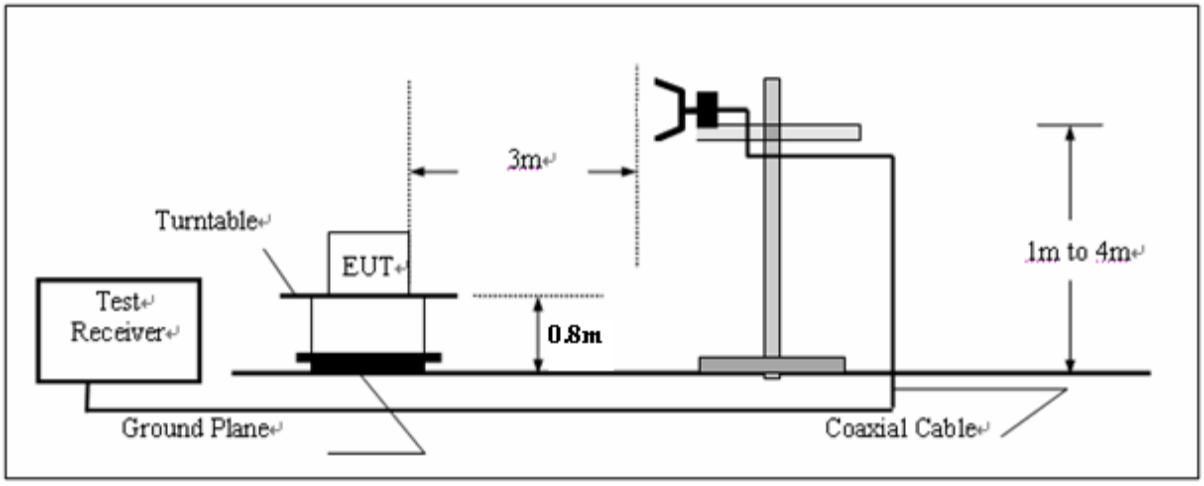
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The test frequency from 9KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL + AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

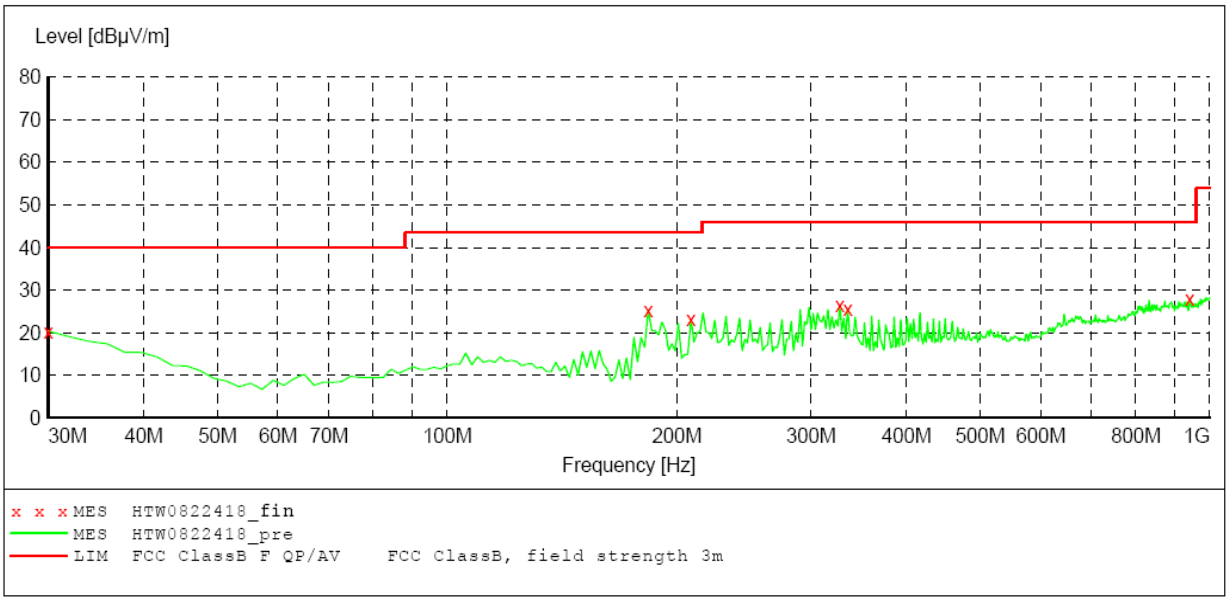
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
0.51	47.16	73.11	25.95	QP	Pass
1.32	43.61	65.87	22.26	QP	Pass
16.05	41.96	69.54	27.58	QP	Pass
21.36	45.78	69.54	23.76	QP	Pass

For 30MHz to 1000MHz

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



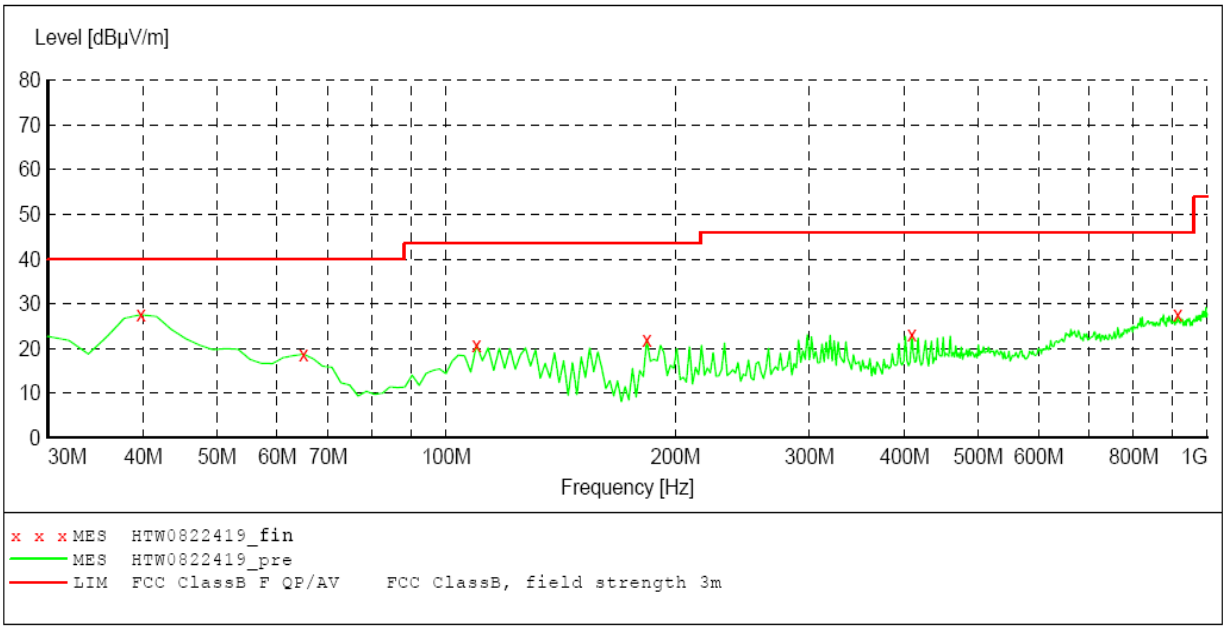
MEASUREMENT RESULT: "HTW0822418_fin"

8/22/2012 8:37PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	20.40	-11.1	40.0	19.6	QP	100.0	298.00	HORIZONTAL
183.567134	25.40	-22.3	43.5	18.1	QP	300.0	304.00	HORIZONTAL
208.837675	23.20	-21.1	43.5	20.3	QP	100.0	269.00	HORIZONTAL
327.414830	26.50	-16.4	46.0	19.5	QP	100.0	263.00	HORIZONTAL
335.190381	25.70	-16.6	46.0	20.3	QP	100.0	263.00	HORIZONTAL
941.683367	28.10	-7.4	46.0	17.9	QP	300.0	105.00	HORIZONTAL

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT: "HTW0822419_fin"

8/22/2012 8:38PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.719439	27.60	-16.4	40.0	12.4	QP	100.0	202.00	VERTICAL
64.989980	18.80	-23.8	40.0	21.2	QP	100.0	183.00	VERTICAL
109.699399	20.80	-19.5	43.5	22.7	QP	100.0	57.00	VERTICAL
183.567134	22.00	-22.3	43.5	21.5	QP	100.0	172.00	VERTICAL
409.058116	23.20	-15.3	46.0	22.8	QP	100.0	0.00	VERTICAL
914.468938	27.60	-7.3	46.0	18.4	QP	100.0	39.00	VERTICAL

Above 1G

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Channel 11-2405MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2405.00	109.8	PK			1.00	74	113.20	28.3	4.90	-36.6	-3.40
1	*2405.00	102.3	AV			1.00	74	105.70	28.3	4.90	-36.6	-3.40
2	4810.00	50.86	PK	74.00	23.14	1.00	178	47.66	32.7	7.00	-36.5	3.20
2	4810.00	--	AV	54.00	--	1.00	178	--	32.7	7.00	-36.5	3.20
3	7215.00	53.63	PK	74.00	20.37	1.00	321	44.23	35.8	8.90	-35.3	9.40
3	7215.00	--	AV	54.00	--	1.00	321	--	35.8	8.90	-35.3	9.40
4	9620.00	62.58	PK	74.00	11.42	1.00	48	49.98	37.2	10.20	-34.8	12.60
4	9620.00	45.52	AV	54.00	8.48	1.00	48	32.92	37.2	10.20	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
11	*2405.00	108.1	PK			1.00 V	158	111.50	28.3	4.90	-36.6	-3.40
1	*2405.00	101.4	AV			1.00 V	158	104.80	28.3	4.90	-36.6	-3.40
2	4810.00	50.01	PK	74.00	23.99	1.00 V	54	46.81	32.7	7.00	-36.5	3.20
2	4810.00	--	AV	54.00	--	1.00 V	54	--	32.7	7.00	-36.5	3.20
3	7215.00	53.20	PK	74.00	20.80	1.00 V	332	43.80	35.8	8.90	-35.3	9.40
3	7215.00	--	AV	54.00	--	1.00 V	332	--	35.8	8.90	-35.3	9.40
4	9620.00	62.10	PK	74.00	11.90	1.00	65	49.50	37.2	10.20	-34.8	12.60
4	9620.00	44.65	AV	54.00	9.35	1.00 V	65	32.05	37.2	10.20	-34.8	12.60

Channel 18-2440MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2440.00	110.9	PK			1.00	247	114.10	28.3	5.10	-36.6	-3.20
1	*2440.00	103.0	AV			1.00	247	106.20	28.3	5.10	-36.6	-3.20
2	4880.00	50.25	PK	74.00	23.75	1.00	105	46.85	32.3	7.60	-36.5	3.40
2	4880.00	--	AV	54.00	--	1.00	105	--	32.3	7.60	-36.5	3.40
3	7320.00	53.21	PK	74.00	20.79	1.00	345	43.81	36.1	8.60	-35.3	9.40
3	7320.00	--	AV	54.00	--	1.00	345	--	36.1	8.60	-35.3	9.40
4	9760.00	65.21	PK	74.00	8.79	1.00	158	52.61	37.2	10.20	-34.8	12.60
4	9760.00	47.28	AV	54.00	6.72	1.00	158	34.68	37.2	10.20	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2440.00	108.8	PK			1.00	74	112.00	28.3	5.10	-36.6	-3.20
1	*2440.00	102.0	AV			1.00	74	105.20	28.3	5.10	-36.6	-3.20
2	4880.00	51.20	PK	74.00	22.8	1.00	85	47.8	32.3	7.60	-36.5	3.40
2	4880.00	--	AV	54.00	--	1.00	85	--	32.3	7.60	-36.5	3.40
3	7320.00	53.20	PK	74.00	20.8	1.00	321	43.8	36.1	8.60	-35.3	9.40
3	7320.00	--	AV	54.00	--	1.00	321	--	36.1	8.60	-35.3	9.40
4	9760.00	63.85	PK	74.00	10.15	1.00	228	51.25	37.2	10.20	-34.8	12.60
4	9760.00	46.22	AV	54.00	7.78	1.00	228	33.62	37.2	10.20	-34.8	12.60

Channel 26-2480MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	88.20	PK			1.00	320	91.50	28.2	5.10	-36.6	-3.30
1	*2480.00	84.40	AV			1.00	320	87.70	28.2	5.10	-36.6	-3.30
2	4960.00	50.25	PK	74.00	23.75	1.00	145	46.45	33.0	7.00	-36.2	3.80
2	4960.00	--	AV	54.00	--	1.00	145	--	33.0	7.00	-36.2	3.80
3	7340.00	52.58	PK	74.00	21.42	1.00	57	43.18	36.2	8.50	-35.3	9.40
3	7340.00	--	AV	54.00	--	1.00	57	--	36.2	8.50	-35.3	9.40
4	9920.00	63.45	PK	74.00	10.55	1.00	115	50.75	37.4	10.10	-34.8	12.70
4	9420.00	45.64	AV	54.00	8.36	1.00	115	32.94	37.4	10.10	-34.8	12.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	*2480.00	89.90	PK			1.00 V	52	93.20	28.2	5.10	-36.6	-3.30
1	*2480.00	85.60	AV			1.00 V	52	88.90	28.2	5.10	-36.6	-3.30
2	4960.00	50.02	PK	74.00	23.98	1.00 V	245	46.22	36.2	8.50	-35.3	3.80
2	4960.00	--	AV	54.00	--	1.00 V	245	--	36.2	8.50	-35.3	3.80
3	7340.00	53.02	PK	74.00	20.98	1.00 V	68	43.62	37.4	10.10	-34.8	9.40
3	7340.00	--	AV	54.00	--	1.00 V	68	--	37.4	10.10	-34.8	9.40
4	9920.00	63.55	PK	74.00	10.45	1.00 V	158	50.85	28.2	5.10	-36.6	12.70
4	9420.00	45.12	AV	54.00	8.88	1.00 V	158	32.42	28.2	5.10	-36.6	12.70

Suprious emission in restricted band												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
1	2390.00	52.80	PK	74.00	21.20	1.00 H	122	56.20	28.3	4.90	36.6	-3.40
1	2390.00	45.30	AV	54.00	8.70	1.00 H	122	48.70	28.3	4.90	36.6	-3.40
2	2390.00	51.10	PK	74.00	22.90	1.00 V	350	54.50	28.3	4.90	36.6	-3.40
2	2390.00	44.40	AV	54.00	9.60	1.00 V	350	47.80	28.3	4.90	36.6	-3.40
3	2483.50	55.61	PK	74.00	18.39	1.00 H	240	58.91	28.2	5.10	36.6	-3.30
3	2483.50	51.81	AV	54.00	2.19	1.00 H	240	55.11	28.2	5.10	36.6	-3.30
4	2483.50	53.31	PK	74.00	20.69	1.00 V	322	56.61	28.2	5.10	36.6	-3.30
4	2483.50	49.01	AV	54.00	4.99	1.00 V	322	52.31	28.2	5.10	36.6	-3.30

REMARKS：

1. ∗Undetectable

2. The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz

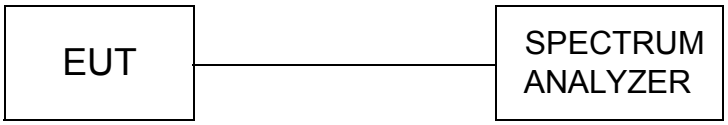
3.The Transd=Cabel loss +Antenna factor +pre-amplifier factor

4. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

5. "---" means the margin at least 10dB, so not record the test values.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the Sepectrum Analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

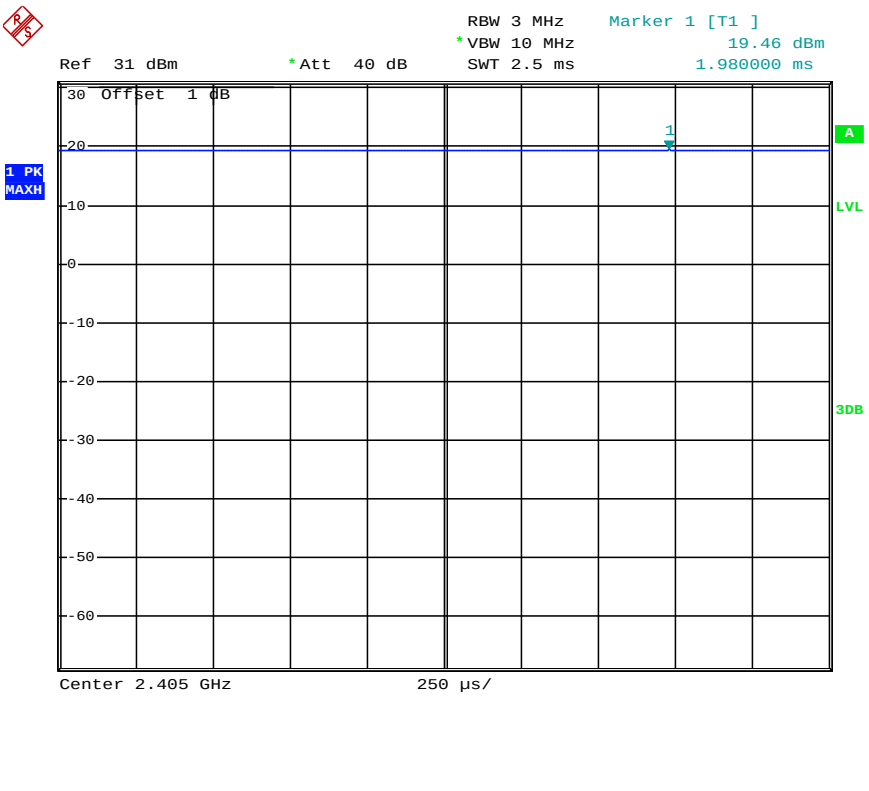
TEST RESULTS

Channel Number	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
11	2405	19.46	30	PASS
18	2440	19.46	30	PASS
26	2480	0.64	30	PASS

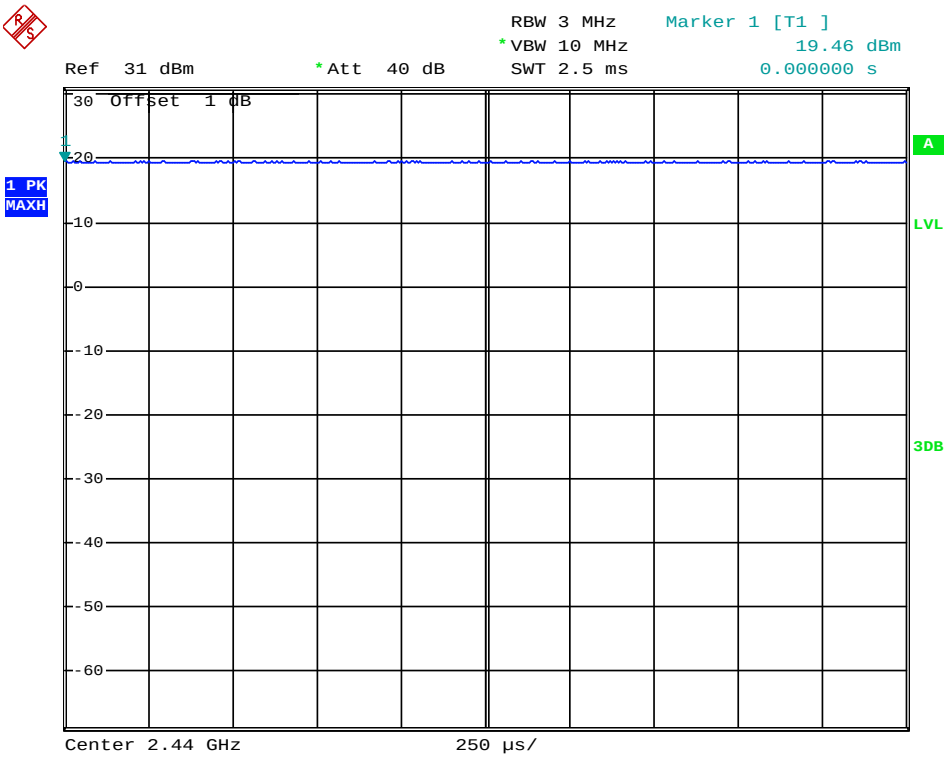
Note: The test results including the cable lose.

Photos of Power Measurement

Channel 11

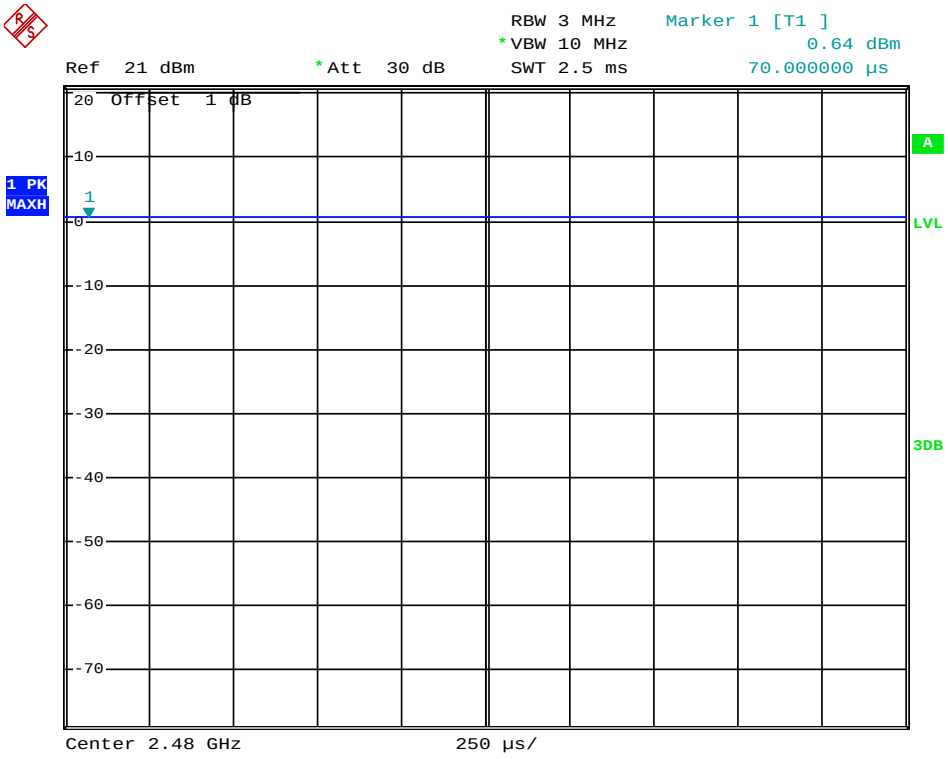


Channel 18



Date: 22.AUG.2012 16:40:02

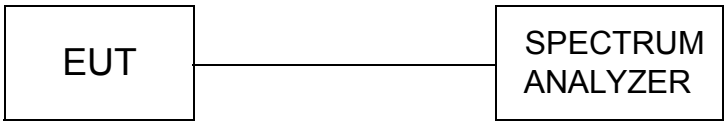
Channel 26



Date: 10.SEP.2012 17:36:13

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

1.Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

2.Set the RBW = 100 kHz.

3.Set the VBW 300 kHz.

4.Set the span to 5-30 % greater than the EBW

5.Detector = peak.

6.Sweep time = auto couple.

7.Trace mode = max hold.

8.Allow trace to fully stabilize.

9.Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

10.Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(3 kHz/100 kHz= -15.2 dB).

11.The resulting peak PSD level must be 8 dBm.

Follow KDB 558074 D01 DTS Meas Guidance v01 of measurement procedure PKPSD

LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

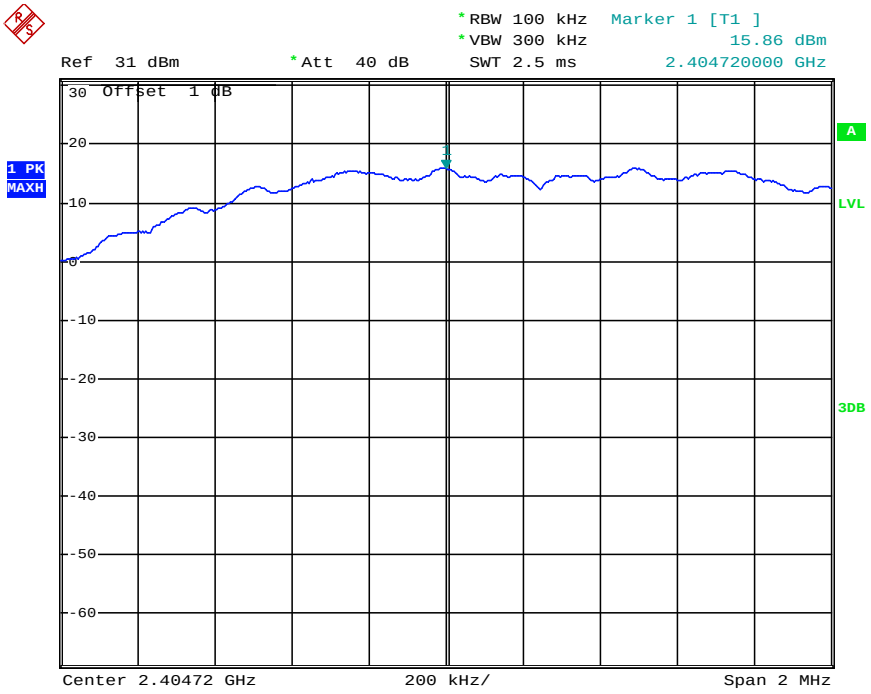
TEST RESULTS

CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/100KHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
11	2404.72	15.86	0.66	8	PASS
18	2440.21	15.90	0.70	8	PASS
26	2480.21	-2.92	-18.12	8	PASS

Note: The test results including the cable lose.

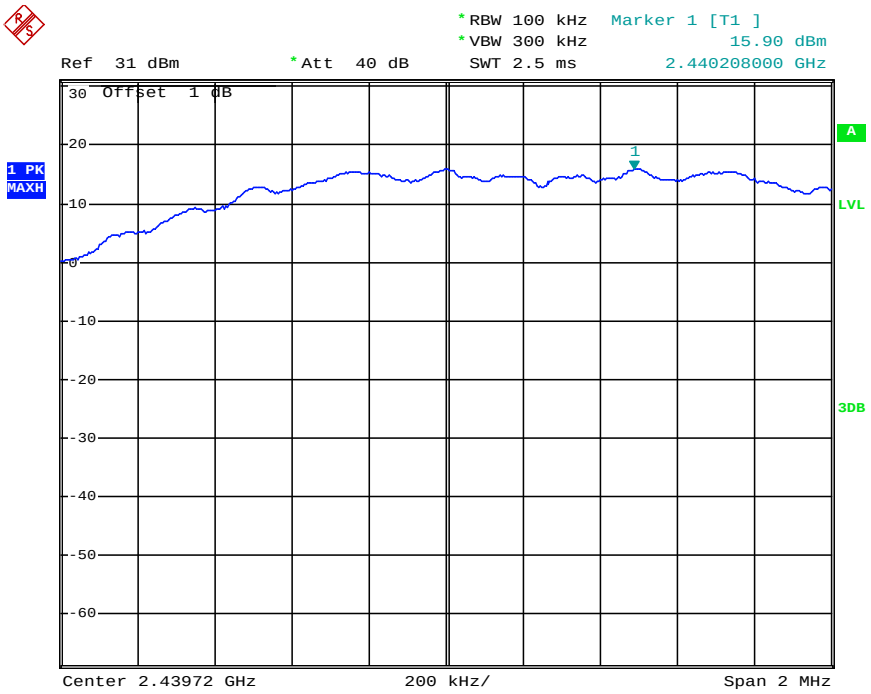
Photos of Power Spectral Density Measurement

Channel 11



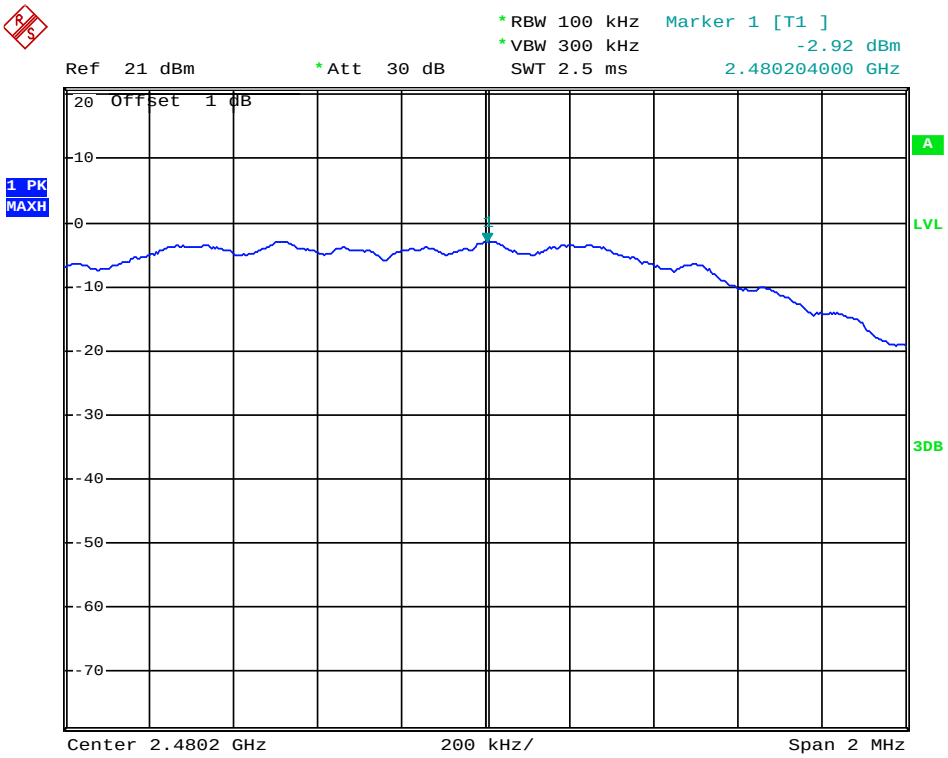
Date: 22.AUG.2012 16:30:37

Channel 18



Date: 22.AUG.2012 16:33:17

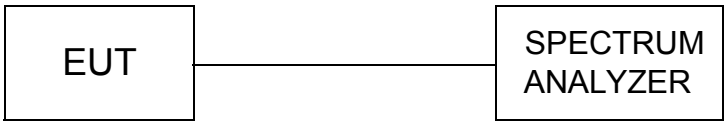
Channel 26



Date: 10.SEP.2012 17:38:32

4.5. Band Edge Compliance of RF Emission

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4:2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW=100kHz and VBM= 300KHz, to measure the conducted peak band edge.

LIMIT

Below -20dB of the highest emission level in operating band.

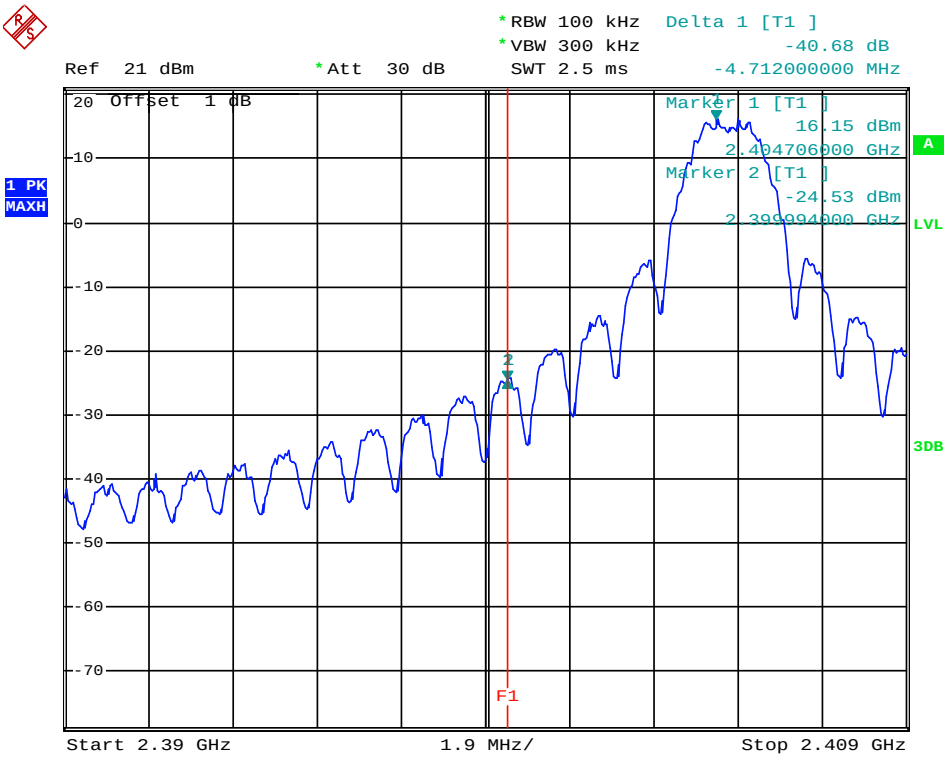
TEST RESULTS

Suprious emission in restricted band please see page 17

Plots of Conducted Band Edge Measurement

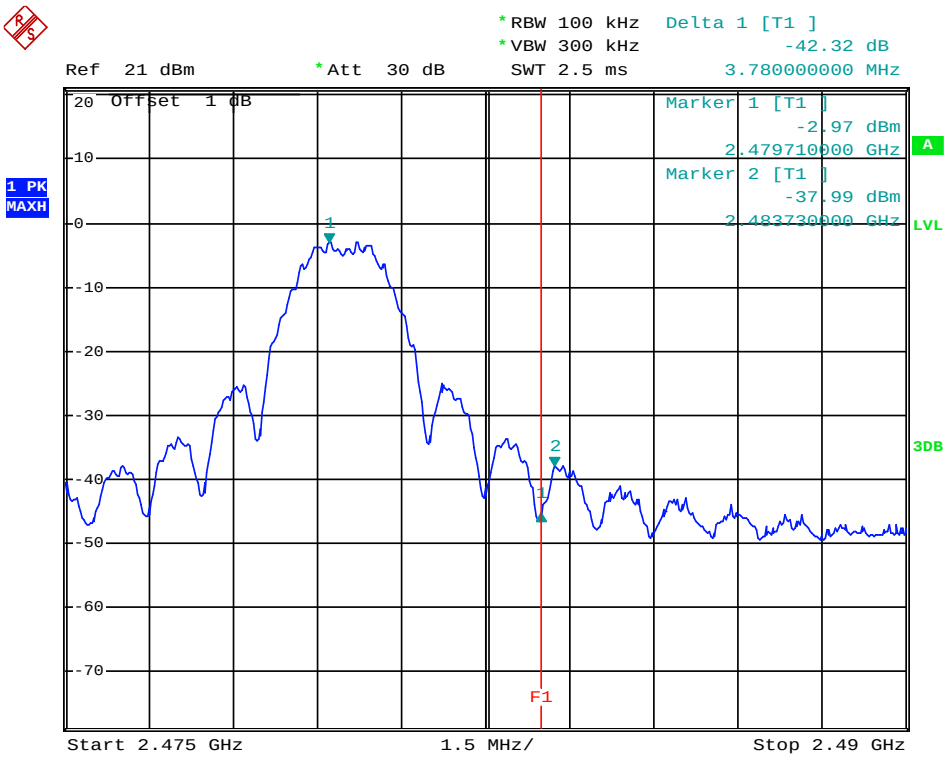
CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	Delta Peak to Band emission (dBc)	LIMIT (dBc)	PASS/FAIL
11	2399.99	40.68	20	PASS
26	2483.73	42.32	20	PASS

Channel 11



Date: 22.AUG.2012 14:58:41

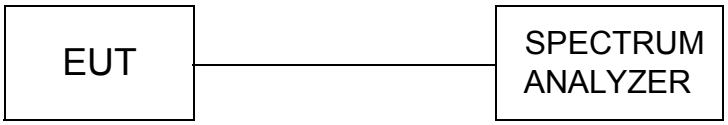
Channel 26



Date: 10.SEP.2012 17:40:53

4.6. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and mwasure frequeny range from 30MHz to 26.5GHz.

LIMIT

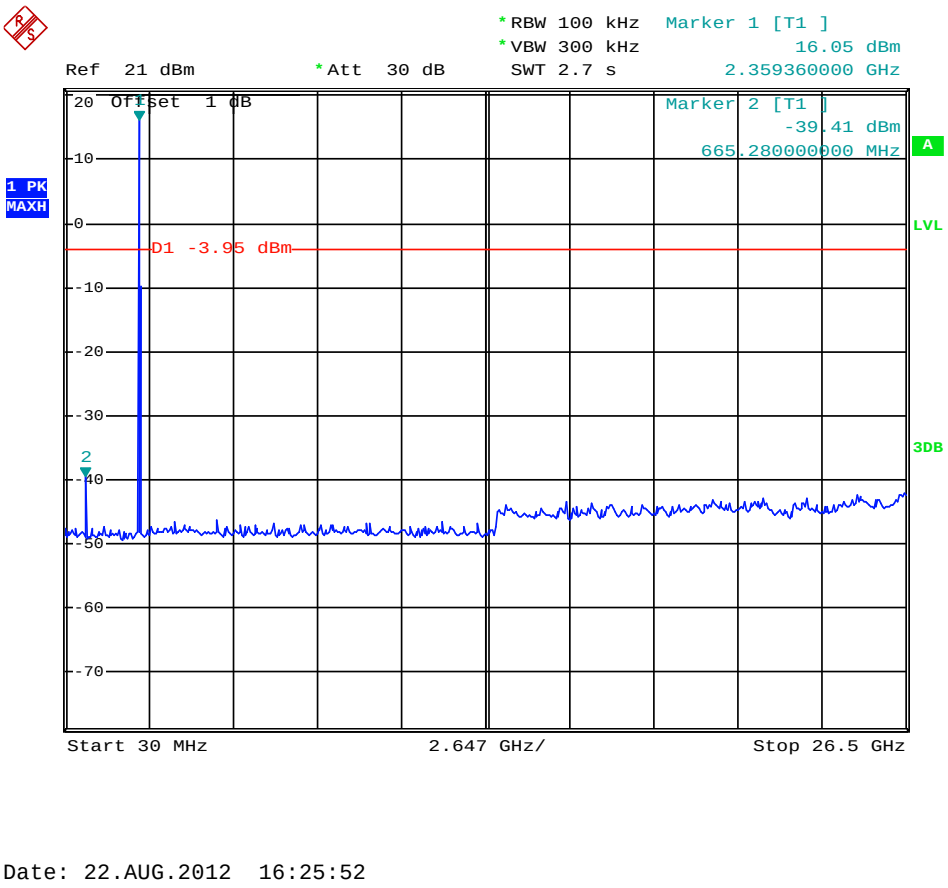
1. Below -20dB of the highest emission level in operating band.

2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

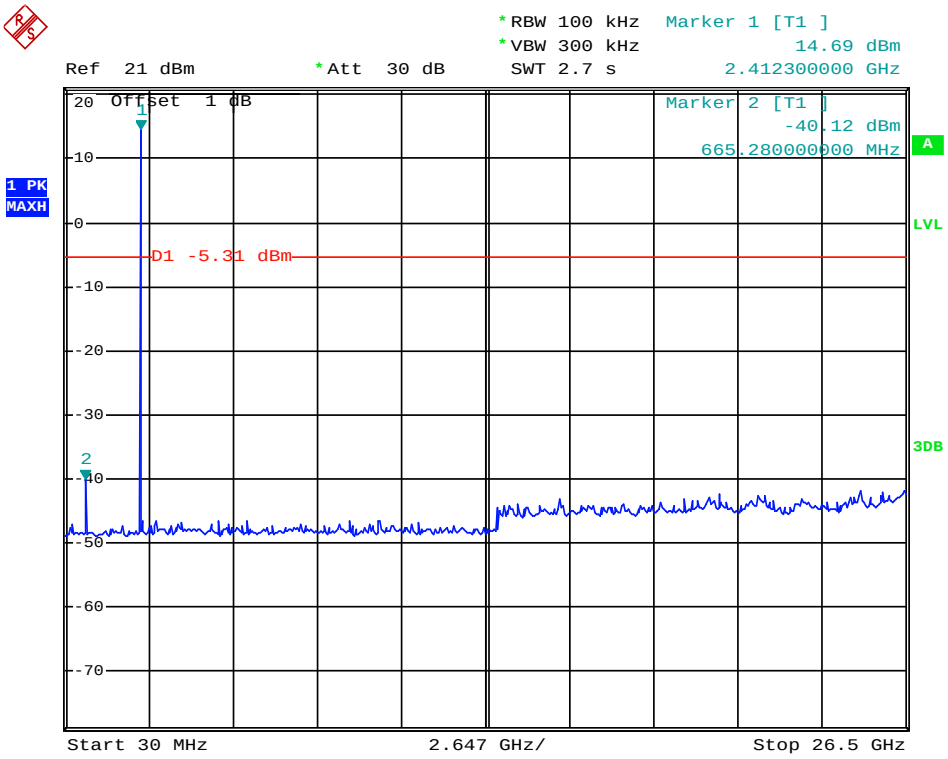
Photos of Spurious RF Conducted Emission Measurement

Channel 11



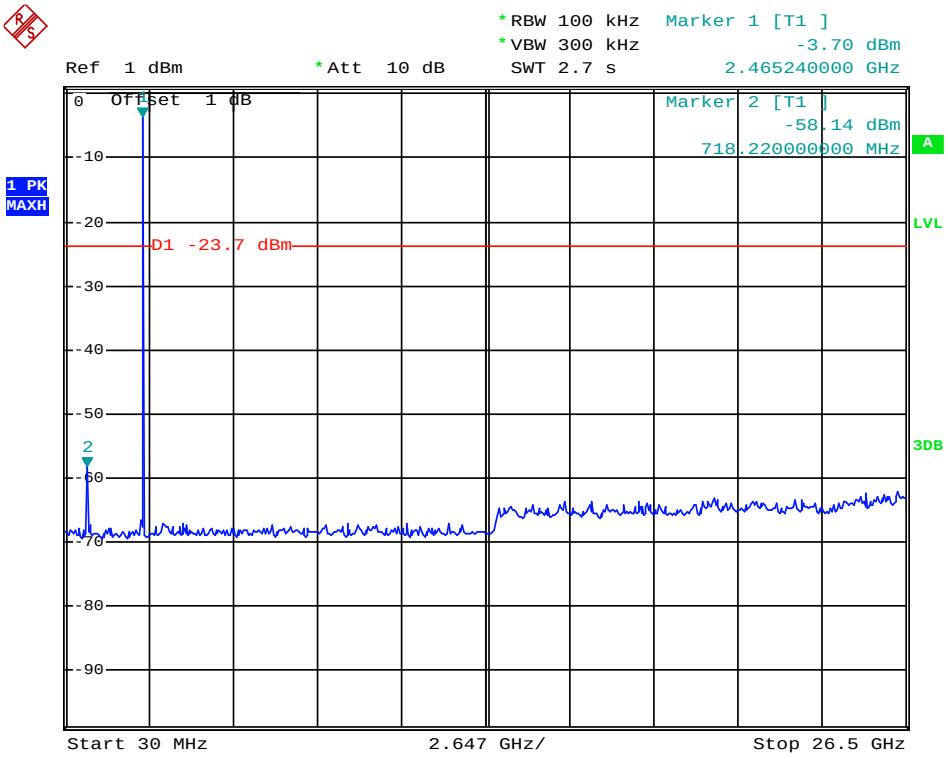
Date: 22.AUG.2012 16:25:52

Channel 18



Date: 22.AUG.2012 16:21:17

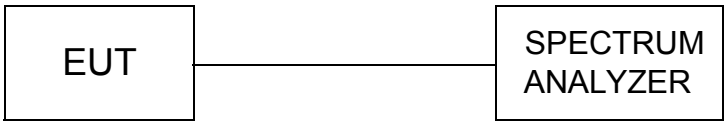
Channel 26



Date: 10.SEP.2012 17:42:27

4.7. 6dB & 20dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with100 KHz RBW and 300KHz VBW.

The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

LIMIT

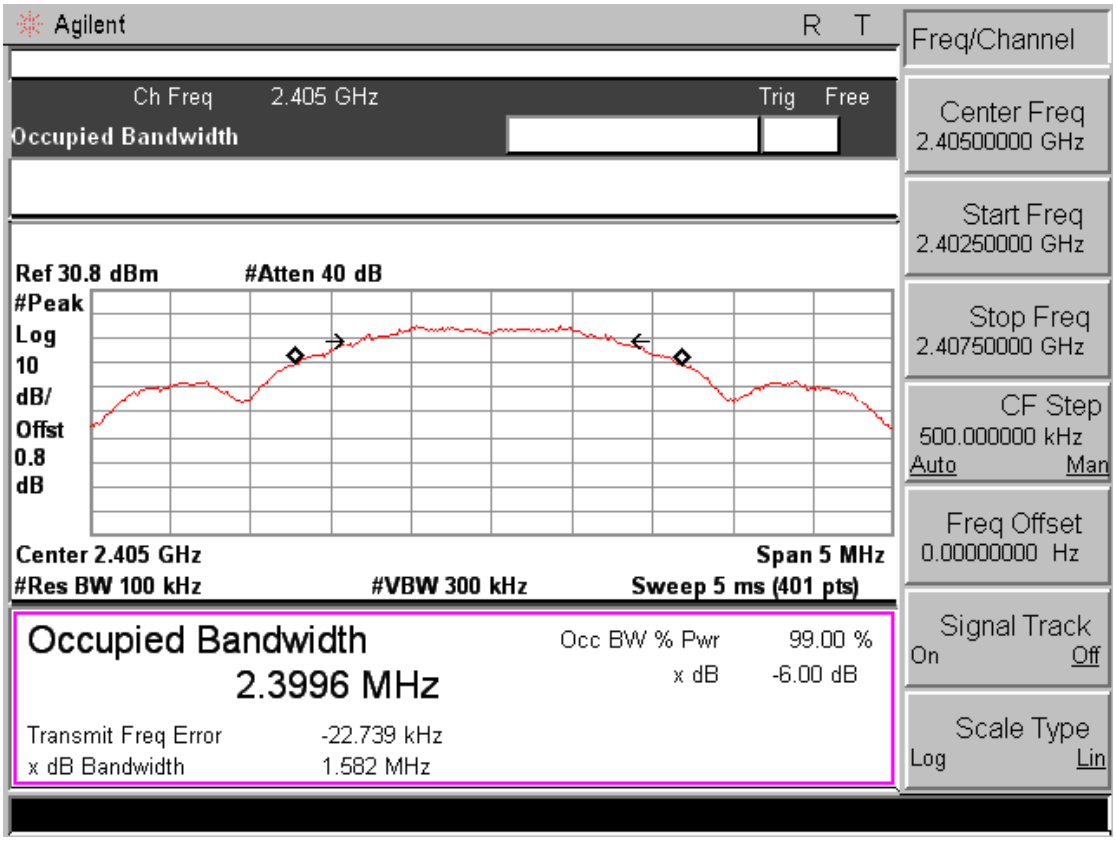
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

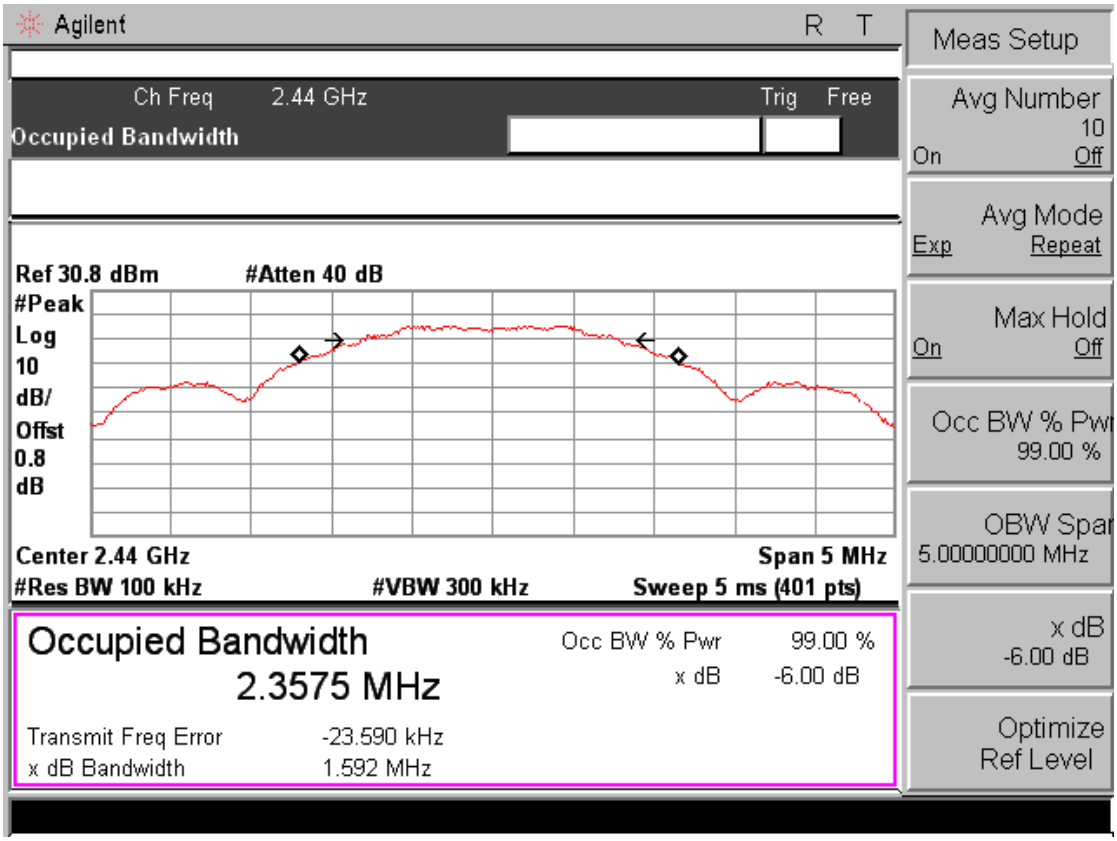
CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
11	2405	1.582	2.399	0.5	PASS
18	2440	1.592	2.357	0.5	PASS
26	2480	1.611	2.453	0.5	PASS

Photos of 6dB Bandwidth Measurement and 99% Occupied Bandwidth

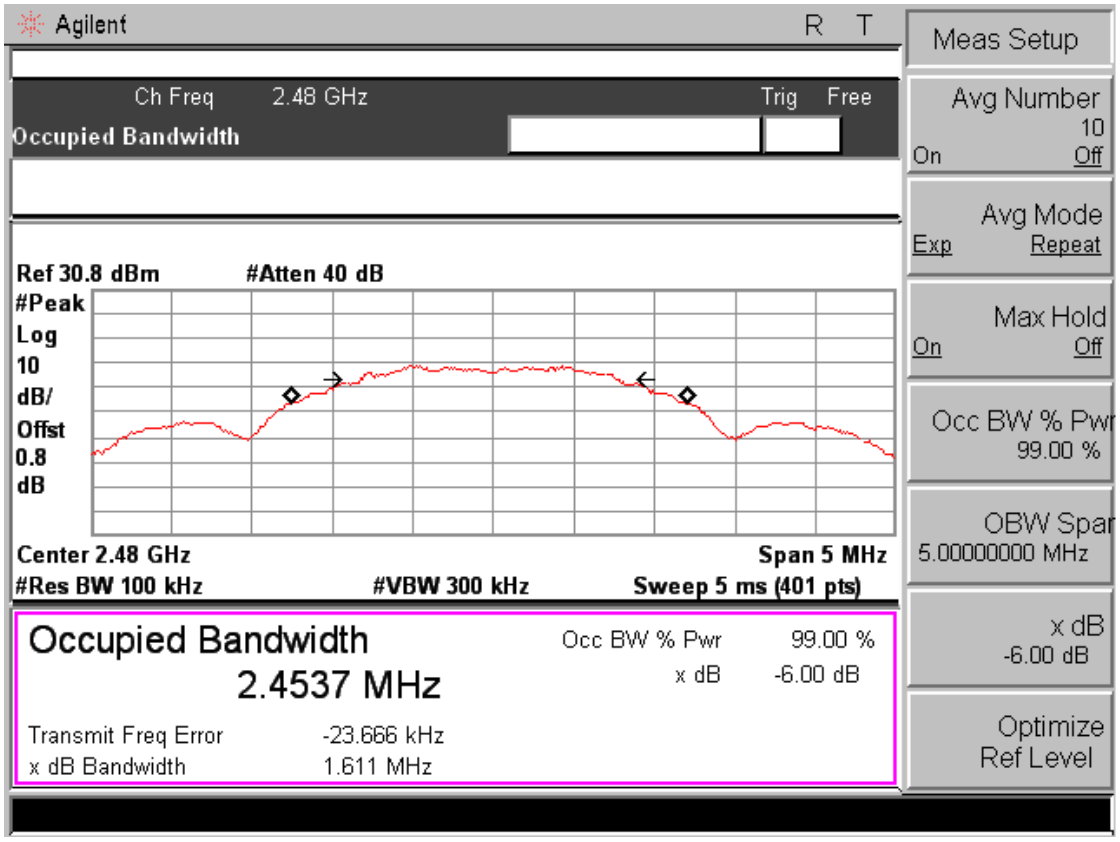
Channel 11



Channel 18



Channel 26



4.8. Receiver spurious Emissions *(Not For FCC Review)*

TEST APPLICABLE

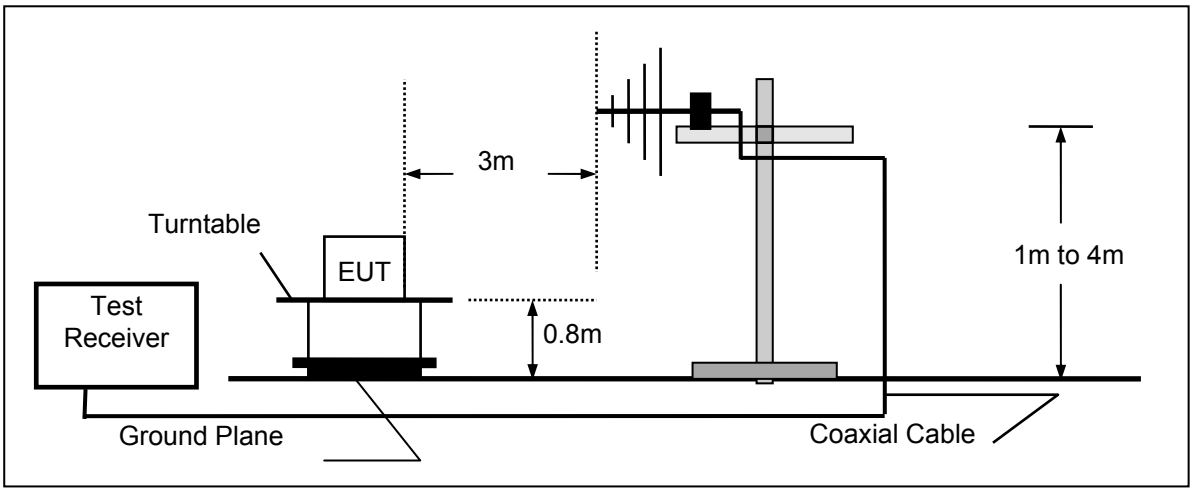
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

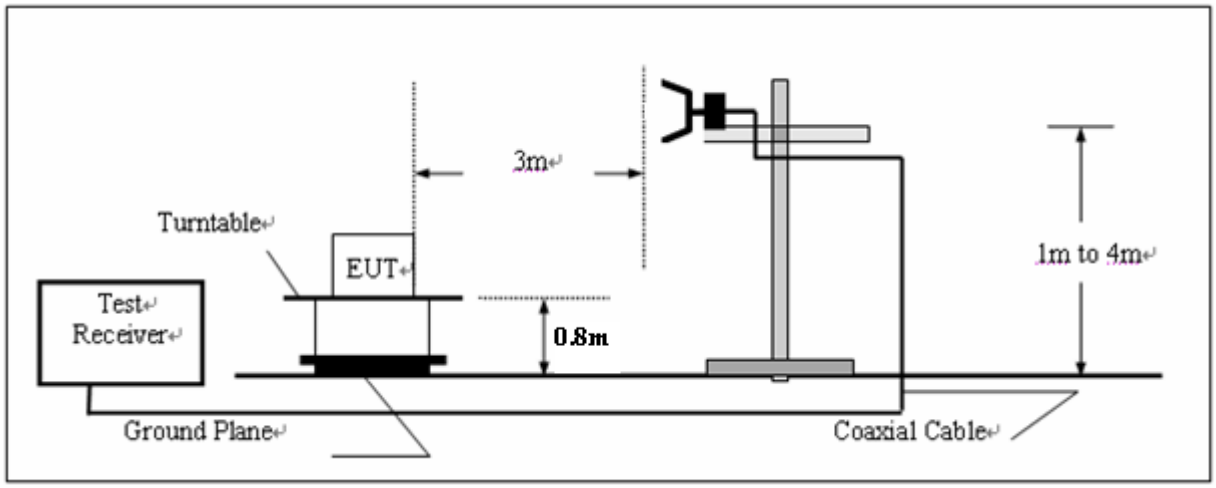
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz



(B) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4 Repeat above procedures until all frequency measurements have been completed.

RECEIVER RADIATED SPOUIOUS LIMIT

For unintentional device, according to § 15.109(a) and RSS-Gen, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

TEST RESULTS

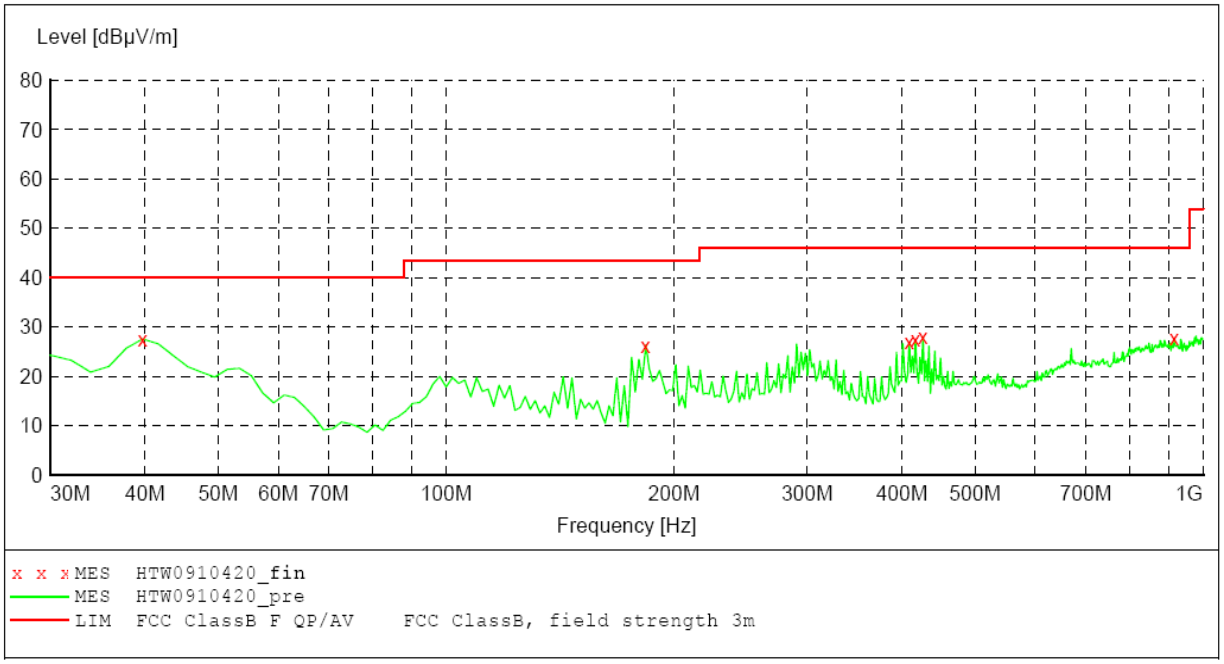
The Radiated Measurement are performed to the five channels (the top channel, the middle channel and the bottom channel), the datum recorded below is the worst case for each channel separation;and the EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.

TEST RESULTS

Below 1GHz(Test Mode: Receiving):

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562



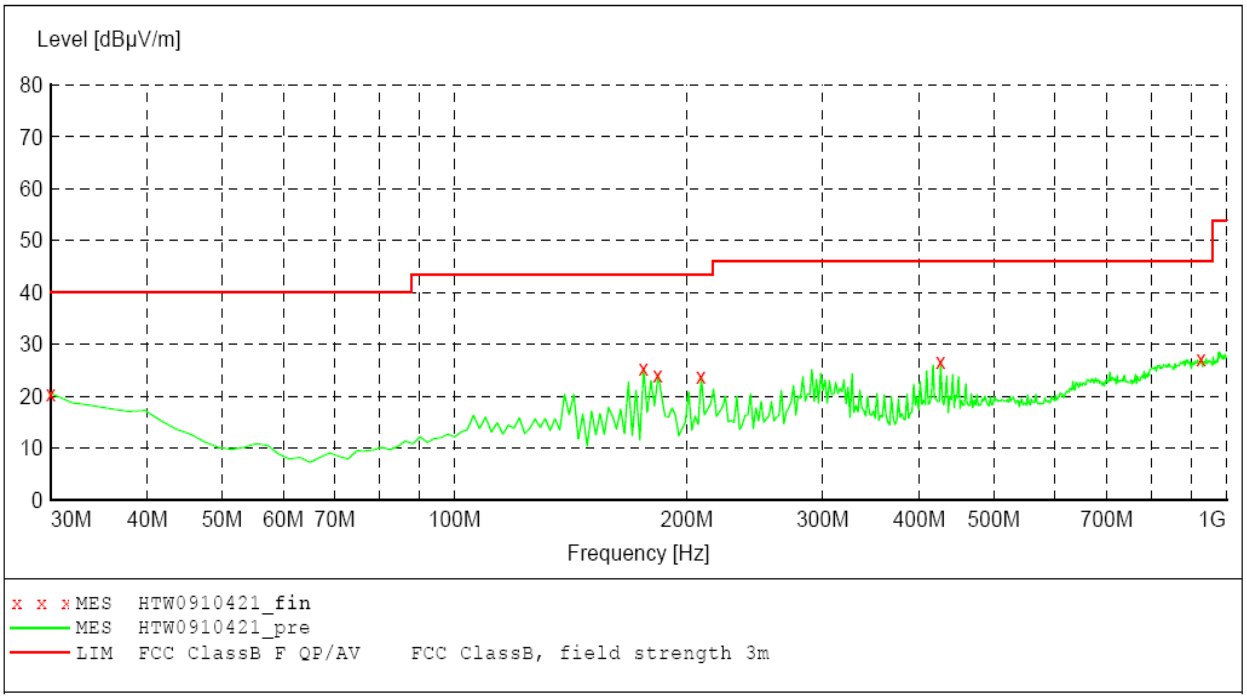
MEASUREMENT RESULT: "HTW0910420_fin"

9/10/2012 5:11PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.719439	27.60	-16.4	40.0	12.4	QP	100.0	69.00	VERTICAL
183.567134	26.30	-22.3	43.5	17.2	QP	100.0	239.00	VERTICAL
409.058116	26.90	-15.3	46.0	19.1	QP	100.0	209.00	VERTICAL
416.833667	27.40	-15.4	46.0	18.6	QP	100.0	211.00	VERTICAL
426.553106	28.00	-15.8	46.0	18.0	QP	100.0	209.00	VERTICAL
916.412826	27.70	-7.3	46.0	18.3	QP	100.0	360.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT: "HTW0910421_fin"

9/10/2012 5:14PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	20.50	-11.1	40.0	19.5	QP	300.0	27.00	HORIZONTAL
175.791583	25.30	-22.7	43.5	18.2	QP	300.0	111.00	HORIZONTAL
183.567134	24.10	-22.3	43.5	19.4	QP	100.0	251.00	HORIZONTAL
208.837675	23.80	-21.1	43.5	19.7	QP	100.0	244.00	HORIZONTAL
426.553106	26.60	-15.8	46.0	19.4	QP	100.0	254.00	HORIZONTAL
928.076152	27.30	-7.2	46.0	18.7	QP	100.0	352.00	HORIZONTAL

Above 1GHz (Test Mode: Receiving):

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	IC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polari-zation
3274.55	44.50	74	29.5	PK	Horizontal
3274.55	34.10	54	19.9	AV	Horizontal
4046.09	45.70	74	28.3	PK	Horizontal
4046.09	35.30	54	18.7	AV	Horizontal
3194.39	43.80	74	30.2	PK	Vertical
3194.39	34.20	54	19.8	AV	Vertical
4186.37	44.70	74	29.3	PK	Vertical
4186.37	34.60	54	19.4	AV	Vertical

*Within measurement uncertainty.

4.9. Antenna Requirement

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.

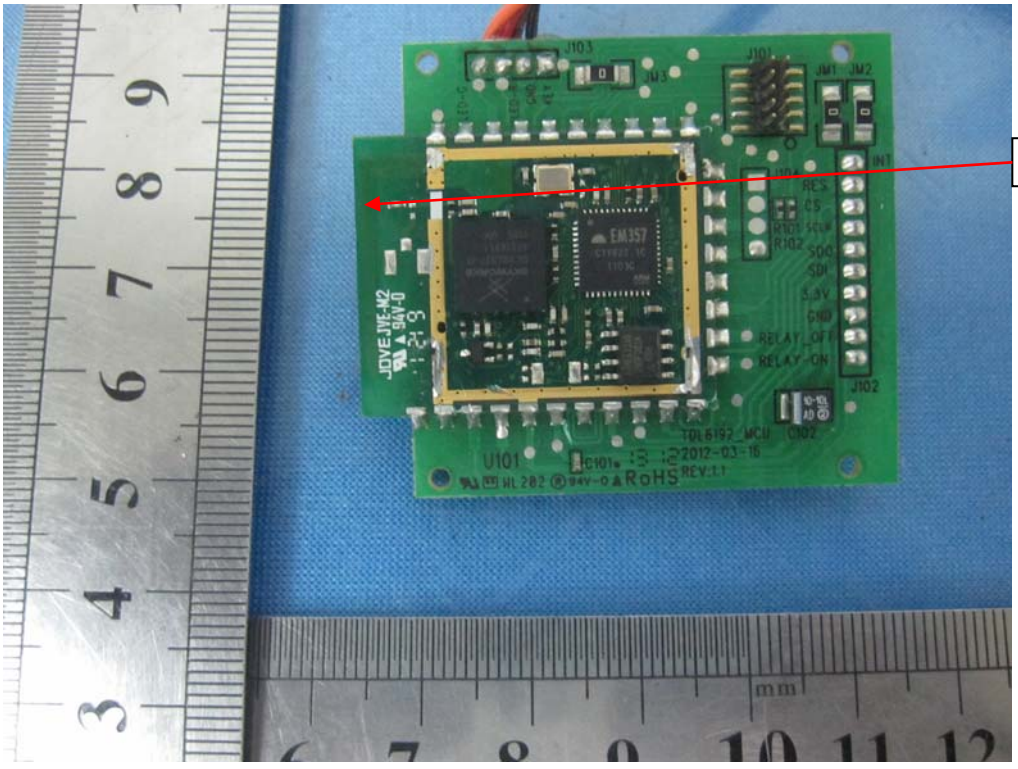
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

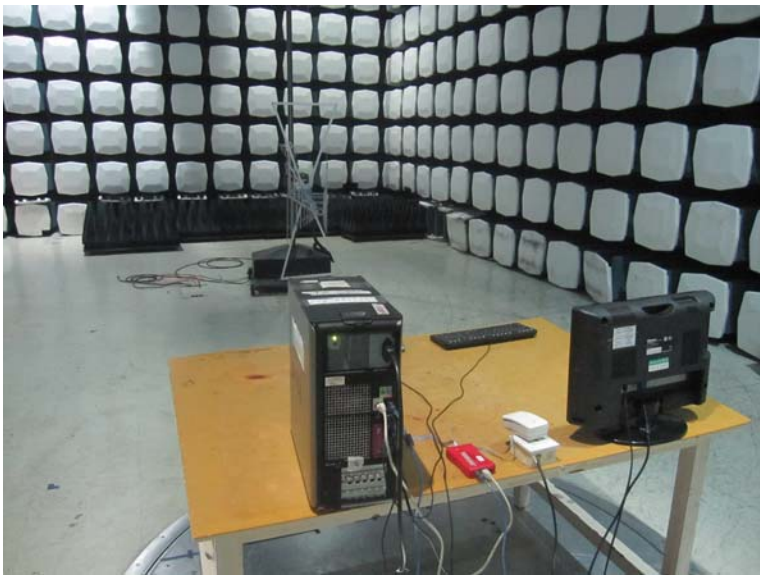
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

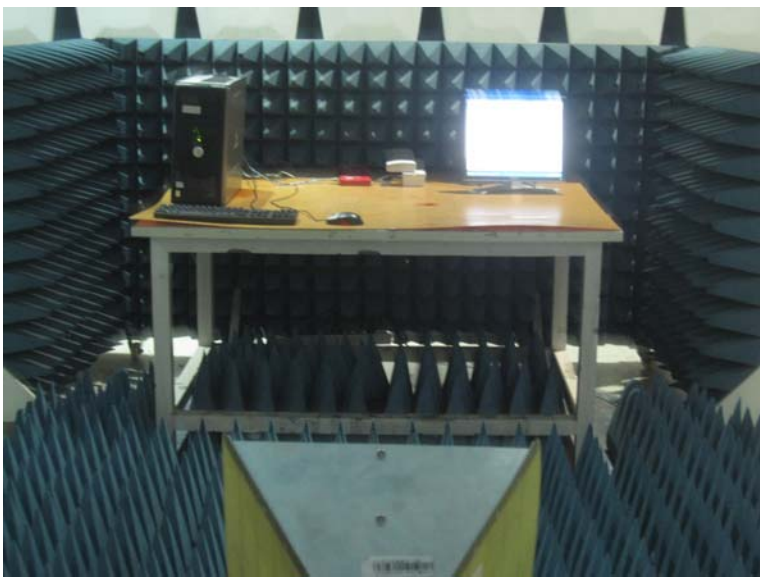
Antenna Connected Construction

The antenna used in this product is a PCB Antenna .The maximum Gain of the antenna only -0.32dBi. Detial please see the photos as following:



5. Test Setup Photos of the EUT

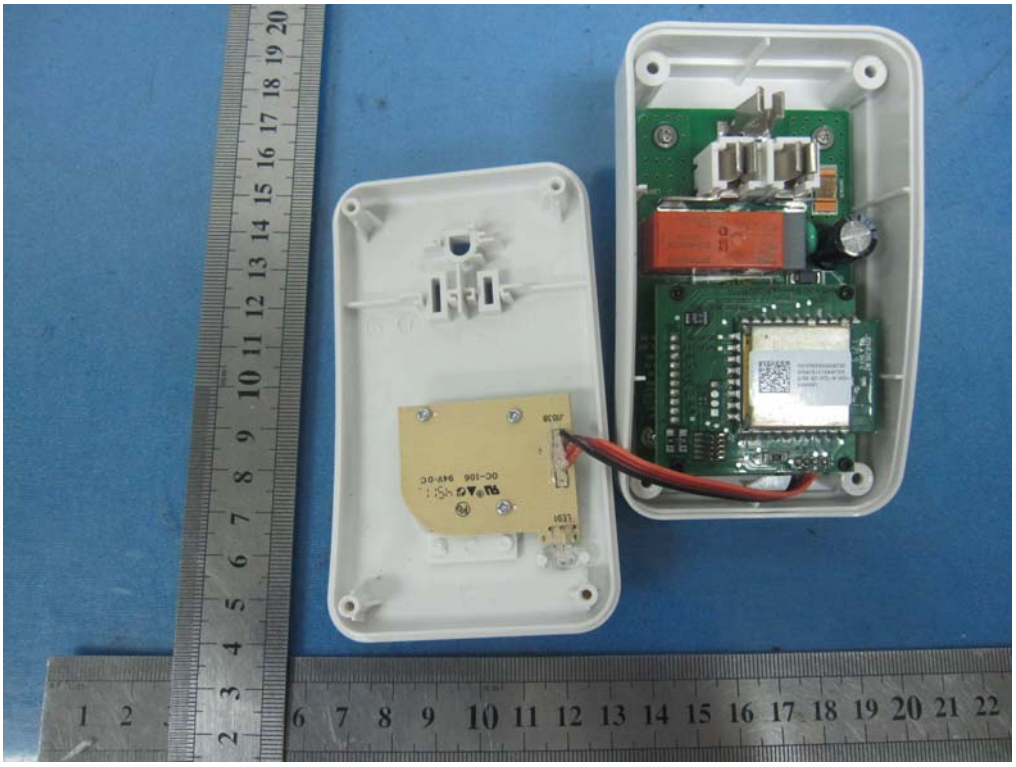


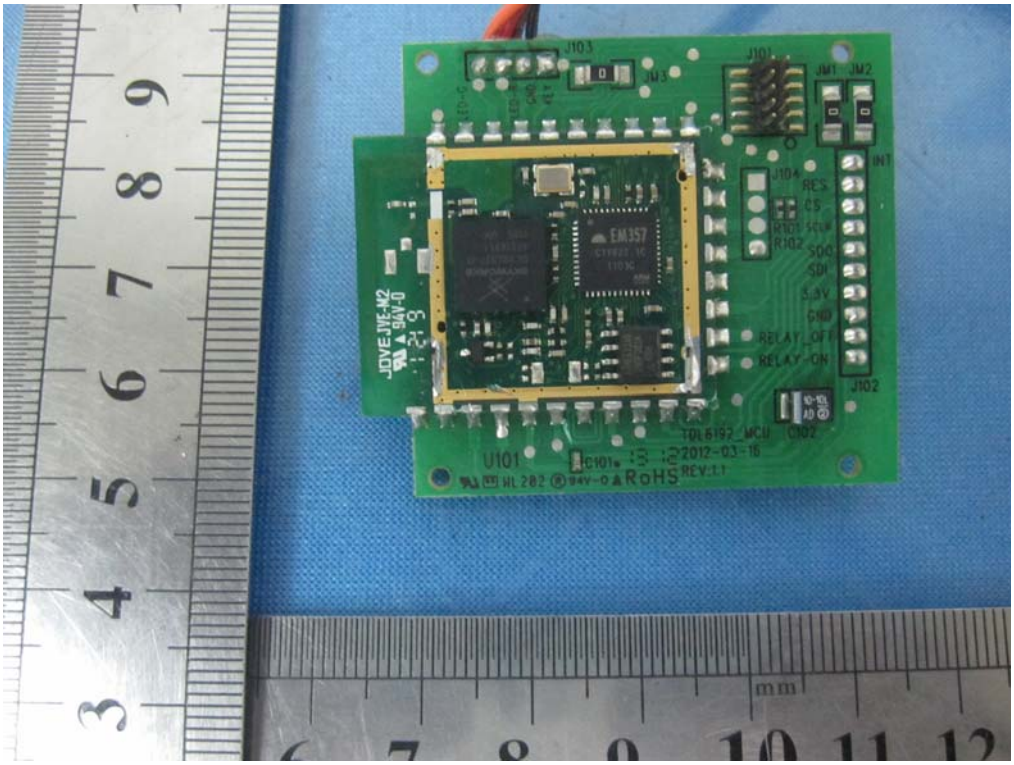


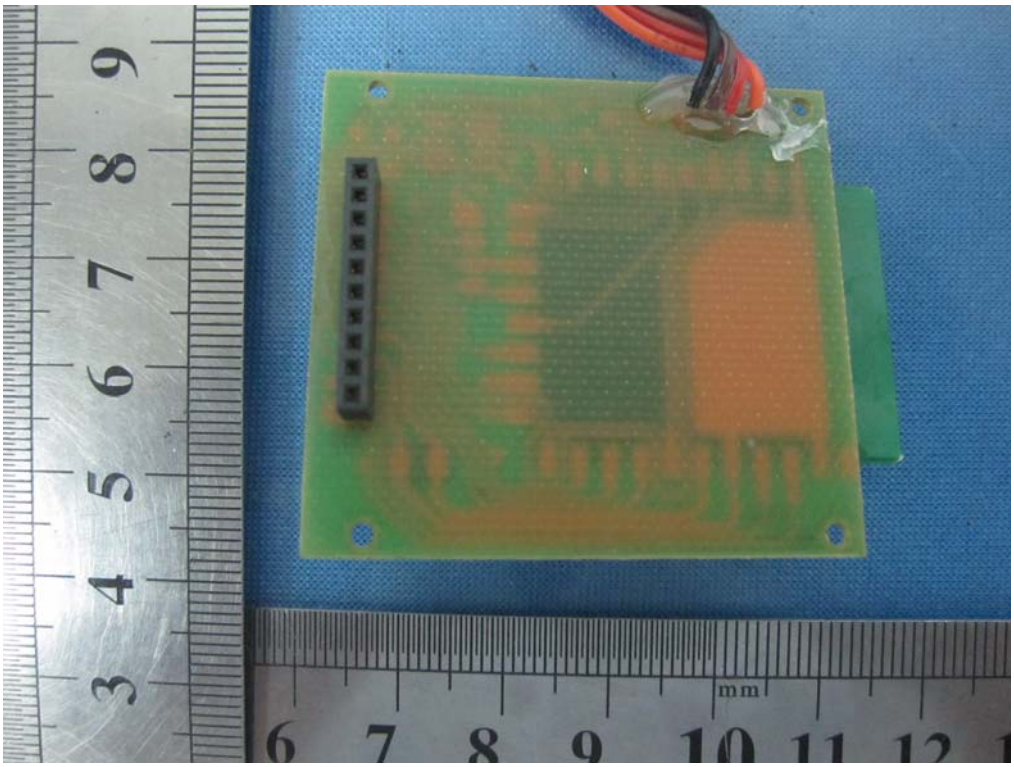
6. External and Internal Photos of the EUT

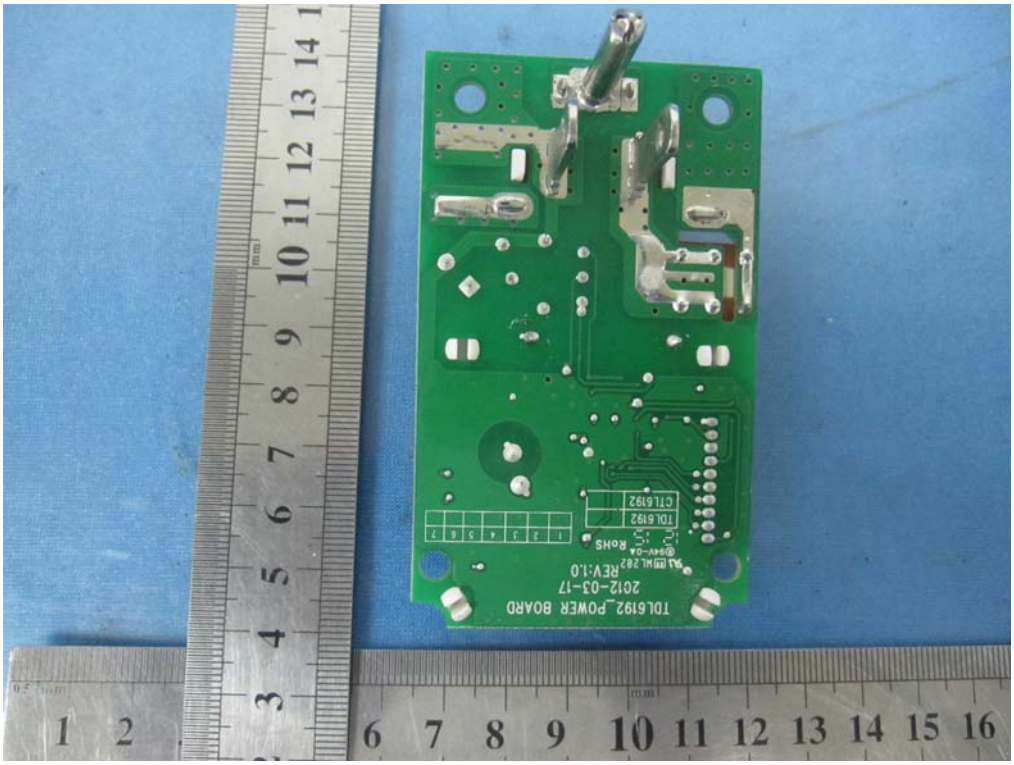
External Photos

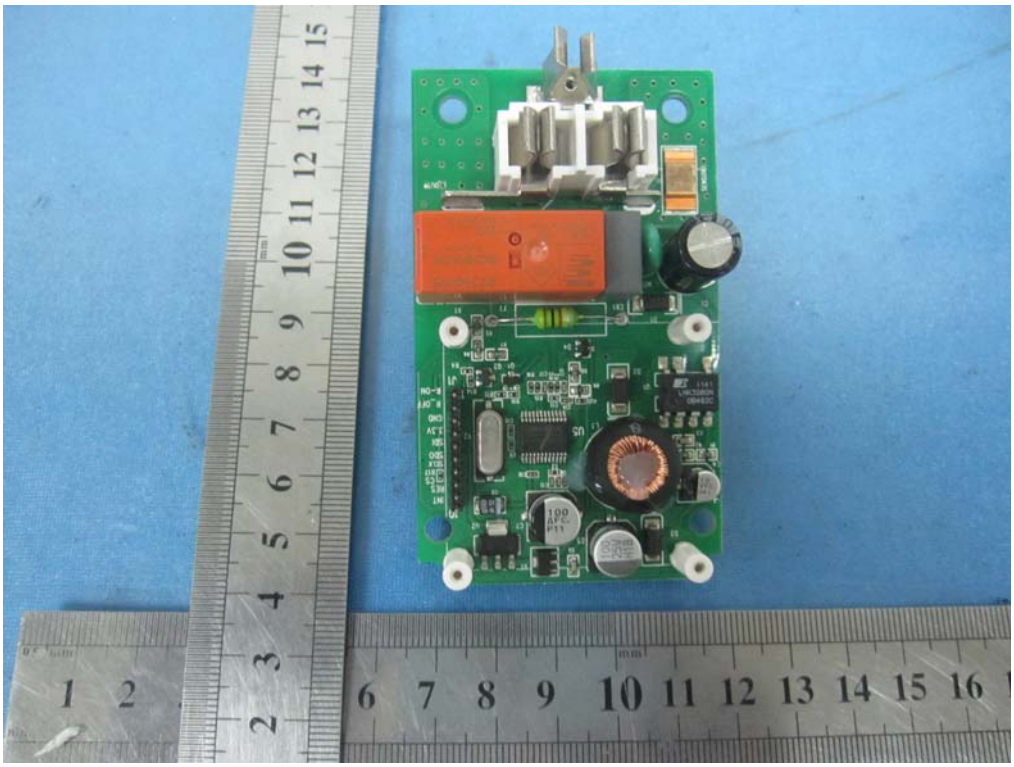
Internal Photos

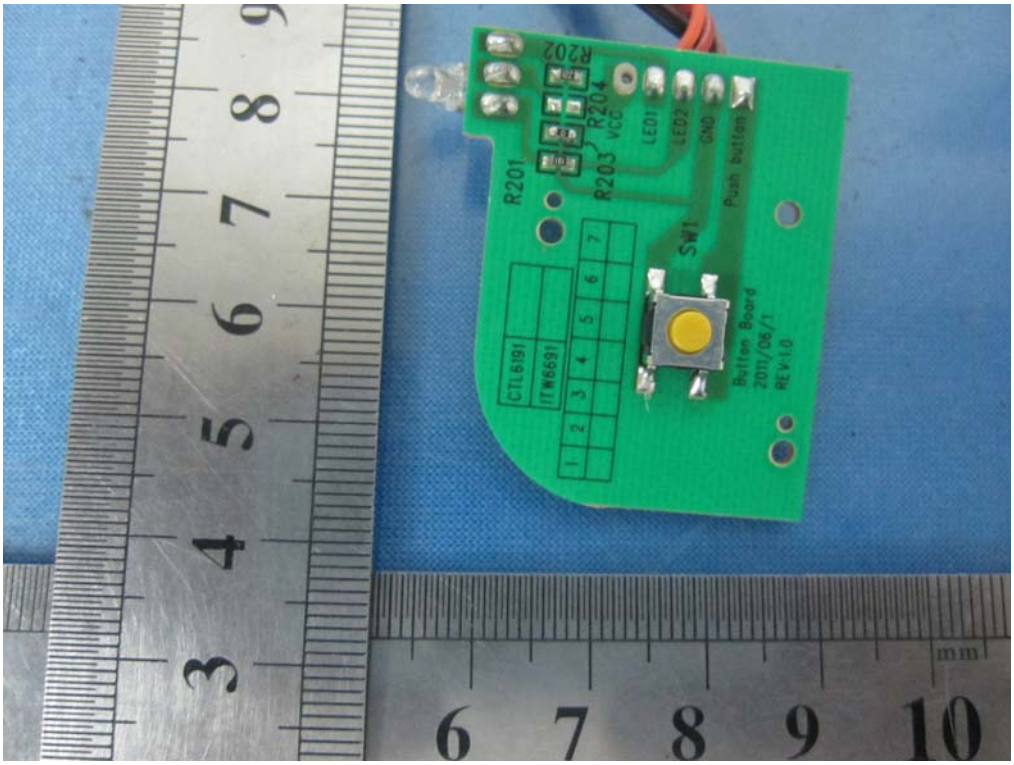


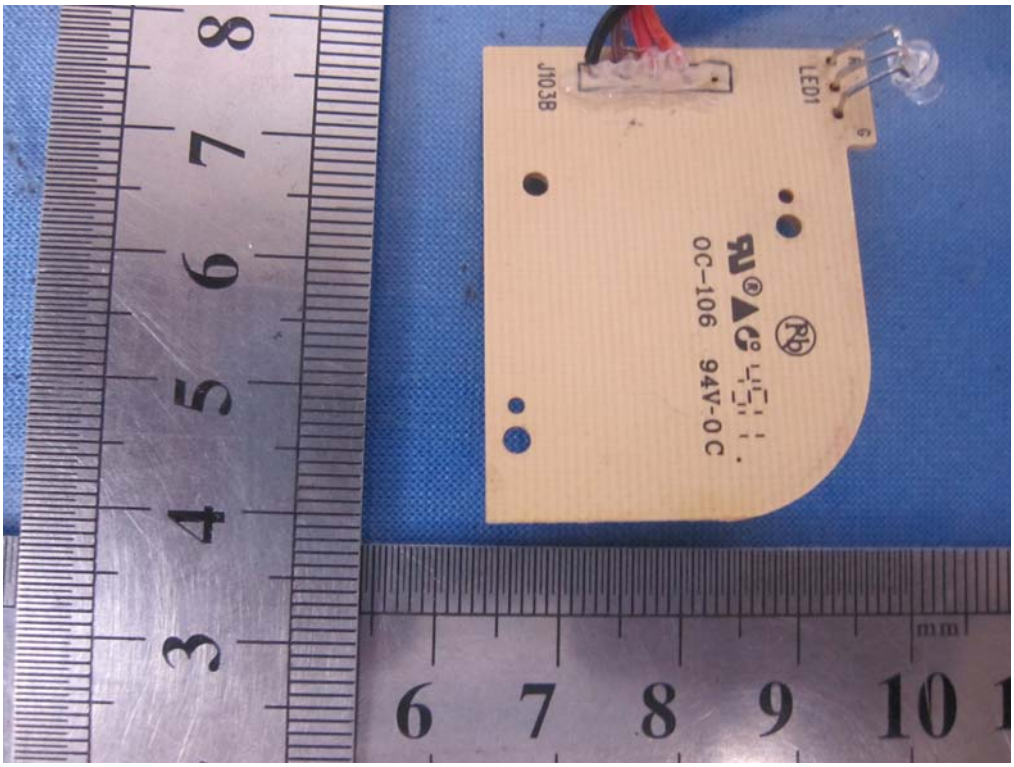

J103
J101
JM1 JM2
INT
J104
RES
CS
SCLK
SDO
SDI
3.3V
GND
RELAY_OFF
RELAY_ON
J102
EM357
JOVE JVE-M2
94V-0
U101
2012-03-16
REV:1.1
RoHS
mm


mm


TDL6192_POWER BOARD
2012-03-17
REV:1.0
TDL6192
CTL6192







.....End of Report.....