

## FCC/IC- TEST REPORT

Report Number : **68.950.14.271.01** Date of Issue: Dec 12, 2014

Model : 360526

Product Type : MP7QCFS Module

Applicant : ICON Health & Fitness Inc.

Address : 1500 South 1000 West, Logan UT 84321, USA

Production Facility : Wanlida Group Co., Ltd.

Address : Wanlida Industry Zone, 363601 Nanjing, Fujian,  
PEOPLE'S REPUBLIC OF CHINA

Test Result :  Positive  Negative

Total pages including Appendices : 26

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13, Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2, Nanshan District,  
Shenzhen City, 518052,  
P. R. China

Telephone: 86 755 8828 6998  
Fax: 86 755 828 5299

#### Test Site 2

Company name: Audix Technology (shenzhen) Co.,Ltd  
Block Shenzhen, Science & Industry Park,  
Nantou, Shenzhen,  
Guangdong,  
China

Telephone: 86 755 2663 9496  
Fax: 86 755 2663 2877

### 3 Description of the Equipment under Test

#### Description of the Equipment Under Test

Product:	MP7QCFS Module
Model no.:	360526
FCC ID:	OMC360526
IC ID:	3673A-360526
Options and accessories:	NIL
Rating:	DC 12V Powered by external power supply: Adaptor Input: 100-240VAC, 50/60Hz Adaptor Output: 12VDC, 2.0A
RF Transmission Frequency:	2402-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Duty Cycle:	15.2%
Antenna Type:	Embedded Type Antenna
Antenna Gain:	1dBi
Description of the EUT:	The Equipment Under Test (EUT) is a MP7QCFS Module operated at 2.4GHz

## 4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 4 November 2014	General Requirements for the Certification of Radio Apparatus
RSS-210 Issue 8 December 2010	RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

All the test methods were according to KDB558074 D01 DTS Meas Guidance v03r02 and ANSI C63.10 (2013).

## 5 Summary of Test Results

Technical Requirements							
FCC Part 15 Subpart C, RSS-Gen, RSS-210							
Test Condition			Pages	Test Site	Test Result		
					Pass	Fail	N/A
§15.207	RSS-GEN A8.8	Conducted emission AC power port	10	---	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247 (b) (1)	RSS-210 A8.4	Conducted peak output power	13	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	RSS-210 A8.2(a) & RSSGEN 6.6	20dB bandwidth	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)	RSS-210 A8.1(a)	Carrier frequency separation	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	RSS-210 A8.1(b)	Number of hopping frequencies	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	RSS-210 A8.1(d)	Dwell Time	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(2)	RSS-210 A8.1(c)	6dB bandwidth and 99% Occupied Bandwidth	14	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(e)	RSS-210 A8.2(b)	Power spectral density	16	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	RSS-210 A8.5	Spurious RF conducted emissions	17	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	RSS-210 A8.5	Band edge	21	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d) & §15.209	RSS-210 2.5 & RSSGEN 6.13	Spurious radiated emissions for transmitter	23	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203	RSSGEN 8.3	Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses a Embedded Type antenna, which gain is 1dBi. According to §15.203 and RSSGEN 8.3, it is considered sufficiently to comply with the provisions of this section.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: OMC360526, IC ID: 3673A-360526 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules and RSS-210.

### SUMMARY:

All tests according to the regulations cited on page 5 were

- Performed

- **Not** Performed

The Equipment under Test

- **Fulfills** the general approval requirements.

- **Does not** fulfill the general approval requirements.

Sample Received Date: November 5, 2014

Testing Start Date: November 6, 2014

Testing End Date: December 11, 2014

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

Reviewed by:

Prepared by:

Tested by:



Phoebe Hu  
EMC Project Manager



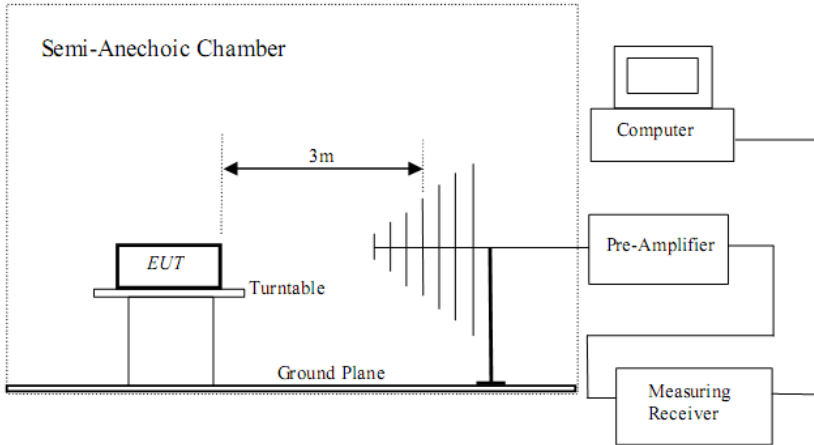
Calvin Weng  
EMC Project Engineer



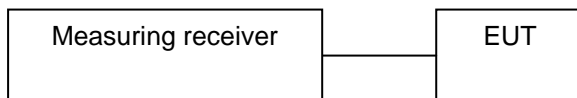
Leo Li  
EMC Test Engineer

## 7 Test Setups

### 7.1 Radiated test setups



### 7.2 Conducted RF test setups





## 8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
---	---	---	---

Test software: USI\_BCM\_Testing\_Tool.

The system was configured to channel 0, 19, and 39 for the test.

## 9 Technical Requirement

### 9.1 Conducted Emission

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

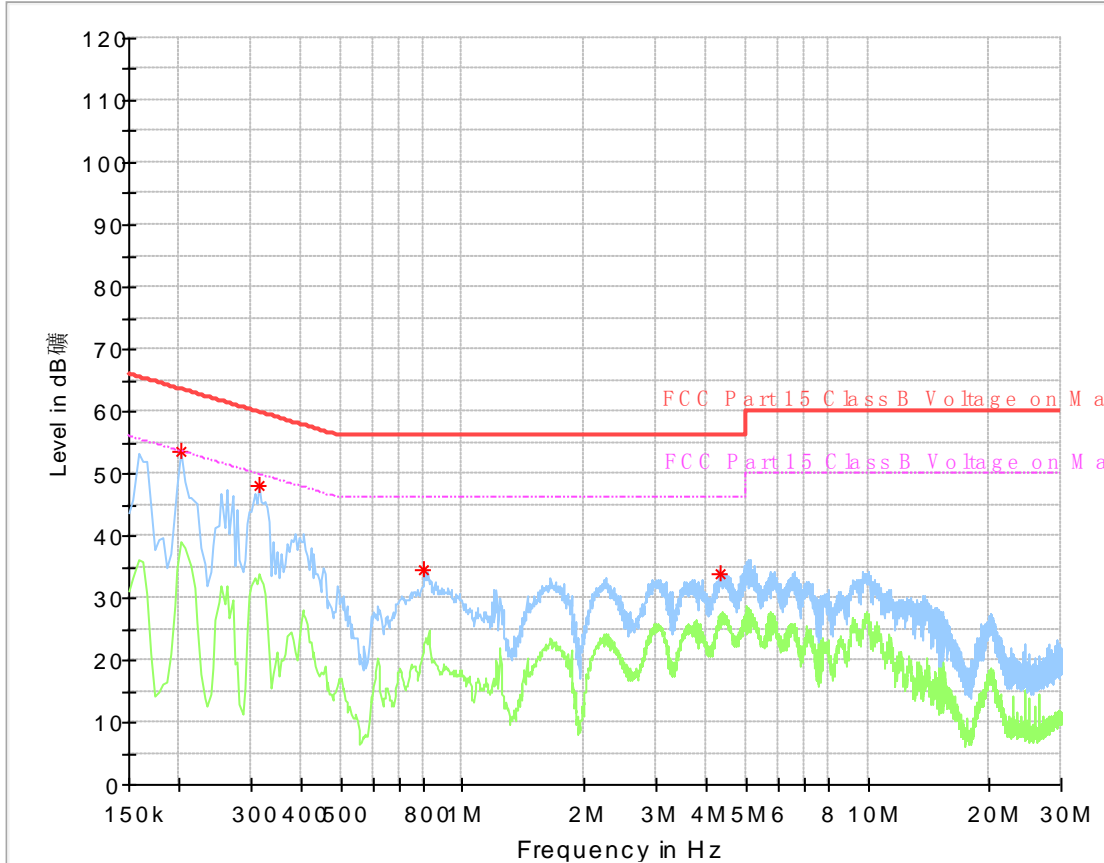
#### Limit

According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dB $\mu$ V	AV Limit dB $\mu$ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

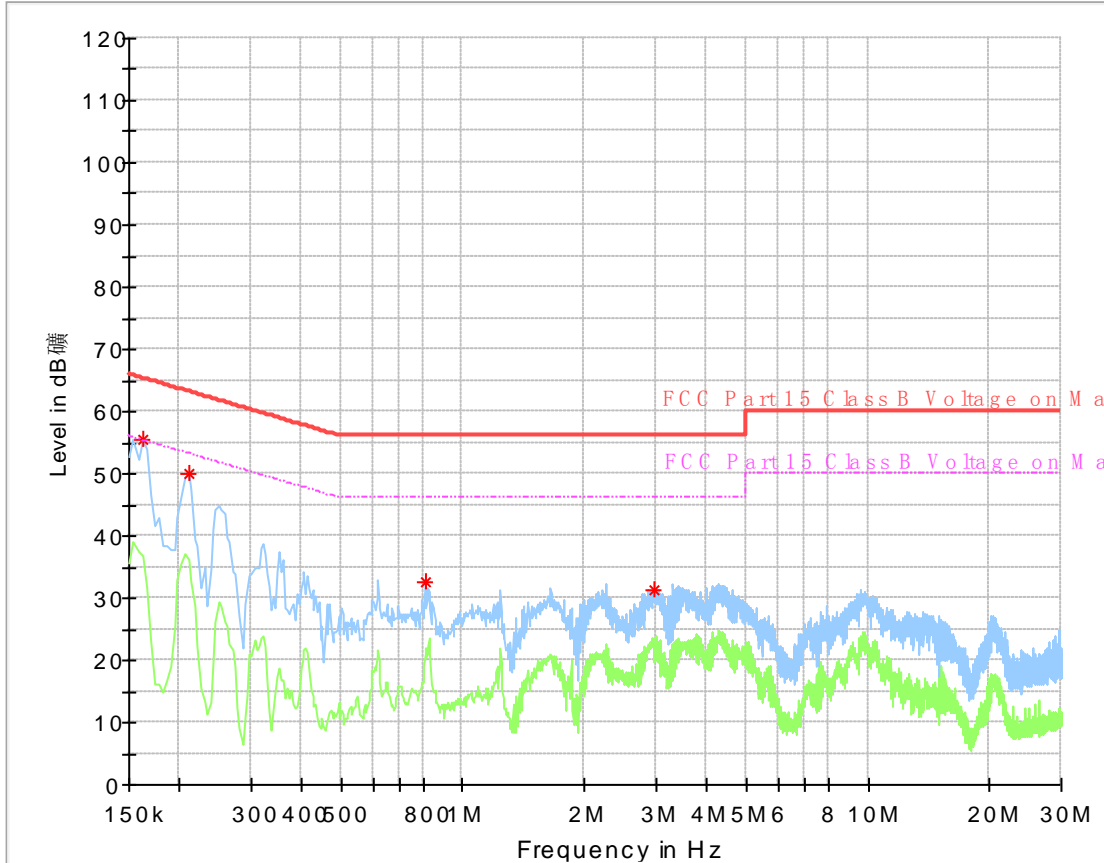
Decreasing linearly with logarithm of the frequency

Product Type : MP7QCFS Module  
 M/N : 360526  
 Operating Condition : Transmitting  
 Test Specification : Line  
 Comment : AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.202000	53.49	---	63.53	10.04	L1	9.8
0.314000	47.96	---	59.86	11.91	L1	10.2
0.802000	34.57	---	56.00	21.43	L1	9.9
4.342000	33.94	---	56.00	22.06	L1	9.9

Product Type : MP7QCFS Module  
 M/N : 360526  
 Operating Condition : Transmitting  
 Test Specification : Neutral  
 Comment : AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.162000	55.61	---	65.36	9.75	N	9.7
0.210000	49.92	---	63.21	13.28	N	9.8
0.806000	32.52	---	56.00	23.48	N	9.9
2.970000	31.41	---	56.00	24.59	N	9.8

## 9.2 Conducted peak output power

### Test Method

1. Use the following spectrum analyzer settings:  
RBW > the 6 dB bandwidth of the emission being measured, VBW $\geq$ 3RBW, Span $\geq$ 3RBW  
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

### Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	$\leq 1$	$\leq 30$

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	3.44	Pass
Middle channel 2440MHz	1.78	Pass
High channel 2480MHz	4.45	Pass

### 9.3 6dB bandwidth and 99% Occupied Bandwidth

#### Test Method

1. Use the following spectrum analyzer settings:  
RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

#### Limit

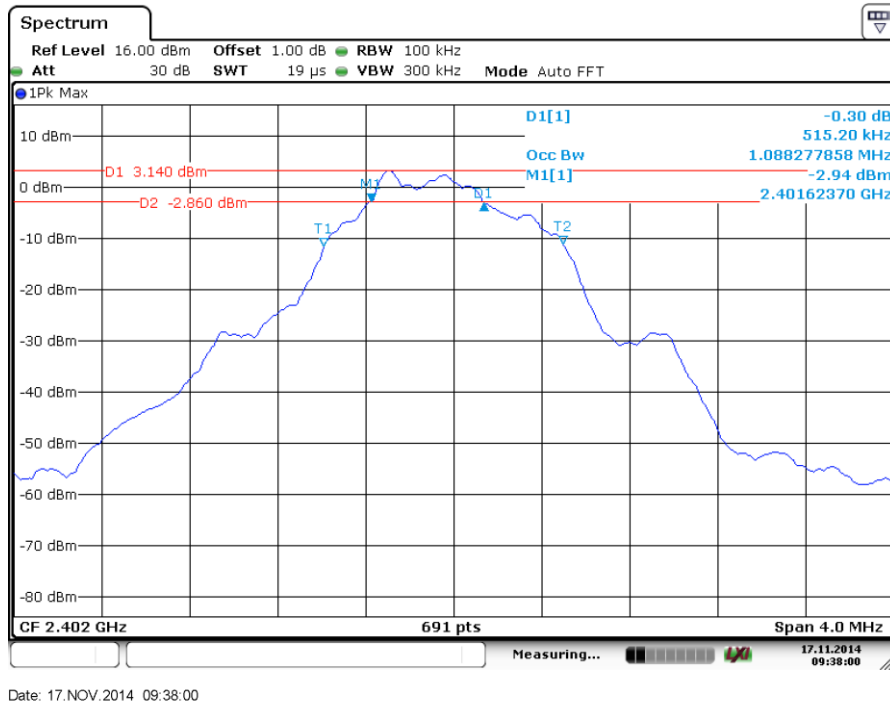
Limit [kHz]

≥500

#### Test result

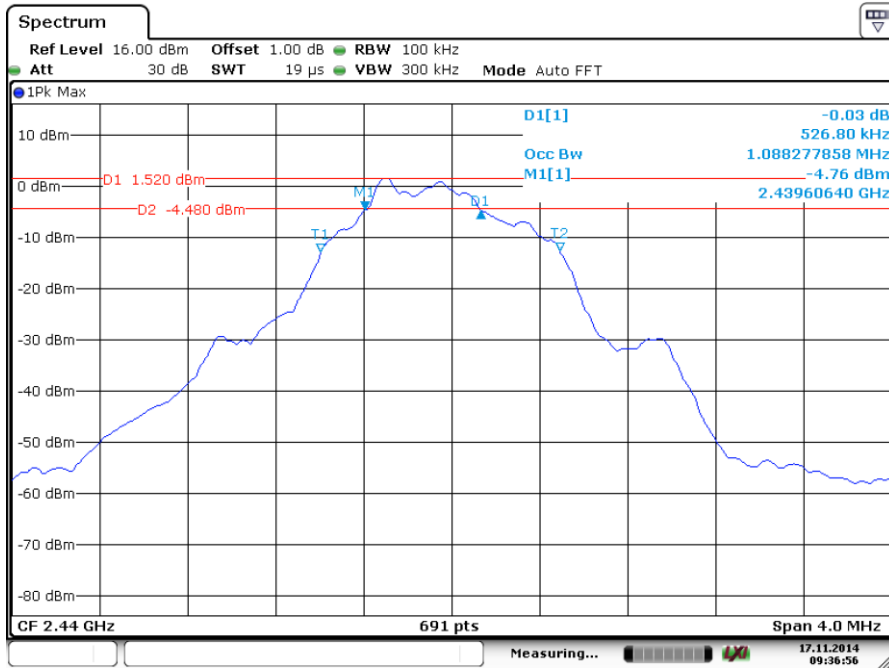
Frequency MHz	6dB bandwidth kHz	99% Bandwidth kHz	Result
Top channel 2402MHz	515.2	1088.3	Pass
Middle channel 2440MHz	526.8	1088.3	Pass
Bottom channel 2480MHz	509.4	1088.3	Pass

2402MHz



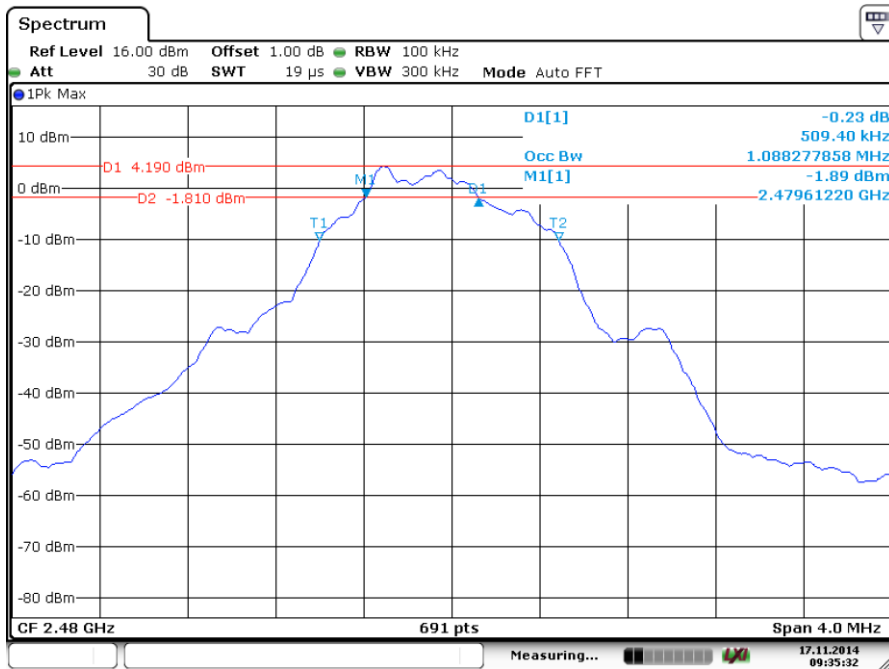


### 2440MHz



Date: 17.NOV.2014 09:36:57

### 2480MHz



Date: 17.NOV.2014 09:35:32

## 9.4 Power spectral density

### Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency.  
RBW=3kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

### Limit

Limit [dBm]

≤8

### Test result

Frequency MHz	Power spectral density dBm	Result
Top channel 2402MHz	-14.78	Pass
Middle channel 2440MHz	-16.41	Pass
Bottom channel 2480MHz	-13.83	Pass



## 9.5 Spurious RF conducted emissions

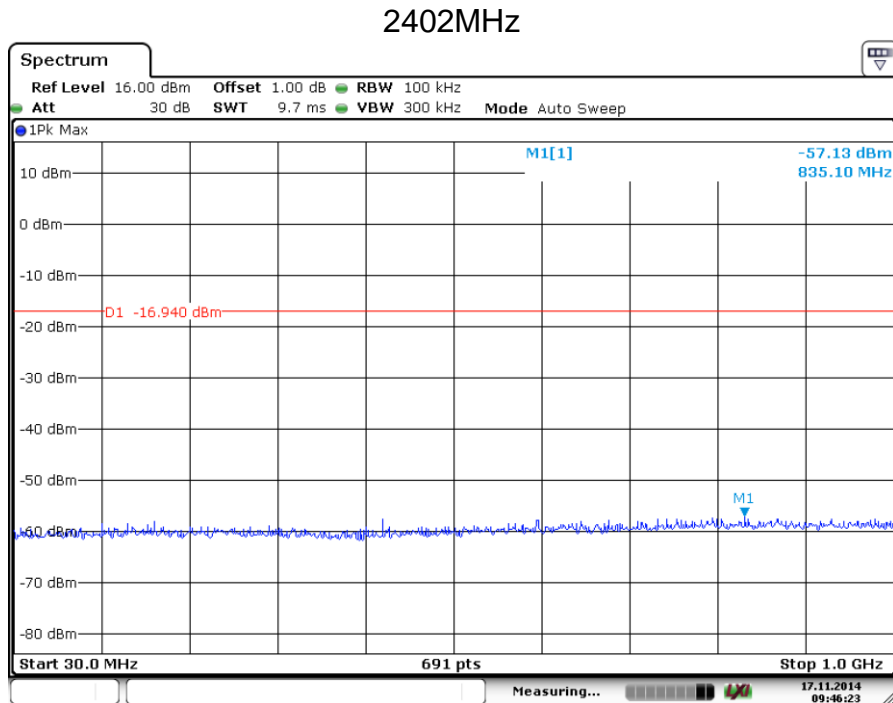
### Test Method

1. Establish a reference level by using the following procedure:
  - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
  - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
  - a. Set the center frequency and span to encompass frequency range to be measured.
  - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

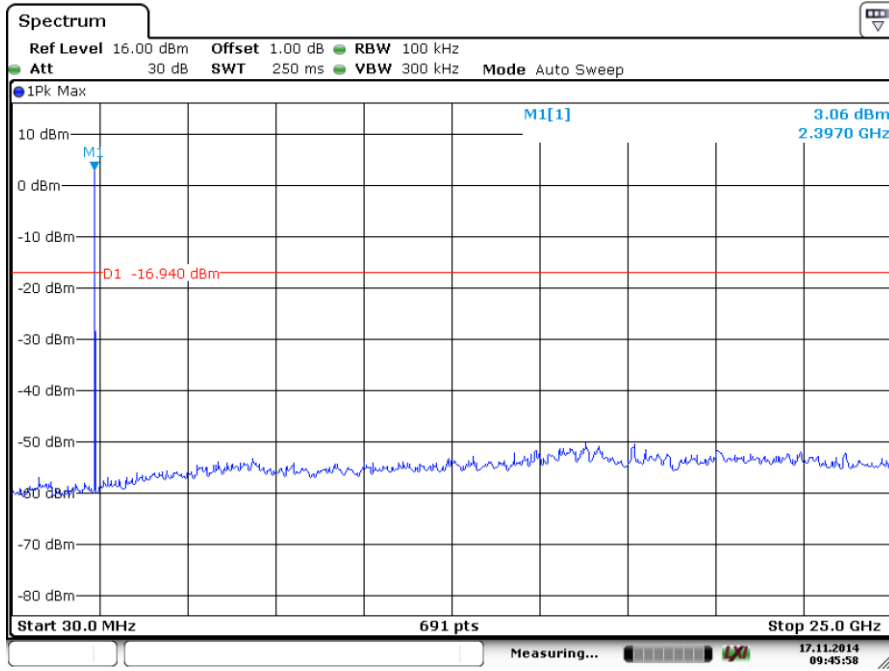
### Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

### Spurious RF conducted emissions

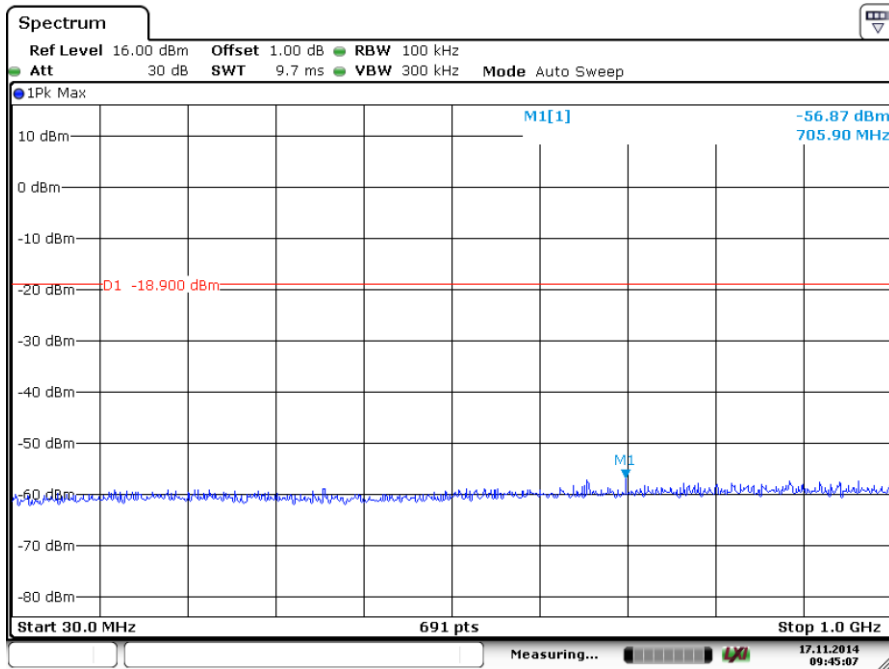


Date: 17.NOV.2014 09:46:23

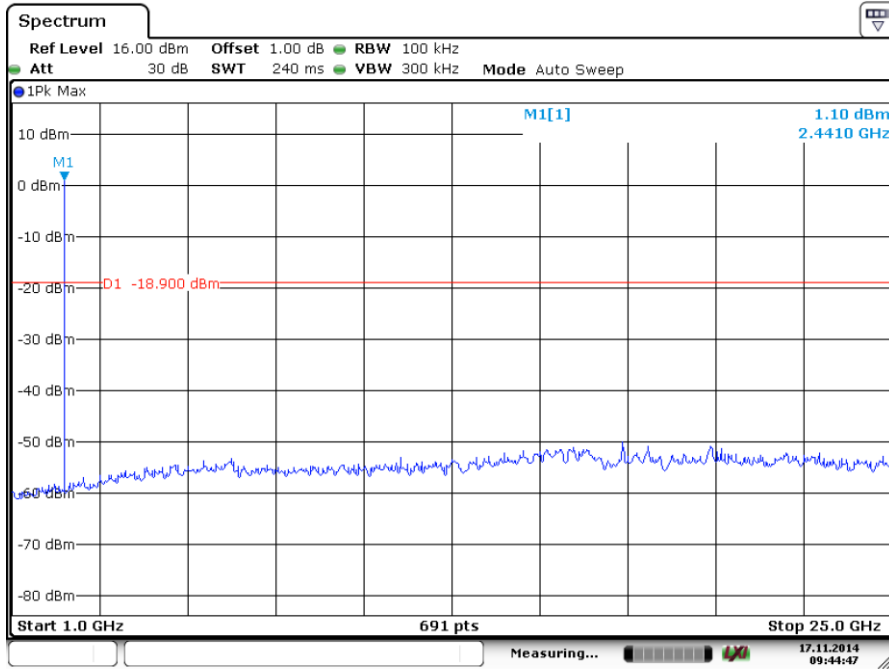


Date: 17.NOV.2014 09:45:58

### 2440MHz

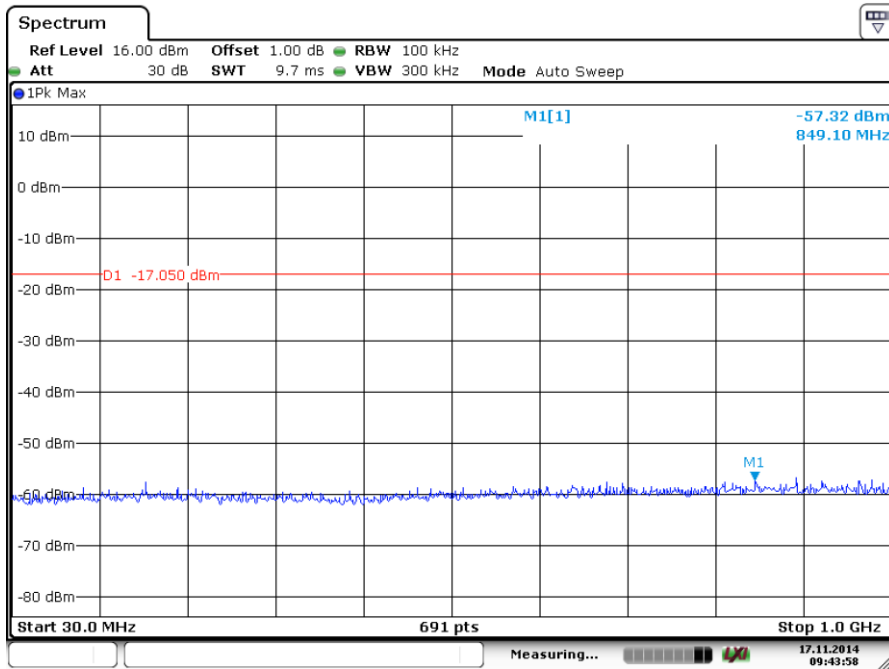


Date: 17.NOV.2014 09:45:06

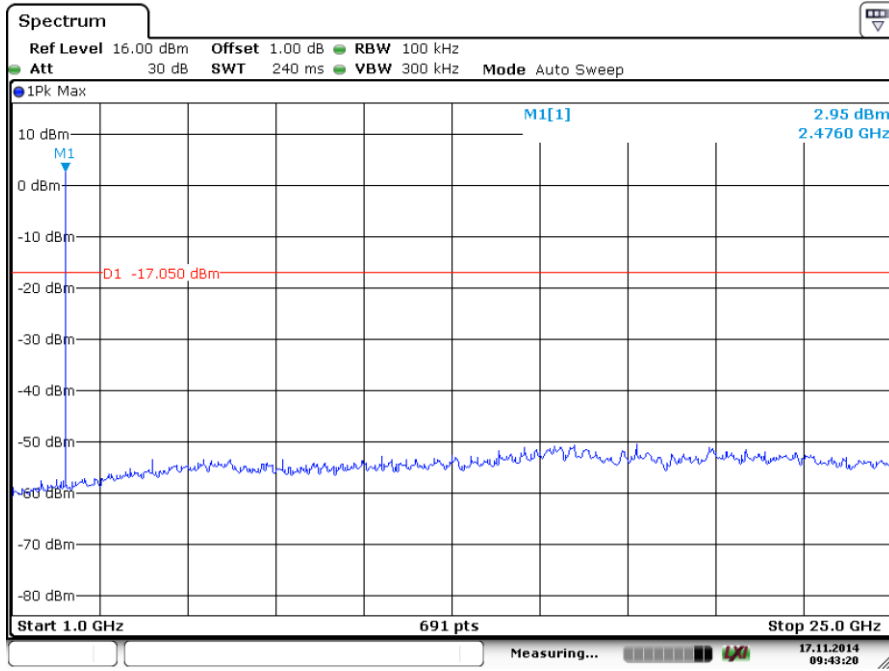


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### 2480MHz



Date: 17.NOV.2014 09:43:57



Date: 17.NOV.2014 09:43:20

## 9.6 Band edge

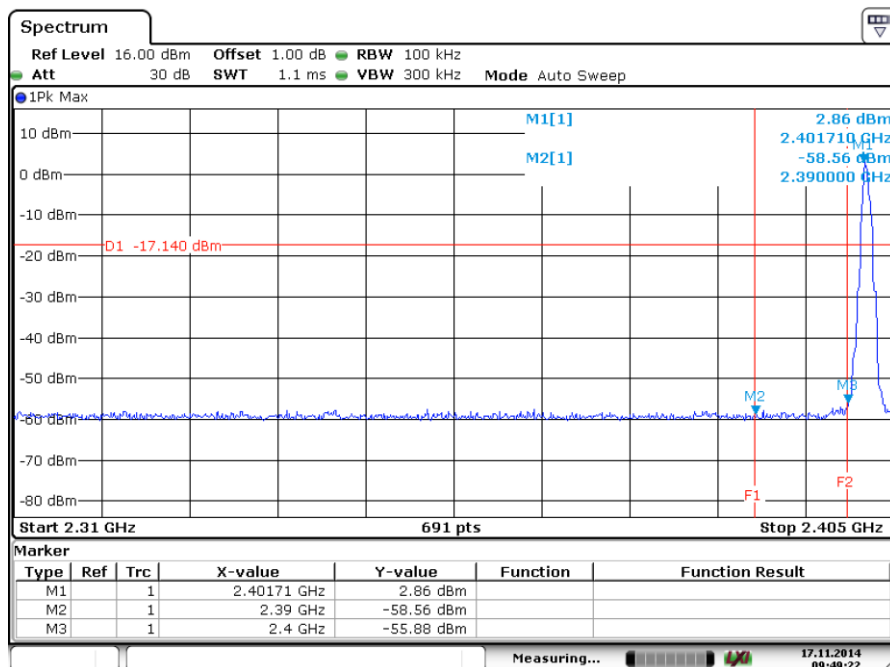
### Test Method

- 1 Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

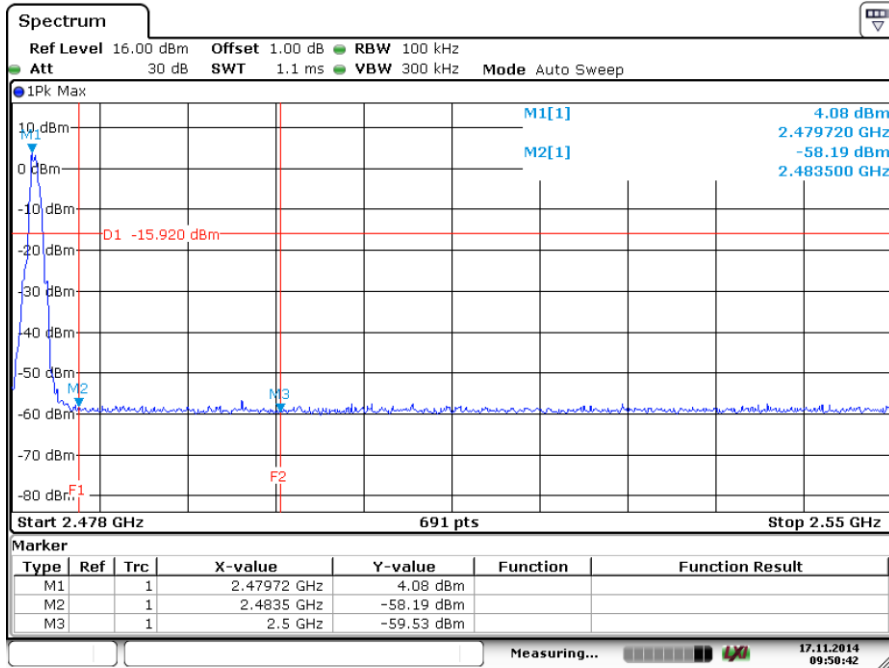
### Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

### Test result



Date: 17.NOV.2014 09:49:22



Date: 17.NOV.2014 09:50:42

## 9.7 Spurious radiated emissions for transmitter

### Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:  
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$ , VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{duty cycle}/100\text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

### Limit

According to part 15.247(d), the radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

### Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

#### Transmitting spurious emission test result as below:

##### 2402MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Margin dBuV/m	Result
800.7	41.52	Horizontal	46	QP	4.17	Pass
299.9	37.01	Vertical	46	QP	8.99	Pass
2402	92.17	Horizontal	-	PK	-	-
2402	60.34	Vertical	-	PK	-	-
*4804	42.31	Horizontal	74	PK	31.69	Pass
*4804	40.33	Vertical	74	PK	33.67	Pass

##### 2440MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Margin dBuV/m	Result
2440	84.31	Horizontal	-	PK	-	-
2440	77.42	Vertical	-	PK	-	-
*4880	40.98	Horizontal	74	PK	33.02	Pass
*4880	41.12	Vertical	74	PK	32.88	Pass

##### 2480MHz

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Margin dBuV/m	Result
2480	88.46	Horizontal	-	PK	-	-
2480	85.24	Vertical	-	PK	-	-
*4960	40.78	Horizontal	74	PK	33.22	Pass
*4960	41.26	Vertical	74	PK	32.74	Pass

#### Remark:

- (1) AV Emission Level= PK Emission Level+20log (duty cycle)
- (2) Data of measurement within 30-1000MHz frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) "\*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.



## 10 Test Equipment List

### List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE	
CE	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Nov.04, 15	<input checked="" type="checkbox"/>
	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Nov.04, 15	<input checked="" type="checkbox"/>
	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.07, 15	<input type="checkbox"/>
	RF Cable	3D-2W	Fujikura	LISN Cable 1#	May.07, 15	<input checked="" type="checkbox"/>
	Coaxial Switch	MP59B	Anritsu	M55367	May.07, 15	<input checked="" type="checkbox"/>
	Passive Probe	ESH2-Z3	Rohde & Schwarz	299.7810.52	May.07, 15	<input type="checkbox"/>
	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100341	May.07, 15	<input type="checkbox"/>
C	Spectrum	Rohde & Schwarz	FSV40	101030	May.08, 15	<input checked="" type="checkbox"/>
RE < 1 GHz	Test Receiver <1GHz	Rohde & Schwarz	ESVS10	834468/011	May.07, 15	<input checked="" type="checkbox"/>
	Amplifier < 1 GHz	HP	8447D	2648A04738	May.07, 15	<input checked="" type="checkbox"/>
	HF Cable	Hubersuhne	Sucoflex104	Room 2	May.08, 15	<input checked="" type="checkbox"/>
	Bilog Antenna	Schaffner	CBL6111C	2598	Oct.25, 15	<input checked="" type="checkbox"/>
RE > 1 GHz	Spectrum > 1GHz	Agilent	E4446A	US44300459	May.08, 15	<input checked="" type="checkbox"/>
	Horn Antenna	EMCO	3115	9607-4877	Jun. 24, 15	<input checked="" type="checkbox"/>
	Amp > 1 Ghz	HP	8449B	3008A08495	May.08, 15	<input checked="" type="checkbox"/>
	HF Cable	Hubersuhne	Sucoflex104	Room1	May.08, 15	<input checked="" type="checkbox"/>

#### C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density\*
- Spurious RF conducted emissions
- Band edge

## 11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items	Extended Uncertainty
Radiation emission	U=4.32dB (30MHz-25GHz)
Output power test	0.94 dB
Power density test	2.10 dB
Bandwidth	1x10 <sup>-9</sup>