

FCC/IC - TEST REPORT

Report Number : **68.950.17.0779.01** Date of Issue: **January 29, 2018**

Model : **KPB03**

Product Type : Kid Power Band

Applicant : UNICEF USA

Address : 12 Maiden Lane, New York NY 10038, USA

Production Facility : Joint Chinese Ltd

Address : Building 4 and Building 6, Huafeng Tech Park, Guangtian Road,

Luotian Industrial Area, Songgang Town, Bao'an District Shenzhen,

P.R China, 518105

Test Result : **Positive** **Negative**

Total pages including Appendices : **25**

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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
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Road 2, Nanshan District
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FCC Registration 514049
No.:

IC Registration 10320A
No.:

3 Description of the Equipment Under Test

Product: Kid Power Band

Model no.: KPB03

FCC ID: 2AF4QKPB03-1727

IC ID: 23560-KPB03

Options and accessories: USB Cable

Rating: DC 3.7V, 70mAh Supplied by Li-ion rechargeable battery
DC 5.0V Charged by USB Port

RF Transmission Frequency: 2402MHz-2480MHz

No. of Operated Channel: 40

Modulation: GFSK

Antenna Type: Integrated antenna

Antenna Gain: 0dBi

Description of the EUT: The Equipment Under Test (EUT) is a smart watch which support Bluetooth function operated at 2.4GHz

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2016 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 4 November 2014	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB 558074 D01 DTS Meas Guidance v04 DTS Measurement Guidance and ANSI C63.10 (2013).

5 Summary of Test Results

Technical Requirements								
FCC Part 15 Subpart C/ RSS-247 Issue 2/RSS-Gen Issue 4				Pages	Test Site	Test Result		
Test Condition		Pass	Fail	N/A				
§15.207 & RSS-GEN 8.8	Conducted emission AC power port	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
§15.247 (b) (1) & RSS-247 5.4(d)	Conducted peak output power	10	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.247(a)(1) & RSS-247 5.1(b)	20dB bandwidth	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
§15.247(a)(1) & RSS-247 5.1(b)	Carrier frequency separation	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Number of hopping frequencies	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Dwell Time	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
§15.247(a)(2) & RSS-247 5.2(a) & RSS-GEN 8.8	6dB bandwidth and 99% Occupied Bandwidth	11	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.247(e) & RSS-247 5.2(b)	Power spectral density	12	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.247(d) & RSS-247 5.5	Spurious RF conducted emissions	15	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.247(d) & RSS-247 5.5	Band edge	19	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.247(d) & §15.209 & RSS-247 5.5 & RSS-Gen 6.13	Spurious radiated emissions for transmitter	21	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
§15.203	Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an Integrated antenna, which gain is 0dBi. In accordance to §15.203 & RSS-Gen 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: 2AF4QKPB03-1727, IC ID: 23560-KPB03, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules and RSS-247, RSS-GEN.

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: October 25, 2017

Testing Start Date: November 20, 2017

Testing End Date: November 30, 2017

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Prepared by:



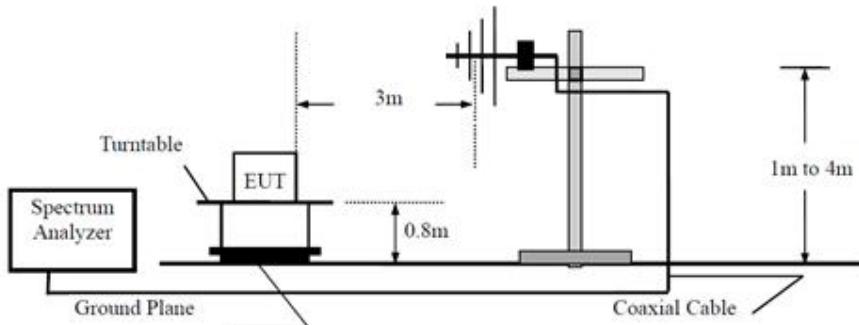
John Zhi
Project Manager



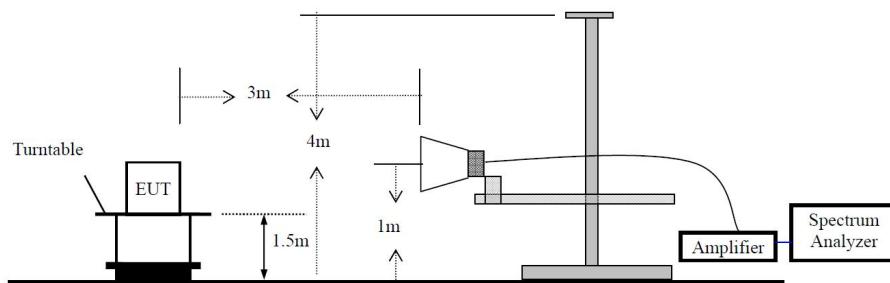
Alan Xiong
Project Engineer

7 Test Setups

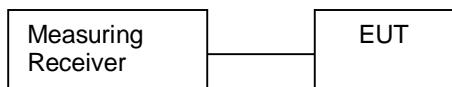
Below 1GHz



Above 1GHz



Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Lenovo	X220	---

Test software: nRFgo Studio, which used to control the EUT in continues transmitting mode.

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

9 Technical Requirement

9.1 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) & RSS-247 5.4(d), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Bottom channel 2402MHz	-2.48	Pass
Middle channel 2440MHz	-2.47	Pass
Top channel 2480MHz	-2.73	Pass

9.2 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 \geq 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	-20.93	Pass
Middle channel 2440MHz	-20.88	Pass
Bottom channel 2480MHz	-21.63	Pass

9.3 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
RBW=100K, VBW \geq 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 \geq 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

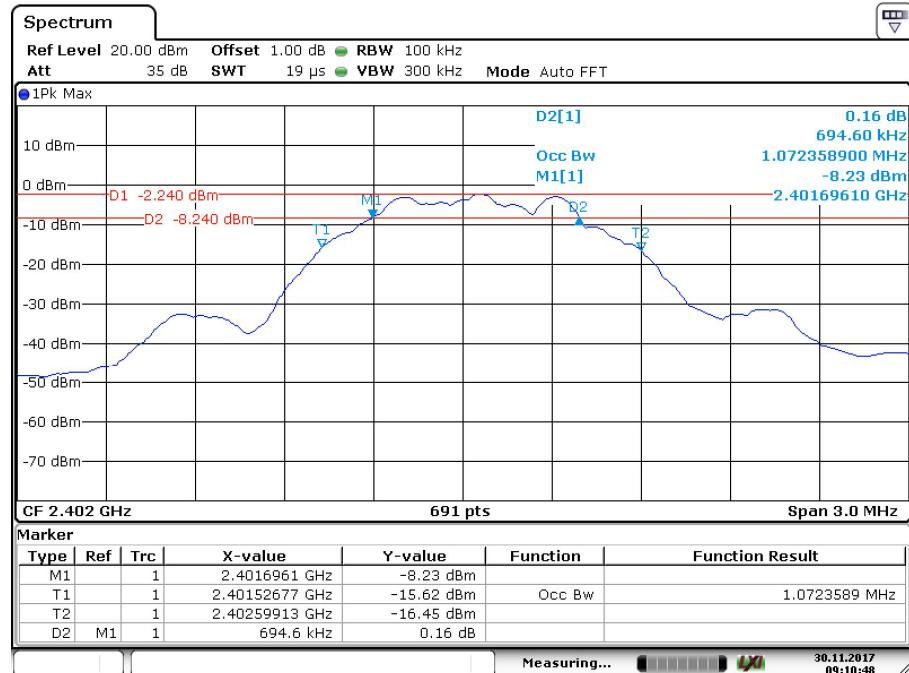
\geq 500

Test result

Frequency MHz	6dB bandwidth kHz	99% bandwidth kHz	Result
Bottom channel 2402MHz	694.6	1072.4	Pass
Middle channel 2440MHz	690.3	1076.7	Pass
Top channel 2480MHz	690.3	1081.0	Pass

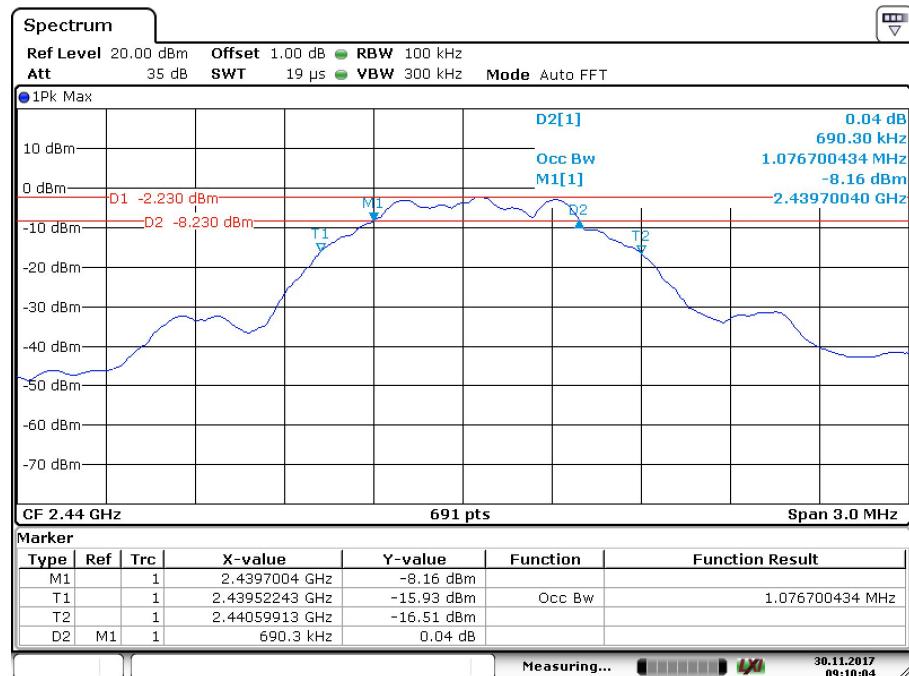
6 dB Bandwidth and 99% Bandwidth

Low channel 2402MHz



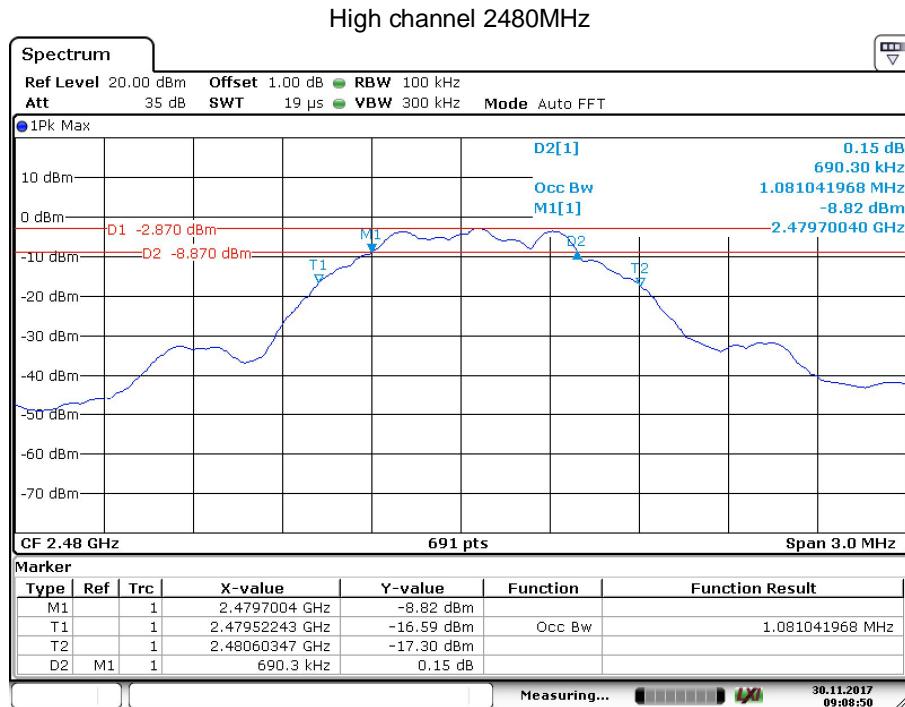
Date: 30.NOV.2017 09:10:48

Middle channel 2440MHz



Date: 30.NOV.2017 09:10:04

6 dB Bandwidth and 99% Bandwidth



Date: 30.NOV.2017 09:08:51

9.4 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW \geq 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.

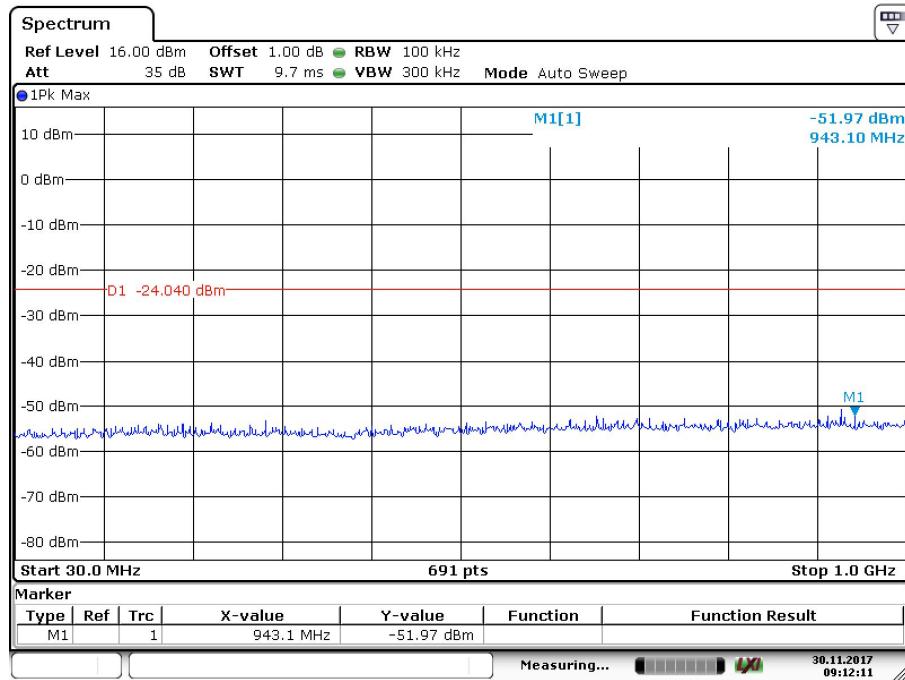
Limit

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

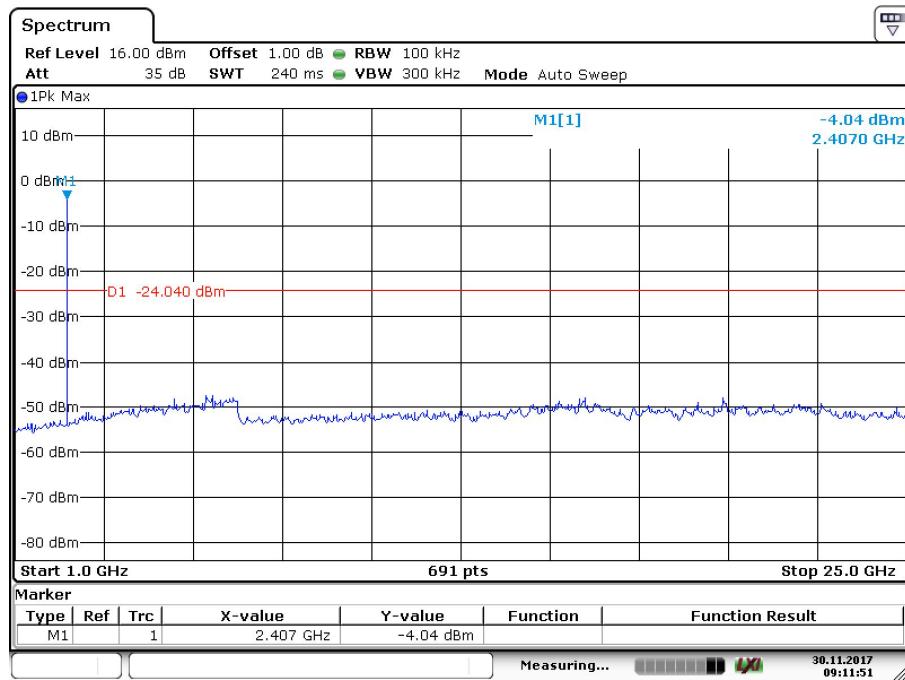


Spurious RF conducted emissions

2402MHz



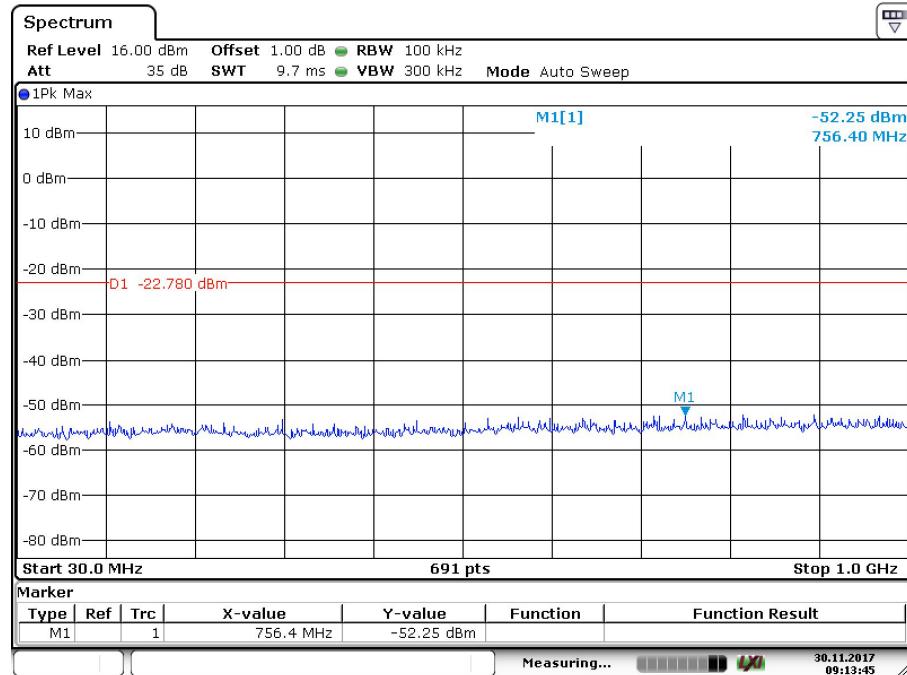
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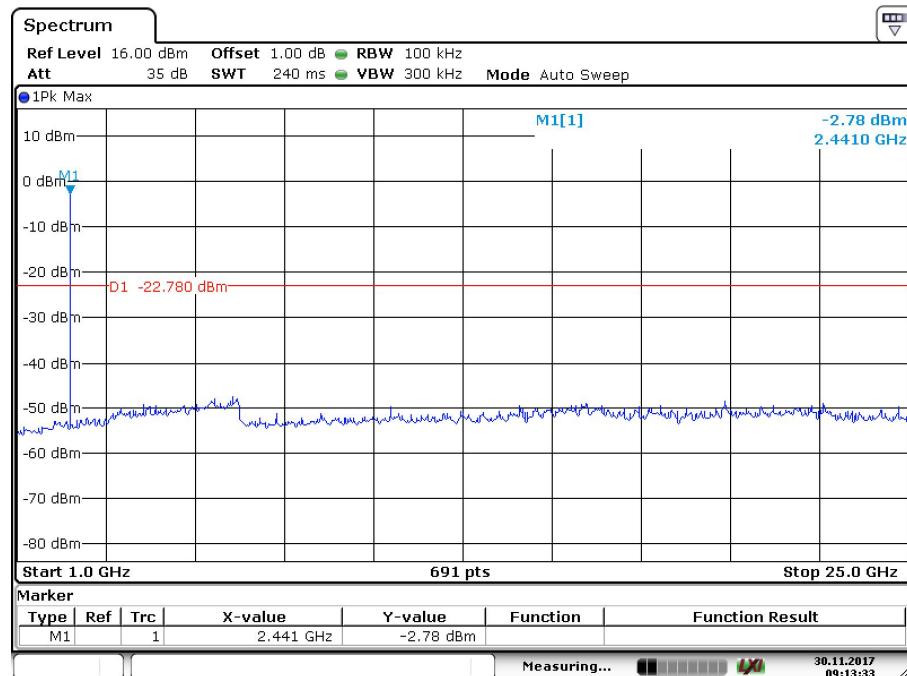
Date: 30.NOV.2017 09:11:51

Spurious RF conducted emissions

2440MHz



Date: 30.NOV.2017 09:13:45

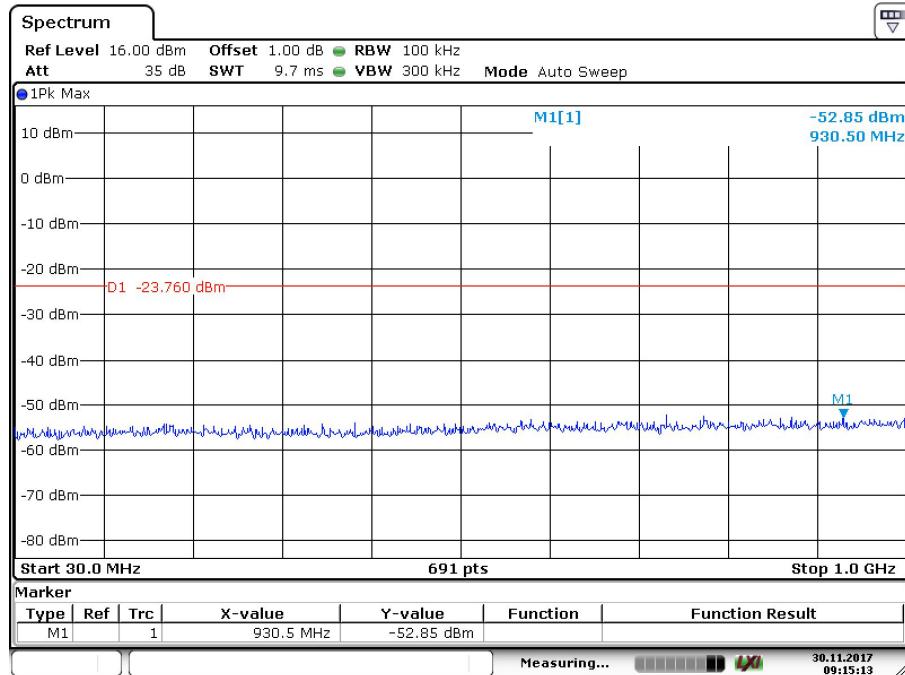


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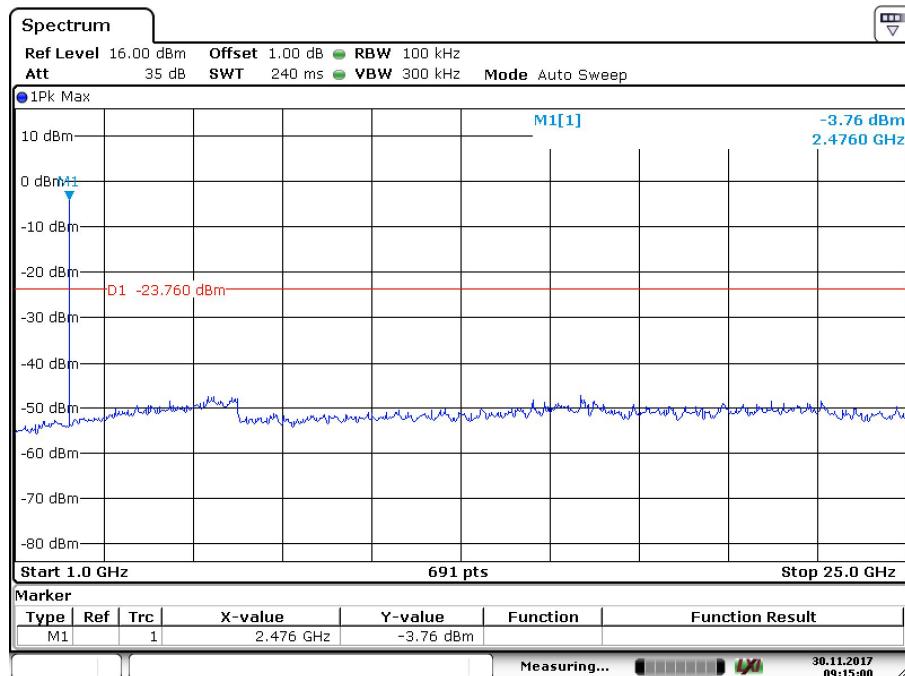


Spurious RF conducted emissions

2480MHz



Date: 30.NOV.2017 09:15:13



Date: 30.NOV.2017 09:15:01

9.5 Band edge

Test Method

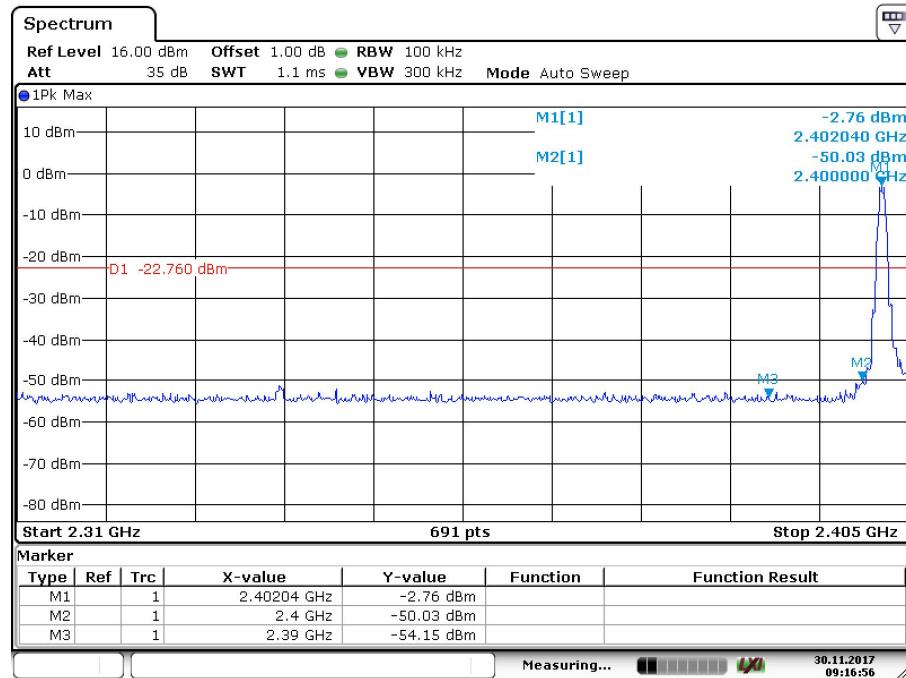
- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record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

Limit

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

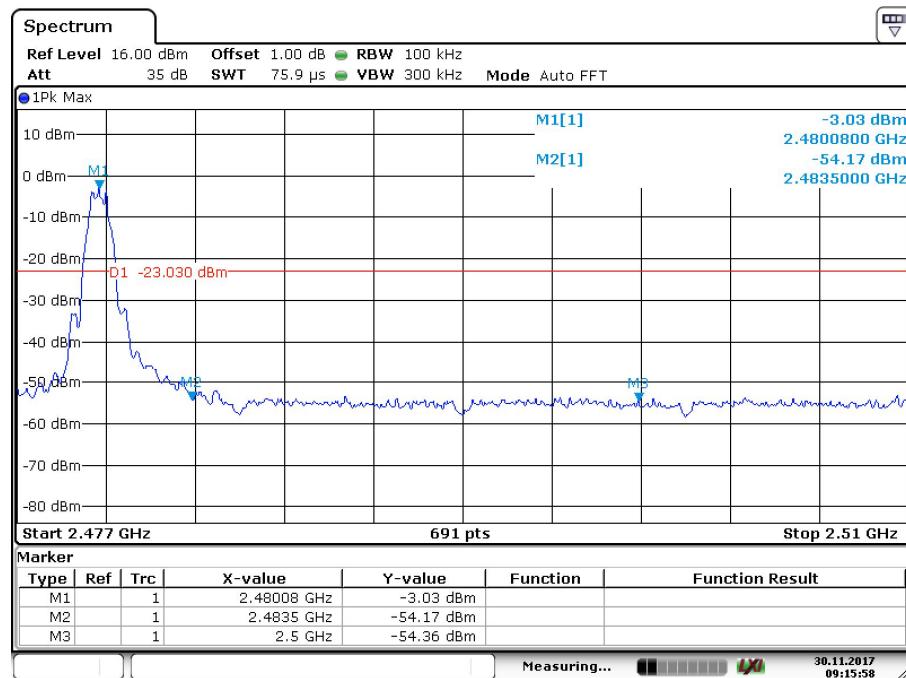
Band edge testing

2402MHz



Date: 30.NOV.2017 09:16:56

2480MHz



Date: 30.NOV.2017 09:15:59

9.6 Spurious radiated emissions for transmitter

Test Method

- 1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 1MHz, $VBW \geq RBW$ for peak measurement and $VBW = 10Hz$ for average
 measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

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, $VBW \geq RBW$ for peak measurement, Sweep = auto, Detector function =
 peak, Trace = max hold.

Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz

Spurious radiated emissions for transmitter

Limit

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 μV/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:

Low channel 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dB μ V/m		dB μ V/m		dB μ V/m	(dB)	
30-1000MHz	45.20	15.49	H	40	QP	24.51	-25.0	Pass
	56.46	16.80	H	40	QP	23.20	-26.3	Pass
	274.06	17.17	H	46	QP	28.83	-21.9	Pass
	944.82	30.66	H	46	QP	15.34	-15.3	Pass
	45.41	16.91	V	40	QP	23.09	-24.6	Pass
	57.86	17.42	V	40	QP	22.58	-25.7	Pass
	586.19	17.26	V	46	QP	28.74	-19.6	Pass
	944.82	34.17	V	46	QP	11.83	-14.4	Pass
1000-2500MHz	7033.59	38.54	H	74	PK	35.46	5.9	Pass
	12749.53	43.16	H	74	PK	30.84	12.6	Pass
	6000.00	41.00	V	74	PK	33.00	3.8	Pass
	10770.00	42.52	V	74	PK	31.48	10.2	Pass

Middle channel 2440MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dB μ V/m		dB μ V/m		dB μ V/m	(dB)	
1000-2500MHz	6000.00	38.69	H	74	PK	35.31	3.7	Pass
	8755.78	41.37	H	74	PK	32.63	8.8	Pass
	6000.00	37.66	V	74	PK	36.34	3.8	Pass
	9497.34	41.46	V	74	PK	32.54	9.0	Pass

High channel 2480MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dB μ V/m		dB μ V/m		dB μ V/m	(dB)	
1000-2500MHz	4951.41	35.96	H	74	PK	38.04	2.6	Pass
	7018.13	39.11	H	74	PK	34.89	5.8	Pass
	6000.00	38.00	V	74	PK	36.00	3.8	Pass
	10073.44	42.74	V	74	PK	31.26	9.8	Pass

Remark:

- (1) ** means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Data of measurement within this frequency range shown -- in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
- (3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

10 Test Equipment List

List of Test Instruments

Radiated Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-14
Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-14
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2018-7-7
Attenuator	Agilent	8491A	MY39264334	2018-7-7
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

TS8997 Test System

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2018-7-7
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2018-7-7
Power Splitter	Weinschel	1580	SC319	2018-7-7
10dB Attenuator	Weinschel	56-10	58764	2018-7-14
10dB Attenuator	R&S	DNF	DNF-001	2018-7-14
10dB Attenuator	R&S	DNF	DNF-002	2018-7-14
10dB Attenuator	R&S	DNF	DNF-003	2018-7-14
10dB Attenuator	R&S	DNF	DNF-004	2018-7-14
Test software	Rohde & Schwarz	EMC32	Version 9.26.01	N/A

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	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.98dB; Vertical: 5.06dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.95dB; Vertical: 4.94dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.14dB; Vertical: 5.12dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.06dB Frequency test involved: 1.16×10^{-7}

THE END