FCC- TEST REPORT

Report Number	:	**68.910.16.064.01**	Date of Issue:	September 09, 2016

Model	:	**JC-B022**
Product Type	:	Electronic Coaster
Applicant	:	Kwench Global Technologies Private Limited.
Address	:	401, 4th Floor, B-Wing, Pinak Galaxy, Kapur Bawadi Junction, Majiwada Thane West, Mumbai, Maharashtra 400607, India.
Production Facility	:	Joint Chinese Ltd.
Address	:	Building 6, Huafeng Tech Park, Guangtian Road, Luotian Industrial Area, Songgang Town, Bao'an District 518100 Shenzhen PEOPLE'S REPUBLIC OF CHINA
Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	31

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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
FCC Registration No.:	502708

3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	Electronic Coaster
Model no.:	JC-B022
FCC ID:	2AJDQ-JC-B022
Options and accessories:	NIL
Rating:	3.7VDC (Supplied by the internal Li-ion rechargeable battery) 5.0VDC (Charging by USB Port)
RF Transmission Frequency:	2402-2480MHz
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 Electronic Coaster with Bluetooth function operating at 2.4GHz

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2015 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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

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5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C			
Test Condition		Pages	Test Result
§15.207	Conducted emission AC power port	10	N/A
§15.247(b)(1)	Conducted peak output power	13	Pass
§15.247(a)(2)	6dB bandwidth	15	Pass
§15.247(e)	Power spectral density*	17	Pass
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	--	N/A
§15.247(a)(1)	Carrier frequency separation	--	N/A
§15.247(a)(1)(iii)	Number of hopping frequencies	--	N/A
§15.247(a)(1)(iii)	Dwell Time	--	N/A
§15.247(d)	Spurious RF conducted emissions	19	Pass
§15.247(d)	Band edge	23	Pass
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter and receiver	25	Pass
§15.203	Antenna requirement	See note 1	Pass

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses an Integrated Antenna, which gain is 0dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AJDQ-JC-B022 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C.

This report is for the BT 4.0 part.

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: August 22, 2016

Testing Start Date: August 22, 2016

Testing End Date: August 31, 2016

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

Reviewed by:	Prepared by:	Tested by:
Phoebe Hu EMC Project Manager	Aaron Lai EMC Project Engineer	Leon Zhang EMC Test Engineer

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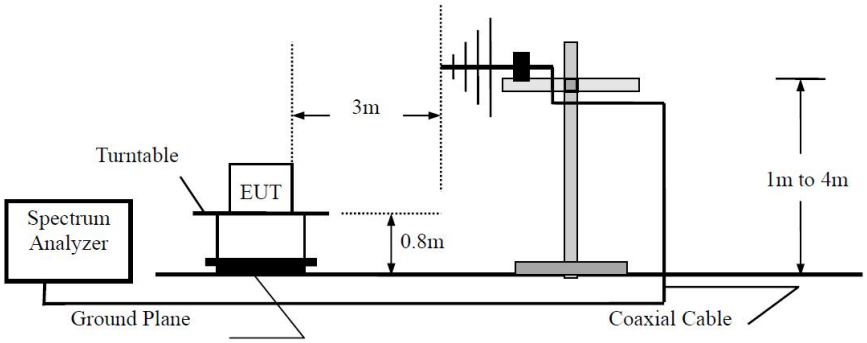
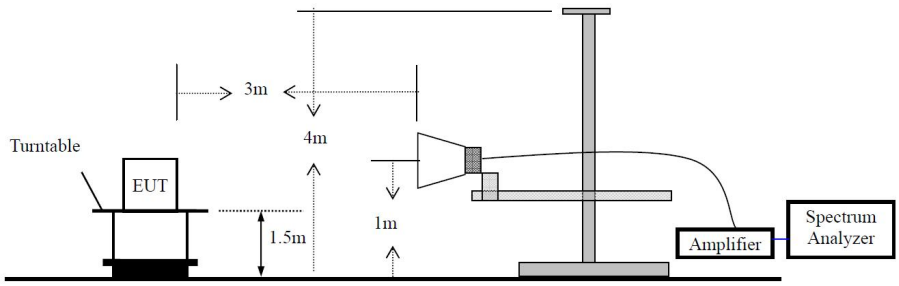
7 Test Setups

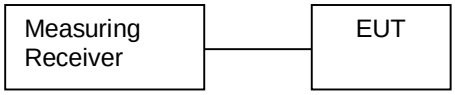
Below 1GHz



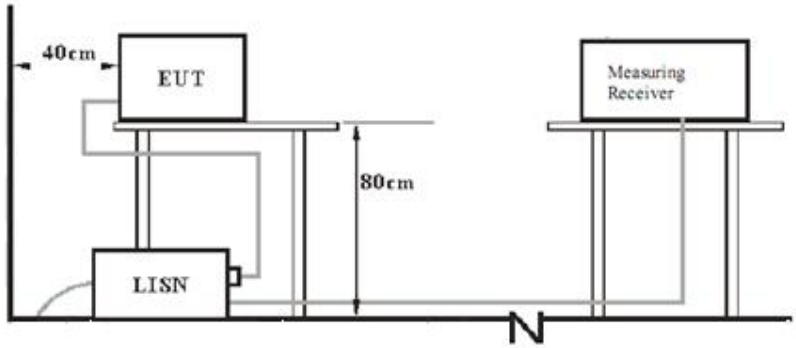
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

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

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

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

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9 Technical Requirement

9.1

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

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linea

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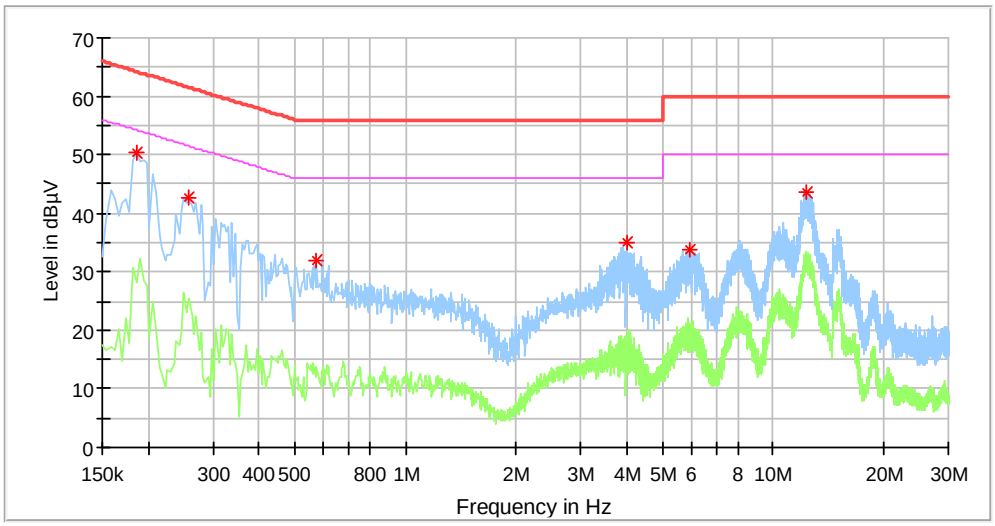
Conducted Emission

Product Type	:	Electronic Coaster
M/N	:	JC-B022
Operating Condition	:	Charging & TX
Test Specification	:	Live
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.186000	50.22	---	64.21	14.00	L1	9.7
0.258000	42.69	---	61.50	18.81	L1	9.7
0.574000	31.82	---	56.00	24.18	L1	9.7
4.002000	34.93	---	56.00	21.07	L1	9.8
5.950000	33.75	---	60.00	26.25	L1	9.9
12.318000	43.67	---	60.00	16.33	L1	10.1

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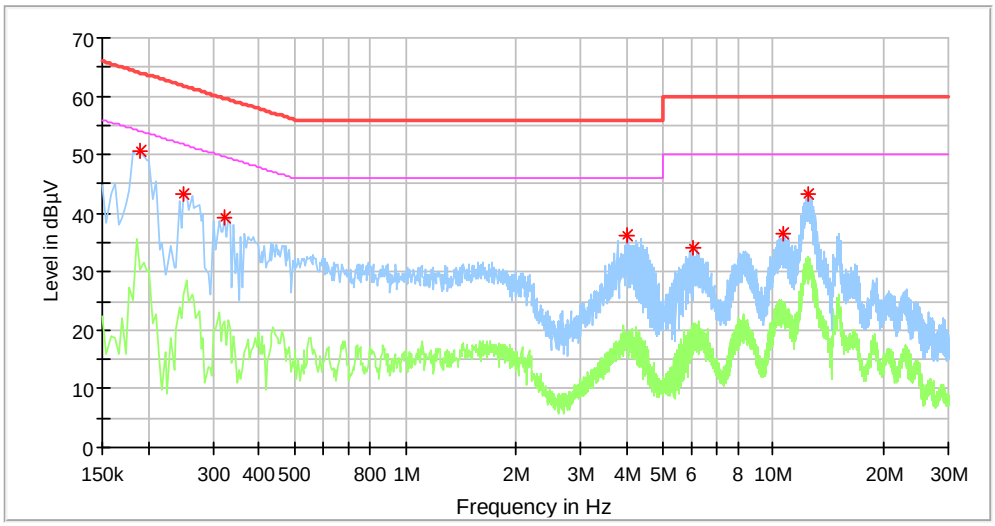
Conducted Emission

Product Type	:	Electronic Coaster
M/N	:	JC-B022
Operating Condition	:	Charging & TX
Test Specification	:	Live
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.190000	50.66	---	64.04	13.38	N	9.6
0.250000	43.27	---	61.76	18.49	N	9.6
0.322000	39.32	---	59.66	20.34	N	9.7
3.986000	36.36	---	56.00	19.64	N	9.8
6.058000	34.17	---	60.00	25.83	N	9.9
10.658000	36.55	---	60.00	23.45	N	10.0
12.534000	43.32	---	60.00	16.68	N	10.1

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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≥3RBW, Span≥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

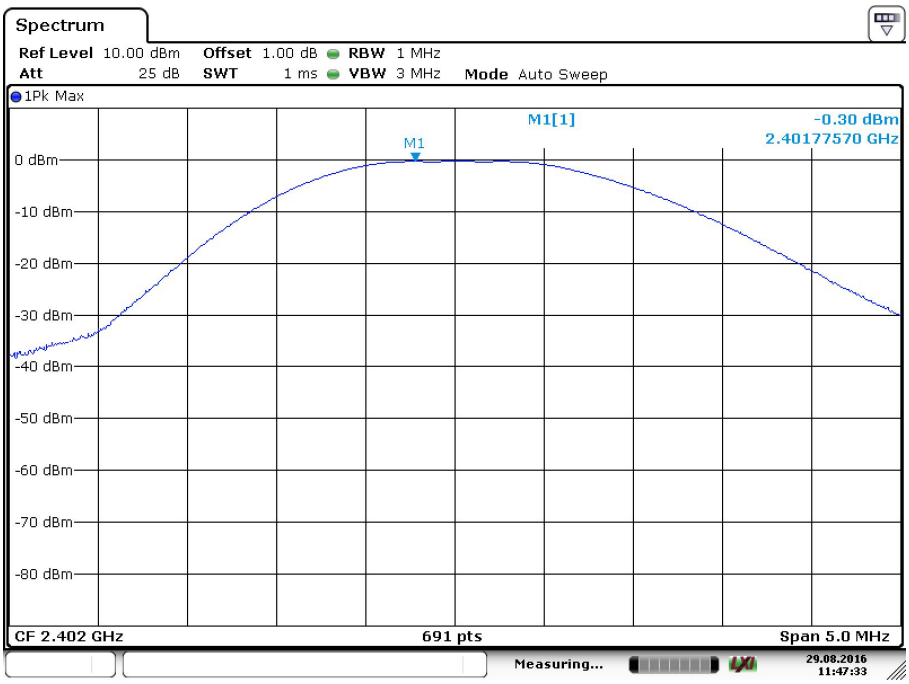
According to §15.247 (b) (1), conducted peak output power limit as below:

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

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2402MHz	-0.30	Pass
Middle channel 2440MHz	-0.29	Pass
Bottom channel 2480MHz	-0.22	Pass

2402MHz



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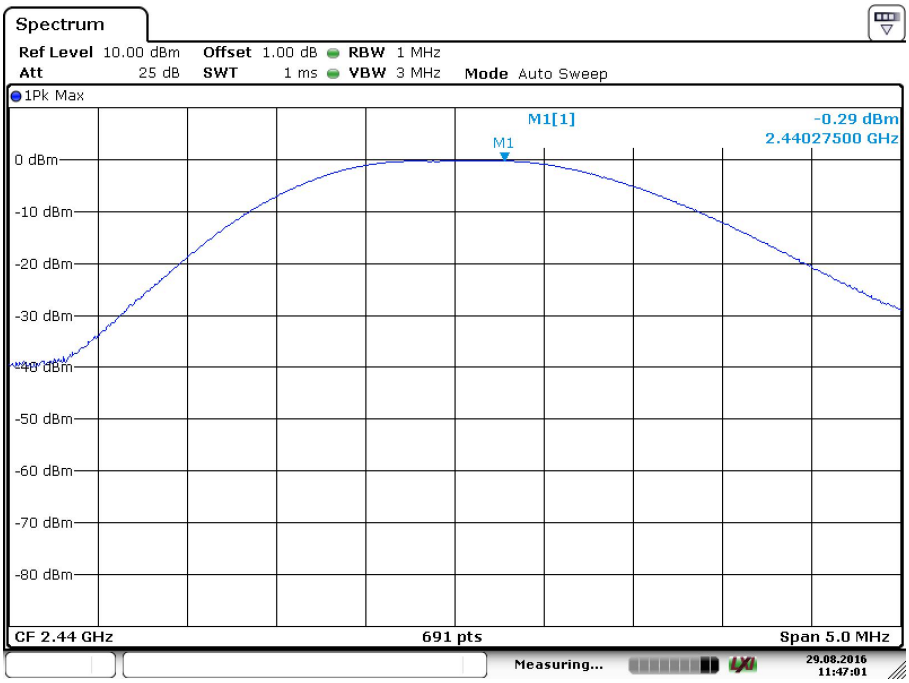
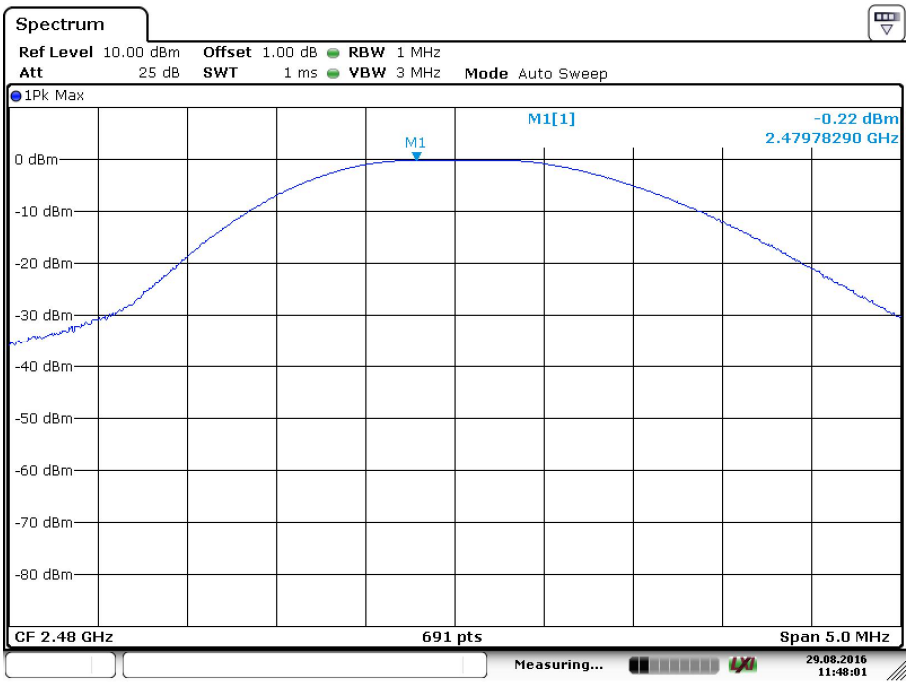
2440MHz



2480MHz



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9.3 6dB 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.

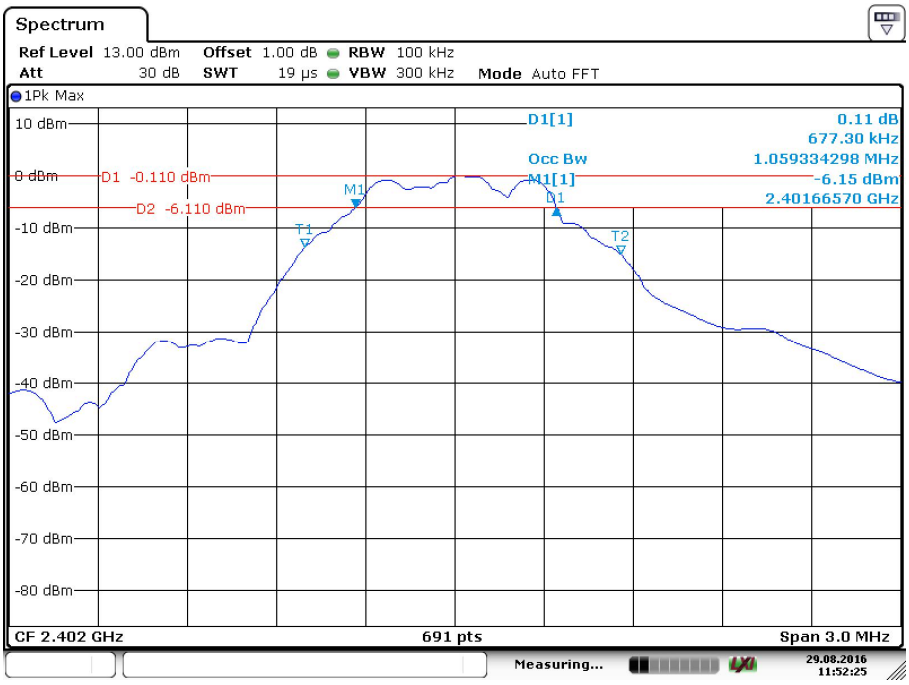
Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth kHz	Result
Top channel 2402MHz	677.30	Pass
Middle channel 2440MHz	668.60	Pass
Bottom channel 2480MHz	659.90	Pass

2402MHz



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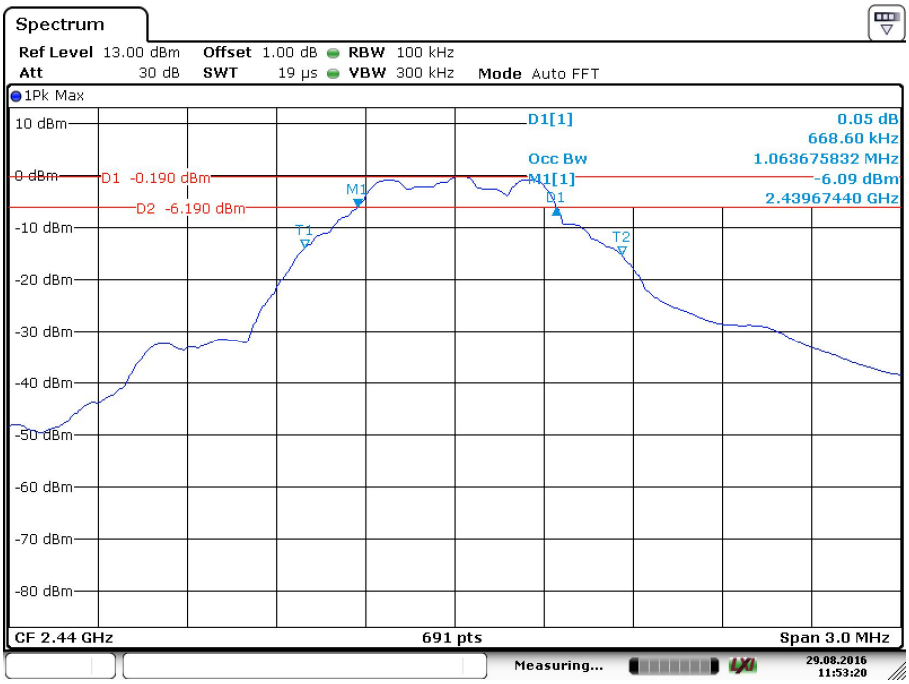
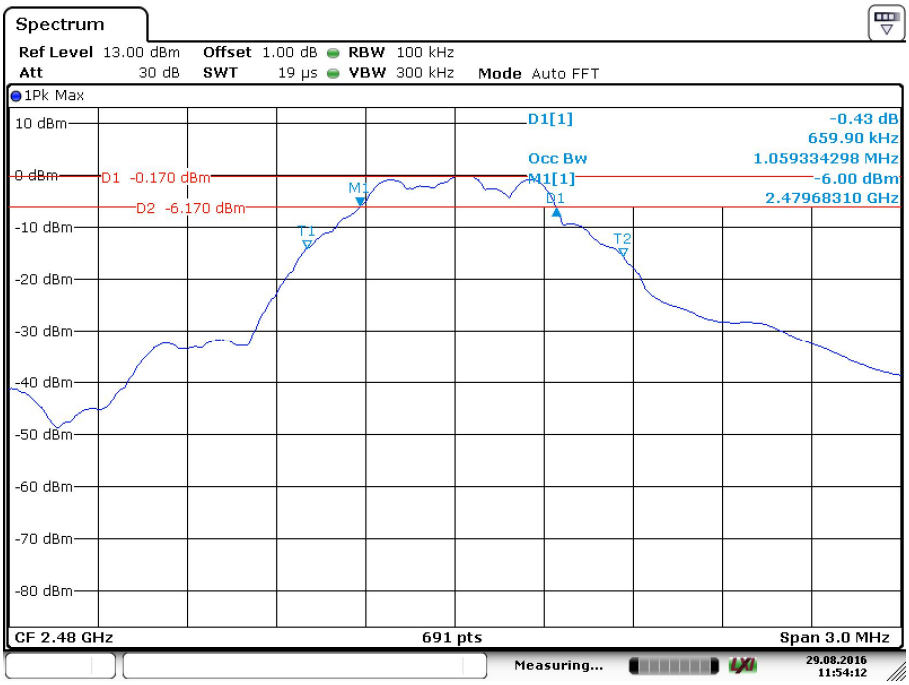
6 dB Bandwidth

2440MHz



2480MHz



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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.

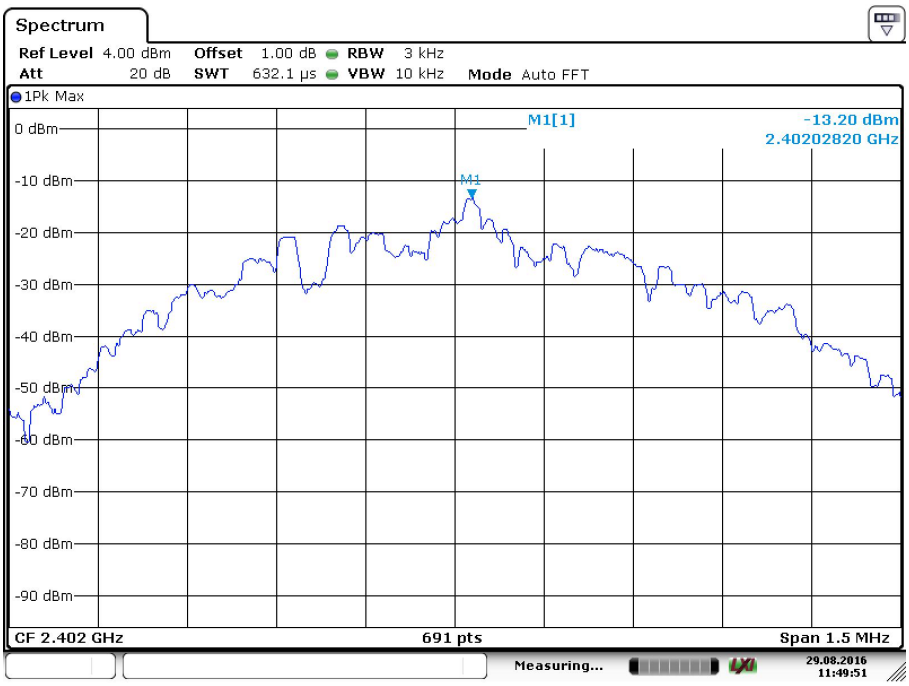
Limit

Limit [dBm]
≤8

Test result

Frequency MHz	Power spectral density dBm	Result
Top channel 2402MHz	-13.20	Pass
Middle channel 2440MHz	-12.77	Pass
Bottom channel 2480MHz	-12.57	Pass

2402MHz



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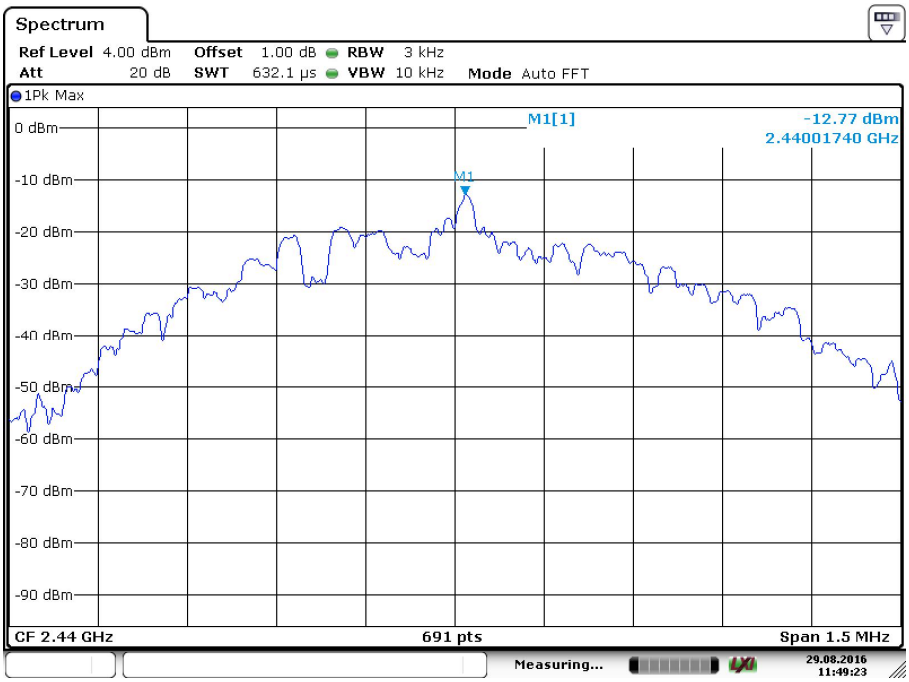
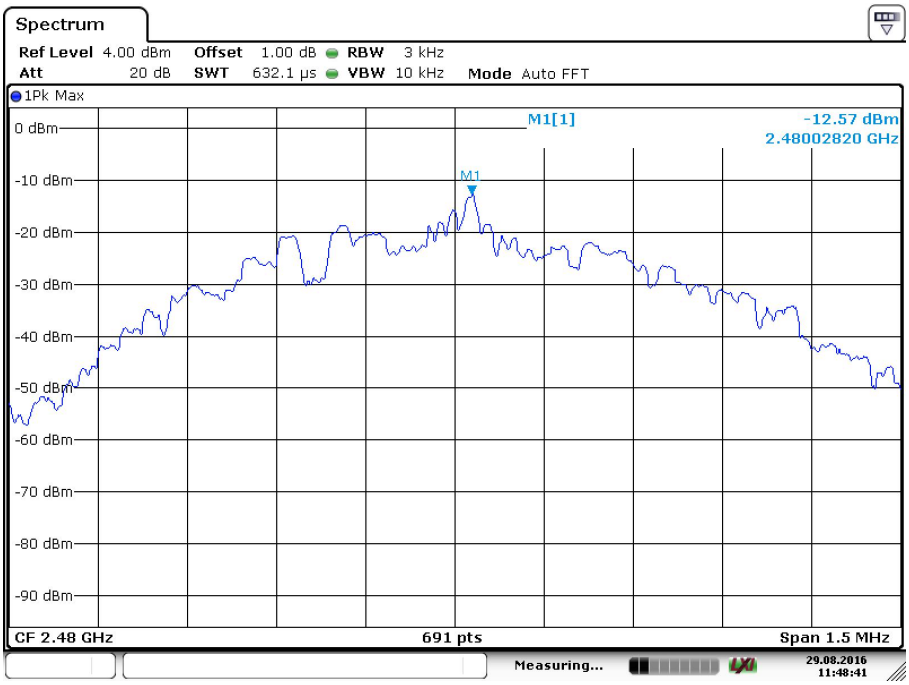
2440MHz



2480MHz



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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

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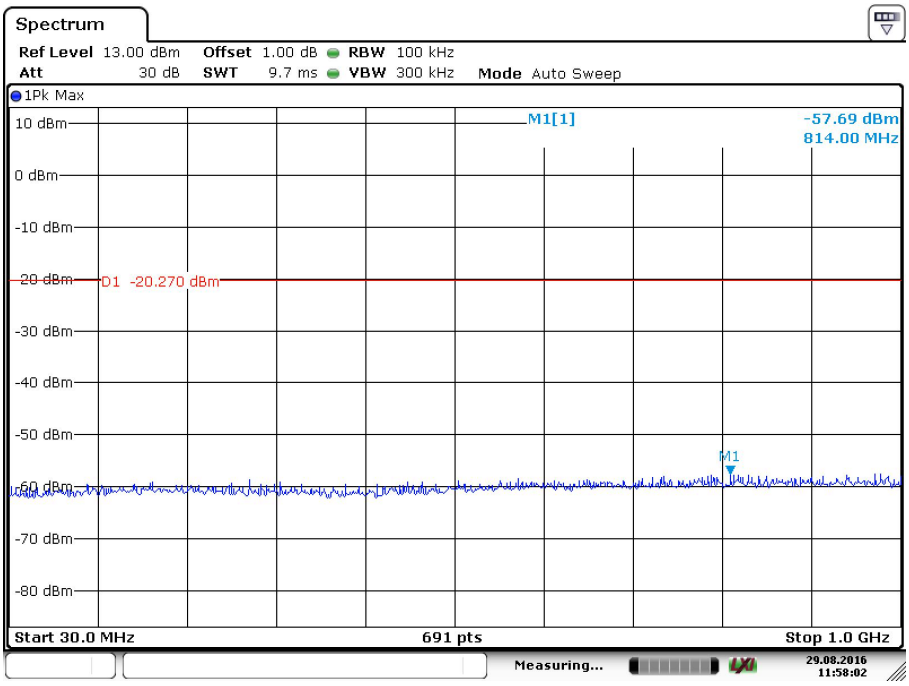
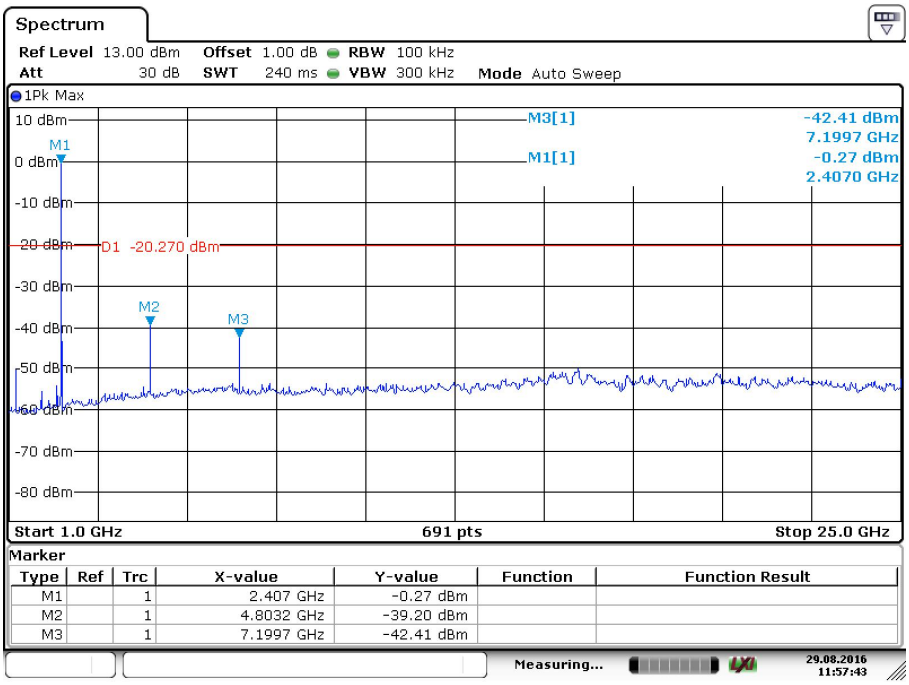
Spurious RF conducted emissions

2402MHz





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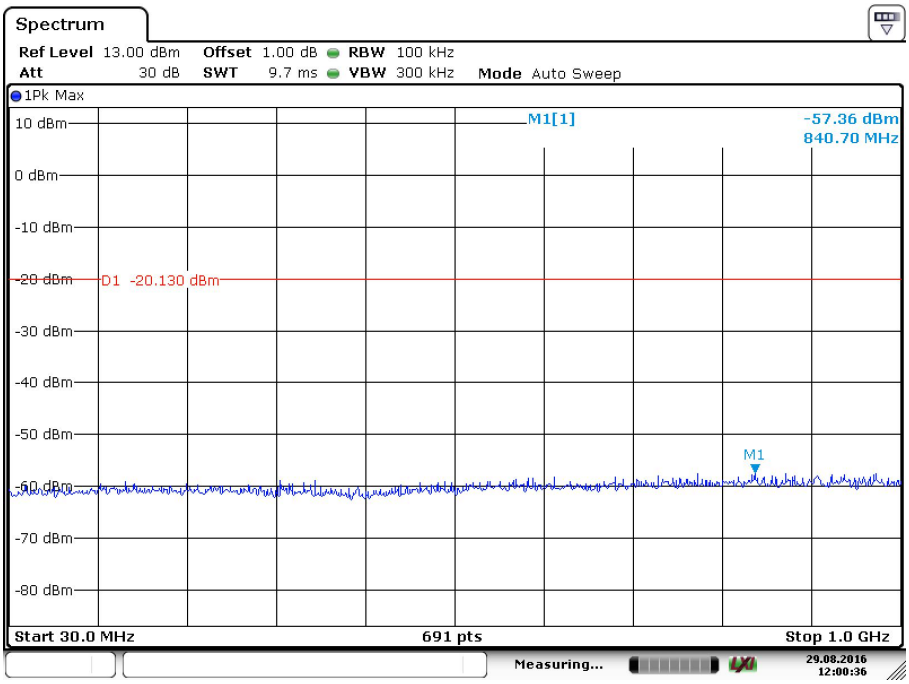
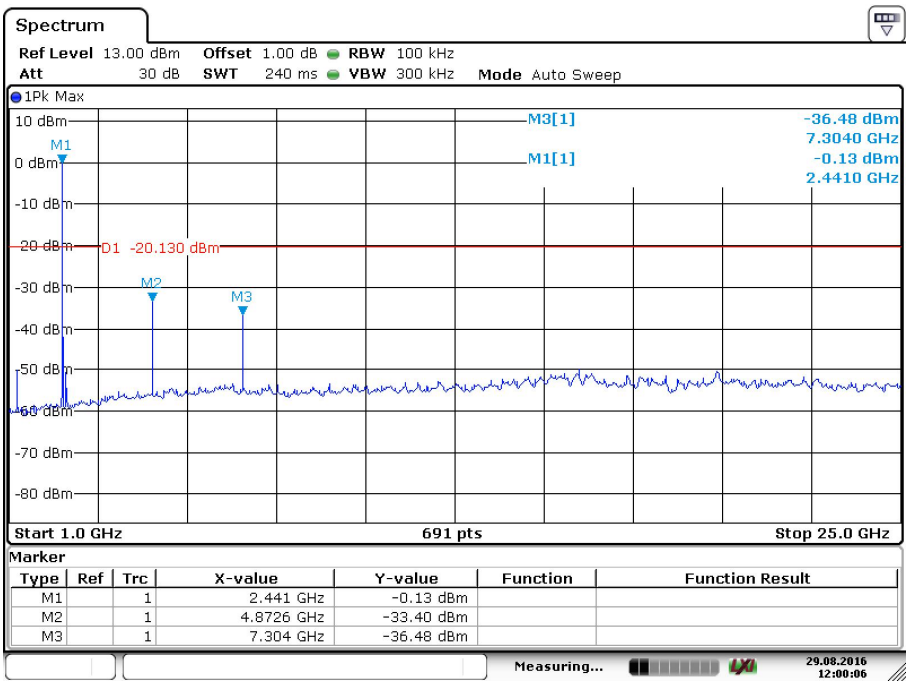
Spurious RF conducted emissions

2440MHz





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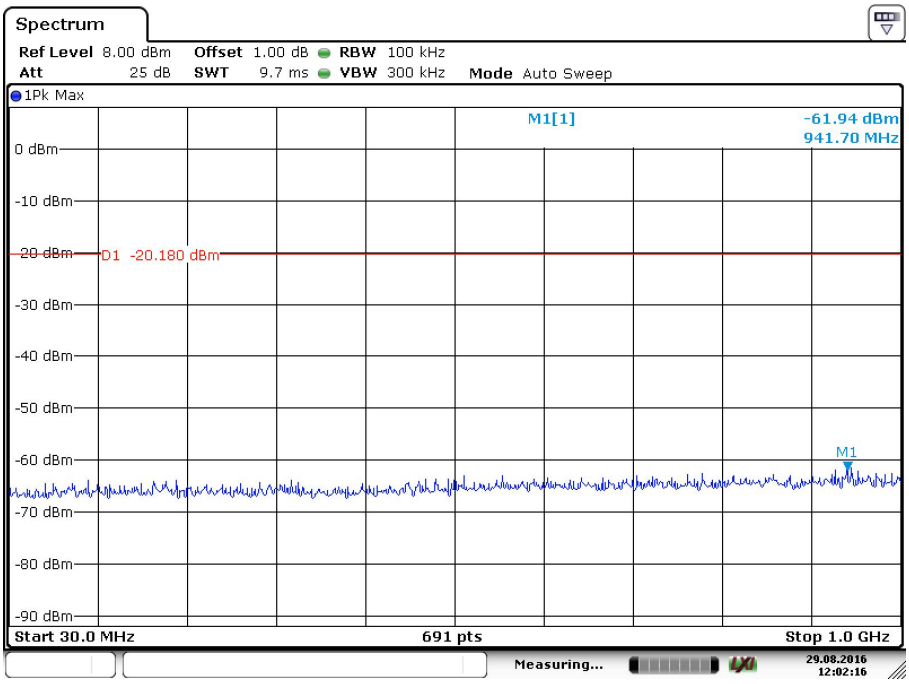
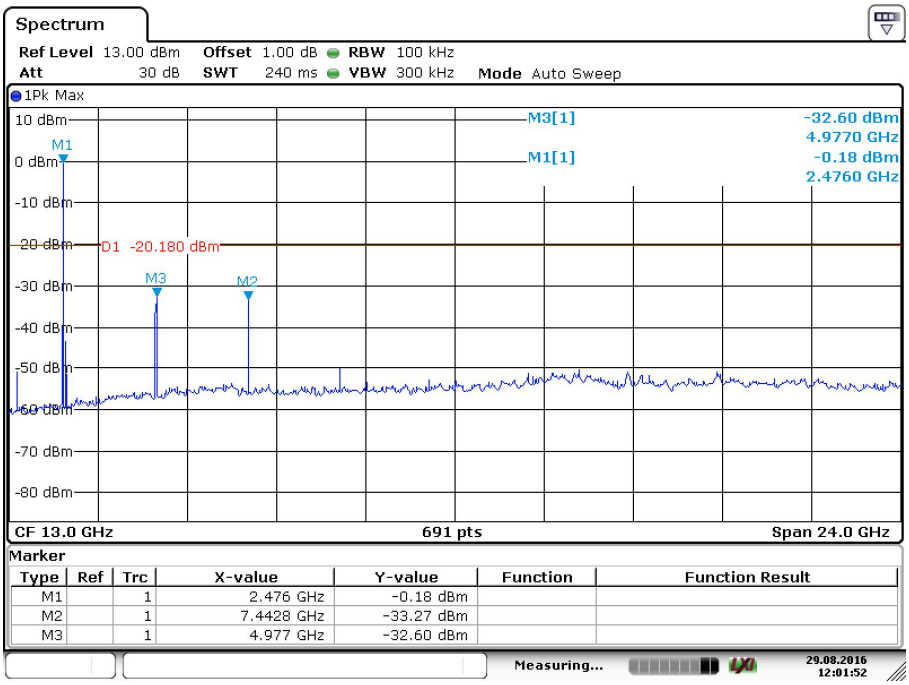
Spurious RF conducted emissions

2480MHz





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9.6 Band edge

Test Method

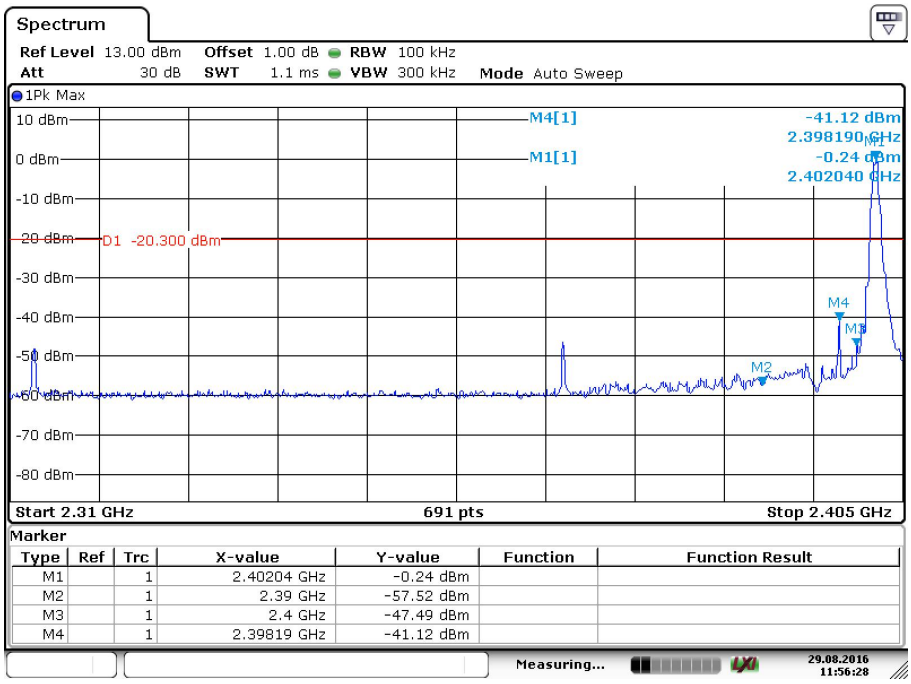
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW⩾RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.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

Limit

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

Test result

2402MHz



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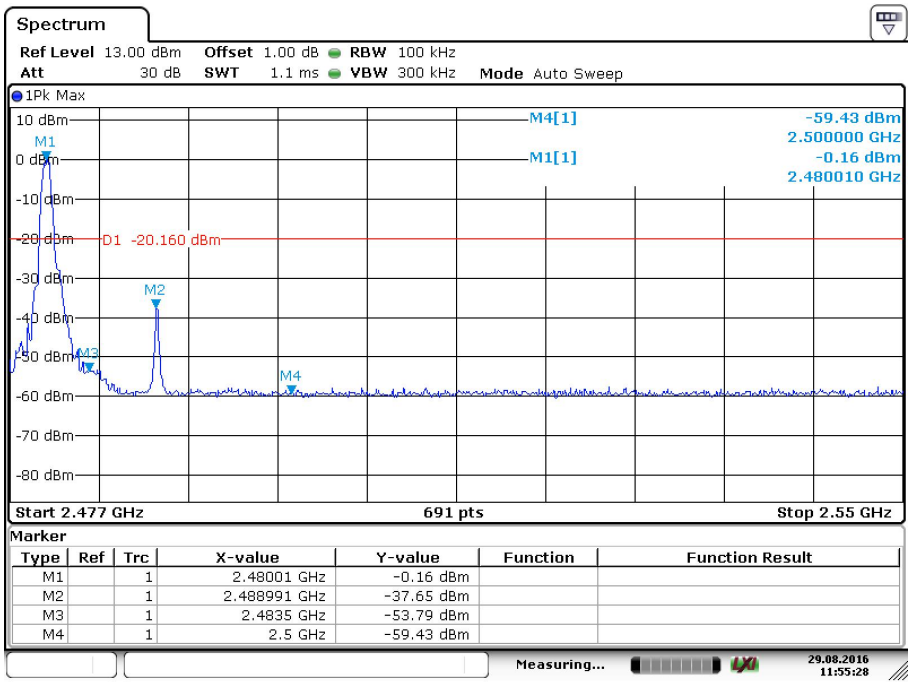
Band edge

2480MHz



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9.7 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⩾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⩾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.

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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 section15.205, 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

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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 (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
275.78	41.15	Horizontal	46.00	QP	Pass
276.00	39.00	Vertical	46.00	QP	Pass

2402MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
4804.00	60.90	Horizontal	74.00	PK	Pass
4804.00	38.80	Horizontal	54.00	AV	Pass
7205.50	53.97	Horizontal	74.00	PK	Pass
7205.50	35.50	Horizontal	54.00	AV	Pass
4804.50	56.58	Vertical	74.00	PK	Pass
4804.50	35.60	Vertical	54.00	AV	Pass
7206.00	45.02	Vertical	74.00	PK	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.

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2440MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
275.00	41.20	Horizontal	46.00	QP	Pass
276.21	40.11	Vertical	46.00	QP	Pass

2440MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
4879.50	64.96	Horizontal	74.00	PK	Pass
4879.50	42.00	Horizontal	54.00	AV	Pass
7319.00	61.23	Horizontal	74.00	PK	Pass
7319.00	40.20	Horizontal	54.00	AV	Pass
4880.00	56.86	Vertical	74.00	PK	Pass
4880.00	41.09	Vertical	54.00	AV	Pass
7320.00	51.09	Vertical	74.00	PK	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.

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2480MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
275.23	41.09	Horizontal	46.00	QP	Pass
276.23	40.45	Vertical	46.00	QP	Pass

2480MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
4959.50	62.29	Horizontal	74.00	PK	Pass
4959.50	41.40	Horizontal	54.00	AV	Pass
7439.50	66.24	Vertical	74.00	PK	Pass
7439.50	45.50	Vertical	54.00	AV	Pass
4960.00	55.72	Vertical	74.00	PK	Pass
4960.00	37.50	Vertical	54.00	AV	Pass
7439.00	50.34	Vertical	74.00	PK	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.

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10 Test Equipment List

List of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2017-7-15
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2017-7-17
Horn Antenna	Rohde & Schwarz	HF907	102295	2017-7-15
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2016-12-27
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2017-7-15
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2017-7-15
Fully Anechoic Chamber	TDK	8X4X4	--	2019-5-29
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2017-7-15
LISN	Rohde & Schwarz	ENV216	100326	2017-7-15

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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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: 4.95dB; Vertical: 5.02dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.93dB; Vertical: 4.92dB;
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV216)	3.50dB
Uncertainty for Conducted RF test	2.04dB

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