FCC - TEST REPORT

Report Number	:	**68.760.16.649.01**	Date of Issue:	September 09, 2016
Model	:	**10113, 10107, 10111, 10114, 10108**		
Product Type	:	10113 - TUBE HEROES UNIVERSITY- Selfie Snap		
Applicant	:	Jazwares Inc		
Address	:	1067 Shotgun Road, Sunrise Sunrise, FL 33326 Florida United States		
Production Facility	:	Jazwares Inc		
Address	:	1067 Shotgun Road, Sunrise Sunrise, FL 33326 Florida United States		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages	:	22		

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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
FCC Registration Number:	502708
Telephone:	86 755 8828 6998
Fax:	86 755 8828 5299

3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	10113 - TUBE HEROES UNIVERSITY- Selfie Snap
Model no.:	10113
FCC ID:	YNIJAZWARES10113
Rating Voltage:	3.0VDC (Supplied by “CR2032” Battery)
RF Transmission Frequency:	2402 – 2480MHz
No. of Operated Channel:	79
Modulation:	GFSK
Antenna Type:	Integrated Antenna
Antenna Gain:	0dBi
Description of the EUT:	NIL

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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

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5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 Conducted emission AC power port	---	---	☐	☐	☒
§15.205(a), §15.209(a), §15.249(a), §15.249(c) Field strength of emissions and Restricted bands	10	Site 1	☒	☐	☐
FCC §15.215(c) 20dB bandwidth	15	Site 1	☒	☐	☐
§15.249(d) Out of band emissions	18	Site 1	☒	☐	☐
§15.203 Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses an integral 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: YNIJAZWARES10113 complies with Section 15.205, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

All models are identical with model: 10113 except model name, so full testing was applied on 10113, the other models were deemed to fulfill the EMC test requirement without further testing.
The EUT only support GFSK modulation of BT3.0 as applicant declared. So this report id only for GFSK modulation of BT3.0
.

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: September 01, 2016

Testing Start Date: September 01, 2016

Testing End Date: September 12, 2016

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

Reviewed by:

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EMC Project Manager

Prepared by:

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EMC Project Engineer

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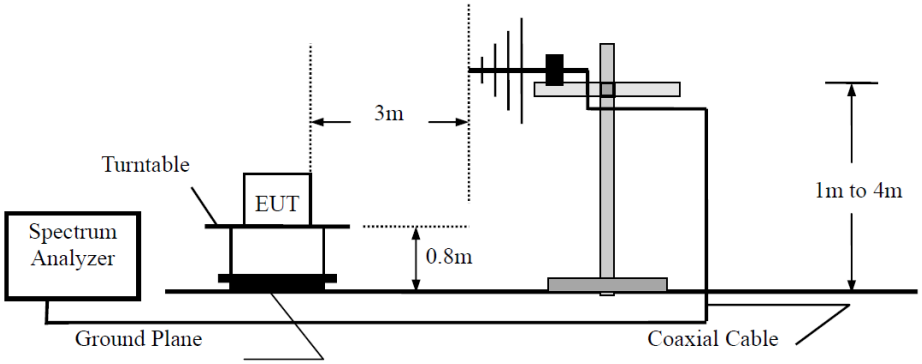
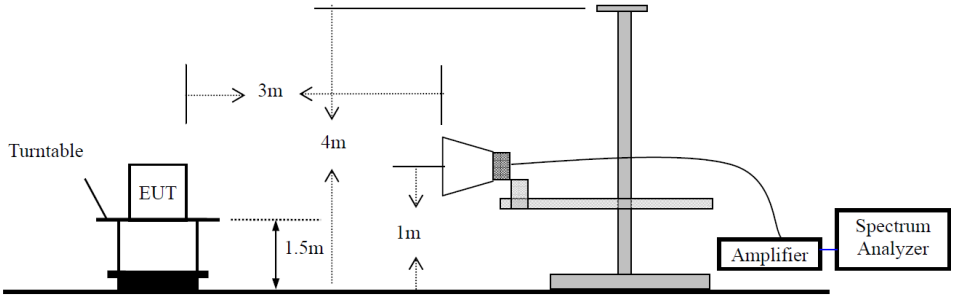
7 Test setups

7.1 Radiated test setups

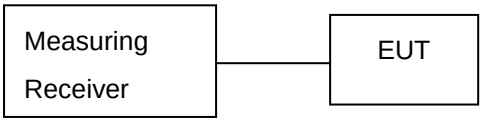
Below 1GHz



Above 1GHz



7.2 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

Name	Model No	S/N	Manufacturer	FCC
Laptop	X240	--	Lenovo	--

Test software BK3221 RF Test which used to control the EUT in continues transmitting mode.

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9 Technical Requirement

9.1 Field strength of emissions and restricted bands

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.

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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.

Limits

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.
According to §15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
According to §15.205 and Unwanted emissions falling into restricted bands in §15.205 (a) Table 3 shall comply with the limits specified in §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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Field strength of emissions and Restricted bands

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.

EUT: 10113 - TUBE HEROES UNIVERSITY- Selfie Snap
M/N: 10113
Operating Condition: Tx; 2402MHz

Below 1GHz

Frequency (MHz)	Emission Level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Value Type	Emission Type
58.34	25.89	H	40	-29.69	QP	Spurious
58.34	23.59	V	40	-13.94	QP	Spurious
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Above 1GHz

Frequency (MHz)	Maximum Emission (dBµV)	Factor (dB)	Emission Level (dBµV/m)	E-Field Polarity	Limits (dBµV/m)	Margin (dB)	Value Type	Emission Type
2402	84.97	0.00	84.97	H	114.00	29.03	Peak	Fundamental
2402	84.97	0.00	84.97	H	94.00	9.03	AVG	Fundamental
2402	78.98	0.00	78.98	V	114.00	35.02	Peak	Fundamental
2402	78.98	0.00	78.98	V	94.00	15.02	AVG	Fundamental
4804 *	37.78	0.00	37.78	H	74.00	36.22	Peak	Spurious
9607.5	41.98	0.00	41.98	H	74.00	32.02	Peak	Spurious
4803.5 *	35.57	0.00	35.57	V	74.00	38.43	Peak	Spurious
9925	42.09	0.00	42.09	V	74.00	31.91	Peak	Spurious
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Remark

1: Data of measurement within this 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.

2: “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

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EUT: 10113 - TUBE HEROES UNIVERSITY- Selfie Snap
M/N: 10113
Operating Condition: Tx; 2441MHz

Below 1GHz

Frequency (MHz)	Emission Level (dBμV/m)	E-Field Polarity	Limits (dBμV/m)	Margin (dB)	Value Type	Emission Type
/	/	H	40	/	Peak	Spurious
/	/	V	40	/	Peak	Spurious
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Above 1GHz

Frequency (MHz)	Maximum Emission (dBμV)	Factor (dB)	Emission Level (dBμV/m)	E-Field Polarity	Limits (dBμV/m)	Margin (dB)	Value Type	Emission Type
2441	86.22	0.00	86.22	H	114.00	27.78	Peak	Fundamental
2441	86.22	0.00	86.22	H	94.00	7.78	AVG	Fundamental
2441	81.36	0.00	81.36	V	114.00	32.64	Peak	Fundamental
2441	81.36	0.00	81.36	V	94.00	12.64	AVG	Fundamental
4980.5 *	36.60	0.00	36.60	H	74.00	37.40	Peak	Spurious
9763.5	44.09	0.00	44.09	H	74.00	29.91	Peak	Spurious
8819.5	42.36	0.00	42.36	V	74.00	31.64	Peak	Spurious
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Remark

1: Data of measurement within this 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.

2: “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

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Field strength of emissions and Restricted bands

EUT: 10113 - TUBE HEROES UNIVERSITY- Selfie Snap
M/N: 10113
Operating Condition: Tx; 2480MHz

Below 1GHz

Frequency (MHz)	Emission Level (dBμV/m)	E-Field Polarity	Limits (dBμV/m)	Margin (dB)	Value Type	Emission Type
/	/	H	40	/	Peak	Spurious
/	/	V	40	/	Peak	Spurious
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Above 1GHz

Frequency (MHz)	Maximum Emission (dBμV)	Factor (dB)	Emission Level (dBμV/m)	E-Field Polarity	Limits (dBμV/m)	Margin (dB)	Value Type	Emission Type
2480	85.52	0.00	85.52	H	114.00	28.48	Peak	Fundamental
2480	85.52	0.00	85.52	H	94.00	8.48	AVG	Fundamental
2480	78.99	0.00	78.99	V	114.00	35.01	Peak	Fundamental
2480	78.99	0.00	78.99	V	94.00	15.01	AVG	Fundamental
7523*	39.82	0.00	37.78	H	74.00	36.22	Peak	Spurious
1017.5	41.92	0.00	41.98	V	74.00	32.02	Peak	Spurious
Remark:								
Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Remark

1: Data of measurement within this 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.

2: “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

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9.2 20dB Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

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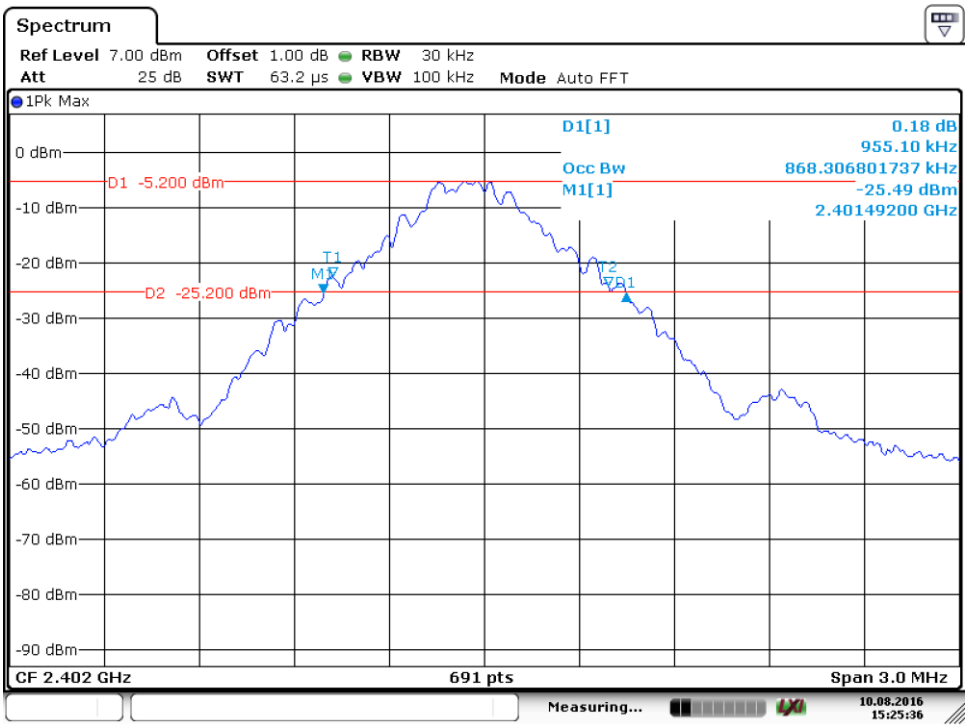
20dB Bandwidth

Frequency MHz	20dB Bandwidth MHz	Limit kHz	Result
2402	955.10	--	Pass
2441	955.10	--	Pass
2480	959.50	--	Pass



2402MHz

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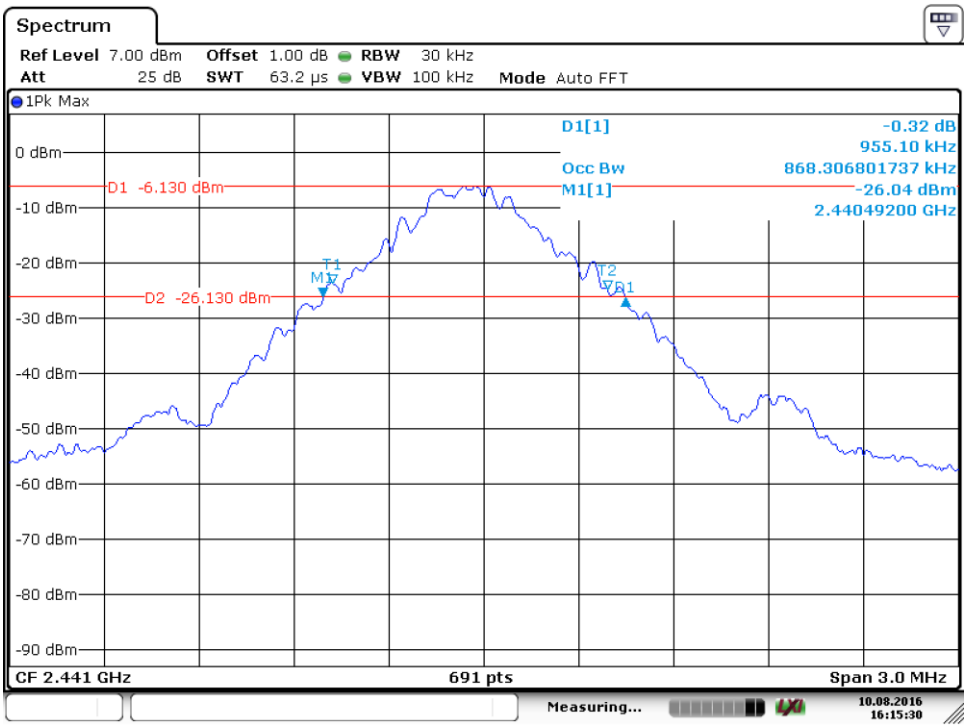
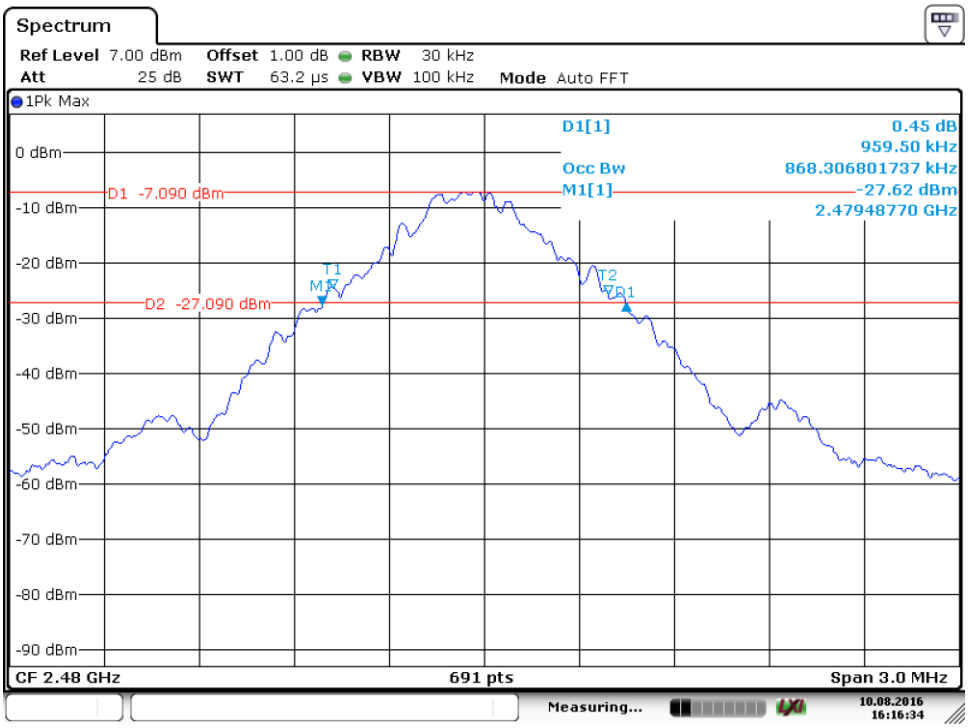
20dB Bandwidth



2441MHz



2480MHz

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9.3 Out of band emissions

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:
According to §15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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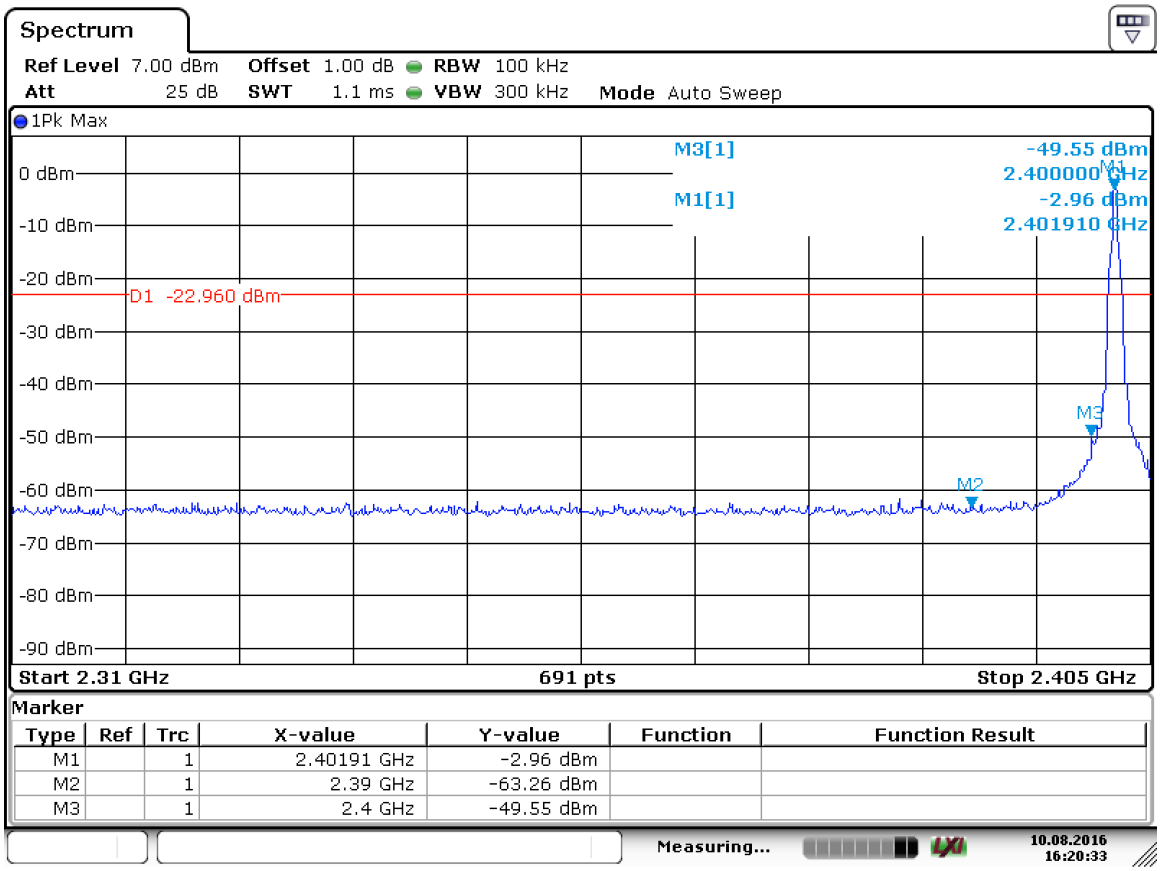
Band edge testing

EUT: 10113 - TUBE HEROES UNIVERSITY- Selfie Snap
M/N: 10113
Operating Condition: Tx; 2402MHz



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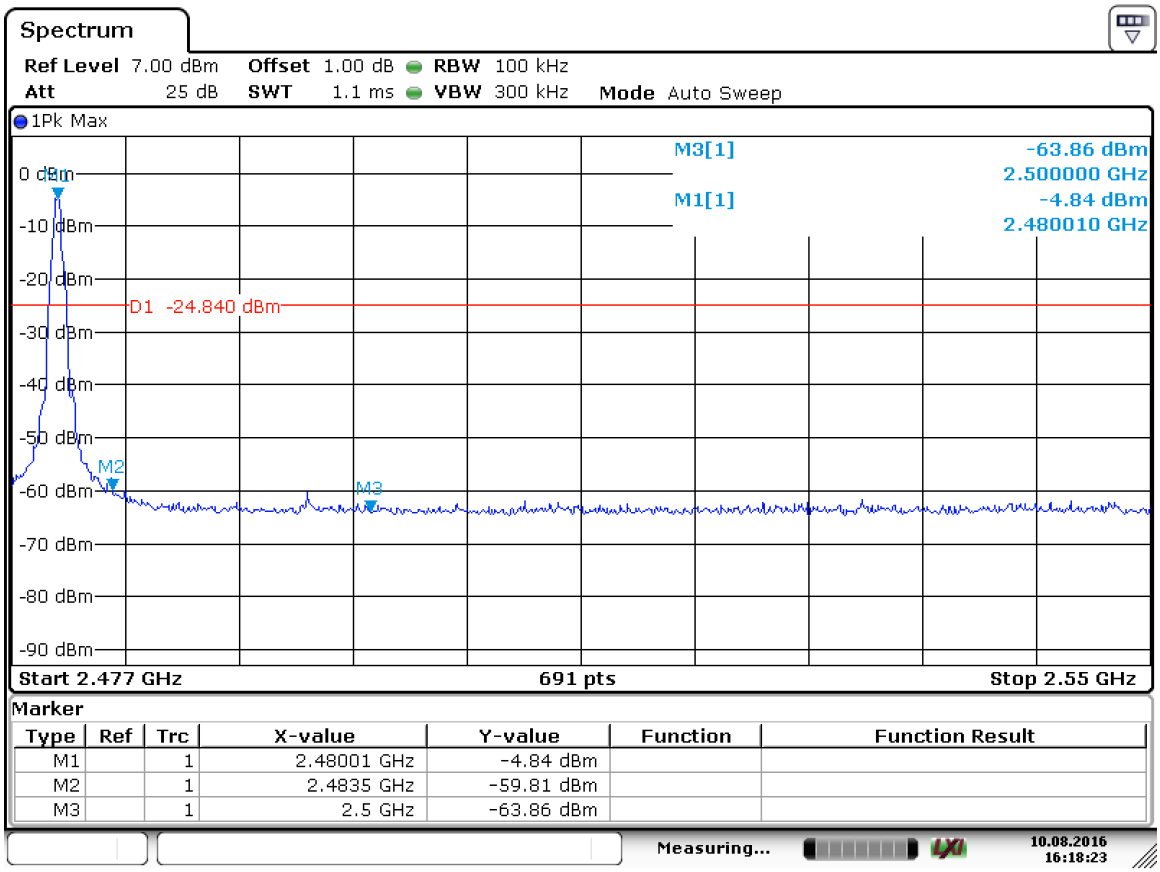
Band edge testing

EUT: 10113 - TUBE HEROES UNIVERSITY- Selfie Snap
M/N: 10113
Operating Condition: Tx; 2480MHz



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10 Test equipment list

List of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2017-7-15
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2017-7-15
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2017-8-3
Horn Antenna	Rohde & Schwarz	HF907	102294	2017-7-15
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2017-7-15
3m Semi-anechoic chamber	TDK	9X6X6	----	2019-5-29

Conducted RF tests

- 20dB bandwidth

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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 Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted RF test with TS 8997	2.04dB

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