FCC - TEST REPORT

Report Number	:	**68.950.19.0095.01**	Date of Issue:	April 12, 2019
Models	:	ITA40201, ITA40101, ITA40001		
Product Type	:	Smart watch		
Applicant	:	American Exchange Time LLC		
Address	:	1441 Broadway,27th Floor, New York, NY 10018 United States		
Manufacturer	:	American Exchange Time LLC		
Address	:	1441 Broadway,27th Floor, New York, NY 10018 United States		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**33**		

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1 Table of Contents

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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 518052 P.R. China
Telephone:	86 755 8828 6998
Fax:	86 755 828 5299
FCC Registration No.:	514049

3 Description of the Equipment Under Test

Product:	Smart watch
Models no.:	ITA40201, ITA40101, ITA40001
FCC ID:	2ARUI-ITA40001B38D
Brand name:	iTouch Air 2S
Options and accessories:	USB charger cable
Rating:	5V/1A
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	Internal Antenna
Antenna Gain:	0dBi
Description of the EUT:	The Equipment Under Test (EUT) is Smart watch with BLE function operated at 2.4GHz.

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2018 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to 558074 D01 DTS 15.247 Meas Guidance v05r02 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 Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10	---	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	13	Site 1	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	16	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	19	Site 1	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	22	Site 1	☒	☐	☐
§15.247(d)	Band edge	26	Site 1	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	28	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 2		☒	☐	☐

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a Integrated antenna, which gain is 0dBi. In accordance 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: 2ARUI-ITA40001B38D complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

ITA40001 is a Smart watch with BLE function. The TX and RX range is 2402MHz-2480MHz.

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: March 12, 2019

Testing Start Date: March 14, 2019

Testing End Date: April 1, 2019

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

Reviewed by:	Prepared by:	Tested by:
John Zhi	Moon Xiong	Louise Liu
Section Manager	Project Engineer	Test Engineer

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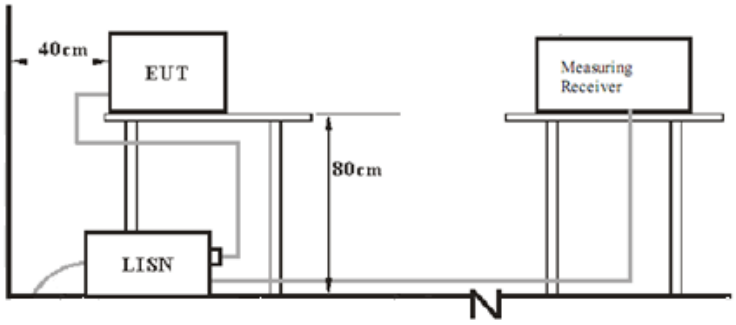
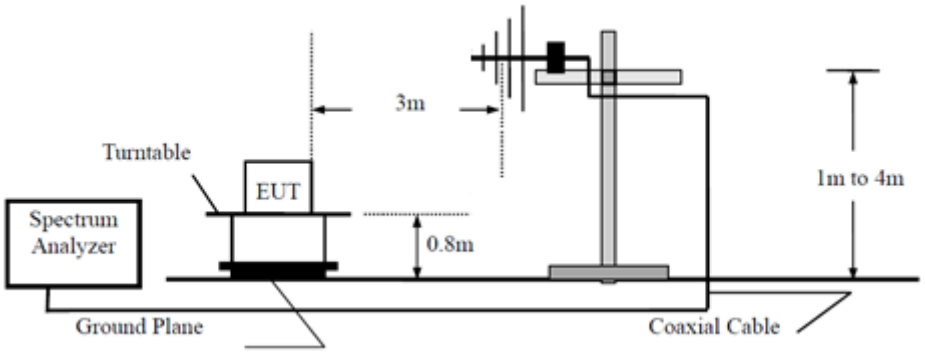
7 Test Setups

AC Power Line Conducted Emission test setups



Below 1GHz



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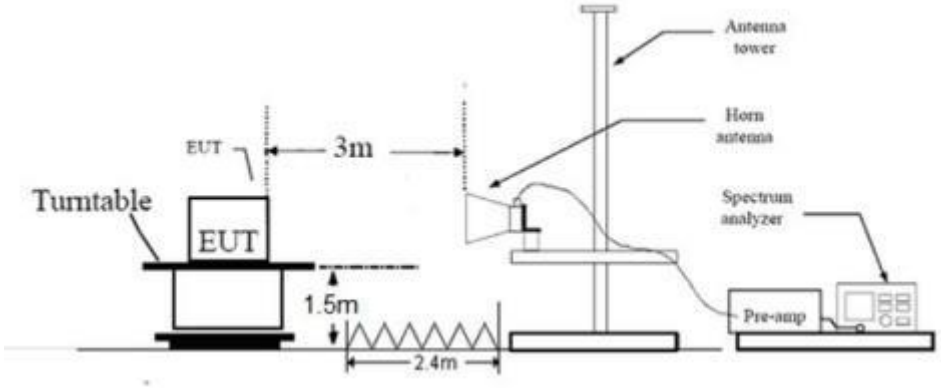
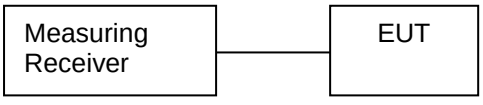


Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	X220	---
Adapter	---	---	

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

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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

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 linearly with logarithm of the frequency.

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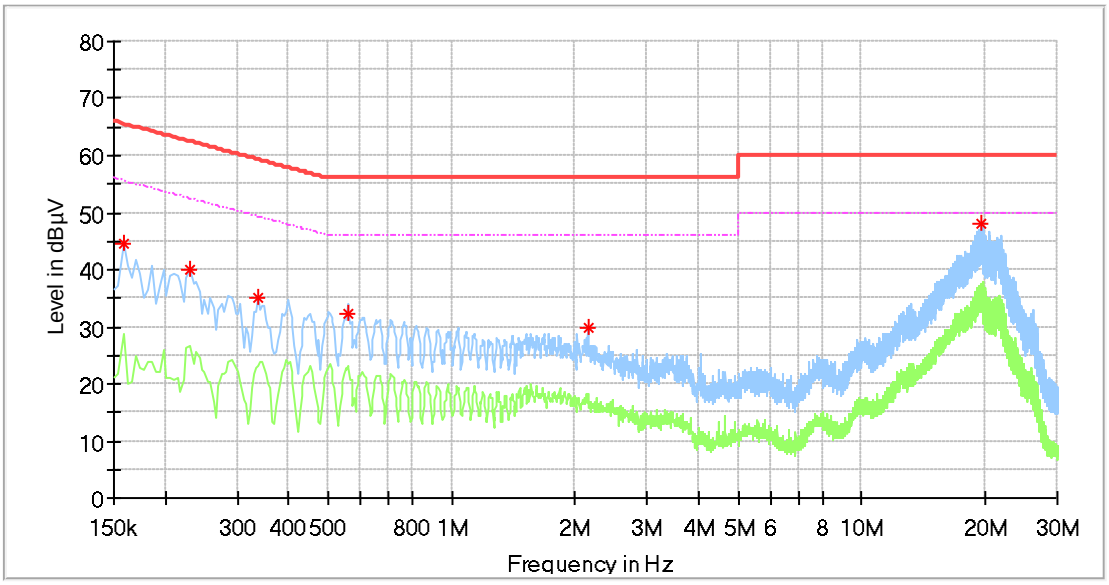
Model:	ITA40001
Test mode:	ON
Test Voltage:	AC 230V/50Hz
Project No/Sample ID:	68.950.19.0095.01
Test By:	Aaron
Remark:	



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	44.71	---	65.57	20.86	L1	10.2
0.230000	40.04	---	62.45	22.41	L1	10.2
0.338000	34.92	---	59.25	24.34	L1	10.2
0.562000	32.22	---	56.00	23.78	L1	10.3
2.146000	29.77	---	56.00	26.23	L1	10.3
19.494000	47.95	---	60.00	12.05	L1	11.0

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---		---

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

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Model:	ITA40001
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Project No/Sample ID:	68.950.19.0095.01
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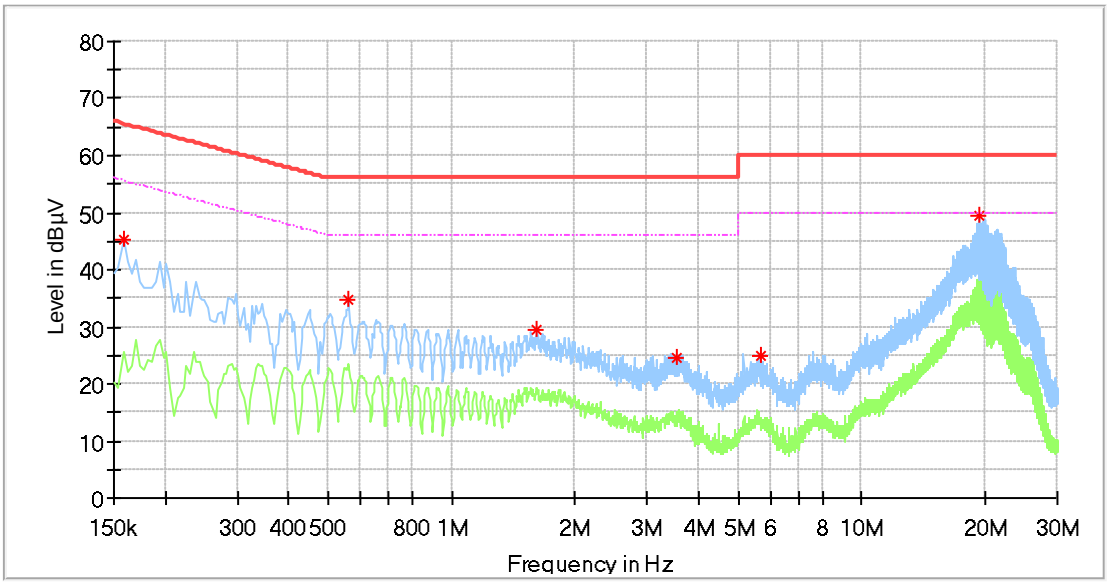
Remark:	



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	45.14	---	65.57	20.42	N	10.2
0.562000	34.78	---	56.00	21.22	N	10.3
1.614000	29.48	---	56.00	26.52	N	10.3
3.558000	24.71	---	56.00	31.29	N	10.4
5.702000	24.75	---	60.00	35.25	N	10.5
19.370000	49.56	---	60.00	10.44	N	11.2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---		---

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

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9.2 Conducted peak output power

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. 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.
3. Add a correction factor to the display.
4. 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
Bottom channel 2402MHz	-5.04	Pass
Middle channel 2440MHz	-5.03	Pass
Top channel 2480MHz	-4.27	Pass

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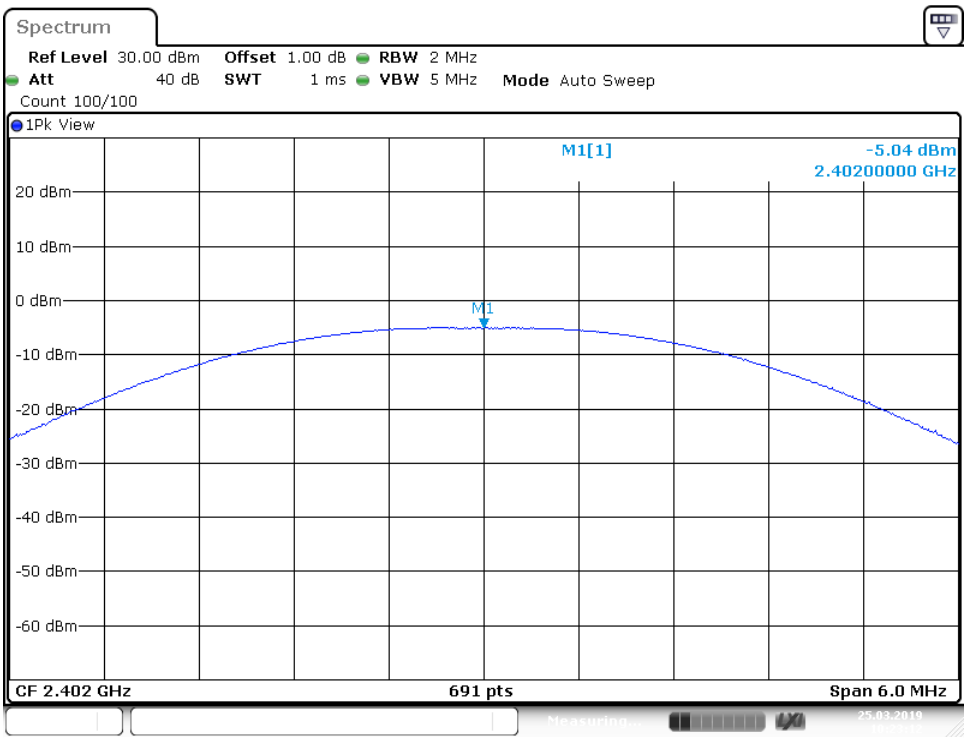
Low channel 2402MHz



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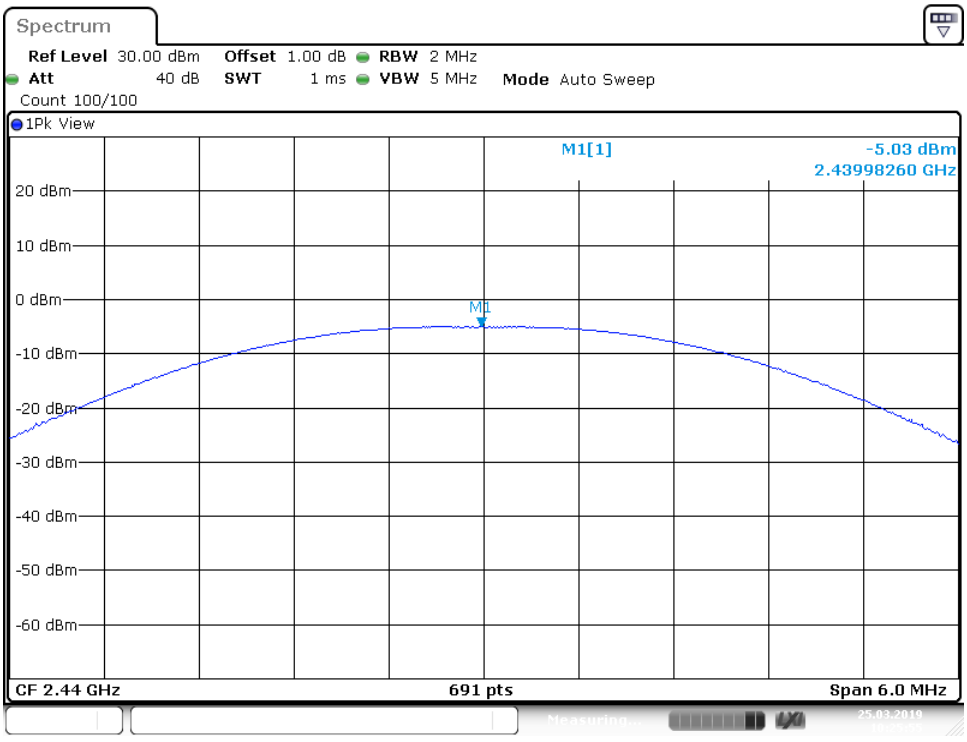
Middle channel 2440MHz



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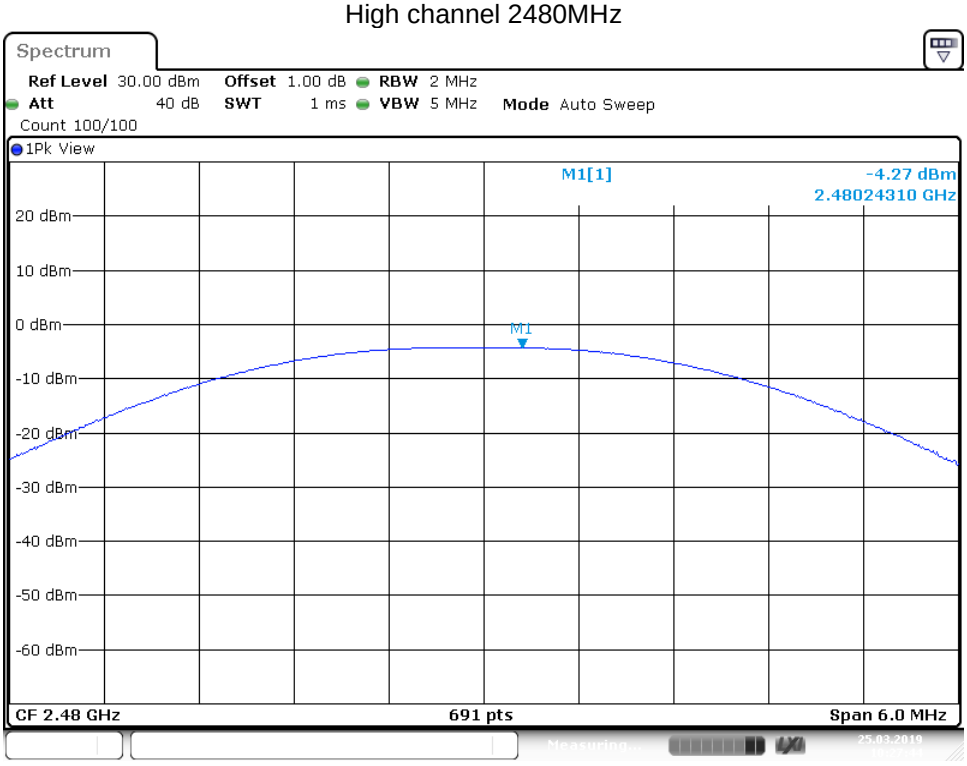
High channel 2480MHz



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9.3 Power spectral density

Test Method

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

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. 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.
3. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
4. 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	-14.87	Pass
Middle channel 2440MHz	-15.07	Pass
Bottom channel 2480MHz	-14.24	Pass

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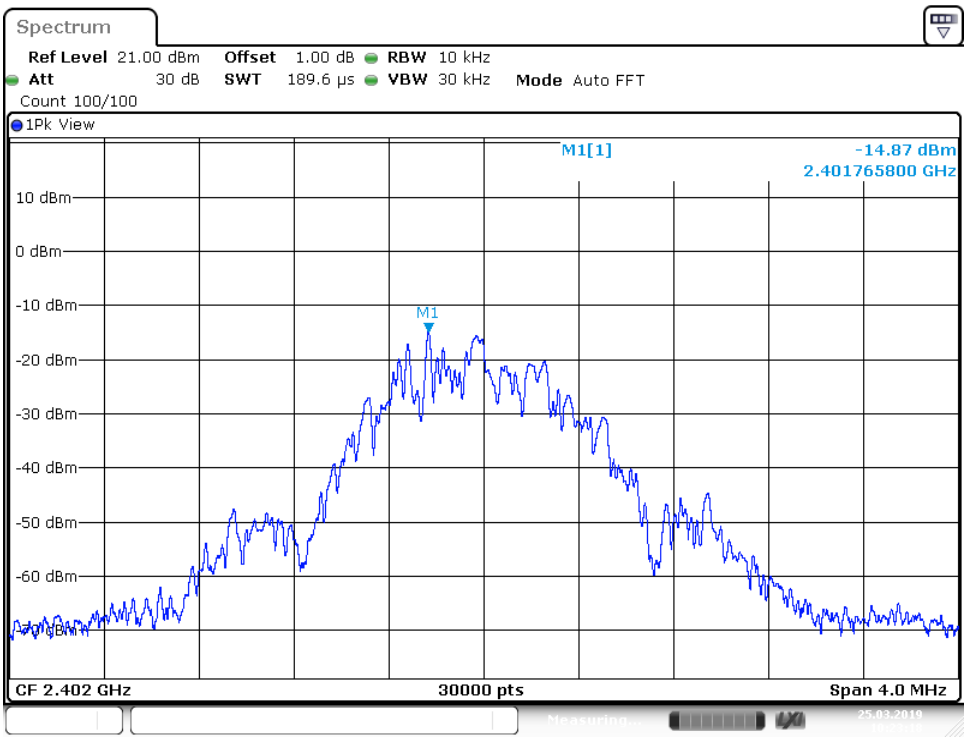
Low channel 2402MHz



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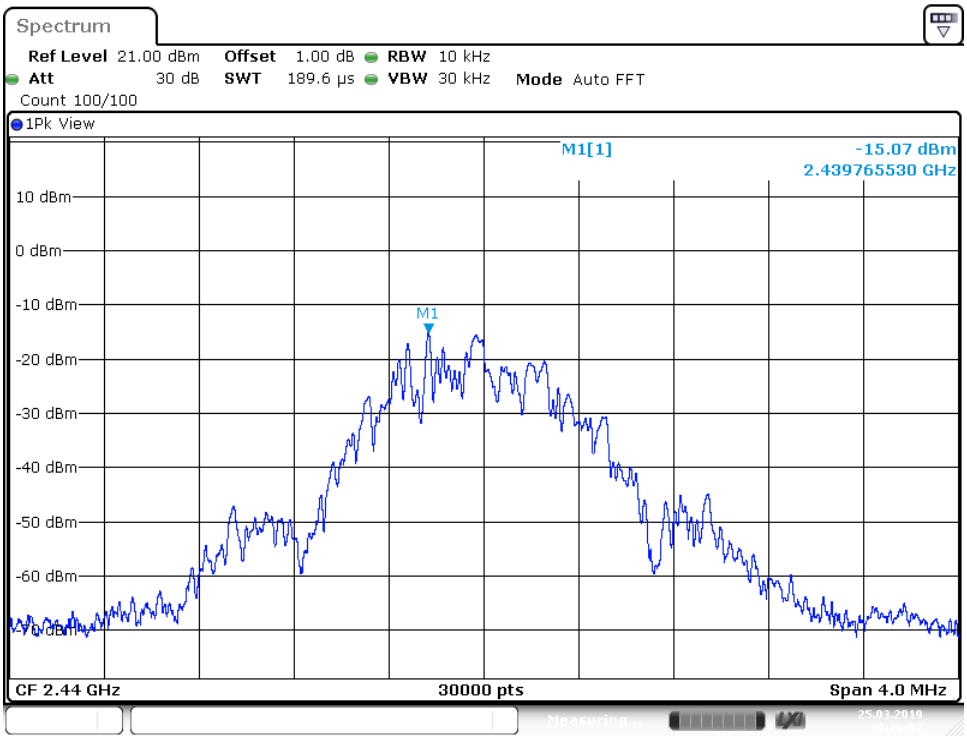
Middle channel 2440MHz



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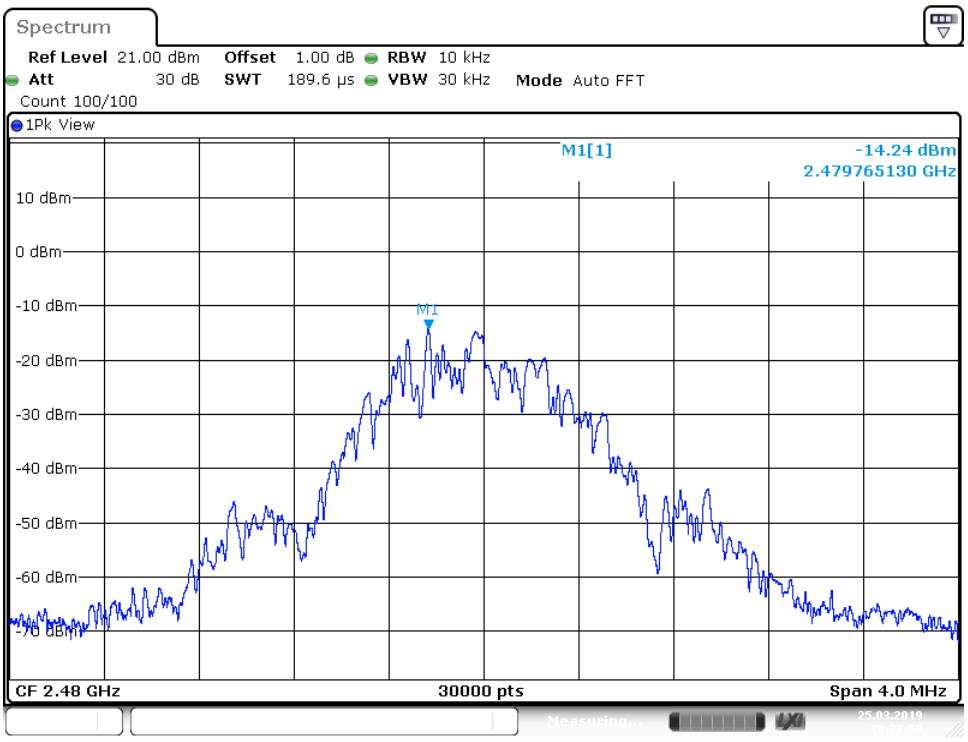
High channel 2480MHz



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9.4 6 dB Bandwidth

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Use the following spectrum analyzer settings: RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
3. 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.
4. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth kHz	Result
Bottom channel 2402MHz	696	Pass
Middle channel 2440MHz	700	Pass
Top channel 2480MHz	696	Pass

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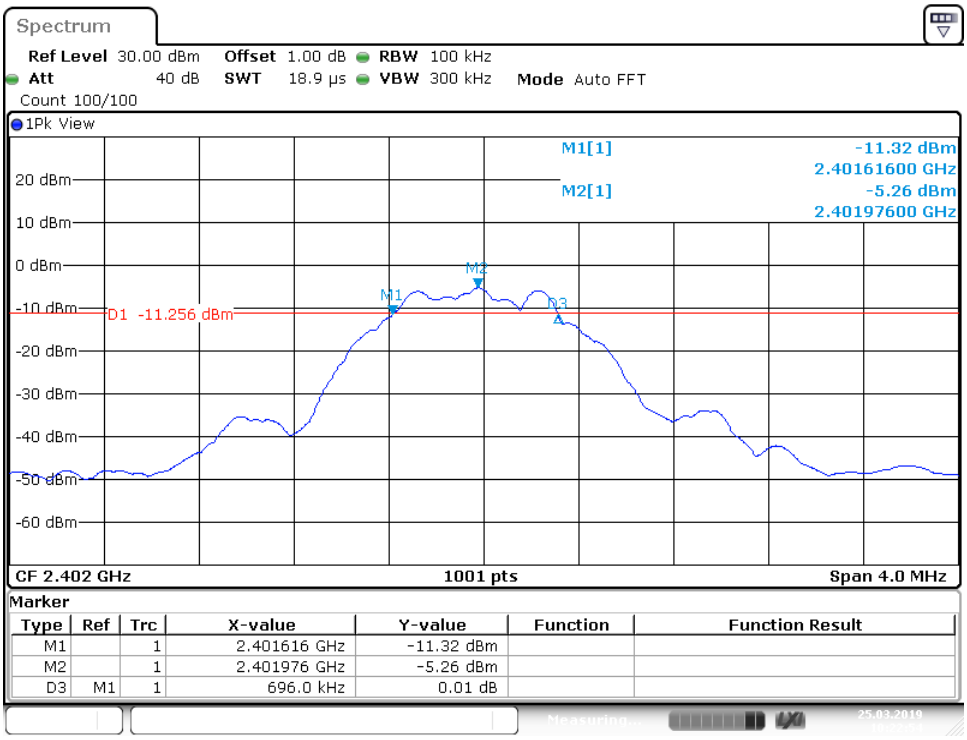
6 dB Bandwidth

Low channel 2402MHz



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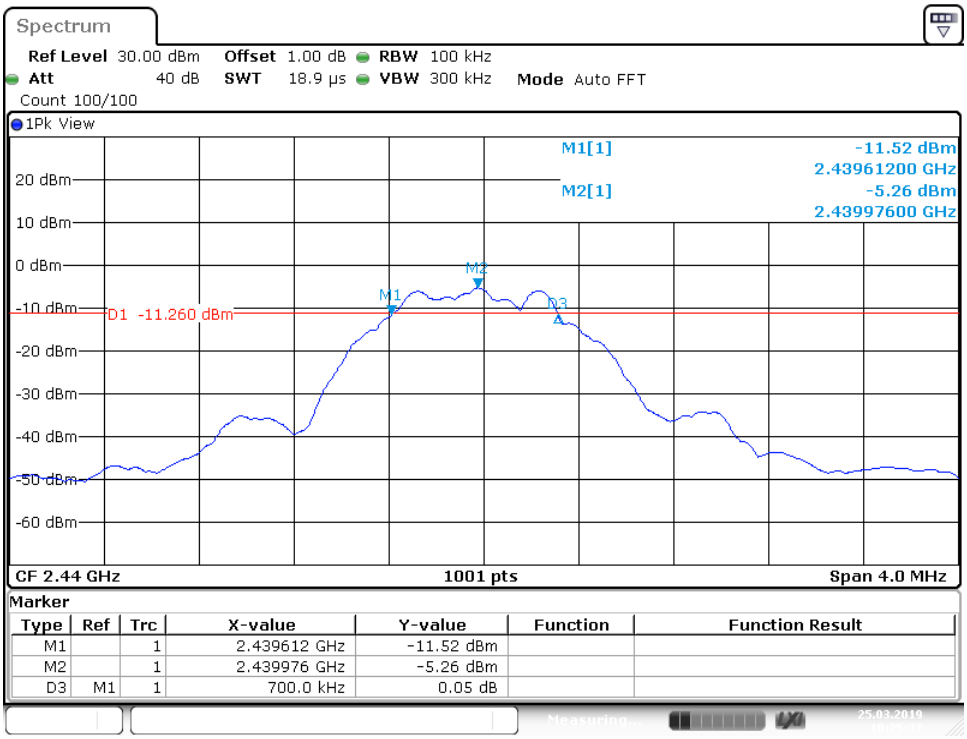
Middle channel 2440MHz



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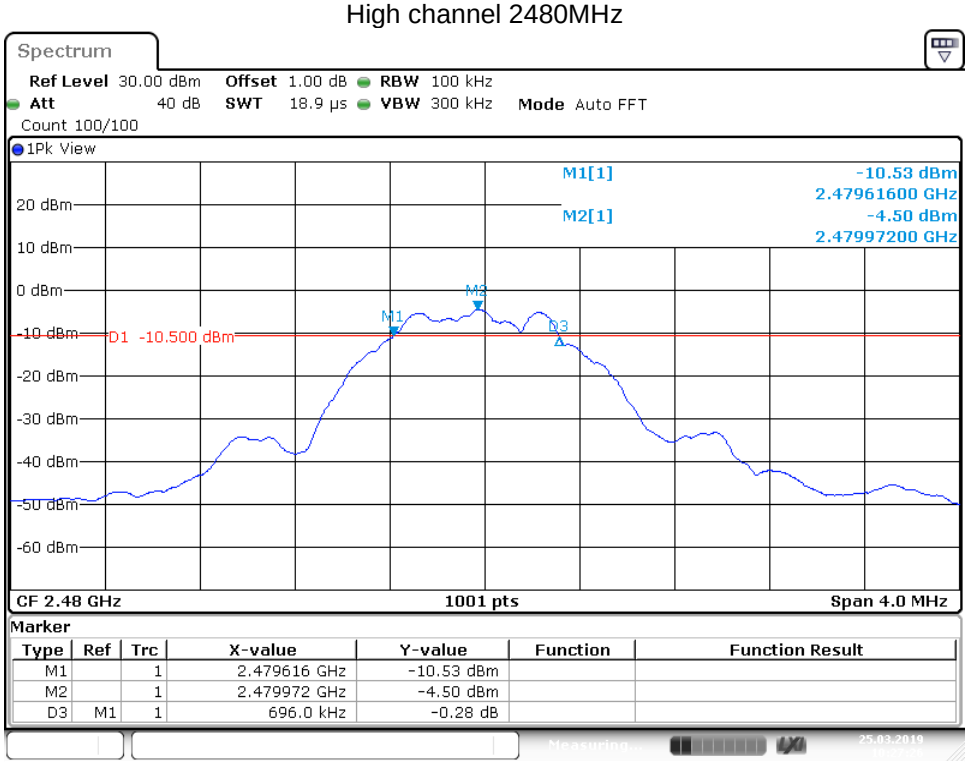
High channel 2480MHz



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9.5 Spurious RF conducted emissions

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. 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.
3. 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.
4. Repeat above procedures until other frequencies measured were completed.

Limit

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

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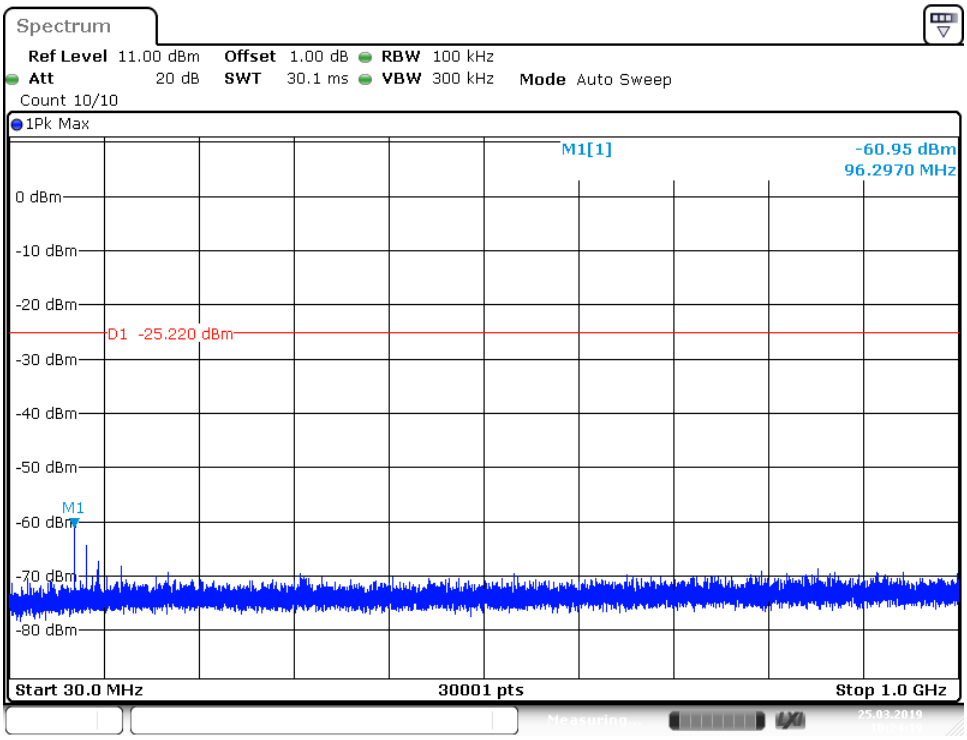
Spurious RF conducted emissions

2402MHz



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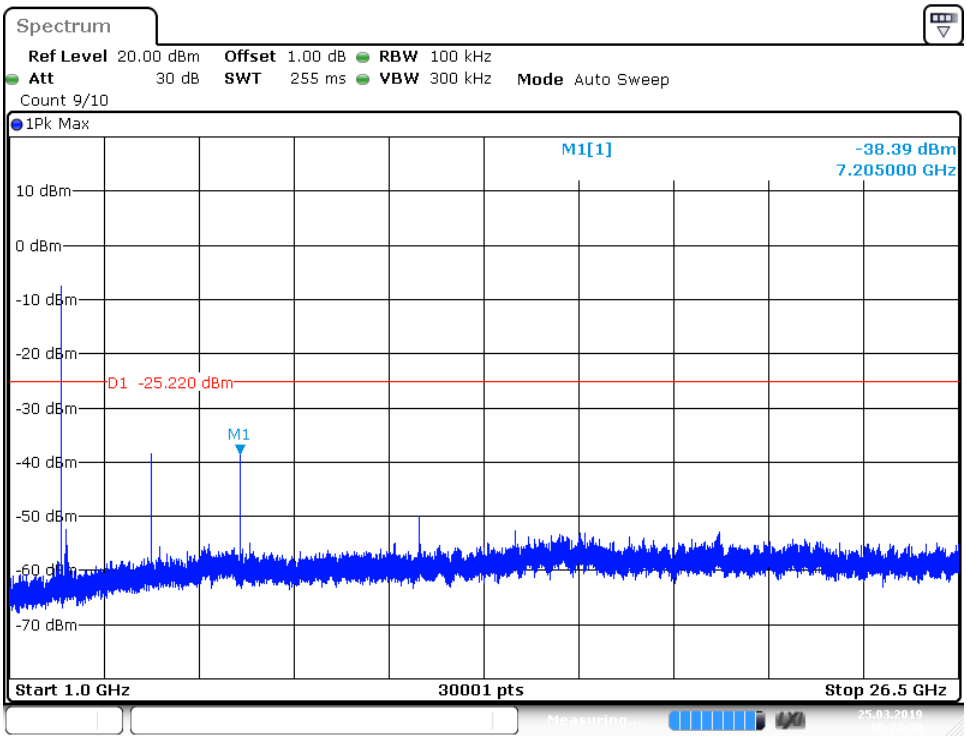

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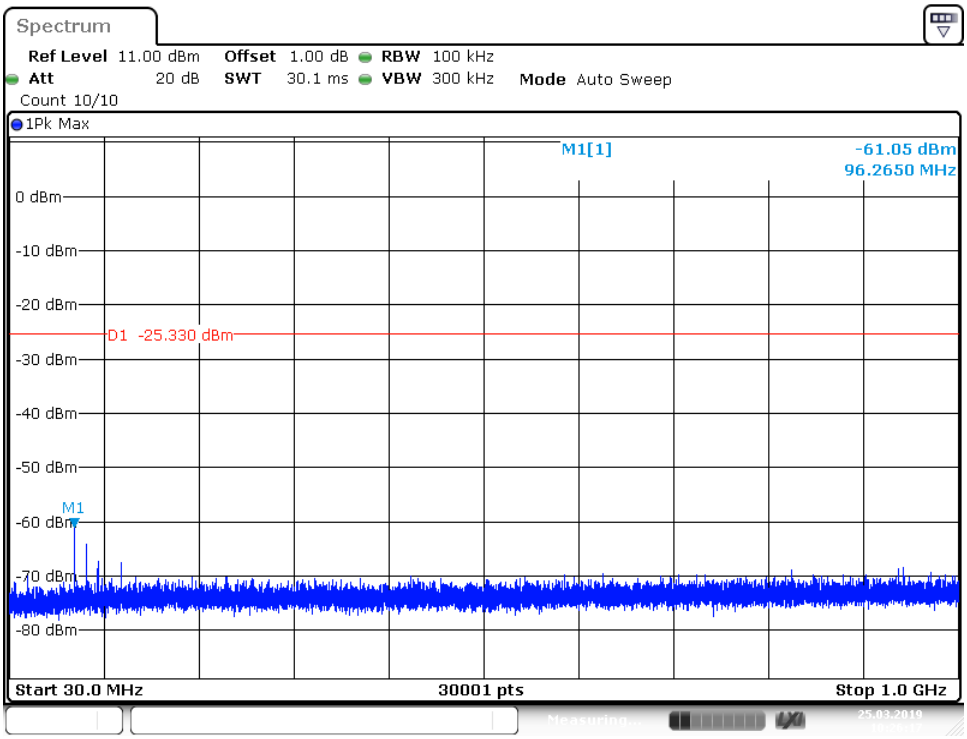
2440MHz



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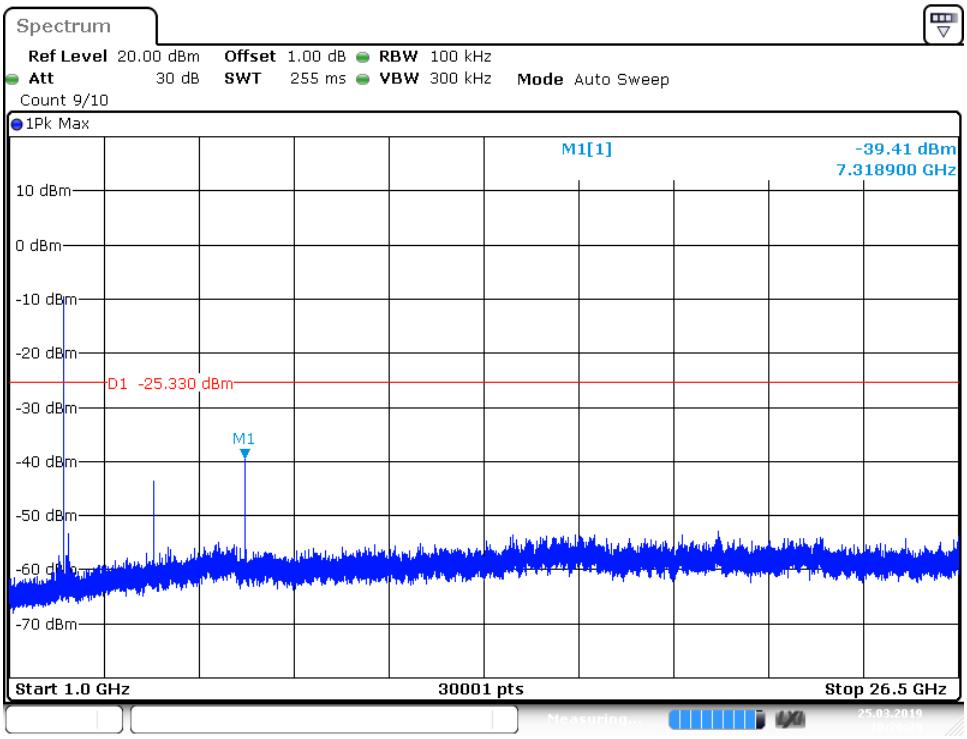

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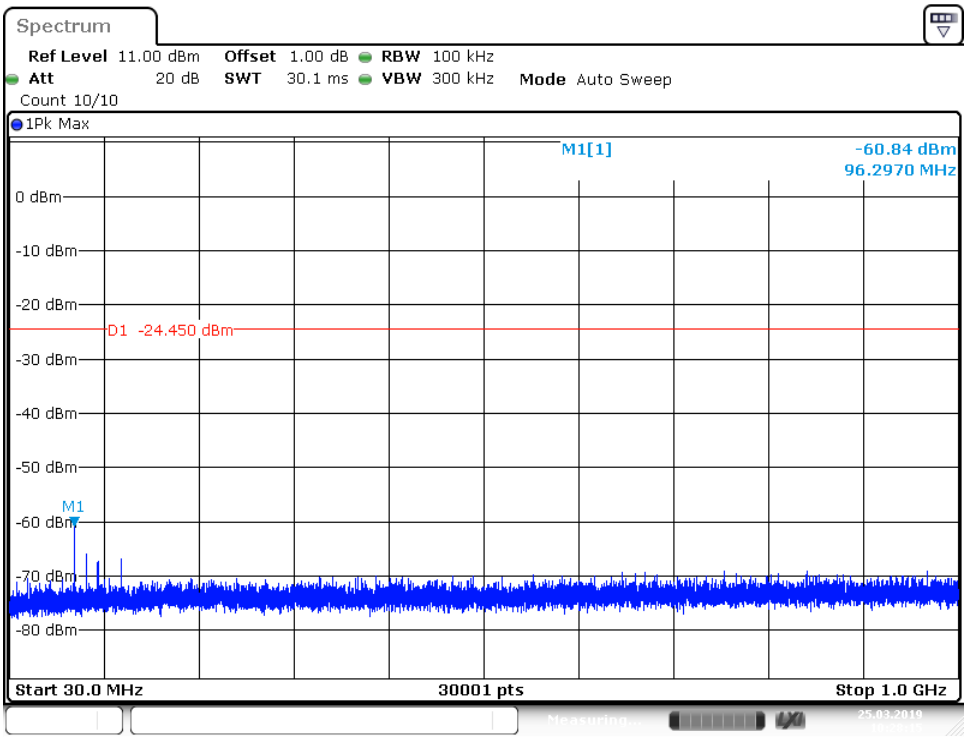
2480MHz



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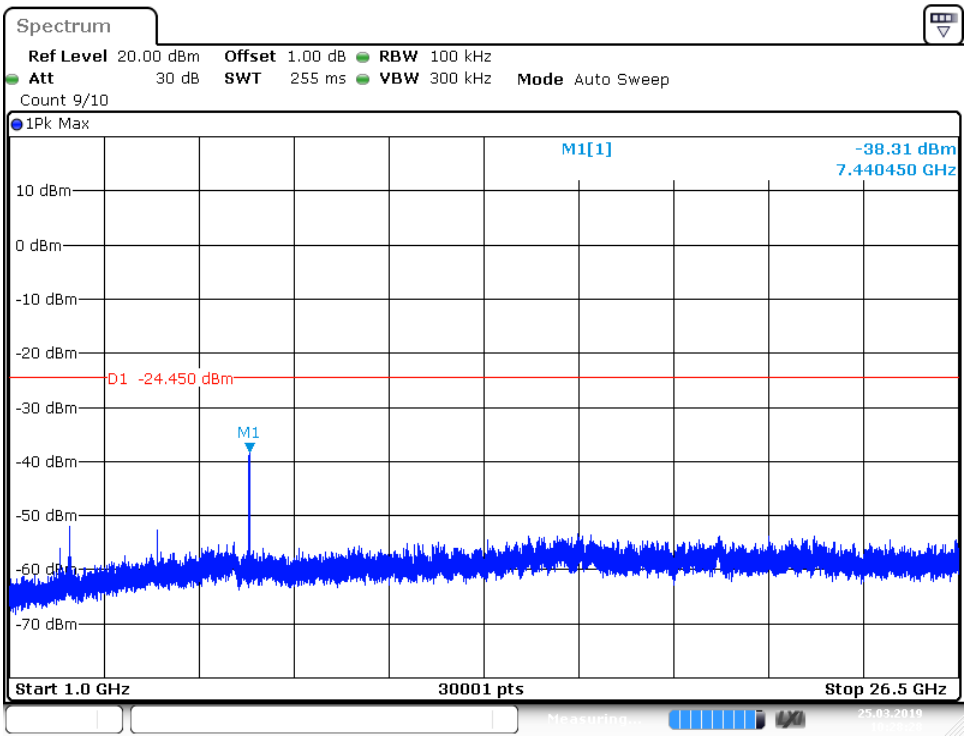

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9.6 Band edge

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. 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.
3. Allow the trace to stabilize, use the peak and delta measurement to record the result.
4. The level displayed must comply with the limit specified in this Section.

Limit

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

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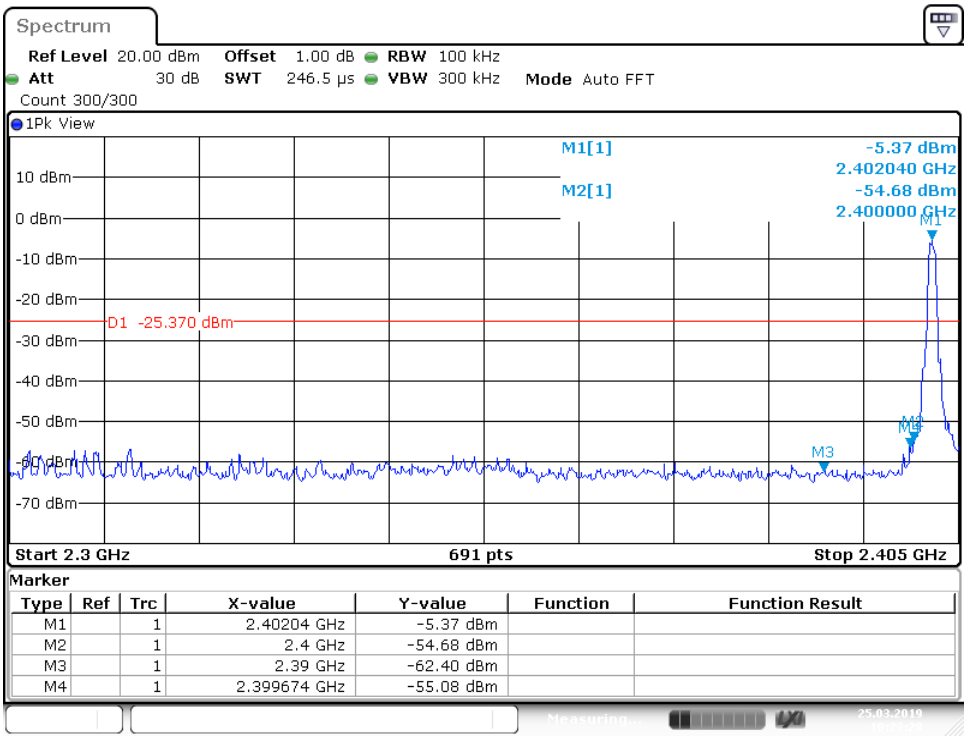
Band edge testing

2402MHz



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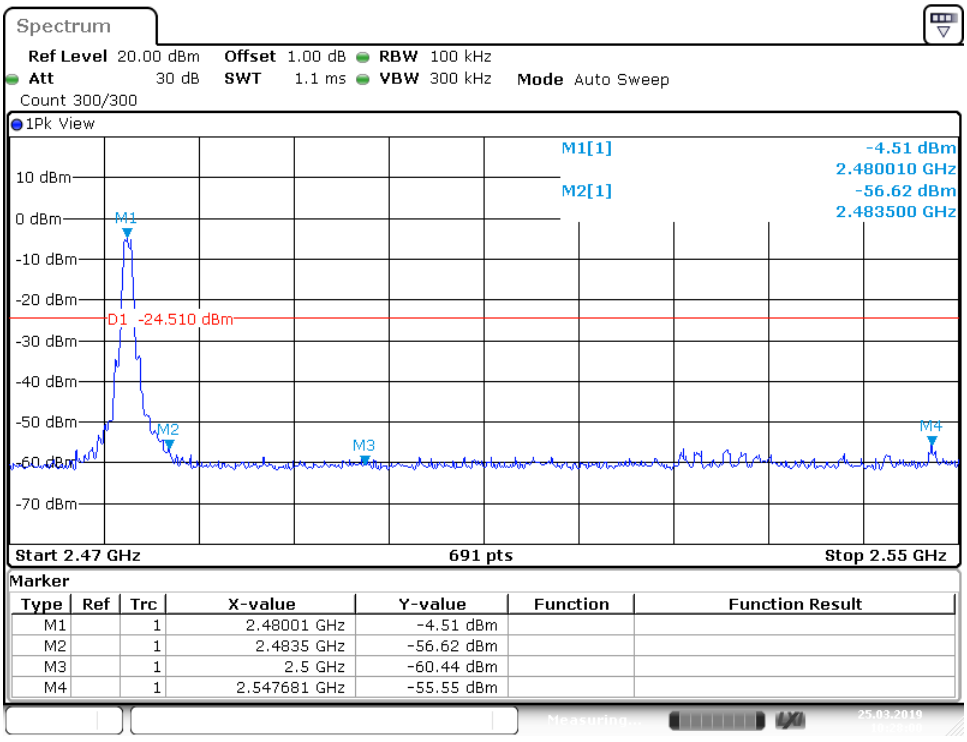
2480MHz



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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 requencyabove1GHz

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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:

Low channel 2402MHz Test Result

Frequency Band	Frequency	Emission level	Correct factor	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m	dBuV/m		dBµV/m		dBuV/m	
30-1000MHz	871.097778	29.14	-15.9	H	46	QP	16.86	Pass
	881.336667	31.84	-15.9	V	46	QP	14.16	Pass
1000-25000MHz	4803.281250	52.08	2.7	H	74	PK	21.92	Pass
	4803.281250	40.50	2.7	H	54	AV	13.50	Pass
	7206.093750	60.59	5.0	H	74	PK	13.41	Pass
	7206.093750	43.10	5.0	H	54	AV	10.90	Pass
	4803.281250	55.09	2.7	V	74	PK	18.91	Pass
	4803.281250	38.70	2.7	V	54	AV	15.30	Pass
	7205.156250	58.79	5.0	V	74	PK	15.21	Pass
	7205.156250	41.40	5.0	V	54	AV	12.60	Pass

Middle channel 2440MHz Test Result

Frequency Band	Frequency	Emission level	Correct factor	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m	dBuV/m		dBµV/m		dBuV/m	
30-1000MHz	--	--	--	H	40	QP	--	Pass
	--	--	--	V	40	QP	--	Pass
1000-25000MHz	7319.062500	61.97	5.2	H	74	PK	12.03	Pass
	4879.687500	39.50	5.2	H	54	AV	14.50	Pass
	4879.687500	39.50	2.9	H	54	AV	14.50	Pass
	7320.000000	63.16	5.2	V	74	PK	10.84	Pass
	7320.000000	42.20	5.2	V	54	AV	11.80	Pass
	4879.218750	39.00	2.9	V	54	AV	15.00	Pass

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High channel 2480MHz Test Result

Frequency Band	Frequency	Emission level	Correct factor	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m	dBuV/m		dBµV/m		dBuV/m	
30-1000MHz	--	--	--	H	40	QP	--	Pass
	--	--	--	V	40	QP	--	Pass
1000-25000MHz	7440.468750	59.57	6.0	H	74	PK	14.43	Pass
	7440.468750	42.10	6.0	H	54	AV	11.90	Pass
	7439.062500	63.13	6.0	V	74	PK	10.87	Pass
	7439.062500	42.00	6.0	V	54	AV	12.00	Pass
	4959.843750	40.00	3.3	V	54	AV	14.00	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 20dB below the permissible limits or the field strength is too small to be measured.

(3) Level= Reading Level + Correction Factor

(4) Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.
(The Reading Level is recorded by software which is not shown in the sheet)

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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	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102294	2019-6-28
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

RF Conducted Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2019-7-6
LISN	Rohde & Schwarz	ENV4200	100249	2019-7-6
LISN	Rohde & Schwarz	ENV432	101318	2019-7-6
LISN	Rohde & Schwarz	ENV216	100326	2019-7-6
ISN	Rohde & Schwarz	ENY81	100177	2019-7-6
ISN	Rohde & Schwarz	ENY81-CA6	101664	2019-7-6
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2019-6-30
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2019-6-30
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2019-7-6
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

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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 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 1000MHz-18000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Conducted Emission 9kHz-150KHz	3.62dB
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%

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