China

FCC - TEST REPORT

Report Number	:	**7088819112402-00**	Date of Issue:	October 24, 2019
Model	:	**ZS11E; ZS11MCE3**		
Product Type	:	ISMART1.0		
FCC ID	:	2AFIXISMART		
Applicant	:	Jiangsu Toppower Automotive Electronics Co., Ltd		
Address	:	No. 19 Fenghuang Avenue, Xuzhou Economic And Technological Development Zone Xuzhou, 221000 China		
Manufacturer	:	Jiangsu Toppower Automotive Electronics Co., Ltd		
Address	:	No. 19 Fenghuang Avenue, Xuzhou Economic And Technological Development Zone Xuzhou, 221000 China		

Test Result	:	■ **Positive**	☐ **Negative**
Total pages including Appendices	:	39	

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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. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
Test Firm Registration Number:	820234
Telephone:	+86 21 6141 0123
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3 Description of the Equipment under Test

Product:	ISMART1.0
Model no.:	ZS11E; ZS11MCE3
FCC ID:	2AFIXISMART
Options and accessories:	Test harness
Rating:	9~16V DC
RF Transmission Frequency:	2402~2480MHz for Bluetooth For 2.4G & 5G Wi-Fi For 802.11b/g/n-HT20: 2412~2462 MHz For 802.11n-HT40: 2422~2452 MHz 5180~5240MHz 5745~5825MHz
No. of Operated Channel:	79 for Bluetooth 4.1+EDR 40 for Bluetooth 4.1 BLE For 2.4GHz Wi-Fi

Operation Frequency each of channel For 802.11b/g/n(H20)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel For 802.11n(H40)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
		4	2427MHz	7	2442MHz		
		5	2432MHz	8	2447MHz		
3	2422MHz	6	2437MHz	9	2452MHz		

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

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FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

Modulation:	Bluetooth 4.0+EDR FHSS: GFSK, 8DPSK, π/4 DQPSK Bluetooth BLE DHSS: QPSK For Wi-Fi: Direct Sequence Spread Spectrum (DSSS) for 802.11b Orthogonal Frequency Division Multiplexing(OFDM) for 802.11g/n
Data speed:	1. Bluetooth: 1Mbps, 2Mbps, 3Mbps 2. Wi-Fi: 11b 1 ~ 11Mbps, 11g/a 6 ~ 54Mbps, 11n HT20 6.5 ~ 65Mbps, 11n HT 40 13.5 ~ 135Mbps, 11ac VHT40 13.5 ~ 180Mbps, 11ac VHT80 29.3 ~ 390Mbps
Duty Cycle:	100%
Antenna Type:	PIFA Antenna
Antenna Gain:	2.4GHz: 2.04dBi 5.2GHz: 4.2dBi 5.8GHz: 5.52dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Car Radio with Bluetooth and WI-FI Module is equipment installed in a car to provide in-car entertainment and information for the vehicle occupants. It consisted of a simple FM/AM/DRM radio, media players and Bluetooth module. User can listen to FM/AM, DRM, USB audio by using the equipment. The EUT support Bluetooth 4.1+EDR and support BLE function and Wi-Fi operated at 5GHz and 2.4GHz. Only 2.4G Bluetooth 4.1 BLE included in this report.

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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

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 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	---	---	☐	☐	☒
§15.247 (b) (1)	Conducted peak output power	14-15	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 Occupied Bandwidth	16-17	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	18-19	Site 1	☒	☐	☐
§15.247(d)	Conducted Band Edge and Out-of-Band Emissions	20-27	Site 1	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	28-35	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Note 1: N/A=Not Applicable. Conducted emission is not apply for battery operated device.
Note 2: The EUT uses a patch antenna, which gain is 2.04dBi for 2.4GHz. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

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6 General Remarks

Remarks

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

This report in only for Bluetooth Low Energy. The TX and RX range is 2402MHz-2480MHz.

According to the client's declaration, we chose the ZS11E to perform the conductive RF tests, and chose ZS11E and ZS11MCE3 to perform the radiated emission test.

HARDWARE MODIFICATION	ZS11E	ZS11MCE3
Band	The same	The same
Power Amplifier	The same	The same
Antenna	The same	The same
PCB Layout	The same	The same
Components on PCB	Have DRM components	No DRM
DRM	Yes	No
LCD Structural Bracket	Not connected the AHU	Connected the AHU
LCD Size	8 "	10.1 "
Speaker	The same	The same
Camera	The same	The same
Bluetooth	The same	The same
WIFI	The same	The same

ZS11E and ZS11MCE3 are use same Bluetooth and WIFI module. Main PCB board is same in these 2 models. ZS11E and ZS11MCE3 all need to match LCD use.

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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 19, 2019

Testing Start Date: September 26, 2019

Testing End Date: October 16, 2019

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Reviewed by:	Prepared by:	Tested by:
Hui TONG	Jiaxi XU	Wenqiang LU
Review Engineer	Project Engineer	Test Engineer

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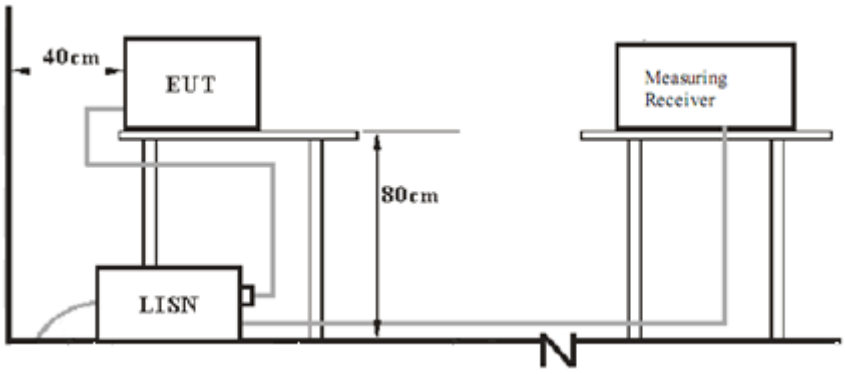
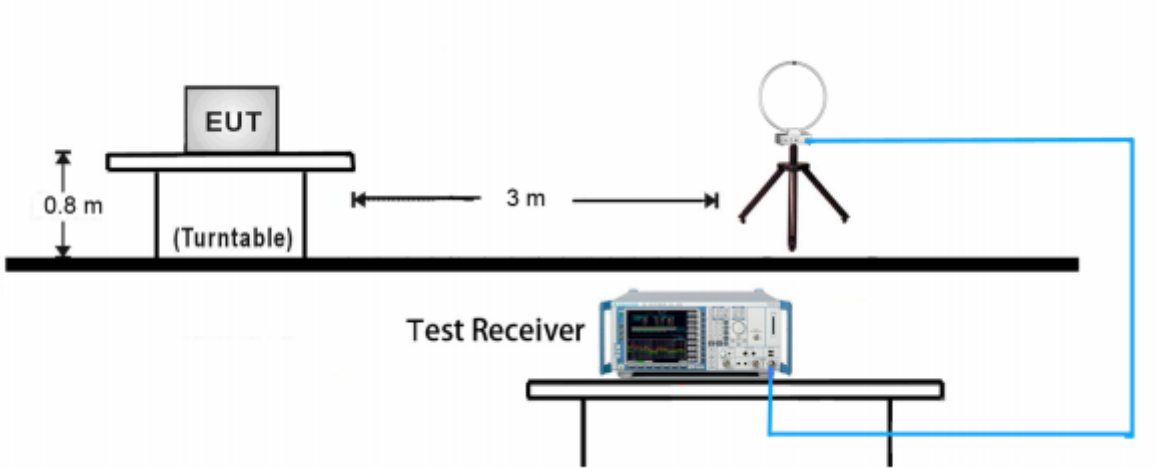
7 Test Setups

7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups

9kHz ~ 30MHz Test Setup:



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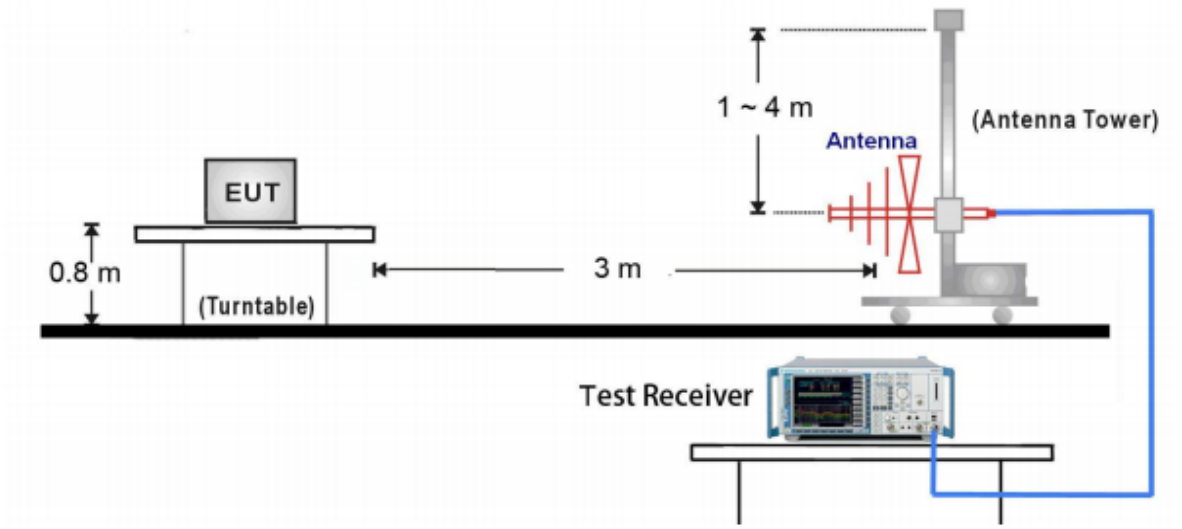
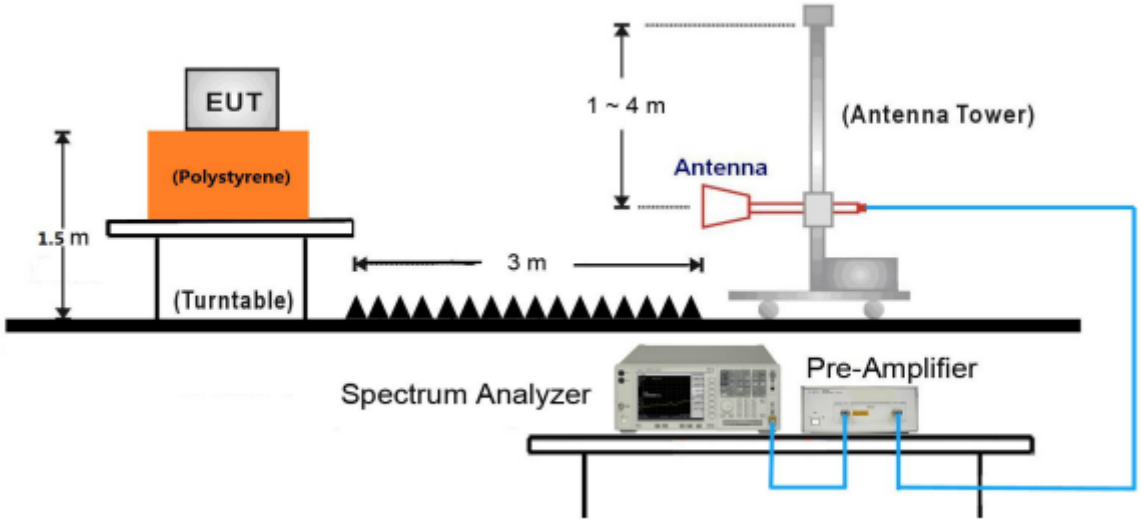
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



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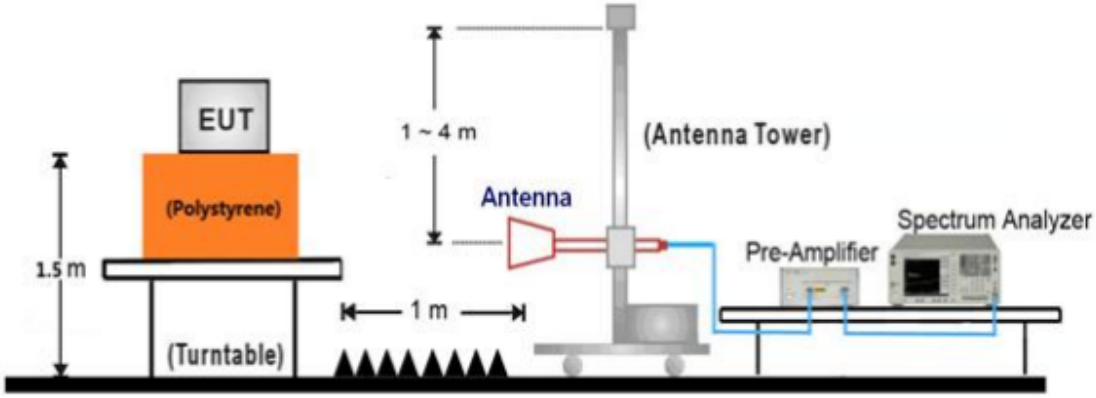
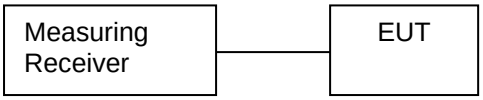
18GHz ~ 25GHz Test Setup:



7.3 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	Lenove	X240	--

Test software: SecureCRT, 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 Conducted peak output power

Test Method

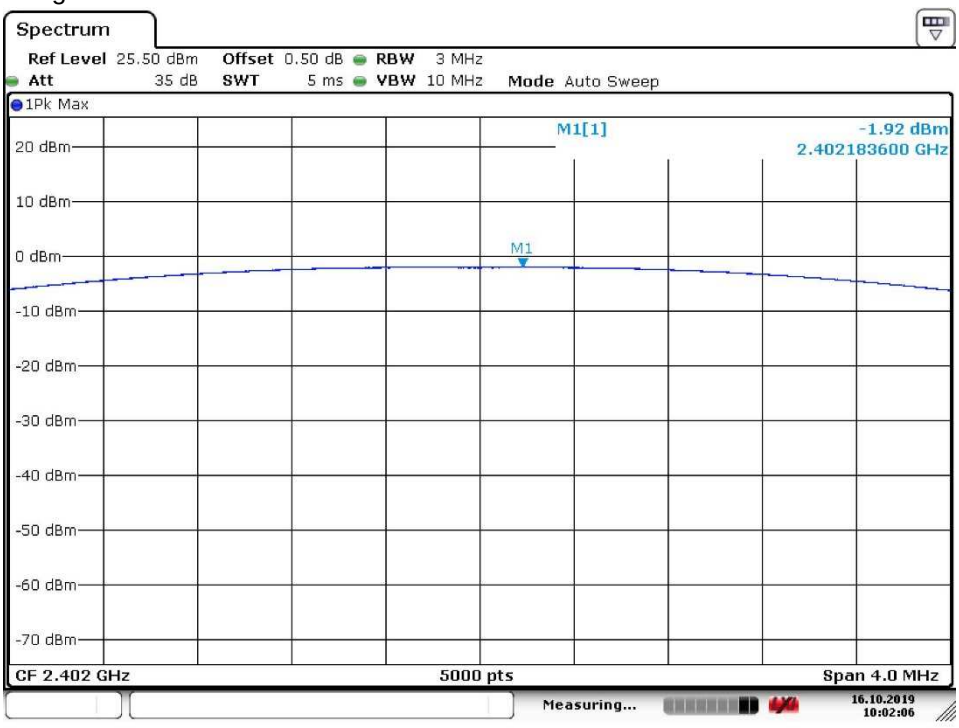
1. Use the following spectrum analyzer settings:
   RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to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

Limits

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
Low channel 2402MHz	-1.92	Pass
Middle channel 2440MHz	-2.09	Pass
High channel 2480MHz	-1.75	Pass



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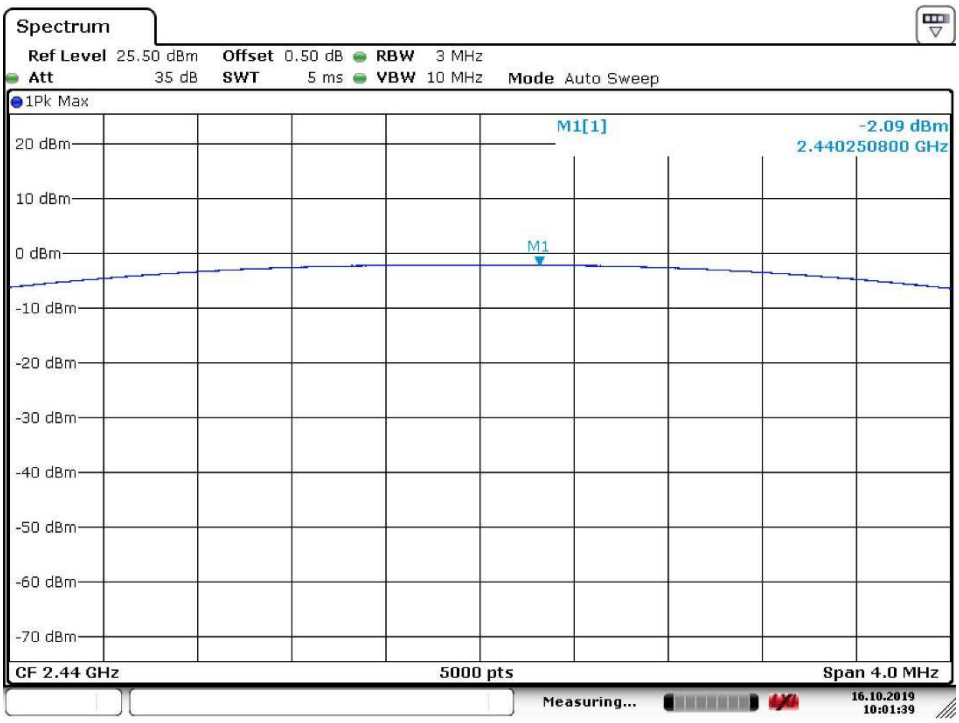

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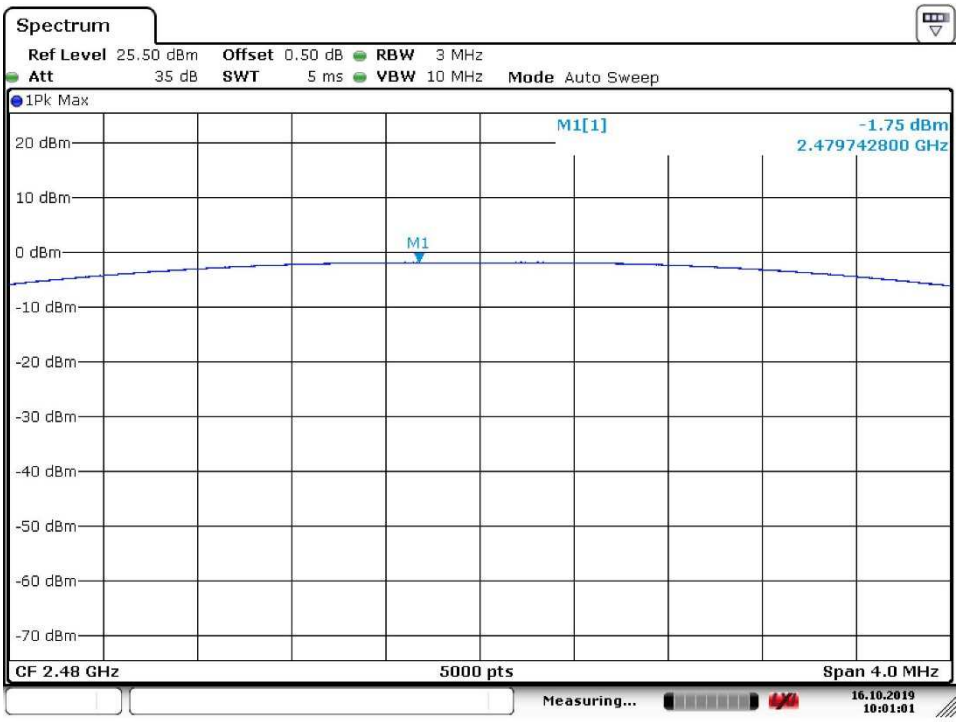

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9.2 6dB Occupied Bandwidth

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 6 dB Bandwidth value.

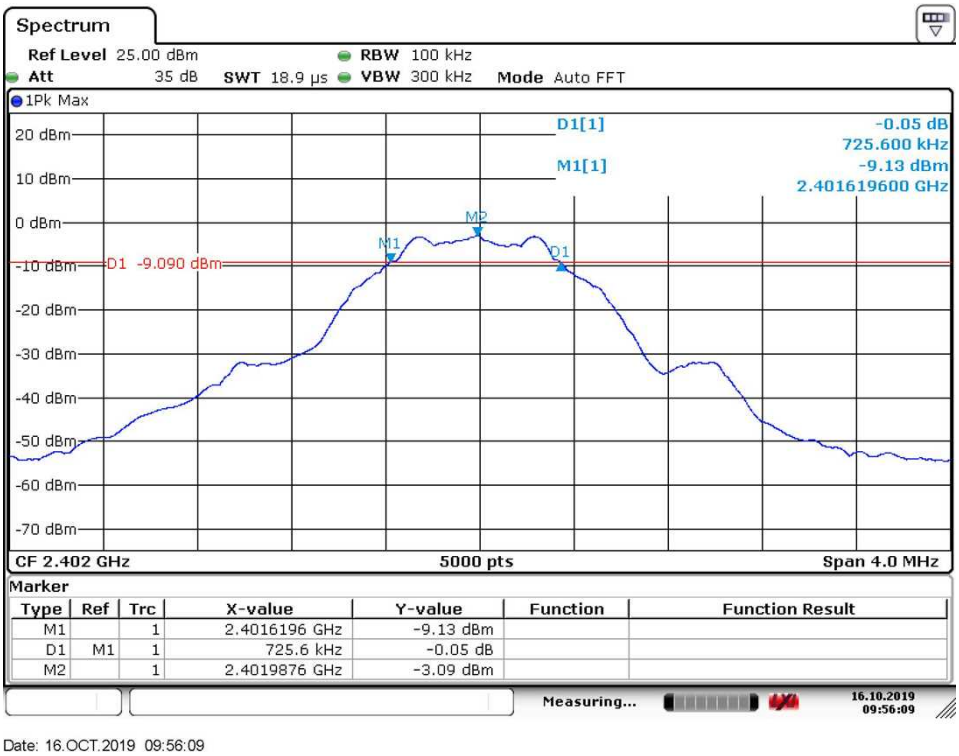
Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth kHz	Result
Top channel 2402MHz	725.6	Pass
Middle channel 2440MHz	726.4	Pass
Bottom channel 2480MHz	726.4	Pass

2402MHz



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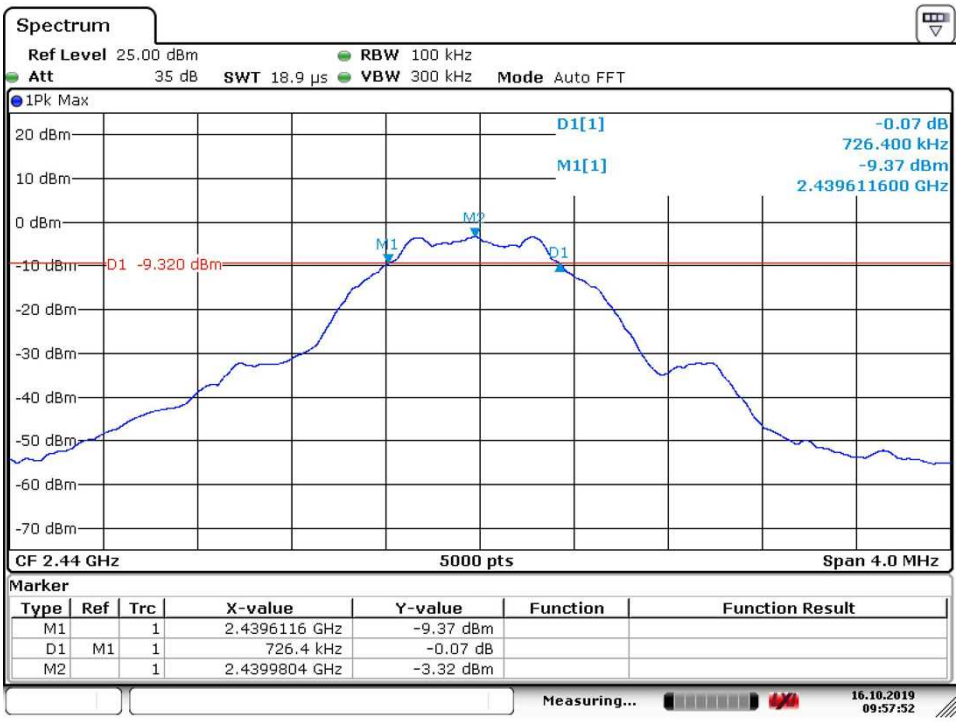
2440MHz



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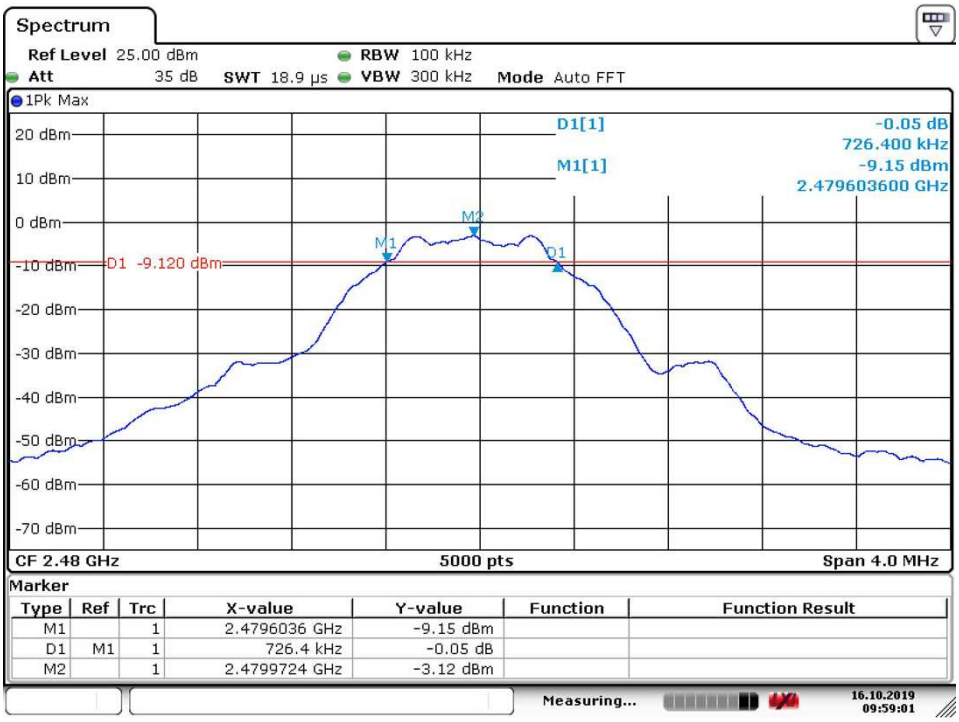
2480MHz



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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:

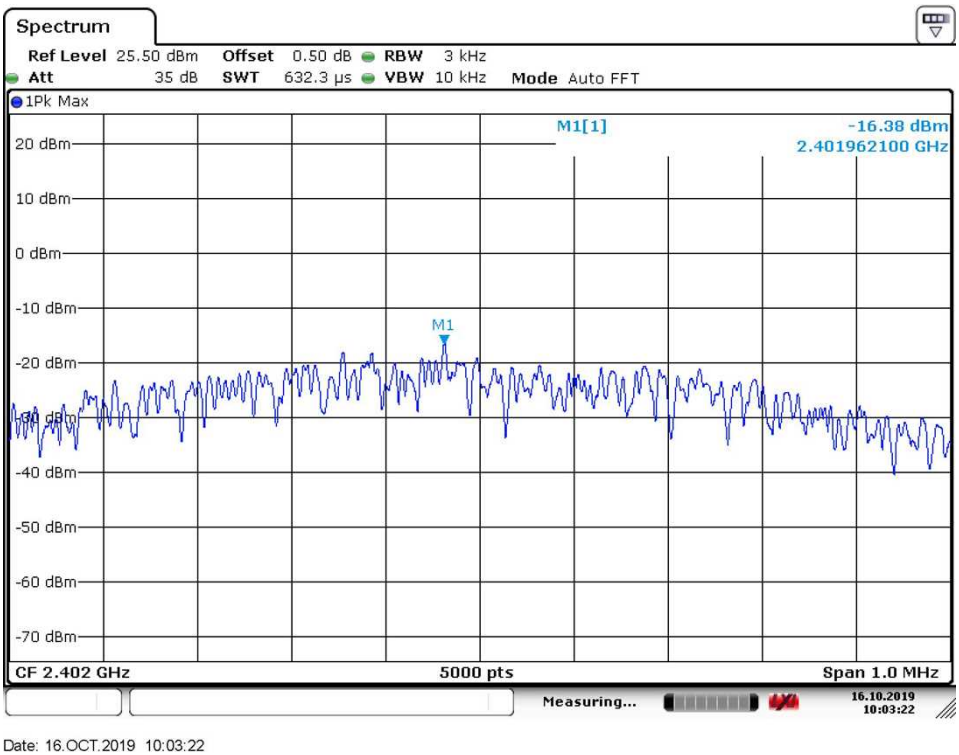
1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures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

Limit

Limit [dBm]
≤8

Test result

Frequency	Power spectral density	Result
MHz	**dBm**	
Top channel 2402MHz	-16.38	Pass
Middle channel 2440MHz	-16.29	Pass
Bottom channel 2480MHz	-16.55	Pass



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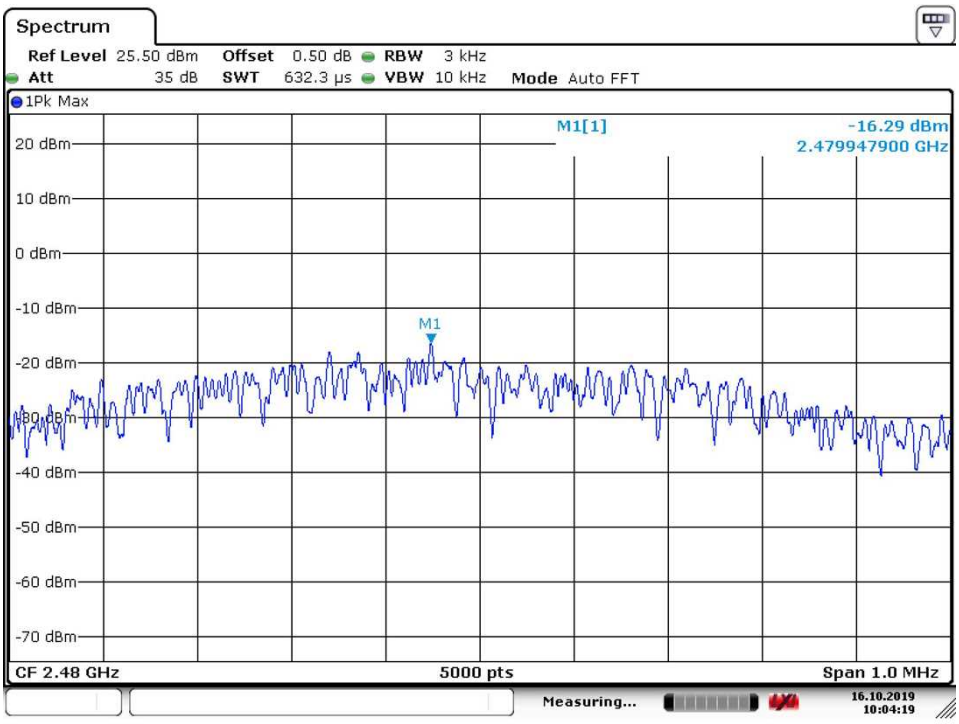

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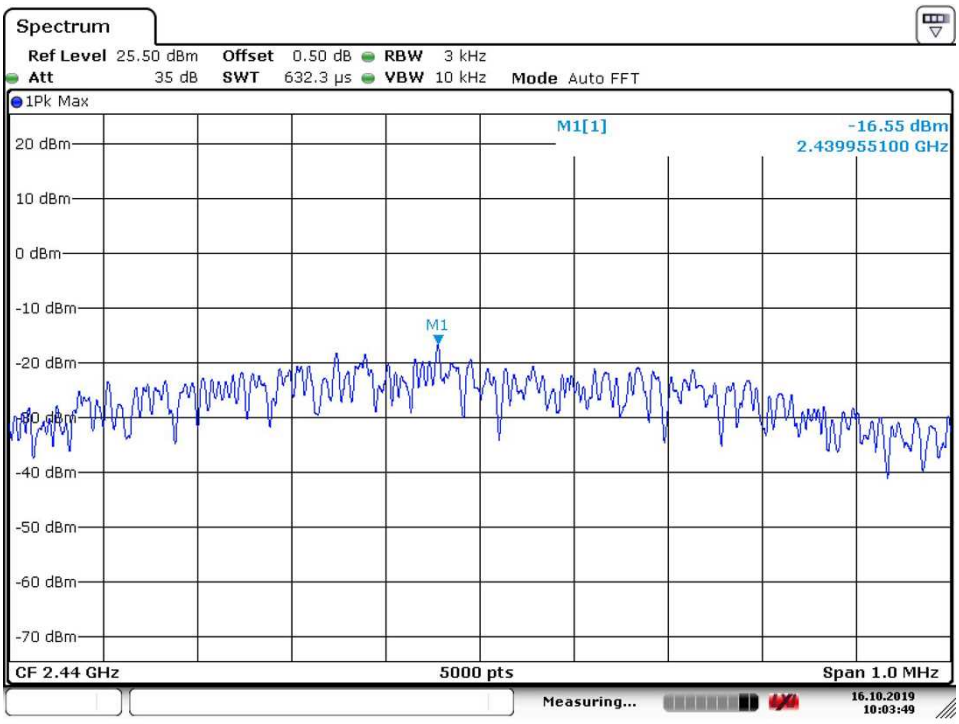

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9.4 Conducted Band Edge and Out-of-Band Emissions

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

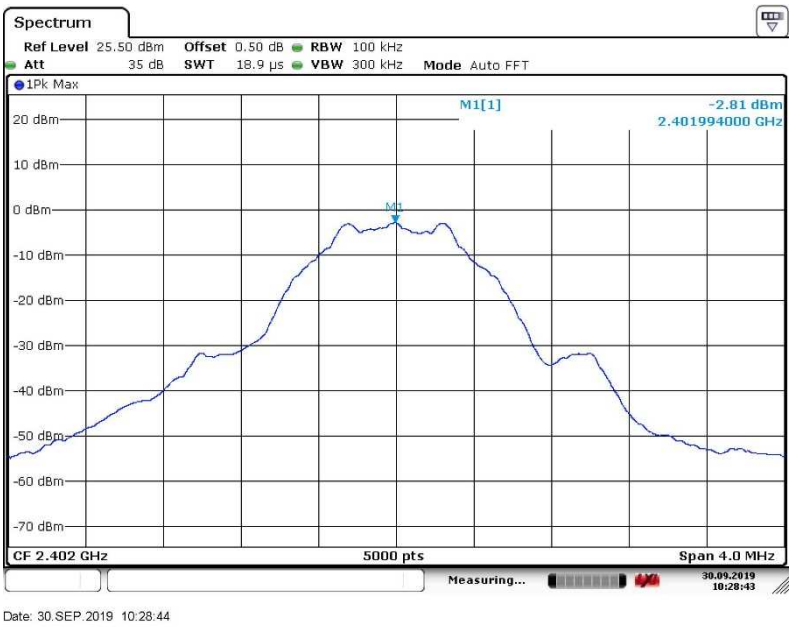
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result:

Frequency MHz	Limit	Result
Top channel 2402MHz	20dBc	Pass
Middle channel 2440MHz	20dBc	Pass
Bottom channel 2480MHz	20dBc	Pass

Spurious RF conducted emissions

2402MHz



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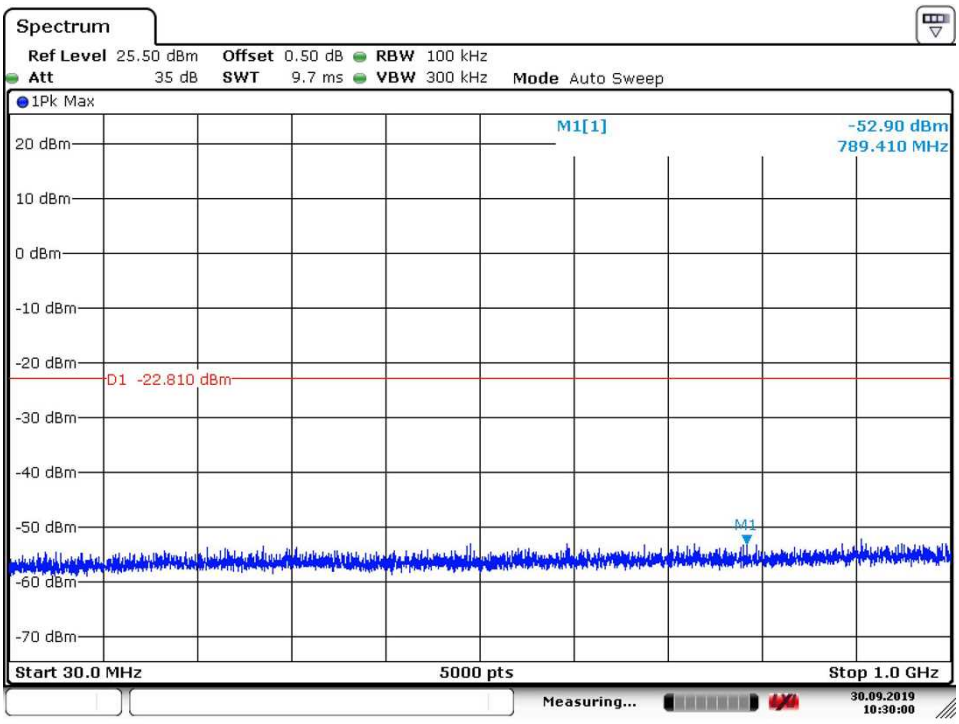

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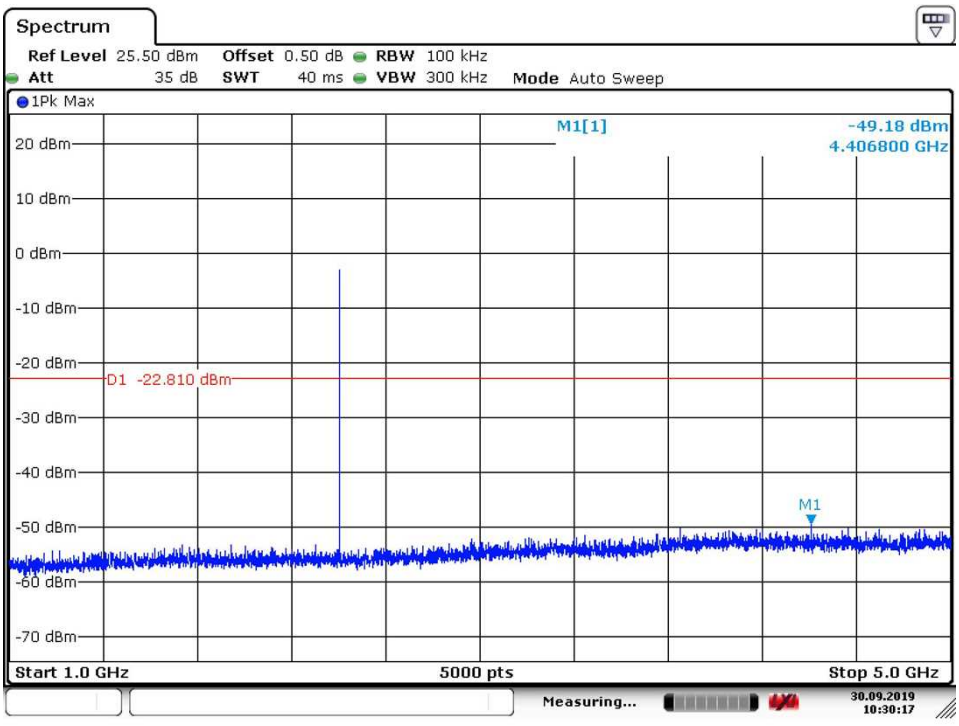

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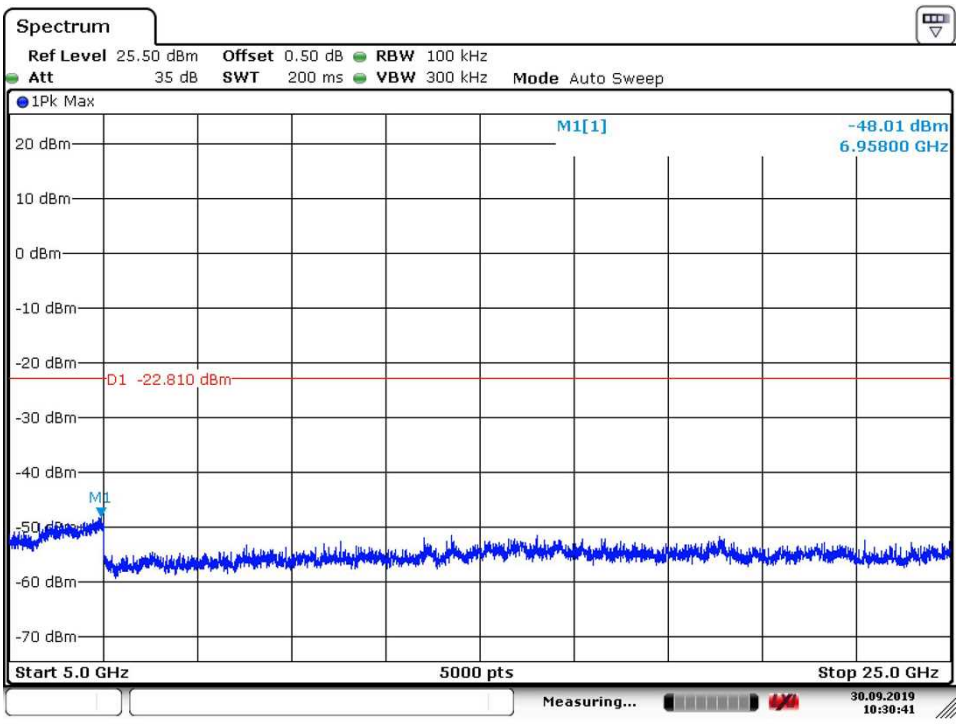

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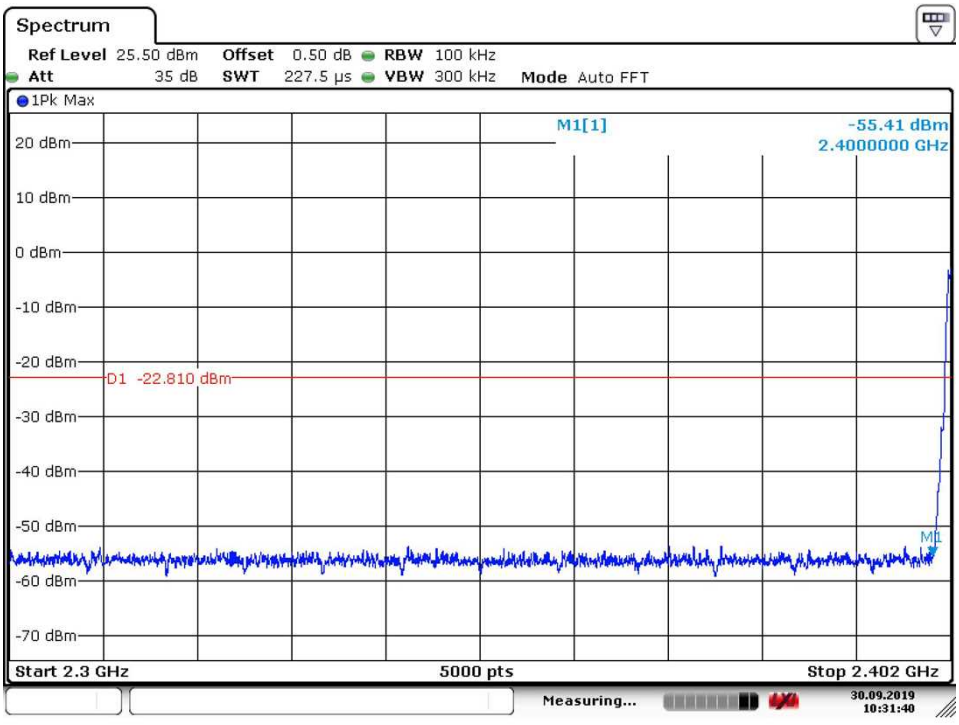

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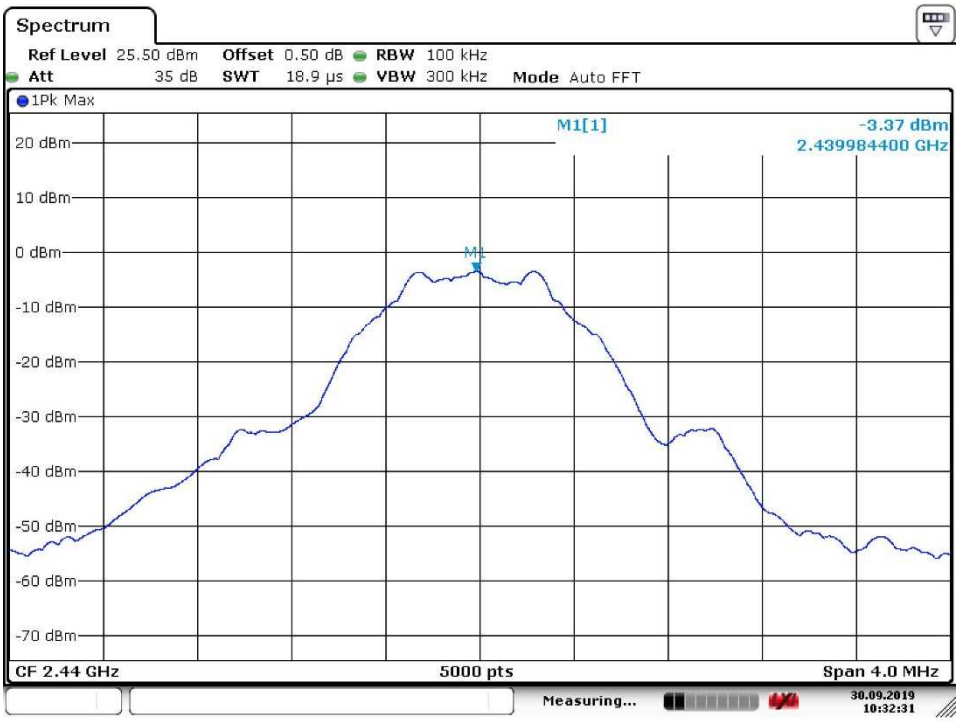
2440MHz



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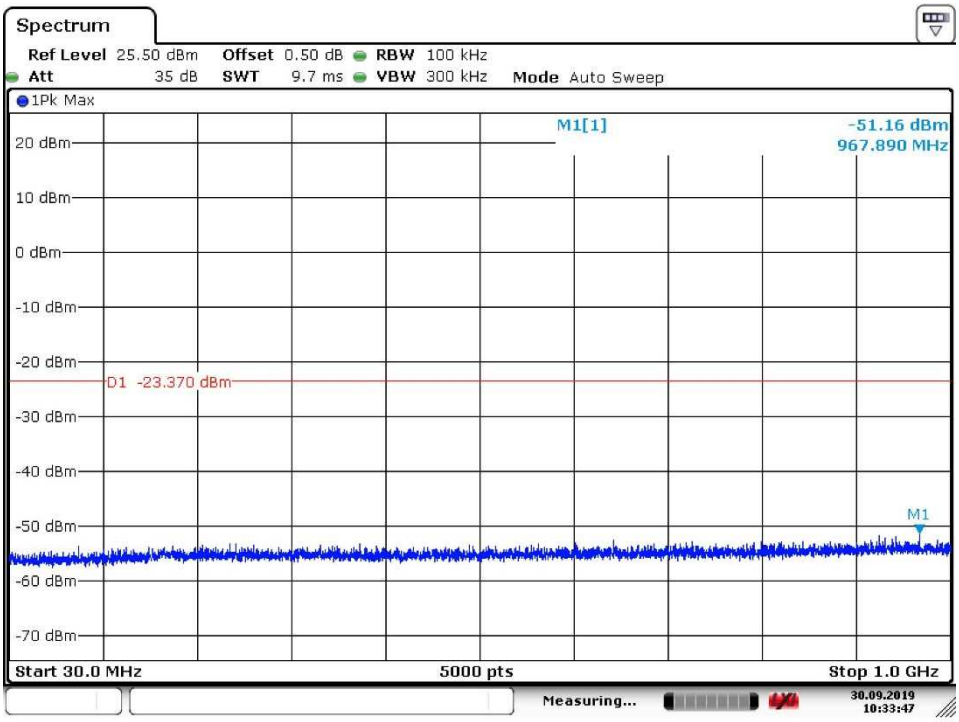

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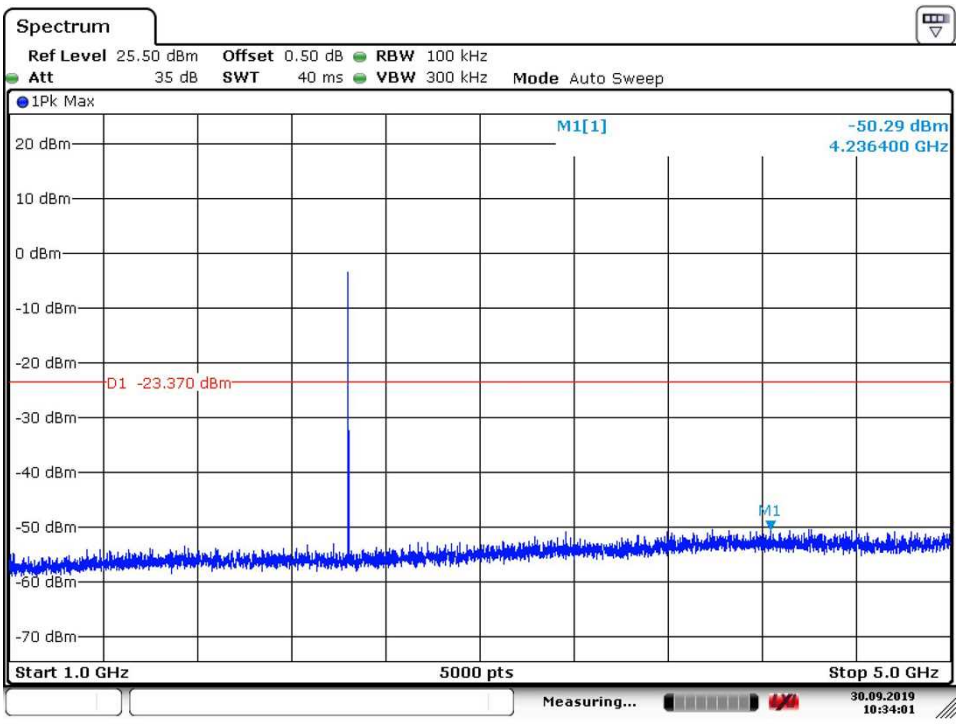

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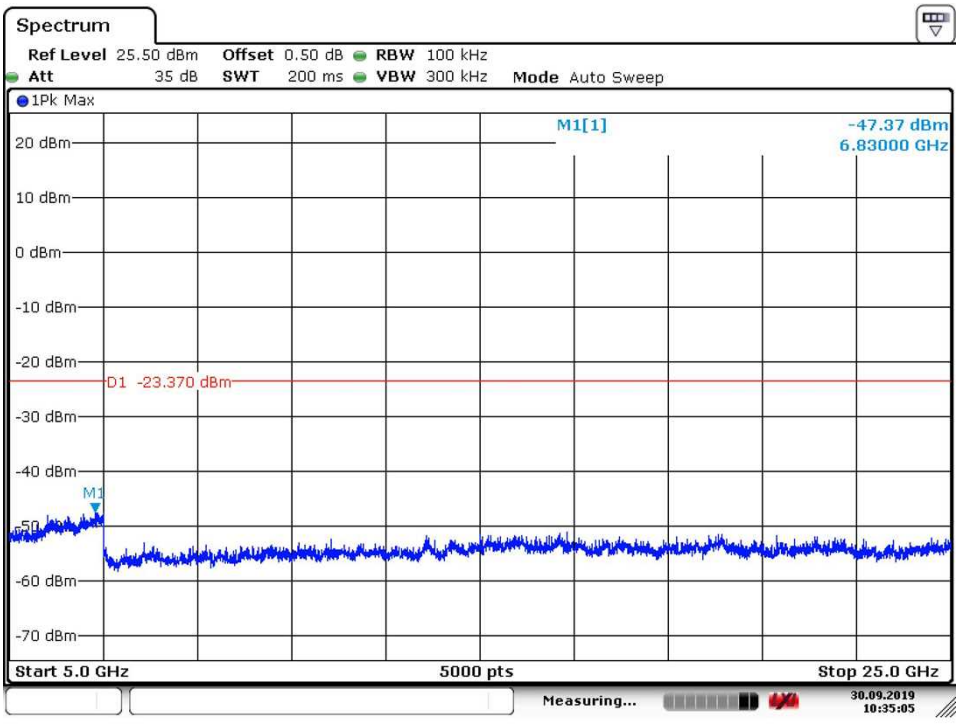

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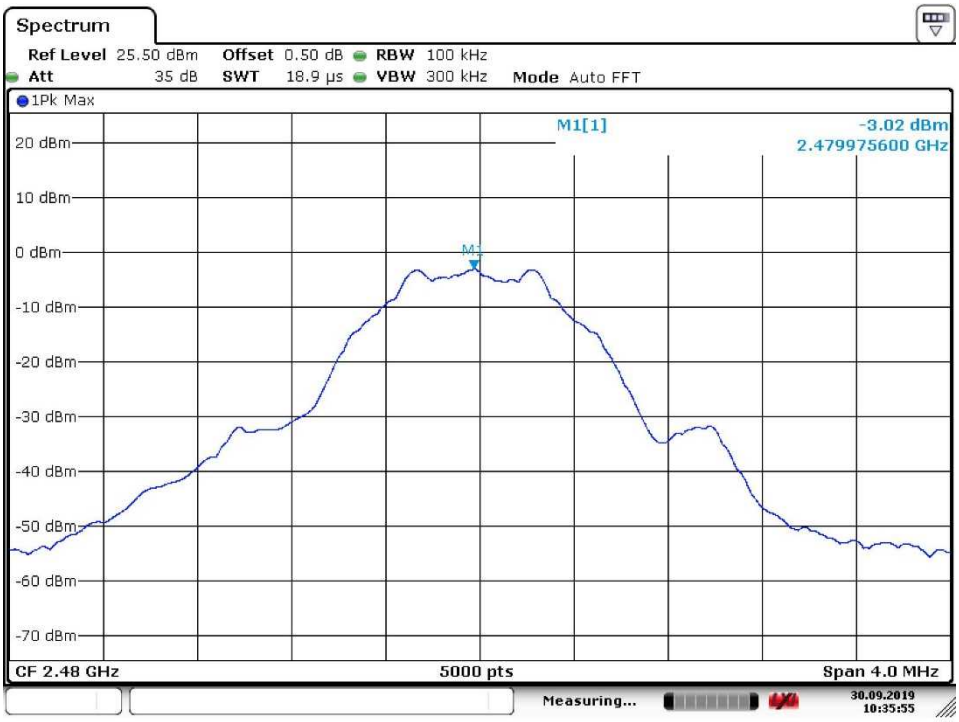
China

2480MHz



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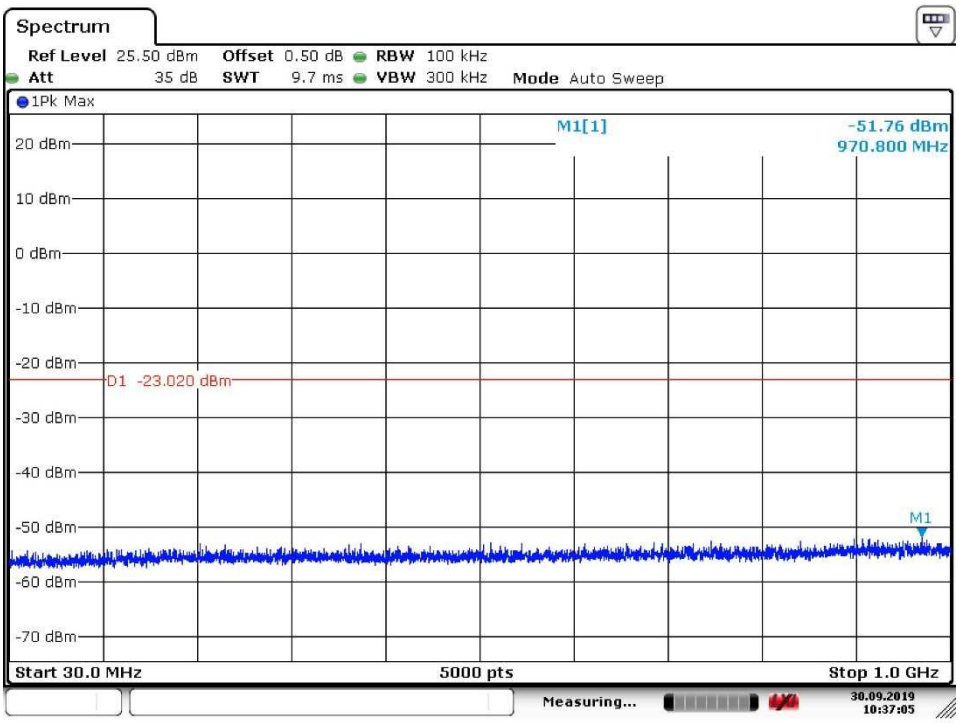

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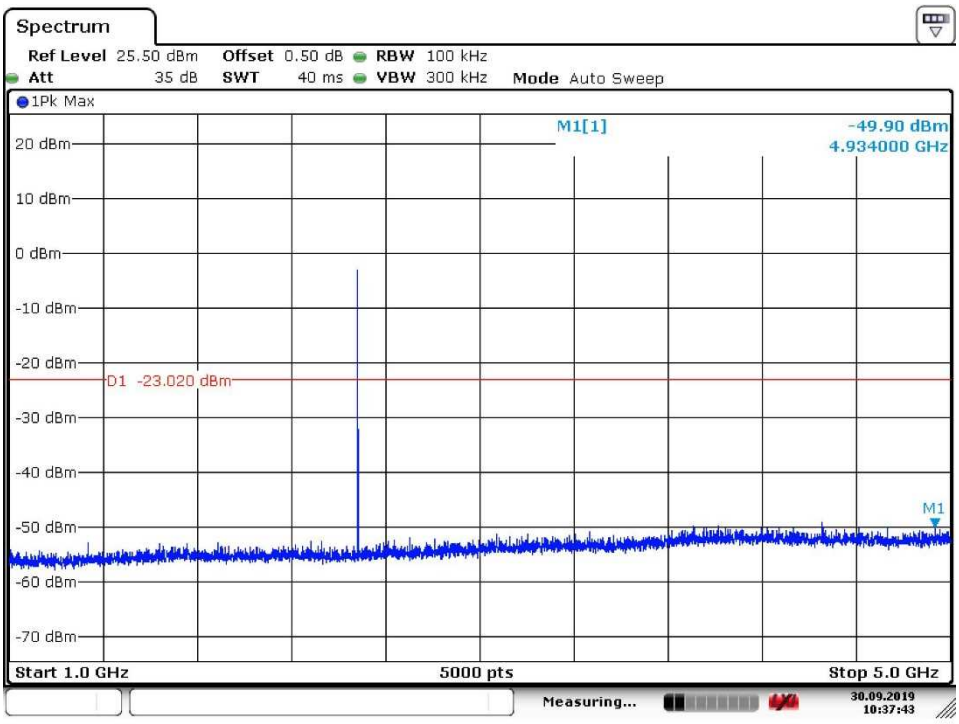

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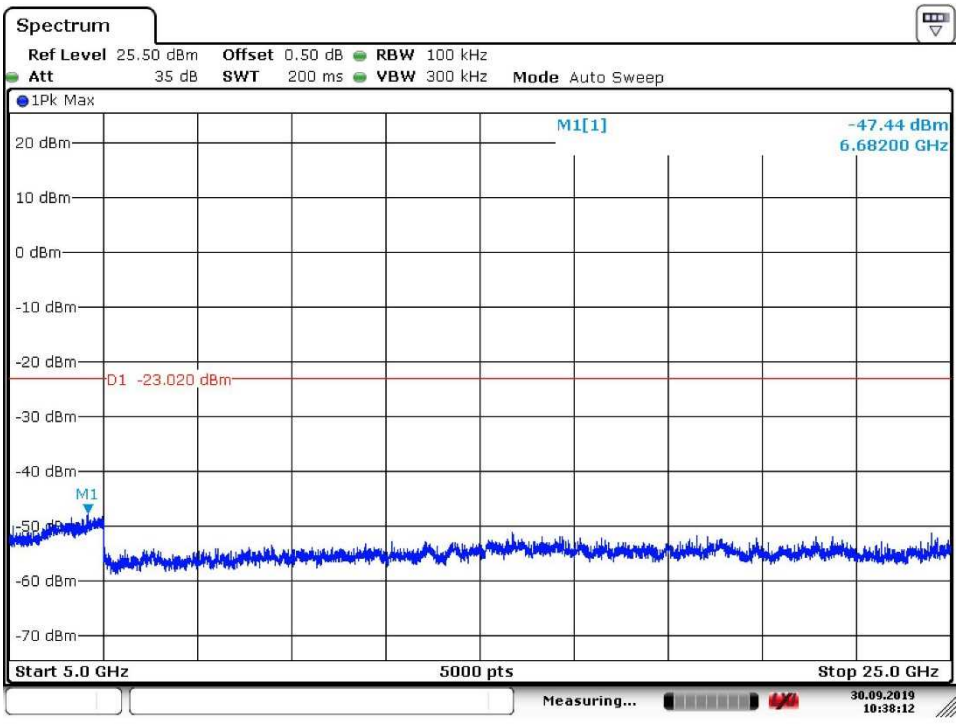

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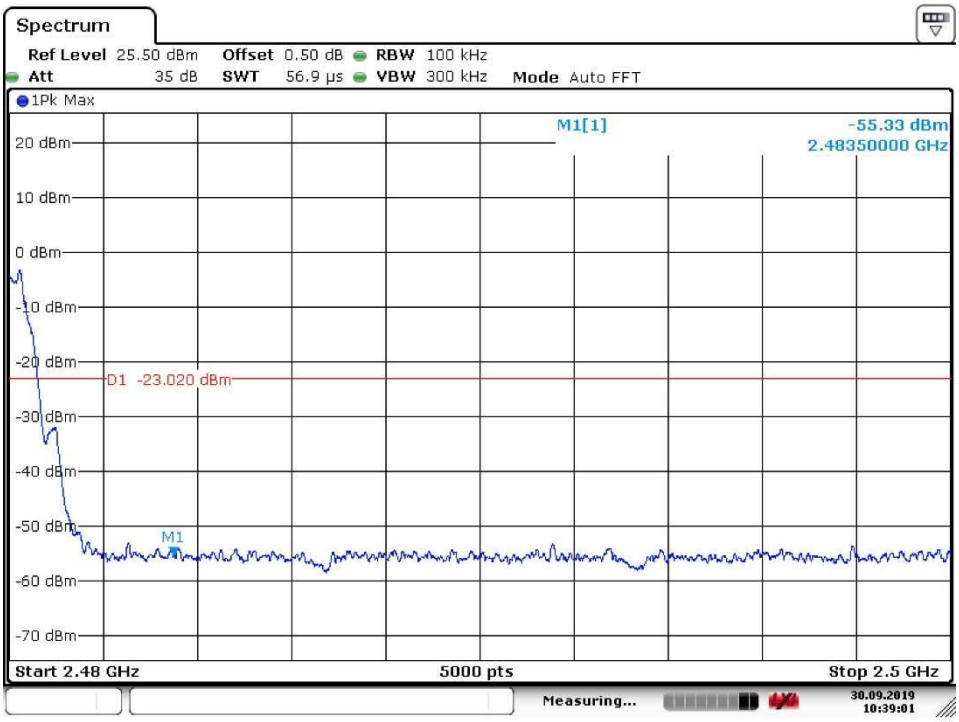

Date: 30.SEP.2019 10:39:01

China

9.5 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 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 to 120 kHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions 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, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
1) If power averaging (rms) mode was used in the preceding step e), then the correction

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factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

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	Measured Distance Meters
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30	30	30

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.

Test results for model ZS11E, ZS11MCE3 are listed in the report.

ZS11E Transmitting spurious emission test result as below:

BLE Mode 2402MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
2390	35.28	H	74	PK	38.72	Pass
4804	40.41	H	74	PK	33.59	Pass
2368.8	38.16	V	74	PK	35.84	Pass
4804	38.01	V	74	PK	35.99	Pass

BLE Mode 2440MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
4882	38.81	H	74	PK	35.19	Pass
4882	39.78	V	74	PK	34.22	Pass

BLE Mode 2480MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
2483.5	43.62	H	74	PK	30.38	Pass
4960	40.49	H	74	PK	33.51	Pass
2483.6	45.26	V	74	PK	28.74	Pass
4960	39.63	V	74	PK	34.37	Pass

Remark:

(1) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
Emission Level =Reading level +Correction Factor

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

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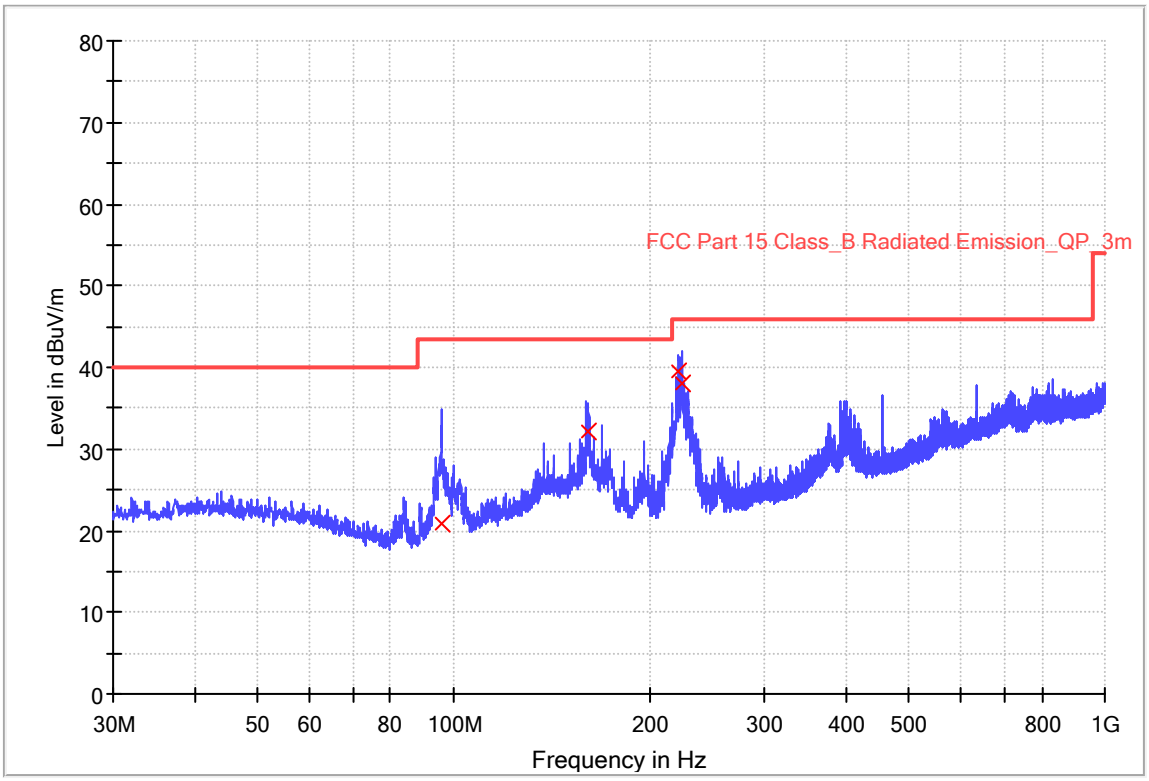
The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2019/09/28 - 17:21
Limit: FCC_Part15.109_RE(3m)_ClassB	Engineer: Wenqiang LU
Probe: VULB9168	Polarity: Horizontal
EUT: ISMART1.0, Model no: ZS11E	Power: 12VDC
Note: There is the worst case within frequency range 30MHz~1GHz.	

RE_VULB9168_pre_Cont_EN 55014_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
95.960000	20.8	1000.0	120.000	100.0	H	1.0	11.0	22.7	43.5
161.240000	32.1	1000.0	120.000	100.0	H	358.0	15.5	11.4	43.5
221.920000	39.5	1000.0	120.000	100.0	H	1.0	12.6	6.5	46.0
224.320000	37.9	1000.0	120.000	100.0	H	359.0	12.7	8.1	46.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

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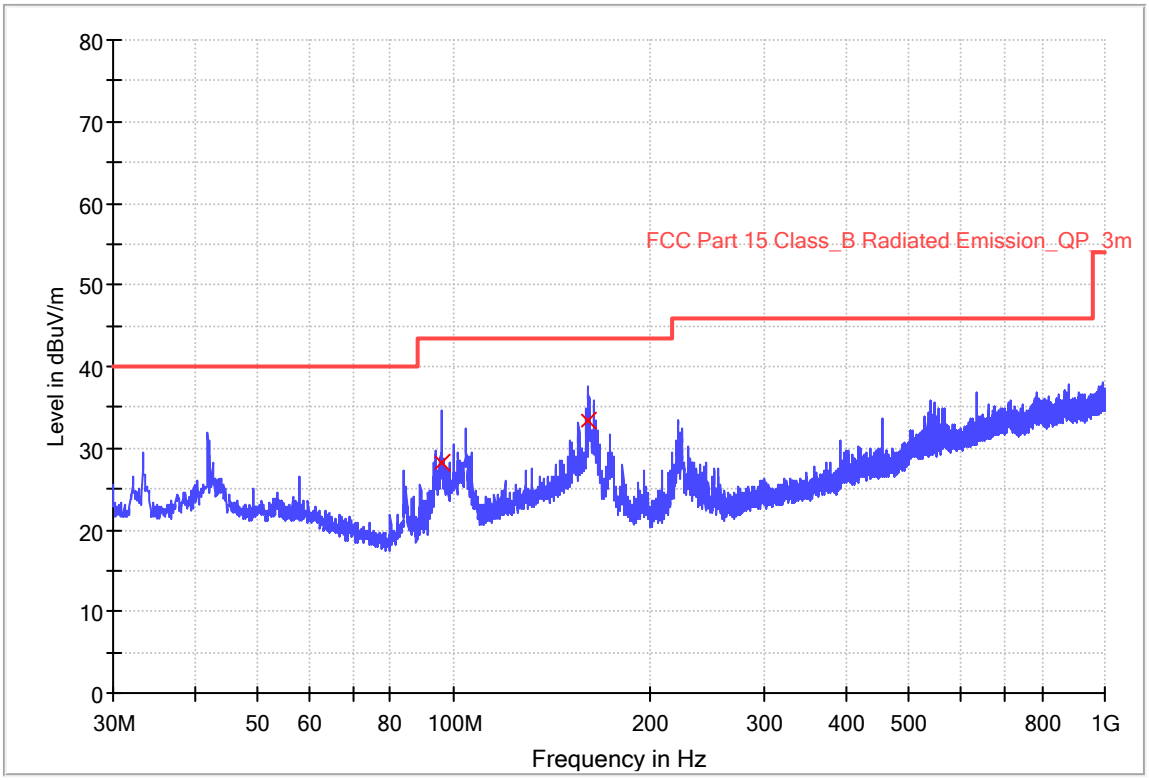
The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2019/09/28 - 17:40
Limit: FCC_Part15.109_RE(3m)_ClassB	Engineer: Wenqiang LU
Probe: VULB9168	Polarity: Vertical
EUT: ISMART1.0, Model no: ZS11E	Power: 12VDC
Note: There is the worst case within frequency range 30MHz~1GHz.	

RE_VULB9168_pre_Cont_EN 55014_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
95.920000	28.1	1000.0	120.000	100.1	V	358.0	11.0	15.4	43.5
161.160000	33.3	1000.0	120.000	100.1	V	1.0	15.6	10.2	43.5

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

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ZS11MCE3 Transmitting spurious emission test result as below:

BLE Mode 2402MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBμV/m		dBuV/m	
2390	34.26	H	74	PK	39.74	Pass
4804	38.69	H	74	PK	35.31	Pass
2390	34.87	V	74	PK	39.13	Pass
4804	40.32	V	74	PK	33.68	Pass

BLE Mode 2441MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBμV/m		dBuV/m	
4882	39.49	H	74	PK	34.51	Pass
4882	37.89	V	74	PK	36.11	Pass

BLE Mode 2480MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBμV/m		dBuV/m	
2483.5	46.42	H	74	PK	27.58	Pass
4960	40.08	H	74	PK	33.92	Pass
2483.6	44.83	V	74	PK	29.17	Pass
4960	38.75	V	74	PK	35.25	Pass

Remark:

(1) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Pre-amplifier
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
Emission Level =Reading level +Correction Factor
(The Reading Level is recorded by software which is not shown in the sheet)

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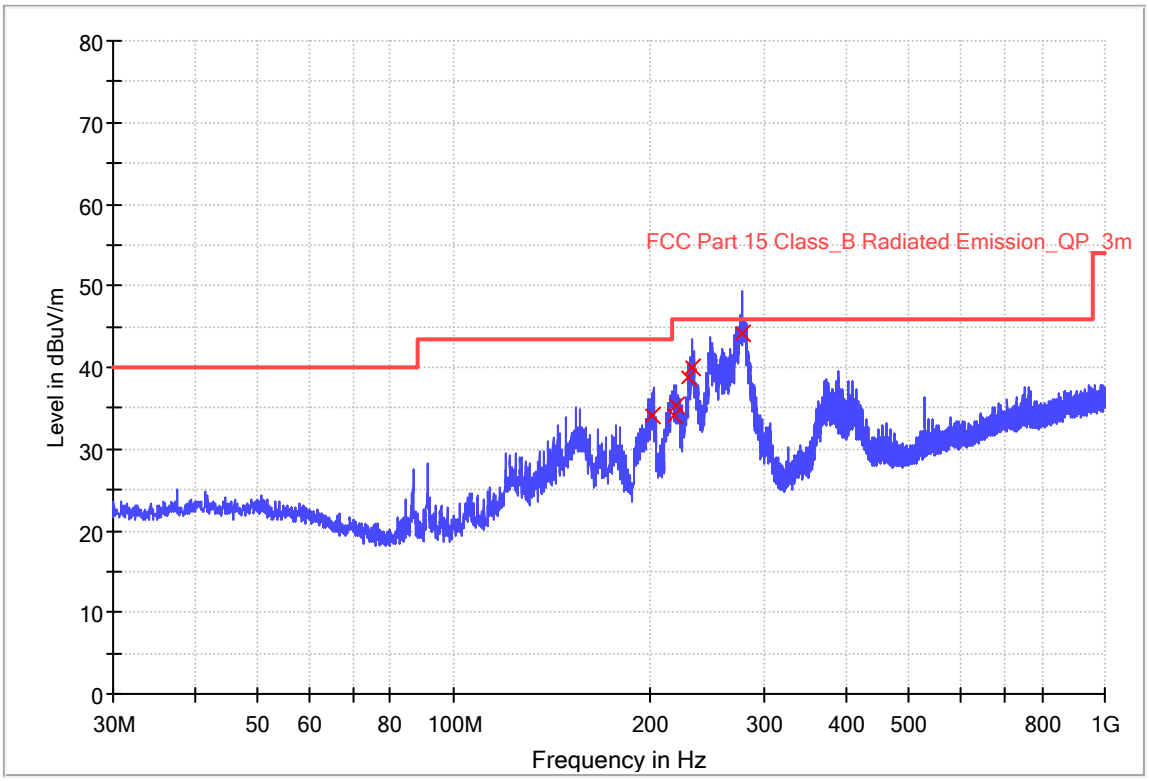
The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2019/09/28 - 17:21
Limit: FCC_Part15.109_RE(3m)_ClassB	Engineer: Wenqiang LU
Probe: VULB9168	Polarity: Horizontal
EUT: ISMART1.0, Model no: ZS11MCE3	Power: 12VDC
Note: There is the worst case within frequency range 30MHz~1GHz.	

RE_VULB9168_pre_Cont_EN 55014_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
202.400000	34.0	1000.0	120.000	100.0	H	6.0	11.7	9.5	43.5
217.640000	34.2	1000.0	120.000	100.0	H	359.0	12.4	11.9	46.0
220.200000	35.2	1000.0	120.000	100.0	H	1.0	12.5	10.8	46.0
229.800000	38.7	1000.0	120.000	100.0	H	2.0	12.9	7.3	46.0
232.200000	39.9	1000.0	120.000	100.0	H	358.0	13.0	6.1	46.0
277.720000	44.2	1000.0	120.000	100.0	H	358.0	14.4	1.8	46.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

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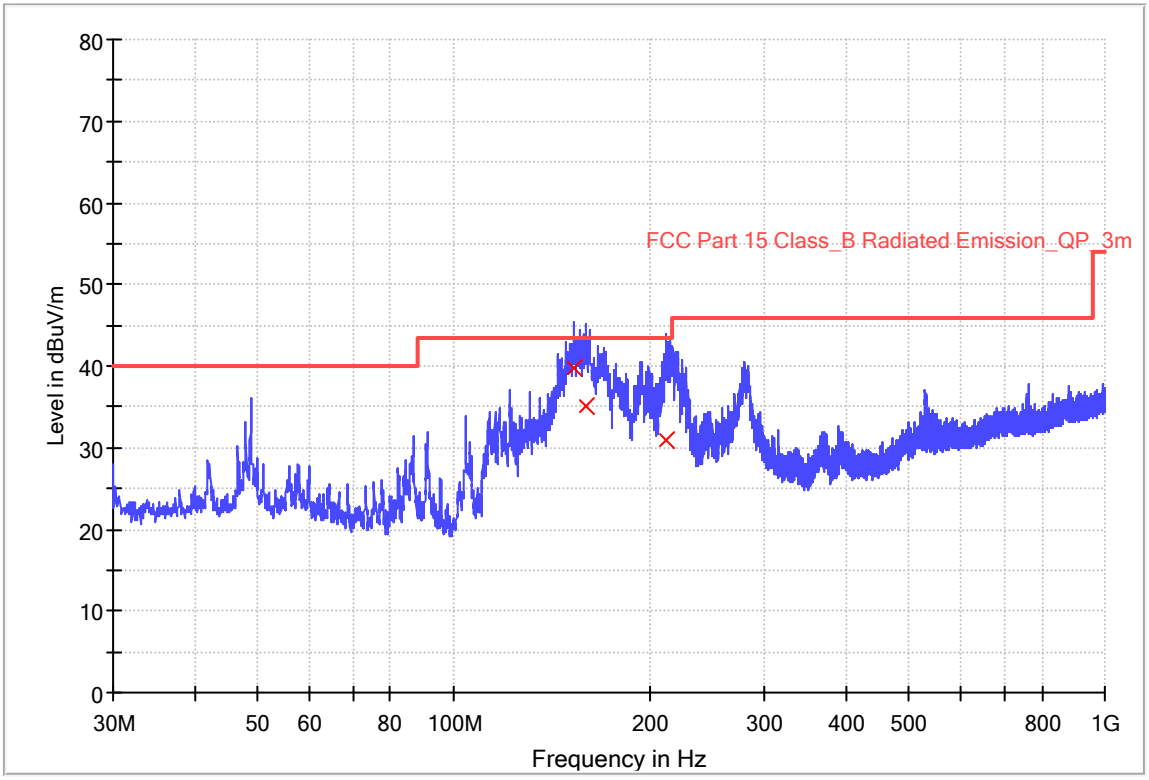
The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2019/09/28 - 17:40
Limit: FCC_Part15.109_RE(3m)_ClassB	Engineer: Wenqiang LU
Probe: VULB9168	Polarity: Vertical
EUT: ISMART1.0, Model no: ZS11MCE3	Power: 12VDC
Note: There is the worst case within frequency range 30MHz~1GHz.	

RE_VULB9168_pre_Cont_EN 55014_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
153.320000	39.8	1000.0	120.000	100.0	V	255.0	15.7	3.7	43.5
159.960000	35.2	1000.0	120.000	100.0	V	1.0	15.7	8.3	43.5
212.120000	30.9	1000.0	120.000	100.0	V	358.0	12.2	12.6	43.5

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

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10 Test Equipment List

List of Test Instruments

Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2020-8-4
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2020-8-4
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2020-8-4
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2022-3-15
	Horn Antenna	Rohde & Schwarz	HF907	102393	2021-4-1
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2020-8-4
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2020-6-27
	DOUBLE-RIDGED WAVEGUIDE HORN WITH PRE-AMPLIFIER (18 GHZ - 40 GHZ)	ETS-Lindgren	3116C-PA	E326	2021-1-28
	3m Semi-anechoic chamber	TDK	9X6X6	----	2021-5-10
CE	EMI Test Receiver	Rohde & Schwarz	ESR3	101907	2020-8-4
	LISN	Rohde & Schwarz	ENV216	101924	2020-8-4

Measurement Software Information			
Test Item	Software	Manufacturer	Version
RE	EMC 32	Rohde & Schwarz	V9.15.00
CE	EMC 32	Rohde & Schwarz	V9.15.03

C - Conducted RF tests

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

China

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:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, ±3.16dB
Radiated Disturbance	30MHz to 1GHz, ±5.03dB (Horizontal) ±5.12dB (Vertical) 1GHz to 18GHz, ±5.15dB (Horizontal) ±5.12dB (Vertical) 18GHz to 25GHz, ±4.76dB

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12 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

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13 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

THE END

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